CITY OF OREGON CITY
PLANNING COMMISSION
AGENDA

Commission Chambers, 625 Center Street, Oregon City
Monday, July 13, 2020 at 7:00 PM

This meeting will be held online via Zoom; please contact planning@orcity.org for the meeting link.

CALL TO ORDER

PUBLIC COMMENT

Citizens are allowed up to 3 minutes to present information relevant to the City but not listed as an item on the agenda. Prior to speaking, citizens shall complete a comment form and deliver it to the City Recorder. The Citizen Involvement Committee does not generally engage in dialog with those making comments but may refer the issue to the City Manager. Complaints shall first be addressed at the department level prior to addressing the Citizen Involvement Committee.

PUBLIC HEARING

1. GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001: I-205 Widening and Abernethy Bridge Seismic Upgrades

COMMUNICATIONS

2. Support for Diversity, Equity, and Inclusion

ADJOURNMENT

PUBLIC COMMENT GUIDELINES

Citizens are allowed up to 3 minutes to present information relevant to the City but not listed as an item on the agenda. Prior to speaking, citizens shall complete a comment form and deliver it to the Staff Member. When the Chair calls your name, proceed to the speaker table and state your name and city of residence into the microphone. To assist in tracking your speaking time, refer to the timer on the table.

As a general practice, the Planning Commission does not engage in discussion with those making comments.

Electronic presentations are permitted but shall be delivered to the City Recorder 48 hours in advance of the meeting.

ADA NOTICE

The location is ADA accessible. Hearing devices may be requested from the City Staff Member prior to the meeting. Individuals requiring other assistance must make their request known 48 hours preceding the meeting by contacting the City Recorder's Office at 503 657 0891

Agenda Posted at City Hall, Pioneer Community Center, Library, City Web site.

Video Streaming & Broadcasts: The meeting is streamed live on Internet on the Oregon City's Web site at www.orcity.org and available on demand following the meeting. The meeting can be viewed live on Willamette Falls Television on channel 28 for Oregon City area residents. The meetings are also rebroadcast on WFMC. Please contact WFMC at 503 650 0275 for a programming schedule

625 Center Street
Oregon City, OR 97045
503-657-0891

CITY OF OREGON CITY

Staff Report

To:	Planning Commission	**Agenda Date:**	07/13/2020
From:	Assistant Planner Diliana Vassileva		

SUBJECT:

GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001: I-205 Widening and Abernethy Bridge Seismic Upgrades

STAFF RECOMMENDATION:

Staff recommends approval of Planning Files GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001 with conditions.

EXECUTIVE SUMMARY:

I-205 widening and Abernethy Bridge seismic upgrades, including review of a variance to maximum height for the bridge supports, Floodplain review and Willamette River Greenway review due to the project's proximity to the Willamette River, Natural Resource Overlay District (NROD) Review for disturbance to the NROD and relocation of Abernethy Creek, and Site Plan and Design Review for new parking within Jon Storm Park.

BACKGROUND:

Though the overall project includes multiple components, this land use review is for the work on private property (Sportcraft Landing and Jon Storm Park), as well as impacts to the Natural Resource Overlay District, Floodplain, and Willamette River Greenway. Work in the right-of-way is not subject to site plan and design review and is not being reviewed under this land use application, except those locations in the right-of-way which are also within an overlay district.

The applicant's narrative provides an overview on the overall project as well as more details on the work taking place within Oregon City:

> *The I-205: Stafford Road to OR 213 Corridor Road Widening and Retrofit of the Abernethy Bridge (Project) consists of a 7-mile widening of I-205 in each direction and a widening and seismic upgrade of Abernethy Bridge over the Willamette River. The Project adds a third general purpose travel lane on I-205 in each direction and a new northbound auxiliary lane*

between OR 99E and OR 213 interchanges. To conform to the new I-205 widths, the Project requires modification of the OR 43 and OR 99E interchange ramps. In addition to Abernethy Bridge, the Project will include the widening and seismic upgrade of five other I-205 bridge sites in the Project area, replacing eight bridges, and completely removing one bridge.

The project elements listed below and described in greater detail in following paragraphs will occur within the limits of the City of Oregon City:

- *Adding a third general purpose lane northbound and southbound on Abernethy Bridge and upgrading the bridge to meet current seismic design standards.*
- *Connecting the OR 99E Interchange ramps with the widened Abernethy Bridge.*
- *Constructing a 1,500-foot-long northbound auxiliary lane that connects the OR 99E Interchange northbound entrance ramp to the OR 213 Interchange northbound exit ramp.*
- *Widening the I-205 Bridge over Main Street and upgrading it to meet current seismic design standards.*
- *Constructing a retaining wall between OR 99E Interchange northbound entrance ramp and Main Street to eliminate impacts to Main Street and avoid right-of-way acquisition.*
- *Diverting Abernethy Creek.*
- *Constructing on-street parking at Jon Storm Park, partially within ODOT right-of-way and partially on City of Oregon City property.*

Staff recommends approval of Planning Files GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001 with conditions.

OREGON CITY

Community Development – Planning

695 Warner Parrott Road | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

TYPE III STAFF REPORT AND RECOMMENDATION

July 13, 2020

FILE NUMBER: GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001

APPLICANT: ODOT
Tova Peltz
123 NW Flanders Street
Portland, OR 97209

REPRESENTATIVE: HDR
Brian Bauman
1050 SW 6th Avenue
Portland, OR 97204

OWNER: City of Oregon City
PO Box 3040
Oregon City, OR 97045

ODOT
123 NW Flanders Street
Portland, OR 97209

REQUEST: I-205 widening and Abernethy Bridge seismic upgrades, including a variance to maximum height requirements for the bridge supports, floodplain review and Willamette River Greenway review due to the project's proximity to the Willamette River, Natural Resource Overlay District (NROD) review for disturbance within the NROD and relocation of Abernethy Creek and Site Plan and Design Review for new parking within Jon Storm Park.

LOCATION: Public right-of-way on Clackamas County Map 2-2E-29 and 2-2E-30DD
1801 Clackamette Drive, Oregon City, OR 97045
Clackamas County Map 2-2E-29CB, Tax Lots 300 and 500

REVIEWER: Diliana Vassileva, Assistant Planner
Sang Pau, Development Engineer

DECISION: Approval with Conditions.

PROCESS: Type III decisions involve the greatest amount of discretion and evaluation of subjective approval standards, yet are not required to be heard by the city commission, except upon appeal.

Applications evaluated through this process include conditional use permits. The process for these land use decisions is controlled by ORS 197.763. Notice of the application and the planning commission hearing is published and mailed to the applicant, recognized neighborhood association and property owners within three hundred feet of the subject property. Notice must be issued at least twenty days pre-hearing, and the staff report must be available at least seven days pre-hearing. At the evidentiary hearing held before the planning commission, all issues are addressed. The decision is final unless appealed and description of the requirements for perfecting an appeal. The decision of the planning commission is appealable to the city commission within fourteen days of the issuance of the final decision. The city commission hearing on appeal is on the record and no new evidence shall be allowed. Only those persons or a city-recognized neighborhood association who have participated either orally or in writing have standing to appeal the decision of the planning commission. Grounds for appeal are limited to those issues raised either orally or in writing before the close of the public record. A city-recognized neighborhood association requesting an appeal fee waiver pursuant to OCMC 17.50.290.C must officially approve the request through a vote of its general membership or board at a duly announced meeting prior to the filing of an appeal. The city commission decision on appeal from the planning commission is the city's final decision and is appealable to the Land Use Board of Appeals (LUBA) within twenty-one days of when it becomes final.

Conditions of Approval
Planning File GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001

(P) = Verify that condition of approval has been met with the Planning Division.
(DS) = Verify that condition of approval has been met with the Development Services Division.
(B) = Verify that condition of approval has been met with the Building Division.
(F) = Verify that condition of approval has been met with Clackamas Fire Department.

The following conditions of approval shall be met to the satisfaction of the City during the process of design to issuance of public improvement or building permits and construction associated with the proposed land use application unless otherwise noted.

1. The development shall comply with all current Oregon City Public Works design standards, specifications, codes, and policies prior to receiving a permit and beginning construction. (DS)
2. The applicant shall submit or address all items in section 16.12.014 of the Oregon City Municipal Code based on the timing requirements contained therein and as deemed applicable by the City. (DS)
3. The developer and engineer for the project shall execute a “Developer/Engineer Agreement for Public Works Improvements” and commit to the responsibilities outlined in the agreement prior to receiving a permit for construction. (DS)
4. The development shall provide construction plans, stamped and signed by a professional engineer licensed in the State of Oregon, containing street, grading, stormwater, sanitary sewer and water infrastructure improvements that conforms to all current Oregon City Public Works standards, specifications, codes, and policies for review and approval by the City prior to receiving a permit for construction. (DS)
5. The development’s contractor(s) and engineer(s) shall attend a pre-construction meeting with Oregon City staff prior to beginning all construction work (public and private) associated with the development. (DS)

6. The improvements proposed on the north side of Clackamette Drive shall consist of an 8-foot-wide parking lane, curb, 5-foot-wide landscape strip and 5-foot-wide sidewalk. An approved design shall be included on engineering plans prior to receiving a permit and beginning construction. (DS)
7. The development shall adjust the alignment of the sidewalk and size of the landscape strip proposed along at Clackamette Drive to avoid conflicting with existing utilities. An approved design shall be included on engineering plans prior to receiving a permit and beginning construction. (DS)
8. The pedestrian/bicycle path on the east side of Clackamette Drive shall have a minimum four-foot planter strip on either side. An approved design shall be included on engineering plans prior to receiving a permit and beginning construction. (DS)
9. Portions of the pedestrian/bicycle path along Clackamette Drive proposed for realignment shall comply with Americans with Disabilities Act (ADA). (DS)
10. The pedestrian/bicycle surfaces shall be paved with all-weather materials as approved by the City and designed to drain stormwater runoff to the side or sides of the accessway. (DS)
11. The proposed retaining wall adjacent Main Street shall be located outside of Oregon City right-of-way (within ODOT ROW). (DS)
12. **Error! Reference source not found.** All detour routes utilizing city streets shall be approved by Oregon City. (DS)
13. Permitted hours of construction shall be set forth by the City Engineer in the pre-construction meeting. (DS)
14. The engineering plans shall provide a local benchmark, onsite, using the NAVD88 datum. (DS)
15. The developer shall provide updated engineered drainage plan(s), drainage report(s), and design flow calculation report(s) stamped and signed by a licensed engineer addressing all items from the Section 9.3 & 9.4 of the Public Works Stormwater and Grading Design Standards prior to receiving a permit and beginning construction. (DS)
16. Erosion and sediment control plans shall be submitted for review and approval by the City prior to issuance of an erosion and sediment control permit. (DS)
17. A city issued erosion and sediment control permit shall be obtained prior to commencement of any earth disturbing activities. (DS)
18. The developer shall obtain a 1200-C (NPDES) permit from Oregon Department of Environmental Quality (DEQ) for construction activities one acre or greater prior to receiving a permit and beginning construction. (DS)
19. For construction activities requiring Oregon State Department of Fish and Wildlife (ODFW) permits, no work will be authorized until the city has received a copy of the ODFW permit. (DS)
20. A Performance Guarantee which is equal to 120% of the estimated cost for construction of public improvements as shown in city approved construction plans shall be provided. The estimated costs shall be supported by a verified engineering estimate and approved by the city engineer. The guarantee shall be in a form identified in Code 17.50.140.A of the Oregon City Municipal Code. The guarantee shall remain in effect until the construction of all required improvements are completed and accepted by the city. (DS)
21. Prior to conducting any tree removal associated with the project, the applicant shall submit a finalized street tree plan demonstrating compliance with tree size, species, and placement requirements in OCMC 12.08 prior to issuance of a permit associated with the proposed project. (P)
22. Prior to conducting any tree removal associated with the project, the applicant shall submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41 and does not include trees located within the NROD which must be mitigated in accordance with OCMC 17.49. The applicant may use any of the mitigation options within Chapter 17.41. (P)

23. Prior to conducting any tree removal associated with the project, the applicant shall submit a plan for tree protection during construction which demonstrates compliance with standards for tree protection during construction in OCMC 17.41.130 for trees impacted by construction. (P)
24. Prior to any work associated with the relocation of Abernethy Creek, the applicant shall provide documentation to the City which demonstrates compliance with the noticing requirements for alterations of watercourses in OCMC 17.42.120. (P)
25. The applicant shall submit documentation demonstrating that any proposed temporary or permanent exterior lighting will be placed or shielded so that it does not shine directly into resource areas. (P)
26. The applicant shall submit documentation recalculating the NROD disturbance area and submit a revised mitigation plan utilizing mitigation option 1 or 2, which demonstrates that mitigation will occur at a 2:1 ratio of mitigation area to proposed NROD disturbance area. If necessary, the revised mitigation plan may exceed plant spacing as recommended by a qualified professional. Because there is limited opportunity for mitigation onsite and as close to the disturbance associated with the right-of-way disturbance, the applicant may also provide mitigation on the Abernethy Creek tributary or elsewhere as close to the impact area as possible within the NROD. The applicant may also provide mitigation areas contiguous to the existing NROD area so the NROD boundary can easily be extended in the future to include the new resource site. (P)
27. Prior to completion of the project, the applicant shall record an easement for mitigation areas within Sportcraft Landing and Jon Storm Park and provide the City with a copy of the easement document prior to completion of the project. (P)
28. The applicant shall submit a revised mitigation plan which includes removal of all invasive and nuisance vegetation within all mitigation areas. (P)
29. Prior to completion of the project, he applicant shall provide a financial guarantee for NROD mitigation plantings in accordance with the standards in OCMC 17.49.180.I. (P)
30. Prior to issuance of a building permit associated with the parking lot, the applicant shall submit a revised parking plan complying with the parallel parking dimensional standards in OCMC 17.52.020.B.4.(P)
31. Prior to issuance of a building permit associated with the parking lot, the applicant shall provide drawings or details of the proposed bicycle racks demonstrating compliance with bicycle parking design standards in OCMC 17.52.040.C.3. (P)
32. The applicant shall submit a revised landscaping plan prepared by a registered landscape architect which identifies that within three years of planting, landscaping will cover one hundred percent of the landscaped area. (P)
33. The applicant shall pay the actual City NROD consultant review fees for review of the project. (P)

<u>The following conditions of approval shall be met to the satisfaction of the City during construction.</u>

34. The workmanship and materials for any work performed under permits issued by Oregon City Public Works shall be in accordance with the edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city. (DS)
35. Pavement cuts or improvements on any public street or alley in the City shall adhere to the City of Oregon City Public Works Pavement Cut Standards. (DS)
36. Improvements shall be constructed under the inspection and approval of the City. Expenses incurred thereby shall be borne by the applicant and paid prior to final approval. The applicant's project engineer also shall inspect construction. A certificate of completion is required prior to providing a punchlist for the contractor. The punchlist must be completed prior to final acceptance by the city. (DS)

37. The public improvements shall be constructed according to approved final engineering plans prior to final acceptance by the city. (DS)

The following conditions of approval shall be met to the satisfaction of the City prior final acceptance of public improvements by the city unless otherwise noted.

38. The property owner shall execute an easement which allows Oregon City to access, operate and maintain city owned water, sanitary sewer and stormwater infrastructure within Oregon Department of Transportation right-of-way. The agreement shall include a site plan identifying all applicable city-owned facilities. The agreement shall run with the land and be applicable to subsequent property owners. The Easement shall be reviewed and accepted by the City prior to recording and the developer shall pay associated recording fees. (DS)
39. The property owner(s) shall execute an agreement providing access to and maintenance of privately-owned stormwater management facilities and pay associated recording fees. The agreement shall include a site plan identifying all stormwater management facilities and an operation and maintenance plan for each type of stormwater facility in accordance with the Public Works Stormwater and Grading Design Standards. The agreement shall run with the land and be applicable to subsequent property owners. The Maintenance Covenant and Access Easement shall be reviewed and accepted by the City prior to recording. (DS)
40. Maintenance Guarantee equal to fifteen percent of the estimated cost for construction of public improvements as shown in city approved construction plans shall be provided. The estimated costs shall be supported by a verified engineering estimate approved by the City Engineer. The guarantee shall be in a form identified in Code 17.50.140.A of the Oregon City Municipal Code. The maintenance guarantee shall warrant to the City of Oregon City that construction of public improvements will remain, for a period of twenty-four (24) months from the date of acceptance, free from defects in materials and workmanship. (DS)
41. As-built construction plans and digital copies of as-built drawings shall be filed with the City Engineer within 90 days of completing improvements. (DS)

I.BACKGROUND:

1. **Existing Conditions**

From the applicant's narrative:

Existing site conditions are primarily a built transportation environment with paved roadway, paved parking, sidewalks, and maintained vegetation on roadway embankments. There are no buildings on the site; however, there is a picnic shelter in Jon Storm Park and docks at Sportcraft Landing Park, some of which are covered with a roof. Surface water on the project site include the Willamette River at the western edge of the Project site and Abernethy Creek, which is in a culvert parallel to I-205 from the east side of Main Street to the west side of McLoughlin Boulevard. The ordinary high water lines for the Willamette River and Abernethy Creek occur within the Project site under the Abernethy Bridge and in the adjacent Jon Storm Park and Sportcraft Landing Park. There are two small isolated wetlands within the area along the south side of the I-205 corridor between Main Street and OR 213. Steep slopes occur along the banks of the Willamette River and Abernethy Creek.

Portions of the project site are also within the Natural Resource Overlay District, Willamette River Greenway, and 100-year Floodplain.

Figure 1. Vicinity Map - Entire Project Area

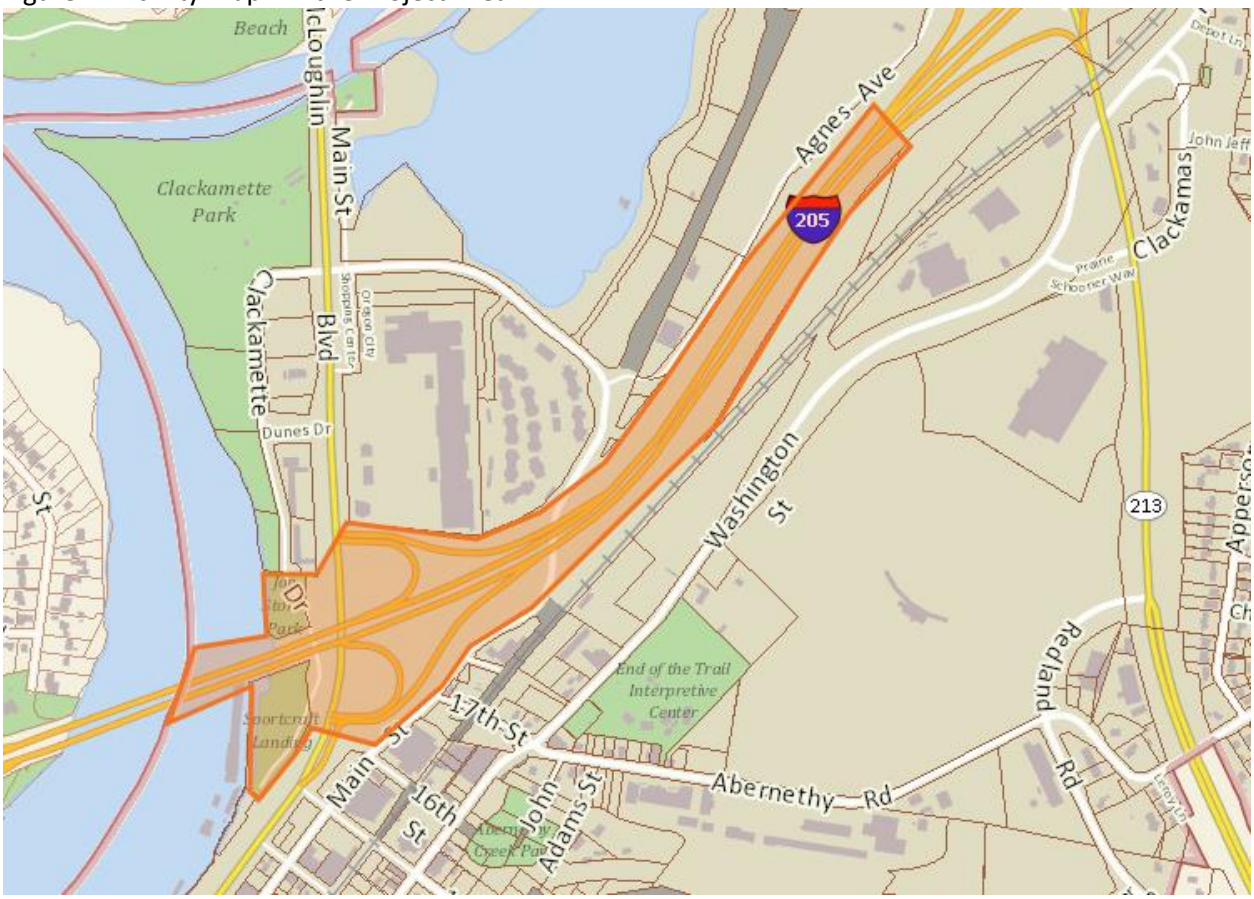


Figure 2: Existing Conditions – Aerial Image

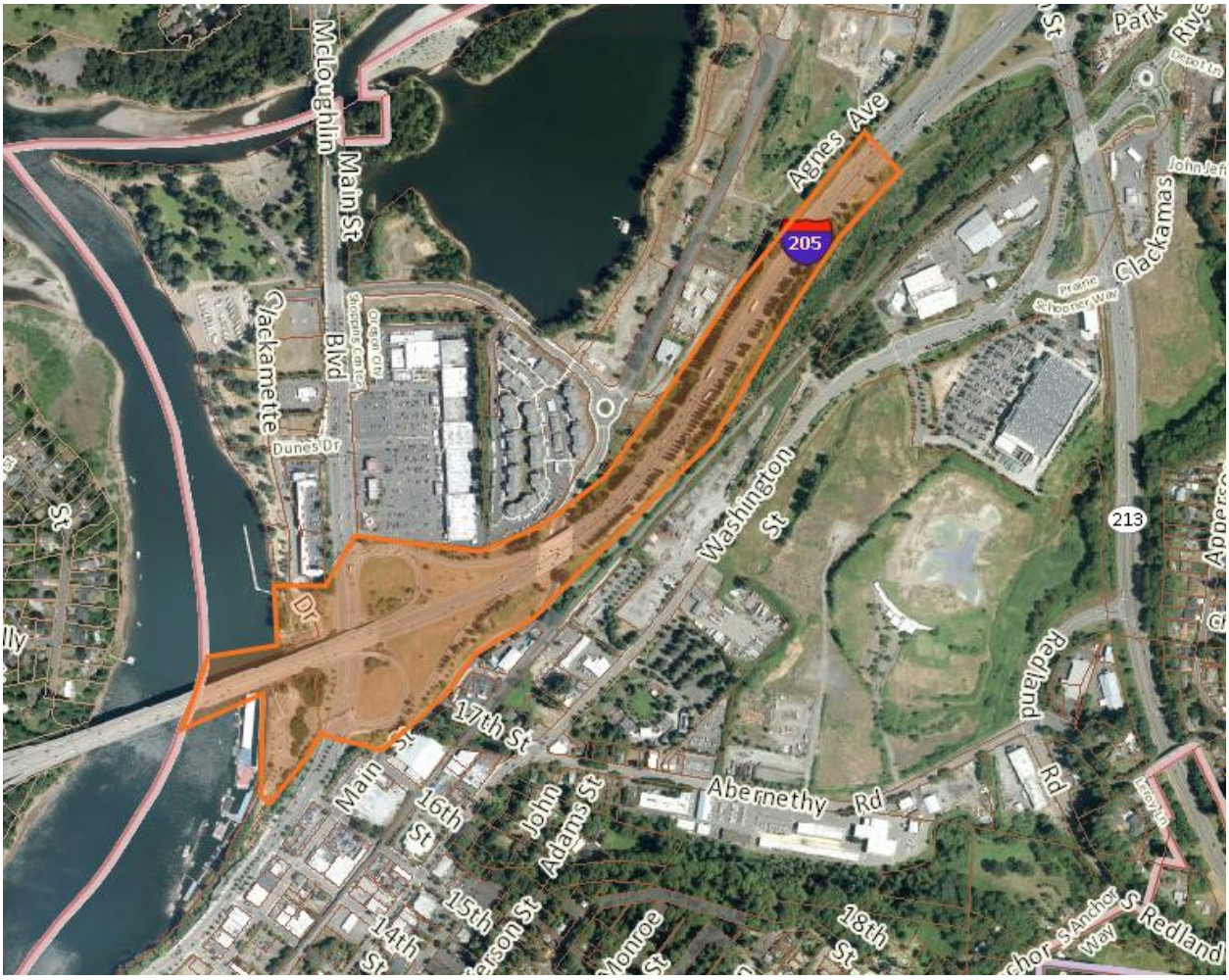


Figure 3: Project Area Natural Resource Overlay District

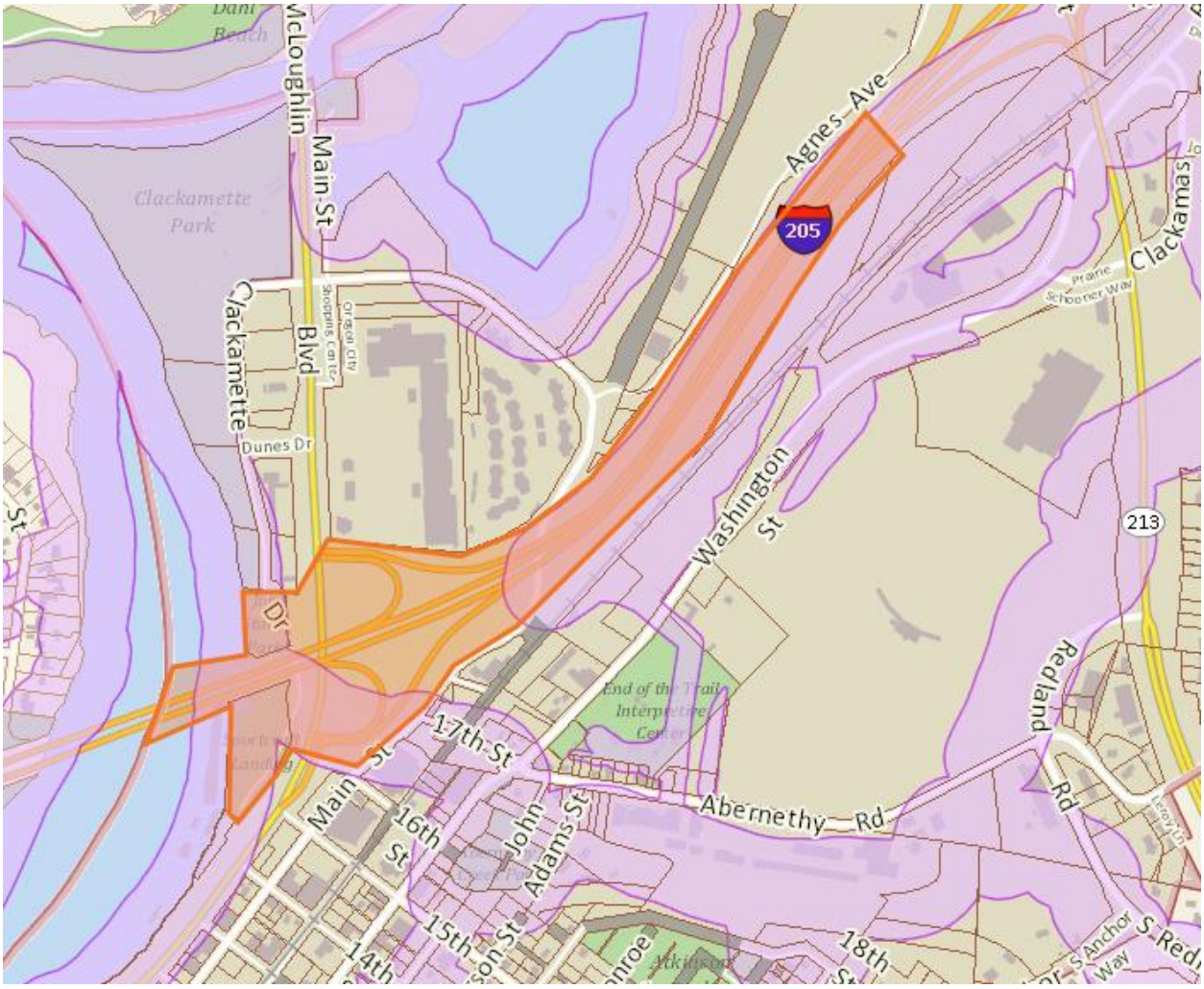


Figure 4: Project Area Willamette River Greenway

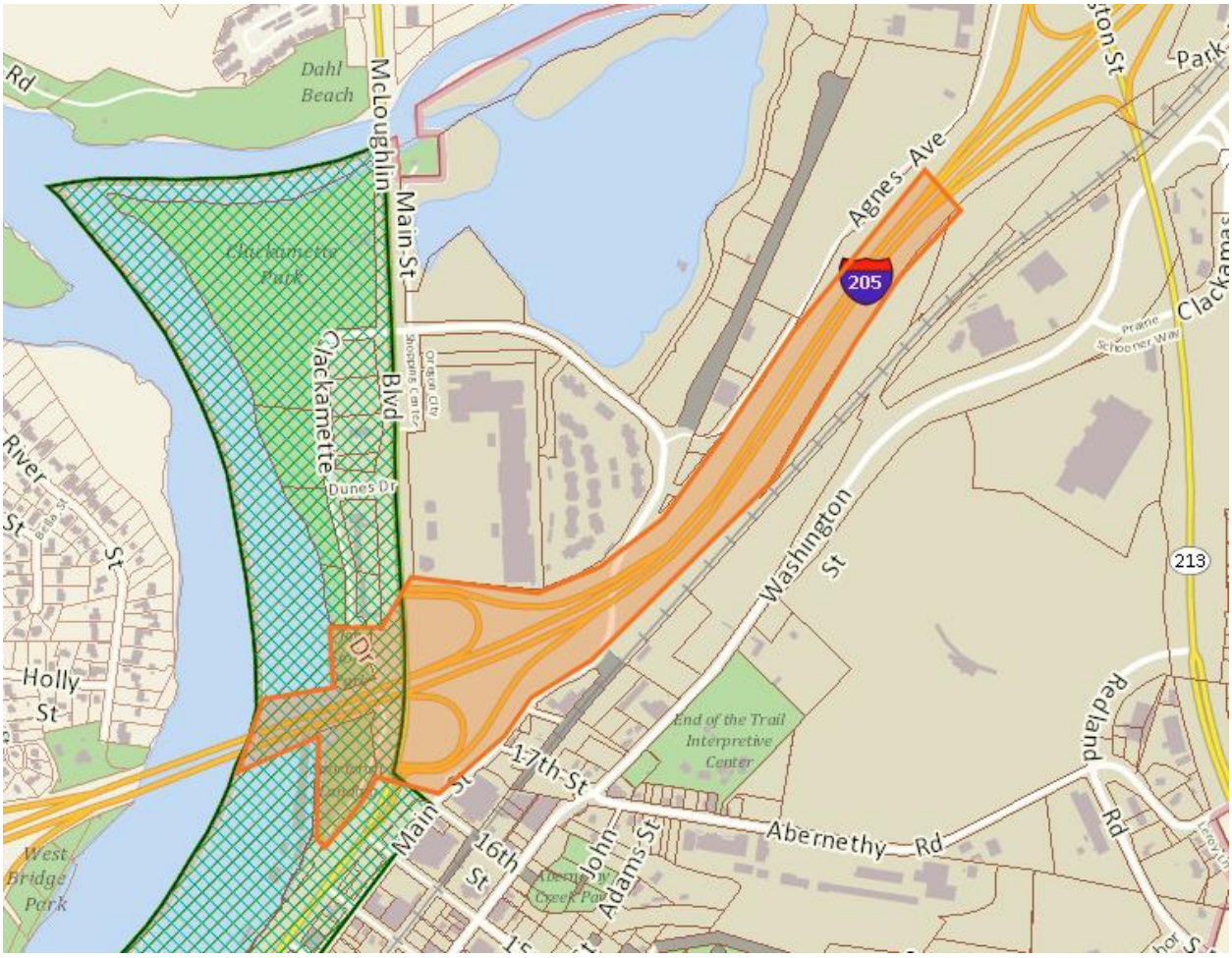
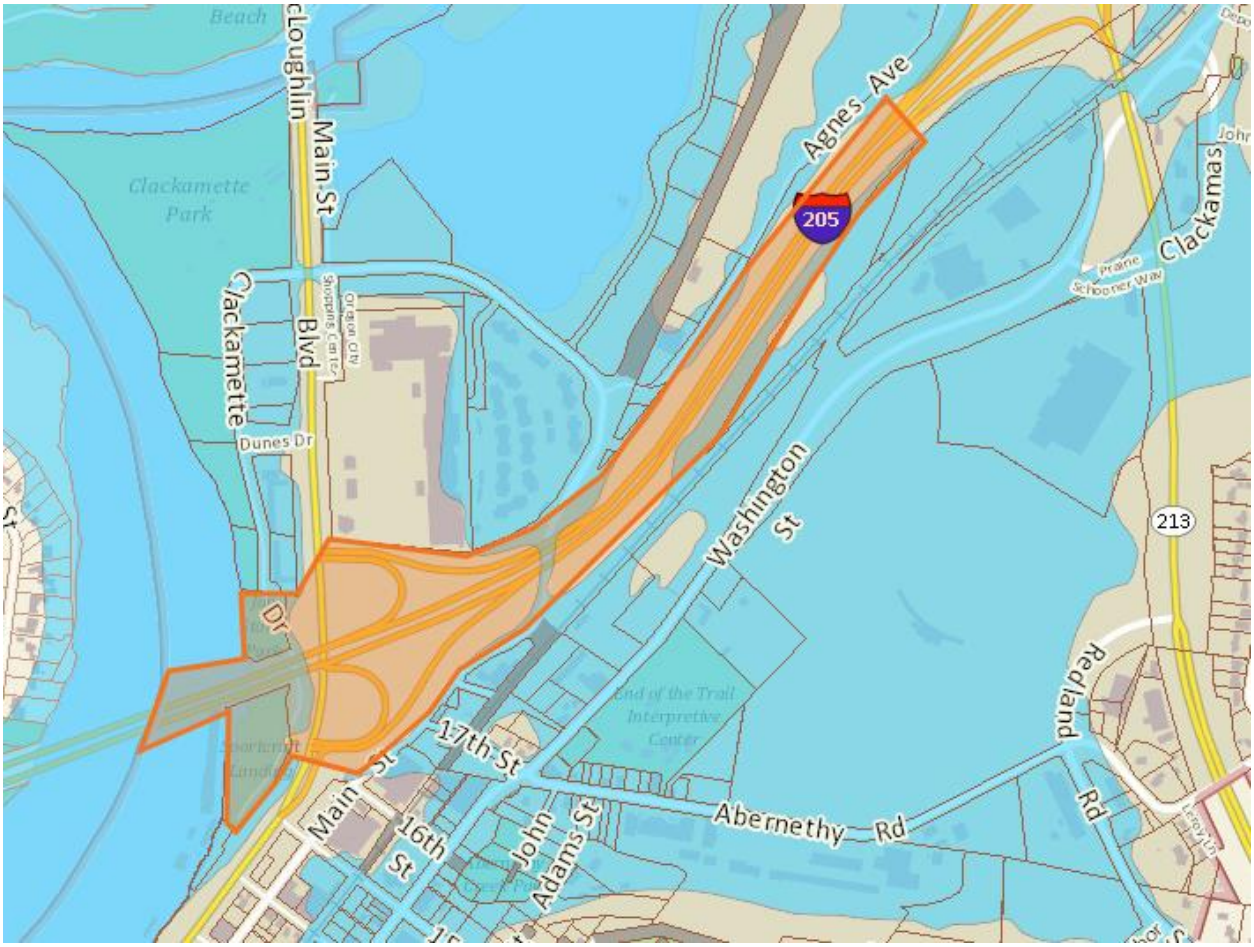


Figure 5: Project Area 100-Year Floodplain



2. Project Description

Though the overall project includes multiple components, this land use review is for the work on private property (Sportcraft Landing and Jon Storm Park), as well as impacts to the Natural Resource Overlay District, Floodplain, and Willamette River Greenway. Work in the right-of-way is not subject to site plan and design review and is not being reviewed under this land use application, except those locations in the right-of-way which are also within an overlay district.

From the applicant's narrative:

> *The I-205: Stafford Road to OR 213 Corridor Road Widening and Retrofit of the Abernethy Bridge (Project) consists of a 7-mile widening of I-205 in each direction and a widening and seismic upgrade of Abernethy Bridge over the Willamette River. The Project adds a third general purpose travel lane on I-205 in each direction and a new northbound auxiliary lane between OR 99E and OR 213 interchanges. To conform to the new I-205 widths, the Project requires modification of the OR 43 and OR 99E interchange ramps. In addition to Abernethy Bridge, the Project will include the widening and seismic upgrade of five other I-205 bridge sites in the Project area, replacing eight bridges, and completely removing one bridge.*
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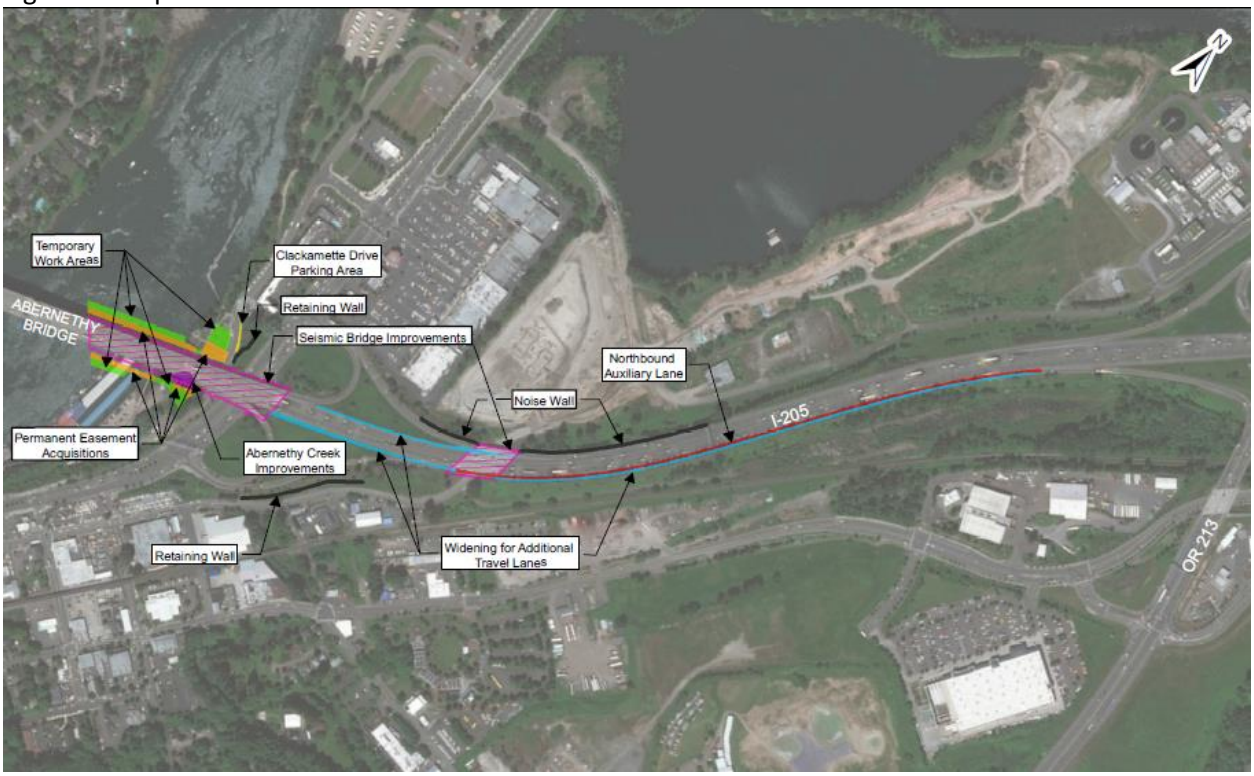
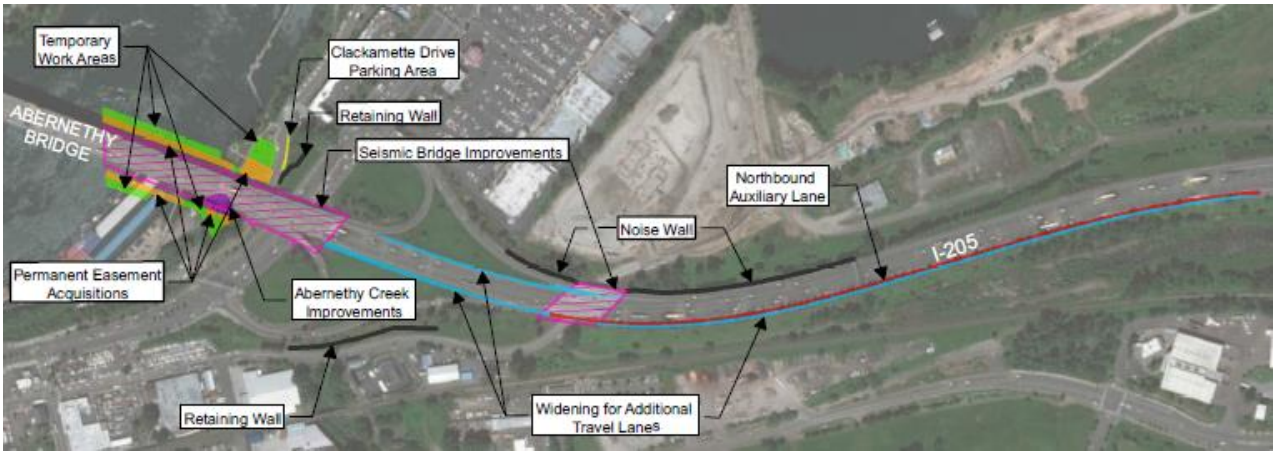
- *Diverting Abernethy Creek.*
- *Constructing on-street parking at Jon Storm Park, partially within ODOT right-of-way and partially on City of Oregon City property.*

Figure 6: Proposed Site Plan





1. **Permits and Approvals:** The applicant is responsible for obtaining approval and permits from each applicable governmental agency and department at Oregon City including but not limited to the Engineering and Building Divisions.

2. **Public Comment**
No comments have been received as of the writing of this staff report.

None of the comments provided indicate that an approval criterion has not been met or cannot be met through the Conditions of Approval in this staff report.

I. ANALYSIS AND FINDINGS:

Municipal Code Standards and Requirements: The following sections of the Oregon City Municipal Code are applicable to this land use approval:

CHAPTER 12.04 STREETS, SIDEWALKS, AND PUBLIC PLACES
CHAPTER 12.08 - PUBLIC AND STREET TREES
CHAPTER 13.12 STORMWATER MANAGEMENT
CHAPTER 15.48 - GRADING, FILLING AND EXCAVATING
CHAPTER 16.12 MINIMUM PUBLIC IMPROVEMENTS AND DESIGN STANDARDS FOR DEVELOPMENT
CHAPTER 17.34 MUD MIXED USE DOWNTOWN DISTRICT
CHAPTER 17.41 TREE PROTECTION, PRESERVATION, REMOVAL AND REPLANTING STANDARDS
CHAPTER 17.42 - FLOOD MANAGEMENT OVERLAY DISTRICT
CHAPTER 17.44 - US—GEOLOGIC HAZARDS
CHAPTER 17.47 – EROSION AND SEDIMENT CONTROL
CHAPTER 17.48 – WILAMETTE RIVER GREENWAY
CHAPTER 17.49 NATURAL RESOURCES OVERLAY DISTRICT
CHAPTER 17.50 ADMINISTRATION AND PROCEDURES
CHAPTER 17.52 OFF-STREET PARKING AND LOADING
CHAPTER 17.54 SUPPLEMENTAL ZONING REGULATIONS AND EXCEPTIONS
CHAPTER 17.60 VARIANCES
CHAPTER 17.62 SITE PLAN AND DESIGN REVIEW

CHAPTER 12.04 – STREETS SIDEWALKS AND PUBLIC SPACES

12.04.005 - Jurisdiction and management of the public rights-of-way.

A. The City has jurisdiction and exercises regulatory management over all public rights-of-way within the City under authority of the City Charter and state law by issuing separate public works right-of-way permits or permits as part of issued public infrastructure construction plans. No work in the public right-of-way shall be done without the proper permit. Some public rights-of-way within the city are regulated by the State of Oregon Department of Transportation (ODOT) or Clackamas County and as such, any work in these streets shall conform to their respective permitting requirements.

C. The City has jurisdiction and exercises regulatory management over each public right-of-way whether the City has a fee, easement, or other legal interest in the right-of-way. The City has jurisdiction and regulatory management of each right-of-way whether the legal interest in the right-of-way was obtained by grant, dedication, prescription, reservation, condemnation, annexation, foreclosure or other means.

D. No person may occupy or encroach on a public right-of-way without the permission of the City. The City grants permission to use rights-of-way by franchises, licenses and permits.

E. The exercise of jurisdiction and regulatory management of a public right-of-way by the City is not official acceptance of the right-of-way, and does not obligate the City to maintain or repair any part of the right-of-way.

Finding: Applicable. The City of Oregon City has jurisdiction over Main Street and Clackamette Drive. Other roads within the development property are under ODOT jurisdiction.

12.04.025 - Driveways.

Driveways shall be reviewed in accordance with OCMC 16.12.035. Driveway requirements may be modified through the procedures in OCMC 16.12.013.

Finding: Applicable. See 16.12.035 for more information.

12.04.030 - Maintenance and repair.

The owner of land abutting the street where a sidewalk has been constructed shall be responsible for maintaining said sidewalk and abutting curb, if any, in good repair.

Finding: Not Applicable. There are no sidewalks along the frontage of the development requiring repair.

12.04.032 - Required sidewalk repair.

A. When the Public Works Director determines that repair of a sidewalk is necessary, written notice shall be provided to the owner of property adjacent to the defective sidewalk.

B. The notice shall require the owner of the property adjacent to the defective sidewalk to complete the repair of the sidewalk within ninety days after the service of notice. The notice shall also state that if the repair is not made by the owner, the City may do the work and the cost of the work shall be assessed against the property adjacent to the sidewalk.

1. All sidewalks hereafter constructed in the City on improved streets shall be constructed to city standards and widths required in the Oregon City Transportation System Plan and OCMC 16.12. Sidewalks and curbs are to be constructed according to plans and specifications provided by the City Engineer.

2. Sidewalks constructed on unimproved streets shall be constructed of concrete according to lines and grades established by the City Engineer. On unimproved streets, curbs do not have to be constructed.

C. The Public Works Director shall cause a copy of the notice to be served personally upon the owner of the property adjacent to the defective sidewalk, or the notice may be served by registered or certified

mail, return receipt requested. If after diligent search the owner is not discovered, the Public Works Director shall cause a copy of the notice to be posted in a conspicuous place on the property, and such posting shall have the same effect as service of notice by mail or by personal service upon the owner of the property.

D. The person serving the notice shall file with the City recorder a statement stating the time, place and manner of service or notice.

Finding: Not Applicable. The Public Works Director has not determined that repair sidewalk adjacent to the property to be necessary. Requirement for new sidewalk construction has been identified in section 16.12 of this report.

12.04.050 - Retaining walls—Required.

Every owner of a lot within the City, abutting upon an improved street, where the surface of the lot or tract of land is above the surface of the improved street and where the soil or earth from the lot, or tract of land is liable to, or does slide or fall into the street or upon the sidewalk, or both, shall build a retaining wall, the outer side of which shall be on the line separating the lot, or tract of land from the improved street, and the wall shall be so constructed as to prevent the soil or earth from the lot or tract of land from falling or sliding into the street or upon the sidewalk, or both, and the owner of any such property shall keep the wall in good repair.

Finding: Complies with Condition. The applicant has proposed a retaining wall to prevent soil or earth from sliding or falling into the street or upon the sidewalk of Main Street. The proposed retaining wall adjacent Main Street shall be located outside of Oregon City right-of-way (within ODOT ROW). **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.04.100 - Excavations—Restoration of pavement.

Whenever any excavation shall have been made in any pavement or other street improvement on any street or alley in the City for any purpose whatsoever under the permit granted by the engineer, it shall be the duty of the person making the excavation to restore the pavement in accordance with the City of Oregon City Public Works Pavement Cut Standard in effect at the time a right-of-way permit is granted. The City Commission may adopt and modify the City of Oregon City Public Works Pavement Cut Standards by resolution as necessary to implement the requirements of this chapter.

Finding: Complies with Condition. The development will perform excavation or pavement cuts for improvements proposed in Main Street and Clackamette Drive. Pavement cuts or other improvement made in a City street or alley shall be done in accordance with the City of Oregon City Public Works Pavement Cut Standards and restored in accordance with the City of Oregon City Public Works Pavement Cut Standards. (Also written in findings for 16.12.029) **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.04.120 - Obstructions—Permit required.

A. Permanent Obstructions. It is unlawful for any person to place, put or maintain any obstruction, other than a temporary obstruction, as defined in subsection B. of this section, in any public street or alley in the City, without obtaining approval for a right-of-way permit from the City Commission by passage of a resolution.

1. The City Engineer shall provide applicants with an application form outlining the minimum submittal requirements.

2. The applicant shall submit at least the following information in the permitting process in order to allow the City Commission to adequately consider whether to allow the placement of an obstruction and whether any conditions may be attached:

a. *Site plan showing right-of-way, utilities, driveways as directed by staff;*
b. *Sight distance per OCMC 10.32, Traffic Sight Obstructions;*
c. *Traffic control plan including parking per Manual on Uniform Traffic Control Devices (MUTCD);*
d. *Alternative routes if necessary;*
e. *Minimizing obstruction area; and*
f. *Hold harmless/maintenance agreement.*

3. *If the City Commission adopts a resolution allowing the placement of a permanent obstruction in the right-of-way, the City Engineer shall issue a right-of-way permit with any conditions deemed necessary by the City Commission.*

B. *Temporary Obstructions.*

1. *A "temporary obstruction" is defined as an object placed in a public street, road or alley for a period of not more than sixty consecutive days. A "temporary obstruction" includes, but is not limited to, moving containers and debris dumpsters.*
2. *The City Engineer, or designee, is authorized to grant a permit for a temporary obstruction.*
3. *The City Engineer shall provide applicants with an application form outlining the minimum submittal requirements.*
4. *The applicant shall submit, and the City Engineer, or designee, shall consider, at least the following items in the permitting process. Additional information may be required in the discretion of the City Engineer:*
   a. *Site plan showing right-of-way, utilities, driveways as directed by staff;*
   b. *Sight distance per OCMC 10.32, Traffic Sight Obstructions;*
   c. *Traffic control plan including parking per Manual on Uniform Traffic Control Devices (MUTCD);*
   d. *Alternative routes if necessary;*
   e. *Minimizing obstruction area; and*
   f. *Hold harmless/maintenance agreement.*
5. *In determining whether to issue a right-of-way permit to allow a temporary obstruction, the City Engineer may issue such a permit only after finding that the following criteria have been satisfied:*
   a. *The obstruction will not unreasonably impair the safety of people using the right-of-way and nearby residents;*
   b. *The obstruction will not unreasonably hinder the efficiency of traffic affected by the obstruction;*
   c. *No alternative locations are available that would not require use of the public right-of-way; and*
   d. *Any other factor that the City Engineer deems relevant.*
6. *The permittee shall post a weatherproof copy of the temporary obstruction permit in plain view from the right-of-way.*

C. *Fees. The fee for obtaining a right-of-way permit for either a permanent obstruction or a temporary obstruction shall be set by resolution of the City Commission.*

Finding: Complies with Condition. The applicant has proposed closures on I-205 and associated freeway exits and entrances. Along with these closures, the applicant has proposed detours through Oregon City which will impact traffic within Oregon City streets. The developer shall submit a traffic control plan for review and approval by the city. Traffic control measures must be in place and accepted by the city prior to any construction commencing. All detour routes utilizing city streets shall be approved by Oregon City. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.04.150 - Street and alley vacations—Cost.

At the time of filing a petition for vacation of a street, alley or any part thereof, a fee as established by City Commission resolution shall be paid to the City. The City Commission, upon hearing such petition, may grant the same in whole or in part, or may deny the same in whole or in part, or may grant the same with such reservations as would appear to be for the public interest, including reservations pertaining to the maintenance and use of underground public utilities in the portion vacated.

Finding: Not Applicable. No vacations are proposed as part of this application.

12.04.170 - Street design—Purpose and general provisions.

All development shall be in conformance with the city's public facility master plans, public works policies, standard drawings and engineering specifications. All streets shall be reviewed and approved by the city engineer prior to construction. All streets and driveway connections to another jurisdiction's facility or right-of-way must be reviewed by the appropriate jurisdiction as a condition of the preliminary plat or site planning and when required by law or intergovernmental agreement shall be approved by the appropriate jurisdiction.

Finding: See findings from section 16.12.010 of this report.

12.04.270 - Standard construction specifications.

The workmanship and materials for any work performed under permits issued per this chapter shall be in accordance with the current edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the City in accordance with this ordinance, in effect at the time of application. The exception to this requirement is where this chapter and the Public Works Street Standard Drawings provide other design details, in which case the requirements of this chapter and the Public Works Street Standard Drawings shall control. In the case of work within ODOT or Clackamas County rights-of-way, work shall be in conformance with their respective construction standards.

Finding: Complies with Condition. The workmanship and materials for any work performed under permits issued by Oregon City Public Works shall be in accordance with the edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city. (Also written in the findings of section 16.12.010) **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

CHAPTER 13.12 – STORMWATER MANAGEMENT

13.12.050 - Applicability and exemptions.

This chapter establishes performance standards for stormwater conveyance, quantity and quality. Additional performance standards for erosion prevention and sediment control are established in OCMC 17.47.

A. Stormwater Conveyance. The stormwater conveyance requirements of this chapter shall apply to all stormwater systems constructed with any development activity, except as follows:

1. The conveyance facilities are located entirely on one privately owned parcel;

2. The conveyance facilities are privately maintained; and

3. The conveyance facilities receive no stormwater runoff from outside the parcel's property limits.

Those facilities exempted from the stormwater conveyance requirements by the above subsection will remain subject to the requirements of the Oregon Uniform Plumbing Code. Those exempted facilities shall be reviewed by the Building Official.
Finding: Applicable. Connection to a public stormwater conveyance system is required to serve this development.

B. Water Quality and Flow Control. The water quality and flow control requirements of this chapter shall apply to the following proposed uses or developments, unless exempted under subsection C:
1. Activities located wholly or partially within water quality resource areas pursuant to OCMC 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the NROD or will disturb more than one thousand square feet of existing impervious surface within the NROD as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given five-year period; or
2. Activities that create or replace more than five thousand square feet of impervious surface, cumulated over any given five-year period.
Finding: Applicable. The proposed development will create more than five hundred square feet of impervious surface within the NROD or will disturb more than one thousand square feet of existing impervious surface within the NROD.

C. Exemptions. The following exemptions to subsection B of this section apply:
1. An exemption to the flow control requirements of this chapter will be granted when the development site discharges to the Willamette River, Clackamas River or Abernethy Creek; and either lies within the one hundred-year floodplain or is up to ten feet above the design flood elevation as defined in OCMC 17.42, provided that the following conditions are met:
a. The project site is drained by a conveyance system that is comprised entirely of manmade elements (e.g. pipes, ditches, culverts outfalls, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water; and
b. The conveyance system between the project site and the exempt receiving water has sufficient hydraulic capacity and erosion stabilization measures to convey discharges from the proposed conditions of the project site and the existing conditions from non-project areas from which runoff is collected.
2. Projects in the following categories are generally exempt from the water quality and flow control requirements:
a. Stream enhancement or restoration projects approved by the City.
b. Farming practices as defined by ORS 30.960 and farm use as defined in ORS 214.000; except that buildings associated with farm practices and farm use are subject to the requirements of this chapter.
c. Actions by a public utility or any other governmental agency to remove or alleviate an emergency condition.
d. Road and parking area preservation/maintenance projects such as pothole and square cut patching, surface sealing, replacing or overlaying of existing asphalt or concrete pavement, provided the preservation/maintenance activity does not expand the existing area of impervious coverage above the thresholds in subsection B of this section.
e. Pedestrian and bicycle improvements (sidewalks, trails, pathways, and bicycle paths/lands) where no other impervious surfaces are created or replaced, built to direct stormwater runoff to adjacent vegetated areas.
f. Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics.
g. Maintenance or repair of existing utilities.
Finding: Not Applicable. No exemptions apply to the proposed development.

D. Uses Requiring Additional Management Practices. In addition to any other applicable requirements of this chapter, the following uses are subject to additional management practices, as defined in the Public Works Stormwater and Grading Design Standards:
1. Bulk petroleum storage facilities;
2. Above ground storage of liquid materials;
3. Solid waste storage areas, containers, and trash compactors for commercial, industrial, or multi-family uses;
4. Exterior storage of bulk construction materials;
5. Material transfer areas and loading docks;
6. Equipment and/or vehicle washing facilities;
7. Development on land with suspected or known contamination;
8. Covered vehicle parking for commercial or industrial uses;
9. Industrial or commercial uses locating in high traffic areas, defined as average daily count trip of two thousand five hundred or more trips per day; and
10. Land uses subject to DEQ 1200-Z Industrial Stormwater Permit Requirements.
Finding: Not Applicable. The development has not proposed use of the land that requires additional management practices as defined in the Public Works Stormwater and Grading Design Standards.

13.12.080 - Submittal requirements.
A. Applications subject to stormwater conveyance, water quality, and/or flow control requirements of this chapter shall prepare engineered drainage plans, drainage reports, and design flow calculation reports in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards.
B. Each project site, which may be composed of one or more contiguous parcels of land, shall have a separate valid city approved plan and report before proceeding with construction.
Finding: Complies with Condition. The applicant's preliminary drainage plan and report shows compliance with the current version of the Oregon City Stormwater and Grading Design Standards. The applicant has proposed stormwater facilities within ODOT ROW sized using the BMP sizing tool for the treatment and detention of stormwater runoff. However, the stormwater report and plan provided is preliminary. Therefore, the applicant is required to provide a finalized plan and report which addresses all items identified in Section 9 of the Public Works Stormwater and Grading Design Standards. Requirements of this code section can be met by meeting approval criteria outlined in section 13.12.090 of this report. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

13.12.090 - Approval criteria for engineered drainage plans and drainage report.
An engineered drainage plan and/or drainage report shall be approved only upon making the following findings:
A. The plan and report demonstrate how the proposed development and stormwater facilities will accomplish the purpose statements of this chapter.
B. The plan and report meet the requirements of the Public Works Stormwater and Grading Design Standards adopted by resolution under OCMC 13.12.020.
C. The storm drainage design within the proposed development includes provisions to adequately control runoff from all public and private streets and roof, footing, and area drains and ensures future extension of the current drainage system.
D. Streambank erosion protection is provided where stormwater, directly or indirectly, discharges to open channels or streams.

E. Specific operation and maintenance measures are proposed that ensure that the proposed stormwater quantity control facilities will be properly operated and maintained.
Finding: Complies with Condition. The applicant's preliminary drainage plan and report shows general compliance with stormwater conveyance, water quality, and flow control requirements of the Oregon City Stormwater and Grading Design Standards. The applicant has proposed stormwater facilities within ODOT ROW sized using the BMP sizing tool for the treatment and detention of stormwater runoff. However, the stormwater report and plan provided is preliminary. Therefore, the applicant did not address all items identified in Section 9 (Submittal Requirements) of the Public Works Stormwater and Grading Design Standards. The developer shall provide updated engineered drainage plan(s), drainage report(s), and design flow calculation report(s) stamped and signed by a licensed engineer addressing all items from the Section 9.3 & 9.4 of the Public Works Stormwater and Grading Design Standards prior to receiving a permit and beginning construction. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

13.12.100 - Alternative materials, alternative design and methods of construction.
The provisions of this chapter are not intended to prevent the use of any material, alternate design or method of construction not specifically prescribed by this chapter or the Public Works Stormwater and Grading Design Standards, provided any alternate has been approved and its use authorized by the City Engineer. The City Engineer may approve any such alternate, provided that the City Engineer finds that the proposed design is satisfactory and complies with the intent of this chapter and that the material, method, or work offered is, for the purpose intended, at least the equivalent of that prescribed by this chapter in effectiveness, suitability, strength, durability and safety. The City Engineer shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any action granting approval of an alternate shall be recorded and entered in the City files.
Finding: Not Applicable. The applicant has not proposed alternative design methods requiring special approval by the City Engineer. However, should the applicant propose such methods with the public facilities construction plan submittal, the proposal will be reviewed and approved by the City Engineer as required.

13.12.110 - Transfer of engineering responsibility.
Project drainage plans shall always have a project engineer. If the project engineer is changed during the course of the work, the City shall be notified in writing and the work shall be stopped until the replacement engineer has agreed to accept the responsibilities of the project engineer. The new project engineer shall provide written notice of accepting project responsibility to the City within seventy-two hours of accepting the position as project engineer.
Finding: Complies with Condition. The developer and engineer for the project shall execute a "Developer/Engineer Agreement for Public Works Improvements" and commit to the responsibilities outlined in the agreement. (Also written in the findings of section 16.12.014) **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

13.12.120 - Standard construction specifications.
The workmanship and materials shall be in accordance with the current edition of the "Standard Specifications for Public Works Construction," as prepared by the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the City, in effect at the time of application. The exception to this requirement is where this chapter and the Public Works Stormwater and Grading Design Standards provide other design details, in which case the requirements of this chapter and the Public Works Stormwater and Grading Design Standards shall be complied with.

Finding: Complies with Condition. The workmanship and materials for any work performed under permits issued by Oregon City Public Works shall be in accordance with the edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city. (Also written in the findings of section 16.12.010) **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

13.12.140 - Maintenance of public stormwater facilities.
A. A stormwater facility that receives stormwater runoff from a public right-of-way shall be a public facility. Upon expiration of the warranty period and acceptance by the City as described below, the City shall be responsible for maintenance of those public stormwater facilities. Access for maintenance of the stormwater facilities shall be provided to the City through the granting of a stormwater easement or other means acceptable to the City.
B. Responsibility for maintenance of stormwater facilities including all landscaping, irrigation systems, structures and appurtenances shall remain with the property owner/developer for two years (known as the warranty period). The owner/developer shall provide the City a separate two-year landscaping maintenance surety bond for one hundred ten percent of the landscaping cost. Transfer of maintenance of stormwater conveyance systems shall occur when the City accepts the stormwater conveyance system.
C. The City will perform an inspection of the development's entire publicly maintained stormwater system approximately forty-five days before the two-year warranty period expires. The stormwater system shall be found to be in a clean, functional condition by the City engineer before acceptance of maintenance responsibility by the City.
Finding: Not Applicable. The development has proposed to construct a new stormwater facility on the development property, outside of Oregon City right-of-way.

13.12.145 - Maintenance of private stormwater facilities.
A. An applicant shall submit an operation and maintenance plan for each proposed stormwater facilities, unless exempted in the Public Works Stormwater and Grading Design Standards. The information in the operation and maintenance plan shall satisfy the requirements of the Public Works Stormwater and Grading Design Standards.
B. Private owners are required to inspect and maintain stormwater facilities on their property in accordance with an approved operation and maintenance plan. A maintenance log is required to document facility inspections and specific maintenance activities. The log shall be available to City inspection staff upon request.
C. Failure to operate or maintain a stormwater facility according to the operation and maintenance plan may result in an enforcement action under Section 13.12.150.
Finding: Complies with Condition. The applicant has proposed private stormwater facilities within the development property. Owners are required to inspect and maintain stormwater facilities on their property in accordance with an approved operation and maintenance plan. The property owner(s) shall execute an agreement providing access to and maintenance of stormwater management facilities and pay associated recording fees. The agreement shall include a site plan identifying all privately-owned stormwater management facilities and an operation and maintenance plan for each type of stormwater facility in accordance with the Public Works Stormwater and Grading Design Standards. The agreement shall run with the land and be applicable to subsequent property owners. The Maintenance Covenant and Access Easement shall be reviewed and accepted by the City prior to recording. **Staff has**

determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

13.12.170 - Permits from other jurisdictions.
A. The Oregon State Department of Environmental Quality (DEQ) currently issues NPDES 1200-C permits for projects that cover areas of one acre or greater. No permit shall be issued for projects of this size (or any other size as modified by DEQ) without a copy of said DEQ permit being on file with Oregon City. DEQ is responsible for policing its own permits; however, if City personnel observe conditions that are believed to be in violation of any such permit, and cannot get corrections made, the City will bring such conditions to the attention of the appropriate DEQ representatives.
Finding: Complies with Condition. The development exceeds 1.0 acre in disturbed area. The developer shall obtain a 1200-C (NPDES) permit from Oregon Department of Environmental Quality (DEQ) for construction activities one acre or greater prior to receiving a permit and beginning construction. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

B. Projects may require Oregon State Division of State Lands (DSL) and/or United States Army Corps of Engineers (USACE) permits. If such permits are required, no permission to construct will be granted until such a time as a copy of such permit is on file with the City or notice is received from those agencies that a permit is not required. DSL/USACE is responsible for enforcing its own permits; however, if City personnel observe conditions that are believed to be in violation of any such permit, and cannot get corrections made, the City will bring such conditions to the attention of the appropriate DSL/USACE representatives.
Finding: Complies as proposed. The applicant has acquired permits from DEQ, DSL, and USACE. The permits were included in their application package (in Attachment L).

C. Projects may require Oregon State Department of Fish and Wildlife (ODFW) permits. When ODFW permits are required, no work will be authorized until the receipt of a copy of the ODFW permit. ODFW is responsible for policing its own permits; however, if City personnel observe conditions that are believed to be in violation of any such permit, and cannot get corrections made, the City will bring such conditions to the attention of the appropriate ODFW representatives.
Finding: Complies with Condition. The applicant has identified the requirement to coordinate construction activities with Oregon State Department of Fish and Wildlife (ODFW) permits. The memo from the applicant's DSL permit states "Fish must be salvaged from the isolation area. Permits from NOAA Fisheries and Oregon Department of Fish and Wildlife, Fish Research are required to salvage fish." For construction activities requiring Oregon State Department of Fish and Wildlife (ODFW) permits, no work will be authorized until the city has received a copy of the ODFW permit.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

CHAPTER 15.48 - GRADING, FILLING AND EXCAVATING

15.48.030 Applicability—Grading permit required.
A. A city-issued grading permit shall be required before the commencement of any of the following filling or grading activities:
1. Grading activities in excess of ten cubic yards of earth;
2. Grading activities which may result in the diversion of existing drainage courses, both natural and man-made, from their natural point of entry or exit from the grading site;

3. Grading and paving activities resulting in the creation of impervious surfaces greater than two thousand square feet or more in area;
4. Any excavation beyond the limits of a basement or footing excavation, having an unsupported soil height greater than five feet after the completion of such a structure; or
5. Grading activities involving the clearing or disturbance of one-half acres (twenty-one thousand seven hundred eighty square feet) or more of land.
Finding: Complies as Proposed. Fill and grading activities are proposed to be undertaken in conjunction with a land use application. A separate grading permit is not required. Approval of the construction plans submitted through the land use application process shall constitute the grading permit required under this chapter.

15.48.040 - Grading permit exemptions.
The following filling and grading activities shall not require the issuance of a grading permit:
A. Excavation for utilities, or for wells or tunnels allowed under separate permit by other governmental agencies;
B. An excavation below finished grade for basements and footings of a building, retaining wall or other structure authorized by a valid building permit. The placement of any fill material removed from such an excavation requires a grading permit if:
1. It exceeds fifty cubic yards,
2. More than ten cubic yards are removed from the site, or
3. The fill is placed on the site to a depth greater than one foot;
C. Farming practices as defined in ORS 30.930 and farm uses as defined in ORS 215.203, except that buildings associated with farm practices and farm uses are subject to the requirements of this chapter;
D. Excavation for cemetery graves;
E. Sandbagging, diking, ditching, filling or similar work when done to protect life or property during an emergency;
F. Repaving of existing paved surfaces that does not alter existing drainage patterns;
G. Maintenance work on public roads performed under the direction of the city, Clackamas County or Oregon State Department of Transportation personnel.
Finding: Not Applicable. The preliminary plan presents grading and paving activities that will result in the disturbance of more than one-half acre and will likely exceed excavation or fill of fifty cubic yards.

15.48.090 Submittal requirements.
An engineered grading plan or an abbreviated grading plan shall be prepared in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards whenever a city approved grading permit is required. In addition, a geotechnical engineering report and/or residential lot grading plan may be required pursuant to the criteria listed below.
A. Abbreviated Grading Plan. The city shall allow the applicant to submit an abbreviated grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards if the following criteria are met:
1. No portion of the proposed site is within the flood management area overlay district pursuant to Chapter 17.42, the unstable soils and hillside constraints overlay district pursuant to Chapter 17.44, or a water quality resource area pursuant to Chapter 17.49; and
2. The proposed filling or grading activity does not involve more than fifty cubic yards of earth.
B. Engineered Grading Plan. The city shall require an engineered grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer if the proposed activities do not qualify for abbreviated grading plan.

C. Geotechnical Engineering Report. The city shall require a geotechnical engineering report in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer who specializes in geotechnical work when any of the following site conditions may exist in the development area:
1. When any publicly maintained facility (structure, street, pond, utility, park, etc.) will be supported by any engineered fill;
2. When an embankment for a stormwater pond is created by the placement of fill;
3. When, by excavation, the soils remaining in place are greater than three feet high and less than twenty feet wide.
D .Residential Lot Grading Plan. The city shall require a residential lot grading plan in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer for all land divisions creating new residential building lots or where a public improvement project is required to provide access to an existing residential lot.
Finding: Complies as Proposed. Fill and grading activities are proposed to be undertaken in conjunction with a land use application and are reflected in the preliminary construction plans provided with the application. A separate grading permit is not required. Approval of the construction plans submitted through the land use application process shall constitute the grading permit required under this chapter.

CHAPTER 16.12 - MINIMUM PUBLIC IMPROVEMENTS AND DESIGN STANDARDS FOR DEVELOPMENT

16.12.010 - Purpose and general provisions.
All development shall be in conformance with the policies and design standards established by this chapter and with applicable standards in the City's public facility master plans and City design standards and specifications. In reviewing applications for development, the City Engineer shall take into consideration any approved development and the remaining development potential of adjacent properties. All street, water, sanitary sewer, storm drainage and utility plans associated with any development shall be reviewed and approved by the City Engineer prior to construction. All streets, driveways or storm drainage connections to another jurisdiction's facility or right-of-way shall be reviewed by the appropriate jurisdiction as a condition of the preliminary plat and when required by law or intergovernmental agreement shall be approved by the appropriate jurisdiction.
Finding: Complies with Condition. Compliance with the “propose and general provisions” of chapter 16.12 can be met by adhering to the following: The development plans shall comply with all current Oregon City Public Works design standards, specifications, codes, and policies prior to receiving a permit and beginning construction. The workmanship and materials for any work performed under permits issued by Oregon City Public Works shall be in accordance with the edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

16.12.011 - Applicability.
A. Compliance with this chapter is required for all development including land divisions, site plan and design review, master plan, detailed development plan and conditional use applications and all public improvements. Minor Site Plan and Design Review applications shall not be subject to this chapter unless improvements are proposed within the right-of-way, or as otherwise provided in this chapter.

B. Compliance with this chapter is also required for new construction or additions which exceed fifty percent of the existing square footage of all 3-4 plexes, single and two-family dwellings living space. Garages, carports, sheds, and porches may not be included in the calculation if these spaces are not living spaces. Accessory dwelling units are not subject to compliance with this chapter. All applicable 3-4 plexes, single and two -family dwellings shall provide any necessary dedications, easements or agreements as identified in the transportation system plan and this chapter, subject to constitutional limitations. In addition, the street frontage shall be improved to include the following priorities for improvements:

1. Improve street pavement, construct curbs, gutters, sidewalks and planter strips; and

2. Plant street trees.

The cost of compliance with the standards identified in 16.12.011.B.1 and 16.12.011.B.2 is calculated based on the square footage valuation from the State of Oregon Building Codes Division and limited to ten percent of the total construction costs. The value of the alterations and improvements is based on the total construction costs for a complete project rather than costs of various project component parts subject to individual building permits. The entire proposed construction project cost includes engineering and consulting fees and construction costs. It does not include permit fees, recording fees, or any work associated with drafting or recording dedications or easements.

Finding: Applicable. The development is required to be processed under site plan and design review; therefore, the development shall follow the standards set forth in OCMC 16.12.

16.12.012 - Jurisdiction and management of the public rights-of-way.

The City has jurisdiction and exercises regulatory management over all public rights-of-way as defined and outlined within 12.04 of the Oregon City Municipal Code.

Finding: Applicable. The city has exercised its regulatory management authority by providing findings within this staff report with conditions to be met by the applicant prior to working within all public rights-of-way.

16.12.013 - Modifications.

The applicant may request and the review body may consider modification of the standards in this chapter resulting from constitutional limitations restricting the City's ability to require the dedication of property or for any other reason, based upon the criteria listed below and other criteria identified in the standard to be modified. All modifications, except for adjustments approved by the City Engineer for tree preservation purposes pursuant to 16.12.013.A, shall be processed through a Type II Land Use application and may require additional evidence from a transportation engineer or others to verify compliance. Compliance with the following criteria is required:

A. The modification meets the intent of the standard;

B. The modification provides safe and efficient movement of pedestrians, motor vehicles, bicyclists and freight;

C. The modification is consistent with an adopted transportation or utility plan; and

D. The modification is complementary with a surrounding street design; or, in the alternative;

E. If a modification is requested for constitutional reasons, the applicant shall demonstrate the constitutional provision or provisions to be avoided by the modification and propose a modification that complies with the state or federal constitution. The City shall be under no obligation to grant a modification in excess of that which is necessary to meet its constitutional obligations.

Finding: Not Applicable. No modification has been requested.

16.12.014 - Administrative provisions.

An applicant shall submit the following items to the City and complete the following tasks prior to proceeding with construction of proposed development plans. These items include the following:
A. Pre-Design Meeting;
B. Final Engineering Plans, Stamped and Signed by an Oregon Licensed Professional Engineer;
C. Stormwater Report, Stamped and Signed by an Oregon Licensed Professional Engineer;
D. Geotechnical Report, Stamped and Signed by an Oregon Licensed Professional Engineer (if applicable);
E. Engineer's Preliminary and Final Cost Estimates (also may be known as engineer's opinion of probable construction cost);
F. Plan Check and Inspection Fees (as set by City resolution);
G. Certificate of Liability Insurance for city funded public projects contracted by the City (not less than one million dollars single incident and two million dollars aggregate);
H. Preconstruction Meeting Notes;
I. Financial Guarantee(s) per OCMC 17.50.140;
J. Applicable Approvals/Permits from other agencies or entities;
K. Developer/Engineer Agreement for public works improvements.
An applicant shall submit the following additional items to the City and complete the following tasks prior to completing construction of proposed development plans. These items include the following:
L. Project Engineer's Certificate of Completion;
M. Stormwater Operation and Maintenance Easement (if applicable);
N. Deed of Dedication (Bargain and Sale Deed);
O. Recorded Plat and/or Easements (if applicable);
P. Recorded Non-Remonstrance Covenant Agreement;
Q. Land Division Compliance Agreement (if applicable);
R. Permanent Stabilization and/or Restoration of the impact from the development;
S. Fulfillment of all Conditions of Approval;
T. Payment of all Outstanding Fees;
U. Maintenance Guarantee(s). per OCMC 17.50.141;
V. Indemnity Agreement (if applicable);
W. Completed Punchlist;
X. As-Built Drawings;
Details on individual items required by this subsection can be obtained by contacting Public Works. Many items, such as the engineer's cost estimate and plan check and inspection fee, maybe be submitted in conjunction with documentation for other infrastructure improvements that are done with the development (such as street, sanitary sewer, and water).

Finding: Complies with Condition. The applicant shall submit or address all items in section 16.12.014 of the Oregon City Municipal Code based on the timing requirements contained therein and as deemed applicable by the City.

The developer and engineer for the project shall execute a "Developer/Engineer Agreement for Public Works Improvements" and commit to the responsibilities outlined in the agreement prior to receiving a permit for construction. The development shall provide construction plans, stamped and signed by a professional engineer licensed in the State of Oregon, containing street, grading, stormwater, sanitary sewer and water infrastructure improvements that conforms to all current Oregon City Public Works standards, specifications, codes, and policies for review and approval by the City prior to receiving a permit for construction. The development's contractor(s) and engineer(s) shall attend a pre-construction meeting with Oregon City staff prior to beginning all construction work (public and private) associated with the development. The public improvements shall be constructed according to approved final engineering plans prior to final acceptance by the city. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

16.12.015 - Street design—Generally.

Development shall be required to provide existing or future connections to adjacent sites through the use of vehicular and pedestrian access easements where applicable. Development shall provide any necessary dedications, easements or agreements as identified in the Transportation System Plan, Trails Master Plan, and/or Parks and Recreation Master Plan and this chapter, subject to constitutional limitations. The location, width and grade of street shall be considered in relation to: existing and planned streets, topographical conditions, public convenience and safety for all modes of travel, existing and identified future transit routes and pedestrian/bicycle accessways, overlay districts, and the proposed use of land to be served by the streets. The street system shall assure an adequate traffic circulation system with intersection angles, grades, tangents and curves appropriate for the traffic to be carried considering the terrain. To the extent possible, proposed streets shall connect to all existing or approved stub streets that abut the development site. The arrangement of streets shall either:
A. Provide for the continuation or appropriate projection of existing principal streets in the surrounding area and on adjacent parcels or conform to a plan for the area approved or adopted by the City to meet a particular situation where topographical or other conditions make continuance or conformance to existing streets impractical;
B. Where necessary to give access to or permit a satisfactory future development of adjoining land, streets shall be extended to the boundary of the development and the resulting dead-end street (stub) may be approved with a temporary turnaround as approved by the City Engineer. Notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future. Access control in accordance with OCMC 16.12.017 shall be required to preserve the objectives of street extensions.
C. Adequate right-of-way and improvements to streets, pedestrian ways, bike routes and bikeways, and transit facilities shall be provided and be consistent with the City's Transportation System Plan. Consideration shall be given to the need for street widening and other improvements in the area of the proposed development impacted by traffic generated by the proposed development. This shall include, but not be limited to, improvements to the right-of-way, such as installation of lighting, signalization, turn lanes, median and parking strips, traffic islands, paving, curbs and gutters, sidewalks, bikeways, street drainage facilities and other facilities needed because of anticipated vehicular and pedestrian traffic generation.

Finding: Compiles as Proposed. The applicant proposes new on-street parking and a sidewalk on Clackamette Drive, but it will not interfere with the continuation or appropriate projection of existing principal streets. The proposed Project does not include street development such that access to future developments of adjoining lands would be considered. The Transportation System Plan does not identify the need for any property dedications or easements associated with the development property.

16.12.016 - Street design.
All development regulated by this chapter shall provide street improvements in compliance with the standards in Table 16.12.016 depending on the street classification set forth in the Transportation System Plan and the Comprehensive Plan designation of the adjacent property, unless an alternative plan has been adopted. The table implements the adopted Transportation System Plan and illustrates the maximum design standards. These standards may be reduced with an alternative street design which may be approved based on the modification criteria in OCMC 16.12.013. The steps for reducing the street design are found in the Transportation System Plan.

Table 16.12.016 Street Design
Table 16.12.016 Street Design. To read the table select the road classification as identified in the Transportation System Plan and the Comprehensive Plan designation of the adjacent properties to find

the maximum design standards for the road cross section. If the Comprehensive Plan designation for lands on either side of the street differs, the wider right-of-way standard shall apply.

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Major Arterial	Mixed Use, Commercial or Public/Quasi Public	116 ft.	94 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells		6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.
	Industrial	120 ft.	88 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	N/A	(5) 14 ft. Lanes	6 ft.
	Residential	126 ft.	94 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Minor Arterial	Mixed Use, Commercial or Public/Quasi Public	116 ft.	94 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells		6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.
	Industrial	118 ft.	86 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	7 ft.	(5) 12 ft. Lanes	N/A
	Residential	100 ft.	68 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	7 ft.	(3) 12 ft. Lanes	6 ft.

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Collector	Mixed Use, Commercial or Public/Quasi Public	86 ft.	64 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells		6 ft.	8 ft.	(3) 12 ft. Lanes	N/A
	Industrial	88 ft.	62 ft.	0.5 ft.	5 ft.	7.5 ft.	6 ft.	7 ft.	(3) 12 ft. Lanes	N/A

	Residential	*85 ft.*	*59 ft.*	*0.5 ft.*	*5 ft.*	*7.5 ft.*	*6 ft.*	*7 ft.*	*(3) 11 ft. Lanes*	*N/A*

Road Classification	*Comprehensive Plan Designation*	*Right-of-Way Width*	*Pavement Width*	*Public Access*	*Sidewalk*	*Landscape Strip*	*Bike Lane*	*Street Parking*	*Travel Lanes*	*Median*
Local	*Mixed Use, Commercial or Public/Quasi Public*	*62 ft.*	*40 ft.*	*0.5 ft.*	*10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells*		*N/A*	*8 ft.*	*(2) 12 ft. Lanes*	*N/A*
	Industrial	*60 ft.*	*38 ft.*	*0.5 ft.*	*5 ft.*	*5.5 ft.*	*(2) 19 ft. Shared Space*			*N/A*
	Residential	*54 ft.*	*32 ft.*	*0.5 ft.*	*5 ft.*	*5.5 ft.*	*(2) 16 ft. Shared Space*			*N/A*

1. Pavement width includes, bike lane, street parking, travel lanes and median.
2. Public access, sidewalks, landscape strips, bike lanes and on-street parking are required on both sides of the street in all designations. The right-of-way width and pavement widths identified above include the total street section.
3. A 0.5 foot curb is included in landscape strip or sidewalk width.
4. Travel lanes may be through lanes or turn lanes.
5. The 0.5 foot public access provides access to adjacent public improvements.
6. Alleys shall have a minimum right-of-way width of twenty feet and a minimum pavement width of sixteen feet. If alleys are provided, garage access shall be provided from the alley.
7. A raised concrete median or landscape median shall be utilized for roads identified to have access restrictions.

Finding: Complies with Condition. The requirements of this section apply to the proposed on-street parking on Clackamette Drive across from Jon Storm Park. The applicant proposes to construct on-street parking in conformance with street design parameters in Table 16.12.016. The site plan was provided to show compliance with this standard did not provide dimensions to confirm compliance with requirements from Table 16.12.016. The improvements proposed on the north side of Clackamette Drive shall consist of an 8-foot-wide parking lane, curb, 5-foot-wide landscape strip and 5-foot-wide sidewalk. An approved design shall be included on engineering plans prior to receiving a permit and beginning construction. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

A. Sidewalks. The applicant shall provide for sidewalks on both sides of all public streets, on any private street if so required by the decision-maker, and in any special pedestrian way within the development. Both sidewalks and curbs are to be constructed to City standards and at widths set forth above, and according to plans and specifications provided by the City Engineer. Exceptions to this requirement may be allowed in order to accommodate topography, trees or some similar site constraint. In the case of major or minor arterials, the decision-maker may approve a development without sidewalks where sidewalks are found to be dangerous or otherwise impractical to construct or are not reasonably related to the applicant's development. The decision-maker may require the applicant to provide sidewalks

concurrent with the issuance of the initial building permit within the area that is the subject of the development application. Applicants for partitions may be allowed to meet this requirement by providing the City with a financial guarantee per OCMC 16.12.110.
Finding: Complies as Proposed. The applicant proposes to provide new sidewalks on Main Street under the I-205 Bridge and on the east side of Clackamette Drive adjacent to the new on-street parking. All new sidewalks are designed according to City standards in Table 16.12.016. Other pedestrian facility improvements are required per OCMC 16.12.032.

B. Pedestrian and Bicycle Accessways Routes. If deemed appropriate to extend pedestrian and bicycle routes, existing or planned, the decision-maker may require the installation of separate pedestrian and bicycle facilities.
Finding: Complies as Proposed. The Applicant has proposed to modify the existing pedestrian/bicycle path on the east side of Clackamette Drive from south of Abernethy Bridge to north of Abernethy Bridge. The applicant has provided a site plan to show what has been proposed.

C. Street Name Signs and Traffic Control Devices. The applicant shall install street signs and traffic control devices as directed by the City Engineer. Street name signs and traffic control devices shall be in conformance with all applicable city regulations and standards.
Not Applicable. The proposal does not include new streets; no new street signs or traffic control devices are proposed.

D. Street Lights. The applicant shall install street lights which shall be served from an underground source of supply. Street lights shall be in conformance with all City regulations.
Finding: Complies as Proposed. The proposal does not include new street lights. Any street lights affected during construction will be returned to preconstruction conditions following construction.

E. Any new street proposed with a pavement width of less than thirty-two feet shall be processed through OCMC 16.12.013 and meet minimum life safety requirements, which may include fire suppression devices as determined by the Fire Marshall to assure an adequate level of fire and life safety. The modified street shall have no less than a twenty-foot wide unobstructed travel lane.
Finding: Not Applicable. This section does not apply because no new street is proposed .

F. All development shall include vegetated planter strips that are five feet in width or larger and located between the sidewalk and curb unless otherwise approved pursuant to this chapter. All development shall utilize the vegetated planter strip for the placement of street trees or place street trees in other acceptable locations, as prescribed by OCMC 12.08. Development proposed along a collector, minor arterial, or major arterial roads may place street trees within tree wells within a wider sidewalk in lieu of a planter strip. In addition to street trees per OCMC 12.08, vegetated planter strips shall include ground cover and/or shrubs spaced four feet apart and appropriate for the location. No invasive or nuisance plant species shall be permitted.
Finding: Complies as Proposed. Consistent with this section of the OCMC, the Landscape Plan includes vegetated planter strips along Clackamette Drive between the new on-street parking and the new sidewalk.

G. Vehicle and pedestrian access easements may serve in lieu of streets when approved by the decision maker and only where dedication of a street is deemed impracticable.
Finding: Not Applicable. The decision maker has not approved access easements in lieu of streets nor has dedication of a street been deemed impracticable.

H. Vehicular and pedestrian easements shall allow for public access and shall comply with all applicable pedestrian access requirements.
Finding: Not Applicable. No vehicular or pedestrian easements are proposed.

16.12.017 - Street design—Access control.
A. A street which is dedicated to end at the boundary of the development or in the case of half-streets dedicated along a boundary shall have an access control granted to the City as a City controlled plat restriction for the purposes of controlling ingress and egress to the property adjacent to the end of the dedicated street. The access control restriction shall exist until such time as a public street is created, by dedication and accepted, extending the street to the adjacent property.
Finding: Not Applicable. No new streets with dead ends are proposed for this development.

B. The City may grant a permit for the adjoining owner to access through the access control.
Finding: Not Applicable. No new streets with dead ends are proposed for this development.

C. The plat shall contain the following access control language or similar on the face of the map at the end of each street for which access control is required: "Access Control (See plat restrictions)."
Finding: Not Applicable. No new streets with dead ends are proposed for this development.

D. Said plats shall also contain the following plat restriction note(s): "Access to (name of street or tract) from adjoining tracts (name of deed document number[s]) shall be controlled by the City of Oregon City by the recording of this plat, as shown. These access controls shall be automatically terminated upon the acceptance of a public road dedication or the recording of a plat extending the street to adjacent property that would access through those Access Controls."
Finding: Not Applicable. No new streets with dead ends are proposed for this development.

16.12.018 - Street design—Alignment.
The centerline of streets shall be:
A. Aligned with existing streets by continuation of the centerlines; or
B. Offset from the centerline by no more than five feet, provided appropriate mitigation, in the judgment of the City Engineer, is provided to ensure that the offset intersection will not pose a safety hazard.
C. Driveways that are at least twenty-four feet wide shall align with existing or planned streets on adjacent sites.
Finding: Not Applicable. No new streets or intersections are proposed.

16.12.019 - Traffic sight obstructions.
All new streets shall comply with the Traffic Sight Obstructions in Chapter 10.32.
Finding: Not Applicable. No new streets are proposed.

16.12.020 - Street design—Intersection angles.
Except where topography requires a lesser angle, streets shall be laid out to intersect at angles as near as possible to right angles. In no case shall the acute angles be less than eighty degrees unless there is a special intersection design. An arterial or collector street intersecting with another street shall have at least one hundred feet of tangent adjacent to the intersection unless topography requires a lesser distance. Other streets, except alleys, shall have at least fifty feet of tangent adjacent to the intersection unless topography requires a lesser distance. All street intersections shall be provided with a minimum curb return radius of twenty-five feet for local streets. Larger radii shall be required for higher street

classifications as determined by the City Engineer. Additional right-of-way shall be required to accommodate curb returns and sidewalks at intersections. Ordinarily, intersections should not have more than two streets at any one point.
Finding: Not Applicable. No new intersections are being created.

16.12.021 - Street design—Grades and curves.
Grades and center line radii shall conform to standards approved by the City Engineer.
Finding: Not Applicable. No new streets are proposed.

16.12.022 - Street design—Development abutting arterial or collector street.
Where development abuts or contains an existing or proposed arterial or collector street, the decision maker may require: access control; screen planting or wall contained in an easement or otherwise protected by a restrictive covenant in a form acceptable to the decision maker along the rear or side property line; or such other treatment it deems necessary to adequately protect residential properties or afford separation of through and local traffic. Reverse frontage lots with suitable depth may also be considered an option for residential property that has arterial frontage. Where access for development abuts and connects for vehicular access to another jurisdiction's facility then authorization by that jurisdiction may be required.
Finding: Not Applicable. The development does not proposed access to an arterial or collector street.

16.12.023 - Street design—Pedestrian and bicycle safety.
Where deemed necessary to ensure public safety, reduce traffic hazards and promote the welfare of pedestrians, bicyclists and residents of the subject area, the decision maker may require that local streets be so designed as to discourage their use by nonlocal automobile traffic.
The City Engineer may require that crosswalks include a large vegetated or sidewalk area which extends into the street pavement as far as practicable to provide safer pedestrian crossing opportunities. These curb extensions can increase the visibility of pedestrians and provide a shorter crosswalk distance as well as encourage motorists to drive slower. The City Engineer may approve an alternative design that achieves the same standard for constrained sites.
Finding: Not Applicable. The development does not require a street design that discourages use by non-local traffic. The City Engineer has not required that crosswalks include a large vegetated or sidewalk area which extends into the street pavement as far as practicable to provide safer pedestrian crossing opportunities.

16.12.024 - Street design—Half street.
Half streets, while generally not acceptable, may be approved where essential to the development, when in conformance with all other applicable requirements, and where it will not create a safety hazard. When approving half streets, the decision maker shall first determine that it will be practical to require the dedication of the other half of the street when the adjoining property is divided or developed. Where the decision maker approves a half street, the applicant shall construct a half street with at least twenty feet of pavement width and provide signage prohibiting street parking so as to make the half street safe until such time as the other half is constructed. Whenever a half street is adjacent to property capable of being divided or developed, the other half of the street shall be provided and improved when that adjacent property divides or develops. Access control may be required to preserve the objectives of half streets.
When the remainder of an existing half-street improvement is completed it shall include the following items: dedication of required right-of-way, construction of the remaining portion of the street including pavement, curb and gutter, landscape strip, sidewalk, street trees, lighting and other improvements as

required for that particular street. It shall also include at a minimum the pavement replacement to the centerline of the street. Any damage to the existing street shall be repaired in accordance with the City's "Pavement Cut Standards" or as approved by the City Engineer.
Finding: Not Applicable. This application does not propose any half streets.

16.12.025 - Street design—Cul-de-sacs and dead-end streets.
The City discourages the use of cul-de-sacs and permanent dead-end streets except where construction of a through street is found by the decision maker to be impracticable due to topography or some significant physical constraint such as geologic hazards, wetland, natural or historic resource areas, pre-existing dedicated open space, pre-existing development patterns, arterial access restrictions or similar situation as determined by the decision maker. This section is not intended to preclude the use of curvilinear eyebrow widening of a street where needed.
A. When permitted, access from new cul-de-sacs and permanent dead-end streets shall be limited to a maximum of twenty-five dwelling units.
Finding: Not Applicable. No new cul-de-sacs or dead-end streets are proposed or required for this development.

B. Cul-de-sacs and permanent dead-end streets shall include pedestrian/bicycle accessways to meet minimum block width standards as prescribed in OCMC 16.12.030.
Finding: Not Applicable. No new cul-de-sacs or dead-end streets are proposed or required for this development.

C. Cul-de-sacs shall have sufficient radius to provide adequate turn-around for emergency vehicles in accordance with fire district and city adopted street standards.
Finding: Not Applicable. No new cul-de-sacs or dead-end streets are proposed or required for this development.

D. Permanent dead-end streets shall provide public street right-of-way/easements sufficient to provide a sufficient amount of turn-around space complete with appropriate no-parking signs or markings to accommodate waste disposal, sweepers, emergency and other long vehicles in the form of a hammerhead or other design to be approved by the decision maker.
Finding: Not Applicable. No new cul-de-sacs or dead-end streets are proposed or required for this development.

E. In the case of dead-end stub streets that will connect to streets on adjacent sites in the future, notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future. A dead-end street shall include signage or barricade meeting Manual on Uniform Traffic Control Devices (MUTCD).
Finding: Not Applicable. No cul-de-sacs or dead-end streets are proposed or required for this development.

16.12.026 - Street design—Alleys.
Alleys with public access easements on private property shall be provided in the Park Place and South End concept plan areas for the following districts R-5, R-3.5, R-2, MUC-1, MUC-2 and NC zones unless other permanent provisions for private access to off-street parking and loading facilities are approved by the decision maker. All alleys intended to provide access for emergency vehicles shall be a minimum width of twenty feet. The corners of alley intersections shall have a radius of not less than ten feet and

shall conform to standards approved by the City Engineer. Access easements and maintenance agreements shall be recorded on affected properties.
Finding: Not Applicable. Alleys are not proposed or required for this development.

16.12.027 - Street design—Off-site street improvements.
During consideration of the preliminary plan for a development, the decision maker shall determine whether existing streets impacted by, adjacent to, or abutting the development meet the applicable design or dimensional requirements. Where such streets fail to meet these requirements, the decision-maker shall require the applicant to make proportional improvements sufficient to achieve conformance with minimum applicable design standards required to serve the proposed development.
Finding: Complies with Condition. The Applicant proposes development that will impact Main Street and Clackamette Drive. The roadway at Main Street will be replaced at the same existing width, as requested by the City of Oregon City. Sidewalks will be installed to meet dimensional standards of Table 16.12.016. At Clackamette Drive, the roadway will be rebuilt to meet dimensional standards, including the addition of a new sidewalk along the east side of the road. The applicant has proposed minor deviations to the sidewalk width where construction to full width would impact an existing utility access point. The development shall adjust the alignment of the sidewalk and size of the landscape strip proposed along at Clackamette Drive where there is conflict with existing utilities. An approved design shall be included on engineering plans prior to receiving a permit and beginning construction. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

16.12.028 - Street design—Transit.
Streets shall be designed and laid out in a manner that promotes pedestrian and bicycle circulation. The applicant shall coordinate with transit agencies where the application impacts transit streets as identified in OCMC 17.04.1310. Pedestrian/bicycle access ways shall be provided as necessary to minimize the travel distance to transit streets and stops and neighborhood activity centers. The decision maker may require provisions, including easements, for transit facilities along transit streets where a need for bus stops, bus pullouts or other transit facilities within or adjacent to the development has been identified.
Finding: Not Applicable. No new street is proposed or require for this development.

16.12.029 - Excavations—Restoration of pavement.
Whenever any excavation shall have been made in any pavement or other street improvement on any street or alley in the City for any purpose whatsoever under the permit granted by the engineer, it shall be the duty of the person making the excavation to restore the pavement in accordance with the City of Oregon City Public Works Pavement Cut Standards in effect at the time the permit is granted. The City Commission may adopt and modify the City of Oregon City Public Works Pavement Cut Standards by resolution as necessary to implement the requirements of this chapter.
Finding: Complies with Condition. The development will perform excavation or pavement cuts for improvements proposed in Main Street and Clackamette Drive. Pavement cuts or improvements on any public street or alley in the City shall adhere to the City of Oregon City Public Works Pavement Cut Standards. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

16.12.030 - Blocks—Width.
The width of blocks shall ordinarily be sufficient to allow for two tiers of lots with depths consistent with the type of land use proposed. The length, width and shape of blocks shall take into account the need for

adequate building site size, convenient motor vehicle, pedestrian, bicycle and transit access, control of traffic circulation, and limitations imposed by topography and other natural features.
All new streets shall be designed as local streets unless otherwise designated as arterials and collectors in the current adopted Transportation System Plan. The maximum block spacing between streets is 530 feet and the minimum block spacing between streets is 150 feet as measured between the right-of-way centerlines except in zones GI, CI, MUE, I, and WFDD where determining the appropriate street spacing will be determined by the City Engineer. If the maximum block size is exceeded, pedestrian accessways shall be provided every 330 feet. The spacing standards within this section do not apply to alleys.
Finding: Not Applicable. This section does not appl as no new streets or blocks are proposed or required.

16.12.031 - Street design—Street names.
Except for extensions of existing streets, no street name shall be used which will duplicate or be confused with the name of an existing street. Street names shall conform to the established standards in the City and shall be subject to the approval of the City.
Finding: Not Applicable. This section does not appl as no new streets or blocks are proposed or required.

16.12.032 – Public off-street pedestrian and bicycle accessways.
Finding: Not applicable. This section does not apply as no public off-street pedestrian and bicycle accessways are proposed or required.

16.12.033 - Mobility standards.
Development shall demonstrate compliance with intersection mobility standards. When evaluating the performance of the transportation system, the City of Oregon City requires all intersections, except for the facilities identified in subsection E below, to be maintained at or below the following mobility standards during the two-hour peak operating conditions. The first hour has the highest weekday traffic volumes and the second hour is the next highest hour before or after the first hour. Except as provided otherwise below, this may require the installation of mobility improvements as set forth in the Transportation System Plan (TSP) or as otherwise identified by the City Engineer.
A. For intersections within the regional center, the following mobility standards apply:
1. During the first hour, a maximum v/c ratio of 1.10 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.
2. During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.
3. Intersections located on the Regional Center boundary shall be considered within the Regional Center.
B. For intersections outside of the Regional Center but designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:
1. During the first hour, a maximum v/c ratio of 0.99 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.
2. During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.

C. For intersections outside the boundaries of the Regional Center and not designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:
1. For signalized intersections:
a. During the first hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.
b. During the second hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.
2. For unsignalized intersections outside of the boundaries of the Regional Center:
a. For unsignalized intersections, during the peak hour, all movements serving more than twenty vehicles shall be maintained at LOS "E" or better. LOS "F" will be tolerated at movements serving no more than twenty vehicles during the peak hour.
D. For the intersection of OR 213 & Beavercreek Road, the following mobility standards apply:
1. During the first, second & third hours, a maximum v/c ratio of 1.00 shall be maintained. Calculation of the maximum v/c ratio will be based on an average annual weekday peak hour.
E. Until the City adopts new performance measures that identify alternative mobility targets, the City shall exempt proposed development that is permitted, either conditionally, outright, or through detailed development master plan approval, from compliance with the above-referenced mobility standards for the following state-owned facilities:
I-205/OR 99E Interchange
State intersections located within or on the Regional Center Boundaries
1. In the case of conceptual development approval for a master plan that impacts the above references intersections:
a. The form of mitigation will be determined at the time of the detailed development plan review for subsequent phases utilizing the Code in place at the time the detailed development plan is submitted; and
b. Only those trips approved by a detailed development plan review are vested.
2. Development which does not comply with the mobility standards for the intersections identified in OCMC 16.12.033 shall provide for the improvements identified in the Transportation System Plan (TSP) in an effort to improve intersection mobility as necessary to offset the impact caused by development. Where required by other provisions of the Code, the applicant shall provide a traffic impact study that includes an assessment of the development's impact on the intersections identified in this exemption and shall construct the intersection improvements listed in the TSP or required by the Code.

Finding: Complies as Proposed. The Project is within the Regional Center and includes the I-205/OR 99E interchange. The City's Traffic Engineer, John Replinger, provided the following comments (Exhibit 3):

> *Based on the inclusion of the project in both Metro's RTP and the City's TSP, ODOT's current project can be described as a mitigation measure that helps address the region's growth and supports its land use plans rather than as a typical land use action that requires separate evaluation and mitigation.*

16.12.035 - Driveways.
A. All new development and redevelopment shall meet the minimum driveway spacing standards identified in Table 16.12.035.A.

Table 16.12.035.A Minimum Driveway Spacing Standards

Street Functional Classification	*Minimum Driveway Spacing Standards*	*Distance*
Major Arterial Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*175 ft.*
Minor Arterial Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*175 ft.*
Collector Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*100 ft.*
Local Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*25 ft.*

The distance from a street corner to a driveway is measured along the right-of-way from the edge of the intersection (on the same side of the road) right-of-way to the nearest portion of the driveway and the distance between driveways is measured at the nearest portions of the driveway at the right-of-way.
Finding: Not Applicable. No new driveways are proposed, and existing driveways are not required to be modified with the development.

B. Nonresidential or multi-family residential driveways that generate high traffic volumes shall be treated as intersections and shall adhere to requirements of OCMC 16.12.020.
Finding: Not Applicable. Nonresidential or multi-family residential driveways proposed for this development will not generate high traffic volumes.

C. One driveway may be allowed per frontage, unless otherwise restricted. In no case shall more than two driveways be allowed for any single-family attached or detached residential property, duplex, 3-4 plex, or property developed with an ADU or internal conversion with multiple frontages, unless otherwise approved by the City Engineer.
Finding: Not Applicable. The development is not for a residential property and no new driveways are proposed.

D. When a property fronts multiple roads, access shall be provided from the road with the lowest classification in the Transportation System Plan whenever possible to minimize points of access to arterials and collectors. At the discretion of the City Engineer, properties fronting a collector or arterial road may be allowed a second driveway, for the creation of a circulation pattern that eliminates reverse maneuvers for vehicles exiting a property if applied for and granted through procedures in OCMC 16.12.013. All lots proposed with a driveway and lot orientation on a collector or minor arterial shall combine driveways into one joint access per two or more lots unless the City Engineer determines that:
1. No driveway access may be allowed since the driveway(s) would cause a significant traffic safety hazard; or
2. Allowing a single driveway access per lot will not cause a significant traffic safety hazard.
Finding: Not Applicable. The development has not proposed new driveways.

E. All driveway approaches shall be limited to the dimensions identified in Table 16.12.035.D.

Table 16.12.035.D Driveway Approach Size Standards

Property Use	*Minimum Driveway Approach Width*		*Maximum Driveway Approach Width*
Single-Family Attached	*10 feet*		*12 feet*
Single-Family Detached in R-5 & R-3.5	*10 feet*		*12 feet*
Single-Family Detached in R-10, R-8, & R-6	*12 feet*		*24 feet*
Duplexes	*12 feet*		*24 feet*
3-4 Plexes	*12 feet*		*24 feet*
Multi-Family	*18 feet*		*30 feet*
Commercial, Industrial, Office, Institutional, Mixed Use, and/or Nonresidential	*One-Way 12 feet*	*Two-Way 20 feet*	*40 feet*

Driveway widths shall match the width of the driveway approach where the driveway meets sidewalk or property line but may be widened onsite (for example between the property line and the entrance to a garage). Groups of more than four parking spaces shall be so located and served by driveways so that their use will not require backing movements or other maneuvering within a street right-of-way other than an alley.

Finding: Not Applicable. The development has not proposed new driveways.

F. The City Engineer reserves the right to require a reduction in the number and size of driveway approaches as far as practicable for any of the following purposes:

1. To provide adequate space for on-street parking;

2. To facilitate street tree planting requirements;

3. To assure pedestrian and vehicular safety by limiting vehicular access points; and

4. To assure that adequate sight distance requirements are met.

a. Where the decision maker determines any of these situations exist or may occur due to the approval of a proposed development for non-residential uses or attached or multi-family housing, a shared driveway shall be required and limited to twenty-four feet in width adjacent to the sidewalk or property line.

Finding: Not Applicable. No restrictions are proposed by the City Engineer.

G. For all driveways, the following standards apply.

1. Each new or redeveloped curb cut shall have an approved concrete approach or asphalted street connection where there is no concrete curb and a minimum hard surface for at least ten feet back into the property as measured from the current edge of sidewalk or street pavement to provide for controlling gravel tracking onto the public street. The hard surface may be concrete, asphalt, or other surface approved by the City Engineer.

2. Any driveway approach built within public right-of-way shall be built and permitted per City requirements as approved by the City Engineer.

3. No driveway with a slope of greater than fifteen percent shall be permitted without approval of the City Engineer.

Finding: Not Applicable. The development has not proposed new driveways.

H. Exceptions. The City Engineer reserves the right to waive these standards or not allow driveway access, if the driveway(s) would cause a significant traffic safety hazard. Narrower driveway widths may be considered where field conditions preclude use of recommended widths. When larger vehicles and trucks will be the predominant users of a particular driveway, turning templates may be utilized to develop a driveway width that can safely and expeditiously accommodate the prevalent type of ingress and egress traffic.
Finding: Not Applicable. No exemptions are proposed.

16.12.065 - Building site—Grading.
Grading of building sites shall conform to the State of Oregon Structural Specialty Code, Title 18, any approved grading plan and any approved residential lot grading plan in accordance with the requirements of OCMC 13.12,15.48, 16.12 and the Public Works Stormwater and Grading Design Standards, and the erosion control requirements of OCMC 17.47.
Finding: Not Applicable. No building is proposed to be constructed with the development.

16.12.085 - Easements.
The following shall govern the location, improvement and layout of easements:
A. Utilities. Utility easements shall be required where necessary as determined by the City Engineer. Insofar as practicable, easements shall be continuous and aligned from block-to-block within the development and with adjoining subdivisions or partitions. Specific utility easements for water, sanitary or storm drainage shall be provided based on approved final engineering plans.
Finding: Complies as proposed. The project area is located within Oregon Department of Transportation (ODOT) right-of-way (ROW). There is Oregon City owned water, sanitary sewer and storm infrastructure within ODOT ROW. The development has stated that an easement can restrict the State's ability to maintain and operate the interstate and is prohibited by 23 CFR 710.409; therefore, the applicant does not propose any easements. However, the city does not concur with this assertion; easements required by Oregon City will not restrict the State's ability to maintain and operate the interstate. The property owner shall execute an easement which allows Oregon City to access, operate and maintain city owned water, sanitary sewer and stormwater infrastructure within Oregon Department of Transportation right-of-way. The agreement shall include a site plan identifying all applicable city-owned facilities. The agreement shall run with the land and be applicable to subsequent property owners. The Easement shall be reviewed and accepted by the City prior to recording and the developer shall pay associated recording fees. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

B. Unusual Facilities. Easements for unusual facilities such as high voltage electric transmission lines, drainage channels and stormwater detention facilities shall be adequately sized for their intended purpose, including any necessary maintenance roads. These easements shall be shown to scale on the preliminary and final plats or maps. If the easement is for drainage channels, stormwater detention facilities or related purposes, the easement shall comply with the requirements of the Public Works Stormwater and Grading Design Standards.
Finding: Not Applicable. The City Engineer has not determined any necessary utility easements or unusual facilities. The Project area is located within State (ODOT) right-of-way. ROW is required for operation, maintenance, and safety of the facility. An easement can restrict the State's ability to maintain and operate the interstate and is prohibited by 23 CFR 710.409; therefore, the Applicant does not propose any easements.

C. Watercourses. Where a development is traversed or bounded by a watercourse, drainageway, channel or stream, a stormwater easement or drainage right-of-way shall be provided which conforms substantially to the line of such watercourse, drainageway, channel or stream and is of a sufficient width to allow construction, maintenance and control for the purpose as required by the responsible agency. For those subdivisions or partitions which are bounded by a stream of established recreational value, setbacks or easements may be required to prevent impacts to the water resource or to accommodate pedestrian or bicycle paths.
Finding: Complies with Condition. The development proposes construction activities over or near a watercourse, drainageway, channel or stream, specifically the Willamette River and Abernethy Creek. See findings from sections 13.12 & 17.49 regarding requirements for construction near, or over, natural watercourses, drainageways, channels or streams. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

D. Access. When easements are used to provide vehicular access to lots within a development, the construction standards, but not necessarily width standards, for the easement shall meet City specifications. The minimum width of the easement shall be 20 feet. The easements shall be improved and recorded by the applicant and inspected by the City Engineer. Access easements may also provide for utility placement.
Finding: Not Applicable. Easements are not used to provide vehicular access to lots within the development. Existing rights-of-way provide access to the development property.

E. Resource Protection. Easements or other protective measures may also be required as the Community Development Director deems necessary to ensure compliance with applicable review criteria protecting any unusual significant natural feature or features of historic significance.
Finding: See findings from section Chapter 17.49 of this report regarding Easements or other protective measures required by the Community Development Director.

16.12.090 - Minimum improvements—Procedures.
In addition to other requirements, improvements installed by the applicant either as a requirement of these or other regulations, or at the applicant's option, shall conform to the requirements of this title and be designed to City specifications and standards as set out in the City's facility master plan and Public Works Stormwater and Grading Design Standards. The improvements shall be installed in accordance with the following procedure:
A. Improvement work shall not commence until construction plans have been reviewed and approved by the City Engineer and to the extent that improvements are located in County or State right-of-way, they shall be approved by the responsible authority. To the extent necessary for evaluation of the proposal, the plans may be required before approval of the preliminary plat of a subdivision or partition. Expenses incurred thereby shall be borne by the applicant and paid for prior to final plan review.
Finding: Complies with Condition. Commencement of improvement work is further restricted by requirements of section 16.12.014; see section 16.12.014 of this report for associated findings. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

B. Improvements shall be constructed under the inspection and approval of the City Engineer. Expenses incurred thereby shall be borne by the applicant and paid prior to final approval. Where required by the City Engineer or other City decision-maker, the applicant's project engineer also shall inspect construction.

Finding: Complies with Condition. Improvements shall be constructed under the inspection and approval of the City. Expenses incurred thereby shall be borne by the applicant and paid prior to final approval. The applicant's project engineer also shall inspect construction. A certificate of completion is required prior to providing a punchlist for the contractor. The punchlist must be completed prior to final acceptance by the city. Payment for inspection fees is further limited by requirements of section 16.12.014; see section 16.12.014 of this report for associated findings. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

C. Erosion control or resource protection facilities or measures are required to be installed in accordance with the requirements of OCMC 17.47, 17.49 and the Public Works Erosion and Sediment Control Standards.
Finding: See findings from section 17.47, 17.49 of this report.

D. Underground utilities, waterlines, sanitary sewers and storm drains installed in streets shall be constructed prior to the surfacing of the streets. Stubs for service connections for underground utilities, such as, storm, water and sanitary sewer shall be placed beyond the ten-foot wide franchise utility easement within private property.
Finding: Not Applicable. There are no franchise utility easements within the development area; underground utilities are only proposed within ODOT ROW.

E. As-built construction plans and digital copies of as-built drawings shall be filed with the City Engineer upon completion of the improvements.
Finding: Complies with Condition. As-built construction plans and digital copies of as-built drawings shall be filed with the City Engineer within 90 days of completing improvements. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

F. The City Engineer may regulate the hours of construction and access routes for construction equipment to minimize impacts on adjoining residences or neighborhoods.
Finding: Complies with Condition. Permitted hours of construction shall be set forth by the City Engineer in the pre-construction meeting. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

16.12.095 - Minimum improvements—Public facilities and services.
The following minimum improvements shall be required of all applicants for a development, unless the decision-maker determines that any such improvement is not proportional to the impact imposed on the City's public systems and facilities:
A. Transportation System. Applicants and all subsequent lot owners shall be responsible for improving the City's planned level of service on all public streets, including alleys within the development and those portions of public streets adjacent to but only partially within development. Applicants are responsible for designing and providing adequate vehicular, bicycle and pedestrian access to their developments and for accommodating future access to neighboring undeveloped properties that are suitably zoned for future development. Storm drainage facilities shall be installed and connected to off-site natural or man-made drainageways. Upon completion of the street improvement survey, the applicant shall reestablish and protect monuments of the type required by ORS 92.060 in monument boxes with covers at every public street intersection and all points or curvature and points of tangency of their center line, and at such other points as directed by the City Engineer.

Finding: Complies as Proposed. The Applicant's proposal is a transportation improvement Project. No new development is proposed that would adversely affect the transportation system. Sidewalks will be constructed along Main Street and the east side of Clackamette Drive within the project limits.

B. Stormwater Drainage System. Applicants shall design and install drainage facilities within a development and shall connect the development's drainage system to the appropriate downstream storm drainage system as a minimum requirement for providing services to the applicant's development. The applicant shall obtain county or state approval when appropriate. Applicants are responsible for extending the appropriate storm drainage system to the development site and for providing for the connection of upgradient properties to that system. The applicant shall design the drainage facilities in accordance with City drainage master plan requirements, OCMC 13.12 and the Public Works Stormwater and Grading Design Standards.
Finding: Complies with Condition. See findings from section 13.12 for the design of stormwater management facilities to serve the development. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

C. Sanitary Sewer System. The applicant shall design and install a sanitary sewer system to serve all lots or parcels within a development in accordance with the City's sanitary sewer design standards, and shall connect those lots or parcels to the City's sanitary sewer system, except where connection is required to the county sanitary sewer system as approved by the county. Applicants are responsible for extending the City's sanitary sewer system to the development site and through the applicant's property to allow for the future connection of neighboring undeveloped properties that are suitably zoned for future development. The applicant shall obtain all required permits and approvals from all affected jurisdictions prior to final approval and prior to commencement of construction. Design shall be approved by the City Engineer before construction begins.
Finding: Not Applicable. The Applicant's proposal does not require sanitary sewer facilities.

D. Water System. The applicant shall design and install a water system to serve all lots or parcels within a development in accordance with the City public works water system design standards, and shall connect those lots or parcels to the City's water system. Applicants are responsible for extending the City's water system to the development site and through the applicant's property to allow for the future connection of neighboring undeveloped properties that are suitably zoned for future development.
Finding: Not Applicable. The Applicant's proposal does not require water system facilities.

E. Street Trees. Refer to OCMC 12.08, Street Trees.
Finding: See findings from section 12.08.

F. Bench Marks. At least one bench mark shall be located within the subdivision boundaries using datum plane specified by the City Engineer.
Finding: Complies with Condition. The engineering plans shall provide a local benchmark, onsite, using the NAVD88 datum. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

G. Other Utilities. The applicant shall make all necessary arrangements with utility companies or other affected parties for the installation of underground lines and facilities. Existing and new electrical lines and other wires, including but not limited to communication, street lighting and cable television, shall be placed underground.

Finding: Complies as Proposed. The development proposes to comply with city requirements to place electrical lines and other wires, including but not limited to communication, street lighting and cable television underground.

H. Oversizing of Facilities. All facilities and improvements shall be designed to City standards as set out in the City's facility master plan, public works design standards, or other City ordinances or regulations. Compliance with facility design standards shall be addressed during final engineering. A development may be required to modify or replace existing offsite systems if necessary to provide adequate public facilities. The City may require oversizing of facilities to meet standards in the City's facility master plan or to allow for orderly and efficient development. Where oversizing is required, the applicant may request reimbursement from the City for oversizing based on the City's reimbursement policy and funds available, or provide for recovery of costs from intervening properties as they develop.
Finding: Not Applicable. No facilities are required to be oversized as part of this application.

I. Erosion Control Plan—Mitigation. The applicant shall be responsible for complying with all applicable provisions of OCMC 17.47 with regard to erosion control.
Finding: See findings from section 17.47 of this report

16.12.100 - Same—Road standards and requirements.
A. The creation of a public street and the resultant separate land parcels shall be in conformance with requirements for subdivisions or partitions and the applicable street design standards of this Chapter. However, the decision-maker may approve the creation of a public street to be established by deed without full compliance with the regulations applicable to subdivisions or partitions where any of the following conditions exist:
1. The establishment of the public street is initiated by the City Commission and is declared essential for the purpose of general traffic circulation and the partitioning of land is an incidental effect rather than the primary objective of the street;
2. The tract in which the street is to be dedicated is within an isolated ownership either not over one acre or of such size and characteristics as to make it impossible to develop building sites for more than three dwelling units.
Finding: Not Applicable. The creation of a new public street is not proposed or required.

B. For any public street created pursuant to subsection A of this section, a copy of a preliminary plan and the proposed deed shall be submitted to the Community Development Director and City Engineer at least ten days prior to any public hearing scheduled for the matter. The plan, deed and any additional information the applicant may submit shall be reviewed by the decision-maker and, if not in conflict with the standards of Title 16 and Title 17, may be approved with appropriate conditions.
Finding: Not Applicable. The applicant has not proposed the creation of a public street to be established by deed without full compliance with the regulations applicable to subdivisions or partitions.

16.12.105 - Same—Timing requirements.
A. Prior to applying for final plat approval, the applicant shall either complete construction of all public improvements required as part of the preliminary plat approval or guarantee the construction of those improvements. Whichever option the applicant elects shall be in accordance with OCMC 17.50.140.
Finding: Not Applicable. The city has only afforded the applicant the option to construct the public improvements according to approved final engineering plans and all applicable requirements of this Code. A plat is not proposed or required for this development.

B. Construction. The applicant shall construct the public improvements according to approved final engineering plans and all applicable requirements of this Code, and under the supervision of the City Engineer. Under this option, the improvement shall be complete and accepted by the City Engineer prior to final plat approval.
Finding: Not Applicable. A plat is not proposed or required for this development.

16.12.110 -Public improvements—Financial guarantees.
A. To ensure construction of required public improvements, the applicant shall provide the City with a performance guarantee in accordance with OCMC 17.50.140.
Finding: Please see findings from Section17.50.140 of this report.

B. After satisfactory completion of required public improvements and facilities, all public improvements not constructed by the City, shall be maintained and under warranty provided by the property owner or developer constructing the facilities until the City accepts the improvements at the end of the warranty period as prescribed in OCMC 17.50.141.
Finding: Please see findings from Section17.50.141 of this report.

16.12.120 Waiver of Remonstrance
The review authority may require a property owner to sign a waiver of remonstrance against the formation of and participation in a local improvement district where it deems such a waiver necessary to provide needed improvements reasonably related to the impacts created by the proposed development. To ensure compliance with this chapter, the review authority may require an applicant to sign or accept a legal and enforceable covenant, contract, dedication, easement, performance guarantee, or other document, which shall be approved in form by the City Attorney.
Finding: Not Applicable. The project area is located within Oregon Department of Transportation (ODOT) right-of-way (ROW). The review authority will not require the property owner to sign a waiver of remonstrance against the formation of and participation in a local improvement district.

CHAPTER 17.47 – EROSION AND SEDIMENT CONTROL

17.47.030 - Applicability.
A. This chapter, which may also be referred to as "erosion control" in this Code, applies to development that may cause visible or measurable erosion on any property within the city limits of Oregon City.
B. This chapter does not apply to work necessary to protect, repair, maintain or replace existing structures, utility facilities, roadways, driveways, accessory uses and exterior improvements in response to emergencies, provided that after the emergency has passed, adverse impacts are mitigated in accordance with applicable standards.
Finding: Applicable. The application disturbs more than 1,000 square feet of earth; therefore, erosion and sediment control standards shall be followed.

17.47.060 - Permit required.
The applicant must obtain an erosion and sediment control permit prior to, or contemporaneous with, the approval of an application for any building, land use or other city-issued permit that may cause visible or measurable erosion.
Finding: Complies with Condition. A city issued erosion and sediment control permit shall be obtained prior to commencement of any earth disturbing activities. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.47.070 - Erosion and sediment control plans.
A. An application for an erosion and sediment control permit shall include an erosion and sediment control plan, which contains methods and interim measures to be used during and following construction to prevent or control erosion prepared in compliance with City of Oregon City public works standards for erosion and sediment control. These standards are incorporated herein and made a part of this title and are on file in the office of the city recorder.
B. Approval Standards. An erosion and sediment control plan shall be approved only upon making the following findings:
1. The erosion and sediment control plan meets the requirements of the City of Oregon City public works standards for erosion and sediment control incorporated by reference as part of this chapter;
2. The erosion and sediment control plan indicates that erosion and sediment control measures will be managed and maintained during and following development. The erosion and sediment control plan indicates that erosion and sediment control measures will remain in place until disturbed soil areas are permanently stabilized by landscaping, grass, approved mulch or other permanent soil stabilizing measures.
C. The erosion and sediment control plan shall be reviewed in conjunction with the requested development approval. If the development does not require additional review, the manager may approve or deny the permit with notice of the decision to the applicant.
D. The city may inspect the development site to determine compliance with the erosion and sediment control plan and permit.
E. Erosion that occurs on a development site that does not have an erosion and sediment control permit, or that results from a failure to comply with the terms of such a permit, constitutes a violation of this chapter.
F. If the manager finds that the facilities and techniques approved in an erosion and sediment control plan and permit are not sufficient to prevent erosion, the manager shall notify the owner or his/her designated representative. Upon receiving notice, the owner or his/her designated representative shall immediately install interim erosion and sediment control measures as specified in the City of Oregon City public works standards for erosion and sediment control. Within three days from the date of notice, the owner or his/her designated representative shall submit a revised erosion and sediment control plan to the city. Upon approval of the revised plan and issuance of an amended permit, the owner or his/her designated representative shall immediately implement the revised plan.
G. Approval of an erosion and sediment control plan does not constitute an approval of permanent road or drainage design (e.g., size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).
Finding: Complies with Condition. Erosion and sediment control plans shall be submitted for review and approval by the City prior to issuance of an erosion and sediment control permit. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.47.080 - Plan implementation.
An approved erosion control and sediment control plan shall be implemented and maintained as follows:
A. Plan approval, where required, shall be obtained prior to clearing or grading. No grading, clearing or excavation of land requiring a plan shall be undertaken prior to approval of the plan.

B. The erosion and sediment control facilities shall be constructed prior to any clearing and grading activities, and maintained in such a manner as to ensure that sediment laden water does not enter the drainage system or violate applicable water standards.
C. The implementation of an erosion and sediment control plan and the construction, maintenance, replacement, and upgrading of erosion and sediment control facilities is the responsibility of the owner or his/her designated representative until all construction is completed and approved, and vegetation, landscaping or approved finished surfaces is established.
D. The erosion and sediment control facilities herein are the minimum requirements for anticipated site conditions. During the construction period, these erosion and sediment control facilities shall be upgraded as needed for unexpected storm events and to ensure that sediment-laden water does not leave the site.
E. Any observation of visible or measurable erosion, or an observation of more than a ten-percent increase in downstream channel turbidities, will result in an enforcement action by the city.
F. The owner or his/her designated representative shall implement the measures and construct facilities as provided for and according to the implementation schedule in the approved plan. The manager shall be allowed reasonable access to the development site for inspection purposes.
Finding: Applicable. The Oregon City Erosion Control Officer ensures that the development will comply with the city's Erosion and Sediment Control Standards. The Oregon City Erosion Control Officer will access the development site and perform inspections to ensure compliance.

17.47.090 - Plan performance guarantee and security.
After the plan is approved by the manager and prior to construction or grading, the owner shall provide a financial guarantee. Erosion and sediment control shall be included in the cost estimate for the primary project, such as land division or site plan, and included in that project's performance guarantee.
Finding: See Findings in Chapter 17.50.

CHAPTER 12.08 PUBLIC AND STREET TREES

12.08.015 - Street tree selection, planting and maintenance requirements.
All development shall provide street trees adjacent to all street frontages. Species and locations of trees shall be selected based upon vision clearance requirements, but shall in all cases be selected from the Oregon City Street Tree List, an approved street tree list for a jurisdiction in the metropolitan region, or be approved by a certified arborist unless otherwise approved pursuant to this section. If a setback sidewalk has already been constructed or the Public Works Department determines that the forthcoming street design shall include a setback sidewalk, then all street trees shall be installed with a planting strip or within tree wells. If existing street design includes a curb-tight sidewalk, then all street trees shall be placed according to OCMC 12.08.035.C.

- *A. One street tree shall be planted for every thirty-five feet of property frontage. The tree spacing shall be evenly distributed throughout the total development frontage to meet the clearance distances required in subsection (B) below. The Community Development Director may approve an alternative street tree plan, or accept fee-in-lieu of planting pursuant to OCMC 12.08.035, if site or other constraints prevent meeting the required total number of tree plantings.*
- *B. The following clearance distances shall be maintained when planting trees:*
  1. *Fifteen feet from streetlights;*
  2. *Five feet from fire hydrants;*
  3. *Twenty feet from intersections;*
  4. *Five feet from all public utilities (i.e. sewer, storm and water lines, utility meters, etc.);*

C. All street trees planted in conjunction with development shall be a minimum of two inches in caliper at six inches above the root crown and installed to city specifications. Larger caliper size trees may be approved if recommended by a certified arborist or registered landscape architect.

D. All established trees shall be pruned tight to the trunk to a height that provides adequate clearance for street cleaning equipment and ensures ADA complaint clearance for pedestrians.

E. All trees planted within the right-of-way shall be planted with root barriers at least eighteen inches in depth adjacent to the sidewalk and curb to ensure proper root growth and reduce potential damage to sidewalks, curbs and gutters.

F. All trees planted beneath powerlines shall be selected based on what is appropriate for the location. In addition, the tree species shall be approved by the associated franchise powerline utility company.

G. Tree species, spacing and selection for stormwater facilities in the public right-of-way and in storm water facilities shall conform to requirements of OCMC 13.12 and the adopted Stormwater and Grading Design Standards and be approved by the City Engineer.

H. Any public or street trees planted within the Natural Resource Overlay District shall conform to the applicable requirements of OCMC 17.49 - Natural Resources Overlay District (NROD).

Finding: Complies with Condition. The project is primarily within the right-of-way, where there is no property frontage. Jon Storm Park and Sportcraft Landing are the only properties with frontage that are part of this project. The properties have approximately 1,100 feet of frontage requiring 31 street trees. The applicant has submitted a street tree plan which includes more than 31 street trees.
The applicant has proposed more than 31 street trees, and the applicant's narrative identified that street trees will comply with placement, species, and size requirements. In the event that tree planting locations or the number of proposed street trees are adjusted, the applicant shall submit a finalized street tree plan demonstrating compliance with tree size, species, and placement requirements in OCMC 12.08 prior to removal of any trees associated with the proposed project. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.08.035 - Tree removal and replacement.

Existing street trees, trees in the right-of-way, and trees on public property shall be retained and protected during development unless removal is specified as part of a land use approval or in conjunction with a public capital improvement project, in accordance with OCMC 17.41.

Finding: Complies. Any street tree removal proposed is reviewed in accordance with OCMC 17.41 or OCMC 17.49 if the tree is located within the Natural Resource Overlay District.

CHAPTER 17.34 MUD MIXED USE DOWNTOWN DISTRICT

17.34.020 - Permitted uses.

Permitted uses in the MUD district are defined as:

A. Banquet, conference facilities and meeting rooms;

B. Bed and breakfast/boarding houses, hotels, motels, and other lodging facilities;

C. Child care centers and/or nursery schools;

D. Indoor entertainment centers and arcades;

E. Health and fitness clubs;

F. Medical and dental clinics, outpatient; infirmary services;

G. Museums, libraries and cultural facilities;

H. Offices, including finance, insurance, real estate and government;

I. Outdoor markets, such as produce stands, craft markets and farmers markets that are operated on the weekends and after six p.m. during the weekday;
J. Postal services;
K.. Repair shops, for radio and television, office equipment, bicycles, electronic equipment, shoes and small appliances and equipment;
L. Multifamily residential, 3-4 plex residential;
M. 1 or 2 units in conjunction with a nonresidential use provided that the residential use occupies no more than 50% of the total square footage of the development;
N. Restaurants, eating and drinking establishments without a drive through;
O. Services, including personal, professional, educational and financial services; laundry and dry-cleaning;
P. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores provided the maximum footprint of a freestanding building with a single store does not exceed sixty thousand square feet (a freestanding building over sixty thousand square feet is allowed as long as the building contains multiple stores);
Q. Seasonal sales;
R. Residential care facilities, assisted living facilities; nursing homes and group homes for over fifteen patients licensed by the state;
S. Studios and galleries, including dance, art, photography, music and other arts;
T. Utilities: Basic and linear facilities, such as water, sewer, power, telephone, cable, electrical and natural gas lines, not including major facilities such as sewage and water treatment plants, pump stations, water tanks, telephone exchanges and cell towers;
U. Veterinary clinics or pet hospitals, pet day care;
V. Home occupations;
W. Research and development activities;
X. Temporary real estate offices in model dwellings located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed;
Y. Transportation facilities;
Z. Live/work dwellings;
AA. After-hours public parking;
BB. Marinas;
CC. Religious institutions.
DD. Mobile food units outside of the downtown design district.

Finding: Complies as Proposed. The applicant has proposed additional on-street parking on Clackamette Drive. Part of Clackamette Drive is located within Jon Storm Park, and part of it is right-of-way within the MUD district. Because the portion of the proposed parking in MUD is within the right-of-way, it is considered a transportation facility, which is a permitted use.

17.34.030 - Conditional uses.
The following uses are permitted in this district when authorized and in accordance with the process and standards contained in OCMC 17.56.
A. Drive-through facilities;
B. Emergency services;
C. Hospitals;
D. Outdoor markets that do not meet the criteria of OCMC 17.34.020.I.;
E. Parks, playgrounds, play fields and community or neighborhood centers;
F. Parking structures and lots not in conjunction with a primary use on private property, excluding after-hours public parking;

G. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies and specialty stores in a freestanding building with a single store exceeding a foot print of sixty thousand square feet;
H. Public facilities such as sewage and water treatment plants, water towers and recycling and resource recovery centers;
I. Public utilities and services such as pump stations and sub-stations;
J. Distributing, wholesaling and warehousing;
K. Gas stations;
L. Public and or private educational or training facilities;
M. Stadiums and arenas;
N. Passenger terminals (water, auto, bus, train), excluding bus stops;
O. Recycling center and/or solid waste facility;
P. Shelters, except within the Downtown Design District.
Finding: Complies as Proposed. No conditional uses within the MUD District have been proposed.

17.34.040 - Prohibited uses.
The following uses are prohibited in the MUD district:
A. Kennels;
B. Outdoor storage and sales, not including outdoor markets allowed in OCMC 17.34.030;
C. Self-service storage;
D. Single-Family attached and detached residential units and duplexes;
E. Motor vehicle and recreational vehicle repair/service;
F. Motor vehicle and recreational vehicle sales and incidental service;
G. Heavy equipment service, repair, sales, storage or rental[2] (including but not limited to construction equipment and machinery and farming equipment);
H. Marijuana production, processing, wholesaling, research, testing, and laboratories;
I. Mobile food units within the downtown design district unless a special event has been issued.
Finding: Complies as Proposed. No prohibited uses within the MUD District have been proposed.

17.34.050 - Pre-existing industrial uses.
Tax lot 5400 located at Clackamas County Tax Assessors Map #22E20DD, Tax Lots 100 and two hundred located on Clackamas County Tax Assessors Map #22E30DD and Tax Lot 700 located on Clackamas County Tax Assessors Map #22E29CB have special provisions for industrial uses. These properties may maintain and expand their industrial uses on existing tax lots. A change in use is allowed as long as there is no greater impact on the area than the existing use.
Finding: Not Applicable. The project does not include development on tax lots with pre-existing industrial uses.

17.34.060 - Mixed-use downtown dimensional standards—For properties located outside of the downtown design district.
A. Minimum lot area: None.
Finding: Not Applicable. No new lots have been proposed.

B. Minimum floor area ratio: 0.30.
C. Minimum building height: Twenty-five feet or two stories except for accessory structures or buildings under one thousand square feet.

D. Maximum building height: Seventy-five feet, except for the following location where the maximum building height shall be forty-five feet:
1. Properties between Main Street and McLoughlin Boulevard and 11th and 16th streets;
2. Property within five hundred feet of the End of the Oregon Trail Center property; or
3. Property abutting single-family detached or attached units.
E. Minimum required setbacks, if not abutting a residential zone: None.
F. Minimum required interior side yard and rear yard setback if abutting a residential zone: Fifteen feet, plus one additional foot in yard setback for every two feet in height over thirty-five feet.
G. Maximum Allowed Setbacks.
1. Front yard: Twenty feet.
2. Interior side yard: No maximum.
4. Rear yard: No maximum.
5. Rear yard abutting street: Twenty feet.
H. Maximum site coverage including the building and parking lot: Ninety percent.
I. Minimum landscape requirement (including parking lot): Ten percent.
Finding: Not Applicable. No new structures have been proposed within the MUD district.

J. Residential minimum net density of 17.4 units per acre, except that no minimum net density shall apply to residential uses proposed above nonresidential uses in a vertical mixed-use configuration or to live/work dwellings.
Finding: Not Applicable. No residential development is proposed.

17.34.070 - Mixed-use downtown dimensional standards—For properties located within the downtown design district.
Finding: Not Applicable. The site is not within the downtown design district.

CHAPTER 17.39 I INSTITUTIONAL DISTRICT

17.39.020 - Permitted uses.
Permitted uses in the institutional district are:
A. Private and/or public educational or training facilities;
B. Parks, playgrounds, playfields and community or neighborhood community centers;
C. Public facilities and services including courts, libraries and general government offices and maintenance facilities;
D. Stadiums and arenas;
E. Banquet, conference facilities and meeting rooms;
F. Government offices;
G. Transportation facilities;
H. Mobile food units.
Finding: Permitted. The project includes temporary construction staging areas in Jon Storm Park, and modifications to the Abernethy Bridge, which is a transportation facility permitted in this zone. Additionally, new parking for Jon Storm Park is proposed, which is accessory to the park use.

17.39.030 - Accessory uses.
The following uses are permitted outright if they are accessory to and related to the primary institutional use:
A. Offices;
B. Retail (not to exceed twenty percent of total gross floor area of all building);

C. Child care centers or nursery schools;
D. Scientific, educational, or medical research facilities and laboratories;
E. Religious institutions.
Finding: Not Applicable. No accessory uses have been proposed.

17.39.040 - Conditional uses.
Uses requiring conditional use permit are:
A. Any uses listed under OCMC 17.39.030 that are not accessory to the primary institutional use;
B. Boarding and lodging houses, bed and breakfast inns;
C. Cemeteries, crematories, mausoleums, and columbariums;
D. Correctional facilities;
E. Helipad in conjunction with a permitted use;
F. Parking lots not in conjunction with a primary use;
G. Public utilities, including sub-stations (such as buildings, plants and other structures);
H. Fire stations;
I. Police Station.
Finding: Not Applicable. No conditional uses have been proposed. The parking lot proposed for Jon Storm Park is associated with a primary use, therefore, it does not require a conditional use permit.

17.39.045 - Prohibited uses.
Prohibited uses in the I district are:
A. Any use not expressly listed in OCMC 17.39.020, 17.39.030 or 17.39.040;
B. Marijuana businesses;
Finding: Complies as Proposed. No prohibited uses have been proposed.

17.39.050 - Dimensional standards.
Dimensional standards in the I district are:
A. Maximum building height: Within one hundred feet of any district boundary, not to exceed thirty-five feet; elsewhere, not to exceed seventy feet.
Finding: The proposed bridge supports are within 100 feet of the district boundary and are approximately 90 feet in height. A variance to this standard is required. Please refer to the variance findings in Chapter 17.60 of this report.

B. Minimum required setbacks: Twenty-five feet from property line except when the development is adjacent to a public right-of-way. When adjacent to a public right-of-way, the minimum setback is zero feet and the maximum setback is five feet.
Finding: Complies as Proposed. The proposed bridge supports are in compliance with setback requirements in the institutional zone.

C. Minimum required landscaping (including landscaping within a parking lot): Fifteen percent.
Finding: Complies as Proposed. Jon Storm Park and Sportcraft Landing are in compliance with landscaping requirements. Though Jon Storm Park will be used as a construction staging area and landscaping may be temporarily impacted, the park will be brought to pre-construction conditions upon completion of the project, therefore, minimum required landscaping will remain in compliance.

17.39.060 - Relationship to master plan.
A. A master plan is required for any development within the I District on a site over ten acres in size that:
1. Is for a new development on a vacant property;

2. Is for the redevelopment of a property previously used an a non-institutional use; or
3. Increases the floor area of the existing development by ten thousand square feet over existing conditions
B. Master plan dimensional standards that are less restrictive than those of the Institutional District require adjustments. Adjustments will address the criteria of OCMC 17.65.70 and will be processed concurrently with the master plan application.
C. Modifications to other development standards in the code may be made as part of the phased master plan adjustment process. All modifications shall be in accordance with the requirements of the master plan adjustment process identified in OCMC 17.65.070.
Finding: Not Applicable. There is a prior master plan for Jon Storm Park which has been completed. Development currently being proposed does not require a master plan.

CHAPTER 17.41 TREE PROTECTION, PRESERVATION, REMOVAL AND REPLANTING STANDARDS

17.41.020 - Tree protection—Applicability.
1. Applications for development subject to OCMC 16.08 (Land Divisions) or OCMC 17.62 (Site Plan and Design Review) shall demonstrate compliance with these standards as part of the review proceedings for those developments. Compliance with this chapter is required from the date a land use application is filed until a land division is recorded or other development approval is final.
2. For public capital improvement projects, the City Engineer shall demonstrate compliance with these standards pursuant to a Type I process.
3. Tree canopy removal greater than twenty-five percent on areas with greater than twenty-five percent slope, unless exempted under OCMC 17.41.040, shall be subject to these standards.
4. A heritage tree or grove which has been designated pursuant to the procedures of OCMC 12.32 shall be subject to the standards of this section.
5. A tree that has been planted pursuant to this section shall remain or shall be replaced with a new tree if removed.
Finding: Applicable. The project includes a Site Plan and Design Review application, therefore, these standards are applicable.

17.41.030 - Tree protection—Conflicting code provisions.
Except as otherwise specified in this section, where these standards conflict with adopted city development codes or policies, the provision which provides the greater protection for regulated trees or groves, as defined in OCMC 17.04, shall govern.
Finding: Complies as Proposed. Tree removal associated with this project is subject to OCMC 17.41, except for tree removal within the Natural Resource Overlay District which is subject to OCMC 17.49.

17.41.040 - Exemptions.

These regulations are not intended to regulate normal cutting, pruning and maintenance of trees on private property except where trees are located on lots that are undergoing development review or are otherwise protected within the Natural Resource Overlay District (NROD) of OCMC 17.49. These standards are not intended to regulate farm and forest practices as those practices are defined under ORS 30.930, for farm or forestlands. These regulations to not apply to the removal of trees that are considered invasive species. An applicant for development may claim exemption from compliance with these standards if the development site containing the regulated grove or trees was a designated farm or forest use, tree farm, Christmas tree plantation, or other approved timber use within one year prior to development application. "Forest practices" and "forestlands" as used in this subsection shall have the meaning as set out in ORS 30.930. The Community Development Director has the authority to modify or waive compliance in this case.

Finding: Not Applicable. The applicant has not requested any exemptions under this section.

17.41.050 - Compliance options.

Applicants for review shall comply with these requirements through one or a combination of the following procedures:

A. Option 1—Mitigation. Retention and removal of trees, with subsequent mitigation by replanting pursuant to OCMC 17.41.060.

B. Option 2—Dedicated Tract. Protection of trees or groves by placement in a tract within a new subdivision or partition plat pursuant to OCMC 17.41.080; or

C. Option 3—Restrictive Covenant. Protection of trees or groves by recordation of a permanent restrictive covenant pursuant to OCMC 17.41.110; or

D. Option 4—Cash-in-lieu of planting pursuant to OCMC 17.41.120.

Finding: Complies as Proposed. The applicant has proposed to utilize mitigation options 1 and 4.

17.41.060 - Tree removal and replanting—Mitigation (Option 1).

A. Applicants for development who select this option shall ensure that all healthy trees shall be preserved outside the construction area as defined in OCMC 17.04 to the extent practicable. Preserved trees are subject to Option 3 of this Chapter. Compliance with these standards shall be demonstrated in a tree mitigation plan report prepared by a certified arborist, horticulturalist or forester or other environmental professional with experience and academic credentials in forestry or arboriculture. Tree inventories for the purposes of mitigation calculations may be prepared by a licensed surveyor. At the applicant's expense, the City may require the report to be reviewed by a consulting arborist. The number of replacement trees required on a development site shall be calculated separately from, and in addition to, any public or street trees in the public right-of-way required under OCMC 12.08— Public and Street Trees, any required tree planting in parking lots, and any trees planted in pedestrian and bicycle accessways.

B. The applicant shall determine the number of trees to be mitigated on the site by counting all of the trees six-inch DBH (minimum four and one-half feet from the ground) or larger on the entire site and either:

1. Trees that are removed outside of the construction area shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2; or

2. Dying, diseased or hazardous trees, when the condition is verified by a certified arborist to be consistent with the definitions in OCMC 17.04, may be removed from the tree replacement calculation. Dead trees may also be removed from the calculation, with the condition of the tree verified either by the Community Development Director or by a certified arborist at the applicant's expense, when the Community Development Director cannot make a determination. To the extent that the Community Development Director determines that the dead, dying, hazardous or diseased condition of the tree is the

result of intentional action, the removal of that tree shall require mitigation pursuant to Column 2 of Table 17.41.060-1.

Finding: Complies with Condition. The applicant has provided a mitigation plan though it is unclear if it was prepared by a certified arborist, horiculturalist, forester or other qualified professional with experience and academic credentials in forestry or arboriculture. Prior to any tree removal associated with the project, the applicant shall submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41. **Staff has determined that it is possible, likely, and reasonable that the applicant can meet this standard through the Conditions of Approval.**

Table 17.41.060-1
Tree Replacement Requirements

Size of tree removed (DBH)	*Column 1* *Number of trees to be planted. (If removed **Outside** of construction area)*	*Column 2* *Number of trees to be planted. (If removed **Within** the construction area)*
6 to 12"	*3*	*1*
13 to 18"	*6*	*2*
19 to 24"	*9*	*3*
25 to 30"	*12*	*4*
31 and over"	*15*	*5*

Steps for calculating the number of replacement trees:

1. Count all trees measuring six inches DBH (minimum four and one-half feet from the ground) or larger on the entire development site.

2. Designate the size (DBH) of all trees pursuant to accepted industry standards.

3. Document in a certified arborist report any trees that are currently dead, dying, diseased or hazardous.

4. Subtract the number of dead, dying, diseased or hazardous trees in step 3 from the total number of trees on the development site in step 1. The remaining number is the number of healthy trees on the site. Use this number to determine the number of replacement trees in steps 5 through 8.

5. Identify the construction area (as defined in OCMC 17.04.230).

6. Determine the number and diameter of trees to be removed within the construction area. Based on the size of each tree, use Column 2 to determine the number of replacement trees required.

7. Determine the number and diameter of trees to be removed outside of the construction area. Based on the size of each tree, use Column 1 to determine the number of replacement trees required.

8. Determine the total number of replacement trees from steps 6 and 7.

Finding: Complies with Condition. The following tree removal is proposed, and associated mitigation is required:

Size of tree removed (DBH)	*Number of Trees Removed **Outside** of Construction Area*	*Number of Trees Removed **Within** the Construction area*	*Number of Mitigation Trees Required (See Table 17.41.060-1)*
6 to 12"	*0*	*74*	*74*
13 to 18"	*0*	*47*	*94*

19 to 24"	*0*	*10*	*30*
25 to 30"	*0*	*4*	*16*
31 and over"	*0*	*0*	*0*
Total	*0*	*137*	*214*

The tree removal plan includes several trees which are located within the NROD, but the mitigation proposed was calculated in accordance with the standards in 17.41. Prior to any tree removal associated with the proposed development, the applicant shall submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41 and does not include trees located within the NROD which must be mitigated in accordance with 17.49. **Staff has determined that it is possible, likely, and reasonable that the applicant can meet this standard through the Conditions of Approval.**

C. Planting area priority for mitigation.
Development applications which opt for removal of trees with subsequent replanting pursuant to OCMC 17.41.050.A. shall be required to mitigate for tree cutting by complying with the following priority for replanting standards below:
1. First Priority. Replanting on the development site.
2. Second Priority. Off-site replacement tree planting locations. If the Community Development Director determines that it is not practicable to plant the total number of replacement trees on-site, a suitable off-site planting location for the remainder of the trees may be approved that will reasonably satisfy the objectives of this section. Such locations may include either publicly owned or private land and shall be approved by the Community Development Director.
Finding: Complies with Condition. The applicant has proposed replanting in the first priority areas. In the event that additional tree removal is required or mitigation planting locations change, prior to any tree removal associated with the proposed development, the applicant shall submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41. **Staff has determined that it is possible, likely, and reasonable that the applicant can meet this standard through the Conditions of Approval.**

D. Replacement tree planting standards.
1. All replacement trees shall be either two-inch caliper deciduous or six-foot high conifer.
Finding: Please refer to findings within OCMC 17.41.060.F.

2. Replacement tree species shall be approved by a landscape architect or certified arborist or shall be found on the City's Native Plant or Street Tree lists.
Finding: Complies with Condition. Not all of the proposed replacement trees are found on the Oregon City Native Plant List or Street Tree List and it is unclear if the planting plan was prepared by a certified arborist or landscape architect. Prior to any tree removal associated with the proposed development, the applicant shall submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41 **Staff has determined that it is possible, likely, and reasonable that the applicant can meet this standard through the Conditions of Approval.**

3. Due to their diminishing range in the region, Oregon white oak (Quercus garryana) trees, if removed, shall be replaced by the same species.
Finding: Complies with Condition. It is unclear whether or not any Oregon White Oaks are proposed to be removed. Prior to any tree removal associated with the proposed development, the applicant shall

submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41. **Staff has determined that it is possible, likely, and reasonable that the applicant can meet this standard through the Conditions of Approval.**

E. All existing tree(s) in the tract shall be protected by a permanent restrictive covenant or easement approved in form by the City.

Finding: Not Applicable. All replacement trees are located either on institutional property or within the public right-of-way. These trees are already protected by Chapters 17.41 or 12.08 of the Oregon City Municipal Code, therefore, additional protections by a permanent restrictive covenant or easement are not required.

F. Alternative mitigation plan.

The Community Development Director may, subject to a Type II procedure, approve an alternative mitigation plan that adequately protects habitat pursuant to the standards for the Natural Resource Overlay District alternative mitigation plan in OCMC 17.49.190.

Finding: Does not Comply. The applicant has proposed to plant 1-inch caliper mitigation trees as opposed to the two-inch caliper trees required by this Chapter. The applicant provides the following rationale for the requested adjustment:

> *The Applicant has prepared a mitigation plan for tree replacement that varies slightly from these standards. The Applicant proposes to plant one-inch caliper trees for several reasons, including the availability of this size, especially since a large quantity is required. A one-inch caliper tree can be procured as a bareroot, container grow, or balled and burlapped (B&B). A bareroot or container grown plant and a smaller specimen is much easier to establish than a larger plant or a B&B plant. Lastly, a tree that establishes into its new home quickly, will outgrow a tree planted at a larger size and ultimately become a healthier, longer-lived tree. The primary reason to plant larger specimens is to better withstand vandalism. These trees are more likely to be threatened by harsh growing conditions than by vandalism, so the smaller planting size is recommended. See Attachment B, for the Landscaping Plan.*

The applicant has not demonstrated that the alternative mitigation plan meets the standards in OCMC 17.49.190. The proposal to have one-inch trees is not an alternative to the standard since it is in conflict with the two-inch caliper requirement. Prior to any tree removal associated with the proposed development, the applicant shall submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41**Staff has determined that it is possible, likely, and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.41.080 - Tree preservation within subdivisions and partitions—Dedicated tract (Option 2).

17.41.110 - Tree protection by restrictive covenant (Option 3).

Any regulated tree or grove which cannot be protected in a tract pursuant to Section 17.41.080 above shall be protected with a restrictive covenant in a format to be approved by the Community Development Director. Such covenant shall be recorded against the property deed and shall contain provisions to permanently protect the regulated tree or grove unless such tree or grove, as determined by a certified arborist and approved by the Community Development Director, are determined to be diseased or hazardous.

Finding: Not Applicable. Mitigation options 2 and 3 are not applicable to this project, because a subdivision or partition is not proposed, and all trees are protected by Chapter 17.41, 17.49 or 12.08.

17.41.120 - Cash-in-lieu of planting (Option 4).

The applicant may choose this option in-lieu-of or in addition to Compliance Options 1 through 3. In this case, the Community Development Director may approve the payment of cash-in-lieu into a dedicated fund for the remainder of trees that cannot be replanted in the manner described above.
The cash-in-lieu payment per required mitigation tree shall be as listed on the adopted fee schedule and shall be adjusted annually based on the Consumer Price Index. The price shall include 150% of the cost of materials, transportation and planting.
Finding: Complies with Condition. The applicant indicated fee-in-lieu of planting is proposed for some of the required mitigation trees. Prior to any tree removal associated with the proposed development, the applicant shall submit a finalized tree removal and mitigation plan that demonstrates compliance with regulations in OCMC 17.41 and the applicant may utilize any of the mitigation options in Chapter 17.41. **Staff has determined that it is possible, likely, and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.41.130 - Regulated tree protection procedures during construction.
A. No permit for any grading or construction of public or private improvements may be released prior to verification by the Community Development Director that regulated trees designated for protection or conservation have been protected according to the following standards. No trees designated for removal shall be removed without prior written approval from the Community Development Director.
B. Tree protection shall be as recommended by a qualified arborist or, as a minimum, to include the following protective measures:
1. Except as otherwise determined by the Community Development Director, all required tree protection measures set forth in this section shall be instituted prior to any development activities, including, but not limited to clearing, grading, excavation or demolition work, and such measures shall be removed only after completion of all construction activity, including necessary landscaping and irrigation installation, and any required plat, tract, conservation easement or restrictive covenant has been recorded.
2. Approved construction fencing, a minimum of four feet tall with steel posts placed no farther than ten feet apart, shall be installed at the edge of the tree protection zone or dripline, whichever is greater. An alternative may be used with the approval of the Community Development Director.
3. Approved signs shall be attached to the fencing stating that inside the fencing is a tree protection zone, not to be disturbed unless prior approval has been obtained from the Community Development Director.
4. No construction activity shall occur within the tree protection zone, including, but not limited to; dumping or storage of materials such as building supplies, soil, waste items; nor passage or parking of vehicles or equipment.
5. The tree protection zone shall remain free of chemically injurious materials and liquids such as paints, thinners, cleaning solutions, petroleum products, and concrete or dry wall excess, construction debris, or run-off.
6. No excavation, trenching, grading, root pruning or other activity shall occur within the tree protection zone unless directed by an arborist present on site and approved by the Community Development Director.
7. No machinery repair or cleaning shall be performed within ten feet of the dripline of any trees identified for protection.
8. Digging a trench for placement of public or private utilities or other structure within the critical root zone of a tree to be protected is prohibited. Boring under or through the tree protection zone may be permitted if approved by the Community Development Director and pursuant to the approved written recommendations and on-site guidance and supervision of a certified arborist.
9. The Community Development Director may require that a certified arborist be present during any construction or grading activities that may affect the dripline of trees to be protected.

10. The Community Development Director may impose conditions to avoid disturbance to tree roots from grading activities and to protect trees and other significant vegetation identified for retention from harm. Such conditions may include, if necessary, the advisory expertise of a qualified consulting arborist or horticulturist both during and after site preparation, and a special maintenance/management program to provide protection to the resource as recommended by the arborist or horticulturist.

C. Changes in soil hydrology due to soil compaction and site drainage within tree protection areas shall be avoided. Drainage and grading plans shall include provision to ensure that drainage of the site does not conflict with the standards of this section. Excessive site run-off shall be directed to appropriate storm drainage facilities and away from trees designated for conservation or protection.

Finding: Complies with Condition. The applicant's submittal included a construction management plan, however, the submitted plans do not include a specific plan for tree protection during construction. Prior to issuance of a permit associated with the proposed development, the applicant shall submit a plan for tree protection during construction which demonstrates compliance with standards for tree protection during construction in OCMC 17.41.130 for trees impacted by construction. **Staff has determined that it is possible likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

CHAPTER 17.42 FLOOD MANAGEMENT OVERLAY DISTRICT

17.42.020 - Applicability.

A.This chapter shall apply to development in the flood management overlay district, which may also be referred to as the "floodplain overlay district" in this code. The flood management overlay district includes all areas of special flood hazards and all flood management areas within the city. The overlay district restricts the uses that are allowed in the base zone by right, with limitations, or as provisional uses.

B. The flood management areas which have been mapped include the following locations:

1. Land contained within the one hundred-year floodplain, flood area and floodway as shown on the Federal Emergency Management Agency flood insurance maps dated June 17, 2008, including areas of special flood hazard pursuant to Section 17.42.040 and the area of inundation for the February 1996 flood; and

2. Lands that have physical or documented evidence of flooding within recorded history based on aerial photographs of the 1996 flooding and/or the water quality and flood management areas maps.

C. The standards that apply to the flood management areas apply in addition to state or federal restrictions governing floodplains or flood management areas.

17.42.040 - Compliance.

No structure or land shall hereafter be constructed, located, extended, converted or altered without full compliance with the terms of these floodplain regulations and other applicable regulations. Violations of the provisions of this chapter by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a civil infraction. Any person who violates this chapter or fails to comply with any of its requirements shall be subject to the enforcement procedures of this code per OCMC 1.20 Civil Infractions and 1.24 Code Enforcement. Nothing herein contained shall prevent the city from taking such other lawful action as is necessary to prevent or remedy.

Finding: Applicable. The proposal includes development within the floodplain overlay district, therefore, this chapter is applicable.

D. Development Permit.

1. A development permit shall be obtained before construction or development begins within any portion of the flood management overlay district. The permit shall be for all structures, including manufactured homes and all other development, including fill and other activities, as set forth in Chapter 17.04 (Definitions).
2. Application for a development permit shall be made on forms furnished by the community development department. Requirements may include, but are not limited to: plans in duplicate drawn to scale showing the nature, location, dimensions and elevations of the area in question; existing or proposed structures, fill, storage materials, drainage facilities; and the location of the foregoing.
3. The following information is specifically required:
a. Elevation in relation to mean sea level of the lowest floor (including basement) of all structures;
b. Elevation in relation to mean sea level to which any structure has been floodproofed;
c. Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Section 17.42.170E.5.; and
d. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.
Finding: Complies as Proposed. The applicant has submitted an application for review and all required application materials have been submitted.

17.42.120 - Alteration of watercourses.
A. Notify adjacent communities and the department of land conservation and development prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.
Finding: Complies with Condition. The applicant has proposed an alteration of Abernethy Creek. The applicant's narrative identified that that the applicant will provide notice to adjacent communities and the Department of Land Conservation and Development prior to alteration or relocation of the watercourse. Prior to beginning work associated with the relocation of Abernethy Creek, the applicant shall provide documentation to the City which demonstrates compliance with the noticing requirements for alterations of watercourses in OCMC 17.42.120. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

B. Require that maintenance is provided within the altered or relocated portion of the watercourse so that the flood-carrying capacity is not diminished.
Finding: Complies as Proposed. The applicant has proposed an alteration of Abernethy Creek and the applicant identified that maintenance will be provided for the realignment of Abernethy Creek ensuring that the flood-carrying capacity of Abernethy Creek will not be diminished.

17.42.140 - Appeals and variance procedure.
A. The purpose of this section is to ensure that compliance with this chapter does not cause unreasonable hardship. To avoid such instances, the requirements of this chapter may be varied. Variances are also allowed when strict application of this chapter would deprive an owner of all economically viable use of land.
B. This section applies to requests to vary from the standards of this chapter only. Requests to vary from other standards of this title shall be subject to the requirements of Chapter 17.60.
Finding: Not Applicable. The applicant has not requested to vary from the standards in this chapter.

17.42.160.A - Flood management area standards.
Uses Permitted Outright:
1. Excavation and fill required to plant any new trees or vegetation.

2. Restoration or enhancement of floodplains, riparian areas, wetland, upland and streams that meet federal and state standards provided that any restoration project which encroaches on the floodway complies with the requirements of Section 17.42.190 (Floodways).
Finding: Complies as Proposed. Both excavation and fill for new plantings, and restoration and enhancement of riparian areas are proposed as part of this project. These activities are exempt from compliance with this chapter, though the proposed restoration work includes the relocation of Abernethy Creek which will encroach within the floodway, therefore, compliance with Section 17.42.190 is required for this portion of the project.

17.42.160.B Provisional Uses.
1.All uses allowed in the base zone or existing flood hazard overlay zone are allowed in the flood management overlay district subject to compliance with the development standards of this section.
Finding: Applicable. The applicant has proposed alterations to uses permitted in the underlying zone, which are permitted subject to compliance with development standards of this section.

17.42.160.C Prohibited Uses.
1.Any use prohibited in the base zone;
2.Uncontained areas of hazardous materials as defined by the Department of Environmental Quality.
Finding: Complies as Proposed. The applicant has not proposed any prohibited uses.

17.42.160.D.1 Site Development Standards. All development in the floodplain shall conform to the following balanced cut and fill standards:
This subsection does not apply to work necessary to protect, repair, maintain or replace existing structures, utility facilities, roadways, driveways, accessory uses and exterior improvements in response to emergencies provided that, after the emergency has passed, adverse impacts are mitigated in accordance with applicable standards.
Finding: Not Applicable. The proposed development is not in response to an emergency, therefore, this section is not applicable.

17.42.160.D.2 No net fill in any floodplain is allowed. All fill placed in a floodplain shall be balanced with at least an equal amount of soil material removed. For the purpose of calculating net fill, fill shall include any structure below the design flood elevation that has been floodproofed pursuant to subsection (E)(5) of this section.
Finding: Complies as Proposed. The applicant submitted a memorandum from Brian Reis, PE, CFM, Cory Gieseke, PE, and Morgan Tholl, EIT, identifying that the total fill volume is estimated to be 1,652 cubic yards, balanced by a cut volume of 2,022 cubic yards, resulting in a net cut of 370 cubic yards.

17.42.160.D.3 Any excavation below bankfull stage shall not count toward compensating for fill.
Finding: Complies as Proposed. The applicant's engineering memo identified that cut and fill volumes were analyzed between the ordinary high water elevation of 30 feet used to estimate bankfull stage and the flood elevation of 48 feet as identified from the Flood Insurance Rate Map (FIRM) panel dated June 17, 2008.

17.42.160.D.4 Excavation to balance a fill shall be located on the same parcel as the fill unless it is not practicable to do so. In such cases, the excavation shall be located in the same Oregon City floodplain, so long as the proposed excavation and fill will not increase flood impacts for surrounding properties as determined through hydrologic and hydraulic analysis.

Finding: Complies as Proposed. The fill associated with this project is taking place within the right-of-way. Proposed cuts to balance out the fill are occurring in the right-of-way and partially within Jon Storm Park, in the same Oregon City floodplain as the fill.

17.42.160.D.5 For excavated areas identified by the city to remain dry in the summer, such as parks or mowed areas, the lowest elevation of the excavated area shall be at least six inches above the winter "low water" elevation, and sloped at a minimum of two percent towards the protected water feature pursuant to Chapter 17.49. One percent slopes will be allowed in smaller areas.
17.42.160.D.6 For excavated areas identified by the city to remain wet in the summer, such as a constructed wetland, the grade shall be designed not to drain into the protected water feature pursuant to Chapter 17.49.
Finding: Complies as Proposed. All excavated areas are identified to remain dry during the summer, and the elevations of the proposed excavated areas are at least six inches above the low water elevation.

17.42.160.D.7 Parking areas in the floodplain shall be accompanied by signs that inform the public that the parking area is located in a flood management area and that care should be taken when the potential for flooding exists.
Finding: Complies as Proposed. The applicant has proposed a new parking area within the floodplain and the applicant's narrative identified that appropriate signage to inform the public that the parking area is located within a flood management area will be installed upon completion of the parking lot.

17.42.160.D.8 Temporary fills permitted during construction shall be removed at the end of construction, thirty days after subdivision acceptance or completion of the final inspection.
Finding: Complies as Proposed. The applicant has proposed temporary fills associated with the development construction, such as the construction staging area in the park. The applicant's narrative identified that the temporary fills associated with the construction will be removed upon completion of the construction.

17.42.160.D.9 New culverts, stream crossings and transportation projects shall be designed as balanced cut and fill projects or designed not to significantly raise the design flood elevation. Such projects shall be designed to minimize the area of fill in flood management areas and to minimize erosive velocities. Stream crossings shall be as close to perpendicular to the stream as practicable. Bridges shall be used instead of culverts wherever practicable.
Finding: Complies as Proposed. The applicant has provided balanced cut and fill calculations as well as a no-rise memorandum concluding that the proposed bridge improvements will result in no rise in FEMA's effective base flood or floodway elevations.

17.42.160.D.10 Excavation and fill required for the construction of detention facilities or structures, and other facilities, such as levees, specifically shall be designed to reduce or mitigate flood impacts and improve water quality. Levees shall not be used to create vacant buildable lands.
Finding: Complies as Proposed. The applicant's narrative identified that no levees are proposed, and excavation and fill associated with detention facilities will be designed to reduce or mitigate flood impacts and improve water quality.

17.42.160.E.1 Construction Standards.
1. Anchoring.
   a. All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.

b. All manufactured homes must likewise be anchored to prevent flotation, collapse or lateral movements and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebooks for additional techniques).

Finding: Complies as Proposed. The proposed construction is a bridge and it will be constructed to prevent flotation, collapse, or lateral movement.

17.42.160.E.2 Construction Materials and Methods.

a. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

b. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

c. Electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

Finding: Complies as Proposed. The structures proposed as part of this development are bridge supports for the Abernethy Bridge. This section is meant to apply to habitable buildings, which are subject to flooding and flood damage and is not applicable to

17.42.160.E.3 Utilities.

a. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system.

b. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharge from the systems into floodwaters.

c. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

Finding: Not Applicable. The applicant has not proposed water supply systems or sanitary sewage systems.

17.42.160.E.4 Residential Construction

a. New construction and substantial improvements of any residential structure shall have the lowest floor, including basement, elevated to at least one foot above the design flood elevation.

b. Full enclosed areas below the lowest floor that are subject to flooding are prohibited unless they are designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria.

i. A minimum of two openings have a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

ii. The bottom of all openings shall be no higher than one foot above grade.

iii. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

Finding: Not Applicable. Residential construction is not proposed as part of this development.

17.42.160.E.5 Nonresidential Construction.

a. New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated to at

least one foot above base flood elevation; or, together with attendant utility and sanitary facilities, shall:

i. Be floodproofed so that below the design flood level the structure is watertight with walls substantially impermeable to the passage of water provided that the requirements of subsection D.2. of this section are met;

ii. Have structured components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

iii. Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in Section 17.42.110B.;

iv. Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in subsection E.4.b. of this section; and

v. Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g., a building constructed to the design flood level will be rated as one foot below that level).

vi. Manufactured Homes. The following standards apply to all manufactured homes to be placed or substantially improved on sites within Flood Hazard Areas.

When manufactured dwellings are installed in flood hazard areas, they shall be elevated and anchored according to the Oregon Residential Specialty Code.

Finding: Not Applicable. These standards are meant to apply to habitable structures. The new structures associated with the project are the bridge supports which do not meet the definition of structure for the purposes of Chapter 17.42 as defined below:

> *OCMC 17.04.1215 – Structure: For OCMC 17.42 "structure" means a walled and roofed building including a gas or liquid storage tank that is principally aboveground.*

F.Recreational Vehicles. Recreational vehicles placed on sites within Zones A1-30, AH and AE as shown on the flood insurance rate map shall:

1.Be on site for fewer than one hundred eighty consecutive days, and be fully licensed and ready for highway use, on its wheels or jacking system, attached to the site only by quick disconnect type utilities and security devices, and have no permanently attached additions; or

2.Meet the requirements of subsection E.6. of this section and the elevation and anchoring requirements for manufactured homes.

Finding: Not Applicable. No recreational vehicles have been proposed as part of this project.

G.Below Grade Crawlspaces. Below grade crawlspaces are allowed subject to the following standards. It should be noted that there are potential increased charges to personal insurance costs for below grade crawlspaces.

Finding: Not Applicable. No below grade crawlspaces have been proposed as part of this project.

17.42.170 - Review of building permits.

Where elevation data is not available either through the flood insurance study, FIRM or from another authoritative source (Section 17.42.110), application for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness shall be made by the building official, considering use of historical data, high water marks, photographs of past floodings,

etc., where available, and the provisions of this title. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.
Finding: Complies as Proposed. Elevation data is available through FIRM. Building permits, if needed, will be reviewed by the Building Official for compliance with any additional floodplain requirements.

17.42.180 - Subdivision standards.
A.Subdivision Proposals.
1.All subdivision proposals shall be consistent with the need to minimize flood damage.
Finding: Not Applicable. No subdivisions are proposed as part of this development.

17.42.190 - Floodways.
Located within areas of special flood hazard established in Section 17.42.030 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles and erosion potential, the following provisions apply:
A.Encroachments, including fill, new construction, substantial improvements and other development shall be prohibited unless certification by a registered professional engineer or architect is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
Finding: Complies as Proposed. The applicant has proposed new bridge supports and a new culvert replacing the existing Abernethy Creek culvert within the floodway. The applicant provided a no-rise memorandum from a registered professional engineer identifying that the proposed encroachments will not result in an increase in flood levels.

B. If subsection A of this section is satisfied, all new construction and substantial improvements shall comply with all applicable flood management area standards of Sections 17.42.160 through 17.42.190.
Finding: Complies as Proposed. Subsection A is satisfied. The proposal is in compliance with Sections 17.42.160 through 17.42.190 as identified within this report.

C.Below-grade crawlspace construction is allowed in the floodplain in accordance with the Oregon Residential Specialty Code and the Oregon State Structural Specialty Code as adopted by local building code.
Finding: Not Applicable. No below-grade crawlspaces within the floodway have been proposed.

D.In areas where a regulatory floodway has not been designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
Finding: Not Applicable. A regulatory floodway has been designated, therefore, this section is not applicable.

CHAPTER 17.48 WRG WILLAMETTE RIVER GREENWAY OVERLAY DISTRICT
17.48.040 - Uses allowed.
All uses permitted pursuant to the provisions of the underlying zoning district are permitted on lands designated WRG; provided, however, that any development, change of use or intensification of use shall be subject, in addition to the provisions of the underlying district, to the provisions of this chapter.

Finding: Applicable. The applicant has proposed an intensification of the existing transportation facility use, therefore this chapter is applicable.

17.48.050 - Permit required—Exceptions.
A Willamette River Greenway permit shall be required for all developments and changes or intensification of uses, except the following:
A. The propagation of timber or the cutting of timber for public safety or personal use, except the cutting of timber along the natural vegetative fringe along the river;
B. Gravel removal from the bed of the Willamette River when conducted under a permit from the state;
C. Customary dredging and channel maintenance;
D. Placing by a public agency of signs, markers, aids and similar structures to serve the public;
E. Activities to protect, conserve, enhance and maintain public recreation, scenic, historical and natural uses on public lands;
F. Acquisition and maintenance of scenic easements by the Oregon Department of Transportation;
G. Partial harvesting of timber shall be permitted beyond the natural vegetative fringe and those areas not covered by a scenic easement and when the harvest is consistent with an approved plan under the Oregon Forest Practices Act. Commercial forest activities and harvesting practices providing for vegetative buffers, shading, soil stabilization, and water filtering effects required under the Oregon Forest Practices Act;
H. The use of a small cluster of logs for erosion control;
I. The expansion of capacity or the replacement of existing communication or energy distribution and transmission systems, except utility sub-stations;
J. The maintenance and repair of existing flood control facilities;
K. Any activity subject to Type I review pursuant to OCMC 17.62.035.A.2, provided that proposed changes are located entirely outside of the compatibility boundary and on existing developed commercial, multifamily, or industrial properties.
L. Within the compatibility boundary, exterior building changes that are not considered remodeling.
M. Changes to landscaping or parking subject to Type I review pursuant to OCMC 17.62.035.A.2 that are more than 100 feet from the Oregon Department of State Lands' mapped ordinary low water line of the Willamette River, provided that changes are located on existing developed commercial, multifamily, or industrial properties.
N. On existing single or two-family residential properties, landscaping, construction of driveways, modification of existing structures or construction or placement of such subsidiary structures or facilities adjacent to the residence.
O. The addition of a wall sign, projecting sign, or roof sign on any building in the WRG overlay.
Finding: Not Applicable. The applicant has proposed significant modifications to the Abernethy Bridge, which are not exempt from review.

17.48.060 - Procedures.
A. Except as specifically provided for in Section 17.48.100, the procedure for action on a Willamette River Greenway permit shall be as provided for under the Type II review provisions in OCMC 17.50.
Finding: Complies as Proposed. The application is being reviewed under the Type III process pursuant with OCMC 17.48.100.

17.48.070 - Development standards—Specific use.
In approving any development or change or intensification of use, the approving officer or body shall apply the following standards:
Considerations for Specific Uses.

A. With respect to recreational uses only: the considerations set forth in section C.3.b of Goal 15.

Finding: Complies as Proposed. Section C.3.b of Goal 15 states: *"(1) Local, regional and state recreational needs shall be provided for consistent with the carrying capacity of the land; (2) Zoning provisions shall allow recreational uses on lands to the extent that such use would not substantially interfere with the long-term capacity of the land for farm use are defined in ORS 215.203 (3) The possibility that public recreation use might disturb adjacent property shall be considered and minimized to the greatest extent practicable; (4) The public parks established by section 8a of Chapter 558, 1973 Oregon Laws, shall be set forth in Oregon Laws, shall be set forth on the appropriate comprehensive plans and zoning established which will permit their development, use and maintenance;"*

The recreational use of Jon Storm Park is being intensified due to the additional parking being added. The recreational use does not interfere with the long-term capacity of the land for farm use, and during the public notice period no comments have been received from adjacent property owners indicating that the additional parking for Jon Storm Park will cause a disturbance for adjacent properties.

B. With respect to those fish and wildlife habitats identified in the city comprehensive plan only: the considerations set forth in section C.3.d. of Goal 15.

Finding: Complies with Condition. Section C.3.d of Goal 15 states: *"Significant fish and wildlife habitats shall be protected;".* Fish and wildlife habitats are protected by the City's Natural Resource Overlay District and the Department of State Lands. The applicant shall meet the conditions of approval in Chapter 17.49 of this staff report. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

C. With respect to those scenic qualities and views identified in the city comprehensive plan only: the considerations set forth in section C.3.e. of Goal 15.

Finding: Complies as Proposed. Section C.3.d of Goal 15 states *"identified scenic qualities and viewpoints shall be preserved;"* The development is located in an urban, developed area. It is not a viewpoint identified in the City Comprehensive Plan. The development does not disturb any scenic qualities.

D. With respect to timber resources only: the considerations set forth in section C.3.h. of Goal 15.

Finding: Not Applicable. The development is not timber resource.

E. With respect to aggregate extraction only: the considerations set forth in section C.3.i. of Goal 15.

Finding: Not Applicable. The development is not an aggregate extraction.

17.48.080 - Development standards—General considerations.

The following considerations shall be applicable to all Willamette River Greenway permits.

A. Access. Adequate public access to the Willamette River shall be considered and provided for.

Finding: Complies as Proposed. Though construction activities under the Abernethy Bridge will temporarily close access to the Willamette River via the existing boat ramp for up to two weeks, the project will not change access to the Willamette River over the long term.

B. Protection and Safety. Maintenance of public safety and protection of public and private property, especially from vandalism and trespass, shall be provided for to the maximum extent practicable.

Finding: Complies as Proposed. The project will not have an impact on public safety and protection of public and private property. The applicant's narrative identified that during construction, public safety will be maintained by restricting access to work areas.

C. Vegetative Fringe. The natural vegetative fringe along the Willamette River shall be protected and enhanced to the maximum extent practicable.
Finding: Complies with Condition. Though the project may have temporary impacts to the vegetative fringe along the Willamette River, post construction conditions within the Willamette River Greenway will be returned to pre-construction conditions and the project will not have a long-term effect on the natural qualities of the vegetative fringe along the Willamette River. In addition to the Willamette River Greenway, the vegetative fringe is protected by the Natural Resource Overlay District. This standard can be met by complying with conditions of approval in Chapter 17.49. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

D. Directing Development Away from the River. Development shall be directed away from the Willamette River to the greatest possible degree, provided that lands committed to urban uses within the Greenway may continue as urban uses, subject to the nonconforming use provisions of Chapter 17.58 of this title.
Finding: Complies as Proposed. The proposed project includes an existing bridge across the Willamette River so directing development away is not possible. Instead the applicant is minimizing impacts to the Willamette River Greenway by using the areas already disturbed for the new bridge improvements. The applicant is proposing to replace existing structures in the Greenway rather than disturbing new areas. To the extent practicable, the project is minimizing impacts to the Willamette River Greenway while taking into consideration that the project is within a developed urban area.

E. A Greenway Setback. In each application, the approving officer or body shall establish a setback to keep structures separated from the Willamette River in order to protect, maintain, preserve and enhance the natural scenic, historic and recreational qualities of the Willamette River Greenway, as set forth in the city comprehensive plan; provided, however, that the requirement to establish such setbacks shall not apply to water-related or water-dependent uses. No greenway setback standards shall apply for areas outside of the 150-foot Compatibility boundary.
Finding: Not Applicable. The bridge is a water-related or water-dependent use. No greenway setback is applicable.

F. Other Applicable Standards. The Oregon Department of Transportation Greenway Plan, the Greenway portions of the city comprehensive plan, the Willamette River Greenway statutes and the provisions of Statewide Planning Goal 15, shall also be considered in actions involving Willamette River Greenway permits.
Finding: Not Applicable. No additional applicable standards have been identified.

17.48.100 - Compatibility review.
A. In all areas within one hundred fifty feet of the Oregon Department of State Lands' mapped ordinary low-water line of the Willamette River, hereinafter referred to as the "compatibility boundary," the provisions of this subsection shall be applicable to all developments and changes or intensification of uses, so as to ensure their compatibility with Oregon's Greenway statutes, and to assure that the best possible appearance, landscaping and public access be provided.
Finding: Applicable. The proposed bridge supports and staging areas are within the compatibility boundary, therefore, compatibility review standards are applicable.

B. All development or changes or intensifications of uses in the compatibility area shall be approved only if the following findings are made by the Planning Commission through a Type III review process pursuant to OCMC 17.50.

1. That to the greatest extent possible, the development or change or intensification of use provides for the maximum possible landscaped area, open space or vegetation between the activity and the river.

Finding: Complies with Condition. The project includes a temporary construction staging area, new parking area, and the new bridge piers. The construction staging area in Jon Storm Park is temporary and Jon Storm Park will be returned to pre-construction conditions. Though the landscape area and vegetation between the activity and the river will temporarily be decreased, the temporary construction area will not have long-term effects to the natural qualities of the Willamette River Greenway. The proposed parking lot is located on the opposite side of Clackamette Drive from the Willamette River. Clackamette Drive will act as a barrier between the river and the new parking lot, therefore, it will not decrease the landscape area and open space located between the river and the parking lot. Finally, the new bridge piers will replace existing bridge piers in the same area of the Willamette River Greenway. The applicant's narrative identified that the locations of the new bridge structures are based on state-of-the-art engineering design and best practices. To the maximum extent possible, the landscape area, open space and vegetation between the activity and the river will be protected over the long-term of the project. In addition to the Willamette River Greenway, these areas are also protected by the Natural Resource Overlay District and this standard can be met by complying with the conditions of approval in Chapter 17.49 of this report. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

2. That to the greatest degree possible, necessary public access is provided to and along the Willamette River by appropriate legal means.

Finding: Complies as Proposed. Though construction activities under the Abernethy Bridge will temporarily close access to the Willamette River via the existing boat ramp for up to two weeks, the project will not change access to the Willamette River over the long term.

17.48.110 - Prohibited activities.

The following are prohibited within the Willamette River Greenway:

A. Structural bank protection, except rip rap or a channelization used as an emergency measure only to protect existing structures. Any such rip rap or channelization to stabilize undeveloped sites shall be prohibited as well;

B. Subsurface sewage disposal drainfields within one hundred feet of the ordinary mean low-water line of the Willamette River.

Finding: Complies as Proposed. No prohibited uses have been proposed.

17.48.120 - Additional procedural requirements.

In addition to the requirements of Chapter 17.50, the following procedural requirements shall be applicable to all matters arising out of Sections 17.48.070 through 17.48.100:

A. Applications submitted for review under Sections 17.48.070 through 17.48.100 shall be accompanied by such materials as are reasonably necessary for adequate review, including, as necessary:

1. A site and landscaping plan showing existing vegetation and development and location of proposed development for activities;

2. Elevations of any proposed structures;

3. Materials list for any proposed structures, including type and colors of siding and roofing; and

4. Cross-sections of any area within the vegetative fringe where grading, filling, timber harvesting or excavating will occur.

Finding: Complies as Proposed. All required application materials have been submitted.

B. 1. Written notice, including a copy of the application, shall be sent immediately upon receipt to the Oregon Department of Transportation by certified mail, return receipt requested. The Oregon Department of Transportation shall have seven working days from the date of mailing to respond before a decision be rendered.
2. Written notice shall be given to the Oregon Department of Transportation by certified mail, return receipt requested, within seven days of the entry of a final order on the disposition of all applications made under Sections 17.48.070 through 17.48.100.
Finding: Complies as Proposed. Written notice was provided to ODOT as part of the public notice. No comments from ODOT have been received as of the writing of this staff report.

CHAPTER 17.49 NATURAL RESOURCES OVERLAY DISTRICT

17.49.035 - Addition of wetlands to map following adoption.
The NROD boundary shall be expanded to include a wetland identified during the course of a development permit review if it is within or partially within the mapped NROD boundary and meets the State of Oregon's definition of a "Locally Significant Wetland". In such cases, the entire wetland and its required vegetated corridor as defined in Table 17.49.110 shall be regulated pursuant to the standards of this chapter. The amended NROD boundary may be relied upon by the Community Development Director for the purposes of subsequent development review.
Finding: Not Applicable. The applicant has not proposed an expansion of the NROD to incorporate a wetland.

17.49.040 - NROD permit and review process.
An NROD permit is required for those uses regulated under OCMC 17.49.090, Uses Allowed under Prescribed Conditions. An NROD permit shall be processed under the Type II development permit procedure, unless an adjustment of standards pursuant to OCMC 17.49.200 is requested or the application is being processed in conjunction with a concurrent application or action requiring a Type III or Type IV development permit.
Finding: Complies as Proposed. The application is being reviewed pursuant to the Type III process.

17.49.050 - Emergencies.
The provisions of this ordinance do not apply to work necessary to protect, repair, maintain, or replace existing structures, utility facilities, roadways, driveways, accessory uses and exterior improvements in response to emergencies. After the emergency has passed, any disturbed native vegetation areas shall be replanted with similar vegetation found in the Oregon City Native Plant List pursuant to the mitigation standards of OCMC 17.49.180. For purposes of this section emergency shall mean any man-made or natural event or circumstance causing or threatening loss of life, injury to person or property, and includes, but is not limited to fire, explosion, flood, severe weather, drought, earthquake, volcanic activity, spills or releases of oil or hazardous material, contamination, utility or transportation disruptions, and disease.
Finding: Not Applicable. The proposed project is not in response to an emergency.

17.49.060 - Consistency and relationship to other regulations.
A. Where the provisions of the NROD are less restrictive or conflict with comparable provisions of the OCMC, other City requirements, regional, state or federal law, the provisions that provides the greater protection of the resource shall govern.
Finding: Not Applicable. No conflicts have been identified.

B. Compliance with Federal and State Requirements.

1. If the proposed development requires the approval of any other governmental agency, such as the Division of State Lands or the U.S. Army Corps of Engineers, the applicant shall make an application for such approval prior to or simultaneously with the submittal of its development application to the City. The planning division shall coordinate City approvals with those of other agencies to the extent necessary and feasible. Any permit issued by the City pursuant to this chapter shall not become valid until other agency approvals have been obtained or those agencies indicate that such approvals are not required.

Finding: Complies as Proposed. The applicant has submitted documentation demonstrating that the project has obtained permits from the Division of State Lands, the US Army Corps of Engineers, and the Department of Environmental Quality.

2. The requirements of this chapter apply only to areas within the NROD and to locally significant wetlands that may be added to the boundary during the course of development review pursuant to OCMC 17.49.035. If, in the course of a development review, evidence suggests that a property outside the NROD may contain a wetland or other protected water resource, the provisions of this chapter shall not be applied to that development review. However, the omission shall not excuse the applicant from satisfying any state and federal wetland requirements which are otherwise applicable. Those requirements apply in addition to, and apart from the requirements of the City's comprehensive plan and this code.

Finding: Applicable. The application is being reviewed for compliance with Chapter 17.49 only for those areas within the Natural Resource Overlay District, and not the natural features themselves such as the Willamette River and Abernethy Creek. The applicant is subject to compliance with all applicable state and federal regulations in addition to the standards within this chapter.

17.49.070 - Prohibited uses.

The following development and activities are not allowed within the NROD:

A. Any new gardens, lawns, structures, development, other than those allowed outright (exempted) by the NROD or that is part of a regulated use that is approved under prescribed conditions. Note: Gardens and lawns within the NROD that existed prior to the time the overlay district was applied to a subject property are allowed to continue but cannot expand further into the overlay district.

B. New lots that would have their buildable areas for new development within the NROD are prohibited.

C. The dumping of materials of any kind is prohibited except for placement of fill as provided in subsection D. below. The outside storage of materials of any kind is prohibited unless they existed before the overlay district was applied to a subject property. Uncontained areas of hazardous materials as defined by the Oregon Department of Environmental Quality (ORS 466.005) are also prohibited.

D. Grading, the placement of fill in amounts greater than ten cubic yards, or any other activity that results in the removal of more than ten percent of the existing native vegetation on any lot within the NROD is prohibited, unless part of an approved development activity.

Finding: Complies as Proposed. The applicant has not proposed any prohibited uses. Though the project includes grading and fill in amounts greater than cubic yards, the applicant has requested a permit for the proposed development activity through this review.

17.49.080 - Uses allowed outright (exempted).

The following uses are allowed within the NROD and do not require the issuance of an NROD permit:

A. Stream, wetland, riparian, and upland restoration or enhancement projects as authorized by the City.

B. Farming practices as defined in ORS 215.203 and farm uses, excluding buildings and structures, as defined in ORS 215.203.

C. Utility service using a single utility pole.

D. Boundary and topographic surveys leaving no cut scars greater than three inches in diameter on live parts of native plants listed in the Oregon City Native Plant List.

E. Soil tests, borings, test pits, monitor well installations, and other minor excavations necessary for geotechnical, geological or environmental investigation, provided that disturbed areas are restored to pre-existing conditions as approved by the Community Development Director.

F. Trails meeting all of the following:

1. Construction shall take place between May 1 and October 30 with hand held equipment;

2. Widths shall not exceed forty-eight inches and trail grade shall not exceed twenty percent;

3. Construction shall leave no scars greater than three inches in diameter on live parts of native plants;

4. Located no closer than twenty-five feet to a wetland or the top of banks of a perennial stream, or no closer than ten feet of an intermittent stream;

5. No impervious surfaces; and

6. No native trees greater than one-inch in diameter may be removed or cut, unless replaced with an equal number of native trees of at least two-inch diameter and planted within ten feet of the trail.

G. Land divisions provided they meet the following standards, and indicate the following on the final plat:

1. Lots shall have their building sites (or buildable areas) entirely located at least five feet from the NROD boundary shown on the City's adopted NROD map. For the purpose of this subparagraph, "building site" means an area of at least 3,500 square feet with minimum dimensions of forty feet wide by forty feet deep;

2. All public and private utilities (including water lines, sewer lines or drain fields, and stormwater disposal facilities) are located outside the NROD;

3. Impervious streets, driveways and parking areas shall be located at least ten feet from the NROD; and

4. The NROD portions of all lots are protected by:

a. A conservation easement; or

b. A lot or tract created and dedicated solely for unimproved open space or conservation purposes.

H. Site Plan and Design Review applications where all new construction is located outside of the NROD boundary shown on the City's adopted NROD map, and the NROD area is protected by a conservation easement approved in form by the City.

I. Routine repair and maintenance of existing structures, roadways, driveways and utilities.

J. Replacement, additions, alterations and rehabilitation of existing structures, roadways, utilities, etc., where the ground level impervious surface area is not increased.

K. Measures approved by the City of Oregon City to remove or abate nuisances or hazardous conditions.

L. Tree Removal. The Community Development Director may permit the removal of any tree determined to be a dead, hazardous, or diseased tree as defined in OCMC 17.04. Any tree that is removed in accordance with this Section (L) shall be replaced with a new tree of at least ½-inch caliper or at least six foot overall height. An exception to this requirement may be granted if the applicant demonstrates that a replacement tree has already been planted in anticipation of tree removal, or if the existing site conditions otherwise preclude tree replacement (due to existing dense canopy coverage or other ecological reasons).

The replacement tree(s) shall be located in the general vicinity of the removed tree(s), somewhere within NROD on the property. The replacement tree(s) shall be identified on the Oregon City Native Plant List or other locally adopted plant list (e.g. Metro or Portland). The property owner shall ensure that the replacement tree(s) survives at least two years beyond the date of its planting.

M. Planting of native vegetation and the removal of non-native, invasive vegetation (as identified on the Oregon City Native Plant List or other locally adopted plant list (e.g. Metro or Portland), or as recommended by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, arboriculture, horticulture, wildlife biology, botany, hydrology or forestry), and removal of refuse and fill, provided that:

1. All work is done using hand-held equipment;
2. No existing native vegetation is disturbed or removed; and
3. All work occurs outside of wetlands and the top-of-bank of streams.
N. Activities in which no more than one hundred square feet of ground surface is disturbed outside of the bankfull stage of water bodies and where the disturbed area is restored to the pre-construction conditions, notwithstanding that disturbed areas that are predominantly covered with invasive species shall be required to remove the invasive species from the disturbance area and plant trees and native plants pursuant to this Chapter.
O. New fences meeting all of the following:
1. No taller than three and a half feet and of split rail or similar open design.;
2. Two feet width on both sides of fence shall be planted or seeded with native grasses, shrubs, herbs, or trees to cover any bare ground;
3. Six inches of clearance from ground level;
4. Fence posts shall be placed outside the top-of-bank of streams and outside of delineated wetlands.
P. Gardens, fences and lawns within the NROD that existed prior to the time the overlay district was applied to a subject property are allowed to be maintained but cannot expand further into the overlay district.
Finding: Not Applicable. The development is not exempt under these standards.

17.49.090 - Uses allowed under prescribed conditions.
The following uses within the NROD are subject to the applicable standards listed in OCMC 17.49.100 through 17.49.190 pursuant to a Type II process:
A. Alteration to existing structures within the NROD when not exempted by OCMC 17.49.080, subject to OCMC 17.49.130.
B. A residence on a highly constrained vacant lot of record that has less than three thousand square feet of buildable area, with minimum dimensions of fifty feet by fifty feet, remaining outside the NROD portion of the property, subject to the maximum disturbance allowance prescribed in OCMC 17.49.120.A.
C. A land division that would create a new lot for an existing residence currently within the NROD, subject to OCMC 17.49.160.
D. Land divisions when not exempted by OCMC 17.49.080, subject to the applicable standards of OCMC 17.49.160.
E. Trails/pedestrian paths when not exempted by OCMC 17.49.080, subject to OCMC 17.49.170 (for trails) or OCMC 17.49.150 (for paved pedestrian paths).
F. New roadways, bridges/creek crossings, utilities or alterations to such facilities when not exempted by OCMC 17.49.080.
G. Roads, bridges/creek crossings Subject to OCMC 17.49.150.
H. Utility lines subject to OCMC 17.49.140.
I. Stormwater detention or pre-treatment facilities subject to OCMC 17.49.155.
J. Institutional, industrial or commercial development on a vacant lot of record situated in an area designated for such use that has more than seventy-five percent of its area covered by the NROD, subject to OCMC 17.49.120.B.
K. City, county and state capital improvement projects, including sanitary sewer, water and storm water facilities, water stations, and parks and recreation projects.
L. Non-hazardous tree removal that is not exempted pursuant to OCMC 17.49.080.K.
M. Fences that do not meet the standards for exemption pursuant to OCMC 17.49. 080.O.4.
Finding: Applicable. The applicant has proposed an alteration to a bridge, which is a use allowed under prescribed conditions pursuant with OCMC 17.48.090.F.

17.49.100 - General development standards.
The following standards apply to all Uses Allowed under Prescribed Conditions within the NROD with the exception of rights of ways (subject to OCMC 17.49.150), trails (subject to OCMC 17.49.170), utility lines (subject to OCMC 17.49.140), land divisions (subject to OCMC 17.49.160), and mitigation projects (subject to OCMC 17.49.180 or 17.49.190):
A. Native trees shall be preserved unless they are located within ten feet of any proposed structures or within five feet of new driveways, or if deemed not wind-safe by a certified arborist. Trees listed on the Oregon City Nuisance Plant List or Prohibited Plant List are exempt from this standard and may be removed. A protective covenant shall be required for any native trees that remain;
Finding: Complies as Proposed. Native trees within the NROD proposed to be removed are located within ten feet of proposed structures.

B. The Community Development Director may allow the landscaping requirements of the base zone, other than landscaping required for parking lots, to be met by preserving, restoring and permanently protecting habitat on development sites in the Natural Resource Overlay District.
Finding: Not Applicable. The applicant has not requested preserving or protecting habitat within the Natural Resource Overlay District in lieu of complying with standards of the underlying zone.

C. All vegetation planted in the NROD shall be native and listed on the Oregon City Native Plant List or other locally adopted plant list (e.g. Metro or Portland), or as recommended by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, arboriculture, horticulture, wildlife biology, botany, hydrology or forestry);
Finding: Complies as Proposed. The applicant identified that all vegetation planted in the NROD is on the Oregon City Native Plant List or other locally adopted plant lists.

D. Grading is subject to installation of erosion control measures required by the City;
Finding: Please refer to the findings within Chapter 17.47 of this report.

E. The minimum front, street, or garage setbacks of the base zone may be reduced to any distance between the base zone minimum and zero in order to minimize the disturbance area within the NROD portion of the lot;
F. Any maximum required setback in any zone, such as for multi-family, commercial or institutional development, may be increased to any distance between the maximum and the distance necessary to minimize the disturbance area within the NROD portion of the lot;
Finding: Not Applicable. The applicant has not requested a reduction in setbacks.

G. Fences in compliance with OCMC 17.49.080.N;
Finding: Not Applicable. The applicant identified that no fencing is proposed within the NROD.

H. Exterior lighting shall be placed or shielded so that they do not shine directly into resource areas;
Finding: Complies with Condition. The applicant identified that no lighting is proposed within the NROD, however, is unclear if any temporary construction lighting is proposed. Prior to issuance of a permit with the proposed development, the applicant shall submit documentation demonstrating that any proposed temporary or permanent exterior lighting will be placed or shielded so that it does not shine directly into resource areas. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

I. If development will occur within the one hundred-year floodplain, the standards of OCMC 17.42 shall be met; and
Finding: Please refer to the findings within Chapter 17.42 of this report.

J. Mitigation of impacts to the regulated buffer is required, subject to OCMC 17.49.180 or 17.49.190.
Finding: Please refer to the findings in 17.49.180 and 17.49.190 of this report.

17.49.110 - Width of vegetated corridor.
A. Calculation of Vegetated Corridor Width within City Limits. The NROD consists of a vegetated corridor measured from the top of bank or edge of a protected habitat or water feature. The minimum required width is the amount of buffer required on each side of a stream, or on all sides of a feature if non-linear. The width of the vegetated corridor necessary to adequately protect the habitat or water feature is specified in Table 17.49.110.

Table 17.49.110

Protected Water Feature Type (see definitions)	*Slope Adjacent to Protected Water Feature*	*Starting Point for Measurements from Water Feature*	*Width of Vegetated Corridor (see Note 1)*
Anadromous fish-bearing streams	*Any slope*	*• Edge of bankfull flow*	*200 feet*
Intermittent streams with slopes less than 25 percent and which drain less than 100 acres	*< 25 percent*	*• Edge of bankfull flow*	*15 feet*
All other protected water features	*< 25 percent*	*•Edge of bankfull flow • Delineated edge of Title 3 wetland*	*50 feet*
	≥25 percent for 150 feet or more (see Note 2)		*200 feet*
	≥25 percent for less than 150 feet (see Note 2)		*Distance from starting point of measurement to top of ravine (break in ≥25 percent slope) (See Note 3) plus 50 feet.*

Notes:
1. Required width (measured horizontally) of vegetated corridor unless reduced pursuant to the provisions of OCMC 17.49.120.
2. Vegetated corridors in excess of fifty feet apply on steep slopes only in the uphill direction from the protected water feature.
3. Where the protected water feature is confined by a ravine or gully, the top of the ravine is the break in the ≥25 percent slope.
Finding: Complies as Proposed. Abernethy Creek and the Willamette River are anadromous fish-bearing streams requiring a 200-foot buffer. The applicant has submitted a wetland delineation prepared by a qualified professional which identifies that the wetlands along the I-205 corridor are protected features

with more than 25% slope also requiring a 200-foot vegetated corridor. The 200-foot buffer required for the wetlands is already significantly decreased due to the existing I-205 pavement which is approximately 75 – 85 feet away from the wetland.

B. Habitat Areas within City Parks. For habitat and water features identified by Metro as regionally significant which are located within city parks, the NROD Boundary shall correspond to the Metro Regionally Significant Habitat Map.
Finding: Not Applicable. The applicant has not proposed any changes to the existing NROD boundary.

C. Habitat Areas outside city limit/within UGB. For habitat and water features identified by Metro as regionally significant which are located outside of the city limits as of the date of adoption of this ordinance, the minimum corridor width from any non-anadromous fish bearing stream or wetland shall be fifty feet.
Finding: Not Applicable. The project does not include habitat areas outside of city limits.

17.49.120 - Maximum disturbance allowance for highly constrained lots of record.
In addition to the General Development Standards of OCMC 17.49.100, the following standards apply to a vacant lot of record that is highly constrained by the NROD, per OCMC 17.49.090.B and 17.49.090.F:
A. Standard for Residential Development. In the NROD where the underlying zone district is zoned Residential (R-10, R-8, R-6, R-5, R-3.5): the maximum disturbance area allowed for new residential development within the NROD area of the lot is three thousand square feet.
B. Standard for all developments not located in R-10, R-8, R-6, R-5, and R-3.5. For all other underlying zone districts, the maximum disturbance area allowed for a vacant, constrained lot of record development within the NROD is that square footage which when added to the square footage of the lot lying outside the NROD portion equals twenty-five percent of the total lot area.
1. Lots that are entirely covered by the NROD will be allowed to develop twenty-five percent of their area.
2. This can be determined by: (1) Multiplying the total square footage of the lot by .25; or (2) Subtracting from that amount the square footage of the lot that is located outside the NROD. The result is the maximum square footage of disturbance to be allowed in the NROD portion of the lot. If the result is < or = to 0, no disturbance is permitted and the building shall be located outside of the boundary.
C. In all areas, the disturbance area of a vacant, highly constrained lot of record within the NROD shall be set back at least fifty feet from the top of bank on Abernethy Creek, Newell Creek, or Livesay Creek or twenty-five feet from the top of bank of any tributary of the aforementioned Creeks, other water body, or from the delineated edge of a wetland located within the NROD area.
D. If the highly constrained lot of record cannot comply with the above standards, a maximum 1,500 square foot disturbance within the NROD area may be allowed.
Finding: Not Applicable. The subject site is not a highly constrained lot of record.

17.49.130 - Existing development standards.
In addition to the General Development Standards of OCMC 17.49.100, the following standards apply to alterations and additions to existing development within the NROD, except for trails, rights of way, utility lines, land divisions and mitigation projects. As of June 1, 2010, applicants for alterations and additions to existing development that are not exempt pursuant to OCMC 17.49.080.J. shall submit a Type II or Type III application pursuant to this section.
Mitigation is required, subject to OCMC 17.49.180 or 17.49.190.
Finding: Please refer to the findings in OCMC 17.49.180 and 17.49.190.

17.49.140 - Standards for utility lines.

The following standards apply to new utilities, private connections to existing or new utility lines, and upgrades of existing utility lines within the NROD:
Finding: Not Applicable. No new utilities, private connections to existing or new utilities or upgrades of existing utility lines within the NROD have been proposed as part of this project.

17.49.150 - Standards for vehicular or pedestrian paths and roads.
The following standards apply to public rights-of-way and private roads within the NROD, including roads, bridges/stream crossings, driveways and pedestrian paths with impervious surfaces:
A. Stream crossings shall be limited to the minimum number and width necessary to ensure safe and convenient pedestrian, bicycle and vehicle connectivity, and shall cross the stream at an angle as close to perpendicular to the stream channel as practicable. Bridges shall be used instead of culverts wherever practicable.
Finding: Complies as Proposed. The applicant has proposed modifying an existing bridge, and the applicant's narrative identifies:

> *The Project entails routine maintenance and alterations to the existing stream crossing structures (Abernethy Bridge) and the alterations are designed to enhance vehicle safety with the minimum width necessary. The existing Abernethy Bridge crossing angle is not perpendicular to the stream, but is as close to perpendicular as was practicable. Changing the orientation to make it perpendicular would not be practicable, as it would result in extensive in water, NROD, and community impacts. There are no existing pedestrian or bicycle facilities on the Abernethy Bridge nor are any proposed. There is no expectation for pedestrian and bicycle connectivity at the stream crossing. No new stream crossings are proposed.*

B. Where the right-of-way or private road crosses a stream the crossing shall be by bridge or a bottomless culvert;
Finding: Complies as Proposed. The applicant has proposed modifying an existing bridge.

C. No fill or excavation shall occur within the ordinary high water mark of a stream without the approval of the Division of State Lands and/or the U.S. Army Corps of Engineers;
D. If the Oregon Department of State Lands (DSL) has jurisdiction over any work that requires excavation or fill in a wetland, required permits or authorization shall be obtained from DSL prior to release of a grading permit;
Finding: Complies as Proposed. The applicant's narrative identified compliance with this standard and the applicant has submitted documentation demonstrating that permits for the project are being obtained from the Division of State Lands and the US Army Corps of Engineers.

E. Any work that will take place within the banks of a stream shall be conducted between June 1 and August 31, or shall be approved by the Oregon Department of Fish and Wildlife; and
Finding: Complies as Proposed. The current work period approved by the Department of State Lands under permit #62035-RF is as follows:

> *Fill or removal activities below the ordinary high water elevation of Abernathy Creek must be conducted between July 1 and October 31; other than for the activities noted below, fill or removal activities below the ordinary high water elevation of Willamette River must be conducted between July 1 and October 31; drilled shaft oscillation work in the Willamette River behind the constructed coffer dams may occur between July 1 and December 31; use of the barge in the Willamette may occur year round. Extensions to these periods may only occur if*

coordinated with Oregon Department of Fish and Wildlife and approved in writing by DSL. If fish eggs are observed within the project area, work must cease, and DSL contacted immediately.

F. Mitigation is required, subject to OCMC 17.49.180 or 17.49.190.
Finding: Please refer to the findings in OCMC 17.49.180 and 17.49.190.

17.49.155 - Standards for stormwater facilities.
Approved facilities that infiltrate stormwater on-site in accordance with Public Works Low-Impact Development standards, including but not limited to; vegetated swales, rain gardens, vegetated filter strips, and vegetated infiltration basins, and their associated piping, may be placed within the NROD boundary pursuant to the following standards:
A. The forest canopy within the driplines of existing trees shall not be disturbed.
Finding: Not Applicable. The applicant has not proposed stormwater facilities that would disturb the forest canopy within the NROD.

B. Only vegetation from the Oregon City Native Plant List shall be planted within these facilities.
Finding: Complies as Proposed. The applicant identified that all plantings proposed within the NROD will be selected from the Oregon City Native Plant List or other locally adopted native plant lists.

C. Mitigation is required, subject to OCMC 17.49.180 or 17.49.190.
Finding: Please refer to the findings within OCMC 17.49.180 and 17.49.190.

D. The storm water facility may encroach up to one-half the distance of the NROD corridor.
Finding: The proposed stormwater facility encroaches more than half the distance of the NROD corridor. An adjustment to this standard is required. Please refer to OCMC 17.49.200.

E. The stormwater facility shall not impact more than one thousand square feet of the NROD. Impacts greater than one thousand square feet shall be processed as a Type III application.
Finding: Complies as Proposed. The applicant has proposed a bioslope along the south side of the I-205 corridor which has an area equal to approximately 4,723 square feet within the NROD, therefore, this application is being reviewed pursuant to the Type III process.

F. The community development director may allow landscaping requirements of the base zone, other than landscaping required for parking lots, to be met by preserving, restoring and permanently protecting habitat on development sites within the Natural Resource Overlay District.
Finding: Not Applicable. The applicant has not requested preserving or protecting habitat within the Natural Resource Overlay District in lieu of complying with standards of the underlying zone.

G. The design of the stormwater facility shall be subject to OCMC 13.12.
Finding: Please refer to the findings within Chapter 13.12 of this report.

17.49.160 - Standards for land divisions.
Other than those land divisions exempted by OCMC 17.49.070.G., new residential lots created within the NROD shall conform to the following standards.
Finding: Not Applicable. The subject site does not include a land division.

17.49.170 - Standards for trails.

All trails that are not exempt pursuant to OCMC 17.49.80.F shall be processed through a Type II or Type III process pursuant to this chapter; and shall provide mitigation, subject to OCMC 17.49.180 or 17.49.190.
Finding: Not Applicable. The applicant has not proposed trails within the NROD.

17.49.180 - Mitigation standards.
The following standards (or the alternative standards of OCMC 17.49.190) apply to required mitigation:
A. Mitigation shall occur at a two-to-one ratio of mitigation area to proposed NROD disturbance area. Mitigation of the removal or encroachment of a wetland or stream shall not be part of this chapter and will be reviewed by the Division of State Lands or the Army Corp of Engineers during a separate review process;
Finding: Complies with Condition. The relocation of Abernethy Creek is not subject to mitigation in accordance with this section. Work within the Willamette River is also not subject to these mitigation standards because these areas are not within the regulated NROD boundary and is under the jurisdiction of DSL and the US Army Corps of Engineers. The components of the project which are subject to mitigation in accordance with this chapter are the proposed parking lot in Jon Storm Park, disturbance associated with the project within Sportcraft Landing and Jon Storm Park, and disturbance in the NROD further north along the I-205 corridor. The applicant identified compliance with this standard, however, it appears that not all areas being disturbed within the NROD are being counted as disturbance area which requires mitigation. Prior to issuance of a permit associated with the proposed project, the applicant shall submit documentation recalculating the NROD disturbance area and submit a revised mitigation plan which demonstrates that mitigation will occur at a 2:1 ratio of mitigation area to proposed NROD disturbance area. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

B. Mitigation shall occur on the site where the disturbance occurs, pursuant to the following:
1. The mitigation required for disturbance associated with a right-of-way or utility in the right-of-way shall be located as close to the impact area as possible within the NROD;
2. If not possible to locate mitigation on the same site, the mitigation shall occur first on the same stream tributary, secondly in the Abernethy, Newell or Livesay Creek or a tributary thereof, or thirdly as close to the impact area as possible within the NROD; and
Finding: Complies with Condition. The applicant has proposed mitigation within Jon Storm Park, Sportcraft Landing as well as mitigation within the right-of-way as close to the impact area as possible within the NROD, however, it appears that the NROD disturbance area was incorrectly calculated and additional mitigation may be required. Prior to issuance of a permit associated with the proposed project, the applicant shall submit documentation recalculating the NROD disturbance area and submit a revised mitigation plan which demonstrates that mitigation will occur at a 2:1 ratio of mitigation area to proposed NROD disturbance area. Because there is limited opportunity for mitigation onsite and as close to the disturbance associated with the right-of-way disturbance, the applicant may also provide mitigation on the Abernethy Creek tributary or elsewhere as close to the impact area as possible within the NROD. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

3. An easement that allows access to the mitigation site for monitoring and maintenance shall be provided as part of the mitigation plan.
Finding: Complies with Condition. The applicant has requested an adjustment to this standard in accordance with OCMC 17.49.200. All proposed mitigation areas are located on public property either within the right-of-way or on public Parks property which allows access to the site for monitoring and maintenance purposes. The applicant has identified that the Federal Highway Administration prohibits

easements as they can restrict the State's ability to maintain and operate the interstate. For this reason, an easement for mitigation areas in the public right-of-way is not required. Prior to completion of the project, the applicant shall record an easement for mitigation areas within Sportcraft Landing and Jon Storm Park and provide the City with a copy of the easement document prior to completion of the project. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

C. Mitigation shall occur within the NROD area of a site unless it is demonstrated that this is not feasible because of a lack of available and appropriate area. In such cases, the proposed mitigation area shall be contiguous to the existing NROD area so the NROD boundary can be easily extended in the future to include the new resource site.

Finding: Complies with Condition. The applicant has proposed mitigation within Jon Storm Park, Sportcraft Landing as well as mitigation within the right-of-way as close to the impact area as possible within the NROD, however, it appears that the NROD disturbance area was incorrectly calculated and additional mitigation may be required. Prior to issuance of a permit associated with the proposed project, the applicant shall submit documentation recalculating the NROD disturbance area and submit a revised mitigation plan which demonstrates that mitigation will occur at a 2:1 ratio of mitigation area to proposed NROD disturbance area. Because there is limited opportunity for mitigation onsite and as close to the disturbance associated with the right-of-way disturbance, the applicant may also provide mitigation areas contiguous to the existing NROD area so the NROD boundary can easily be extended in the future to include the new resource site. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

D. Invasive and nuisance vegetation shall be removed within the mitigation area;

Finding: Complies with Condition. The applicant identified compliance with this standard, however, based on the conditions within this report the disturbance area was miscalculated, and additional mitigation areas may be required. The applicant shall submit a revised mitigation plan which includes removal of all invasive and nuisance vegetation within all mitigation areas. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

E. Required Mitigation Planting. An applicant shall meet Mitigation Planting Option 1 or 2 below, whichever option results in more tree plantings, except that where the disturbance area is one acre or more, Mitigation Option 2 shall be required. All trees, shrubs and ground cover shall be selected from the Oregon City Native Plant List.

NOTE: Applications on sites where no trees are present or which are predominantly covered with invasive species shall be required to mitigate the site, remove the invasive species and plant trees and native plants pursuant to Option 2.

Finding: Complies with Condition. The applicant has proposed mitigation within Jon Storm Park, Sportcraft Landing as well as mitigation within the right-of-way as close to the impact area as possible within the NROD, however, it appears that the NROD disturbance area was incorrectly calculated and additional mitigation may be required. Prior to issuance of a permit associated with the proposed project, the applicant shall submit documentation recalculating the NROD disturbance area and submit a revised mitigation plan utilizing mitigation option 1 or 2, which demonstrates that mitigation will occur at a 2:1 ratio of mitigation area to proposed NROD disturbance area. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

1. Mitigation Planting Option 1.

a. Planting Quantity. This option requires mitigation planting based on the number and size of trees that are removed from the site pursuant to Table 17.49.180E.1.a.

Table 17.49.180E.1.a.—Required Planting

Size of Tree to be Removed (DBH)	*Number of Trees and Shrubs to be Replanted*
6 to 12"	*2 trees and 3 shrubs*
13 to 18"	*3 trees and 6 shrubs*
19 to 24"	*5 trees and 12 shrubs*
25 to 30"	*7 trees and 18 shrubs*
Over 30"	*10 trees and 30 shrubs*

b. Plant Size. Replacement trees shall be at least one-half inch in caliper on average, measured at six inches above the ground level for field grown trees or above the soil line for container grown trees. Oak, madrone, ash or alder may be one gallon size. Conifers shall be a minimum of six feet in height. Shrubs shall be at least one-gallon container size or the equivalent in ball and burlap, and shall be at least twelve inches in height at the time of planting. All other species shall be a minimum of four-inch pots;

c. Plant Spacing. Except for the outer edges of mitigation areas, trees and shrubs shall be planted in a non-linear fashion. Plant spacing for new species shall be measured from the driplines of existing trees when present. Trees shall be planted on average between eight and twelve feet on center, and shrubs shall be planted on average between four and five feet on center, or clustered in single species groups of no more than four plants, with each cluster planted on average between eight and ten feet on center.

d. Mulching and Irrigation. Mulch new plantings a minimum of three inches in depth and eighteen inches in diameter. Water new plantings one inch per week from June 30th to September 15th, for the three years following planting.

e. Plant Species. Shrubs shall consist of at least two different species. If ten trees or more are planted, no more than one-half of the trees may be of the same genus. Conifers shall be replaced with conifers. Bare ground shall be planted or seeded with native grasses and ground cover species.

Finding: Complies with Condition. The applicant has proposed mitigation within Jon Storm Park, Sportcraft Landing as well as mitigation within the right-of-way as close to the impact area as possible within the NROD, however, it appears that the NROD disturbance area was incorrectly calculated and additional mitigation may be required. Prior to issuance of a permit associated with the proposed project, the applicant shall submit documentation recalculating the NROD disturbance area and submit a revised mitigation plan utilizing mitigation option 1 or 2, which demonstrates that mitigation will occur at a 2:1 ratio of mitigation area to proposed NROD disturbance area. Based on comments received from the City's Natural Resource Consultant, David Evans & Associates, the plant spacing requirements may be exceeded provided that mitigation is provided at 2:1 ratio based on the disturbance area, and that the mitigation area includes the required number of trees and shrubs in accordance with OCMC 17.49.180. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

2. Mitigation Planting Option 2.

a. Planting Quantity. In this option, the mitigation requirement is calculated based on the size of the disturbance area within the NROD. Native trees and shrubs are required to be planted at a rate of five trees and twenty-five shrubs per every five hundred square feet of disturbance area (calculated by dividing the number of square feet of disturbance area by five hundred, and then multiplying that result times five

trees and twenty-five shrubs, and rounding all fractions to the nearest whole number of trees and shrubs; for example, if there will be three hundred thirty square feet of disturbance area, then three hundred thirty divided by five hundred equals .66, and .66 times five equals 3.3, so three trees shall be planted, and .66 times twenty-five equals 16.5, so seventeen shrubs shall be planted). Bare ground shall be planted or seeded with native grasses or herbs. Non-native sterile wheat grass may also be planted or seeded, in equal or lesser proportion to the native grasses or herbs.

b. Plant Size. Plantings may vary in size dependent on whether they are live cuttings, bare root stock or container stock, however, no initial plantings may be shorter than twelve inches in height.

c. Plant Spacing. Trees shall be planted at average intervals of seven feet on center. Shrubs may be planted in single-species groups of no more than four plants, with clusters planted on average between eight and ten feet on center.

d. Mulching and Irrigation shall be applied in the amounts necessary to ensure eighty percent survival at the end of the required five-year monitoring period.

e. Plant Diversity. Shrubs shall consist of at least three different species. If twenty trees or more are planted, no more than one-third of the trees may be of the same genus.

Finding: Complies with Condition. The applicant has proposed mitigation within Jon Storm Park, Sportcraft Landing as well as mitigation within the right-of-way as close to the impact area as possible within the NROD, however, it appears that the NROD disturbance area was incorrectly calculated and additional mitigation may be required. Prior to issuance of a permit associated with the proposed project, the applicant shall submit documentation recalculating the NROD disturbance area and submit a revised mitigation plan utilizing mitigation option 1 or 2, which demonstrates that mitigation will occur at a 2:1 ratio of mitigation area to proposed NROD disturbance area. Based on the adjustments requested as part of this proposal and comments received from the City's Natural Resource Consultant, David Evans & Associates, the plant spacing requirements may be exceeded provided that mitigation is provided at 2:1 ratio based on the disturbance area, and that the mitigation area includes the required number of trees and shrubs in accordance with OCMC 17.49.180. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

F. An alternative planting plan using native plants may be approved in order to create a new wetland area, if it is part of a wetlands mitigation plan that has been approved by the DSL or the U.S. Army Corps of Engineers (USACE) in conjunction with a wetland joint removal/fill permit application.

Finding: Not Applicable. The applicant has not proposed an alternative planting plan.

G. Monitoring and Maintenance. The mitigation plan shall provide for a five-year monitoring and maintenance plan with annual reports in a form approved by the Community Development Director. Monitoring of the mitigation site is the on-going responsibility of the property owner, assign, or designee, who shall submit said annual report to the Planning Division, documenting plant survival rates of shrubs and trees on the mitigation site. Photographs shall accompany the report that indicate the progress of the mitigation. A minimum of eighty percent survival of trees and shrubs of those species planted is required at the end of the five-year maintenance and monitoring period. Any invasive species shall be removed and plants that die shall be replaced in kind to meet the eighty percent survival requirement. Bare spots and areas of invasive vegetation larger than ten square feet that remain at the end the five-year monitoring period shall be replanted or reseeded with native grasses and/or ground cover species.

Finding: Complies as Proposed. The applicant identified compliance with monitoring and maintenance requirements.

H. Covenant or Conservation Easement. The applicant shall record a restrictive covenant or conservation easement, in a form provided by the City, requiring the owners and assigns of properties subject to this section to comply with the applicable mitigation requirements of this section. Said covenant shall run with the land, and permit the City to complete mitigation work in the event of default by the responsible party. Costs borne by the City for such mitigation shall be borne by the owner.

Finding: Complies with Condition. The applicant has requested to adjustment to this standard in accordance with OCMC 17.49.200. All proposed mitigation areas are located on public property either within the right-of-way or on public Parks property which allows access to the site for monitoring and maintenance purposes. The applicant has identified that the Federal Highway Administration prohibits easements as they can restrict the State's ability to maintain and operate the interstate. For this reason, an easement for mitigation areas in the public right-of-way is not required. The applicant shall record an easement for mitigation areas within Sportcraft Landing and Jon Storm Park and provide the City with a copy of the easement document prior to completion of the project. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

I. Financial Guarantee. A financial guarantee for establishment of the mitigation area, in a form approved by the City, shall be submitted before development within the NROD disturbance area commences. The City will release the guarantee at the end of the five-year monitoring period, or before, upon its determination that the mitigation plan has been satisfactorily implemented pursuant to this section.

Finding: Complies with Condition. An adjustment to this standard is requested, however, staff is recommending denial of the requested adjustment. Please refer to OCMC 17.49.200. Prior to completion of the project, the applicant shall provide a financial guarantee for NROD mitigation plantings in accordance with the standards in OCMC 17.49.180.I. **Staff has determined that it is possible, likely and reasonable that the applicant can comply with this standard through the Conditions of Approval.**

17.49.190 - Alternative mitigation standards.

detrimental impact on resources and functional values in the area designated to be left undisturbed;

Finding: Not Applicable. The applicant has not proposed an alternative mitigation plan.

17.49.200 - Adjustment from standards.

If a regulated NROD use cannot meet one or more of the applicable NROD standards then an adjustment may be issued if all of the following criteria are met. Compliance with these criteria shall be demonstrated by the applicant in a written report prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. At the applicant's expense, the City may require the report to be reviewed by an environmental consultant. Such requests shall be processed under the Type III development permit procedure. The applicant shall demonstrate:

Finding: Complies with Condition. The application is being reviewed pursuant to the Type III process and the applicant has requested an adjustment to the following NROD standards:

- 17.49.155.D – Stormwater Facilities Encroachment into NROD Buffer
- 17.49.180.D.2.c – Mitigation Plant Spacing
- 17.49.180.H – Covenant or Conservation Easement
- 17.49.180.I – Financial Guarantee

The applicant shall pay the actual City NROD consultant review fees for review of the project. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

A. There are no feasible alternatives for the proposed use or activity to be located outside the NROD area or to be located inside the NROD area and to be designed in a way that will meet all of the applicable NROD development standards;

Finding: Complies with Condition.

- 17.49.155.D – Stormwater Facilities Encroachment into NROD Buffer

Finding: Complies as Proposed. It is impossible for the stormwater facility to not encroach more than halfway into the buffer, because the existing I-205 pavement itself is already more than halfway into the 200-foot buffer. The applicant is proposing the stormwater facility as far away from the existing wetlands as possible. Due to the existing location of the freeway, there are no other alternatives which would meet the standards.

- 17.49.180.D.2.c – Mitigation Plant Spacing

Finding: Complies with Condition. The applicant has proposed an appropriate amount of mitigation plants and the appropriate mitigation area, however, due to the large mitigation area the plant spacing is exceeded. Though the applicant is required to submit a revised mitigation as conditioned within this report, the City's NROD consultant, David Evans & Associates, has indicated that exceeding the plant spacing is appropriate given the large mitigation area. The intent of plant spacing requirements is to provide new plantings adequate room to grow. The applicant is exceeding the spacing requirement and the proposed spacing is appropriate for the plant species. The applicant has proposed an appropriate mitigation area and an appropriate amount of plantings, however, due to the large mitigation area the plant spacing is exceeded. Though an alternative would be to plant additional plants, this is unnecessary since the applicant has proposed the right number of shrubs based on the disturbance area as calculated in the application. As conditioned in this report, the disturbance must be recalculated and additional mitigation area may be required. If necessary, the revised mitigation plan may exceed plant spacing as recommended by a qualified professional provided that mitigation is provided at 2:1 ratio based on the disturbance area, and that the mitigation area includes the required number of trees and shrubs in accordance with OCMC 17.49.180. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

- 17.49.180.H – Covenant or Conservation Easement

Finding: Complies as Proposed. The applicant has identified that easements and covenants are prohibited by the Federal Highway Administration (12 CFR 710.409) because they can restrict the State's ability to maintain and operate the interstate. Nevertheless, the applicant has identified that ODOT will be responsible for monitoring and maintaining the mitigation area. The mitigation area is protected by the Natural Resource Overlay District even without an easement, and failure to maintain the mitigation area through code enforcement procedure. Because the easement is prohibited by the Federal Highway Administration and because there are other mechanisms through which the mitigation area plantings are protected, an easement is not required.

- 17.49.180.I – Financial Guarantee

Finding: Does not Comply. The applicant has requested an adjustment to the financial guarantee as there is no easement or covenant proposed. Financial guarantees ensure that NROD mitigation plantings will survive through the five-year monitoring and mitigation period, however, they are not necessarily

related to the easement or covenant. Regardless of the fact that there may not be an easement associated with the mitigation area, the financial guarantee can still be paid to ensure survival of the plants at the end of the five-year monitoring and maintenance period. Staff is recommending denial of this adjustment.

B. The proposal has fewer adverse impacts on significant resources and resource functions found in the local NROD area than actions that would meet the applicable environmental development standards;
Finding: Complies with Condition.

- 17.49.155.D – Stormwater Facilities Encroachment into NROD Buffer

Finding: Complies as Proposed. It is impossible for the stormwater facility to not encroach more than halfway into the buffer, because the existing I-205 pavement itself is already more than halfway into the 200-foot buffer. The applicant is proposing the stormwater facility as far away from the existing wetlands as possible. Due to the existing location of the freeway, there are no other alternatives which would meet the standards.

- 17.49.180.D.2.c – Mitigation Plant Spacing

Finding: Complies with Condition. As conditioned within this report, the applicant would provide an adequate mitigation area and adequate number of plants, however, due to the large mitigation area, the plant spacing is exceeded. Because the applicant is proposing adequate mitigation area and plants, the proposal will not have adverse impacts. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

- 17.49.180.G – Covenant or Conservation Easement

Finding: Complies as Proposed. The applicant has identified that easements and covenants are prohibited by the Federal Highway Administration (12 CFR 710.409) because they can restrict the State's ability to maintain and operate the interstate. Nevertheless, the applicant has identified that ODOT will be responsible for monitoring and maintaining the mitigation area. The mitigation area is protected by the Natural Resource Overlay District even without an easement, and failure to maintain the mitigation area through code enforcement procedure. The lack of an easement will allow the applicant to comply with the Federal Highway Administration requirements while maintaining adequate protection for mitigation plantings, therefore, the adjustment will result in fewer adverse impacts.

- 17.49.180.H – Financial Guarantee

Finding: Does not Comply. The applicant has requested an adjustment to the financial guarantee as there is no easement or covenant proposed. Financial guarantees ensure that NROD mitigation plantings will survive through the five-year monitoring and mitigation period, however, they are not necessarily related to the easement or covenant. Regardless of the fact that there may not be an easement associated with the mitigation area, the financial guarantee can still be paid to ensure survival of the plants at the end of the five-year monitoring and maintenance period. Staff is recommending denial of this adjustment.

C. The proposed use or activity proposes the minimum intrusion into the NROD area that is necessary to meet development objectives;
Finding: Complies as Proposed. With the exception of the adjustment to OCMC 17.49.155.D, none of the adjustments requested would result in intrusion into the NROD.

- 17.49.155.D – Stormwater Facilities Encroachment into NROD Buffer

Finding: Complies as Proposed. It is impossible for the stormwater facility to not encroach more than halfway into the buffer, because the existing I-205 pavement itself is already more than halfway into the 200-foot buffer. The applicant is proposing the stormwater facility as far away from the existing wetlands as possible resulting in the minimum intrusion into the NROD area that is necessary. Due to the existing location of the freeway, there are no other alternatives which would meet the standards.

D. Fish and wildlife passage will not be impeded;
Finding: Complies as Proposed. The applicant's DSL permit specifies that the project must meet Oregon Department of Fish and Wildlife requirements for fish passage. None of the adjustment requested being requested impact fish and wildlife passage.

E. With the exception of the standard(s) subject to the adjustment request, all other applicable NROD standards can be met; and
Finding: Complies with Condition. As demonstrated within this report, all other applicable NROD requirements will be met or can be met through the Conditions of Approval. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

F. The applicant has proposed adequate mitigation to offset the impact of the adjustment.
Finding: Complies with Condition. Adequate mitigation for the project will be provided as conditioned within this report. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.49.210 - Type II development permit application.
Unless otherwise directed by the NROD standards, proposed development within the NROD shall be processed as a Type II development permit application. All applications shall include the items required for a complete application by OCMC 17.49.220—17.49.230, and 17.50.080 as well as a discussion of how the proposal meets all of the applicable NROD development standards in OCMC 17.49.100—17.49.170.
Finding: Complies as Proposed. Due to adjustments being requested, the application is being processed pursuant to the Type III process. All required application materials have been submitted.

17.49.220 - Required site plans.
Site plans showing the following required items shall be part of the application:
A. For the entire subject property (NROD and non-NROD areas):
1. The NROD district boundary. This may be scaled in relation to property lines from the NROD Map;
2. One hundred-year floodplain and floodway boundary (if determined by FEMA);
3. Creeks and other waterbodies;
4. Any wetlands, with the boundary of the wetland that will be adjacent to the proposed development determined in a wetlands delineation report prepared by a professional wetland specialist and following the Oregon Division of State Lands wetlands delineation procedures;
5. Topography shown by contour lines of two or one foot intervals for slopes less than fifteen percent and by ten foot intervals for slopes fifteen percent or greater;
6. Existing improvements such as structures or buildings, utility lines, fences, driveways, parking areas, etc.
7. Extent of the required Vegetated Corridor required by Table 17.49.110.
B. Within the NROD area of the subject property:
1. The distribution outline of shrubs and ground covers, with a list of most abundant species;

2. Trees six inches or greater in diameter, identified by species. When trees are located in clusters they may be described by the approximate number of trees, the diameter range, and a listing of dominant species;
3. An outline of the disturbance area that identifies the vegetation that will be removed. All trees to be removed with a diameter of six inches or greater shall be specifically identified as to number, trunk diameters and species;
4. If grading will occur within the NROD, a grading plan showing the proposed alteration of the ground at two foot vertical contours in areas of slopes less than fifteen percent and at five foot vertical contours of slopes fifteen percent or greater.
C. A construction management plan including:
1. Location of site access and egress that construction equipment will use;
2. Equipment and material staging and stockpile areas;
3. Erosion control measures that conform to City of Oregon City erosion control standards;
4. Measures to protect trees and other vegetation located outside the disturbance area.
D. A mitigation site plan demonstrating compliance with OCMC 17.49.180 or 17.49.190, including:
1. Dams, weirs or other in-water features;
2. Distribution, species composition, and percent cover of ground covers to be planted or seeded;
3. Distribution, species composition, size, and spacing of shrubs to be planted;
4. Location, species and size of each tree to be planted;
5. Stormwater management features, including retention, infiltration, detention, discharges and outfalls;
6. Water bodies or wetlands to be created, including depth;
7. Water sources to be used for irrigation of plantings or for a water source for a proposed wetland.
Finding: Complies as Proposed. All required application items have been submitted.

17.49.230 - Mitigation plan report.
A mitigation plan report that accompanies the above mitigation site plan is also required. The report shall be prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. The mitigation plan report shall, at a minimum, discuss:
A. Written responses to each applicable Mitigation Standard in OCMC 17.49.180 or 17.49.190 indicating how the proposed development complies with the mitigation standards;
B. The resources and functional values to be restored, created, or enhanced through the mitigation plan;
C. Documentation of coordination with appropriate local, regional, state and federal regulatory/resource agencies such as the Oregon Department of State Lands (DSL) and the United States Army Corps of Engineers (USACE);
D. Construction timetables;
E. Monitoring and Maintenance practices pursuant to OCMC 17.49.230.F and a contingency plan for undertaking remedial actions that might be needed to correct unsuccessful mitigation actions during the first five years of the mitigation area establishment.
Finding: Complies with Condition. The applicant provided a mitigation plan report, however, as conditioned in this report, the disturbance must be recalculated and additional mitigation area may be required. If necessary, the revised mitigation plan may exceed plant spacing as recommended by a qualified professional provided that mitigation is provided at 2:1 ratio based on the disturbance area, and that the mitigation area includes the required number of trees and shrubs in accordance with OCMC 17.49.180. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.49.240 - Density transfer.
Finding: Not Applicable. The applicant has not requested a density transfer as part of this development.

17.49.250 - Verification of NROD boundary.
The NROD boundary may have to be verified occasionally to determine the true location of a resource and its functional values on a site. This may be through a site specific environmental survey or a simple site visit in those cases where existing information demonstrates that the NROD significance rating does not apply to a site-specific area. Applications for development on a site located in the NROD area may request a determination that the subject site is not in an NROD area and therefore is not subject to the standards of OCMC 17.49.100. Verifications shall be processed as either a Type I or Type II process.
Finding: Applicable. The applicant has requested a Type II NROD verification, however, due to adjustments being requested the application is being processed pursuant to the Type III process.

17.49.255 - Type I verification.
Finding: Not Applicable. The applicant has not requested a Type I verification.

17.49.260. - Type II verification.
Verifications of the NROD which cannot be determined pursuant to the standards of OCMC 17.49.255 may be processed under the Type II permit procedure.
A. Applicants for a determination under this section shall submit a site plan meeting the requirements of OCMC 17.49.220 as applicable.
B. Such requests may be approved provided that there is evidence that demonstrates in an environmental report prepared by one or more qualified professionals with experience and credentials in natural resource areas, including wildlife biology, ecology, hydrology and forestry, that a resource function(s) and/or land feature(s) does not exist on a site-specific area.
C. Verification to remove a recently developed area from the NROD shall show that all of the following have been met:
1. All approved development in the NROD has been completed;
2. All mitigation required for the approved development, located within the NROD, has been successful; and
3. The previously identified resources and functional values on the developed site no longer exist or have been subject to a significant detrimental impact.
Finding: Applicable. The applicant has submitted an environmental report prepared by a qualified environmental professional which provides evidence disputing the City's mapped NROD boundary. The applicant has not requested to remove a recently developed area from the NROD boundary.

17.49.265 - Corrections to violations.
For correcting violations, the violator shall submit a remediation plan that meets all of the applicable standards of the NROD. The remediation plan shall be prepared by one or more qualified professionals with experience and credentials in natural resource areas, including wildlife biology, ecology, hydrology and forestry. If one or more of these standards cannot be met, then the applicant's remediation plan shall demonstrate that there will be:
A. No permanent loss of any type of resource or functional value listed in OCMC 17.49.10, as determined by a qualified environmental professional;
B. A significant improvement of at least one functional value listed in OCMC 17.49.10, as determined by a qualified environmental professional; and
C. There will be minimal loss of resources and functional values during the remediation action until it is fully established.

Finding: Not Applicable. No violations have been identified.

CHAPTER 17.50 ADMINISTRATION AND PROCEDURES

17.50.050 – Pre-application conference.

A Pre-application Conference. Prior to a Type II – IV or Legislative application, excluding Historic Review, being deemed complete, the applicant shall schedule and attend a pre-application conference with City staff to discuss the proposal, unless waived by the Community Development Director. The purpose of the pre-application conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal.

1. To schedule a pre-application conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee.

2. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans.

3. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the pre-application conference.

B. A pre-application conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant shall schedule and attend another conference before the City will accept a permit application. The Community Development Director may waive the pre-application requirement if, in the Director's opinion, the development has not changed significantly and the applicable municipal code or standards have not been significantly amended. In no case shall a pre-application conference be valid for more than one year.

Finding: Complies as Proposed. The applicant held a pre-application conference on February 28, 2020 (PA 19-08). The land use application was submitted within one year of the pre-application conference on February 27, 2020.

17.50.055 - Neighborhood association meeting.

Neighborhood Association Meeting. The purpose of the meeting with the recognized neighborhood association is to inform the affected neighborhood association about the proposed development and to receive the preliminary responses and suggestions from the neighborhood association and the member residents.

A. Applicants applying for annexations, zone change, comprehensive plan amendments, conditional use, Planning Commission variances, subdivision, or site plan and design review (excluding minor site plan and design review), general development master plans or detailed development plans applications shall schedule and attend a meeting with the City-recognized neighborhood association in whose territory the application is proposed no earlier than one year prior to the date of application. Although not required for other projects than those identified above, a meeting with the neighborhood association is highly recommended.

B. The applicant shall request via email or regular mail a request to meet with the neighborhood association chair where the proposed development is located. The notice shall describe the proposed project. A copy of this notice shall also be provided to the chair of the Citizen Involvement Committee.

C. A meeting shall be scheduled within thirty days of the date that the notice is sent. A meeting may be scheduled later than thirty days if by mutual agreement of the applicant and the neighborhood association. If the neighborhood association does not want to, or cannot meet within thirty days, the applicant shall host a meeting inviting the neighborhood association, Citizen Involvement Committee, and all property owners within three hundred feet to attend. This meeting shall not begin before six p.m. on a weekday or may be held on a weekend and shall occur within the neighborhood association boundaries or at a City facility.

D. If the neighborhood association is not currently recognized by the City, is inactive, or does not exist, the applicant shall request a meeting with the Citizen Involvement Committee.

E. To show compliance with this section, the applicant shall submit a copy of the email or mail notice to the neighborhood association and CIC chair, a sign-in sheet of meeting attendees, and a summary of issues discussed at the meeting. If the applicant held a separately noticed meeting, the applicant shall submit a copy of the meeting flyer, postcard or other correspondence used, and a summary of issues discussed at the meeting and submittal of these materials shall be required for a complete application.

Finding: Complies as Proposed. The applicant attended a Two Rivers Neighborhood Association meeting on July 24, 2019, and has submitted the associated application materials to demonstrate compliance with this section.

17.50.100 - Notice posting requirements.

Where this chapter requires notice of a pending or proposed permit application or hearing to be posted on the subject property, the requirements of this section shall apply.

A. City Guidance and the Applicant's Responsibility. The City shall supply all of the notices which the applicant is required to post on the subject property and shall specify the dates the notices are to be posted and the earliest date on which they may be removed. The City shall also provide a statement to be signed and returned by the applicant certifying that the notice(s) were posted at the correct time and that if there is any delay in the City's land use process caused by the applicant's failure to correctly post the subject property for the required period of time and in the correct location, the applicant agrees to extend the applicable decision-making time limit in a timely manner.

B. Number and Location. The applicant shall place the notices on each frontage of the subject property. If the property's frontage exceeds six hundred feet, the applicant shall post one copy of the notice for each six hundred feet or fraction thereof. Notices do not have to be posted adjacent to alleys or unconstructed right-of-way. Notices shall be posted within ten feet of the street and shall be visible to pedestrians and motorists. Notices shall not be posted within the public right-of-way or on trees. The applicant shall remove all signs within ten days following the event announced in the notice.

Finding: Complies as Proposed. The subject site was posted with land use notice longer than the required amount of time.

17.50.140 – Financial Guarantees.

When conditions of permit approval require a permitee to construct certain public improvements, the City shall require the permitee to provide financial guarantee for construction of the certain public improvements. Financial guarantees shall be governed by this section.

A. Form of Guarantee. Guarantees shall be in a form approved by the City Attorney. Approvable forms of guarantee include irrevocable standby letters of credit to the benefit of the City issued by a recognized lending institution, certified checks, dedicated bank accounts or allocations of construction loans held in reserve by the lending institution for the benefit of the City. The form of guarantee shall be specified by the City Engineer and, prior to execution and acceptance by the City shall be reviewed and approved by the City Attorney. The guarantee shall be filed with the City Engineer.

B. Performance Guarantees. A permittee shall be required to provide a performance guarantee as follows.

1. After Final Approved Design by The City: The City may request the Permittee to submit a Performance Guarantee for construction of certain public improvements. A permitee may request the option of submitting a Performance Guarantee when prepared for temporary/final occupancy. The guarantee shall be one hundred twenty percent of the estimated cost of constructing the public improvements as submitted by the permittee's engineer. The engineer's estimated costs shall be supported by a verified engineering estimate and approved by the City Engineer.

2. Before Complete Design Approval and Established Engineered Cost Estimate: The City may request a permittee to submit a Performance Guarantee for construction of certain public improvements. A permitee may request the option of submitting a performance guarantee before public improvements are designed and

completed. The guarantee shall be one hundred fifty percent of the estimated cost of constructing the public improvements as submitted by *the permittee's engineer and approved by the City Engineer. The engineer's estimated costs shall be supported by a verified engineering estimate and approved by the City Engineer.*

C. Release of Guarantee. The guarantee shall remain in effect until the improvement is actually constructed and accepted by the City. Once the City has inspected and accepted the improvement, the City shall release the guarantee to the permittee. If the improvement is not completed to the City's satisfaction within the time limits specified in the permit approval, the City Engineer may, at their discretion, draw upon the guarantee and use the proceeds to construct or complete construction of the improvement and for any related administrative and legal costs incurred by the City in completing the construction, including any costs incurred in attempting to have the permittee complete the improvement. Once constructed and approved by the City, any remaining funds shall be refunded to the permittee. The City shall not allow a permittee to defer construction of improvements by using a performance guarantee, unless the permittee agrees to construct those improvements upon written notification by the City, or at some other mutually agreed-to time. If the permittee fails to commence construction of the required improvements within six months of being instructed to do so, the City may, without further notice, undertake the construction of the improvements and draw upon the permittee's performance guarantee to pay those costs.

D. Fee-in-lieu. When conditions of approval or the City Engineer allows a permittee to provide a fee-in-lieu of actual construction of public improvements, the fee shall be one hundred fifty percent of the estimated cost of constructing the public improvements as submitted by the permittee's engineer and approved by the City Engineer. The percentage required is to ensure adequate funds for the future work involved in design, bid, contracting, and construction management and contract closeout. The engineer's estimated costs shall be supported by a verified engineering estimate and approved by the City Engineer. The fee-in-lieu shall be submitted as cash, certified check, or other negotiable instrument acceptable by the City Attorney.

Finding: Complies as Conditioned. A Performance Guarantee which is equal to 120% of the estimated cost for construction of public improvements as shown in city approved construction plans shall be provided. The estimated costs shall be supported by a verified engineering estimate and approved by the city engineer. The guarantee shall be in a form identified in Code 17.50.140.A of the Oregon City Municipal Code. The guarantee shall remain in effect until the construction of all required improvements are completed and accepted by the city. The City engineer has not allowed the permittee to provide a fee-in-lieu of actual construction of public improvements. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.50.141 – Public improvements – Warranty

All public improvements not constructed by the City, shall be maintained and under warranty provided by the property owner or developer constructing the facilities until the City accepts the improvements at the end of the warranty period. The warranty is to be used at the discretion of the City Engineer or designee to correct deficiencies in materials or maintenance of constructed public infrastructure, or to address any failure of engineering design.

A. Duration of Warranty. Responsibility for maintenance of public improvements shall remain with the property owner or developer for a warranty period of two years.

B. Financial Guarantee. Approvable forms of guarantee include irrevocable standby letters of credit to the benefit of the City issued by a recognized lending institution, bond, certified checks, dedicated bank accounts or allocations of construction loans held in reserve by the lending institution for the benefit of the City. The form of guarantee shall be specified by the City Engineer and, prior to execution and acceptance by the City shall be reviewed and approved by the City Attorney. The guarantee shall be filed with the City Engineer.

C. Amount of Warranty. The amount of the warranty shall be equal to fifteen percent of the estimated cost of construction of all public improvements (including those improvements that will become owned and maintained by the City at the end of the two year maintenance period), and shall be supported by a verified engineering estimate and approved by the City Engineer. Upon expiration of the warranty period and

acceptance by the City as described below, the City shall be responsible for maintenance of those improvements.

D. *Transfer of Maintenance. The City will perform an inspection of all public improvements approximately forty-five days before the two-year warranty period expires. The public improvements shall be found to be in a clean, functional condition by the City Engineer before acceptance of maintenance responsibility by the City. Transfer of maintenance of public improvements shall occur when the City accepts the improvements at the end of the two year warranty period.*

Finding: Complies as Conditioned. Maintenance Guarantee equal to fifteen percent of the estimated cost for construction of public improvements as shown in city approved construction plans shall be provided. The estimated costs shall be supported by a verified engineering estimate approved by the City Engineer. The guarantee shall be in a form identified in Code 17.50.140.A of the Oregon City Municipal Code. The maintenance guarantee shall warrant to the City of Oregon City that construction of public improvements will remain, for a period of twenty-four (24) months from the date of acceptance, free from defects in materials and workmanship. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

CHAPTER 17.52 OFF-STREET PARKING AND LOADING

17.52.010 - Applicability.

The construction of a new structure or parking lot, or alterations to the size or use of an existing structure, parking lot or property use shall require site plan review approval and compliance with this chapter. This chapter does not apply to single-family attached, detached residential dwellings and duplexes.

Finding: Applies. The proposal includes a new parking lot, therefore, compliance with this chapter is required.

17.52.015 - Planning commission adjustment of parking standards.

Finding: Not Applicable. The applicant has not requested a Planning Commission adjustment to parking standards.

17.52.020 - Number of automobile spaces required.

A. The number of parking spaces shall comply with the minimum and maximum standards listed in Table 17.52.020. The parking requirements are based on spaces per one thousand square feet net leasable area unless otherwise stated.

Table 17.52.020		
LAND USE	*PARKING REQUIREMENTS*	
	MINIMUM	*MAXIMUM*
Multifamily Residential	*1.00 per unit*	*2.5 per unit*
3-4 Plex Residential	*2.00*	*4*
Hotel, Motel	*1.0 per guest room*	*1.25 per guest room*
Correctional Institution	*1 per 7 beds*	*1 per 5 beds*
Senior housing, including congregate care, residential care and assisted living facilities;	*1 per 7 beds*	*1 per 5 beds*

nursing homes and other types of group homes		
Hospital	*2.00*	*4.00*
Preschool Nursery/Kindergarten	*2.00*	*3.00*
Elementary/Middle School	*1 per classroom*	*1 per classroom + 1 per administrative employee + 0.25 per seat in auditorium/assembly room/stadium*
High School, College, Commercial School for Adults	*0.20 per # staff and students*	*0.30 per # staff and students*
Auditorium, Meeting Room, Stadium, Religious Assembly Building, movie theater,	*.25 per seat*	*0.5 per seat*
Retail Store, Shopping Center, Restaurants	*4.10*	*5.00*
Office	*2.70*	*3.33*
Medical or Dental Clinic	*2.70*	*3.33*
Sports Club, Recreation Facilities	*Case Specific*	*5.40*
Storage Warehouse, Freight Terminal	*0.30*	*0.40*
Manufacturing, Wholesale Establishment	*1.60*	*1.67*
Light Industrial, Industrial Park	*1.3*	*1.60*

1. Multiple Uses. In the event several uses occupy a single structure or parcel of land, the total requirements for off-street parking shall be the sum of the requirements of the several uses computed separately.

2. Requirements for types of buildings and uses not specifically listed herein shall be determined by the Community Development Director, based upon the requirements of comparable uses listed.

Finding: Complies as Proposed. There are no parking requirements specific to parks. The original Master Plan for Jon Storm Park used the City of Portland's parking requirements to determine the appropriate number of parking spaces. Staying consistent with the basis upon which parking for Jon Storm Park was originally evaluated, staff reviewed the City of Portland's current parking requirements for parks, which require a minimum of 20 parking stalls per acre and a maximum of 30 parking stalls per acre. The subject site is approximately 1.45 acres in size requiring a minimum of 29 parking stalls and a maximum of 44 parking stalls. The site is currently developed with 28 parking stalls and the applicant has proposed 5 additional parking spaces for a total of 33 parking stalls.

3. Where calculation in accordance with the above list results in a fractional space, any fraction less than one-half shall be disregarded and any fraction of one-half or more shall require one space.

Finding: Complies as Proposed. Fractions were rounded in accordance with this chapter.

4. Fleet vehicle parking shall be accommodated within the maximum parking ratio, except that in GI, CI, and MUE zones, fleet vehicle parking may be included in a parking lot in addition to the maximum number of permitted parking spaces.

Finding: Not Applicable. The proposal does not include fleet vehicle parking.

5. A change in use within an existing habitable building located in the MUD Design District or the Willamette Falls Downtown District is exempt from additional parking requirements. Additions to an existing building and new construction are required to meet the minimum parking requirements for the areas as specified in Table 17.52.020 for the increased square footage.
Finding: Not Applicable. The proposal does not include a change in use within an existing habitable building located in the MUD Design District and thus no additional parking requirements apply.

B. Parking requirements can be met either onsite, or offsite by meeting one or multiple of the following conditions:
1. Parking may be located on the same site as the associated use which it is supporting.
Finding: Complies as Proposed. The parking lot is located on the same site as the use it is supporting.

2. Mixed Uses. If more than one type of land use occupies a single structure or parcel of land, the total requirements for off-street automobile parking shall be the sum of the requirements for all uses, unless it can be shown that the peak parking demands are actually less (e.g. the uses operate on different days or at different times of the day). In that case, the total requirements shall be reduced accordingly, up to a maximum reduction of fifty percent, as determined by the Community Development Director.
Finding: Not Applicable. The proposed parking lot is not serving multiple uses.

3. Shared Parking. Required parking facilities for two or more uses, structures, or parcels of land may be satisfied by the same parking facilities used jointly, to the extent that the owners or operators show that the need for parking facilities does not materially overlay (e.g., uses primarily of a daytime versus nighttime nature), that the shared parking facility is within one thousand feet of the potential uses, and provided that the right of joint use is evidenced by a recorded deed, lease, contract, or similar written instrument authorizing the joint use.
Finding: Not Applicable. The applicant has not proposed a shared parking agreement.

4. On-Street Parking. On-street parking may be counted toward the minimum standards when it is on the street face abutting the subject land use. An on-street parking space shall not obstruct a required clear vision area and it shall not violate any law or street standard. On-street parking for commercial uses shall conform to the following standards:
a. Dimensions. The following constitutes one on-street parking space:
1. Parallel parking: twenty-two feet of uninterrupted and available curb;
2. Forty-five and/or sixty-degree diagonal parking: Fifteen feet of curb;
3. Ninety-degree (perpendicular) parking: Twelve feet of curb.
4. Public Use Required for Credit. On-street parking spaces counted toward meeting the parking requirements of a specific use may not be used exclusively by that use, but shall be available for general public use at all times. Signs or other actions that limit general public use of on-street spaces are prohibited.
Finding: Complies with Condition. The applicant has proposed five parallel parking stalls on Clackamette Drive. This portion of Clackamette Drive is actually part of the Jon Storm Park property, not public right-of-way. Because this portion of Clackamette Drive acts as a public right-of-way even though it is partially on private property, the applicant shall submit a revised parking plan complying with the parallel parking dimensional standards in OCMC 17.52.020.B.4. **Staff has determined that it is possible, likely and reasonable that the applicant can meet these standards through the Conditions of Approval.**

C. Reduction of the Number of the Minimum Automobile Spaces Required. Any combination of the reductions below is permitted unless otherwise noted.

1. Downtown Parking Overlay. The minimum required number of parking stalls is reduced within the Downtown Parking Overlay by fifty percent.
2. Transit Oriented Development. For projects not located within the Downtown Parking Overlay District, the minimum required number of parking stalls is reduced up to twenty-five percent when:
a. In a commercial center (sixty thousand square feet or greater of retail or office use measured cumulatively within a five hundred foot radius) or
b. When adjacent to multi-family development with over eighty units or
c. Within 1,320 feet of an existing or planned public transit street and within 1,320 feet of the opposite use (commercial center or multi-family development with over eighty units).
3. Tree Preservation. The Community Development Director may grant an adjustment to any standard of this requirement provided that the adjustment preserves a designated heritage tree or grove so that the reduction in the amount of required pavement can help preserve existing healthy trees in an undisturbed, natural condition.
4. Transportation Demand Management. The Community Development Director shall reduce the required number of parking stalls up to twenty-five percent when a parking-traffic study prepared by a traffic engineer demonstrates alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to standard Institute of Transportation Engineers vehicle trip generation rates and further that the transportation demand management program promotes or achieves parking utilization lower than minimum city parking requirements.

A transportation demand management (TDM) program shall be developed to include strategies for reducing vehicle use and parking demand generated by the development and will be measured annually. If, at the annual assessment, the City determines the plan is not successful, the plan may be revised. If the City determines that no good-faith effort has been made to implement the plan, the City may take enforcement actions.
5. The minimum required number of stalls may be reduced by up to ten percent when the subject property is adjacent to an existing or planned fixed public transit route or within one thousand feet of an existing or planned transit stop.
Finding: Not Applicable. The applicant has not requested a reduction to the minimum parking requirements.

17.52.030 - Standards for automobile parking.
A. Access. Ingress and egress locations on public thoroughfares shall be located in the interests of public traffic safety and meet requirements of OCMC 16.12.035. Groups of more than four parking spaces shall be so located and served by driveways so that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley.
Finding: Not Applicable. No changes to parking lot ingress or egress have been proposed.

B. Surfacing. Required off-street parking spaces and access aisles shall have paved surfaces adequately maintained. The use of pervious asphalt/concrete and alternative designs that reduce storm water runoff and improve water quality pursuant to the City's stormwater and low impact development design standards are encouraged.
Finding: Complies as Proposed. The applicant has proposed paved surfaces for all proposed parking spaces.

C. Drainage. Drainage shall be designed in accordance with the requirements of OCMC 13.12 and the City public works stormwater and grading design standards.

Finding: Please refer to the findings in OCMC 13.12.

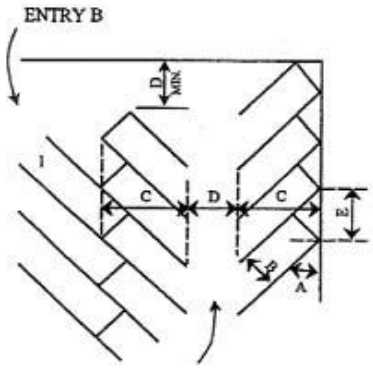
D. Dimensional Standards.

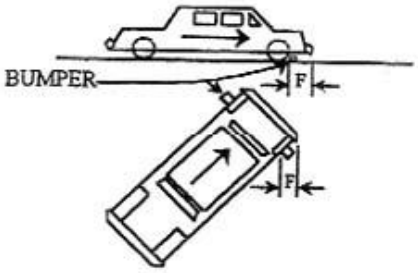
1. Requirements for parking developed at varying angles are according to the table included in this section. A parking space shall not be less than seven feet in height when within a building or structure, and shall have access by an all-weather surface to a street or alley. Parking stalls in compliance with the American with Disabilities Act may vary in size in order to comply with the building division requirements. Up to thirty-five percent of the minimum required parking may be compact, while the remaining required parking stalls are designed to standard dimensions. The Community Development Director may approve alternative dimensions for parking stalls in excess of the minimum requirement which comply with the intent of this chapter.

PARKING STANDARD
PARKING ANGLE SPACE DIMENSIONS

A Parking Angle		*B Stall Width*	*C Stall to Curb*	*D Aisle Width*	*E Curb Length*	*F Overhang*
0 degrees		*8.5*	*9.0*	*12*	*20*	*0*
30 degrees	*Standard* *Compact*	*9'* *8'*	*17.3'* *14.9'*	*11'* *11'*	*18'* *16'*	
45 degrees	*Standard* *Compact*	*8.5* *8.5*	*19.8'* *17.0'*	*13'* *13'*	*12.7'* *11.3'*	*1.4*
60 degrees	*Standard* *Compact*	*9'* *8'*	*21'* *17.9'*	*18'* *16'*	*10.4'* *9.2'*	*1.7*
90 degrees	*Standard* *Compact*	*9'* *8'*	*19.0'* *16.0'*	*24'* *22'*	*9'* *8'*	*1.5*

All dimensions are to the nearest tenth of a foot.





Finding: Not Applicable. The applicant has proposed five parallel parking stalls on Clackamette Drive. This portion of Clackamette Drive is actually part of the Jon Storm Park property, not public right-of-way. Because this portion of Clackamette Drive acts as a public right-of-way even though it is partially on private property, the applicant is subject to the parallel parking standards in OCMC 17.52.020.B.4 rather than this section.

2. Alternative parking/plan. Any applicant may propose an alternative parking plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. In such situations, the Community Development Director may approve an alternative parking lot plan with variations to parking dimensions of this section. The alternative shall be consistent with the intent of this chapter and shall create a safe space for automobiles and pedestrians while providing landscaping to the quantity and quality found within parking lot landscaping requirements.
Finding: Not Applicable. The applicant has not proposed an alternative parking plan.

E. Carpool and Vanpool Parking. New developments with seventy-five or more parking spaces, excluding projects where seventy-five percent or more of the total floor area is residential , and new hospitals, government offices, group homes, nursing and retirement homes, schools and transit park-and-ride facilities with fifty or more parking spaces, shall identify the spaces available for employee, student and commuter parking and designate at least five percent, but not fewer than two, of those spaces for exclusive carpool and vanpool parking. Carpool and vanpool parking spaces shall be located closer to the main employee, student or commuter entrance than all other employee, student or commuter parking spaces with the exception of ADA accessible parking spaces. The carpool/vanpool spaces shall be clearly marked "Reserved - Carpool/Vanpool Only."
Finding: Not Applicable. The proposed project is not a new development with 75 or more parking spaces. Carpool and vanpool standards are not applicable.

17.52.040 - Bicycle parking standards.
B. Number of Bicycle Spaces Required. For any use not specifically mentioned in Table A, the bicycle parking requirements shall be the same as the use which, as determined by the Community Development Director, is most similar to the use not specifically mentioned. Calculation of the number of bicycle parking spaces required shall be determined in the manner established in OCMC 17.52.020 for determining automobile parking space requirements. Modifications to bicycle parking requirements may be made through the site plan and design, conditional use, or master plan review process.

*TABLE A Required Bicycle Parking Spaces**

Where two options for a requirement are provided, the option resulting in more bicycle parking applies. Where a calculation results in a fraction, the result is rounded up to the nearest whole number.

USE	*MINIMUM BICYCLE PARKING*	*MINIMUM BICYCLE PARKING - COVERED - The following percentage of bicycle parking is required to be covered*
Multi-family (five or more units)	*1 per 10 units (minimum of 2)*	*50% (minimum of 1)*
Correctional institution	*1 per 15 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Nursing home or care facility	*1 per 30 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Hospital	*1 per 20 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Park-and-ride lot	*1 per 5 auto spaces (minimum of 2)*	*50% (minimum of 1)*

Transit center	*1 per 5 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Parks and open space	*1 per 10 auto spaces (minimum of 2)*	*0%*
Public parking lots	*1 per 10 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Automobile parking structures	*1 per 10 auto spaces (minimum of 4)*	*80% (minimum of 2)*
Religious institutions, movie theater, auditorium or meeting room	*1 per 10 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Libraries, museums	*1 per 5 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Preschool, nursery, kindergarten	*2 per classroom (minimum of 2)*	*50% (minimum of 1)*
Elementary	*4 per classroom (minimum of 2)*	*50% (minimum of 1)*
Junior high and High school	*2 per classroom (minimum of 2)*	*50% (minimum of 2)*
College, business/commercial schools	*2 per classroom (minimum of 2)*	*50% (minimum of 1)*
Swimming pools, gymnasiums, ball courts	*1 per 10 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Retail stores and shopping centers	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 2)*
Retail stores handling exclusively bulky merchandise such as automobile, boat or trailer sales or rental	*1 per 40 auto spaces (minimum of 2)*	*0%*
Bank, office	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Medical and dental clinic	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Eating and drinking establishment	*1 per 20 auto spaces (minimum of 2)*	*0%*
Gasoline service station	*1 per 10 auto spaces (minimum of 2)*	*0%*

** Covered bicycle parking is not required for developments with two or fewer parking stalls.*

Finding: Complies as Proposed. The park includes 28 parking stalls and the applicant has proposed an additional 5 parking stalls for a total of 33. One bicycle parking space is required for every 10 parking stalls, therefore, three bicycle parking spaces are required. The park already includes six existing bicycle

parking spaces and the applicant has proposed additional bicycle parking to the north of the proposed parking area.

C. Design Standards.
1. Bicycle parking facilities shall be in the form of a lockable enclosure onsite, secure room in a building onsite, a covered or uncovered rack onsite, or within the adjacent right-of-way.
Finding: Complies as Proposed. The applicant has proposed an uncovered bicycle rack to the north of the proposed parking area.

2. Bicycle parking areas shall be clearly marked or visible from on-site buildings or the street. If a bicycle parking area is not plainly visible from the street or main building entrance, a sign shall be posted indicating the location of the bicycle parking area. Indoor bicycle parking areas shall not require stairs to access the space. If sites have more than one building, bicycle parking shall be distributed as appropriate to serve all buildings.
Finding: Complies as Proposed. The proposed bicycle parking is located near Clackamette Drive and is clearly visible from the street.

3. All bicycle racks shall be designed so that:
a. The bicycle frame is supported horizontally at two or more places.
b. The frame and at least one wheel of the bicycle can be locked to the rack with a standard U-type lock.
c. The user is not required to lift the bicycle onto the bicycle rack.
d. Each bicycle parking space is accessible without moving another bicycle.
bicycle independent of the other bicycles on the rack.
e. It is a minimum of thirty inches tall and eighteen inches wide between the two points of contact.
f. Provides an area of six feet by two feet per bicycle.
g. All bicycle racks and lockers shall be securely anchored to the ground or to a structure.
Finding: Complies with Condition. The applicant identified compliance with the bicycle parking design standards in this section, though, bicycle rack design drawings were not submitted. Prior to issuance of a permit associated with the proposed project, the applicant shall provide drawings or details of the proposed bicycle racks demonstrating compliance with bicycle parking design standards in OCMC 17.52.040.C.3. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.52.060 - Parking lot landscaping.
A. Applicability. Unless otherwise specified, construction of new parking lots and alterations of existing parking lots shall comply with parking lot landscaping standards. Parking lot landscaping requirements within this section do not apply to parking structures or parking garages, except landscaping as required in OCMC 17.62.
Finding: Applicable. The applicant has proposed a new parking area therefore, this section is applicable.

B. Development Standards.
1. The landscaping shall be located in defined landscaped areas that are uniformly distributed throughout the parking or loading area.
Finding: Complies as Proposed. The proposed landscaping throughout the parking lot is uniformly distributed.

2. All areas in a parking lot not used for parking, maneuvering, or circulation shall be landscaped.
Finding: Complies as Proposed. All areas in the newly proposed public parking lot not used for parking, maneuvering, or circulation are landscaped.

3. Parking lot trees shall be a mix of deciduous shade trees and coniferous trees. The trees shall be evenly distributed throughout the parking lot as both interior and perimeter landscaping.
Finding: The applicant has requested a modification to this standard and has proposed an alternative parking plan in accordance with OCMC 17.52.060.F. Please refer to the findings in OCMC 17.62.015.

4. Required landscaping trees shall be of a minimum two-inch minimum caliper size (though it may not be standard for some tree types to be distinguished by caliper), planted according to American Nurseryman Standards, and selected from the Oregon City Street Tree List or approved by an arborist;
Finding: Complies as Proposed. The landscape plan identifies that all parking lot trees will be a minimum of two inches in caliper, selected off of the Oregon City Street Tree List, planted according to American Nurseryman standards.

5. At maturity, all of the landscaped area shall be planted in ground cover plants, which includes grasses. Mulch (as a ground cover) shall only be allowed underneath plants at full growth and within two feet of the base of a tree and is not a substitute for ground cover.
Finding: Complies with as Proposed. The applicant has proposed a compact ground cover and no mulch or similar materials in place of ground cover.

6. Landscaped areas shall include irrigation systems unless an alternate plan is submitted, and approved by the Community Development Director, that can demonstrate adequate maintenance;
Finding: Complies as Proposed. The applicant submitted an alternative irrigation plan, which includes drought tolerant plant species and the contractor supplying water during the establishment period of new plantings. Additionally this landscaping will be part of Jon Storm Park and will be maintained by the City Parks Department after completion of this project.

7. All landscaping shall be installed according to accepted planting procedures, according to American Nurseryman Standards.
Finding: Complies as Proposed. The landscaping plan indicates that all landscaping shall be installed according to accepted planting procedures, according to American Nurseryman Standards

C. Perimeter Parking Lot Landscaping and Parking Lot Entryway/Right-of-Way Screening. Parking lots and associated drive aisles shall include a five-foot wide landscaped buffer where the parking lot abuts the right-of-way and/or adjoining properties. In order to provide connectivity between non-single-family sites, the Community Development Director may approve an interruption in the perimeter parking lot landscaping for a single driveway where the parking lot abuts property designated as multi-family, commercial or industrial. Shared driveways and parking aisles that straddle a lot line do not need to meet perimeter landscaping requirements.

1. The perimeter parking lot are[a] shall include:

a. Trees spaced a maximum of thirty feet apart (minimum of one tree on either side of the entryway is required). When the parking lot is adjacent to a public right-of-way, the parking lot trees shall be offset from the street trees;

b. An evergreen hedge screen of thirty to forty-two inches high or shrubs spaced no more than four feet apart on average. The hedge/shrubs shall be parallel to and not nearer than two feet from the right-of-way line. The required screening shall be designed to allow for free access to the site and sidewalk by pedestrians. Visual breaks, no more than five feet in width, shall be provided every thirty feet within evergreen hedges abutting public right-of-ways.

D. Parking Area/Building Buffer. Except for parking lots with fewer than five parking stalls, parking areas (excluding drive aisles with no adjacent parking) shall be separated from the exterior wall of a structure, exclusive of pedestrian entranceways or loading areas, by one of the following:

1. Minimum five-foot wide landscaped planter strip (excluding areas for pedestrian connection) meeting the standards for perimeter parking lot area landscaping; or:

2. Minimum seven foot sidewalks with shade trees spaced a maximum of thirty feet apart in three-foot by five-foot tree wells.

E. Interior Parking Lot Landscaping. Surface parking lots with more than five parking stalls shall include at least forty-five square feet of interior parking lot landscaping per parking stall to improve the water quality, reduce storm water runoff, and provide pavement shade. Pedestrian walkways or any impervious surface in the landscaped areas are not to be counted in the percentage. Fractions shall be rounded up when calculating the required number of plantings. Interior parking lot landscaping shall include:

a. A minimum of one tree per four parking spaces.

b. A minimum of 1.5 shrubs per parking space.

c. No more than eight contiguous parking spaces shall be created without providing an interior landscape strip between them. Landscape strips shall be provided between rows of parking shall be a minimum of six feet in width and a minimum of ten feet in length.

Finding: The applicant has requested a modification to this standard and has proposed an alternative parking plan in accordance with OCMC 17.52.060.F. Please refer to the findings in OCMC 17.62.015.

F. Alternative landscaping plan.

Any applicant may propose an alternative landscaping plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. Alternative plans may include the use of low impact development techniques and minimized landscaping requirements. In such situations, the Community Development Director may approve variations to the landscaping standards of OCMC 17.52.060 in accordance with A and/or B below.

1. General Review Standard. The alternative shall meet the standards in OCMC 17.62.015- Modifications that will better meet design review requirements.

2. Credit for Pervious/Low Impact Development. The Community Development Director may count up to fifty percent of the square footage of any pervious hardscaped landscape material within a parking lot that is designed and approved pursuant to the City's adopted stormwater and low impact development design standards toward minimum landscaping requirements for the site. (This includes porous pavement

detention, open celled block pavers, porous asphalt, porous concrete pavement, porous turf, porous gravel, etc.).

Finding: Applicable. The applicant has proposed an alternative parking plan in accordance with OCMC 17.52.060.F. Please refer to the findings in OCMC 17.62.015.

17.52.080 - Maintenance.

The owner, tenant and their agent, if any, shall be jointly and severally responsible for the maintenance of the site including but not limited to the off-street parking and loading spaces, bicycle parking and all landscaping which shall be maintained in good condition so as to present a healthy, neat and orderly appearance and shall be kept free from refuse and debris.

All plant growth in interior landscaped areas shall be controlled by pruning, trimming, or otherwise so that:

a. It will not interfere with the maintenance or repair of any public utility;

b. It will not restrict pedestrian or vehicular access; and

c. It will not constitute a traffic hazard due to reduced visibility.

Finding: Complies as Proposed. The parking and landscaping area will be part of Jon Storm Park and the Oregon City Parks Department will be responsible for long-term maintenance.

17.52.090 - Loading areas.

B. Applicability.

OCMC 17.52.090 applies to uses that are expected to have service or delivery truck visits with a forty-foot or longer wheelbase, at a frequency of one or more vehicles per week. The City Engineer and decision maker shall determine through site plan and design review the number, size, and location of required loading areas, if any.

C. Standards.

1. The off-street loading space shall be large enough to accommodate the largest vehicle that is expected to serve the use without obstructing vehicles or pedestrian traffic on adjacent streets and driveways. Applicants are advised to provide complete and accurate information about the potential need for loading spaces because the City Engineer or decision maker may restrict the use of other public right-of-way to ensure efficient loading areas and reduce interference with other uses.

2. Where parking areas are prohibited between a building and the street, loading areas or drive isles are also prohibited.

3. The City Engineer and decision maker, through site plan and design review, may approve a loading area adjacent to or within a street right-of-way when all of the following loading and unloading operations conditions are met:

a. Short in duration (i.e., less than one hour);

b. Infrequent (less than three operations daily between 5:00 a.m. and 12:00 a.m. or all operations between 12:00 a.m. and 5:00 a.m. at a location that is not adjacent to a residential zone);

c. Does not obstruct traffic during peak traffic hours;

d. Does not interfere with emergency response services; and

e. Is acceptable to the applicable roadway authority.

Finding: Not Applicable. No loading areas have been proposed.

CHAPTER 17.54 SUPPLEMENTAL ZONING REGULATIONS AND EXCEPTIONS

17.54.100 Fences, Hedges, Walls, and Retaining Walls.

A. A fence, hedge, wall, retaining wall, or combination thereof may be located on real property, not within the right-of-way, subject to all of the following:

1. A fence, hedge, wall, retaining wall, or combination thereof located in front of a building may be up to 3.5-feet in total height as measured from the finished grade at any point on the fence.
2. A fence, hedge, wall, located next to, or behind the forward most building, or within more than forty feet of the right-of-way, whichever is less may be up to:
a. Six feet in total height for residential properties with less than five units as measured from the finished grade at any point on the fence; or
b. Eight feet in total height for all other uses as measured from the finished grade at any point on the fence.
3. A retaining wall or combination of a fence, hedge, wall located next to and behind the forward most building, or within more than forty feet of the right-of-way, whichever is less, may be up to (as measured from the finished grade) 8.5 feet in height from the finished grade.
4. Fences, hedges, and/or walls located within two feet above a retaining wall, as measured on a horizontal plane, shall be measured together for the purposes of determining height.
5. Property owners shall ensure compliance with the Traffic Sight Obstruction requirements in Chapter 10.32 of the Oregon City Municipal Code.
6. Retaining walls completely below the elevation of the right-of-way may be up to six feet in height.
7. Minimum fall protection required by the Building Official, such as railings, is not included in the height of a retaining wall but must comply with the fence height requirements.
Finding: Not Applicable. The applicant has not proposed any fences or walls on real property outside of the right-of-way.

B. When no other practicable alternative exists, the City Engineer may permit a fence, hedge, wall, retaining wall, or combination thereof to be located within the right-of-way subject to all of the following:
1. A Revocable Permanent Obstruction in the Right of Way permit is granted per OCMC 12.04.120;
2. Retaining walls, fences, or hedges comply with OCMC 17.54.100.A, unless determined to be impracticable by the City Engineer.
3. The abutting property owner shall ensure compliance with the Traffic Sight Obstruction requirements in Chapter 10.32 of the Oregon City Municipal Code.
Finding: Not Applicable. The applicant has not proposed a fence, hedge, wall, retaining wall, or combination thereof to be located within the city right-of-way.

C. It is unlawful for any person to erect any electric fence or any fence constructed in whole or in part of barbed wire or to use barbed wire, except as erected in connection with security installations at a minimum height of six feet, providing further that prior written approval has been granted by the City Manager.
Finding: Not Applicable. The applicant has not proposed an electric or barbed wire fence.

CHAPTER 17.60 VARIANCES

17.60.020 - Variances—Procedures.
A. A request for a variance shall be initiated by a property owner or authorized agent by filing an application with the city recorder. The application shall be accompanied by a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development. When relevant to the request, building plans may also be required. The application shall note the zoning requirement and the extent of the variance requested. Procedures shall thereafter be held under Chapter 17.50. In addition, the procedures set forth in subsection D. of this section shall apply when applicable.
B. A nonrefundable filing fee, as listed in OCMC 17.50.080, shall accompany the application for a variance to defray the costs.

Finding: Complies as Proposed. The applicant has requested a variance and has paid all associated application fees.

C. Before the planning commission may act on a variance, it shall hold a public hearing thereon following procedures as established in Chapter 17.50. A Variance shall address the criteria identified in OCMC 17.60.030, Variances — Grounds.
Finding: Complies as Proposed. The applicant has requested a variance pursuant to the Type III process and a Planning Commission hearing will be held on July 13, 2020.

D. Minor variances, as defined in subsection E. of this section, shall be processed as a Type II decision, shall be reviewed pursuant to the requirements in OCMC 17.50.030B., and shall address the criteria identified in OCMC 17.60.030, Variance — Grounds.
E. For the purposes of this section, minor variances shall be defined as follows:
1. Variances to setback and yard requirements to allow additions to existing buildings so that the additions follow existing building lines;
2. Variances to width, depth and frontage requirements of up to twenty percent;
3. Variances to residential yard/setback requirements of up to twenty-five percent;
4. Variances to nonresidential yard/setback requirements of up to ten percent;
5. Variances to lot area requirements of up to five percent;
6. Variance to lot coverage requirements of up to twenty-five percent;
7. Variances to the minimum required parking stalls of up to five percent; and
8. Variances to the floor area requirements and minimum required building height in the mixed-use districts.
9. Variances to design and/or architectural standards for single family dwellings, duplexes, single-family attached dwellings, internal conversions, accessory dwelling units, and 3-4 plexes in OCMC 17.14, 17.16, 17.20, 17.21, and 17.22.
Finding: Not Applicable. The applicant has requested a variance to height to the bridge supports. The variance does not qualify for a minor variance review.

17.60.030 - Variance—Grounds.
A variance may be granted only in the event that all of the following conditions exist:
A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;
Finding: Complies as Proposed. The applicant has requested a variance to the height standards in the Institutional zone for the height of the proposed bridge supports. The bridge supports are replacing existing bridge supports and the bridge elevation will remain at its current level. Maintaining the bridge elevation at its current level is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access, or other necessary or desirable qualities. Notice was provided to property owners within 300 feet of the subject site and land use notice signs were posted on the property and no comments have been received indicating that the proposal would cause damage to adjacent properties.

B. That the request is the minimum variance that would alleviate the hardship;
Finding: Complies as Proposed. The existing bridge is at approximately 90 feet at its highest point. To meet the dimensional standards of the Institutional zone, the Abernethy Bridge, I-205, and ramps would need to be completely redesigned. Roads that pass under I-205 would also need to be redesigned and reconstructed to meet required clearances. Meeting the standard is not practicable and creates an

undue hardship. Allowing the bridge the remain at its current height is the minimum variance that would alleviate the hardship.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.
Finding: Complies as Proposed. The purpose to height requirements is to preserve scenic viewpoints and to maintain building scale conformity in individual zoning districts. Building height requirements are meant for habitable buildings and are not intended to apply to bridges, though the code fails to explicitly identify that height requirements are no applicable to bridges and a bridge meets the definition of a structure or building, therefore, building height limits are applied. Because the building height requirements are not intended for bridges, the variance equals the purpose of the regulation being modified.

D. Any impacts resulting from the adjustment are mitigated;
Finding: Complies as Proposed. Because the bridge would remain at its existing height, the variance will not result in any additional impacts. Any impacts resulting from maintaining the bridge elevation at its current level are far less than the impacts of reconfiguring the bridge to comply with the height requirements of the Institutional zoning district. Because of this, no mitigation is required.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance; and
Finding: Complies as Proposed. No practical alternatives which would accomplish the same purpose have been identified. Reducing the elevation of the bridge would allow for the minimum vertical clearance over either the Willamette River navigation channel or McLoughlin Boulevard to be maintained.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.
Finding: Complies as Proposed. The proposal conforms to the intent of the ordinance being varied. The following Comprehensive Plan goals and policies are applicable to the development:

Goal 5.2: Protect the scenic qualities of Oregon City and scenic views of the surrounding landscape.
Policy 5.2.1 Identify and protect significant views of local and distant features such as Mt. Hood, the Cascade Mountains, the Clackamas River Valley, the Willamette River, Willamette Falls, the Tualatin Mountains, Newell Creek Canyon, and the skyline of the city of Portland, as viewed from within the city.
Policy 5.2.2 Maximize the visual compatibility and minimize the visual distraction of new structures or development within important viewsheds by establishing standards for landscaping, placement, height, mass, color, and window reflectivity
Finding: Complies as Proposed. The project proposes to replace existing bridge supports. The applicant has not requested to increase the height of the bridge, only to keep it at its current elevation. The bridge supports will be consistent with the existing bridge supports and not result in additional visual distractions or block the view of the Willamette River.

Goal 7.1 Natural Hazards Protect life and reduce property loss from the destruction associated with natural hazards.
Policy 7.1.9 Locate, design, and construct structures in conformance with current building codes and standards for seismic-resistant design.
Policy 7.1.10 Evaluate the need to retrofit existing public facilities such as water reservoirs, bridges, pipelines, and hospitals to better withstand earthquakes.

Policy 7.1.11 Prioritize roadways needed for public service, medical, and emergency vehicles during emergencies.
Finding: Complies as Proposed. The variance to height is being requested as part of proposed seismic improvements to the Abernethy Bridge which is a key access point in the event of an emergency.

CHAPTER 17.62 - SITE PLAN AND DESIGN REVIEW

17.62.015 - Modifications that will better meet design review requirements.
The review body shall consider modification of certain site related development standards of this Chapter specified below. These modifications may be approved as part of a Type II design review process.
A. Applicability.
1. This process shall apply to modifications to:
a. Landscaping in OCMC 17.62.050.A;
b. Vehicular Connections to Adjoining Properties in OCMC 17.62.050.B.2;
c. On-site pedestrian circulation in OCMC 17.62.050.C;
d. Utility Undergrounding Requirements in OCMC 16.12.095.G;
e. Building location in OCMC 17.62.055.D;
f. Building Details in OCMC 17.62.050.B.9.055.I;
g. Windows in OCMC 17.62.050.B.10.055.JParking Lot Landscaping in OCMC 17.52.060.
Finding: Complies with Condition. The applicant has requested a modification to the parking lot landscaping standards in OCMC 17.52.060, however, the modification fee was not paid with application submittal. The modification is allowed per OCMC 17.62.015.A.j. Prior to issuance of a permit associated with the proposed project, the applicant shall pay the required modification fee for the modification to parking lot landscaping. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

B. The review body may approve requested modifications if it finds that the applicant has shown that the following approval criteria are met:
1. The modification will result in a development that better meets the applicable design guidelines; and
Findings: Complies as Proposed. The applicant has requested a modification to parking lot landscaping standards in OCMC 17.52.060. The proposed parking is parallel parking located on Clackamette Drive which in this location is part of the Jon Storm Park property and is subject to the landscaping standards for private parking lots, including standards for interior parking lot landscaping, building buffer parking lot landscaping and perimeter parking lot landscaping. Rather than providing these landscape areas, the applicant has proposed a planter strip between the sidewalk and the proposed parking area. Though the parking lot is on Jon Storm Park property and not in the public right-of-way, Clackamette Drive effectively acts as a public right-of-way in this location and the proposed parking will look like on-street parking even though it is actually located on park property. It is impracticable to require interior parking lot landscaping, building buffer landscaping and perimeter parking lot landscaping to what looks like on-street parking. The modification would result in a development that better meets design guidelines and is consistent with typical street design standards.

2. The modification meets the intent of the standard. On balance, the proposal will be consistent with the purpose of the standard for which a modification is requested.
Findings: Complies as Proposed. The intent of parking lot landscaping standards is as follows:
1.To enhance and soften the appearance of parking lots;
2. To limit the visual impact of parking lots from sidewalks, streets and particularly from residential areas;

3. To shade and cool parking areas;

4. To reduce air and water pollution;

5. To reduce stormwater impacts and improve water quality; and

6. To establish parking lots that are more inviting to pedestrians and bicyclists.

The applicant has proposed a landscaping strip along the new parking on Clackamette Drive which will soften the appearance of the new parking, limit the visual impact of the parking lot from the sidewalk, shade and cool the parking lot, reduce air and water pollution as well as storwamter impacts, and establish a parking lot and overall development that is more inviting to pedestrians and bicyclists. The proposed modification meets the intent of parking lot landscaping standards.

17.62.030 - When required.

Site plan and design review shall be required for all development of real property in all zones except the low and medium density residential districts, unless otherwise provided for by this title or as a condition of approval of a permit. Site plan and design review shall also apply to all conditional uses, cluster housing developments, multi-family uses, manufactured home parks, and non-residential uses in all zones. Site Plan and Design Review does not apply to activities occurring within the right-of-way except for communication facilities pursuant to OCMC 17.80.

Site plan and design review is required for a change in use between the uses in Table 17.62.030:

Table 17.62.030

Existing Use	*Proposed Use*
Residential	*Nonresidential use, including but not limited to: commercial, office, industrial, retail, or institutional*
Single-family or duplex	*3 or more dwellings*

Site plan and design review shall not alter the type and category of uses permitted in the underlying zoning districts.

The general standards of section 17.62.050 do not apply to 3-4 plex, duplex, single-family attached dwellings, single-family detached residential unit, internal conversions, live/work dwelling and accessory dwelling unit Type I applications.

Finding: Applicable. The applicant has proposed alterations to the Abernethy Bridge and a new parking lot. Compliance with Chapter 17.62 is required.

17.62.035 - Minor site plan and design review.

This section provides for a Minor Site Plan and Design Review process. Minor Site Plan review is a Type I or Type II decision, as described in OCMC 17.62.035.A., subject to administrative proceedings described in OCMC 17.50 and may be utilized as the appropriate review process only when authorized by the Community Development Director. The purpose of this type of review is to expedite design review standards for uses and activities that require only a minimal amount of review, typical of minor modifications and/or changes to existing uses or buildings.

A. Type I Minor Site Plan and Design Review.

1. Applicability. Type I applications involve no discretion and are typically processed concurrently with a building permit application. The Type I process is not applicable for:

a. Any activity which is included with or initiates actions that require Type II-IV review.

b. Any increase in square footage of a conditional or nonconforming use (excluding nonconforming structures).

c. Any proposal in which nonconforming upgrades are required under OCMC 17.58.

d. Any proposal in which modifications are proposed under OCMC 17.62.015.

B. Type II Minor Site Plan and Design Review.

1. Type II Minor Site Plan and Design Review applies to the following uses and activities unless those uses and activities qualify for Type I review per OCMC 17.62.035.A.:
a. Modification of an office, commercial, industrial, institutional, public or multi-family structure that does not increase the interior usable space (for example covered walkways or entryways, addition of unoccupied features such as clock tower, etc.).
b. Modification to parking lot layout and landscaping, or the addition of up to five parking spaces.
c. A maximum addition of up to one thousand square feet to a commercial, office, institutional, public, multi-family, or industrial building provided that the addition is not more than thirty-five percent of the original building square footage.
d. Mobile food units in OCMC 17.54.115.
e. Other land uses and activities may be added if the Community Development Director makes written findings that the activity/use will not increase off-site impacts and is consistent with the type and/or scale of activities/uses listed above.
Finding: Not Applicable. The proposal does not qualify for a Minor Site Plan and Design Review.

17.62.040 – Items required.
Finding: Complies as Proposed. All required application materials have been submitted with this development application.

17.62.050 - General Standards
All development shall comply with the following standards:
A. Landscaping.
1. Existing native vegetation is encouraged to be retained to the maximum extent practicable. All plants listed on the Oregon City Nuisance Plant List shall be removed from the site prior to issuance of a final occupancy permit for the building.
Finding: Complies as Proposed. The applicant's narrative identified that nuisance species will be removed as part of this development. Though landscaping is proposed to be removed to accommodate this development, landscaping is protected by the NROD and will be mitigated accordingly. Upon completion of the project, the site will be returned to pre-construction conditions.

2. The amount of landscaping required is found in the standards for each underlying zone. Where the underlying zone does not contain and minimum landscaping standard, the minimum site landscaping shall be 15% of the total site area. Except as allowed elsewhere in Title 16 or 17 of this Code, all areas to be credited towards landscaping shall be installed with growing plant materials.
Finding: Complies as Proposed. Jon Storm Park and Sportcraft Landing are in compliance with landscaping requirements. Though Jon Storm Park will be used as a construction staging area and landscaping may be temporarily impacted, the park will be brought to pre-construction conditions upon completion of the project, therefore, minimum required landscaping will remain in compliance.

3. Pursuant to OCMC 17.49, landscaping requirements within the Natural Resource Overlay District, other than landscaping required for parking lots, may be met by preserving, restoring and permanently protecting native vegetation and habitat on development sites.
Finding: Please refer to the findings in OCMC 17.49.

4. A landscaping plan shall be prepared by a registered landscape architect for new or revised landscaped areas and parking lots. Landscape architect approval is not required for tree removal and/or installation if the species are chosen from an approved street tree list. A certified landscape designer, arborist, or nurseryman shall be acceptable in lieu of a landscape architect for projects with less than five

hundred square feet of landscaping. All landscape plans shall include a mix of vertical (trees and shrubs) and horizontal elements (grass, groundcover, etc.) that within three years will cover one hundred percent of the landscape area. Plant species listed on the Oregon City Nuisance Plant list are prohibited and native species are encouraged. No mulch, bark chips, or similar materials shall be allowed at the time of landscape installation except under the canopy of shrubs and within two feet of the base of trees.
Finding: Complies with Condition. It is unclear whether or not the landscaping plan was prepared by a registered landscape architect, and the plan does not identify that within the ground cover will cover on hundred percent of the landscape area. Prior to issuance of a permit associated with the proposed project, the applicant shall submit a revised landscaping plan prepared by a registered landscape architect which identifies that within three years of planting, landscaping will cover one hundred percent of the landscaped area. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

5. Landscaping shall be visible from public thoroughfares to the extent practicable.
Finding: Complies as Proposed. Landscaping will be visible from Clackamette Drive and McLoughlin Boulevard.

6. The landscaping in parking areas shall not obstruct lines of sight for safe traffic operation and shall comply with all requirements of OCMC 10.32, Traffic Sight Obstructions.
Finding: Complies as Proposed. The applicant's narrative identified compliance with this standard.

B. Vehicular Access and Connectivity.
1. Parking areas shall be located behind the building façade that is closest to the street, below buildings, or on one or both sides of buildings.
Finding: Complies as Proposed. There is no primary building at Jon Storm Park. The applicant has proposed parking on the east side of Clackamette Drive which looks like on-street parking though this portion of Clackamette Drive is actually on park property. The proposed parking is located on the street even though the street in this location is part of the Jon Storm Park property. Nevertheless, the parking area is not located in front of a building façade that is located closest to the street, therefore, the standard is met.

2. Existing or future connections to adjacent sites through the use of vehicular and pedestrian access easements which provide connection from the right-of-way to the adjoining property shall be provided.
Finding: Not Applicable. Pedestrian or vehicular connections to adjacent sites are not required. The vicinity is a natural and recreational area along the Willamette River. Pedestrian pathways within Jon Storm park and Clackamette Drive provide adequate connections to adjacent sites for vehicles and pedestrians.

3. Parcels larger than three acres shall provide streets as required in OCMC 16.12.
Finding: Not Applicable. The subject site is less than 3 acres in size.

4. Parking garage entries shall not be more than half of the streetscape.
Finding: Not Applicable. A parking garage has not been proposed as part of this development.

C. A well-marked, continuous and protected on-site pedestrian circulation system meeting the following standards shall be provided:
1. Pathways between all building entrances and the street are required. Pathways between the street and buildings fronting on the street shall be direct and not cross a drive aisle. Exceptions may be allowed

by the director where steep slopes, a physically constrained site, or protected natural resources prevent a direct connection or where an indirect route would enhance the design and/or use of a common open space.

2. The pedestrian circulation system shall connect all main entrances, parking areas, bicycle parking, recreational areas, common outdoor areas, and any pedestrian amenities on the site. For buildings fronting on the street, the sidewalk may be used to meet this standard.

3. The pedestrian circulation system shall connect the principal building entrance to those of buildings on adjacent sites, except within industrial zoning designations.

Finding: Complies as Proposed. With the exception of pedestrian crossings across Clackamette Drive to provide pedestrian access to the new parking area, no changes to the on-site pedestrian circulation system are proposed. Though the pedestrian circulation system may be temporarily impacted during construction, the site will be returned to pre-construction conditions

4. Elevated external stairways or walkways shall not extend beyond the building facade except for external stairways or walkways located in, or facing interior courtyard areas that are not visible from the street or a public access easement. This standard does not apply to sky-bridges or sky-ways.

Finding: Not Applicable. No elevated external stairways or walkways are proposed.

5. On-site pedestrian walkways shall be hard surfaced, well drained and at least five feet wide. Surface material shall contrast visually to adjoining surfaces. When bordering parking spaces other than spaces for parallel parking, pedestrian walkways shall be a minimum of seven feet in width unless curb stops are provided. When the pedestrian circulation system is parallel and adjacent to an auto travel lane, the walkway shall be raised or separated from the auto travel lane by a raised curb, bollards, landscaping or other physical barrier. If a raised walkway is used, the ends of the raised portions shall be equipped with curb ramps for each direction of travel. Pedestrian walkways that cross drive isles or other vehicular circulation areas shall utilize a change in textual material or height to alert the driver of the pedestrian crossing area.

Finding: Complies as proposed. All on-site pedestrian walkways are proposed to be at least five feet wide and contrasting with adjoining surfaces. Pedestrian walkways across Clackamette Drive are striped in order to visually contrast adjoining surfaces in accordance with this section.

D. All development shall maintain continuous compliance with applicable federal, state, and City standards.

Finding: Complies as Proposed. The applicant's narrative identified that the development proposal will *maintain continuous compliance with applicable federal, state, and City standards.*

E. Adequate public water and sanitary sewer facilities sufficient to serve the proposed or permitted level of development shall be provided pursuant to OCMC 16.12. The applicant shall demonstrate that adequate facilities and services are presently available or can be made available concurrent with development. Service providers shall be presumed correct in the evidence, which they submit. All facilities shall be designated to City standards as set out in the City's facility master plans and public works design standards. A development may be required to modify or replace existing offsite systems if necessary to provide adequate public facilities. The City may require over sizing of facilities where necessary to meet standards in the City's facility master plan or to allow for the orderly and efficient provision of public facilities and services. Where over sizing is required, the developer may request reimbursement from the City for over sizing based on the City's reimbursement policy and fund availability, or provide for recovery of costs from intervening properties as they develop.

Finding: Please refer to the findings in OCMC 16.12.

F. If a transit agency, upon review of an application for an industrial, institutional, retail or office development, recommends that a bus stop, bus turnout lane, bus shelter, accessible bus landing pad, lighting, or transit stop connection be constructed, or that an easement or dedication be provided for one of these uses, consistent with an agency adopted or approved plan at the time of development, the review authority shall require such improvement, using designs supportive of transit use. Improvements at a major transit stop may include intersection or mid-block traffic management improvements to allow for crossings at major transit stops, as identified in the City's Transportation System Plan.

Finding: Complies as proposed. Notice of this application was provided to Tri-Met, who did not comment on the proposal.

G. Screening of Mechanical Equipment: Commercial, mixed-use, institutional, and multi-family buildings shall include the following measures to screen or block views of mechanical equipment from adjacent streets according to the following requirements.

1. Rooftop mechanical equipment, including HVAC equipment and utility equipment that serves the structure, shall be screened from view from the adjacent street on all new buildings or building additions. Screening shall be accomplished through the use of parapet walls or a sight-obscuring enclosure around the equipment constructed of one of the primary materials used on the primary facades of the structure, and that is an integral part of the building's architectural design. The parapet or screen shall completely surround the rooftop mechanical equipment to an elevation equal to or greater than the highest portion of the rooftop mechanical equipment being screened from adjacent streets, as viewed from the sidewalk or future sidewalk location on the adjacent street at pedestrian level. In the event such parapet wall does not fully screen all rooftop equipment, then the rooftop equipment shall be enclosed by a screen constructed of one of the primary materials used on the primary facade of the building so as to achieve complete screening. Screening requirements do not apply to new or replacement equipment on existing buildings. New or replacement rooftop mechanical equipment on existing buildings shall be painted or powder-coated.

Finding: Not Applicable. No rooftop mechanical equipment is proposed as part of this development.

2. Wall-mounted mechanical HVAC and air conditioning equipment, and groups of multiple utility meters shall not be placed on the front facade of a building or on a facade that faces a right-of-way. Wall-mounted mechanical equipment, including air conditioning and groups of multiple utility meters, that extend six inches or more from the outer building wall shall be screened from view from adjacent streets; from residential, public, and institutional properties; and from public areas of the site or adjacent sites through the use of (a) sight-obscuring enclosures constructed of one of the primary materials used on the primary facade of the structure, (b) sight-obscuring fences, or (c) trees or shrubs that block at least eighty percent of the equipment from view or (d) painting the units to match the building. Wall-mounted mechanical equipment that extends six inches or less from the outer building wall shall be designed to blend in with the color and architectural design of the subject building. Vents which extend six inches or less from the outer building wall shall exempt from this standard if painted.

Finding: Not Applicable. No wall mounted mechanical equipment is proposed as part of this development.

3. Ground-mounted above-grade mechanical equipment shall be screened by ornamental fences, screening enclosures, trees, or shrubs that block at least eighty percent of the view from the public right of way.

Finding: Not Applicable. The applicant identified that any ground-mounted mechanical equipment will comply with screening standards in this section.

4. This section shall not apply to the installation of solar energy panels, photovoltaic equipment, wind power generating equipment, dishes/antennas, pipes, vents, and chimneys.
Finding: Not Applicable. No solar energy panels, photovoltaic equipment, wind power generating equipment, dishes/antennas, pipes, vents, and chimneys are proposed.

H. Building Materials.
1. Prohibited Materials. The following materials shall be prohibited in visible locations from the right-of-way or a public access easement unless an exception is granted by the Community Development Director based on the integration of the material into the overall design of the structure.
i. Vinyl or plywood siding (including T-111 or similar plywood).
ii. Glass block or highly tinted, reflected, translucent or mirrored glass (except stained glass) as more than ten percent of the building facade.
iii. Corrugated fiberglass.
iv. Chain link fencing (except for temporary purposes such as a construction site, gates for a refuse enclosure, stormwater facilities, when excepted by 17.62.050.H.2.vii, or when located on properties within the General Industrial District).
v. Crushed colored rock/crushed tumbled glass.
vi. Non-corrugated and highly reflective sheet metal.
vii. Tarps, except for the protection of outside storage.
Finding: Complies as Proposed. The application does not propose any prohibited materials.

2. Special Material Standards. The following materials are allowed if they comply with the requirements found below:
i. Concrete Block. When used for the front façade of any building, concrete blocks shall be split, rock- or ground-faced and shall not be the prominent material of the elevation. Plain concrete block or plain concrete may be used as foundation material if the foundation material is not revealed more than three feet above the finished grade level adjacent to the foundation wall.
ii. Metal Siding. Metal siding shall have visible corner moldings and trim and incorporate masonry or other similar durable/permanent material near the ground level (first two feet above ground level) except when used for a temporary structure.
iii. Exterior insulation and finish system (EIFS) and similar troweled finishes shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.
iv. Building surfaces shall be maintained in a clean condition and painted surfaces shall be maintained to prevent or repair peeling, blistered or cracking paint.
v. Membrane or fabric covered storage areas are permitted as temporary structures, excluding the use of tarps.
vi. Vinyl or powder coated chain link fencing is permitted for City-owned stormwater management facilities, reservoirs, and other public works facilities such as pump stations, maintenance yards, and storage yards not located within the General Industrial District.
vii. Chain link fencing is permitted in the following circumstances:
1. Within City-owned parks and recreational facilities
2. On any property when used for a baseball or softball backstop or dugout, track and field facility, or sports court.
Finding: Not Applicable. No special materials have been proposed as part of the development.

J. Development shall comply with requirements of the following Oregon City Municipal Code chapters, as applicable, including but not limited to:

1. 12.04 Streets, Sidewalks and Public Places
2. 12.08 Public and Street Trees
3. 13.04 Water Service System
4. 13.08 Sewer Regulations
5. 13.12 Stormwater Management
6. 16.12 Minimum Improvements and Design Standards for Development
7. 17.20 Residential Design Standards for ADU's, Cluster Housing, Internal Conversions, Live/Work Units, and Manufactured Home Parks
8. 17.40 Historic Overlay District
9. 17.41 Tree Protection Standards
10. 17.42 Flood Management Overlay District
11. 17.44 Geologic Hazards
12. 17.47 Erosion and Sediment Control
13. 17.48 Willamette River Greenway
14. 17.49 Natural Resource Overlay District
15. 17.50 Administration and Procedures
16. 17.52 Off-Street Parking and Loading
17. 17.54 Supplemental Zoning Regulations and Exceptions
18. 17.58 Lawful Nonconforming Uses, Structures, and Lots
19. 17.65 Master Plans and Planned Unit Development

Finding: Applies. The applicable chapters are included within this report.

17.62.055 –Institutional, office, multi-family, retail, and commercial building standards.
B. Applicability. This section applies to institutional, office, multi-family, retail and commercial buildings except accessory structures less than one thousand square feet and temporary structures.
Finding: Not Applicable. No institutional, office, multi-family, retail, or commercial buildings have been proposed. This section is not applicable.

17.62.065 - Outdoor lighting.
B. Applicability.
1. General.
a. All exterior lighting for any type of commercial, mixed-use, industrial, institutional, or multi-family development shall comply with the standards of this section, unless excepted in subsection B.3.
b. The City Engineer or Public Works Director shall have the authority to enforce these regulations on private property if any outdoor illumination is determined to present an immediate threat to the public health, safety and welfare.
Finding: Not Applicable. The application includes institutional development, however, no new lighting outside of the right-of-way is proposed or required, therefore this section is not applicable.

17.62.085 - Refuse and recycling standards for commercial, industrial, office, institutional, and multi-family developments.
The purpose and intent of these provisions is to provide an efficient, safe and convenient refuse and recycling enclosure for the public as well as the local collection firm. All new development, change in property use, expansions or exterior alterations to uses, other than single-family or duplex residences,

single-family attached dwellings, 3-4 plexes, internal conversions, or accessory dwelling units (ADUs), shall include a refuse and recycling enclosure. The area(s) shall be:

A. Fully enclosed and visually screened;
B. Located in a manner easily and safely accessible by collection vehicles;
C. Located in a manner so as not to hinder travel lanes, walkways, streets or adjacent properties;
D. On a level, hard surface designed to discharge surface water runoff and avoid ponding;
E. Maintained by the property owner;
F. Used only for purposes of storing solid waste and recyclable materials;
G. Designed in accordance with applicable sections of the Oregon City Municipal Code (including OCMC 8.20—Solid Waste Collection and Disposal) and city adopted policies.

Enclosures are encouraged to be sized appropriately to meet the needs of current and future tenants and designed with sturdy materials which are compatible to the primary structure(s).

Finding: Not Applicable. No new refuse and recycling enclosures are proposed as part of this development.

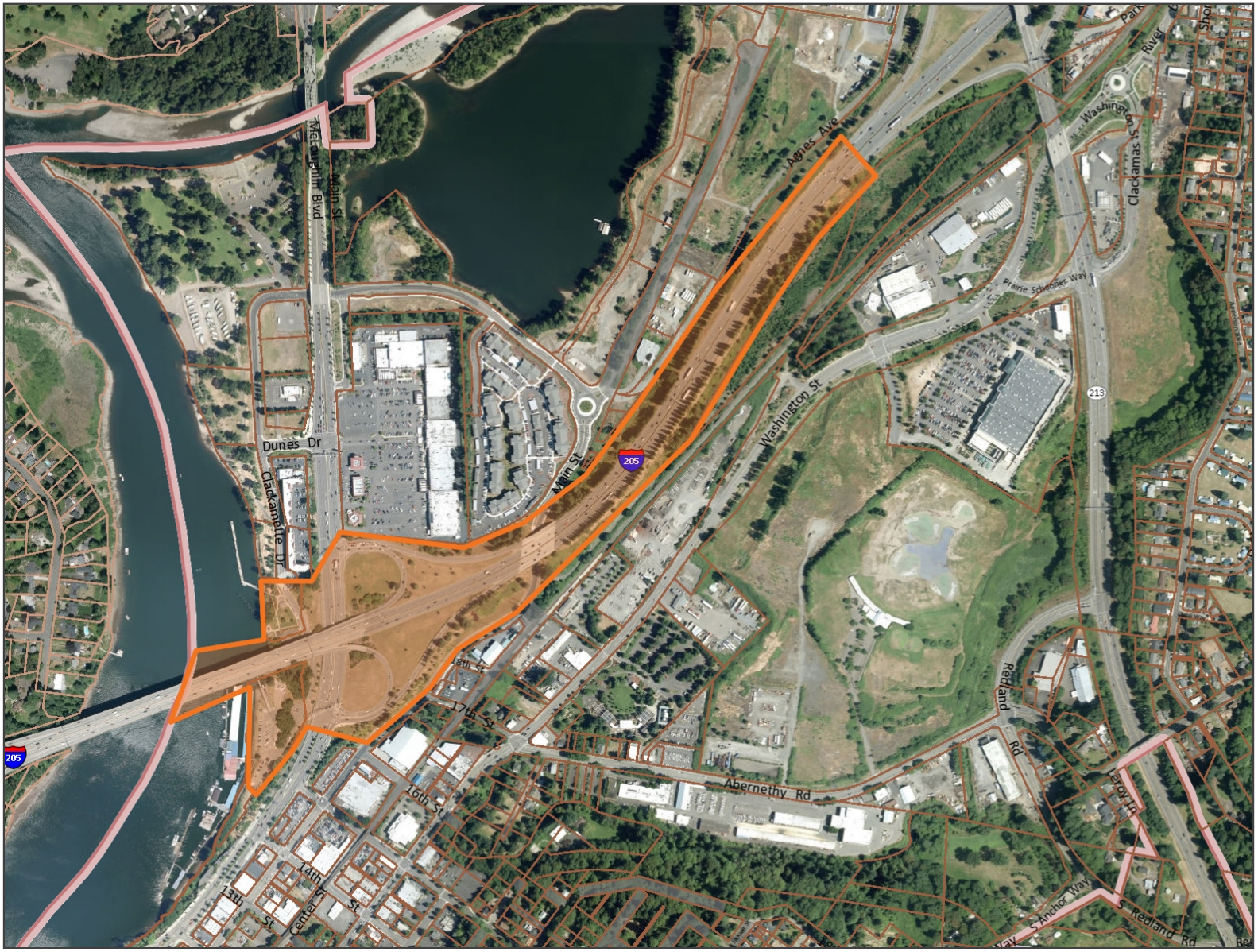
CONCLUSION AND DECISION:

Based on the analysis and findings as described above, Staff concludes that Planning Files GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001, can meet the requirements as described in the Oregon City Municipal Code by complying with the Conditions of Approval provided in this report. Therefore, the Community Development Director recommends approval of Planning Files GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001 with conditions, based upon the findings and exhibits contained in this staff report.

EXHIBITS:

1. Vicinity Map
2. Applicant's Narrative and Plans (On File)
3. Letter from John Replinger

Vicinity Map

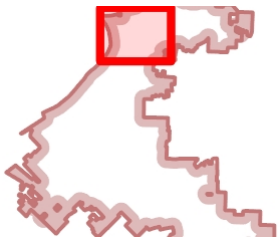


Legend

- Street Names
- Taxlots
- Taxlots Outside UGB
- Unimproved ROW
- City Limits
- UGB
- Basemap

Notes

Overview Map



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Map created 7/6/2020

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0 800 1,600 Feet

1: 9,600

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OREGON CITY

Community Development – Planning

698 Warner Parrott Road | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A)	Type II (OCMC 17.50.030.B)	Type III / IV (OCMC 17.50.030.C)
❑ Compatibility Review	❑ Detailed Development Review	❑ Annexation
❑ Lot Line Adjustment	❑ Geotechnical Hazards	❑ Code Interpretation / Similar Use
❑ Non-Conforming Use Review	❑ Minor Partition (<4 lots)	❑ Concept Development Plan
❑ Natural Resource (NROD) Verification	❑ Minor Site Plan & Design Review	❑ Conditional Use
❑ Site Plan and Design Review	❑ Non-Conforming Use Review	❑ Comprehensive Plan Amendment (Text/Map)
❑ Extension of Approval	❑ Site Plan and Design Review	❑ Detailed Development Plan
	❑ Subdivision (4+ lots)	❑ Historic Review
	❑ Minor Variance	❑ Municipal Code Amendment
	❑ Natural Resource (NROD) Review	❑ Variance
		❑ Zone Change

File Number(s): PA 19-08

Proposed Land Use or Activity: I-205 Freeway Widening and Abernethy Bridge Seismic Upgrades

Project Name: I-205: Stafford Road to OR213 Corridor Road Widening and Retrofit of the Abernethy Bridge Project Number of Lots Proposed (If Applicable): _____

Physical Address of Site: ODOT right-of-way at I-205

Clackamas County Map and Tax Lot Number(s): Map 22E29CB, Tax Lots: 0300, 0500, ROADS. Map 22E29, Tax Lot: ROADS. Map 22E30DD, Tax Lot: ROADS.

Applicant(s):

Applicant(s) Signature: _____

Applicant(s) Name Printed: Tova Peltz, ODOT Date: 2/24/2020

Mailing Address: 123 NW Flanders St, Portland, OR 97209

Phone: 503-731-8455 Fax: _____ Email: tova.r.peltz@odot.state.or.us

Property Owner(s):

Property Owner(s) Signature: _____

Property Owner(s) Name Printed: Tova Peltz (See next page for additional property owner signature) Date: 2/24/2020

Mailing Address: 123 NW Flanders St, Portland, OR 97209

Phone: 503-731-8455 Fax: _____ Email: tova.r.peltz@odot.state.or.us

Representative(s):

Representative(s) Signature: _____

Representative (s) Name Printed: Brian Bauman, HDR Date: 2/24/2020

Mailing Address: 1050 SW 6th Ave, Suite 1800, Portland, OR 97204

Phone: 503-727-3908 Fax: _____ Email: brian.bauman@hdrinc.com

All signatures represented must have the full legal capacity and hereby authorize the filing of this application and certify that the information and exhibits herewith are correct and indicate the parties willingness to comply with all code requirements.

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Applicant(s):

Applicant(s) Signature: _____

Applicant(s) Name Printed: Tova Peltz, ODOT Date: _____

Mailing Address: 123 NW Flanders Street, Portland, OR 97209

Phone: 503-731-8455 Fax: _____ Email: tova.r.peltz@odot.state.or.us

Property Owner(s):

Property Owner(s) Signature: Tony Konkol

Property Owner(s) Name Printed: Tony Konkol, City of Oregon City Date: 2-26-2020

Mailing Address: 625 Center St., Oregon City, OR 97045

Phone: 503-496-1582 Fax: _____ Email: tkonkol@orcity.org

Representative(s):

Representative(s) Signature: _____

Representative (s) Name Printed: Brian Bauman, HDR Date: _____

Mailing Address: 1050 SW 6th Ave, Suite 1800, Portland , OR 97204

Phone: 503-727-3908 Fax: _____ Email: brian.bauman@hdrinc.com

All signatures represented must have the full legal capacity and hereby authorize the filing of this application and certify that the information and exhibits herewith are correct and indicate the parties willingness to comply with all code requirements.

TYPE III –SITE PLAN AND DESIGN REVIEW
Applicant's Submittal
February 27, 2020

APPLICANT: Name: Tova Peltz, Oregon Department of Transportation
Address: 123 NW Flanders Street
Portland OR 97209

OWNER: Name: Tova Peltz, Oregon Department of Transportation
Address: 123 NW Flanders Street
Portland OR 97209

REQUEST: I-205: Stafford Road to OR 213 Corridor Road Widening and Retrofit of the Abernethy Bridge Project

LOCATION: Address: ODOT Right-of-way
Map 22E29CB, Tax Lots: 300, 500, ROADS
Map 22E29, Tax Lot: ROADS
Map 22E30DD, Tax Lot: ROADS

I. BACKGROUND

1. Existing Conditions

The I-205 corridor in Oregon City traverses northeast-southwest through the northern portion of Oregon City, roughly paralleling S. Clackamas River Drive/Washington Street. The Project site is almost entirely within the I-205 right-of-way between OR 213 and the Willamette River. ODOT proposes easements on Oregon City land at Jon Storm Park and Sportcraft Landing Park, including open space areas and paved parking areas.

Existing site conditions are primarily a built transportation environment with paved roadway, paved parking, sidewalks, and maintained vegetation on roadway embankments. There are no buildings on the site; however, there is a picnic shelter in Jon Storm Park and docks at Sportcraft Landing Park, some of which are covered with a roof. Surface water on the project site include the Willamette River at the western edge of the Project site and Abernethy Creek, which is in a culvert parallel to I-205 from the east side of Main Street to the west side of McLoughlin Boulevard. The ordinary high water lines for the Willamette River and Abernethy Creek occur within the Project site under the Abernethy Bridge and in the adjacent Jon Storm Park and Sportcraft Landing Park. There are two small isolated wetlands within the area along the south side of the I-205 corridor between Main Street and OR 213. Steep slopes occur along the banks of the Willamette River and Abernethy Creek.

2. Project Description

The I-205: Stafford Road to OR 213 Corridor Road Widening and Retrofit of the Abernethy Bridge (Project) consists of a 7-mile widening of I-205 in each direction and a widening and seismic upgrade of Abernethy Bridge over the Willamette River. The Project adds a third general purpose travel lane on I-205 in each direction and a new northbound auxiliary lane between OR 99E and OR 213 interchanges. To conform to the new I-205 widths, the Project requires modification of the OR 43 and OR 99E interchange ramps. In addition to Abernethy Bridge, the Project will include the widening and seismic upgrade of five other I-205 bridge sites in the Project area, replacing eight bridges, and completely removing one bridge.

The project elements listed below and described in greater detail in following paragraphs will occur within the limits of the City of Oregon City:

- Adding a third general purpose lane northbound and southbound on Abernethy Bridge and upgrading the bridge to meet current seismic design standards.
- Connecting the OR 99E Interchange ramps with the widened Abernethy Bridge.
- Constructing a 1,500-foot-long northbound auxiliary lane that connects the OR 99E Interchange northbound entrance ramp to the OR 213 Interchange northbound exit ramp.
- Widening the I-205 Bridge over Main Street and upgrading it to meet current seismic design standards.
- Constructing a retaining wall between OR 99E Interchange northbound entrance ramp and Main Street to eliminate impacts to Main Street and avoid right-of-way acquisition.
- Diverting Abernethy Creek.
- Constructing on-street parking at Jon Storm Park, partially within ODOT right-of-way and partially on City of Oregon City property.

Roadway improvements are planned to occur within existing right-of-way. They are designed to minimize modifications of entrance and exit ramps at interchanges, retaining walls, illumination relocations, and the amount of freeway reconstruction work. They are also designed to minimize impacts to environmentally sensitive features.

The Abernethy Bridge will be widened to provide an additional through lane and a wider outside shoulder, resulting in an additional 16 feet of roadway width in both directions. The river span widenings consist of steel member cantilevers from the existing main span box girders and the approach span widenings are achieved through the addition of multiple steel girder lines. The bridge seismic retrofit includes nearly all existing columns and crossbeams. These elements require enlargement or alternative seismic retrofit measures to resolve seismic deficiencies. Additional foundation elements, including drilled shafts and micropiles, will be needed at a number of bents to resolve seismic deficiencies. Ground improvement consisting of deep soil mixing or jet grouting is also needed on the riverbanks to reduce the potential effects of liquefaction and lateral spreading that may occur in the alluvium and gravel soils during a seismic event.

The Main Street Bridge will be widened approximately 14 feet to accommodate the addition of a third lane in each direction on I-205. The seismic retrofit involves installing micropiles, footing overlays, and in-fill walls between the existing columns. At the interior bents, the widening will be supported by the newly constructed pier wall over a reinforced concrete pile cap supported by micropiles. At the end bents, the additional bridge width is supported by a concrete seat abutment on drilled shaft foundations.

The retaining wall proposed between the OR 99E northbound entrance ramp and Main Street will retain the fill required to realign the entrance ramp by approximately 24 feet. The wall will be approximately 320 feet long. It will not interfere with the existing semi-cantilever wall running behind a sidewalk along Main Street.

Abernethy Creek is fish habitat and has documented use by coho, fall chinook, and winter steelhead salmon. Abernethy Creek is in a 20-foot-diameter concrete culvert approximately 650 feet long that begins east of Main Street and crosses beneath Main Street, the I-205 northbound entrance and exit ramps, OR 99E, and Clackamette Drive before emerging adjacent to the Sportcraft Landing Park parking lot beneath the Abernethy Bridge. Abernethy Creek feeds into the Willamette River next to the south column of an Abernethy Bridge bent. The Project requires permanently diverting the creek to

accommodate 12-foot-diameter drilled shafts and columns that will be placed within the existing creek alignment. Diverting the creek between the culvert outfall and the Willamette River will eliminate existing low fish passage barriers.

ODOT proposes to create on-street parking suitable for six vehicles or two trailers on Clackamette Drive. The new on-street parking will be north of the Abernethy Bridge, on the east side of Clackamette Drive across from Jon Storm Park.

II. RESPONSES TO THE OREGON CITY MUNICIPAL CODE

OCMC 12.08 – PUBLIC AND STREET TREES

12.08.015 - Street tree selection, planting and maintenance requirements.

All development shall provide street trees adjacent to all street frontages. Species and locations of trees shall be selected based upon vision clearance requirements, but shall in all cases be selected from the Oregon City Street Tree List, an approved street tree list for a jurisdiction in the metropolitan region, or be approved by a certified arborist unless otherwise approved pursuant to this section. If a setback sidewalk has already been constructed or the Public Works Department determines that the forthcoming street design shall include a setback sidewalk, then all street trees shall be installed with a planting strip or within tree wells. If existing street design includes -a curb-tight sidewalk, then all street trees shall be placed according to OCMC 12.08.035.C.

Applicant's Response: The Applicant will provide street trees adjacent to all street frontages in public right-of-way as long as the locations are compliant with ODOT clearance requirements. Street trees will be selected from the Oregon City Street Tree List or approved by a certified arborist.

A. One street tree shall be planted for every thirty-five feet of property frontage. The tree spacing shall be evenly distributed throughout the total development frontage to meet the clearance distances required in subsection (B) below. The Community Development Director may approve an alternative street tree plan, or accept fee-in-lieu of planting pursuant to OCMC 12.08.035, if site or other constraints prevent meeting the required total number of tree plantings.

B. The following clearance distances shall be maintained when planting trees:
   1) Fifteen feet from streetlights;
   2) Five feet from fire hydrants;
   3) Twenty feet from intersections;
   4) Five feet from all public utilities (i.e. sewer, storm and water lines, utility meters, etc.);

C. All street trees planted in conjunction with development shall be a minimum of two inches in caliper at six inches above the root crown and installed to city specifications. Larger caliper size trees may be approved if recommended by a certified arborist or registered landscape architect.

D. All established trees shall be pruned tight to the trunk to a height that provides adequate clearance for street cleaning equipment and ensures ADA complaint clearance for pedestrians.

E. All trees planted within the right-of-way shall be planted with root barriers at least eighteen inches in depth adjacent to the sidewalk and curb to ensure proper root growth and reduce potential damage to sidewalks, curbs and gutters.

F. All trees planted beneath powerlines shall be selected based on what is appropriate for the location. In addition, the tree species shall be approved by the associated franchise powerline utility company.

G. Tree species, spacing and selection for stormwater facilities in the public right-of-way and in storm water facilities shall conform to requirements of OCMC 13.12 and the adopted Stormwater and Grading Design Standards and be approved by the City Engineer.

H. Any public or street trees planted within the Natural Resource Overlay District shall conform to the applicable requirements of OCMC 17.49 - Natural Resources Overlay District (NROD).

Applicant's Response: The Applicant will meet the requirements of this section to the extent practicable, taking into consideration ODOT clearance requirements and tree health. The Applicant proposes to plant 74 trees along 2,608 feet of street frontage. The Landscaping Plan in Attachment B shows street tree planting locations. The Project site has 3,016 feet of frontage that would require 86 trees but, because of ODOT clearance requirements related to maintenance and safety, the Applicant cannot plant street trees along all of the proposed development frontage, including under bridges and along the I-205 corridor. For these areas, the applicant will pay a fee-in-lieu of planting trees. Street frontage under bridges is not suitable for street tree placement due to excessive amounts of shading and moisture. Trees placed along the I-205 corridor would create maintenance difficulties and safety issues; i.e., trees would need to be pruned to prevent limbs from obstructing the roadway, which would require maintenance crews accessing the trees from the highway. The Applicant proposes an alternative street tree plan that does not include street frontages on Main Street under the bridge or on McLoughlin Boulevard under the Abernethy Bridge. The Applicant proposes 74 street trees to be planted, and 12 trees to be paid for with fee-in-lieu, for a total of 86 replacement trees.

12.08.025 - General tree maintenance.

Abutting property owners shall be responsible for the maintenance and replacement of street trees and planting strips. Topping of trees is prohibited, unless under recommendation of a certified arborist, or other qualified professional. Trees shall be trimmed appropriately. Maintenance shall include watering during dry periods, trimming of established trees to remove dead branches and dangerous limbs and to maintain a minimum seven-foot clearance above all sidewalks, eight-foot clearance in clear vision areas pursuant to OCMC 10.32, and ten-foot clearance above the street. Planter strips shall be kept clear of weeds, obstructing vegetation and trash.

Applicant's Response: The Applicant will be responsible for general tree maintenance within its right-of-way in accordance with its maintenance program.

12.08.035 - Tree removal and replacement.

Existing street trees, trees in the right-of-way, and trees on public property shall be retained and protected during development unless removal is specified as part of a land use approval or in conjunction with a public capital improvement project, in accordance with OCMC 17.41. Tree removal shall be mitigated by the following:

A. A diseased or hazardous street tree, as determined by a registered arborist and approved by the City, may be removed, if replaced with one new tree for each diseased or hazardous tree. Hazardous trees which have raised the adjacent sidewalk in a manner which does not comply with the Americans with Disabilities Act may be removed and replaced without approval of an arborist.

B. A non-diseased, non-hazardous street tree that is removed shall be replaced in accordance with the Table 12.08.035. All replaced street trees shall have a minimum 1.5-inch caliper trunk measured six inches above the root crown.

Table 12.08.035

Replacement Schedule for Trees Determined to be Dead, Diseased or Hazardous by a Certified Arborist		*Replacement Schedule for Trees Not Determined to be Dead, Diseased or Hazardous by a Certified Arborist*	
Diameter of tree to be Removed (Inches of diameter at 4-ft height)	*Number of Replacement Trees to be Planted*	*Diameter of tree to be Removed (Inches of diameter at 4-ft height)*	*Number of Replacement Trees to be Planted*
Any Diameter	*1 Tree*	*Less than 6"*	*1 Tree*
		6" to 12"	*2 Trees*

Replacement Schedule for Trees Determined to be Dead, Diseased or Hazardous by a Certified Arborist		*Replacement Schedule for Trees Not Determined to be Dead, Diseased or Hazardous by a Certified Arborist*	
Diameter of tree to be Removed (Inches of diameter at 4-ft height)	*Number of Replacement Trees to be Planted*	*Diameter of tree to be Removed (Inches of diameter at 4-ft height)*	*Number of Replacement Trees to be Planted*
		13" to 18"	*3 Trees*
		19" to 24"	*4 Trees*
		25" to 30"	*5 Trees*
		31" and over	*8 Trees*

C. For the purposes of this chapter, removed trees shall be replaced by trees within the right-of-way abutting the frontage subject to the clearance distances required under OCMC 12.08.015(B). If a sufficient location to replant tree(s) is not available, the Community Development Director may allow:

1. Off-site installation of replacement trees within the right-of-way or on public property;

2. Planting of replacement trees or designation of existing trees on the abutting property within ten feet of the right-of-way as street trees. Designated street trees shall be a minimum of two inches in caliper and shall comply with the requirements in section B. In order to assure protection and replacement of the trees on private property, a covenant shall be recorded identifying the tree(s) as subject to the protections and replacement requirements in this chapter; or

3. If sufficient space to replant tree(s) is not available, the Community Development Director may allow a fee in-lieu of planting the tree(s) to be placed into a City fund dedicated to obtaining trees, planting trees and/or tree education in Oregon City.

D. Trees that are listed as invasive or nuisance species as defined in OCMC 17.04.605 may be removed without replacement.

Applicant's Response: The Applicant proposes to remove 137 trees within ODOT right-of-way for the Project. This does not include trees that will be removed from Jon Storm Park or trees within the NROD, which are described in OCMC 17.41.060 and 17.49.180, respectively. Based on Table 12.08035, the Applicant is required to plant 337 replacement trees; however, due to ODOT clear zone rules, as well as unsuitable planting areas, the Applicant is unable to plant this quantity. The Applicant proposes to plant 137 street trees and pay a fee-in-lieu for the 200 remaining trees. See the Landscaping Plans (Attachment B) for tree removal locations, a table showing the calculated number of replacement trees, and a replacement tree planting plan.

OCMC 13.12 – STORMWATER MANAGEMENT

13.12.050 - Applicability and exemptions.

This chapter establishes performance standards for stormwater conveyance, quantity and quality. Additional performance standards for erosion prevention and sediment control are established in OCMC 17.47.

A. Stormwater Conveyance. The stormwater conveyance requirements of this chapter shall apply to all stormwater systems constructed with any development activity, except as follows:

1. The conveyance facilities are located entirely on one privately owned parcel;

2. The conveyance facilities are privately maintained; and

3. The conveyance facilities receive no stormwater runoff from outside the parcel's property limits.

Those facilities exempted from the stormwater conveyance requirements by the above subsection will remain subject to the requirements of the Oregon Uniform Plumbing Code. Those exempted facilities shall be reviewed by the Building Official.

Applicant's Response: The Project is designed in compliance with stormwater conveyance, quantity, and quality standards.

B. Water Quality and Flow Control. The water quality and flow control requirements of this chapter shall apply to the following proposed uses or developments, unless exempted under subsection C:

1. Activities located wholly or partially within water quality resource areas pursuant to OCMC 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the NROD or will disturb more than one thousand square feet of existing impervious surface within the NROD as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given five-year period; or

2. Activities that create or replace more than five thousand square feet of impervious surface, cumulated over any given five-year period.

Applicant's Response: The Project is exempt under subsection C as described below.

C. Exemptions. The following exemptions to subsection B of this section apply:

1. An exemption to the flow control requirements of this chapter will be granted when the development site discharges to the Willamette River, Clackamas River or Abernethy Creek; and either lies within the one hundred-year floodplain or is up to ten feet above the design flood elevation as defined in OCMC 17.42, provided that the following conditions are met:

a. The project site is drained by a conveyance system that is comprised entirely of manmade elements (e.g. pipes, ditches, culverts outfalls, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water; and

b. The conveyance system between the project site and the exempt receiving water has sufficient hydraulic capacity and erosion stabilization measures to convey discharges from the proposed conditions of the project site and the existing conditions from non-project areas from which runoff is collected.

2. Projects in the following categories are generally exempt from the water quality and flow control requirements:

a. Stream enhancement or restoration projects approved by the City.

b. Farming practices as defined by ORS 30.960 and farm use as defined in ORS 214.000; except that buildings associated with farm practices and farm use are subject to the requirements of this chapter.

c. Actions by a public utility or any other governmental agency to remove or alleviate an emergency condition.

d. Road and parking area preservation/maintenance projects such as pothole and square cut patching, surface sealing, replacing or overlaying of existing asphalt or concrete pavement, provided the preservation/maintenance activity does not expand the existing area of impervious coverage above the thresholds in subsection B of this section.

e. Pedestrian and bicycle improvements (sidewalks, trails, pathways, and bicycle paths/lands) where no other impervious surfaces are created or replaced, built to direct stormwater runoff to adjacent vegetated areas.

f. Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics.

g. Maintenance or repair of existing utilities.

Applicant's Response: The Project is exempt under Section C (1)(a-b) because the site will discharge to the Willamette River, Clackamas River, or Abernethy Creek through a manmade conveyance system, and lies within the 100-year floodplain. See Attachment C for the Stormwater Report.

D. Uses Requiring Additional Management Practices. In addition to any other applicable requirements of this chapter, the following uses are subject to additional management practices, as defined in the Public Works Stormwater and Grading Design Standards:

1. *Bulk petroleum storage facilities;*
2. *Above ground storage of liquid materials;*
3. *Solid waste storage areas, containers, and trash compactors for commercial, industrial, or multi-family uses;*
4. *Exterior storage of bulk construction materials;*
5. *Material transfer areas and loading docks;*
6. *Equipment and/or vehicle washing facilities;*
7. *Development on land with suspected or known contamination;*
8. *Covered vehicle parking for commercial or industrial uses;*
9. *Industrial or commercial uses locating in high traffic areas, defined as average daily count trip of two thousand five hundred or more trips per day; and*
10. *Land uses subject to DEQ 1200-Z Industrial Stormwater Permit Requirements.*

Applicant's Response: The Applicant proposes exterior storage of construction materials and will follow additional management practices consistent with standards according to the DEQ NPDES 1200-CA Permit and the Public Works Stormwater and Grading Design Standards. Additional Phase II hazardous materials testing will be conducted in 2020 to determine if contaminated soils are located within the project area. Contaminated soils will be handled and disposed of in accordance with federal and state regulations, as well as in accordance with Section 6.9 (Land with Suspected or Known Contamination) of the Stormwater and Grading Design Standards.

13.12.080 - Submittal requirements.

A. Applications subject to stormwater conveyance, water quality, and/or flow control requirements of this chapter shall prepare engineered drainage plans, drainage reports, and design flow calculation reports in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards.

B. Each project site, which may be composed of one or more contiguous parcels of land, shall have a separate valid city approved plan and report before proceeding with construction.

Applicant's Response: The application submitted is subject to stormwater conveyance, water quality, and flow requirements. See the engineered drainage plans, stormwater report, and flow calculations in Attachment C, Stormwater Report.

13.12.090 - Approval criteria for engineered drainage plans and drainage report.

An engineered drainage plan and/or drainage report shall be approved only upon making the following findings:

A. The plan and report demonstrate how the proposed development and stormwater facilities will accomplish the purpose statements of this chapter.

B. The plan and report meet the requirements of the Public Works Stormwater and Grading Design Standards adopted by resolution under OCMC 13.12.020.

C. The storm drainage design within the proposed development includes provisions to adequately control runoff from all public and private streets and roof, footing, and area drains and ensures future extension of the current drainage system.

D. Streambank erosion protection is provided where stormwater, directly or indirectly, discharges to open channels or streams.

E. Specific operation and maintenance measures are proposed that ensure that the proposed stormwater quantity control facilities will be properly operated and maintained.

Applicant's Response: The Applicant's proposed stormwater facilities, described in the Stormwater Report in Attachment C and shown in the site plans in Attachment A, accomplish the purpose statements of this chapter. The proposed stormwater facilities are designed to meet the minimum stormwater quality treatment requirements to control runoff and protect against streambank erosion. The proposed stormwater quantity treatment exceeds the requirements. See Attachment C for the Stormwater Report and Engineered Drainage Plan.

13.12.100 - Alternative materials, alternative design and methods of construction.

The provisions of this chapter are not intended to prevent the use of any material, alternate design or method of construction not specifically prescribed by this chapter or the Public Works Stormwater and Grading Design Standards, provided any alternate has been approved and its use authorized by the City Engineer. The City Engineer may approve any such alternate, provided that the City Engineer finds that the proposed design is satisfactory and complies with the intent of this chapter and that the material, method, or work offered is, for the purpose intended, at least the equivalent of that prescribed by this chapter in effectiveness, suitability, strength, durability and safety. The City Engineer shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any action granting approval of an alternate shall be recorded and entered in the City files.

Applicant's Response: The applicant acknowledges this section and will comply with allowed or alternative materials, design, and methods of construction.

13.12.110 - Transfer of engineering responsibility.

Project drainage plans shall always have a project engineer. If the project engineer is changed during the course of the work, the City shall be notified in writing and the work shall be stopped until the replacement engineer has agreed to accept the responsibilities of the project engineer. The new project engineer shall provide written notice of accepting project responsibility to the City within seventy-two hours of accepting the position as project engineer.

Applicant's Response: The project drainage plan will always have a project engineer. The applicant will notify the City if the project engineer is changed at any point.

13.12.120 - Standard construction specifications.

The workmanship and materials shall be in accordance with the current edition of the "Standard Specifications for Public Works Construction," as prepared by the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the City, in effect at the time of application. The exception to this requirement is where this chapter and the Public Works Stormwater and Grading Design Standards provide other design details, in which case the requirements of this chapter and the Public Works Stormwater and Grading Design Standards shall be complied with.

Applicant's Response: The Applicant will meet specifications for construction of stormwater management facilities as applicable to ODOT right-of-way and City jurisdiction.

13.12.140 - Maintenance of public stormwater facilities.

A. A stormwater facility that receives stormwater runoff from a public right-of-way shall be a public facility. Upon expiration of the warranty period and acceptance by the City as described below, the City shall be responsible for maintenance of those public stormwater facilities. Access for

maintenance of the stormwater facilities shall be provided to the City through the granting of a stormwater easement or other means acceptable to the City.

B. *Responsibility for maintenance of stormwater facilities including all landscaping, irrigation systems, structures and appurtenances shall remain with the property owner/developer for two years (known as the warranty period). The owner/developer shall provide the City a separate two-year landscaping maintenance surety bond for one hundred ten percent of the landscaping cost. Transfer of maintenance of stormwater conveyance systems shall occur when the City accepts the stormwater conveyance system.*
C. *The City will perform an inspection of the development's entire publicly maintained stormwater system approximately forty-five days before the two-year warranty period expires. The stormwater system shall be found to be in a clean, functional condition by the City engineer before acceptance of maintenance responsibility by the City.*

Applicant's Response: The Applicant will maintain public stormwater facilities located within ODOT right-of-way, based on ODOT standard practices of maintenance. The Stormwater Report and Engineered Drainage Plans demonstrate that flow directed to Oregon City facilities will not exceed the capacity of those facilities. The Applicant anticipates no change to existing public facilities under the responsibility of Oregon City. No warranty between the Applicant and Oregon City is needed.

13.12.145 - Maintenance of private stormwater facilities.

A. *An applicant shall submit an operation and maintenance plan for each proposed stormwater facilities, unless exempted in the Public Works Stormwater and Grading Design Standards. The information in the operation and maintenance plan shall satisfy the requirements of the Public Works Stormwater and Grading Design Standards.*
B. *Private owners are required to inspect and maintain stormwater facilities on their property in accordance with an approved operation and maintenance plan. A maintenance log is required to document facility inspections and specific maintenance activities. The log shall be available to City inspection staff upon request.*
C. *Failure to operate or maintain a stormwater facility according to the operation and maintenance plan may result in an enforcement action under Section 13.12.150.*

Applicant's Response: No private stormwater facilities are proposed.

13.12.170 - Permits from other jurisdictions.

A. *The Oregon State Department of Environmental Quality (DEQ) currently issues NPDES 1200-C permits for projects that cover areas of one acre or greater. No permit shall be issued for projects of this size (or any other size as modified by DEQ) without a copy of said DEQ permit being on file with Oregon City. DEQ is responsible for policing its own permits; however, if City personnel observe conditions that are believed to be in violation of any such permit, and cannot get corrections made, the City will bring such conditions to the attention of the appropriate DEQ representatives.*
B. *Projects may require Oregon State Division of State Lands (DSL) and/or United States Army Corps of Engineers (USACE) permits. If such permits are required, no permission to construct will be granted until such a time as a copy of such permit is on file with the City or notice is received from those agencies that a permit is not required. DSL/USACE is responsible for enforcing its own permits; however, if City personnel observe conditions that are believed to be in violation of any such permit, and cannot get corrections made, the City will bring such conditions to the attention of the appropriate DSL/USACE representatives.*
C. *Projects may require Oregon State Department of Fish and Wildlife (ODFW) permits. When ODFW permits are required, no work will be authorized until the receipt of a copy of the ODFW permit. ODFW is responsible for policing its own permits; however, if City personnel observe conditions that*

are believed to be in violation of any such permit, and cannot get corrections made, the City will bring such conditions to the attention of the appropriate ODFW representatives.

Applicant's Response: The Applicant has acquired permits from DEQ, DSL, and USACE. See Attachment L for received permits. No permits from ODFW are required for the project.

OCMC 15.48 – GRADING, FILLING, AND EXCAVATING

15.48.030 Applicability—Grading permit required.

A. A city-issued grading permit shall be required before the commencement of any of the following filling or grading activities:

1. Grading activities in excess of ten cubic yards of earth;

2. Grading activities which may result in the diversion of existing drainage courses, both natural and man-made, from their natural point of entry or exit from the grading site;

3. Grading and paving activities resulting in the creation of impervious surfaces greater than two thousand square feet or more in area;

4. Any excavation beyond the limits of a basement or footing excavation, having an unsupported soil height greater than five feet after the completion of such a structure; or

5. Grading activities involving the clearing or disturbance of one-half acres (twenty-one thousand seven hundred eighty square feet) or more of land.

Applicant's Response: The Applicant will prepare a grading permit request prior to the commencement of filling or grading activities identified in this section.

15.48.090 Submittal requirements.

An engineered grading plan or an abbreviated grading plan shall be prepared in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards whenever a city approved grading permit is required. In addition, a geotechnical engineering report and/or residential lot grading plan may be required pursuant to the criteria listed below.

A. Abbreviated Grading Plan. The city shall allow the applicant to submit an abbreviated grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards if the following criteria are met:

1. No portion of the proposed site is within the flood management area overlay district pursuant to Chapter 17.42, the unstable soils and hillside constraints overlay district pursuant to Chapter 17.44, or a water quality resource area pursuant to Chapter 17.49; and

2. The proposed filling or grading activity does not involve more than fifty cubic yards of earth.

B. Engineered Grading Plan. The city shall require an engineered grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer if the proposed activities do not qualify for abbreviated grading plan.

C. Geotechnical Engineering Report. The city shall require a geotechnical engineering report in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer who specializes in geotechnical work when any of the following site conditions may exist in the development area:

1. When any publicly maintained facility (structure, street, pond, utility, park, etc.) will be supported by any engineered fill;

2. *When an embankment for a stormwater pond is created by the placement of fill;*

3. *When, by excavation, the soils remaining in place are greater than three feet high and less than twenty feet wide.*

D. *Residential Lot Grading Plan. The city shall require a residential lot grading plan in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer for all land divisions creating new residential building lots or where a public improvement project is required to provide access to an existing residential lot.*

Applicant's Response: The Applicant's site design includes plans for grading shown as cut and fill slopes in the Site Plan (Attachment A). These plans meet the requirement of 15.48.090.B Engineered Grading Plan. A Geotechnical Engineering Report is provided in Attachment D. A Residential Lot Grading Plan is not applicable to this Project.

OCMC 16.12 – MINIMUM PUBLIC IMPROVEMENTS AND DESIGN STANDARDS

16.12.010 - Purpose and general provisions.

All development shall be in conformance with the policies and design standards established by this chapter and with applicable standards in the City's public facility master plans and City design standards and specifications. In reviewing applications for development, the City Engineer shall take into consideration any approved development and the remaining development potential of adjacent properties. All street, water, sanitary sewer, storm drainage and utility plans associated with any development shall be reviewed and approved by the City Engineer prior to construction. All streets, driveways or storm drainage connections to another jurisdiction's facility or right-of-way shall be reviewed by the appropriate jurisdiction as a condition of the preliminary plat and when required by law or intergovernmental agreement shall be approved by the appropriate jurisdiction.

16.12.011 - Applicability.

A. *Compliance with this chapter is required for all development including land divisions, site plan and design review, master plan, detailed development plan and conditional use applications and all public improvements. Minor Site Plan and Design Review applications shall not be subject to this chapter unless improvements are proposed within the right-of-way.*

B. *Compliance with this chapter is also required for new construction or additions which exceed fifty percent of the existing square footage of all single and two-family dwellings living space. Garages, carports, sheds, and porches may not be included in the calculation if these spaces are not living spaces. Accessory dwelling units are not subject to compliance with this chapter. All applicable single and two -family dwellings shall provide any necessary dedications, easements or agreements as identified in the transportation system plan and this chapter, subject to constitutional limitations. In addition, the street frontage shall be improved to include the following priorities for improvements:*

   1. *Improve street pavement, construct curbs, gutters, sidewalks and planter strips; and*

   2. *Plant street trees.*

   The cost of compliance with the standards identified in 16.12.011.B.1 and 16.12.011.B.2 is calculated based on the square footage valuation from the State of Oregon Building Codes Division and limited to ten percent of the total construction costs. The value of the alterations and improvements is based on the total construction costs for a complete project rather than costs of various project component parts subject to individual building permits. The entire proposed construction project cost includes engineering and consulting fees and construction costs. It does not include permit fees, recording fees, or any work associated with drafting or recording dedications or easements.

Applicant's Response: This section applies due to necessity of site plan and design review, conditional use applications, and public improvements.

16.12.013 - Modifications.

The applicant may request and the review body may consider modification of the standards in this chapter resulting from constitutional limitations restricting the City's ability to require the dedication of property or for any other reason, based upon the criteria listed below and other criteria identified in the standard to be modified. All modifications shall be processed through a Type II Land Use application and may require additional evidence from a transportation engineer or others to verify compliance. Compliance with the following criteria is required:

A. The modification meets the intent of the standard;

B. The modification provides safe and efficient movement of pedestrians, motor vehicles, bicyclists and freight;

C. The modification is consistent with an adopted transportation or utility plan; and

D. The modification is complementary with a surrounding street design; or, in the alternative;

E. If a modification is requested for constitutional reasons, the applicant shall demonstrate the constitutional provision or provisions to be avoided by the modification and propose a modification that complies with the state or federal constitution. The City shall be under no obligation to grant a modification in excess of that which is necessary to meet its constitutional obligations.

Applicant's Response: No modifications are proposed.

16.12.015 - Street design—Generally.

Development shall be required to provide existing or future connections to adjacent sites through the use of vehicular and pedestrian access easements where applicable. Development shall provide any necessary dedications, easements or agreements as identified in the Transportation System Plan, Trails Master Plan, and/or Parks and Recreation Master Plan and this chapter, subject to constitutional limitations. The location, width and grade of street shall be considered in relation to: existing and planned streets, topographical conditions, public convenience and safety for all modes of travel, existing and identified future transit routes and pedestrian/bicycle accessways, overlay districts, and the proposed use of land to be served by the streets. The street system shall assure an adequate traffic circulation system with intersection angles, grades, tangents and curves appropriate for the traffic to be carried considering the terrain. To the extent possible, proposed streets shall connect to all existing or approved stub streets that abut the development site. The arrangement of streets shall either:

A. Provide for the continuation or appropriate projection of existing principal streets in the surrounding area and on adjacent parcels or conform to a plan for the area approved or adopted by the City to meet a particular situation where topographical or other conditions make continuance or conformance to existing streets impractical;

B. Where necessary to give access to or permit a satisfactory future development of adjoining land, streets shall be extended to the boundary of the development and the resulting dead-end street (stub) may be approved with a temporary turnaround as approved by the City Engineer. Notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future. Access control in accordance with OCMC 16.12.017 shall be required to preserve the objectives of street extensions.

C. Adequate right-of-way and improvements to streets, pedestrian ways, bike routes and bikeways, and transit facilities shall be provided and be consistent with the City's Transportation System Plan.

Consideration shall be given to the need for street widening and other improvements in the area of the proposed development impacted by traffic generated by the proposed development. This shall include, but not be limited to, improvements to the right-of-way, such as installation of lighting, signalization, turn lanes, median and parking strips, traffic islands, paving, curbs and gutters, sidewalks, bikeways, street drainage facilities and other facilities needed because of anticipated vehicular and pedestrian traffic generation.

Applicant's Response: The Applicant proposes new on-street parking and a sidewalk on Clackamette Drive, but it will not interfere with the continuation or appropriate projection of existing principal streets. The proposed Project does not include street development such that access to future developments of adjoining lands would be considered. The Transportation System Plan does not identify the need for any property dedications or easements associated with the Project.

16.12.016 - Street design.

All development regulated by this chapter shall provide street improvements in compliance with the standards in Table 16.12.016 depending on the street classification set forth in the Transportation System Plan and the Comprehensive Plan designation of the adjacent property, unless an alternative plan has been adopted. The table implements the adopted Transportation System Plan and illustrates the maximum design standards. These standards may be reduced with an alternative street design which may be approved based on the modification criteria in OCMC 16.12.013. The steps for reducing the street design are found in the Transportation System Plan.

Table 16.12.016 Street Design
Table 16.12.016 Street Design. To read the table select the road classification as identified in the Transportation System Plan and the Comprehensive Plan designation of the adjacent properties to find the maximum design standards for the road cross section. If the Comprehensive Plan designation for lands on either side of the street differs, the wider right-of-way standard shall apply.

Road Classification	***Comprehensive Plan Designation***	***Right-of-Way Width***	***Pavement Width***	***Public Access***	***Sidewalk***	***Landscape Strip***	***Bike Lane***	***Street Parking***	***Travel Lanes***	***Median***
Collector	*Mixed Use, Commercial or Public/Quasi Public*	*86 ft.*	*64 ft.*	*0.5 ft.*	*10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells*		*6 ft.*	*8 ft.*	*(3) 12 ft. Lanes*	*N/A*
	Industrial	*88 ft.*	*62 ft.*	*0.5 ft.*	*5 ft.*	*7.5 ft.*	*6 ft.*	*7 ft.*	*(3) 12 ft. Lanes*	*N/A*
	Residential	*85 ft.*	*59 ft.*	*0.5 ft.*	*5 ft.*	*7.5 ft.*	*6 ft.*	*7 ft.*	*(3) 11 ft. Lanes*	*N/A*

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Local	Mixed Use, Commercial or Public/Quasi Public	62 ft.	40 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells		N/A	8 ft.	(2) 12 ft. Lanes	N/A
	Industrial	60 ft.	38 ft.	0.5 ft.	5 ft.	5.5 ft.	(2) 19 ft. Shared Space			N/A
	Residential	54 ft.	32 ft.	0.5 ft.	5 ft.	5.5 ft.	(2) 16 ft. Shared Space			N/A

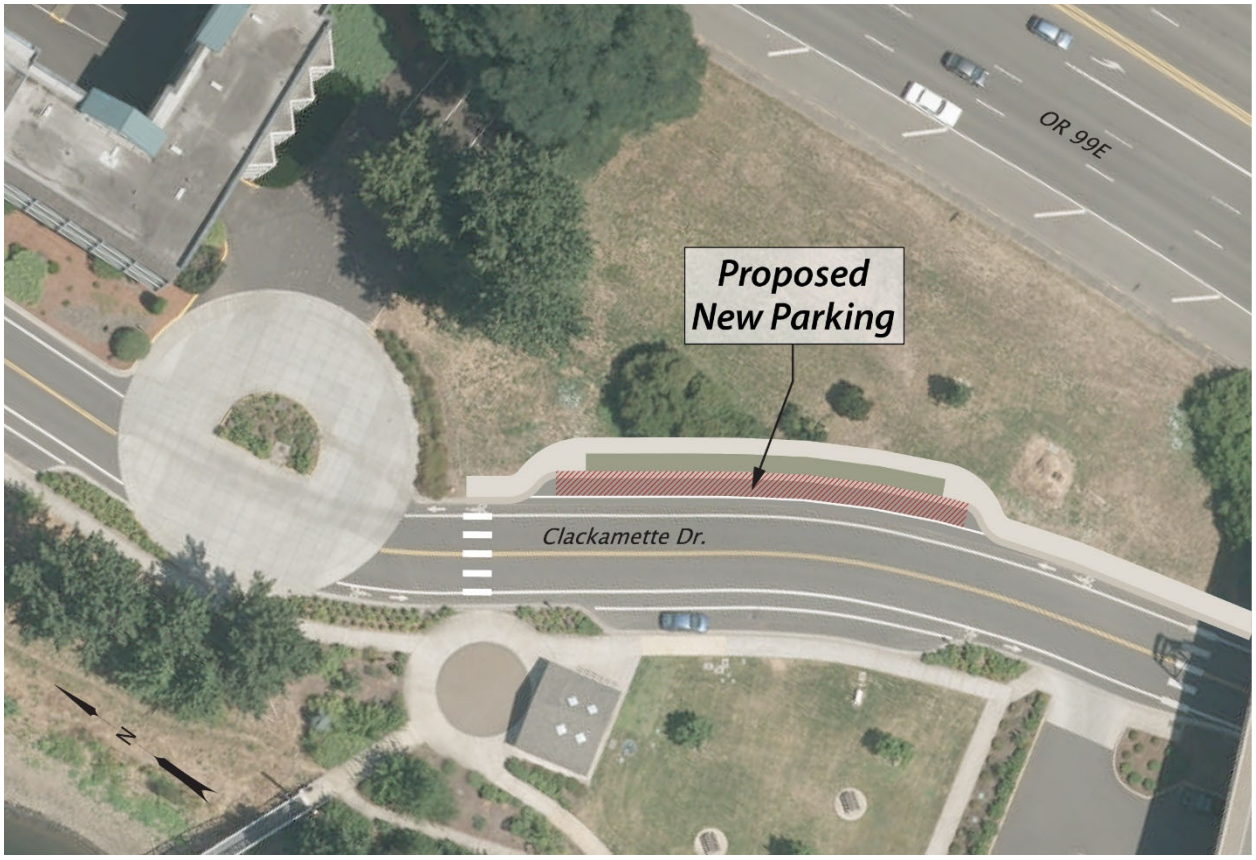
1. *Pavement width includes, bike lane, street parking, travel lanes and median.*
2. *Public access, sidewalks, landscape strips, bike lanes and on-street parking are required on both sides of the street in all designations. The right-of-way width and pavement widths identified above include the total street section.*
3. *A 0.5 foot curb is included in landscape strip or sidewalk width.*
4. *Travel lanes may be through lanes or turn lanes.*
5. *The 0.5 foot public access provides access to adjacent public improvements.*
6. *Alleys shall have a minimum right-of-way width of twenty feet and a minimum pavement width of sixteen feet. If alleys are provided, garage access shall be provided from the alley.*
7. *A raised concrete median or landscape median shall be utilized for roads identified to have access restrictions.*

Applicant's Response: The requirements of this section apply to the proposed on-street parking on Clackamette Drive across from Jon Storm Park. The Applicant proposes on-street parking in conformance with street design parameters in Table 16.12.016. See Attachment A for the Site Plans.

A. Sidewalks. The applicant shall provide for sidewalks on both sides of all public streets, on any private street if so required by the decision-maker, and in any special pedestrian way within the development. Both sidewalks and curbs are to be constructed to City standards and at widths set forth above, and according to plans and specifications provided by the City Engineer. Exceptions to this requirement may be allowed in order to accommodate topography, trees or some similar site constraint. In the case of major or minor arterials, the decision-maker may approve a development without sidewalks where sidewalks are found to be dangerous or otherwise impractical to construct or are not reasonably related to the applicant's development. The decision-maker may require the applicant to provide sidewalks concurrent with the issuance of the initial building permit within the area that is the subject of the development application. Applicants for partitions may be allowed to meet this requirement by providing the City with a financial guarantee per OCMC 16.12.110.

Applicant's Response: The Applicant will provide new sidewalks on Main Street under the I-205 Bridge and on the east side of Clackamette Drive adjacent to the new on-street parking. All new sidewalks are designed according to City standards in Table 16.12.016. See Figure 1 below and Attachment A, Site Plans. Other pedestrian facilities are described in the Applicant's response to OCMC 16.12.032.

Figure 1. Proposed On-Street Parking on Clackamette Drive



B. Pedestrian and Bicycle Accessways Routes. If deemed appropriate to extend pedestrian and bicycle routes, existing or planned, the decision-maker may require the installation of separate pedestrian and bicycle facilities.

Applicant's Response: The Applicant will modify the existing pedestrian/bicycle path on the east side of Clackamette Drive from south of Abernethy Bridge to north of Abernethy Bridge. See Attachment A, Site Plans. Other pedestrian facilities are described in the Applicant's response to OCMC 16.12.032.

C. Street Name Signs and Traffic Control Devices. The applicant shall install street signs and traffic control devices as directed by the City Engineer. Street name signs and traffic control devices shall be in conformance with all applicable city regulations and standards.

Applicant's Response: The proposal does not include new streets; no new street signs or traffic control devices are proposed.

D. Street Lights. The applicant shall install street lights which shall be served from an underground source of supply. Street lights shall be in conformance with all City regulations.

Applicant's Response: The proposal does not include new street lights. Any street lights affected during construction will be returned to preconstruction conditions following construction.

E. Any new street proposed with a pavement width of less than thirty-two feet shall be processed through OCMC 16.12.013 and meet minimum life safety requirements, which may include fire suppression devices as determined by the Fire Marshall to assure an adequate level of fire and life safety. The modified street shall have no less than a twenty-foot wide unobstructed travel lane.

Applicant's Response: This section does not apply because no new street is proposed.

F. All development shall include vegetated planter strips that are five feet in width or larger and located between the sidewalk and curb unless otherwise approved pursuant to this chapter. All development shall utilize the vegetated planter strip for the placement of street trees or place street trees in other acceptable locations, as prescribed by OCMC 12.08. Development proposed along a collector, minor arterial, or major arterial roads may place street trees within tree wells within a wider sidewalk in lieu of a planter strip. In addition to street trees per OCMC 12.08, vegetated planter strips shall include ground cover and/or shrubs spaced four feet apart and appropriate for the location. No invasive or nuisance plant species shall be permitted.

Applicant's Response: Consistent with this section of the OCMC, the Landscape Plan includes vegetated planter strips along Clackamette Drive between the new on-street parking and the new sidewalk. See Attachment B, Landscaping Plans.

G. Vehicle and pedestrian access easements may serve in lieu of streets when approved by the decision maker and only where dedication of a street is deemed impracticable.

Applicant's Response: This section does not apply because no vehicle and pedestrian access easements are proposed in lieu of streets.

H. Vehicular and pedestrian easements shall allow for public access and shall comply with all applicable pedestrian access requirements.

Applicant's Response: The applicant does not propose any vehicular and pedestrian easements related to new streets or in lieu of streets.

16.12.017 - Street design—Access control.

A. A street which is dedicated to end at the boundary of the development or in the case of half-streets dedicated along a boundary shall have an access control granted to the City as a City controlled plat restriction for the purposes of controlling ingress and egress to the property adjacent to the end of the dedicated street. The access control restriction shall exist until such time as a public street is created, by dedication and accepted, extending the street to the adjacent property.

B. The City may grant a permit for the adjoining owner to access through the access control.

C. The plat shall contain the following access control language or similar on the face of the map at the end of each street for which access control is required: "Access Control (See plat restrictions)."

D. Said plats shall also contain the following plat restriction note(s): "Access to (name of street or tract) from adjoining tracts (name of deed document number[s]) shall be controlled by the City of Oregon City by the recording of this plat, as shown. These access controls shall be automatically terminated upon the acceptance of a public road dedication or the recording of a plat extending the street to adjacent property that would access through those Access Controls."

Applicant's Response: This section does not apply as no new streets are proposed.

16.12.018 - Street design—Alignment.

The centerline of streets shall be:

A. Aligned with existing streets by continuation of the centerlines; or

B. Offset from the centerline by no more than five feet, provided appropriate mitigation, in the judgment of the City Engineer, is provided to ensure that the offset intersection will not pose a safety hazard.

C. Driveways that are at least twenty-four feet wide shall align with existing or planned streets on adjacent sites.

Applicant's Response: This section does not apply as no new streets are proposed.

16.12.019 - Traffic sight obstructions.

All new streets shall comply with the Traffic Sight Obstructions in Chapter 10.32.

Applicant's Response: This section does not apply as no new streets are proposed.

16.12.020 - Street design—Intersection angles.

Except where topography requires a lesser angle, streets shall be laid out to intersect at angles as near as possible to right angles. In no case shall the acute angles be less than eighty degrees unless there is a special intersection design. An arterial or collector street intersecting with another street shall have at least one hundred feet of tangent adjacent to the intersection unless topography requires a lesser distance. Other streets, except alleys, shall have at least fifty feet of tangent adjacent to the intersection unless topography requires a lesser distance. All street intersections shall be provided with a minimum curb return radius of twenty-five feet for local streets. Larger radii shall be required for higher street classifications as determined by the City Engineer. Additional right-of-way shall be required to accommodate curb returns and sidewalks at intersections. Ordinarily, intersections should not have more than two streets at any one point.

Applicant's Response: This section does not apply as no new streets or intersections are proposed.

16.12.021 - Street design—Grades and curves.

Grades and center line radii shall conform to standards approved by the City Engineer.

Applicant's Response: This section does not apply as no new streets are proposed.

16.12.022 - Street design—Development abutting arterial or collector street.

Where development abuts or contains an existing or proposed arterial or collector street, the decision maker may require: access control; screen planting or wall contained in an easement or otherwise protected by a restrictive covenant in a form acceptable to the decision maker along the rear or side property line; or such other treatment it deems necessary to adequately protect residential properties or afford separation of through and local traffic. Reverse frontage lots with suitable depth may also be considered an option for residential property that has arterial frontage. Where access for development abuts and connects for vehicular access to another jurisdiction's facility then authorization by that jurisdiction may be required.

Applicant's Response: This section does not apply as no new streets are proposed.

16.12.023 - Street design—Pedestrian and bicycle safety.

Where deemed necessary to ensure public safety, reduce traffic hazards and promote the welfare of pedestrians, bicyclists and residents of the subject area, the decision maker may require that local streets be so designed as to discourage their use by nonlocal automobile traffic.
The City Engineer may require that crosswalks include a large vegetated or sidewalk area which extends into the street pavement as far as practicable to provide safer pedestrian crossing opportunities. These curb extensions can increase the visibility of pedestrians and provide a shorter crosswalk distance as well as encourage motorists to drive slower. The City Engineer may approve an alternative design that achieves the same standard for constrained sites.

Applicant's Response: This section does not apply as no new streets are proposed.

16.12.024 - Street design—Half street.

Half streets, while generally not acceptable, may be approved where essential to the development, when in conformance with all other applicable requirements, and where it will not create a safety hazard. When approving half streets, the decision maker shall first determine that it will be practical to require the dedication of the other half of the street when the adjoining property is divided or developed. Where the decision maker approves a half street, the applicant shall construct a half street with at least twenty feet of pavement width and provide signage prohibiting street parking so as to make the half street safe until such time as the other half is constructed. Whenever a half street is adjacent to property capable of being divided or developed, the other half of the street shall be provided and improved when that adjacent property divides or develops. Access control may be required to preserve the objectives of half streets. When the remainder of an existing half-street improvement is completed it shall include the following items: dedication of required right-of-way, construction of the remaining portion of the street including pavement, curb and gutter, landscape strip, sidewalk, street trees, lighting and other improvements as required for that particular street. It shall also include at a minimum the pavement replacement to the centerline of the street. Any damage to the existing street shall be repaired in accordance with the City's "Pavement Cut Standards" or as approved by the City Engineer.

Applicant's Response: This section does not apply as no half streets are proposed.

16.12.025 - Street design—Cul-de-sacs and dead-end streets.

The City discourages the use of cul-de-sacs and permanent dead-end streets except where construction of a through street is found by the decision maker to be impracticable due to topography or some significant physical constraint such as geologic hazards, wetland, natural or historic resource areas, pre-existing dedicated open space, pre-existing development patterns, arterial access restrictions or similar situation as determined by the decision maker. This section is not intended to preclude the use of curvilinear eyebrow widening of a street where needed.

A. When permitted, access from new cul-de-sacs and permanent dead-end streets shall be limited to a maximum of twenty-five dwelling units.

B. Cul-de-sacs and permanent dead-end streets shall include pedestrian/bicycle accessways to meet minimum block width standards as prescribed in OCMC 16.12.030.

C. Cul-de-sacs shall have sufficient radius to provide adequate turn-around for emergency vehicles in accordance with fire district and city adopted street standards.

D. Permanent dead-end streets shall provide public street right-of-way/easements sufficient to provide a sufficient amount of turn-around space complete with appropriate no-parking signs or markings to accommodate waste disposal, sweepers, emergency, and other long vehicles in the form of a hammerhead or other design to be approved by the decision maker.

E. In the case of dead-end stub streets that will connect to streets on adjacent sites in the future, notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future. A dead-end street shall include signage or barricade meeting Manual on Uniform Traffic Control Devices (MUTCD).

Applicant's Response: This section does not apply as no cul-de-sacs or dead-end streets are proposed.

16.12.026 - Street design—Alleys.

Alleys with public access easements on private property shall be provided in the Park Place and South End concept plan areas for the following districts R-5, R-3.5, R-2, MUC-1, MUC-2 and NC zones unless other permanent provisions for private access to off-street parking and loading facilities are approved by the

decision maker. All alleys intended to provide access for emergency vehicles shall be a minimum width of twenty feet. The corners of alley intersections shall have a radius of not less than ten feet and shall conform to standards approved by the City Engineer. Access easements and maintenance agreements shall be recorded on affected properties.

Applicant's Response: This section does not apply as no alleys are proposed.

16.12.027 - Street design—Off-site street improvements.

During consideration of the preliminary plan for a development, the decision maker shall determine whether existing streets impacted by, adjacent to, or abutting the development meet the applicable design or dimensional requirements. Where such streets fail to meet these requirements, the decision-maker shall require the applicant to make proportional improvements sufficient to achieve conformance with minimum applicable design standards required to serve the proposed development.

Applicant's Response: The Applicant proposes development that will impact Main Street and Clackamette Drive. The roadway at Main Street will be replaced at the same existing width, as requested by the City of Oregon City. Sidewalks will be installed to meet dimensional standards of Table 16.12.016. At Clackamette Drive, the roadway will be rebuilt to meet dimensional standards, including the addition of a new sidewalk along the east side of the road. Minor deviations to the sidewalk width may be required where construction to full width would impact an existing utility access point.

16.12.028 - Street design—Transit.

Streets shall be designed and laid out in a manner that promotes pedestrian and bicycle circulation. The applicant shall coordinate with transit agencies where the application impacts transit streets as identified in OCMC 17.04.1310. Pedestrian/bicycle access ways shall be provided as necessary to minimize the travel distance to transit streets and stops and neighborhood activity centers. The decision maker may require provisions, including easements, for transit facilities along transit streets where a need for bus stops, bus pullouts or other transit facilities within or adjacent to the development has been identified.

Applicant's Response: This section does not apply as no new streets are proposed.

16.12.029 - Excavations—Restoration of pavement.

Whenever any excavation shall have been made in any pavement or other street improvement on any street or alley in the City for any purpose whatsoever under the permit granted by the engineer, it shall be the duty of the person making the excavation to restore the pavement in accordance with the City of Oregon City Public Works Pavement Cut Standards in effect at the time the permit is granted. The City Commission may adopt and modify the City of Oregon City Public Works Pavement Cut Standards by resolution as necessary to implement the requirements of this chapter.

Applicant's Response: All excavated areas will be restored in accordance with the City of Oregon City Public Works Pavement Cut Standards.

16.12.030 - Blocks—Width.

The width of blocks shall ordinarily be sufficient to allow for two tiers of lots with depths consistent with the type of land use proposed. The length, width and shape of blocks shall take into account the need for adequate building site size, convenient motor vehicle, pedestrian, bicycle and transit access, control of traffic circulation, and limitations imposed by topography and other natural features.
All new streets shall be designed as local streets unless otherwise designated as arterials and collectors in the current adopted Transportation System Plan. The maximum block spacing between streets is 530 feet and the minimum block spacing between streets is 150 feet as measured between the right-of-way centerlines except in zones GI, CI, MUE, I, and WFDD where determining the appropriate street spacing

will be determined by the City Engineer. If the maximum block size is exceeded, pedestrian accessways shall be provided every 330 feet. The spacing standards within this section do not apply to alleys.

Applicant's Response: This section does not apply as no new streets or blocks are proposed.

16.12.031 - Street design—Street names.

Except for extensions of existing streets, no street name shall be used which will duplicate or be confused with the name of an existing street. Street names shall conform to the established standards in the City and shall be subject to the approval of the City.

Applicant's Response: This section does not apply as no new streets or street names are proposed.

16.12.032 – Public off-street pedestrian and bicycle accessways.

Pedestrian/bicycle accessways are intended to provide direct, safe and convenient connections between residential areas, retail and office areas, institutional facilities, industrial parks, transit streets, neighborhood activity centers, rights-of-way, and pedestrian/bicycle accessways which minimize out-of-direction travel, and transit-orientated developments where public street connections for automobiles, bicycles and pedestrians are unavailable. Pedestrian/bicycle accessways are appropriate in areas where public street options are unavailable, impractical or inappropriate. Pedestrian and bicycle accessways are required through private property or as right-of-way connecting development to the right-of-way at intervals not exceeding 330 feet of frontage; or where the lack of street continuity creates inconvenient or out of direction travel patterns for local pedestrian or bicycle trips.

- *A. Entry points shall align with pedestrian crossing points along adjacent streets and with adjacent street intersections.*
- *B. Accessways shall be free of horizontal obstructions and have a nine foot six inch high vertical clearance to accommodate bicyclists. To safely accommodate both pedestrians and bicycles, accessway right-of-way widths shall be as follows:*
  - *1. Accessways shall have a fifteen- foot wide right-of-way with a seven-foot wide paved surface with a minimum four-foot planter strip on either side.*
  - *2. If an accessway also provides secondary fire access, the right-of-way width shall be at least twenty- four feet wide with a - sixteen foot paved surface between four-foot planter strips on either side.*
- *C. Accessways shall be direct with at least one end point of the accessway always visible from any point along the accessway. On-street parking shall be prohibited within fifteen feet of the intersection of the accessway with public streets to preserve safe sight distance and promote safety.*
- *D. To enhance pedestrian and bicycle safety, accessways shall be lighted with pedestrian-scale lighting. Accessway lighting shall be to a minimum level of one-half-foot-candles, a one and one-half foot-candle average, and a maximum to minimum ratio of seven-to-one and shall be oriented not to shine upon adjacent properties. Street lighting shall be provided at both entrances.*
- *E. Accessways shall comply with Americans with Disabilities Act (ADA).*
- *F. The planter strips on either side of the accessway shall be landscaped along adjacent property by installation of the following:*
  - *1. Either an evergreen hedge screen of thirty to forty-two inches high or shrubs spaced no more than four feet apart on average; and*

2. *Ground cover covering one hundred percent of the exposed ground. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees; and*

3. *A two-inch minimum caliper tree for every thirty-five -feet along the accessway. Trees may be planted on either side of the accessway, provided they are spaced no more than thirty-five feet apart; and*

4. *In satisfying the requirements of this section, evergreen plant materials that grow over forty-two inches in height shall be avoided. All plant materials shall be selected from the Oregon City Native Plant List.*

G. *Accessways shall be designed to prohibit unauthorized motorized traffic. Curbs and removable, lockable bollards are suggested mechanisms to achieve this.*

H. *Accessway surfaces shall be paved with all-weather materials as approved by the City. Pervious materials are encouraged. Accessway surfaces shall be designed to drain stormwater runoff to the side or sides of the accessway. Minimum cross slope shall be two percent.*

I. *In parks, greenways or other natural resource areas, accessways may be approved with a five-foot wide gravel path with wooden, brick or concrete edgings.*

J. *The decision maker may approve an alternative accessway design due to existing site constraints through the modification process set forth in OCMC 16.12.013.*

K. *Ownership, liability and maintenance of accessways. To ensure that all pedestrian/bicycle accessways will be adequately maintained over time, the City Engineer shall require one of the following:*

1. *Dedicate the accessways to the public as public right-of-way prior to the final approval of the development; or*

2. *The developer incorporates the accessway into a recorded easement or tract that specifically requires the property owner and future property owners to provide for the ownership, liability and maintenance of the accessway.*

Applicant's Response: This section does not apply as no public off-street pedestrian and bicycle accessways are proposed.

16.12.033 - Mobility standards.

Development shall demonstrate compliance with intersection mobility standards. When evaluating the performance of the transportation system, the City of Oregon City requires all intersections, except for the facilities identified in subsection E below, to be maintained at or below the following mobility standards during the two-hour peak operating conditions. The first hour has the highest weekday traffic volumes and the second hour is the next highest hour before or after the first hour. Except as provided otherwise below, this may require the installation of mobility improvements as set forth in the Transportation System Plan (TSP) or as otherwise identified by the City Engineer.

A. *For intersections within the regional center, the following mobility standards apply:*

1. *During the first hour, a maximum v/c ratio of 1.10 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.*

2. *During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole.*

For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.

3. *Intersections located on the Regional Center boundary shall be considered within the Regional Center.*

B. *For intersections outside of the Regional Center but designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:*

1. *During the first hour, a maximum v/c ratio of 0.99 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.*

2. *During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.*

C. *For intersections outside the boundaries of the Regional Center and not designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:*

1. *For signalized intersections:*

a. *During the first hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.*

b. *During the second hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.*

2. *For unsignalized intersections outside of the boundaries of the Regional Center:*

a. *For unsignalized intersections, during the peak hour, all movements serving more than twenty vehicles shall be maintained at LOS "E" or better. LOS "F" will be tolerated at movements serving no more than twenty vehicles during the peak hour.*

D. *For the intersection of OR 213 & Beavercreek Road, the following mobility standards apply:*

1. *During the first, second & third hours, a maximum v/c ratio of 1.00 shall be maintained. Calculation of the maximum v/c ratio will be based on an average annual weekday peak hour.*

E. *Until the City adopts new performance measures that identify alternative mobility targets, the City shall exempt proposed development that is permitted, either conditionally, outright, or through detailed development master plan approval, from compliance with the above-referenced mobility standards for the following state-owned facilities:*

I-205/OR 99E Interchange
State intersections located within or on the Regional Center Boundaries

1. *In the case of conceptual development approval for a master plan that impacts the above references intersections:*

a. *The form of mitigation will be determined at the time of the detailed development plan review for subsequent phases utilizing the Code in place at the time the detailed development plan is submitted; and*

b. *Only those trips approved by a detailed development plan review are vested.*

2. *Development which does not comply with the mobility standards for the intersections identified in OCMC 16.12.033 shall provide for the improvements identified in the Transportation System Plan (TSP) in an effort to improve intersection mobility as necessary to offset the impact caused by development. Where required by other provisions of the Code, the applicant shall provide a traffic impact study that includes an assessment of the development's impact on the intersections identified in this exemption and shall construct the intersection improvements listed in the TSP or required by the Code.*

Applicant's Response: The Project is within the Regional Center and includes the I-205/OR 99E interchange. A Traffic Analysis was done for all intersections within the project area. All intersections meet the mobility standards identified in OCMC 16.12.033. See Attachment M for the Traffic Analysis Memorandum.

16.12.035 - Driveways.

A. All new development and redevelopment shall meet the minimum driveway spacing standards identified in Table 16.12.035.A.

Table 16.12.035.A Minimum Driveway Spacing Standards

Street Functional Classification	*Minimum Driveway Spacing Standards*	*Distance*
Major Arterial Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*175 ft.*
Minor Arterial Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*175 ft.*
Collector Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*100 ft.*
Local Streets	*Minimum distance from a street corner to a driveway for all uses other than detached single and two-family dwellings*	*25 ft.*

The distance from a street corner to a driveway is measured along the right-of-way from the edge of the intersection (on the same side of the road) right-of-way to the nearest portion of the driveway and the distance between driveways is measured at the nearest portions of the driveway at the right-of-way.

B. *Nonresidential or multi-family residential driveways that generate high traffic volumes shall be treated as intersections and shall adhere to requirements of OCMC 16.12.020.*

C. *One driveway may be allowed per frontage, unless otherwise restricted. In no case shall more than two driveways be allowed for any single-family attached or detached residential property, duplex, 3-4 plex, or property developed with an ADU or internal conversion with multiple frontages, unless otherwise approved by the City Engineer.*

D. *When a property fronts multiple roads, access shall be provided from the road with the lowest classification in the Transportation System Plan whenever possible to minimize points of access to arterials and collectors. At the discretion of the City Engineer, properties fronting a collector or arterial road may be allowed a second driveway, for the creation of a circulation pattern that eliminates reverse maneuvers for vehicles exiting a property if applied for and granted through procedures in OCMC 16.12.013. All lots proposed with a driveway and lot orientation on a collector or minor arterial shall combine driveways into one joint access per two or more lots unless the City Engineer determines that:*

1. *No driveway access may be allowed since the driveway(s) would cause a significant traffic safety hazard; or*
2. *Allowing a single driveway access per lot will not cause a significant traffic safety hazard.*

F. All driveway approaches shall be limited to the dimensions identified in Table 16.12.035.D.

Table 16.12.035.D Driveway Approach Size Standards			
Property Use	*Minimum Driveway Approach Width*		*Maximum Driveway Approach Width*
Single-Family Attached	*10 feet*		*12 feet*
Single-Family Detached in R-5 & R-3.5	*10 feet*		*12 feet*
Single-Family Detached in R-10, R-8, & R-6	*12 feet*		*24 feet*
Duplexes	*12 feet*		*24 feet*
3-4 Plexes	*12 feet*		*24 feet*
Multi-Family	*18 feet*		*30 feet*
Commercial, Industrial, Office, Institutional, Mixed Use, and/or Nonresidential	*One-Way 12 feet*	*Two-Way 20 feet*	*40 feet*

Driveway widths shall match the width of the driveway approach where the driveway meets sidewalk or property line but may be widened onsite (for example between the property line and the entrance to a garage). Groups of more than four parking spaces shall be so located and served by driveways so that their use will not require backing movements or other maneuvering within a street right-of-way other than an alley.

G. The City Engineer reserves the right to require a reduction in the number and size of driveway approaches as far as practicable for any of the following purposes:

1. *To provide adequate space for on-street parking;*
2. *To facilitate street tree planting requirements;*
3. *To assure pedestrian and vehicular safety by limiting vehicular access points; and*
4. *To assure that adequate sight distance requirements are met.*
    a. *Where the decision maker determines any of these situations exist or may occur due to the approval of a proposed development for non-residential uses or attached or multi-family housing, a shared driveway shall be required and limited to twenty-four feet in width adjacent to the sidewalk or property line.*

H. For all driveways, the following standards apply.

1. *Each new or redeveloped curb cut shall have an approved concrete approach or asphalted street connection where there is no concrete curb and a minimum hard surface for at least ten feet back into the property as measured from the current edge of sidewalk or street pavement to provide for controlling gravel tracking onto the public street. The hard surface may be concrete, asphalt, or other surface approved by the City Engineer.*
2. *Any driveway approach built within public right-of-way shall be built and permitted per City requirements as approved by the City Engineer.*

3. *No driveway with a slope of greater than fifteen percent shall be permitted without approval of the City Engineer.*

I. Exceptions. The City Engineer reserves the right to waive these standards or not allow driveway access, if the driveway(s) would cause a significant traffic safety hazard. Narrower driveway widths may be considered where field conditions preclude use of recommended widths. When larger vehicles and trucks will be the predominant users of a particular driveway, turning templates may be utilized to develop a driveway width that can safely and expeditiously accommodate the prevalent type of ingress and egress traffic.

Applicant's Response: This section does not apply as no new driveways are proposed.

16.12.065 - Building site—Grading.

Grading of building sites shall conform to the State of Oregon Structural Specialty Code, Title 18, any approved grading plan and any approved residential lot grading plan in accordance with the requirements of OCMC 13.12,15.48, 16.12 and the Public Works Stormwater and Grading Design Standards, and the erosion control requirements of OCMC 17.47.

Applicant's Response: Proposed grading complies with the State of Oregon Structural Specialty Code; OCMC 13.12, 15.48, 16.12; the Public Works Stormwater and Grading Design Standards; and the erosion control requirements of OCMC 17.47.

16.12.085 - Easements.

The following shall govern the location, improvement and layout of easements:

A. Utilities. Utility easements shall be required where necessary as determined by the City Engineer. Insofar as practicable, easements shall be continuous and aligned from block-to-block within the development and with adjoining subdivisions or partitions. Specific utility easements for water, sanitary or storm drainage shall be provided based on approved final engineering plans.

B. Unusual Facilities. Easements for unusual facilities such as high voltage electric transmission lines, drainage channels and stormwater detention facilities shall be adequately sized for their intended purpose, including any necessary maintenance roads. These easements shall be shown to scale on the preliminary and final plats or maps. If the easement is for drainage channels, stormwater detention facilities or related purposes, the easement shall comply with the requirements of the Public Works Stormwater and Grading Design Standards.

C. Watercourses. Where a development is traversed or bounded by a watercourse, drainageway, channel or stream, a stormwater easement or drainage right-of-way shall be provided which conforms substantially to the line of such watercourse, drainageway, channel or stream and is of a sufficient width to allow construction, maintenance and control for the purpose as required by the responsible agency. For those subdivisions or partitions which are bounded by a stream of established recreational value, setbacks or easements may be required to prevent impacts to the water resource or to accommodate pedestrian or bicycle paths.

D. Access. When easements are used to provide vehicular access to lots within a development, the construction standards, but not necessarily width standards, for the easement shall meet City specifications. The minimum width of the easement shall be 20 feet. The easements shall be improved and recorded by the applicant and inspected by the City Engineer. Access easements may also provide for utility placement.

E. Resource Protection. Easements or other protective measures may also be required as the Community Development Director deems necessary to ensure compliance with applicable review criteria protecting any unusual significant natural feature or features of historic significance.

Applicant's Response: The City Engineer has not determined any necessary utility easements or unusual facilities. The Project area is located within State (ODOT) right-of-way. ROW is required for operation,

maintenance, and safety of the facility. An easement can restrict the State's ability to maintain and operate the interstate and is prohibited by 23 CFR 710.409; therefore, the Applicant does not propose any easements. The Project would not disturb the historic Abernethy Elm Stump, as it would be protected by a no-work zone as shown in the project plans and would be flagged in the field during construction. See Attachment A, Sheet FB08.

16.12.090 - Minimum improvements—Procedures.

In addition to other requirements, improvements installed by the applicant either as a requirement of these or other regulations, or at the applicant's option, shall conform to the requirements of this title and be designed to City specifications and standards as set out in the City's facility master plan and Public Works Stormwater and Grading Design Standards. The improvements shall be installed in accordance with the following procedure:

A. Improvement work shall not commence until construction plans have been reviewed and approved by the City Engineer and to the extent that improvements are located in County or State right-of-way, they shall be approved by the responsible authority. To the extent necessary for evaluation of the proposal, the plans may be required before approval of the preliminary plat of a subdivision or partition. Expenses incurred thereby shall be borne by the applicant and paid for prior to final plan review.

B. Improvements shall be constructed under the inspection and approval of the City Engineer. Expenses incurred thereby shall be borne by the applicant and paid prior to final approval. Where required by the City Engineer or other City decision-maker, the applicant's project engineer also shall inspect construction.

C. Erosion control or resource protection facilities or measures are required to be installed in accordance with the requirements of OCMC 17.47, 17.49 and the Public Works Erosion and Sediment Control Standards.

D. Underground utilities, waterlines, sanitary sewers and storm drains installed in streets shall be constructed prior to the surfacing of the streets. Stubs for service connections for underground utilities, such as, storm, water and sanitary sewer shall be placed beyond the ten-foot wide franchise utility easement within private property.

E. As-built construction plans and digital copies of as-built drawings shall be filed with the City Engineer upon completion of the improvements.

F. The City Engineer may regulate the hours of construction and access routes for construction equipment to minimize impacts on adjoining residences or neighborhoods.

Applicant's Response: The Applicant will comply with all applicable improvement procedures outlined in this section. Improvements on state right-of-way will be inspected and approved by the State Engineer.

16.12.095 - Minimum improvements—Public facilities and services.

The following minimum improvements shall be required of all applicants for a development, unless the decision-maker determines that any such improvement is not proportional to the impact imposed on the City's public systems and facilities:

A. Transportation System. Applicants and all subsequent lot owners shall be responsible for improving the City's planned level of service on all public streets, including alleys within the development and those portions of public streets adjacent to but only partially within development. Applicants are responsible for designing and providing adequate vehicular, bicycle and pedestrian access to their developments and for accommodating future access to neighboring undeveloped properties that are suitably zoned for future development. Storm drainage facilities shall be installed and connected to off-site natural or man-made drainageways. Upon completion of the street improvement survey, the applicant shall reestablish and protect monuments of the type required by ORS 92.060 in monument

boxes with covers at every public street intersection and all points or curvature and points of tangency of their center line, and at such other points as directed by the City Engineer.

Applicant's Response: The Applicant's proposal is a transportation improvement Project. No new development is proposed that would adversely affect the transportation system. Sidewalks will be constructed along Main Street and the east side of Clackamette Drive within the project limits.

B. Stormwater Drainage System. Applicants shall design and install drainage facilities within a development and shall connect the development's drainage system to the appropriate downstream storm drainage system as a minimum requirement for providing services to the applicant's development. The applicant shall obtain county or state approval when appropriate. Applicants are responsible for extending the appropriate storm drainage system to the development site and for providing for the connection of upgradient properties to that system. The applicant shall design the drainage facilities in accordance with City drainage master plan requirements, OCMC 13.12 and the Public Works Stormwater and Grading Design Standards.

Applicant's Response: The Applicant's Stormwater Plan (see Attachment C) meets the requirements of this section.

C. Sanitary Sewer System. The applicant shall design and install a sanitary sewer system to serve all lots or parcels within a development in accordance with the City's sanitary sewer design standards, and shall connect those lots or parcels to the City's sanitary sewer system, except where connection is required to the county sanitary sewer system as approved by the county. Applicants are responsible for extending the City's sanitary sewer system to the development site and through the applicant's property to allow for the future connection of neighboring undeveloped properties that are suitably zoned for future development. The applicant shall obtain all required permits and approvals from all affected jurisdictions prior to final approval and prior to commencement of construction. Design shall be approved by the City Engineer before construction begins.

Applicant's Response: The Applicant's proposal does not require sanitary sewer facilities. This section is not applicable.

D. Water System. The applicant shall design and install a water system to serve all lots or parcels within a development in accordance with the City public works water system design standards, and shall connect those lots or parcels to the City's water system. Applicants are responsible for extending the City's water system to the development site and through the applicant's property to allow for the future connection of neighboring undeveloped properties that are suitably zoned for future development.

Applicant's Response: The Applicant's proposal does not require water system facilities. This section is not applicable.

E. Street Trees. Refer to OCMC 12.08, Street Trees.

Applicant's Response: The Applicant will comply with all applicable street tree requirements outlined in OCMC 12.08.

F. Bench Marks. At least one bench mark shall be located within the subdivision boundaries using datum plane specified by the City Engineer.

Applicant's Response: The Applicant is not proposing a subdivision. This section does not apply.

G. Other Utilities. The applicant shall make all necessary arrangements with utility companies or other affected parties for the installation of underground lines and facilities. Existing and new electrical

lines and other wires, including but not limited to communication, street lighting and cable television, shall be placed underground.

Applicant's Response: The applicant will comply with all applicable utility placement and installation.

H. Oversizing of Facilities. All facilities and improvements shall be designed to City standards as set out in the City's facility master plan, public works design standards, or other City ordinances or regulations. Compliance with facility design standards shall be addressed during final engineering. A development may be required to modify or replace existing offsite systems if necessary to provide adequate public facilities. The City may require oversizing of facilities to meet standards in the City's facility master plan or to allow for orderly and efficient development. Where oversizing is required, the applicant may request reimbursement from the City for oversizing based on the City's reimbursement policy and funds available, or provide for recovery of costs from intervening properties as they develop.

Applicant's Response: The Applicant will design all improvements to City standards as required.

I. Erosion Control Plan—Mitigation. The applicant shall be responsible for complying with all applicable provisions of OCMC 17.47 with regard to erosion control.

Applicant's Response: The applicant will comply with all erosion control plan requirements in OCMC 17.47. See Attachment A for the Erosion and Sediment Control Plan.

16.12.100 - Same—Road standards and requirements.

A. The creation of a public street and the resultant separate land parcels shall be in conformance with requirements for subdivisions or partitions and the applicable street design standards of this Chapter. However, the decision-maker may approve the creation of a public street to be established by deed without full compliance with the regulations applicable to subdivisions or partitions where any of the following conditions exist:

1. The establishment of the public street is initiated by the City Commission and is declared essential for the purpose of general traffic circulation and the partitioning of land is an incidental effect rather than the primary objective of the street;

2. The tract in which the street is to be dedicated is within an isolated ownership either not over one acre or of such size and characteristics as to make it impossible to develop building sites for more than three dwelling units.

B. For any public street created pursuant to subsection A of this section, a copy of a preliminary plan and the proposed deed shall be submitted to the Community Development Director and City Engineer at least ten days prior to any public hearing scheduled for the matter. The plan, deed and any additional information the applicant may submit shall be reviewed by the decision-maker and, if not in conflict with the standards of Title 16 and Title 17, may be approved with appropriate conditions.

Applicant's Response: The Applicant does not propose to create a new public street or separate land parcels. This section does not apply.

16.12.105 - Same—Timing requirements.

A. Prior to applying for final plat approval, the applicant shall either complete construction of all public improvements required as part of the preliminary plat approval or guarantee the construction of those improvements. Whichever option the applicant elects shall be in accordance with OCMC 17.50.140.

B. Construction. The applicant shall construct the public improvements according to approved final engineering plans and all applicable requirements of this Code, and under the supervision of the City

Engineer. Under this option, the improvement shall be complete and accepted by the City Engineer prior to final plat approval.

Applicant's Response: The Applicant will not apply for plat approval. This section does not apply.

16.12.110 -Public improvements—Financial guarantees.

A. To ensure construction of required public improvements, the applicant shall provide the City with a performance guarantee in accordance with OCMC 17.50.140.
B. After satisfactory completion of required public improvements and facilities, all public improvements not constructed by the City, shall be maintained and under warranty provided by the property owner or developer constructing the facilities until the City accepts the improvements at the end of the warranty period as prescribed in OCMC 17.50.141.

Applicant's Response: The Applicant acknowledges this section and will comply with financial guarantees as applicable to project facilities outside of ODOT right-of-way unless obligations are otherwise stated within an MOA or MOU between the City and the Applicant.

16.12.120 Waiver of Remonstrance

The review authority may require a property owner to sign a waiver of remonstrance against the formation of and participation in a local improvement district where it deems such a waiver necessary to provide needed improvements reasonably related to the impacts created by the proposed development. To ensure compliance with this chapter, the review authority may require an applicant to sign or accept a legal and enforceable covenant, contract, dedication, easement, performance guarantee, or other document, which shall be approved in form by the City Attorney.

Applicant's Response: The applicant acknowledges this section and will comply with a Waiver of Remonstrance if applicable.

CHAPTER 17.34 – MUD MIXED USE DOWNTOWN DISTRICT

17.34.020 - Permitted uses.

Permitted uses in the MUD district are defined as:

A. Banquet, conference facilities and meeting rooms;
B. Bed and breakfast/boarding houses, hotels, motels, and other lodging facilities;
C. Child care centers and/or nursery schools;
D. Indoor entertainment centers and arcades;
E. Health and fitness clubs;
F. Medical and dental clinics, outpatient; infirmary services;
G. Museums, libraries and cultural facilities;
H. Offices, including finance, insurance, real estate and government;
I. Outdoor markets, such as produce stands, craft markets and farmers markets that are operated on the weekends and after six p.m. during the weekday;
J. Postal services;
~~*K. Parks, playgrounds, play fields and community or neighborhood centers;*~~
L. Repair shops, for radio and television, office equipment, bicycles, electronic equipment, shoes and small appliances and equipment;
M. Multifamily residential, 3-4 plex residential, or 1 or 2 units in conjunction with a nonresidential use;
N. Restaurants, eating and drinking establishments without a drive through;

O. *Services, including personal, professional, educational and financial services; laundry and dry-cleaning;*
F. *Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores provided the maximum footprint of a freestanding building with a single store does not exceed sixty thousand square feet (a freestanding building over sixty thousand square feet is allowed as long as the building contains multiple stores);*
P. *Seasonal sales;*
Q. *Residential care facilities, assisted living facilities; nursing homes and group homes for over fifteen patients licensed by the state;*
R. *Studios and galleries, including dance, art, photography, music and other arts;*
S. *Utilities: Basic and linear facilities, such as water, sewer, power, telephone, cable, electrical and natural gas lines, not including major facilities such as sewage and water treatment plants, pump stations, water tanks, telephone exchanges and cell towers;*
T. *Veterinary clinics or pet hospitals, pet day care;*
U. *Home occupations;*
V. *Research and development activities;*
W. *Temporary real estate offices in model dwellings located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed;*
X. *Transportation facilities;*
Y. *Live/work dwellings;*
Z. After-hours public parking;

AA. Marinas;

BB. Religious institutions.

CC. Transitory mobile food carts outside of the downtown design district.

Applicant's Response: The Applicant proposes on-street parking on Clackamette Drive that extends partially into the MUD District. Its purpose is to provide parking for Jon Storm Park users; therefore, it will be an expansion of the park within the MUD District, which is not a permitted use. Due to site constraints, it is not possible to construct the on-street parking without expanding it into the MUD District.

17.34.030 - Conditional uses.

The following uses are permitted in this district when authorized and in accordance with the process and standards contained in OCMC 17.56.

A. *Drive-through facilities;*
B. *Emergency services;*
C. *Hospitals;*
D. *Outdoor markets that do not meet the criteria of OCMC 17.34.020.I.;*
E. *Parks, playgrounds, play fields and community or neighborhood centers;*
F. *Parking structures and lots not in conjunction with a primary use on private property, excluding after-hours public parking;*
G. *Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies and specialty stores in a freestanding building with a single store exceeding a foot print of sixty thousand square feet;*
H. *Public facilities such as sewage and water treatment plants, water towers and recycling and resource recovery centers;*

I. *Public utilities and services such as pump stations and sub-stations;*
J. *Distributing, wholesaling and warehousing;*
K. *Gas stations;*
L. *Public and or private educational or training facilities;*
M. *Stadiums and arenas;*
N. *Passenger terminals (water, auto, bus, train);*
O. *Recycling center and/or solid waste facility;*

Applicant's Response: No conditional uses are proposed within the MUD District.

17.34.040 - Prohibited uses.

The following uses are prohibited in the MUD district:

A. *Kennels;*
B. *Outdoor storage and sales, not including outdoor markets allowed in OCMC 17.34.030;*
C. *Self-service storage;*
D. *Single-Family attached and detached residential units and duplexes;*
E. *Motor vehicle and recreational vehicle repair/service;*
F. *Motor vehicle and recreational vehicle sales and incidental service;*
G. *Heavy equipment service, repair, sales, storage or rental[2] (including but not limited to construction equipment and machinery and farming equipment);*
H. *Marijuana production, processing, wholesaling, research, testing, and laboratories;*
I. *Transitory food carts within the downtown design district, unless a special event has been issued;*
J. *Non-transitory mobile food carts.*

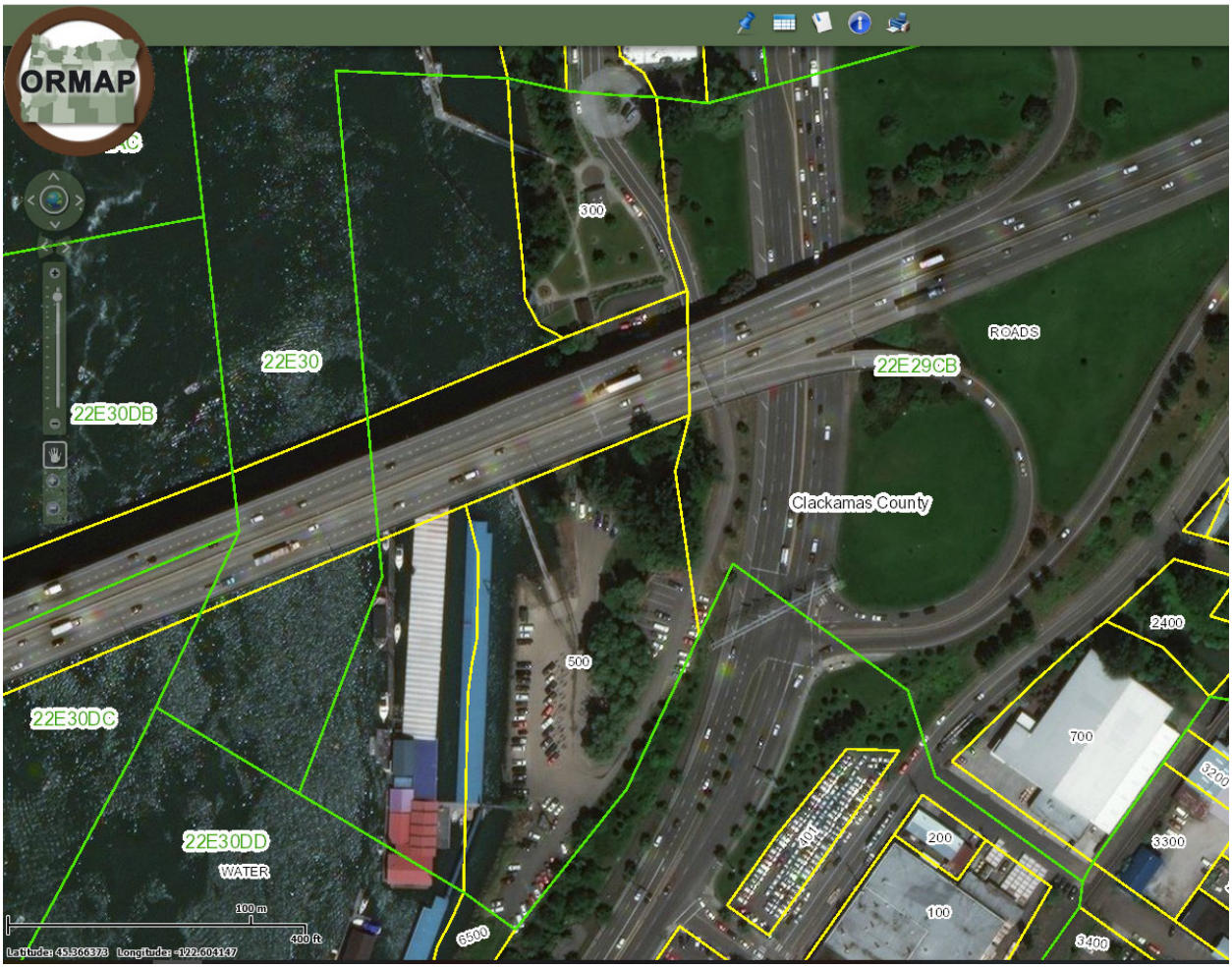
Applicant's Response: The Applicant proposes no prohibited uses in the MUD district.

17.34.050 - Pre-existing industrial uses.

Tax lot 5400 located at Clackamas County Tax Assessors Map #22E20DD, Tax Lots 100 and two hundred located on Clackamas County Tax Assessors Map #22E30DD and Tax Lot 700 located on Clackamas County Tax Assessors Map #22E29CB have special provisions for industrial uses. These properties may maintain and expand their industrial uses on existing tax lots. A change in use is allowed as long as there is no greater impact on the area than the existing use.

Applicant's Response: The Project does not propose a change in use within Clackamas County Tax Assessors Map #22E20DD tax lot 5400, Map #22E30DD tax lots 100 or 200, or Map #22E29CB tax lot 700 (Figure 2). The Project does not require a change in use of the tax lots with special provisions for industrial uses.

Figure 2. Tax Lots Included in the Project Proposal are #300 and #500



17.34.060 - Mixed-use downtown dimensional standards

For properties located outside of the downtown design district.

A. Minimum lot area: None.

Applicant's Response: The Project is in compliance with the minimum lot area.

B. Minimum floor area ratio: 0.30.

Applicant's Response: This section does not apply because the Project does not include a building.

C. Minimum building height: Twenty-five feet or two stories except for accessory structures or buildings under one thousand square feet.

Applicant's Response: This section does not apply because the Project does not include construction of a building.

D. Maximum building height: Seventy-five feet, except for the following location where the maximum building height shall be forty-five feet:

1. Properties between Main Street and McLoughlin Boulevard and 11th and 16th streets;
2. Property within five hundred feet of the End of the Oregon Trail Center property; or
3. Property within one-hundred feet of single-family detached or attached units.

Applicant's Response: This section does not apply because the Project does not include construction of a building.

E. Minimum required setbacks, if not abutting a residential zone: None.

Applicant's Response: The Project does not include a building; therefore, setbacks are not applicable.

F. Minimum required interior side yard and rear yard setback if abutting a residential zone: Fifteen feet, plus one additional foot in yard setback for every two feet in height over thirty-five feet.

Applicant's Response: This section does not apply as no yards are proposed.

G. Maximum Allowed Setbacks.

1. *Front yard: Twenty feet.*
2. *Interior side yard: No maximum.*
3. *Corner side yard abutting street: Twenty feet.*
4. *Rear yard: No maximum.*
5. *Rear yard abutting street: Twenty feet.*

Applicant's Response: This section does not apply as no yards are proposed.

H. Maximum site coverage including the building and parking lot: Ninety percent.

Applicant's Response: The Project does not propose covering more than 90% of the site with building or parking.

I. Minimum landscape requirement (including parking lot): Ten percent.

Applicant's Response: The Project will meet the minimum landscape requirement. See Attachment B for landscaping plans.

J. Residential minimum net density of 17.4 units per acre, except that no minimum net density shall apply to residential uses proposed above nonresidential uses in a vertical mixed-use configuration or to live/work dwellings.

Applicant's Response: This section does not apply as no residential uses are existing or proposed.

CHAPTER 17.39 – I INSTITUTIONAL DISTRICT

17.39.020 - Permitted uses.

Permitted uses in the institutional district are:

A. Private and/or public educational or training facilities;
B. Parks, playgrounds, playfields and community or neighborhood community centers;
C. Public facilities and services including courts, libraries and general government offices and maintenance facilities;
D. Stadiums and arenas;
E. Banquet, conference facilities and meeting rooms;
F. Government offices;
G. Transportation facilities;
H. Mobile food carts.

Applicant's Response: The Project includes transportation facilities in the Institutional District; therefore, is a permitted use.

17.39.030 - Accessory uses.

The following uses are permitted outright if they are accessory to and related to the primary institutional use:

A. Offices;
B. Retail (not to exceed twenty percent of total gross floor area of all building);
C. Child care centers or nursery schools;
D. Scientific, educational, or medical research facilities and laboratories;
E. Religious institutions.

Applicant's Response: The Project does not include any accessory uses listed in 17.39.030 in the Institutional District.

17.39.040 - Conditional uses.

Uses requiring conditional use permit are:

A. Any uses listed under OCMC 17.39.030 that are not accessory to the primary institutional use;
B. Boarding and lodging houses, bed and breakfast inns;
C. Cemeteries, crematories, mausoleums, and columbariums;
D. Correctional facilities;
E. Helipad in conjunction with a permitted use;
F. Parking lots not in conjunction with a primary use;
G. Public utilities, including sub-stations (such as buildings, plants and other structures);
H. Fire stations;
I. Police Station.

Applicant's Response: No conditional uses in the Institutional District are proposed.

17.39.045 - Prohibited uses.

Prohibited uses in the I district are:

A. Any use not expressly listed in OCMC 17.39.020, 17.39.030 or 17.39.040;
B. Marijuana businesses;

Applicant's Response: The Project does not include any prohibited uses in the Institutional District.

17.39.050 - Dimensional standards.

Dimensional standards in the I district are:

A. Maximum building height: Within one hundred feet of any district boundary, not to exceed thirty-five feet; elsewhere, not to exceed seventy feet.

Applicant's Response: The Project includes widening and seismically upgrading Abernethy Bridge, which is within 100 feet of the Institutional District boundary. The bridge elevation is approximately 90 feet at its highest within 100 feet of the Institutional District boundary. The bridge improvements include placement of new piers adjacent to existing piers and removal of the existing piers, which are seismically deficient. The elevation of the bridge would not change. Although the newly constructed piers will exceed the dimensional standards of the Institutional District, the new piers will replace similarly sized but seismically deficient structures of the overall bridge structure. To comply with height requirements, the entire existing project area would need to be reconstructed. This includes lowering the on- and off-ramps of I-205, and changing the alignment of OR 99E. Because this work is not practical, the applicant is applying for a variance to 17.39.050. See the Applicant Response for Section 17.60 for the variance request.

B. Minimum required setbacks: Twenty-five feet from property line except when the development is adjacent to a public right-of-way. When adjacent to a public right-of-way, the minimum setback is zero feet and the maximum setback is five feet.

Applicant's Response: The proposed improvements meet the minimum setback requirements of this section.

17.39.060 - Relationship to master plan.

A. A master plan is required for any development within the I District on a site over ten acres in size that:
1. Is for a new development on a vacant property;
2. Is for the redevelopment of a property previously used an a non-institutional use; or
3. Increases the floor area of the existing development by ten thousand square feet over existing conditions
B. Master plan dimensional standards that are less restrictive than those of the Institutional District require adjustments. Adjustments will address the criteria of OCMC 17.65.70 and will be processed concurrently with the master plan application.
C. Modifications to other development standards in the code may be made as part of the phased master plan adjustment process. All modifications shall be in accordance with the requirements of the master plan adjustment process identified in OCMC 17.65.070.

Applicant's Response: The Project does not involve development within the Institutional District on a site over 10 acres; therefore, no Master Plan is required. The Project does not meet dimensional standards as described for 17.39.050.

CHAPTER 17.41 – TREE PRESERVATION REMOVAL AND REPLANTING PROTECTION

17.41.020 - Tree protection—Applicability.

1. Applications for development subject to OCMC 16.08 (Land Divisions) or OCMC 17.62 (Site Plan and Design Review) shall demonstrate compliance with these standards as part of the review proceedings for those developments. Compliance with this chapter is required from the date a land use application is filed until a land division is recorded or other development approval is final.
2. For public capital improvement projects, the City Engineer shall demonstrate compliance with these standards pursuant to a Type I process.
3. Tree canopy removal greater than twenty-five percent on areas with greater than twenty-five percent slope, unless exempted under OCMC 17.41.040, shall be subject to these standards.
4. A heritage tree or grove which has been designated pursuant to the procedures of OCMC 12.32 shall be subject to the standards of this section.
5. A tree that has been planted pursuant to this section shall remain or shall be replaced with a new tree if removed.

Applicant's Response: The Applicant proposes the majority of work in ODOT rights-of-way, which are not subject to OCMC 16.08 or 17.62. Two areas of the Project are outside of the right-of-way: Tax Lots 22E29CB0300 and 22E29CB0500, at Jon Storm Park and Sportcraft Landing Park. This section only applies to those areas.

17.41.030 - Tree protection—Conflicting code provisions.

Except as otherwise specified in this section, where these standards conflict with adopted city development codes or policies, the provision which provides the greater protection for regulated trees or groves, as defined in OCMC 17.04, shall govern.

Applicant's Response: The Applicant acknowledges this section and will comply with the codes providing greater protection.

17.41.040 - Exemptions.

These regulations are not intended to regulate normal cutting, pruning and maintenance of trees on private property except where trees are located on lots that are undergoing development review or are otherwise protected within the Natural Resource Overlay District (NROD) of OCMC 17.49. These standards are not intended to regulate farm and forest practices as those practices are defined under ORS 30.930, for farm or forestlands. These regulations to not apply to the removal of trees that are considered invasive species. An applicant for development may claim exemption from compliance with these standards if the development site containing the regulated grove or trees was a designated farm or forest use, tree farm, Christmas tree plantation, or other approved timber use within one year prior to development application. "Forest practices" and "forestlands" as used in this subsection shall have the meaning as set out in ORS 30.930. The Community Development Director has the authority to modify or waive compliance in this case.

Applicant's Response: The Applicant acknowledges the exemptions.

17.41.050 - Compliance options.

Applicants for review shall comply with these requirements through one or a combination of the following procedures:

- *A. Option 1—Mitigation. Retention and removal of trees, with subsequent mitigation by replanting pursuant to OCMC 17.41.060.*
- *B. Option 2—Dedicated Tract. Protection of trees or groves by placement in a tract within a new subdivision or partition plat pursuant to OCMC 17.41.080; or*
- *C. Option 3—Restrictive Covenant. Protection of trees or groves by recordation of a permanent restrictive covenant pursuant to OCMC 17.41.110; or*
- *D. Option 4—Cash-in-lieu of planting pursuant to OCMC 17.41.120.*

Applicant's Response: The Applicant will comply with Options 1 and 4. Trees that are removed for the Project will be replanted unless site constraints limit replanting opportunities. Where replanting is not possible or practical, the Applicant will pay cash-in-lieu of planting. See Attachment B for the Tree Removal and Mitigation Plan.

17.41.060 - Tree removal and replanting—Mitigation (Option 1).

- *A. Applicants for development who select this option shall ensure that all healthy trees shall be preserved outside the construction area as defined in OCMC 17.04 to the extent practicable. Preserved trees are subject to Option 3 of this Chapter. Compliance with these standards shall be demonstrated in a tree mitigation plan report prepared by a certified arborist, horticulturalist or forester or other environmental professional with experience and academic credentials in forestry or arboriculture. Tree inventories for the purposes of mitigation calculations may be prepared by a licensed surveyor. At the applicant's expense, the City may require the report to be reviewed by a consulting arborist. The number of replacement trees required on a development site shall be calculated separately from, and in addition to, any public or street trees in the public right-of-way required under OCMC 12.08— Public and Street Trees, any required tree planting in parking lots, and any trees planted in pedestrian and bicycle accessways.*
- *B. The applicant shall determine the number of trees to be mitigated on the site by counting all of the trees six-inch DBH (minimum four and one-half feet from the ground) or larger on the entire site and either:*

1. *Trees that are removed outside of the construction area shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2; or*
2. *Dying, diseased or hazardous trees, when the condition is verified by a certified arborist to be consistent with the definitions in OCMC 17.04, may be removed from the tree replacement calculation. Dead trees may also be removed from the calculation, with the condition of the tree verified either by the Community Development Director or by a certified arborist at the applicant's expense, when the Community Development Director cannot make a determination. To the extent that the Community Development Director determines that the dead, dying, hazardous or diseased condition of the tree is the result of intentional action, the removal of that tree shall require mitigation pursuant to Column 2 of Table 17.41.060-1.*

Table 17.41.060-1 Tree Replacement Requirements

Size of tree removed (DBH)	*Column 1* *Number of trees to be planted.* *(If removed **Outside** of construction area)*	*Column 2* *Number of trees to be planted.* *(If removed **Within** the construction area)*
6 to 12"	*3*	*1*
13 to 18"	*6*	*2*
19 to 24"	*9*	*3*
25 to 30"	*12*	*4*
31 and over"	*15*	*5*

Steps for calculating the number of replacement trees:

1. *Count all trees measuring six inches DBH (minimum four and one-half feet from the ground) or larger on the entire development site.*
2. *Designate the size (DBH) of all trees pursuant to accepted industry standards.*
3. *Document in a certified arborist report any trees that are currently dead, dying, diseased, or hazardous.*
4. *Subtract the number of dead, dying, diseased, or hazardous trees in step 3 from the total number of trees on the development site in step 1. The remaining number is the number of healthy trees on the site. Use this number to determine the number of replacement trees in steps 5 through 8.*
5. *Identify the construction area (as defined in OCMC 17.04.230).*
6. *Determine the number and diameter of trees to be removed within the construction area. Based on the size of each tree, use Column 2 to determine the number of replacement trees required.*
7. *Determine the number and diameter of trees to be removed outside of the construction area. Based on the size of each tree, use Column 1 to determine the number of replacement trees required.*
8. *Determine the total number of replacement trees from steps 6 and 7.*

Applicant's Response: The Applicant will comply with Option 1. Trees that are removed for the Project will be replanted unless site constraints limit replanting opportunities. The remainder of trees will be mitigated with Option 4, cash-in-lieu of planting. See Attachment B for the Tree Removal and Mitigation Plan.

C. Planting area priority for mitigation.

Development applications which opt for removal of trees with subsequent replanting pursuant to OCMC 17.41.050.A. shall be required to mitigate for tree cutting by complying with the following priority for replanting standards below:

1. *First Priority. Replanting on the development site.*
2. *Second Priority. Off-site replacement tree planting locations. If the Community Development Director determines that it is not practicable to plant the total number of replacement trees on-site, a suitable off-site planting location for the remainder of the trees may be approved that will reasonably satisfy the objectives of this section. Such locations may include either publicly owned or private land and shall be approved by the Community Development Director.*

Applicant's Response: The Applicant proposes mitigation in first priority areas.

D. Replacement tree planting standards.

1. All replacement trees shall be either two-inch caliper deciduous or six-foot high conifer.

2. Replacement tree species shall be approved by a landscape architect or certified arborist or shall be found on the City's Native Plant or Street Tree lists.

3. Due to their diminishing range in the region, Oregon white oak (Quercus garryana) trees, if removed, shall be replaced by the same species.

Applicant's Response: The Applicant has prepared a mitigation plan for tree replacement that varies slightly from these standards. The Applicant proposes to plant one-inch caliper trees for several reasons, including the availability of this size, especially since a large quantity is required. A one-inch caliper tree can be procured as a bareroot, container grow, or balled and burlapped (B&B). A bareroot or container grown plant and a smaller specimen is much easier to establish than a larger plant or a B&B plant. Lastly, a tree that establishes into its new home quickly, will outgrow a tree planted at a larger size and ultimately become a healthier, longer-lived tree. The primary reason to plant larger specimens is to better withstand vandalism. These trees are more likely to be threatened by harsh growing conditions than by vandalism, so the smaller planting size is recommended. See Attachment B, for the Landscaping Plan.

E. All existing tree(s) in the tract shall be protected by a permanent restrictive covenant or easement approved in form by the City.

Applicant's Response: This section does not apply.

F. The Community Development Director may, subject to a Type II procedure, approve an alternative mitigation plan that adequately protects habitat pursuant to the standards for the Natural Resource Overlay District alternative mitigation plan in OCMC 17.49.190.

Applicant's Response: This section does not apply. The applicant has proposed a mitigation plan that complies with 17.41.060

17.41.080 - Tree preservation within subdivisions and partitions—Dedicated tract (Option 2).

A. An applicant for a new subdivision and partition may delineate and show the regulated trees or groves as either a separate tract or part of a larger tract that meets the requirements of subsection D. of this section. All existing tree(s) in the tract shall be protected by a permanent restrictive covenant or easement approved in form by the City.

B. The standards for land divisions subject to this section shall apply in addition to the requirements of the City land division ordinance and zoning ordinance, provided that the minimum lot area, minimum average lot width, and minimum average lot depth standards of the base zone may be superseded in order to allow for a reduction of dimensional standards pursuant to OCMC 17.41.080.F below.

C. *Prior to preliminary plat approval, the regulated tree or grove area shall be shown either as a separate tract or part of a larger tract that meets the requirements of subsection D. of this section, which shall not be a part of any parcel used for construction of a dwelling. The size of the tract shall be the minimum necessary as recommended by a consulting arborist to adequately encompass the dripline of the tree, protect the critical root zone and ensure long term survival of the tree or grove.*

D. *Prior to final plat approval, ownership of the regulated tree or grove tract shall be identified to distinguish it from lots intended for sale. The tract may be identified as any one of the following:*
   1. *Private open space held by the owner or a homeowner's association; or*
   2. *For residential land divisions, private open space subject to an easement conveying stormwater and surface water management rights to the city and preventing the owner of the tract from activities and uses inconsistent with the purpose of this document; or*
   3. *Public open space where the tract has been dedicated to the City or other governmental unit; or*
   4. *Any other ownership proposed by the owner and approved by the Community Development Director.*

E. *Density transfers incentive for tree protection tracts.*
   1. *The purpose of this section is to allow dimensional adjustments within a regulated tree protection tract to be transferred outside said tract to the remainder of the site. Density shall not be transferred beyond the boundaries of the development site.*
   2. *Development applications for subdivisions and minor partitions that request a density transfer shall:*
      a. *Provide a map showing the net buildable area of the tree protection tract;*
      b. *Provide calculations justifying the requested dimensional adjustments;*
      c. *Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the tree protection tract created pursuant to this section;*
      d. *Demonstrate that, with the exception of the tree protection tract, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;*
      e. *Meet all other standards of the base zone except as modified in this section.*
   3. *The area of land contained in a tree protection tract may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code.*

F. *Permitted modifications to dimensional standards.*
   1. *An applicant proposing to protect trees in a dedicated tract may request, and the Community Development Director, pursuant to a Type II procedure, may grant a reduction to, the lot size, width, depth, and setbacks of the underlying zone district in approving a subdivision or partition if necessary to retain a regulated tree or grove in a tract, as long as the calculation of average lot size, including tree protection tracts, meet the minimum lot size for the zone. The applicant may choose to make the adjustments over as many lots as required. For example, the lot reduction could be spread across all the remaining lots in the proposed subdivision or partition or could be applied to only those needed to incorporate the area of the tree tract.*

Table 17.41.080.A

Lot Size Reduction

ZONE	*Min. Lot Size [sq. feet]*	*Min. Lot Width*	*Min. Lot Depth*
R-10	*5,000 sq. feet*	*50'*	*65'*
R-8	*4,000 sq. feet*	*45'*	*60'*
R-6	*3,500 sq. feet*	*35'*	*55'*
R-5	*3,000 sq. feet*	*30'*	*50'*
R-3.5	*1,800 sq. feet*	*20'*	*45'*

Table 17.41.080.B

Reduced Dimensional Standards for Detached Single-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
8,000—9,999 square feet	*15 feet*	*20 feet*	*7/9 feet*	*15 feet*	*40%*
6,000—7,999 square feet	*10 feet*	*15 feet*	*5/7 feet*	*15 feet*	*40%*
4,000—5,999 square feet	*10 feet*	*15 feet*	*5/5 feet*	*10 feet*	*40%*
1,800—3,999 square feet	*5 feet*	*15 feet*	*5/5 feet*	*10 feet*	*55%*

Table 17.41.080.C

Reduced Dimensional Standards for Single-Family Attached or Two-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
3,500—7,000 square feet	*10 feet*	*15 feet*	*5/0* feet*	*10 feet*	*40%*
1,800—3,499 square feet	*5 feet*	*15 feet*	*5/0* feet*	*10 feet*	*55%*

**0 foot setback is only allowed on single-family attached units*

Applicant's Response: This section does not apply as the proposed action is not within a subdivision nor does the applicant propose a partition. As noted in the Applicant's Response to OCMC 16.41.060, the Applicant will comply with Options 1 and 4.

17.41.110 - Tree protection by restrictive covenant (Option 3).

Any regulated tree or grove which cannot be protected in a tract pursuant to Section 17.41.080 above shall be protected with a restrictive covenant in a format to be approved by the Community Development Director. Such covenant shall be recorded against the property deed and shall contain provisions to permanently protect the regulated tree or grove unless such tree or grove, as determined by a certified arborist and approved by the Community Development Director, are determined to be diseased or hazardous.

A. Permitted adjustments.

1. *The Community Development Director, pursuant to a Type II procedure, may grant an adjustment to the side, front and rear yard setback standards by up to fifty percent if necessary to retain a Regulated Tree or Grove through a restrictive covenant pursuant to this section. In no case may the side yard setback be reduced to less than three feet. The adjustment shall be the minimum necessary to accomplish preservation of trees on the lot and shall not conflict with other conditions imposed on the property.*
2. *The Community Development Director, pursuant to a Type II procedure, may grant an adjustment to street standards, pursuant to adopted public works standards, in order to preserve a tree. This may include flexibility to redesign sidewalk and planter strip sizes and locations and allow placement of sidewalks and planter strips in an easement within private lots.*
3. *The Community Development Director, pursuant to a Type II procedure, may allow other adjustments in order to preserve any healthy tree that cannot be moved due to its size, but will*

contribute to the landscape character of the area and will not present a foreseeable hazard if retained

Applicant's Response: This section does not apply. As noted in the Applicant's Response to OCMC 16.41.060, the Applicant will comply with Options 1 and 4.

17.41.120 - Cash-in-lieu of planting (Option 4).

The applicant may choose this option in-lieu-of or in addition to Compliance Options 1 through 3. In this case, the Community Development Director may approve the payment of cash-in-lieu into a dedicated fund for the remainder of trees that cannot be replanted in the manner described above.
The cash-in-lieu payment per required mitigation tree shall be as listed on the adopted fee schedule and shall be adjusted annually based on the Consumer Price Index. The price shall include 150% of the cost of materials, transportation and planting.

Applicant's Response: The Applicant proposes cash-in-lieu of planting for areas where site constraints limit opportunities for replanting, with a total number of trees equal to 14.

17.41.130 - Regulated tree protection procedures during construction.

A. No permit for any grading or construction of public or private improvements may be released prior to verification by the Community Development Director that regulated trees designated for protection or conservation have been protected according to the following standards. No trees designated for removal shall be removed without prior written approval from the Community Development Director.

B. Tree protection shall be as recommended by a qualified arborist or, as a minimum, to include the following protective measures:

1. *Except as otherwise determined by the Community Development Director, all required tree protection measures set forth in this section shall be instituted prior to any development activities, including, but not limited to clearing, grading, excavation or demolition work, and such measures shall be removed only after completion of all construction activity, including necessary landscaping and irrigation installation, and any required plat, tract, conservation easement or restrictive covenant has been recorded.*
2. *Approved construction fencing, a minimum of four feet tall with steel posts placed no farther than ten feet apart, shall be installed at the edge of the tree protection zone or dripline, whichever is greater. An alternative may be used with the approval of the Community Development Director.*
3. *Approved signs shall be attached to the fencing stating that inside the fencing is a tree protection zone, not to be disturbed unless prior approval has been obtained from the Community Development Director.*
4. *No construction activity shall occur within the tree protection zone, including, but not limited to; dumping or storage of materials such as building supplies, soil, waste items; nor passage or parking of vehicles or equipment.*
5. *The tree protection zone shall remain free of chemically injurious materials and liquids such as paints, thinners, cleaning solutions, petroleum products, and concrete or dry wall excess, construction debris, or run-off.*
6. *No excavation, trenching, grading, root pruning or other activity shall occur within the tree protection zone unless directed by an arborist present on site and approved by the Community Development Director.*
7. *No machinery repair or cleaning shall be performed within ten feet of the dripline of any trees identified for protection.*

8. *Digging a trench for placement of public or private utilities or other structure within the critical root zone of a tree to be protected is prohibited. Boring under or through the tree protection zone may be permitted if approved by the Community Development Director and pursuant to the approved written recommendations and on-site guidance and supervision of a certified arborist.*
9. *The Community Development Director may require that a certified arborist be present during any construction or grading activities that may affect the dripline of trees to be protected.*
10. *The Community Development Director may impose conditions to avoid disturbance to tree roots from grading activities and to protect trees and other significant vegetation identified for retention from harm. Such conditions may include, if necessary, the advisory expertise of a qualified consulting arborist or horticulturist both during and after site preparation, and a special maintenance/management program to provide protection to the resource as recommended by the arborist or horticulturist.*

C. *Changes in soil hydrology due to soil compaction and site drainage within tree protection areas shall be avoided. Drainage and grading plans shall include provision to ensure that drainage of the site does not conflict with the standards of this section. Excessive site run-off shall be directed to appropriate storm drainage facilities and away from trees designated for conservation or protection.*

Applicant's Response: The Applicant will comply with the requirements of this section. Trees in the project area that will be preserved will be protected with fencing and signage that clearly prohibits construction activities. No excavation or grading will take place within tree protection zones and construction machinery will stay at a minimum 10 feet away from the protected trees' driplines. See Attachment A, Site Plans, for the Construction Management Plan, which shows tree protection measures.

CHAPTER 17.42 FLOOD MANAGEMENT OVERLAY DISTRICT

17.42.120 - Alteration of watercourses.

A. *Notify adjacent communities and the department of land conservation and development prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.*

B. *Require that maintenance is provided within the altered or relocated portion of the watercourse so that the flood-carrying capacity is not diminished.*

Applicant's Response: The Applicant will notify adjacent communities and the Department of Land Conservation and Development prior to watercourse alteration. The Applicant will provide maintenance provided for the realignment of Abernethy Creek; the flood-carrying capacity will not be diminished.

17.42.160.A *- Flood management area standards.*

Uses Permitted Outright:

1. *Excavation and fill required to plant any new trees or vegetation.*
2. *Restoration or enhancement of floodplains, riparian areas, wetland, upland and streams that meet federal and state standards provided that any restoration project which encroaches on the floodway complies with the requirements of Section 17.42.190 (Floodways).*

Applicant's Response: This section does not apply.

17.42.160.B *Provisional Uses.*

Applicant's Response: The applicant does not propose any provisional uses.

17.42.160.C *Prohibited Uses.*

Applicant's Response: The applicant does not propose any prohibited uses.

17.42.160.D.1 *Site Development Standards. All development in the floodplain shall conform to the following balanced cut and fill standards:*
This subsection does not apply to work necessary to protect, repair, maintain or replace existing structures, utility facilities, roadways, driveways, accessory uses and exterior improvements in response to emergencies provided that, after the emergency has passed, adverse impacts are mitigated in accordance with applicable standards.

Applicant's Response: The Project is not in response to an emergency, so balanced cut and fill standards apply, which the project will comply with.

17.42.160.D.2 *No net fill in any floodplain is allowed. All fill placed in a floodplain shall be balanced with at least an equal amount of soil material removed. For the purpose of calculating net fill, fill shall include any structure below the design flood elevation that has been floodproofed pursuant to subsection (E)(5) of this section.*

Applicant's Response: The Applicant will mitigate all fill proposed within the floodplain with an equal amount of cut within the floodplain. See Attachment E for proposed Cut/Fill work within the floodplain.

17.42.160.D.3 *Any excavation below bankfull stage shall not count toward compensating for fill.*

Applicant's Response: The Applicant acknowledges and is in compliance with this section.

17.42.160.D.4 *Excavation to balance a fill shall be located on the same parcel as the fill unless it is not practicable to do so. In such cases, the excavation shall be located in the same Oregon City floodplain, so long as the proposed excavation and fill will not increase flood impacts for surrounding properties as determined through hydrologic and hydraulic analysis.*

Applicant's Response: All excavation to balance fill will be located within the same right-of-way. A hydraulic analysis has been completed to show no increase in floodway or floodplain elevations. See Attachment E for the No-Rise Certification.

17.42.160.D.5 *For excavated areas identified by the city to remain dry in the summer, such as parks or mowed areas, the lowest elevation of the excavated area shall be at least six inches above the winter "low water" elevation, and sloped at a minimum of two percent towards the protected water feature pursuant to Chapter 17.49. One percent slopes will be allowed in smaller areas.*

Applicant's Response: No excavation more than 6 inches above the winter low water elevation is proposed in areas designated to remain dry in the summer.

17.42.160.D.6 *For excavated areas identified by the city to remain wet in the summer, such as a constructed wetland, the grade shall be designed not to drain into the protected water feature pursuant to Chapter 17.49.*

Applicant's Response: There are no excavated areas within the Project identified to remain wet in the summer.

17.42.160.D.7 *Parking areas in the floodplain shall be accompanied by signs that inform the public that the parking area is located in a flood management area and that care should be taken when the potential for flooding exists.*

Applicant's Response: Parking areas in the floodplain will provide signs informing of the location within a flood management area.

17.42.160.D.8 *Temporary fills permitted during construction shall be removed at the end of construction, thirty days after subdivision acceptance or completion of the final inspection.*

Applicant's Response: All temporary fills will be removed at the end of construction.

17.42.160.D.9 *New culverts, stream crossings and transportation projects shall be designed as balanced cut and fill projects or designed not to significantly raise the design flood elevation. Such projects shall be designed to minimize the area of fill in flood management areas and to minimize erosive velocities. Stream crossings shall be as close to perpendicular to the stream as practicable. Bridges shall be used instead of culverts wherever practicable.*

Applicant's Response: Cut/fill will be balanced and the Project will not raise the design flood elevation. See Attachment E for the Floodplain cut/fill memo.

17.42.160.D.10 *Excavation and fill required for the construction of detention facilities or structures, and other facilities, such as levees, specifically shall be designed to reduce or mitigate flood impacts and improve water quality. Levees shall not be used to create vacant buildable lands.*

Applicant's Response: Excavation and fill required for the construction of detention facilities or structures are designed to reduce or mitigate flood impacts and improve water quality. No levees are proposed.

17.42.160.E.1 *Construction Standards.*

1. *Anchoring.*
   a. *All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.*
   b. *All manufactured homes must likewise be anchored to prevent flotation, collapse or lateral movements and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebooks for additional techniques).*

Applicant's Response: This section does not apply. The applicant does not propose any features that require anchoring.

17.42.160.E.2 *Construction Materials and Methods.*

a. *All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.*
b. *All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.*
c. *Electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.*

Applicant's Response: The Applicant is in compliance with construction materials and methods requirements.

17.42.160.E.3 *Utilities.*

a. *All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system.*
b. *New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharge from the systems into floodwaters.*
c. *On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.*

Applicant's Response: This section does not apply. The applicant does not propose water supply systems or sanitary sewage systems.

17.42.160.E.4 *Residential Construction*

a. *New construction and substantial improvements of any residential structure shall have the lowest floor, including basement, elevated to at least one foot above the design flood elevation.*
b. *Full enclosed areas below the lowest floor that are subject to flooding are prohibited unless they are designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria.*
   i. *A minimum of two openings have a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.*
   ii. *The bottom of all openings shall be no higher than one foot above grade.*
   iii. *Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.*

Applicant's Response: This section does not apply as there are no residential improvements proposed.

17.42.160.E.5 *Nonresidential Construction.*

a. *New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated to at least one foot above base flood elevation; or, together with attendant utility and sanitary facilities, shall:*
   i. *Be floodproofed so that below the design flood level the structure is watertight with walls substantially impermeable to the passage of water provided that the requirements of subsection D.2. of this section are met;*
   ii. *Have structured components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;*
   iii. *Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in Section 17.42.110B.;*
   iv. *Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in subsection E.4.b. of this section; and*
   v. *Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g., a building constructed to the design flood level will be rated as one foot below that level).*
   vi. *Manufactured Homes. The following standards apply to all manufactured homes to be placed or substantially improved on sites within Flood Hazard Areas.*

When manufactured dwellings are installed in flood hazard areas, they shall be elevated and anchored according to the Oregon Residential Specialty Code.

Applicant's Response: The Applicant proposes nonresidential construction, including work to the Abernethy Bridge which is a nonresidential structure. The bridge is designed to be floodproofed and to resist loads. All design work to the bridge will be done by a registered professional engineer.

17.42.160.F Recreational Vehicles.

Applicant's Response: This section does not apply as no recreational vehicles are proposed to be on site.

17.42.160.G Below Grade Crawlspaces.

Applicant's Response: This section does not apply as no buildings or crawlspaces are proposed.

17.42.170 - Review of building permits.

Where elevation data is not available either through the flood insurance study, FIRM or from another authoritative source (Section 17.42.110), application for building permits shall be reviewed to assure that

proposed construction will be reasonably safe from flooding. The test of reasonableness shall be made by the building official, considering use of historical data, high water marks, photographs of past floodings, etc., where available, and the provisions of this title. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

Applicant's Response: This section does not apply as the Applicant is not applying for a building permit.

17.42.180 - Subdivision standards.

Applicant's Response: This section does not apply as no subdivisions are proposed.

17.42.190 - Floodways.

Applicant's Response: The Project has been designed to not increase flood levels.

CHAPTER 17.48 - WRG WILLAMETTE RIVER GREENWAY OVERLAY DISTRICT

17.48.010 - Designated.

This chapter shall apply to all development, changes of use or intensification of use in that area designated WRG Willamette River Greenway on a special city zoning map.

17.48.020 - Purpose.

The purpose of this chapter is to:

A. Protect, conserve, enhance and maintain the natural scenic, historical, agricultural, economic and recreational qualities of land along the Willamette River;

B. Maintain the integrity of the Willamette River by minimizing erosion, promoting bank stability and maintaining and enhancing water quality and fish and wildlife habitats;

C. Implement the Willamette River Greenway goal and the Willamette River Greenway portions of the city comprehensive plan.

Applicant's Response: The Applicant recognizes the purpose of this chapter of the OCMC of use in the Willamette River Greenway.

17.48.040 - Uses allowed.

All uses permitted pursuant to the provisions of the underlying zoning district are permitted on lands designated WRG; provided, however, that any development, change of use or intensification of use shall be subject, in addition to the provisions of the underlying district, to the provisions of this chapter.

17.48.050 - Permit required—Exceptions.

A Willamette River Greenway permit shall be required for all developments and changes or intensification of uses, except the following:

A. The propagation of timber or the cutting of timber for public safety or personal use, except the cutting of timber along the natural vegetative fringe along the river;

B. Gravel removal from the bed of the Willamette River when conducted under a permit from the state;

C. Customary dredging and channel maintenance;

D. Placing by a public agency of signs, markers, aids and similar structures to serve the public;

E. Activities to protect, conserve, enhance and maintain public recreation, scenic, historical and natural uses on public lands;

F. Acquisition and maintenance of scenic easements by the Oregon Department of Transportation;

G. Partial harvesting of timber shall be permitted beyond the natural vegetative fringe and those areas not covered by a scenic easement and when the harvest is consistent with an approved plan under the Oregon Forest Practices Act. Commercial forest activities and harvesting practices providing for vegetative buffers, shading, soil stabilization, and water filtering effects required under the Oregon Forest Practices Act;

H. The use of a small cluster of logs for erosion control;

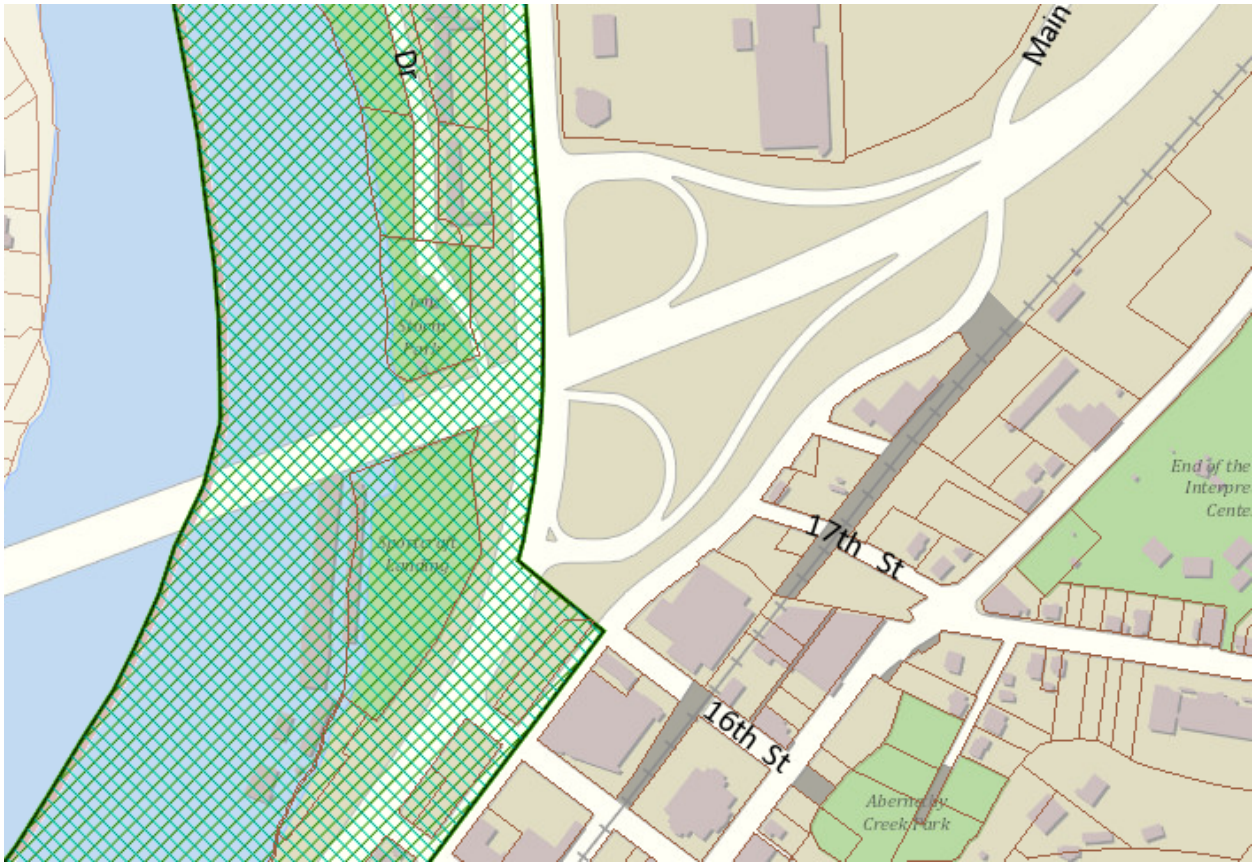
I. The expansion of capacity or the replacement of existing communication or energy distribution and transmission systems, except utility sub-stations;

J. The maintenance and repair of existing flood control facilities;

K. Uses lawfully existing on the effective date of the provisions codified in this chapter; provided, however, that any change or intensification of use or new development shall require a Willamette River Greenway permit.

Applicant's Response: The Project is an intensification of use and includes uses in the Willamette River Greenway that are not identified in the list of exceptions. A Willamette River Greenway permit is required.

Figure 3. Willamette River Greenway Overlay District.



17.48.060 - Administrative procedure.

Except as specifically provided for in Section 17.48.090, the procedure for action on a Willamette River Greenway permit shall be as provided for under the administrative action provisions in Chapter 17.50. In addition to those provisions, however, notice of a pending Willamette River Greenway permit under Sections 17.48.070 through 17.48.090 or of a compatibility review hearing under Section 17.48.100, shall be given to all persons requesting the same and paying a reasonable fee therefore, as determined by the community development director.

Applicant's Response: The Applicant requests a Willamette River Greenway permit as part of this land use application and agrees to pay the applicable fee.

17.48.070 - Development standards—Specific use.

In approving any development or change or intensification of use, the approving officer or body shall apply the following standards:
Considerations for Specific Uses.

A. With respect to recreational uses only: the considerations set forth in section C.3.b of Goal 15.

B. With respect to those fish and wildlife habitats identified in the city comprehensive plan only: the considerations set forth in section C.3.d. of Goal 15.

C. With respect to those scenic qualities and views identified in the city comprehensive plan only: the considerations set forth in section C.3.e. of Goal 15.

D. With respect to timber resources only: the considerations set forth in section C.3.h. of Goal 15.

E. With respect to aggregate extraction only: the considerations set forth in section C.3.i. of Goal 15.

Applicant's Response: The specific uses in this section do not apply to the Applicant's proposal.

17.48.080 - Development standards—General considerations.

The following considerations shall be applicable to all Willamette River Greenway permits.

A. Access. Adequate public access to the Willamette River shall be considered and provided for.

B. Protection and Safety. Maintenance of public safety and protection of public and private property, especially from vandalism and trespass, shall be provided for to the maximum extent practicable.

C. Vegetative Fringe. The natural vegetative fringe along the Willamette River shall be protected and enhanced to the maximum extent practicable.

D. Directing Development Away from the River. Development shall be directed away from the Willamette River to the greatest possible degree, provided that lands committed to urban uses within the Greenway may continue as urban uses, subject to the nonconforming use provisions of Chapter 17.58 of this title.

E. A Greenway Setback. In each application, the approving officer or body shall establish a setback to keep structures separated from the Willamette River in order to protect, maintain, preserve and enhance the natural scenic, historic and recreational qualities of the Willamette River Greenway, as set forth in the city comprehensive plan; provided, however, that the requirement to establish such setbacks shall not apply to water-related or water-dependent uses.

F. Other Applicable Standards. The Oregon Department of Transportation Greenway Plan, the Greenway portions of the city comprehensive plan, the Willamette River Greenway statutes and the provisions of Statewide Planning Goal 15, shall also be considered in actions involving Willamette River Greenway permits.

Applicant's Response: The Applicant's proposal does not change access to the Willamette River over the long-term use of the Project, although construction equipment and construction activities under the Abernethy Bridge will temporarily close access to the Willamette River via the existing boat ramp for up to 2 weeks. The temporary use of the area under and adjacent to the Abernethy Bridge will not result in a long-term effect on the natural scenic, historical, agricultural, economic, or recreational qualities of land along the Willamette River. During construction, the Applicant will maintain public safety and protect the project area from vandalism and trespass to the maximum extent practicable by restricting access to work areas. The Applicant's design protects the natural vegetative fringe along the Willamette River to the maximum extent practicable. The bridge improvements will be made in the same area as the existing bridge and are not considered new development in the Greenway. The locations of the new bridge structures are based on state-of-the-art engineering design and best practices. They will replace existing structures on the Greenway. Post-construction conditions in the Willamette River Greenway will be returned to pre-construction conditions. The Project will maintain the integrity of the Willamette River by minimizing erosion, promoting bank stability, and maintaining and enhancing water quality and fish and wildlife habitats.

17.48.090 - Procedure.

The planning director shall make findings, and may impose reasonable conditions to carry out this chapter, regarding all general, and any applicable specific, considerations of this section. The community development director shall then give notice of a pending Willamette River Greenway permit application, and proposed action thereon, in the manner provided for, and to those persons for whom notice shall be given, under Chapter 17.50 *of this Code, and to all other interested persons who wish to be notified and who pay a reasonable fee for such notification. If no interested person requests a hearing on such permit application within ten days of giving notice, the application shall be approved, either with or without conditions, or denied, as proposed by the community development director and in accordance with the findings required by this subsection. If there be objection, the matter shall be heard by the planning commission as an administrative action.*

Applicant's Response: The Applicant acknowledges and is in compliance with this section.

17.48.100 - Compatibility review.

A. In all areas within one hundred fifty feet of the ordinary low-water line of the Willamette River, hereinafter referred to as the "compatibility boundary," the provisions of this subsection shall be applicable to all developments and changes or intensification of uses, so as to ensure their compatibility with Oregon's Greenway statutes, and to assure that the best possible appearance, landscaping and public access be provided.

B. All development or changes or intensifications of uses in the compatibility area shall be approved only if the following findings be made by the planning commission.

1. That to the greatest extent possible, the development or change or intensification of use provides for the maximum possible landscaped area, open space or vegetation between the activity and the river.

2. That to the greatest degree possible, necessary public access is provided to and along the Willamette River by appropriate legal means.

C. Procedure for action on compatibility review shall be as set forth in Section 17.48.060 and shall include application of the relevant use management considerations and requirements provided in Sections 17.48.070 and 17.48.080. The planning commission, after notice and public hearing held pursuant to Chapter 17.50 shall approve issuance, approve issuance with conditions or disapprove issuance of the Willamette River Greenway conditional use permit. The application

shall be accompanied by the fee listed in Chapter 17.52 to defray the costs of publication, investigation and processing.

Applicant's Response: The Applicant acknowledges and will comply with this section. The proposed landscaping plans (Attachment B) are designed to provide the maximum amount of landscaped area to the greatest extent possible between the river and the project activity areas. Public access to and along the Willamette River will be provided to the greatest extent possible by the Project (see Attachment A for site plans).

17.48.110 - Prohibited activities.

The following are prohibited within the Willamette River Greenway:

A. Any main or accessory residential structure exceeding a height of thirty-five feet, except for areas located within the Willamette Falls Downtown District;

B. Structural bank protection, except rip rap or a channelization used as an emergency measure only to protect existing structures. Any such rip rap or channelization to stabilize undeveloped sites shall be prohibited as well;

C. Subsurface sewage disposal drainfields within one hundred feet of the ordinary mean low-water line of the Willamette River.

Applicant's Response: The Applicant's proposal does not propose any prohibited activities listed in this section.

17.48.120 - Additional procedural requirements.

In addition to the requirements of Chapter 17.50, the following procedural requirements shall be applicable to all matters arising out of Sections 17.48.070 through 17.48.100:

A. Applications submitted for review under Sections 17.48.070 through 17.48.100 shall be accompanied by such materials as are reasonably necessary for adequate review, including, as necessary:

1. *A site and landscaping plan showing existing vegetation and development and location of proposed development for activities;*
2. *Elevations of any proposed structures;*
3. *Materials list for any proposed structures, including type and colors of siding and roofing; and*
4. *Cross-sections of any area within the vegetative fringe where grading, filling, timber harvesting or excavating will occur.*

B.

1. *Written notice, including a copy of the application, shall be sent immediately upon receipt to the Oregon Department of Transportation by certified mail, return receipt requested. The Oregon Department of Transportation shall have seven working days from the date of mailing to respond before a decision be rendered.*
2. *Written notice shall be given to the Oregon Department of Transportation by certified mail, return receipt requested, within seven days of the entry of a final order on the disposition of all applications made under Sections 17.48.070 through 17.48.100.*

Applicant's Response: The Applicant has provided information in this application that can be used for purposes of review under the Willamette River Greenway Overlay requirements. See Attachments A and B and Applicant's Responses in Section for OCMC 17.49.

OCMC 17.47 – EROSION AND SEDIMENT CONTROL

17.47.070 Erosion and sediment control plans.

A. An application for an erosion and sediment control permit shall include an erosion and sediment control plan, which contains methods and interim measures to be used during and following construction to prevent or control erosion prepared in compliance with City of Oregon City public works standards for erosion and sediment control. These standards are incorporated herein and made a part of this title and are on file in the office of the city recorder.

Applicant's Response: An Erosion and Sediment Control Plan has been created and complies with this section. See Attachment A for the Erosion and Sediment Control Plan.

OCMC 17.49 – NATURAL RESOURCE OVERLAY DISTRICT

17.49.050 - Emergencies.

The provisions of this ordinance do not apply to work necessary to protect, repair, maintain, or replace existing structures, utility facilities, roadways, driveways, accessory uses and exterior improvements in response to emergencies. After the emergency has passed, any disturbed native vegetation areas shall be replanted with similar vegetation found in the Oregon City Native Plant List pursuant to the mitigation standards of OCMC 17.49.180. For purposes of this section emergency shall mean any man-made or natural event or circumstance causing or threatening loss of life, injury to person or property, and includes, but is not limited to fire, explosion, flood, severe weather, drought, earthquake, volcanic activity, spills or releases of oil or hazardous material, contamination, utility or transportation disruptions, and disease.

Applicant's Response: The proposed Project is planned and is not a result of an emergency.

17.49.060 - Consistency and relationship to other regulations.

A. Where the provisions of the NROD are less restrictive or conflict with comparable provisions of the OCMC, other City requirements, regional, state or federal law, the provisions that provides the greater protection of the resource shall govern.

B. Compliance with Federal and State Requirements.

1. If the proposed development requires the approval of any other governmental agency, such as the Division of State Lands or the U.S. Army Corps of Engineers, the applicant shall make an application for such approval prior to or simultaneously with the submittal of its development application to the City. The planning division shall coordinate City approvals with those of other agencies to the extent necessary and feasible. Any permit issued by the City pursuant to this chapter shall not become valid until other agency approvals have been obtained or those agencies indicate that such approvals are not required.

2. The requirements of this chapter apply only to areas within the NROD and to locally significant wetlands that may be added to the boundary during the course of development review pursuant to OCMC 17.49.035. If, in the course of a development review, evidence suggests that a property outside the NROD may contain a wetland or other protected water resource, the provisions of this chapter shall not be applied to that development review. However, the omission shall not excuse the applicant from satisfying any state and federal wetland requirements which are otherwise applicable. Those requirements apply in addition to, and apart from the requirements of the City's comprehensive plan and this code.

Applicant's Response: Permits needed from other agencies will be applied for prior to or simultaneously with the development application to the city. The applicant will apply the requirements of this chapter only to areas within the NROD and to locally significant wetlands.

17.49.070 - Prohibited uses.

The following development and activities are not allowed within the NROD:

A. *Any new gardens, lawns, structures, development, other than those allowed outright (exempted) by the NROD or that is part of a regulated use that is approved under prescribed conditions. Note: Gardens and lawns within the NROD that existed prior to the time the overlay district was applied to a subject property are allowed to continue but cannot expand further into the overlay district.*
B. *New lots that would have their buildable areas for new development within the NROD are prohibited.*
C. *The dumping of materials of any kind is prohibited except for placement of fill as provided in subsection D. below. The outside storage of materials of any kind is prohibited unless they existed before the overlay district was applied to a subject property. Uncontained areas of hazardous materials as defined by the Oregon Department of Environmental Quality (ORS 466.005) are also prohibited.*
D. *Grading, the placement of fill in amounts greater than ten cubic yards, or any other activity that results in the removal of more than ten percent of the existing native vegetation on any lot within the NROD is prohibited, unless part of an approved development activity.*

Applicant's Response: The Project includes grading and fill in amounts greater than 10 cubic yards. The applicant is submitting an application for development within the NROD.

17.49.080 - Uses allowed outright (exempted).

The following uses are allowed within the NROD and do not require the issuance of an NROD permit:

A. *Stream, wetland, riparian, and upland restoration or enhancement projects as authorized by the City.*
B. *Farming practices as defined in ORS 215.203 and farm uses, excluding buildings and structures, as defined in ORS 215.203.*
C. *Utility service using a single utility pole.*
D. *Boundary and topographic surveys leaving no cut scars greater than three inches in diameter on live parts of native plants listed in the Oregon City Native Plant List.*
E. *Soil tests, borings, test pits, monitor well installations, and other minor excavations necessary for geotechnical, geological or environmental investigation, provided that disturbed areas are restored to pre-existing conditions as approved by the Community Development Director.*
F. *Trails meeting all of the following:*
    1. *Construction shall take place between May 1 and October 30 with hand held equipment;*
    2. *Widths shall not exceed forty-eight inches and trail grade shall not exceed twenty percent;*
    3. *Construction shall leave no scars greater than three inches in diameter on live parts of native plants;*
    4. *Located no closer than twenty-five feet to a wetland or the top of banks of a perennial stream, or no closer than ten feet of an intermittent stream;*
    5. *No impervious surfaces; and*
    6. *No native trees greater than one-inch in diameter may be removed or cut, unless replaced with an equal number of native trees of at least two-inch diameter and planted within ten feet of the trail.*
G. *Land divisions provided they meet the following standards, and indicate the following on the final plat:*
    1. *Lots shall have their building sites (or buildable areas) entirely located at least five feet from the NROD boundary shown on the City's adopted NROD map. For the purpose of this*

subparagraph, "building site" means an area of at least 3,500 square feet with minimum dimensions of forty feet wide by forty feet deep;

2. *All public and private utilities (including water lines, sewer lines or drain fields, and stormwater disposal facilities) are located outside the NROD;*
3. *Impervious streets, driveways and parking areas shall be located at least ten feet from the NROD; and*
4. *The NROD portions of all lots are protected by:*
   a. *A conservation easement; or*
   b. *A lot or tract created and dedicated solely for unimproved open space or conservation purposes.*

H. *Site Plan and Design Review applications where all new construction is located outside of the NROD boundary shown on the City's adopted NROD map, and the NROD area is protected by a conservation easement approved in form by the City.*

I. *Routine repair and maintenance of existing structures, roadways, driveways and utilities.*

J. *Replacement, additions, alterations and rehabilitation of existing structures, roadways, utilities, etc., where the ground level impervious surface area is not increased.*

K. *Measures approved by the City of Oregon City to remove or abate nuisances or hazardous conditions.*

L. *Tree Removal. The Community Development Director may permit the removal of any tree determined to be a dead, hazardous, or diseased tree as defined in OCMC 17.04. Any tree that is removed in accordance with this Section (L) shall be replaced with a new tree of at least ½-inch caliper or at least six foot overall height. An exception to this requirement may be granted if the applicant demonstrates that a replacement tree has already been planted in anticipation of tree removal, or if the existing site conditions otherwise preclude tree replacement (due to existing dense canopy coverage or other ecological reasons).*

   a. *The replacement tree(s) shall be located in the general vicinity of the removed tree(s), somewhere within NROD on the property. The replacement tree(s) shall be identified on the Oregon City Native Plant List or other locally adopted plant list (e.g. Metro or Portland). The property owner shall ensure that the replacement tree(s) survives at least two years beyond the date of its planting.*

M. *Planting of native vegetation and the removal of non-native, invasive vegetation (as identified on the Oregon City Native Plant List or other locally adopted plant list (e.g. Metro or Portland), or as recommended by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, arboriculture, horticulture, wildlife biology, botany, hydrology or forestry), and removal of refuse and fill, provided that:*
   1. *All work is done using hand-held equipment;*
   2. *No existing native vegetation is disturbed or removed; and*
   3. *All work occurs outside of wetlands and the top-of-bank of streams.*

N. *Activities in which no more than one hundred square feet of ground surface is disturbed outside of the bankfull stage of water bodies and where the disturbed area is restored to the pre-construction conditions, notwithstanding that disturbed areas that are predominantly covered with invasive species shall be required to remove the invasive species from the disturbance area and plant trees and native plants pursuant to this Chapter.*

O. *New fences meeting all of the following:*

   1. *No taller than three and a half feet and of split rail or similar open design.;*
   2. *Two feet width on both sides of fence shall be planted or seeded with native grasses, shrubs, herbs, or trees to cover any bare ground;*

3. *Six inches of clearance from ground level;*
4. *Fence posts shall be placed outside the top-of-bank of streams and outside of delineated wetlands.*

P. *Gardens, fences and lawns within the NROD that existed prior to the time the overlay district was applied to a subject property are allowed to be maintained but cannot expand further into the overlay district.*

Applicant's Response: The proposed Project will require an NROD permit as none of the exempt uses in this section apply.

17.49.090 - Uses allowed under prescribed conditions.

The following uses within the NROD are subject to the applicable standards listed in OCMC 17.49.100 through 17.49.190 pursuant to a Type II process:

A. *Alteration to existing structures within the NROD when not exempted by OCMC 17.49.080, subject to OCMC 17.49.130.*
B. *A residence on a highly constrained vacant lot of record that has less than three thousand square feet of buildable area, with minimum dimensions of fifty feet by fifty feet, remaining outside the NROD portion of the property, subject to the maximum disturbance allowance prescribed in OCMC 17.49.120.A.*
C. *A land division that would create a new lot for an existing residence currently within the NROD, subject to OCMC 17.49.160.*
D. *Land divisions when not exempted by OCMC 17.49.080, subject to the applicable standards of OCMC 17.49.160.*
E. *Trails/pedestrian paths when not exempted by OCMC 17.49.080, subject to OCMC 17.49.170 (for trails) or OCMC 17.49.150 (for paved pedestrian paths).*
F. *New roadways, bridges/creek crossings, utilities or alterations to such facilities when not exempted by OCMC 17.49.080.*
G. *Roads, bridges/creek crossings Subject to OCMC 17.49.150.*
H. *Utility lines subject to OCMC 17.49.140.*
I. *Stormwater detention or pre-treatment facilities subject to OCMC 17.49.155.*
J. *Institutional, industrial or commercial development on a vacant lot of record situated in an area designated for such use that has more than seventy-five percent of its area covered by the NROD, subject to OCMC 17.49.120.B.*
K. *City, county and state capital improvement projects, including sanitary sewer, water and storm water facilities, water stations, and parks and recreation projects.*
L. *Non-hazardous tree removal that is not exempted pursuant to OCMC 17.49.080.K.*
M. *Fences that do not meet the standards for exemption pursuant to OCMC 17.49. 080.O.4.*

Applicant's Response: The Project includes alteration to existing structures within the NROD that are not exempted under Section 17.49.080, but will be submitted as a Type III application. Roads, bridges/creek crossings will comply with Section 17.49.150 as outlined in Section G. See responses to OCMC 17.49.150 below.

17.49.100 - General development standards.

The following standards apply to all Uses Allowed under Prescribed Conditions within the NROD with the exception of rights of ways (subject to OCMC 17.49.150), trails (subject to OCMC 17.49.170), utility lines (subject to OCMC 17.49.140), land divisions (subject to OCMC 17.49.160), and mitigation projects (subject to OCMC 17.49.180 or 17.49.190):

A. *Native trees shall be preserved unless they are located within ten feet of any proposed structures or within five feet of new driveways, or if deemed not wind-safe by a certified arborist. Trees listed on the Oregon City Nuisance Plant List or Prohibited Plant List are exempt from this standard and may be removed. A protective covenant shall be required for any native trees that remain;*

Applicant's Response: No native trees farther than 10 feet from a structure are proposed to be removed.

B. *The Community Development Director may allow the landscaping requirements of the base zone, other than landscaping required for parking lots, to be met by preserving, restoring, and permanently protecting habitat on development sites in the Natural Resource Overlay District.*

Applicant's Response: The applicant acknowledges this section and will consult with the Community Development Director.

C. *All vegetation planted in the NROD shall be native and listed on the Oregon City Native Plant List or other locally adopted plant list (e.g. Metro or Portland), or as recommended by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, arboriculture, horticulture, wildlife biology, botany, hydrology or forestry);*

Applicant's Response: All proposed vegetation will be native and listed on the Oregon City Native Plant List or other locally adopted plant lists.

D. *Grading is subject to installation of erosion control measures required by the City;*

Applicant's Response: The applicant is in compliance with erosion control measures for grading. See Attachment A for the Erosion and Sediment Control Plan.

E. *The minimum front, street, or garage setbacks of the base zone may be reduced to any distance between the base zone minimum and zero in order to minimize the disturbance area within the NROD portion of the lot;*

Applicant's Response: No minimum setbacks apply. The Project is to repair a bridge that spans the entire NROD zone and there are no options to avoid impacts. Disturbance will be minimized to the extent possible.

F. *Any maximum required setback in any zone, such as for multi-family, commercial or institutional development, may be increased to any distance between the maximum and the distance necessary to minimize the disturbance area within the NROD portion of the lot;*

Applicant's Response: The Project is to repair a bridge that spans the entire NROD zone and there are no options available to avoid impacts; therefore, no maximum setbacks apply.

G. *Fences in compliance with OCMC 17.49.080.N;*

Applicant's Response: No fences are proposed in the NROD.

H. *Exterior lighting shall be placed or shielded so that they do not shine directly into resource areas;*

Applicant's Response: No lighting is proposed in the NROD.

I. *If development will occur within the one hundred-year floodplain, the standards of OCMC 17.42 shall be met; and*

Applicant's Response: The Applicant proposes work within the 100-year floodplain and will follow the requirements of OCMC 17.42. See Attachment E for the Flood Management Plan.

J. Mitigation of impacts to the regulated buffer is required, subject to OCMC 17.49.180 or 17.49.190.

Applicant's Response: The Applicant created a mitigation plan compliant with 17.49.180. See Attachment G for Mitigation Plan Report.

17.49.110 - Width of vegetated corridor.

A. Calculation of Vegetated Corridor Width within City Limits. The NROD consists of a vegetated corridor measured from the top of bank or edge of a protected habitat or water feature. The minimum required width is the amount of buffer required on each side of a stream, or on all sides of a feature if non-linear. The width of the vegetated corridor necessary to adequately protect the habitat or water feature is specified in Table 17.49.110.

Table 17.49.110

Protected Water Feature Type (see definitions)	*Slope Adjacent to Protected Water Feature*	*Starting Point for Measurements from Water Feature*	*Width of Vegetated Corridor (see Note 1)*
Anadromous fish-bearing streams	*Any slope*	*• Edge of bankfull flow*	*200 feet*
Intermittent streams with slopes less than 25 percent and which drain less than 100 acres	*< 25 percent*	*• Edge of bankfull flow*	*15 feet*
All other protected water features	*< 25 percent*	*•Edge of bankfull flow • Delineated edge of Title 3 wetland*	*50 feet*
	≥25 percent for 150 feet or more (see Note 2)		*200 feet*
	≥25 percent for less than 150 feet (see Note 2)		*Distance from starting point of measurement to top of ravine (break in ≥25 percent slope) (See Note 3) plus 50 feet.*

Notes:

1. Required width (measured horizontally) of vegetated corridor unless reduced pursuant to the provisions of OCMC 17.49.120.

2. Vegetated corridors in excess of fifty feet apply on steep slopes only in the uphill direction from the protected water feature.

3. Where the protected water feature is confined by a ravine or gully, the top of the ravine is the break in the ≥25 percent slope.

B. Habitat Areas within City Parks. For habitat and water features identified by Metro as regionally significant which are located within city parks, the NROD Boundary shall correspond to the Metro Regionally Significant Habitat Map.

C. Habitat Areas outside city limit/within UGB. For habitat and water features identified by Metro as regionally significant which are located outside of the city limits as of the date of adoption of this ordinance, the minimum corridor width from any non-anadromous fish bearing stream or wetland shall be fifty feet.

Applicant's Response: The width of the vegetated corridor that applies to this Project is 200 feet, due to its proximity to the Willamette River and Abernethy Creek (which are anadromous fish-bearing streams). Wetlands identified along the I-205 corridor east of Main Street also require 200-foot-wide vegetated corridors because the wetlands are located on slopes greater than or equal to 25%. Currently, due to prior development, none of the buffers extend the full 200 feet as required (including impervious surfaces), at which point the vegetated corridor ends. See Attachment H for the NROD Boundary Verification.

17.49.120 - Maximum disturbance allowance for highly constrained lots of record.

In addition to the General Development Standards of OCMC 17.49.100, the following standards apply to a vacant lot of record that is highly constrained by the NROD, per OCMC 17.49.090.B and 17.49.090.F:

A. Standard for Residential Development. In the NROD where the underlying zone district is zoned Residential (R-10, R-8, R-6, R-5, R-3.5): the maximum disturbance area allowed for new residential development within the NROD area of the lot is three thousand square feet.

B. Standard for all developments not located in R-10, R-8, R-6, R-5, and R-3.5. For all other underlying zone districts, the maximum disturbance area allowed for a vacant, constrained lot of record development within the NROD is that square footage which when added to the square footage of the lot lying outside the NROD portion equals twenty-five percent of the total lot area.

1. Lots that are entirely covered by the NROD will be allowed to develop twenty-five percent of their area.

2. This can be determined by: (1) Multiplying the total square footage of the lot by .25; or (2) Subtracting from that amount the square footage of the lot that is located outside the NROD. The result is the maximum square footage of disturbance to be allowed in the NROD portion of the lot. If the result is < or = to 0, no disturbance is permitted and the building shall be located outside of the boundary.

C. In all areas, the disturbance area of a vacant, highly constrained lot of record within the NROD shall be set back at least fifty feet from the top of bank on Abernethy Creek, Newell Creek, or Livesay Creek or twenty-five feet from the top of bank of any tributary of the aforementioned Creeks, other water body, or from the delineated edge of a wetland located within the NROD area.

D. If the highly constrained lot of record cannot comply with the above standards, a maximum 1,500 square foot disturbance within the NROD area may be allowed.

Applicant's Response: The Project is not located on a highly constrained lot of record.

17.49.130 - Existing development standards.

In addition to the General Development Standards of OCMC 17.49.100, the following standards apply to alterations and additions to existing development within the NROD, except for trails, rights of way, utility lines, land divisions and mitigation projects. As of June 1, 2010, applicants for alterations and additions to existing development that are not exempt pursuant to OCMC 17.49.080.J. shall submit a Type II or Type III application pursuant to this section.
Mitigation is required, subject to OCMC 17.49.180 or 17.49.190.

Applicant's Response: The majority of the proposed Project is located within ODOT right-of-way. The Applicant's Type III application demonstrates compliance with this section for the project areas not within right-of-way.

17.49.140 - Standards for utility lines.

The following standards apply to new utilities, private connections to existing or new utility lines, and upgrades of existing utility lines within the NROD:

A. *The disturbance area for private connections to utility lines shall be no greater than ten feet wide;*
B. *The disturbance area for the upgrade of existing utility lines shall be no greater than fifteen feet wide;*
C. *New utility lines shall be within the right-of-way, unless reviewed under subsection D.*
D. *New utility lines that cross above or underneath a drainage way, wetland, stream, or ravine within the NROD but outside of a right-of-way shall be processed as a Type III permit pursuant to OCMC 17.49.200, Adjustment from Standards.*
E. *No fill or excavation is allowed within the ordinary high water mark of a stream without the approval of the Division of State Lands and/or the U.S. Army Corps of Engineers;*
F. *The Division of State Lands must approve any work that requires excavation or fill in a wetland;*
G. *Native trees more than ten inches in diameter shall not be removed unless it is shown that there are no feasible alternatives; and*
H. *Each six to ten-inch diameter native tree cut shall be replaced at a ratio of three trees for each one removed. Each eleven-inch or greater diameter native tree shall be replaced at a ratio of five trees for each removed. The replacement trees shall be a minimum one-half inch diameter and selected from the Oregon City Native Plant List. All trees shall be planted within the NROD on the subject property. Where a utility line is approximately parallel with the stream channel, at least half of the replacement trees shall be planted between the utility line and the stream channel.*
I. *Mitigation is required, subject to OCMC 17.49.180 or 17.49.190.*

Applicant's Response: This section does not apply. No work is proposed to new utilities, private connections to existing or new utility lines, or upgrades of existing utility lines within the NROD. The applicant proposes a mitigation plan compliant with OCMC 17.49.180.

17.49.150 - Standards for vehicular or pedestrian paths and roads.

The following standards apply to public rights-of-way and private roads within the NROD, including roads, bridges/stream crossings, driveways and pedestrian paths with impervious surfaces:

A. *Stream crossings shall be limited to the minimum number and width necessary to ensure safe and convenient pedestrian, bicycle and vehicle connectivity, and shall cross the stream at an angle as close to perpendicular to the stream channel as practicable. Bridges shall be used instead of culverts wherever practicable.*

Applicant's Response: The Project entails routine maintenance and alterations to the existing stream crossing structures (Abernethy Bridge) and the alterations are designed to enhance vehicle safety with the minimum width necessary. The existing Abernethy Bridge crossing angle is not perpendicular to the stream, but is as close to perpendicular as was practicable. Changing the orientation to make it perpendicular would not be practicable, as it would result in extensive in water, NROD, and community impacts. There are no existing pedestrian or bicycle facilities on the Abernethy Bridge nor are any proposed. There is no expectation for pedestrian and bicycle connectivity at the stream crossing. No new stream crossings are proposed.

B. Where the right-of-way or private road crosses a stream the crossing shall be by bridge or a bottomless culvert;

Applicant's Response: The right-of-way crossing the Willamette River is the Abernethy Bridge. No new stream crossings are proposed.

C. No fill or excavation shall occur within the ordinary high water mark of a stream without the approval of the Division of State Lands and/or the U.S. Army Corps of Engineers;

Applicant's Response: All proposed fill or excavation within the ordinary high water mark of a stream will take place after approval from DSL and/or USACE.

D. If the Oregon Department of State Lands (DSL) has jurisdiction over any work that requires excavation or fill in a wetland, required permits or authorization shall be obtained from DSL prior to release of a grading permit;

Applicant's Response: No excavation or fill in a wetland is proposed.

E. Any work that will take place within the banks of a stream shall be conducted between June 1 and August 31, or shall be approved by the Oregon Department of Fish and Wildlife; and

Applicant's Response: The current in-water work window for the project area is June 1 – October 31. Proposed work within the banks of Abernethy Creek and the Willamette River will be conducted between June 1 and October 31. DSL approved an extension for drilled shaft oscillation work in the Willamette River to occur from July 1 to December 31 (see Attachment G for DSL permit #62035).

F. Mitigation is required, subject to OCMC 17.49.180 or 17.49.190.

Applicant's Response: Mitigation will be implemented according to the proposed mitigation plan (Attachment G).

17.49.155 - Standards for stormwater facilities.

Approved facilities that infiltrate stormwater on-site in accordance with Public Works Low-Impact Development standards, including but not limited to; vegetated swales, rain gardens, vegetated filter strips, and vegetated infiltration basins, and their associated piping, may be placed within the NROD boundary pursuant to the following standards:

A. The forest canopy within the driplines of existing trees shall not be disturbed.

Applicant's Response: No stormwater facilities are proposed that would disturb the forest canopy within the NROD.

B. Only vegetation from the Oregon City Native Plant List shall be planted within these facilities.

Applicant's Response: The applicant will only plant vegetation from the Oregon City Native Plant List or other locally adopted native plant lists.

C. Mitigation is required, subject to OCMC 17.49.180 or 17.49.190.

Applicant's Response: Mitigation will be implemented according to the proposed mitigation plan (Attachment G).

D. The storm water facility may encroach up to one-half the distance of the NROD corridor.

Applicant's Response: The Applicant proposes a bioslope along the I-205 corridor that would be placed both inside of and outside of the NROD boundary.

E. The stormwater facility shall not impact more than one thousand square feet of the NROD. Impacts greater than one thousand square feet shall be processed as a Type III application.

Applicant's Response: The Applicant proposes a bioslope along the south side of the I-205 corridor, which has an area equal to 4,723 square feet within the NROD. This application will be submitted as a Type III application.

F. The community development director may allow landscaping requirements of the base zone, other than landscaping required for parking lots, to be met by preserving, restoring, and permanently protecting habitat on development sites within the Natural Resource Overlay District.

Applicant's Response: The applicant acknowledges this section.

G. The design of the stormwater facility shall be subject to OCMC 13.12.

Applicant's Response: All stormwater facilities are designed to meet the standards of OCMC 13.12. See Attachment C, Stormwater Report for stormwater facility details.

17.49.160 - Standards for land divisions.

Other than those land divisions exempted by OCMC 17.49.070.G., new residential lots created within the NROD shall conform to the following standards.

A. For a lot for an existing residence currently within the NROD. This type of lot is allowed within the NROD for a residence that existed before the NROD was applied to a subject property. A new lot for an existing house may be created through a partition or subdivision process when all of the following are met:
   1. There is an existing house on the site that is entirely within the NROD area; and
   2. The existing house will remain; and
   3. The new lot is no larger than required to contain the house, minimum required side setbacks, garage, driveway and a twenty-foot deep rear yard, with the remaining NROD area beyond that point protected by a conservation easement, or by dedicating a conservation tract or public open space.

B. Protection and ownership of NROD areas in land divisions:
   1. New partitions shall delineate the NROD area either as a separate tract or conservation easement that meets the requirements of subsection 2. of this section.
   2. Prior to final plat approval, ownership and maintenance of the NROD area shall be identified to distinguish it from the buildable areas of the development site. The NROD area may be identified as any one of the following:
      a. A tract of private open space held by the homeowners association;
      b. For residential land divisions, a tract of private open space held by a homeowner's association subject to an easement conveying stormwater and surface water management rights to the City and preventing the owner of the tract from activities and uses inconsistent with the purpose of this document;
      c. Public open space where the tract has been dedicated to the City or other governmental unit;
      d. Conservation easement area pursuant to OCMC 17.49.180.G. and approved in form by the Community Development Director; or
      e. Any other ownership proposed by the owner and approved by the Community Development Director.

f. NROD tracts shall be exempt from minimum frontage requirements, dimensional standards of the zoning designation, street frontage requirements, or flag lot standards pursuant to OCMC 16.08.053.

Applicant's Response: This section does not apply. The applicant does not propose any residential lots.

17.49.170 - Standards for trails.

All trails that are not exempt pursuant to OCMC 17.49.80.F shall be processed through a Type II or Type III process pursuant to this chapter; and shall provide mitigation, subject to OCMC 17.49.180 or 17.49.190.

Applicant's Response: No trails are proposed in the NROD.

17.49.180 - Mitigation standards.

The following standards (or the alternative standards of OCMC 17.49.190) apply to required mitigation:

A. Mitigation shall occur at a two-to-one ratio of mitigation area to proposed NROD disturbance area. Mitigation of the removal or encroachment of a wetland or stream shall not be part of this chapter and will be reviewed by the Division of State Lands or the Army Corp of Engineers during a separate review process;

Applicant's Response: Mitigation for disturbance in the NROD will be implemented at a 2:1 ratio. DSL has reviewed and concurred with the project mitigation for stream impacts. Proposed mitigation for stream impacts was reviewed and approved by USACE during a separate review process. See Attachment L for received permits.

B. Mitigation shall occur on the site where the disturbance occurs, pursuant to the following:

1. The mitigation required for disturbance associated with a right-of-way or utility in the right-of-way shall be located as close to the impact area as possible within the NROD;

2. If not possible to locate mitigation on the same site, the mitigation shall occur first on the same stream tributary, secondly in the Abernethy, Newell or Livesay Creek or a tributary thereof, or thirdly as close to the impact area as possible within the NROD; and

3. An easement that allows access to the mitigation site for monitoring and maintenance shall be provided as part of the mitigation plan.

Applicant's Response: Mitigation for disturbance associated with a right-of-way will occur as close to the impact area as possible within the NROD. ODOT will be responsible for monitoring and maintaining the mitigation area. The Project area is located within right-of-way. Right-of-way access is required for operation, maintenance, and safety of the facility. An easement can restrict the State's ability to maintain and operate the interstate and is not allowed by the Federal Highway Administration, therefore, the Applicant does not propose any easements. See Attachment G for the NROD mitigation site plan and report.

C. Mitigation shall occur within the NROD area of a site unless it is demonstrated that this is not feasible because of a lack of available and appropriate area. In such cases, the proposed mitigation area shall be contiguous to the existing NROD area so the NROD boundary can be easily extended in the future to include the new resource site.

Applicant's Response: Mitigation will occur within the NROD areas of the project site. See Attachment G for the Mitigation Plan and Report.

Invasive and nuisance vegetation shall be removed within the mitigation area;

Applicant's Response: All invasive and nuisance vegetation will be removed within the mitigation area.

D. Required Mitigation Planting. An applicant shall meet Mitigation Planting Option 1 or 2 below, whichever option results in more tree plantings, except that where the disturbance area is one acre or more, Mitigation Option 2 shall be required. All trees, shrubs and ground cover shall be selected from the Oregon City Native Plant List.

Applicant's Response: The disturbance area is more than 1 acre and will comply with Option 2.

NOTE: Applications on sites where no trees are present or which are predominantly covered with invasive species shall be required to mitigate the site, remove the invasive species and plant trees and native plants pursuant to Option 2.

1. Mitigation Planting Option 1.

a. Planting Quantity. This option requires mitigation planting based on the number and size of trees that are removed from the site pursuant to Table 17.49.180E.1.a.

Table 17.49.180E.1.a.—Required Planting

Size of Tree to be Removed (DBH)	*Number of Trees and Shrubs to be Replanted*
6 to 12"	*2 trees and 3 shrubs*
13 to 18"	*3 trees and 6 shrubs*
19 to 24"	*5 trees and 12 shrubs*
25 to 30"	*7 trees and 18 shrubs*
Over 30"	*10 trees and 30 shrubs*

b. Plant Size. Replacement trees shall be at least one-half inch in caliper on average, measured at six inches above the ground level for field grown trees or above the soil line for container grown trees. Oak, madrone, ash or alder may be one gallon size. Conifers shall be a minimum of six feet in height. Shrubs shall be at least one-gallon container size or the equivalent in ball and burlap, and shall be at least twelve inches in height at the time of planting. All other species shall be a minimum of four-inch pots;

Applicant's Response: The applicant will comply with the requirements of Option 2.

c. Plant Spacing. Except for the outer edges of mitigation areas, trees and shrubs shall be planted in a non-linear fashion. Plant spacing for new species shall be measured from the driplines of existing trees when present. Trees shall be planted on average between eight and twelve feet on center, and shrubs shall be planted on average between four and five feet on center, or clustered in single species groups of no more than four plants, with each cluster planted on average between eight and ten feet on center.

Applicant's Response: The applicant will comply with the requirements of Option 2.

d. Mulching and Irrigation. Mulch new plantings a minimum of three inches in depth and eighteen inches in diameter. Water new plantings one inch per week from June 30th to September 15th, for the three years following planting.

Applicant's Response: The applicant will comply with the requirements of Option 2.

e. Plant Species. Shrubs shall consist of at least two different species. If ten trees or more are planted, no more than one-half of the trees may be of the same genus.

Conifers shall be replaced with conifers. Bare ground shall be planted or seeded with native grasses and ground cover species.

Applicant's Response: The applicant will comply with the requirements of Option 2.

2. *Mitigation Planting Option 2.*
   a. *Planting Quantity. In this option, the mitigation requirement is calculated based on the size of the disturbance area within the NROD. Native trees and shrubs are required to be planted at a rate of five trees and twenty-five shrubs per every five hundred square feet of disturbance area (calculated by dividing the number of square feet of disturbance area by five hundred, and then multiplying that result times five trees and twenty-five shrubs, and rounding all fractions to the nearest whole number of trees and shrubs; for example, if there will be three hundred thirty square feet of disturbance area, then three hundred thirty divided by five hundred equals .66, and .66 times five equals 3.3, so three trees shall be planted, and .66 times twenty-five equals 16.5, so seventeen shrubs shall be planted). Bare ground shall be planted or seeded with native grasses or herbs. Non-native sterile wheat grass may also be planted or seeded, in equal or lesser proportion to the native grasses or herbs.*

Applicant's Response: The Project proposes 58,687 square feet of disturbance area within the NROD. Based on the mitigation calculation, a total of 587 trees and 2,934 shrubs will be planted in an area equal to 117,374 square feet to meet the 2:1 mitigation ratio requirement. See Attachment G for the Mitigation Plan.

   b. *Plant Size. Plantings may vary in size dependent on whether they are live cuttings, bare root stock or container stock, however, no initial plantings may be shorter than twelve inches in height.*

Applicant's Response: No initial plantings shorter than 12 inches are proposed.

   c. *Plant Spacing. Trees shall be planted at average intervals of seven feet on center. Shrubs may be planted in single-species groups of no more than four plants, with clusters planted on average between eight and ten feet on center.*

Applicant's Response: Trees are proposed to be planted at an average of 15 feet on center. Shrubs will be installed 5 feet on center, in groups of 3 to 9 plants per species. Shrub groups will be spaced no closer than 15 feet apart and no closer than 5 feet to an adjacent tree. Planting at a more open density will yield a healthier, more self-sustaining ecosystem. Overplanting will require removals or result in tree-fall as species crowd each other out. See Attachment H for the planting plan prepared by a professional landscape architect.

   d. *Mulching and Irrigation shall be applied in the amounts necessary to ensure eighty percent survival at the end of the required five-year monitoring period.*

Applicant's Response: Mulching and irrigation will be applied to ensure 80% survival after 5 years of monitoring.

   e. *Plant Diversity. Shrubs shall consist of at least three different species. If twenty trees or more are planted, no more than one-third of the trees may be of the same genus.*

Applicant's Response: Proposed plantings meet the plant diversity requirements. The Applicant proposes to plan 13 different species of shrubs, 19 species of trees, and a mix of several species of grasses and forbs. See Attachment G for the NROD mitigation landscaping plan.

E. An alternative planting plan using native plants may be approved in order to create a new wetland area, if it is part of a wetlands mitigation plan that has been approved by the DSL or the U.S. Army Corps of Engineers (USACE) in conjunction with a wetland joint removal/fill permit application.

Applicant's Response: No alternative planting plan for wetland creation is proposed.

F. Monitoring and Maintenance. The mitigation plan shall provide for a five-year monitoring and maintenance plan with annual reports in a form approved by the Community Development Director. Monitoring of the mitigation site is the on-going responsibility of the property owner, assign, or designee, who shall submit said annual report to the Planning Division, documenting plant survival rates of shrubs and trees on the mitigation site. Photographs shall accompany the report that indicate the progress of the mitigation. A minimum of eighty percent survival of trees and shrubs of those species planted is required at the end of the five-year maintenance and monitoring period. Any invasive species shall be removed and plants that die shall be replaced in kind to meet the eighty percent survival requirement. Bare spots and areas of invasive vegetation larger than ten square feet that remain at the end the five-year monitoring period shall be replanted or reseeded with native grasses and/or ground cover species.

Applicant's Response: The applicant will provide a 5-year monitoring and maintenance plan, including annual reports. See the NROD Mitigation Plan Report in Attachment G for monitoring and maintenance details.

G. Covenant or Conservation Easement. The applicant shall record a restrictive covenant or conservation easement, in a form provided by the City, requiring the owners and assigns of properties subject to this section to comply with the applicable mitigation requirements of this section. Said covenant shall run with the land, and permit the City to complete mitigation work in the event of default by the responsible party. Costs borne by the City for such mitigation shall be borne by the owner.

Applicant's Response: ODOT will be responsible for monitoring and maintaining the mitigation area. The Project area is located within right-of-way. Right-of-way access is required for operation, maintenance, and safety of the facility. An easement can restrict the State's ability to maintain and operate the interstate and is prohibited by 23 CFR 710.409, therefore, the Applicant does not propose any easements.

H. Financial Guarantee. A financial guarantee for establishment of the mitigation area, in a form approved by the City, shall be submitted before development within the NROD disturbance area commences. The City will release the guarantee at the end of the five-year monitoring period, or before, upon its determination that the mitigation plan has been satisfactorily implemented pursuant to this section.

Applicant's Response: ODOT is responsible for monitoring and maintenance of all NROD mitigation areas. Financial guarantees are not proposed as no easements or covenants are proposed and ODOT is self-insured. See Attachment G for the proposed NROD mitigation plan and report.

17.49.190 - Alternative mitigation standards.

In lieu of the above mitigation standards of OCMC 17.49.180, the following standards may be used. Compliance with these standards shall be demonstrated in a mitigation plan report prepared by an environmental professional with experience and academic credentials in one or more natural resource

areas such as ecology, wildlife biology, botany, hydrology or forestry. At the applicant's expense, the City may require the report to be reviewed by an environmental consultant.

A. The report shall document the existing condition of the vegetated corridor as one of the following categories:

Good Existing Corridor:	*Combination of trees, shrubs and groundcover are eighty percent present, and there is more than fifty percent tree canopy coverage in the vegetated corridor.*
Marginal Existing Vegetated Corridor:	*Combination of trees, shrubs and groundcover are eighty percent present, and twenty-five to fifty percent canopy coverage in the vegetated corridor.*
Degraded Existing Vegetated Corridor:	*Less vegetation and canopy coverage than marginal vegetated corridors, and/or greater than ten percent surface coverage of any non-native species.*

Applicant's Response: This section does not apply as no alternative mitigation plan is proposed.

B. The proposed mitigation shall occur at a minimum two-to-one ratio of mitigation area to proposed disturbance area;

Applicant's Response: This section does not apply as no alternative mitigation plan is proposed.

C. The proposed mitigation shall result in a significant improvement to Good Existing Condition as determined by a qualified environmental professional;

Applicant's Response: This section does not apply as no alternative mitigation plan is proposed.

D. There shall be no detrimental impact on resources and functional values in the area designated to be left undisturbed;

Applicant's Response: This section does not apply as no alternative mitigation plan is proposed.

E. Where the proposed mitigation includes alteration or replacement of development in a stream channel, wetland, or other water body, there shall be no detrimental impact related to the migration, rearing, feeding or spawning of fish;

Applicant's Response: This section does not apply as no alternative mitigation plan is proposed.

F. Mitigation shall occur on the site of the disturbance to the extent practicable. If the proposed mitigation cannot practically occur on the site of the disturbance, then the applicant shall possess a legal instrument, such as an easement, sufficient to carry out and ensure the success of the mitigation.

Applicant's Response: This section does not apply as no alternative mitigation plan is proposed.

17.49.200 - Adjustment from standards.

If a regulated NROD use cannot meet one or more of the applicable NROD standards then an adjustment may be issued if all of the following criteria are met. Compliance with these criteria shall be demonstrated by the applicant in a written report prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. At the applicant's expense, the City may require the report to be reviewed by an environmental consultant. Such requests shall be processed under the Type III development permit procedure. The applicant shall demonstrate:

A. There are no feasible alternatives for the proposed use or activity to be located outside the NROD area or to be located inside the NROD area and to be designed in a way that will meet all of the applicable NROD development standards;

Applicant's Response: The Project cannot meet all applicable NROD standards listed in this Section, and no feasible alternatives exist that would avoid proposed work within NROD areas. The Applicant has created a written report (NROD Mitigation Plan Report) which is included in Attachment G.

B. The proposal has fewer adverse impacts on significant resources and resource functions found in the local NROD area than actions that would meet the applicable environmental development standards;

Applicant's Response: Per response to 17.49.200(A) above, there is no alternative action that would meet applicable environmental development standards and meet the purpose and need of the Project.

C. The proposed use or activity proposes the minimum intrusion into the NROD area that is necessary to meet development objectives;

Applicant's Response: The materials presented in this application demonstrate the Applicant's effort to minimize intrusion into the NROD. See Attachment G for the NROD Mitigation Plan Report.

D. Fish and wildlife passage will not be impeded;

Applicant's Response: Permits in Attachment L demonstrate that fish and wildlife passage will not be impeded.

E. With the exception of the standard(s) subject to the adjustment request, all other applicable NROD standards can be met; and

Applicant's Response: Besides the standards listed in 17.49.180(D)(2)(c), 17.49.180(G), and 17.49.180(H), all other applicable NROD standards will be met.

F. The applicant has proposed adequate mitigation to offset the impact of the adjustment.

Applicant's Response: The Applicant has created a mitigation plan that is adequate to offset the impact of the adjustment. See Attachment G.

17.49.210 - Type II development permit application.

Unless otherwise directed by the NROD standards, proposed development within the NROD shall be processed as a Type II development permit application. All applications shall include the items required for a complete application by OCMC 17.49.220—17.49.230, and 17.50.080 as well as a discussion of how the proposal meets all of the applicable NROD development standards in OCMC 17.49.100—17.49.170.

Applicant's Response: This application will be submitted as a Type III development permit application.

17.49.220 - Required site plans.

Site plans showing the following required items shall be part of the application:

A. For the entire subject property (NROD and non-NROD areas):

1. *The NROD district boundary. This may be scaled in relation to property lines from the NROD Map;*
2. *One hundred-year floodplain and floodway boundary (if determined by FEMA);*
3. *Creeks and other waterbodies;*
4. *Any wetlands, with the boundary of the wetland that will be adjacent to the proposed development determined in a wetlands delineation report prepared by a professional*

wetland specialist and following the Oregon Division of State Lands wetlands delineation procedures;

5. *Topography shown by contour lines of two or one foot intervals for slopes less than fifteen percent and by ten foot intervals for slopes fifteen percent or greater;*
6. *Existing improvements such as structures or buildings, utility lines, fences, driveways, parking areas, etc.*
7. *Extent of the required Vegetated Corridor required by Table 17.49.110.*

B. *Within the NROD area of the subject property:*
   1. *The distribution outline of shrubs and ground covers, with a list of most abundant species;*
   2. *Trees six inches or greater in diameter, identified by species. When trees are located in clusters they may be described by the approximate number of trees, the diameter range, and a listing of dominant species;*
   3. *An outline of the disturbance area that identifies the vegetation that will be removed. All trees to be removed with a diameter of six inches or greater shall be specifically identified as to number, trunk diameters and species;*
   4. *If grading will occur within the NROD, a grading plan showing the proposed alteration of the ground at two foot vertical contours in areas of slopes less than fifteen percent and at five foot vertical contours of slopes fifteen percent or greater.*

C. *A construction management plan including:*
   1. *Location of site access and egress that construction equipment will use;*
   2. *Equipment and material staging and stockpile areas;*
   3. *Erosion control measures that conform to City of Oregon City erosion control standards;*
   4. *Measures to protect trees and other vegetation located outside the disturbance area.*

D. *A mitigation site plan demonstrating compliance with OCMC 17.49.180 or 17.49.190, including:*
   1. *Dams, weirs or other in-water features;*
   2. *Distribution, species composition, and percent cover of ground covers to be planted or seeded;*
   3. *Distribution, species composition, size, and spacing of shrubs to be planted;*
   4. *Location, species and size of each tree to be planted;*
   5. *Stormwater management features, including retention, infiltration, detention, discharges and outfalls;*
   6. *Water bodies or wetlands to be created, including depth;*
   7. *Water sources to be used for irrigation of plantings or for a water source for a proposed wetland.*

Applicant's Response: The applicant has included all required site plans. See Attachment F for NROD Site Plans and Attachment G for Mitigation Site Plans and Report.

17.49.230 - Mitigation plan report.

A mitigation plan report that accompanies the above mitigation site plan is also required. The report shall be prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. The mitigation plan report shall, at a minimum, discuss:

A. *Written responses to each applicable Mitigation Standard in OCMC 17.49.180 or 17.49.190 indicating how the proposed development complies with the mitigation standards;*
B. *The resources and functional values to be restored, created, or enhanced through the mitigation plan;*

C. *Documentation of coordination with appropriate local, regional, state and federal regulatory/resource agencies such as the Oregon Department of State Lands (DSL) and the United States Army Corps of Engineers (USACE);*
D. *Construction timetables;*
E. *Monitoring and Maintenance practices pursuant to OCMC 17.49.230.F and a contingency plan for undertaking remedial actions that might be needed to correct unsuccessful mitigation actions during the first five years of the mitigation area establishment.*

Applicant's Response: The Applicant has prepared a mitigation plan report. See Attachment G.

17.49.240 - Density transfer.

The NROD allocates urban densities to the non-NROD portions of properties located partially within the NROD, generally resulting in a substantial increase in net development potential.
For lots of record that are located within the NROD, density transfer is allowed, subject to the following provisions:

A. *Density may be transferred from the NROD to non-NROD portions of the same property or of contiguous properties within the same development site;*
B. *The residential transfer credit shall be as follows: for new residential partitions and subdivisions, one-third of the area of the NROD tract or conservation easement area may be added to the net developable area outside of the tract or conservation easement area within the boundary of the development site in order to calculate the allowable number of lots.*
C. *Permitted Modifications to Residential Dimensional Standards. In order to allow for a transfer of density pursuant to subsection B. above, the dimensional standards of the base zone may be modified in order minimize disturbance to the NROD. The permissible reductions are specified in Tables 17.49.240C.—17.49.240D.*
D. *The applicant shall demonstrate that the minimum lot size of the underlying zone has been met. The area of the NROD in subsection B. above that is used to transfer density may be included in the calculation of the average minimum lot size.*
E. *The applicant may choose to make the adjustments over as many lots as required.*

Table 17.49.240 A: Lot Size Reductions Allowed for NROD Density Transfers

ZONE	Min. Lot Size (%)	Min. Lot Width	Min. Lot Depth
R-10	5,000 sq. feet	50'	65'
R-8	4,000 sq. feet	45'	60'
R-6	3,500 sq. feet	35'	55'
R-5	3,000 sq. feet	30'	50'
R-3.5	1,800 sq. feet	20'	45'

Table 17.49.240 B: Reduced Dimensional Standards for Detached Single-Family Residential Units

Size of Reduced Lot	Front Yard Setback	Rear Yard Setback	Side yard Setback	Corner Side	Lot Coverage
8,000—9,999 square feet	15 feet	20 feet	7/9 feet	15 feet	40%
6,000—7,999 square feet	10 feet	15 feet	5/7 feet	15 feet	40%

4,000—5,999 square feet	*10 feet*	*15 feet*	*5/5 feet*	*10 feet*	*40%*
1,800—3,999 square feet	*5 feet*	*15 feet*	*5/5 feet*	*10 feet*	*55%*

Table 17.49.240 C: Reduced Dimensional Standards for Single-Family Attached or Two-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
3,500—7,000 square feet	*10 feet*	*15 feet*	*5/0* feet*	*10 feet*	*40%*
1,800—3,499 square feet	*5 feet*	*15 feet*	*5/0* feet*	*10 feet*	*55%*

**0 foot setback is only allowed on single-family attached units*

F. For density transfers on properties zoned Commercial, Institutional, Industrial or Multi-Family, the transfer credit ratio is ten thousand square feet per acre of land within the NROD;

G. The area of land contained in the NROD area may be excluded from the calculations for determining compliance with minimum density requirements of the land division code.

H. The owner of the transferring property shall execute a covenant that records the transfer of density. The covenant shall be found to meet the requirements of this section and be recorded before building permits are issued; and

I. All other applicable development standards, including setbacks, building heights, and maximum lot coverage shall continue to apply when a density transfer occurs.

Applicant's Response: This section does not apply as no density transfers are proposed.

17.49.250 - Verification of NROD boundary.

The NROD boundary may have to be verified occasionally to determine the true location of a resource and its functional values on a site. This may be through a site specific environmental survey or a simple site visit in those cases where existing information demonstrates that the NROD significance rating does not apply to a site-specific area. Applications for development on a site located in the NROD area may request a determination that the subject site is not in an NROD area and therefore is not subject to the standards of OCMC 17.49.100. Verifications shall be processed as either a Type I or Type II process.

Applicant's Response: A wetland delineation was conducted and concluded that the NROD boundary is not as extensive as shown. See the Type II Verification below.

17.49.255 - Type I verification.

A. Applicants for a determination under this section shall submit a site plan meeting the requirements of OCMC 17.49.220, as applicable.

B. An applicant may request a Type I Verification determination by the Community Development Director. Such requests may be approved provided that there is evidence substantiating that all the requirements of this chapter relative to the proposed use are satisfied and demonstrates that the property also satisfies the following criteria, as applicable:

1. No soil, vegetation, hydrologic features have been disturbed;

2. No hydrologic features have been changed;

3. *There are no man-made drainage features, water marks, swash lines, drift lines present on trees or shrubs, sediment deposits on plants, or any other evidence of sustained inundation.*
4. *The property does not contain a wetland as identified by the City's Local Wetland Inventory or Water Quality and Flood Management Areas map.*
5. *There is no evidence of a perennial or intermittent stream system or other protected water feature. This does not include established irrigation ditches currently under active farm use, canals or manmade storm or surface water runoff structures or artificial water collection devices.*
6. *Evidence of prior land use approvals that conform to the Natural Resource Overlay District, or which conformed to the Water Quality Resources Area Overlay District that was in effect prior to the current adopted NROD (Ord. 99-1013).*
7. *There is an existing physical barrier between the site and a protected water feature, including:*
    a. *Streets, driveways, alleys, parking lots or other approved impervious areas wider than fifteen feet and which includes drainage improvements that are connected to the City storm sewer system, as approved by the City.*
    b. *Walls, buildings, drainages, culverts, topographic features or other structures which form a physical barrier between the site and the protected water features, as approved by the City.*

C. *If the City is not able to clearly determine, through the Type I verification process that the applicable criteria subsection B.1.—B.7 above are met, the verification application shall be denied. An applicant may then opt to apply for a verification through the Type II process defined below.*

Applicant's Response: This section does not apply as the Applicant is submitting a Type II verification.

17.49.260. - Type II verification.

Verifications of the NROD which cannot be determined pursuant to the standards of OCMC 17.49.255 may be processed under the Type II permit procedure.

A. *Applicants for a determination under this section shall submit a site plan meeting the requirements of OCMC 17.49.220 as applicable.*
B. *Such requests may be approved provided that there is evidence that demonstrates in an environmental report prepared by one or more qualified professionals with experience and credentials in natural resource areas, including wildlife biology, ecology, hydrology and forestry, that a resource function(s) and/or land feature(s) does not exist on a site-specific area.*
C. *Verification to remove a recently developed area from the NROD shall show that all of the following have been met:*
    1. *All approved development in the NROD has been completed;*
    2. *All mitigation required for the approved development, located within the NROD, has been successful; and*
    3. *The previously identified resources and functional values on the developed site no longer exist or have been subject to a significant detrimental impact.*

Applicant's Response: A Type II verification has been completed. See Attachment H.

17.49.265 - Corrections to violations.

For correcting violations, the violator shall submit a remediation plan that meets all of the applicable standards of the NROD. The remediation plan shall be prepared by one or more qualified professionals with experience and credentials in natural resource areas, including wildlife biology, ecology, hydrology

and forestry. If one or more of these standards cannot be met, then the applicant's remediation plan shall demonstrate that there will be:

A. No permanent loss of any type of resource or functional value listed in OCMC 17.49.10, as determined by a qualified environmental professional;

B. A significant improvement of at least one functional value listed in OCMC 17.49.10, as determined by a qualified environmental professional; and

C. There will be minimal loss of resources and functional values during the remediation action until it is fully established.

Applicant's Response: This section does not apply as no corrections to violations are proposed.

OCMC 17.50 – ADMINISTRATIVE PROCESSES

17.50.050 – Pre-application conference.

A Pre-application Conference. Prior to a Type II – IV or Legislative application, excluding Historic Review, being deemed complete, the applicant shall schedule and attend a pre-application conference with City staff to discuss the proposal, unless waived by the Community Development Director. The purpose of the pre-application conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal.

1. To schedule a pre-application conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee.

2. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans.

3. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the pre-application conference.

B. A pre-application conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant shall schedule and attend another conference before the City will accept a permit application. The Community Development Director may waive the pre-application requirement if, in the Director's opinion, the development has not changed significantly and the applicable municipal code or standards have not been significantly amended. In no case shall a pre-application conference be valid for more than one year.

C. Notwithstanding any representations by City staff at a pre-application conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.

Applicant's Response: The applicant participated in a pre-application conference on February 28, 2019. The Applicant requested an extension of the validity of the pre-application conference to 1 year on August, 8, 2019. The extension was approved and is valid until February 28, 2020. See Attachment I for pre-application conference notes and documentation of extension request.

17.50.055 - Neighborhood association meeting.

Neighborhood Association Meeting. The purpose of the meeting with the recognized neighborhood association is to inform the affected neighborhood association about the proposed development and to receive the preliminary responses and suggestions from the neighborhood association and the member residents.

A. Applicants applying for annexations, zone change, comprehensive plan amendments, conditional use, Planning Commission variances, subdivision, or site plan and design review (excluding minor site plan and design review), general development master plans or detailed development plans applications shall schedule and attend a meeting with the City-recognized neighborhood association in whose territory the application is proposed no earlier than one year prior to the date of application. Although not required for other projects than those identified above, a meeting with the neighborhood association is highly recommended.

B. The applicant shall request via email or regular mail a request to meet with the neighborhood association chair where the proposed development is located. The notice shall describe the proposed project. A copy of this notice shall also be provided to the chair of the Citizen Involvement Committee.

C. A meeting shall be scheduled within thirty days of the date that the notice is sent. A meeting may be scheduled later than thirty days if by mutual agreement of the applicant and the neighborhood association. If the neighborhood association does not want to, or cannot meet within thirty days, the applicant shall host a meeting inviting the neighborhood association, Citizen Involvement Committee, and all property owners within three hundred feet to attend. This meeting shall not begin before six p.m. on a weekday or may be held on a weekend and shall occur within the neighborhood association boundaries or at a City facility.

D. If the neighborhood association is not currently recognized by the City, is inactive, or does not exist, the applicant shall request a meeting with the Citizen Involvement Committee.

E. To show compliance with this section, the applicant shall submit a copy of the email or mail notice to the neighborhood association and CIC chair, a sign-in sheet of meeting attendees, and a summary of issues discussed at the meeting. If the applicant held a separately noticed meeting, the applicant shall submit a copy of the meeting flyer, postcard or other correspondence used, and a summary of issues discussed at the meeting and submittal of these materials shall be required for a complete application.

Applicant's Response: The applicant attended a neighborhood association meeting with Two Rivers Neighborhood Association on July 24, 2019. A sign-in sheet of meeting attendees, a summary of issues discussed, and a letter from the neighborhood association chairman indicating that a neighborhood meeting was held are provided in Attachment J.

17.50.100 FENCES, HEDGES, WALLS, AND RETAINING WALLS.

A. A fence, hedge, wall, retaining wall, or combination thereof may be located on real property, not within the right-of-way, subject to all of the following:

1. A fence, hedge, wall, retaining wall, or combination thereof located in front of a building may be up to 3.5-feet in total height as measured from the finished grade at any point on the fence.

2. A fence, hedge, wall, located next to and behind the forward most building, or within more than forty feet of the right-of-way, whichever is less may be up to:

a. Six feet in total height for residential properties with less than five units as measured from the finished grade at any point on the fence; or

b. Eight feet in total height for all other uses as measured from the finished grade at any point on the fence.

3. A retaining wall or combination of a fence, hedge, wall located next to and behind the forward most building, or within more than forty feet of the right-of-way, whichever is less, may be up to (as measured from the finished grade) 8.5 feet in height from the finished grade.

4. *Fences, hedges, and/or walls located within two feet above a retaining wall, as measured on a horizontal plane, shall be measured together for the purposes of determining height.*
5. *Property owners shall ensure compliance with the Traffic Sight Obstruction requirements in Chapter 10.32 of the Oregon City Municipal Code.*

Applicant's Response: The Applicant does not propose to locate a fence, hedge, wall, retaining wall, or combination thereof on real property outside of right-of-way. This section of OCMC 17.54.100 does not apply to the Applicant's proposal.

B. *When no other practicable alternative exists, the City Engineer may permit a fence, hedge, wall, retaining wall, or combination thereof to be located within the right-of-way subject to all of the following:*
   1. *A Revocable Permanent Obstruction in the Right of Way permit is granted per OCMC 12.04.120;*
   2. *Retaining walls, fences, or hedges comply with OCMC 17.54.100.A, unless determined to be impracticable by the City Engineer.*
   3. *The abutting property owner shall ensure compliance with the Traffic Sight Obstruction requirements in Chapter 10.32 of the Oregon City Municipal Code.*

Applicant's Response: The Applicant proposes to construct a retaining walls within ODOT right-of-way along I-205, parallel to Main Street (see Attachment A). The applicant does not require a Revocable Permanent Obstruction in the Right of Way permit from Oregon City as the wall is not proposed to be constructed within Oregon City right-of-way. The requirements of OCMC 17.54.100.A do not apply to the wall because it would not be located in front of, next to, or behind a building, or within 2 feet of a retaining wall. The wall would not be an obstruction; rather, it is a required element of the design to support structural integrity of the roadway improvement.

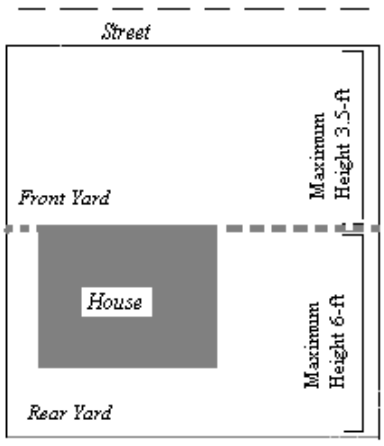
D. *It is unlawful for any person to erect any electric fence or any fence constructed in whole or in part of barbed wire or to use barbed wire, except as erected in connection with security installations at a minimum height of six feet, providing further that prior written approval has been granted by the City Manager.*

Applicant's Response: The Applicant does not propose to erect any electric fence or any fence in whole or in part of barbed wire or to use barbed wire.

Residential Height Requirements

Any fence, hedge, or wall located in front of may be up to 3.5-feet in total height.

A fence, hedge, or wall located next to and behind your home may be up to 6 feet in total height.



Applicant's Response: The applicant does not proposed a fence, hedge, or wall on any parcel with a home. This section of the code does not apply to the Applicant's proposal.

CHAPTER 17.60 – VARIANCES

17.60.020 - Variances—Procedures.

A. A request for a variance shall be initiated by a property owner or authorized agent by filing an application with the city recorder. The application shall be accompanied by a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development. When relevant to the request, building plans may also be required. The application shall note the zoning requirement and the extent of the variance requested. Procedures shall thereafter be held under Chapter 17.50. In addition, the procedures set forth in subsection D. of this section shall apply when applicable.

Applicant's Response: The requested variances are identified in the site plan. The zoning requirements and extent of the variance requested are listed below:

ZONING REQUIREMENT	VARIANCE REQUESTED
17.39.050 *Dimensional standards in the I district are:* *A. Maximum building height: Within one hundred feet of any district boundary, not to exceed thirty-five feet; elsewhere, not to exceed seventy feet.*	The bridge elevation is approximately 90 feet at its highest within 100 feet of the Institutional District boundary. To meet the dimensional standard of 17.39.050, the I-205 Bridge, roadway, and ramps would need to be completely redesigned and reconstructed. Roads that pass under I-205 also would need to be redesigned and reconstructed to meet required clearances. Meeting the standard is not practicable because it would cause undo expense and inappropriate use of resources.

B. A nonrefundable filing fee, as listed in OCMC 17.50.080, shall accompany the application for a variance to defray the costs.

Applicant's Response: The Applicant has included the nonrefundable filing fee for the requested variance with this application.

C. Before the planning commission may act on a variance, it shall hold a public hearing thereon following procedures as established in Chapter 17.50. A Variance shall address the criteria identified in OCMC 17.60.030, Variances — Grounds.

Applicant's Response: The Applicant understands a public hearing will be held for the requested variance.

D. Minor variances, as defined in subsection E. of this section, shall be processed as a Type II decision, shall be reviewed pursuant to the requirements in OCMC 17.50.030B., and shall address the criteria identified in OCMC 17.60.030, Variance — Grounds.

Applicant's Response: The Applicant does not propose minor variances listed in OCMC 17.60.020E.

E. For the purposes of this section, minor variances shall be defined as follows:
1. *Variances to setback and yard requirements to allow additions to existing buildings so that the additions follow existing building lines;*
2. *Variances to width, depth, and frontage requirements of up to twenty percent;*
3. *Variances to residential yard/setback requirements of up to twenty-five percent;*
4. *Variances to nonresidential yard/setback requirements of up to ten percent;*
5. *Variances to lot area requirements of up to five percent;*
6. *Variance to lot coverage requirements of up to twenty-five percent;*
7. *Variances to the minimum required parking stalls of up to five percent; and*
8. *Variances to the floor area requirements and minimum required building height in the mixed-use districts.*
9. *Variances to design and/or architectural standards for single family dwellings, duplexes, single-family attached dwellings, internal conversions, accessory dwelling units, and 3-4 plexes in OCMC 17.14, 17.16, 17.20, 17.21, and 17.22.*

Applicant's Response: The applicant does not propose minor variances listed in OCMC 17.60.020E.

17.60.030 - Variance—Grounds.

A variance may be granted only in the event that all of the following conditions exist:

A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;
B. That the request is the minimum variance that would alleviate the hardship;
C. Granting the variance will equal or exceed the purpose of the regulation to be modified.
D. Any impacts resulting from the adjustment are mitigated;
E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance; and
F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Applicant's Response: The Applicant's requested variances meet the conditions listed in 17.60.030 as follows for 17.39.050A:

A. The applicant is not requesting a modification of the existing bridge structure height. Maintaining the bridge elevation at its current level is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access, or other desirable or necessary qualities otherwise protected by this title.
B. Maintaining the bridge elevation at its current level is the minimum variance that would alleviate the hardship.
C. Granting the variance to maintain the bridge elevation at its current level will equal or exceed the purpose of the regulation to be modified.
D. Any impacts resulting from maintaining the bridge elevation at its current level are far less than the impact of reconfiguring the bridge to meet the dimensional standard of the Institutional District.
E. No practical alternatives to bridge design have been identified, which would accomplish the same purpose and not require a variance. Reducing the elevation of the bridge would not allow for the minimum vertical clearance over either the Willamette River navigation channel or McLoughlin Boulevard to be maintained.

F. The intent of the ordinance being varied relates to building heights within an institutional zone. Because the variance is specific to a bridge structure, it conforms to the intent of the ordinance. It does not seek variance for a building.

OCMC 17.62 – SITE PLAN AND DESIGN REVIEW

17.62.015 - Modifications that will better meet design review requirements.

The review body shall consider modification of certain site related development standards of this Chapter specified below. These modifications may be approved as part of a Type II design review process.

A. Applicability.
   1. This process shall apply to modifications to:
      a. Landscaping in OCMC 17.62.050.A;
      b. Vehicular Connections to Adjoining Properties in OCMC 17.62.050.B.2;
      c. On-site pedestrian circulation in OCMC 17.62.050.C;
      d. Utility Undergrounding Requirements in OCMC 16.12.095.G;
      e. Building location in OCMC 17.62.055.D;
      f. Building Details in OCMC 17.62.050.B.9.055.I;
      g. Windows in OCMC 17.62.050.B.10.055.J
      h. Parking Lot Landscaping in OCMC 17.52.060.
   2. Modifications that are denied through Type II design review may be requested as a variance through the Variance process pursuant to OCMC 17.60.020 or Master Plan Adjustment pursuant to OCMC 17.65.070 as applicable.
   3. Rather than a modification, applicants may choose to apply for a Variance through the Variance process pursuant to OCMC 17.60.020 or Master Plan Adjustment pursuant to OCMC 17.65.070 as applicable.

B. The review body may approve requested modifications if it finds that the applicant has shown that the following approval criteria are met:
   1. The modification will result in a development that better meets the applicable design guidelines; and
   2. The modification meets the intent of the standard. On balance, the proposal will be consistent with the purpose of the standard for which a modification is requested.

Applicant's Response: The Applicant acknowledges the process of modifications to design review requirements.

17.62.030 - When required.

Site plan and design review shall be required for all development of real property in all zones except the low and medium density residential districts, unless otherwise provided for by this title or as a condition of approval of a permit. Site plan and design review shall also apply to all conditional uses, cluster housing developments, multi-family uses, and non-residential uses in all zones. Site Plan and Design Review does not apply to activities occurring within the right-of-way except for communication facilities pursuant to OCMC 17.80.
Site plan and design review is required for a change in use between the uses in Table 17.62.030:
Table 17.62.030

Existing Use	*Proposed Use*
Residential	*Nonresidential use, including but not limited to: commercial, office, industrial, retail, or institutional*
Single-family or duplex	*3 or more dwellings*

Site plan and design review shall not alter the type and category of uses permitted in the underlying zoning districts.

Applicant's Response: The Applicant acknowledges site plan and design reviews are required for improvements located outside of the right-of-way. The Applicant proposes activities outside the right-of-way will include temporary construction work zones to facilitate making seismic upgrades to Abernethy Bridge and construction of on-street parking on Clackamette Drive to benefit Oregon City by providing more parking facilities for Jon Storm Park users, Sportcraft Landing Park, and Clackamette Park. The proposed on-street parking will be a permanent feature, and is located both in ODOT right-of-way and on City of Oregon City property. Temporary work areas will be restored to pre-construction conditions once construction is complete. Section 17.62 applies to the portion of the on-street parking that lies within Oregon City property. See Attachment A for a site plan of the Project area.

17.62.035 - Minor site plan and design review.

This section provides for a Minor Site Plan and Design Review process. Minor Site Plan review is a Type I or Type II decision, as described in OCMC 17.62.035.A., subject to administrative proceedings described in OCMC 17.50 and may be utilized as the appropriate review process only when authorized by the Community Development Director. The purpose of this type of review is to expedite design review standards for uses and activities that require only a minimal amount of review, typical of minor modifications and/or changes to existing uses or buildings.

A. Type I Minor Site Plan and Design Review.

1. Applicability. Type I applications involve no discretion and are typically processed concurrently with a building permit application. The Type I process is not applicable for:

a. Any activity which is included with or initiates actions that require Type II-IV review.

b. Any increase in square footage of a conditional or nonconforming use (excluding nonconforming structures).

c. Any proposal in which nonconforming upgrades are required under OCMC 17.58.

d. Any proposal in which modifications are proposed under OCMC 17.62.015.

2. The following projects may be processed as a Type I application:

a. Addition of up to two hundred square feet to a commercial, institutional, or multifamily structure in which no increases are required to off-street parking. This includes a new ancillary structure, addition to an existing structure, or new interior space (excluding new drive thru). Increases of more than two hundred square feet in a twelve-month period shall be processed as Type II.

b. Addition of up to one thousand square feet to an industrial use in which no increases are required to off-street parking. This includes a new ancillary structure, addition to an existing structure, or new interior space (excluding ancillary retail and office). Increases of more than one thousand square feet in a twelve-month period shall be processed as Type II.

c. Temporary structures, excluding mobile vendors.

d. Removal, replacement or addition of awnings, or architectural projections to existing structures.

e. Addition, modification, or relocation of refuse enclosure.

f. Changes to amount, location, or design of bicycle parking.

g. Installation of mechanical equipment.

h. Repaving of previously approved parking lots with no change to striping.

i. Replacement of exterior building materials.

j. *Addition of windows and doors, relocation of windows and doors in which transparency levels remain unchanged, or removal of windows and doors provided minimum transparency requirements are still met.*
k. *Addition or alteration of parapets or rooflines.*
l. *Modification of building entrances.*
m. *Addition to or alteration of a legal nonconforming single or two-family dwelling.*
n. *Change to parking lot circulation or layout, excluding driveway modifications.*
o. *Removal or relocation of vehicle parking stalls provided total parking remains between approved minimum and maximum with no new reductions other than through the downtown parking district.*
p. *Adoption of shared parking agreements.*
q. *Changes to landscaping that do not require stormwater quality and quantity treatment under OCMC 13.12.*
r. *New or changes to existing pedestrian accessways, walkways or plazas.*
s. *Installation of or alterations to ADA accessibility site elements.*
t. *Modification or installation of a fence, hedge, or wall, or addition of a fence, hedge or wall.*
u. *Addition of or alterations to outdoor lighting.*
v. *Demolition of any structure or portion of a structure*
w. *Tree removal*
x. *Type I Master Plan Amendments under OCMC 17.65.080.*
y. *Mobile food carts in one location for five hours or less as identified in OCMC 17.54.115*
z. *3-4 plex, duplex, single-family attached dwellings, single-family detached residential unit, internal conversions, live/work dwelling and accessory dwelling unit.*
aa. *Placement of a single manufactured home within an existing space or lot in a manufactured home park.*

3. *Submittal Requirements. A Type I application shall include:*
   a. *A narrative describing the project.*
   b. *Site plan drawings showing existing conditions/uses and proposed conditions/uses.*
   c. *Architectural drawings, including building elevations and envelopes, if architectural work is proposed.*
   d. *A completed application form.*
   e. *Any other information determined necessary by the Community Development Director.*

B. *Type II Minor Site Plan and Design Review.*
   1. *Type II Minor Site Plan and Design Review applies to the following uses and activities unless those uses and activities qualify for Type I review per OCMC 17.62.035.A.:*
      a. *Modification of an office, commercial, industrial, institutional, public or multi-family structure that does not increase the interior usable space (for example covered walkways or entryways, addition of unoccupied features such as clock tower, etc.).*
      b. *Modification to parking lot layout and landscaping, or the addition of up to five parking spaces.*
      c. *A maximum addition of up to one thousandsquare feet to a commercial, office, institutional, public, multi-family, or industrial building provided that the addition is not more than thirty-five percent of the original building square footage.*
      d. *Mobile food carts in OCMC 17.54.115.*
      e. *Other land uses and activities may be added if the Community Development Director makes written findings that the activity/use will not increase off-site impacts and is consistent with the type and/or scale of activities/uses listed above.*

2. *Application. The application for the Type II Minor Site Plan and Design Review shall contain the following elements:*
   a. *The submittal requirements of OCMC 17.50.*
   b. *A narrative explaining all aspects of the proposal in detail and addressing each of the applicable criteria listed in OCMC 17.62.*
   c. *Site plan drawings showing existing conditions/uses and proposed conditions/uses.*
   d. *Architectural drawings, including building elevations and envelopes, if architectural work is proposed.*
   e. *Additional submittal material may be required by the Community Development Director on a case-by-case basis.*

Applicant's Response: The Applicant has prepared this Type II submittal in accordance with the requirements outlined in the pre-application conference by Oregon City Development Services and Planning Division staff. It contains the applicable elements listed in OCMC 17.62.040.

17.62.040 – Items required.

A complete application for Site Plan and Design Review shall be submitted. Except as otherwise in subsection I of this section, the application shall include the following:

A. A site plan or plans, to scale, containing the following:
   1. *Vicinity information showing streets and access points, pedestrian and bicycle pathways, transit stops and utility locations;*
   2. *The site size, dimensions, and zoning, including dimensions and gross area of each lot or parcel and tax lot and assessor map designations for the proposed site and immediately adjoining properties;*
   3. *Contour lines at twofoot contour intervals for grades zero to ten percent, and five-foot intervals for grades over ten percent;*
   4. *The location of natural hazard areas on and within one hundred feet of the boundaries of the site, including:*
      a. *Areas indicated on floodplain maps as being within the one-hundred-year floodplain,*
      b. *Unstable slopes, as defined in OCMC 17.44.020,*
      c. *Areas identified on the seismic conditions map in the comprehensive plan as subject to earthquake and seismic conditions;*
   5. *The location of natural resource areas on and within one hundred feet of the boundaries of the site, including fish and wildlife habitat, existing trees (six inches or greater in caliper measured four feet above ground level), wetlands, streams, natural areas, wooded areas, areas of significant trees or vegetation, and areas designated as being within the natural resources overlay district;*
   6. *The location of inventoried historic or cultural resources on and within one hundred feet of the boundaries of the site;*
   7. *The location, dimensions, and setback distances of all existing permanent structures, improvements and utilities on or within twenty five feet of the site, and the current or proposed uses of the structures;*
   8. *The location, dimensions, square footage, building orientation and setback distances of proposed structures, improvements and utilities, and the proposed uses of the structures by square footage;*
   9. *The location, dimension and names, as appropriate, of all existing and platted streets, other public ways, sidewalks, bike routes and bikeways, pedestrian/bicycle accessways and other*

pedestrian and bicycle ways, transit street and facilities, neighborhood activity centers, and easements on and within two hundred fifty feet of the boundaries of the site;

10. *The location, dimension and names, as appropriate, of all proposed streets, other public ways, sidewalks, bike routes and bikeways, pedestrian/bicycle accessways and other pedestrian and bicycle ways, transit streets and facilities, neighborhood activity centers, and easements on and within two hundred feet of the boundaries of the site;*
11. *All parking, circulation, loading and servicing areas, including the locations of all carpool, vanpool and bicycle parking spaces as required in OCMC 17.52;*
12. *Site access points for automobiles, pedestrians, bicycles and transit;*
13. *On-site pedestrian and bicycle circulation;*
14. *Outdoor common areas proposed as open space;*
15. *Total impervious surface created (including buildings and hard ground surfaces);*
16. *The proposed location, dimensions, and materials of fences and walls.*

B. *A landscaping plan, drawn to scale, showing the location and types of existing trees (six inches or greater in caliper measured four feet above ground level) and vegetation proposed to be removed and to be retained on the site, the location and design of landscaped areas, the varieties, sizes and spacings of trees and plant materials to be planted on the site, other pertinent landscape features, and irrigation systems required to maintain plant materials.*
C. *Architectural drawings or sketches, drawn to scale and showing floor plans, elevations accurately reflected to grade, and exterior materials of all proposed structures and other improvements as they will appear on completion of construction. The name of the adjacent street shall be identified on each applicable building elevation.*
D. *An electronic materials board clearly depicting all building materials with specifications as to type, color, and texture of exterior materials of proposed structures. .*
E. *An erosion/sedimentation control plan, in accordance with the requirements of OCMC 17.47 and the Public Works Erosion and Sediment Control Standards, and a drainage plan developed in accordance with city drainage master plan requirements, OCMC 13.12 and the Public Works Stormwater and Grading Design Standards. The drainage plan shall identify the location of drainage patterns and drainage courses on and within one hundred feet of the boundaries of the site. Where development is proposed within an identified hazard area, these plans shall reflect concerns identified in the hydrological/geological/geotechnical development impact statement.*
F. *An exterior lighting plan, drawn to scale, showing type, height, and area of illumination.*
G. *Archeological Monitoring Recommendation. For all projects that will involve ground disturbance, the applicant shall provide:*
    1. *A letter or email from the Oregon State Historic Preservation Office Archaeological Division indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the Oregon State Historic Preservation Office and that the Oregon State Historic Preservation Office had not commented within forty-five days of notification by the applicant; and*
    2. *A letter or email from the applicable tribal cultural resource representative of the Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz, Confederated Tribes of the Umatilla, Confederated Tribes of the Warm Springs and the Confederated Tribes of the Yakama Nation indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the applicable tribal cultural resource representative and that the applicable tribal cultural resource representative had not commented within forty-five days of notification by the applicant.*
    If, after forty-five days' notice from the applicant, the Oregon State Historic Preservation Office or the applicable tribal cultural resource representative fails to provide comment, the

City will not require the letter or email as part of the completeness review. For the purpose of this section, ground disturbance is defined as the movement of native soils.

H. Such special studies or reports as the Community Development Director may require to obtain information to ensure that the proposed development does not adversely affect the surrounding community or identified natural resource areas or create hazardous conditions for persons or improvements on the site. The Community Development Director shall require an applicant to submit one or more development impact evaluations as may be necessary to establish that the City's traffic safety or capacity standards, natural resource, including geologic hazard and flood plain overlay districts, will be satisfied.

I. The Community Development Director may waive the submission of information for specific requirements of this section or may require information in addition to that required by a specific provision of this section, as follows:

1. The Community Development Director may waive the submission of information for a specific requirement upon determination either that specific information is not necessary to evaluate the application properly, or that a specific approval standard is not applicable to the application. If submission of information is waived, the Community Development Director shall, in the decision, identify the waived requirements, explain the reasons for the waiver, and state that the waiver may be challenged on appeal and may be denied by a subsequent review authority. If the matter is forwarded to the Planning Commission for initial review, the information required by this paragraph shall be included in the staff report;

2. The Community Development Director may require information in addition to that required by a specific provision of this section upon determination that the information is needed to evaluate the application properly and that the need can be justified on the basis of a special or unforeseen circumstance as necessary to comply with the applicable standards. If additional information is required, the Community Development Director shall, in the decision, explain the reasons for requiring the additional information.

J. One full-sized copy of all architectural and site plans.

Applicant's Response: The Applicant has met the requirements of this section as follows:

A. A site plan for the project elements outside of right-of-way that shows vicinity information, site dimensions, zoning, tax lots, 2-foot contours, natural hazard areas, natural resources, existing structures, streets, proposed and existing pedestrian/bicycle access ways, proposed roadway and parking improvements, proposed walls, and new impervious areas is provided in Attachment A.

B. A landscaping plan showing the location and types of existing trees 6 inches or greater in caliper that are proposed to be removed is located in Attachment B. The location and design of landscaped areas, the trees and plant materials to be planted, and other pertinent landscape features for the project elements outside of right-of-way is also provided in Attachment B.

C. The project elements outside of right-of-way do not include construction of new buildings or structures that require architectural drawings or building elevations. This section of OCMC 17.62.040 does not apply.

D. The project elements outside of right-of-way do not include construction of new buildings or structures. This section of OCMC 17.62.040 does not apply.

E. The Applicant has prepared an erosion and sediment control plan that includes the area subject to this section of OCMC 17.62.40: see Attachment A. The drainage plan, including drainage patterns and drainage courses on the project site is included in Attachment C.

F. The exterior lighting (illumination) plan is included in Attachment A.

G. The Applicant has consulted with the Oregon State Historic Preservation Office and the Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz, Confederated Tribes of the Warm Springs, and the Confederated Tribes of the Yakama Nation and obtained concurrence from SHPO as part of the Section 106 Consultation process. No archaeological monitoring was recommended. See Attachment K for Section 106 Consultation documentation.

H. The Applicant requests a Geologic Hazard Waiver. The waiver request is in the Geotechnical Engineering Report in Attachment D. The Community Development Director has not asked the Applicant for other special studies or reports.

I. The Community Development Director has not waived specific submission requirements or required additional information pursuant to this section of OCMC 17.62.040.

Copies of the site plan for project elements outside of right-of-way are included in Attachment A and submitted in full size with this application.

17.62.050 - General Standards

All development shall comply with the following standards:

A. Landscaping.

1. Existing native vegetation is encouraged to be retained to the maximum extent practicable. All plants listed on the Oregon City Nuisance Plant List shall be removed from the site prior to issuance of a final occupancy permit for the building.

Applicant's Response: For the proposed activities outside of the right-of-way, the Applicant will remove plants listed on the Oregon City Nuisance Plant List and replant cleared areas using native vegetation to the extent practicable. The Landscaping Plan is provided in Attachment B of this permit application.

2. Except as allowed elsewhere in Title 16 or 17 of this Code, all areas to be credited towards landscaping shall be installed with growing plant materials.

Applicant's Response: The Applicant will install growing plant materials in all landscaping areas to be applied to the percentage of the landscaping.

3. Pursuant to OCMC 17.49, landscaping requirements within the Natural Resource Overlay District, other than landscaping required for parking lots, may be met by preserving, restoring, and permanently protecting native vegetation and habitat on development sites.

Applicant's Response: The landscaping plan includes preserving and protecting existing native vegetation and habitat on the development sites in the NROD to the extent practicable. Native vegetation that is removed for construction will be restored using native plant seeds to the extent practicable.

4. A landscaping plan shall be prepared by a registered landscape architect for new or revised landscaped areas and parking lots. Landscape architect approval is not required for tree removal and/or installation if the species are chosen from an approved street tree list. A certified landscape designer, arborist, or nurseryman shall be acceptable in lieu of a landscape architect for projects with less than five hundred square feet of landscaping. All landscape plans shall include a mix of vertical (trees and shrubs) and horizontal elements (grass, groundcover, etc.) that within three years will cover one hundred percent of the landscape area. Plant species listed on the Oregon City Nuisance Plant list are prohibited and native species are encouraged. No mulch, bark chips, or similar materials shall be allowed at the time of landscape installation except under the canopy of shrubs and within two feet of the base of trees.

Applicant's Response: A landscape plan has been prepared by a registered landscape architect and proposes only approved species. See Attachment B of this permit application.

5. *Landscaping shall be visible from public thoroughfares to the extent practicable.*

Applicant's Response: The Landscaping Plan includes landscaping that will be visible from public thoroughfares to the extent practicable. See Attachment B of this permit application.

6. *The landscaping in parking areas shall not obstruct lines of sight for safe traffic operation and shall comply with all requirements of OCMC 10.32, Traffic Sight Obstructions.*

Applicant's Response: The Applicant proposes a 5-foot vegetated landscaping strip adjacent to the proposed on-street parking on the east side of Clackamette Drive. The plantings will not obstruct line-of-sight for traffic.

B. *Vehicular Access and Connectivity.*
   1. *Parking areas shall be located behind the building façade that is closest to the street, below buildings, or on one or both sides of buildings.*

Applicant's Response: The proposed on-street spaces on Clackamette Drive are not considered a parking area requiring compliance with this portion of the OCMC.

2. *Existing or future connections to adjacent sites through the use of vehicular and pedestrian access easements which provide connection from the right-of-way to the adjoining property shall be provided.*

Applicant's Response: No access easements are proposed.

3. *Parcels larger than three acres shall provide streets as required in OCMC 16.12.*

Applicant's Response: The Applicant does not propose improvements on any area outside of the right-of-way greater than 3 acres. There is no need for the Applicant to provide streets.

4. *Parking garage entries shall not be more than half of the streetscape.*

Applicant's Response: There are no parking garages proposed in the Project.

C. *A well-marked, continuous, and protected on-site pedestrian circulation system meeting the following standards shall be provided:*
   1. *Pathways between all building entrances and the street are required. Pathways between the street and buildings fronting on the street shall be direct and not cross a drive aisle. Exceptions may be allowed by the director where steep slopes, a physically constrained site, or protected natural resources prevent a direct connection or where an indirect route would enhance the design and/or use of a common open space.*

Applicant's Response: The Applicant does not propose buildings. This section of OCMC 17.62.050 does not apply.

2. *The pedestrian circulation system shall connect all main entrances, parking areas, bicycle parking, recreational areas, common outdoor areas, and any pedestrian amenities on the site. For buildings fronting on the street, the sidewalk may be used to meet this standard.*

Applicant's Response: The Applicant does not propose pedestrian circulation systems.

3. *The pedestrian circulation system shall connect the principal building entrance to those of buildings on adjacent sites, except within industrial zoning designations.*

Applicant's Response: The Applicant does not propose buildings. This section of OCMC 17.62.050 does not apply.

4. Elevated external stairways or walkways shall not extend beyond the building facade except for external stairways or walkways located in, or facing interior courtyard areas that are not visible from the street or a public access easement. This standard does not apply to sky-bridges or sky-ways.

Applicant's Response: The Applicant does not propose buildings with external stairways or walkways. This section of OCMC 17.62.050 does not apply.

5e. On-site pedestrian walkways shall be hard surfaced, well drained and at least five feet wide. Surface material shall contrast visually to adjoining surfaces. When bordering parking spaces other than spaces for parallel parking, pedestrian walkways shall be a minimum of seven feet in width unless curb stops are provided. When the pedestrian circulation system is parallel and adjacent to an auto travel lane, the walkway shall be raised or separated from the auto travel lane by a raised curb, bollards, landscaping or other physical barrier. If a raised walkway is used, the ends of the raised portions shall be equipped with curb ramps for each direction of travel. Pedestrian walkways that cross drive isles or other vehicular circulation areas shall utilize a change in textual material or height to alert the driver of the pedestrian crossing area.

Applicant's Response: The Project is in compliance with pedestrian walkway requirements and proposes surfaces at least 5 to 7 feet wide. Walkways parallel to travel lanes will be raised or separated and have curb ramps. Crosswalk striping is proposed near the on-street parking lane on Clackamette Drive from the sidewalk to Jon Storm Park.

D. All development shall maintain continuous compliance with applicable federal, state, and City standards.

Applicant's Response: The proposed on-street parking and associated improvements will be in compliance with all applicable federal, state, and City standards.

E. Adequate public water and sanitary sewer facilities sufficient to serve the proposed or permitted level of development shall be provided pursuant to OCMC 16.12. The applicant shall demonstrate that adequate facilities and services are presently available or can be made available concurrent with development. Service providers shall be presumed correct in the evidence, which they submit. All facilities shall be designated to City standards as set out in the City's facility master plans and public works design standards. A development may be required to modify or replace existing offsite systems if necessary to provide adequate public facilities. The City may require over sizing of facilities where necessary to meet standards in the City's facility master plan or to allow for the orderly and efficient provision of public facilities and services. Where over sizing is required, the developer may request reimbursement from the City for over sizing based on the City's reimbursement policy and fund availability, or provide for recovery of costs from intervening properties as they develop.

Applicant's Response: No public water or sanitary sewer facilities are needed for the Project as there are no buildings proposed.

F. If a transit agency, upon review of an application for an industrial, institutional, retail or office development, recommends that a bus stop, bus turnout lane, bus shelter, accessible bus landing pad, lighting, or transit stop connection be constructed, or that an easement or

dedication be provided for one of these uses, consistent with an agency adopted or approved plan at the time of development, the review authority shall require such improvement, using designs supportive of transit use. Improvements at a major transit stop may include intersection or mid-block traffic management improvements to allow for crossings at major transit stops, as identified in the City's Transportation System Plan.

Applicant's Response: The Applicant assumes no transit agency would recommend adding transit facilities as a result of this proposal.

G. Screening of Mechanical Equipment:

1. *Rooftop mechanical equipment, including HVAC equipment and utility equipment that serves the structure, shall be screened from view from the adjacent street. Screening shall be accomplished through the use of parapet walls or a sight-obscuring enclosure around the equipment constructed of one of the primary materials used on the primary facades of the structure, and that is an integral part of the building's architectural design. The parapet or screen shall completely surround the rooftop mechanical equipment to an elevation equal to or greater than the highest portion of the rooftop mechanical equipment being screened. In the event such parapet wall does not fully screen all rooftop equipment, then the rooftop equipment shall be enclosed by a screen constructed of one of the primary materials used on the primary facade of the building so as to achieve complete screening.*
2. *Wall-mounted mechanical equipment shall not be placed on the front facade of a building or on a facade that faces a right-of-way. Wall-mounted mechanical equipment, including air conditioning or HVAC equipment and groups of multiple utility meters, that extends six inches or more from the outer building wall shall be screened from view from streets; from residential, public, and institutional properties; and from public areas of the site or adjacent sites through the use of (a) sight-obscuring enclosures constructed of one of the primary materials used on the primary facade of the structure, (b) sight-obscuring fences, or (c) trees or shrubs that block at least eighty percent of the equipment from view or (d) painting the units to match the building. Wall-mounted mechanical equipment that extends six inches or less from the outer building wall shall be designed to blend in with the color and architectural design of the subject building. Vents which extend six inches or less from the outer building wall shall exempt from this standard if painted.*
3. *Ground-mounted above-grade mechanical equipment shall be screened by ornamental fences, screening enclosures, trees, or shrubs that block at least eighty percent of the view.*
4. *This section shall not apply to the installation of solar energy panels, photovoltaic equipment, or wind power generating equipment.*

Applicant's Response: This section of OCMC 17.62.050 applies to electrical equipment needed for parking lot lighting. No rooftop or wall-mounted mechanical equipment will be used. Ground-mounted above-grade mechanical equipment will be screened by at least 80 percent.

H. Building Materials.

1. *Prohibited Materials. The following materials shall be prohibited in visible locations from the right-of-way or a public access easement unless an exception is granted by the Community Development Director based on the integration of the material into the overall design of the structure.*
    - *i. Vinyl or plywood siding (including T-111 or similar plywood).*
    - *ii. Glass block or highly tinted, reflected, translucent, or mirrored glass (except stained glass) as more than ten percent of the building facade.*

iii. *Corrugated fiberglass.*
iv. *Chain link fencing (except for temporary purposes such as a construction site, gates for a refuse enclosure, stormwater facilities, or when located on properties within the General Industrial District).*
v. *Crushed colored rock/crushed tumbled glass.*
vi. *Non-corrugated and highly reflective sheet metal.*
vii. *Tarps, except for the protection of outside storage.*

Applicant's Response: No prohibited building materials are proposed.

2. *Special Material Standards. The following materials are allowed if they comply with the requirements found below:*
   i. *Concrete Block. When used for the front façade of any building, concrete blocks shall be split, rock- or ground-faced and shall not be the prominent material of the elevation. Plain concrete block or plain concrete may be used as foundation material if the foundation material is not revealed more than three feet above the finished grade level adjacent to the foundation wall.*
   ii. *Metal Siding. Metal siding shall have visible corner moldings and trim and incorporate masonry or other similar durable/permanent material near the ground level (first two feet above ground level) except when used for a temporary structure.*
   iii. *Exterior insulation and finish system (EIFS) and similar troweled finishes shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.*
   iv. *Building surfaces shall be maintained in a clean condition and painted surfaces shall be maintained to prevent or repair peeling, blistered or cracking paint.*
   v. *Membrane or fabric covered storage areas are permitted as temporary structures, excluding the use of tarps.*
   vi. *Vinyl or powder coated chain link fencing is permitted for City-owned stormwater management facilities, reservoirs, and other public works facilities such as pump stations, maintenance yards, and storage yards not located within the General Industrial District.*

Applicant's Response: None of the Applicant's proposed improvements include materials listed in this section of OCMC 17.62.050.

Temporary Structures. Temporary structures are permitted pursuant to the following standards:

1. *Structures up to two hundred square feet:*
   i. *Shall not be on a property for more than three consecutive days; and*
   ii. *Shall not be on a property more than six times per year; and*
   iii. *Shall comply with the minimum dimensional standards of the zoning designation; and*
   iv. *Shall be sited so as to leave the minimum number of parking spaces for the primary uses as required by OCMC 17.52 or as otherwise specified in a land use approval;*
   v. *Shall not disturb ingress or egress to the site; and*
   vi. *Shall be exempt from all sections of s OCMC 12.08, 16.12, 17.52 and 17.62 except subsections 17.62.050.I and J.*
2. *Temporary structures larger than two hundred square feet may be permitted up to 2 times per year; and:*
   i. *Structures larger than two hundred square feet up to eight hundred square feet:*
      a. *Shall not be on a property for more than thirty consecutive days;*

b. Shall comply with the minimum dimensional standards of the zoning designation;
c. Shall be sited so as to leave the minimum number of parking spaces for the primary uses as required by OCMC 17.52 or as otherwise specified in a land use approval;
d. Shall not disturb ingress or egress to the site; and
e. Shall be exempt from all sections of OCMC 12.08, 16.12, 17.52, and 17.62 except subsections 17.62.050.I and J.

ii. Structures larger than eight hundred square feet:
a. Shall not be on a property for more than seven consecutive days;
b. Shall comply with the minimum dimensional standards of the zoning designation;
c. Shall be sited so as to leave the minimum number of parking spaces for the primary uses as required by OCMC 17.52 or as otherwise specified in a land use approval;
d. Shall not disturb ingress or egress to the site; and
e. Shall be exempt from all sections of OCMC 12.08, 16.12, 17.52, and 17.62 except subsections 17.62.050.I and J.

3. Government owned properties are exempt from all sections of OCMC 12.08, 16.12, 17.52 and 17.62 except subsections 17.62.050.H and I and the dimensional standards of the zoning designation.

Applicant's Response: This section of OCMC 17.62.050 does not apply to the Applicant's proposal. The Project does not include temporary structures outside of right-of-way.

J. Development shall comply with requirements of the following Oregon City Municipal Code chapters, as applicable, including but not limited to:
1. 12.04 Streets, Sidewalks and Public Places
2. 12.08 Public and Street Trees
3. 13.04 Water Service System
4. 13.08 Sewer Regulations
5. 13.12 Stormwater Management
6. 16.12 Minimum Improvements and Design Standards for Development
7. 17.20 Residential Design Standards for ADU's, Cluster Housing, Internal Conversions, Live/Work Units, and Manufactured Home Parks
8. 17.40 Historic Overlay District
9. 17.41 Tree Protection Standards
10. 17.42 Flood Management Overlay District
11. 17.44 Geologic Hazards
12. 17.47 Erosion and Sediment Control
13. 17.48 Willamette River Greenway
14. 17.49 Natural Resource Overlay District
15. 17.50 Administration and Procedures
16. 17.52 Off-Street Parking and Loading
17. 17.54 Supplemental Zoning Regulations and Exceptions
18. 17.58 Lawful Nonconforming Uses, Structures, and Lots
19. 17.65 Master Plans and Planned Unit Development

Applicant's Response: The Applicant's proposal will comply with applicable OCMC code listed in this section of OCMC 17.62.050 as demonstrated in other sections of this application.

17.62.055 –Institutional, office, multi-family, retail, and commercial building standards.

A. Purpose. The primary objective of the regulations contained in this section is to provide a range of design choices that promote creative, functional, and cohesive development that is compatible with surrounding areas. Buildings approved in compliance with these standards are intended to serve multiple tenants over the life of the building, and are not intended for a one-time occupant. The standards encourage people to spend time in the area, which also provides safety though informal surveillance. Finally, this section is intended to promote the design of an urban environment that is built to human scale by creating buildings and streets that are attractive to pedestrians, create a sense of enclosure, provide activity and interest at the intersection of the public and private spaces, while also accommodating vehicular movement.

B Applicability. This section applies to institutional, office, multi-family, retail, and commercial buildings except accessory structures less than one thousand square feet and temporary structures.

C. Conflicts. With the exception of standards for building orientation and building front setbacks, in the event of a conflict between a design standard in this section and a standard or requirement contained in the underlying zoning district, the standard in the zoning district shall prevail.

D. Siting of Structures. On sites with one hundred feet or more of frontage at least sixty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line. For sites with less than one hundred feet of street frontage, at least fifty percent of the site frontage width shall be occupied by buildings placed within five feet of the property. Multi-family developments shall be placed no farther than twenty feet from the front property line. This section does not apply to properties with less than forty feet of frontage.

A larger front yard setback may be approved through site plan and design review if the setback area incorporates at least one element from the following list for every five feet of increased setback requested:

1. *Tables, benches or other approved seating area.*
2. *Cobbled, patterned, or paved stone or enhanced concrete.*
3. *Pedestrian scale lighting.*
4. *Sculpture/public art.*
5. *Fountains/Water feature.*
6. *At least twenty square feet of landscaping or planter boxes for each tenant facade fronting on the activity area.*
7. *Outdoor café.*
8. *Enhanced landscaping or additional landscaping.*
9. *Other elements, as approved by the Community Development Director, that can meet the intent of this section.*

E. Building Orientation. All buildings along the street frontage shall face the front most architecturally significant facade toward the street and have a functional primary entrance facing the street. Primary building entrances shall be clearly defined and recessed or framed by a sheltering element such as an awning, arcade or portico in order to provide shelter from the summer sun and winter weather.

F. Entryways. Entrances shall include a doorway and a minimum of four of the following elements:

1. *Display windows;*

Recesses or projections; Peaked roof or raised parapet over the door; Canopy of at least five feet in depth; Porch; Distinct materials; Architectural details such as tile work and moldings; Pedestrian amenities such as benches, planters or planter boxes; Landscape treatments integrating arbors, low walls, trellis work; or Similar elements. Trellises, canopies and fabric

awnings may project up to five feet into front setbacks and public rights-of-way, provided that the base is not less than eight feet at the lowest point and no higher than ten feet above the sidewalk.

G. *Corner Lots.*
For buildings located at the corner of intersections, the primary entrance of the building shall be located at the corner of the building or within twenty-five feet of the corner of the building. Additionally, one of the following treatments shall be required:
   1. *Incorporate prominent architectural elements, such as increased building height or massing, cupola, turrets, or pitched roof, at the corner of the building or within twenty-five feet of the corner of the building.*
   2. *Chamfer the corner of the building (i.e. cut the corner at a forty-five degree angle and a minimum of ten feet from the corner) and incorporate extended weather protection (arcade or awning), special paving materials, street furnishings, or plantings in the chamfered area.*
   3. *Standards 1 and 2 above do not apply to multi-family buildings or multi-family portions of residential mixed-use buildings.*

H. *Variation in Massing. For street facing facades greater than 120 feet in length a modulation is required which extends through all floors. Decks and roof overhangs may encroach up to three feet per side into the modulation. The modulation shall meet one of the following dimensional requirements:*
   1. *A minimum depth of two percent of the length of the façade and a minimum width of thirty percent of the length of the façade; or*
   2. *A minimum depth of four percent of the length of the façade and a minimum width of twenty percent of the length of the façade.*

I *Building Design Elements.*
   1. *All front and side facades shall provide a design element or architectural feature that add interest and detail such that there are no blank walls of thirty feet in length or more, measured horizontally. Features that can meet this requirement include:*
      a. *Change in building material or texture;*
      b. *Window or door;*
      c. *Balcony; or*
      d. *Pillar or post*
   2. *Street facing facades shall include additional design features. For every thirty feet of façade length, three of the following elements are required:*
      a. *Decorative materials on more than ten percent of the total wall area (e.g., brick or stonework, shingles, wainscoting, ornamentation, and similar features);*
      b. *Decorative cornice and/or roof line (e.g., for flat roofs);*
      c. *Roof gable;*
      d. *Recessed entry;*
      e. *Covered canopy entry;*
      f. *Cupola or tower;*
      g. *Dormer;*
      h. *Balcony;*
      i. *Pillars or posts;*
      j. *Repeating pattern of building materials;*
      k. *A change in plane of at least two feet in width and six inches in depth;*
      l. *Bay or oriel window; or*
      m. *An alternative feature providing visual relief and detail as approved by the Community Development Director*

3. *Building Detail Variation. Architectural features shall be varied on different buildings within the same development. At least two of the required features on each street-facing elevation shall be distinct from the street-facing elevations of other buildings within the same development.*

J. *Windows.*

1. *The minimum windows requirements are set forth in Table 17.62.055.J. Windows are measured in lineal fashion between 3.5 feet and six feet from the ground. For example, a one hundred foot long building elevation would be required to have at least sixty feet (sixty percent of one hundred feet) of windows in length between the height of 3.5 feet and six feet from the ground.*

Table 17.62.055.J Minimum Windows				
Use	*Ground Floor: Front and Street Facing Facades*	*Upper floor(s): Front and Street Facing Facades*	*Ground Floor: Side(s) Facades*	*Upper Floor(s): Side(s) Facades*
Non-Multi-Family (or Portions of Buildings Thereof)	*60%*	*10%*	*30%*	*10%*
Multi-Family (or Portions of Buildings Thereof)	*15%*	*15%*	*10%*	*10%*

2. *Reflective, glazed, mirrored, or tinted glass is limited to ten percent of the lineal footage of windows on the street facing facade. Highly reflective or glare-producing glass with a reflective factor of one-quarter or greater is prohibited on all building facades. Any glazing materials shall have a maximum fifteen percent outside visual light reflectivity value. No exception shall be made for reflective glass styles that appear transparent when internally illuminated.*
3. *Side walls that face walkways may include false windows and door openings only when actual doors and windows are not feasible because of the nature of the use of the interior use of the building. False windows located within twenty feet of a right-of-way shall be utilized as display windows with a minimum display depth of thirty-six inches.*
4. *Multi-family windows shall incorporate window trim at least four inches in width when surrounded by horizontal or vertical lap siding.*

K. *Roof Treatments. The maximum length of any continuous roofline on a street-facing façade shall be seventy-five feet without a cross gable or change in height of at least two feet.*

L. *Drive-through facilities shall:*

1. *Be located at the side or rear of the building.*
2. *Be designed to maximize queue storage on site.*

M. *Special development standards along transit streets.*

1. *Purpose. This section is intended to provide direct and convenient pedestrian access to retail, office and institutional buildings from public sidewalks and transit facilities and to promote pedestrian and transit travel to commercial and institutional facilities.*
2. *Applicability. Except as otherwise provide in this section, the requirements of this section shall apply to the construction of new retail, office and institutional buildings which front on a transit street.*
3. *Development Standards.*
   a. *All buildings shall have at least one main building entrance oriented towards the transit street. A main building entrance is oriented toward a transit street if it is directly located*

on the transit street, or if it is linked to the transit street by an on-site pedestrian walkway that does not cross off-street parking or maneuvering areas.

i. If the site has frontage on more than one transit street, or on a transit street and a street intersecting a transit street, the building shall provide one main building entrance oriented to the transit street or to the corner where the two streets intersect.

ii. For building facades over three hundred feet in length on a transit street, two or more main building entrances shall be provided as appropriate and oriented towards the transit street.

b. In the event a requirement of this section conflicts with other requirements in Title 17, the requirements of this section shall control.

4. Exemptions. The following permitted uses are exempted from meeting the requirements of subsection 3. of this section:

a. Heavy equipment sales;

b. Motor vehicle service stations, including convenience stores associated therewith; or

c. Solid waste transfer stations.

Applicant's Response: This section of OCMC 17.63.050 does not apply to the Applicant's proposal because the Project does not include construction of new retail, office and institutional buildings that front on a transit street.

17.62.056 - Additional standards for large retail establishments.

Retail building(s) occupying more than ten thousand gross square feet of floor area shall contribute to the establishment or enhancement of community and public spaces by providing at least two of the following:

A. Patio/seating area;

B. Pedestrian plaza with benches;

C. Transportation center;

D. Window shopping walkway;

E. Outdoor playground area;

F. Kiosk area, water feature;

G. Clock tower; or

H. Other such deliberately shaped area and/or a focal feature or amenity that, in the judgment of the appropriate decision maker, adequately enhances such community and public spaces. Any such areas shall have direct access to the public sidewalk network and such features shall not be constructed of materials that are inferior to the principle materials of the building and landscape.

Applicant's Response: The Project is not a large retail establishment: OCMC 17.62.056 does not apply to the Applicant's proposal.

17.62.065 - Outdoor lighting.

A. Purpose. The general purpose of this section is to require outdoor lighting that is adequate for safety and convenience; in scale with the activity to be illuminated and its surroundings; directed to the surface or activity to be illuminated; and designed to clearly render people and objects and contribute to a pleasant nighttime environment. Additional specific purposes are to:

1. Provide safety and personal security as well as convenience and utility in areas of public use or traverse, for uses where there is outdoor public activity during hours of darkness;

2. *Control glare and excessive brightness to improve visual performance, allow better visibility with relatively less light, and protect residents from nuisance and discomfort;*
3. *Control trespass light onto neighboring properties to protect inhabitants from the consequences of stray light shining in inhabitants' eyes or onto neighboring properties;*
4. *Result in cost and energy savings to establishments by carefully directing light at the surface area or activity to be illuminated, using only the amount of light necessary; and*
5. *Control light pollution to minimize the negative effects of misdirected light and recapture views to the night sky.*
6. *Encourage energy efficient lighting with new technologies such as Light Emitting Diodes (LED) or similar to reduce ongoing electrical demand and operating costs.*

B. *Applicability.*

1. *General.*
   a. *All exterior lighting for any type of commercial, mixed-use, industrial, or multi-family development shall comply with the standards of this section, unless excepted in subsection B.3.*
   b. *The City Engineer or Public Works Director shall have the authority to enforce these regulations on private property if any outdoor illumination is determined to present an immediate threat to the public health, safety and welfare.*

Applicant's Response: This section does not apply as exterior lighting is exempted by subsection B.3b: Public street and right-of-way lighting. No lights outside of right-of-way are proposed. .

2. *Lighting Plan Requirement. All commercial, industrial, mixed-use, cottage housing and multi-family developments shall submit a proposed exterior lighting plan. The plan shall be submitted concurrently with the site plan. The exterior lighting plan shall include plans and specifications for streetlights, parking lot lights, and exterior building lights. The specifications shall include details of the pole, fixture height and design, lamp type, wattage, and spacing of lights.*

Applicant's Response: This section does not apply as exterior lighting and is exempted by subsection B.3.b. and B.3.d.

3. *Excepted Lighting. The following types of lighting are excepted from the requirements of this section.*
   a. *Residential lighting for single-family attached and detached homes, and duplexes*
   b. *Public street and right-of-way lighting.*
   c. *Temporary decorative seasonal lighting provided that individual lamps have a light output of sixty watts or less.*
   d. *Temporary lighting for emergency or nighttime work and construction.*
   e. *Temporary lighting for theatrical, television, and performance areas, or for special public events.*
   f. *Lighting for a special district, street, or building that, according to an adopted municipal plan or ordinance, is determined to require special lighting aesthetics as part of its physical character.*
   g. *Lighting required and regulated by the Federal Aviation Administration.*

Applicant's Response: Temporary lighting for nighttime construction activities will be needed in work zones outside of the right-of-way: these are excepted conditions under this section of OCMC 17.62.065.

C. *Design and Illumination Standards.*

1. *Outdoor lighting, if provided, shall be provided in a manner that enhances security, is appropriate for the use, avoids adverse impacts on surrounding properties, and the night sky through appropriate shielding as defined in this section. Glare shall not cause illumination on other properties in excess of a measurement of 0.5 footcandles of light as measured at the property line.*

Applicant's Response: Exterior lighting subject to the requirements of this section will be consistent with this standard. The lighting will be in compliance with applicable minimum, maximum, and average foot-candle levels.

2. *Lighting shall be provided in parking lots and vehicular circulation areas.*

Applicant's Response: This section does not apply to the Applicant's proposal.

3. *Lighting shall be provided in pedestrian walkways, pedestrian plazas, and pedestrian circulation areas.*

Applicant's Response: The Applicant's exterior lighting plan complies with the requirements of this section.

4. *Lighting shall be provided at all building entrances.*

Applicant's Response: This section of OCMC 17.62.065 is not applicable to the Applicant's proposal.

5. *With the exception of pedestrian scale lighting, all light sources shall be concealed or shielded with a full cut-off style fixture in order to minimize the potential for glare and unnecessary diffusion on adjacent property.*

Applicant's Response: The Applicant's exterior lighting plan complies with the requirements of this section.

6. *The maximum height of any lighting pole serving a multi-family residential use shall be twenty feet. The maximum height serving any other type of use shall be twenty-five feet, except in parking lots larger than five acres, the maximum height shall be thirty-five feet if the pole is located at least one hundred feet from any residential use.*

Applicant's Response: The Applicant's exterior lighting plan complies with the requirements of this section.

7. *Floodlights shall not be utilized to light all or any portion of a building facade between 10 p.m. and 6 a.m.*

Applicant's Response: The Applicant's exterior lighting plan does not include floodlights to light building facades.

8. *Lighting on outdoor canopies shall be fully recessed into the canopy and shall not protrude downward beyond the ceiling of the canopy.*

Applicant's Response: The Applicant's exterior lighting plan does not include lighting on outdoor canopies.

9. *All outdoor light not necessary for security purposes shall be reduced, activated by motion sensor detectors, or turned off during non-operating hours.*

Applicant's Response: The Applicant's exterior lighting plan complies with the requirements of this section.

10. *Light fixtures used to illuminate flags, statues, or any other objects mounted on a pole, pedestal, or platform shall use a narrow cone beam of light that will not extend beyond the illuminated object.*

Applicant's Response: The Applicant's exterior lighting plan does not include light fixtures to illuminate flags, statues, or any other mounted objects.

11. *For upward-directed architectural, landscape, and decorative lighting, direct light emissions shall not be visible above the building roofline.*

Applicant's Response: The Applicant's exterior lighting plan does not include upward-directed architectural, landscape, and decorative lighting.

12. *No flickering or flashing lights shall be permitted, except for temporary decorative seasonal lighting.*

Applicant's Response: The Applicant's exterior lighting plan does not include flickering or flashing lights.

13. *Lighting for outdoor recreational uses such as ball fields, playing fields, tennis courts, and similar uses, are allowed a light post height up to eighty feet in height.*

Applicant's Response: The Applicant's exterior lighting plan does not include lighting for outdoor recreational uses such as ball fields, playing fields, tennis courts, and similar uses. This section of OCMC 17.62.065 is not applicable to the Applicant's proposal.

14. *Main building entrances shall be well lighted and visible from any transit street. The minimum lighting level for building entries fronting on a transit street shall be three foot-candles.*

Applicant's Response: This section of OCMC 17.62.065 is not applicable to the Applicant's proposal because the Project does not include a building.

17.62.085 - Refuse and recycling standards for commercial, industrial, office, institutional, and multi-family developments.

The purpose and intent of these provisions is to provide an efficient, safe and convenient refuse and recycling enclosure for the public as well as the local collection firm. All new development, change in property use, expansions or exterior alterations to uses, other than single-family or duplex residences, single-family attached dwellings, 3-4 plexes, internal conversions, or accessory dwelling units (ADUs), shall include a refuse and recycling enclosure. The area(s) shall be:

A. Fully enclosed and visually screened;
B. Located in a manner easily and safely accessible by collection vehicles;
C. Located in a manner so as not to hinder travel lanes, walkways, streets or adjacent properties;
D. On a level, hard surface designed to discharge surface water runoff and avoid ponding;
E. Maintained by the property owner;
F. Used only for purposes of storing solid waste and recyclable materials;
G. Designed in accordance with applicable sections of the Oregon City Municipal Code (including OCMC 8.20—Solid Waste Collection and Disposal) and city adopted policies. Enclosures are encouraged to be sized appropriately to meet the needs of current and future tenants and designed with sturdy materials which are compatible to the primary structure(s).

Applicant's Response: The Applicant's proposal does not include commercial, industrial, or multi-family development. This section does not apply.

17.62.090 – Implementation.

A. Applications for site plan and design review shall be reviewed in the manner provided in OCMC 16.12 and 17.50. The Building Official may issue a certificate of occupancy only after the improvements required by Site Plan and Design Review approval have been completed, or a schedule for completion and a bond or other financial guarantee have been accepted by the City.

B. In performing Site Plan and Design Review, the review authority shall consider the effect of additional financial burdens imposed by such review on the cost and availability of needed housing types. Consideration of such factors shall not prevent the imposition of conditions of approval found necessary to meet the requirements of this section. The cost of such conditions of approval shall not unduly increase the cost of housing beyond the minimum necessary to achieve the provisions of this title, nor shall such cost prevent the construction of needed housing types.

C. The Site Plan and Design Review provisions of this chapter shall not be applied to reduce the density or height of an application for a development project that reserves at least seventy-five percent of the gross floor area for housing where the proposed density or height is at or below what is allowed in the base zone, except in the following situations:

1. Where the reduction in density is required for development subject to historic overlay provision in OCMC 17.40; or

2. Where the reduction in density is necessary to resolve a health, safety or habitability issue, or to comply with the Natural Resource Overlay District regulations of OCMC 17.49, the Geologic Hazard Overlay District regulations of OCMC 17.44, or the Floodplain Management Overlay District regulations of OCMC 17.42 or steep slope regulations.

Applicant's Response: The Applicant's proposal does not include improvements that would be subject to 17.62.090 Implementation.

OCMC 17.58 – LAWFUL NON-CONFOMRING USES, LOTS, STRUCTURES AND SITES

17.58.040 - Lawful nonconforming structure or site.

A structure or site that was lawfully established but no longer conforms to all development standards of this land use code (such as setbacks) shall be considered lawfully nonconforming. Notwithstanding development standard requirements in this Code, minor repairs and routine maintenance of a lawful nonconforming structure are permitted. The continuation of a lawful nonconforming structure or site is subject to the following:

A. Accidental Destruction. When a nonconforming structure is damaged by fire or other causes, the structure may be rebuilt using the same structure footprint.

B. Intentional Destruction. When a nonconforming structure is removed or intentionally damaged by fire or other causes within the control of the owner, the replacement structure shall comply with the development standards of this title.

C. Expansion. An expansion of a lawful nonconforming structure or site may be approved, conditionally approved or denied in accordance with the standards and procedures of this section.

1. In making a determination on such applications, the decision maker shall weigh the proposal's positive and negative features and the public convenience or necessity to be served against any adverse conditions that would result from authorizing the particular development at the location proposed, and, to approve such expansion, it shall be found that the criteria identified in OCMC 17.58.060 have either been met, can be met by observance of conditions, or are not applicable.

2. *Increases in the square footage of a building and/or site improvements which include installation of any additional off-street parking stalls that exceed the threshold of subparagraph C.2.a. below shall comply with the development standards listed in subparagraph C.2.b. The value of the alterations and improvements is based on the entire project and not individual building permits.*
   a. *Thresholds triggering compliance. The standards of subparagraph C.2.b. below shall be met when the value of the increase in square footage of a building and/or increase in off-street parking stalls, as determined by the Community Development Director, is more than seventy-five thousand dollars. The following alterations and improvements shall not be included in the threshold calculation:*
      1. *Proposed alterations to meet approved fire and life safety agreements;*
      2. *Alterations related to the removal of existing architectural barriers, as required by the Americans with Disabilities Act, or as specified in Section 1113 of the Oregon Structural Specialty Code;*
      3. *Alterations required to meet Seismic Design Requirements; and*
      4. *Improvements to on-site stormwater management facilities in conformance with Oregon City Stormwater Design Standards.*
   b. *Standards that shall be met. Developments not complying with the development standards listed below shall be brought into conformance.*
      1. *Pedestrian circulation systems, as set out in the pedestrian standards that apply to the sites;*
      2. *Minimum perimeter parking lot landscaping;*
      3. *Minimum interior parking lot landscaping;*
      4. *Minimum site landscaping requirements;*
      5. *Bicycle parking by upgrading existing racks and providing additional spaces in order to comply with OCMC 17.52—Off-Street Parking and Loading;*
      6. *Screening; and*
      7. *Paving of surface parking and exterior storage and display areas.*
   c. *Area of required improvements.*
      1. *Generally. Except as provided in C.2.c.2. below, required improvements shall be made for the entire site.*
      2. *Exception for sites with ground leases. Required improvements may be limited to a smaller area if there is a ground lease for the portion of the site where the alterations are proposed. If all of the following are met, the area of the ground lease will be considered as a separate site for purposes of required improvements. The applicant shall meet the following:*
         i. *The signed ground lease — or excerpts from the lease document satisfactory to the city attorney — shall be submitted to the Community Development Director. The portions of the lease shall include the following:*
            A. The term of the lease. In all cases, there shall be at least one year remaining on the ground lease; and
            B. A legal description of the boundaries of the lease.
         ii. *The boundaries of the ground lease shall be shown on the site plan submitted with the application. The area of the lease shall include all existing and any proposed development that is required for, or is used exclusively by, those uses within the area of the lease; and*
         iii. *Screening shall not be required along the boundaries of ground leases that are interior to the site.*

d. Timing and cost of required improvements. The applicant may choose one of the two following options for making the required improvements:

1. Option 1. Required improvements may be made as part of the alteration that triggers the required improvements. The cost of the standards that shall be met, identified in subparagraph C.2.b. above, is limited to ten percent of the value of the proposed alterations. It is the responsibility of the applicant to document to the Community Development Director the value of the required improvements. Additional costs may be required to comply with other applicable requirements associated with the proposal. When all required improvements are not being made, the priority for the improvements shall be as listed in subparagraph C.2.b. above.

2. Option 2. Required improvements may be made over several years, based on the compliance period identified in Table 17.58—1 below. However, by the end of the compliance period, the site shall be brought fully into compliance with the standards listed in subparagraph C.2.b. Where this option is chosen, the following shall be met:

i. Before a building permit is issued, the applicant shall submit the following to the Community Development Director:

A. A Nonconforming Development Assessment, which identifies in writing and on a site plan, all development that does not meet the standards listed in Subparagraph C.2.b.

B. A covenant, in a form approved by the City Attorney, executed by the property owner that meets the requirements of OCMC 17.50.150. The covenant shall identify development on the site that does not meet the standards listed in Subparagraph C.2.b., and require the owner to bring that development fully into compliance with this title. The covenant shall also specify the date by which the owner will be in conformance. The date shall be within the compliance periods set out in Table 17.58 — 1.

ii. The nonconforming development identified in the Nonconforming Development Assessment shall be brought into full compliance with the requirements of this Title within the following compliance periods. The compliance period begins when a building permit is issued for alterations to the site of more than seventy-five thousand dollars. The compliance periods are based on the size of the site (see Table 17.58—1 below).

iii. By the end of the compliance period, the applicant or owner shall request that the site by certified by the Community Development Director as in compliance. If the request is not received within that time, or if the site is not fully in conformance, no additional building permits will be issued.

iv. If the regulations referred to by subparagraph C.2.b. are amended after the Nonconforming Development Assessment is received by the Community Development Director, and those amendments result in development on the site that was not addressed by the Assessment becoming nonconforming, the applicant shall address the new nonconforming development using Option 1 or 2. If the applicant chooses Option 2, a separate Nonconforming Development Assessment, covenant and compliance period will be required for the new nonconforming development.

Table 17.58—1: Compliance Periods for Option 2

Square footage of site	*Compliance Period*
Less than 150,000 sq. ft.	*2 years*
150,000 sq. ft. or more, up to 300,000 sq. ft.	*3 years*
300,000 sq. ft. or more, up to 500,000 sq. ft.	*4 years*
More than 500,000 sq. ft.	*5 years*

Applicant's Response: The Applicant acknowledges the requirements of this section and will coordinate any structural changes with the City.

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

Construction Costs for Site Plan and Design Review and Detailed Development Plans

The cost of Planning Division review for Site Plan and Design Review and Detailed Development Plans is based on the construction cost of the project. The construction costs is defined as all costs to complete the project, including soft costs. The estimate does exclude interior furniture or moving expenses.

Address: I-205 Widening and Abernethy Bridge Seismic Upgrades - construction costs specific to proposed on-street parking at Jon Storm Park, Clackamette Drive, Tax Lot ID Number 22E29CB00300

Project Description: Proposed on-street parking to support access to Jon Storm Park, east side of Clackamette Drive. Construction costs relate only to construction activities on Tax Lot ID Number 22E29CB00300.

Construction Costs:

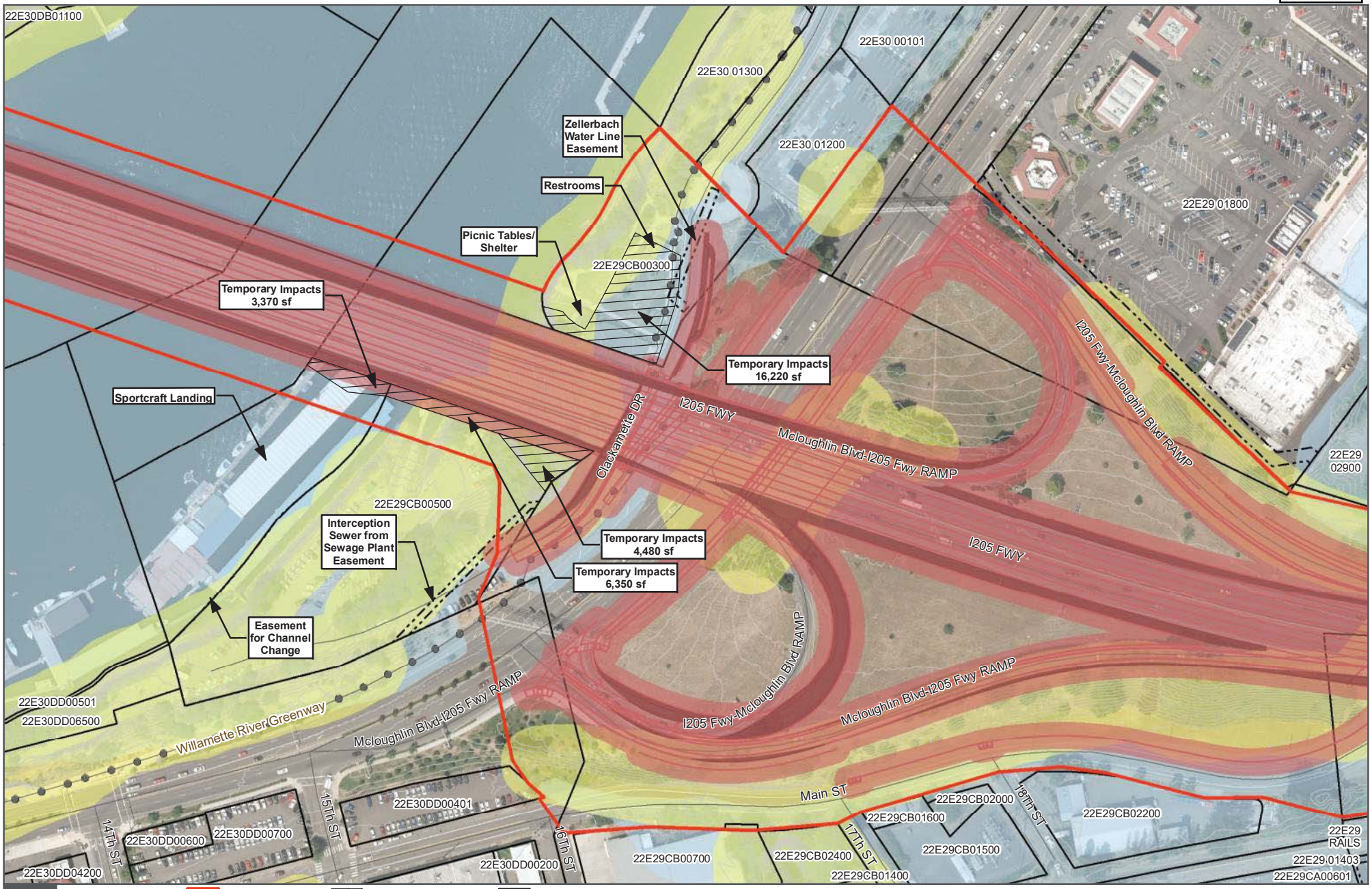
Item	*Quantity*	*Cost*
PARKING LOT		
Clearing and Grubbing	0.1 acre	$4,500
Excavation	250 CY	$44,000
Agg Base	150 Ton	$3,150
Level 3 Asphalt Pavement	100 Ton	$2,700
Signs	LS	$2,000
Lighting	LS	$5,000
Pavement Markings	100’	$200
Landscaping	LS	$1,000
JON STORM PARK RESTORATION	LS	$50,000
CLACKAMETTE DRIVE		
Sidewalk	600 sq ft	$16,000
Curb Ramps	2	$9,000

OREGON CITY

Item	*Quantity*	*Cost*
DRAINAGE		
Stormwater Planter	1	$50,000
Drainage Inlet	1	$2,100
12” pipe under Clackamette Dr.	40’	$4,400
Adjust Inlet	1	$1,000
Connection to Extg Structure	1	$1,000
	SUBTOTAL	$196,050
	Mobilization (10%)	$ 19,605
	Contingencies (20%)	$ 39,210
	TOTAL	**$254,865**
	CALL	**$260,000**

Attachment A. Site Plan and Drawings

Site Plan



I-205 ABERNETHY

SITE PLAN - OREGON CITY

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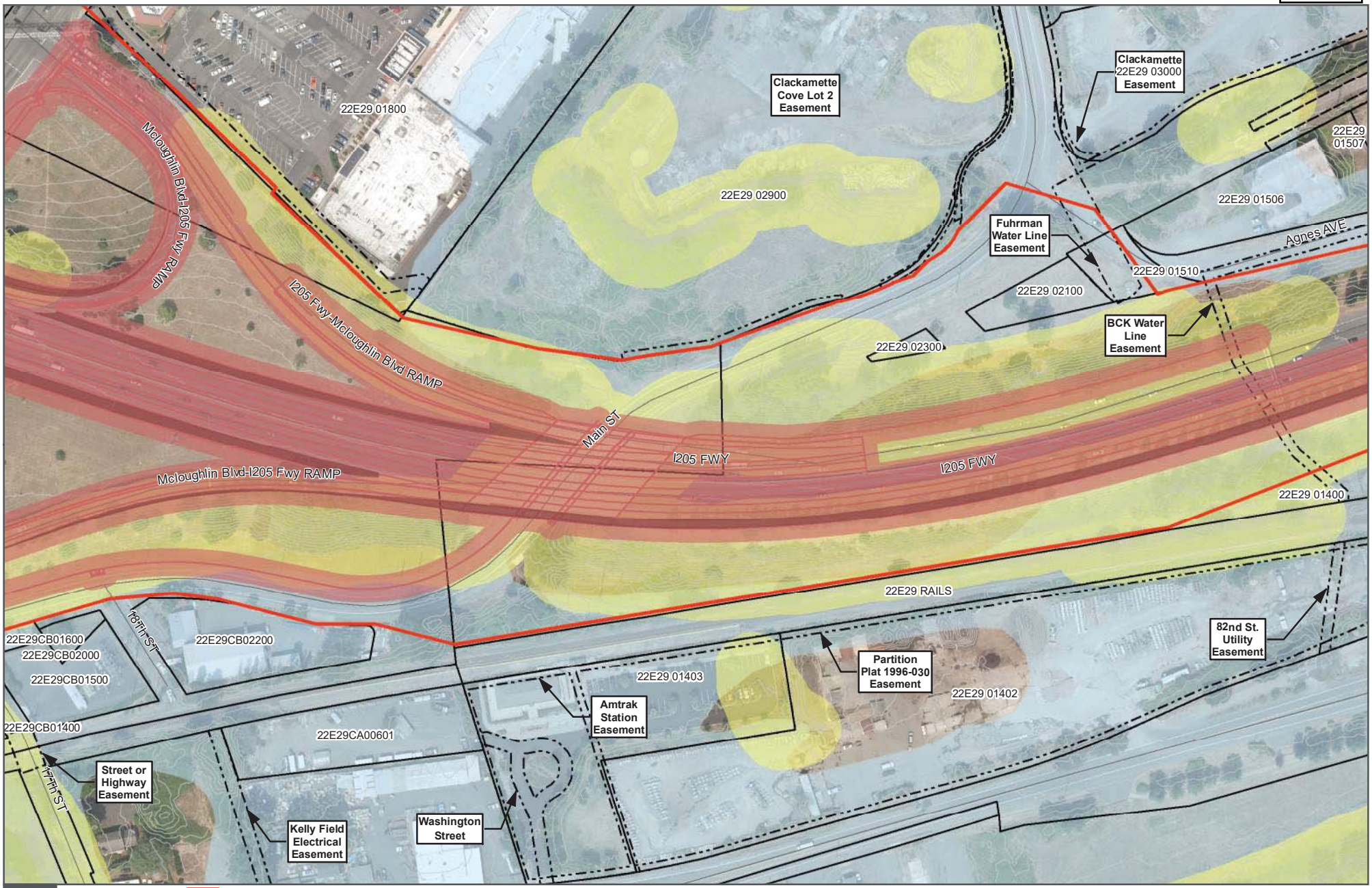
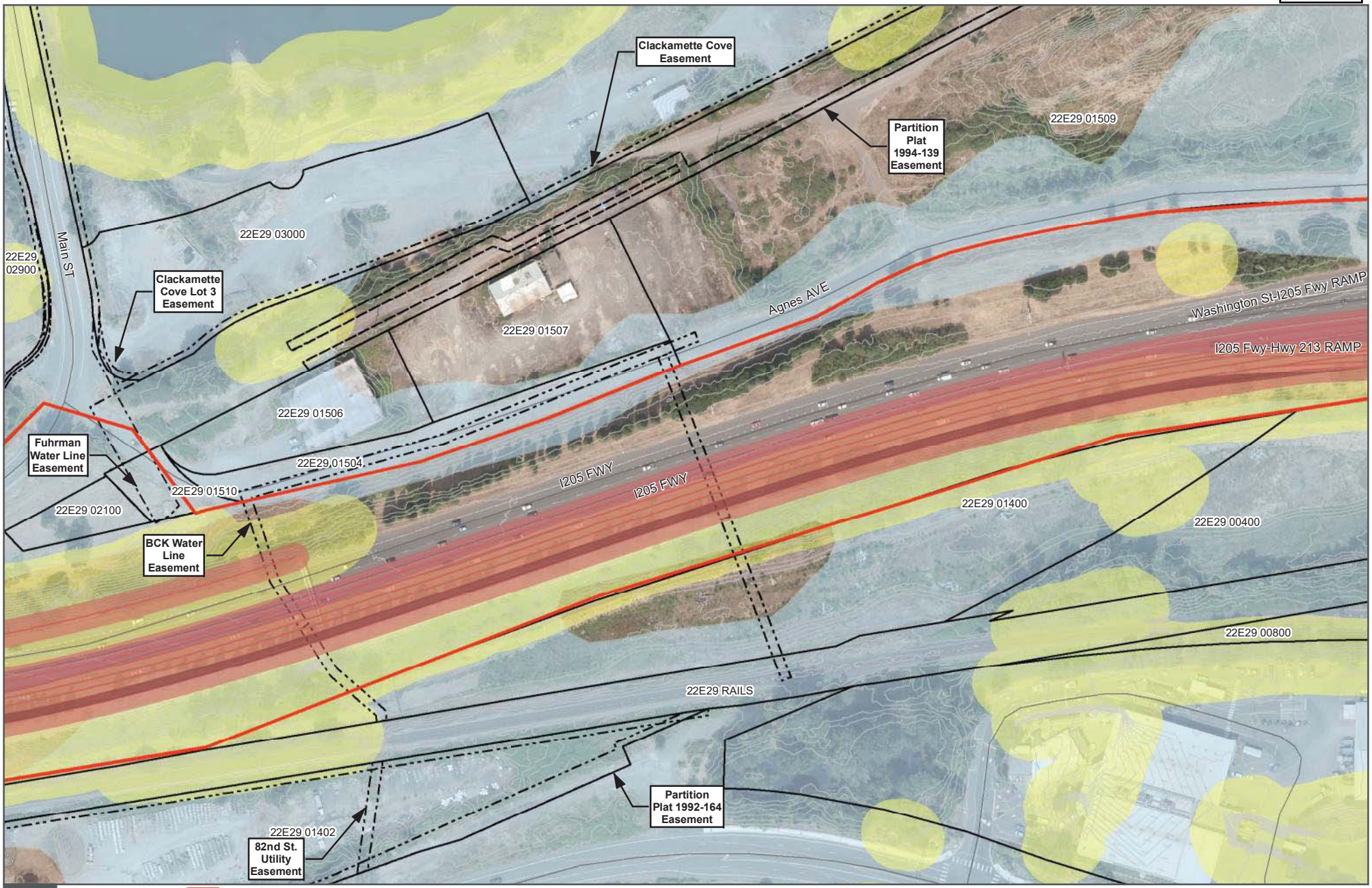


Project Area - API
Project Design Area
Building Structures
Easements
Temporary Impacts
Floodplain - 100 Year
Geologic Hazards
New Impervious Surface
Taxlot
Existing Roads
Recreational Trail
Contour - 2ft

0 100 200 Feet

I-205 ABERNETHY
SITE PLAN - OREGON CITY

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\DRAFT\LAND_USE_PERMIT\OREGON_CITY.MXD - USER: JBEARD - DATE: 6/17/2019



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Contour - 2ft

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I-205 ABERNETHY
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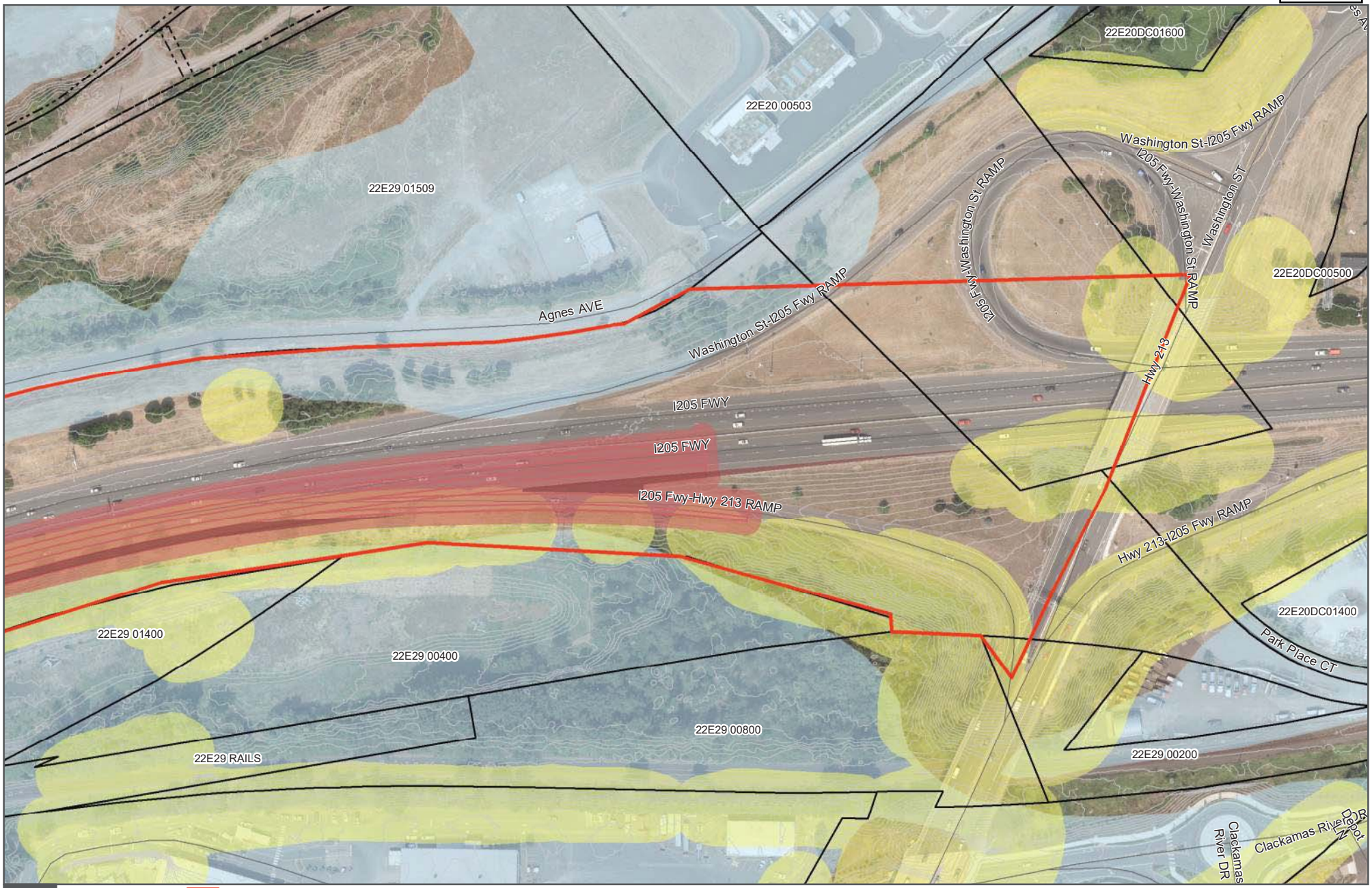

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Contour - 2ft

0 100 200 Feet

I-205 ABERNETHY
SITE PLAN - OREGON CITY

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\DRAFT\LAND_USE_PERMIT\OREGON_CITY.MXD - USER: JBEARD - DATE: 6/17/2019

Plan Sheets

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INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02	Index Of Sheets Cont'd.
A03 thru A04	Standard Drawing Numbers
A05	Plan Sheet Layout

PACKAGE A
PRELIMINARY PLANS

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING & SIGNALS

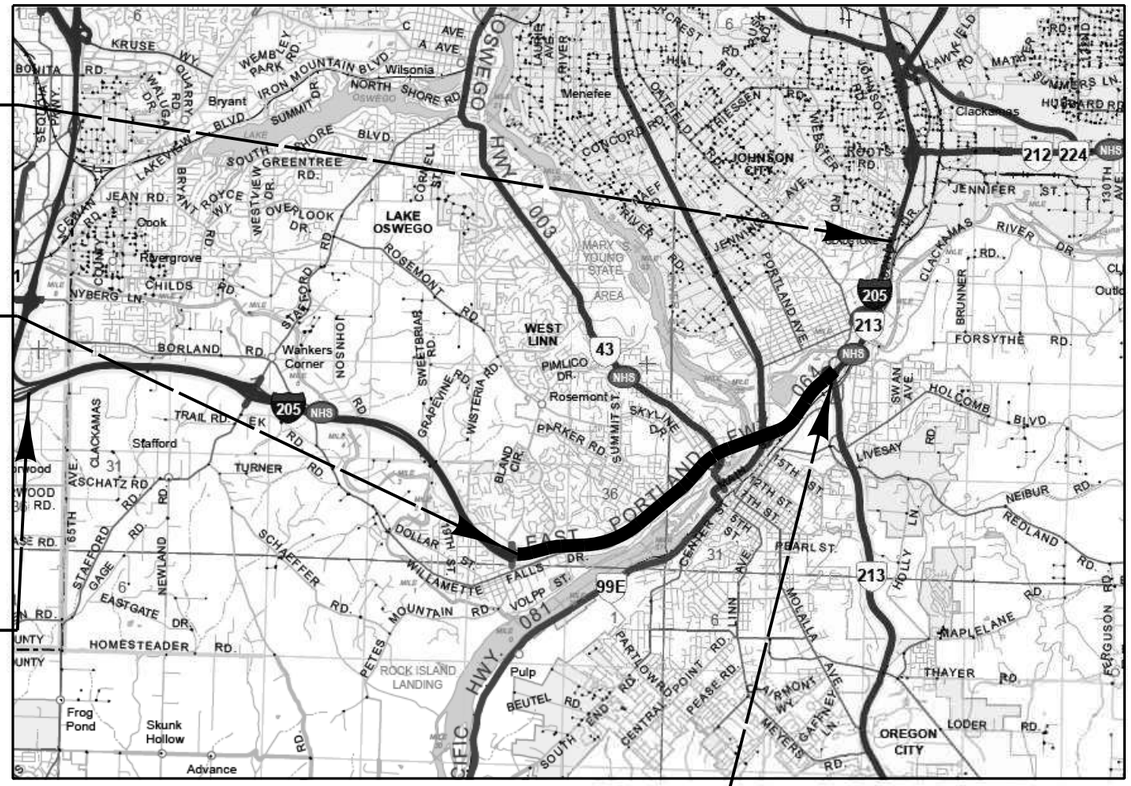
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY
NOVEMBER 2020

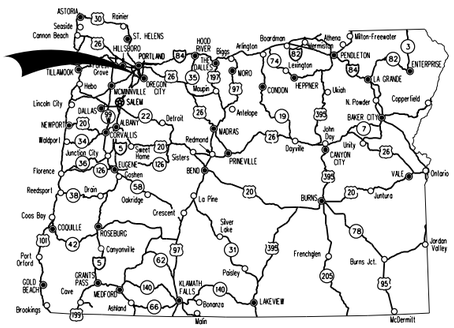
BEGINNING OF PROJECT
S???(???)
(M.P. 11.68)

PAVING LIMITS
S???(???)
STA. "LS2" 859+79 (M.P. 6.41)

END OF PROJECT
S???(???)
STA. "LN2" 1152+80 (M.P. 0.87)



PAVING LIMITS
S???(???)
STA. "L" 661+21 (M.P. 10.21)



Overall Length Of Project - 10.81 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

LET'S ALL
WORK TOGETHER
TO MAKE THIS
JOB SAFE

N

T. 2 S., R. 2 E., W.M.

OREGON TRANSPORTATION COMMISSION

Tammy Baney	CHAIR
Bob Van Brocklin	COMMISSIONER
Alando Simpson	COMMISSIONER
Sean O'Hollaren	COMMISSIONER
Paula Brown	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

Approving Authority: _____
Signature & date

_____
Print name and title

_____
Concurrence by ODOT Chief Engineer

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S???(???)	A01

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Rotation: 0° 0'

INDEX OF SHEETS, CONT.

SHEET NO.	DESCRIPTION
BA01 thru BA18	Typical Sections
BB01 thru BB03	Roadway Details
BC01 thru BC13	Curb Ramp Details
C01	Alignment
C01A	General Construction
C01B	Drainage & Utilities
C01C	Profile
C02	Alignment
C02A	General Construction
C02B	Drainage & Utilities
C02C	Profile
C03	Alignment
C03A	General Construction
C03B	Drainage & Utilities
C03C	Profile
C04	Alignment
C04A	General Construction
C04B	General Construction Notes
C04C	Drainage & Utilities
C04D	Drainage & Utilities Notes
C04E thru C04G	Drainage Profile
C04H thru C04K	Profile
C05	Alignment
C05A	General Construction
C05B	General Construction Notes
C05C	Drainage & Utilities
C05D	Drainage & Utilities Notes
C05E thru C05J	Drainage Profile
C05K thru C05P	Profile
C06	Alignment
C06A	General Construction
C06B	General Construction Notes
C06C	Drainage & Utilities
C06D, C06E	Drainage Profile
C06F, C06G	Profile
C07	Alignment
C07A	General Construction
C07B	Drainage & Utilities
C07C	Profile
C08	Alignment
C08A	General Construction
C08B	Drainage & Utilities
C08C	Drainage & Utilities Notes
C06D thru C08G	Drainage Profile
C08H	Profile
C09	Alignment
C09A	General Construction
C09B	General Construction Notes
C09C	Drainage & Utilities
C09D	Drainage & Utilities Notes
C09E thru C09H	Profile
EA01	Traffic Control Summary
EA02 thru EA05	Traffic Control Details
EB01 thru EB25	Traffic Control Detour Plan
EC01 thru EC5	Temporary Pedestrian Access Route
ED01 thru ED39	Traffic Control Plan Stage I
EE01 thru EE25	Traffic Control Plan Stage II
EF01 thru EF10	Traffic Control Plan Stage III
EG01 thru EG12	Traffic Control Plan Stage IV
EH01 thru EH05	Access Details

INDEX OF SHEETS, CONT.

SHEET NO.	DESCRIPTION
FA01 thru FA07	Roadside Development General Notes
FA08 thru FA17A	Roadside Development Planting Plan
FB01 thru FB20	Erosion and Sediment Control
GA01 thru GA13	Geotechnical Data
GB101 thru GB105	Retaining Wall A
GB201 thru GB205	Retaining Wall B
GC01 thru GC05	Noise Wall
HA01 thru HA12	Water Quality Plan and Profile
HF01 thru HF05	Waterway Enhancement (Abernethy Crk)

BRIDGES

SHEET NO.	BDS DRAWING NO.	DESCRIPTION
	STRUCTURE NO. 09702	
JA01	-	Plan, Elevation & Typical Section
JA02	-	Stage Construction
JA03	-	Retrofit Details
	STRUCTURE NO. 09403	
JB01	-	Plan, Elevation & Typical Section
JB02	-	Plan and Elevation - 2
JB03	-	Plan and Elevation - 3
JB04	-	Construction Sequence - 1
JB05	-	Construction Sequence - 2
JB06	-	Construction Sequence - 3
JB07	-	Construction Sequence - 4
JB08	-	Pier 3 (Piers 4, 5 & 6 Similar)
JB09	-	Pier 9
JB10	-	Pier 10
JB11	-	Pier 12 (Piers 1, 2, 11, 13 & 14 Similar)

PERMANENT SIGNING

SHEET NO.	DRAWING NO.	DESCRIPTION
LA01 thru LB04		Permanent Signing
LD01 thru LD04		Sign and ITS Structure Corridor Map
LD05 thru LD08		Sign Bridge

SIGNALS

SHEET NO.	DRAWING NO.	DESCRIPTION
MA01		Signal and Interconnect Legend
MB01 thru ME01		Signal Plan
MF01 thru MH02		Ramp Meter Plan

PERMANENT PAVEMENT MARKINGS

SHEET NO.	DRAWING NO.	DESCRIPTION
QA01		Pavement Marking Details
QB01 thru QB09		Pavement Marking Plan

OREGON DEPARTMENT OF TRANSPORTATION

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S???(???)	A02

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Rotation: 0°

Standard Drg. Nos.

RD140	*- Roadway Cross Slopes Superelevated Sections*
RD150	*- Slope Rounding*
RD160	*- Maintenance Pad Details*
RD300	*- Trench Backfill, Bedding, Pipe Zone And Mult. Installations*
RD302	*- Street Cut*
RD312	*- Subsurface Drain*
RD316	*- Sloped Ends For Metal Pipe*
RD317	*- Culvert Embankment Protection and Riprap Pads*
RD318	*- Sloped Ends For Concrete Pipe*
RD320	*- Paved End Slope For Culverts 60" Maximum Pipe Size*
RD325	*- Coupling Bands For Corrugated Metal Pipe*
RD326	*- Coupling Bands For Corrugated Metal Pipe*
RD327	*- Coupling Bands For Corrugated Metal Pipe*
RD334	*- Locator Post*
RD335	*- Standard Storm Sewer Manhole*
RD336	*- Standard Manhole Details*
RD339	*- Pipe To Structure Connections*
RD342	*- Shallow Manholes*
RD344	*- Standard Manhole Base Section*
RD345	*- Pipe To Manhole Connections*
RD348	*- Manhole With Inlet*
RD356	*- Manhole Covers And Frames*
RD360	*- Manhole Frame Adjustment*
RD364	*- Concrete Inlets Type G-1, G-2, G-2M & G-2MA*
RD365	*- Frames & Grates For Concrete Inlets*
RD370	*- Ditch Inlet Type D*
RD376	*- Miscellaneous Drainage Structures Siphon Box, Inlet Cap & Inlet Adjustment*
RD386	*- Fill Height Tables For Circular Concrete Pipe*
RD388	*- Fill Height Tables For PVC Pipe*
RD390	*- Fill Height Tables For Corrugated HDPE Pipe*
RD393	*- Fill Height Tables For Polypropylene Pipe*
RD398	*- Culvert ID Marker*
RD399	*- Stormwater Treatment And Storage Facility Field Markers*
RD400	*- Guardrail And Metal Median Barrier*
RD405	*- Guardrail And Metal Median Barrier Parts*
RD410	*- Guardrail Parts (Thrie Beam)*
RD415	*- Guardrail And Metal Median Barrier Parts*
RD419	*- Grading for Guardrail Terminals*
RD420	*- TL-3 Energy-Absorbing Terminal*
RD440	*- Guardrail Installation At Bridge Ends*
RD450	*- Guardrail Anchors (Steel)*
RD451	*- Wood Breakaway Posts*
RD480	*- 31" Guardrail And Metal Median Barrier*
RD481	*- 31" Guardrail And Metal Median Barrier Height Conversion*
RD482	*- 31" Guardrail Type 3*
RD500	*- Precast Concrete Barrier Pin And Loop Assembly*
RD505	*- Concrete Barrier Cast-In-Place*
RD510	*- Concrete Barrier Terminal*
RD515	*- Median Barrier Anchoring Details*
RD516	*- Securing Concrete Barrier To Roadway*
RD520	*- Cast-In-Place Concrete Barrier Transition To Concrete Bridge Rail Type "F"*
RD530	*- Guardrail Transition To Concrete Barrier*
RD545	*- Precast Tall (42") Concrete Barrier*

RD550	*- Cast-In-Place Tall Concrete Barrier Transition To Concrete Bridge Rail Type "F"*
RD560	*- Cast-In-Place Tall Concrete Barrier Transistion To Standard Concrete Barrier*
RD580	*- 31" Guardrail Transition To Concrete Barrier*
RD581	*- 31" Guardrail Transition To Tall Concrete Barrier*
RD610	*- Asphalt Concrete Pavement (ACP) Details*
RD700	*- Curbs*
RD705	*- Islands*
RD706	*- Traffic Separators And Transitions*
RD720	*- Sidewalks*
RD753	*- Pay Limit For Retrofit Sidewalk Ramp Placement Options Large Radii*
RD755	*- Sidewalk Ramp Details*
RD757	*- Sidewalk Ramp Placement Options Large Radii*
RD759	*- Truncated Dome Detectable Warning Surface Details & Locations*
RD815	*- Chain Link Fence*
RD1000	*- Construction Entrances*
RD1006	*- Check Dams Type 2 and 6*
RD1010	*- Inlet Protection Type 2, 3, 6 and 7*
RD1030	*- Sediment Barrier Type 2, 3 and 4*
RD1032	*- Sediment Barrier Type 8*
RD1033	*- Sediment Barrier Type 9*
RD1040	*- Sediment Fence*
RD1055	*- Slope and Channel Matting*
BR115	*- Slope Paving*
BR157	*- Asphaltic Plug Joint Seal*
BR240	*- Protective Fencing*
BR241	*- Protective Fencing Details-1*
BR242	*- Protective Fencing Details-2*
TM200	*- Sign Installation Details*
TM201	*- Miscellaneous Sign Placement Details*
TM204	*- Flag Board Mounting Details*
TM206	*- Sign Bracing Detail*
TM211	*- Signing Details US & Interstate Route Shields*
TM212	*- Signing Details Oregon Route Signs*
TM220	*- Multi-Post Installations With Auxiliary Signs*
TM221	*- Signing Details Milepost Markers*
TM222	*- Installation Details Milepost Marker Posts*
TM223	*- Conventional Roads Directional Sign Layout Street Name Signs*
TM224	*- Freeway/Expressway Directional Sign Layout*
TM225	*- Exit Number And Gore Signing Details*
TM230	*- Mounting Details For Removable Legend 4" Through 8" Letters & Numbers*
TM231	*- Mounting Details For Removable Legend 10" Through 12" Letters & Numbers*
TM232	*- Mounting Details For Removable Legend 13½" Through 18" Letters & Numbers*
TM233	*- Mounting Details For Removable Legend Various Arrow Sizes*

OREGON DEPARTMENT OF TRANSPORTATION

Standard Drawings located on the web at:
http://www.oregon.gov/ODOT/HWY/ENGSERVICES/pages/standard drawings home.aspx

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S???(???)	A03

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Standard Drg. Nos.

TM450 – Mast Arm Pole Details
TM452 – Strain Pole Details
TM455 – Temporary Signal Pole Details
TM457 – Vehicle, Pedestrian Signal And Pushbutton Mounting Option Details
TM460 – Vehicle Signal Details
TM462 – Adjustable Signal Head Mounting Details
TM463 – Spanwire Mounting Details
TM465 – Overhead Sign, Fire Preemption And Photoelectric Control Details
TM467 – Pedestrian Signal And Pedestrian Pushbutton Details
TM470 – Color Code Charts
TM472 – Traffic Signal Junction Boxes/Hand Holes
TM475 – Loop Details
TM480 – Loop Entrance Details
TM482 – Controller Cabinet And Foundation Details
TM485 – Service Cabinets And Service Cabinet Wiring Details
TM490 – Crosswalk Closure Detail
TM492 – Ramp Meter Pedestal Details

TM500 – Pavement Marking Standard Detail Blocks
TM501 – Pavement Marking Standard Detail Blocks
TM502 – Pavement Marking Standard Detail Blocks
TM503 – Pavement Marking Standard Detail Blocks
TM516 – Raised Pavement Markers: Freeway Median Crossover
TM520 – Durable Pavement Markings Method "A" & Method "D" Surface Installed Profiled
TM530 – Intersection Pavement Markings (Crosswalk, Stop Bar & Bike Lane Stencil)
TM547 – Freeway Entrance Ramp Pavement Markings
TM551 – Freeway Exit Ramp Pavement Markings
TM560 – Alignment Layout: General
TM570 – Traffic Delineators
TM571 – Traffic Delineators Steel Post Details
TM575 – Traffic Delineator Installation For Freeways
TM577 – Traffic Delineator Installation For Special Applications

TM600 – Multi-Post Breakaway Sign Supports Notes
TM601 – Multi-Post Breakaway Sign Supports Details
TM602 – Triangular Base Breakaway Multi-Directional Slip Base Design
TM614 – Standard Truss Type Sign Bridge 50' To 167' Span Range Typical Plan And Elevation
TM615 – Standard Truss Type Sign Bridge 50' To 167' Span Range Notes
TM616 – Standard Truss Type Sign Bridge 50' To 167' Span Range Bridge Truss Details
TM617 – Standard Truss Type Sign Bridge 50' To 167' Span Range End Truss Details
TM618 – Standard Truss Type Sign Bridge 50' To 167' Span Range Sign And Luminaire Mounting Details
TM619 – Standard Truss Type Sign Bridge 50' To 167' Span Range Std. Spread Ftg. Foundation Details
TM620 – Standard Truss Type Sign Bridge 50' To 167' Span Range Miscellaneous Details
TM622 – Std. Monotube Cantilever Sign Support Typical Plan, Elevation And Sections
TM623 – Std. Monotube Cantilever Sign Support Notes
TM624 – Std. Monotube Cantilever Sign Support Misc. Details
TM625 – Std. Monotube Cantilever Sign Support Sign And Luminaire Mounting Details
TM626 – Std. Monotube Cantilever Sign Support Std. Spread Footing Foundation Details
TM627 – Std. Monotube Cantilever Sign Support Details
TM629 – Slip Base And Fixed Base Luminaire Supports General Details And Design Criteria
TM630 – Slip Base And Fixed Base Luminaire Supports Base Plate & Footing Details
TM635 – Breakaway Sign & Luminaire Supports – Support Location Guidelines
TM650 – Traffic Signal Supports General Details & Design Criteria
TM651 – Traffic Signal Supports Notes And Reactions
TM652 – Traffic Signal Supports Steel Details
TM653 – Traffic Signal Supports Foundation Requirements
TM670 – Wood Post Sign Supports
TM671 – 3 Second Gust Wind Speed Map

TM675 – Extruded Aluminum Panels
TM676 – Sign Attachments
TM677 – Sign Mounts
TM678 – Secondary Sign Mounting Details
TM679 – Signal Mast Arm Street Name Sign Mounts
TM680 – Signal Pole Mounts
TM681 – Perforated Steel Square Tube (PSST) Sign Support Installation
TM687 – Perforated Steel Square Tube (PSST) Anchor Foundation
TM688 – Perforated Steel Square Tube (PSST) Slip Base Foundation

TM800 – Tables, Abrupt Edge And PCMS Details
TM810 – Temporary Pavement Markings
TM820 – Temporary Barricades
TM821 – Temporary Sign Supports
TM822 – Temporary Sign Supports
TM830 – Temporary Concrete Barrier And Rumble Strip Details
TM831 – Temporary Impact Attenuators
TM832 – Temporary Impact Attenuators
TM833 – Temporary Impact Attenuators
TM840 – Closure Details
TM841 – Intersection Work Zone Details
TM842 – Signalized Intersection Details
TM843 – Multi-Lane Signalized Intersection Details
TM844 – Temporary Pedestrian Access Routing
TM850 – 2-Lane, 2-Way Roadways
TM851 – Non-Freeway Multi-Lane Sections
TM860 – Freeway Sections-Ramps
TM861 – Freeway Sections
TM862 – Freeway Sections
TM880 – Freeway Or Divided Highway Speed Reduction (Paving Operations)

R/W Map No.
1A-18-31
1A-20-07
9B-01-06
9B-01-07
9B-17-13

Standard Drawings located on the web at:
http://www.oregon.gov/ODOT/HWY/ENGSERVICES/pages/standard drawings home.aspx

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S???(???)	A04

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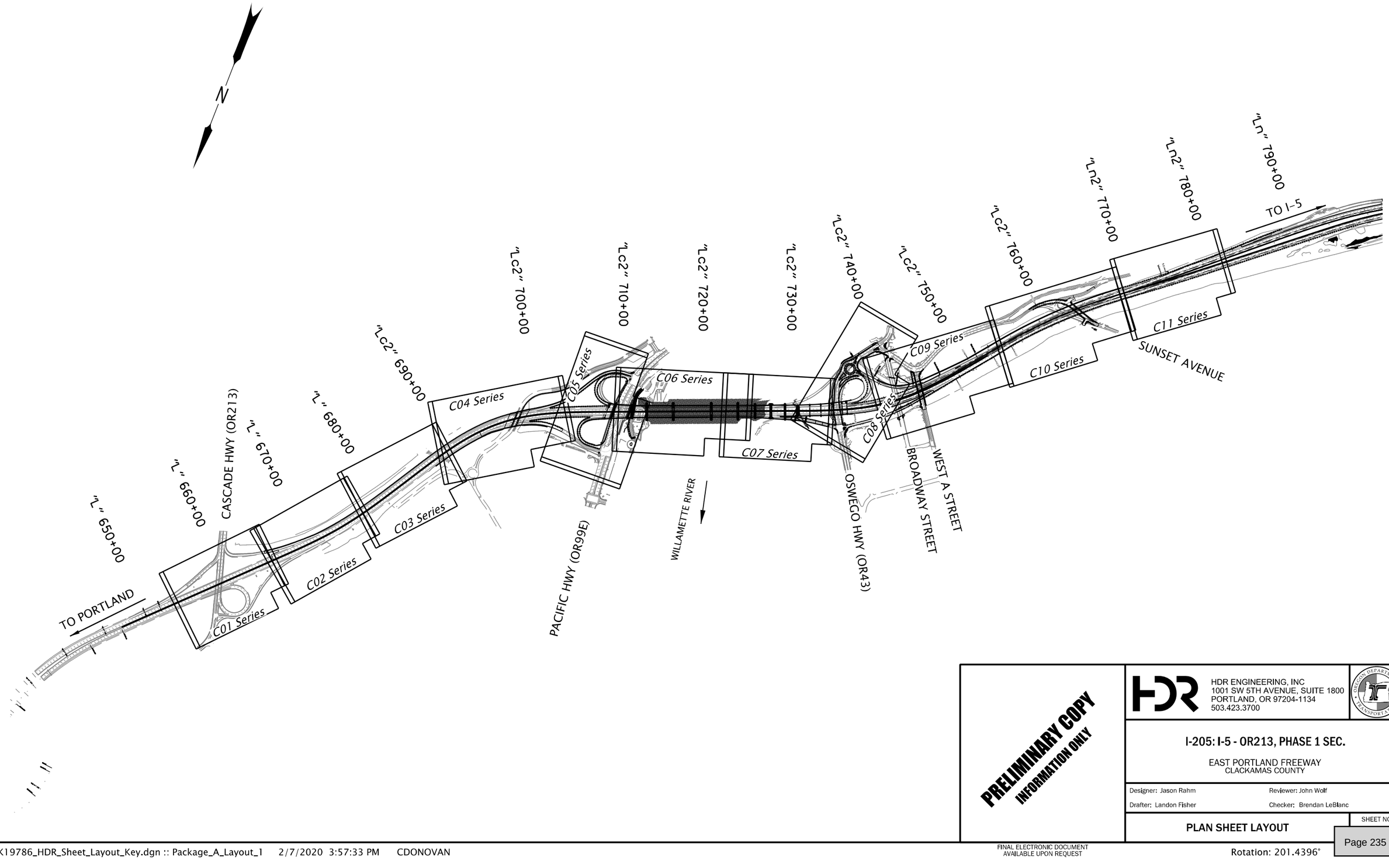

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PORTLAND, OR 97204-1134
503.423.3700

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Landon Fisher | Checker: Brendan LeBlanc

PLAN SHEET LAYOUT

SHEET NO.

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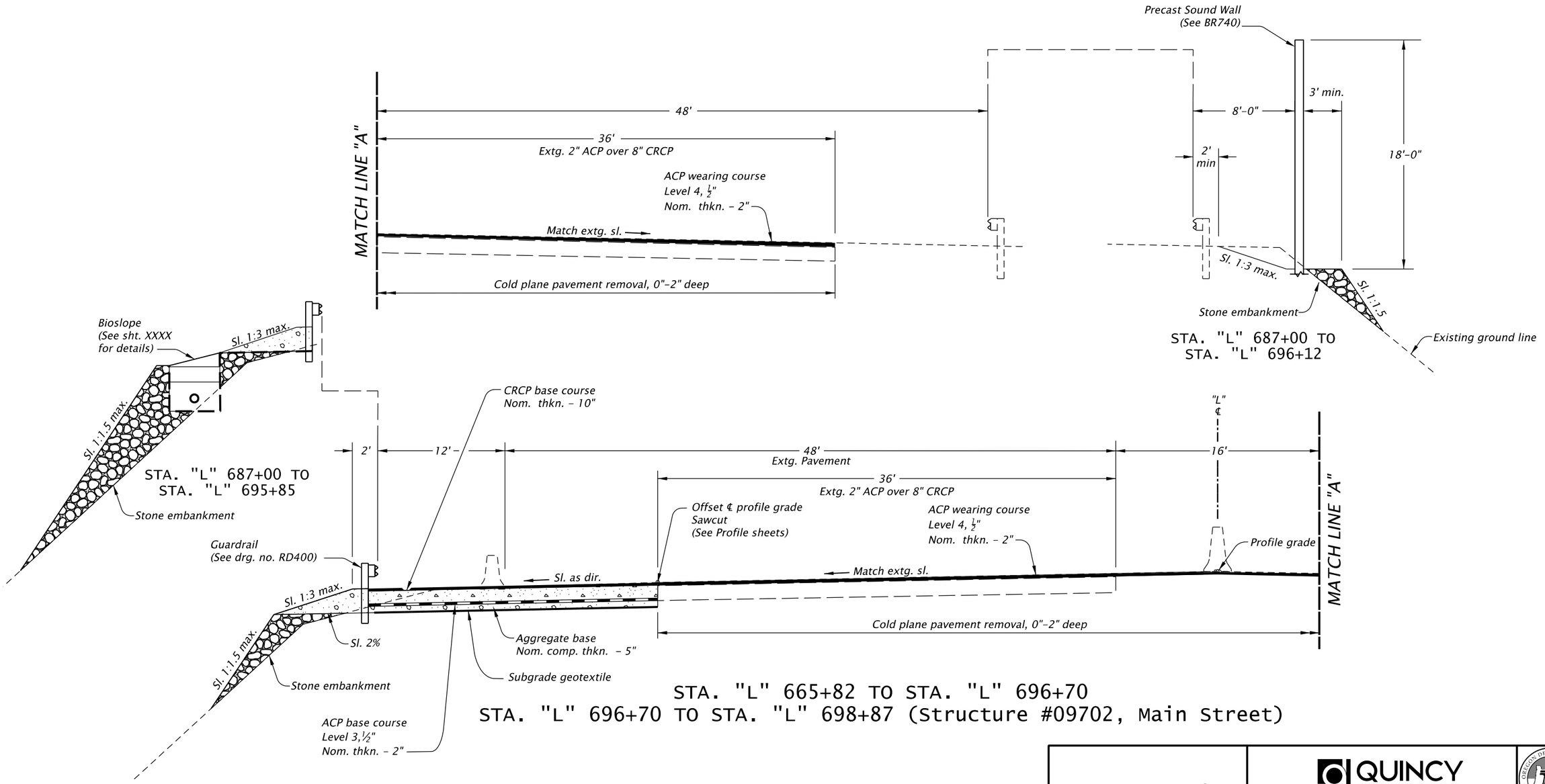

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. Use PG64-22 in Level 3 1/2" ACP.
5. Use PG70-22ER in Level 4 1/2" ACP.
6. Existing surfacing 4" ACP over 8" CTB.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

TYPICAL SECTIONS

SHEET NO.

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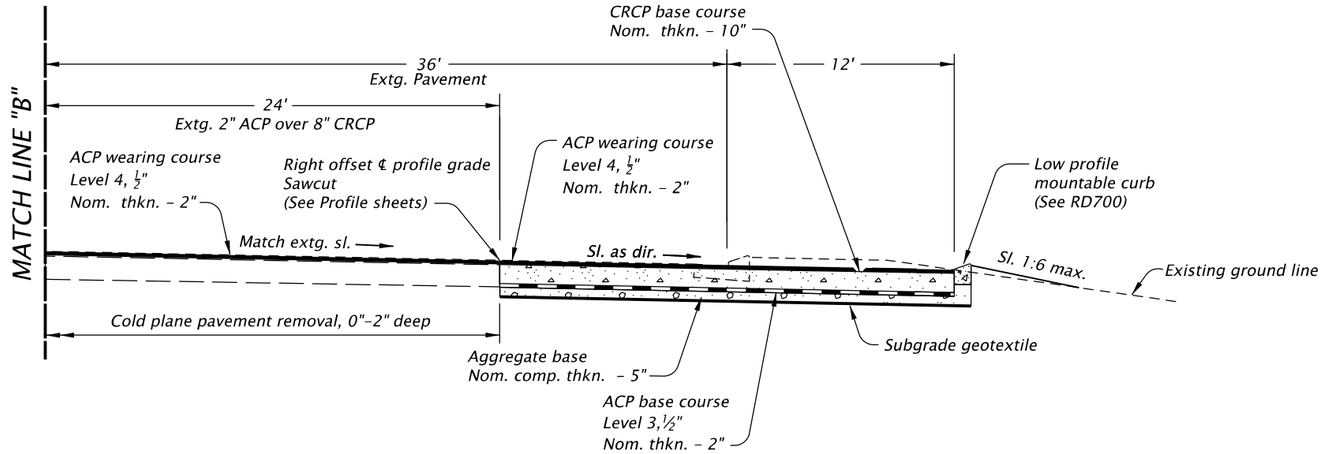

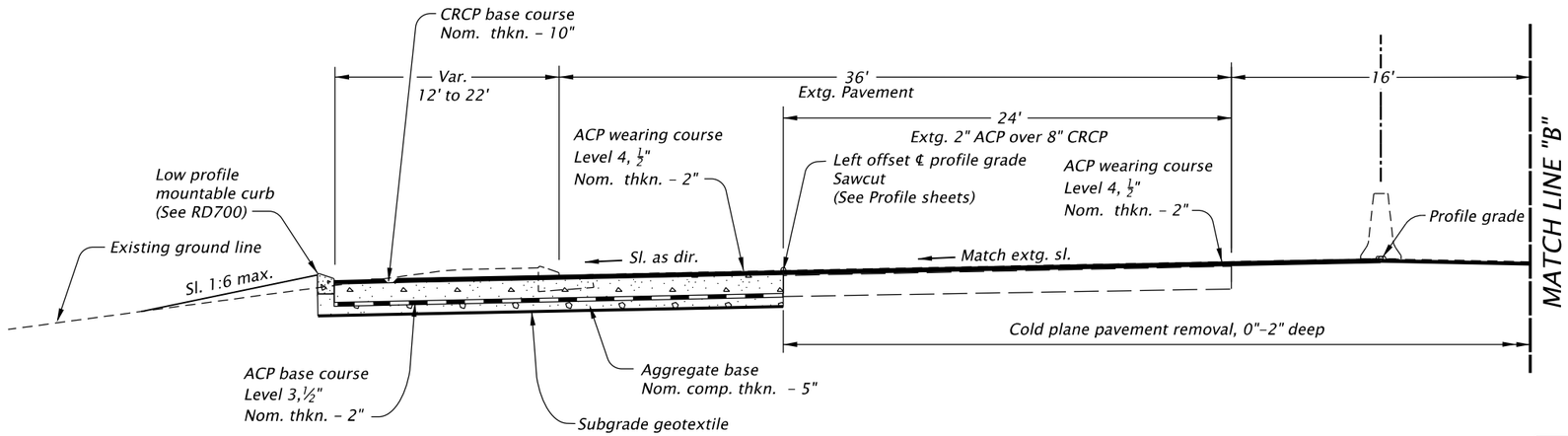

STA. "L" 698+87 TO STA. "L" 707+83

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. Use PG64-22 in Level 3 1/2" ACP.
5. Use PG70-22ER in Level 4 1/2" ACP.
6. Existing surfacing 4" ACP over 8" CTB.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Scott Sinclair
Checker: NA

TYPICAL SECTIONS

SHEET NO.

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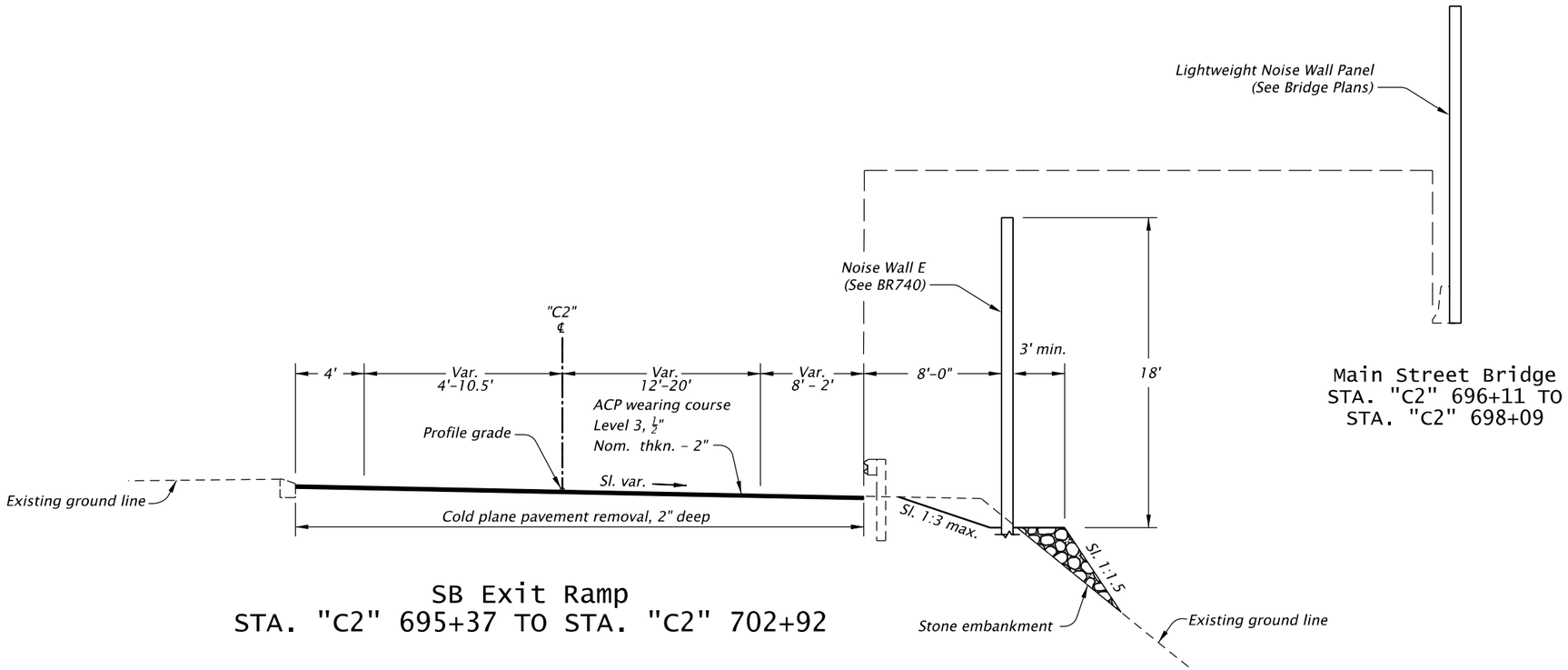
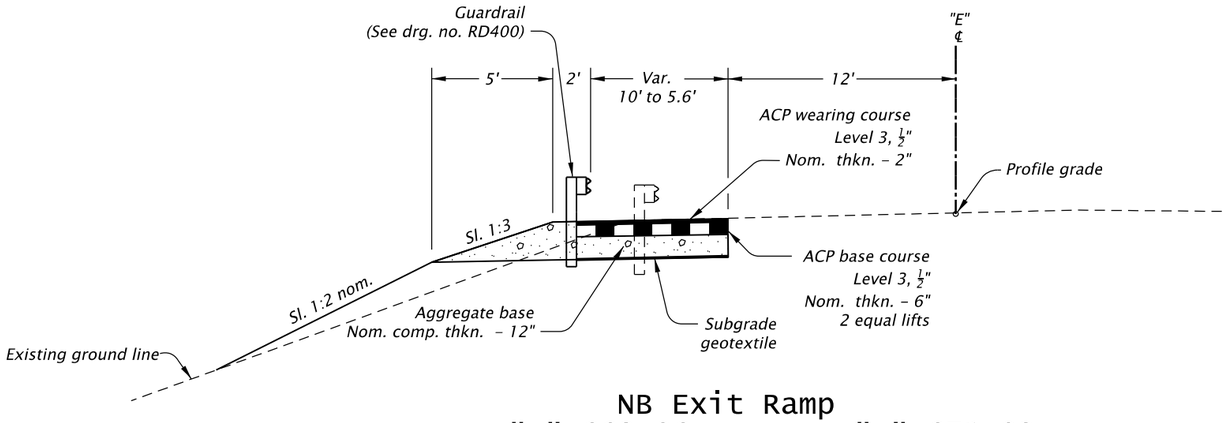


Main Street Bridge
STA. "C2" 696+11 TO
STA. "C2" 698+09

SB Exit Ramp
STA. "C2" 695+37 TO STA. "C2" 702+92



NB Exit Ramp
STA. "E" 663+96 TO STA. "E" 671+92

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. Use PG64-22 in Level 3 1/2" ACP.
5. Use PG670-22ER in Level 4 1/2" ACP.
6. Existing surfacing 4" ACP over 8" CTB.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Scott Sinclair
Checker: NA

TYPICAL SECTIONS

SHEET NO.

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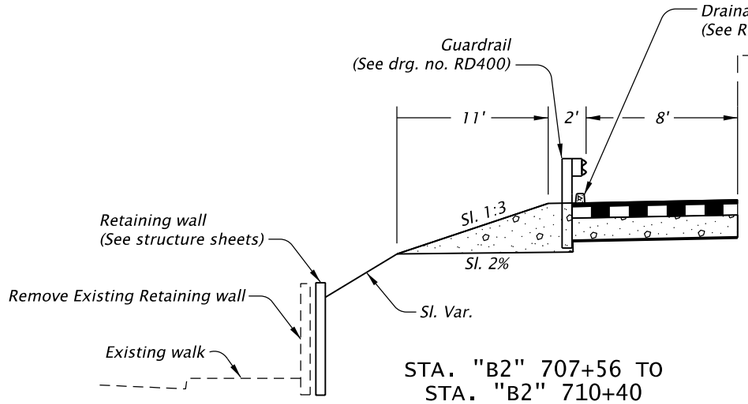
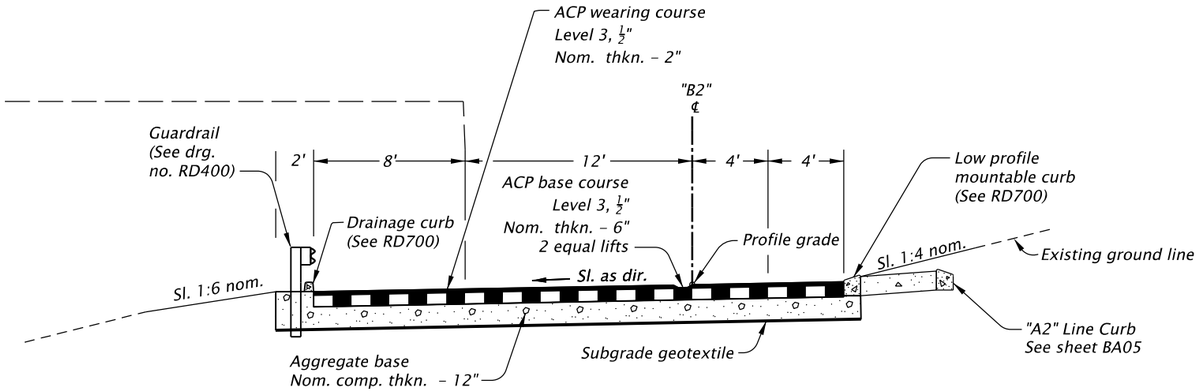
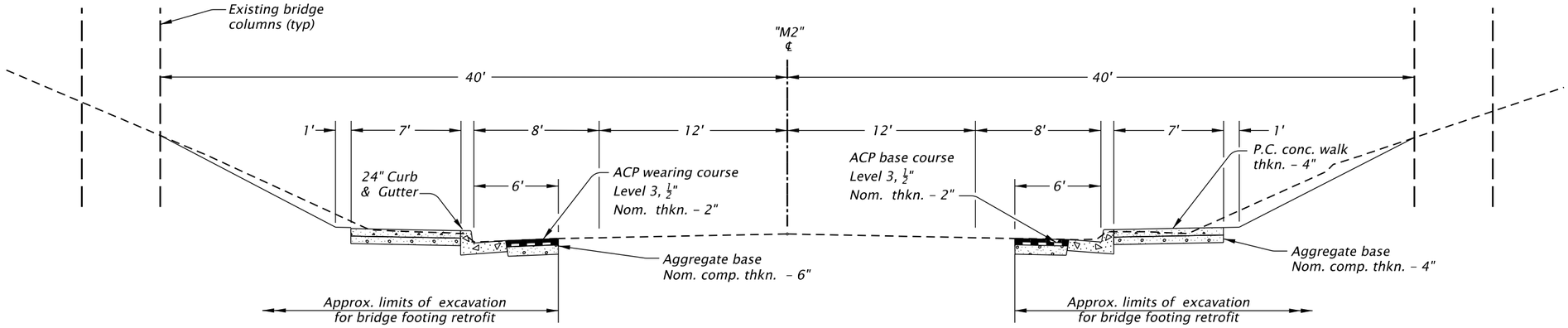


STA. "B2" 707+56 TO
STA. "B2" 710+40



NB Entrance Ramp
STA. "B2" 698+26 TO STA. "B2" 712+06



Main Street
STA. "M2" 15+80 TO STA. "M2" 18+02

NOTE:
1. *Side-slopes are shown as vert. to horiz.*
2. *For standard superelevation, see drg. no. RD140.*
3. *For slope rounding, see drg. no. RD150.*
4. *Use PG64-22 in Level 3 1/2" ACP.*
5. *Use PG70-22ER in Level 4 1/2" ACP.*
6. *Existing surfacing 4" ACP over 8" CTB.*

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

TYPICAL SECTIONS

SHEET NO.
Page 239

FINAL ELECTRONIC DOCUMENT
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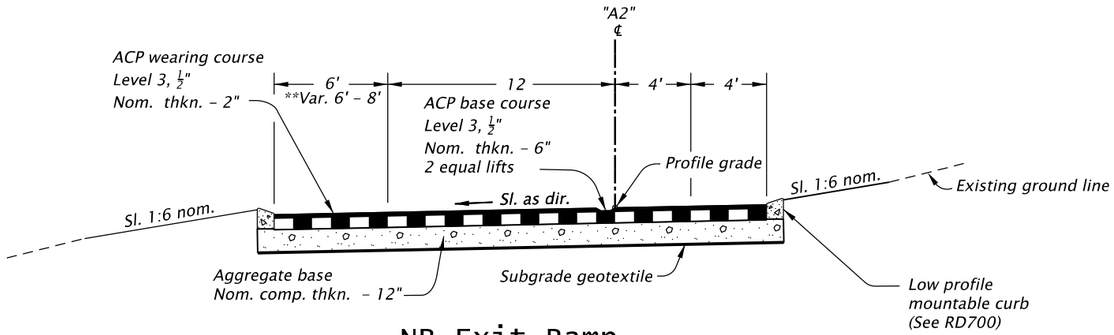
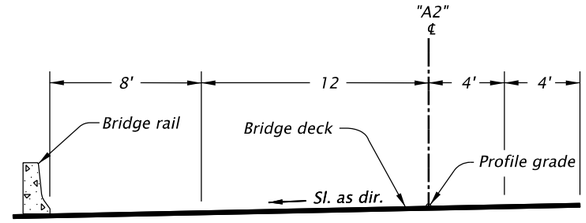
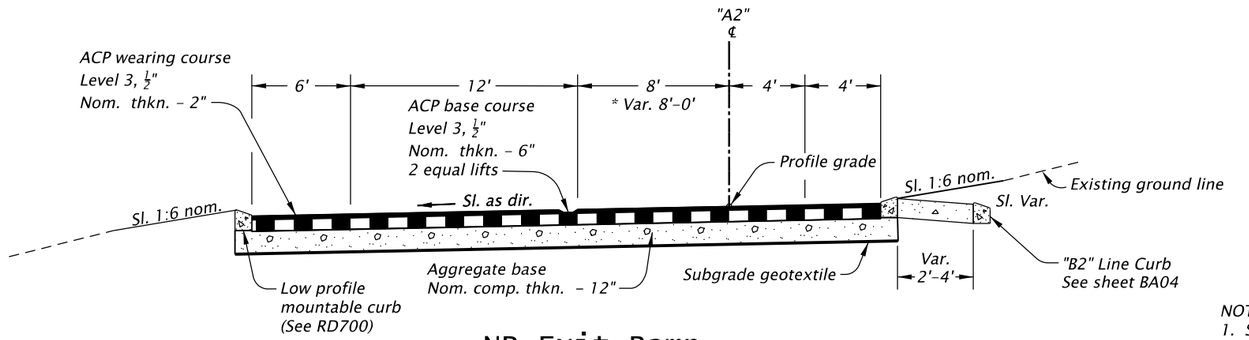


NB Exit Ramp
STA. "A2" 705+78 TO STA. "A2" 706+59
**STA. "A2" 706+59 TO STA. "A2" 708+08



NB Exit Ramp
STA. "A2" 708+08 TO STA. "A2" 712+27



NB Exit Ramp
STA. "A2" 700+82 TO STA. "A2" 704+62
*STA. "A2" 704+62 TO STA. "A2" 705+78

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. Use PG64-22 in Level 3 1/2" ACP.
5. Use PG70-22ER in Level 4 1/2" ACP.
6. Existing surfacing 4" ACP over 8" CTB.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

TYPICAL SECTIONS

SHEET NO.

R_K19786_QEI_ty_01.dgn :: Default 2/11/2020 9:23:23 AM CDONOVAN

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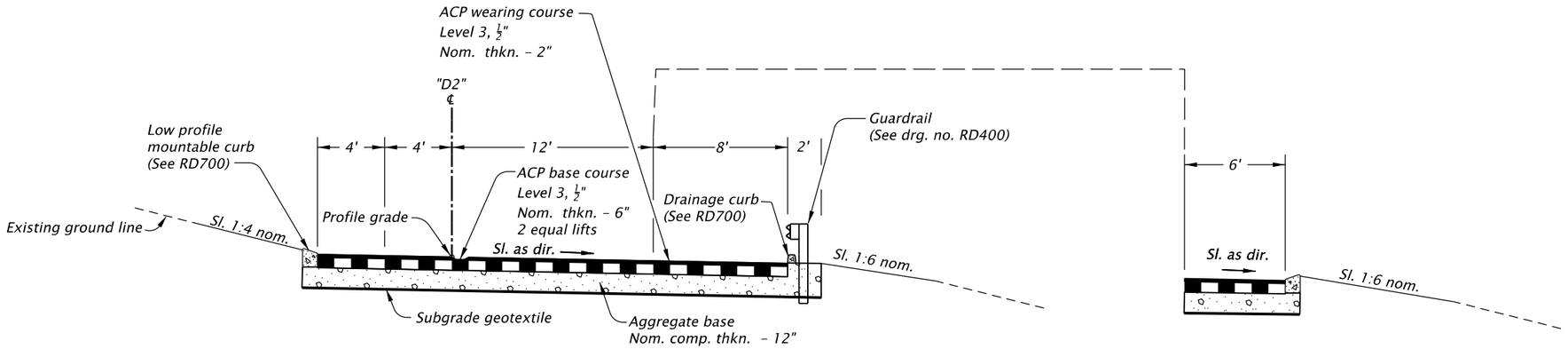
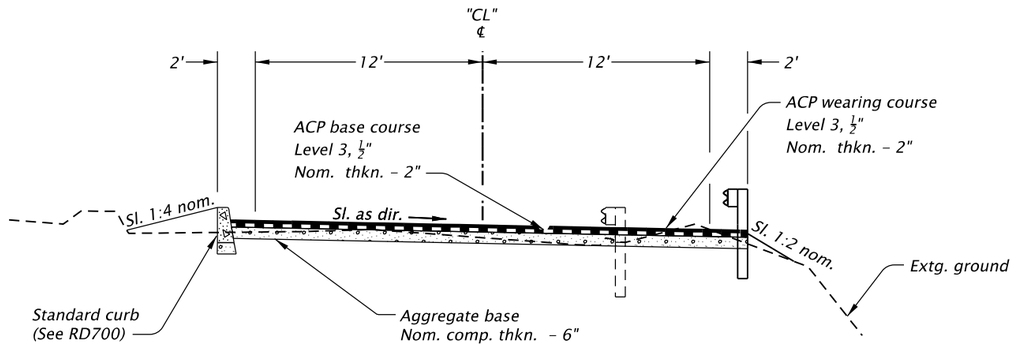
Rotation: 0°



OR99E SB Entrance Ramp
STA. "D2" 700+50 TO STA. "D2" 711+04

STA. "D2" 701+30 TO
STA. "D2" 705+17



Clackamette Drive
STA. "CL" 12+25 TO STA. "CL" 16+00

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. Use PG64-22 in Level 3 1/2" ACP.
5. Use PG70-22ER in Level 4 1/2" ACP.
6. Existing surfacing 4" ACP over 8" CTB.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Scott Sinclair
Checker: NA

TYPICAL SECTIONS

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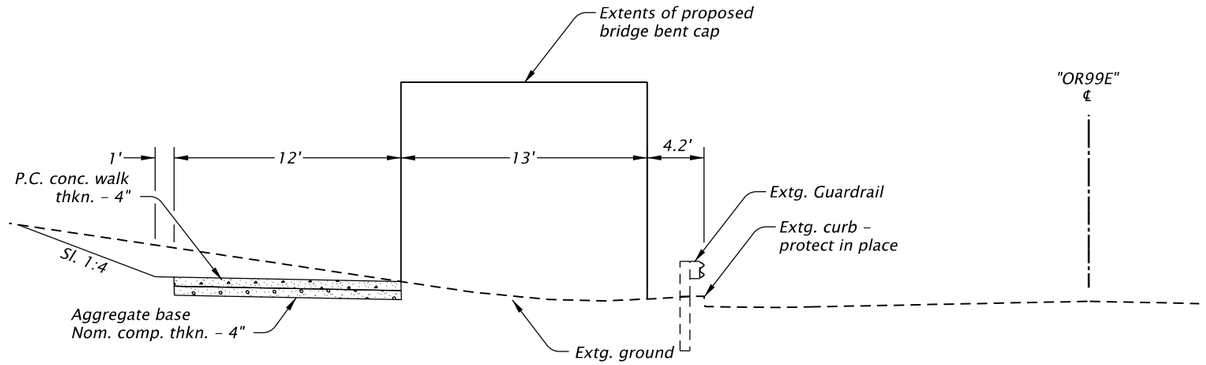
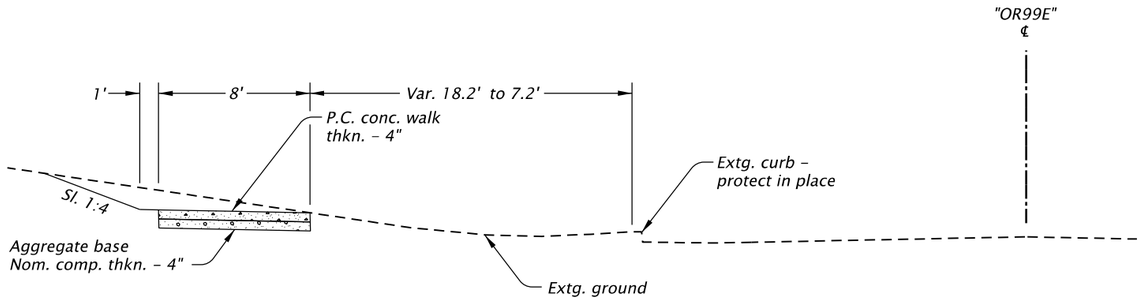


OR99E McLoughlin Blvd.
STA. "OR99E" 111+98 TO STA. "OR99E" 113+94



OR99E McLoughlin Blvd.
STA. "OR99E" 109+02 TO STA. "OR99E" 111+98
STA. "OR99E" 113+94 TO STA. "OR99E" 116+60

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. Use PG64-22 in Level 3 1/2" ACP.
5. Use PG70-22ER in Level 4 1/2" ACP.
6. Existing surfacing 4" ACP over 8" CTB.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

TYPICAL SECTIONS

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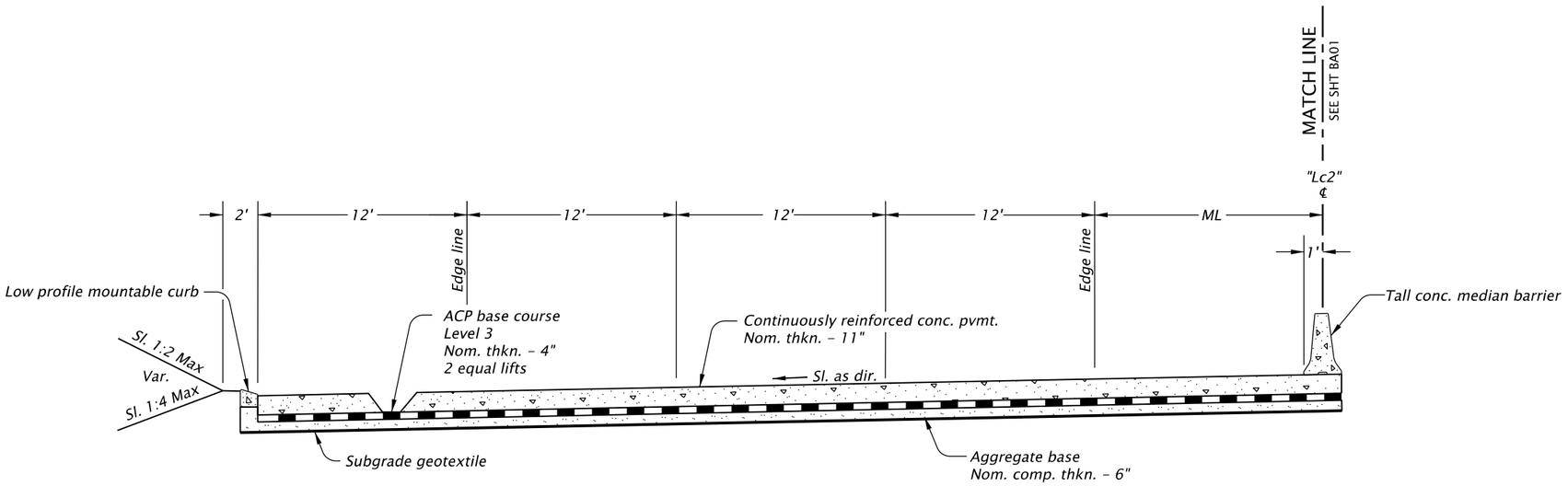
STA. TO STA.		ML
735+40	736+00	8'
736+00	739+35	Var. 8' to 11.4'



STA. "Lc2" 735+40 To STA. "Lc2" 739+35

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. For CRCP details, see shts. BBXX - BBXX.
5. For subgrade stabilization, see sht. BB01.
6. Extg. surfacing 2" ACP over 8" CRCP
7. Use PG 64-22 in Level 3, 1/2" dense ACP base course.

REGISTERED PROFESSIONAL ENGINEER
77911PE
OREGON
JULY 14, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Reviewer: John Wolf
Drafter: Connor Donovan
Checker: Brendan LeBlanc

TYPICAL SECTIONS

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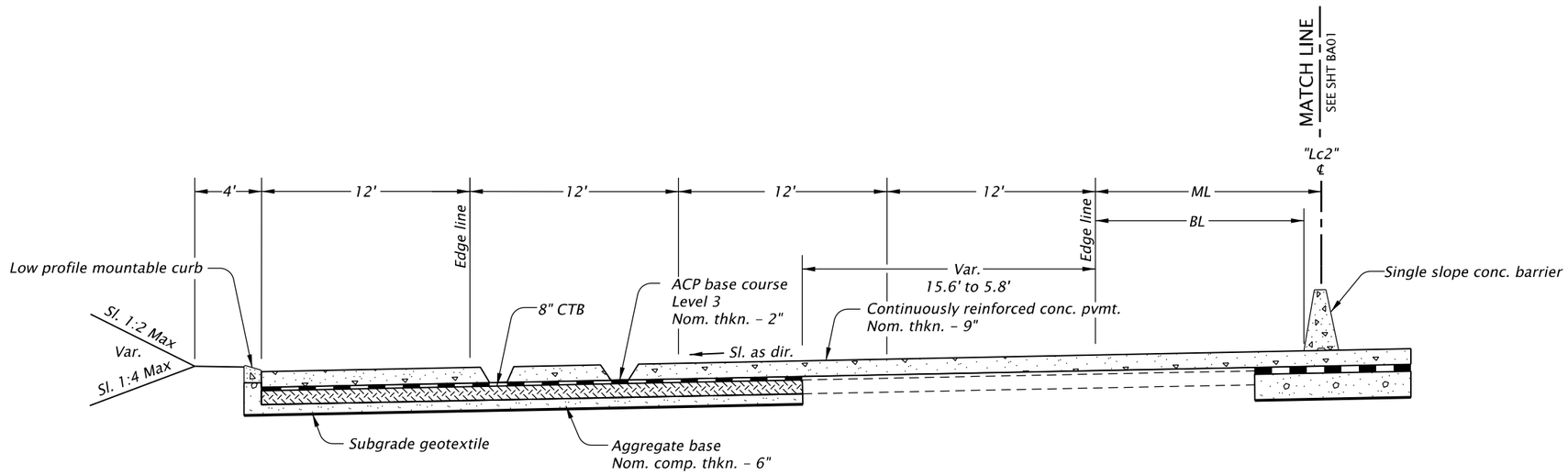
STA. TO STA.		ML
739+35	741+00	Var. 11.4' to 13'
741+00	744+37	13'

STA. TO STA.		BL
739+35	741+00	Var. 10.4' to 12'
741+00	741+36	12'
741+36	743+34	Var. 12' to 15'
743+34	744+15	9'
744+15	744+37	Var. 9' to 9.3'



STA. "Lc2" 739+35 To STA. "Lc2" 744+37

NOTE:
1. *Side-slopes are shown as vert. to horiz.*
2. *For standard superelevation, see drg. no. RD140.*
3. *For slope rounding, see drg. no. RD150.*
4. *For CRCP details, see shts. BBXX - BBXX.*
5. *For subgrade stabilization, see sht. BB01.*
6. *Extg. surfacing 2" ACP over 8" CRCP*
7. *Use PG 64-22 in Level 3, 1/2" dense ACP base course.*

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OREGON
JULY 14, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

TYPICAL SECTIONS

SHEET NO.

R_K19786_HDR_ty_01.dgn :: Typical_Sections 2/7/2020 4:02:00 PM CDONOVAN

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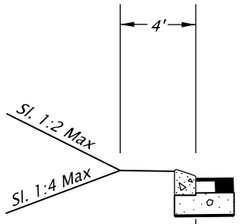
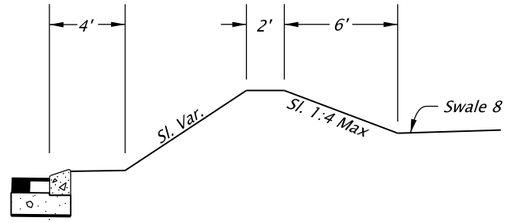
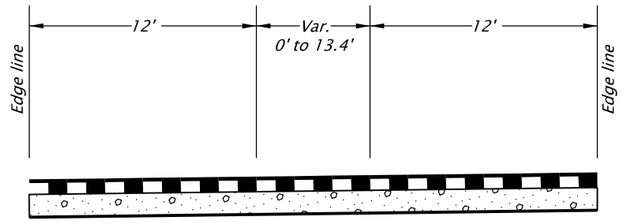


NB Entrance Ramp
STA. "E3" 739+19 To STA. "E3" 740+11

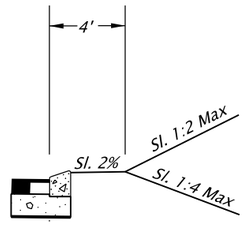


NB Entrance Ramp
STA. "E3" 737+46 To STA. "E3" 738+76

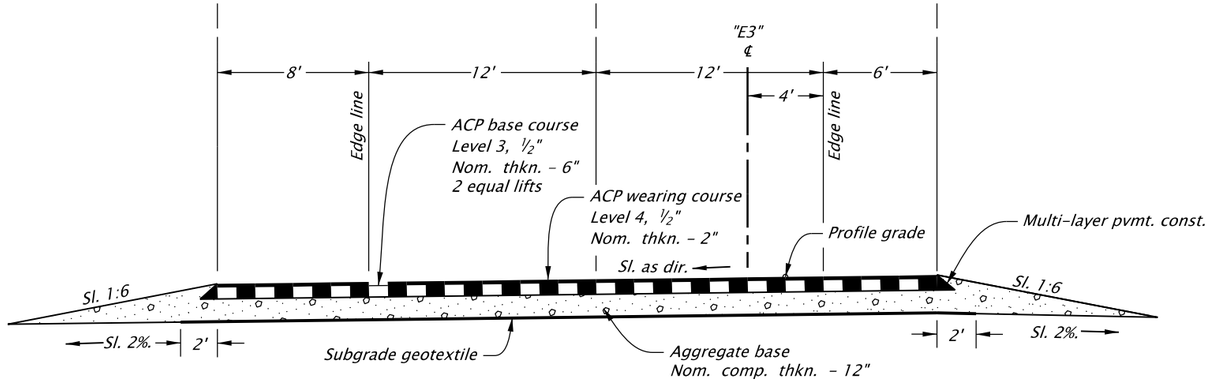
NB Entrance Ramp
STA. "E3" 736+55 To STA. "E3" 739+19



NB Entrance Ramp
STA. "E3" 739+08 To STA. "E3" 740+11



NB Entrance Ramp
STA. "E3" 735+78 To STA. "E3" 740+11



NB Entrance Ramp
STA. "E3" 735+21 TO STA. "E3" 740+11

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. For subgrade stabilization, see sht. BB01.
5. Use PG 64-22 in Level 3, 1/2" dense ACP base course.
6. Use PG 70-22 in Level 4, 1/2" dense ACP wearing course.

STA. "OR43" 12+70 To STA. "OR43" 14+35

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77918 PE
OREGON
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503.423.3700

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

TYPICAL SECTIONS

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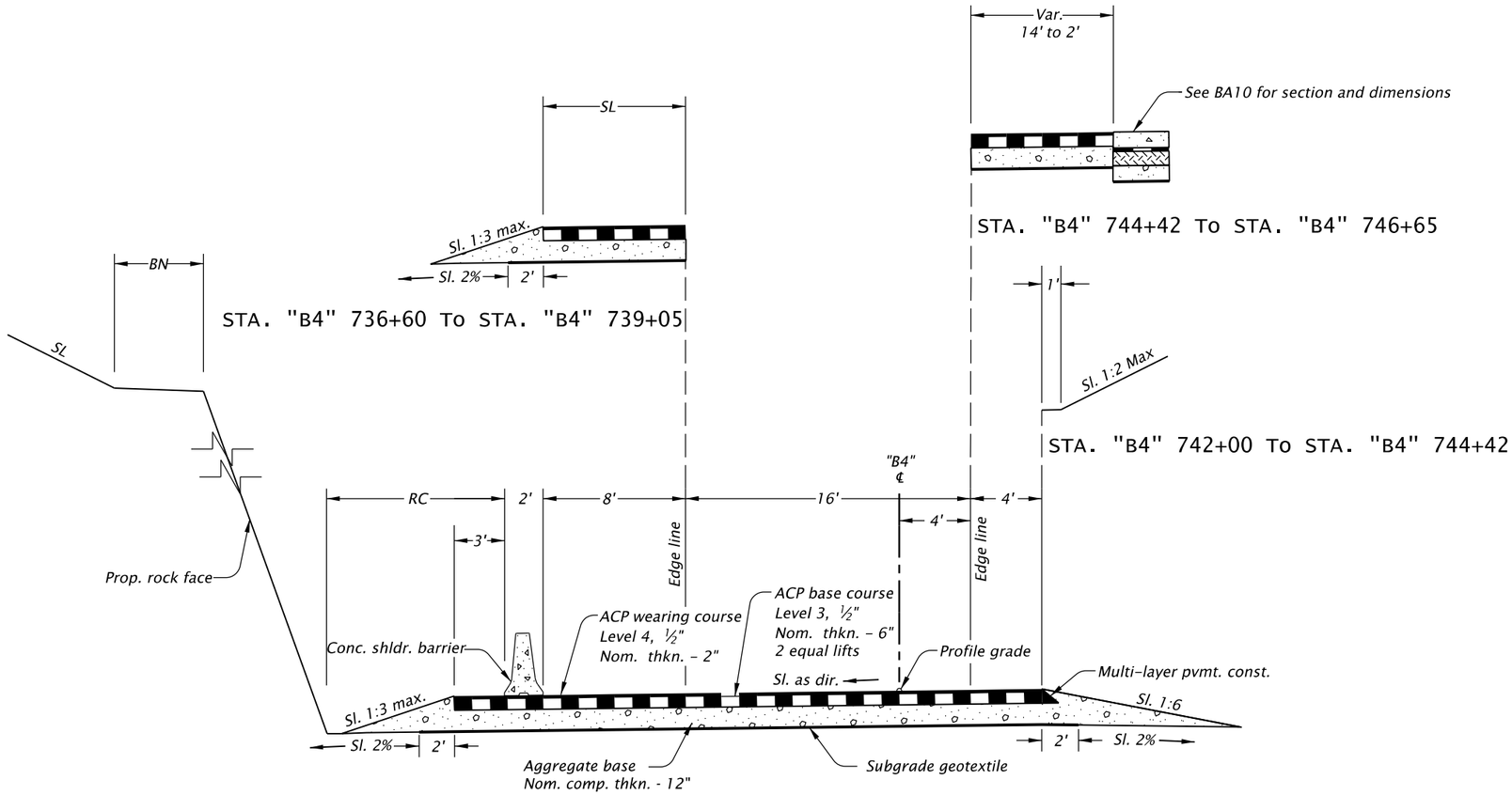

NB Exit Ramp
STA. "B4" 736+60 To STA. "B4" 746+65

STA. TO STA.		SL
736+60	738+68	8'
738+68	739+05	Var. 8' to 13'

STA. TO STA.		BN
736+05	744+55	5'
744+55	744+65	Var. 5' to 10'
744+65	746+65	10'

STA. TO STA.		RC
739+05	744+80	10'
744+80	745+05	Var. 10' to 24'
745+05	746+65	24'

STA. TO STA.		SL
736+05	741+84	1:2
741+84	742+19	Var. 1:2 to 1:1
742+19	743+62	1:1
743+62	743+97	Var. 1:1 to 1:2
743+97	746+65	1:2

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see drg. no. RD140.
3. For slope rounding, see drg. no. RD150.
4. For CRCP details, see shts. BBXX - BBXX.
5. For subgrade stabilization, see sht. BB01.
6. Use PG 64-22 in Level 3, 1/2" dense ACP base course.
7. Use PG 70-22 in Level 4, 1/2" dense ACP wearing course.

REGISTERED PROFESSIONAL ENGINEER
77911PE
OREGON
JULY 14, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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503.423.3700

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

TYPICAL SECTIONS

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R_K19786_HDR_ty_01.dgn :: Typical_Sections 2/7/2020 4:02:09 PM CDONOVAN
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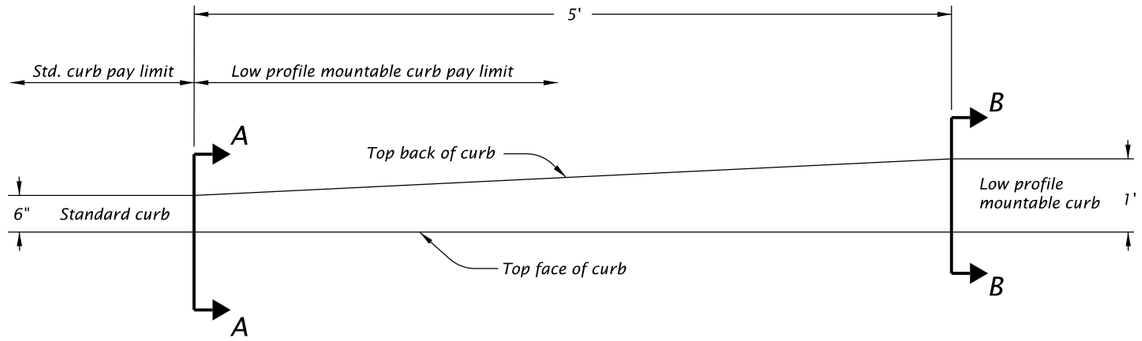
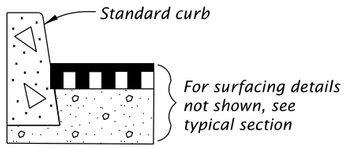
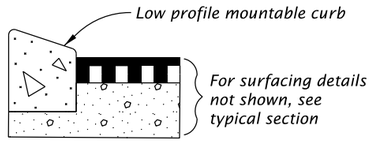




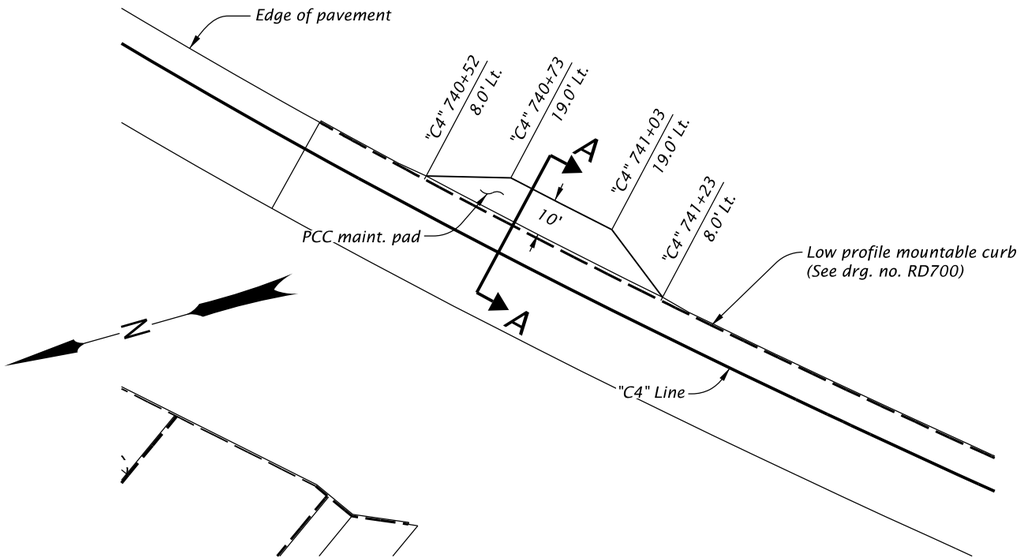
SECTION A-A



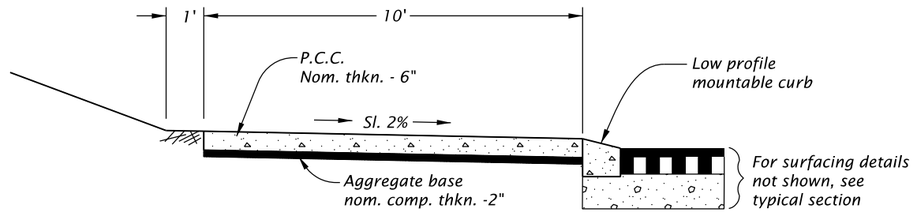
SECTION B-B

Notes:
1. For curb details not shown, see RD700.
2. Begin transition at "C4" 740+44 lt.

STANDARD CURB TRANSITION TO LOW PROFILE MOUNTABLE CURB (NOT TO SCALE)



"C4" MAINTENANCE PAD (NOT TO SCALE)



SECTION A-A

REGISTERED PROFESSIONAL ENGINEER
7791 PE
OREGON
JULY 14, 2011
JOHN M. RAHM
EXPIRES: DEC. 31, 2020

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mark Taylor
Reviewer: John Wolf
Drafter: Connor Donovan
Checker: Brendan LeBlanc

DETAILS

SHEET NO.

R_K19786_HDR_dt_01.dgn :: BB08 2/7/2020 4:02:47 PM CDONOVAN

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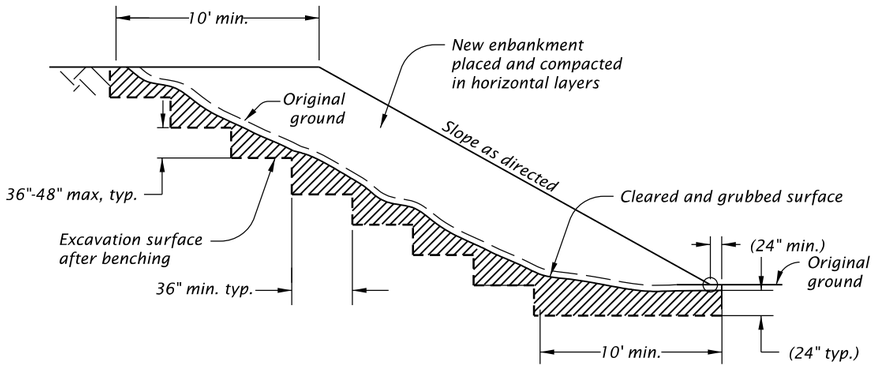


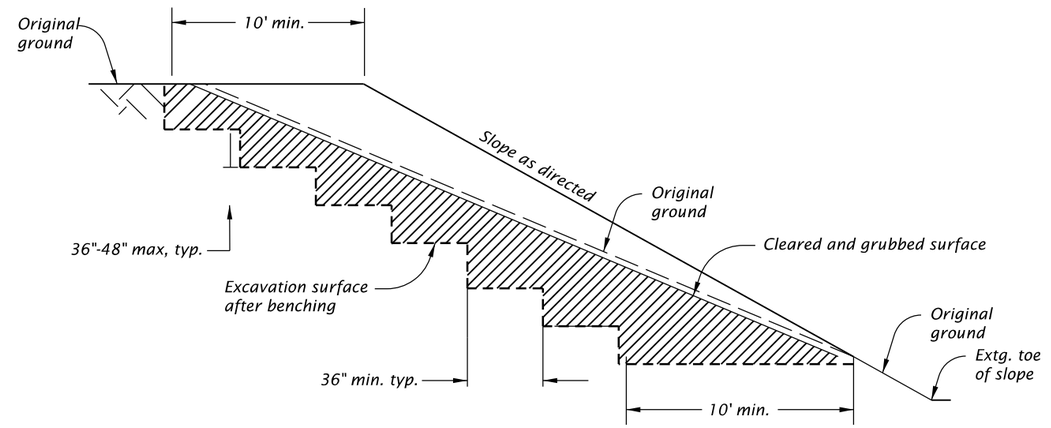
STANDARD ENBANKMENT CONSTRUCTION DETAIL

(Not to scale)

Enbankment general notes:

1. *Construct benches on original ground slopes steeper than 1V:5H to provide positive bond with existing ground.*
2. *Benching work and materials, are incidental to enbankment construction.*

Excavation



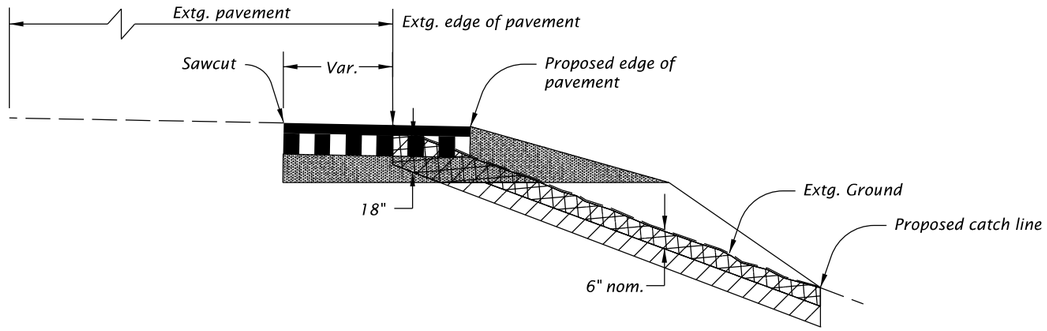
Excavation

SLIVER FILL CONSTRUCTION DETAIL

(Not to scale)

Enbankment general notes:

1. *Construct benches on original ground slopes steeper than 1V:5H to provide positive bond with existing ground.*
2. *Benching work and materials, are incidental to enbankment construction.*
3. *Applies to embankments which tow out at a height greater than 5' above the existing toe of slope.*



UNCLEAN MEDIA EXCAVATION DETAIL

(Not to scale)

Enbankment general notes:

1. *Material removed from the unclean media zone shown from all earthwork shall be managed in accordance with section 00294*
2. *Separate material below the unclean media & reuse onsite, or haul off site in accordance with section 00330*
3. *All clearing material shall be hauled off site*
4. *Excavate to depths as required for the purposed grading. Over-excavation to the full 18" depth of unclean media is not required.*

Grubbing material. Reuse on site or dispose of at mandatory disposal site shown on sht. GG01

Unclean material shown thus

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77918 PE
OREGON
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1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mark Taylor | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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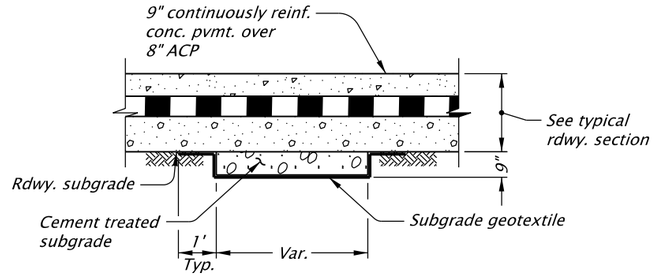
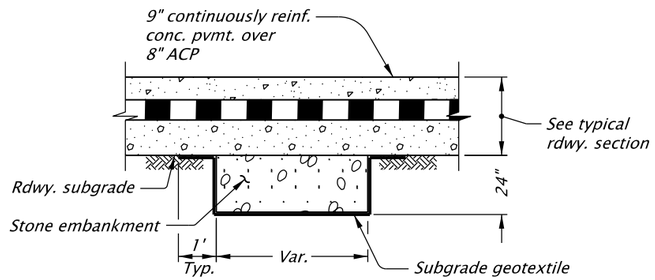
Rotation: 0° 0'



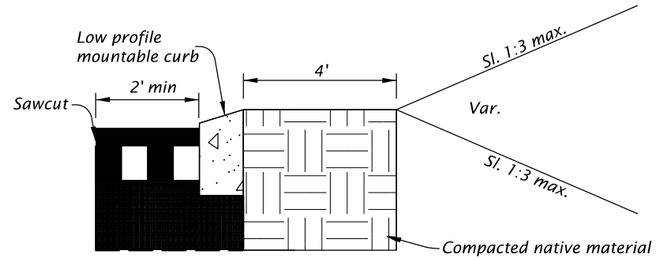
9" CEMENT TREATED SUBGRADE STABILIZATION



24" STONE EMBANKMENT SUBGRADE STABILIZATION

NOTES:

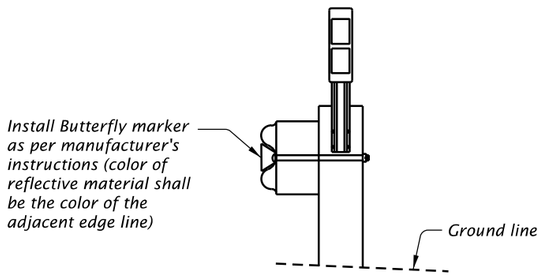
1. *Stone embankment or cement treated subgrade stabilization to be used in areas not meeting compaction requirements.*
2. *Assume a quantity of XXX,XXX for estimating purposes. 10% of this quantity is assumed to be 24" subgrade stabilization and 90% is cement treated subgrade 9-inch thick. Stabilization type to be approved by Engineer.*
3. *Locate as directed by Engineer.*
4. *For surfacing details not shown, see typical sections.*



NOTES:

1. *For surfacing details not shown, see typical sections.*
2. *See std. drg. no. RD700 for curb details not shown.*

LOW PROFILE MOUNTABLE CURB CONSTRUCTION



Note: Install at 50' spacing

GUARDRAIL DELINEATOR, TYPE 6

REGISTERED PROFESSIONAL ENGINEER
77911PE
OREGON
JULY 14, 2011
JON M. RAHM
EXPIRES: DEC. 31, 2020

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mark Taylor
Drafter: Connor Donovan
Reviewer: John Wolf
Checker: Brendan LeBlanc

DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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R_K19786_HDR_dt_01.dgn :: BB10 2/7/2020 4:03:14 PM CDONOVAN

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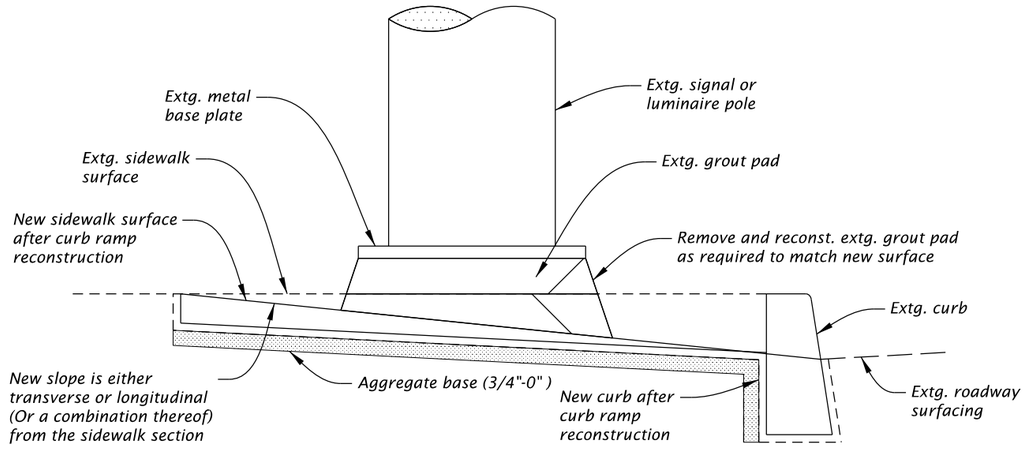
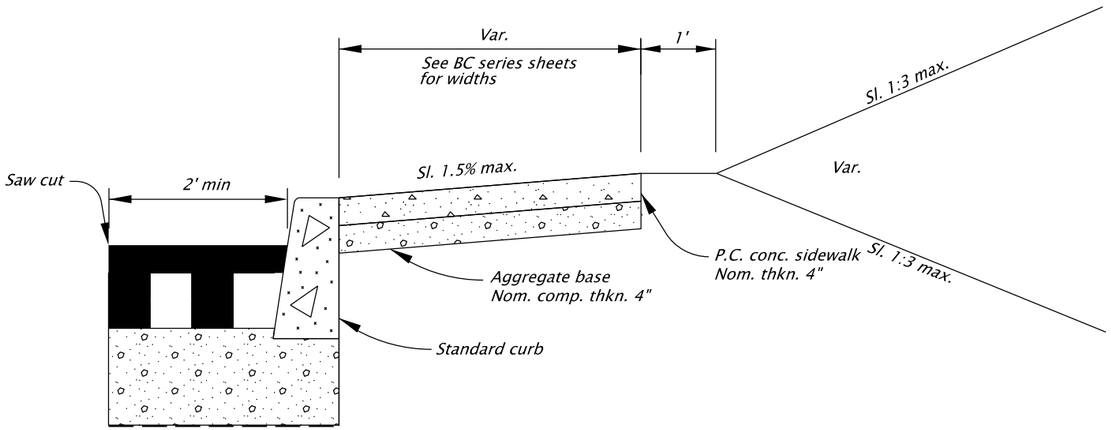


NOTES:
1. This applies to sidewalk reconstruction areas where signal poles are affected. Work is incidental to sidewalk reconstruction.
2. Finished sidewalk cross slope must meet max/min slope and min clearance shown on plans.

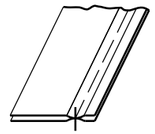
POLE BASE GROUT PAD



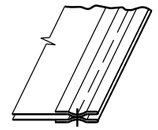
NOTES:
1. For pavement details not shown, see typical sections
2. See std. drg. no. RD700 for curb details not shown
3. E = 7", H = 16"

CURB WITH SIDEWALK

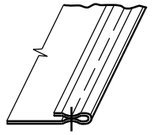
GEOTEXTILE STITCHING



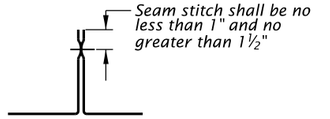
TYPE SSa-1



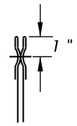
TYPE SSd-1



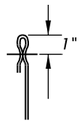
TYPE SSn-1



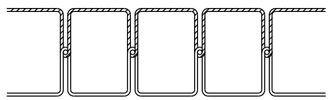
"FLAT" OR "PRAYER" SEAM SSa-1



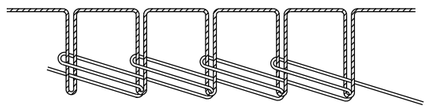
"BUTTERFLY" SEAM SSd-1



"J" SEAM SSn-1



STITCH TYPE 301



STITCH TYPE 401

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77911PE
OREGON
JULY 14, 2011
JON M. RAHM
EXPIRES: DEC. 31, 2020

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mark Taylor
Reviewer: John Wolf
Drafter: Connor Donovan
Checker: Brendan LeBlanc

DETAILS

SHEET NO.

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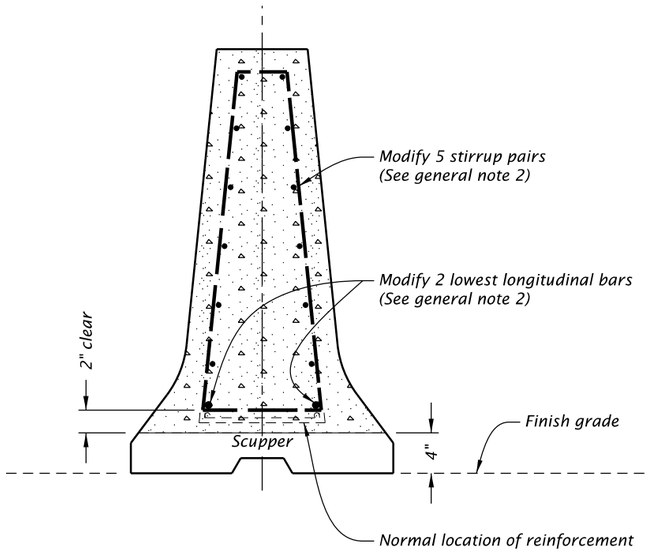
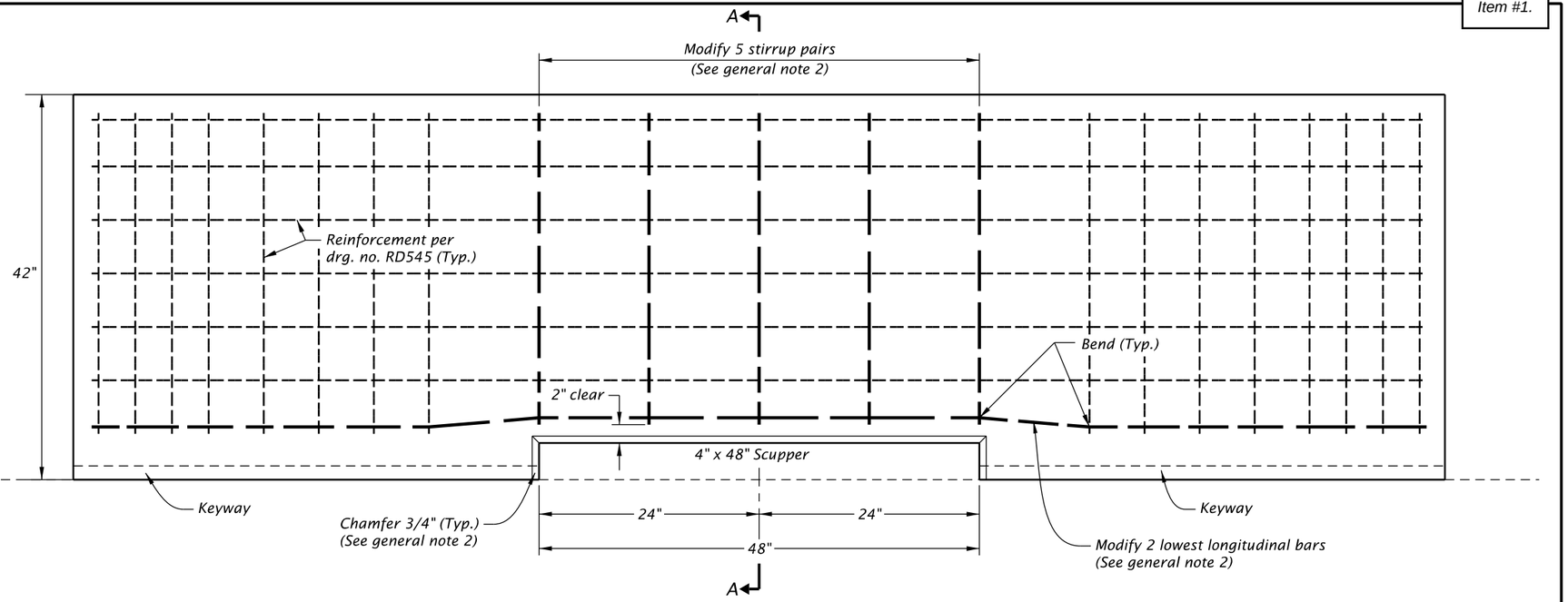
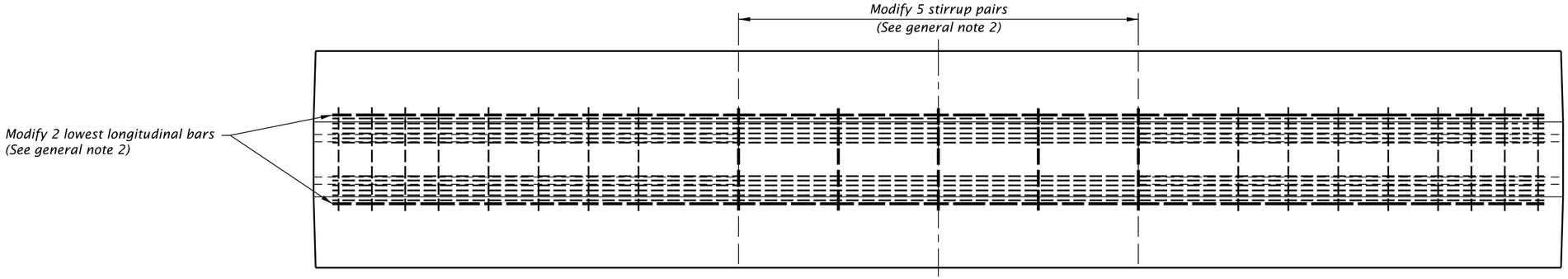


SECTION A-A



ELEVATION



PLAN

GENERAL NOTES FOR ALL DETAILS:

1. *See drg. no. RD545 for precast tall (42") concrete barrier details not shown.*
2. *Modify drg. no. RD545 as shown above:*
   a) *Omit the 2 (3" x 12") scuppers, and provide a single 4" x 48" scupper, at midpoint.*
   b) *Chamfer all scupper edges ¾" (Typ.).*
   c) *At the scupper, modify 2 lowest longitudinal bars (By bending), to provide 2" cover.*
   d) *At the scupper, modify 5 stirrup pairs (By shortening), to provide 2" cover.*

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JULY 14, 2011
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mark Taylor
Drafter: Connor Donovan
Reviewer: John Wolf
Checker: Brendan LeBlanc

DETAILS

SHEET NO.

R_K19786_HDR_dt_01.dgn :: BB12 2/7/2020 4:03:37 PM CDONOVAN
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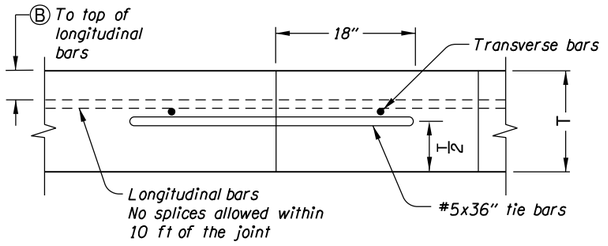
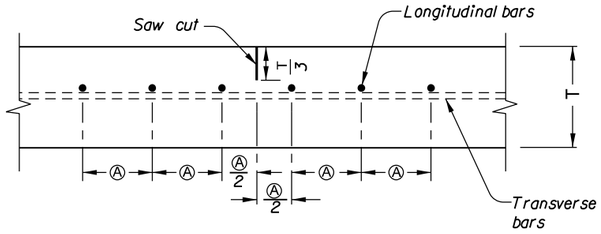
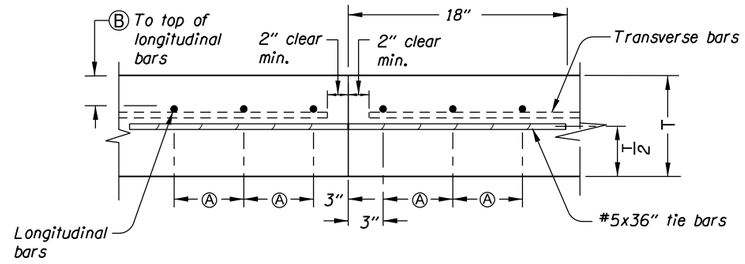


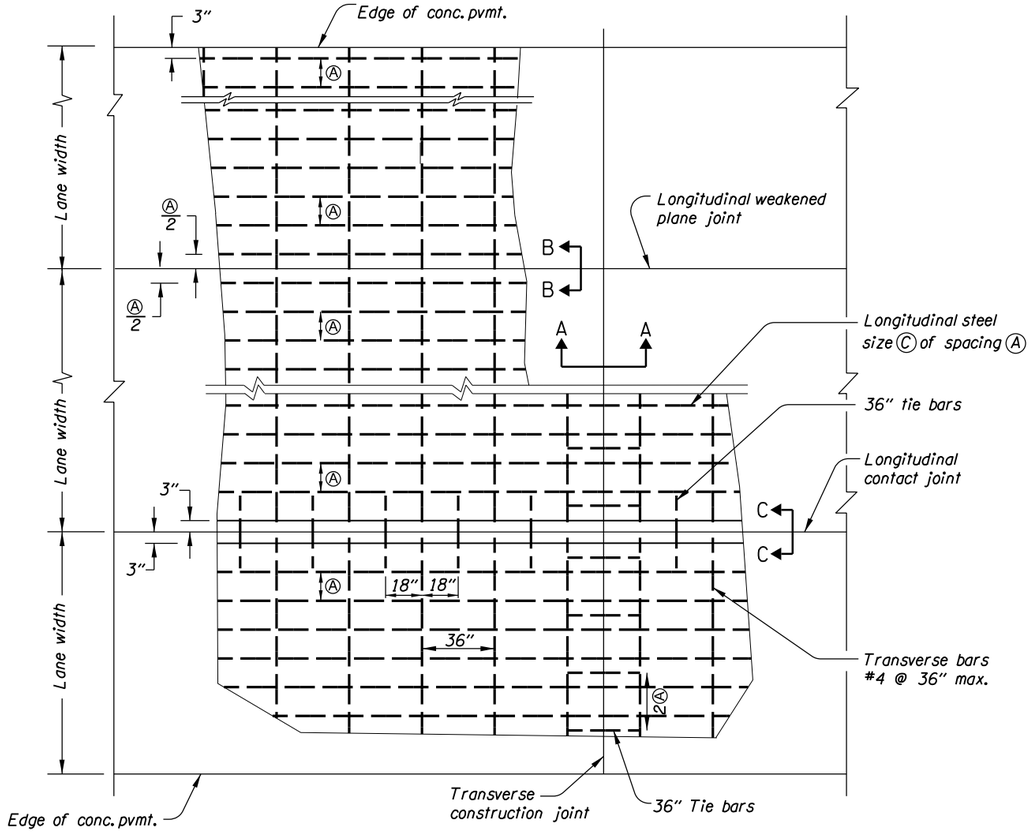
SECTION A-A
TRANSVERSE CONSTRUCTION JOINT



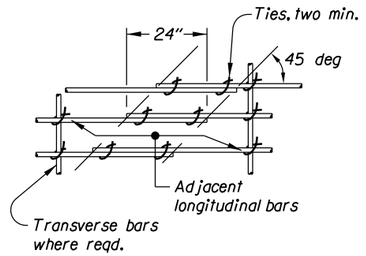
SECTION B-B
LONGITUDINAL WEAKENED PLANE JOINT



SECTION C-C
LONGITUDINAL CONTACT JOINT



TYPICAL PAVEMENT LAYOUT
PLAN VIEW (NOT TO SCALE)



LAPPING METHOD

PVMT. THKN. T (in)	Ⓐ (in)	Ⓑ (in)	Ⓒ BAR SIZE

Ⓐ = Max. bar spacing

Ⓑ = Depth to top of longitudinal bars

NOTE:
Spacing and depth of longitudinal steel is specific to each project.

PAVEMENT AND STEEL DETAILS

GENERAL NOTES FOR ALL DETAILS:

1. *Pavement width, pavement thickness, the crown cross-slope, and related details are shown elsewhere in the plans.*
2. *Install tie bars for longitudinal contact joint by drilling and securing according to the applicable specifications for resin bonded anchors. When approved by the Engineer, tie bars may be installed by inserting into plastic concrete at longitudinal contact joint.*
3. *Use reinforcing steel conforming to ASTM A706 or AASHTO M31 (ASTM A615) grade 60. Use full length bars as shown, and place them a minimum 2" clear of the nearest face of conc. unless shown or noted otherwise.*
4. *Construct a longitudinal joint (Section B-B or Section C-C) for pavement widths of more than 15 ft. Locate these joints within 6 in. of the lane line unless the joint location is shown elsewhere on the plans.*
5. *Use HPC4000-1½ paving concrete.*

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OREGON
JULY 14, 2011
JON M. RAHM
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mark Taylor
Reviewer: John Wolf
Drafter: Connor Donovan
Checker: Brendan LeBlanc

DETAILS

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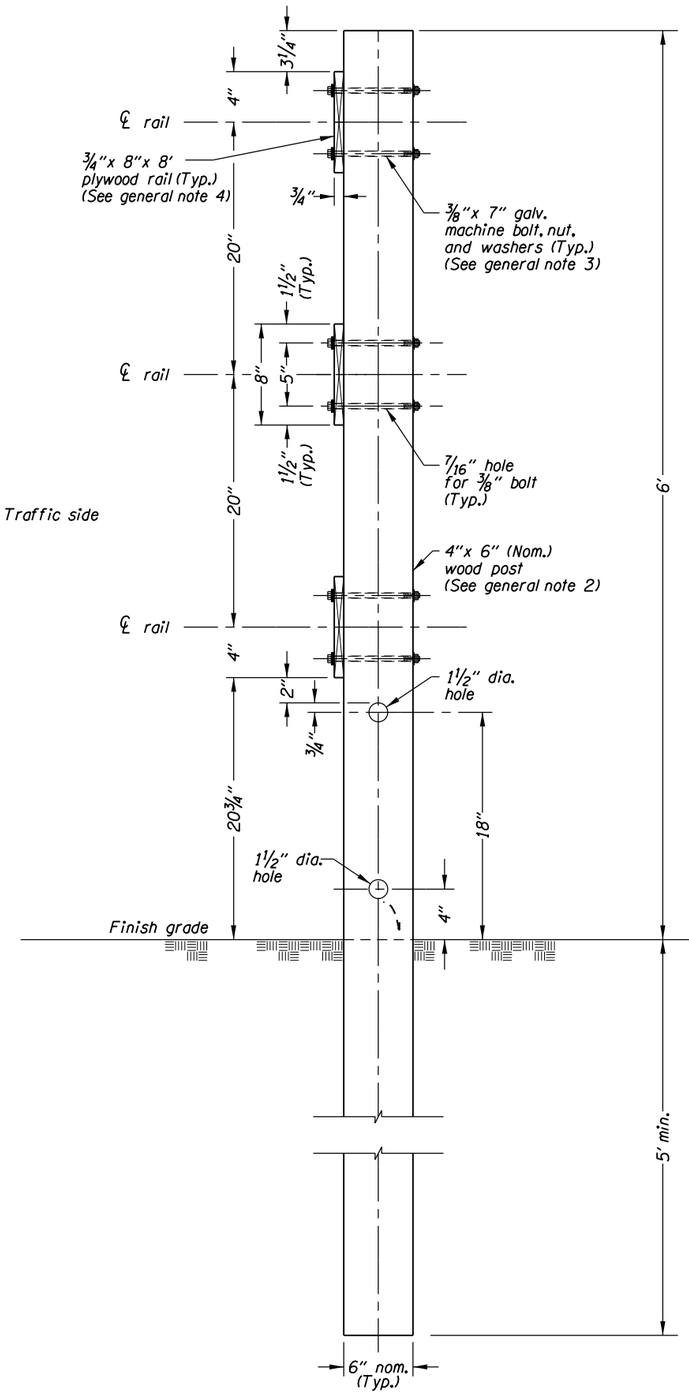
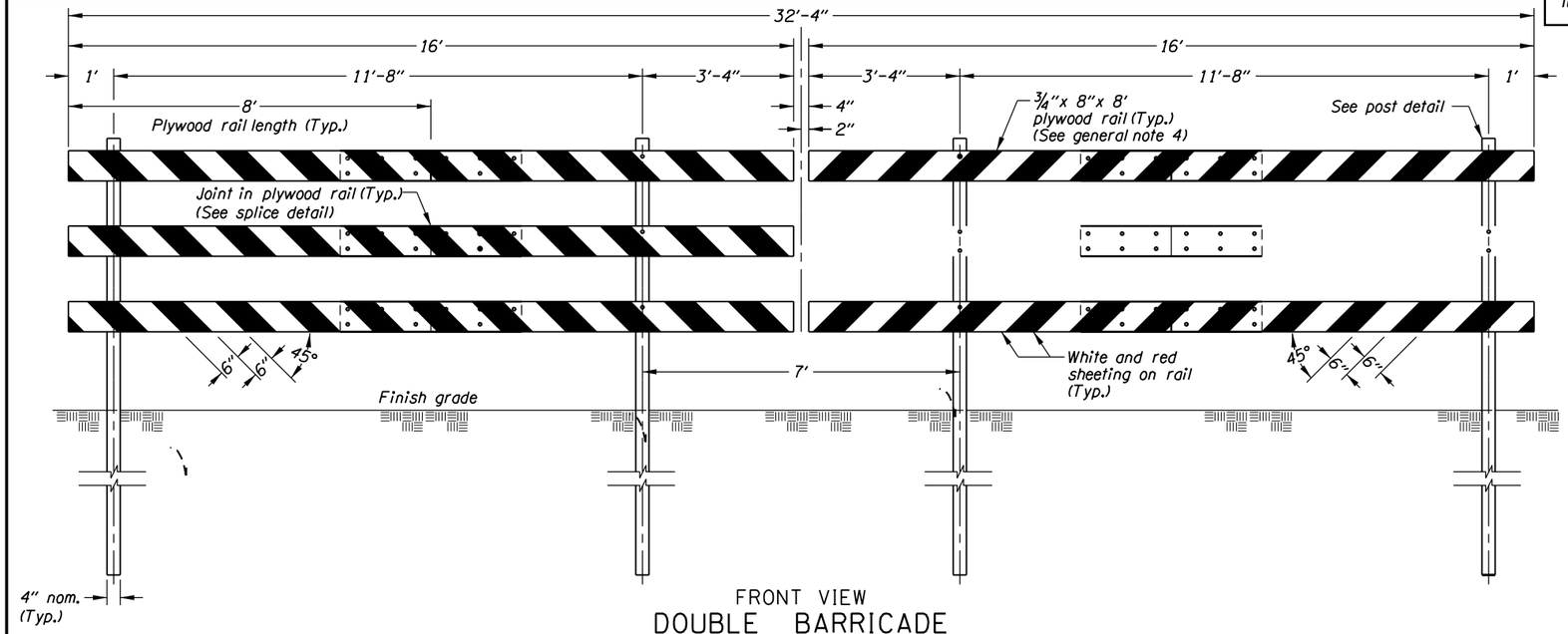


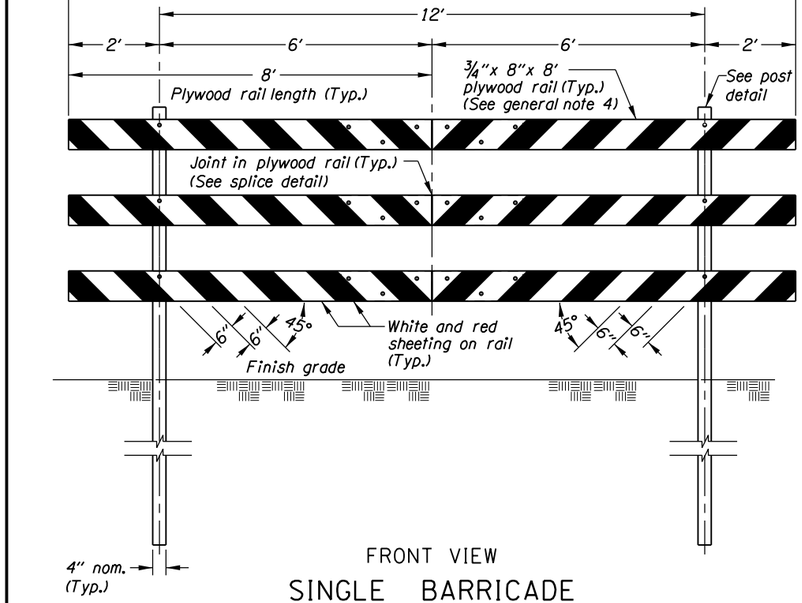
RIGHT SIDE VIEW

POST DETAIL



FRONT VIEW

DOUBLE BARRICADE

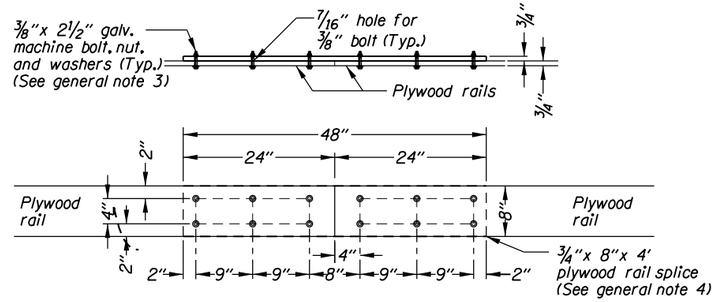


FRONT VIEW

SINGLE BARRICADE

NOTES TO DESIGNER:
1. Do not place any barricades in the clear zone for traffic approaching barricade ends.

GENERAL NOTES FOR ALL DETAILS:
1. Post spacing shall not be less than 7' center to center.
2. Wood posts shall comply with the requirements for wood post sign supports per drg. no. TM670.
3. Bolt, nuts, & washers shall comply with the requirements for sign attachments per drg. no. TM676.
4. Plywood rails & splices shall comply with the requirements for permanent signing plywood.



SPLICE DETAIL

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77911 PE
OREGON
JULY 24, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm	Reviewer: John Wolf
Drafter: Connor Donovan	Checker: Brendan LeBlanc

DETAILS

SHEET NO.

R_K19786_HDR_dt_01.dgn :: BB15 2/7/2020 4:03:38 PM CDONOVAN

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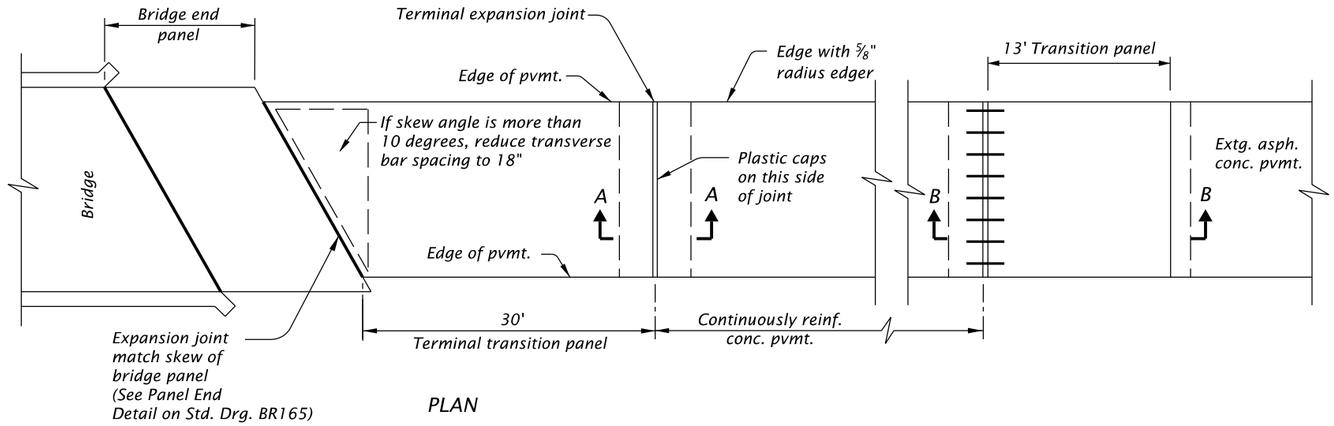
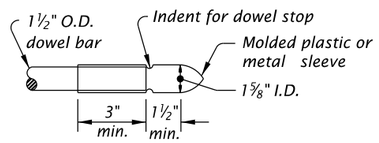


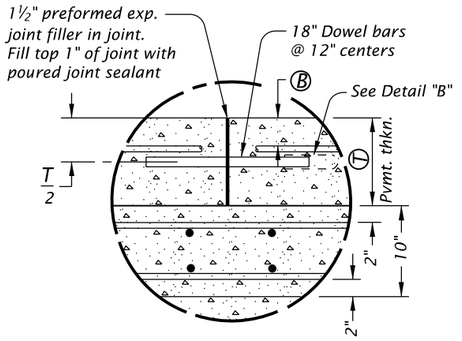
PLAN

ELEVATION

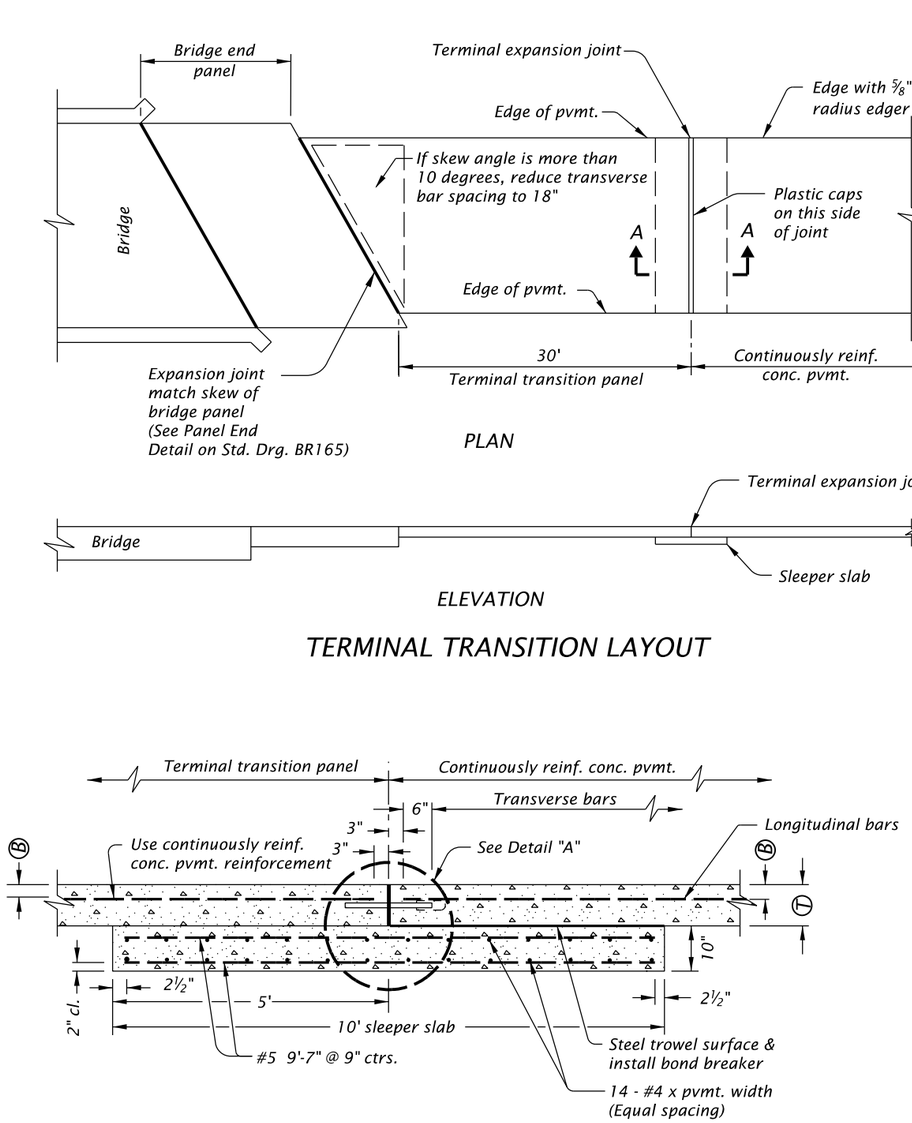
TERMINAL TRANSITION LAYOUT



DETAIL "B"

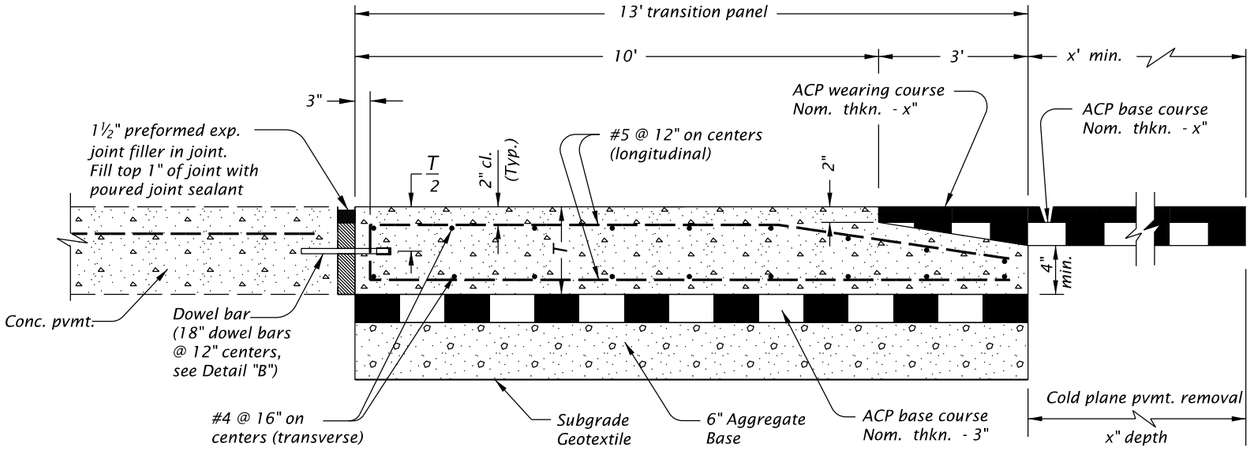


DETAIL "A"



SECTION A-A

TERMINAL EXPANSION JOINT



SECTION B-B

TRANSITION PANEL

GENERAL NOTES FOR ALL DETAILS:

1. *Use a transition panel at the transition to an asphaltic conc. pvmt.*
2. *Lap all bars 24" at splices.*
3. *Use reinforcing steel conforming to ASTM A706 or AASHTO M31 (ASTM A615) grade 60. Use full length bars as shown, and place them a minimum 2" clear of the nearest face of conc. unless shown or noted otherwise.*
4. *Use HPC4000-1½ paving concrete.*
5. *For ACP type and other details not shown, see other plan sheets.*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

DETAILS

SHEET NO.

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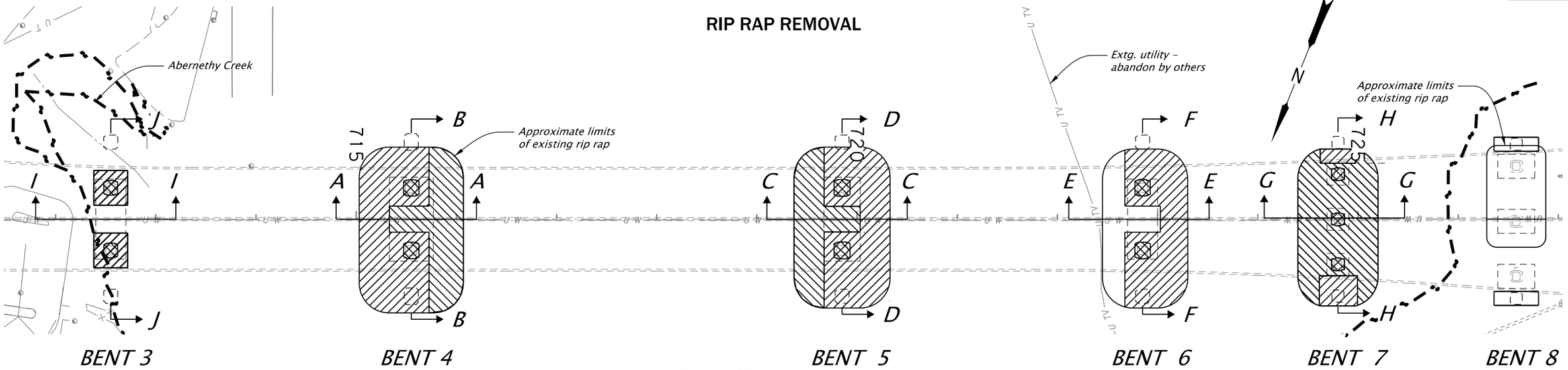
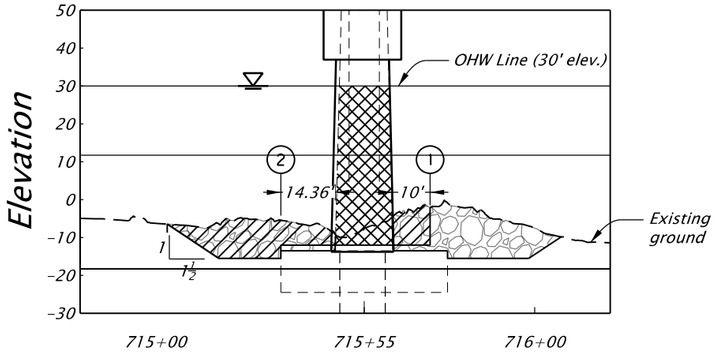
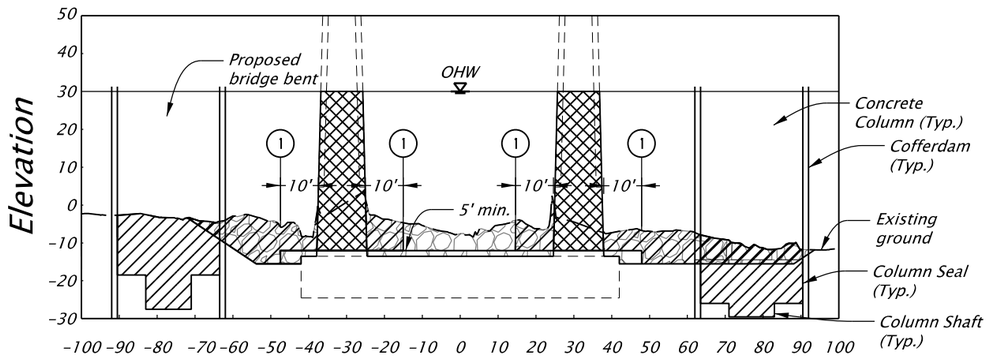
RIP RAP REMOVAL



PLAN VIEW
Scale: 1"=100'



SECTION A-A BENT 4 (STA. 715+55)
Scale: 1"=40'



SECTION B-B BENT 4 (STA. 715+55)
Scale: 1"=40'

TABLE NO. 1 RIP RAP REMOVAL DETAILS

REQUIRED REMOVAL (CY)	ADDITIONAL ALLOWABLE REMOVAL (CY)	TOTAL
7,859	4,730	12,589

LEGEND

- REQUIRED RIP RAP REMOVAL LIMITS
- EXISTING GROUND
- ESTIMATED LIMITS OF EXISTING RIP RAP
- PERM REMOVAL – EXTG. CONCRETE COLUMNS
- POTENTIAL RIP RAP REMOVAL

(1) *Remove rip rap 10' surrounding existing column and to a minimum depth of 5'.*

(2) *Remove rip rap from existing column to edge of footing or a minimum depth of 5'.*

General Note:

Rip rap locations and extg. elevations are approximate and for reference only. Actual rip rap location and depths vary. For additional information, see as-constructed plans
--V---

See sheet A02 for additional bridge and foundation details not shown.

See sheets BB16 & BB17 for additional rip rap removal information.

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77910PE
OREGON
JULY 14, 2011
JASON M. RAHM
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

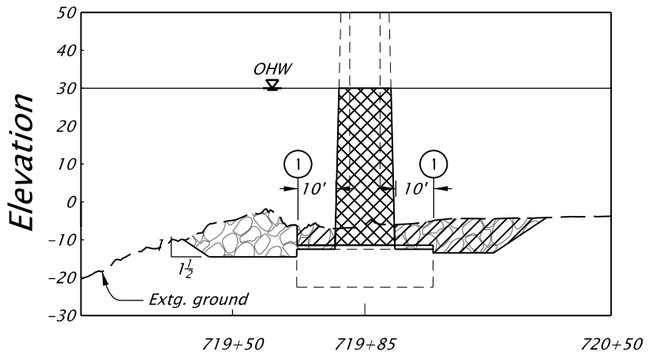
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

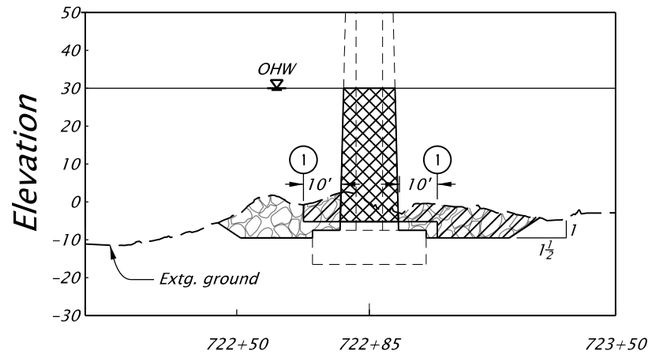
DETAILS

SHEET NO.

RIP RAP REMOVAL

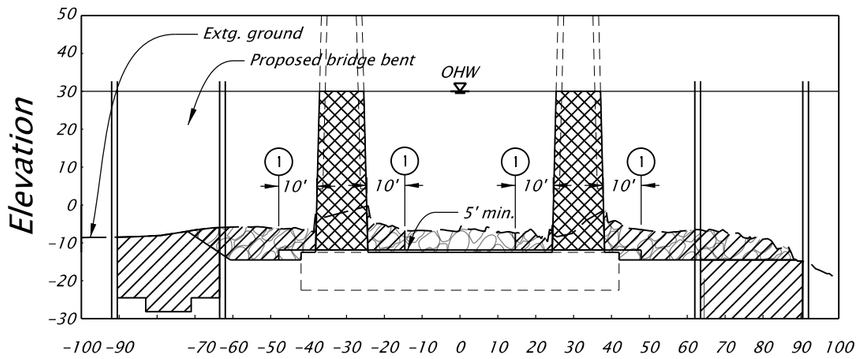


SECTION C-C BENT 5 (STA. 719+85)
Scale: 1"=40'

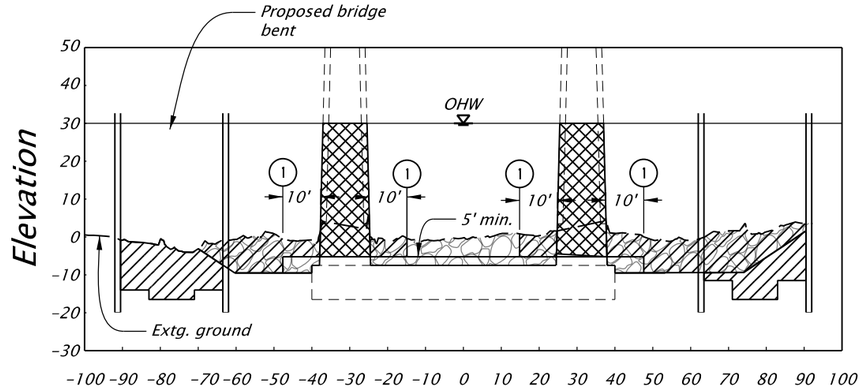


SECTION E-E BENT 6 (STA. 722+85)
Scale: 1"=40'

(1) *Remove rip rap 10' surrounding existing column and to a minimum depth of 5'*



SECTION D-D BENT 5 (STA. 719+85)
Scale: 1"=40'



SECTION F-F BENT 6 (STA. 722+85)
Scale: 1"=40'

General Note:

Rip rap locations and extg. elevations are approximate and for reference only. Actual rip rap location and depths vary. For additional information, see as-constructed plans __V-___.

See sheet A02 for additional bridge and foundation details not shown.

See sheets BB15 & BB17 for additional rip rap removal information.

LEGEND

- *PERM REMOVAL*
- *EXISTING GROUND*
- *ESTIMATED LIMITS OF EXISTING RIP RAP*
- *PERM REMOVAL*

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OREGON
JULY 14, 2011
JASON M. RAHM
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I-205: I-5 - OR213, PHASE 1 SEC.

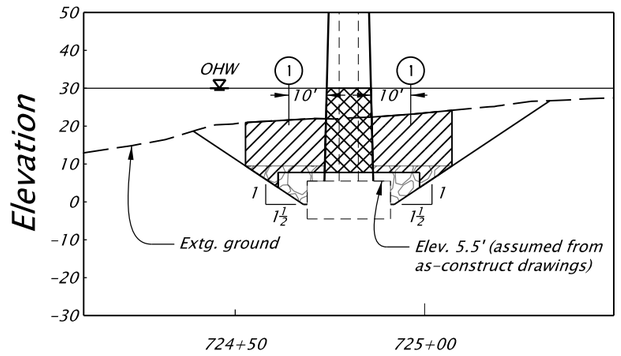
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

DETAILS

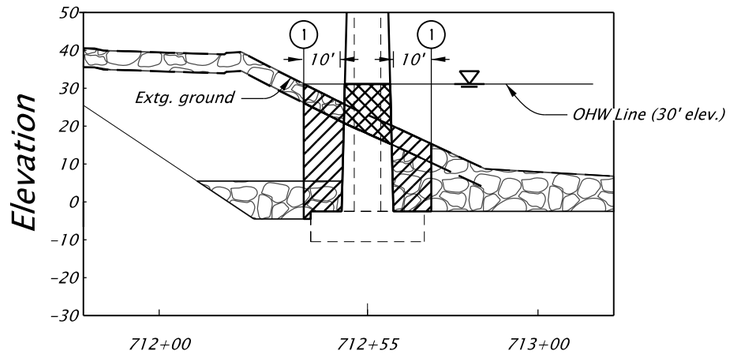
SHEET NO.

RIP RAP REMOVAL



SECTION G-G BENT 7 (STA. 724+80)

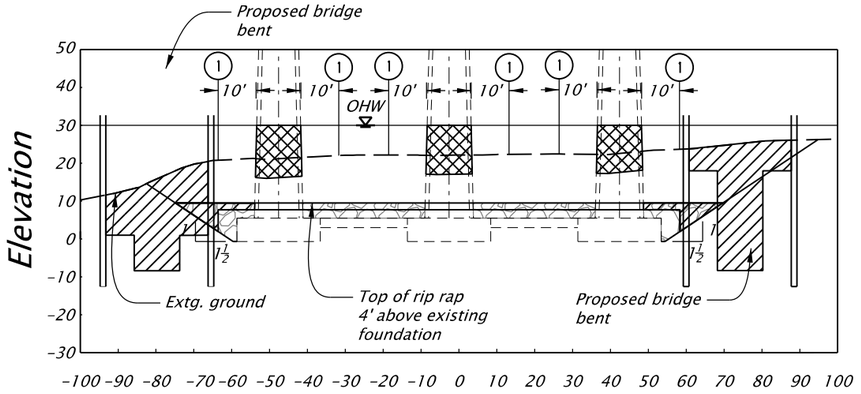
Scale: 1"=40'



SECTION I-I BENT 3 (STA. 712+55)

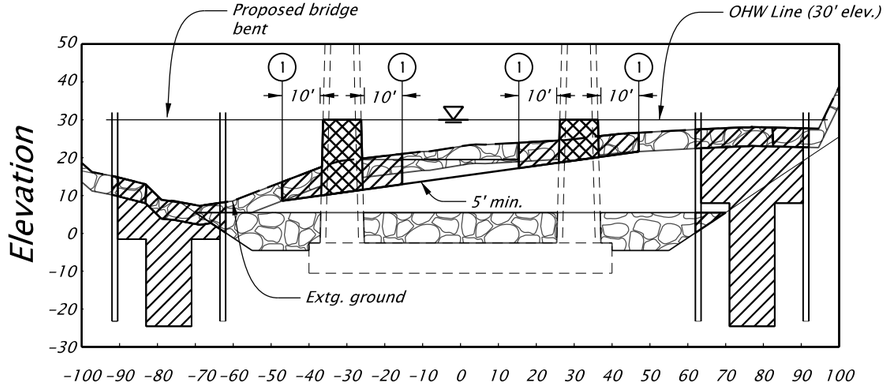
Scale: 1"=40'

(1) *Remove rip rap 10' surrounding existing column and to a minimum depth of 5'*



SECTION H-H BENT 7 (STA. 724+80)

Scale: 1"=40'



SECTION J-J BENT 3 (STA. 712+55)

Scale: 1"=40'

General Note:

Rip rap locations and extg. elevations are approximate and for reference only. Actual rip rap location and depths vary. For additional information, see as-constructed plans __V-___.

See sheet A02 for additional bridge and foundation details not shown.

See sheets BB15 & BB16 for additional rip rap removal information.

LEGEND

- *PERM REMOVAL*
- *EXISTING GROUND*
- *ESTIMATED LIMITS OF EXISTING RIP RAP*
- *PERM REMOVAL - EXTG. CONCRETE COLUMNS*

REGISTERED PROFESSIONAL ENGINEER
77918PE
OREGON
JULY 14, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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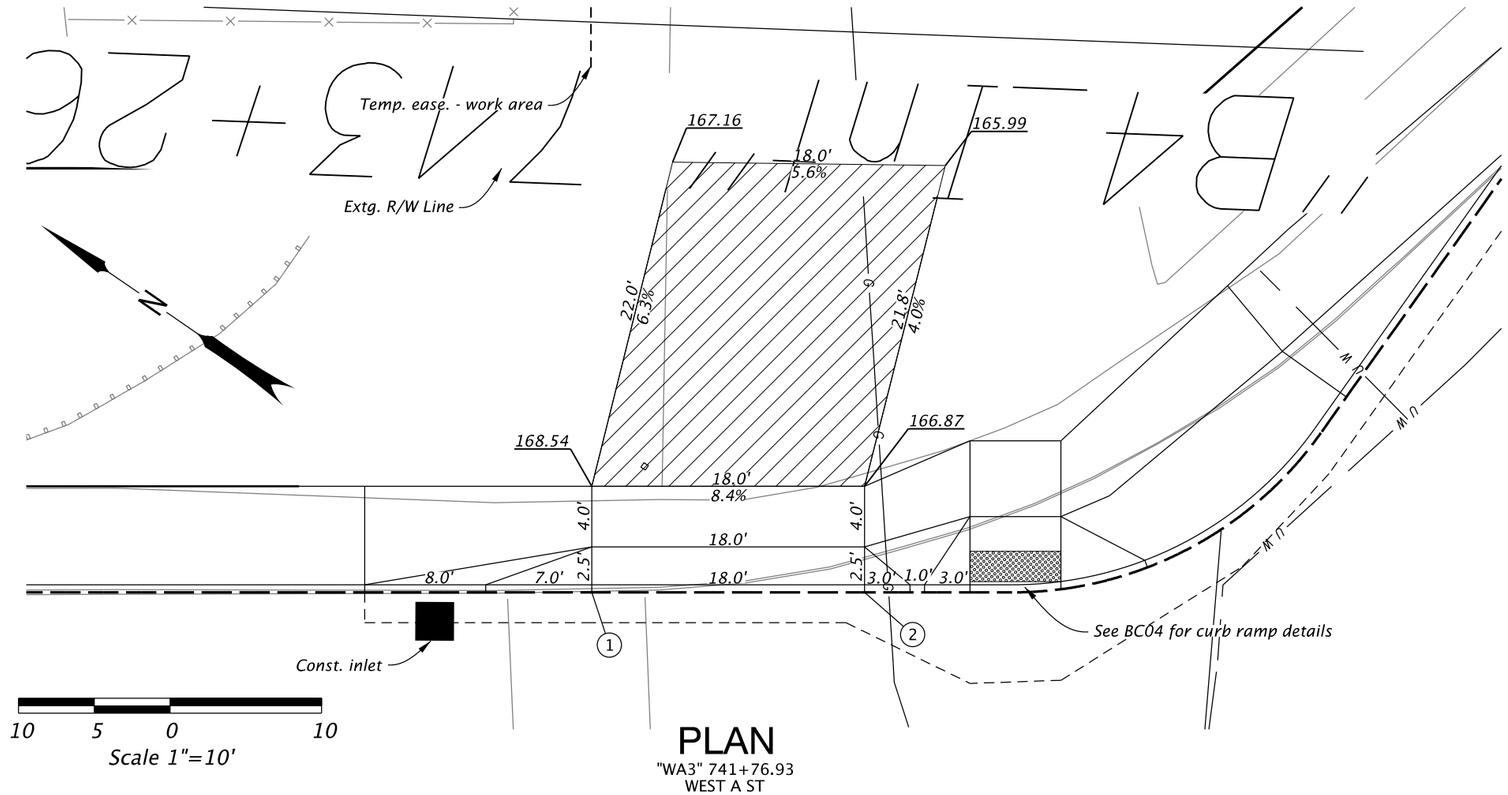
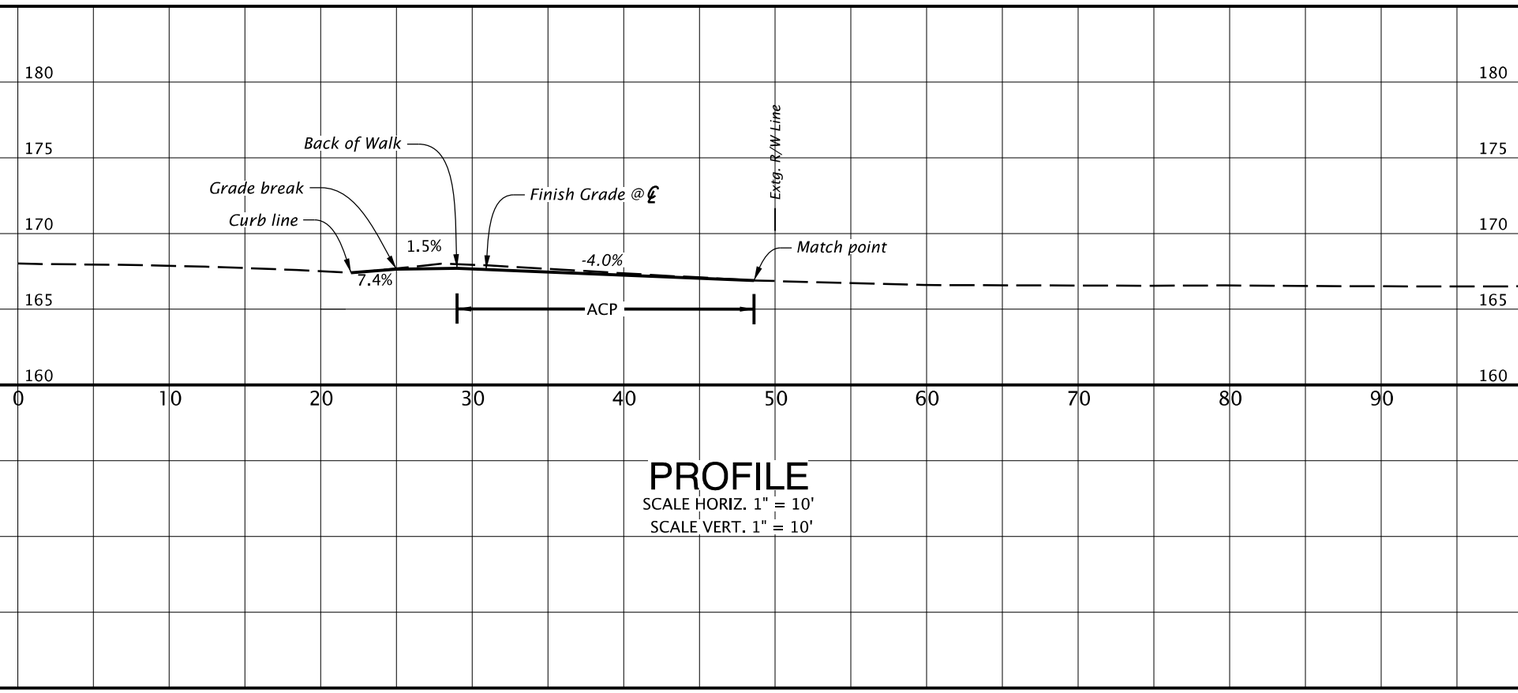
R_K19786_HDR_dt_01.dgn :: BB19-20 2/7/2020 4:03:42 PM CDONOVAN

Rotation: 0° 0'



PLAN

"WA3" 741+76.93
WEST A ST



PROFILE

SCALE HORIZ. 1" = 10'
SCALE VERT. 1" = 10'

Driveway – P.C. Conc.

Driveway paving area

Full depth paving area

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Const. conc. curb.

Sawcut line

Location	"XX" Station	Gutter Elevation	Top Back of Curb
(1)	XX+XX.XX	166.50	166.51
(2)	XX+XX.XX	168.43	168.44

REGISTERED PROFESSIONAL ENGINEER
77918PE
OREGON
JULY 14, 2011
JASON M. RAHM
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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Drafter: Connor Donovan
Reviewer: John Wolf
Checker: Brendan LeBlanc

DRIVEWAY DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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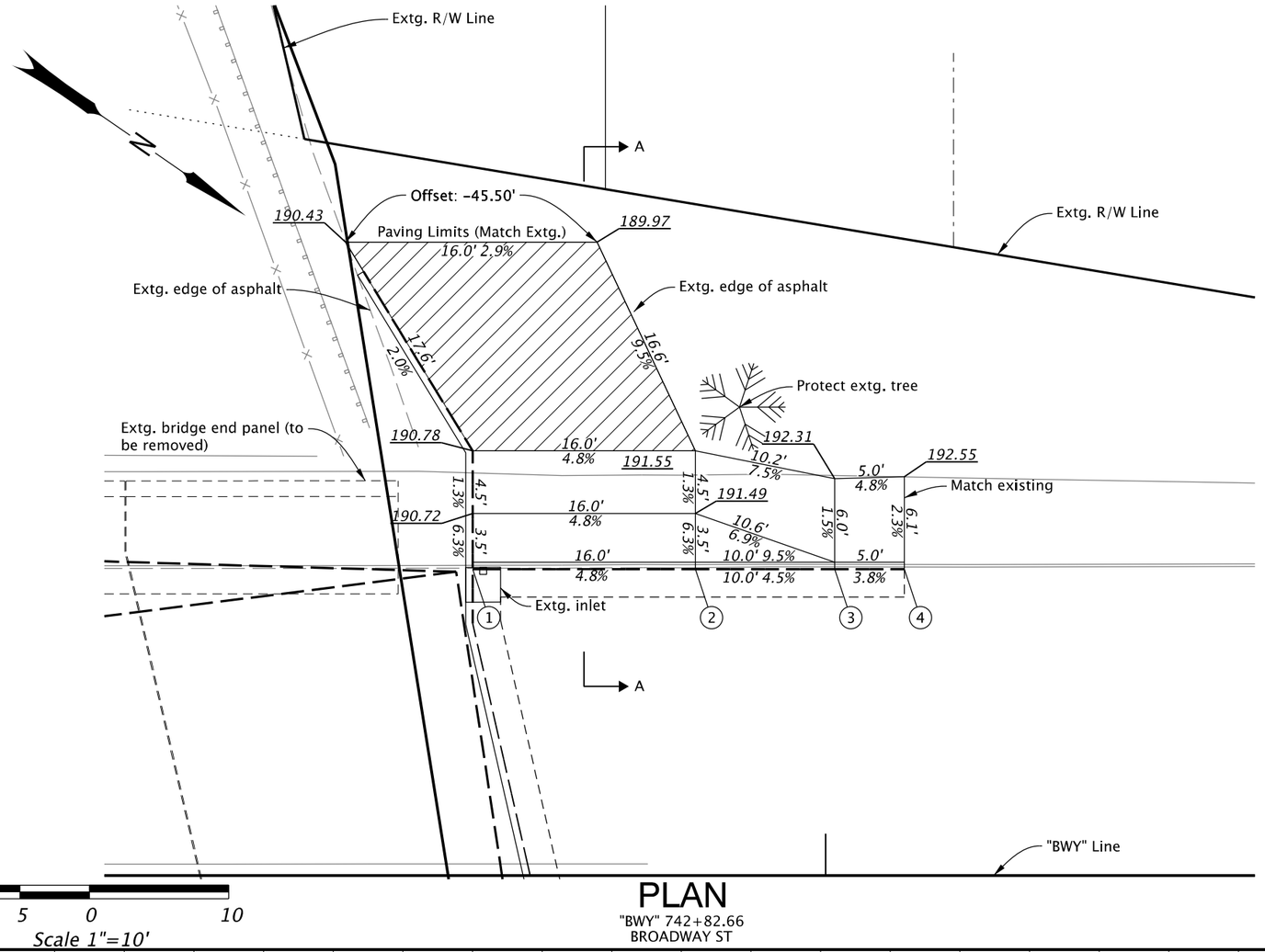
R_K19786_HDR_dt_01.dgn :: BB21 2/7/2020 4:03:43 PM CDONOVAN

Rotation: 304.6864° 0'



PLAN

"BWY" 742+82.66
BROADWAY ST

PROFILE

SCALE HORIZ. 1" = 10'
SCALE VERT. 1" = 10'

Driveway - P.C. Conc.

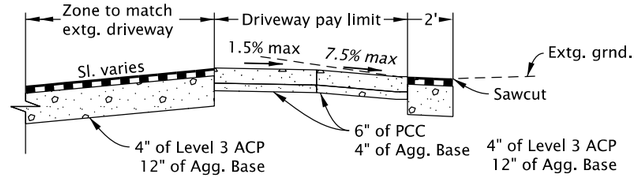
Driveway paving area

Full depth paving area

Const. conc. curb.

Sawcut line

CONSTRUCTION NOTES:



SECTION A-A

Location	"BWY" Station	Offset	Gutter Elevation	Top Back of Curb
1	742+74.66	-22.00	190.50	190.50
2	742+90.66	-22.00	191.27	191.27
3	743+00.66	-22.00	191.72	192.22
4	743+05.66	-22.00	191.91	192.41

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7791 PE
OREGON
JULY 14, 2011
JASON M. RAHM
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

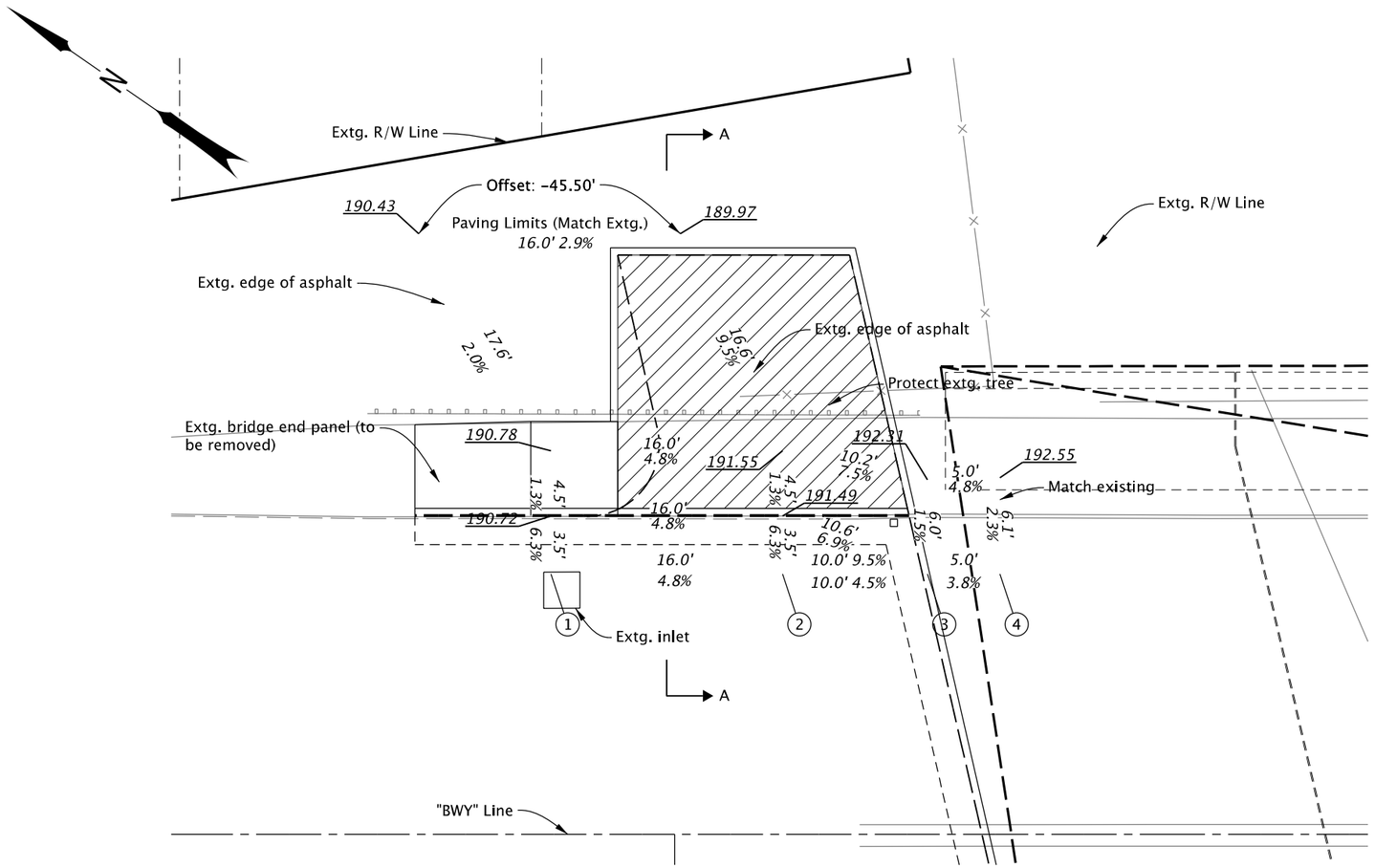
Designer: Jason Rahm
Reviewer: John Wolf
Drafter: Connor Donovan
Checker: Brendan LeBlanc

DRIVEWAY DETAILS

SHEET NO.

R_K19786_HDR_dt_01.dgn :: BB22 2/7/2020 4:03:44 PM CDONOVAN

Rotation: 124.7225° 0'



10 5 0 10

Scale 1"=10'

PLAN

"BWY" 742+82.66
BROADWAY ST

PROFILE

SCALE HORIZ. 1" = 10'
SCALE VERT. 1" = 10'

Driveway – P.C. Conc.

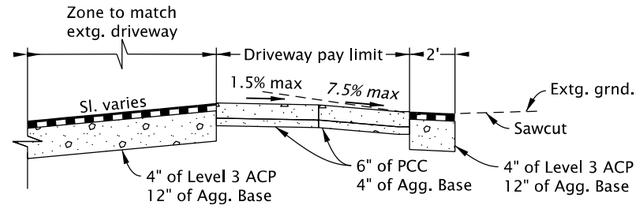
Driveway paving area

Full depth paving area

Const. conc. curb.

Sawcut line

CONSTRUCTION NOTES:



SECTION A-A

Location	"BWY" Station	Offset	Gutter Elevation	Top Back of Curb
1	742+74.66	-22.00	190.50	190.50
2	742+90.66	-22.00	191.27	191.27
3	743+00.66	-22.00	191.72	192.22
4	743+05.66	-22.00	191.91	192.41

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77911PE
OREGON
JULY 14, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Drafter: Connor Donovan
Reviewer: John Wolf
Checker: Brendan LeBlanc

DRIVEWAY DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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R_K19786_HDR_dt_01.dgn :: BB24 2/7/2020 4:03:46 PM CDONOVAN

Rotation: 304.7225° 0'

Linear Referencing Method (LRM) Number
(Use ODOT TransGIS,turn on level Roadside<ADA Ramps
to see LRM and corner position number of ramps inventoried.)

These items represent the minimum information required on curb ramp details

This is a code to identify the intersection on a specific state highway.
There is a four part format for the code: Highway #; Highway Suffix; Roadway ID, Mileage Type.

1) *The Highway Number is a 3 digit number (not the route number) assigned to all state highways by ODOT. Valid numbers are 001-493.*

2) *Highway Suffix is a letter format assigned to frontage roads and connections to identify the unique connection, for example AA or AB. Use the Identify Features tool on the Trans GIS Highway Network layer; turn on Hwy Network-Colored layer for visual reference. If the intersection is not located on a connection use 00 for the code.*

3) *Roadway ID is a one letter code used to identify alignment. There are two possible letter codes; I for increasing mile point direction and D for decreasing mile point direction. For most highways, the I direction is south and east. Note I-5 doesn't follow this rule. Generally "I" will be used. When there is a separated highway there will be an I roadway and a D roadway.*

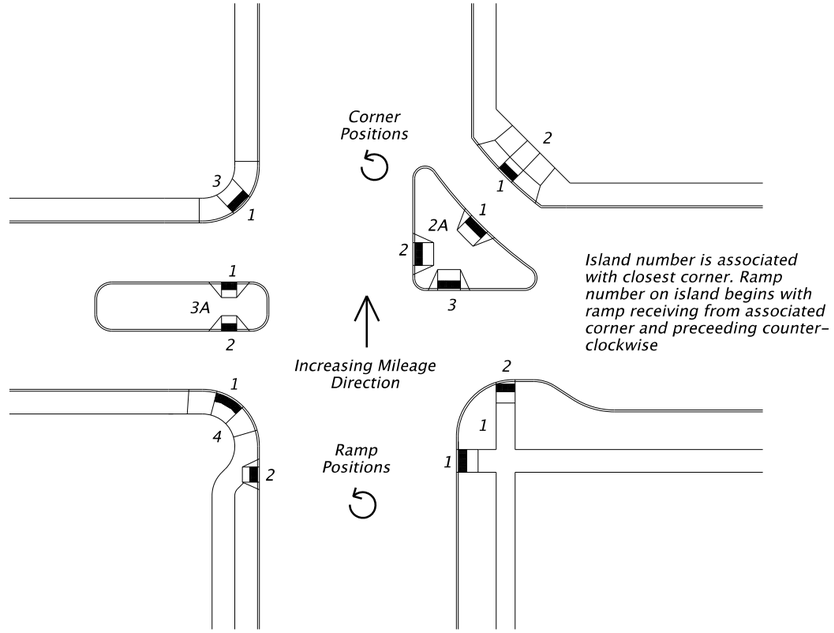
4) *Mileage Type is used when there are multiple locations of the same mile point on a section of highway. Overlay lapping mileage is listed as "z" mileage.*

An LRM number of 22800I00 is on State Highway 228, on the main highway, increasing mile point direction, and is on a section of highway that doesn't have repeating mile point numbers.

Mile point of an intersection is based on the mile point of the center of the intersection listed to the hundredth of a mile.

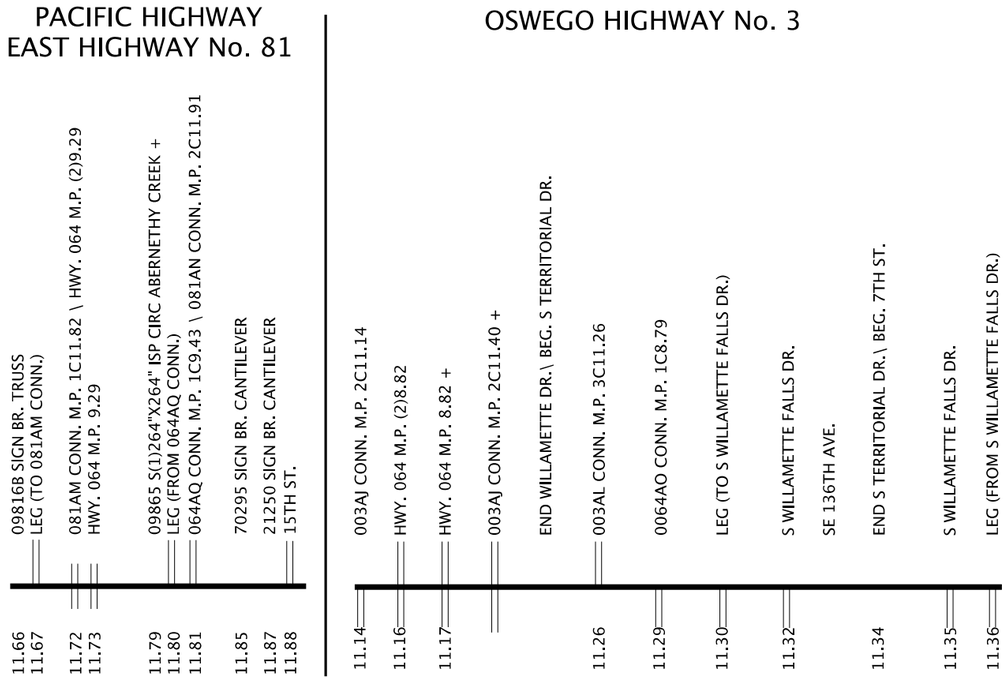
Corner Position is based on increasing mile points beginning with the first corner on the right and proceeds counter-clockwise around the intersection, numbering consecutive 1 through the end of corners. An "A" is added to the number for an island For example an island between corner positions 1 and 2 has a corner position number of 1A (see corner position and ramp position diagram).

Ramp Position is a number given to each ramp beginning with Corner Position 1 and the first ramp encountered in the increasing mile point direction and proceeds counter-clockwise around the corner. Proceed following the pedestrian route and in Corner Position Number order (see corner position and ramp position diagram). When more than one ramp is shown, label the ramps.



CORNER POSITION AND RAMP POSITION DIAGRAM

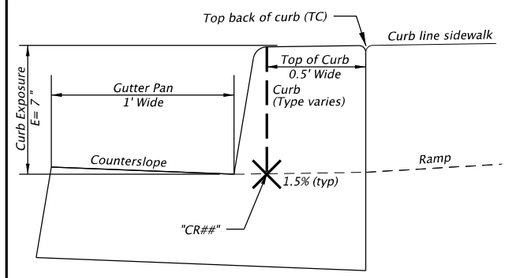
HTTP://WWW.Oregon.gov/ODOT/TD/TDATA/Pages/otms/OTMS_Highway_Reports.aspx
NOTE: Milepoints on Straightline Chart are not to Scale.



This product is for informational purposes only and may not be suitable for legal, engineering, or surveying purposes. This information is provided with the understanding that conclusions drawn from such information are the responsibility of the user.

GENERAL NOTES:

1. *INROADS alignment located at gutter.*
2. *A 10" max. reach is required to the pedestrian pushbutton. See Std. Drg. TM458. Additional concrete may need to be added to provide access to the pedestrian pushbutton.*
3. *Design Exception Control number shown for reference. NA shown where no design exception exists.*
4. *See Std. Drgs. RD752, RD753, RD755-RD757, RD759 for details not shown.*
5. *Elevations shown at a minimum at front and back of ramp, front and back of wings, horizontal breaks along back of sidewalk.*



CURB DETAIL

REGISTERED PROFESSIONAL ENGINEER
7791
OREGON
JULY 14, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Drafter: Connor Donovan
Reviewer: John Wolf
Checker: Brendan LeBlanc

CURB RAMP DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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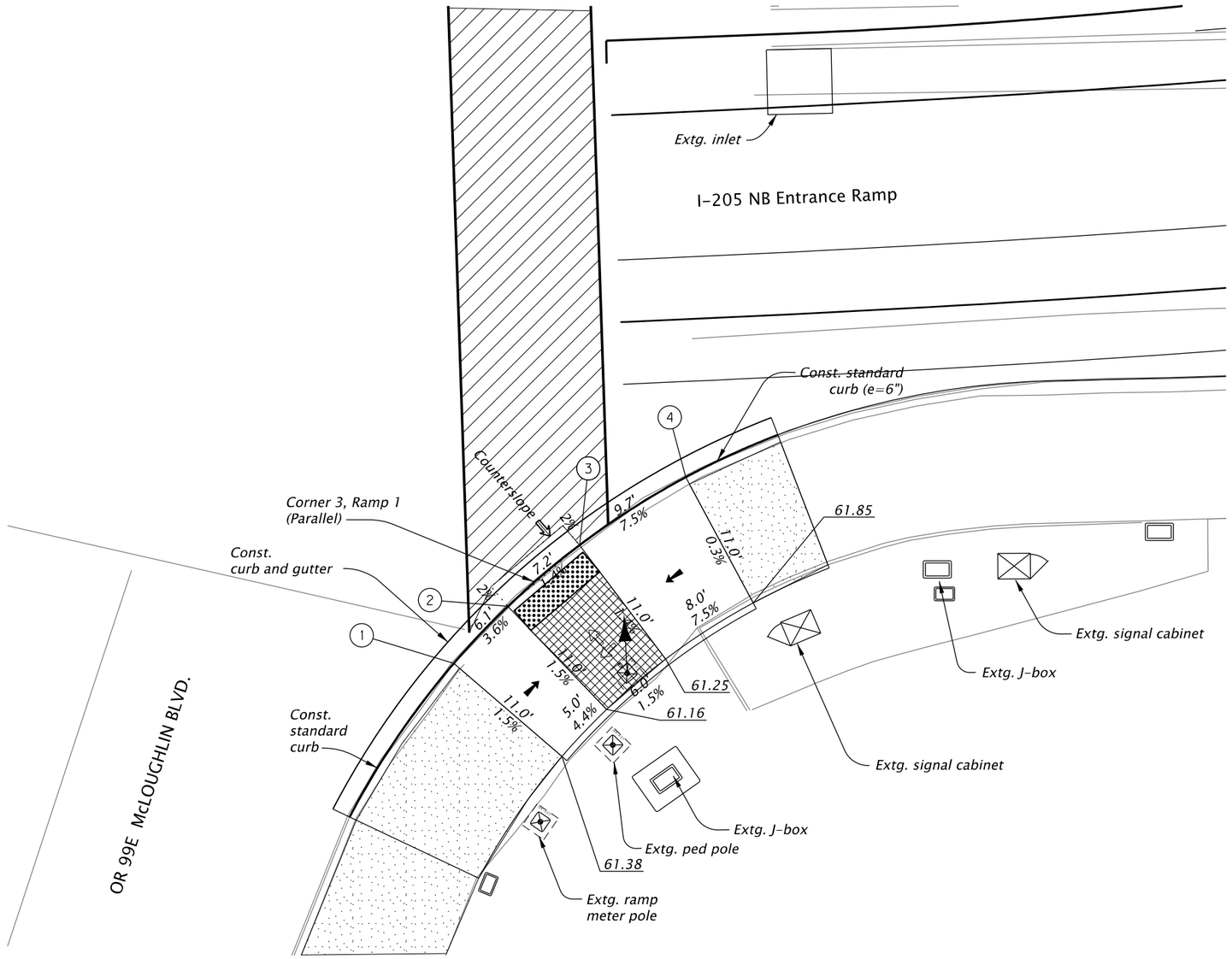


10 5 0 10

Scale 1"=10'

Location	"B2" Station	Gutter Elevation	Top Back of Curb
1	712+20.49	60.64	61.22
2	712+16.16	60.99	61.00
3	712+10.47	61.09	61.10
4	712+02.13	61.32	61.82

OR 99E at I-205 NB ramp terminal (SE Corner)

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.81
CORNER POSITION: 3
RAMP NUMBER: 1

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. Slopes hold over elevations.
2. Max. cross slope change on ramp 0.5% per foot.
3. See Std. Drgs. for details not shown.
4. Curb exposure E = 7" unless otherwise shown.
5. See sheet BC01 for curb detail.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Scott Sinclair
Checker: Name

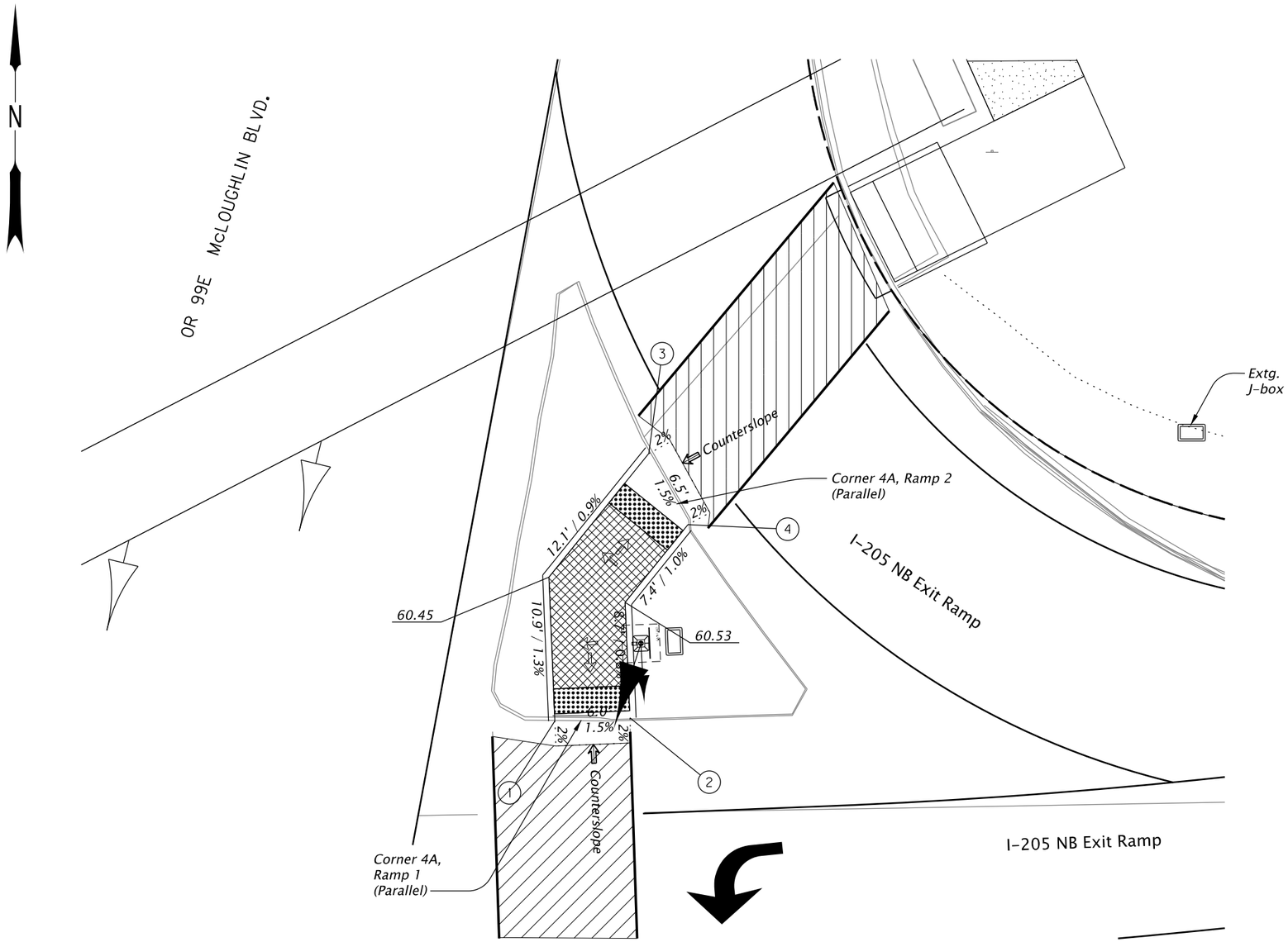
CURB RAMP DETAILS

SHEET NO.

R_K19786_QEI_dt_01.dgn :: BC02 2/11/2020 10:39:02 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'



10 5 0 10

Scale 1"=10'

Location	"A2" Station	Gutter Elevation	Top Back of Curb
1	700+76.23	60.30	60.31
2	700+82.23	60.59	60.60
3	700+84.67	60.33	60.34
4	700+87.47	60.59	60.60

OR 99E at I-205 NB ramp terminal (NE Corner)

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.81
CORNER POSITION: 4A
RAMP NUMBER: 1 & 2

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. *Slopes hold over elevations.*
2. *Max. cross slope change on ramp 0.5% per foot.*
3. *See Std. Drgs. for details not shown.*
4. *Curb exposure E = 7" unless otherwise shown.*
5. *See sheet BC01 for curb detail.*

PRELIMINARY PLANS
INFORMATION ONLY

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I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: Name

CURB RAMP DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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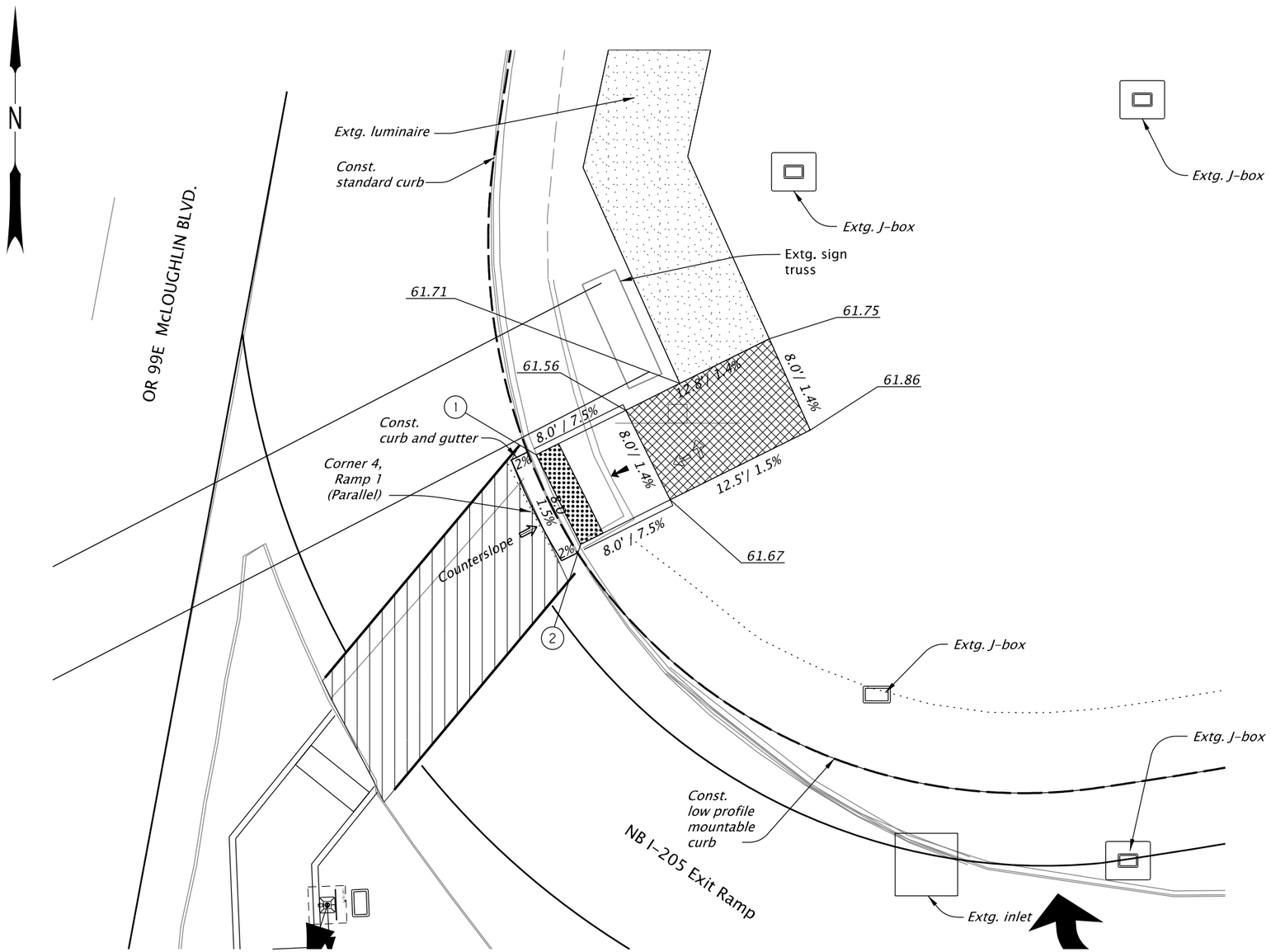
Rotation: 0° 0'



10 5 0 10

Scale 1"= 10'

Location	"A2" Station	Gutter Elevation	Top Back of Curb
1	701+02.00	60.95	60.96
2	701+05.56	61.07	61.08

OR 99E at I-205 NB ramp terminal (SE Corner)

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.81
CORNER POSITION: 4
RAMP NUMBER: 1

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. *Slopes hold over elevations.*
2. *Max. cross slope change on ramp 0.5% per foot.*
3. *See Std. Drgs. for details not shown.*
4. *Curb exposure E = 7" unless otherwise shown.*
5. *See sheet BC01 for curb detail.*

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Drafter: Scott Sinclair
Reviewer: Karen Tatman
Checker: Name

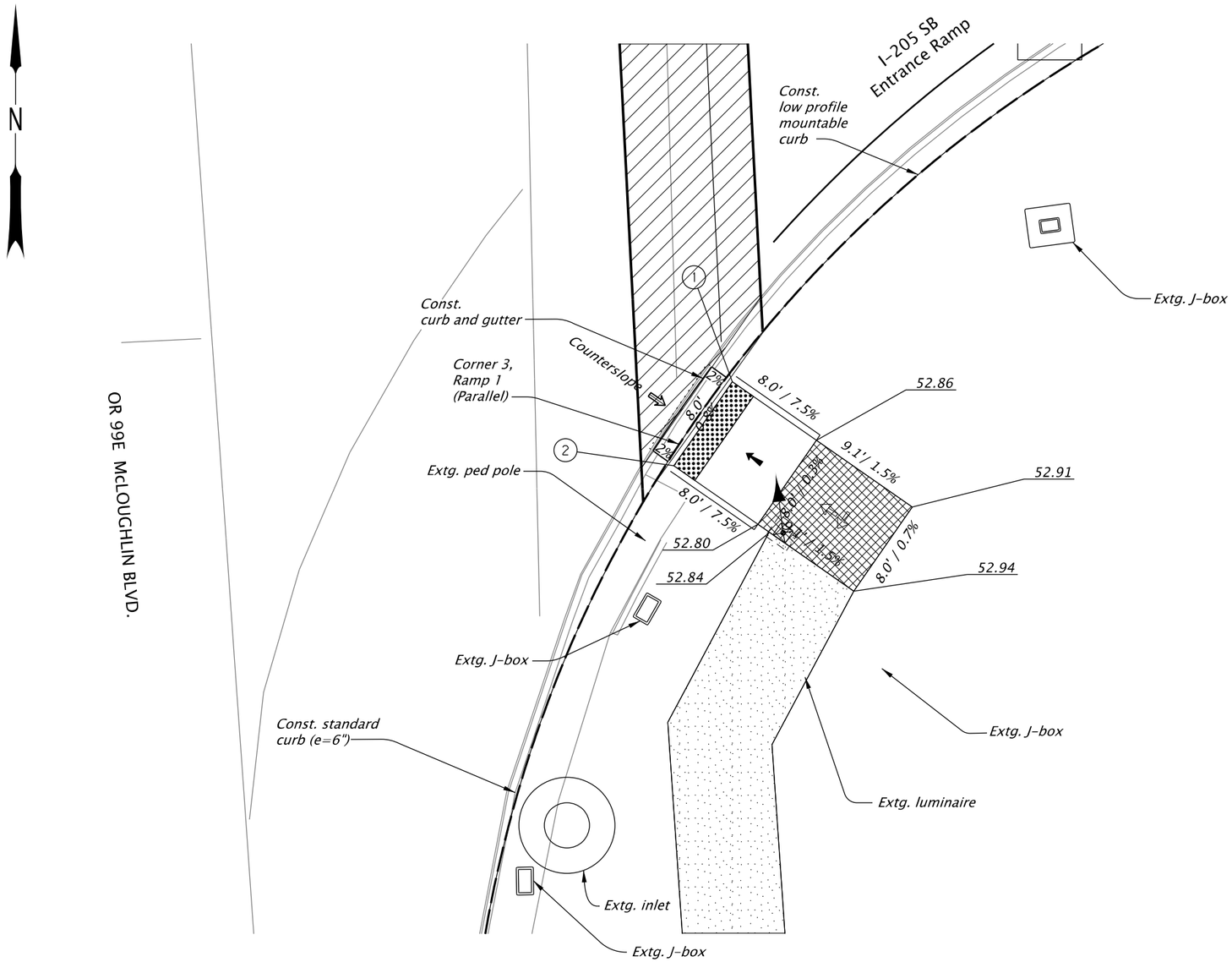
CURB RAMP DETAILS

SHEET NO.

R_K19786_QEI_dt_01.dgn :: BC04 2/11/2020 10:39:07 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'



10 5 0 10

Scale 1"=10'

Location	"D2" Station	Gutter Elevation	Top Back of Curb
(1)	700+51.68	52.26	52.27
(2)	700+46.65	52.32	52.33

OR 99E at I-205 SB ramp terminal (NE Corner)

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.64
CORNER POSITION: 3
RAMP NUMBER: 1

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. Slopes hold over elevations.
2. Max. cross slope change on ramp 0.5% per foot.
3. See Std. Drgs. for details not shown.
4. Curb exposure E = 7" unless otherwise shown.
5. See sheet BC01 for curb detail.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: Name

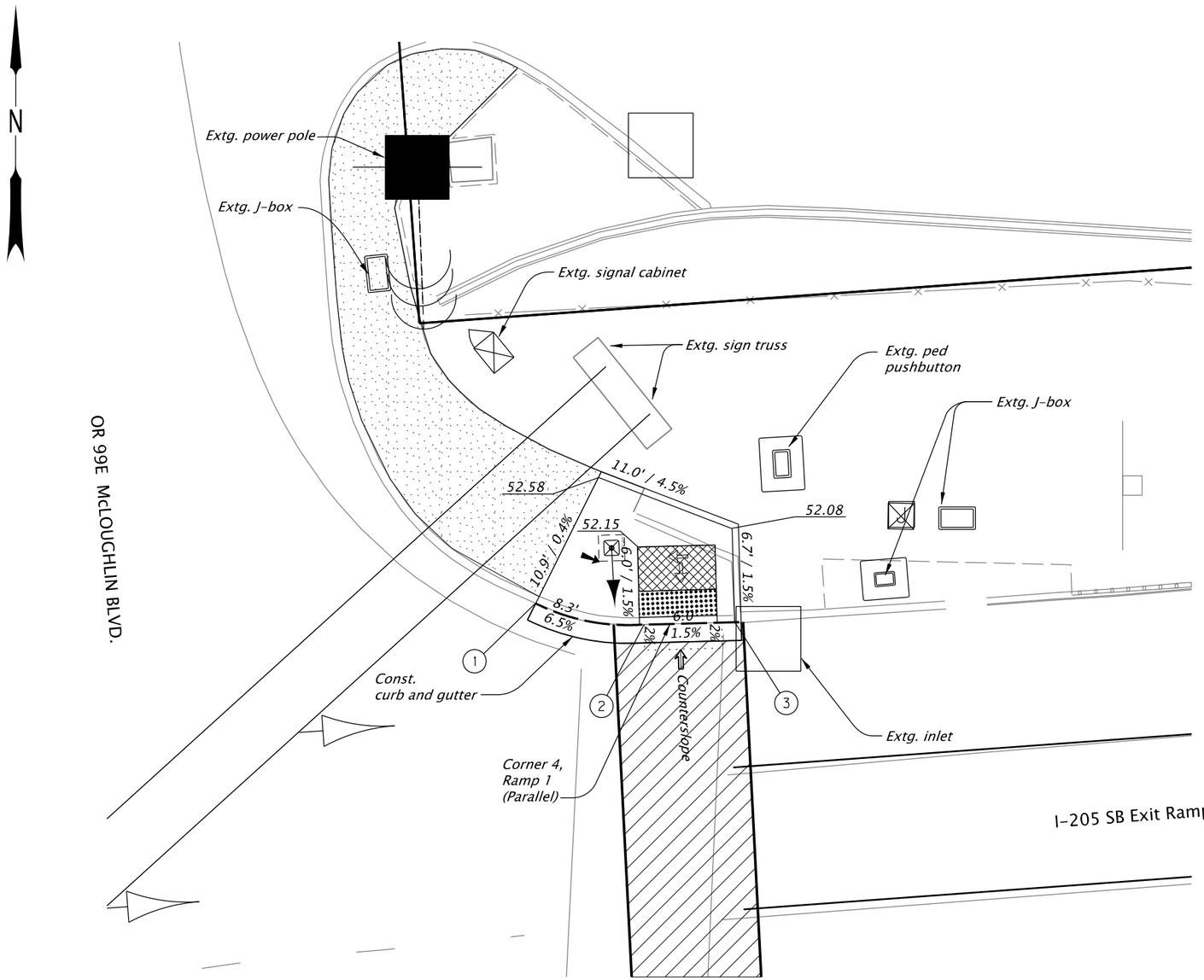
CURB RAMP DETAILS

SHEET NO.

R_K19786_QEI_dt_01.dgn :: BC05 2/11/2020 10:39:09 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 360°



10 5 0 10

Scale 1"=10'

Location	"C2" Station	Gutter Elevation	Top Back of Curb
1	707+85.05	52.04	52.62
2	707+77.16	52.06	52.08
3	707+69.82	51.97	51.98

OR 99E at I-205 SB ramp terminal (NE Corner)

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.63
CORNER POSITION: 4
RAMP NUMBER: 1

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. *Slopes hold over elevations.*
2. *Max. cross slope change on ramp 0.5% per foot.*
3. *See Std. Drgs. for details not shown.*
4. *Curb exposure E = 7" unless otherwise shown.*
5. *See sheet BC01 for curb detail.*

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -0R213, PHASE 1 SEC.

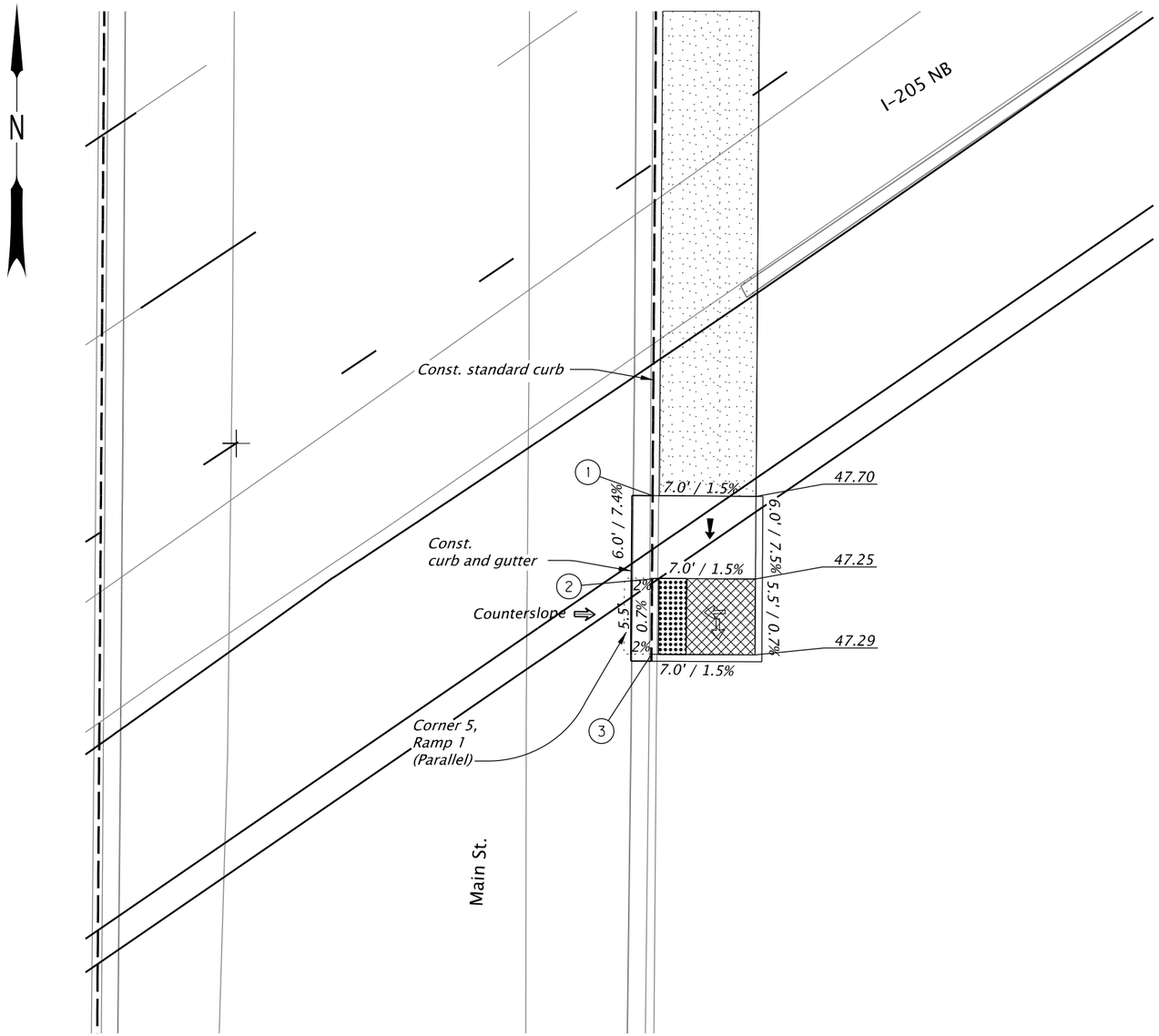
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: Name

SHEET NO.

CURB RAMP DETAILS

R_K19786_QEI_dt_01.dgn :: BC06 2/11/2020 10:39:10 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 360°



10 5 0 10

Scale 1"=10'

Location	"M2" Station	Gutter Elevation	Top Back of Curb
1	17+62.00	47.09	47.59
2	17+68.00	47.13	47.14
3	17+73.50	47.17	47.18

Main Street at I-205 Main Street Bridge

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.63
CORNER POSITION: 5
RAMP NUMBER: 1

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. Slopes hold over elevations.
2. Max. cross slope change on ramp 0.5% per foot.
3. See Std. Drgs. for details not shown.
4. Curb exposure E = 7" unless otherwise shown.
5. See sheet BC01 for curb detail.

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -0R213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: Name

CURB RAMP DETAILS

SHEET NO.

R_K19786_QEI_dt_01.dgn :: BC07 2/11/2020 10:39:12 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
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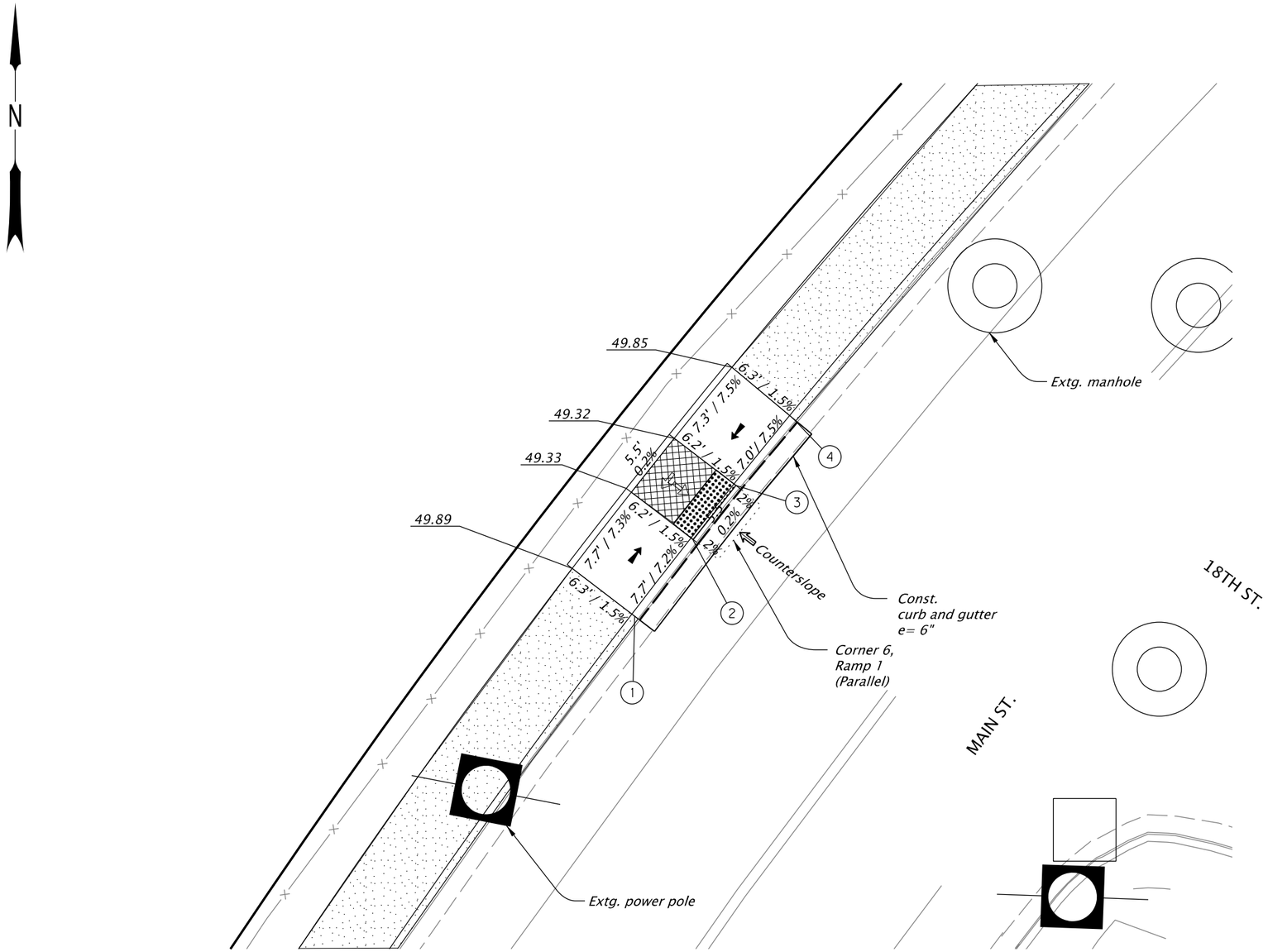
Rotation: 360°



10 5 0 10

Scale 1"= 10'

Main Street at 18th Street

Location	"M2" Station	Gutter Elevation	Top Back of Curb
1	25+01.57	49.21	49.70
2	24+94.20	49.23	49.24
3	24+88.88	49.22	49.23
4	24+82.10	49.16	49.75

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.63
CORNER POSITION: 6
RAMP NUMBER: 1

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. *Slopes hold over elevations.*
2. *Max. cross slope change on ramp 0.5% per foot.*
3. *See Std. Drgs. for details not shown.*
4. *Curb exposure E = 7" unless otherwise shown.*
5. *See sheet BC01 for curb detail.*

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -0R213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: Name

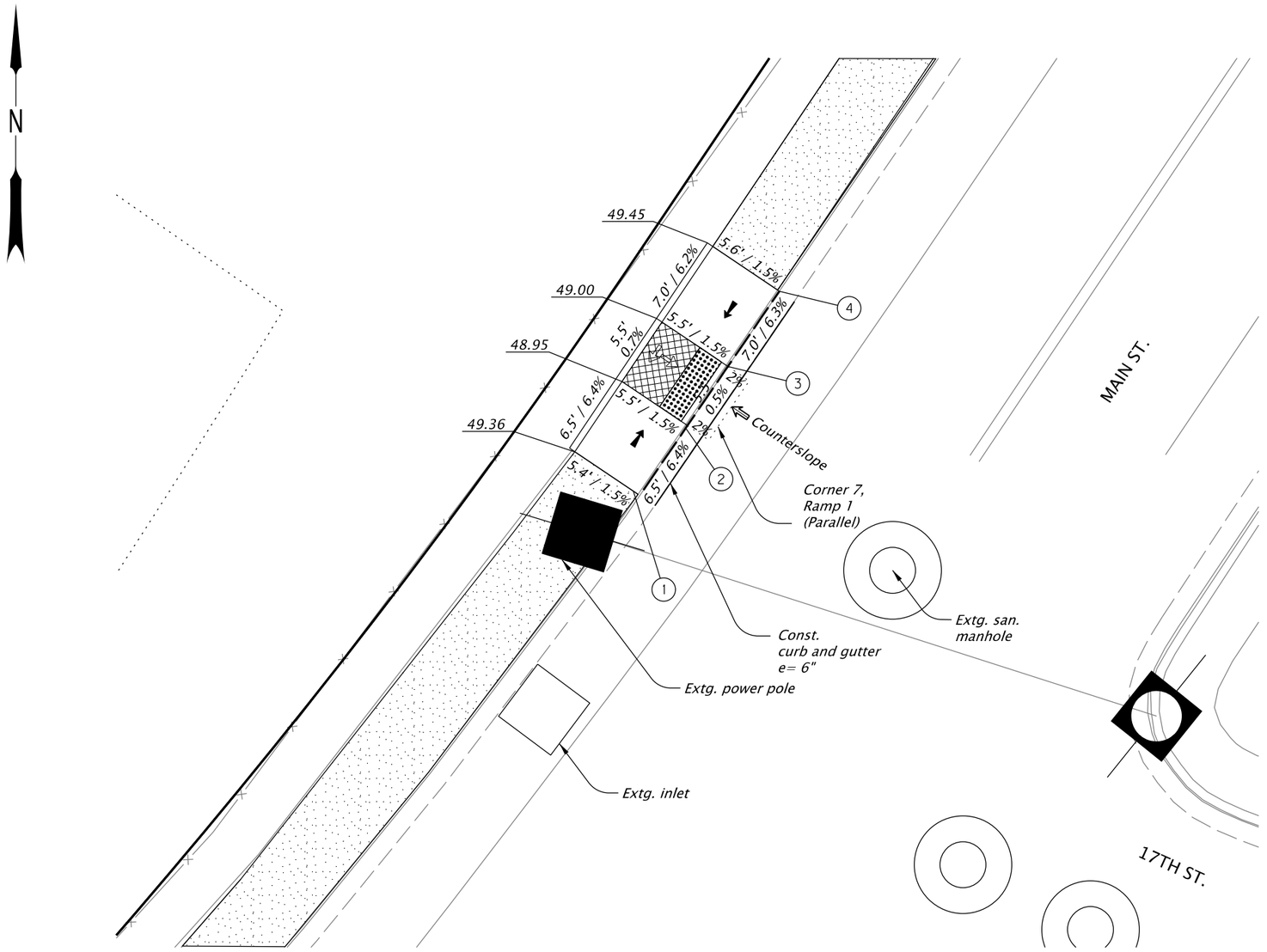
CURB RAMP DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_QEI_dt_01.dgn :: BC08 2/11/2020 10:39:13 AM CDONOVAN

Rotation: 360° 0'



10 5 0 10

Scale 1"=10'

Location	"M2 Station	Gutter Elevation	Top Back of Curb
1	27+06.63	48.78	49.27
2	26+99.97	48.86	48.86
3	26+94.27	48.88	48.92
4	26+87.21	48.86	49.35

Main Street at 17th Street

DESIGN EXCEPTION CONTROL: NA
LRM: 08100I00
MP: 11.63
CORNER POSITION: 7
RAMP NUMBER: 1

Marked or intended crossing location

Sidewalk

Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
slope (for drainage) is considered level.

Truncated dome detectable warning surface

Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)

Slope 7.5% max.
(Max. 8.3% finished surface slope)
(Ramp length 15' max., measured along finished surface slope)

Counter slope

CONSTRUCTION NOTES:

1. *Slopes hold over elevations.*
2. *Max. cross slope change on ramp 0.5% per foot.*
3. *See Std. Drgs. for details not shown.*
4. *Curb exposure E = 7" unless otherwise shown.*
5. *See sheet BC01 for curb detail.*

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 -0R213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: Name

CURB RAMP DETAILS

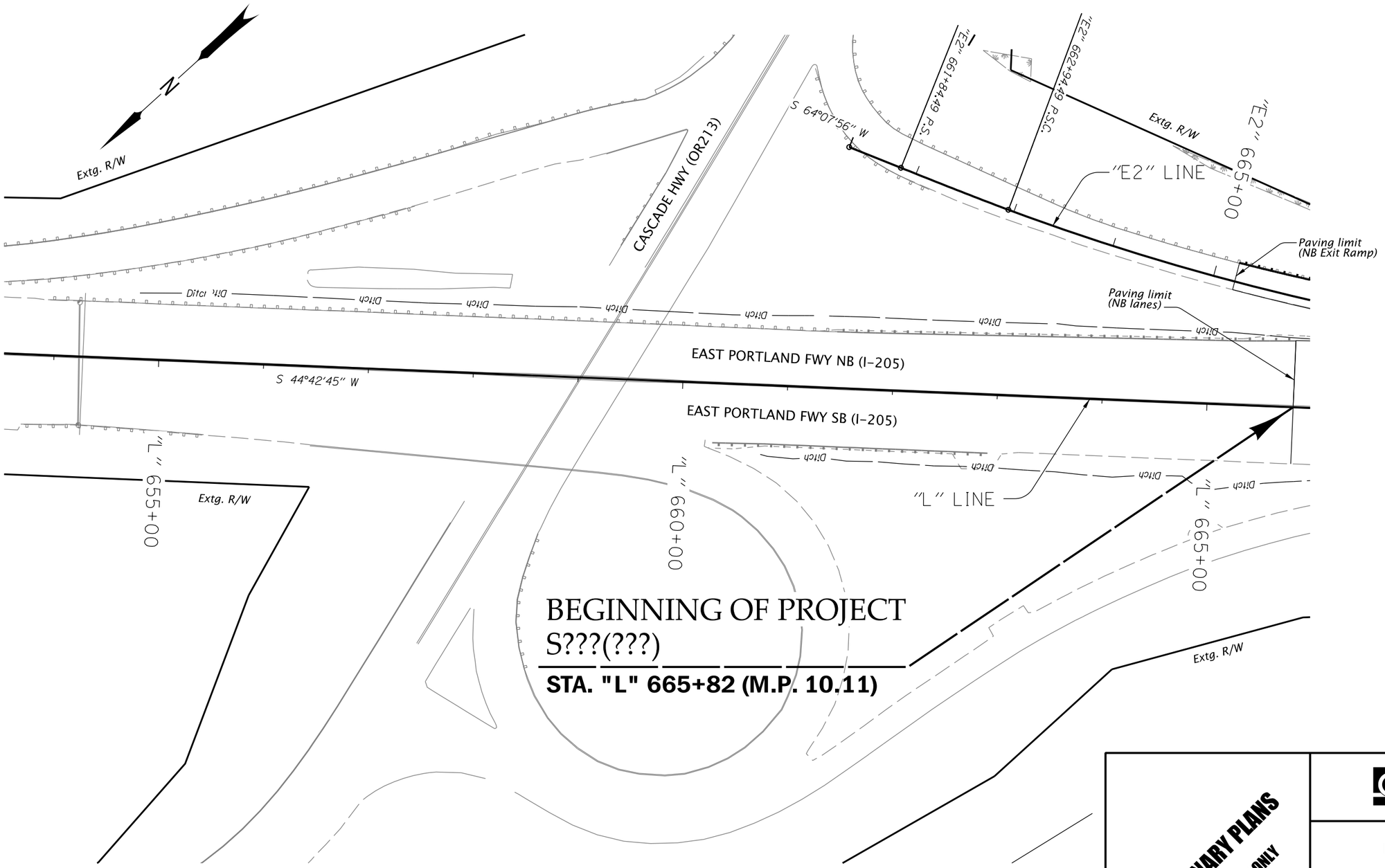
SHEET NO.

R_K19786_QEI_dt_01.dgn :: BC09 2/11/2020 10:39:14 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 360°

Sec. 29, T. 2S, R.2E, W.M.
PARK PLACE INTERCHANGE



BEGINNING OF PROJECT
S???(???)
STA. "L" 665+82 (M.P. 10.11)

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

ALIGNMENT

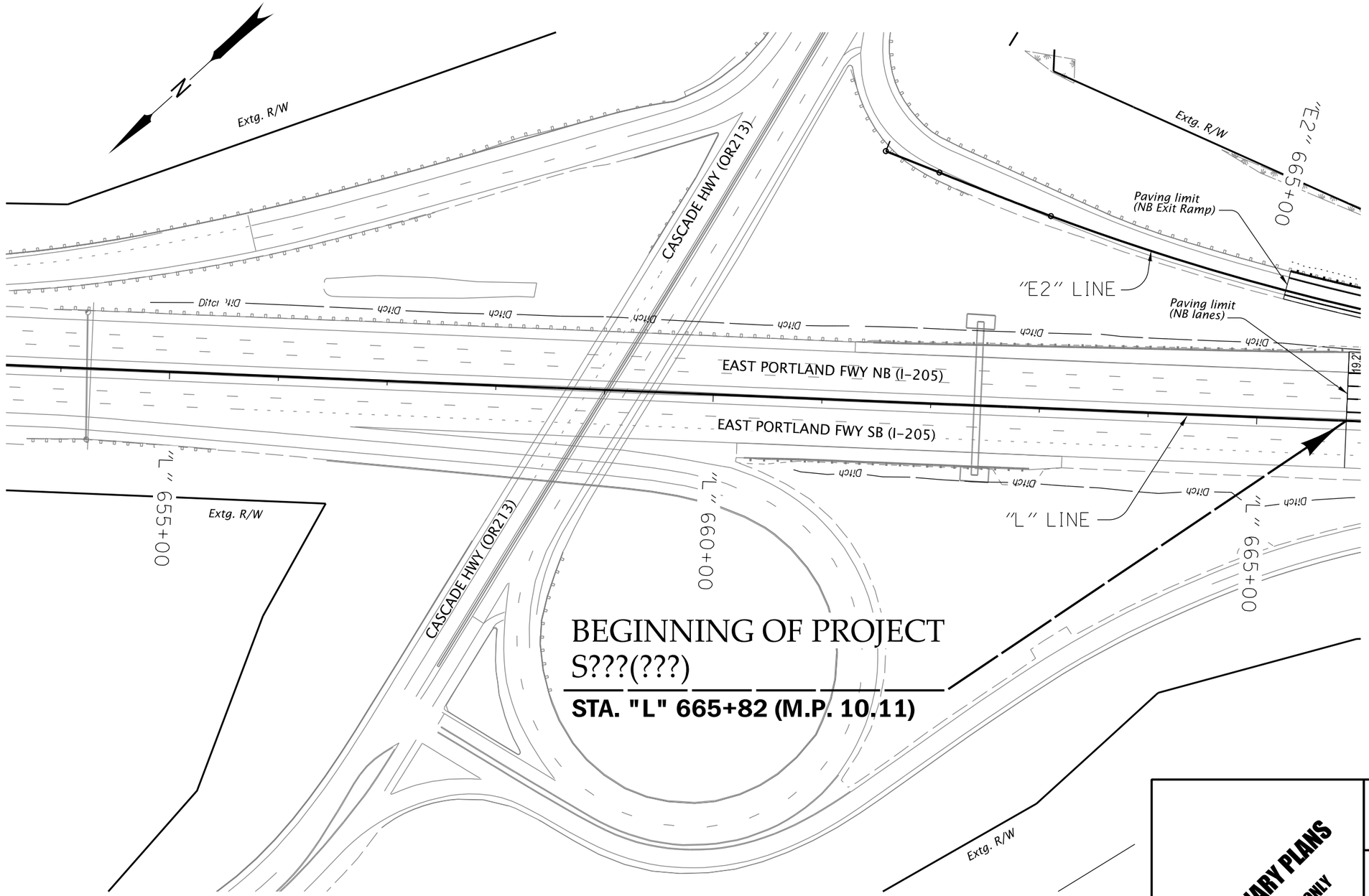
SHEET NO.

R_K19786_0E1_a1_01.dgn :: C01 2/11/2020 10:57:03 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 22? "=100'

Sec. 29, T. 2S, R.2E, W.M.
PARK PLACE INTERCHANGE



PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Drafter: Scott Sinclair
Reviewer: Karen Tatman
Checker: NA

GENERAL CONSTRUCTION

SHEET NO.

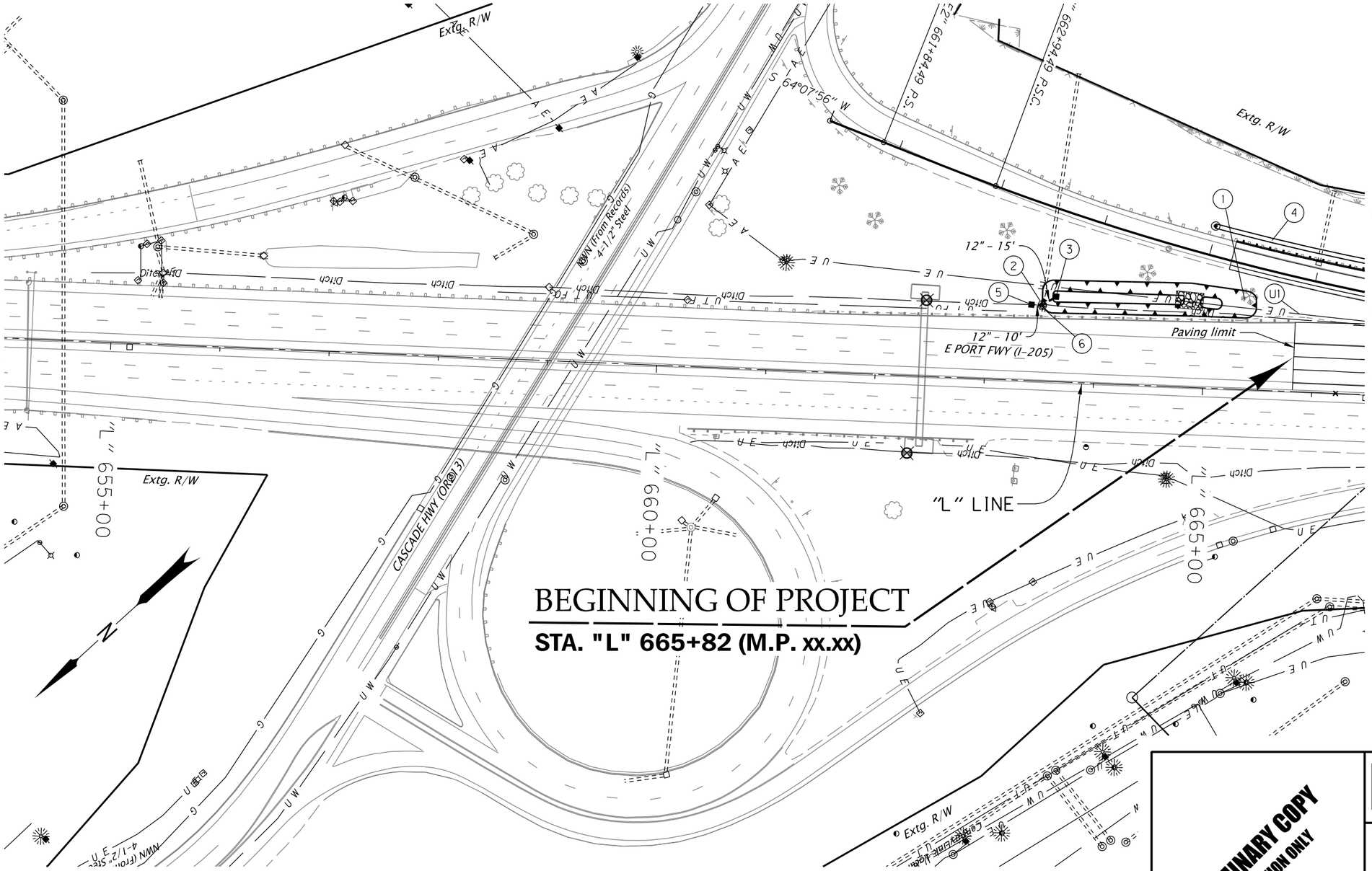
R_K19786_QEI_pl_01.dgn :: CO1A 2/11/2020 11:09:41 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 227.6721°

Sec. 29, T. 2 S, R. 2 E, W.M.

PARK PLACE INTERCHANGE



1. Sta. "L" 665+46.16, 77.84' Lt. to Sta. "L" 663+50.02, 77.02' Lt.
   Const. detention pond with biofiltration swale
   (For details, see sht. HA02)

2. Sta. "L" 663+50.47, 69.59' Lt.
   Const. storm sew. manhole over existing sewer
   Inst. 12" storm sew. pipe - 10'
   5' depth
   Inst. 12" storm sew. pipe - 15'
   5' Depth
   (See drg. nos. RD300, RD335, RD345, RD386, RD390, RD393, RD399)

3. Sta. "L" 663+62.66, 77.93' Lt.
   Const. type "D" inlet
   (See drg. no. RD370)

4. Sta. "L" 665+05.80, 148.33' Lt. to Sta. "L" 683+98.68, 77.08' Lt.
   Const. bioslope - 1877'
   Inst. 12" drain pipe - 1877'
   (For details, see sht. HA03)

5. Sta. "L" 663+40.49, 69.63' Lt.
   Const. type "D" inlet
   (See drg. no. RD376)

6. Remove inlet

U1. Relocate ODOT UG electrial line

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

DRAINAGE & UTILITIES

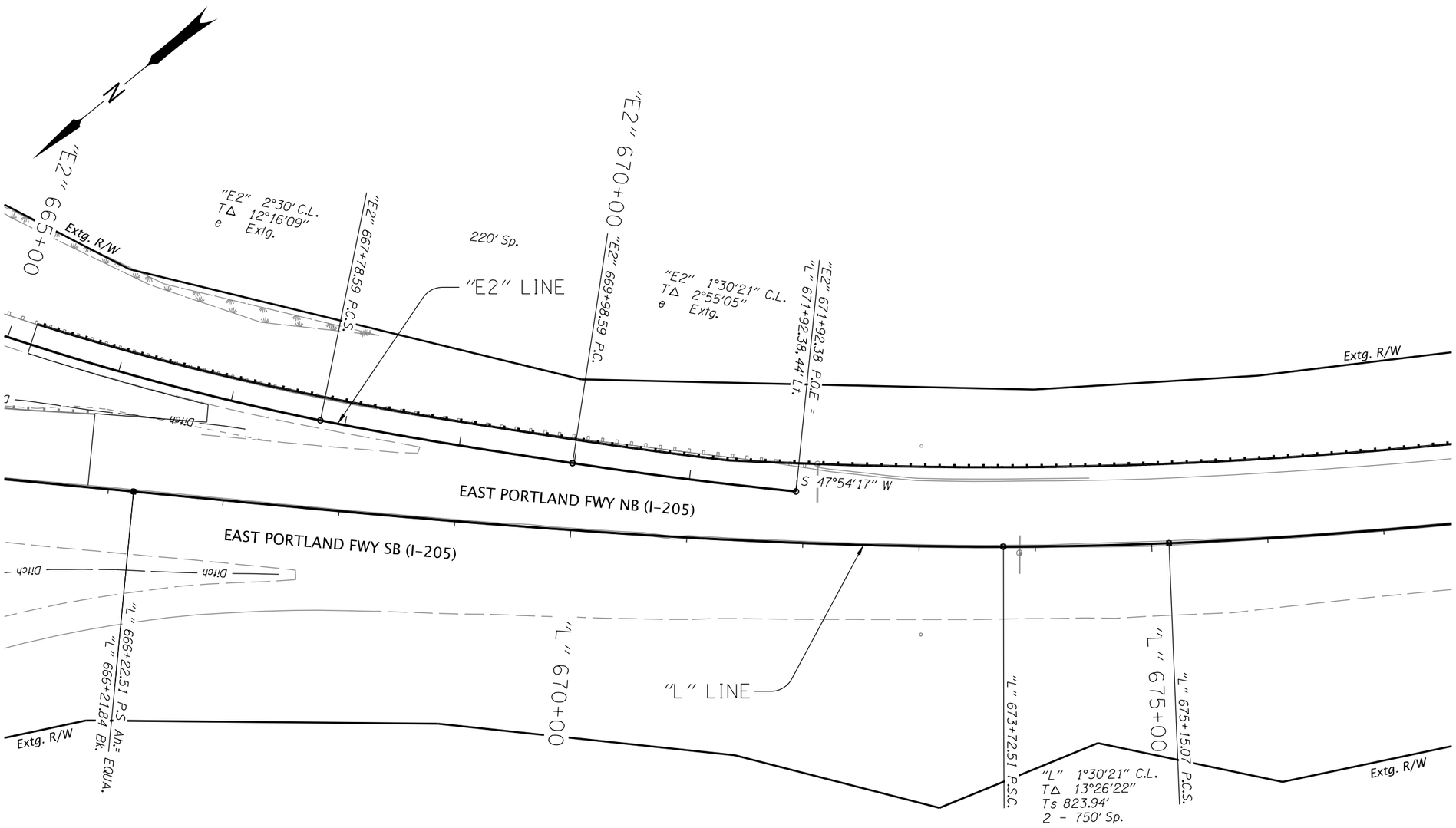
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_HDR_dr.dgn :: C01B 2/11/2020 11:16:14 AM CDONOVAN

Rotation: 227.6721°

Sec. 29, T. 2S, R.2E, W.M.



PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton	Reviewer: Karen Tatman
Drafter: Scott Sinclair	Checker: NA

ALIGNMENT

SHEET NO.

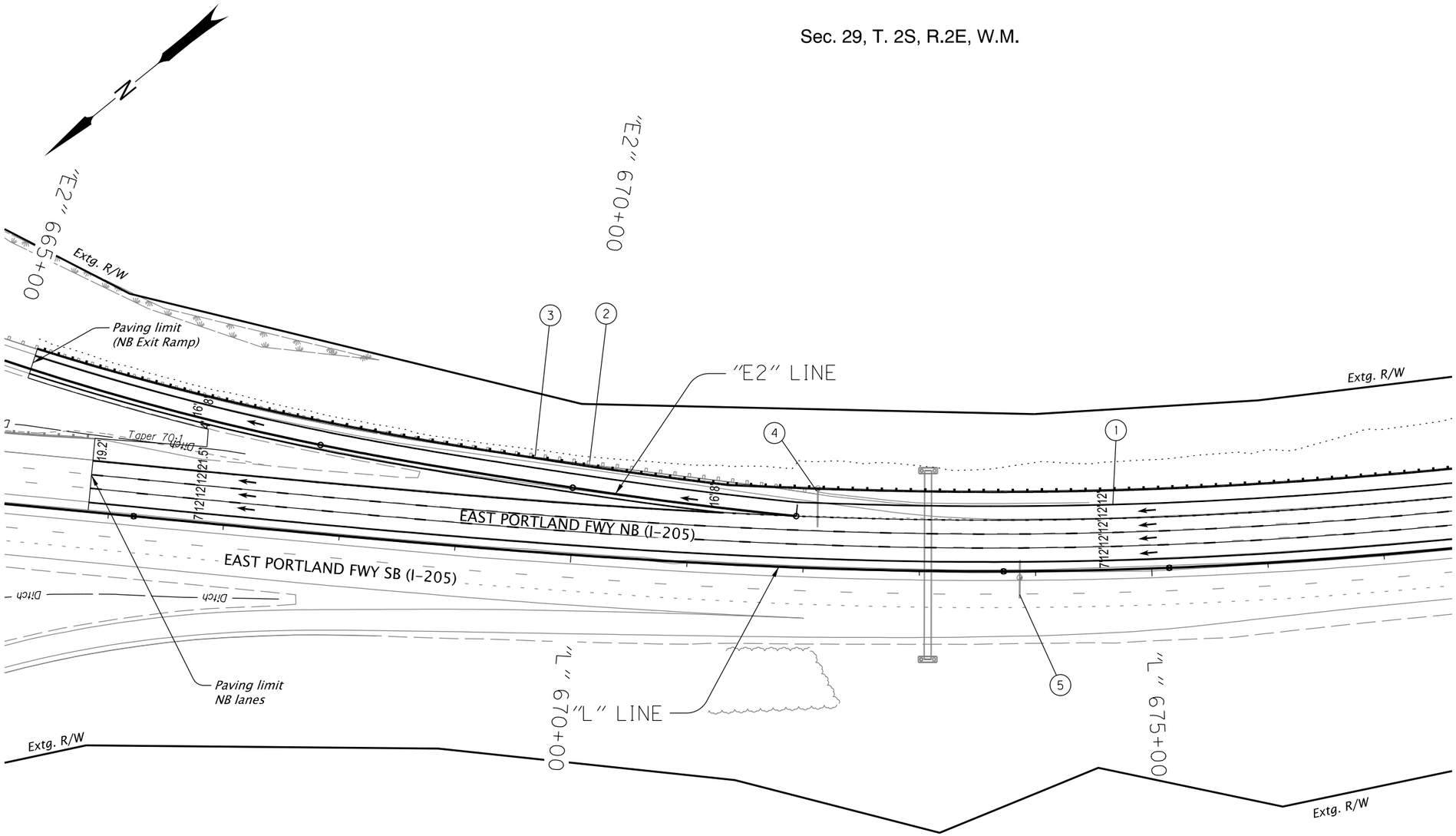
R_K19786_0EI_al_01.dgn :: C02 2/11/2020 10:57:08 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 23(

"=100'

Sec. 29, T. 2S, R.2E, W.M.



1. Sta. "L" 672+09 to Sta. "L" 699+37, Lt.
   Remove conc. barrier
2. Sta. "E2" 663+96 to Sta. "L" 672+09, Lt.
   Remove guardrail
3. Sta. "E2" 663+96 to Sta."L" 697+21, Lt.
   Const. 31" guardrail (Type 2A)
4. Sta. "L" 672+10, Lt.
   Remove cantilever sign support and footing
5. Sta. "L" 673+86
   Remove butterfly sign support

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

GENERAL CONSTRUCTION

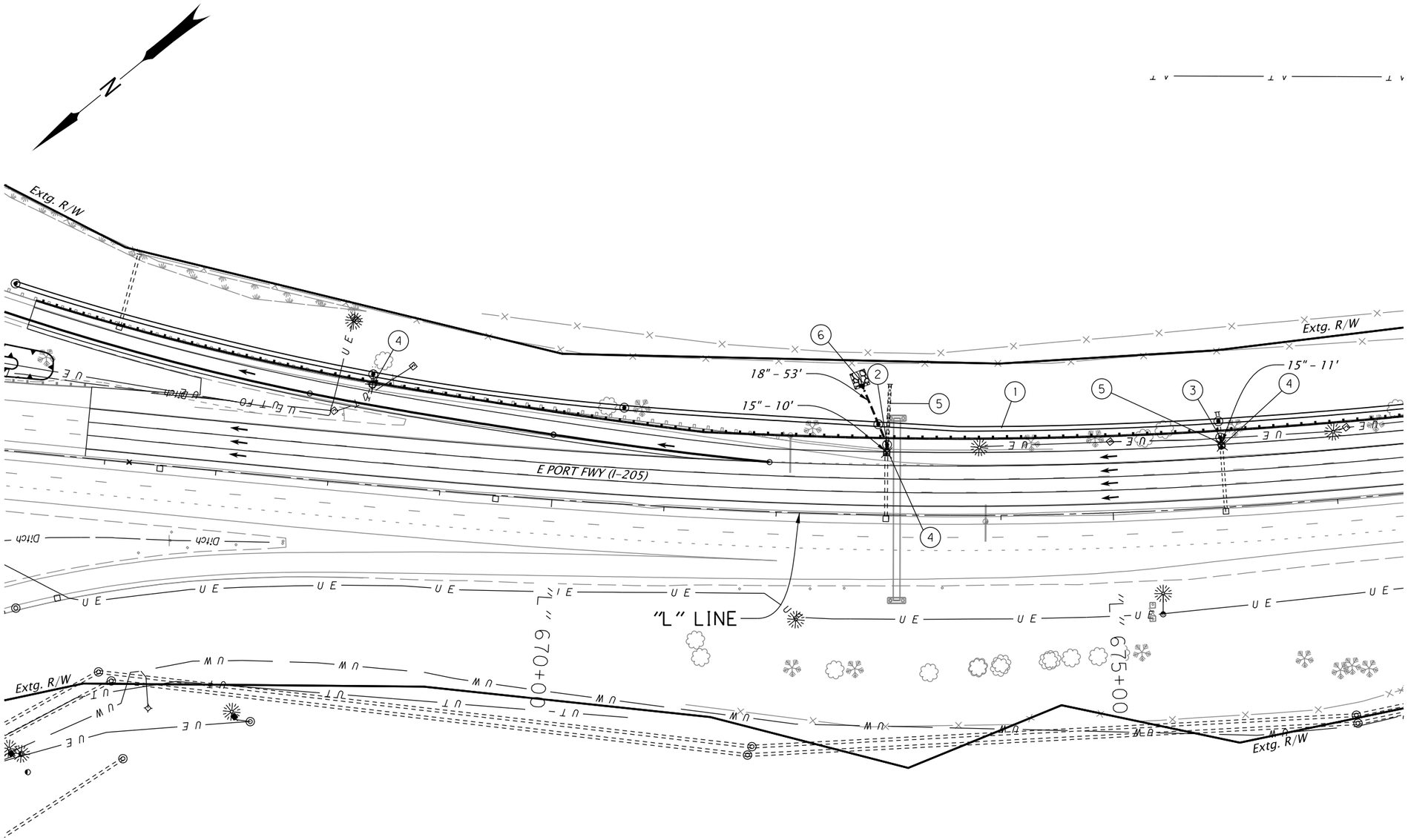
SHEET NO.

R_K19786_QEI_pl_01.dgn :: CO2A 2/11/2020 11:09:49 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 230.7962°

Sec. 29, T. 2 S, R. 2 E, W.M.



1. See sht. CO1B, note 4
2. Sta. "L" 672+97.62, 62.54' Lt.
   Const. storm sew. manhole
   Extend 15" storm sew. pipe - 10' Rt.
   5' Depth
3. Sta. "L" 675+98.99, 62.29' Lt.
   Const. storm sew. manhole over existing sewer
   Extend 15" storm sew. pipe - 11' Rt.
   5' Depth
4. Remove inlet - 3
5. Remove pipe - 70'
6. Sta. "L" 672+71.92, 120.51' Lt.
   Inst. 18" storm sew. pipe - 53'
   10' Depth
   Const. riprap pad
   Loose riprap (class 50) - 5.0 tons
   Inst. delineator (W-1 reflector)
   (See drg. no. RD317)

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

DRAINAGE & UTILITIES

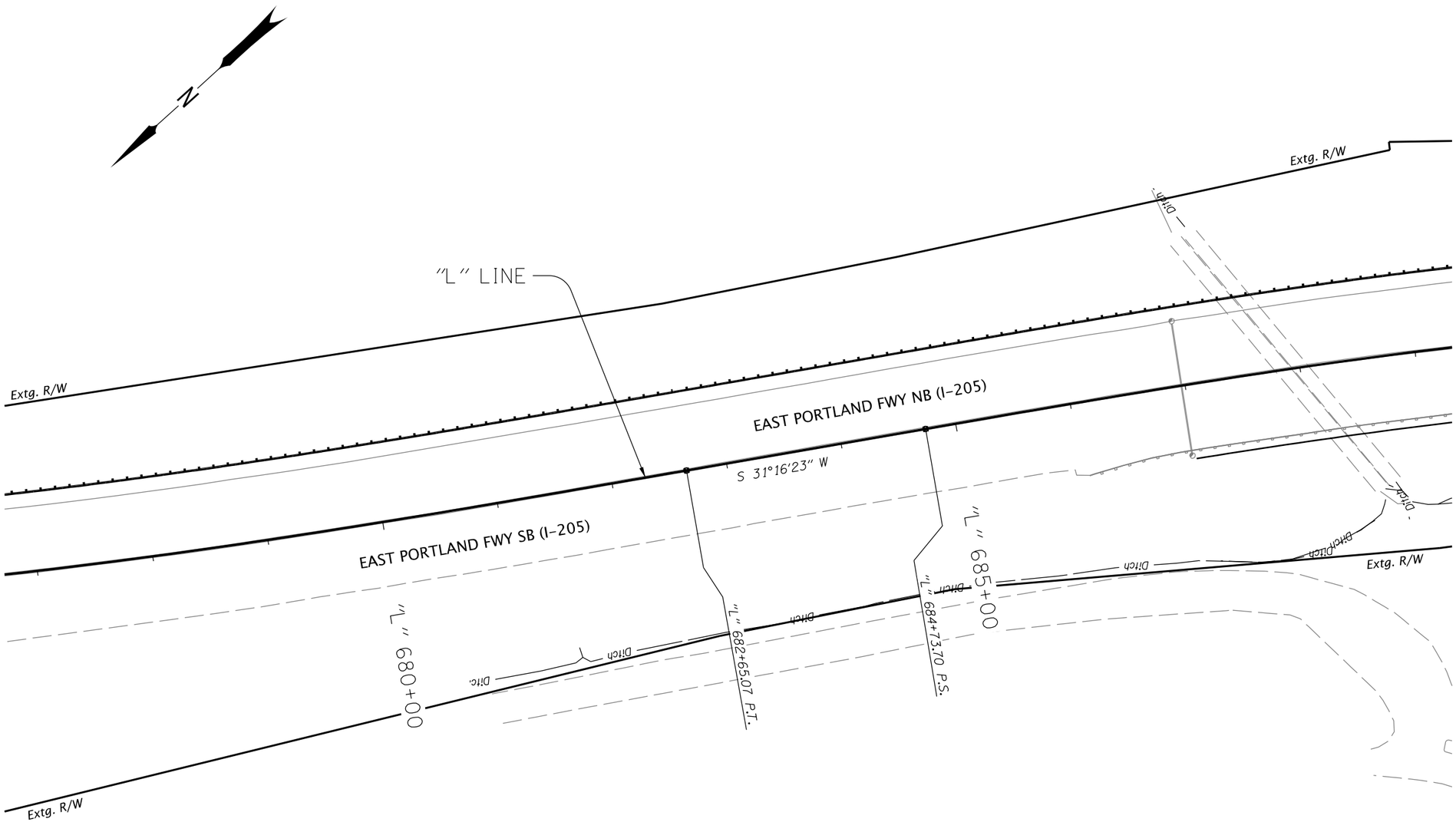
SHEET NO.

R_K19786_HDR_dr.dgn :: C02B 2/11/2020 11:16:19 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.



PRELIMINARY PLANS

INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton	Reviewer: Karen Tatman
Drafter: Scott Sinclair	Checker: NA

ALIGNMENT

SHEET NO.

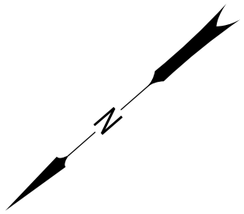
R_K19786_QEI_a1_01.dgn :: C03 2/11/2020 10:57:09 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 228 1"=100'

Sec. 29, T. 2 S, R. 2 E, W.M.

?? v – ???

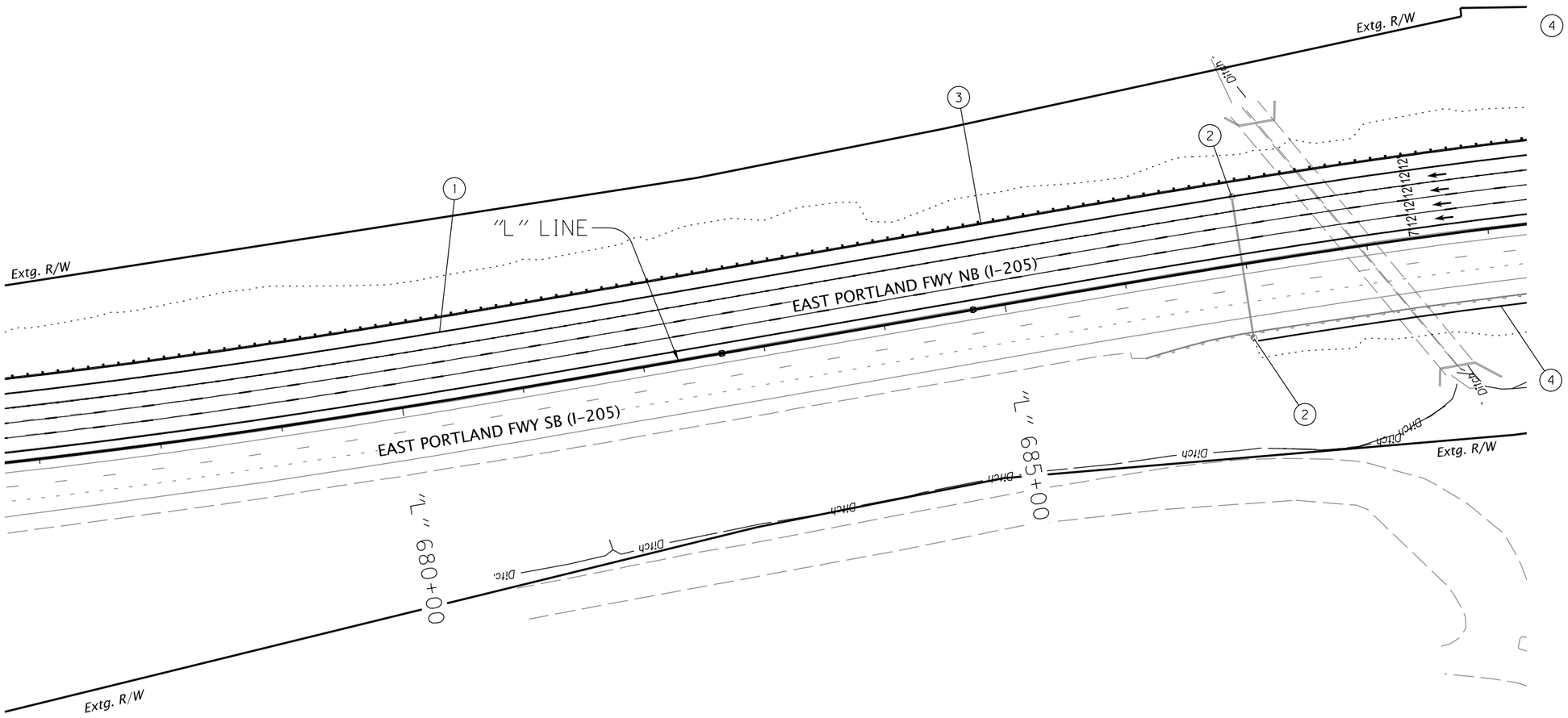


1 *See sht. C02A, Note 1*
Remove conc. barrier

2 *Sta. "L" 686+97, Lt. and Rt.*
Remove sign bridge support and footing

3 *See sht. C02A, Note 2*
Const. 31" guardrail (Type 2A)

4 *Structure no. XXXX*
Sta. "L" 687+00 to Sta. "C2" 701+18, Rt.
Const. Sound Wall E



PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

GENERAL CONSTRUCTION

SHEET NO.

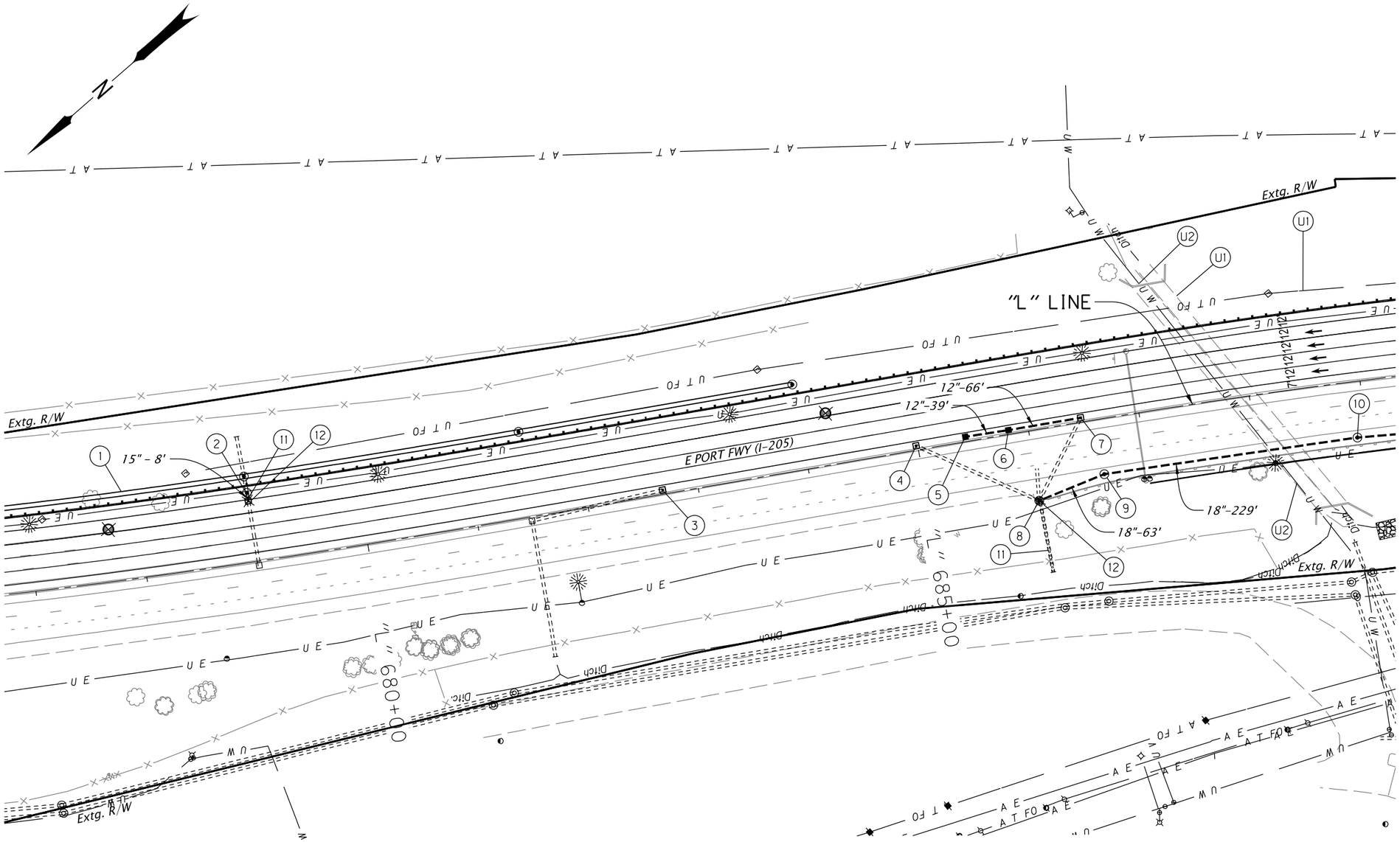
R_K19786_QEI_pl_01.dgn :: CO3A 2/11/2020 11:09:51 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 228.87°

0'

Sec. 29, T. 2 S, R. 2 E, W.M.



1. See sht. C01B, note 4
2. Sta. "L" 678+99.77, 62.10 Lt.
   Const. storm sew. manhole
   Extend 15" storm sew. pipe - 8' Rt.,
   5' Depth
3. Sta. "L" 682+68.35, Lt.
   Adjust inlet
4. Sta. "L" 684+98.63, Lt.
   Adjust inlet
5. Sta. "L" 685+43.24, Lt.
   Const. type "G-2" inlet - 18" Sump
   (See drg. no. RD364)
6. Sta. "L" 685+82.29, Lt.
   Const. type "G-2 inlet" - 18" Sump
   Inst. 12" storm sew. pipe - 39'
   5' Depth
7. Sta. "L" 686+46.66, Lt.
   Adjust inlet
   Inst. 12" storm sew. pipe - 66'
   10' Depth
   Connect to existing inlet
8. Sta. "L" 685+99.13, Rt.
   Const. storm sew. manhole w/ type "G-2" inlet
   Connect existing pipes
   (See drg. no. RD348)
9. Sta. "L" 686+60.59, 49.38' Rt.
   Const. storm sew. manhole
   Inst. 18" storm sew. pipe - 63'
   10' Depth
10. Sta. "L" 688+91.47, 50.12' Rt.
    Const. storm sew. manhole
    Inst. 18" storm sew. pipe - 229'
    10' Depth
11. Remove pipe - 71'
12. Remove inlet - 4

U1. Protect ODOT 12' box culvert

U2. Protect Oregon City water line

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

DRAINAGE & UTILITIES

SHEET NO.

R_K19786_HDR_dr.dgn :: C03B 2/11/2020 11:16:20 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

?? V - ???

N

"M2" 18° C.L.
T△ 28°01'14"
e Extg.

"M2" 18+12.53 P.C.

"L" LINE

"M2" 15+00

Extg. R/W

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

"M2" 16+30.41 P.T.

"M2" 14+74.74 P.C.

S 52°25'48" W

"L" 694+73.70 P.S.C.

Paving limit
(SB lanes)

"L" 695+37.26 = 695+37.26. 44' Rt.

"C2" 696+00

S 28°25'01" W

"L" 695+00

"L" 3° C.R.
T△ 37°00'00"
Ts 1145.17'
2 - 1000' Sp.

"C2" 3°00' C.R.
T△ 7°12'46"
e 10.5%

MAIN ST.

Extg. R/W

Ditch

Ditch

Ditch

Ditch

"L" 694+00

"L" 695+00

"M2" 20+00

"B2" 700+00

"M2" 18° C.R.
T△ 60°30'00"
e Extg.

"B2" 1°30'00" C.R.
T△ 2°17'04"

"L" 698+25.80 P.O.B.
44' Lt.

"B2" 698+25.80 P.O.B.

S 0°25'41" W

S 59°38'34" W

"L" 697+07.03 P.C.S.

"M2" 16+98.16 P.O.T.

"L" 697+83.13 P.O.S. =
"C2" 697+77.69 P.C.S.

150' Sp

"C2" 699+27.68 P.S.C.

"C2" 700+00

"C2" LINE

"C2" 8°00' C.R.
T△ 27°49'08"
e Extg.

"C2" 702+75.42 P.C.S.

Paving limit

Extg. R/W

"M2" 21+48.64 P.T.

"M2" 22+67.63 P.C.

"M2" 10° C.L.
T△ 26°48'03"
e Extg.

S 60°53'47" W

Extg. R/W

"M2" LINE

"B2" 699+78.09 P.T.

"B2" 700+26.72 P.S.

"B2" 702+66.72 P.S.C.

"B2" 7° C.L.
T△ 9°12'29"
2 Sp 240'
e 10.5%

"B2" LINE

S 54°16'43" W

S 56°33'47" W

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Scott Sinclair
Checker: NA

ALIGNMENT

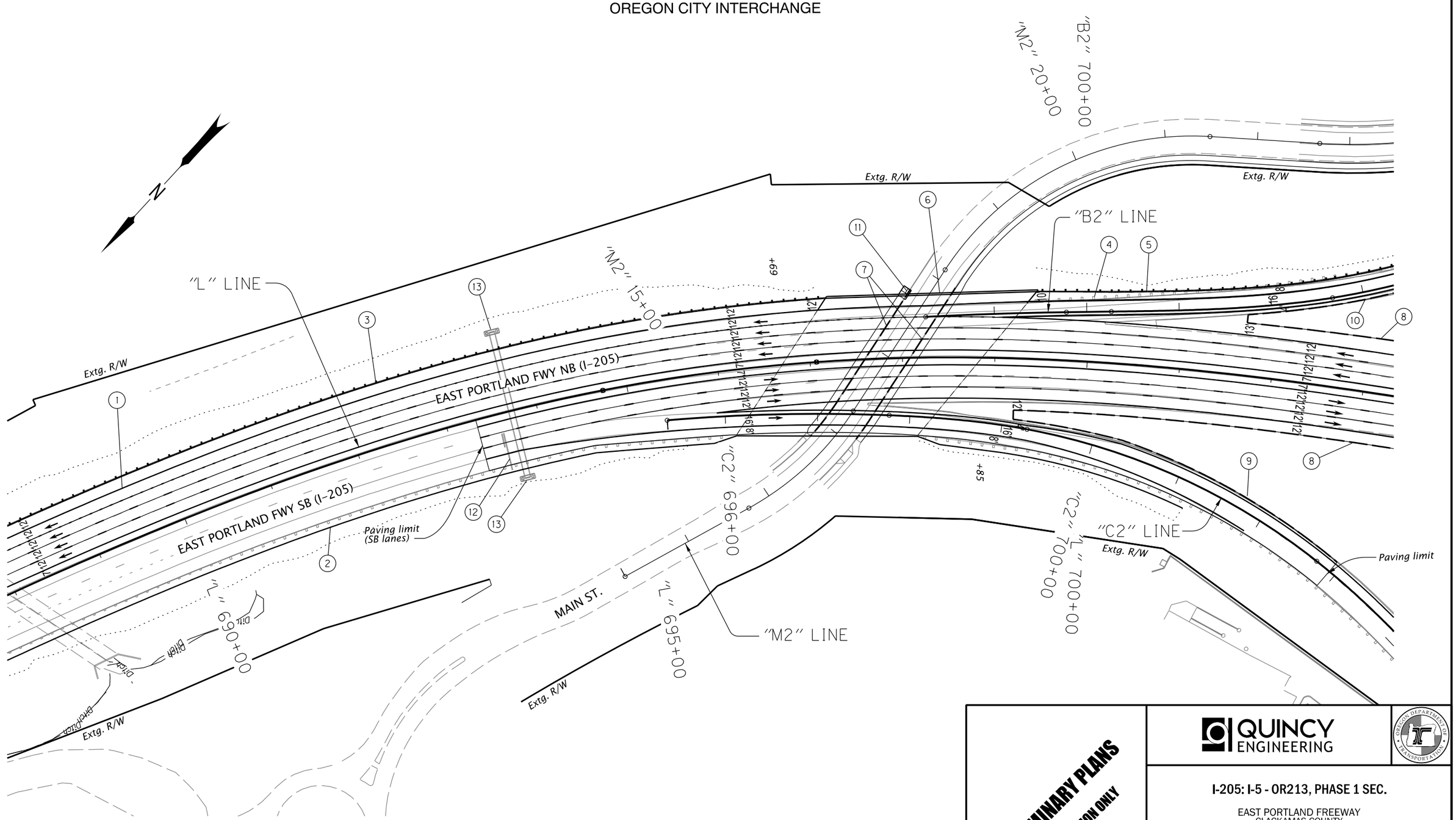
SHEET NO.

R_K19786_QEI_al_01.dgn :: C04 2/11/2020 10:57:10 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 212 "=100'

Sec. 29, T. 2 S, R. 2 E, W.M.
OREGON CITY INTERCHANGE



PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Scott Sinclair
Checker: NA

GENERAL CONSTRUCTION

SHEET NO.

R_K19786_QEI_pl_01.dgn :: CO4A 2/11/2020 11:09:52 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 212.6746°

Sec. 29, T. 2 S, R. 2 E, W.M.
OREGON CITY INTERCHANGE

(1) *See Sht. C02A, Note 1*
Remove conc. barrier

(2) *See Sht. C03A, Note 2*
Const. Sound Wall E

(3) *See Sht. C02A, Note 2*
Const. 31" guardrail (Type 2A)

(4) *Sta. "B2" 699+38 to Sta. "B2" 711+01, Lt.*
Remove guardrail

(5) *Sta. "B2" 699+46 to Sta. "B2" 711+07, Lt.*
Const. drainage curb
Const. 31" guardrail (Type 2A)

(6) *Widen / retrofit Bridge No. 09702*

(7) *Sta. "M2" 15+80 to Sta. "M2" 27+07, Rt. & Lt.*
Const. standard curb
Const. P.C. conc. walk
(For details, see Sht. BB0X)

(8) *Sta. "L" 699+22 to Sta. "L" 708+07, Rt. & Lt.*
Const. low profile mountable curb

(9) *Sta. "C2" 699+10 to Sta. "C2" 702+92, Lt.*
Const. low profile mountable curb

(10) *Sta. "B2" 701+74 to Sta. "B2" 712+07, Rt.*
Const. low profile mountable curb

(11) *Const. curb ramp, parallel*
(For details, see Sht. BB0X)

(12) *Sta. "L" 693+58, Rt.*
Remove cantilever sign support and footing

(13) *Sta. "L" 693+72, Rt. & Lt.*
Const. sign bridge support and footing

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

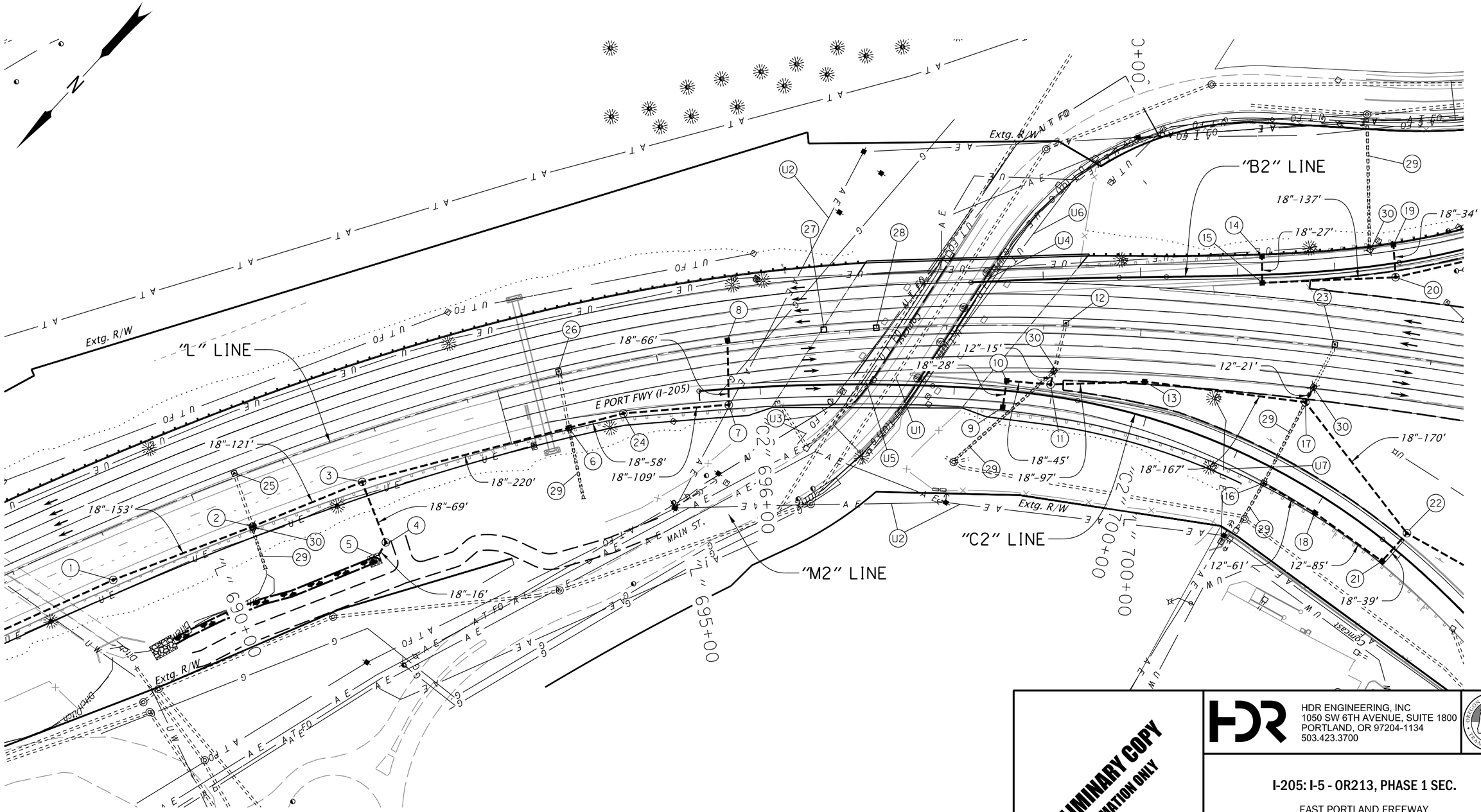
GENERAL CONSTRUCTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_QEI_pl_01.dgn :: CO4B 2/11/2020 11:09:54 AM CDONOVAN
Rotation: 212.6746° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.
OREGON CITY INTERCHANGE



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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

DRAINAGE & UTILITIES

SHEET NO.

R_K19786_HDR_dr.dgn :: C04C 2/11/2020 11:16:23 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 212.6746° 0'

(1) *See sht. C03C, note 10*

(2) *Sta. "L" 690+47.07, Rt.*
Const. storm sew. manhole w/ type "G-2" inlet
Inst. 18" storm sew. pipe - 153'
20' Depth
Connect existing sewer

(3) *Sta. "L" 691+70.34, 48.99' Rt.*
Const. storm sew. manhole w/ inside drop
Inst. 18" storm sew. pipe - 121'
20' Depth
Inst. 18" storm sew. pipe - 220'
5' Depth
(See drg. no. RD350)

(4) *Sta. "L" 691+73.59, 115.84' Rt.*
Const. pollution control manhole
Inst. 18" storm sew. pipe - 69'
20' Depth
(See drg. no. RD340)

(5) *Sta. "L" 691+58.97, 128.64' Rt. to Sta. "L" 689+24.75, 133.18' Rt.*
Const. biofiltration swale
Inst. 18" storm sew. pipe - 16'
5' Depth
(For details, see sht. HA04)

(6) *Sta. "L" 693+94.84, Rt.*
Adjust inlet
Inst. 18" storm sew. pipe - 58'
10' Depth

(7) *Sta. "L" 695+66.12, 62.53' Rt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 66'
5' Depth

(8) *Sta. "L" 695+74.21, Lt.*
Const. type "G-2" inlet - 18" Sump

(9) *Sta. "C2" 698+51.43, Rt.*
Const. type "G-2" inlet - 18" Sump

(10) *Sta. "C2" 698+53.11, Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 28'
5' Depth

(11) *Sta. "C2" 698+97.61, 11.72' Lt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 45'
5' Depth
Extend 12" storm sew. pipe - 15'

(12) *Sta. "L" 699+22.67, Lt.*
Adjust inlet

(13) *Sta. "L" 700+09.96, Rt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 97'
10' Depth

(14) *Sta. "B2" 701+27.94, Lt.*
Const. type "G-2" inlet - 18" Sump

(15) *Sta. "B2" 701+24.90, Rt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 27'
5' Depth

(16) *Sta. "C2" 701+39.47, Rt.*
Adjust inlet
Connect to extg. structure

(17) *Sta. "C2" 701+39.00, 75.47' Lt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 167'
20' Depth
Extend 12" storm sew. pipe - 21'
10' Depth

(18) *Sta. "C2" 702+01.71, Rt.*
Const. type G-2 inlet - 18" Sump
Inst. 12" storm sew. pipe - 61'
5' Depth

(19) *Sta. "B2" 702+63.44, Lt.*
Const. type "G-2" inlet - 18" Sump

(20) *Sta. "B2" 702+60.65, 14.46' Rt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 34'
5' Depth
Inst. 18" storm sew. pipe - 137'
5' Depth

(21) *Sta. "C2" 702+89.10, Rt.*
Const. type "G-2" inlet - 18" Sump
Inst. 12" storm sew. pipe - 85'
5' Depth

(22) *Sta. "C2" 702+90.61, 20.61' Lt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 39'
5' Depth
Inst. 18" storm sew. pipe - 170'
10' Depth

(23) *Sta. "L" 701+99.46, Lt.*
Adjust inlet

(24) *Sta. "L" 694+54.42, 52.51' Rt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 109'
10' Depth

(25) *Sta. "L" 690+49.41, Lt.*
Adjust inlet

(26) *Sta. "L" 693+98.26, Lt.*
Adjust inlet

(27) *Sta. 696+73.82, Lt.*
Cap inlet

(28) *Sta. 697+27.63, Lt.*
Cap inlet

(29) *Remove/abandon pipe - 381'*

(30) *Remove inlet - 4*

(U1) *Protect Clackamas County sewer*

(U2) *Protect PGE OH power lines*

(U3) *Relocate CBX UG communications lines (By others)*

(U4) *Relocate NW Natural 2" poly gas line and UG PGE electric (By others)*

(U5) *Relocate Comcast UG communications line (By others)*

(U6) *Relocate PGE UG Fiber (By others)*

(U7) *Relocate PGE UG electric (By others)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

DRAINAGE & UTILITIES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_HDR_dr.dgn :: C04C 2/11/2020 11:16:27 AM CDONOVAN

Rotation: 0° 0'

"B2" LINE
NB ENTRANCE RAMP

"C2" LINE
SB EXIT RAMP

100
90
80
70
60
50
40
30
20

Ground line @ ℄

Profile grade @ ℄

20"

Subgrade

Exc. xxx C.Y.

Emb. xxx C.Y.

695+00

700+00

700+00

DESIGN ACCEPTANCE PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: PARK PLACE INTCHE TO WEST LINN INTCHE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Name
Checker: Name

PROFILE

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_QEI_pf_01.dgn :: Default 2/11/2020 11:27:58 AM CDONOVAN

Rotation: 0°

"L" LINE

100
90
80
70
60
50
40
30
20
10

690+00
695+00
700+00

Profile grade @ ℄

25 690+49.41 Extg. Inlet
F.L. 66.01 Out (NW) (Extg.)

3 691+70.34 Manhole
Rim Elev. 69.15
F.L. 64.61 In (SW)
F.L. 51.30 In (NE)
F.L. 51.00 Out (NW)

26 693+98.26 Extg. Inlet
F.L. 66.12 Out (NW)

24 694+54.42 Manhole
Rim Elev. 75.44
F.L. 66.44 In (SW)
F.L. 66.26 Out (NE)

8 695+74.21 Inlet
F.L. 72.11 Out (NW)

19"

Subgrade @ sawcut

Extg. 15"

+0.50%
18" – 220'

+0.64%
18" – 58'

+0.50%
18" – 109'

+7.71%
18" – 66'

Extg. 12"

-0.50%
18" – 121'

-0.50%
18" – 153'

693+94.84 Inlet
F.L. 65.82 In (SE)
F.L. 65.89 In (SW)
F.L. 65.71 Out (NE)
6

695+66.12 Manhole
Rim Elev. 71.17
F.L. 67.02 In (SE)
F.L. 66.98 Out (NE)
7

690+47.07 Inlet
F.L. 61.25 In (SE) (Extg.)
F.L. 51.94 In (NE)
F.L. 51.91 Out (SW)
2

-15.65%
18" – 69'

691+73.59 Manhole
Rim Elev. 43.29
F.L. 40.20 In (SE)
4

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Drafter: Morgan Tholl
Reviewer: Karen Tatman
Checker: Christine Higgins

DRAINAGE PROFILE

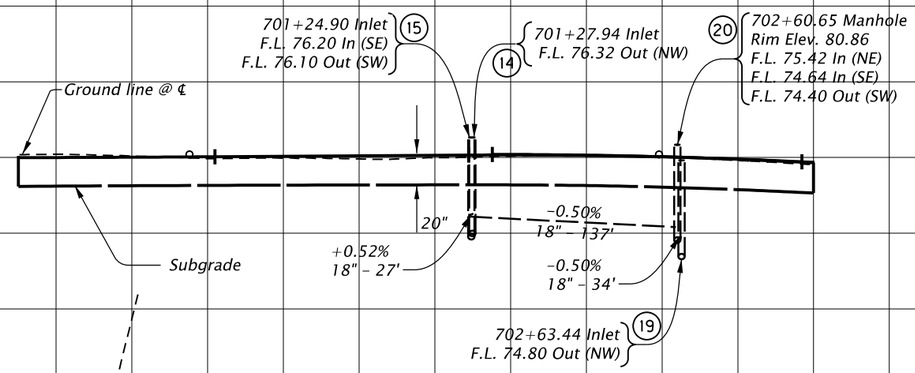
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_HDR_drpf_01.dgn :: C04E 2/11/2020 11:33:45 AM CDONOVAN

Rotation: 0°

"B2" LINE
OR99E NB ENTRANCE RAMP



100 90 80 70 60 50 40 30 20

695+00 700+00 705+00

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke **Reviewer:** Karen Tatman
Drafter: Morgan Tholl **Checker:** Christine Higgins

DRAINAGE PROFILE SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_HDR_drpf_01.dgn :: C04F 2/11/2020 11:33:49 AM CDONOVAN

Rotation: 0°

"C2" LINE
OR99E SB EXIT RAMP

100 90 80 70 60 50 40 30 20

10 698+53.11 Inlet
F.L. 66.76 In (NW)
F.L. 66.70 Out (SW)

16 701+39.47 Extg. Inlet
F.L. 66.65 Out (W)

11 698+97.61 Manhole
Rim Elev. 73.05
F.L. 66.47 In (NE)
F.L. 66.41 In (S)
F.L. 64.30 Out (SW)

18 702+01.71 Inlet
F.L. 66.19 In (E)
F.L. 66.02 Out (W)

12 "L" 699+22.67 Extg. Inlet
F.L. 72.49 Out (N)

9 698+56.43 Inlet
F.L. 66.90 Out (SE)

22 702+90.61 Manhole
Rim Elev. 71.49
F.L. 65.81 In (N)
F.L. 61.96 In (E)
F.L. 61.83 Out (W)

Extg. 12"

-0.50%
18" - 28'

+9.35%
12" - 15'

-0.49%
18" - 97'

-0.50%
18" - 167'

-0.75%
12" - 61'

-1.61%
12" - 85'

-0.50%
18" - 170'

-0.49%
18" - 39'

-0.51%
18" - 45'

701+39.00 Manhole
Rim Elev. 75.98
F.L. 62.88 In (NE)
F.L. 64.87 In (S)
F.L. 62.81 Out (W)
17

Sta. "L" 700+09.96 Inlet
F.L. 63.82 In (NE)
F.L. 63.71 Out (SW)
13

702+89.10 Inlet
F.L. 64.65 In (E)
F.L. 66.00 Out (S)
21

660+00 665+00 670+00

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

DRAINAGE PROFILE

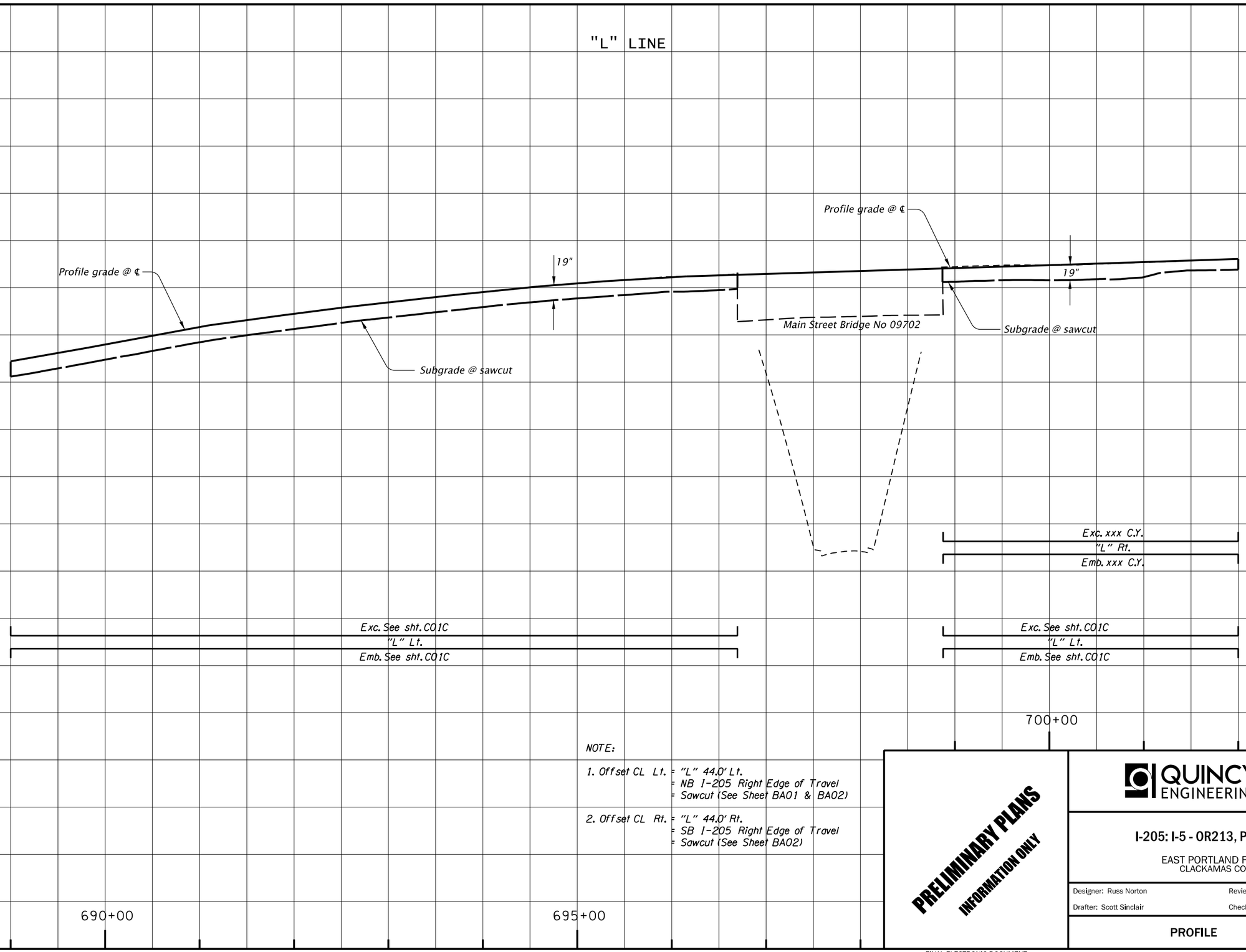
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_HDR_drpf_01.dgn :: C04G 2/11/2020 11:33:53 AM CDONOVAN

Rotation: 0°

"L" LINE



NOTE:

1. Offset CL Lt. = "L" 44.0' Lt.
   = NB I-205 Right Edge of Travel
   = Sawcut (See Sheet BA01 & BA02)
2. Offset CL Rt. = "L" 44.0' Rt.
   = SB I-205 Right Edge of Travel
   = Sawcut (See Sheet BA02)

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton	Reviewer: Karen Tatman
Drafter: Scott Sinclair	Checker: NA

PROFILE

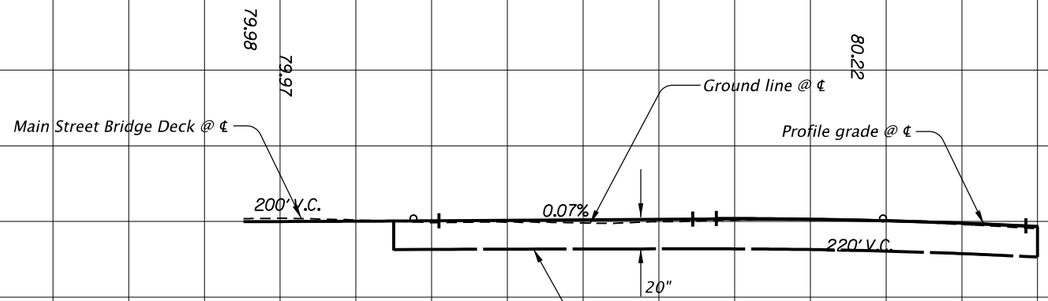
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_QEI_pf_01.dgn :: Default 2/11/2020 11:27:49 AM CDONOVAN

Rotation: 0°

"B2" LINE
OR99E NB ENTRANCE RAMP



100 90 80 70 60 50 40 30 20

695+00 700+00 705+00

PRELIMINARY PLANS
INFORMATION ONLY

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton
Reviewer: Karen Tatman
Drafter: Scott Sinclair
Checker: NA

PROFILE

SHEET NO.

R_K19786_QEI_pf_01.dgn :: Default 2/11/2020 11:28:12 AM CDONOVAN

Rotation: 0°

Sec. 29, 30, T. 2S, R.2E, W.M.
OREGON CITY INTERCHANGE

"C2" LINE
"L" LINE
"B2" LINE
"A2" LINE
"M2" LINE
"D2" LINE
"99E2" LINE

EAST PORTLAND FWY SB (I-205)
EAST PORTLAND FWY NB (I-205)
PACIFIC HWY (OR99E)
18TH ST.
17TH ST.
16TH ST.
MAIN ST.
Extg. R/W
Work area
Temp. ease.
320' Sp
200' Sp seg.
250' Sp

"C2" 702+75.42 P.C.S.
"C2" 706+47.79 P.T.
"C2" 705+68.19 P.C.
"C2" 705+25.42 P.T.
"C2" 706+00
"C2" 708+52.99 P.O.E.=
"C2" 25°00'00" C.L. T Δ e Extg.
N 40°17'20" W
"D2" 38°40'12" C.R. T Δ Sp In - 100' Sp Out - 200' e 12%
"D2" 705+18.48 P.S.
"D2" 705+00
"D2" 702+54.82 P.C.
"D2" 701+54.82 P.S.
"D2" 699+74.97 P.O.B.=
"D2" 707+18.48 P.T.
"D2" 710+00
"D2" 711+03.97 P.O.E.=
"L" 703+98.26 P.C.S.
"L" 705+00
"L" 707+06.80 Bk.
"L" 707+07.90 Ah.= EQUA.
"L" 707+08.13 P.T.
"L" 710+00
"L" 712+27.31 P.O.B.=
"L" 712+74
"B2" 703+98.26 P.C.S.
"B2" 706+38.26 P.T.
"B2" 707+10.33 P.S.
"B2" 709+10.33 P.S.C.
"B2" 710+00
"B2" 710+27.82 P.C.S.
"B2" 712+27.82 P.T.
"B2" 18° C.R. T Δ Sp 200' e 12% 21°08'50"
"M2" 25+00
"M2" 25+35.64 P.T.
"M2" 26+92.78 P.C.
"M2" 28+73.88 P.T.
"M2" 30+00
"M2" 30+00.19 P.C.
"M2" 31+69.76 P.T.
"M2" 10° C.R. T Δ e 18°06'34" Extg.
"M2" 10° C.L. T Δ e 16°57'25" Extg.
S 34°05'44" W
S 30°33'18" W
S 52°12'17" W
"A2" 704+64.43 P.S.C.
"A2" 706+61.87 P.C.S.
"A2" 702+64.43 P.C.S.
"A2" 700+99.58 P.C.
"A2" 709+81.87 P.T.
"A2" 710+00
"A2" 36° C.L. T Δ e 71°04'43" 12%
"A2" 12° C.L. T Δ e 19°46'56" 11.5%
S 65°46'23" W
S 71°16'23" W
S 87°42'08" W
N 87°44'03" E
N 85°48'42" E
S 85°48'42" W
S 4°07'36" E
"99E2" 105+00
"99E2" 108+22.67 P.O.T.
"99E2" 108+49.67 P.O.T.
"99E2" 110+00
"99E2" 110+93.66 P.S.
"99E2" 115+00
"99E2" 11...
Extg. R/W

See Sheet C06 for Work on Clackamette Drive

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

ALIGNMENT

SHEET NO.

R_K19786_QE1_al_01.dgn :: C05 2/11/2020 10:57:11 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

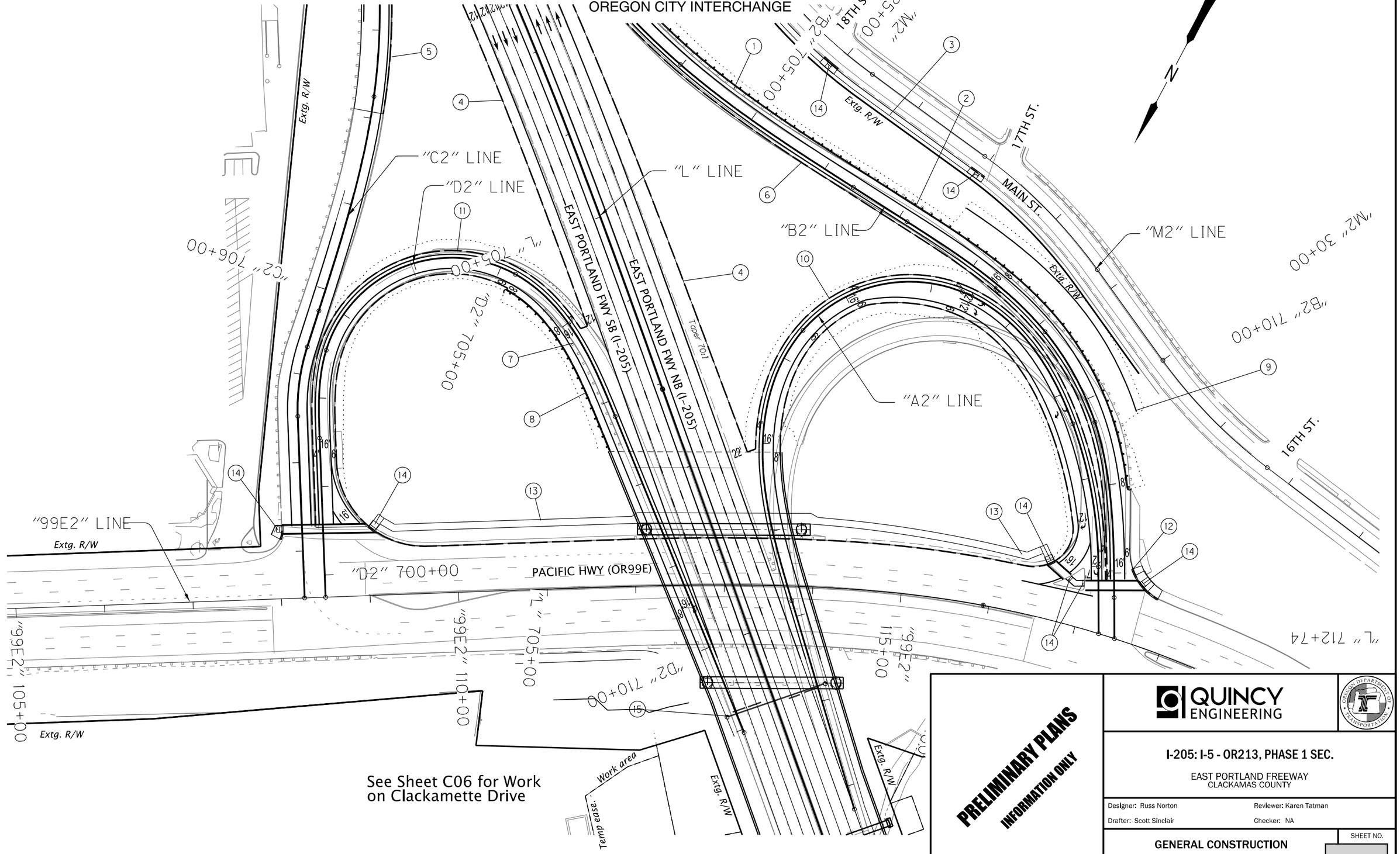
Rotation: 272

"=100'

Sec. 29, 30, T. 2S, R.2E, W.M.

OREGON CITY INTERCHANGE

??



PRELIMINARY PLANS

INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton	Reviewer: Karen Tatman
Drafter: Scott Sinclair	Checker: NA

GENERAL CONSTRUCTION

SHEET NO.

R_K19786_QEI_pl_01.dgn :: CO5A 2/11/2020 11:09:55 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 272.0412° 0'

Sec. 29, 30, T. 2S, R.2E, W.M.
OREGON CITY INTERCHANGE

1. *See sht. C04A, Note 4*
   Remove guardrail

2. *See sht. C04A, Note 5*
   Const. drainage curb
   Const. guardrail (Type 2A)

3. *See sht. C04A, Note 7*
   Const. conc. sidewalk

4. *See sht. C04A, Note 8*
   Const. low profile mountable curb

5. *See sht. C04A, Note 9*
   Const. low profile mountable curb

6. *See sht. C04A, Note 10*
   Const. low profile mountable curb

7. *Sta. "D2" 705+68 to Sta. "D2" 707+54, Rt.*
   Remove guardrail

8. *Sta. "D2" 705+17 to Sta. "D2" 707+51, Rt.*
   Const. drainage curb
   Const. guardrail (Type 2A)

9. *Sta."B2" 707+52 to Sta. "B2" 710+34, Lt.*
   Const. retaining wall

10. *Sta. "A2" 701+05 to Sta."A2" 708+08, Lt. & Rt.*
    Const. low profile mountable curb

11. *Sta. "D2" 700+51 to Sta. "D2" 706+11, Lt. & Rt.*
    Const. low profile mountable curb

12. *Sta. "B2" 711+95 to Sta. "B2" 712+29, Lt.*
    Const. curb and gutter

13. *Sta. "OR99E" 109+02 to Sta. "OR99E" 116+60, Lt.*
    Const. Sidewalk

14. *Const. curb ramp - 8*
    (For details see Sht. BB0X)

15. *Sta. "L" 710+82, Lt. and Rt.*
    Remove sign bridge supports

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

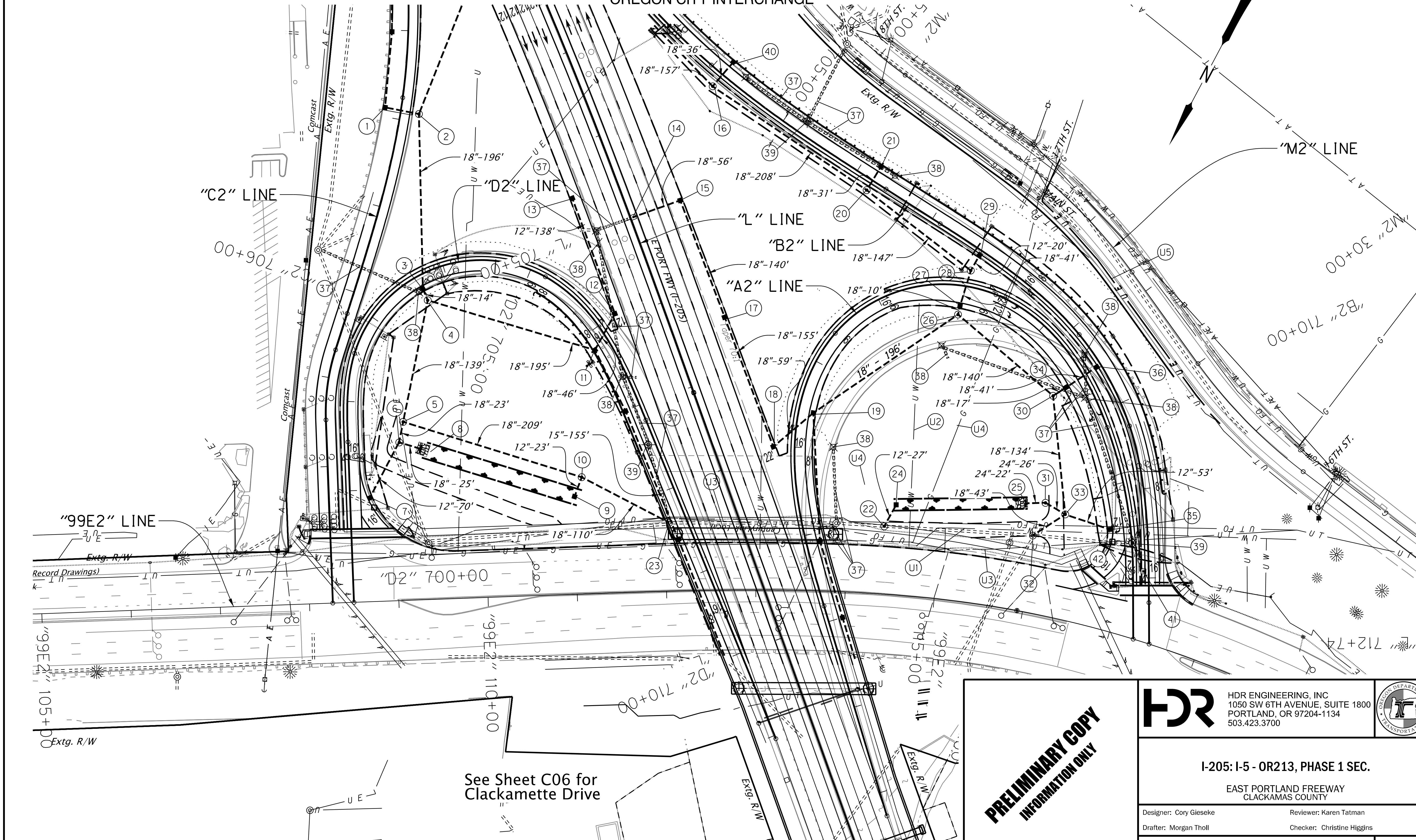
Designer: Russ Norton	Reviewer: Karen Tatman
Drafter: Scott Sinclair	Checker: NA

GENERAL CONSTRUCTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Sec. 29, T. 2 S, R. 2 E, W.M.
OREGON CITY INTERCHANGE



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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

SHEET NO.

DRAINAGE & UTILITIES

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Rotation: 272.0412°

(1) *See sht. C04C, note 21*

(2) *See sht. C04C, note 22*

(3) *Sta. "D2" 703+67.14, Rt.*
Const. "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 196'
10' Depth

(4) *Sta. "D2" 703+65.64, 28.96' Rt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 14'
5' Depth
Inst. 18" storm sew. pipe - 195'
10' Depth

(5) *Sta. "D2" 701+75.84, 62.59' Rt.*
Const. diversion manhole
Inst. 18" storm sew. pipe - 139'
5' Depth
(For details, see sht. HA11)

(6) *Sta. "D2" 701+52.06, 57.42' Rt.*
Const. pollution control manhole
Inst. 12" storm sew. pipe - 70'
5' Depth
Inst. 18" storm sew. pipe - 23'
5' Depth

(7) *Sta. "D2" 700+93.88, Rt.*
Const. type "G-2" inlet - 18" Sump

(8) *Sta. "99E2" 109+34.68, 167.57' Lt. to Sta. "99E2" 111+06.11, 107.62' Lt.*
Const. biofiltration swale
Inst. 18" storm sew. pipe - 25'
5' Depth
(For details, see sht. HA05)

(9) *Sta. "99E2" 111+01.04, 109.07' Lt.*
Const. type "D" inlet

(10) *Sta. "99E2" 111+09.66, 130.73' Lt.*
Const. storm sew. manhole
Inst. 12" storm sew. pipe - 23'
10' Depth
Inst. 18" storm sew. pipe - 209'
10' Depth

(11) *Sta. "D2" 706+20.50, Rt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 46'
5' Depth
Connect bridge drainage
(For details, see shts. BR...)

(12) *Sta. "D2" 705+97.46, 23.72' Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 12" storm sew. pipe - 138'
5' Depth

(13) *Sta. "L" 704+52.19, Rt.*
Const. type "G-2" inlet - 18" Sump

(14) *Sta. "L" 704+98.85, Lt.*
Adjust inlet

(15) *Sta. "L" 704+99.63, Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 56'
5' Depth
Connect to extg. structure

(16) *Sta. "B2" 704+14.63, 17.11' Rt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 157'
5' Depth
Inst. 18" storm sew. pipe - 36'
5' Depth

(17) *Sta. "L" 706+38.98, Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 140'
5' Depth

(18) *Sta. "L" 707+94.93, Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 155'
10' Depth
Connect bridge drainage

(19) *Sta. "A2" 707+58.20, Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 59'
10' Depth

(20) *Sta. "B2" 706+20.80, 12.57' Rt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 31'
5' Depth
Inst. 18" storm sew. pipe - 208'
10' Depth

(21) *Sta. "B2" 706+19.98, Lt.*
Const. type "G-2" inlet - 18" Sump

(22) *Sta. "99E2" 114+38.82, 75.82' Lt.*
Const. storm sew. manhole over existing sewer
Inst. 12" storm sew. pipe - 27'
10' Depth

(23) *Sta. "99E2" 112+04.98, 76.59' Lt.*
Connect to existing structure
Inst. 18" storm sew. pipe - 110'
20' Depth

(24) *Sta. "99E2" 114+52.43, 100.08' Lt.*
Const. type "D" inlet

(25) *Sta. "99E2" 115+84.70, 120.53' Lt. to Sta. "99E2" 114+47.00, 100.54' Lt.*
Const. biofiltration swale
Inst. 24" storm sew. pipe - 22'
5' Depth
(For details, see sht. HA06)

(26) *Sta. "A2" 705+03.62, 33.23' Lt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 10'
5' Depth
Inst. 18" storm sew. pipe - 196'
10' Depth

(27) *Sta. "A2" 705+01.91, Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 41'
10' Depth

(28) *Sta. "A2" 704+97.19, 18.05' Rt.*
Const. storm sew. manhole
Inst. 12" storm sew. pipe - 20'
5' Depth
Inst. 18" storm sew. pipe - 147'
10' Depth

(29) *Sta. "B2" 707+66.43, Rt.*
Const. type "G-2" inlet - 18" Sump

(30) *Sta. "A2" 703+25.29, 40.65' Lt.*
Const. storm sew. manhole
Inst. 18" storm sew. pipe - 17'
5' Depth
Inst. 18" storm sew. pipe - 140'
5' Depth

(31) *Sta. "99E" 116+02.40, 124.55' Lt.*
Const. pollution control manhole
Inst. 24" storm sew. pipe - 26'
5' Depth

(32) *Sta. "99E" 115+95.64, 86.18' Lt.*
Inst. 18" storm sew. pipe - 43'
10' Depth
Connect to existing structure

(33) *Sta. "99E" 116+24.33, 116.05' Lt.*
Const. diversion manhole
Inst. 12" storm sew. pipe - 53'
5' Depth
Inst. 18" storm sew. pipe - 134'
5' Depth
(For details, see sht. HA11)

(34) *Sta. "A2" 703+26.53, Lt.*
Const. type "G-2" inlet - 18" Sump
Inst. 18" storm sew. pipe - 41'
5' Depth

(35) *Sta. "A2" 701+46.53, Lt.*
Const. type "G-2" inlet - 18" Sump

(36) *Sta. "B2" 709+51.44, 7.94' Rt.*
Const. type "G-2" inlet - 18" Sump

(37) *Remove pipe - 1170'*

(38) *Remove inlet - 7*

(39) *Remove manhole - 3*

(40) *Sta. "B2" 704+14.77, Lt.*
Const. type "G-2" inlet - 18" Sump

(41) *Sta. "99E2" 117+17.39, 75.92' Lt.*
Adjust inlet

(42) *Sta. "99E2" 116+77.97, 98.57' Lt.*
Adjust inlet

(U1) *Relocate Oregon City water line (By others)*

(U2) *Relocate NW Natural 4 $\frac{1}{2}$" steel gas line (By others)*

(U3) *Relocate CenturyLink fiber optic duct bank (By others)*

(U4) *Protect West Linn 24" water line*

(U5) *Protect PGE UG electric*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

DRAINAGE & UTILITIES NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Sec. 30, T. 2S, R.2E, W.M.
OREGON CITY INTERCHANGE

WILLAMETTE RIVER

"99E2" LINE
"A2" 700+99.58 P.C.
N 87°44'03" E
S 87°42'08" W
"99E2" 118+81.68 P.C.S.
"B2" 712+74.10 P.O.E. =
"99E2" 117+46.63 P.O.C.
Extg. R/W
"A2" 700+24.04 P.O.E. =
"99E2" 117+27.59 P.O.C.
"99E2" 5° C.R.
T△ 39°24'05"
Ts 663.16'
2 - 500' Sp.
e Extg.
"99E2" 115+93.66 P.S.C.
"CL" LINE
"99E2" 115+00
"CL" 15+00
"CL" 14+26.31 P.C.
"CL" 15+35.96 P.T.
Extg. R/W
"L" LINE
Temp. ease. - Work area
Perm. ease.
"CL" 28° 38'52" C.R.
T△ 31°24'44"
Ts 56.24'
e Crown
EAST PORTLAND FWY NB (I-205)
S 68°16'23" W
EAST PORTLAND FWY SB (I-205)
"L" 715+00
"L" 720+00
Perm. ease.
Temp. ease. - Work area
PACIFIC HWY (OR99E)
S 10°55'37" E
"B2" 710+00
"CL" 12+04.83 P.T.
Extg. R/W
"CL" 19° 45' C.R.
T△ 24°45'47"
Ts 63.69'
e Crown
"CL" 10+79.45 P.C.
Temp. ease. - Work area
"99E2" 110+93.66 P.S.
S 40°07'36" E
S 35°41'25" E
"CL" 10+00
"99E2" 110+00
Extg. R/W
CLACKAMETTE Dr.

See Sheet C05 for
Work on I-205

N

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton	Reviewer: Karen Tatman
Drafter: Scott Sinclair	Checker: NA

ALIGNMENT

SHEET NO.

R_K19786_0EI_al_01.dgn :: C06 2/11/2020 10:57:12 AM CDONOVAN

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Rotation: 19 "=100'

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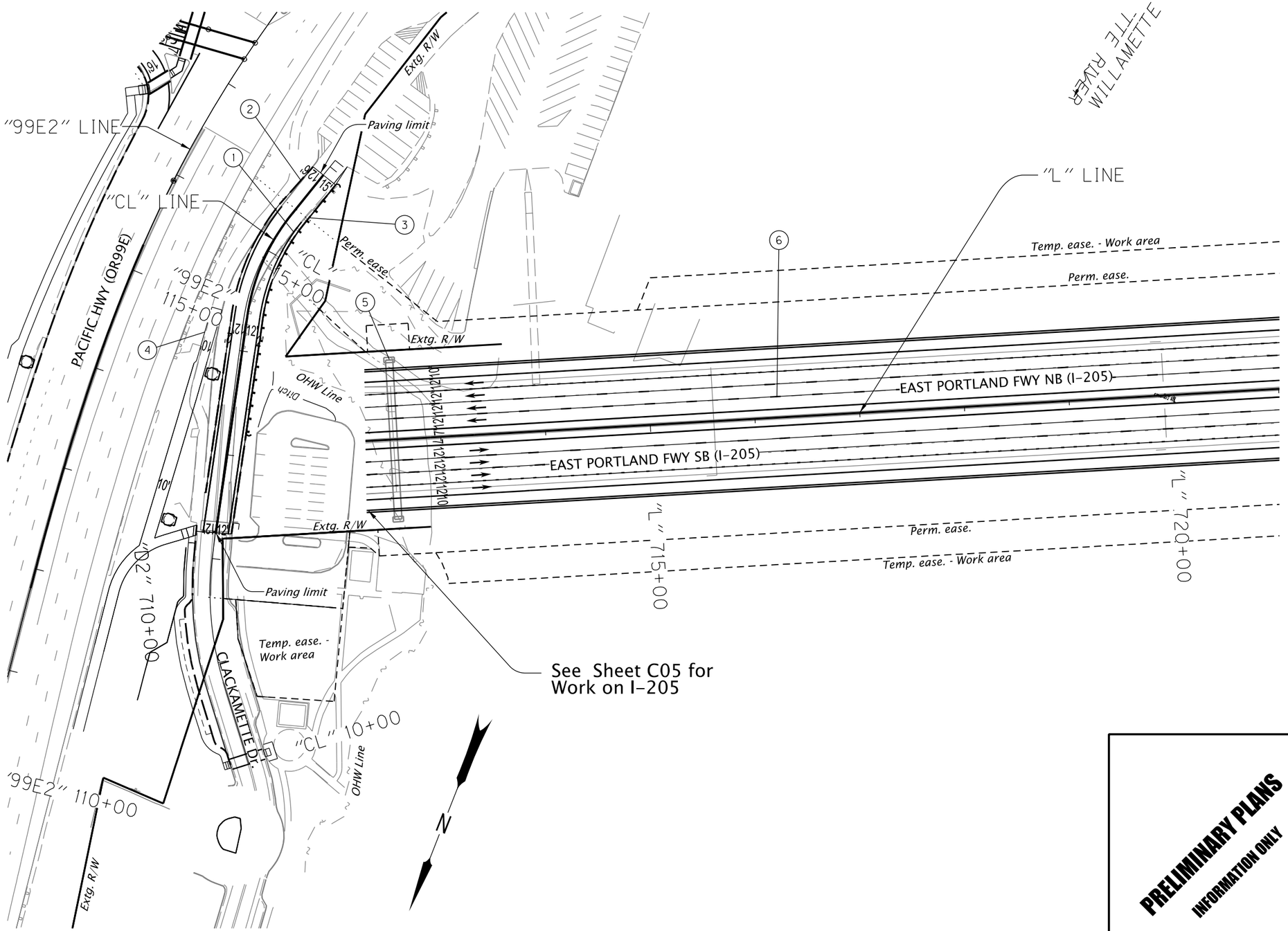
OREGON CITY INTERCHANGE



1. Sta. "CL" 13+94 to Sta. "CL" 15+89, Rt.
   Remove guardrail
2. Sta. "CL" 12+61 to Sta. "CL" 15+89, Rt.
   Const. drainage curb
   (For details, see Sht. BB0X)
3. Sta. "CL" 13+46 to Sta. "CL" 15+89, Lt.
   Const. drainage curb
   Const. guardrail (Type 2A)
   (For details, see Sht. BB0X)
4. Sta. "CL" 10+28 to Sta. "CL" 14+36, Lt.
   Const asph. walk, 10' width
   (For details, see Sht. BB0X)
5. Sta. "L" 712+55 Lt. and Rt.
   Const. sign bridge
6. Widen / retrofit Br. No. 09403

PRELIMINARY PLANS
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Russ Norton | Reviewer: Karen Tatman
Drafter: Scott Sinclair | Checker: NA

GENERAL CONSTRUCTION

SHEET NO.

R_K19786_QEI_pl_01.dgn :: CO6A 2/11/2020 11:09:58 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431°

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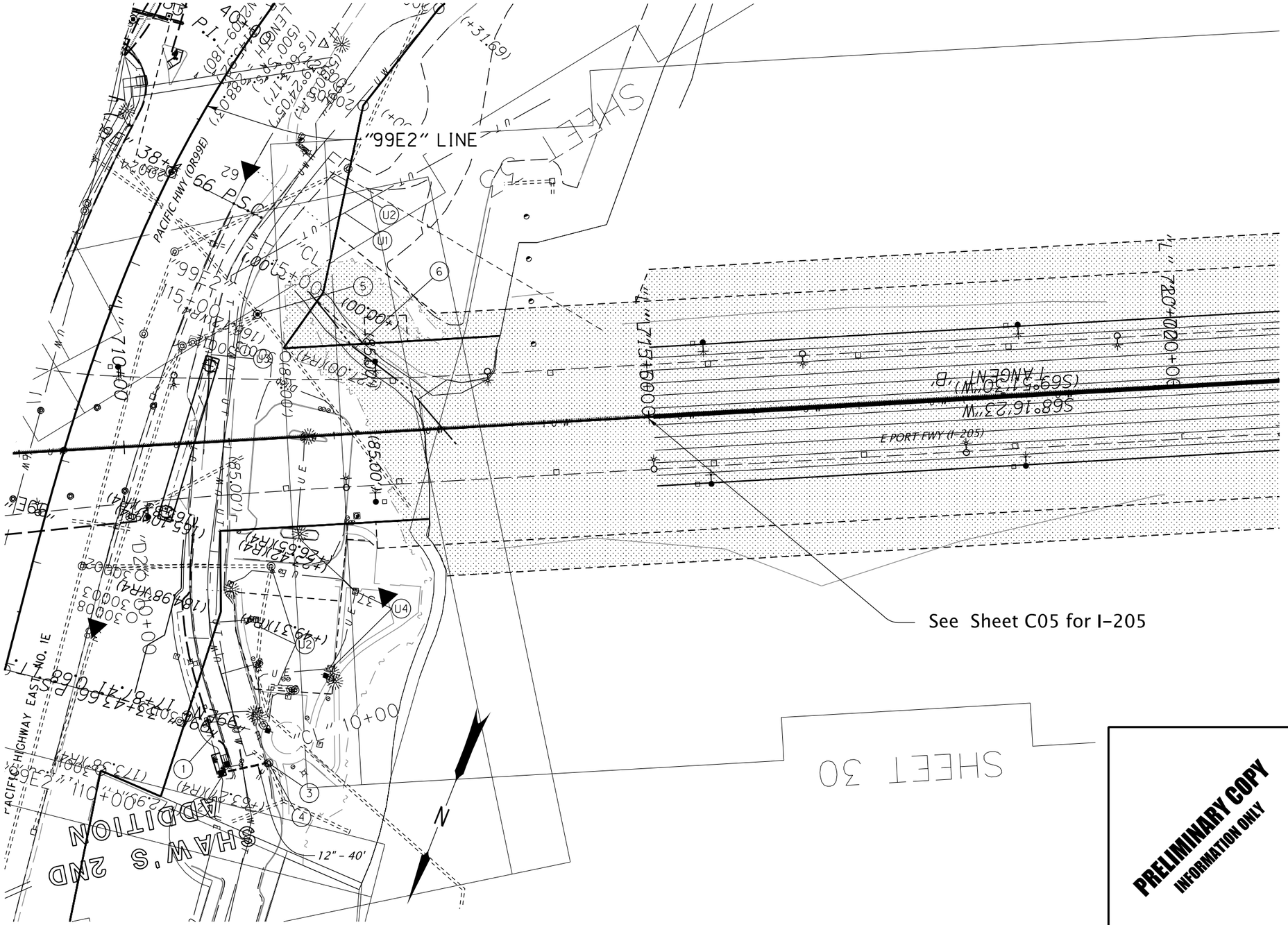
OREGON CITY INTERCHANGE



1. Sta. "99E2" 110+82.72, 207.37' Rt.
   Const. stormwater planter
   (For details, see sht. HA10)
2. Sta. "99E2" 110+52.63, 227.34' Rt.
   Const. type "D" inlet
3. Sta. "99E2" 110+69.79, 265.27' Rt.
   Inst. 12" storm sew. pipe – 40'
   x' Depth
   Connect to existing structure
4. Adjust manhole
5. Adjust manhole
6. Const. Abernethy Creek
   (For details, see sht. FBXX – FBXX)

U1 Protect CenturyLink UG communications

U2 Protect Oregon City sanitary sewer

U3 Relocate CenturyLink fiber optic duct bank (By others)

U4 Protect Oregon City water meters

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503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

DRAINAGE & UTILITIES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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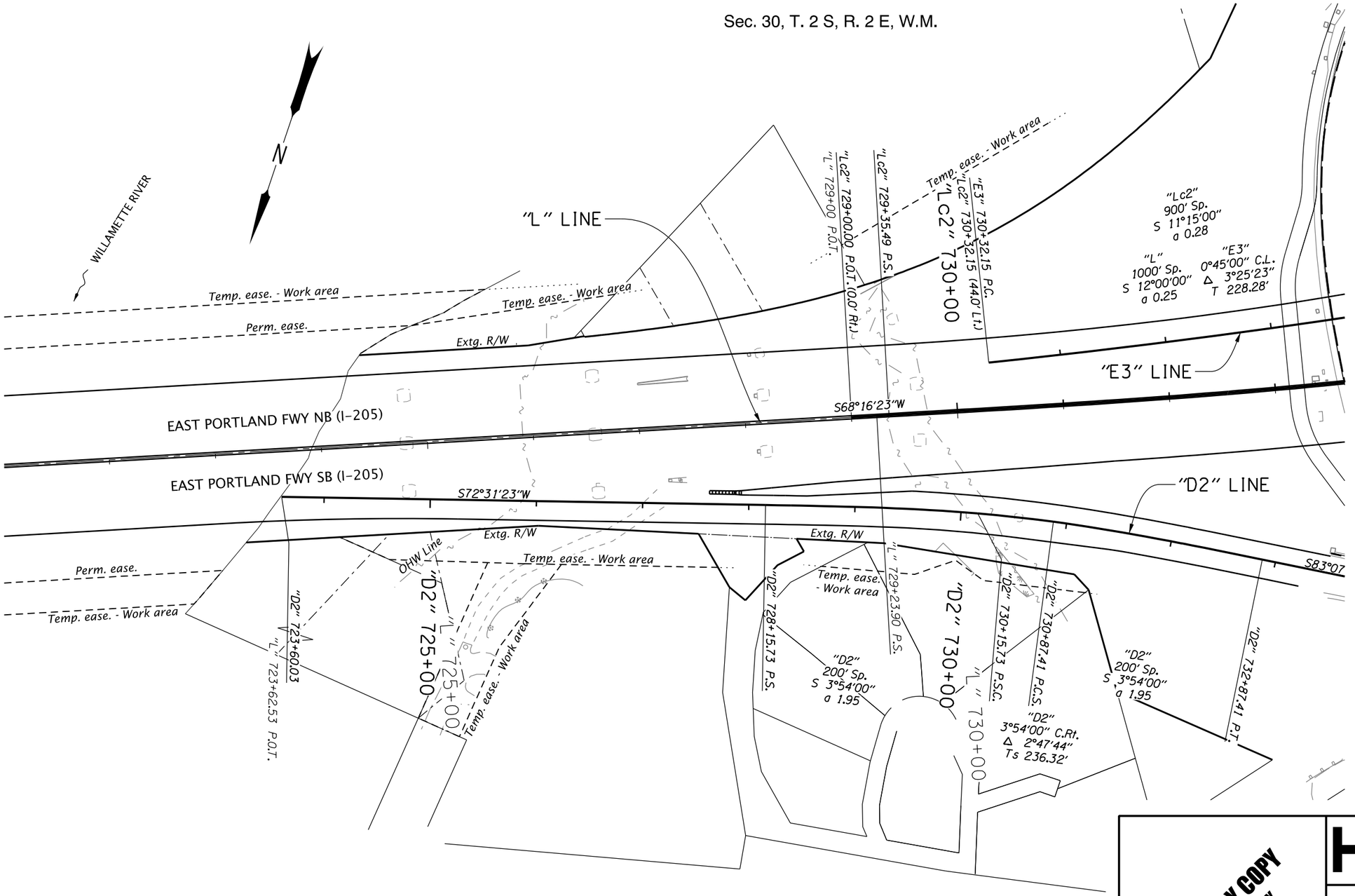
Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Connor Donovan | Checker: Brendan LeBlanc

ALIGNMENT

SHEET NO.

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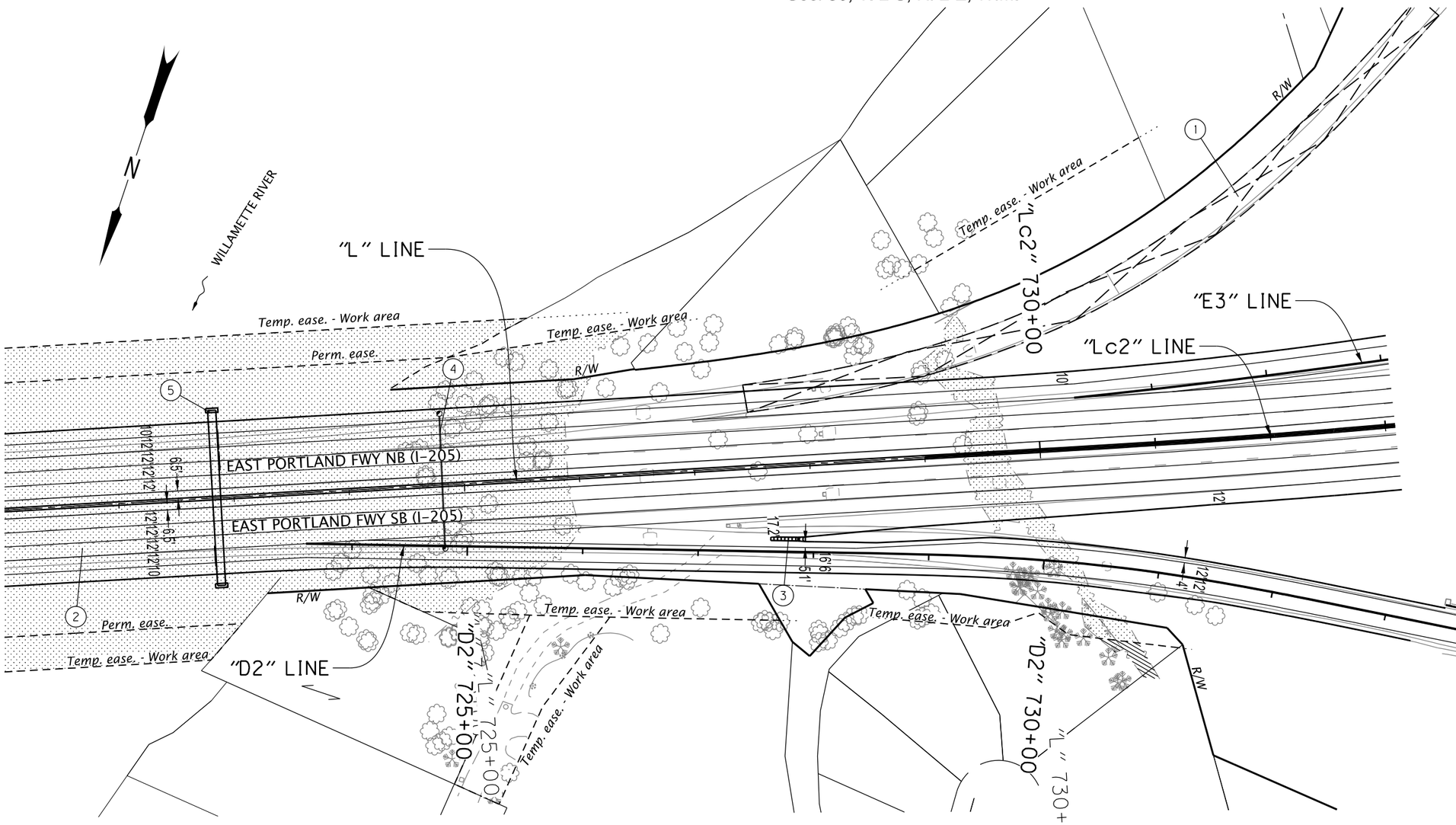
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



1. Remove structure shown as thus:
2. See sht. C06B, note 3
   Widen extg. structure
   (For drg. nos., see sht. XX)
3. Sta. "L" 727+62.6, Rt.
   Const. impact attenuator
   (For details, see sht. XX)
4. Sta. "L" 724+80.3, Lt. and Rt.
   Remove sign support and footing
   (For drg. nos. see sht. XX)
5. Sta. "L" 722+85.0, Lt. and Rt.
   Const. sign support and footing
   (For drg. nos. see sht. XX)

LEGEND

- Ordinary high water
- Wetlands
- Regulated Work Access
- No Work Access

REGISTERED PROFESSIONAL ENGINEER
7791 PE
OREGON
JULY 14, 2011
JASON M. RAHM
EXPIRES: DEC. 31, 2020

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FINAL ELECTRONIC DOCUMENT
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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mark Taylor
Drafter: Connor Donovan
Reviewer: Jason Rahm
Checker: John Wolf

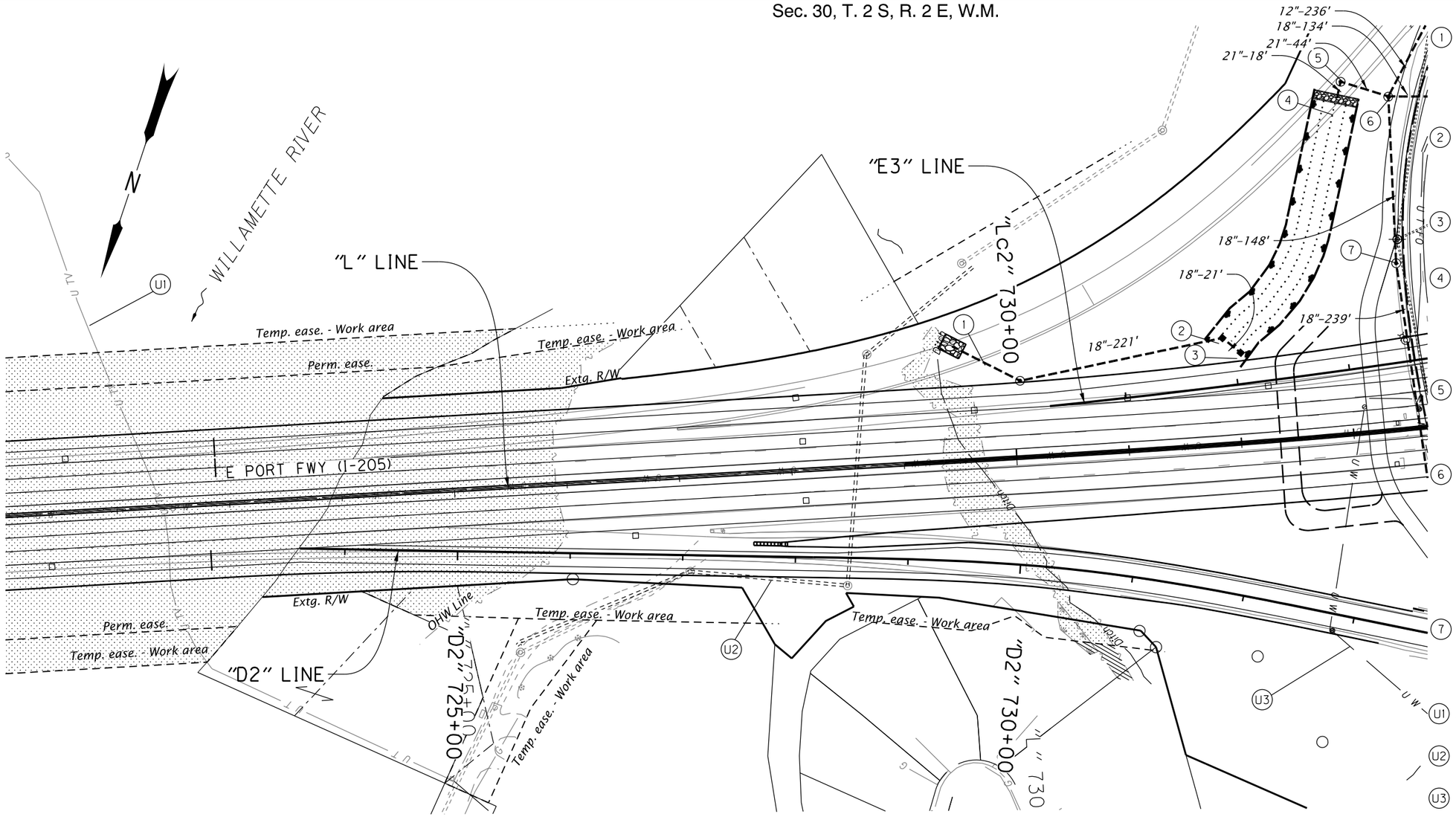
GENERAL CONSTRUCTION

SHEET NO.

R_K19786_HDR_pl01.dgn :: C07A 2/7/2020 4:05:58 PM CDONOVAN

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



1. Sta. "L" 729+79.26, 79.08' Lt.
   Const. riprap basin
   Inst. 18" storm sew. pipe – 221'
   x' Depth
   (For details, see sht. HA01)
2. Sta. "OR43" 8+87.56, 214.24' Lt.
   Const. type "D" inlet
   Inst. 18" storm sew. pipe – 21'
   x' Depth
3. Sta. "OR43" 8+75.47, 199.11' Lt.
   Const. type "D" inlet
4. Sta. "OR43" 10+59.46, 110.66' Lt. to Sta. "OR43" 8+78.88, 209.80' Lt.
   Const. biofiltration swale
   Inst. 21" storm sew. pipe – 18'
   20' Depth
   (For details, see sht. HA07)
5. Sta. "OR43" 10+68.83, 110.43' Lt.
   Const. pollution control manhole
   Inst. 21" storm sew. pipe – 44'
   20' Depth
6. Sta. "OR43" 10+65.30, 66.45' Lt.
   Const. storm sew. manhole
   Inst. 12" storm sew. pipe – 236'
   10' Depth
   Inst. 18" storm sew. pipe – 134'
   10' Depth
   Inst. 18" storm sew. pipe – 148'
   10' Depth
7. Sta. "OR43" 9+32.92, 48.87' Lt.
   Const. storm sew. manhole
   Inst. 18" storm sew. pipe – 239'
   10' Depth

U1 Abandon CenturyLink submarine cable (By others)

U2 Relocate West Linn sanitary (By others)

U3 Relocate West Linn water line (By others)

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

DRAINAGE & UTILITIES

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Rotation: 198.4431° 0'

Stage I: OR43 Interchange Ramp Reconfiguration & Roundabout

PRE-PHASE 1a Contractor Access, TPAR, Temp Signal Modification
- *Construct Temporary Contractor Access at SB ramp intersection, including temporary signal modification*
- *Construct TPAR*

PRE-PHASE 1b Contractor Access Road and Temp Signal
- *Construct Temporary Contractor Access Road under Abernethy Bridge*
- *Construct Temporary Pedestrian Accessible Route*

PHASE 1 I-205 Aux Lane, Ramp Widening &Temp Ramp
- *Widen Abernethy bridge superstructure to infill OR43 NB loop entrance ramp gore area*

PHASE 1B OR43 NB to I-205 NB Entrance Ramp Gore Point
- *Widen Abernethy Bridge superstructure to infill OR43 NB entrance ramp gore area (night time ramp closure)*

PHASE 2 Auxiliary Lane, Ramp Widening & Temp Ramp
- *Widen Abernethy Bridge between OR43 NB ramps*
- *Widen OR43 NB loop entrance ramp*

PHASE 3 OR43 Loop Entrance Ramp
- *Realign NB loop entrance ramp (weekend ramp closure)*

PHASE 4 Realign NB Exit Ramp to OR43
- *Construct Abernethy Bridge Pier 14 column widening and seismic upgrades*
- *Construct western portion of Roundabout and realigned NB Exit Ramp while maintaining traffic on existing exit ramp*
- *Construct separated pedestrian path and retaining wall*

PHASE 5 OR43 Pavement
- *Pave OR43 (limited duration closure)*

PHASE 6 OR43 Pavement & Bridge Demo
- *Demolish OR43 NB entrance ramp structure*
- *Construct south side of OR43 & Willamette Falls Dr intersection*

PHASE 7 OR43 NB Loop Entrance Ramp Gore
- *Construct permanent gore*

Stage II: Northbound Ramps and Land Spans Staging

PHASE 1 I-205 Aux Lane, Ramp Widening, and Temp Ramp
OR213 Intchg to OR99E Intchg
- *Widen NB I-205 at OR213 exit ramp gore*
- *Widen NB I-205 from OR213 Exit Ramp to Abernethy Bridge while maintaining existing number of traffic lanes*
- *Begin substructure work for Bridge No. 09702 (temporary signal on Main Street)*
- *Widen NB entrance ramp from OR99E, including retaining walls, while maintaining one lane of traffic*
- *Begin temporary I-205 NB Exit Ramp to OR99E while maintaining traffic on existing ramp*
- *Construct new parking lot on Clackamette Drive*

Abernethy Bridge
- *Continue Abernethy Bridge substructure construction for river spans*
- *Widen land spans from NB On Ramp gore to end bridge*

Stage II: Northbound Ramps and Land Spans Staging -- Continued

PHASE 2 NB I-205 Exit Ramp to OR99E
OR213 Intchg to OR99E Intchg
- *Continue widening NB I-205 from OR213 exit ramp to Abernethy Bridge*
- *Complete substructure work for Bridge No. 09702 (temp signal on Main Street)*
- *Construct new NB I-205 to OR99E exit ramp alignment*
- *Construct TPAR from OR99E to Clackamette Drive*

PHASE 3 Set Bridge Girders on NB I-205
OR213 Intchg to OR99E Intchg
- *Set girders for I-205 bridge over Main Street using night time closure*
- *Set girders for Abernethy Bridge span over OR99E*

PHASE 4 Pavement Rehabilitation
OR213 Intchg to OR99E Intchg
- *Cold plane and inlay I-205 and entrance ramp from OR99E using night time single lane closures*

Stage III: Southbound Ramps and Land Spans Staging

PHASE 1 Widen from Br 09702 to OR43
OR213 Intchg to OR99E Intchg
- *Widen I-205 from Bridge No. 09702 to SB Entrance Ramp Gore while maintaining two SB through lanes*
- *Widen SB entrance ramp from OR99E while maintaining one ramp lane and extg meter*

Abernethy Bridge
- *Widen land spans on north and south sides of river, using night closures for demolition and girder setting*

OR43 Intchg
- *Widen I-205 SB exit ramp to OR43*

PHASE 2 OR43 Exit Ramp Gore
OR43 Inchg
- *Widen Abernethy Bridge superstructure to infill the OR43 SB exit ramp gore area (night time ramp closure)*

PHASE 3 Abernethy Bridge Land Span Widening over OR43
Abernethy Bridge
- *Widen bridge from SB exit ramp gore to end of bridge using night time closures for demolition and girder setting*

PHASE 4 PAVEMENT REHABILITATION
OR213 Intchg to OR99E Intchg
- *Cold plane and inlay I-205 and SB ramps to / from OR99E*

Stage IV: I-205 River Spans Superstructure Widening

PHASE 1 Abernethy Bridge Cantilever Outside Widening
- *Construct river spans outside cantilever widening for both NB and SB*

PHASE 2 NB Abernethy Bridge Girder Launch
- *NB Girder Launch*

PHASE 3 SB Abernethy Bridge Girder Launch
- *SB Girder Launch*

PHASE 4 Abernethy Bridge Median Widening
- *Construct median widening for both NB and SB*

Interim Completion Date Configurations

CONFIGURATION #1
I-205 NB and SB: Complete temporary pavement widening of I-205 NB and SB to south of OR43

I-205 NB: Three lanes open from "L" 713+50 to "L" 731+50

OR43: Final configuration

CONFIGURATION #2
I-205 NB: Four lanes open from "L" 672+00 to "L" 696+50 and three lanes open from "Lc2" 730+00 to "L" 696+50. Recovery area for NB exit ramp to OR213 completed.

CONFIGURATION #3
I-205 NB and SB: Existing Abernethy Bridge river spans in final location with joints complete.

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Brendan LeBlanc | Reviewer: Name
Drafter: Landon Fisher | Checker: Name

TRAFFIC CONTROL SUMMARY

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Summary of Road Closures

I-205: Northbound weekend closure for northbound Abernethy Bridge transverse Slide, followed by a southbound weekend closure to complete the southbound Abernethy Bridge transverse Slide (separated by approximately one month).

OR43: Three weeks of continuous closure for road construction. Up to six night-time closures for I-205 demolition, girder installation, and temporary scaffolding installation.

OR99E: Up to six night-time closures for I-205 demolition, girder installation, and temporary scaffolding installation. Up to six months of long term closure of the northbound lane between the ramps (auxiliary/weaving lane) for pier 1 construction.

Northbound Entrance Slip Ramp from OR43: One night-time closure for gore point work. Three weeks of continuous closure (occurs during OR43 closure) for OR43 road construction.

Northbound Entrance Loop Ramp from OR43: One weekend closure for ramp construction.

Northbound Exit Ramp to OR43: Three weeks of continuous closure (occurs during OR43 closure) for OR43 road construction.

Northbound Ramps for OR99E: Four night-time closures for ramp terminal area completion.

Southbound Exit Ramp to OR43: Two weeks of night-time closures for bridge superstructure construction.

Main Street: Up to three night-time closures for I-205 demolition, girder installation, and temporary scaffolding installation. Up to six months of long term one lane operation for substructure construction.

Clackamette Drive: Up to six night-time closures for I-205 demolition, girder installation, and temporary scaffolding installation. Up to eight months of long term one lane operation for pier 2 construction.

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Brendan LeBlanc | Reviewer: Name
Drafter: Landon Fisher | Checker: Name

TRAFFIC CONTROL SUMMARY

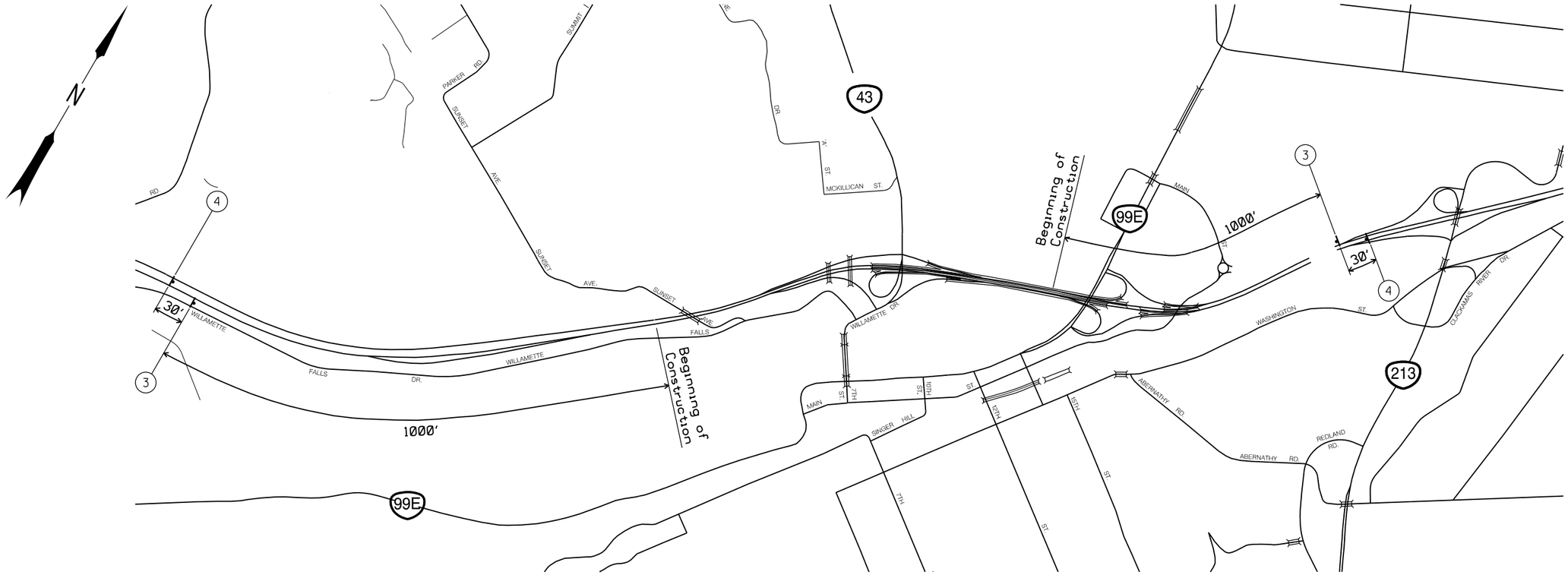
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_tc01.dgn :: EA02 - Traffic Control Summary 2/11/2020 2:50:14 PM CDONOVAN

Rotation: 0° 0'

ADVANCE SIGNING PLAN



END ROAD WORK	ROAD WORK AHEAD	ROAD WORK AHEAD / FINES DOUBLE	W20-1 48x48 R2-6 36x24 Type "W1"	ROAD WORK AHEAD	ODOT YOUR TAX DOLLARS AT WORK COMPLETION SUMMER 2019	ROAD WORK NEXT 6 MILES
CG20-2a 48x24 (All Stages)	W20-1 48x48 (All Stages)	(All Stages)		W20-1 36x36 (All Stages) (Mount on Barrier)	48x54 Type "W8" (All Stages)	60x24
(1) (5 Reqd.)	(2) (3 Reqd.)	(3) (1 Reqd.)		(4) (1 Reqd.)	(5) (1 Reqd.)	(6) (1 Reqd.)

WORK ZONE

TEMPORARY SIGN SUPPORT

TEMPORARY SIGN ON TEMPORARY SUPPORT

PCMS WITH 8' TYPE III BARRICADE (R)

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury | Reviewer: Simon Eng
Drafter: Amy Salisbury | Checker: Colette Snuffin

TRAFFIC CONTROL DETAILS

SHEET NO.

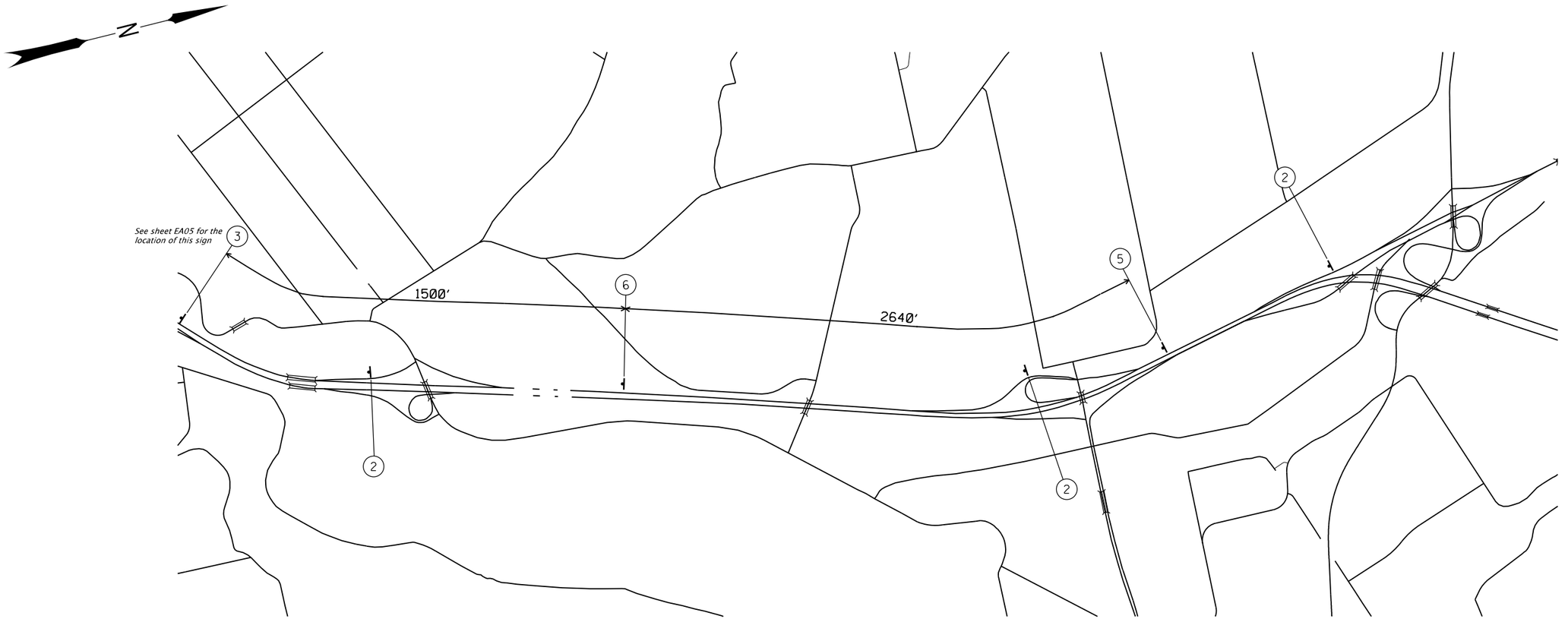
R_K19786_HDR_tc01.dgn :: EA06 2/11/2020 2:57:02 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 30.1844°

0'

A D V A N C E S I G N I N G P L A N



END ROAD WORK	ROAD WORK AHEAD	ROAD WORK AHEAD / FINES DOUBLE	ROAD WORK AHEAD	ODOT / YOUR TAX DOLLARS AT WORK / COMPLETION SUMMER 2019	ROAD WORK NEXT 6 MILES
CG20-2a 48x24 (All Stages)	*W20-1 48x48 (All Stages)*	*W20-1 48x48 (All Stages)* R2-6 36x24 Type "W1"	*W20-1 36x36 (All Stages) (Mount on Barrier)*	*48x54 Type "W8" (All Stages)*	*60x24*
1	2	3	4	5	6
(5 Reqd.)	*(3 Reqd.)*	*(1 Reqd.)*	*(1 Reqd.)*	*(1 Reqd.)*	*(1 Reqd.)*

WORK ZONE

TEMPORARY SIGN SUPPORT

TEMPORARY SIGN ON TEMPORARY SUPPORT

PCMS WITH 8' TYPE III BARRICADE (R)

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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury | Reviewer: Simon Eng
Drafter: Amy Salisbury | Checker: Colette Snuffin

TRAFFIC CONTROL DETAILS

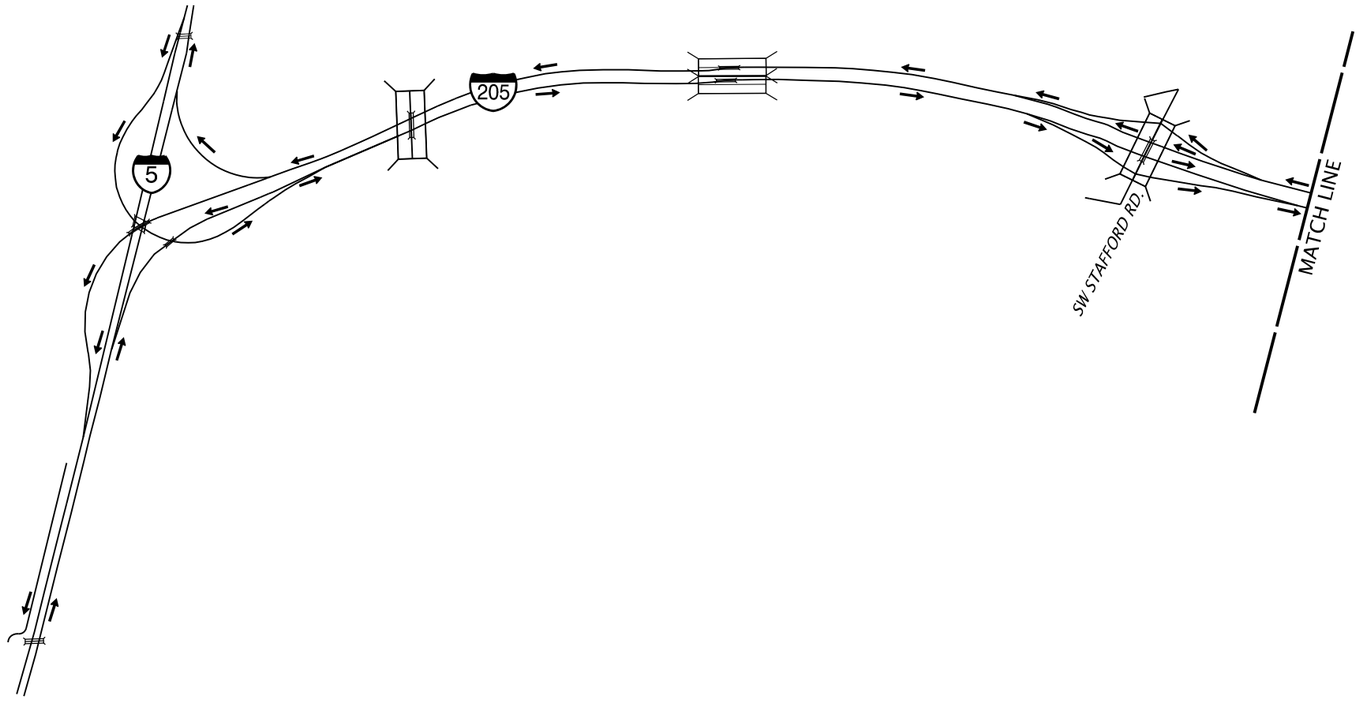
SHEET NO.

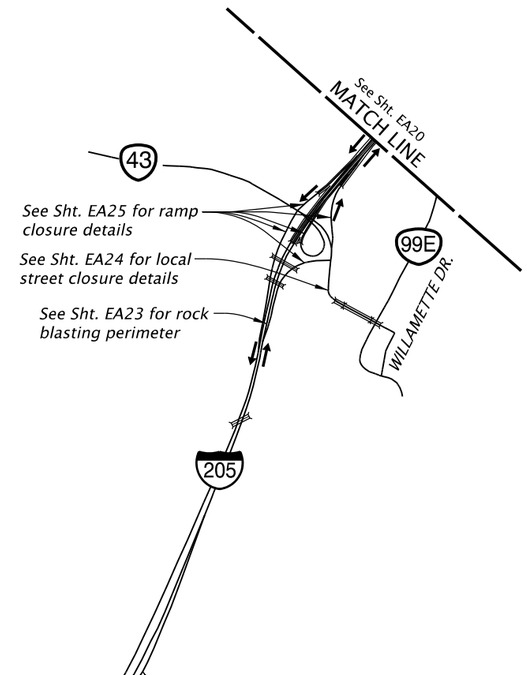
R_K19786_HDR_tc01.dgn :: EA07 2/11/2020 2:57:48 PM CDONOVAN

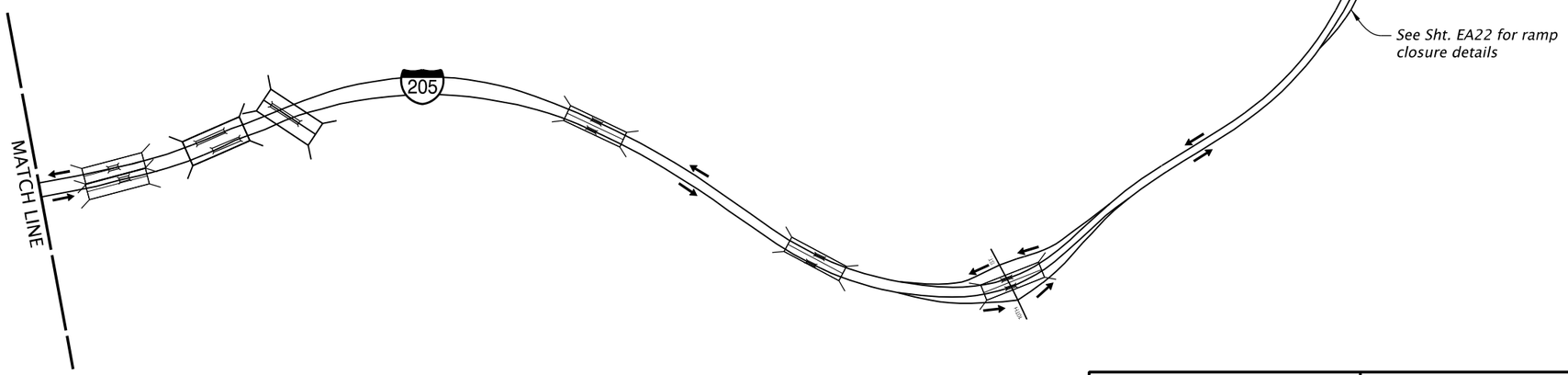
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 75.975° 0'

NB I-205 ROLLING SLOWDOWN METHOD







Legend

→ *Direction of Traffic*

Notes:

1) See Sht. EA21 for RSM details
2) See Sht. EBXX for advanced warning sign placement

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

R_K19786_HDR_tc01.dgn :: EA19 2/11/2020 3:07:31 PM CDONOVAN

Rotation: 0° 0'

XXX-XXX

D E T O U R

OR43 SOUTHBOUND TO I-205 NORTHBOUND ENTRANCE RAMP CLOSURE

(Night time)

N

RAMP CLOSED

OR22-18
48x30
(Mount On TSS)

(1)

RAMP CLOSED AHEAD

W20-3 mod.
48x48

NORTH 205 INTERSTATE

M3-1 24x12
M1-1 30x24

(2)

DETOUR AHEAD

W20-2
48x48

(3)

DETOUR NORTH 205 INTERSTATE

M4-8 24x12
M3-1 24x12
M1-1 30x24
M6-1R 21x15

(4)

DETOUR NORTH 205 INTERSTATE

M4-8 24x12
M3-1 24x12
M1-1 30x24
M6-2R 21x15

(5)

DETOUR NORTH 205 INTERSTATE

M4-8 24x12
M3-1 24x12
M1-1 30x24
M6-1L 21x15

(6)

2 Reqd.

DETOUR NORTH 205 INTERSTATE

M4-8 24x12
M3-1 24x12
M1-1 30x24
M5-1L 21x15

(7)

2 Reqd.

END DETOUR

CG20-5
30x24

(8)

ON ROADWAY

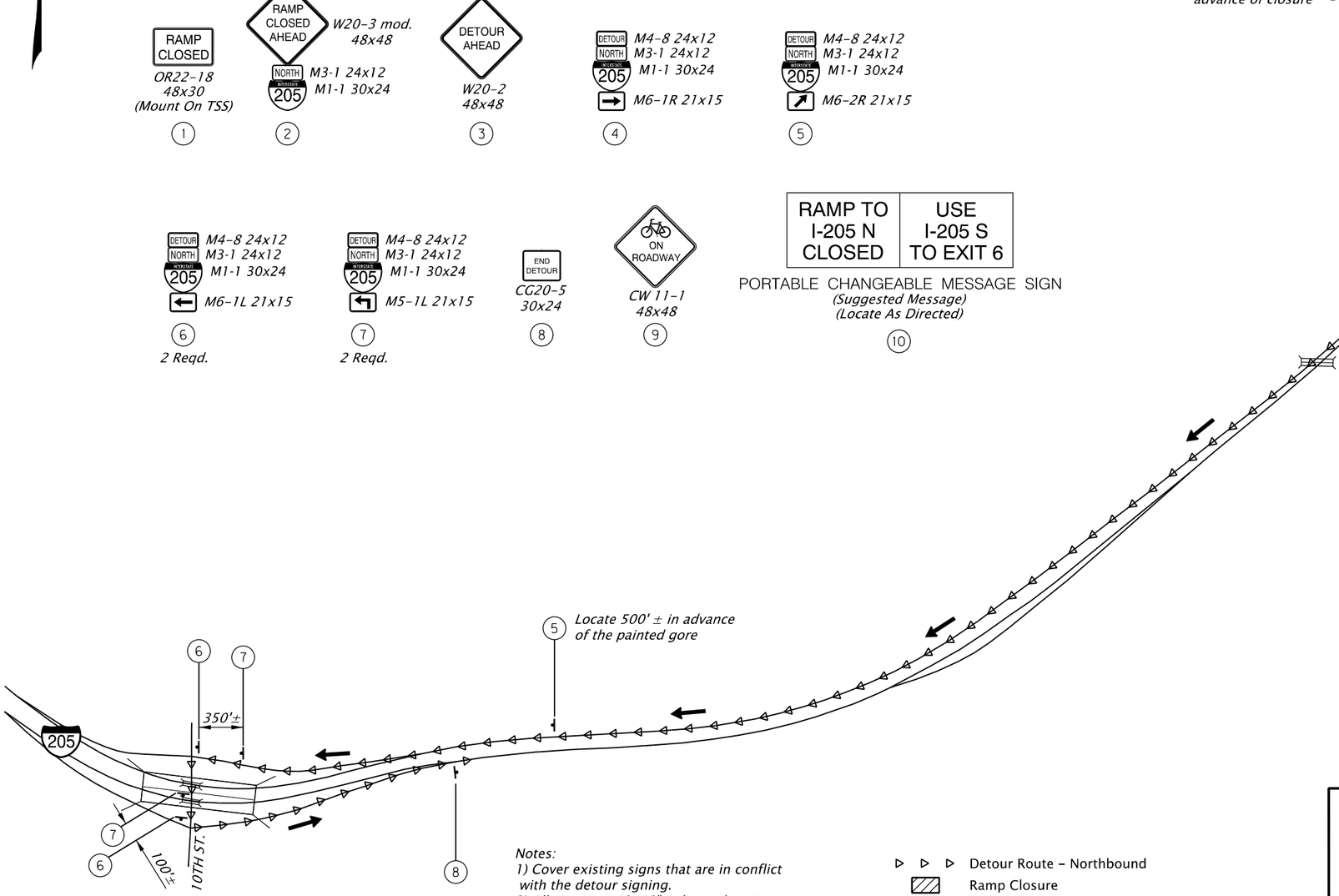
CW 11-1
48x48

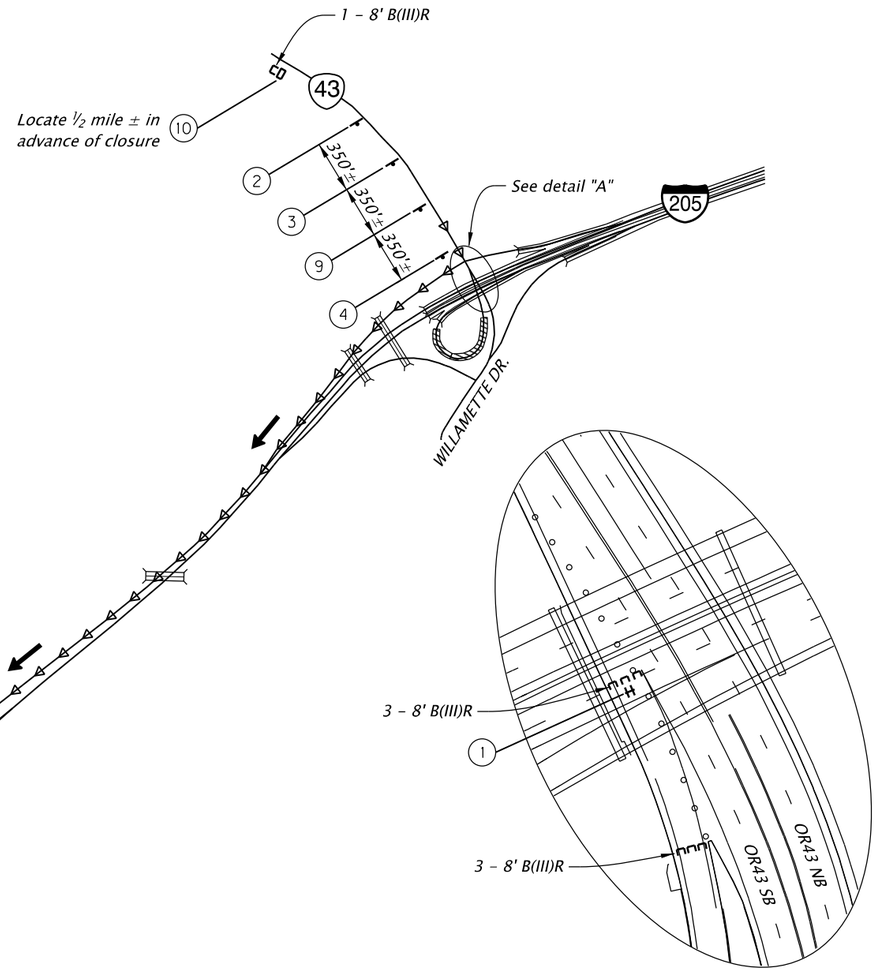
(9)

RAMP TO I-205 N CLOSED	USE I-205 S TO EXIT 6

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(10)





Detail "A"
Scale: 1"=100'

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

- Detour Route - Northbound
- Ramp Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 20' Max. Spacing

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INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salsbury
Drafter: Stephanie Teeter
Reviewer: Brandon LeBlanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc03.dgn :: EB01_395 Closure 2/10/2020 9:56:25 AM CDONOVAN

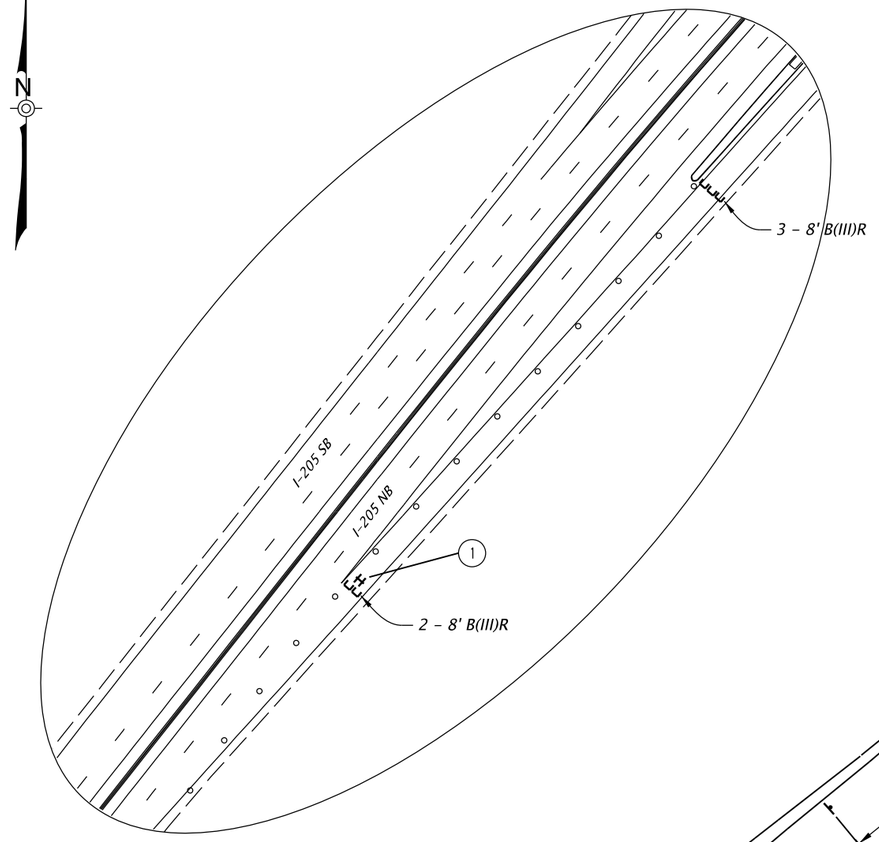
Rotation: N/A

XXX-XXX

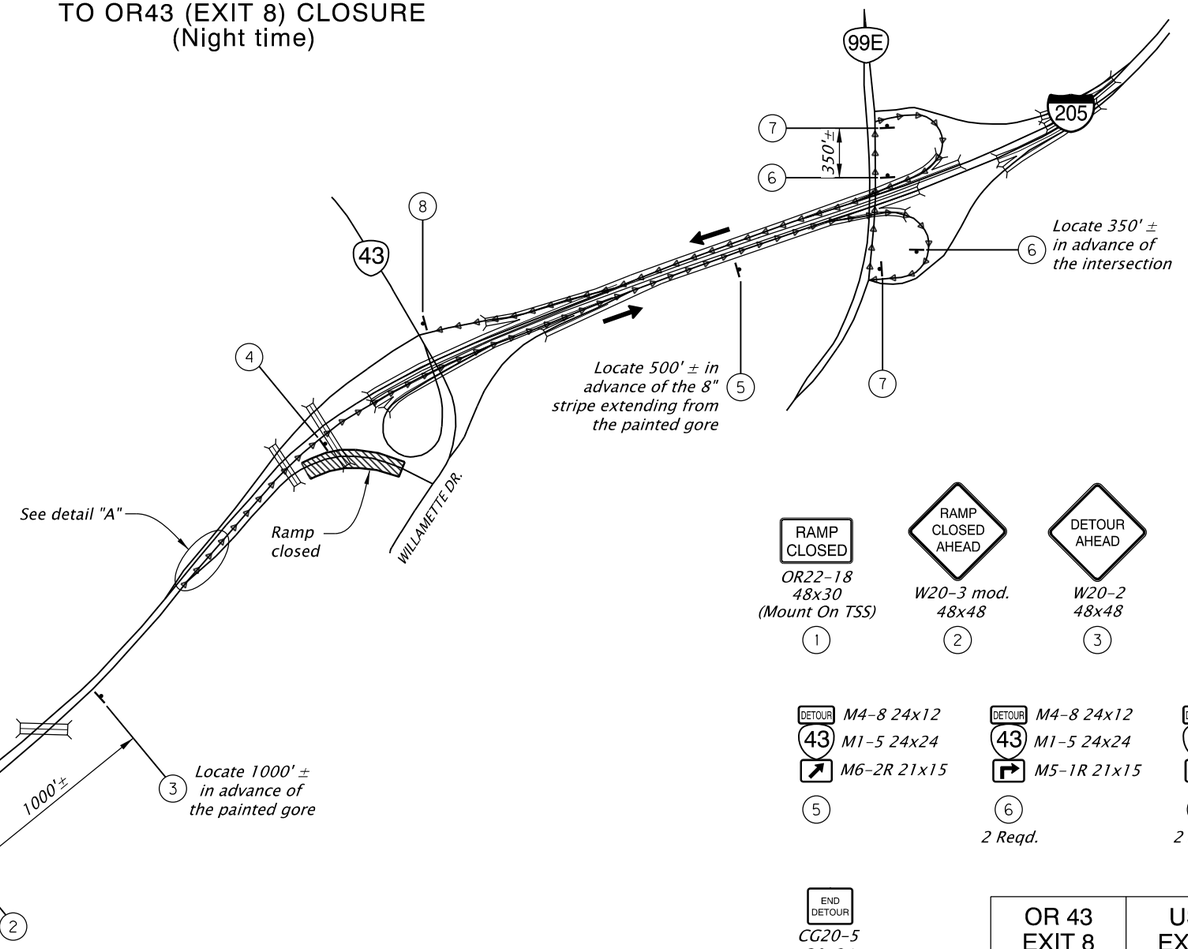
D E T O U R

I-205 NB EXIT RAMP TO OR43 (EXIT 8) CLOSURE

(Night time)



Detail "A"
Scale: 1"=100'



RAMP CLOSED
OR22-18
48x30
(Mount On TSS)
1

RAMP CLOSED AHEAD
W20-3 mod.
48x48
2

DETOUR AHEAD
W20-2
48x48
3

DETOUR M4-8 24x12
43 M1-5 24x24
M6-3 21x15
4

DETOUR M4-8 24x12
43 M1-5 24x24
M6-2R 21x15
5

DETOUR M4-8 24x12
43 M1-5 24x24
M5-1R 21x15
6
2 Reqd.

DETOUR M4-8 24x12
43 M1-5 24x24
M6-1R 21x15
7
2 Reqd.

END DETOUR
CG20-5
30x24
8

OR 43 EXIT 8 CLOSED	USE EXIT 9 OR 99E

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
9

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

- Detour Route - Northbound
- Ramp Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 40' Max. Spacing

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INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Sillsbury
Drafter: Stephanie Dexter
Reviewer: Brenda Erickson
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

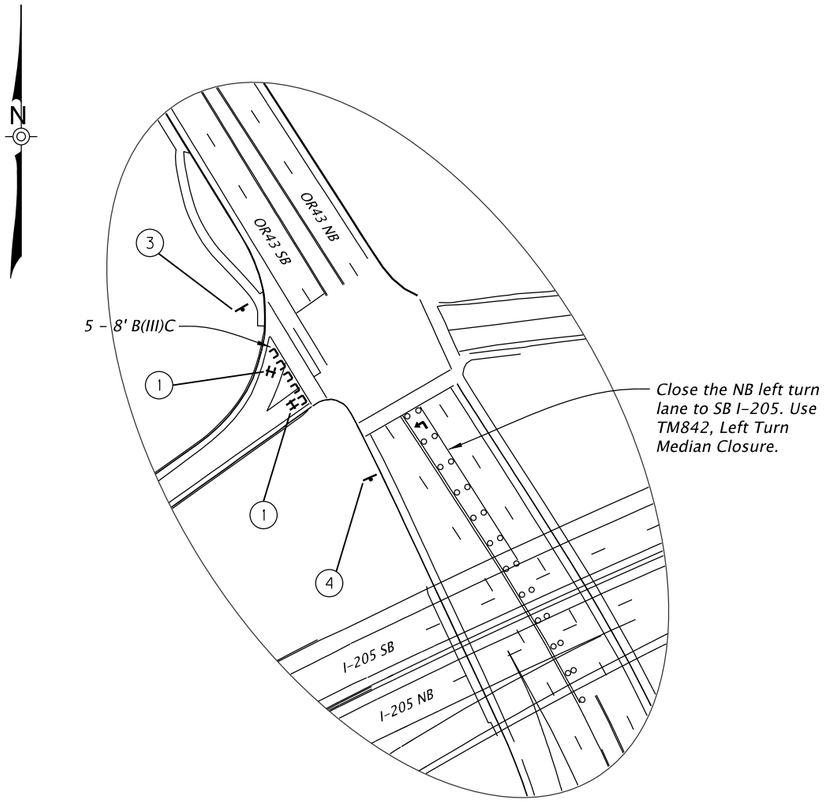
TZ_K19786_HDR_tc03.dgn :: EB02_397 Closure 2/10/2020 9:56:26 AM CDONOVAN

Rotation: N/A

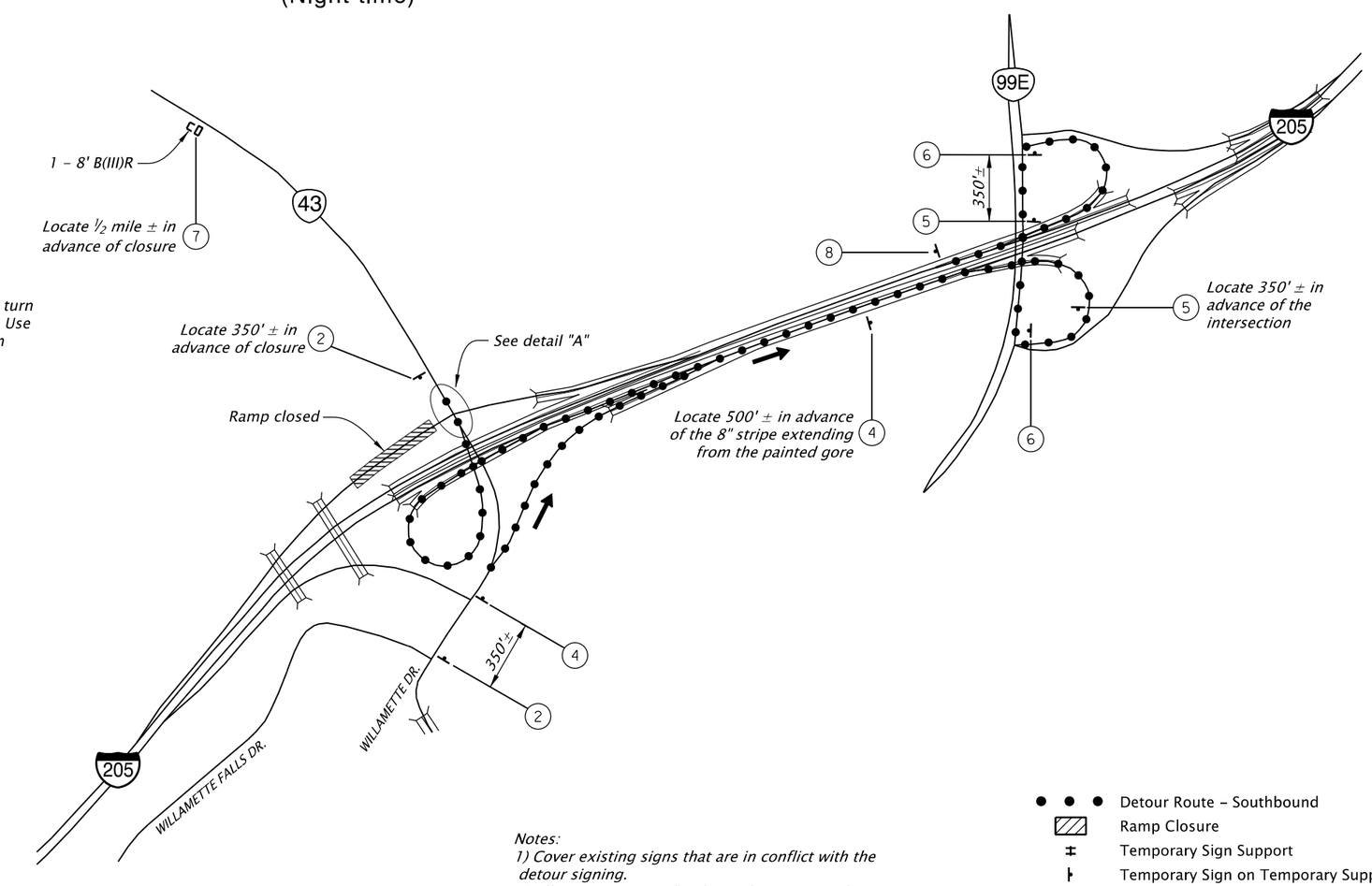
D E T O U R

OR43 TO I-205 SOUTHBOUND ENTRANCE RAMP CLOSURE

(Night time)



Detail "A"
Scale: 1"=100'



RAMP CLOSED / DETOUR — *OR22-18 48x30*, *48x18 (Mount on TSS)*
1
2 Reqd.

RAMP CLOSED AHEAD — *W20-3 mod. 48x48*; SOUTH / INTERSTATE 205 — *M3-3 24x12*, *M1-1 30x24*
2
2 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — *M4-8 24x12*, *M3-3 24x12*, *M1-1 30x24*; *M6-3 21x15*
3

DETOUR / SOUTH / INTERSTATE 205 — *M4-8 24x12*, *M3-3 24x12*, *M1-1 30x24*; *M6-2R 21x15*
4
3 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — *M4-8 24x12*, *M3-3 24x12*, *M1-1 30x24*; *M5-1R 21x15*
5
2 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — *M4-8 24x12*, *M3-3 24x12*, *M1-1 30x24*; *M6-1R 21x15*
6
2 Reqd.

RAMP TO I-205 S CLOSED	USE I-205 N TO EXIT 9

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
7

END DETOUR — *CG20-5 30x24*
8

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

- ● ● ● Detour Route - Southbound
- Ramp Closure
- ǂ Temporary Sign Support
- ⊦ Temporary Sign on Temporary Support
- ▭ PCMS
- ⊔ 8' Type III Barricade (C, L, R, or LR)
- ○ ○ ○ Temporary Plastic Drums on 20' Max. Spacing

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury — Reviewer: Shawn Le Blanc
Drafter: Stephanie Teeter — Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

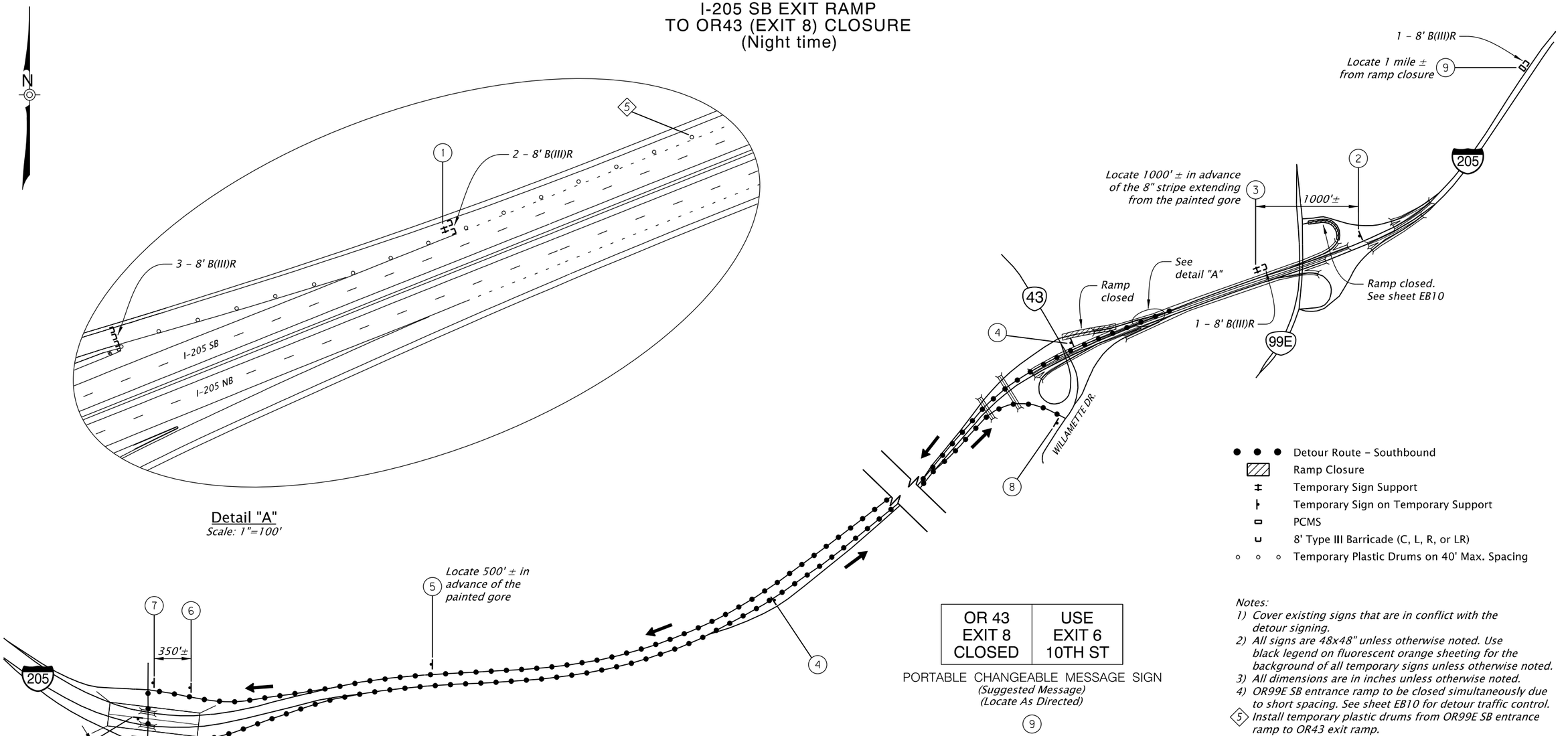
TZ_K19786_HDR_tc03.dgn :: EB03_394 Closure 2/10/2020 9:56:27 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: N/A

D E T O U R

I-205 SB EXIT RAMP TO OR43 (EXIT 8) CLOSURE

(Night time)

XXX-XXX



Detail "A"
Scale: 1"=100'

OR 43 EXIT 8 CLOSED	USE EXIT 6 10TH ST

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
9

Notes:

1) *Cover existing signs that are in conflict with the detour signing.*
2) *All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.*
3) *All dimensions are in inches unless otherwise noted.*
4) *OR99E SB entrance ramp to be closed simultaneously due to short spacing. See sheet EB10 for detour traffic control.*
5) *Install temporary plastic drums from OR99E SB entrance ramp to OR43 exit ramp.*

RAMP CLOSED
OR22-18 48x30 (Mount On TSS)
1

RAMP CLOSED AHEAD
W20-3 mod. 48x48
2

DETOUR AHEAD
W20-2 48x48
3

DETOUR 43
M4-8 24x12
M1-5 24x24
M6-3 21x15
4
2 Reqd.

DETOUR 43
M4-8 24x12
M1-5 24x24
M6-2R 21x15
5

DETOUR 43
M4-8 24x12
M1-5 24x24
M5-1L 21x15
6
2 Reqd.

DETOUR 43
M4-8 24x12
M1-5 24x24
M6-1L 21x15
7
2 Reqd.

END DETOUR
CG20-5 30x24
8

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INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury
Drafter: Stephanie Teeter
Reviewer: Brooke LeBlanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

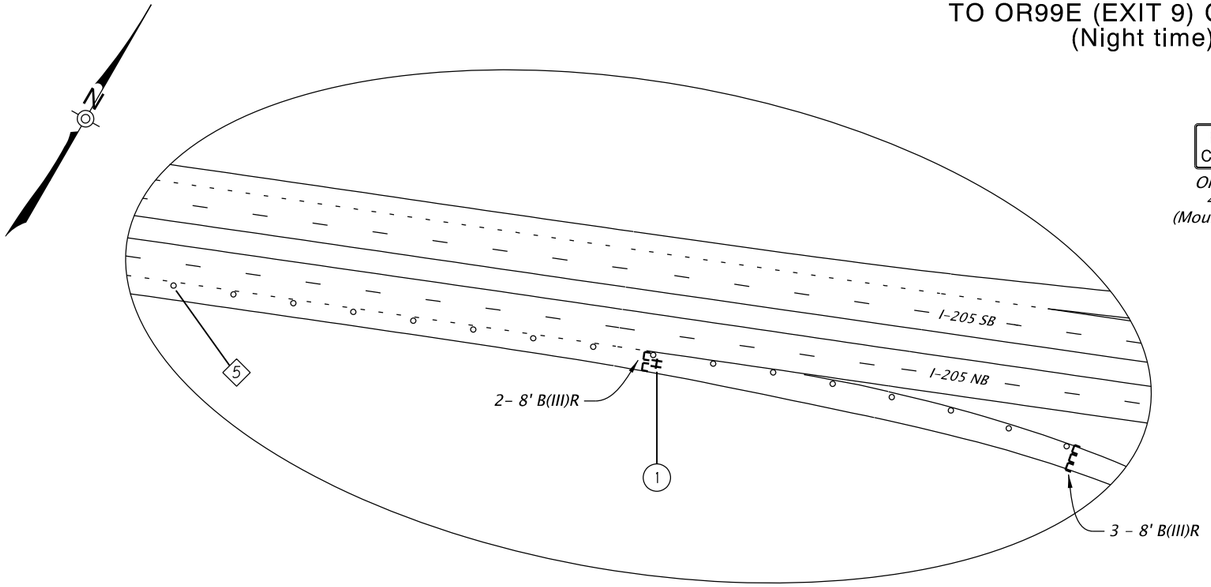
SHEET NO.
Page 309

XXX-XXX

D E T O U R

I-205 NB EXIT RAMP TO OR99E (EXIT 9) CLOSURE

(Night time)



Detail "A"
Scale: 1"=100'

RAMP CLOSED
OR22-18 48x30 (Mount On TSS) (1)

RAMP CLOSED AHEAD
W20-3 mod. 48x48 (2)

DETOUR AHEAD
W20-2 48x48 (3)

DETOUR 99E
M4-8 24x12
M1-5 30x24
M6-3 21x15 (4)
3 Reqd.

DETOUR 99E
M4-8 24x12
M1-5 30x24
M6-2R 21x15 (5)
2 Reqd.

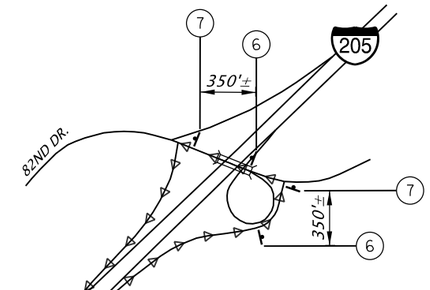
DETOUR 99E
M4-8 24x12
M1-5 30x24
M5-1L 21x15 (6)
2 Reqd.

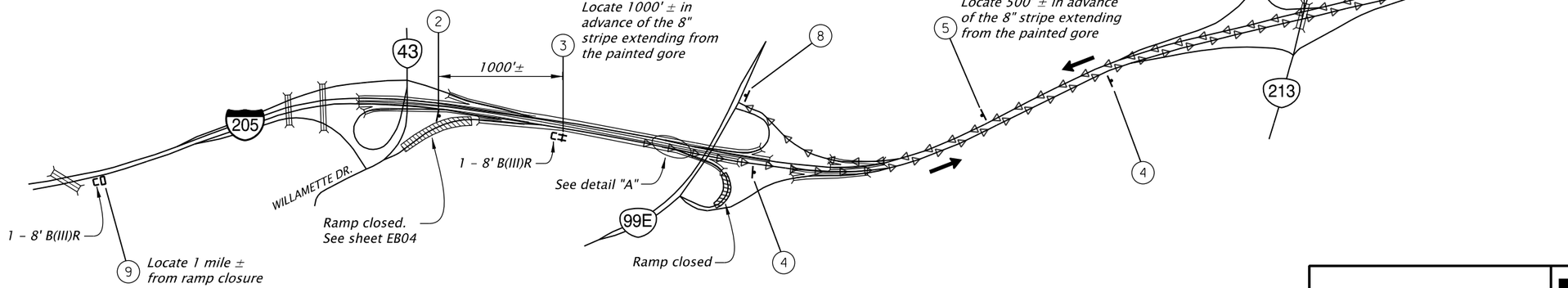
DETOUR 99E
M4-8 24x12
M1-5 30x24
M6-1L 21x15 (7)
2 Reqd.

END DETOUR
CG20-5 30x24 (8)

OR 99E EXIT 9 CLOSED	USE EXIT 11 82ND DR

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed) (9)





Notes:
1) *Cover existing signs that are in conflict with the detour signing.*
2) *All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.*
3) *All dimensions are in inches unless otherwise noted.*
4) *OR43 NB slip entrance ramp to be closed simultaneously due to short spacing. See sheet EB04 for detour traffic control.*
5) *Install temporary plastic drums from OR43 NB slip entrance ramp to OR99E exit ramp.*

▷ ▷ ▷ Detour Route – Northbound
Ramp Closure
Temporary Sign Support
Temporary Sign on Temporary Support
PCMS
8' Type III Barricade (C, L, R, or LR)
○ ○ ○ Temporary Plastic Drums on 40' Max. Spacing

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INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salsbury
Drafter: Stephanie Dexter
Reviewer: Brenda Le Blanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc03.dgn :: EB06_389 Closure 2/10/2020 9:56:29 AM CDONOVAN
Rotation: 30°

D E T O U R

OR 99E TO I-205 NORTHBOUND ENTRANCE RAMP CLOSURE

(Night time)

RAMP CLOSED / DETOUR — OR22-18 48x30
48x18 (Mount on TSS)
(1)

RAMP CLOSED AHEAD — W20-3 mod. 48x48
NORTH / INTERSTATE 205 — M3-1 24x12, M1-1 30x24
(2) 2 Reqd.

DETOUR / NORTH / INTERSTATE 205 — M4-8 24x12, M3-1 24x12, M1-1 30x24, M6-3 21x15
(3) 2 Reqd.

DETOUR / NORTH / INTERSTATE 205 — M4-8 24x12, M3-1 24x12, M1-1 30x24, M6-2R 21x15
(4) 2 Reqd.

DETOUR / NORTH / INTERSTATE 205 — M4-8 24x12, M3-1 24x12, M1-1 30x24, M5-1L 21x15
(5)

DETOUR / NORTH / INTERSTATE 205 — M4-8 24x12, M3-1 24x12, M1-1 30x24, M6-1R 21x15
(6)

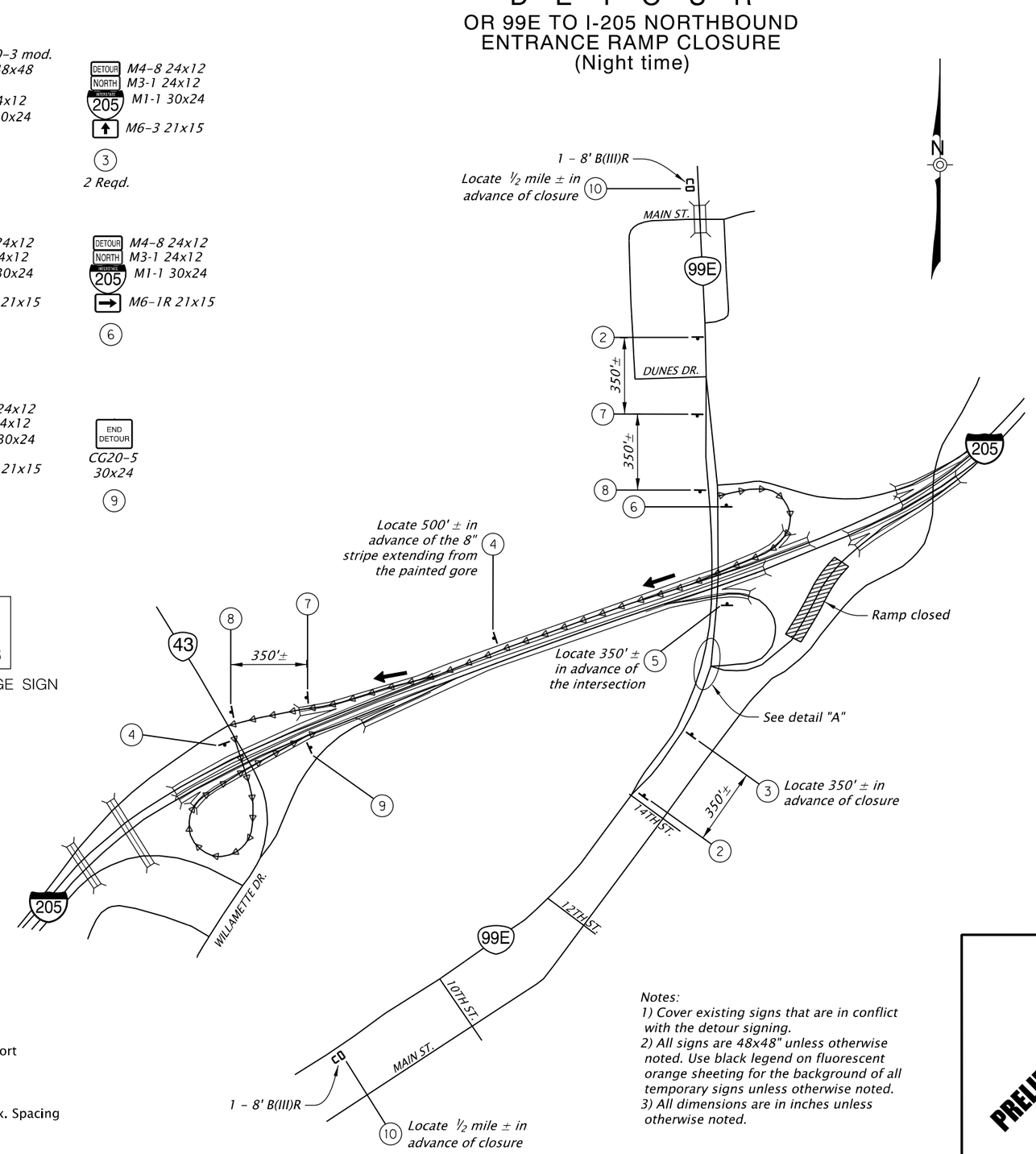
DETOUR / NORTH / INTERSTATE 205 — M4-8 24x12, M3-1 24x12, M1-1 30x24, M5-1L 21x15
(7) 2 Reqd.

DETOUR / NORTH / INTERSTATE 205 — M4-8 24x12, M3-1 24x12, M1-1 30x24, M6-1L 21x15
(8) 2 Reqd.

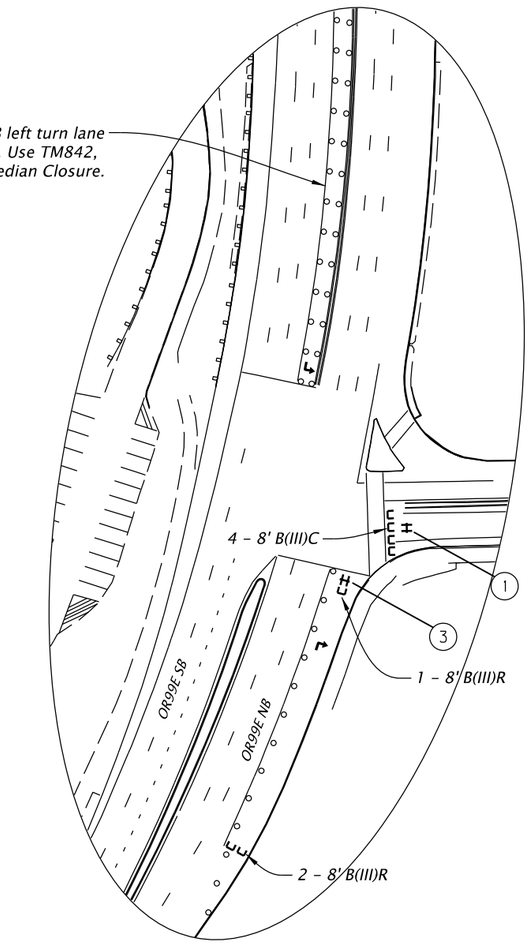
END DETOUR — CG20-5 30x24
(9)

RAMP TO	USE
I-205 N CLOSED	I-205 S TO EXIT 8

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(10) 2 Reqd.



Close the SB left turn lane to NB I-205. Use TM842, Left Turn Median Closure.



Detail "A"
Scale: 1"=100'

- ▷ ▷ ▷ Detour Route – Northbound
- Ramp Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- ○ ○ ○ Temporary Plastic Drums on 20' Max. Spacing

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury — Reviewer: Shanda Le Blanc
Drafter: Stephanie Teeter — Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

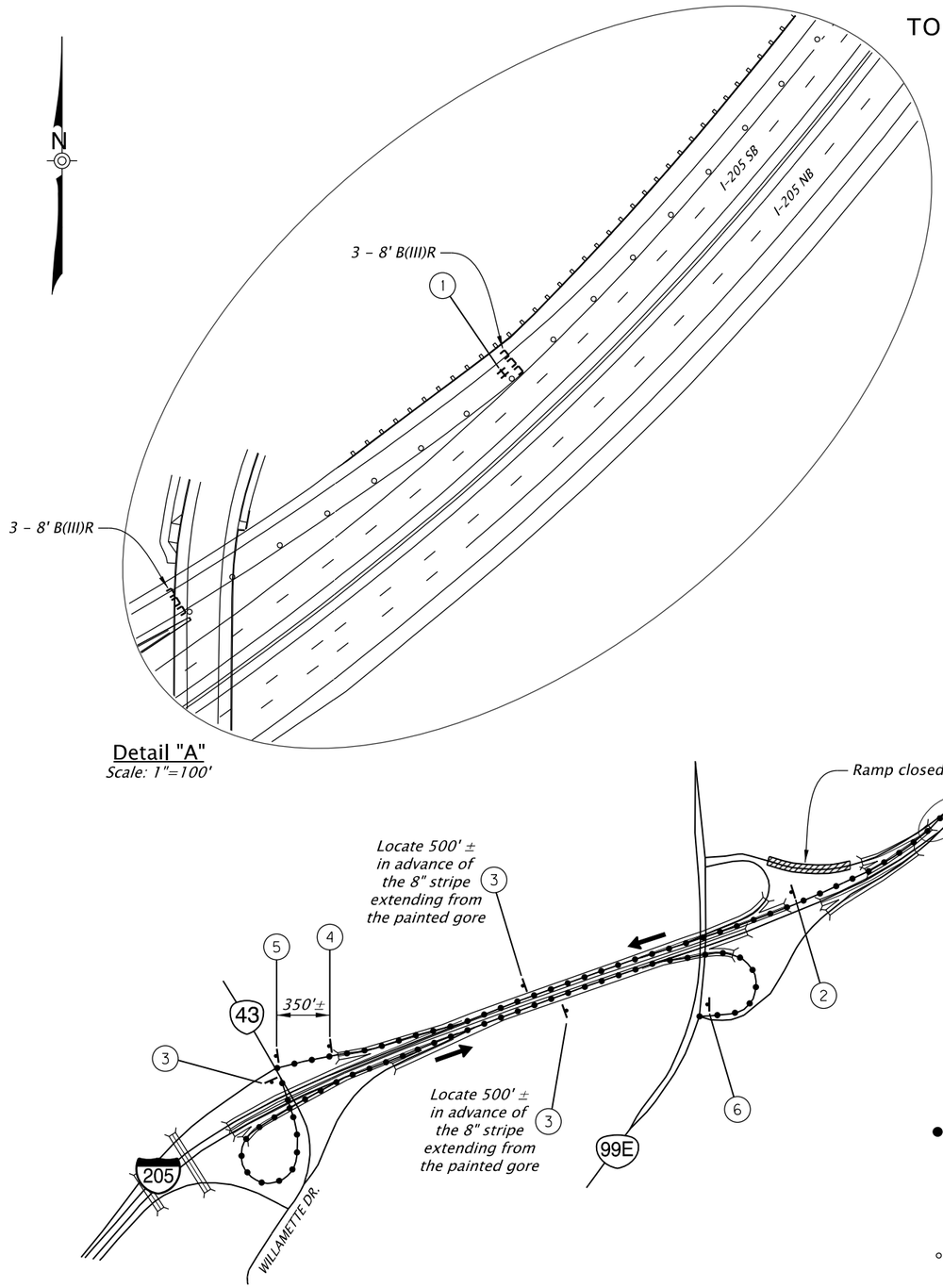
SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB07_387 Closure 2/10/2020 9:56:30 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: N/A

D E T O U R

I-205 SB EXIT RAMP TO OR99E (EXIT 9) CLOSURE

(Night time)



- Detour Route – Southbound
- Ramp Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 40' Max. Spacing

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

1. RAMP CLOSED — OR22-18, 48x30 (Mount On TSS)
2. DETOUR / 99E / ↑ — M4-8 24x12; M1-5 30x24; M6-3 21x15
3. DETOUR / 99E / ↗ — M4-8 24x12; M1-5 30x24; M6-2R 21x15 — 2 Reqd.
4. DETOUR / 99E / ↰ — M4-8 24x12; M1-5 30x24; M5-1L 21x15
5. DETOUR / 99E / ← — M4-8 24x12; M1-5 30x24; M6-1L 21x15
6. END DETOUR — CG20-5, 30x24

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salsbury
Drafter: Stephanie Tepe
Reviewer: Brenda Le Blanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB08-09_386 Closure 2/10/2020 9:56:30 AM CDONOVAN

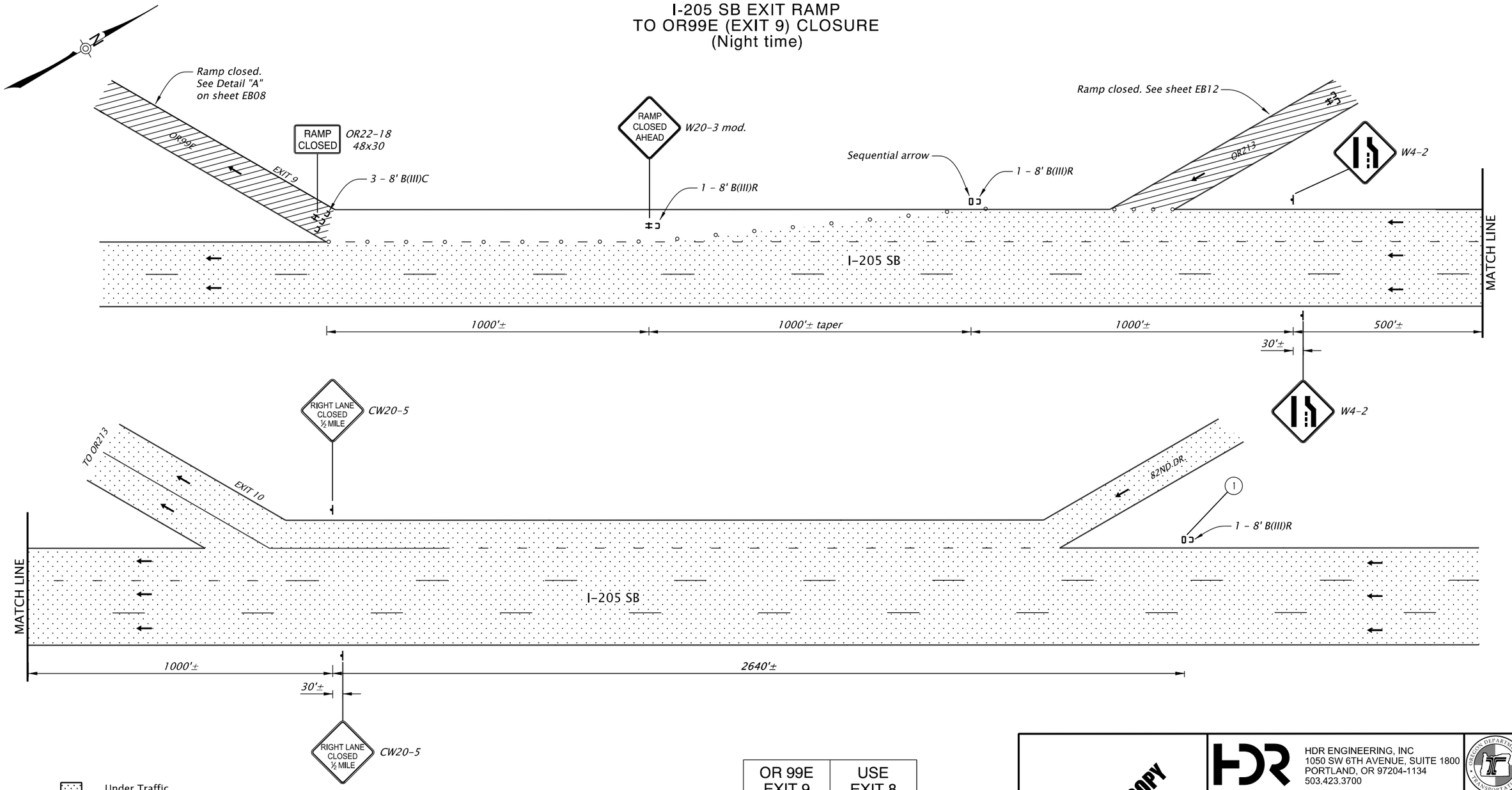
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: N/A

D E T O U R

I-205 SB EXIT RAMP TO OR99E (EXIT 9) CLOSURE

(Night time)



- Under Traffic
- Ramp Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 40' Max. Spacing

Notes:

1) *Cover existing signs that are in conflict with the detour signing.*
2) *All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.*
3) *All dimensions are in inches unless otherwise noted.*

OR 99E EXIT 9 CLOSED	USE EXIT 8 OR 43

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(1)

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury
Drafter: Stephanie Geeter
Reviewer: Brenden LeBlanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB08-09_386 Closure 2/10/2020 9:56:31 AM CDONOVAN

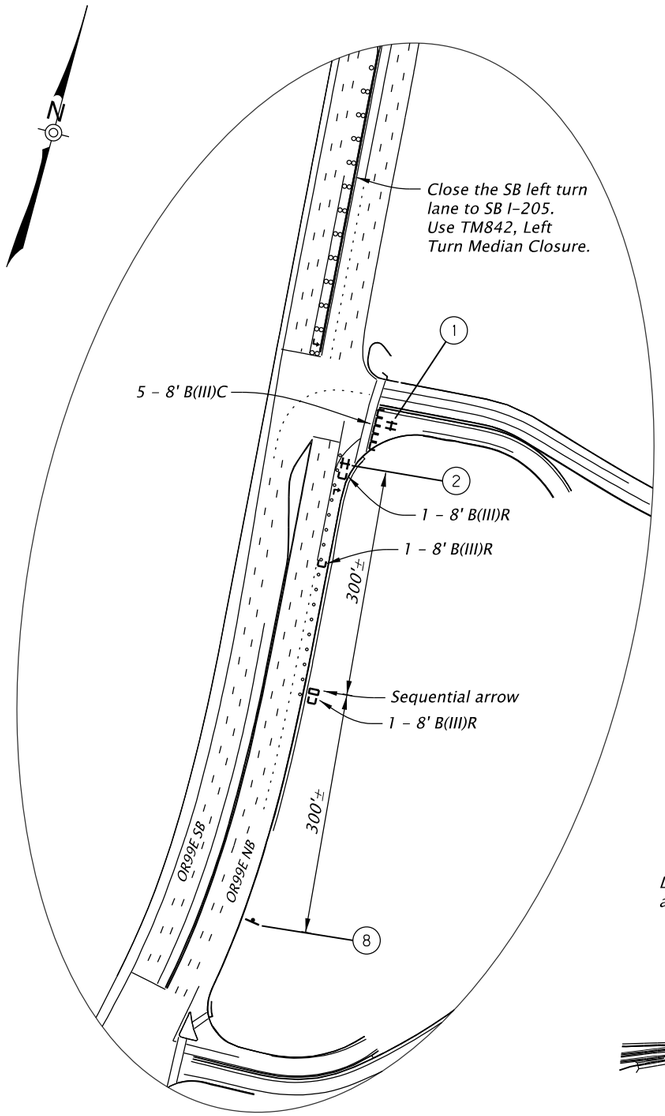
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: N/A

D E T O U R

OR99E TO I-205 SOUTHBOUND ENTRANCE RAMP CLOSURE

(Night time)



Detail "A"
Scale: 1"=100'

ROAD CLOSED / DETOUR — *OR22-18, 48x30; 48x18 (Mount on TSS)* — 1

RAMP CLOSED — *OR22-18, 48x30 (Mount On TSS)* — 2

RAMP CLOSED AHEAD — *W20-3 mod. 48x48*; SOUTH 205 INTERSTATE — *M3-3 24x12, M1-1 30x24* — 3 — *2 Reqd.*

DETOUR / SOUTH 205 INTERSTATE — *M4-8 24x12, M3-3 24x12, M1-1 30x24*; *M6-3 21x15* — 4 — *2 Reqd.*

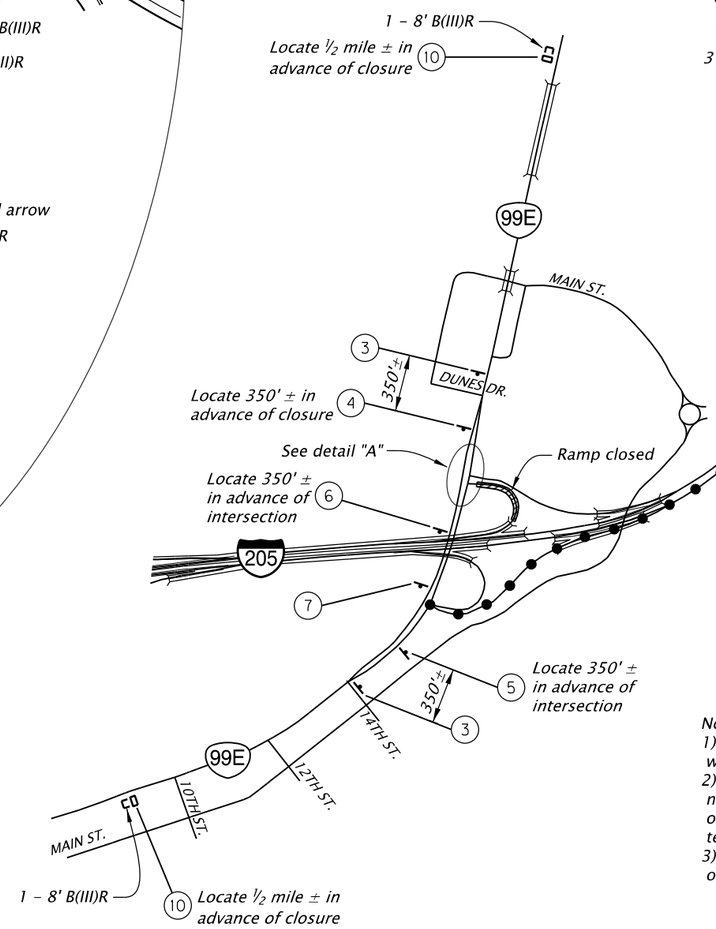
DETOUR / SOUTH 205 INTERSTATE — *M4-8 24x12, M3-3 24x12, M1-1 30x24*; *M6-2R 21x15* — 5 — *2 Reqd.*

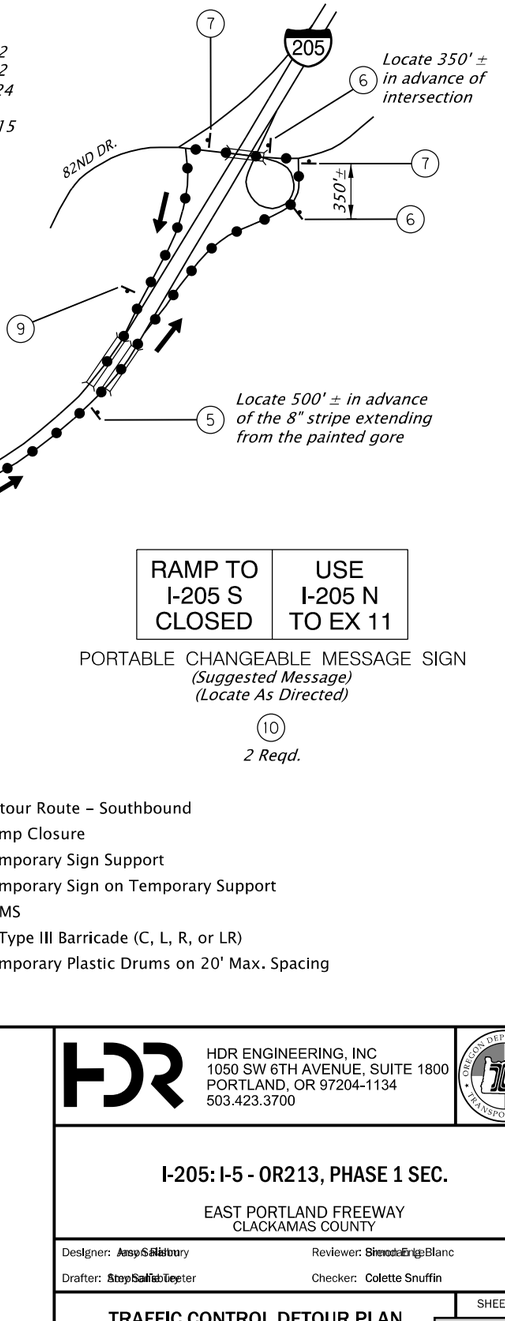
DETOUR / SOUTH 205 INTERSTATE — *M4-8 24x12, M3-3 24x12, M1-1 30x24*; *M5-1L 21x15* — 6 — *3 Reqd.*

DETOUR / SOUTH 205 INTERSTATE — *M4-8 24x12, M3-3 24x12, M1-1 30x24*; *M6-1L 21x15* — 7 — *3 Reqd.*

W4-2 48x48 — 8

END DETOUR — *CG20-5 30x24* — 9





RAMP TO I-205 S CLOSED	USE I-205 N TO EX 11

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

10
2 Reqd.

- Detour Route – Southbound
- Ramp Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 20' Max. Spacing

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salsbury — Reviewer: Shawn Boyle
Drafter: Stephanie Dexter — Checker: Colette Snuffin

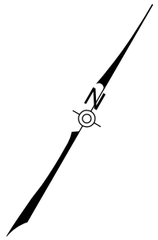
TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

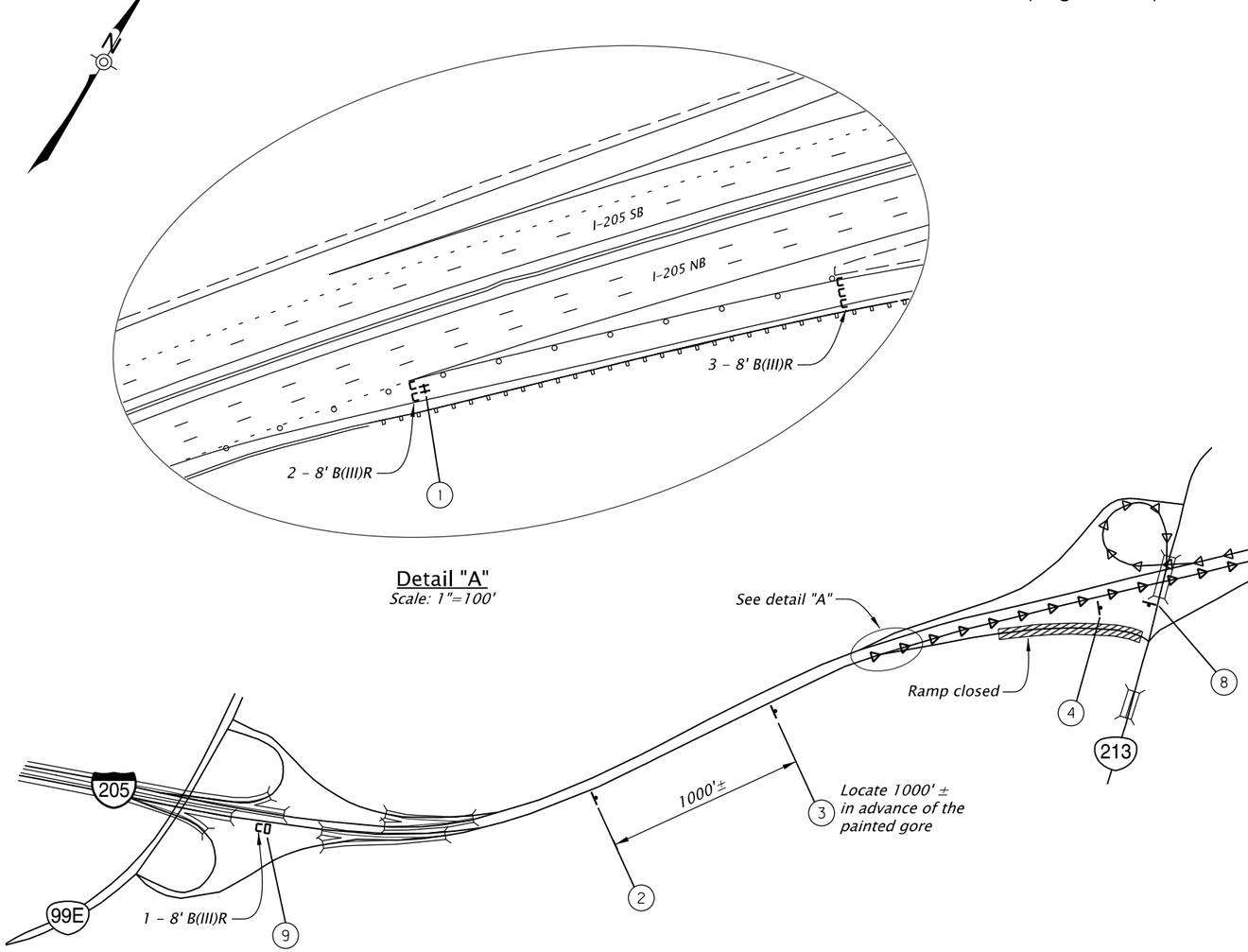
TZ_K19786_HDR_tc03.dgn :: EB10_388 Closure 2/10/2020 9:56:32 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 15°

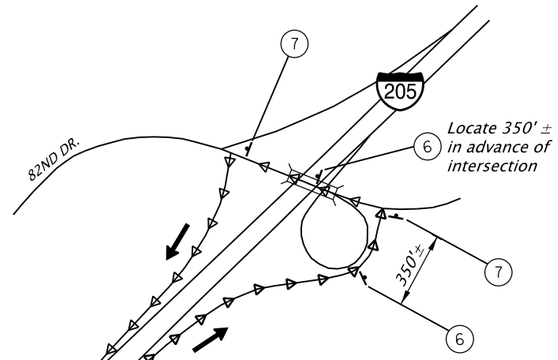
D E T O U R

I-205 NB EXIT RAMP
TO OR213 (EXIT 10) CLOSURE
(Night time)



Detail "A"
Scale: 1"=100'





Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

OR 213 EXIT 10 CLOSED	USE EXIT 11 82ND DR

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
9

▷ ▷ ▷ Detour Route – Northbound
Ramp Closure
Temporary Sign Support
Temporary Sign on Temporary Support
PCMS
8' Type III Barricade (C, L, R, or LR)
○ ○ ○ Temporary Plastic Drums on 40' Max. Spacing

RAMP CLOSED
OR22-18 48x30 (Mount On TSS)
1

RAMP CLOSED AHEAD
W20-3 mod. 48x48
2

DETOUR AHEAD
W20-2 48x48
3

DETOUR 213
M4-8 24x12
M1-5 30x24
M6-3 21x15
4

DETOUR 213
M4-8 24x12
M1-5 30x24
M6-2R 21x15
5
2 Reqd.

DETOUR 213
M4-8 24x12
M1-5 30x24
M5-1L 21x15
6
2 Reqd.

DETOUR 213
M4-8 24x12
M1-5 30x24
M6-1L 21x15
7
2 Reqd.

END DETOUR
CG20-5 30x24
8

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

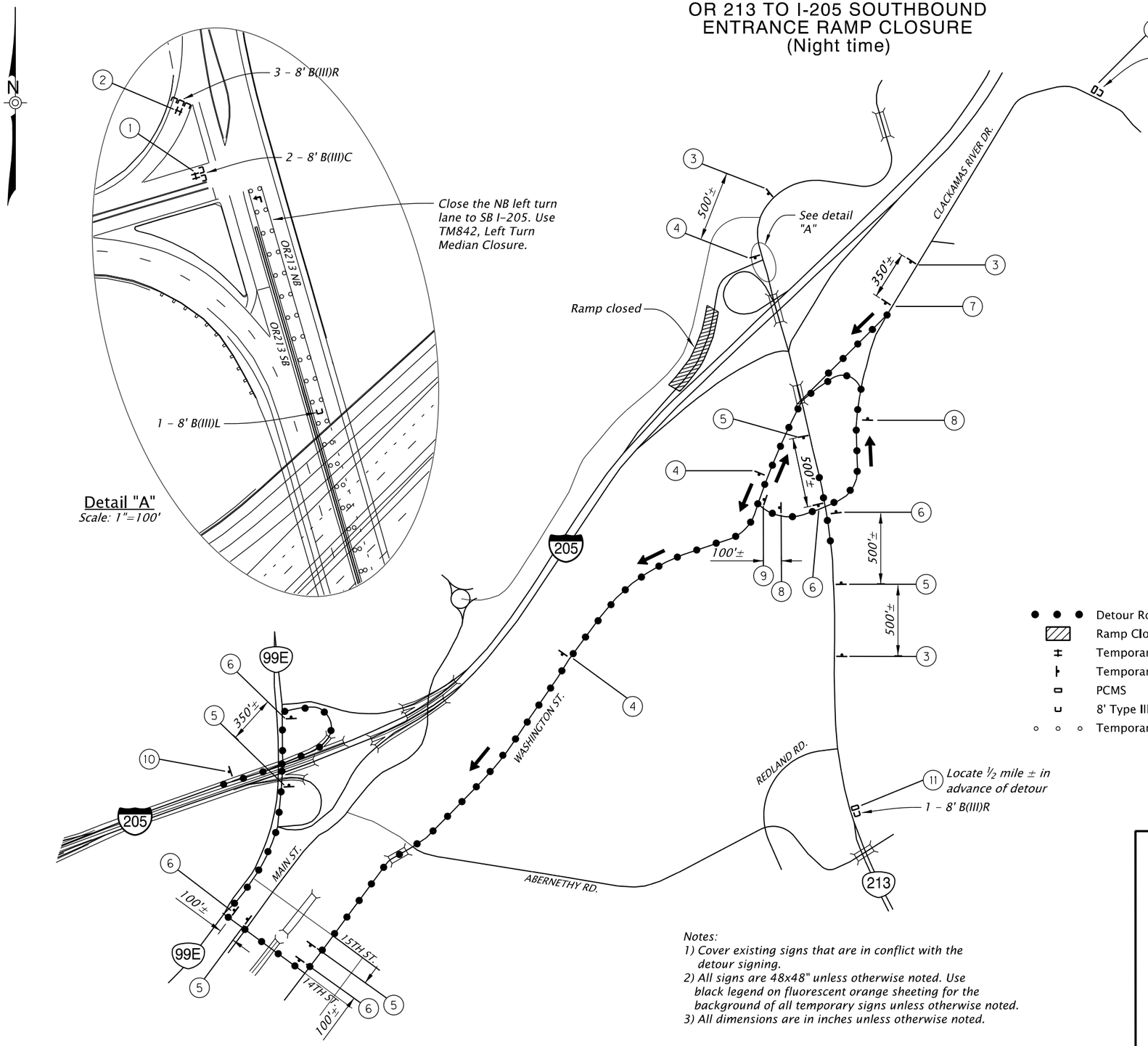
Designer: Amy Salsbury
Drafter: Stephanie Dexter
Reviewer: Shawna LeBlanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB11_383 Closure 2/10/2020 9:56:32 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 30°

OR 213 TO I-205 SOUTHBOUND ENTRANCE RAMP CLOSURE (Night time)



11 Locate ½ mile ± in advance of detour
1 - 8' B(III)R

RAMP CLOSED / DETOUR — OR22-18 48x30
48x18 (Mount on TSS) — (1)

RAMP CLOSED — OR22-18 48x30 (Mount On TSS) — (2)

RAMP CLOSED AHEAD — W20-3 mod. 48x48
SOUTH / INTERSTATE 205 — M3-3 24x12, M1-1 30x24
(3) 3 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — M4-8 24x12, M3-3 24x12, M1-1 30x24
M6-3 21x15 — (4) 3 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — M4-8 24x12, M3-3 24x12, M1-1 30x24
M5-1L 21x15 — (5) 5 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — M4-8 24x12, M3-3 24x12, M1-1 30x24
M6-1R 21x15 — (6) 5 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — M4-8 24x12, M3-3 24x12, M1-1 30x24
M6-2R 21x15 — (7)

DETOUR / SOUTH / INTERSTATE 205 — M4-8 24x12, M3-3 24x12, M1-1 30x24
M5-1L 21x15 — (8) 2 Reqd.

DETOUR / SOUTH / INTERSTATE 205 — M4-8 24x12, M3-3 24x12, M1-1 30x24
M6-1L 21x15 — (9)

END DETOUR — CG20-5 30x24 — (10)

- ● ● ● Detour Route - Southbound
- Ramp Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- ○ ○ ○ Temporary Plastic Drums on 20' Max. Spacing

RAMP TO I-205 S CLOSED	USE WASHGTON STREET

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(11)
2 Reqd.

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury — Reviewer: Shawn Le Blanc
Drafter: Stephanie Teeter — Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc03.dgn :: EB12_382 Closure 2/10/2020 9:56:33 AM CDONOVAN

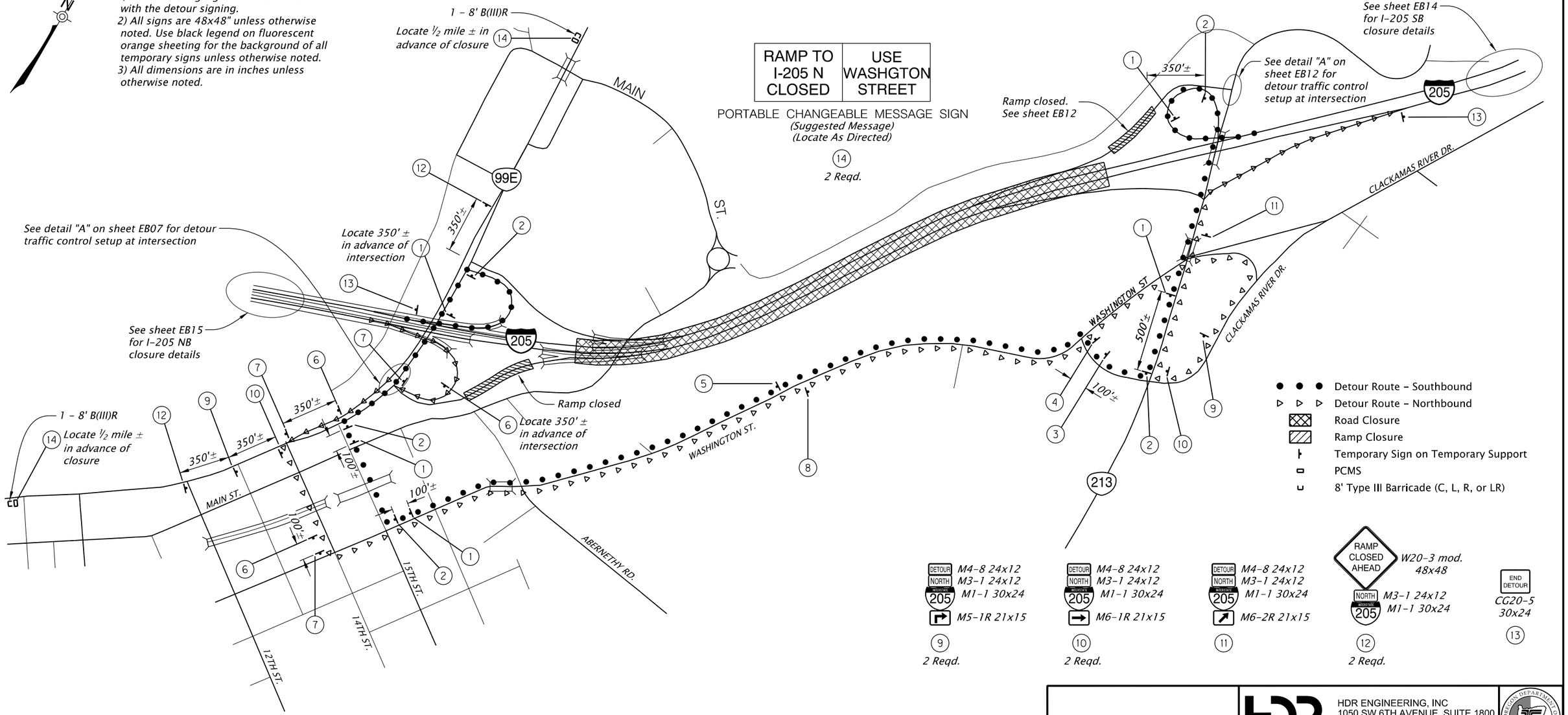
Rotation: N/A

D E T O U R
SIGN STRUCTURE CONSTRUCTION
OR213 TO OR99E CLOSURE
(Night time)

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

RAMP TO I-205 N CLOSED	USE WASHGTON STREET

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(14)
2 Reqd.



DETOUR / NORTH / INTERSTATE 205 / M4-8 24x12
M3-1 24x12
M1-1 30x24
M5-1R 21x15
(9) *2 Reqd.*

DETOUR / NORTH / INTERSTATE 205 / M4-8 24x12
M3-1 24x12
M1-1 30x24
M6-1R 21x15
(10) *2 Reqd.*

DETOUR / NORTH / INTERSTATE 205 / M4-8 24x12
M3-1 24x12
M1-1 30x24
M6-2R 21x15
(11)

RAMP CLOSED AHEAD / W20-3 mod. 48x48
NORTH / INTERSTATE 205 / M3-1 24x12
M1-1 30x24
(12) *2 Reqd.*

END DETOUR / CG20-5 30x24
(13)

DETOUR / SOUTH / INTERSTATE 205 / M4-8 24x12
M3-3 24x12
M1-1 30x24
M5-1R 21x15
(1) *5 Reqd.*

DETOUR / SOUTH / INTERSTATE 205 / M4-8 24x12
M3-3 24x12
M1-1 30x24
M6-1R 21x15
(2) *5 Reqd.*

DETOUR / SOUTH / INTERSTATE 205 / M4-8 24x12
M3-3 24x12
M1-1 30x24
M5-1L 21x15
(3)

DETOUR / SOUTH / INTERSTATE 205 / M4-8 24x12
M3-3 24x12
M1-1 30x24
M6-1L 21x15
(4)

DETOUR / SOUTH / INTERSTATE 205 / M4-8 24x12
M3-3 24x12
M1-1 30x24
M6-3 21x15
(5)

DETOUR / NORTH / INTERSTATE 205 / M4-8 24x12
M3-1 24x12
M1-1 30x24
M5-1L 21x15
(6) *3 Reqd.*

DETOUR / NORTH / INTERSTATE 205 / M4-8 24x12
M3-1 24x12
M1-1 30x24
M6-1L 21x15
(7) *3 Reqd.*

DETOUR / NORTH / INTERSTATE 205 / M4-8 24x12
M3-1 24x12
M1-1 30x24
M6-3 21x15
(8)

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury
Drafter: Stephanie Tester
Reviewer: Brenda Le Blanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

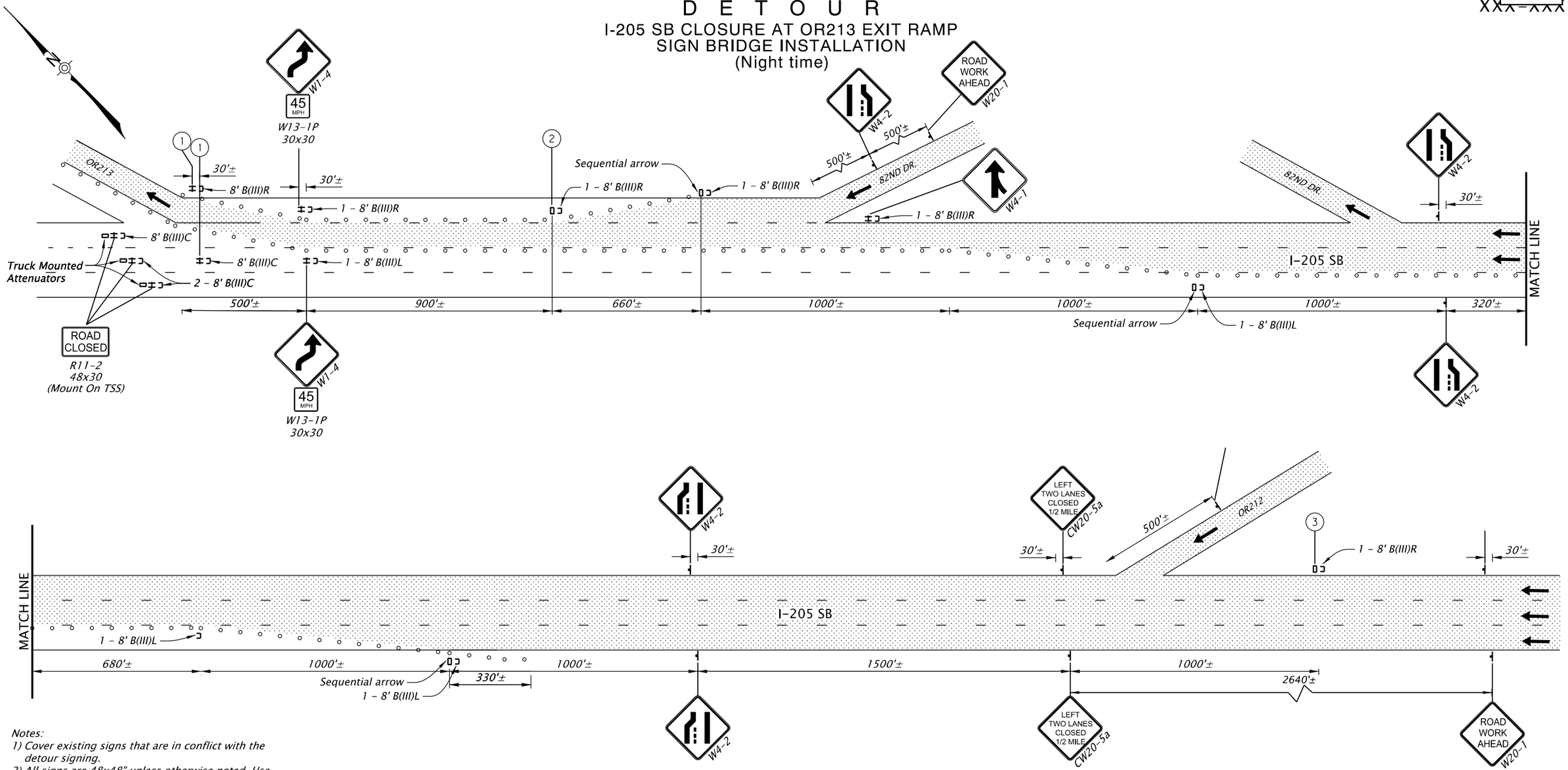
SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB13_Sign Structures 2/10/2020 9:56:34 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 30°

XXX-XXX

D E T O U R

I-205 SB CLOSURE AT OR213 EXIT RAMP
SIGN BRIDGE INSTALLATION
(Night time)



Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

- Under Traffic
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 40' Max. Spacing

DETOUR SOUTH INTERSTATE 205 — M4-8 24x12, M3-3 24x12, M1-1 30x24

M6-2R 21x15

(1) 2 Reqd.

FREEWAY CLOSED 1/4 MILE	ALL VEH MUST USE EXIT 10

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(2)

FREEWAY CLOSED 2 MILE	ALL MUST DETOUR EXIT 10

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(3)

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Eileen Stapleton — Reviewer: Brenda Le Blanc
Drafter: Stephanie Tee — Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

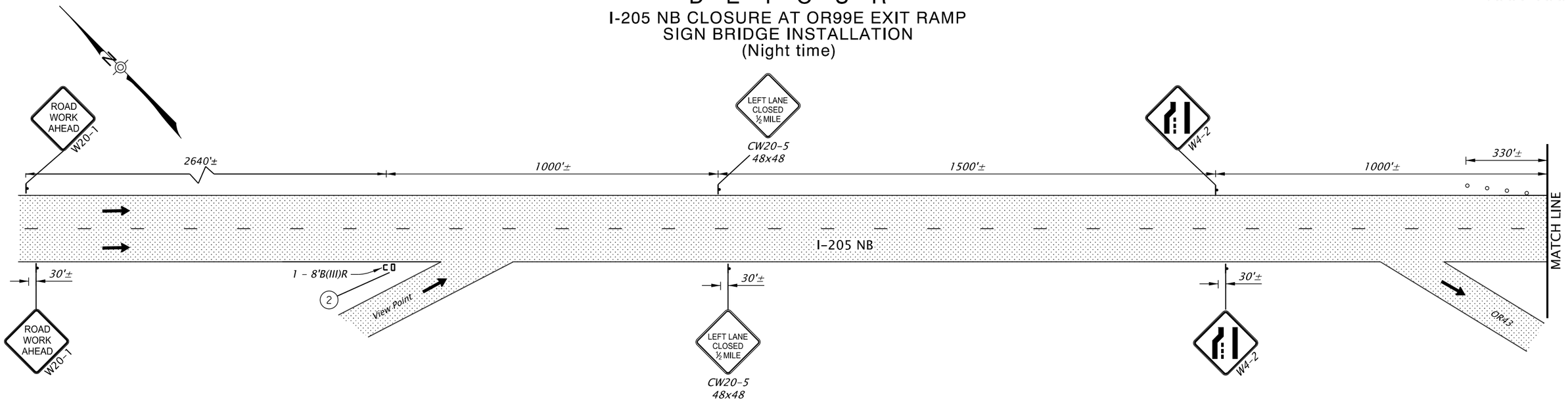
SHEET NO.

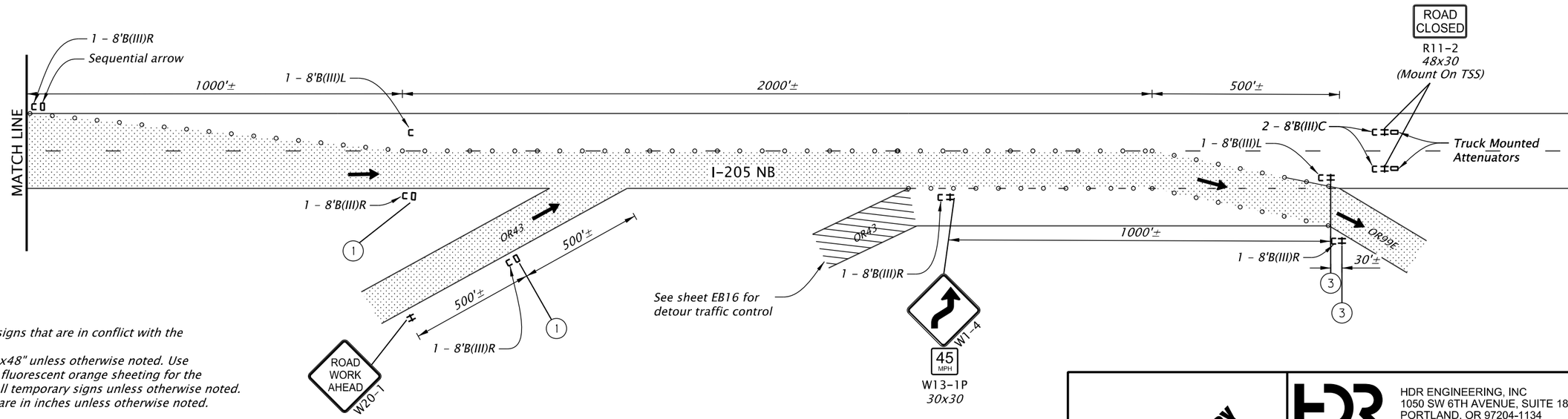
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc03.dgn :: EB14-15_Sign Structures Closure 2/10/2020 9:56:35 AM CDONOVAN
Rotation: 45°

D E T O U R

I-205 NB CLOSURE AT OR99E EXIT RAMP
SIGN BRIDGE INSTALLATION
(Night time)





Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

FREEWAY CLOSED 1/2 MILE	ALL VEH MUST USE EXIT 9

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(1)

FREEWAY CLOSED 1 MILE	ALL MUST DETOUR EXIT 9

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(2)

DETOUR SOUTH INTERSTATE 205
M4-8 24x12
M3-3 24x12
M1-1 30x24
M6-2R 21x15
(3)
2 Reqd.

- Under Traffic
- Ramp Closed
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type **III** Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 40' Max. Spacing

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Ellen Shapton
Drafter: Stephanie Teeter
Reviewer: Brenda Erickson
Checker: Colette Snuffin

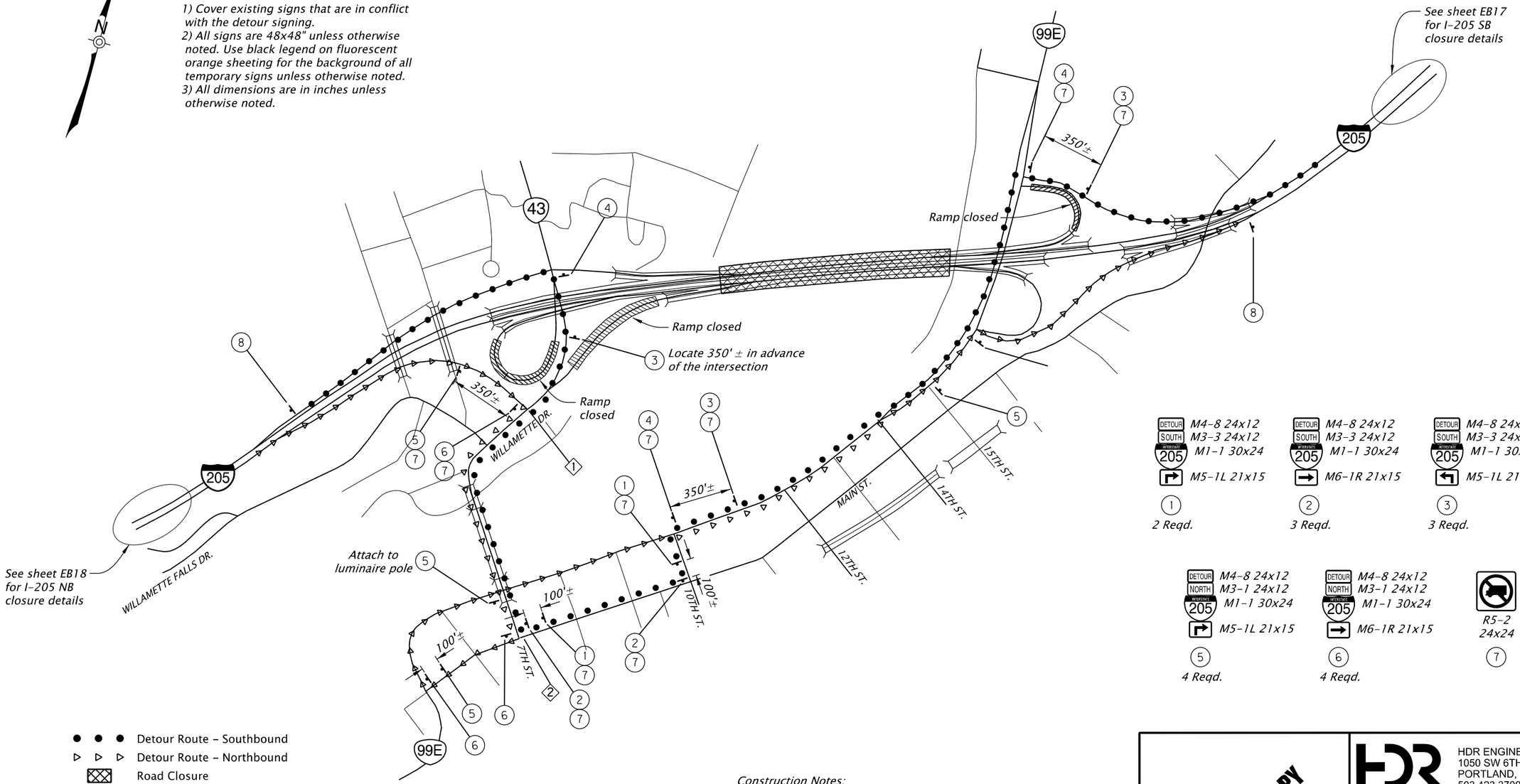
TRAFFIC CONTROL DETOUR PLAN

SHEET NO.
Page 319

D E T O U R

OR 43 TO OR 99E
ABERNETHY BRIDGE CLOSURE
(Night time)

General Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.



- Detour Route – Southbound
- Detour Route – Northbound
- Road Closure
- Ramp Closure
- Temporary Sign on Temporary Support
- (N / 7) Mount sign 7 below sign N

Construction Notes:
1. *Utilize flagger control at I-205 northbound exit ramp and OR43 to prevent trucks from crossing the Oregon City Arch Bridge.*
2. *Utilize flagger control at 7th St. and Main St. intersection to prevent trucks from crossing the Oregon City Arch Bridge.*

DETOUR SOUTH 205 M4-8 24x12 M3-3 24x12 M1-1 30x24 M5-1L 21x15	DETOUR SOUTH 205 M4-8 24x12 M3-3 24x12 M1-1 30x24 M6-1R 21x15	DETOUR SOUTH 205 M4-8 24x12 M3-3 24x12 M1-1 30x24 M5-1L 21x15	DETOUR SOUTH 205 M4-8 24x12 M3-3 24x12 M1-1 30x24 M6-1L 21x15
1 2 Reqd.	2 3 Reqd.	3 3 Reqd.	4 2 Reqd.

DETOUR NORTH 205 M4-8 24x12 M3-1 24x12 M1-1 30x24 M5-1L 21x15	DETOUR NORTH 205 M4-8 24x12 M3-1 24x12 M1-1 30x24 M6-1R 21x15	R5-2 24x24	END DETOUR CG20-5 30x24
5 4 Reqd.	6 4 Reqd.	7	8

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salsbury
Drafter: Stephanie Detter
Reviewer: Brenda Le Blanc
Checker: Colette Snuffin

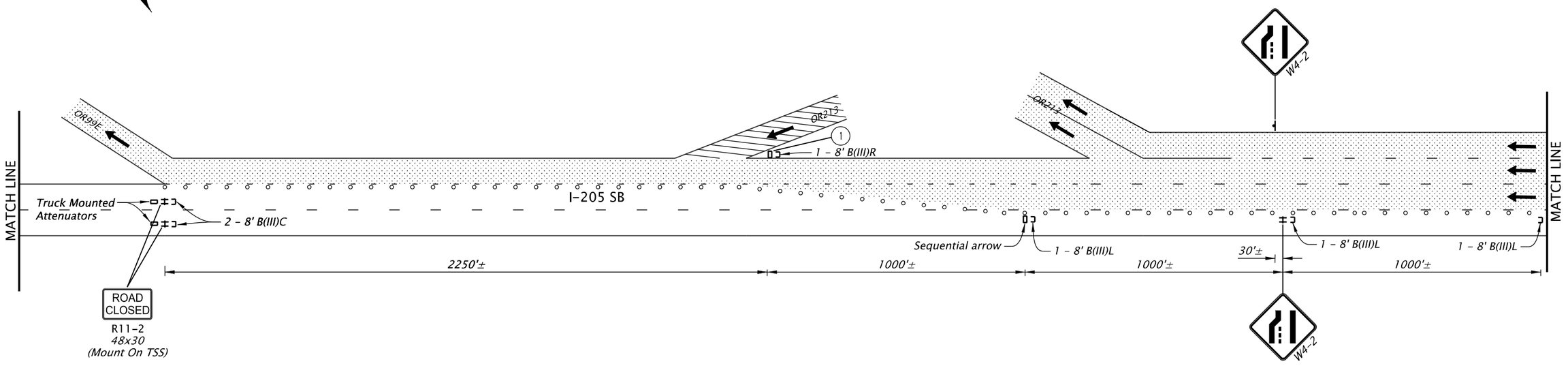
TRAFFIC CONTROL DETOUR PLAN

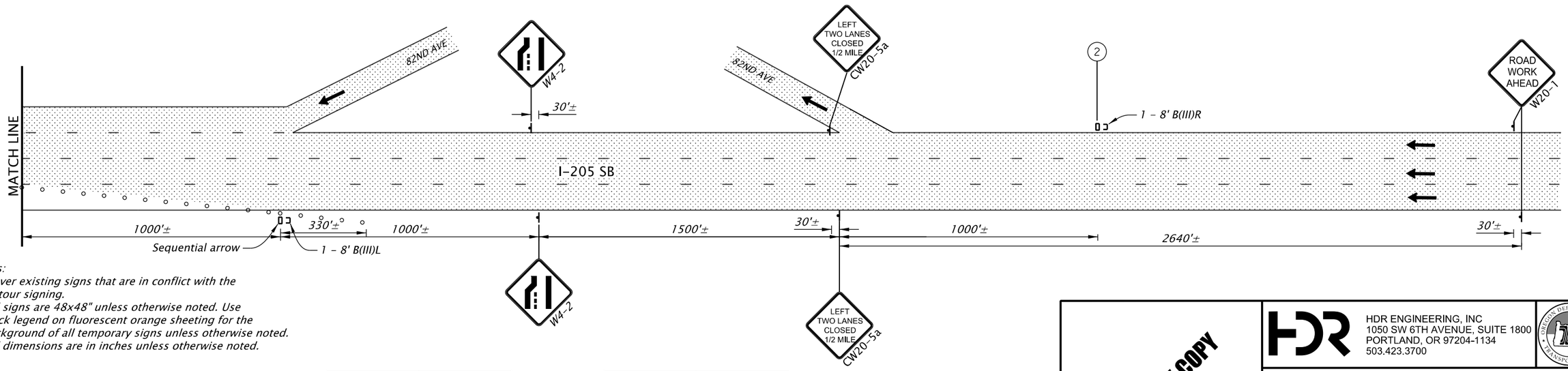
SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB16_Sign Structures 2/10/2020 9:56:38 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 15°

D E T O U R

I-205 SB
ABERNETHY BRIDGE CLOSURE
(Night time)





Notes:
1) *Cover existing signs that are in conflict with the detour signing.*
2) *All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.*
3) *All dimensions are in inches unless otherwise noted.*

- Under Traffic
- Ramp Closed
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 40' Max. Spacing

FREEWAY CLOSED 1/2 MILE	ALL VEH MUST USE EXIT 9

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(1)

FREEWAY CLOSED 2 MILE	ALL MUST DETOUR EXIT 9

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(2)

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Eileen Stamps
Drafter: Stephanie Tam
Reviewer: Brenda LaBlanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

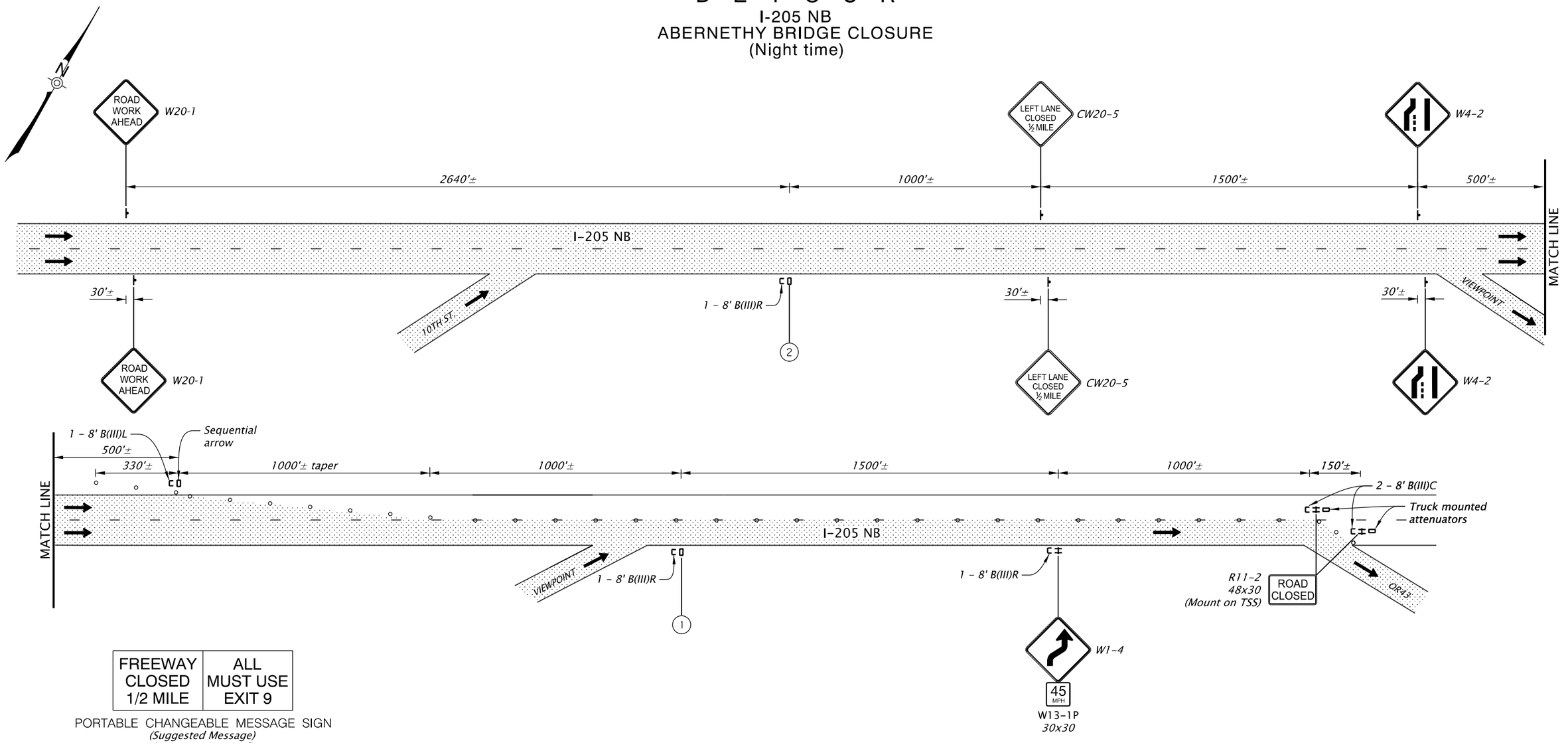
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc03.dgn :: EB17-18_Sign Structures Closure 2/10/2020 9:56:39 AM CDONOVAN
Rotation: 45°

D E T O U R

I-205 NB
ABERNETHY BRIDGE CLOSURE
(Night time)



FREEWAY CLOSED 1/2 MILE	ALL MUST USE EXIT 9

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(1)

FREEWAY CLOSED 1 MILE	USE EXIT 8 OR43

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(2)

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

- Under Traffic
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 40' Max. Spacing

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salsbury
Drafter: Stephanie Tepetter
Reviewer: Brenda Blanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

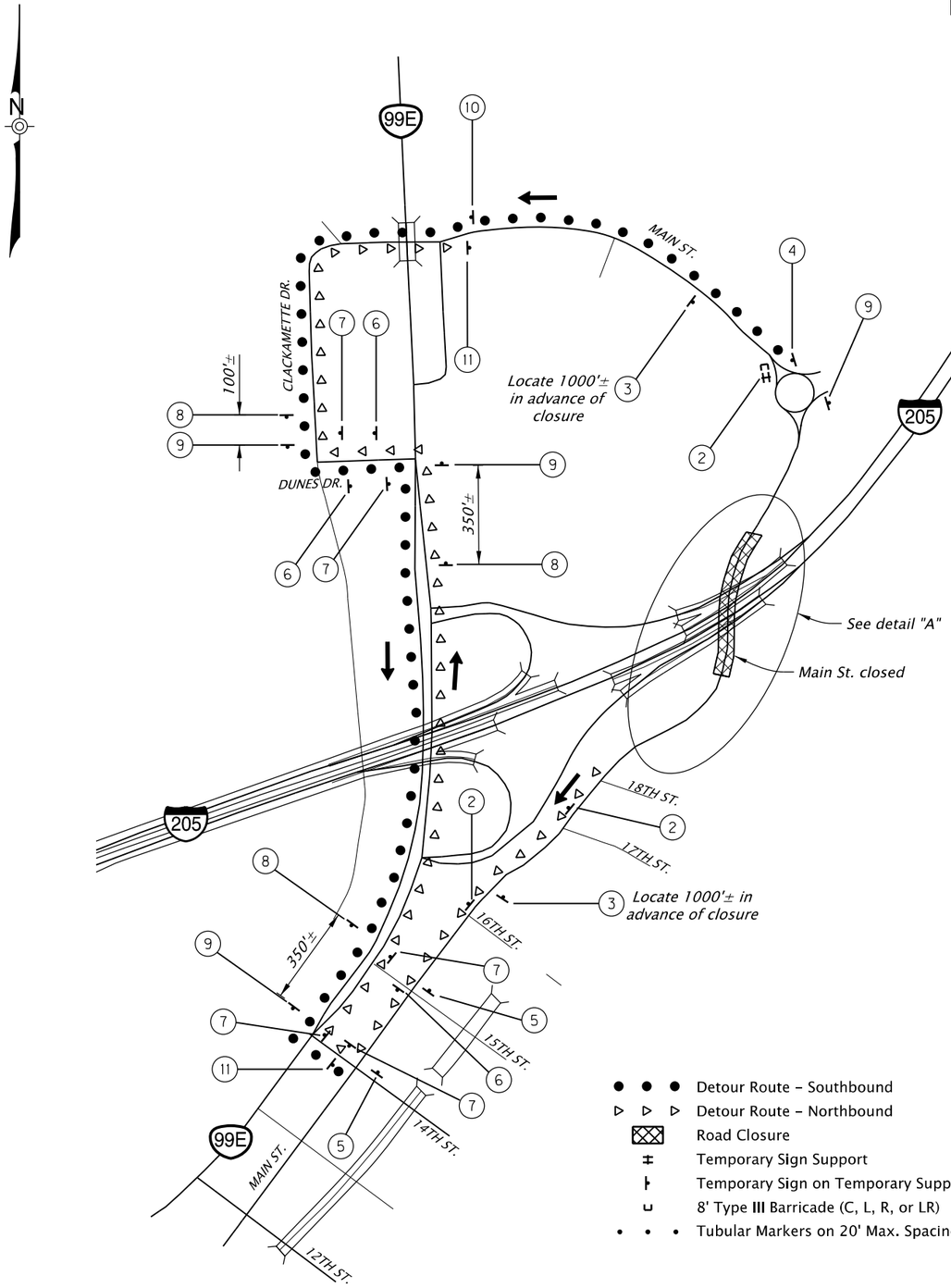
SHEET NO.

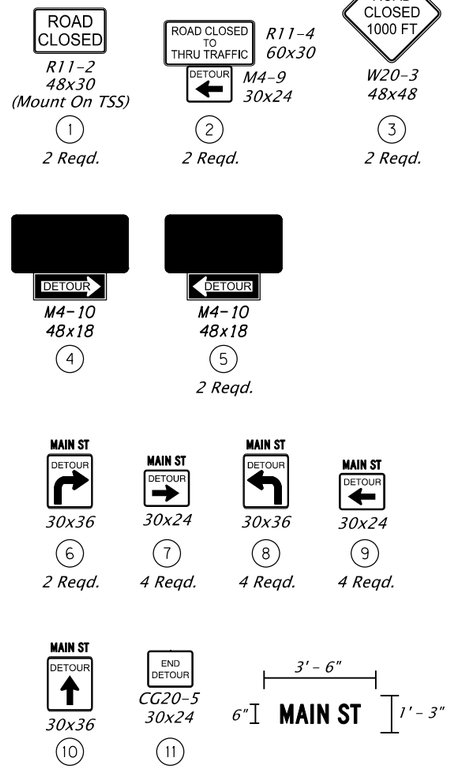
TZ_K19786_HDR_tc03.dgn :: EB17-18_Sign Structures Closure 2/10/2020 9:56:40 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 45° N/A

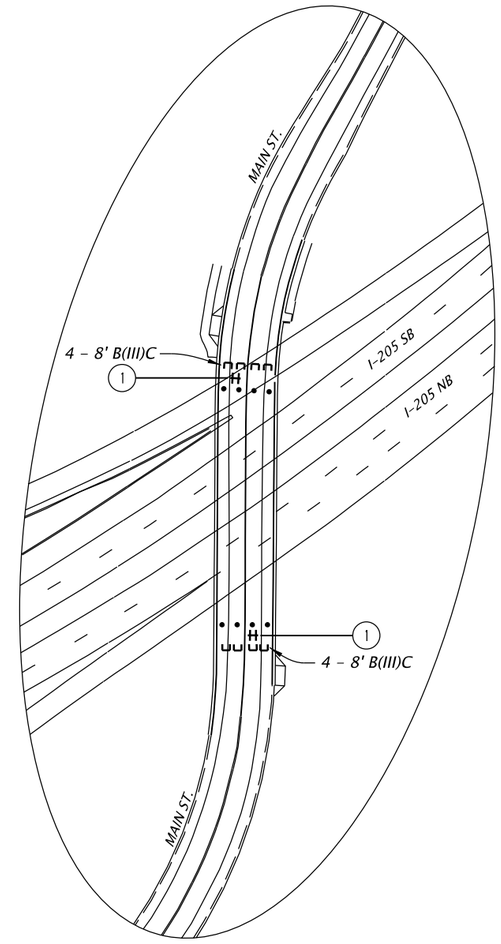
XXX-XXX

D E T O U R

MAIN ST. CLOSURE
(Night time)







Detail "A"
Scale: 1"=100'

- ● ● ● Detour Route – Southbound
- ▷ ▷ ▷ Detour Route – Northbound
- Road Closure
- ⌶ Temporary Sign Support
- ⌶ Temporary Sign on Temporary Support
- ⊔ 8' Type III Barricade (C, L, R, or LR)
- • • • Tubular Markers on 20' Max. Spacing

Notes:
1) *Cover existing signs that are in conflict with the detour signing.*
2) *All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.*
3) *All dimensions are in inches unless otherwise noted.*

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INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Andy Salisbury
Drafter: Stephanie Dexter
Reviewer: Shawn Le Blanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

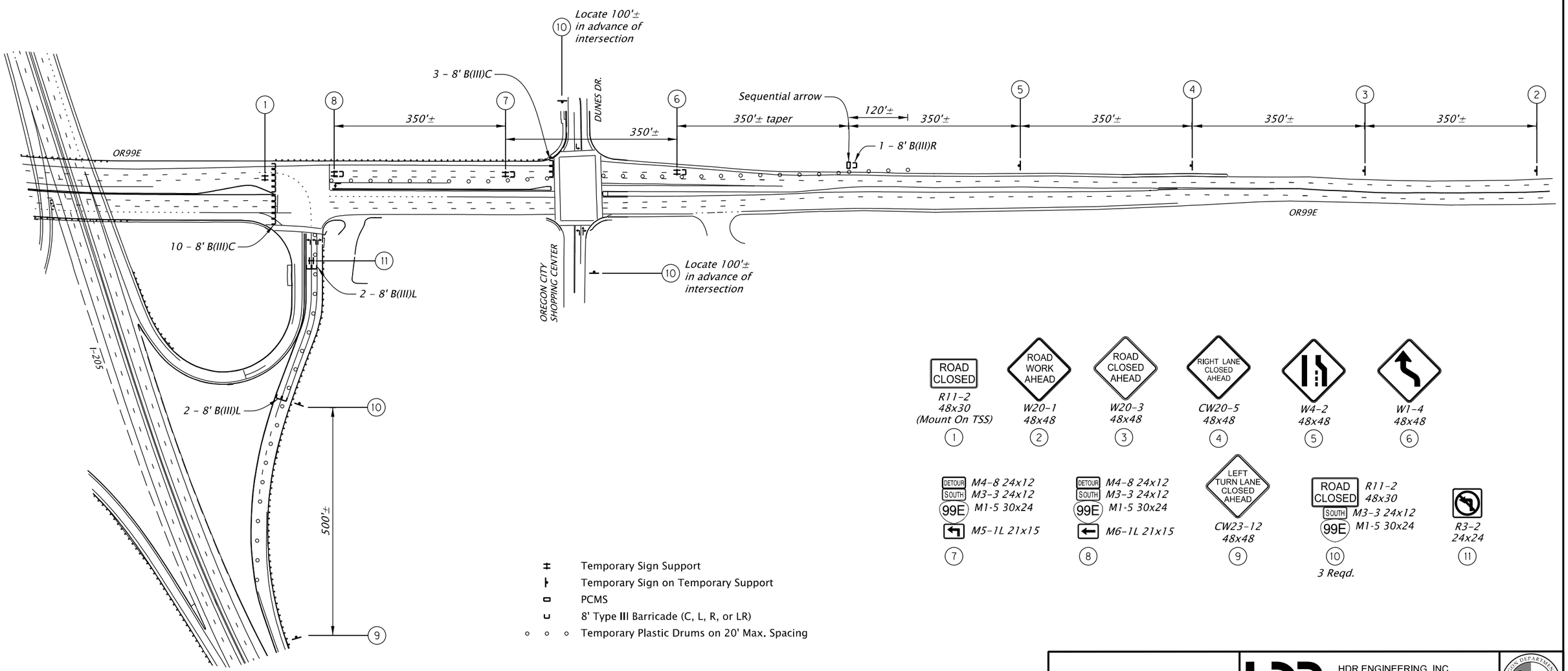
TZ_K19786_HDR_tc03.dgn :: EB19_Main St 2/10/2020 9:56:41 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: N/A

D E T O U R

OR99E SB CLOSURE
(Night time)



- ⊢ Temporary Sign Support
- ⊢ Temporary Sign on Temporary Support
- ▭ PCMS
- ⊔ 8' Type III Barricade (C, L, R, or LR)
- ○ ○ ○ Temporary Plastic Drums on 20' Max. Spacing

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

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INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

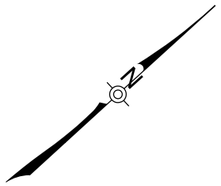
Designer: Amy Salisbury
Reviewer: Brenda Erickson
Drafter: Stephanie Dexter
Checker: Colette Snuffin

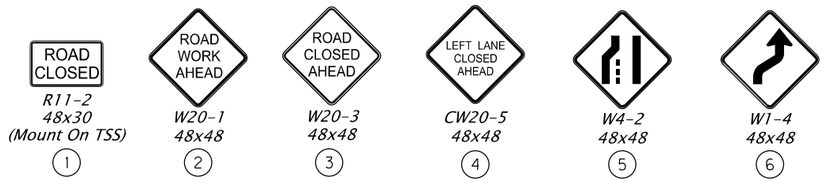
TRAFFIC CONTROL DETOUR PLAN

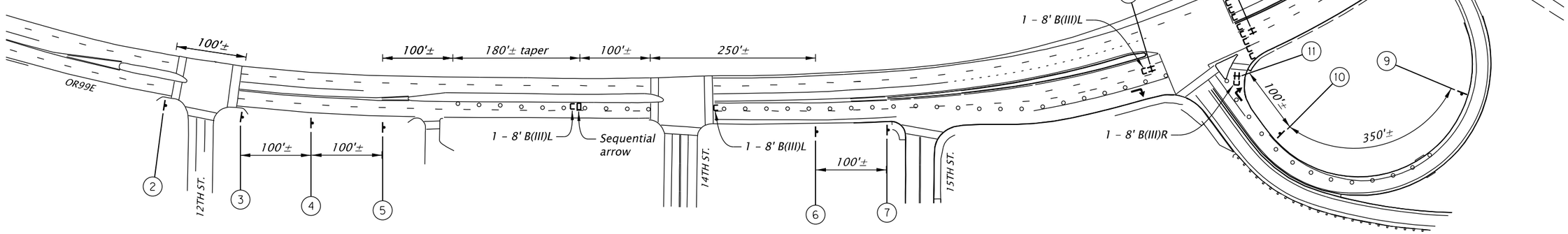
SHEET NO.

D E T O U R

OR99E NB CLOSURE
(Night time)







H	Temporary Sign Support
⊢	Temporary Sign on Temporary Support
▭	PCMS
⊔	8' Type III Barricade (C, L, R, or LR)
○ ○ ○	Temporary Plastic Drums on 20' Max. Spacing

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salsbury
Drafter: Stephanie Geeter
Reviewer: Brenda LeBlanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB20-22_OR99E Closure 2/10/2020 9:56:42 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: N/A

D E T O U R

OR99E CLOSURE
(Night time)

XXX-XXX

DETOUR / NORTH / 99E — M4-8 24x12, M3-1 24x12, M1-5 30x24, M6-3 21x15 — (1) 3 Reqd.

DETOUR / NORTH / 99E — M4-8 24x12, M3-1 24x12, M1-5 30x24, M6-2R 21x15 — (2) 2 Reqd.

DETOUR / NORTH / 99E — M4-8 24x12, M3-1 24x12, M1-5 30x24, M5-1L 21x15 — (3) 2 Reqd.

DETOUR / NORTH / 99E — M4-8 24x12, M3-1 24x12, M1-5 30x24, M6-1L 21x15 — (4) 2 Reqd.

DETOUR / SOUTH / 99E — M4-8 24x12, M3-3 24x12, M1-5 30x24, M6-3 21x15 — (5)

DETOUR / SOUTH / 99E — M4-8 24x12, M3-3 24x12, M1-5 30x24, M6-2R 30x21 — (6) 3 Reqd.

DETOUR / SOUTH / 99E — M4-8 24x12, M3-3 24x12, M1-5 30x24, M5-1L 21x15 — (7)

DETOUR / SOUTH / 99E — M4-8 24x12, M3-3 24x12, M1-5 30x24, M6-1L 21x15 — (8)

END DETOUR — CG20-5 30x24 — (9)

OR99E CLOSED 1/2 MILE	FOLLOW DETOUR

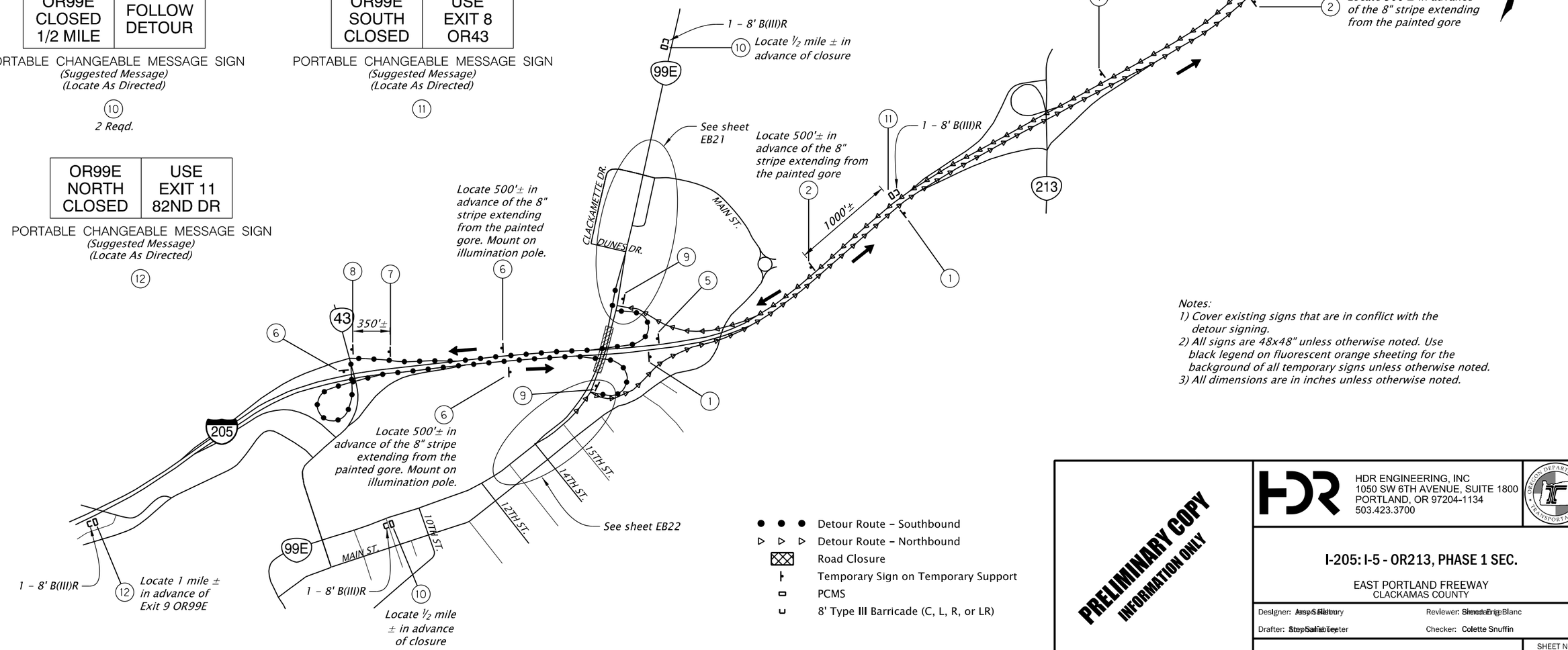
PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(10) 2 Reqd.

OR99E SOUTH CLOSED	USE EXIT 8 OR43

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(11)

OR99E NORTH CLOSED	USE EXIT 11 82ND DR

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)
(12)



● ● ● Detour Route – Southbound
▷ ▷ ▷ Detour Route – Northbound
Road Closure
Temporary Sign on Temporary Support
PCMS
8' Type III Barricade (C, L, R, or LR)

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury — Reviewer: Brenda Le Blanc
Drafter: Stephanie Dexter — Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc03.dgn :: EB20-22_OR99E Closure 2/10/2020 9:56:43 AM CDONOVAN
Rotation: 90°

XXX-XXX

7 DAYS IN ADVANCE OF CLOSURE

OR43 N CLOSED	MMM DD TO MMM DD

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

DURING CLOSURE

OR43 N CLOSED AHEAD	USE 99E FOLLOW DETOUR

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(1) *2 Reqd.*

ROAD CLOSED / DETOUR — *R11-2 48x30*; *M4-10 48x18 (Mount on TSS)*
(2) *3 Reqd.*

DETOUR AHEAD — *W20-2 48x48*; NORTH 43 — *M3-1 24x12*; *M1-5 24x24*
(3)

DETOUR *24x12*
43 NORTH LAKE OSWEGO
RIGHT LEFT LANE
(4)

DETOUR / NORTH 43 — *M4-8 24x12*; *M3-1 24x12*; *M1-5 24x24*; *M6-1R 21x15*
(5) *5 Reqd.*

DETOUR / NORTH 43 — *M4-8 24x12*; *M3-1 24x12*; *M1-5 24x24*; *M5-1R 21x15*
(6) *2 Reqd.*

DETOUR / NORTH 43 — *M4-8 24x12*; *M3-1 24x12*; *M1-5 24x24*; *M6-3 21x15*
(7) *4 Reqd.*

DETOUR / NORTH 43 — *M4-8 24x12*; *M3-1 24x12*; *M1-5 24x24*; *M6-2R 21x15*
(8)

END DETOUR — *CG20-5 30x24*
(9)

R3-2 24x24
(10)

54x54
(11) *2 Reqd.*

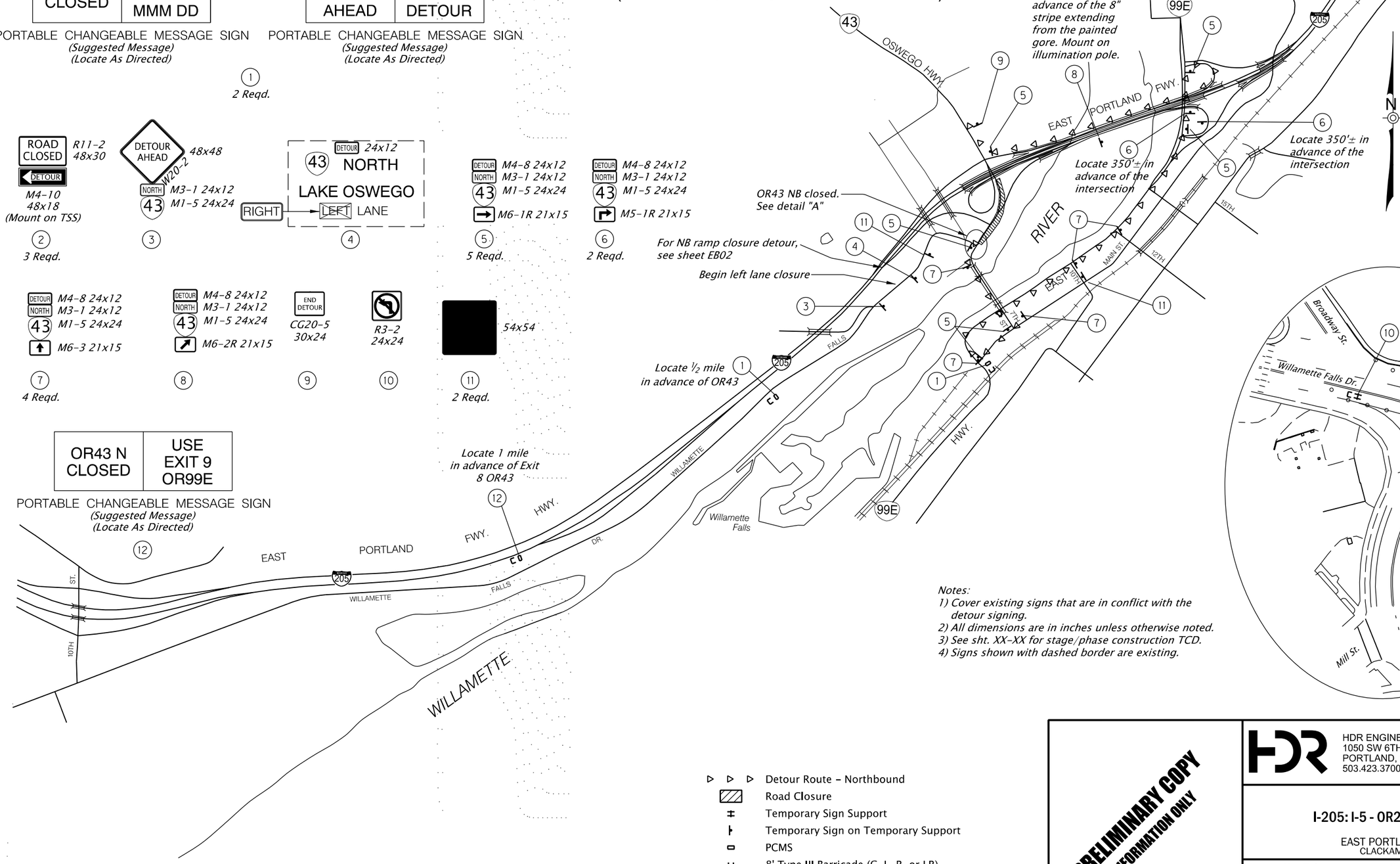
OR43 N CLOSED	USE EXIT 9 OR99E

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(12)

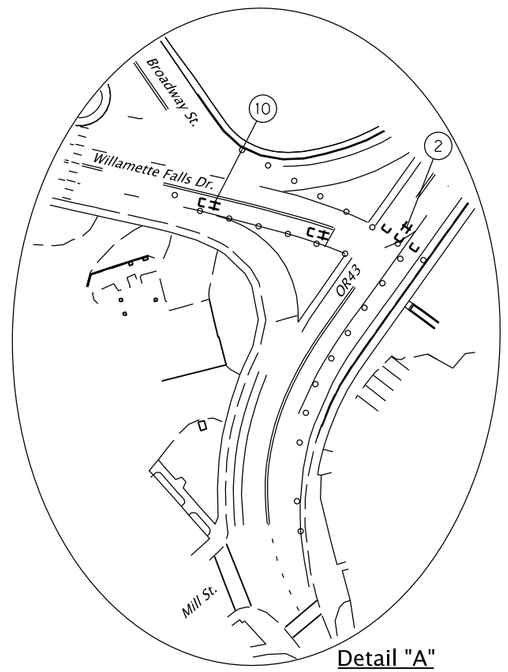
D E T O U R

OR43 NB CLOSURE
(LIMITED DURATION - THREE WEEKS)



GENERAL NOTES:

OR43 closed from beneath I-205 bridge to Willamette Falls Drive. Traffic to be detoured to Oregon City Arch Bridge via I-205 using Exit 9 and OR99E.



Detail "A"
Scale: 1"=100'

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All dimensions are in inches unless otherwise noted.
3) See sht. XX-XX for stage/phase construction TCD.
4) Signs shown with dashed border are existing.

- ▷ ▷ ▷ Detour Route – Northbound
- Road Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- ○ ○ ○ Temporary Plastic Drums on 20' Max. Spacing

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Taylor — Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter — Checker: Celeste Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc03.dgn :: EB23_43 Closure NB 2/10/2020 9:56:44 AM CDONOVAN

Rotation: 254.172°

XXX-XXX

D E T O U R

OR43 SB CLOSURE
(LIMITED DURATION - THREE WEEKS)

7 DAYS IN ADVANCE OF CLOSURE

OR43 S CLOSED	MMM DD TO MMM DD

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

DURING CLOSURE

OR43 S CLOSED AHEAD	USE I205 EXIT 9 OR99E

PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(1) *2 Reqd.*

DETOUR AHEAD W20-2 *48x48*
SOUTH 43 *24x12*
24x24
(2) *2 Reqd.*

ROAD CLOSED
R11-2
48x30
(Mount On TSS)
(3)

DETOUR SOUTH 43 *M4-8 24x12* *M3-3 24x12* *M1-5 24x24* *M6-3*
21x15
(4) *3 Reqd.*

DETOUR SOUTH 43 *M4-8 24x12* *M3-3 24x12* *M1-5 24x24* *M6-2R*
21x15
(5) *3 Reqd.*

DETOUR SOUTH 43 *M4-8 24x12* *M3-3 24x12* *M1-5 24x24* *M5-1L*
21x15
(6) *3 Reqd.*

DETOUR SOUTH 43 *M4-8 24x12* *M3-3 24x12* *M1-5 24x24* *M6-1L*
21x15
(7) *3 Reqd.*

END DETOUR
CG20-5
30x24
(8)

54x54
(9)

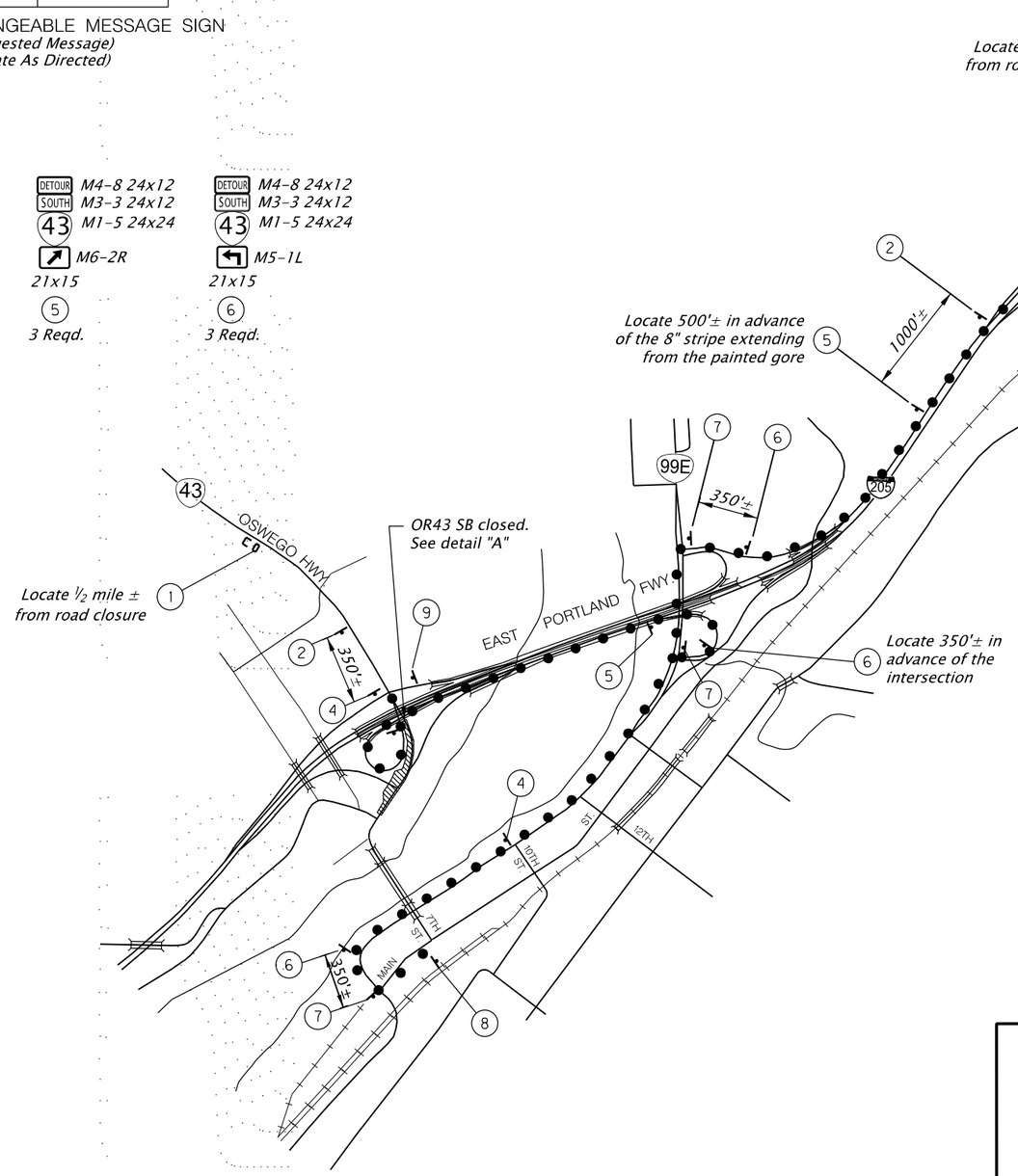
OR43 SOUTH CLOSED	USE EXIT 9 OR99E

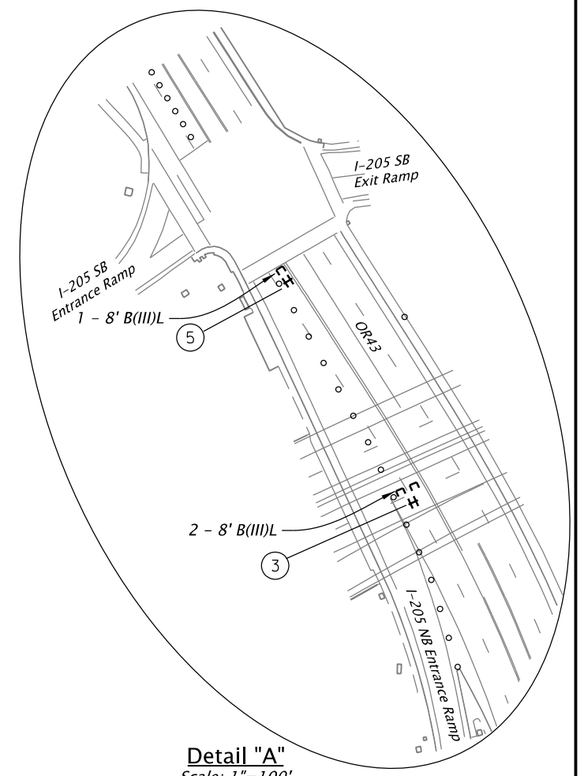
PORTABLE CHANGEABLE MESSAGE SIGN
(Suggested Message)
(Locate As Directed)

(10)

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All dimensions are in inches unless otherwise noted.
3) See sht. XX-XX for stage/phase construction TCD.
4) Sign 9 to be installed on an illumination pole on the left side of the OR43 southbound exit ramp.

- Detour Route - Southbound
- Road Closure
- Temporary Sign Support
- Temporary Sign on Temporary Support
- PCMS
- 8' Type III Barricade (C, L, R, or LR)
- Temporary Plastic Drums on 20' Max. Spacing





Detail "A"
Scale: 1"=100'

N

GENERAL NOTES:

OR43 closed from beneath I-205 bridge to Willamette Falls Drive. Traffic to be detoured to Oregon City Arch Bridge via I-205 using Exit 9 and OR99E.

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mason Taylor
Drafter: Stephanie Teeter
Reviewer: Brandan LeBlanc
Checker: Celeste Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB24_43 Closure SB 2/10/2020 9:57:16 AM CDONOVAN

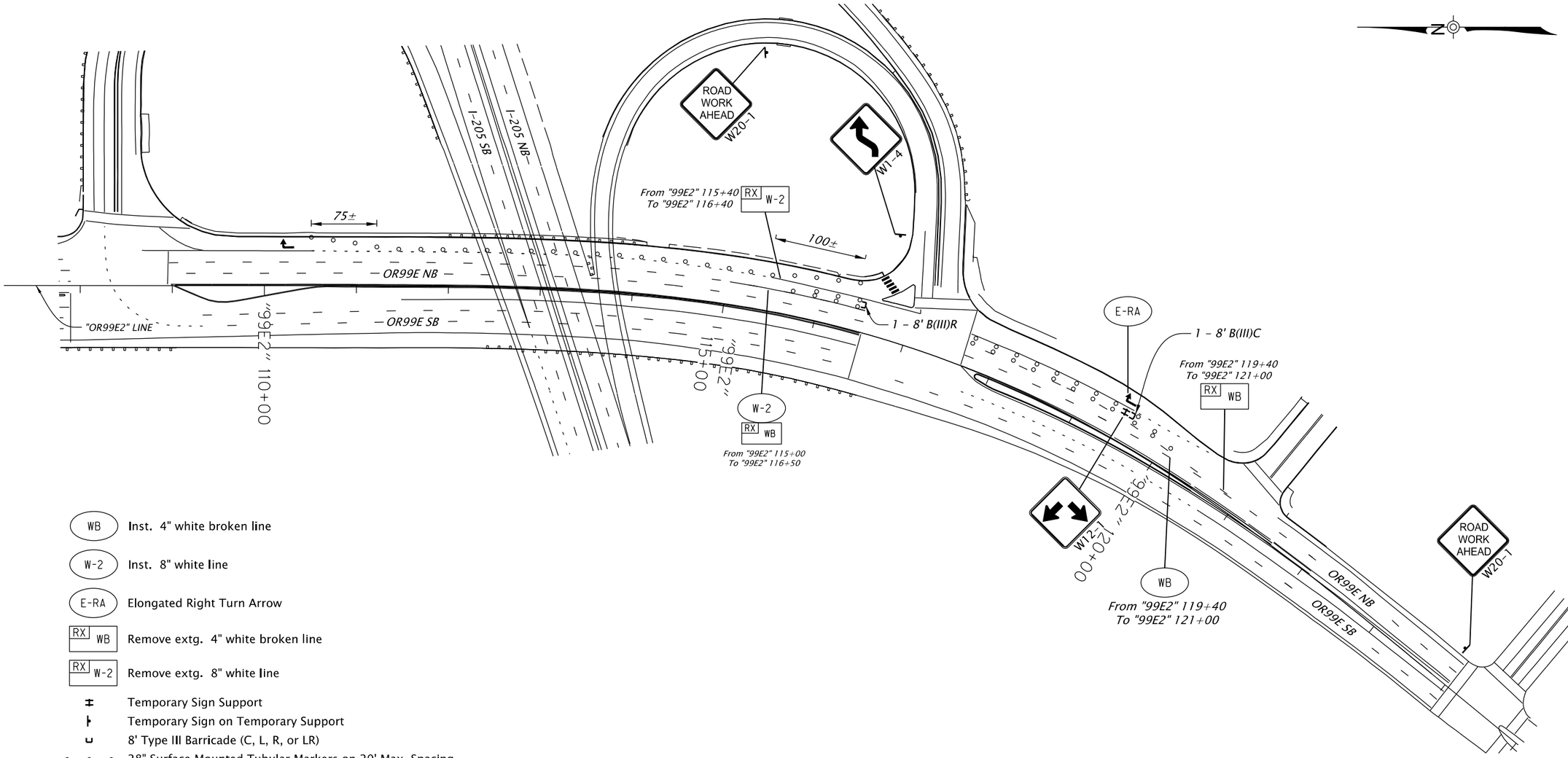
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 254.172°

S T A G E N O .

PHASE NO.

ABERNETHY BRIDGE BENT 1 CONSTRUCTION
OR99E NB LANE CLOSURE



WB	Inst. 4" white broken line
W-2	Inst. 8" white line
E-RA	Elongated Right Turn Arrow
RX WB	Remove extg. 4" white broken line
RX W-2	Remove extg. 8" white line
⊣⊢	Temporary Sign Support
⊢	Temporary Sign on Temporary Support
⊔	8' Type III Barricade (C, L, R, or LR)
○ ○ ○	28" Surface Mounted Tubular Markers on 20' Max. Spacing

Notes:
1) Cover existing signs that are in conflict with the detour signing.
2) All signs are 48x48" unless otherwise noted. Use black legend on fluorescent orange sheeting for the background of all temporary signs unless otherwise noted.
3) All dimensions are in inches unless otherwise noted.

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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Amy Salisbury
Drafter: Stephanie Dexter
Reviewer: Brenda LeBlanc
Checker: Colette Snuffin

TRAFFIC CONTROL DETOUR PLAN

SHEET NO.

TZ_K19786_HDR_tc03.dgn :: EB25 2/10/2020 9:57:18 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: N/A

1

2

R9-9
24x12

M4-9b
30x24
(Mount on B(II)R)

3

R9-9
24x12

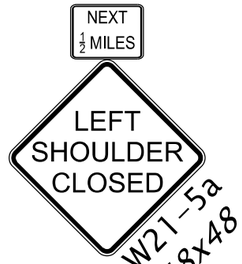
M4-9b
30x24
(Mount on B(II)R)

4

CR4-22b
15x24

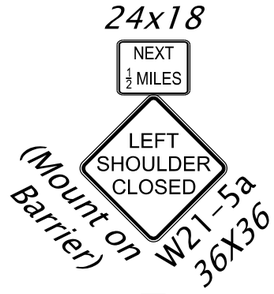
5

36x30



6

24x18



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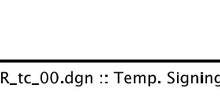


W1-4b
48x48

8

9

10

11

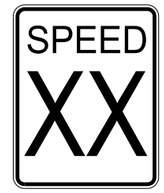
R9-11
24x18

M4-9b
30x24
(Mount on B(II)R)

12

CW23-7
48x54

13



14

15

16

W1-4b
48x48

17

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter
Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

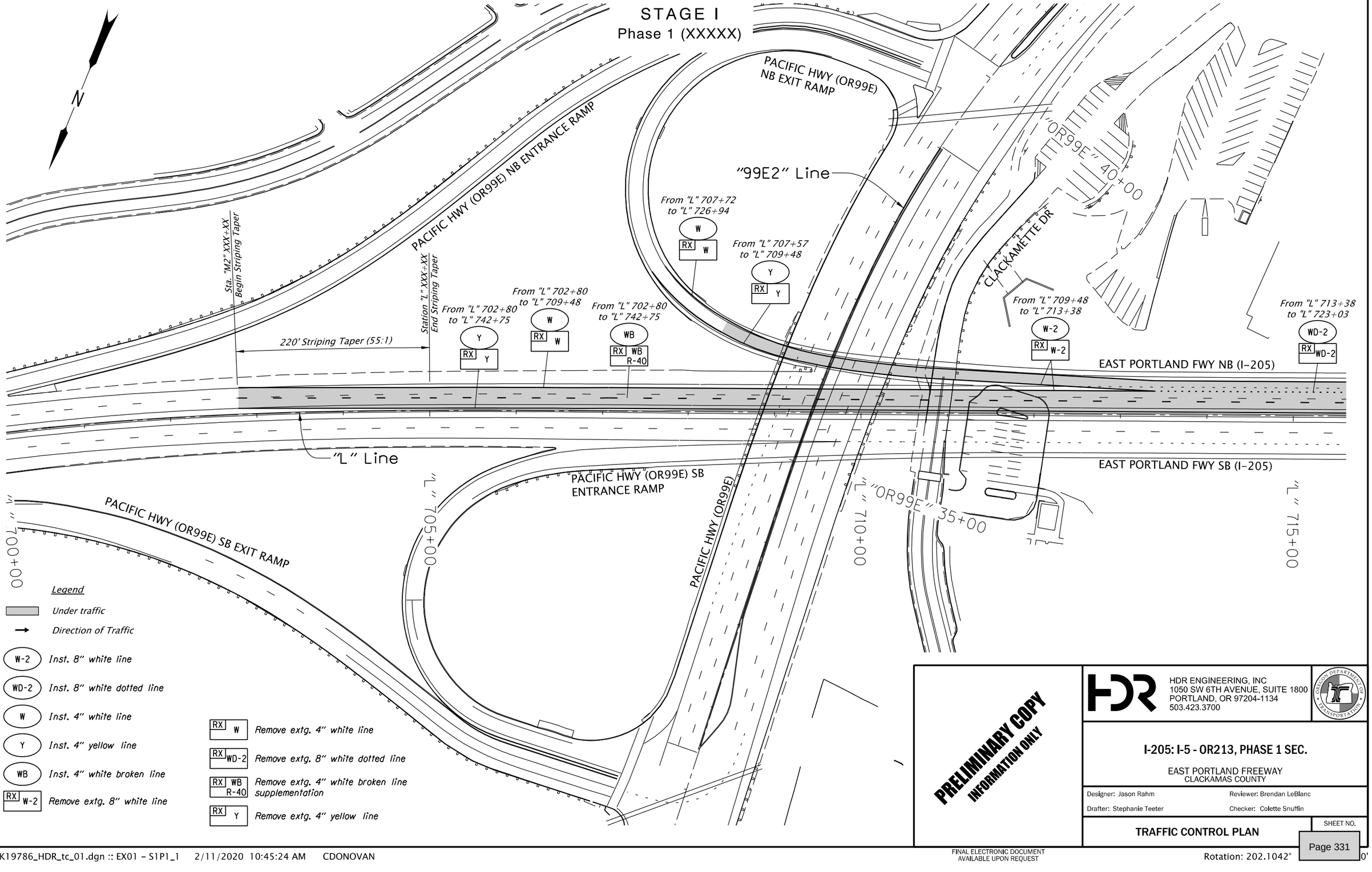
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_00.dgn :: Temp. Signing 2/11/2020 10:38:37 AM CDONOVAN

Rotation: 247.8868° 0'

STAGE I
Phase 1 (XXXXX)



Legend

- *Under traffic*
- *Direction of Traffic*
- W-2 — *Inst. 8" white line*
- WD-2 — *Inst. 8" white dotted line*
- W — *Inst. 4" white line*
- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- RX W-2 — *Remove extg. 8" white line*
- RX W — *Remove extg. 4" white line*
- RX WD-2 — *Remove extg. 8" white dotted line*
- RX WB R-40 — *Remove extg. 4" white broken line supplementation*
- RX Y — *Remove extg. 4" yellow line*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

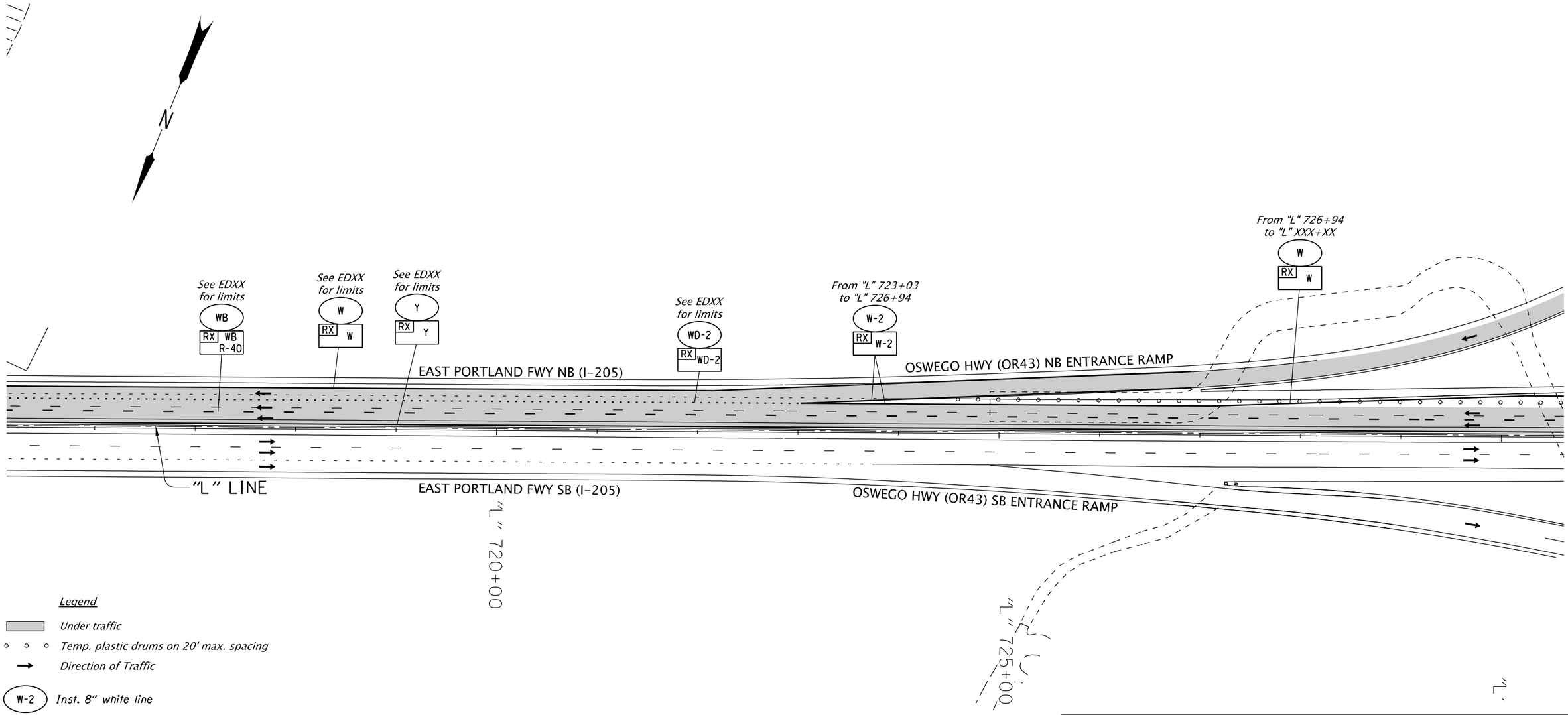
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_01.dgn :: EX01 - S1P1_1 2/11/2020 10:45:24 AM CDONOVAN

Rotation: 202.1042° 0'

STAGE I
Phase 1 (XXXXX)



Legend

- *Under traffic*
- *Temp. plastic drums on 20' max. spacing*
- *Direction of Traffic*
- W-2 — *Inst. 8" white line*
- WD-2 — *Inst. 8" white dotted line*
- W — *Inst. 4" white line*
- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- RX W-2 — *Remove extg. 8" white line*
- RX W — *Remove extg. 4" white line*
- RX WD-2 — *Remove extg. 8" white dotted line*
- RX WB R-40 — *Remove extg. 4" white broken line supplementation*
- RX Y — *Remove extg. 4" yellow line*

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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_01.dgn :: EX02 - S1P1_2 2/11/2020 10:45:28 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 202.1042° 0'

1

2

R9-9
24x12

M4-9b
30x24
(Mount on B(II)R)

3

R9-9
24x12

M4-9b
30x24
(Mount on B(II)R)

4

R9-11a
24x12

M4-9b
30x24
(Mount on B(II)R)

5

M4-9b
30x24
(Mount on B(II)R)

6

M4-9b
30x24
(Mount on B(II)R)

7

R11-2
48x30

M4-10
48x18
(Mount on TSS)

8

R11-2
48x30

M4-10
48x18
(Mount on TSS)
(3 Reqd.)

9

10

11

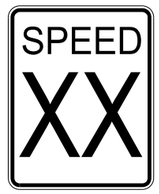
R9-11
24x18

M4-9b
30x24
(Mount on B(II)R)

12

CW23-7
48x54

13



14

15

R3-2
24x24

16

R3-5
30x36

17

R3-5
30x36

18

CR4-22b
15x24

19

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter
Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_01.dgn :: EX19 - Temp. Signing_1 2/11/2020 10:45:52 AM CDONOVAN

Rotation: 247.8868° 0'

Phase 1 (XXXXX)

Construction Notes:

1. Begin OR213 exit ramp recovery area
2. Begin I-205 widening for OR213 interchange to Main St. Bridge No. 09702
3. See sht. EX08 for signing plan

CASCADE HWY (OR213)

CASCADE HWY NB EXIT RAMP

"E2" Line

"E2" 665+00

"E2" 670+00

"L" 665+00

"L" 670+00

"L" 675+00

"L" Line

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

CASCADE HWY SB ENTRANCE RAMP

Station "L" 662+64 Begin Striping Taper

275' Buffer
275' Striping Taper

Station "L" 665+39 End Striping Taper

Station "E2" 665+40 Begin Striping Taper

150' Buffer
150' Striping Taper

Station "E2" 666+90 End Striping Taper

From "E2" 665+40 to "E2" 668+67

Y

RX Y

Station "E2" 668+67 Begin Striping Taper

295' Striping Taper

Station "E2" 671+62 End Striping Taper

From "E2" 668+67 to "E2" 671+62

W-2

75' 16:1 Barrier Taper Rate

Temp. Impact Attenuator (55mph Double Barrier)

From "E2" 668+67 to "E2" 671+73

RX W-2

From "E2" 671+73 to "L" 673+40

RX WD

From "E2" 671+62 to "L" 673+60

WD

Temp. Tall Concrete Barrier, Reflectorized - 2,650'
Sta "L" 671+61 to
Sta "L" 698+00

From "E2" XXX+XX to "L" XXX+XX

W

RX W

Temp. Tall Concrete Barrier, Reflectorized - 250'
Sta "E2" 666+90 to
Sta "E2" 669+39

Temp. Tall Concrete Barrier, Reflectorized - 400'
Sta "L" 665+38 to
Sta "L" 669+39

75' 30:1 Barrier Taper Rate

RX Y

Y

From "E2" XXX+XX to "E2" XXX+XX

RX WB

WB

From "E2" XXX+XX to "E2" XXX+XX

A

Legend

- Under traffic
- Under construction
- Direction of traffic
- Concrete barrier
- Temp. Impact attenuator
- Immediate grading limits
- Final grading limits
- Under traffic
- Existing ground
- Top of stage, temp. or final surfacing
- Temp. plastic drums on 40' max. spacing
- Temp. plastic drums on 20' max. spacing

RX WB — Remove extg. 4" white broken line	Y — Inst. 4" yellow line
RX Y — Remove extg. 4" yellow line	WB — Inst. 4" white broken line
RX W — Remove extg. 4" white line	W — Inst. 4" white line
RX WD — Remove extg. 4" white dotted line	W-2 — Inst. 8" white line
RX W-2 — Remove extg. 8" white line	WD — Inst. 4" white dotted line

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_02.dgn :: EX01 - S2P1_1 2/11/2020 10:57:50 AM CDONOVAN

Rotation: 224.398° 0'

STAGE II
Phase 1 (XXXXX)

N

Construction Notes:

1. *Continue I-205 widening from previous sheet*
2. *See sht. EX08 for signing plan*

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

B

B

"L" Line

"L" 680+00

"L" 685+00

"L" 690+00

RX Y — Y — *See sht. EX01 for limits*

RX WB — WB — *See sht. EX01 for limits*

RX W — W — *See sht. EX01 for limits*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

RX Y — *Remove extg. 4" yellow line*

RX WB — *Remove extg. 4" white broken line*

RX W — *Remove extg. 4" white line*

Y — *Inst. 4" yellow line*

WB — *Inst. 4" white broken line*

W — *Inst. 4" white line*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm — Reviewer: Brendan LeBlanc

Drafter: Stephanie Teeter — Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_02.dgn :: EX02 - S2P1_2 2/11/2020 10:57:51 AM CDONOVAN

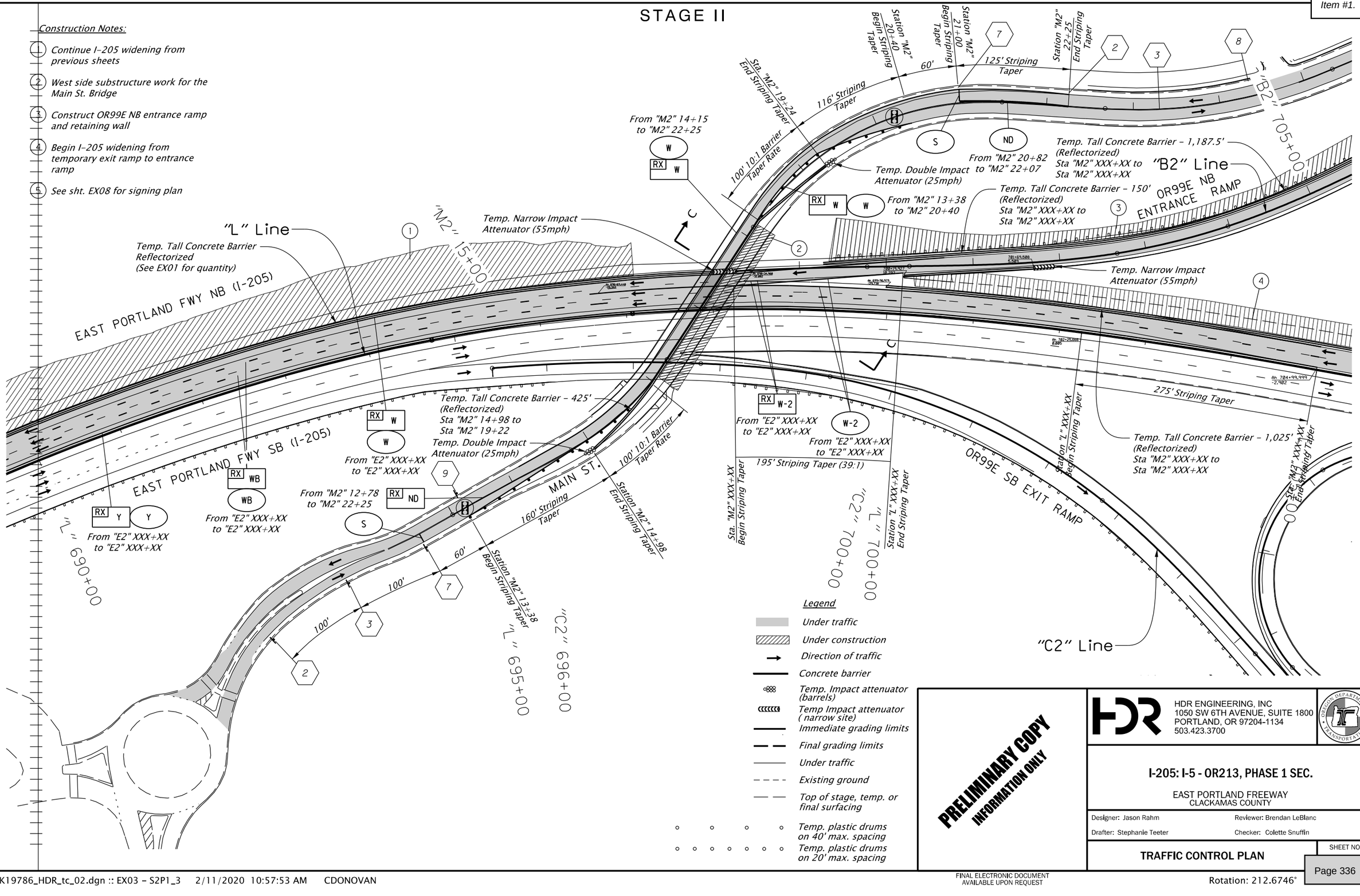
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

STAGE II

Construction Notes:

1. *Continue I-205 widening from previous sheets*
2. *West side substructure work for the Main St. Bridge*
3. *Construct OR99E NB entrance ramp and retaining wall*
4. *Begin I-205 widening from temporary exit ramp to entrance ramp*
5. *See sht. EX08 for signing plan*



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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_02.dgn :: EX03 - S2P1_3 2/11/2020 10:57:53 AM CDONOVAN
Rotation: 212.6746° 0'

STAGE II
Phase 1 (XXXXX)

N

"M2" Line

"99E2" Line

"B2" Line

"A2" Line

"L" Line

"CL" Line

MAIN ST.

OR99E NB ENTRANCE RAMP

OR99E NB EXIT RAMP

OR99E SB ENTRANCE RAMP

PACIFIC HWY (OR99E)

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

From "E2" XXX+XX to "E2" XXX+XX

Station "M2" 30+82 Begin Striping Taper

Station "M2" 30+19 End Striping Taper

62.5' Striping Taper

100'

Station "M2" 26+28 Begin Striping Taper

Station "M2" 25+65 End Striping Taper

Striping Taper

Temp. Impact Attenuator (XXmph)

Temp. Narrow Impact Attenuator (XXmph)

Temp. Tall Concrete Barrier - 400' (Reflectorized) Sta "M2" XXX+XX to Sta "M2" XXX+XX

Temp. Tall Concrete Barrier - 200' (Reflectorized) Sta "M2" XXX+XX to Sta "M2" XXX+XX

"B2" 712+74.10 P.O.E. =
"99E2" 117+46.63 P.O.C.

"A2" 700+24.04 P.O.E. =
"99E2" 117+27.59 P.O.C.

"99E2" 120+00

"99E2" 115+00

"A2" 710+00

"B2" 705+00

"L" 715+00

"L" 710+00

"L" 705+00

"CL" 15+00

62.5' 16:1 Barrier Taper Rate

75' 16:1 Barrier Taper Rate

185' Striping Taper

Station "OR99E" 112+35 End Striping Taper

Station "OR99E" 110+51 Begin Striping Taper

Temp. Tall Concrete Barrier Reflectorized (See EX03 for quantity)

See sheet EXXX for limits

1250'

1000'

30'

Construction Notes:

1. Continue I-205 widening from previous sheets
2. West side substructure work for the Main St. Bridge
3. Construct OR99E NB entrance ramp and retaining wall
4. Begin I-205 widening from temporary exit ramp to entrance ramp
5. See sht. EX08 for signing plan

Legend

- Under traffic
- Under construction
- Direction of traffic
- Concrete barrier
- Temp. Impact attenuator (barrels)
- Temp Impact attenuator (narrow site)
- Temp. plastic drums on 40' max. spacing
- Temp. plastic drums on 20' max. spacing
- Immediate grading limits
- Final grading limits
- Under traffic
- Existing ground
- Top of stage, temp. or final surfacing

Y — Inst. 4" yellow line

WB — Inst. 4" white broken line

W — Inst. 4" white line

RX Y — Remove extg. 4" yellow line

RX WB — Remove extg. 4" white broken line

RX W — Remove extg. 4" white line

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

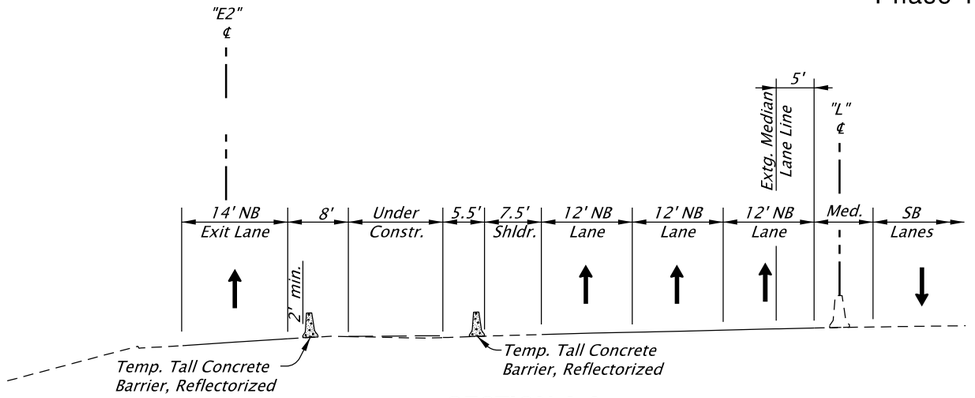
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

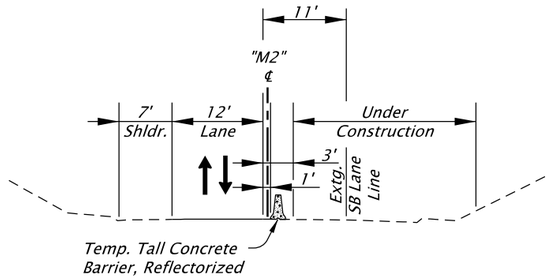
TZ_K19786_HDR_tc_02.dgn :: EX04 - S2P1_4 2/11/2020 10:57:54 AM CDONOVAN

Rotation: 192.3209° 0'

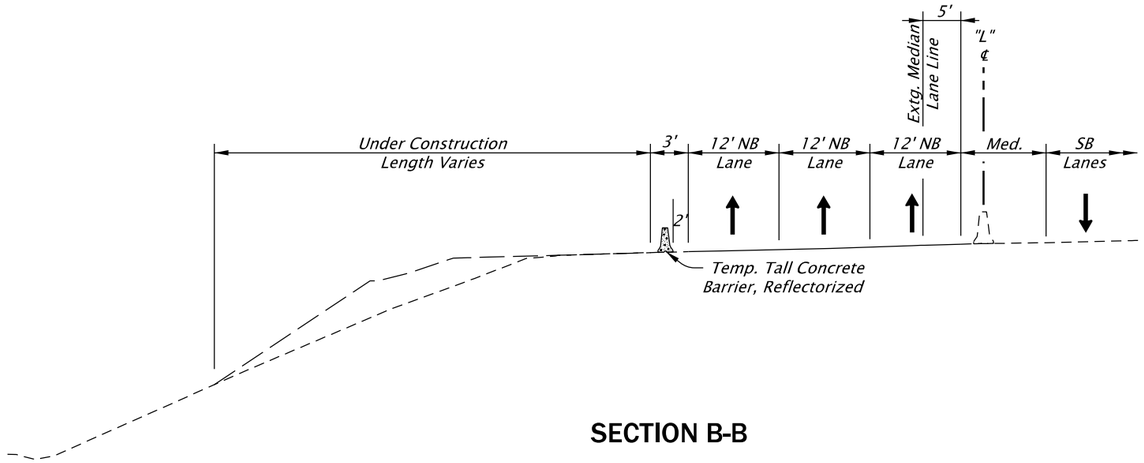
STAGE II
Phase 1 (XXXXX)



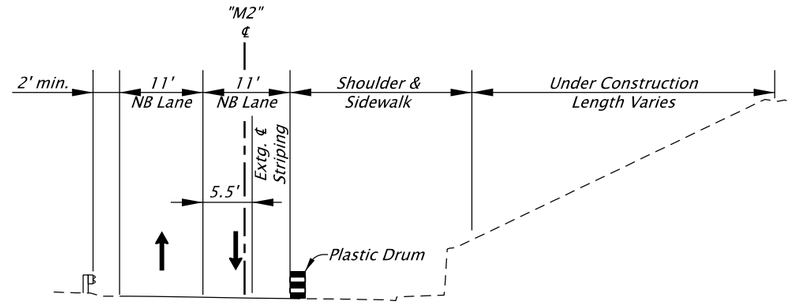
SECTION A-A



SECTION C-C



SECTION B-B



SECTION D-D

Legend

- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

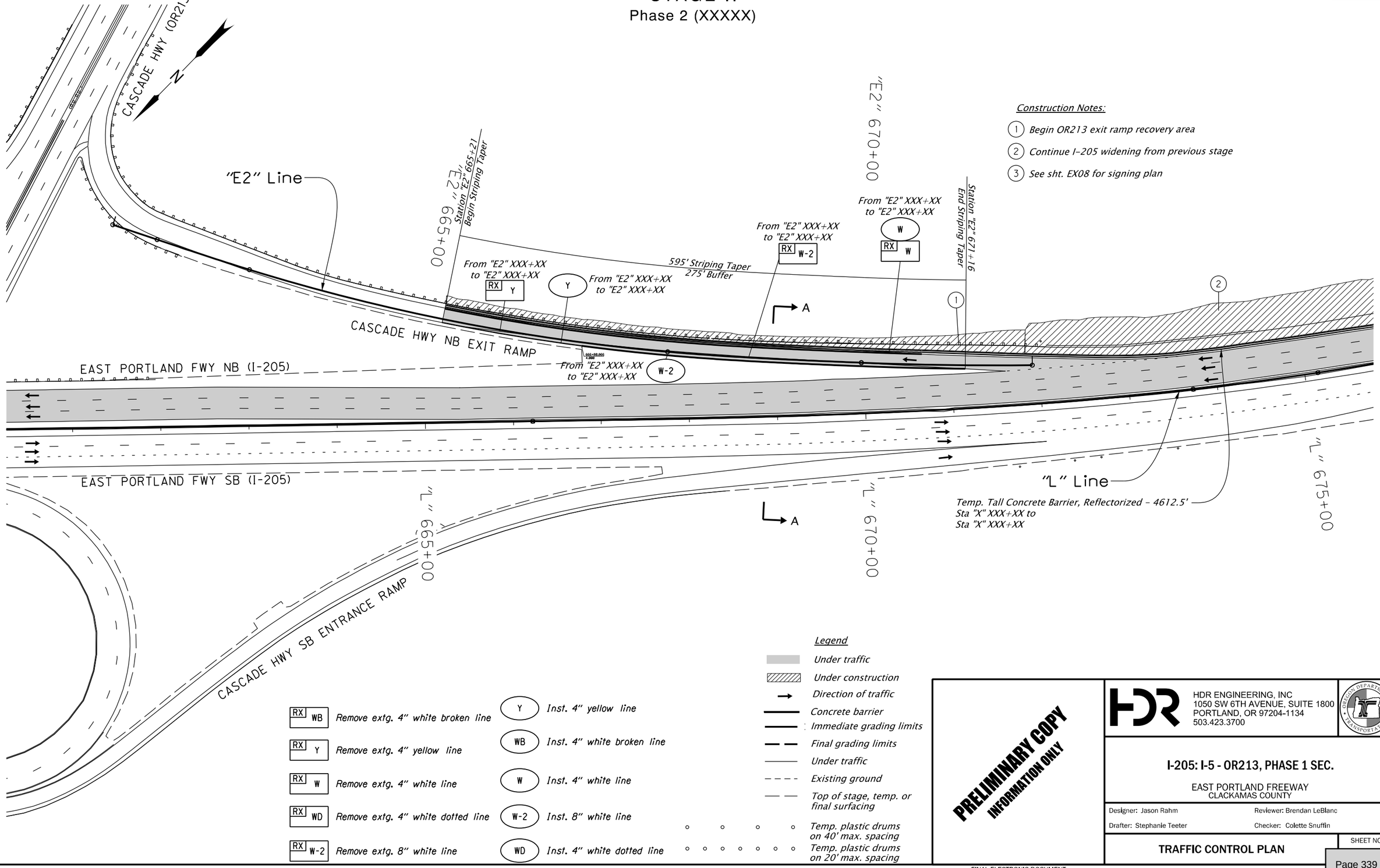
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_02.dgn :: EX05 - S2P1_5 2/11/2020 10:57:55 AM CDONOVAN

Rotation: 0° 0'

STAGE II
Phase 2 (XXXXX)



Construction Notes:

1. *Begin OR213 exit ramp recovery area*
2. *Continue I-205 widening from previous stage*
3. *See sht. EX08 for signing plan*

Temp. Tall Concrete Barrier, Reflectorized - 4612.5'
Sta "X" XXX+XX to
Sta "X" XXX+XX

RX WB	*Remove extg. 4" white broken line*	Y	*Inst. 4" yellow line*
RX Y	*Remove extg. 4" yellow line*	WB	*Inst. 4" white broken line*
RX W	*Remove extg. 4" white line*	W	*Inst. 4" white line*
RX WD	*Remove extg. 4" white dotted line*	W-2	*Inst. 8" white line*
RX W-2	*Remove extg. 8" white line*	WD	*Inst. 4" white dotted line*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

PRELIMINARY COPY INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_02.dgn :: EX06 - S2P2_1 2/11/2020 10:57:56 AM CDONOVAN

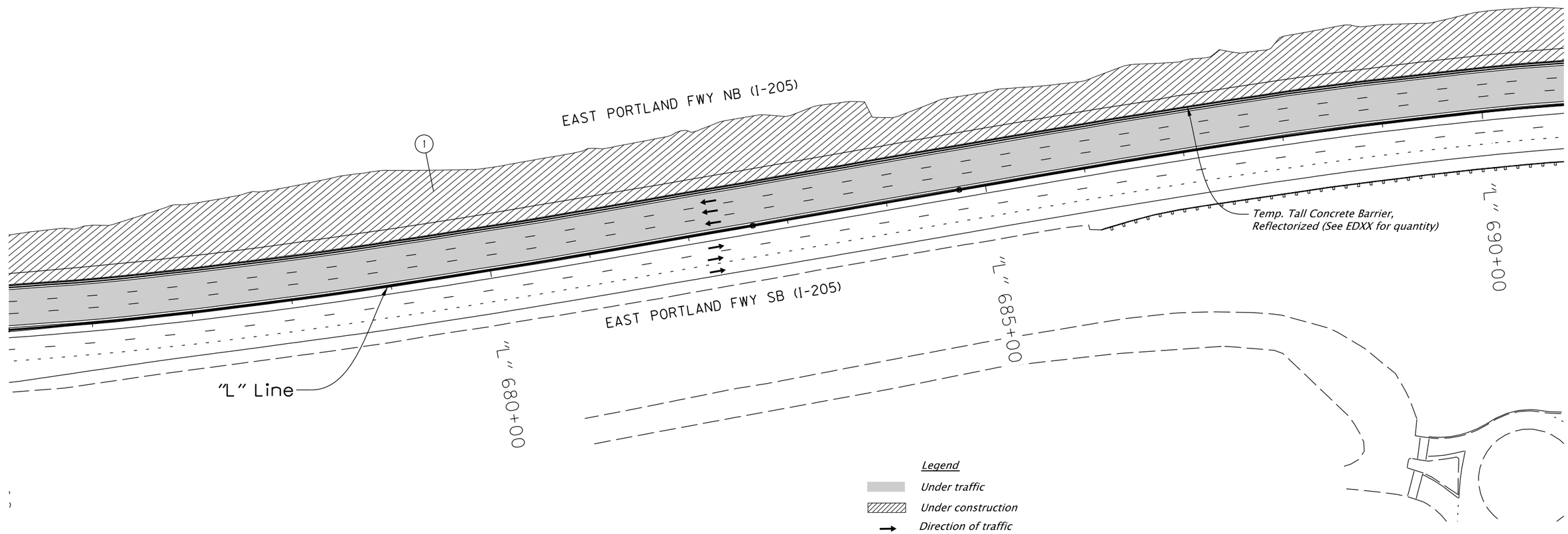
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 224.398° 0'

STAGE II
Phase 2 (XXXXX)

Construction Notes:

1. *Continue I-205 widening from previous stage*
2. *See sht. EX08 for signing plan*



Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_02.dgn :: EX07 - S2P2_2 2/11/2020 10:57:57 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

STAGE II
Phase 2 (XXXXX)

Construction Notes:

1. *Continue I-205 widening from previous stage*
2. *East side substructure work for the Main St. Bridge*
3. *Continue constructing OR99E NB entrance ramp and retaining wall from previous stage*
4. *Continue I-205 widening from temporary exit ramp to entrance ramp from previous stage*
5. *See sht. EX08 for signing plan*

N

"L" Line

EAST PORTLAND FWY NB (I-205)

"M2" 15+00

"M2" Line

"B2" Line

"B2" 705+00

OR99E NB ENTRANCE RAMP

Station "M2" 19+40 Begin Striping Taper

Sta. "M2" 20+40 End Striping Taper

100' Striping Taper

100' 10:1 Barrier Taper Rate

60' 125' 100' 100'

7 2 3 8

RX W W

From "M2" 13+40 to "M2" 20+83

Temp. Double Impact Attenuator (25mph)

Temp. Tall Concrete Barrier - 150' (Reflectorized) Sta "M2" XXX+XX to Sta "M2" XXX+XX

Temp. Tall Concrete Barrier Reflectorized (See EX01 for quantity)

Temp. Narrow Impact Attenuator (55mph)

Temp. Tall Concrete Barrier - XXX' (Reflectorized) Sta "M2" XXX+XX to Sta "M2" XXX+XX

Temp. Tall Concrete Barrier - 500' (Reflectorized) Sta "M2" 14+40 to Sta "M2" 19+40

From "M2" 13+90 to "M2" 20+40

Temp. Double Impact Attenuator (25mph)

EAST PORTLAND FWY SB (I-205)

MAIN ST.

"L" 690+00

"L" 695+00

"C2" 696+00

"C2" "L" 700+00

"L" 705+00

OR99E SB EXIT RAMP

"C2" Line

125' 10:1 Barrier Taper Rate

100' Striping Taper

Sta. "M2" 14+40 End Striping Taper

60'

100'

Station "M2" 13+40 Begin Striping Taper

RX W — Remove extg. 4" white line

W — Inst. 4" white line

Legend

- Under traffic
- Under construction
- Direction of traffic
- Concrete barrier
- Temp. Impact attenuator (barrels)
- Temp Impact attenuator (narrow site)
- Immediate grading limits
- Final grading limits
- Under traffic
- Existing ground
- Top of stage, temp. or final surfacing
- Temp. plastic drums on 40' max. spacing
- Temp. plastic drums on 20' max. spacing

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm — Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter — Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

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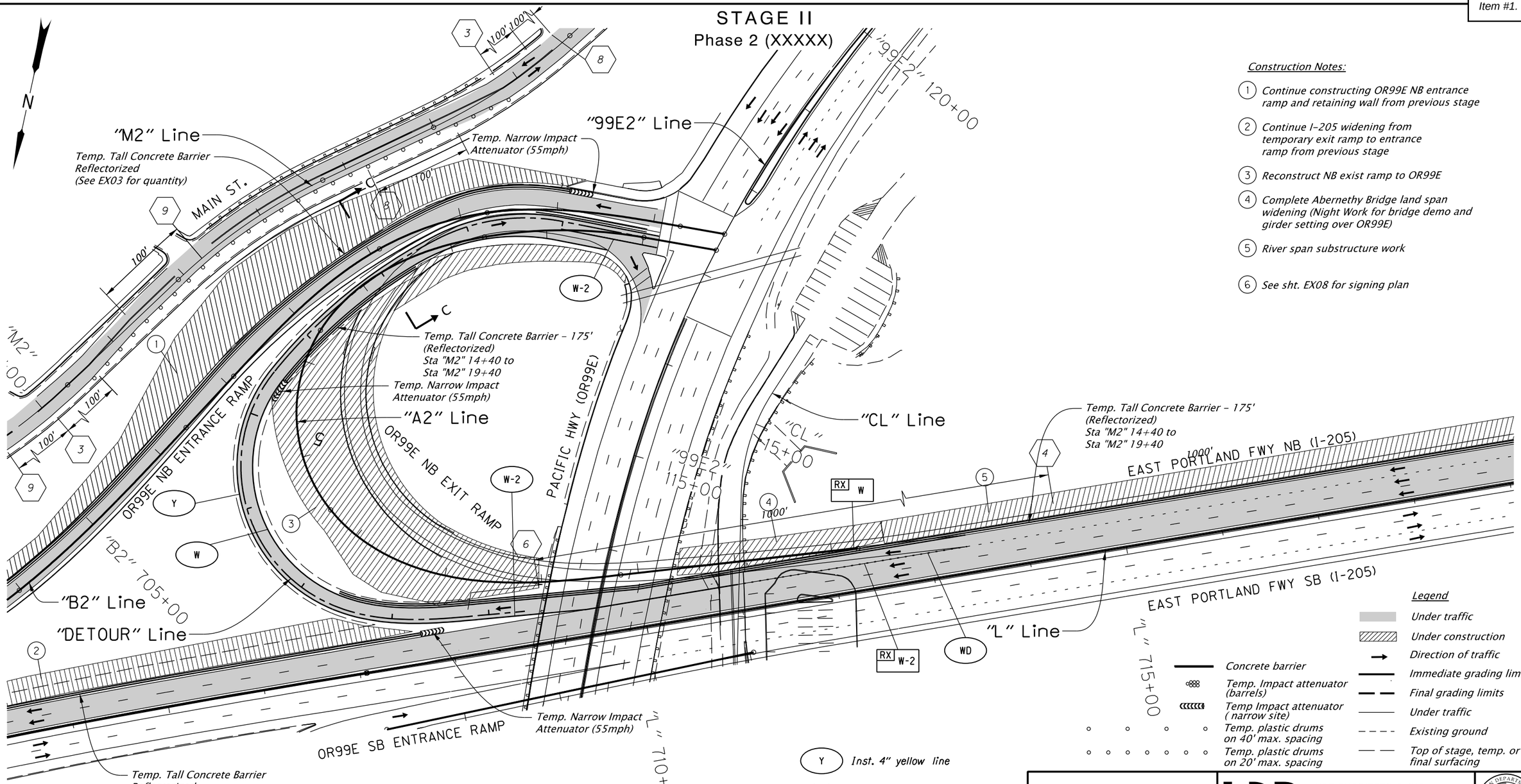
TZ_K19786_HDR_tc_02.dgn :: EX08 - S2P2_3 2/11/2020 10:57:58 AM CDONOVAN

Rotation: 212.6746° 0'

STAGE II
Phase 2 (XXXXX)



Construction Notes:

1. *Continue constructing OR99E NB entrance ramp and retaining wall from previous stage*
2. *Continue I-205 widening from temporary exit ramp to entrance ramp from previous stage*
3. *Reconstruct NB exist ramp to OR99E*
4. *Complete Abernethy Bridge land span widening (Night Work for bridge demo and girder setting over OR99E)*
5. *River span substructure work*
6. *See sht. EX08 for signing plan*

Y	*Inst. 4" yellow line*
WB	*Inst. 4" white broken line*
W	*Inst. 4" white line*
RX Y	*Remove extg. 4" yellow line*
RX WB	*Remove extg. 4" white broken line*
RX W	*Remove extg. 4" white line*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator (barrels)*
- *Temp Impact attenuator (narrow site)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

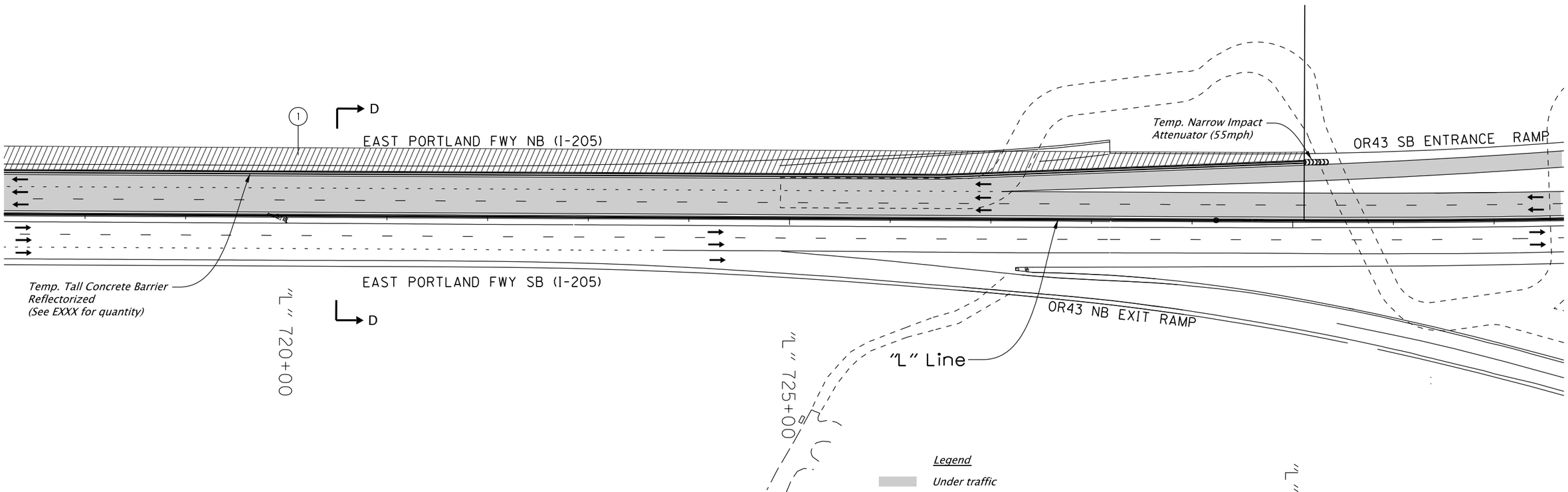
TZ_K19786_HDR_tc_02.dgn :: EX09 - S2P2_4 2/11/2020 10:57:59 AM CDONOVAN
Rotation: 192.3209° 0'

STAGE II
Phase 2 (XXXXX)

N

Construction Notes:

1. *River span substructure work*
2. *See sht. EX08 for signing plan*



Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp Impact attenuator (narrow site)*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

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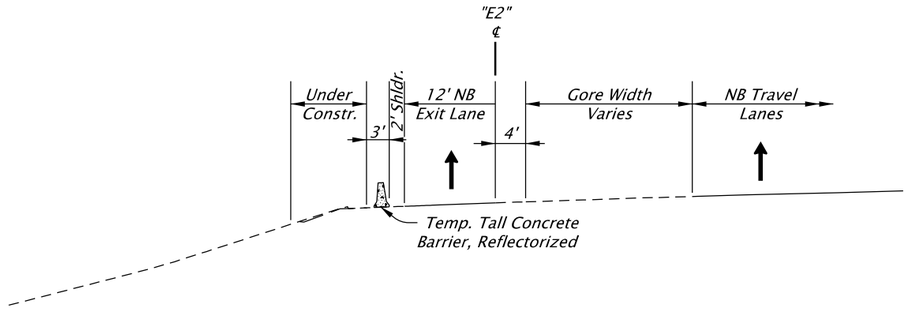
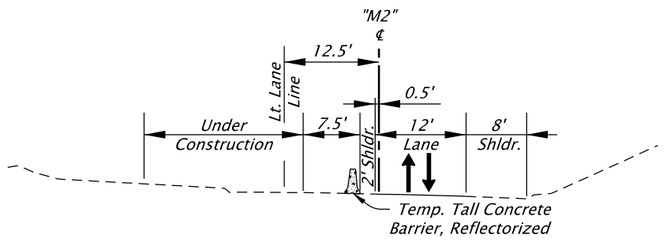
TZ_K19786_HDR_tc_02.dgn :: EX10 – S2P2_5 2/11/2020 10:58:00 AM CDONOVAN

Rotation: 202.0165° 0'

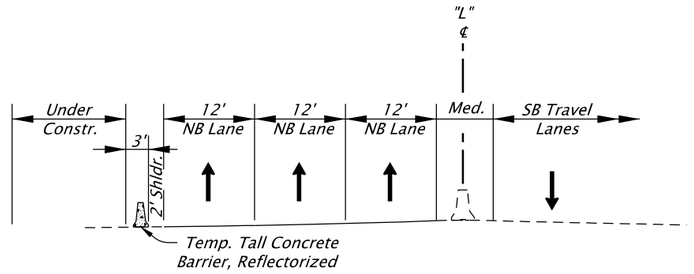
STAGE II
Phase 2 (XXXXX)



SECTION A-A



SECTION B-B



SECTION D-D

Legend

- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_02.dgn :: EX11 – S2P2_6 2/11/2020 10:58:01 AM CDONOVAN

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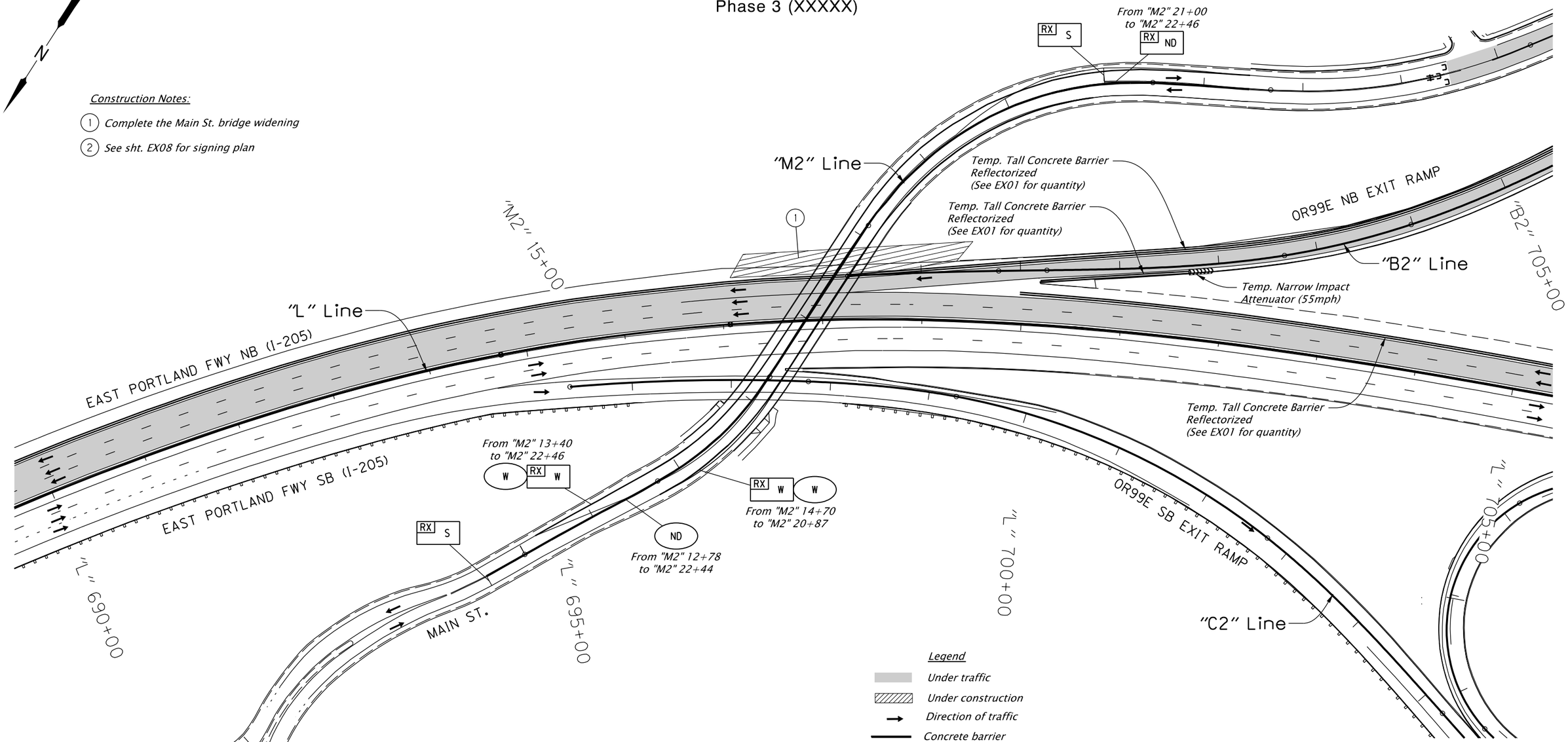
Rotation: 0°

STAGE II
Phase 3 (XXXXX)

N

Construction Notes:

1. *Complete the Main St. bridge widening*
2. *See sht. EX08 for signing plan*



RX WB	*Remove extg. 4" white broken line*
RX Y	*Remove extg. 4" yellow line*
RX W	*Remove extg. 4" white line*
RX WD	*Remove extg. 4" white dotted line*
RX W-2	*Remove extg. 8" white line*
Y	*Inst. 4" yellow line*
WB	*Inst. 4" white broken line*
W	*Inst. 4" white line*
W-2	*Inst. 8" white line*
WD	*Inst. 4" white dotted line*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator (barrels)*
- *Temp Impact attenuator (narrow site)*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_02.dgn :: EX12 - S2P3_1 2/11/2020 10:58:02 AM CDONOVAN

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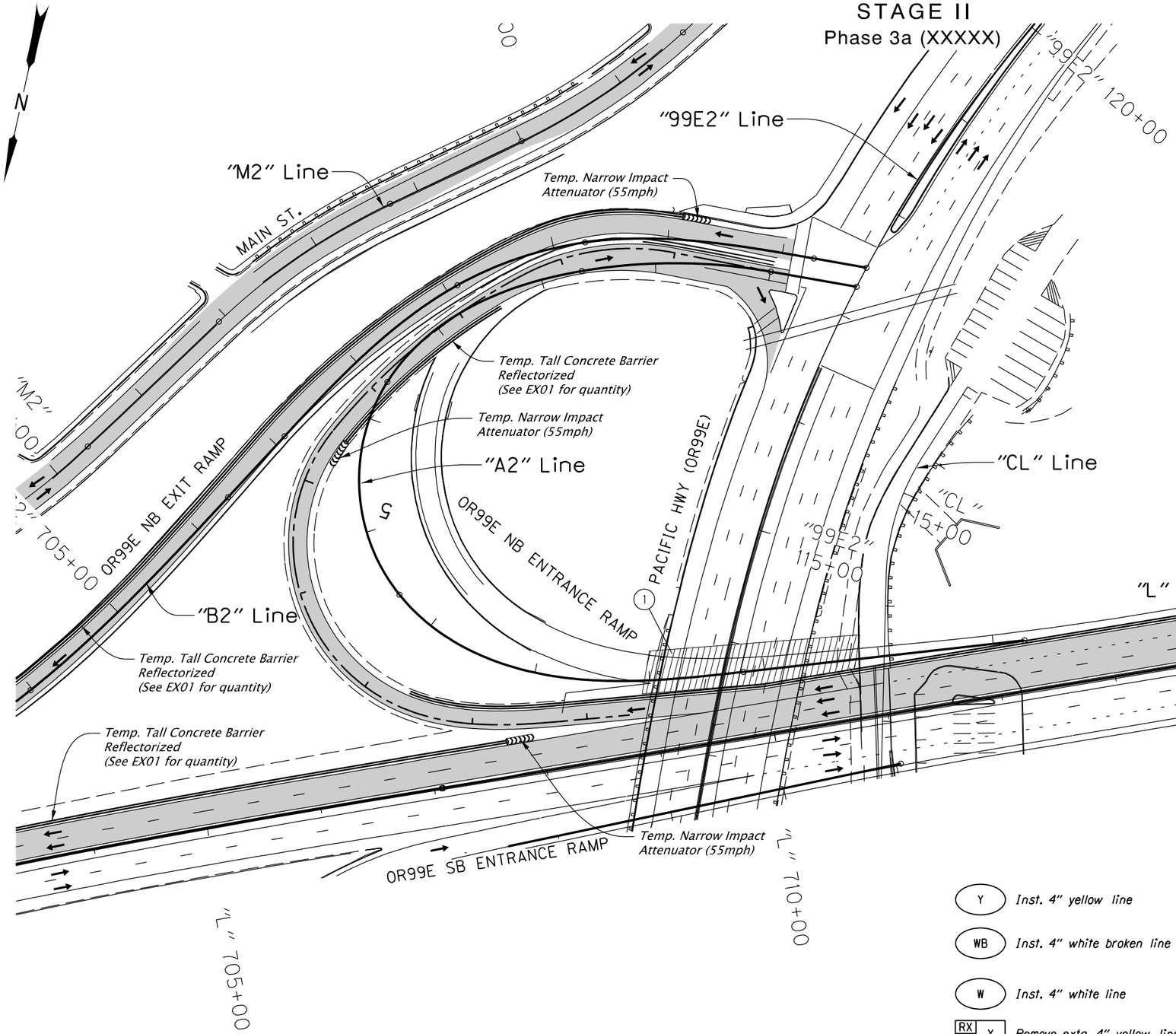
Rotation: 212.6746° 0'

STAGE II
Phase 3a (XXXXX)



Construction Notes:

1. *Complete Abernethy Bridge land span widening (Night Work for bridge demo and girder setting over OR99E)*
2. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Immediate grading limits*
- *Temp. Impact attenuator (barrels)*
- *Final grading limits*
- *Temp Impact attenuator (narrow site)*
- *Under traffic*
- *Temp. plastic drums on 40' max. spacing*
- *Existing ground*
- *Temp. plastic drums on 20' max. spacing*
- *Top of stage, temp. or final surfacing*

- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- W — *Inst. 4" white line*
- RX Y — *Remove extg. 4" yellow line*
- RX WB — *Remove extg. 4" white broken line*
- RX W — *Remove extg. 4" white line*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

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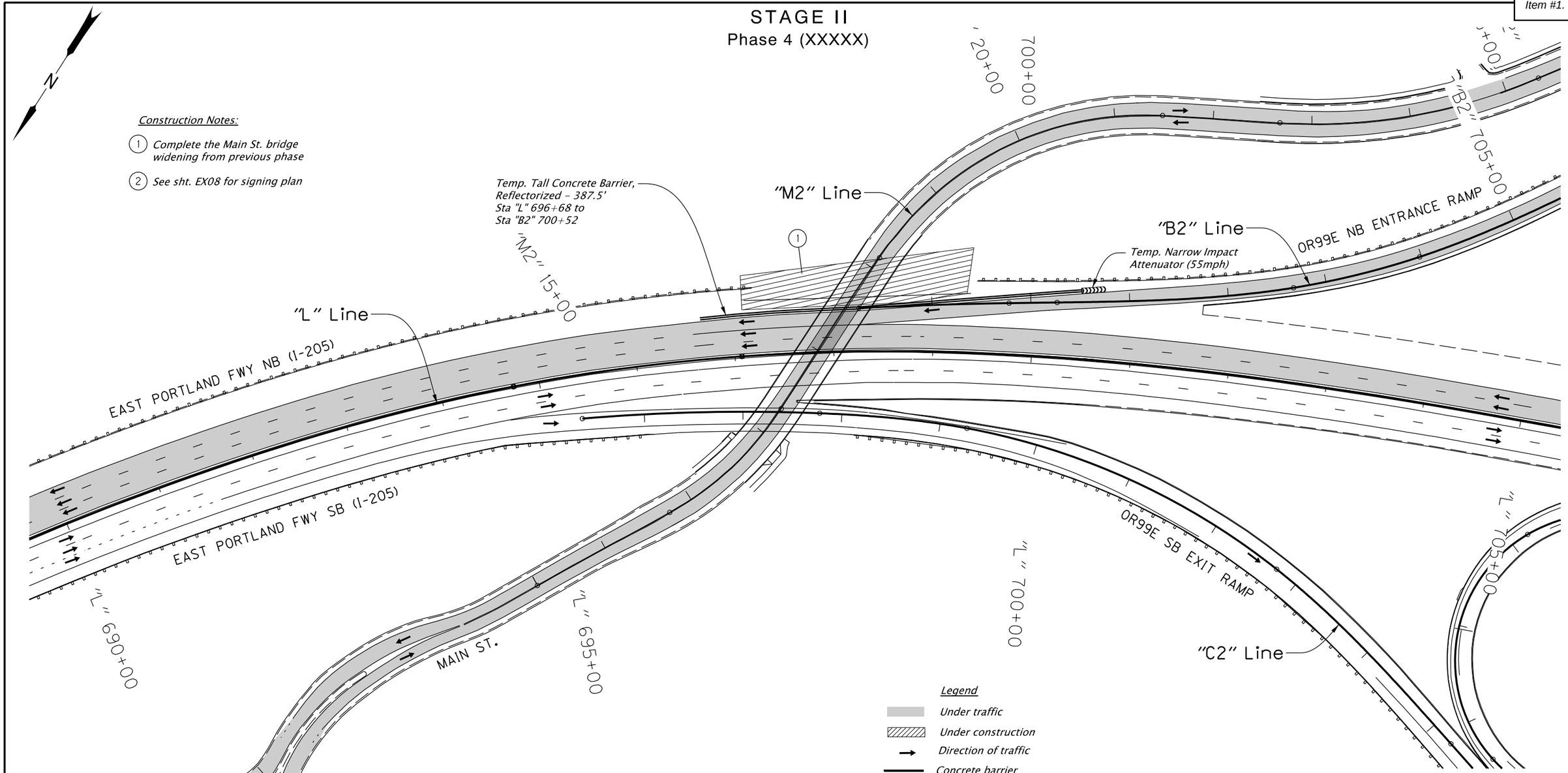
TZ_K19786_HDR_tc_02.dgn :: EX13 - S2P3a_1 2/11/2020 10:58:03 AM CDONOVAN

Rotation: 192.3209° 0'

STAGE II
Phase 4 (XXXXX)



RX WB	Remove extg. 4" white broken line	Y	Inst. 4" yellow line
RX Y	Remove extg. 4" yellow line	WB	Inst. 4" white broken line
RX W	Remove extg. 4" white line	W	Inst. 4" white line
RX WD	Remove extg. 4" white dotted line	W-2	Inst. 8" white line
RX W-2	Remove extg. 8" white line	WD	Inst. 4" white dotted line

Legend

- Under traffic
- Under construction
- Direction of traffic
- Concrete barrier
- Temp. Impact attenuator (barrels)
- Temp Impact attenuator (narrow site)
- Immediate grading limits
- Final grading limits
- Under traffic
- Existing ground
- Top of stage, temp. or final surfacing
- Temp. plastic drums on 40' max. spacing
- Temp. plastic drums on 20' max. spacing

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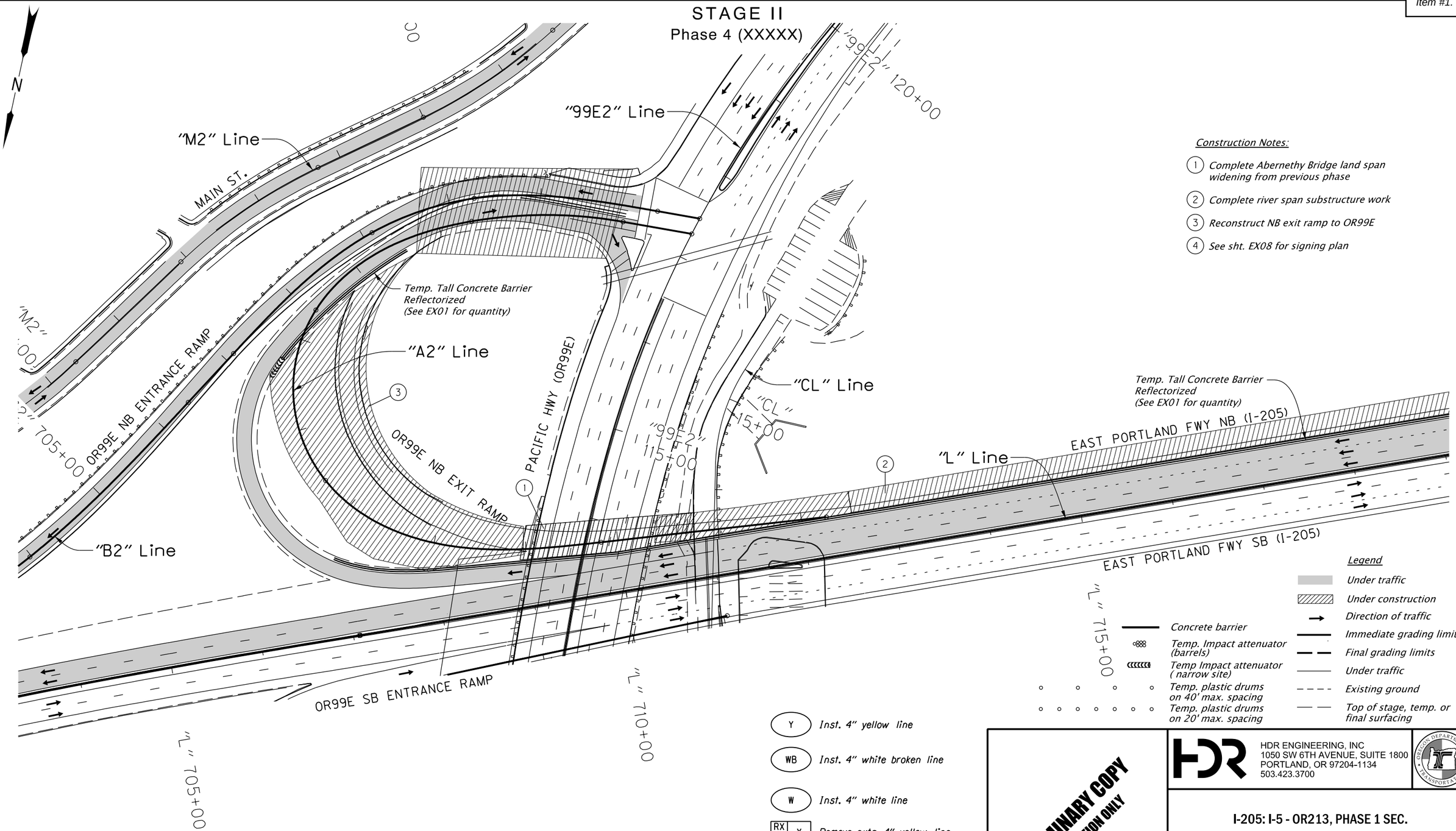
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN | SHEET NO.

STAGE II
Phase 4 (XXXXX)



Construction Notes:

1. *Complete Abernethy Bridge land span widening from previous phase*
2. *Complete river span substructure work*
3. *Reconstruct NB exit ramp to OR99E*
4. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator (barrels)*
- *Temp Impact attenuator (narrow site)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- W — *Inst. 4" white line*
- RX Y — *Remove extg. 4" yellow line*
- RX WB — *Remove extg. 4" white broken line*
- RX W — *Remove extg. 4" white line*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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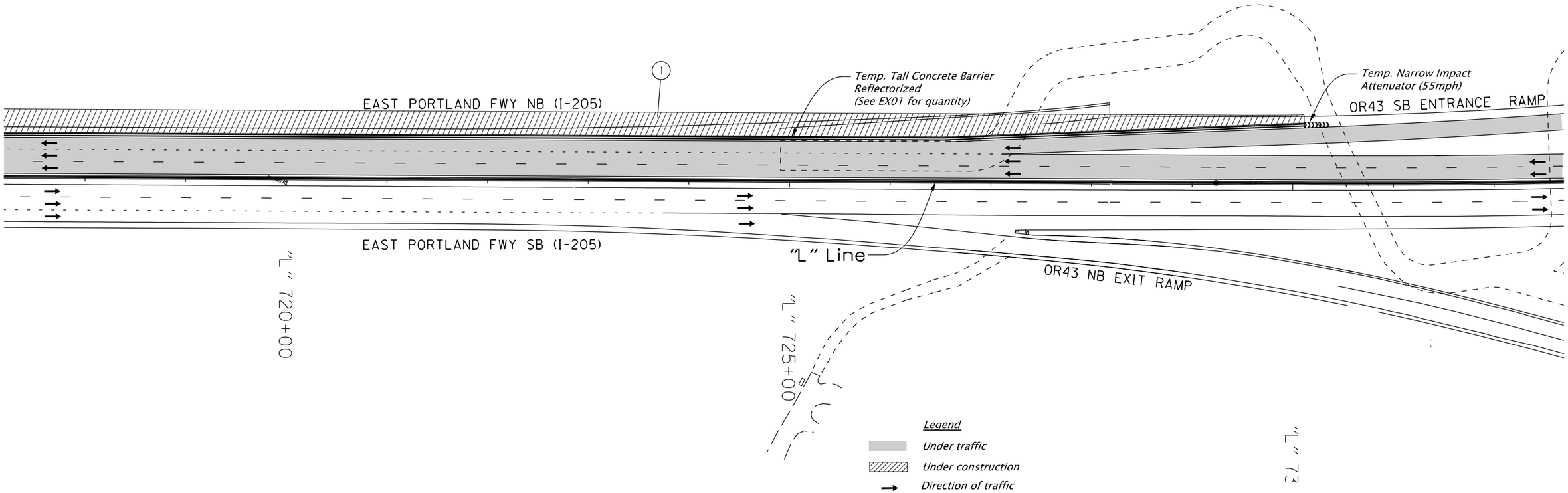
TZ_K19786_HDR_tc_02.dgn :: EX15 - S2P4_2 2/11/2020 10:58:05 AM CDONOVAN
Rotation: 192.3209°

STAGE II
Phase 4 (XXXXX)

N

Construction Notes:

1. *Complete river span substructure work*



Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp Impact attenuator (narrow site)*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

RX WB	*Remove extg. 4" white broken line*	Y	*Inst. 4" yellow line*
RX Y	*Remove extg. 4" yellow line*	WB	*Inst. 4" white broken line*
RX W	*Remove extg. 4" white line*	W	*Inst. 4" white line*
RX WD	*Remove extg. 4" white dotted line*	W-2	*Inst. 8" white line*
RX W-2	*Remove extg. 8" white line*	WD	*Inst. 4" white dotted line*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

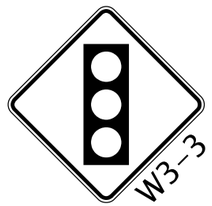
TZ_K19786_HDR_tc_02.dgn :: EX16 - S2P4_3 2/11/2020 10:58:07 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 202.0165°

0'

1



2

3

4

ROAD
CLOSED

R11-2
48x30
(Mount On TSS)

5

E5-2
48x36

6

R10-6
24x36

7

8

9

10

11

12

13

14

15

16

17

18

19

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_02.dgn :: EX17 - Temp. Signing_1 2/11/2020 10:58:08 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
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Rotation: 247.8868° 0'

N

STAGE IIA
Phase 1 (XXXXX)

OR99E SB ENTRANCE RAMP

OR99E NB EXIT RAMP

OR99E NB ENTRANCE RAMP

"D2" Line

Temp. Tall Concrete Barrier, Reflectorized – 375'
Sta "99E2" 109+00 to
Sta "99E2" 112+75

"A2" Line

PACIFIC HIGHWAY (OR99E) NB

"D2" 700+00

"99E2" 105+00

PACIFIC HIGHWAY (OR99E) SB

"99E2" Line

112.5' 10:1 Barrier Taper Rate

150' Buffer

350'

88' Shoulder Taper

"99E2" 115+00

"CL" 715+00

"99E2" 120+00

"L" 712+74

"L" 710+00

A

"CL" Line

"CL" 10+00

EAST PORTLAND FWY NB (I-205)

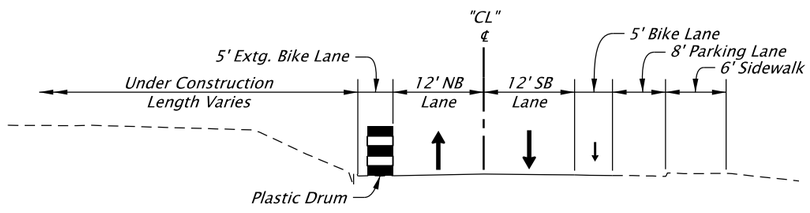
"L" Line

"L" 715+00

EAST PORTLAND FWY SB (I-205)

Construction Notes:

1. *Construct Parking Lot*
2. *See sht. EX08 for signing plan*



SECTION A-A

Legend

- *Under traffic*
- *Under construction*
- *Concrete Barrier*
- *Temp. Sign on Temp. Sign Support (TSS)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Direction of Traffic*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

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1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter
Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_02A.dgn :: EX20 – S2aP1 2/11/2020 11:04:41 AM CDONOVAN

Rotation: 270° 0'

STAGE IIA
Phase 2 (XXXXX)

N

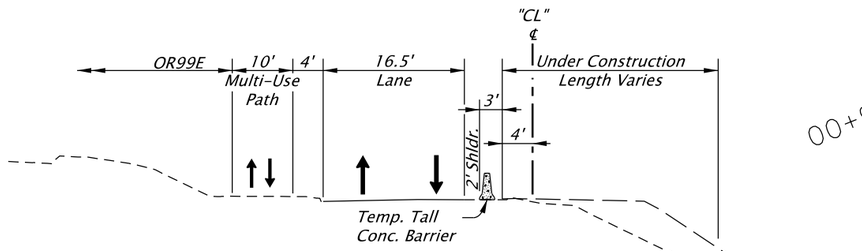
OR99E SB ENTRANCE RAMP
OR99E NB EXIT RAMP
OR99E NB ENTRANCE RAMP
"D2" Line
"A2" Line
PACIFIC HIGHWAY (OR99E) NB
PACIFIC HIGHWAY (OR99E) SB
"D2" 700+00
"99E2" 105+00
"99E2" 110+00
"99E2" 115+00
"99E2" 120+00
"D2" 710+00
"A2" 710+00
"99E2" Line
"CL" Line
"L" 712+74
"L" 715+00
"CL" 10+00
50' 8:1 Barrier Taper Rate
75' Buffer
100' Taper
100'
100'
EAST PORTLAND FWY NB (I-205)
EAST PORTLAND FWY SB (I-205)
"L" Line
B
B

Construction Notes:

1. *Construct south side of Clackamette Drive*
2. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Concrete Barrier*
- *Temp. Sign on Temp. Sign Support (TSS)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Direction of Traffic*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*



SECTION B-B

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter
Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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TZ_K19786_HDR_tc_02A.dgn :: EX21 - S2aP2 2/11/2020 11:04:42 AM CDONOVAN

Rotation: 270° 0'

N

STAGE IIA
Phase 3 (XXXXX)

OR99E SB ENTRANCE RAMP
OR99E NB EXIT RAMP
OR99E NB ENTRANCE RAMP

"D2" Line
"A2" Line
"99E2" Line
"CL" Line
"L" Line

PACIFIC HIGHWAY (OR99E) NB
PACIFIC HIGHWAY (OR99E) SB
EAST PORTLAND FWY NB (I-205)
EAST PORTLAND FWY SB (I-205)

"D2" 700+00
"99E2" 105+00
"99E2" 110+00
"D2" 710+00
"L" 712+74
"L" 715+00
"CL" 5+00
"CL" 10+00
"99E2" 120+00

RX ND
From "CL" 0+79 to "CL" 3+47

ND
From "CL" 0+79 to "CL" 5+89

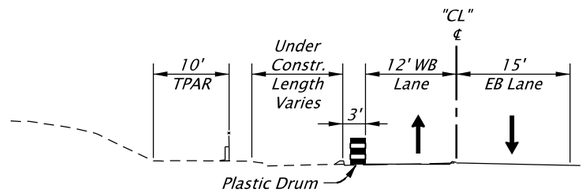
100' 100'

Construction Notes:

1. *Complete north side of Clackamette Drive*
2. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Concrete Barrier*
- *Temp. Sign on Temp. Sign Support (TSS)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Direction of Traffic*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*



SECTION C-C

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter
Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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Rotation: 270° 0'

STAGE III
Phase 1 (XXXXX)

RX WB — Remove extg. 4" white broken line

RX Y — Remove extg. 4" yellow line

RX W — Remove extg. 4" white line

RX W-2 — Remove extg. 8" white line

WB R-40 — Inst. 4" white broken line supplementation

Y — Inst. 4" yellow line

W — Inst. 4" white line

W-2 — Inst. 8" white line

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

"L" Line

"M2" Line

"B2" Line

"C2" Line

OR99E NB ENTRANCE RAMP

OR99E SB EXIT RAMP

MAIN ST.

"L" 690+00

"L" 695+00

"C2" 696+00

"L" 700+00

"C2" 700+00

Station "L" 695+00
Begin Striping Taper

330' Striping Taper
(55:1)

Station "L" 698+31
End Striping Taper

From "L" 695+69
to "L" 697+57
RX W-2 W-2

From "L" 695+00
to "L" XXX+XX
RX Y Y

From "L" 695+17
to "L" XXX+XX
RX WB WB R-40 WB R-40

From "L" 697+57
to "L" XXX+XX
W

From "L" 699+34
to "L" XXX+XX
RX W

Temp. Double Impact
Attenuator (55mph)

From "L" 697+69
to "L" 699+34
RX W-2

From "C2" 698+26
to "C2" 700+29
RX Y

From "C2" 697+57
to "C2" 702+88
Y

From "C2" 695+91
to "C2" 701+91
RX W

Temp. Tall Concrete Barrier,
Reflectorized - 662.5'
Sta "C2" 696+27 to
Sta "C2" 705+85

Temp. Tall Concrete Barrier,
Reflectorized - 1025'
Sta "L" 696+30 to
Sta "L" 706+64

From "C2" 695+91
to "C2" 704+24
W

RX WB

220' Striping Taper
(55:1)

Station "CL" 695+91
Begin Striping Taper

Station "CL" 698+13
End Striping Taper

Station "L" 702+41
Begin Striping Taper

180' Striping Taper
(45:1)

Station "L" 704+24
End Striping Taper

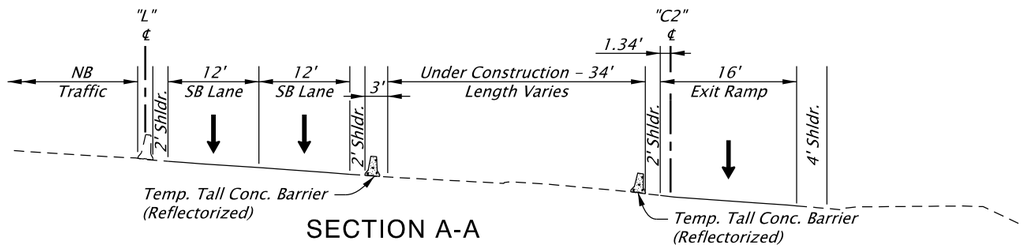
A

A

1

Construction Notes:

1. Construct I-205 SB widening from OR99E exit ramp to OR99E entrance ramp
2. See sht. EX08 for signing plan



SECTION A-A

Legend

- Under traffic
- Under construction
- Concrete Barrier
- Temp. plastic drums on 40' max. spacing
- Temp. plastic drums on 20' max. spacing
- Direction of Traffic
- Existing ground
- Top of stage, temp. or final surfacing
- Temporary Impact Attenuator (Narrow Site)

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

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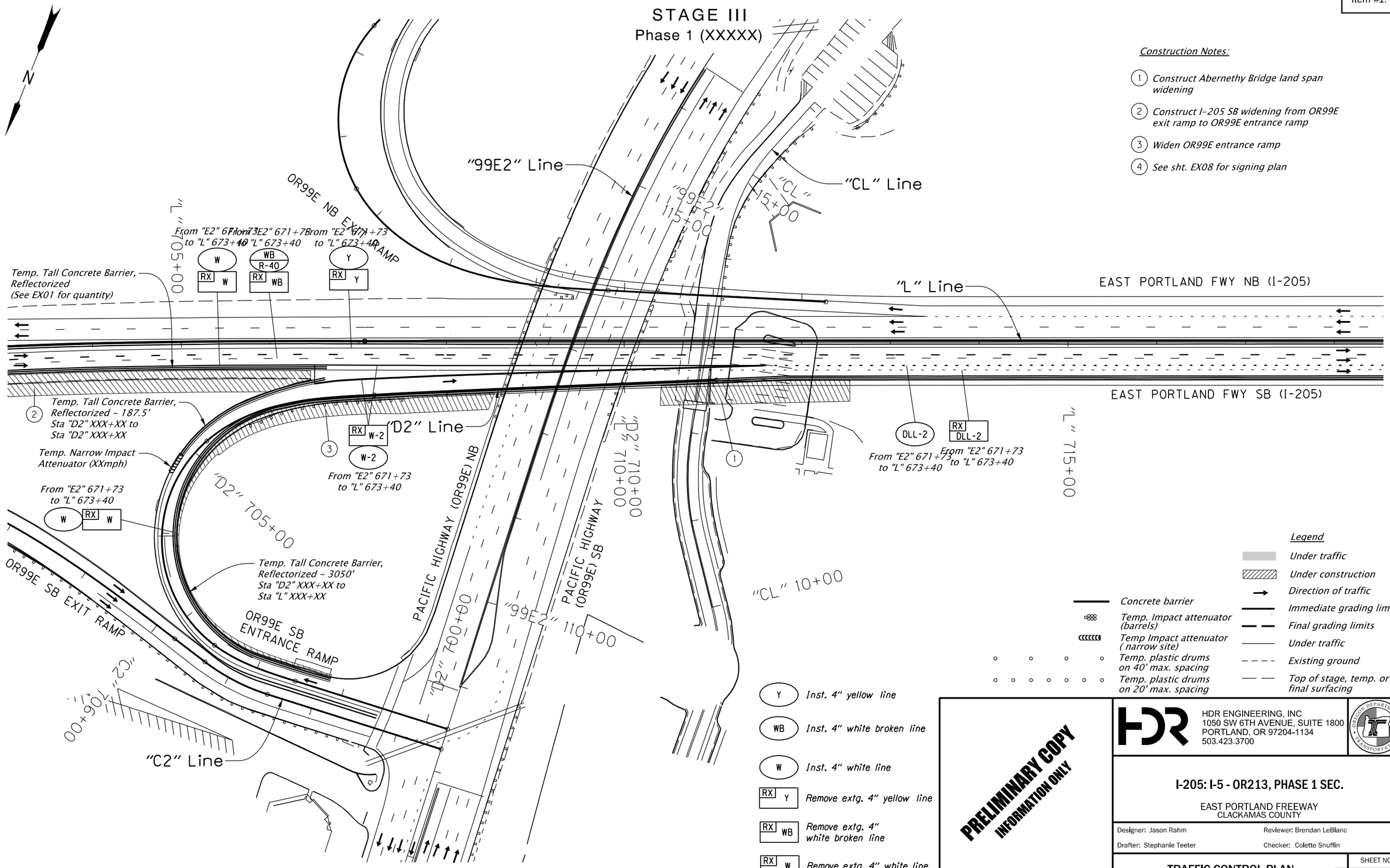
STAGE III
Phase 1 (XXXXX)



Construction Notes:

1. *Construct Abernethy Bridge land span widening*
2. *Construct I-205 SB widening from OR99E exit ramp to OR99E entrance ramp*
3. *Widen OR99E entrance ramp*
4. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Immediate grading limits*
- *Temp. Impact attenuator (barrels)*
- *Final grading limits*
- *Temp Impact attenuator (narrow site)*
- *Under traffic*
- *Temp. plastic drums on 40' max. spacing*
- *Existing ground*
- *Temp. plastic drums on 20' max. spacing*
- *Top of stage, temp. or final surfacing*

- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- W — *Inst. 4" white line*
- RX Y — *Remove extg. 4" yellow line*
- RX WB — *Remove extg. 4" white broken line*
- RX W — *Remove extg. 4" white line*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

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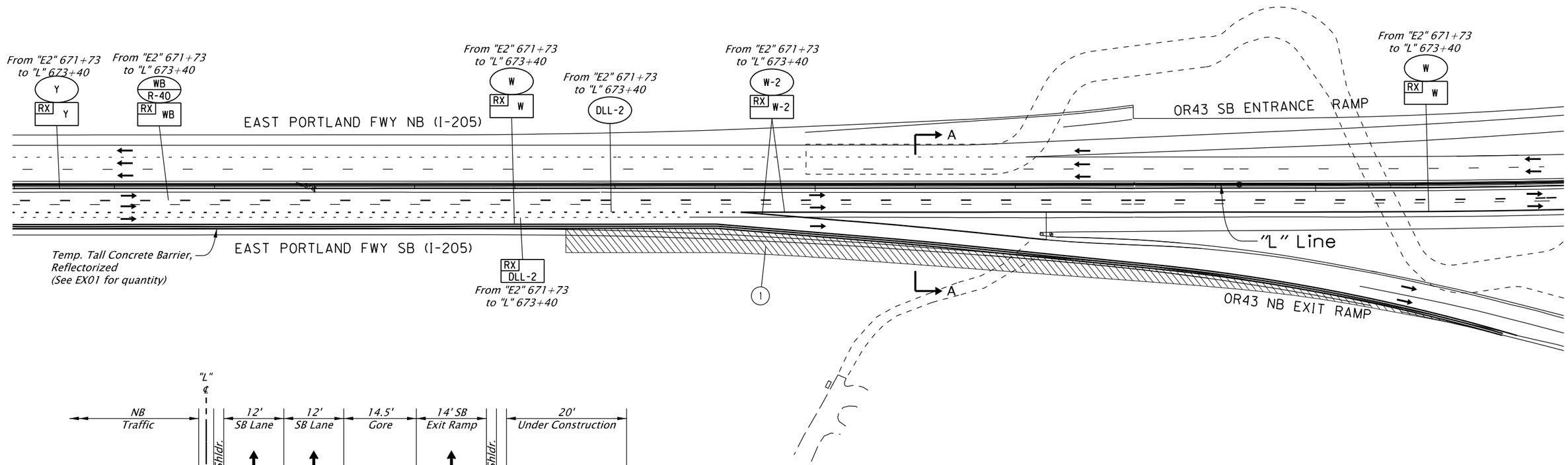
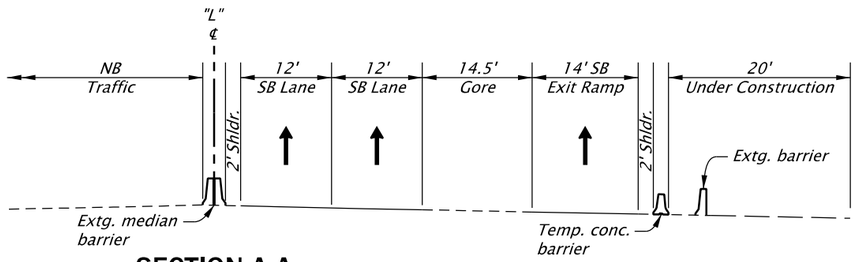
STAGE III
Phase 1 (XXXXX)

N

Construction Notes:

1. *Construct land span widening of the Abernethy Bridge*
2. *Construct the widening of the OR43 SB exit ramp*
3. *See sht. EX08 for signing plan*





SECTION A-A

- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- W — *Inst. 4" white line*
- RX Y — *Remove extg. 4" yellow line*
- RX WB — *Remove extg. 4" white broken line*
- RX W — *Remove extg. 4" white line*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Concrete barrier*
- *Temp. Impact attenuator (barrels)*
- *Temp Impact attenuator (narrow site)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

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STAGE III
Phase 1 (XXXXX)

Construction Notes:

1. *Construct the widening of the OR43 SB exit ramp*
2. *See sht. EX08 for signing plan*

N

OR43 SB ENTRANCE RAMP

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

"L" Line

From "E2" 671+73 to "L" 673+40
RX W
W

From "E2" 671+73 to "L" 673+40
WB
R-40
RX WB

From "E2" 671+73 to "L" 673+40
Y
RX Y

1

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

OR43 NB EXIT RAMP

RX W
W

From "E2" 671+73 to "L" 673+40

"L" 730+00

305' Striping Taper (55:1)

Station "L" XXX+XX Begin Striping Taper

Station "L" XXX+XX End Striping Taper

Legend

- *Under traffic*
- *Under construction*
- *Concrete Barrier*
- *Temp. Sign on Temp. Sign Support (TSS)*
- *Direction of Traffic*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

RX WB — *Remove extg. 4" white broken line*

RX Y — *Remove extg. 4" yellow line*

RX W — *Remove extg. 4" white line*

Y — *Inst. 4" yellow line*

WB — *Inst. 4" white broken line*

W — *Inst. 4" white line*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

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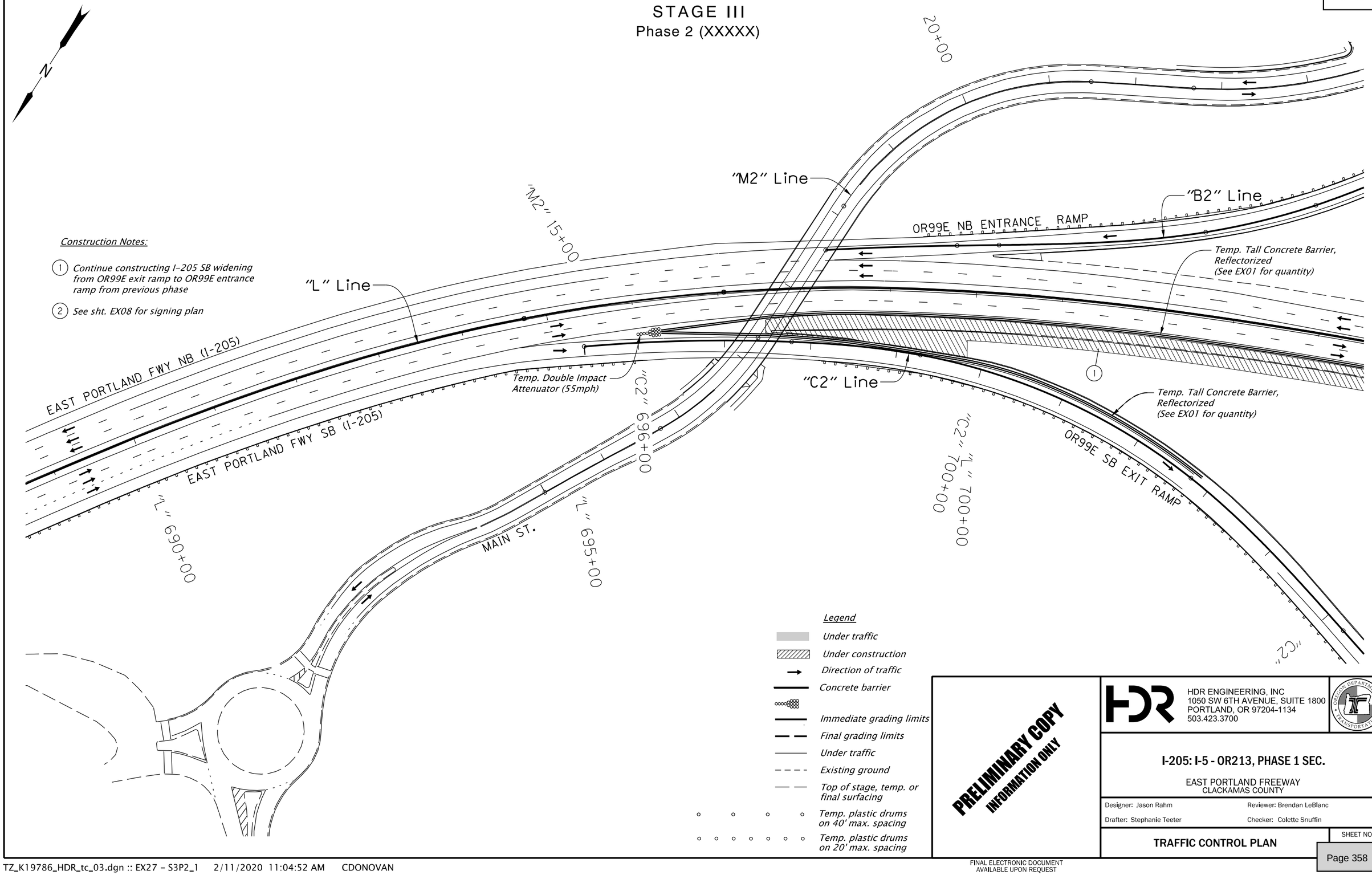
STAGE III
Phase 2 (XXXXX)



Construction Notes:

1. *Continue constructing I-205 SB widening from OR99E exit ramp to OR99E entrance ramp from previous phase*
2. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

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STAGE III
Phase 2 (XXXXX)

N

OR99E NB EXIT RAMP

"99E2" Line

"CL" Line

"L" 705+00

"99E2" 15+00

"CL" 15+00

"L" Line

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

"L" 715+00

"P2" 710+00

"CL" 10+00

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

Temp. Narrow Impact Attenuator (XXmph)

Temp. Tall Concrete Barrier, Reflectorized – 2112.50' Sta "D2" XXX+XX to Sta "D2" XXX+XX

"D2" 705+00

"D2" Line

OR99E SB EXIT RAMP

OR99E SB ENTRANCE RAMP

PACIFIC HIGHWAY (OR99E) NB

PACIFIC HIGHWAY (OR99E) SB

"D2" 700+00

"99E2" 110+00

"C2" 706+00

"C2" Line

Construction Notes:

1. *Continue constructing Abernethy Bridge land span widening from previous phase*
2. *Continue constructing I-205 SB widening from OR99E exit ramp to OR99E entrance ramp from previous phase*
3. *Continue widening OR99E entrance ramp from previous phase*
4. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator (barrels)*
- *Temp Impact attenuator (narrow site)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- W — *Inst. 4" white line*
- RX Y — *Remove extg. 4" yellow line*
- RX WB — *Remove extg. 4" white broken line*
- RX W — *Remove extg. 4" white line*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

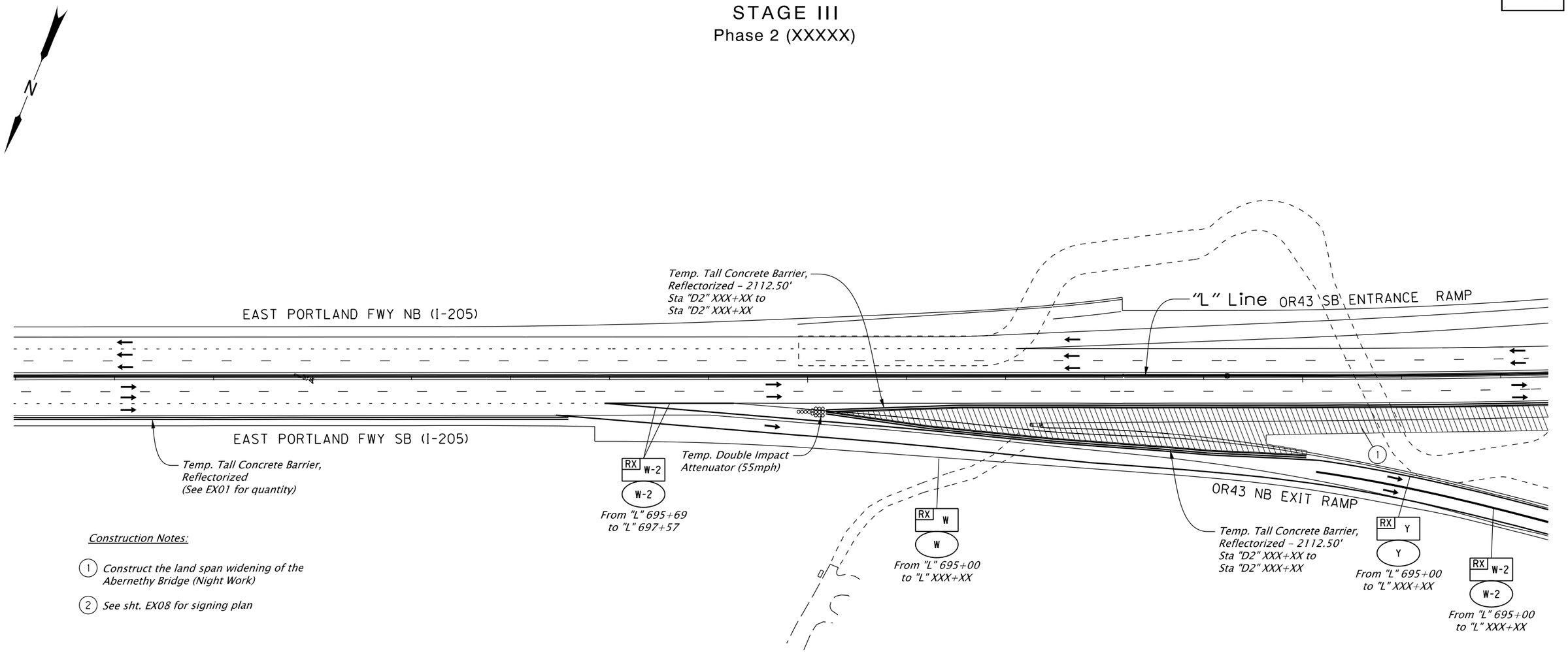
TRAFFIC CONTROL PLAN

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TZ_K19786_HDR_tc_03.dgn :: EX28 – S3P2_2 2/11/2020 11:04:53 AM CDONOVAN

STAGE III
Phase 2 (XXXXX)



Construction Notes:

1. *Construct the land span widening of the Abernethy Bridge (Night Work)*
2. *See sht. EX08 for signing plan*

RX WB	*Remove extg. 4" white broken line*	Y	*Inst. 4" yellow line*
RX Y	*Remove extg. 4" yellow line*	WB	*Inst. 4" white broken line*
RX W	*Remove extg. 4" white line*	W	*Inst. 4" white line*
RX WD	*Remove extg. 4" white dotted line*	W-2	*Inst. 8" white line*
RX W-2	*Remove extg. 8" white line*	WD	*Inst. 4" white dotted line*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

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STAGE III
Phase 2 (XXXXX)

Construction Notes:

1. *Construct the land span widening of the Abernethy Bridge (Night Work)*
2. *See sht. EX08 for signing plan*

OR43 SB ENTRANCE RAMP

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

"L" Line

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

OR43 NB EXIT RAMP

"L" 730+00

RX W / W — *From "L" 695+00 to "L" XXX+XX*

RX W-2 / W-2 — *From "L" 695+69 to "L" 697+57*

RX Y / Y — *From "L" 695+00 to "L" XXX+XX*

RX WB	*Remove extg. 4" white broken line*	Y	*Inst. 4" yellow line*
RX Y	*Remove extg. 4" yellow line*	WB	*Inst. 4" white broken line*
RX W	*Remove extg. 4" white line*	W	*Inst. 4" white line*
RX WD	*Remove extg. 4" white dotted line*	W-2	*Inst. 8" white line*
RX W-2	*Remove extg. 8" white line*	WD	*Inst. 4" white dotted line*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

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TZ_K19786_HDR_tc_03.dgn :: EX30 - S3P2_4 2/11/2020 11:04:54 AM CDONOVAN

STAGE III
Phase 3 (XXXXX)

N

"99E2" Line

"CL" Line

OR99E NB EXIT RAMP

"L" 705+00

"99E2" 115+00

"CL" 115+00

"L" Line

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

"D2" Line

"D2" 705+00

"C2" Line

OR99E SB EXIT RAMP

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

OR99E SB ENTRANCE RAMP

"C2" 706+00

PACIFIC HIGHWAY (OR99E) NB

"D2" 700+00

"D2" 710+00

PACIFIC HIGHWAY (OR99E) SB

"99E2" 110+00

"CL" 10+00

"L" 715+00

1

Construction Notes:

1. *Continue constructing Abernethy Bridge land span widening from previous phase*
2. *See sht. EX08 for signing plan*

Legend

- *Concrete barrier*
- *Temp. Impact attenuator (barrels)*
- *Temp Impact attenuator (narrow site)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

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TZ_K19786_HDR_tc_03.dgn :: EX31 – S3P3_1 2/11/2020 11:04:54 AM CDONOVAN

STAGE III
Phase 3 (XXXXX)

Construction Notes:

1. *Continue constructing Abernethy Bridge land span widening from previous phase*
2. *See sht. EX08 for signing plan*

N

OR43 SB ENTRANCE RAMP

"L" Line

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

OR43 NB EXIT RAMP

"L" 730+00

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_03.dgn :: EX32 - S3P3_2 2/11/2020 11:04:55 AM CDONOVAN

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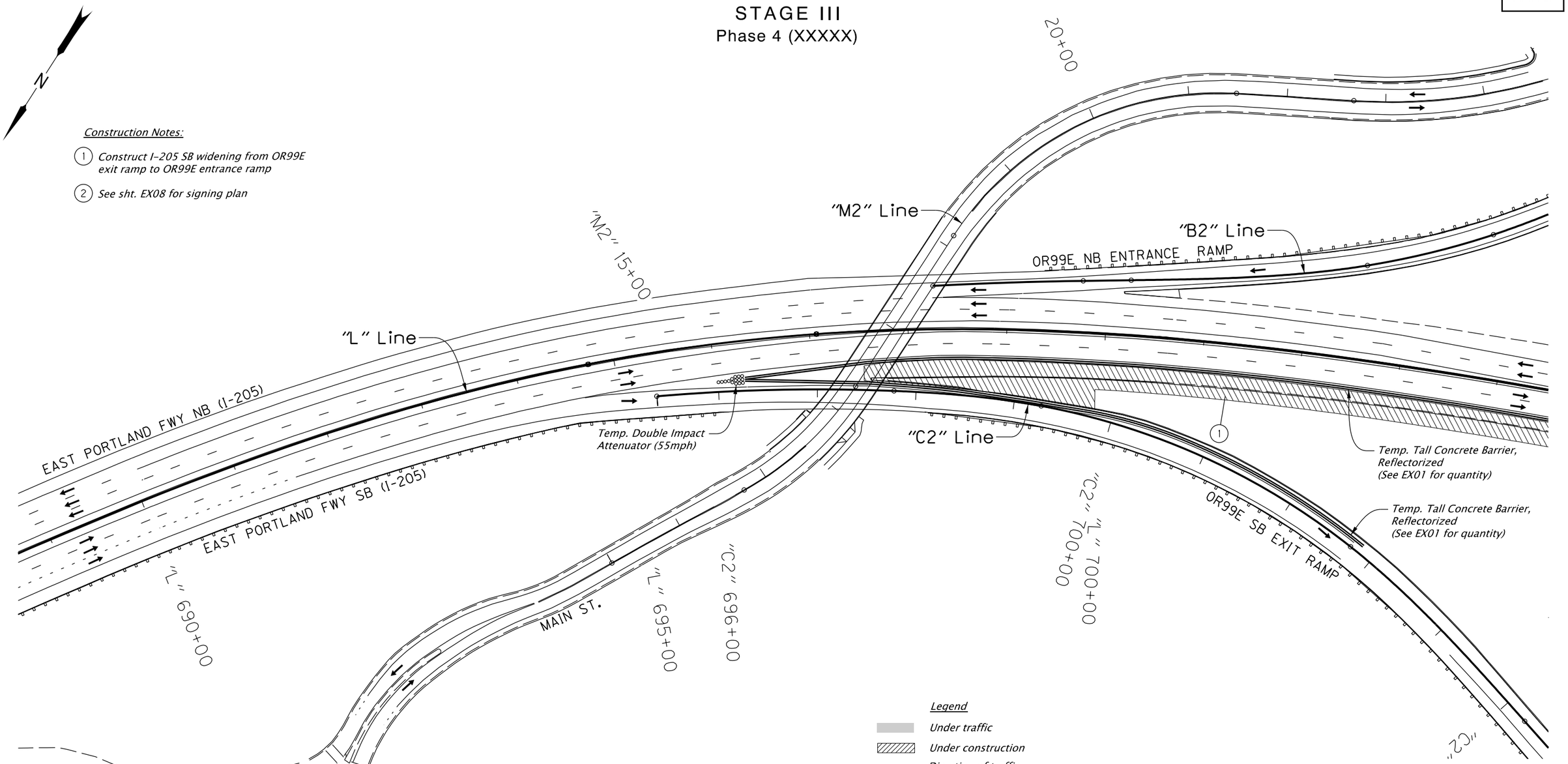
STAGE III
Phase 4 (XXXXX)

N

Construction Notes:

1. *Construct I-205 SB widening from OR99E exit ramp to OR99E entrance ramp*
2. *See sht. EX08 for signing plan*



Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_03.dgn :: EX33 - S3P4_1 2/11/2020 11:04:55 AM CDONOVAN

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STAGE III
Phase 4 (XXXXX)

N

"L" 705+00

OR99E NB EXIT RAMP

"99E2" Line

"99E2" 15+00

"CL" Line

"CL" 15+00

From "L" 695+69
to "L" 697+57
W-2 RX W-2

"L" Line

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

2 Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

Temp. Narrow Impact Attenuator (55mph)

1

Temp. Tall Concrete Barrier, Reflectorized – 1650'
Sta "D2" XXX+XX to
Sta "D2" XXX+XX

"L" 715+00

River Span Widening???

3 "D2" Line

"D2" 705+00

From "L" 695+00
to "L" XXX+XX
RX W W

From "L" 695+00
to "L" XXX+XX
Y RX Y

OR99E SB EXIT RAMP

OR99E SB ENTRANCE RAMP

PACIFIC HIGHWAY (OR99E) NB

PACIFIC HIGHWAY (OR99E) SB

"D2" 710+00

"D2" 700+00

"99E2" 110+00

"C2" 706+00

"C2" Line

"CL" 10+00

...ncrete Barrier,
– 625'
...XX to
...XX

Construction Notes:

1. *Construct Abernethy Bridge land span widening*
2. *Construct I-205 SB widening from OR99E exit ramp to OR99E entrance ramp*
3. *Widen OR99E entrance ramp*
4. *See sht. EX08 for signing plan*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator (barrels)*
- *Temp Impact attenuator (narrow site)*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*

- Y — *Inst. 4" yellow line*
- WB — *Inst. 4" white broken line*
- W — *Inst. 4" white line*
- RX Y — *Remove extg. 4" yellow line*
- RX WB — *Remove extg. 4" white broken line*
- RX W — *Remove extg. 4" white line*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm
Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter
Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

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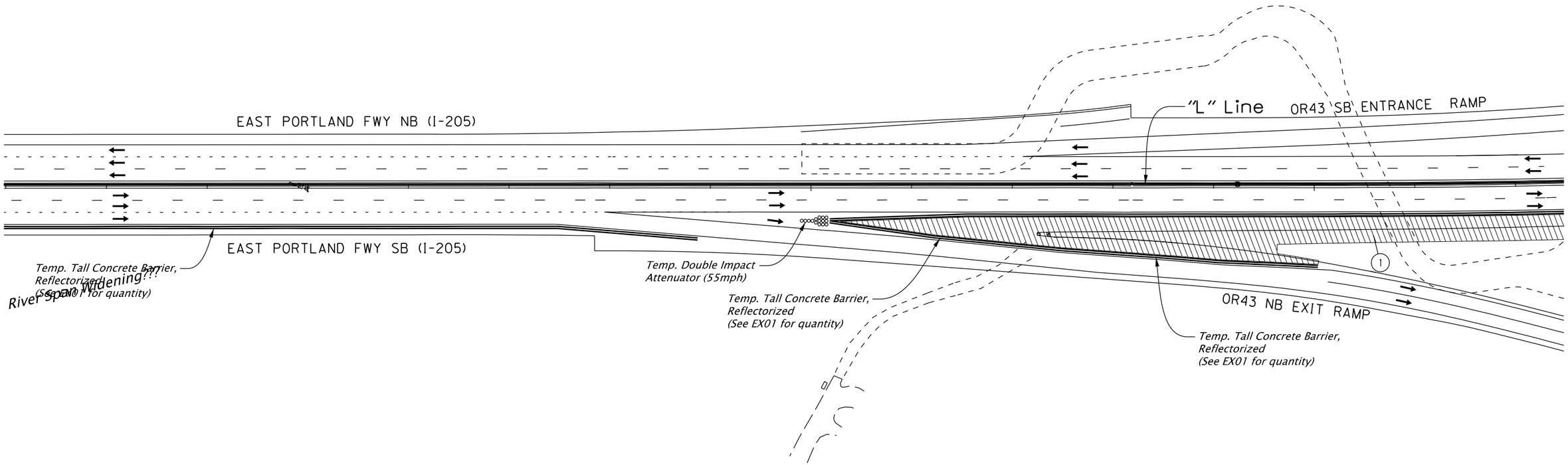
STAGE III
Phase 4 (XXXXX)

N

Construction Notes:

1. *Construct the land span widening of the Abernethy Bridge (Night Work)*
2. *See sht. EX08 for signing plan*



RX WB	*Remove extg. 4" white broken line*	Y	*Inst. 4" yellow line*
RX Y	*Remove extg. 4" yellow line*	WB	*Inst. 4" white broken line*
RX W	*Remove extg. 4" white line*	W	*Inst. 4" white line*
RX WD	*Remove extg. 4" white dotted line*	W-2	*Inst. 8" white line*
RX W-2	*Remove extg. 8" white line*	WD	*Inst. 4" white dotted line*

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

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STAGE III
Phase 4 (XXXXX)

N

OR43 SB ENTRANCE RAMP

"L" Line

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

Temp. Tall Concrete Barrier, Reflectorized (See EX01 for quantity)

OR43 NB EXIT RAMP

"L" 730+00

1

Legend

- *Under traffic*
- *Under construction*
- *Direction of traffic*
- *Concrete barrier*
- *Temp. Impact attenuator*
- *Immediate grading limits*
- *Final grading limits*
- *Under traffic*
- *Existing ground*
- *Top of stage, temp. or final surfacing*
- *Temp. plastic drums on 40' max. spacing*
- *Temp. plastic drums on 20' max. spacing*

Construction Notes:

1. *Construct the land span widening of the Abernethy Bridge (Night Work)*
2. *See sht. EX08 for signing plan*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: Brendan LeBlanc
Drafter: Stephanie Teeter | Checker: Colette Snuffin

TRAFFIC CONTROL PLAN

SHEET NO.

TZ_K19786_HDR_tc_03.dgn :: EX36 – S3P4_4 2/11/2020 11:04:57 AM CDONOVAN

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GENERAL NOTES:

1. Plant all trees beyond "clear zone"; verify with engineer prior to planting. Engineer shall approve all work outside designated work limits prior to construction. Do not plant trees within 20' of a bridge/viaduct or within 10' of a trail, waterline, or stormwater line.

2. Locate underground utility lines prior to any digging or ground disturbance.

3. Adjust planting locations so vegetation does not conflict with above- or below-ground utilities.

4. Adjust plant locations to avoid conflict with traffic sight lines and signs or other appurtenances. Verify location changes with Engineer.

5. All dimensions shown on details are minimum dimensions.

6. See Plant Schedule FA02, FA03 for plants and landscape material.

7. Plan is schematic. Planting may be adjusted to fit site conditions with prior Agency approval.

8. Lay out plant material in groups as indicated in plant and material schedule, details and plan sheets.

9. Stake all planting areas for review and approval by Engineer prior to planting.

10. Do not install plant material without prior inspection and approval as required by 01040.19(d).

11. Comply with Oregon Standard Specifications for Construction and Special Provisions for construction applicable to this project.

12. Thoroughly water all plant material (saturated backfill) within 24-hours of installation regardless of rainfall events.

13. Verify field conditions prior to construction with any adjustments to the plans made as directed by the Engineer.

14. Protect all trees and land areas marked for protection. Do not damage natural (non-invasive) vegetation.

15. Comply with erosion control measures per Section 00280 and all applicable permits during construction.

16. Where discrepancies between the Plant Schedule and the plans exist, plans shall prevail.

17. See Special Provision 01030.13(f) for seed mixes

18. Prepare all planting and seeding areas per Method B, see 01040.48(b) in the Oregon Standard Specifications for Construction.

19. Include Mycorrhizal innoculates for all seeding and individual plant installations. Apply per manufacturer's recommendation.

20. Flag all planted tree species with color-coded identification flags.

Mitigation and Restoration Permitting Requirements

	Area (square feet)							Plant Totals	
	FA08	FA10	FA12	FA13*	FA14	FA15	TOTAL	TREES	SHRUBS
DSL Permit Requirements	-	-	-	19,187	42,555	148,187	209,929	1,004	2,031
NROD Permit Requirements	50,776	53,500	-	4,190	-	-	108,466	745*	3,954
							TOTAL	1,661	5,985

*DSL Restoration Numbers for FA13 are applied to NROD Permit Mitigation Total Requirements

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1125 SE Madison St, Suite 201
Portland, OR 97214
503.239.0600

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Plant and Material Schedule

Trees

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
TARME	*Arbutus menziesii*	Madrone	1/2" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	3	-	-	-	1	-	4
TCADE	*Calocedrus decurrens*	Incense Cedar	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	6	8	14
TCONU	*Cornus nuttallii*	Pacific Dogwood	1" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	7	-	7
TPIPO	*Pinus ponderosa 'Willamette Valley'*	Willamette Ponderosa Pine	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	42	14	99	79	26	-	29	23	300
TPSME	*Pseudotsuga menziesii*	Douglas Fir	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	29	-	29
TQUCH	*Quercus chrysolepis*	Canyon Live Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	34	-	-	-	15	49
TQUGA	*Quercus garryana*	Oregon White Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	5	69	12	-	24	12	116
TULAM	*Ulmus americana 'Valley Forge'*	Valley Forge American Elm	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	7	-	-	-	7
TUMCA	*Umbellularia californica*	Oregon Myrtle	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	31	-	-	-	-	31

Broadleaf Evergreen Shrubs

Deciduous Shrubs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
ARCO	*Arctostaphylos columbiana x 'Patula'*	Manzanita	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	214	-	-	-	-	214
COSE	*Cornus sericea*	Red Osier Dogwood	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	1,005	-	-	-	-	1,005
FRCA	*Frangula californica 'Eve Case'*	Eve Case Coffeeberry	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	51	-	-	-	-	51
GAEL	*Garrya elliptica 'James Roof'*	Wavyleaf Silktassel	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	61	-	-	-	-	61
MAAQ	*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	397	-	-	-	-	397
MOCA	*Morella californica*	Pacific Wax Myrtle	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	57	-	-	-	-	57

Ornamental Grasses and Forbs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	TOTAL
-	*Asclepias speciosa*	Showy milkweed	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Calamagrostis x acutiflora 'Karl Foerster'*	Feather reed grass	12" Height	2' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Carex glauca*	Blue Sedge	12" Height	1' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Deschampsia cespitosa 'Goldtau'*	Tufted hairgrass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Juncus patens 'Carmen's Grey'*	Carman's Grey Blue Rush	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Solidago 'Goldkind'*	Golden Baby goldenrod	12" Height	1' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Stipa gigantea*	Giant feather grass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Veratrum californicum*	California false hellebore	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248

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503.239.0600

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

SHEET NO.

ROADSIDE DEVELOPMENT GENERAL NOTES

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

ROADSIDE DEVELOPMENT PLANT SCHEDULE

City of Oregon NROD Mitigation Trees and Shrubs

Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA10	TOTAL
NROD Trees & Shrubs	*Arbutus menziesii*	Pacific Madrone	1/2" Calip.	13.5' O.C.	Bareroot	20%		64	40	104
	Pinus ponderosa var. willamettensis	Ponderosa Pine	18" Height	13.5' O.C.	Bareroot	30%		96	60	156
	Quercus garryana	Oregon White Oak	1/2" Calip.	13.5' O.C.	Bareroot	30%		96	60	156
	Rhamnus purshiana	Cascara	1/2" Calip.	13.5' O.C.	Bareroot	10%		32	20	52
	Salix scouleriana	Scouler's Willow	1/2" Calip.	13.5' O.C.	Bareroot	10%		32	20	52
	Arctostaphylos columbiana	Hairy Manzanita	12" Height	6' O.C.	Bareroot	20%		277	174	451
	Berberis (Mahonia) aquifolium	Tall Oregongrape	12" Height	6' O.C.	Bareroot	30%		416	261	677
	Ceanothus velutinus	Snowbrush	12" Height	6' O.C.	Bareroot	20%		277	174	451
	Corylus cornuta var. Californica	Western Hazelnut	12" Height	6' O.C.	Bareroot	15%		208	130	338
	Ribes lobbii	Gummy Gooseberry	12" Height	6' O.C.	Bareroot	15%		208	130	338
NROD Shrubs	*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Min.	6' O.C.	Bareroot	20%		-	118	118
	Cornus sericea	Redtwig Dogwood	12" Min.	6' O.C.	Bareroot	10%		-	177	177
	Ribes sanguineum	Redflowering Currant	12" Min.	6' O.C.	Bareroot	15%		-	118	118
	Rubus parviflorus	Thimbleberry	12" Min.	6' O.C.	Bareroot	15%		-	89	89
	Spirea douglasii	Douglas Spirea	12" Min.	6' O.C.	Bareroot	15%		-	89	89
	Symphoricarpos albus	Snowberry	12" Min.	6' O.C.	Bareroot	25%		-	148	148

Upland Riparian Restoration Mix

Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX A: Trees	*Acer macrophyllum*	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	8%		-	-	36	36
	Arbutus menziesii	Pacific Madrone	1/2" Calip.	15'-20' Min.	Container	15%		-	-	67	67
	Calocedrus decurrens	Incense Cedar	18" Height	30' Min.	Bareroot	8%		-	-	36	36
	Corylus cornuta var. californica	Western Hazelnut	1/2" Calip.	15'-20' Min.	Bareroot	15%		-	-	67	67
	Cornus nuttallii	Western Dogwood	1/2" Calip.	15'-20' Min.	Bareroot	5%		-	-	22	22
	Quercus garryana	Oregon White Oak	1/2" Calip.	15'-20' Min.	Bareroot	26%		-	-	116	116
	Pseudotsuga menziesii	Douglas Fir	18" Height	30' Min.	Bareroot	8%		-	-	36	36
	Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	15%		-	-	67	67
MIX A & B: Shrubs	*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Height	5' Min.	Bareroot	25%		-	-	370	370
	Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%		-	-	148	148
	Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%		-	-	222	222
	Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%		-	-	148	148
	Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%		-	-	222	222
	Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%		-	-	370	370

Lowland Riparian Restoration Mix

Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX C: Trees	*Abies grandis*	Grand Fir	18" Height	30' Min.	Bareroot	10%		8	21	-	29
	Acer macrophyllum	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	10%		8	21	-	29
	Alnus rubra	Red Alder	1/2" Calip.	15'-20' Min.	Bareroot	26%		22	54	-	76
	Fraxinus latifolia	Oregon Ash	1/2" Calip.	30' Min.	Bareroot	6%		5	13	-	18
	Prunus emarginata	Bitter Cherry	1/2" Calip.	15'-20' Min.	Bareroot	15%		13	31	-	44
	Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	10%		8	21	-	29
	Salix lucida	Shining Willow	1/2" Calip.	15'-20' Min.	Bareroot	15%		13	31	-	44
	Thuja plicata	Western Redcedar	18" Height	30' Min.	Bareroot	8%		7	17	-	24
MIX C & D: Shrubs	*Cornus sericea*	Redtwig Dogwood	12" Height	5' Min.	Bareroot	25%		46	115	-	161
	Physocarpus capitatus	Pacific Ninebark	12" Height	5' Min.	Bareroot	10%		18	46	-	64
	Rubus spectabilis	Salmonberry	12" Height	5' Min.	Bareroot	15%		28	69	-	97
	Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%		18	46	-	64
	Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%		28	69	-	97
	Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%		46	115	-	161

Roadside Riparian Restoration Mix

Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX E: Trees & Shrubs	*Pinus ponderosa var. willamettensis*	Willamette Ponderosa Pine	3'-4' Height	25'	#5 Container	50%		2	-	21	23
	Quercus garryana	Oregon White Oak	1/2" caliper	25'	Bareroot	40%		2	-	16	18
	Arbutus menziesii	Pacific Madrone	1'-2' Height	25'	#1 Container	10%		-	-	4	4
	Berberis (Mahonia) aquifolium	Tall Oregon Grape	12" Height	5' Min.	#1 Container	60%		14	-	53	64
	Ceanothus velutinus	Snowbrush	12" Height	5' Min.	#1 Container	10%		2	-	9	11
	Ribes sanguineum	Redflowering Currant	12" Height	5' Min.	#1 Container	15%		3	-	13	16
	Symphoricarpos albus	Snowberry	12" Height	5' Min.	#1 Container	15%		3	-	13	16

Seed Mix* **See Special Provisions 01030.13(f) for Seed Mix** **Area (square feet)**

Key		FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
	Permanent Seeding	2,066	-	-	1,273	175,749	-	-	-	129,854	308,942
	Water Quality Seeding	787	-	-	1,294	4,934	440	-	9,971	14,616	31,226
Varies	Riparian Seeding	-	-	-	-	-	23,824	42,555	-	-	66,379
	Wildflower Seeding	64,818	-	75,645	-	1,379	31,172	-	142,999	6,082	314,943
Varies	Native Shade Seeding	-	-	-	-	-	-	-	80,985	-	80,985
	Wetland Seeding	-	-	-	-	-	-	-	410	-	410
	Upland Shrub Seeding	-	-	-	-	-	7,672	-	46,091	-	53,763

*** Verify compost erosion blanket is installed prior to applying seed**

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke Reviewer: Ben Ngan
Drafter: David Goodyke Checker: Ben Ngan

SHEET NO.

ROADSIDE DEVELOPMENT GENERAL NOTES

R_K19786_FA01_FA16_NNA.dgn :: FA01-FA07 2/10/2020 2:47:42 PM CDONOVAN

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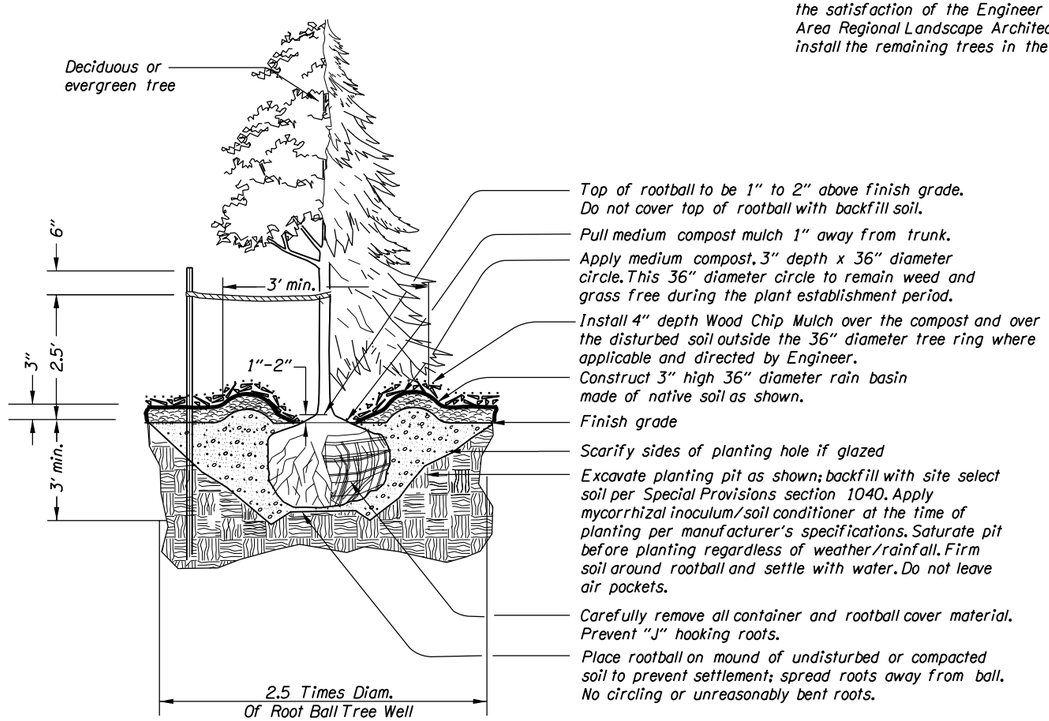
Rotation A

NOTE:

After tree location staking is complete and prior to planting any trees, Contractor shall construct two typical tree planting and staking installations per details and specifications, with Engineer and Area Regional Landscape Architect present. When the installations are complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining trees in the same manner.



TREE PLANTING and STAKING
On Terrain Flatter Than 5H:1V

Not To Scale

TREE STAKING NOTES:

1) Tree ties to be either:

Rigid guy system. Galvanized wire to be approximately 1/8" thickness and 24" length with a plastic sleeve over the portion that contacts the tree. The wire tie is to go through the wood stake and be securely fastened.

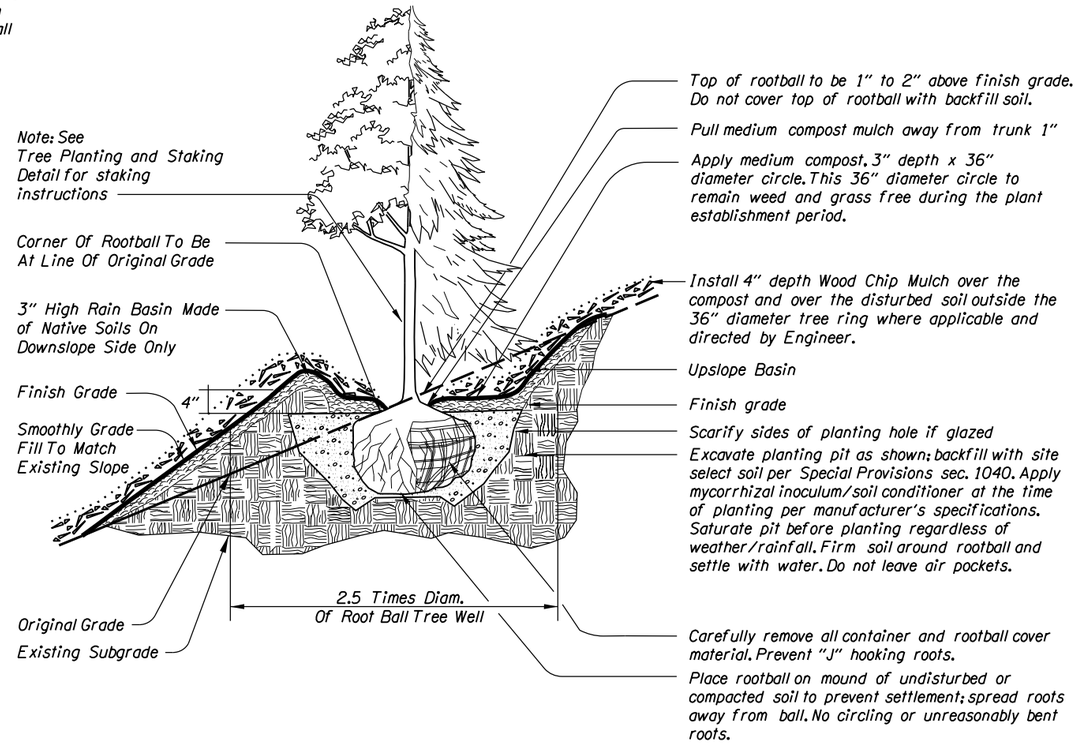
Plastic chain type, approximately 1" width by 1/8" thickness where two stakes are required. Cross ties between stakes and wrap tie around tree. Fasten securely to stake.

2) Furnish tree stakes on all tree plantings.

Stakes to be construction grade, rough sawn or finished Douglas Fir or Pine. Stain with approved green penetrating oil. Stake Size is to be 1½"x1½" by following lengths:

Trees 36" and shorter - Use one - 6' (approximate) stake
Trees taller than 36" - Use one - 8' (approximate) stake

Drive stakes vertically and at least 24" into undisturbed soil. Do not drive stakes through root ball. Locate stakes to best resist prevailing winds.



TREE PLANTING and STAKING on SLOPES
On slopes 5H:1V or steeper

Not To Scale

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1125 SE Madison St, Sulte 201
Portland, OR 97214
503.239.0600

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

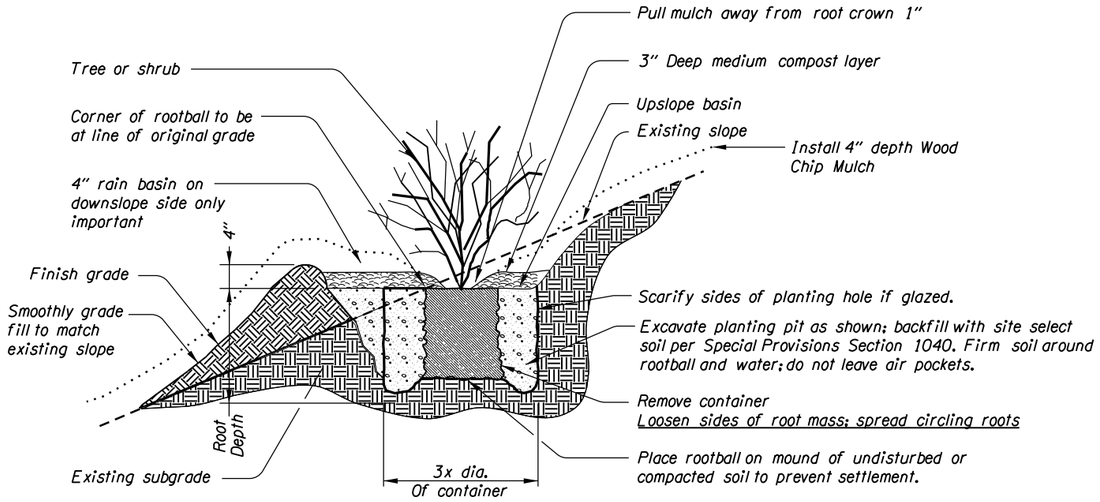
ROADSIDE DEVELOPMENT SITE DETAILS

SHEET NO.

R_K19786_FA01_FA16_NNA.dgn :: FA01-FA07 2/10/2020 2:47:43 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation A

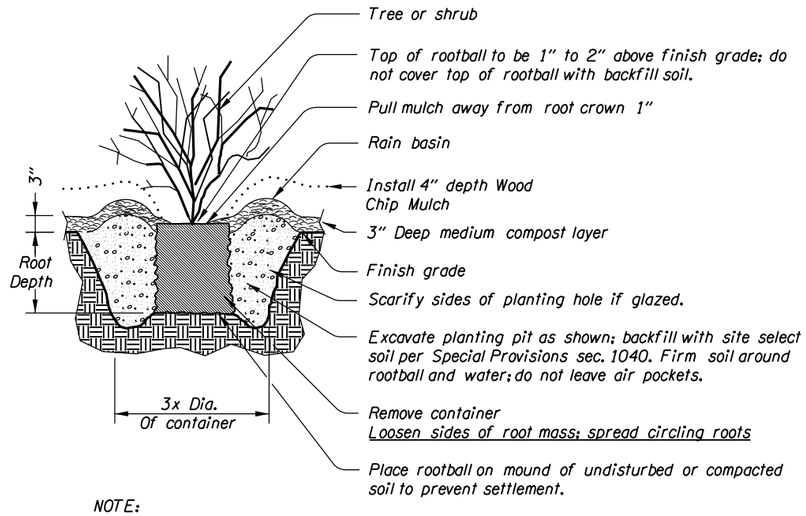


NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2) Apply Mychorrhizae per specifications.

SLOPE PLANTING FOR #1 & #2 CONTAINERS

Not To Scale



NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2)Apply Mycorrhizae per specifications.

GENERAL PLANTING FOR #1 & #2 CONTAINERS

Not To Scale

GENERAL NOTES:
1) All dimensions shown on details are minimum dimensions.

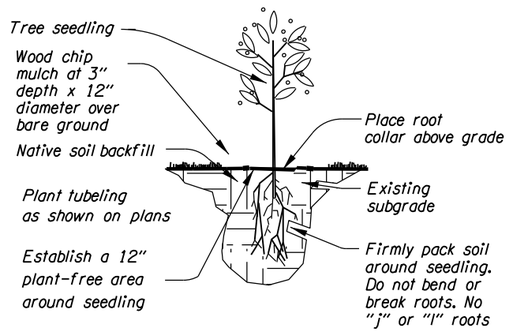
2) See "American Standard for Nursery Stock" for plant quality minimum standards such as size of root ball or caliper of trunk.

3) See plant list or special provisions and identify plant material that may need to be ordered early or contract-grown.

4) Excavate all plant wells per detail at 3x diameter of rootball or container & backfill with site select topsoil free of noxious weeds plant material including roots & sprigs.

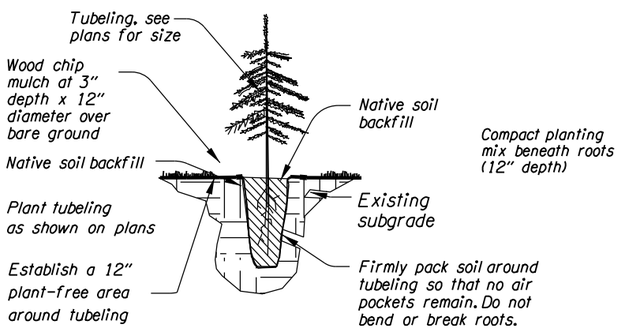
5) After shrub location staking is complete and prior to planting any shrubs. Contractor shall construct a typical shrub planting per detail and specifications with Engineer and Area Regional Landscape Architect present. When the installation is complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining shrubs in the same manner.

6) Apply Mycorrhizae per specifications.



SEEDLING PLANTING

Not To Scale



TUBELING PLANTING

Not To Scale

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Reviewer: Ben Ngan
Drafter: David Goodyke
Checker: Ben Ngan

ROADSIDE DEVELOPMENT SITE DETAILS

SHEET NO.

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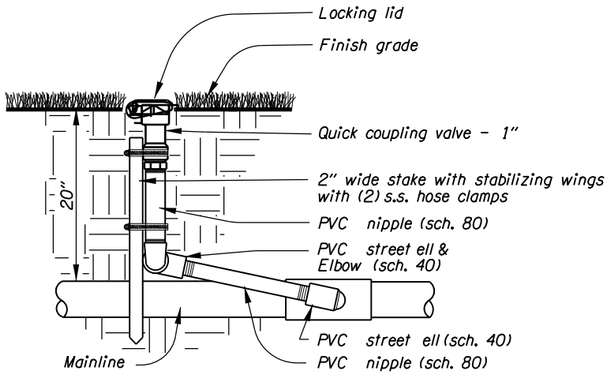
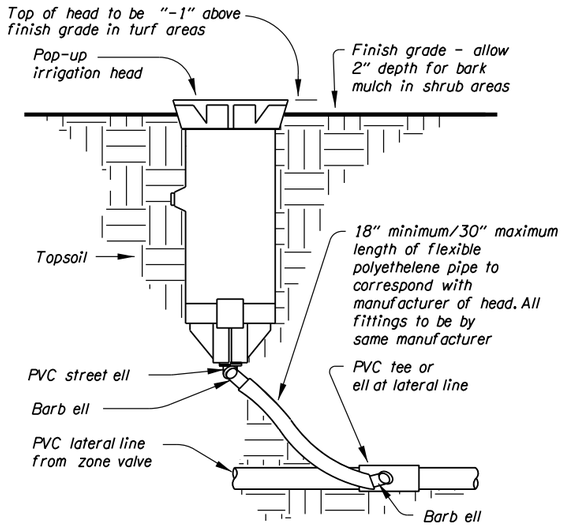
Rotation



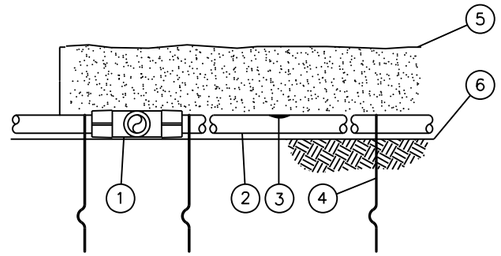
QUICK COUPLING VALVE

Not To Scale



SPRINKLER HEAD AND JOINTS

Not To Scale



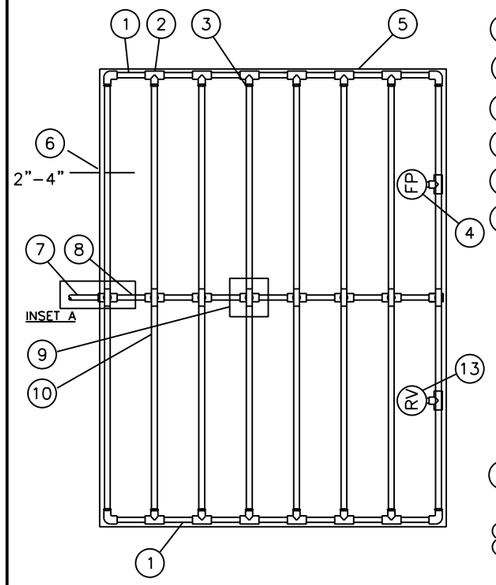
1. Compression Fitting
2. On-Surface Dripline
3. Inline Drip Emitter Outlet
4. Tie-Down Stake
5. Mulch
6. Finish Grade

DRIPLINE AT GRADE

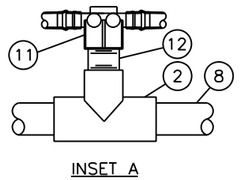
Not To Scale

NOTES:
1) Place tie-down stakes every 3' in sand, 4' in loam, and 5' in clay.

2) At fittings where there is a change of direction, such as tees or elbows, use tie-down stakes on each leg of the change of direction.



1. PVC exhaust header
2. PVC SCH 40 TEE or EL (Typical)
3. Barb x Male Fitting
4. Flush Point (Typical)
5. Perimeter of Area
6. Perimeter Dripline to Pipe to be installed 2"-4" from Perimeter of Area
7. PVC Supply Pipe from Existing Valve
8. PVC Supply Manifold
9. Connection from Supply Manifold to Dripline (Typical) - see Inset A
10. On-Surface Dripline
11. Barb x Female Fitting
12. ¾" PVC Nipple, length as necessary
13. At ends of area, add air relief valve



NOTE:
1) Provide Low Volume (Drip) Tubing with emitters spaced at 18" and providing a flow rate of 0.9 gallons/hour and spaced at 24", or approved equal.

2) Modify detail to meet the specific requirements of the selected equipment brand's manufacturer and the specific shape and size of the plant bed to be irrigated.

LOW VOLUME (DRIP) TUBING

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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1125 SE Madison St, Suite 201
Portland, OR 97214
503.239.0600

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT SITE DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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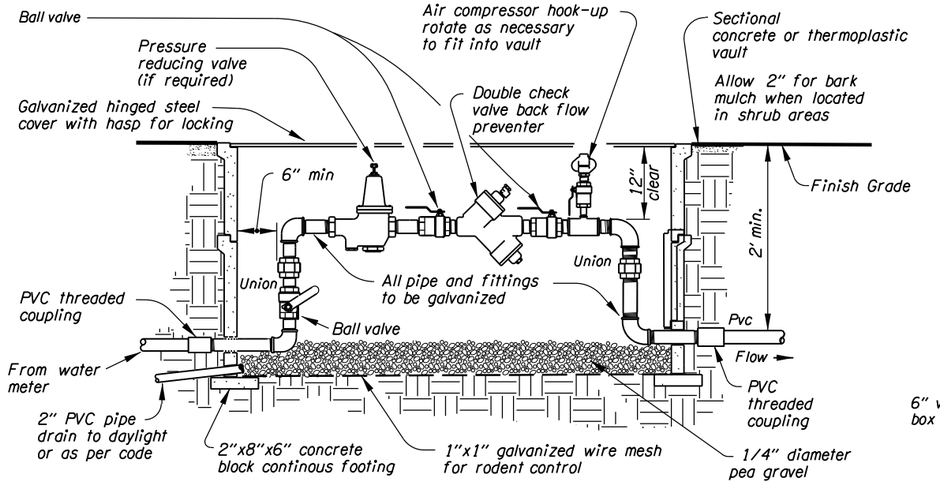


BACKFLOW PREVENTION ASSEMBLY

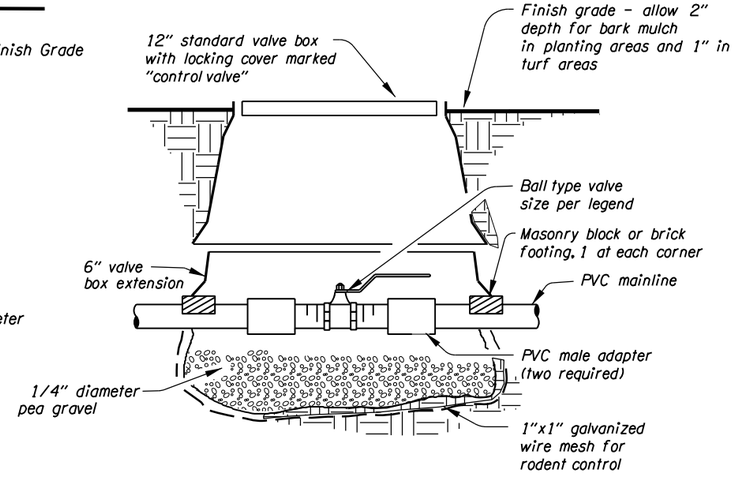
Not To Scale

NOTES:
1) Install backflow prevention assembly in accordance with "accepted procedure and practice in cross connection control manual"

2) Comply with local jurisdiction requirements. These may vary from those shown on drawings. verify compliance.

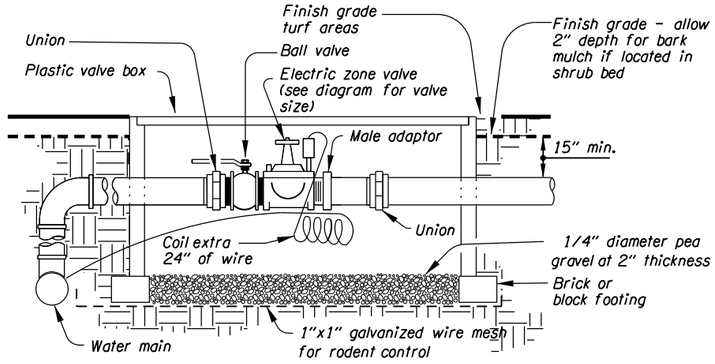
3) Provide 6" access clearance for devices 2" and smaller.

4) Size of double check valve shown on plans or specifications.



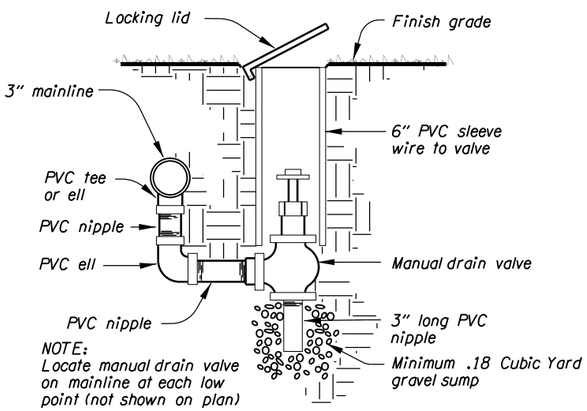
ISOLATION VALVE & BOX

Not To Scale



ELECTRIC ZONE VALVE

Not To Scale



MANUAL DRAIN VALVE

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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EAST PORTLAND FREEWAY
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ROADSIDE DEVELOPMENT SITE DETAILS

SHEET NO.

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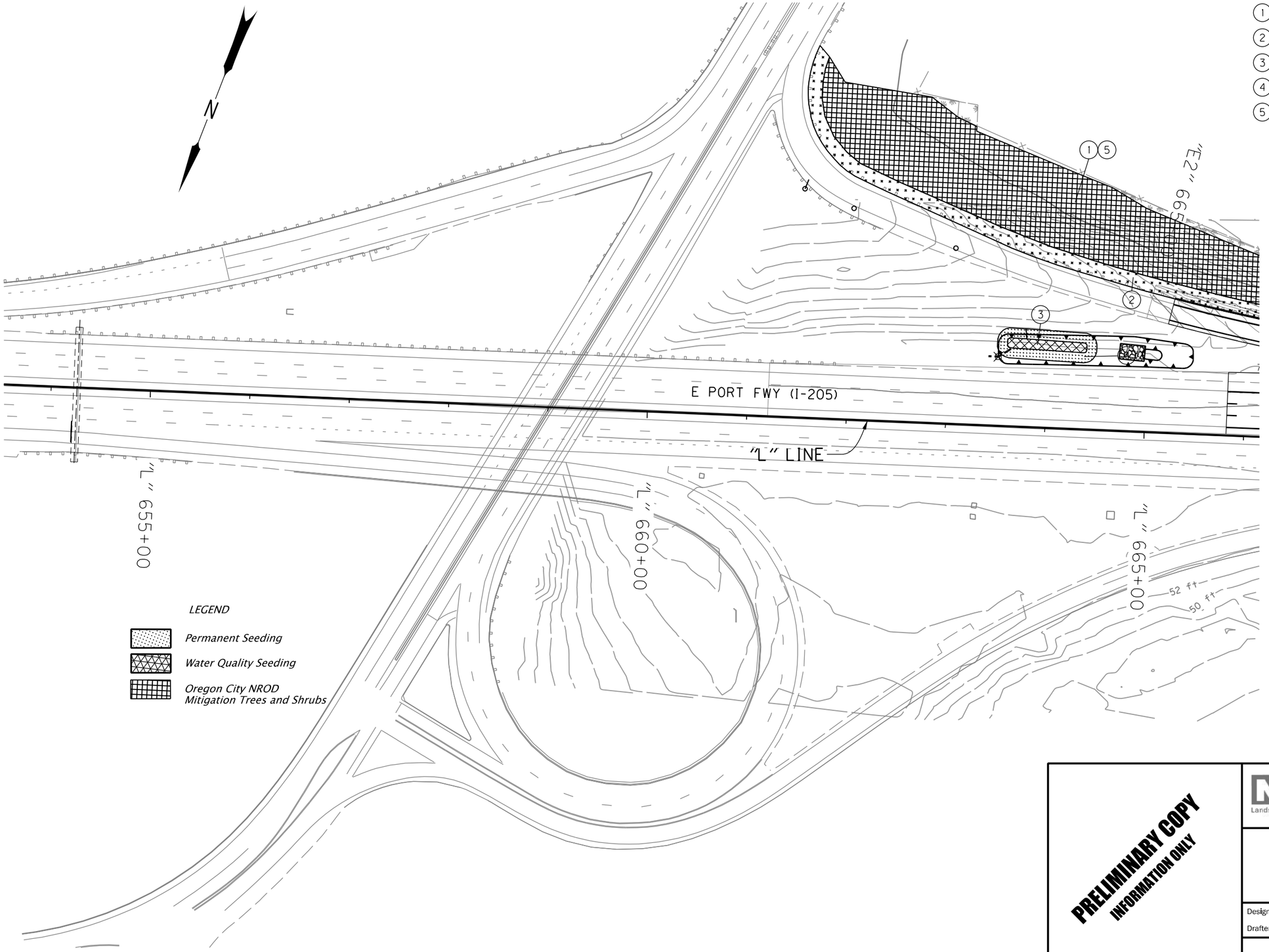
Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 50,776 s.f. Wildflower Seeding
2. Install 14,042 s.f. Wildflower Seeding
3. Install 787 s.f. Water Quality Seeding
4. Install 2,066 s.f. Permanent Seeding
5. Install 50,776 s.f. NROD Mitigation Trees and Shrubs



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ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

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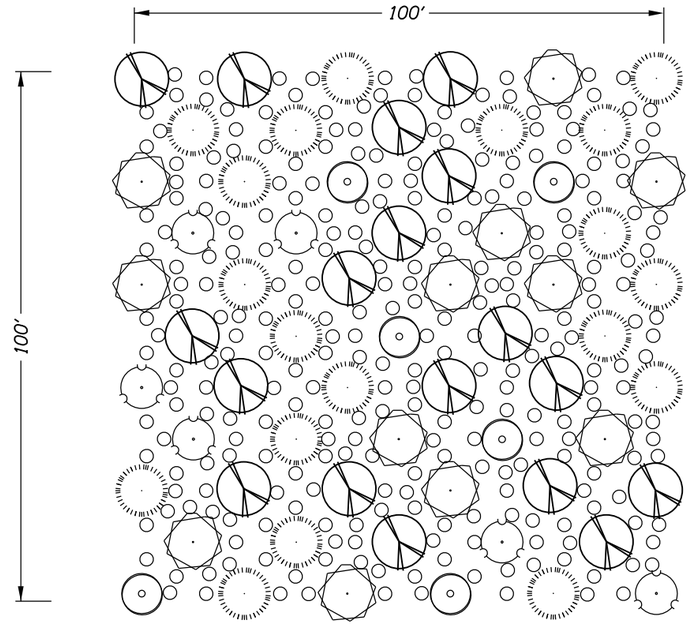
Rotation: 227.6721° 0'



NROD Mitigation Planting Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Arbutus menziezii	13 stems / 10,000 s.f.	20%
	Pinus ponderosa	18 stems / 10,000 s.f.	30%
	Quercus garryana	18 stems / 10,000 s.f.	30%
	Small Trees		
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Salix scouleriana	6 stems / 10,000 s.f.	10%
	Shrubs*		
	Arctostaphylos columbiana	55 stems / 10,000 s.f.	20%
	Berberis (Mahonia) aquifolium	82 stems / 10,000 s.f.	30%
	Ceanothus velutinus	55 stems / 10,000 s.f.	20%
	Corylus cornuta var. Californica	41 stems / 10,000 s.f.	15%
	Ribes lobbii	41 stems / 10,000 s.f.	15%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Arbutus menziezii (TARME), 20%*
- *Pinus ponderosa (TPIPO), 30%*
- *Quercus garryana (TQUGA), 30%*

Small Trees
- *Rhamnus purshiana (TRHPU), 10%*
- *Salix scouleriana (TSASC), 10%*

Shrubs
- *Assorted Species*

DETAIL: NROD MITIGATION TREES AND SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 61 trees/10,000 s.f.

2) Install trees at an average of 13.75' O.C. with triangular spacing

3) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

4) Concentrate TQUGA in areas with most southern and western sun exposure.

5) Install trees in groups of up to 4 specimens per species.

6) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

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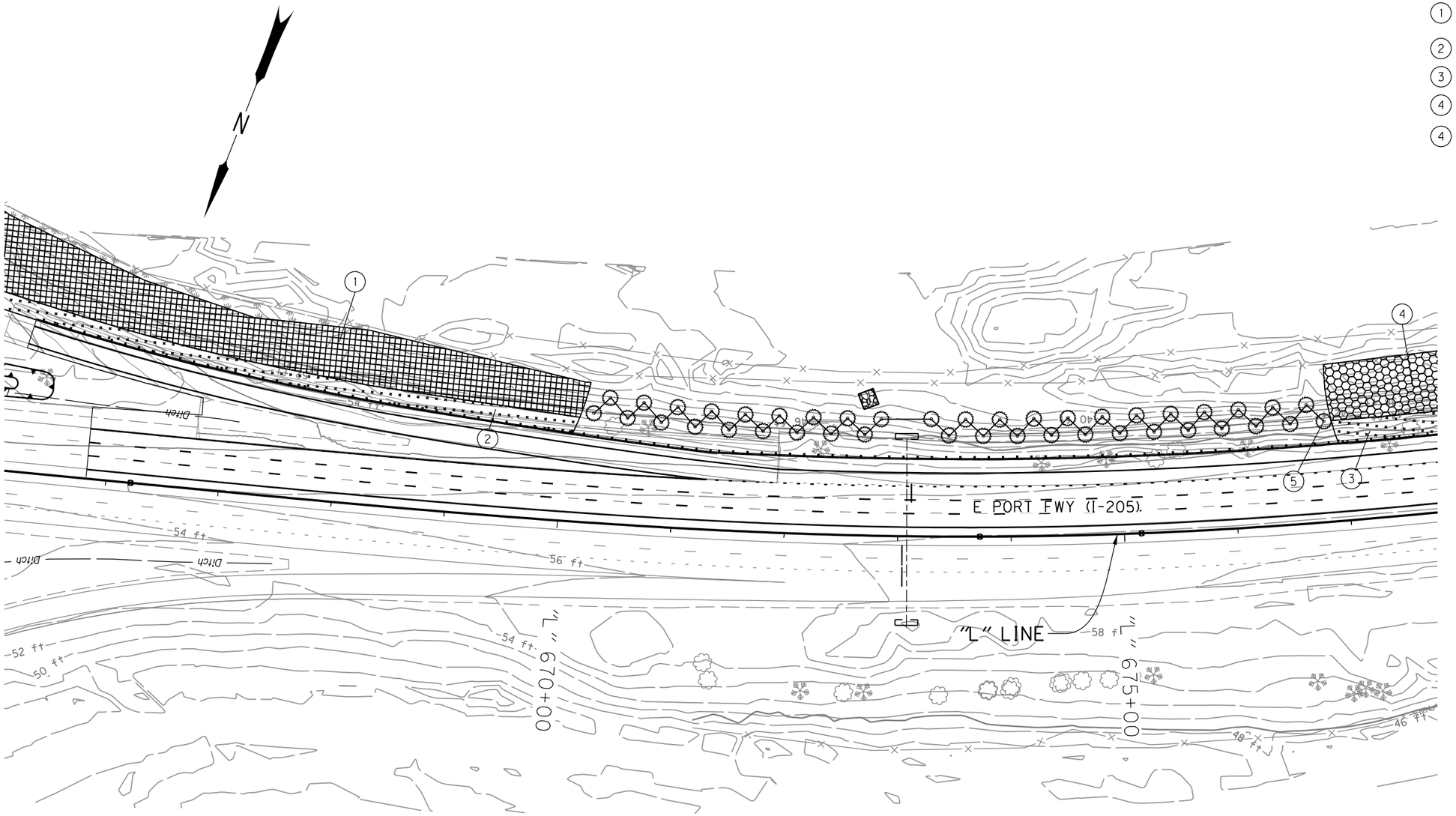
Rotation: 227.6721° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

?? ? – ???

1. Total area on FA08 and FA09, shown on FA08, notes 1 & 5
2. Total area on FA08 and FA09, shown on FA08, note 2
3. Total area on FA09 and FA10, shown on FA10, note 2
4. Total area on FA09 and FA10, shown on FA10, notes 1 & 4
4. Install 42 TPIPO



LEGEND

Oregon City NROD
Mitigation Trees and Shrubs

ExistingTrees

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503.239.0600

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

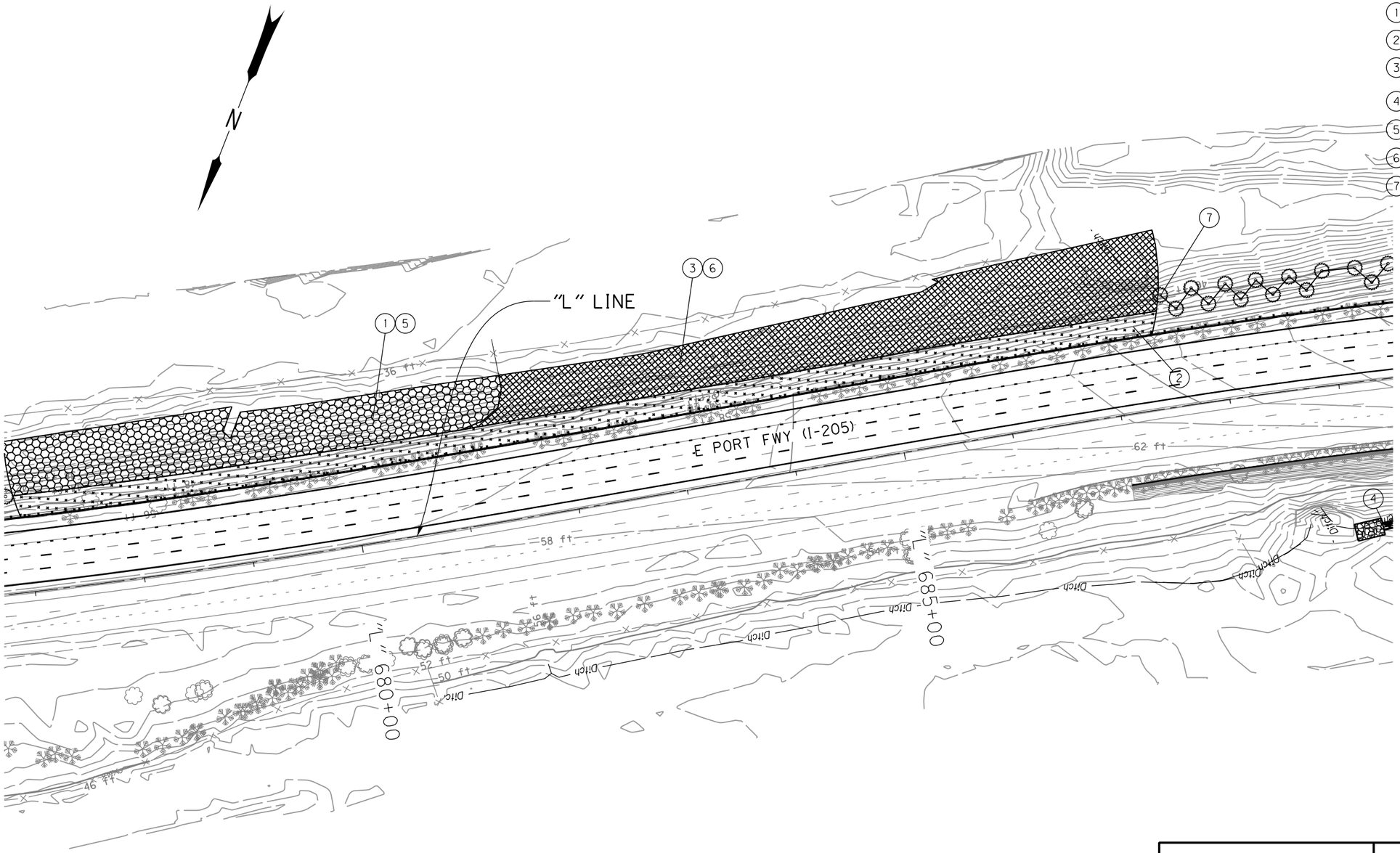
R_K19786_FA01_FA16_NNA.dgn :: FA09 2/10/2020 2:47:49 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 31,833 s.f. Wildflower Seeding
2. Install 22,145 s.f. Wildflower Seeding
3. Install 21,615 s.f. Wildflower Seeding
4. Total quantity for area on FA10 and FA11, shown on FA11, note 1
5. Install 31,833 s.f. NROD Mitigation Trees and Shrubs
6. Install 21,615 s.f. NROD Mitigation Trees and Shrubs
7. Install 14 TPIPO



LEGEND

- Water Quality Seeding
- Oregon City NROD Mitigation Trees and Shrubs
- ExistingTrees

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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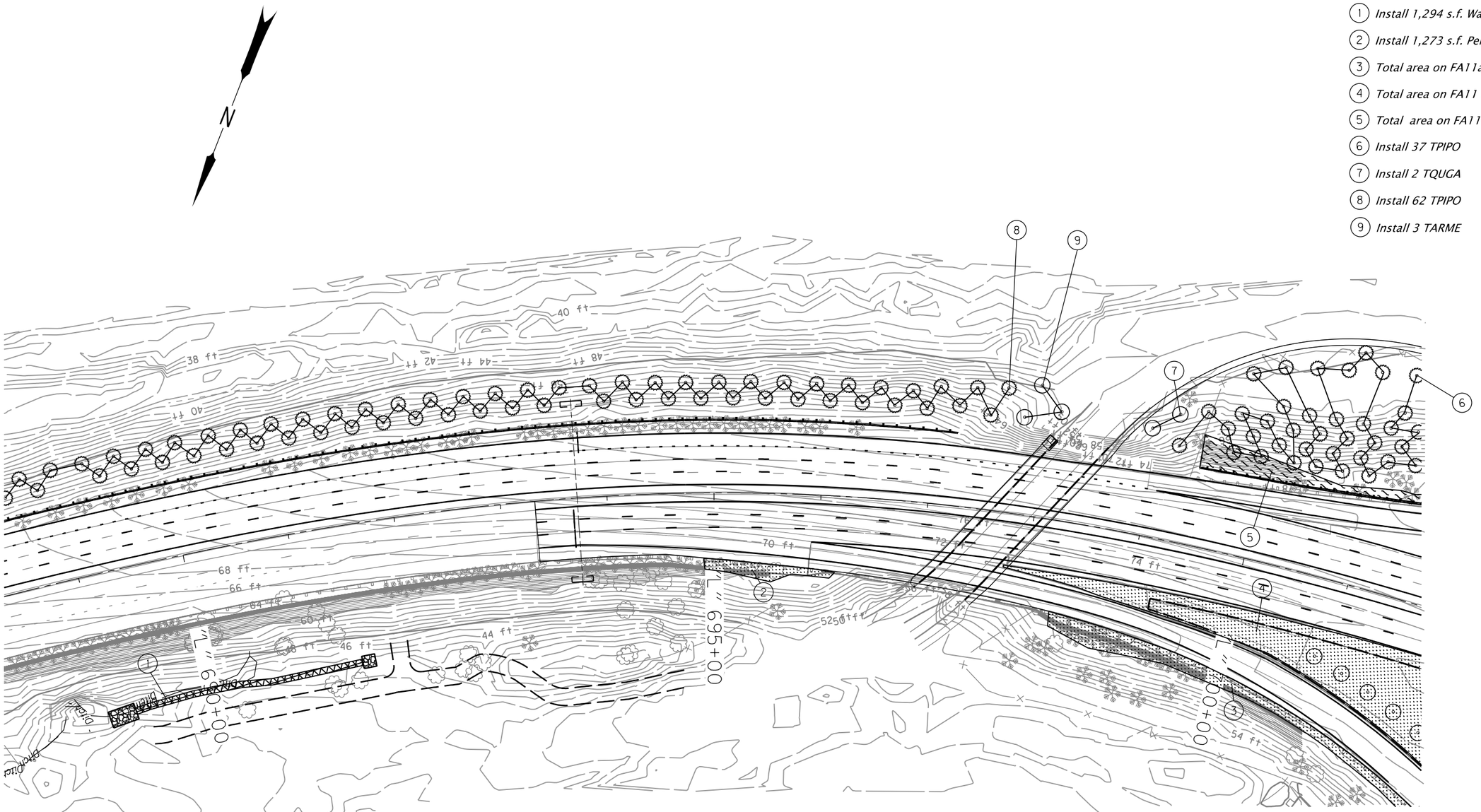
R_K19786_FA01_FA16_NNA.dgn :: FA10 2/10/2020 2:47:51 PM CDONOVAN

Rotation: 228.87°

0'

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 1,294 s.f. Water Quality Seeding
2. Install 1,273 s.f. Permanent Seeding
3. Total area on FA11and FA12, shown on FA12, note 1
4. Total area on FA11 and FA12, shown on FA12, note 2
5. Total area on FA11 and FA12, shown on FA12, note 33
6. Install 37 TPIPO
7. Install 2 TQUGA
8. Install 62 TPIPO
9. Install 3 TARME



LEGEND

- Permanent Seeding
- Water Quality Seeding
- Ornamental Grasses and Forbs
- Proposed Trees
- ExistingTrees

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OREGON DEPARTMENT OF TRANSPORTATION

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Reviewer: Ben Ngan
Drafter: David Goodyke
Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

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FINAL ELECTRONIC DOCUMENT
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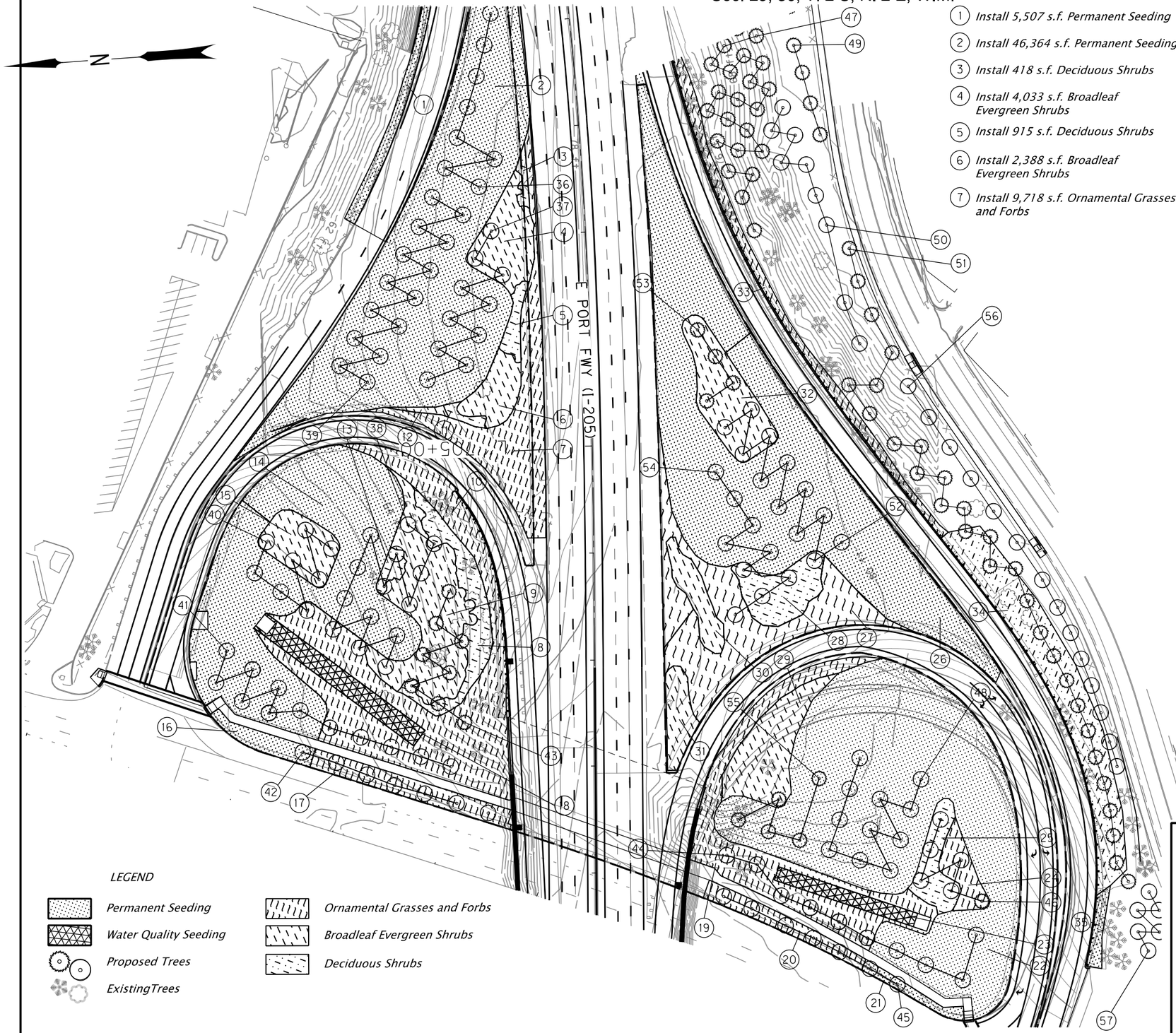
Rotation: 222.7112°

0'

Sec. 29, 30, T. 2 S, R. 2 E, W.M.



1. Install 5,507 s.f. Permanent Seeding
2. Install 46,364 s.f. Permanent Seeding
3. Install 418 s.f. Deciduous Shrubs
4. Install 4,033 s.f. Broadleaf Evergreen Shrubs
5. Install 915 s.f. Deciduous Shrubs
6. Install 2,388 s.f. Broadleaf Evergreen Shrubs
7. Install 9,718 s.f. Ornamental Grasses and Forbs
8. Install 4,239 s.f. Deciduous Shrubs
9. Install 9,712 s,f, Broadleaf Evergreen Shrubs
10. Install 20,139 s.f. Ornamental Grasses and Shrubs
11. Install 375 s.f. Deciduous Shrubs
12. Install 260 s.f. Broadleaf Evergreen Shrubs
13. Install 648 s.f. Deciduous Shrubs
14. Install 30,343 s.f. Permanent Seeding
15. Install 3,362 s.f. Broadleaf Evergreen Shrubs
16. Install 1,603 s.f. Permanent Seeding
17. Install 3,471 s.f. Ornamental Grasses and Forbs
18. Install 3,153 s.f. Water Quality Seeding
19. Install 10,277 s.f. Ornamental Grasses and Forbs
20. Install 2,319 s.f. Ornamental Grasses and Forbs
21. Install 989 s.f. Permanent Seeding
22. Install 46,511 s.f. Permanent Seeding
23. Install 1,781 s.f. Water Quality Seeding
24. Install 1,923 s.f. Ornamental Grasses and Forbs
25. Install 2,523 s.f. Broadleaf Evergreen Shrubs
26. Install 43,636 s.f. Permanent Seeding
27. Install 12,295 s.f. Ornamental Grasses and Forbs
28. Install 3,629 s.f. Deciduous Shrubs
29. Install 5,407 s.f. Broadleaf Evergreen Shrubs
30. Install 2,113 s.f. Broadleaf Evergreen Shrubs
31. Install 1,994 s.f. Broadleaf Evergreen Shrubs
32. Install 5,574 s.f. Broadleaf Evergreen Shrubs
33. Install 7,431 s.f. Ornamental Grasses and Shrubs
34. Install 11,524 s.f. Deciduous Shrubs
35. Install 1,379 s.f. NROD Mitigation Shrubs
36. Install 796 s.f. Permanent Seeding
37. Install 8 TPIPO
38. Install 10 TQUGA
39. Install 14 TUMCA
40. Install 14 TQUCH
41. Install 8 TQUCH
42. Install 12 TQUGA
43. Install 6 TQUGA
44. Install 8 TPIPO
45. Install 10 TQUGA
46. Install 6 TQUGA
47. Install 21 TPIPO
48. Install 11 TUMCA
49. Install 4 TPIPO
50. Install 9 TQUGA
51. Install 29 TPIPO
52. Install 12 TQUCH
53. Install 4 TPIPO
54. Install 9 TQUGA
55. Install 5 TPIPO
56. Install 14 TQUGA
57. Install 6 TUMCA

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1125 SE Madison St, Suite 201
Portland, OR 97214
503.239.0600

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

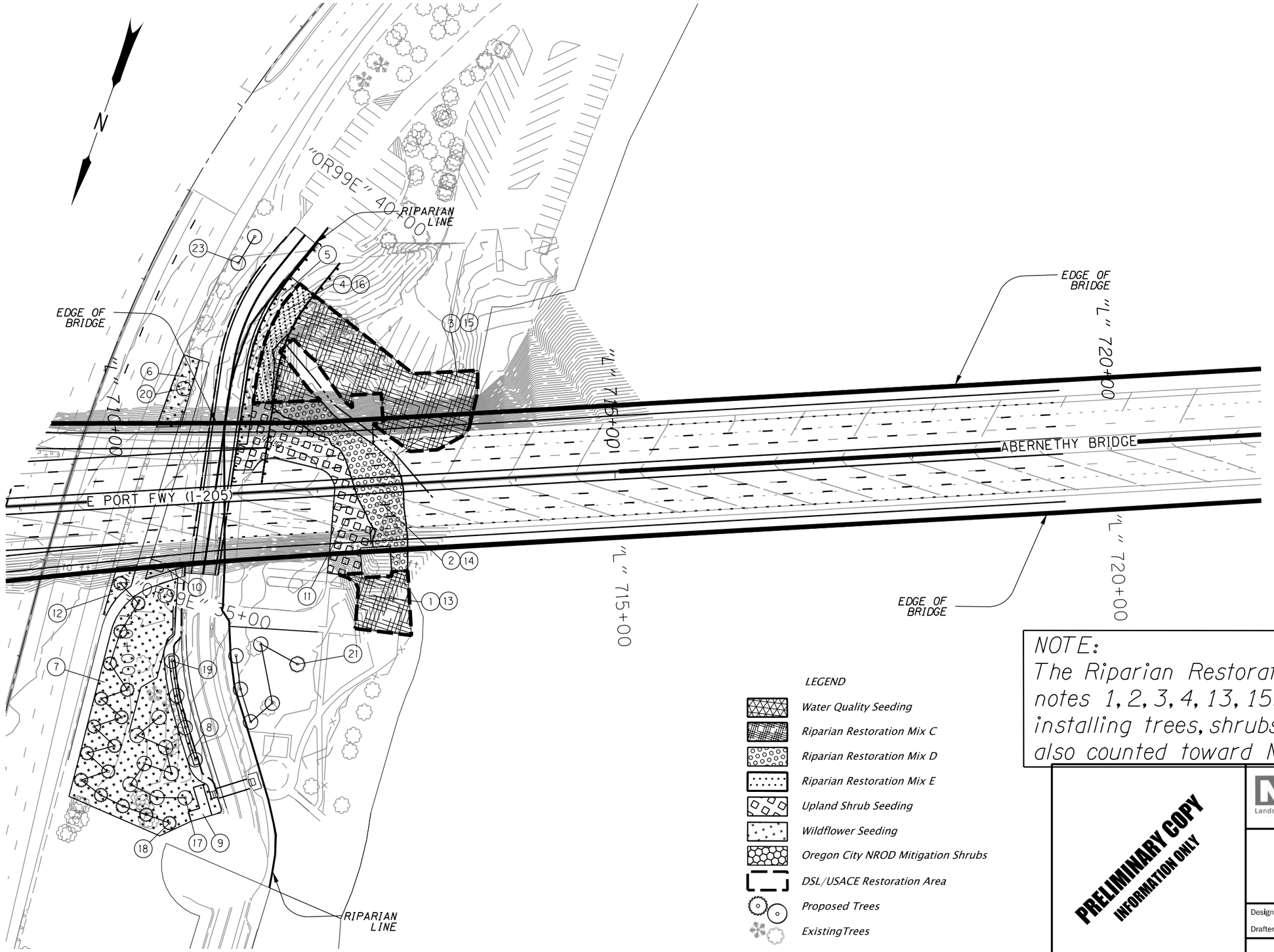
SHEET NO.

R_K19786_FA01_FA16_NNA.dgn :: FA12 2/10/2020 2:47:54 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 201.4396° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



1. Install 3,144 s.f. Riparian Seeding
2. Install 6,769 s.f. Riparian Seeding
3. Install 13,911 s.f. Riparian Seeding
4. Install 2,132 s.f. Wildflower Seeding
5. Install 1,796 s.f. Wildflower Seeding
6. Install 1,468 s.f. Wildflower Seeding
7. Install 20,102 s.f. Wildflower Seeding
8. Install 618 s.f. Wildflower Seeding
9. Install 440 s.f. Water Quality Seeding
10. Install 212 s.f. Wildflower Seeding
11. Install 7,672 s.f. Upland Shrub Seeding
12. Install 654 s.f. Wildflower Seeding
13. Install 3,144 s.f. Riparian Restoration Mix C
14. Install 6,769 s.f. Riparian Restoration Mix D
15. Install 13,911 s.f. Riparian Restoration Mix C
16. Install 2,132 s.f. Riparian Restoration Mix E
17. Install 8 TQUGA
18. Install 16 TPIPO
19. Install 4 TULAM
20. Install 1 TQUGA
21. Install 6 TULAM
22. Install 10 TPIPO
23. Install 2 TQUGA
24. Install 1 TQUGA

LEGEND

- Water Quality Seeding
- Riparian Restoration Mix C
- Riparian Restoration Mix D
- Riparian Restoration Mix E
- Upland Shrub Seeding
- Wildflower Seeding
- Oregon City NROD Mitigation Shrubs
- DSL/USACE Restoration Area
- Proposed Trees
- ExistingTrees

NOTE:
The Riparian Restoration Mixes called out in notes 1, 2, 3, 4, 13, 15, 16, 17, and 18 specify installing trees, shrubs, and groundcover that are also counted toward NROD mitigation totals.

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ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

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FINAL ELECTRONIC DOCUMENT
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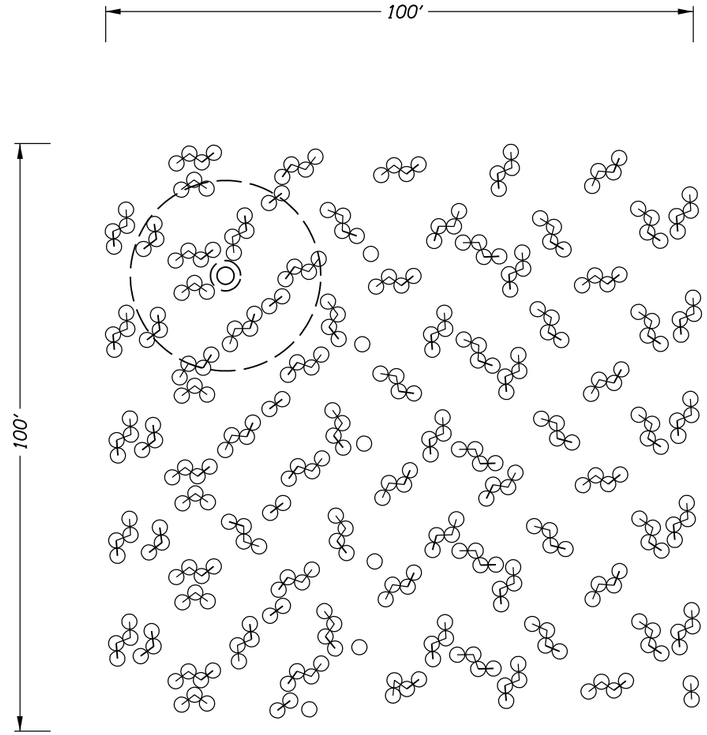
Rotation: 275.7836°



NROD Mitigation Planting Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Berberis (Mahonia) aquifolium	55 stems / 10,000 s.f.	20%
	Cornus sericea	27 stems / 10,000 s.f.	10%
	Ribes sanguineum	41 stems / 10,000 s.f.	15%
	Rubus parviflorus	41 stems / 10,000 s.f.	15%
	Spirea douglasii	41 stems / 10,000 s.f.	15%
	Symphoricarpos albus	68 stems / 10,000 s.f.	25%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND
Shrubs
Assorted Species
5' Buffer
Existing Tree

DETAIL: NROD MITIGATION SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

2) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

3) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

4) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

5) In areas where existing trees are to be preserved, maintain a 5' distance from the adjacent trees trunks to the edge of shrubs.

6) Adjust planting locations as necessary to avoid disturbing mature tree roots over 2" diameter.

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Reviewer: Name
Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

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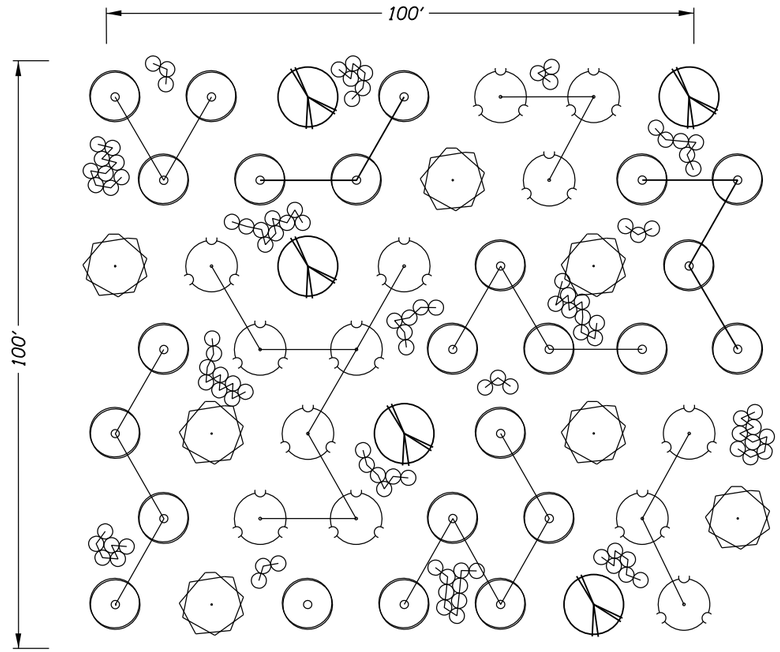

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Acer macrophyllum (TACMA), 10%*
- *Abies grandis (TABGR), 10%*
- *Thuja plicata (TTHPL), 8%*

Small Trees
- *Fraxinus latifolia (TFRLA), 6%*
- *Prunus emarginata (TPREM), 15%*
- *Salix lucida ssp. Lasiandra(TSALU), 15%*
- *Rhamnus purshiana (TRHPU), 10%*

Fast-Growing Trees
- *Alnus rubra (TALRU), 26%*

Shrubs
- *Lowland Shrubs*

DETAIL: LOWLAND TREES AND PLANTING MIX C AND D

Not To Scale

Riparian Restoration Mix C: Lowland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Abies grandis	5 stems / 10,000 s.f.	10%
	Acer macrophyllum	4 stems / 10,000 s.f.	10%
	Thuja plicata	4 stems / 10,000 s.f.	8%
	Small Trees		
	Fraxinus latifolia	3 stems / 10,000 s.f.	6%
	Prunus emarginata	7 stems / 10,000 s.f.	15%
	Salix lucida ssp.lasiandra	7 stems / 10,000 s.f.	15%
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Fast-Growing Trees (13)*		
	Alnus rubra	13 stems / 10,000 s.f.	26%

Riparian Restoration Mix C and D: Lowland Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Cornus sericea	27 stems / 10,000 s.f.	25%
	Physocarpus capitatus	11 stems / 10,000 s.f.	10%
	Rubus spectabilis	16 stems / 10,000 s.f.	15%
	Sambucus racemosa	11 stems / 10,000 s.f.	10%
	Spirea douglasii	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	27 stems / 10,000 s.f.	25%

* Groupings required

TREE PLANTING NOTES

1) Install trees at an overall density of 49 trees/10,000 s.f.

2) Install trees at an average of 15' O.C. with triangular spacing, 49 trees/10,000 s.f. Large, Slow-Growing Trees must be planted at minimum 30' O.C. from one another. Fast-Growing and Small Trees shall be installed at a 10 - 20' O.C. average spacing from others.

3) Install Fast-Growing Trees in groups of 2 - 7

4) Install Small Trees in groups of 2 - 5

5) Install shrubs at an overall density of 108 shrubs/10,000 s.f.

6) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Name
Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

R_K19786_FA01_FA16_NNA.dgn :: FA13-FA13B 2/10/2020 2:47:59 PM CDONOVAN

Rotation: 275.7836° 0'

GENERAL NOTES:

The construction, adjustment, maintenance, and upgrading of these Erosion and Sediment Control measures is the responsibility of the contractor for the duration of the project to comply with Section 00280 of the Oregon Standard Specifications for construction and the NPDES 1200-CA permit.

Erosion and Sediment Control measures shown on this plan are for anticipated site conditions. Adjust or upgrade these measures for unexpected storm events to ensure that sediment and sediment-laden water does not leave the site.

Develop a revised plan of the Erosion and Sediment Control measures shown as required by Section 00280, Oregon Standard Specifications for Construction. Implement this plan for all clearing and grading activities and in segments applicable to each staging phase. Construct in such a manner so as to ensure that sediment and sediment-laden water does not enter the roadway or drainage system, or violate applicable water standards.

Install measures within the right-of-way unless directed otherwise.

Inlet protection for existing facilities shall be installed before construction begins and shall remain in place until all construction is completed and approved. The contractor shall protect all storm drain inlets within the work area and adjacent to the work limits within 100' outside all working, stockpile, and staging areas, including the first inlet downstream (at any distance). In the case of inlets to be removed, protection measures shall remain in place until the new inlet is constructed and connected to the drainage network, and the existing inlet has been disconnected from the existing drainage network. Inlet protection shall be installed on new inlets before they are connected to the existing drainage network.

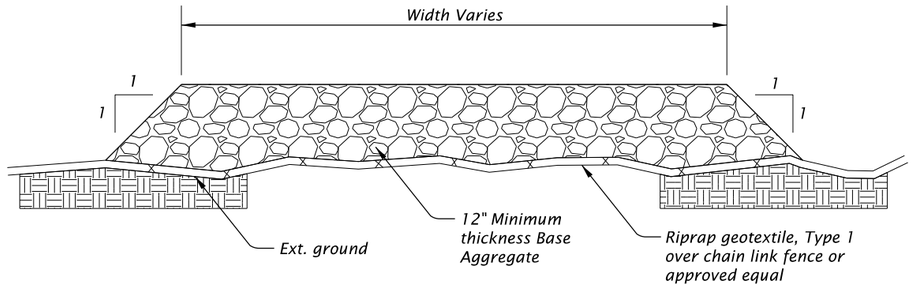
See section 00280 for material not shown in plans.

STANDARD DRAWINGS

☒	*RD1000*	*Construction Entrances*
☐	*RD1005*	*Check Dams Type 1, 3 and 4*
☒	*RD1006*	*Check Dams Type 2 and 6*
☒	*RD1010*	*Inlet Protection Type 2, 3, 6 and 7*
☐	*RD1015*	*Inlet Protection Type 4*
☒	*RD1030*	*Sediment Barrier Type 2, 3 and 4*
☐	*RD1031*	*Sediment Barrier Type 5 and 6*
☒	*RD1032*	*Sediment Barrier Type 8*
☒	*RD1033*	*Sediment Barrier Type 9*
☒	*RD1040*	*Sediment Fence*
☐	*RD1045*	*Temporary Slope Drain With Energy Dissipator*
☐	*RD1050*	*Temporary Scour Basin*
☒	*RD1055*	*Slope and Channel Matting*
☒	*RD1060*	*Tire Wash Facility Type 1 and 2*
☒	*RD1065*	*Sediment Trap*
☒	*RD1070*	*Concrete Truck Wash Out*

SEQUENCE OF WORK NOTES:

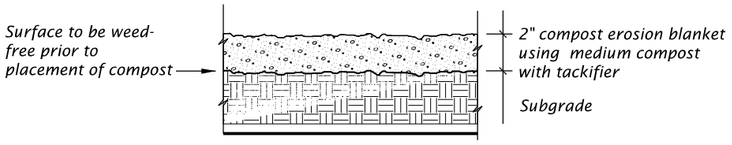
This Erosion and Sediment Control Plan has been prepared based upon the construction sequence represented in the Traffic Control Plan Sheets. This ESCP is not intended to supercede a construction sequencing plan. The ESCP is to be reviewed and revised to fit the actual construction sequence.



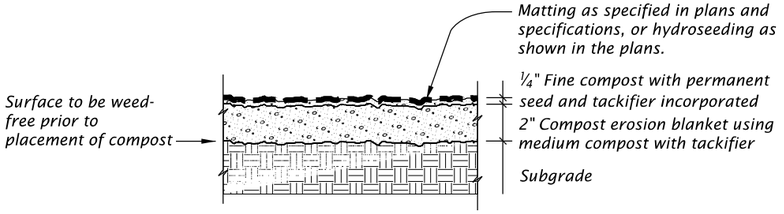
1. Existing ground shall grubbed to a depth 6".

2. Cover existing ground under Staging Area with riprap geotextile and either chain link fence or other approved geogrid type material and cover with Base Aggregate.

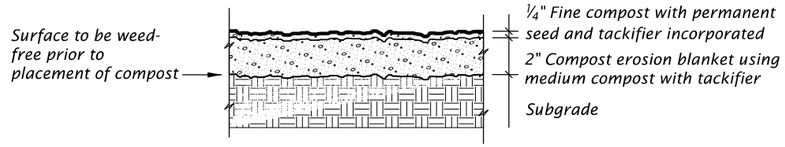
STAGING AREA DETAIL
N.T.S.



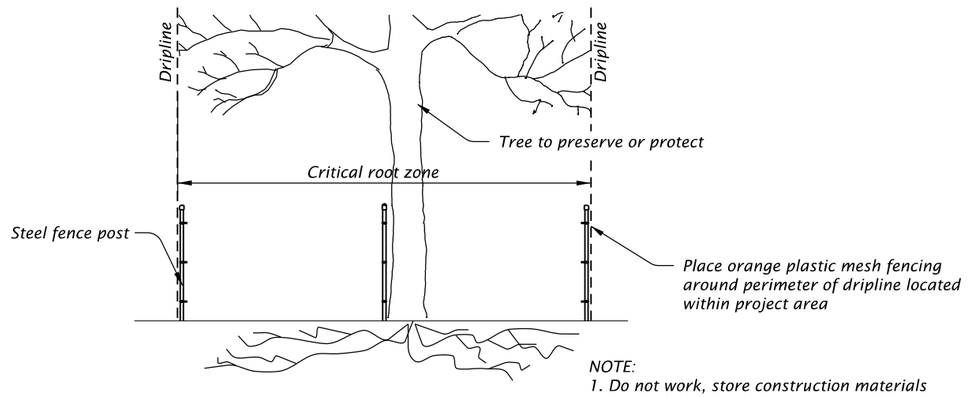
APPLICATION - TEMPORARY/PERMANENT MULCHING
N.T.S.



APPLICATION - STEEP SLOPES, SHALLOW DITCHES & BIO-SWALES
N.T.S.



APPLICATION – TEMPORARY/PERMANENT VEGETATIVE COVER
N.T.S.



NOTE:
1. Do not work, store construction materials or park within the critical root zone of marked trees unless written approval has been obtained from the Engineer.

TREE PROTECTION DETAIL
N.T.S.

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1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

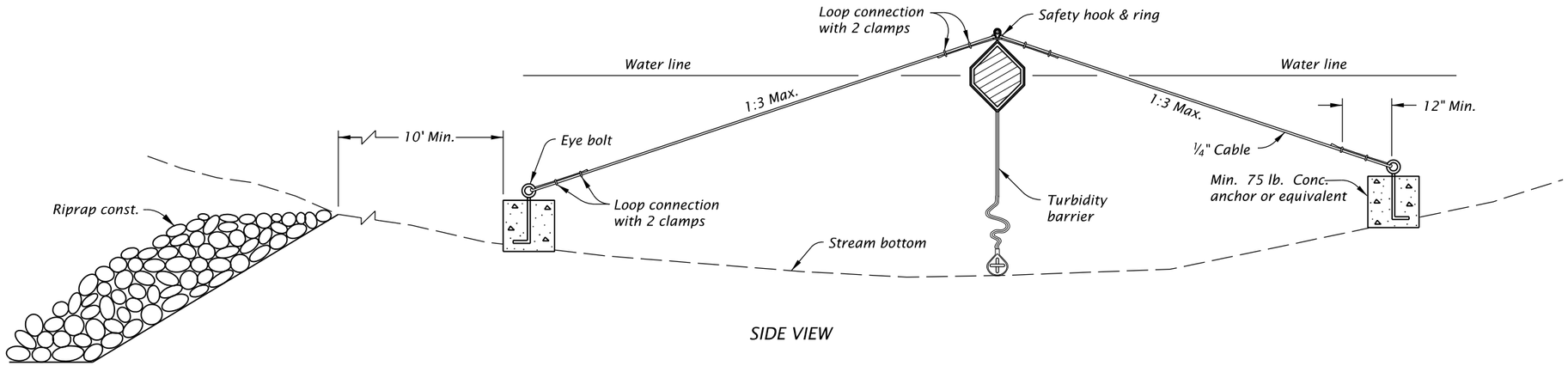
EROSION AND SEDIMENT CONTROL

SHEET NO.

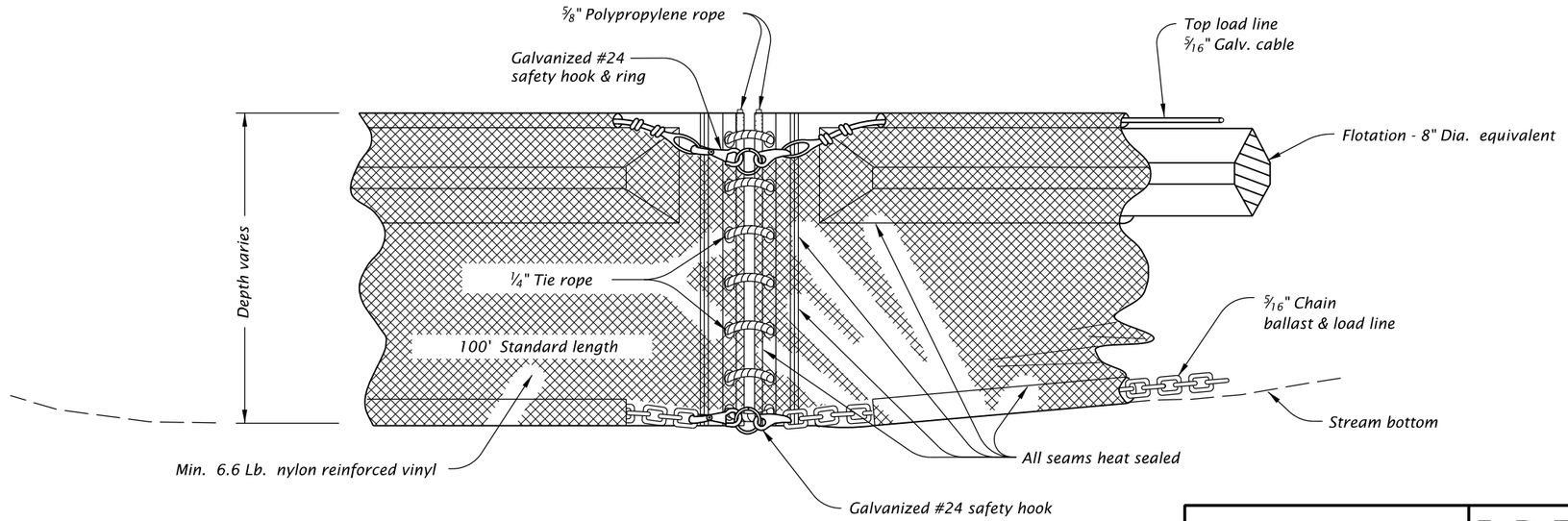
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_01.dgn :: FB01 2/7/2020 4:10:52 PM CDONOVAN
Rotation: 0° 0'

SEDIMENT BARRIER FLOATING



SIDE VIEW



ANCHOR ASSEMBLY

NOTE:

Components of this barrier may be similar or identical to proprietary designs. Any infringement on the proprietary rights of the designer shall be the sole responsibility of the contractor. Substitutions shall be as approved by the engineer.

TURBIDITY BARRIER

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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EE_K19786_HDR_ecpl_01.dgn :: FB02 2/7/2020 4:10:54 PM CDONOVAN

Rotation: 0° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

BEGINNING OF PROJECT
S???(???)
STA. "L" 655+00 (M.P. 10.24)

N

Extg. R/W

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Ditch

1. *Const. check dam, (Type 6) - xx (See drg. no. RD1006)*
2. *Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)*
3. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
4. *Install orange plastic mesh fencing*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

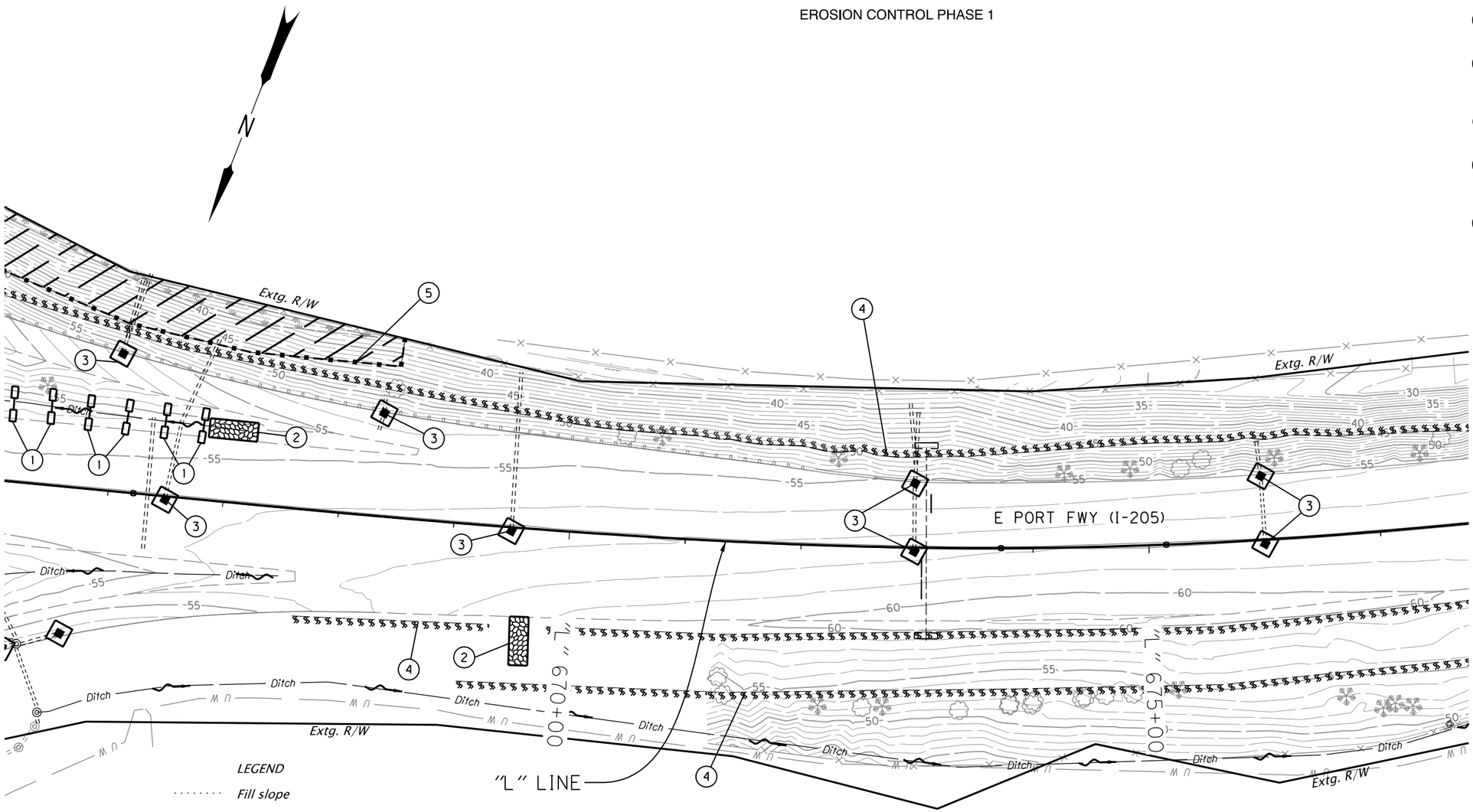
EE_K19786_HDR_ecpl_01.dgn :: FB03 2/7/2020 4:10:57 PM CDONOVAN

Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
2. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
3. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
4. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Wetland*
- *Ordinary High Water*
- *Compost filter berm*
- *Flow direction*
- *Construction entrance*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB04 2/7/2020 4:11:01 PM CDONOVAN

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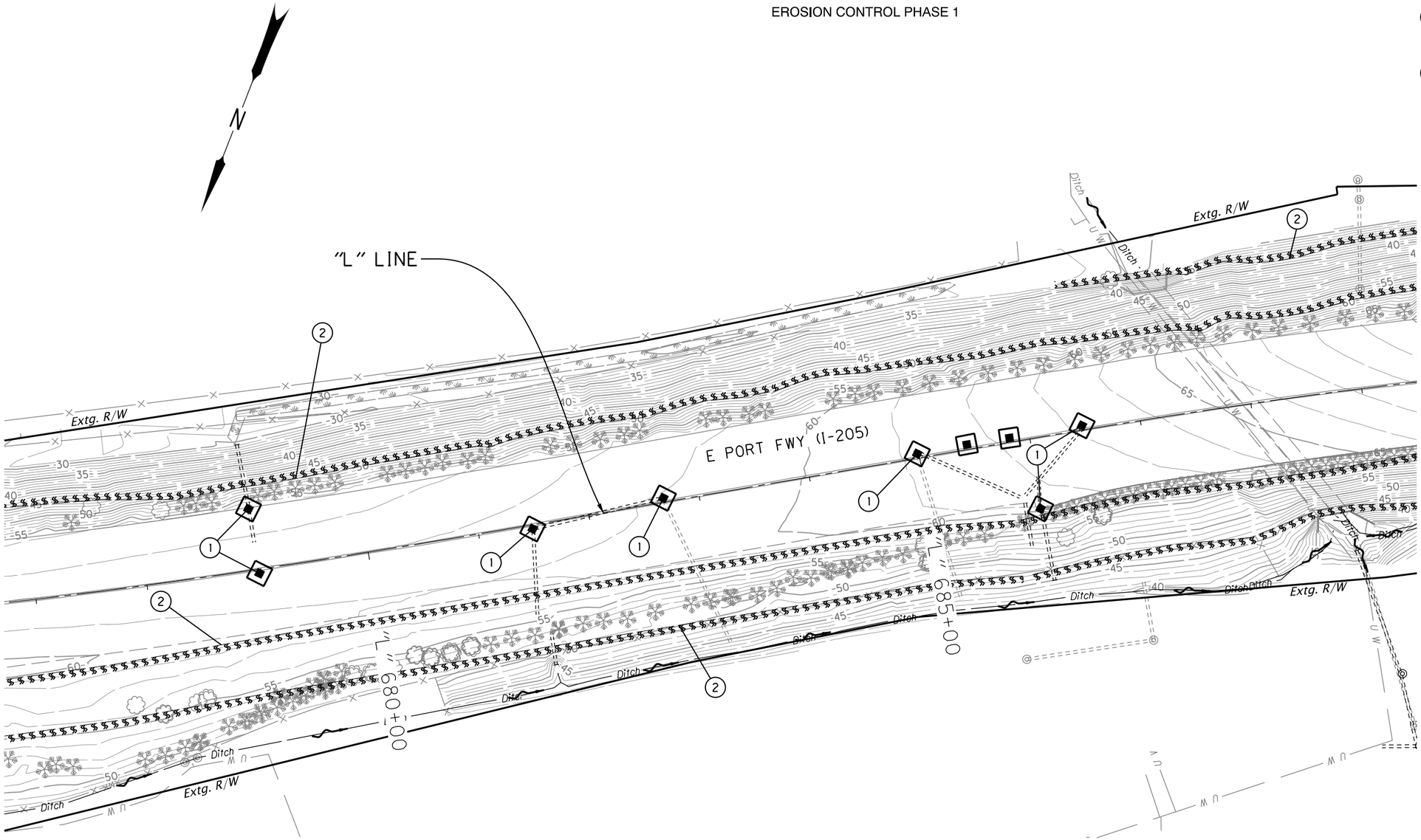
Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

(1) *Const. inlet protection - xx (Type 3) (See drg. no. RD1010)*

(2) *Install sediment barrier, (Type 9) - xx' (See drg. no. RD1033)*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*

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CLACKAMAS COUNTY

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EROSION AND SEDIMENT CONTROL

SHEET NO.

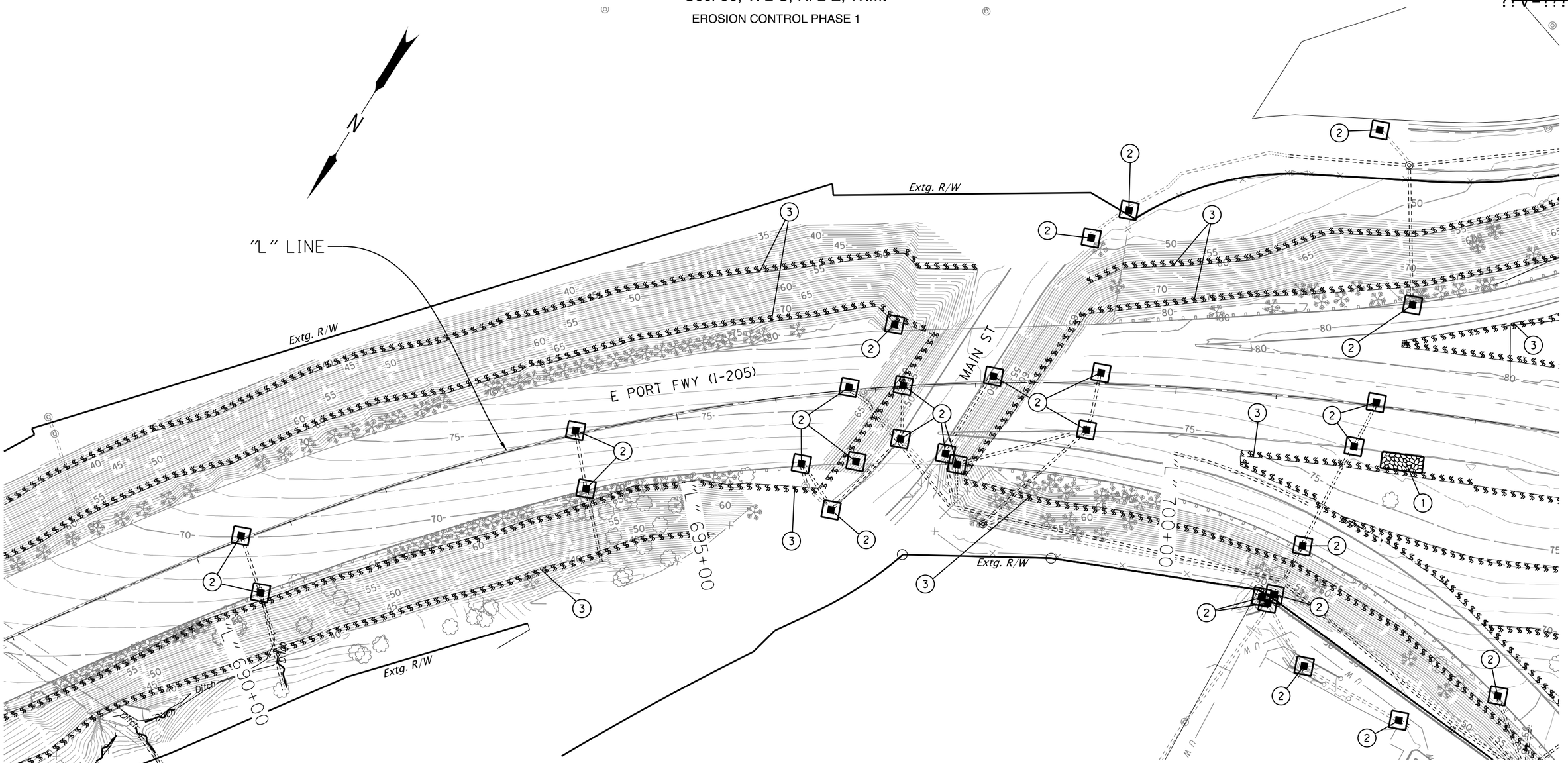
EE_K19786_HDR_ecpl_01.dgn :: FB05 2/7/2020 4:11:05 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
3. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB06 2/7/2020 4:11:09 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 212.6746° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost filter berm
- Ordinary High Water
- Flow direction
- Construction entrance

1. Const. construction entrance – xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
3. Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)

"L" LINE

"L" 705+00

"L" 710+00

Extg. R/W

E PORTLAND FWY (I-205)

PACIFIC HWY (OR99E)

Extg. R/W

For creek erosion control plans see shts. FB21, FB22, FB23

ASBURY CREEK

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB07 2/7/2020 4:11:13 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 272.0412°

Sec. 30, T. 2 S, R. 2 E, W.M.

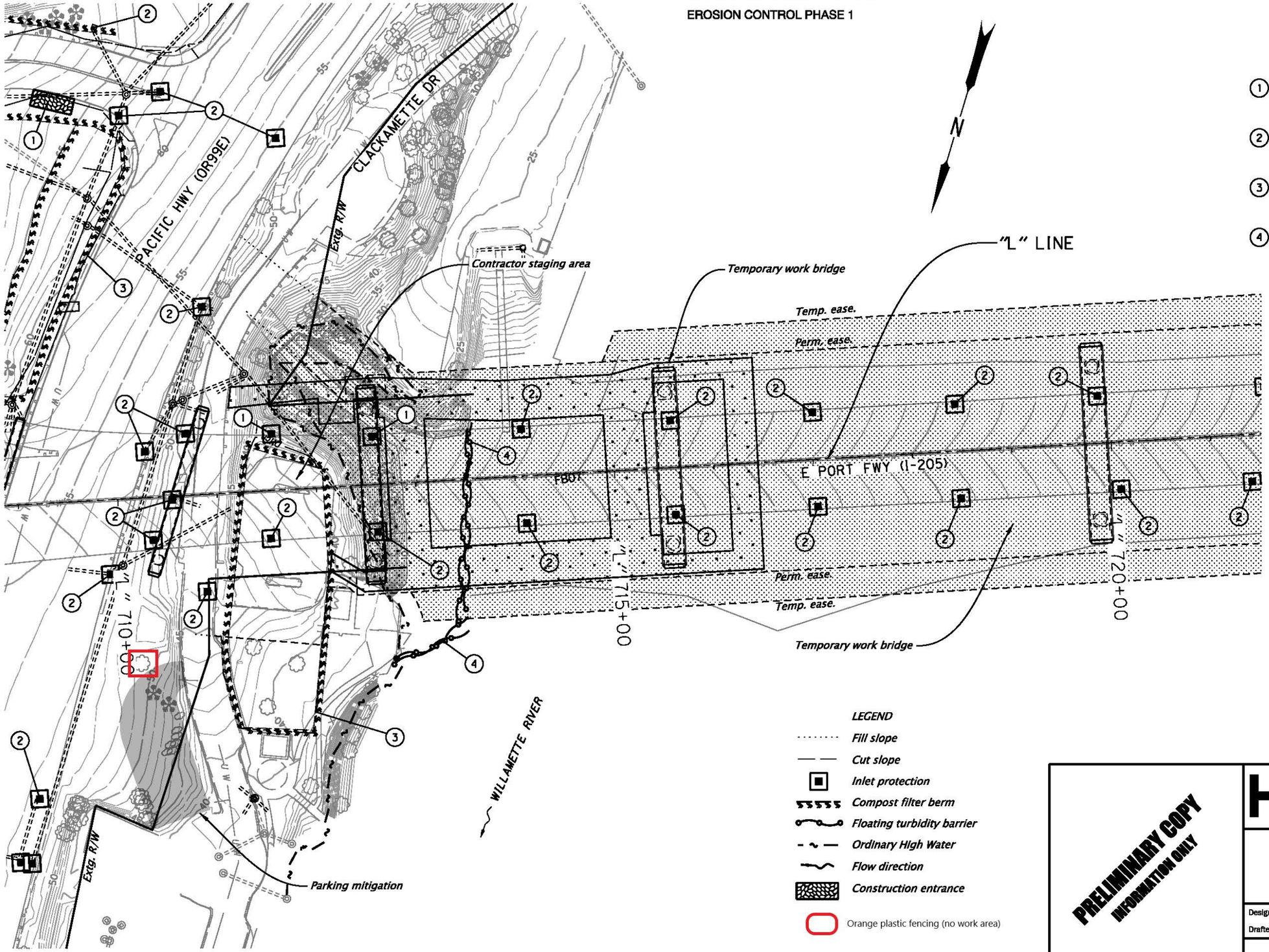
EROSION CONTROL PHASE 1

??V=???

GENERAL NOTES:

Floating turbidity barrier only required for rip rap removal.

1. *Const. construction entrance – x (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*
4. *Const. turbidity barrier – xx (See Sheet FB11)*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Floating turbidity barrier*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*
- Orange plastic fencing (no work area)

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Stelgleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

EE_K19786_HDR_ecpl_01.dgn :: FB08 2/7/2020 4:11:17 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431° Scale: 1"=100'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

BEGINNING OF PROJECT
S???(???)

STA. "L" 655+00 (M.P. 10.24)

N

Extg. R/W

E PORT FWY (I-205)

"L" LINE

CASCADE HWY (OR213)

"L" 655+00

"L" 660+00

"L" 665+00

Ditch

Extg. R/W

1. *Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) - xx (See drg. no. RD1006)*
3. *Const. construction entrance - xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) - xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing - xx*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Erosion control matting*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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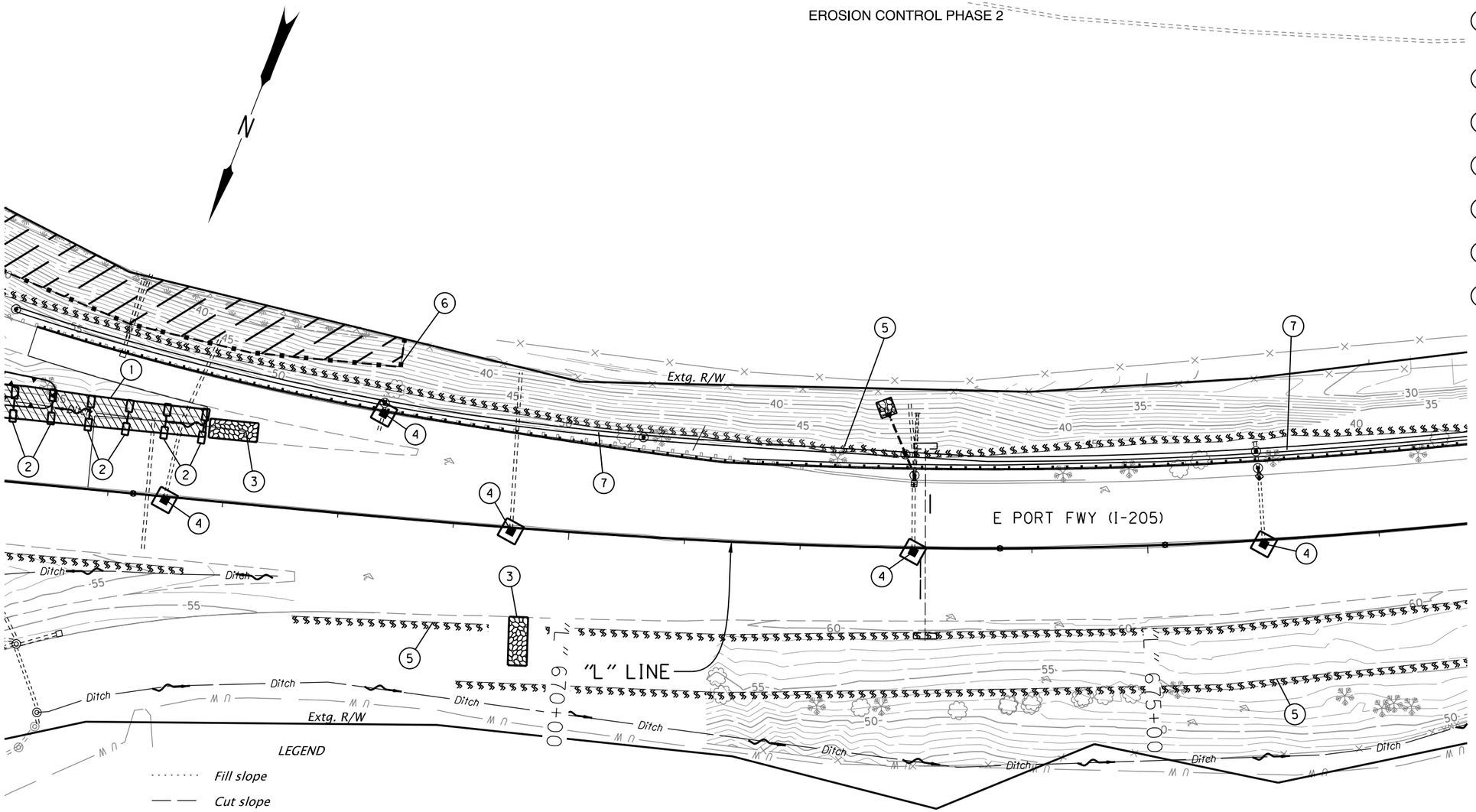
EE_K19786_HDR_ecpl_02.dgn :: FB21 2/7/2020 4:14:28 PM CDONOVAN

Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*
7. *Seeding and mulching – xx*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

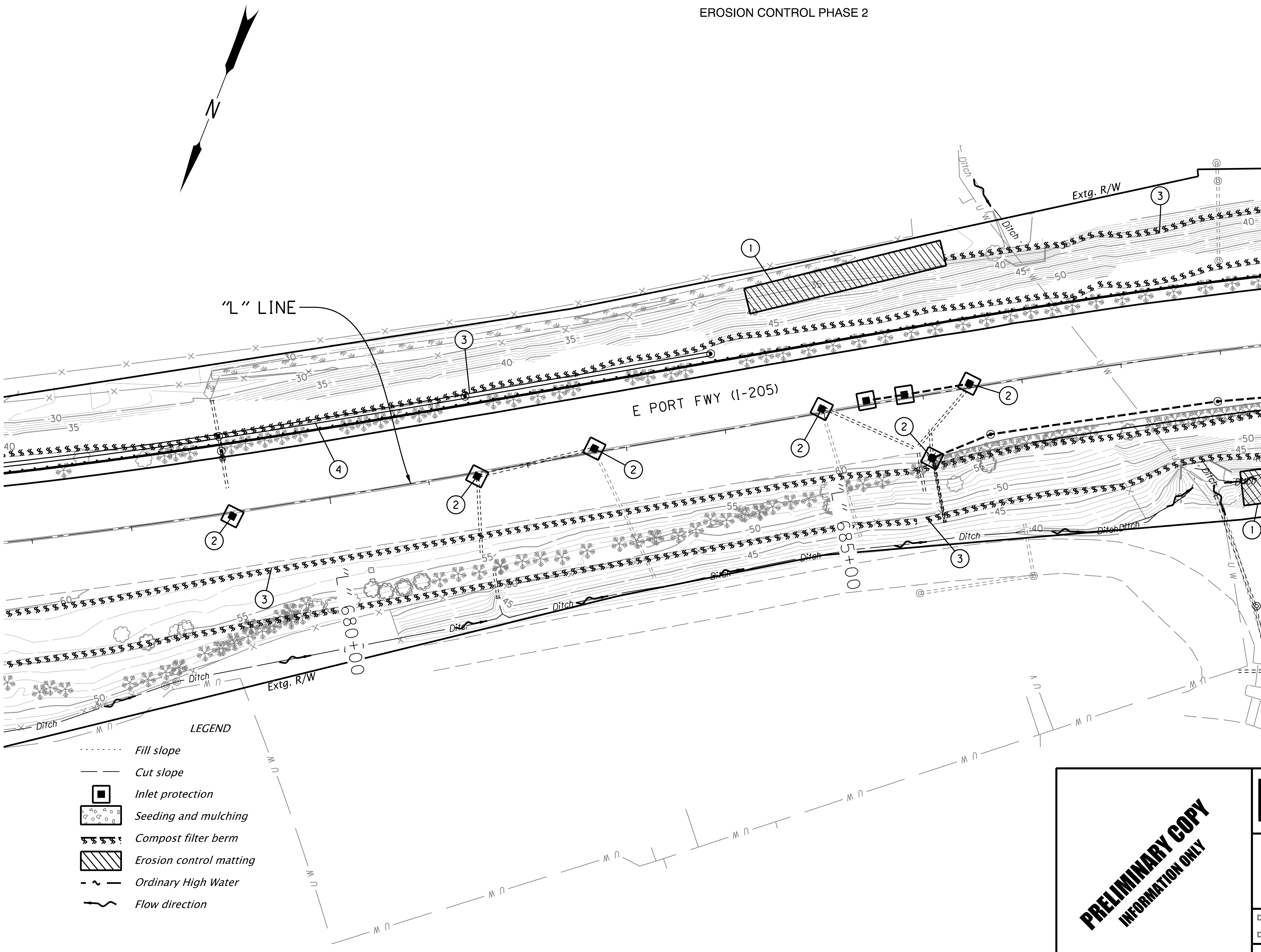
EE_K19786_HDR_ecpl_02.dgn :: FB22 2/7/2020 4:14:32 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)
3. Install sediment barrier, (Type 9) - xx (See drg. no. RD1033)
4. Seeding and mulching - xx

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Seeding and mulching*
- *Compost filter berm*
- *Erosion control matting*
- *Ordinary High Water*
- *Flow direction*

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503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

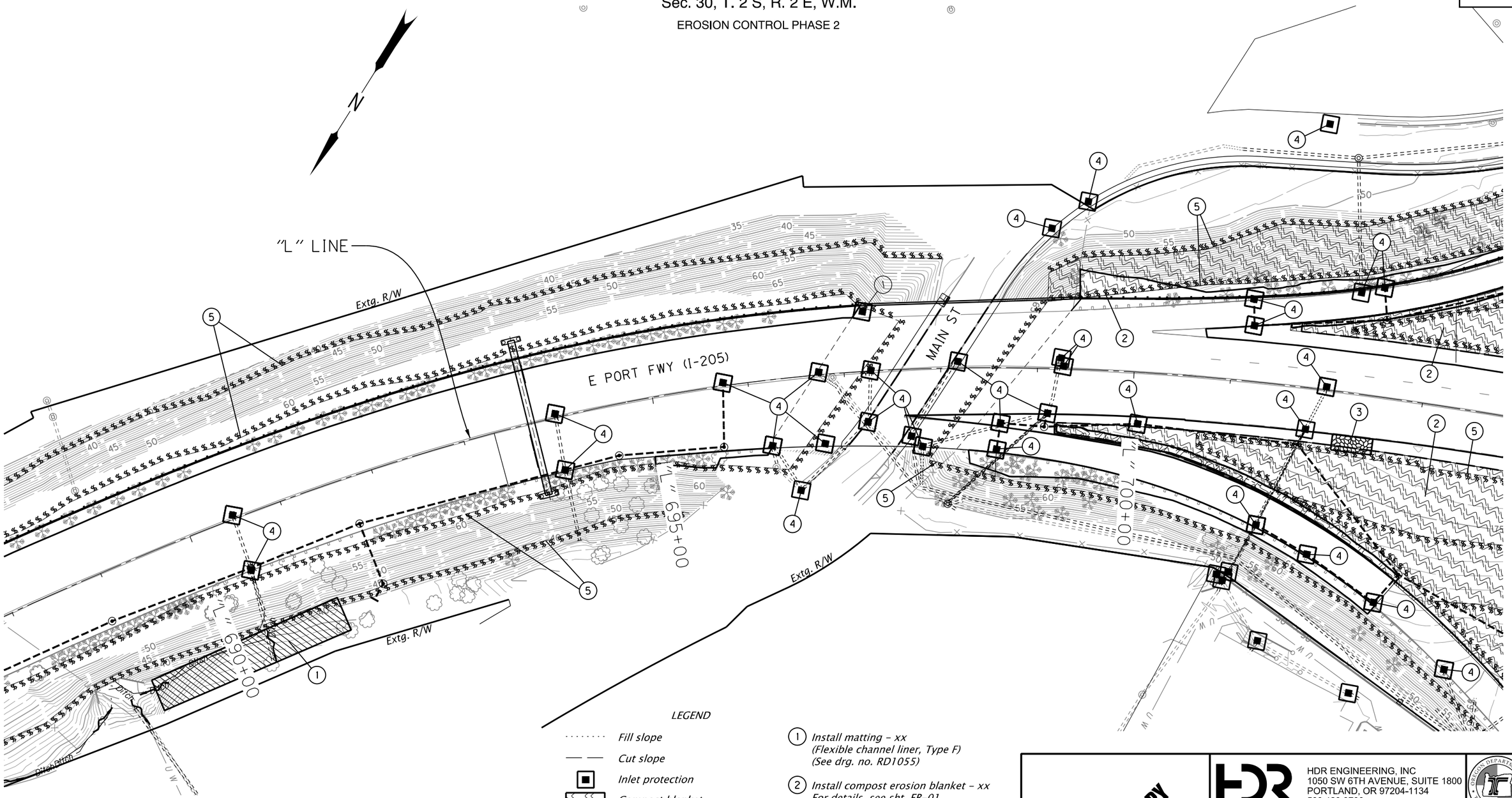
Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost blanket*
- *Erosion control matting*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Compost filter berm*

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Install compost erosion blanket – xx For details, see sht. FB-01*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB24 2/7/2020 4:14:40 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 212.6746° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Erosion control matting
- Ordinary High Water
- Construction entrance
- Flow direction
- Compost filter berm
- Orange plastic fence (no work area)

1. Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket - xx For details, see sht. FB-01
3. Const. construction entrance - xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)
5. Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
6. Install orange plastic mesh fencing - xx

Extg. R/W

105+00

E PORT FWY (I-205)

"L" LINE

PACIFIC HWY (OR99E)

710+00

Parking mitigation

Perm. ease.

ABERNETHY CREEK

Ditch

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB25 2/7/2020 4:14:44 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 272.0412°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

?? V = ???

1. *Install matting - xx*
   (Flexible channel liner, Type F)
   (See drg. no. RD1055)

2. *Install compost erosion blanket - xx*
   For details, see sht. FB-01

3. *Const. construction entrance - xx*
   (See drg. no. RD1000)

4. *Const. inlet protection, (Type 3) - xx*
   (See drg. no. RD1010)

5. *Install sediment barrier - xx*
   (Type 9)
   (See drg. no. RD1033)

6. *Install orange plastic mesh fencing - xx*

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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB25A 2/7/2020 4:14:46 PM CDONOVAN

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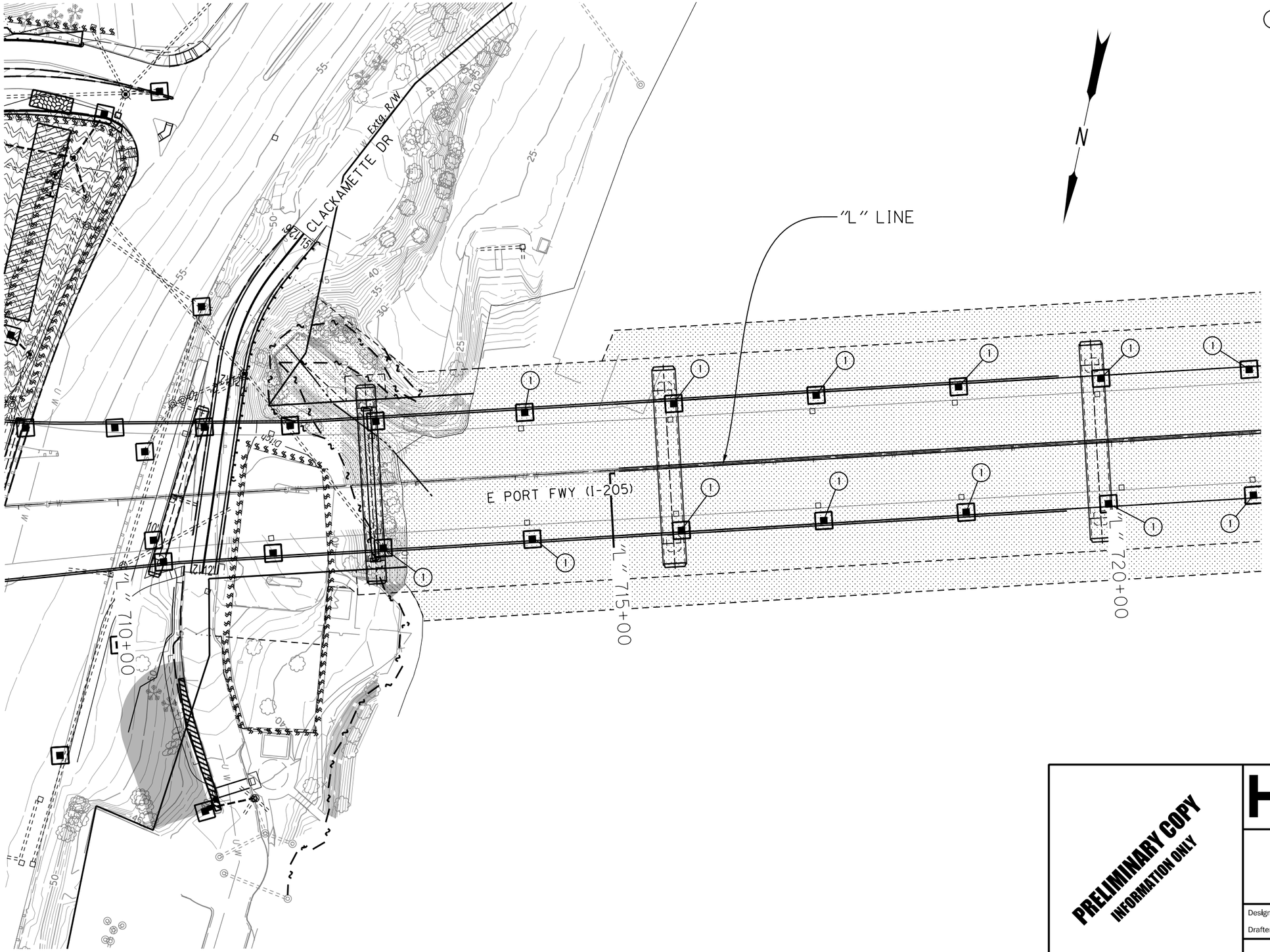

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

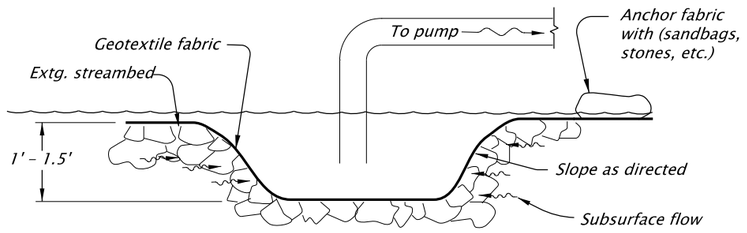
SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB26 2/7/2020 4:14:50 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.3393° 0'

TEMPORARY WATER MANAGEMENT FACILITY



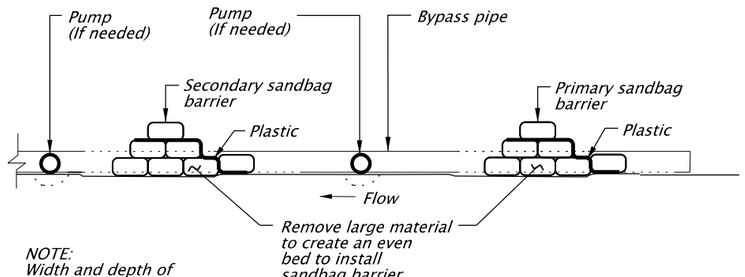
SUMP DETAIL
NTS

GENERAL NOTES:

The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.



NOTE:
Width and depth of sandbag barrier will vary depending on site and stream flow conditions.

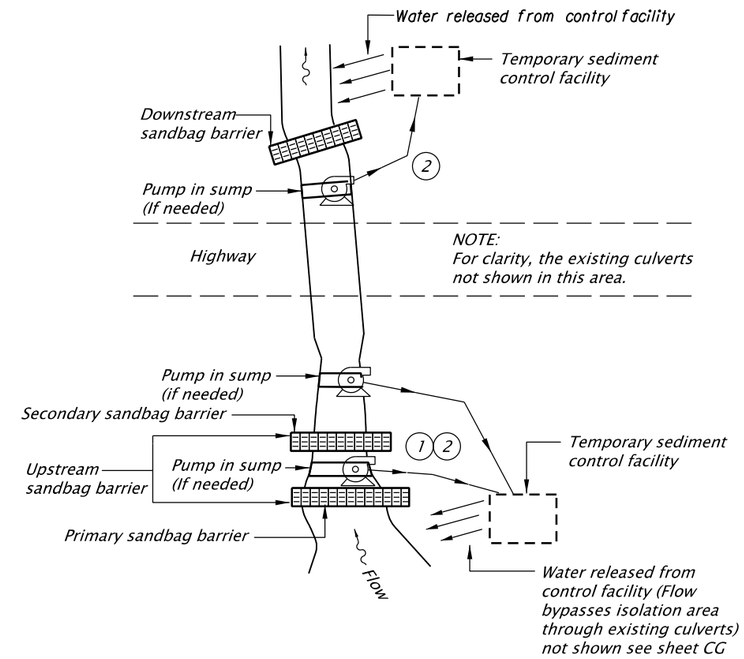
SANDBAG BARRIER SECTION

LEGEND:

Sandbag barrier line

Sediment control facility

Sump pump

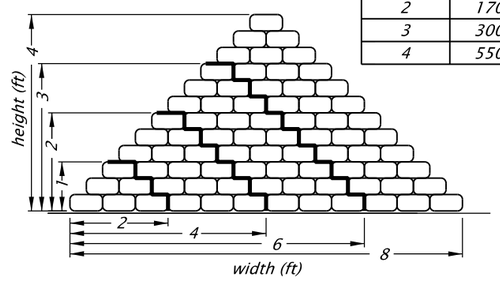


COMBINED PUMP/GRAVITY BYPASS DETAIL
NTS

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500



FULL ISOLATION NOTES:

(1) *See sheet FB22 note.*

(2) *See sheet FB22 note.*

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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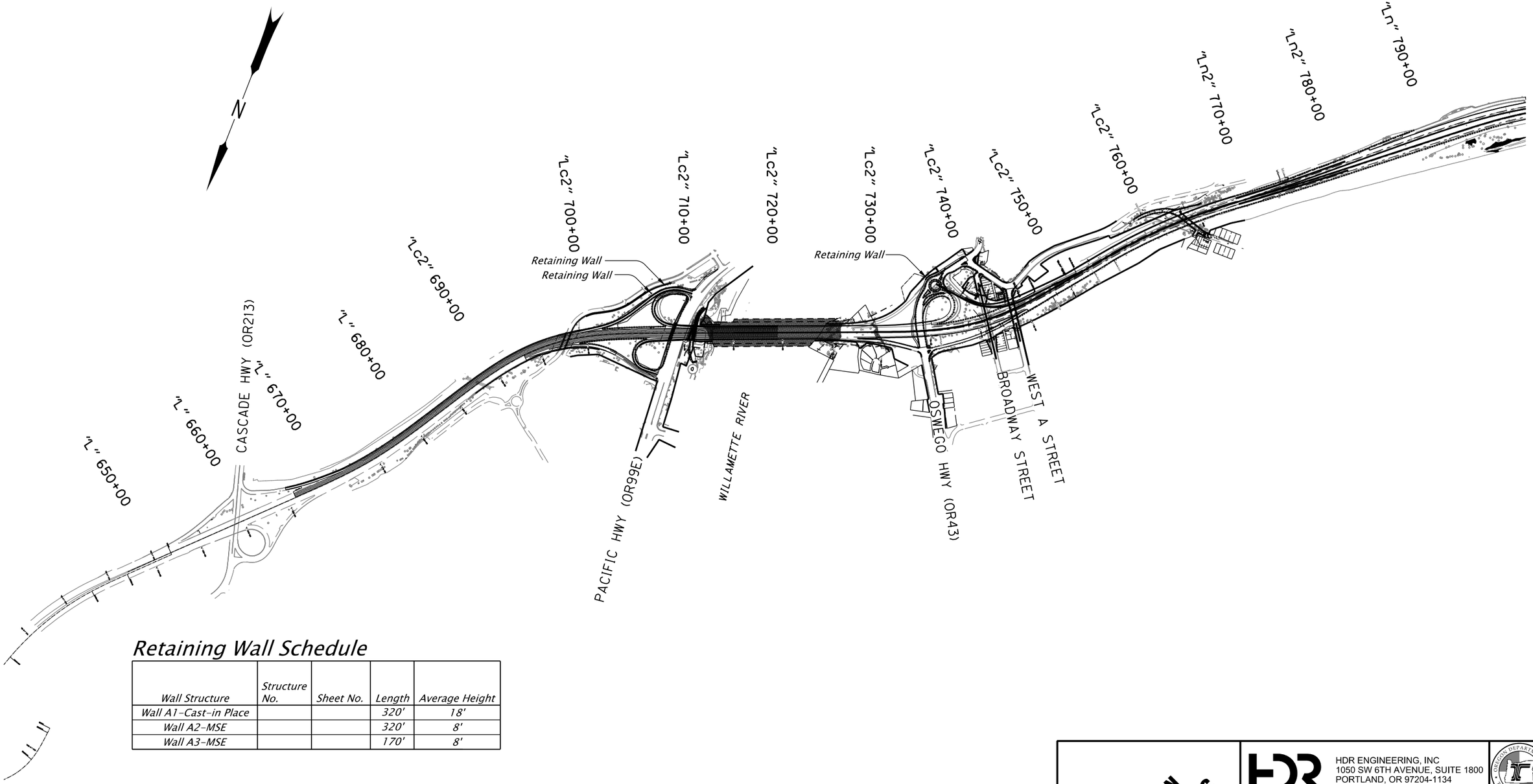
EE_K19786_HDR_ecpl_03.dgn :: FB45 bypass detail 2/7/2020 4:16:27 PM CDONOVAN

Rotation: 360° 0'



Retaining Wall Schedule

Wall Structure	Structure No.	Sheet No.	Length	Average Height
Wall A1-Cast-in Place			320'	18'
Wall A2-MSE			320'	8'
Wall A3-MSE			170'	8'

DRAFT DESIGN ACCEPTANCE PLANS
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Jason Rahm | Reviewer: John Wolf
Drafter: Landon Fisher | Checker: Brendan LeBlanc

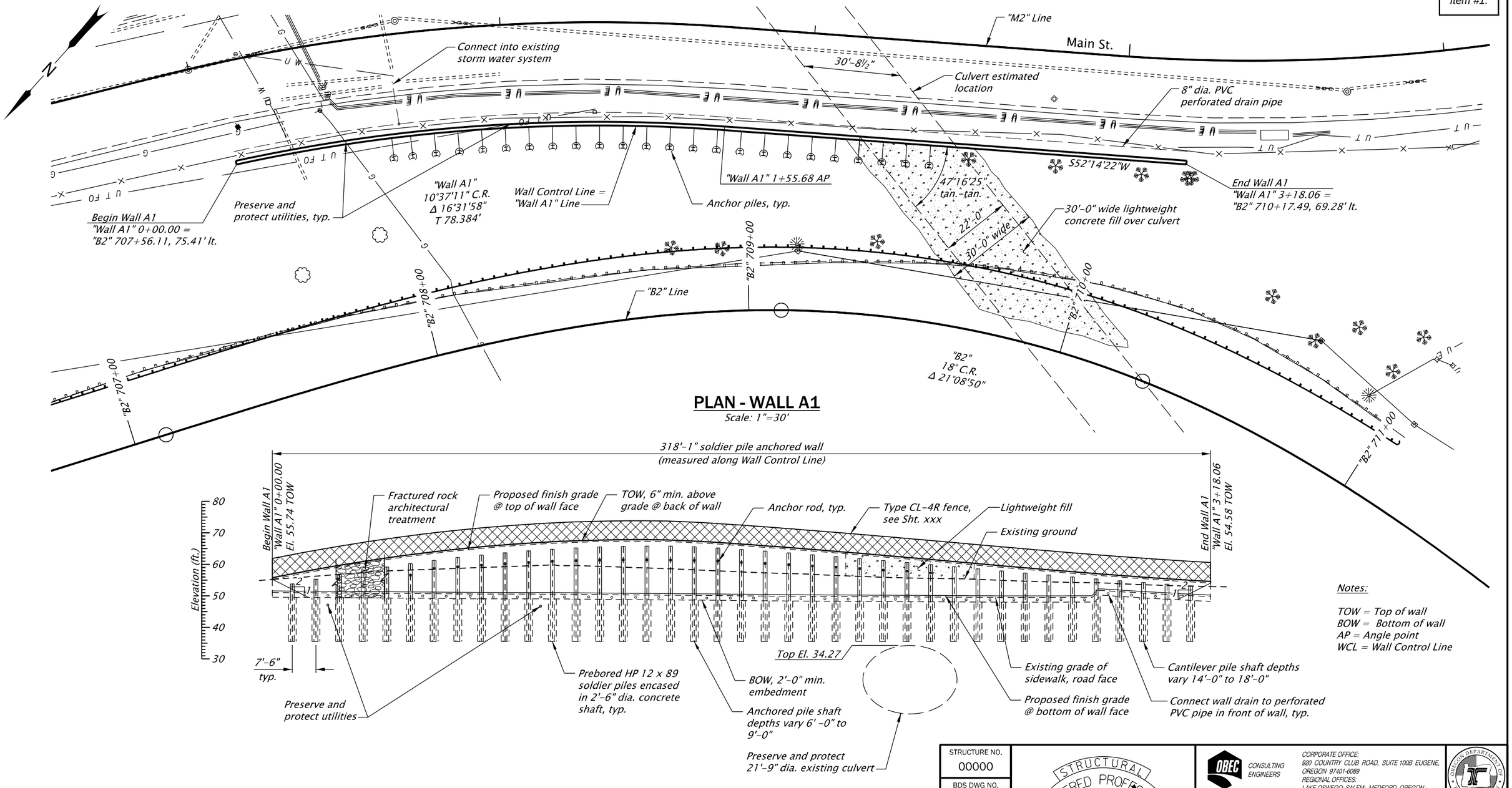
RETAINING WALL LAYOUT

SHEET NO.

GT_K19786_HDR_rtwpl_00.dgn :: GA01 2/7/2020 4:16:35 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 201.4396° 0'



PLAN - WALL A1

Scale: 1"=30'

DEVELOPED ELEVATION - WALL A1

Scale: 1"=30'

Notes:

TOW = Top of wall
BOW = Bottom of wall
AP = Angle point
WCL = Wall Control Line

Note:
Elevations shown are based on North American Vertical Datum 1988 (NAVD88).

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 000	
COUNTY	Clackamas
DATE	8/19

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 15185 OREGON PETER GLEN SLOCUM
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EXPIRES: 06/30/10, 2005

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A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

rtw_Main St_NE_45.36470/-122.59898

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Keava Campbell, E.I. | Reviewer: Douglas Kirkpatrick, P.E.
Drafter: Yuka Garzenelli | Checker: Peter G. Slocum, P.E., S.E.

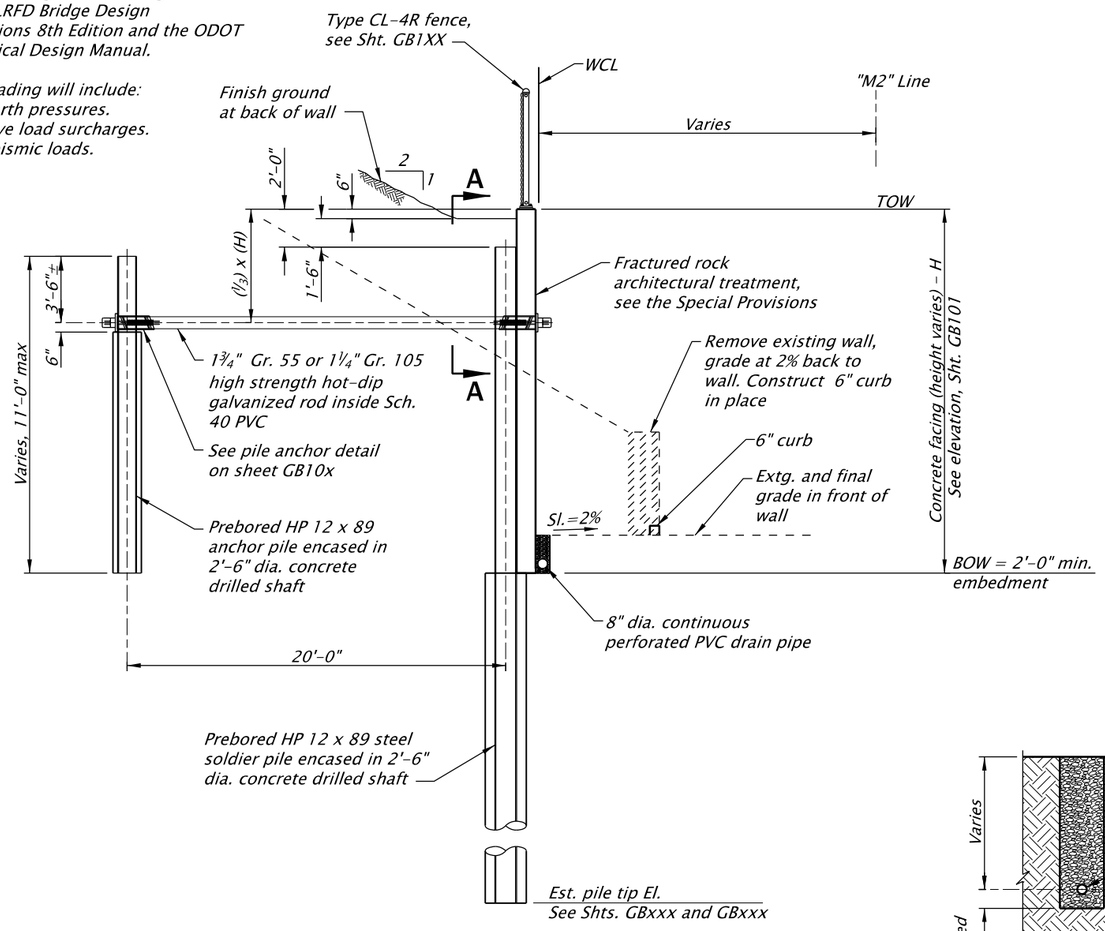
RETAINING WALLS - WALL A1

SHEET NO.

Notes:

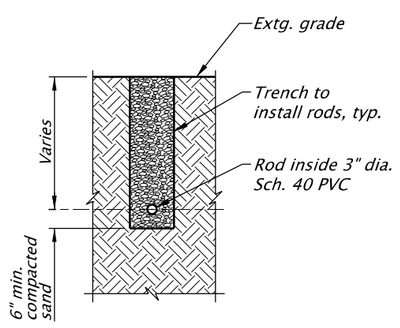
The wall is designed according to AASHTO LRFD Bridge Design Specifications 8th Edition and the ODOT Geotechnical Design Manual.

Design loading will include:
* Earth pressures.
* Live load surcharges.
* Seismic loads.



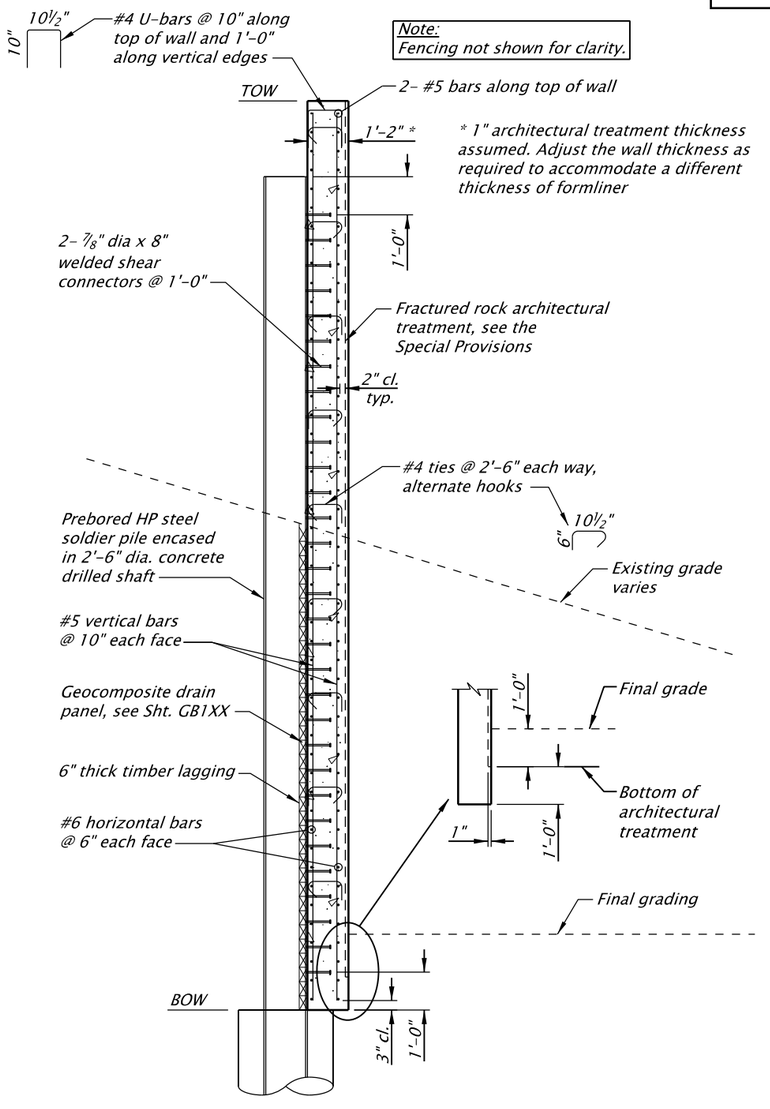
TYPICAL SECTION - "B2" 708+25 to "B2" 709+75

Scale: 1/8" = 1'-0"



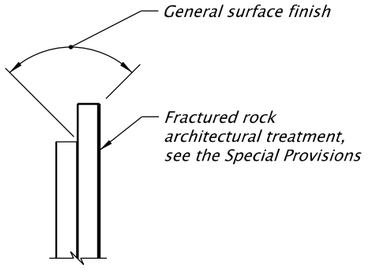
SECTION A-A

Scale: 1/4" = 1'-0"



WALL REINFORCEMENT

Scale: 1/4" = 1'-0"



CONCRETE SURFACE FINISH DIAGRAM

No Scale

Soldier Pile Installation Notes:

Provide HP 12 x 89 steel anchor piles and soldier piles.

Temporary casing above bedrock may be required to maintain excavation integrity during soldier pile installation.

Limit the number of prebored open holes to 3 adjacent holes without filling with soldier piling and concrete. Groups of 3 must be 40 feet apart if not filled with concrete.

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 000	
COUNTY	Clackamas
DATE	8/19

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 10, 2005
PETER GLEN SLOCUM
EXPIRES: 06/30/
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OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

rtw_Main St_NE_45.36470/-122.59898

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Keava Campbell, E.I. | Reviewer: Douglas Kirkpatrick, P.E.
Drafter: Yuka Garzenelli | Checker: Peter G. Slocum, P.E., S.E.

RETAINING WALLS - WALL A1

SHEET NO.

Details in progress

STRUCTURE NO.	00000
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	
M.P.: 000	
COUNTY	Clackamas
DATE	8/19

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
5[illegible]
OREGON
JUNE 10, 2005
PETER GLEN SLOCUM
EXPIRES: 06/30/

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A DOWL LLC Company

CORPORATE OFFICE:
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REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

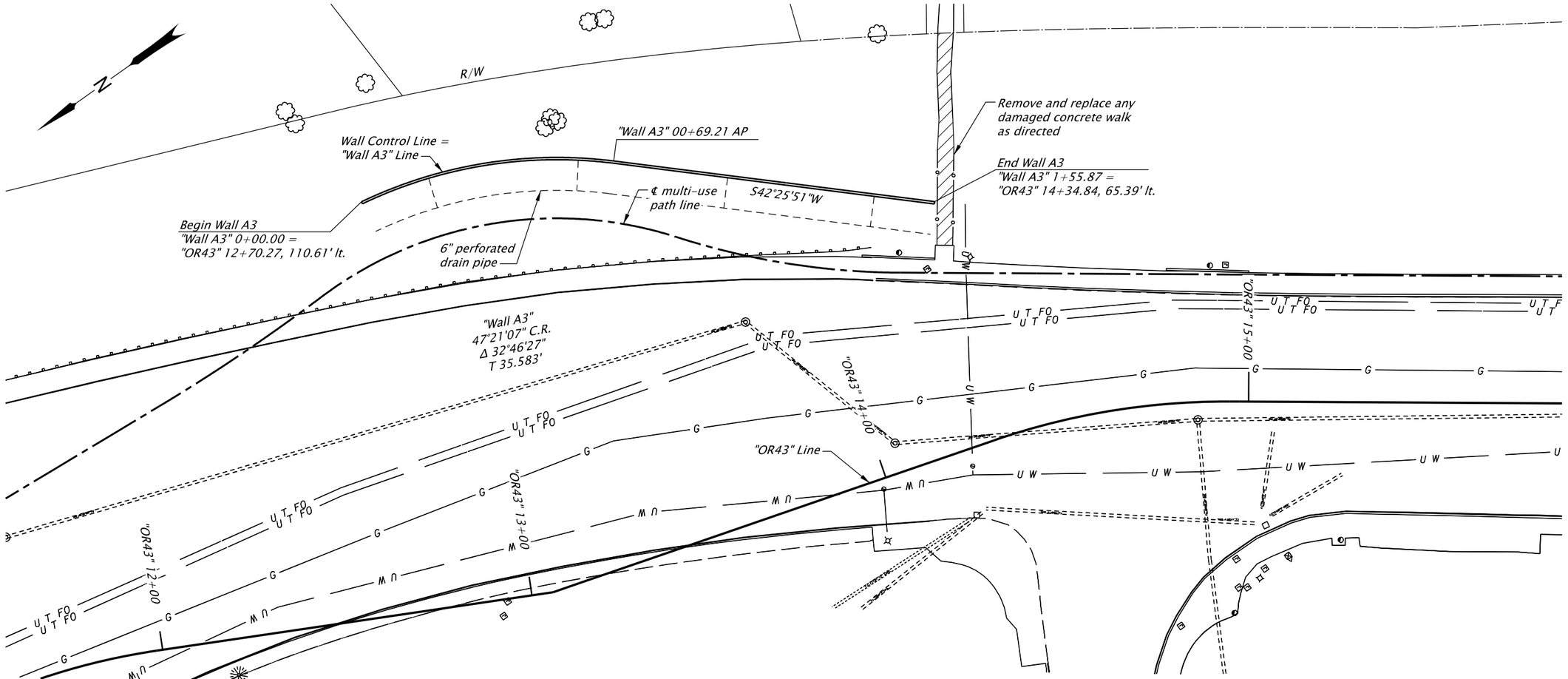
rtw_Main St_NE_45.36470/-122.59898

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Keava Campbell, E.I. | Reviewer: Douglas Kirkpatrick, P.E.
Drafter: Yuka Garzenelli | Checker: Peter G. Slocum, P.E., S.E.

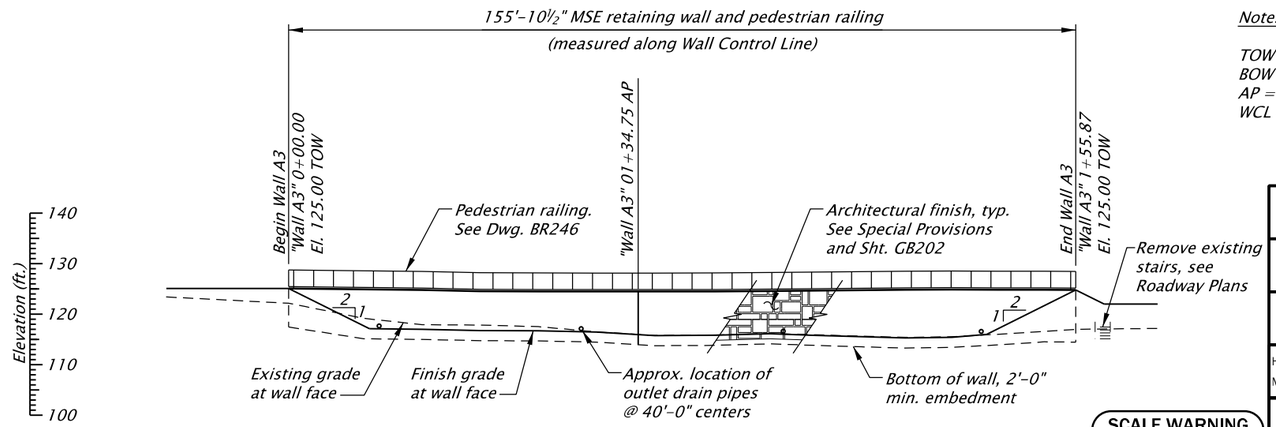
RETAINING WALLS - WALL A1

SHEET NO.



PLAN - WALL A3

Scale: 1"=30'



DEVELOPED ELEVATION - WALL A3

Scale: 1"=30'

Notes:

TOW = Top of wall
BOW = Bottom of wall
AP = Angle point
WCL = Wall Control Line

Note:
Elevations shown are based on North American Vertical Datum 1988 (NAVD88).

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 000	
COUNTY	Clackamas
DATE	8/19

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 10, 2005
PETER GLEN SLOCUM
EXPIRES: 06/30/
ADVANCE COPY SUBJECT TO CHANGE

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
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REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

rtw_OR43_ES_45.36153/-122.60909

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Keava Campbell, E.I. Reviewer: Douglas Kirkpatrick, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

RETAINING WALLS - WALL A3

SHEET NO.

A_GB201_Plan Sheets - OBEC :: GB201 8/12/2019 3:03:22 PM YGarzenelli

Rotation: 234.784° 0'

Notes:

The wall is designed according to AASHTO LRFD Bridge Design Specifications 8th Edition and the ODOT Geotechnical Design Manual.

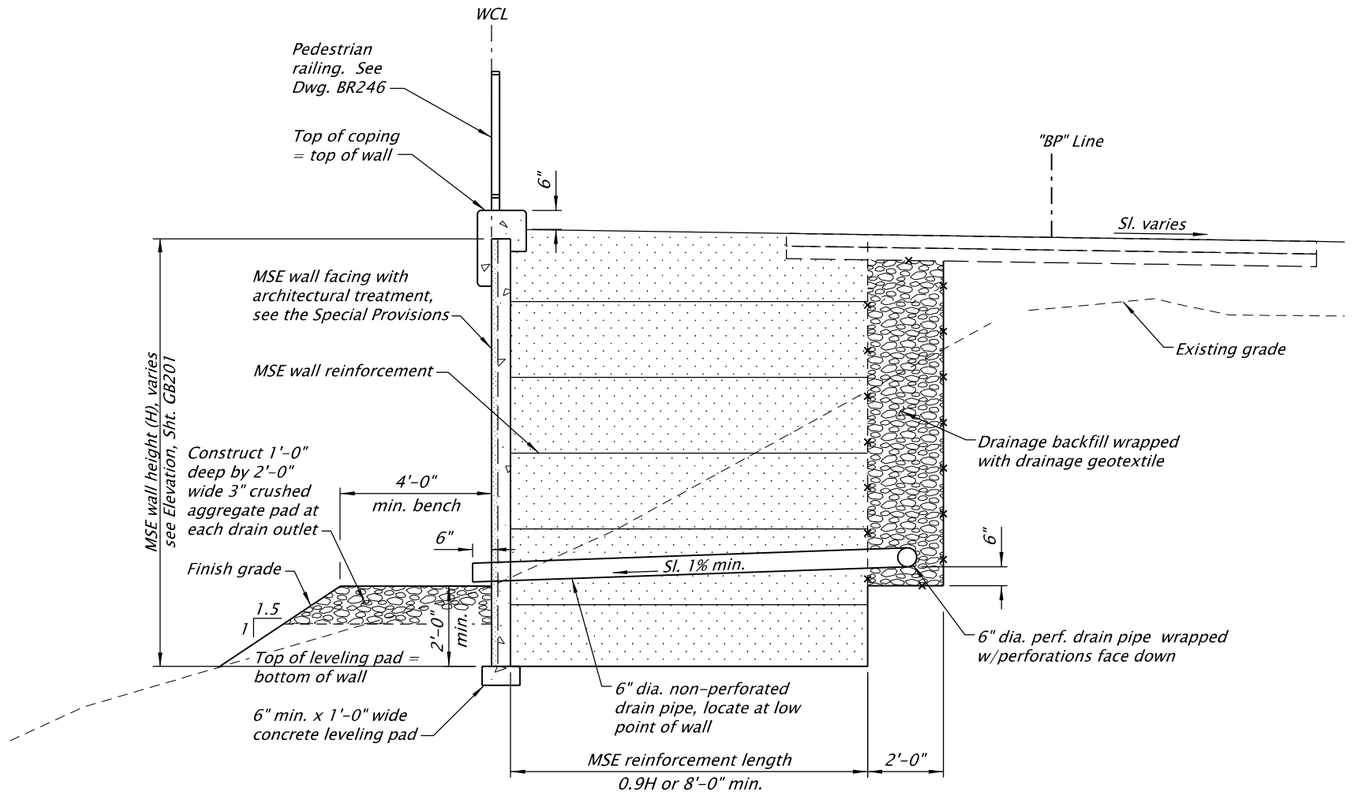
Design loading will include:
- ** Earth pressures.*
- ** Live load surcharges.*
- ** Seismic loads.*

MSE retaining wall design is based on the following soil properties per ODOT GDM and recommendations by the geotechnical team:

Soil angle of internal friction = 32°
Soil cohesion = 0 psf
Soil weight = 125 pcf

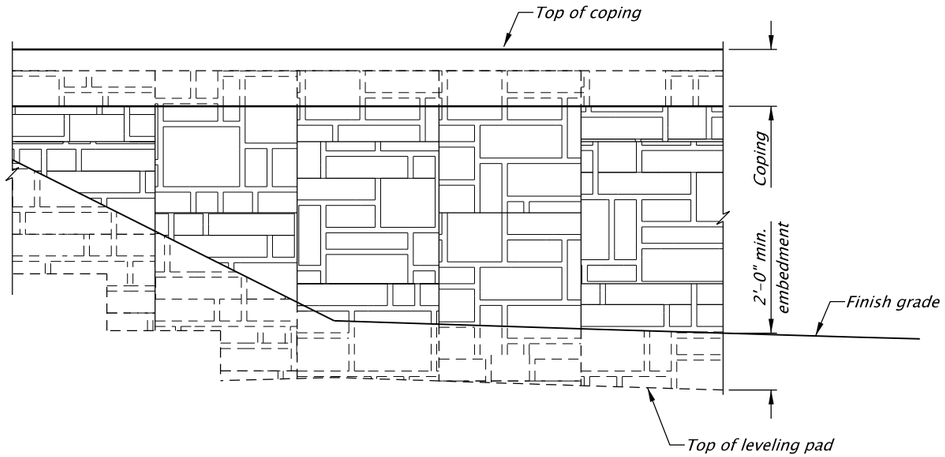
The internal and external stability for overturning and sliding, and the overall stability, bearing resistance and settlement are addressed in site specific design.

The MSE retaining wall is not designed for traffic barrier vehicular collision load or hydrostatic or seepage forces.



TYPICAL SECTION

Scale: 1/4"=1'-0"



RETAINING WALL A3 ARCHITECTURAL TREATMENT

Scale: 3/16"=1'-0"

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 000	
COUNTY	Clackamas
DATE	8/19

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON JUNE 10, 2005 PETER GLEN SLOCUM
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rtw_OR43_ES_45.36153/-122.60909

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Keava Campbell, E.I. | Reviewer: Douglas Kirkpatrick, P.E.
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RETAINING WALLS - WALL A3

SHEET NO.

General Notes:

Provide all materials and perform all work according to the Oregon Standard Specifications for Construction 2018 and the Special Provisions.

Design shall be in accordance with the "2017 AASHTO LRFD Bridge Design Specification", 8th Edition, as modified by the "ODOT Geotechnical Design Manual", 2018. Seismic design is for 1000-year return period criteria. Use Site Class "B" and horizontal seismic coefficients equal to 0.XX.

Provide a minimum service life of 75 years for all components.

Provide all reinforcing steel according to ASTM Specification A706 or A615, Grade 60. Provide field-bent or welded reinforcement according to ASTM Specification A706. Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise. Provide the following splice lengths, unless shown otherwise:

Reinforcing Splice Length (Class B. Uncoated) Grade 60, f'c = 4.0 ksi											
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11	#14	#18
Uncoated Splice Length	1'-4"	1'-7"	2'-0"	2'-5"	2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	Not Permitted	

Place bars 2" clear of the nearest face of concrete unless shown otherwise.

Do not backfill wall until all trenching that may be necessary in front of the wall is backfilled and compacted, and compacted toe fill is in place to top of subgrade.

Provide Class 4000 - ¾ concrete for the precast wall panels and the coping.

Provide commercial grade concrete for the leveling pads.

The location/stationing of steps in the foundation must maintain the cover shown in the plans. Any deviation requires approval by the Engineer.

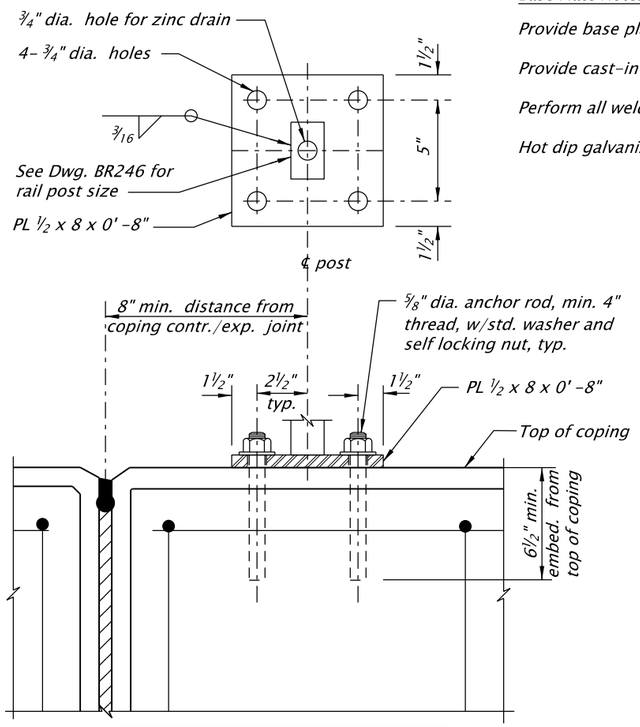
Contractor shall include details to avoid utilities in working drawing submittal.

Field verify elevation of top of coping prior to construction of coping. This dimension may vary. Keep coping depth smooth and uniform.

Provide coping contraction joints at 15'-0" maximum spacing and coping expansion joints at 45'-0" maximum spacing. Stop horizontal bars 2" clear of expansion joints. Provide extra bent bars on each side of joints. Align coping joints with vertical wall joints.

Provide an architectural finish on all wall facing panels. See the Special Provisions.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 800-332-2344 or 811.



Note:
For details not shown of pedestrian rail, see Dwg. BR246.

PEDESTRIAN RAIL CONNECTION DETAIL
No Scale

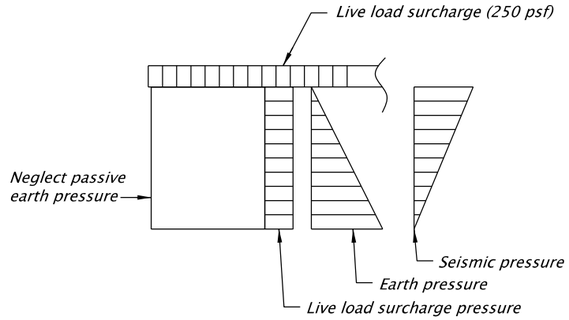
Base Plate Notes:

Provide base plates conforming to ASTM Specification A36.

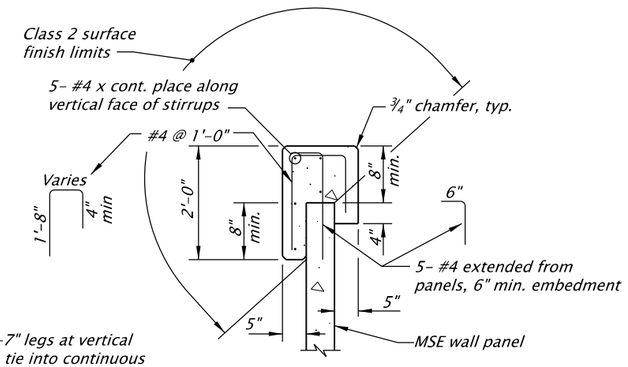
Provide cast-in-place or post installed anchor rods conforming to ASTM F1554 Grade 55 and high strength epoxy.

Perform all welding according to the 2015 American Welding Society AWS D1.1.

Hot dip galvanize base plates, pipes, anchor bolts and associated hardware after fabrication.



WALLS SUPPORTING LIVE LOAD
No Scale

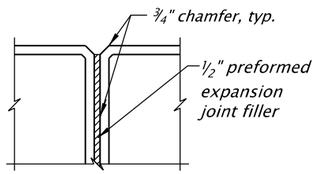


Coping Notes:

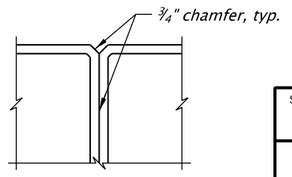
5- #4 "L" bars with 1'-7" legs at vertical and horizontal corners, tie into continuous bars, typ.

Stop longitudinal bars 2" clear of coping end, typ.

COPING DETAIL
No Scale



COPING EXPANSION JOINT DETAIL
No Scale



COPING CONTRACTION JOINT DETAIL
No Scale

SCALE WARNING
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STRUCTURE NO.	00000
BDS DWG NO.	00000
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HWY: 064 M.P.: 000	
COUNTY	Clackamas
DATE	8/19

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER PETER GLEN SLOCUM 10, 2005 EXPIRES: 06/30/

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OREGON DEPARTMENT OF TRANSPORTATION

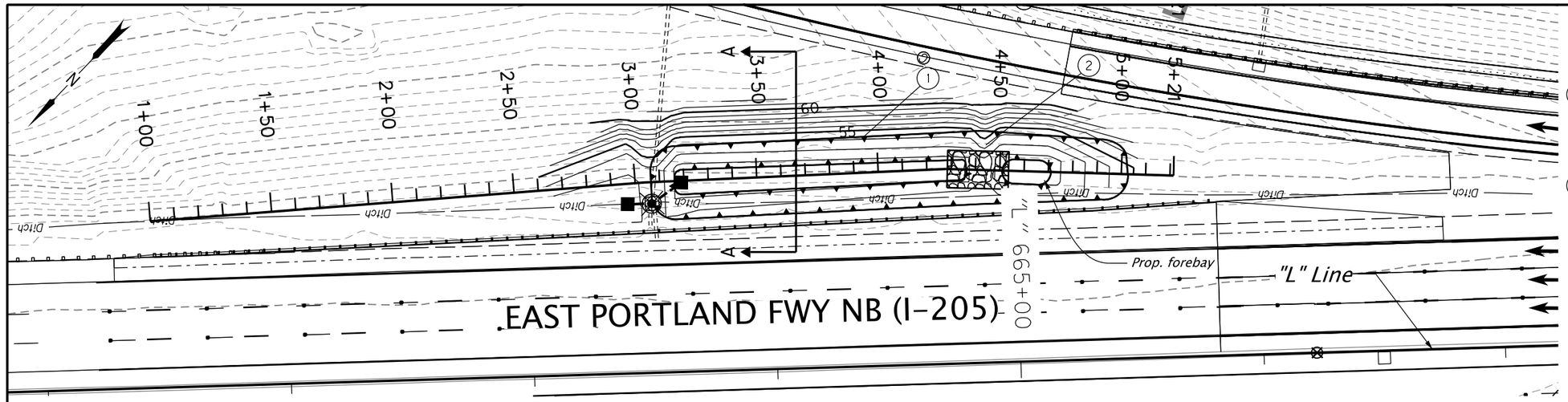
rtw_OR43_ES_45.36153/-122.60909

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Keava Campbell, E.I. Reviewer: Douglas Kirkpatrick, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

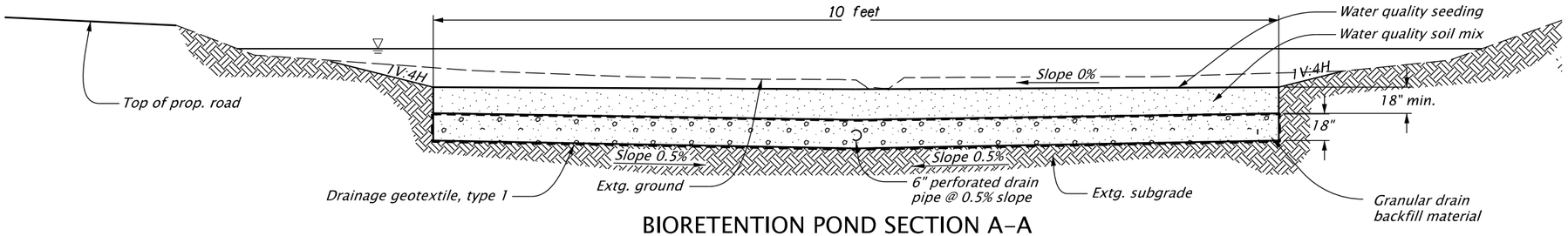
RETAINING WALLS - WALL A3

SHEET NO.



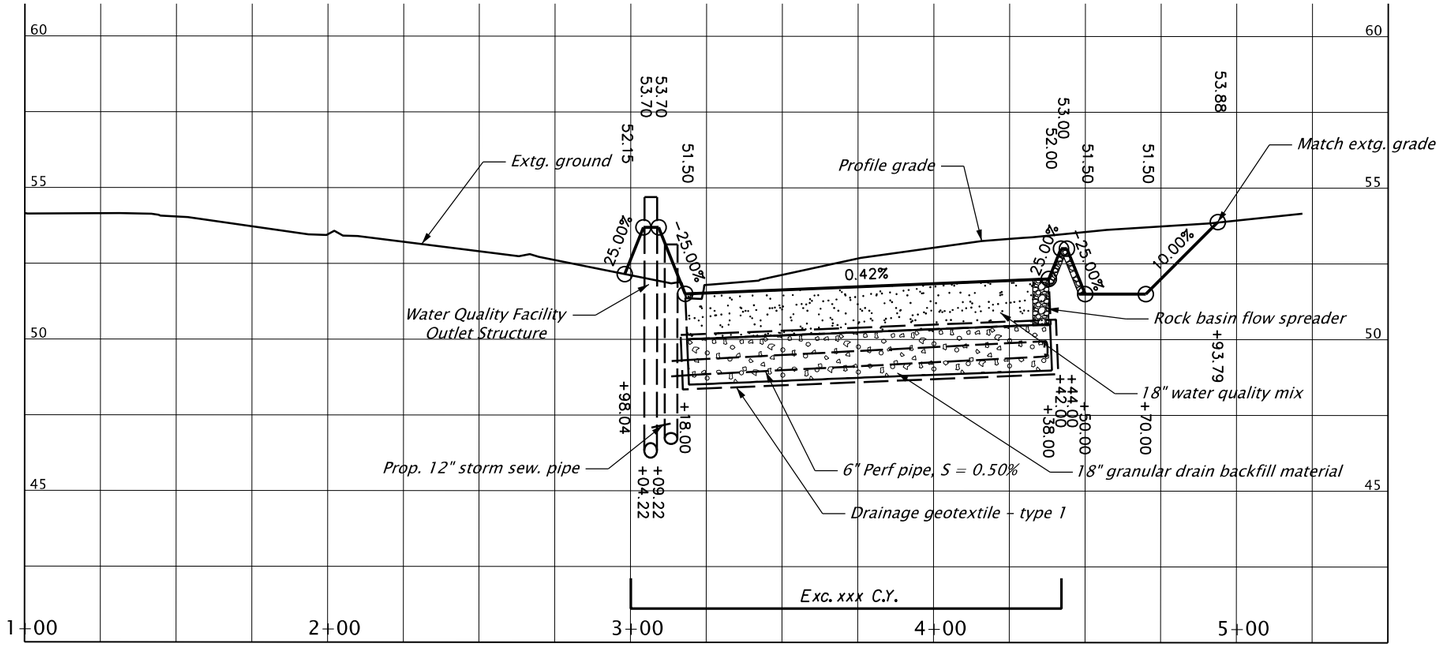
1. Sta. 3+09.86 to Sta. 4+10.05 = Sta. "L" 664+49.08, 81.53' Lt. to Sta. "L" 663+49.06, 84.27' Lt.
   Const. biorention pond
   (For details, see sht. HAxx)

2. Sta. 4+50.00, 0.00'
   Const. forebay berm
   (For details, see sht. HAxx)



BIORETENTION POND SECTION A-A

Scale: NTS



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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

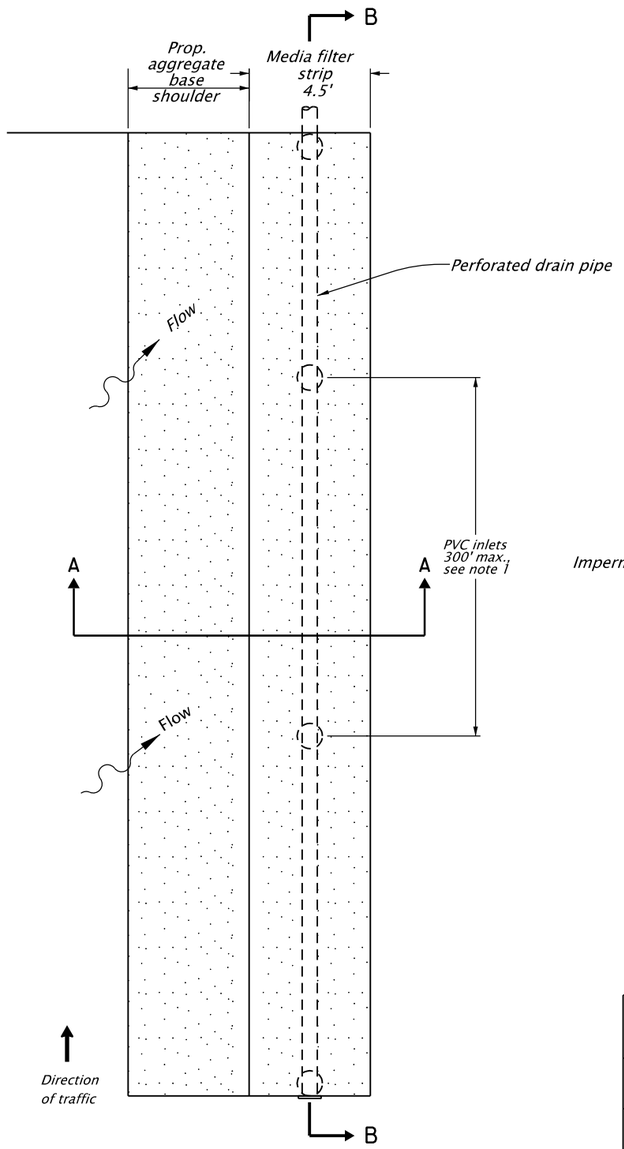
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

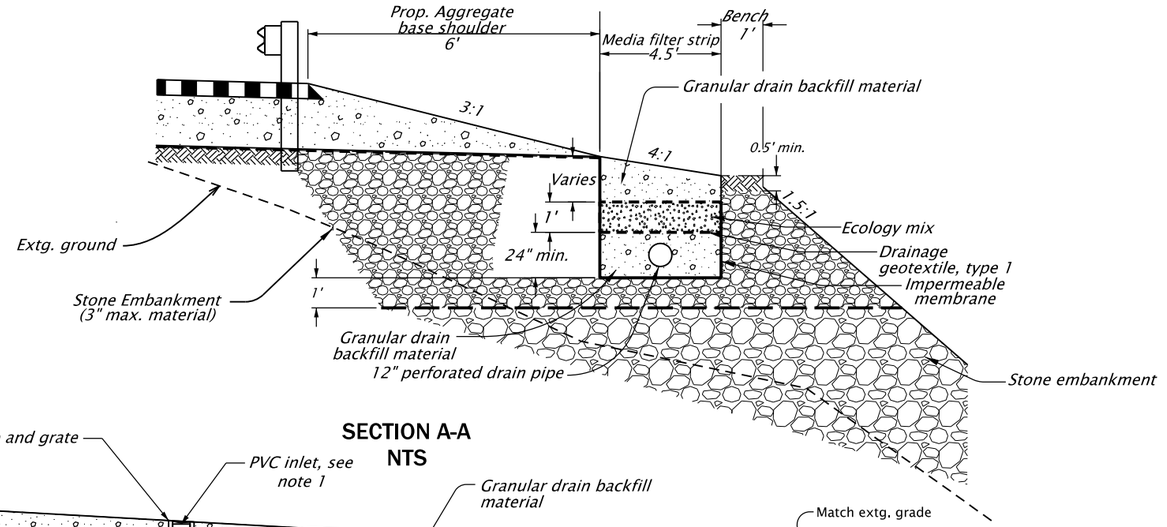
SHEET NO.

Rotation: 223.5514°
Vertical Scale: 1:10

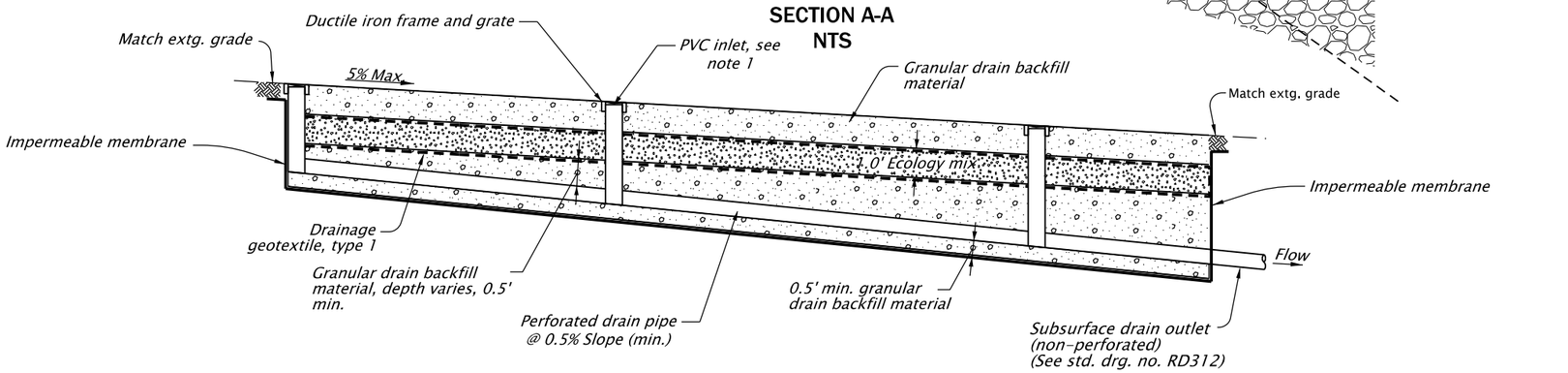
BIOSLOPE
STA. "L" 665+00 TO STA. "L" 684+00



PLAN
NTS



SECTION A-A
NTS



SECTION B-B
NTS

Bioslope I.D.	Basin Area (acres)	2-Year Peak Flow (cfs)	Length (ft)	Assumed Long Term * Infiltration Capacity (cfs)	Rdwy Slope	Pipe Slope	Pipe ** Capacity (cfs)
Bioslope #1	0.253	0.14	333	0.35	1.9%	1.9%	2.37
Bioslope #2	0.840	0.47	459	0.48	0.2%	0.5%	1.22
Bioslope #3	0.517	0.29	307	0.32	0.2%	0.5%	1.22
Bioslope #4	0.496	0.28	301	0.31	0.3%	0.5%	1.22
Bioslope #5	0.871	0.49	500	0.52	0.8%	0.8%	1.54

* assumes 4.5 feet wide infilration trench as shown in detail
** assumes 12 inch pipe and 0.027 mannings coefficient

Notes:

1. Install PVC inlets as shown along perforated drain pipe. PVC inlet should be flush to ground surface. See sheet HAXX and HAXX for details.

DFI#XXXXXX

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

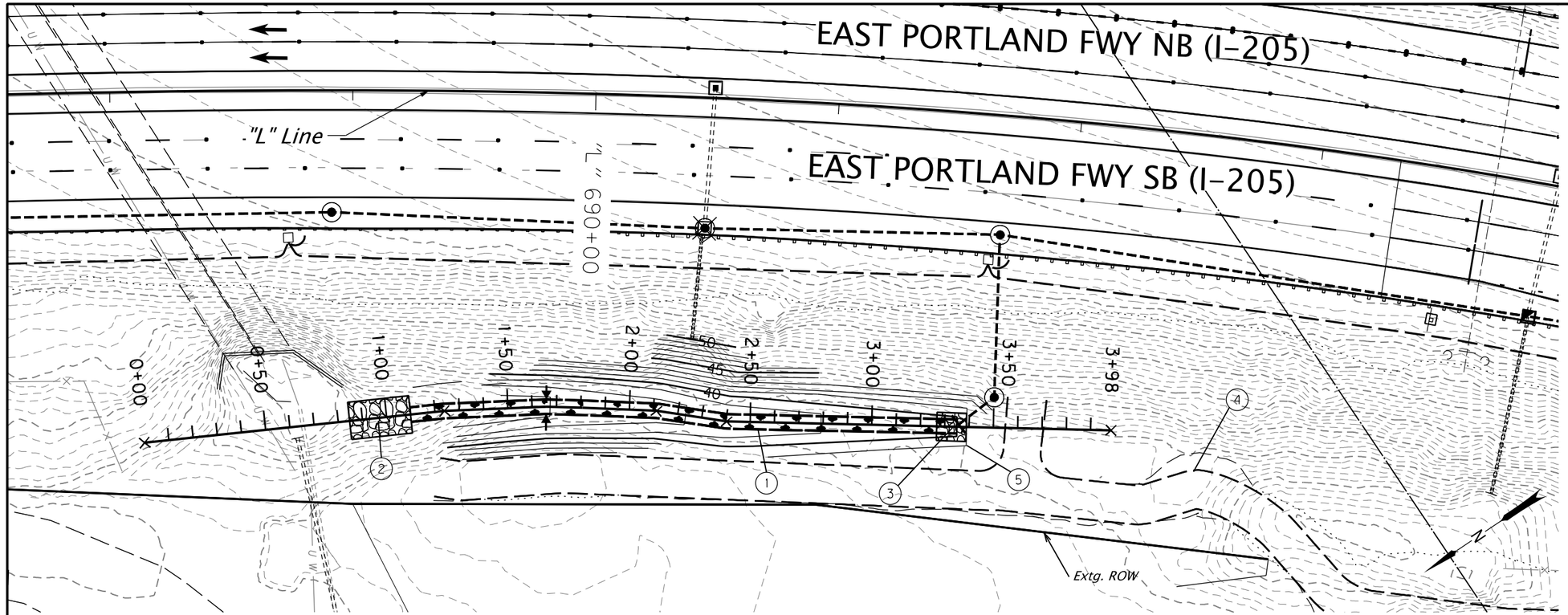
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'



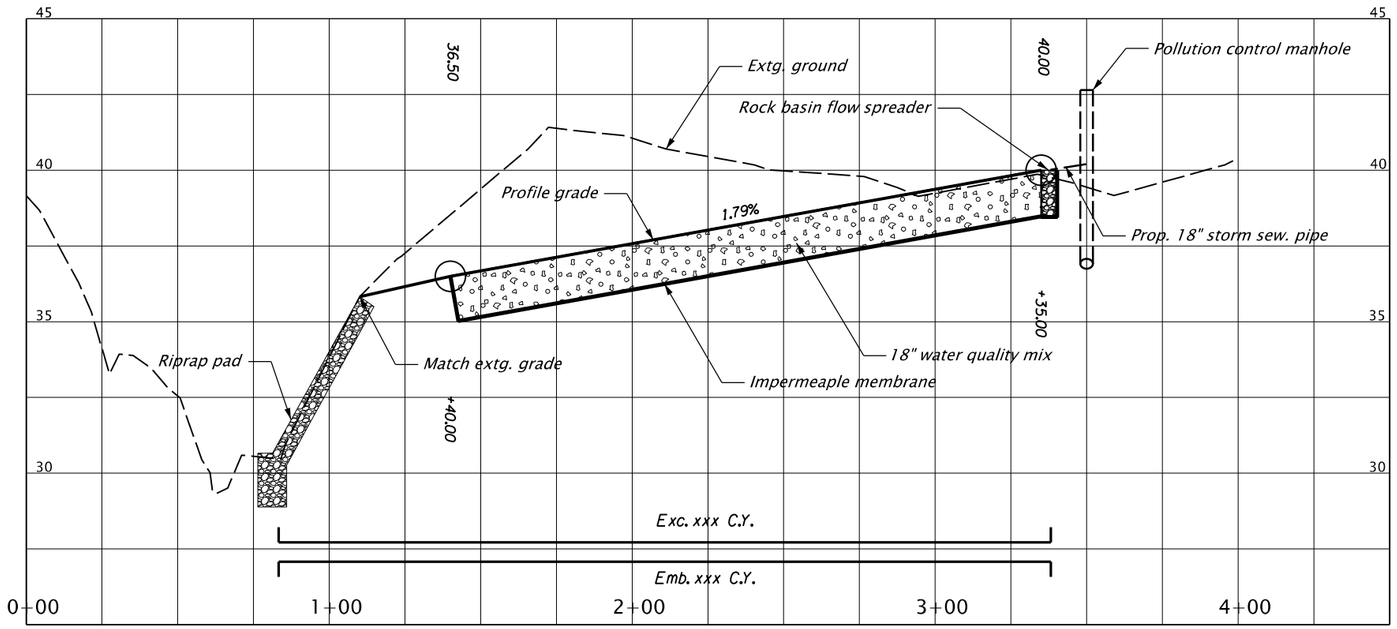
1. *Sta. 1+09.97 to Sta. 3+34.91 = Sta. "L" 691+58.97, 128.64' Rt. to Sta. "L" 689+24.75, 133.18' Rt.*
   Const. biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 0+97.37, 0.00'*
   Const. riprap pad
   Loose riprap (class 50) - 5.0 tons
   (See drg. no. RD317)

3. *Sta. 3+33.58, 0.00'*
   Const. rock basin flow spreader
   (For details, see sht. HAxx)

4. *Sta. XX+XX.XX*
   Const. maintenance access road
   (For details, see sht. HAxx)

5. *Sta. XX+XX.XX*
   Const. biofiltration swale berm
   (For details, see sht. HAxx)



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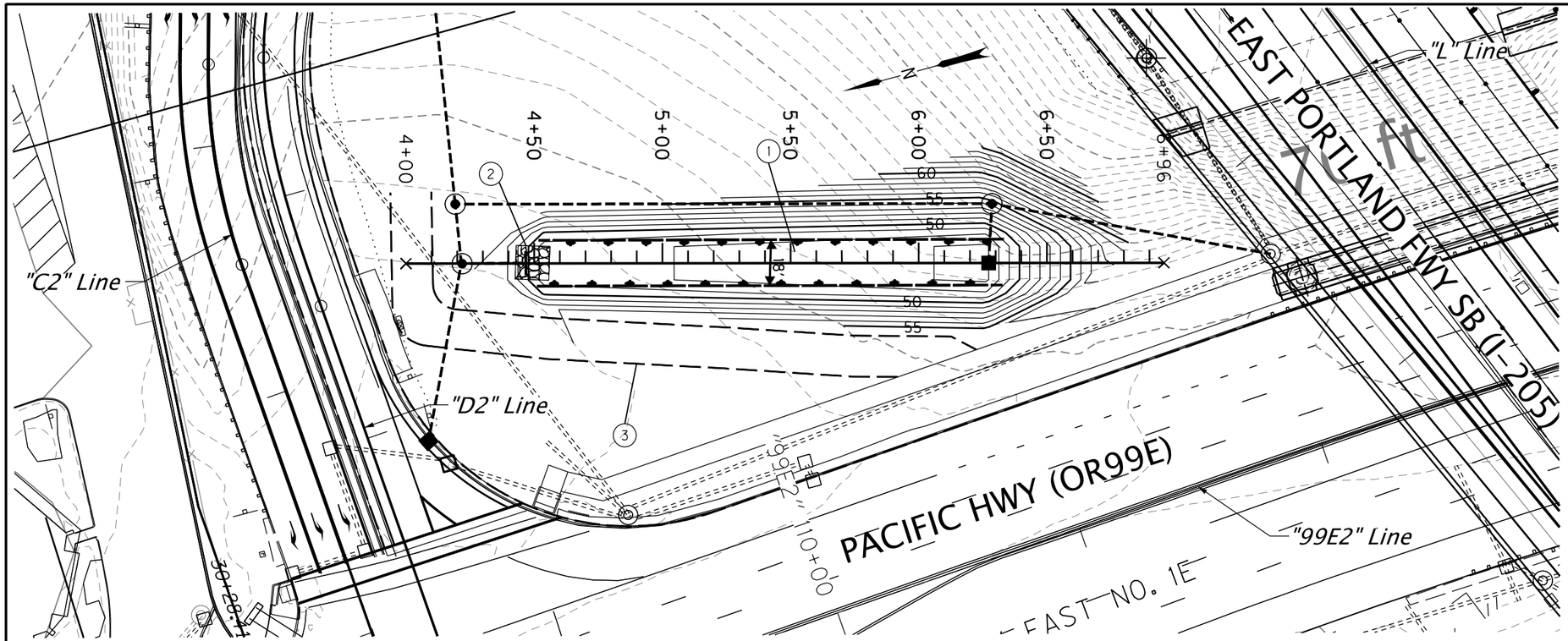
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

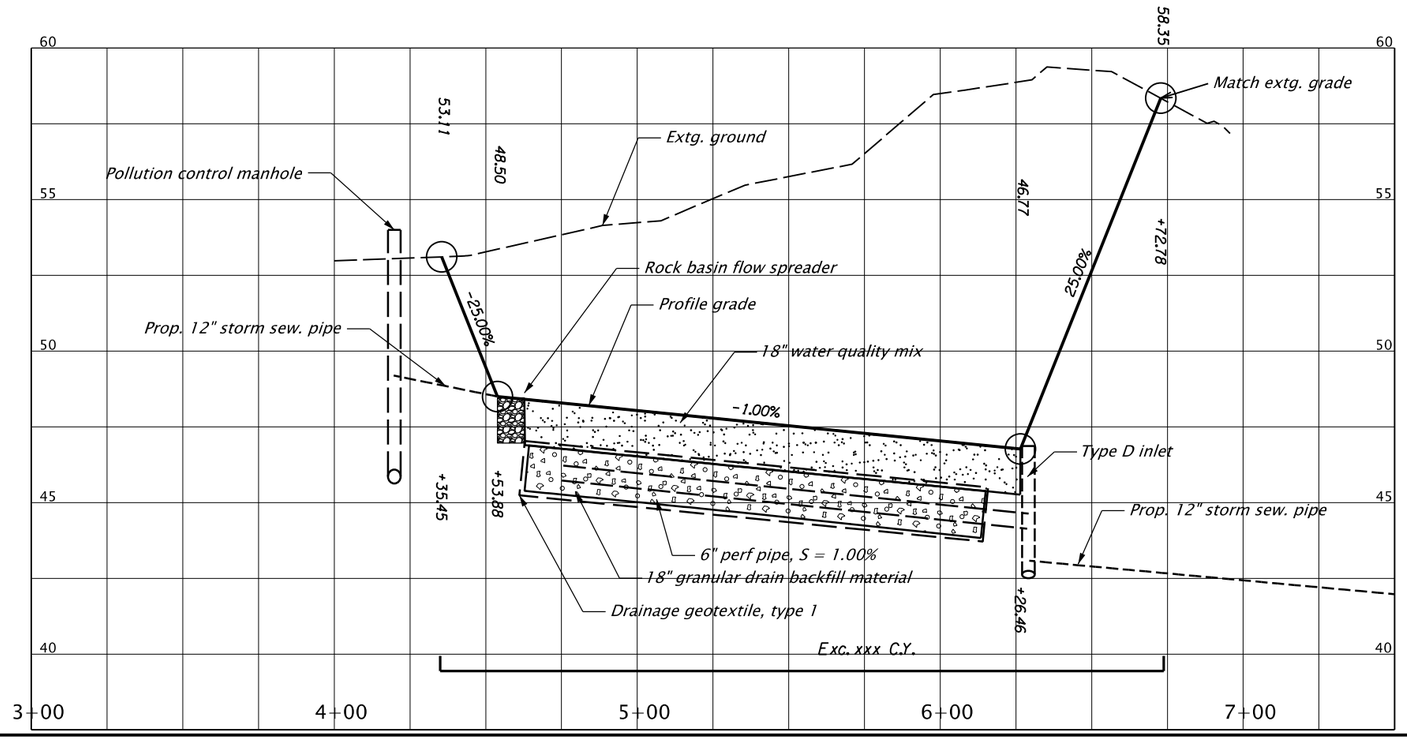
Rotation: 236.1297°
Vertical Scale: 1:10



(1) *Sta. 4+50.41 to Sta. 6+34.91 = Sta. "99E2" 109+34.68, 167.57' Lt. to Sta. "99E2" 111+06.11, 107.62' Lt.*
Const. biofiltration swale
(For details, see sht. HAxx)

(2) *Sta. 4+48.95, 0.00'*
Construct rock basin flow spreader
(For details, see sht. HAxx)

(3) *Sta. XX+XX.XX*
Construct maintenance access road
(For details, see sht. HAxx)



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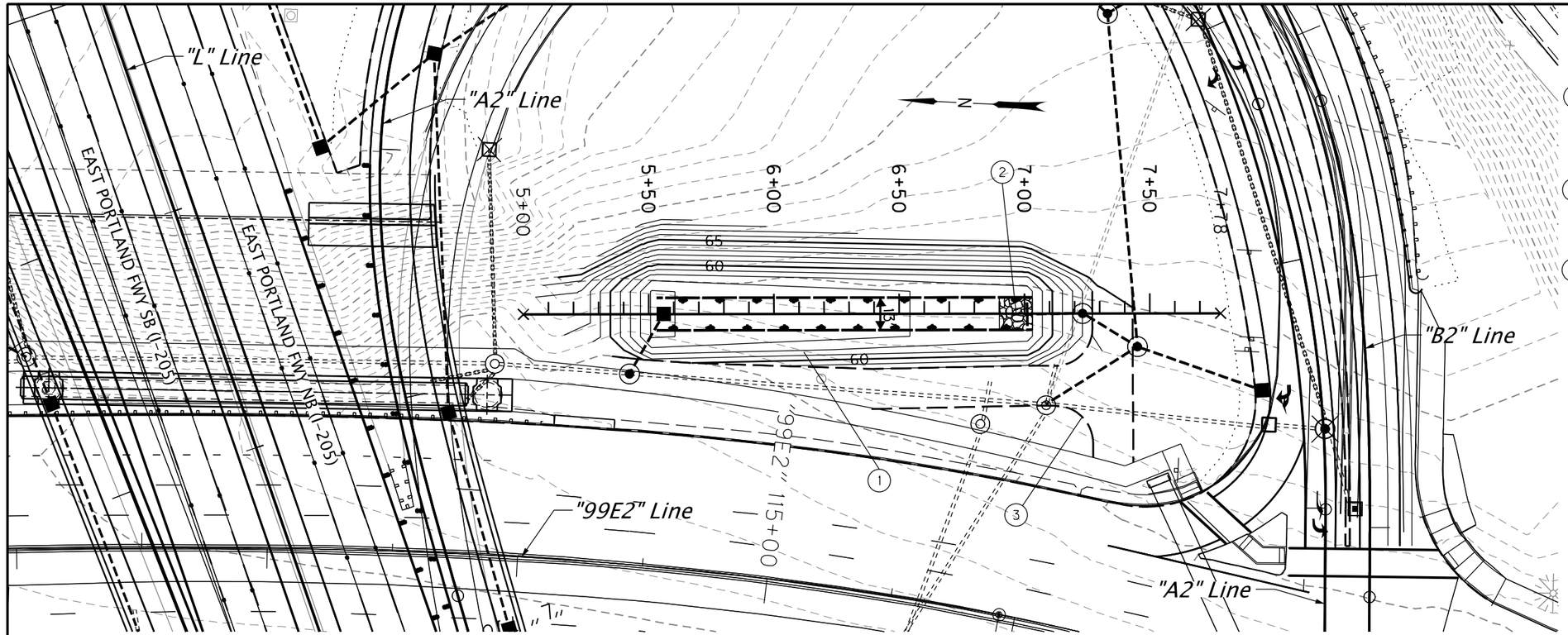
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

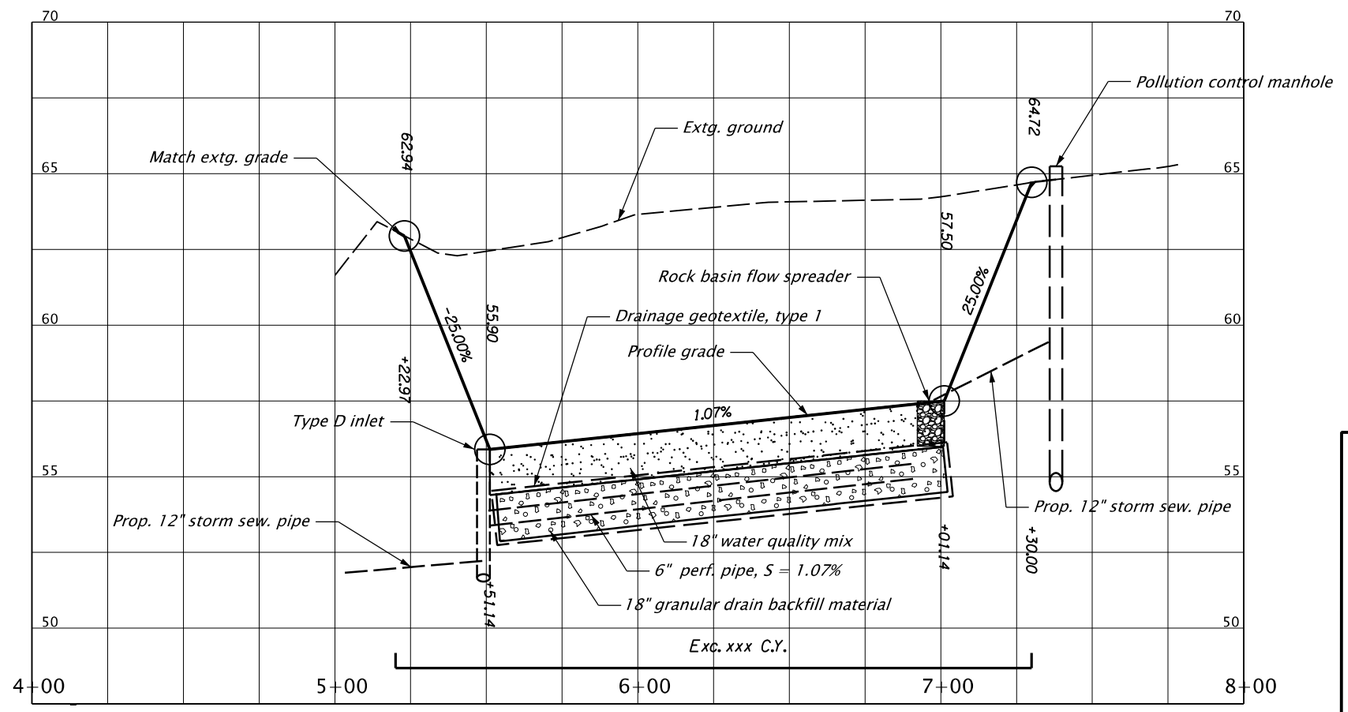
Rotation: 254.7731° 0'
Vertical Scale: 1:10



1. Sta. 7+03.50 to 5+52.97 = Sta. "99E2" 115+84.70, 120.53' Lt. to Sta. "99E2" 114+47.00, 100.54' Lt.
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. Sta. 6+95.86, 0.00'
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. Sta. XX+XX.XX
   Construct maintenance access road
   (For details, see sht. HAxx)



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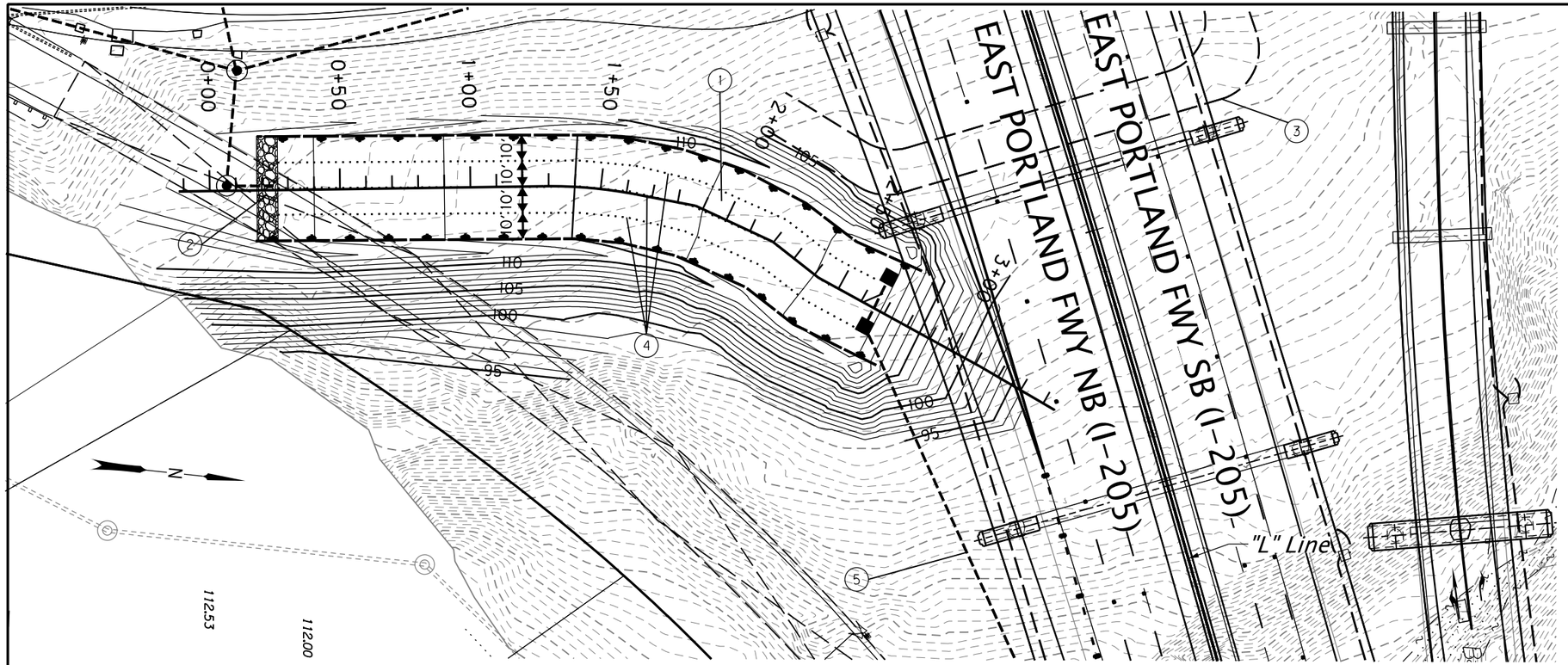
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 272.7106° 0'
Vertical Scale: 1:10



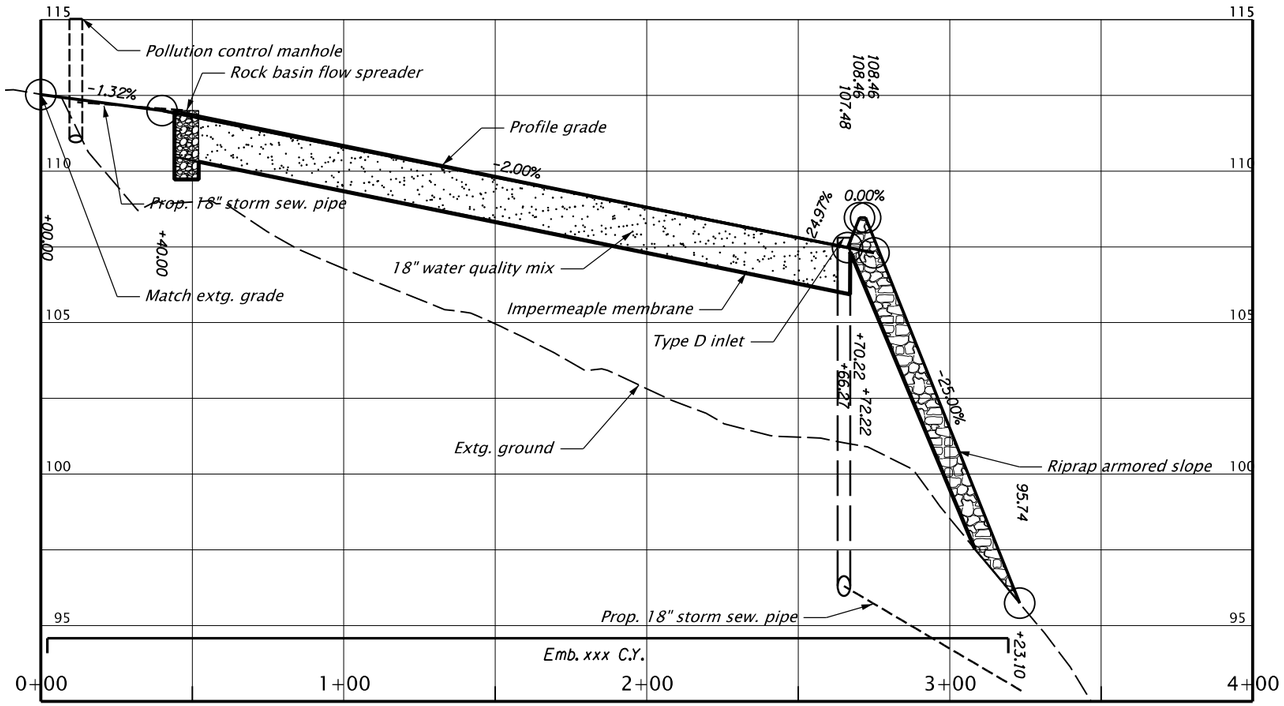
1. *Sta. 0+31.89 to Sta. 2+48.39 = Sta. "OR43" 10+59.46, 110.66' Lt. to Sta. "OR43" 8+78.88, 209.80' Lt.*
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 0+37.15, 2.22' Lt.*
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. *Sta. XX+xx.xx*
   Construction maintenance access road
   (For details, see sht. HAxx)

4. *Construct biofiltration swale divider*
   (For details, see sht. HAxx)

5. *Construct pipe and outfall*
   (For details, see sht. HA11)



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OREGON DEPARTMENT OF TRANSPORTATION

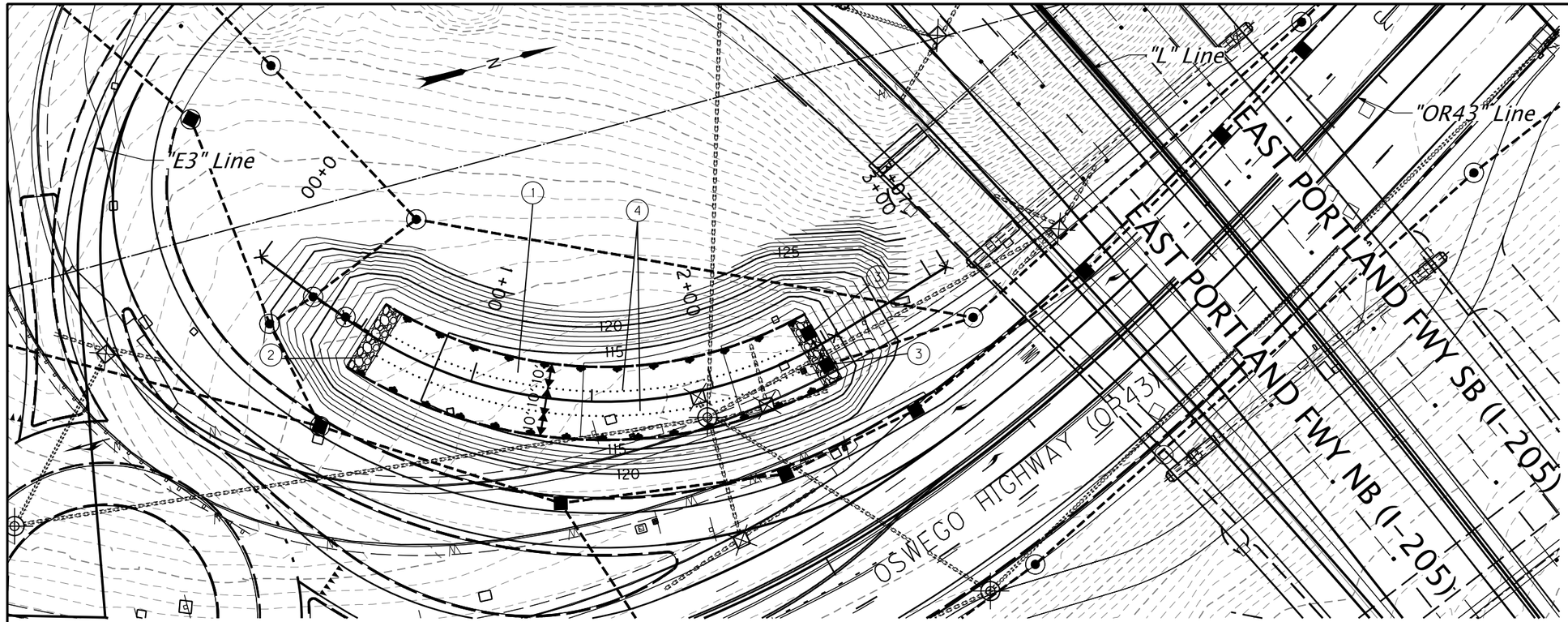
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:	Reviewer:
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE — SHEET NO.

Rotation: 96.0998°
Vertical Scale: 1:10

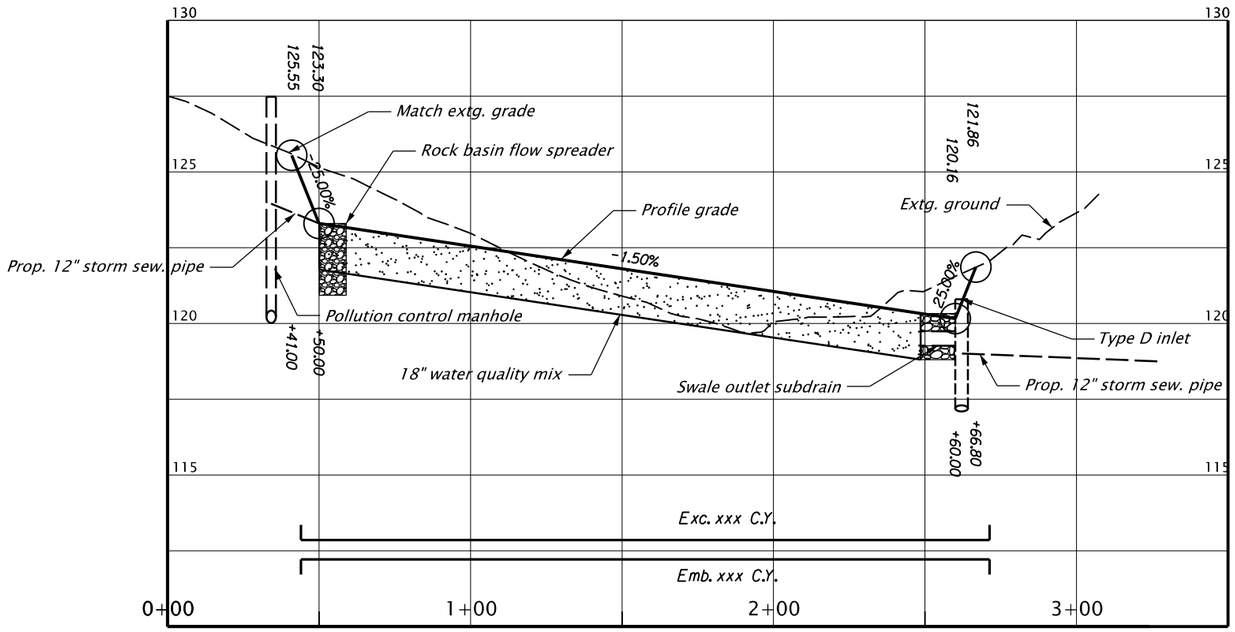


1. Sta. 0+54.22 to 2+55.48 = Sta. "E3" 740+37.28, 107.23' Lt. to Sta. "OR43" 9+52.79, 60.58' Rt.
   Construct 30' wide biofiltration swale
   (For details, see sht. HAxx)

2. Sta. 0+58.54
   Construct rock basin flow spreader
   (For details, see sht. HA10)

3. Sta. 2+60.28
   Construct rock basin flow spreader
   (For details, see sht. HA10)

4. Construct biofiltration swale divider
   (For details, see sht. HAxx)



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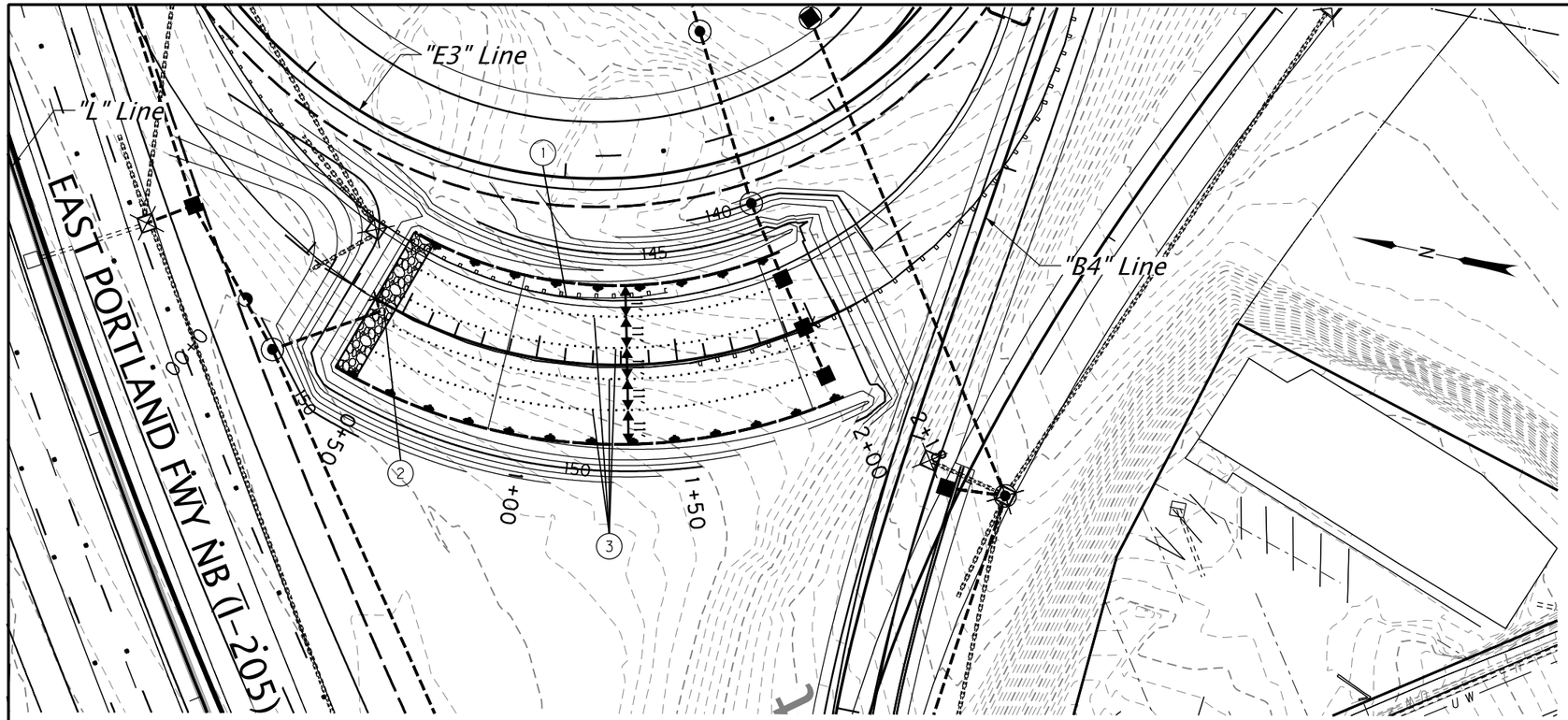
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

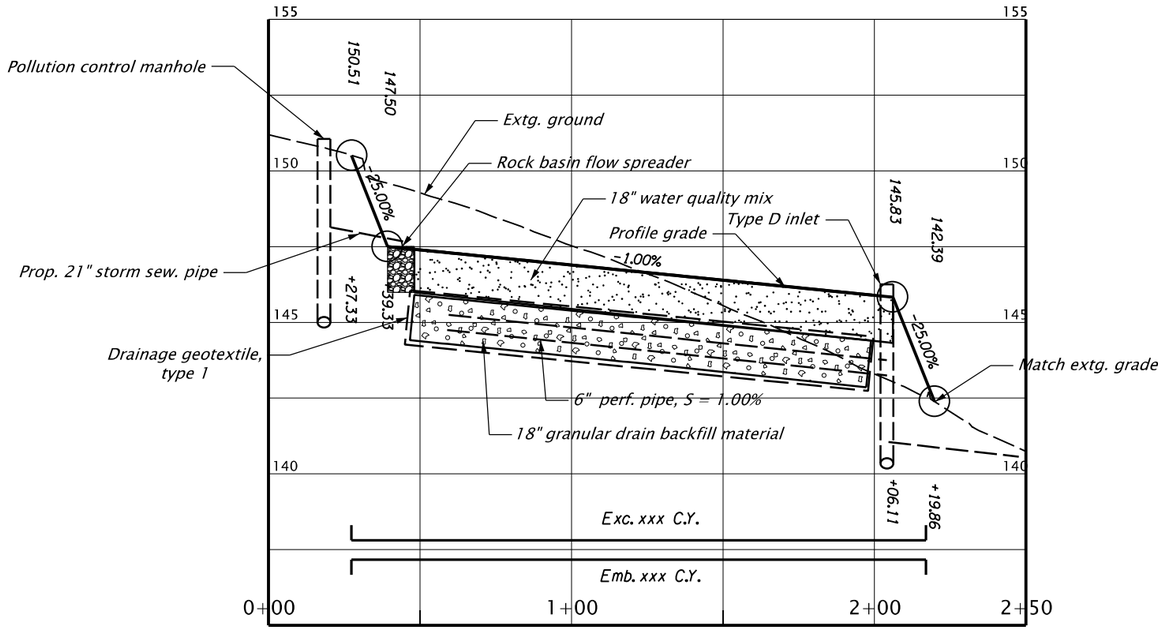
Rotation: 75.0253° 0'
Vertical Scale: 1:10



(1) *Sta. 0+39.24 to Sta. 1+98.79 = Sta. "E3" 737+52.57, 56.87' Rt. to Sta. "E3" 738+66.37, 64.42' Rt.*
Construct biofiltration swale
(For details, see sht. HAxx)

(2) *Sta. 0+44.18, 0.00'*
Construct rock basin flow spreader
(For details, see sht. HAxx)

(3) *Construct biofiltratoin swale divider*
(For details, see sht. HAxx)



DFI no. ######

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

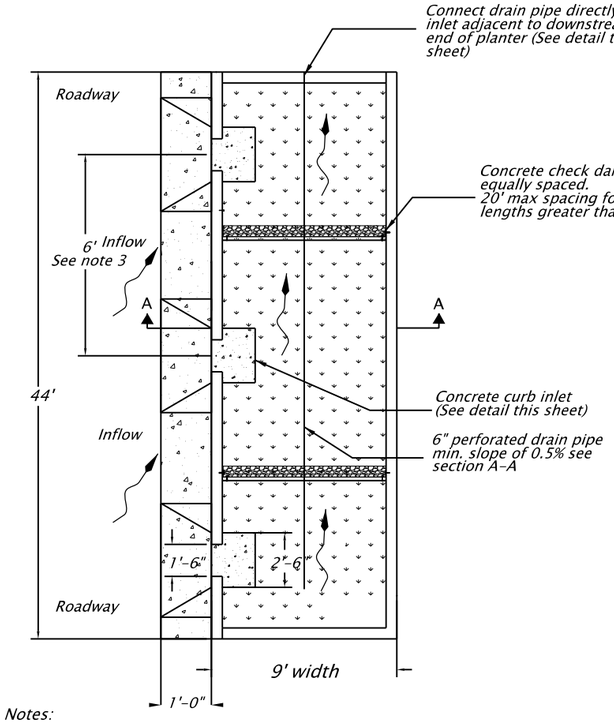
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

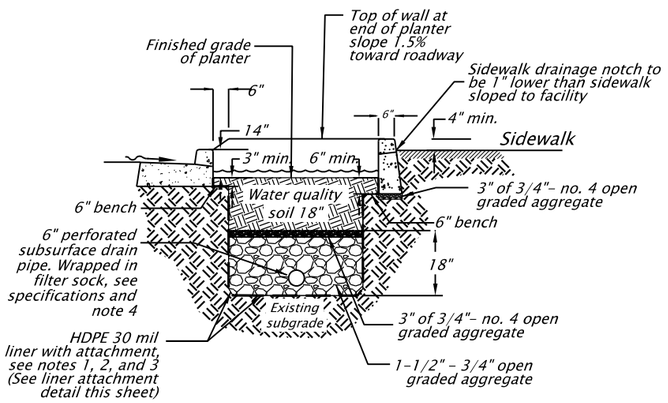
Rotation: 281.7947°
Vertical Scale: 1"=5'

STORMWATER PLANTER



Notes:
1. Match longitudinal slope of planter to slope of the road.
2. If less than 18" is between splash pad and planter end wall, extend pad to wall.
3. Install inlets (6' on center) on all sides of facility that are adjacent to parking lot.

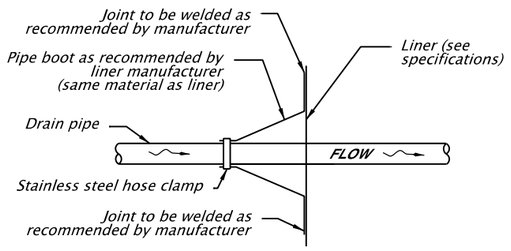
PLAN VIEW



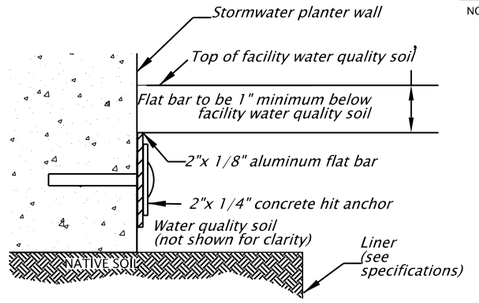
Notes:
1. Partial or full liner required. See stormwater planter table (this sheet) for requirement.
2. Partial liner located along side of planter adjacent to roadway.
3. Full liner located along all sides of planter.
4. Drain pipe only required for fully lined planters.
5. Scarify the native soil 12" following the initial excavation and before installing water quality soil and rock.

SECTION A-A

STORMWATER PLANTER DETAIL
NOT TO SCALE



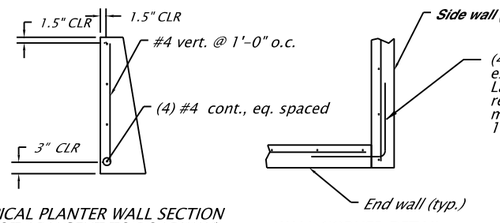
PIPE BOOT
NOT TO SCALE



Notes:
1. Adhere liner to concrete with top coat tc moldable sealant, or approved equal.
2. Liner to extend from top of water quality soil to the bottom of excavation.
3. 3" of concrete is required on all sides of attachment. Adjust sidewalk depth as necessary.
4. Secure liner to concrete with 2" aluminum flat bar, placed as directed (around entire facility).
5. Attach flat bar with concrete hit anchors, 24" o.c.
6. Trim excess liner to the top of the flat bar.

LINER ATTACHMENT DETAIL

NOT TO SCALE



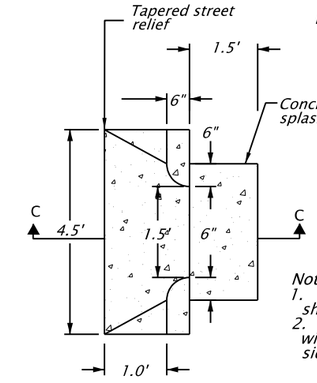
TYPICAL PLANTER WALL SECTION (NOT ADJACENT TO ROADWAY)

WALL CORNER DETAIL

Notes:
1. Top of planter walls to be 4" higher than adjacent sidewalk.
2. Bottom of planter walls to be 6" below top of water quality soil.

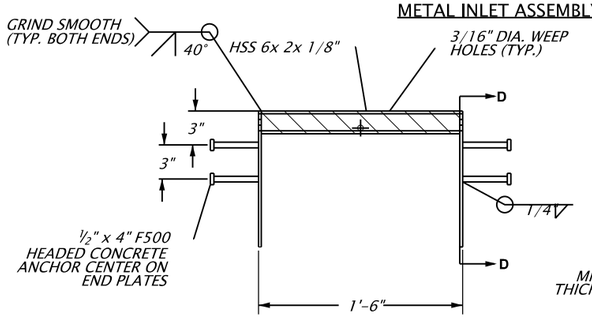
PLANTER WALL

NOT TO SCALE

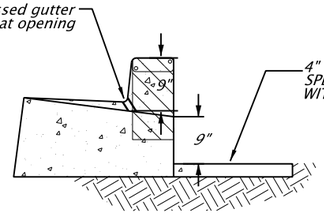


PLAN

METAL INLET ASSEMBLY

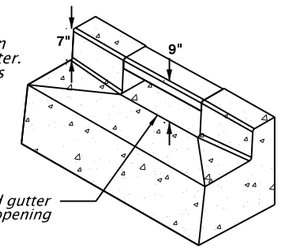


ELEVATION

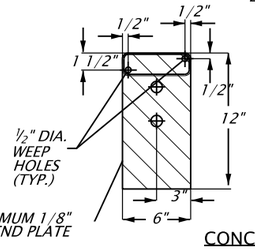


SECTION C-C

Notes:
1. Concrete splash pad elevation shall be level with soil inside planter.
2. Splash pad shall be six inches wider than inlet opening on both sides.



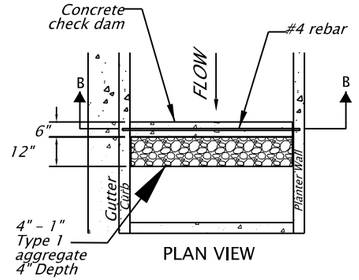
ISOMETRIC



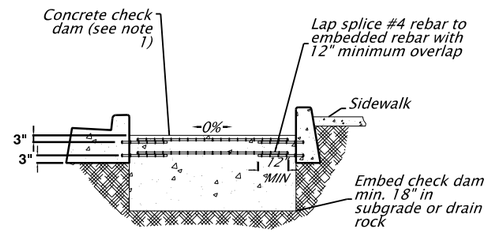
SECTION D-D

CONCRETE CURB INLET

NOT TO SCALE



PLAN VIEW



SECTION B-B

Notes:
1. Top of dam elevation to be 2" lower than upstream curb depression elevation.
2. Concrete to be 3,000 psi.
3. Embed #4 rebar 3" into curb and planter wall.

CONCRETE CHECK DAM

NOT TO SCALE

DFI no. ######

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

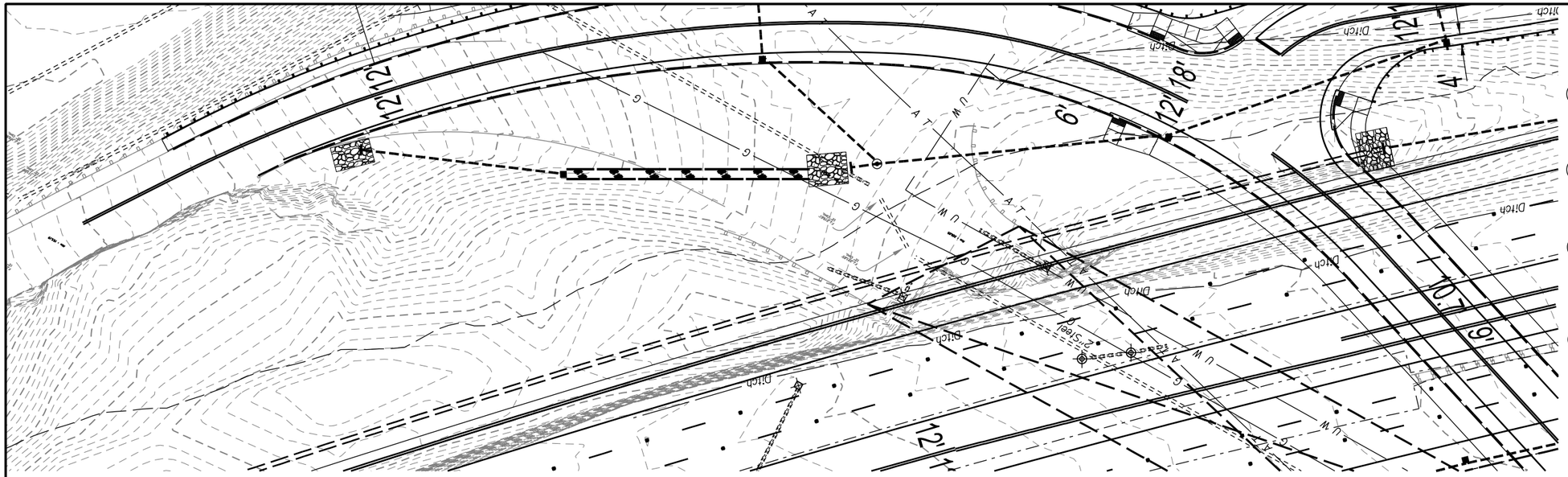
Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

SHEET NO.

WATER QUALITY DETAILS

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 0°



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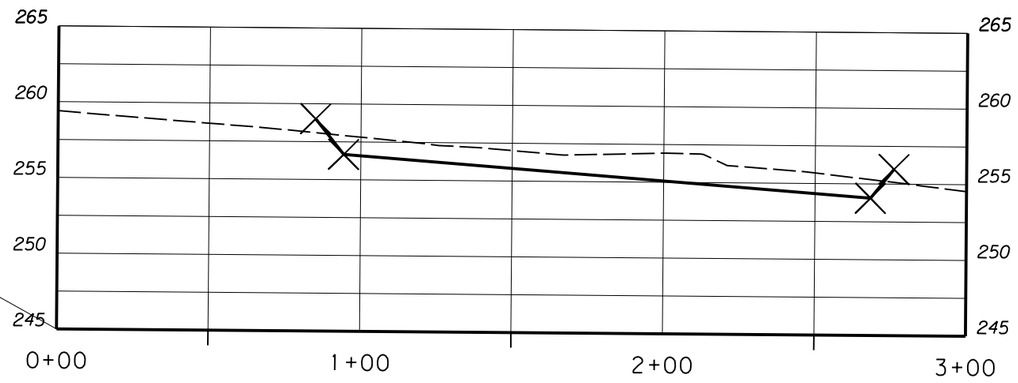
   (For details, see sht. HA01)

2. Sta. XX+XX.XX
   Construct type "D" inlet
   (See drg. no. RD370)

3. Sta. XX+XX.XX
   Construct standard manhole over extg. sewer
   Install 12" storm sew. pipe. - xx'
   (See drg. nos. RD335, RD336, RD345 and RD356)

4. Sta. XX+XX.XX
   Construct rock basin flow spreader
   (For details, see sht. HA01)



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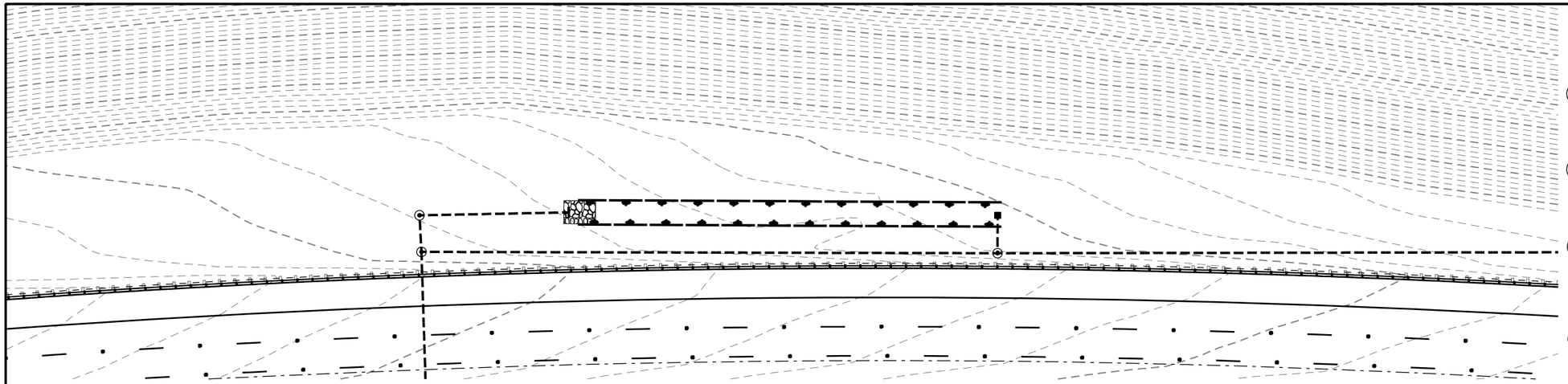
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 223.5514°
Vertical Scale: 1:10



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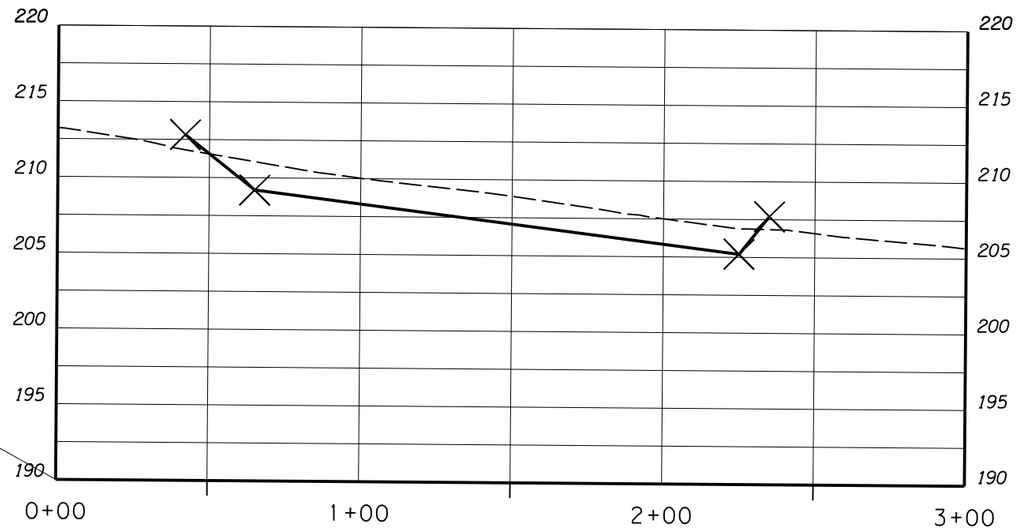

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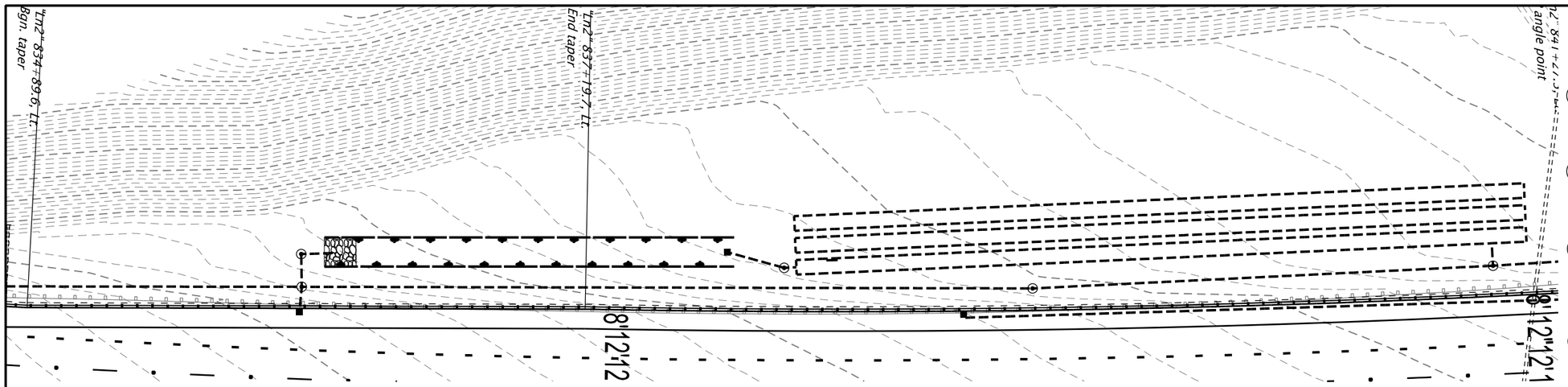

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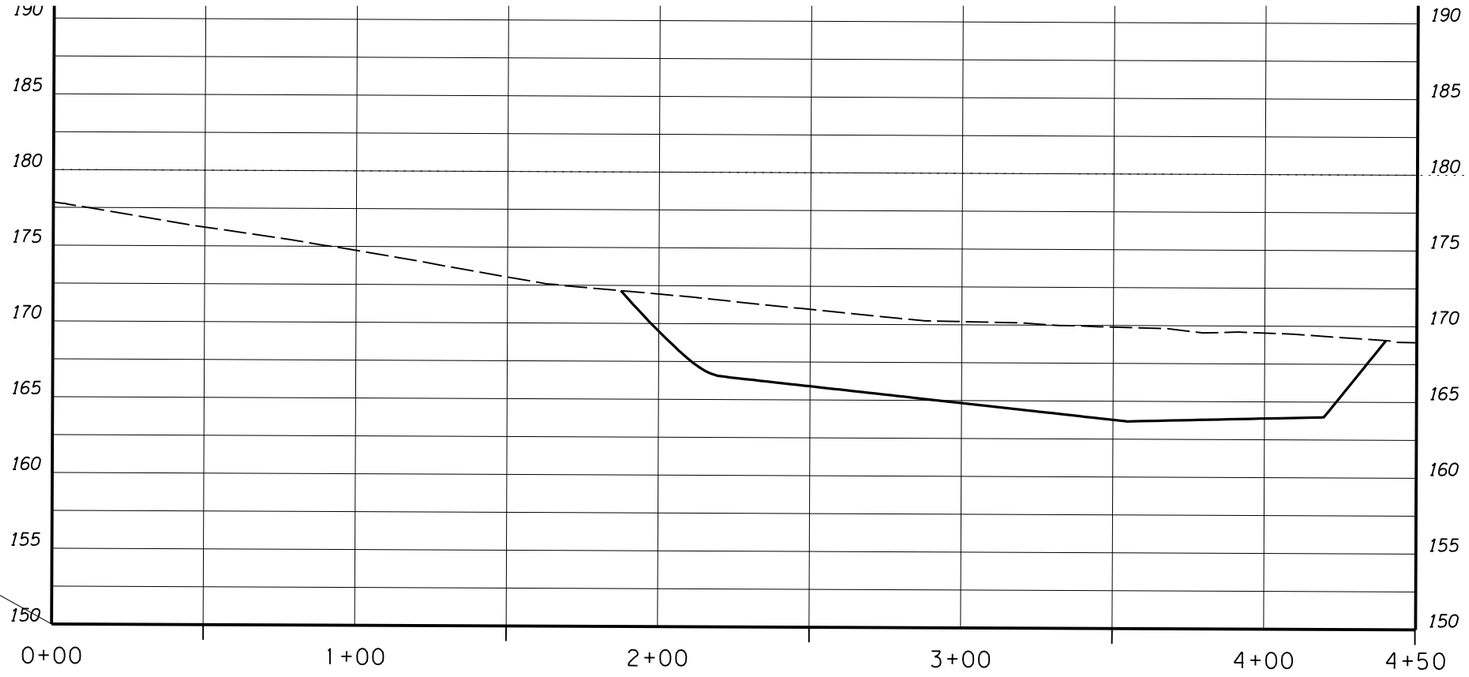

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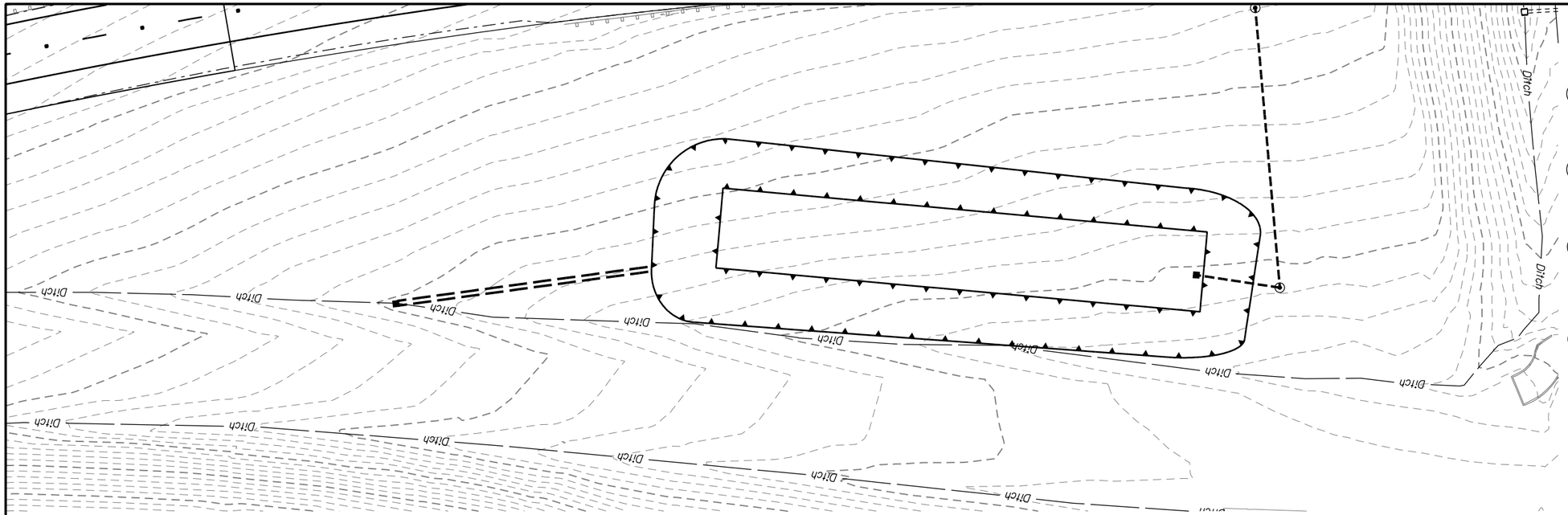

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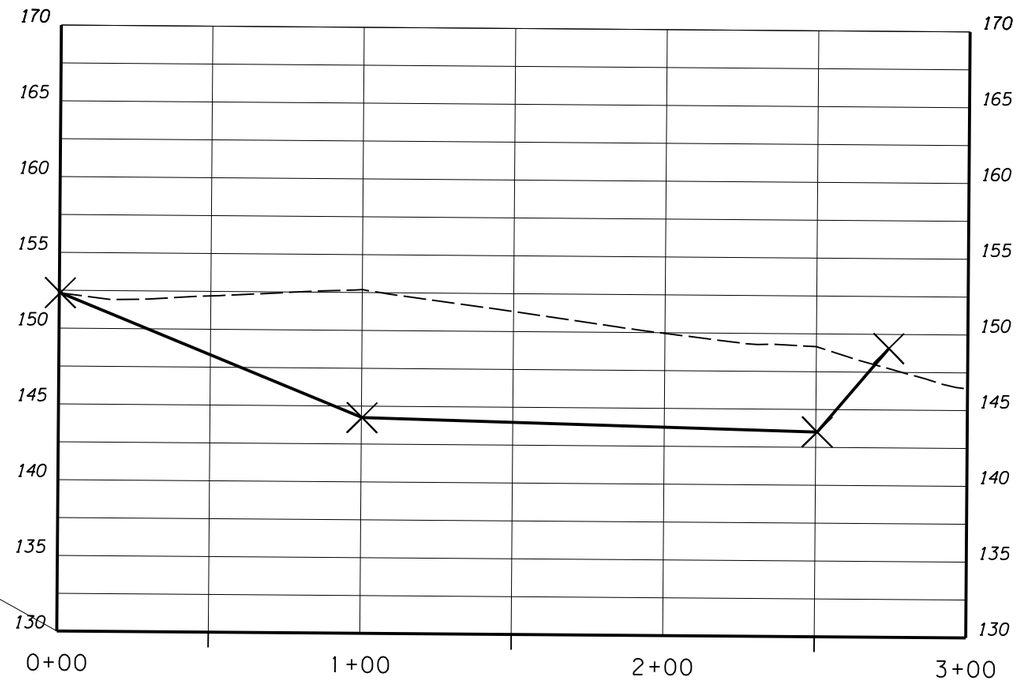

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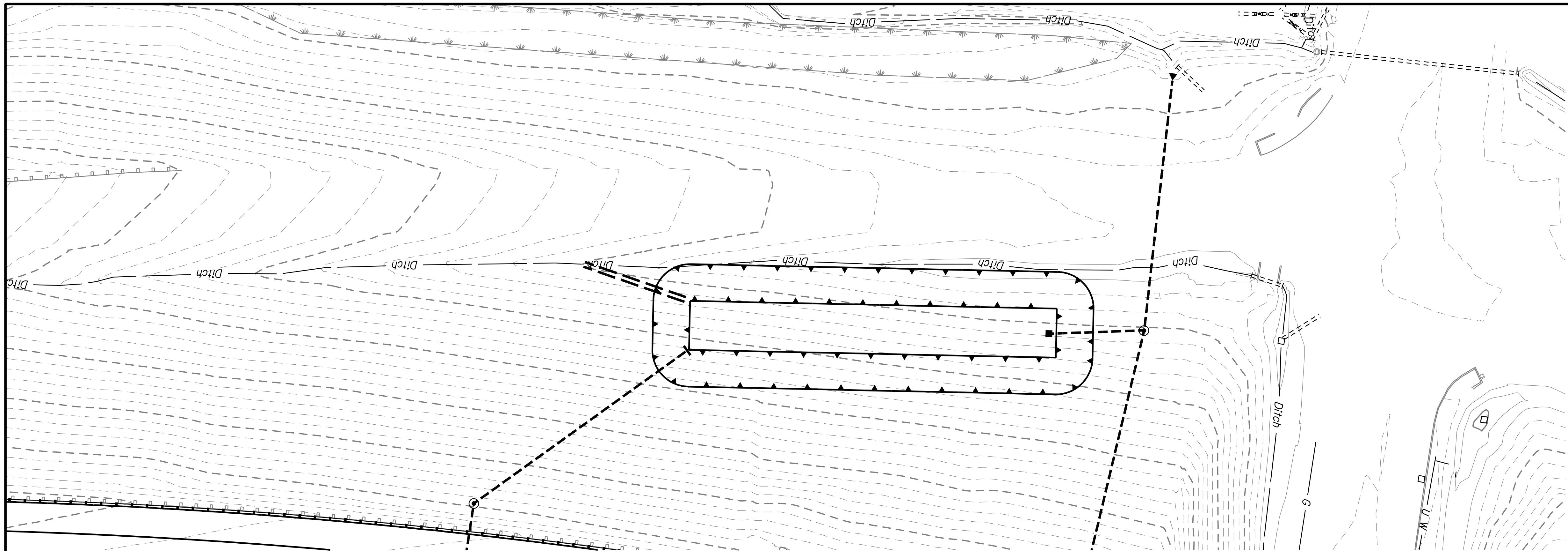

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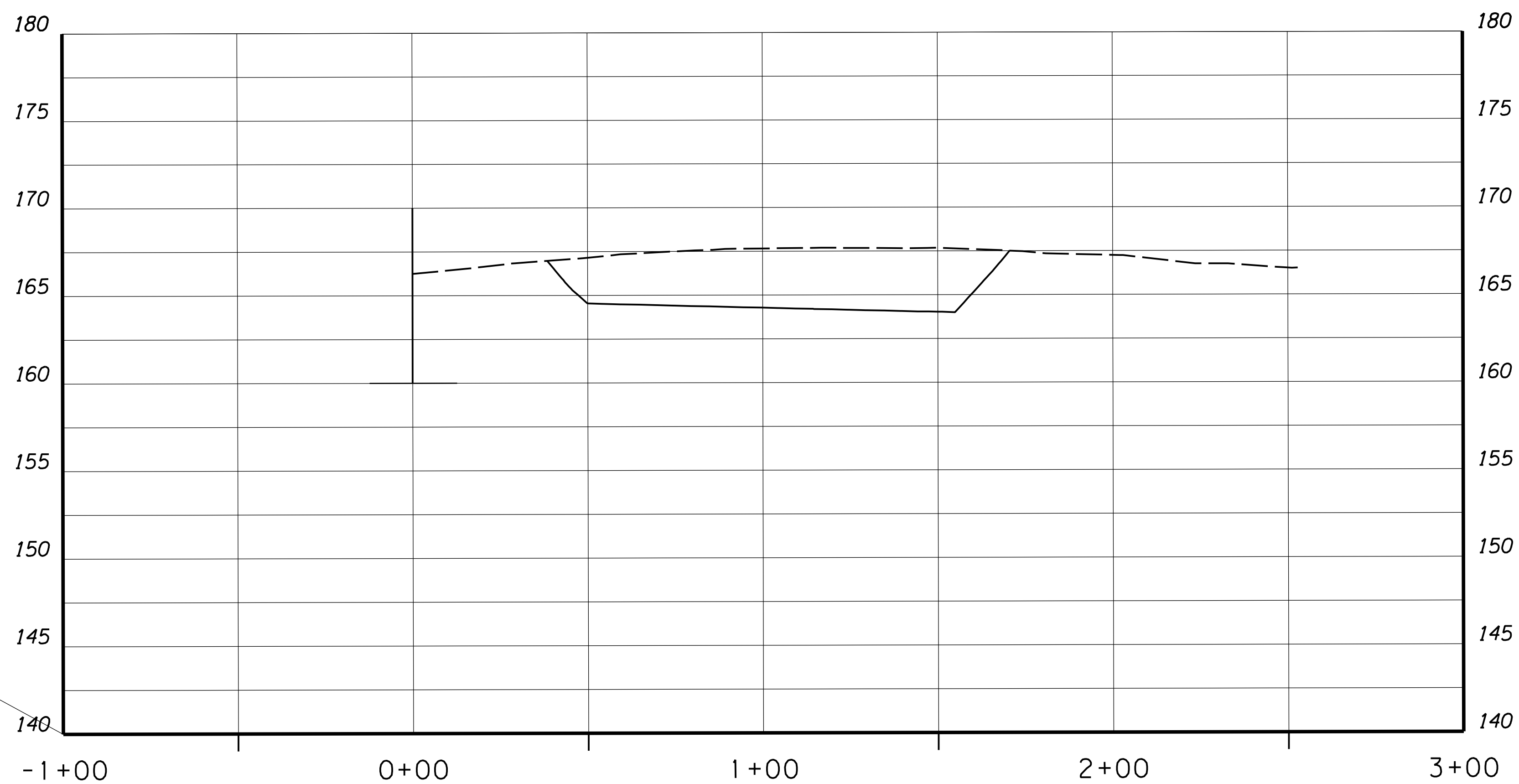

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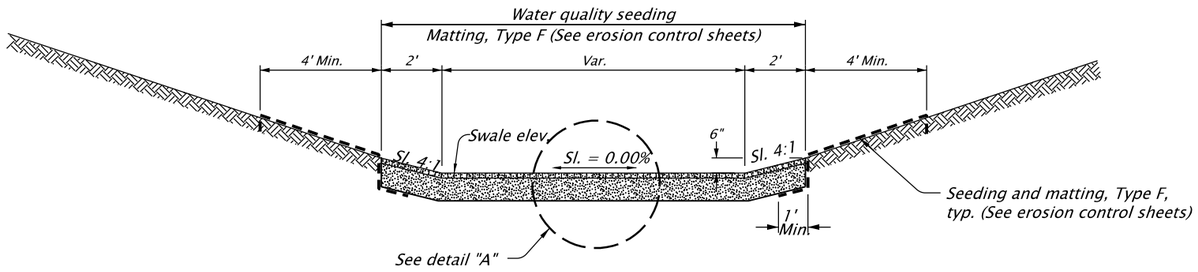
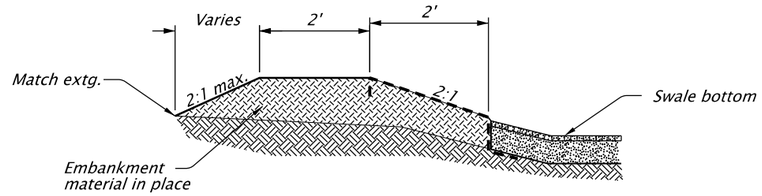
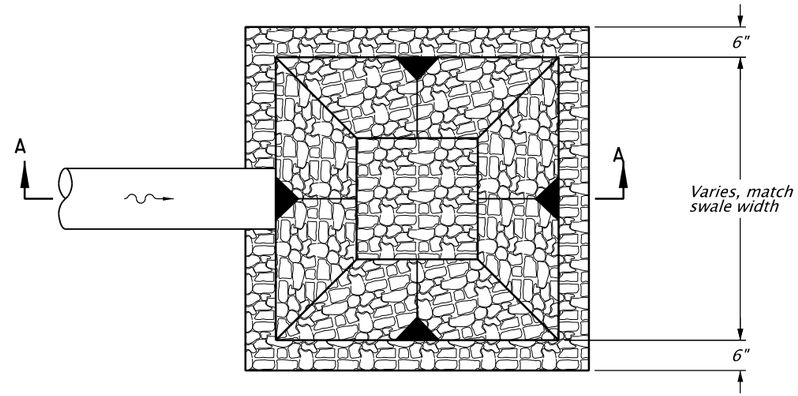


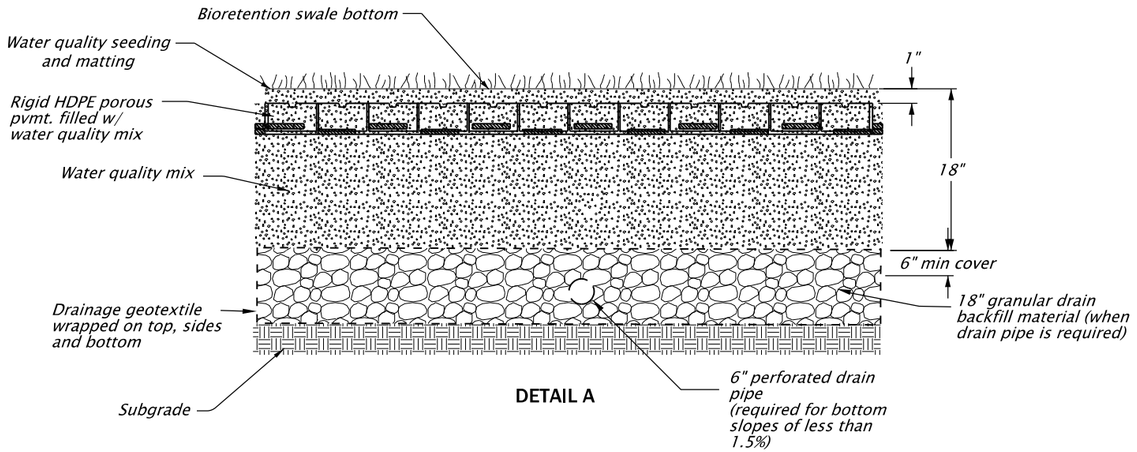
BIORETENTION SWALE
NTS



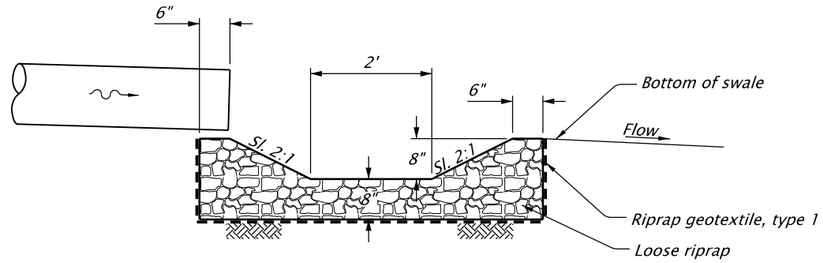
BIORETENTION SWALE BERM
NTS



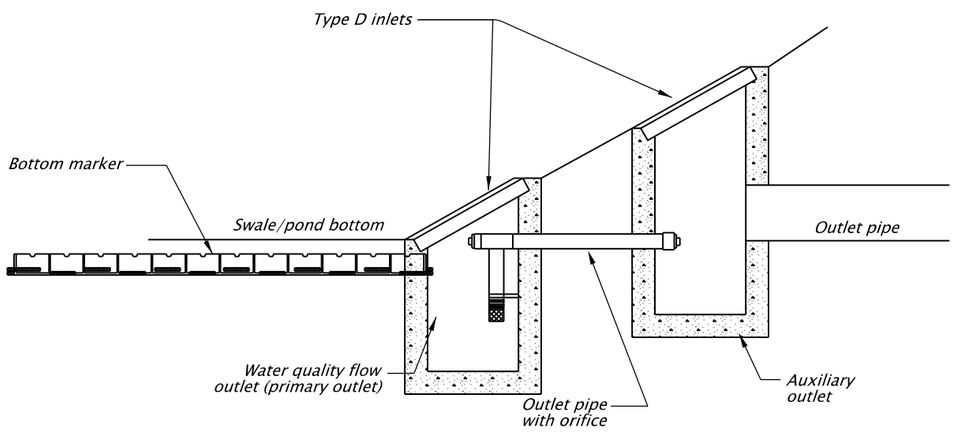
ROCK BASIN FLOW SPREADER
NTS



DETAIL A



SECTION A-A



WATER QUALITY FACILITY OUTLET STRUCTURE
NTS

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

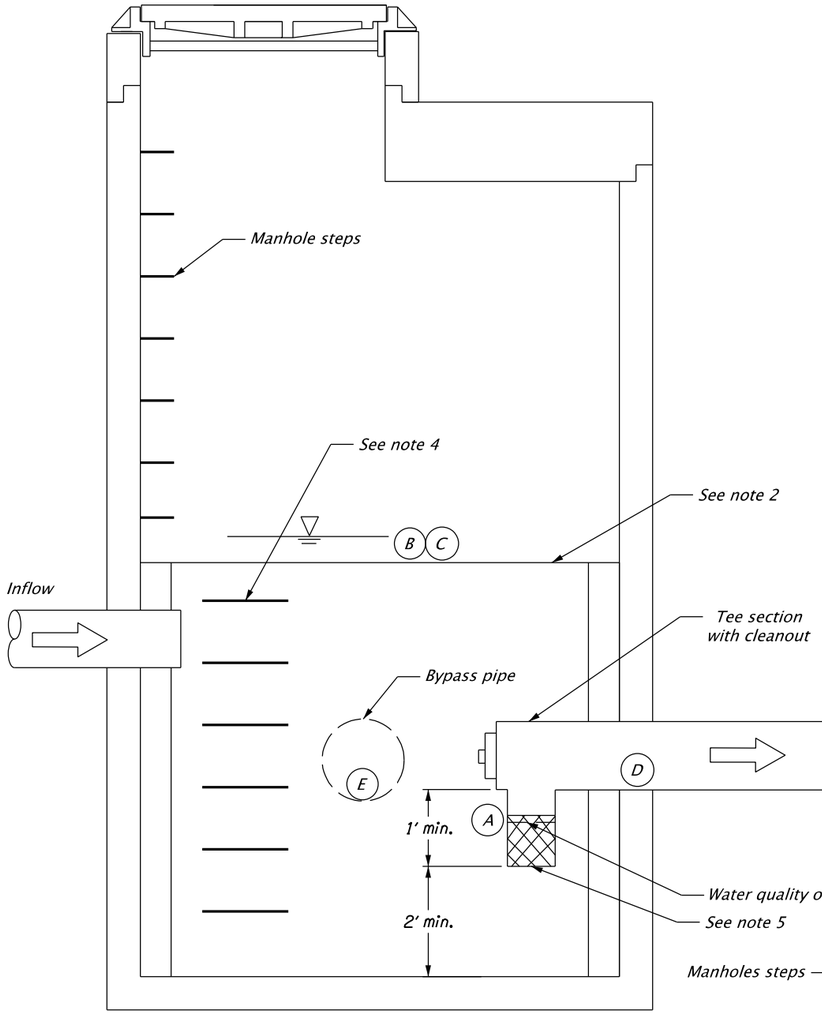
Designer:
Reviewer:
Drafter:
Checker:

WATER QUALITY DETAILS

SHEET NO.

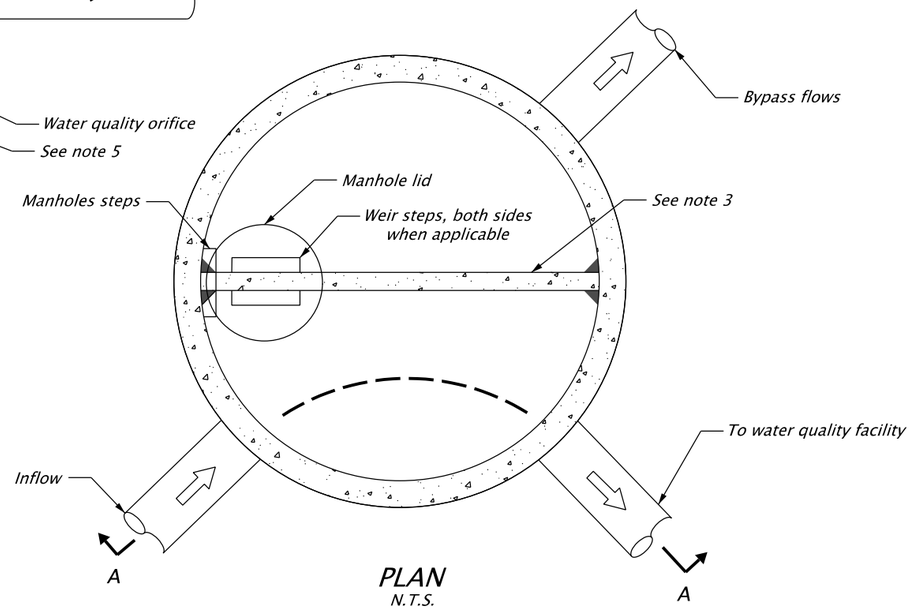
Rotation: 0°
0'

FLOW SPLITTER MANHOLE



SECTION A–A
N.T.S.

		WQF#4	WQF#5	WQF#6	WQF#7
DESCRIPTION	LETTER	VALUE	VALUE	VALUE	VALUE
ORIFICE DIAMETER	A	$8\frac{1}{8}$"			
WEIR ELEVATION	B	50.83'			
WEIR LENGTH	C	6.0'			
INVERT OF OUTLET PIPE TO WATER QUALITY FACILITY	D	48.7'			
INVERT OF HIGH FLOW BYPASS OUTLET PIPE	E	48.7'			



PLAN
N.T.S.

GENERAL NOTES:

1. *Manhole structure 72 in. min. dia.*
2. *4 in . min. thickness reinforced concrete weir.*
3. *Weir shall be grouted to manhole stucture (both ends)*
4. *Provide weir steps when height of weir is greater than 36 inches, both sides*
5. *Water quality orifice screening. The wire cloth strainer assembly should be secured to pipe with a stainless steel hose clamp. Orifice screening must contain mulitple openings that are equal to or less than the orifice diameter.*
6. *Include tracer wire as shown in Standard Drawing RD336.*

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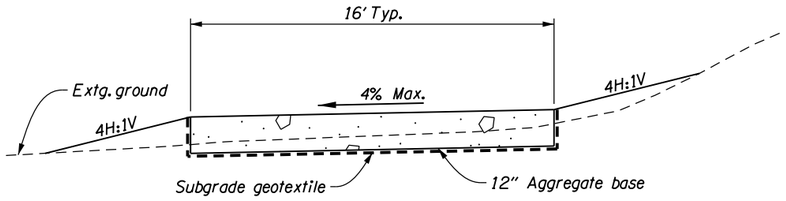
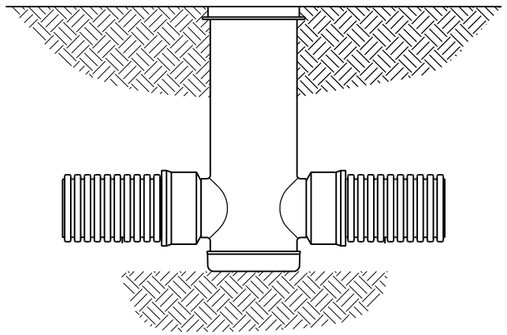
WATER QUALITY DETAILS

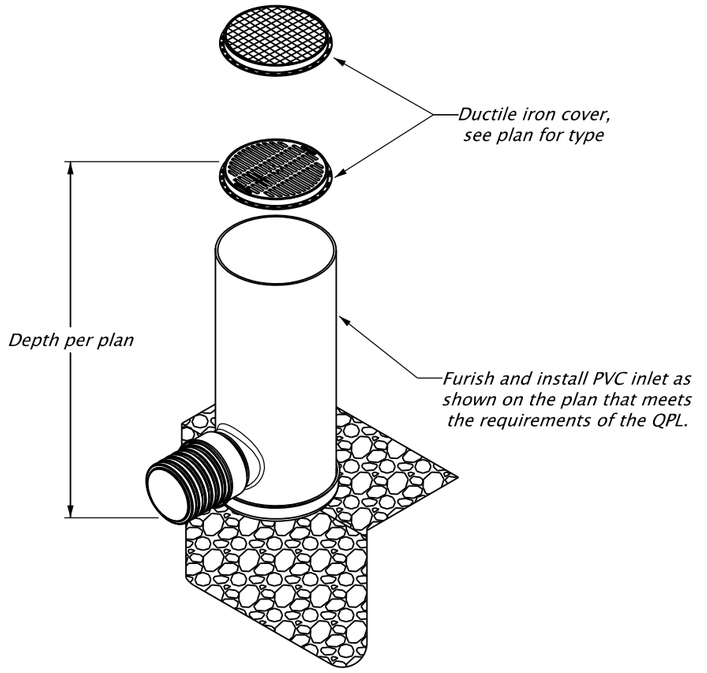
SHEET NO.

Rotation: 0° Sca = 1



MAINTENANCE ACCESS ROAD SECTION
NTS





PVC INLET
NTS

UNDER DEVELOPMENT

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke | Reviewer: Karen Tatman
Drafter: Morgan Tholl | Checker: Christine Higgins

WATER QUALITY DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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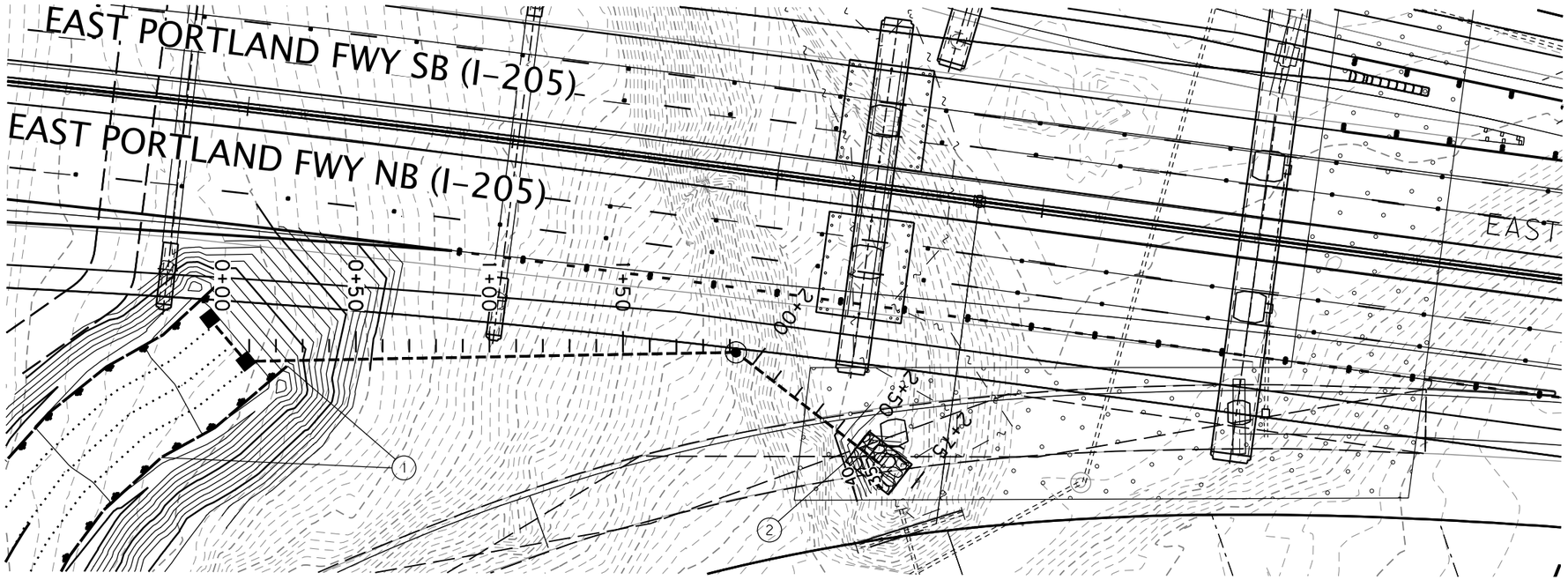
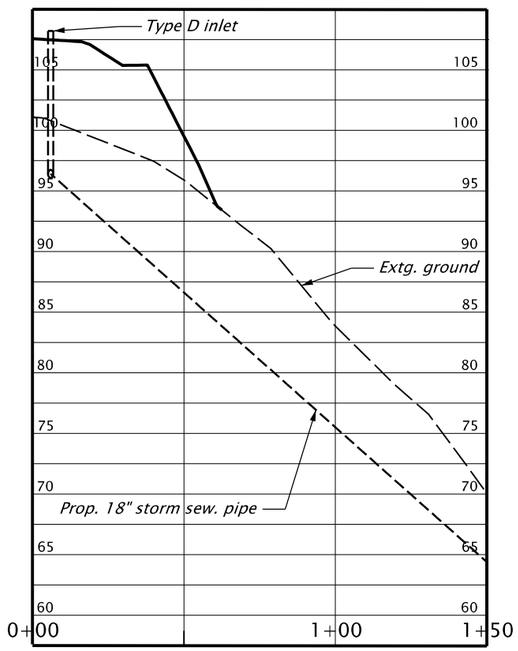
Rotation: 0° Sca =1

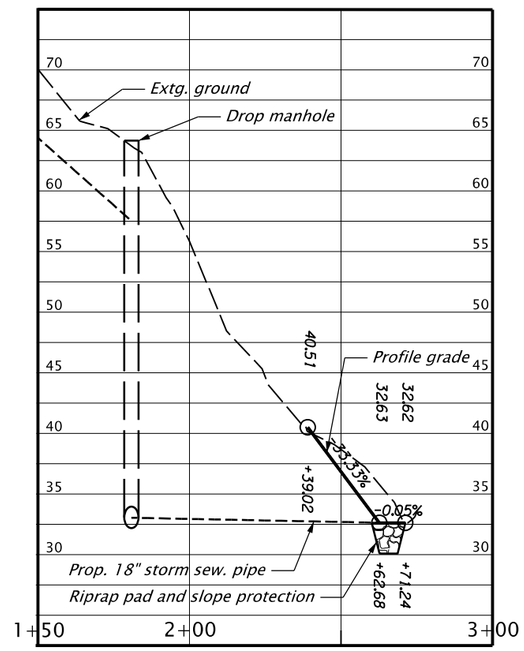


N

1 *Construct biofiltration swale*
(For details, see sht. HA06)

2 *Sta. 2+50.00*
Construct riprap pad and slope protection
(See drg. no. RD317)





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1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

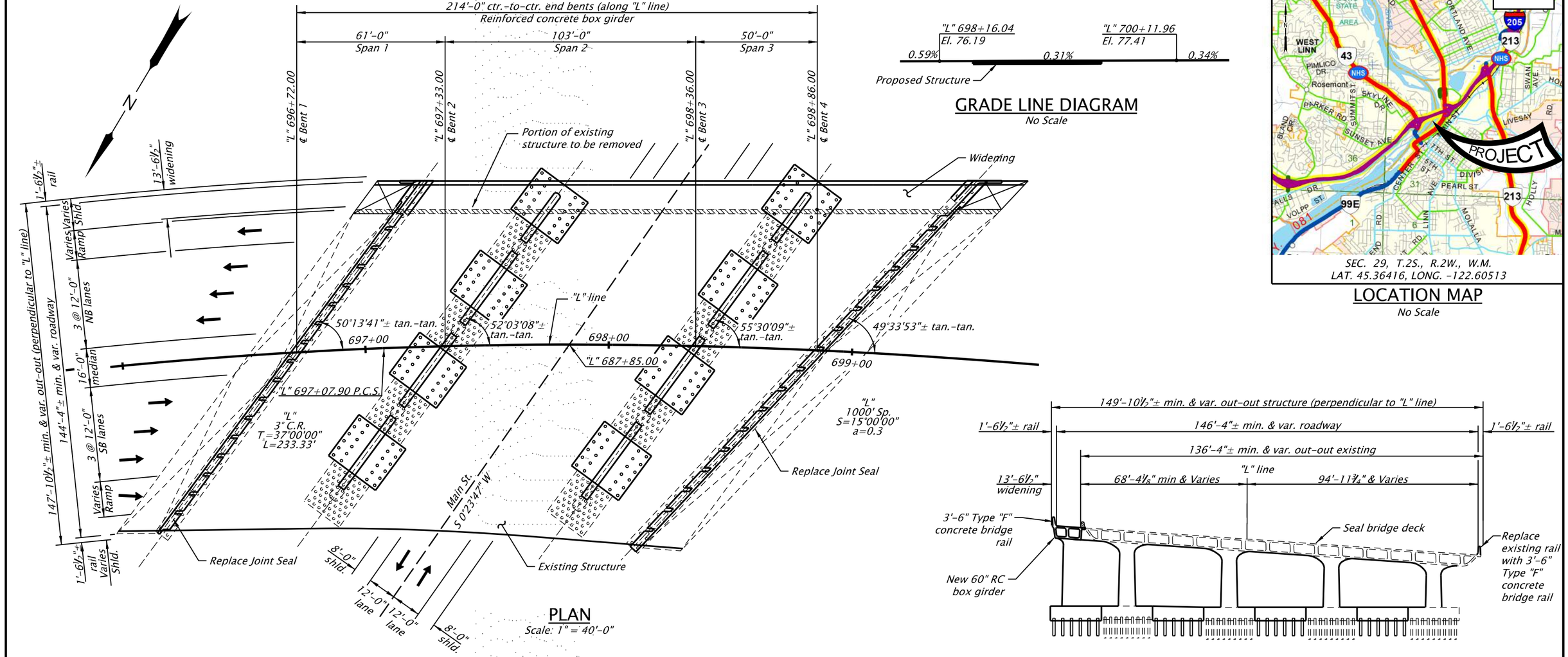
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:	Reviewer:
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 29.332° *0'*
Vertical Scale: 1:4



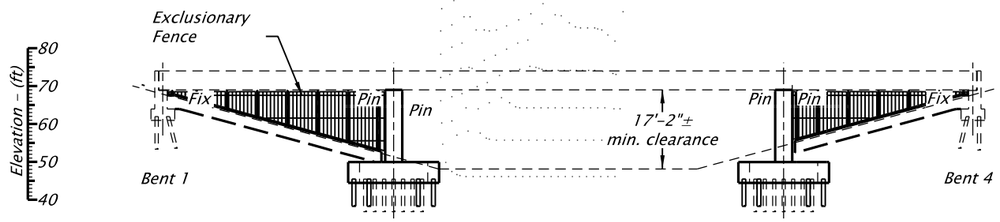
PLAN
Scale: 1" = 40'-0"

GRADE LINE DIAGRAM
No Scale

SEC. 29, T.2S., R.2W., W.M.
LAT. 45.36416, LONG. -122.60513

LOCATION MAP
No Scale

TYPICAL SECTION
Scale: 1" = 40'-0"



ELEVATION
Scale: 1" = 40'-0"

Note:
Elevations shown are based on North American Vertical Datum (1988).

For Traffic Control Plans, refer to sheet series EC.

Indicates bridge removal

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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STRUCTURE NO.	09702
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 000 M.P.: 000.00-000.00	
COUNTY	Clackamas
DATE	07/18

DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
Drafter: Josh Goodall | Checker: Brett Karnes

PLAN AND ELEVATION | SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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GENERAL NOTES

Provide all materials and perform all work according to the Oregon Standard Specifications for Construction 2018.

Bridge is designed in accordance with the 8th edition of the AASHTO LRFD Bridge Design Specifications with an allowance of 25psf for future wearing surface and all of the following Live Loads :

Service and Strength I Limit States:
HL-93: Design truck or the design tandems and the design lane load.

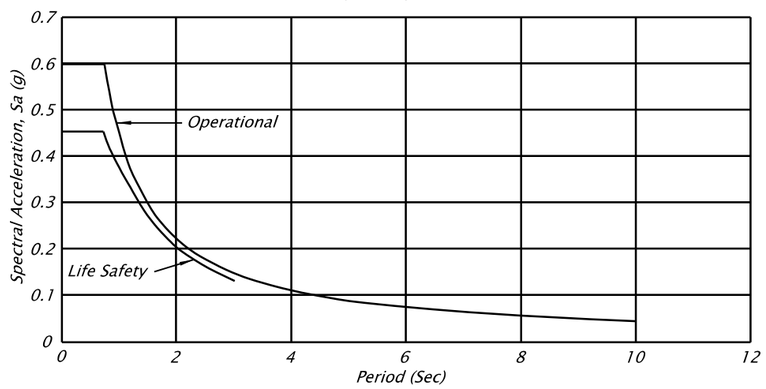
Strength II Limit State:
ODOT Type STP-5BW Permit truck
ODOT Type STP-4E Permit truck

Seismic design is performed by the multi-mode analysis in accordance with the "AASHTO Guide Specifications for LRFD Seismic Bridge Design" ("AASHTO LRFD Bridge Design Specifications") as modified by the "ODOT Bridge Design Manual". The 2014 USGS Seismic Hazard Maps (Site-Specific Ground Motion Response Analysis) have been used to collect the Seismic Hazard Values for the bridge site with Latitude 45.3667N and Longitude -122.5967W:

Furnish a high strength resin for the QPL for all resin bonded anchors.

Many aspects of this work are dependent upon the geometry of the existing structure. Dimensions and geometry of existing features shown in these plans are based upon information shown in the as-constructed drawings and shall be considered approximate. Contractor shall field verify all dimensions before ordering or fabricating any material.

Response Spectra Curve



(The Response Modification factors used are: R=1.0 for column moments, R=0.8 for abutment connections, and R=1.0 for other components).

Provide reinforcing steel according to ASTM Specification A706, or AASHTO M31 (ASTM A615) Grade 60 or Grade 80 where shown on plans.. Provide field bent bars according to ASTM Specification A706. Use the following splice lengths (unless shown otherwise):

Reinforcing Splice Lengths (Class B) Grade 60 f'c = 4.0 ksi, λ_{rc} = 0.4, 2in min. concrete clear cover										
Bar Size	*#3*	*#4*	*#5*	*#6*	*#7*	*#8*	*#9*	*#10*	*#11*	*#14 & #18*
Uncoated	*1'-4"*	*1'-7"*	*2'-0"*	*2'-5"*	*2'-9"*	*3'-2"*	*3'-7"*	*4'-0"*	*4'-5"*	*Not permitted*
Coated (1)	*1'-5"*	*1'-11"*	*2'-5"*	*2'-10"*	*3'-4"*	*3'-9"*	*4'-3"*	*4'-10"*	*5'-4"*	*Not permitted*
Coated (2)	*1'-10"*	*2'-5"*	*3'-0"*	*3'-7"*	*4'-2"*	*4'-9"*	*5'-4"*	*6'-0"*	*6'-8"*	*Not permitted*

*Use Coated (1) for epoxy coated bars with cover at least 3*d_b and clear spacing between bars at least 6*d_b.*

*Use Coated (2) for epoxy coated bars with cover less than 3*d_b or clear spacing between bars less than 6*d_b.*

Increase all splice lengths 30% for horizontal or nearly horizontal bars placed so that more than 12" of fresh concrete is cast below the bar.

Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.

Support the bottom mat reinforcing steel from the forms with precast mortar blocks at 24"maximum centers each way. Support the top mat of reinforcing steel from the bottom mat of reinforcing steel with wire bar supports as shown in Chapter 3 of the CRSI Manual of Standard Practice (SBU, BBU, or CHCU). Place wire bar supports at 24"maximum centers.

Use uncoated reinforcing steel in the deck and bridge end panel. This includes top and bottom longitudinal bars, top and bottom transverse bars, and all bars extending into the rail.

Place bars 2"clear of the nearest face of concrete (unless shown otherwise). The top bends of stirrups extending from beam stems into the top slab may be shop or field bent (unless shown otherwise).

Do not fabricate reinforcing steel for pier walls until final footing elevations have been determined in the field.

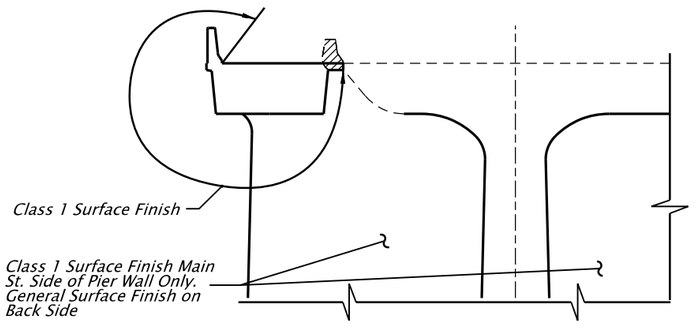
Provide Class HPC4500 1½ concrete in deck.

Provide Class 4000 1½, 1 or ¾ concrete in box girder and footings.

Provide Class 4000 ¾ in pier walls.

Provide Class HPC4500 1½ concrete in reinforced concrete end panels.

Provide Class 3300 1½, 1 or ¾ concrete for all other concrete.



CONCRETE FINISH DETAIL

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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Clackamas

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07/18

DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall
Drafter: Josh Goodall
Reviewer: Jeff Olson
Checker: Brett Karnes

GENERAL NOTES

SHEET NO.

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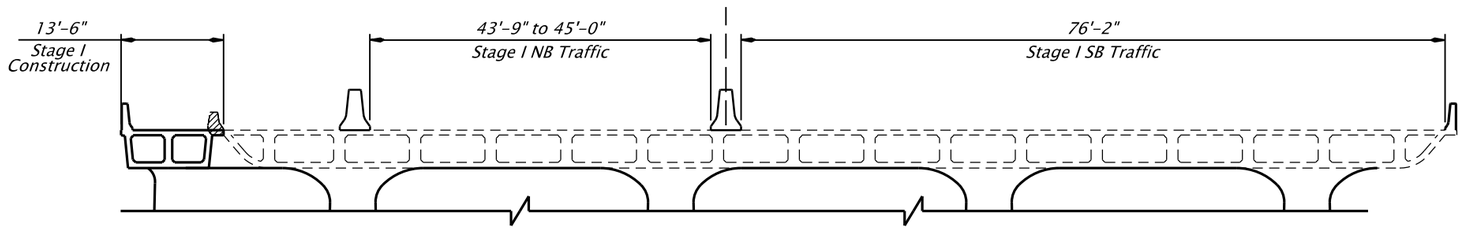
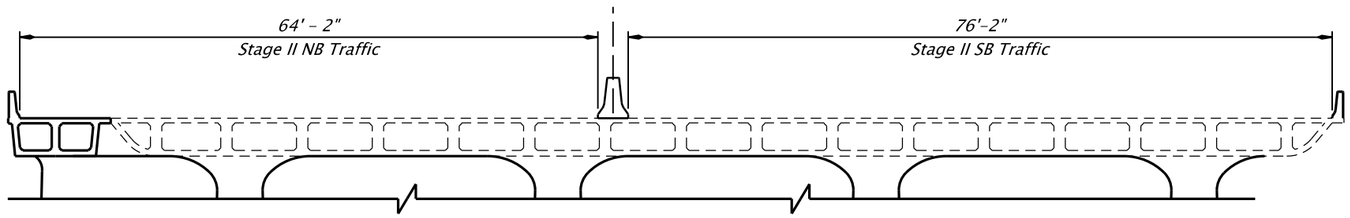


STAGE I
Scale: 1" = 20'-0"

*Traffic on Main St. reduced to 20'-0" during bridge substructure retrofit (this stage)



STAGE II
Scale: 1" = 20'-0"

Stage Construction Notes:

Stage I:
1. Install temporary barrier on bridge deck.
2. Construct bridge substructure widening and retrofit. Complete all work on Bent 2 substructure prior to beginning work on Bent 3 (or vice-versa).
3. Construct superstructure widening.
4. Complete closure pour between widening and existing structure.

Stage II:
1. Shift traffic to final configuration.

SCALE WARNING
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Checker: Brett Karnes

STAGE CONSTRUCTION

SHEET NO.

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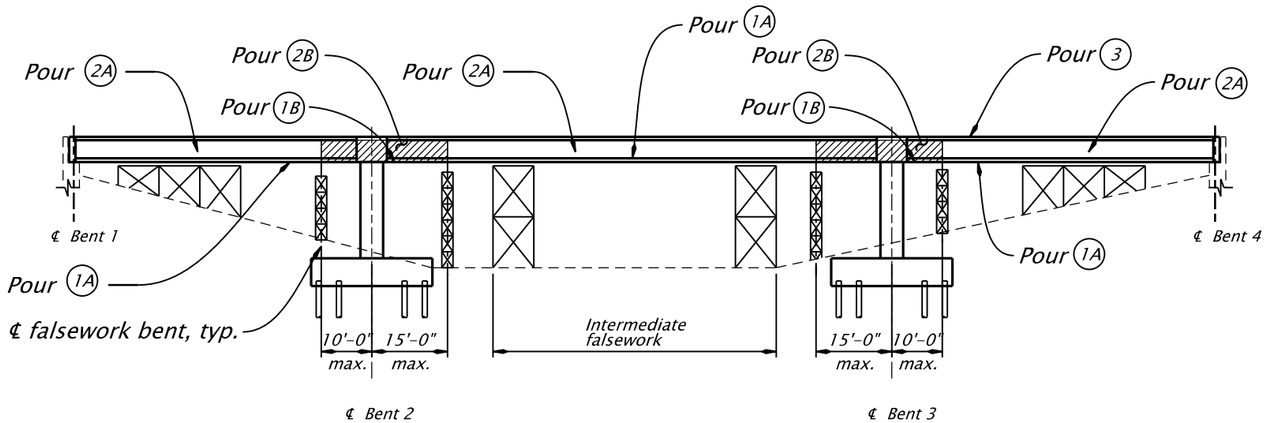
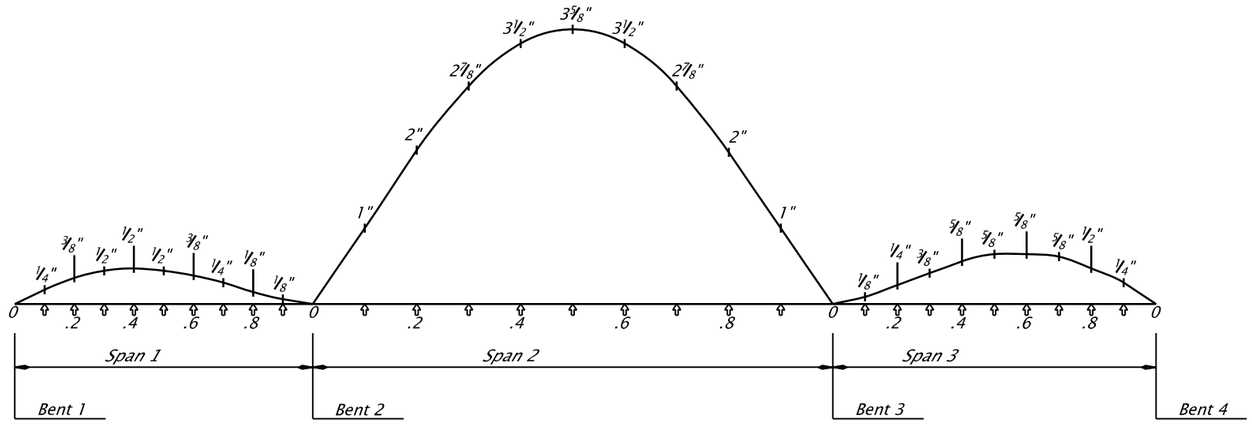


POUR SCHEDULE

Scale: 1" = XXX



CAMBER DIAGRAM

No Scale

Note:
Camber is designed to compensate for deflection due to the dead load of all concrete, railing, future wearing surface, and the long-term effects of shrinkage and creep. Additional deflection due to falsework settlement is not included in this value and is the responsibility of the contractor.

Box Girder Pour Sequence:

1. *Pours (1A) and (1B) are bottom slab pours. Stop Pours (1A) at a falsework bent and not at an interior permanent bent. Complete all Pours (1A) prior to starting Pours (1B). Delay a minimum of 3 days between adjacent Pours (1A) or (1B). Complete all Pours (1A) and (1B) and delay a minimum of 5 days prior to starting Pours (2A) and (2B).*

2. *Pours (2A) and (2B) are longitudinal and transverse beam pours to the bottom of the top fillets. Stop Pours (2A) and (2B) at a falsework bent and not at an interior permanent bent. Delay a minimum of 3 days between adjacent Pours (2A) and (2B). Complete all Pours (2A) and (2B) prior to starting Pour (3).*

3. *Pour (3) includes the top fillets and the deck slab. Delay Pour (3) a minimum of 3 days after the completion of Pours (2A) and (2B). Transverse construction joints in Pour (3) must be over a transverse beam, with use of a deck construction joint. No longitudinal construction joints are permitted. Delay a minimum of 5 days between adjacent Pours (3). Do not remove bulkheads for deck pours until at least 3 days after completion of pour. Deck pours man extend over any part of any span or spans as long as them meet these requirements.*

4. *For construction joint details see Box Girder Details Sheets.*

5. *Falsework shall not be removed untill all concrete in box girder pours has reached its full design strength.*

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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BDS DWG NO.	00000
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DATE	07/18

DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall
Drafter: Josh Goodall
Reviewer: Jeff Olson
Checker: Brett Karnes

POUR SEQUENCE

SHEET NO.

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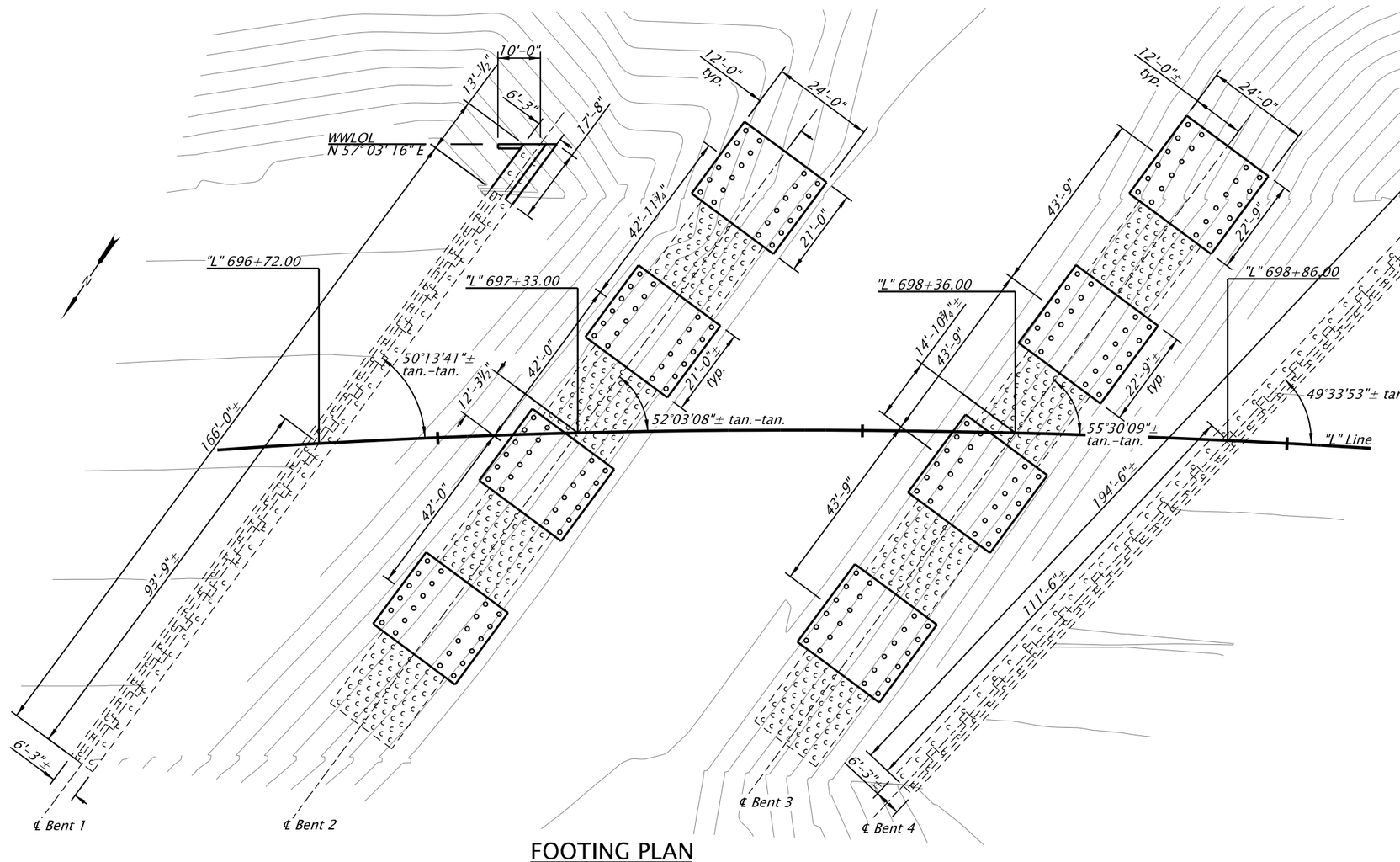


FOOTING PLAN

Scale: 1" = 30'-0"

FOUNDATION DESIGN NOTES:

For micropile foundations:

All Bents: Provide Micropiles ==> 10-3/4 x 0.625, ASTM A252, Grade 80 with 2-1/2"dia. reinforcing bars drilled to the depth(s) specified.

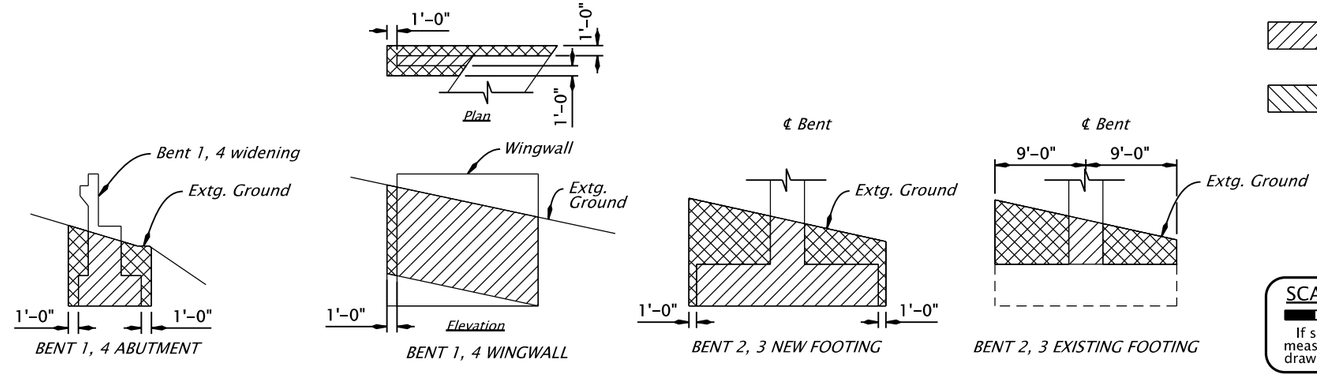
Support all falsework on driven piles.

Verify controlling existing dimensions in field prior to fabricating any materials or beginning construction. Inform engineer of any identified discrepancies.

For micropile layouts, see Bent 1, 4, and Bent 2,3 Details sheets.

Provide all shoring as required for construction. The contractor shall determine the actual locations and limites of all shoring required.

Bent	Cutoff Elevation	Max Tip Elevation	Nominal Resistance
1	Bottom of Footing + 2'	Bottom of Footing - 55'	350 kip(C) 175 kip(T)
2	Bottom of Footing + 2'	Bottom of Footing - 55'	350 kip(C) 175 kip(T)
3	Bottom of Footing + 2'	Bottom of Footing - 55'	350 kip(C) 175 kip(T)
4	Bottom of Footing + 2'	Bottom of Footing - 55'	350 kip(C) 175 kip(T)



Pay Limits of Structure Excavation

Pay Limits of Select General Backfill

EXCAVATION AND BACKFILL LIMITS

No Scale

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CLACKAMAS COUNTY

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Reviewer: Jeff Olson
Checker: Brett Karnes

FOOTING PLAN

SHEET NO.

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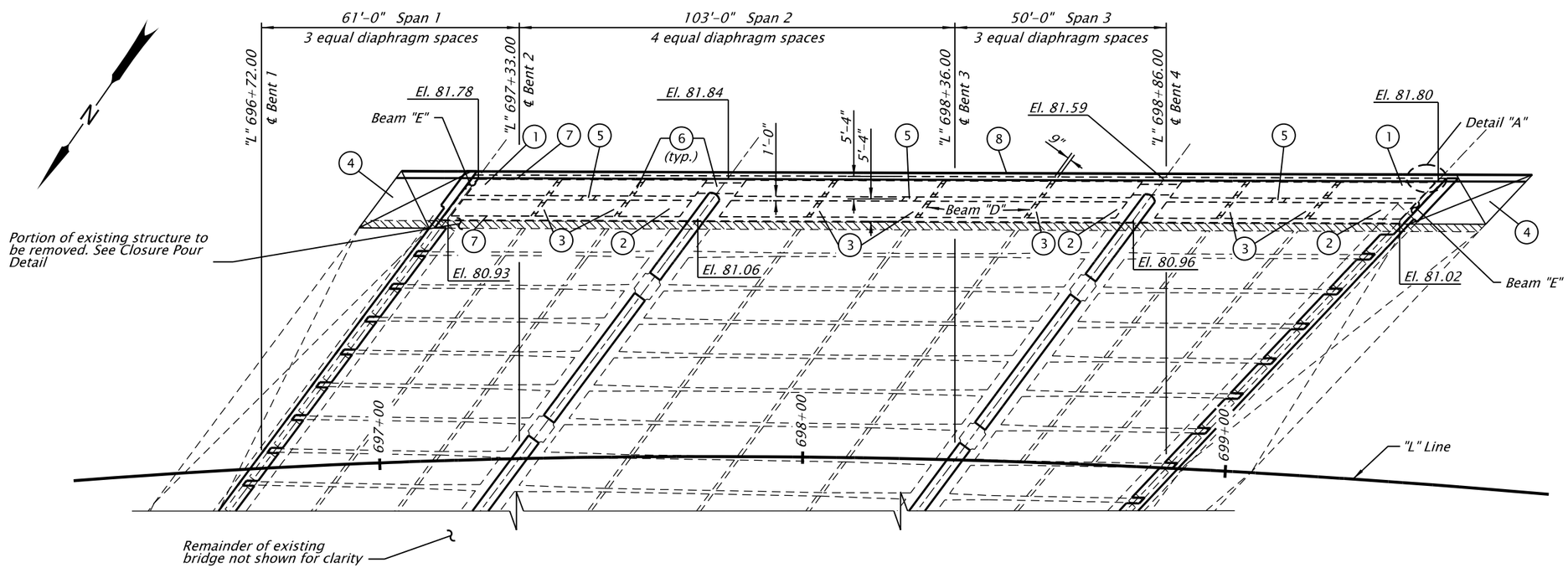
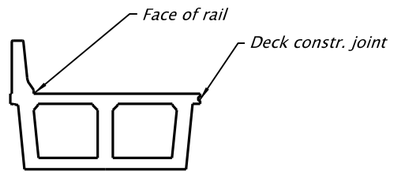


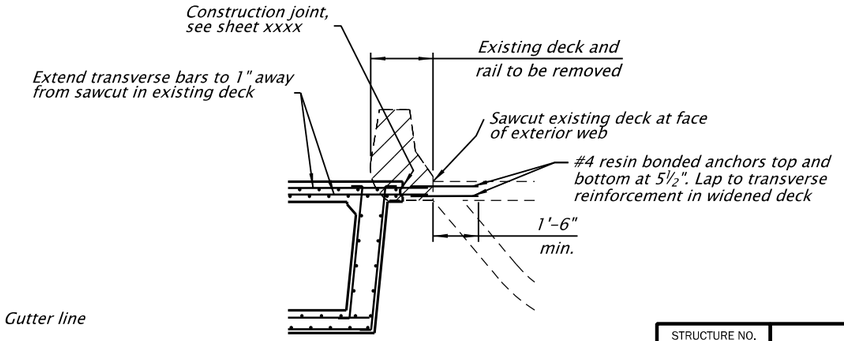
DECK PLAN
Scale: 1" = 30'-0"

Note:
Deck elevations shown are finish grade at face of rail and at widening face of deck construction joint.

"L" Line Station	Deck Elevation at:	
	Face of Rail	Deck Constr. Joint
697+20	81.71	80.95
697+40	81.76	81.00
697+60	81.80	81.04
697+80	81.84	81.07
698+00	81.86	81.10
698+20	81.87	81.13
698+40	81.80	81.08
698+60	81.70	81.01
698+80	81.62	80.92
699+00	81.74	80.99
699+20	81.77	81.01
699+40	81.79	n/a



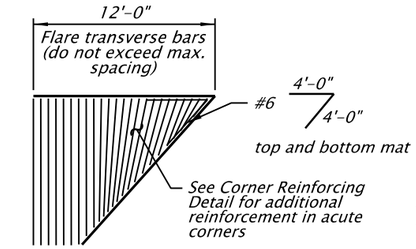
ELEVATION DETAIL
No Scale



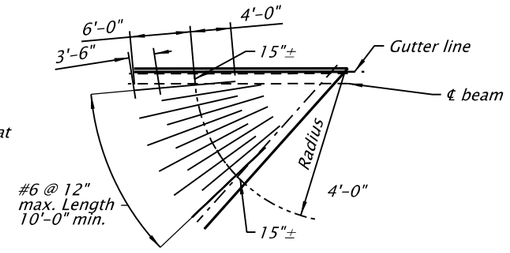
CLOSURE POUR DETAIL
Scale: 1" = 5'-0"

Detail Reference Notes:

1. *Access hole and ladder support through bottom flange. See Std. Dwg. BR135.*
2. *Place 4" dia. screen drain hole through bottom slab at low points each cell.*
3. *Place 4" square drain hole through diaphram beam at low point in each cell.*
4. *Reinforced concrete end panel.*
5. *Access hole though girder web, see Std. Dwg. BR136.*
6. *Access hole through crossbeam and Beam "D". See Dwgs. XXXXX and XXXXX*
7. *Place vent tubes in exterior girders at high point of each cell. See Std. Dwg. BR136.*
8. *3'-6" Type "F" rail. See Std. Dwg. BR290*



DETAIL A
Scale: 1" = 10'-0"



CORNER REINFORCING DETAIL
Scale: 1" = 15'-0"

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
Drafter: Josh Goodall | Checker: Brett Karnes

DECK PLAN

SHEET NO.

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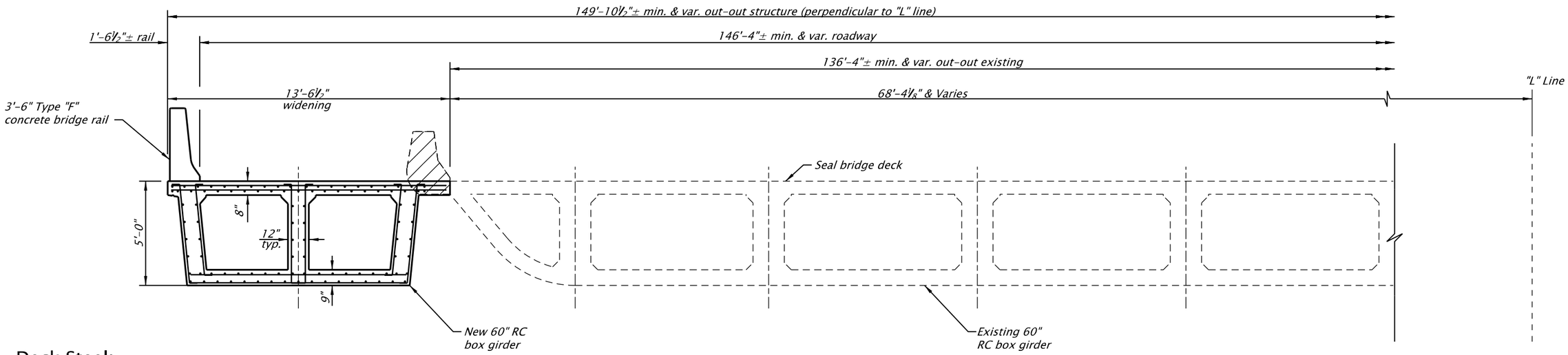

Deck Steel:

No. 4 transverse bars @ 5½" centers top and bottom.
No. 4 longitudinal bars @ 8" max. top and bottom and splice to nearest negative moment bars.
All transverse bars laid perpendicular to box girder webs.
All longitudinal bars laid parallel to box gider webs.
Place transverse bottom mat bars directly below and in line with top mat bars.
Offset longitudinal bottom mat bars one-half space from top mat bars.
See Box Girder Details for deck steel in negative moment regions.

Bottom Slab Steel:

No. 5 straight transverse bars @ 12" centers top and bottom.
No. 5 longitudinal bars @ 8" max. top and bottom and splice to nearest positive moment regions.
All transverse bars laid perpendicular to box girder webs.
All longitudinal bars laid parallel to box girder webs.
Place transverse bottom mat bars directly below and in line with top mat bars.
Offset longitudinal bottom mat bars one-half space from top mat bars.
See Box Girder Details for additional bottom slab steel in positive moment regions.

TYPICAL SECTION

Scale: 1" = 5'-0"

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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CLACKAMAS COUNTY

Designer: Josh Goodall
Drafter: Josh Goodall
Reviewer: Jeff Olson
Checker: Brett Karnes

BOX GIRDER TYPICAL SECTION

SHEET NO.

BR_K19786_QE1_dt_01.dgn :: Default 2/11/2020 3:33:43 PM CDONOVAN

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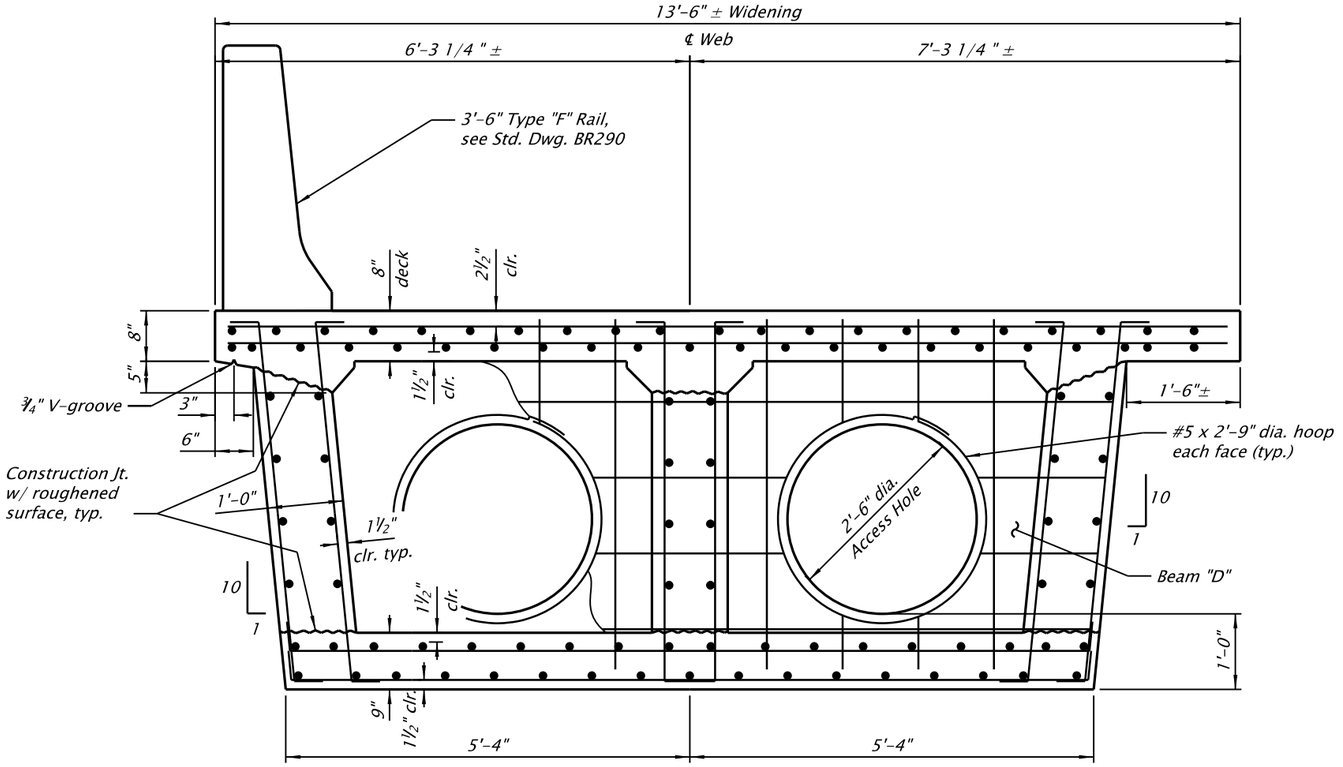
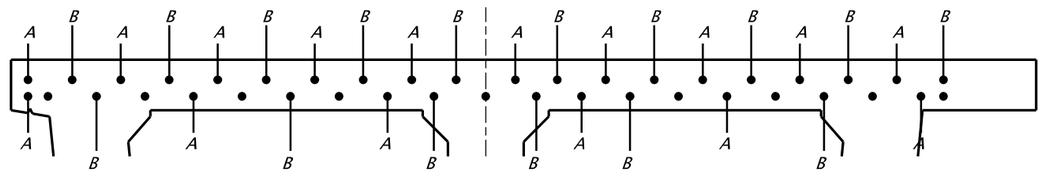
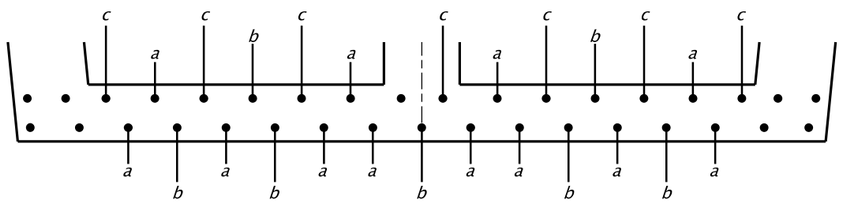


TYPICAL SECTION OF WIDENING

Scale: 1" = 2'-0"

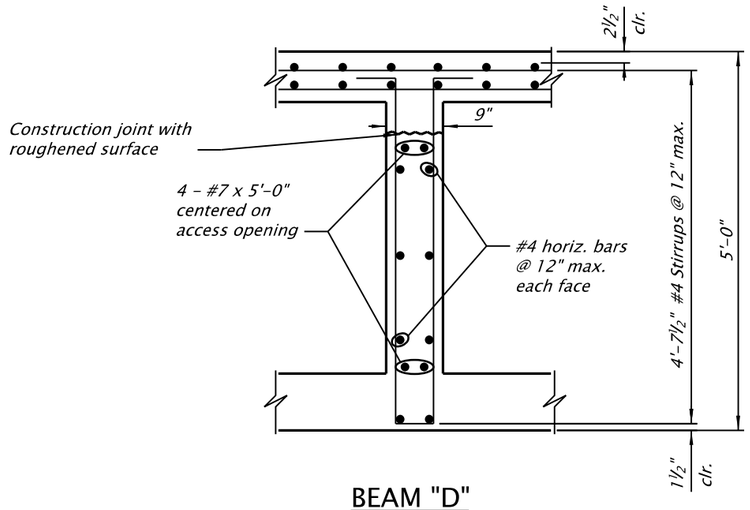




ADDITONAL POSITIVE/NEGATIVE MOMENT REINFORCEMENT

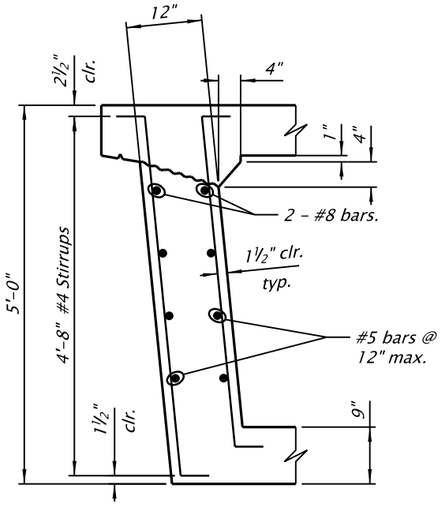
Scale: 1" = 2'-0"

Note:
For additional information, see Box Girder Details Nos. 2-5.



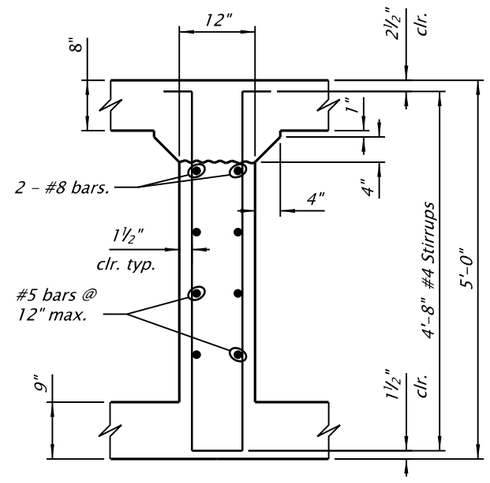
BEAM "D"

Scale: 1" = 2'-0"



EXTERIOR WEB

Scale: 1" = 2'-0"



INTERIOR WEB

Scale: 1" = 2'-0"

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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STRUCTURE NO.	09702
BDS DWG NO.	00000
CALC. BOOK	0000
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DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
Drafter: Josh Goodall | Checker: Brett Karnes

BOX GIRDER DETAILS No. 1

SHEET NO.

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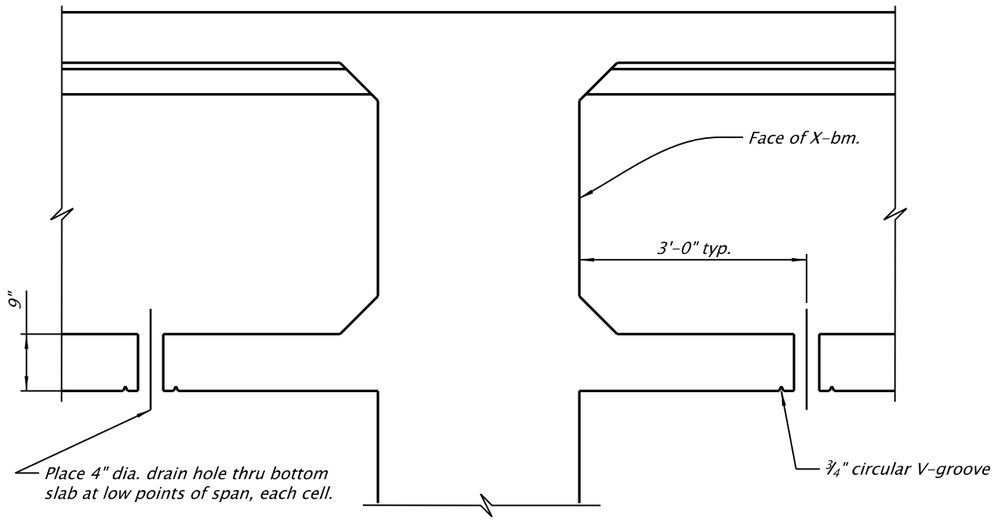
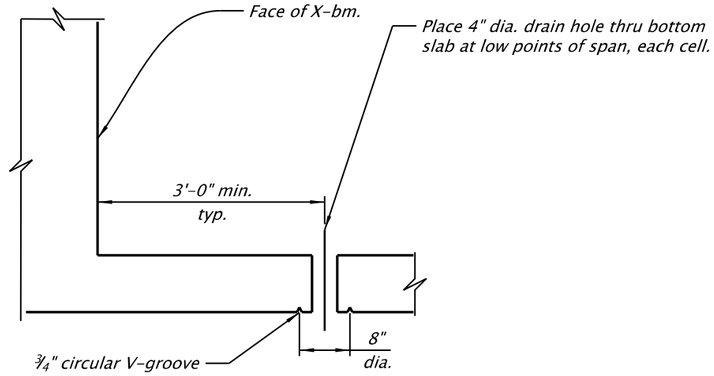
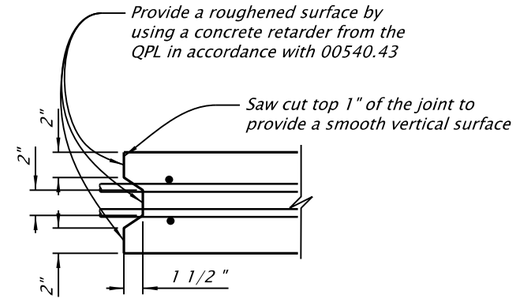
Note:
No transverse construction joint allowed in deck within 30'-0" of interior bents.



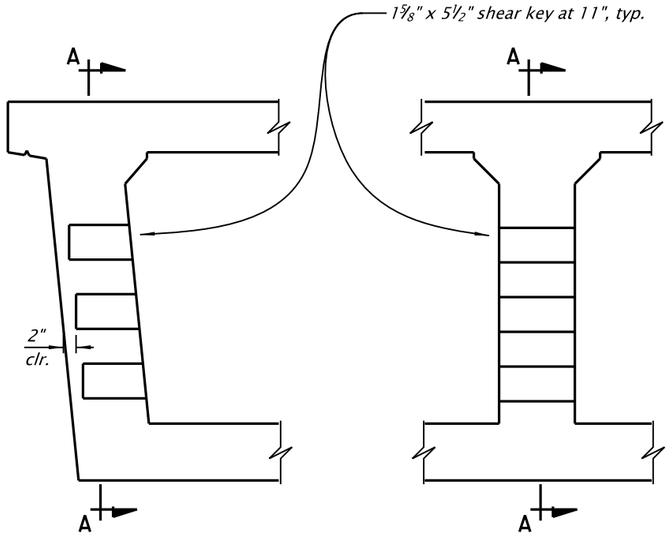
BOTTOM SLAB DRAIN AT BENTS 2,3
Scale: 1" = 2'-0"



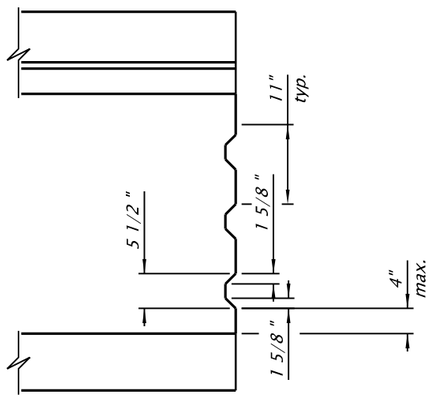
BOX GIRDER BOTTOM SLAB DRAIN
Scale: 1" = 2'-0"



DECK CONSTRUCTION JOINT
Scale: 1" = 1'-0"



WEB SHEAR KEY AT CONSTRUCTION JOINT
Scale: 1" = 2'-0"



SECTION A-A
Scale: 1" = 2'-0"

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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BDS DWG NO.	00000
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DESIGN ACCEPTANCE PLANS
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall
Drafter: Josh Goodall
Reviewer: Jeff Olson
Checker: Brett Karnes

BOX GIRDER DETAILS No. 2

SHEET NO.

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BR_K19786_QE1_dt_06.dgn :: Default 2/11/2020 3:26:53 PM CDONOVAN
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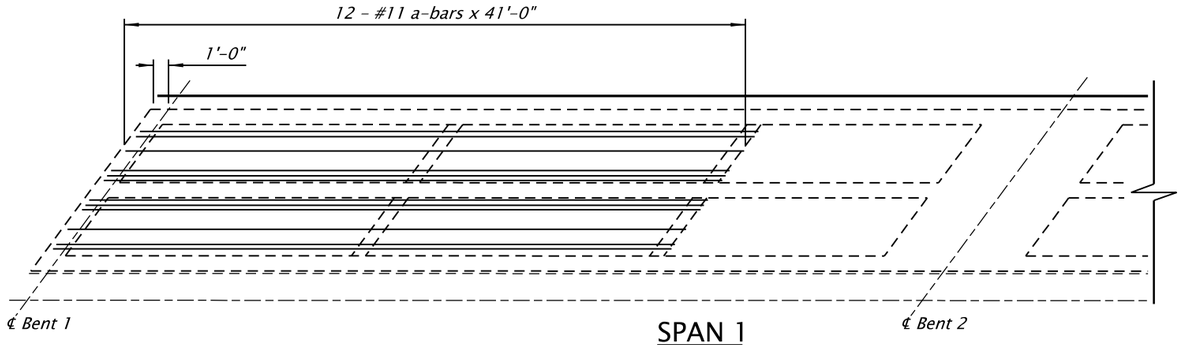
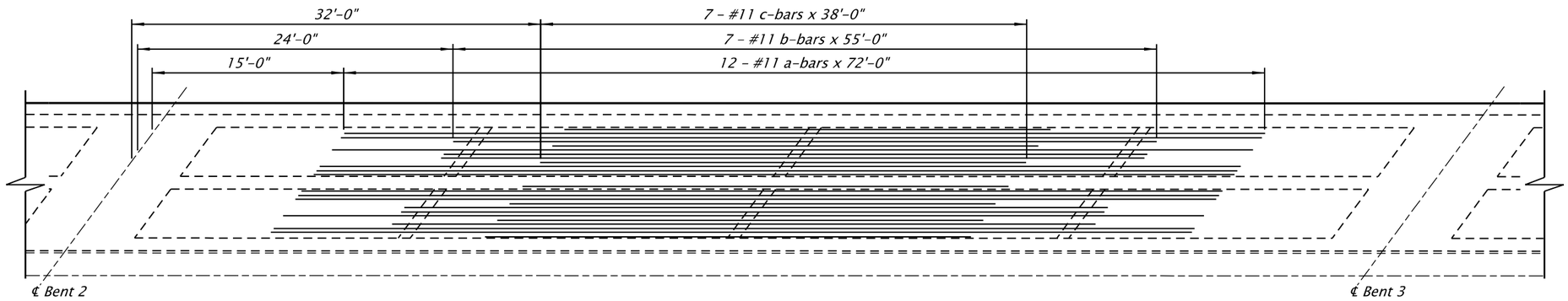
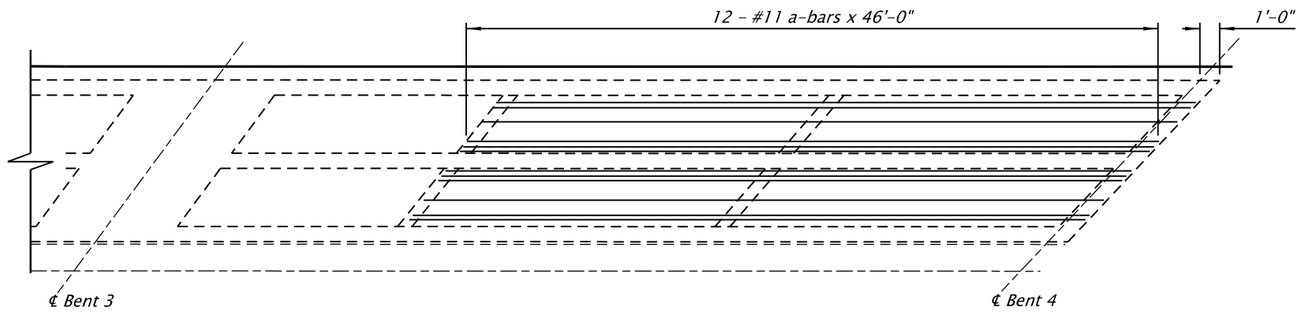


SPAN 1
Scale: 1" = 10'-0"



SPAN 2
Scale: 1" = 10'-0"



SPAN 3
Scale: 1" = 10'-0"

ADDITIONAL POSITIVE MOMENT REINFORCEMENT

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
Drafter: Josh Goodall | Checker: Brett Karnes

BOX GIRDERS DETAILS NO. 3

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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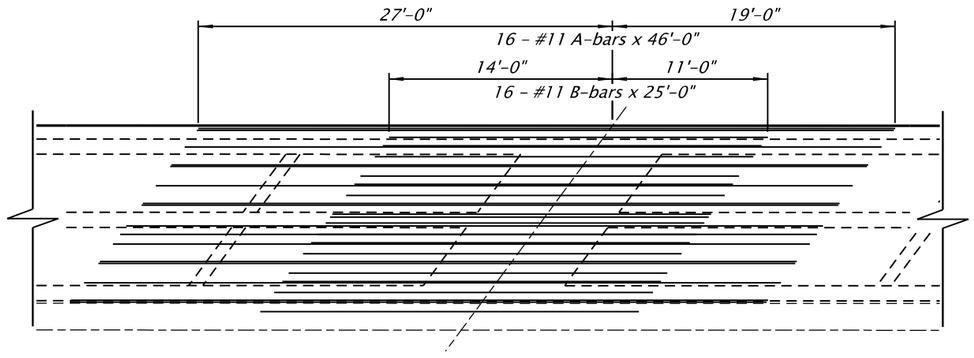
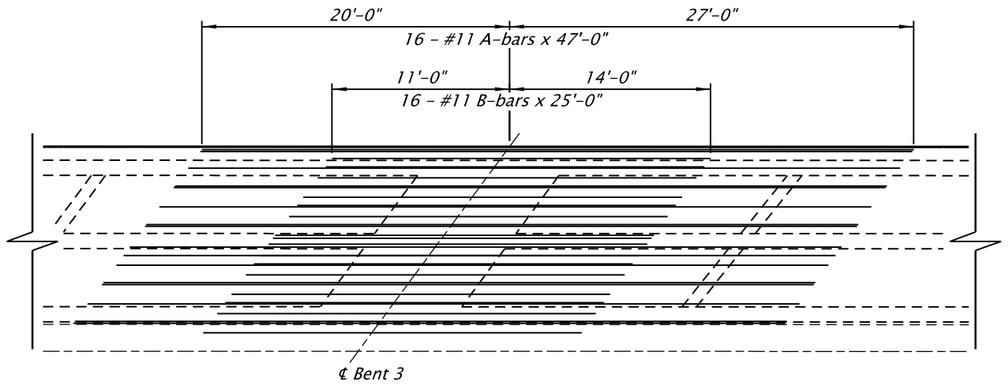


BENT 2

Scale: 1" = 10'-0"



BENT 3

Scale: 1" = 10'-0"

ADDITIONAL NEGATIVE MOMENT REINFORCEMENT

SCALE WARNING

If scale bar doesn't measure one inch then drawing is not to scale

ACCOMPANIED BY DWGS.:
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STRUCTURE NO.	09702
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 000	M.P.: 000.00-000.00
COUNTY	Clackamas
DATE	07/18

DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
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BOX GIRDER DETAILS No. 4

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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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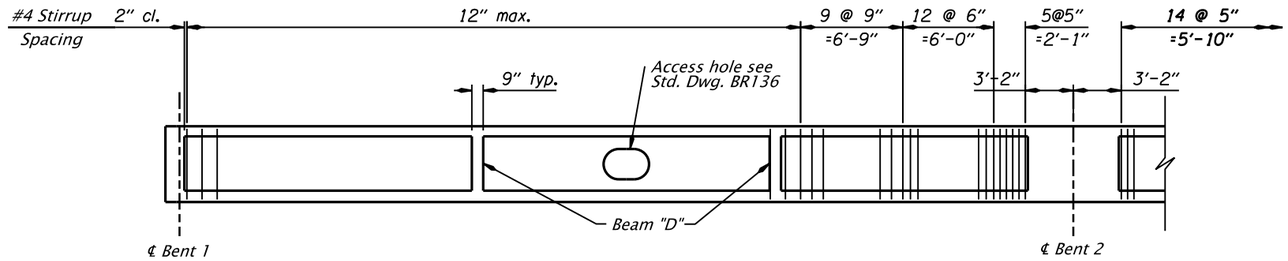
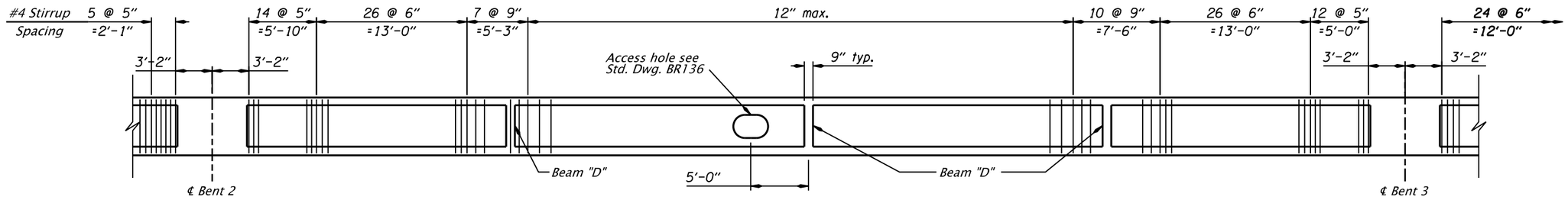
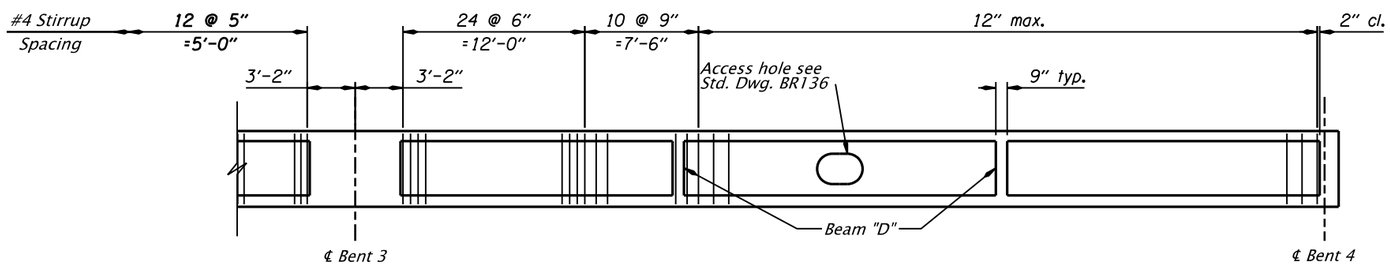


SPAN 1
Scale: 1" = 30'-0"



SPAN 2
Scale: 1" = 30'-0"



SPAN 3
Scale: 1" = 30'-0"

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

ACCOMPANIED BY DWGS.:
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STRUCTURE NO.	09702
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 000 M.P.: 000.00-000.00	
COUNTY	Clackamas
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DESIGN ACCEPTANCE PLANS
INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall
Drafter: Josh Goodall
Reviewer: Jeff Olson
Checker: Brett Karnes

BOX GIRDER DETAILS No. 5

SHEET NO.

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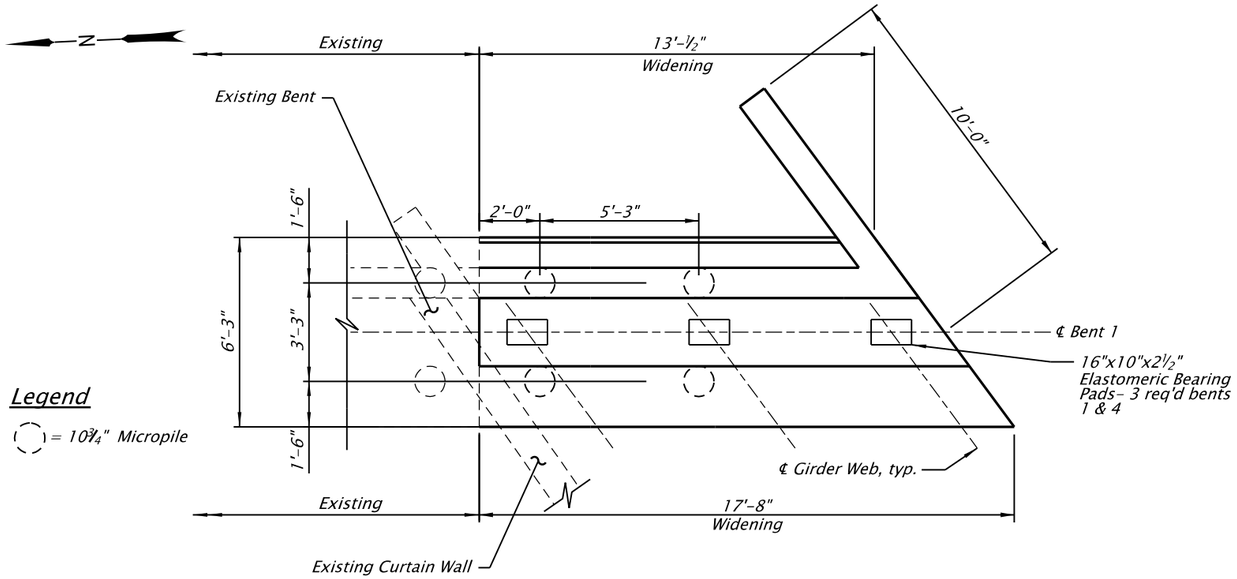
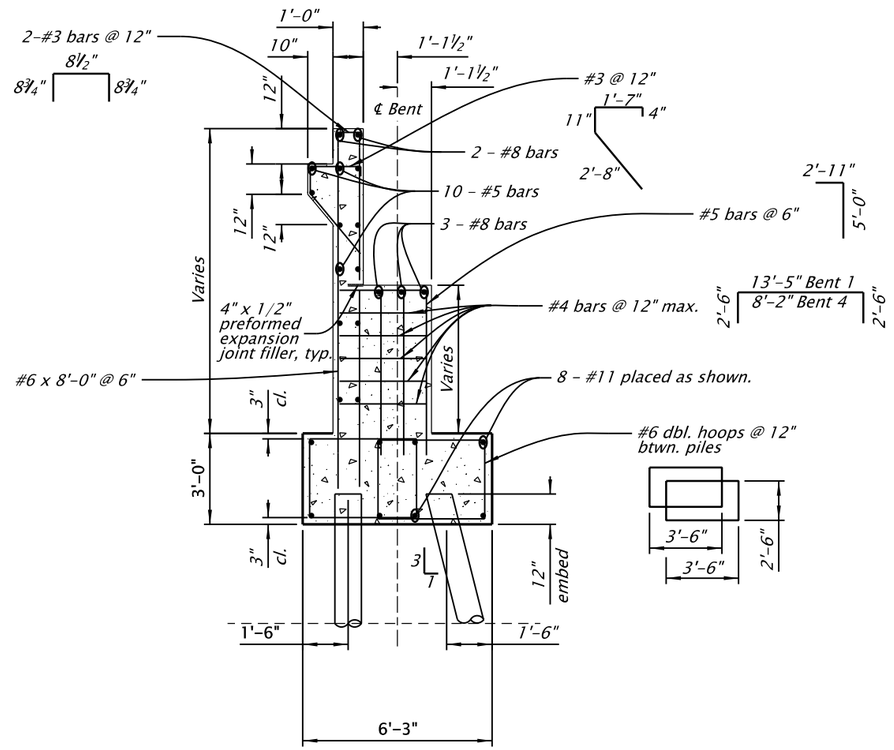


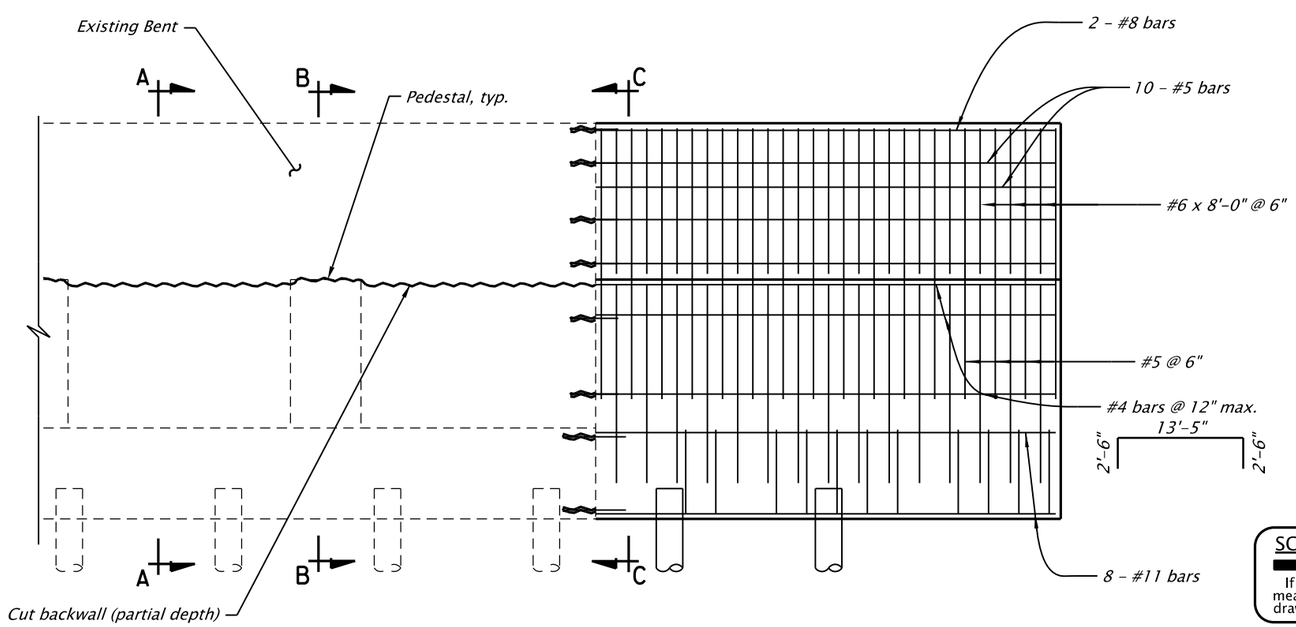
PARTIAL PLAN, BENT 1

Scale: 1" = 5'-0"



WIDENING TYPICAL SECTION

Scale: 1" = 5'-0"



PARTIAL ELEVATION - BENT 1

Scale: 1" = 5'-0"

Note:
Bent 1 shown, Bent 4 similar except as noted

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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STRUCTURE NO.	09702
BDS DWG NO.	00000
CALC. BOOK	0000
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DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

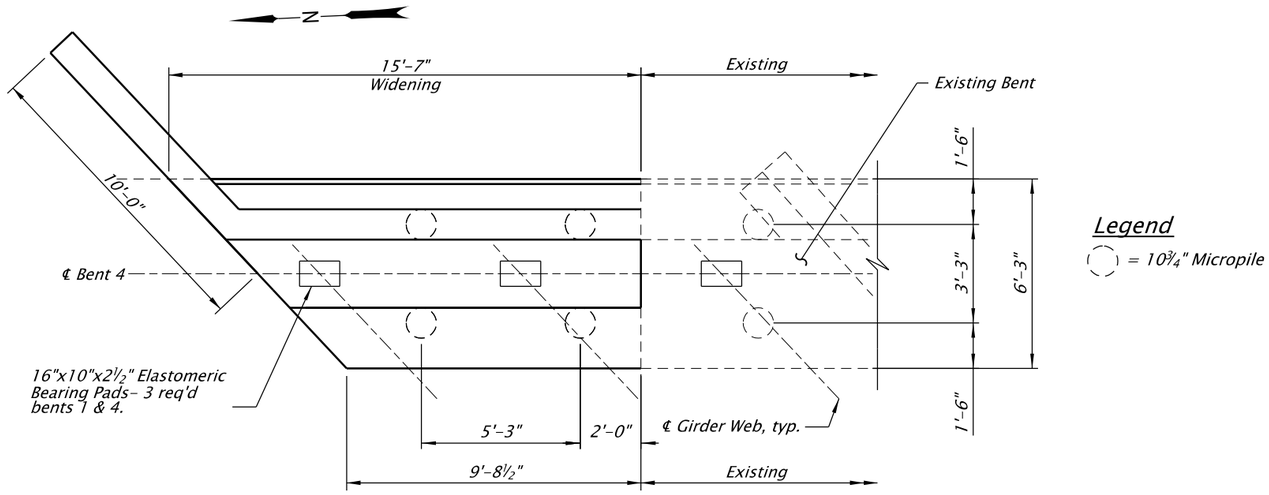
I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
Drafter: Josh Goodall | Checker: Brett Karnes

BENT 1

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

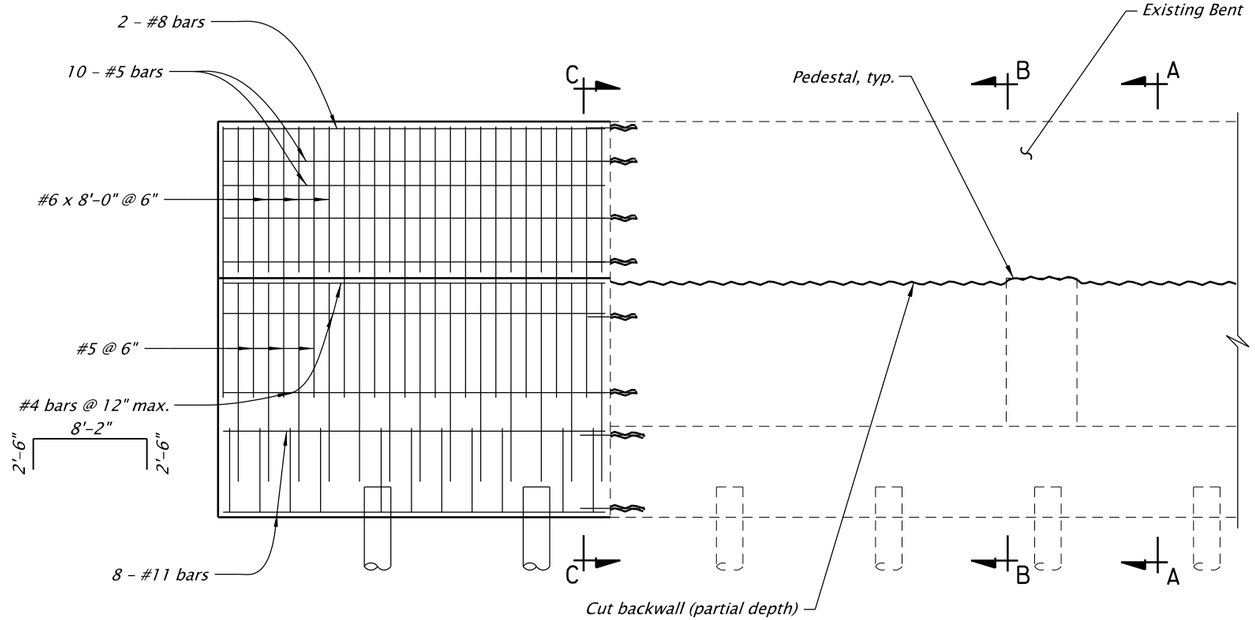


Legend

( ) = 10¾" Micropile

PARTIAL PLAN, BENT 4

Scale: 1" = 5'-0"



PARTIAL ELEVATION - BENT 4

Scale: 1" = 5'-0"

Note:

See Bent 1 sheet for typical section

SCALE WARNING

If scale bar doesn't measure one inch then drawing is not to scale

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STRUCTURE NO.	09702
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DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
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BENT 4

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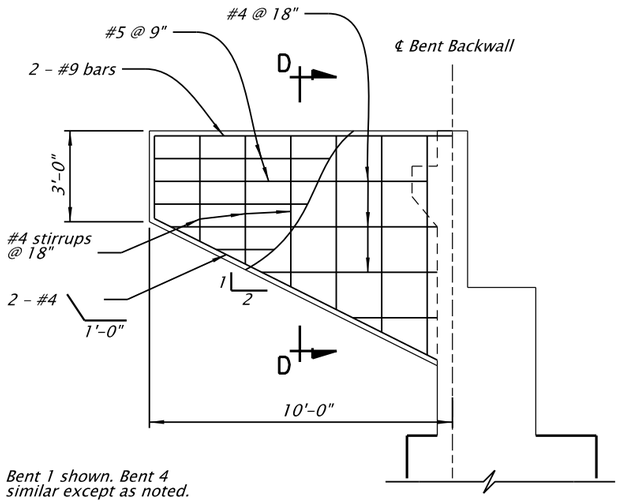
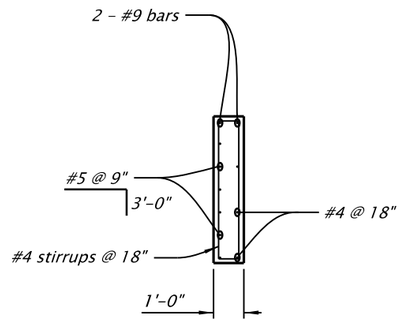
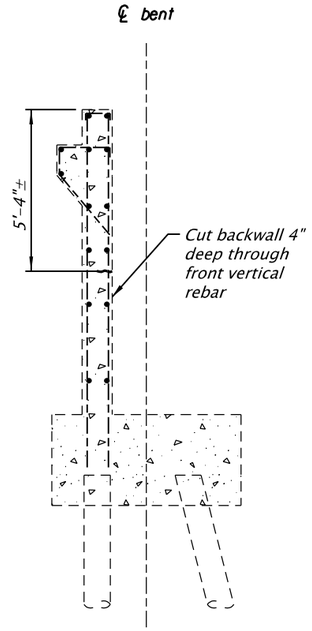


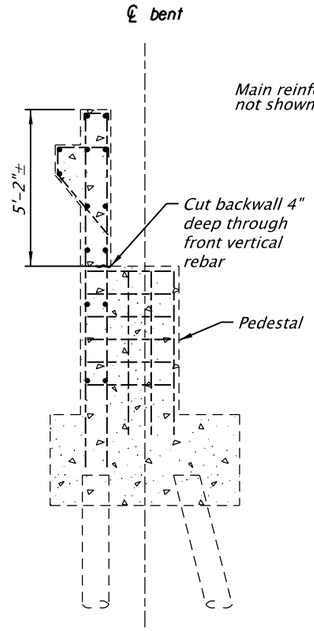
WINGWALL ELEVATION
Scale: 1" = 5'-0"



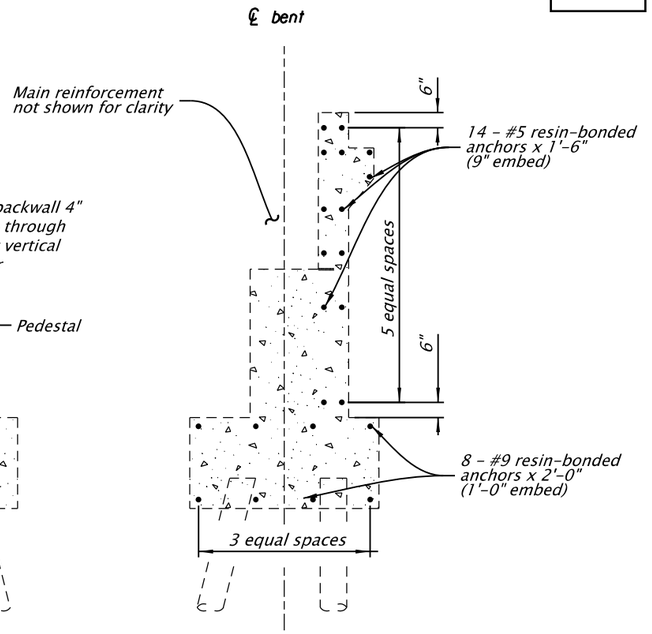
SECTION D-D
Scale: 1" = 5'-0"



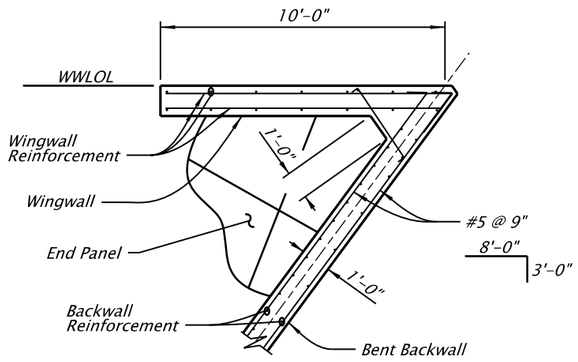
SECTION A-A
Scale: 1" = 5'-0"



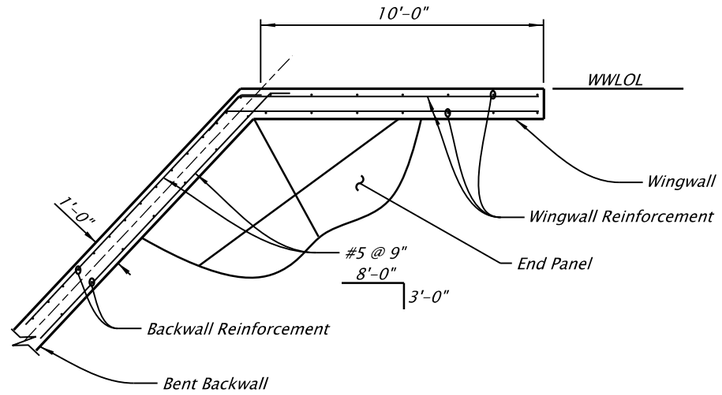
SECTION B-B
Scale: 1" = 5'-0"



SECTION C-C
Scale: 1" = 5'-0"



Bent 1



Bent 4

WINGWALL CORNER DETAIL
Scale: 1" = 5'-0"

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

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DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
Drafter: Josh Goodall | Checker: Brett Karnes

BENT 1, 4 DETAILS

SHEET NO.

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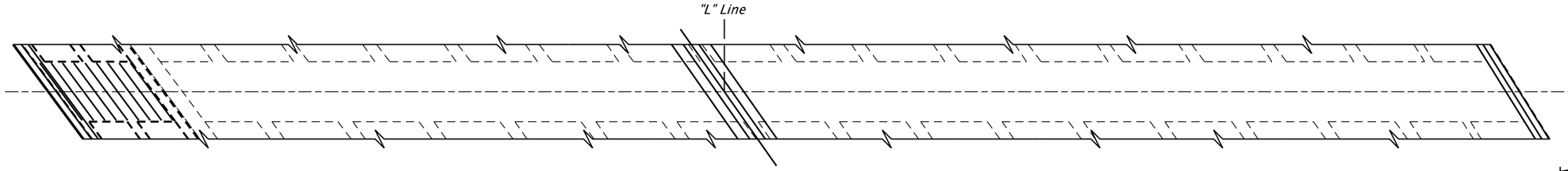
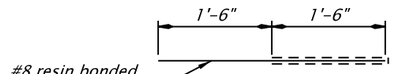
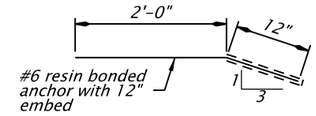


PLAN – BENTS 2, 3

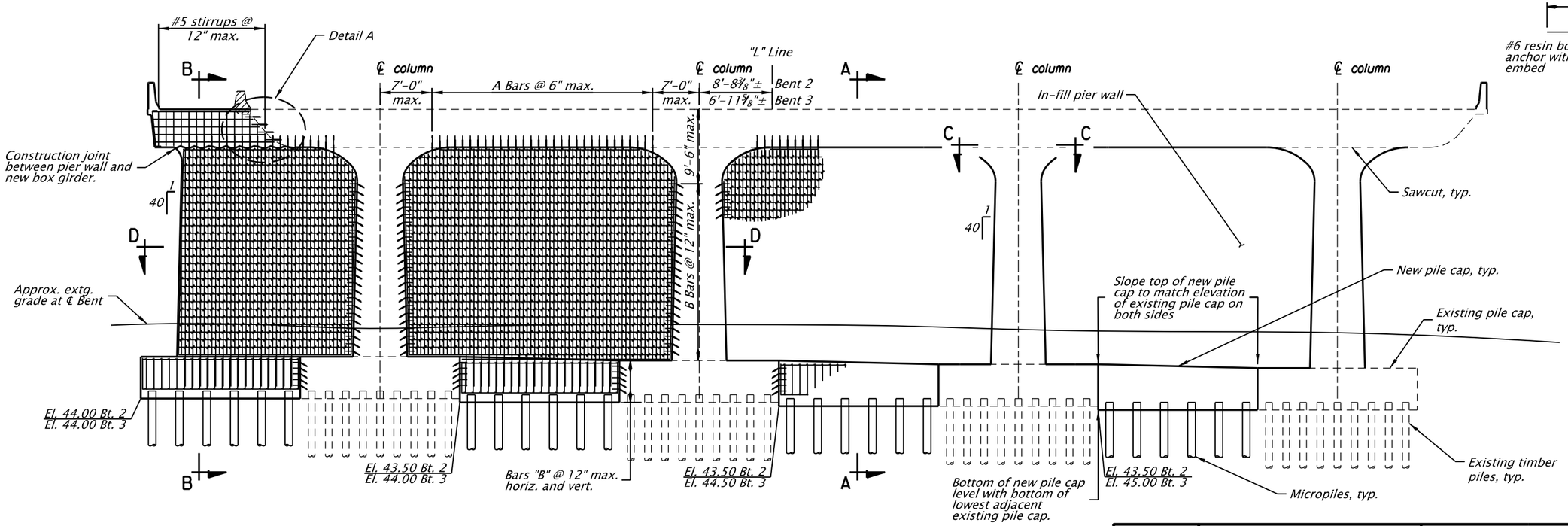
Scale: 1" = 15'-0"



A Bar



B Bar



ELEVATION – BENTS 2, 3

Scale: 1" = 15'-0"

Notes:

1. Pier Wall reinforcement shown is typical for all bays.
2. For Section A-A and B-B, see sheet JA18.
3. For Detail A, see sheet JA18.

SCALE WARNING

If scale bar doesn't measure one inch then drawing is not to scale

ACCOMPANIED BY DWGS.:
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BDS DWG NO.	00000
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HWY: 000	
M.P.: 000.00-000.00	
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QUINCY ENGINEERING

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HWY. 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
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Checker: Brett Karnes

BENTS 2, 3

SHEET NO.

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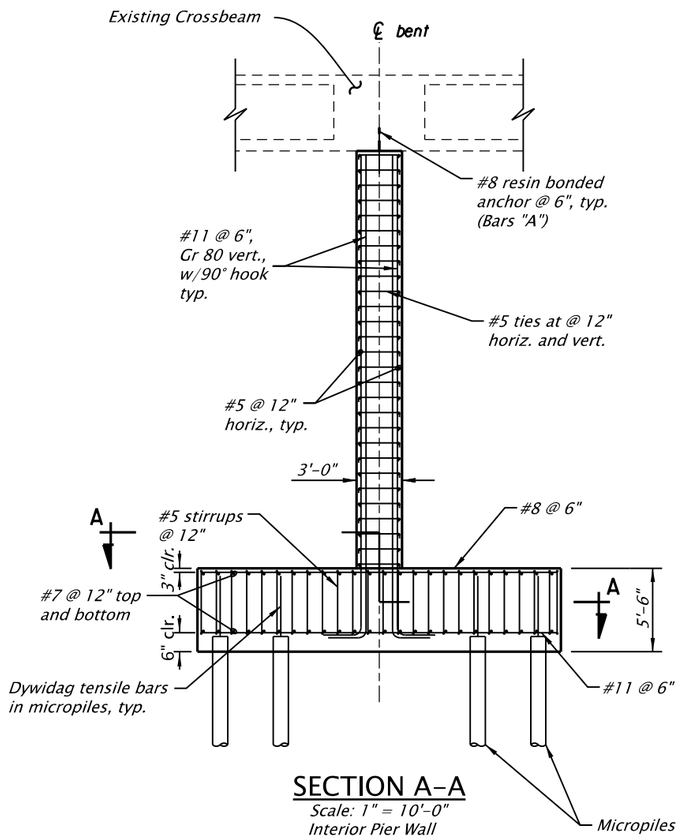
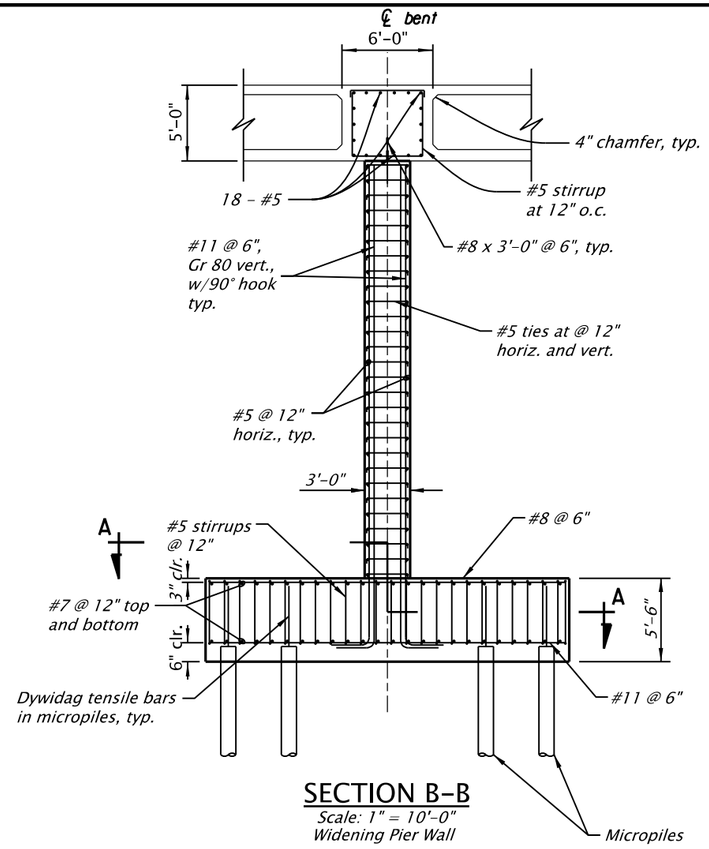
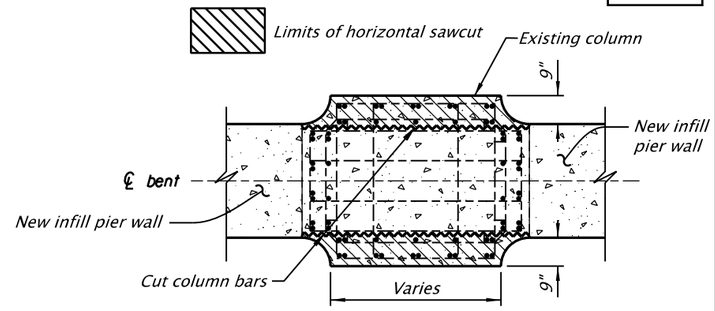
Rotation: 0°



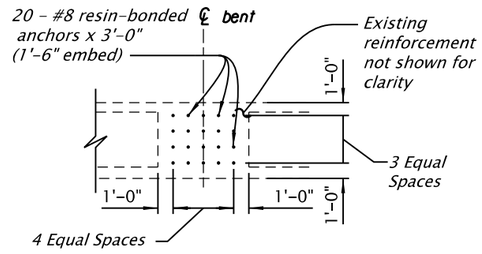
SECTION A-A
Scale: 1" = 10'-0"
Interior Pier Wall



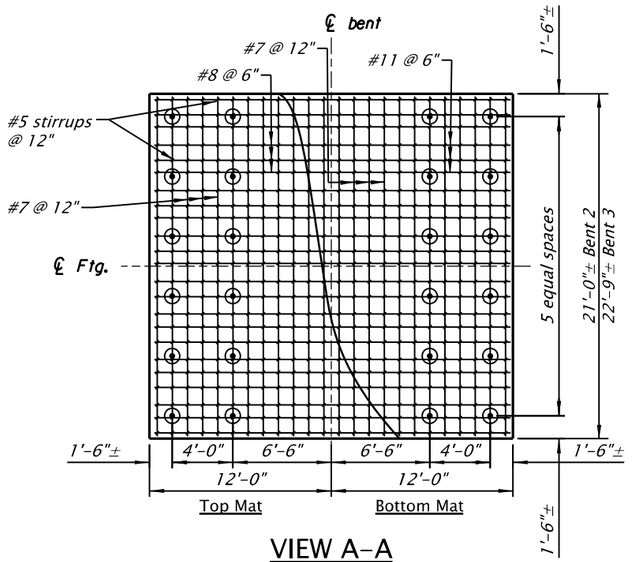
SECTION B-B
Scale: 1" = 10'-0"
Widening Pier Wall



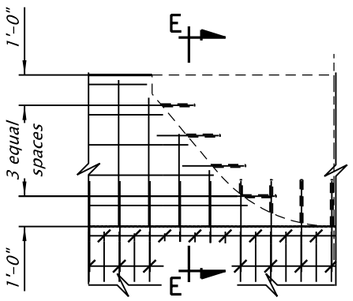
SECTION C-C
Scale: 1/4" = 1'-0"



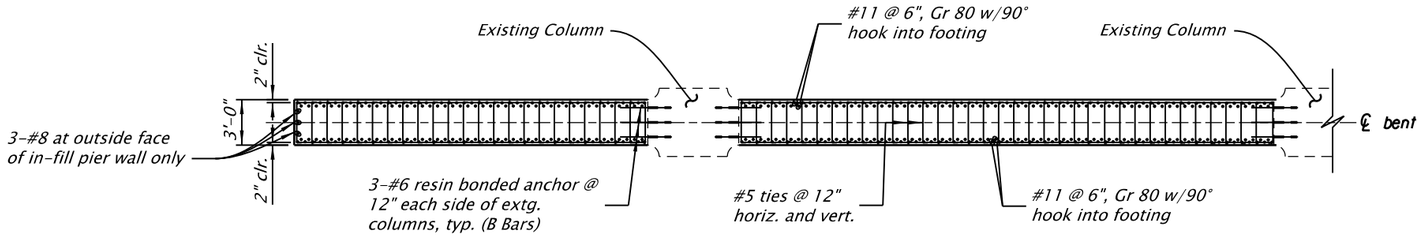
SECTION E-E
Scale: 1" = 10'-0"



VIEW A-A
Scale: 1" = 10'-0"



DETAIL A
Scale: 1" = XXX



SECTION D-D
Scale: 1" = 10'-0"

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

ACCOMPANIED BY DWGS.:
00000

STRUCTURE NO.	09702
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 000 M.P.: 000.00-000.00	
COUNTY	Clackamas
DATE	07/18

DESIGN ACCEPTANCE PLANS INFORMATION ONLY

QUINCY ENGINEERING

HWY. 64 OVER MAIN ST. (OREGON CITY)

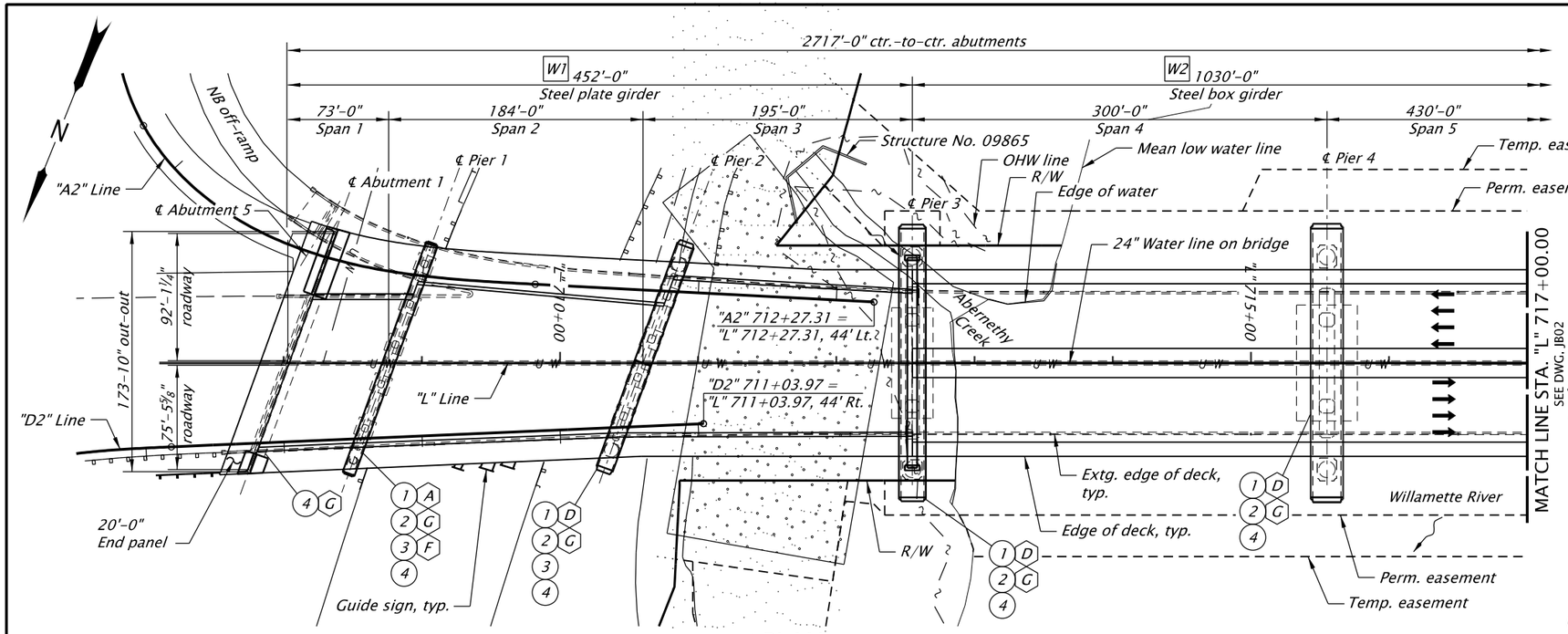
I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Josh Goodall | Reviewer: Jeff Olson
Drafter: Josh Goodall | Checker: Brett Karnes

BENTS 2, 3 DETAILS

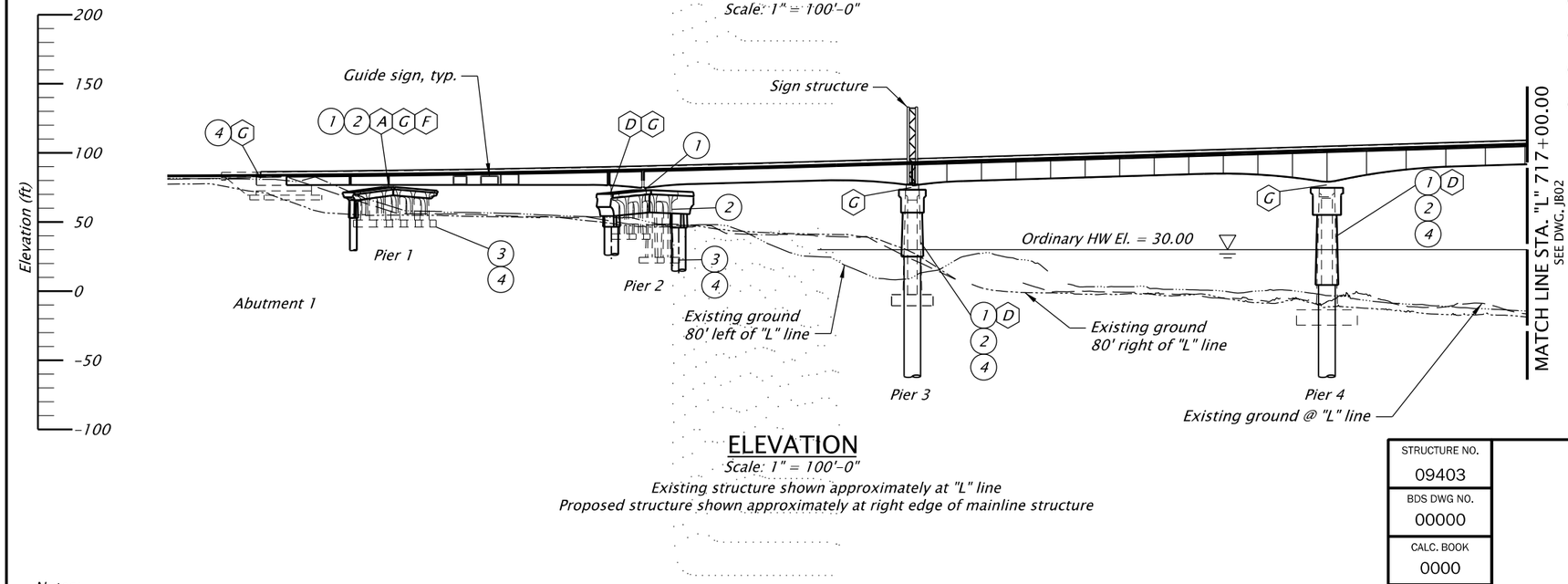
SHEET NO.

BR_K19786_QEI_dt_04.dgn :: Default 2/11/2020 3:28:51 PM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 0°



PLAN

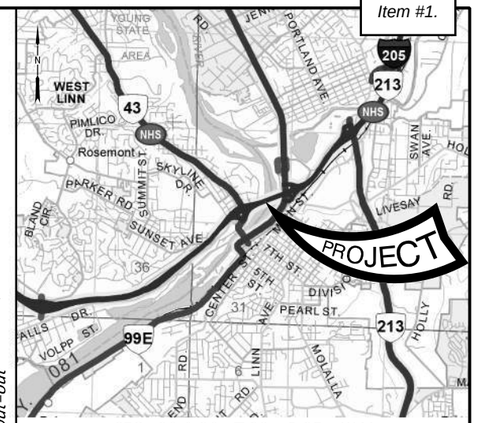
Scale: 1" = 100'-0"



ELEVATION

Scale: 1" = 100'-0"

Existing structure shown approximately at "L" line
Proposed structure shown approximately at right edge of mainline structure



SEC. 29 & 30, T.2S., R.2E., W.M.
LAT. 45.36416, LONG. -122.60513

LOCATION MAP

No Scale

SEISMIC DEFICIENCY

1. Crossbeam flexural/shear strength (LL)
2. Column flexural/shear strength (LL)
3. Lack of top mat pile cap reinforcing (LL)
4. Insufficient pile anchorage (LL)
5. Spread footing overturning/strength (LL)

SEISMIC RETROFIT

- A Crossbeam enlargement
- B Column enlargement
- C Pile cap enlargement
- D Substructure replacement
- E Micropiles
- F Strengthen footing and pile connection
- G Isolation bearings

WIDENING

- W1 Steel girder widening
- W2 Cantilever widening

LEGEND:

Ground improvements

ACCOMPANIED BY DWGS.:
JBA01 thru JBX__

Notes:
1. Elevations shown are based on North American Vertical Datum (1988).

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

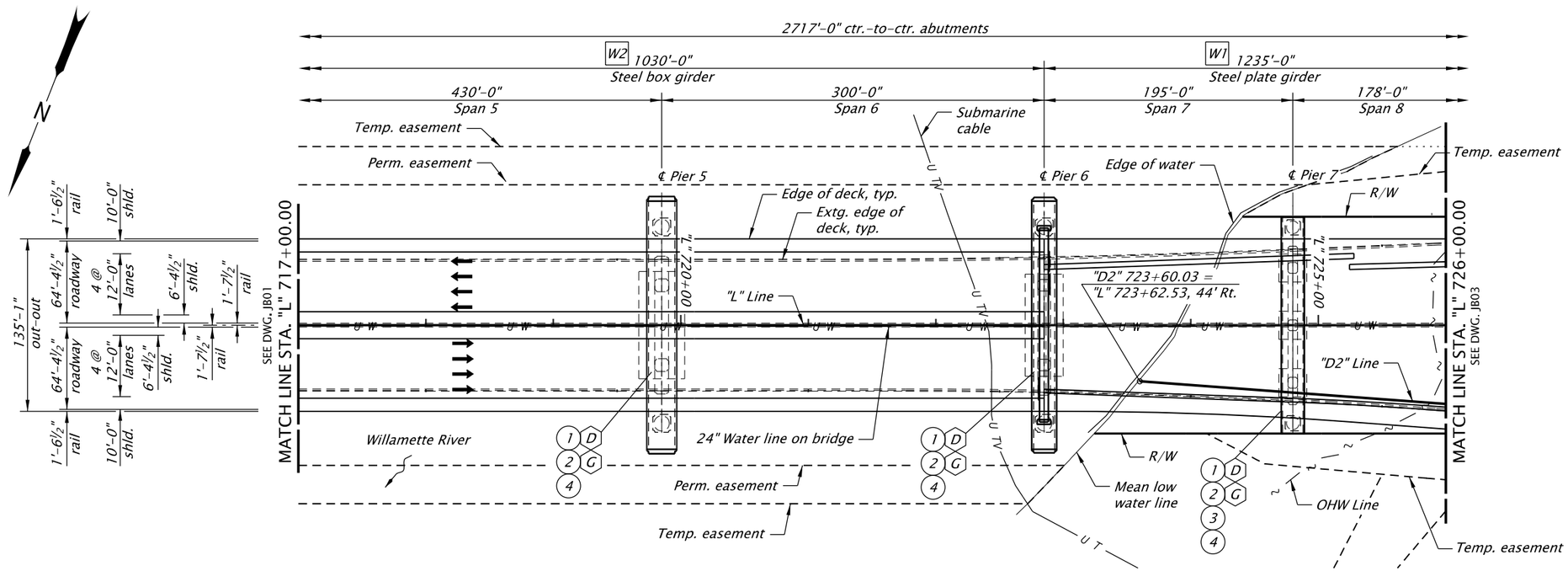
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

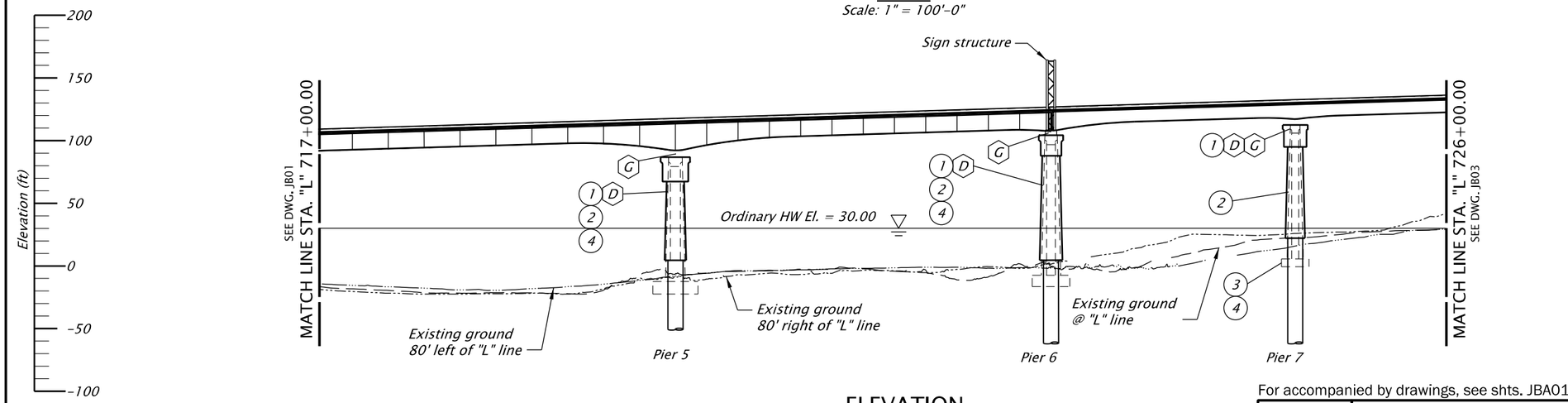
PLAN AND ELEVATION - 1

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



PLAN
Scale: 1" = 100'-0"



ELEVATION
Scale: 1" = 100'-0"
Existing structure shown approximately at "L" line
Proposed structure shown approximately at right edge of mainline structure

SEISMIC DEFICIENCY
1. Crossbeam flexural/shear strength (LL)
2. Column flexural/shear strength (LL)
3. Lack of top mat pile cap reinforcing (LL)
4. Insufficient pile anchorage (LL)
5. Spread footing overturning/strength (LL)

SEISMIC RETROFIT
- A Crossbeam enlargement
- B Column enlargement
- C Pile cap enlargement
- D Substructure replacement
- E Micropiles
- F Strengthen footing and pile connection
- G Isolation bearings

WIDENING
- W1 Steel girder widening
- W2 Cantilever widening

For accompanied by drawings, see shts. JBA01 & JBA02

Notes:
1. Elevations shown are based on North American Vertical Datum (1988).

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	
M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PLAN AND ELEVATION - 2

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

BR_K19786_HDR_pe_02.dgn :: Default 2/7/2020 4:36:43 PM CDONOVAN
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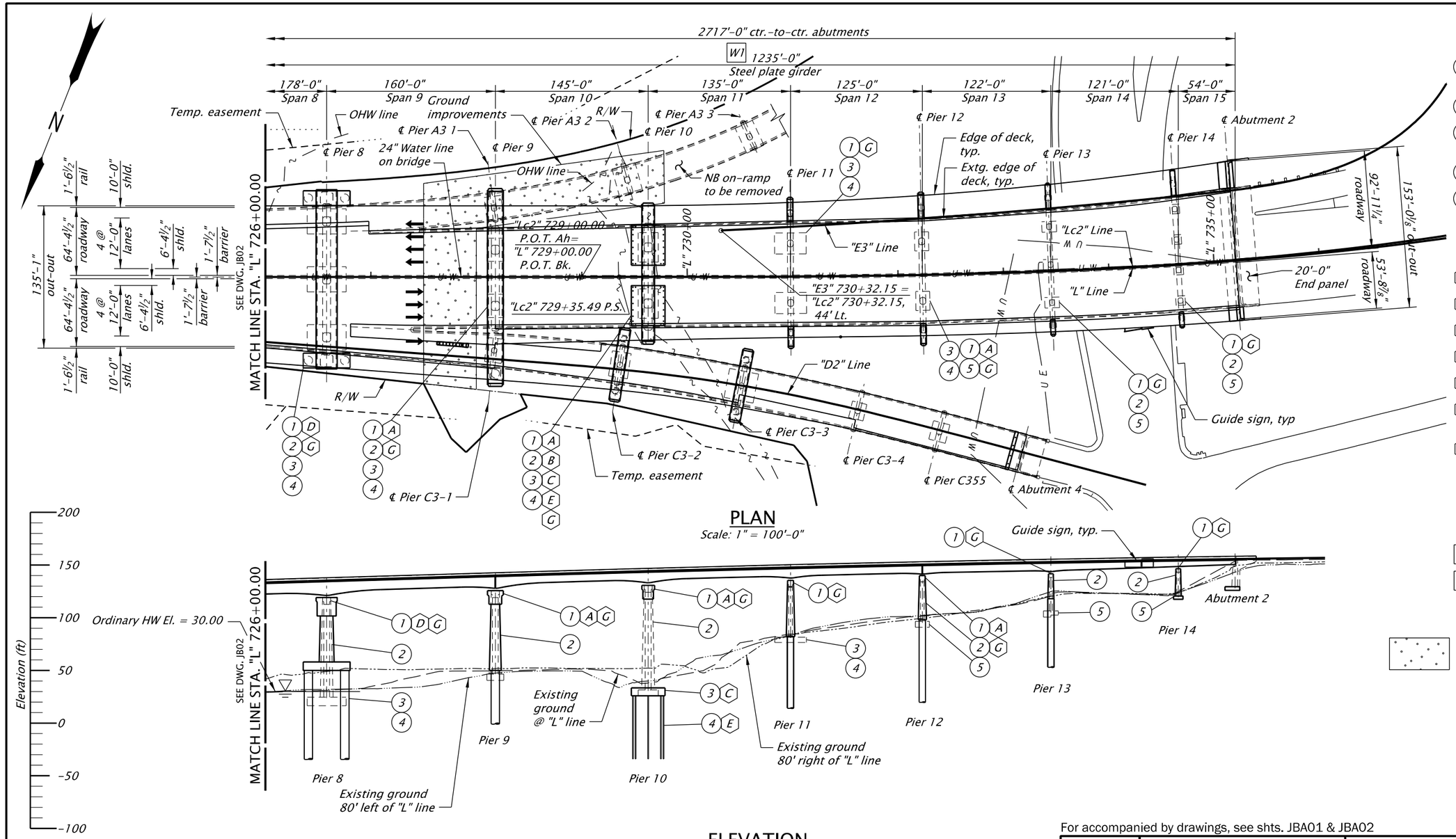

PLAN
Scale: 1" = 100'-0"

ELEVATION
Scale: 1" = 100'-0"

Existing structure shown approximately at "L" line
Proposed structure shown approximately at right edge of mainline structure

SEISMIC DEFICIENCY
1. Crossbeam flexural/shear strength (LL)
2. Column flexural/shear strength (LL)
3. Lack of top mat pile cap reinforcing (LL)
4. Insufficient pile anchorage (LL)
5. Spread footing overturning/strength (LL)

SEISMIC RETROFIT
- A Crossbeam enlargement
- B Column enlargement
- C Pile cap enlargement
- D Substructure replacement
- E Micropiles
- F Strengthen footing and pile connection
- G Isolation bearings

WIDENING
- W1 Steel girder widening
- W2 Cantilever widening

LEGEND:
Ground improvements

Notes:
1. Elevations shown are based on North American Vertical Datum (1988).

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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OREGON DEPARTMENT OF TRANSPORTATION

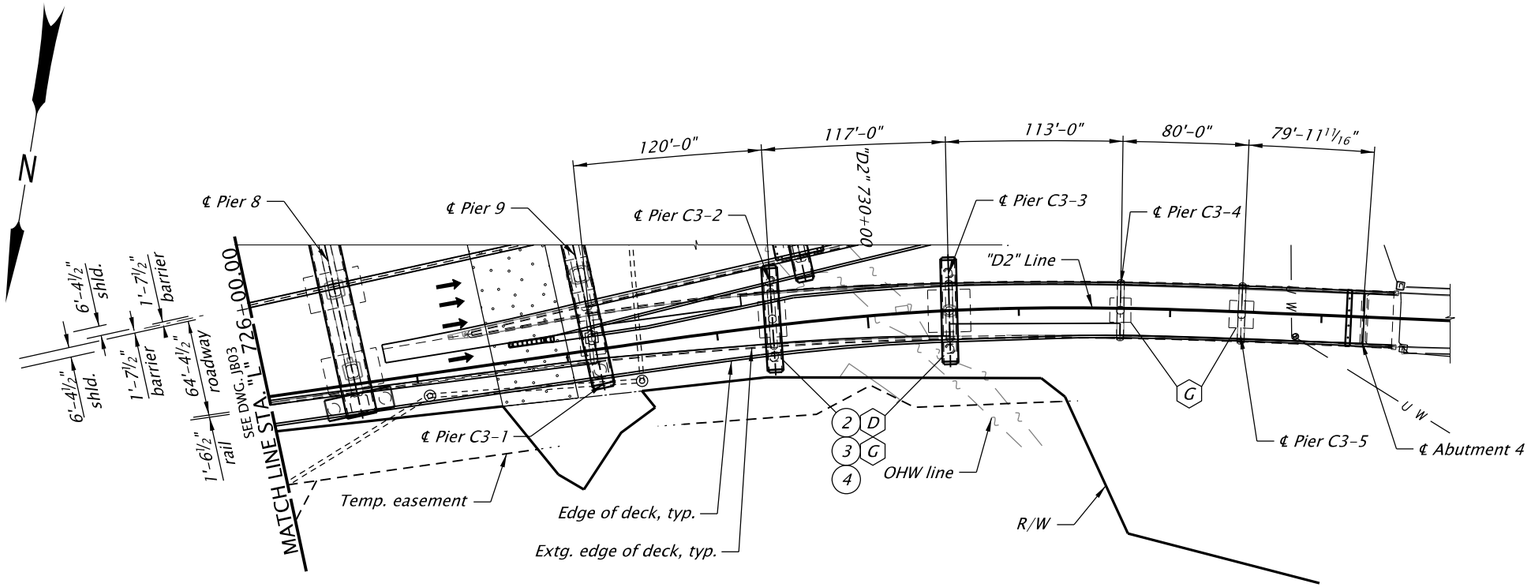
WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

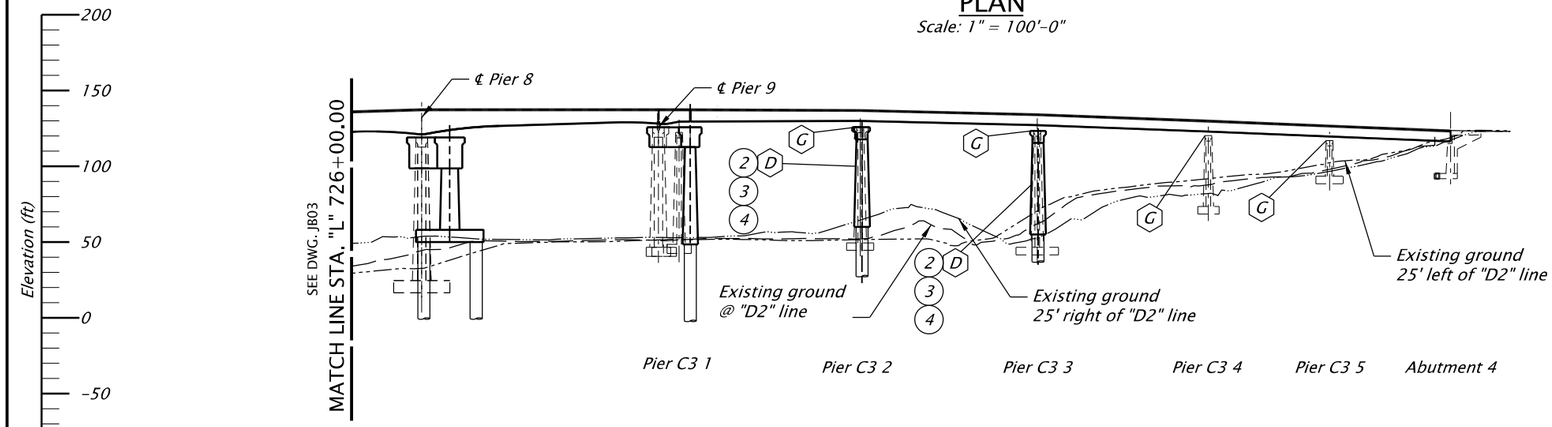
PLAN AND ELEVATION - 3

SHEET NO.



PLAN

Scale: 1" = 100'-0"



ELEVATION

Scale: 1" = 100'-0"

Existing structure shown approximately at "L" line
Proposed structure shown approximately at right edge of mainline structure

SEISMIC DEFICIENCY

1. *Crossbeam flexural/shear strength (LL)*
2. *Column flexural/shear strength (LL)*
3. *Lack of top mat pile cap reinforcing (LL)*
4. *Insufficient pile anchorage (LL)*
5. *Spread footing overturning/strength (LL)*

SEISMIC RETROFIT

- A *Crossbeam enlargement*
- B *Column enlargement*
- C *Pile cap enlargement*
- D *Substructure replacement*
- E *Micropiles*
- F *Strengthen footing and pile connection*
- G *Isolation bearings*

WIDENING

- W1 *Steel girder widening*
- W2 *Cantilever widening*

LEGEND:

Ground improvements

Notes:
1. Elevations shown are based on North American Vertical Datum (1988).

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PLAN AND ELEVATION - RAMP C3

SHEET NO.

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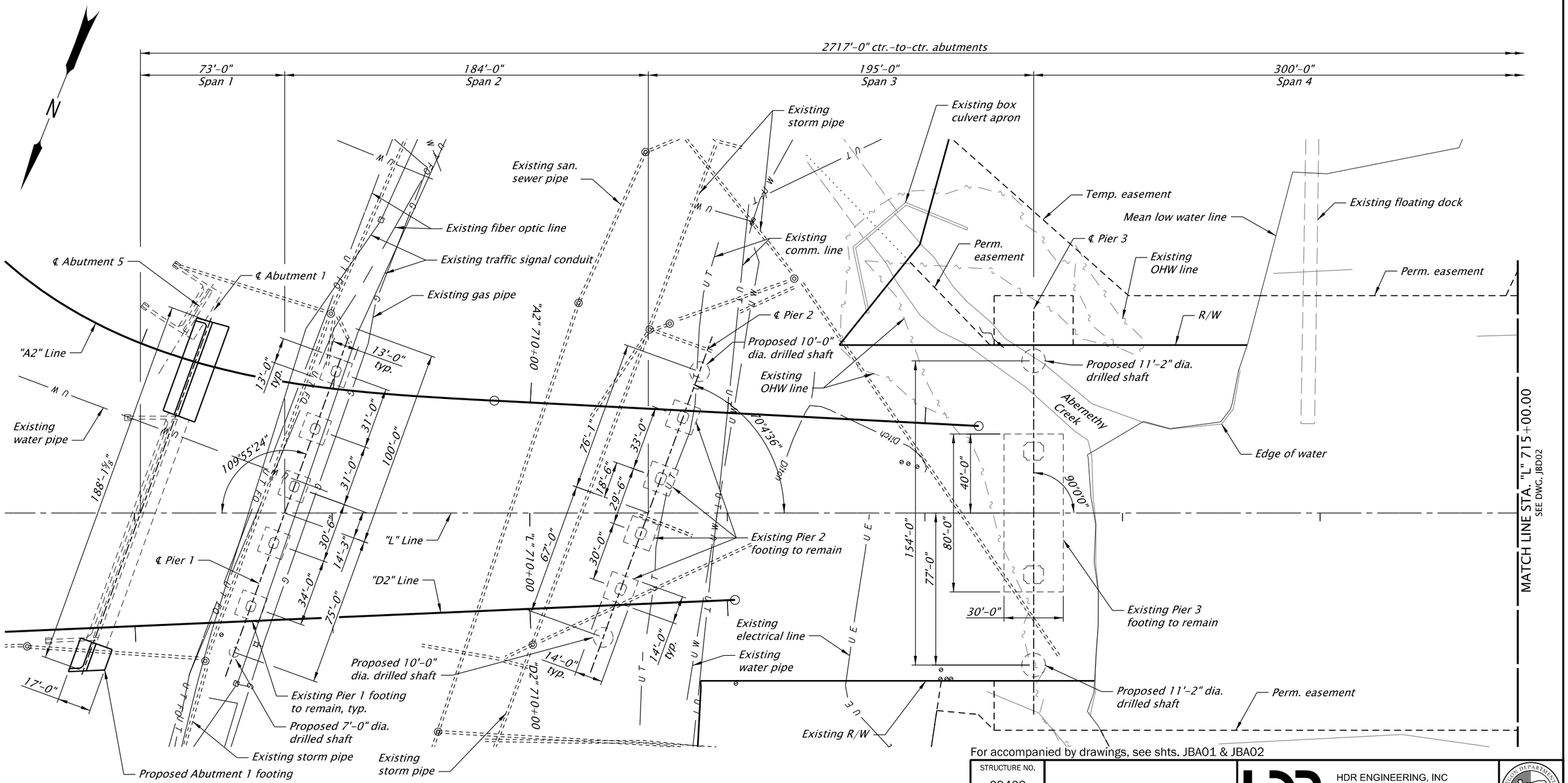

FOUNDATION PLAN

Scale: 1"=50'

For accompanied by drawings, see shts. JBA01 & JBA02

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

FOUNDATION PLAN - 1

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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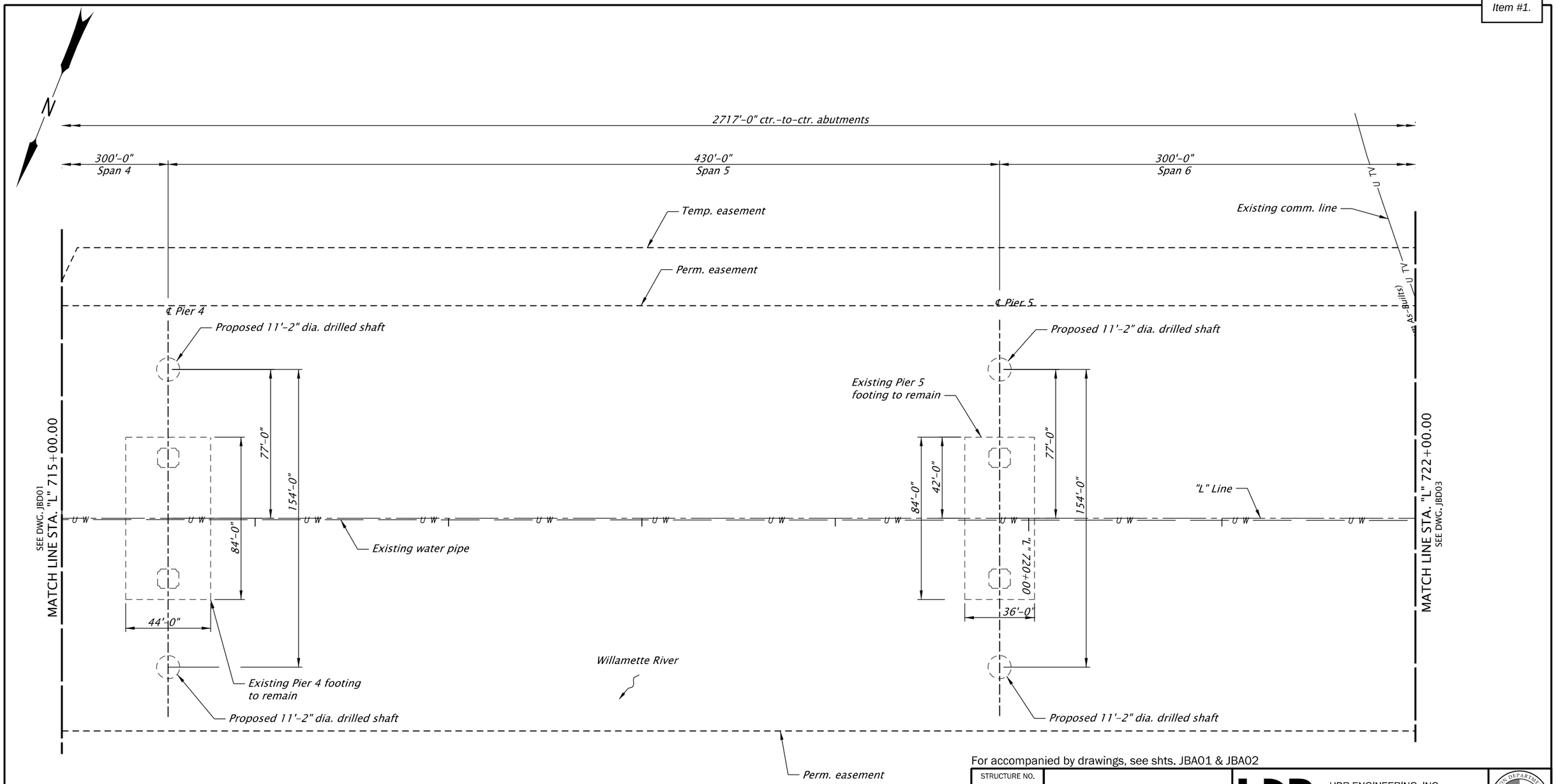

For accompanied by drawings, see shts. JBA01 & JBA02

FOUNDATION PLAN

Scale: 1"=50'

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	
M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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503.423.3700

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

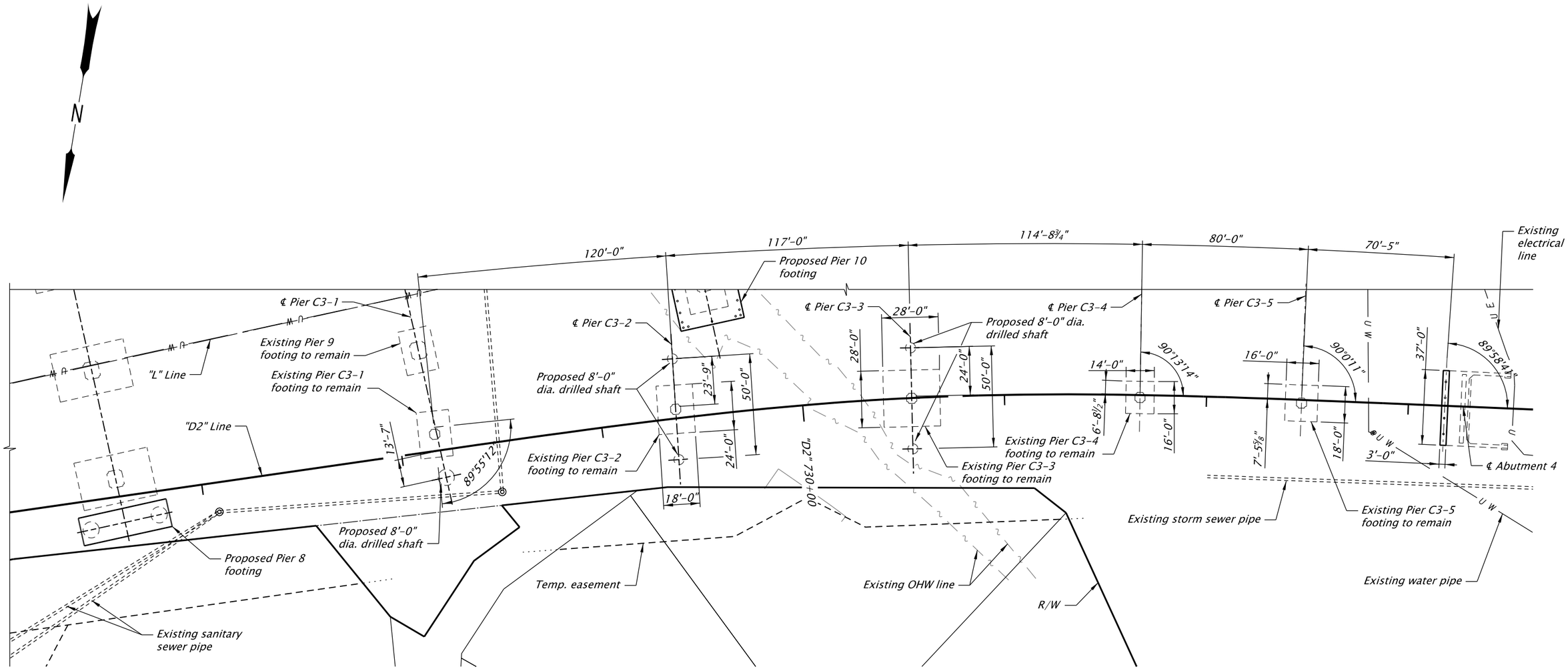
FOUNDATION PLAN - 2

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

BR_K19786_HDR_ftg_02.dgn :: Default 2/7/2020 4:41:36 PM CDONOVAN

Rotation: 201.7268° 0'



FOUNDATION PLAN

Scale: 1"=50'

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING

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503.423.3700

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell
Reviewer: Jeff Olson
Drafter: Heather Gonsior
Checker: Name

FOUNDATION PLAN - RAMP C3

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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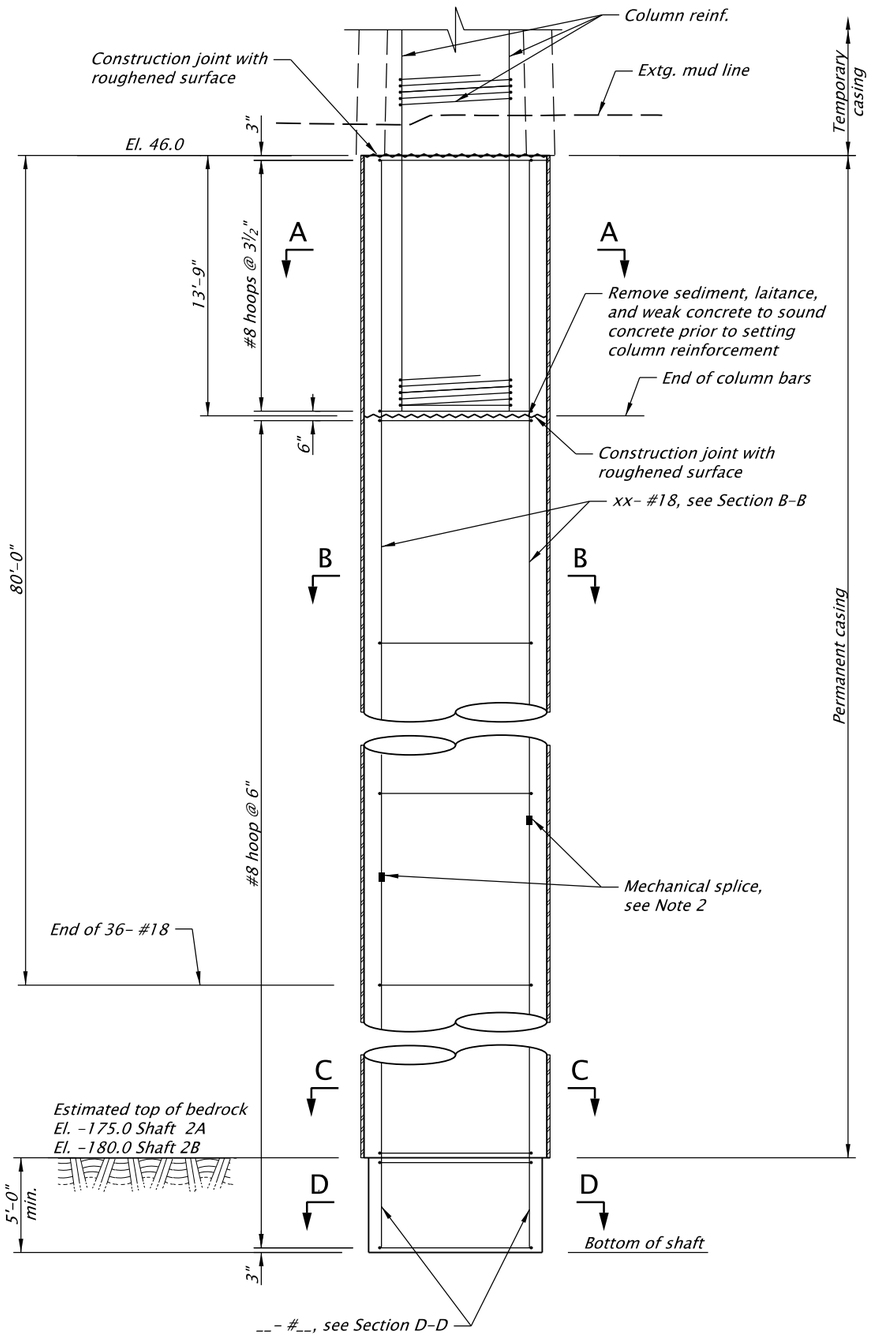
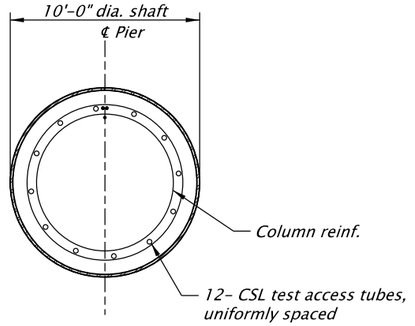
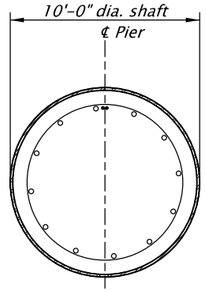
Rotation: 189.2809° 0'



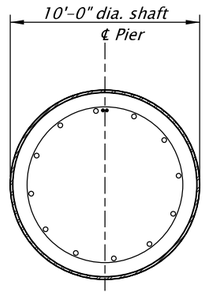
ELEVATION



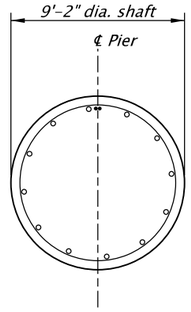
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

Note:

1. *Tip elevation may vary to construct required socket into bedrock.*
2. *Do not splice more than 50% of reinf. bar at any one location. Stagger splices a minimum of 3'-0".*

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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PORTLAND, OR 97204-1134
503.423.3700

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 2 SHAFTS

SHEET NO.

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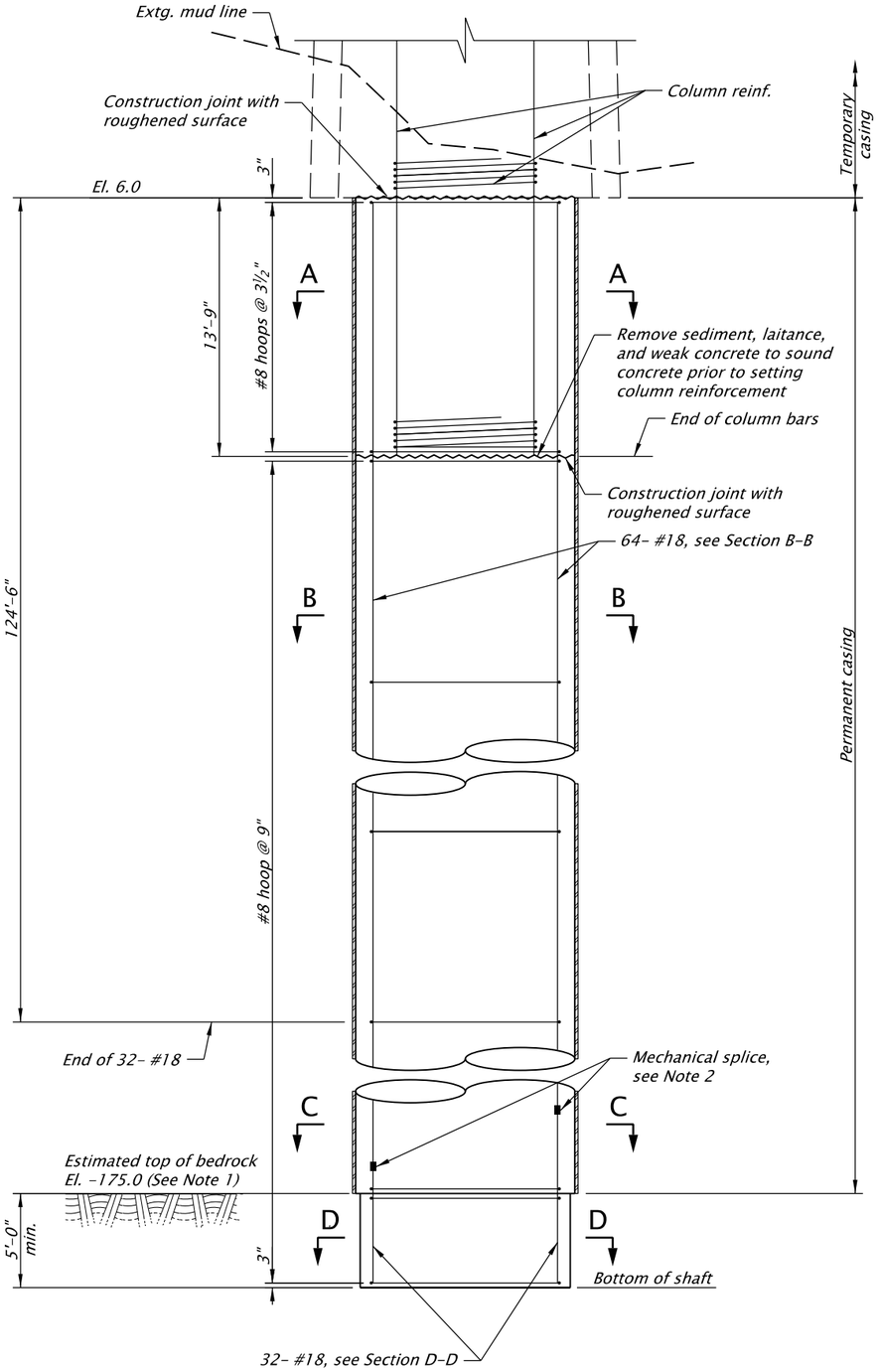
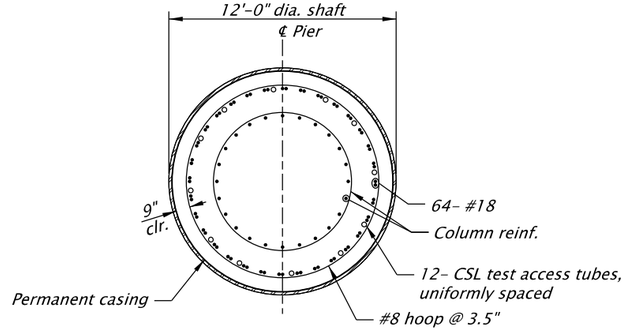
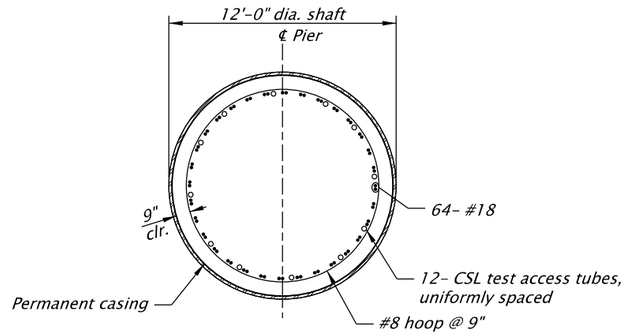


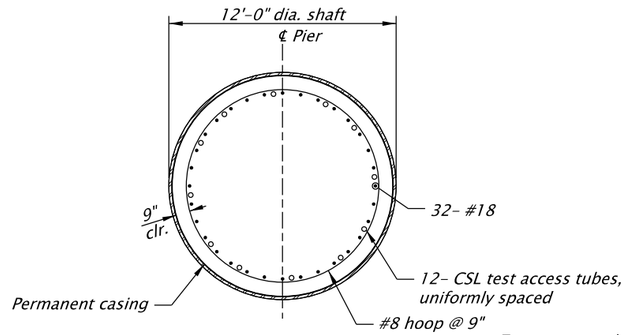
ELEVATION
Scale: 1/8"=1'-0"



SECTION A-A



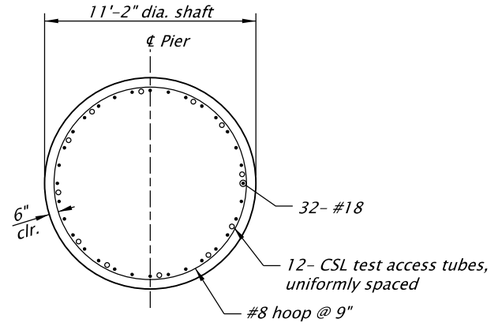
SECTION B-B



SECTION C-C

Note:

1. *Tip elevation may vary to construct required socket into bedrock.*
2. *Do not splice more than 50% of reinf. bar at any one location. Stagger splices a minimum of 3'-0".*



SECTION D-D

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

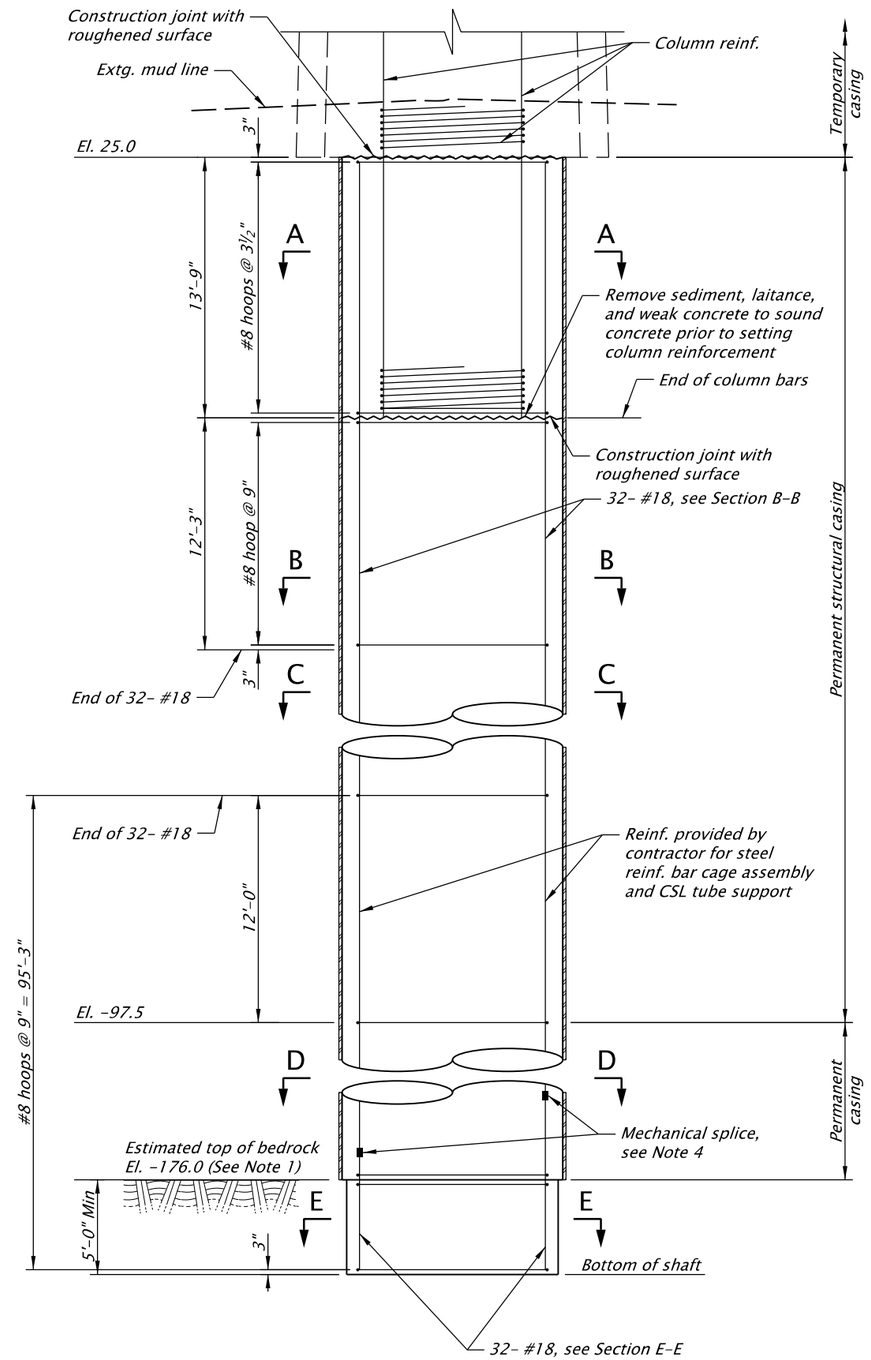
WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

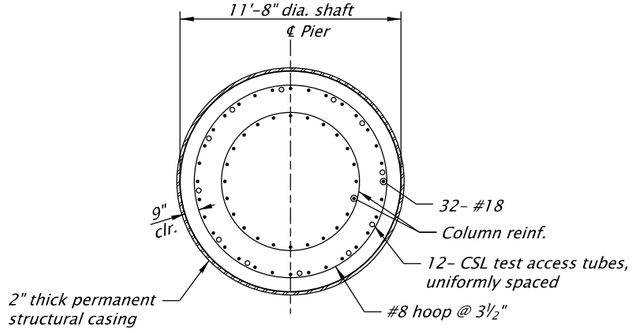
Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 3 SHAFT 3A

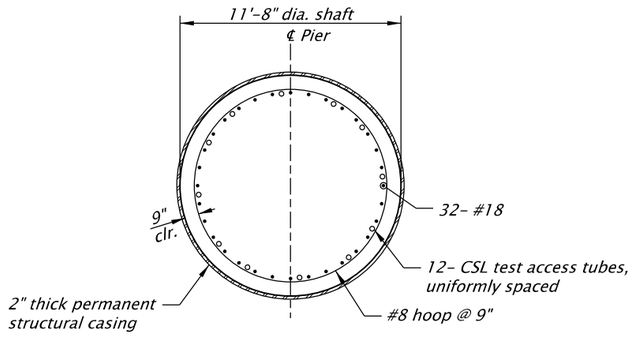
SHEET NO.



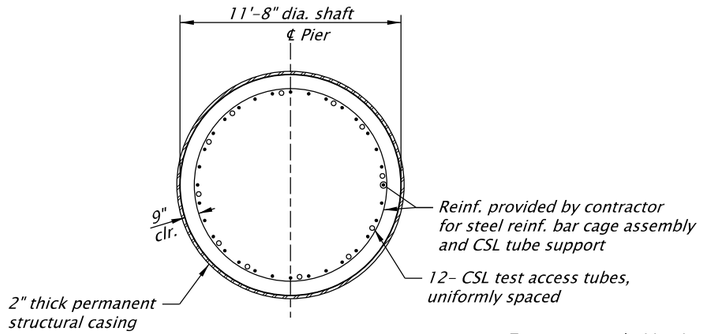
ELEVATION
Scale: 1/8"=1'-0"



SECTION A-A



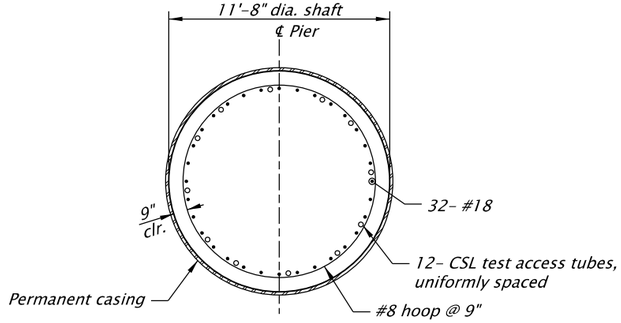
SECTION B-B



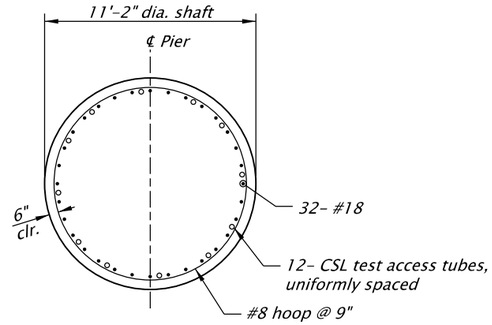
SECTION C-C

Notes:

1. *Tip elevation may vary to construct required socket into bedrock.*
2. *Permanent structural casing shall conform to ASTM A572 Grade 50 or ASTM A588 for longitudinal seam welded tube.*
3. *Where the minimum thickness of permanent casing is shown, it is specified to satisfy structural design requirements only. The contractor shall increase the casing thickness to provide casing of sufficient strength to resist handling, transportation, and installation stresses and the external stresses of the subsurface materials.*
4. *Do not splice more than one-third of reinf. bar at any one location. Stagger splices a minimum of 3'-0".*



SECTION D-D



SECTION E-E

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

PRELIMINARY COPY INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

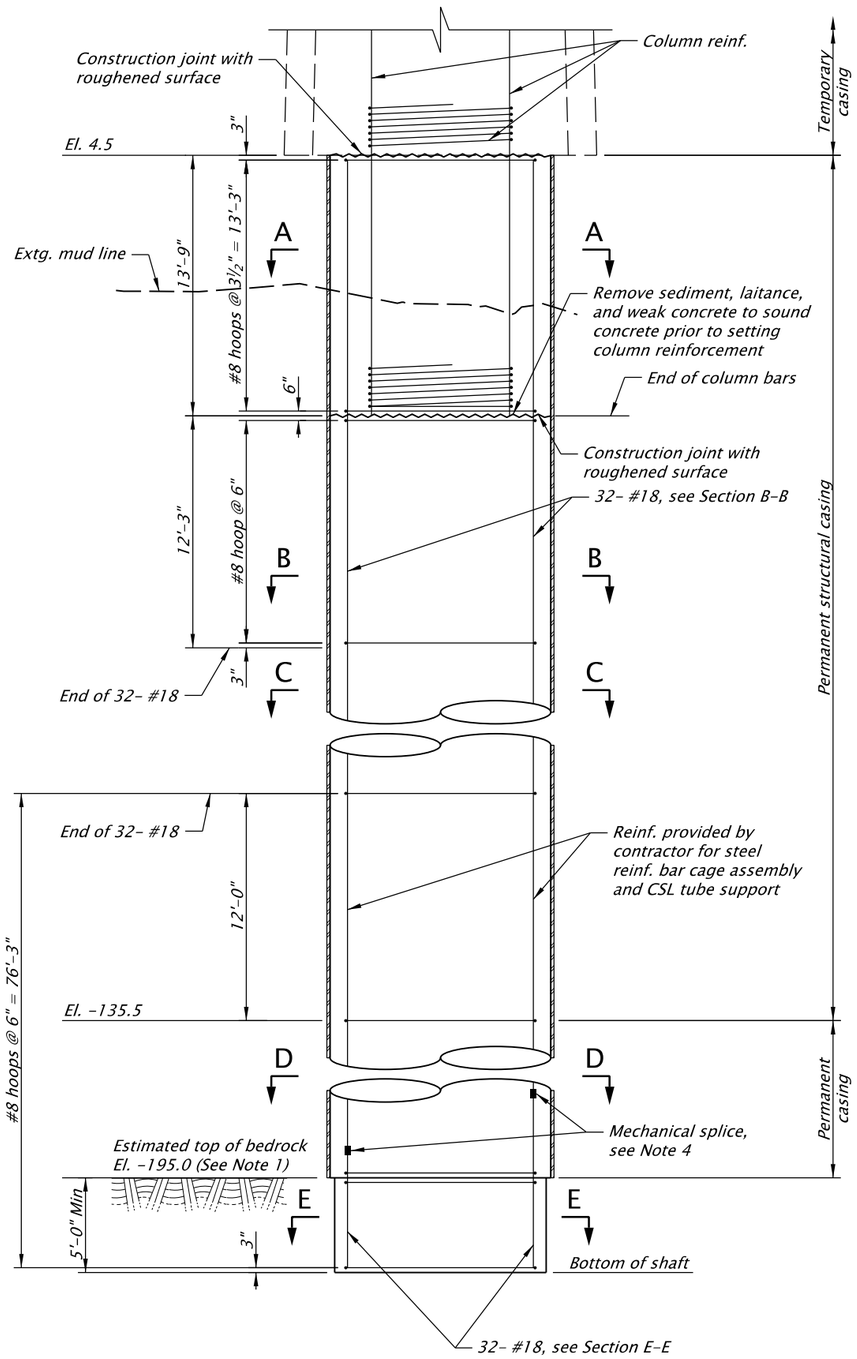
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

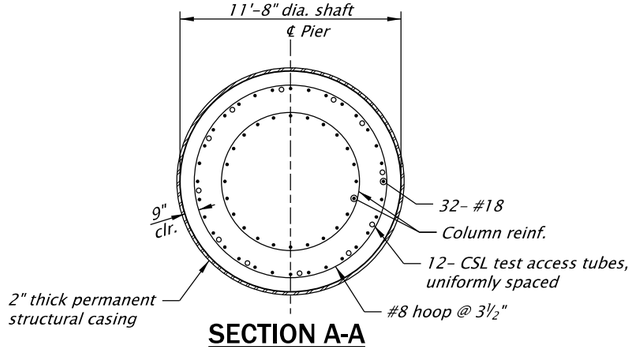
PIER 3 SHAFT 3B

SHEET NO.

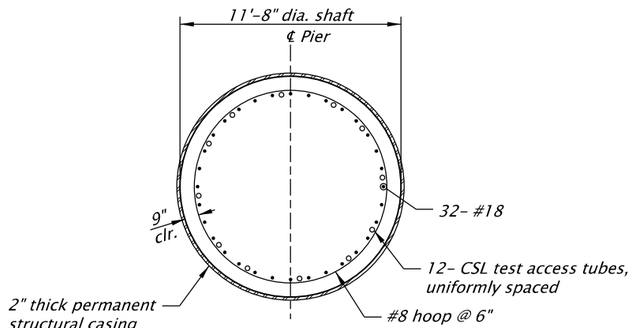
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



ELEVATION
Scale: 1/8"=1'-0"



SECTION A-A
Scale: 1/8"=1'-0"



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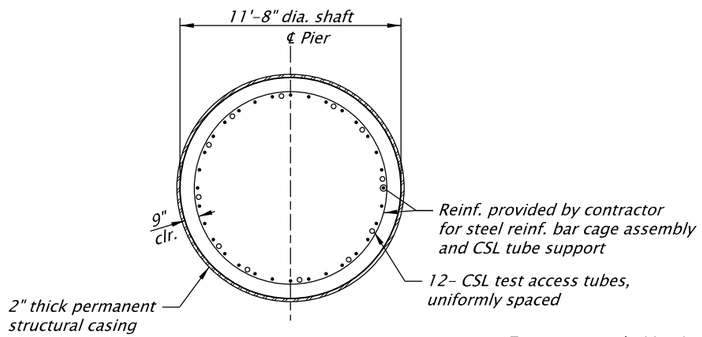
Scale: 1/8"=1'-0"



SECTION C-C
Scale: 1/8"=1'-0"

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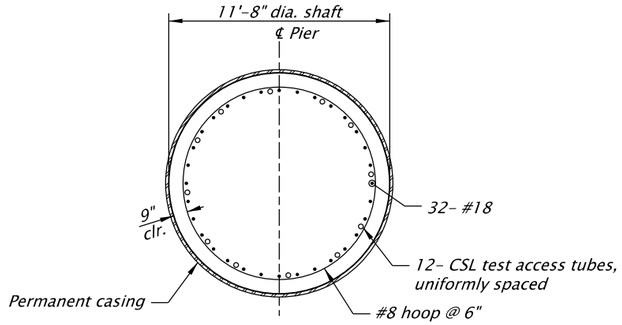

SECTION D-D
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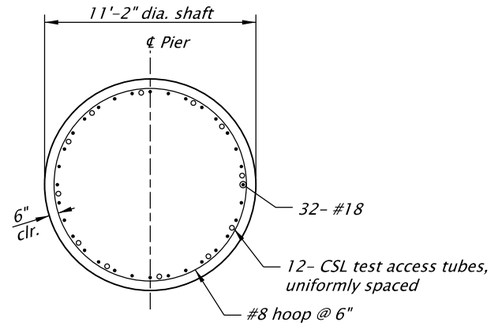

SECTION E-E
Scale: 1/8"=1'-0"

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	
M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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OREGON DEPARTMENT OF TRANSPORTATION

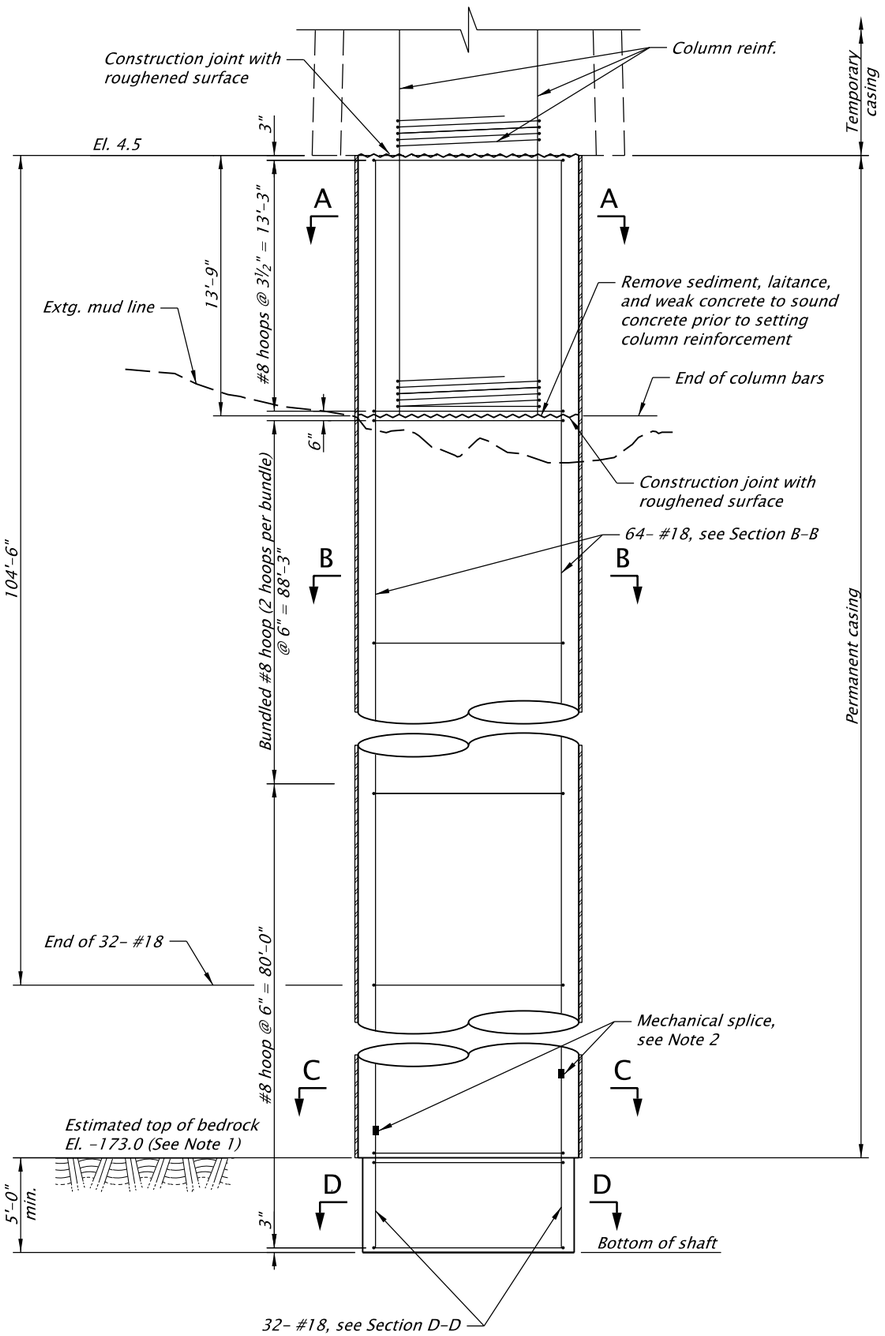
WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

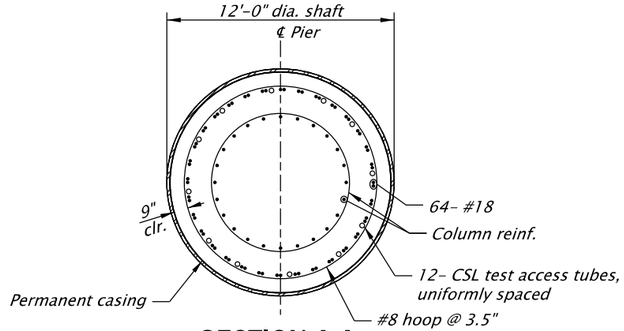
Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 4 SHAFT 4A

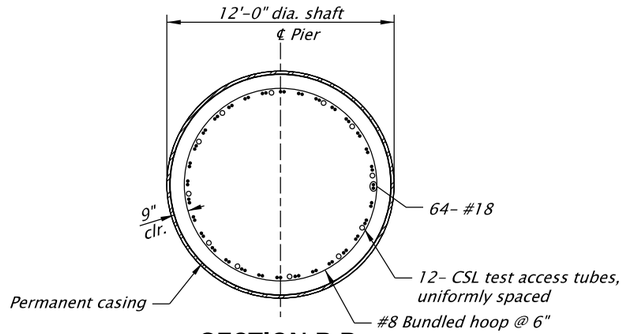
SHEET NO.



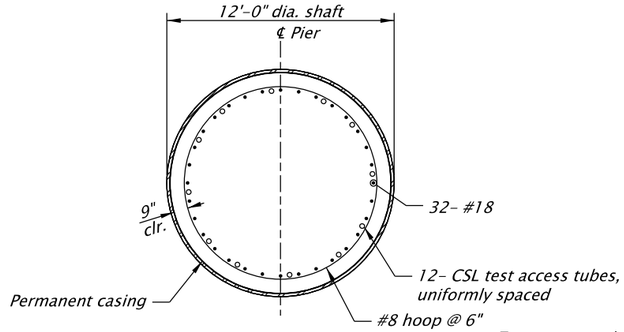
ELEVATION
Scale: 1/8"=1'-0"



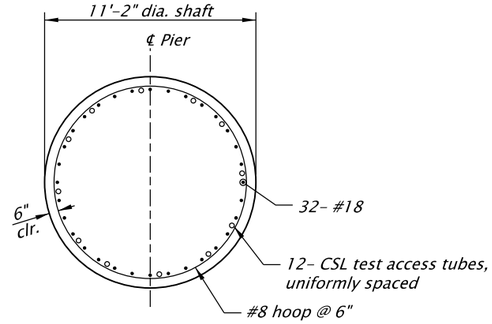
SECTION A-A
Scale: 1/8"=1'-0"



SECTION B-B
Scale: 1/8"=1'-0"



SECTION C-C
Scale: 1/8"=1'-0"



SECTION D-D
Scale: 1/8"=1'-0"

Note:

1. *Tip elevation may vary to construct required socket into bedrock.*
2. *Do not splice more than 50% of reinf. bar at any one location. Stagger splices a minimum of 3'-0".*

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
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CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

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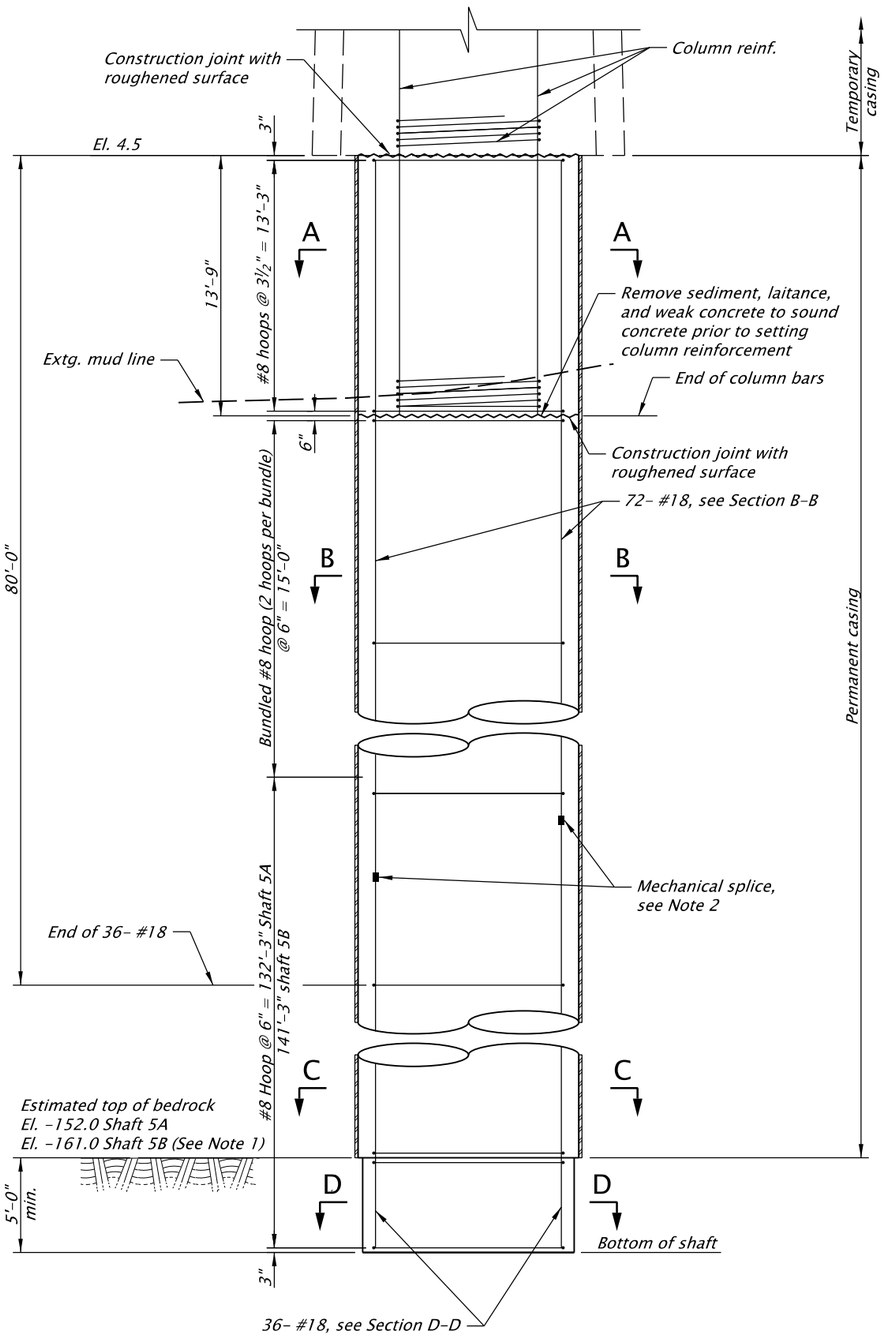
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

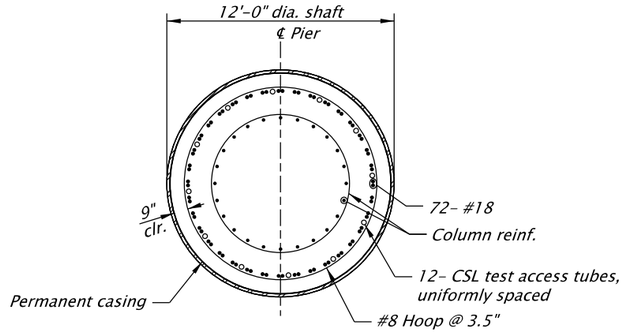
PIER 4 SHAFT 4B

SHEET NO.

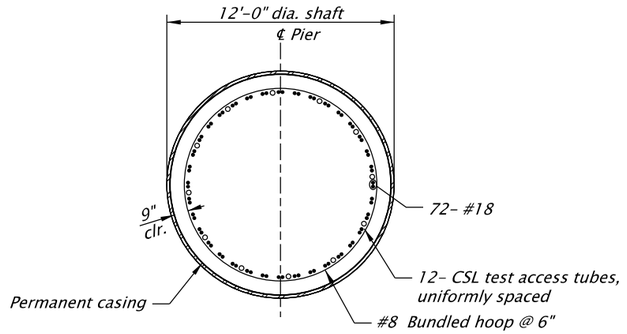
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



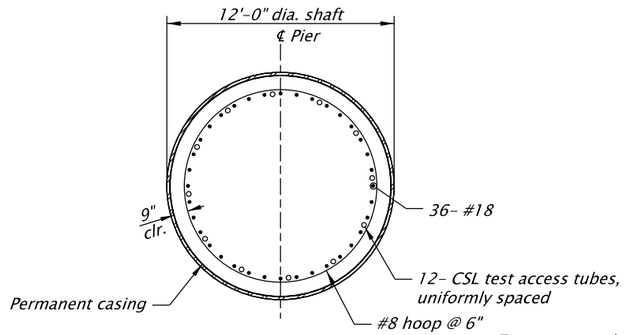
ELEVATION
Scale: 1/8"=1'-0"



SECTION A-A



SECTION B-B



SECTION C-C

Note:

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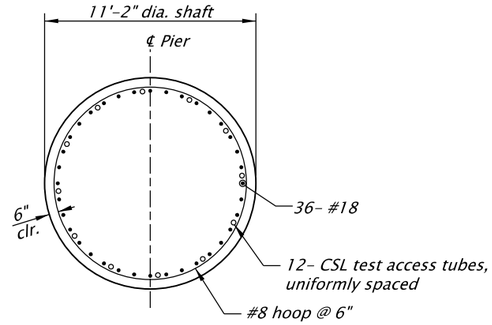

SECTION D-D

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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OREGON DEPARTMENT OF TRANSPORTATION

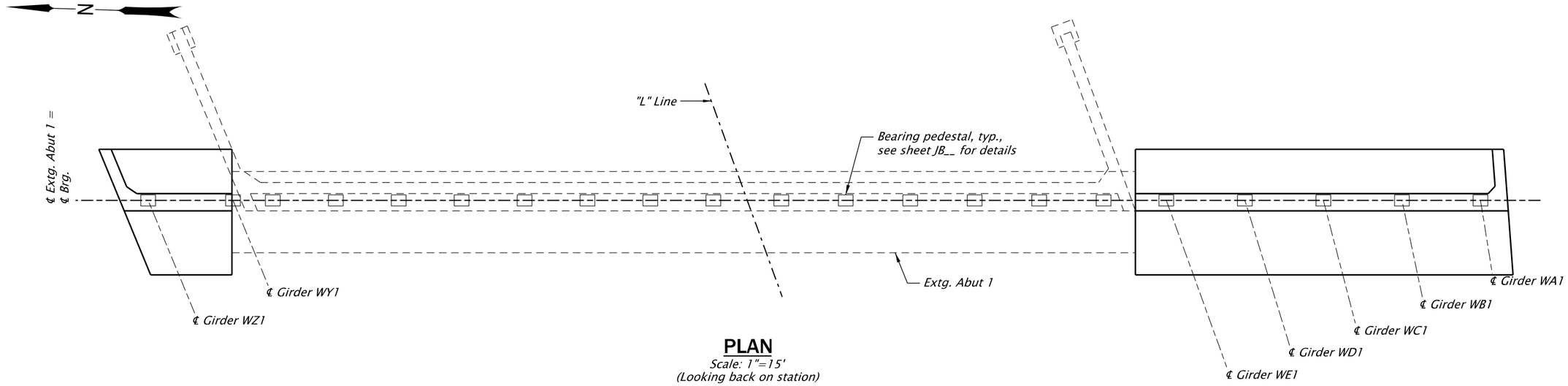
WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

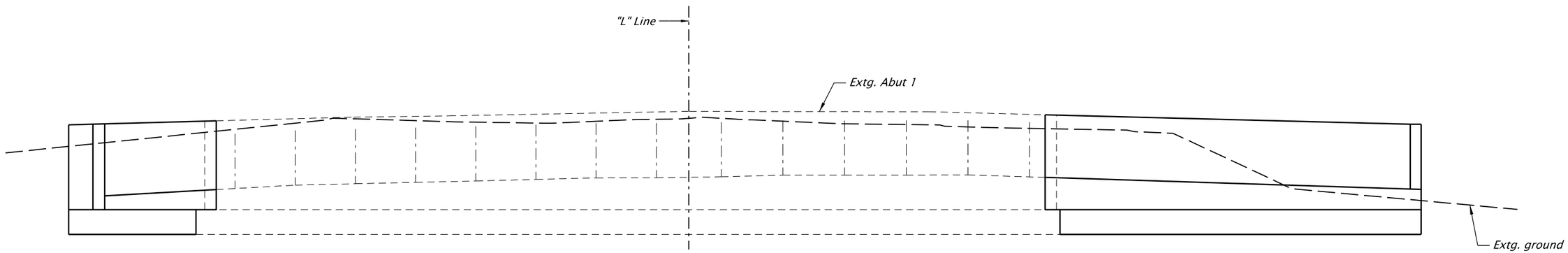
Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 5 SHAFTS | SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



PLAN
Scale: 1"=15'
(Looking back on station)



ELEVATION
Scale: 1"=15'
(Looking back on station)

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STRUCTURE NO.	09403
BDS DWG NO.	00000
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HWY: 064 M.P.: 9.03	
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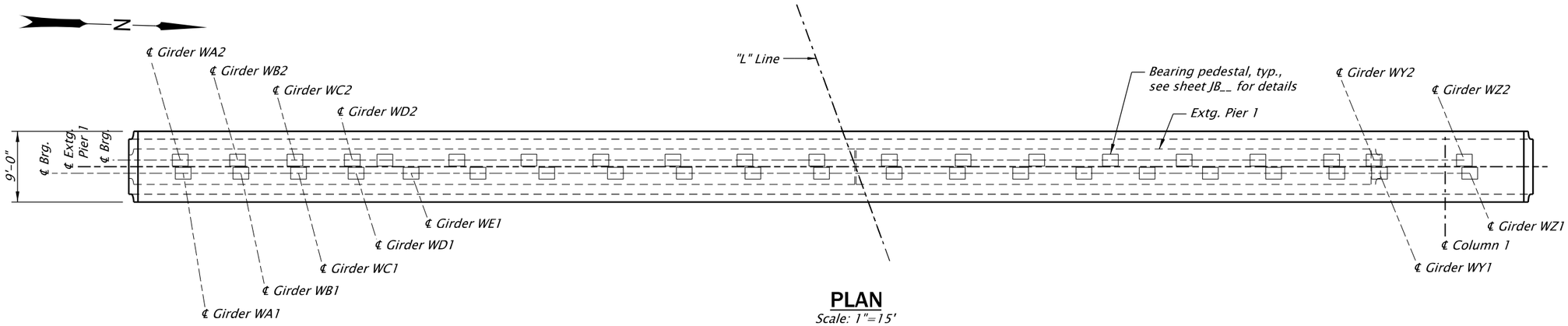
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell
Drafter: Heather Gonsior
Reviewer: Jeff Olson
Checker: Name

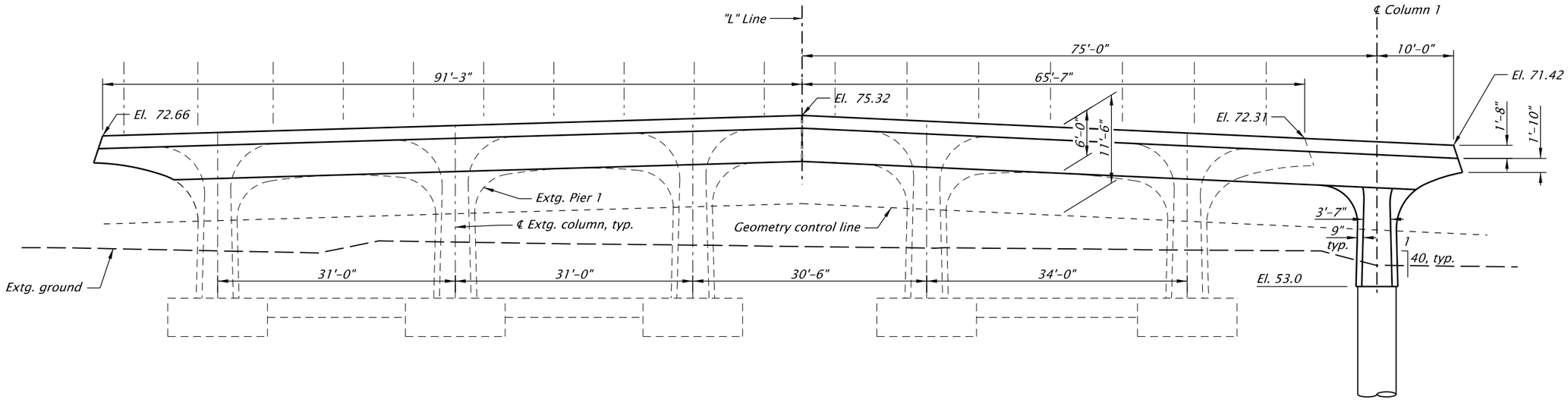
ABUTMENT 1 PLAN AND ELEVATION

SHEET NO.

Rotation: 271.8035°



PLAN
Scale: 1"=15'



ELEVATION
Scale: 1"=15'

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
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HWY: 064	
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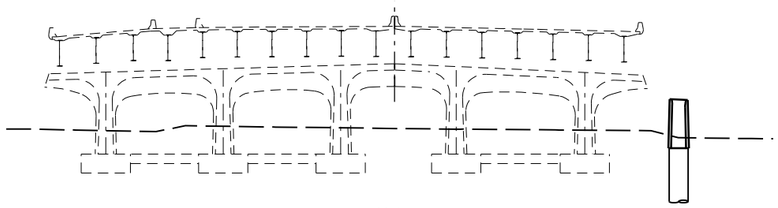
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 1 GEOMETRY PLAN AND ELEVATION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



ELEVATION
Step 1

Pier 1 Construction Sequence

Step 1

- *Construct drilled shaft.*
- *Construct column.*

Step 2

- *Remove existing*
- *Construct falsework/formwork for concrete crossbeam.*
- *Place crossbeam reinforcement, ____ for the new crossbeam.*
- *Place crossbeam concrete.*

Step 3

- *Remove side forms.*
- *Place*

Step 4

- *Remove crossbeam falsework/formwork.*

Step 5

- *Construct the outside superstructure widening.*
- *Construct*

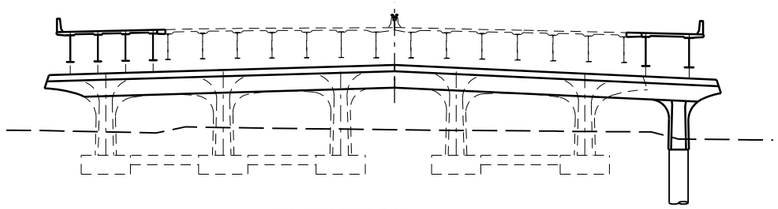
Step 6

- *Construct inside superstructure widening from Piers 3 to 6.*
- *Open roadway to final lane configuration.*

Notes:

1. *This sequence of construction is necessary to be compatible with the design of the bridge elements. Deviation from this sequence requires approval by the Engineer.*

2. *Work bridge and falsework/formwork not shown for clarity.*



ELEVATION
Step __

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STRUCTURE NO.	09403
BDS DWG NO.	00000
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OREGON DEPARTMENT OF TRANSPORTATION

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I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Heather Gonsior | Checker: Name

PIER 1 CONSTRUCTION SEQUENCE

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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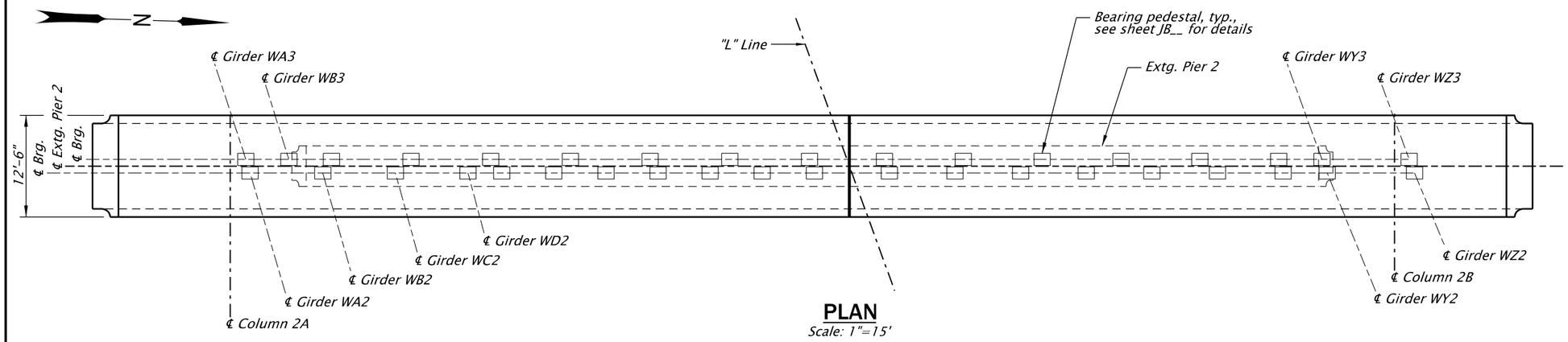
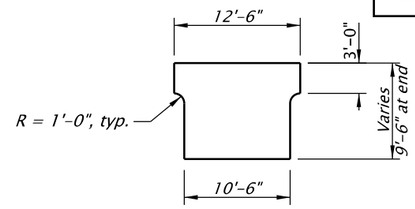
BR_K19786_HDR_bt_11.dgn :: Default 2/7/2020 4:45:24 PM CDONOVAN

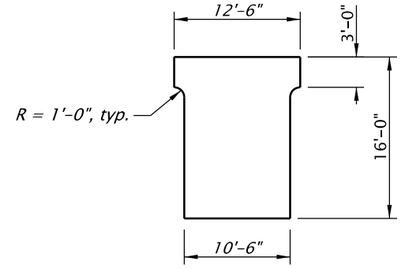
Rotation: 91.8035° 0'



PLAN
Scale: 1"=15'



SECTION A-A
Scale: 1"=15'



SECTION B-B
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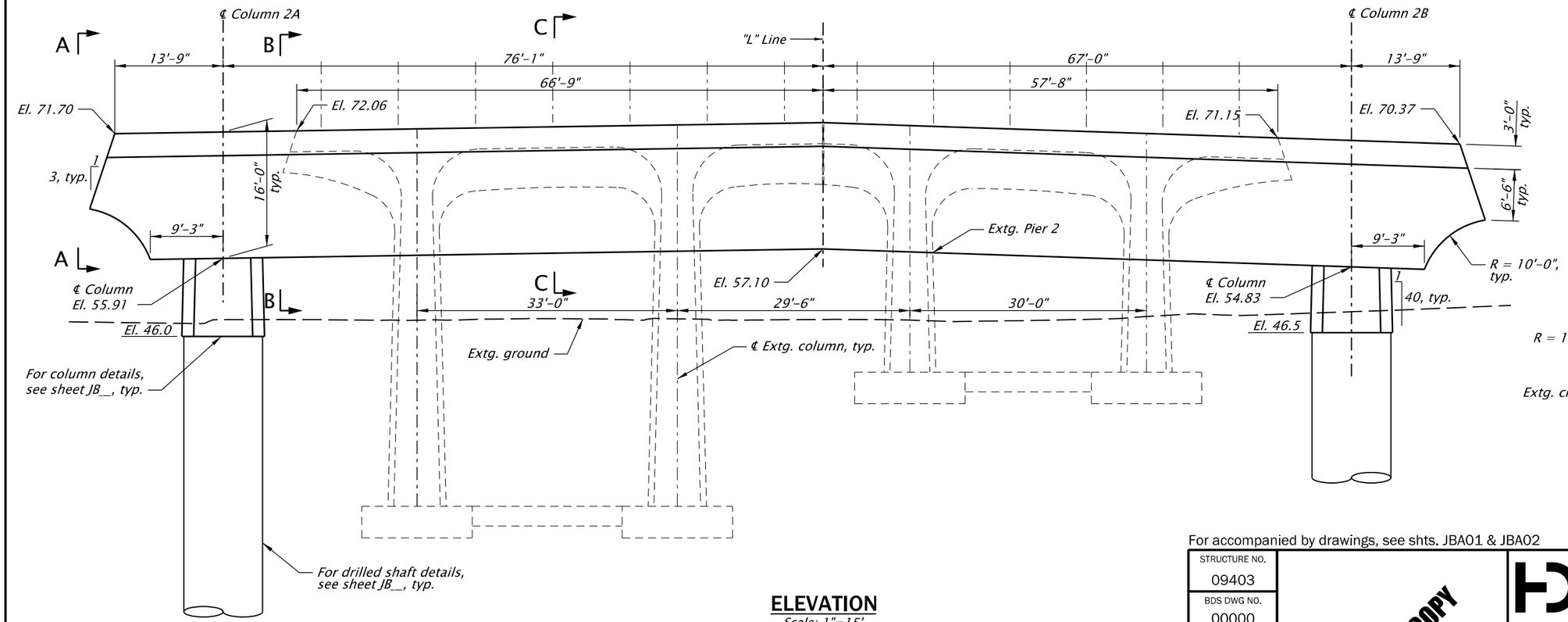
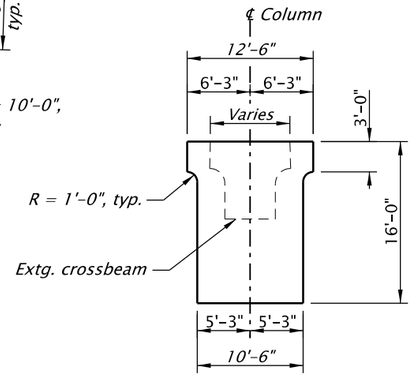


ELEVATION
Scale: 1"=15'



SECTION C-C
Scale: 1"=15'

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
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HWY: 064 M.P.: 9.03	
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WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

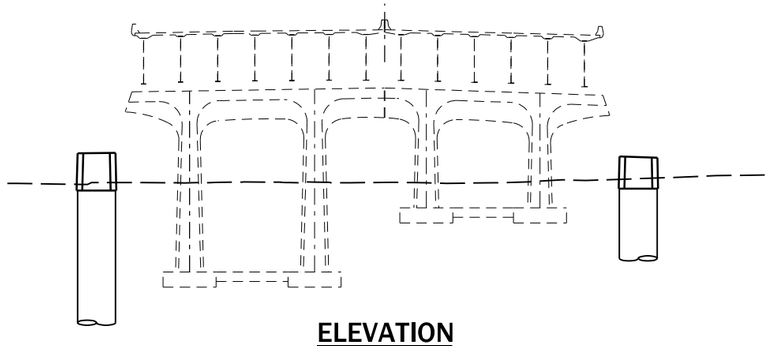
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 2 GEOMETRY PLAN AND ELEVATION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



ELEVATION
Step 1

Pier 2 Construction Sequence

Step 1

- *Construct drilled shaft.*
- *Construct column.*

Step 2

- *Remove existing*
- *Construct falsework/formwork for concrete crossbeam.*
- *Place crossbeam reinforcement, ____ for the new crossbeam.*
- *Place crossbeam concrete.*

Step 3

- *Remove side forms.*
- *Place*

Step 4

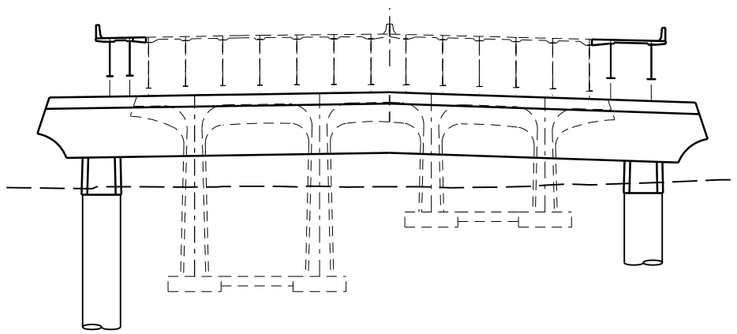
- *Remove crossbeam falsework/formwork.*

Step 5

- *Construct the outside superstructure widening.*
- *Construct*

Step 6

- *Construct inside superstructure widening from Piers 3 to 6.*
- *Open roadway to final lane configuration.*



ELEVATION
Step __

Notes:

1. *This sequence of construction is necessary to be compatible with the design of the bridge elements. Deviation from this sequence requires approval by the Engineer.*

2. *Work bridge and falsework/formwork not shown for clarity.*

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	
M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

SCALE WARNING
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 2 CONSTRUCTION SEQUENCE

SHEET NO.

BR_K19786_HDR_bt_21.dgn :: Default 2/7/2020 4:45:30 PM CDONOVAN

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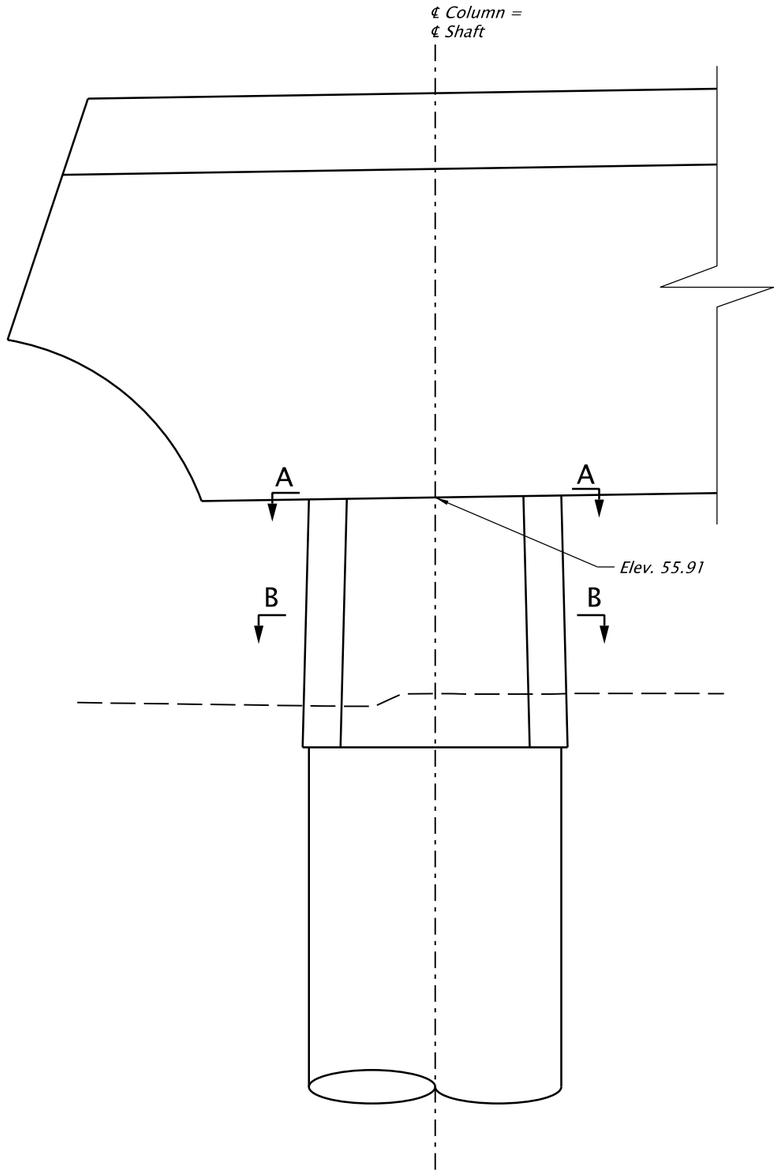

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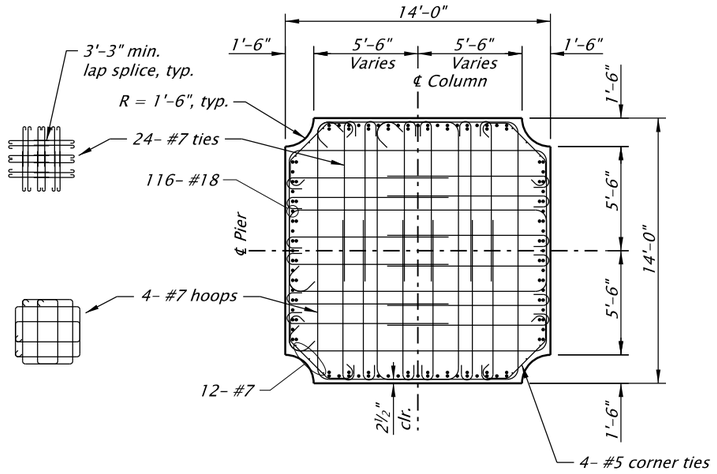

SECTION A-A
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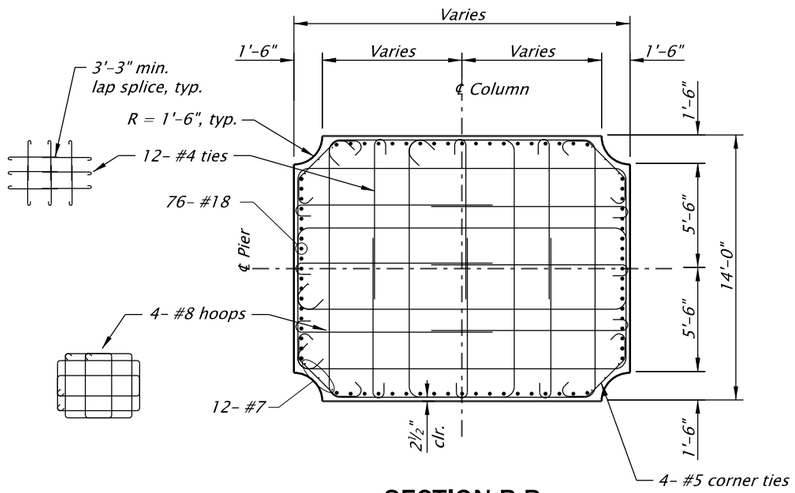

SECTION B-B
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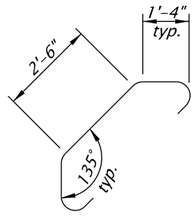

CORNER TIE
No scale

Notes:

1. *Optional construction joint with roughened surface and column lap splice permissible within these limits. See sheet JB___ for typical column lap splice details.*
2. *Provide 1½" clear from top of spiral to lowest point of construction joint. Provide 6" max. vertical break in spiral to allow placement of bottom mat of crossbeam reinforcement.*
3. *No welding of reinforcement is permitted in this region after the column cage is assembled. Reinforcement shall be field or shop welded independently and then assembled around the column longitudinal steel after welding.*
4. *All reinforcement size #18 shall meet the requirements of ASTM A706 Grade 80.*

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
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WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 2 COLUMN

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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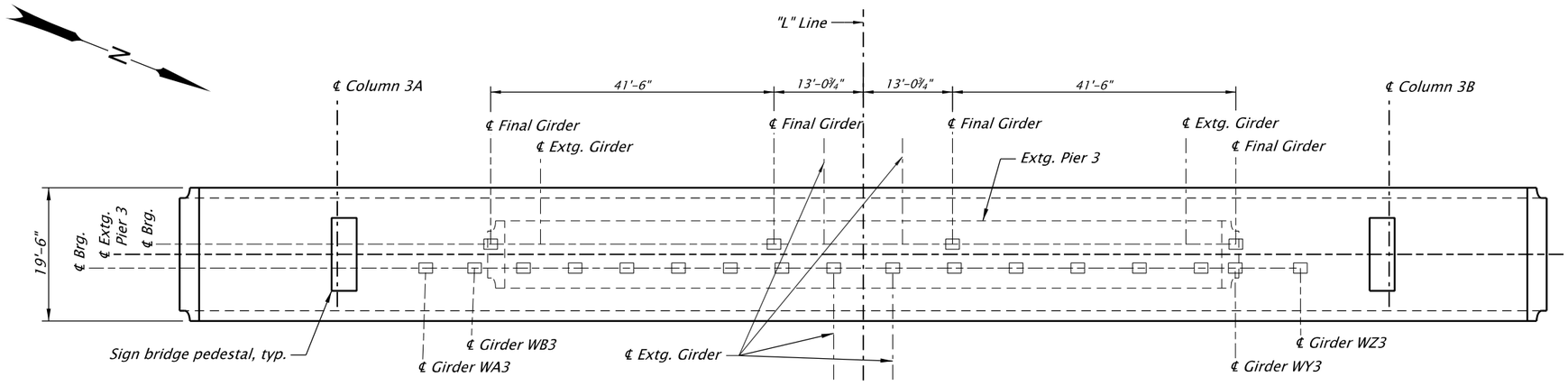

PLAN
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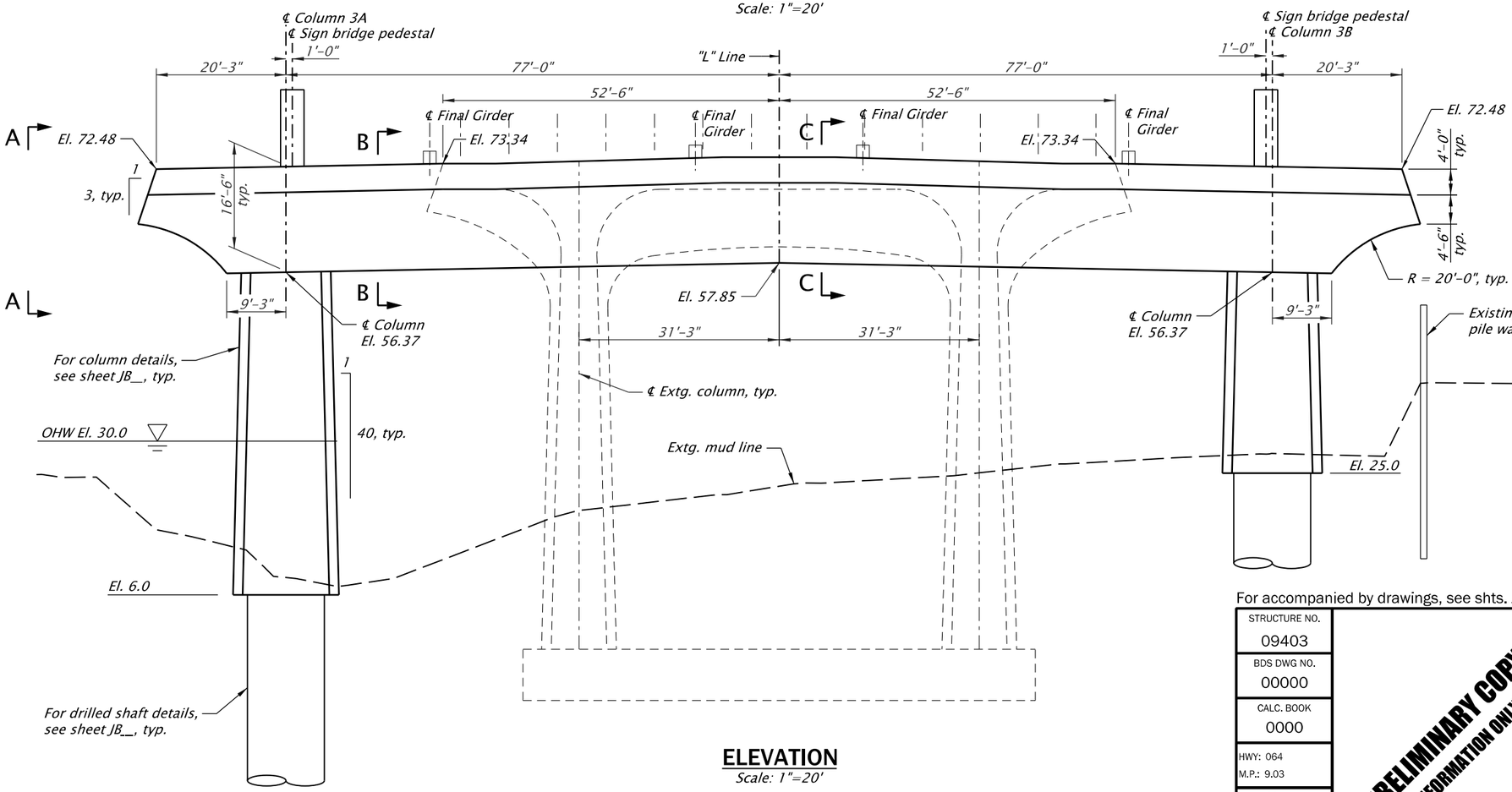
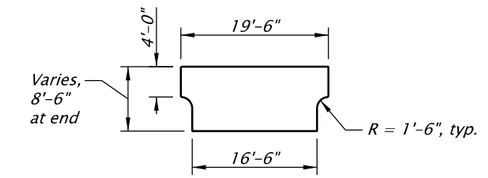
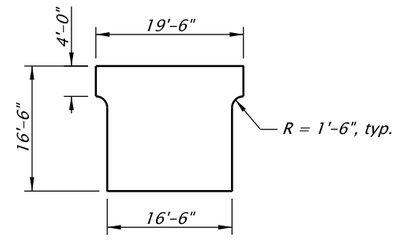


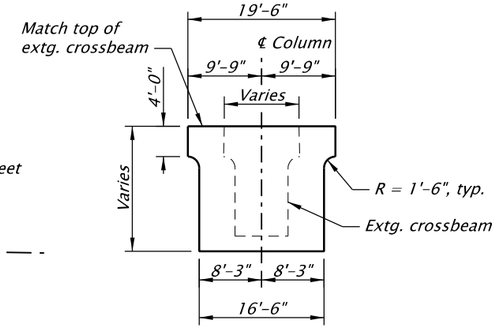
ELEVATION
Scale: 1"=20'



SECTION A-A
Scale: 1"=20'



SECTION B-B
Scale: 1"=20'



SECTION C-C
Scale: 1"=20'

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

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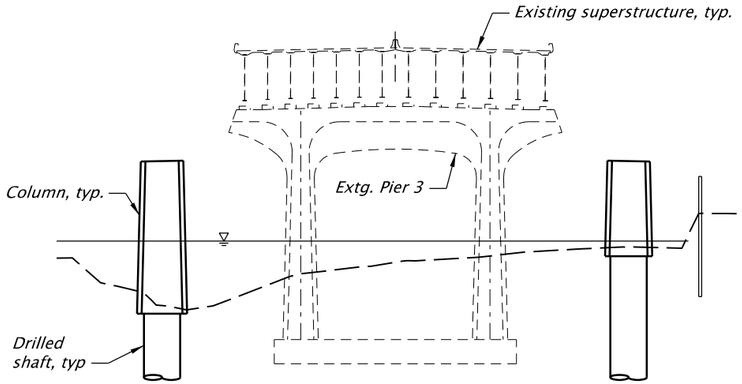
WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

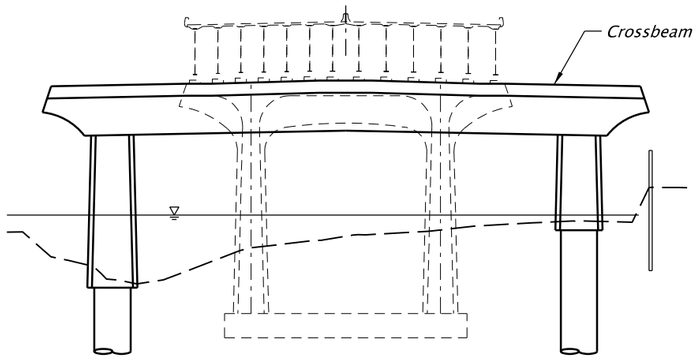
Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 3 GEOMETRY PLAN AND ELEVATION | SHEET NO.

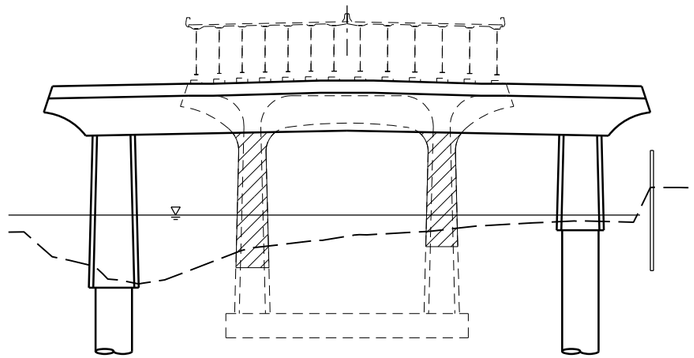
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



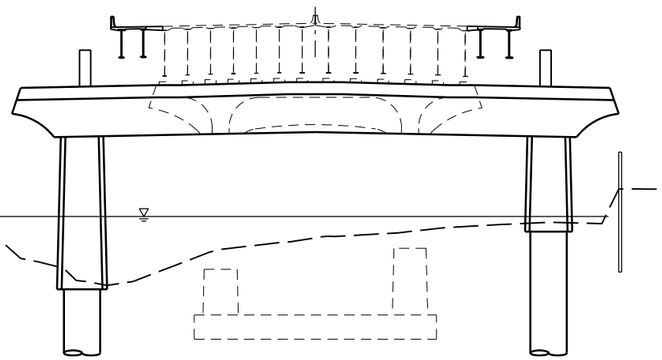
ELEVATION
Step 1



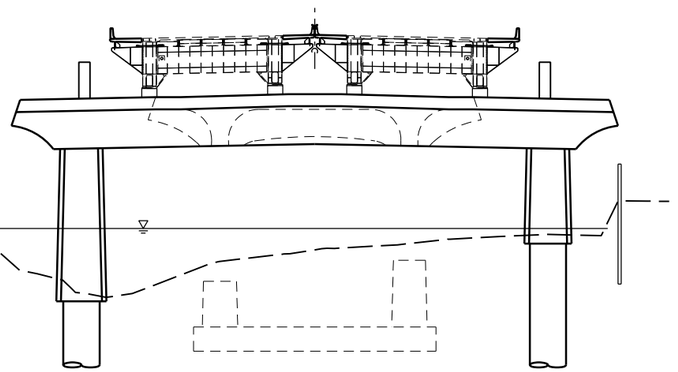
ELEVATION
Steps 2 & 3



ELEVATION
Step 4



ELEVATION
Steps 5, 7



ELEVATION
Steps 6 & 7

Notes:

1. *This sequence of construction is necessary to be compatible with the design of the bridge elements. Deviation from this sequence requires approval by the Engineer.*
2. *Work bridge and falsework/formwork not shown for clarity.*

Pier 3 Construction Sequence

Step 1
- *Construct drilled shafts.*
- *Construct columns.*

Step 2
- *Remove existing shear lugs, bumper assemblies, shock transmission units, walkway platforms, and handrails.*
- *Construct falsework/formwork for concrete crossbeam.*
- *Place crossbeam reinforcement, post-tensioning duct and thermal control plan elements for the new crossbeam.*
- *Place crossbeam concrete.*

Step 3
- *Remove side forms.*
- *Place post-tension bar and once crossbeam concrete meets the specified compressive strength, stress bars.*
- *Place post-tension strand and once all post-tension bars have been stressed and crossbeam concrete meets the specified compressive strength, stress strands. Strand stressing sequence shall be in accordance with the sequence shown on sheet JB___.*

Step 4
- *Remove crossbeam falsework/formwork.*
- *Remove existing column from bottom of new crossbeam to below existing mud line.*

Step 5
- *Temporarily support existing Girders A3 to N3.*
- *Remove existing bearing and bearing pedestals to top of existing crossbeam.*
- *Construct new bearing pedestals and install isolation bearings.*
- *Remove temporary supports.*
- *Construct superstructure widening for Span 3 (NB and SB).*

Step 6
- *Construct the outside superstructure widening from Piers 3 to 6.*
- *Lateral slide NB and SB superstructure.*

Step 7
- *Construct superstructure widening from Piers 3 to 6.*
- *Construct sign bridge pedestal and erect sign bridge.*
- *Open roadway to final lane configuration.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

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INFORMATION ONLY

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 3 CONSTRUCTION SEQUENCE

SHEET NO.

BR_K19786_HDR_bt_31.dgn :: Default 2/7/2020 4:45:40 PM CDONOVAN

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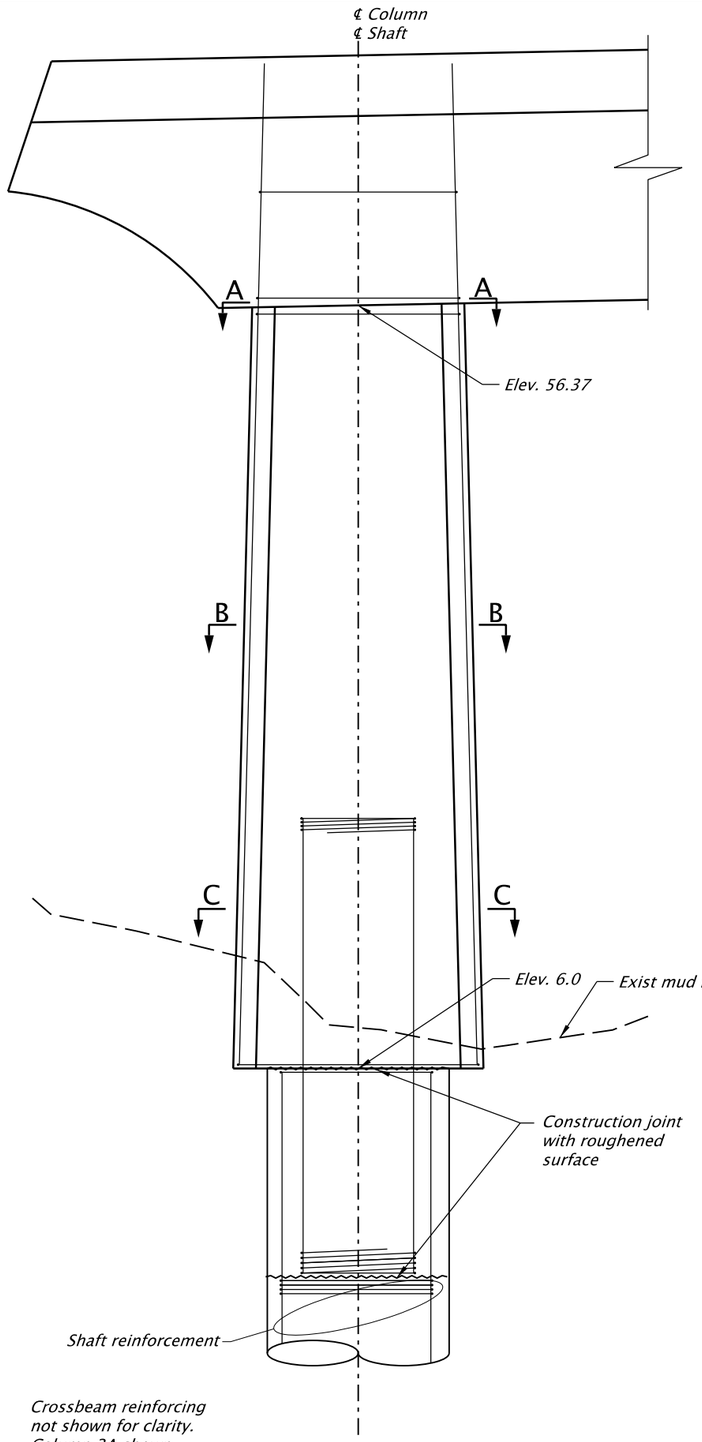
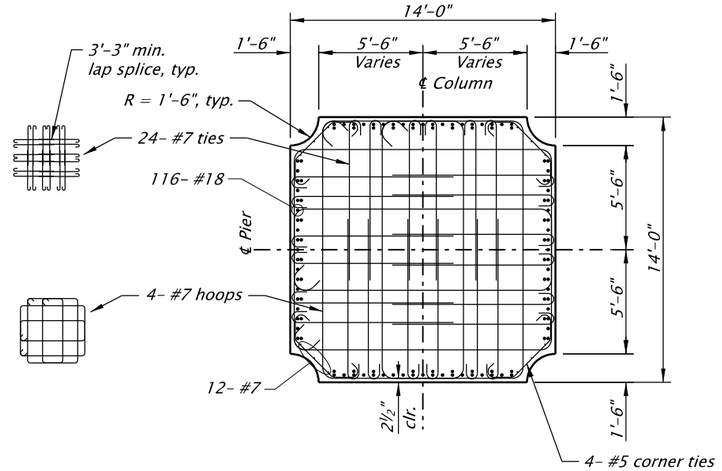


Crossbeam reinforcing not shown for clarity. Column 3A shown, Column 3B similar.

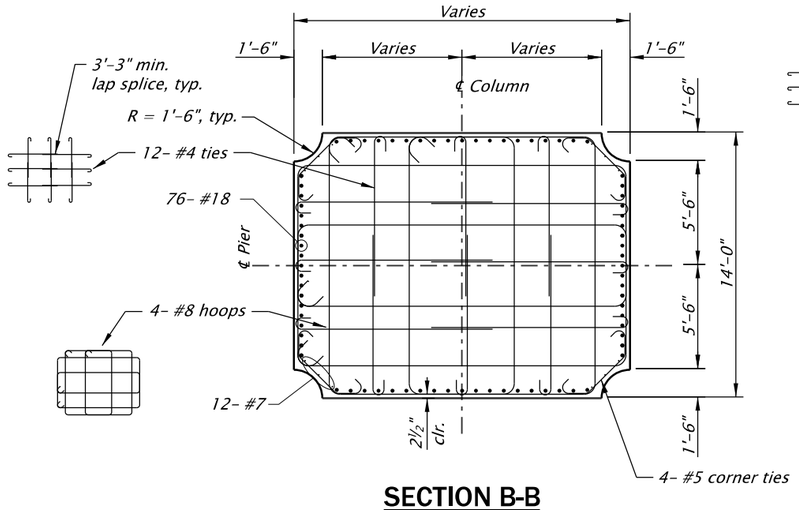
ELEVATION
Scale: 1"=10'-0"



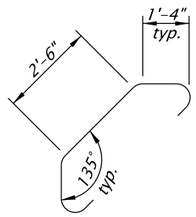
SECTION A-A
Scale: ⅛"=1'-0"

Notes:

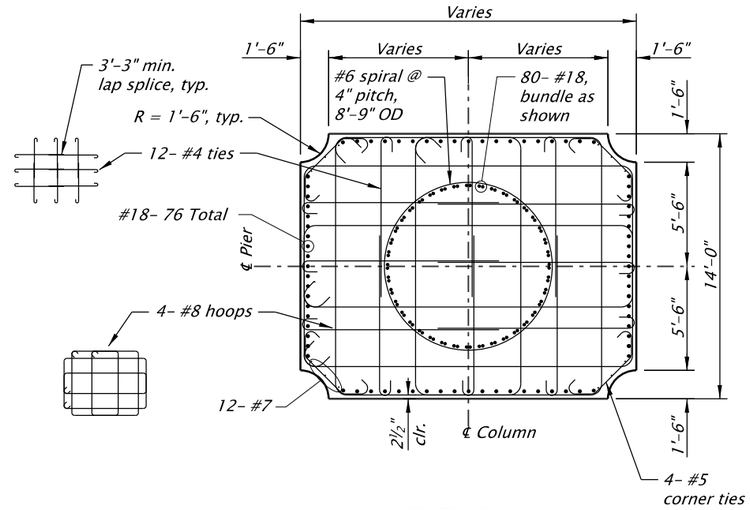
1. Optional construction joint with roughened surface and column lap splice permissible within these limits. See sheet JB___ for typical column lap splice details.
2. Provide 1½" clear from top of spiral to lowest point of construction joint. Provide 6" max. vertical break in spiral to allow placement of bottom mat of crossbeam reinforcement.
3. No welding of reinforcement is permitted in this region after the column cage is assembled. Reinforcement shall be field or shop welded independently and then assembled around the column longitudinal steel after welding.
4. All reinforcement size #18 shall meet the requirements of ASTM A706 Grade 80.



SECTION B-B
Scale: ⅛"=1'-0"



CORNER TIE
No scale



SECTION C-C
Scale: ⅛"=1'-0"

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

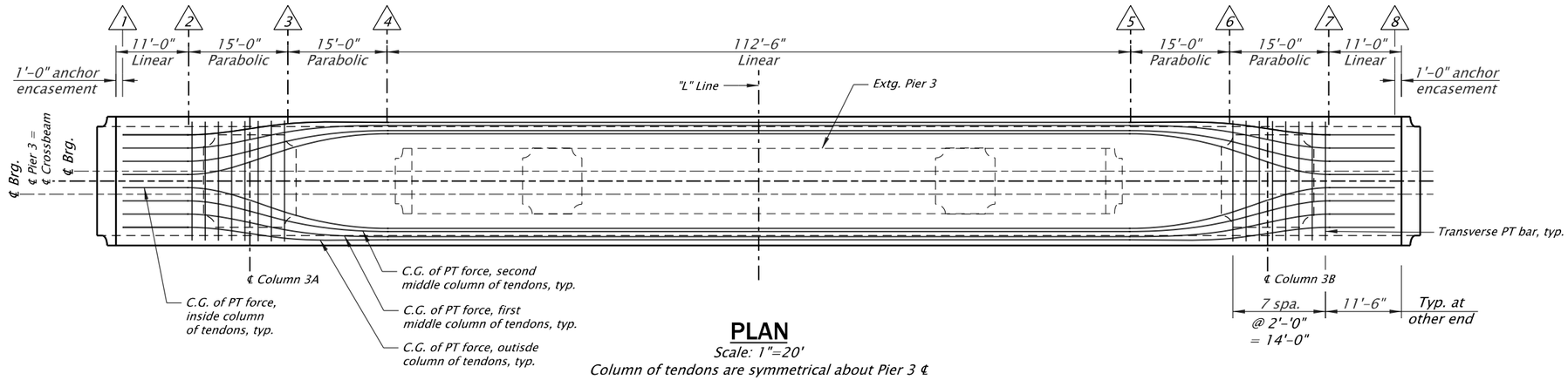
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell
Drafter: Heather Gonsior
Reviewer: Jeff Olson
Checker: Name

PIER 3 COLUMN

SHEET NO.

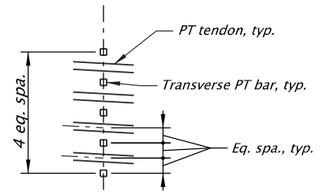
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



PLAN

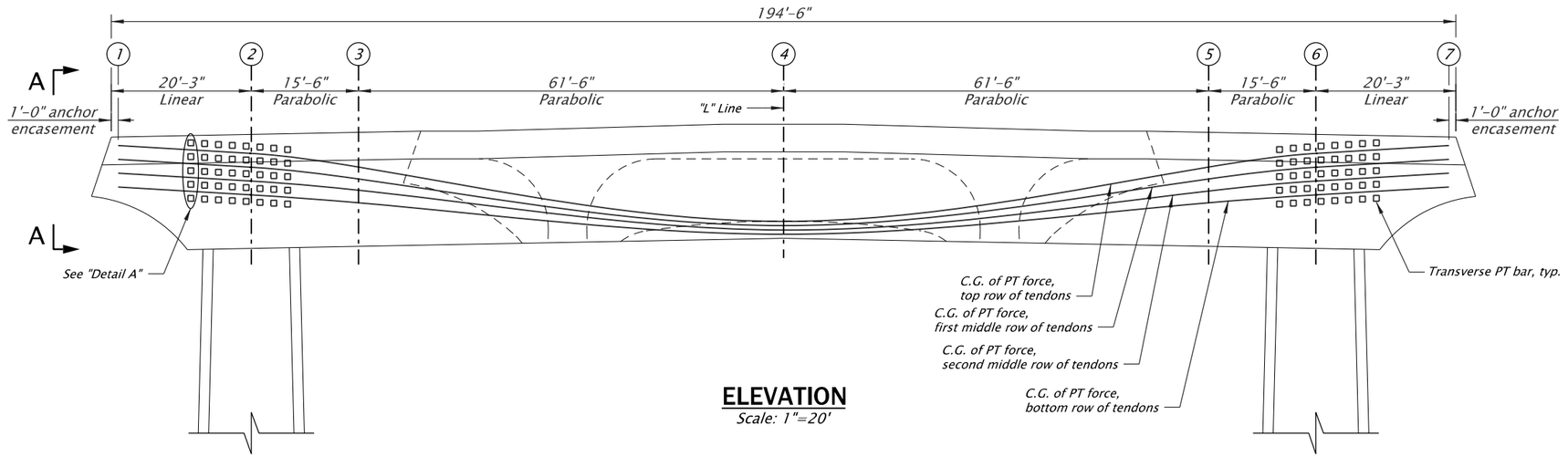
Scale: 1"=20'

Column of tendons are symmetrical about Pier 3 ℄



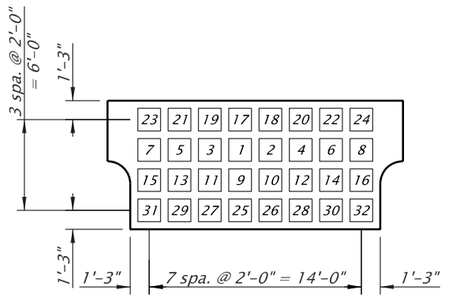
DETAIL A

No scale



ELEVATION

Scale: 1"=20'



VIEW A-A

Scale: 1"=10'

Control Points	① ⑦	② ⑥	③ ⑤	④
Top row	1'-3"	13'-9"	11'-5¾"	2'-5¼"
First middle row	3'-3"	11'-9"	9'-9"	1'-9¾"
Second middle row	5'-3"	9'-9"	8'-0¼"	1'-2¼"
Bottom row	7'-3"	7'-9"	6'-3¾"	6¾"

VERTICAL TENDON LAYOUT DATA

Measured vertically from the bottom of the crossbeam, except ① and ⑦ are measured from the top of the crossbeam

Control Points	1 8	2 7	3 6	4 5
Outside column	1'-3"	1'-3"	1'-0¾"	10⅜"
First middle column	3'-3"	3'-3"	2'-3½"	1'-3⅞"
Second middle column	5'-3"	5'-3"	3'-8¼"	2'-1⅜"
Inside column	7'-3"	7'-3"	4'-11"	2'-6⅞"

HORIZONTAL TENDON LAYOUT DATA

Measured horizontally from the bottom corner of the crossbeam

Notes:

1. For additional post-tensioning details, see sheet JB__.
2. For Pier 3 construction sequence, see sheet JB__.

☐ = Sequence of tendon/strand stressing

3. Details for Pier 3 are shown. Details for Pier 6 are similar.

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
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I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell
Reviewer: Jeff Olson
Drafter: Heather Gonsior
Checker: Name

PIER 3 POST-TENSIONING GEOMETRY

SHEET NO.

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BR_K19786_HDR_bt_33.dgn :: Default 2/7/2020 4:45:47 PM CDONOVAN

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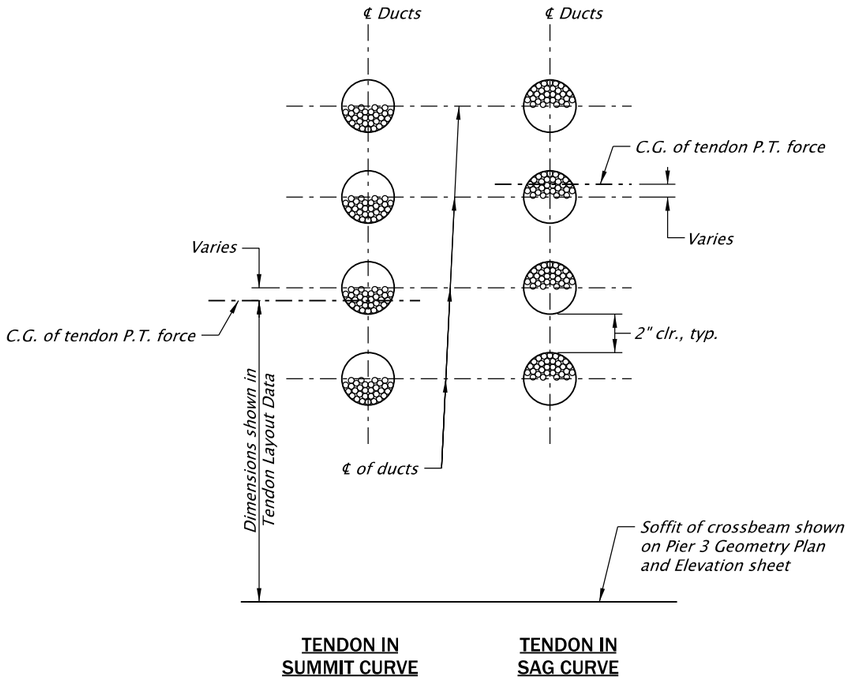
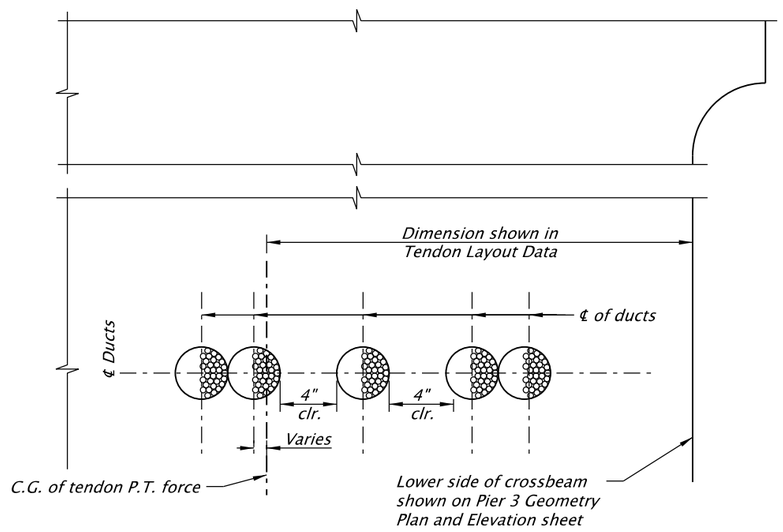


STRAND VERTICAL LOCATION DETAIL



STRAND HORIZONTAL LOCATION DETAIL

Post-Tensioning Notes:

1. *The minimum compressive strength of the crossbeam cast-in-place concrete at the time of post-tensioning P/T bars shall be 4,000 psi.*
2. *The minimum compressive strength of the crossbeam cast-in-place concrete at the time of post-tensioning P/T tendons shall be 5,000 psi.*
3. *The minimum prestressing load after seating for post-tensioned tendons shall be as shown in the Tendon Post-Tensioning Table.*
4. *1¼" dia. P/T bars to be stressed to 135 kips each, seated and re-stressed to verify anchor set is less than or equal to 0.06".*
5. *The design is based on the additional estimated short-term time-dependent prestress loss of post-tensioning strands shown in the Tendon Post-Tensioning Table due to elastic shortening adjusted for elastic gain. The design is also based on the additional estimated long-term time-dependent prestress loss of post-tensioning strand shown in the Tendon Post-Tensioning Table due to steel relaxation, creep, and shrinkage of concrete. These losses vary along the length of the post-tensioning strands, and the maximum loss is provided.*
6. *The contractor shall submit the stressing sequence and elongation calculations to the engineer for approval. All losses due to tendon vertical and horizontal curvature shall be included in the elongation calculations.*
   - *A. Each tendon shall be stressed at the left end of the crossbeam only.*
   - *B. The sequence stressing shall be as shown on the Pier 3 Post-Tension Geometry sheet.*
7. *Side forms for the crossbeam shall be removed prior to post-tensioning.*
8. *Caps for grouting as required by Specification 00555.03 shall remain in place and be permanent after grouting.*
9. *Details for Pier 3 are shown. Details for Pier 6 are similar.*

TENDON POST-TENSIONING TABLE

Row	Total Prestressing Load Per Row		Additional Short-Term Estimated Prestress Loss ksi (ES - EG)	Additional Long-Term Estimated Prestress Loss ksi (R + CR + SH)
	Jacking kip	After Seating kip		
Top row	10,898	9,494	2	37
First middle row	10,898	9,531	2	38
Second middle row	10,898	9,569	2	40
Bottom row	10,898	9,609	2	41

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
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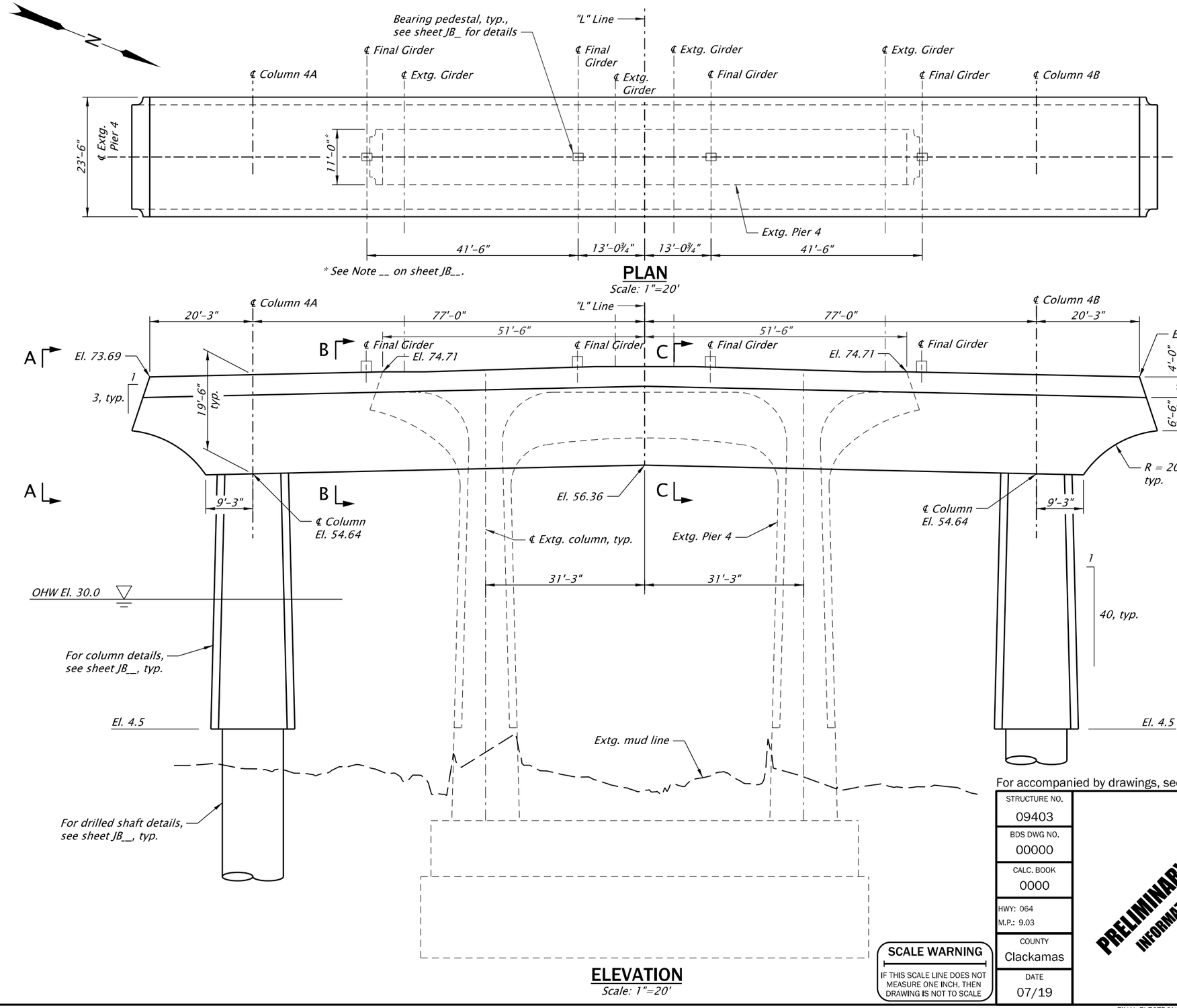
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 3 POST-TENSIONING NOTES

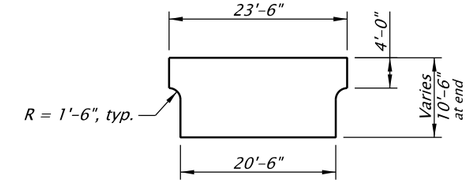
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



PLAN
Scale: 1"=20'

ELEVATION
Scale: 1"=20'



SECTION A-A
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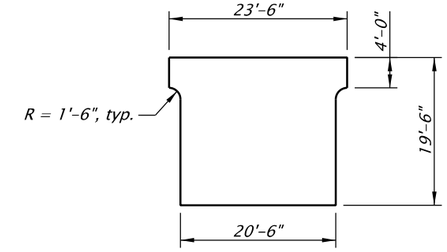
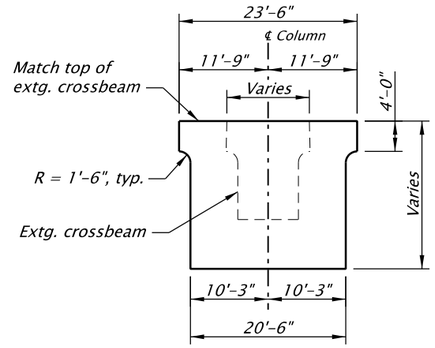


SECTION B-B
Scale: 1"=20'



SECTION C-C
Scale: 1"=20'

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/19

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WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 4 GEOMETRY PLAN AND ELEVATION | SHEET NO.

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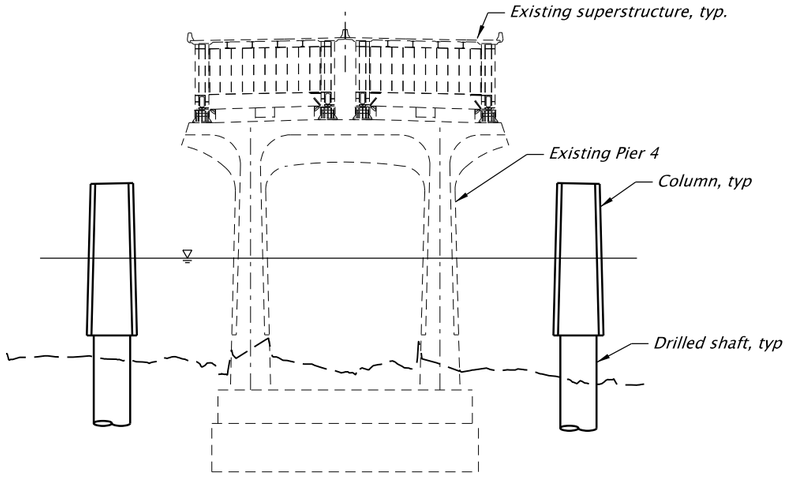
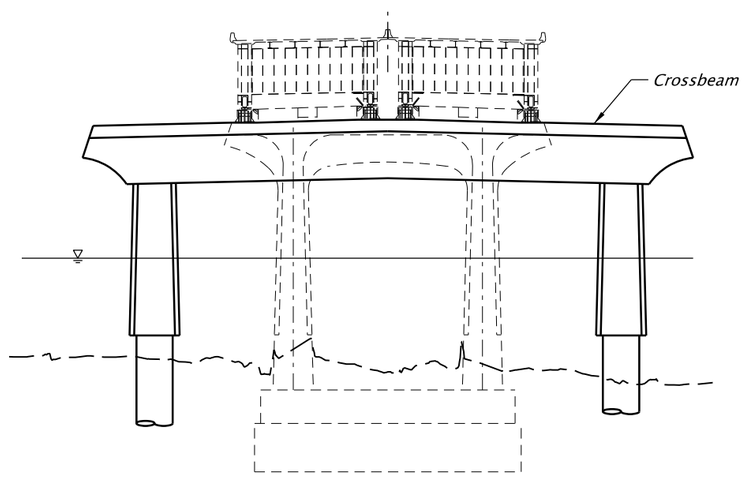
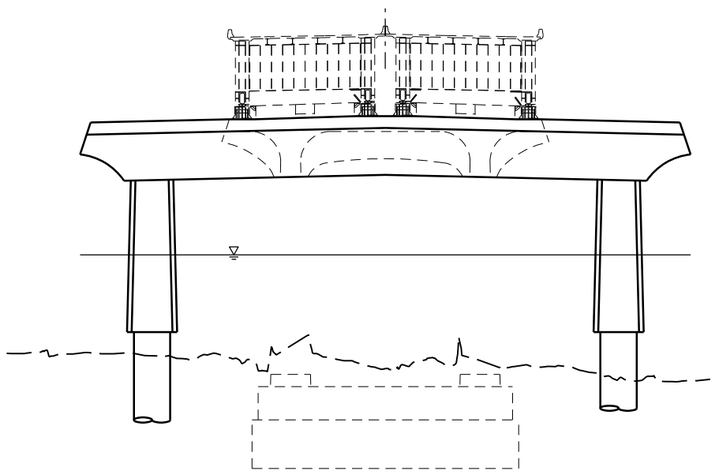


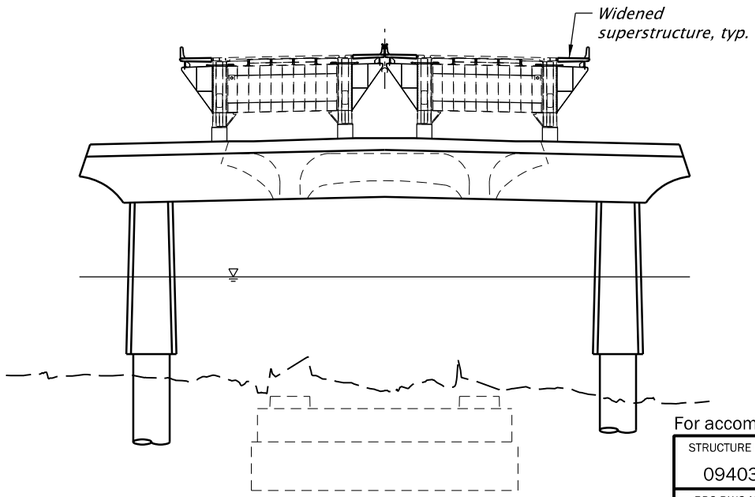
ELEVATION
Step 1



ELEVATION
Step 2 to 3



ELEVATION
Step 4



ELEVATION
Step 5 to 6

Pier 4 Construction Sequence

Step 1

- *Construct drilled shafts.*
- *Construct columns.*

Step 2

- *Remove existing shear lugs, bumper assemblies, shock transmission units (Pier 5 only), walkway platforms and handrails.*
- *Construct falsework/formwork for concrete crossbeam.*
- *Place crossbeam reinforcement, post-tensioning duct and thermal control plan elements for the new crossbeam.*
- *Place crossbeam concrete.*

Step 3

- *Remove side forms.*
- *Place post-tension bar and once crossbeam concrete meets the specified compressive strength, stress bars.*
- *Place post-tension strand and once all post-tension bars have been stress and crossbeam concrete meets the specified compressive strength, stress strands. Strand stressing sequence shall be in accordance with the sequence shown on JB___.*

Step 4

- *Remove crossbeam falsework/formwork.*
- *Remove existing column from bottom of new crossbeam to below existing mud line.*

Step 5

- *Construct the outside superstructure widening from Piers 3 to 6.*
- *Construct new bearing pedestal and install isolation bearings.*
- *Lateral slide NB and SB superstructure.*

Step 6

- *Construct inside superstructure widening from Piers 3 to 6.*
- *Open roadway to final lane configuration.*

Notes:

1. *This sequence of construction is necessary to be compatible with the design of the bridge elements. Deviation from this sequence requires approval by the Engineer.*
2. *Work bridge and falsework/formwork not shown for clarity.*
3. *This construction sequence is provided for Pier 4. The construction sequence for Pier 5 is similar.*

For accompanied by drawings, see shts. JBA01 & JBA02

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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PIER 4 CONSTRUCTION SEQUENCE

SHEET NO.

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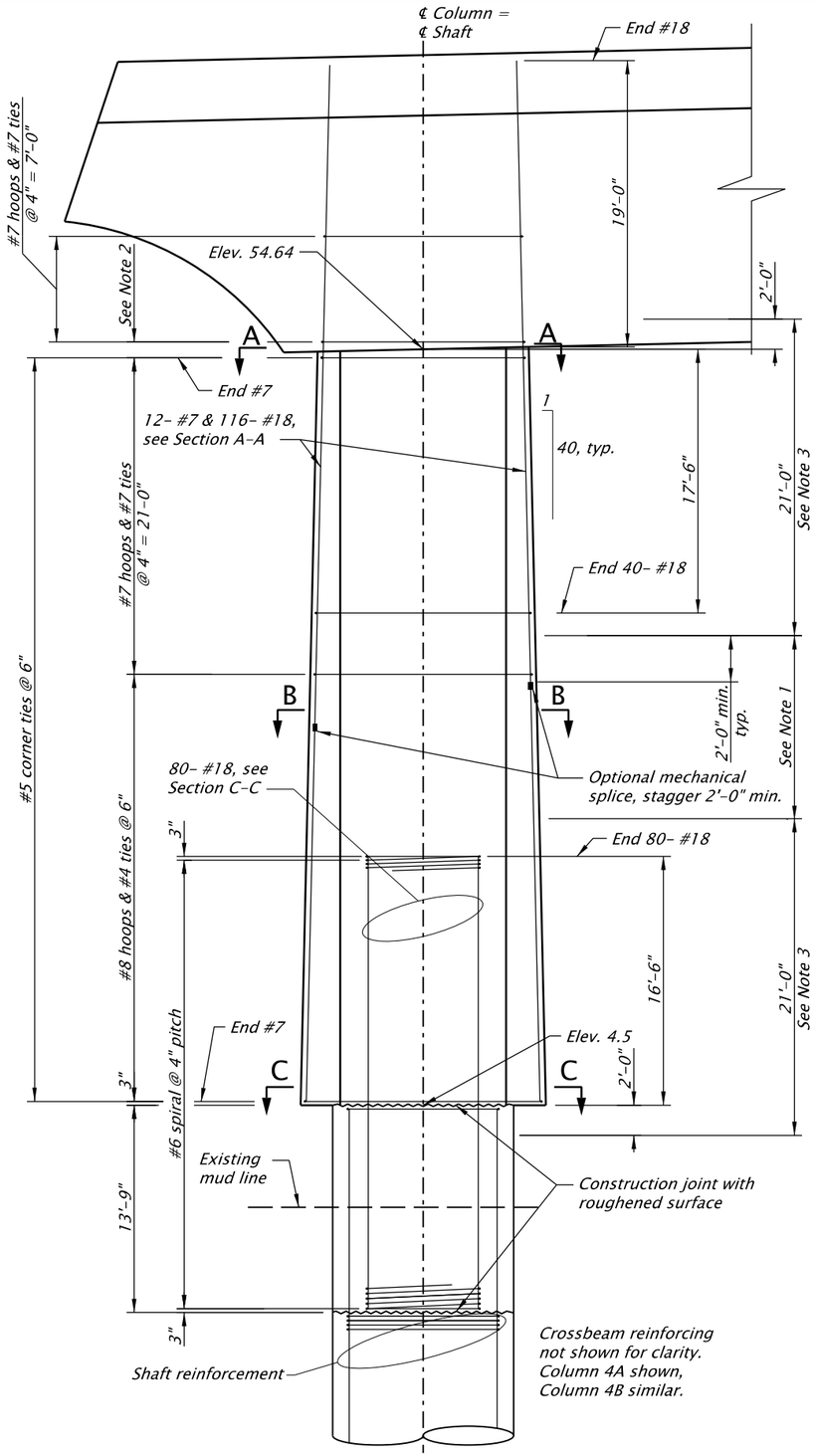
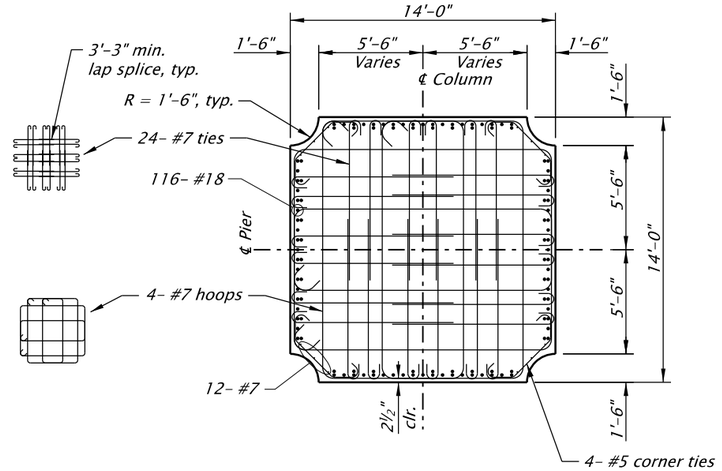


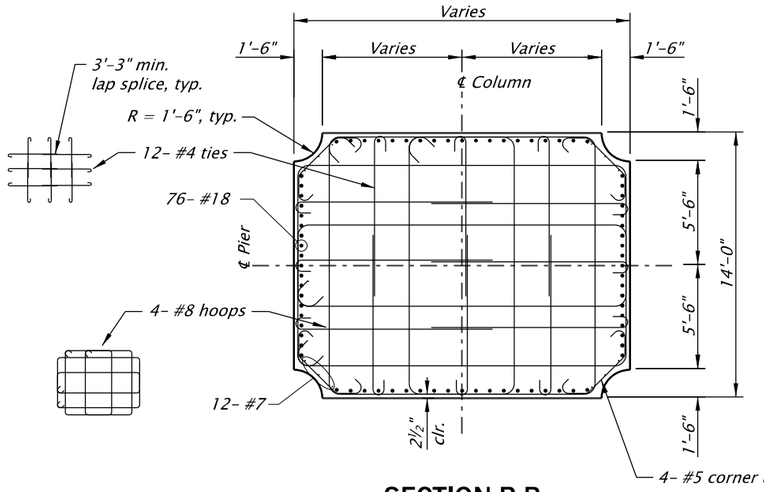
ELEVATION

Scale: 1"=10'-0"



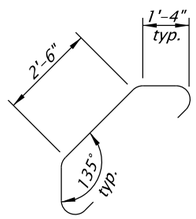
SECTION A-A

Scale: ⅛"=1'-0"



SECTION B-B

Scale: ⅛"=1'-0"



CORNER TIE

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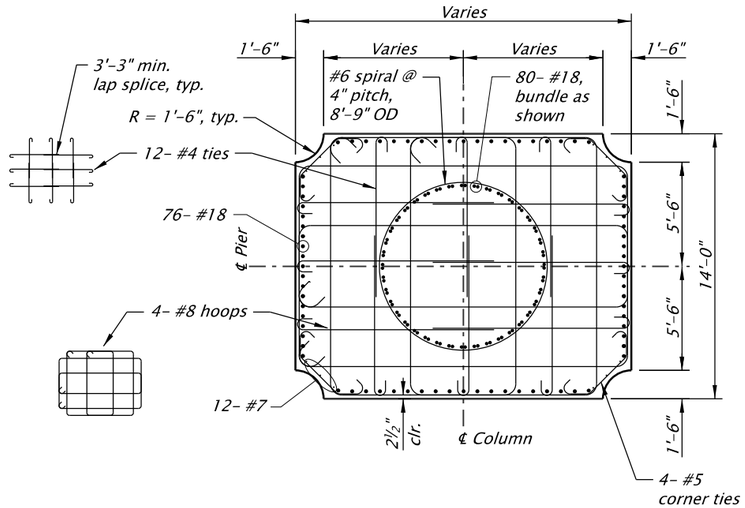

SECTION C-C

Scale: ⅛"=1'-0"

Notes:

1. *Optional construction joint with roughened surface and column lap splice permissible within these limits. See sheet JB___ for typical column lap splice details.*
2. *Provide 1½" clear from top of spiral to lowest point of construction joint. Provide 6" max. vertical break in spiral to allow placement of bottom mat of crossbeam reinforcement.*
3. *No welding of reinforcement is permitted in this region after the column cage is assembled. Reinforcement shall be field or shop welded independently and then assembled around the column longitudinal steel after welding.*
4. *All reinforcement size #18 shall meet the requirements of ASTM A706 Grade 80.*

For accompanied by drawings, see shts. JBA01 & JBA02

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PIER 4 COLUMN

SHEET NO.

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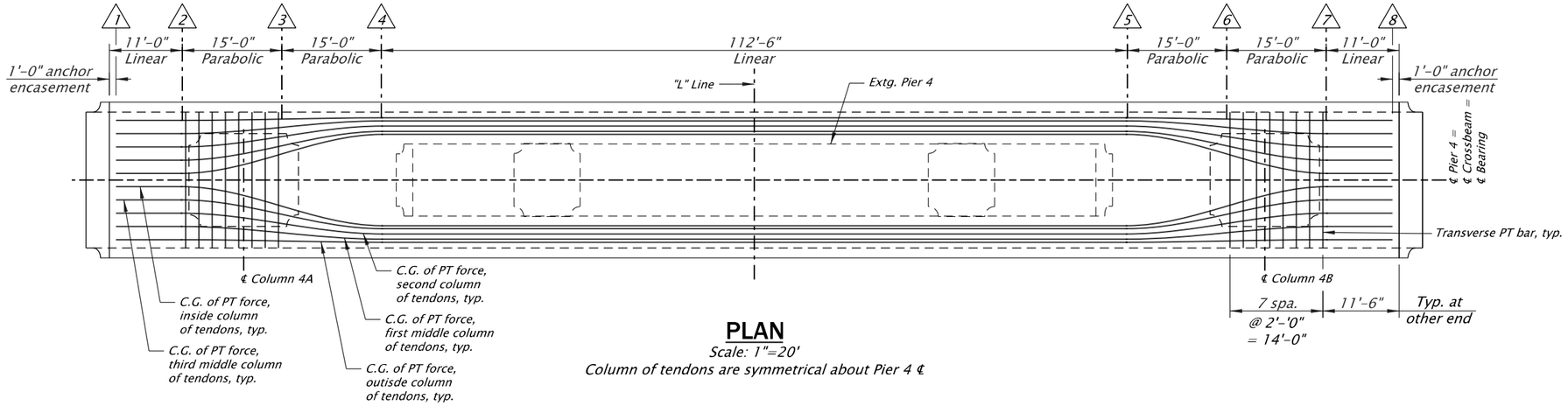
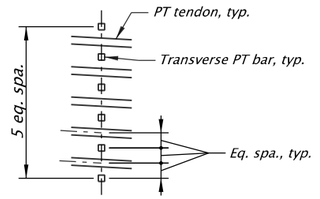


PLAN

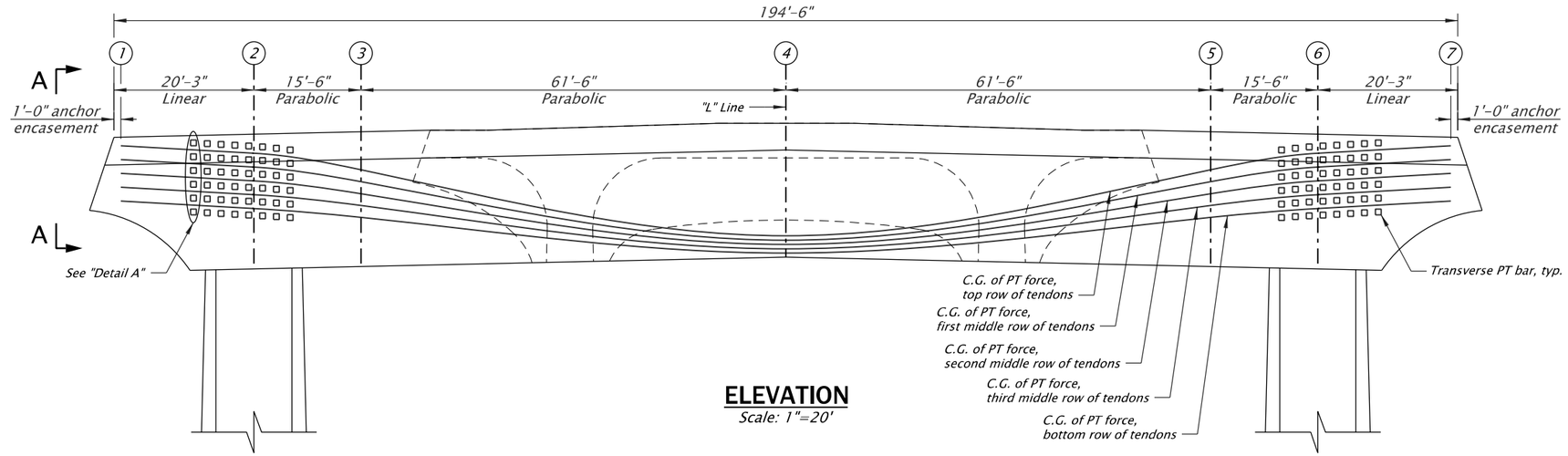
Scale: 1"=20'

Column of tendons are symmetrical about Pier 4 ℄



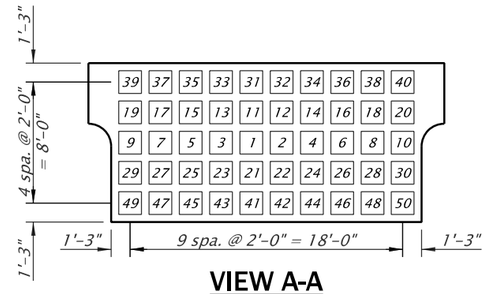
DETAIL A

No scale



ELEVATION

Scale: 1"=20'



VIEW A-A

Scale: 1"=10'

Notes:

1. *For additional post-tensioning details, see sheet JB__.*
2. *For Pier 4 construction sequence, see sheet JB__.*

☐ = *Sequence of tendon/strand stressing*

Control Points	① ⑦	② ⑥	③ ⑤	④
Top row	1'-3"	16'-9"	14'-0"	3'-0¾"
First middle row	3'-3"	14'-9"	12'-3¼"	2'-5¼"
Second middle row	5'-3"	12'-9"	10'-6½"	1'-9¾"
Third middle row	7'-3"	10'-9"	8'-10"	1'-2¼"
Bottom row	9'-3"	8'-9"	7'-1¼"	6¾"

VERTICAL TENDON LAYOUT DATA

Measured vertically from the bottom of the crossbeam, except ① and ⑦ are measured from the top of the crossbeam

Control Points	1 8	2 7	3 6	4 5
Outside column	1'-3"	1'-3"	1'-0¾"	10⅜"
First middle column	3'-3"	3'-3"	2'-3½"	1'-3⅞"
Second middle column	5'-3"	5'-3"	3'-8¼"	2'-1⅜"
Third middle column	7'-3"	7'-3"	5'-1"	2'-10⅞"
Inside column	9'-3"	9'-3"	6'-3¾"	3'-4⅜"

HORIZONTAL TENDON LAYOUT DATA

Measured horizontally from the bottom corner of the crossbeam

For accompanied by drawings, see shts. JBA01 & JBA02

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CLACKAMAS COUNTY

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PIER 4 POST-TENSIONING GEOMETRY

SHEET NO.

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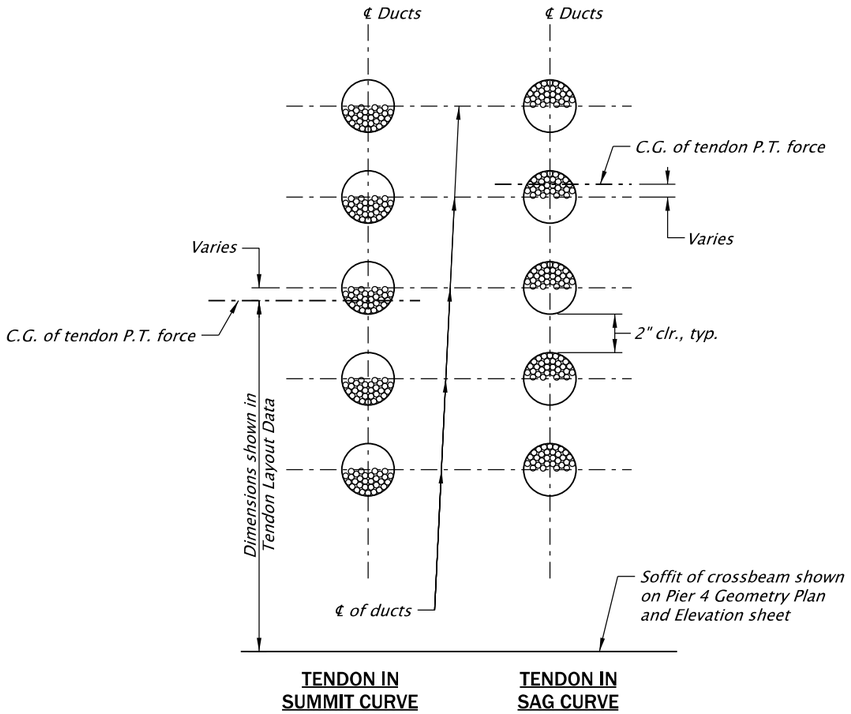
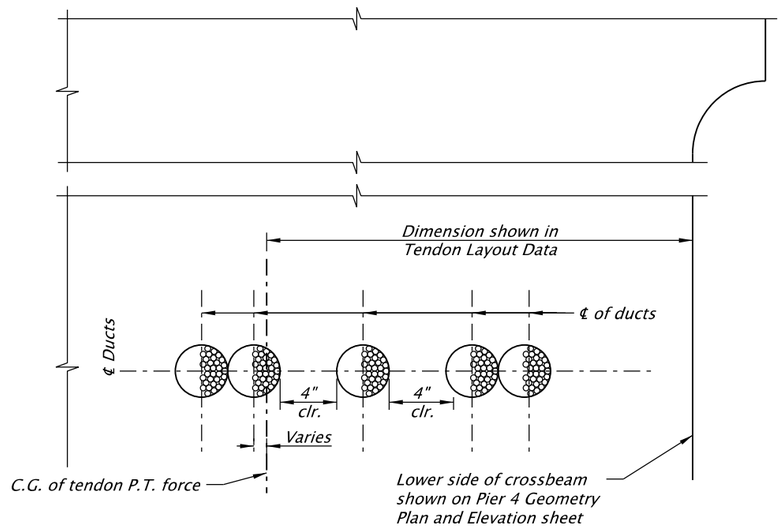


STRAND VERTICAL LOCATION DETAIL



STRAND HORIZONTAL LOCATION DETAIL

Post-Tensioning Notes:

1. *The minimum compressive strength of the crossbeam cast-in-place concrete at the time of post-tensioning P/T bars shall be 4,000 psi.*
2. *The minimum compressive strength of the crossbeam cast-in-place concrete at the time of post-tensioning P/T tendons shall be 5,000 psi.*
3. *The minimum prestressing load after seating for post-tensioned tendons shall be as shown in the Tendon Post-Tensioning Table.*
4. *1¼" dia. P/T bars to be stressed to 135 kips each, seated and re-stressed to verify anchor set is less than or equal to 0.06".*
5. *The design is based on the additional estimated short-term time-dependent prestress loss of post-tensioning strands shown in the Tendon Post-Tensioning Table due to elastic shortening adjusted for elastic gain. The design is also based on the additional estimated long-term time-dependent prestress loss of post-tensioning strand shown in the Tendon Post-Tensioning Table due to steel relaxation, creep, and shrinkage of concrete. These losses vary along the length of the post-tensioning strands, and the maximum loss is provided.*
6. *The contractor shall submit the stressing sequence and elongation calculations to the engineer for approval. All losses due to tendon vertical and horizontal curvature shall be included in the elongation calculations.*
   - *A. Each tendon shall be stressed at the left end of the crossbeam only.*
   - *B. The sequence stressing shall be as shown on the Pier 4 Post-Tension Geometry sheet.*
7. *Side forms for the crossbeam shall be removed prior to post-tensioning.*
8. *Caps for grouting as required by Specification 00555.03 shall remain in place and be permanent after grouting.*

TENDON POST-TENSIONING TABLE

Row	Total Prestressing Load Per Row		Additional Short-Term Estimated Prestress Loss ksi (ES - EG)	Additional Long-Term Estimated Prestress Loss ksi (R + CR + SH)
	Jacking kip	After Seating kip		
Top row	13,623	11,733	0	41
First middle row	13,623	11,775	0	42
Second middle row	13,623	11,817	0	44
Third middle row	13,623	11,861	0	46
Bottom row	13,623	11,907	0	47

For accompanied by drawings, see shts. JBA01 & JBA02

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PIER 4 POST-TENSIONING NOTES

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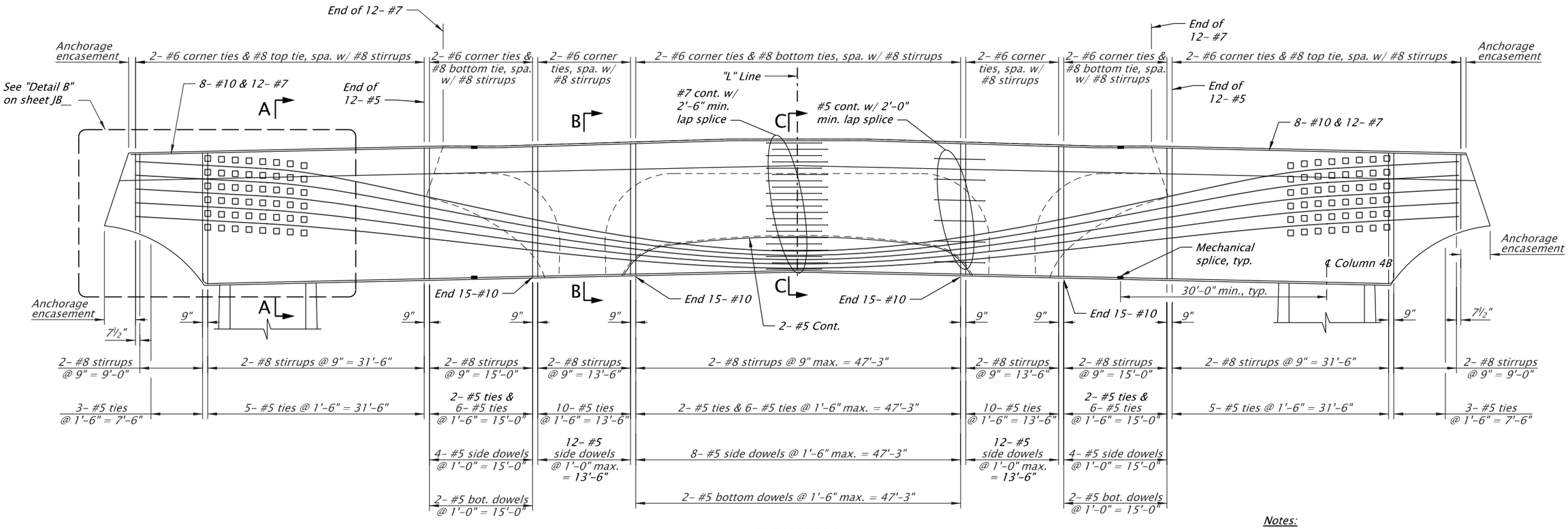

ELEVATION

Scale: 1"=15'

Notes:

1. *See Special Provisions for mass concrete requirements.*
2. *Column and bearing pedestal reinforcement not shown for clarity.*
3. *Mechanical splice for adjacent bars shall be alternated about crossbeam midspan and shall be spaced at lease 2'-0".*

For accompanied by drawings, see shts. JBA01 & JBA02

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PIER 4 CROSSBEAM - 1

SHEET NO.

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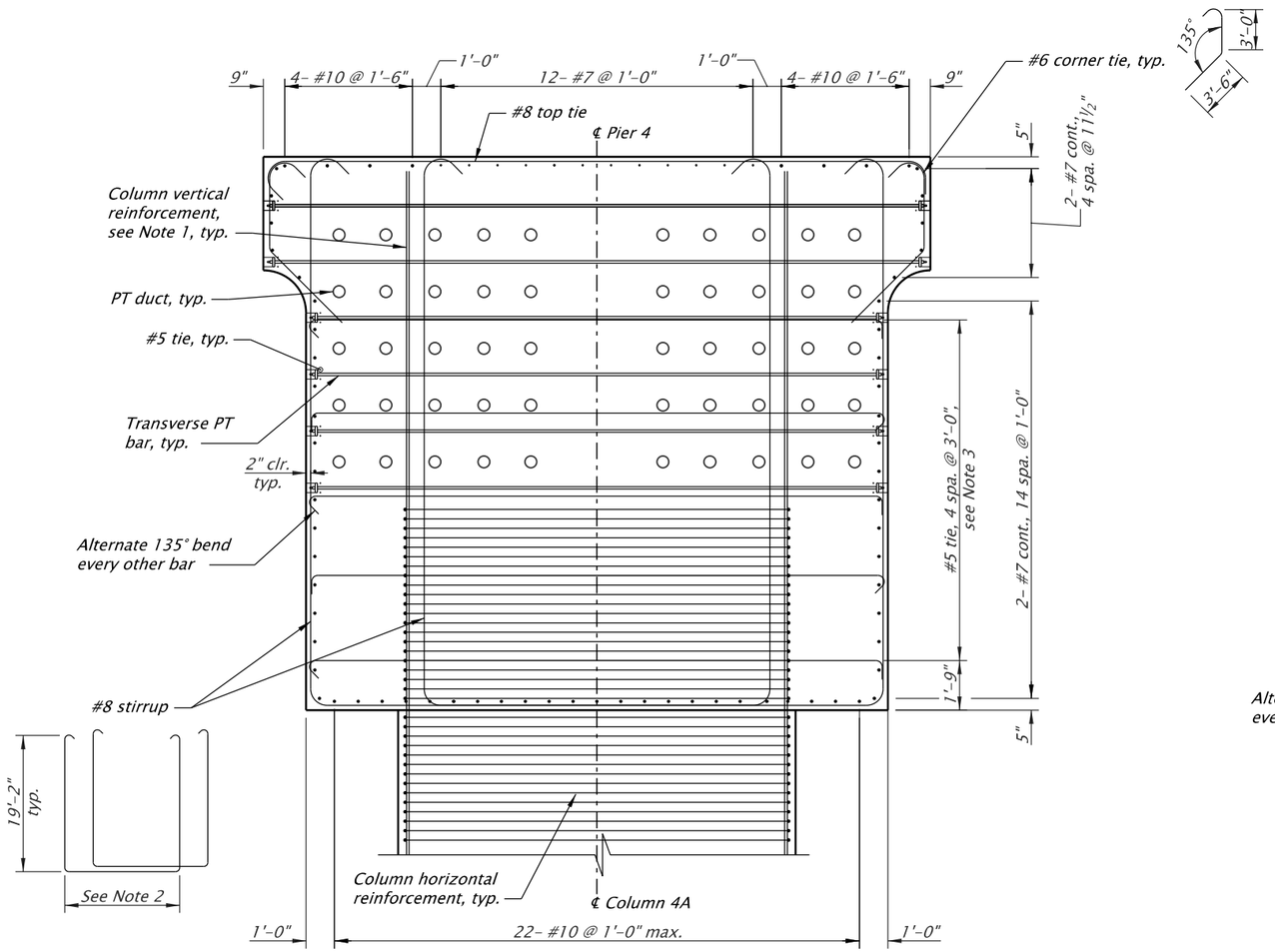
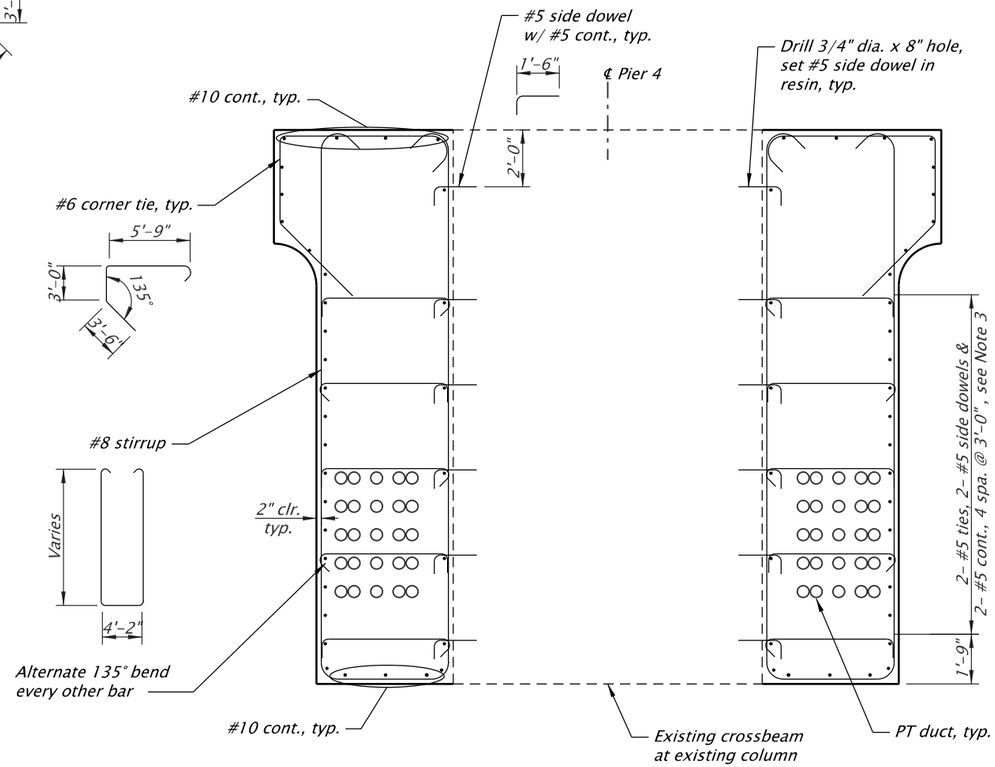


SECTION A-A

Scale: 3/16"=1'-0"



SECTION B-B

Scale: 3/16"=1'-0"

See Section A-A for additional details

Notes:

1. *Up to 6 column vertical reinforcing bar along each side of the column may be cut at the lowest row of post-tensioning ducts if interference occurs with the ducts for the post-tensioning strand or with the ducts for the transverse post-tensioning bars.*
2. *Stirrup width shall be 16'-2", except when the stirrup interferes with the duct for the post-tensioning strand, the width shall be 15'-2" or 14'-2".*
3. *It is acceptable to adjust tie spacing adjacent to the location of interference with post-tensioning ducts.*
4. *Details for Pier 4 are shown. Details for Pier 5 are similar.*

For accompanied by drawings, see shts. JBA01 & JBA02

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PIER 4 CROSSBEAM - 2

SHEET NO.

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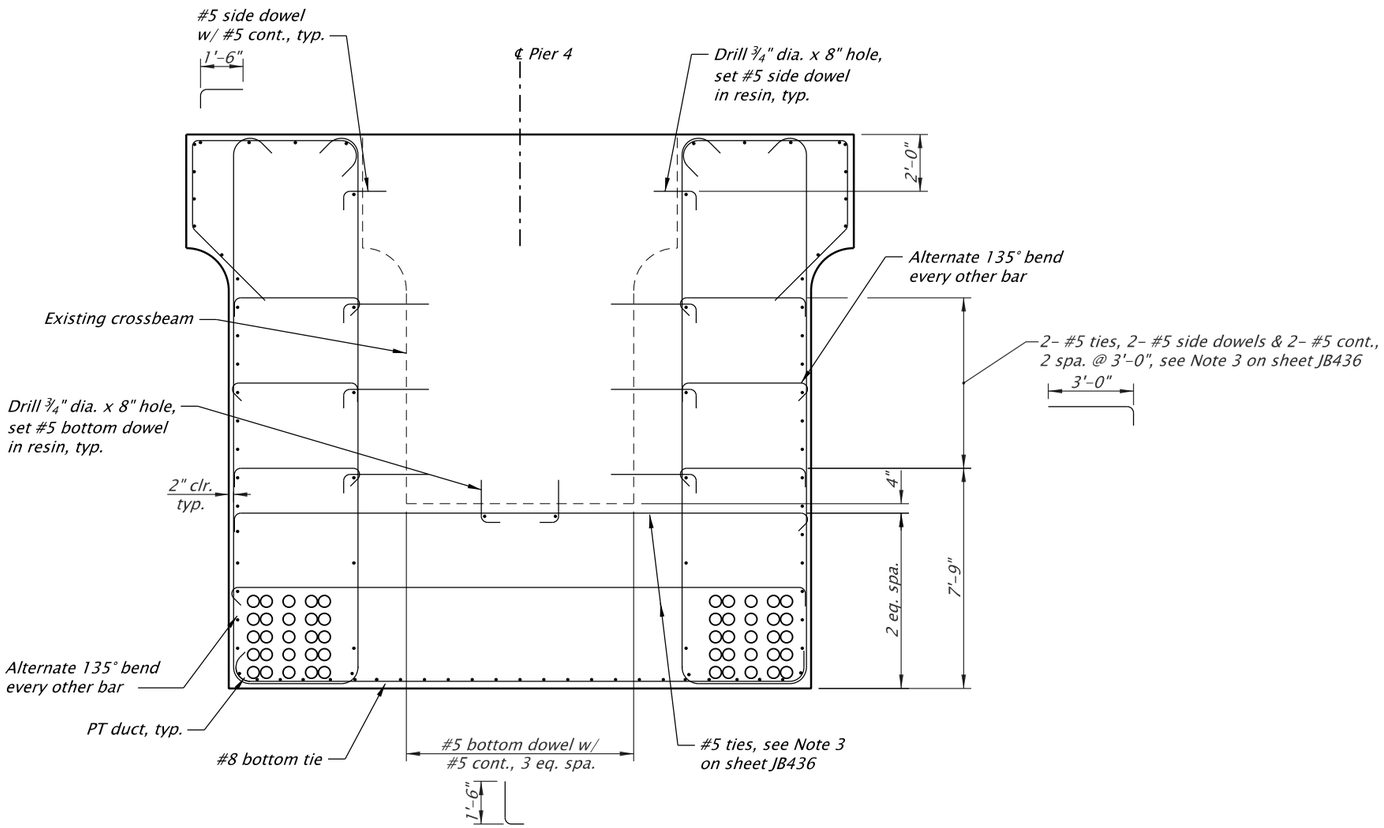

SECTION C-C

Scale: 3/16"=1'-0"

See Section A-A and Section B-B on sheet JB436 for additional details.

Note:

Details for Pier 4 are shown. Details for Pier 5 are similar.

For accompanied by drawings, see shts. JBA01 & JBA02

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PIER 4 CROSSBEAM - 3

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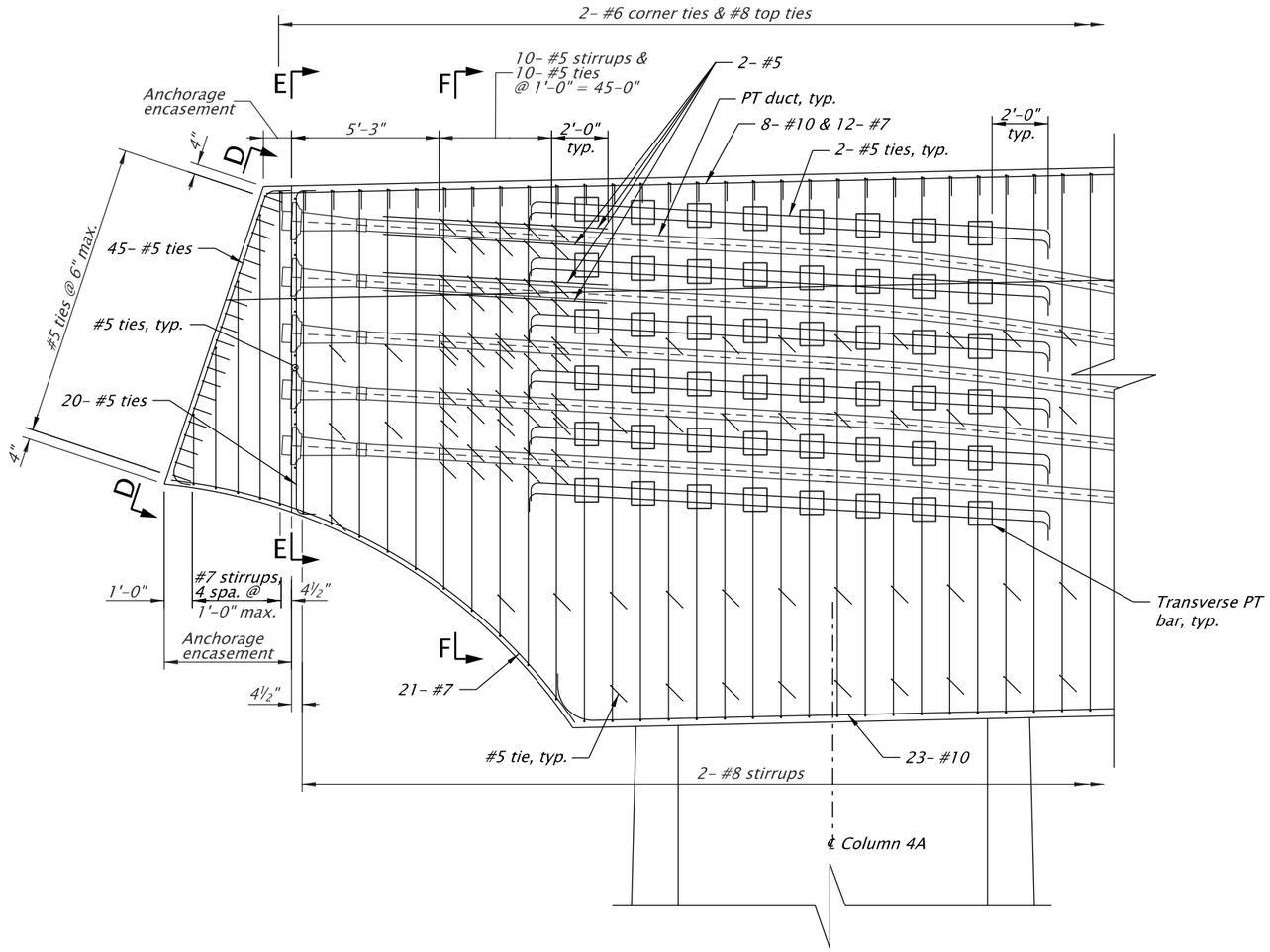
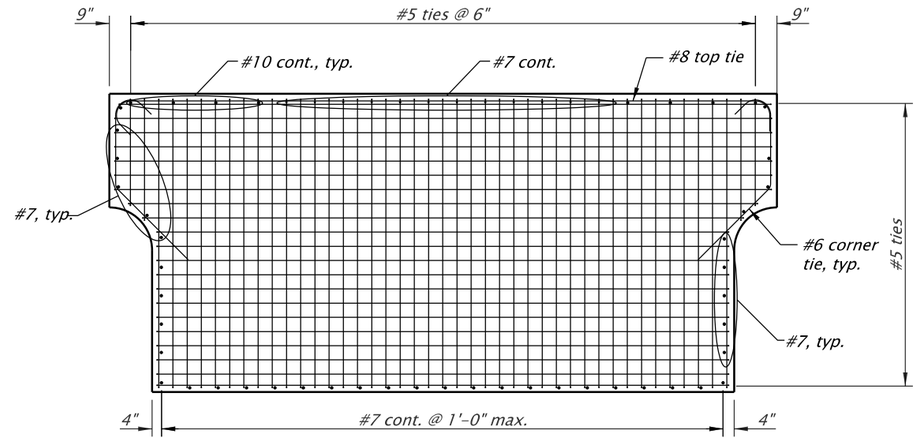


DETAIL 1

Scale: 3/16"=1'-0"

Left side shown, right side similar.
Column reinforcement not shown for clarity.



SECTION D-D

Scale: 3/16"=1'-0"

Note:

For Sections E-E and F-F, see sheet JB___.

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	07/19

SCALE WARNING

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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 4 CROSSBEAM - 4

SHEET NO.

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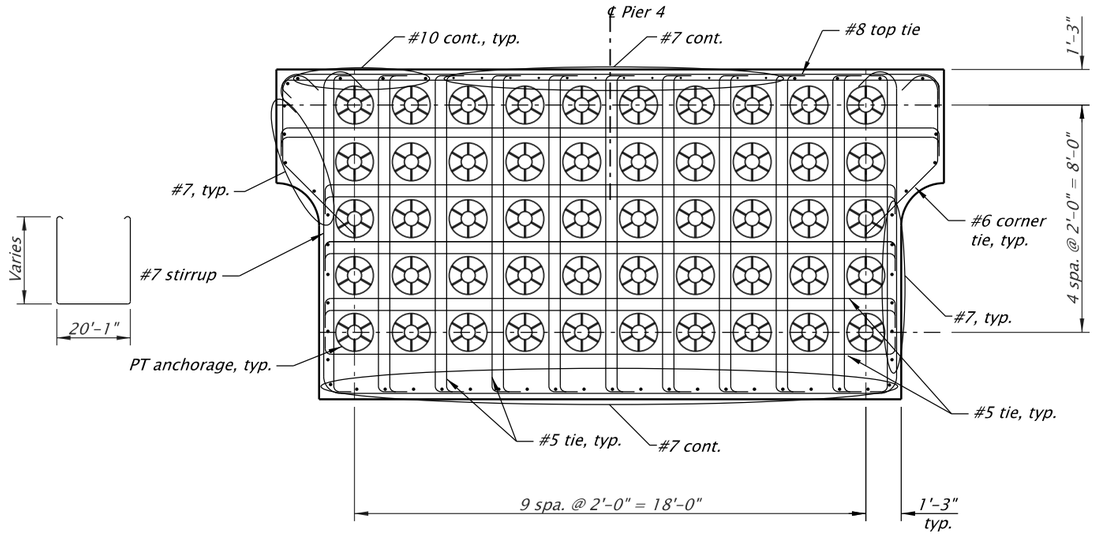
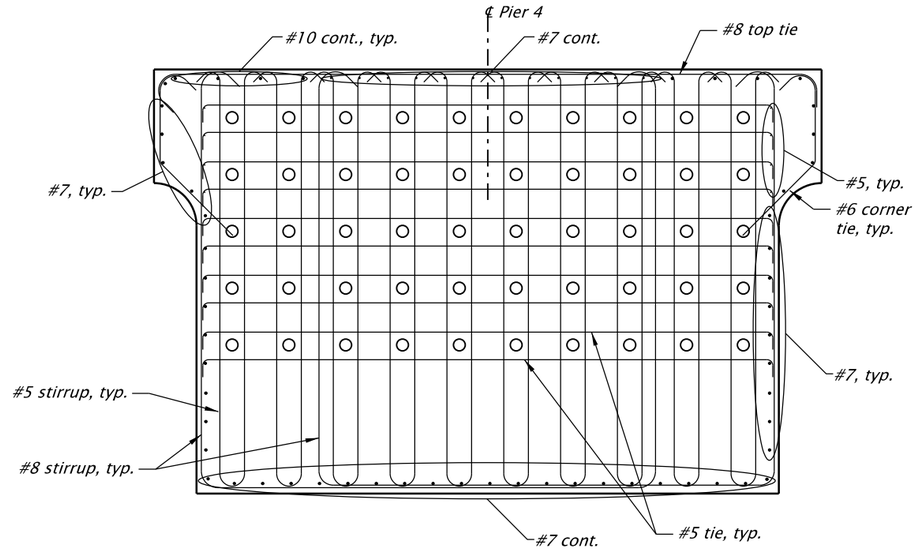


SECTION E-E

Scale: 3/16"=1'-0"



SECTION F-F

Scale: 3/16"=1'-0"

Note:

For locations of Sections E-E and F-F, see sheet JB___.

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
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WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

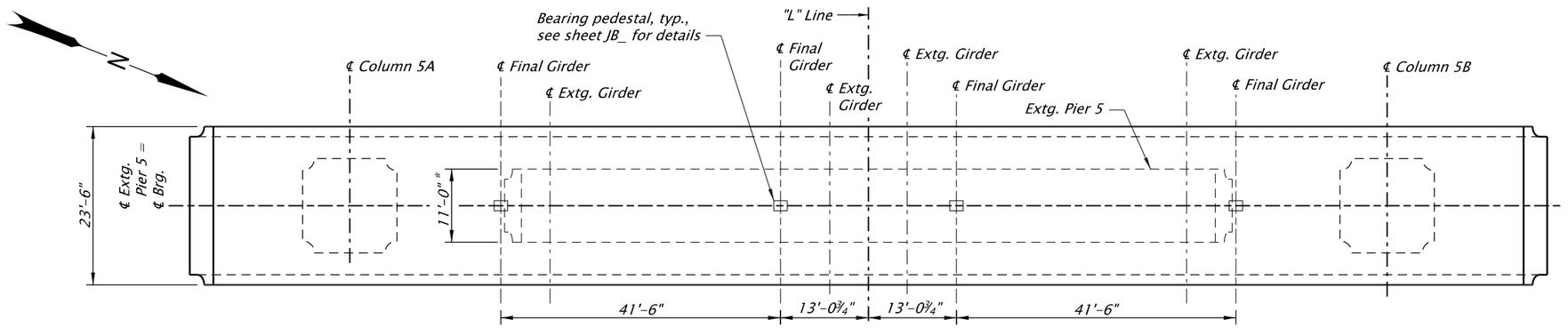
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 4 CROSSBEAM - 5

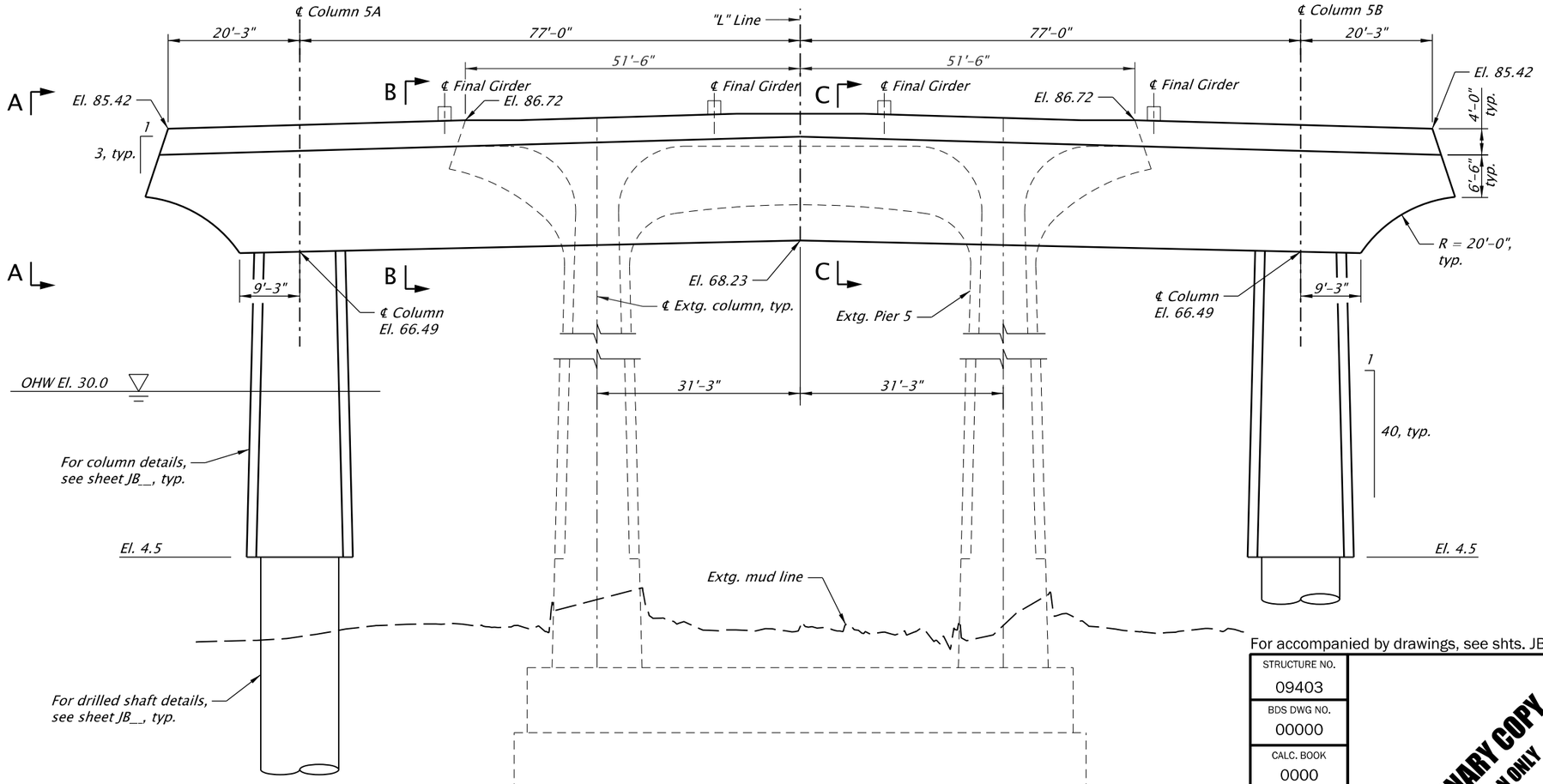
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

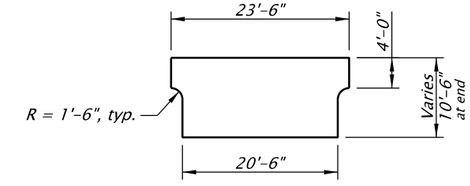


* See Note __ on sheet JB__.

PLAN
Scale: 1"=20'



ELEVATION
Scale: 1"=20'



SECTION A-A
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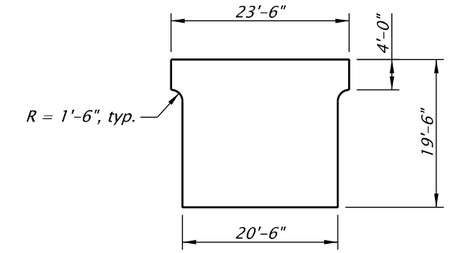
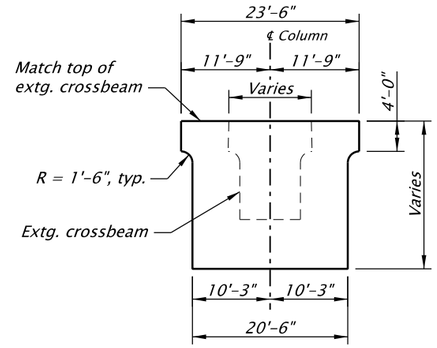


SECTION B-B
Scale: 1"=20'



SECTION C-C
Scale: 1"=20'

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
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COUNTY	Clackamas
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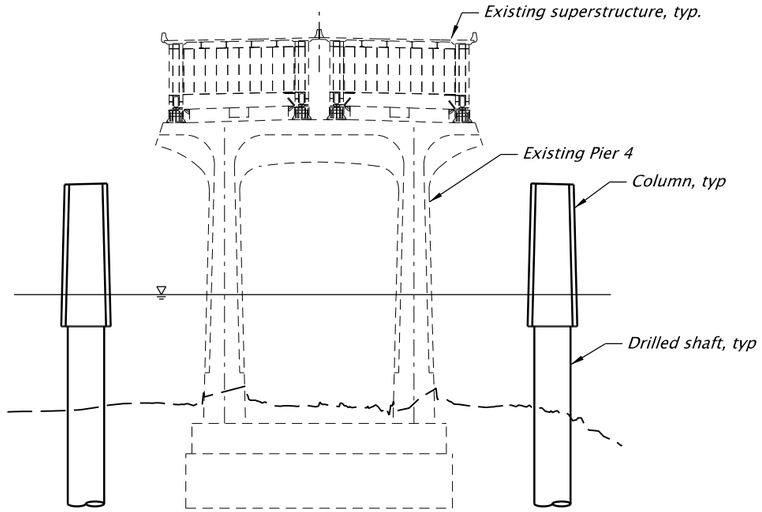
WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

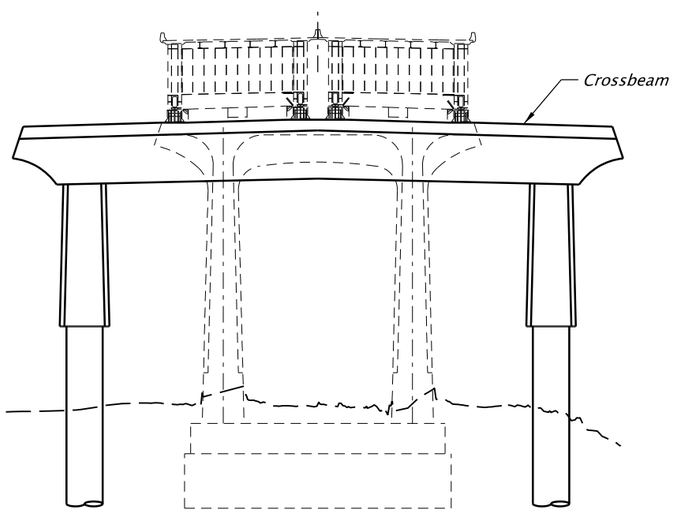
Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 5 GEOMETRY PLAN AND ELEVATION | SHEET NO.

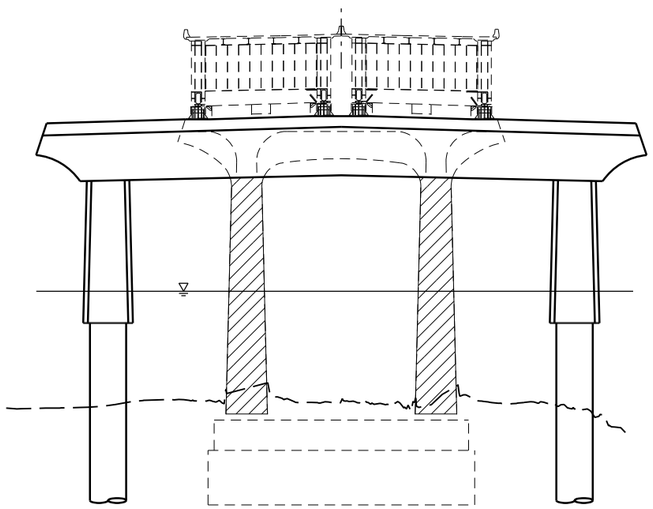
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



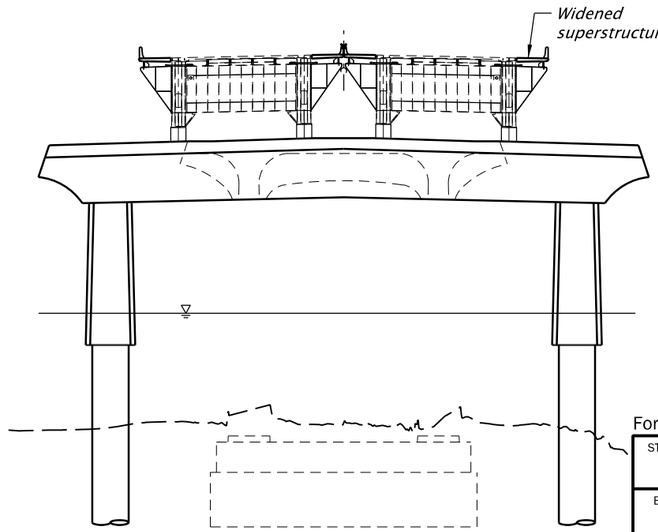
ELEVATION
Step 1



ELEVATION
Step 2 to 3



ELEVATION
Step 4



ELEVATION
Step 5 to 6

Pier 5 Construction Sequence

Step 1

- *Construct drilled shafts.*
- *Construct columns.*

Step 2

- *Remove existing shear lugs, bumper assemblies, shock transmission units (Pier 5 only), walkway platforms and handrails.*
- *Construct falsework/formwork for concrete crossbeam.*
- *Place crossbeam reinforcement, post-tensioning duct and thermal control plan elements for the new crossbeam.*
- *Place crossbeam concrete.*

Step 3

- *Remove side forms.*
- *Place post-tension bar and once crossbeam concrete meets the specified compressive strength, stress bars.*
- *Place post-tension strand and once all post-tension bars have been stress and crossbeam concrete meets the specified compressive strength, stress strands. Strand stressing sequence shall be in accordance with the sequence shown on JB___.*

Step 4

- *Remove crossbeam falsework/formwork.*
- *Remove existing column from bottom of new crossbeam to below existing mud line.*

Step 5

- *Construct the outside superstructure widening from Piers 3 to 6.*
- *Construct new bearing pedestal and install isolation bearings.*
- *Lateral slide NB and SB superstructure.*

Step 6

- *Construct inside superstructure widening from Piers 3 to 6.*
- *Open roadway to final lane configuration.*

Notes:

1. *This sequence of construction is necessary to be compatible with the design of the bridge elements. Deviation from this sequence requires approval by the Engineer.*
2. *Work bridge and falsework/formwork not shown for clarity.*
3. *This construction sequence is provided for Pier 4. The construction sequence for Pier 5 is similar.*

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: Name

PIER 5 CONSTRUCTION SEQUENCE

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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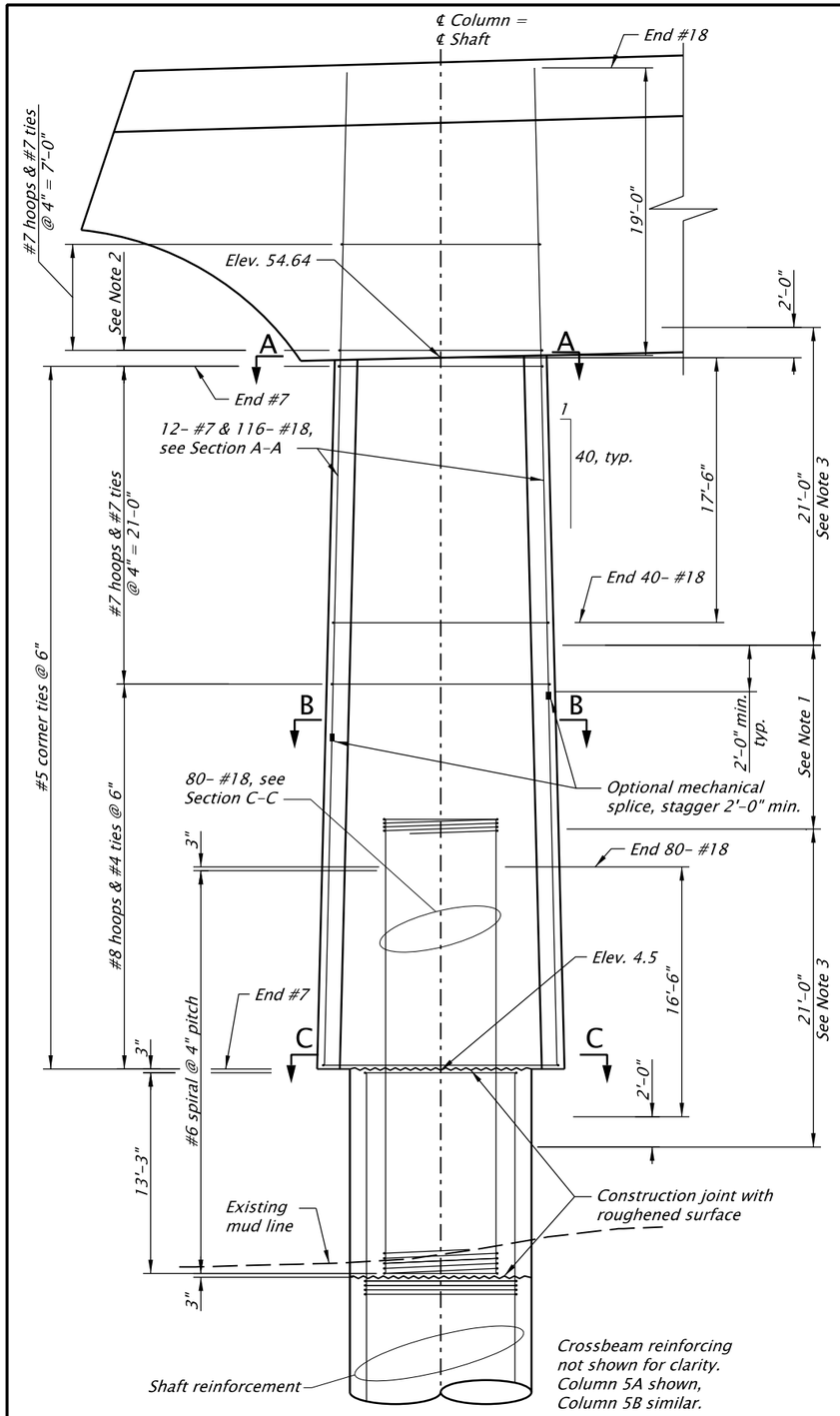
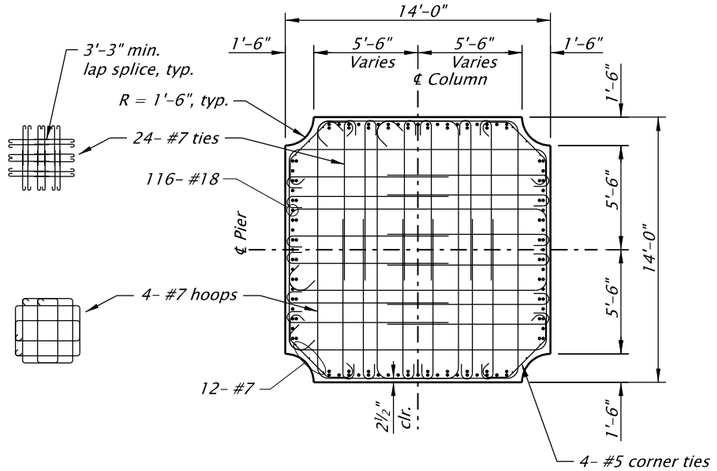


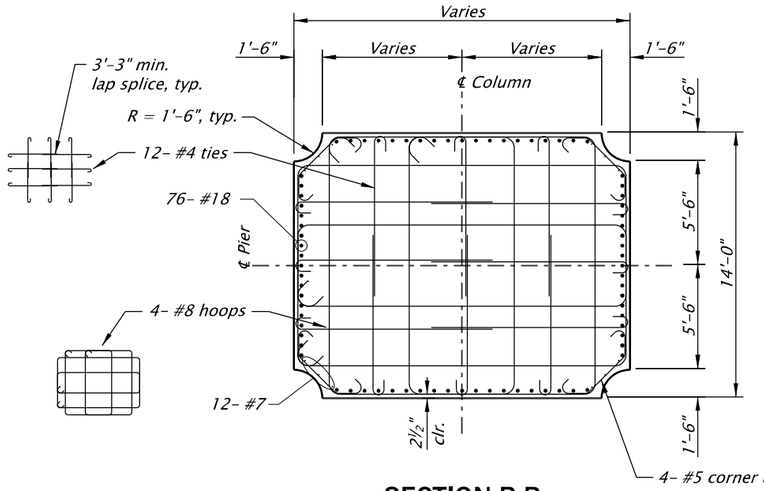
ELEVATION

Scale: 1"=10'-0"



SECTION A-A

Scale: ⅛"=1'-0"



SECTION B-B

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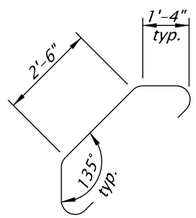
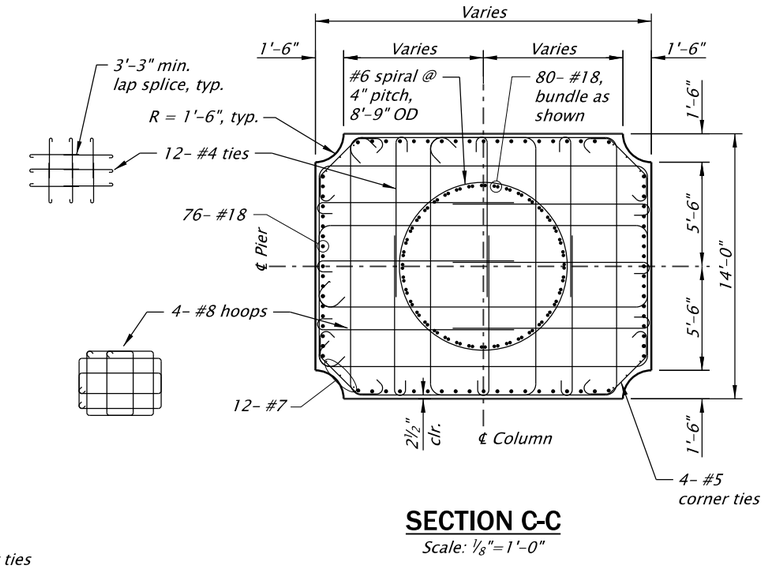


CORNER TIE

No scale



SECTION C-C

Scale: ⅛"=1'-0"

Notes:

1. *Optional construction joint with roughened surface and column lap splice permissible within these limits. See sheet JB___ for typical column lap splice details.*
2. *Provide 1½" clear from top of spiral to lowest point of construction joint. Provide 6" max. vertical break in spiral to allow placement of bottom mat of crossbeam reinforcement.*
3. *No welding of reinforcement is permitted in this region after the column cage is assembled. Reinforcement shall be field or shop welded independently and then assembled around the column longitudinal steel after welding.*
4. *All reinforcement size #18 shall meet the requirements of ASTM A706 Grade 80.*

For accompanied by drawings, see shts. JBA01 & JBA02

STRUCTURE NO.	09403
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CALC. BOOK	0000
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M.P.: 9.03	
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WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Heather Gonsior	Checker: Name

PIER 5 COLUMN

SHEET NO.

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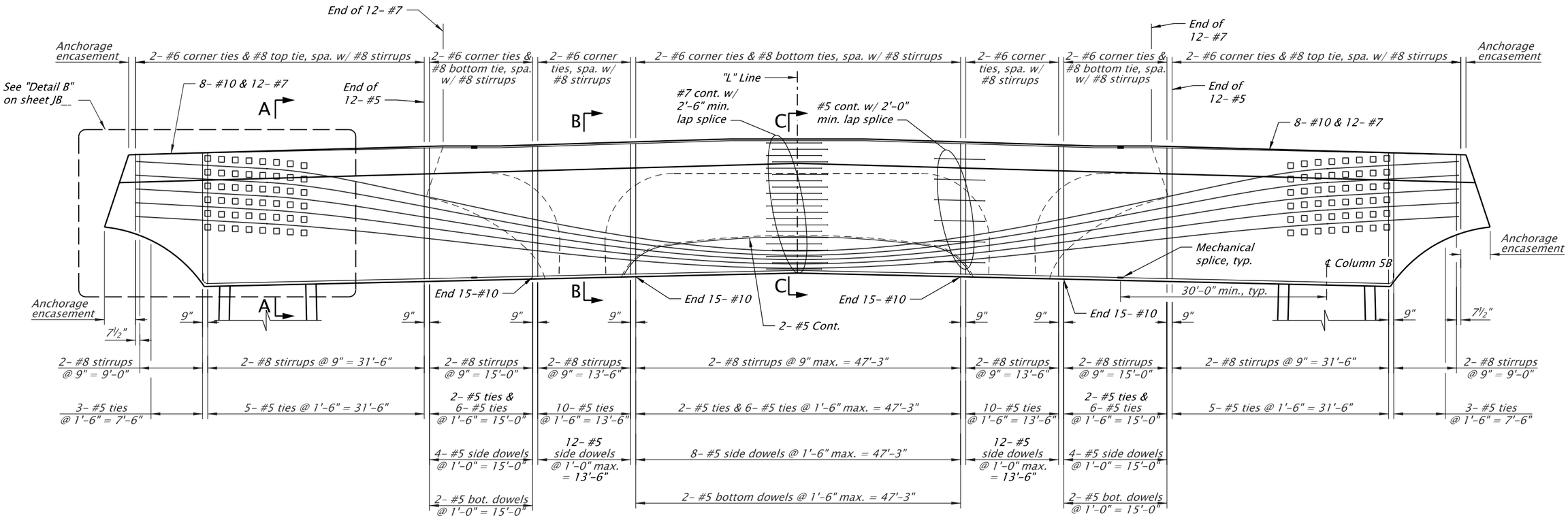

ELEVATION

Scale: 1"=15'

For accompanied by drawings, see shts. JBA01 & JBA02

Notes:

1. *See Special Provisions for mass concrete requirements.*
2. *Column and bearing pedestal reinforcement not shown for clarity.*
3. *Mechanical splice for adjacent bars shall be alternated about crossbeam midspan and shall be spaced at lease 2'-0".*

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PIER 5 CROSSBEAM - 1

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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JB00	Deck Plan Spans 1 thru 3
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JB00	Deck Plan Spans 5 & 6
JB00	Deck Plan Spans 10 thru 12 & C31 thru C34
JB00	Deck Plan Spans13 thru 15
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JB00	Plate Girder Span 1 Typical Section – 2
JB00	Plate Girder Span 2 Typical Section
JB00	Plate Girder Span 3 Typical Section
JB00	Plate Girder Spans 1 thru 3 Framing Plan
JB00	Plate Girder Span 1 Girder Elevation – 1
JB00	Plate Girder Span 1 Girder Elevation – 2
JB00	Plate Girder Span 1 Girder Elevation – 3
JB00	Plate Girder Span 1 Girder Elevation – 4
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JB00	Plate Girder Span 2 Girder Elevation – 3
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JB00	Bearing Modification Pier 1A

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JB00	Bearing Modification Pier 4
JB00	Bearing Modification Pier 5
JB00	Bearing Modification Pier 6A
JB00	Bearing Modification Pier 6B
JB00	Bearing Modification Pier 7
JB00	Bearing Modification Pier 8
JB00	Bearing Modification Pier 9A
JB00	Bearing Modification Pier 9B
JB00	Bearing Modification Pier 10
JB00	Bearing Modification Pier 11
JB00	Bearing Modification Pier 12A
JB00	Bearing Modification Pier 12B
JB00	Bearing Modification Pier 13
JB00	Bearing Modification Pier 14
JB00	Bearing Modification Abut 2
JB00	Plate Girder Spans 7 thru 15 Expansion Joint – 1
JB00	Plate Girder Spans 7 thru 15 Expansion Joint – 3
JB00	Plate Girder Spans 7 thru 15 Expansion Joint – 4
JB00	Plate Girder Spans 7 thru 15 Expansion Joint – 5
JB00	Plate Girder Spans 7 thru 15 Bearing Details – 1
JB00	Plate Girder Spans 7 thru 15 Bearing Details – 2
JB00	Plate Girder Spans 7 thru 15 Bearing Details – 3
JB00	Drainage Plan – 1
JB00	Drainage Plan – 2
JB00	Drainage Plan – 3
JB00	Drainage Plan – 4
JB00	Drainage Details – 1
JB00	Drainage Details – 2
JB00	Water Line Support Details – 1
JB00	Water Line Support Details – 2
JB00	Water Line Support Details – 3
JB00	Water Line Support Details – 4
JB00	Electrical Plan
JB00	Electrical Details – 1
JB00	Electrical Details – 2
JB00	Sign Support Details – 1
JB00	Sign Support Details – 2
JB00	Sign Details – 1
JB00	Sign Details – 2

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO. 09403

BDS DWG NO. 00000

CALC. BOOK 0000

HWY: 064
M.P.: 9.03

COUNTY Clackamas

DATE MO/YR

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

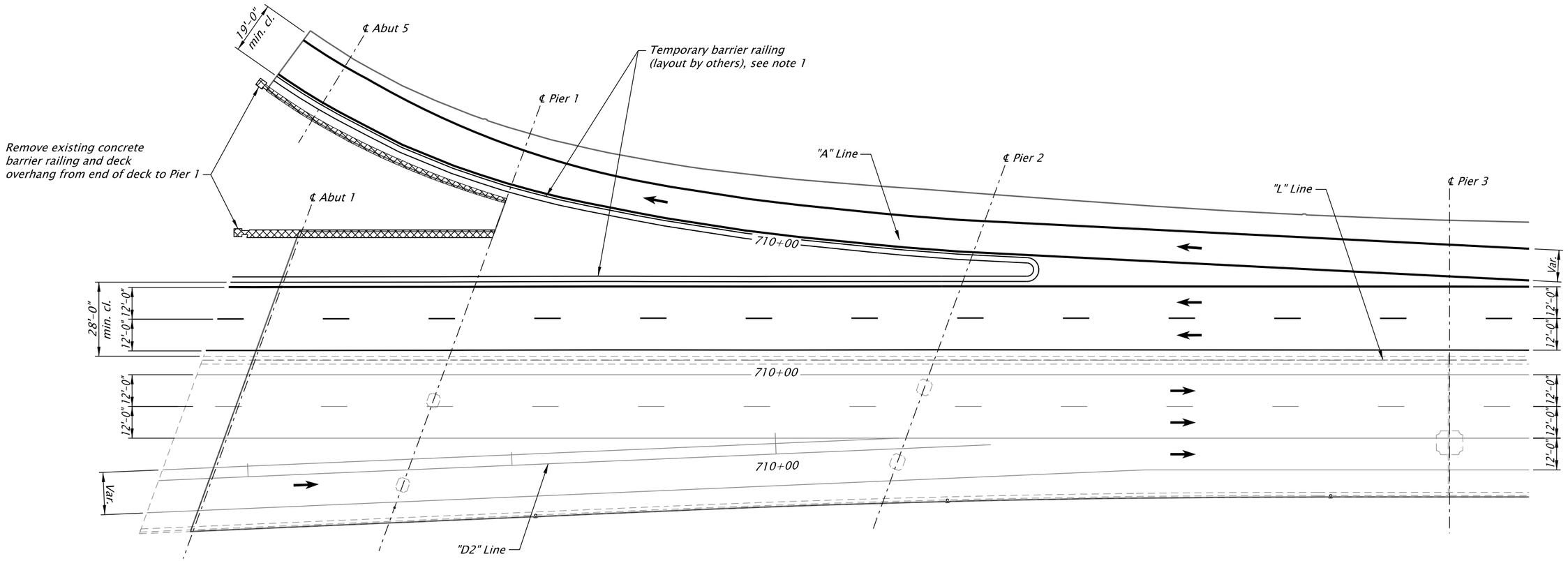
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll
Drafter: Bob Maechler
Reviewer: Name
Checker: Name

WIDENING AND SEISMIC RETROFIT
INDEX OF SHEETS - 1

SHEET NO.

Rotation: 0° Sca = 1



STAGE 1 DEMOLITION PLAN

Scale: 1" = 40'

Legend:

Stage 1 - Remove portion of NB mainline deck and portion of NB Off-Ramp deck

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

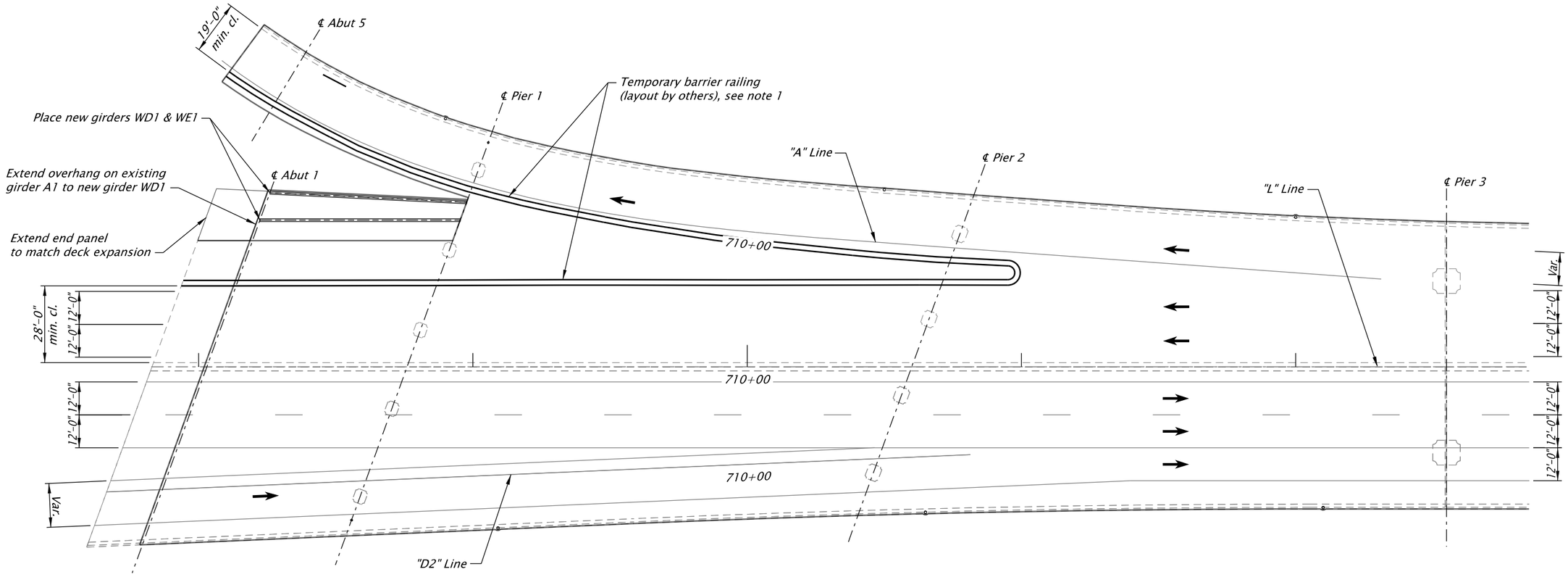
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Luke Lockwood
Drafter: Luke Lockwood | Checker: Luke Lockwood

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 1

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



STAGE 1 CONSTRUCTION PLAN

Scale: 1" = 40'

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

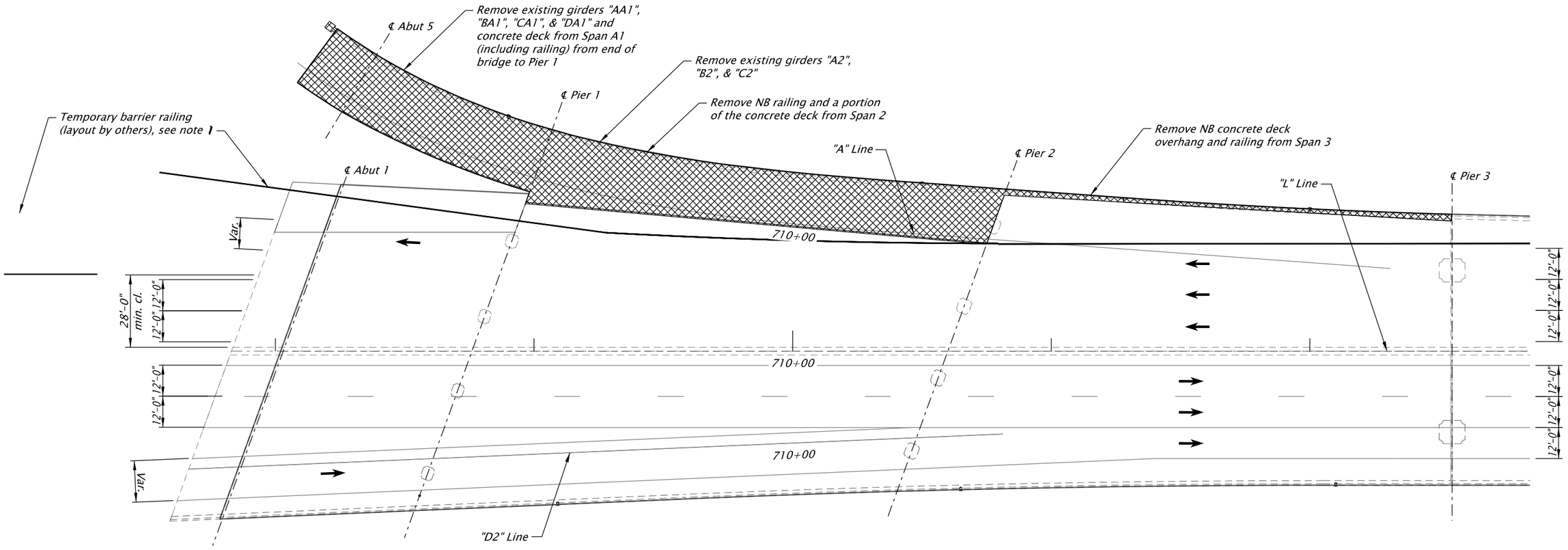
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Luke Lockwood
Drafter: Luke Lockwood | Checker: Luke Lockwood

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 2

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



STAGE 2 DEMOLITION PLAN

Scale: 1" = 40'

Legend:

Stage 2 – Remove portion of NB mainline superstructure and remaining NB Off-Ramp superstructure

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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QUINCY ENGINEERING

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

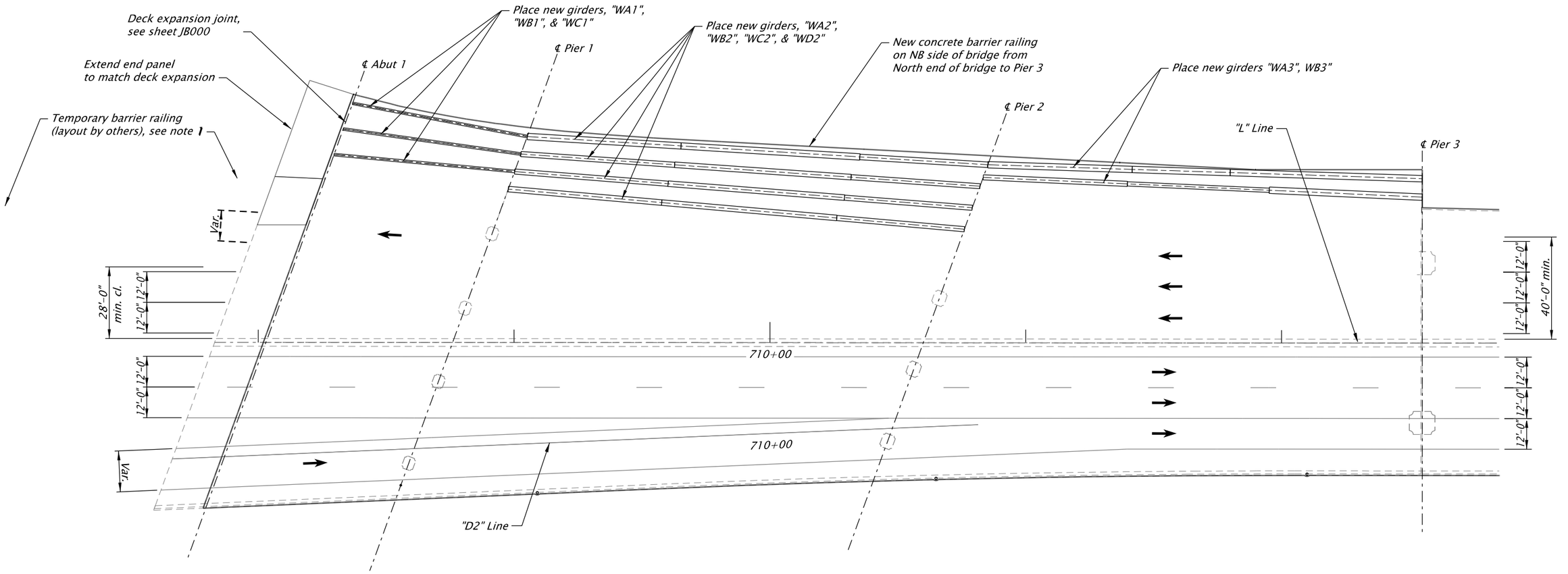
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Luke Lockwood
Drafter: Luke Lockwood | Checker: Luke Lockwood

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 3

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



STAGE 2 CONSTRUCTION PLAN

Scale: 1" = 40'

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY:	064
M.P.:	9.03
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

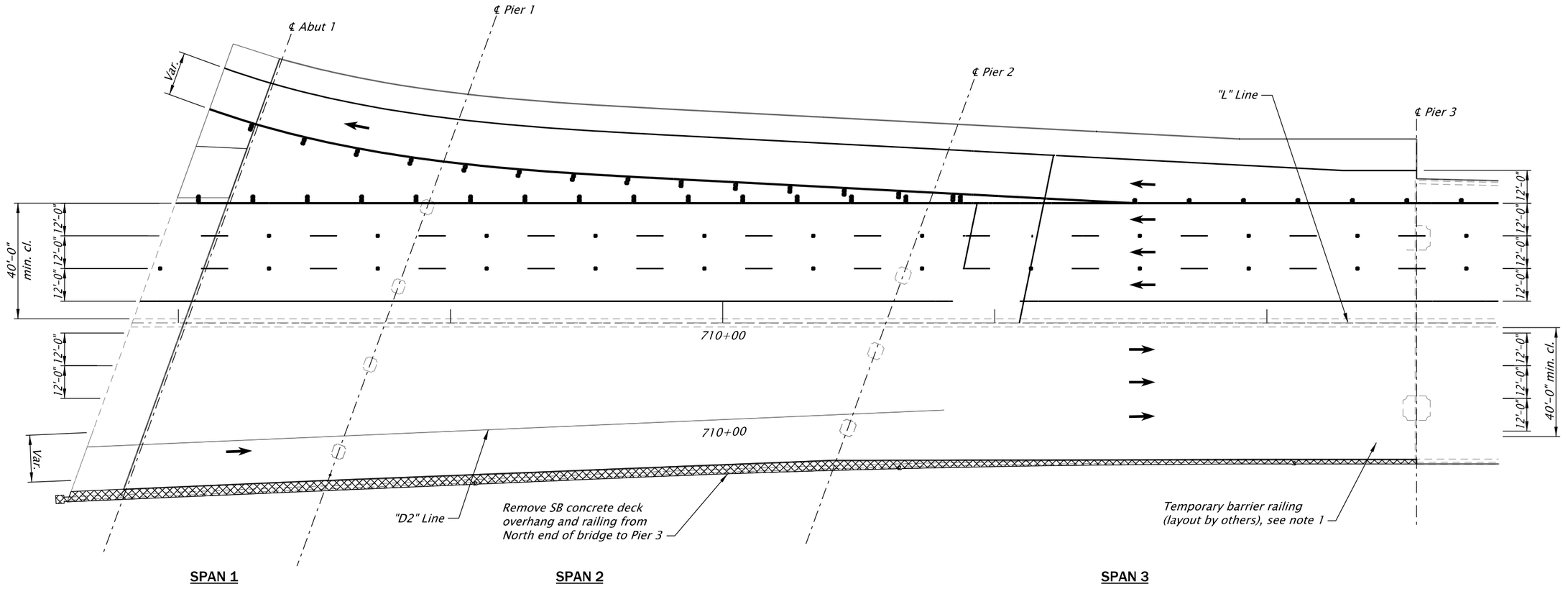
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Luke Lockwood
Drafter: Luke Lockwood | Checker: Luke Lockwood

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 4

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



STAGE 3 DEMOLITION PLAN

Scale: 1" = 40'

Legend:

Stage 3 – Remove portion of SB mainline deck overhang

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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QUINCY ENGINEERING

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood — Reviewer: Luke Lockwood
Drafter: Luke Lockwood — Checker: Luke Lockwood

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 5

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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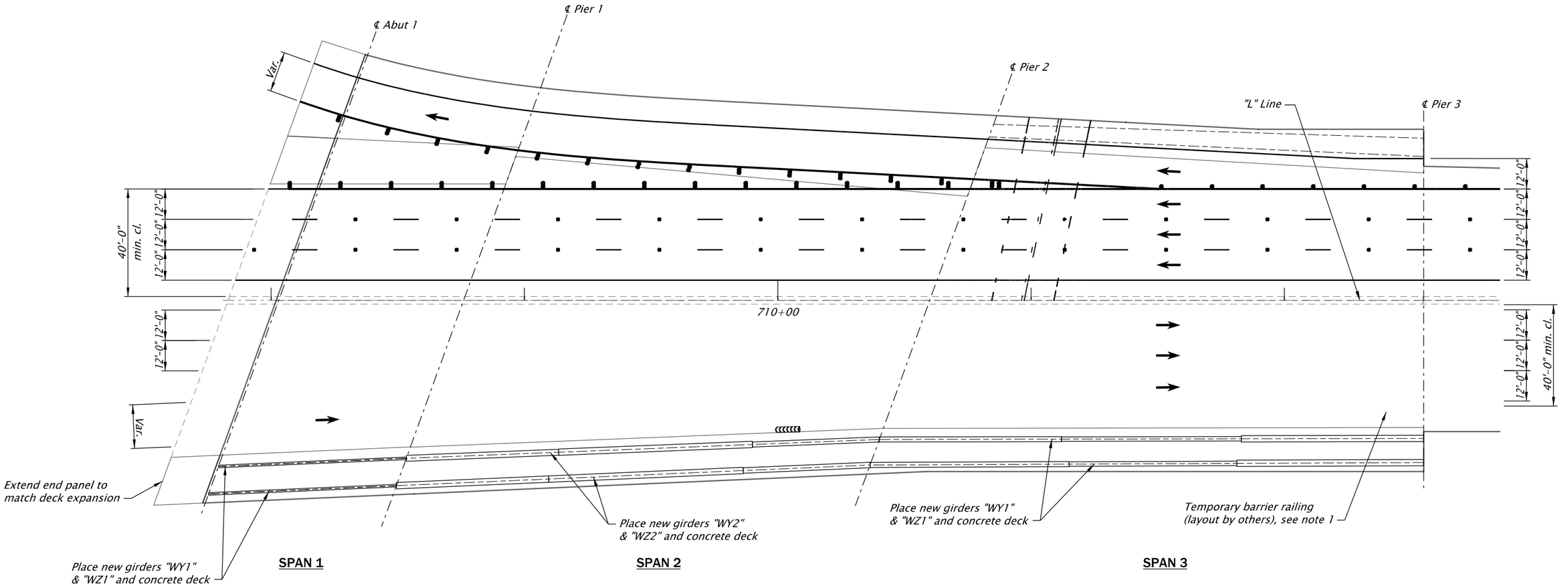

STAGE 3 CONSTRUCTION PLAN

Scale: 1" = 40'

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

STRUCTURE NO.	9403
BDS DWG NO.	00000
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HWY:	205
M.P.:	000.00-000.00
COUNTY	Clackamas
DATE	01/22/2019

DATE: XX/XX/20
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QUINCY ENGINEERING

HWY 64 OVER MAIN ST. (OREGON CITY)

I-205: PARK PLACE INTCHGE TO WEST LINN INTCHGE SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood — Reviewer: Luke Lockwood
Drafter: Luke Lockwood — Checker: Luke Lockwood

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 6

SHEET NO.

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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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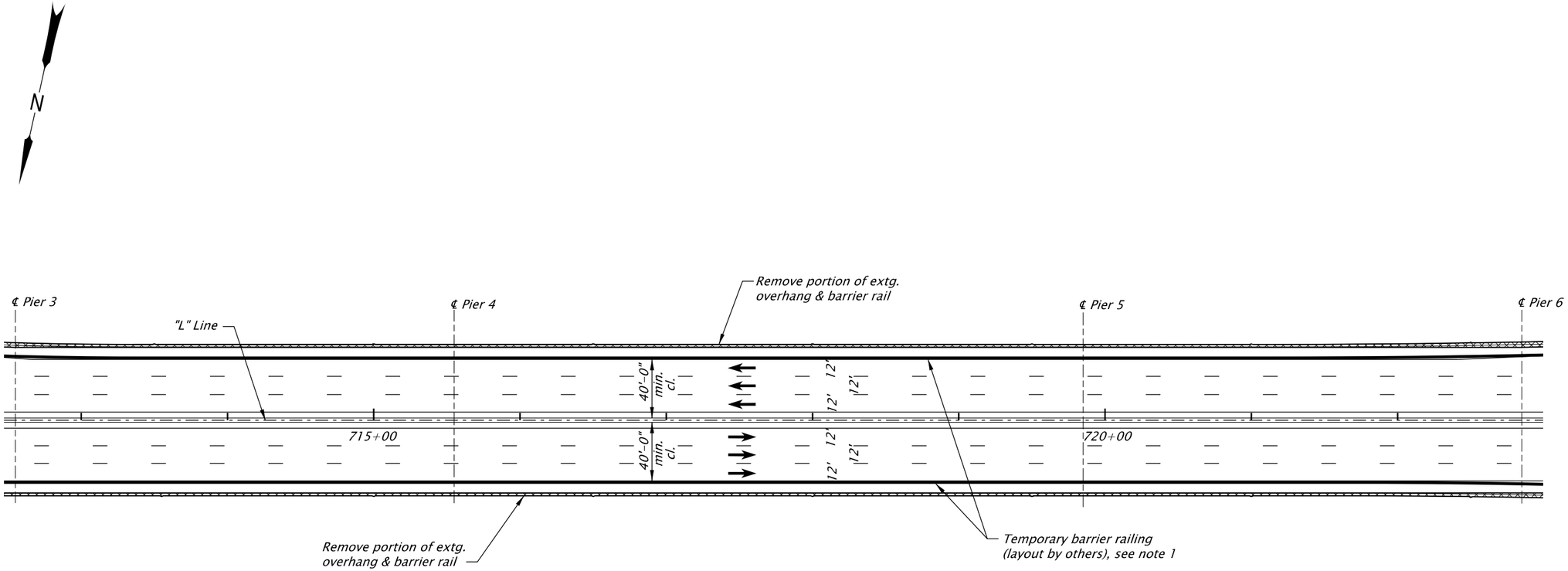

STAGE 1 DEMOLITION - SPANS 4 THRU 6

Scale: 1" = 80'

Legend:

Stage 1 – Remove portion of NB and SB mainline deck

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes Reviewer: Name

Drafter: Bob Maechler Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 7

SHEET NO.

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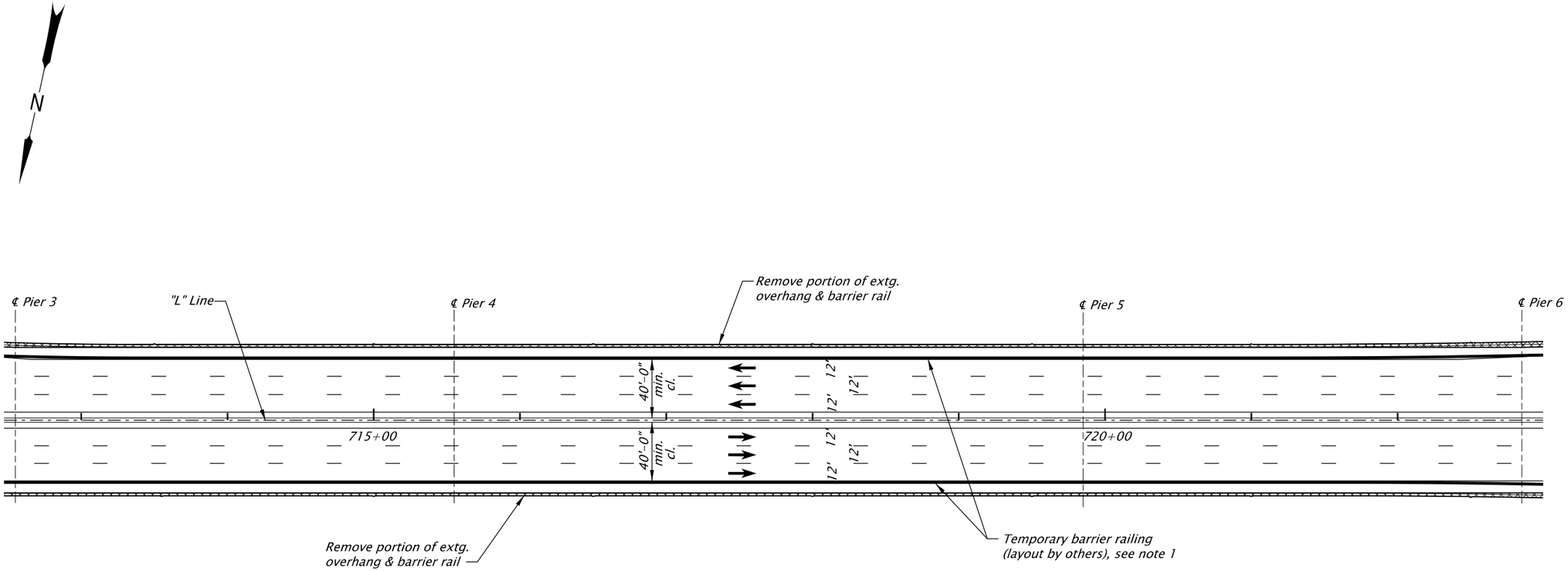

STAGE 1 DEMOLITION - SPANS 4 THRU 6

Scale: 1" = 80'

Legend:

Stage 1 – Remove portion of NB and SB mainline deck

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 8

SHEET NO.

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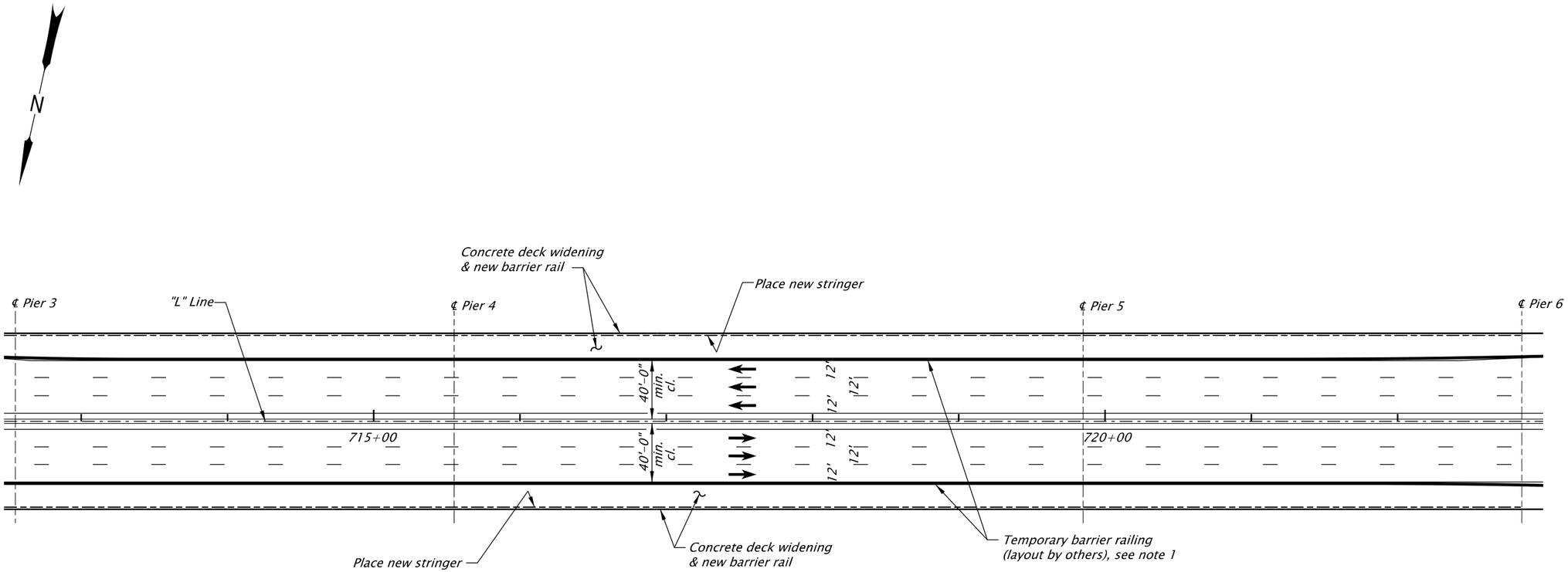

STAGE 1 CONSTRUCTION - SPANS 4 THRU 6

Scale: 1" = 80'

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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INFORMATION ONLY

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

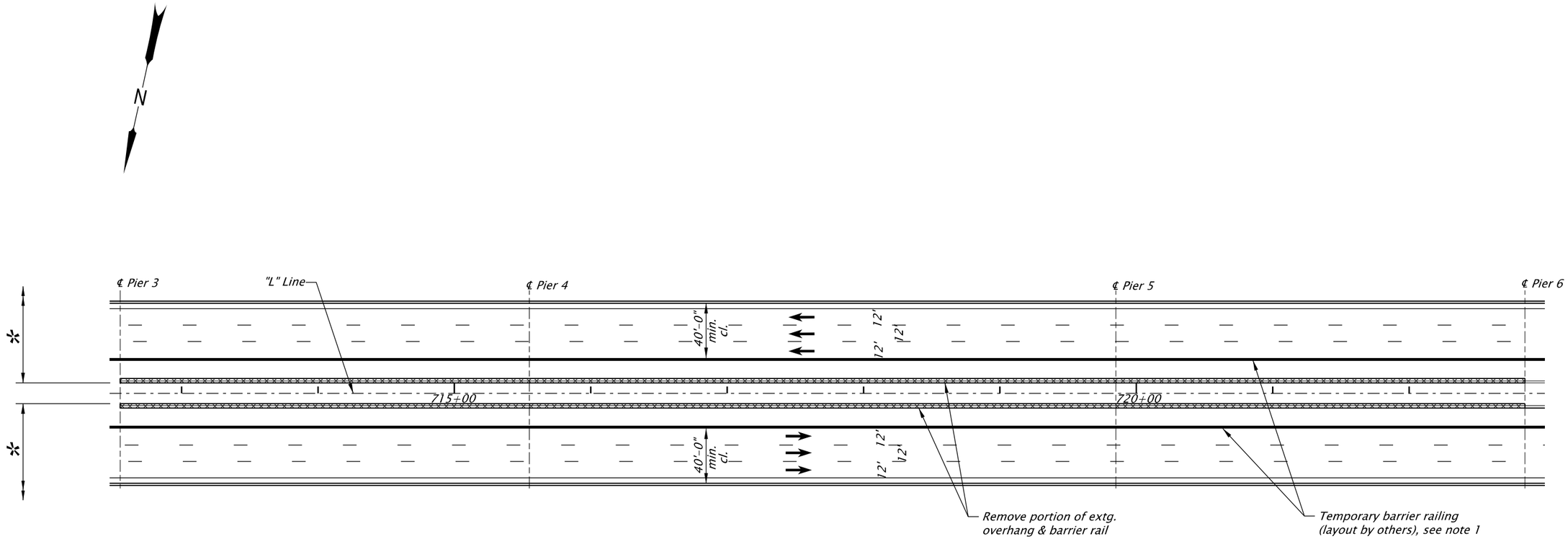
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 9

SHEET NO.



STAGE 2 MOVE BOX GIRDER AND DEMOLITION - SPANS 4 THRU 6

Scale: 1" = 80'

Legend:

Stage 2 – Remove portion of NB and SB deck

Move out box girder Spans 4, 5, & 6

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

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INFORMATION ONLY

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 10

SHEET NO.

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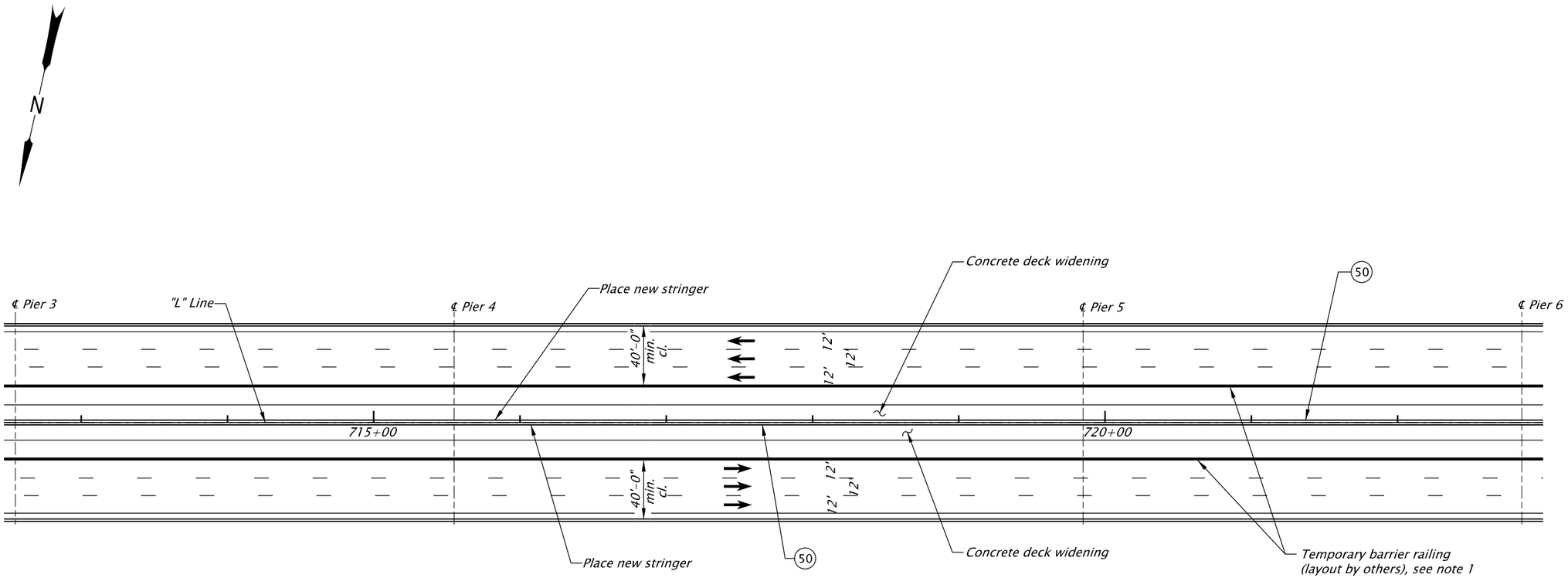

STAGE 2 CONSTRUCTION - SPANS 4 THRU 6

Scale: 1" = 80'

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

DETAIL REFERENCE NUMBERS:

(50) *Standard Concrete Bridge Rail, Type "F" 42 Inch, see dwg. BR290 for details.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
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DATE	MO/YR

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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

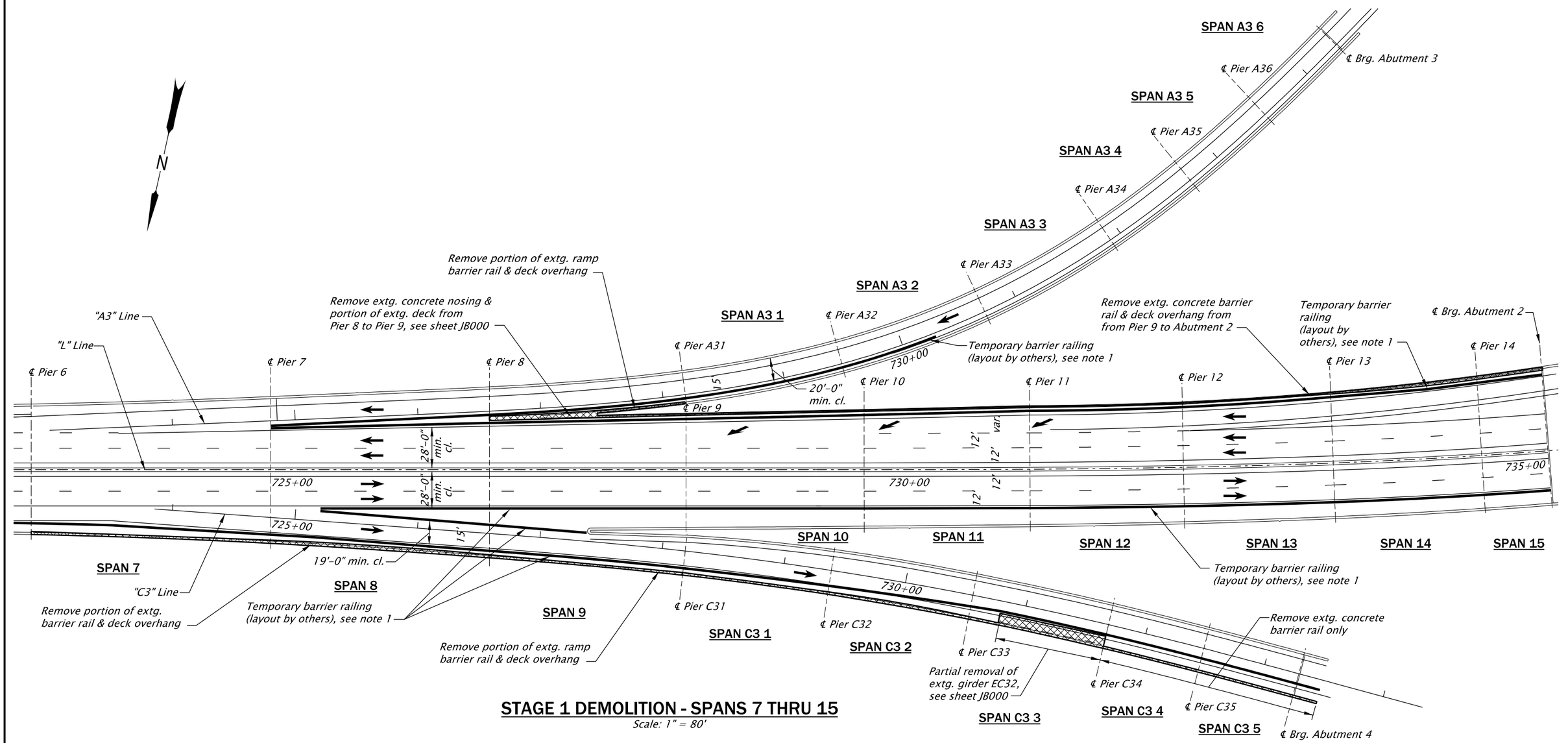
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 11

SHEET NO.



STAGE 1 DEMOLITION - SPANS 7 THRU 15

Scale: 1" = 80'

Legend:

Stage 1 - Remove portion of NB mainline deck and portion of NB On-Ramp deck

Notes:

1. Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

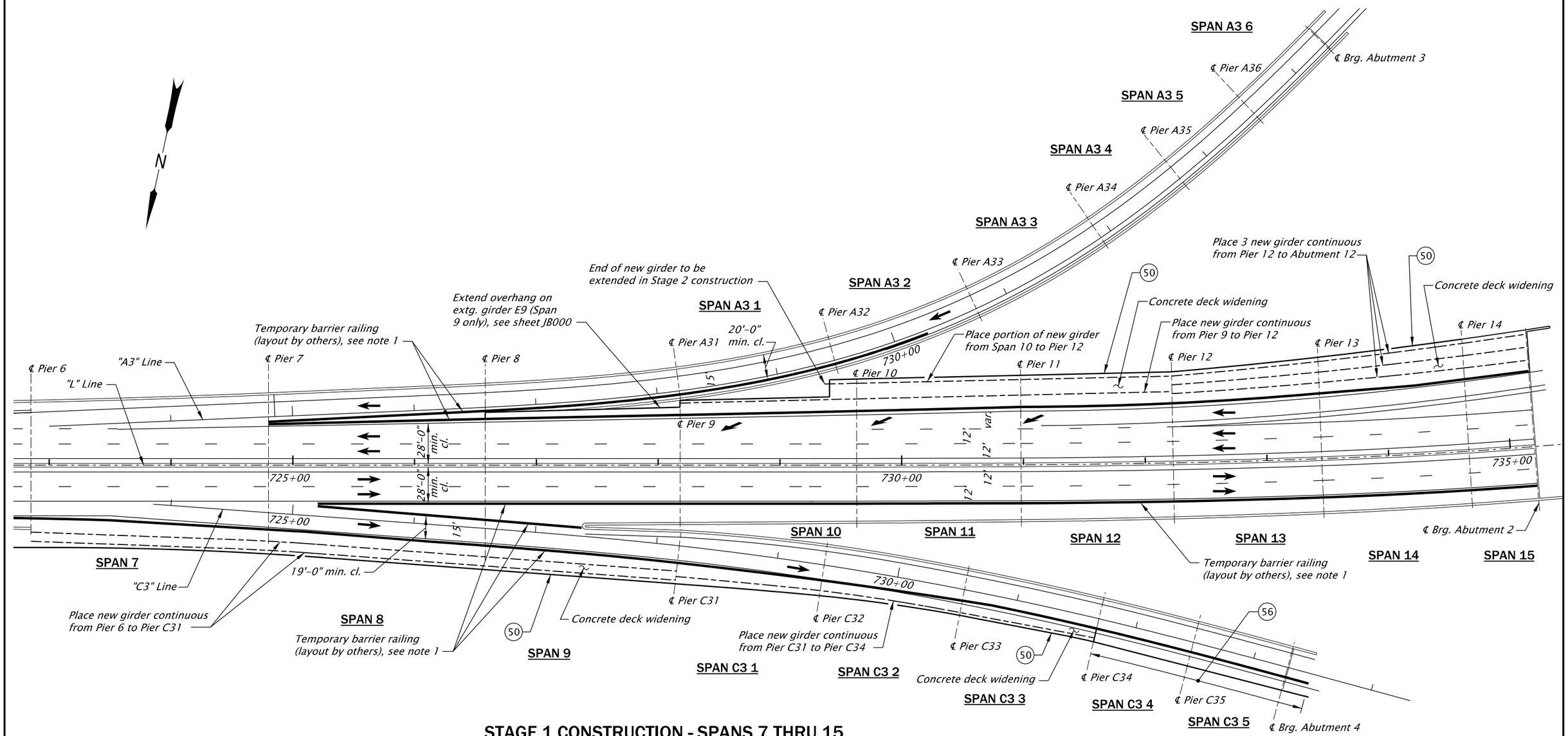
Designer: Carl Hughes | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 12

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



STAGE 1 CONSTRUCTION - SPANS 7 THRU 15

Scale: 1" = 80'

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

DETAIL REFERENCE NUMBERS:

(50) *Standard Concrete Bridge Rail, Type "F" 42 Inch, see dwg. BR290 for details.*

(56) *Type "F" Concrete Rail 42 Inch replacement, see dwg. BR290 and detail DET3280 for details.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

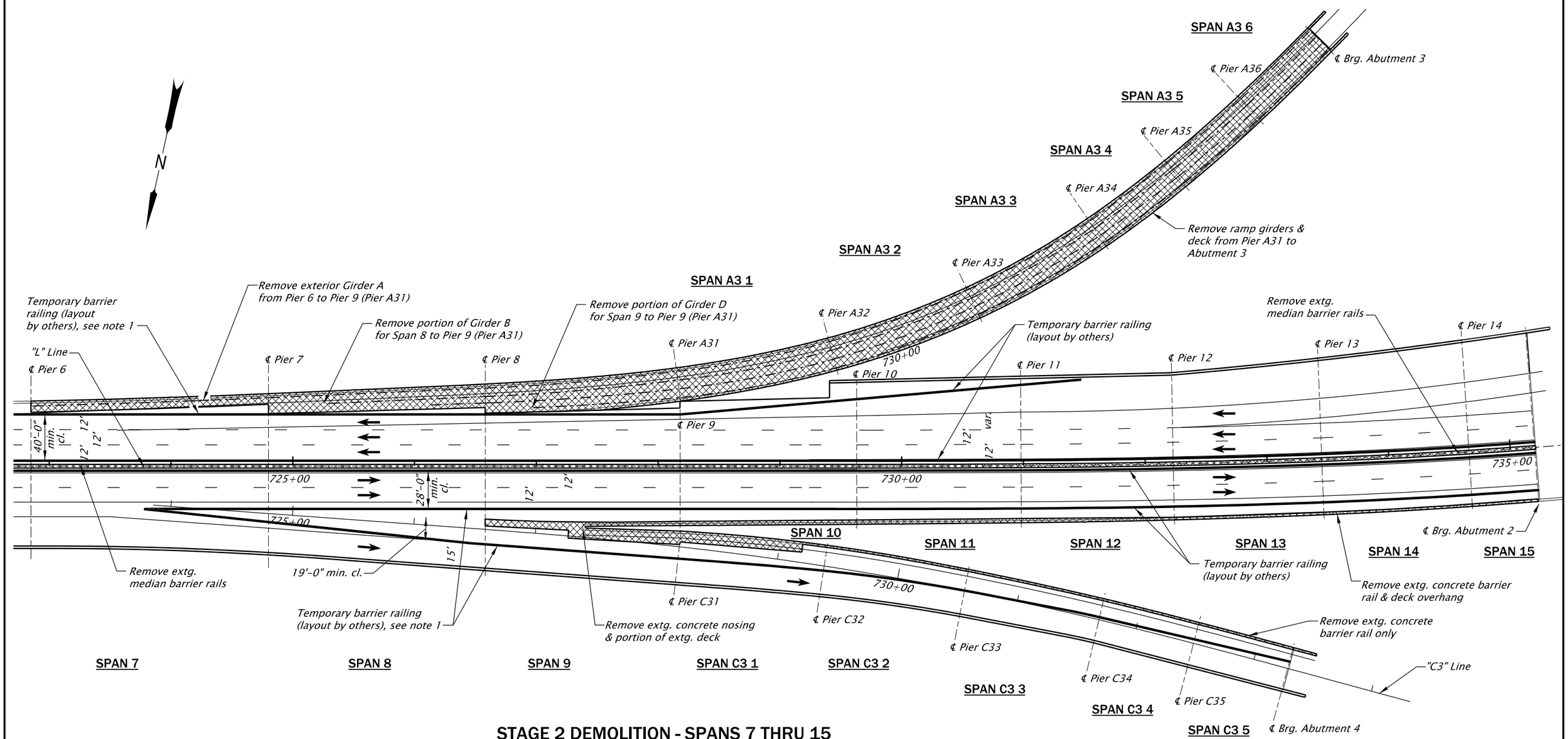
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 13

SHEET NO.



STAGE 2 DEMOLITION - SPANS 7 THRU 15

Scale: 1"= 80'

Legend:

Stage 2 – Remove NB On-Ramp Structure

Notes:

1. Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 14

SHEET NO.

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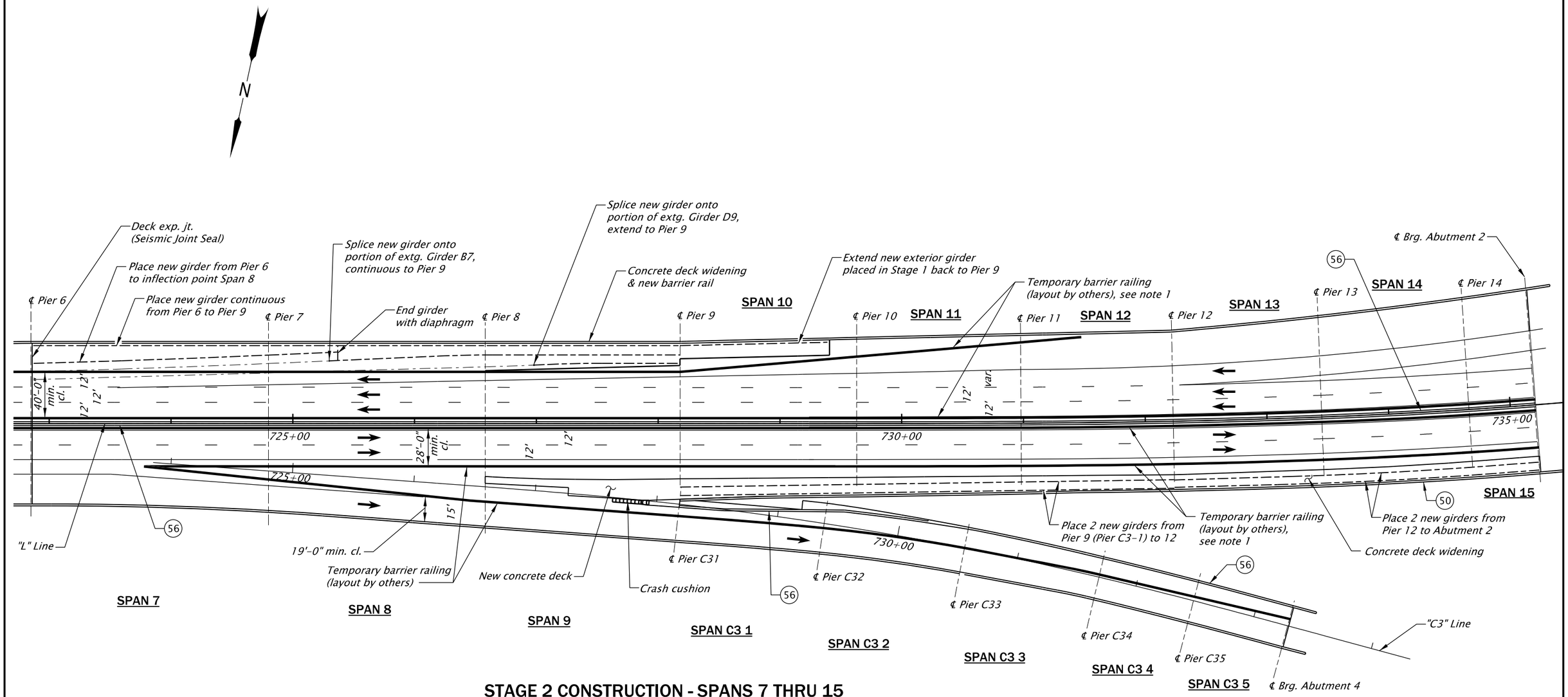

STAGE 2 CONSTRUCTION - SPANS 7 THRU 15

Scale: 1" = 80'

Notes:

1. *Precast concrete barrier anchored to bridge deck. Layout by others. See DET3295 and DET3296.*

DETAIL REFERENCE NUMBERS:

(50) *Standard Concrete Bridge Rail, Type "F" 42 Inch, see dwg. BR290 for details.*

(56) *Type "F" Concrete Rail 42 Inch replacement, see dwg. BR290 and detail DET3280 for details.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
STAGING PLAN - 15

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

BR_K21400_QEI_gcs_15.dgn :: Default 2/7/2020 4:51:44 PM CDONOVAN

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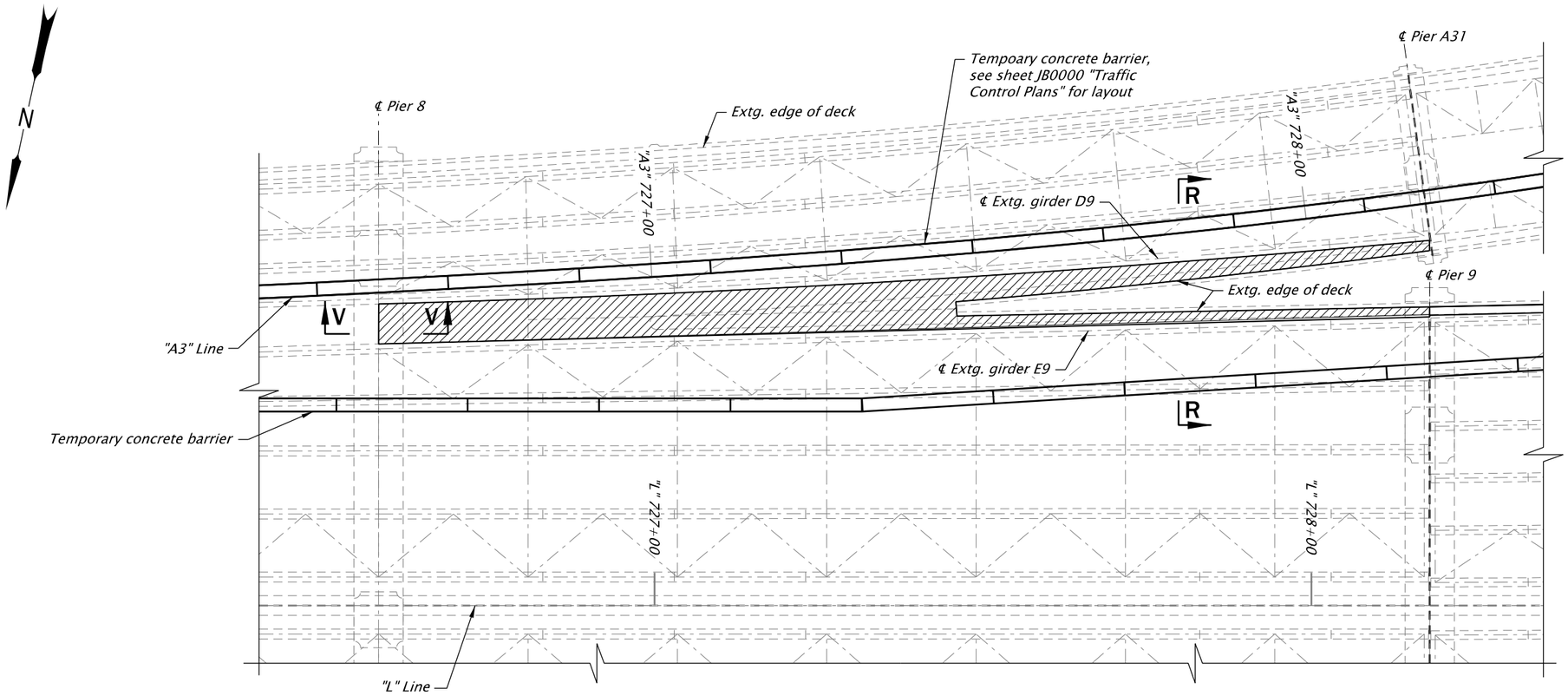
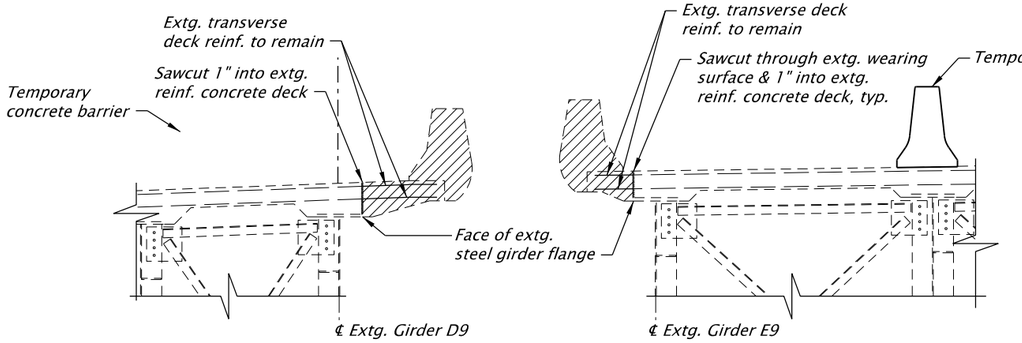


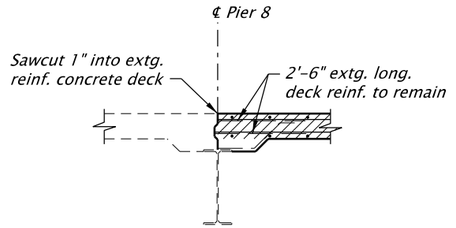
STAGE 1 DEMOLITION - SPAN 9

Scale: 1" = 20'



SECTION R-R

Scale: 1" = 5'



PART SECTION S-S

Scale: ¼" = 1'-0"

Note:

1. *Type "F" Concrete Rail , 42 Inch replacement. See dwg. BR290 and detail DET3280 for details.*
2. *For Section V-V, see sheet JB0000.*

Legend:

Stage 1 - Remove existing concrete barrier rail, barrier nosing, and bridge deck overhang

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

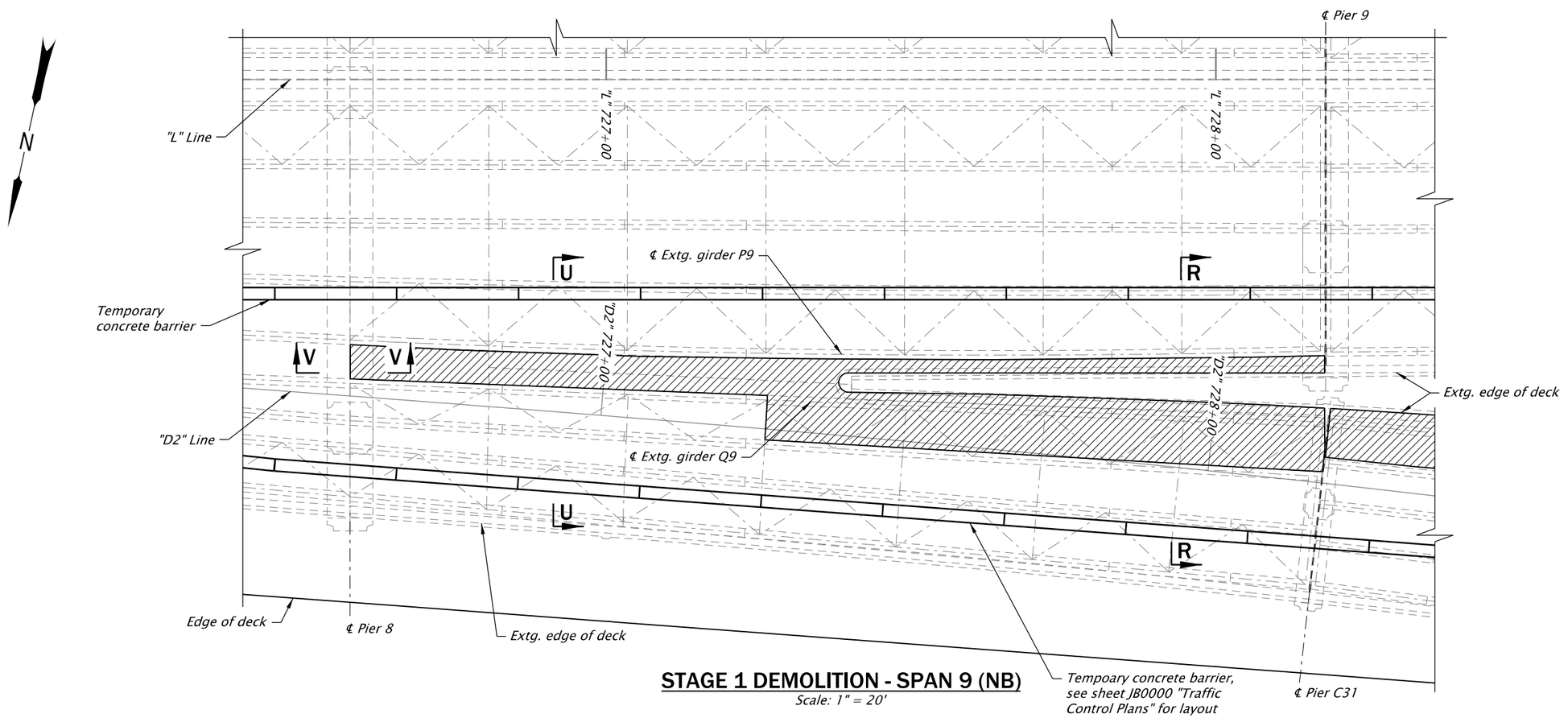
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL DECK REMOVAL SPAN 9 - 1

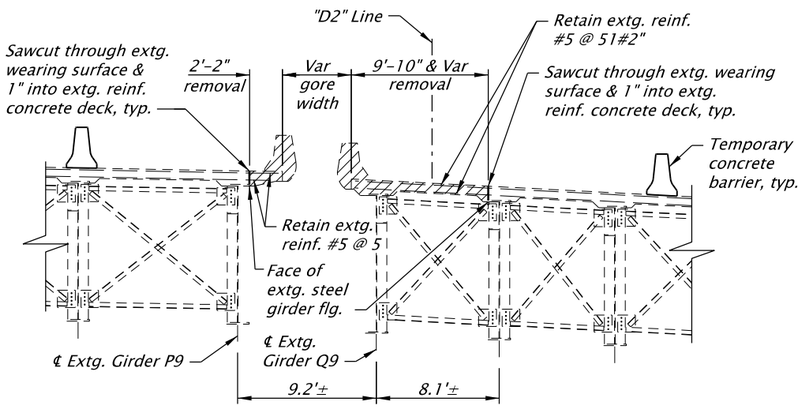
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



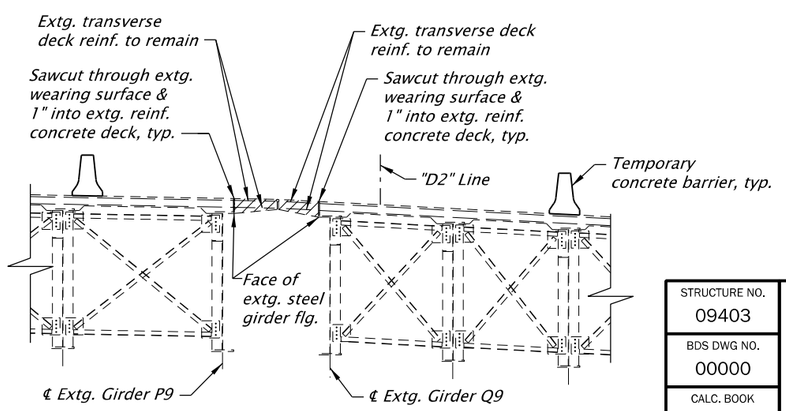
STAGE 1 DEMOLITION - SPAN 9 (NB)

Scale: 1" = 20'



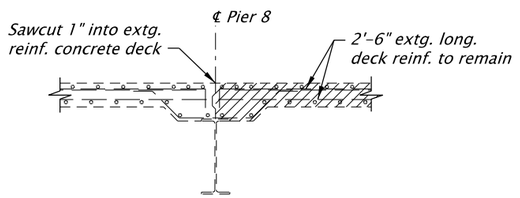
SECTION R-R

Scale: 1" = 10'



SECTION U-U

Scale: 1" = 10'



PART SECTION V-V

Scale: ¼" = 1'-0"

Legend:

Stage 1 – Remove existing concrete barrier rail, barrier nosing, bridge deck overhang, and bridge deck

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Rod Simmons | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL DECK REMOVAL SPAN 9 - 2

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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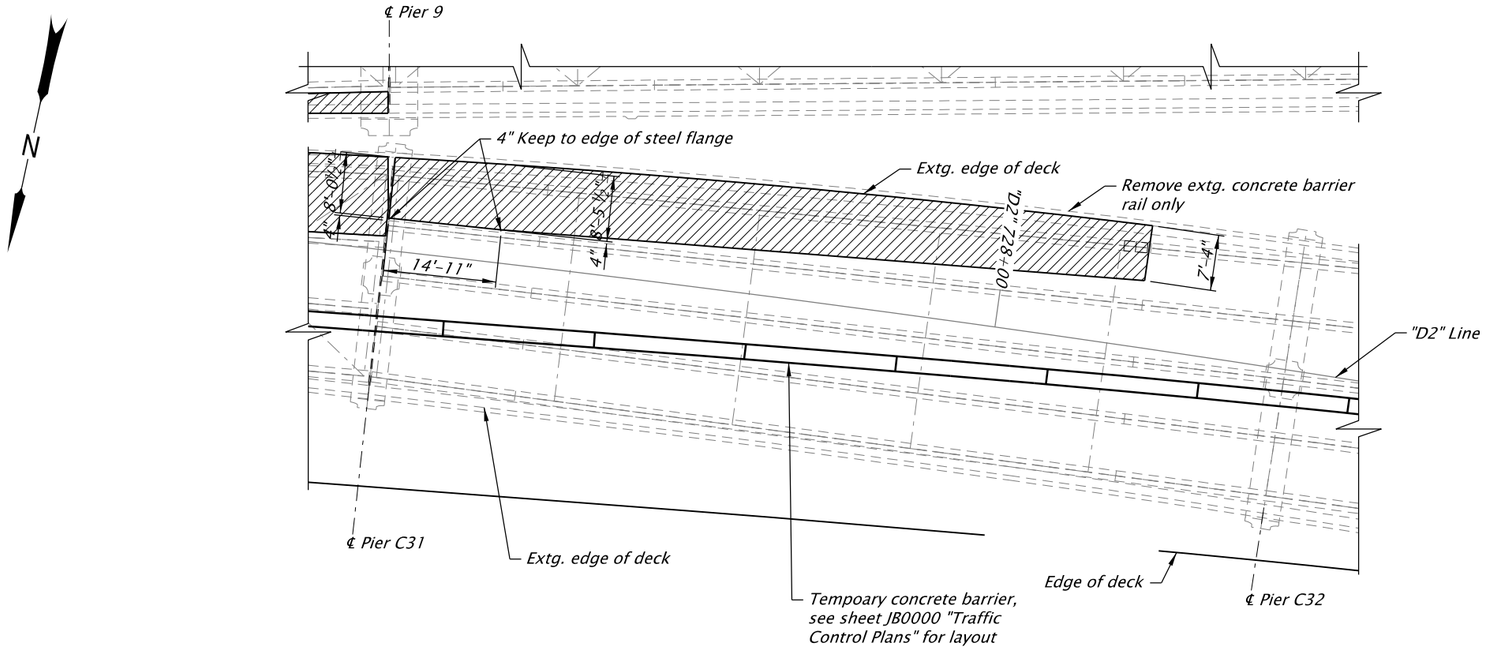

STAGE 1 DEMOLITION - SPAN C31

Scale: 1" = 20'

Legend:

Stage 1 – Remove existing concrete barrier rail, barrier nosing, bridge deck overhang, and bridge deck

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

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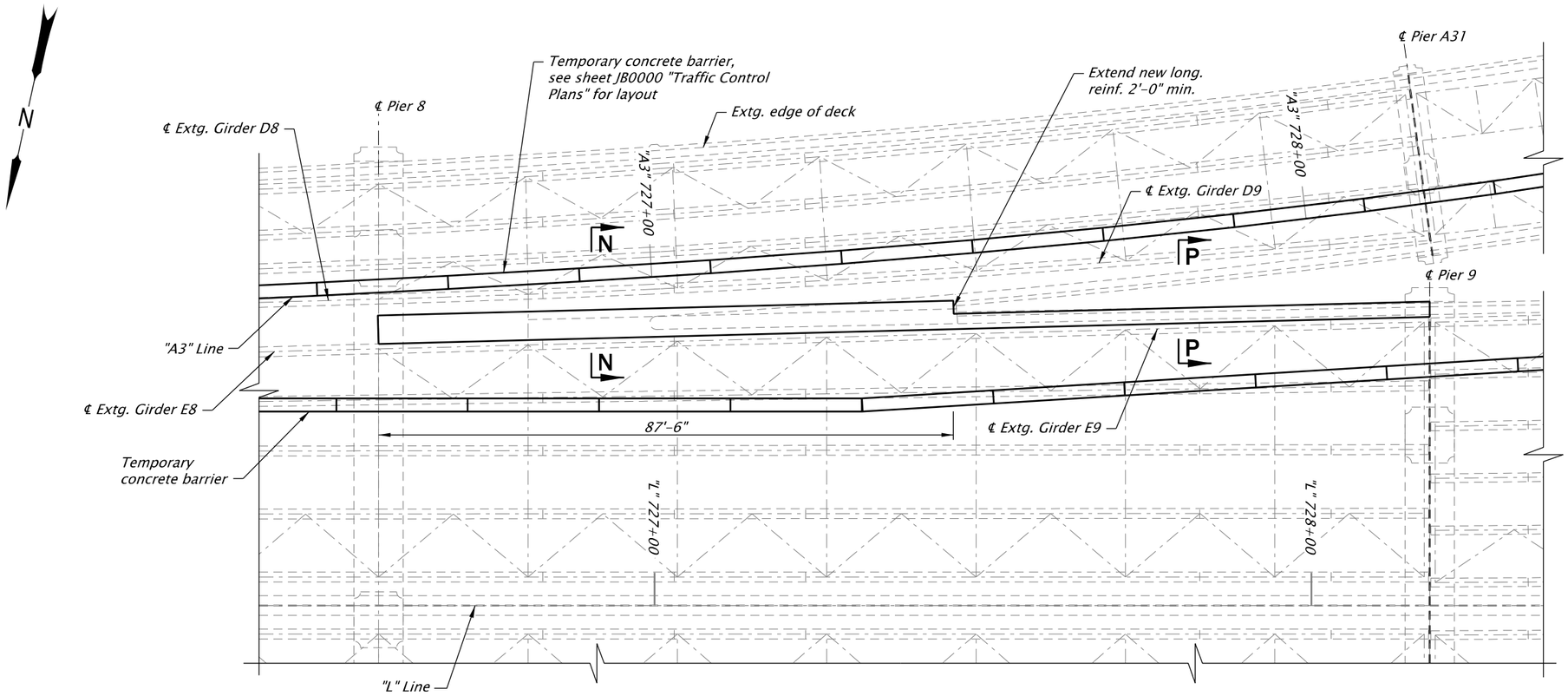
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Rod Simmons | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

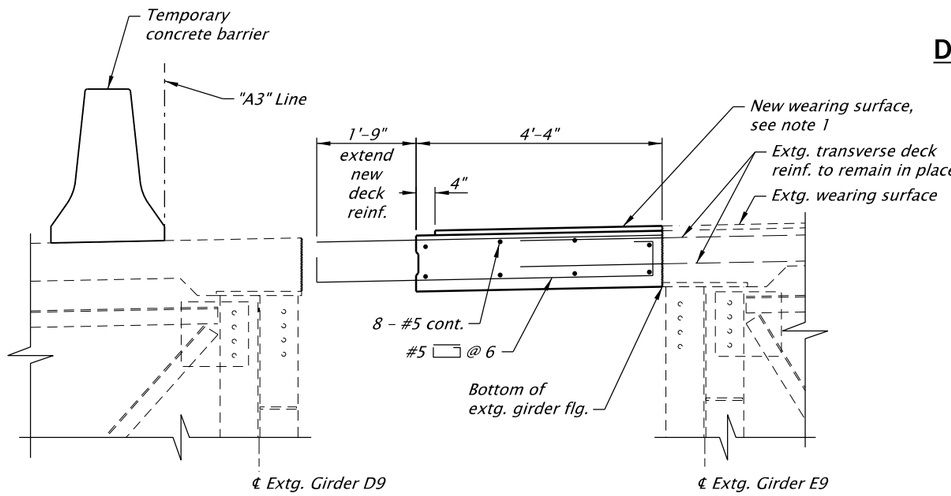
WIDENING AND SEISMIC RETROFIT
PARTIAL DECK REMOVAL SPAN C31

SHEET NO.



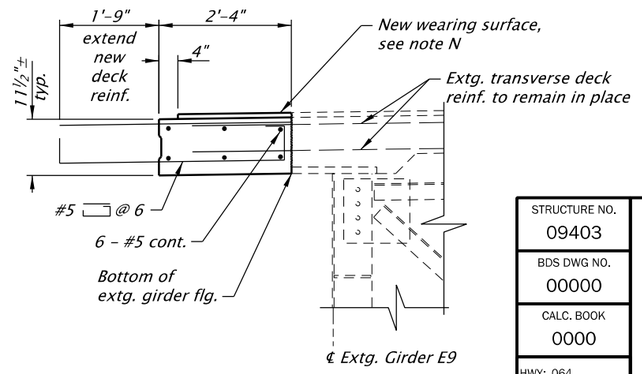
DECK CONSTRUCTION - SPAN 9

Scale: 1" = 20'



SECTION N-N

Scale: 3/8" = 1'-0"



SECTION P-P

Scale: 3/8" = 1'-0"

Note:
1. New wearing surface to match grade and cross-slope of existing wearing surface.

STRUCTURE NO.	09403
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COUNTY	Clackamas
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SCALE WARNING
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL DECK CONSTRUCTION SPAN 9 - 1

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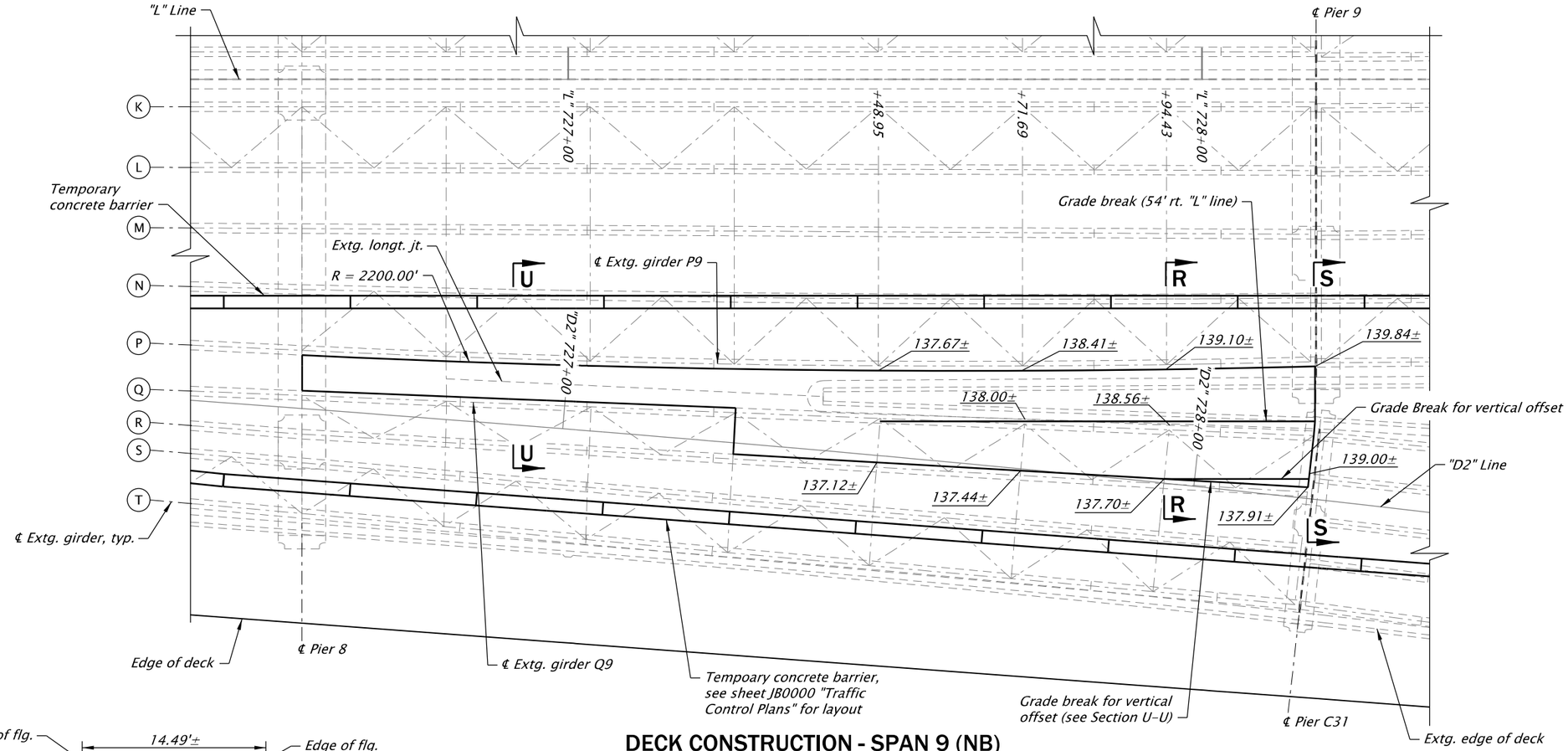
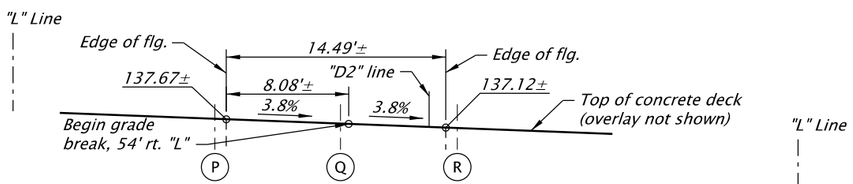
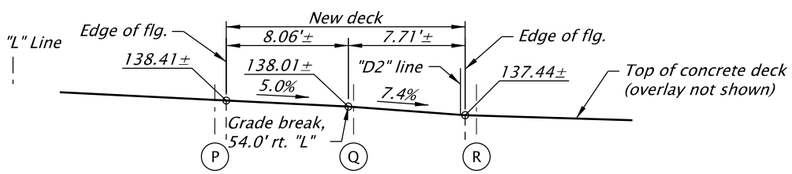
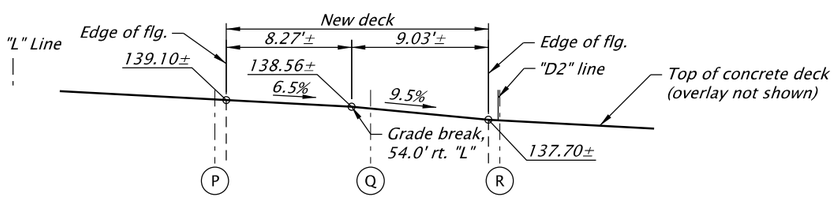




CROSS-SLOPE STA. 727+48.95



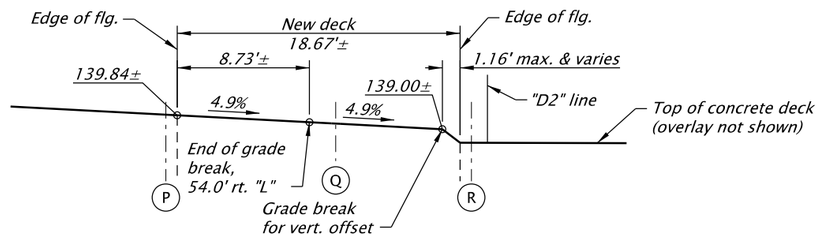
CROSS-SLOPE STA. 727+71.69



CROSS-SLOPE STA. 727+94.43

DECK CONSTRUCTION - SPAN 9 (NB)

Scale: 1" = 20'



CROSS-SLOPE STA. 728+18.00±

(Along end of deck)

Note:
Existing deck elevations are approximate based on As-Builts. The Contractor shall survey the deck at the points shown and establish the exact elevations. The grade break elevations shown shall then be adjusted by the exact difference between the shown elevations and the surveyed elevations in order to maintain the cross slopes indicated by the shown elevations.

STRUCTURE NO.	09403
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HWY: 064 M.P.: 9.03	
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SCALE WARNING

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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Rod Simmons | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL DECK CONSTRUCTION SPAN 9 - 2

SHEET NO.

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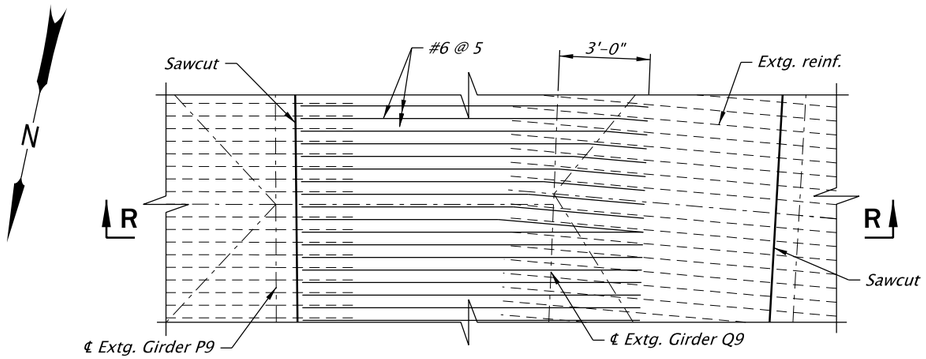
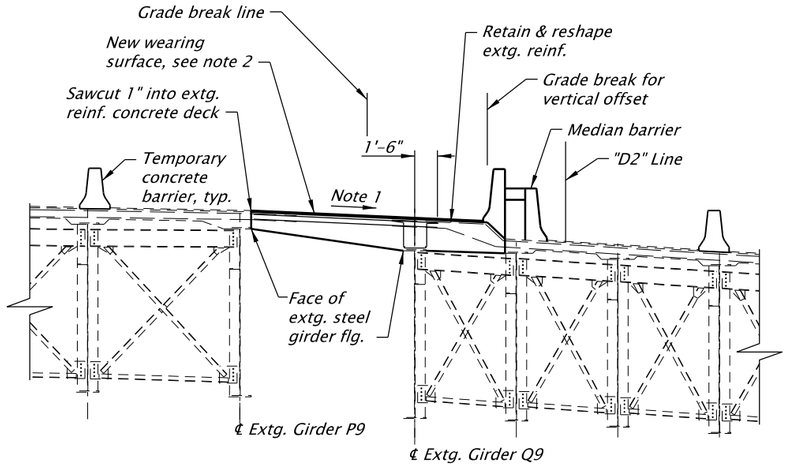
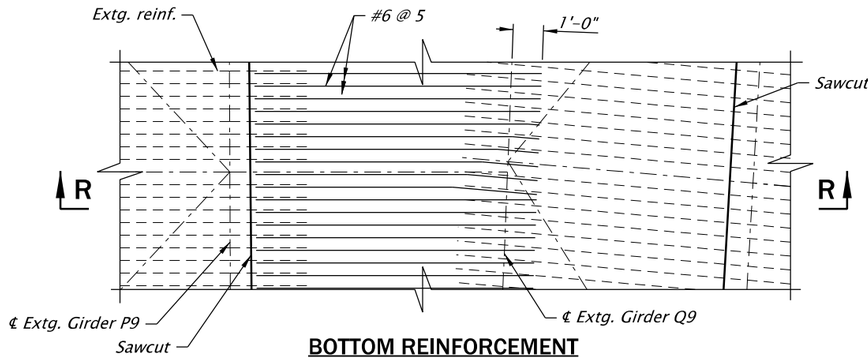


TOP REINFORCEMENT



SECTION S-S

Scale: 1" = 10'

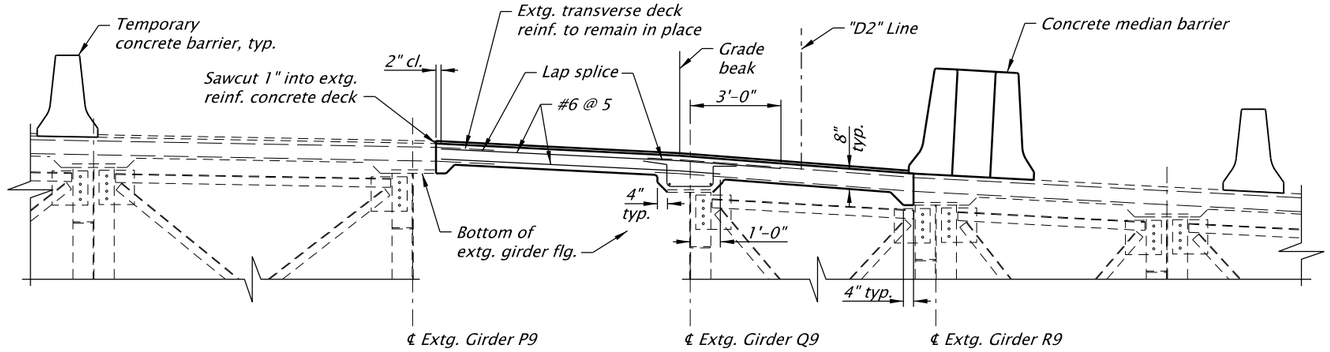


BOTTOM REINFORCEMENT

Note:
Bend reinforcement as required to avoid vertical overlapping with exiting bars

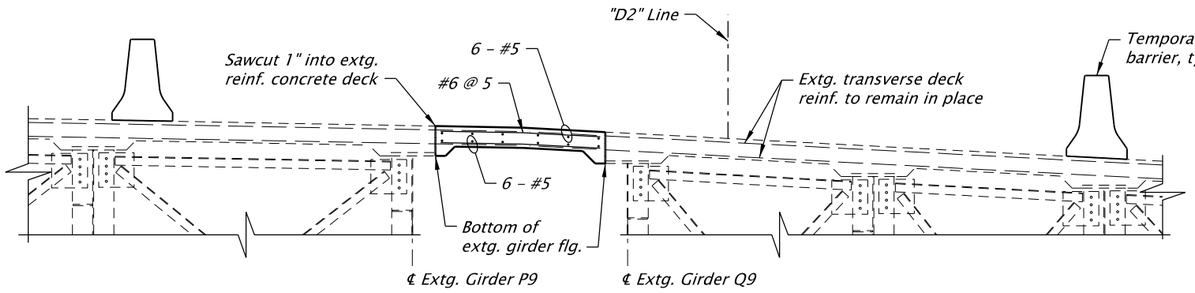
SPAN 9 - PLAN

Scale: 1" = 5'



SECTION R-R - CONSTRUCTION

Scale: 1" = 5'



SECTION U-U

Scale: 1" = 5'

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
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DATE: X/XX/'20
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Rod Simmons | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL DECK CONSTRUCTION SPAN 9 - 3

SHEET NO.

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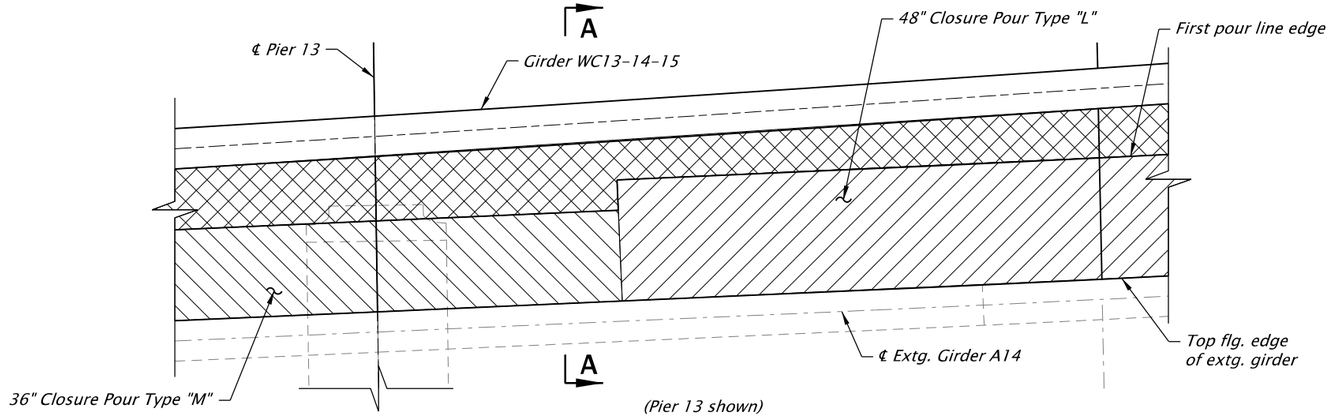
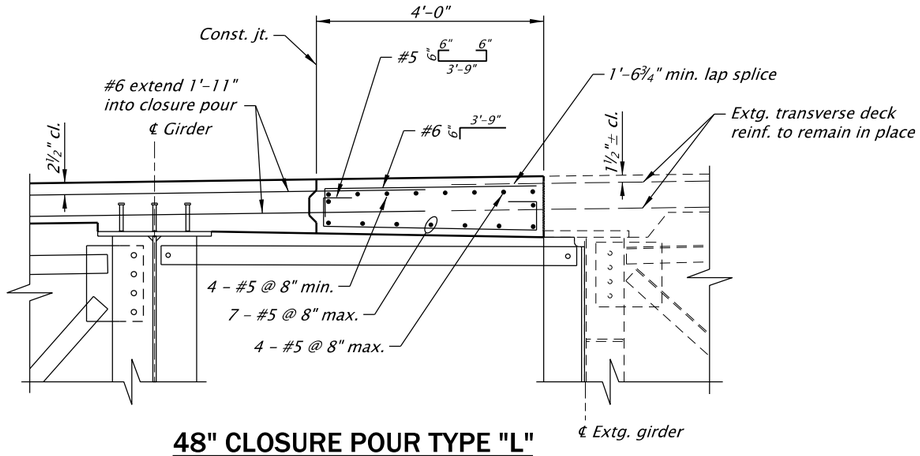


(Pier 13 shown)

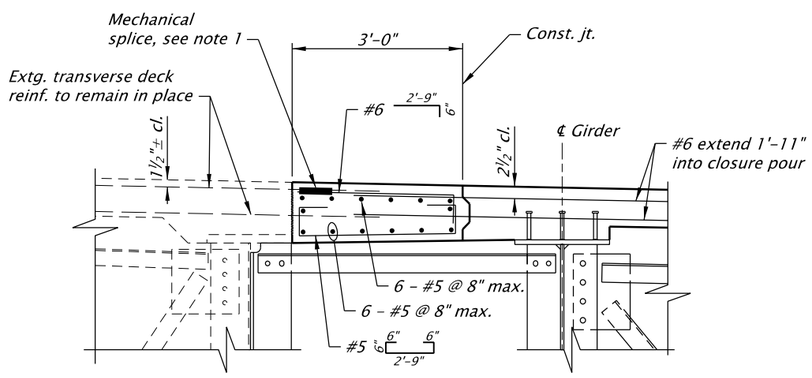
CLOSURE POUR TRANSITION

Scale: 1" = 50'



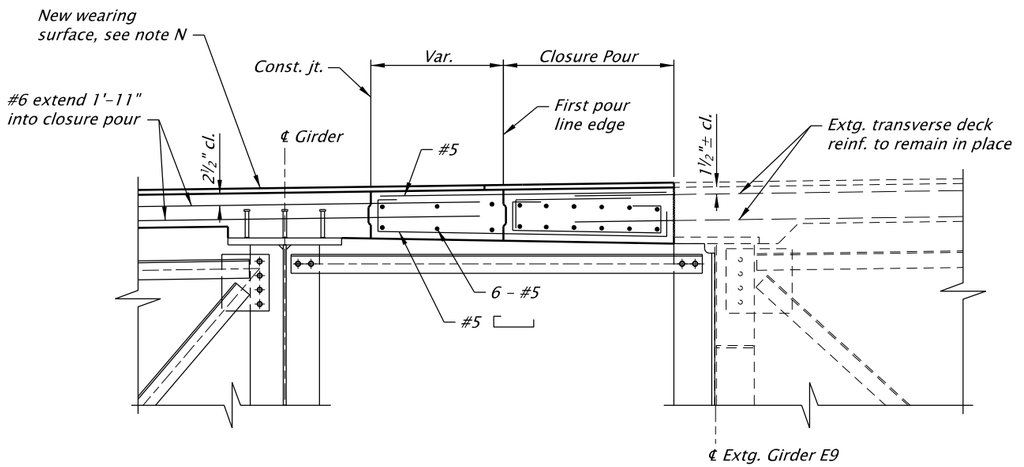
48" CLOSURE POUR TYPE "L"

Scale: ⅜" = 1'-0"



36" CLOSURE POUR TYPE "M"

Scale: ⅜" = 1'-0"



SECTION A-A

Scale: ⅜" = 1'-0"

Note:
1. 7" mechanical service splice allows 6" gap adjacent. Provide 1" minimum clearance over mechanical splice.

STRUCTURE NO.	09403
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

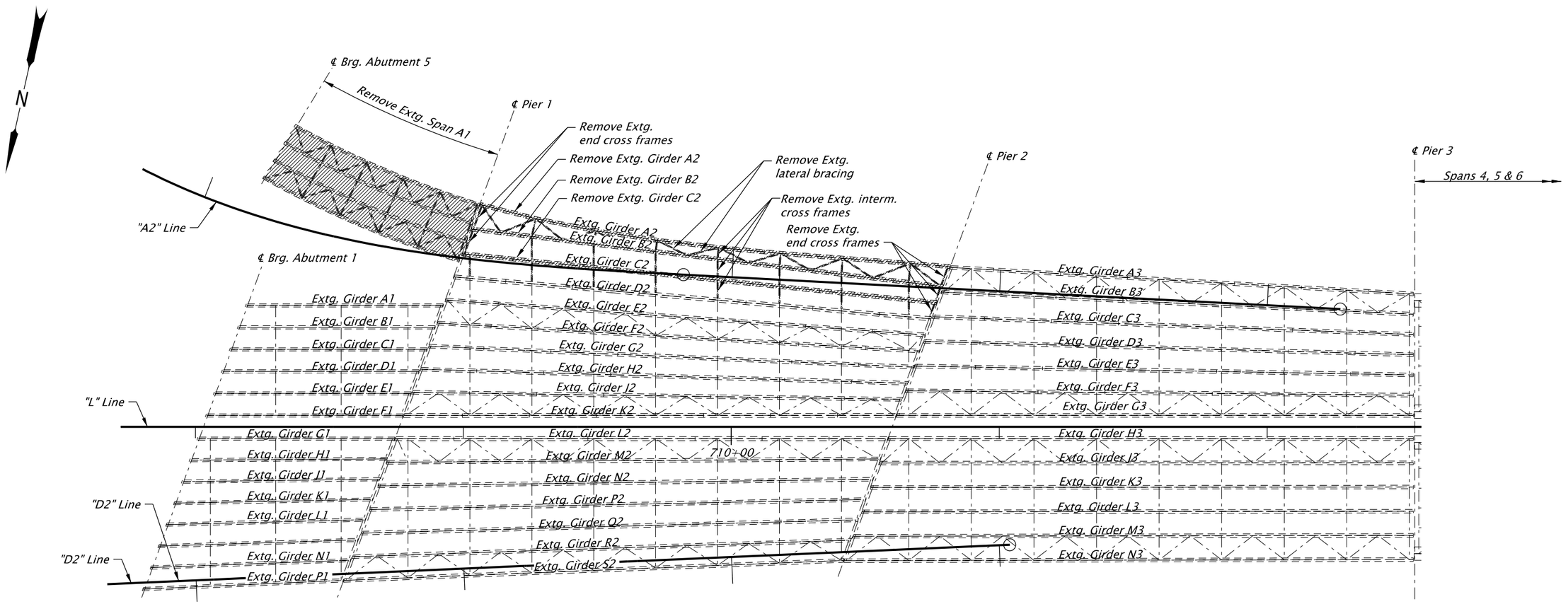
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
CLOSURE POUR DETAILS

SHEET NO.



FRAMING PLAN

Scale: 1" = 40'

Legend:

Partial bridge removal

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING

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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL REMOVAL FRAMING PLAN SPANS 1 thru 3

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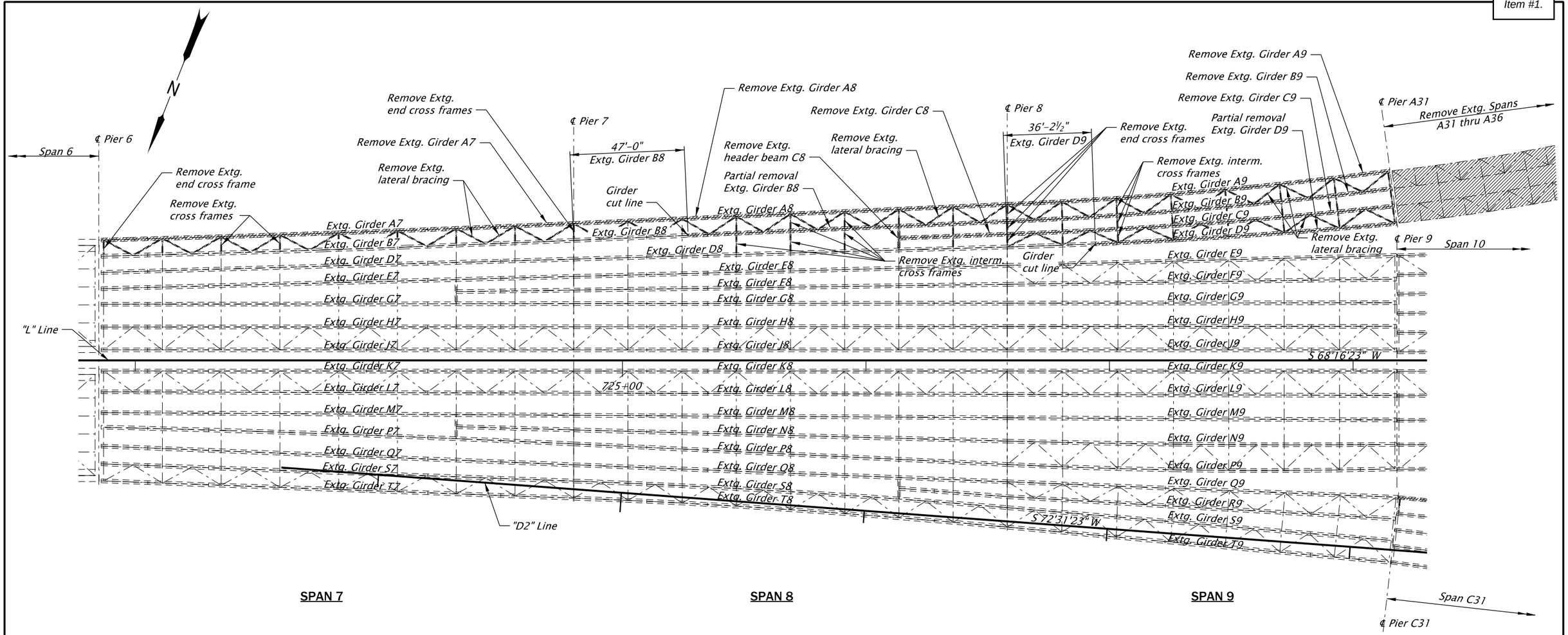

FRAMING PLAN

Scale: 1" = 40'

Legend:

Partial bridge removal

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL REMOVAL FRAMING PLAN SPANS 7 thru 9

SHEET NO.

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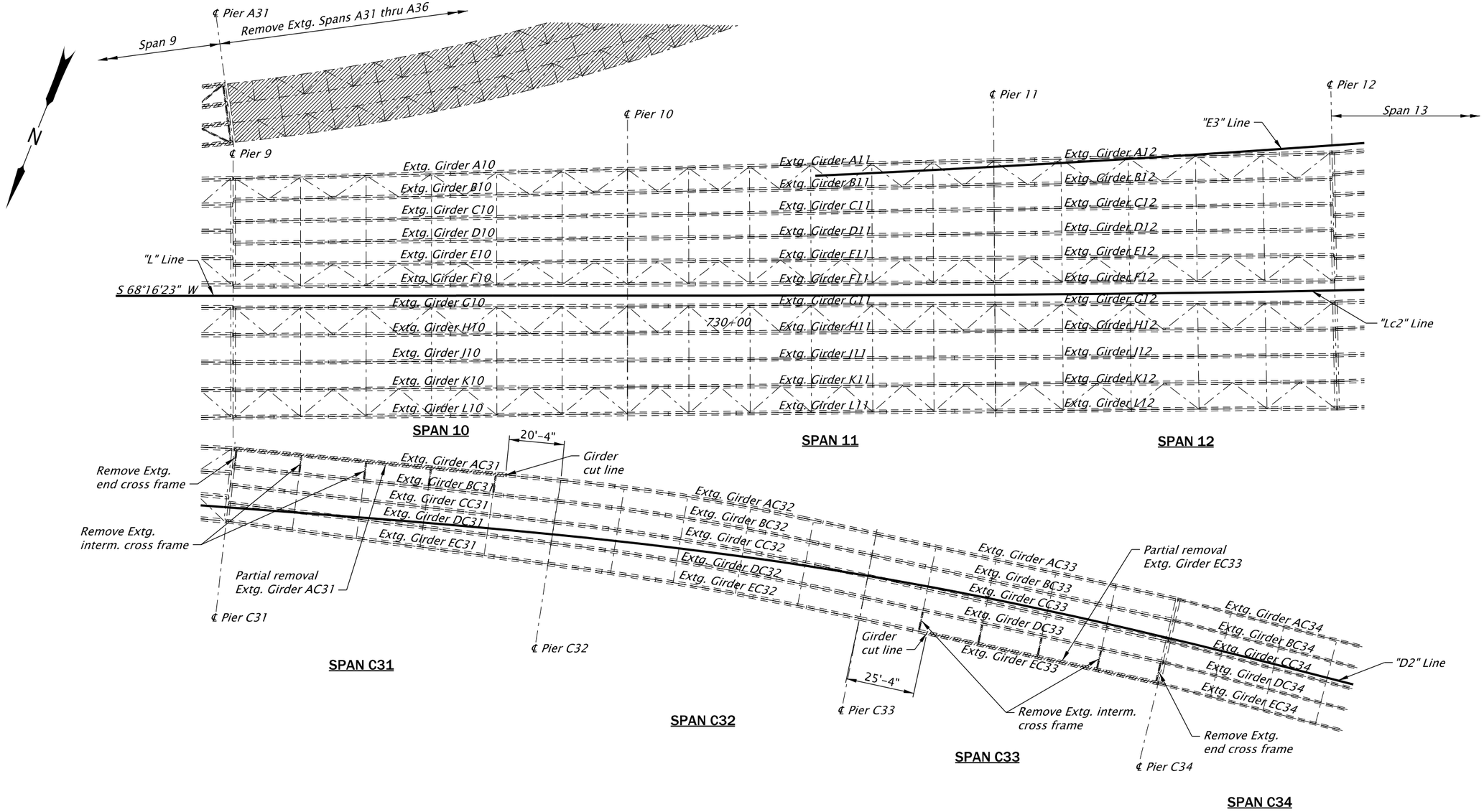

FRAMING PLAN

Scale: 1" = 40'

Legend:

Partial bridge removal

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PARTIAL REMOVAL FRAMING PLAN SPANS C31 thru C

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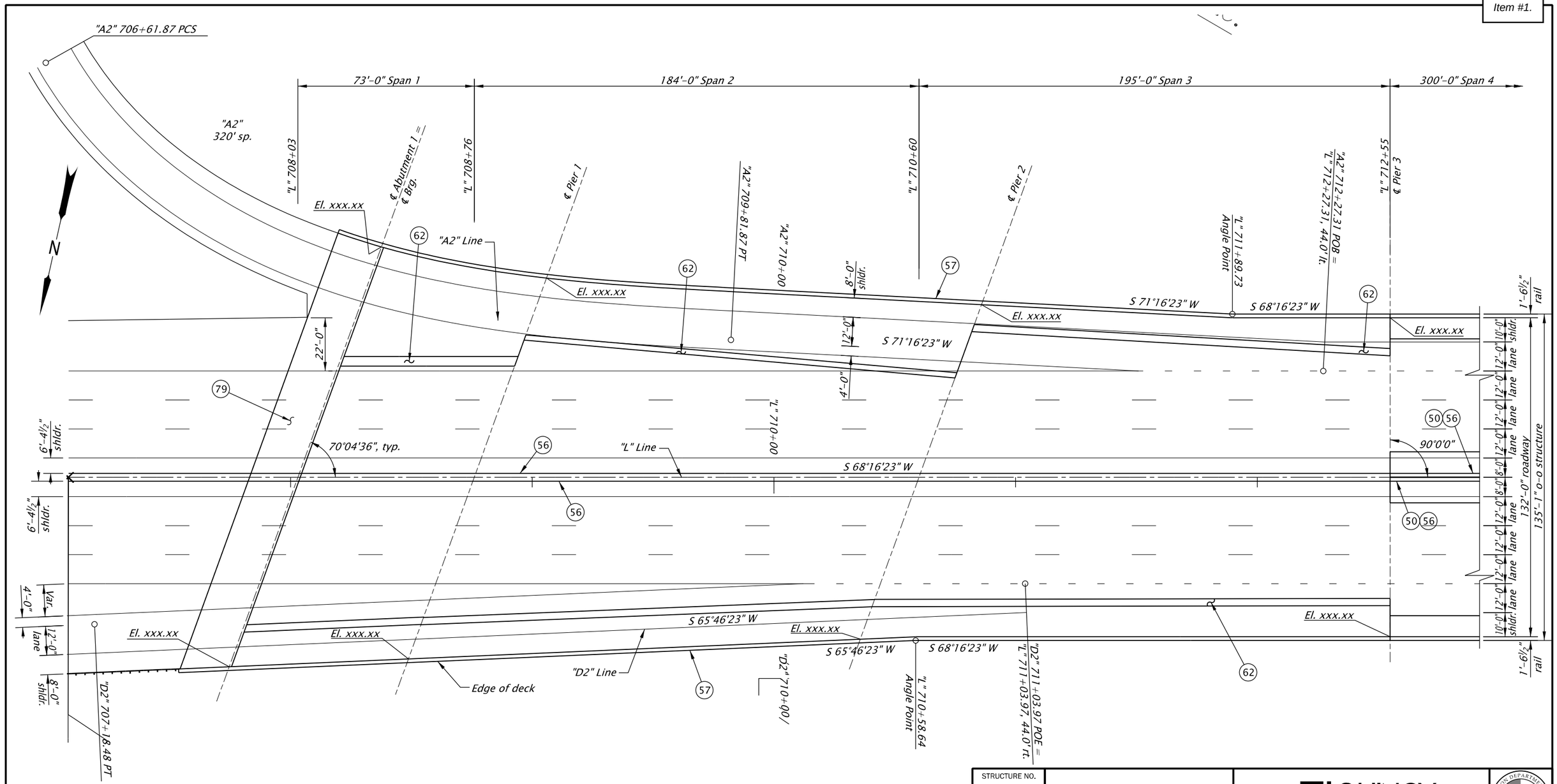

DECK PLAN - SPAN 1, 2 & 3

Scale: 1" = 40'

DETAIL REFERENCE NUMBERS:

(50) *Type "F" Concrete Rail, see dwg. BR200 for details*

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(62) *Concrete Closure Pour, see dwg. JB000 for details.*

(79) *Standard Bridge End Panel at bridge ends, see dwg. BR165.*

SCALE WARNING

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT

DECK PLAN SPANS 1 thru 3

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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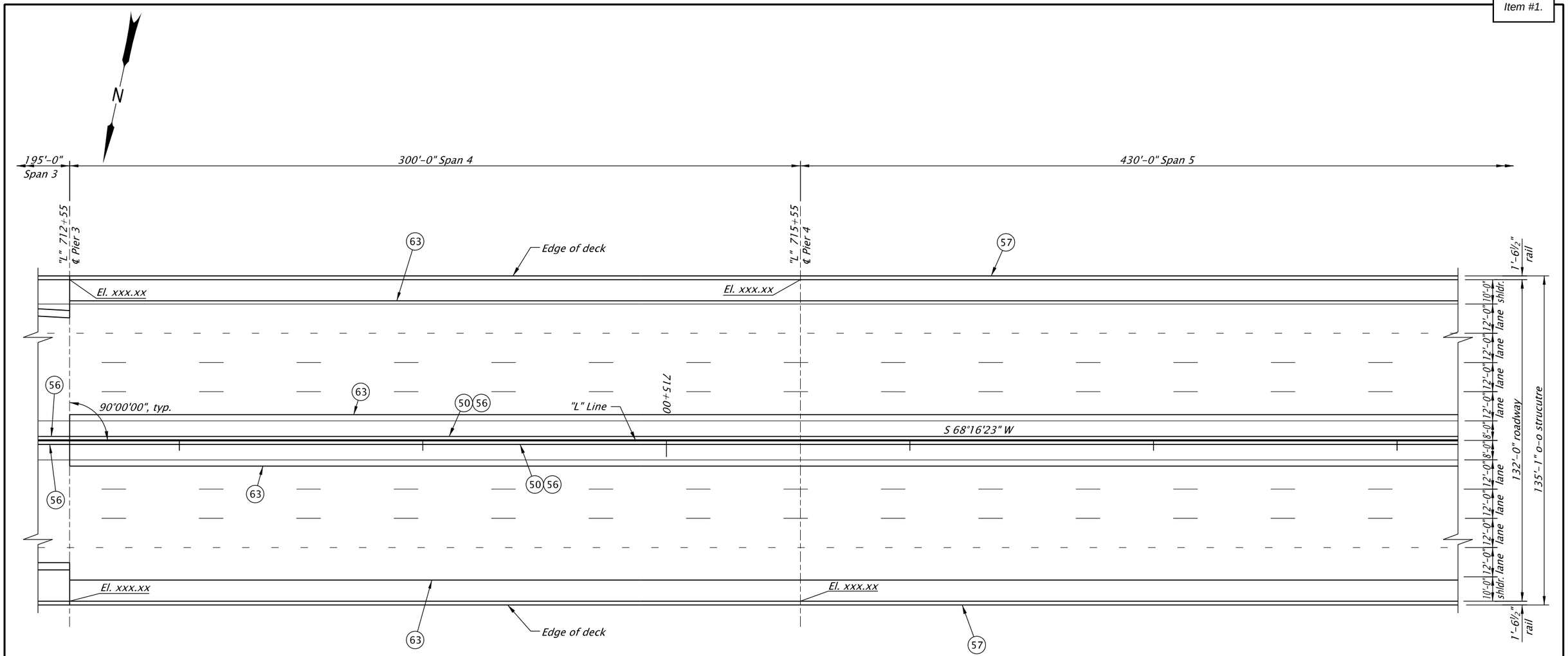

DECK PLAN - SPAN 4 & 5

Scale: 1" = 40'

DETAIL REFERENCE NUMBERS:

(50) *Type "F" Concrete Rail, see dwg. BR200 for details*

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(63) *Deck Joints, see dwg. JB000 for details*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

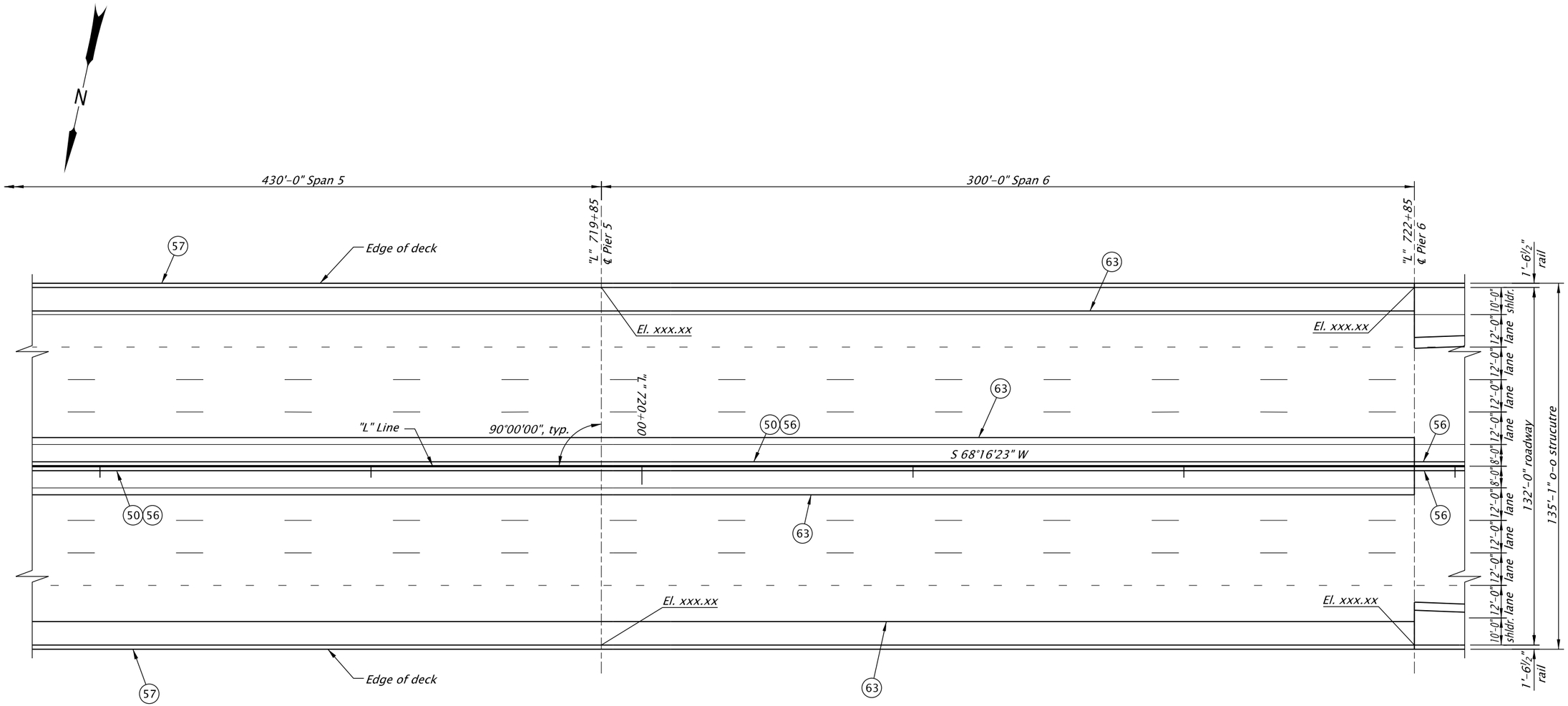
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
DECK PLAN SPANS 4 & 5

SHEET NO.



DECK PLAN - SPAN 5 & 6

Scale: 1" = 40'

DETAIL REFERENCE NUMBERS:

(50) *Type "F" Concrete Rail, see dwg. BR200 for details*

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(63) *Deck Joints, see dwg. JB000 for details.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
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HWY: 064 M.P.: 9.03	
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

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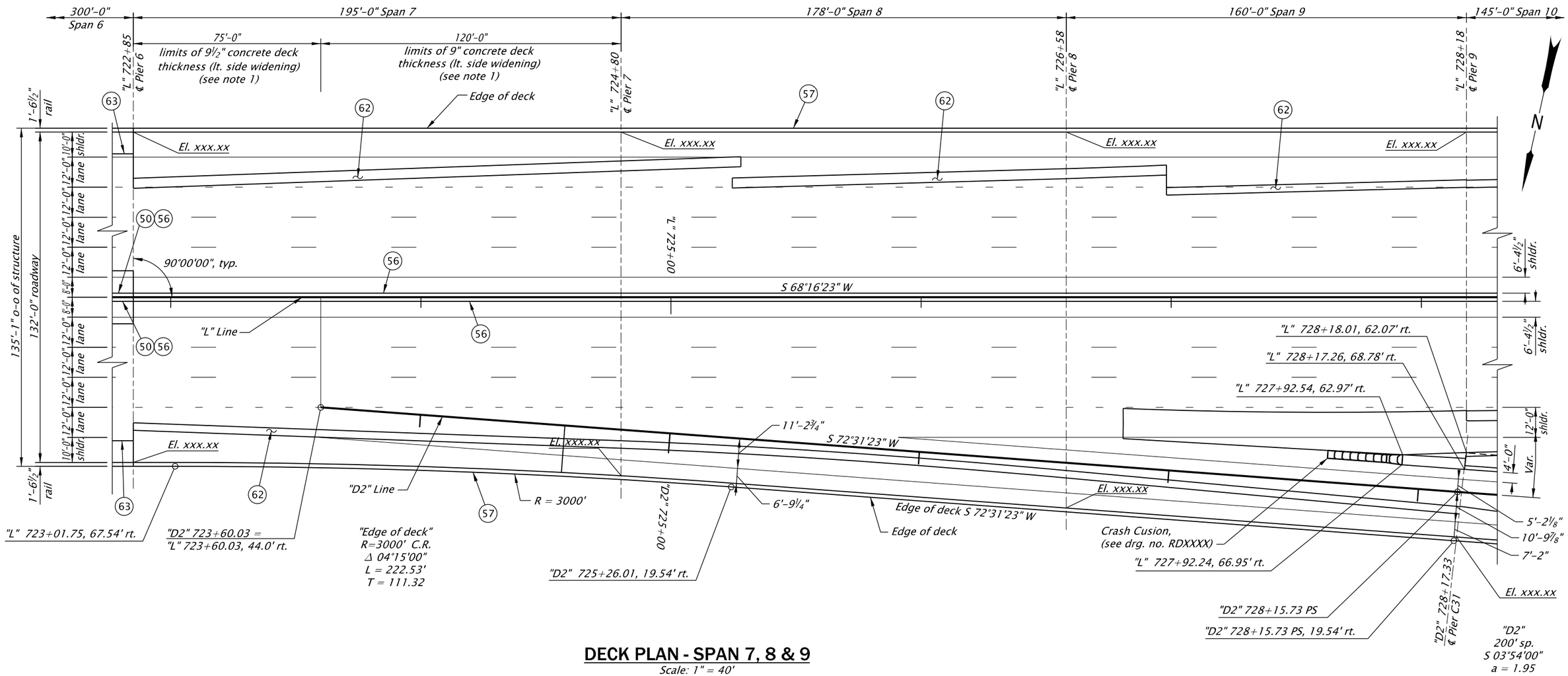
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
DECK PLAN SPANS 5 & 6

SHEET NO.



DECK PLAN - SPAN 7, 8 & 9

Scale: 1" = 40'

Notes:

1. See "Typical Section Span 7" sheet JB0000 for details.

DETAIL REFERENCE NUMBERS:

(50) Type "F" Concrete Rail, see dwg. BR200 for details

(56) Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details

(57) Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details

(62) Concrete Closure Pour, see dwg. JB000 for details.

(63) Deck Joint, see dwg. JB000 for details.

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
DECK PLAN SPANS 7 thru 9

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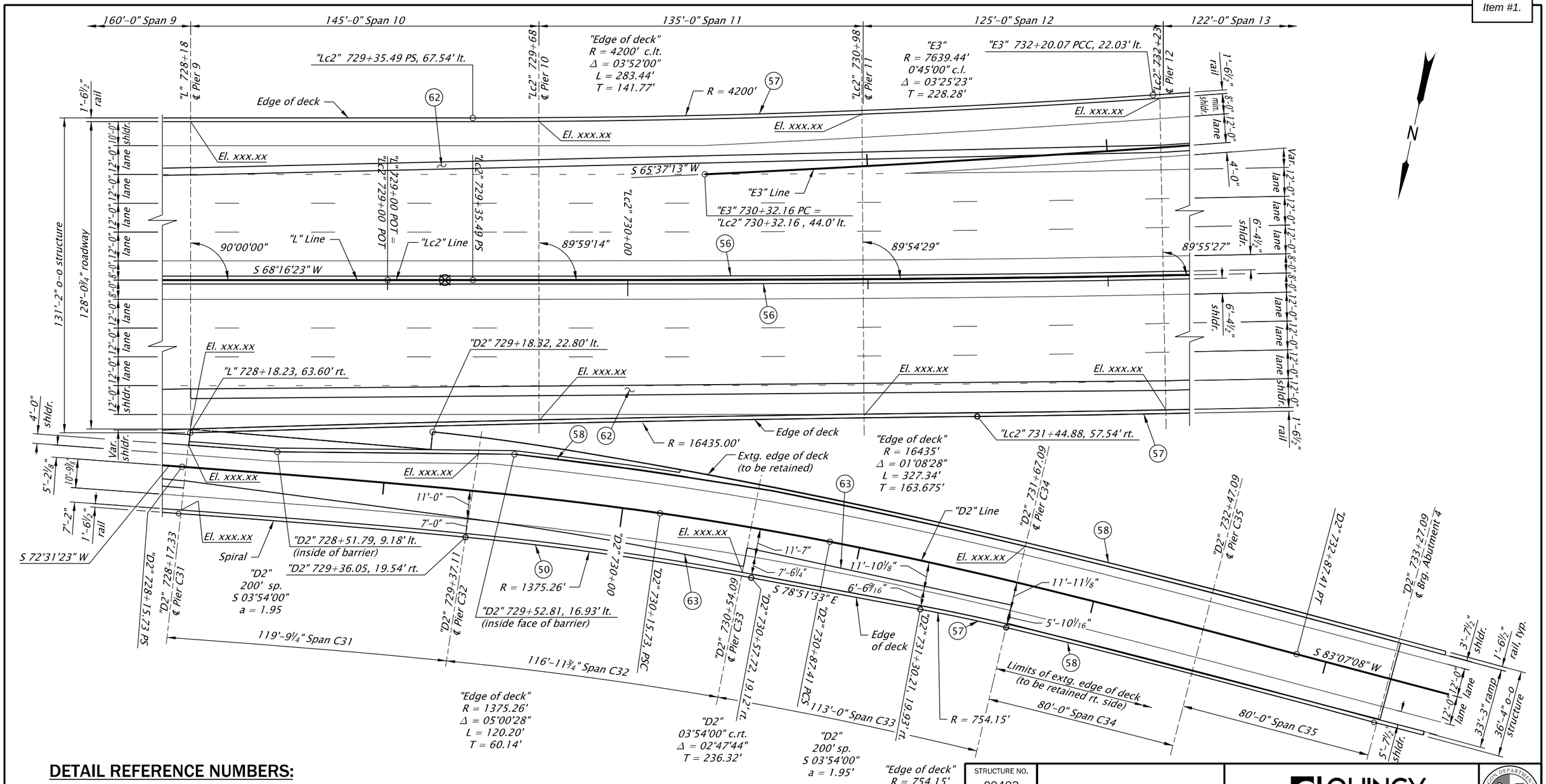

DETAIL REFERENCE NUMBERS:

(50) *Type "F" Concrete Rail, see dwg. BR200 for details*

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(58) *Type "F" Concrete Rail Replacement of Existing Parpet Rail, see detail DET3280 and dwg. BR290 for details*

(62) *Concrete Closure Pour, see dwg. JB000 for details.*

(63) *Deck Joint, see dwg. JB000 for details.*

DECK PLAN - SPAN 10, 11 & 12

Scale: 1" = 40'

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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QUINCY ENGINEERING

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
DECK PLAN SPANS 10 thru 12 & C31 thru C34

SHEET NO.

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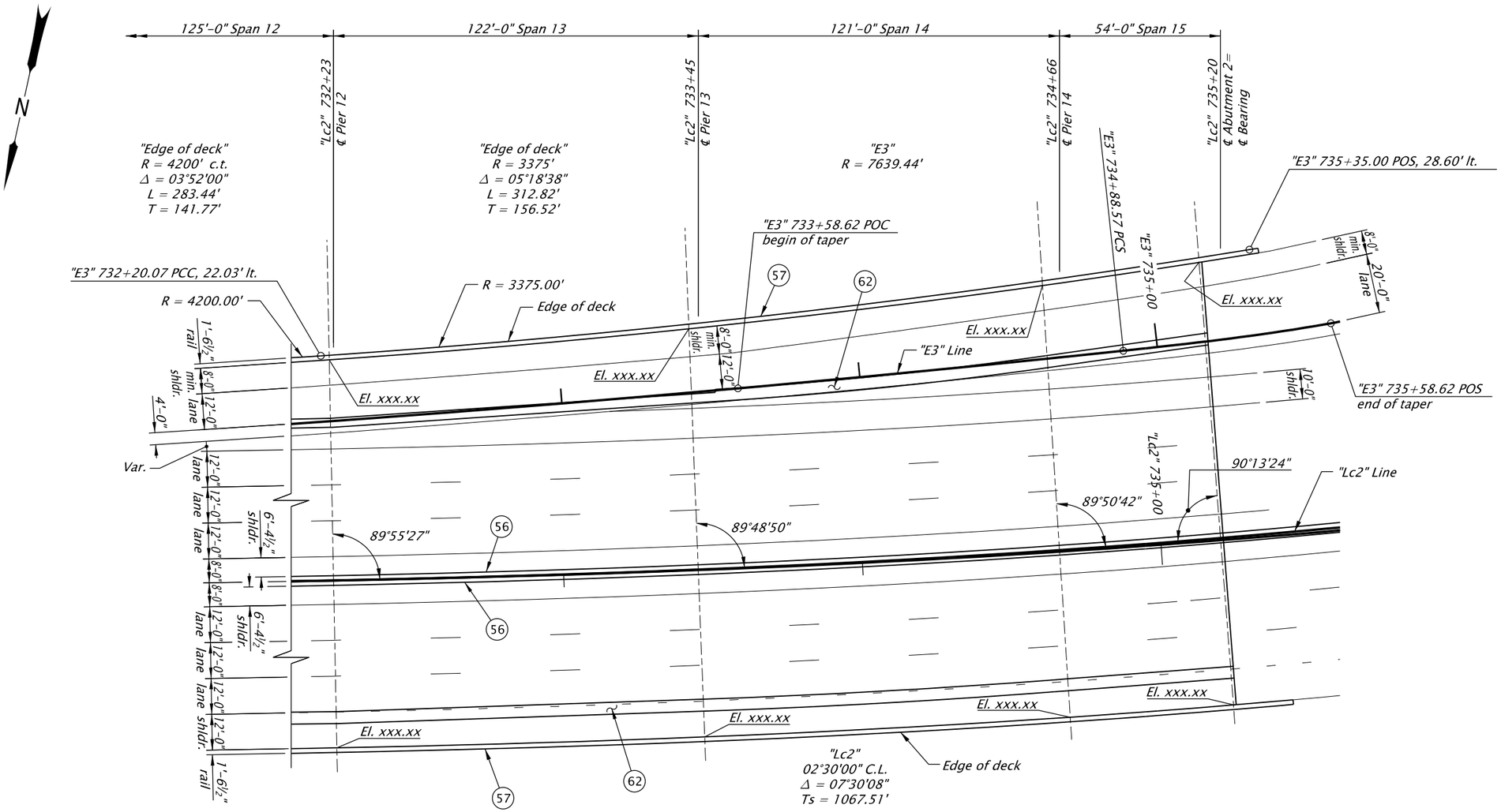

DECK PLAN - SPAN 13, 14 & 15

Scale: 1" = 40'

DETAIL REFERENCE NUMBERS:

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(62) *Concrete Closure Pour, see dwg. JB000 for details.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
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QUINCY ENGINEERING

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes | Reviewer: Name
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WIDENING AND SEISMIC RETROFIT
DECK PLAN SPANS 13 thru 15

SHEET NO.

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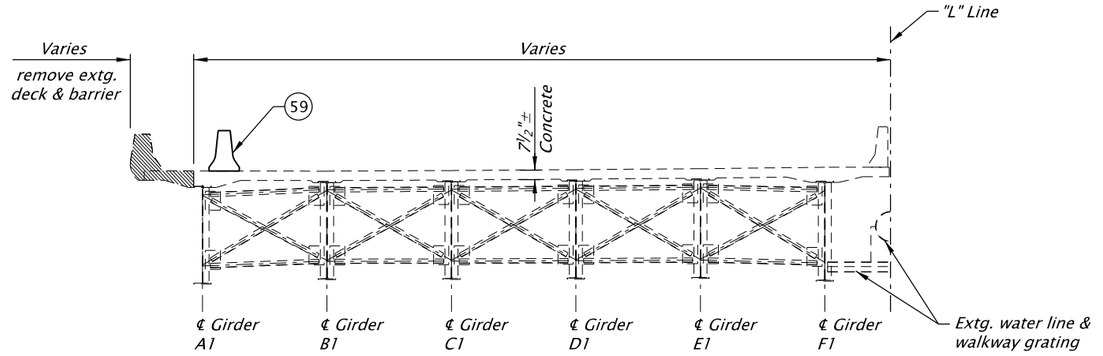
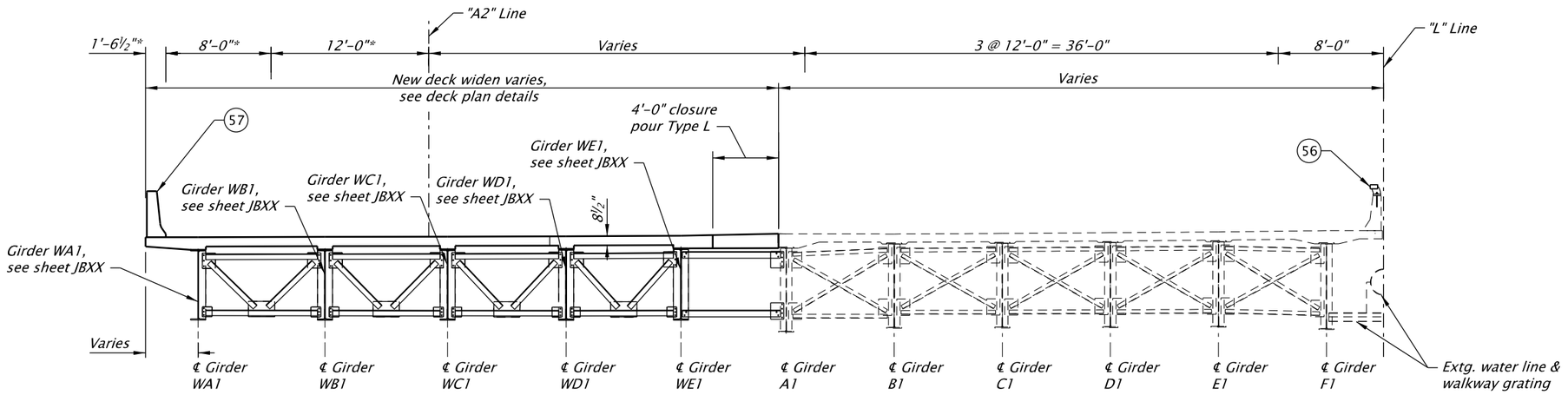


TYPICAL SECTION - PARTIAL REMOVAL SPAN 1 NB

Scale: 1" = 10'



* Dimension perpendicular to "A2" Line

DETAIL REFERENCE NUMBERS:

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(59) *Temporary Precast Concrete Barrier Pin and Loop/Anchors, see details DET3295 & DET3296 for details*

TYPICAL SECTION - SPAN 1 NB

Scale: 1" = 10'

Note:
1. *For closure pour details, see sheet JBXXX.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

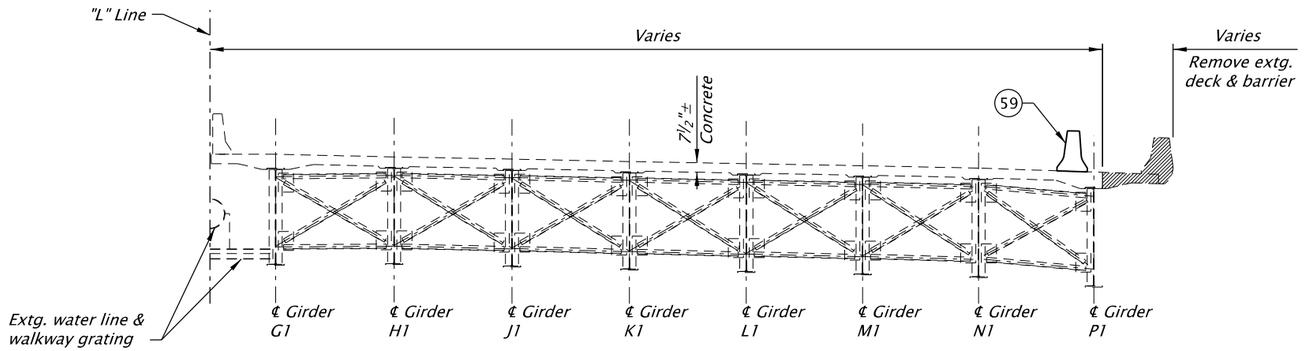
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Luke Lockwood | Checker: Name

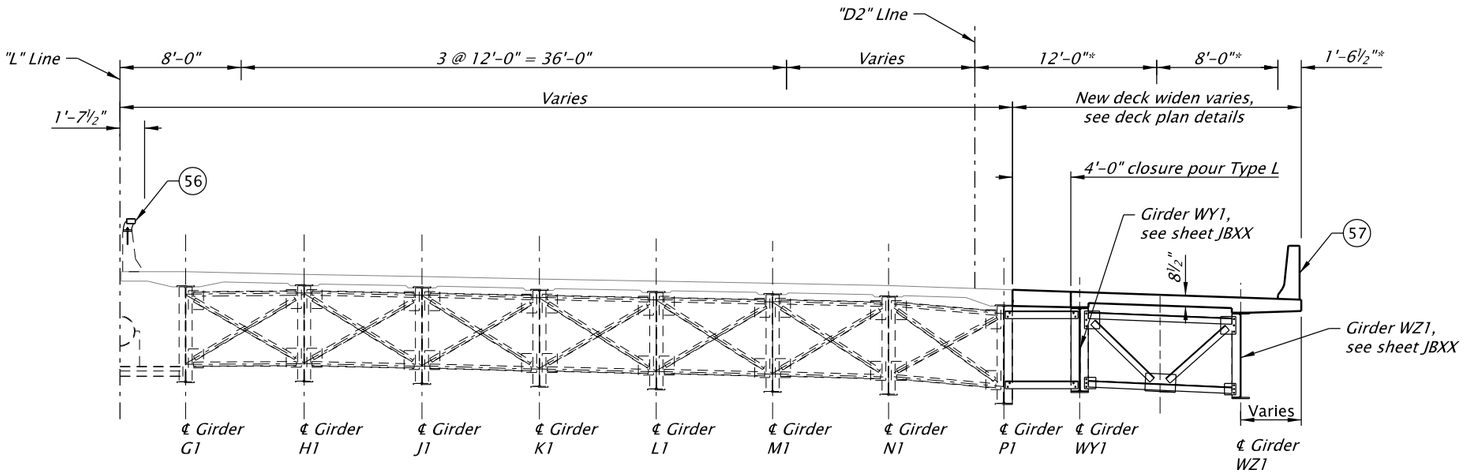
WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 TYPICAL SECTION - 1

SHEET NO.



TYPICAL SECTION - PARTIAL REMOVAL SPAN 1 SB

Scale: 1" = 10'



* *Dimension perpendicular to "D2" Line*

TYPICAL SECTION - SPAN 1 SB

Scale: 1" = 10'

Note:
1. *For closure pour details, see sheet JBXXX.*

DETAIL REFERENCE NUMBERS:

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(59) *Temporary Precast Concrete Barrier Pin and Loop/Anchors, see details DET3295 & DET3296 for details*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Luke Lockwood | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 TYPICAL SECTION - 2

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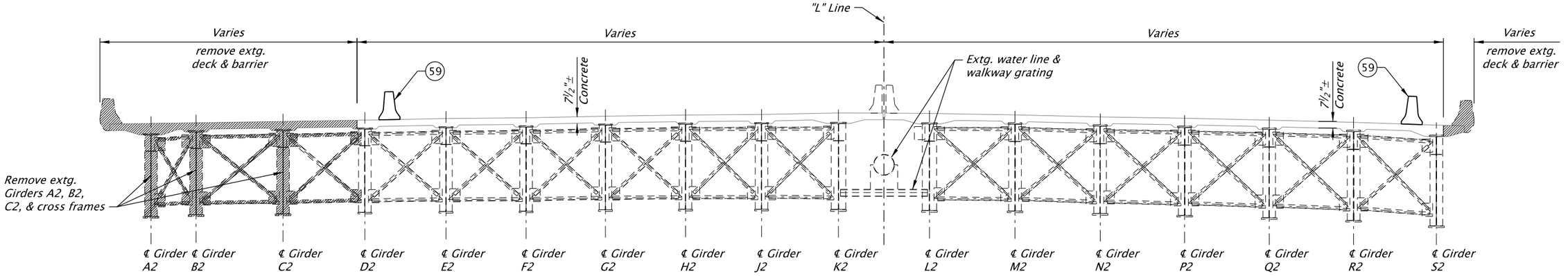
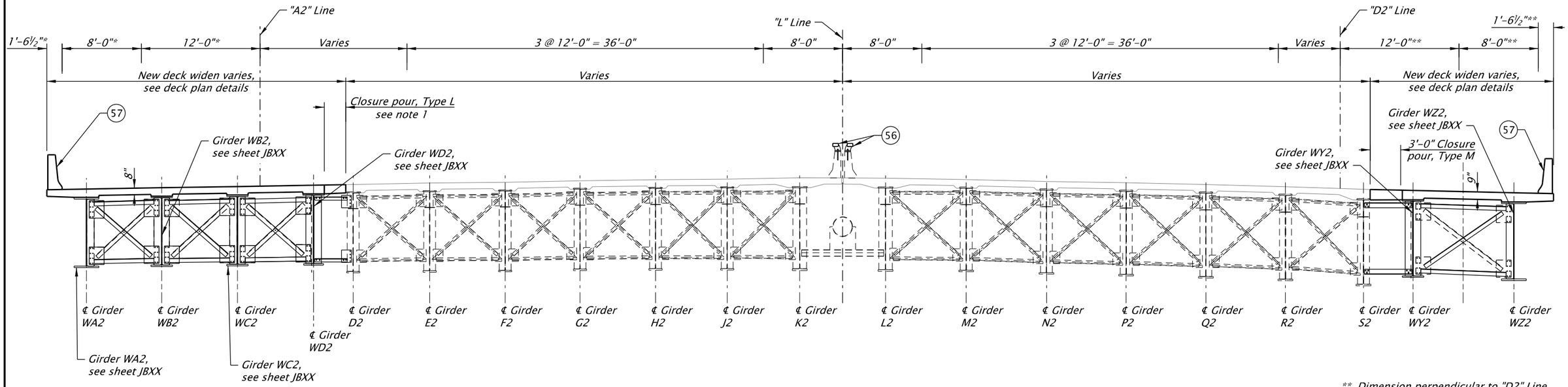


TYPICAL SECTION - PARTIAL REMOVAL SPAN 2

Scale: 1" = 10'



* Dimension perpendicular to "A2" Line

** Dimension perpendicular to "D2" Line

TYPICAL SECTION - SPAN 2

Scale: 1" = 10'

Note:
1. For closure pour details, see sheet JBXXX.

DETAIL REFERENCE NUMBERS:

(56) Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details

(57) Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details

(59) Temporary Precast Concrete Barrier Pin and Loop/Anchors, see details DET3295 & DET3296 for details

SCALE WARNING
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STRUCTURE NO.	09403
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HWY: 064 M.P.: 9.03	
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Luke Lockwood | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 2 TYPICAL SECTION

SHEET NO.

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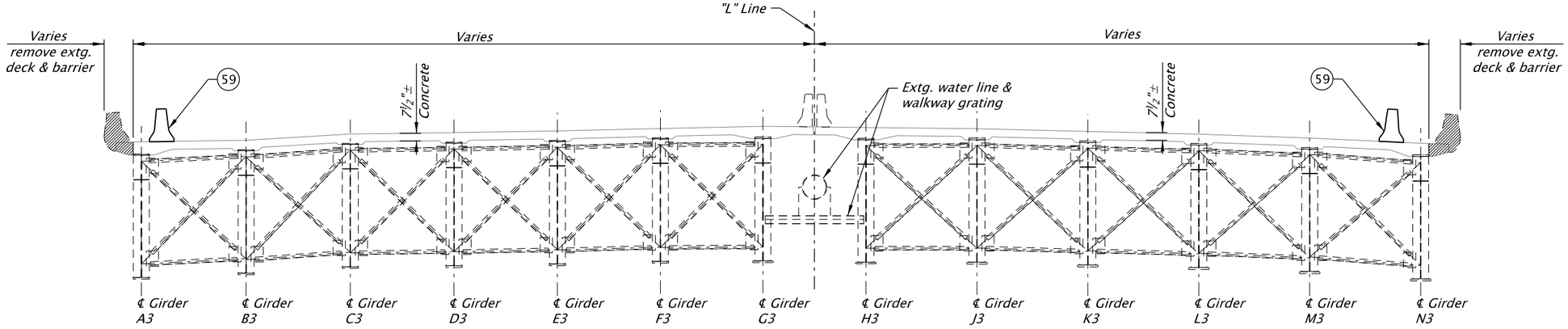
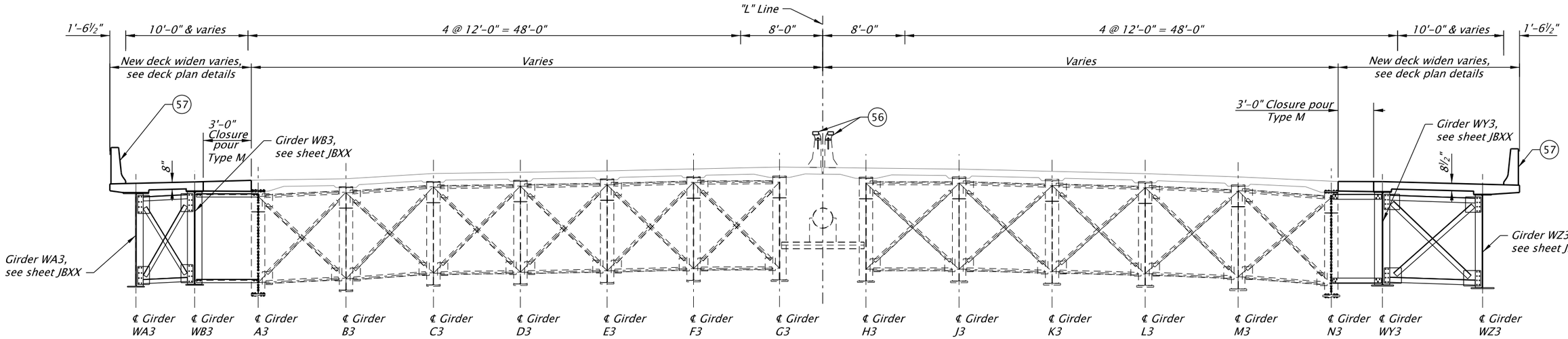


TYPICAL SECTION - PARTIAL REMOVAL SPAN 3

Scale: 1" = 10'



TYPICAL SECTION - SPAN 3

Scale: 1" = 10'

DETAIL REFERENCE NUMBERS:

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(59) *Temporary Precast Concrete Barrier Pin and Loop/Anchors, see details DET3295 & DET3296 for details*

Note:
1. *For closure pour details, see sheet JBXXX.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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BDS DWG NO.	00000
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Luke Lockwood | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 3 TYPICAL SECTION

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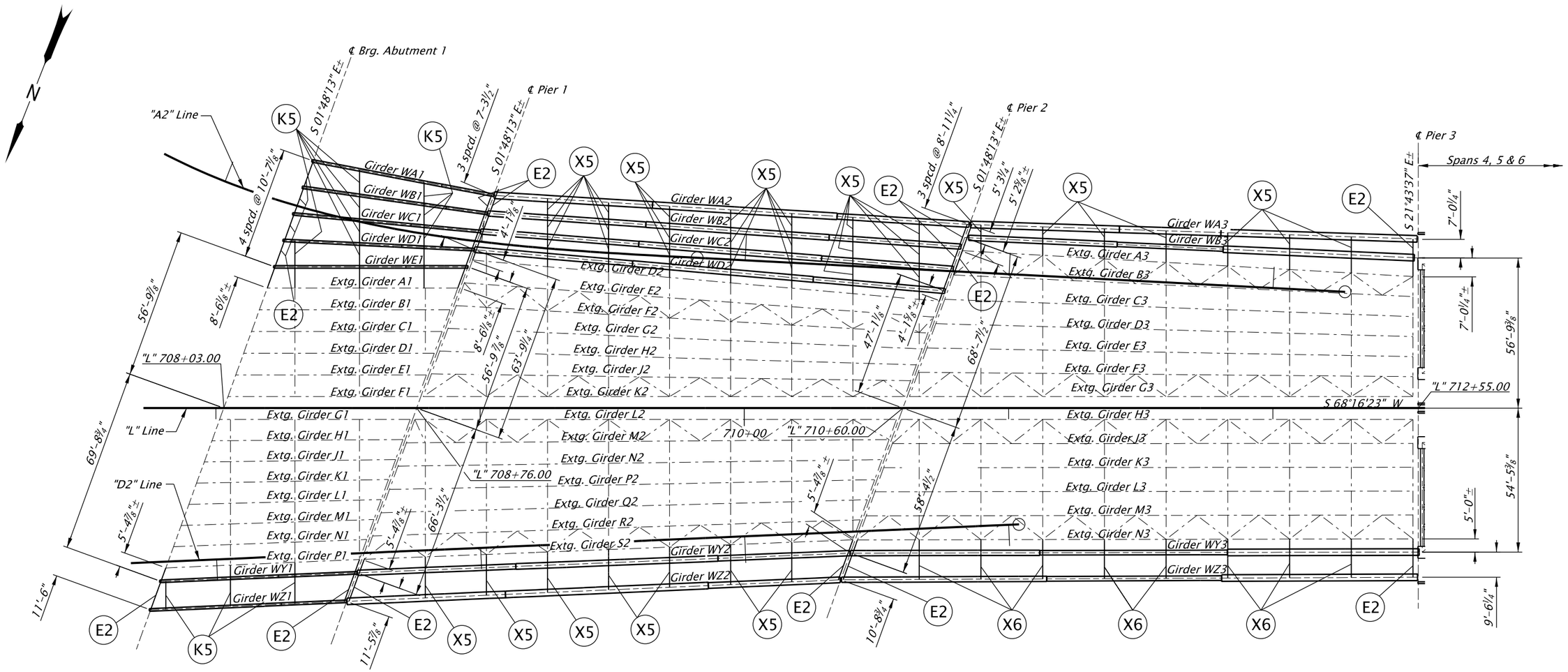

SPAN 1 **SPAN 2** **SPAN 3**

FRAMING PLAN

Scale: 1" = 40'

CROSS FRAME SCHEDULE

- K5 *See sheet JBXXX for cross frame details*
- X5 *See sheet JBXXX for cross frame details*
- X6 *See sheet JBXXX for cross frame details*

NOTE:
Dimensions are along ℄ Bearing

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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carl Hughes Reviewer: Name
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WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPANS 1 thru 3 FRAMING PLAN

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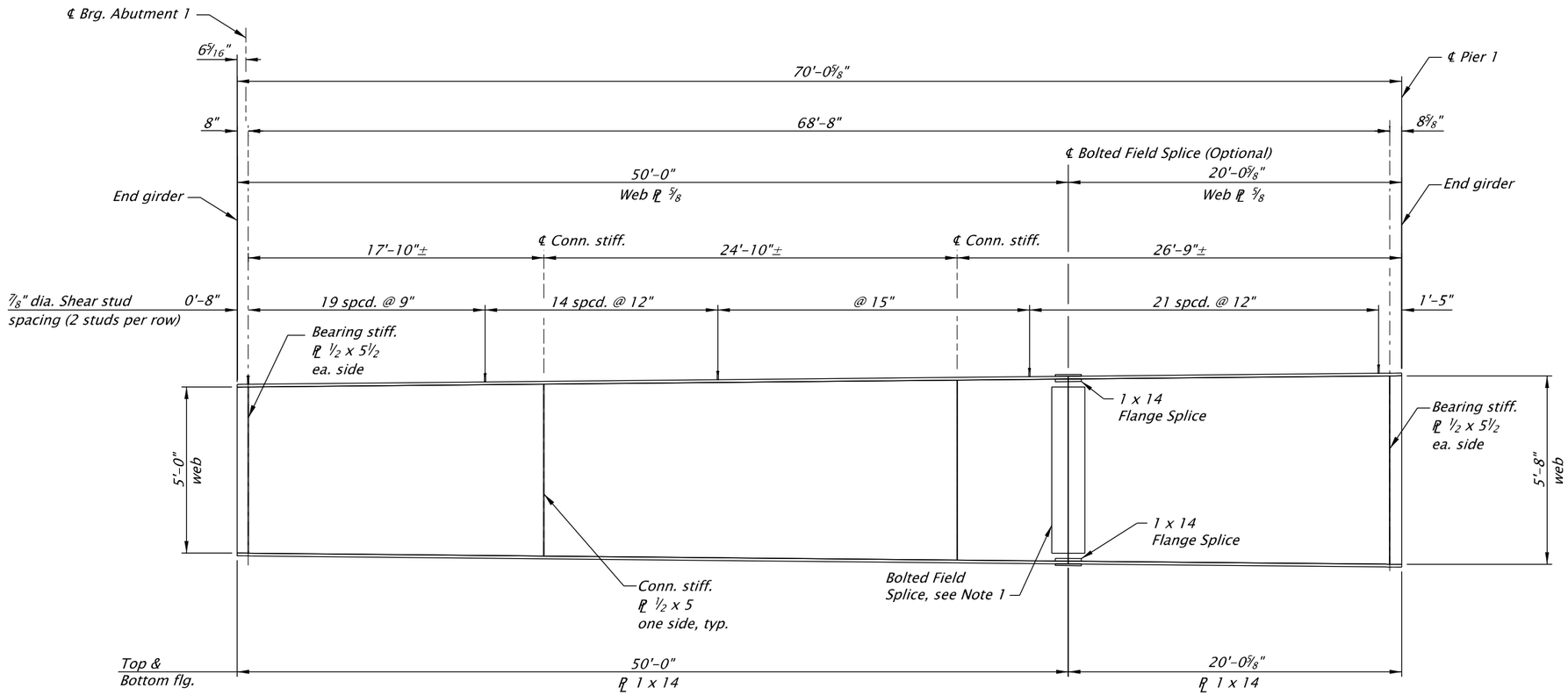

GIRDER WA1 ELEVATION

Horizontal Scale: 1/8" = 1'-0"
Vertical Scale: 1/4" = 1'-0"

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

SCALE WARNING
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Reviewer: Name
Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 GIRDER ELEVATION - 1

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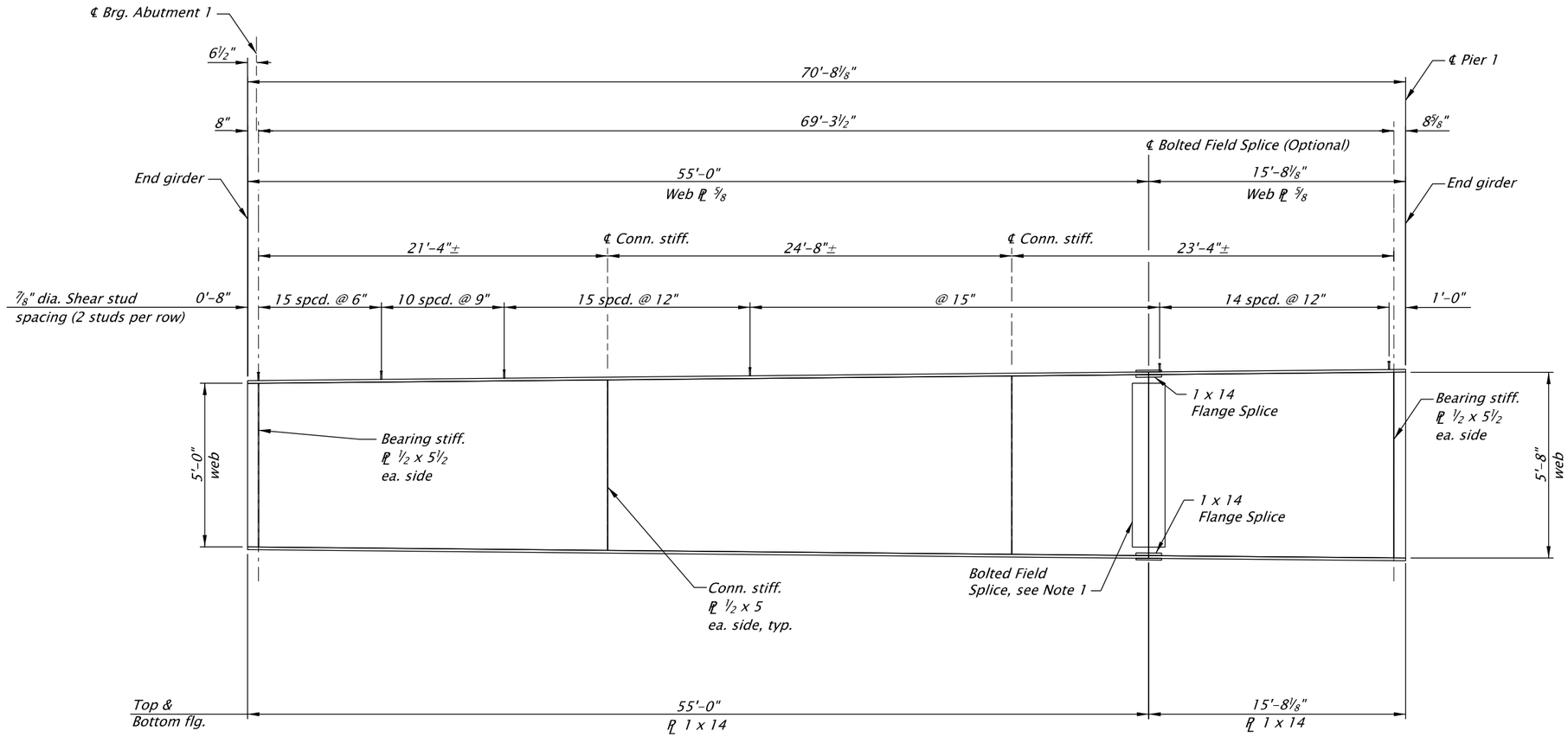

GIRDER WB1 ELEVATION

Horizontal Scale: ⅛" = 1'-0"
Vertical Scale: ¼" = 1'-0"

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffeners Details.*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 GIRDER ELEVATION - 2

SHEET NO.

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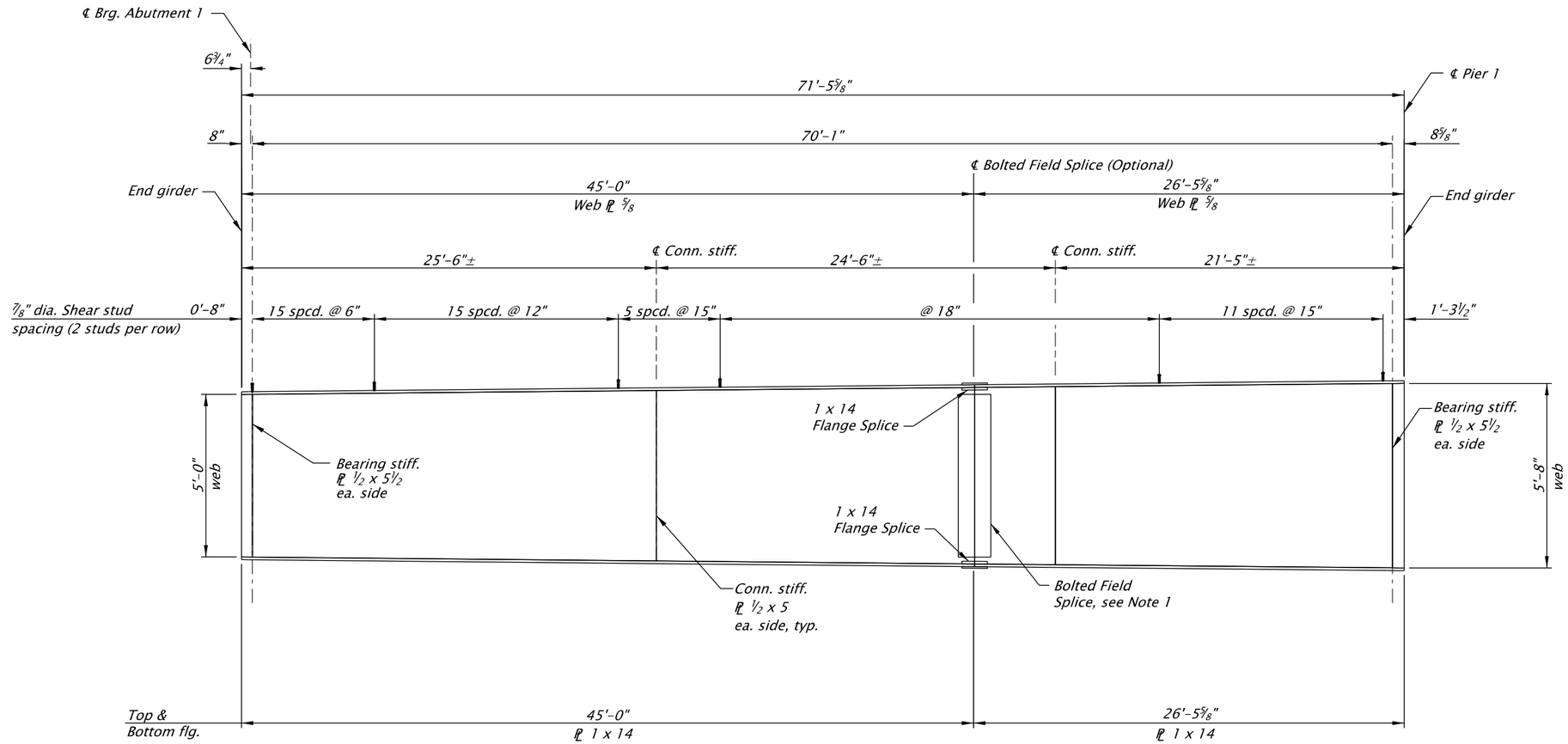

GIRDER WC1 ELEVATION

Horizontal Scale: ⅛" = 1'-0"
Vertical Scale: ¼" = 1'-0"

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffeners Details.*

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CLACKAMAS COUNTY

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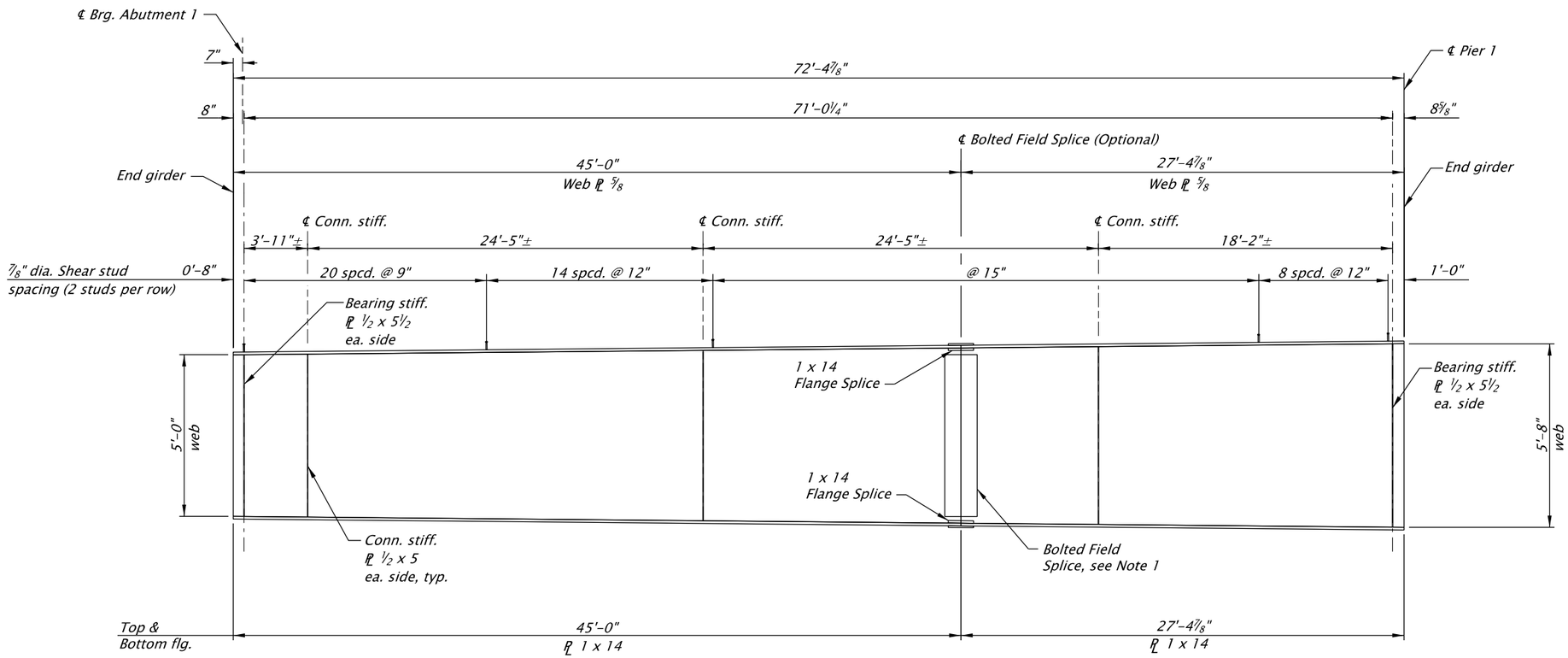
WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 GIRDER ELEVATION - 3

SHEET NO.



GIRDER WD1 ELEVATION

Horizontal Scale: ⅛" = 1'-0"
Vertical Scale: ¼" = 1'-0"

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 GIRDER ELEVATION - 4

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

BR_K21400_QEI_gdcb2_4.dgn :: Default 2/7/2020 4:59:10 PM CDONOVAN
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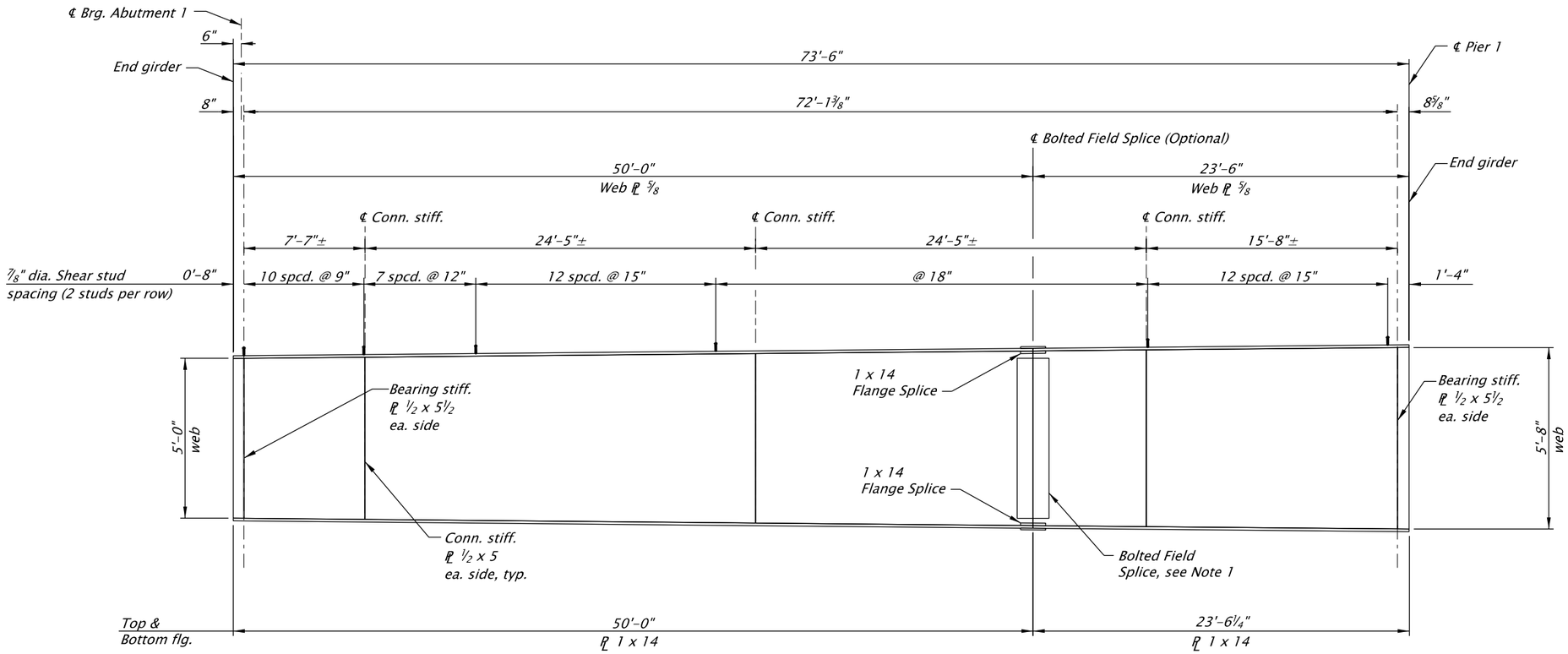


GIRDER WE1 ELEVATION

Horizontal Scale: ⅛" = 1'-0"
Vertical Scale: ¼" = 1'-0"

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

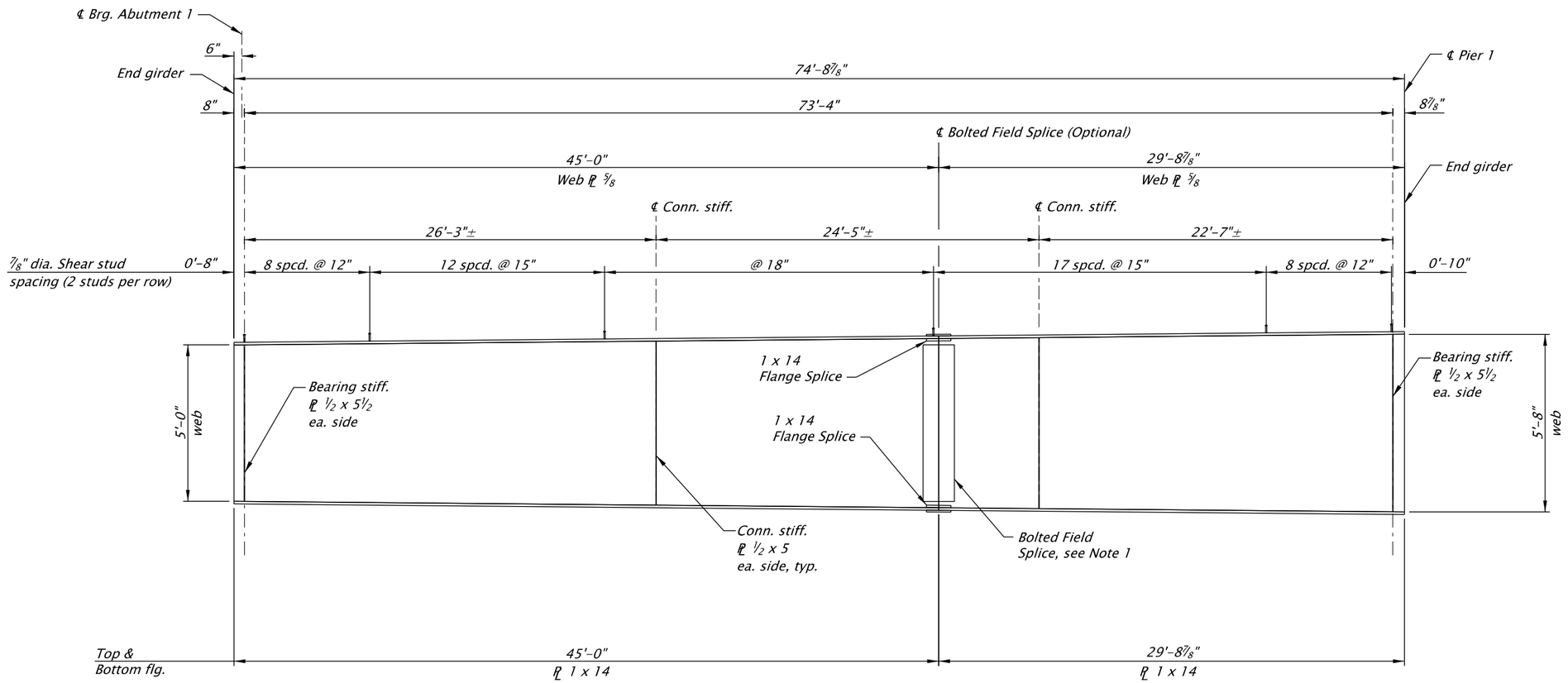
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 GIRDER ELEVATION - 5

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



GIRDER WY1 ELEVATION

Horizontal Scale: ⅛" = 1'-0"
Vertical Scale: ¼" = 1'-0"

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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QUINCY ENGINEERING

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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

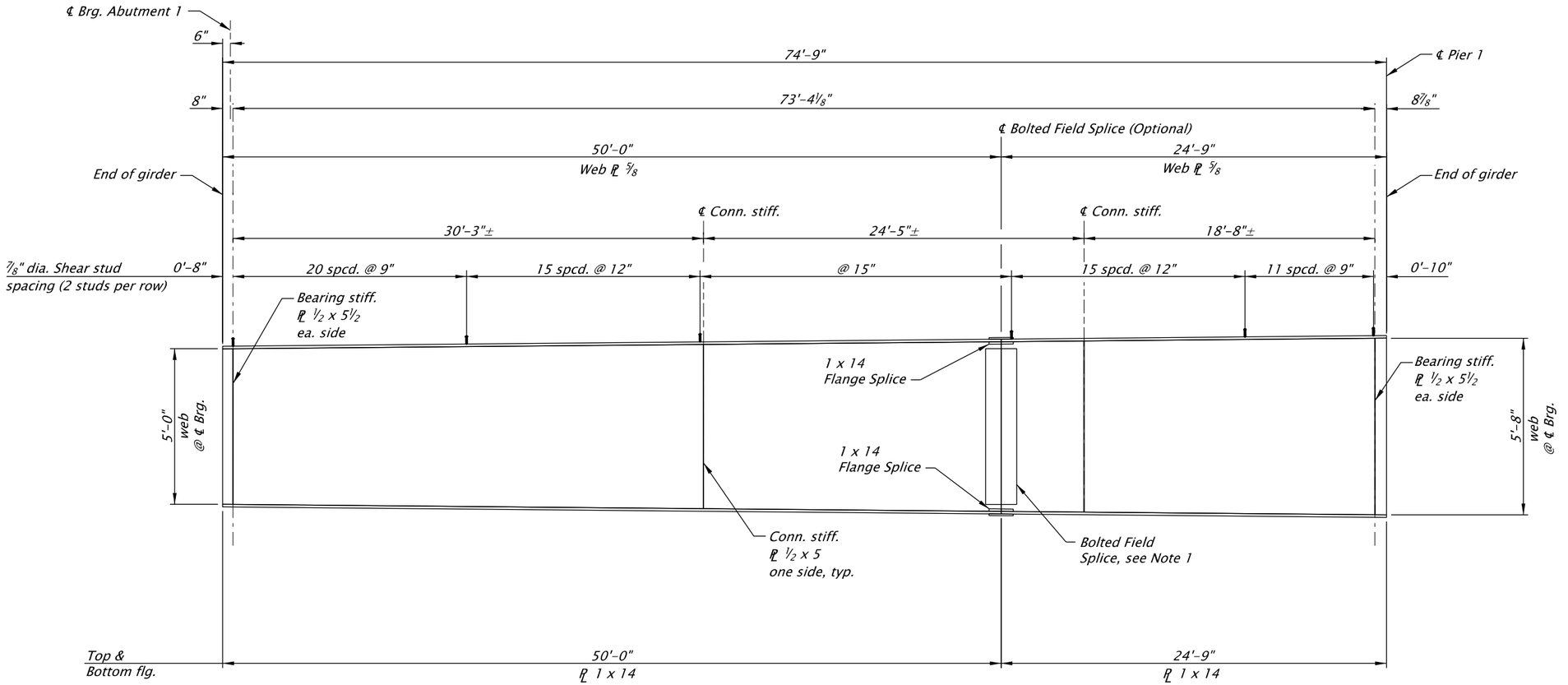
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood
Drafter: Bob Maechler
Reviewer: Name
Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 GIRDER ELEVATION - 6

SHEET NO.



GIRDER WZ1 ELEVATION

Horizontal Scale: 1/8" = 1'-0"
Vertical Scale: 1/4" = 1'-0"

Notes:
1. See sheets JBXX thru JBXX for Bolted Field Splice.

2. See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20
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WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

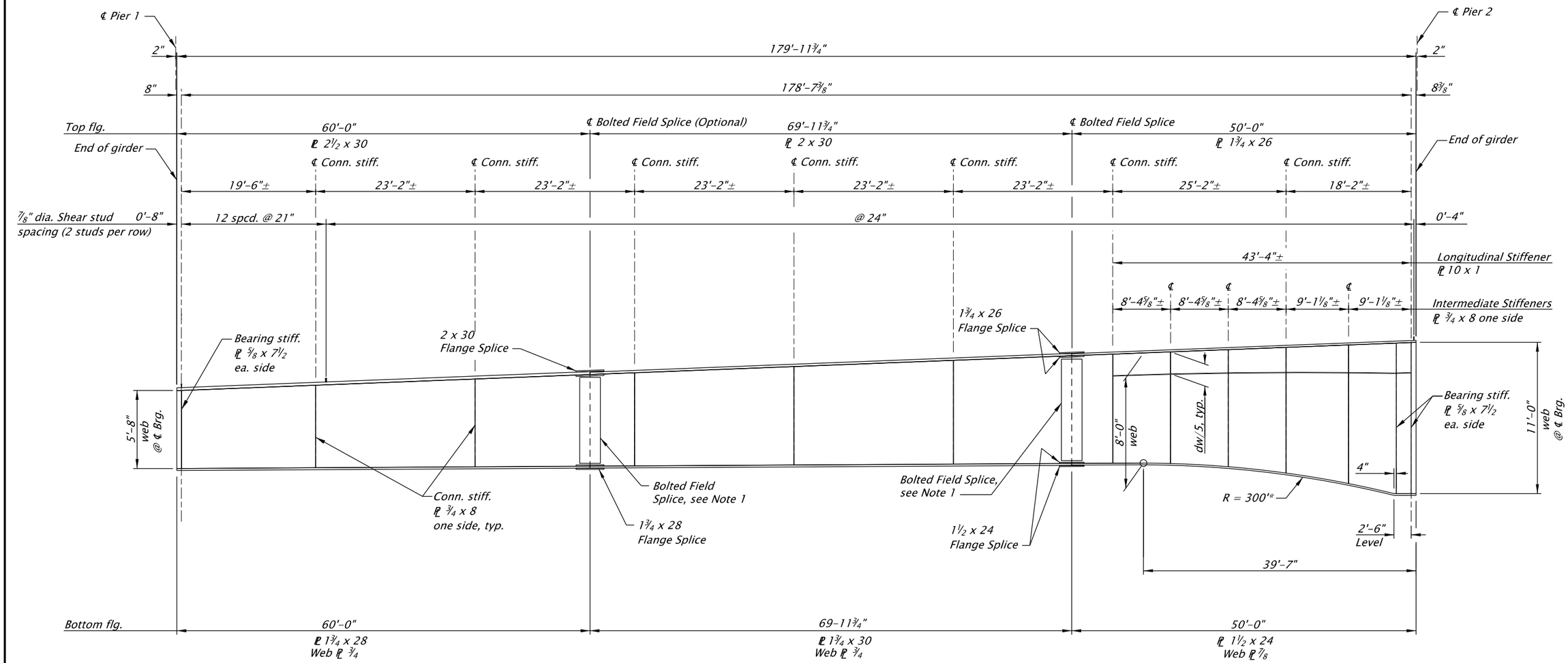
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 1 GIRDER ELEVATION - 7

SHEET NO.



GIRDER WA2 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:

1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

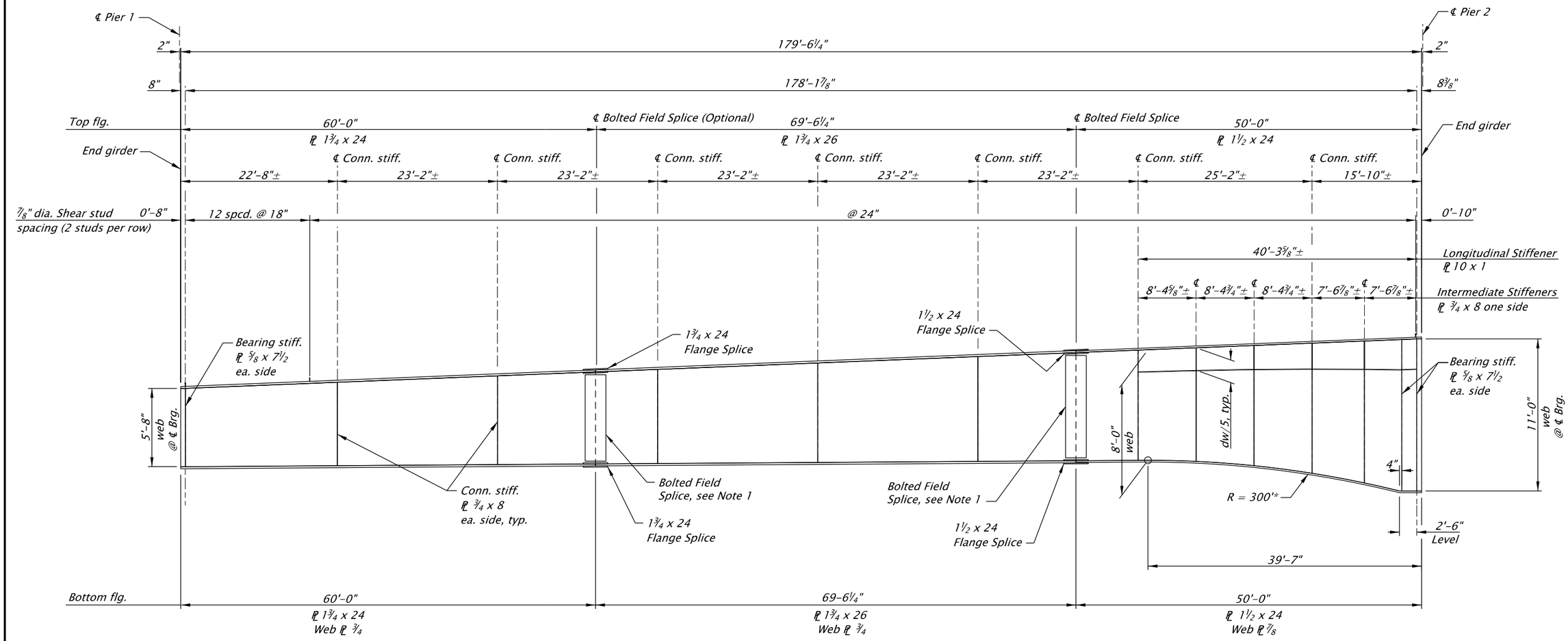
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 2 GIRDER ELEVATION - 1

SHEET NO.



GIRDER WB2 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:

1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20
PROGRESS PRINT
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

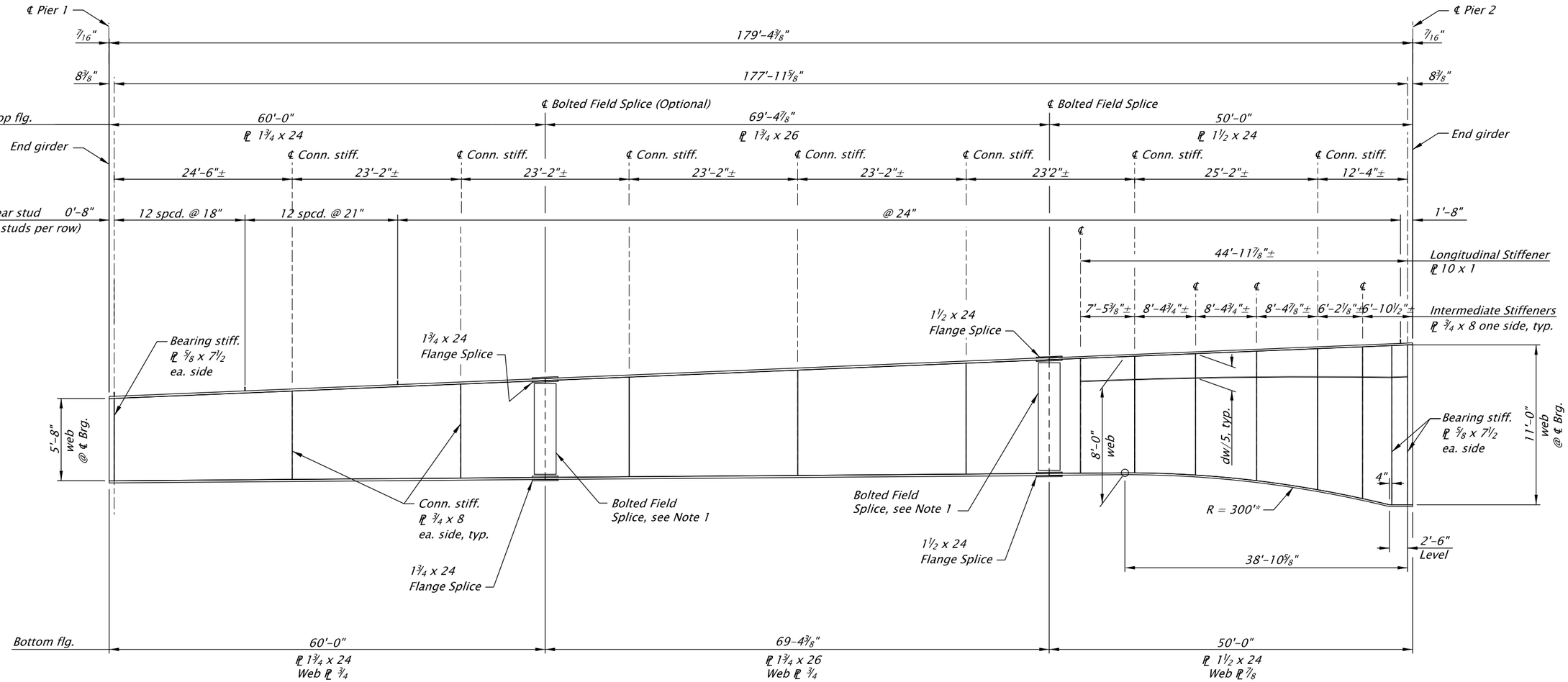
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 2 GIRDER ELEVATION - 2

SHEET NO.



GIRDER WC2 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:

1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
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DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

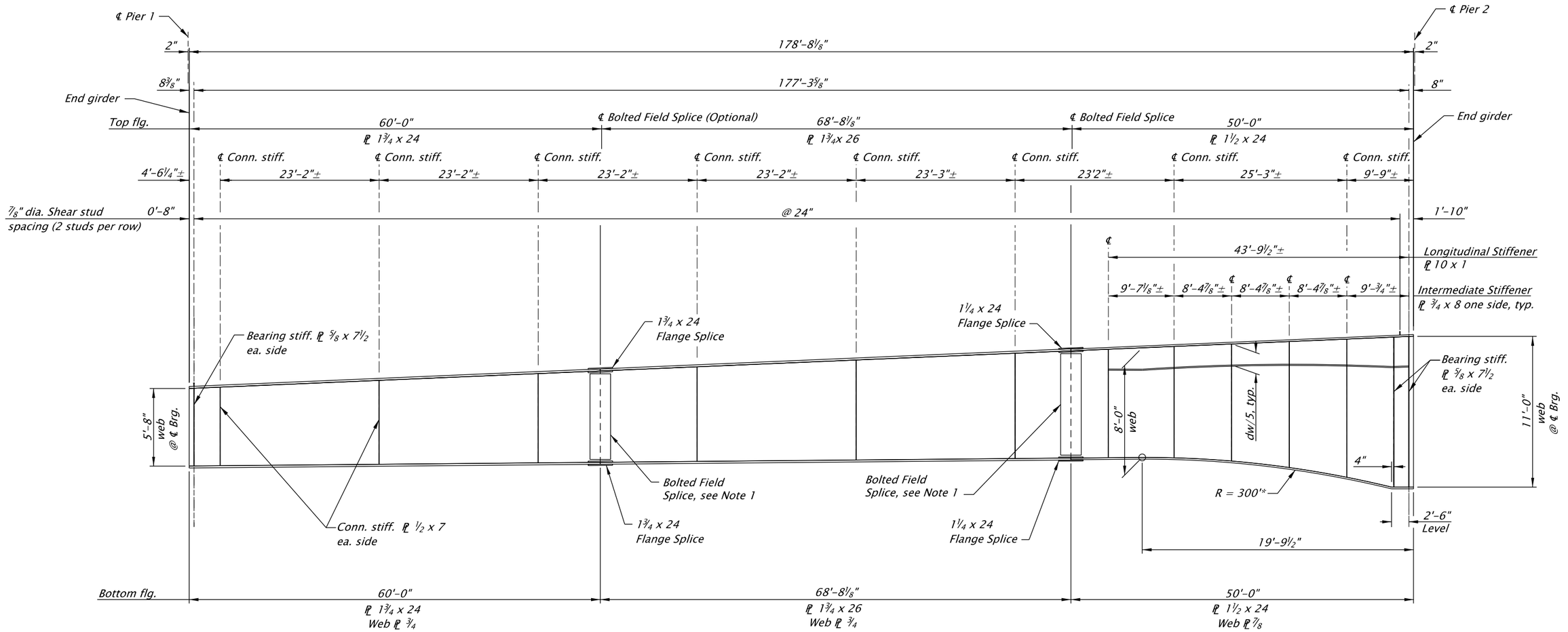
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 2 GIRDER ELEVATION - 3

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



GIRDER WD2 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:
1. See sheets JBXX thru JBXX for Bolted Field Splice.
2. See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.

* Radius will vary depending on profile grade and camber

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood
Drafter: Bob Maechler
Reviewer: Name
Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 2 GIRDER ELEVATION - 4

SHEET NO.

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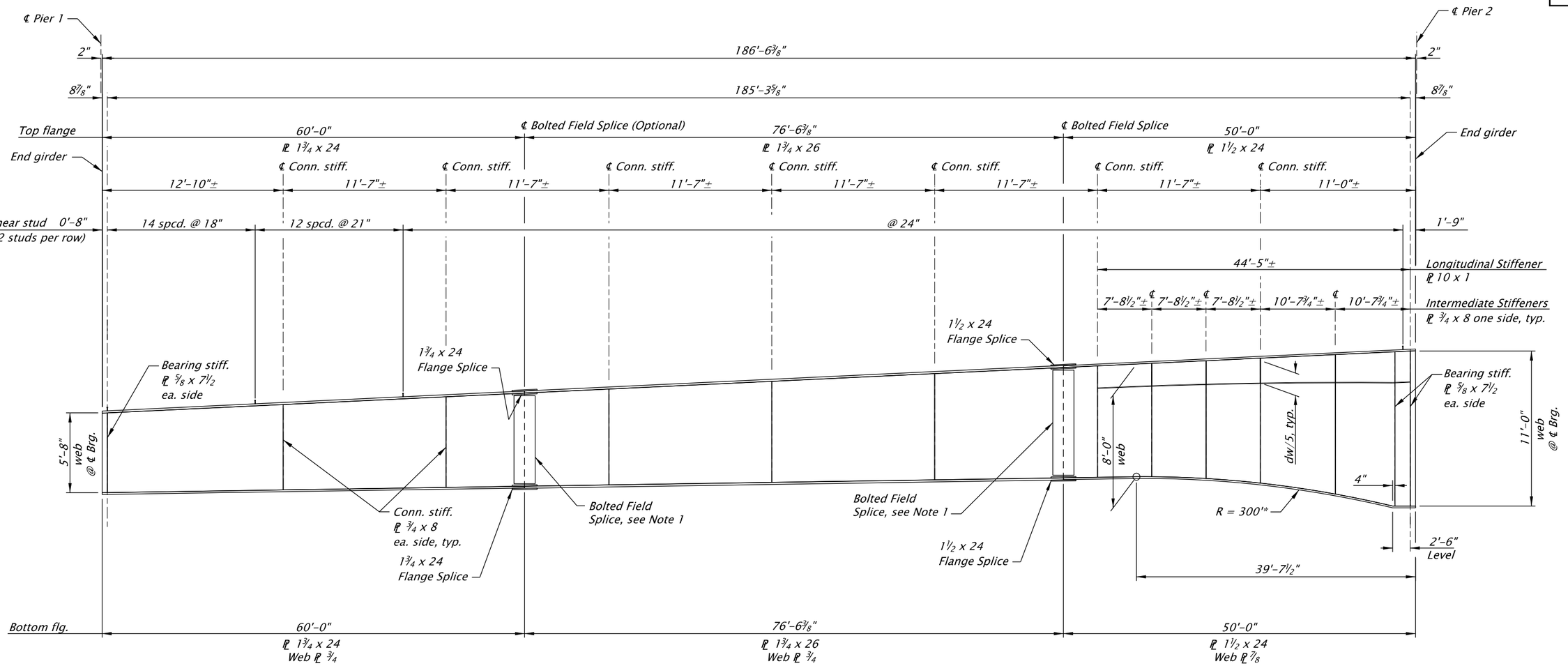

GIRDER WY2 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:

1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20 PROGRESS PRINT INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 2 GIRDER ELEVATION - 5

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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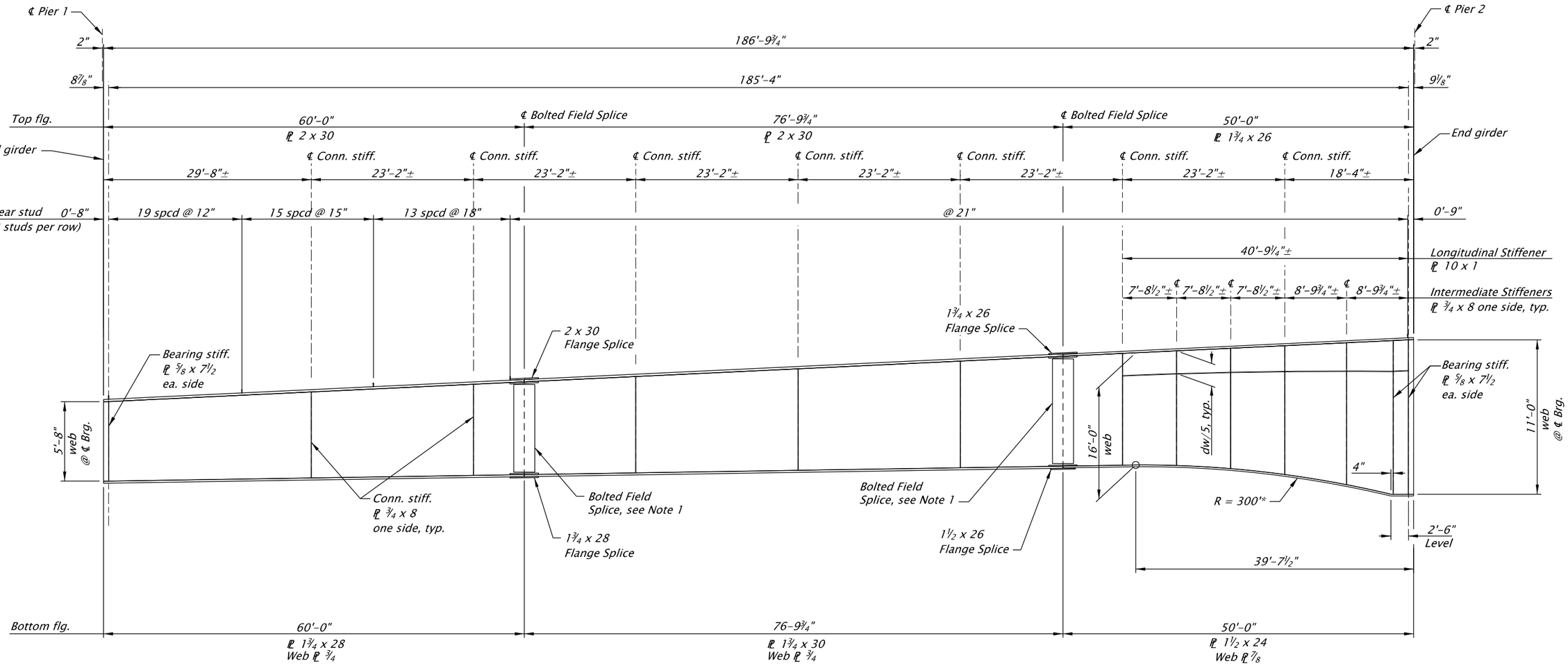


GIRDER WZ2 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:

1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

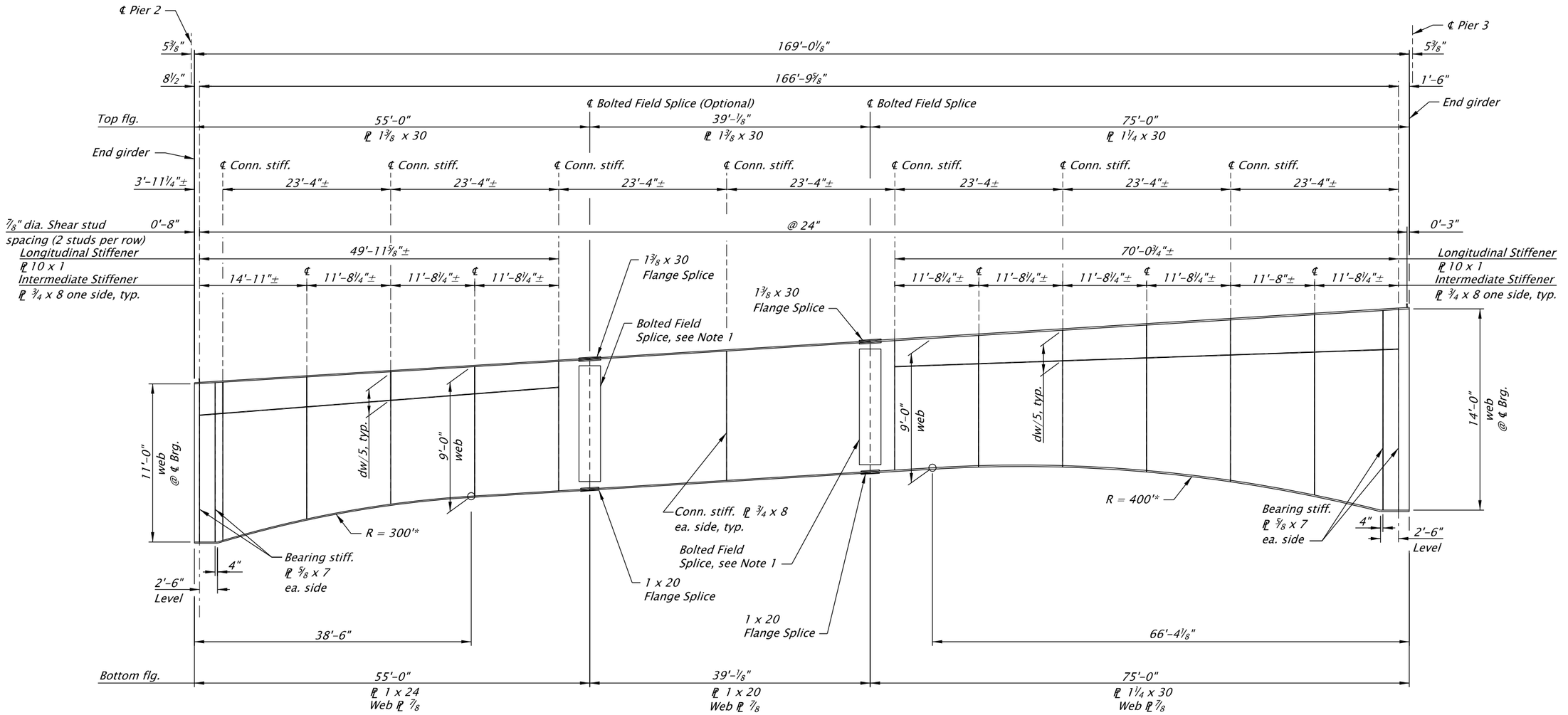
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 2 GIRDER ELEVATION - 6

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



GIRDER WA3 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:

1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

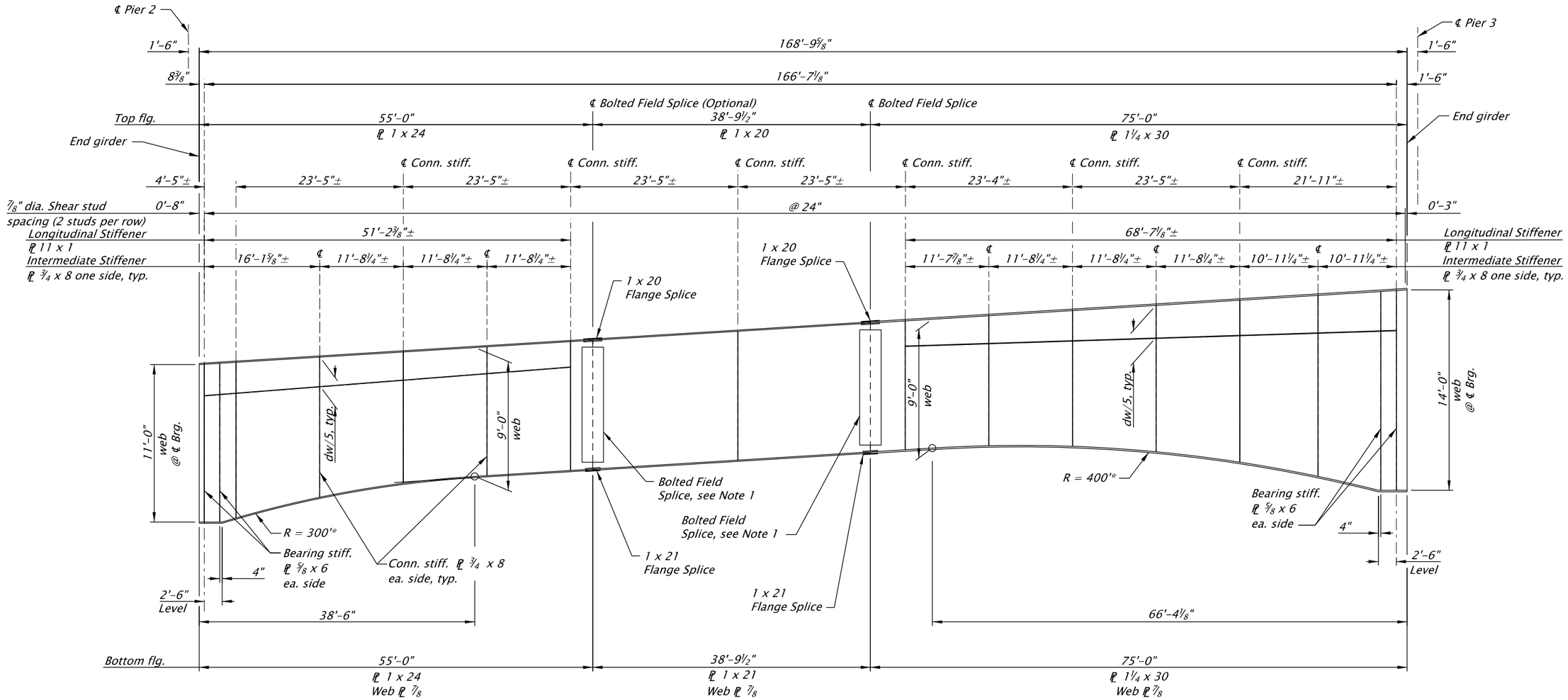
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Liam Kucey
Drafter: Bob Maechler
Reviewer: Name
Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 3 GIRDER ELEVATION - 1

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



GIRDER WB3 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20 PROGRESS PRINT INFORMATION ONLY

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Liam Kucey | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 3 GIRDER ELEVATION - 2

SHEET NO.

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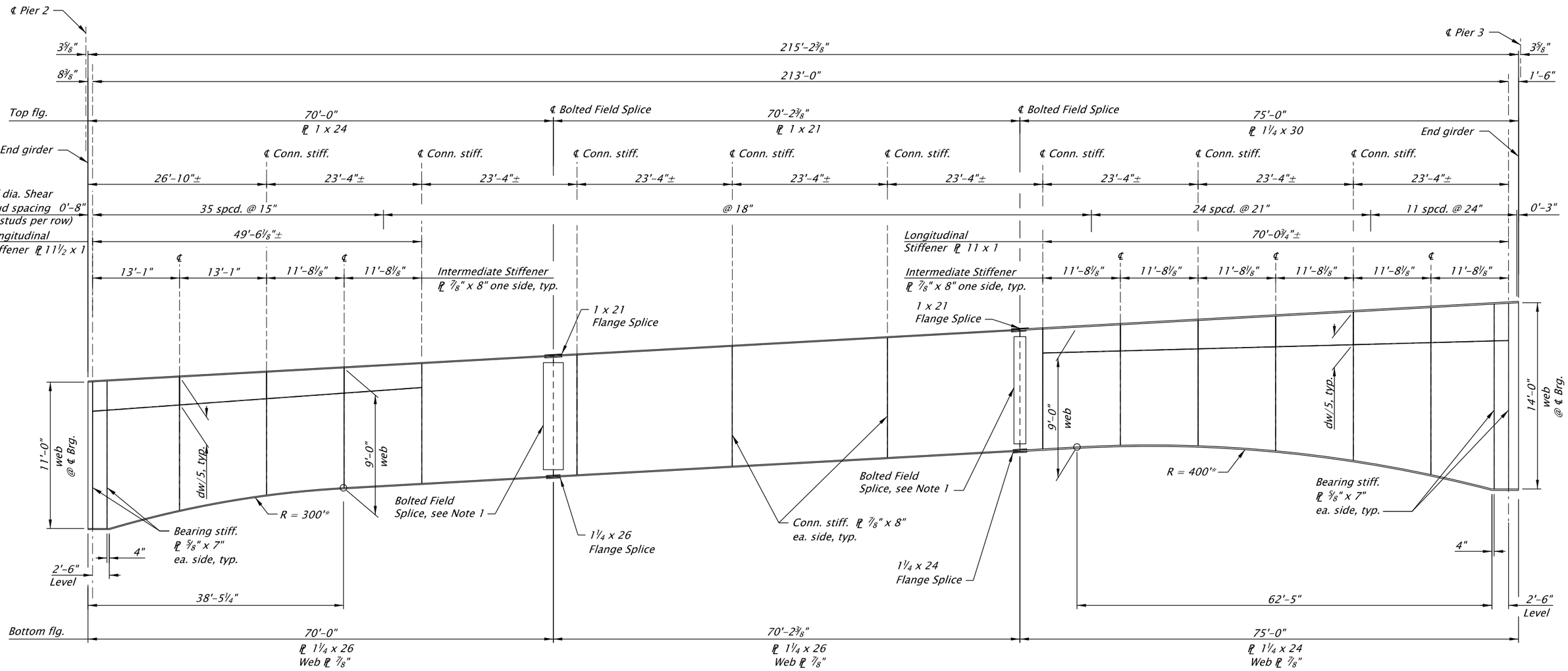

GIRDER WY3 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:
1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

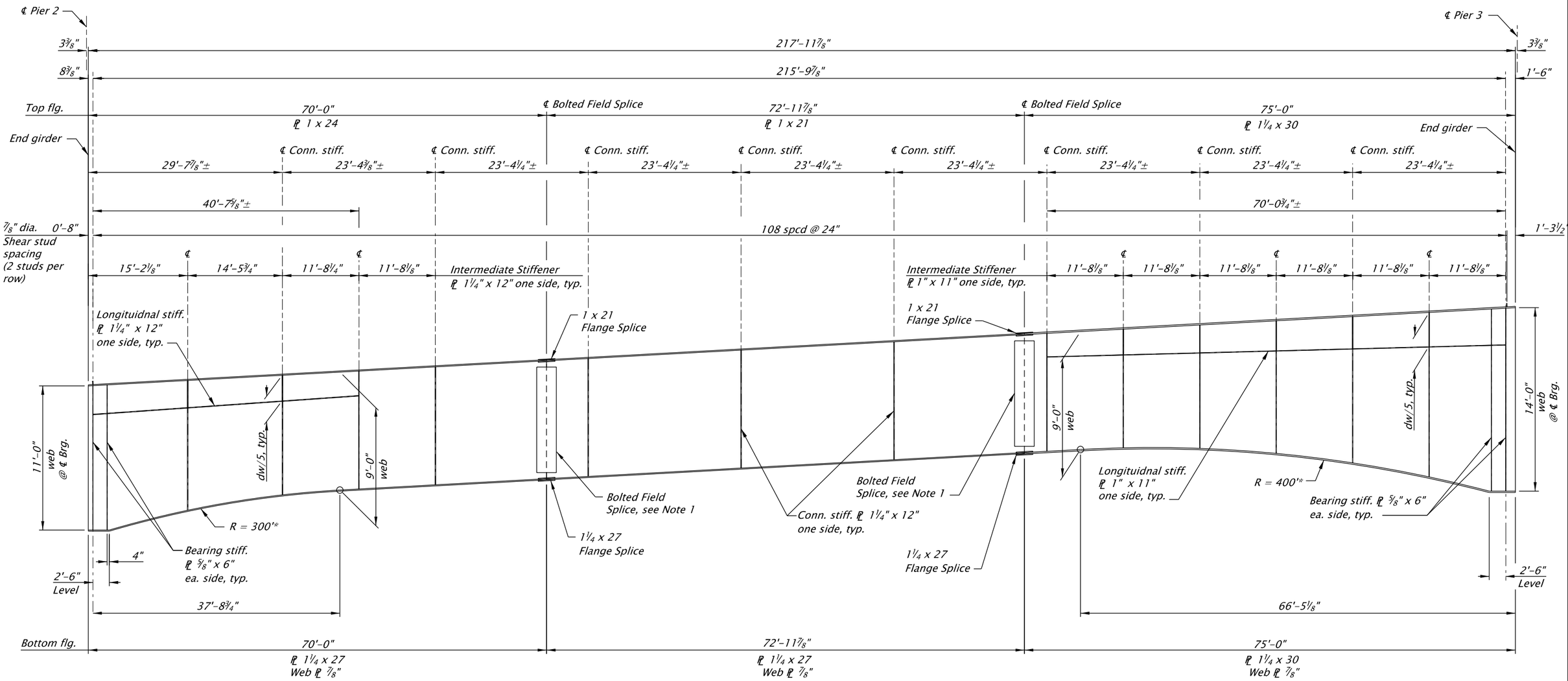
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Liam Kucey | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 3 GIRDER ELEVATION - 3

SHEET NO.



GIRDER WZ3 ELEVATION

Horizontal Scale: 1" = 15'
Vertical Scale: No Scale

Notes:

1. *See sheets JBXX thru JBXX for Bolted Field Splice.*
2. *See sheets JBXX, JBXX, JBXX and JBXX for Connection stiffener Details.*

* *Radius will vary depending on profile grade and camber*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
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HWY: 064	M.P.: 9.03
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WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Liam Kucey | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPAN 3 GIRDER ELEVATION - 4

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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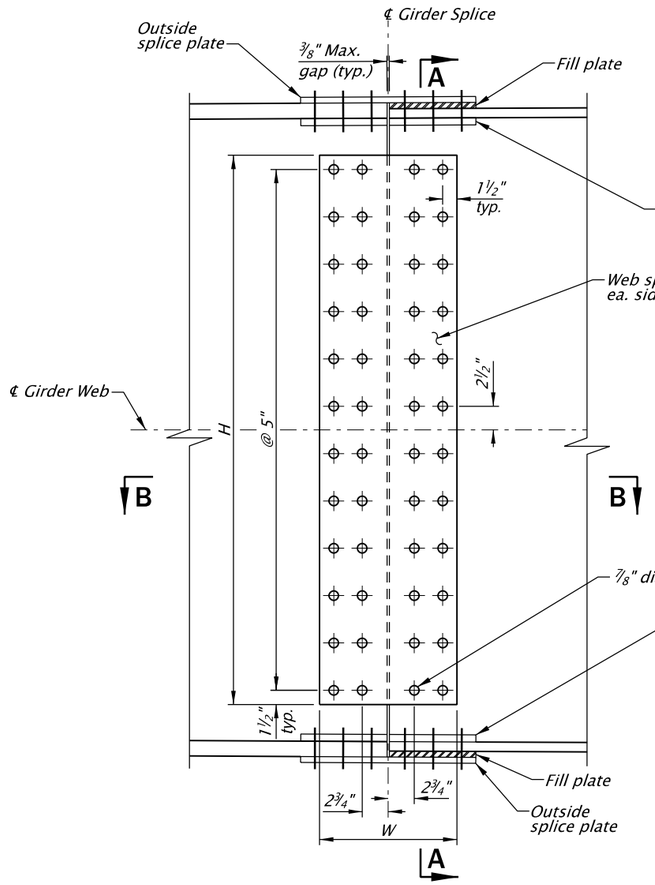
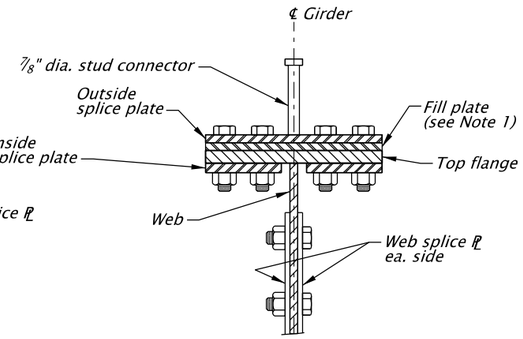
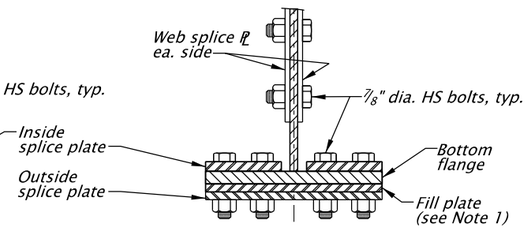


GIRDER SPLICE A

Scale: ¾ = 1'–0"



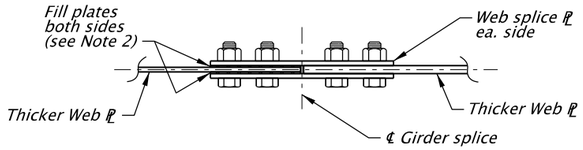
TOP FLANGE SECTION



BOTTOM FLANGE SECTION

SECTION A-A

Scale: 1" = 1'–0"



SECTION B-B

Scale: 1" = 1'–0"

WEB SPLICE PLATE TABLE					
Girder	Splice Number	7/8" dia. HS Bolts	Dimensions		
			H	W	Thickness
Span 1					
WA1	1	48 - 7/8" dia. HSB	4'-10"	1'-2 1/2"	3/8"
WB1	1	48 - 7/8" dia. HSB	4'-10"	1'-2 1/2"	3/8"
WC1	1	48 - 7/8" dia. HSB	4'-10"	1'-2 1/2"	3/8"
WD1	1	48 - 7/8" dia. HSB	4'-10"	1'-2 1/2"	3/8"
WE1	1	48 - 7/8" dia. HSB	4'-10"	1'-2 1/2"	3/8"
WY1	1	48 - 7/8" dia. HSB	4'-10"	1'-2 1/2"	3/8"
WZ1	1	48 - 7/8" dia. HSB	4'-10"	1'-2 1/2"	3/8"

WEB SPLICE PLATE TABLE					
Girder	Splice Number	7/8" dia. HS Bolts	Dimensions		
			H	W	Thickness
Span 2					
WA2	1	56 - 7/8" dia. HSB	5'-8"	1'-2 1/2"	3/8"
WB2	1	60 - 7/8" dia. HSB	6'-1"	1'-2 1/2"	3/8"
WC2	1	60 - 7/8" dia. HSB	6'-1"	1'-2 1/2"	3/8"
WD2	1	60 - 7/8" dia. HSB	6'-1"	1'-2 1/2"	3/8"
WY2	1	60 - 7/8" dia. HSB	6'-1"	1'-2 1/2"	3/8"
WZ2	1	60 - 7/8" dia. HSB	6'-1"	1'-2 1/2"	3/8"
WA2	2	68 - 7/8" dia. HSB	6'-11"	1'-2 1/2"	3/8"
WB2	2	68 - 7/8" dia. HSB	6'-11"	1'-2 1/2"	3/8"
WC2	2	68 - 7/8" dia. HSB	6'-11"	1'-2 1/2"	3/8"
WD2	2	68 - 7/8" dia. HSB	6'-11"	1'-2 1/2"	3/8"
WY2	2	68 - 7/8" dia. HSB	6'-11"	1'-2 1/2"	3/8"
WZ2	2	72 - 7/8" dia. HSB	7'-4"	1'-2 1/2"	3/8"
Span 3					
WA3	1	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"
WB3	1	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"
WY3	1	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"
WZ3	1	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"
WA3	2	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"
WB3	2	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"
WY3	2	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"
WZ3	2	80 - 7/8" dia. HSB	8'-2"	1'-2 1/2"	3/8"

Notes:

1. *No fill plate required when flange thickness is the same on both sides of splice.*
2. *No fill plate required when the web thickness difference is 1/16" or less.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

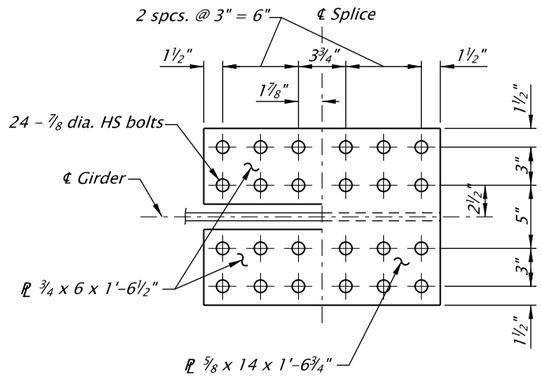
Designer: Martin Pohll — Reviewer: Name
Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPANS 1 thru 3 SPLICE DETAILS - 1

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

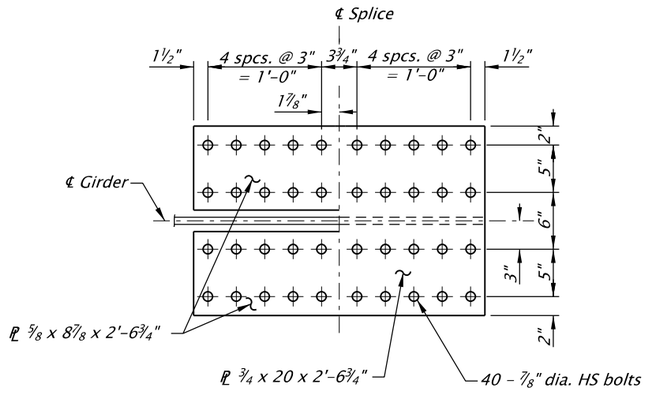
BR_K21400_QEI_gdsp_01.dgn :: Default 2/7/2020 5:00:03 PM CDONOVAN
Rotation: 0° Sca=1



INSIDE **OUTSIDE**

1 x 14 FLANGE SPLICE - PLAN

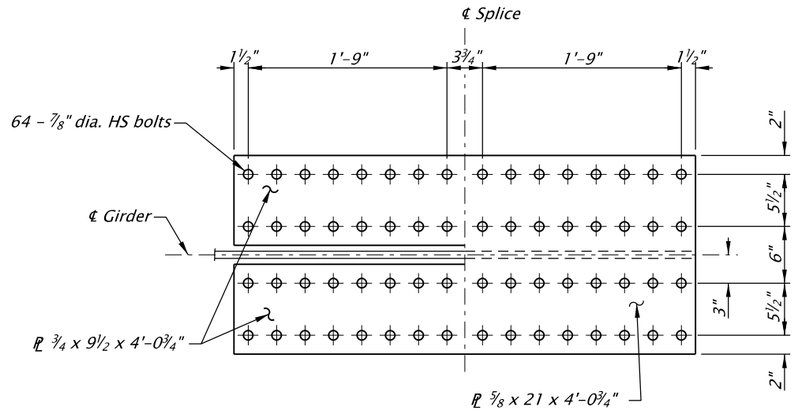
Scale: 1" = 1'-0"



INSIDE **OUTSIDE**

1 x 20 FLANGE SPLICE - PLAN

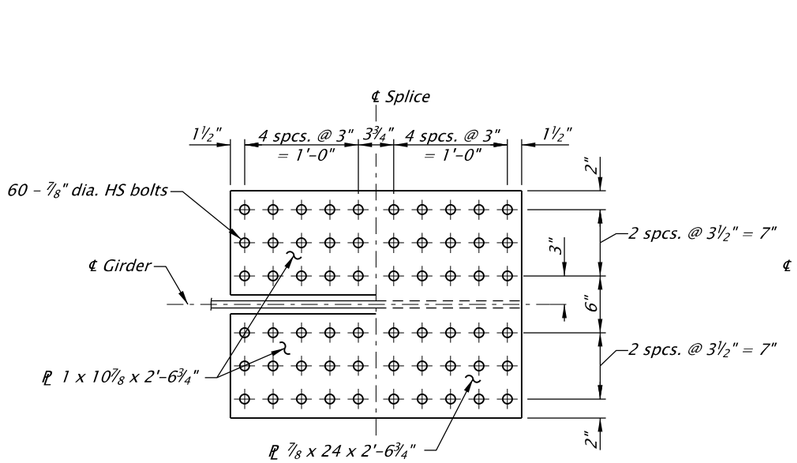
Scale: 1" = 1'-0"



INSIDE **OUTSIDE**

1 x 21 FLANGE SPLICE - PLAN

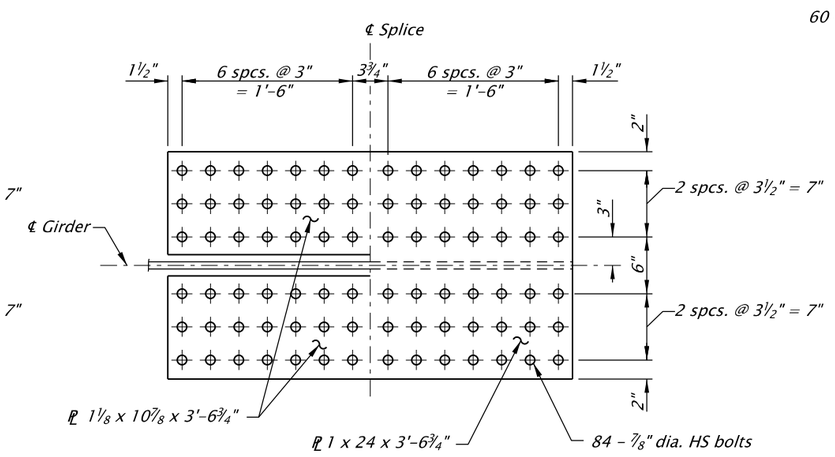
Scale: 1" = 1'-0"



INSIDE **OUTSIDE**

1½ x 24 FLANGE SPICE - PLAN

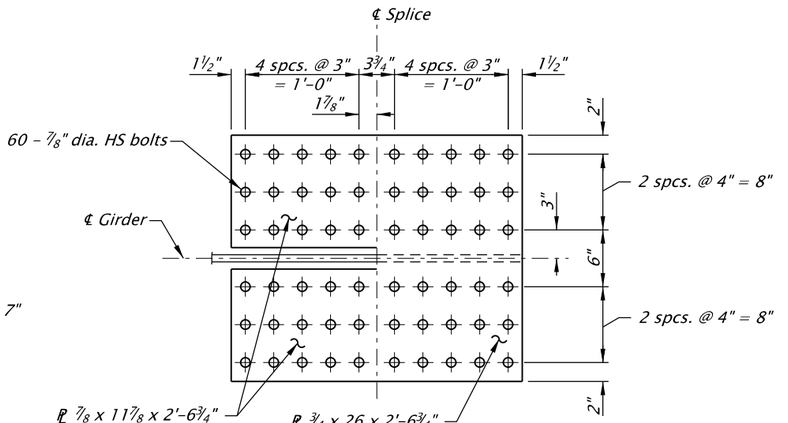
Scale: ¾" = 1'-0"



INSIDE **OUTSIDE**

1¾ x 24 FLANGE SPICE - PLAN

Scale: ¾" = 1'-0"



INSIDE **OUTSIDE**

1¼ x 26 FLANGE SPICE - PLAN

Scale: ¾" = 1'-0"

Notes:

1. *Flange splice size refers to the smaller flange at the splice location.*
2. *Fill ℄ size and thickness varies by location.*
3. *For locations of flange splices, see Girder Elevation sheets.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT

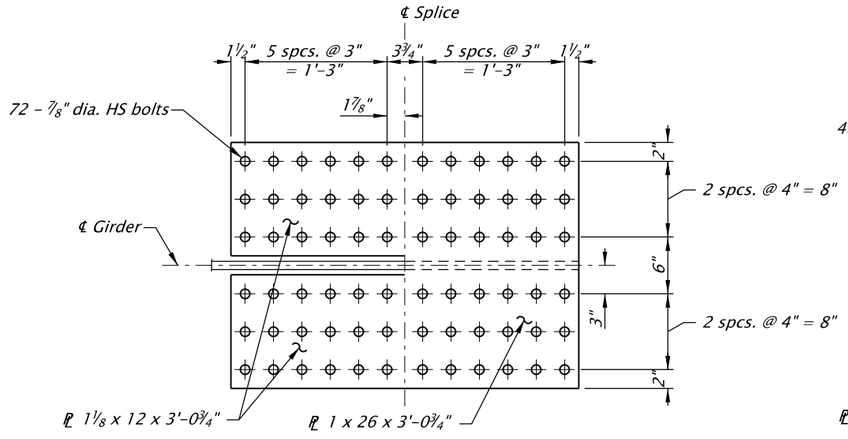
PLATE GIRDER SPANS 1 thru 3 SPLICE DETAILS - 2

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

BR_K21400_QEI_gdsp_02.dgn :: Default 2/7/2020 5:00:08 PM CDONOVAN

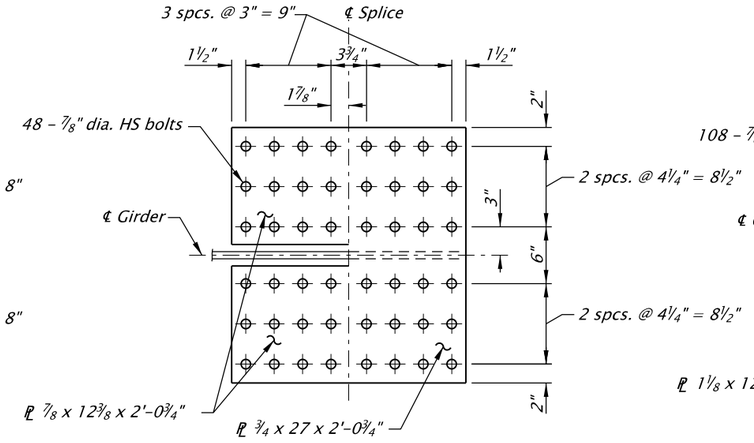
Rotation: 0° Sca=1



INSIDE **OUTSIDE**

1¾ x 26 FLANGE SPICE - PLAN

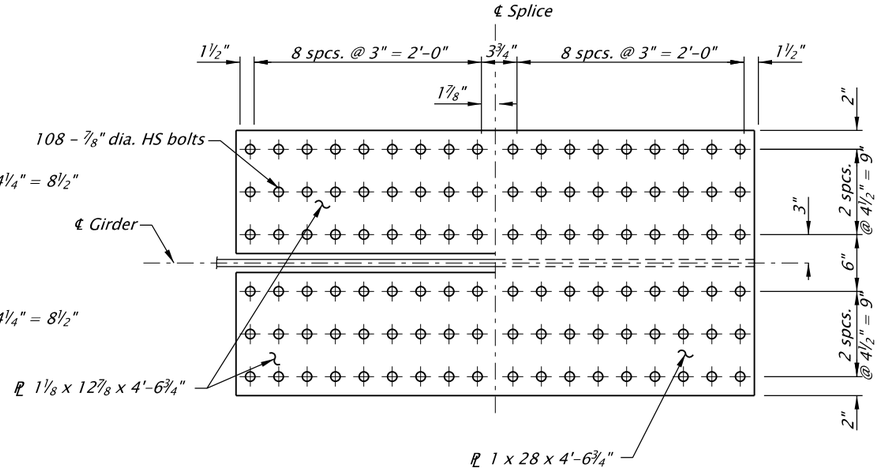
Scale: ¾" = 1'-0"



INSIDE **OUTSIDE**

1¼ x 27 FLANGE SPICE - PLAN

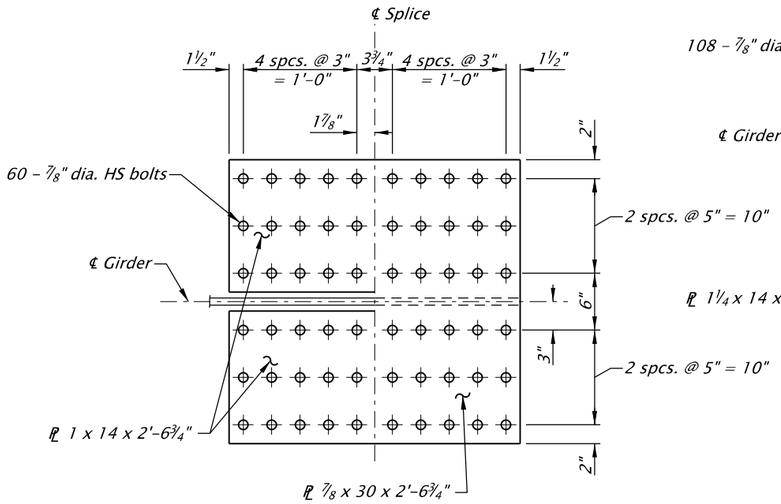
Scale: ¾" = 1'-0"



INSIDE **OUTSIDE**

1¾ x 28 FLANGE SPICE - PLAN

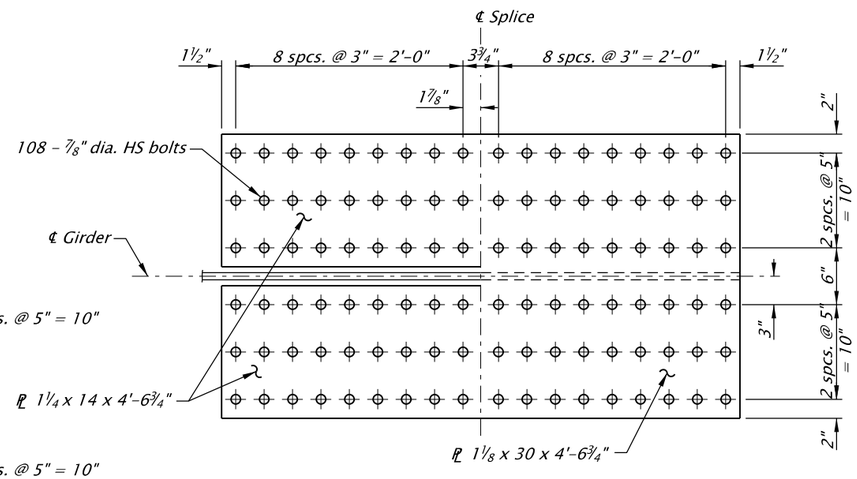
Scale: ¾" = 1'-0"



INSIDE **OUTSIDE**

1⅜ x 30 FLANGE SPICE - PLAN

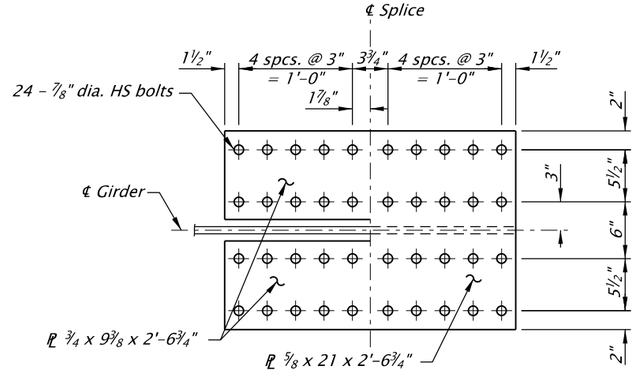
Scale: ¾" = 1'-0"



INSIDE **OUTSIDE**

2 x 30 FLANGE SPLICE - PLAN

Scale: ¾" = 1'-0"



INSIDE **OUTSIDE**

1 x 21 FLANGE SPLICE - PLAN

Scale: ¾" = 1'-0"

Notes:

1. *Flange splice size refers to the smaller flange at the splice location.*
2. *Fill ℄ size and thickness varies by location.*
3. *For locations of flange splices, see Girder Elevation sheets.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
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HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll Reviewer: Name

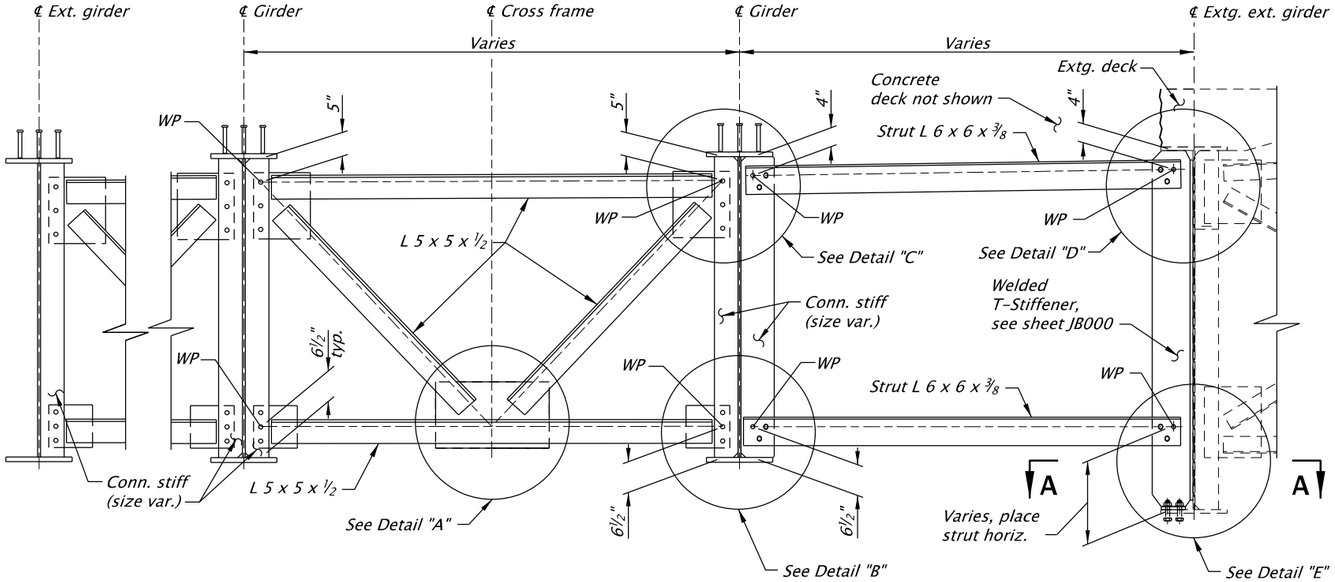
Drafter: Bob Maechler Checker: Name

WIDENING AND SEISMIC RETROFIT

PLATE GIRDER SPANS 1 thru 3 SPLICE DETAILS - 3

SHEET NO.

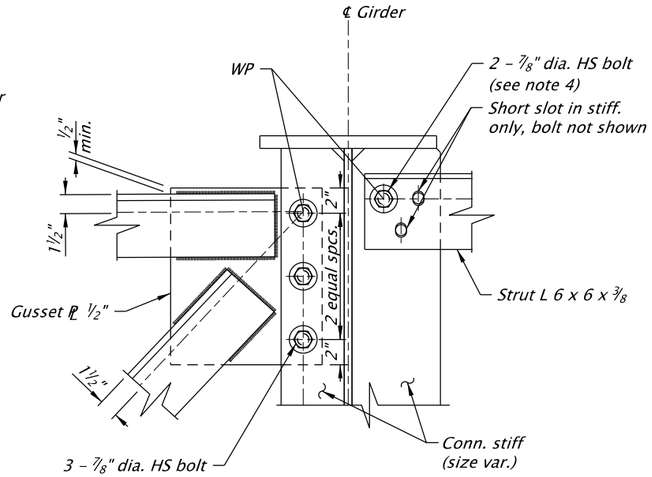
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



(Span 1 left side shown, Span 1 right side similar)

SPANS 1 THRU 3
INTERMEDIATE CROSS FRAME (K5)

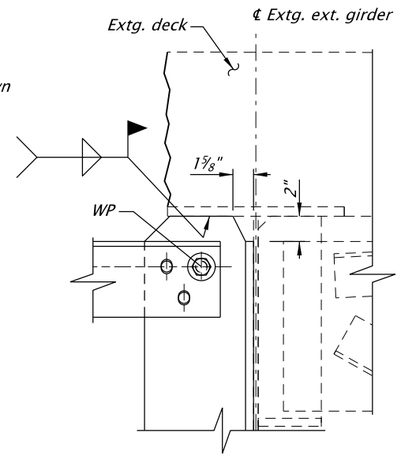
Scale: ⅜" = 1'–0"



(For details not shown, see Detail "B")

DETAIL "C"

Scale: 1" = 1'–0"



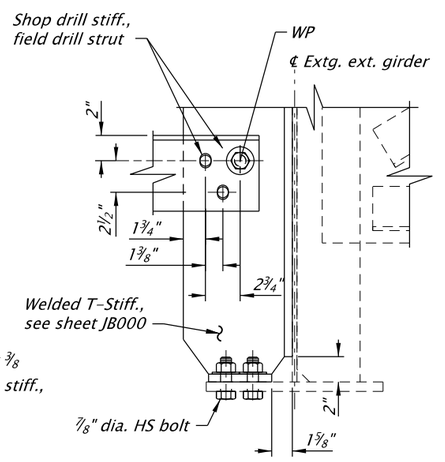
(For details not shown, see Detail "E")

DETAIL "D"

Scale: 1" = 1'–0"

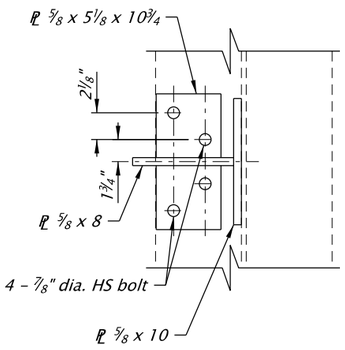
DETAIL "B"

Scale: 1" = 1'–0"



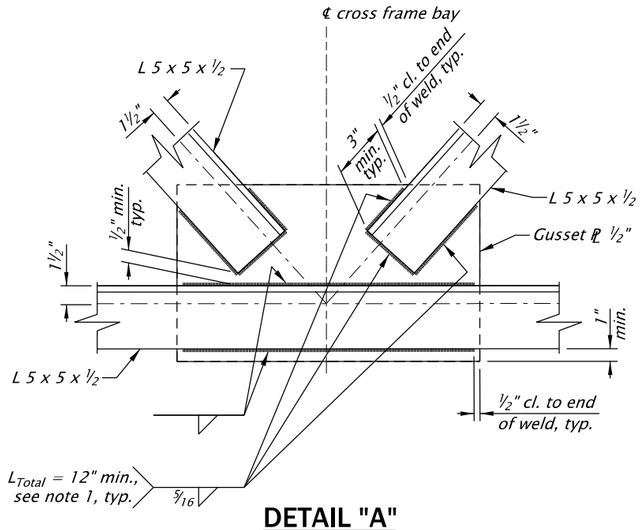
DETAIL "E"

Scale: 1" = 1'–0"



SECTION A-A

Scale: 1" = 1'–0"



DETAIL "A"

Scale: 1" = 1'–0"

Notes:

1. Weld details apply to all frame members unless otherwise noted.
2. For connection stiffener details, see Girder Elevation sheets.
3. 1½" minimum required at time of field drilling.
4. Snug tight. Peen threads or use locknuts.
5. Except for cross-slope drop, details are symmetrical about centerline of cross frame bay.
6. Vertical dimensions to WP's are from inside face of flange.

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - 0R213, PHASE 1 SEC.

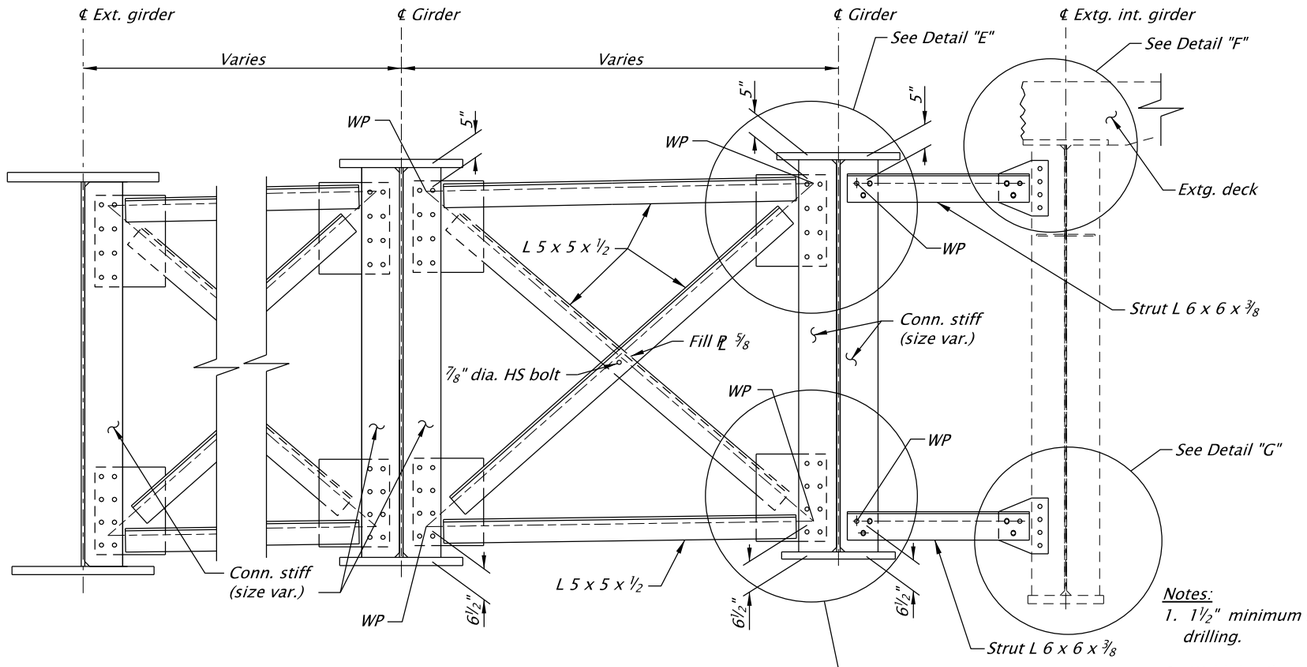
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPANS 1 THRU 3 CROSS FRAME K5 DETAI

SHEET NO.

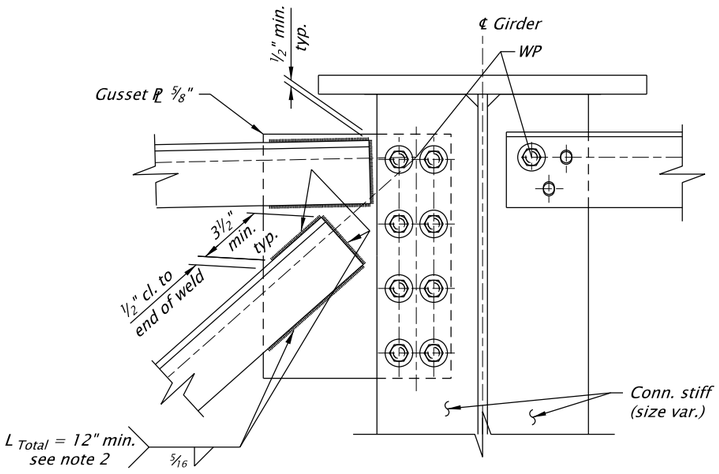
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



(Span 2 left side shown, Span 2 right side similar)

SPANS 1 THRU 3
INTERMEDIATE CROSS FRAME (X5)

Scale: ⅜" = 1'-0"



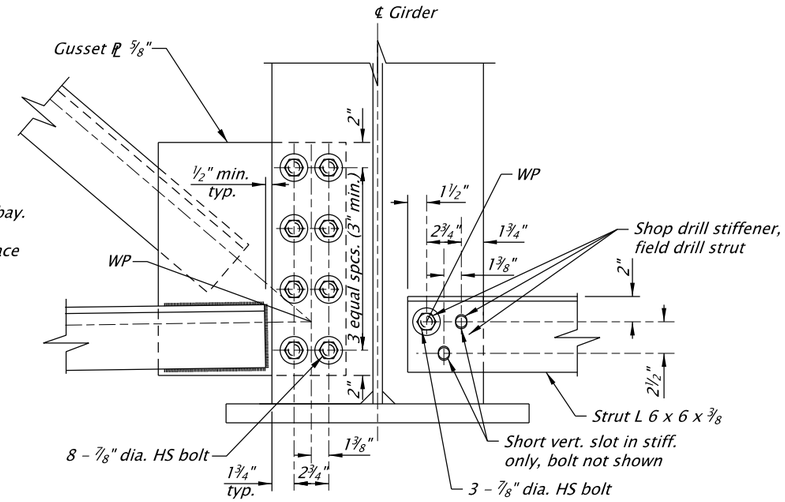
(For details not shown, see Detail "D")

DETAIL "E"

Scale: 1" = 1'-0"

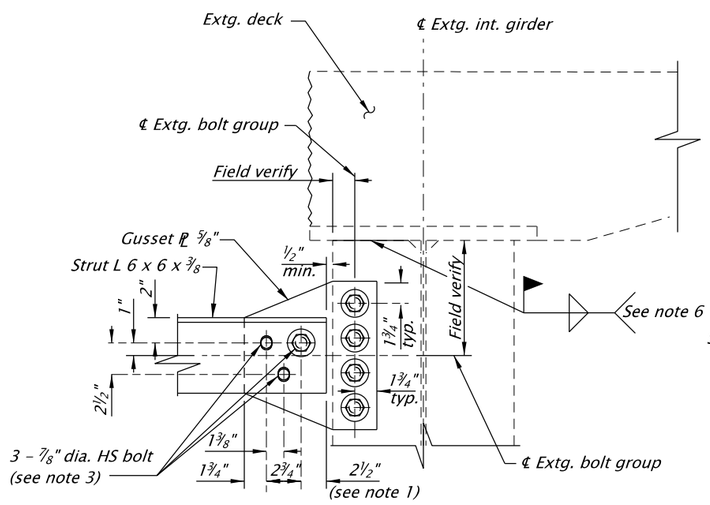
Notes:

1. 1½" minimum required at time of field drilling.
2. Weld details apply to all frame members unless otherwise noted.
3. Snug tight. Peen threads or use lock nuts.
4. Except for cross-slope drop, details are symmetrical about centerline of cross frame bay.
5. Vertical dimensions to WP's are from inside face of flange.
6. If present, remove existing seal weld.



DETAIL "D"

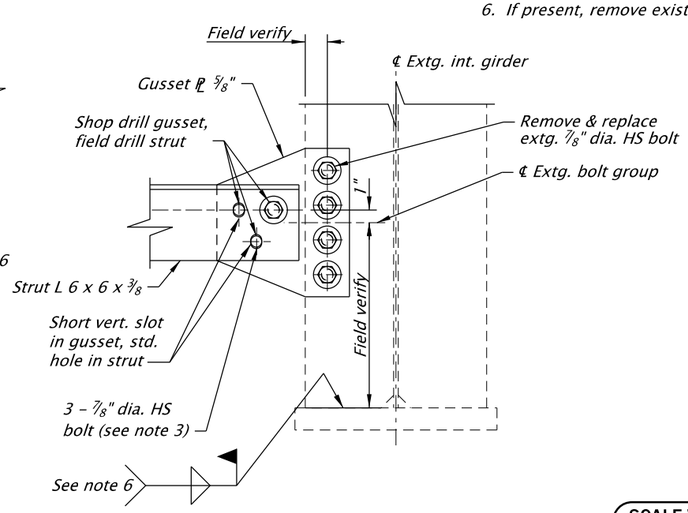
Scale: 1" = 1'-0"



(For details not shown, see Detail "G")

DETAIL "F"

Scale: 1" = 1'-0"



(For details not shown, see Detail "F")

DETAIL "G"

Scale: 1" = 1'-0"

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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DATE: X/XX/20
PROGRESS PRINT
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

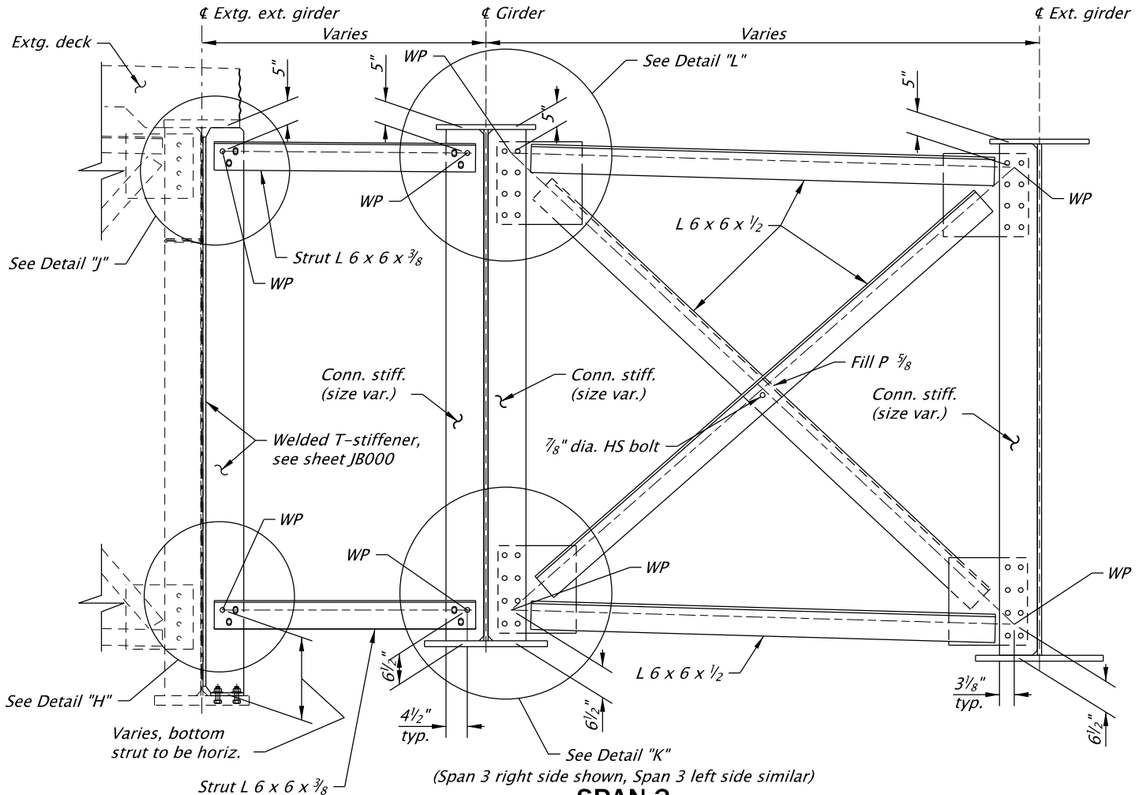
Designer: Luke Lockwood — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT

PLATE GIRDER SPANS 1 THRU 3 CROSS FRAME X5 DETAI

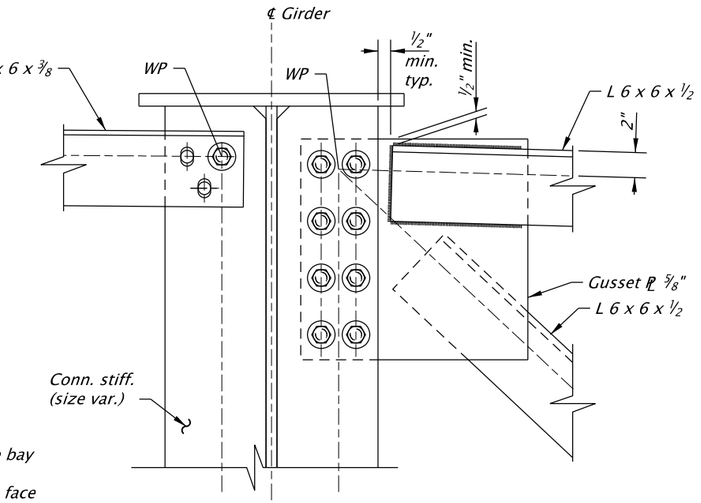
SHEET NO.



SPAN 3
INTERMEDIATE CROSS FRAME (X6)
Scale: ⅜" = 1'-0"

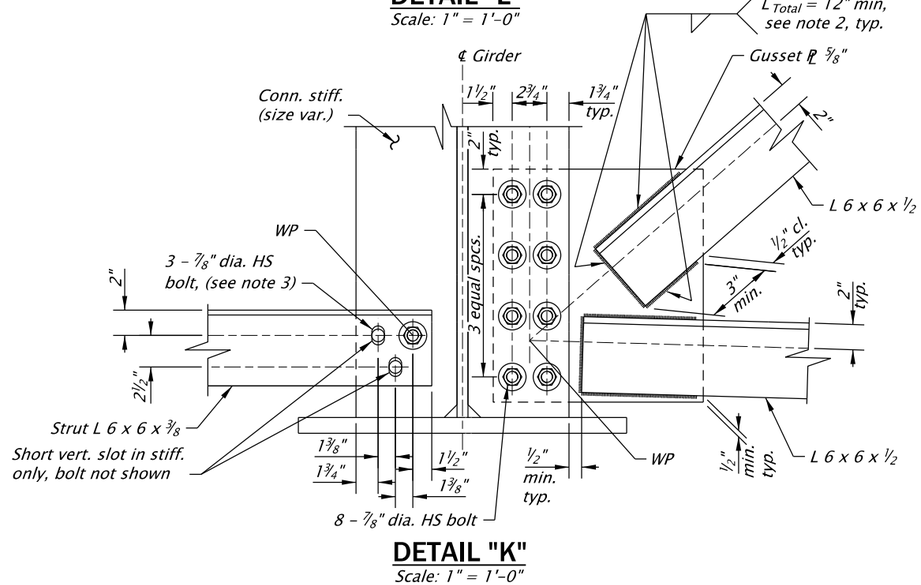
Notes:

1. 1½" minimum required at time of field drilling.
2. Weld details apply to all frame members unless otherwise noted.
3. Snug tight. Peen threads or use lock nuts.
4. Expect for cross-slope drop, details are symmetrical about centerline of cross frame bay
5. Vertical dimensions to WP's are from inside face of flange.

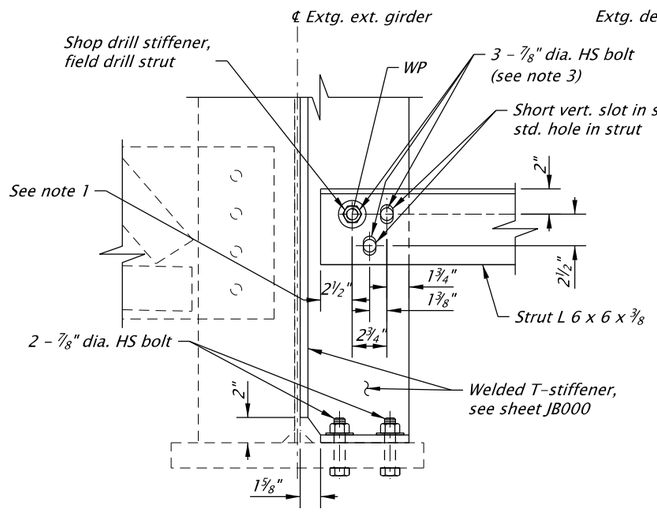


(For details not shown, see Detail "K")

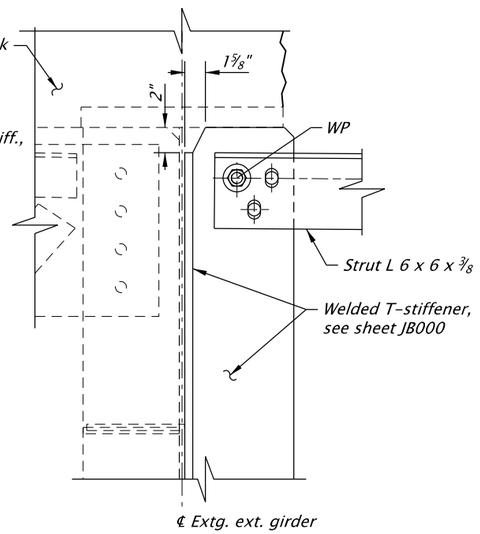
DETAIL "L"
Scale: 1" = 1'-0"



DETAIL "K"
Scale: 1" = 1'-0"



DETAIL "H"
Scale: 1" = 1'-0"



(For details not shown, see Detail "H")

DETAIL "J"
Scale: 1" = 1'-0"

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
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DATE: X/XX/20 PROGRESS PRINT INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

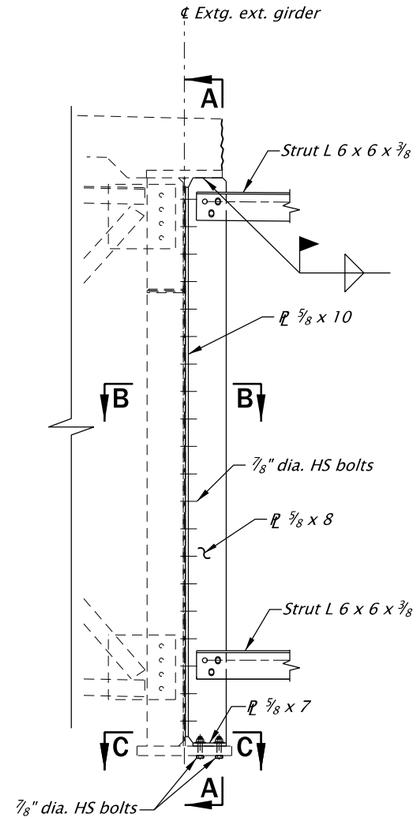
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
PLATE GIRDER SPANS 1 THRU 3 CROSS FRAME X6 DETAILS

SHEET NO.

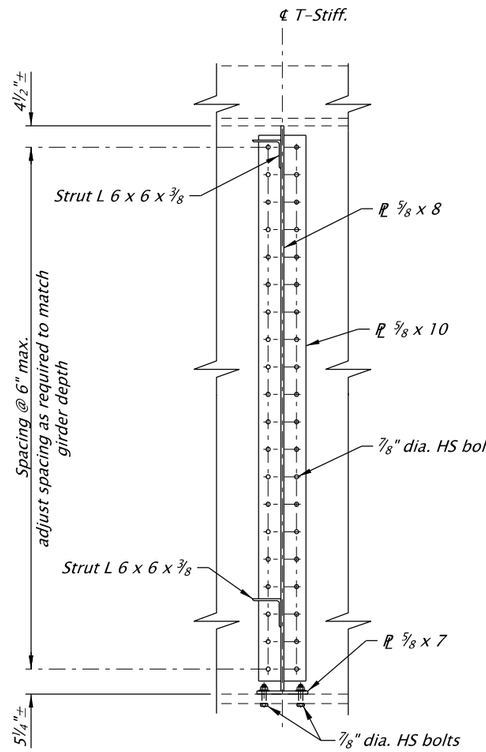
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



(Cross Frame X6 shown, others similar)

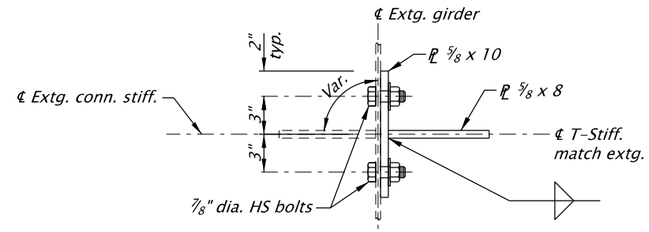
WELDED T-STIFFENER DETAIL

Scale: 3/8" = 1'-0"



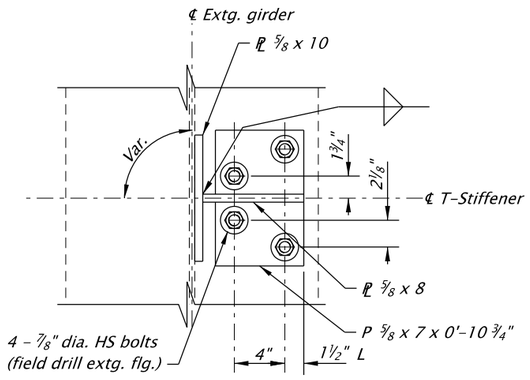
SECTION A-A

Scale: 3/8" = 1'-0"



SECTION B-B

Scale: 1" = 1'-0"



SECTION C-C

Scale: 1" = 1'-0"

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Luke Lockwood | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

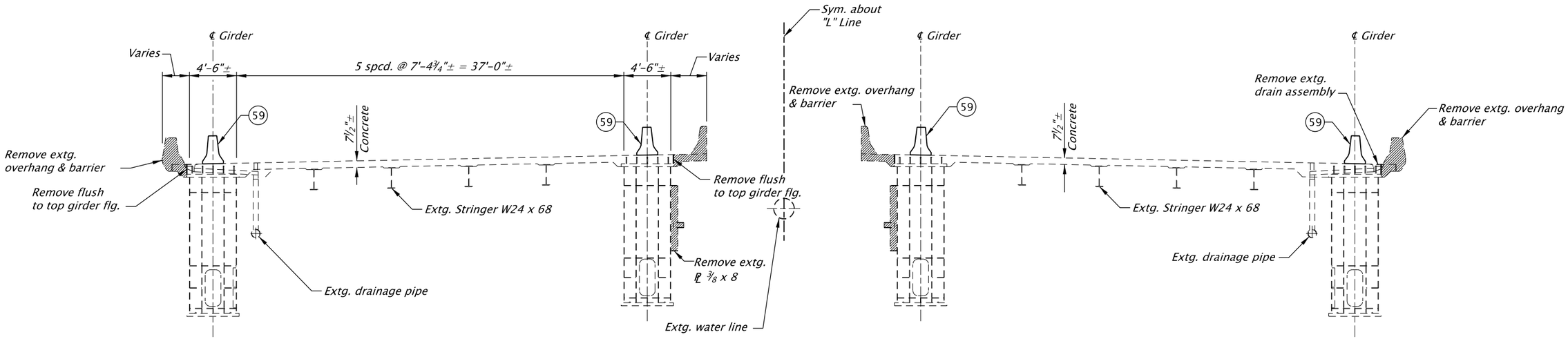
WIDENING AND SEISMIC RETROFIT

PLATE GIRDER SPANS 1 THRU 3 CROSS FRAME X6 DETAILS

SHEET NO.

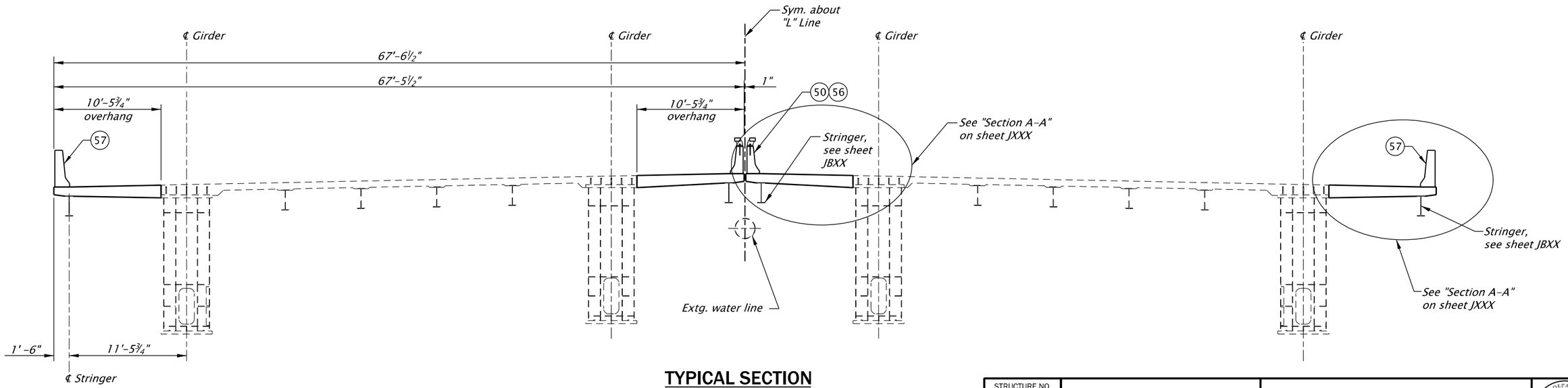
BR_K21400_QEI_gdcf_04.dgn :: Default 2/7/2020 5:00:54 PM CDONOVAN

Rotation: 0° Sca=1



TYPICAL SECTION - PARTIAL REMOVAL

Scale: 1" = 10'



TYPICAL SECTION

Scale: 1" = 10'

DETAIL REFERENCE NUMBERS:

(50) *Type "F" Concrete Rail, see dwg. BR200 for details*

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

(59) *Temporary Precast Concrete Barrier Pin and Loop/Anchors, see details DET3295 & DET3296 for details*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

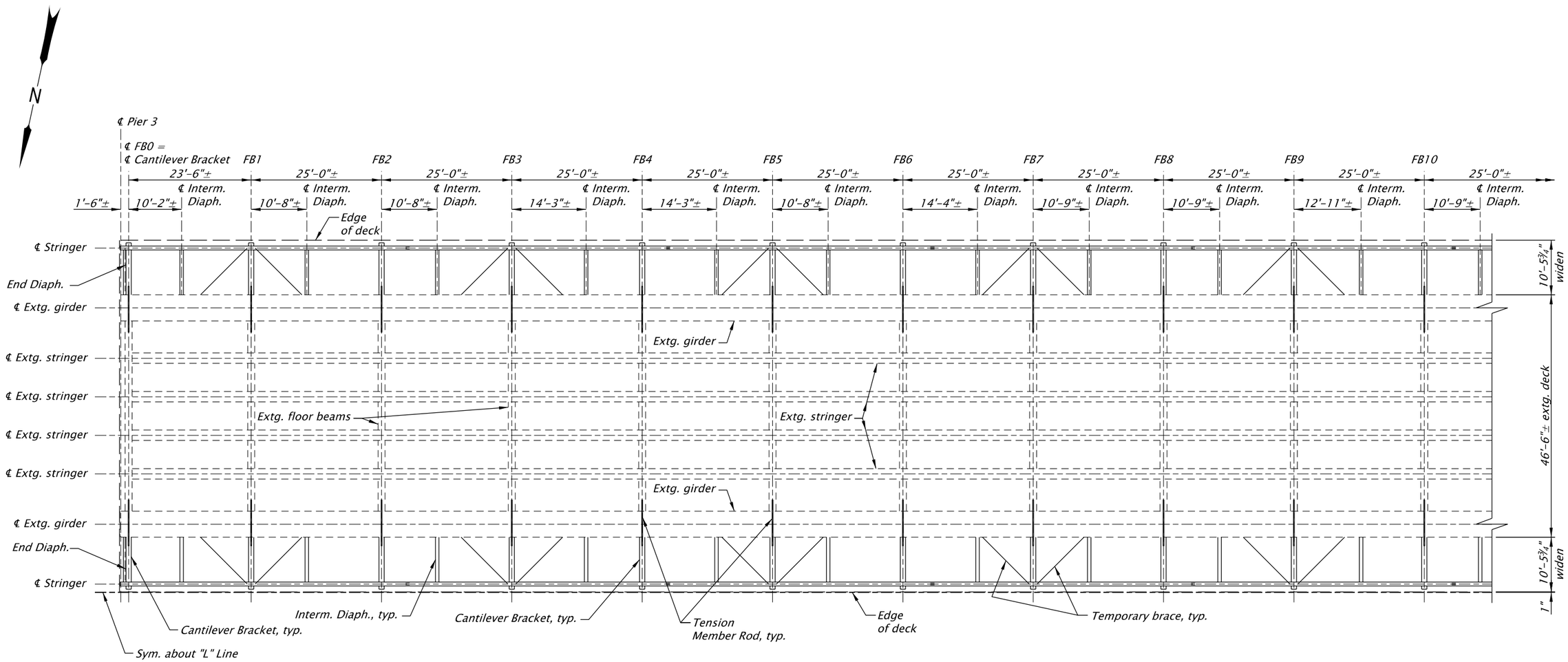
WIDENING AND SEISMIC RETROFIT BOX GIRDER TYPICAL SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

BR_K21400_QEI_gdty_01.dgn :: Default 2/9/2020 12:05:57 PM CDONOVAN

Rotation: 0° Sca 1



FRAMING PLAN

Scale: 1" = 20'

Notes:

1. *See sheets JBXX, JBXX and JBXX for Cantilever Bracket.*
2. *See sheet JBXX for Intermediate Diaphragm.*
3. *See sheet JBXX for Pier 3 End Diaphragm.*
4. *See sheet JBXX for Pier 6 End Diaphragm.*
5. *See sheet JBXX for Temporary Brace.*
6. *See sheets JBXX, JBXX, JBXX, JBXX and JBXX for Stringers.*
7. *See sheets JBXX, JBXX, JBXX and JBXX for concrete deck widen.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20 PROGRESS PRINT INFORMATION ONLY

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QUINCY ENGINEERING

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

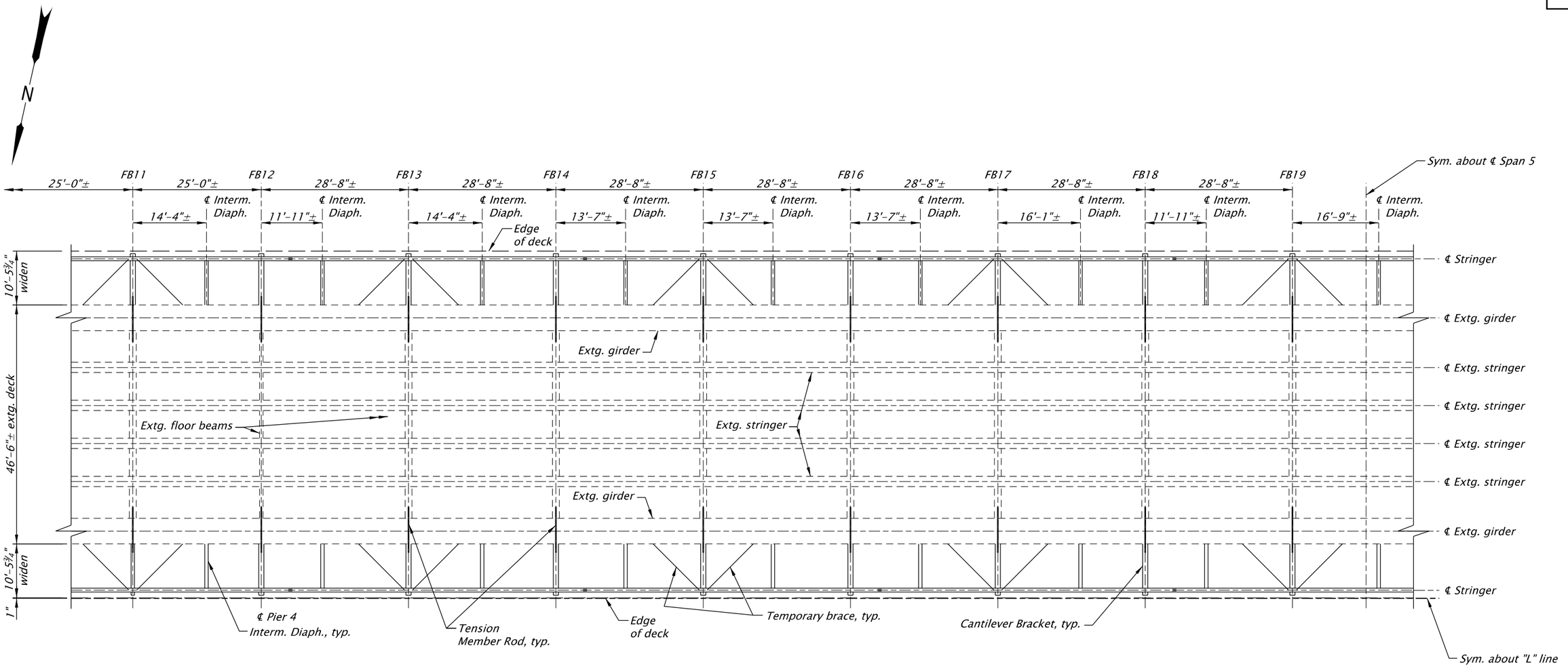
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FRAMING PLAN - 1

SHEET NO.



FRAMING PLAN

Scale: 1" = 20'

Notes:

1. *See sheets JBXX, JBXX and JBXX for Cantilever Bracket.*
2. *See sheet JBXX for Intermediate Diaphragm.*
3. *See sheet JBXX for Pier 3 End Diaphragm.*
4. *See sheet JBXX for Pier 6 End Diaphragm.*
5. *See sheet JBXX for Temporary Brace.*
6. *See sheets JBXX, JBXX, JBXX, JBXX and JBXX for Stringers.*
7. *See sheets JBXX, JBXX, JBXX and JBXX for concrete deck widen.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FRAMING PLAN - 2

SHEET NO.

BR_K21400_QEI_gdfa_02.dgn :: Default 2/9/2020 12:07:14 PM CDONOVAN

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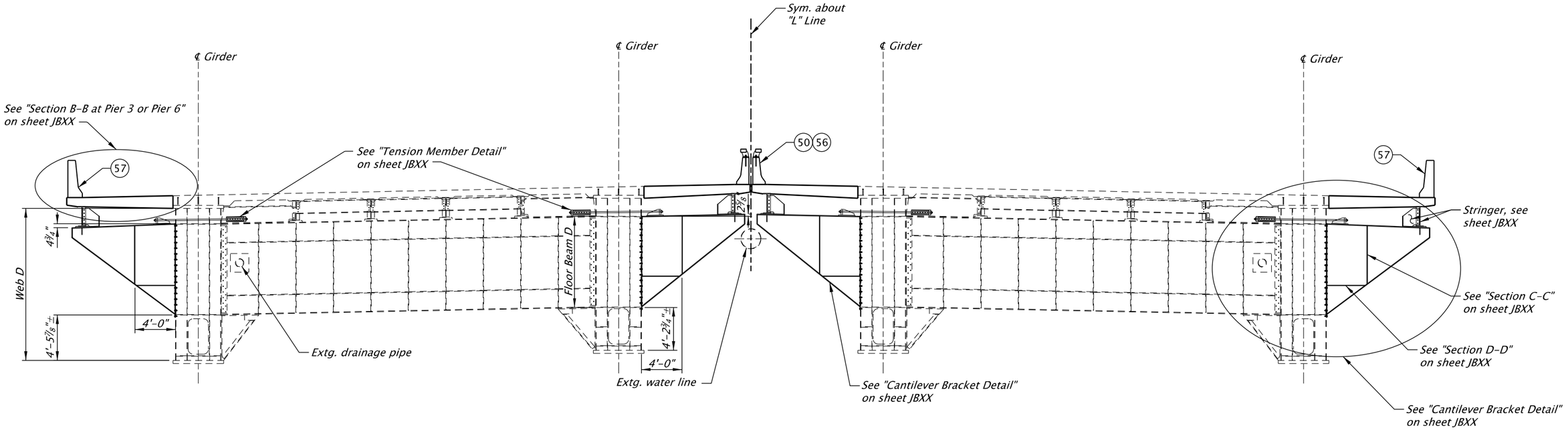

FLOOR BEAM 0

Scale: 1" = 10'

Dimension				
Location	Web D*	Floor Beam Depth	Floor Beam Web Thick	Floor Beam Flanges
FB0	15'-0"±	9'-0"±	⅜"±	¾"x16±

* Web depth measured vertical

DETAIL REFERENCE NUMBERS:

(50) Type "F" Concrete Rail, see dwg. BR200 for details

(56) Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details

(57) Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

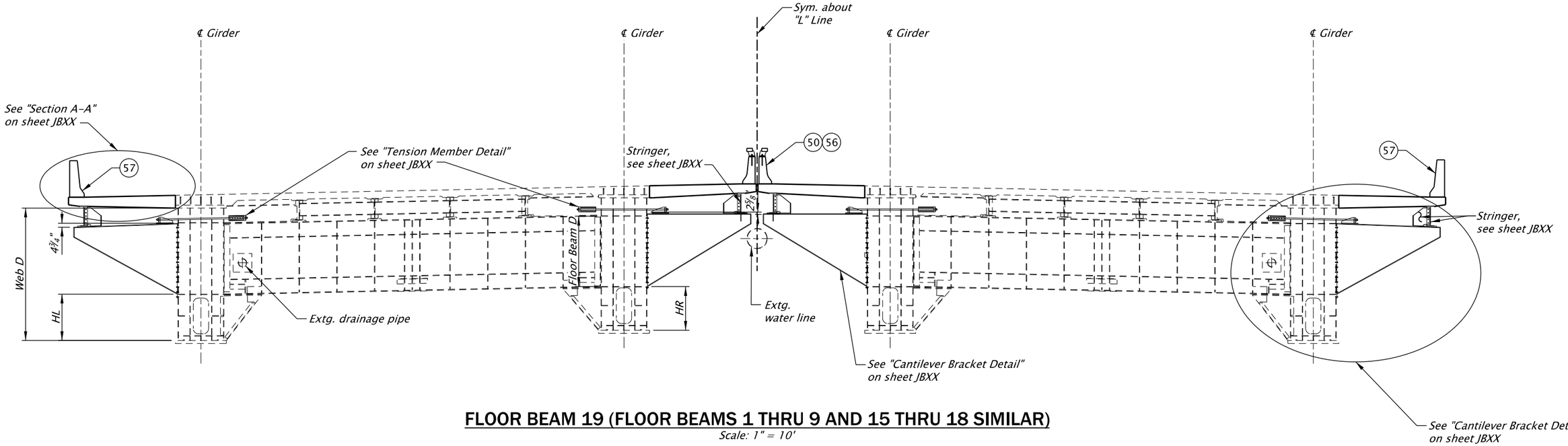
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FLOOR BEAM 0

SHEET NO.



FLOOR BEAM 19 (FLOOR BEAMS 1 THRU 9 AND 15 THRU 18 SIMILAR)

Scale: 1" = 10'

Dimension						
Location	Web D*	Floor Beam Depth	Floor Beam Web Thick	Floor Beam Flanges	HL	HR
FB1	13'-2¾"±	6'-11¾"±	⅜"±	¾"x16±	4'-8⅞"±	4'-5¾"±
FB2-FB8	13'-0"±	6'-11¾"±	⅜"±	¾"x16±	4'-6⅛"±	4'-3"±
FB9	13'-2 9/16"±	6'-11¾"±	⅜"±	¾"x16±	4'-8 1/16"±	4'-5 9/16"±
FB15	13'-0¼"±	6'-11¾"±	⅜"±	¾"x16±	4'-6⅜"±	4'-3¼"±
FB16-FB19	13'-0"±	6'-11¾"±	⅜"±	¾"x16±	4'-6⅛"±	4'-3"±

* Web depth measured normal to girder top flange slope

DETAIL REFERENCE NUMBERS:

(50) Type "F" Concrete Rail, see dwg. BR200 for details

(56) Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details

(57) Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
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CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FLOOR BEAMS 1 THRU 9 & 15 THRU 1

SHEET NO.

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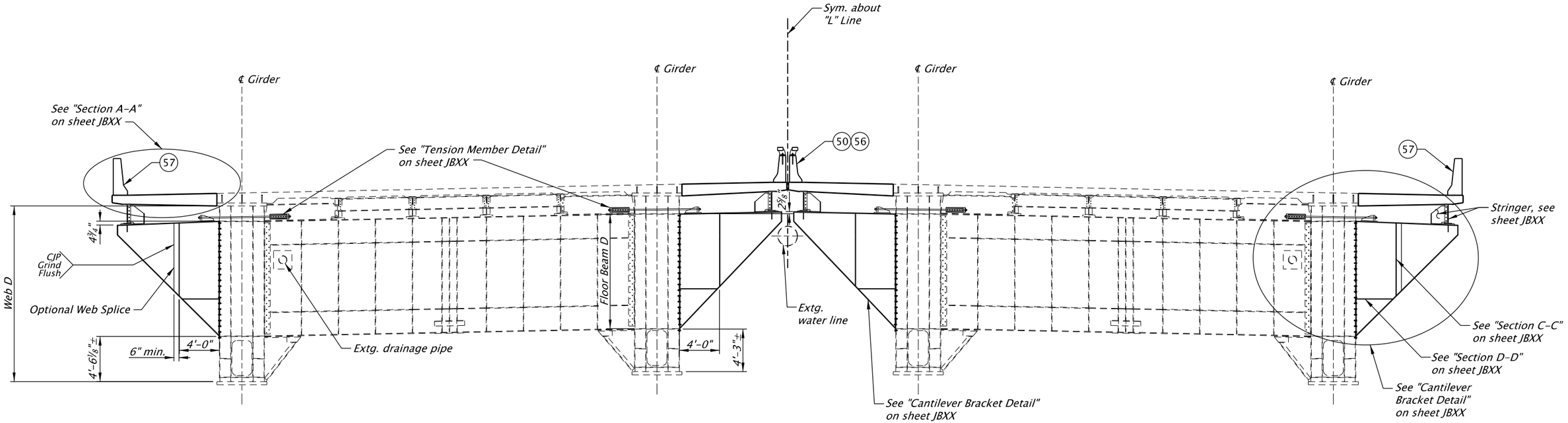
Rotation: 0° Sca 1



FLOOR BEAM 11 (FLOOR BEAMS 10, 13 AND 14 SIMILAR)

Scale: 1" = 10'

Location	Dimension			
	Web D*	Floor Beam Depth	Floor Beam Web Thick	Floor Beam Flanges
FB10	14'-8⅛"±	8'-7⅞"±	7/16"±	¾"x16±
FB11	17'-6⁷/16"±	11'-6³/16"±	½"±	¾"x16±
FB13	17'-3⅜"±	11'-3⅛"±	½"±	¾"x16±
FB14	14'-2¹/16"±	8'-2⁷/16"±	7/16"±	¾"x16±

* Web depth measured normal to girder top flange slope

DETAIL REFERENCE NUMBERS:

(50) *Type "F" Concrete Rail, see dwg. BR200 for details*

(56) *Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details*

(57) *Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT

BOX GIRDER FLOOR BEAMS 10, 11, 13 & 14

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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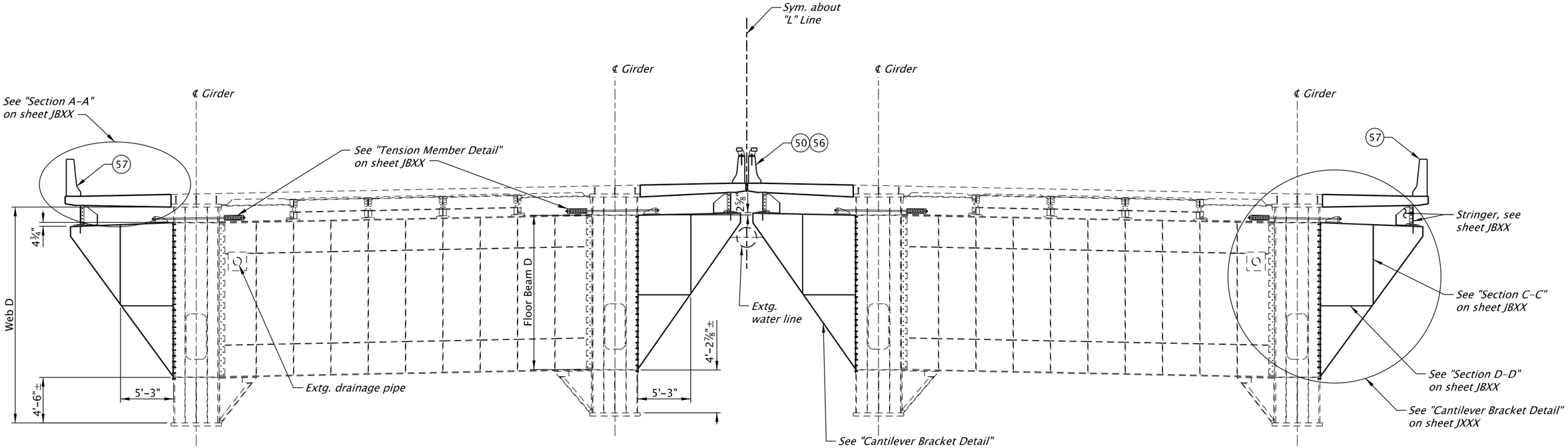
Rotation: 0° Sca = 1



FLOOR BEAM 12

Scale: 1" = 10'

Dimension				
Location	Web D*	Floor Beam Depth	Floor Beam Web Thick	Floor Beam Flanges
FB12	21'-4⅜"±	15'-4¼"±	9/16"±	1"x18±

* Web depth measured vertical

DETAIL REFERENCE NUMBERS:

(50) Type "F" Concrete Rail, see dwg. BR200 for details

(56) Type "F" Concrete Rail Rectangular Tube Retrofit, see dwg. BR285 & BR286 for details

(57) Type "F" Concrete Rail, 42 Inch, see dwg. BR290 for details

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
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CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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PROGRESS PRINT
INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

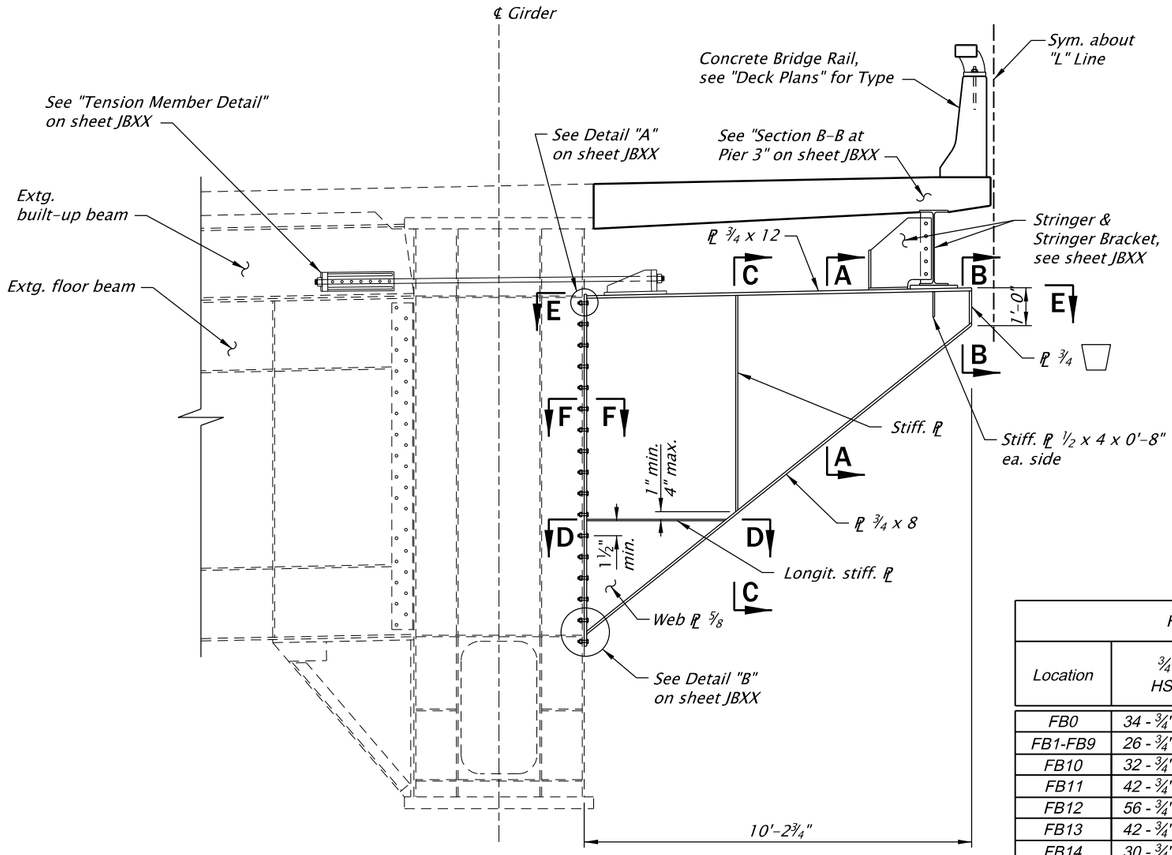
Designer: Martin Pohll — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FLOOR BEAM 12

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



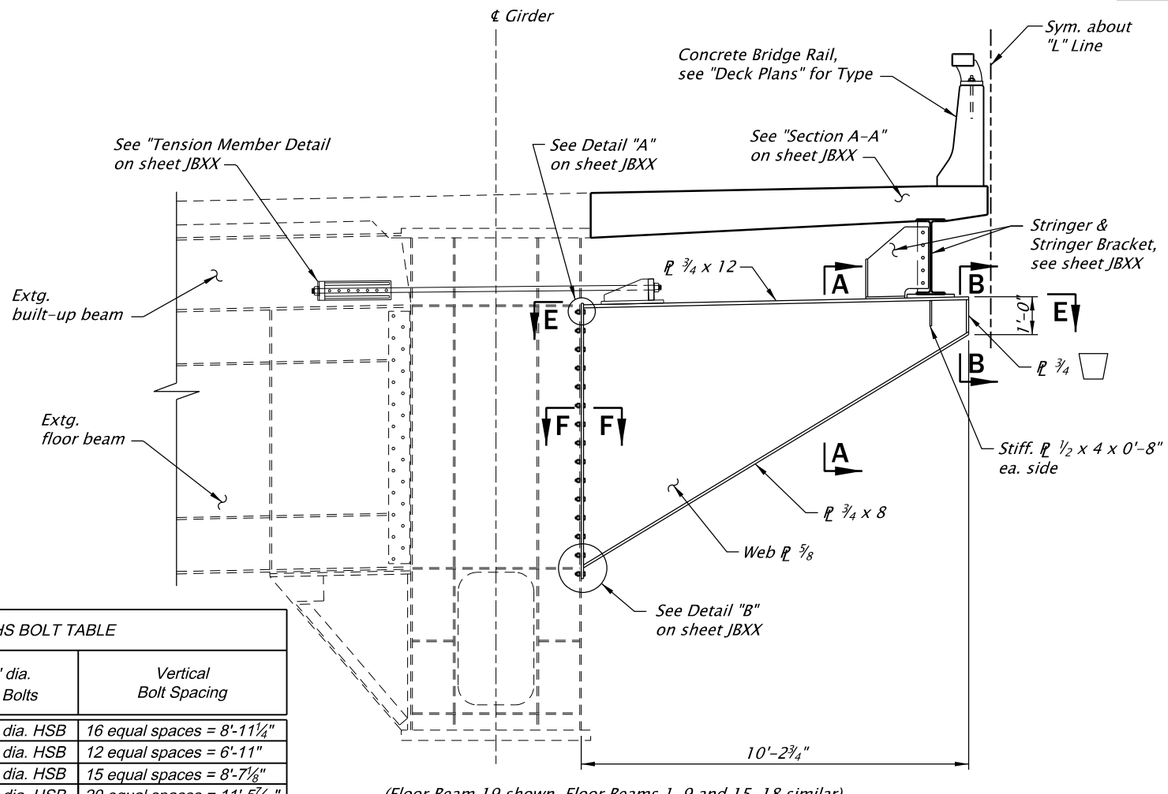
(Floor Beam 0 shown, Floor Beams 10–14 similar)
(Interior widening shown, Exterior widening similar)

CANTILEVER BRACKET DETAIL

Scale: ¼" = 1'-0"

HS BOLT TABLE		
Location	¾" dia. HS Bolts	Vertical Bolt Spacing
FB0	34 - ¾" dia. HSB	16 equal spaces = 8'-11¼"
FB1-FB9	26 - ¾" dia. HSB	12 equal spaces = 6'-11"
FB10	32 - ¾" dia. HSB	15 equal spaces = 8'-7⅛"
FB11	42 - ¾" dia. HSB	20 equal spaces = 11'-5⁷⁄₁₆"
FB12	56 - ¾" dia. HSB	27 equal spaces = 15'-3½"
FB13	42 - ¾" dia. HSB	20 equal spaces = 11'-2⅜"
FB14	30 - ¾" dia. HSB	14 equal spaces = 8'-1¹¹⁄₁₆"
FB15-FB19	26 - ¾" dia. HSB	12 equal spaces = 6'-11"

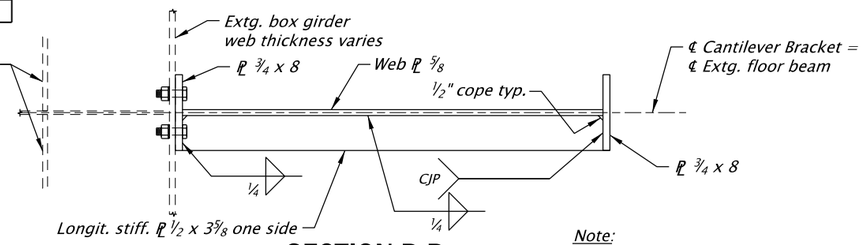
Note: Adjust bolt spacing based on field measured floor beam depth.



(Floor Beam 19 shown, Floor Beams 1–9 and 15–18 similar)
(Interior widening shown, Exterior widening similar)

CANTILEVER BRACKET DETAIL

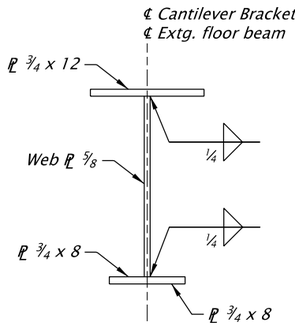
Scale: ¼" = 1'-0"



SECTION D-D

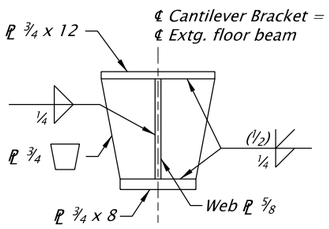
Scale: ¾" = 1'-0"

Note:
For details not shown, see sheet JBXX.



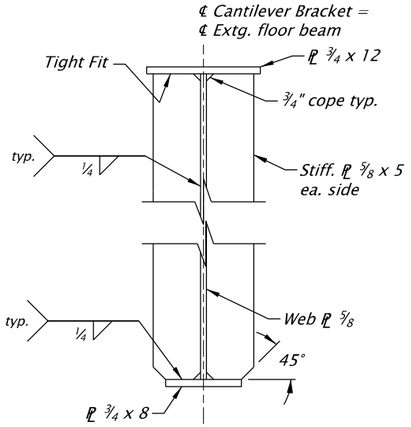
SECTION A-A

Scale: ¾" = 1'-0"



SECTION B-B

Scale: ¾" = 1'-0"



SECTION C-C

Scale: ¾" = 1'-0"

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
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HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FLOOR BEAM DETAILS - 1

SHEET NO.

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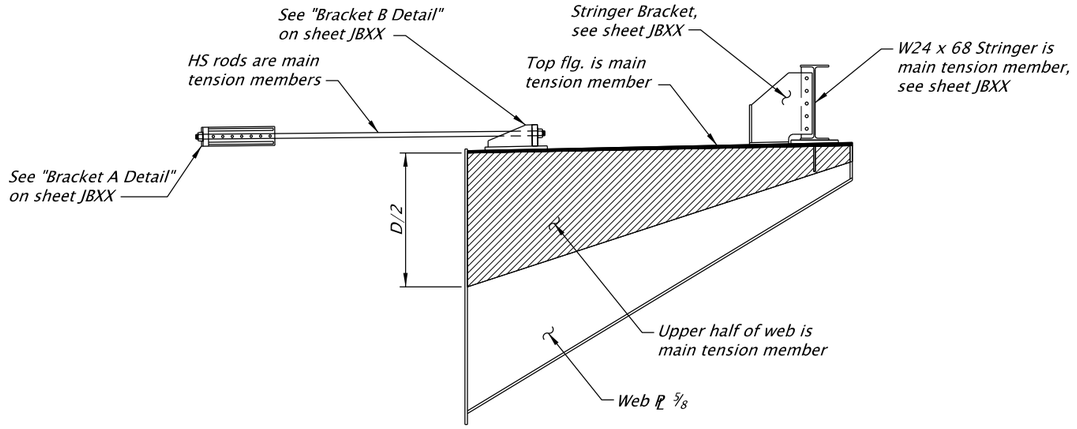
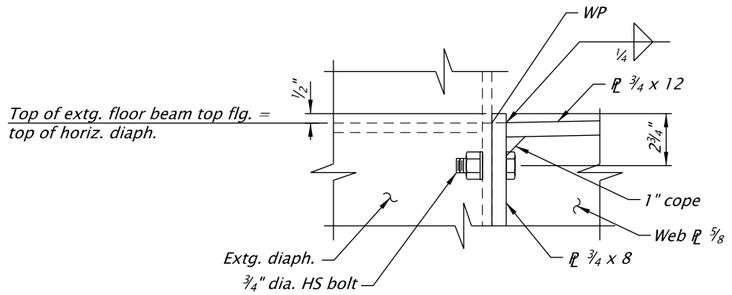
Rotation: 0° Sca=1



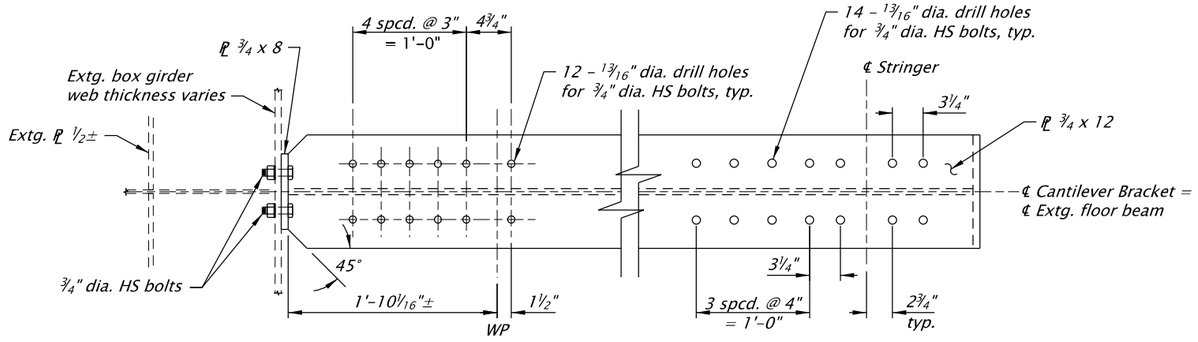
MAIN TENSION MEMBER DETAIL

Scale: 1/4" = 1'-0"



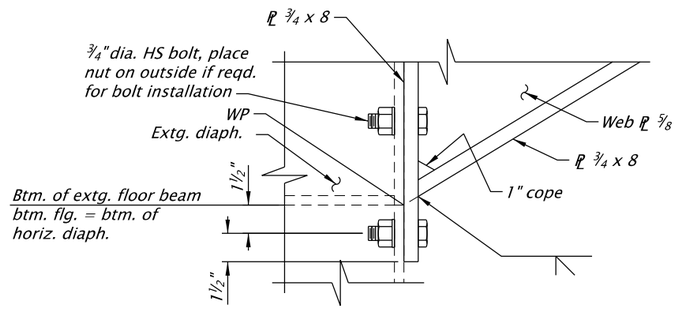
DETAIL "A"

Scale: 1 1/2" = 1'-0"



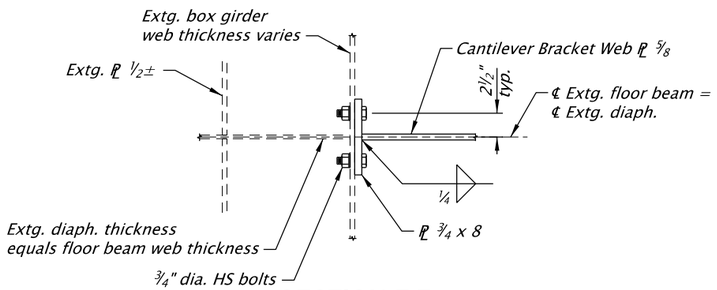
SECTION E-E

Scale: 3/4" = 1'-0"



DETAIL "B"

Scale: 1 1/2" = 1'-0"



SECTION F-F

Scale: 3/4" = 1'-0"

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FLOOR BEAM DETAILS - 2

SHEET NO.

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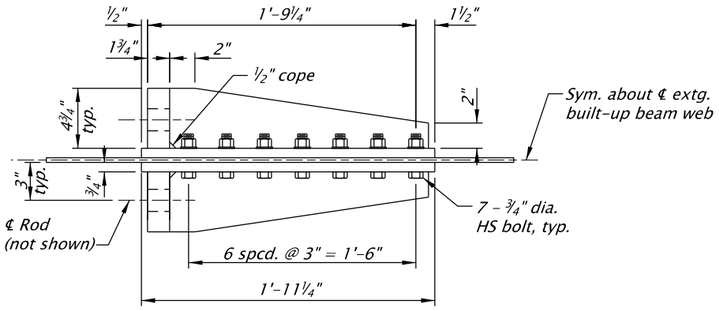
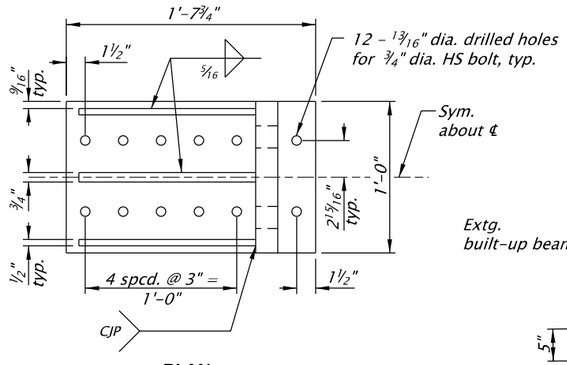


PLAN



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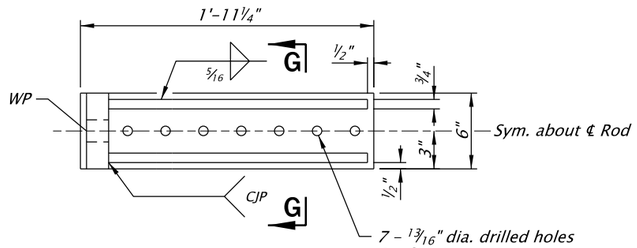
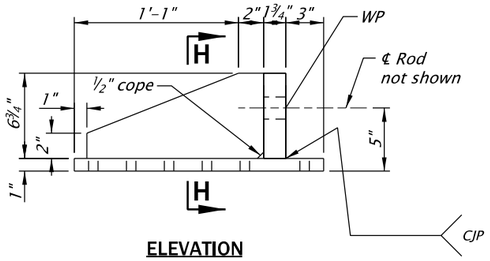
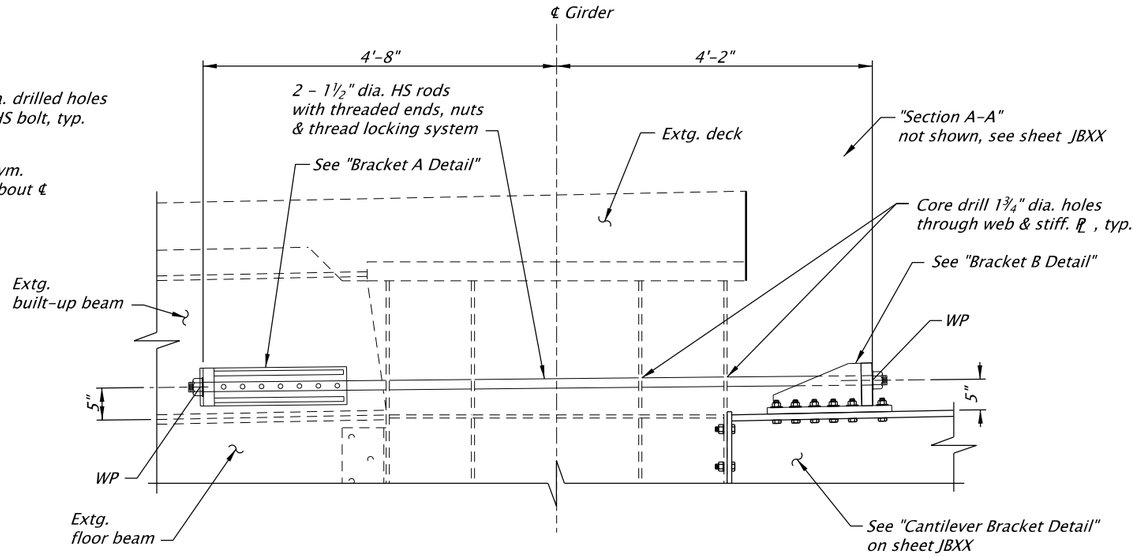


ELEVATION

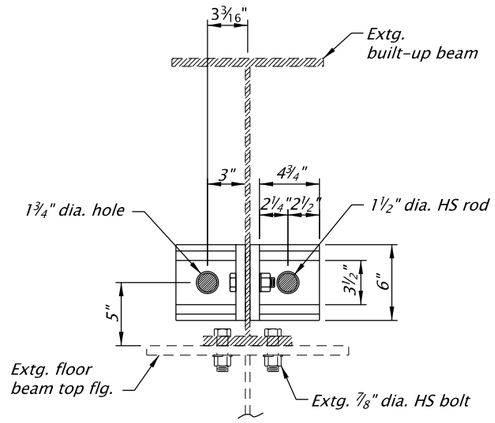


ELEVATION

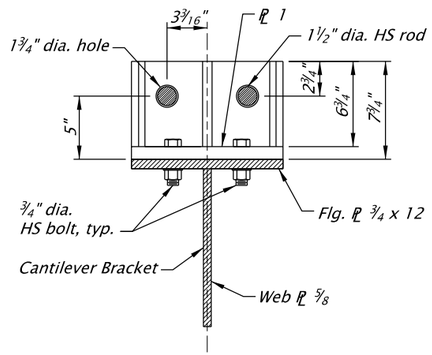


TENSION MEMBER DETAIL

Scale: ½" = 1'-0"



SECTION G-G



SECTION H-H

BRACKET A DETAIL

Scale: 1" = 1'-0"

BRACKET B DETAIL

Scale: 1" = 1'-0"

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
PROGRESS PRINT
INFORMATION ONLY

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

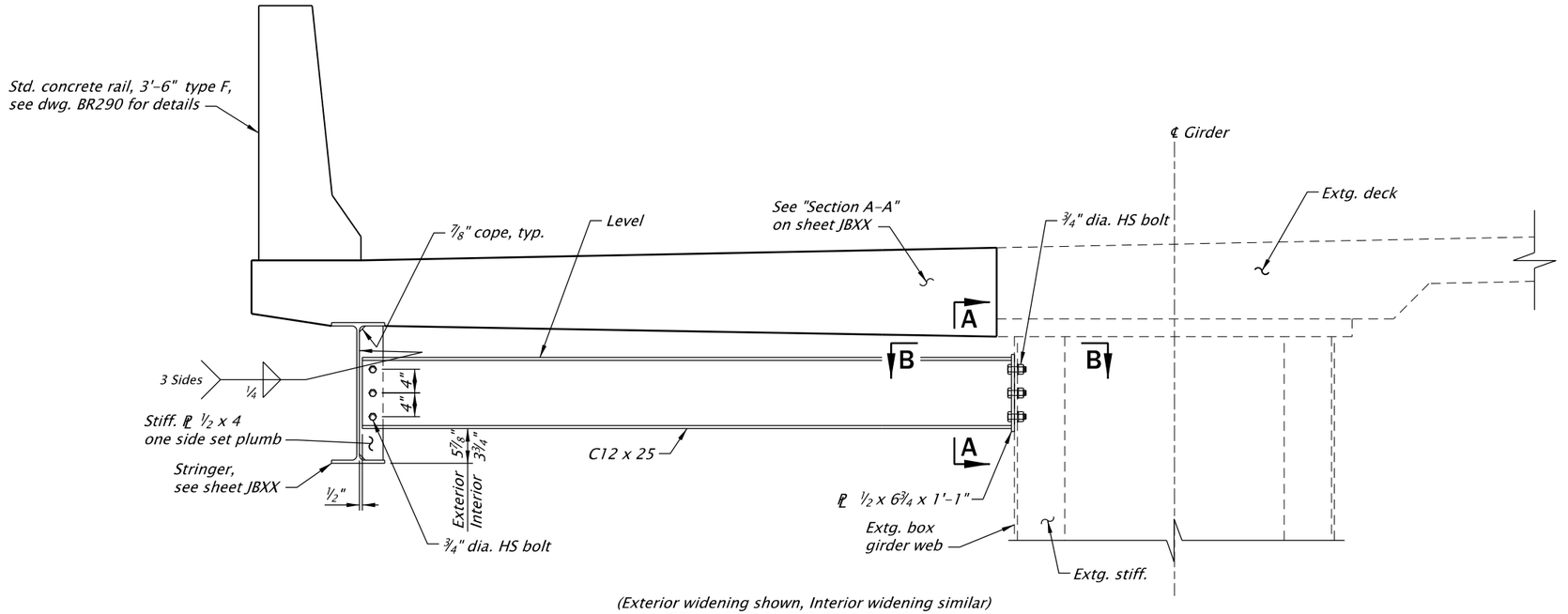
Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER FLOOR BEAM DETAILS - 3

SHEET NO.

BR_K21400_QEI_gdfb_07.dgn :: Default 2/9/2020 12:08:00 PM CDONOVAN

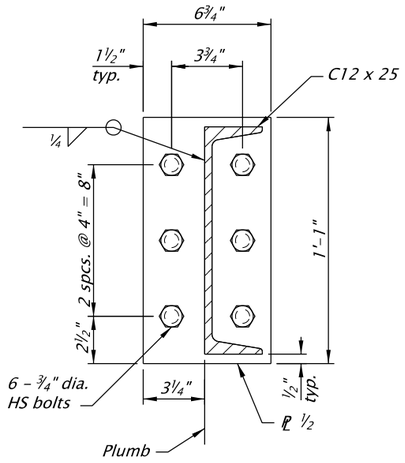
Rotation: 0° Sca =1



(Exterior widening shown, Interior widening similar)

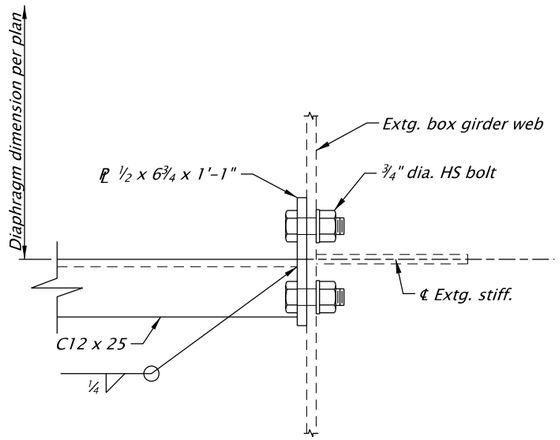
INTERMEDIATE DIAPHRAGM

Scale: ½= 1'-0"



SECTION A-A

Scale: 1½= 1'-0"



SECTION B-B

Scale: 1½" = 1'-0"

Notes:

1. *Field locate existing box girder stiffeners to establish diaphragm location.*
2. *Box girder web thickness varies.*

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DESIGN IN ADVANCE
PROGRESS PRINT
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

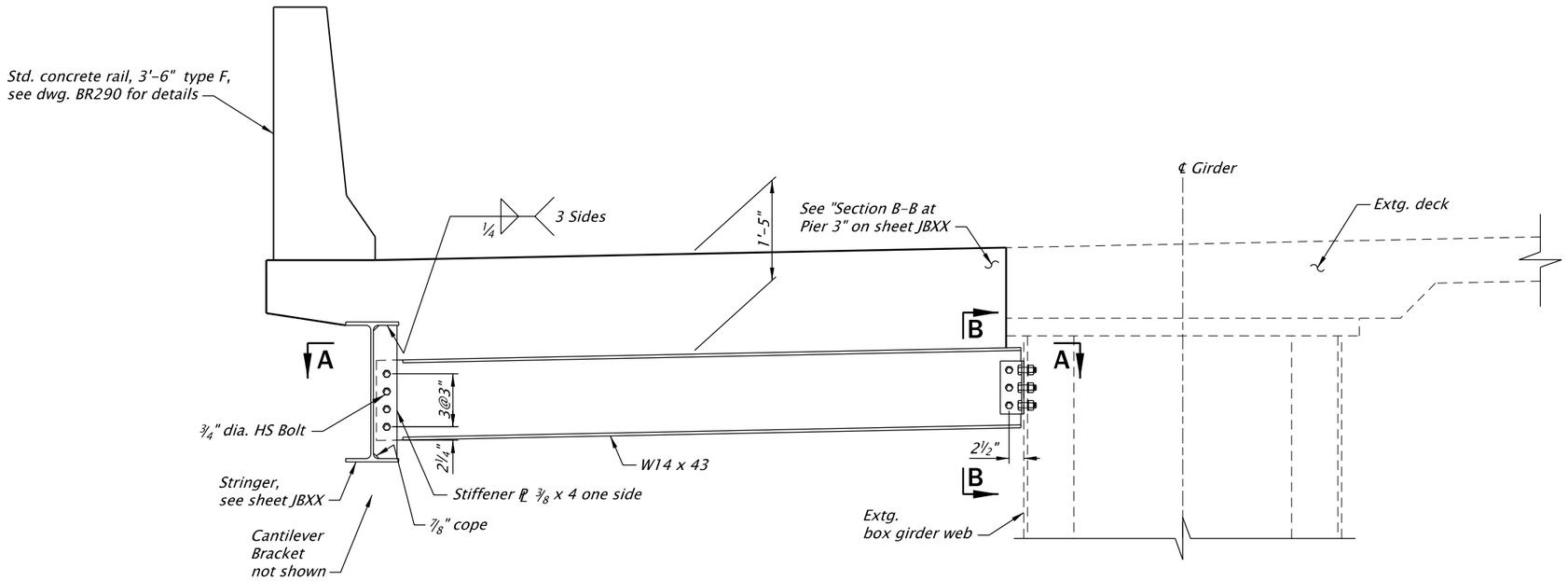
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER INTERMEDIATE DIAPHRAGM

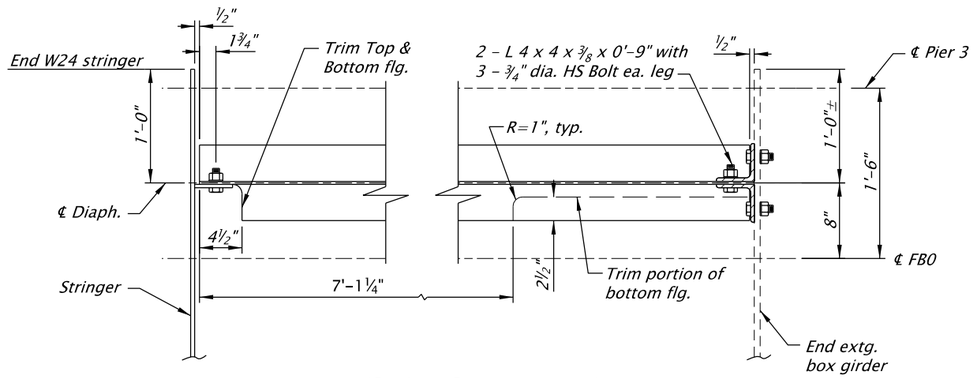
SHEET NO.



(Exterior widening shown, Interior widening similar)

END DIAPHRAGM PIER 3

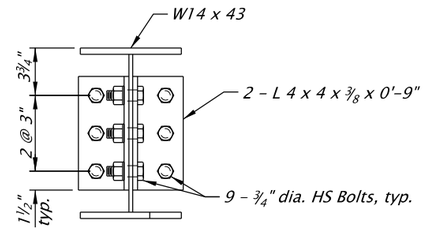
Scale: ½" = 1'-0"



(Cantilever Bracket not shown)

SECTION A-A

Scale: ¾" = 1'-0"



SECTION B-B

Scale: 1½" = 1'-0"

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

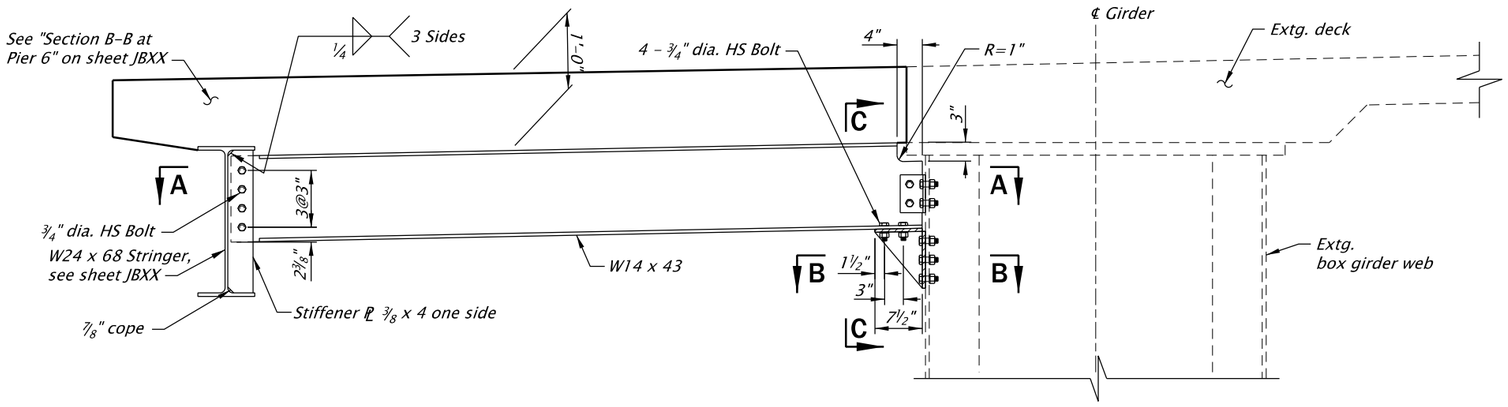
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER END DIAPHRAGM PIER 3

SHEET NO.

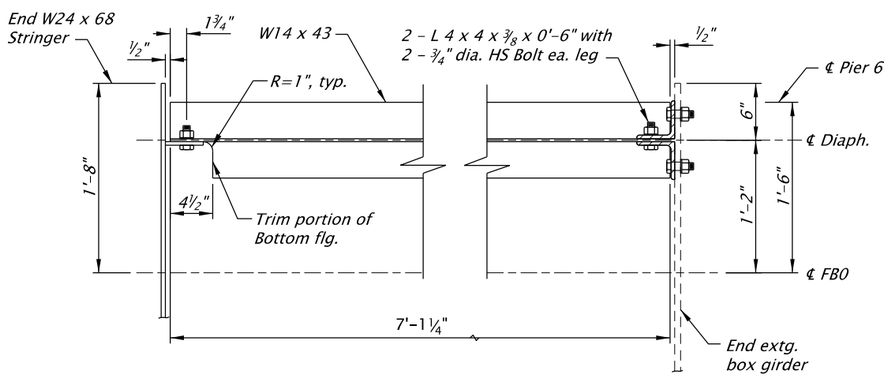
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



(Exterior widening shown, Interior widening similar)

END DIAPHRAGM PIER 6

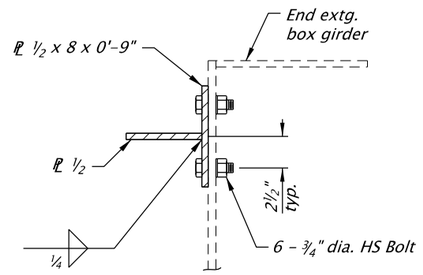
Scale: 1/2" = 1'-0"



(Cantilever Bracket not shown)

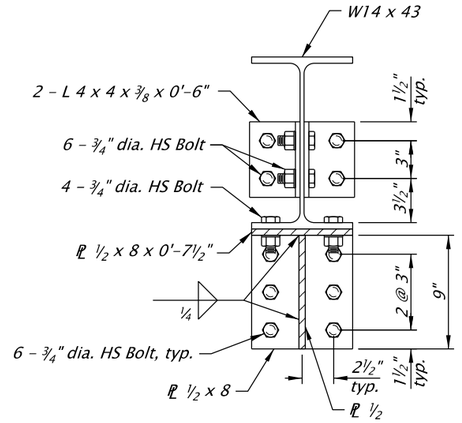
SECTION A-A

Scale: 1 1/2" = 1'-0"



SECTION B-B

Scale: 1 1/2" = 1'-0"



SECTION C-C

Scale: 1 1/2" = 1'-0"

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/20
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

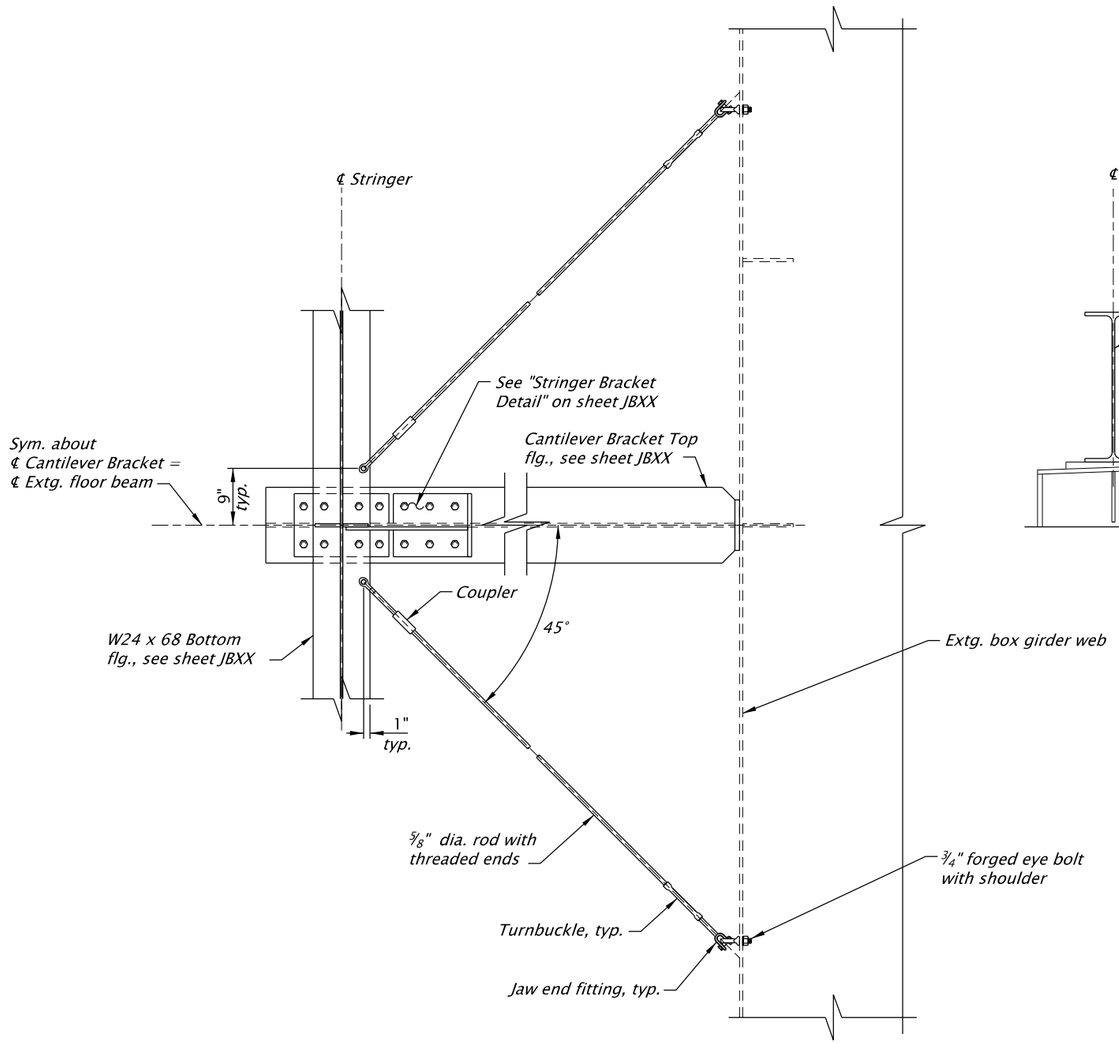
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

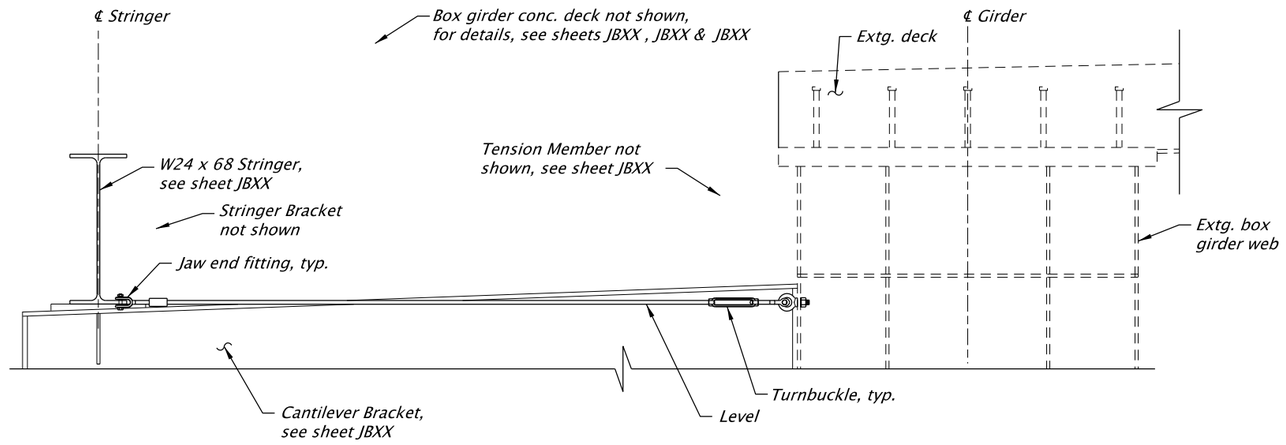
WIDENING AND SEISMIC RETROFIT
BOX GIRDER END DIAPHRAGM PIER 6

SHEET NO.



PLAN

Scale: ½" = 1'-0"



ELEVATION

Scale: ½" = 1'-0"

Notes:

1. *Install rod bracing prior to placing new concrete slab.*
2. *Remove rod bracing after new concrete slab has achieved f'c = 3000 psi.*
3. *Fill open holes with HS Bolt.*

STRUCTURE NO.	09403
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HWY: 064 M.P.:	9.03
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SCALE WARNING

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DATE: X/XX/'20
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll — Reviewer: Name
Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT BOX GIRDER TEMPORARY BRACE

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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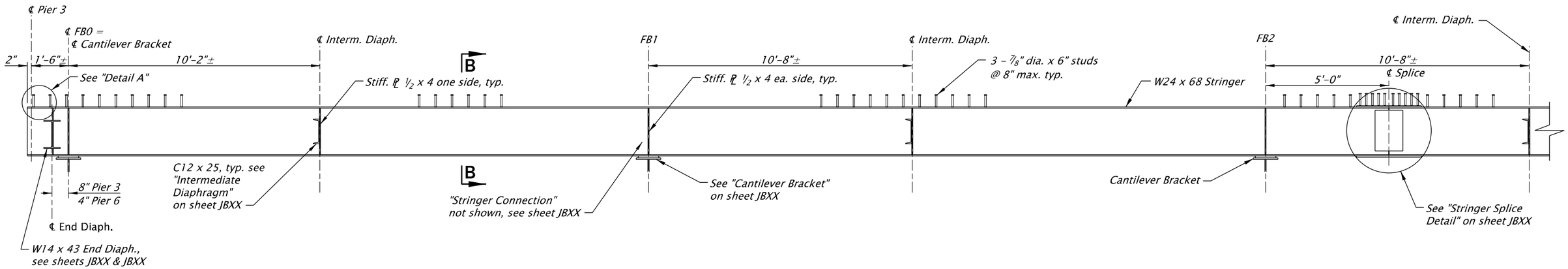
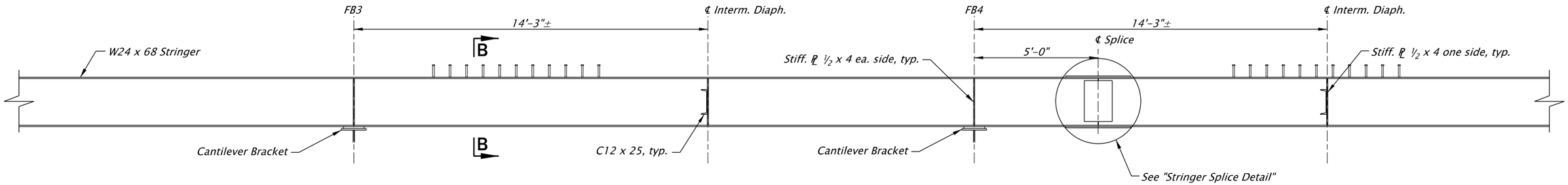
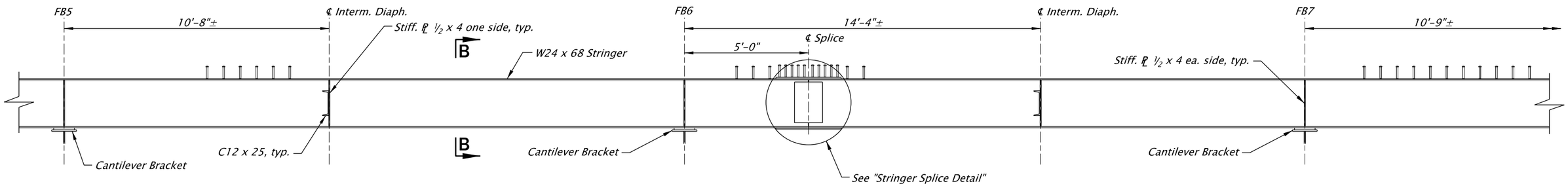
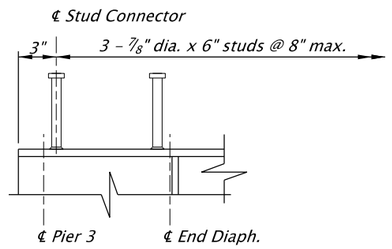
Rotation: 0° Sca=1









DETAIL "A"
Scale: 1" = 1'-0"

STRINGER ELEVATION SPANS 4 THRU 6
Scale: ¼" = 1'-0"

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
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HWY: 064 M.P.: 9.03	
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PROGRESS PRINT
INFORMATION ONLY

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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

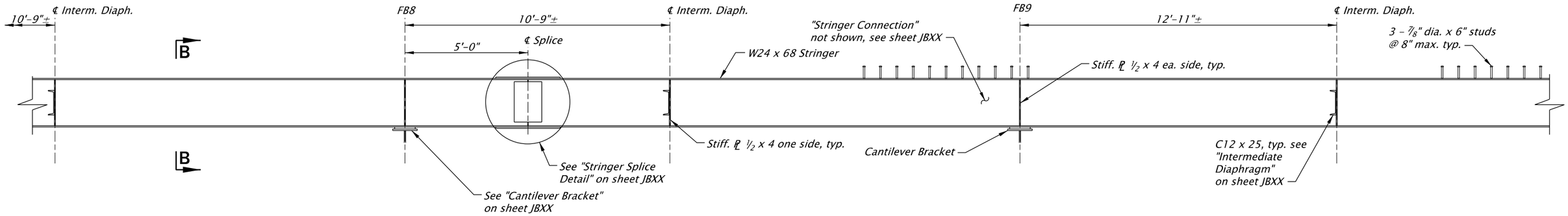
Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

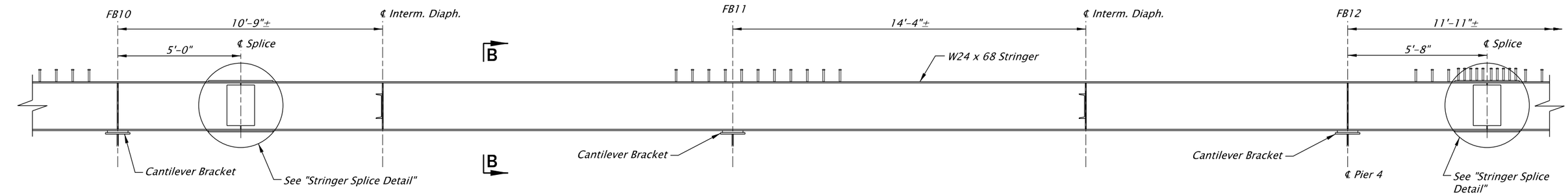
WIDENING AND SEISMIC RETROFIT
BOX GIRDER STRINGER ELEVATION - 1

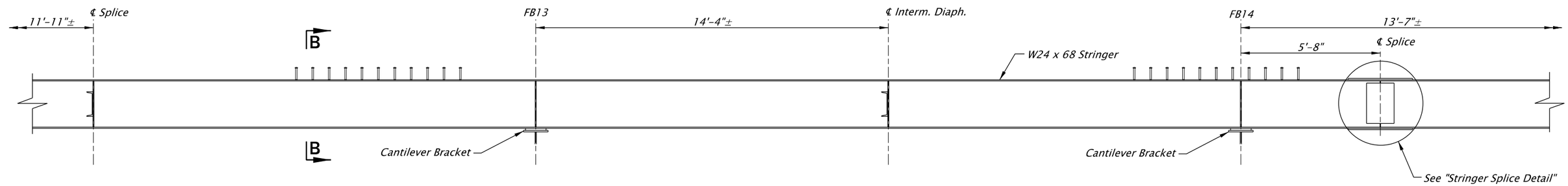
SHEET NO.

BR_K21400_QEI_gdse_01.dgn :: Default 2/9/2020 12:09:41 PM CDONOVAN

Rotation: 0° Sca=1







STRINGER ELEVATION SPANS 4 THRU 6

Scale: ¼" = 1'-0"

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

DATE: X/XX/'20 PROGRESS PRINT INFORMATION ONLY

QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll | Reviewer: Name
Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER STRINGER ELEVATION - 2

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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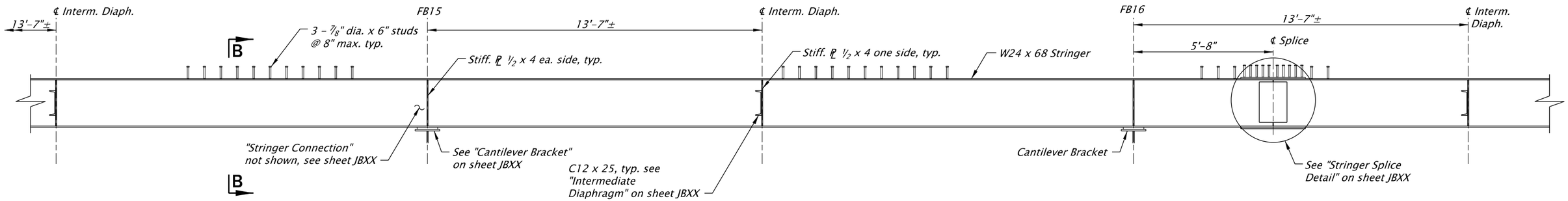
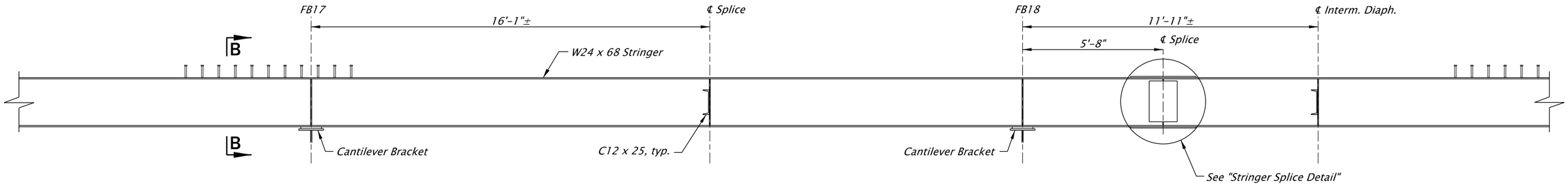
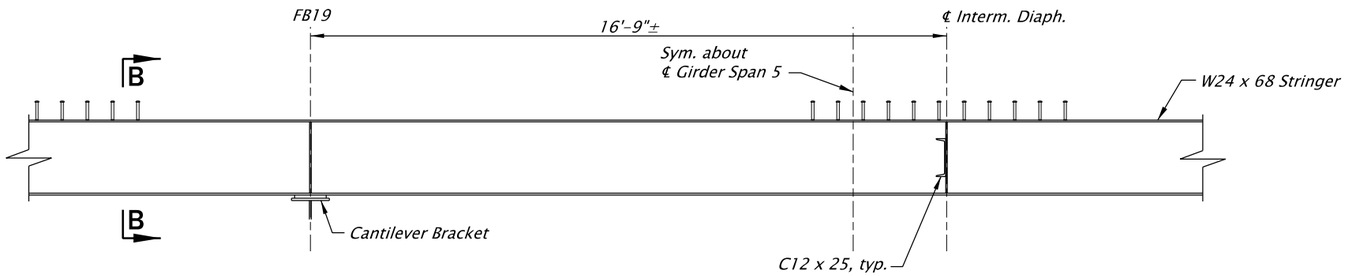
Rotation: 0° Sca 1







STRINGER ELEVATION SPANS 4 THRU 6

Scale: 1/4" = 1'-0"

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
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DATE: X/XX/20
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll
Drafter: Bob Maechler
Reviewer: Name
Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER STRINGER ELEVATION - 3

SHEET NO.

BR_K21400_QEI_gdse_03.dgn :: Default 2/9/2020 12:09:54 PM CDONOVAN

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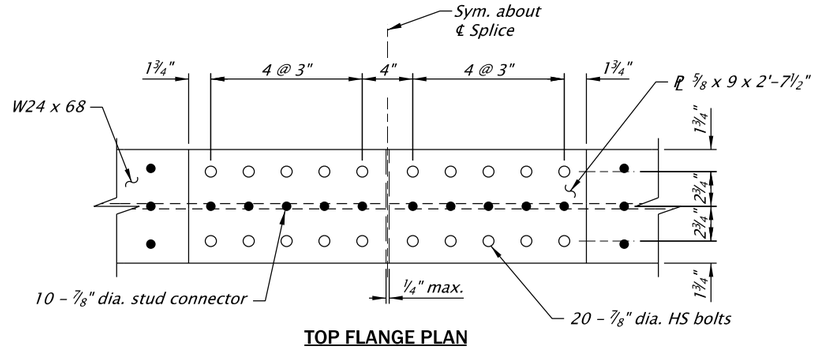
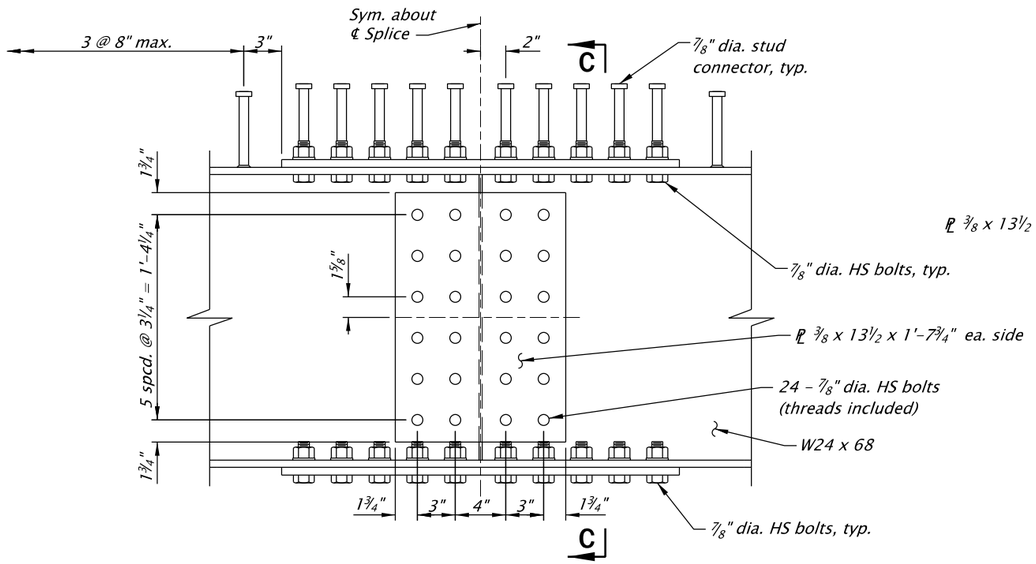
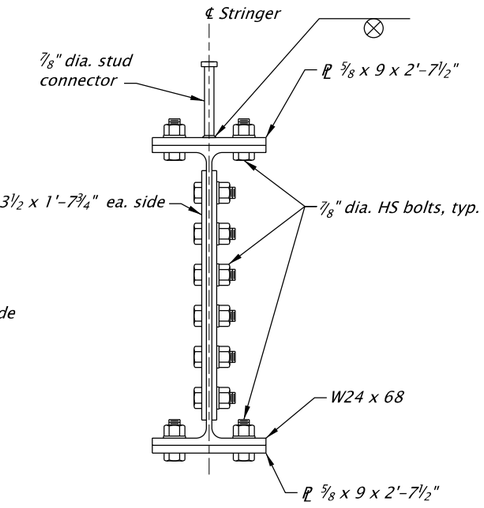


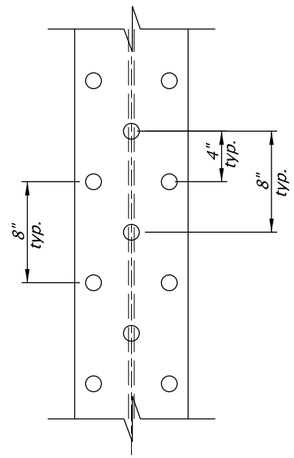
TOP FLANGE PLAN



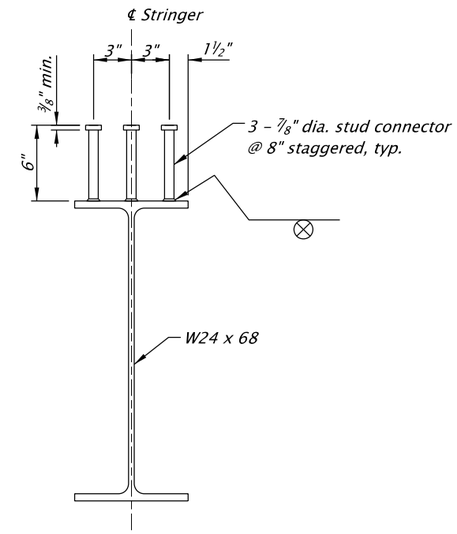
ELEVATION



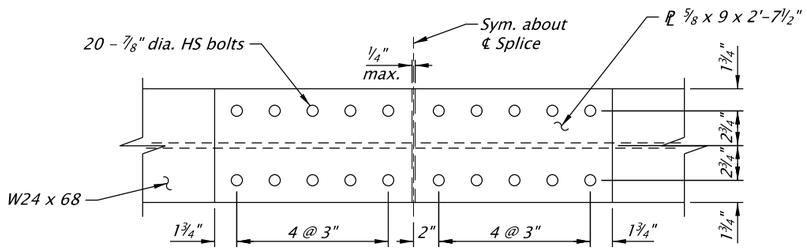
SECTION C-C



TOP FLANGE PLAN



SECTION B-B
Scale: 1" = 1'-0"



BOTTOM FLANGE PLAN

STRINGER SPICE DETAIL
Scale: 1" = 1'-0"

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

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QUINCY ENGINEERING

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll — Reviewer: Name
Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER STRINGER DETAILS - 1

SHEET NO.

BR_K21400_QEI_gdse_04.dgn :: Default 2/9/2020 12:10:21 PM CDONOVAN
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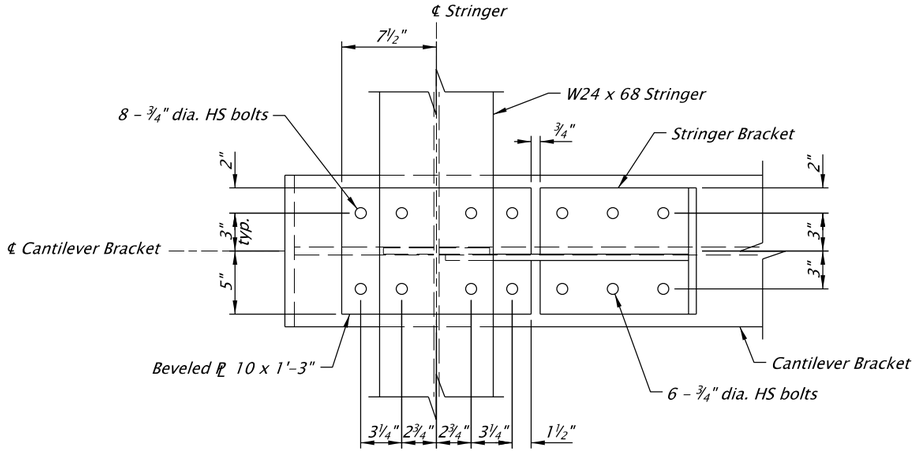
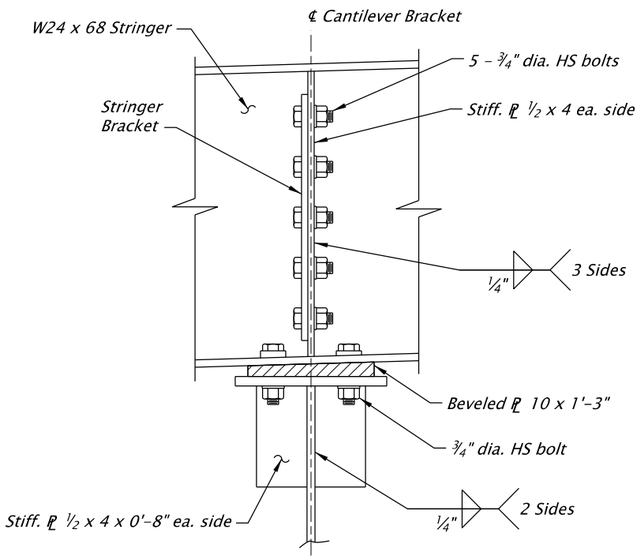
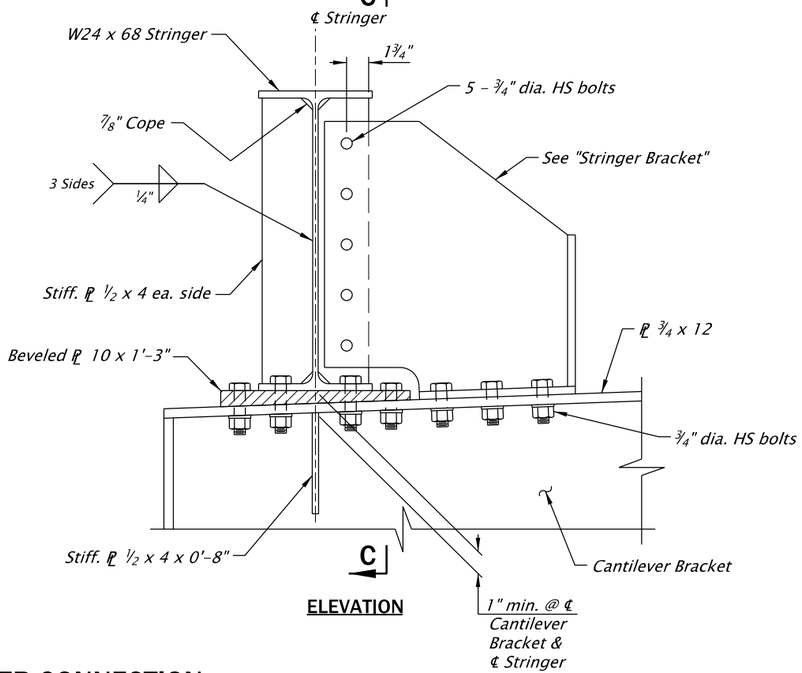


PLAN



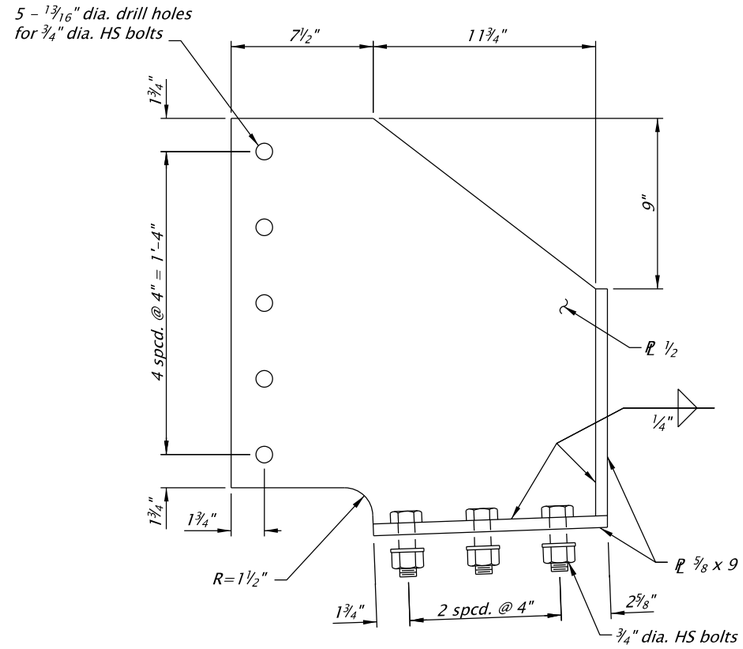
SECTION C-C



ELEVATION

STRINGER CONNECTION

Scale: 1" = 1'-0"



STRINGER BRACKET

Scale: 1½" = 1'-0"

Notes:

1. *Exterior widening shown, Interior widening similar.*
2. *Shear studs not shown.*

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

DATE: X/XX/20
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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll — Reviewer: Name
Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER STRINGER DETAILS - 2

SHEET NO.

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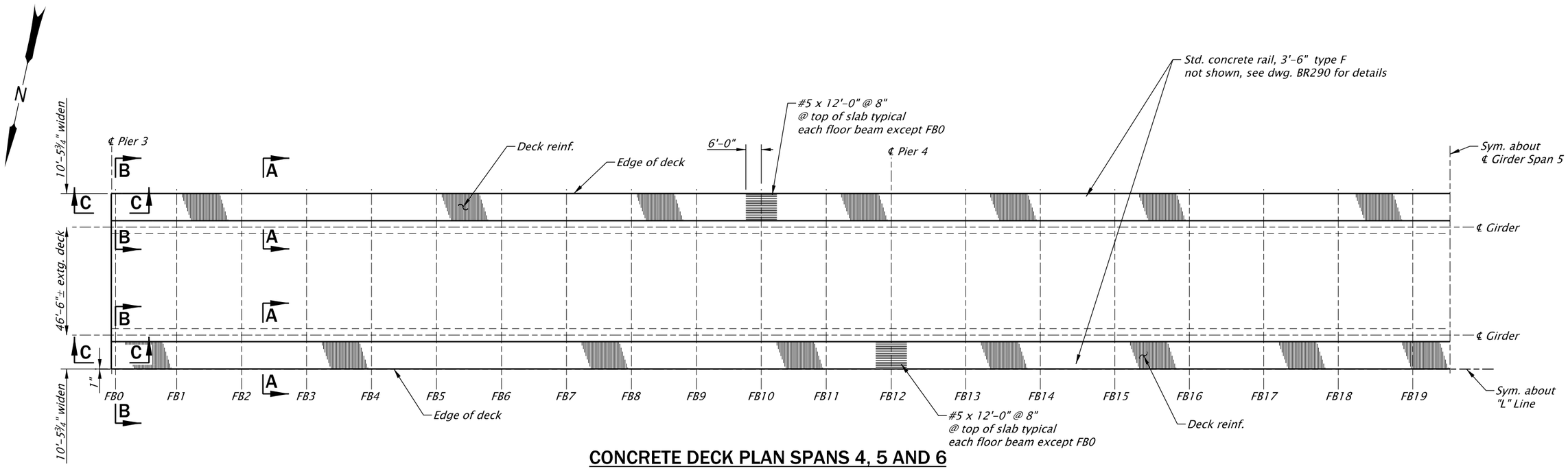
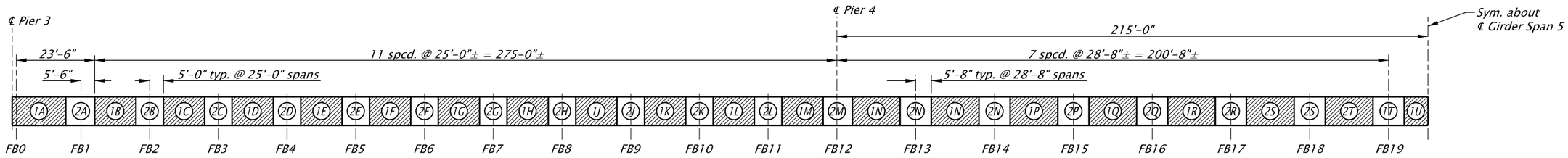


CONCRETE DECK PLAN SPANS 4, 5 AND 6

Scale: 1" = 40'



DECK POUR SCHEDULE - PLAN VIEW

Scale: 1" = 40'

Notes:

1. Deck slabs shall be poured in numerical order as shown.
2. Pours 1A to 1U may be made in any sequence.
3. Make Pours 2A to 2T after pours 1A to 1U have reached f'c and have set a minimum of 5 days.
4. Pours 2A to 2T may be made in any sequence.
5. See sheets JBxx and JBxx for "Section A-A", "Section B-B" and Section "C-C".

SCALE WARNING
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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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WIDENING AND SEISMIC RETROFIT
BOX GIRDER CONCRETE DECK PLAN

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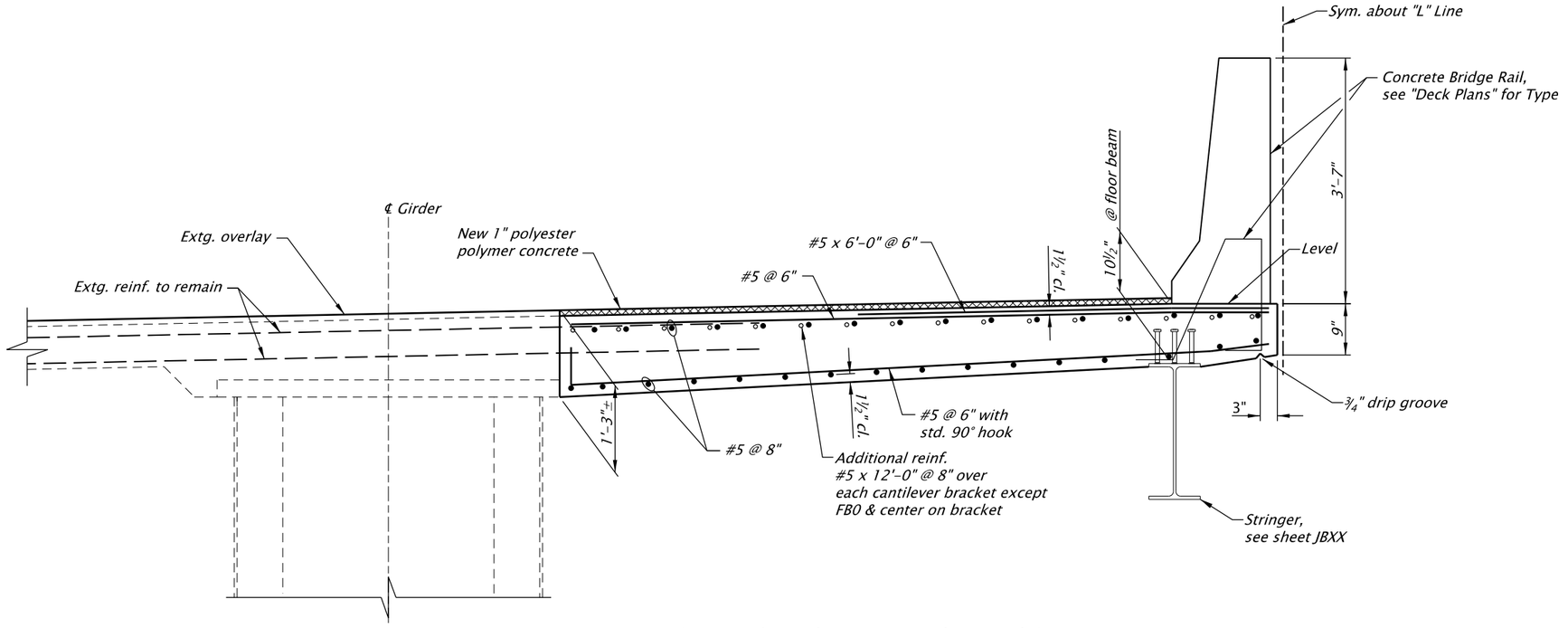
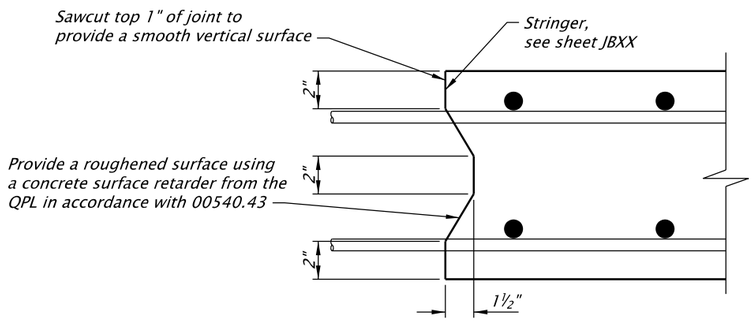


(Interior Widening Shown, Exterior Widening Similar)

SECTION A-A

Scale: ½" = 1'-0"



DECK TRANSVERSE CONSTRUCTION JOINT

Scale: 1½" = 1'-0"

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CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	MO/YR

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER CONCRETE DECK DETAILS - 1

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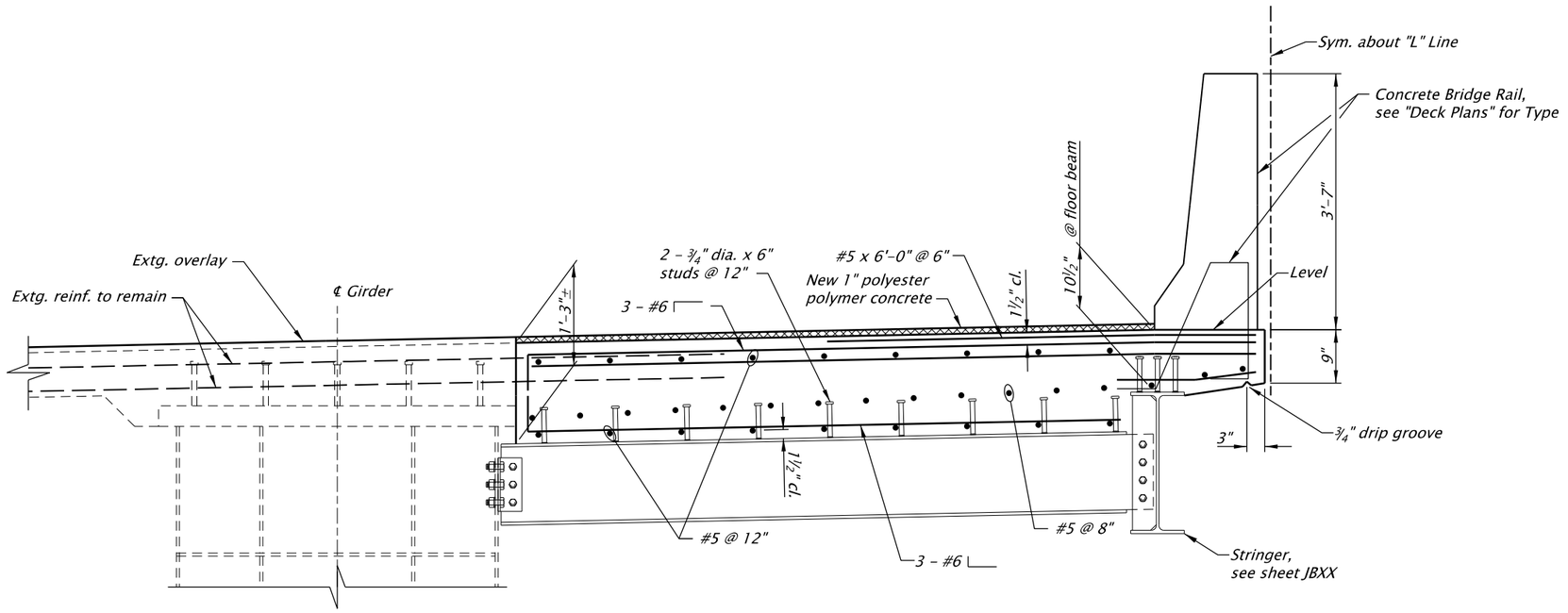
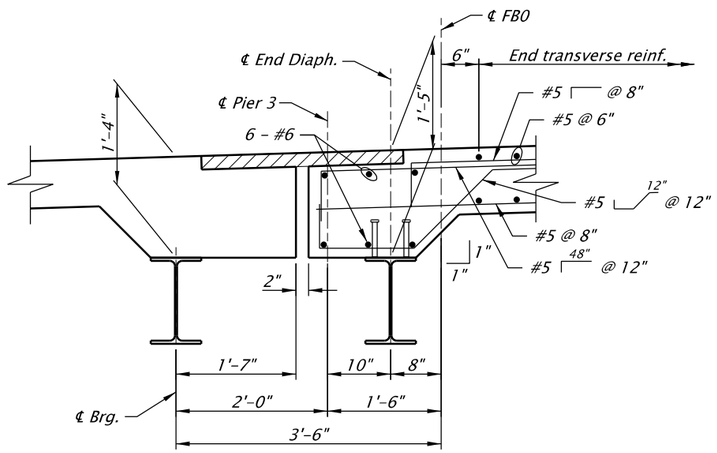


(Interior Widening Shown, Exterior Widening Similar)

SECTION B-B AT PIER 3

Scale: ½" = 1'-0"



SECTION C-C AT PIER 3

Scale: ½" = 1'-0"

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
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CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
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DATE: X/XX/20
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

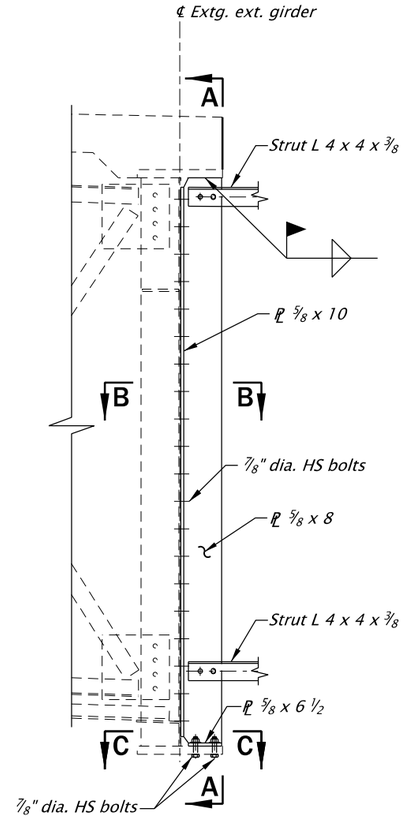
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Martin Pohll — Reviewer: Name

Drafter: Bob Maechler — Checker: Name

WIDENING AND SEISMIC RETROFIT
BOX GIRDER CONCRETE DECK DETAILS - 2

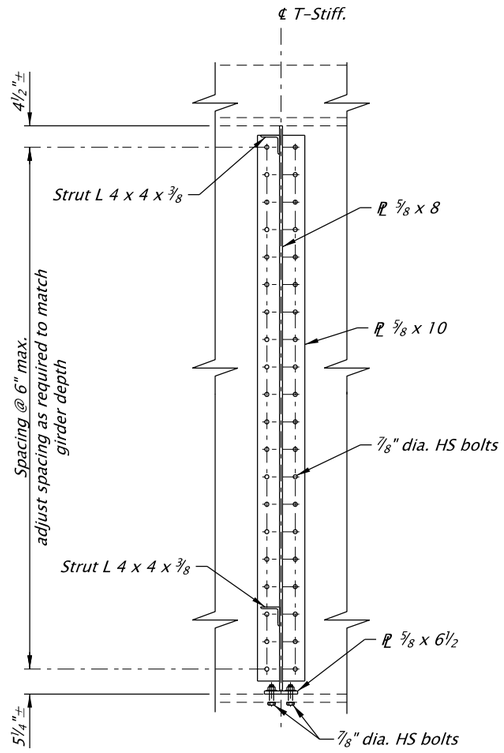
SHEET NO.



(Cross Frame X4 shown, others similar)

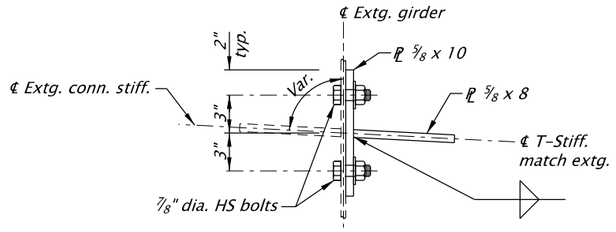
WELDED T-STIFFENER DETAIL

Scale: 3/8" = 1'-0"



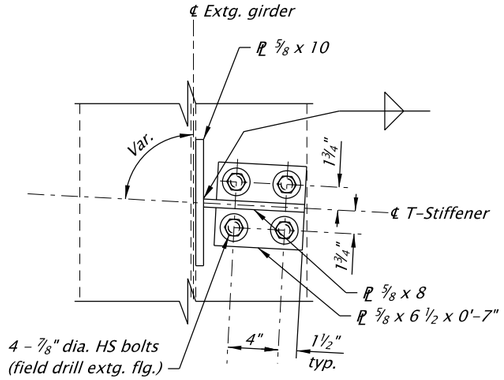
SECTION A-A

Scale: 3/8" = 1'-0"



SECTION B-B

Scale: 1" = 1'-0"



SECTION C-C

Scale: 1" = 1'-0"

SCALE WARNING

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STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	M.P.: 9.03
COUNTY	Clackamas
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DATE: X/XX/20
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QUINCY ENGINEERING

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3. HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Rod Simmons | Reviewer: Name

Drafter: Bob Maechler | Checker: Name

WIDENING AND SEISMIC RETROFIT

PLATE GIRDER SPANS 7 trhu 15 CROSS FRAME X4 DETAILS

SHEET NO.

ITS LEGEND

LEGEND

POLES

- RR / CP — Remove and relocate existing camera pole and lowering device.
- RI / CP — Reinstall existing camera pole and lowering device.
- EX / 2 — Retain and protect existing utility pole.

CABINETS

- EX / 334 — Retain and protect existing Model 334 ITS cabinet.
- RI / 334 — Reinstall Model 334 ITS cabinet.
- RR / 334 — Remove and reinstall Model 334 ITS cabinet.
- RIS — Install 8" riser frame. See Sheet No. KB01 for details and ODOT Blue Sheets for product information.
- EX / SC — Retain and protect existing service cabinet.

JUNCTION BOXES

- HH / 1 — Install 24" x 30" x 24" fiber optic handhole. See details on Sheet No. KB02 and ODOT Blue Sheets for product information.
- JB / 2A — Install 22" x 12" x 12" (min. dimensions) polymer concrete junction box with concrete apron.
- JB / X — Install 20" x 16" x 8" (min. dimensions) ga. stainless steel junction box.
- JB / RM — Junction box (See Ramp Meter Plans).
- JB / CBX — Existing CBX juntion box.
- EX / HH — Retain and protect existing handhole.
- RX / HH — Remove existing fiber optic handhole.
- RX / JB — Remove existing junction box.

CONDUITS

- BC / S — Install (S=size) inch rigid metallic conduit, conduit bodies, expansion fittings, and surface mounted metallic junction boxes as required. Submit proposed method of attachment to the bridge for approval.
- HDD — Install conduit by horizontal directional drilling. Open trench not allowed across road.
- S — Install (S=size) inch conduit.
- CJ — Install and connect new electrical conduit to existing electrical conduit.
- EX / EC (S) — Retain and protect existing (S=size) inch electrical conduit.
- AX / IC (S) — Abandon existing (S=size) inch. interconnect conduit.
- EX / IC (S) — Retain and protect existing (S=size) inch interconnect conduit.

EQUIPMENT

- RR / CAM — Remove and relocate existing traffic camera.
- RI / CAM — Reinstall existing traffic camera.
- GR — Install 8' ground rod(s).
- DIN / F — Install Fiber Optic Interconnect DIN bracket per ODOT green sheets Communications Bracket.

WIRES & CABLES

- N / NET — Install (N=number) industrial ethernet cables (see Standard Specifications section 02920).
- PL — Install ¼" diameter poly pull line (500-pound min. strength).
- 1 / 16 — Install No. 16 AWG THWN stranded copper conductor for locate purposes.
- N | G — Install (N=number) No. (G=AWG wire size) type XHHW wires.
- N-GB — Install (N=number) No. (G=AWG) THWN (bond wires).
- EX / W — Retain and protect existing wiring.
- RX / W — Remove existing wiring.
- RR / W — Remove and relocate existing wiring.
- RI / W — Reinstall existing wiring.

FIBER OPTIC

- EX / SPC — Retain and protect existing fiber optic splice closure.
- PFO / N, X — Install (N=number) single mode fiber optic cable for fiber optic connection patch panel for ownership by (X=jurisdiction).
- FO / N, X — Install (N=number) single mode fiber optic cable for ownership by (X=jurisdiction).
- EX FO / N, X — Retain and protect existing (N=number) single mode fiber optic cable owned by (X=jurisdiction).
- RX / FP — Remove existing fiber optic connection patch.
- FP — Install fiber optic connection patch panel with SC connectors. See Sheet No. KB02 for installation details and ODOT Green Sheet for product information.
- FDP — Install fiber optic distribution panel with SC connectors.
- RX PFO / N, X — Remove existing (N=number) single mode fiber optic cable for fiber optic Connection Patch Panel owned by (X=jurisdiction).
- RX FO / N, X — Remove existing (N=number) single mode fiber optic cable owned by (X=jurisdiction).
- RI FO / N, X — Reinstall existing (N=number) single mode fiber optic cable owned by (X=jurisdiction).
- RR FO / N, X — Remove and relocate existing (N=number) single mode fiber optic cable owned by (X=jurisdiction).
- EX / 6P, X — Retain and proct existing 6 pair cable owned by (X=jurisdiction).
- RX / 6P, X — Remove existing 6 pair cable owned by (X=jurisdiction).

JURISDICTION

ODOT = Oregon Department of Transportation
CBX = Clackamas Broadband Exchange
DTD = Clackamas County Department of Transportation and Development
⇨ Existing travel lane
➡ Future travel lane

ACCOMPANIED BY DWGS.:
TM471, TM472, TM482 and TM485.

HWY: 064
M.P.: Varies
UNIT FILE CODE
ITS-01
DFI/TSSU NO.

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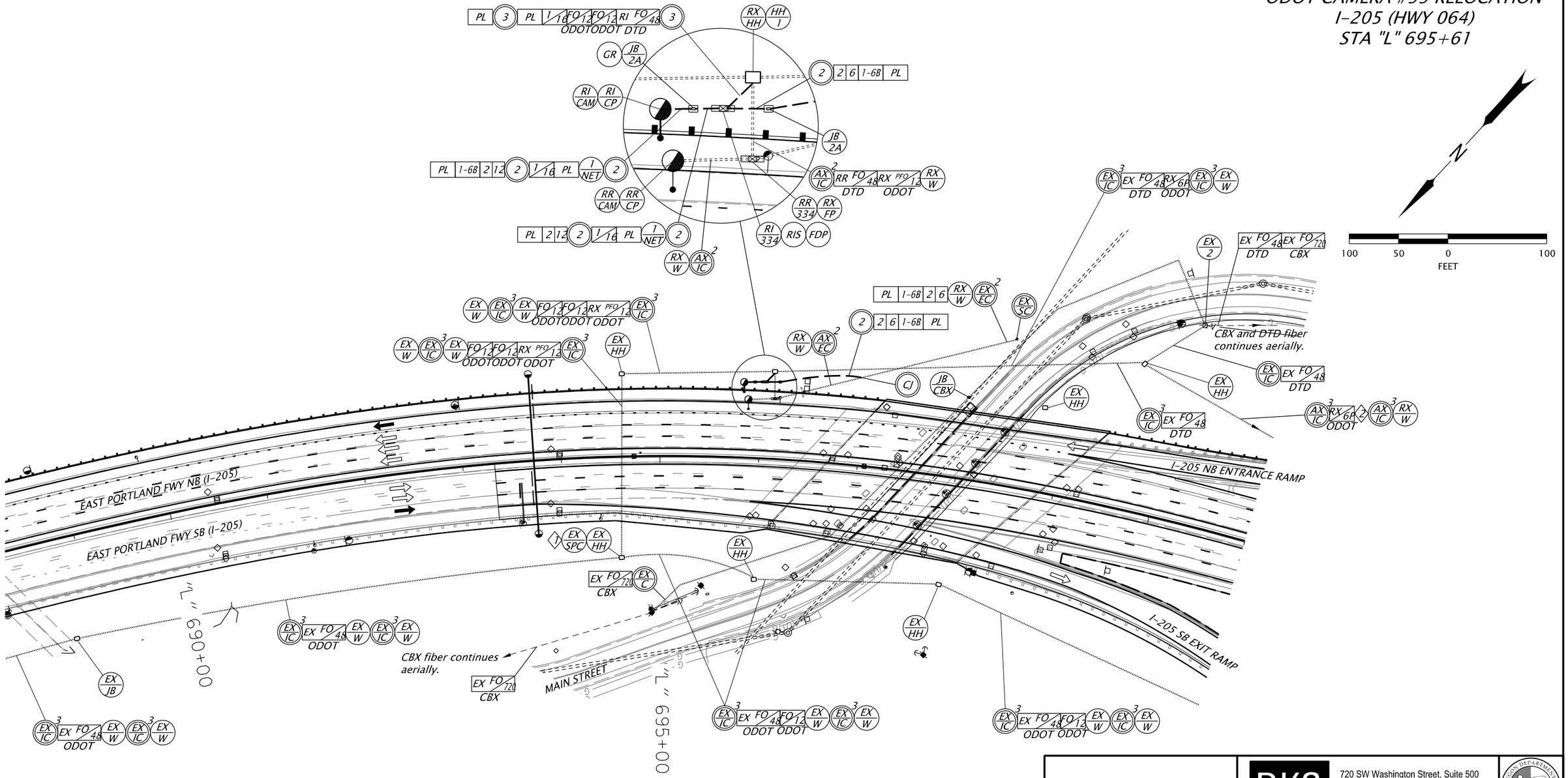
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: Awais Zubair
Drafter: KCD
Reviewer: Jim Peters
Checker: Nate Schroeder

INTELLIGENT TRANSPORTATION SYSTEMS
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

ODOT CAMERA #99 RELOCATION
I-205 (HWY 064)
STA "L" 695+61



Construction Notes:

1. *Existing fiber optic cable to be spliced with new fiber optic cable using existing splice closure. Splicing to be done by others.*

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EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

HWY: 064
M.P.: Varies
UNIT FILE CODE: ITS-02
DFI/TSSU NO.

Designer: Awais Zubair
Drafter: KCD
Reviewer: Jim Peters
Checker: Nate Schroeder

INTELLIGENT TRANSPORTATION SYSTEMS
SHEET NO.

FIBER CONDUIT RELOCATION
I-205 (HWY 064)
STA "L" 701+00 TO STA "L" 715+00

Continues to I-205 NB Exit ramp cabinet.

I-205 NB ENTRANCE RAMP

I-205 NB EXIT RAMP

EAST PORTLAND FWY NB (I-205)

EAST PORTLAND FWY SB (I-205)

I-205 SB ENTRANCE RAMP

I-205 SB EXIT RAMP

PACIFIC HWY (OR99E)

D2" 705+00

C2" 706+00

L" 700+00

L" 710+00

D2" 710+00

Note:
SB Ramp cabinet to be connected to ODOT main line via ODOT camera #99 cabinet.
Fiber interconnect between SB Ramp cabinet and NB Ramp cabinet.
Copper interconnect between SB Exit Ramp/OR99E signal and NB Ramp/OR99E signal.
Design details will be added at next submittal.

Construction Notes:

1. *Splice existing fiber optic cable with new fiber optic cable using existing splice closure.*

N

100 50 0 100
FEET

HWY: 064
M.P.: Varies
UNIT FILE CODE
ITS-03
DFI/TSSU NO.

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INTELLIGENT TRANSPORTATION SYSTEMS
SHEET NO.

FINAL ELECTRONIC DOCUMENT
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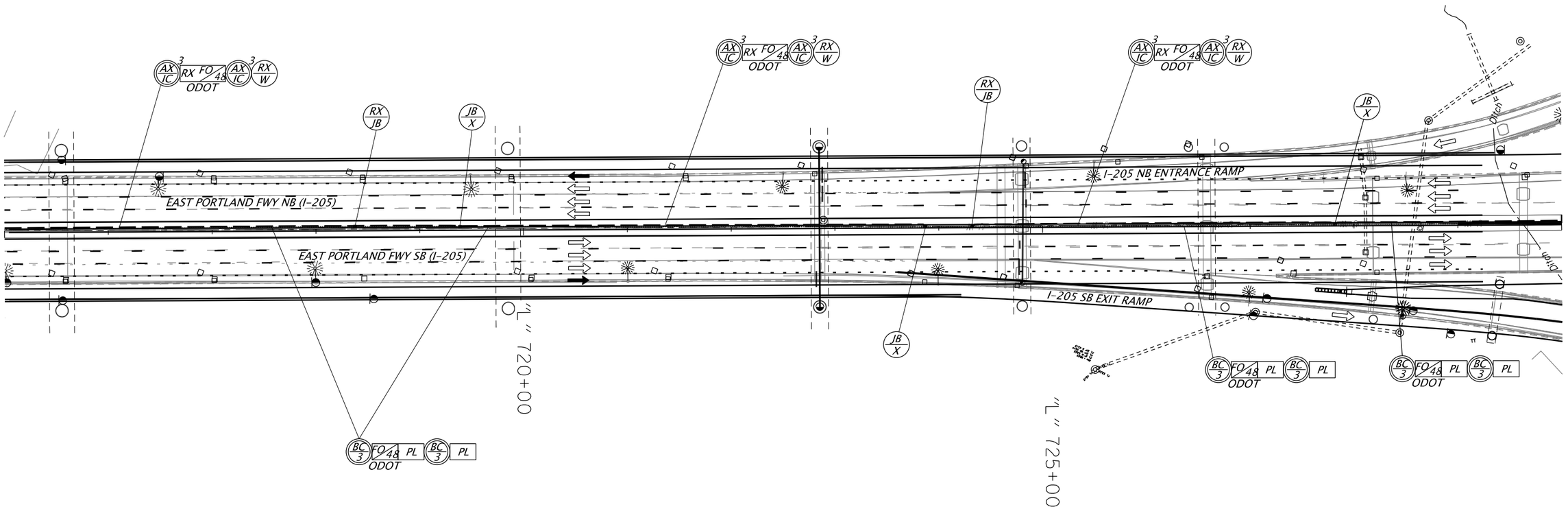
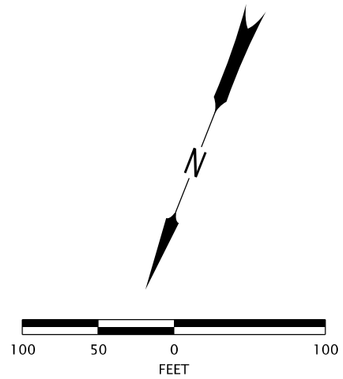
FIBER CONDUIT RELOCATION
I-205 (HWY 064)
STA "L" 715+00 TO STA "L" 730+00





HWY: 064
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I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: Awais Zubair
Drafter: KCD
Reviewer: Jim Peters
Checker: Nate Schroeder

INTELLIGENT TRANSPORTATION SYSTEMS

SHEET NO.

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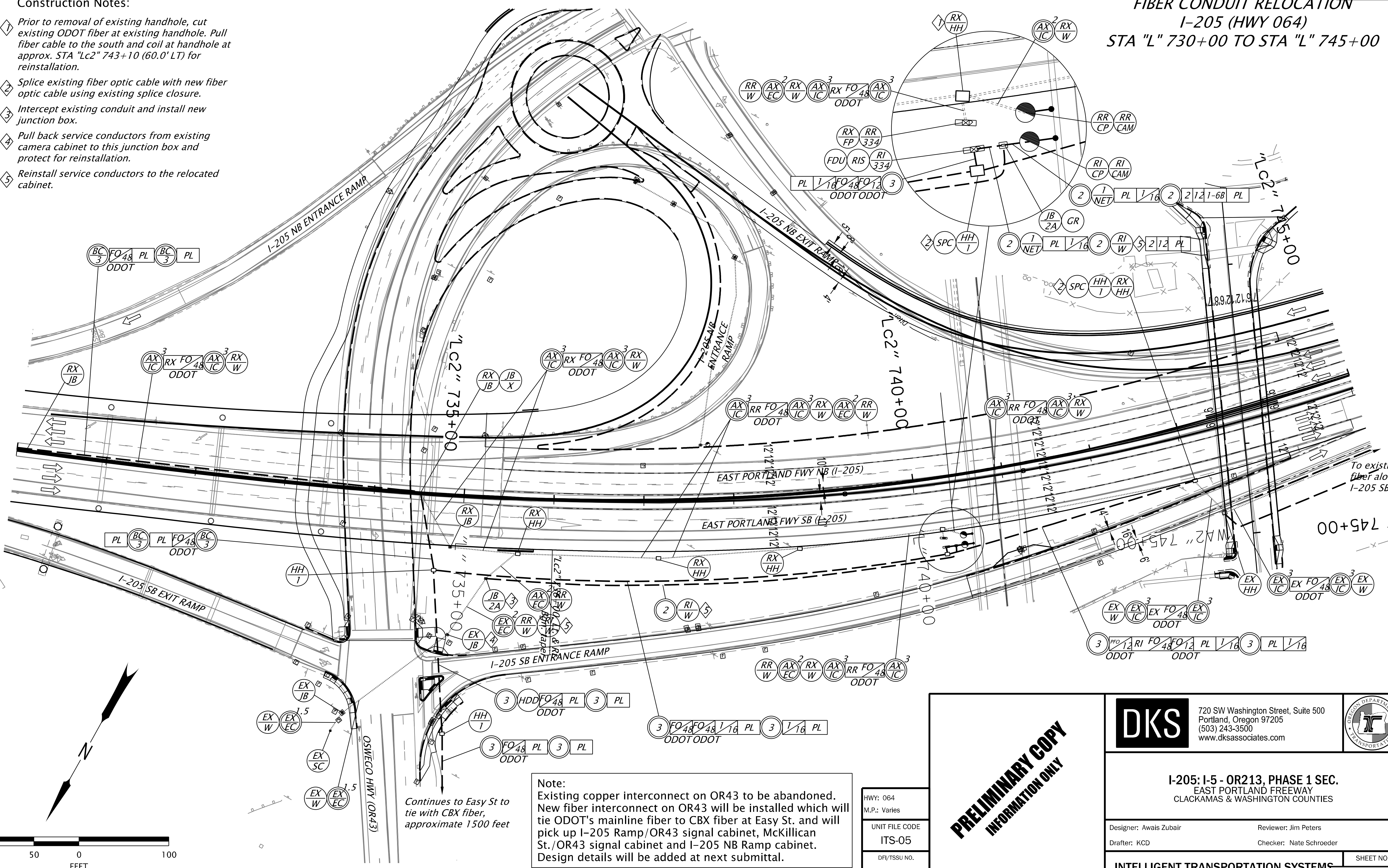
Item #1.

FIBER CONDUIT RELOCATION
I-205 (HWY 064)
STA "L" 730+00 TO STA "L" 745+00

Construction Notes:

1. *Prior to removal of existing handhole, cut existing ODOT fiber at existing handhole. Pull fiber cable to the south and coil at handhole at approx. STA "Lc2" 743+10 (60.0' LT) for reinstallation.*
2. *Splice existing fiber optic cable with new fiber optic cable using existing splice closure.*
3. *Intercept existing conduit and install new junction box.*
4. *Pull back service conductors from existing camera cabinet to this junction box and protect for reinstallation.*
5. *Reinstall service conductors to the relocated cabinet.*



Note:
Existing copper interconnect on OR43 to be abandoned. New fiber interconnect on OR43 will be installed which will tie ODOT's mainline fiber to CBX fiber at Easy St. and will pick up I-205 Ramp/OR43 signal cabinet, McKillican St./OR43 signal cabinet and I-205 NB Ramp cabinet. Design details will be added at next submittal.

HWY: 064
M.P.: Varies

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ITS-05
DFI/TSSU NO.

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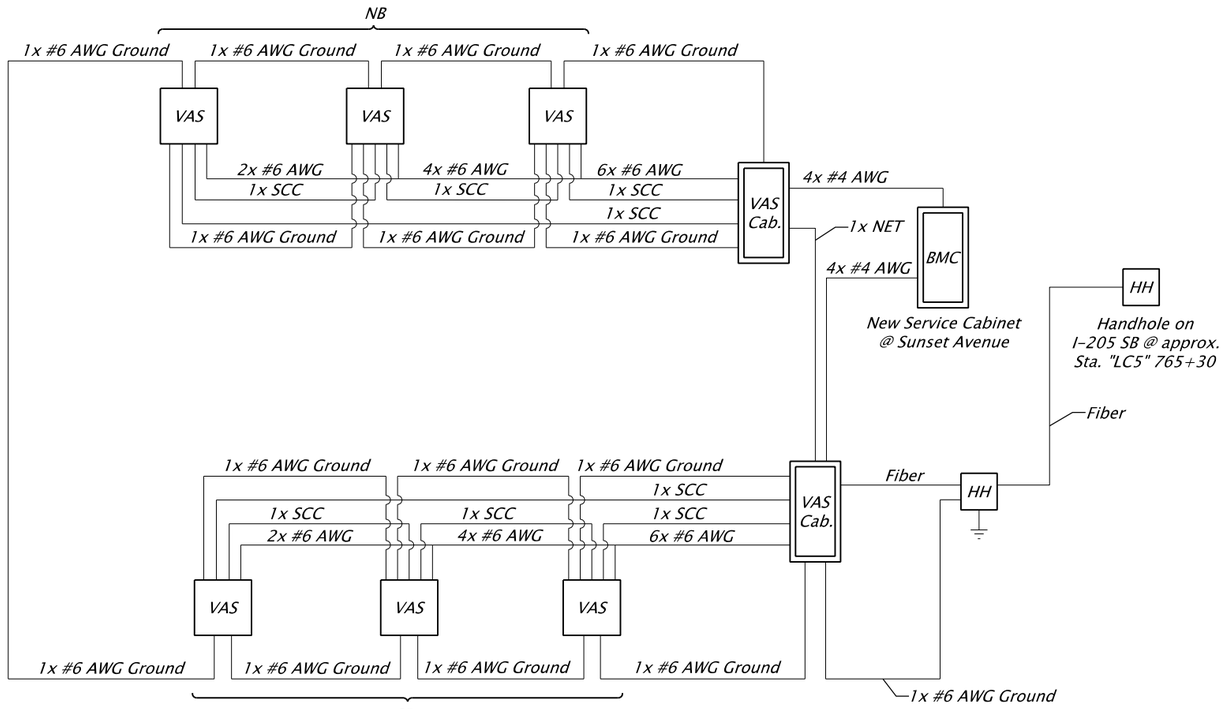
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: Awais Zubair | Reviewer: Jim Peters
Drafter: KCD | Checker: Nate Schroeder

INTELLIGENT TRANSPORTATION SYSTEMS SHEET NO.

WIRING DIAGRAM



WIRING DIAGRAM - SITE "J"

Not to scale

Wiring is schematic, not all JBs shown. Terminate power, ground and sign control cable at sign.

HWY: 064
M.P.: Varies

UNIT FILE CODE
ITS-13

DFI/TSSU NO.

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OREGON DEPARTMENT OF TRANSPORTATION

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CLACKAMAS & WASHINGTON COUNTIES

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Reviewer: Jim Peters
Checker: Nate Schroeder

INTELLIGENT TRANSPORTATION SYSTEMS

SHEET NO.

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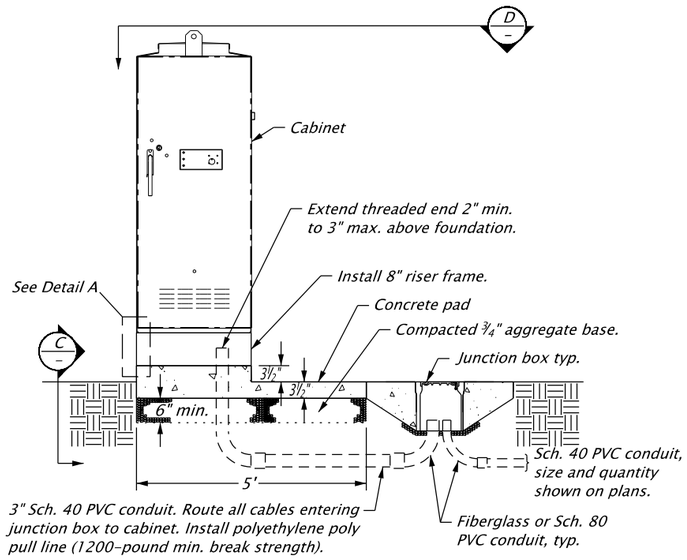
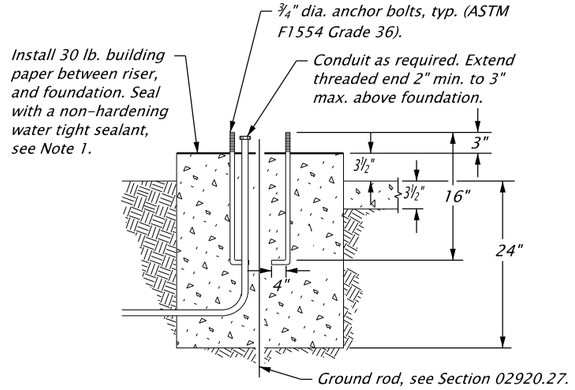
CABINET INSTALLATION DETAILS



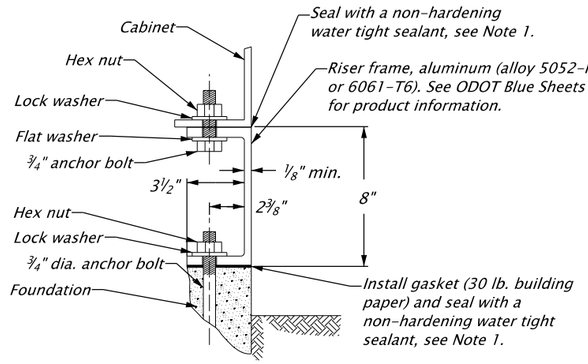
GROUND MOUNT CABINET INSTALLATION DETAIL

No Scale



C GROUND MOUNT CABINET FOUNDATION

Scale: None



DETAIL A
RISER FRAME CONNECTION DETAIL

Scale: None

General Notes:

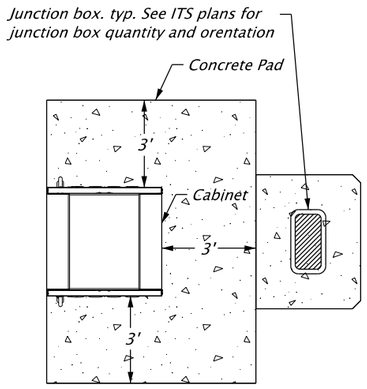
1. *See Dwg. TM482 for cabinet and foundation details not shown.*
2. *Contractor is responsible for determining anchor bolt spacing and pad dimensioning prior to pouring foundation.*
3. *Riser frame bolts must be galvanized ASTM A307 Grade A. Nuts must be ASTM A563 Grade A. Galvanization of steel alloy for riser frame bolts, nuts and washer may be to ASTM F2329 or ASTM A153.*
4. *All conduits not shown in foundation for clarity, see Site Plans for size and quantity.*

Note:

1. *Use elastometric sealants meeting ASTM C 920 for exterior applications. Apply sealant when ambient temperature is between 40 and 90 degrees F. Clean surface from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Remove oil and grease with solvent. Surfaces must be wiped dry with clean cloths prior to applying. Apply continuous sealant bead of ¼ in. width around surface. Upon completion of sealant remove remaining smears and stains and leave work in a neat manner.*

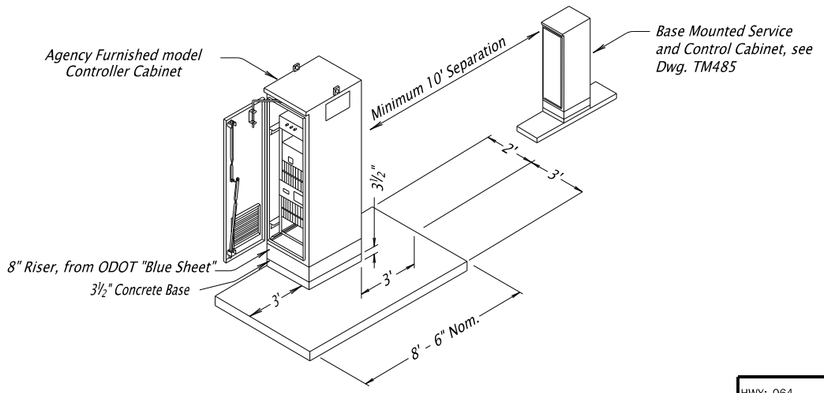
GROUND ROD INSTALLATION DETAILS

Scale: None



D CABINET CONCRETE PAD DETAIL - TOP VIEW

Scale: None



CABINET SITE LAYOUT

NOTE:
Contractor shall furnish riser for agency-furnished Cabinets. Match cabinet material and finish.

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(503) 243-3500
www.dksassociates.com

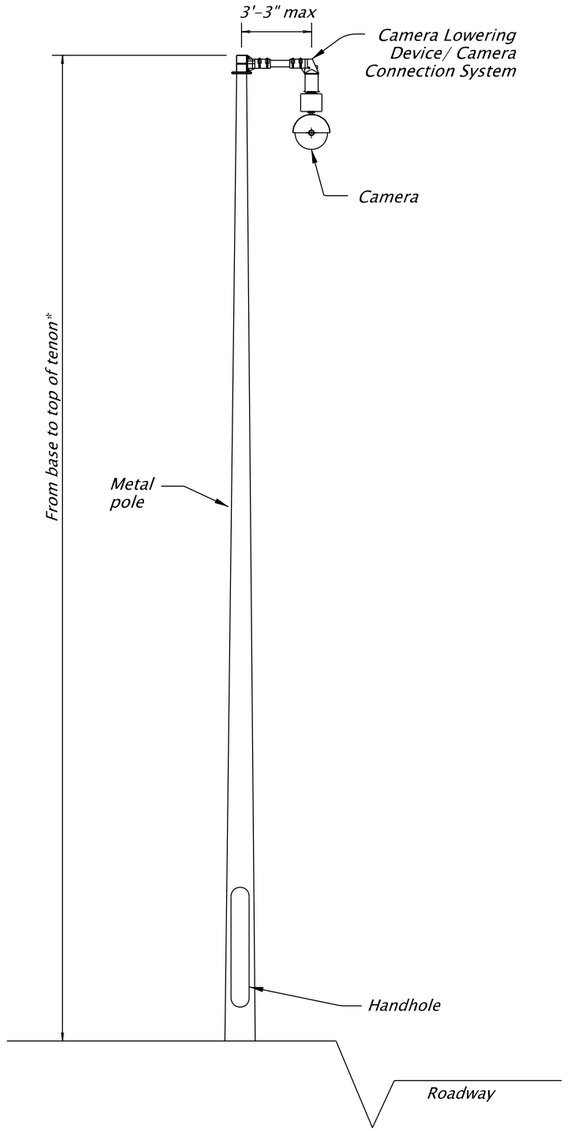
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

HWY: 064	
M.P.: Varies	
UNIT FILE CODE	ITS-06
DFI/TSSU NO.	
Designer: Awais Zubair	Reviewer: Jim Peters
Drafter: KCD	Checker: Nate Schroeder

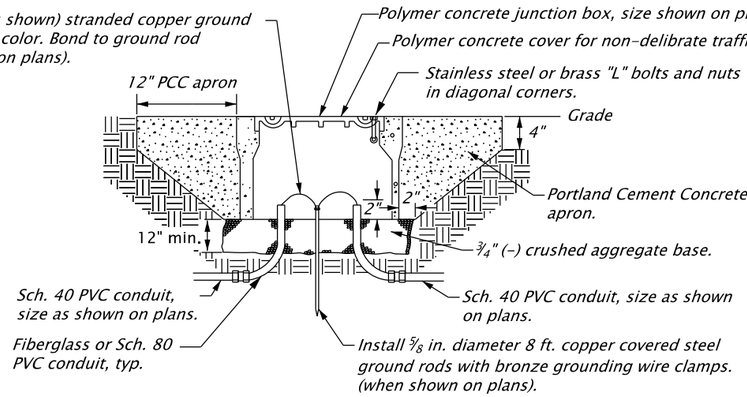
INTELLIGENT TRANSPORTATION SYSTEMS — SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

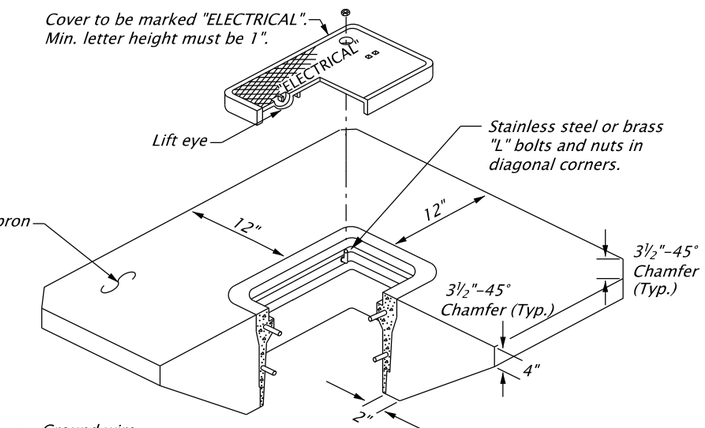
JUNCTION BOX INSTALLATION DETAILS
PTZ CAMERA INSTALLATION DETAILS



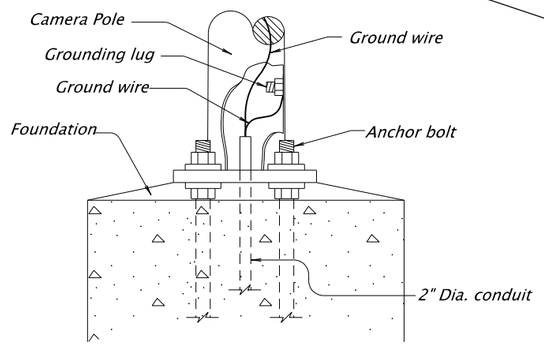
POLE INSTALLATION DETAIL
*See Sheet No. KA02 and KA05 for pole height.
Not to scale



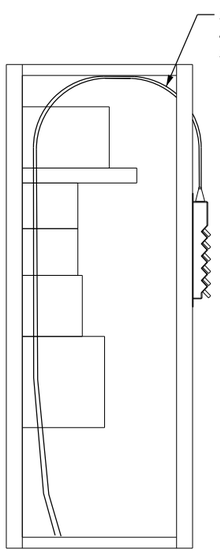
POLYMER CONCRETE JUNCTION BOX
Not to scale



JUNCTION BOX CONCRETE APRON
Not to scale



GROUNDING LUG DETAIL
Not to scale



TYPICAL ODOT FIBER OPTIC CONNECTION PATCH PANEL INSTALLATION IN CONTROLLER CABINET
Not to scale

General Notes:

1. *Provide drip loops for all exposed cabling.*
2. *All cables shall be continuous to the cabinet. No splices will be accepted. Contractor shall field verify length prior to ordering cable. Coil excess of each cable in cabinet.*

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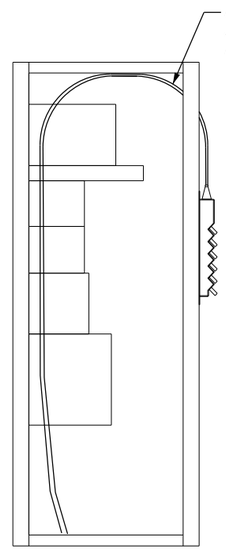
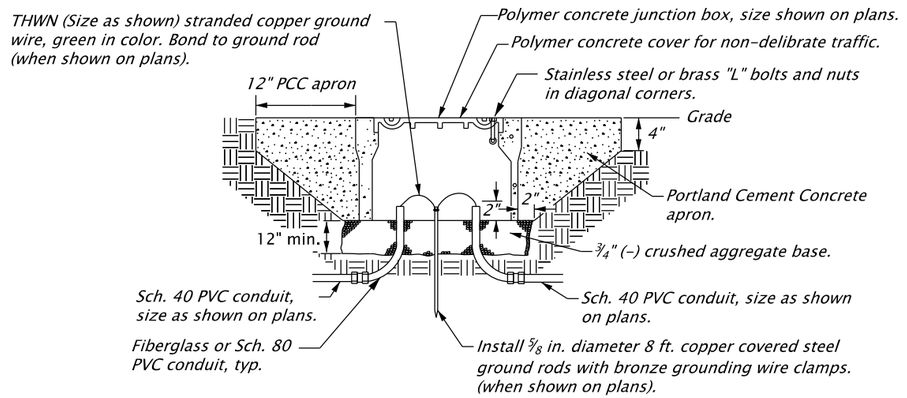
HWY: 064	
M.P.: Varies	
UNIT FILE CODE: ITS-07	
DFI/TSSU NO.	
Designer: Awais Zubair	Reviewer: Jim Peters
Drafter: KCD	Checker: Nate Schroeder
INTELLIGENT TRANSPORTATION SYSTEMS	SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

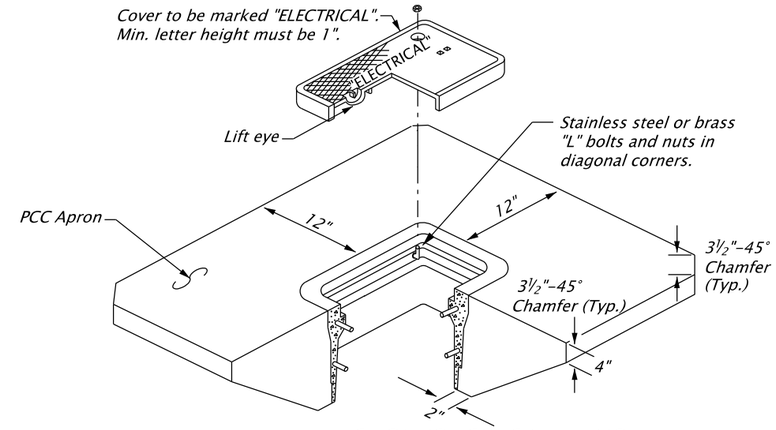
FIBER OPTIC CONNECTION PATCH PANEL (FCPP) INSTALLATION DETAIL
JUNCTION BOX INSTALLATION DETAILS



TYPICAL ODOT FIBER OPTIC CONNECTION PATCH PANEL
INSTALLATION IN CONTROLLER CABINET
Not to scale



POLYMER CONCRETE JUNCTION BOX
Not to scale



JUNCTION BOX CONCRETE APRON
Not to scale

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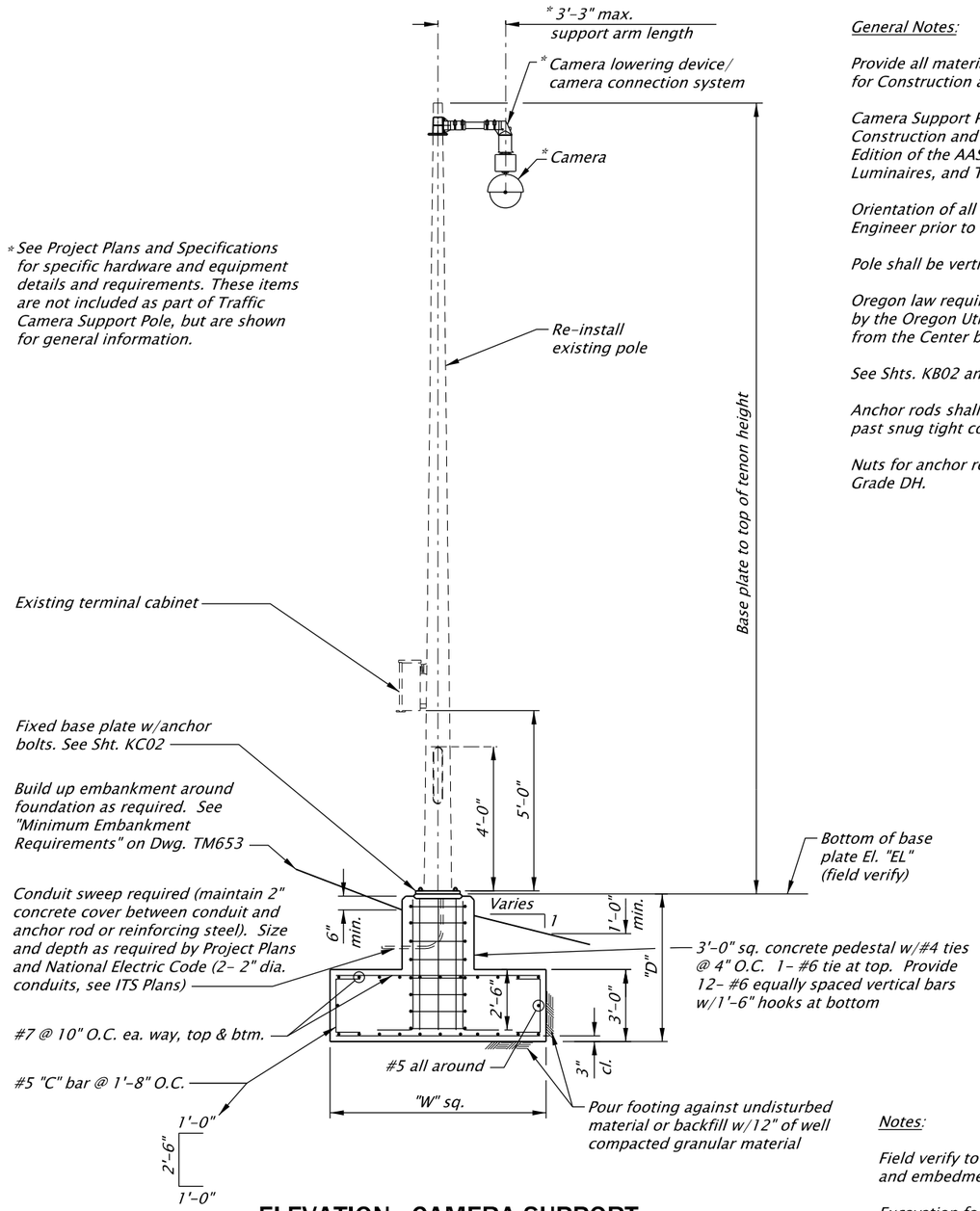
HWY: 064
M.P.: Varies
UNIT FILE CODE: ITS-17
DFI/TSSU NO.

Designer: Awais Zubair
Drafter: KCD
Reviewer: Jim Peters
Checker: Nate Schroeder

INTELLIGENT TRANSPORTATION SYSTEMS
SHEET NO.



ELEVATION - CAMERA SUPPORT

No Scale

"L" 695+80

Note:
Elevations are based on the North American Vertical Datum, 1988.

General Notes:

Provide all materials and perform all work according to the 2018 Oregon Standard Specifications for Construction and the Special Provisions.

Camera Support Pole foundation shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Foundations are designed in accordance with the 5th Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2001 and interim revisions through 2002.

Orientation of all devices, as shown on KA and KB Sheets, shall be verified in the field by the Engineer prior to constructing foundation.

Pole shall be vertical in final position.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

See Shts. KB02 and KC02 and Dwgs. TM652 and TM653 for details not shown.

Anchor rods shall conform to ASTM F1554, Grade 55. Tighten anchor rod nuts with 60° turn past snug tight condition.

Nuts for anchor rods shall be well lubricated heavy hexagon nuts conforming to ASTM A563, Grade DH.

Flat washers shall be hardened steel washers conforming to ASTM F436.

High strength bolts shall conform to ASTM A325.

All structural steel including fasteners shall be hot-dip galvanized after fabrication unless noted otherwise.

Silicon content of base metal shall be in the range of 0 to 0.04% or 0.15 to 0.25%.

Reinforcing steel shall conform to ASTM A615, Gr 60, or A706. Vertical reinforcing steel shall not be spliced.

Under no circumstances shall the pole top plate be rotated after the camera is installed without authorization from the Engineer.

Footing concrete shall be Commercial Grade Concrete Class 3000. Non-epoxy grout in grout pads shall be non-shrink, high early strength grout (non-ferrous) with a minimum strength of 5000 psi.

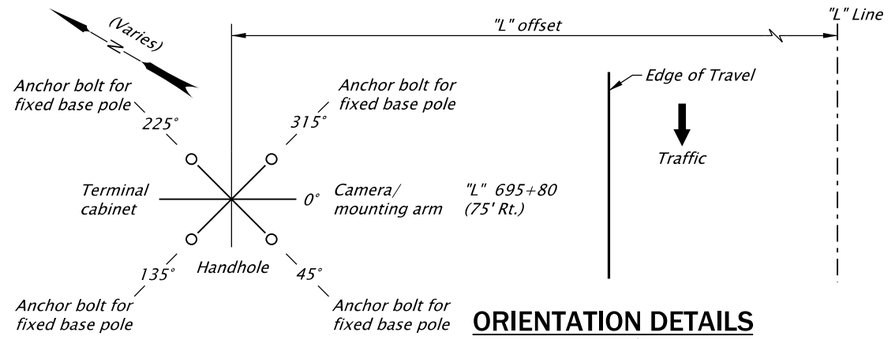
Provide submittals including calculations for review prior to fabrication as described in Section 00965 of the Specifications.

This footing design is based on assumed "Average Soil" conditions with compact material having ϕ = 25 deg., γ = 100 pcf, lateral bearing capacity = 120 psf. Notify the Engineer should subsurface conditions encountered be "Poor Soil" condition of poorly compacted sands, soft clays and loams with large amounts of organic material.

Notes:

Field verify to maintain clearance and embedment.

Excavation for spread footing will likely encounter rock. Refer to General Notes.



ORIENTATION DETAILS

No Scale

Orientation Notes:

All angles measure clockwise from face of pole normal to roadway as viewed from top end of pole.

Orientation for optimal view by camera to be field verified by the Engineer.

CAMERA SUPPORT TABLE

Anchor Rod Dia.	Rod Circle "BC"	Proj. "E" max.	Anchor Rod Length	Top Thread Length	Bottom Thread Length	Structure Number XXXXX	Footing Depth "D"	Footing Width "W"	Hwy. No.	Station	Elevation "EL"
2"	19½"	9½"	4'-0"	7"	3"	Pole 1	6'-0"	9'-0"	064	"L" 695+80 (75' Rt.)	296.00'

ACCOMPANIED BY DWGS.:
XXXXXX, KB02, TM652, TM653

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: X.XX	
UNIT FILE CODE	ITS-00
DFI/TSSU NO.	N/A

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER PETER GLEN SLOCUM OREGON 10, 2005 EXPIRES: 06/30/

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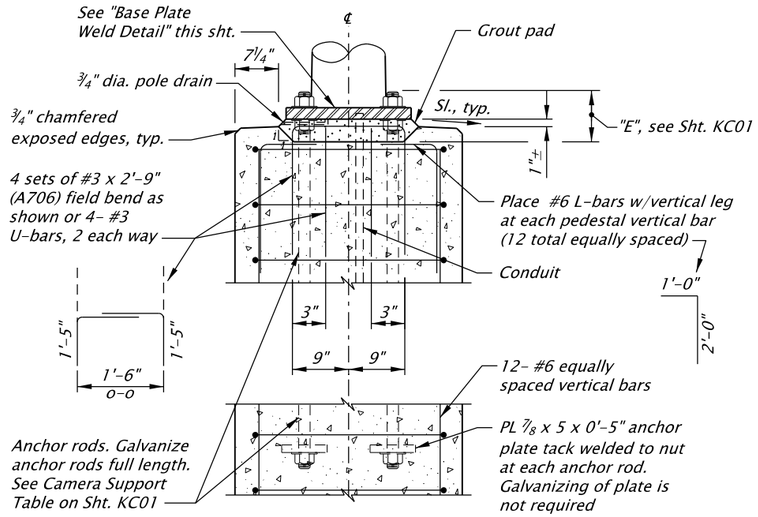
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

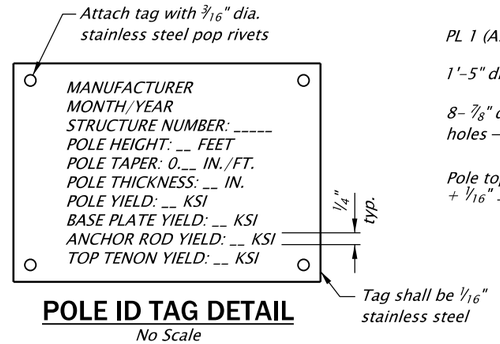
Designer: Peter G. Slocum, S.E. Reviewer: Kenton Alldritt, P.E.
Drafter: Yuka Garzenelli Checker: Wyatt Dean, E.I.

SHEET NO.
CCTV DETAILS - 1



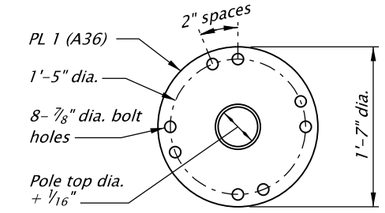
TOP OF FOOTING DETAIL

Not all reinforcing steel shown for clarity
No Scale

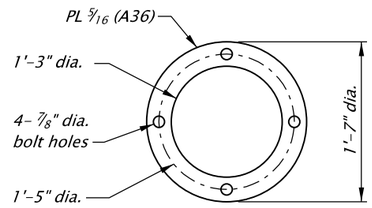


POLE ID TAG DETAIL

No Scale

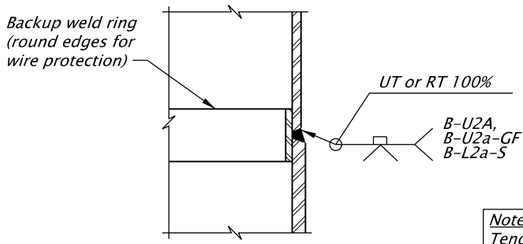


PLAN



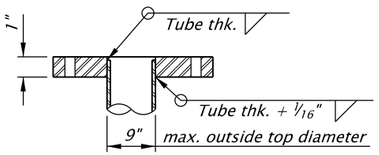
WASHER PLATE

No Scale



POLE SPLICE WELD DETAIL

No Scale

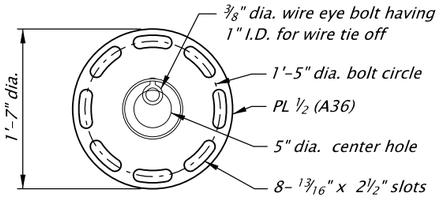


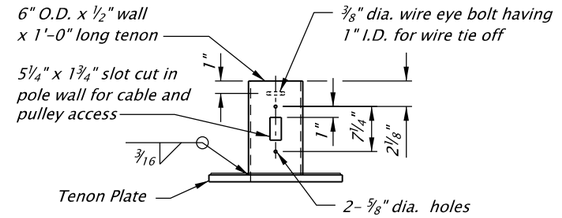
ELEVATION

POLE TOP PLATE

No Scale

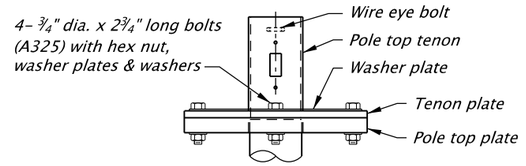
Note:
Tenon dimensions shown are typical of general configuration desired and may vary depending on camera lowering device manufacturer's connection requirements. Variations from the details shown shall be submitted to the Engineer for review and approval.





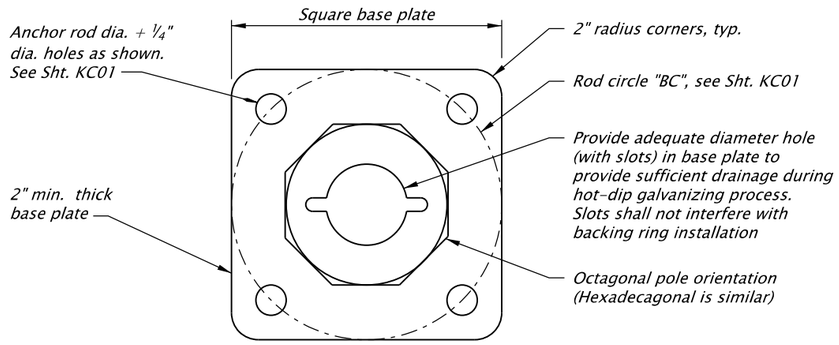
POLE TOP TENON

No Scale



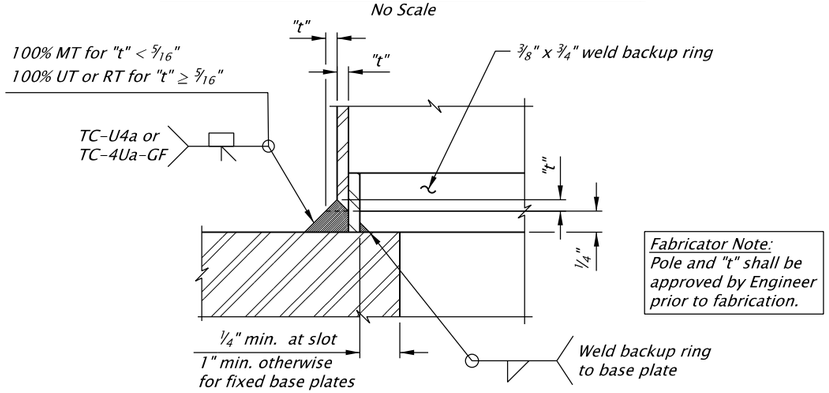
POLE TOP TENON DETAIL

No Scale



PLAN - BASE PLATE (FIXED BASE POLE)

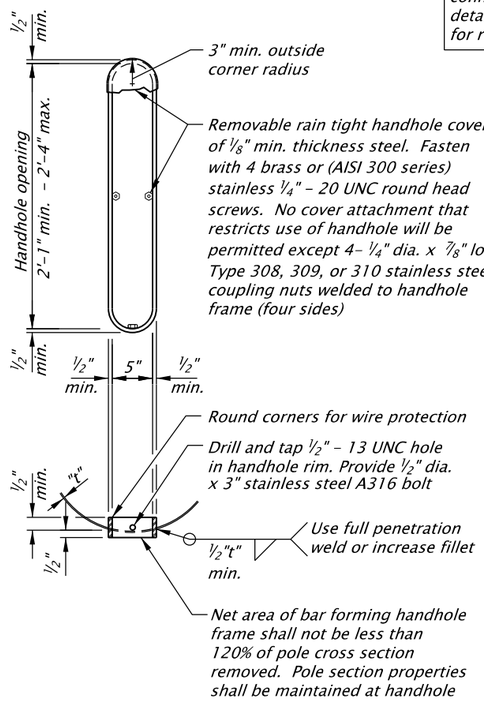
No Scale



Fabricator Note:
Pole and "t" shall be approved by Engineer prior to fabrication.

BASE PLATE WELD DETAIL

No Scale



HANDHOLE DETAIL

No Scale

SCALE WARNING
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STRUCTURE NO.	00000 00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 9.54 SB	
UNIT FILE CODE	ITS-00
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER — OREGON — 10, 2005 — PETER GLEN SLOCUM
EXPIRES: 06/30/

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CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

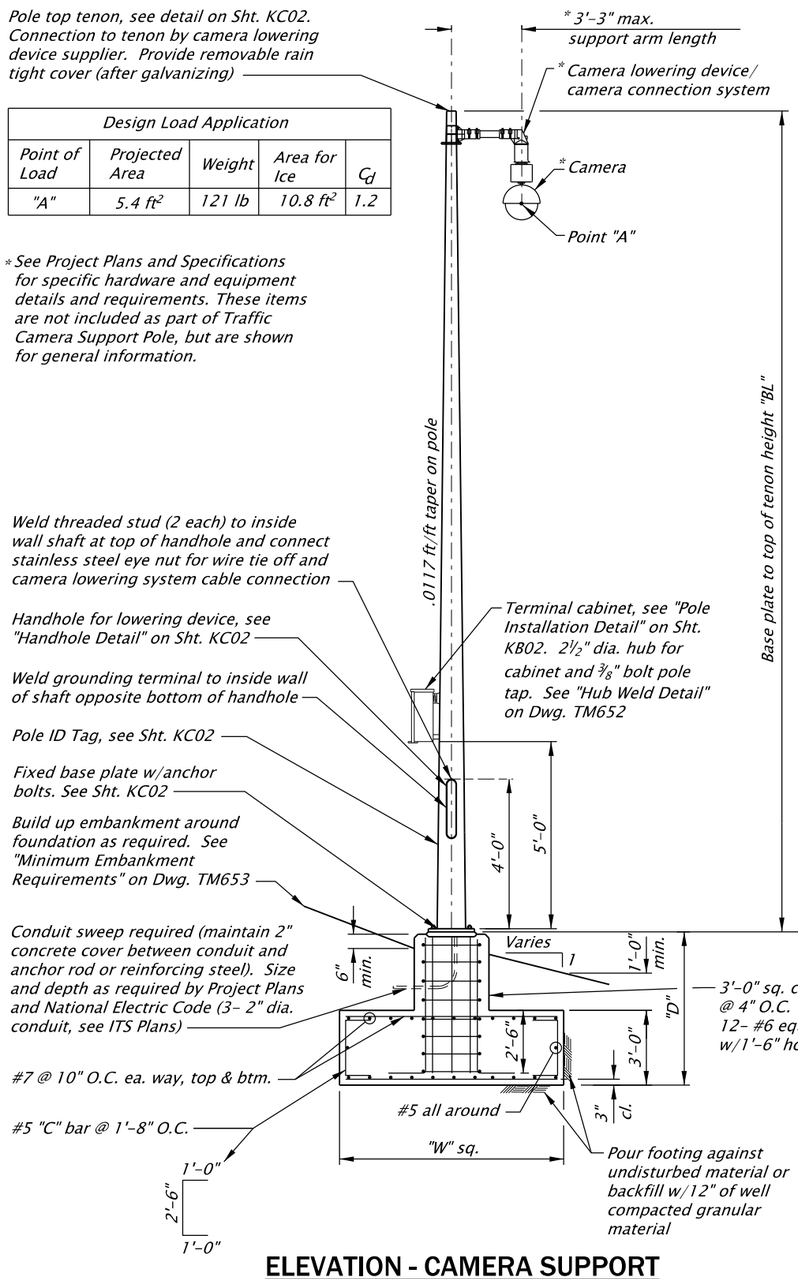
OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Peter G. Slocum, S.E. — Reviewer: Kenton Alldritt, P.E.
Drafter: Yuka Garzenelli — Checker: Wyatt Dean, E.I.

CCTV DETAILS - 2

SHEET NO.



Design Load Application				
Point of Load	Projected Area	Weight	Area for Ice	C_d
"A"	5.4 ft²	121 lb	10.8 ft²	1.2

* See Project Plans and Specifications for specific hardware and equipment details and requirements. These items are not included as part of Traffic Camera Support Pole, but are shown for general information.

ELEVATION - CAMERA SUPPORT

No Scale

"L" 740+50

Note:
Elevations are based on the North American Vertical Datum, 1988.

Notes:

Field verify to maintain clearance and embedment.

Excavation for spread footing will likely encounter rock. Refer to General Notes.

See "Pole Installation Detail" and "Camera Pole Orientation Detail" on Sht. KB02 for additional information and location of all equipment, hubs, cabinets, J-hooks, ground lug and weatherheads.

CAMERA SUPPORT TABLE												
Pole Length "BL"	Anchor Rod Dia.	Rod Circle "BC"	Proj. "E" max.	Anchor Rod Length	Top Thread Length	Bottom Thread Length	Structure Number XXXXX	Footing Depth "D"	Footing Width "W"	Hwy. No.	Station	Elevation "EL"
60'-6"	2"	19½"	9½"	4'-0"	7"	3"	Pole 2	6'-6"	10'-0"	064	"L" 740+50 (68' Rt.)	147.00'

General Notes:

Provide all materials and perform all work according to the 2018 Oregon Standard Specifications for Construction and the Special Provisions.

Camera Support Poles shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Poles are designed in accordance with the 5th Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2001 and interim revisions through 2002.

Design wind velocity shall be 110 mph (3 second gust), 50 year reoccurence.

Computed wind induced deflection of pole at 30 mph (non-gust) shall be limited to 1 inch measured at top of pole.

The Combined Stress Ratio (CSR) of the pole shall not exceed 0.60.

Grounding terminal and eye nut connnection shall be ½" dia. x 1⅝" Type 308, 309, or 310 threaded stainless steel welded stud.

Round and smooth all edges along electrical wire way.

Orientation of all devices, as shown on Sht. KB02, shall be verified in the field by the Engineer prior to constructing foundation.

Tenon dimensions are indicative of general configuration desired and may be varied depending on Camera Lowering Device Supplier's connection requirements. Variations from that shown shall be allowed as approved by the Engineer. See Special Provisions for requirements.

Steel sheet for poles and tenon shall conform to ASTM A595, Grade A or B, or approved equal. All other steel sheet and plate shall conform to ASTM A572 Gr. 50, or approved equal unless shown otherwise. Supplement S18 of ASTM A6 regarding maximum tensile strength shall apply.

All pole shafts may be round, hexadecagonal, dodecagonal or octagonal.

Pole shall be vertical in final position.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

See Shts. KB02 and KC02 and Dwgs. TM652 and TM653 for details not shown.

Anchor rods shall conform to ASTM F1554, Grade 55. Tighten anchor rod nuts with 60° turn past snug tight condition.

Nuts for anchor rods shall be well lubricated heavy hexagon nuts conforming to ASTM A563, Grade DH.

Flat washers shall be hardened steel washers conforming to ASTM F436.

High strength bolts shall conform to ASTM A325.

All structural steel including fasteners shall be hot-dip galvanized after fabrication unless noted otherwise.

Silicon content of base metal shall be in the range of 0 to 0.04% or 0.15 to 0.25%.

Reinforcing steel shall conform to ASTM A615, Gr 60, or A706. Vertical reinforcing steel shall not be spliced.

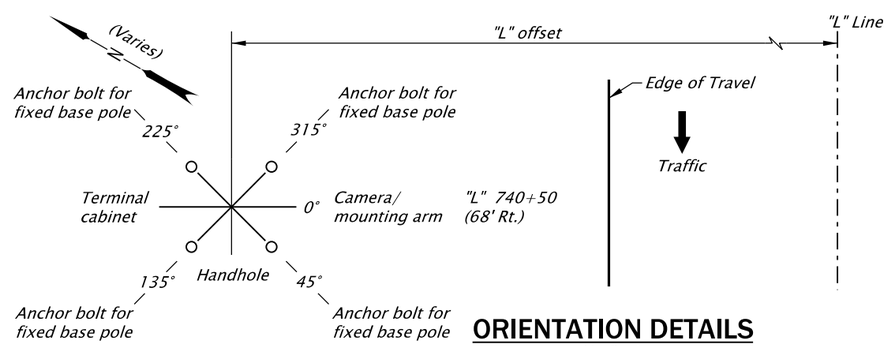
Longitudinal seam welds shall achieve complete penetration within 6 in. of a circumferential weld. 60% minimum penetration required for the remainder of the seam weld.

Under no circumstances shall the pole top plate be rotated after the camera is installed without authorization from the Engineer.

Footing concrete shall be Commercial Grade Concrete Class 3000. Non-epoxy grout in grout pads shall be non-shrink, high early strength grout (non-ferrous) with a minimum strength of 5000 psi.

Provide submittals including calculations for review prior to fabrication as described in Section 00965 of the Specifications.

This footing design is based on assumed "Average Soil" conditions with compact material having ϕ = 25 deg., γ = 100 pcf, lateral bearing capacity = 120 psf. Notify the Engineer should subsurface conditions encountered be "Poor Soil" condition of poorly compacted sands, soft clays and loams with large amounts of organic material.



ORIENTATION DETAILS

No Scale

Orientation Notes:

All angles measure clockwise from face of pole normal to roadway as viewed from top end of pole.

Orientation for optimal view by camera to be field verified by the Engineer.

STRUCTURE NO.	00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064	M.P.: X.XX
UNIT FILE CODE	ITS-00
DFI/TSSU NO.	N/A

ACCOMPANIED BY DWGS.:
XXXXXX, KB02, TM652, TM653

SCALE WARNING
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920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-8089
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
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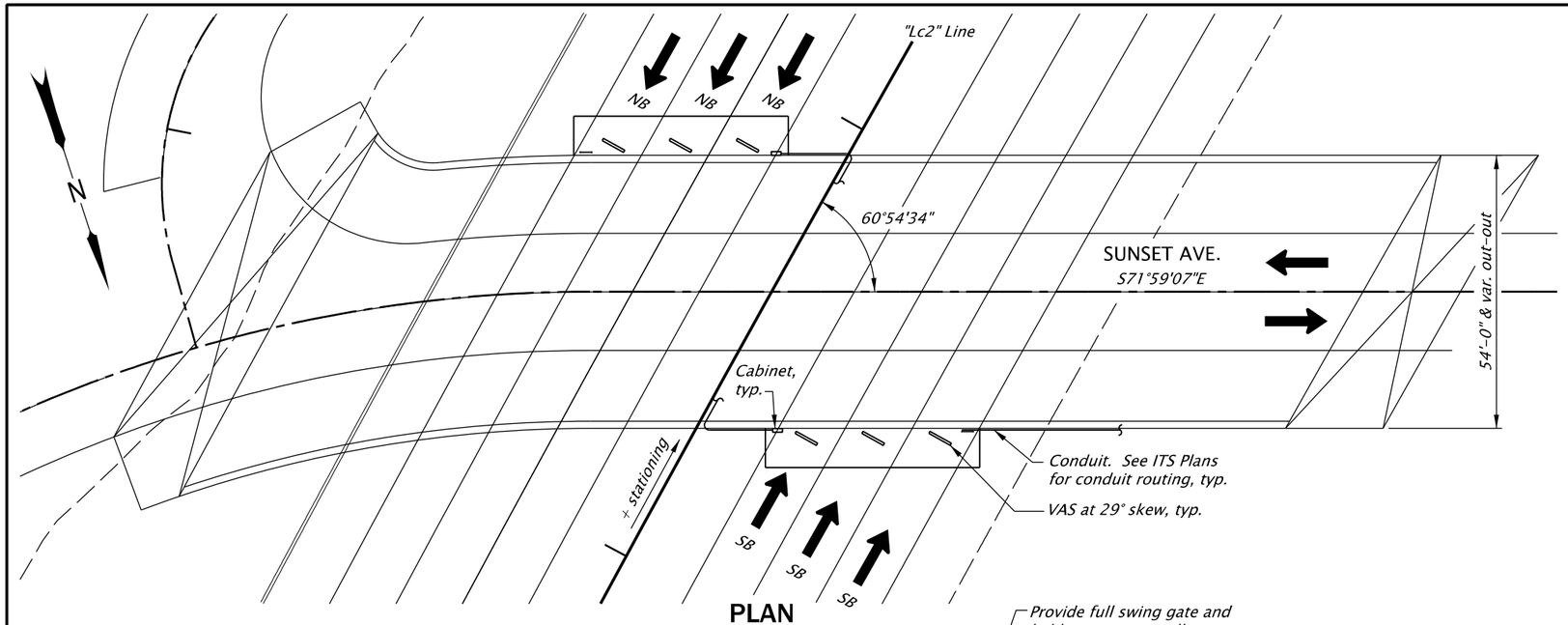
Designer: Peter G. Slocum, S.E. Reviewer: Kenton Alldritt, P.E.
Drafter: Yuka Garzenelli Checker: Wyatt Dean, E.I.

CCTV DETAILS - 3

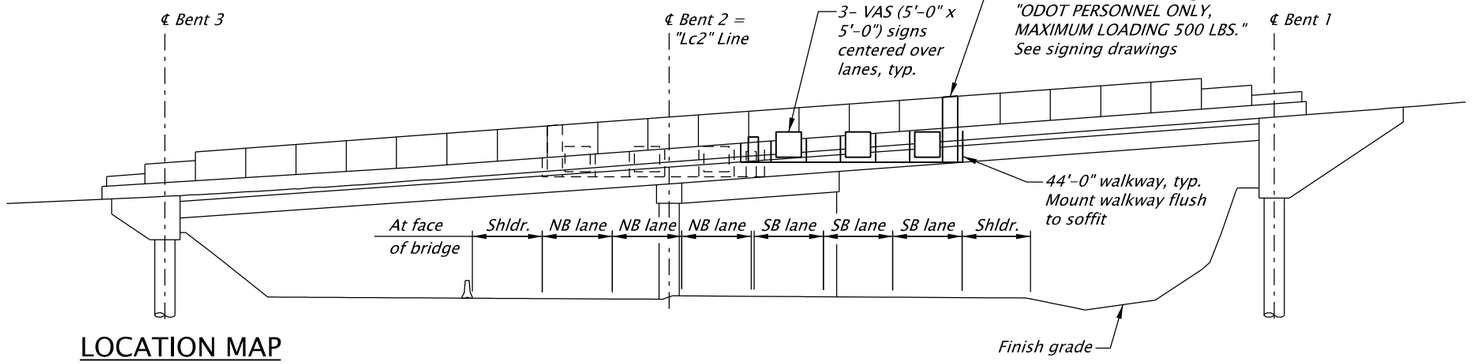
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



PLAN

Scale: 1"=30'



*ELEVATION - SUNSET BRIDGE

Scale: 1"=30'

*Elevation view is looking ahead on station, SB direction at north face of bridge

LOCATION MAP

No Scale

M.P. 8.22 NB/8.26 SB

Construction Notes:

The bottom of the walkway shall be horizontal and 6" above bridge soffit unless noted otherwise.

Install signs on fully erected support structure. Do not install signs until after support structure erection and bolt tightening is 100% complete. Tighten resin bonded anchors ¼" turn past snug tight.

The fabrication drawings shall be based on Contractor's field measurements.

General Notes:

All materials and workmanship shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Structure mounts are designed in accordance with the 5th Edition (2009) of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 1st edition, 2015 and interim revisions 2017.

Basic wind speed (1700 year recurrence interval) used for sign structure design is 115 mph, G = 1.14, K_z = 0.98 and Exposure C were used for design.

The walkway is designed for a total of 500 lbs. of personnel and equipment in addition to the self-weight of the walkway.

All structural steel shapes shall conform to ASTM A572, Grade 50, or ASTM A992, unless noted otherwise. All structural plates shall conform to ASTM A572, Grade 50. All structural tubing shall conform to ASTM A500, Grade B.

All bolts shall be considered high strength (H.S.) and slip critical and tightened according to Section 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C (slip coefficient = 0.33). See Dwg. TM608 for typical high strength bolt connection (steel to steel) and Dwg. TM607 for notes on bolts, washers and nuts.

All fasteners shall be ASTM A325 unless otherwise noted. All steel and fasteners shall be hot-dip galvanized after fabrication, unless noted otherwise. The silicon content of the base metal shall be according to the Special Provisions for all hot-dip galvanized steel, unless noted otherwise.

Holes drilled in existing concrete shall be core drilled. Hammer drills shall not be used. Contractor shall avoid drilling through concrete reinforcement when possible by adjusting support locations slightly. Reinforcement location prior to drilling is required. Notify Engineer immediately if conflict exists.

Contractor shall field verify conditions, work, locations, elevations and all dimensions prior to beginning fabrication. Existing traffic lane and structural dimensions shown are approximate and should not be used as a basis for development of fabrication drawings.

See Intelligent Transportation Systems (ITS) Plans for sign information. See ITS Plans for VAS and related electrical conduit information.

All welding shall conform to the 2010 AWS D1.1.

See Technical Specifications for approved mechanical expansion anchors.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

ACCOMPANIED BY DWGS.:
TM607, TM608

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	00000
CALC. BOOK	7084
HWY: 064 M.P.:	8.22 NB/ 8.26 SB
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON PETER GLEN SLOCUM
ADVANCE COPY SUBJECT TO CHANGE
EXPIRES: 06/30/

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

SUNSET AVE. (WEST LINN) OVER HWY. 64

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Peter G. Slocum, S.E.
Drafter: Yuka Garzenelli
Reviewer: Douglas Kirkpatrick, P.E.
Checker: Kenton Alldritt, P.E.

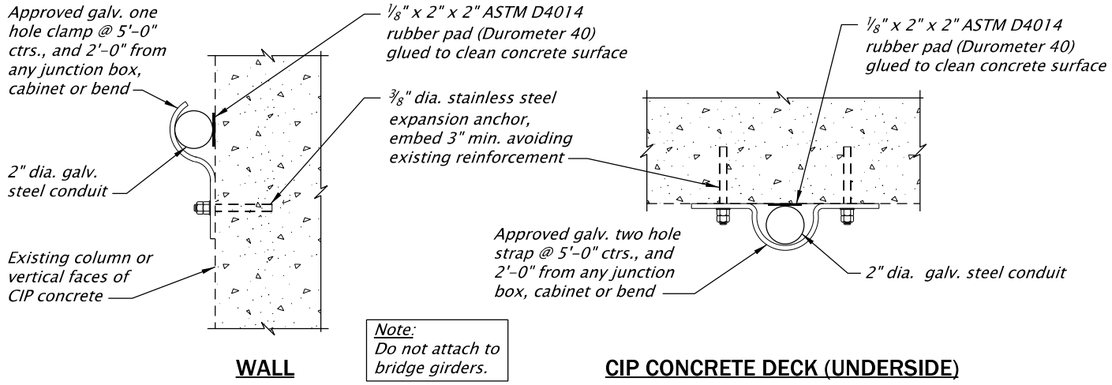
MOUNTS ON BRIDGE MP 8.3 NB/SB

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

ITS_K19786_OBEC_lpl_14.dgn :: KC04 2/10/2020 3:35:47 PM CDONOVAN

Rotation: 161.9854°



Note:
Do not attach to bridge girders.

WALL **CIP CONCRETE DECK (UNDERSIDE)**

CIP WALL OR DECK CONDUIT ATTACHMENTS

No Scale

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.:	8.22 NB/ 8.26 SB
UNIT FILE CODE	ITS-00
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER OREGON 10, 2005 PETER GLEN SLOCUM
ADVANCE COPY SUBJECT TO CHANGE
EXPIRES: 06/30/

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

SUNSET AVE. (WEST LINN) OVER HWY. 64

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

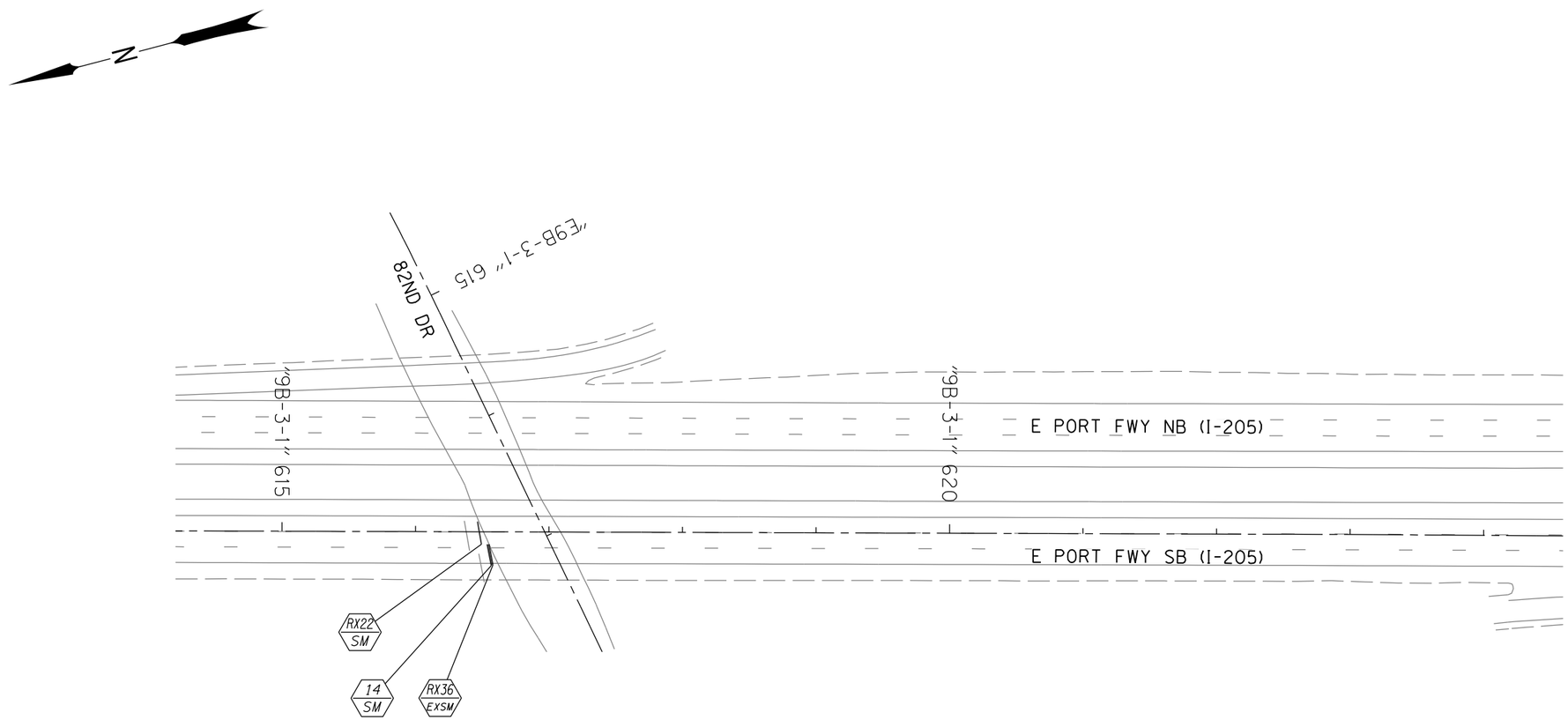
Designer: Peter G. Slocum, S.E. Reviewer: Douglas Kirkpatrick, P.E.
Drafter: Yuka Garzenelli Checker: Kenton Alldritt, P.E.

VAS SIGN MOUNTING DETAILS

SHEET NO.

Sec. 30, T. 2 S, R. 2 E, W.M.

SIGNING PLAN
I-205 M.P. 11.06 TO M.P. 10.89
STA "9B-3-1" 615+00 TO "9B-3-1" 624+00



LEGEND

- N EXM — Install new sign (N) on existing (M) sign support
- RXN M — Remove existing sign (N) and (M) sign support
- RXN EXM — Remove existing sign (N) and protect and maintain existing (M) sign support

N = Sign Number

M = Material

Material options:

SM = Bridge Structure Mount

NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

REGISTERED PROFESSIONAL ENGINEER 65671 OREGON July 9, 2002 COLETTE T. SNUFFIN Expires June 30, 2020

PRELIMINARY COPY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano	Reviewer: Simon Eng
Drafter: Carolyn Mariano	Checker: Colette Snuffin

HWY: 064
M.P.: 11.06-10.89

TRS
00000

DFI/TSSU NO.
N/A

PERMANENT SIGNING

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TN_K19786_HDR_snpl_02_09132019.dgn :: LA01 2/11/2020 2:18:43 PM CDONOVAN

Rotation: 255.4793° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

SIGNING PLAN
I-205 M.P. 10.81 TO M.P. 10.58
STA "9B-3-1" 630+00 TO "9B-3-1" 642+00

LEGEND

N / M — Install new sign (N) on new (M) sign support

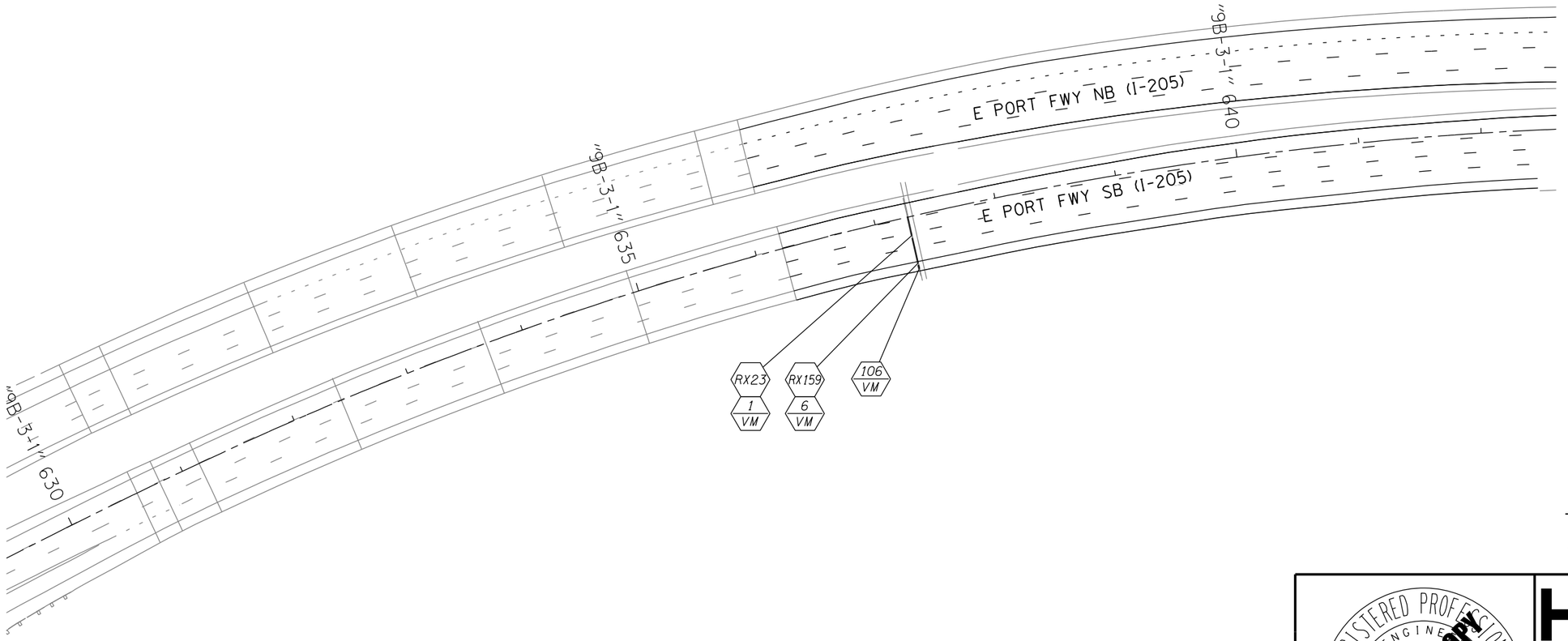
RXN — Remove existing sign (N)

N = Sign Number

M = Material

Material options:

VM = Vertical Sign Mount



NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

HWY: 064
M.P.: 10.81-10.58

TRS
00000

DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
6556
OREGON
Aug 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

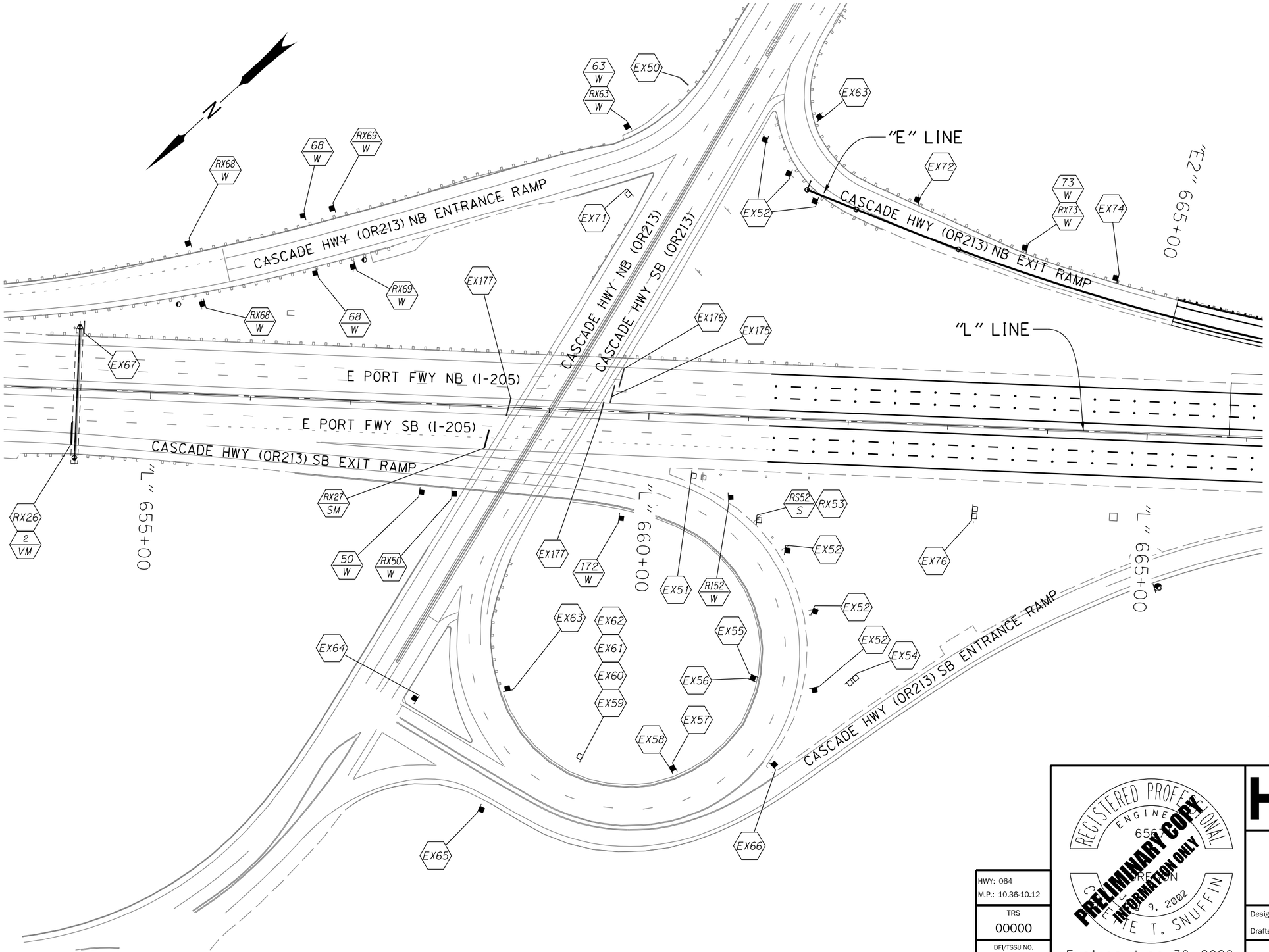
SHEET NO.

TN_K19786_HDR_snpl_02_09132019.dgn :: LA02 2/11/2020 2:19:12 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 227.6721° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



SIGNING PLAN
I-205 M.P. 10.36 TO M.P. 10.12
STA "L" 653+50 TO "L" 665+65

LEGEND

N / M	Install new sign (N) on new (M) sign support
EXN	Maintain and protect existing sign (N) and support
RXN / M	Remove existing sign (N) and (M) sign support
RXN	Remove existing sign (N)
RSN / M	Remove and save existing sign (N) and remove (M) sign support
RIN / M	Reinstall existing sign (N) on new (M) sign support

N = Sign Number

M = Material

Material options:

SM = Structure Mount
VM = Vertical Sign Mount
SB = Sign Bridge
S = Steel Breakaway Support (TBB or MPB)

NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

REGISTERED PROFESSIONAL ENGINEER
650[illegible]
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: 064	Designer: Carolyn Mariano
M.P.: 10.36-10.12	Reviewer: Simon Eng
TRS 00000	Drafter: Carolyn Mariano
DFI/TSSU NO. N/A	Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

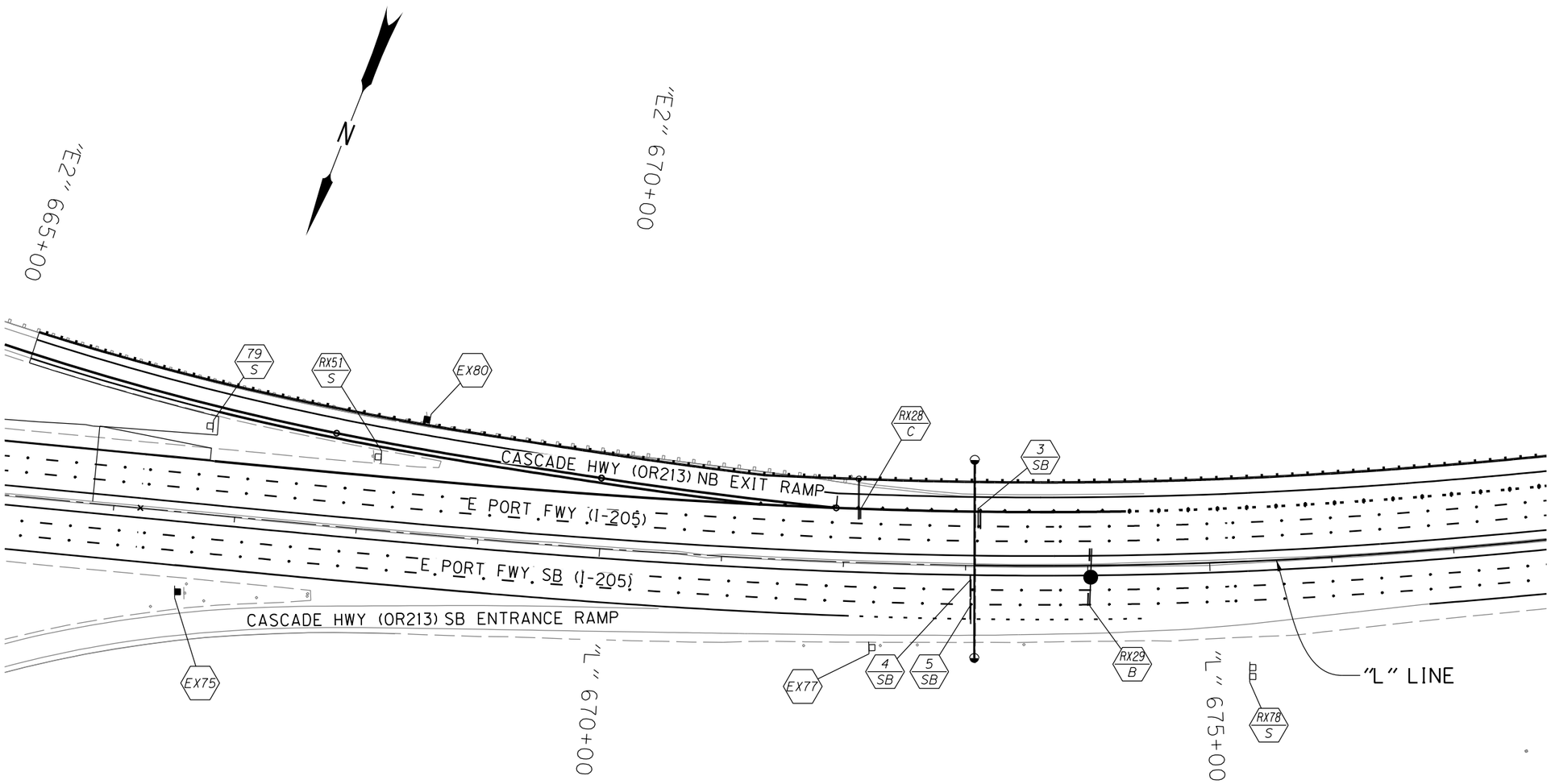
TN_K19786_HDR_snpl_02_09132019.dgn :: LA03 2/11/2020 2:19:32 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 227.6721° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

SIGNING PLAN
I-205 M.P. 10.12 TO M.P. 9.86
STA "L" 665+65 TO "L" 677+25



LEGEND

- N / M — *Install new sign (N) on new (M) sign support*
- EXN — *Maintain and protect existing sign (N) and support*
- RXN / M — *Remove existing sign (N) and (M) sign support*

N = Sign Number

M = Material

Material options:

S = Steel Breakaway Support (TBB or MPB)
C = Cantilever
SB = Sign Bridge
B = Butterfly

NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

REGISTERED PROFESSIONAL ENGINEER
6567
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano	Reviewer: Simon Eng
Drafter: Carolyn Mariano	Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

HWY: 064	
M.P.: 10.12-9.86	
TRS	00000
DFI/TSSU NO.	N/A

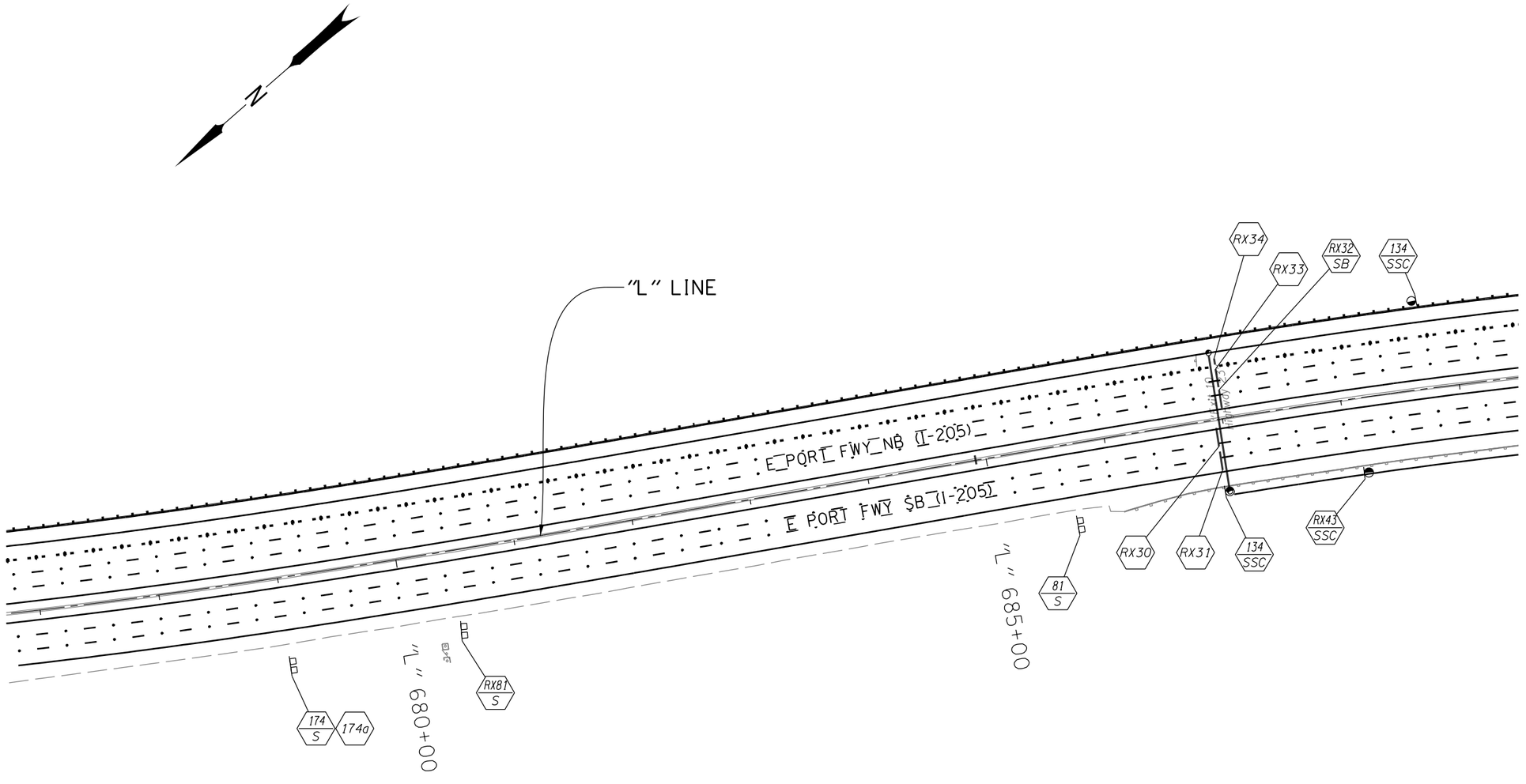
TN_K19786_HDR_snpl_02_09132019.dgn :: LA04 2/11/2020 2:19:55 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

SIGNING PLAN
I-205 M.P. 9.86 TO M.P. 9.67
STA "L" 677+25 TO "L" 689+00



LEGEND

- N — Install new sign (N)
- N / M — Install new sign (N) on new (M) sign support
- EXN — Maintain and protect existing sign (N) and support
- RXN / M — Remove existing sign (N) and (M) sign support
- RXN — Remove existing sign (N)
- RIN / M — Reinstall existing sign (N) on new (M) sign support

N = Sign Number

M = Material

Material options:

SB = Sign Bridge
SSC = Stainless Steel Clamp
S = Steel Breakaway Support (TBB or MPB)

NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

HWY: 064	
M.P.: 9.86-9.67	
TRS	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER
656
OREGON
FEB. 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

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INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano	Reviewer: Simon Eng
Drafter: Carolyn Mariano	Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_snpl_02_09132019.dgn :: LA05 2/11/2020 2:20:17 PM CDONOVAN

Rotation: 228.87° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

SIGNING PLAN
I-205 M.P. 9.67 TO M.P. 9.42
STA "L" 689+00 TO "L" 703+35

LEGEND

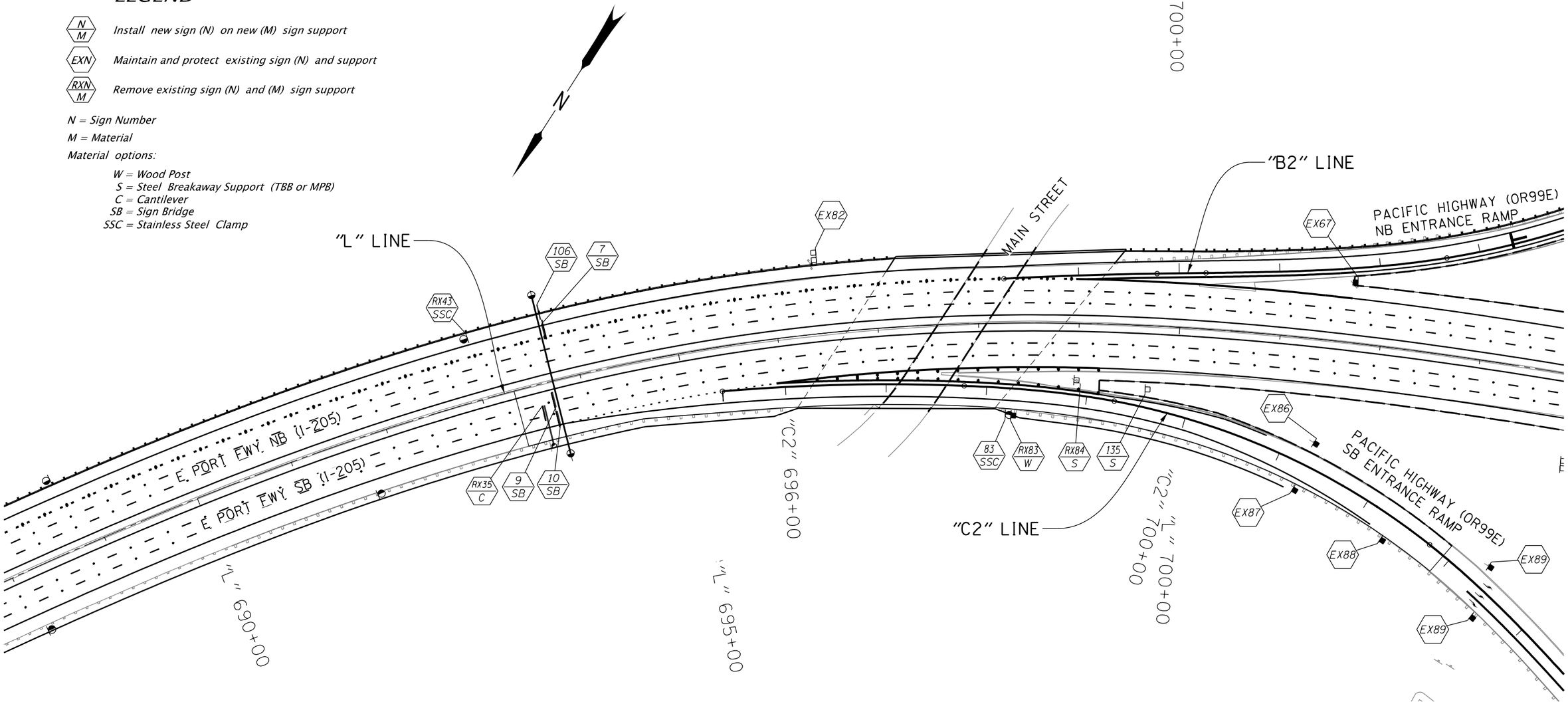
- N / M — Install new sign (N) on new (M) sign support
- EXN — Maintain and protect existing sign (N) and support
- RXN / M — Remove existing sign (N) and (M) sign support

N = Sign Number

M = Material

Material options:

W = Wood Post
S = Steel Breakaway Support (TBB or MPB)
C = Cantilever
SB = Sign Bridge
SSC = Stainless Steel Clamp



NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

HWY: 064
M.P.: 9.67-9.42

TRS
00000

DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
OREGON
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TN_K19786_HDR_snpl_02_09132019.dgn :: LA06 2/11/2020 2:20:47 PM CDONOVAN

Rotation: 212.6746° 0'

LEGEND

N — Install new sign (N)

N / M — Install new sign (N) on new (M) sign support

EXN — Maintain and protect existing sign (N) and support

RXN / M — Remove existing sign (N) and (M) sign support

N = Sign Number

M = Material

Material options:

W = Wood Post
S = Steel Breakaway Support (TBB or MPB)
C = Cantilever
SB = Sign Bridge
SSC = Stainless Steel Clamp

HWY: 064
M.P.: 11.06-10.89

TRS
00000

DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
656[illegible]
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_snpl_02_09132019.dgn :: LA06 2/11/2020 2:21:18 PM CDONOVAN

Rotation: 212.6746° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

SIGNING PLAN
I-205 M.P. 9.42 TO M.P. 9.28
STA "L" 703+35 TO "L" 709+35

LEGEND

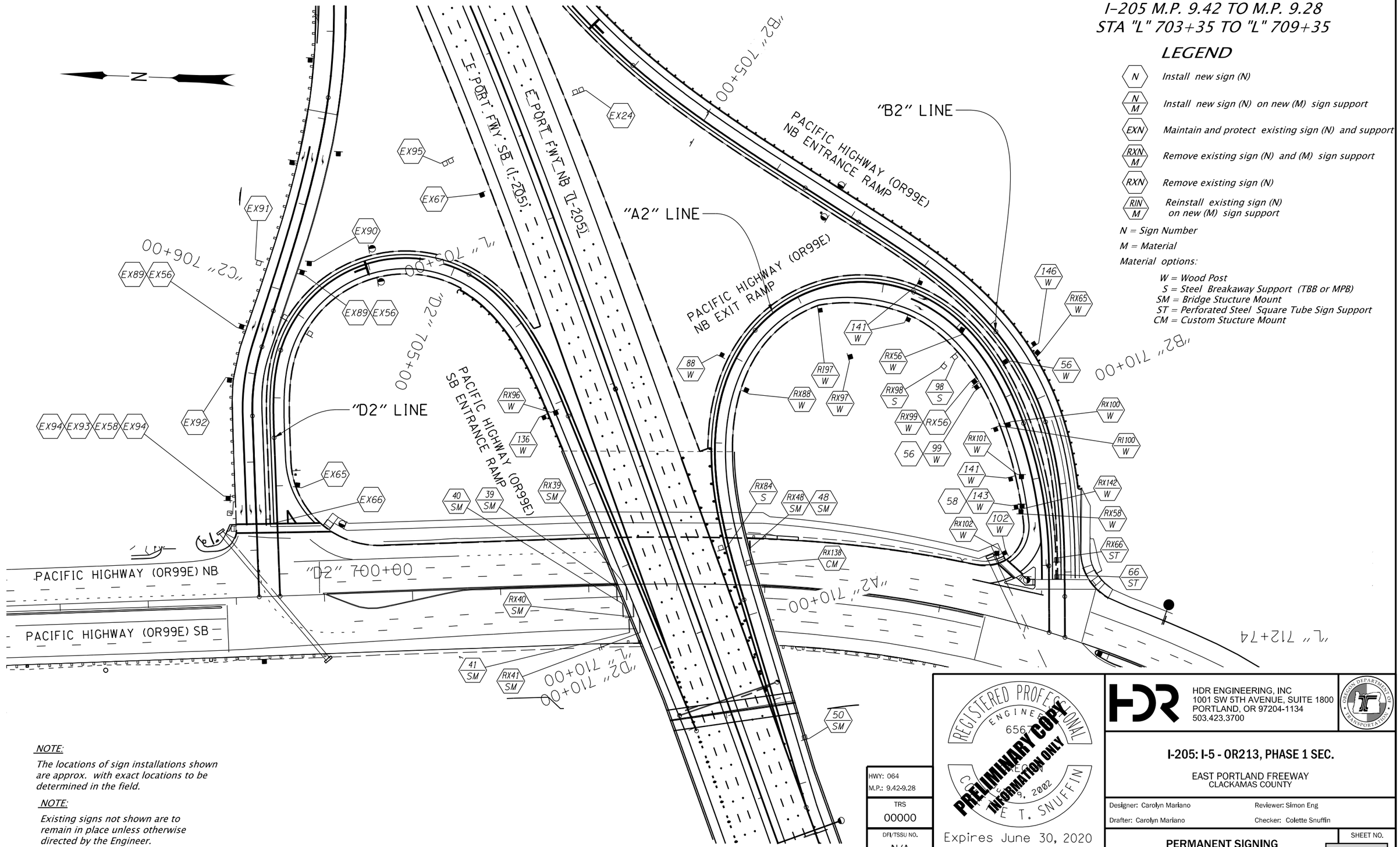
- N — Install new sign (N)
- N / M — Install new sign (N) on new (M) sign support
- EXN — Maintain and protect existing sign (N) and support
- RXN / M — Remove existing sign (N) and (M) sign support
- RXN — Remove existing sign (N)
- RIN / M — Reinstall existing sign (N) on new (M) sign support

N = Sign Number

M = Material

Material options:

W = Wood Post
S = Steel Breakaway Support (TBB or MPB)
SM = Bridge Stucture Mount
ST = Perforated Steel Square Tube Sign Support
CM = Custom Stucture Mount



NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

HWY: 064
M.P.: 9.42-9.28

TRS
00000

DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
6567
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

TN_K19786_HDR_snpl_02_09132019.dgn :: LA07 2/11/2020 2:21:39 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 272.0412°

Sec. 30, T. 2 S, R. 2 E, W.M.

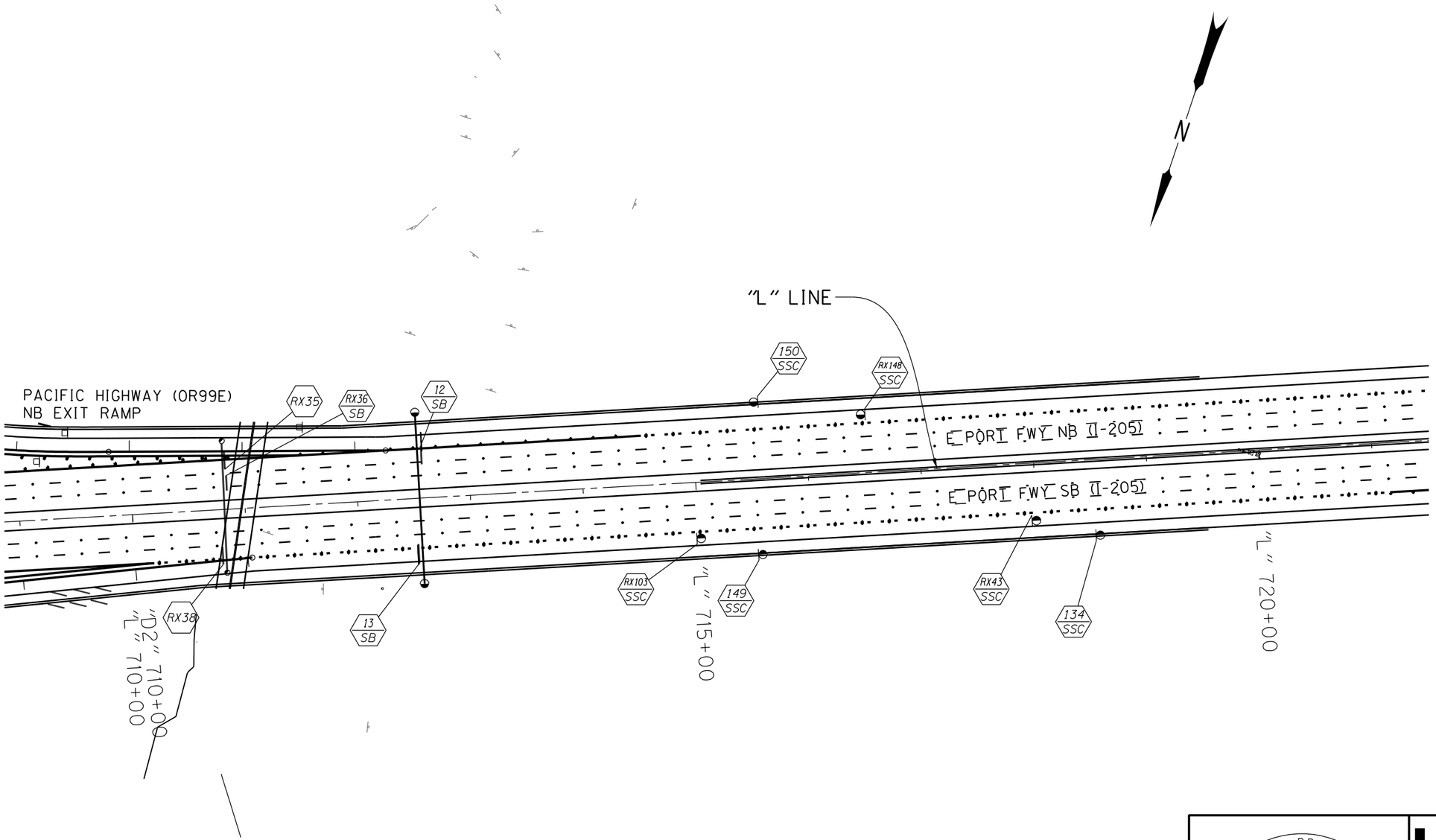
SIGNING PLAN
I-205 M.P. 9.28 TO M.P. 9.06
STA "L" 709+35 TO "L" 723+45

LEGEND

- N / M — Install new sign (N) on new (M) sign support
- RXN / M — Remove existing sign (N) and (M) sign support
- RXN — Remove existing sign (N)

N = Sign Number
M = Material
Material options:

SB = Sign Bridge
SSC = Stainless Steel Clamp



NOTE:
Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:
The locations of sign installations shown are approx. with exact locations to be determined in the field.

HWY: 064
M.P.: 9.28-9.06

TRS
00000

DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
OREGON
[illegible] 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

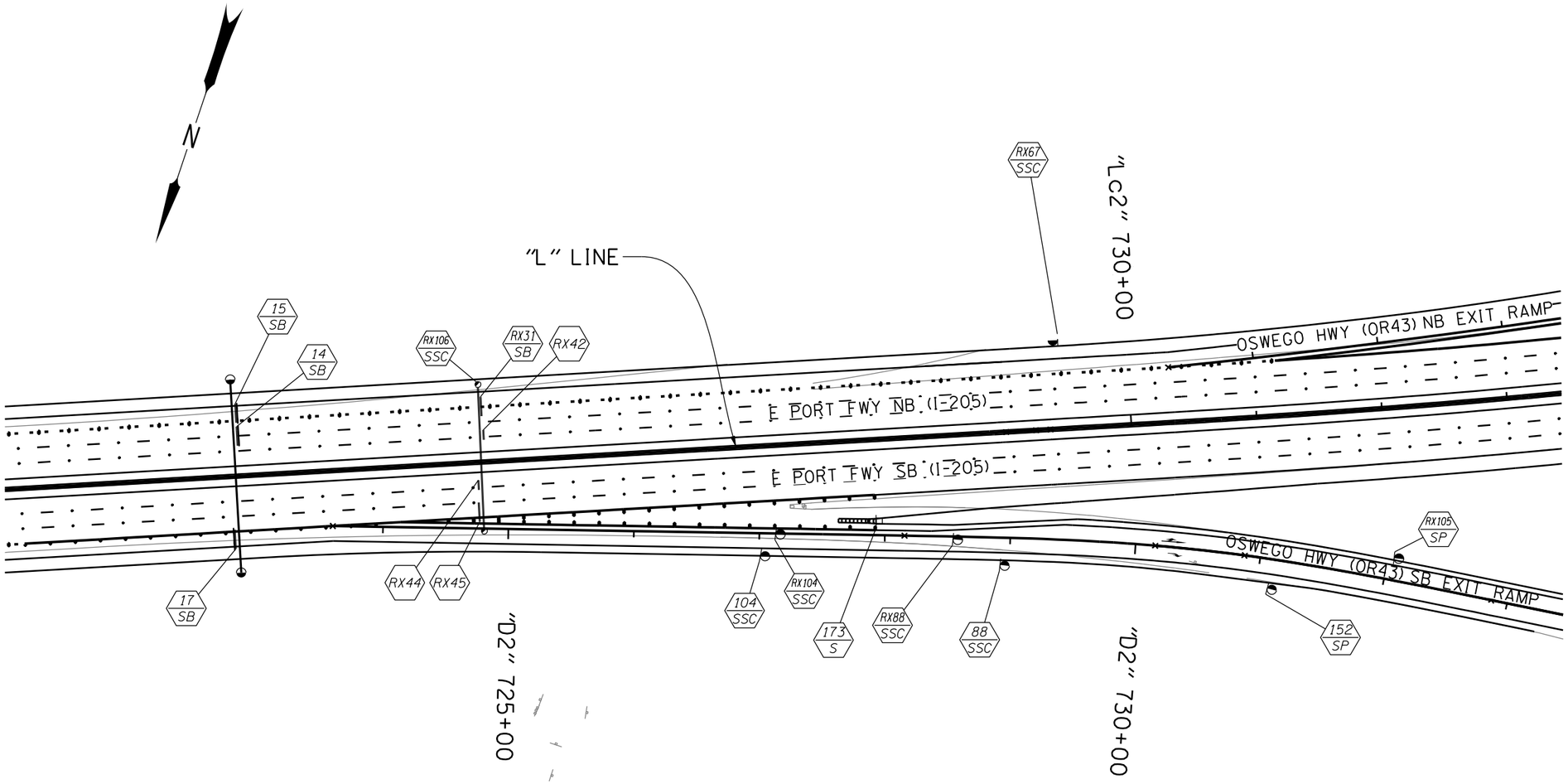
SHEET NO.

TN_K19786_HDR_snpl_02_09132019.dgn :: LA08 2/11/2020 2:22:16 PM CDONOVAN

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

SIGNING PLAN
I-205 M.P. 9.06 TO M.P. 8.87
STA "L" 723+45 TO "L" 733+15



LEGEND

- N / M — Install new sign (N) on new (M) sign support
- RXN / M — Remove existing sign (N) and (M) sign support
- RXN — Remove existing sign (N)

N = Sign Number

M = Material

Material options:

- SP = Signal Pole Mount
- SB = Sign Bridge
- SSC = Stainless Steel Clamp
- S = Steel Breakaway Support (TBB or MPB)

NOTE:

Existing signs not shown are to remain in place unless otherwise directed by the Engineer.

NOTE:

The locations of sign installations shown are approx. with exact locations to be determined in the field.

REGISTERED PROFESSIONAL ENGINEER
6567
OREGON
COLETTE T. SNUFFIN
JULY 9, 2002
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

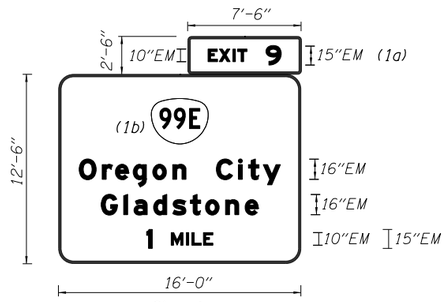
Designer: Carolyn Mariano	Reviewer: Simon Eng
Drafter: Carolyn Mariano	Checker: Colette Snuffin

PERMANENT SIGNING

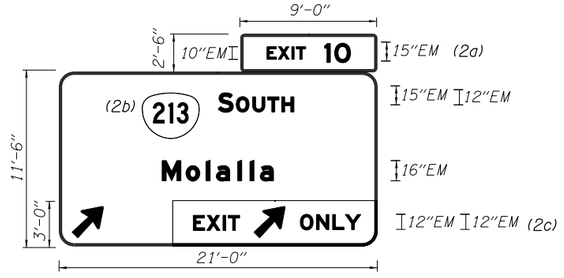
HWY: 064	
M.P.: 9.06-8.87	
TRS	00000
DFI/TSSU NO.	N/A
SHEET NO.	Page 587

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

SIGNING DETAILS



Sign 1



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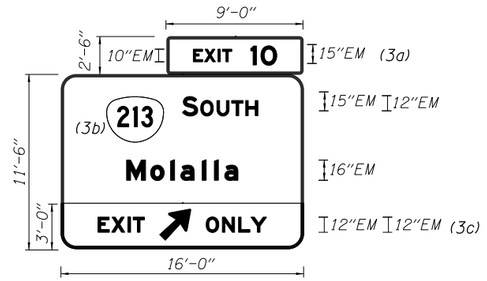

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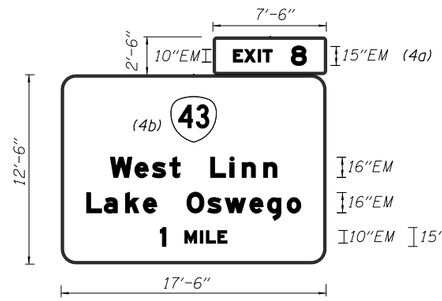

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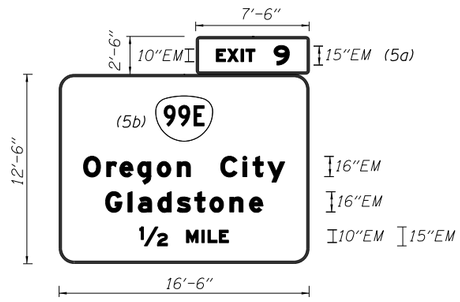

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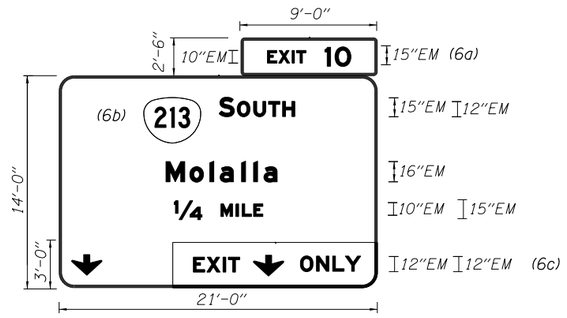

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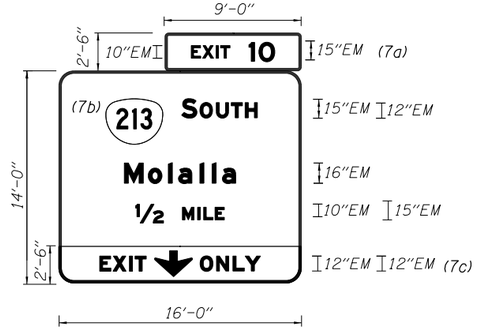
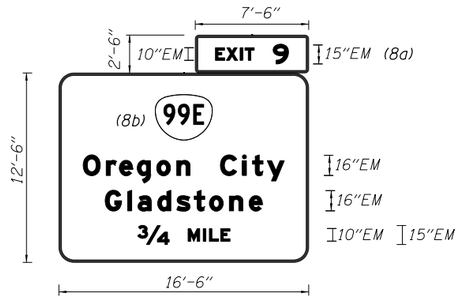
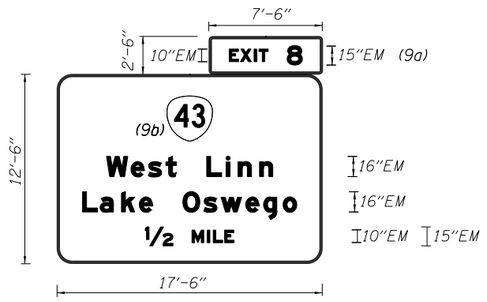


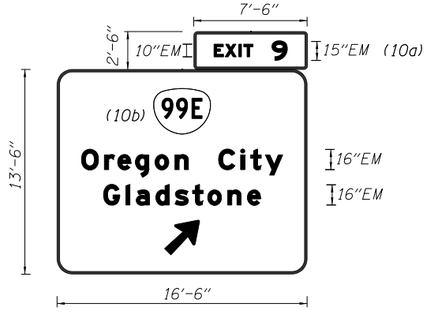
Sign 7



Sign 8



Sign 9



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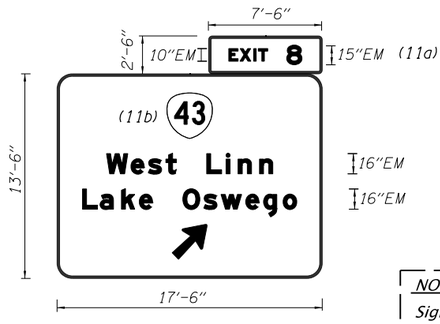


Sign 11

NOTE:
Signs shown with broken borders are existing signs.

REGISTERED PROFESSIONAL ENGINEER
6567
OREGON
COLETTE T. SNUFFIN
9, 2002
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

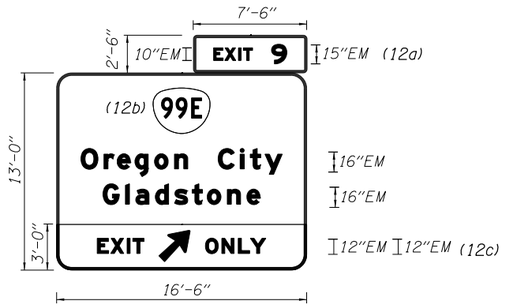
PERMANENT SIGNING

SHEET NO.

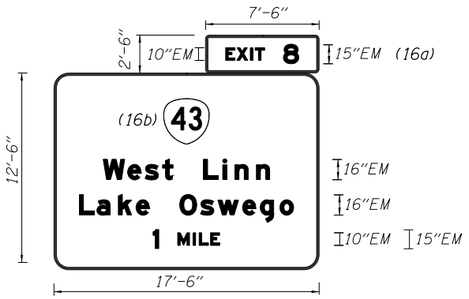
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:48 PM CDONOVAN
Rotation: 0° 0'

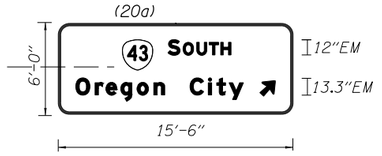
SIGNING DETAILS



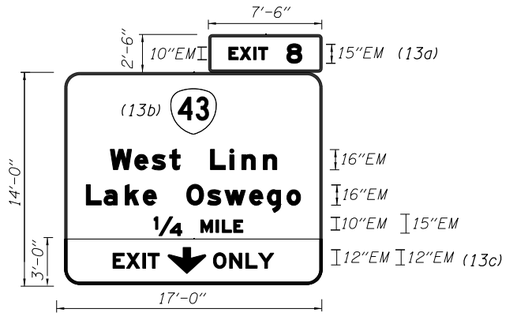
Sign 12



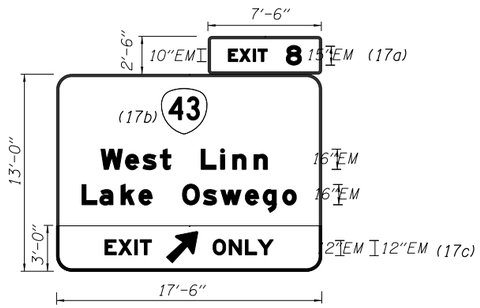
Sign 16



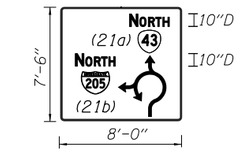
Sign 20



Sign 13

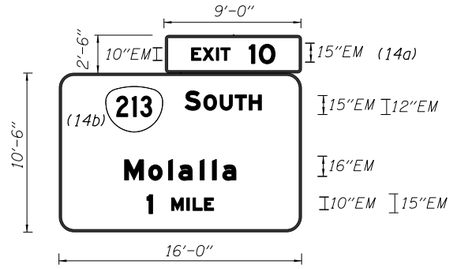


Sign 17



Sign 21

Sign 22



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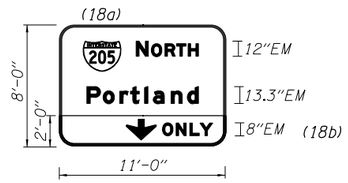
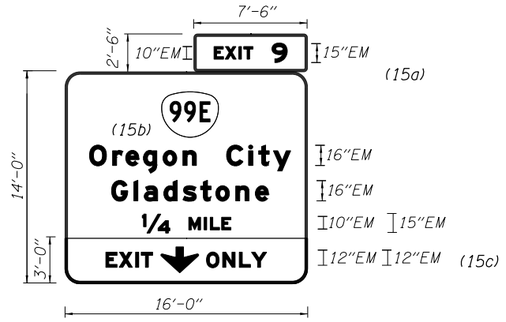


Sign 18

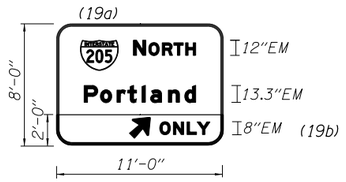
Downtown Oregon City	1 1/4
West Linn	1 3/4
10th Street	3 3/4

Sign 23

NOTE:
Signs shown with broken borders are existing signs.



Sign 15



Sign 19

HWY: 064	
M.P.: 8.48-11.06	
TRS	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER 65[illegible] OREGON COLETTE T. SNUFFIN July 9, 2002 Expires June 30, 2020

PRELIMINARY COPY INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano | Reviewer: Simon Eng
Drafter: Carolyn Mariano | Checker: Colette Snuffin

PERMANENT SIGNING

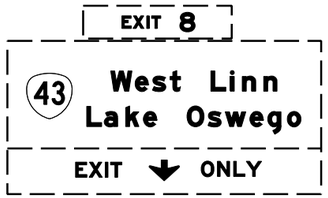
SHEET NO.

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:50 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 0° 0'

SIGNING DETAILS

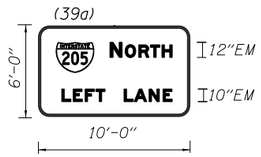


Sign 38

Sign 42

Sign 47

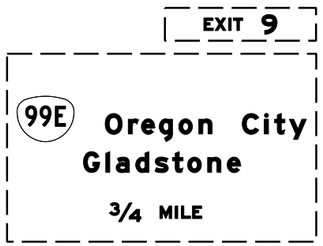
Sign 43



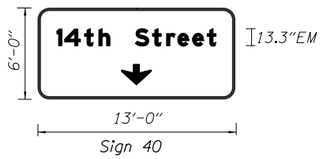
Sign 39

Sign 48

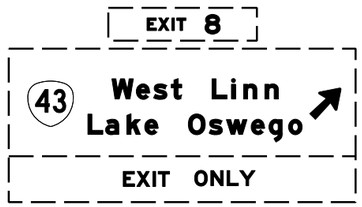
Sign 44



Sign 49



Sign 40



Sign 45

NOTE:
Signs shown with broken borders are existing signs.

Sign 41

Sign 46

HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
650
OREGON
May 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

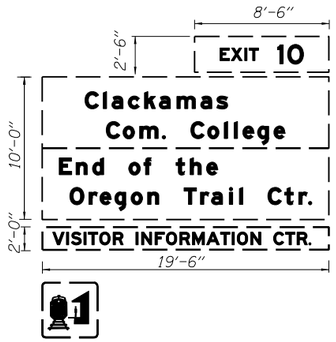
SHEET NO.

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:51 PM CDONOVAN

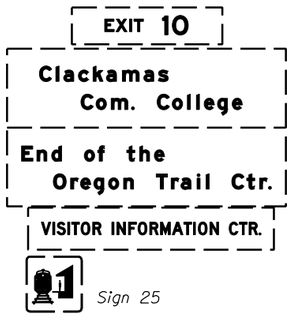
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'

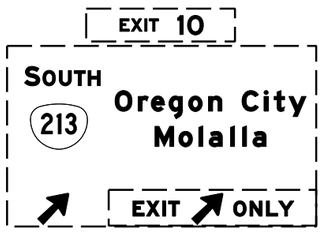
SIGNING DETAILS



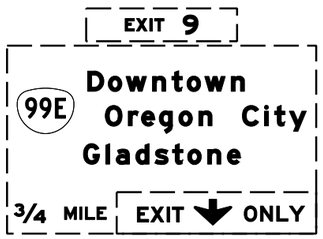
Sign 24



Sign 25



Sign 26



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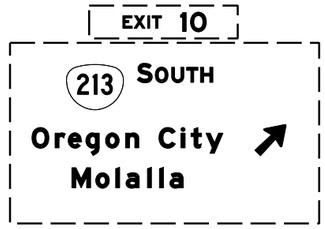
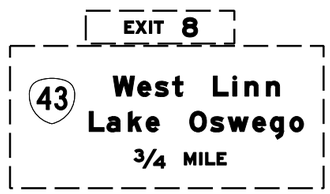


Sign 28

Sign 29



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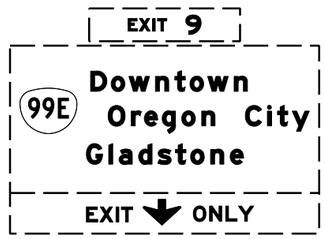
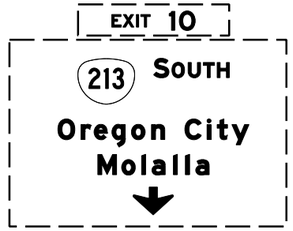
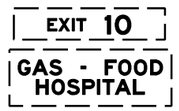


Sign 31

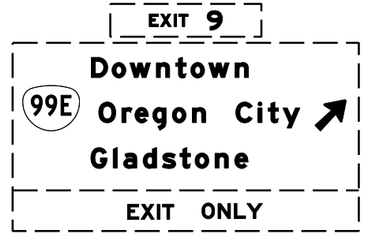
Sign 32



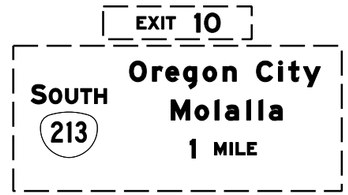
Sign 33



Sign 34



Sign 35



Sign 36

Sign 37

NOTE:
Signs shown with broken borders are existing signs.

REGISTERED PROFESSIONAL ENGINEER
6567
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: 064	
M.P.: 8.48-11.06	
TRS	00000
DFI/TSSU NO.	N/A

Designer: Carolyn Mariano — Reviewer: Simon Eng
Drafter: Carolyn Mariano — Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:52 PM CDONOVAN

Rotation: 0° 0'

SIGNING DETAILS

W13-2
48"x60"

Sign 50

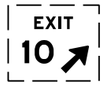
R5-1a
42"x30"

Sign 56

Sign 62

Sign 67

Sign 72



Sign 51

Sign 57

W11-1
36"x36"

W16-7P
30"x18"

Sign 63

Sign 68

W1-1
36"x36"

W13-1P
30"x30"

Sign 73

Sign 52

R5-1
48"x48"

Sign 58

Sign 64

Sign 69

Sign 74

Sign 53

Sign 59

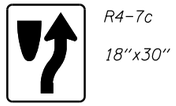
Sign 65

Sign 70

Sign 75

Sign 54

Sign 60



R4-7c
18"x30"

Sign 66

Sign 71

Sign 61

Sign 55

NOTE:
Signs shown with broken borders are existing signs.

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

I-205: I-5 - OR213, PHASE 1 SEC.

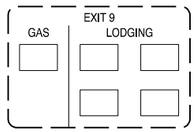
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: 064	
M.P.: 8.48-11.06	
TRS	Designer: Carolyn Mariano / Reviewer: Simon Eng
00000	Drafter: Carolyn Mariano / Checker: Colette Snuffin
DFI/TSSU NO.	SHEET NO.
N/A	PERMANENT SIGNING

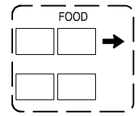
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:52 PM CDONOVAN
Rotation: 0° 0'

SIGNING DETAILS



Sign 76

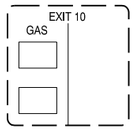


Sign 87

Sign 93

Sign 96

Sign 77

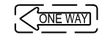


Sign 82

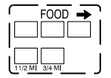
W3-3

48"x48"

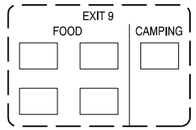
Sign 88



Sign 94



Sign 97

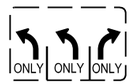


Sign 78

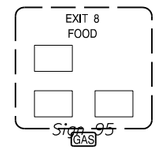
W13-2

48"x60"

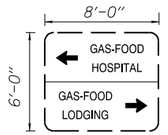
Sign 83



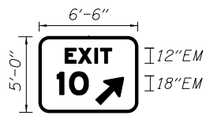
Sign 89



Sign 95



Sign 98



Sign 79

Sign 84

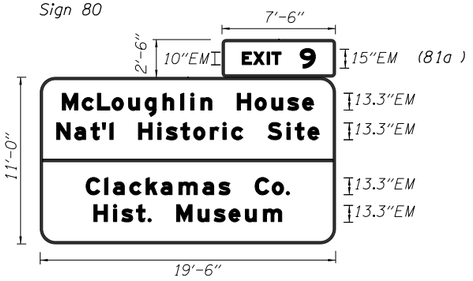
Sign 90

Sign 99

Sign 80

Not used

Sign 85



Sign 81

Sign 86

Sign 92

Sign 91

NOTE:
Signs shown with broken borders are existing signs.

REGISTERED PROFESSIONAL ENGINEER
65673
COLETTE T. SNUFFIN
PRELIMINARY COPY
INFORMATION ONLY
9, 2002
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

HWY: 064
M.P.: 8.48-11.06

TRS
00000

DFI/TSSU NO.
N/A

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:53 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0°

SIGNING DETAILS

PEDESTRIANS PROHIBITED
NON-MOTORIZED VEHICLES PROHIBITED BEYOND THIS POINT
NO PARKING UNDERGROUND SPRINKLERS

Sign 126

Sign 127

Sign 128

GAS
GAS - DIESEL FOOD
High School

Sign 129

BEGIN RIGHT TURN LANE
YIELD TO PEDS

Sign 130

SLOW TRUCKS

Sign 131

Sign 132

McLoughlin House
NAT'L HISTORIC SITE
NEXT RIGHT

Sign 133

SPEED LIMIT 55

R2-1
48"x 60"

Sign 134

6'-6"
5'-0"
EXIT 9
12"EM
18"EM

Sign 135

George Abernethy Bridge
5'-0" × 11'-0"
18"EM
18"EM
18"EM

Sign 136

Not used

Sign 137

EXIT 30 MPH

Sign 138

Not used

Sign 139

Not used

Sign 140

R3-8
ONLY ONLY
36"x36"

Sign 141

R1-5b
STOP HERE FOR
36"x36"

Sign 143

RIGHT TURN YIELD TO PEDS

Sign 142

Not used

Sign 144

Not used

Sign 145

NON-MOTORIZED VEHICLES PROHIBITED BEYOND THIS POINT

Sign 146

ENTERING Oregon City

Sign 148

Not used

Sign 147

3'-6"
ENTERING West Linn
18"EM
18"EM
7'-0"

Sign 149

3'-6"
ENTERING Oregon City
18"EM
18"EM
8'-0"

Sign 150

Not used

Sign 151

2'-0"
Willamette Falls Locks
6"D
6"D
6'-0"

Sign 152

NOTE:
Signs shown with broken borders are existing signs.

REGISTERED PROFESSIONAL ENGINEER
656
OREGON
July 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano	Reviewer: Simon Eng
Drafter: Carolyn Mariano	Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

SIGNING DETAILS

R5-10c
24"x12"
Sign 153

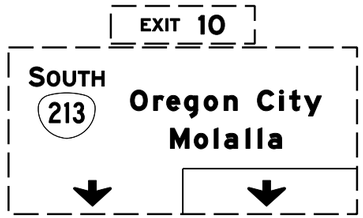
R4-4
36"x30"
Sign 154

W2-6
30"x30"
Sign 155

R3-8 (mod)
36"x30"
Sign 156

R3-8 (mod)
36"x30"
Sign 157

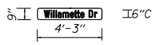
R6-4a
48"x24"
Sign 158



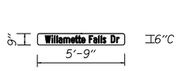
Sign 159

W2-6
30"x30"
M6-1
21"x15"
Sign 160

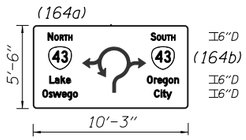
R1-1
36"x36"
Sign 161



Sign 162



Sign 163

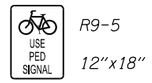


Sign 164

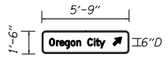
D11-1
24"x18"
M6-1
12"x9"
Sign 165

D11-1
24"x18"
Sign 166

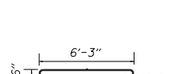
D11-1
24"x18"
M6-1
12"x9"
Sign 167



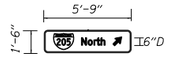
R9-5
12"x18"
Sign 168



Sign 169

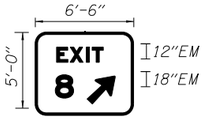


Sign 170

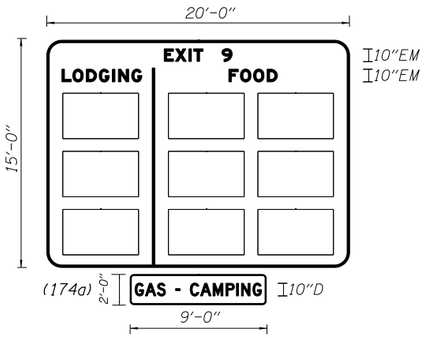


Sign 171

W1-15
48"x48"
W13-1P
30"x30"
Sign 172

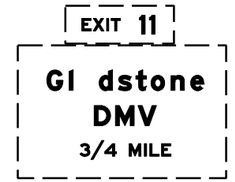


Sign 173



Sign 174

Sign 175



Sign 176

Sign 177

NOTE:
Signs shown with broken borders are existing signs.

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
COLETTE T. SNUFFIN
PRELIMINARY COPY
INFORMATION ONLY
JULY 9, 2002
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

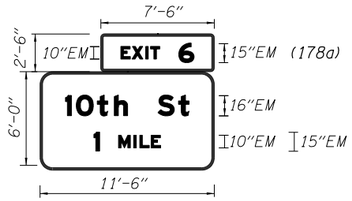
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: 064	
M.P.: 8.48-11.06	
TRS	
00000	
DFI/TSSU NO.	
N/A	
Designer: Carolyn Mariano	Reviewer: Simon Eng
Drafter: Carolyn Mariano	Checker: Colette Snuffin
PERMANENT SIGNING	SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:55 PM CDONOVAN
Rotation: 0° 0'

SIGNING DETAILS



Sign 178

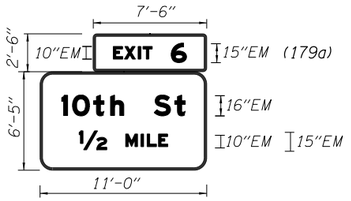
Not used

Sign 182

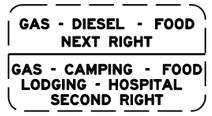
Sign 186

Sign 190

Sign 193



Sign 179

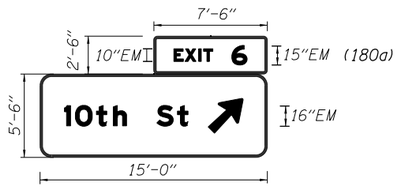


Sign 183

Sign 187

Sign 191

Sign 194



Sign 180

Sign 184

Sign 188

Sign 192

Sign 195

NOTE:
Signs shown with broken borders are existing signs.

Sign 181

Sign 185

Sign 189

HWY: 064
M.P.: 8.48-11.06

TRS
00000

DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
656
OREGON
COLETTE T. SNUFFIN
PRELIMINARY COPY
INFORMATION ONLY
9, 2002
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

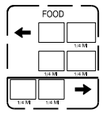
TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:55 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'

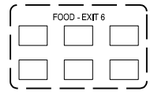
SIGNING DETAILS

Sign 196



Sign 201

Sign 206



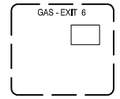
Sign 211

Sign 215

Sign 197

Sign 202

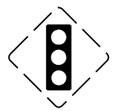
Sign 207



Sign 212

Sign 216

Sign 198



Sign 203

Sign 208

Sign 213

Sign 217

Sign 199

Sign 204

Sign 209

Sign 214

Sign 200

Sign 205

Sign 210

NOTE:
Signs shown with broken borders are existing signs.

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

REGISTERED PROFESSIONAL ENGINEER
6567
OREGON
COLETTE T. SNUFFIN
July 9, 2002
PRELIMINARY COPY
INFORMATION ONLY
Expires June 30, 2020

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: 064	
M.P.: 8.48-11.06	
TRS 00000	
DFI/TSSU NO. N/A	
Designer: Carolyn Mariano	Reviewer: Simon Eng
Drafter: Carolyn Mariano	Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:56 PM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 0° 0'

SIGNING DETAILS

Sign 100

Sign 101

R1-2
48"x48"

Sign 102

Sign 103

W13-2
48"x60"

Sign 104

Sign 105

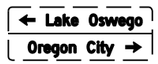
D9-2
30"x30"

Sign 106

Sign 107

Sign 108

Sign 109



Sign 110

Sign 111

Sign 112

Sign 113

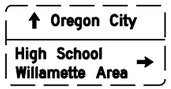
Sign 114

Sign 115

Sign 116

Sign 117

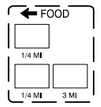
Sign 118



Sign 119

Sign 120

Sign 121



Sign 122

Sign 123

Sign 124

Sign 125

NOTE:
Signs shown with broken borders are existing signs.

REGISTERED PROFESSIONAL ENGINEER
6567
OREGON
COLETTE T. SNUFFIN
9, 2002
PRELIMINARY COPY
INFORMATION ONLY
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: 064	Designer: Carolyn Mariano
M.P.: 8.48-11.06	Reviewer: Simon Eng
TRS 00000	Drafter: Carolyn Mariano
DFI/TSSU NO. N/A	Checker: Colette Snuffin

PERMANENT SIGNING

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_sndt_01_A2.dgn :: LB01-LB05 2/11/2020 2:04:57 PM CDONOVAN

Rotation: 0° 0'

SIGN & POST DATA TABLE

SIGN AND POST DATA TABLE

SIGN NO.	SIGN LOCATION 4/ (TM200–TM201, TM635)	SIGN DIMENSIONS		SUB-STRATE			COLOR 1/					LEGEND		SIGN NO. 2/	TYPE OF SUPPORT																							POST		FOOTING		REMARKS
							BACKGROUND		LEGEND																													SECONDARY SIGN (TM676 & TM678)				SIZE	LENGTH	LOCATION 3/	MIN. DEPTH 5/	
		WIDTH	HEIGHT	PLYWOOD	SHEET ALUMINUM	EXTRUDED ALUM. (TM675)	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	NON-REFLECTIVE	PERMANENT	REMOVABLE (TM230 – TM233)		WOOD POST (TM670–TM671, TM676)	SQ. TUBE SIGN SUPPORT (TM671, TM676, TM681, TM687–TM689)	TRIANGULAR BASE BREAKAWAY (TM602)	H – FRAME	MULTI-POST BREAKAWAY (TM220, TM600–TM601)	STAINLESS STEEL CLAMP (SSC) (TM677)	SIGNAL POLE MOUNT (TM680)	MAST ARM SIGN MOUNT (TM679)	BRIDGE STRUCTURE MOUNT (TM677)	CANTILEVER / BUTTERFLY (TM622–TM627)	SIGN BRIDGE (TM606–TM612, TM614–TM620)	EXIT NUMBER SIGN MOUNT (TM220, TM225)	ROUTE MARKER FRAME (TM678)	MILEPOST MARKER POST (TM221–TM222)	CROSSWALK CLOSURE	BARRICADE (TM490)	VERTICAL SIGN MOUNTS ON EXISTING STRUCTURES	CUSTOM VARIABLE SUPPORT	C 4X5.4	C 4X7.25	LENGTH	(BASED ON ESTIMATED LENGTH)	(MUST BE FIELD VERIFIED)			
1	"L" 654+26	192	150			✓	G			W			✓	1											✓					✓											*Install on exist.sign bridge.For details see LD sheets.*
1a		90	30			✓	G			W			✓	1a												✓												(2) S 3x5.7	7'–0"			
1b		45	36		✓			SW			BK			1b																											
2	"L" 654+26	252	138			✓	G			W			✓	2											✓					✓											
2a		108	30			✓	G			W			✓	2a												✓												(2) S 3x5.7	7'–0"			*Install on exist.sign bridge.For details see LD sheets.*
2b		45	36		✓			SW			BK	✓		2b																											
2c		162	36		✓			FY				✓		2c																											
3	"L" 673+07	192	138			✓	G			W			✓	3											✓					✓											
3a		100	30			✓	G			W			✓	3a												✓												(2) S 3x5.7	7'–0"			
3b		45	36		✓			SW			BK	✓		3b																											
3c		192	36		✓			FY			BK		✓	3c																											
4	"L" 673+07	210	150			✓	G						✓	4											✓					✓											
4a		90	30			✓	G			W			✓	4a												✓												(2) S 3x5.7	7'–0"			
4b		36	36		✓			SW			BK	✓		4b																											
5	"L" 673+07	198	150			✓	G			W			✓	5											✓					✓											
5a		90	30			✓	G			W			✓	5a												✓												(2) S 3x5.7	7'–0"			
5b		45	36		✓			SW			BK	✓		5b																											
6	"L" 654+26	252	168			✓	G			W			✓	6																											
6a		108	24.5			✓	G			W				6a																											
6b		45	36		✓			SW			BK	✓		6b																											
6c		162	36		✓			FY				✓		6c																											
7	"L" 693+72	192	168			✓	G			W			✓	7											✓																
7a		108	30			✓	G			W			✓	7a												✓																
7b		45	36		✓			SW			BK	✓		7b																											
7c		192	30		✓			FY			BK	✓		7c																											
9	"L" 693+70	210	150			✓	G			W			✓	9																											
9a		90	30			✓	G			W			✓	9a											✓												(2) S 3x5.7	7'–0"			
9b		36	36					SW			BK	✓		9b												✓															

1/ BK=BLACK
BL=BLUE
BR=BROWN
FY=FLUORESCENT YELLOW
G=GREEN
O=ORANGE
R=RED
RW=RED–WHITE
RB=RED–BLUE
SW=SILVER–WHITE
W=WHITE
Y=YELLOW
YG=YELLOW–GREEN

2/ NOTE: L,C,R ARE LOCATIONS OF POSTS FACING THE SIGN.
L=LEFT POST
C=CENTER POST
R=RIGHT POST

3/ DISTANCE FROM EDGE OF TRAVEL LANE, FACE OF CURB, GUARDRAIL, OR BARRIER TO THE CENTERLINE OF FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601, TM602 AND TM635.

4/ NOTE: THE LOCATIONS SHOWN ARE APPROXIMATE EXCEPT FOR SPEED ZONES, SCHOOL ZONES, OBJECT MARKERS AND MILEPOST MARKERS. EXACT LOCATIONS ARE TO BE DETERMINED BY THE ENGINEER.

5/ MINIMUM DEPTH OF FOOTING FOR TRIANGULAR BASE BREAKAWAY AND MULTI-POST BREAKAWAY INSTALLATIONS IS FOR A 2' DIAMETER FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601 AND TM602.

HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

SIGN AND POST DATA TABLE

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TN_K19786_HDR_snpd_01.dgn :: LC01-LC03 2/11/2020 2:09:15 PM CDONOVAN
Rotation: 360°

SIGN & POST DATA TABLE

SIGN AND POST DATA TABLE

SIGN NO.	SIGN LOCATION 4/ (TM200-TM201, TM635)	SIGN DIMENSIONS		SUB-STRATE			COLOR 1/						LEGEND		SIGN NO. 2/	TYPE OF SUPPORT																					POST		FOOTING		REMARKS
							BACKGROUND		LEGEND																													SECONDARY SIGN (TM676 & TM678)			SIZE	LENGTH	LOCATION 3/	MIN. DEPTH 5/	
		WIDTH	HEIGHT	PLYWOOD	SHEET ALUMINUM	EXTRUDED ALUM. (TM675)	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	NON-REFLECTIVE	PERMANENT	REMOVABLE (TM230 - TM233)		WOOD POST (TM670-TM671, TM676)	SQ. TUBE SIGN SUPPORT (TM671, TM676, TM681, TM687-TM689)	TRIANGULAR BASE BREAKAWAY (TM602)	H - FRAME	MULTI-POST BREAKAWAY (TM220, TM600-TM601)	STAINLESS STEEL CLAMP (SSC) (TM677)	SIGNAL POLE MOUNT (TM680)	MAST ARM SIGN MOUNT (TM679)	BRIDGE STRUCTURE MOUNT (TM677)	CANTILEVER / BUTTERFLY (TM622-TM627)	SIGN BRIDGE (TM606-TM612, TM614-TM620)	EXIT NUMBER SIGN MOUNT (TM220, TM225)	ROUTE MARKER FRAME (TM678)	MILEPOST MARKER POST (TM221-TM222)	CROSSWALK CLOSURE BARRICADE (TM490)	VERTICAL SIGN MOUNTS ON EXISTING STRUCTURES	CUSTOM VARIABLE SUPPORT	C 4X5.4	C 4X7.25	LENGTH	(BASED ON ESTIMATED LENGTH)	(MUST BE FIELD VERIFIED)			
10	"L" 693+70	198	162			✓	G			W			✓		10																									
10a		90	30			✓	G			W			✓		10a												✓														
10b		45	36		✓			SW			BK	✓			10b													✓													
12	"L" 712+55	198	156			✓	G			W			✓		12												✓													
12a		120	30			✓	G			W			✓		12a													✓												
12b		45	36		✓			SW			BK	✓			12b																									
12c		198	36					FY			BK	✓			12c																									
13	"L" 712+55	210	150			✓	G			W			✓		13												✓													
13a		120	30			✓	G			W			✓		13a													✓												
13b		36	36		✓			SW			BK	✓			13b																									
13c		210	30		✓			FY			BK	✓			13c																									
14	"9B-3-1" 616+55	192	126			✓	G			W			✓		14									✓																Install on exist. structure. For details see LD sheets.
14a		120	30			✓	G			W			✓		14a													✓												
14b		45	36		✓			SW			BK	✓			14b																									
14	"L" 722+83	192	126			✓	G			W			✓		14												✓													
14a		120	30			✓	G			W			✓		14a													✓												
14b		45	36		✓			SW			BK	✓			14b																									
15	"L" 722+83	192	168			✓	G			W					15												✓													
15a		120	30			✓	G			W					15a													✓												
15b		45	36		✓			SW			BK	✓			15b																									
15c		198	30		✓			FY			BK	✓			15c													✓												
17	"L" 722+83	210	156			✓	G			W					17												✓													
17a		120	30			✓	G			W					17a													✓												
17b		36	36		✓			SW			BK	✓			17b																									
17c		210	36		✓			FY			BK	✓			17c																									
18	"OR43" 5+93	132	96			✓	G			W			✓		18												✓													
18a		45	36		✓		RB			W		✓			18a																									
18b		132	24		✓			FY			BK	✓			18b																									

1/ BK=BLACK
BL=BLUE
BR=BROWN
FY=FLUORESCENT YELLOW
G=GREEN
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RB=RED-BLUE
SW=SILVER-WHITE
W=WHITE
Y=YELLOW
YG=YELLOW-GREEN

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HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
COLETTE T. SNUFFIN
PRELIMINARY COPY
INFORMATION ONLY
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

SIGN AND POST DATA TABLE

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TN_K19786_HDR_snpd_01.dgn :: LC01-LC03 2/11/2020 2:09:57 PM CDONOVAN
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SIGN & POST DATA TABLE

SIGN NO.	SIGN LOCATION 4/ (TM200–TM201, TM635)	SIGN DIMENSIONS		SUB-STRATE			COLOR 1/				LEGEND		SIGN NO. 2/	TYPE OF SUPPORT																						POST		FOOTING		REMARKS
							BACKGROUND		LEGEND																												SIZE	LENGTH	LOCATION 3/	MIN. DEPTH 5/	
		WIDTH	HEIGHT	PLYWOOD	SHEET ALUMINUM	EXTRUDED ALUM. (TM675)	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	NON-REFLECTIVE	PERMANENT	REMOVABLE (TM230 – TM233)		WOOD POST (TM670–TM671, TM676)	SQ. TUBE SIGN SUPPORT (TM671, TM676, TM681, TM687–TM689)	TRIANGULAR BASE BREAKAWAY (TM602)	H – FRAME	MULTI-POST BREAKAWAY (TM220, TM600–TM601)	STAINLESS STEEL CLAMP (SSC) (TM677)	SIGNAL POLE MOUNT (TM680)	MAST ARM SIGN MOUNT (TM679)	BRIDGE STRUCTURE MOUNT (TM677)	CANTILEVER / BUTTERFLY (TM622–TM627)	SIGN BRIDGE (TM606–TM612, TM614–TM620)	EXIT NUMBER SIGN MOUNT (TM220, TM225)	ROUTE MARKER FRAME (TM678)	MILEPOST MARKER POST (TM221–TM222)	CROSSWALK CLOSURE	BARRICADE (TM490)	VERTICAL SIGN MOUNTS ON EXISTING STRUCTURES	CUSTOM VARIABLE SUPPORT	SECONDARY SIGN (TM676 & TM678) C 4X5.4	SECONDARY SIGN (TM676 & TM678) C 4X7.25	SECONDARY SIGN (TM676 & TM678) LENGTH	(BASED ON ESTIMATED LENGTH)	(MUST BE FIELD VERIFIED)			
19	"0R43" 7+30	132	96			✓	G			W			19										✓															
19a		45	36		✓		RB			W		✓	19a																										
19b		132	24		✓			FY			BK	✓	19b																										
20	"0R43" 7+30	186	72			✓	G			W			20										✓		✓													
20a		36	36		✓			SW			BK	✓	20a																										
21	"0R43" 15+90	96	90										21											✓														
21a		36	36		✓			SW			BK	✓	21a																										
21b		45	36		✓		RB			W		✓	21b																										
39	"L" 709+30	120	72			✓	G			W			39										✓															
39a		45	36		✓			SW			BK	✓	39a																										
40	"L" 709+50	156	72			✓	G			W			40										✓															
41	"L" 709+66	162	90			✓	G			W			41										✓															
48	"A2" 709+20	174	96			✓	G			W			48										✓															
48a		36	36		✓			SW			BK	✓	48a																										
50	"A2" 711+50	48	60			✓	Y			BK		✓	50			✓						✓																
56	"A2" 703+40 LT.	42	30		✓		R		SW			✓	56																								4" x 6"	16'			
56	"A2" 704+60 RT.	42	30		✓		R		SW			✓	56			✓																							
58	"A2" 702+08 LT.	48	48		✓		R		SW			✓	58																										
66	"A2" 700+82	18	30			✓	Y			BK			66		✓																							4" x 4"	14'-0"			
79	"L" 666+77	78	60			✓	G			W			79						✓							✓												5x5x3/16	11'-10"	29'-4"	4'-6"	
81	"L" 685+69	234	132			✓	GB			W			81						✓																			14x30	20'-8"	29'-4"	4'-6"	
81a		90	30			✓	GB			W			81a													✓											14x30	24'-4"	38'-8"	4'-6"	
83	"C2" 698+22	48	60		✓		Y			BK		✓	85							✓																			

1/ BK=BLACK
BL=BLUE
BR=BROWN
FY=FLUORESCENT YELLOW
G=GREEN
O=ORANGE
R=RED
RB=RED–BLUE
SW=SILVER–WHITE
W=WHITE
Y=YELLOW
YG=YELLOW–GREEN
GB=GREEN–BROWN

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L=LEFT POST
C=CENTER POST
R=RIGHT POST

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REGISTERED PROFESSIONAL ENGINEER
656
OREGON
PRELIMINARY COPY
INFORMATION ONLY
July 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

SIGN AND POST DATA TABLE

SHEET NO.

TN_K19786_HDR_snpd_01.dgn :: LC01-LC03 2/11/2020 2:10:47 PM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 360°

SIGN & POST DATA TABLE

SIGN AND POST DATA TABLE

SIGN NO.	SIGN LOCATION 4/ (TM200–TM201, TM635)	SIGN DIMENSIONS		SUB-STRATE			COLOR 1/					LEGEND		SIGN NO. 2/	TYPE OF SUPPORT																								POST		FOOTING		REMARKS
							BACKGROUND		LEGEND																															SIZE	LENGTH	LOCATION 3/	MIN. DEPTH 5/	
		WIDTH	HEIGHT	PLYWOOD	SHEET ALUMINUM	EXTRUDED ALUM. (TM675)	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	NON-REFLECTIVE	PERMANENT	REMOVABLE (TM230 – TM233)		WOOD POST (TM670–TM671, TM676)	SQ. TUBE SIGN SUPPORT (TM671, TM676, TM681, TM687–TM689)	TRIANGULAR BASE BREAKAWAY (TM602)	H – FRAME	MULTI-POST BREAKAWAY (TM220, TM600–TM601)	STAINLESS STEEL CLAMP (SSC) (TM677)	SIGNAL POLE MOUNT (TM680)	MAST ARM SIGN MOUNT (TM679)	BRIDGE STRUCTURE MOUNT (TM677)	CANTILEVER / BUTTERFLY (TM622–TM627)	SIGN BRIDGE (TM606–TM612, TM614–TM620)	EXIT NUMBER SIGN MOUNT (TM220, TM225)	ROUTE MARKER FRAME (TM678)	MILEPOST MARKER POST (TM221–TM222)	CROSSWALK CLOSURE	BARRICADE (TM490)	VERTICAL SIGN MOUNTS ON EXISTING STRUCTURES	CUSTOM VARIABLE SUPPORT	SECONDARY SIGN (TM676 & TM678) C 4X5.4	SECONDARY SIGN (TM676 & TM678) C 4X7.25	SECONDARY SIGN (TM676 & TM678) LENGTH	(BASED ON ESTIMATED LENGTH)	(MUST BE FIELD VERIFIED)			
88	"A2" 707+08	48	48		✓		Y				BK	✓		88	✓																							6" x 6"	18'-0"		5'-0"	
88	"D2" 728+95	48	48		✓		Y				BK	✓		88						✓																						
98	"Ah2" 708+75	96	72		✓		BL			W		✓		98			✓																							6x6x3/16	12'-6"	16'-0"	5'-0"	
102	"A2" 702+84	48	48		✓		R		RW			✓		102	✓																							6" x 6"	18'-0"			
102	"OR43" 13+92	48	48		✓		R		RW			✓		102		✓																							2 1/4" & 2 1/2"-12ga.	10'-6"			
102	"OR43" 12+17	48	48		✓		R		RW			✓		102		✓																							2 1/4" & 2 1/2"-12ga.	10'-6"			
102	"OR43" 13+70	48	48		✓		R		RW			✓		102		✓																							2 1/4" & 2 1/2"-12ga.	10'-6"			
104	"D2" 727+05	48	60		✓			SW			BK	✓		104						✓																						
134	"L" 688+77.LT	48	60		✓			SW			BK	✓		134						✓																						
134	"L" 688+77.RT	48	60		✓			SW			BK	✓		134						✓																						
134	"L" 718+54.RT	48	60		✓			SW			BK	✓		134						✓																						
135	"L" 699+68	78	60			✓	G			W			✓	135			✓								✓														5x5x3/16	12'-0"	19'-2"	4'-6"	
136	"D2" 707+10	132	60			✓	G			W			✓	136	✓																											
141	"A2" 702+08	36	36			✓	SW				BK	✓		141	✓																							4" x 6"	16'			
143	"A2" 701+70	30	36			✓	W			BK			✓	143	✓																											
146	"B2" 709+58	24	24			✓	SW			BK		✓		146	✓																							4" x 4"	14'-0"			
149	"L" 715+58.RT	84	42			✓	G			W			✓	149						✓																						
150	"L" 715+58.LT	96	42			✓	G			W			✓	150						✓																						
152	"D2" 731+10	72	24			✓	G			W			✓	152							✓																					
153	"OR43" 5+30	24	12	✓			SW				BK	✓		153	✓																							4" x 4"	14'-0"			
153	"OR43" 6+40	24	12	✓			SW				BK	✓		153	✓																							4" x 4"	14'-0"			

1/ BK=BLACK
BL=BLUE
BR=BROWN
FY=FLUORESCENT YELLOW
G=GREEN
O=ORANGE
R=RED
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HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
PRELIMINARY COPY INFORMATION ONLY
COLETTE T. SNUFFIN
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

SIGN AND POST DATA TABLE

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TN_K19786_HDR_snpd_01.dgn :: LC01-LC03 2/11/2020 2:11:08 PM CDONOVAN

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SIGN & POST DATA TABLE

SIGN NO.	SIGN LOCATION 4/ (TM200–TM201, TM635)	SIGN DIMENSIONS		SUB-STRATE			COLOR 1/					LEGEND		SIGN NO. 2/	TYPE OF SUPPORT																					POST		FOOTING		REMARKS
							BACKGROUND		LEGEND																												SIZE	LENGTH	LOCATION 3/	MIN. DEPTH 5/	
		WIDTH	HEIGHT	PLYWOOD	SHEET ALUMINUM	EXTRUDED ALUM. (TM675)	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	NON-REFLECTIVE	PERMANENT	REMOVABLE (TM230 – TM233)		WOOD POST (TM670–TM671, TM676)	SQ. TUBE SIGN SUPPORT (TM671, TM676, TM681, TM687–TM689)	TRIANGULAR BASE BREAKAWAY (TM602)	H – FRAME	MULTI-POST BREAKAWAY (TM220, TM600–TM601)	STAINLESS STEEL CLAMP (SSC) (TM677)	SIGNAL POLE MOUNT (TM680)	MAST ARM SIGN MOUNT (TM679)	BRIDGE STRUCTURE MOUNT (TM677)	CANTILEVER / BUTTERFLY (TM622–TM627)	SIGN BRIDGE (TM606–TM612, TM614–TM620)	EXIT NUMBER SIGN MOUNT (TM220, TM225)	ROUTE MARKER FRAME (TM678)	MILEPOST MARKER POST (TM221–TM222)	CROSSWALK CLOSURE BARRICADE (TM490)	VERTICAL SIGN MOUNTS ON EXISTING STRUCTURES	CUSTOM VARIABLE SUPPORT	SECONDARY SIGN (TM676 & TM678) C 4X5.4	SECONDARY SIGN (TM676 & TM678) C 4X7.25	SECONDARY SIGN (TM676 & TM678) LENGTH	(BASED ON ESTIMATED LENGTH)	(MUST BE FIELD VERIFIED)			
154	"0R43" 7+30	36	30		✓		SW				BK	✓		154	✓																					4" x 4"	14'-0"			
155	"0R43" 10+08	30	30		✓		Y				BK	✓		155		✓																					2" – 12 ga.	12'- 6"			
156	"0R43" 14+90	36	30		✓		SW				BK	✓		156		✓																					2" – 12 ga.	11'- 6"			
157	"0R43" 8+21	36	30		✓		SW				BK	✓		157		✓																					2" – 12 ga.	11'- 6"			
158	"0R43" 12+60	48	24		✓		W				BK	✓		158		✓																					2 1/2"-12ga.	10'- 6"			
160	"C4" 734+00	72	18			✓	G			W			✓	160																							2 1/2"-12ga.	10'- 0"			
161	"0R43" 17+50	36	36		✓		R		SW			✓		161		✓																					2 1/2"-12ga.	12'- 9"			
162	"0R43" 17+50	51	9			✓	G			W			✓	162																							2" – 12 ga.	9'- 10"			
163	"0R43" 17+50	69	9			✓	G			W			✓	163																							2" – 12 ga.	9'- 10"			
164	"B4" 740+65	123	66			✓	G			W			✓	164			✓																								
164a		36	36		✓			SW			BK	✓		164a																											
164b		36	36		✓			SW			BK	✓		164b																											
165	"0R43" 7+61	24	18			✓	G			W			✓	165	✓																									
165a		12	9			✓	G			W			✓	165a																											
165	"0R43" 6+42	24	18			✓	G			W			✓	165	✓																									
165a		12	9			✓	G			W			✓	165a																											
166	"0R43" 7+11	24	18			✓	G			W			✓	166	✓																									
167	"0R43" 16+73	24	18			✓	G			W			✓	165	✓																									
167a		12	9			✓	G			W			✓	165a																											
168	"0R43" 16+89	12	18			✓	G			W			✓	168																										Install Sign 168 above Sign 155.
168	"0R43" 6+42	12	18			✓	G			W			✓	168																										Install Sign 168 below Sign 165.

1/ BK=BLACK
BL=BLUE
BR=BROWN
FY=FLUORESCENT YELLOW
G=GREEN
O=ORANGE
R=RED
RB=RED–BLUE
SW=SILVER–WHITE
W=WHITE
Y=YELLOW
YG=YELLOW–GREEN

2/ NOTE: L,C,R ARE LOCATIONS OF POSTS FACING THE SIGN.
L=LEFT POST
C=CENTER POST
R=RIGHT POST

3/ DISTANCE FROM EDGE OF TRAVEL LANE, FACE OF CURB, GUARDRAIL, OR BARRIER TO THE CENTERLINE OF FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601, TM602 AND TM635.

4/ NOTE: THE LOCATIONS SHOWN ARE APPROXIMATE EXCEPT FOR SPEED ZONES, SCHOOL ZONES, OBJECT MARKERS AND MILEPOST MARKERS. EXACT LOCATIONS ARE TO BE DETERMINED BY THE ENGINEER.

5/ MINIMUM DEPTH OF FOOTING FOR TRIANGULAR BASE BREAKAWAY AND MULTI-POST BREAKAWAY INSTALLATIONS IS FOR A 2' DIAMETER FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601 AND TM602.

HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
PRELIMINARY COPY INFORMATION ONLY
JANUARY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

SIGN AND POST DATA TABLE

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

TN_K19786_HDR_snpd_01.dgn :: LC01-LC03 2/11/2020 2:11:30 PM CDONOVAN
Rotation: 360°

SIGN & POST DATA TABLE

SIGN AND POST DATA TABLE

SIGN NO.	SIGN LOCATION 4/ (TM200–TM201, TM635)	SIGN DIMENSIONS		SUB-STRATE			COLOR 1/						LEGEND		SIGN NO. 2/	TYPE OF SUPPORT																					POST		FOOTING		REMARKS
							BACKGROUND		LEGEND																													SECONDARY SIGN (TM676 & TM678)			SIZE	LENGTH	LOCATION 3/	MIN. DEPTH 5/	
		WIDTH	HEIGHT	PLYWOOD	SHEET ALUMINUM	EXTRUDED ALUM. (TM675)	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	ASTM TYPE III OR TYPE IV	ASTM TYPE IX	NON-REFLECTIVE	PERMANENT	REMOVABLE (TM230 – TM233)		WOOD POST (TM670–TM671, TM676)	SQ. TUBE SIGN SUPPORT (TM671, TM676, TM681, TM687–TM689)	TRIANGULAR BASE BREAKAWAY (TM602)	H – FRAME	MULTI-POST BREAKAWAY (TM220, TM600–TM601)	STAINLESS STEEL CLAMP (SSC) (TM677)	SIGNAL POLE MOUNT (TM680)	MAST ARM SIGN MOUNT (TM679)	BRIDGE STRUCTURE MOUNT (TM677)	CANTILEVER / BUTTERFLY (TM622–TM627)	SIGN BRIDGE (TM606–TM612, TM614–TM620)	EXIT NUMBER SIGN MOUNT (TM220, TM225)	ROUTE MARKER FRAME (TM678)	MILEPOST MARKER POST (TM221–TM222)	CROSSWALK CLOSURE BARRICADE (TM490)	VERTICAL SIGN MOUNTS ON EXISTING STRUCTURES	CUSTOM VARIABLE SUPPORT	C 4X5.4	C 4X7.25	LENGTH	(BASED ON ESTIMATED LENGTH)	(MUST BE FIELD VERIFIED)			
169	"OR43" 14+9	18	6			✓	G			W			✓		169		✓																							
170	"OR43" 13+82	18	6			✓	G			W			✓		170		✓																							
171	"OR43" 14+80	18	6			✓	G			W			✓		171		✓																							
171a		45	36		✓			SW			BK	✓			171a																									
172	"L" 660+24	48	48			✓	Y				BK	✓			172	✓																								
172a		30	30			✓	Y				BK	✓			172a																									
173	"D2" 728+5	78	60			✓	G			W			✓		173			✓									✓													
174	"L" 680+98	240	180			✓	BL			W			✓		174				✓																					
174a	"L" 680+98	108	24			✓	BL			W			✓		174a																									

1/ BK=BLACK
BL=BLUE
BR=BROWN
FY=FLUORESCENT YELLOW
G=GREEN
O=ORANGE
R=RED
RB=RED–BLUE
SW=SILVER–WHITE
W=WHITE
Y=YELLOW
YG=YELLOW–GREEN

2/ NOTE: L,C,R ARE LOCATIONS OF POSTS FACING THE SIGN.
L=LEFT POST
C=CENTER POST
R=RIGHT POST

3/ DISTANCE FROM EDGE OF TRAVEL LANE, FACE OF CURB, GUARDRAIL, OR BARRIER TO THE CENTERLINE OF FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601, TM602 AND TM635.

4/ NOTE: THE LOCATIONS SHOWN ARE APPROXIMATE EXCEPT FOR SPEED ZONES, SCHOOL ZONES, OBJECT MARKERS AND MILEPOST MARKERS. EXACT LOCATIONS ARE TO BE DETERMINED BY THE ENGINEER.

5/ MINIMUM DEPTH OF FOOTING FOR TRIANGULAR BASE BREAKAWAY AND MULTI-POST BREAKAWAY INSTALLATIONS IS FOR A 2' DIAMETER FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601 AND TM602.

HWY: 064
M.P.: 8.48-11.06
TRS
00000
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
656
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2020

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano
Drafter: Carolyn Mariano
Reviewer: Simon Eng
Checker: Colette Snuffin

SIGN AND POST DATA TABLE

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

TN_K19786_HDR_snpd_01.dgn :: LC01-LC03 2/11/2020 2:12:04 PM CDONOVAN

Rotation: 360°

SIGN & POST DATA TABLE

SIGN AND POST DATA TABLE

SIGN NO.	SIGN LOCATION 4/ (TM200-TM201, TM635)	SIGN DIMENSIONS: WIDTH	SIGN DIMENSIONS: HEIGHT	SUB-STRATE: PLYWOOD	SUB-STRATE: SHEET ALUMINUM	SUB-STRATE: EXTRUDED ALUM. (TM675)	COLOR 1/ BACKGROUND: ASTM TYPE III OR TYPE IV	COLOR 1/ BACKGROUND: ASTM TYPE IX	COLOR 1/ LEGEND: ASTM TYPE III OR TYPE IV	COLOR 1/ LEGEND: ASTM TYPE IX	COLOR 1/ LEGEND: NON-REFLECTIVE	LEGEND: PERMANENT	LEGEND: REMOVABLE (TM230 - TM233)	SIGN NO. 2/	TYPE OF SUPPORT: WOOD POST (TM670-TM671, TM676)	SQ. TUBE SIGN SUPPORT (TM671, TM676, TM681, TM687-TM689)	TRIANGULAR BASE BREAKAWAY (TM602)	H - FRAME	MULTI-POST BREAKAWAY (TM220, TM600-TM601)	STAINLESS STEEL CLAMP (SSC) (TM677)	SIGNAL POLE MOUNT (TM680)	MAST ARM SIGN MOUNT (TM679)	BRIDGE STRUCTURE MOUNT (TM677)	CANTILEVER / BUTTERFLY (TM622-TM627)	SIGN BRIDGE (TM606-TM612, TM614-TM620)	EXIT NUMBER SIGN MOUNT (TM220, TM225)	ROUTE MARKER FRAME (TM678)	MILEPOST MARKER POST (TM221-TM222)	CROSSWALK CLOSURE BARRICADE (TM490)	VERTICAL SIGN MOUNTS ON EXISTING STRUCTURES	CUSTOM VARIABLE SUPPORT	SECONDARY SIGN (TM676 & TM678): C 4X5.4	SECONDARY SIGN: C 4X7.25	SECONDARY SIGN: LENGTH	POST SIZE (BASED ON ESTIMATED LENGTH)	POST LENGTH (MUST BE FIELD VERIFIED)	FOOTING LOCATION 3/	FOOTING MIN. DEPTH 5/	REMARKS

1/ BK=BLACK
BL=BLUE
BR=BROWN
FY=FLUORESCENT YELLOW
G=GREEN
O=ORANGE
R=RED
RB=RED-BLUE
SW=SILVER-WHITE
W=WHITE
Y=YELLOW
YG=YELLOW-GREEN

2/ NOTE: L,C,R ARE LOCATIONS OF POSTS FACING THE SIGN.
L=LEFT POST
C=CENTER POST
R=RIGHT POST

3/ DISTANCE FROM EDGE OF TRAVEL LANE, FACE OF CURB, GUARDRAIL, OR BARRIER TO THE CENTERLINE OF FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601, TM602 AND TM635.

4/ NOTE: THE LOCATIONS SHOWN ARE APPROXIMATE EXCEPT FOR SPEED ZONES, SCHOOL ZONES, OBJECT MARKERS AND MILEPOST MARKERS. EXACT LOCATIONS ARE TO BE DETERMINED BY THE ENGINEER.

5/ MINIMUM DEPTH OF FOOTING FOR TRIANGULAR BASE BREAKAWAY AND MULTI-POST BREAKAWAY INSTALLATIONS IS FOR A 2' DIAMETER FOOTING. FOR ADDITIONAL INFORMATION SEE STANDARD DRAWINGS TM601 AND TM602.

HWY: 000
M.P.: 000.00-000.00
TRS
00000
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
OREGON
COLETTE T. SNUFFIN
PRELIMINARY COPY
INFORMATION ONLY
Expires June 30, 2020

HDR ENGINEERING, INC
1001 SW 5TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

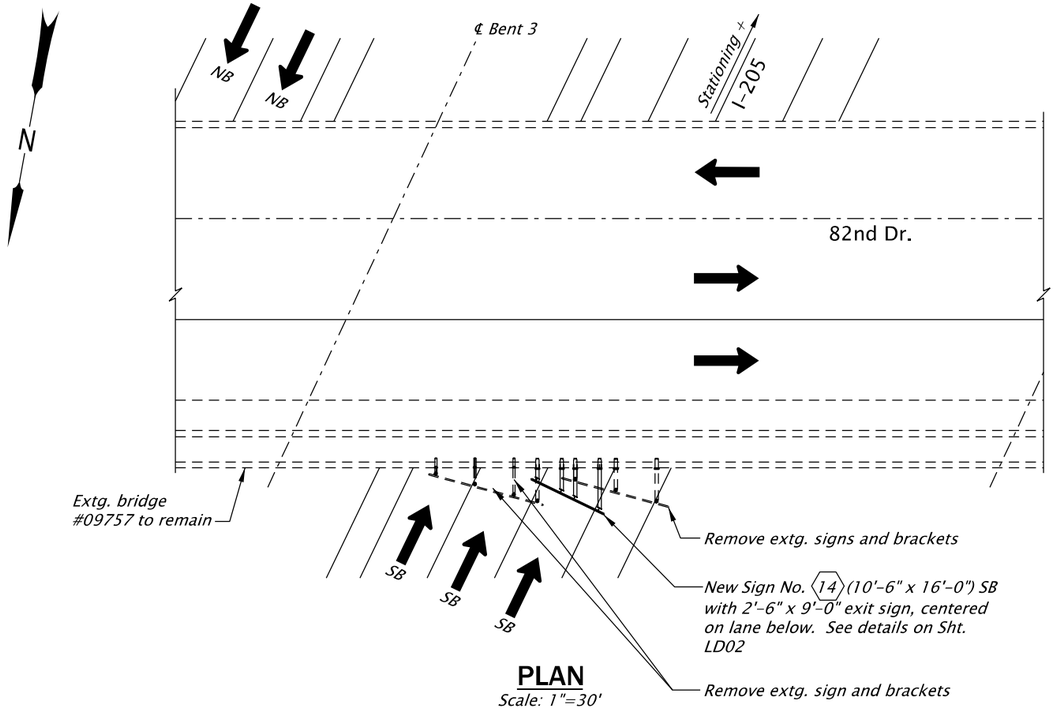
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Carolyn Mariano | Reviewer: Simon Eng
Drafter: Carolyn Mariano | Checker: Colette Snuffin

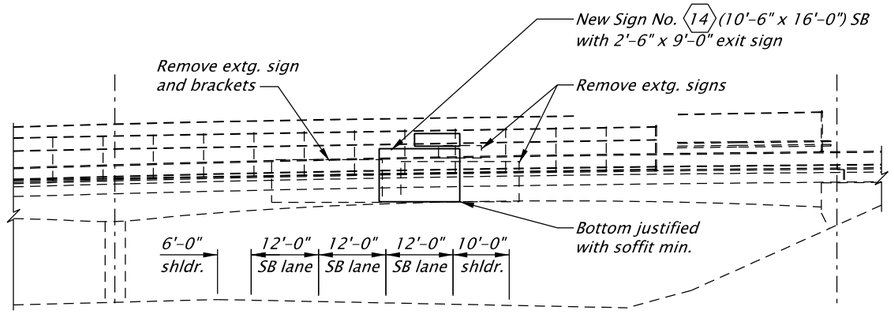
SIGN AND POST DATA TABLE

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

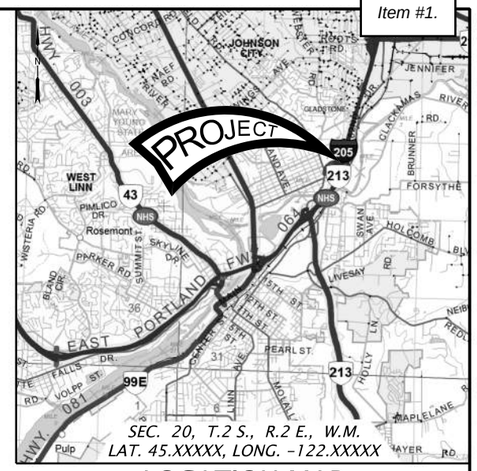


PLAN
Scale: 1"=30'



ELEVATION
Scale: 1"=30'

Existing Sign Bridge M.P. 11.04 SB



LOCATION MAP
No Scale

General Notes:

All materials and workmanship shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Structure mounts are designed in accordance with the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 1st Edition, 2015 and interim revisions 2017.

Basic wind speed (1700 year recurrence interval) used for sign structure design is 115 mph, G = 1.14, K_z = 1.0 and Exposure C were used for design.

All structural steel shapes shall conform to ASTM A572, Grade 50, or ASTM A992, unless noted otherwise.

All fasteners shall be ASTM A325 unless otherwise noted. All steel and fasteners shall be hot-dip galvanized after fabrication, unless noted otherwise. The silicon content of the base metal shall be according to the Special Provisions for all hot-dip galvanized steel, unless noted otherwise.

Contractor shall field verify conditions, work, locations, elevations and all dimensions prior to beginning fabrication. Existing traffic lane and structural dimensions shown are approximate and should not be used as a basis for development of fabrication drawings.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

Note:
Elevations are based on the North American Vertical Datum, 1988.

ACCOMPANIED BY DWGS.:
00000

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09757
BDS DWG NO.	00000
CALC. BOOK	7084
HWY: 064	
M.P.: 11.04 SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
OREGON
JUNE 10, 2005
PETER GLEN SLOCUM
EXPIRES: 06/30/
ADVANCE COPY SUBJECT TO CHANGE

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON ; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

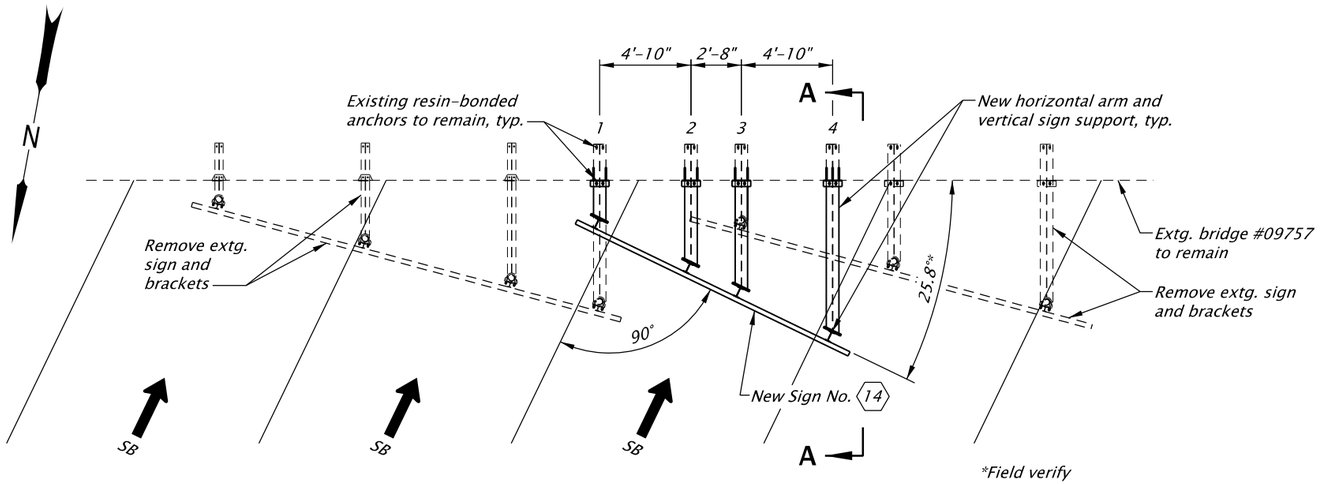
82nd Dr over Hwy 64 (Gladstone Intchg)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Wyatt Dean, E.I.
Drafter: Yuka Garzenelli
Reviewer: Jeff Bernardo, P.E.
Checker: Peter G. Slocum, P.E., S.E.

PLAN AND ELEVATION

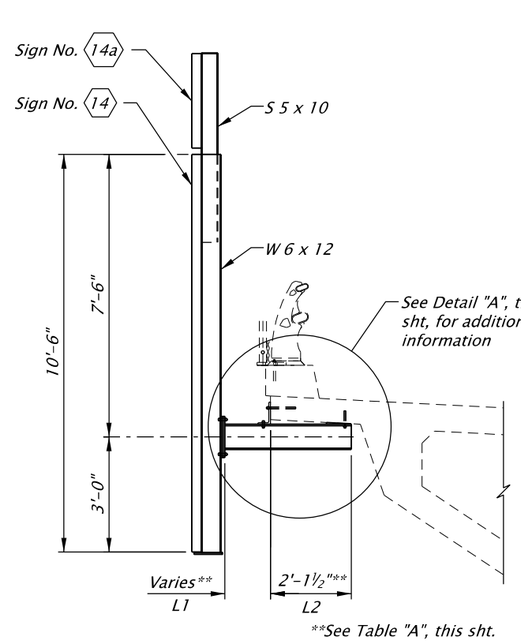
SHEET NO.



SIGN PLAN
Scale: 1/8"=1'-0"

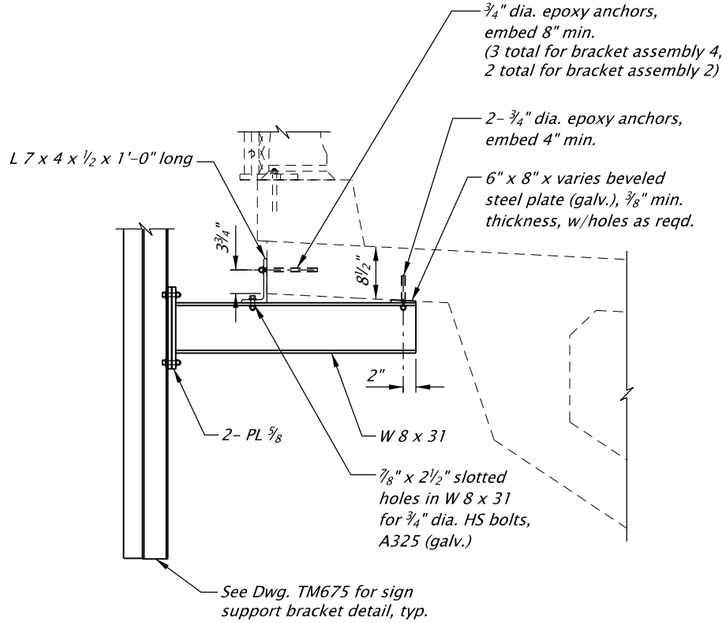
Notes:

1. Bracket assemblies 1 & 3 reuse existing resin-bonded anchors.
2. Bracket assemblies 2 & 4 require new resin-bonded anchors.
3. All bracket assemblies require new horizontal arms, vertical sign supports, angles connectors, and plate connectors.



**See Table "A", this sht.

SECTION A-A
Scale: 1/4"=1'-0"



DETAIL "A"
Scale: 1/2"=1'-0"

TABLE "A"								
Sign No.	Brackets							
	1		2		3		4	
	L1	L2	L1	L2	L1	L2	L1	L2
14	1'-11⅝"	2'-1½"***	4'-3⅝"	2'-1½"***	5'-7"	2'-1½"***	7'-11"	2'-1½"***

***Field verify

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09757
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 11.04 SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER — OREGON — PETER GLEN SLOCUM — 10, 2005
ADVANCE COPY SUBJECT TO CHANGE
EXPIRES: 06/30/

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

82nd Dr over Hwy 64 (Gladstone Intchg)

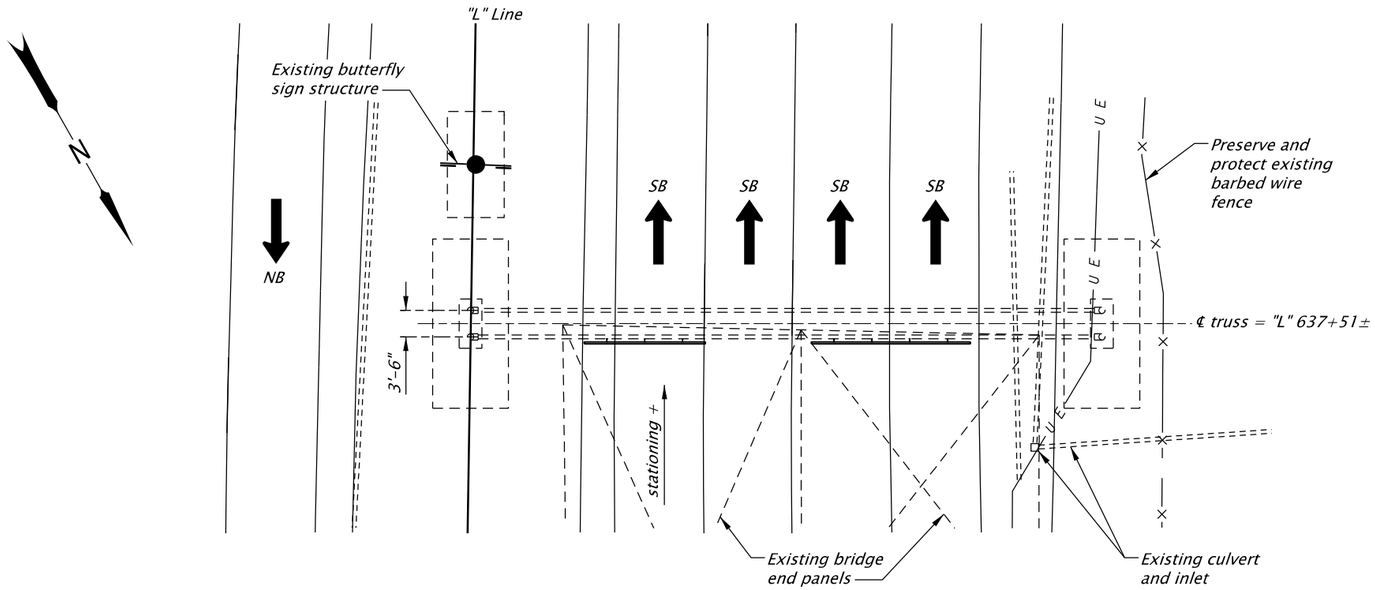
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Wyatt Dean, E.I. — Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli — Checker: Peter G. Slocum, P.E., S.E.

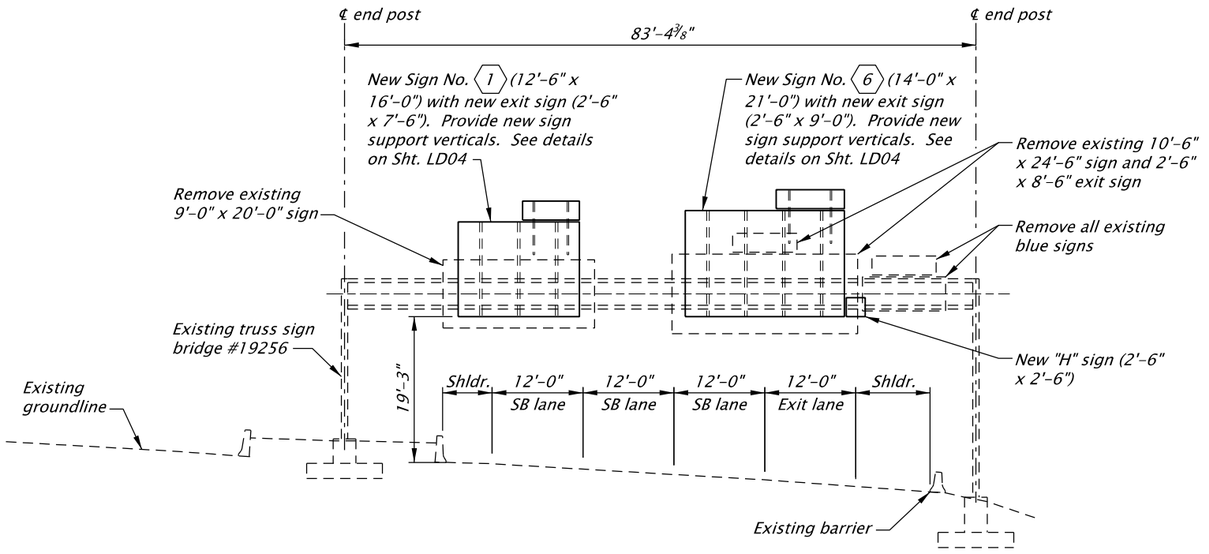
SIGN DETAILS — SHEET NO.

TN_K19786_OBEC_sndt_02.dgn :: LD02 2/10/2020 3:58:46 PM CDONOVAN

Rotation: 0° Sca 1

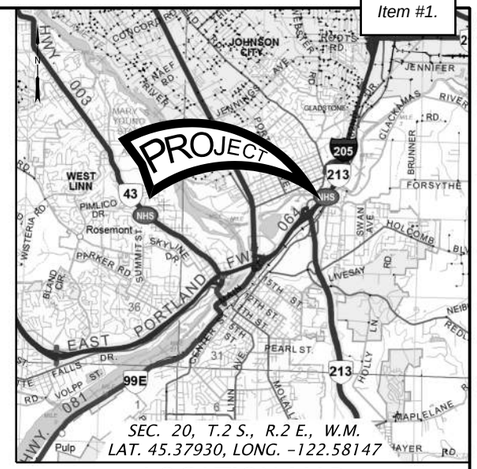


PLAN
Scale: 1"=20'



*ELEVATION
Scale: 1"=20' *Elevation view is looking ahead on station, SB direction

Existing Sign Bridge M.P. 10.68 SB



LOCATION MAP
No Scale

General Notes:

All materials and workmanship shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Vertical structure mounts are designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 4th edition, 2001 and 2002 interim revisions.

Basic wind speed (3 second gust) used for sign structure design is 110 mph, G = 1.14, I_r = 1.0 (50 year recurrence interval) and Exposure C were used for design.

All structural steel shapes shall conform to ASTM A572, Grade 50, or ASTM A992, unless noted otherwise. All structural plates shall conform to ASTM A36, or ASTM A572, Grade 42.

All fasteners shall be ASTM A325 unless otherwise noted. All structural steel and fasteners shall be hot-dip galvanized after fabrication, unless noted otherwise. The silicon content of the base metal shall be according to the Special Provisions for all hot-dip galvanized steel, unless noted otherwise.

Contractor shall field verify conditions, work, locations, elevations and all dimensions prior to beginning fabrication. Existing traffic lane and structural dimensions shown are approximate and should not be used as a basis for development of fabrication drawings.

See Signing Plans and Dwgs. TM220, TM618 and TM675 for sign mounting details.

All welding shall conform to the current edition American Welding Society (AWS) D1.1.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

Note:
Elevations are based on the North American Vertical Datum, 1988.

STRUCTURE NO.	19256
BDS DWG NO.	00000
CALC. BOOK	7084
HWY: 064 M.P.: 10.68 SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

ACCOMPANIED BY DWGS.:
000000, TM220, TM618, TM675

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER 9488 OREGON MARCH 8, 2016 KENTON CHARLES ALLDRITT
ADVANCE COPY SUBJECT TO CHANGE
EXPIRES: 12/31/.....

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

SIGN BRIDGE, HWY 64 SB @ MP 10.68

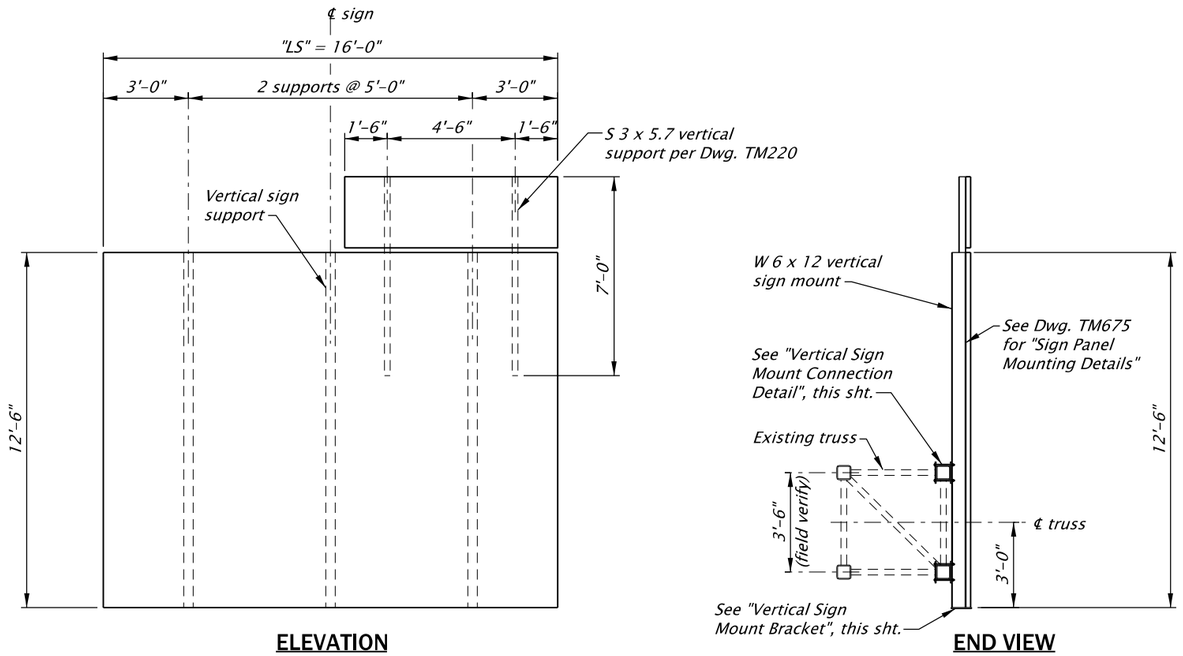
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Kenton Alldritt, P.E. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

PLAN AND ELEVATION SHEET NO.

TN_K19786_OBEC_snps_01.dgn :: LD03 2/10/2020 3:58:54 PM CDONOVAN

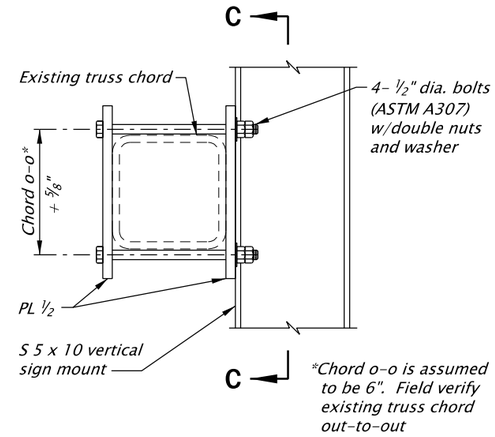
Rotation: 150.5707° 0'



ELEVATION **END VIEW**

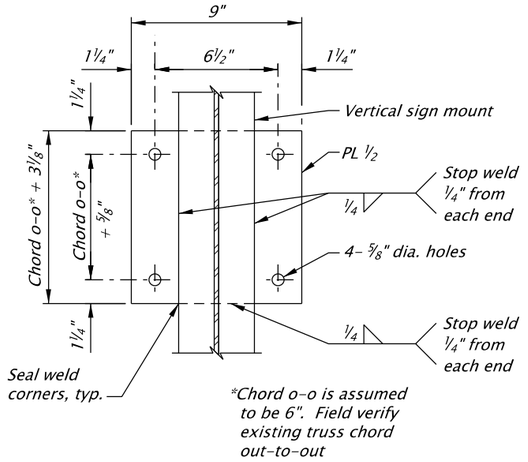
VERTICAL SIGN MOUNT - SIGN NO. 1

Scale: 3/16"=1'-0"



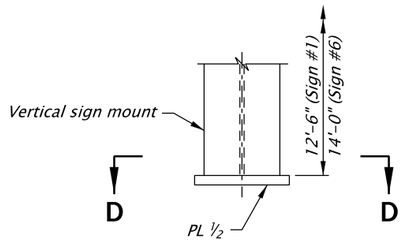
VERTICAL SIGN MOUNT CONNECTION DETAIL

Scale: 1 1/2"=1'-0"



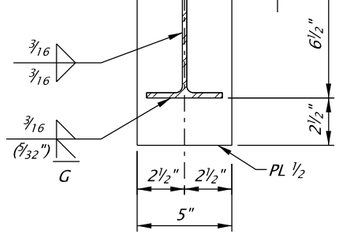
SECTION C-C

Scale: 1 1/2"=1'-0"



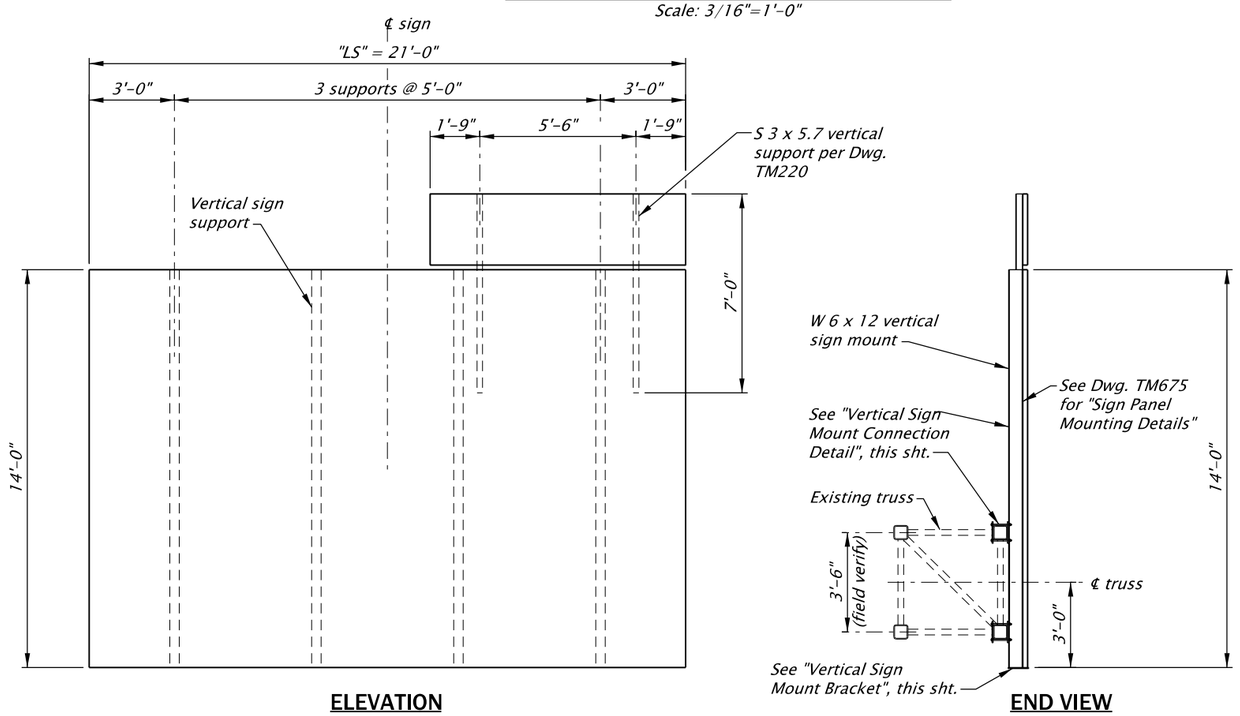
VERTICAL SIGN MOUNT BRACKET

Scale: 1 1/2"=1'-0"



SECTION D-D

Scale: 1 1/2"=1'-0"



ELEVATION **END VIEW**

VERTICAL SIGN MOUNT - SIGN NO. 6

Scale: 3/16"=1'-0"

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	19256
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 10.68 SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER OREGON MARCH 8, 2016 KENTON CHARLES ALLDRITT

ADVANCE COPY SUBJECT TO CHANGE

EXPIRES: 12/31/.....

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

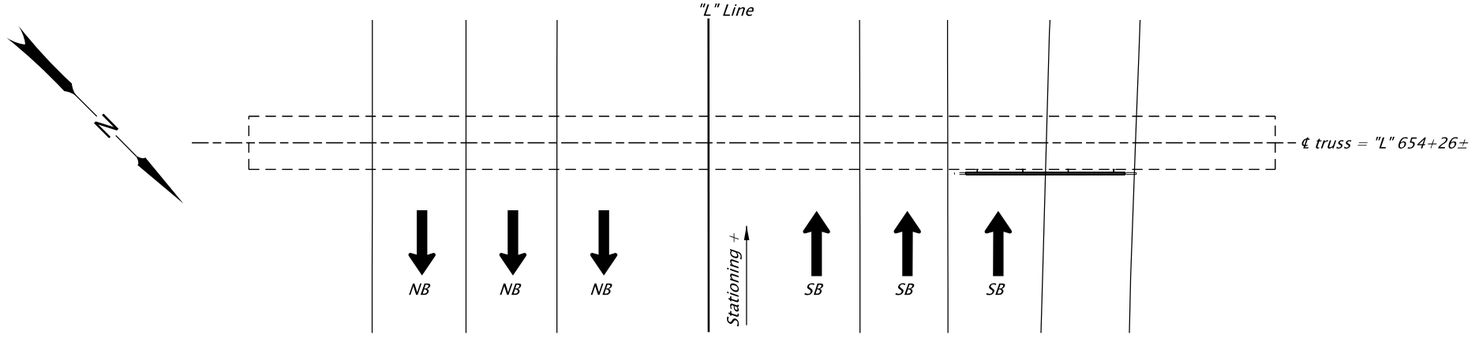
SIGN BRIDGE, HWY 64 SB @ MP 10.68

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

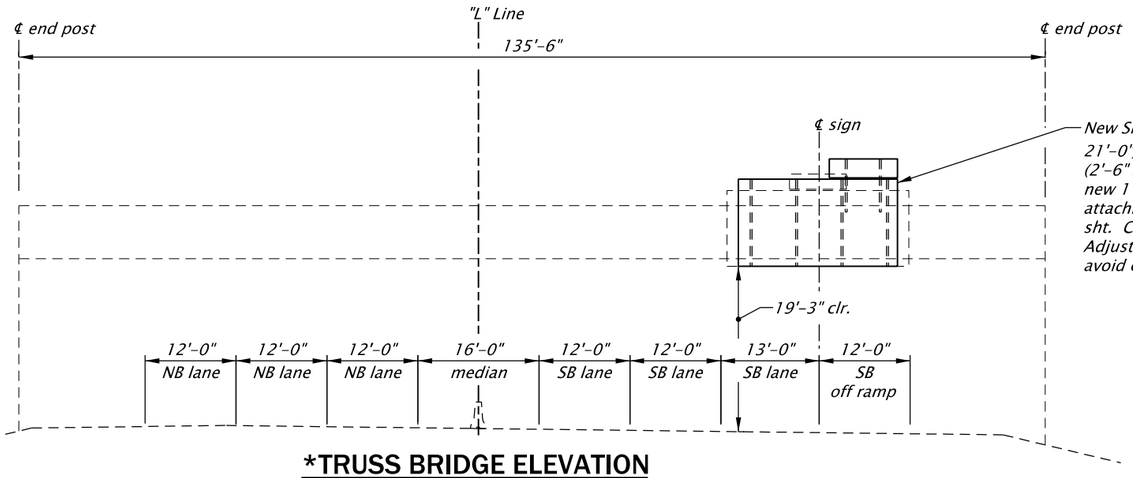
Designer: Kenton Alldritt, P.E. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

SIGN DETAILS SHEET NO.

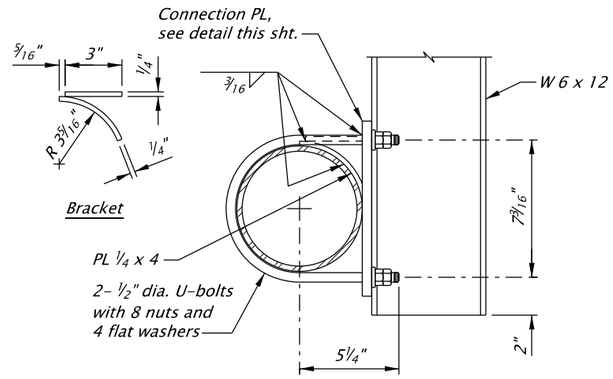
TN_K19786_OBEC_sndt_03.dgn :: LD04 2/10/2020 3:58:59 PM CDONOVAN
Rotation: 0° Sca=1



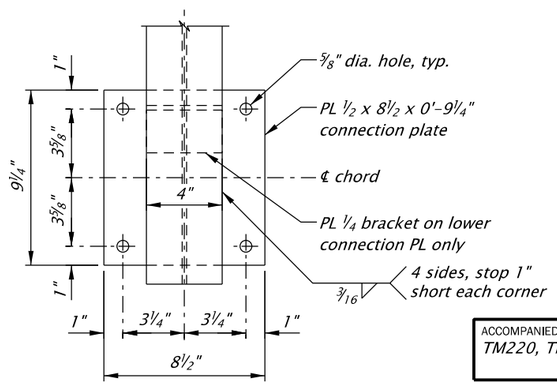
PLAN
Scale: 1"=20'



***TRUSS BRIDGE ELEVATION**
Scale: 1"=20' *Elevation view is looking ahead on station, SB direction.

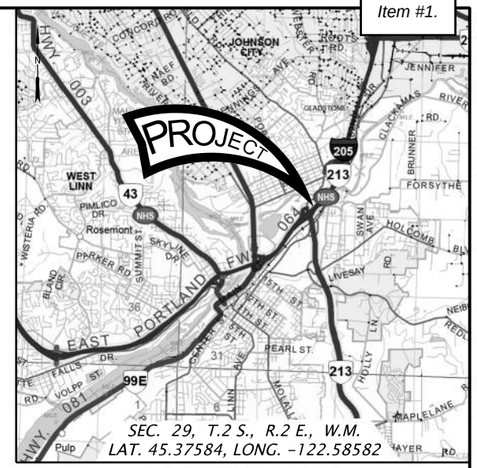


DETAIL A
Scale: 1 1/2"=1'-0"



CONNECTION PLATE DETAIL
Scale: 1 1/2"=1'-0"

EXISTING SIGN BRIDGE M.P. 10.34 SB



LOCATION MAP
No Scale

General Notes:

All materials and workmanship shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Vertical structure mounts are designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 4th edition, 2001 and 2002 interim revisions.

Basic wind speed (3 second gust) used for new sign support design only is 110 mph, G = 1.14, I_r = 1.0 (50 year recurrence interval) and Exposure C were used for design.

All structural steel shapes shall conform to ASTM A572, Grade 50, or ASTM A992, unless noted otherwise. All structural plates shall conform to ASTM A36, or ASTM A572, Grade 42.

All fasteners shall be ASTM A325 unless otherwise noted. All structural steel and fasteners shall be hot-dip galvanized after fabrication, unless noted otherwise. The silicon content of the base metal shall be according to the Special Provisions for all hot-dip galvanized steel, unless noted otherwise.

Contractor shall field verify conditions, work, locations, elevations and all dimensions prior to beginning fabrication. Existing traffic lane and structural dimensions shown are approximate and should not be used as a basis for development of fabrication drawings.

See Signing Plans and Dwgs. TM220, TM618 and TM675 for sign mounting details.

All welding shall conform to the current edition American Welding Society (AWS) D1.1.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

STRUCTURE NO.	19257
BDS DWG NO.	00000
CALC. BOOK	7084
HWY: 064 M.P.: 10.34 SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

ACCOMPANIED BY DWGS.:
TM220, TM618, TM675

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON 10, 2005 PETER GLEN SLOCUM
ADVANCE COPY SUBJECT TO CHANGE
EXPIRES: 06/30/

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

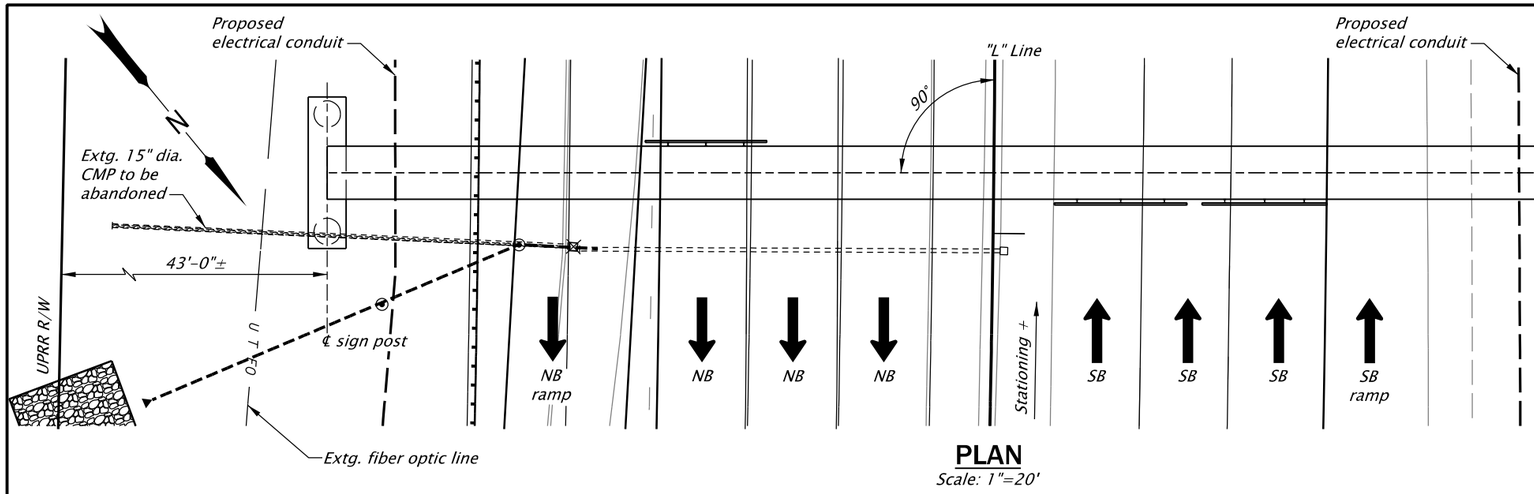
SIGN BRIDGE, HWY 64 SB @ MP 10.34

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

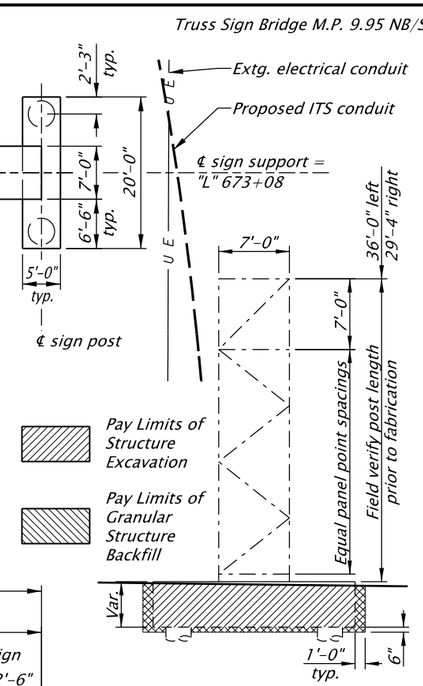
Designer: Peter G. Slocum, P.E., S.E. Reviewer: Jeff Parker, P.E.
Drafter: Yuka Garzenelli Checker: Kenton Alldritt, P.E.

PLAN AND ELEVATION

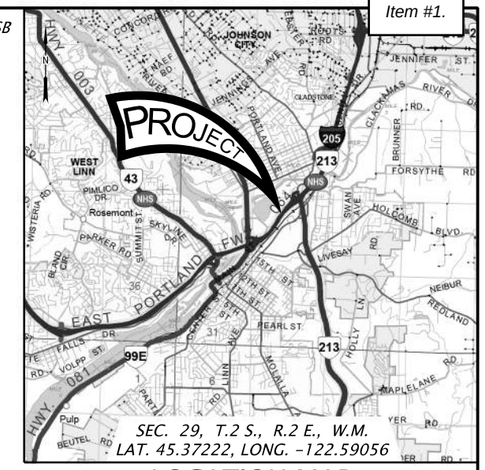
SHEET NO.



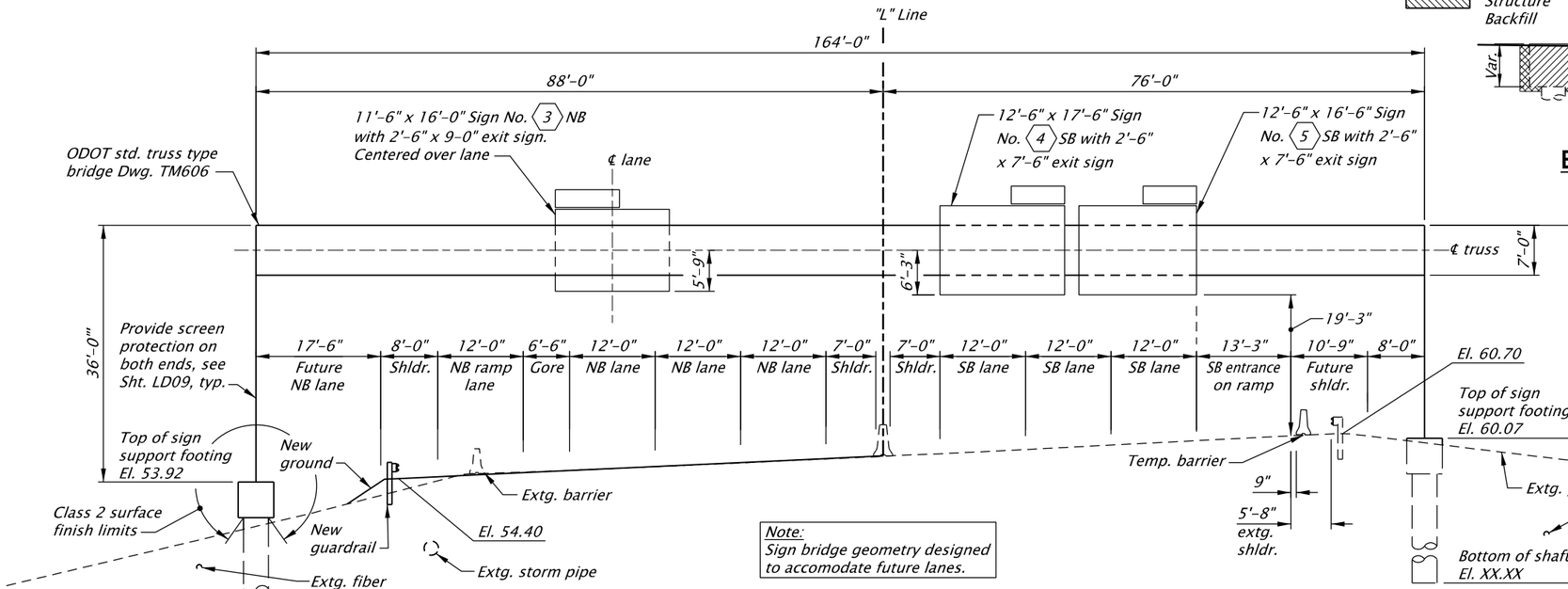
PLAN
Scale: 1"=20'



END TRUSS
No Scale



LOCATION MAP
No Scale



*ELEVATION
Scale: 1"=20'

*Elevation view is looking ahead on station SB direction

Note:
Sign bridge geometry designed to accomodate future lanes.

Note:
Elevations are based on the North American Vertical Datum, 1988.

PROJECT DATA
(Left and Right are as seen while looking ahead on station)

Sign Bridge		"S" Span	Foundation Sheet Number	Spread Footing Foundation Design Number See Dwg. TM619	"HP" Post Height see Dwg. TM614 (Field Verify)		"HF" Foundation Height see Dwg. TM619 (Field Verify)		Luminaires ("Yes" or "No") see Dwg. TM618
At Station	M.P.				Left	Right	Left	Right	
"L" 673+08	9.95 NB/SB	164'-0"	LD02	N/A	36'-0"	29'-10"	N/A	N/A	No

General Notes:

All materials and workmanship shall conform to the Oregon Standard Specifications for Construction 2018 and the Special Provisions. Truss type sign bridge structures are designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, with 2001 and 2002 interim Revisions and Dwgs. TM614 through TM620.

The sign support shall meet the requirements for span length, post height, and sign area, as shown on Dwg.TM614. Use sign bridge design for "S" = 148' to 167'.

Sign support structure is designed for all items shown including future signs and lanes (by others).

Field verify conditions, elevations, dimensions, and span prior to fabrication. Field verify utility locations and conditions prior to construction.

See Traffic Plans for sign information.

Right of way line and wetland boundary are outside limits of view.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

STRUCTURE NO.	00000
BDS DWG NO.	00000
CALC. BOOK	7084
HWY: 064 M.P.: 9.95 NB/SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

ACCOMPANIED BY DWGS.:
000000, 000000, TM606, TM614-TM620

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
OREGON
PETER GLEN SLOCUM
10, 2005
ADVANCE COPY SUBJECT TO CHANGE
EXPIRES: 06/30/

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

sn_Hwy064_MP9.95

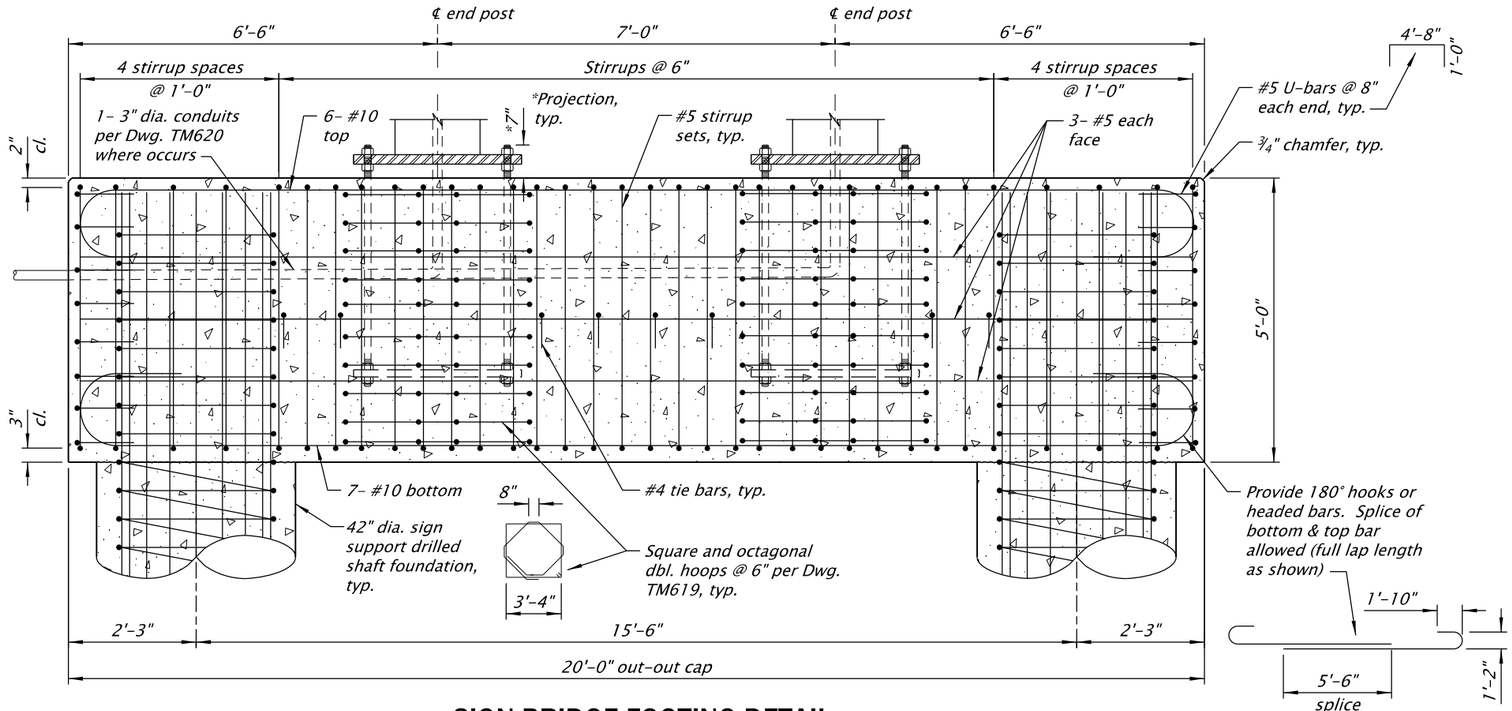
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Wyatt Dean, E.I. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

PLAN AND ELEVATION SHEET NO.

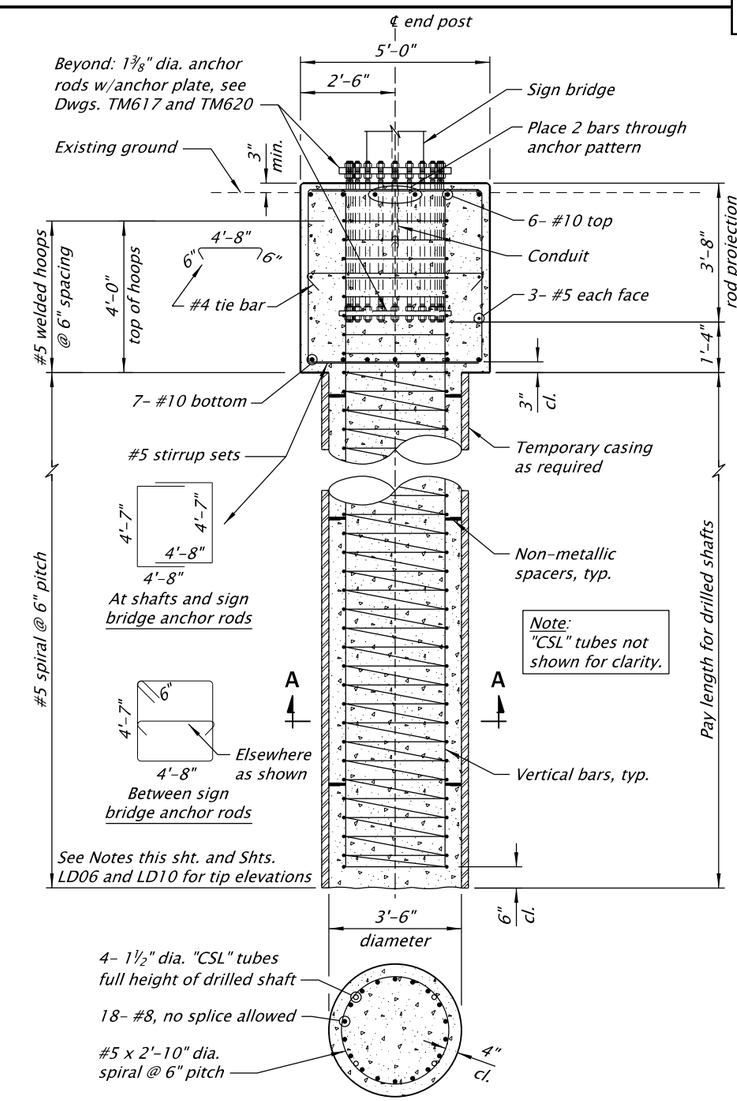
TN_K19786_OBEC_snps_01.dgn :: LD06 2/10/2020 3:59:14 PM CDONOVAN

Rotation: 140.6429° 0'



SIGN BRIDGE FOOTING DETAIL

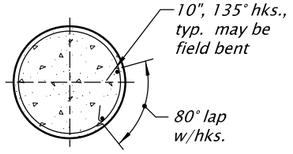
Scale: 3/8"=1'-0"



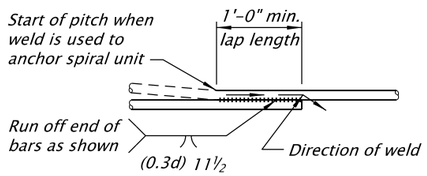
SECTION A-A

DRILLED SHAFT

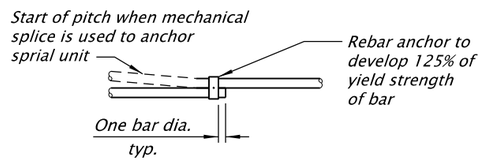
Scale: 1/4"=1'-0"



LAPPED SPLICE OPTION



WELDED SPLICE OPTION



MECHANICAL SPLICE OPTION

SPIRAL SPLICE/TERMINATION DETAIL

No Scale

Drilled Shaft Notes:

Reinforced concrete drilled shafts shall be constructed in accordance with the "Oregon Standard Specifications for Construction" 2018 and the Special Provisions. Minimum tip elevations of drilled shafts shall be as shown on Plan and Elevation sheets.

Where groundwater is encountered and excavations are not dewatered, the concrete must be placed with a rigid pipe tremie in accordance with Section 00512.47(c).

Coordinate moving existing barrier for construction and traffic activities with ODOT.

Securely tie "CSL" tubes to reinforcement.

Cap concrete shall be Class 4000 - ¾".
Drilled shaft concrete shall be Class 4000 - ⅜".

Use temporary casing as required. Permanent casing not permitted.

See Dwg. TM615 for notes not shown.

Spiral Notes:

Reinforcing steel shall conform to ASTM A615 (Grade 60) or A706.

ASTM A706 spirals shall be used for all welded splices, except ASTM A615 (Grade 60), ASTM A82, or ASTM A496 may be used if copies of the chemical composition analysis are submitted and approved as weldable by the Engineer.

Make flare weld in direction shown.

Mechanical splice is not allowed for ASTM A82 spirals.

Spirals shall be terminated at each end or discontinuity with 1½ extra turns and a splice to itself as shown.

STRUCTURE NO.	00000, 00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 9.95 NB/SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER
OREGON
OCTOBER 10, 2005
PETER GLEN SLOCUM
EXPIRES: 06/30/
ADVANCE COPY SUBJECT TO CHANGE
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-8089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

sn_Hwy064_MP9.95

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

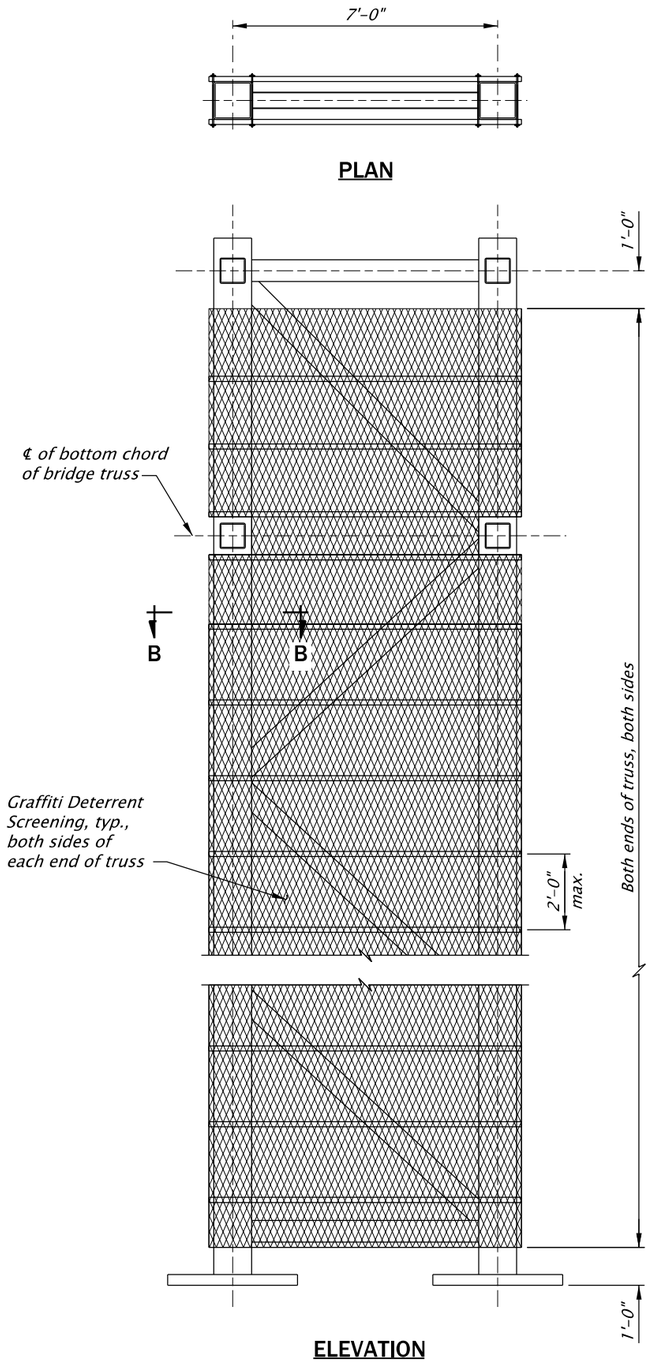
Designer: Wyatt Dean, E.I. — Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli — Checker: Peter G. Slocum, P.E., S.E.

SIGN BRIDGE DETAILS

SHEET NO.

TN_K19786_OBEC_sndt_04.dgn :: LD08 2/10/2020 3:59:26 PM CDONOVAN

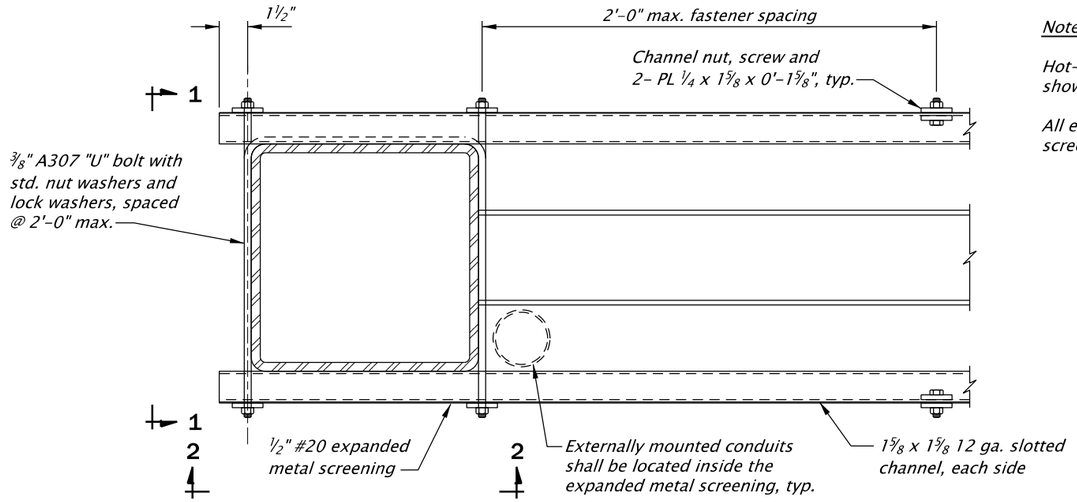
Rotation: 0° Sca=1



ELEVATION

SCREENING LOCATION DETAIL

Scale: 1/4"=1'-0"



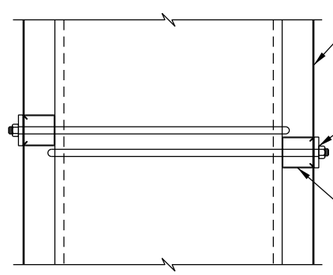
SECTION B-B

Scale: 1 1/2"=1'-0"

Notes:

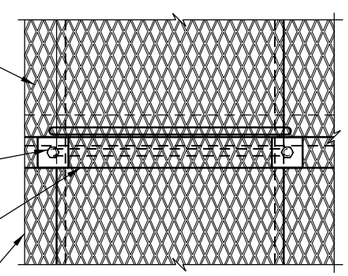
Hot-dip galvanize all steel shown on this sheet.

All expanded flattened metal screening shall be ASTM F1267.



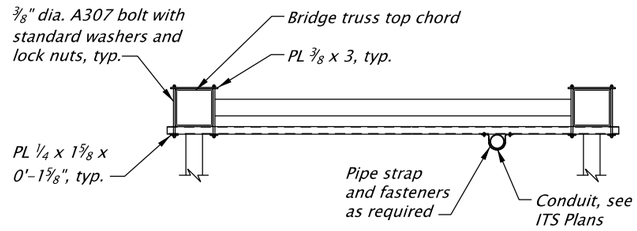
VIEW 1-1

Scale: 1 1/2"=1'-0"



VIEW 2-2

Scale: 1 1/2"=1'-0"



CONDUIT SUPPORT DETAIL

Scale: 3/8"=1'-0"

SCALE WARNING

IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000, 00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.:	9.95 NB/SB
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 15185 OREGON JUNE 10, 2005 PETER GLEN SLOCUM

ADVANCE COPY SUBJECT TO CHANGE

EXPIRES: 06/30/

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

sn_Hwy064_MP9.95

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Wyatt Dean, E.I. Reviewer: Jeff Bernardo, P.E.

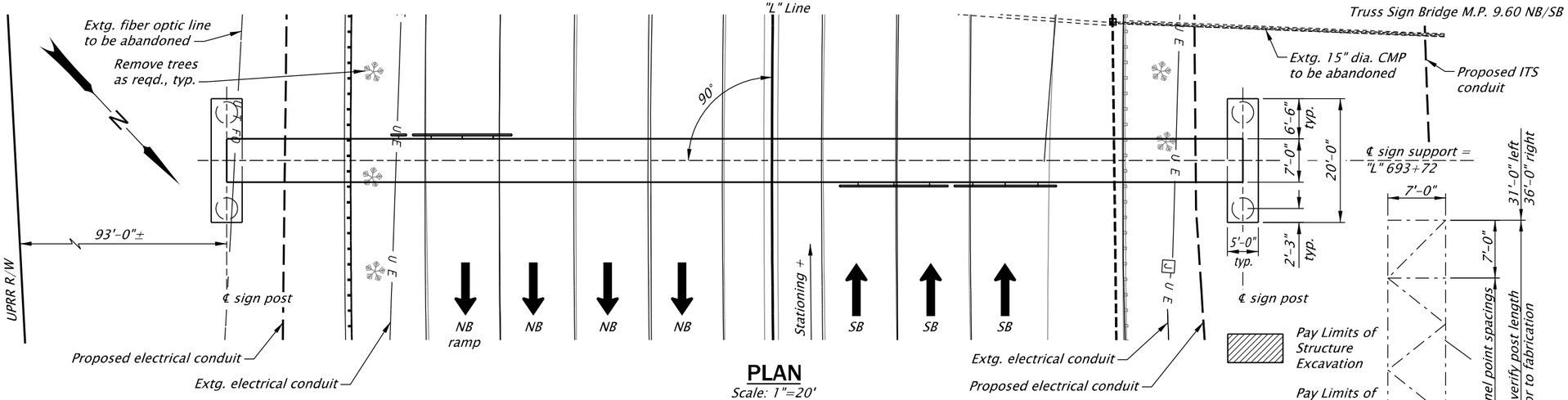
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

SIGN BRIDGE DETAILS

SHEET NO.

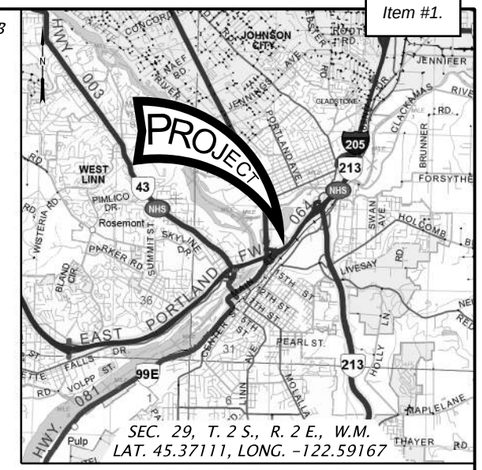
TN_K19786_OBEC_sndt_05.dgn :: LD09 2/10/2020 4:00:12 PM CDONOVAN

Rotation: 0° Sca=1

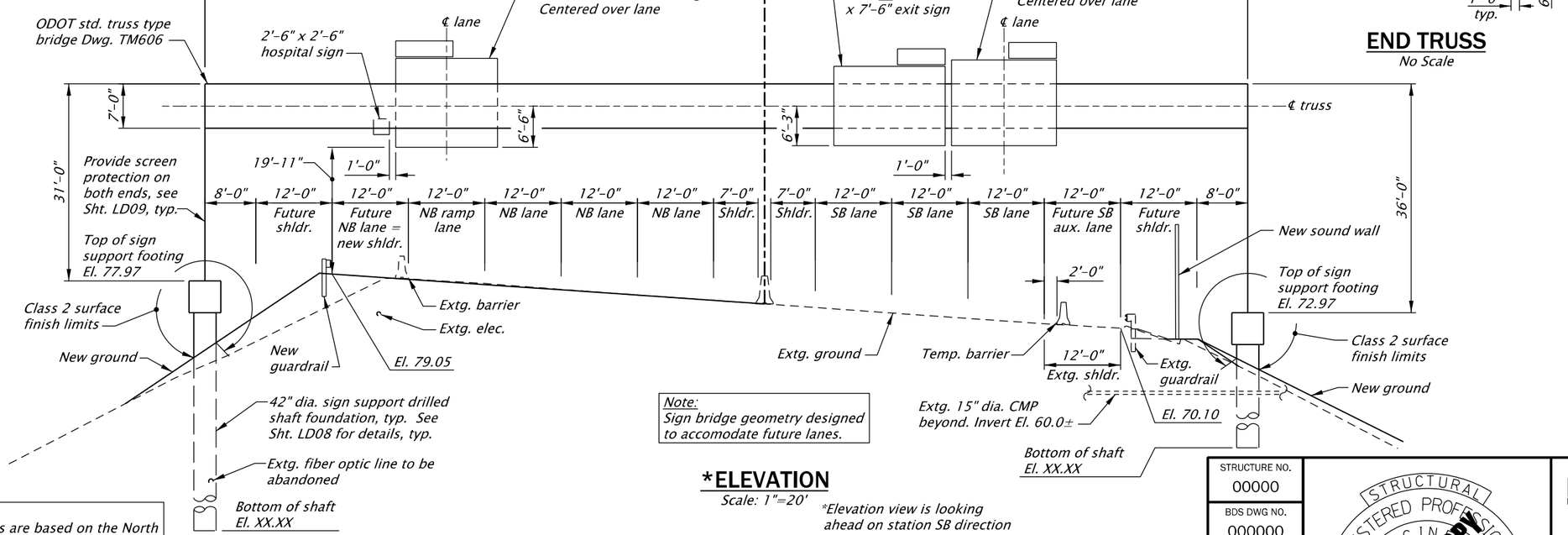


PLAN
Scale: 1"=20'

END TRUSS
No Scale



LOCATION MAP
No Scale



Note:
Sign bridge geometry designed to accomodate future lanes.

*ELEVATION
Scale: 1"=20'

*Elevation view is looking ahead on station SB direction

Note:
Elevations are based on the North American Vertical Datum, 1988.

PROJECT DATA
(Left and Right are as seen while looking ahead on station)

Sign Bridge		"S" Span	Foundation Sheet Number	Spread Footing Foundation Design Number See Dwg. TM619	"HP" Post Height see Dwg. TM614 (Field Verify)		"HF" Foundation Height see Dwg. TM619 (Field Verify)		Luminaires ("Yes" or "No") see Dwg. TM618
At Station	M.P.				Left	Right	Left	Right	
"L" 693+72	9.60 NB/SB	164'-0"	LD02	N/A	31'-0"	36'-0"	N/A	N/A	No

Notes:

All materials and workmanship shall conform to the Oregon Standard Specifications for Construction 2018 and the Special Provisions. Truss type sign bridge structures are designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, with 2001 and 2002 interim Revisions and Dwgs. TM614 through TM620.

The sign support shall meet the requirements for span length, post height, and sign area, as shown on Dwg.TM614. Use sign bridge design for "S" = 148' to 167'.

Sign support structure is designed for all items shown including future signs and lanes (by others).

Field verify conditions, elevations, dimensions, and span prior to fabrication. Field verify utility locations and conditions prior to construction.

See Traffic Plans for sign information.

Right of way line and wetland boundary are outside limits of view.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

ACCOMPANIED BY DWGS.:
000000, 000000, TM606, TM614-TM620

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 9.60 NB/SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON JUNE 10, 2005 PETER GLEN SLOCUM
EXPIRES: 06/30/
ADVANCE COPY SUBJECT TO CHANGE

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

sn_Hwy064_MP9.60

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

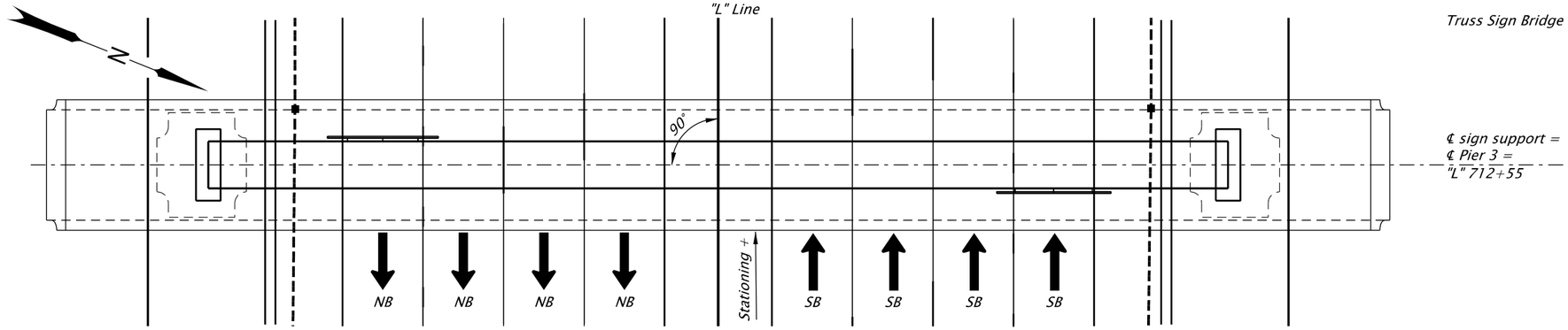
Designer: Wyatt Dean, E.I. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

PLAN AND ELEVATION

SHEET NO.

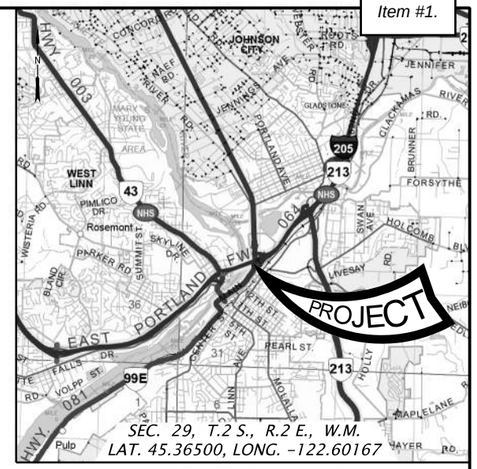
TN_K19786_OBEC_snps_01.dgn :: LD10 2/10/2020 4:00:23 PM CDONOVAN

Rotation: 136.6391° 0'

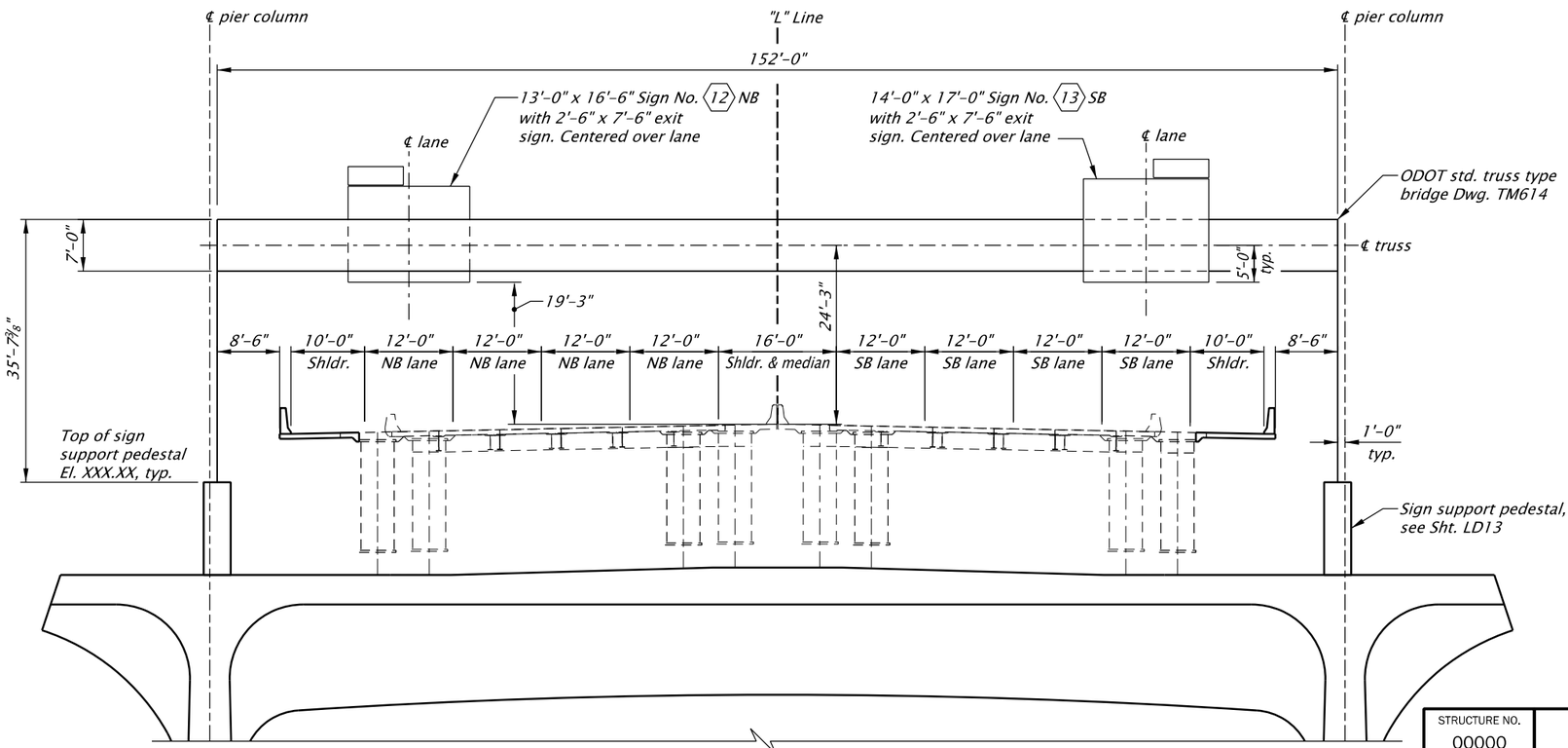


PLAN
Scale: 1"=20'

Truss Sign Bridge M.P. 9.22 NB/SB



LOCATION MAP
No Scale



*TRUSS TYPE SIGN BRIDGE AT PIER 3 ELEVATION
Scale: 1"=20'

*Elevation view is looking ahead on station SB direction

Notes:

All materials and workmanship shall conform to the Oregon Standard Specifications for Construction 2018 and the Special Provisions. Structure mounts are designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, Sixth Edition, 2013, with 2015 interim Revisions.

Basic wind speed used for sign structure design is 110 mph, $G = 1.14$, $K_z = 1.39$ and Exposure C was used for design.

The sign support shall meet the requirements for span length, post height, and sign area, as shown on Dwg.TM614. Use sign bridge design for "S" = 149' to 167'.

Sign support structure is designed for all items shown including future signs (by others).

Field verify conditions, elevations, dimensions, and span prior to fabrication. Field verify utility locations and conditions prior to construction.

See Traffic Plans for sign information.

Right of way line and wetland boundary are outside limits of view.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

Note:
Elevations are based on the North American Vertical Datum, 1988.

PROJECT DATA
(Left and Right are as seen while looking ahead on station)

Sign Bridge		"S" Span	Foundation Sheet Number	Spread Footing Foundation Design Number See Dwg. TM619	"HP" Post Height see Dwg. TM614 (Field Verify)		"HF" Foundation Height see Dwg. TM619 (Field Verify)		Luminaires ("Yes" or "No") see Dwg. TM618
At Station	M.P.				Left	Right	Left	Right	
"L" 712+55	9.22 NB/SB	152'-0"	-	-	36'-0"	36'-0"	N/A	N/A	No

ACCOMPANIED BY DWGS.:
000000, TM614, TM620

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 9.22 NB/SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER
OREGON
MARCH 8, 2016
KENTON CHARLES ALLDRITT
EXPIRES: 12/31/.....

ADVANCE COPY SUBJECT TO CHANGE

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

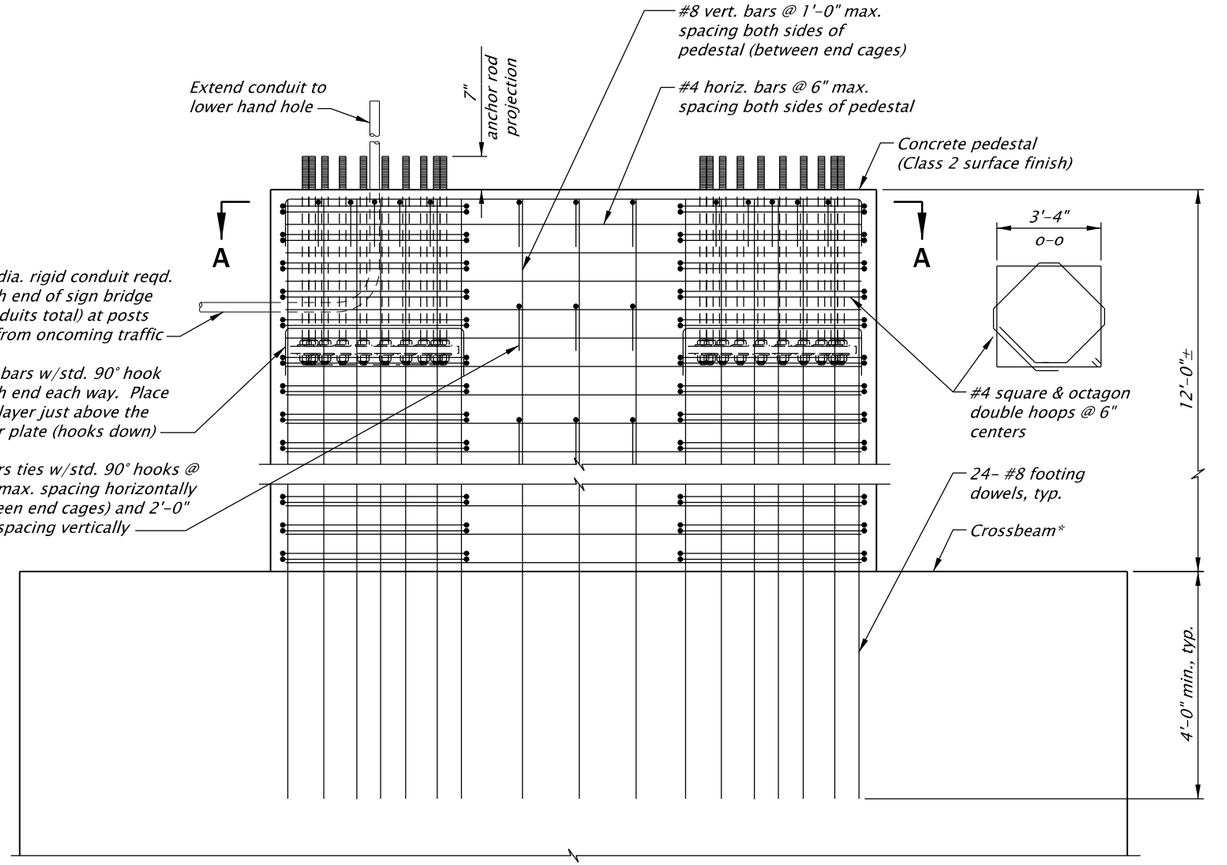
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Kenton Alldritt, P.E. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

PLAN AND ELEVATION SHEET NO.

TN_K19786_OBEC_snps_01.dgn :: LD12 2/10/2020 4:00:26 PM CDONOVAN

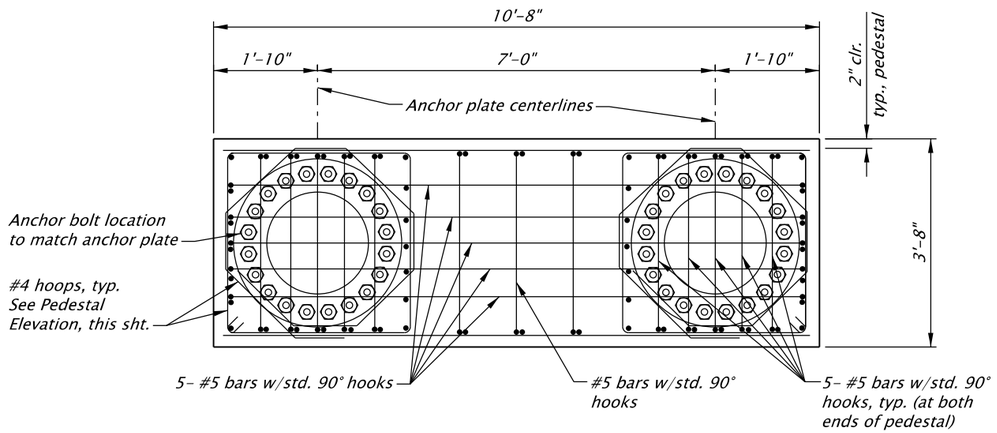
Rotation: 111.7268° 0'



PEDESTAL ELEVATION

Scale: 3/8"=1'-0"

*Reinforcement not shown for clarity. See Bridge Plans for crossbeam reinforcement



SECTION A-A

Scale: 3/8"=1'-0"

STRUCTURE NO.	00000, 00000
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 9.22 NB/SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER OREGON MARCH 8, 2016 KENTON CHARLES ALLDRITT

ADVANCE COPY SUBJECT TO CHANGE

EXPIRES: 12/31/.....

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

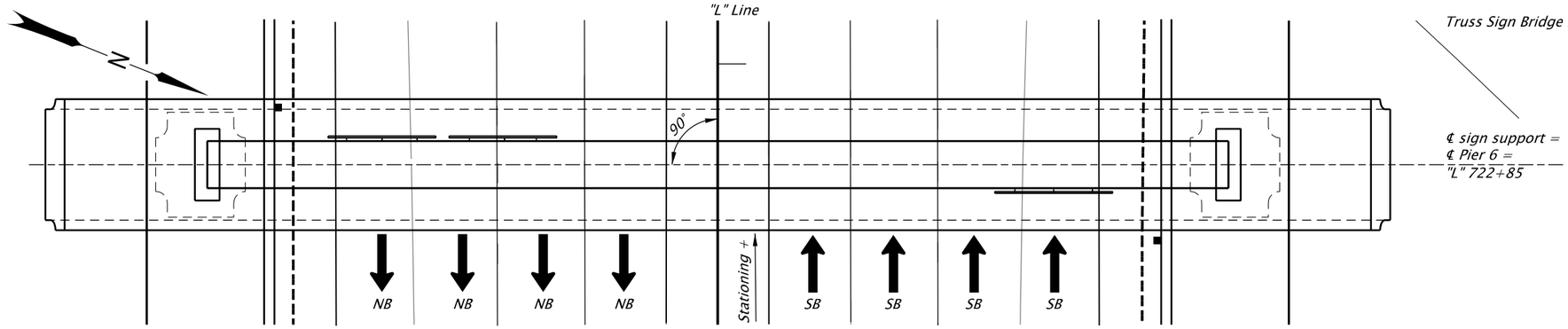
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

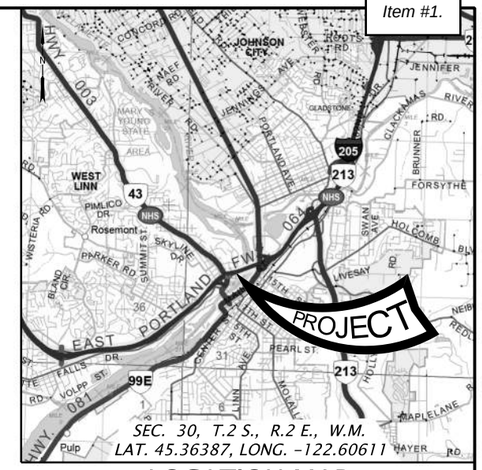
Designer: Kenton Alldritt, P.E. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

SIGN BRIDGE DETAILS

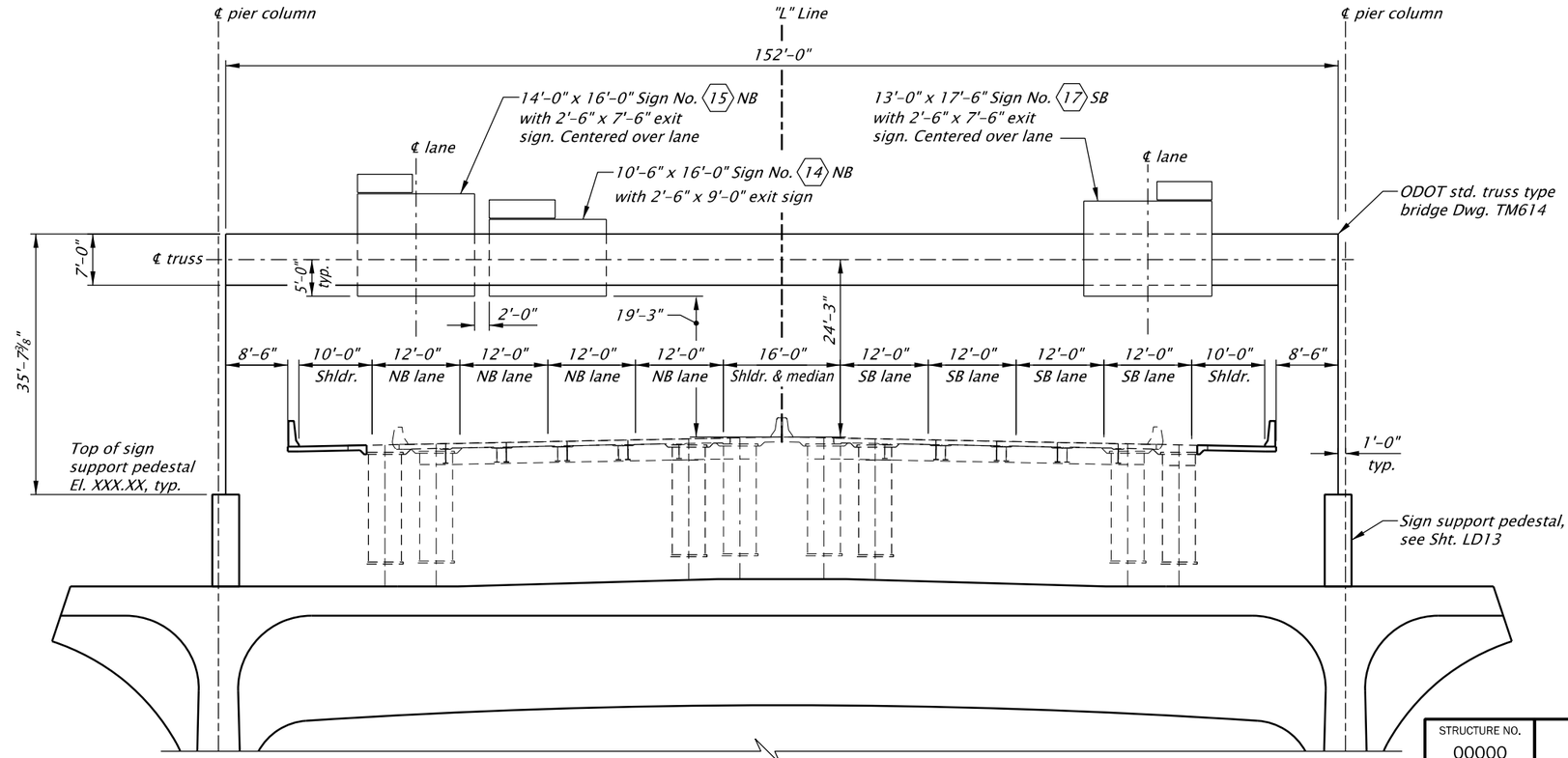
SHEET NO.



PLAN
Scale: 1"=20'



LOCATION MAP
No Scale



*TRUSS TYPE SIGN BRIDGE AT PIER 6 ELEVATION
Scale: 1"=20'

*Elevation view is looking ahead on station SB direction

Note:
Elevations are based on the North American Vertical Datum, 1988.

PROJECT DATA
(Left and Right are as seen while looking ahead on station)

Sign Bridge		"S" Span	Foundation Sheet Number	Spread Footing Foundation Design Number See Dwg. TM619	"HP" Post Height see Dwg. TM614 (Field Verify)		"HF" Foundation Height see Dwg. TM619 (Field Verify)		Luminaires ("Yes" or "No") see Dwg. TM618
At Station	M.P.				Left	Right	Left	Right	
"L" 722+85	9.07 NB/SB	152'-0"	-	-	36'-0"	36'-0"	N/A	N/A	No

Notes:

All materials and workmanship shall conform to the Oregon Standard Specifications for Construction 2018 and the Special Provisions. Structure mounts are designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, Sixth Edition, 2013, with 2015 interim Revisions.

Basic wind speed used for sign structure design is 110 mph, $G = 1.14$, $K_Z = 1.39$ and Exposure C was used for design.

The sign support shall meet the requirements for span length, post height, and sign area, as shown on Dwg.TM614. Use sign bridge design for "S" = 149' to 167'.

Sign support structure is designed for all items shown including future signs (by others).

Field verify conditions, elevations, dimensions, and span prior to fabrication. Field verify utility locations and conditions prior to construction.

See Traffic Plans for sign information.

Right of way line and wetland boundary are outside limits of view.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

STRUCTURE NO. 00000
BDS DWG NO. 00000
CALC. BOOK 7084
HWY: 064
M.P.: 9.07 NB/SB
UNIT FILE CODE 00000
DFI/TSSU NO. N/A

ACCOMPANIED BY DWGS.:
000000, TM614, TM620

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 8, 2016
KENTON CHARLES ALLDRITT
EXPIRES: 12/31/.....
ADVANCE COPY SUBJECT TO CHANGE

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-8089
REGIONAL OFFICES: LAKE OSWEGO, SALEM, MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

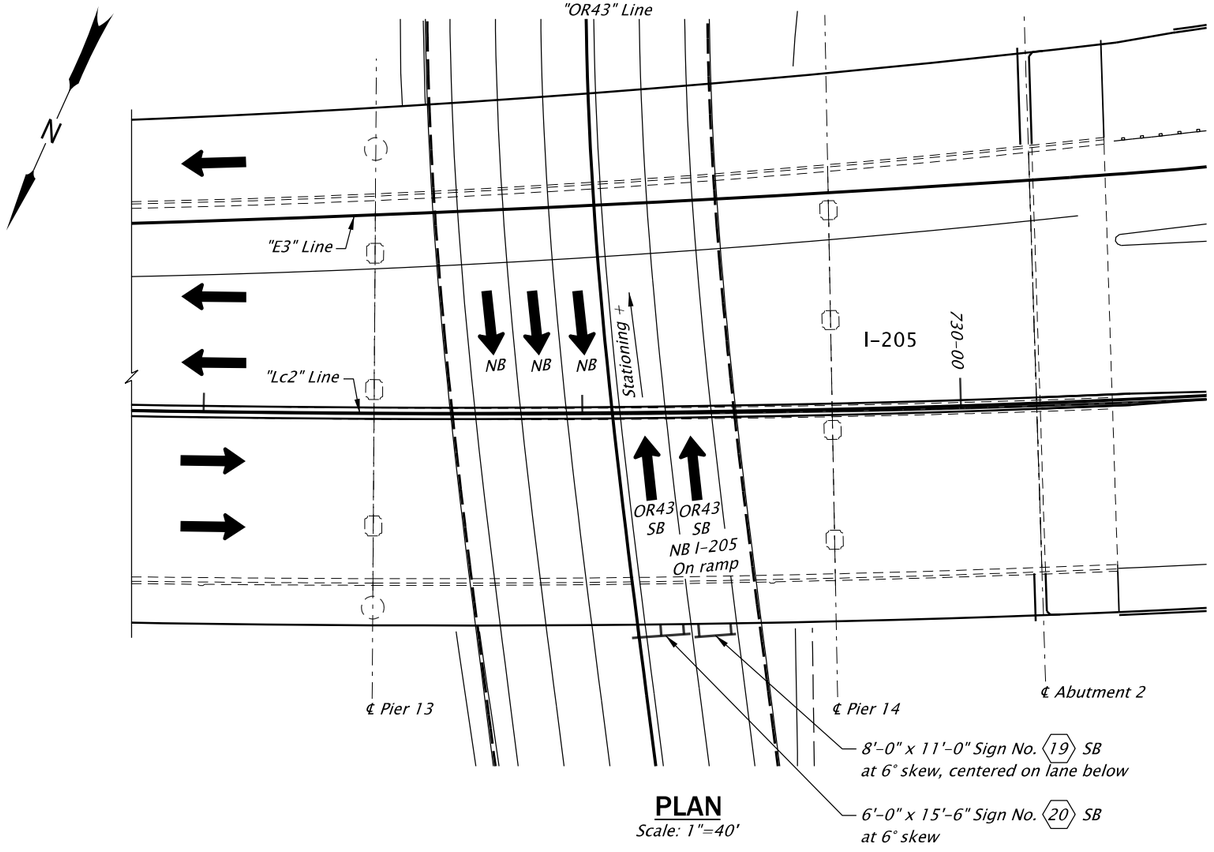
I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Kenton Alldritt, P.E. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

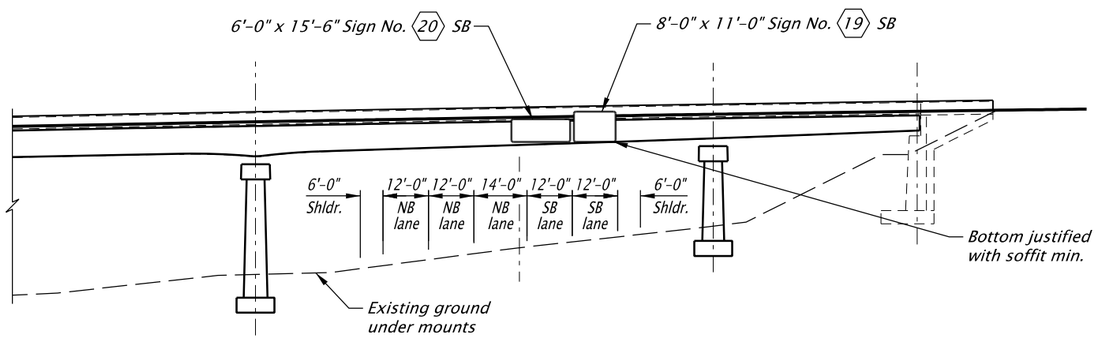
PLAN AND ELEVATION
SHEET NO.

TN_K19786_OBEC_snps_01.dgn :: LD14 2/10/2020 4:00:40 PM CDONOVAN

Rotation: 111.7268° 0'

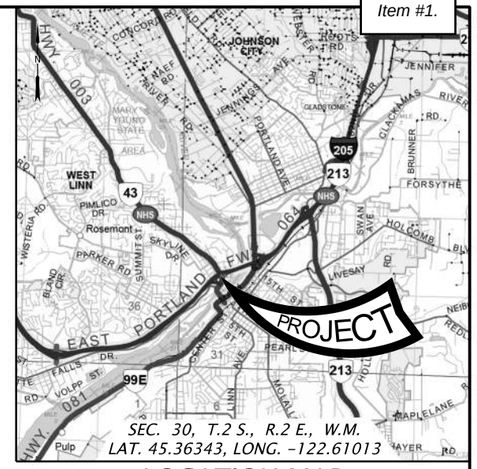


PLAN
Scale: 1"=40'



ELEVATION
Scale: 1"=40'

Signs on Existing Bridge M.P. 8.69 SB



LOCATION MAP
No Scale

General Notes:

All materials and workmanship shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Structure mounts are designed in accordance with the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 1st Edition, 2015 and interim revisions 2017.

Basic wind speed (1700 year recurrence interval) used for sign structure design is 115 mph, G = 1.14, K_Z = 1.0 and Exposure C were used for design.

All structural steel shapes shall conform to ASTM A572, Grade 50, or ASTM A992, unless noted otherwise.

All fasteners shall be ASTM A325 unless otherwise noted. All steel and fasteners shall be hot-dip galvanized after fabrication, unless noted otherwise. The silicon content of the base metal shall be according to the Special Provisions for all hot-dip galvanized steel, unless noted otherwise.

Contractor shall field verify conditions, work, locations, elevations and all dimensions prior to beginning fabrication. Existing traffic lane and structural dimensions shown are approximate and should not be used as a basis for development of fabrication drawings.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

STRUCTURE NO.	09403
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 8.69 SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

ACCOMPANIED BY DWGS.:
000000

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 10, 2005
PETER GLEN SLOCUM
EXPIRES: 06/30/

ADVANCE COPY
SUBJECT TO CHANGE

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

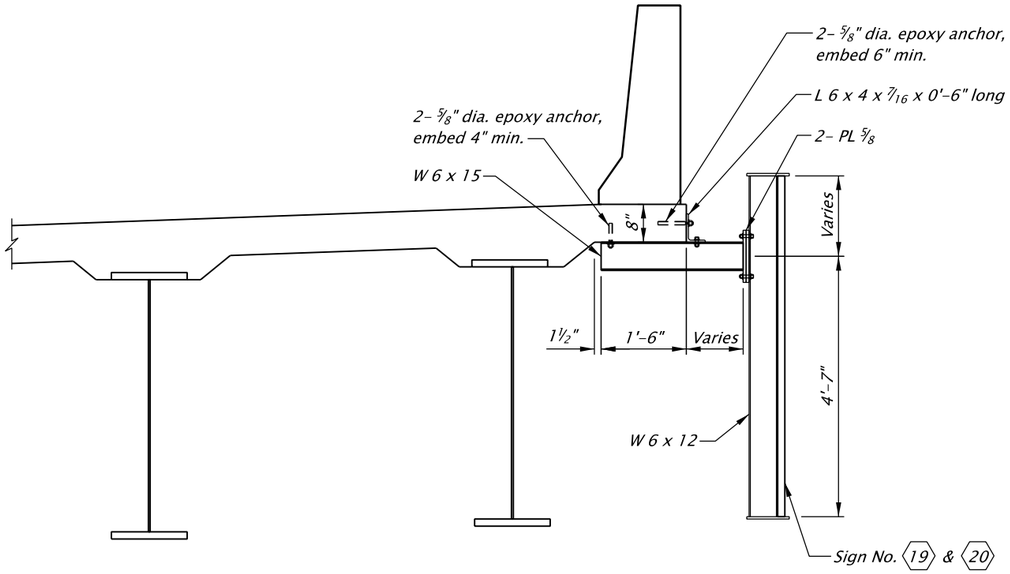
Willamette River & Hwy 1E & Hwy 3, Hwy 64 (George Abernethy)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Wyatt Dean, E.I. | Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli | Checker: Peter G. Slocum, P.E., S.E.

PLAN AND ELEVATION | SHEET NO.

TN_K19786_OBEC_snps_01.dgn :: LD15 2/10/2020 4:00:43 PM CDONOVAN
Rotation: 204.3238° 0'



SECTION
Scale: 3/8"=1'-0"

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	09403
BDS DWG NO.	000000
CALC. BOOK	7084
HWY: 064 M.P.: 8.69 SB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

REGISTERED PROFESSIONAL ENGINEER
OREGON
10, 2005
PETER GLEN SLOCUM
EXPIRES: 06/30/

ADVANCE COPY
SUBJECT TO CHANGE

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE:
920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES:
LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

Willamette River & Hwy 1E & Hwy 3, Hwy 64 (George Abernethy)

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

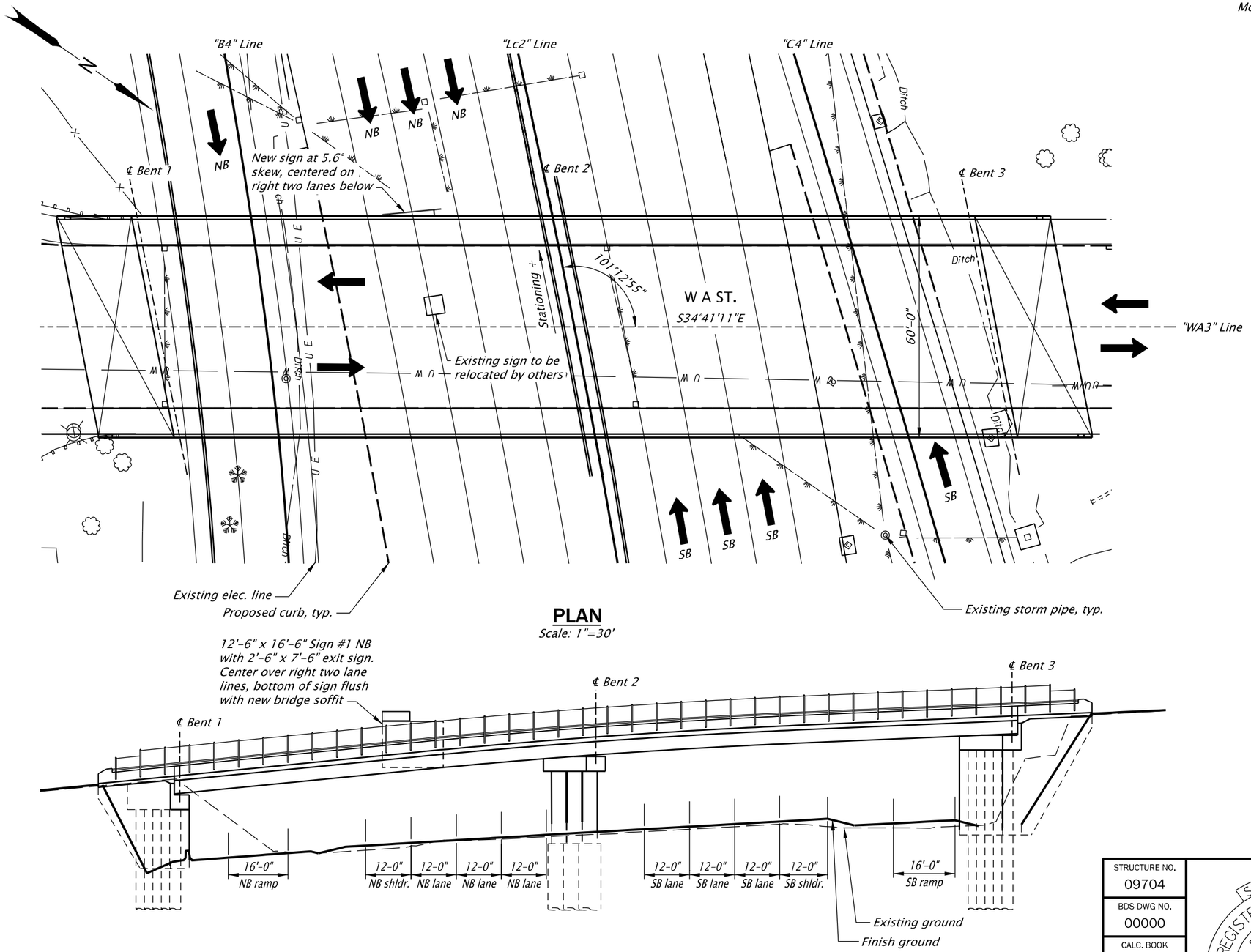
Designer: Wyatt Dean, E.I. Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli Checker: Peter G. Slocum, P.E., S.E.

SIGN DETAILS

SHEET NO.

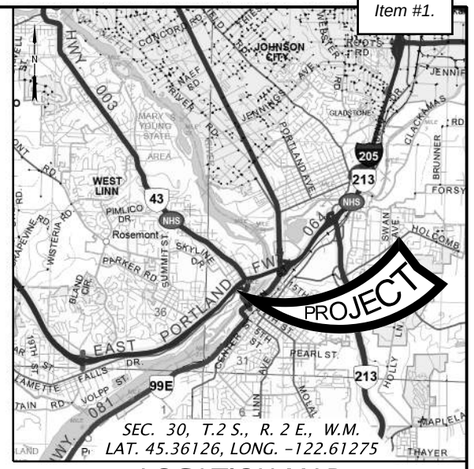
TN_K19786_OBEC_sndt_07.dgn :: LD16 2/10/2020 4:00:50 PM CDONOVAN
Rotation: 0° Sca=1

Mounts on Bridge M.P. 8.64 NB



PLAN
Scale: 1"=30'

ELEVATION
Scale: 1"=30'



LOCATION MAP
No Scale

General Notes:

All materials and workmanship shall conform to the 2018 Oregon Standard Specifications for Construction and the Special Provisions. Structure mounts are designed in accordance with the 5th Edition (2009) of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 1st Edition, 2015 and interim revisions 2017.

Basic wind speed (1700 year recurrence interval) used for sign structure design is 115 mph, G = 1.14, Kz = 0.98 and Exposure C were used for design.

All structural steel shapes shall conform to ASTM A572, Grade 50, or ASTM A992, unless noted otherwise.

All fasteners shall be ASTM A325 unless otherwise noted. All steel and fasteners shall be hot-dip galvanized after fabrication, unless noted otherwise. The silicon content of the base metal shall be according to the Special Provisions for all hot-dip galvanized steel, unless noted otherwise.

Contractor shall field verify conditions, work, locations, elevations and all dimensions prior to beginning fabrication. Existing traffic lane and structural dimensions shown are approximate and should not be used as a basis for development of fabrication drawings.

Oregon law requires the rules set forth in OAR 952-001-0010 through 952-001-0090, adopted by the Oregon Utility Notification Center, to be observed. Copies of these rules may be obtained from the Center by calling 1-800-332-2344 or 811.

STRUCTURE NO.	09704
BDS DWG NO.	00000
CALC. BOOK	7084
HWY: 064 M.P.: 8.64 NB	
UNIT FILE CODE	00000
DFI/TSSU NO.	N/A

ACCOMPANIED BY DWGS.:
00000

SCALE WARNING
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 15485 OREGON JUNE 10, 2005 PETER GLEN SLOCUM
ADVANCE COPY SUBJECT TO CHANGE
EXPIRES: 06/30/

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OBEC CONSULTING ENGINEERS
A DOWL LLC Company
CORPORATE OFFICE: 920 COUNTRY CLUB ROAD, SUITE 100B EUGENE, OREGON 97401-6089
REGIONAL OFFICES: LAKE OSWEGO; SALEM; MEDFORD, OREGON; VANCOUVER, WASHINGTON

OREGON DEPARTMENT OF TRANSPORTATION

West A St (West Linn) over Hwy 64

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Wyatt Dean, E.I. | Reviewer: Jeff Bernardo, P.E.
Drafter: Yuka Garzenelli | Checker: Peter G. Slocum, P.E., S.E.

PLAN AND ELEVATION

SHEET NO.

TN_K19786_OBEC_snps_01.dgn :: LD17 2/10/2020 4:01:01 PM CDONOVAN

Rotation: 124.6856° 0'

L E G E N D

C O N T R O L L E R S

- 334 — Install a model 334 cabinet & control equipment with riser frame, as shown (Ramp meter)
- C / ATC — Install model ATC controller. (Agency furnished)
- CC — Install Controller rectangular rapid flashing beacon controller cabinet
- EX / C — Retain and protect existing controller

P O L E S

- VP — Install vehicle signal pedestal with transformer base.
- PP — Install pedestrian signal pedestal with frangible base
- WS — Install wood pedestrian pushbutton post
- VP / RM — Vehicle signal pedestal (See Ramp Meter Plan)
- XR / PP — Install (X=number) sided rectangular rapid flashing beacon system. (Pedestrian Pedestal) (See RRS Dwg. No. 20064)
- EX / PP — Retain and protect existing pedestrian signal pedestal
- EX / ST — Retain and protect existing signal truss
- EX / VP — Retain and protect existing vehicle signal pedestal
- RX / VP — Remove existing vehicle signal pedestal
- RX / PP — Remove existing pedestrian signal pedestal
- RX / RP — Remove existing radar pole
- RX / PB — Remove existing pedestrian pushbutton post
- RX / MP — Remove existing traffic signal mast arm pole & terminal cabinet
- RX / PP — Remove existing pedestrian signal pedestal

S I G N A L S

- V / Ph — Install phase (Ph=phase) vehicle signal with 2" fluorescent yellow reflective sheeting on backboard per std. dwg. TM460
- FY / 12 — Install 12 inch flashing yellow beacon.
- PBH — Install pushbutton with mount ("PUSHBUTTON TO TURN ON WARNING LIGHTS" R10-25).
- C/A / Ph — Install phase (Ph=phase) countdown pedestrian signal with clamshell mount and pushbutton with mount. Include phase (Ph=phase) audible pedestrian signal.
- GPL — Install geometrically programmed louvers. Pelco Modal GL-1010 with 7 degree view cut-off or approved equal
- EX / VPh — Retain and protect existing phase (Ph=phase) vehicle signal.
- EX / VP — Retain and protect existing vehicle signal pedestal.
- RX / P — Remove existing pedestrian signal
- RX / PB — Remove existing pedestrian pushbutton and instruction sign
- RX / V — Remove existing vehicle signal
- RX / VPh — Remove existing phase (Ph=phase) vehicle signal

L E G E N D

S I G N A L S (continued)

- RX / P/B — Remove existing pedestrian signal, pushbutton and instruction sign

C A B I N E T S

- BMC — Install base mounted service cabinet, 120/240 volt metered, for signal system
- BMCF — Install base mounted flasher cabinet, 120/240 volt metered, for signal and flashing beacons
- TC — Install terminal cabinet
- EX / C — Retain and protect existing cabinet
- EX / TC — Retain and protect existing terminal cabinet
- EX / SC — Retain and protect existing service cabinet
- EX / MS — Retain and protect existing meter base
- RX / SC — Remove existing service cabinet
- RX / MS — Remove existing meter base
- RX / C — Remove existing controller cabinet & equipment
- RX / SC — Remove existing service cabinet
- RX / TC — Remove existing terminal cabinet

S I G N S

- AL / 8S — Install aluminum (24"x12") "ONE VEHICLE PER GREEN" sign (OR20-1)
- AL / 9 — Install aluminum (24"x36") "STOP HERE ON RED" sign (R10-6)
- AL / 6R — Install aluminum (36"x36") NO RIGHT TURN "SYMBOL" sign (R3-1)
- AL / 6L — Install aluminum (36"x36") NO LEFT TURN "SYMBOL" sign (R3-2)
- AL / 18 — Install aluminum (36"x36") "BE PREPARED TO STOP" sign (W3-4)
- AL / 19 — Install aluminum (24"x18") "WHEN FLASHING" sign (W16-13P)
- AL / 31 — Install aluminum (18"x30") "ARROW PLAQUE" sign (W16-7P)
- AL / 54 — Install aluminum (36"x36") "PEDESTRIAN CROSSING" sign (W11-2)
- EX / PR — Retain and protect existing part time restriction sign
- EX / AL — Retain and protect existing aluminum sign and mount.
- RX / AL — Remove existing aluminum sign and mount
- RX / PR — Remove existing part time restriction sign
- RX / OS — Remove existing interior illuminated sign

J U N C T I O N B O X E S

- JB / 1 — Install 17"x10"x12" (min. dimension) precast concrete junction box
- JB / 1A — Install 17"x10"x12" (min. dimension) precast concrete junction box with concrete apron
- JB / 2 — Install 22"x12"x12" (min. dimension) precast concrete junction box

RAMP METER PLANS

EAST PORTLAND FREEWAY
AT PACIFIC HIGHWAY EAST
I-205 SB AT MP 9.31

EAST PORTLAND FREEWAY
AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48

EAST PORTLAND FREEWAY
AT OSWEGO HIGHWAY
I-205 NB AT MP 8.82 & 8.99

NOTE:

See Sheet No. MA02 for continued legend sheet

NOTE:

See Sheet No. MB01 thru ME01 and MG01 thru MJ04 for Signal and Detector Plans

NOTE:

See Sheet No. MF01 and MF02 for RRFB Flashing Beacon Plans

SIGNAL PLANS

EAST PORTLAND FREEWAY AT
PACIFIC HIGHWAY EAST
OR99 AT MP 11.64

EAST PORTLAND FREEWAY AT
PACIFIC HIGHWAY EAST
OR99 AT MP 11.81

EAST PORTLAND FREEWAY AT
OSWEGO HIGHWAY
OR43 AT MP 11.13

EAST PORTLAND FREEWAY AT
OSWEGO HIGHWAY
OR43 AT MP 11.29

EAST PORTLAND FREEWAY
AT OSWEGO HIGHWAY (SB ON-RAMP)
I-205 SB AT MP 8.83

EAST PORTLAND FREEWAY
AT 10TH ST (NB ON-RAMP)
I-205 NB AT MP 6.60

FLASHING BEACON PLANS

OSWEGO HIGHWAY AT
WILLAMETTE FALLS DRIVE
OR43 AT MP 11.35

ACCOMPANIED BY DWGS.:
TM450, TM452, TM455, TM457, TM460, TM462, TM463, TM465, TM467, TM470, TM472, TM475, TM480, TM482, TM485, TM490, TM492, TM650, TM651, TM652, TM653, TM680, and T.R.S. dwgs. xxxxx-xxxxx

HWY: VARIES
M.P.: VARIES
COUNTY 00000
DATE XXXXX

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
OREGON
9, 2002
JOLETTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

SIGNAL LEGEND

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

L E G E N D

J U N C T I O N B O X E S (continued)

- JB / 2A — Install 22"x12"x12" (min. dimension) precast concrete junction box with concrete apron
- JB / 6 — Install 12"x10"x8" (min. dimension) galv. cast iron junction box with gasketed galv. steel cover
- SP / S — Install 6" max. sand pocket block-out with (S=size) inch conduit to junction box
- EX / JB — Retain and protect existing junction box.
- EX / JB2 — Retain and protect existing 22"x12"x12" (min. dimension) precast concrete junction box
- EX / HH — Retain and protect existing fiber optic hand hole
- EX / SB — Retain and protect existing loop access point, galv. cast iron street box with conduit to junction box
- RX / JB — Remove existing junction box
- HH / IC — Handhole (See Interconnect Plan)
- JB / SP — Junction box (See Signal Plan)
- JB / DP — Junction box (See Detection Plan)
- JB / RM — Junction box (See Ramp Meter Plan)

D E T E C T I O N

- L / F — Install 6' round or 4' diamond Ramp Meter (F=function) detector loop
  D = Demand C = Count
  P = Passage Q = Queue
- LD / Ph — Install phase (Ph=phase) 6' round or 4' diamond vehicle detector loop
- N / LW — Install (N=number) pair of loop wires
- EX / FPh — Retain and protect existing phase (Ph=phase) loop feeder cable
- ZON — Proposed detection zone
- R-N / T — Install near-range radar detector unit (T=Radar)
- R-F / T — Install far-range radar detector unit (T=Radar)
- EX / DPh — Retain and protect existing phase (Ph=phase) vehicle detector loop
- EX / ZON — Retain and protect existing detection zone
- EX / SP — Retain and protect existing loop access point, sand pocket to junction box
- RX / FPh — Remove existing phase (Ph=phase) loop feeder cable
- RX / RAD — Remove existing radar vehicle detector unit
- RX / CAM — Remove existing video vehicle detector camera
- AX / D-F — Abandon existing (F=function) vehicle detector loop
- AX / D — Abandon existing vehicle detector loop

L E G E N D

W I R E S & C A B L E S

- RCC / T — Install radar control cable (T=Radar)
- RI / W — Reinstall existing wiring
- EX / W — Retain and protect existing wiring
- RS / W — Remove and save existing wiring
- RX / W — Remove existing wiring

C O N D U I T S

- S — Install (S=size) inch conduit
- HDD — Install conduit by horizontal directional drilling, open trench not allowed
- EX / RC — Retain and protect existing rigid metallic conduit
- RC / S — Install (S=size) inch rigid metallic conduit, conduit bodies, expansion fittings, and surface mounted metallic junction boxes as required. Submit proposed method of attachment to the bridge for approval.
- EC — Electrical conduit (See Signal Plan)
- DC — Detection conduit (See Detection Plan)
- RM — Ramp meter conduit (See Ramp Meter Plan)
- EX / S C — Retain and protect existing (S=size) inch conduit
- EX / EC — Retain and protect existing electrical conduit
- EX / DC — Retain and protect existing detector conduit
- EX / S C — Retain and protect existing (S=size) inch detector conduit
- EX / IC — Retain and protect existing interconnect conduit
- EX / RM — Retain and protect existing ramp meter conduit
- AX / C — Abandon existing conduit
- AX / RC — Abandon existing rigid metallic conduit
- IC — Interconnect conduit (see interconnect plan)

H E A D S & B R A C K E T S

B = Adjustable signal bracket assembly w/rain cap(s) (Install 1" galvanized chase nipple).

AB = Adjustable sign bracket assembly w/rain cap(s)

2 = 12"R. 12"Y. 12"G

3R = 12" RRTA. 12" YRTA. 12" GRTA

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER 65[illegible] OREGON JULY 9, 2002 COLETTE T. SNUFFIN Expires June 30, 2018

PRELIMINARY COPY INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

HWY: VARIES
M.P.: VARIES
COUNTY: XXXXX
DATE: XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

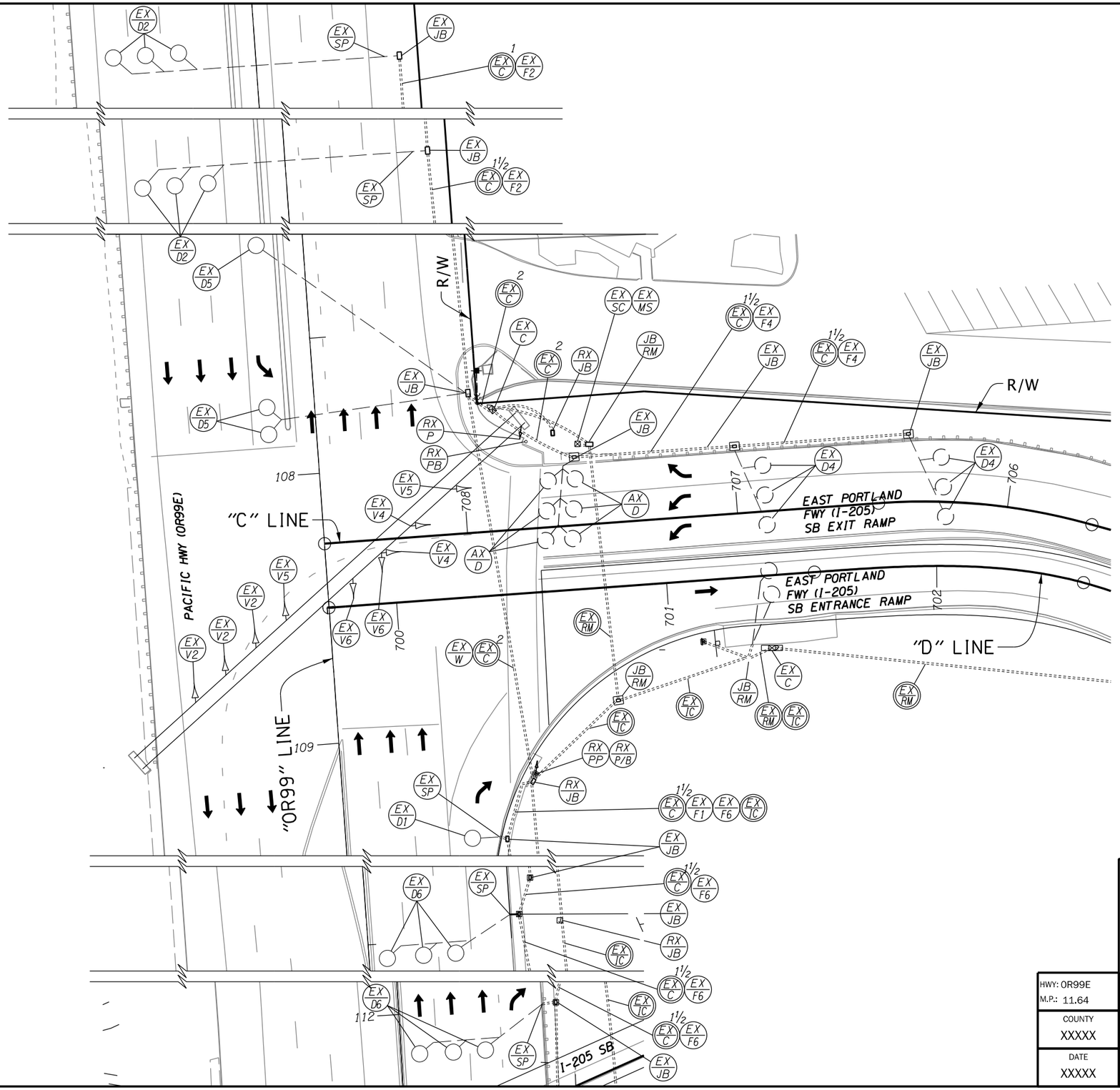
Designer: F. Weary Reviewer: C. Snuffin
Drafter: J. Mai Checker: C. Stewart

SIGNAL LEGEND

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

REMOVAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.64
(OREGON CITY)



N

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

NOTE:
Right of way for West & SE quadrant is outside of plan sheet view

Traffic Section Approval

HWY: OR99E
M.P.: 11.64
COUNTY
XXXXX
DATE
XXXXX

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 9, 2002
JOLETTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

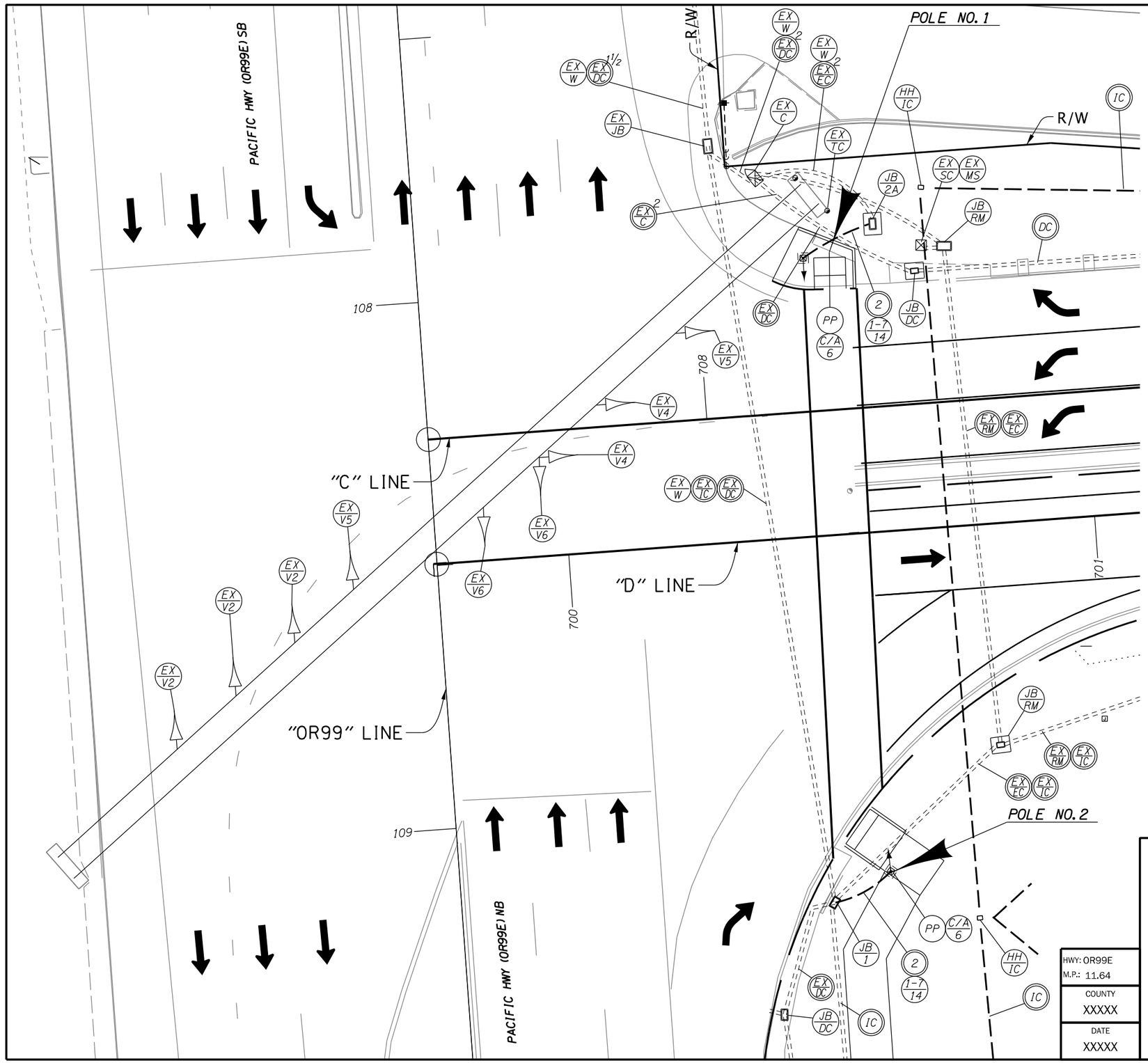
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

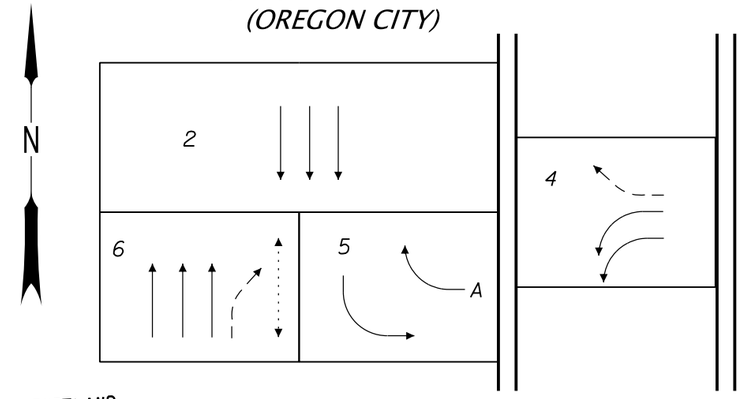
Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

REMOVAL PLAN

SHEET NO.

SIGNAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.64
(OREGON CITY)





OLA= Ph.4 & Ph.5

NORMAL PHASE ROTATION

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

NOTE:
Right of way for West & SE quadrant is outside of plan sheet view

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
DEC 9, 2002
JULIE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

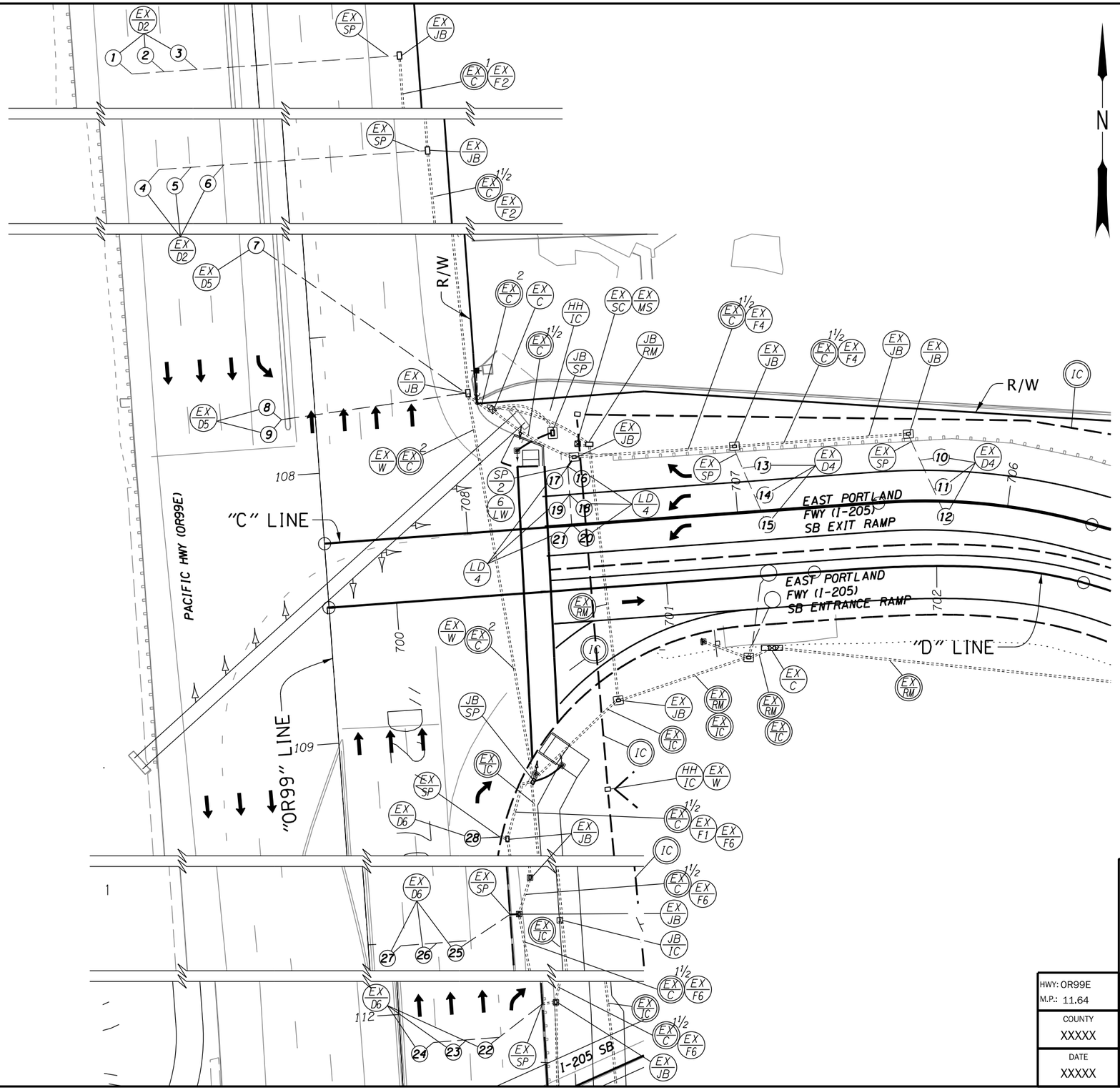
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary	Reviewer: C. Snuffin
Drafter: J. Mai	Checker: C. Stewart

SIGNAL PLAN

SHEET NO.

HWY: OR99E
M.P.: 11.64
COUNTY XXXXX
DATE XXXXX



DETECTOR PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.64
(OREGON CITY)

Loop Number	Distance Feet	Phase	Slot	Controller Cabinet
1	320	2	I2U	
2	320	2	I2L	
3	320	2	I3U	
4	160			
5	160	2	I4U	
6	160			
7	75	5	J1U	
No Work 8	15			
9	5	5	J9U	
10	148	4	I7L	
11	148	4	I6U	
12	148	4	I6L	
13	82	4	I7L	
14	82			
15	82	4	I7U	
16	15			
17	5	4	I7L	
18	15			
19	5	4	I7L	
20	15			
21	5	4	I7L	
22	320	6	J3L	
23	320	6	J2L	
No Work 24	320	6	J2U	
25	160			
26	160	6	J3U	
27	160			
28	40	1	I1U	For Counts Only

LOOP DETECTOR WIRING DIAGRAM
"Distance" is from Stop Line to center of loop in feet

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

NOTE:
Right of way for West & SE quadrant is outside of plan sheet view

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

REGISTERED PROFESSIONAL ENGINEER
OLIVIA T. SNUFFIN
Expires June 30, 2018
PRELIMINARY COPY
INFORMATION ONLY

HWY: OR99E
M.P.: 11.64
COUNTY: XXXXX
DATE: XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

DETECTOR PLAN

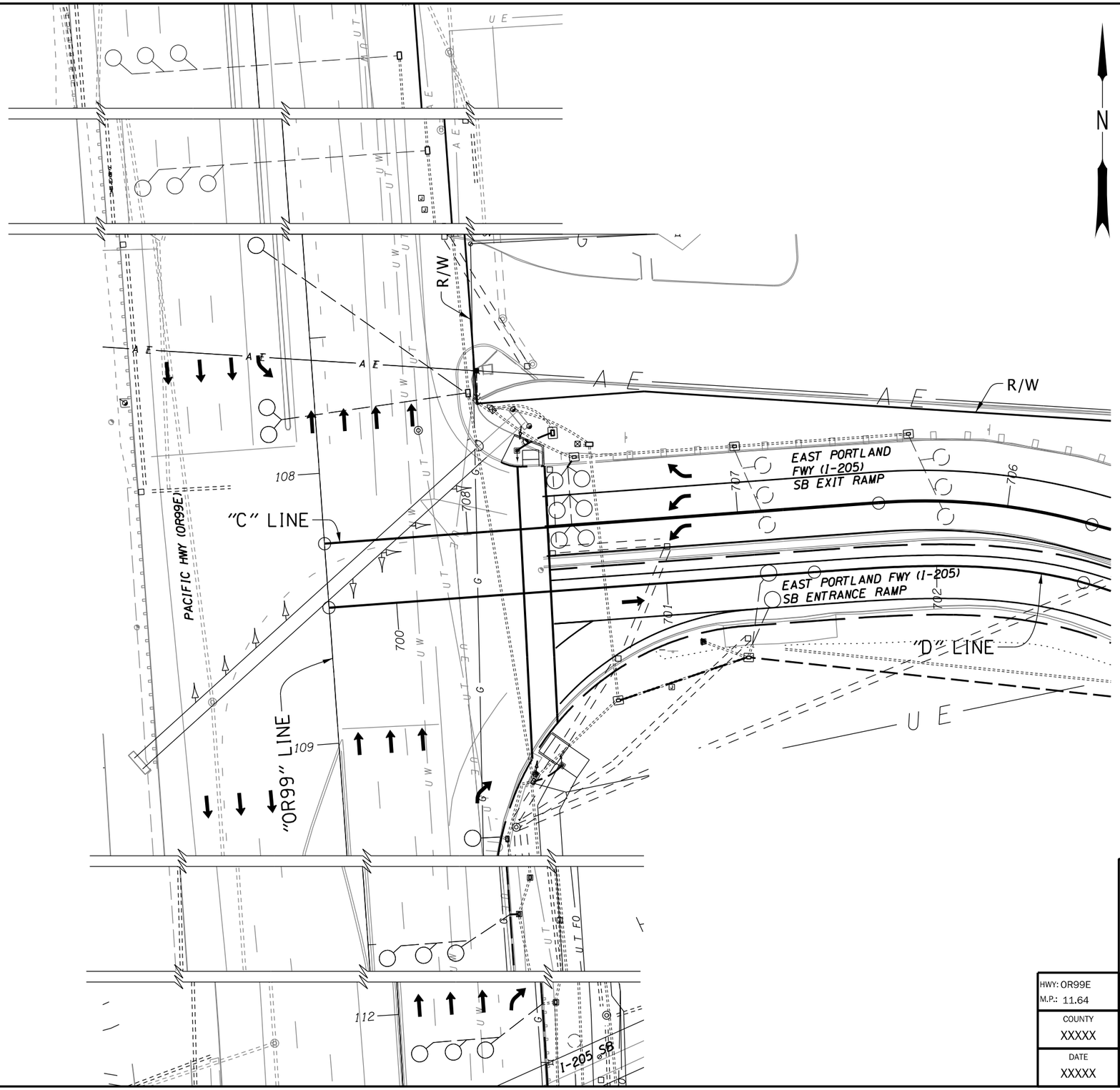
SHEET NO.

T_K19786_HDR_sgps_01.dgn :: MB03 - Detector Plan_OR99 SB Terminal 2/10/2020 9:59:29 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 0°

EXISTING UTILITIES
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.64
(OREGON CITY)



NOTE:
Right of way for West & SE quadrant is outside of plan sheet view

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
65
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: OR99E	
M.P.: 11.64	
COUNTY: XXXXX	
DATE: XXXXX	
Designer: F. Weary	Reviewer: C. Snuffin
Drafter: J. Mai	Checker: C. Stewart

EXISTING UTILITIES

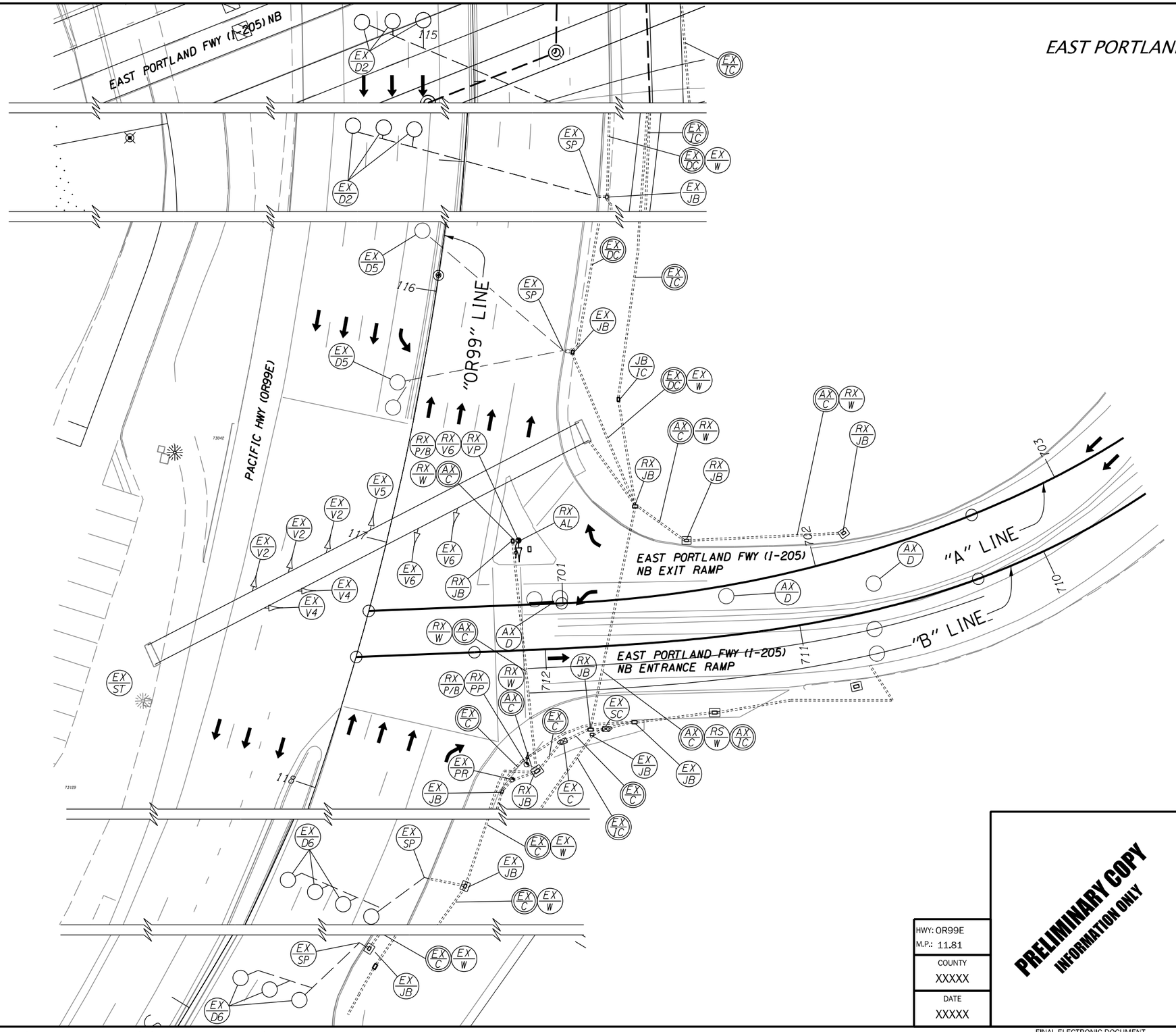
SHEET NO.

T_K19786_HDR_sgps_01.dgn :: MB04 – Utility Plan_OR99 SB Terminal 2/10/2020 9:59:38 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'

REMOVAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.81
(OREGON CITY)



N

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

NOTE:
Right of way for all quadrants is outside of plan sheet view

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

PRELIMINARY COPY
INFORMATION ONLY

HWY: OR99E
M.P.: 11.81
COUNTY
XXXXX
DATE
XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

REMOVAL PLAN

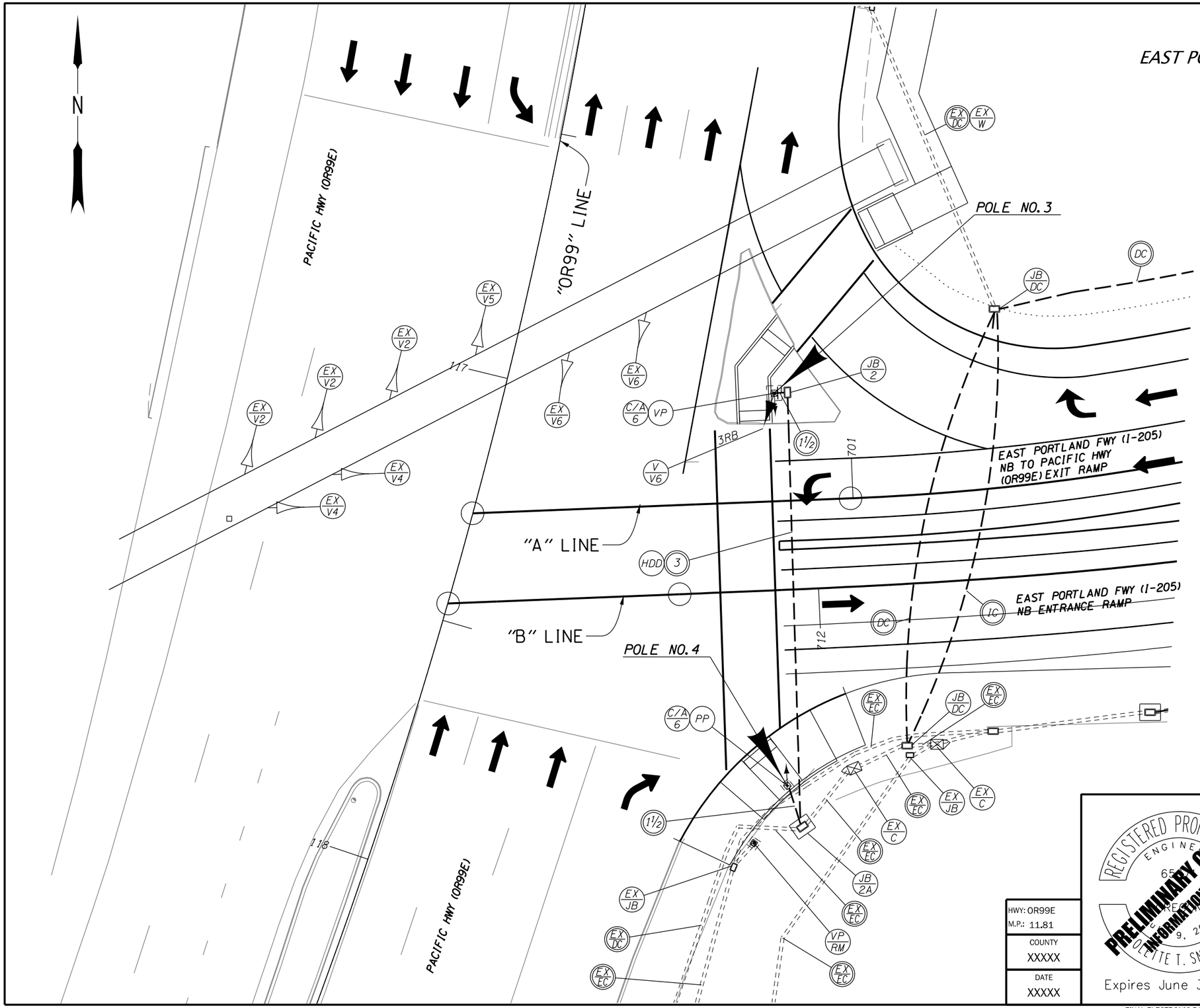
SHEET NO.
Page 627

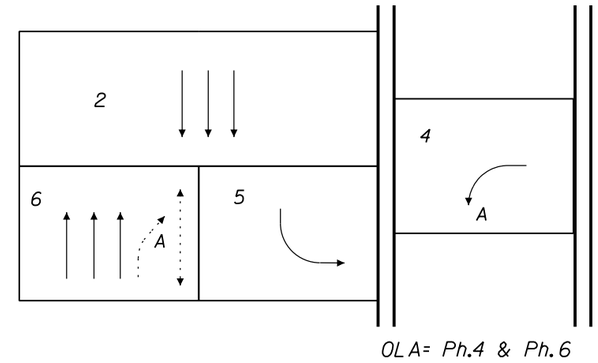
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

T_K19786_HDR_sgps_01.dgn :: MC01 - Removal Plan_OR99 NB Terminal 2/10/2020 9:59:49 AM CDONOVAN

Rotation: 0° 0'

SIGNAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.81
(OREGON CITY)





OL A= Ph.4 & Ph.6

NORMAL PHASE ROTATION

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

NOTE:
Right of way for all quadrants is outside of plan sheet view

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 9, 2002
JULIETTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HWY: OR99E
M.P.: 11.81
COUNTY: XXXXX
DATE: XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

SIGNAL PLAN

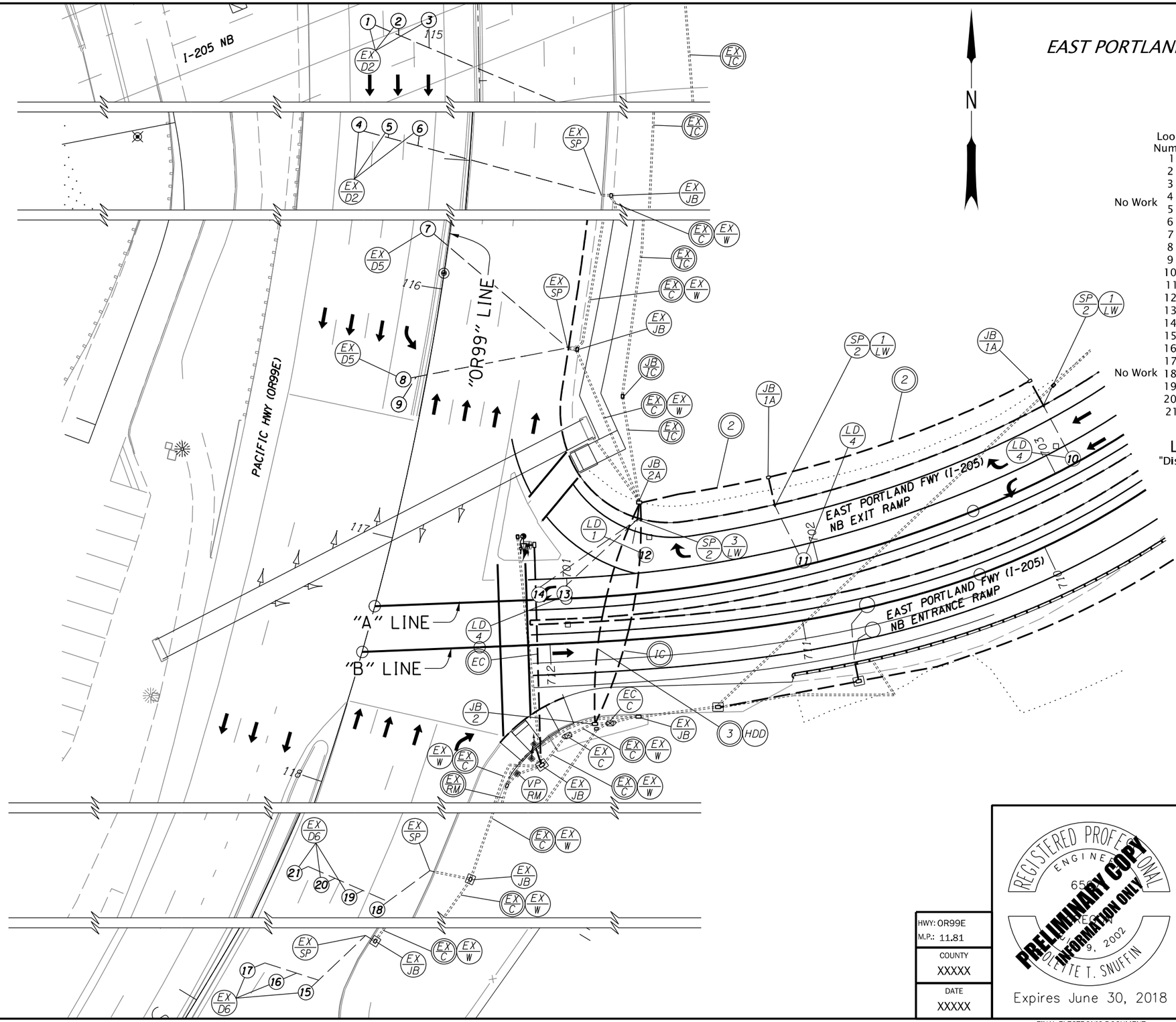
SHEET NO.

T_K19786_HDR_sgps_01.dgn :: MC02 - Signal Plan_OR99 NB Terminal 2/10/2020 9:59:57 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'

DETECTOR PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.81
(OREGON CITY)



Loop Number	Distance Feet	Phase	Slot	Controller Cabinet
1	320	2	I2U	
2	320	2	I2L	
3	320	2	I3U	
No Work 4	160			
5	160	2	I4U	
6	160			
7	75	5	J1U	
8	15	5	J9U	
9	5			
10	225	4	I6U	
11	110	4	I6L	
12	40	1	I1U	For Counts Only
13	15	4	I7U	
14	5			
15	320	6	J2U	
16	320	6	J2L	
17	320	6	J3U	
No Work 18	160			
19	160	6	J4U	
20	160			
21	160			

LOOP DETECTOR WIRING DIAGRAM
"Distance" is from Stop Line to center of loop in feet

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

NOTE:
Right of way is outside of plan sheet view

Note:
Contractor is responsible for numbering of new detector loops & loop feeders, in junction boxes and cabinet, to match wiring diagram.

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
JULIETTE T. SNUFFIN
Expires June 30, 2018
PRELIMINARY COPY FOR INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

HWY: OR99E
M.P.: 11.81
COUNTY: XXXXX
DATE: XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

DETECTOR PLAN

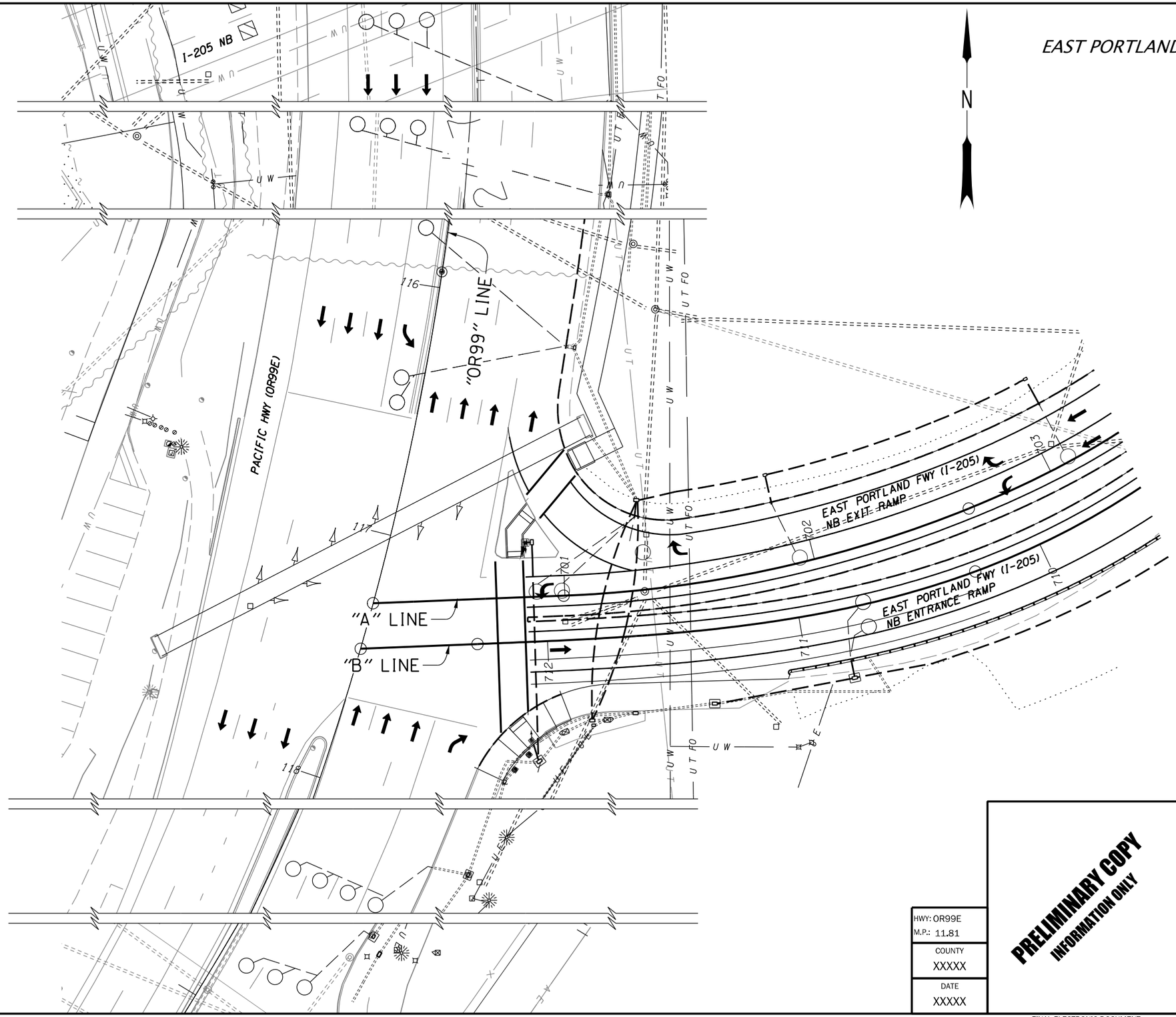
SHEET NO.

T_K19786_HDR_sgps_01.dgn :: MC03 - Detector Plan_OR99 NB Terminal 2/10/2020 10:00:02 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 0°

EXISTING UTILITIES
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
OR99 AT MP 11.81
(OREGON CITY)



NOTE:
See Plan Sheet No. MA01, MA02 for Legend

NOTE:
Right of way for all quadrants is outside of plan sheet view

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

PRELIMINARY COPY
INFORMATION ONLY

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: OR99E	
M.P.: 11.81	
COUNTY: XXXXX	
DATE: XXXXX	
Designer: F. Weary	Reviewer: C. Snuffin
Drafter: J. Mai	Checker: C. Stewart

EXISTING UTILITIES

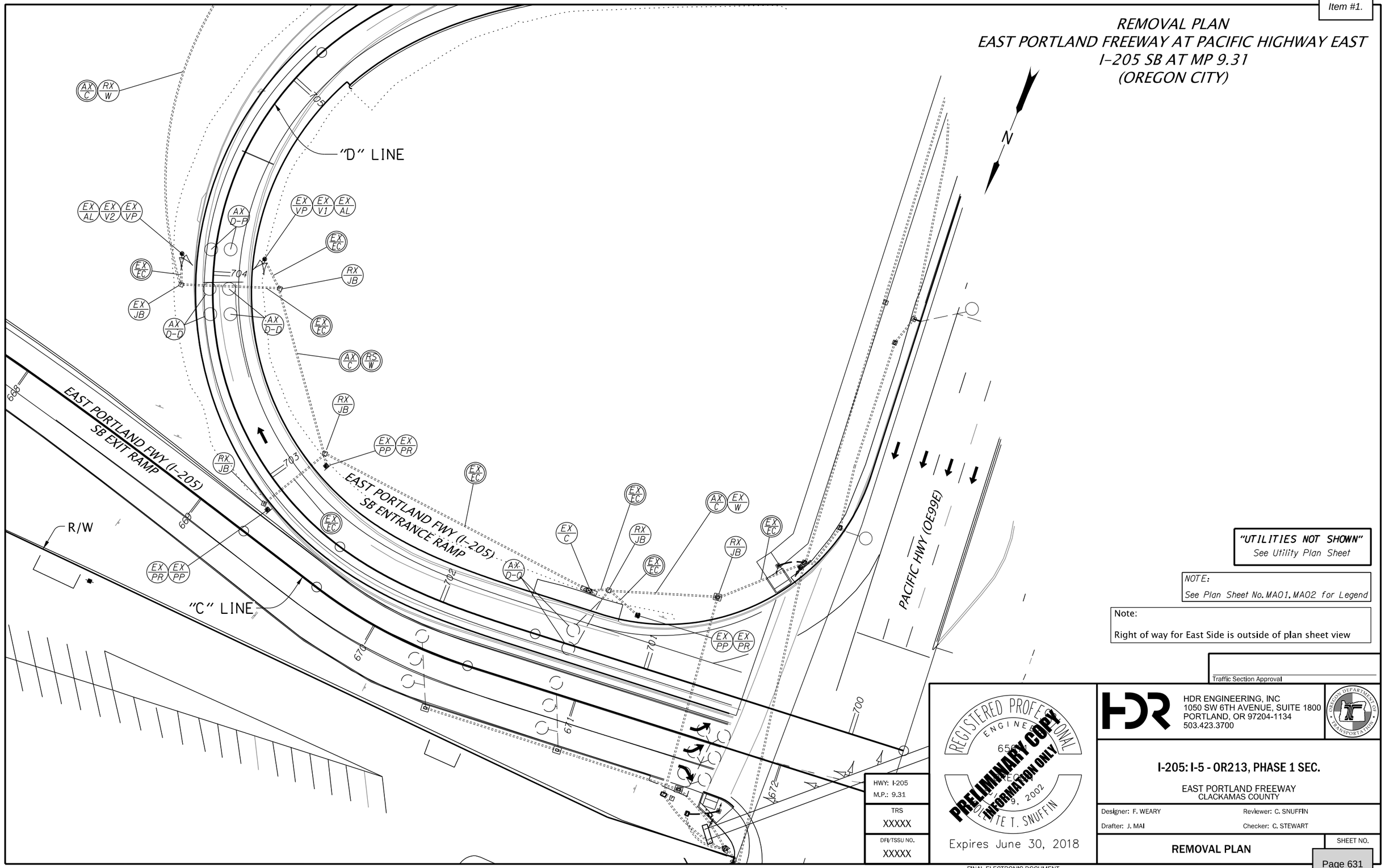
SHEET NO.

T_K19786_HDR_sgps_01.dgn :: MC04 - Utility Plan_OR99 NB Terminal 2/10/2020 10:00:12 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° 0'

REMOVAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 SB AT MP 9.31
(OREGON CITY)



"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:
Right of way for East Side is outside of plan sheet view

Traffic Section Approval

HWY: I-205	
M.P.: 9.31	
TRS	XXXXX
DFI/TSSU NO.	XXXXX

REGISTERED PROFESSIONAL ENGINEER
6509
OREGON
JULY 9, 2002
JULIE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART

REMOVAL PLAN

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MG01 - Removal Plan_OR99E SB 2/10/2020 10:01:25 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 201.7921° 0'

REMOVAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 SB AT MP 9.31
(OREGON CITY)

N

"Lc2" LINE

EAST PORTLAND FWY (I-205) NB

EAST PORTLAND FWY (I-205) SB

EAST PORTLAND FWY (I-205) SB ENTRANCE RAMP

"D" LINE

AX D-C

RX JB

RX W

AX C

704 705 706 707 708 709 710

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:
Right of way is outside of plan sheet view

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
[illegible], 2002
PRELIMINARY COPY
INFORMATION ONLY
CLETE T. SNUFFIN
Expires June 30, 2018

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: I-205	
M.P.: 9.31	
TRS	XXXXX
DFI/TSSU NO.	XXXXX
Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART

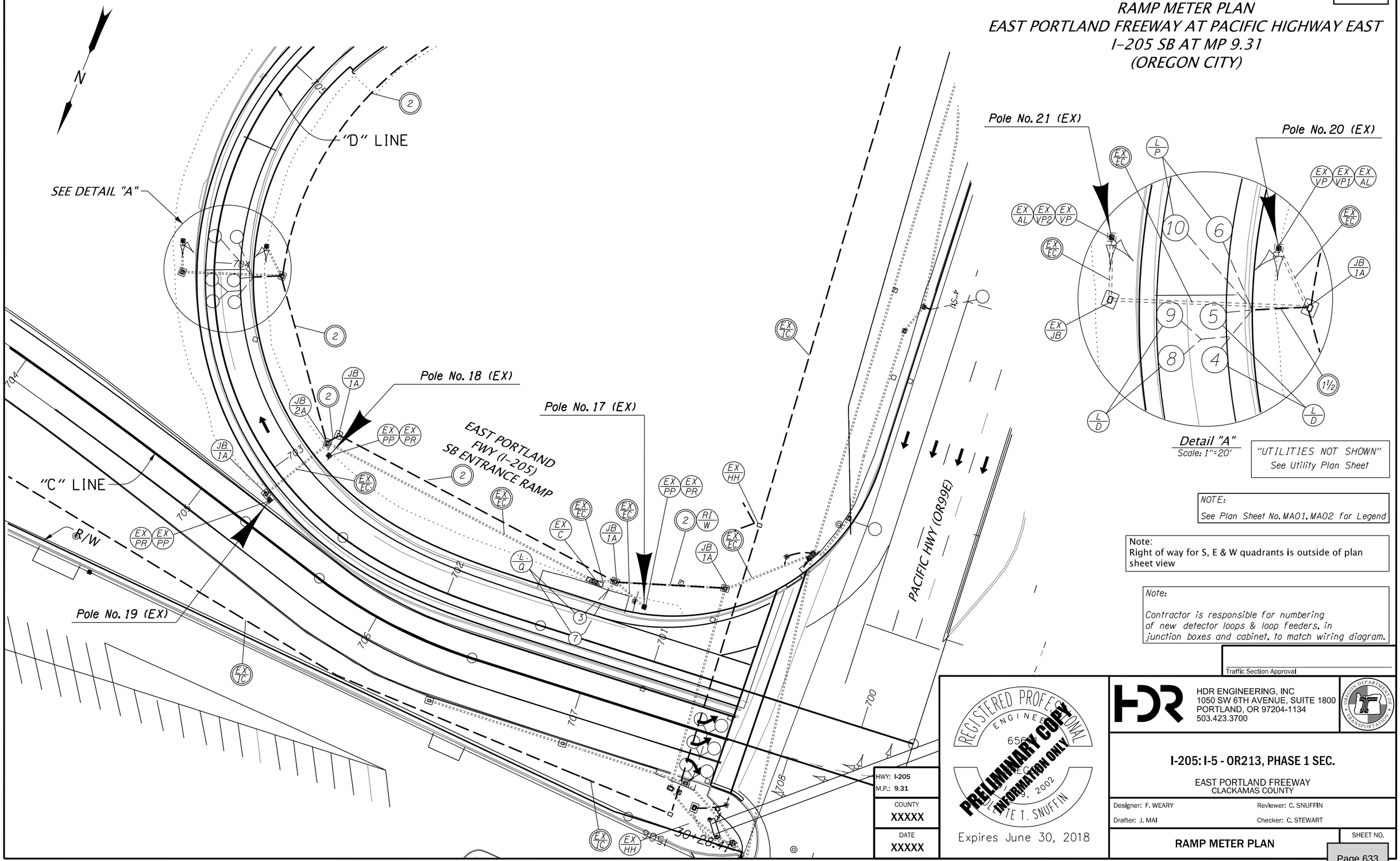
REMOVAL PLAN

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MG02 - Removal Plan_OR99E SB 2/10/2020 10:01:27 AM CDONOVAN

Rotation: 201.7921° 0'

RAMP METER PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 SB AT MP 9.31
(OREGON CITY)



Detail "A"
Scale: 1"=20'

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:
Right of way for S, E & W quadrants is outside of plan sheet view

Note:
Contractor is responsible for numbering of new detector loops & loop feeders, in junction boxes and cabinet, to match wiring diagram.

Traffic Section Approval

HWY: I-205
M.P.: 9.31
COUNTY
XXXXX
DATE
XXXXX

REGISTERED PROFESSIONAL ENGINEER
6569
OREGON
JULY 9, 2002
DELETTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY | Reviewer: C. SNUFFIN
Drafter: J. MAI | Checker: C. STEWART

RAMP METER PLAN

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MG03 - Ramp Meter Plan_OR99E SB 2/10/2020 10:01:29 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

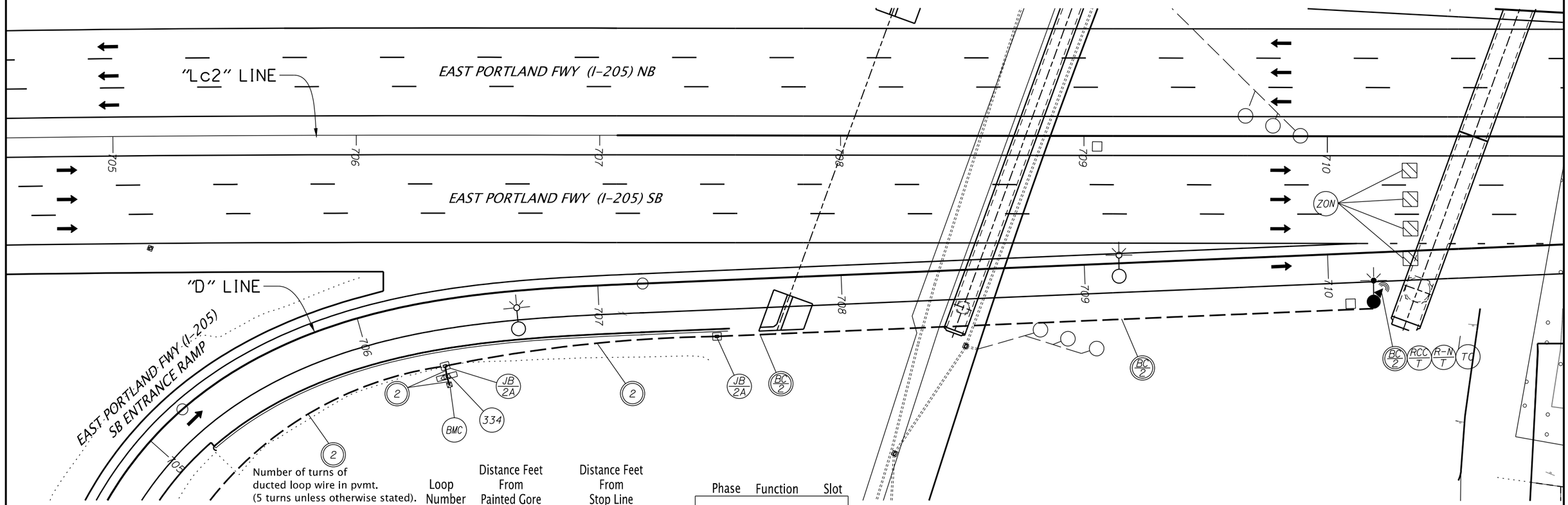
Rotation: 201.7921° 0'

RAMP METER PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 SB AT MP 9.31
(OREGON CITY)

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:
Right of way is outside of plan sheet view



Number of turns of ducted loop wire in pvmt. (5 turns unless otherwise stated).

Loop Number	Distance Feet From Painted Gore	Distance Feet From Stop Line	Phase	Function	Slot
1A	NOT USED			C	6L
1B	NOT USED			C	6U
2A	NOT USED			C	7L
2B	NOT USED			C	7U
turns of ducted loop wire — 3		340	1	Q	2U
turns of ducted loop wire — 4		15	1	D	4L
turns of ducted loop wire — 5		5			
turns of ducted loop wire — 6		15	1	P	4U
turns of ducted loop wire — 7		340	2	Q	3L
turns of ducted loop wire — 8		15	2	D	5L
turns of ducted loop wire — 9		5			
turns of ducted loop wire — 10		15	2	P	5U

Controller Cabinet

LOOP DETECTOR WIRING DIAGRAM

C=Count, P=Passage, D=Demand, Q=Queue
Center all loops in travel lanes or as shown on plan.

CONSTRUCTION NOTE:

1. Radar unit to be mounted on proposed streetlight pole.

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
DECEMBER 9, 2002
COLETTE T. SNUFFIN
Expires June 30, 2018

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INFORMATION ONLY

HWY: I-205
M.P.: 9.31
TRS XXXXX
DFI/TSSU NO. XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY
Drafter: J. MAI
Reviewer: C. SNUFFIN
Checker: C. STEWART

RAMP METER PLAN

SHEET NO.

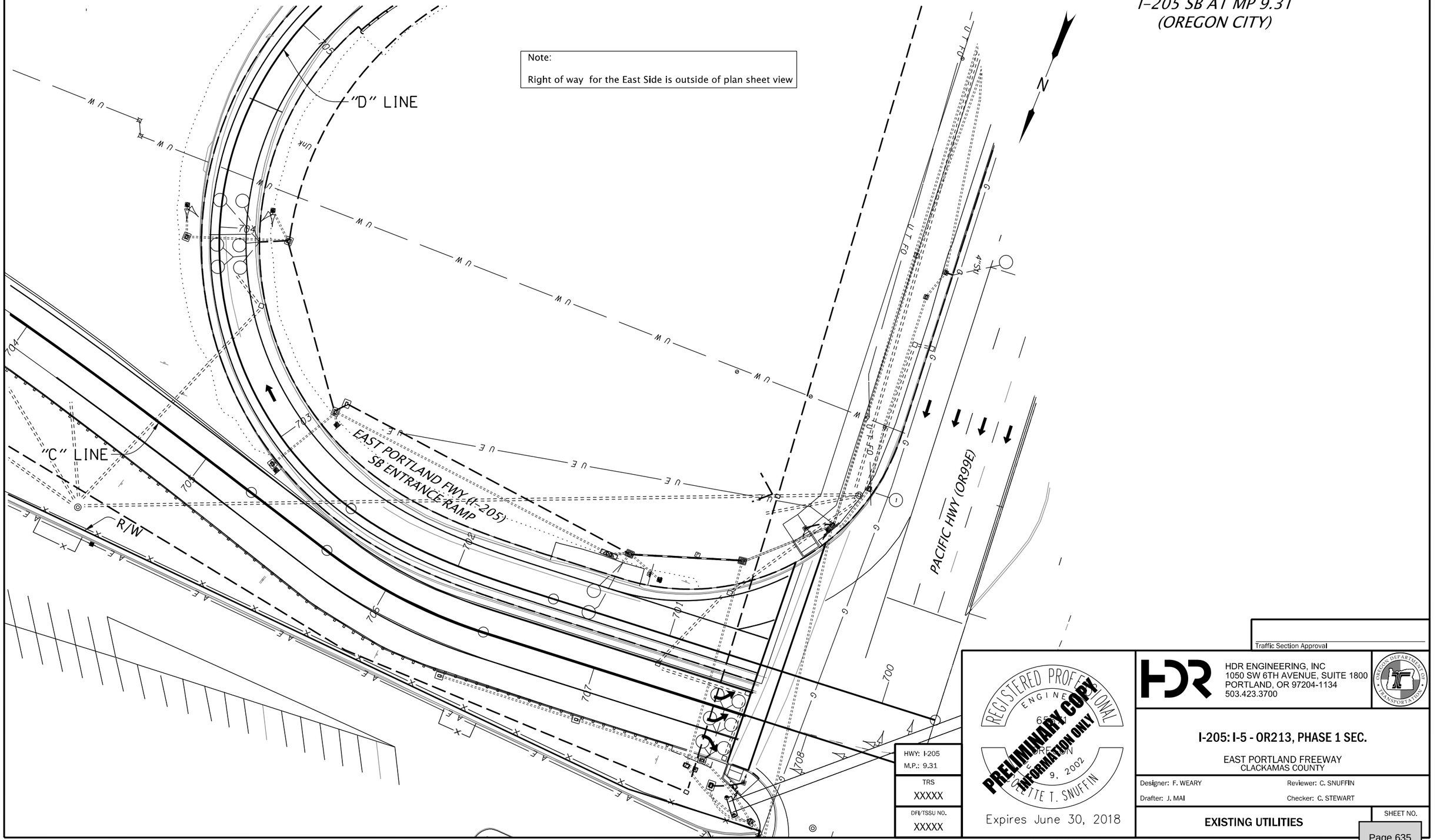
T_K19786_HDR_sgps_03.dgn :: MG04 - Ramp Meter Plan_OR99E SB 2/10/2020 10:01:31 AM CDONOVAN

Rotation: 201.7921° 0'

EXISTING UTILITIES
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 SB AT MP 9.31
(OREGON CITY)

Note:

Right of way for the East Side is outside of plan sheet view



HWY: I-205
M.P.: 9.31

TRS
XXXXX

DFI/TSSU NO.
XXXXX

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REGISTERED PROFESSIONAL ENGINEER
OREGON
9, 2002
ANNETTE T. SNUFFIN
Expires June 30, 2018

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY
Drafter: J. MAI
Reviewer: C. SNUFFIN
Checker: C. STEWART

EXISTING UTILITIES

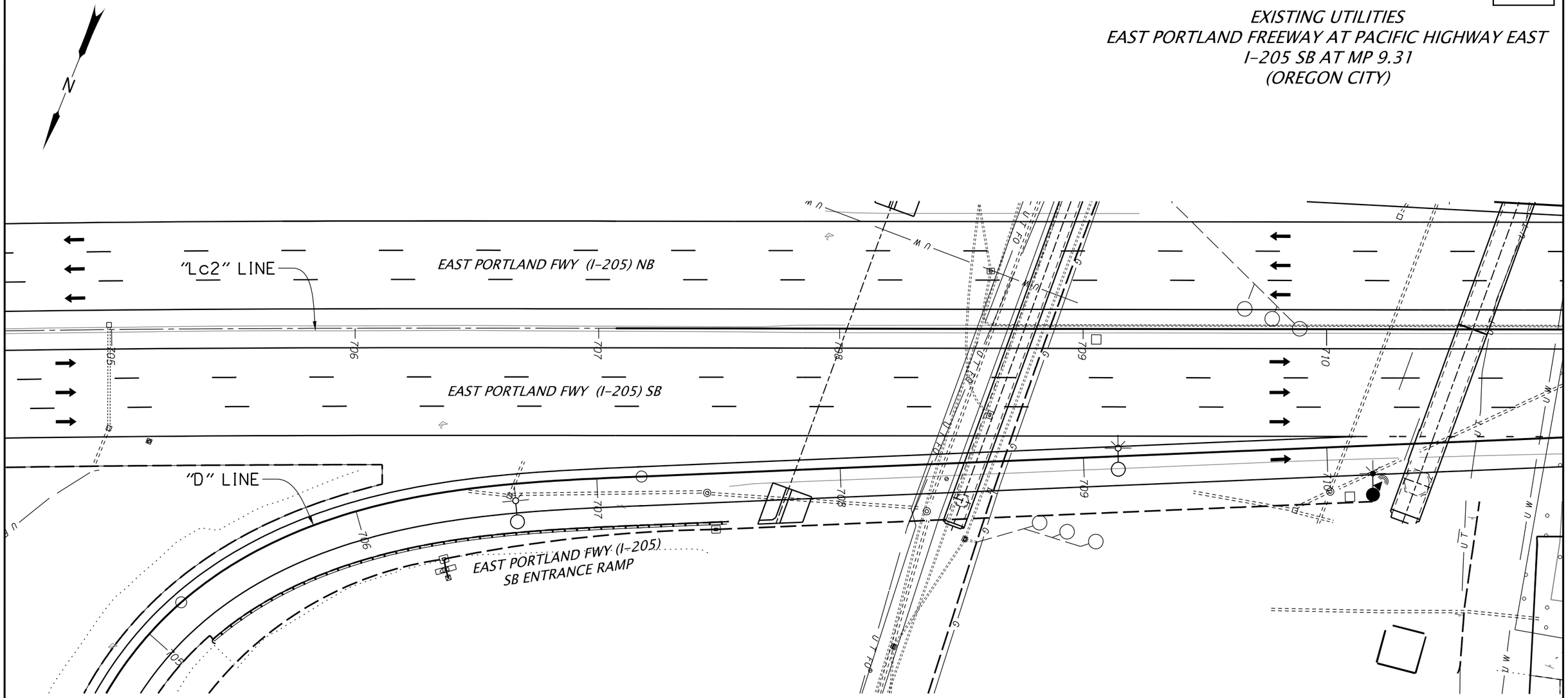
SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MG05 - Utility Plan_OR99E SB 2/10/2020 10:01:32 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 201.7921° 0'

EXISTING UTILITIES
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 SB AT MP 9.31
(OREGON CITY)



Note:

Right of way is outside of plan sheet view

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
DEC. 9, 2002
DELETTE T. SNUFFIN
Expires June 30, 2018

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: I-205	
M.P.: 9.31	
TRS	XXXXX
DFI/TSSU NO.	XXXXX
Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART

EXISTING UTILITIES

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MG06 - Utility Plan_OR99E SB 2/10/2020 10:01:32 AM CDONOVAN

Rotation: 201.7921° [illegible]0'

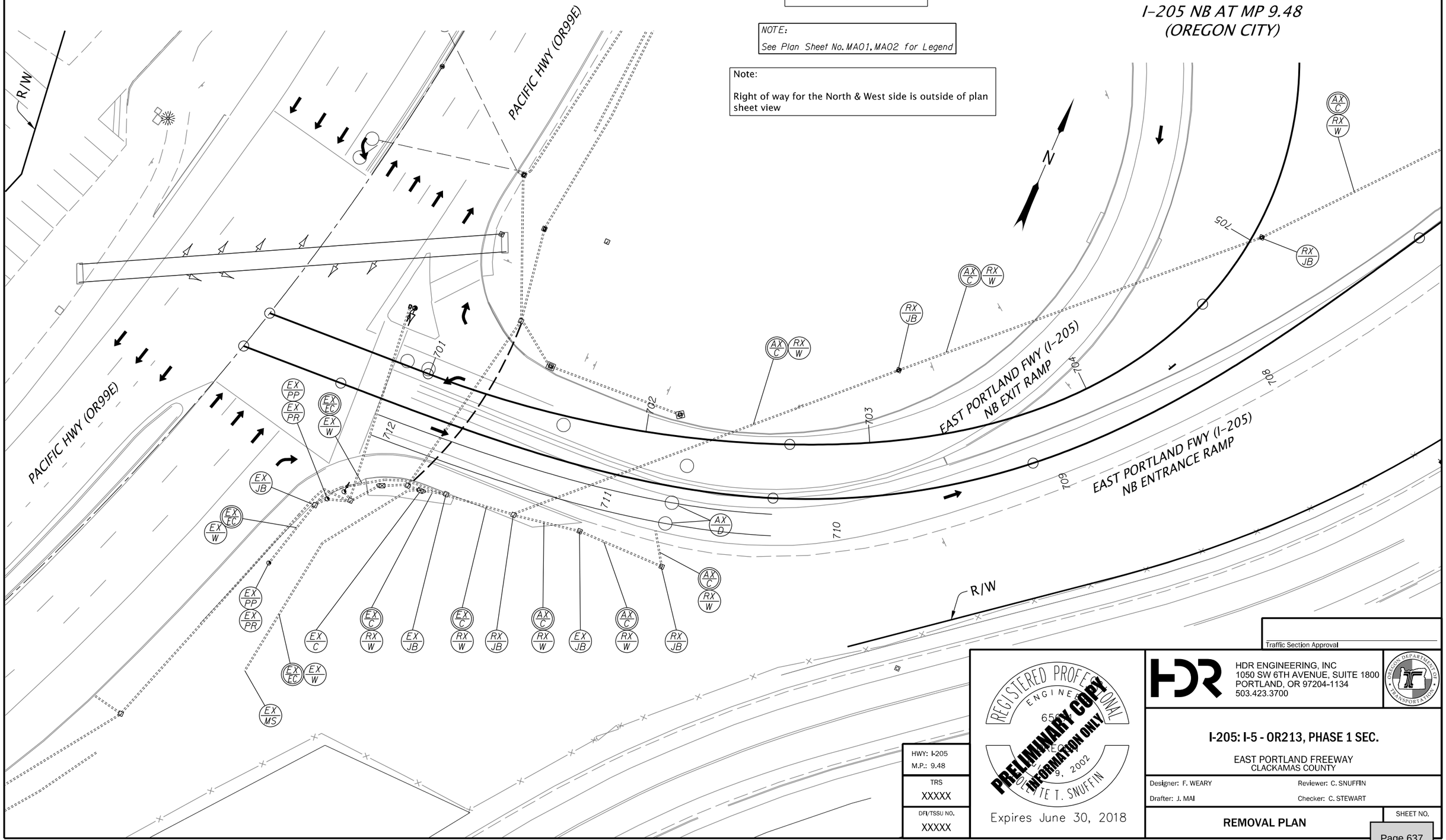
"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:

Right of way for the North & West side is outside of plan sheet view

REMOVAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)



Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
[illegible]
9, 2002
COLLETTE T. SNUFFIN
Expires June 30, 2018

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART

REMOVAL PLAN

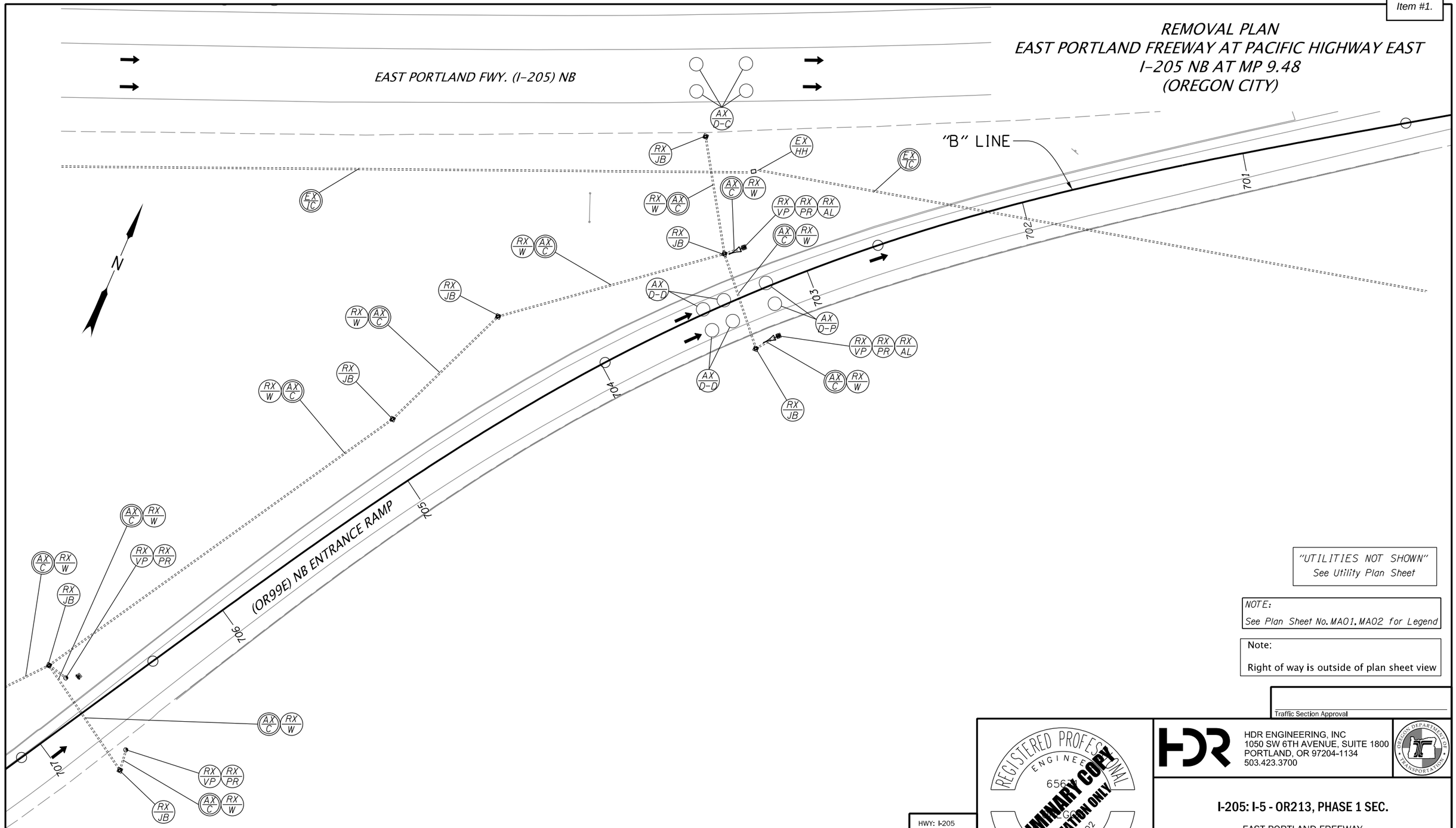
SHEET NO.

HWY: I-205	
M.P.: 9.48	
TRS	XXXXX
DFI/TSSU NO.	XXXXX

T_K19786_HDR_sgps_03.dgn :: MH01 - Removal Plan_OR99E NB 2/10/2020 10:01:34 AM CDONOVAN

Rotation: 23.2102° 0'

REMOVAL PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)



"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:
Right of way is outside of plan sheet view

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
JULY 9, 2002
LEE T. SNUFFIN
Expires June 30, 2018

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: I-205	
M.P.: 9.48	
TRS	XXXXX
DFI/TSSU NO.	XXXXX
Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART

REMOVAL PLAN

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MH02 - Removal Plan_OR99E NB 2/10/2020 10:01:34 AM CDONOVAN

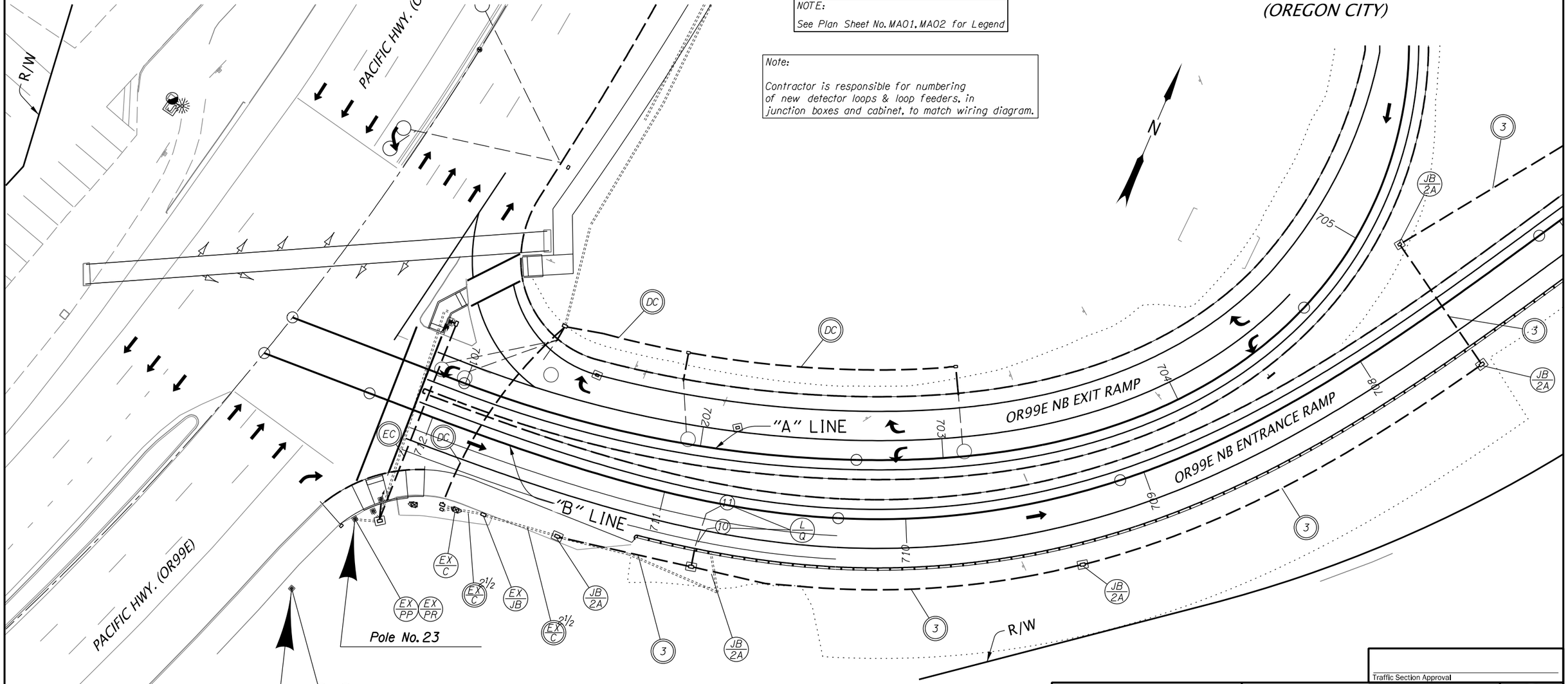
Rotation: 23.2102° 0'

RAMP METER PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:
Contractor is responsible for numbering of new detector loops & loop feeders, in junction boxes and cabinet, to match wiring diagram.



Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
[illegible], 2002
CLAYTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

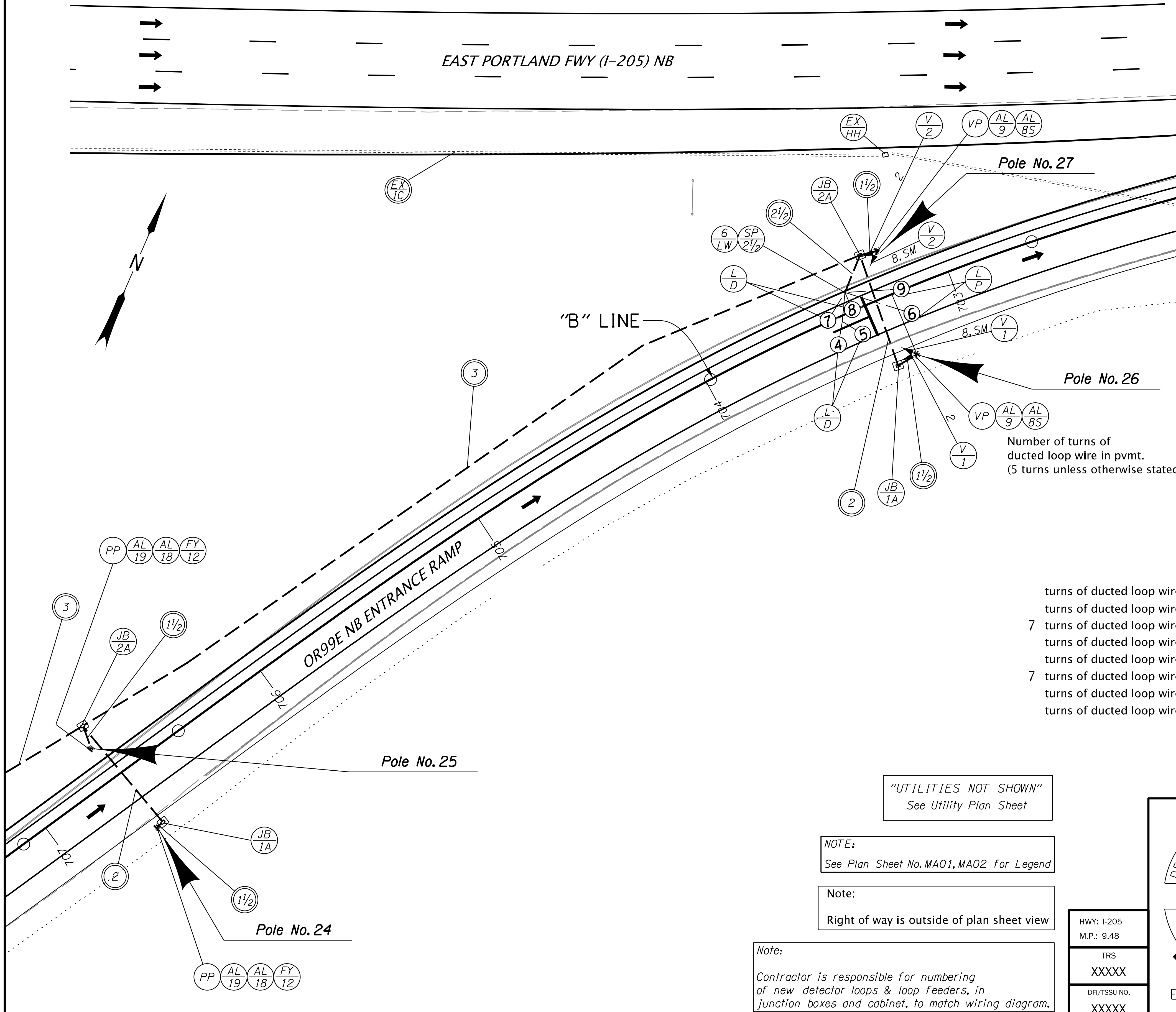
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: I-205	
M.P.: 9.48	
TRS	
XXXXX	
DFI/TSSU NO.	
XXXXX	
Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART
RAMP METER PLAN	SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MH03 - Ramp Meter Plan_OR99E NB 2/10/2020 10:01:35 AM CDONOVAN

Rotation: 23.2102° [illegible]0'

RAMP METER PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)



Controller Cabinet

Number of turns of ducted loop wire in pvmt. (5 turns unless otherwise stated).	Loop Number	Distance Feet From Painted Gore	Distance Feet From Stop Line	Phase	Function	Slot
	1A	NOT USED			C	6L
	1B	NOT USED			C	6U
	2A	NOT USED			C	7L
	2B	NOT USED			C	7U
	3A	NOT USED			C	8U
	3B	NOT USED			C	8L
turns of ducted loop wire	4		15	1	D	4L
turns of ducted loop wire	5		5			
7 turns of ducted loop wire	6		15	1	P	4U
turns of ducted loop wire	7		15	2	D	5L
turns of ducted loop wire	8		5			
7 turns of ducted loop wire	9		15	2	P	5U
turns of ducted loop wire	10		750	1	Q	2U
turns of ducted loop wire	11		750	2	Q	3L

LOOP DETECTOR WIRING DIAGRAM

C=Count, P=Passage, D=Demand, Q=Queue
Center all loops in travel lanes or as shown on plan.

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:
Right of way is outside of plan sheet view

Note:
Contractor is responsible for numbering of new detector loops & loop feeders, in junction boxes and cabinet, to match wiring diagram.

HWY: I-205
M.P.: 9.48

TRS
XXXXX

DFI/TSSU NO.
XXXXX

REGISTERED PROFESSIONAL ENGINEER
65633
OREGON
... 2002
... T. SNUFFIN
PRELIMINARY COPY
INFORMATION ONLY
Expires June 30, 2018

Traffic Section Approval

HDR
HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY
Reviewer: C. SNUFFIN
Drafter: J. MAI
Checker: C. STEWART

SHEET NO.

RAMP METER PLAN

RAMP METER PLAN
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)

N

R/W

CONSTRUCTION NOTE:

1. Radar unit to be mounted on CCTV pole.

MAIN ST.

"Lc2" LINE

"C" LINE

OR99E SB EXIT RAMP

EAST PORTLAND FWY (I-205) SB

EAST PORTLAND FWY (I-205) NB

OR99E NB ENTRANCE RAMP

"B" LINE

699 698 697 696 695 694 693 692 691 690 689

ZON

EX CAM

EX C

EX EC

EX JB

BC 1

RCC T

R-N T

TC 1

"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See Plan Sheet No. MA01, MA02 for Legend

Note:

Right of way for South & SE quadrant is outside of plan sheet view

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
JULY 9, 2002
CLAYTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: I-205	Designer: F. WEARY
M.P.: 9.48	Reviewer: C. SNUFFIN
TRS XXXXX	Drafter: J. MAI
DFI/TSSU NO. XXXXX	Checker: C. STEWART

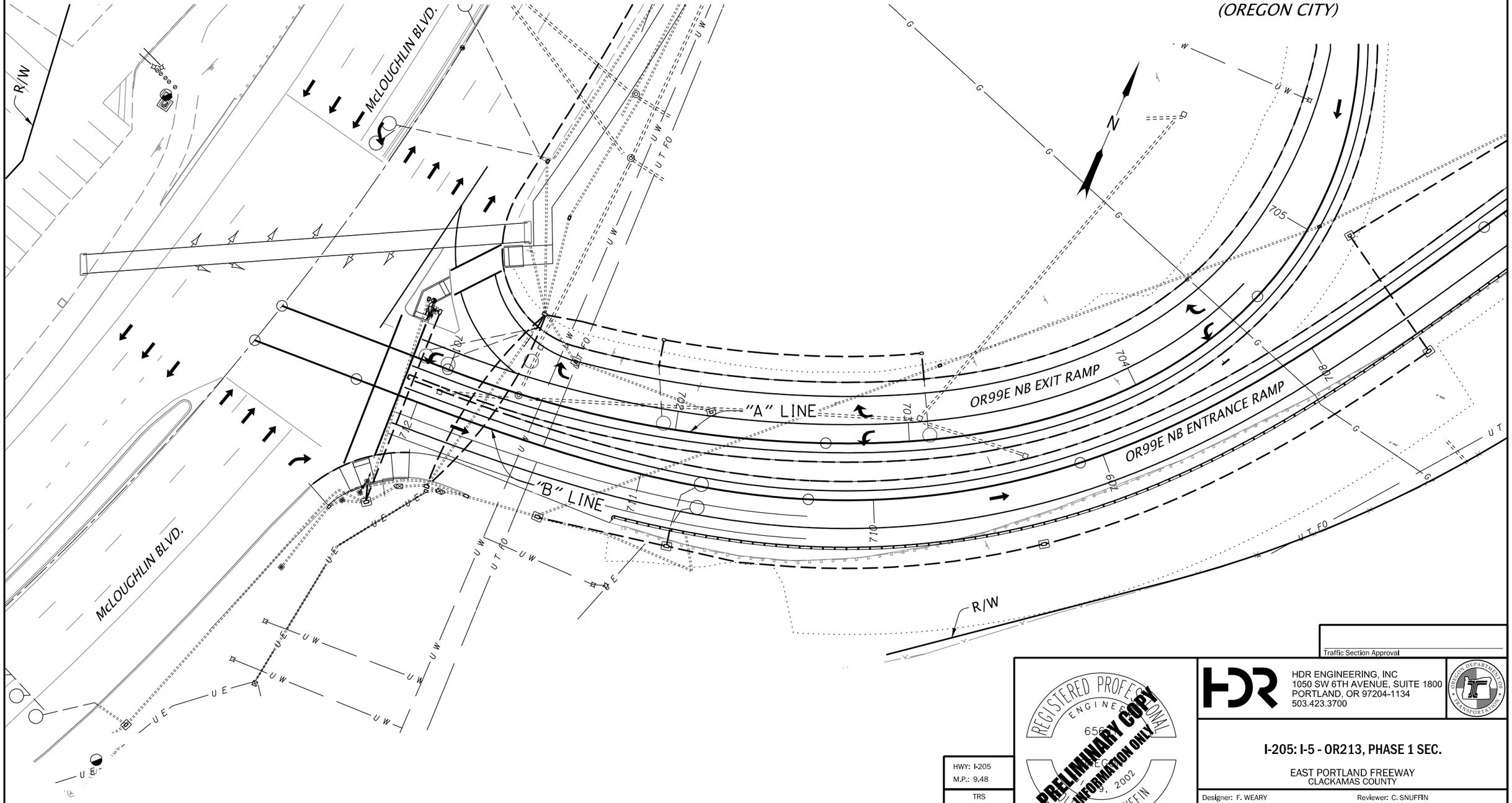
RAMP METER PLAN

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MH05 - Ramp Meter Plan_OR99E NB 2/10/2020 10:01:42 AM CDONOVAN

Rotation: 23.2102° 0'

EXISTING UTILITIES
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)



Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

REGISTERED PROFESSIONAL ENGINEER
6561
OREGON
JULY 9, 2002
JULIETTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

HWY: I-205	
M.P.: 9.48	
TRS	XXXXX
DFI/TSSU NO.	XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART

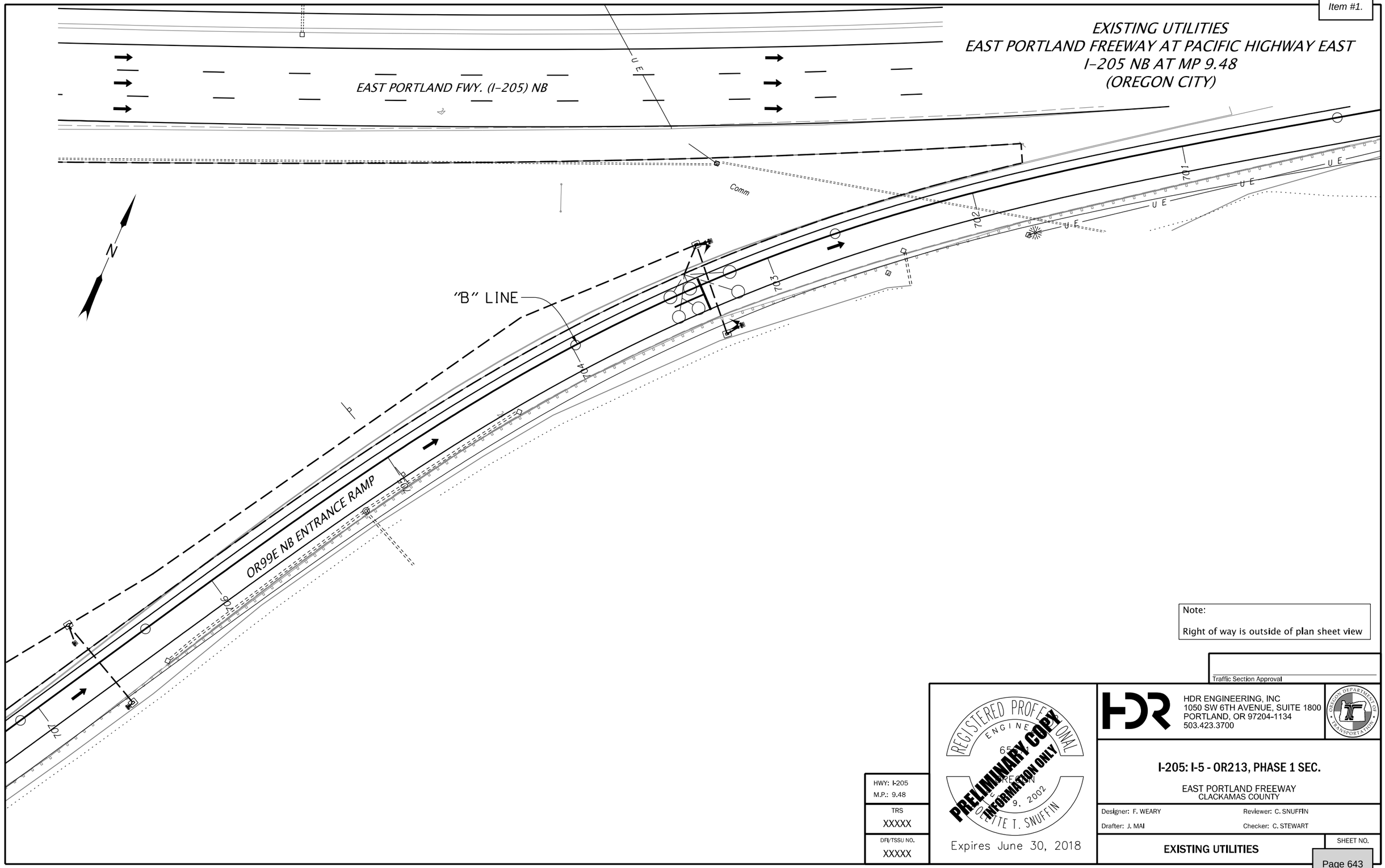
EXISTING UTILITIES

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MH06 - Utility Plan_OR99E NB 2/10/2020 10:01:43 AM CDONOVAN

Rotation: 23.2102° 0'

EXISTING UTILITIES
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)



Note:

Right of way is outside of plan sheet view

Traffic Section Approval

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

REGISTERED PROFESSIONAL ENGINEER
65[illegible]
OREGON
JULY 9, 2002
CLAYTE T. SNUFFIN
Expires June 30, 2018

PRELIMINARY COPY
INFORMATION ONLY

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

HWY: I-205	Designer: F. WEARY
M.P.: 9.48	Reviewer: C. SNUFFIN
TRS XXXXX	Drafter: J. MAI
DFI/TSSU NO. XXXXX	Checker: C. STEWART

EXISTING UTILITIES

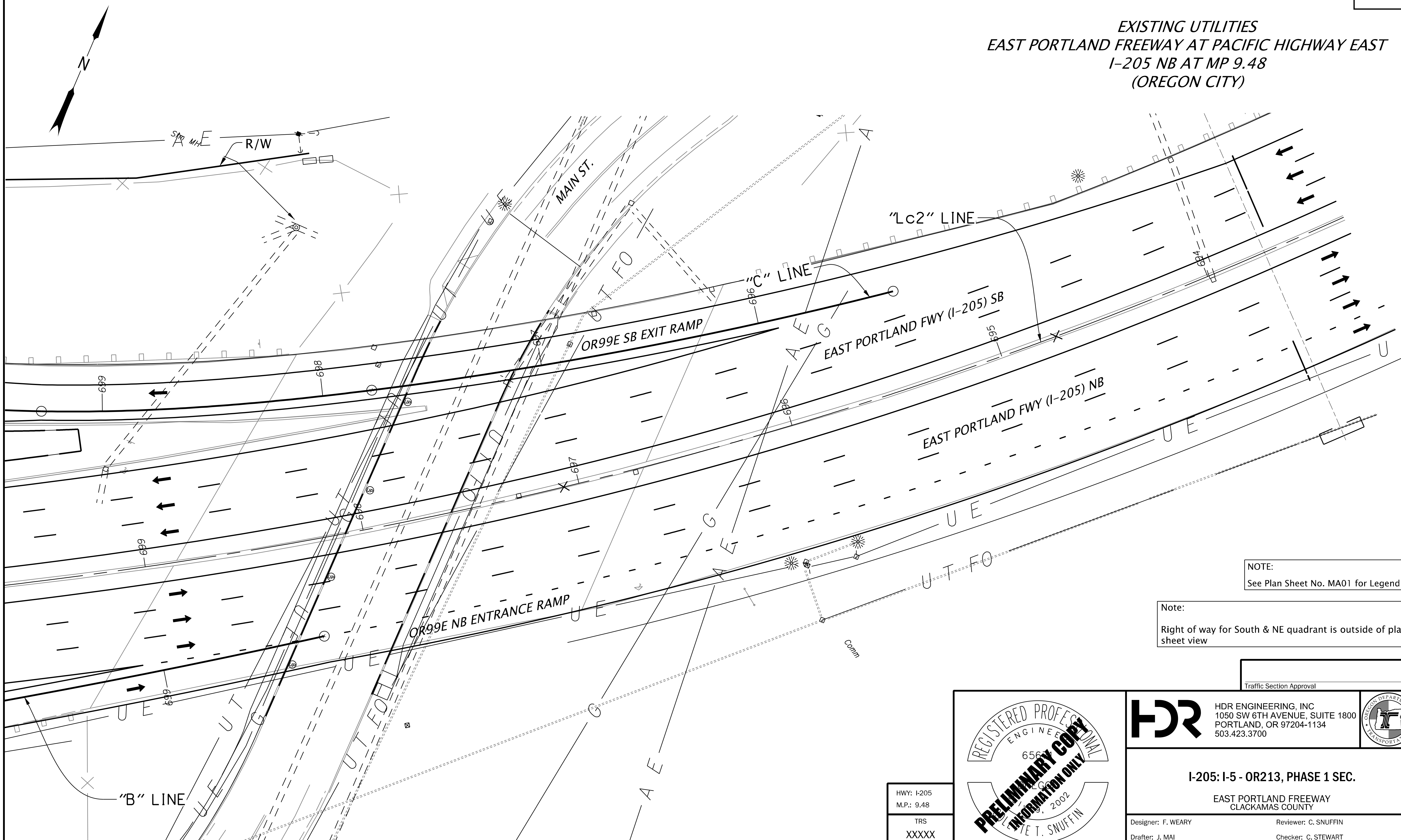
SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MH07 - Utility Plan_OR99E NB 2/10/2020 10:01:44 AM CDONOVAN

Rotation: 23.2102° 0'

Item #1.

EXISTING UTILITIES
EAST PORTLAND FREEWAY AT PACIFIC HIGHWAY EAST
I-205 NB AT MP 9.48
(OREGON CITY)



NOTE:
See Plan Sheet No. MA01 for Legend

Note:
Right of way for South & NE quadrant is outside of plan sheet view

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY COPY INFORMATION ONLY
Expires June 30, 2018

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

HWY: I-205
M.P.: 9.48

TRS
XXXXX

DFI/TSSU NO.
XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY | Reviewer: C. SNUFFIN
Drafter: J. MAI | Checker: C. STEWART

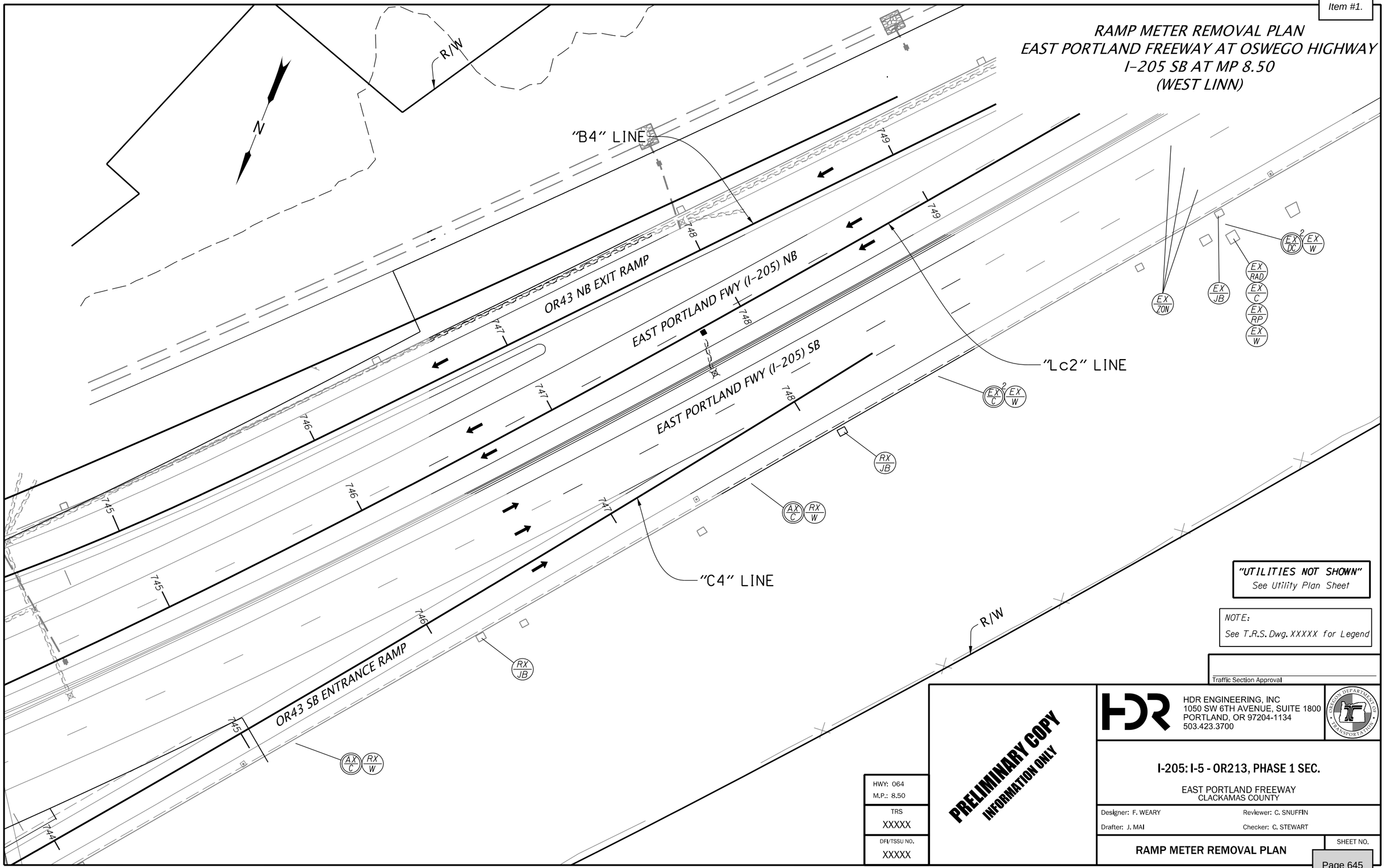
EXISTING UTILITIES

SHEET NO.

T_K19786_HDR_sgps_03.dgn :: MH08 - Utility Plan_OR99E NB 2/10/2020 10:01:45 AM CDONOVAN

Rotation: 23.2102°

RAMP METER REMOVAL PLAN
EAST PORTLAND FREEWAY AT OSWEGO HIGHWAY
I-205 SB AT MP 8.50
(WEST LINN)



"UTILITIES NOT SHOWN"
See Utility Plan Sheet

NOTE:
See T.R.S. Dwg. XXXXX for Legend

Traffic Section Approval

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. WEARY	Reviewer: C. SNUFFIN
Drafter: J. MAI	Checker: C. STEWART

HWY: 064
M.P.: 8.50

TRS
XXXXX

DFI/TSSU NO.
XXXXX

RAMP METER REMOVAL PLAN

SHEET NO.

T_K21401_HDR_sgps_01_09132019.dgn :: MK03 - Removal Plan_OR43 SB 2/10/2020 10:02:00 AM CDONOVAN

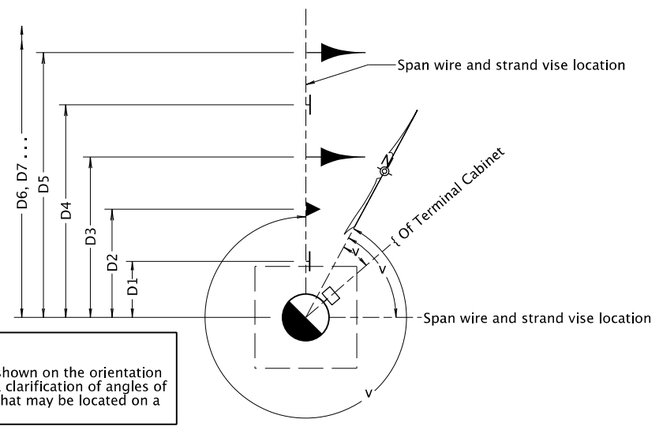
Rotation: 201.7921° 0'

POLE ENTRANCE CHART

		See TM650 thru TM653	EQUIPMENT ON POLE						EQUIPMENT ON SPAN WIRE (Length in Feet and Equipment Type)								FOUNDATION INFORMATION (See Std. Drg. TM653)	
POLE NO.	DWG. NO.	TYPE	PED. SIGNAL DEG.	PUSH BUTTON DEG.	TERM. CABINET DEG.	SIGN DEG.	TRAFFIC SIGNAL DEG.	RADAR DETECTION DEGREE	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	FOUNDATION NUMBER	REQUIRED FOUNDATION DEPTH
1	MB02	PP	180	180					———	———	———	———	———	———	———	———		
2	MB02	PP	0	305					———	———	———	———	———	———	———	———		
3	MC02	VP	180	270			180		———	———	———	———	———	———	———	———		
4	MC02	PP	0	320					———	———	———	———	———	———	———	———		
5	MD02	WPX							67 / V3	80 / V3	160 / P2	———	———	———	———	———		
6	MD02	WPX							———	———	———	———	———	———	———	———		
7	MD03	PP	65	150					———	———	———	———	———	———	———	———		
8	MD03	PP	350	75					———	———	———	———	———	———	———	———		
9	MD03	PP	165	60					———	———	———	———	———	———	———	———		
10	MD03	PP	50	145					———	———	———	———	———	———	———	———		
11	MD03	PP	130	220					———	———	———	———	———	———	———	———		
12	MD03	PP	170	180					———	———	———	———	———	———	———	———		
13	MD03	PP	340	240					———	———	———	———	———	———	———	———		
14	MD03	PP	115	330					———	———	———	———	———	———	———	———		
15	MF01	PP	40&220	220					———	———	———	———	———	———	———	———		
16	MF01	PP	35&215						———	———	———	———	———	———	———	———		
17	MG03	PP (EX)				265	265		———	———	———	———	———	———	———	———		
18	MG03	PP (EX)				297	297		———	———	———	———	———	———	———	———		
19	MG03	PP (EX)				297	297		———	———	———	———	———	———	———	———		
20	MG03	VP (EX)				341	341		———	———	———	———	———	———	———	———		

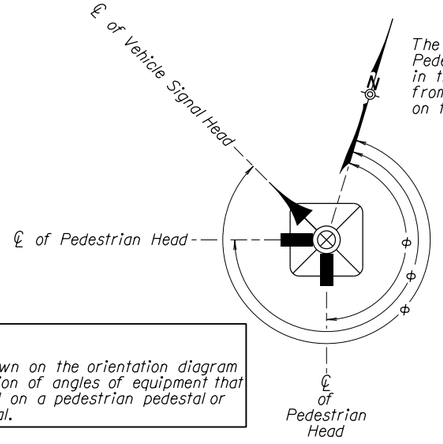
SIGNAL DETAILS
EAST PORTLAND FREEWAY
I-205 M.P. VARIES
(OREGON CITY)

MISC. ITEMS
EX = Existing
VP = Vehicle signal pedestal (See Std. Dwg. TM457)
PP = Pedestrian signal pedestal (See Std. Dwg. TM457)
WPX = Temporary Wood Pole



NOTE:
Equipment shown on the orientation diagram is a clarification of angles of equipment that may be located on a Strain Pole

STRAIN POLE ORIENTATION DIAGRAM



The north arrow shown relates to zero degrees on Pedestrian and Vehicle signal poles. Degrees shown in the pole entrance chart show the degrees clockwise from plan sheet north arrow (zero) to equipment located on the pole.

Equipment shown on the orientation diagram is a clarification of angles of equipment that may be located on a pedestrian pedestal or vehicle pedestal.

PEDESTRIAN PEDESTAL / VEHICLE PEDESTAL ORIENTATION DIAGRAM

HWY: VARIES
M.P.: VARIES
COUNTY: XXXXX
DATE: XXXXX

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OREGON
JULY 9, 2002
JULIETTE T. SNUFFIN
Expires June 30, 2018
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary | Reviewer: C. Snuffin
Drafter: J. Mai | Checker: C. Stewart

SIGNALS - DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

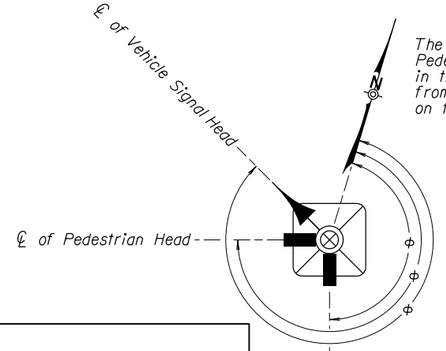
T_K19786_HDR_sgps_04.dgn :: MN01-02 Pole Entrance Chart 2/10/2020 10:02:29 AM CDONOVAN
Rotation: 0° 0'

POLE ENTRANCE CHART

		See TM650 thru TM653	EQUIPMENT ON POLE					
POLE NO.	DWG. NO.	TYPE	PED. SIGNAL DEG.	PUSH BUTTON DEG.	TERM. CABINET DEG.	SIGN DEG.	TRAFFIC SIGNAL DEG.	RADAR DETECTION DEGREE
21	MG03	VP (EX)				341	341	
22	MH03	PP				198		
23	MH03	PP				344		
24	MH04	PP				207		
25	MH04	PP				207		
26	MH04	VP				227	227	
27	MH04	VP				227	227	
28	MJ03	RP			58			327

SIGNAL DETAILS
EAST PORTLAND FREEWAY
I-205 M.P. VARIES
(OREGON CITY)

MISC. ITEMS
VP = Vehicle signal pedestal (See Std. Dwg. TM457)
PP = Pedestrian signal pedestal (See Std. Dwg. TM457)



The north arrow shown relates to zero degrees on Pedestrian and Vehicle signal poles. Degrees shown in the pole entrance chart show the degrees clockwise from plan sheet north arrow (zero) to equipment located on the pole.

NOTE:

Equipment shown on the orientation diagram is a clarification of angles of equipment that may be located on a pedestrian pedestal or vehicle pedestal.

PEDESTRIAN PEDESTAL / VEHICLE PEDESTAL ORIENTATION DIAGRAM

HWY: VARIES
M.P.: VARIES
COUNTY: XXXXX
DATE: XXXXX

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65
OREGON
JULY 9, 2002
COLETTE T. SNUFFIN
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

SIGNALS - DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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T_K19786_HDR_sgps_04.dgn :: MN01-02 Pole Entrance Chart 2/10/2020 10:02:30 AM CDONOVAN

Rotation: 0° 0'

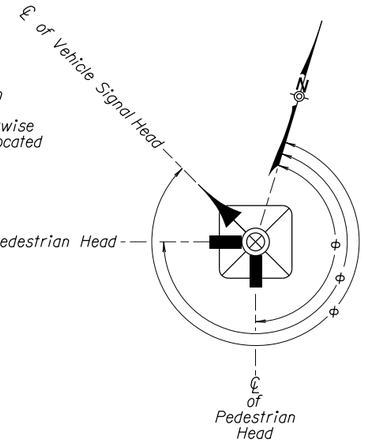
POLE ENTRANCE CHART

		See TM650 thru TM653	EQUIPMENT ON POLE						EQUIPMENT ON MAST ARM (Length in Feet and Equipment Type)										FOUNDATION INFORMATION (See Std. Drg. TM653)	
POLE NO.	DWG. NO.	TYPE	PED. SIGNAL DEG.	PUSH BUTTON DEG.	TERM. CABINET DEG.	SIGN DEG.	TRAFFIC SIGNAL DEG.	RADAR DETECTION DEGREE	ARM LENGTH	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	FOUNDATION NUMBER	REQUIRED FOUNDATION DEPTH
1	MK04	WPX				54														
2	MK04	WPX				54														
3	MK04	WPX				51														
4	MK04	WPX				51														
5	MK05	WPX				40														
6	MK05	WPX				38														
7	MK06	WPX			180			128												
8	MK07	VP				53														
9	MK07	VP				53														
10	MK07	VP				57														
11	MK07	VP				57														
12	MK08	VP				41	41													
13	MK08	VP				39	39													
14	MK09	RP(EX)																		
15	ML01	VP(EX)																		
16	ML01	VP				102	102													
17	ML01	VP				85														
18	ML01	VP				105														
19	ML01	VP(EX)																		
20	ML01	VP(EX)																		

MISC. ITEMS
WPX = TEMPORARY WOOD POLE
EX = EXISTING
VP = VEHICLE PEDESTIAL
PP = PEDESTRIAN PEDESTAL
RP = RADAR POLE

POLE ENTRANCE CHART
EAST PORTLAND FREEWAY
I-205 M.P. 6.60 - 8.83
(OREGON CITY)

The north arrow shown relates to zero degrees on Pedestrian and Vehicle signal poles. Degrees shown in the pole entrance chart show the degrees clockwise from plan sheet north arrow (zero) to equipment located on the pole.



NOTE:
Equipment shown on the orientation diagram is a clarification of angles of equipment that may be located on a pedestrian pedestal or vehicle pedestal.

PEDESTRIAN PEDESTAL / VEHICLE PEDESTAL
ORIENTATION DIAGRAM

NOTE:
See T.R.S. Dwg. MA01 for Legend

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COUNTY: XXXXX
DATE: XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary | Reviewer: C. Snuffin
Drafter: J. Mai | Checker: C. Stewart

POLE ENTRANCE CHART

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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T_K19786_HDR_sgps_04.dgn :: MN03 - Pole Entrance Chart 2/10/2020 10:02:30 AM CDONOVAN
Rotation: 0° 0'

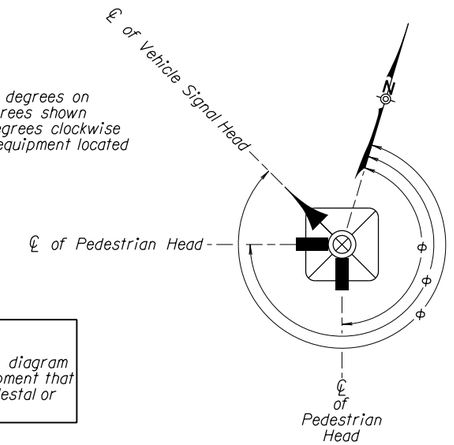
POLE ENTRANCE CHART

		See TM650 thru TM653	EQUIPMENT ON POLE						EQUIPMENT ON MAST ARM (Length in Feet and Equipment Type)										FOUNDATION INFORMATION (See Std. Drg. TM653)	
POLE NO.	DWG. NO.	TYPE	PED. SIGNAL DEG.	PUSH BUTTON DEG.	TERM. CABINET DEG.	SIGN DEG.	TRAFFIC SIGNAL DEG.	RADAR DETECTION DEGREE	ARM LENGTH	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	FOUNDATION NUMBER	REQUIRED FOUNDATION DEPTH
21	ML02	RP(EX)																		
22	MM01	PP(EX)																		
23		PP(EX)																		
24	MM02	PP				259														
25		PP				236														
26	MM03	VP				243	243													
27		VP				244	244													
28	MM04	RP(EX)																		

MISC. ITEMS
EX = EXISTING
VP = VEHICLE PEDESTIAL
PP = PEDESTRIAN PEDESTAL
RP = RADAR POLE

POLE ENTRANCE CHART
EAST PORTLAND FREEWAY
I-205 M.P. 6.60 - 8.83
(OREGON CITY)

The north arrow shown relates to zero degrees on Pedestrian and Vehicle signal poles. Degrees shown in the pole entrance chart show the degrees clockwise from plan sheet north arrow (zero) to equipment located on the pole.



NOTE:
Equipment shown on the orientation diagram is a clarification of angles of equipment that may be located on a pedestrian pedestal or vehicle pedestal.

PEDESTRIAN PEDESTAL / VEHICLE PEDESTAL
ORIENTATION DIAGRAM

NOTE:
See T.R.S. Dwg. MA01 for Legend

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503.423.3700

HWY: 064
M.P.: VARIES
COUNTY: XXXXX
DATE: XXXXX

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: F. Weary
Drafter: J. Mai
Reviewer: C. Snuffin
Checker: C. Stewart

POLE ENTRANCE CHART

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

T_K19786_HDR_sgps_04.dgn :: MN04 - Pole Entrance Chart 2/10/2020 10:02:31 AM CDONOVAN

Rotation: 0° 0'

TEMPORARY ILLUMINATION LEGEND

LEGEND FOR TEMPORARY ILLUMINATION PLAN

T-"N" — Install Class 4 wood pole for temporary illumination with 15 ft. metal bracket arm, roadway luminaire and 400 watt HPS lamp. Provide 40 foot mounting height with M-S-III type luminaire ("N"=pole number).

M-"N" — Install metal pole for temporary illumination with mounting tenon, roadway luminaire and 400 watt HPS lamp. Provide 40 foot mounting height with M-S-III type luminaire ("N"=pole number).

BMP — Install metal light pole on temporary concrete barrier bracket mount. See Sheet No. PBXX for details

Rel — Relocate temporary wood pole with metal bracket arm & luminaire from previous location as shown in plans and notes.

WP — Install class 4 wood pole for aerial electrical distribution or service drop.

EX — Retain and protect existing/temporary illumination.

P / X — Install wood pole "X" feet from edge of pavement or construction area.

BB / X — Install wood pole "X" feet behind concrete barrier or guardrail.

T-#N — Install triplex aluminum service cable with ACSR messenger. ("N" = wire size)

Q-#N — Install quadruplex copper service cable with ACSR messenger. ("N" = wire size)

Install down guy wire/anchors as required.

S — Install (S) inch rigid non-metallic electrical conduit

N / S — Install electrical copper conductors / cables. ("N" =number of conductors, "S" = size of conductors).

G — Install one No. 10 copper ground wire

PS — Power Source, 120/240 volt single phase. Field verify and coordinate with utility company.

C / 90 — Install galv. steel cabinet. (Show details from Dwg. DET4350)

WH — Install two 1¼ inch Service Weatherheads, for service drop & power distribution, on galvanized steel conduit. Provide drip loops in wires.

MS — Install 120/240 volt single phase meter service. Coordinate with utility company.

PE — Install 120/240 volt photoelectronic control on top of wood pole

CJ — Splice new electrical conduit to existing electrical conduit

TEMPORARY ILLUMINATION INSTALLATION

SCOPE:

The work to be done under this contract shall consist of providing all labor, material, and equipment for the temporary roadway Illumination as shown on the plans set forth in these Specifications

GENERAL:

Miscellaneous and incidental materials required for the complete installation not mentioned in the plans or in the specifications shall be furnished and placed by the contractor. Such materials shall be of good quality and be suitable for the use intended. See "Section 00960 - Common Provisions for Electrical Systems" and "Section 00970 - Highway Illumination" of the Standard Specifications for methods and materials not shown or noted. The materials and workmanship shall conform to the current requirements of the National Electrical Code (NEC) and National Electrical Safety Code (NESC).

WOOD POLES:

Wood poles shall be per "subsection 2120 - Poles and Pilling" and placed as shown in the plans. Pole length shall be sufficient to provide specified (on the temp. illumination plans) mounting ht. above pavement and the basic clearance for conductors indicated below.

Preservative treatment for the wood poles is not required for one year or less construction period. When preservative treatment is required for wood poles, it shall be per "subsection 2190 - Preservative Treatment of Timber".

LUMINAIRE ARMS:

Arms on wood poles shall be constructed of 2 inch Schedule 40 steel pipe with tie rods. Arms shall be hot dip galvanized after fabrication and nominal length of arms shall be 16 feet unless otherwise noted. Submit detailed shop drawings for metal arm fabrication for approval.

CONVENTIONAL ROADWAY LUMINAIRES:

Mounting heights of luminaires shall be within the specified length plus or minus 1 foot and shall be installed in accordance with the applicable portions of Subsection 00970.44.

The luminaires shall conform to Subsection 02926.53(a) of the Standard Specifications.

See Subsection 02926.53(b) for classification of luminaire light distribution.

PERFORMANCE OF M-S-3 ROADWAY LUMINAIRES:

When equipped with a 400 watt HPS (50,000 lumen lamp) at mounting height of 40 feet, each luminaire (Medium-SemiCutoff-type 3) shall provide the following performance:

A minimum of 41% of lamp lumens shall be projected downward on the street side of the luminaire and a maximum of 30% of the the lamp lumens shall be projected downward on the house side of the luminaire. Total lamp efficiency shall be a minimum of 73%. The maximun candelas shall not exceed 15000 in any direction.

M-S-3 Luminaire with 40 feet Mounting Height shall provide minimum illuminance on the pavement as follows:

POINT	LONGITUDINAL DISTANCE	TRANSVERSE DISTANCE	MINIMUM ILLUMINANCE (in FC)
A	0.0 MH	1.5 MH	0.59
B	2.0 MH	0.0 MH	0.67
C	2.0 MH	1.5 MH	0.31
D	3.0 MH	0.0 MH	0.23
E	3.0 MH	1.5 MH	0.18

The maximum No. of temporary illumination wood poles is 11 and the No. of temporary metal illumination poles is 18. Temporary metal illumination poles may be moved up two times each.

HPS LAMPS:

High Pressure Sodium lamps shall be in new condition.

BALLAST:

Luminaires shall employ integral ballast operating on specified power supply voltage. (Designer should specify a voltage of designed temporary illumination system in this plan.) Ballast shall be a regulator type designed to operate specified wattage high pressure sodium lamp, with a minimum power factor of 90%. Ballast shall provide reliable lamp starting down to a temperature of -29°C.

CABLE AND WIRE:

All overhead wire shall be triplex aluminum or quadruplex copper as indicated service cable covered with polyethylene (ACSR messenger). Wire from the aerial cable to the luminaire ballasts shall be 2-#10 copper (THWN) conductors. Form a drip loop in conductors to the aerial cable. All conductors shall conform to the applicable portions of subsection 02920.20 and 02920.23.

EQUIPMENT BOND:

All exposed conduit on wood poles shall be effectively grounded in accordance with subsection 00960.50.

CONDUCTOR CLEARANCE:

Branch circuit conductors shall provide a minimum of 15 feet clearance above the ground and a minimum of 18 feet clearance above any pavement. The mininimum clearance of crossing primary wires, carried on different supports, shall conform to the requirements of the National Electrical Safety Code, C2. When more than one set of wires are installed between two poles, each set of wires shall have 2 feet minimum clearance from other sets.

MAINTAINING TEMPORARY ILLUMINATION:

The Agency will continue operation and maintenance, including the furnishing of electrical energy, of the existing illumination facilities.

The contractor will maintain temporary illumination installed.

The contractor shall obtain Engineer's approval when existing illumination or temporary illumination is taken down or diconnected for relocation and/or costruction. Contractor shall cover all gore area and lane merging area in highway, if it is under traffic, within project limits with adequate illumination using temporary illumination and/or permanent illumination system constructed prior to the project completion.

ELECTRICAL SERVICE:

The contractor shall furnish all labor and materials to provide electrical service to the temporary illumination. Service locations will be determined in the field by the Project Manager. Electrical energy costs and service installation costs charged by utility company will be paid for by the Agency.

LIGHTING LEVELS AND VOLTAGE DROP CALCULATION

Lighting levels of temporary illumination shall be per ODOT Standard as shown on ODOT Traffic Lighting Design Manual.

Voltage Drop Calculation shall be per ODOT Standard and NEC.

Submit lighting levels summary and typical total voltage drop calculation for review.

ACCOMPANIED BY DWGS.: See IL. Dwgs. PA02 thru PA06

HWY: 064
M.P.: X.XX
TRS 00001
DFI/TSSU NO. N/A

REGISTERED PROFESSIONAL ENGINEER 53,041 OREGON JANUARY 15, 2002 DENA M. BECKWITH
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503.719.7997

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

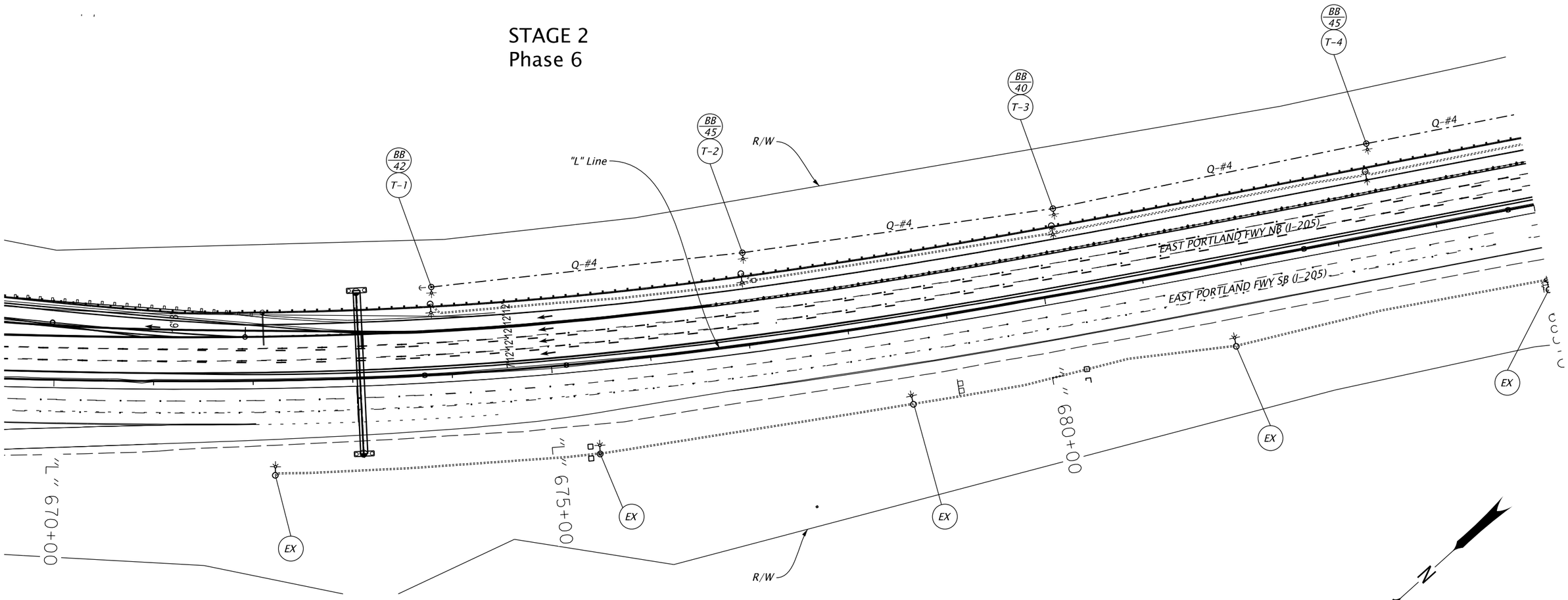
Designer: A. Roeszler | Review: M. Leal
Drafter: GTEng CAD | Checker: D. Beckwith

ILLUMINATION LEGEND | SHEET NO.

TL_K19786_GTE_ilpl_01.dgn :: PA01 Temp Lighting Legend 9/26/2019 1:09:28 PM Rick Rotation: 0°

TEMPORARY ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 669+50 TO STA. "L" 685+00

STAGE 2
Phase 6



NOTE:

See Sheet No. PA01 for Legend

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I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

HWY: 064	Designer: A. Roeszler
M.P.: X.XX	Drafter: GTEng CAD
TRS 00002	Review: M. Leal
DFI/TSSU NO. N/A	Checker: D. Beckwith

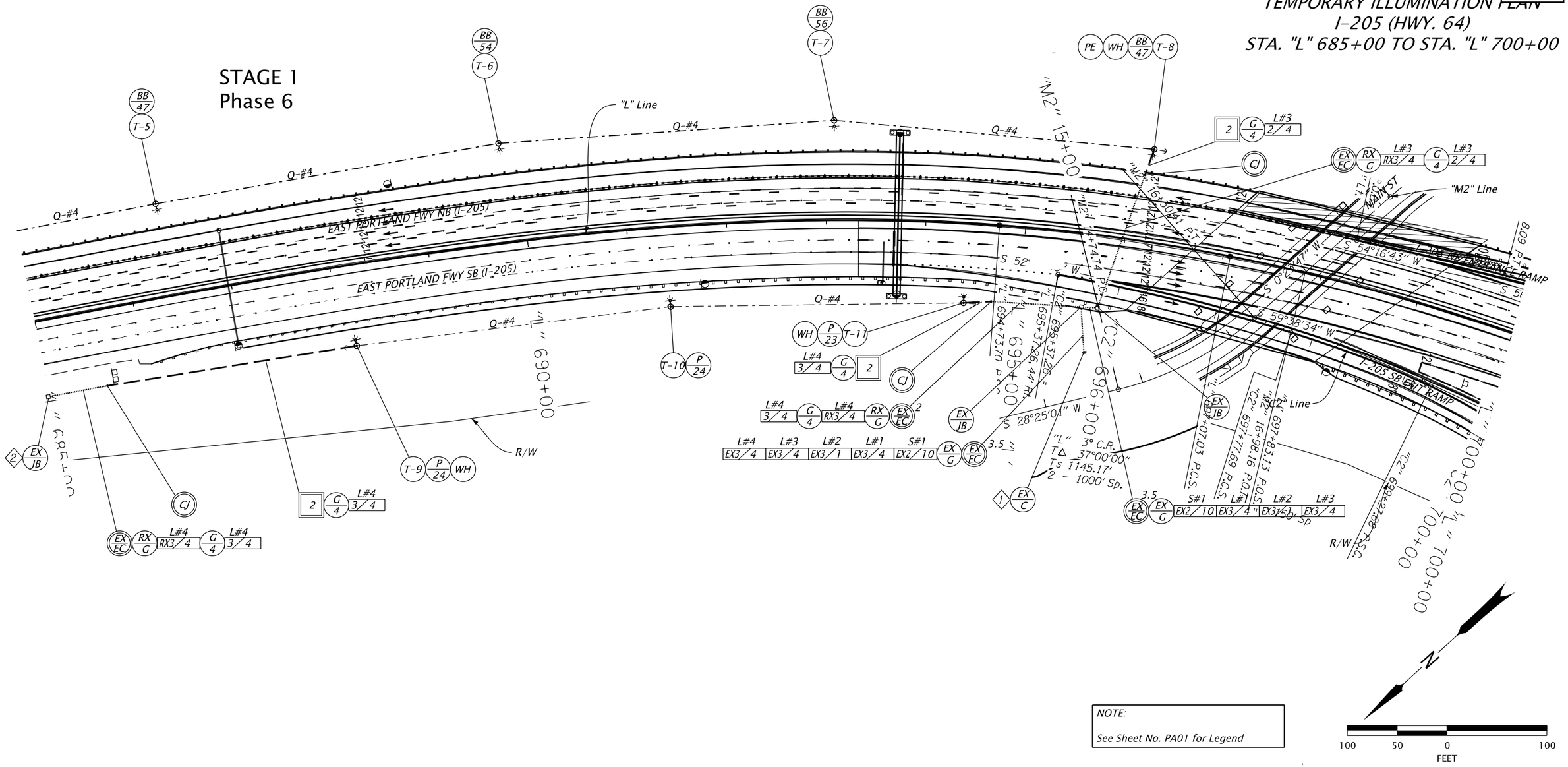
TEMPORARY ILLUMINATION PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PA02 9/26/2019 1:09:33 PM Rick

TEMPORARY ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 685+00 TO STA. "L" 700+00

STAGE 1
Phase 6



NOTE:

See Sheet No. PA01 for Legend

CONSTRUCTION NOTES:

1. *See Illumination Plans for service cabinet replacement.*
2. *Splice new conductors to existing coductors in existing junction box.*

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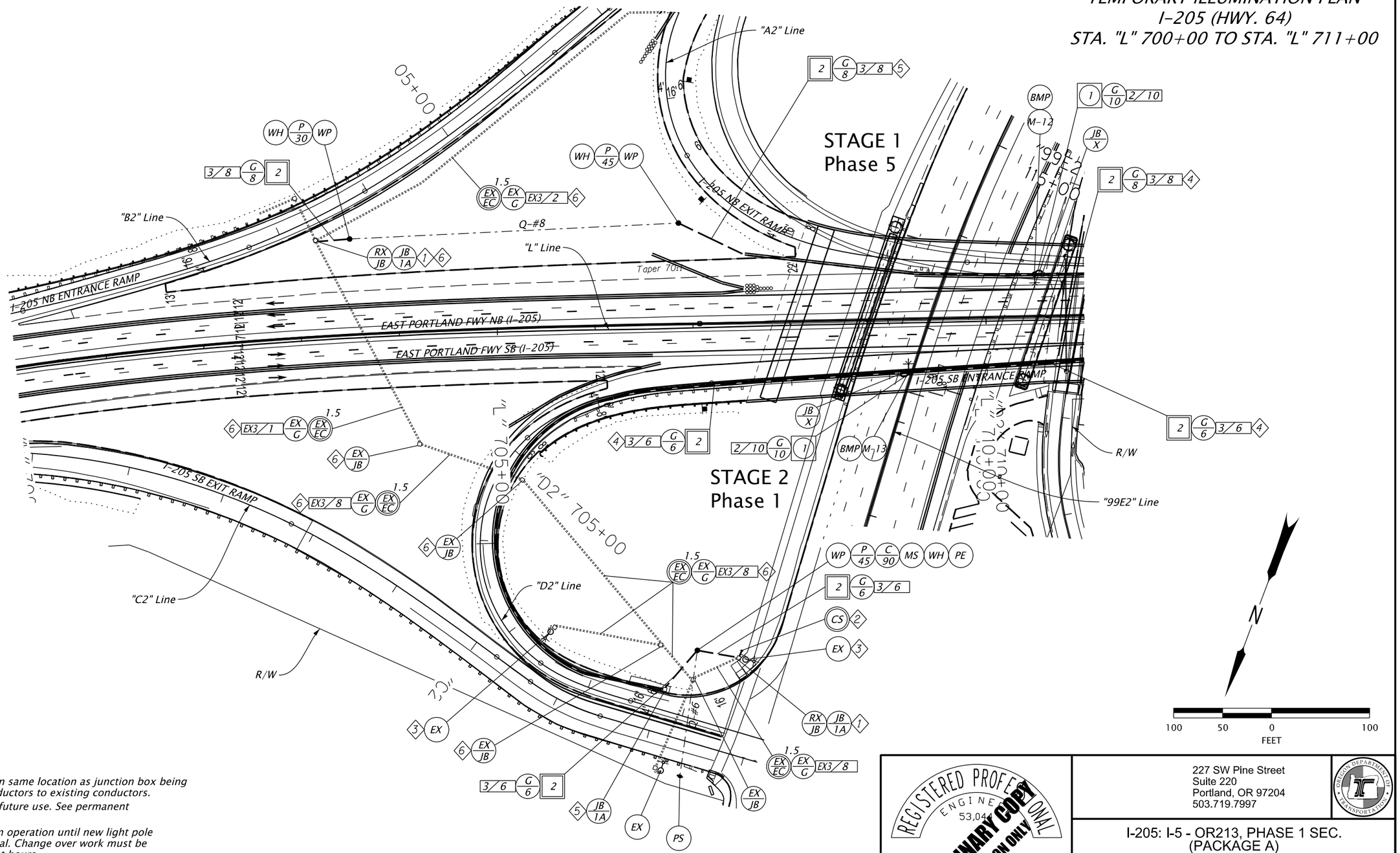
I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

HWY: 064	
M.P.: X.XX	
TRS	
00002	
DFI/TSSU NO.	
N/A	
Designer: A. Roeszler	Review: M. Leal
Drafter: GTEng CAD	Checker: D. Beckwith

TEMPORARY ILLUMINATION PLAN

SHEET NO.

TEMPORARY ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 700+00 TO STA. "L" 711+00



CONSTRUCTION NOTES:

1. *Install new junction box in same location as junction box being removed. Splice new conductors to existing conductors.*
2. *Cap conduit stub out for future use. See permanent Illumination Plans.*
3. *Keep existing light pole in operation until new light pole is installed and operational. Change over work must be completed during daylight hours.*
4. *Mount PVC conduit to top of concrete barrier. Install pull boxes every 300 feet.*
5. *Transition conduit to temporary concrete barrier.*
6. *See Illumination Plans for removal.*

NOTE:

See Sheet No. PA01 for Legend

HWY: 064	
M.P.: X.XX	
TRS	00002
DFI/TSSU NO.	N/A

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JULY 15, 2002
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OREGON DEPARTMENT OF TRANSPORTATION

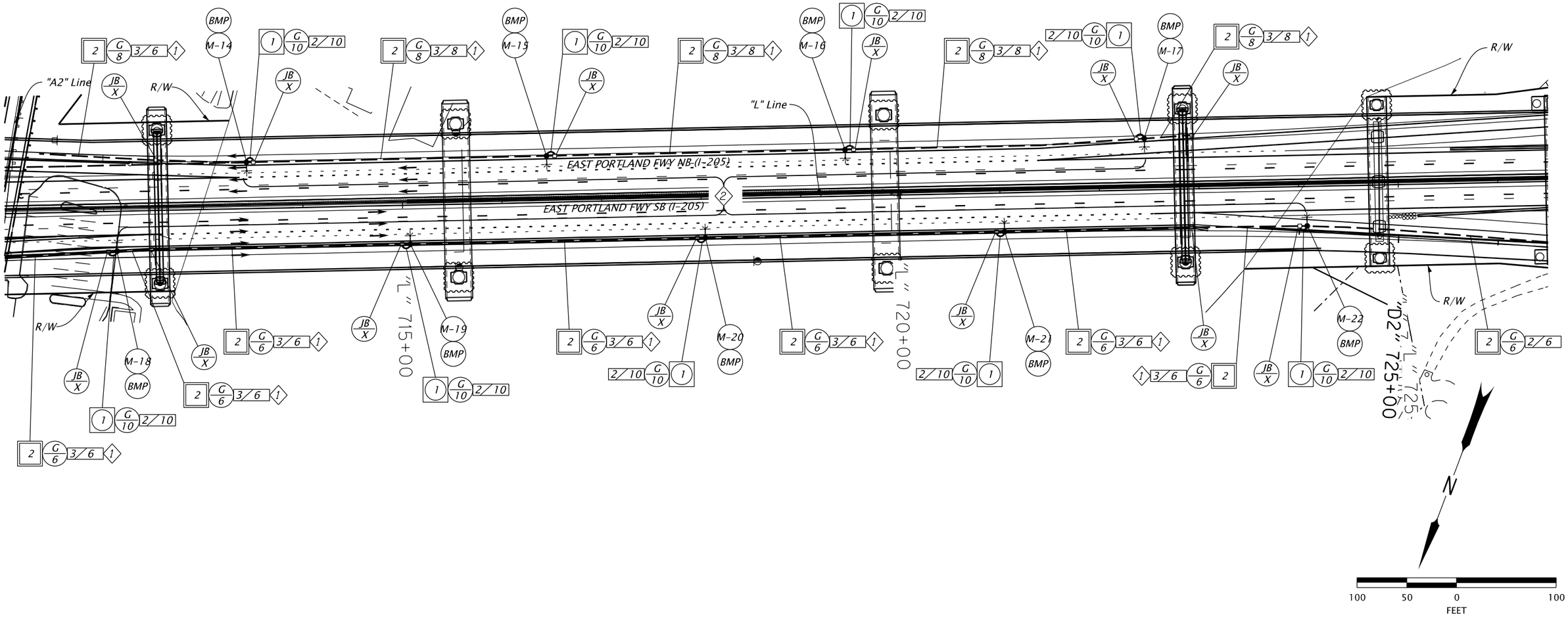
I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: A. Roeszler | Review: M. Leal
Drafter: GTEng CAD | Checker: D. Beckwith

TEMPORARY ILLUMINATION PLAN | SHEET NO.

TEMPORARY ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 711+00 TO STA. "L" 726+50

STAGE 3
Phase 1



CONSTRUCTION NOTES:

1. *Mount PVC conduit to top of concrete barrier.*
2. *Temporary light poles M-14 to M-17 and poles M-19 to M-21 may be fed from the temporary service cabinet to the east on OR99E or the temporary service cabinet to the west on OR43.*

NOTE:

See Sheet No. PA01 for Legend

HWY: 064	
M.P.: X.XX	
TRS	00002
DFI/TSSU NO.	N/A

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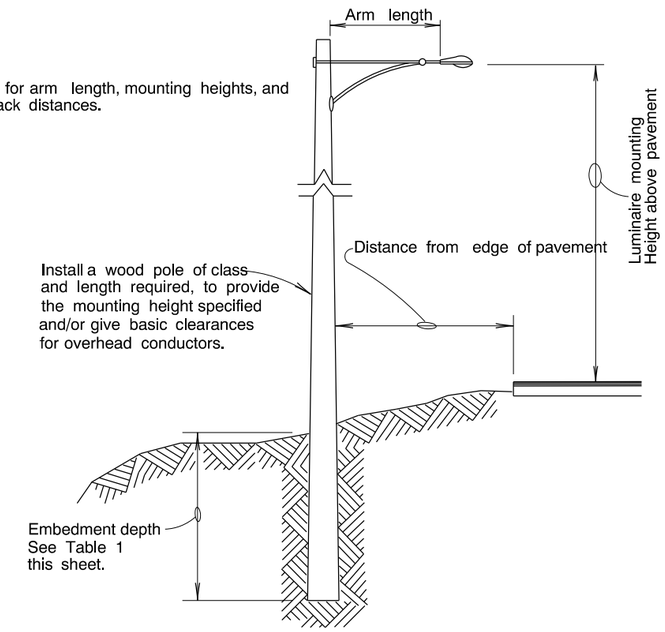
OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: A. Roeszler | Review: M. Leal
Drafter: GTEng CAD | Checker: D. Beckwith

TEMPORARY ILLUMINATION PLAN | SHEET NO.

NOTE: See plans for arm length, mounting heights, and pole set back distances.



TYPICAL WOOD POLE INSTALLATION

No Scale

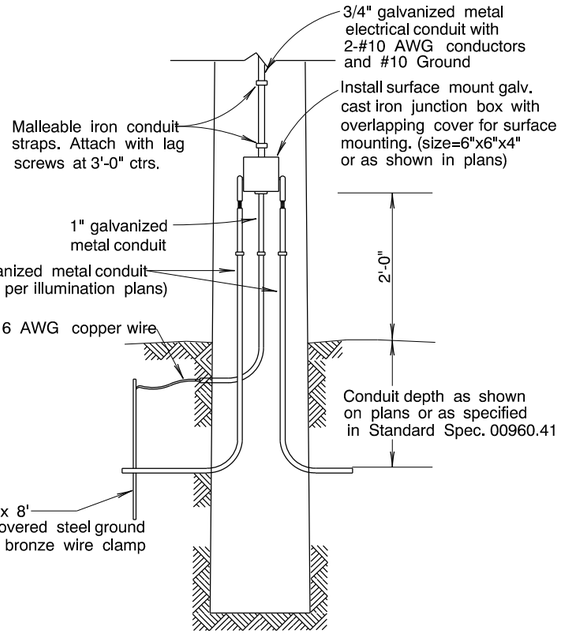
Note: Details are not meant to reflect any manufacturer's product.
Other designs may be acceptable, but must be submitted for approval.

Note:
- Luminaire supports shall be designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals
- The design wind velocity shall be 100 mph unless shown otherwise on the plans or in the Special Provisions for the project.
- Bolts shall conform to ASTM Specification A307.
- Steel sheet and plate shall be Merchant quality.
- All structural steel including washers and nuts shall be hot dip galvanized after fabrication unless noted otherwise.
- Wind rods required for arms over 8'.

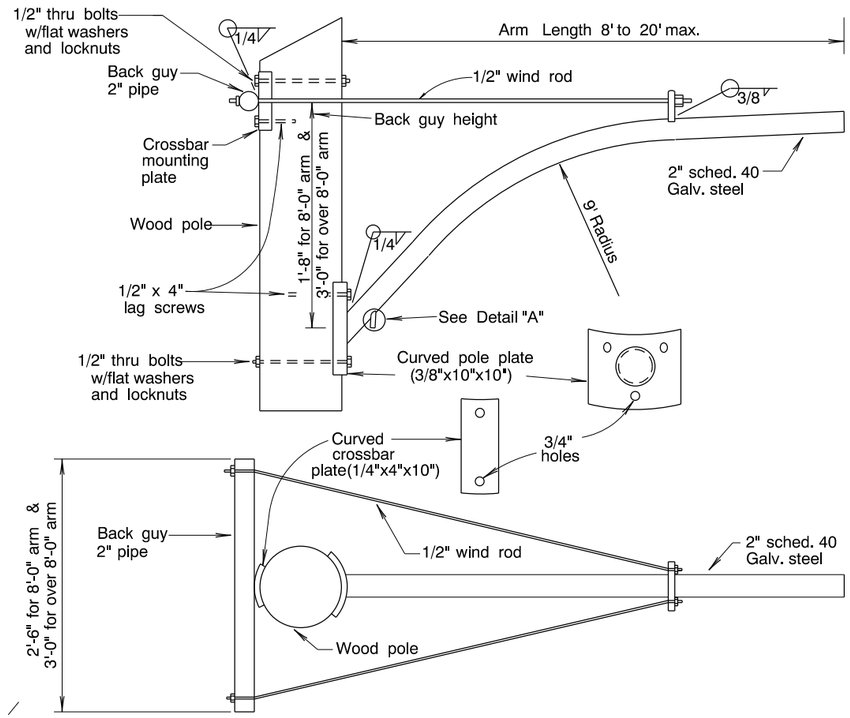
TABLE 1
SETTING DEPTH FOR WOOD POLES

Length of Pole (feet)	Depth in Soil (feet)	Depth in Rock (feet)
25	5.0	3.5
30	5.5	3.5
35	5.5	4.0
40	6.0	4.0
45	6.5	4.5
50	7.0	5.0
55	7.5	5.0
60	8.0	5.5

Note: 1. Where soil is underlain with rock, the depth of the hole in the rock is to be 70% of the depth required in soil.
2. Where poles are located on other than level areas, measure the setting depth from the low side of the hole.



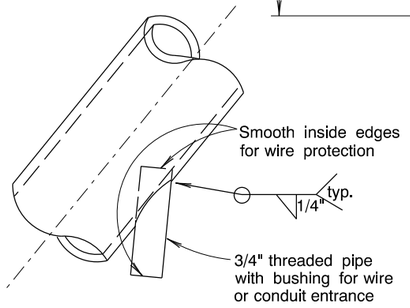
TYPICAL JUNCTION BOX
ON WOOD POLE INSTALLATION
No Scale



BRACKET FOR ARMS 8' TO 20'

No Scale

ARM LENGTH	LUM. MAX. WT.	MAX. PROJ. AREA
8' thru 20'	65 lbs.	2 sq. ft.



DETAIL "A"

No Scale

HWY: 064
M.P.: X.XX

TRS
00002

DFI/TSSU NO.
N/A

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I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

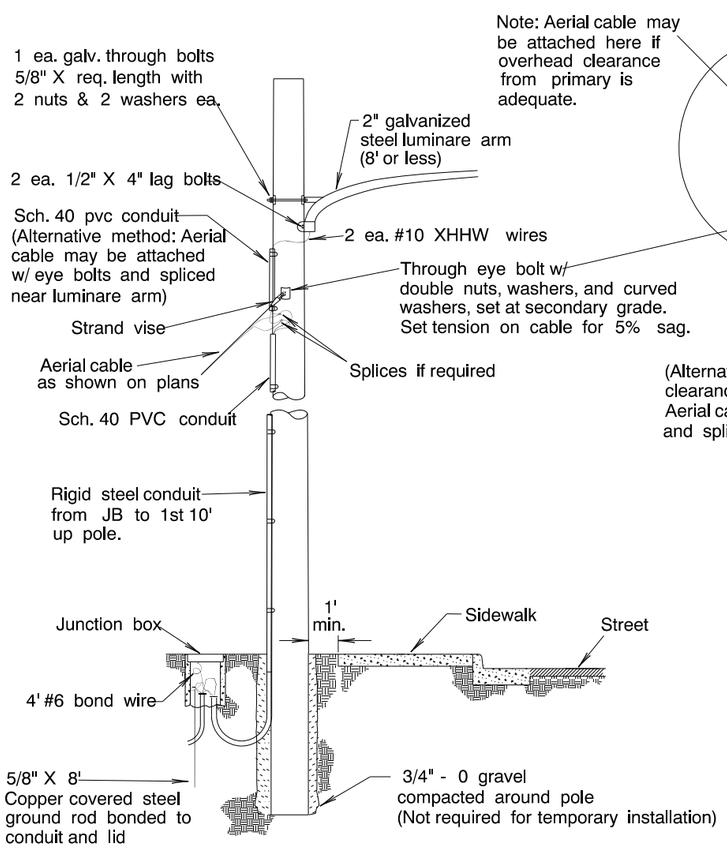
Designer: A. Roeszler
Drafter: GTEng CAD
Review: M. Leal
Checker: D. Beckwith

TEMPORARY ILLUMINATION DETAILS

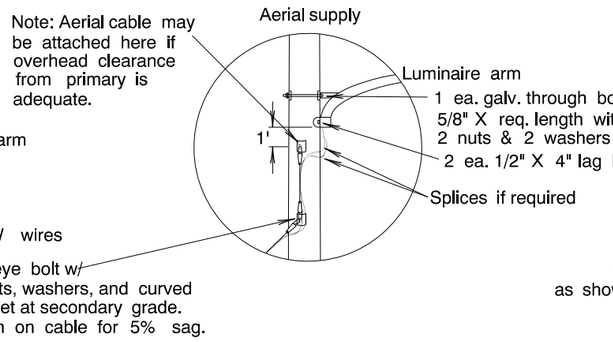
SHEET NO.

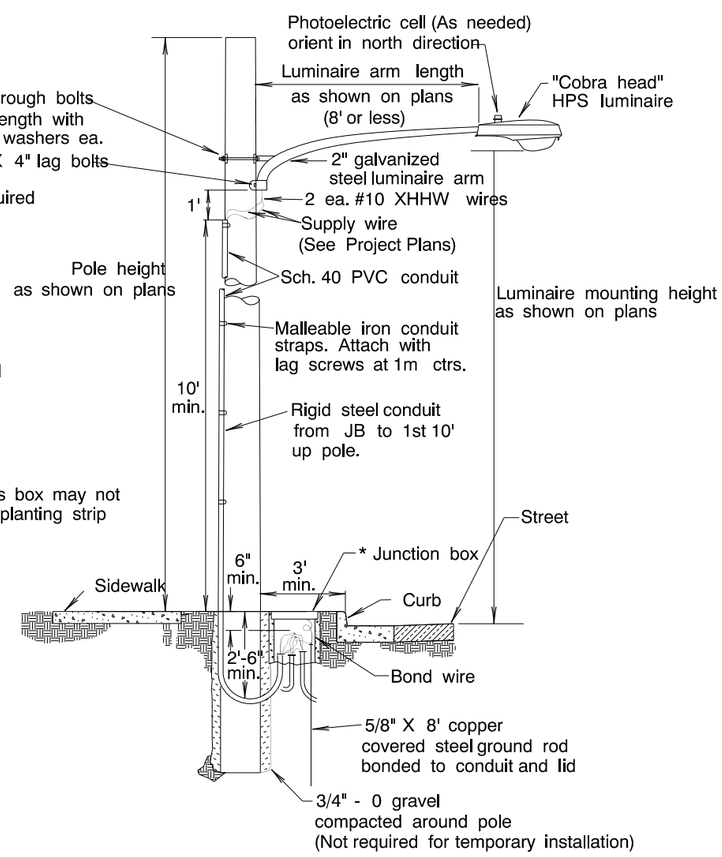
TL_K19786_GTE_ilps_01.dgn :: PA12 9/26/2019 1:10:23 PM Rick

LUMINAIRE INSTALL... ON WOOD POLES



TYPICAL CURB-SIDE SIDEWALK LOCATION
(UNDERGROUND TO AERIAL TRANSITION)





TYPICAL SETBACK SIDEWALK LOCATION
(UNDERGROUND SERVICE)

BRACKET ARMS 8 FEET OR LESS (AS REQUIRED)

Note:
- Luminaire supports shall be designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals
- The design wind velocity shall be 100 mph unless shown otherwise on the plans or in the Special Provisions for the project.
- Bolts shall conform to ASTM Specification A307.
- Steel sheet and plate shall be Merchant quality.
- All structural steel including washers and nuts shall be hot dip galvanized after fabrication unless noted otherwise.
- Wind rods required for arms over 8'
- Details are not for ODOT Highway projects. Designer or Engineer may use the details per request of the city / county who owns and maintains the Illumination system.

	LUM. MAX. WT.	MAX. PROJ. AREA
5' thru 8'	65 lbs.	2 sq. ft.

ARM LENGTH

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HWY: 064
M.P.: X.XX
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DFI/TSSU NO. N/A

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503.719.7997

I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: A. Roeszler | Review: M. Leal
Drafter: GTEng CAD | Checker: D. Beckwith

TEMPORARY ILLUMINATION DETAILS

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PA13 9/26/2019 1:10:24 PM Rick

ILLUMINATION LEGEND

L E G E N D

POLES

- EX / LP — Maintain and protect existing illumination pole and appurtenances
- TL / X — Install illumination pole (X=feet) feet from edge of travel lane or fog line
- N — Install illumination pole (N=number) (See metal light pole table)
- SMP — Structure mounted pole support (See bridge or wall drawings)
- SB / X — Install illumination pole (X=feet) feet behind shoulder barrier center point
- FC / X — Install illumination pole (X=feet) feet from face of curb
- RX / LP — Remove existing illumination pole and appurtenances (See special provisions)

CABINETS

- C / A — Install 240/480 volt metered, single phase base-mounted service cabinet
- C / B — Install 277/480 volt metered, three phase base-mounted service cabinet
- C / C — Intall 240/480 volt metered, single phase base-mounted service cabinet
- RX / C — Remove existing controller cabinet

JUNCTION BOXES

- EX / JB — Retain and protect existing junction box
- JB / 1A — Install 17"x10"x12" (min. dimension) precast concrete junction box with concrete apron
- JB / 2A — Install 22"x12"x12" (min. dimension) precast concrete junction box with concrete apron
- JB / A9 — Install cast in concrete 6"x6"x4" (min. dimension) galv. cast iron junction (See bridge or wall plans)
- JB / X — Install __" X __" X __" (min. dimension) galv. cast iron junction box with gasketed galv. steel cover
- RX / JB — Remove existing junction box

WIRES & CABLES

- EX / W — Retain and protect existing wiring
- G / N — Install (N=number) No. (G=AWG wire size) copper XHHW wire (GREEN in color)
- N / S — Install XHHW copper electrical conductors (N=Number of conductors, S=Size of conductors)
- T#N — Illumination circuit (T=Circuit type), number (N=Circuit number)
- EXN / S — Retain and protect existing electrical conductors (N=Number of conductors, S=Size of conductors)
- EX / G — Retain and protect existing ground wire
- RX / W — Remove existing wiring
- AX / DW — Abandon existing direct-bury wire

CONDUITS

- EX / EC (S) — Retain and protect existing electrical conduit size (S=size) inch
- S — Install (S=size) inch rigid non-metallic conduit
- S — Install (S=size) inch rigid metallic conduit
- HDD — Install conduit by horizontal directional drilling, open trench not allowed
- CJ — Splice new electrical conduit to existing electrical conduit
- AX / EC — Abandon existing electrical conduit
- RX / EC — Remove existing rigid metallic conduit

LUMINAIRES

- PE — Install photoelectronic control relay
- UD / N — Install underdeck luminaire (N=number) (See underdeck light table)
- NAV / N — Install (N=Number) navigation light
- BOX / N — Install (N=Number) box girder light
- RX / UD — Remove existing underdeck illumination
- RX / Lum — Remove existing luminaire
- RX / PE — Remove existing photocell

MISCELLANEOUS

- GFI / N — Install (N=Number) 120V GFI receptical

ACCOMPANIED BY DWGS.: See IL. Dwgs. PA08 thru PA14

HWY: 064
M.P.: 8.7 to 10.1
TRS 00001
DFI/TSSU NO. N/A

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: A. Roeszler | Review: M. Leal
Drafter: GTEng CAD | Checker: D. Beckwith

ILLUMINATION LEGEND

SHEET NO.

TL_K19786_GTE_ilpl_01.dgn :: PB01 9/26/2019 1:09:29 PM Rick
Rotation: 0°

ILLUMINATION LEGEND

Metal Light Pole Table (1)

Pole No.	Station	Distance from Center Line	Attachment of Arm (2) (4)	Upsweep of Arm		BL (2)	Luminaire			Mounting Height (ft)	Base Plate Config (3)	Notes
				Length	Rise		Lamp (Watts)	Line Volt	Type			
1			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
2			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
3			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
4			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
5			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
6			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
7			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
8			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
9			47.5	8	2'-6"	50.0	215	480	3	50	F	H90
10			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
11			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
12			48.5	6	1'-6.5"	50.0	215	480	3	50	SMP	H90
13			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
14			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
15			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
16			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
17			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
18			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
19			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
20			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
21			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
22			48.5	6	1'-6.5"	50.0	215	480	3	50	SMP	H90
23			48.5	6	1'-6.5"	50.0	215	480	3	50	F	H90
24			47.5	8	2'-6"	50.0	215	480	3	50	SMP	H90
25			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
26			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
27			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
28			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
29			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
30			48.5	6	1'-6.5"	50.0	215	480	3	50	SMP	H90
31			48.5	6	1'-6.5"	50.0	241	480	3	50	SMP	H90
32			47.5	8	2'-6"	50.0	241	480	3	50	SMP	H90
33			47.5	8	2'-6"	50.0	215	480	3	50	SMP	H90
34			30.6	12	4'-5"	35.0	215	480	3	35	SMP	H90
35			47.5	8	2'-6"	50.0	215	480	3	50	SMP	H90
36			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
37			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
38			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
39			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
40			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
41			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
42			48.5	4	1'-6.5"	50.0	215	480	3	50	SMP	H90
43			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
44			38.5	4	1'-6.5"	40.0	215	480	3	40	SMP	H90
45			46.6	10	3'-5.5"	50.0	215	480	3	50	SMP	H90
46			38.5	4	1'-6.5"	40.0	215	480	3	40	SMP	H90
47			38.5	6	1'-6.5"	40.0	215	480	3	40	F	H90
48			38.5	6	1'-6.5"	40.0	215	480	3	40	F	H90
49			38.5	6	1'-6.5"	40.0	215	480	3	40	F	H90
50			38.5	4	1'-6.5"	40.0	215	480	3	40	F	H90
51			29.2	15	5'-10"	35.0	215	480	3	35	F	H90
52			29.2	15	5'-10"	35.0	215	480	3	35	F	H90
53			29.2	15	5'-10"	35.0	215	480	3	35	F	H90
54			29.2	15	5'-10"	35.0	215	480	3	35	F	H90
55			28.5	4	1'-6.5"	30.0	215	480	3	30	F	H90
56			33.5	4	1'-6.5"	35.0	215	480	3	35	S	H90
57			33.5	4	1'-6.5"	35.0	215	480	3	35	F	H90
58			29.2	15	5'-10"	35.0	215	480	3	35	F	H90
59			29.2	15	5'-10"	35.0	215	480	3	35	F	H90
60			31.6	10	3'-5.5"	35.0	215	480	3	35	F	H90
61			30.6	12	4'-5"	35.0	215	480	3	35	F	H90
62			45.6	12	4'-5"	50.0	241	480	3	50	F	H90
63			45.6	12	4'-5"	50.0	241	480	3	50	F	H90
64			47.5	8	2'-6"	50.0	241	480	3	50	F	H90
1E			34.2	15	5'-10"	40.0	215	240	3	40	F	H90

(1) = Metal light pole and foundation shall be according to ODOT Standard Specifications for Construction and Standard Dwgs. TM629 & TM630.
(2) = Field verify attachment height of arm and "BL" before ordering. Values are approximated from grading cross sections.
(3) = Verify base plate configuration prior to foundation installation.
(4) = Attachment height of arm may very due to difference in manufacturers arm rise.

S = Slip Base illumination pole. See Standard. Dwgs. No. TM629 & TM630
F = Fixed Base illumination pole. See Standard. Dwgs. No. TM629 & TM630
SMP = Structure Mounted Pole. See Bridge Drawings for details.
BL = Base Plate To Luminaire Height
H(N) = Handhole Orientation measured from luminaire arm clockwise direction (N = angle in degrees)

Underdeck Luminaire Table

Luminaire No.	Station	Distance from Center Line	Luminaire			Circuit No.	Mounting Height (ft)	Notes
			Lamp (Watts)	Line Volt	Type			
U1			239	480	2	U1	19	
U2			239	480	2	U1	19	
U3			239	480	2	U1	19	
U4			239	480	2	U1	19	
U5			239	480	2	U1	19	
U6			239	480	2	U1	19	
U7			239	480	2	U2	19	
U8			239	480	2	U2	19	
U9			239	480	2	U2	19	
U10			239	480	2	U2	19	

Lighting Design Values

Location	Average Maintained Illuminance	Average/Minimum Uniformity
NB Sta "L" 695+00 to Sta "L" 672+00	0.9	3:1
SB Sta "L" 696+00 to Sta "L" 677+00	0.9	2.3:1
NB Sta "L" 715+00 to Sta "L" 728+00	1.0	3.2:1
SB Sta "L" 715+00 to Sta "L" 724+00	0.9	3:1
OR99E NB Exit Ramp Gore	1.1	2.6:1
OR99E NB Entrance Ramp Gore	1.0	1.7:1
OR99E SB Exit Ramp Gore	1.1	1.9:1
OR99E SB Entrance Ramp Gore	1.0	2.5:1
OR99E Underdeck	1.1	2.7:1
OR43 NB Entrance Ramp	1.4	2.8:1
OR43 NB Entrance Ramp Gore	1.0	2.4:1
OR43 NE Exit Ramp	1.4	2.7:1
OR43 SB Exit Ramp	1.4	2.8:1
OR43 SB Exit Ramp Gore	1.2	2.0:1
OR43 at I-205 SB On/Off Ramps Intersection	1.8	2.6:1
OR43 at I-205 NB On/Off Ramps Roundabout	1.9	2.7:1
OR43 Underdeck	1.2	3.0:1

ACCOMPANIED BY DWGS.:
See IL. Dwgs. PA08 thru PA14

HWY: 064
M.P.: X.XX
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I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

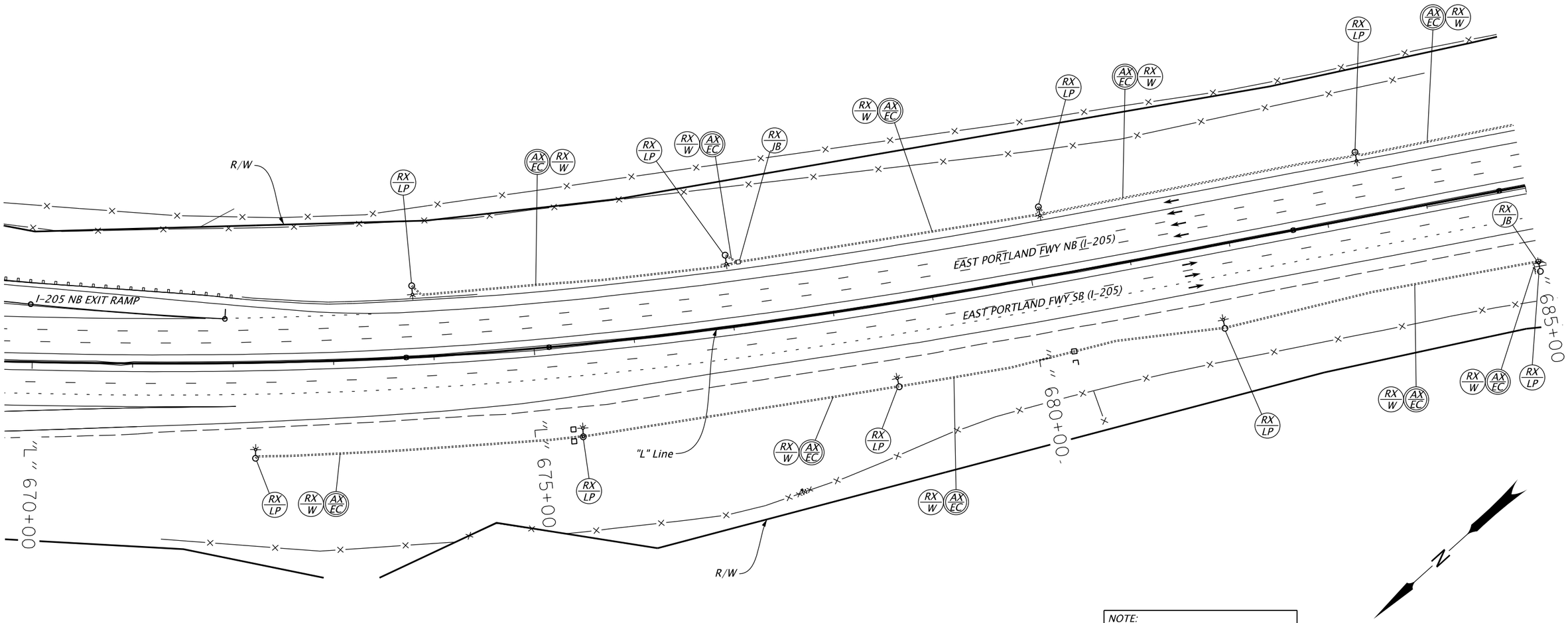
Designer: A. Roeszler
Drafter: GTEng CAD
Review: M. Leal
Checker: D. Beckwith

ILLUMINATION LEGEND

SHEET NO.

TL_K19786_GTE_ilpl_01.dgn :: PB02 9/26/2019 1:09:29 PM Rick
Rotation: 0°

ILLUMINATION REMOVAL PLAN
I-205 (HWY. 64)
STA. "L" 669+50 TO STA. "L" 685+00



NOTE:

See Sheet No. PB01 for Legend

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(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

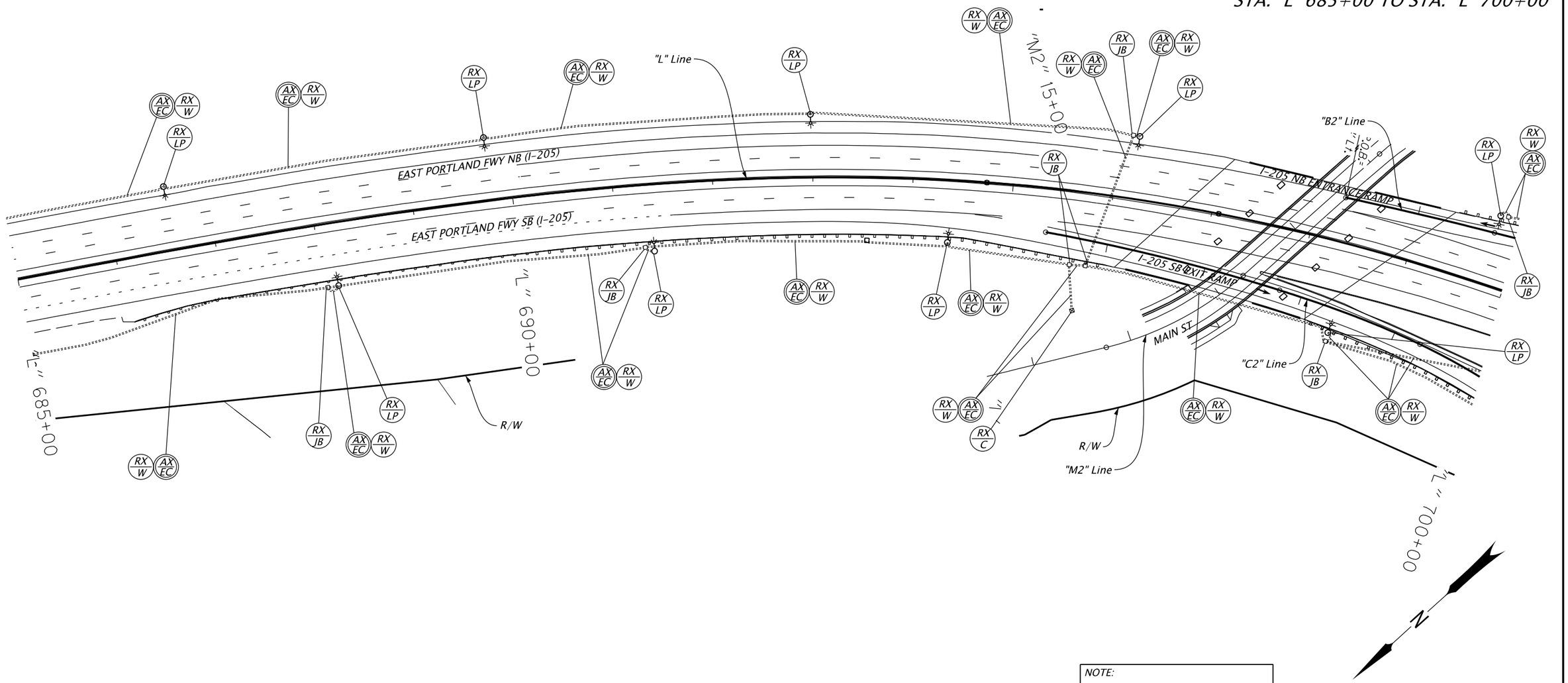
HWY: 064	
M.P.: 9.8 to 10.1	
TRS	
00002	
DFI/TSSU NO.	
N/A	
Designer: A. Roeszler	Review: M. Leal
Drafter: GTEng CAD	Checker: D. Beckwith

ILLUMINATION REMOVAL PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PB03 9/26/2019 1:10:26 PM Rick

ILLUMINATION REMOVAL PLAN
I-205 (HWY. 64)
STA. "L" 685+00 TO STA. "L" 700+00



NOTE:

See Sheet No. PB01 for Legend

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(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

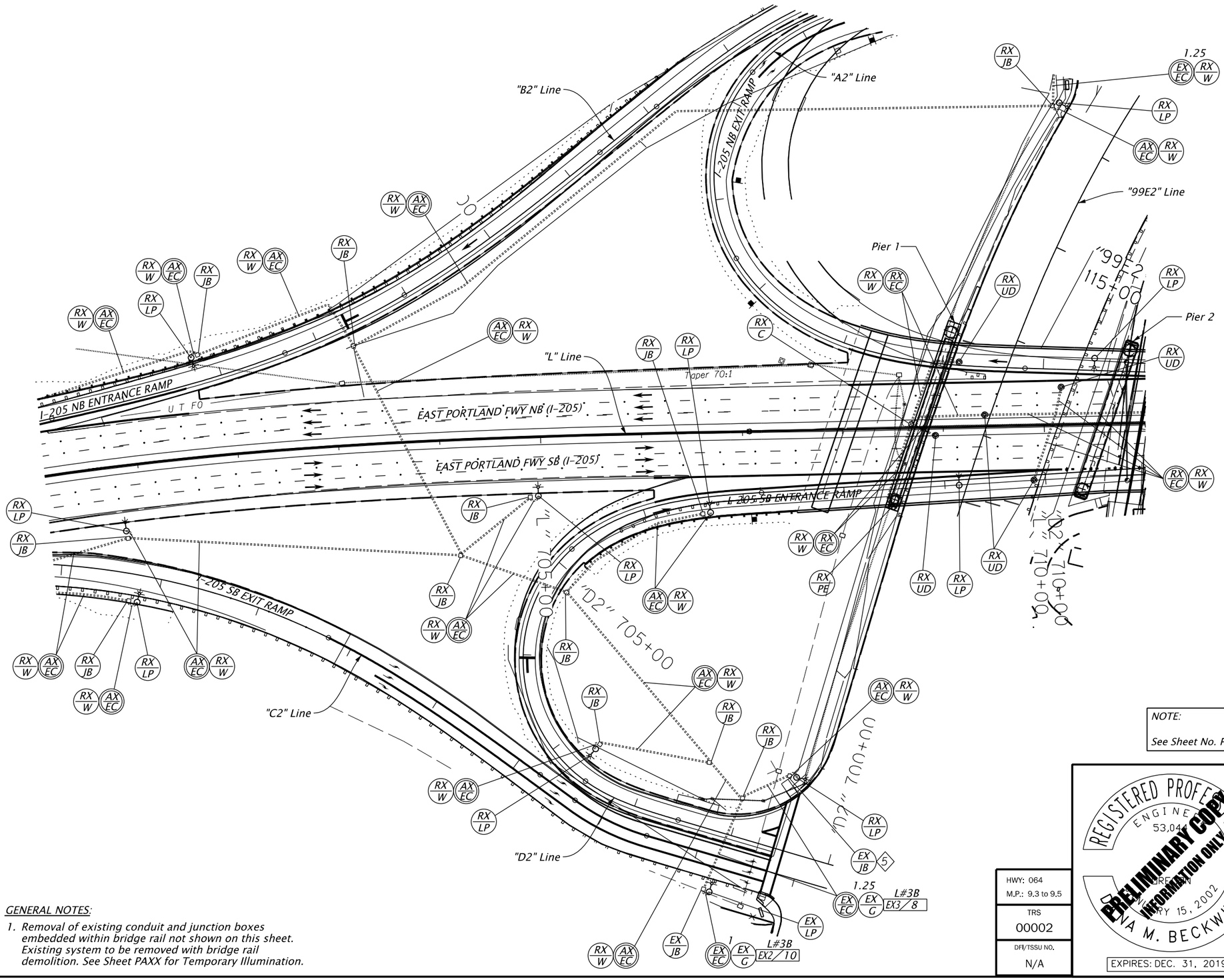
HWY: 064	Designer: A. Roeszler
M.P.: 9.5 to 9.8	Drafter: GTEng CAD
TRS: 00002	Review: M. Leal
DFI/TSSU NO.: N/A	Checker: D. Beckwith

ILLUMINATION REMOVAL PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PB04 9/26/2019 1:10:27 PM Rick

ILLUMINATION REMOVAL PLAN
I-205 (HWY. 64)
STA. "L" 700+00 TO STA. "L" 711+00



NOTE:

See Sheet No. PB01 for Legend

GENERAL NOTES:

1. Removal of existing conduit and junction boxes embedded within bridge rail not shown on this sheet. Existing system to be removed with bridge rail demolition. See Sheet PAXX for Temporary Illumination.

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HWY: 064	
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EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: A. Roeszler	Review: M. Leal
Drafter: GTEng CAD	Checker: D. Beckwith

ILLUMINATION REMOVAL PLAN

SHEET NO.

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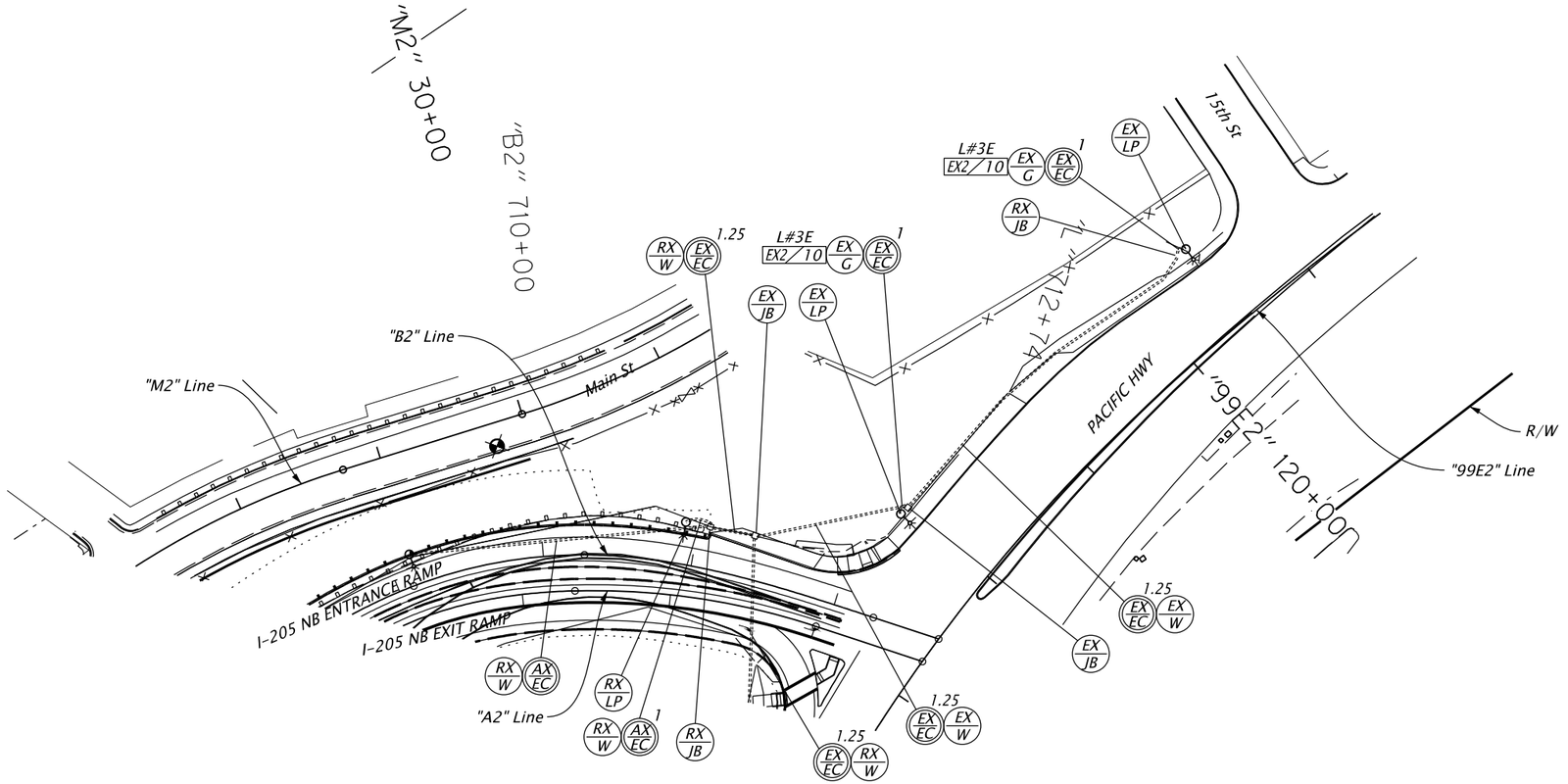
ILLUMINATION REMOVAL PLAN
I-205 (HWY. 64)
STA. "A2" X+XX TO STA. "A2" X+XX
STA. "B2" X+XX TO STA. "B2" X+XX
STA. "99E2" X+XX TO STA. "99E2" X+XX



NOTE:

See Sheet No. PB01 for Legend

REGISTERED PROFESSIONAL ENGINEER
53,044
OREGON
JANUARY 15, 2002
DENA M. BECKWITH
EXPIRES: DEC. 31, 2019

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227 SW Pine Street
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

HWY: 064
M.P.: 9.3 to 9.4
TRS
00002
DFI/TSSU NO.
N/A

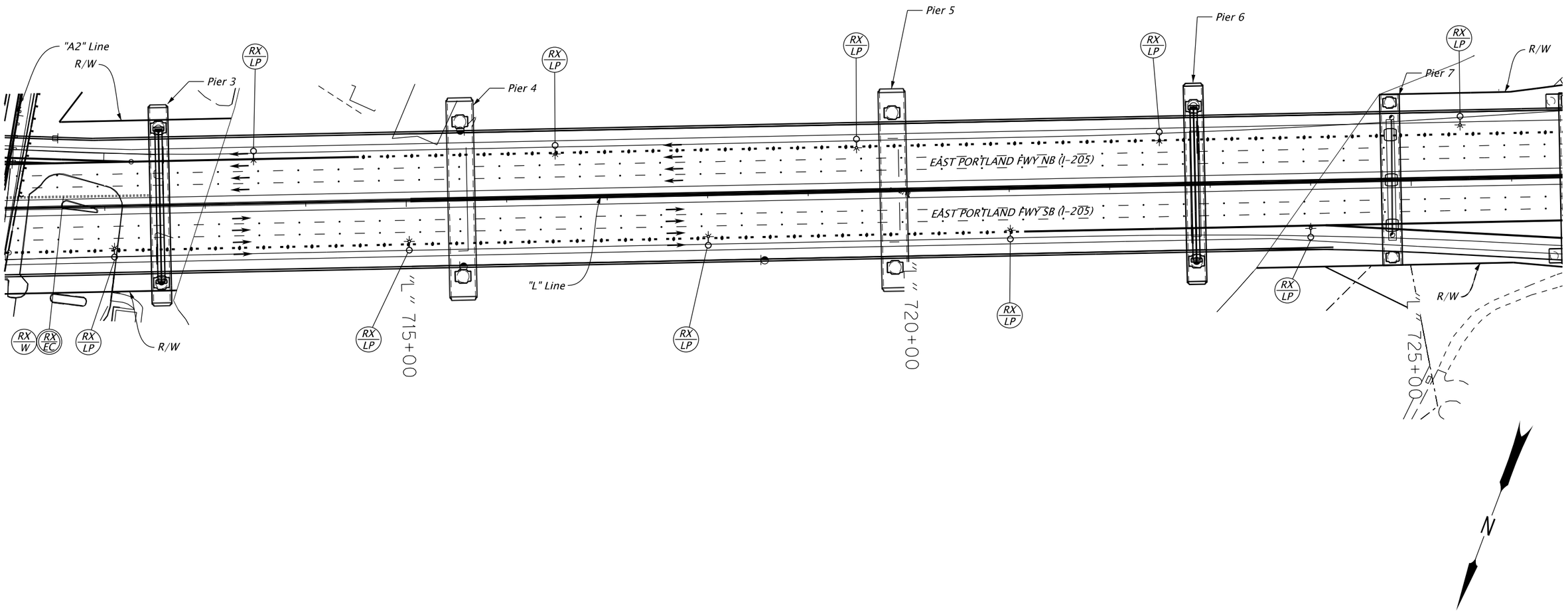
Designer: A. Roeszler
Review: M. Leal
Drafter: GTEng CAD
Checker: D. Beckwith

ILLUMINATION REMOVAL PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PB06 9/26/2019 1:10:32 PM Rick

ILLUMINATION REMOVAL PLAN
I-205 (HWY. 64)
STA. "L" 711+00 TO STA. "L" 726+50



GENERAL NOTES:

1. *Removal of existing conduit and junction boxes embedded within bridge rail not shown on this sheet. Existing system to be removed with bridge rail demolition. See Sheet PAXX for Temporary Illumination.*

NOTE:

See Sheet No. PB01 for Legend

HWY: 064	
M.P.: 9.0 to 9.3	
TRS	00002
DFI/TSSU NO.	N/A

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53,044
OREGON
JULY 15, 2002
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(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

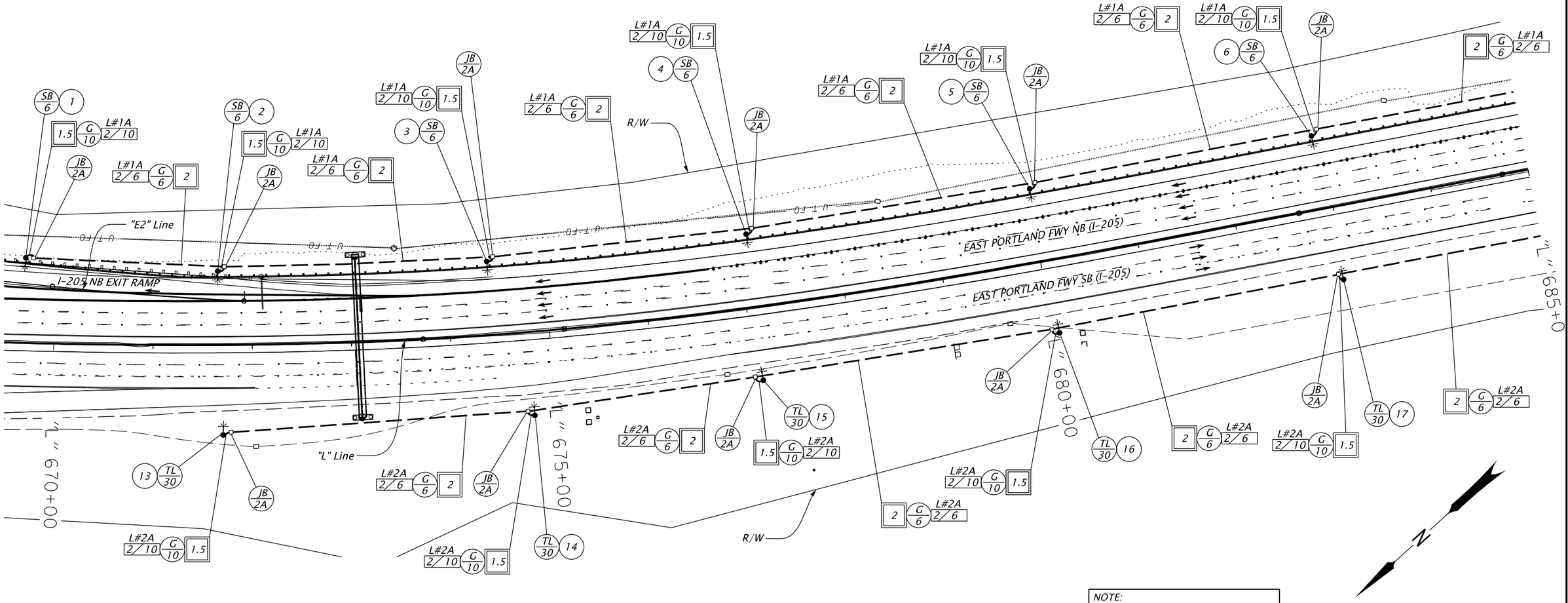
Designer: A. Roeszler	Review: M. Leal
Drafter: GTEng CAD	Checker: D. Beckwith

ILLUMINATION REMOVAL PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PB07 9/26/2019 1:10:34 PM Rick

ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 669+50 TO STA. "L" 685+00



NOTE:

See Sheet No. PB01 for Legend

GENERAL NOTES:

1. *Contractor to contact utility companies for field verifications prior to roadway lighting improvements.*
2. *Conduit and junction box locations are approximate and shall be verified in the field by the contractor.*

REGISTERED PROFESSIONAL ENGINEER 53,044 OREGON JANUARY 15, 2002 DENA M. BECKWITH
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(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

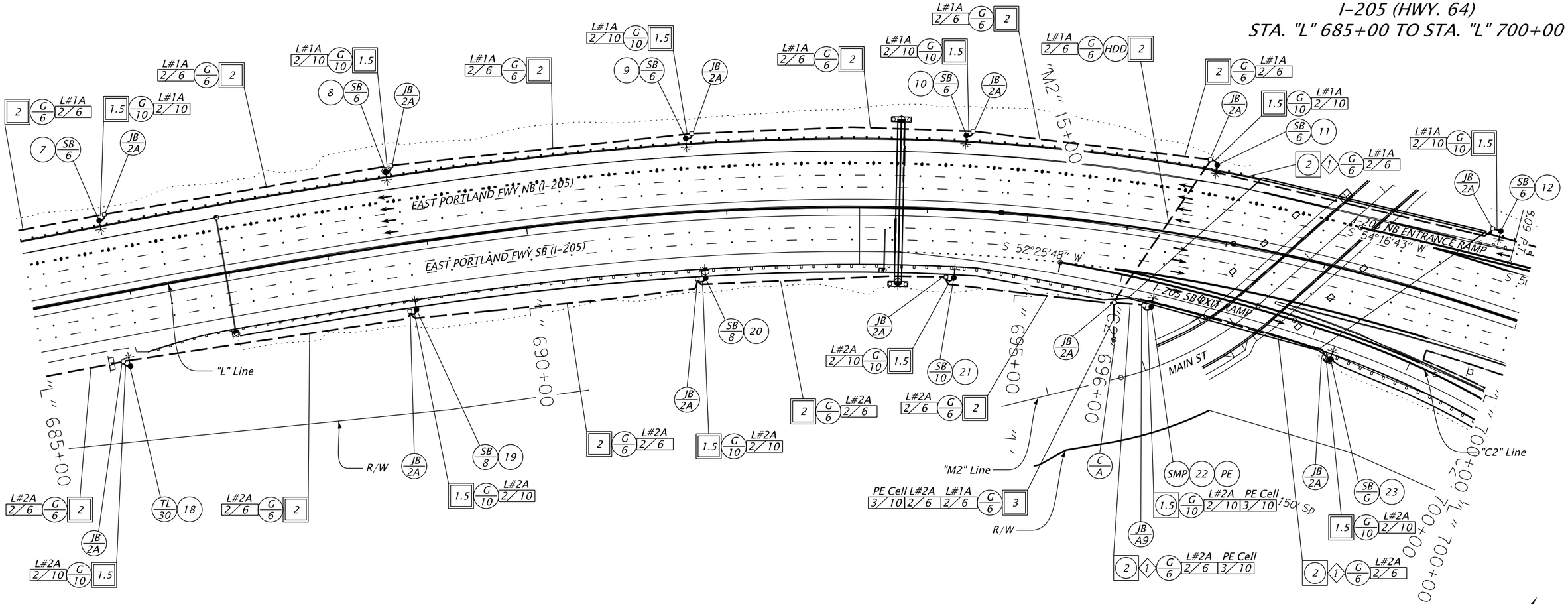
HWY: 064	Designer: A. Roeszler
M.P.: 9.8 to 10.1	Drafter: GTEng CAD
TRS 00002	Review: M. Leal
DFI/TSSU NO. N/A	Checker: D. Beckwith

ILLUMINATION PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PC01 9/26/2019 1:11:36 PM Rick

ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 685+00 TO STA. "L" 700+00



NOTE:

See Sheet No. PB01 for Legend

CONSTRUCTION NOTES:

1. Install expansion fitting at structure expansion joint.

GENERAL NOTES:

1. Contractor to contact utility companies for field verifications prior to roadway lighting improvements.
2. Conduit and junction box locations are approximate and shall be verified in the field by the contractor.

HWY: 064	
M.P.: 9.5 to 9.8	
TRS	00002
DFI/TSSU NO.	N/A

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53,044
OREGON
JANUARY 15, 2002
DANA M. BECKWITH
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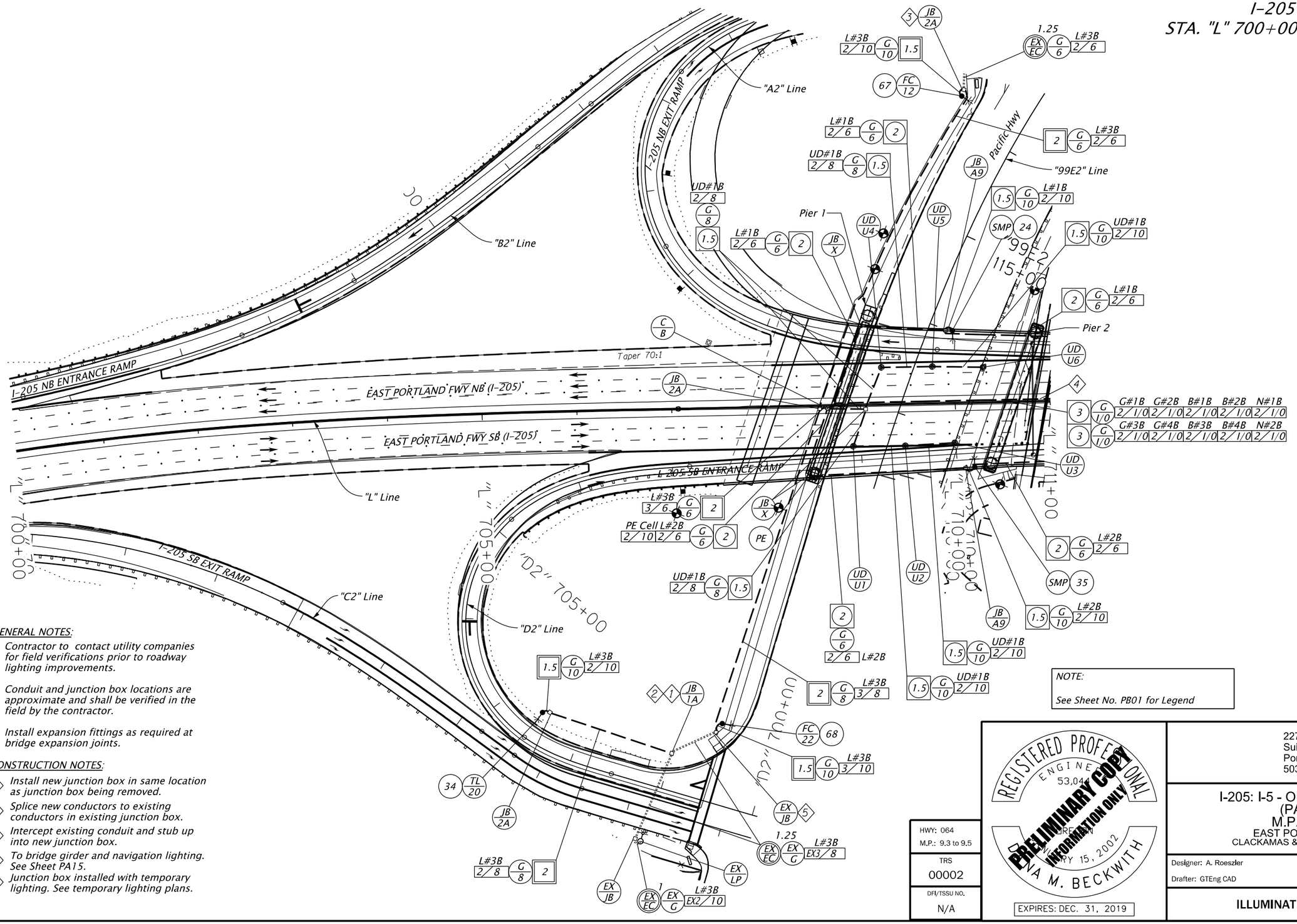
I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: A. Roeszler	Review: M. Leal
Drafter: GTEng CAD	Checker: D. Beckwith

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PC02 9/26/2019 1:11:39 PM Rick

ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 700+00 TO STA. "L" 711+00



GENERAL NOTES:

1. *Contractor to contact utility companies for field verifications prior to roadway lighting improvements.*
2. *Conduit and junction box locations are approximate and shall be verified in the field by the contractor.*
3. *Install expansion fittings as required at bridge expansion joints.*

CONSTRUCTION NOTES:

1. *Install new junction box in same location as junction box being removed.*
2. *Splice new conductors to existing conductors in existing junction box.*
3. *Intercept existing conduit and stub up into new junction box.*
4. *To bridge girder and navigation lighting. See Sheet PA15.*
5. *Junction box installed with temporary lighting. See temporary lighting plans.*

NOTE:

See Sheet No. PB01 for Legend

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JANUARY 15, 2002
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(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

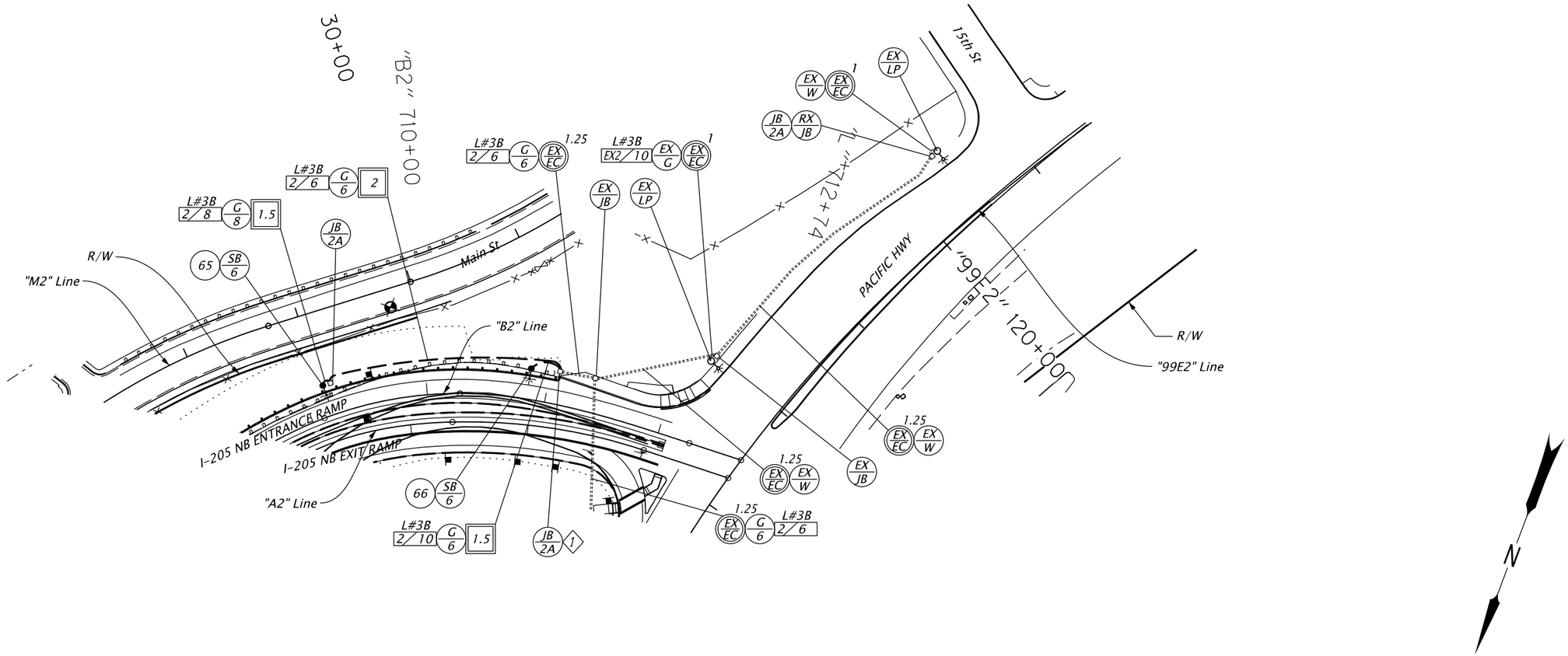
HWY: 064	
M.P.: 9.3 to 9.5	
TRS	
00002	
DFI/TSSU NO.	
N/A	
Designer: A. Roeszler	Review: M. Leal
Drafter: GTEng CAD	Checker: D. Beckwith

ILLUMINATION PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PC03 9/26/2019 1:11:42 PM Rick

ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "A2" X+XX TO STA. "A2" X+XX
STA. "B2" X+XX TO STA. "B2" X+XX
STA. "99E2" X+XX TO STA. "99E2" X+XX



NOTE:

See Sheet No. PB01for Legend

GENERAL NOTES:

1. Contractor to contact utility companies for field verifications prior to roadway lighting improvements.
2. Conduit and junction box locations are approximate and shall be verified in the field by the contractor.

CONSTRUCTION NOTES:

1. Install new junction box in same location as junction box being removed.

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EVA M. BECKWITH
EXPIRES: DEC. 31, 2019

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I-205: I-5 - OR213, PHASE 1 SEC.
(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

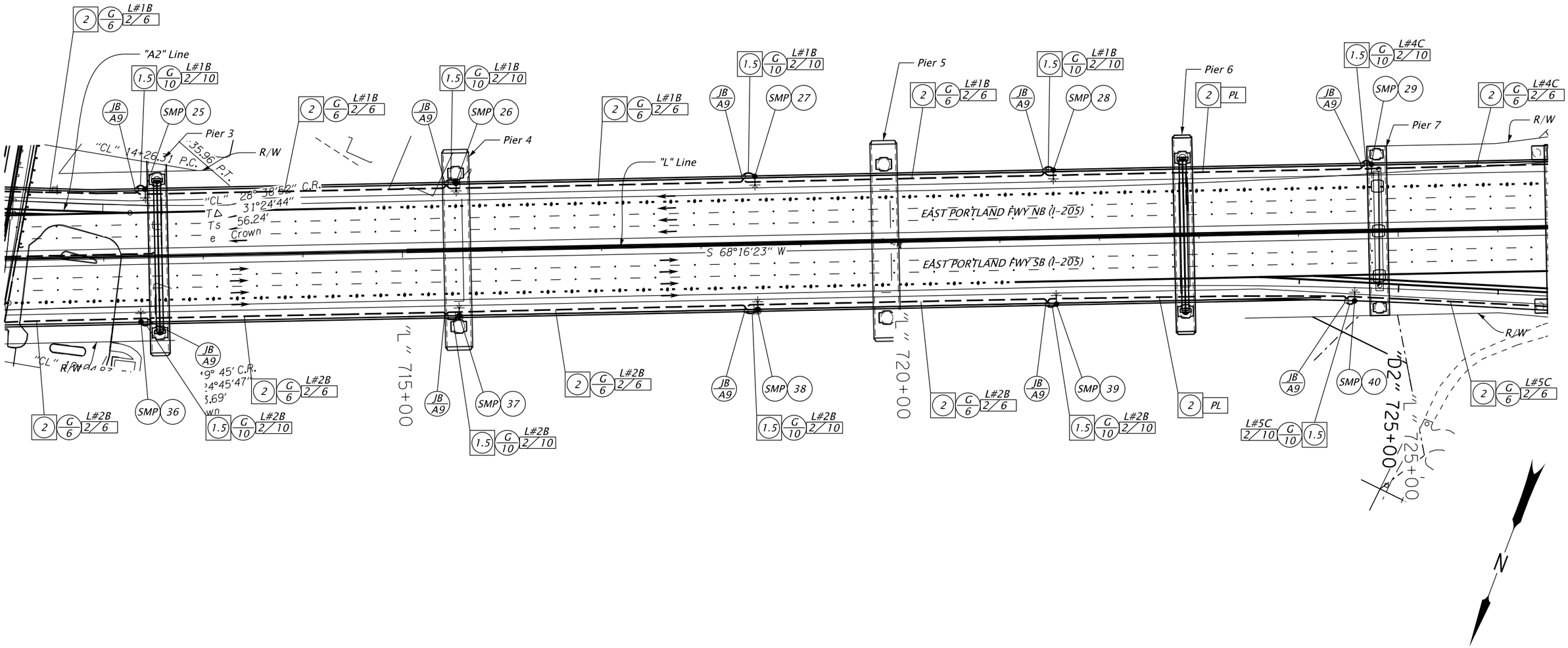
HWY: 064	Designer: A. Roeszler
M.P.: 9.3 to 9.4	Review: M. Leal
TRS 00002	Drafter: GTEng CAD
DFI/TSSU NO. N/A	Checker: D. Beckwith

ILLUMINATION PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PC04 9/26/2019 1:11:46 PM Rick

ILLUMINATION PLAN
I-205 (HWY. 64)
STA. "L" 711+00 TO STA. "L" 726+50



GENERAL NOTES:

1. *See Sheet PA15 for Bridge Girder and Navigation Lighting.*
2. *Install expansion fittings as required at bridge expansion joints.*
3. *Contractor to contact utility companies for field verifications prior to roadway lighting improvements.*
4. *Conduit and junction box locations are approximate and shall be verified in the field by the contractor.*
5. *See bridge drawings for conduit, junction and light pole footings within bridge rail.*

NOTE:

See Sheet No. PB01 for Legend

HWY: 064
M.P.: 9.0 to 9.3
TRS
00002
DFI/TSSU NO.
N/A

REGISTERED PROFESSIONAL ENGINEER
53,044
OREGON
MAY 15, 2002
DENA M. BECKWITH
EXPIRES: DEC. 31, 2019

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(PACKAGE A)
M.P. 0.87 - 11.68
EAST PORTLAND FREEWAY
CLACKAMAS & WASHINGTON COUNTIES

Designer: A. Roeszler
Review: M. Leal
Drafter: GTEng CAD
Checker: D. Beckwith

ILLUMINATION PLAN

SHEET NO.

TL_K19786_GTE_ilps_01.dgn :: PC05 9/26/2019 1:11:48 PM Rick

Attachment B. Landscaping Plans

GENERAL NOTES:

1. Plant all trees beyond "clear zone"; verify with engineer prior to planting. Engineer shall approve all work outside designated work limits prior to construction. Do not plant trees within 20' of a bridge/viaduct or within 10' of a trail, waterline, or stormwater line.

2. Locate underground utility lines prior to any digging or ground disturbance.

3. Adjust planting locations so vegetation does not conflict with above- or below-ground utilities.

4. Adjust plant locations to avoid conflict with traffic sight lines and signs or other appurtenances. Verify location changes with Engineer.

5. All dimensions shown on details are minimum dimensions.

6. See Plant Schedule FA02, FA03 for plants and landscape material.

7. Plan is schematic. Planting may be adjusted to fit site conditions with prior Agency approval.

8. Lay out plant material in groups as indicated in plant and material schedule, details and plan sheets.

9. Stake all planting areas for review and approval by Engineer prior to planting.

10. Do not install plant material without prior inspection and approval as required by 01040.19(d).

11. Comply with Oregon Standard Specifications for Construction and Special Provisions for construction applicable to this project.

12. Thoroughly water all plant material (saturated backfill) within 24-hours of installation regardless of rainfall events.

13. Verify field conditions prior to construction with any adjustments to the plans made as directed by the Engineer.

14. Protect all trees and land areas marked for protection. Do not damage natural (non-invasive) vegetation.

15. Comply with erosion control measures per Section 00280 and all applicable permits during construction.

16. Where discrepancies between the Plant Schedule and the plans exist, plans shall prevail.

17. See Special Provision 01030.13(f) for seed mixes

18. Prepare all planting and seeding areas per Method B, see 01040.48(b) in the Oregon Standard Specifications for Construction.

19. Include Mycorrhizal innoculates for all seeding and individual plant installations. Apply per manufacturer's recommendation.

20. Flag all planted tree species with color-coded identification flags.

Mitigation and Restoration Permitting Requirements

	Area (square feet)							Plant Totals	
	FA08	FA10	FA12	FA13*	FA14	FA15	TOTAL	TREES	SHRUBS
DSL Permit Requirements	-	-	-	19,187	42,555	148,187	209,929	1,004	2,031
NROD Permit Requirements	50,776	53,500	-	4,190	-	-	108,466	745*	3,954
							TOTAL	1,661	5,985

*DSL Restoration Numbers for FA13 are applied to NROD Permit Mitigation Total Requirements

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Plant and Material Schedule

Trees

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
TARME	*Arbutus menziesii*	Madrone	1/2" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	3	-	-	-	1	-	4
TCADE	*Calocedrus decurrens*	Incense Cedar	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	6	8	14
TCONU	*Cornus nuttallii*	Pacific Dogwood	1" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	7	-	7
TPIPO	*Pinus ponderosa 'Willamette Valley'*	Willamette Ponderosa Pine	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	42	14	99	79	26	-	29	23	300
TPSME	*Pseudotsuga menziesii*	Douglas Fir	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	29	-	29
TQUCH	*Quercus chrysolepis*	Canyon Live Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	34	-	-	-	15	49
TQUGA	*Quercus garryana*	Oregon White Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	5	69	12	-	24	12	116
TULAM	*Ulmus americana 'Valley Forge'*	Valley Forge American Elm	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	7	-	-	-	7
TUMCA	*Umbellularia californica*	Oregon Myrtle	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	31	-	-	-	-	31

Broadleaf Evergreen Shrubs

Deciduous Shrubs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
ARCO	*Arctostaphylos columbiana x 'Patula'*	Manzanita	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	214	-	-	-	-	214
COSE	*Cornus sericea*	Red Osier Dogwood	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	1,005	-	-	-	-	1,005
FRCA	*Frangula californica 'Eve Case'*	Eve Case Coffeeberry	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	51	-	-	-	-	51
GAEL	*Garrya elliptica 'James Roof'*	Wavyleaf Silktassel	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	61	-	-	-	-	61
MAAQ	*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	397	-	-	-	-	397
MOCA	*Morella californica*	Pacific Wax Myrtle	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	57	-	-	-	-	57

Ornamental Grasses and Forbs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	TOTAL
-	*Asclepias speciosa*	Showy milkweed	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Calamagrostis x acutiflora 'Karl Foerster'*	Feather reed grass	12" Height	2' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Carex glauca*	Blue Sedge	12" Height	1' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Deschampsia cespitosa 'Goldtau'*	Tufted hairgrass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Juncus patens 'Carmen's Grey'*	Carman's Grey Blue Rush	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Solidago 'Goldkind'*	Golden Baby goldenrod	12" Height	1' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Stipa gigantea*	Giant feather grass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Veratrum californicum*	California false hellebore	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke Reviewer: Ben Ngan
Drafter: David Goodyke Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

ROADSIDE DEVELOPMENT PLANT SCHEDULE

City of Oregon NROD Mitigation Trees and Shrubs

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA10	TOTAL
NROD Trees & Shrubs		*Arbutus menziesii*	Pacific Madrone	1/2" Calip.	13.5' O.C.	Bareroot	20%	N/A	64	40	104
		Pinus ponderosa var. willamettensis	Ponderosa Pine	18" Height	13.5' O.C.	Bareroot	30%	N/A	96	60	156
		Quercus garryana	Oregon White Oak	1/2" Calip.	13.5' O.C.	Bareroot	30%	N/A	96	60	156
		Rhamnus purshiana	Cascara	1/2" Calip.	13.5' O.C.	Bareroot	10%	N/A	32	20	52
		Salix scouleriana	Scouler's Willow	1/2" Calip.	13.5' O.C.	Bareroot	10%	N/A	32	20	52
		Arctostaphylos columbiana	Hairy Manzanita	12" Height	6' O.C.	Bareroot	20%	N/A	277	174	451
		Berberis (Mahonia) aquifolium	Tall Oregongrape	12" Height	6' O.C.	Bareroot	30%	N/A	416	261	677
		Ceanothus velutinus	Snowbrush	12" Height	6' O.C.	Bareroot	20%	N/A	277	174	451
		Corylus cornuta var. Californica	Western Hazelnut	12" Height	6' O.C.	Bareroot	15%	N/A	208	130	338
		Ribes lobbii	Gummy Gooseberry	12" Height	6' O.C.	Bareroot	15%	N/A	208	130	338
NROD Shrubs		*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Min.	6' O.C.	Bareroot	20%	N/A	-	118	118
		Cornus sericea	Redtwig Dogwood	12" Min.	6' O.C.	Bareroot	10%	N/A	-	177	177
		Ribes sanguineum	Redflowering Currant	12" Min.	6' O.C.	Bareroot	15%	N/A	-	118	118
		Rubus parviflorus	Thimbleberry	12" Min.	6' O.C.	Bareroot	15%	N/A	-	89	89
		Spirea douglasii	Douglas Spirea	12" Min.	6' O.C.	Bareroot	15%	N/A	-	89	89
		Symphoricarpos albus	Snowberry	12" Min.	6' O.C.	Bareroot	25%	N/A	-	148	148

Upland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX A: Trees		*Acer macrophyllum*	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Arbutus menziesii	Pacific Madrone	1/2" Calip.	15'-20' Min.	Container	15%	N/A	-	-	67	67
		Calocedrus decurrens	Incense Cedar	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Corylus cornuta var. californica	Western Hazelnut	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
		Cornus nuttallii	Western Dogwood	1/2" Calip.	15'-20' Min.	Bareroot	5%	N/A	-	-	22	22
		Quercus garryana	Oregon White Oak	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	-	-	116	116
		Pseudotsuga menziesii	Douglas Fir	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
MIX A & B: Shrubs		*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370
		Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370

Lowland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX C: Trees		*Abies grandis*	Grand Fir	18" Height	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Acer macrophyllum	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Alnus rubra	Red Alder	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	22	54	-	76
		Fraxinus latifolia	Oregon Ash	1/2" Calip.	30' Min.	Bareroot	6%	N/A	5	13	-	18
		Prunus emarginata	Bitter Cherry	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	10%	N/A	8	21	-	29
		Salix lucida	Shining Willow	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Thuja plicata	Western Redcedar	18" Height	30' Min.	Bareroot	8%	N/A	7	17	-	24
MIX C & D: Shrubs		*Cornus sericea*	Redtwig Dogwood	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161
		Physocarpus capitatus	Pacific Ninebark	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Rubus spectabilis	Salmonberry	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161

Roadside Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX E: Trees & Shrubs		*Pinus ponderosa var. willamettensis*	Willamette Ponderosa Pine	3'-4' Height	25'	#5 Container	50%	N/A	2	-	21	23
		Quercus garryana	Oregon White Oak	1/2" caliper	25'	Bareroot	40%	N/A	2	-	16	18
		Arbutus menziesii	Pacific Madrone	1'-2' Height	25'	#1 Container	10%	N/A	-	-	4	4
		Berberis (Mahonia) aquifolium	Tall Oregon Grape	12" Height	5' Min.	#1 Container	60%	N/A	14	-	53	64
		Ceanothus velutinus	Snowbrush	12" Height	5' Min.	#1 Container	10%	N/A	2	-	9	11
		Ribes sanguineum	Redflowering Currant	12" Height	5' Min.	#1 Container	15%	N/A	3	-	13	16
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	#1 Container	15%	N/A	3	-	13	16

SHRUB PLANTING NOTES FOR MIXES A, B, C, D, and E

1. *Install shrubs at a density of 108 shrubs per 10,000 s.f.*
2. *Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to an adjacent tree stem.*
3. *Spread species throughout the planting area to avoid a monoculture; a random 10,000 s.f. sample shall contain all species.*
4. *Maintain a 1' diameter plant-free area around each stem and mulch with shredded wood to prevent weeds.*
5. *See Sheet FA04 for Tree Planting details.*
6. *See Sheet FA05 for Shrub Planting details.*

Seed Mix* **See Special Provisions 01030.13(f) for Seed Mix** **Area (square feet)**

Key		FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
	Permanent Seeding	2,066	-	-	1,273	175,749	-	-	-	129,854	308,942
	Water Quality Seeding	787	-	-	1,294	4,934	440	-	9,971	14,616	31,226
Varies	Riparian Seeding	-	-	-	-	-	23,824	42,555	-	-	66,379
	Wildflower Seeding	64,818	-	75,645	-	1,379	31,172	-	142,999	6,082	314,943
Varies	Native Shade Seeding	-	-	-	-	-	-	-	80,985	-	80,985
	Wetland Seeding	-	-	-	-	-	-	-	410	-	410
	Upland Shrub Seeding	-	-	-	-	-	7,672	-	46,091	-	53,763

*** Verify compost erosion blanket is installed prior to applying seed**

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

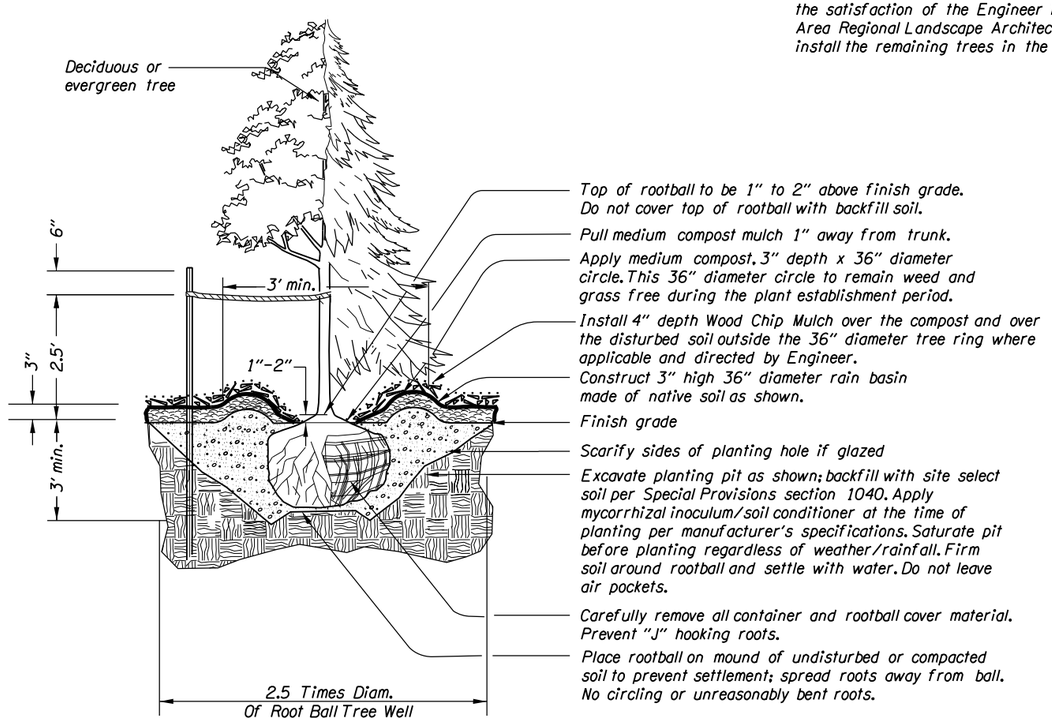
Designer: David Goodyke Reviewer: Ben Ngan
Drafter: David Goodyke Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

NOTE:

After tree location staking is complete and prior to planting any trees, Contractor shall construct two typical tree planting and staking installations per details and specifications, with Engineer and Area Regional Landscape Architect present. When the installations are complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining trees in the same manner.



TREE PLANTING and STAKING
On Terrain Flatter Than 5H:1V

Not To Scale

TREE STAKING NOTES:

1) Tree ties to be either:

Rigid guy system. Galvanized wire to be approximately 1/8" thickness and 24" length with a plastic sleeve over the portion that contacts the tree. The wire tie is to go through the wood stake and be securely fastened.

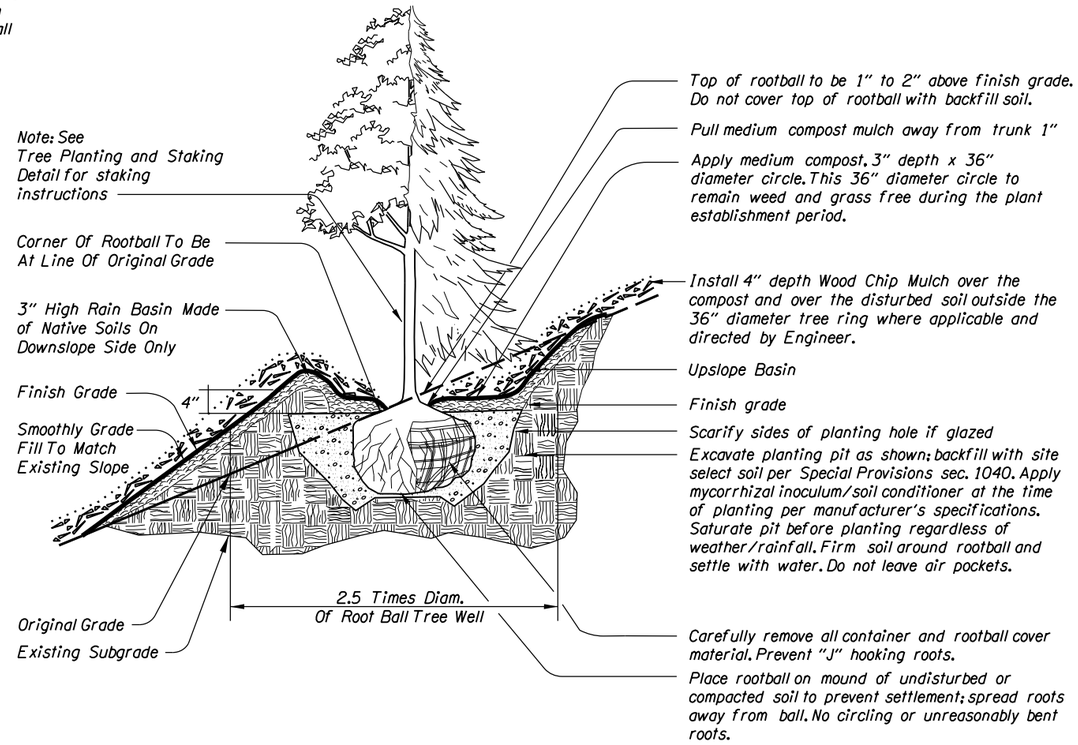
Plastic chain type, approximately 1" width by 1/8" thickness where two stakes are required. Cross ties between stakes and wrap tie around tree. Fasten securely to stake.

2) Furnish tree stakes on all tree plantings.

Stakes to be construction grade, rough sawn or finished Douglas Fir or Pine. Stain with approved green penetrating oil. Stake Size is to be 1½"x1½" by following lengths:

Trees 36" and shorter - Use one - 6' (approximate) stake
Trees taller than 36" - Use one - 8' (approximate) stake

Drive stakes vertically and at least 24" into undisturbed soil. Do not drive stakes through root ball. Locate stakes to best resist prevailing winds.



TREE PLANTING and STAKING on SLOPES
On slopes 5H:1V or steeper

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

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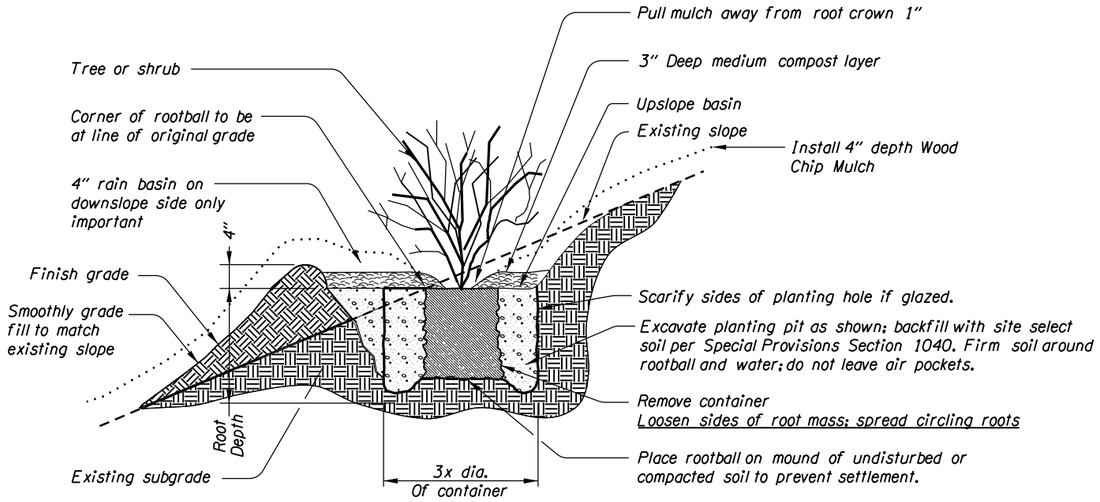
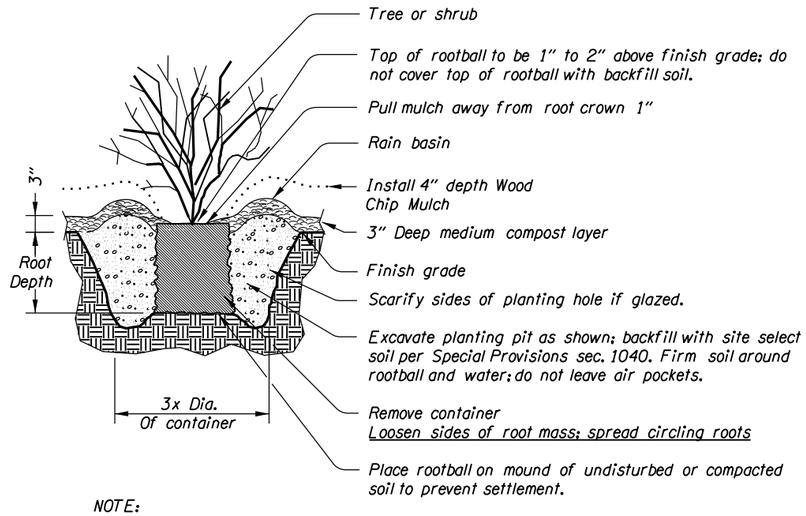


NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2) Apply Mychorrhizae per specifications.

SLOPE PLANTING FOR #1 & #2 CONTAINERS

Not To Scale



NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2)Apply Mycorrhizae per specifications.

GENERAL PLANTING FOR #1 & #2 CONTAINERS

Not To Scale

GENERAL NOTES:
1) All dimensions shown on details are minimum dimensions.

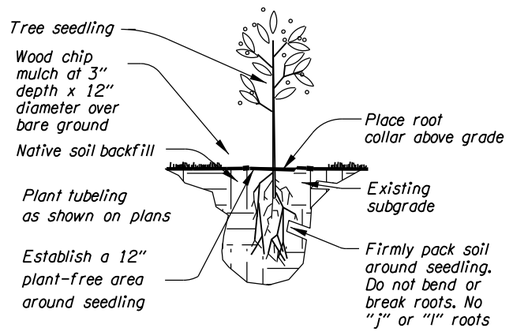
2) See "American Standard for Nursery Stock" for plant quality minimum standards such as size of root ball or caliper of trunk.

3) See plant list or special provisions and identify plant material that may need to be ordered early or contract-grown.

4) Excavate all plant wells per detail at 3x diameter of rootball or container & backfill with site select topsoil free of noxious weeds plant material including roots & sprigs.

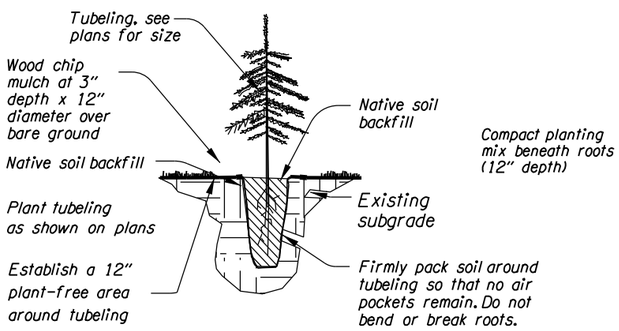
5) After shrub location staking is complete and prior to planting any shrubs. Contractor shall construct a typical shrub planting per detail and specifications with Engineer and Area Regional Landscape Architect present. When the installation is complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining shrubs in the same manner.

6) Apply Mycorrhizae per specifications.



SEEDLING PLANTING

Not To Scale



TUBELING PLANTING

Not To Scale

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

NNA_Roadside_Devel :: FA01-FA07 12/20/2019 12:01:10 PM Jane

FINAL ELECTRONIC DOCUMENT
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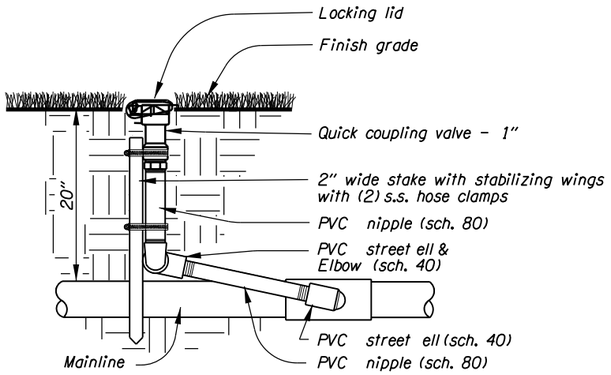
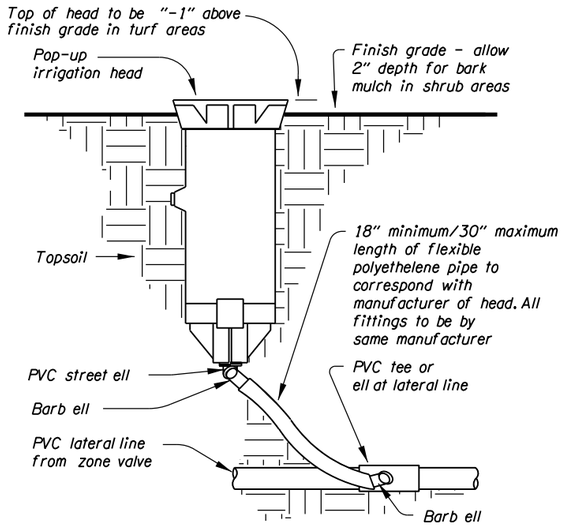
Rotation



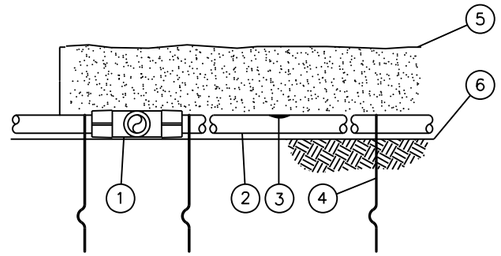
QUICK COUPLING VALVE

Not To Scale



SPRINKLER HEAD AND JOINTS

Not To Scale



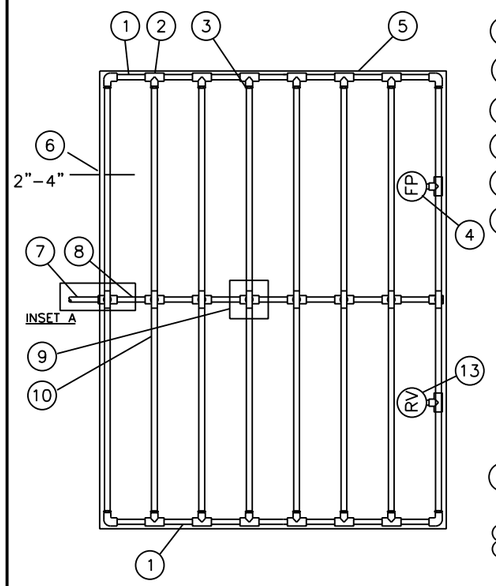
DRIPLINE AT GRADE

Not To Scale

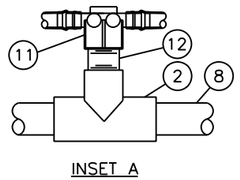
1. Compression Fitting
2. On-Surface Dripline
3. Inline Drip Emitter Outlet
4. Tie-Down Stake
5. Mulch
6. Finish Grade

NOTES:
1) Place tie-down stakes every 3' in sand, 4' in loam, and 5' in clay.

2) At fittings where there is a change of direction, such as tees or elbows, use tie-down stakes on each leg of the change of direction.



1. PVC exhaust header
2. PVC SCH 40 TEE or EL (Typical)
3. Barb x Male Fitting
4. Flush Point (Typical)
5. Perimeter of Area
6. Perimeter Dripline to Pipe to be installed 2"-4" from Perimeter of Area
7. PVC Supply Pipe from Existing Valve
8. PVC Supply Manifold
9. Connection from Supply Manifold to Dripline (Typical) - see Inset A
10. On-Surface Dripline
11. Barb x Female Fitting
12. ¾" PVC Nipple, length as necessary
13. At ends of area, add air relief valve



NOTE:
1) Provide Low Volume (Drip) Tubing with emitters spaced at 18" and providing a flow rate of 0.9 gallons/hour and spaced at 24", or approved equal.

2) Modify detail to meet the specific requirements of the selected equipment brand's manufacturer and the specific shape and size of the plant bed to be irrigated.

LOW VOLUME (DRIP) TUBING

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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503.423.3700

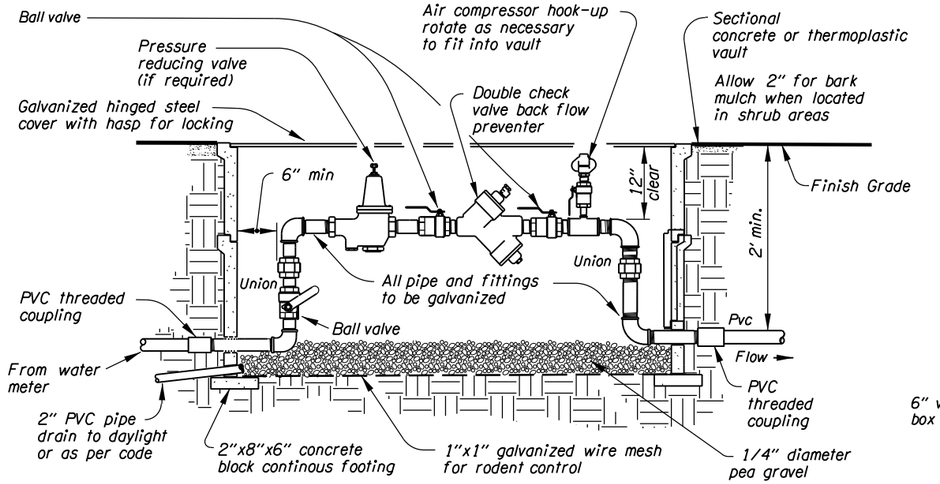
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.



BACKFLOW PREVENTION ASSEMBLY

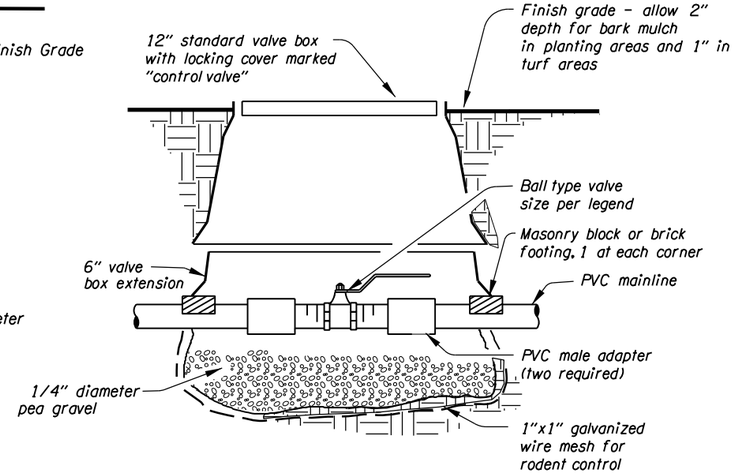
Not To Scale

NOTES:
1) Install backflow prevention assembly in accordance with "accepted procedure and practice in cross connection control manual"

2) Comply with local jurisdiction requirements. These may vary from those shown on drawings. verify compliance.

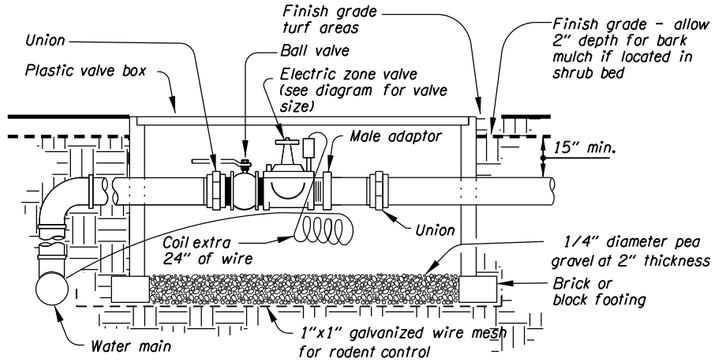
3) Provide 6" access clearance for devices 2" and smaller.

4) Size of double check valve shown on plans or specifications.



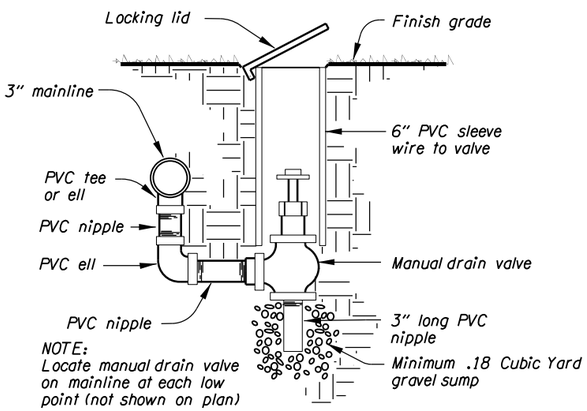
ISOLATION VALVE & BOX

Not To Scale



ELECTRIC ZONE VALVE

Not To Scale



MANUAL DRAIN VALVE

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

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Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 50,776 s.f. Wildflower Seeding
2. Install 14,042 s.f. Wildflower Seeding
3. Install 787 s.f. Water Quality Seeding
4. Install 2,066 s.f. Permanent Seeding
5. Install 50,776 s.f. NROD Mitigation Trees and Shrubs

N

E PORT FWY (I-205)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

"L" 665+00

52 ft

50 ft

LEGEND

- Permanent Seeding
- Water Quality Seeding
- Oregon City NROD Mitigation Trees and Shrubs

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA08-FA08A 12/20/2019 12:01:15 PM Jane

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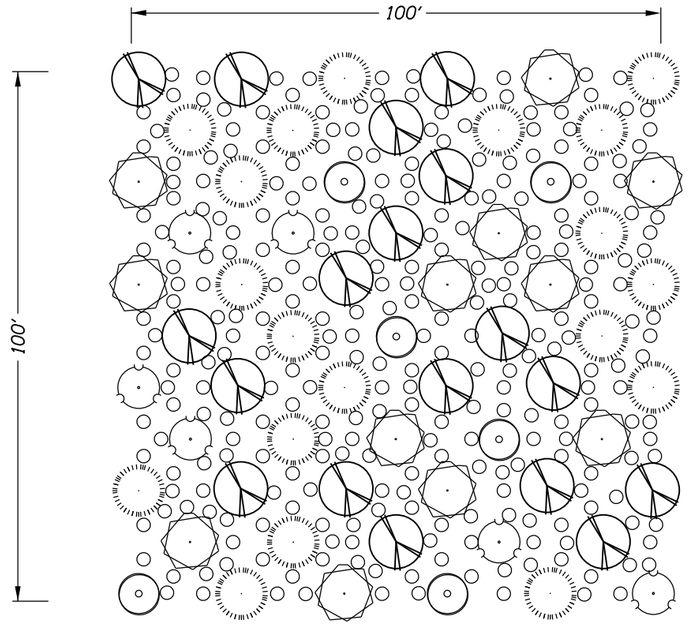
Rotation: 227.6721° 0'



NROD Mitigation Planting Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Arbutus menziezii	13 stems / 10,000 s.f.	20%
	Pinus ponderosa	18 stems / 10,000 s.f.	30%
	Quercus garryana	18 stems / 10,000 s.f.	30%
	Small Trees		
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Salix scouleriana	6 stems / 10,000 s.f.	10%
	Shrubs*		
	Arctostaphylos columbiana	55 stems / 10,000 s.f.	20%
	Berberis (Mahonia) aquifolium	82 stems / 10,000 s.f.	30%
	Ceanothus velutinus	55 stems / 10,000 s.f.	20%
	Corylus cornuta var. Californica	41 stems / 10,000 s.f.	15%
	Ribes lobbii	41 stems / 10,000 s.f.	15%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Arbutus menziezii (TARME), 20%*
- *Pinus ponderosa (TPIPO), 30%*
- *Quercus garryana (TQUGA), 30%*

Small Trees
- *Rhamnus purshiana (TRHPU), 10%*
- *Salix scouleriana (TSASC), 10%*

Shrubs
- *Assorted Species*

DETAIL: NROD MITIGATION TREES AND SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 61 trees/10,000 s.f.

2) Install trees at an average of 13.75' O.C. with triangular spacing

3) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

4) Concentrate TQUGA in areas with most southern and western sun exposure.

5) Install trees in groups of up to 4 specimens per species.

6) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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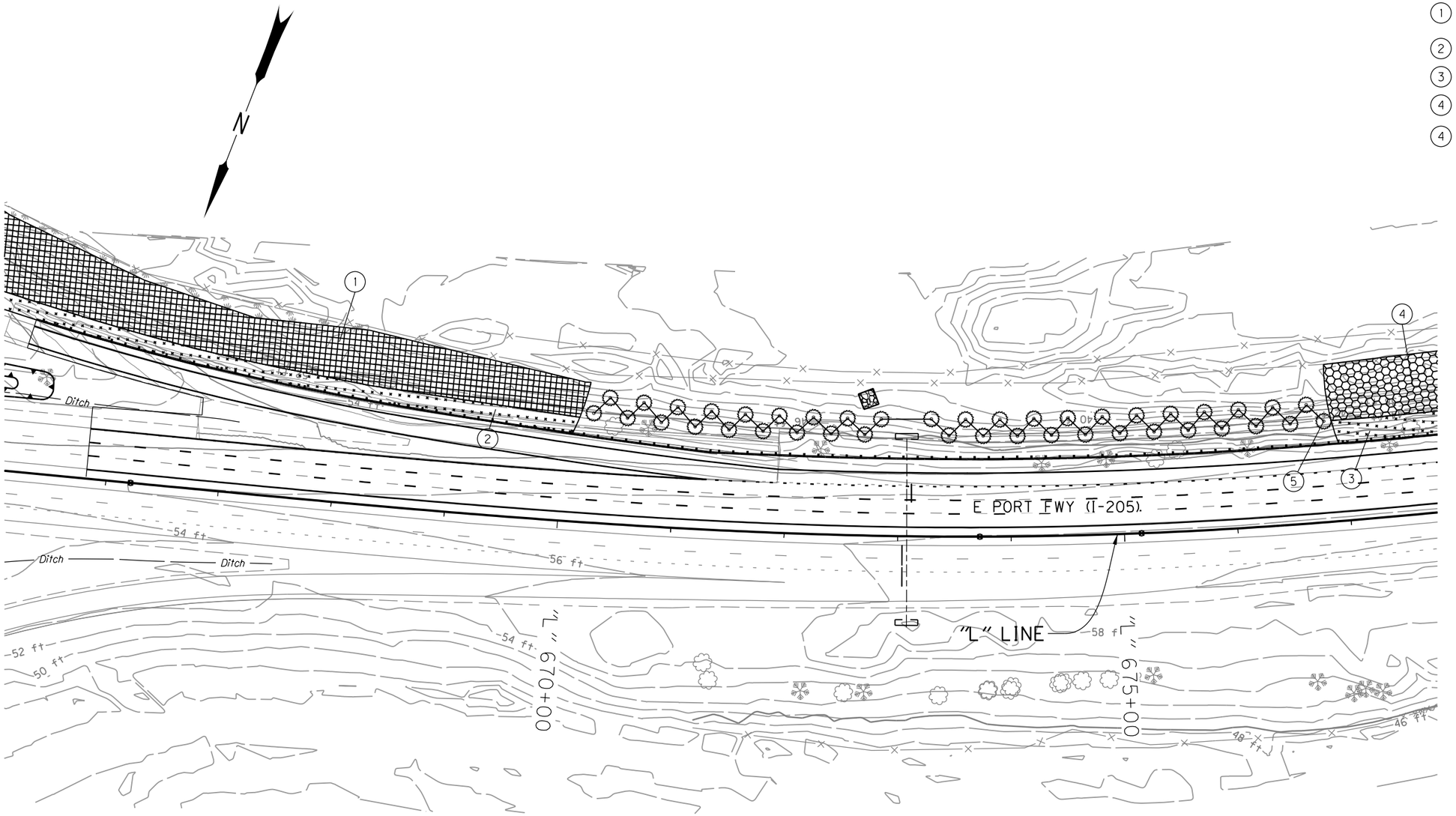
Rotation: 227.6721° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

?? ? – ???

1. Total area on FA08 and FA09, shown on FA08, notes 1 & 5
2. Total area on FA08 and FA09, shown on FA08, note 2
3. Total area on FA09 and FA10, shown on FA10, note 2
4. Total area on FA09 and FA10, shown on FA10, notes 1 & 4
4. Install 42 TPIPO



LEGEND

Oregon City NROD Mitigation Trees and Shrubs

ExistingTrees

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

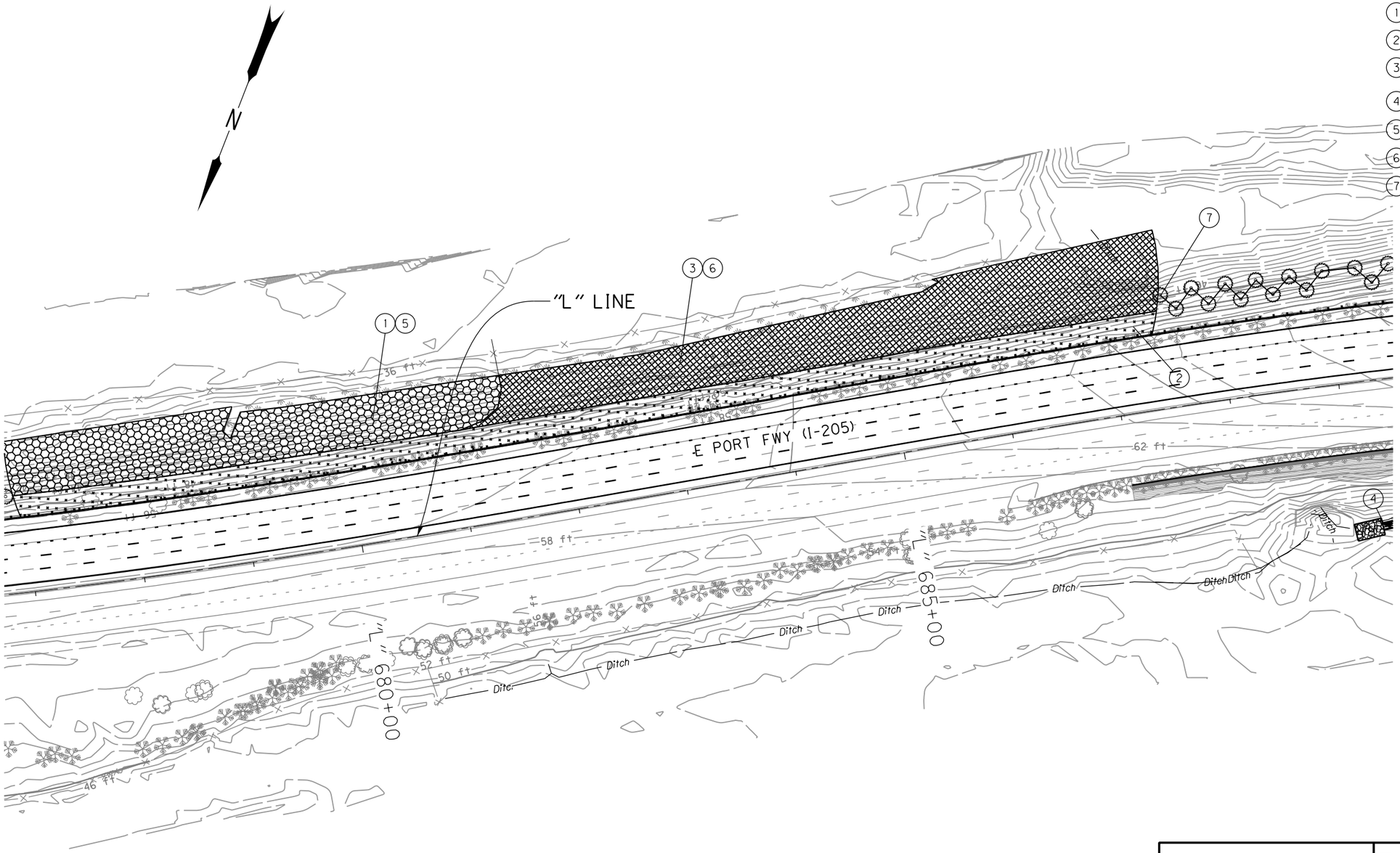
NNA_Roadside_Devel :: FA09 12/20/2019 12:01:20 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 31,833 s.f. Wildflower Seeding
2. Install 22,145 s.f. Wildflower Seeding
3. Install 21,615 s.f. Wildflower Seeding
4. Total quantity for area on FA10 and FA11, shown on FA11, note 1
5. Install 31,833 s.f. NROD Mitigation Trees and Shrubs
6. Install 21,615 s.f. NROD Mitigation Trees and Shrubs
7. Install 14 TPIPO



LEGEND

- Water Quality Seeding
- Oregon City NROD Mitigation Trees and Shrubs
- ExistingTrees

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

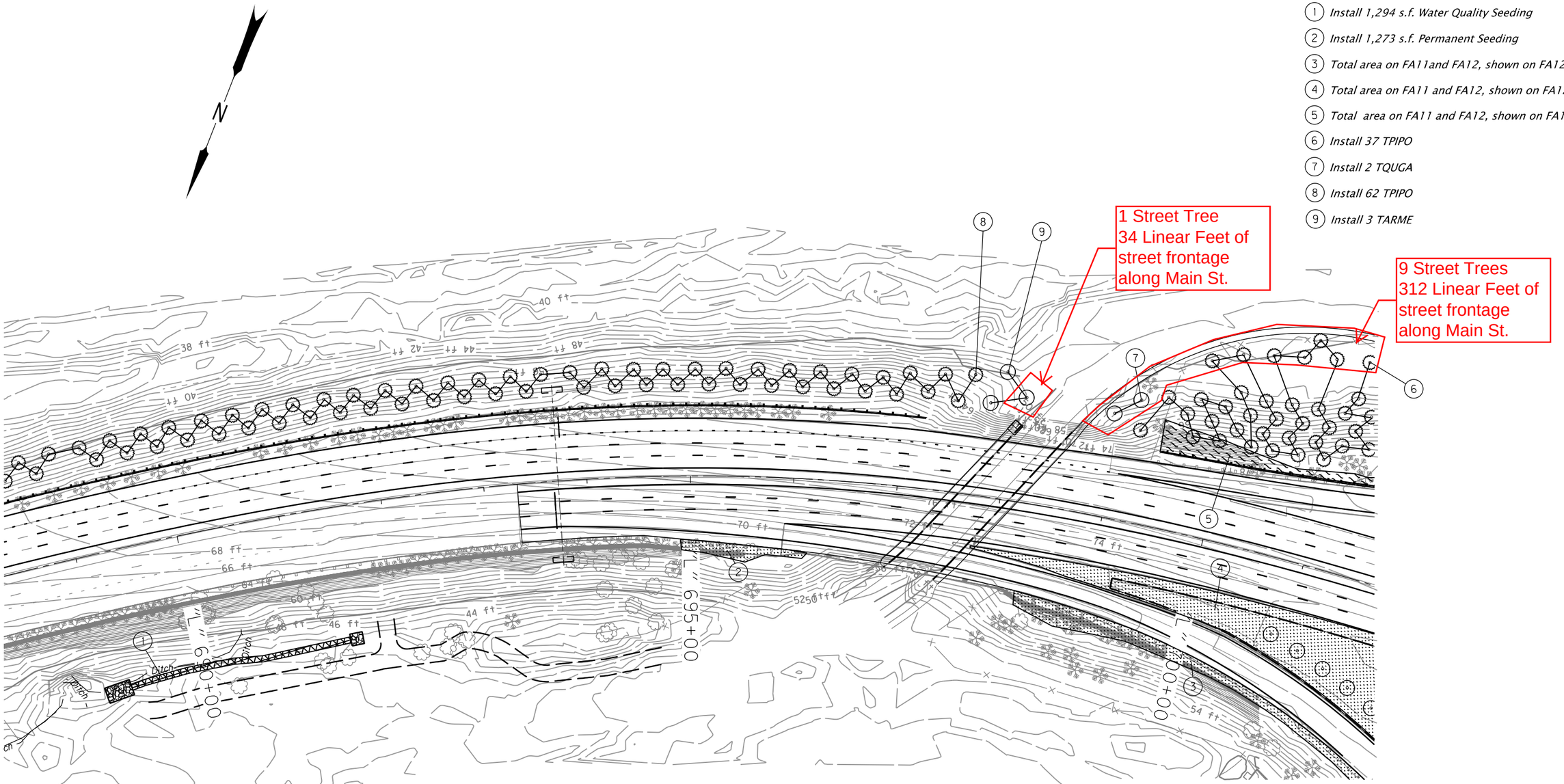
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA10 12/20/2019 12:01:21 PM Jane

Rotation: 228.87° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 1,294 s.f. Water Quality Seeding
2. Install 1,273 s.f. Permanent Seeding
3. Total area on FA11and FA12, shown on FA12, note 1
4. Total area on FA11 and FA12, shown on FA12, note 2
5. Total area on FA11 and FA12, shown on FA12, note 33
6. Install 37 TPIPO
7. Install 2 TQUGA
8. Install 62 TPIPO
9. Install 3 TARME



LEGEND

- Permanent Seeding
- Water Quality Seeding
- Ornamental Grasses and Forbs
- Proposed Trees
- ExistingTrees

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA11 12/20/2019 12:01:22 PM Jane

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AVAILABLE UPON REQUEST

Rotation: 222.7112° 0'

Sec. 29, 30, T. 2 S, R. 2 E, W.M.

??V-???

N

E PORT FWY (I-205)

1. Install 5,507 s.f. Permanent Seeding
2. Install 46,364 s.f. Permanent Seeding
3. Install 418 s.f. Deciduous Shrubs
4. Install 4,033 s.f. Broadleaf Evergreen Shrubs
5. Install 915 s.f. Deciduous Shrubs
6. Install 2,388 s.f. Broadleaf Evergreen Shrubs
7. Install 9,718 s.f. Ornamental Grasses and Forbs
8. Install 4,239 s.f. Deciduous Shrubs
9. Install 9,712 s,f, Broadleaf Evergreen Shrubs
10. Install 20,139 s.f. Ornamental Grasses and Shrubs
11. Install 375 s.f. Deciduous Shrubs
12. Install 260 s.f. Broadleaf Evergreen Shrubs
13. Install 648 s.f. Deciduous Shrubs
14. Install 30,343 s.f. Permanent Seeding
15. Install 3,362 s.f. Broadleaf Evergreen Shrubs
16. Install 1,603 s.f. Permanent Seeding
17. Install 3,471 s.f. Ornamental Grasses and Forbs
18. Install 3,153 s.f. Water Quality Seeding
19. Install 10,277 s.f. Ornamental Grasses and Forbs
20. Install 2,319 s.f. Ornamental Grasses and Forbs
21. Install 989 s.f. Permanent Seeding
22. Install 46,511 s.f. Permanent Seeding
23. Install 1,781 s.f. Water Quality Seeding
24. Install 1,923 s.f. Ornamental Grasses and Forbs
25. Install 2,523 s.f. Broadleaf Evergreen Shrubs
26. Install 43,636 s.f. Permanent Seeding
27. Install 12,295 s.f. Ornamental Grasses and Forbs
28. Install 3,629 s.f. Deciduous Shrubs
29. Install 5,407 s.f. Broadleaf Evergreen Shrubs
30. Install 2,113 s.f. Broadleaf Evergreen Shrubs
31. Install 1,994 s.f. Broadleaf Evergreen Shrubs
32. Install 5,574 s.f. Broadleaf Evergreen Shrubs
33. Install 7,431 s.f. Ornamental Grasses and Shrubs
34. Install 11,524 s.f. Deciduous Shrubs
35. Install 1,379 s.f. NROD Mitigation Shrubs
36. Install 796 s.f. Permanent Seeding
37. Install 8 TPIPO
38. Install 10 TQUGA
39. Install 14 TUMCA
40. Install 14 TQUCH
41. Install 8 TQUCH
42. Install 12 TQUGA
43. Install 6 TQUGA
44. Install 8 TPIPO
45. Install 10 TQUGA
46. Install 6 TQUGA
47. Install 21 TPIPO
48. Install 11 TUMCA
49. Install 4 TPIPO
50. Install 9 TQUGA
51. Install 29 TPIPO
52. Install 12 TQUCH
53. Install 4 TPIPO
54. Install 9 TQUGA
55. Install 5 TPIPO
56. Install 14 TQUGA
57. Install 6 TUMCA

27 Street Trees
896 Linear Feet of street frontage along Main St.

7 Street Trees
283 Linear Feet of street frontage along OR99E

7 Street Trees
267 Linear Feet of street frontage along OR99E

Permanent Seeding
Water Quality Seeding
Proposed Trees
ExistingTrees
Ornamental Grasses and Forbs
Broadleaf Evergreen Shrubs
Deciduous Shrubs

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA12 12/20/2019 12:01:23 PM Jane

FINAL ELECTRONIC DOCUMENT
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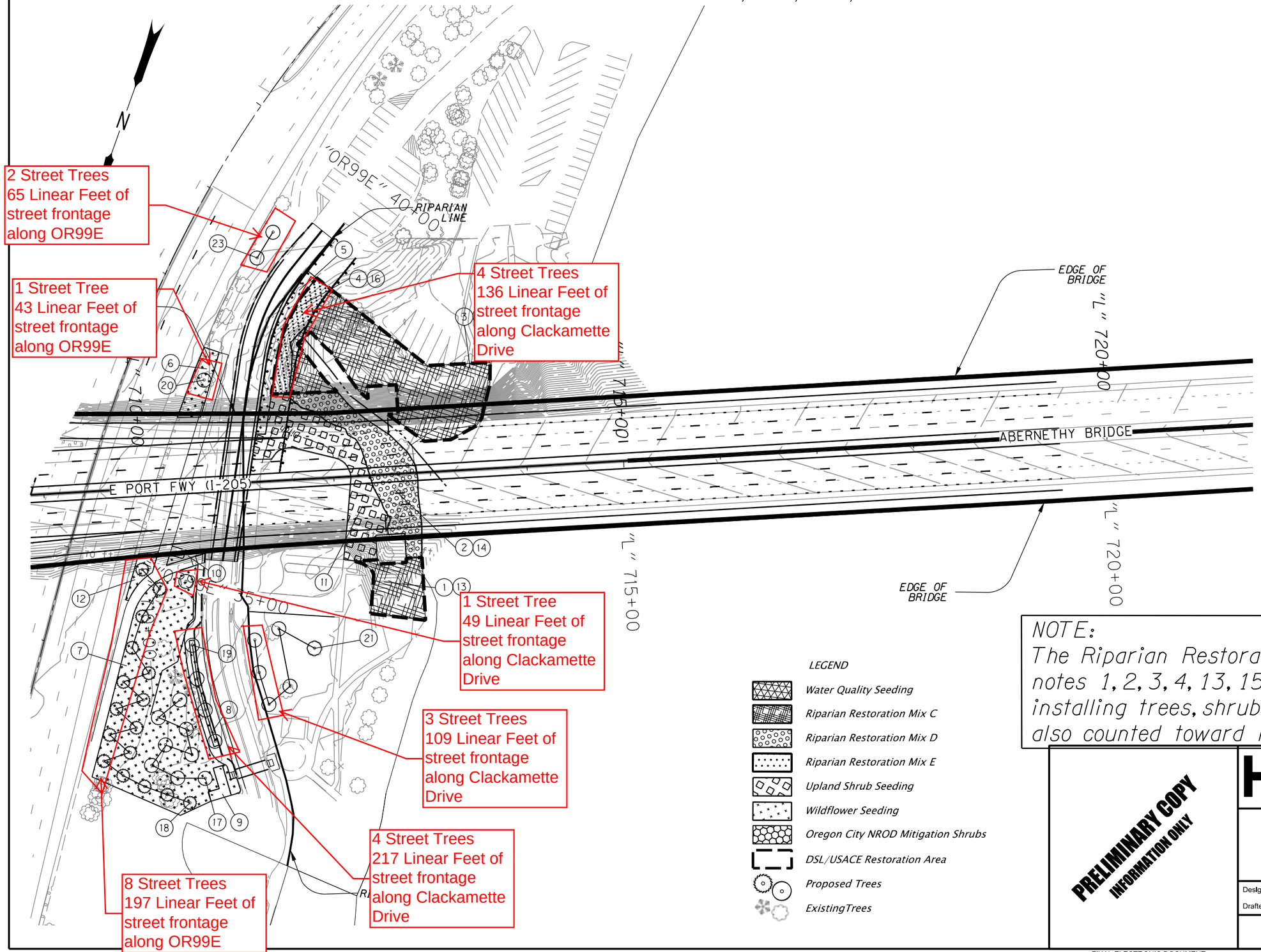
Rotation: 201.4396° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



1. Install 3,144 s.f. Riparian Seeding
2. Install 6,769 s.f. Riparian Seeding
3. Install 13,911 s.f. Riparian Seeding
4. Install 2,132 s.f. Wildflower Seeding
5. Install 1,796 s.f. Wildflower Seeding
6. Install 1,468 s.f. Wildflower Seeding
7. Install 20,102 s.f. Wildflower Seeding
8. Install 618 s.f. Wildflower Seeding
9. Install 440 s.f. Water Quality Seeding
10. Install 212 s.f. Wildflower Seeding
11. Install 7,672 s.f. Upland Shrub Seeding
12. Install 654 s.f. Wildflower Seeding
13. Install 3,144 s.f. Riparian Restoration Mix C
14. Install 6,769 s.f. Riparian Restoration Mix D
15. Install 13,911 s.f. Riparian Restoration Mix C
16. Install 2,132 s.f. Riparian Restoration Mix E
17. Install 8 TQUGA
18. Install 16 TPIPO
19. Install 4 TULAM
20. Install 1 TQUGA
21. Install 6 TULAM
22. Install 10 TPIPO
23. Install 2 TQUGA
24. Install 1 TQUGA

LEGEND

- Water Quality Seeding
- Riparian Restoration Mix C
- Riparian Restoration Mix D
- Riparian Restoration Mix E
- Upland Shrub Seeding
- Wildflower Seeding
- Oregon City NROD Mitigation Shrubs
- DSL/USACE Restoration Area
- Proposed Trees
- ExistingTrees

NOTE:
The Riparian Restoration Mixes called out in notes 1, 2, 3, 4, 13, 15, 16, 17, and 18 specify installing trees, shrubs, and groundcover that are also counted toward NROD mitigation totals.

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

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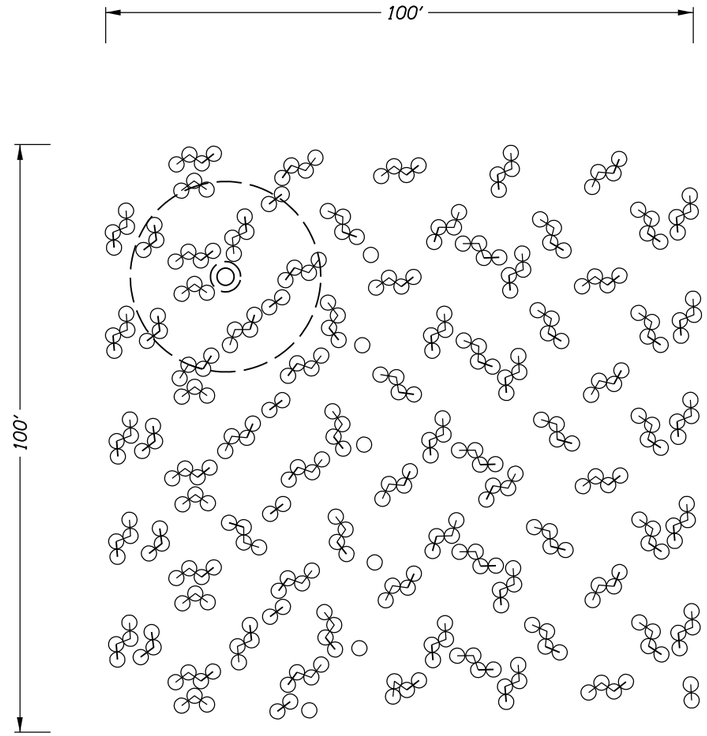
NNA_Roadside_Devel :: FA13-FA13B 12/20/2019 12:01:26 PM Jane

Rotation: 275.7836° 0'



NROD Mitigation Planting Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Berberis (Mahonia) aquifolium	55 stems / 10,000 s.f.	20%
	Cornus sericea	27 stems / 10,000 s.f.	10%
	Ribes sanguineum	41 stems / 10,000 s.f.	15%
	Rubus parviflorus	41 stems / 10,000 s.f.	15%
	Spirea douglasii	41 stems / 10,000 s.f.	15%
	Symphoricarpos albus	68 stems / 10,000 s.f.	25%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND
Shrubs
Assorted Species
5' Buffer
Existing Tree

DETAIL: NROD MITIGATION SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

2) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

3) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

4) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

5) In areas where existing trees are to be preserved, maintain a 5' distance from the adjacent trees trunks to the edge of shrubs.

6) Adjust planting locations as necessary to avoid disturbing mature tree roots over 2" diameter.

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Name
Drafter: David Goodyke | Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

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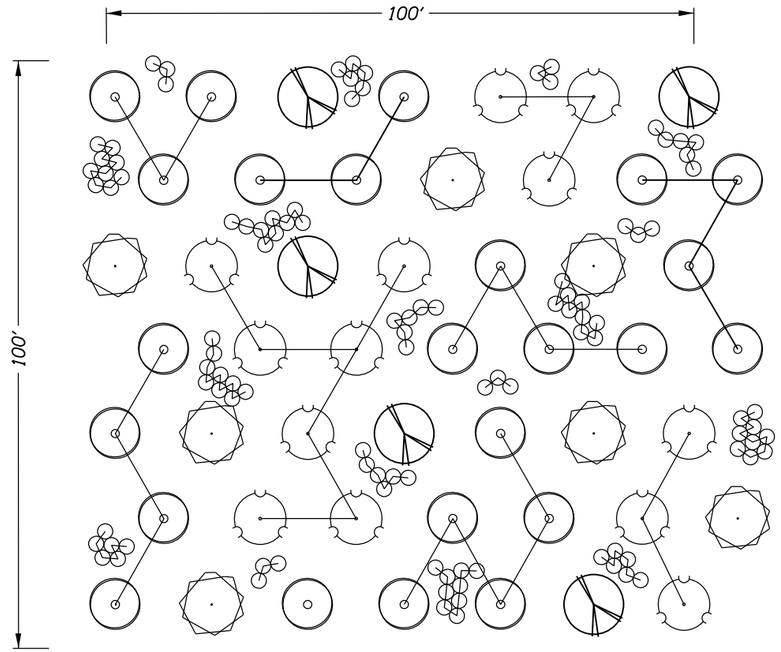

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND

Large, Slow-Growing Trees
- Acer macrophyllum (TACMA), 10%
- Abies grandis (TABGR), 10%
- Thuja plicata (TTHPL), 8%

Small Trees
- Fraxinus latifolia (TFRLA), 6%
- Prunus emarginata (TPREM), 15%
- Salix lucida ssp. Lasiandra(TSALU), 15%
- Rhamnus purshiana (TRHPU), 10%

Fast-Growing Trees
- Alnus rubra (TALRU), 26%

Shrubs
- Lowland Shrubs

Riparian Restoration Mix C: Lowland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Abies grandis	5 stems / 10,000 s.f.	10%
	Acer macrophyllum	4 stems / 10,000 s.f.	10%
	Thuja plicata	4 stems / 10,000 s.f.	8%
	Small Trees		
	Fraxinus latifolia	3 stems / 10,000 s.f.	6%
	Prunus emarginata	7 stems / 10,000 s.f.	15%
	Salix lucida ssp.lasiandra	7 stems / 10,000 s.f.	15%
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Fast-Growing Trees (13)*		
	Alnus rubra	13 stems / 10,000 s.f.	26%

Riparian Restoration Mix C and D: Lowland Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Cornus sericea	27 stems / 10,000 s.f.	25%
	Physocarpus capitatus	11 stems / 10,000 s.f.	10%
	Rubus spectabilis	16 stems / 10,000 s.f.	15%
	Sambucus racemosa	11 stems / 10,000 s.f.	10%
	Spirea douglasii	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	27 stems / 10,000 s.f.	25%

* Groupings required

DETAIL: LOWLAND TREES AND PLANTING MIX C AND D

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 49 trees/10,000 s.f.

2) Install trees at an average of 15' O.C. with triangular spacing, 49 trees/10,000 s.f. Large, Slow-Growing Trees must be planted at minimum 30' O.C. from one another. Fast-Growing and Small Trees shall be installed at a 10 - 20' O.C. average spacing from others.

3) Install Fast-Growing Trees in groups of 2 - 7

4) Install Small Trees in groups of 2 - 5

5) Install shrubs at an overall density of 108 shrubs/10,000 s.f.

6) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

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I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Name
Drafter: David Goodyke | Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

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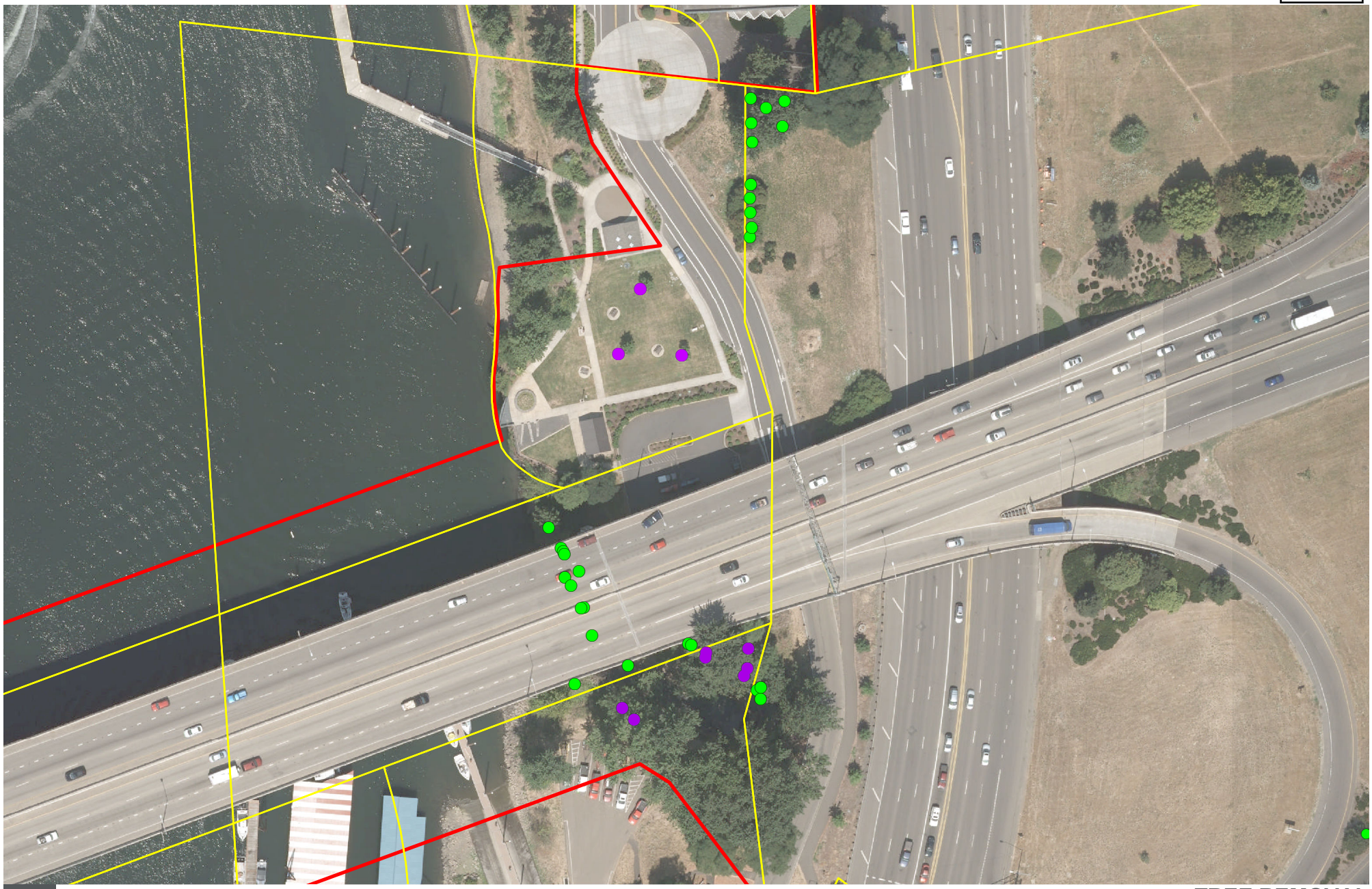

TREE REMOVAL

0 62.5 125 Feet

12.08 Trees to be removed

17.41 Trees to be removed

Project Area

Tax Lots

DATA SOURCE: ESRI, HDR, City of Oregon City

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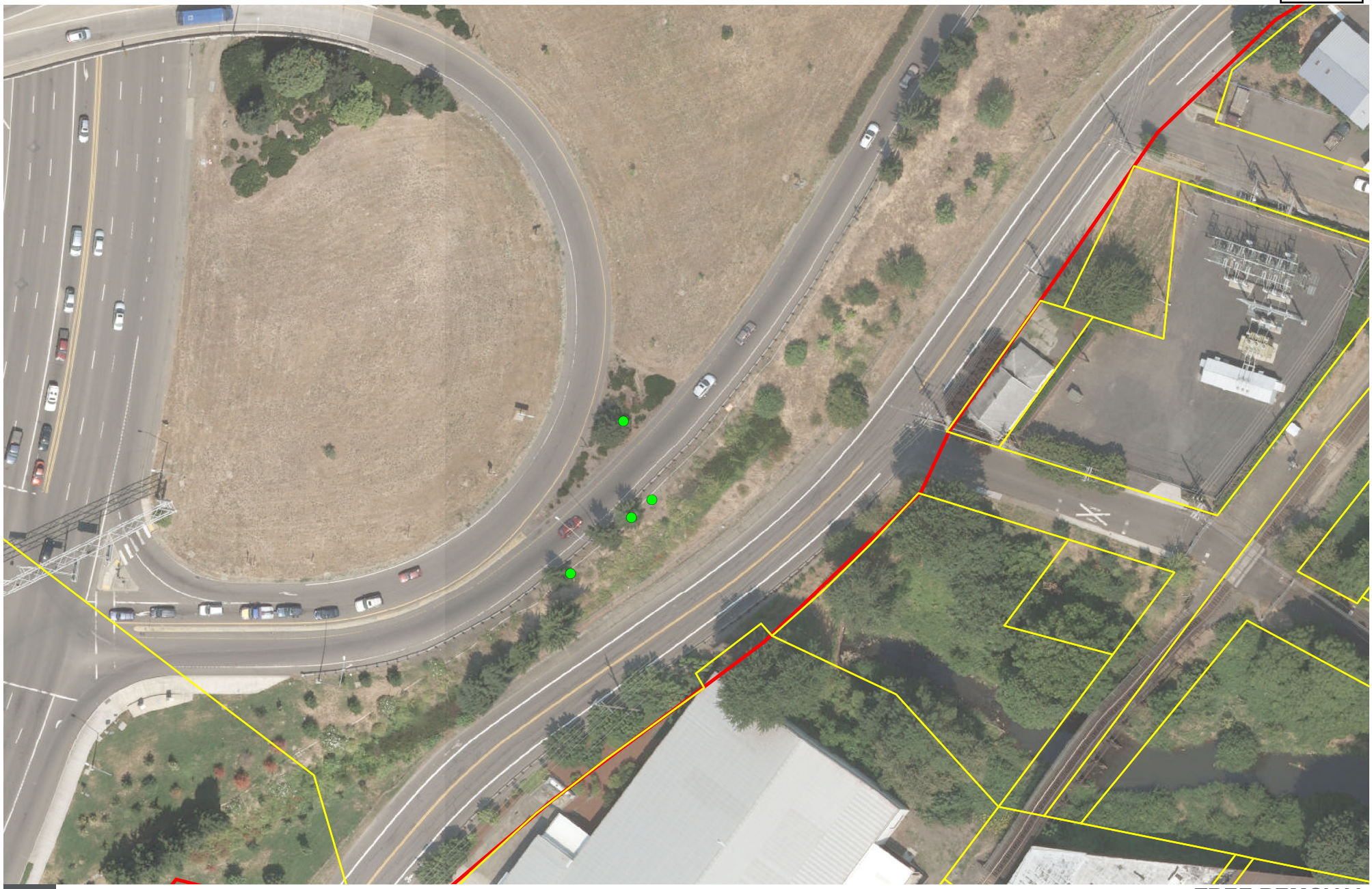

TREE REMOVAL

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\TREEREMOVAL.MXD - USER: RBARKSDALE - DATE: 8/1/2019

TREE REMOVAL

0 90 180 Feet

12.08 Trees to be removed

17.41 Trees to be removed

Project Area

Tax Lots

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\TREEREMOVAL.MXD - USER: RBARKSDALE - DATE: 8/1/2019

TREE REMOVAL

0 90 180 Feet

12.08 Trees to be removed

17.41 Trees to be removed

Project Area

Tax Lots

DATA SOURCE: ESRI, HDR, City of Oregon City

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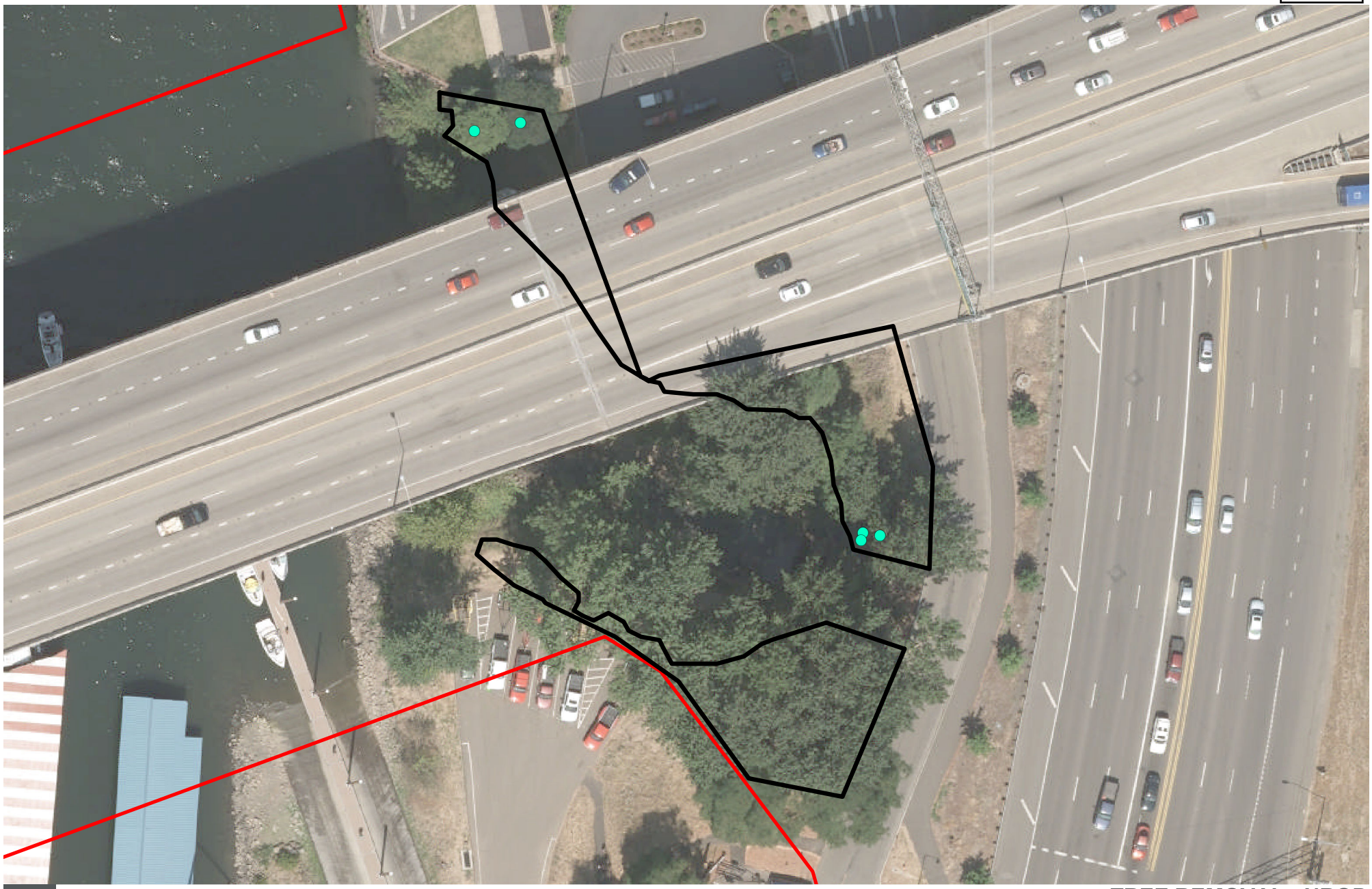

TREE REMOVAL - NROD

0 30 60 Feet

Project Area | NROD | 17.49 Trees to be Removed

DATA SOURCE: ESRI, HDR, City of Oregon City

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TREE REMOVAL - NROD

0 105 210 Feet

Project Area

NROD

17.49 Trees to be Removed

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED_NOLABELS.MXD - USER: RBARKSDALE - DATE: 8/7/2019

12.08.035 Tree Removal – Trees within right-of-way

Trees that are dead, diseased, or hazardous				**Trees that are not dead, diseased, or hazardous**			
Diameter of tree to be Removed (Inches of diameter at 4-ft height)	**Proposed # for removal**	*Number of Replacement Trees to be Planted*	**Proposed # for replacement**	*Diameter of tree to be Removed (Inches of diameter at 4-ft height)*	**Proposed # for removal**	*Number of Replacement Trees to be Planted*	**Proposed # of replacement trees**
Any Diameter	**0**	*1 Tree*	**0**	*Less than 6"*	**11**	*1 Tree*	**11**
				6" to 12"	**69**	*2 Trees*	**138**
				13" to 18"	**44**	*3 Trees*	**132**
				19" to 24"	**9**	*4 Trees*	**36**
				25" to 30"	**4**	*5 Trees*	**20**
				31" and over	**0**	*8 Trees*	**0**
TOTAL					**(137)**		**337**

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17.41.060 Tree Replacement Requirements – trees on public property

Size of tree removed (DBH)	*Column 1* *Number of trees to be planted. (If removed **Outside** of construction area)*	**Proposed # of Trees for removal outside construction area**	*Column 2* *Number of trees to be planted. (If removed **Within** the construction area)*	**Proposed # of trees for removal within construction area**	**Proposed # of replacement trees**
6 to 12"	*3*	**0**	*1*	**5**	**5**
13 to 18"	*6*	**0**	*2*	**3**	**6**
19 to 24"	*9*	**0**	*3*	**1**	**3**
25 to 30"	*12*	**0**	*4*	**0**	**0**
31 and over"	*15*	**0**	*5*	**0**	**0**
TOTAL				**(9)**	**14**

17.49.180 NROD tree removal mitigation – trees within NROD

Size of tree (DBH) being removed	Proposed # of trees for removal	Proposed # of replacement trees
6-12	8	
13-18	19	
19-24	16	
25-30	2	
31+	0	
TOTAL	**(45)**	**587**

Mitigation Option 2 requirements are based on the size of the disturbance area.

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Total proposed tree removal and replacement

OCMC Tree removal section	Proposed # of trees for removal	Proposed # of trees for replacement
12.08	137	337
17.41	9	14
17.49	45	587
TOTAL	**(191)**	**938**

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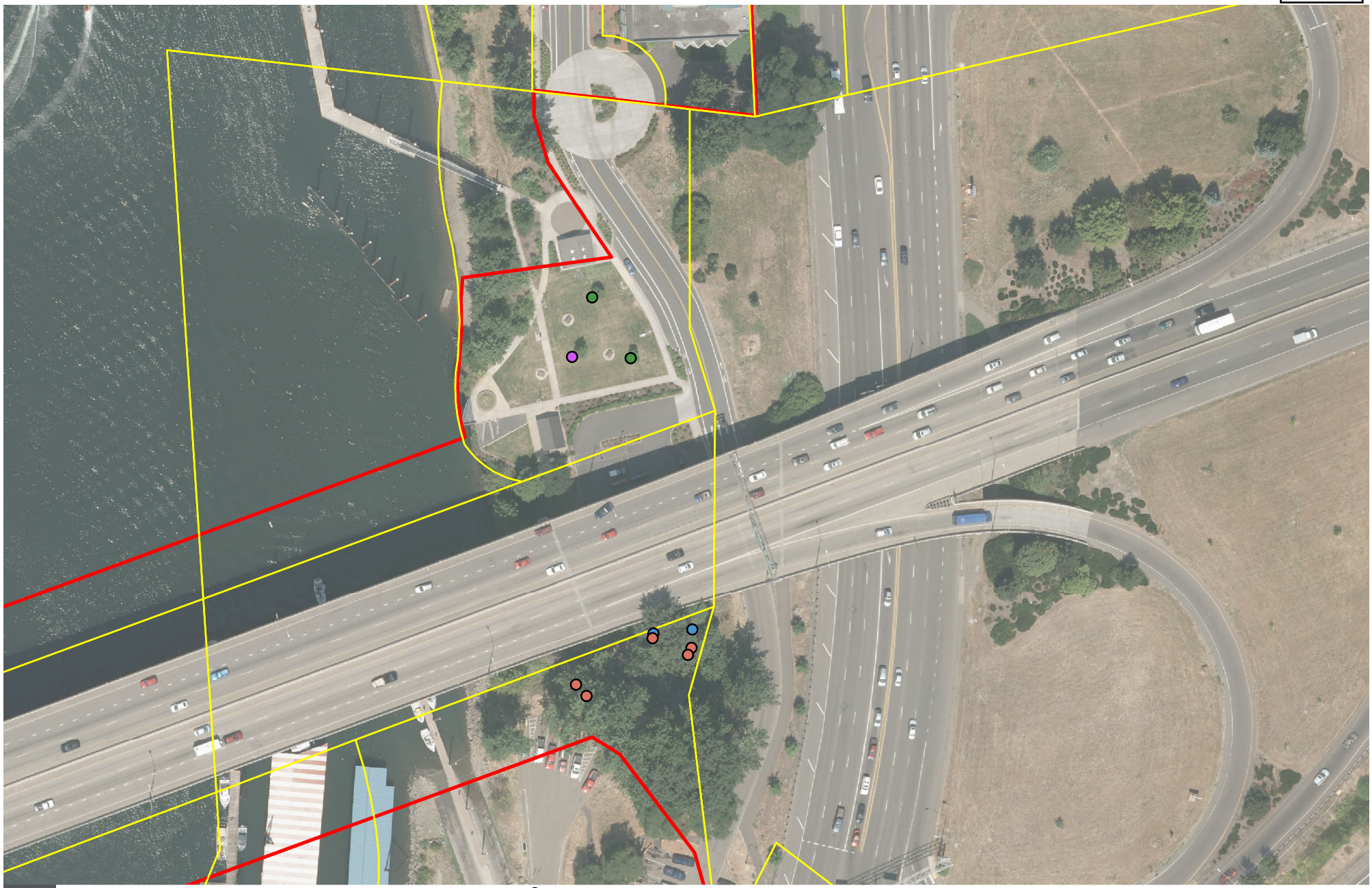
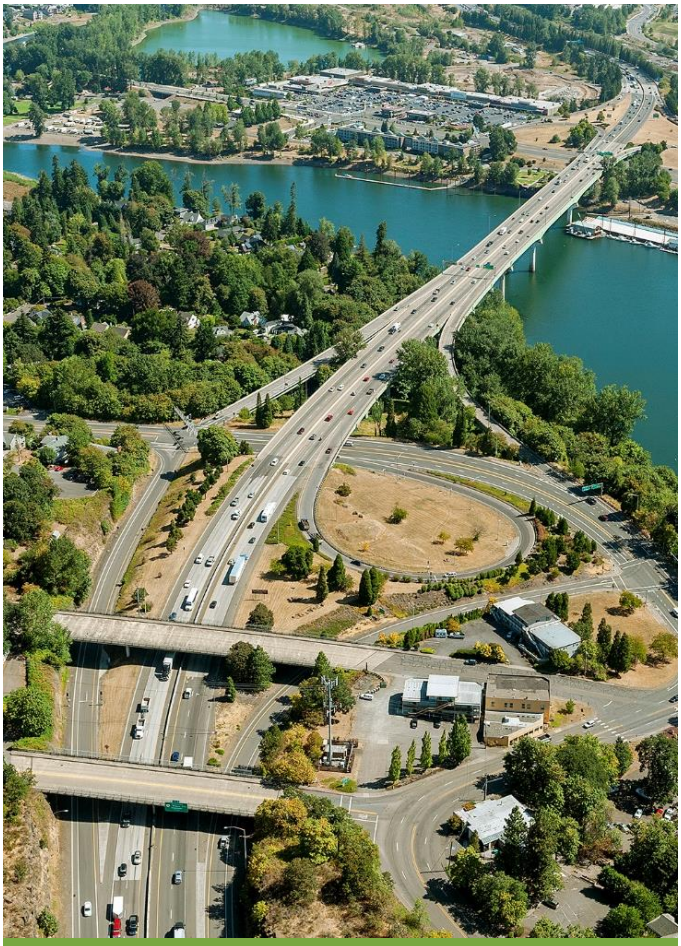


TREE REMOVAL

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\TREE_REMOVAL.GDB\TREEREMOVAL17.62.MXD - USER: RBARKSDALE - DATE: 8/8/2019

Attachment C(1). Stormwater Report



Preliminary Stormwater Report

ODOT | K19786 I-205: I-5 – OR 213, Phase 1

Combined I-205 Freeway Widening and Abernethy Bridge Project

ODOT EA: PE003013
HDR Project # 10063137

December 20, 2019

Prepared by: Cory Gieseke, PE – HDR

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1.2 Project Description 1
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Appendices

Appendix A. NRCS Soil Survey Report, Draft Infiltration Testing Memo, and Groundwater Well Locations

Appendix B. Contributing Impervious Area, Impervious Surface Area, and Water Quality Facility Figures

Appendix C. Hydrology Calculations

Appendix D. Stormwater Facility Design Calculations

Appendix E. Operation and Maintenance Manuals

Appendix F. Downstream Analysis

Acronyms

ADT	average daily traffic
bgs	below ground surface
BMP	Best Management Practice
cfs	cubic feet per second
CIA	contributing impervious area
DDE	dichloro-2,2-bis(p-chlorophenyl) ethylene
DDT	dichlorodiphenyltrichloroethane
ft/s	feet per second
HSG	Hydrologic Soil Groups
in/hr	inches per hour
MP	mile post
NAVD88	North American Vertical Datum of 1988
NB	northbound
NRCS	Natural Resources Conservation Service
ODOT	Oregon Department of Transportation
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
project	I-205: I-5 – OR 213, Phase 1
ROW	right-of-way
SB	southbound
STA	Station
SWMACC	Surface Water Management Agency of Clackamas County
USGS	U.S. Geological Survey

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1 Introduction

1.1 Purpose

This report provides a water quality impact assessment and post-construction stormwater management plan for the I-205: I-5 – OR 213, Phase 1 (project). The report summarizes the project stormwater management plan and discusses minimization of water quality impacts.

1.2 Project Description

This project is located on I-205 from mile post (MP) 8.71 to MP 10.24 in Clackamas County, Oregon.

Main components of the project include:

- Reconstructing the I-205 southbound (SB) auxiliary lane from the OR 99E exit ramp to the OR 43 entrance ramp (across the Abernethy Bridge)
- Reconstructing and extending the I-205 northbound (NB) auxiliary lane from the OR 43 entrance ramp to the OR 99E exit ramp (across the Abernethy Bridge)
- Constructing the NB auxiliary lane from OR 99E entrance ramp to OR 213 exit ramp
- Adjusting the OR 99E interchange ramp geometries to conform to the additional freeway lanes
- Modifying the OR 43 interchange by consolidating the entrance and exit ramps and removing the existing OR 43 NB entrance ramp that connects to the Abernethy Bridge
- Widening and seismically retrofitting the following bridges:
    - I-205 over Willamette River (Abernethy Bridge) – MP 9.03
    - I-205 SB Connector #2 to OR 43 (West Linn interchanges) – MP 9.14
    - I-205 NB Connector #1 to OR 99E (Oregon City interchange) – MP 9.30
    - I-205 over Main Street (Oregon City) – MP 9.51

2 Stormwater Design Requirements

The project will be designed to meet stormwater management design standards outlined in Oregon Department of Transportation's (ODOT) *Hydraulics Manual* (2014), Oregon City Public Works *Stormwater and Grading Design Standards* (2019), or City of Portland *Stormwater Management Manual (2016)*, as amended and adopted by the City of West Linn and the requirements in the City of West Linn Public Works *Design Standards* (2010). In the event design standards are different for the two agencies in overlapping coverage areas, the most conservative standard will be used. The following sections address preliminary water quality and quantity control design criteria.

2.1 Water Quality Standards

Stormwater treatment within ODOT's right-of-way (ROW) is required to meet water quality control standards (ODOT 2014). The project water quality goal is met if "…treatment is provided for all of the runoff generated by the Water Quality Design Storm from the contributing impervious area (CIA) using Best Management Practices (BMPs) that utilize infiltration, media filtration, or vegetative filtration." The project's CIA consists of all impervious surfaces within the project limits and impervious surfaces owned or operated by ODOT outside the project limits that drain to the project via direct flow or discrete conveyance.

Stormwater quality treatment facilities will be designed based on a water quality design flow rate and volume. Per the City of West Linn and Oregon City, the water quality design storm is 0.83 and 1.0 inch, respectively. However, ODOT's *Hydraulics Manual*s water quality design storm is one-half of the 2-year, 24-hour storm event, or 1.22 inches. Water quality facilities will be designed using the ODOT water quality design storm of 1.22 inches. Table 1 provides additional project design rainfall depths.

Table 1. Design Rainfall Depth

Return Interval	Rainfall Depth ODOT (inches)[1]	Rainfall Depth West Linn (inches)[2]	Rainfall Depth Oregon City (inches)[3]
Water Quality	1.22	0.83	1.0
2	2.44	2.4	2.8
10	3.28	3.4	3.5
25	3.82	3.9	4.0
50	4.17	N/A	4.4
100	4.65	4.4	4.5

[1] ODOT Hydraulics Manual Chapter 7 Appendix H, Oregon 24-Hour Precipitation Maps
[2] City of Portland Stormwater Management Manual Appendix A, Table A-1
[3] Oregon City Stormwater and Grading Design Standards Chapter 5, Table 5-2

2.1.1 Target Pollutant Removal

Pollutants of concern typically expected in highway runoff are sediment, nutrients, oil and grease, polycyclic aromatic hydrocarbons (PAH), and particulate and dissolved metals (such as copper and lead). Because I-205 has a high average daily traffic (ADT), high pollutant loads and concentrations are expected.

2.1.2 Receiving Waterbodies

The proposed receiving waterbody is the Willamette River. Table 2 lists the beneficial uses and water quality impairments for the receiving waterbody.

Table 2. Receiving Waters Beneficial Uses and Water Quality Impairments

Waterbody	Beneficial Uses[1]	Listed Water Quality Impairments[2]
Willamette River	Public/private/industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, commercial navigation and transportation	aldrin, chlorophyll a, chlordane, DDE, DDT, dieldrin, dioxin, e coli, hexachlorobenzene, iron, lead, manganese, mercury, PCB, pentachlorophenol, polynuclear aromatic hydrocarbons, temperature

[1] Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines, Appendix 3 Designated Beneficial Uses(Oregon Department of Environmental Quality [DEQ] 2018)

[2] Water Quality Assessment – Oregon's 2012 Integrated Report Assessment Database and 303(d) List (DEQ 2014)

DDE=Dichloro-2,2-bis(p-chlorophenyl) ethylene

DDT=Dichlorodiphenyltrichloroethane

PCB=Polychlorinated Biphenyls

2.2 Water Quantity Standards

2.2.1 Detention

ODOT requires detention when one of the following criteria is met (ODOT 2014):

- Required by a local jurisdiction
- Drainage deficiencies, such as flooding, have been documented
- Discharge into an intermittent or perennial waterbody with an upstream drainage basin less than 100 square miles
- Uncontrolled peak post-construction discharge rate during the design storm increases 0.5 cubic feet per second (cfs) or more
- Total contributing area after the proposed development is 0.25 acres or more

ODOT detention guidelines are in place to reduce streambed and bank impacts to the receiving streams. The project should not increase peak flows or duration of flows for a recurrence interval that corresponds to a flow resulting in sediment transport. ODOT defines sediment transport flows from a lower end of 42 percent of the 2-year event to an upper threshold of the 10-year event for incised streams or bank overtopping for minimally incised streams.

ODOT does not require detention if the site discharges into a waterbody with an upstream drainage basin greater than 100 square miles.

Oregon City uses the same flow control guidelines as ODOT, and exempts systems that discharge directly to the Clackamas River, Willamette River, and Abernethy Creek from flow control.

The City of West Linn requires the post-project runoff from a 2-year, 24-hour storm event to be less than or equal to one-half the runoff from a 2-year, 24-hour storm for pre-development conditions. The facilities must also control the post-development peak flows

from the 5-, 10-, and 25-year, 24-hour storm to the predevelopment 5-, 10-, and 25-year, 24-hour design storm events. Systems that discharge stormwater runoff directly into the Willamette River or through a conveyance system that has adequate capacity to convey the 10-year storm event to the Willamette River are exempt from detention requirements.

2.2.2 Infiltration Design Standards

The City of West Linn and Oregon City stormwater design guidance materials both recommend the use of infiltration as a stormwater treatment and disposal technique above other methods. Both the City of Portland *Stormwater Management Manual*, as modified by the City of West Linn and the Oregon City Public Works *Stormwater and Grading Design Standards* state that infiltration may not be required if site conditions make infiltration infeasible. Examples include:

- The site has seasonally high groundwater of less than 5 feet below the lowest elevation of the infiltration facility,
- The site has low infiltration rates of less than 2.0 inches per hour,
- The facility would be located on fill, and
- The site is located near steep slopes or does not meet slope setbacks.

Infiltration testing is discussed in Section 3.1.1; none of the tests had infiltration rates above 2.0 inches per hour. Because of the low onsite infiltration rates, infiltration will not be utilized as a treatment and disposal technique. Infiltration will be allowed to the extent that passive infiltration occurs. Because the proposed stormwater facilities are flow-through treatment facilities, very little to zero infiltration is anticipated to occur.

3 Existing and Proposed Conditions

3.1 Existing Conditions

The project is located along the existing I-205 corridor, between the Park Place Interchange and West A Street. The roadway topography varies between flat and 3 percent slopes and generally slopes downhill in a west to east direction. The embankment side slopes range from flat to retaining walls. The roadway surface is located in both cut and fill sections in relation to the adjacent ground. In general, the northern side of the highway is at a higher elevation than the southern side. Elevations along the project range from 50 to 160 feet.

3.1.1 Geotechnical Investigations

Soils within the project area generally consist of the Hydrologic Soil Groups (HSG) C and D, with a few pockets of HSG B. The entire Natural Resources Conservation Service (NRCS) Soil Survey Report can be found in Appendix A (NRCS 2017).

In-situ infiltration tests were completed in several locations throughout the project. Locations of the tests are shown in the Stormwater CIA Exhibit (Appendix B) and summarized in Table 3. Multiple tests were conducted at each location. The average

infiltration rates during the August 2018 geotechnical investigation ranged from 0.24 inches per hour (in/hr) to 1.44 in/hr.

Table 3. In-Situ Infiltration Test Results

Designation	Approximate Depth (feet)	Infiltration Testing Method	Final Infiltration Rate for each Trial (inches/hour)			Average Infiltration Rate (inches/hour)
			1	2	3	
INF19786-11	2.0	Open Pit Falling Head Test	0.72	0.36	0.36	0.48
INF19786-12	2.0	Open Pit Falling Head Test	1.44	0.72	1.44	1.20
INF19786-13	3.0	Open Pit Falling Head Test	1.44	1.44	1.44	1.44
INF19786-14	3.5	Open Pit Falling Head Test	1.44	0.72	1.44	1.20
INF19786-15	2.0	Open Pit Falling Head Test	0.36	0.00	0.36	0.24

Groundwater wells were installed in October of 2017 and November of 2018, and elevations of seasonal groundwater levels have been measured periodically since installation. The piezometers were installed near the west and east ends of the Abernethy Bridge. See Table 4 for measured seasonal high groundwater elevations and Appendix A for locations of wells. For locations not in the vicinity of the test wells, the U.S. Geological Survey (USGS) groundwater elevation maps are referenced for approximate groundwater elevations (USGS 2009). The portion of the project located within West Linn will have groundwater located between 60 and 70 feet below ground surface (bgs). The portion of the project located in Oregon City will have groundwater located between 12 and 20 feet bgs.

Table 4. Measured Seasonal High Groundwater Elevations

Facility Number	Anticipated Seasonal High Groundwater Elevation (NAVD88) (feet)
TB19786-01	13.8
TB19786-09	27.4
TB19786-30B	17.5
TB19786-32	17.6
TB19786-40	26.1
TB19786-44	36.5

3.2 Existing Facilities

The existing project area consists of approximately 22 acres of CIA, including pavement, gravel shoulders, overpasses that drain to the project, and bridges.

The existing stormwater management features only consist of conveyance systems; there are no existing water quality facilities within the project footprint. The existing conveyance systems will be utilized to the extent feasible; however, incorporating new water quality facilities and providing a conveyance system that meets current design standards will require construction of additional conveyance networks.

3.3 Pre-development Conditions

The City of West Linn water quantity design criteria requires the post-project runoff from a 2-, 10-, and 25-year, 24-hour storm event be less than or equal to the runoff from the corresponding storm event for pre-development conditions. ODOT and Oregon City water quantity design criteria require the duration of peak flow rates from post-development conditions to be less than or equal to the duration of peak flow rates from pre-development conditions for all peak flows between 42 percent of the 2-year peak flow rate up to the 10-year peak flow rate. Pre-development refers to what the landscape was before any human alterations took place. To compare pre-development conditions to post-project discharge values, the assumed undisturbed project area is a forest or woods in good hydraulic condition.

3.4 Proposed Conditions

The proposed changes to existing conditions that could potentially affect water quality or hydrology include widening the roadway surface an additional travel lane in both directions and, to a lesser extent, removing and relocating existing bridges and ramps. The proposed project area will consist of 26.6 acres of CIA. The additional travel lanes will not change existing roadway drainage patterns. In some areas along the project, drainage ditches will be replaced with closed conduit conveyance systems due to lack of available space. To meet the stormwater design criteria, water quality facilities are proposed along the length of the project and a water quality/detention facility is proposed at one location. These facilities are generally located in areas with adequate available ROW to construct and safely maintain the facilities following ODOT guidelines.

Drainage curbs and inlets will be utilized to the extent practicable to capture only runoff from the roadway surface and not capture or convey runoff from non-roadway surfaces to water quality facilities. This will help reduce the required amount of ROW for the overall water quality facilities footprints.

4 Preliminary Stormwater Recommendation

The project has been divided into basins based on topography and the proposed conveyance system. Appendix B provides a map of basin and facility locations. Table 5 provides a summary of proposed drainage basins.

Table 5. Basin Summary

Basin	Treatment Facility	Treated CIA (acres)	Untreated CIA (acres)	Offset Treatment Impervious Area (acres)	Comments
10	1	1.065	0	0	—
20	2	3.080	0	0	—
30	3	2.179	0	0	—
0S-31	3	0	0	1.652	—
40	4	0.396	0	0	—
41	4	4.560	0	0	—
42	4	0.698	0	0	—
43	4	0.338	0	0	—
50	5	0.719	0	0	—
51	5	0.578	0	0	—
52	5	3.570	0	0	—
53	—	0	0.273	0	Not feasible to provide treatment due to maintenance access concerns and lack of elevation to convey to proposed regional facilities.
60	6	2.299	0	0	—
61	6	0.474	0	0	—
62	6	2.315	0	0	—
63	6	0.123	0	0	—
64	—	0	0.592	0	Not feasible to provide engineered treatment due to lack of suitable ROW and proximity to Willamette River. Non-engineered dispersion is expected to occur before runoff reaches receiving water.

Basin	Treatment Facility	Treated CIA (acres)	Untreated CIA (acres)	Offset Treatment Impervious Area (acres)	Comments
70	7	0.287	0	0	—
71	7	0.333	0	0	—
72	7	0.556	0	0	—
80	8	1.953	0	0	—
90	9	0.134	0	0	—
Totals		**25.658**	**0.865**	**1.652**	**—**

For the basins where treatment is proposed, the runoff is conveyed to a water quality facility for treatment. The facilities are sized using guidelines from ODOT's *Hydraulics Manual* (2014) based on the volumetric flow rate expected to result from the water quality storm event in the corresponding basins. Flow rate calculations for each basin can be found in Appendix C. Key design considerations for the biofiltration swales included a minimum residence time of 9 minutes and a maximum velocity of 3 feet per second (ft/s) in a 25-year storm event. Swale and bioslope sizing calculations are included in Appendix D. The bioretention pond was sized to infiltrate the water quality storm event and provide enough detention to achieve an outflow rate during the 10-year storm equal to the preconstruction outflow rate. Inflow and outflow hydrographs for the proposed detention facility are provided in Appendix C. The bioslope and stormwater planter were sized to infiltrate the peak flows anticipated during the water quality storm event.

Table 6 details the stormwater management facilities and includes a description, specifications, and maintenance considerations for each facility.

Table 6. Stormwater Management Facility Summary

Facility	Treated Area (Acres)	Description	Specifications	Maintenance
1	1.065	Combination biofiltration swale/detention pond located between Station (STA) “L” 663+47 and STA “L” 665+04. The pond receives runoff from Basin 10 via sheet flow and conveyance in an existing ditch, and outfalls to a tributary to Abernethy Creek (Appendix B).	Bottom width is 10 feet and bottom length is 157 feet. Stormwater pretreatment will be accomplished by sheet flow over vegetation. A 6-inch perforated drain pipe with a slope of 0.5% will be installed in granular drain backfill material to prevent standing water conditions due to the low infiltration rate. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 1 in Appendix C for design flow rates.	Routine maintenance for detention ponds such as mowing, debris removal, and sediment removal. Maintenance access to the facility will be from the shoulder of I-205 NB.
2	3.080	Bioslope located between STA. “L” 665+00 and STA. “L” 684+00. The Bioslope receives runoff from Basin 20 via sheet flow. The bioslope outfalls to an existing roadside ditch, which is connected to the Clackamas River via an existing stormwater conveyance system (Appendix B).	The length of roadway treated by the bioslope is 1,900 feet. The width is 4.5 feet. One foot of ecology mix soil will be used to treat the runoff. A 12- inch perforated drain pipe located in an 24-inch layer of granular backfill material will be used to drain the bioslope (Appendix B).	Routine maintenance for bioslopes such as debris and sediment removal. Maintenance access to the facility will be from the I-205 NB shoulder.
3	3.831	Biofiltration swale located between STA “L” 689+24 and STA “L” 691+59. The swale receives runoff from Basin 30 via the proposed pipe network, which utilizes existing pipes and structures where possible, and outfalls to an existing system leading to Clackamas River (Appendix B).	Bottom width is 6 feet and bottom length is 235 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet and additional flow spreaders at 50-foot intervals. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 3 in Appendix C for design flow rates.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road to be constructed in ODOT ROW from Main Street.
4	5.992	Biofiltration swale located between STA “99E2” 109+30 and STA “99E2” 111+03. Runoff from Basins 40, 41, 42, and 43 is collected and piped to the low end of the I-205 SB on-ramp from OR 99E. After treatment, the proposed network connects to an existing system that outfalls to the Willamette River (Appendix B).	Bottom width is 20 feet total, divided into two 10-foot-wide sections with a center flow separator, and bottom length is 180 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet and additional flow spreaders at 50-foot intervals. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 4 in Appendix C for design flow rates.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road from 99E.
5	4.867	Biofiltration swale located between STA “99E2” 114+47 and STA “99E2” 115+86. Runoff from Basins 50, 51, and 52 is collected and piped under the on- and off-ramps connecting I-205 NB to OR99E. The conveyance system consolidates at the low end of the off-ramp prior to the swale inlet. After treatment, the proposed network connects to an existing system that outfalls to the Willamette River (Appendix B).	Bottom width is 14 feet and bottom length is 150 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet and additional flow spreaders at 50-foot intervals. A sub-surface drain pipe is required because the bottom slope is less than 1.5%. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 5 in Appendix C for design flow rates.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road from 99E.
6	5.211	Biofiltration swale located between STA “OR43” 10+52 and STA “OR43” 8+97. Runoff from Basins 60, 61, 62, and 63 is conveyed to the swale via a pipe network. After treatment, the proposed system outfalls to the Willamette River at a proposed riprap pad underneath Abernethy Bridge (Appendix B).	Bottom width is 40 feet total, divided into four 10-foot-wide sections with flow separators, and bottom length is 250 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. Planting will be accomplished with an 18-inch layer of water quality mix and seeding. See Basin 6 in Appendix C for design flow rates. The swale is designed to treat runoff from offsite area and future development.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road to be constructed in ODOT ROW underneath Abernethy Bridge.
7	1.176	Biofiltration swale located between STA “OR43” 9+55 and STA “OR43” 12+30. Runoff from Basin 72 is captured and conveyed via a ditch to a ditch inlet at the high end of the I-205 NB off-ramp to OR43. The stormwater is conveyed through the proposed pipe network and picks up flow from Basins 70 and 71. A flow splitter manhole diverts the volumetric flow rate generated by the water quality storm event in Basins 70, 71, and 72 to the swale. After treatment, the proposed system outfalls to the Willamette River at a proposed riprap pad underneath Abernethy Bridge (Appendix B).	Bottom width is 30 feet total, divided into three 10-foot-wide sections with flow separators, and bottom length is 210 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet and additional flow spreaders at 50-foot intervals. A sub-surface drain pipe is required because the bottom slope is less than 1.5%. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 7 in Appendix C for design flow rates. The swale is designed to treat runoff from offsite area and future development.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be from the OR43 on-ramp to I-205 NB shoulder.
8	1.953	Biofiltration swale located between STA “E3” 737+51 and STA “E3” 738+64. Runoff from Basin 80 is conveyed to the swale in a pipe network. The swale is sized to treat runoff from improvements further upstream, as well as some of the offsite flow from a large residential area. After treatment, the proposed system outfalls to the Willamette River at a proposed riprap pad underneath Abernethy Bridge (Appendix B).	Bottom width is 55 feet total, divided into five 11-foot-wide sections with flow separators, and bottom length is 142 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet. A sub-surface drain pipe is required because the bottom slope is less than 1.5%. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 8 in Appendix C for design flow rates. The swale is designed to treat runoff from offsite area and future development.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be from the OR43 on-ramp to I-205 NB shoulder.
9	0.134	Stormwater planter located behind curbline of proposed on-street parking spaces and sidewalk in John Storm Park. Runoff from Basin 90 is conveyed via sheet flow and curb drops. The stormwater planter is sized to treat runoff from the proposed impervious area from the new parking. After treatment, the proposed facility connects to an existing stormwater network and discharges into the Willamette River (Appendix B).	Bottom width is 6 feet and bottom length is 20 feet. The primary outlet will be a perforated sub drain. There will be a high flow outlet located above the water quality treatment depth. Curb cuts and splash pads will be the primary inlets to the facility.	Routine maintenance for stormwater planters such as weed, debris, and sediment removal. Maintenance access to the facilities will be from the shoulder of Clackamette Drive.

4.1 Future Build-out Accommodation

Water quality facilities 6, 7, and 8 are sized to incorporate additional flows from an adjacent proposed project (I-205: I-5 to OR213, Phase 2 Section). The adjacent proposed project footprint does not have enough available space to construct water quality facilities. Therefore, the I-205: I-5 to OR213, Phase 1 Section Project is being designed to divert runoff for the water quality storm event from the adjacent project into the proposed conveyance system and treatment facilities located at the OR 43 interchange.

4.2 Groundwater Considerations

Stormwater facilities were designed to not infiltrate in areas with high groundwater tables. Table 7 summarizes the anticipated seasonal high groundwater elevations at each facility and whether or not a liner is proposed for each water quality facility. It is proposed that Facilities 2 and 6 have impermeable membranes for structural purposes as both facilities are located on fill. Because the groundwater elevation was obtained from the USGS Depth to Groundwater maps and the anticipated close proximity of the groundwater to the facility invert, an impermeable membrane is proposed for Facility 3 to prevent migration to the groundwater.

Table 7 Water Quality Facility Depth to Groundwater

Facility ID	Facility Invert Elevation	Anticipated High Seasonal Groundwater Elevation	Depth to Groundwater	Impermeable Liner
WQF #1	48.5	33.7*	14.8*	No
WQF #2	Varies	Varies	Varies	Yes
WQF #3	35.0	29.3*	5.7*	Yes
WQF #4	43.8	17.5	26.3	No
WQF #5	52.9	17.5	35.4	No
WQF #6	105.8	36.5	69.3	Yes
WQF #7	118.7	66.2*	52.5*	No
WQF #8	142.8	74.3*	68.5*	No
WQF #9	37.9	17.6	20.3	No

***** Groundwater elevation from USGS Depth to Groundwater Interactive Maps (USGS)

4.3 Planting Plan

The stormwater facilities will be planted in accordance to ODOT standard practices. Vegetation will be established prior to operation. Permanent seeding should be performed March 1 through May 15 and September 1 through October 31. The seeding mix proposed for the vegetated water quality facility bottoms and sides is shown in Table 8.

Table 8. Water Quality Facility Seeding

Common Name	Botanical Name	Pounds per Acre
California Oatgrass	*Danthonia californica*	5
Tufted Hairgrass	*Deschampsia cespitosa*	4
Slender Hairgrass	*Deschampsia elongata*	4
Red Fescue	*Festuca rubra var. rubra*	10
Meadow Barley	*Hordeum brachyantherum*	10
Dense Sedge	*Carex densa*	1
Slough Sedge	*Carex obnupta*	1
Slender Rush	*Juncus patens*	0.5
Spreading Rush	*Juncus tenuis*	0.5
Broadleaf Lupine	*Lupinus latifolius*	0.25
Graceful Cinquefoil	*Potentilla gracilis*	0.25

4.4 Maintenance Plan

4.4.1 Responsible Party

ODOT staff will provide oversight during project construction to ensure that the water quality and stormwater management elements of the project are properly constructed following project plans and specifications. Vegetation will be established prior to use. Planting should take place from March 1 through May 15 or September 1 through October 31. During this post-construction period, ODOT construction inspection staff will conduct inspections to determine if the water quality and stormwater management swales are vegetated according to specifications and treatment needs. After construction, ODOT maintenance staff will review the facilities at intervals sufficient to ensure continued functioning as designed.

4.4.2 Routine Maintenance Actions

As part of the final plans package, templates for each stormwater facility will be provided. After the facilities have been constructed, a comprehensive Operations and Maintenance Manual will be completed by ODOT staff for each facility using standards described in the ODOT Hydraulics Manual. Appendix E provides tables of routine maintenance for the applicable stormwater facilities.

4.4.3 Maintenance Activity Schedule

Maintenance activities will follow the schedule outline in the tables provided in Appendix E as well as the maintenance schedules determined by ODOT District 2B.

4.5 Downstream Analysis

The project proposes to connect and discharge stormwater into existing drainage systems owned and maintained by Oregon City. A downstream analysis was completed for both drainage systems that the project proposes to connect. Both existing stormwater systems were found to have adequate capacity and no improvements downstream of the project are proposed. Appendix F summarizes the methodology and the results of the downstream analysis.

5 References

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Appendix A. NRCS Soil Survey Report, Draft Infiltration Testing Memo, and Groundwater Well Locations

United States Department of Agriculture

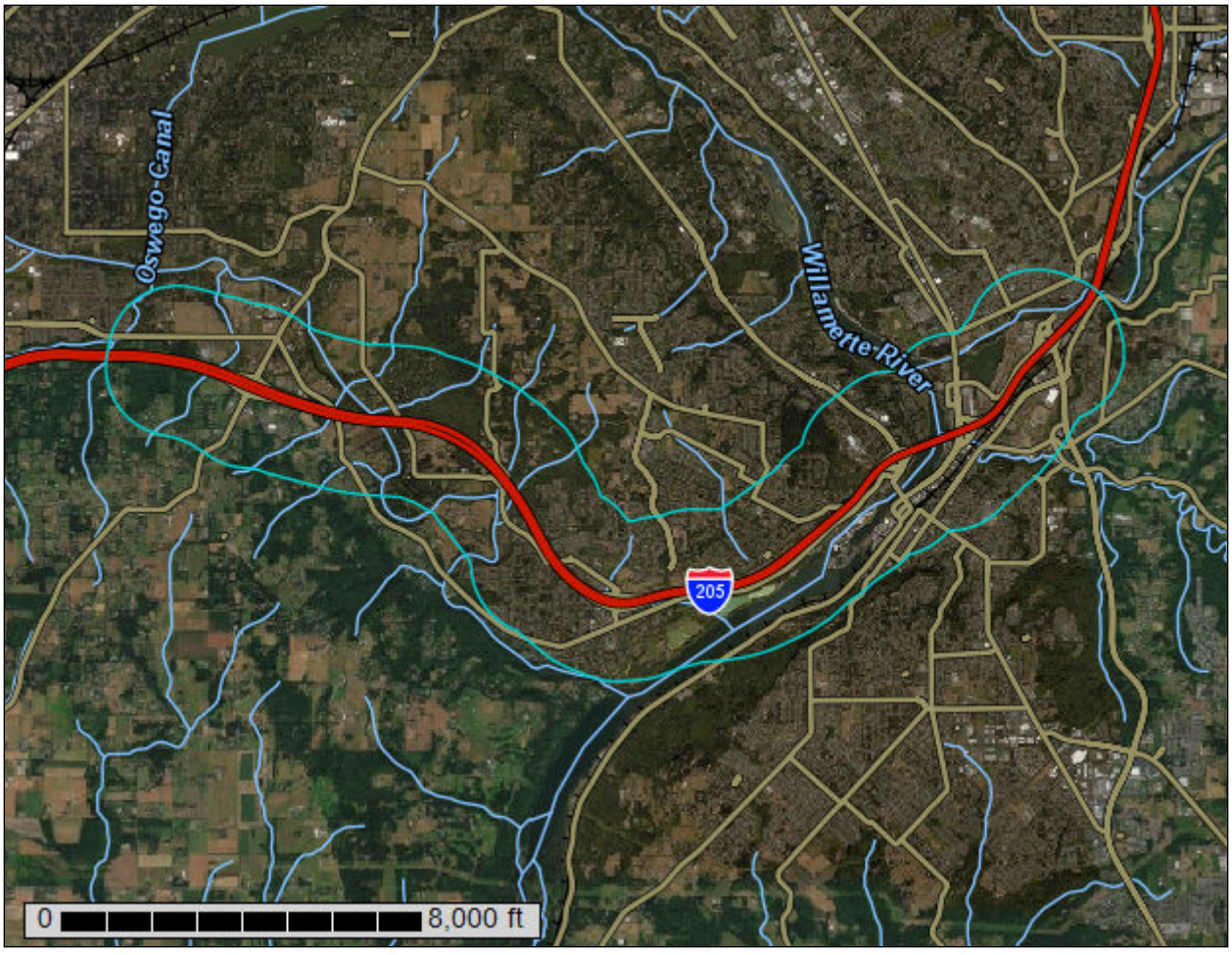
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Clackamas County Area, Oregon

I-205 Abernethy to Stafford Widening



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

122° 44' 33" W
122° 33' 40" W
45° 23' 46" N
45° 19' 31" N

521000 522000 523000 524000 525000 526000 527000 528000 529000 530000 531000 532000 533000 534000

5026000 5025000 5024000 5023000 5022000 5021000 5020000 5027000

Tualatin River
Newland Creek
Willamette River
Mud Creek
Newell Creek
205

Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1A	Aloha silt loam, 0 to 3 percent slopes	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	34.9	0.6%
3	Amity silt loam	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	47.0	0.8%
11	Camas gravelly sandy loam	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	53.4	0.9%
16	Chehalis silt loam	50.7	0.8%
19	Cloquato silt loam	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	48.2	0.8%
25	Cove silty clay loam	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	7.9	0.1%
41	Huberly silt loam	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	94.8	1.6%

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
53C	Latourell loam, 8 to 15 percent slopes	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	6.5	0.1%
56	McBee silty clay loam	74.6	1.2%
57	McBee variant loam	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	61.0	1.0%
67	Newberg fine sandy loam	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	23.5	0.4%
73	Riverwash	39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	39.9	0.7%
82	Urban land	363.1	6.0%
83	Wapato silt loam	6.5	0.1%
84	Wapato silty clay loam	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	287.0	4.7%
93E	Xerochrepts-Rock outcrop complex, moderately steep	115.8	1.9%

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
W	Water	477.5	7.9%
Totals for Area of Interest		**6,050.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clackamas County Area, Oregon

1A—Aloha silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 223l
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Aloha and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aloha

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 51 inches: silt loam
H3 - 51 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 3 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

1B—Aloha silt loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 223m
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Aloha and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aloha

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 51 inches: silt loam
H3 - 51 to 80 inches: silt loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 3 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

3—Amity silt loam

Map Unit Setting

National map unit symbol: 2247
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Amity and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amity

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 22 inches: silt loam
H2 - 22 to 62 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Dayton

Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Huberly

Percent of map unit: 2 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

7B—Borges silty clay loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2277
Elevation: 250 to 1,400 feet
Mean annual precipitation: 48 to 65 inches
Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 140 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Borges and similar soils: 80 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Borges

Setting

Landform: Depressions on terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 18 inches: silty clay loam
H2 - 18 to 45 inches: silty clay
H3 - 45 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Delena

Percent of map unit: 6 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

11—Camas gravelly sandy loam

Map Unit Setting

National map unit symbol: 2231
Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Camas and similar soils: 80 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Camas

Setting

Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 10 inches: gravelly sandy loam
H2 - 10 to 17 inches: gravelly sandy loam
H3 - 17 to 60 inches: stratified extremely gravelly coarse sand to very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 9 to 17 inches to strongly contrasting textural stratification
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

12A—Canderly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2232
Elevation: 120 to 250 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Canderly and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canderly

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: sandy loam
H2 - 7 to 46 inches: sandy loam
H3 - 46 to 60 inches: stratified gravelly sand to coarse sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

13B—Cascade silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2234
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Cascade and similar soils: 80 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cascade

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 21 inches: silt loam
H3 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

13C—Cascade silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2235
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cascade and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cascade

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 21 inches: silt loam
H3 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

13D—Cascade silt loam, 15 to 30 percent slopes

Map Unit Setting
National map unit symbol: 2236
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Cascade and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cascade

Setting
Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile
H1 - 0 to 11 inches: silt loam
H2 - 11 to 21 inches: silt loam
H3 - 21 to 60 inches: silty clay loam

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

16—Chehalis silt loam

Map Unit Setting

National map unit symbol: 223g
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Chehalis and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chehalis

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 44 inches: silty clay loam
H3 - 44 to 60 inches: stratified fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

19—Cloquato silt loam

Map Unit Setting

National map unit symbol: 223k
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cloquato and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cloquato

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 42 inches: silt loam
H3 - 42 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

23B—Cornelius silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 223r
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cornelius and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cornelius

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 16 inches: silt loam

H2 - 16 to 34 inches: silty clay loam
H3 - 34 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

23C—Cornelius silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 223s
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cornelius and similar soils: 80 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cornelius

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 34 inches: silty clay loam
H3 - 34 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 4 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

25—Cove silty clay loam

Map Unit Setting

National map unit symbol: 223y

Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cove and similar soils: 85 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cove

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Wapato

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Conser

Percent of map unit: 4 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Concord

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 1 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

30C—Delena silt loam, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2248
Elevation: 250 to 1,400 feet
Mean annual precipitation: 48 to 65 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 140 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Delena and similar soils: 80 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delena

Setting

Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 25 inches: silty clay loam
H3 - 25 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Borges

Percent of map unit: 8 percent
Landform: Depressions on terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

36C—Hardscrabble silt loam, 7 to 20 percent slopes

Map Unit Setting

National map unit symbol: 224k
Elevation: 150 to 600 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hardscrabble and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hardscrabble

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 14 inches: silty clay loam
H3 - 14 to 60 inches: clay

Properties and qualities

Slope: 7 to 20 percent
Depth to restrictive feature: 12 to 24 inches to abrupt textural change
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

37C—Helvetia silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 224m
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Helvetia and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Helvetia

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed old alluvium

Typical profile

H1 - 0 to 14 inches: silt loam

H2 - 14 to 21 inches: silty clay loam
H3 - 21 to 40 inches: silty clay
H4 - 40 to 60 inches: silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 2 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

37D—Helvetia silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 224n
Elevation: 250 to 500 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Helvetia and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Helvetia

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed old alluvium

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 21 inches: silty clay loam
H3 - 21 to 40 inches: silty clay
H4 - 40 to 60 inches: silty clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)
Hydric soil rating: No

41—Huberly silt loam

Map Unit Setting

National map unit symbol: 224s
Elevation: 150 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Huberly and similar soils: 85 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huberly

Setting

Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 24 inches: silt loam
H3 - 24 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Dayton

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Delena

Percent of map unit: 2 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

45C—Jory silty clay loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 224y
Elevation: 250 to 1,200 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Jory and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jory

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

H1 - 0 to 13 inches: silty clay loam
H2 - 13 to 60 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

48B—Kinton silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2256
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kinton and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kinton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 35 inches: silt loam
H3 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

48C—Kinton silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2257
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kinton and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kinton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 35 inches: silt loam
H3 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

48D—Kinton silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2258
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kinton and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kinton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 35 inches: silt loam

H3 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 2 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

53B—Latourell loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 225k
Elevation: 50 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Latourell and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Latourell

Setting

Landform: Terraces

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 48 inches: loam
H3 - 48 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

53C—Latourell loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 225l
Elevation: 50 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Latourell and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Latourell

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 48 inches: loam

H3 - 48 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

54C—Laurelwood silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 225p
Elevation: 200 to 1,500 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Laurelwood and similar soils: 85 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laurelwood

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material over older clayey material

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 18 inches: silty clay loam
H3 - 18 to 46 inches: silty clay loam
H4 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Aqualfs

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

54D—Laurelwood silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 225q
Elevation: 200 to 1,500 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Laurelwood and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laurelwood

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material over older clayey material

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 18 inches: silty clay loam
H3 - 18 to 46 inches: silty clay loam
H4 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)
Hydric soil rating: No

54E—Laurelwood silt loam, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: 225r
Elevation: 200 to 1,500 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 51 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Laurelwood and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laurelwood

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty material over older clayey material

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 18 inches: silty clay loam
H3 - 18 to 46 inches: silty clay loam
H4 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

56—McBee silty clay loam

Map Unit Setting

National map unit symbol: 225t
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Mcbee and similar soils: 85 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbee

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 48 inches: silty clay loam
H3 - 48 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

57—McBee variant loam

Map Unit Setting

National map unit symbol: 225v
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Mcbee, variant, and similar soils: 90 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbee, Variant

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 28 inches: loam

H2 - 28 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

64B—Nekia silty clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2268
Elevation: 250 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Nekia and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nekia

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, crest, interfluve

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from basalt

Typical profile

H1 - 0 to 19 inches: silty clay loam
H2 - 19 to 39 inches: clay
H3 - 39 to 43 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

64C—Nekia silty clay loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2269
Elevation: 250 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nekia and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nekia

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, crest, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from basalt

Typical profile

H1 - 0 to 19 inches: silty clay loam

H2 - 19 to 39 inches: clay
H3 - 39 to 43 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

67—Newberg fine sandy loam

Map Unit Setting

National map unit symbol: 226g
Elevation: 30 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Newberg and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newberg

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 23 inches: fine sandy loam
H3 - 23 to 42 inches: fine sand
H4 - 42 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

70C—Powell silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 226m
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Powell and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Powell

Setting

Landform: Terraces
Landform position (three-dimensional): Riser

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material over old silty alluvium

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 15 inches: silt loam
H3 - 15 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 15 to 23 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

73—Riverwash

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: stratified sand to gravel

Properties and qualities

Slope: 0 to 3 percent
Natural drainage class: Well drained
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Yes

76B—Salem silt loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 226y
Elevation: 200 to 650 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Salem and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salem

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 24 inches: gravelly clay loam
H3 - 24 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

78B—Saum silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2271
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

78C—Saum silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2272
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

78D—Saum silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2273
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)
Hydric soil rating: No

78E—Saum silt loam, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2274
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

82—Urban land

Map Unit Setting

National map unit symbol: 227g
Elevation: 50 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

83—Wapato silt loam

Map Unit Setting

National map unit symbol: 227h
Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Wapato and similar soils: 90 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wapato

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 41 inches: silty clay loam
H3 - 41 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Cove

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

84—Wapato silty clay loam

Map Unit Setting

National map unit symbol: 227j
Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Wapato and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wapato

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 18 inches: silty clay loam
H2 - 18 to 45 inches: silty clay loam
H3 - 45 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Cove

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Humaquepts

Percent of map unit: 4 percent
Landform: Flood plains
Hydric soil rating: Yes

88A—Willamette silt loam, wet, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 227q

Elevation: 150 to 350 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Willamette, wet, and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willamette, Wet

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

88B—Willamette silt loam, wet, 3 to 7 percent slopes

Map Unit Setting

National map unit symbol: 227r
Elevation: 150 to 350 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Willamette, wet, and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willamette, Wet

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

89D—Witzel very stony silt loam, 3 to 40 percent slopes

Map Unit Setting

National map unit symbol: 227s
Elevation: 300 to 1,000 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Witzel and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Witzel

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, nose slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from basalt

Typical profile

H1 - 0 to 4 inches: very stony silt loam
H2 - 4 to 16 inches: very stony silty clay loam
H3 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 40 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)
Hydric soil rating: No

91A—Woodburn silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 227y
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodburn and similar soils: 85 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 38 inches: silty clay loam
H3 - 38 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 3 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

91B—Woodburn silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227z
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodburn and similar soils: 90 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 38 inches: silty clay loam
H3 - 38 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 2 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

Dayton

Percent of map unit: 1 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

91C—Woodburn silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2280
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodburn and similar soils: 90 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 38 inches: silty clay loam
H3 - 38 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

92F—Xerochrepts and Haploxerolls, very steep

Map Unit Setting

National map unit symbol: 2281
Elevation: 50 to 1,000 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerochrepts and similar soils: 50 percent
Haploxerolls and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerochrepts

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from igneous rock

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 48 inches: gravelly clay loam
H3 - 48 to 60 inches: very cobbly clay loam

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Haploxerolls

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium derived from igneous rock

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 60 inches: very gravelly loam

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 36 to 48 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

93E—Xerochrepts-Rock outcrop complex, moderately steep

Map Unit Setting
National map unit symbol: 2282
Elevation: 100 to 500 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition
Xerochrepts and similar soils: 60 percent
Rock outcrop: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerochrepts

Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from andesite and/or basalt

Typical profile
H1 - 0 to 26 inches: gravelly loam
H2 - 26 to 30 inches: unweathered bedrock

Properties and qualities
Slope: 0 to 30 percent
Depth to restrictive feature: 10 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rock Outcrop

Typical profile
R - 0 to 60 inches: unweathered bedrock

Properties and qualities
Slope: 0 to 30 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

W—Water

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Yes

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

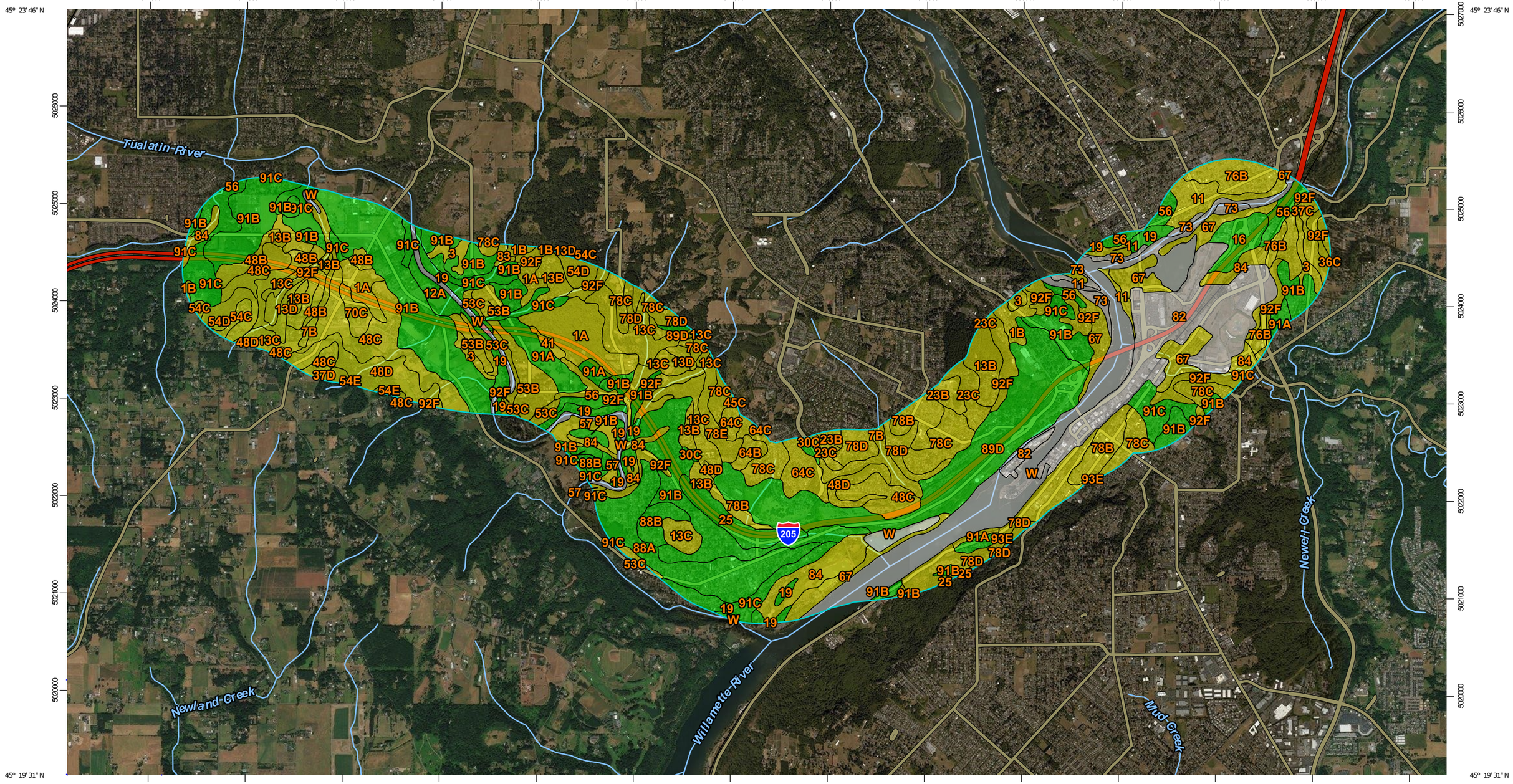
Building Site Development

Building site development interpretations are designed to be used as tools for evaluating soil suitability and identifying soil limitations for various construction purposes. As part of the interpretation process, the rating applies to each soil in its described condition and does not consider present land use. Example interpretations can include corrosion of concrete and steel, shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

Corrosion of Concrete

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Background

Aerial Photography

Soils

Soil Rating Polygons

- High
- Moderate
- Low
- Not rated or not available

Soil Rating Lines

- High
- Moderate
- Low
- Not rated or not available

Soil Rating Points

- High
- Moderate
- Low
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Corrosion of Concrete

Corrosion of Concrete— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
1A	Aloha silt loam, 0 to 3 percent slopes	Moderate	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	Moderate	34.9	0.6%
3	Amity silt loam	Moderate	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	Moderate	47.0	0.8%
11	Camas gravelly sandy loam	Moderate	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	Low	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	Moderate	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	Moderate	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	Moderate	53.4	0.9%
16	Chehalis silt loam	Low	50.7	0.8%
19	Cloquato silt loam	Low	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	Moderate	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	Moderate	48.2	0.8%
25	Cove silty clay loam	Low	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	Low	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	High	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	Moderate	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	Moderate	7.9	0.1%
41	Huberly silt loam	Moderate	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	Moderate	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	Moderate	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	Moderate	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	Moderate	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	Moderate	94.8	1.6%

Corrosion of Concrete— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	Moderate	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	Moderate	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	Moderate	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	Moderate	6.5	0.1%
56	McBee silty clay loam	Low	74.6	1.2%
57	McBee variant loam	Moderate	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	Moderate	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	Moderate	61.0	1.0%
67	Newberg fine sandy loam	Moderate	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	Moderate	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	Moderate	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	Moderate	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	Moderate	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	Moderate	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	Moderate	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	Moderate	6.5	0.1%
84	Wapato silty clay loam	Moderate	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	Low	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	Low	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	Low	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	Low	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	Low	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	Low	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	Moderate	287.0	4.7%

Corrosion of Concrete— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
93E	Xerochrepts-Rock outcrop complex, moderately steep	Moderate	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Corrosion of Concrete

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

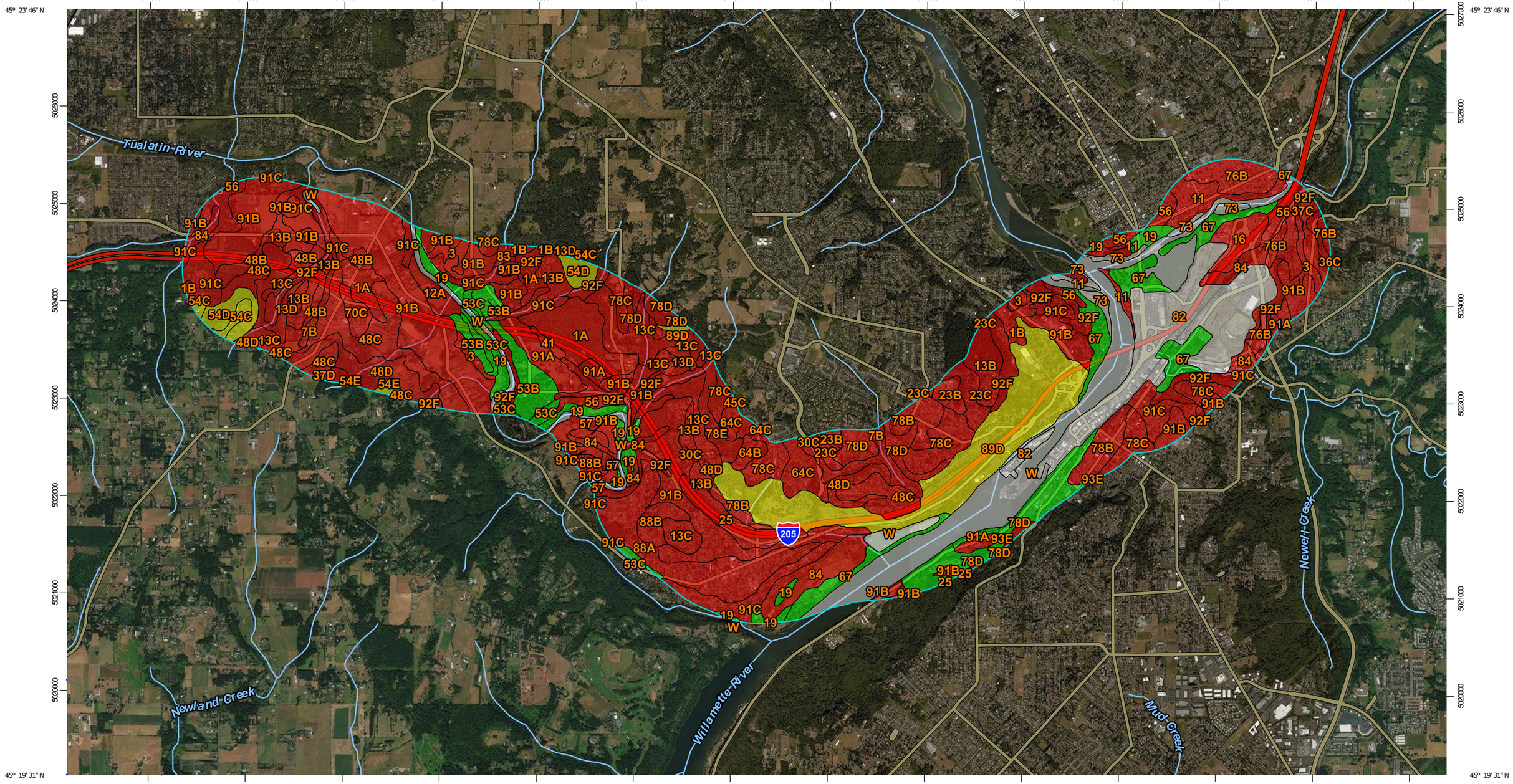
Tie-break Rule: Higher

Corrosion of Steel

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Custom Soil Resource Report
Map—Corrosion of Steel



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

High

Moderate

Low

Not rated or not available

Soil Rating Lines

High

Moderate

Low

Not rated or not available

Soil Rating Points

High

Moderate

Low

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Corrosion of Steel

Corrosion of Steel— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
1A	Aloha silt loam, 0 to 3 percent slopes	High	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	High	34.9	0.6%
3	Amity silt loam	High	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	High	47.0	0.8%
11	Camas gravelly sandy loam	High	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	High	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	High	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	High	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	High	53.4	0.9%
16	Chehalis silt loam	High	50.7	0.8%
19	Cloquato silt loam	Low	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	High	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	High	48.2	0.8%
25	Cove silty clay loam	High	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	High	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	High	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	High	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	High	7.9	0.1%
41	Huberly silt loam	High	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	High	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	High	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	High	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	High	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	Low	94.8	1.6%

Corrosion of Steel— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	Low	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	Moderate	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	Moderate	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	Moderate	6.5	0.1%
56	McBee silty clay loam	High	74.6	1.2%
57	McBee variant loam	High	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	High	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	High	61.0	1.0%
67	Newberg fine sandy loam	Low	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	High	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	High	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	High	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	High	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	High	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	High	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	High	6.5	0.1%
84	Wapato silty clay loam	High	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	High	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	High	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	Moderate	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	High	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	High	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	High	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	High	287.0	4.7%

Corrosion of Steel— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93E	Xerochrepts-Rock outcrop complex, moderately steep	Low	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Corrosion of Steel

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Water Management

Water Management interpretations are tools for evaluating the potential of the soil in the application of various water management practices. Example interpretations include pond reservoir area, embankments, dikes, levees, and excavated ponds.

Subsurface Water Management, Outflow Quality

The ratings for Subsurface Water Management, Outflow Quality are based on the soil properties that affect the capacity of the soil to convey surface and subsurface water and on the properties that affect water quality. The properties that affect the conveyance and water quality include salinity, sodicity, soil reaction, soil taxonomic great group placement, gypsum content, shrink-swell potential, soil saturation, and surface erosion.

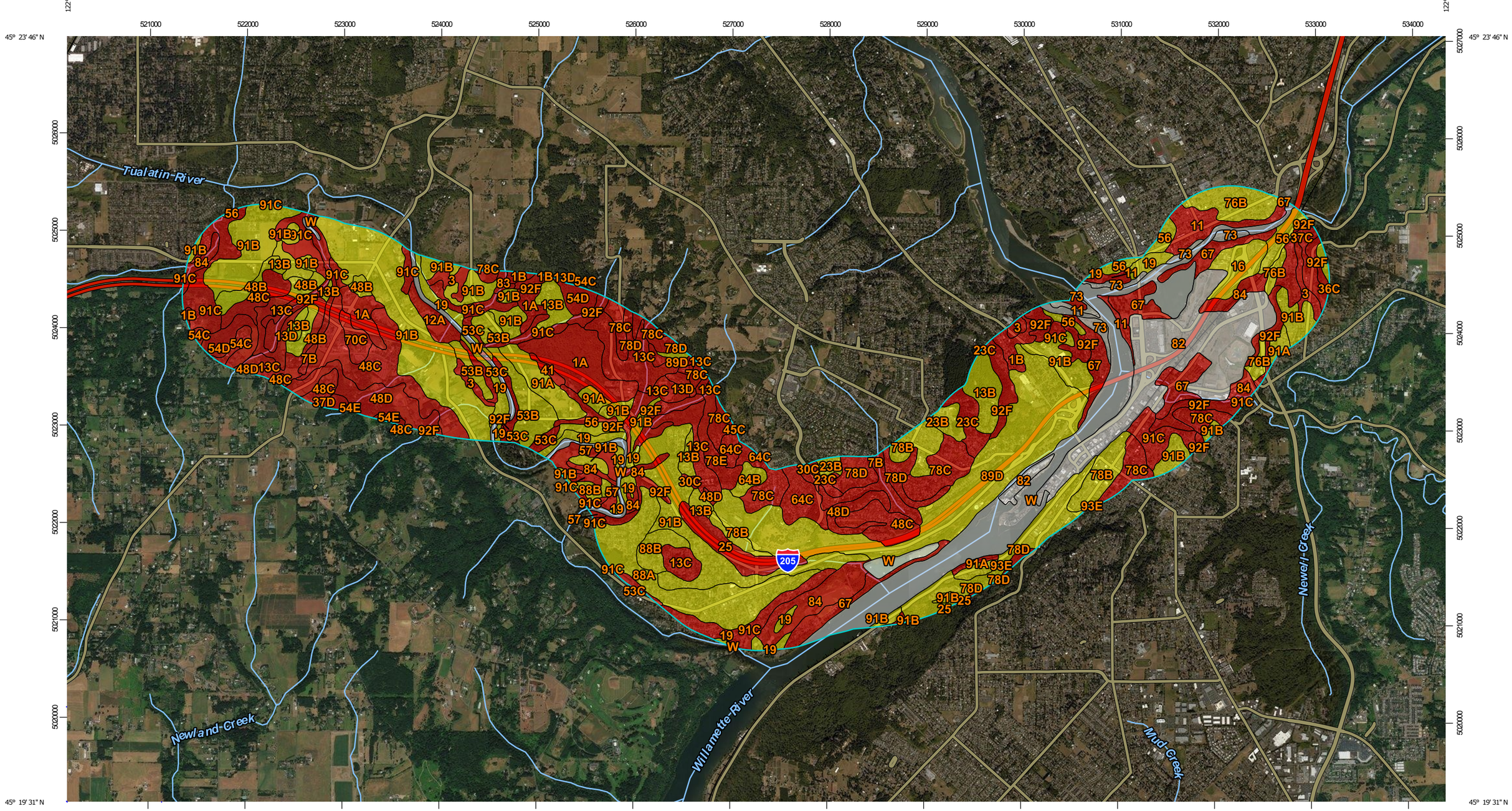
The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor water quality can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as that listed for the map unit. The percent composition of each component in a particular map unit is given so that the user will realize the percentage of each map unit that has the specified rating.

A map unit may have other components with different ratings. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report
Map—Subsurface Water Management, Outflow Quality



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Lines
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Points
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Subsurface Water Management, Outflow Quality

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
1A	Aloha silt loam, 0 to 3 percent slopes	Very limited	Aloha (85%)	Pesticide and nutrient movement (1.00)	161.9	2.7%
			Huberly (3%)	Pesticide and nutrient movement (1.00)		
			Dayton (2%)	Pesticide and nutrient movement (1.00)		
1B	Aloha silt loam, 3 to 6 percent slopes	Very limited	Aloha (85%)	Pesticide and nutrient movement (1.00)	34.9	0.6%
				Water Erosion (0.46)		
			Huberly (3%)	Pesticide and nutrient movement (1.00)		
			Dayton (2%)	Pesticide and nutrient movement (1.00)		
3	Amity silt loam	Very limited	Amity (85%)	Pesticide and nutrient movement (1.00)	51.2	0.8%
			Dayton (3%)	Pesticide and nutrient movement (1.00)		
			Huberly (2%)	Pesticide and nutrient movement (1.00)		
7B	Borges silty clay loam, 0 to 8 percent slopes	Very limited	Borges (80%)	Pesticide and nutrient movement (1.00)	47.0	0.8%
				Water Erosion (0.12)		
			Delena (6%)	Pesticide and nutrient movement (1.00)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Water Erosion (1.00)		
11	Camas gravelly sandy loam	Very limited	Camas (80%)	Pesticide and nutrient movement (1.00)	78.0	1.3%
			Wapato (2%)	Pesticide and nutrient movement (1.00)		
12A	Canderly sandy loam, 0 to 3 percent slopes	Very limited	Canderly (90%)	Pesticide and nutrient movement (1.00)	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	Somewhat limited	Cascade (80%)	Pesticide and nutrient movement (0.99)	130.4	2.2%
				Water Erosion (0.12)		
13C	Cascade silt loam, 8 to 15 percent slopes	Very limited	Cascade (80%)	Water Erosion (1.00)	134.6	2.2%
				Pesticide and nutrient movement (0.99)		
13D	Cascade silt loam, 15 to 30 percent slopes	Very limited	Cascade (80%)	Water Erosion (1.00)	53.4	0.9%
				Pesticide and nutrient movement (0.99)		
16	Chehalis silt loam	Somewhat limited	Chehalis (85%)	Pesticide and nutrient movement (0.22)	50.7	0.8%
19	Cloquato silt loam	Somewhat limited	Cloquato (85%)	Pesticide and nutrient movement (0.22)	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	Somewhat limited	Cornelius (85%)	Pesticide and nutrient movement (0.71)	30.8	0.5%
				Water Erosion (0.12)		
23C	Cornelius silt loam, 8 to 15 percent slopes	Very limited	Cornelius (80%)	Water Erosion (1.00)	48.2	0.8%
				Pesticide and nutrient movement (0.71)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Delena (4%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
25	Cove silty clay loam	Very limited	Cove (85%)	Pesticide and nutrient movement (1.00)	63.3	1.0%
			Wapato (5%)	Pesticide and nutrient movement (1.00)		
			Conser (4%)	Pesticide and nutrient movement (1.00)		
			Concord (2%)	Pesticide and nutrient movement (1.00)		
			Dayton (1%)	Pesticide and nutrient movement (1.00)		
30C	Delena silt loam, 3 to 12 percent slopes	Very limited	Delena (80%)	Pesticide and nutrient movement (1.00)	9.9	0.2%
				Water Erosion (0.90)		
			Borges (8%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (0.04)		
36C	Hardscrabble silt loam, 7 to 20 percent slopes	Very limited	Hardscrabble (85%)	Pesticide and nutrient movement (1.00)	0.0	0.0%
				Water Erosion (1.00)		
				Too acid (0.04)		
37C	Helvetia silt loam, 8 to 15 percent slopes	Very limited	Helvetia (85%)	Water Erosion (1.00)	51.0	0.8%
				Pesticide and nutrient movement (0.14)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
			Delena (2%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
37D	Helvetia silt loam, 15 to 30 percent slopes	Very limited	Helvetia (85%)	Water Erosion (1.00)	7.9	0.1%
				Pesticide and nutrient movement (0.14)		
41	Huberly silt loam	Very limited	Huberly (85%)	Pesticide and nutrient movement (1.00)	8.3	0.1%
			Dayton (5%)	Pesticide and nutrient movement (1.00)		
			Delena (2%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
45C	Jory silty clay loam, 8 to 15 percent slopes	Very limited	Jory (90%)	Water Erosion (1.00)	0.7	0.0%
				Pesticide and nutrient movement (0.00)		
48B	Kinton silt loam, 3 to 8 percent slopes	Somewhat limited	Kinton (85%)	Pesticide and nutrient movement (0.71)	67.3	1.1%
				Water Erosion (0.42)		
48C	Kinton silt loam, 8 to 15 percent slopes	Very limited	Kinton (85%)	Water Erosion (1.00)	247.5	4.1%
				Pesticide and nutrient movement (0.71)		
			Delena (3%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
48D	Kinton silt loam, 15 to 30 percent slopes	Very limited	Kinton (85%)	Water Erosion (1.00)	125.4	2.1%
				Pesticide and nutrient movement (0.71)		
			Delena (2%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
53B	Latourell loam, 3 to 8 percent slopes	Somewhat limited	Latourell (90%)	Water Erosion (0.42)	94.8	1.6%
				Pesticide and nutrient movement (0.22)		
53C	Latourell loam, 8 to 15 percent slopes	Very limited	Latourell (85%)	Water Erosion (1.00)	37.2	0.6%
				Pesticide and nutrient movement (0.22)		
54C	Laurelwood silt loam, 8 to 15 percent slopes	Very limited	Laurelwood (85%)	Water Erosion (1.00)	16.3	0.3%
				Pesticide and nutrient movement (0.00)		
54D	Laurelwood silt loam, 15 to 30 percent slopes	Very limited	Laurelwood (80%)	Water Erosion (1.00)	62.1	1.0%
				Pesticide and nutrient movement (0.00)		
54E	Laurelwood silt loam, 30 to 60 percent slopes	Very limited	Laurelwood (80%)	Water Erosion (1.00)	6.5	0.1%
				Pesticide and nutrient movement (0.00)		
56	McBee silty clay loam	Somewhat limited	McBee (85%)	Pesticide and nutrient movement (0.82)	74.6	1.2%
57	McBee variant loam	Very limited	McBee, Variant (90%)	Pesticide and nutrient movement (1.00)	35.5	0.6%

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Wapato (3%)	Pesticide and nutrient movement (1.00)		
64B	Nekia silty clay loam, 2 to 8 percent slopes	Somewhat limited	Nekia (80%)	Water Erosion (0.08)	17.7	0.3%
				Pesticide and nutrient movement (0.00)		
64C	Nekia silty clay loam, 8 to 15 percent slopes	Very limited	Nekia (80%)	Water Erosion (1.00)	61.0	1.0%
				Pesticide and nutrient movement (0.00)		
67	Newberg fine sandy loam	Very limited	Newberg (85%)	Pesticide and nutrient movement (1.00)	189.0	3.1%
			Wapato (2%)	Pesticide and nutrient movement (1.00)		
70C	Powell silt loam, 8 to 15 percent slopes	Very limited	Powell (85%)	Pesticide and nutrient movement (1.00)	23.5	0.4%
				Water Erosion (1.00)		
			Delena (3%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
73	Riverwash	Not rated	Riverwash (100%)		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	Somewhat limited	Salem (85%)	Pesticide and nutrient movement (0.22)	89.8	1.5%
				Water Erosion (0.12)		
78B	Saum silt loam, 3 to 8 percent slopes	Somewhat limited	Saum (80%)	Water Erosion (0.42)	110.0	1.8%
				Pesticide and nutrient movement (0.22)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
78C	Saum silt loam, 8 to 15 percent slopes	Very limited	Saum (80%)	Water Erosion (1.00)	229.2	3.8%
				Pesticide and nutrient movement (0.22)		
78D	Saum silt loam, 15 to 30 percent slopes	Very limited	Saum (80%)	Water Erosion (1.00)	157.1	2.6%
				Pesticide and nutrient movement (0.22)		
78E	Saum silt loam, 30 to 60 percent slopes	Very limited	Saum (80%)	Water Erosion (1.00)	39.9	0.7%
				Pesticide and nutrient movement (0.22)		
82	Urban land	Not rated	Urban land (100%)		363.1	6.0%
83	Wapato silt loam	Very limited	Wapato (90%)	Pesticide and nutrient movement (1.00)	6.5	0.1%
			Cove (6%)	Pesticide and nutrient movement (1.00)		
84	Wapato silty clay loam	Very limited	Wapato (85%)	Pesticide and nutrient movement (1.00)	146.1	2.4%
			Cove (6%)	Pesticide and nutrient movement (1.00)		
			Humaquepts (4%)	Pesticide and nutrient movement (1.00)		
88A	Willamette silt loam, wet, 0 to 3 percent slopes	Somewhat limited	Willamette, wet (85%)	Pesticide and nutrient movement (0.64)	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	Somewhat limited	Willamette, wet (85%)	Pesticide and nutrient movement (0.64)	42.8	0.7%
				Water Erosion (0.36)		
89D	Witzel very stony silt loam, 3 to	Somewhat limited	Witzel (80%)	Water Erosion (0.68)	439.2	7.3%

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
	40 percent slopes			Pesticide and nutrient movement (0.22)		
91A	Woodburn silt loam, 0 to 3 percent slopes	Somewhat limited	Woodburn (85%)	Pesticide and nutrient movement (0.96)	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	Somewhat limited	Woodburn (90%)	Pesticide and nutrient movement (0.96)	779.4	12.9%
				Water Erosion (0.12)		
91C	Woodburn silt loam, 8 to 15 percent slopes	Very limited	Woodburn (90%)	Water Erosion (1.00)	283.3	4.7%
				Pesticide and nutrient movement (0.96)		
			Dayton (2%)	Pesticide and nutrient movement (1.00)		
92F	Xerochrepts and Haploxerolls, very steep	Very limited	Xerochrepts (50%)	Water Erosion (1.00)	287.0	4.7%
				Pesticide and nutrient movement (0.14)		
			Haploxerolls (35%)	Water Erosion (1.00)		
				Pesticide and nutrient movement (0.48)		
93E	Xerochrepts-Rock outcrop complex, moderately steep	Somewhat limited	Xerochrepts (60%)	Water Erosion (0.72)	115.8	1.9%
				Pesticide and nutrient movement (0.00)		
W	Water	Not rated	Water (100%)		477.5	7.9%
Totals for Area of Interest					**6,050.5**	**100.0%**

Subsurface Water Management, Outflow Quality— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Very limited	2,732.4	45.2%
Somewhat limited	2,437.8	40.3%

Subsurface Water Management, Outflow Quality— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Null or Not Rated	880.4	14.5%
Totals for Area of Interest	**6,050.5**	**100.0%**

Rating Options—Subsurface Water Management, Outflow Quality

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

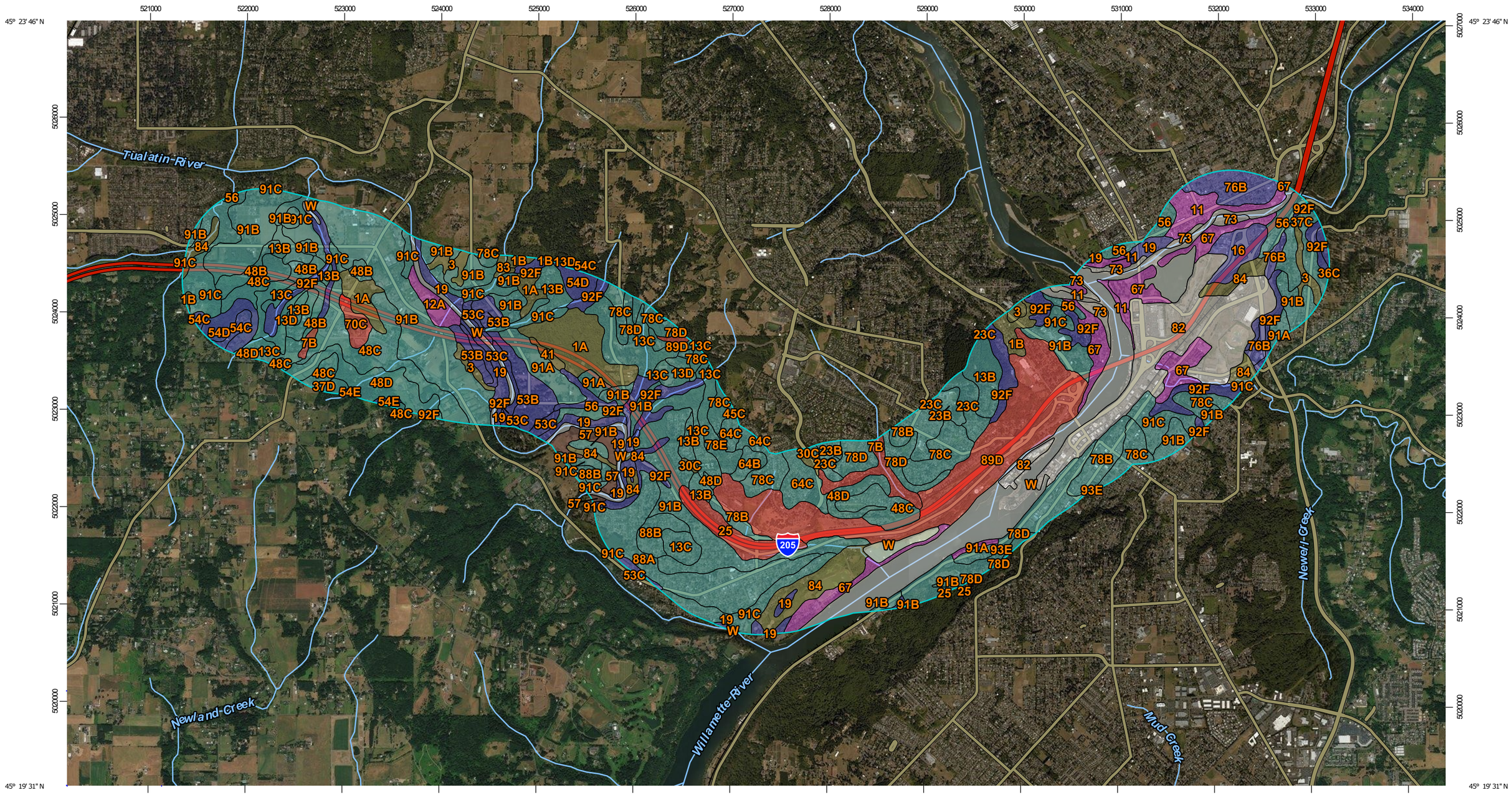
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at

or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

0 500 1000 2000 3000 Meters

0 1500 3000 6000 9000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	C/D	34.9	0.6%
3	Amity silt loam	C/D	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	D	47.0	0.8%
11	Camas gravelly sandy loam	A	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	A	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	C	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	C	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	C	53.4	0.9%
16	Chehalis silt loam	B	50.7	0.8%
19	Cloquato silt loam	B	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	C	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	C	48.2	0.8%
25	Cove silty clay loam	D	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	C/D	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	D	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	C	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	C	7.9	0.1%
41	Huberly silt loam	C/D	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	C	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	C	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	C	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	C	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	B	94.8	1.6%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	B	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	B	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	B	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	B	6.5	0.1%
56	McBee silty clay loam	C	74.6	1.2%
57	McBee variant loam	B/D	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	C	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	C	61.0	1.0%
67	Newberg fine sandy loam	A	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	D	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	B	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	C	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	C	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	C	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	C	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	C/D	6.5	0.1%
84	Wapato silty clay loam	C/D	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	C	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	C	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	D	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	C	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	C	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	B	287.0	4.7%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93E	Xerochrepts-Rock outcrop complex, moderately steep	C	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

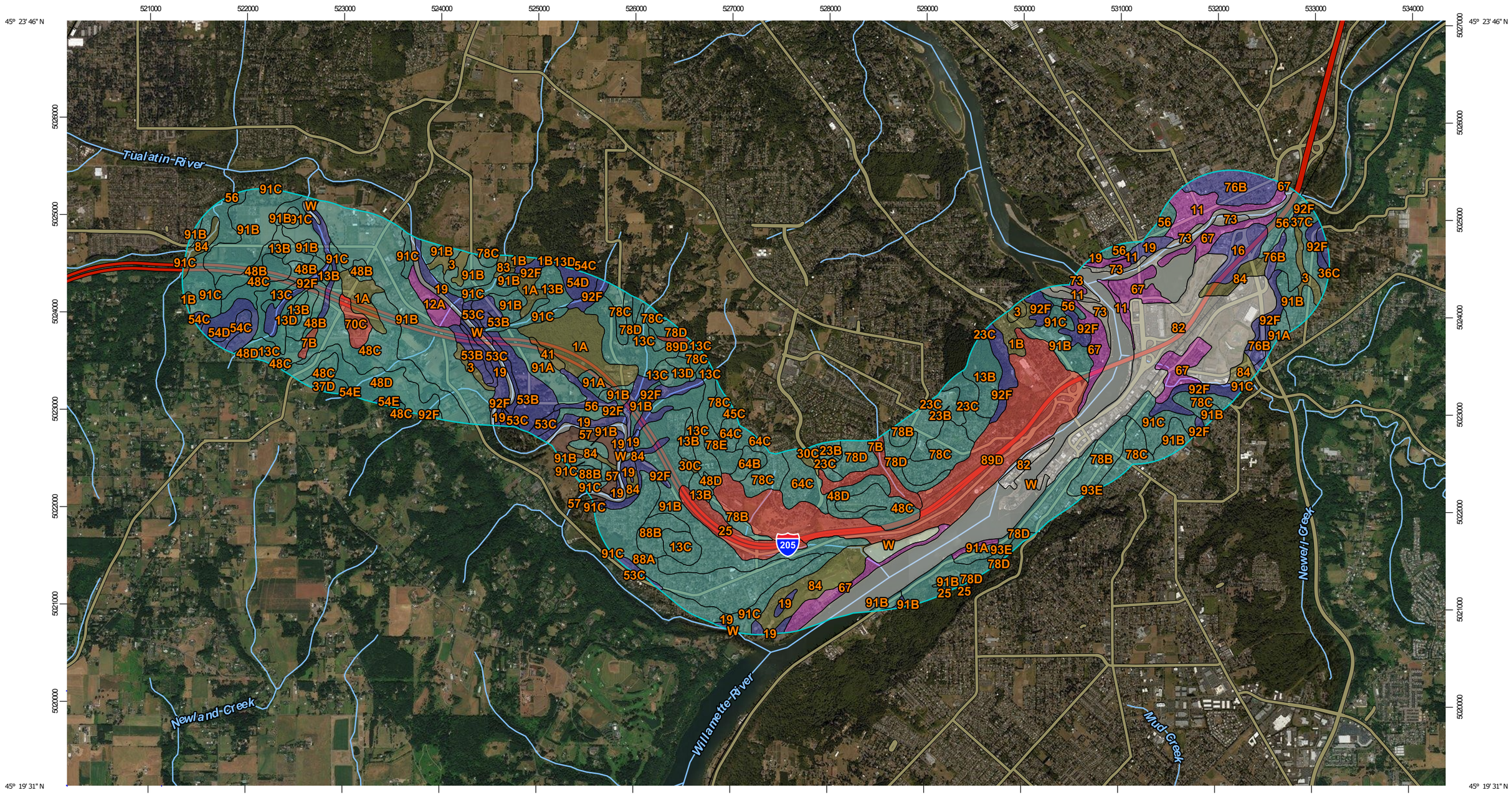
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

0 500 1000 2000 3000 Meters

0 1500 3000 6000 9000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

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Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	C/D	34.9	0.6%
3	Amity silt loam	C/D	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	D	47.0	0.8%
11	Camas gravelly sandy loam	A	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	A	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	C	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	C	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	C	53.4	0.9%
16	Chehalis silt loam	B	50.7	0.8%
19	Cloquato silt loam	B	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	C	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	C	48.2	0.8%
25	Cove silty clay loam	D	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	C/D	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	D	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	C	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	C	7.9	0.1%
41	Huberly silt loam	C/D	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	C	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	C	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	C	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	C	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	B	94.8	1.6%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	B	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	B	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	B	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	B	6.5	0.1%
56	McBee silty clay loam	C	74.6	1.2%
57	McBee variant loam	B/D	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	C	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	C	61.0	1.0%
67	Newberg fine sandy loam	A	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	D	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	B	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	C	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	C	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	C	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	C	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	C/D	6.5	0.1%
84	Wapato silty clay loam	C/D	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	C	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	C	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	D	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	C	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	C	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	B	287.0	4.7%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93E	Xerochrepts-Rock outcrop complex, moderately steep	C	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Water Features

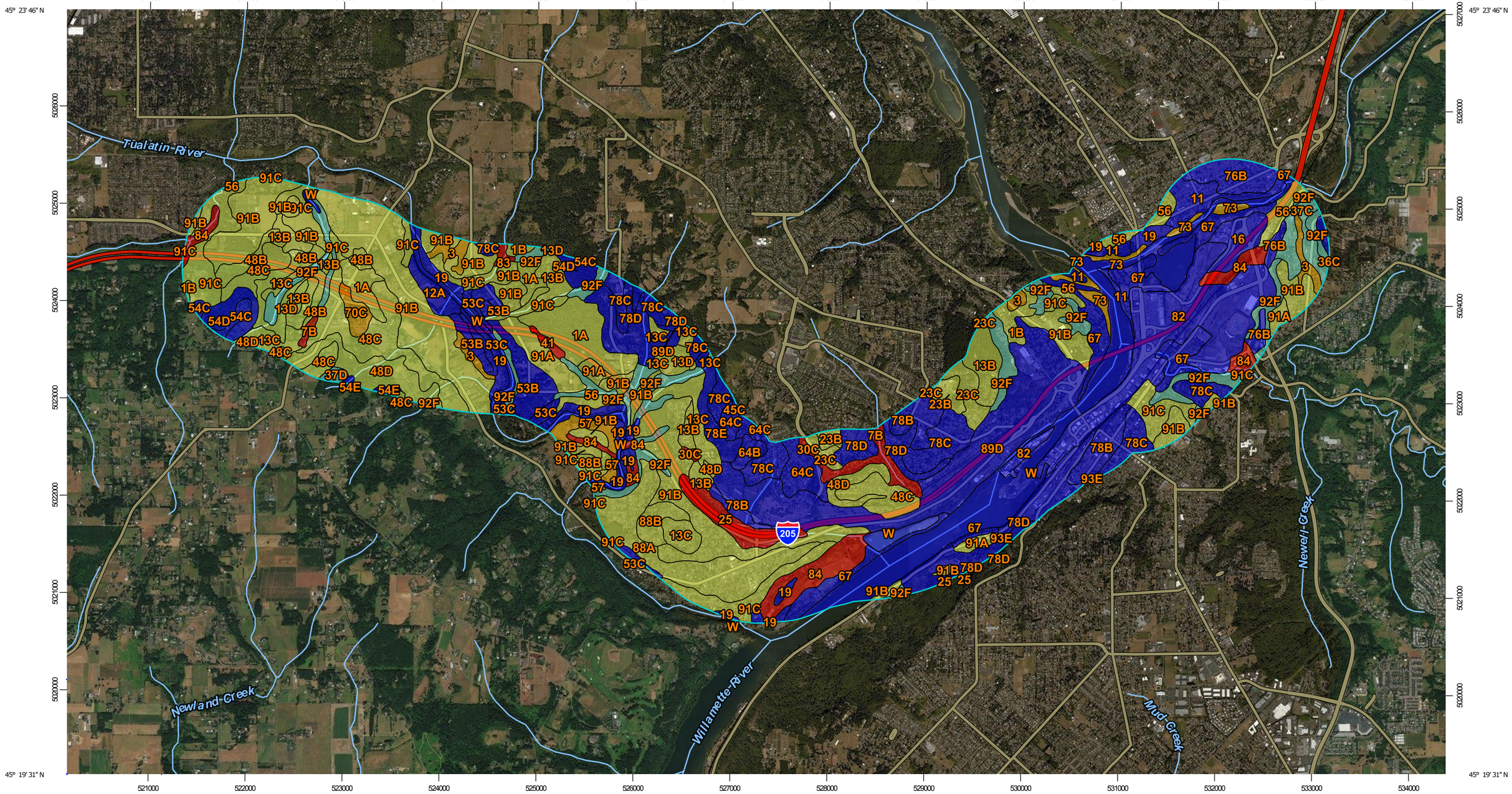
Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Water Table



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Depth to Water Table

Depth to Water Table— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	54	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	54	34.9	0.6%
3	Amity silt loam	31	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	8	47.0	0.8%
11	Camas gravelly sandy loam	>200	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	>200	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	61	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	61	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	61	53.4	0.9%
16	Chehalis silt loam	>200	50.7	0.8%
19	Cloquato silt loam	>200	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	86	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	86	48.2	0.8%
25	Cove silty clay loam	15	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	23	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	31	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	137	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	137	7.9	0.1%
41	Huberly silt loam	23	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	>200	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	86	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	86	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	86	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	>200	94.8	1.6%

Depth to Water Table— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	>200	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	>200	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	>200	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	>200	6.5	0.1%
56	McBee silty clay loam	76	74.6	1.2%
57	McBee variant loam	31	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	>200	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	>200	61.0	1.0%
67	Newberg fine sandy loam	>200	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	38	23.5	0.4%
73	Riverwash	31	39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	>200	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	>200	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	>200	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	>200	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	>200	39.9	0.7%
82	Urban land	>200	363.1	6.0%
83	Wapato silt loam	0	6.5	0.1%
84	Wapato silty clay loam	8	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	92	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	92	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	>200	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	64	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	64	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	64	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	137	287.0	4.7%

Depth to Water Table— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating (centimeters)**	**Acres in AOI**	**Percent of AOI**
93E	Xerochrepts-Rock outcrop complex, moderately steep	>200	115.8	1.9%
W	Water	>200	477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

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SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

August 22, 2018

Mr. Steve Drahota
HDR, Inc.
1001 SW 5th Avenue, Suite 1800
Portland, Oregon 97204

RE: DRAFT PRELIMINARY INFILTRATION TESTING RESULTS MEMORANDUM CLACKAMAS COUNTY, OREGON

Dear Mr. Drahota:

This letter report summarizes results of infiltration testing performed by Shannon & Wilson, Inc. (Shannon & Wilson), to support design of stormwater management facilities for the I-205: Stafford Road to OR99E Corridor Widening Project. The project area is shown on the Vicinity Map, Figure 1. We understand the Oregon Department of Transportation (ODOT) is planning to widen the Interstate-205 (I-205) corridor from Stafford Road to OR99E. This project will widen I-205 to three lanes northbound and three lanes southbound from Stafford Road to OR213. We also understand the project will include proposed facilities such as detention ponds and swales which will be deeper than 3 feet.

To assist HDR, Inc. (HDR), for the design of the proposed stormwater management facilities, Shannon & Wilson is providing geotechnical field explorations and infiltration testing services. Our services were performed in accordance with the scope of services defined in the HDR Subconsultant Task Order No.10063137-001, dated June 14, 2018.

INFILTRATION TESTING

Shannon & Wilson is currently performing a subsurface investigation for Amendment 3 at the project site. As part of the ongoing subsurface investigation, we completed 15 infiltration tests. Approximate locations of the infiltration test sites are shown on the Site and Exploration Plan, Figure 2. A Shannon & Wilson representative was on site to perform each infiltration test.

Infiltration Testing

Infiltration tests were conducted in accordance with the procedures described in the Infiltration Testing Guide, of the *Stormwater Standards, Clackamas County Stormwater Service District No.*

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LAKE OSWEGO, OREGON 97035-3480
503-210-4750
www.shannonwilson.com

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1(E.2.2). Infiltration tests must be performed at the base of the proposed facilities, which is anticipated to be approximately six feet. As shown in Table 1 below, nine of the holes were excavated to less than 3.5 feet. At these locations, we encountered refusal conditions after several attempts due to gravels, cobbles, and boulders, at or near the surface.

The test hole was advanced using a gasoline-powered auger and hand tools. A 6-inch-diameter PVC casing was embedded into the underlying soil to perform the Encased Falling Head Test method. This method is not appropriate in gravelly soils or conditions in which a good seal with the casing cannot be established. In these cases, the Open Pit Falling Head Test method was followed.

The excavated hole was then filled with clean water a minimum of 12 inches deep, and this depth was maintained for at least 4 hours to presoak the native material. After the presaturation period, the holes were refilled with water to 6 inches (12 inches for Open Pit Falling Head Test Method) and the drawdown time was measured. Measurements were made every 10 minutes for one hour in faster draining soils, or 20 minutes for two hours in slower draining soils.

The process of refilling the hole and taking measurements (a trial) is repeated until the change in measured infiltration rate between two successive trials is no more than five percent. At least three trials were conducted for each test.

The infiltration test results of all infiltration tests are presented on Figures 3 through 17.

RESULTS

According to the *Stormwater Standards, Clackamas County Stormwater Service District No. 1(E.2.2),* the final infiltration rates were calculated using the following standard calculation. The calculation is performed for each water level drop and is outlined below:

= (Drop in water level/Time interval) x conversion

= 0.055ft/20min x (12in/ft) x (60min/hr)

= 1.98 inches per hour

Field-measured infiltration rates in the final test of each trial for each test location are provided in Table 1 below.

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TABLE 1
INFILTRATION TESTING SUMMARY

Designation	Approximate Depth (feet)	Infiltration Testing Method	Final Infiltration Rate (inches/hour) for each Trial		
			1	2	3
INF19786-01	5.0	Encased Falling Head Test	0.06	0.00	0.00
INF19786-02	5.5	Encased Falling Head Test	0.72	0.36	0.72
INF19786-03	5.5	Encased Falling Head Test	0.09	0.18	0.0
INF19786-04	6	Encased Falling Head Test	1.44	1.44	0.72
INF19786-05	5.25	Encased Falling Head Test	0.00	0.00	0.00
INF19786-06	2.5	Open Pit Falling Head Test	0.36	0.17	0.36
INF19786-07	5.5	Encased Falling Head Test	0.72	0.72	0.72
INF19786-08	2.0	Open Pit Falling Head Test	1.44	1.44	1.44
INF19786-09	2.0	Open Pit Falling Head Test	3.60	3.60	2.88
INF19786-10	2.0	Open Pit Falling Head Test	2.88	2.88	2.88
INF19786-11	2.0	Open Pit Falling Head Test	0.72	0.36	0.36
INF19786-12	2.0	Open Pit Falling Head Test	1.44	0.72	1.44
INF19786-13	3.0	Open Pit Falling Head Test	1.44	1.44	1.44
INF19786-14	3.5	Open Pit Falling Head Test	1.44	0.72	1.44
INF19786-15	2.0	Open Pit Falling Head Test	0.36	0.00	0.36

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LIMITATIONS

Shannon & Wilson has prepared this report in a professional manner, using a level of skill and care normally exercised for similar projects under similar conditions by reputable and competent geotechnical consultants currently practicing in the area, and in accordance with the terms and conditions set forth in our proposal. The facts and conditions referenced in this report may change over time, and the conclusions set forth herein are applicable to the facts and conditions

as described only at the time of this report. Conclusions were made within the operative constraints of the scope, budget, and schedule for this project. We believe that the conditions stated here are factual, but no guarantee is made or implied. This report is for the exclusive use of HDR, Inc. We have prepared an enclosure, "Important Information About Your Geotechnical/Environmental Report," to help you and others understand the use and limitations of our reports.

Sincerely,

SHANNON & WILSON, INC.

Cody Sorensen, CEG
Senior Engineering Geologist

Christina Villeneuve, GIT
Staff Geologist

CLV:NMV/mmm

Enc: Figure 1: Vicinity Map
Figure 2: Site and Exploration Plan
Figures 3 through 17: Infiltration Test Results
Important Information About Your Geotechnical/Environmental Report

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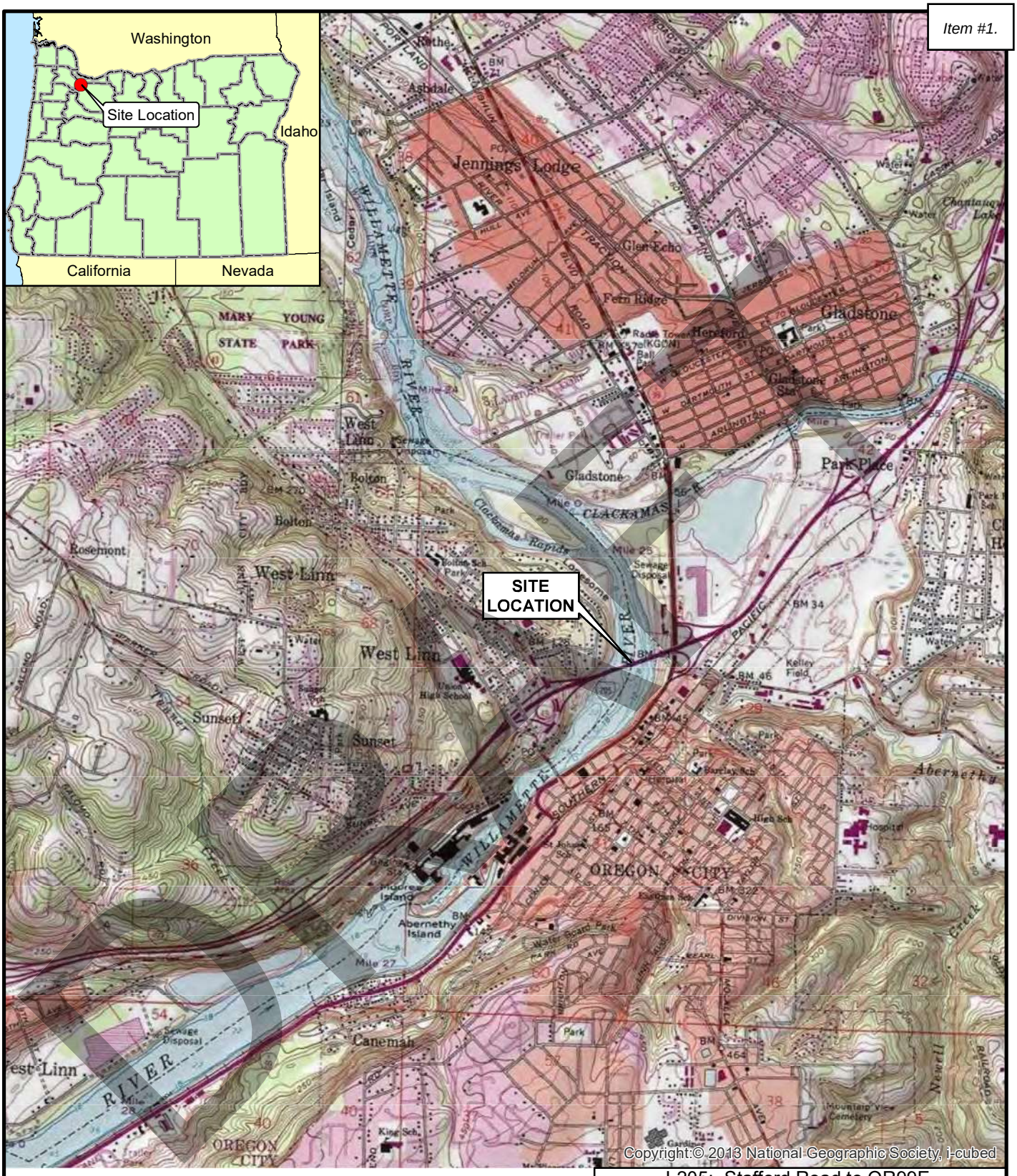

0 0.25 0.5 1

Scale in Miles

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

VICINITY MAP

August 2018 24-1-04165-006

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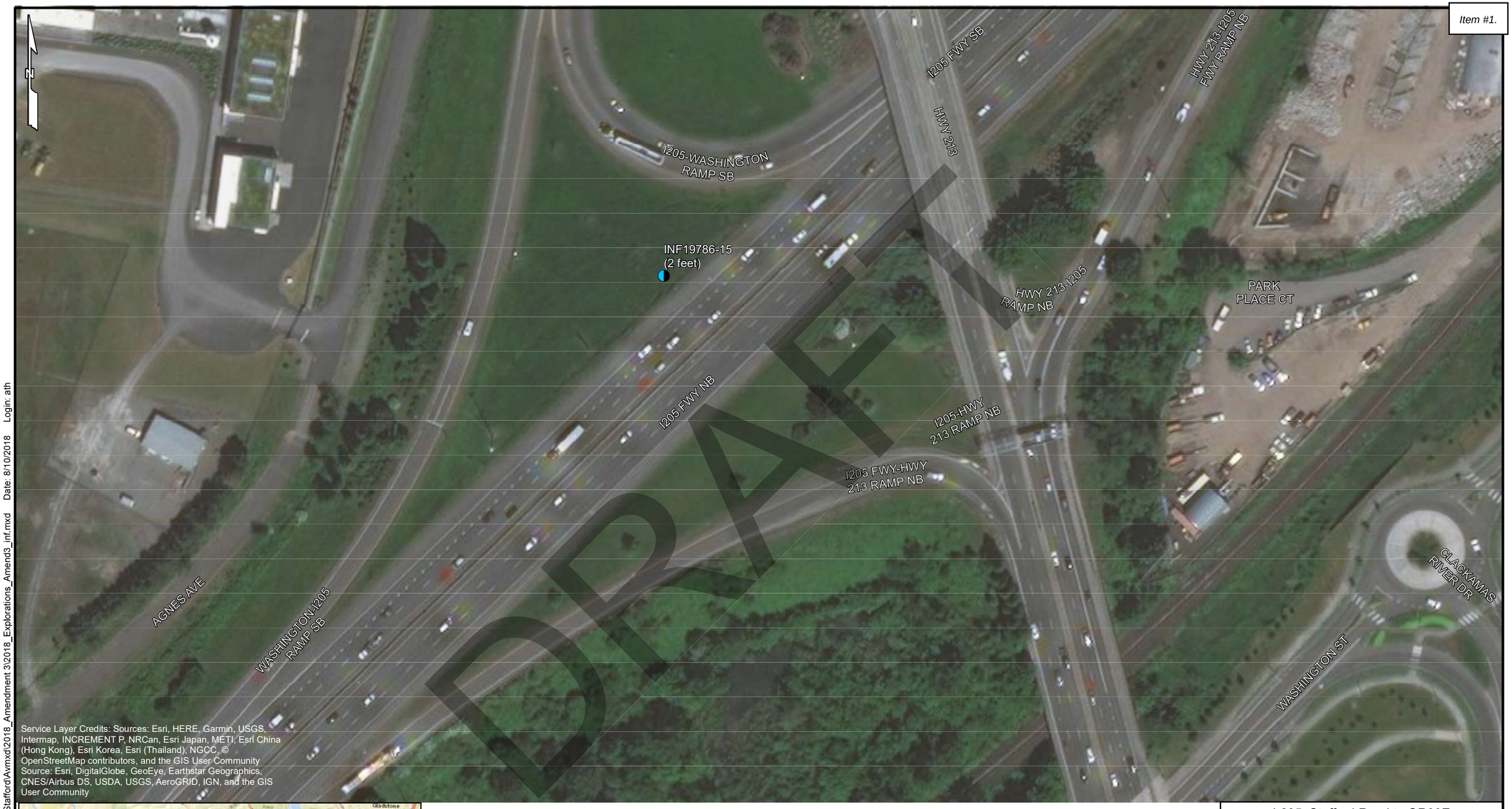

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LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200
Scale in Feet

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

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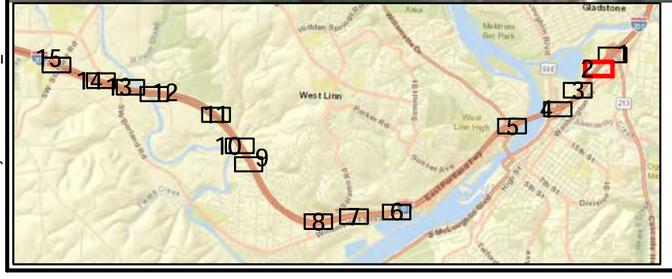

LEGEND

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EXPLORATION PLAN
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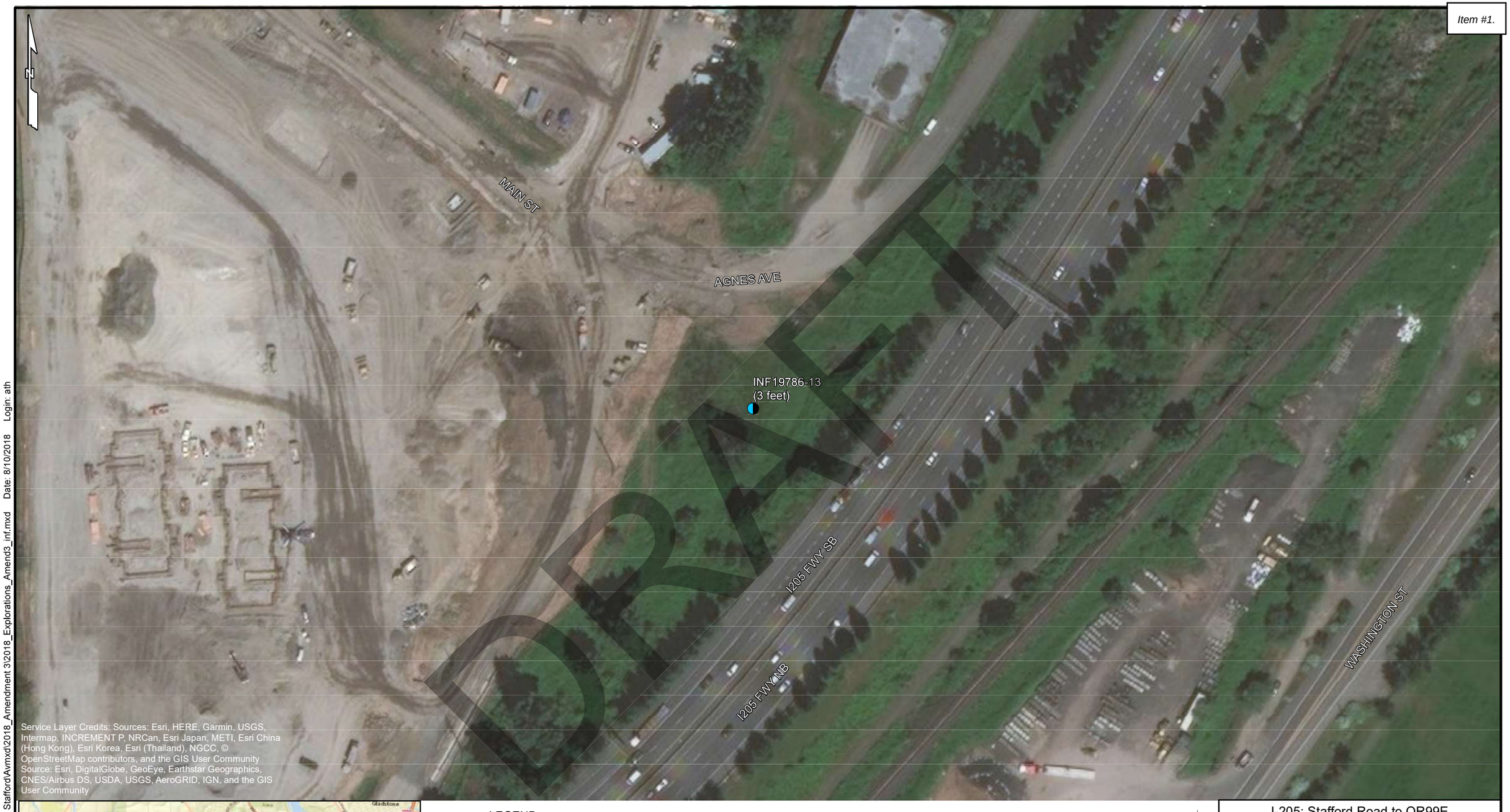

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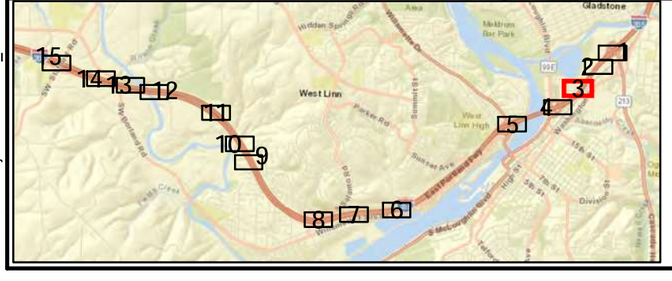

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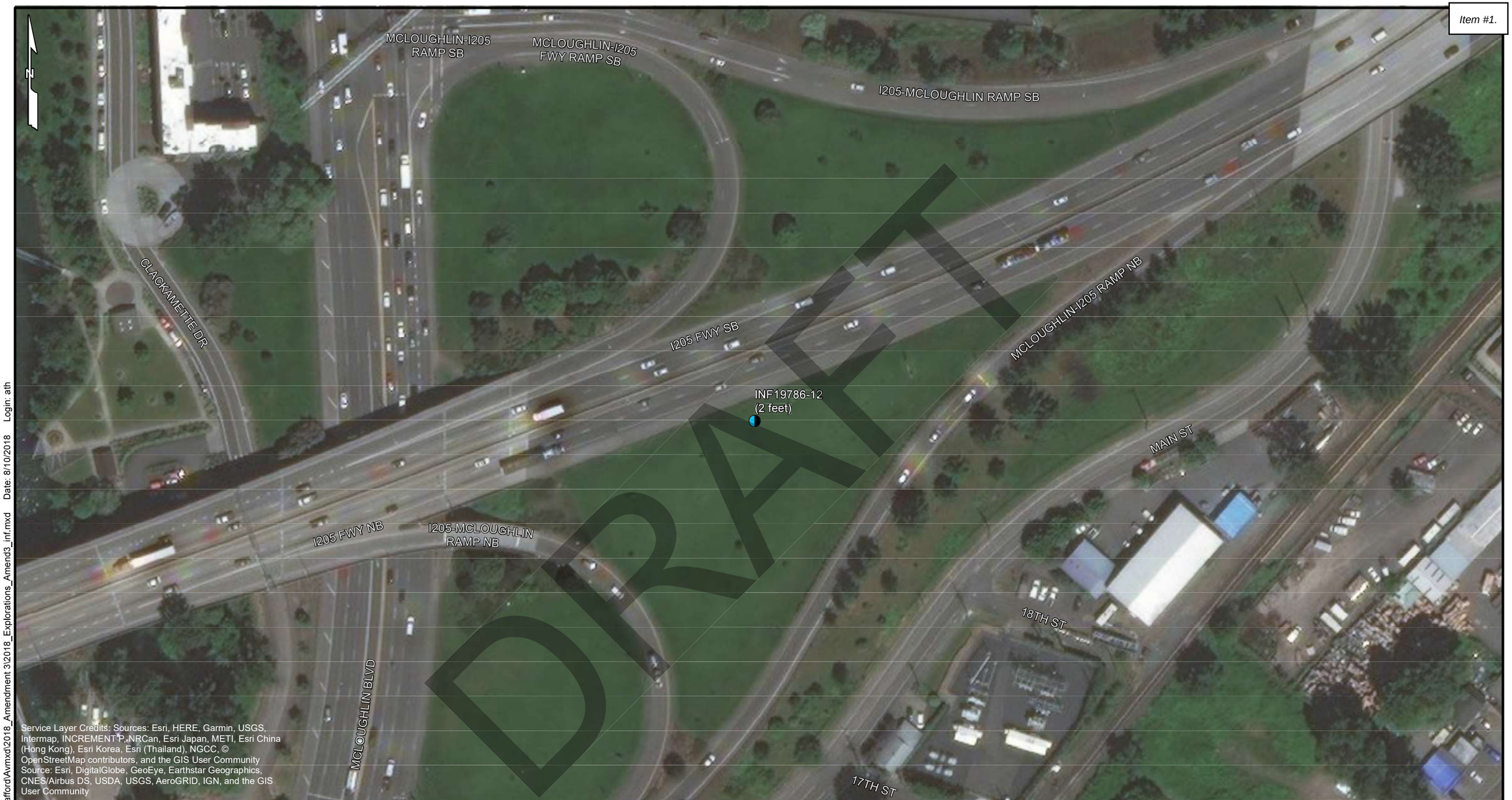

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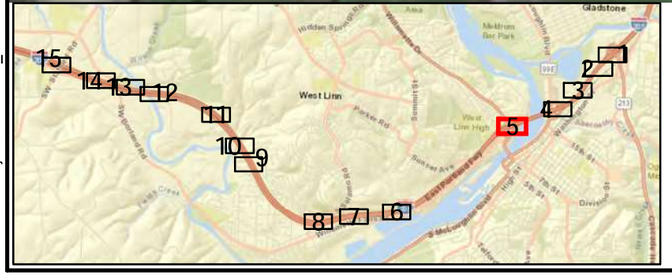

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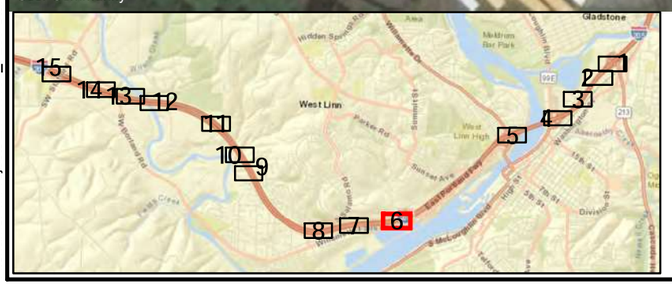

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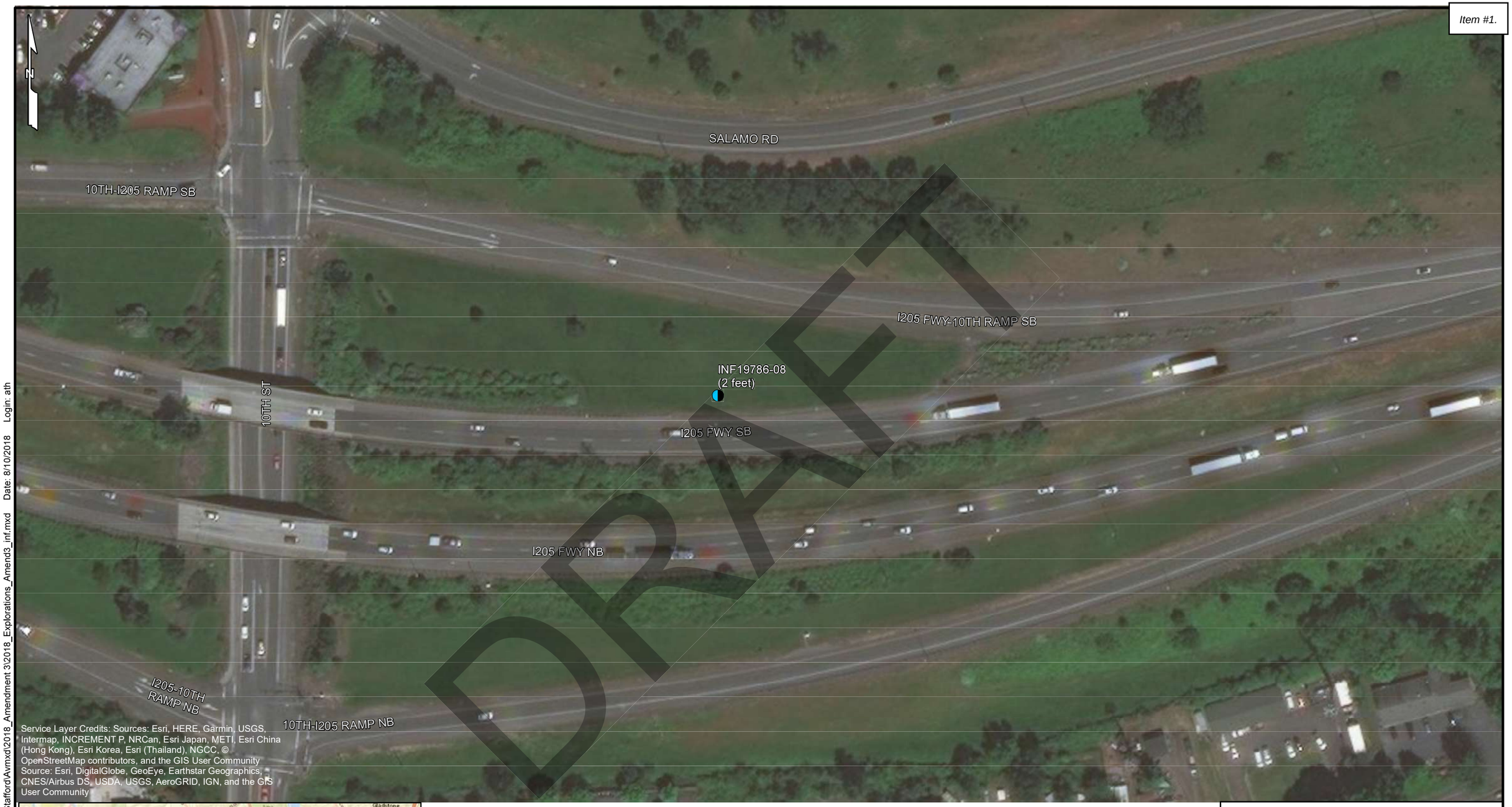

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(Final Depth)

Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

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Sheet

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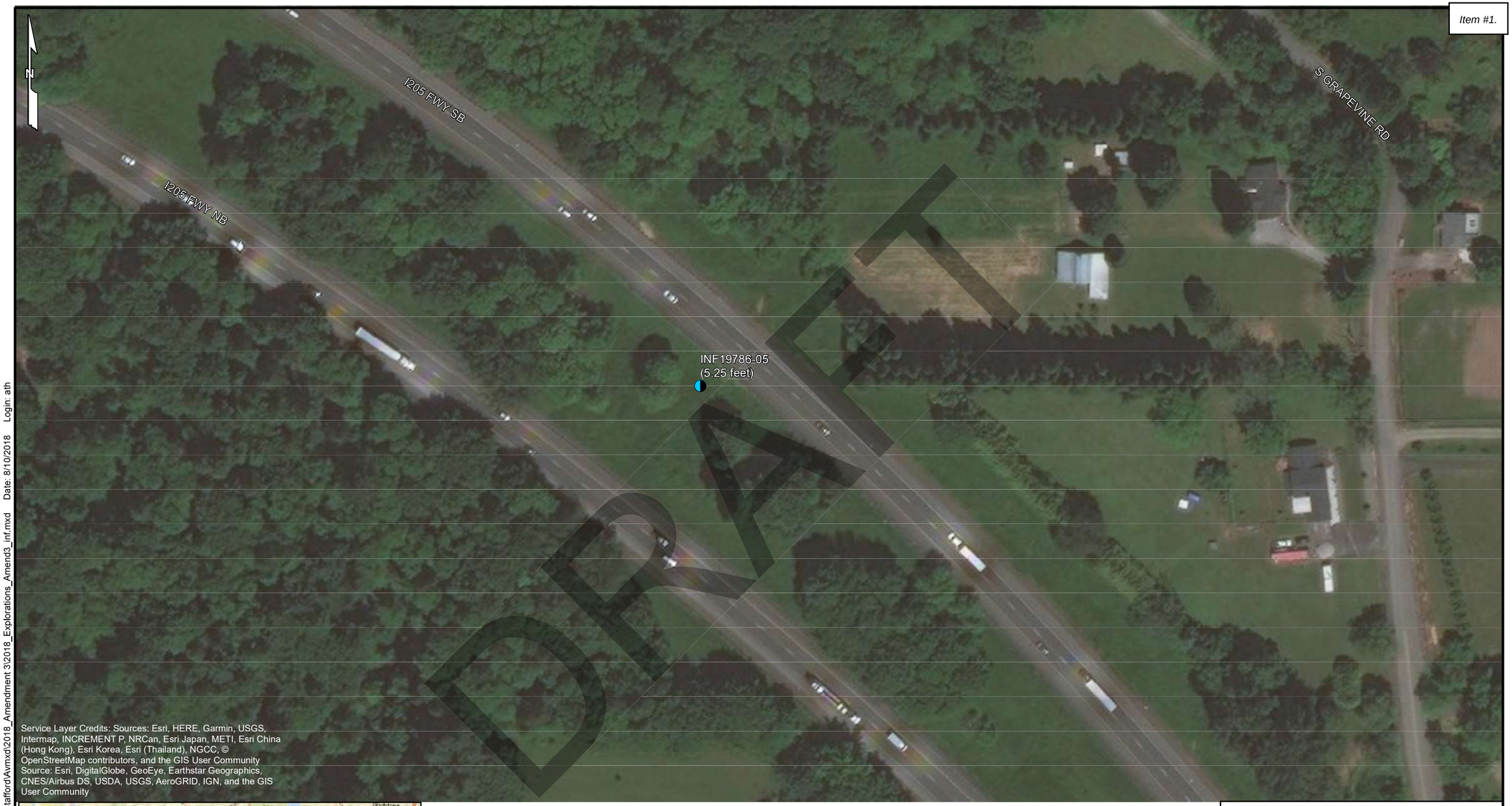

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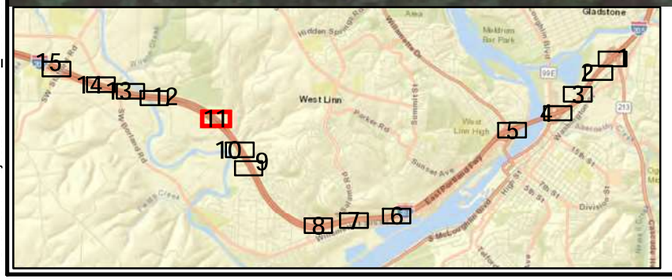

LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

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LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

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LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200

Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

INF19786-15A
(Final Depth)
Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

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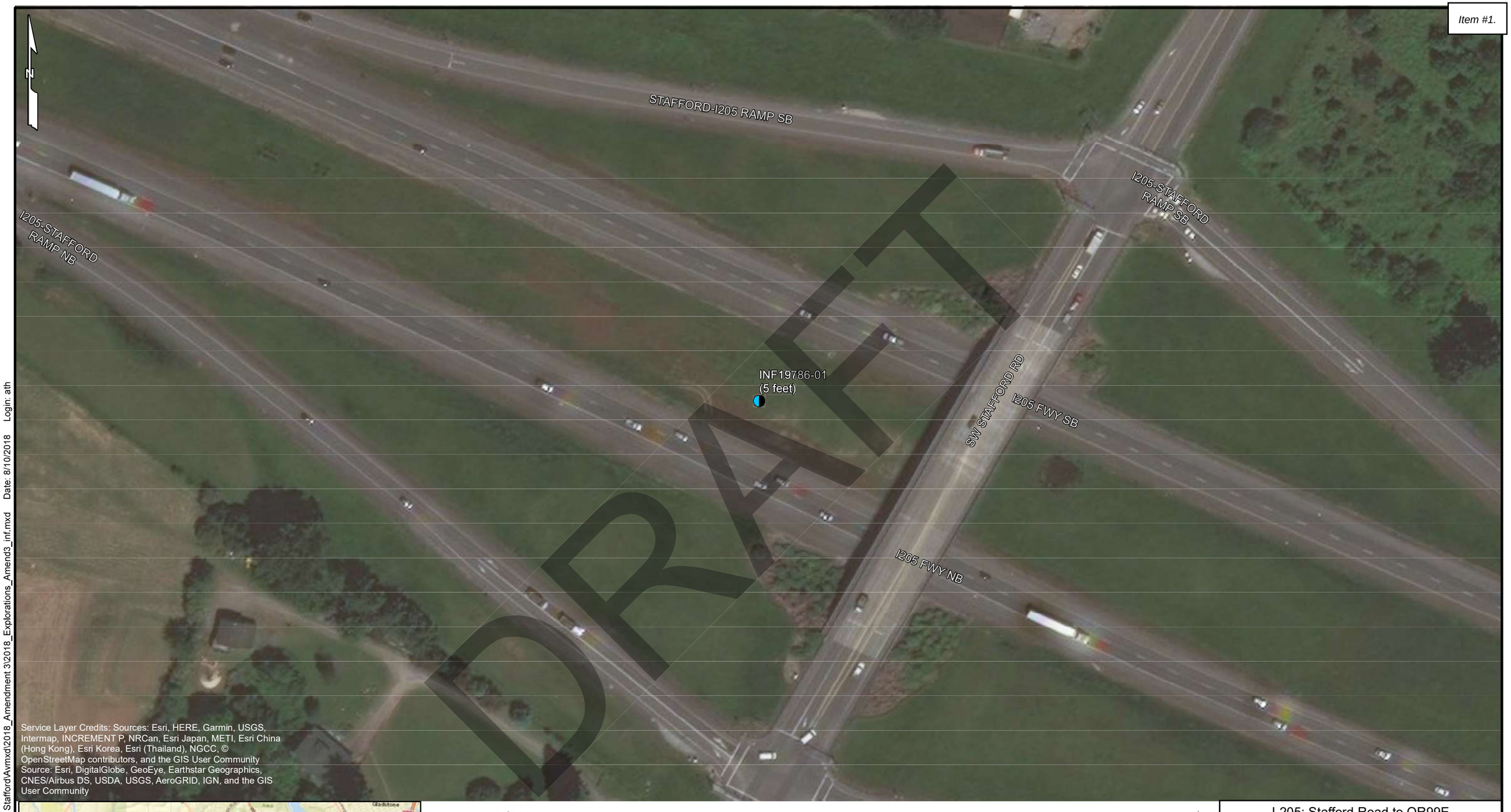

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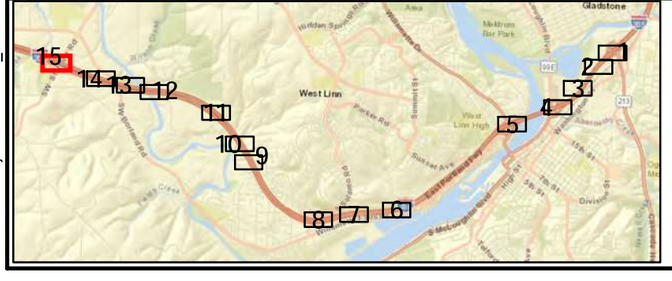

LEGEND

INF19786-15A
(Final Depth)
Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sheet

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/6/2018

Location: I-205 northbound median mile marker 3.0

Test Hole Number: INF19786-01

Depth to bottom of hole: 5.0 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 2.0	Sandy SILT; ML; Light brown; Moist
2.0 - 5.0	Silty SAND; SM; Brown; Nonplastic fines; Moist; Fine to medium sand

Presaturation Start Time: 8:00 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	5.40	-	-	-	Trial #1
12:20	20	5.40	0.00	0.01	0.06	
12:40	20	5.40	0.00			
13:00	20	5.40	0.00			
13:20	20	5.40	0.00			
13:40	20	5.40	0.00			
14:00	20	5.41	0.01			
14:00	0	5.40		-	-	Trial #2
14:20	20	5.40	0.00	0.00	0.00	
14:40	20	5.40	0.00			
15:00	20	5.40	0.00			
15:20	20	5.40	0.00			
15:40	20	5.40	0.00			
16:00	20	5.40	0.00			
16:00	0	5.40		-	-	Trial #3
16:20	20	5.40	0.00	0.00	0.00	
16:40	20	5.40	0.00			
17:00	20	5.40	0.00			
17:20	20	5.40	0.00			
17:40	20	5.40	0.00			
18:00	20	5.40	0.00			

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-01

August 2018 24-1-04165-006

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FIG. 3

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/9/2018

Location: I-205 southbound median mile marker 3.5

Test Hole Number: INF19786-02

Depth to bottom of hole: 5.5 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 -5.5	SILT with trace sand; ML; Brown; Nonplastic fines; Moist

Presaturation Start Time: 8:15 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:02	0	5.45	-	-	-	Trial #1
12:12	10	5.46	0.01	0.01	0.72	
12:22	10	5.47	0.01	0.01	0.72	
12:32	10	5.48	0.01	0.01	0.72	
12:42	10	5.48	0.00	0.01	0.36	
12:52	10	5.49	0.01			
13:02	10	5.50	0.01	0.01	0.72	
13:06	0	5.45	-	-	-	Trial #2
13:26	20	5.47	0.02		0.72	
13:46	20	5.48	0.01		0.36	
14:06	20	5.50	0.02		0.72	
14:26	20	5.52	0.02		0.72	
14:46	20	5.54	0.02		0.72	
15:06	20	5.55	0.01		0.36	
15:10	0	5.45	-	-	-	Trial #3
15:30	20	5.47	0.02		0.72	
15:50	20	5.49	0.02		0.72	
16:10	20	5.50	0.01		0.36	
16:30	20	5.52	0.02		0.72	
16:50	20	5.54	0.02		0.72	
17:10	20	5.56	0.02		0.72	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-02

August 2018 24-1-04165-006

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FIG. 4

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/10/2018

Location: I-205 southbound shoulder mile marker 4.0

Test Hole Number: INF19786-03

Depth to bottom of hole: 5.5 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 2.0	SILT; ML; Light brown; Moist
2.0 - 5.5	Sandy SILT; ML; Brown; Nonplastic fines; Moist; Fine to medium sand

Presaturation Start Time: 8:09 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	5.97	-	-	-	Trial #1
12:20	20	5.97	0.00	0.01	0.36	
12:40	20	5.98	0.01	0.01	0.36	
13:00	20	5.99	0.01	0.01	0.36	
13:20	20	5.99	0.00			
13:40	20	5.99	0.00	0.01	0.09	
14:00	20	6.00	0.01			
14:00	0	5.97	-	-	-	Trial #2
14:20	20	5.97	0.00			
14:40	20	5.97	0.00	0.01	0.09	
15:00	20	5.98	0.01			
15:40	20	5.99	0.00	0.01	0.18	
16:00	20	6.00	0.01			
16:00	0	5.97	-	-	-	Trial #3
16:20	20	5.97	0.00			
16:40	20	5.97	0.00	0.01	0.09	
17:00	20	5.98	0.01			
17:40	20	5.99	0.01	0.01	0.18	
18:00	20	5.99	0.00	0.00	0.00	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-03

August 2018 24-1-04165-006

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FIG. 5

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/11/2018

Location: I-205 northbound median mile marker 4.1

Test Hole Number: INF19786-04

Depth to bottom of hole: 6.0 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 1.5	Sandy SILT; ML; Light brown; Moist
1.5 - 6.0	Silty SAND; ML; Light brown; Moist; Fine to medium sand

Presaturation Start Time: 8:07 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
12:02	0	6.14	-	-	Trial #1
12:12	10	6.15	0.01	0.72	
12:22	10	6.17	0.02	1.44	
12:32	10	6.19	0.02	1.44	
12:42	10	6.20	0.01	0.72	
12:52	10	6.22	0.02	1.44	
13:02	10	6.24	0.02	1.44	
13:03	0	6.14	-	-	Trial #2
13:13	10	6.15	0.01	0.72	
13:23	10	6.16	0.01	0.72	
13:33	10	6.18	0.02	1.44	
13:43	10	6.19	0.01	0.72	
13:53	10	6.21	0.02	1.44	
14:03	10	6.23	0.02	1.44	
14:05	0	6.14	-	-	Trial #3
14:15	10	6.16	0.02	1.44	
14:25	10	6.17	0.01	0.72	
14:35	10	6.19	0.02	1.44	
14:45	10	6.20	0.01	0.72	
14:55	10	6.22	0.02	1.44	
15:05	10	6.23	0.01	0.72	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-04

August 2018 24-1-04165-006

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FIG. 6

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/12/2018

Location: I-205 southbound median mile marker 4.7

Test Hole Number: INF19786-05

Depth to bottom of hole: 5.25 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 0.5	SILT; ML; Light brown; Moist
0.5 - 5.25	SILT with some sand; ML; Light brown; Moist

Presaturation Start Time: 8:17 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	6.04	-	-	-	Trial #1
12:20	20	6.04	0.00	0.00	0.00	
12:40	20	6.04	0.00			
13:00	20	6.04	0.00			
13:20	20	6.04	0.00			
13:40	20	6.04	0.00			
14:00	20	6.04	0.00			
14:00	0	6.04	-	-	-	Trial #2
14:20	20	6.04	0.00	0.01	0.09	
14:40	20	6.04	0.00			
15:00	20	6.04	0.00			
15:20	20	6.05	0.01			
15:40	20	6.05	0.00	0.00	0.00	
16:00	20	6.05	0.00			
16:00	0	6.04	-	-	-	Trial #3
16:20	20	6.04	0.00	0.00	0.00	
16:40	20	6.04	0.00			
17:00	20	6.04	0.00			
17:20	20	6.04	0.00			
17:40	20	6.04	0.00			
18:00	20	6.04	0.00			

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-05

August 2018 24-1-04165-006

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FIG. 7

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/16/2018

Location: I-205 northbound median mile marker 5.4

Test Hole Number: INF19786-06

Depth to bottom of hole: 2.5 feet

Diameter of hole: 8 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 1.0	SILT; ML; Light brown; Moist
0.5 - 2.5	SILT with trace sand and gravel, with cobbles; ML; Light brown; Moist
2.5	Silty GRAVEL with Cobbles; GM; Refusal

Presaturation Start Time: 8:20 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
11:24	0	4.01	-	-	-	Trial #1
11:44	20	4.01	0.00	0.02	0.24	
12:04	20	4.01	0.00			
12:24	20	4.03	0.02			
12:44	20	4.03	0.00	0.02	0.36	
13:04	20	4.05	0.02			
13:24	20	4.06	0.01	0.01	0.36	
13:25	0	4.01	-	-	-	Trial #2
13:45	20	4.01	0.00	0.01	0.17	
14:05	20	4.02	0.01			
14:25	20	4.03	0.01	0.01	0.36	
14:45	20	4.04	0.01	0.01	0.36	
15:05	20	4.04	0.00	0.01	0.17	
15:25	20	4.05	0.01			
15:26	0	4.01	-	-	-	Trial #3
15:46	20	4.02	0.01	0.01	0.36	
16:06	20	4.02	0.00	0.01	0.17	
16:26	20	4.03	0.01			
16:46	20	4.03	0.00	0.01	0.17	
17:06	20	4.04	0.01			
17:26	20	4.05	0.01	0.01	0.36	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-06

August 2018 24-1-04165-006

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FIG. 8

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/13/2018

Location: I-205 northbound shoulder mile marker 5.5

Test Hole Number: INF19786-07

Depth to bottom of hole: 5.5 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 5.5	Sandy SILT; ML; Light brown; Moist

Presaturation Start Time: 8:40 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	5.91	-	-	-	Trial #1
12:10	10	5.93	0.02	0.02	1.44	
12:20	10	5.93	0.00	0.01	0.36	
12:30	10	5.94	0.01			
12:40	10	5.96	0.02	0.02	1.44	
12:50	10	5.97	0.01	0.01	0.72	
13:00	10	5.98	0.01	0.01	0.72	
13:01	0	5.91	-	-	-	Trial #2
13:11	10	5.92	0.01	0.01	0.72	
13:21	10	5.93	0.01	0.01	0.72	
13:31	10	5.94	0.01	0.01	0.72	
13:41	10	5.95	0.01	0.03	2.15	
13:51	10	5.97	0.02	0.02	0.72	
14:01	10	5.97	0.00			
14:02	0	5.91	-	-	-	Trial #3
14:12	10	5.92	0.01	0.01	0.72	
14:22	10	5.93	0.01	0.01	0.72	
14:32	10	5.94	0.01	0.01	0.72	
14:42	10	5.96	0.02	0.02	1.44	
14:52	10	5.97	0.01	0.01	0.72	
15:02	10	5.98	0.01	0.01	0.72	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-07

August 2018 24-1-04165-006

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FIG. 9

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/19/2018

Location: I-205 southbound median mile marker 6.5

Test Hole Number: INF19786-08

Depth to bottom of hole: 2.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 0.5	SILT; ML; Light brown; Moist
0.5-2.0	SILT with trace sand and gravel, with cobbles; ML; Light brown; Moist
2.0	Silty GRAVEL with Cobbles; ML; Refusal

Presaturation Start Time: 8:25 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
12:01	0	3.81	-	-	Trial #1
12:11	10	3.83	0.02	1.44	
12:21	10	3.87	0.04	2.88	
12:31	10	3.90	0.03	2.16	
12:41	10	3.92	0.02	1.44	
12:51	10	3.94	0.02	1.44	
13:01	10	3.96	0.02	1.44	
13:02	0	3.83	-	-	Trial #2
13:12	10	3.86	0.03	2.16	
13:22	10	3.89	0.03	2.16	
13:32	10	3.91	0.02	1.44	
13:42	10	3.93	0.02	1.44	
13:52	10	3.95	0.02	1.44	
14:02	10	3.97	0.02	1.44	
14:04	0	3.83	-	-	Trial #3
14:14	10	3.85	0.02	1.44	
14:24	10	3.87	0.02	1.44	
14:34	10	3.89	0.02	1.44	
14:44	10	3.92	0.03	2.16	
14:54	10	3.93	0.01	0.72	
15:04	10	3.95	0.02	1.44	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-08

August 2018 24-1-04165-006

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FIG. 10

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/17/2018

Location: I-205 northbound median mile marker 7.0

Test Hole Number: INF19786-09

Depth to bottom of hole: 2.0 feet

Diameter of hole: 12 inches

Test method: Open Pit Falling Head Test

Depth (feet):	Soil Texture:
0.0 - 0.5	SILT; ML; Light brown; Moist
0.5-2.0	Gravelly SILT with some sand, with cobbles; ML; Light brown; **Moist**
2.0	Silty GRAVEL with Cobbles; GM; Refusal

Presaturation Start Time: 9:00 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
13:00	0	3.43	-	-	Trial #1
13:10	10	3.64	0.21	15.12	
13:20	10	3.75	0.11	7.92	
13:30	10	3.83	0.08	5.76	
13:40	10	3.91	0.08	5.76	
13:50	10	3.97	0.06	4.32	
14:00	10	4.02	0.05	3.60	
14:34	0	3.44	-	-	Trial #2
14:44	10	3.59	0.15	10.80	
14:54	10	3.69	0.10	7.20	
15:04	10	3.77	0.08	5.76	
15:14	10	3.84	0.07	5.04	
15:24	10	3.90	0.06	4.32	
15:34	10	3.95	0.05	3.60	
15:37	0	3.42	-	-	Trial #3
15:47	10	3.57	0.15	10.80	
15:57	10	3.67	0.10	7.20	
16:07	10	3.74	0.07	5.04	
16:17	10	3.81	0.07	5.04	
16:27	10	3.87	0.06	4.32	
16:37	10	3.91	0.04	2.88	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-09

August 2018 24-1-04165-006

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FIG. 11

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/20/2018

Location: I-205 southbound shoulder mile marker 7.2

Test Hole Number: INF19786-10

Depth to bottom of hole: 2.0 feet

Diameter of hole: 14 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 2.0	GRAVEL with some silt and sand, with Cobbles; GP-GM; Light brown, Moist
2.0	GRAVEL with Cobbles; Refusal

Presaturation Start Time: 9:20 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
13:01	0	3.88	-	-	Trial #1
13:11	10	3.99	0.11	7.92	
13:21	10	4.06	0.07	5.04	
13:31	10	4.12	0.06	4.32	
13:41	10	4.18	0.06	4.32	
13:51	10	4.22	0.04	2.88	
14:01	10	4.26	0.04	2.88	
14:03	0	3.88	-	-	Trial #2
14:13	10	3.98	0.10	7.20	
14:23	10	4.04	0.06	4.32	
14:33	10	4.10	0.06	4.32	
14:43	10	4.14	0.04	2.88	
14:53	10	4.19	0.05	3.60	
15:03	10	4.23	0.04	2.88	
15:05	0	3.82	-	-	Trial #3
15:15	10	3.93	0.11	7.92	
15:25	10	4.01	0.08	5.76	
15:35	10	4.07	0.06	4.32	
15:45	10	4.11	0.04	2.88	
15:55	10	4.16	0.05	3.60	
16:05	10	4.20	0.04	2.88	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-10

August 2018 24-1-04165-006

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FIG. 12

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/23/2018

Location: I-205 northbound beneath east Abernethy Bridge abutment mile marker 8.9

Test Hole Number: INF19786-11

Depth to bottom of hole: 2.0 feet

Diameter of hole: 14 inches

Test method: Open Pit Falling Head Test

Depth (feet):	Soil Texture:
0.0 - 1.5	GRAVEL with some silt and sand, with Cobbles; GP-GM; Light brown, Moist
1.5-3.0	SILT with some sand and gravel, with Cobbles; ML, Light brown, Moist
3.0	GRAVEL and Cobbles; Refusal

Presaturation Start Time: 9:05 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
13:00	0	4.44	-	-	-	Trial #1
13:10	10	4.45	0.01	0.01	0.72	
13:20	10	4.45	0.00	0.01	0.36	
13:30	10	4.46	0.01			
13:40	10	4.46	0.00	0.02	0.72	
13:50	10	4.48	0.02			
14:00	10	4.49	0.01	0.01	0.72	
14:02	0	4.43	-		-	Trial #2
14:22	20	4.45	0.02		0.72	
14:42	20	4.47	0.02		0.72	
15:02	20	4.48	0.01		0.36	
15:22	20	4.49	0.01		0.36	
15:42	20	4.51	0.02		0.72	
16:02	20	4.52	0.01		0.36	
16:04	0	4.44	-		-	Trial #3
16:24	20	4.46	0.02		0.72	
16:44	20	4.47	0.01		0.36	
17:04	20	4.49	0.02		0.72	
17:24	20	4.50	0.01		0.36	
17:44	20	4.51	0.01		0.36	
18:04	20	4.52	0.01		0.36	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-11

August 2018 24-1-04165-006

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FIG. 13

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/24/2018

Location: I-205 northbound shoulder mile marker 9.4

Test Hole Number: INF19786-12

Depth to bottom of hole: 2.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 2.0	SILT; ML; Light brown, Moist
2.0	BASALT fragments and GRAVEL; GP; Refusal

Presaturation Start Time: 8:05 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
11:31	0	4.01	-	-	Trial #1
11:41	10	4.03	0.02	1.44	
11:51	10	4.06	0.03	2.16	
12:01	10	4.08	0.02	1.44	
12:11	10	4.11	0.03	2.16	
12:21	10	4.14	0.03	2.16	
12:31	10	4.16	0.02	1.44	
12:32	0	4.01	-	-	Trial #2
12:42	10	4.03	0.02	1.44	
12:52	10	4.05	0.02	1.44	
13:02	10	4.08	0.03	2.16	
13:12	10	4.10	0.02	1.44	
13:22	10	4.13	0.03	2.16	
13:32	10	4.14	0.01	0.72	
13:33	0	4.01	-	-	Trial #3
13:33	10	4.03	0.02	1.44	
13:33	10	4.06	0.03	2.16	
14:03	10	4.08	0.02	1.44	
14:13	10	4.10	0.02	1.44	
14:23	10	4.12	0.02	1.44	
14:33	10	4.15	0.02	1.44	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-12

August 2018 24-1-04165-006

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FIG. 14

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/25/2018

Location: I-205 southbound south of Agnes Avenue mile marker 9.7

Test Hole Number: INF19786-13

Depth to bottom of hole: 3.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 3.0	SILT with some sand and gravel; ML; Light brown, Moist
3.0	GRAVEL and Cobbles; Refusal

Presaturation Start Time: 7:55 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
11:30	0	3.86	-	-	Trial #1
11:40	10	3.89	0.03	2.16	
11:50	10	3.92	0.03	2.16	
12:00	10	3.95	0.03	2.16	
12:10	10	3.97	0.02	1.44	
12:20	10	3.99	0.02	1.44	
12:30	10	4.01	0.02	1.44	
12:31	0	3.85	-	-	Trial #2
12:41	10	3.88	0.03	2.16	
12:51	10	3.91	0.03	2.16	
13:01	10	3.94	0.03	2.16	
13:11	10	3.96	0.02	1.44	
13:21	10	3.98	0.02	1.44	
13:31	10	4.00	0.02	1.44	
13:32	0	3.86	-	-	Trial #3
13:32	10	3.89	0.03	2.16	
13:32	10	3.92	0.03	2.16	
14:02	10	3.94	0.02	1.44	
14:12	10	3.97	0.03	2.16	
14:22	10	3.99	0.02	1.44	
14:32	10	4.01	0.02	1.44	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-13

August 2018 24-1-04165-006

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FIG. 15

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/26/2018

Location: I-205 northbound shoulder mile marker 10.0

Test Hole Number: INF19786-14

Depth to bottom of hole: 3.5 feet

Diameter of hole: 8 inches

Test method: Open Pit Falling Head Test

Depth (feet):	Soil Texture:
0.0 - 2.0	SILT with some gravel, ML, Brown, Moist
2.0-3.5	SILT with some gravel, with Cobbles; trace organics, ML, Dark brown, Moist
3.5	GRAVEL with Cobbles; Refusal

Presaturation Start Time: 9:12 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
13:00	0	3.78	-	-	Trial #1
13:10	10	3.82	0.04	2.88	
13:20	10	3.86	0.04	2.88	
13:30	10	3.89	0.03	2.16	
13:40	10	3.91	0.02	1.44	
13:50	10	3.93	0.02	1.44	
14:00	10	3.95	0.02	1.44	
14:01	0	3.82	-	-	Trial #2
14:11	10	3.84	0.02	1.44	
14:21	10	3.87	0.03	2.16	
14:31	10	3.88	0.01	0.72	
14:41	10	3.90	0.02	1.44	
14:51	10	3.92	0.02	1.44	
15:01	10	3.93	0.01	0.72	
15:02	0	3.81	-	-	Trial #3
15:12	10	3.82	0.01	0.72	
15:22	10	3.84	0.02	1.44	
15:32	10	3.87	0.03	2.16	
15:42	10	3.89	0.02	1.44	
15:52	10	3.90	0.01	0.72	
16:02	10	3.92	0.02	1.44	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-14

August 2018 24-1-04165-006

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FIG. 16

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/16/2018

Location: I-205 southbound shoulder mile marker 10.1

Test Hole Number: INF19786-15A

Depth to bottom of hole: 2.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 2.0	SILT with some sand and gravel, with Cobbles; ML; Light brown; Moist
2.0	GRAVEL with Cobbles; Refusal

Presaturation Start Time: 8:30 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
11:30	0	3.98	-		-	Trial #1
11:50	20	3.99	0.01		0.36	
12:10	20	4.00	0.01		0.36	
12:30	20	4.01	0.01		0.36	
12:50	20	4.03	0.02		0.72	
13:10	20	4.04	0.01		0.36	
13:30	20	4.05	0.01		0.36	
13:31	0	3.98	-	-	-	Trial #2
13:51	20	3.99	0.01	0.01	0.36	
14:11	20	4.01	0.02	0.02	0.72	
14:31	20	4.02	0.01	0.01	0.36	
14:51	20	4.03	0.01	0.02	0.36	
15:11	20	4.04	0.01			
15:31	20	4.04	0.00	0.00	0.00	
15:32	0	3.98	-		-	Trial #3
15:52	20	3.99	0.01		0.36	
16:12	20	4.00	0.01		0.36	
16:32	20	4.01	0.01		0.36	
16:52	20	4.02	0.01		0.36	
17:12	20	4.03	0.01		0.36	
17:32	20	4.04	0.01		0.36	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-15

August 2018 24-1-04165-006

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FIG. 17

SHANNON & WILSON, INC.
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Attachment to and part of Report 24-1-04165-006
Draft Infiltration Testing – Abernethy
Date: August 2018
To: HDR, Inc.
Mr. Steve Drahota, PE

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

DRAFT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

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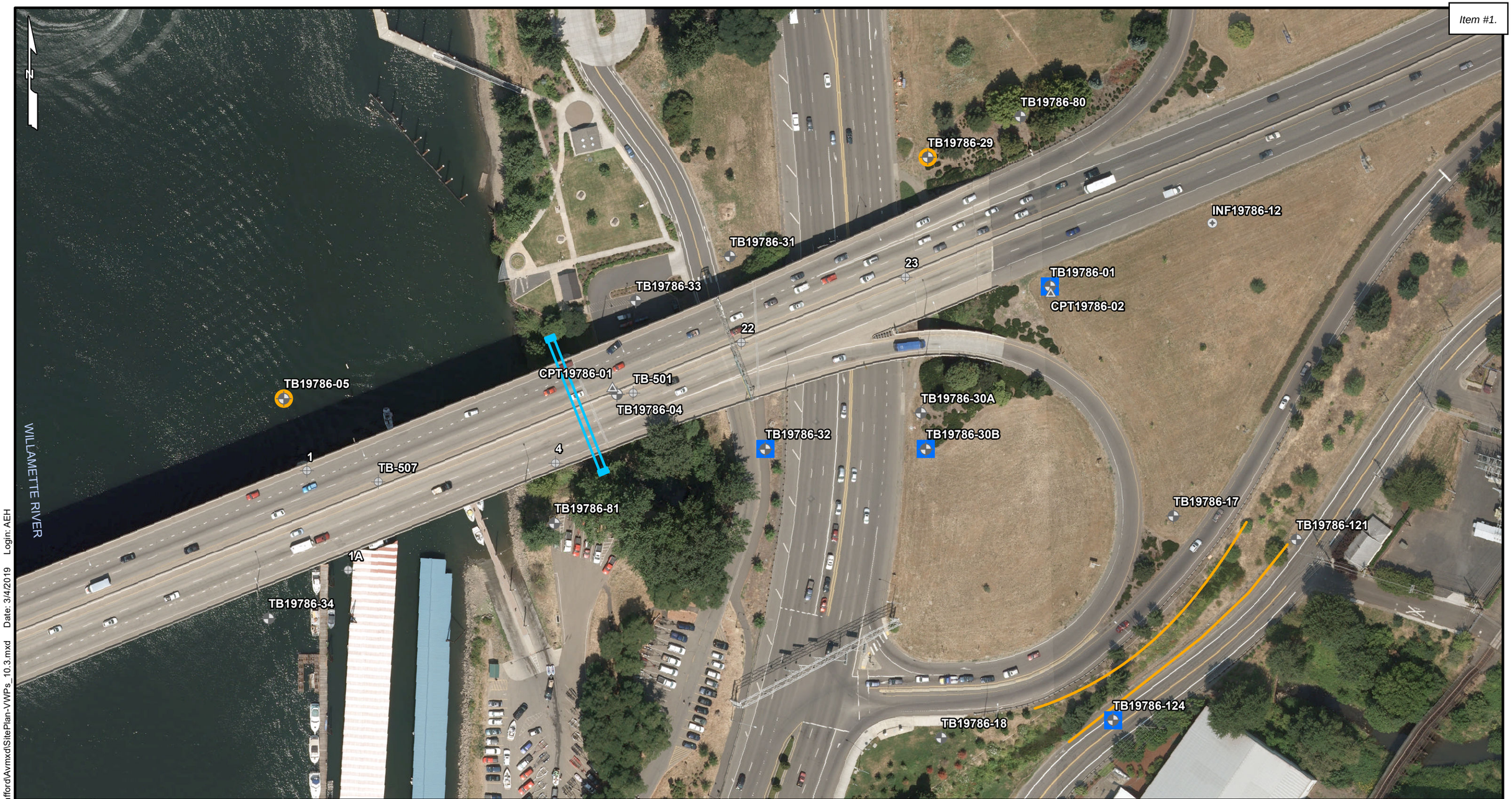


LEGEND

- Boring (Shannon & Wilson, 2017-2019)
- CPT (Shannon & Wilson, 2017)
- Historic Boring (ODOT or Dames & Moore)
- Infiltration Test (Shannon & Wilson, 2017)
- Vibrating Wire Piezometer
- Shear Wave Velocity Profile
- Proposed Retaining Wall
- Proposed Sound Wall
- Proposed Traffic Sign

0 50 100 200

Scale in Feet

NOTES

1. Locations of proposed features from files downloaded from ProjectWise: TN_K19786_OBEC_snd_bas_01.dgn, TN_K21400_OBEC_snd_bas_01.dgn, TN_K21401_OBEC_snd_bas_01.dgn, R_K19786_rtw_bas_01.dgn, and R_K21401_rtw_bas_01.dgn, on December 10, 2018, file R_K19786_QEI_bas_03.dgn, on December 26, 2018, and file R_K21401_OBEC_bas_01.dgn, on December 31, 2018.

I-205: Stafford Road to OR99E Widening
Clackamas County, Oregon

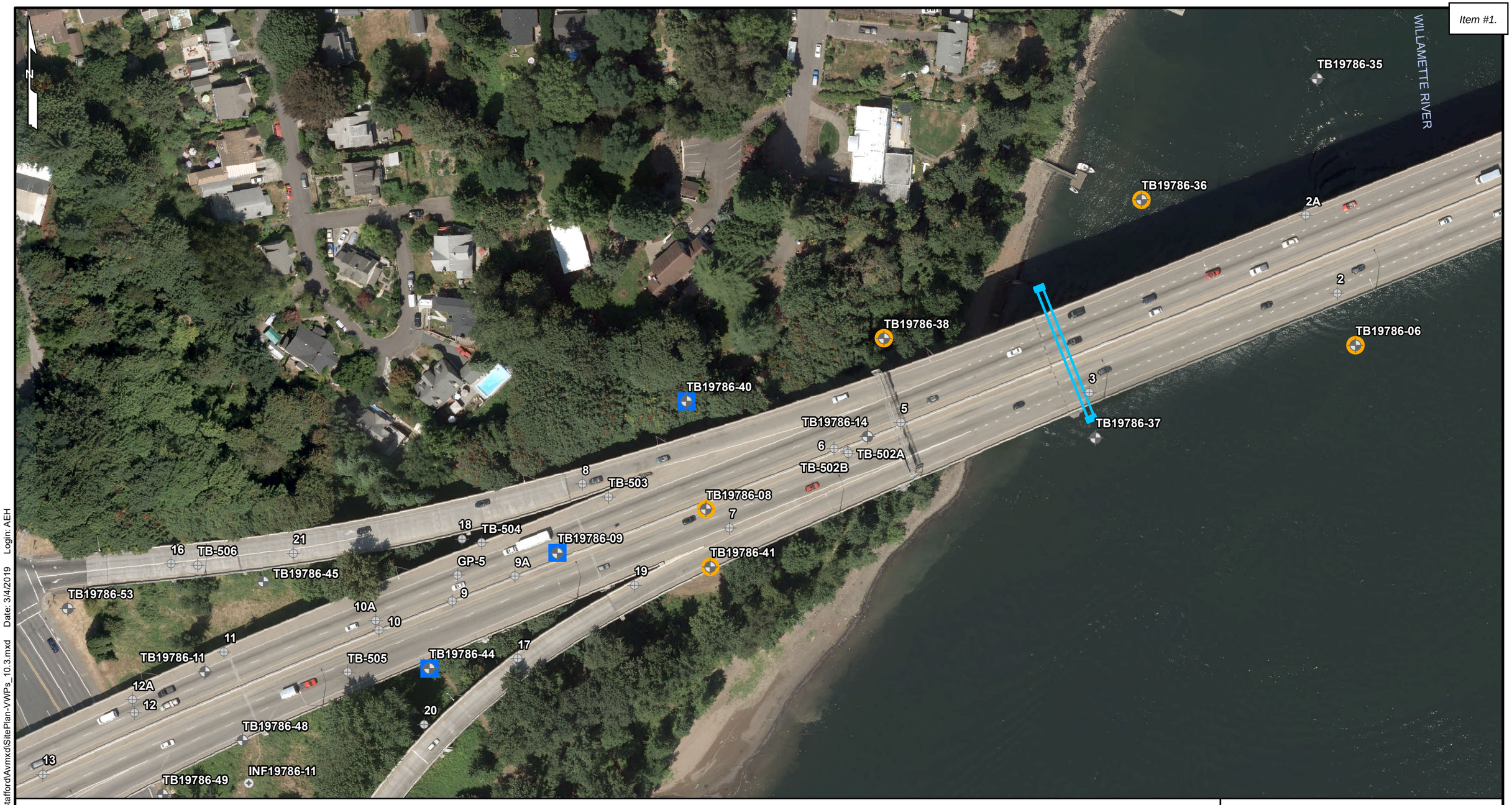
SITE AND EXPLORATION PLAN

March 2019 24-1-04165

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sheet F

Filename: T:\Projects\24-1\4165_I-205 Stafford\Avmxd\SitePlan-VWPs_10.3.mxd Date: 3/4/2019 Login: AEH



LEGEND

- Boring (Shannon & Wilson, 2017-2019)
- CPT (Shannon & Wilson, 2017)
- Historic Boring (ODOT or Dames & Moore)
- Infiltration Test (Shannon & Wilson, 2017)
- Vibrating Wire Piezometer
- Shear Wave Velocity Profile
- Proposed Retaining Wall
- Proposed Sound Wall
- Proposed Traffic Sign

0 50 100 200
Scale in Feet

NOTES

1. Locations of proposed features from files downloaded from ProjectWise: TN_K19786_OBEC_snd_bas_01.dgn, TN_K21400_OBEC_snd_bas_01.dgn, TN_K21401_OBEC_snd_bas_01.dgn, R_K19786_rtw_bas_01.dgn, and R_K21401_rtw_bas_01.dgn, on December 10, 2018, file R_K19786_QEI_bas_03.dgn, on December 26, 2018, and file R_K21401_OBEC_bas_01.dgn, on December 31, 2018.

I-205: Stafford Road to OR99E Widening
Clackamas County, Oregon

SITE AND EXPLORATION PLAN

March 2019 24-1-04165

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sheet F

Filename: T:\Projects\24-1\4165_I-205 Stafford\Avmxd\SitePlan-VWPs_10.3.mxd Date: 3/4/2019 Login: AEH

Appendix B. Contributing Impervious Area, Impervious Surface Area, and Water Quality Facility Figures

Existing FEMA 100 Year Floodplain Boundary

Willamette River

Subbasin 61
CIA = 0.474 acres

Subbasin 70
CIA = 0.287 acres

Subbasin 60
CIA = 2.299 acres

Subbasin 41
CIA = 4.560 acres

Subbasin 52
CIA = 3.570 acres

Prop. Water Quality Swale for CIA "80" treatment.

Subbasin 80
CIA = 1.953 acres

Prop. outlet to Willamette River

BH.# INF19786-11

Prop. Water Quality Swale for CIA "60", "61", "62" and "63" treatment.

Prop. Water Quality Swale for CIA "70", "71" and "72" treatment.

Subbasin 71
CIA = 0.333 acres

Subbasin 63
CIA = 0.123 acres

Subbasin 72
CIA = 0.556 acres

Subbasin 62
CIA = 2.315 acres

Subbasin 64
CIA = 0.592 acres

Edge of Water

Existing FEMA 100 Year Floodplain Boundary

Legend

- Existing Pipe
- Bioslope
- Wetland Boundary
- Proposed Pipe
- CIA basin
- Proposed Inlet
- Non-triggered treated areas
- Proposed Manhole
- Conveyance Direction
- Surface Flow
- Not Treated CIA
- Water quality swale boundary
- Combination detention pond/ water quality swale boundary

Total Treated CIA - 25.658 Acres

Total Not Treated CIA - 0.847 Acres

Total Offset Treatment CIA - 1.652 Acres

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:

Drafter: Checker:

STORMWATER CIA EXHIBIT

SHEET NO.

Edge of Water

Willamette River

Prop. Water Quality Swale for CIA "40", "41", "42" and "43" treatment.

Existing FEMA 100 Year Floodplain Boundary

Extg. outfall to Clackamas River

BH.# INF19786-13

Prop. Water Quality Swale for CIA "30" and "OS-31" treatment.

Subbasin OS-31
CIA = 1.652 acres

Subbasin 43
CIA = 0.338 acres

Prop. stormwater planter for CIA "90" treatment.

Extg. outfall to Willamette River

Subbasin 90
CIA = 0.134 acres

Subbasin 40
CIA = 0.396 acres

Subbasin 42
CIA = 0.698 acres

Subbasin 41
CIA = 4.560 acres

Extg. outlet pipe to Willamette River

Subbasin 20
CIA = 3.080 acres

Subbasin 30
CIA = 2.179 acres

Subbasin 52
CIA = 3.570 acres

Abernethy Creek

Subbasin 53
CIA = 0.273 acres

Prop. Water Quality Swale for CIA "50", "51" and "52" treatment.

BH.# INF19786-12

Subbasin 50
CIA = 0.719 acres

Subbasin 51
CIA = 0.578 acres

Legend

- Wetland Boundary
- CIA basin
- Non-triggered treated areas
- Not Treated CIA
- Water quality swale boundary
- Bioslope
- Existing Pipe
- Proposed Pipe
- Proposed Inlet
- Proposed Manhole
- Conveyance Direction
- Surface Flow
- Combination detention pond/ water quality swale boundary
- Existing FEMA 100 Year Floodplain Boundary

Total Treated CIA - 25.658 Acres

Total Not Treated CIA - 0.847 Acres

Total Offset Treatment CIA - 1.652 Acres

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SHEET NO.

Clackamas River

Edge of Water

Extg. outfall to Clackamas River

Existing FEMA 100 Year Floodplain Boundary

Subbasin 10
CIA = 1.065 acres

Subbasin 20
CIA = 3.080 acres

BH.# INF19786-13

BH.# INF19786-14

BH.# INF19786-15

WQF #1

WQF #2

WQF #3

Water Quality Facility #1
Prop. Bioretention Facility and Detention Pond for CIA "10" treatment.

Water Quality Facility #2
Prop. Bioslope for CIA "20" treatment.

40 ft

60 ft

50 ft

Ditch

"L" 660+00

"L" 665+00

"L" 670+00

"L" 675+00

"L" 680+00

"L" 685+00

Legend

- Wetland Boundary
- CIA basin
- Non-triggered treated areas
- Not Treated CIA
- Water quality swale boundary
- Bioslope
- Existing Pipe
- Proposed Pipe
- Proposed Inlet
- Proposed Manhole
- Conveyance Direction
- Surface Flow
- Combination detention pond/ water quality swale boundary
- Existing FEMA 100 Year Floodplain Boundary

Total Treated CIA - 25.658 Acres

Total Not Treated CIA - 0.847 Acres

Total Offset Treatment CIA - 1.652 Acres

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CLACKAMAS COUNTY

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STORMWATER CIA EXHIBIT

SHEET NO.

Rotation: 44.768°

Total pre-project ISA - 22.339 Acres

Total post project ISA - 26.456 Acres

Subbasin 72
Prop. full depth reconstruction of extg. ISA. - 0.556 acres

Subbasin 70
Prop. new ISA. - 0.265 acres

Subbasin 70
Prop. removal of ISA. - 0.294 acres

Subbasin 70
Prop. full depth reconstruction of extg. ISA. - 0.024 acres

Subbasin 61
Prop. full depth reconstruction of extg. ISA. - 0.422 acres

Subbasin 61
Prop. removal of ISA. - 0.048 acres

Subbasin 61
Prop. new ISA. - 0.049 acres

Subbasin 41
Prop. full depth reconstruction of ISA. - 3.606 acres

Subbasin 41
Prop. new ISA. - 0.938 acres

Subbasin 80
Prop. full depth reconstruction of extg. ISA. - 1.698 acres

Subbasin 80
Prop. new ISA. - 0.193 acres

Subbasin 60
Prop. new ISA. - 0.582 acres

Subbasin 60
Prop. full depth reconstruction of extg. ISA.- 1.717 acres

Subbasin 52
Prop. new ISA. - 0.737 acres

Subbasin 52
Prop. full depth reconstruction of ISA. - 2.847 acres

Subbasin 62
Prop. removal of ISA. - 0.407 acres

Subbasin 62
Prop. full depth reconstruction of extg. ISA. - 1.647 acres

Subbasin 62
Prop. new ISA. - 0.670 acres

Subbasin 63
Prop. full depth reconstruction of extg. ISA. - 0.039 acres

Subbasin 71
Prop. full depth reconstruction of extg. ISA. - 0.289 acres

Subbasin 71
Prop. new ISA. - 0.042 acres

Subbasin 63
Prop. new ISA. - 0.083 acres

Subbasin 63
Prop. removal of ISA. - 0.278 acres

Subbasin 64
Prop. new ISA. - 0.060 acres

Subbasin 64
Prop. full depth reconstruction of extg. ISA. - 0.529 acres

Edge of Water

Willamette River

"L" 730+00

"L" 725+00

"L" 720+00

"L" 735+00

"L" 740+00

"L" 745+00

Begin Lt. & Rt. Turn Lane Taper

61 60 41 52 80 72 71 70 62 63 64

Legend

- New ISA
- Existing ISA
- Removed ISA
- Wetland Boundary
- Subbasin Boundary

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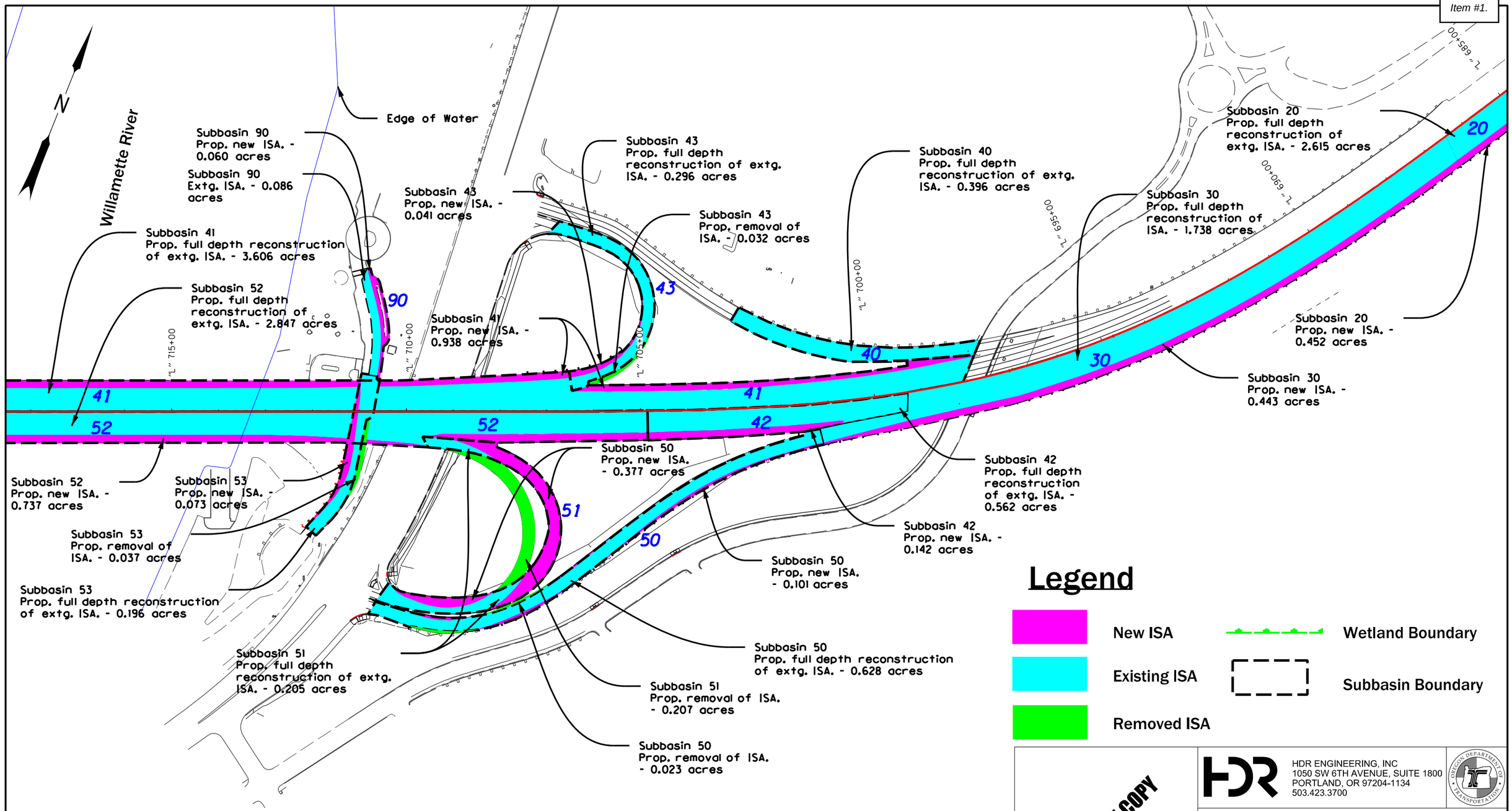
STORMWATER CIA EXHIBIT

SHEET NO.

Rotation: 21.7268° Sca



Legend

- New ISA
- Existing ISA
- Removed ISA
- Wetland Boundary
- Subbasin Boundary

Total pre-project ISA - 22.339 Acres

Total post project ISA - 26.456 Acres

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CLACKAMAS COUNTY

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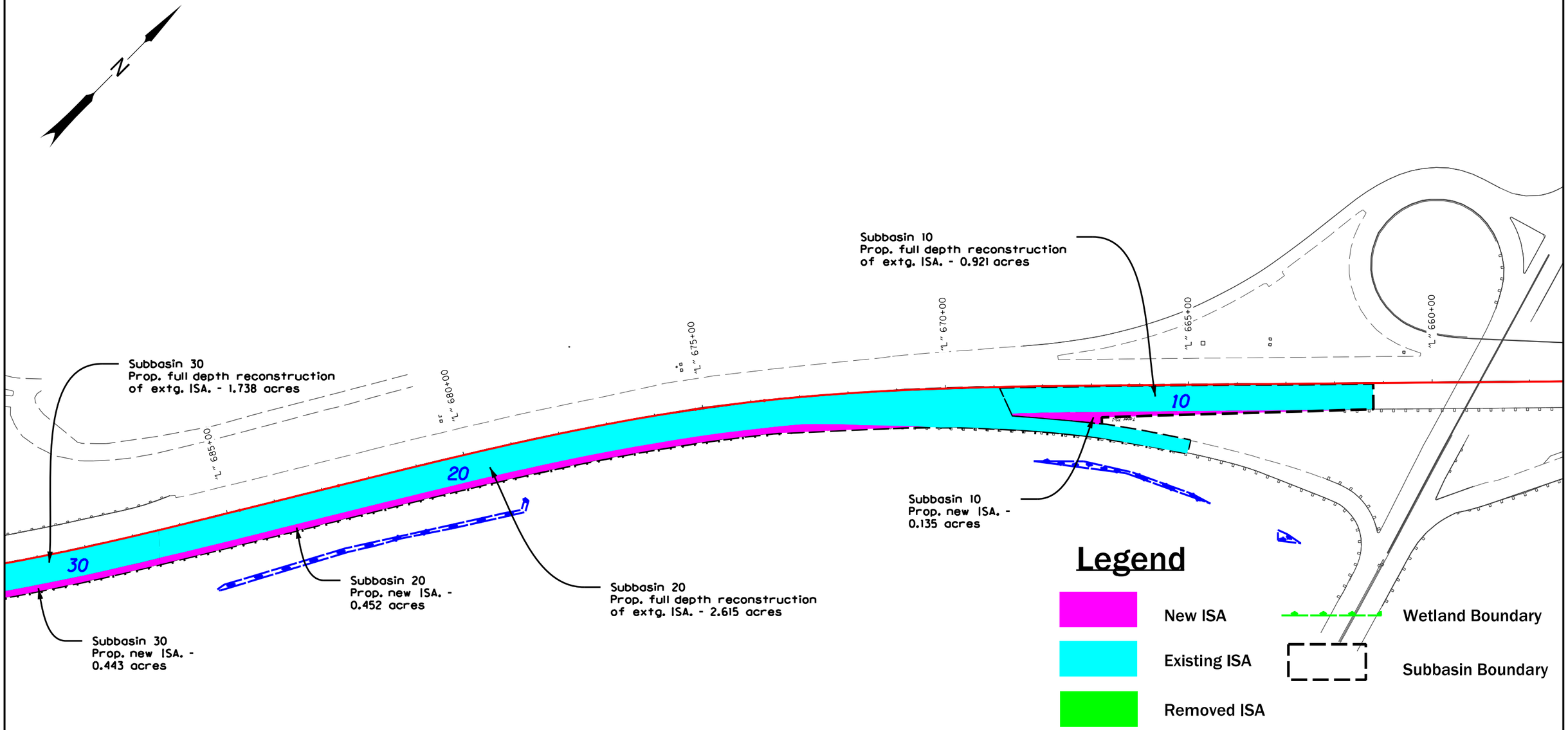
STORMWATER CIA EXHIBIT

SHEET NO.

Rotation: 21.7268° 0'



Total pre-project ISA - 22.339 Acres

Total post project ISA - 26.456 Acres

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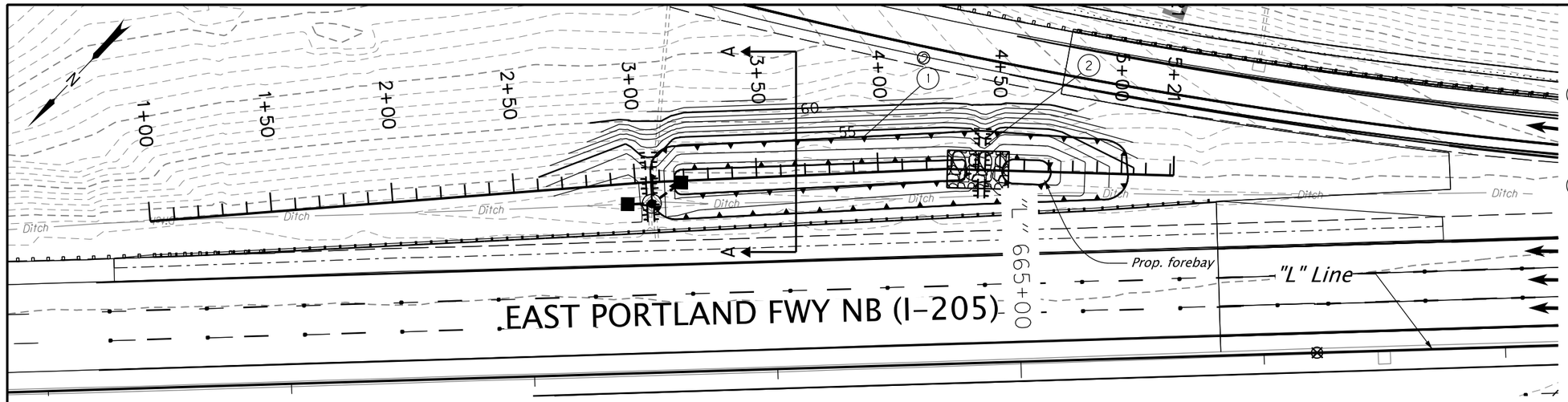
STORMWATER CIA EXHIBIT

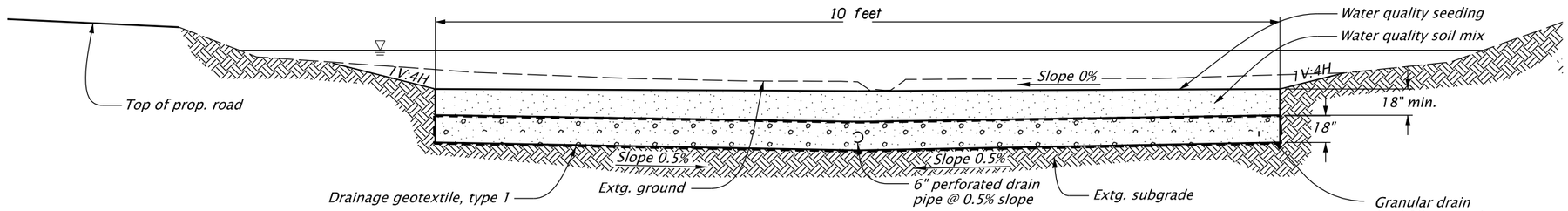
SHEET NO.

Rotation: 44.768°



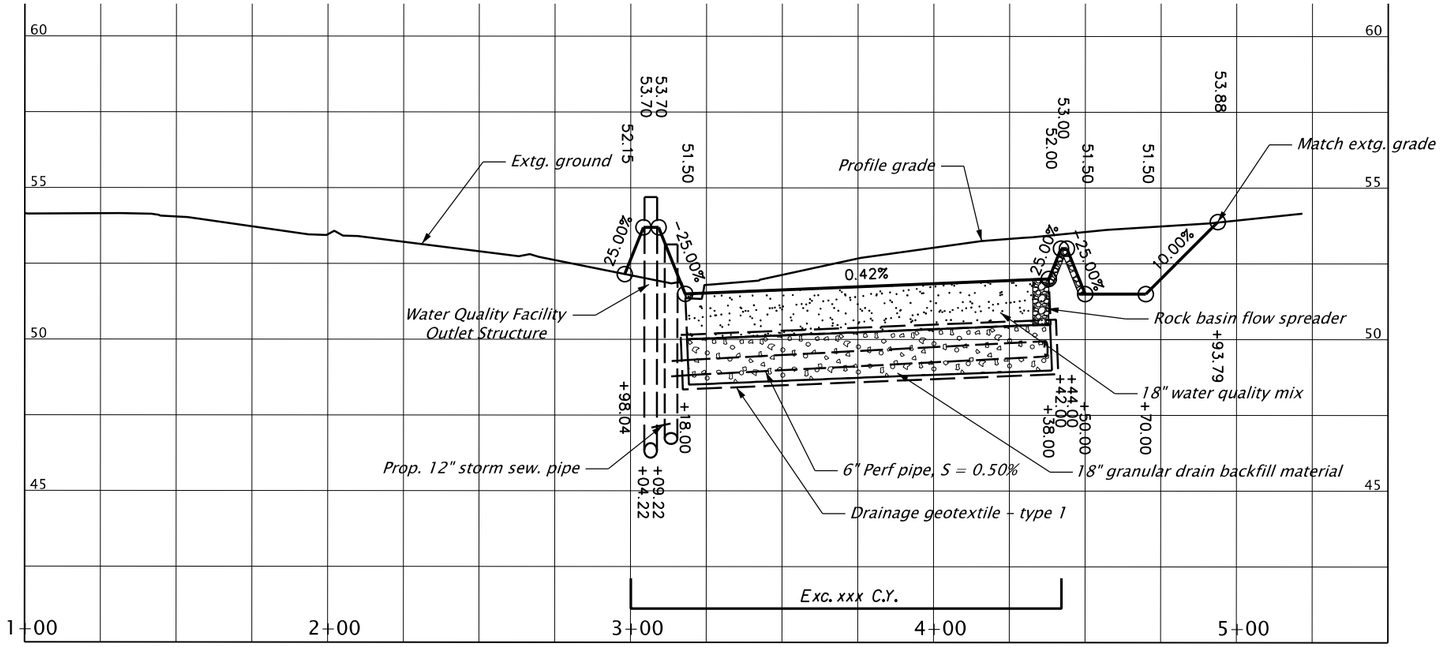
1. Sta. 3+09.86 to Sta. 4+10.05 = Sta. "L" 664+49.08, 81.53' Lt. to Sta. "L" 663+49.06, 84.27' Lt.
   Const. biorention pond
   (For details, see sht. HAxx)

2. Sta. 4+50.00, 0.00'
   Const. forebay berm
   (For details, see sht. HAxx)



BIORETENTION POND SECTION A-A

Scale: NTS



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

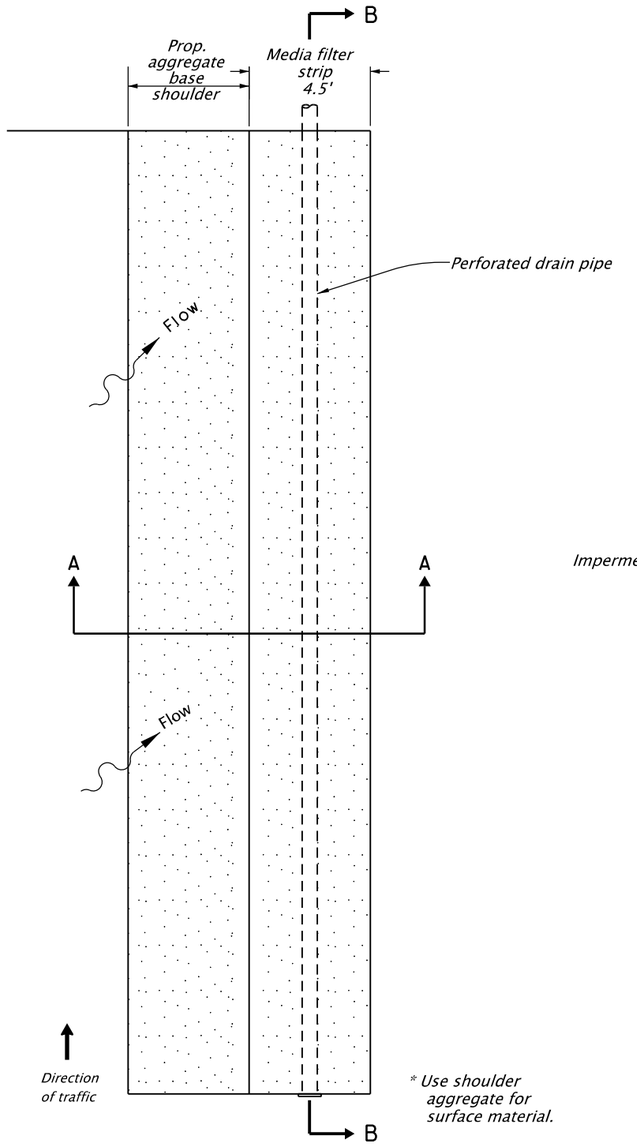
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

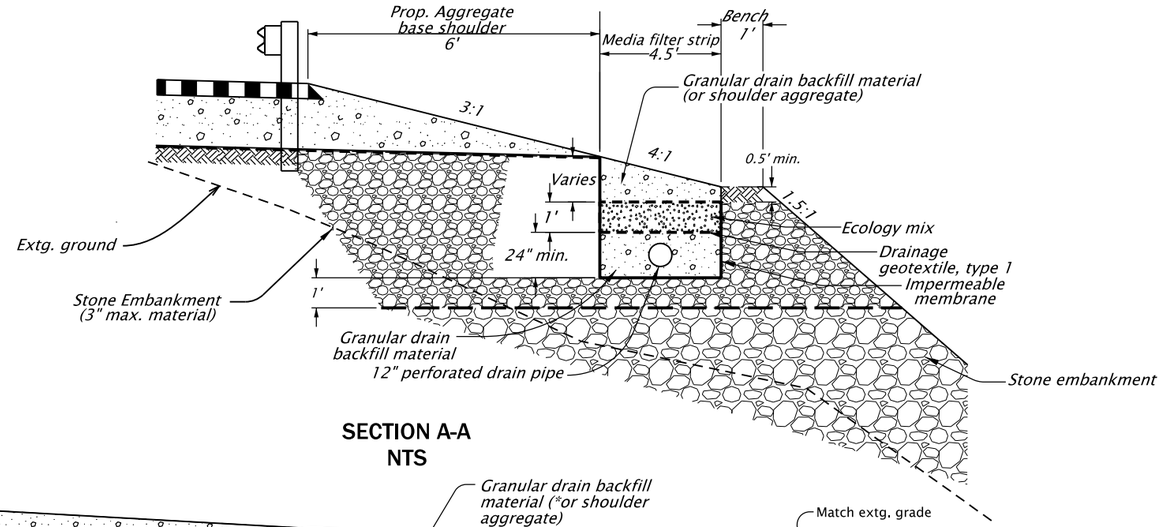
Rotation: 223.5514°
Vertical Scale: 1:10

BIOSLOPE
STA. "L" 665+00 TO STA. "L" 684+00

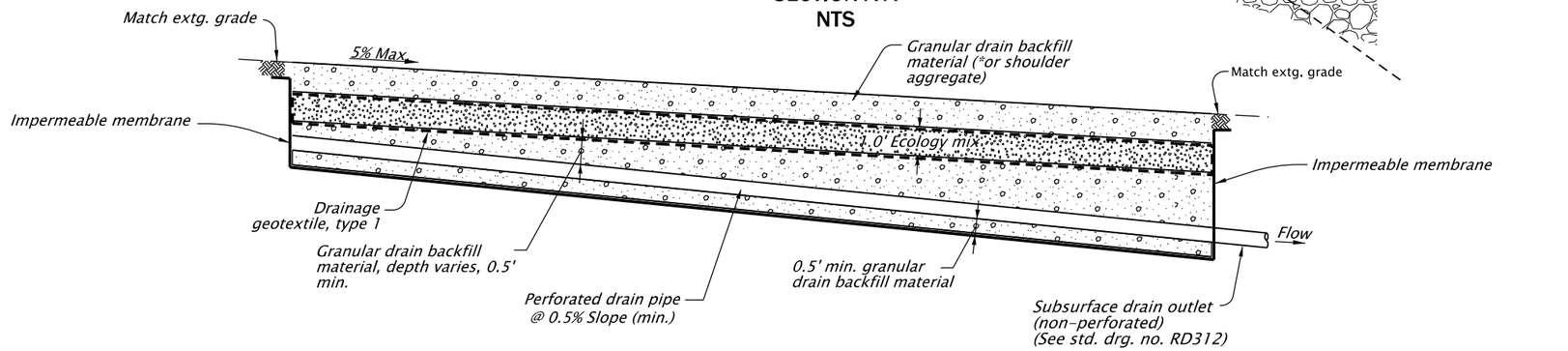


* Use shoulder aggregate for surface material.

PLAN
NTS



SECTION A-A
NTS



SECTION B-B
NTS

DFI#XXXXXX

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

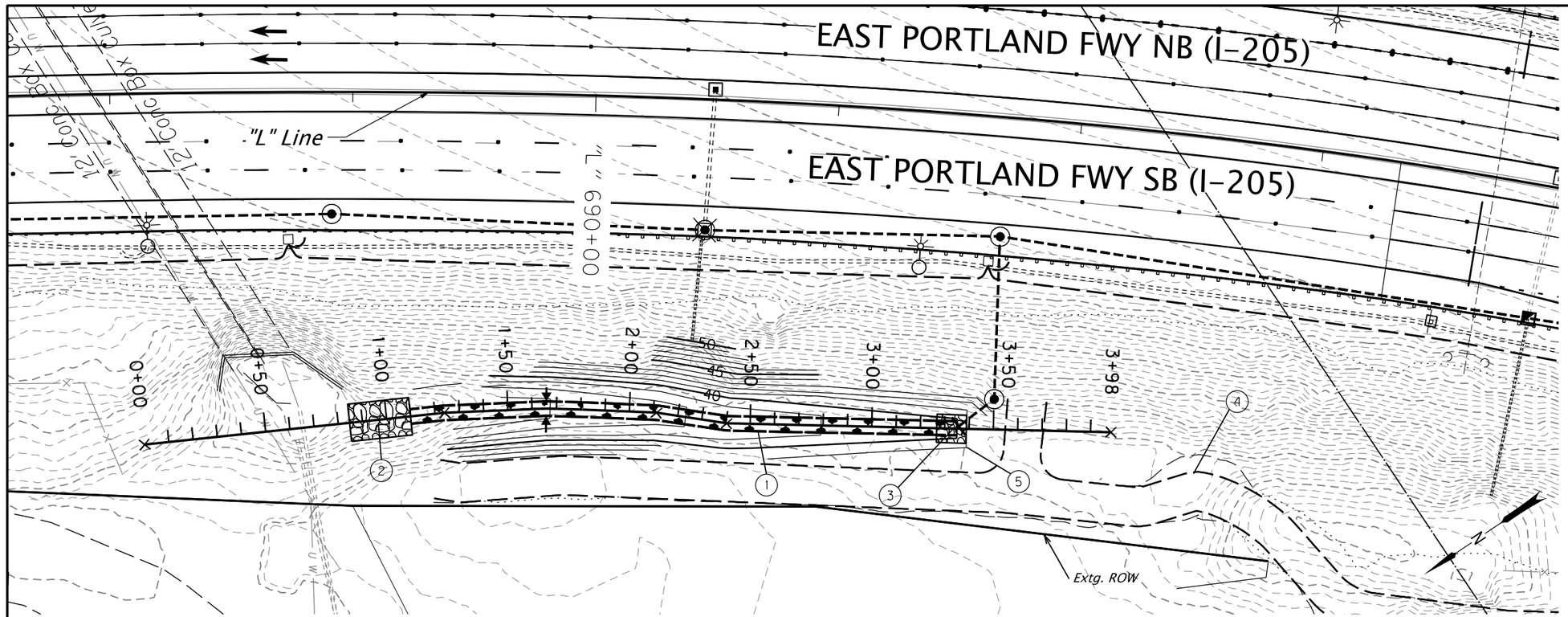
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0°



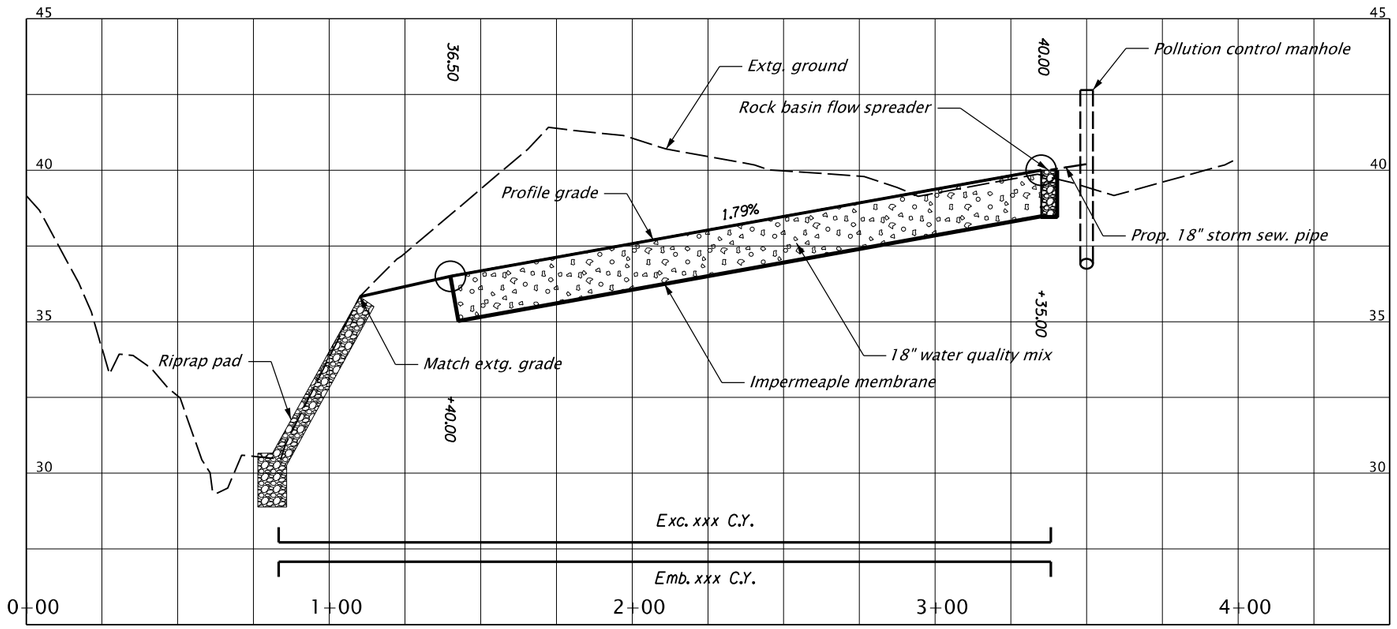
1. *Sta. 1+09.97 to Sta. 3+34.91 = Sta. "L" 691+58.97, 128.64' Rt. to Sta. "L" 689+24.75, 133.18' Rt.*
   Const. biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 0+97.37, 0.00'*
   Const. riprap pad
   Loose riprap (class 50) - 5.0 tons|
   (See drg. no. RD317)

3. *Sta. 3+33.58, 0.00'*
   Const. rock basin flow spreader
   (For details, see sht. HAxx)

4. *Sta. XX+XX.XX*
   Const. maintenance access road
   (For details, see sht. HAxx)

5. *Sta. XX+XX.XX*
   Const. biofiltration swale berm
   (For details, see sht. HAxx)



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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

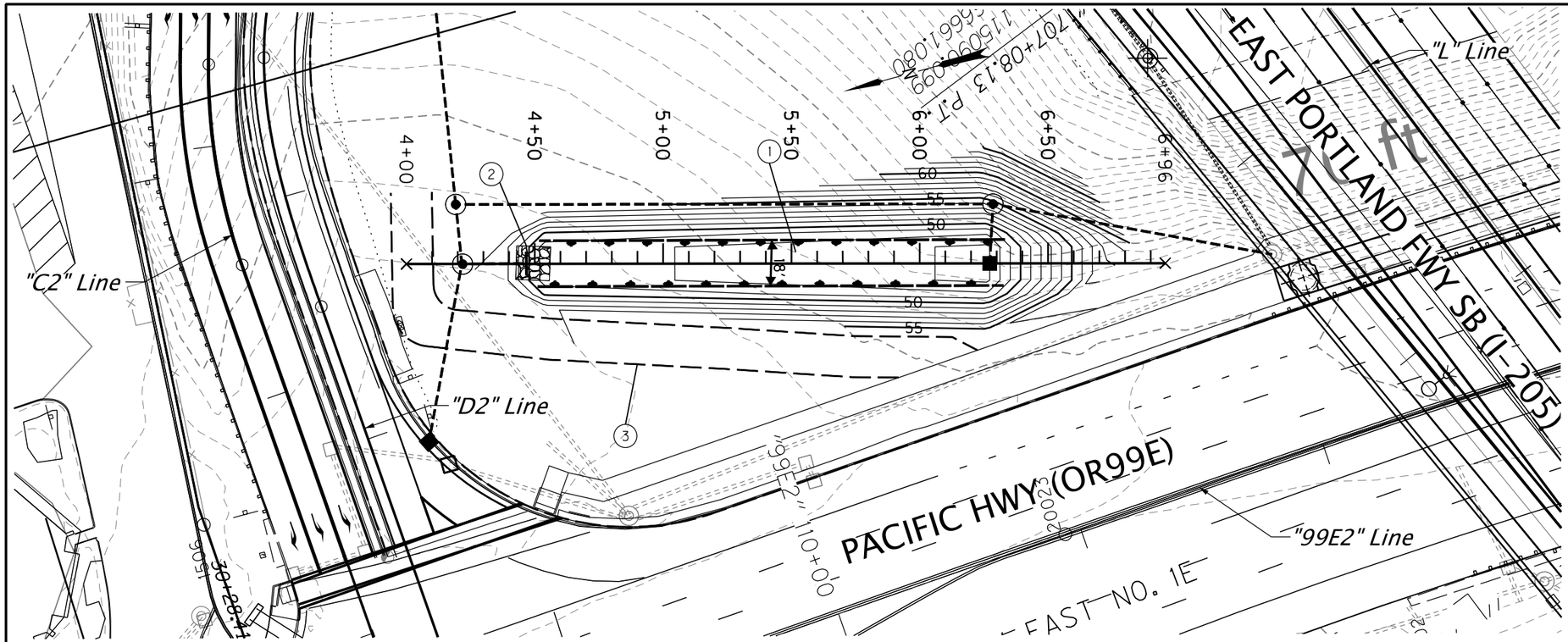
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:	Reviewer:
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

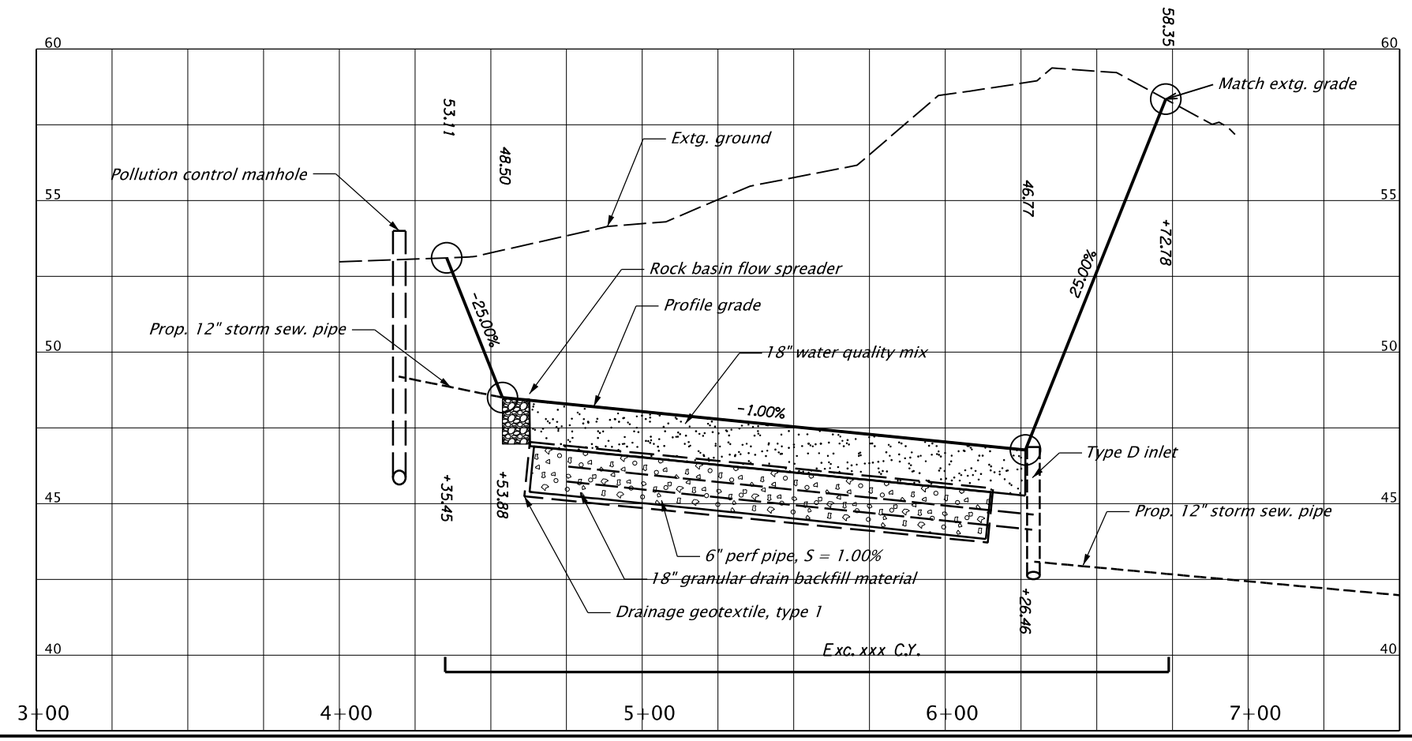
Rotation: 236.1297°
Vertical Scale: 1:10



1. *Sta. 4+50.41 to Sta. 6+34.91 = Sta. "99E2" 109+34.68, 167.57' Lt. to Sta. "99E2" 111+06.11, 107.62' Lt.*
   Const. biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 4+48.95, 0.00'*
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. *Sta. XX+XX.XX*
   Construct maintenance access road
   (For details, see sht. HAxx)



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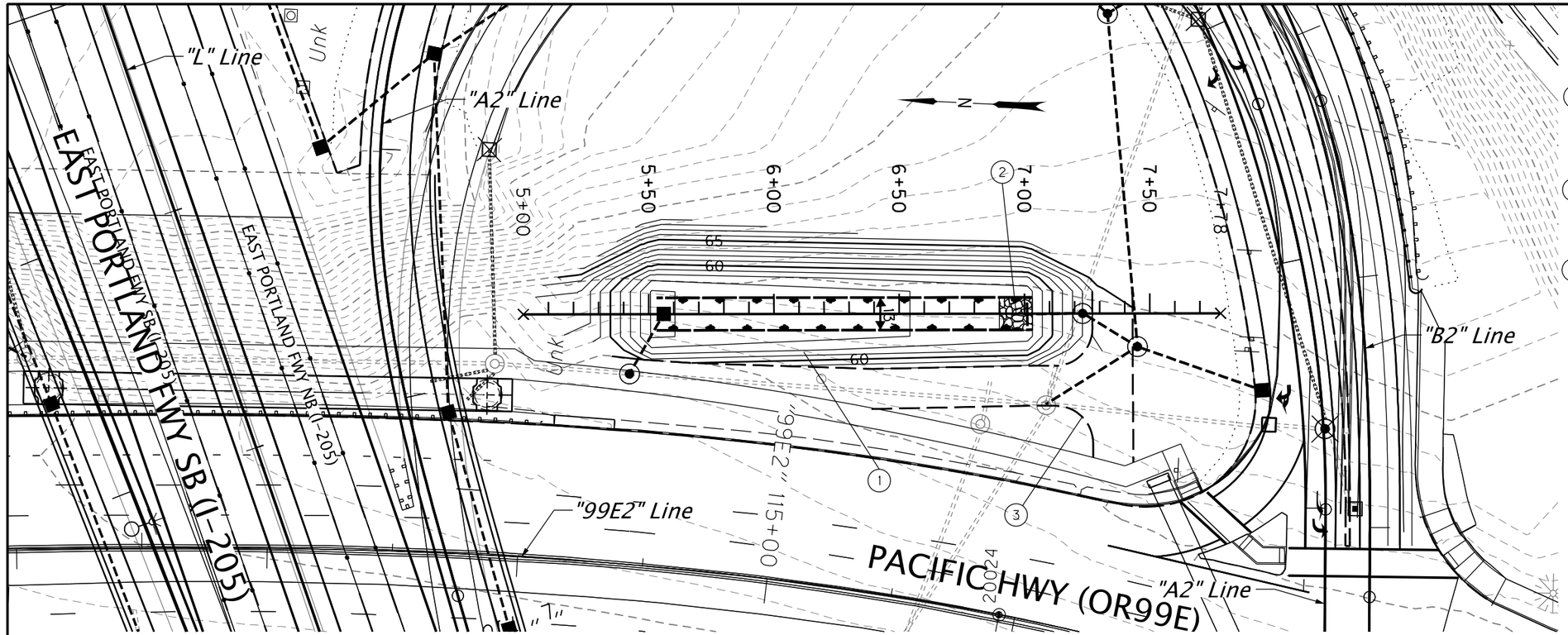
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

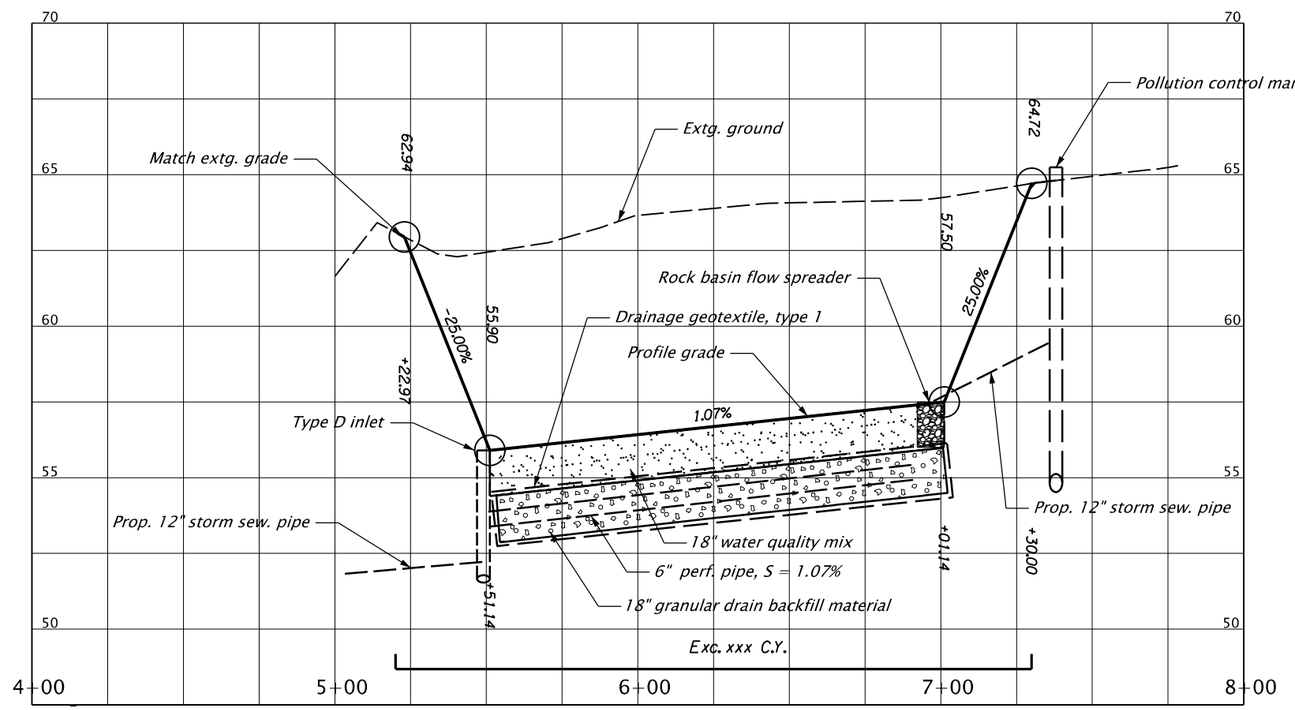
Rotation: 254.7731°
Vertical Scale: 1:10



1. *Sta. 7+03.50 to 5+52.97 = Sta. "99E2" 115+84.70, 120.53' Lt. to Sta. "99E2" 114+47.00, 100.54' Lt.*
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 6+95.86, 0.00'*
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. *Sta. XX+XX.XX*
   Construct maintenance access road
   (For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
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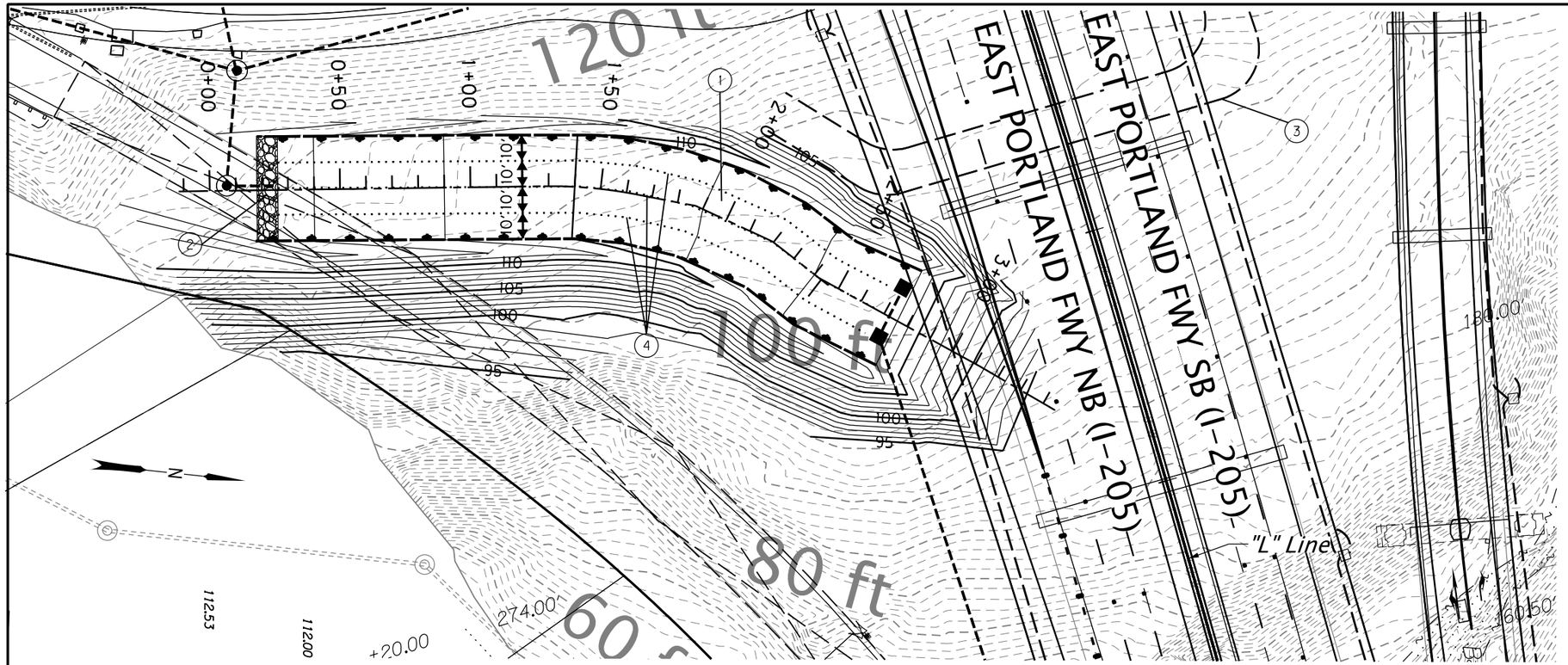
WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 272.7106° *0'*
Vertical Scale: 1:10

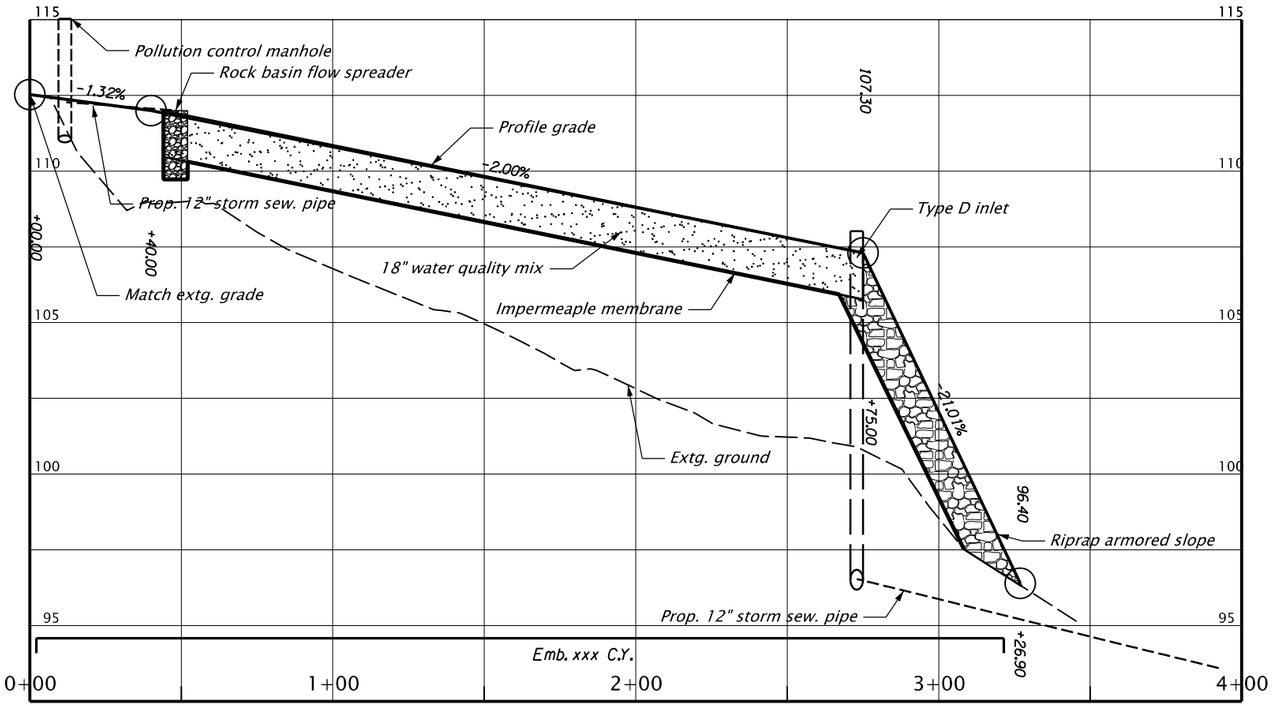


1. *Sta. 0+31.89 to Sta. 2+48.39 = Sta. "OR43" 10+59.46, 110.66' Lt. to Sta. "OR43" 8+78.88, 209.80' Lt.*
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 0+37.15, 2.22' Lt.*
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. *Sta. XX+xx.xx*
   Construction maintenance access road
   (For details, see sht. HAxx)

4. *Construct biofiltration swale divider*
   (For details, see sht. HAxx)



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OREGON DEPARTMENT OF TRANSPORTATION

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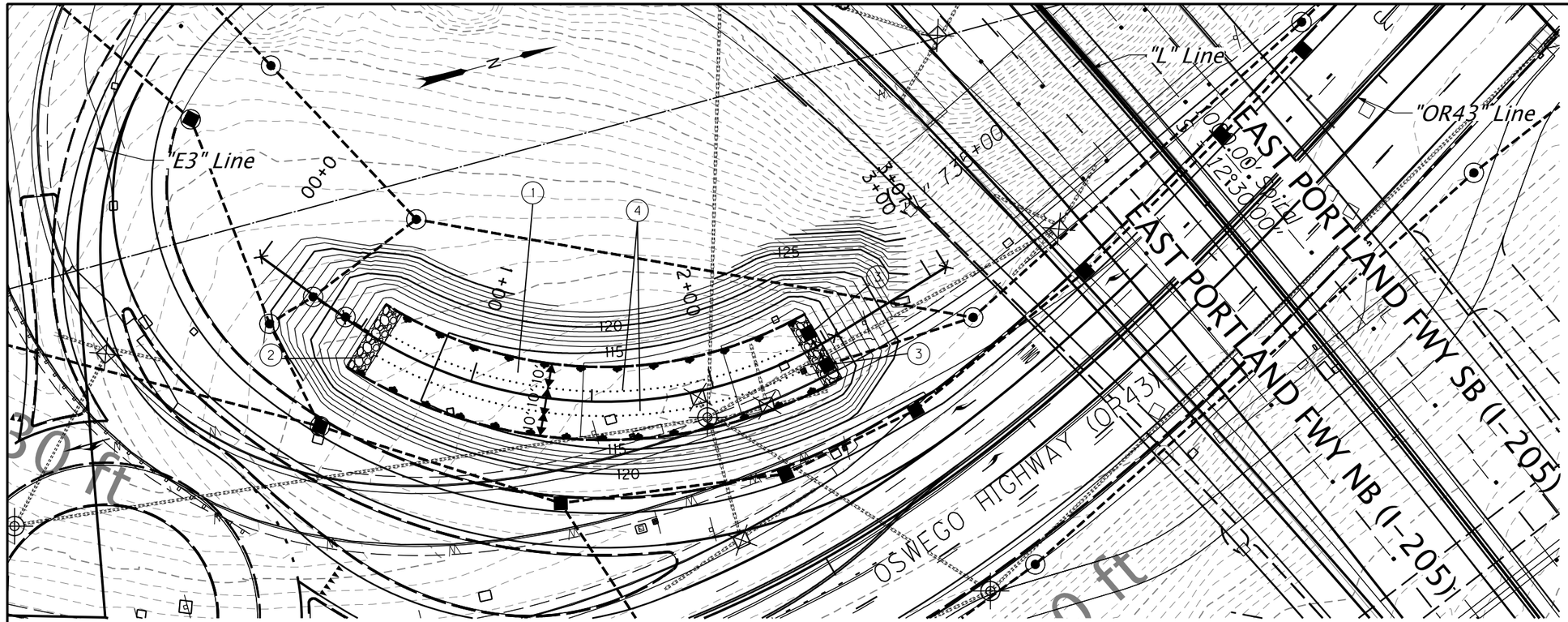
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:	Reviewer:
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE — SHEET NO.

Rotation: 96.0998°
Vertical Scale: 1:10

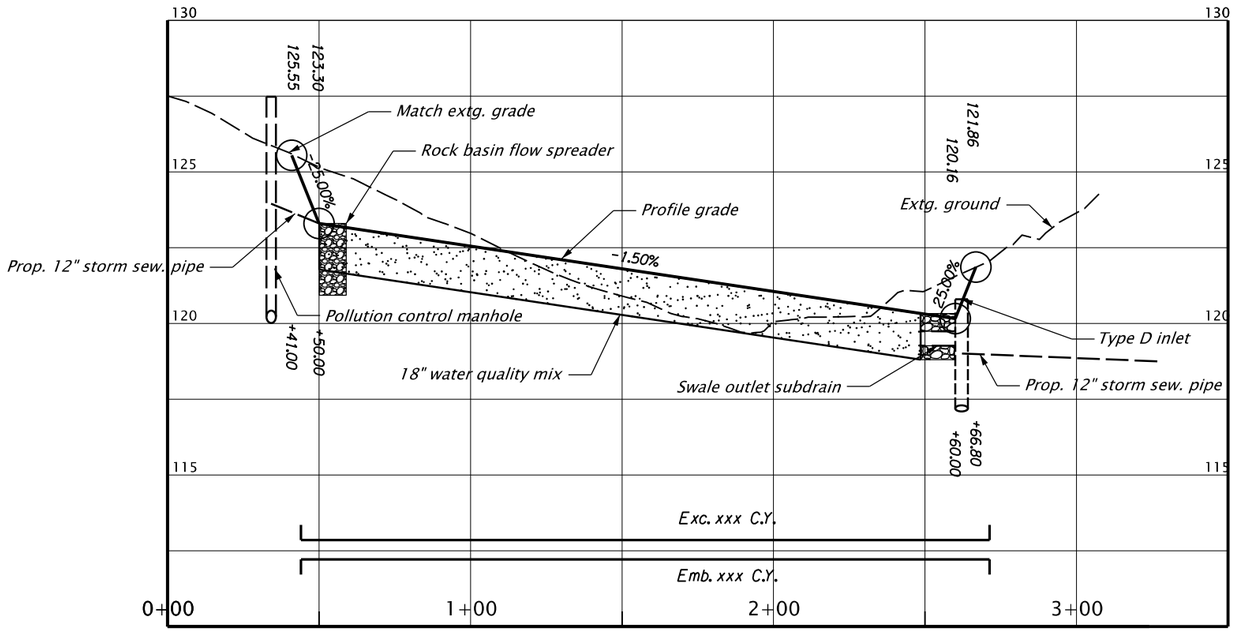


1. Sta. 0+54.22 to 2+55.48 = Sta. "E3" 740+37.28, 107.23' Lt. to Sta. "OR43" 9+52.79, 60.58' Rt.
   Construct 30' wide biofiltration swale
   (For details, see sht. HAxx)

2. Sta. 0+58.54
   Construct rock basin flow spreader
   (For details, see sht. HA10)

3. Sta. 2+60.28
   Construct rock basin flow spreader
   (For details, see sht. HA10)

4. Construct biofiltration swale divider
   (For details, see sht. HAxx)



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OREGON DEPARTMENT OF TRANSPORTATION

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

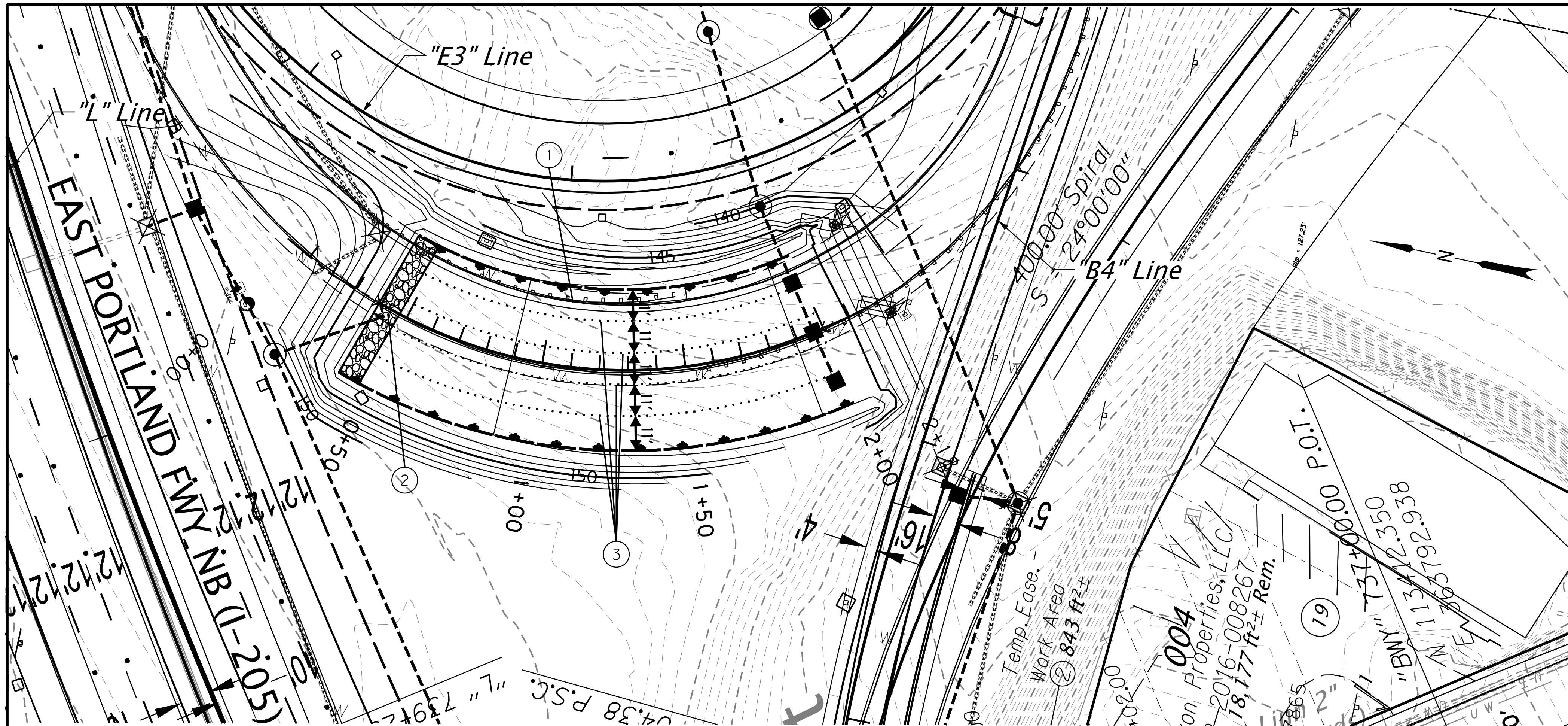
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 75.0253° 0'
Vertical Scale: 1:10

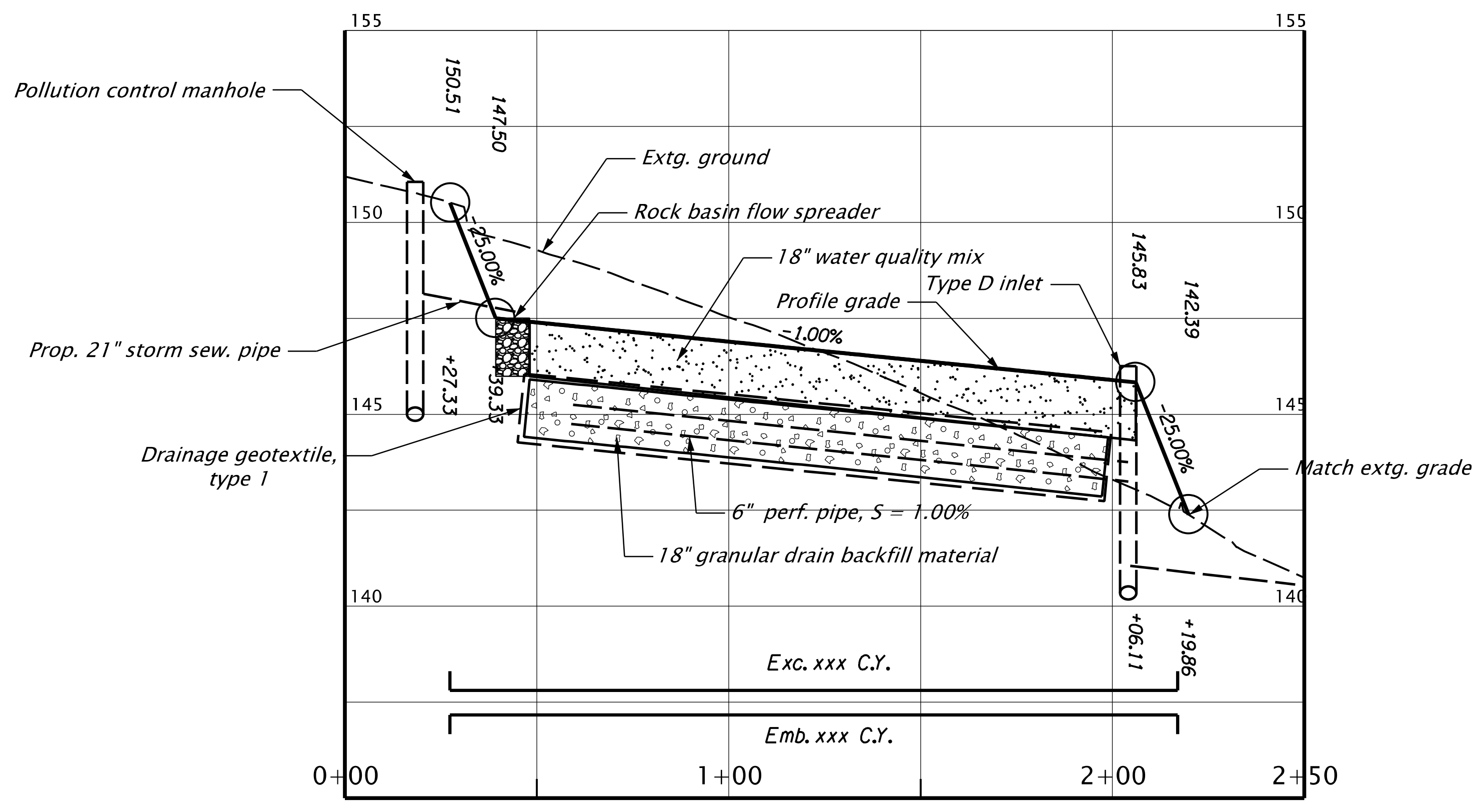
Item #1.



① Sta. 0+39.24 to Sta. 1+98.79 = Sta. "E3" 737+52.57, 56.87' Rt. to Sta. "E3" 738+66.37, 64.42' Rt.
Construct biofiltration swale
(For details, see sht. HAxx)

② Sta. 0+44.18, 0.00'
Construct rock basin flow spreader
(For details, see sht. HAxx)

③ Construct biofiltratoin swale divider
(For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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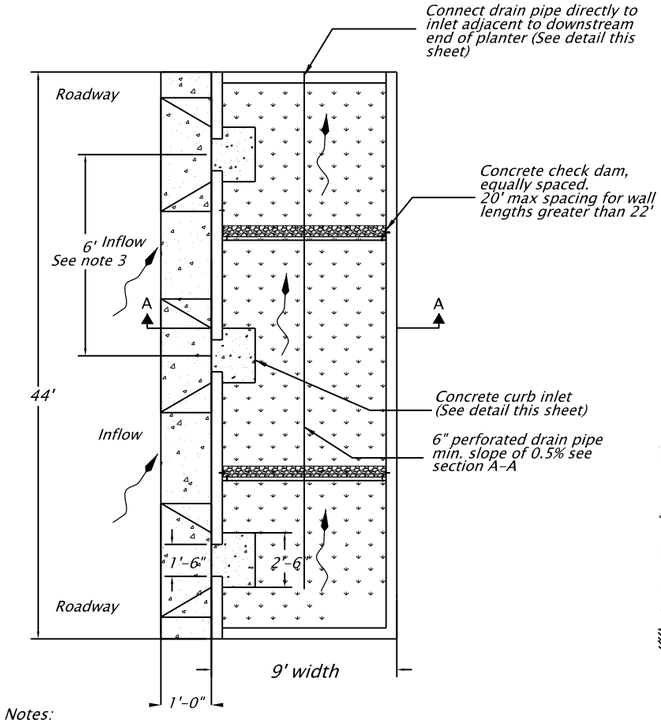
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

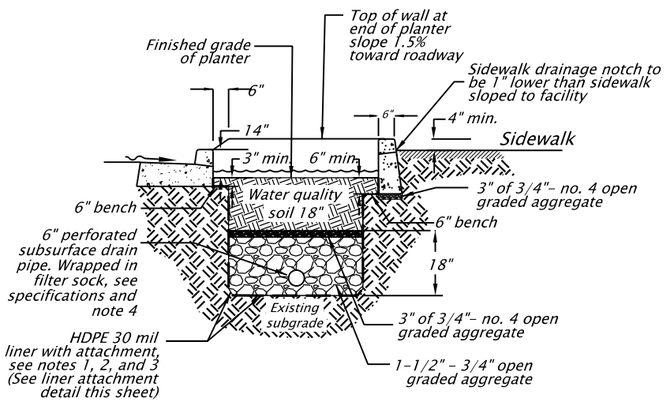
Rotation: 281.7947°
Vertical Scale: 1"=5'

STORMWATER PLANTER



Notes:
1. Match longitudinal slope of planter to slope of the road.
2. If less than 18" is between splash pad and planter end wall, extend pad to wall.
3. Install inlets (6' on center) on all sides of facility that are adjacent to parking lot.

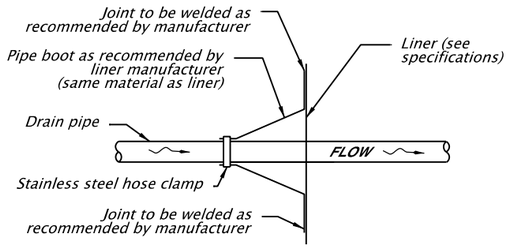
PLAN VIEW



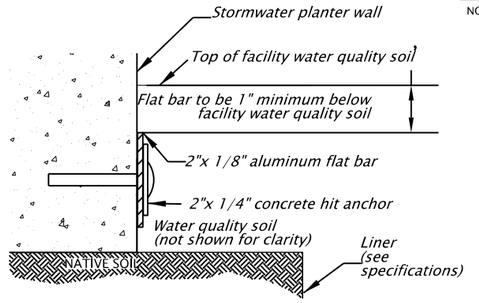
Notes:
1. Partial or full liner required. See stormwater planter table (this sheet) for requirement.
2. Partial liner located along side of planter adjacent to roadway.
3. Full liner located along all sides of planter.
4. Drain pipe only required for fully lined planters.
5. Scarify the native soil 12" following the initial excavation and before installing water quality soil and rock.

SECTION A-A

STORMWATER PLANTER DETAIL
NOT TO SCALE



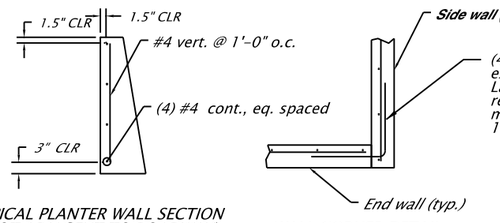
PIPE BOOT
NOT TO SCALE



Notes:
1. Adhere liner to concrete with top coat tc moldable sealant, or approved equal.
2. Liner to extend from top of water quality soil to the bottom of excavation.
3. 3" of concrete is required on all sides of attachment. Adjust sidewalk depth as necessary.
4. Secure liner to concrete with 2" aluminum flat bar, placed as directed (around entire facility).
5. Attach flat bar with concrete hit anchors, 24" o.c.
6. Trim excess liner to the top of the flat bar.

LINER ATTACHMENT DETAIL

NOT TO SCALE



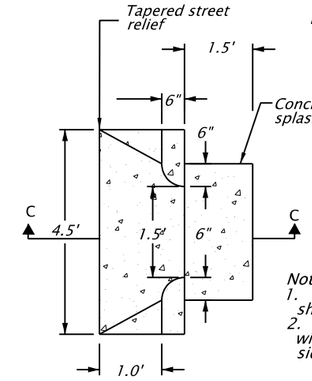
TYPICAL PLANTER WALL SECTION (NOT ADJACENT TO ROADWAY)

WALL CORNER DETAIL

Notes:
1. Top of planter walls to be 4" higher than adjacent sidewalk.
2. Bottom of planter walls to be 6" below top of water quality soil.

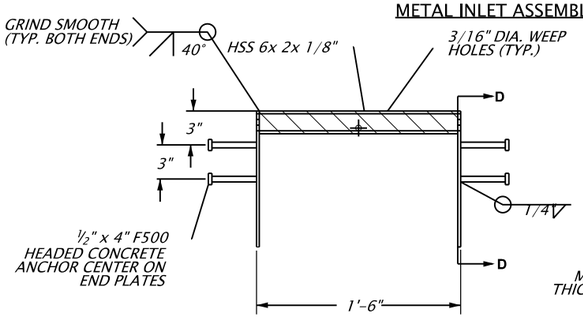
PLANTER WALL

NOT TO SCALE

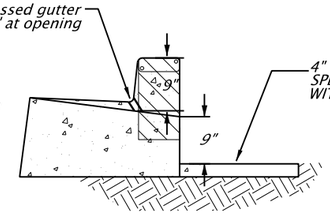


PLAN

METAL INLET ASSEMBLY

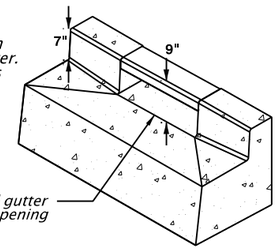


ELEVATION

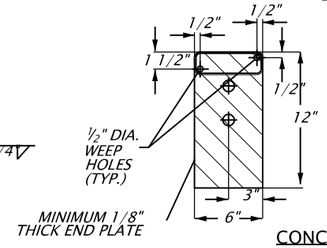


SECTION C-C

Notes:
1. Concrete splash pad elevation shall be level with soil inside planter.
2. Splash pad shall be six inches wider than inlet opening on both sides.



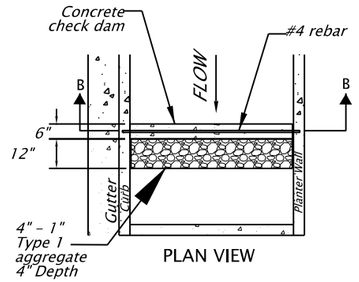
ISOMETRIC



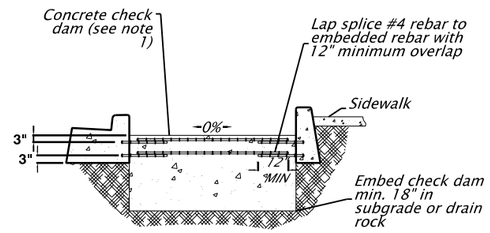
SECTION D-D

CONCRETE CURB INLET

NOT TO SCALE



PLAN VIEW



SECTION B-B

Notes:
1. Top of dam elevation to be 2" lower than upstream curb depression elevation.
2. Concrete to be 3,000 psi.
3. Embed #4 rebar 3" into curb and planter wall.

CONCRETE CHECK DAM

NOT TO SCALE

PRELIMINARY COPY
INFORMATION ONLY

DFI no. ######

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

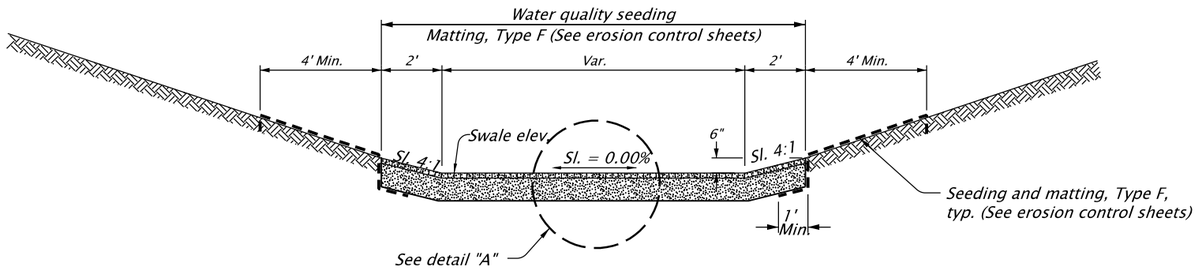
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY DETAILS

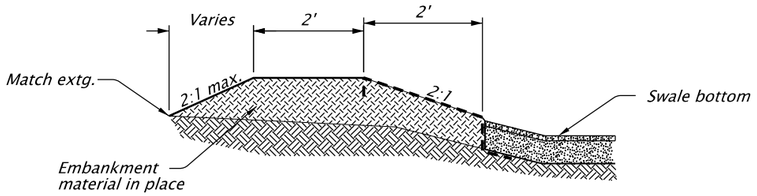
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

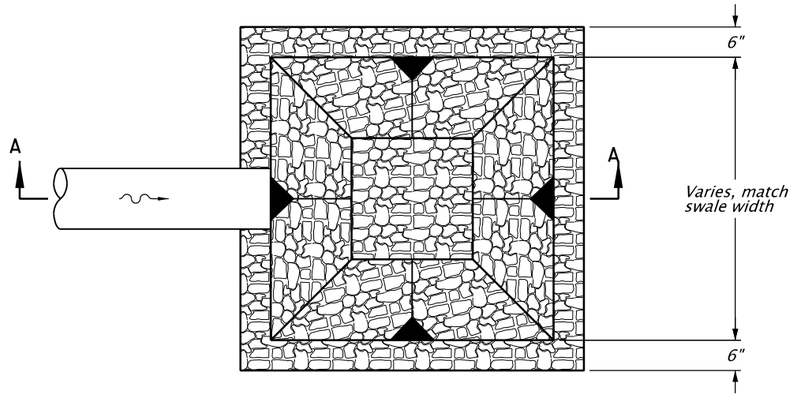
Rotation: 0° 0'



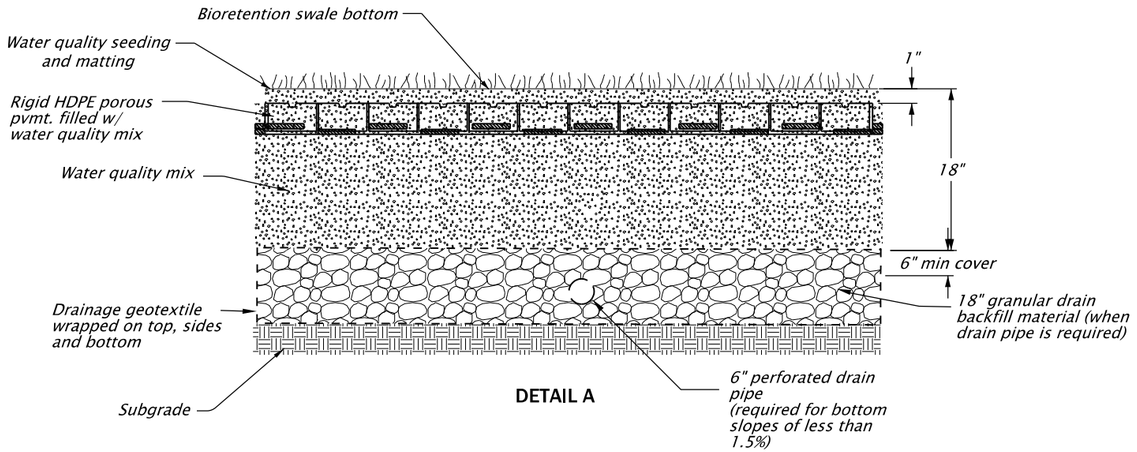
BIORETENTION SWALE
NTS



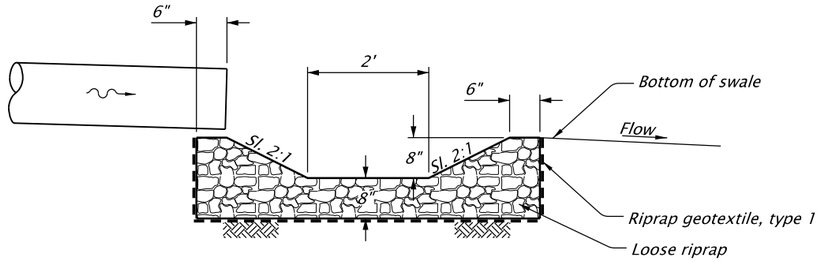
BIORETENTION SWALE BERM
NTS



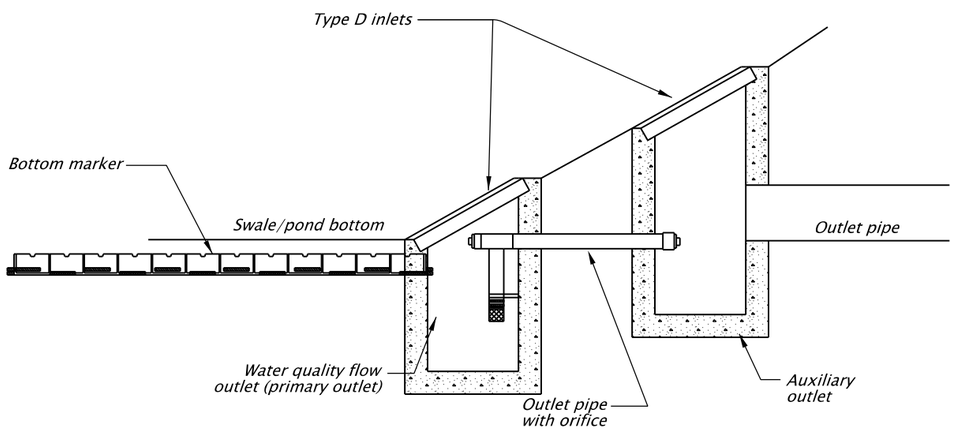
ROCK BASIN FLOW SPREADER
NTS



DETAIL A



SECTION A-A



WATER QUALITY FACILITY OUTLET STRUCTURE
NTS

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

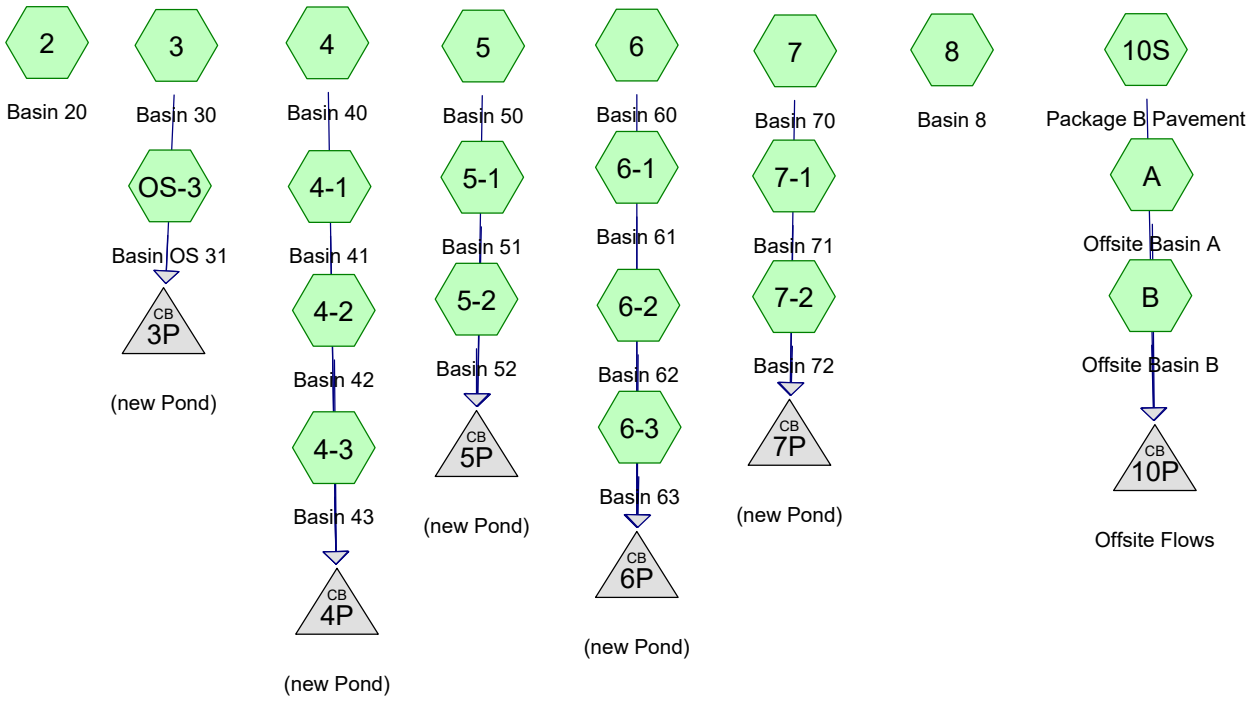
Designer: Reviewer:
Drafter: Checker:

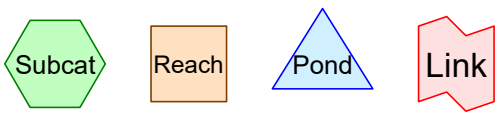
WATER QUALITY DETAILS

SHEET NO.

Rotation: 0° 0'

Appendix C. Hydrology Calculations





Drainage Diagram for Abernethy Basins
Prepared by HDR, Printed 3/28/2019
HydroCAD® 9.10 s/n 04284 © 2010 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
111.160	83	1/4 acre lots, 38% imp, HSG C (A, B)
24.458	98	(2, 3, 4, 4-1, 4-2, 4-3, 5, 5-1, 5-2, 6, 6-1, 6-2, 6-3, 7, 7-1, 7-2, 8)
17.417	98	Paved roads w/curbs & sewers, HSG B (10S, OS-3)

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=2.36 cfs 0.782 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.67 cfs 0.553 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.30 cfs 0.101 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=3.49 cfs 1.158 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.53 cfs 0.177 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.26 cfs 0.086 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.55 cfs 0.183 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.44 cfs 0.147 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=2.74 cfs 0.907 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.76 cfs 0.584 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 0.120 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.77 cfs 0.588 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.031 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.22 cfs 0.073 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.26 cfs 0.085 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.141 af

Subcatchment 8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=3.05"
Tc=12.0 min CN=0/98 Runoff=1.38 cfs 0.496 af

Subcatchment 10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=3.05"
Tc=15.0 min CN=0/98 Runoff=10.77 cfs 4.003 af

Subcatchment A: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=1.83"
Tc=20.0 min CN=74/98 Runoff=6.61 cfs 2.985 af

Subcatchment B: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=1.83"
Tc=60.0 min CN=74/98 Runoff=20.05 cfs 14.005 af

Subcatchment OS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.27 cfs 0.419 af

Pond 3P: (new Pond) Peak Elev=0.77' Inflow=2.94 cfs 0.973 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=2.94 cfs 0.973 af

Pond 4P: (new Pond) Peak Elev=0.96' Inflow=4.59 cfs 1.522 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.59 cfs 1.522 af

Pond 5P: (new Pond) Peak Elev=0.86' Inflow=3.73 cfs 1.236 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=3.73 cfs 1.236 af

Pond 6P: (new Pond) Peak Elev=0.89' Inflow=3.99 cfs 1.323 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=3.99 cfs 1.323 af

Pond 7P: (new Pond) Peak Elev=0.44' Inflow=0.90 cfs 0.299 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=0.90 cfs 0.299 af

Pond 10P: Offsite Flows Peak Elev=2.84' Inflow=36.77 cfs 20.993 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=36.77 cfs 20.993 af

Summary for Subcatchment 2: Basin 20

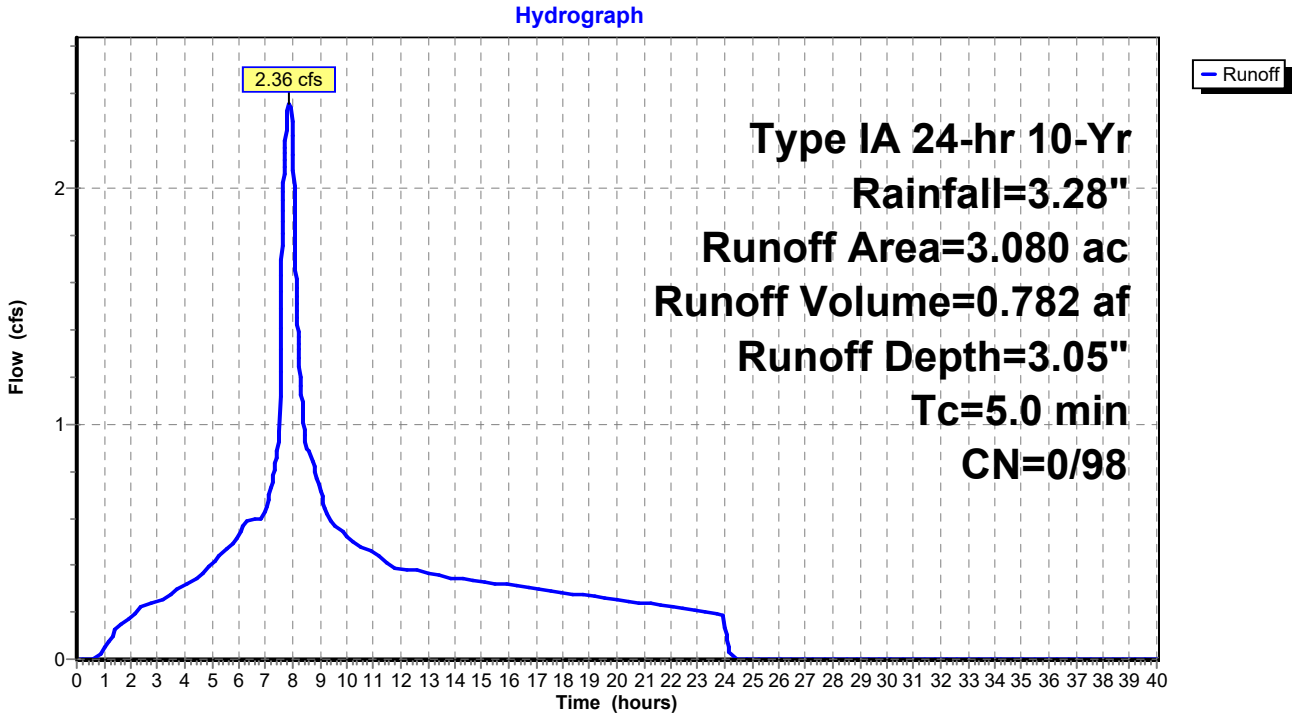
Runoff = 2.36 cfs @ 7.88 hrs, Volume= 0.782 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

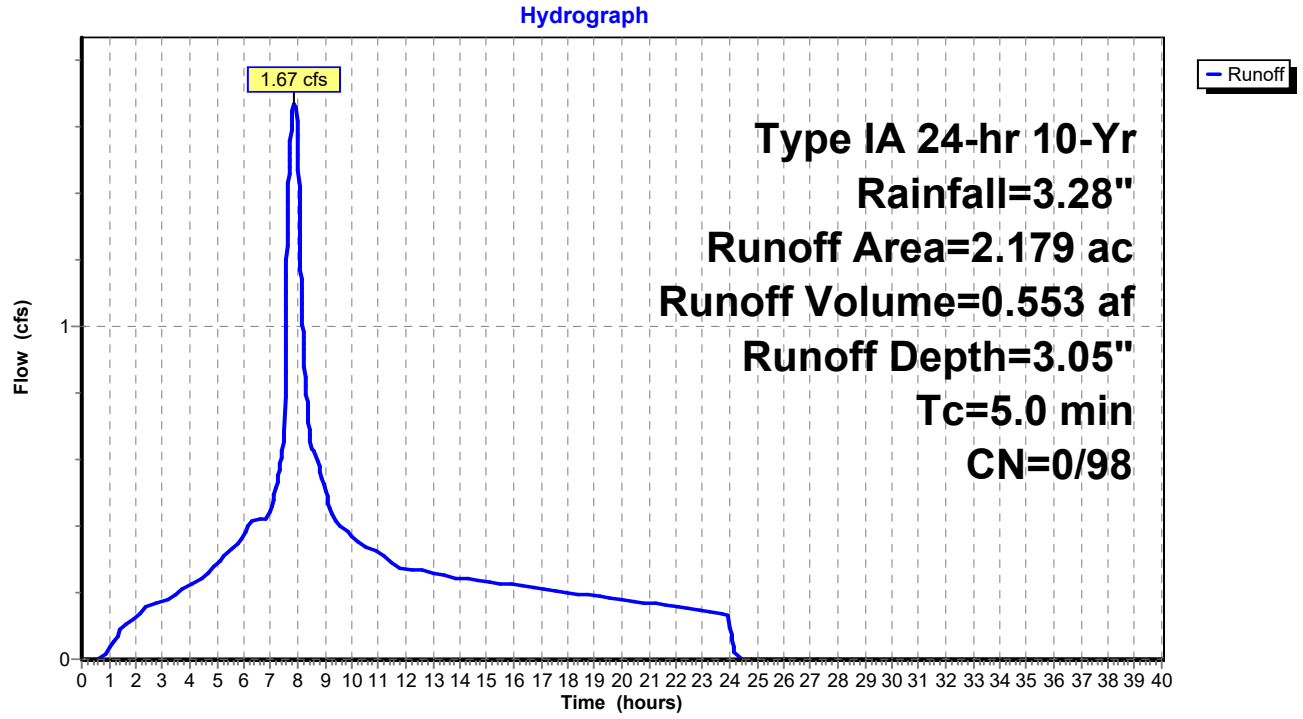
Runoff = 1.67 cfs @ 7.88 hrs, Volume= 0.553 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

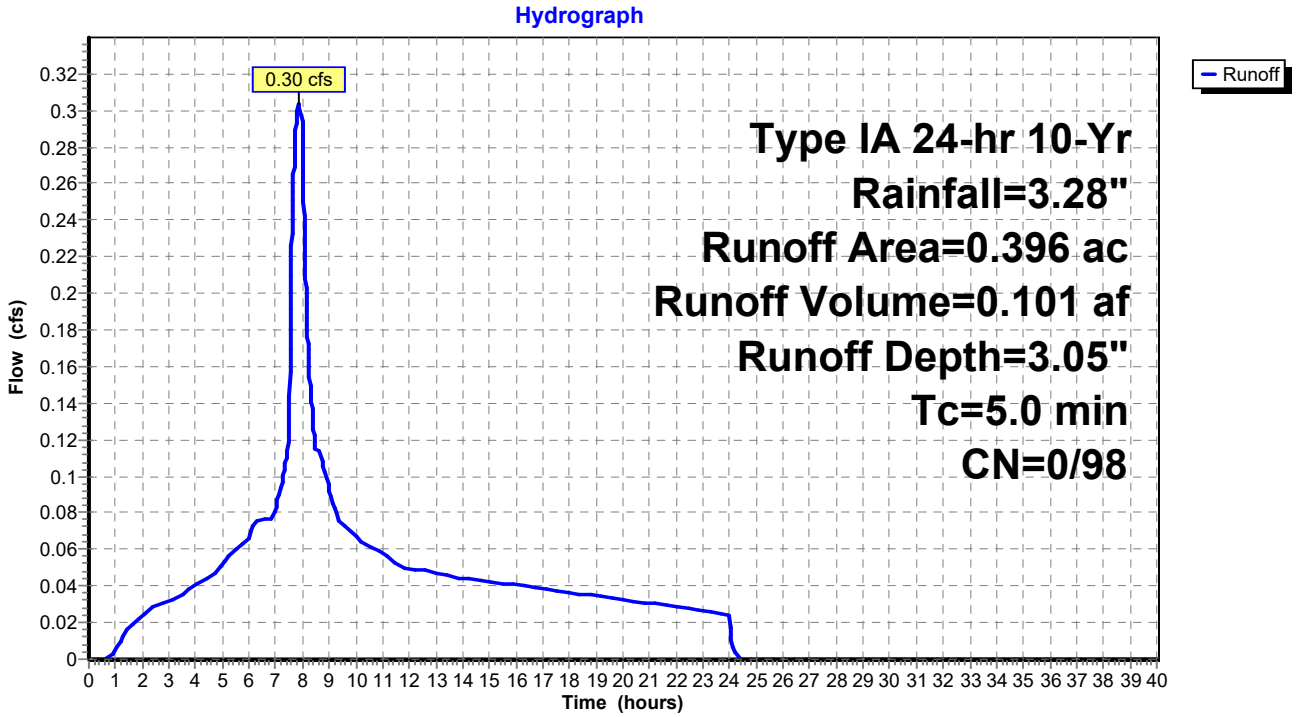
Runoff = 0.30 cfs @ 7.88 hrs, Volume= 0.101 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

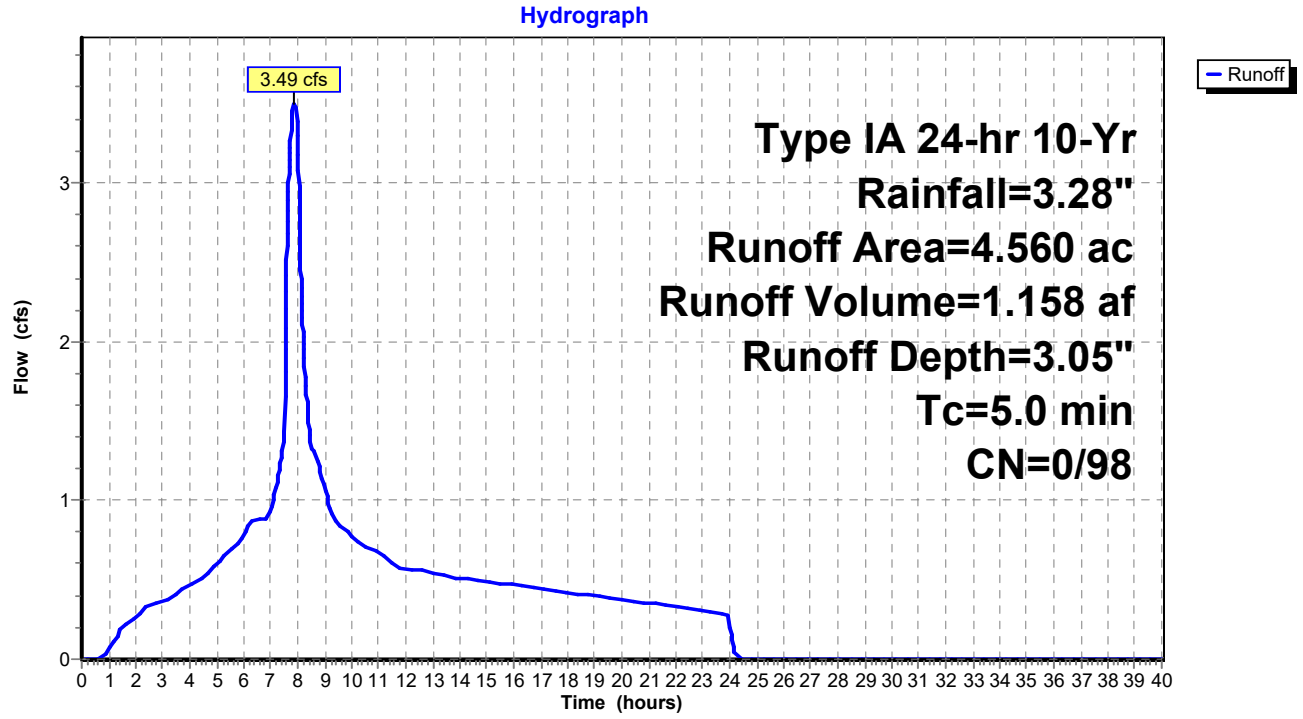
Runoff = 3.49 cfs @ 7.88 hrs, Volume= 1.158 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

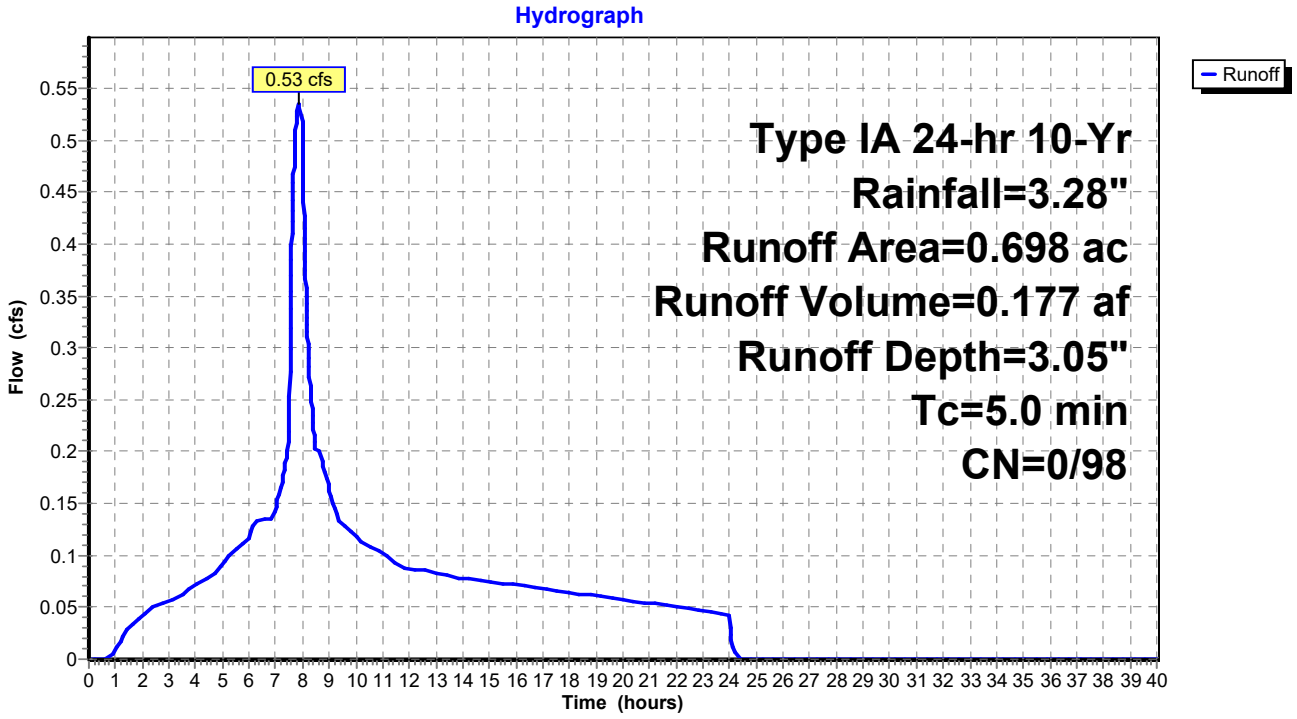
Runoff = 0.53 cfs @ 7.88 hrs, Volume= 0.177 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

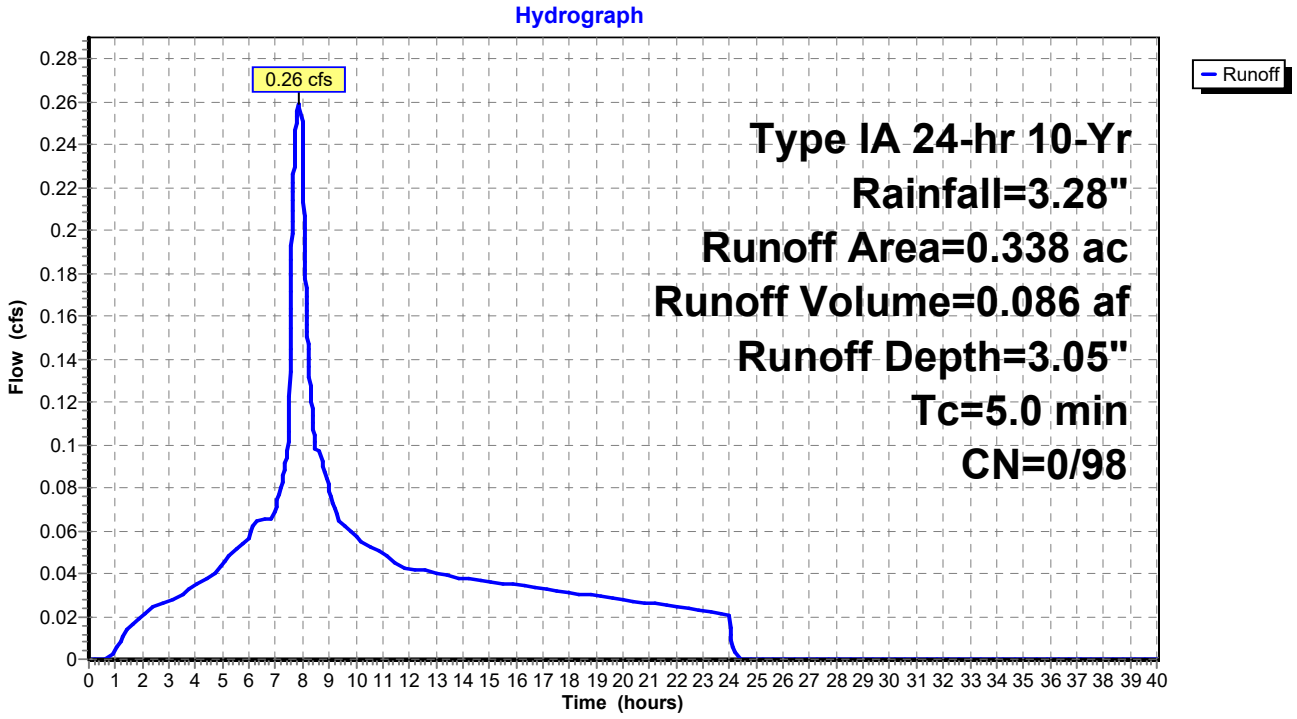
Runoff = 0.26 cfs @ 7.88 hrs, Volume= 0.086 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

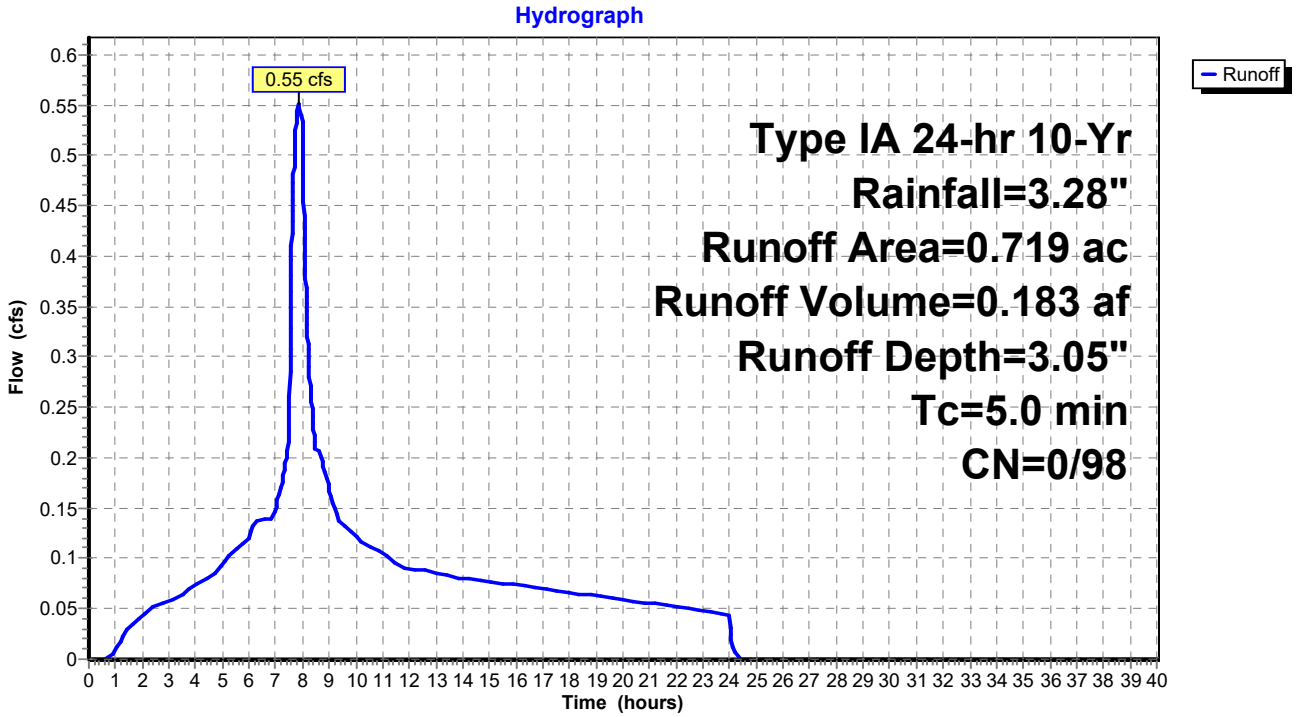
Runoff = 0.55 cfs @ 7.88 hrs, Volume= 0.183 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

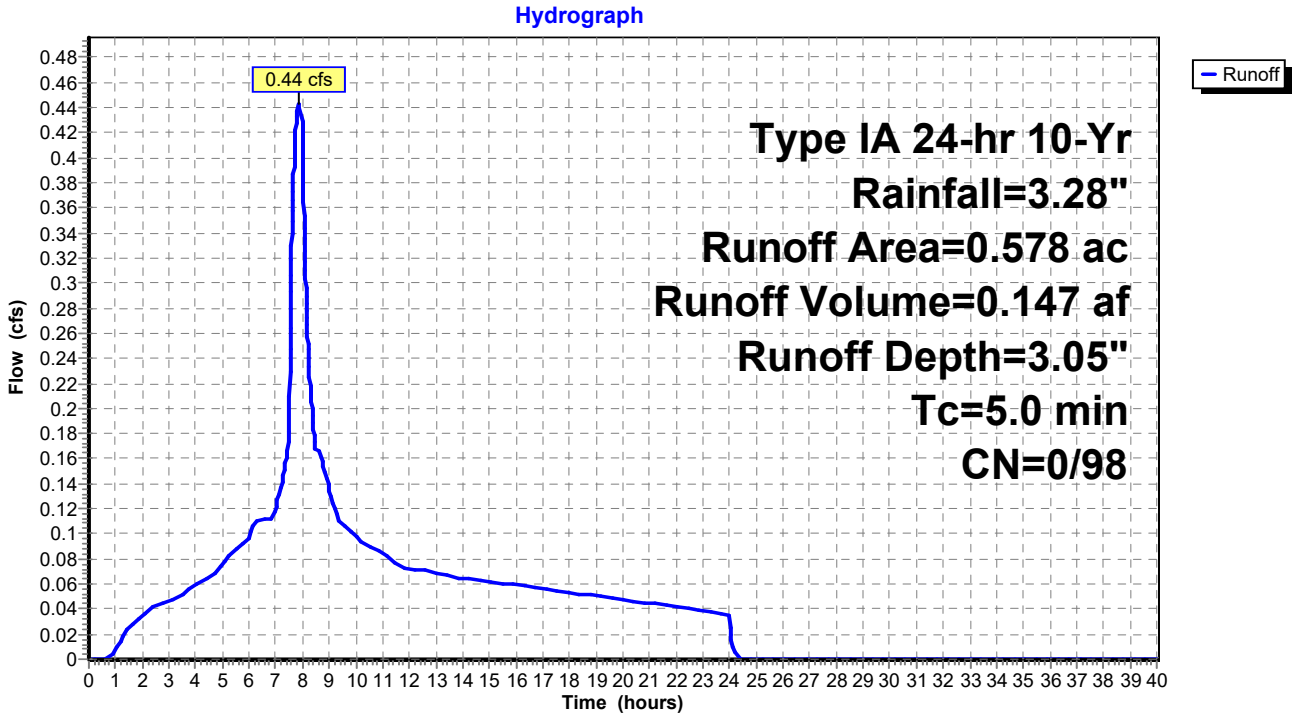
Runoff = 0.44 cfs @ 7.88 hrs, Volume= 0.147 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

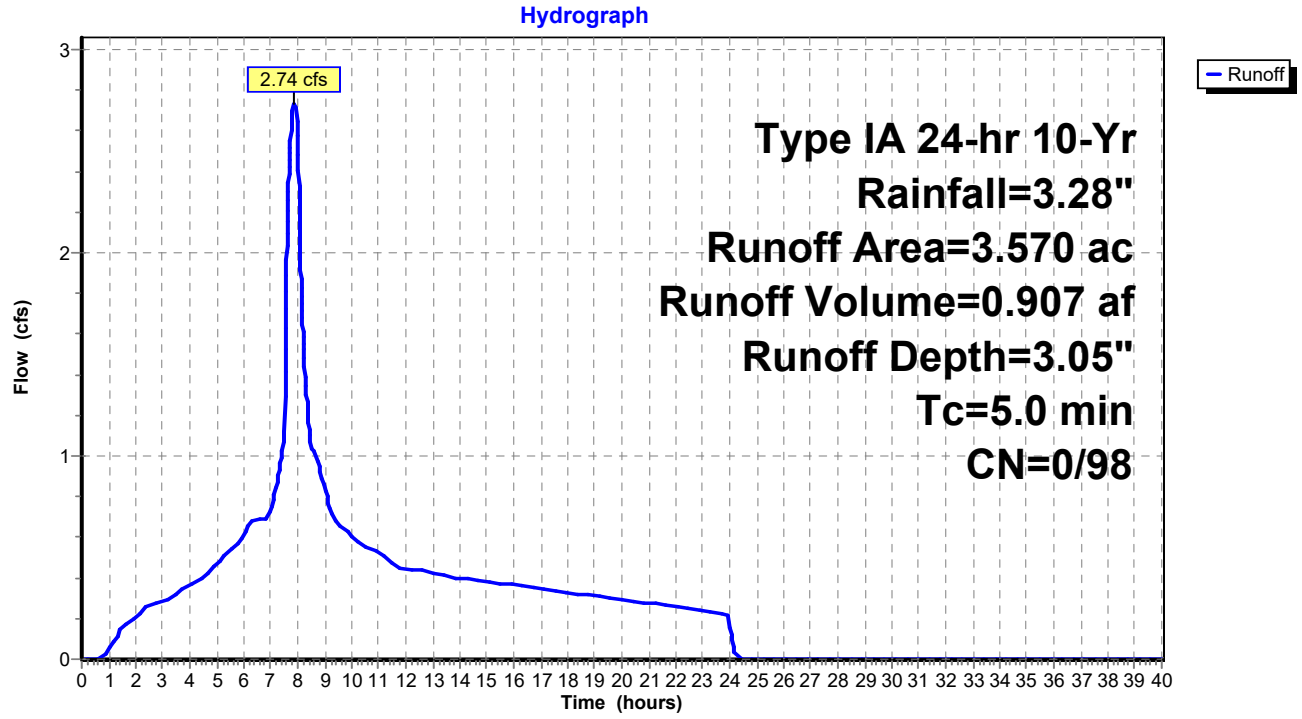
Runoff = 2.74 cfs @ 7.88 hrs, Volume= 0.907 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

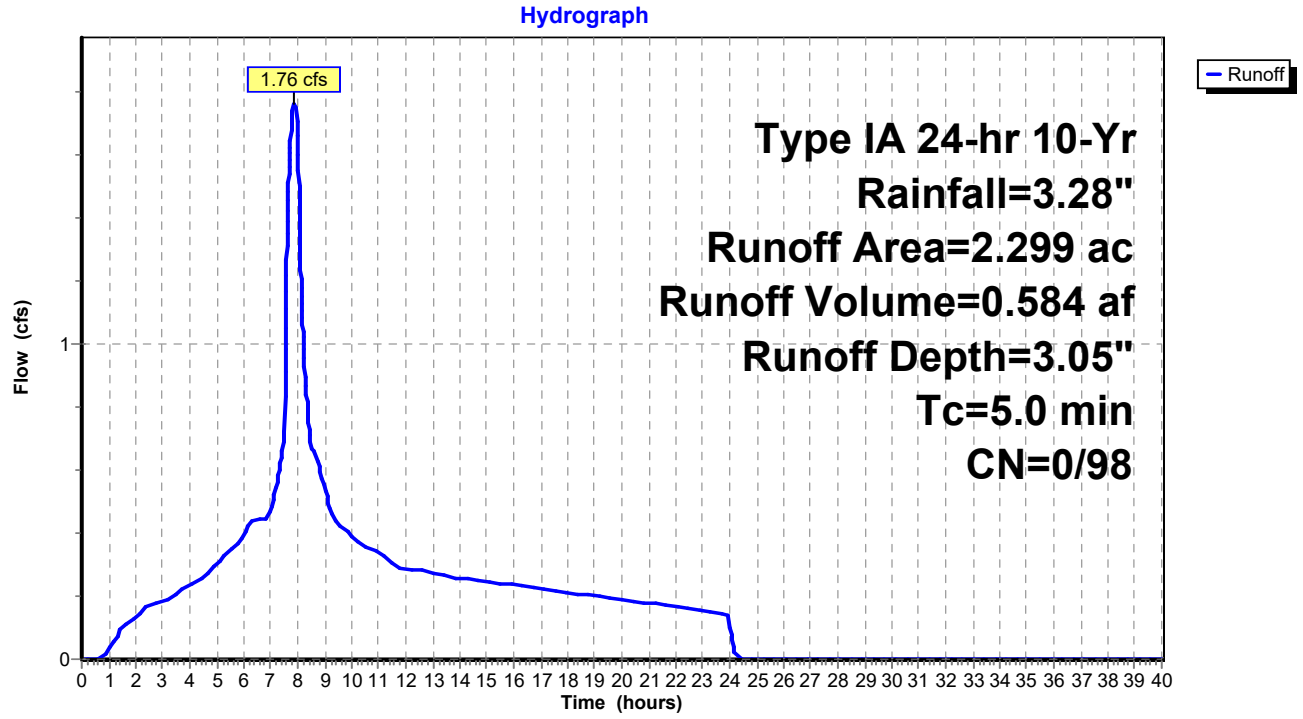
Runoff = 1.76 cfs @ 7.88 hrs, Volume= 0.584 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

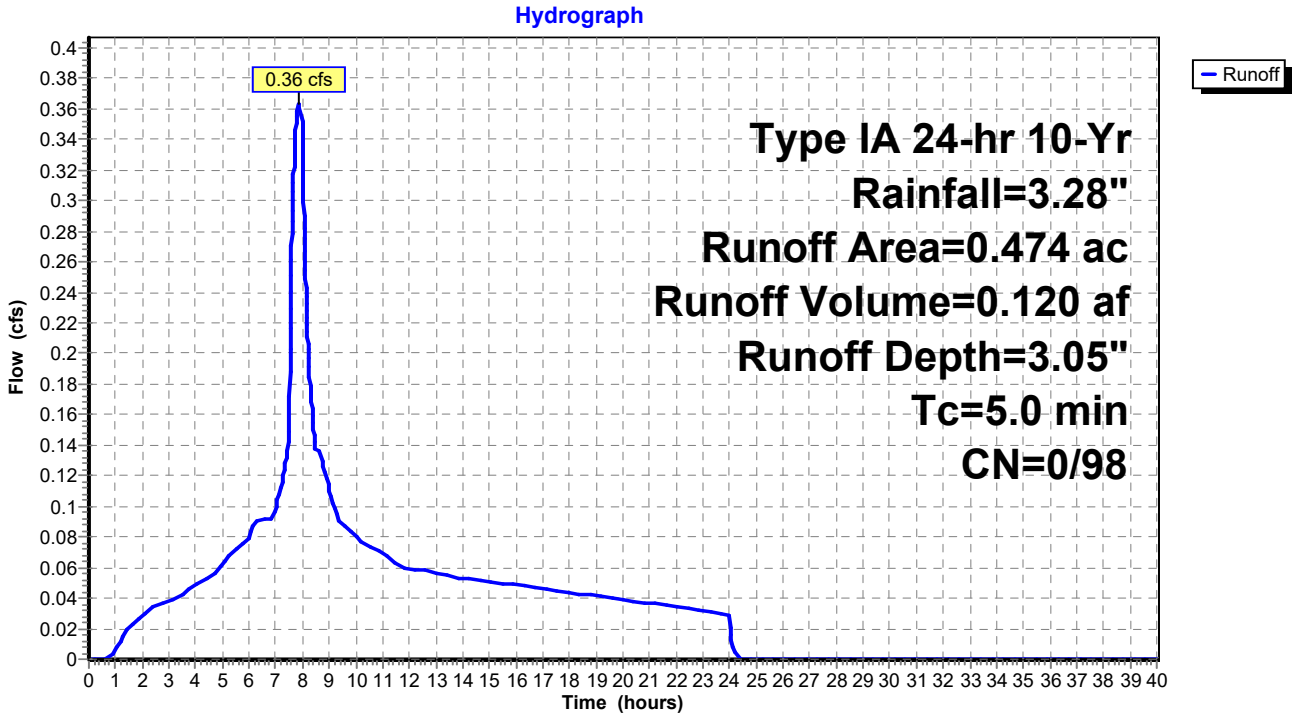
Runoff = 0.36 cfs @ 7.88 hrs, Volume= 0.120 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

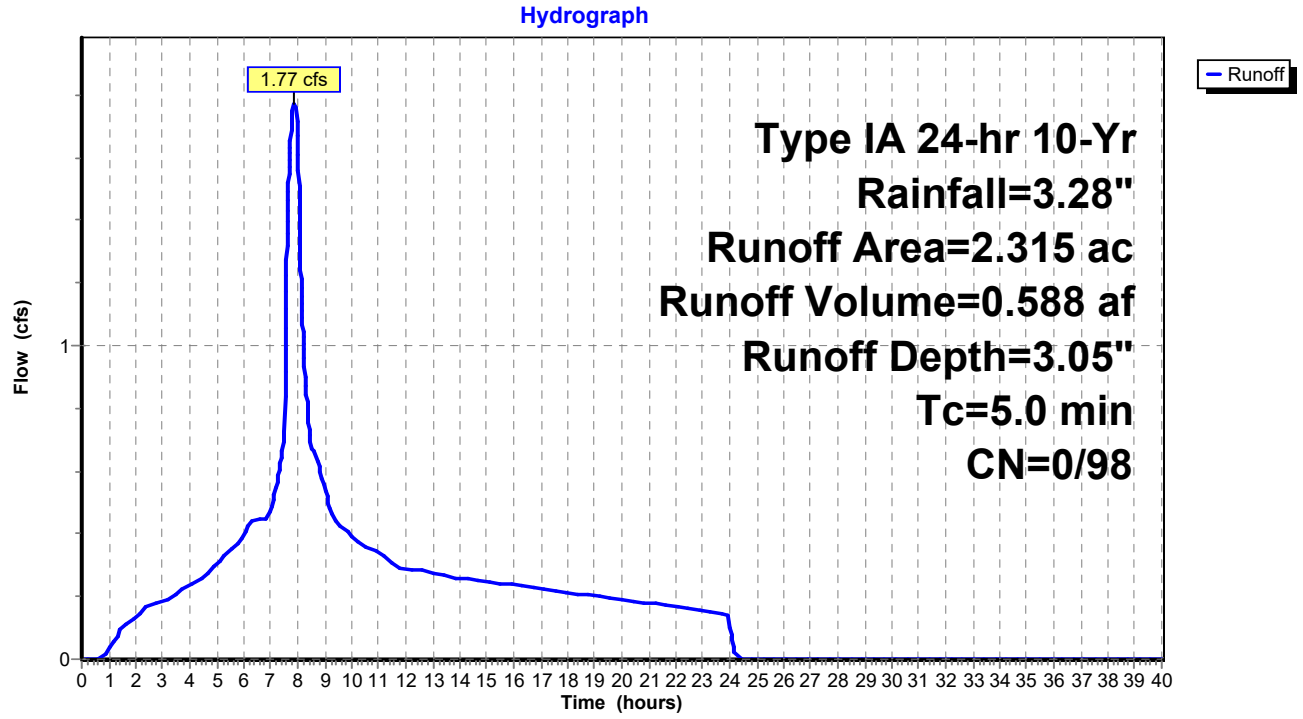
Runoff = 1.77 cfs @ 7.88 hrs, Volume= 0.588 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

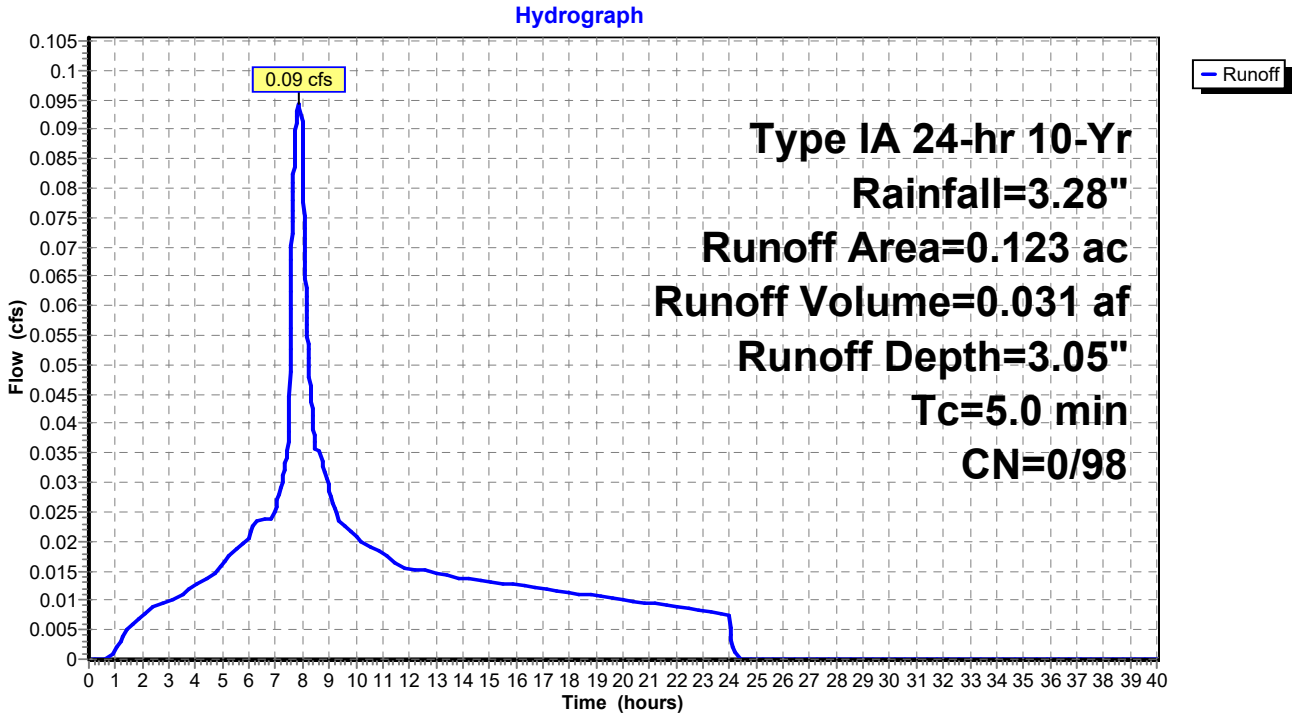
Runoff = 0.09 cfs @ 7.88 hrs, Volume= 0.031 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

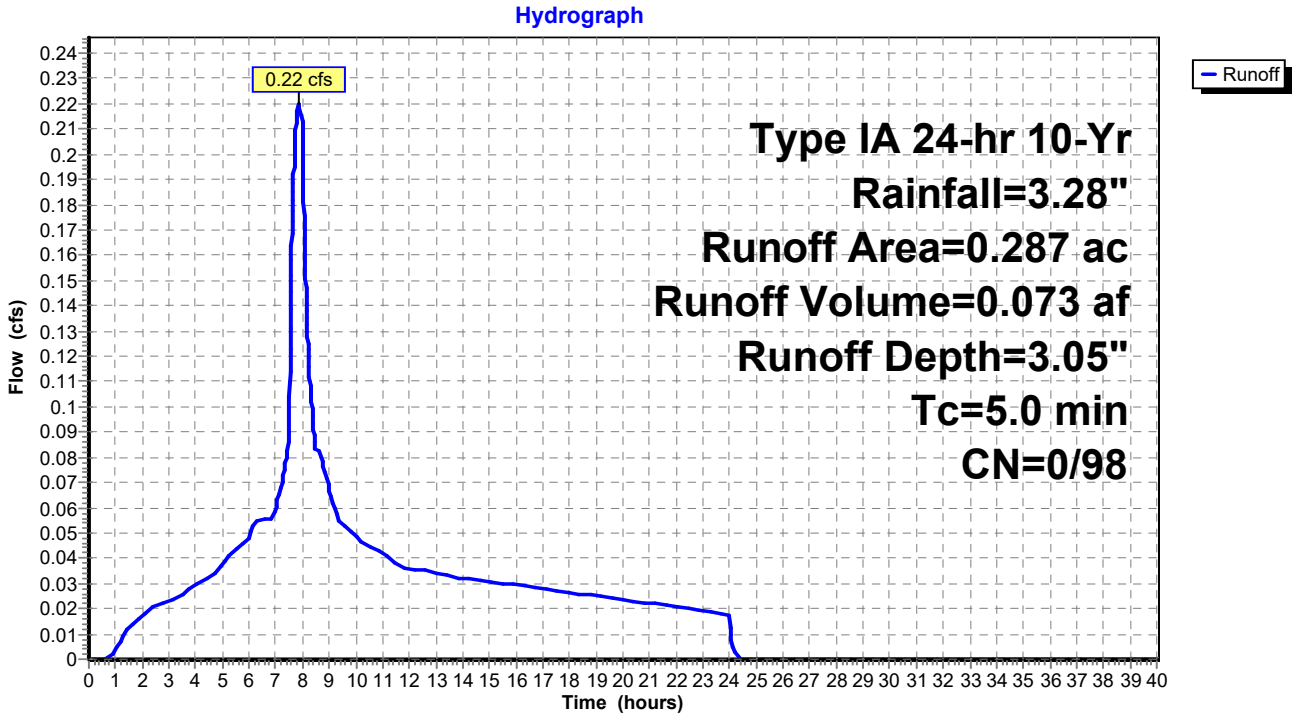
Runoff = 0.22 cfs @ 7.88 hrs, Volume= 0.073 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

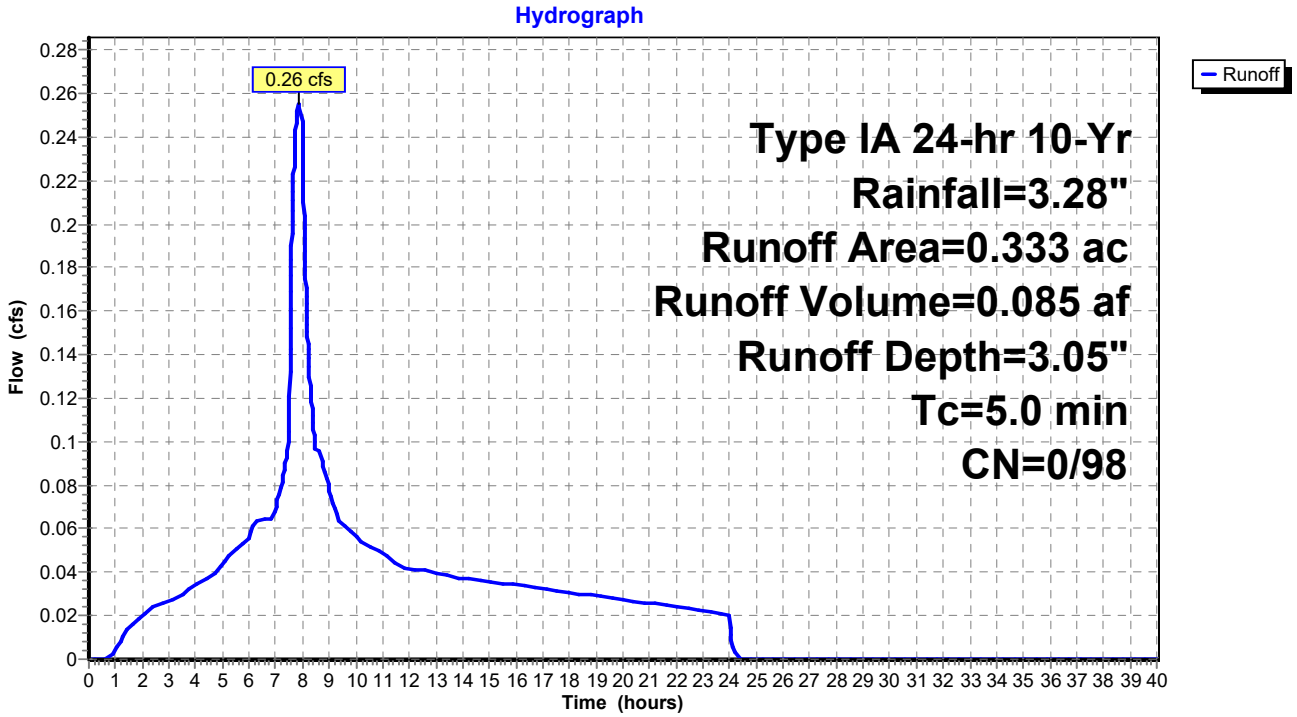
Runoff = 0.26 cfs @ 7.88 hrs, Volume= 0.085 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

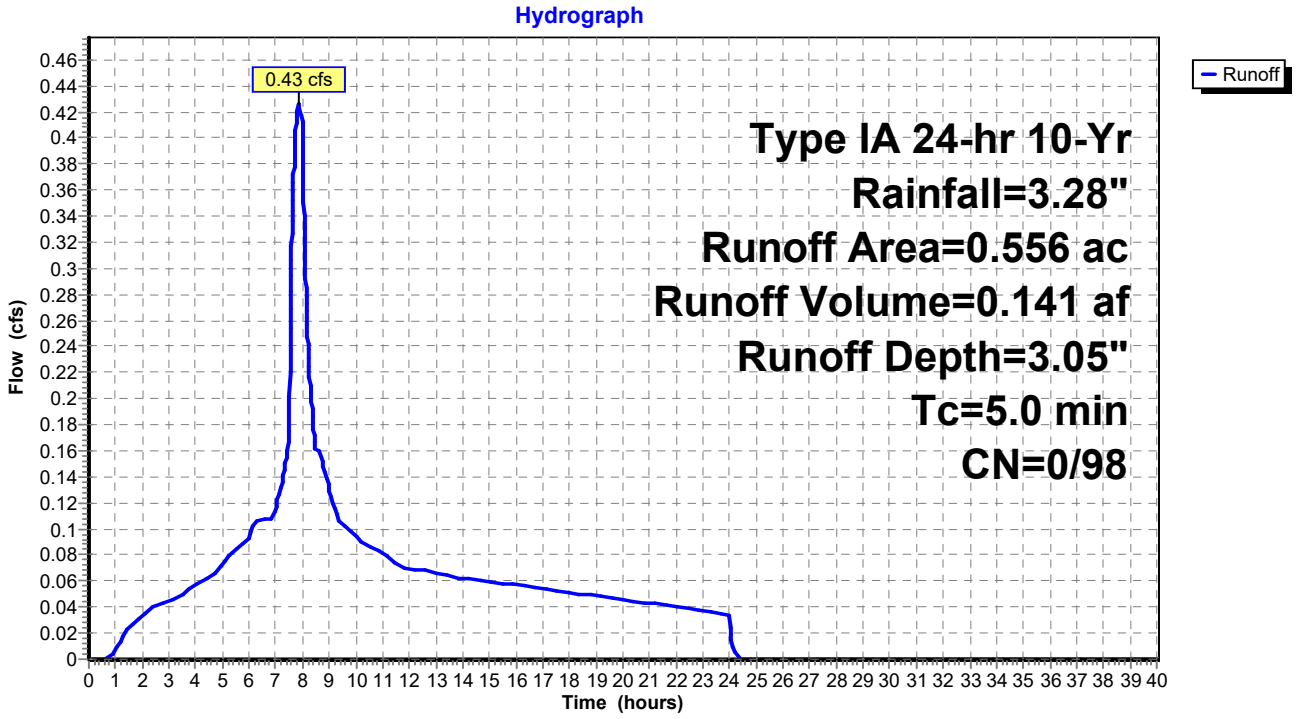
Runoff = 0.43 cfs @ 7.88 hrs, Volume= 0.141 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

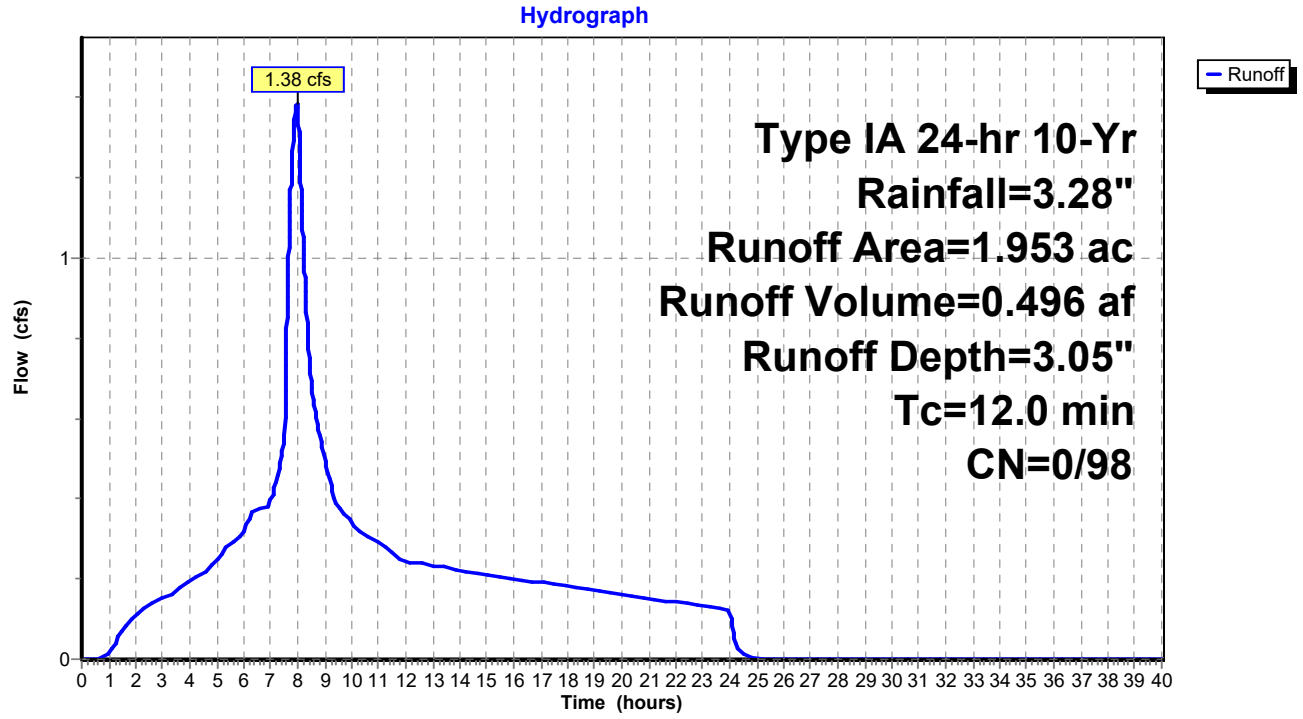
Runoff = 1.38 cfs @ 7.99 hrs, Volume= 0.496 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

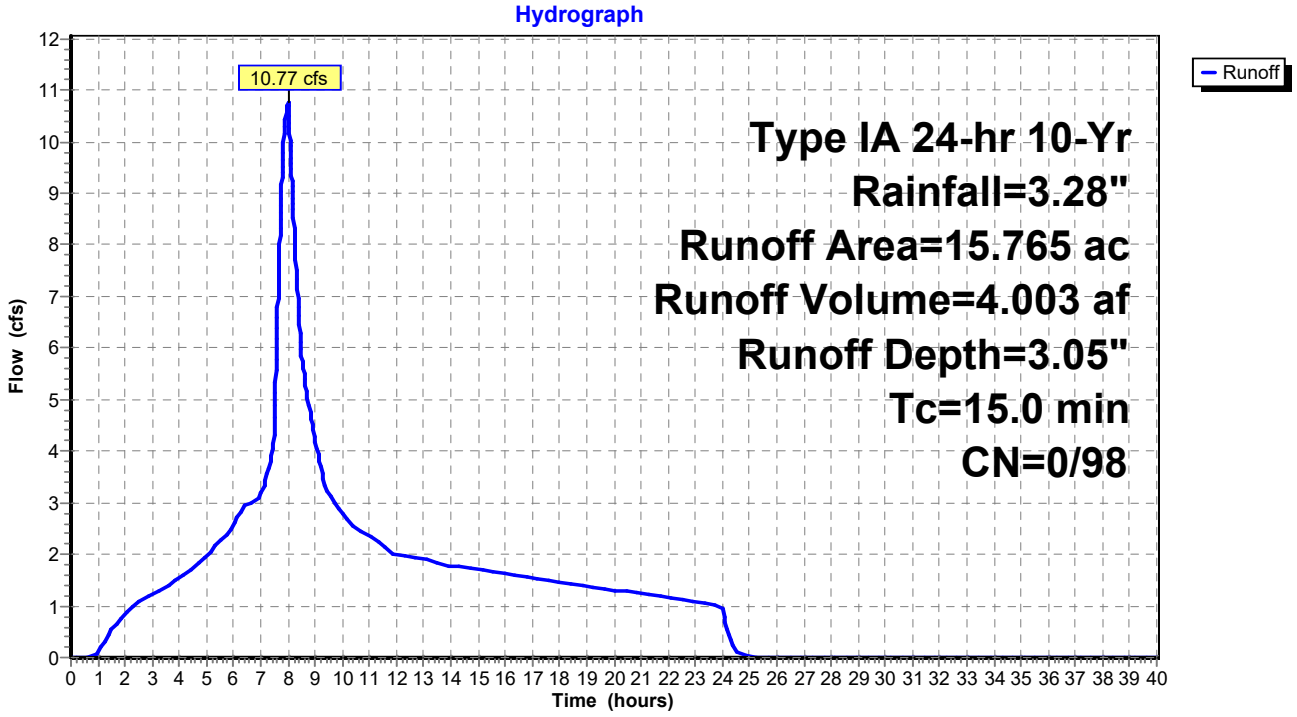
Runoff = 10.77 cfs @ 8.00 hrs, Volume= 4.003 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

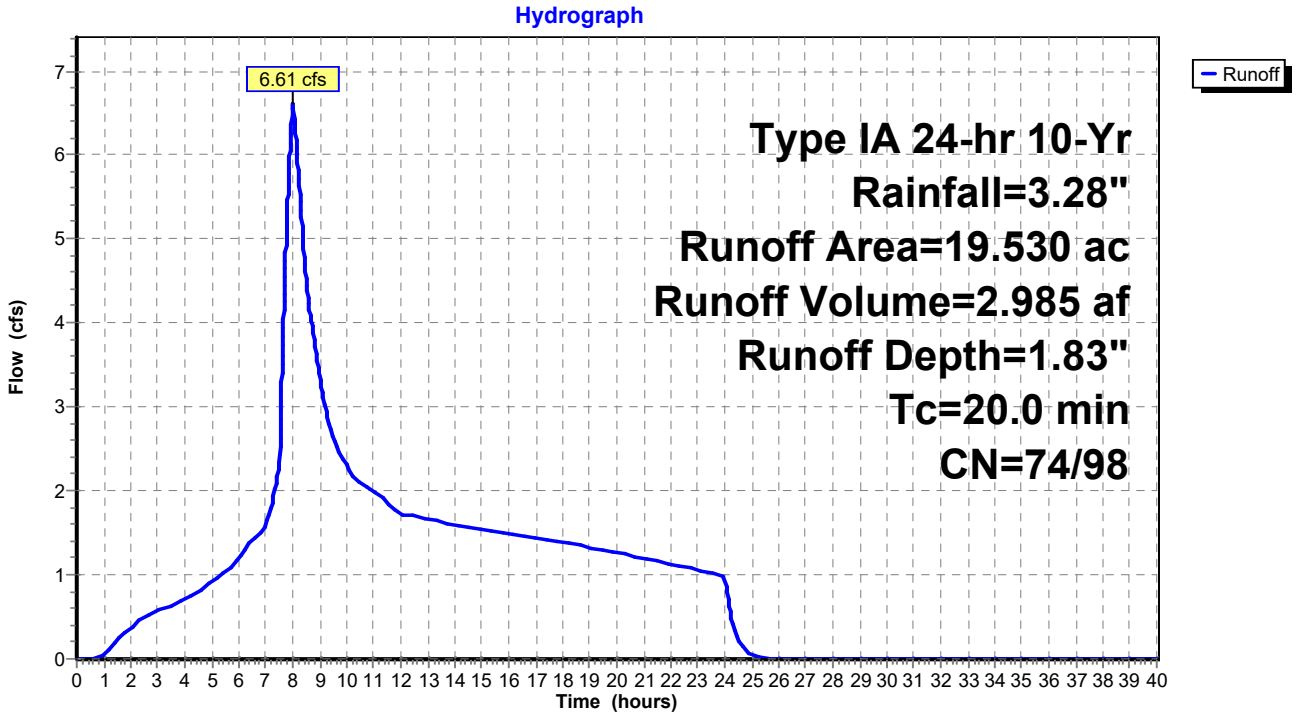
Runoff = 6.61 cfs @ 8.01 hrs, Volume= 2.985 af, Depth= 1.83"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

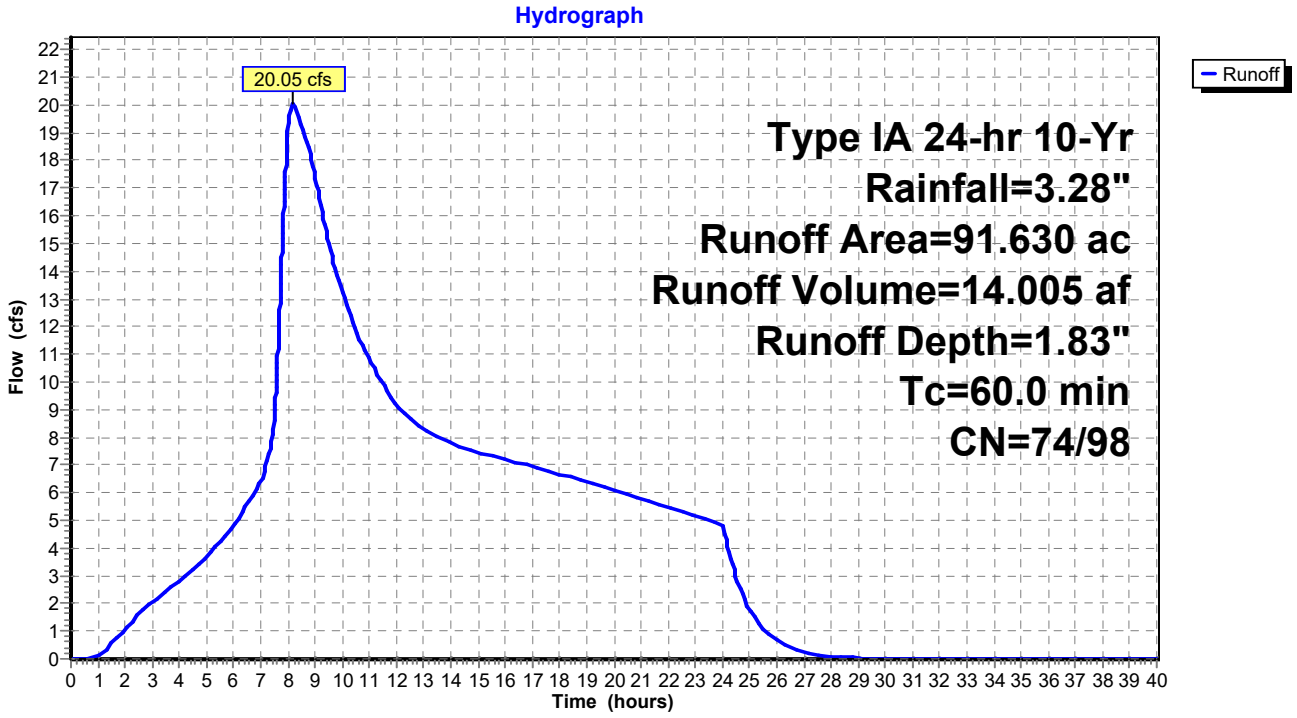
Runoff = 20.05 cfs @ 8.20 hrs, Volume= 14.005 af, Depth= 1.83"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

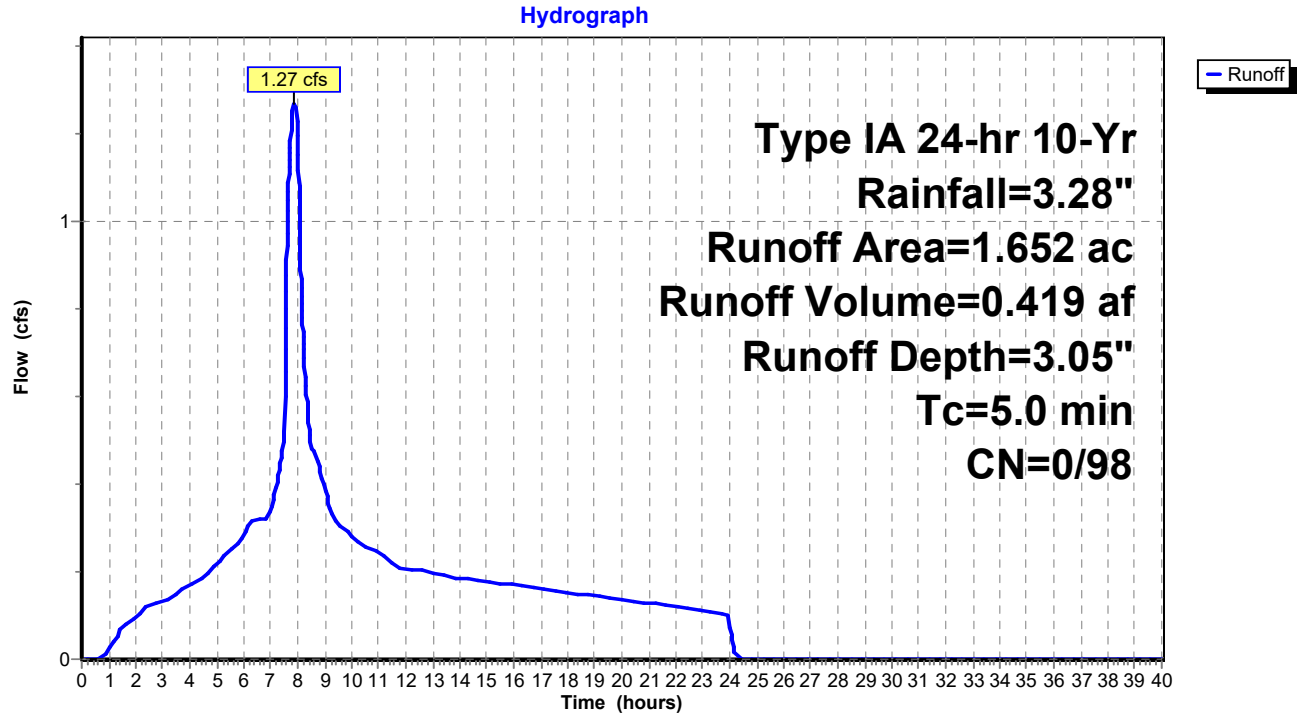
Runoff = 1.27 cfs @ 7.88 hrs, Volume= 0.419 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

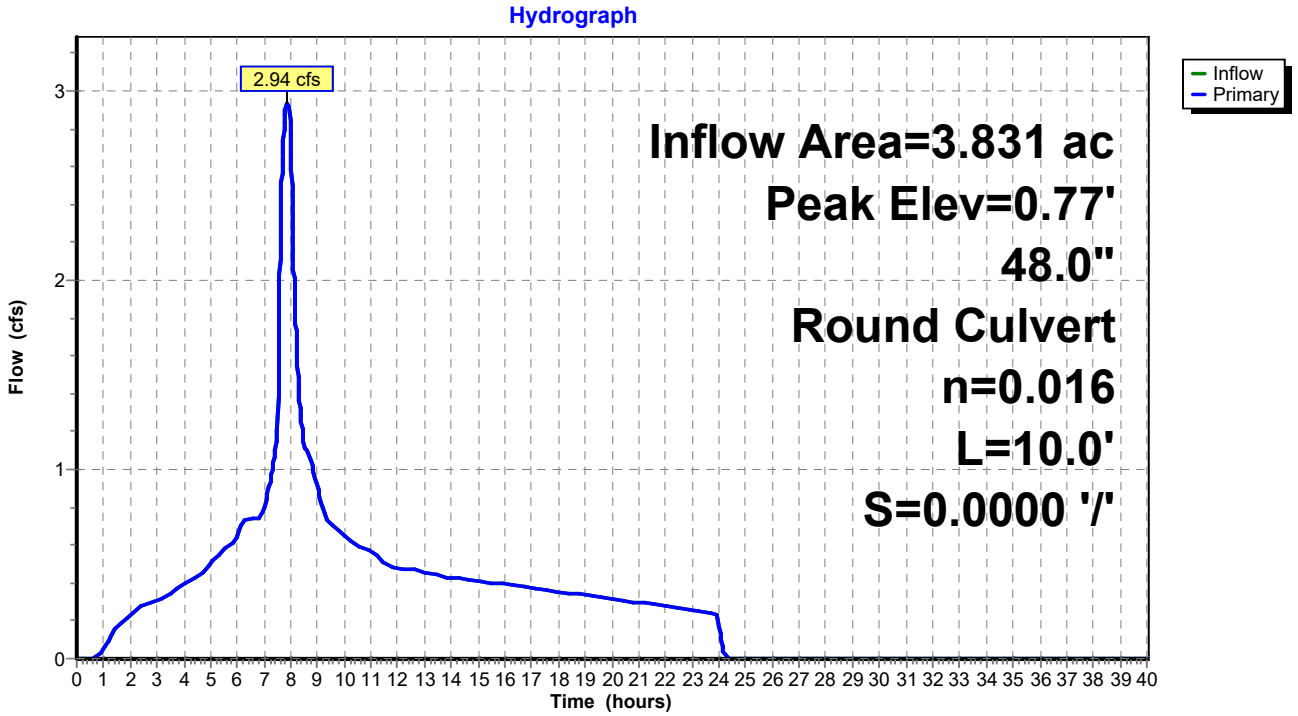
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 2.94 cfs @ 7.88 hrs, Volume= 0.973 af
Outflow = 2.94 cfs @ 7.88 hrs, Volume= 0.973 af, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 7.88 hrs, Volume= 0.973 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.77' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=2.93 cfs @ 7.88 hrs HW=0.77' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.93 cfs @ 2.63 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

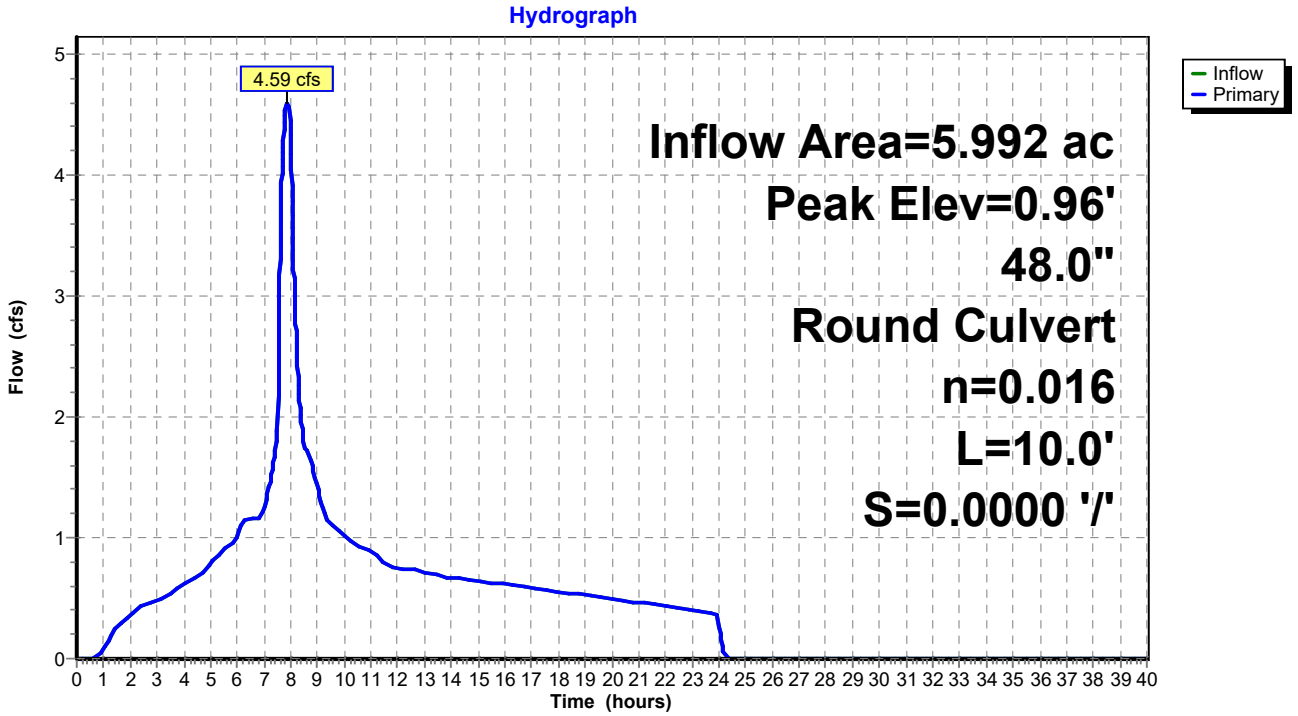
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 4.59 cfs @ 7.88 hrs, Volume= 1.522 af
Outflow = 4.59 cfs @ 7.88 hrs, Volume= 1.522 af, Atten= 0%, Lag= 0.0 min
Primary = 4.59 cfs @ 7.88 hrs, Volume= 1.522 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.96' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.59 cfs @ 7.88 hrs HW=0.96' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.59 cfs @ 2.99 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

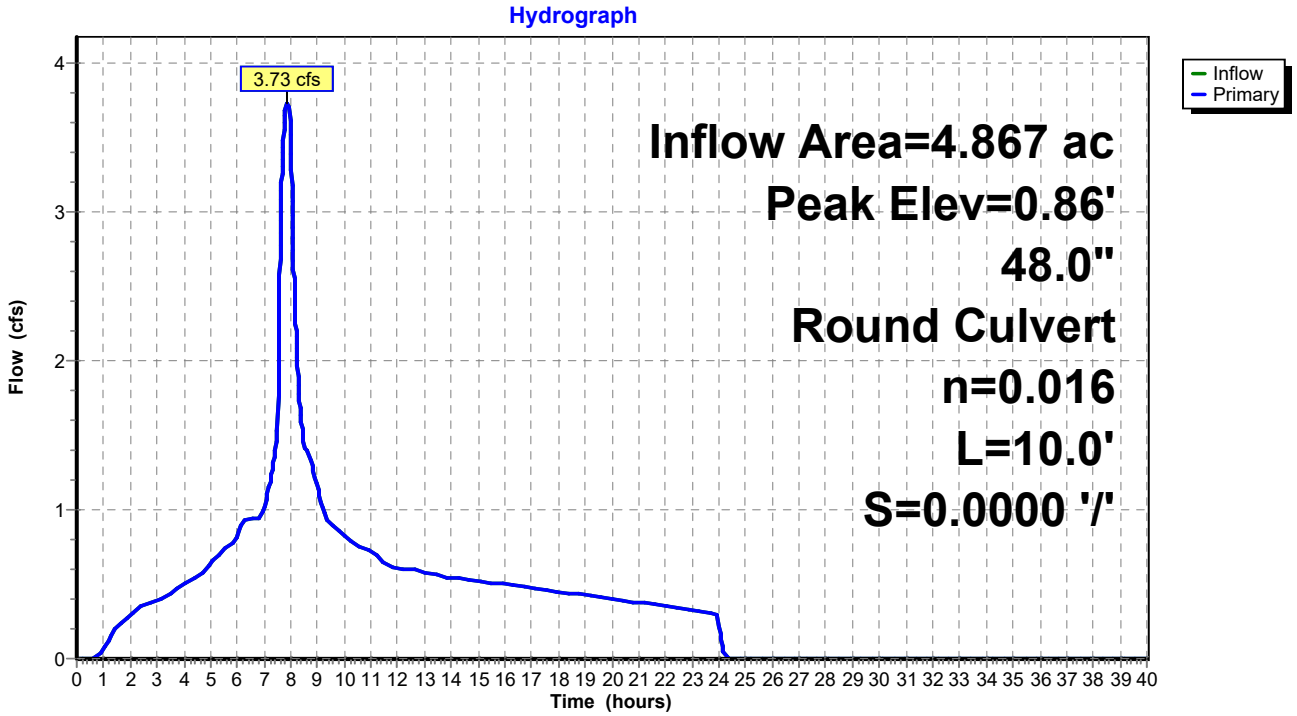
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 3.73 cfs @ 7.88 hrs, Volume= 1.236 af
Outflow = 3.73 cfs @ 7.88 hrs, Volume= 1.236 af, Atten= 0%, Lag= 0.0 min
Primary = 3.73 cfs @ 7.88 hrs, Volume= 1.236 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.86' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=3.73 cfs @ 7.88 hrs HW=0.86' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.73 cfs @ 2.82 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

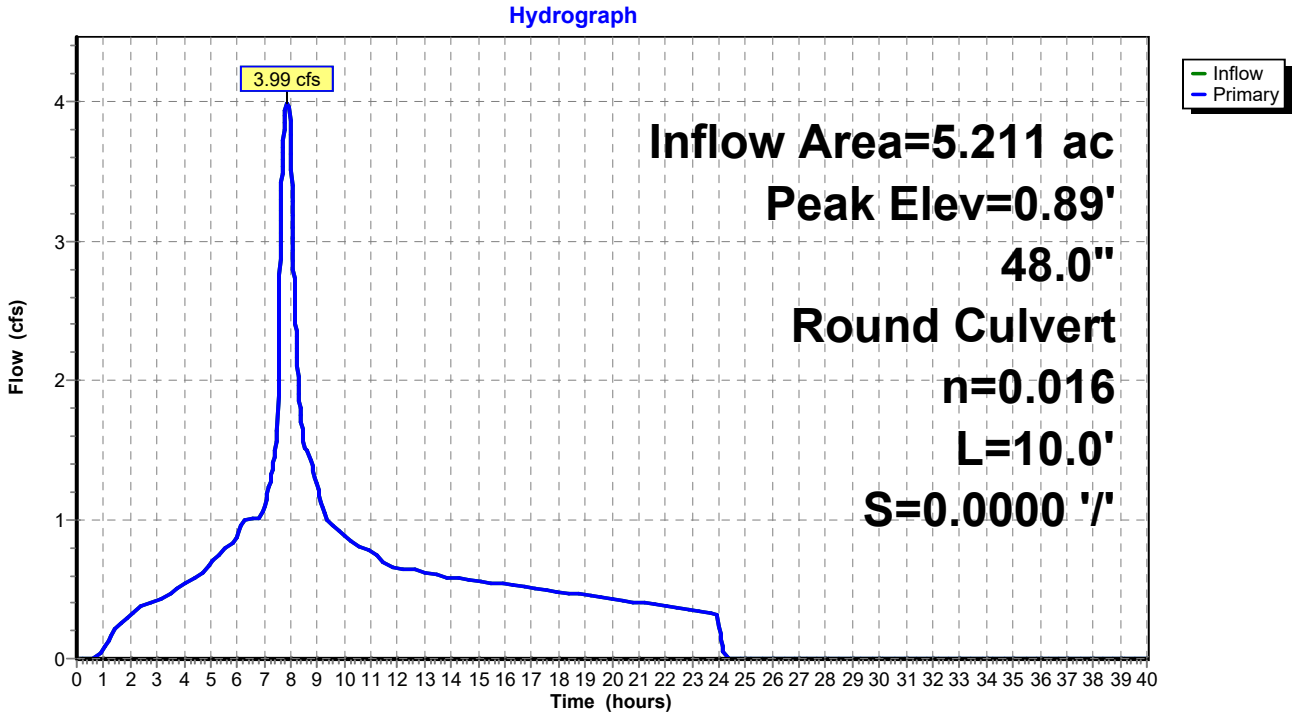
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 3.99 cfs @ 7.88 hrs, Volume= 1.323 af
Outflow = 3.99 cfs @ 7.88 hrs, Volume= 1.323 af, Atten= 0%, Lag= 0.0 min
Primary = 3.99 cfs @ 7.88 hrs, Volume= 1.323 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.89' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=3.99 cfs @ 7.88 hrs HW=0.89' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.99 cfs @ 2.87 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

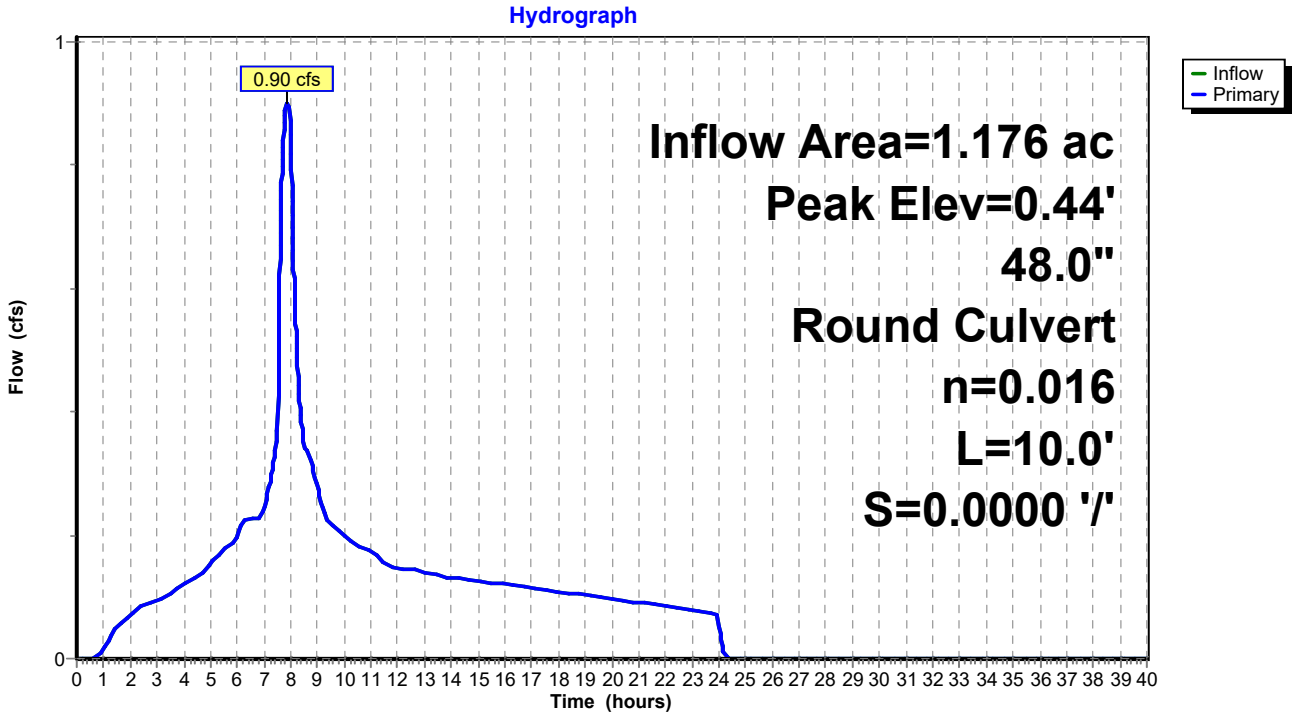
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 0.90 cfs @ 7.88 hrs, Volume= 0.299 af
Outflow = 0.90 cfs @ 7.88 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 7.88 hrs, Volume= 0.299 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.44' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=0.90 cfs @ 7.88 hrs HW=0.44' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.90 cfs @ 1.84 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

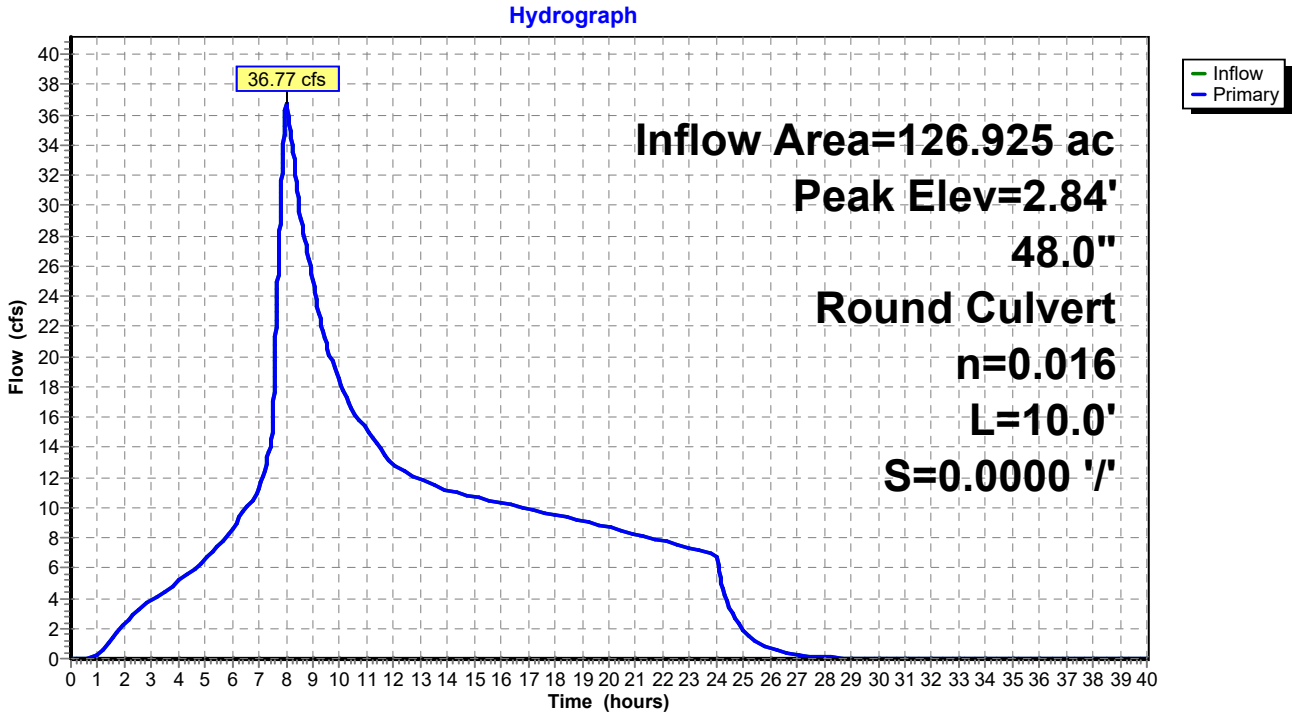
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 1.98" for 10-Yr event
Inflow = 36.77 cfs @ 8.01 hrs, Volume= 20.993 af
Outflow = 36.77 cfs @ 8.01 hrs, Volume= 20.993 af, Atten= 0%, Lag= 0.0 min
Primary = 36.77 cfs @ 8.01 hrs, Volume= 20.993 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 2.84' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=36.77 cfs @ 8.01 hrs HW=2.84' (Free Discharge)
└**1=Culvert** (Barrel Controls 36.77 cfs @ 5.40 fps)

Pond 10P: Offsite Flows



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=2.76 cfs 0.920 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=1.95 cfs 0.651 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 0.118 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=4.09 cfs 1.363 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.63 cfs 0.209 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.30 cfs 0.101 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.64 cfs 0.215 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.52 cfs 0.173 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=3.20 cfs 1.067 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=2.06 cfs 0.687 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.142 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=2.08 cfs 0.692 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.037 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.26 cfs 0.086 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.30 cfs 0.099 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.50 cfs 0.166 af

Subcatchment 8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=3.59"
Tc=12.0 min CN=0/98 Runoff=1.62 cfs 0.584 af

Subcatchment 10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=3.59"
Tc=15.0 min CN=0/98 Runoff=12.60 cfs 4.711 af

Subcatchment A: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=2.27"
Tc=20.0 min CN=74/98 Runoff=8.38 cfs 3.696 af

Subcatchment B: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=2.27"
Tc=60.0 min CN=74/98 Runoff=25.41 cfs 17.342 af

Subcatchment OS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=1.48 cfs 0.494 af

Pond 3P: (new Pond) Peak Elev=0.83' Inflow=3.44 cfs 1.145 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=3.44 cfs 1.145 af

Pond 4P: (new Pond) Peak Elev=1.04' Inflow=5.38 cfs 1.790 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=5.38 cfs 1.790 af

Pond 5P: (new Pond) Peak Elev=0.93' Inflow=4.37 cfs 1.454 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.37 cfs 1.454 af

Pond 6P: (new Pond) Peak Elev=0.97' Inflow=4.67 cfs 1.557 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.67 cfs 1.557 af

Pond 7P: (new Pond) Peak Elev=0.47' Inflow=1.05 cfs 0.351 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.05 cfs 0.351 af

Pond 10P: Offsite Flows Peak Elev=3.22' Inflow=45.61 cfs 25.749 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=45.61 cfs 25.749 af

Summary for Subcatchment 2: Basin 20

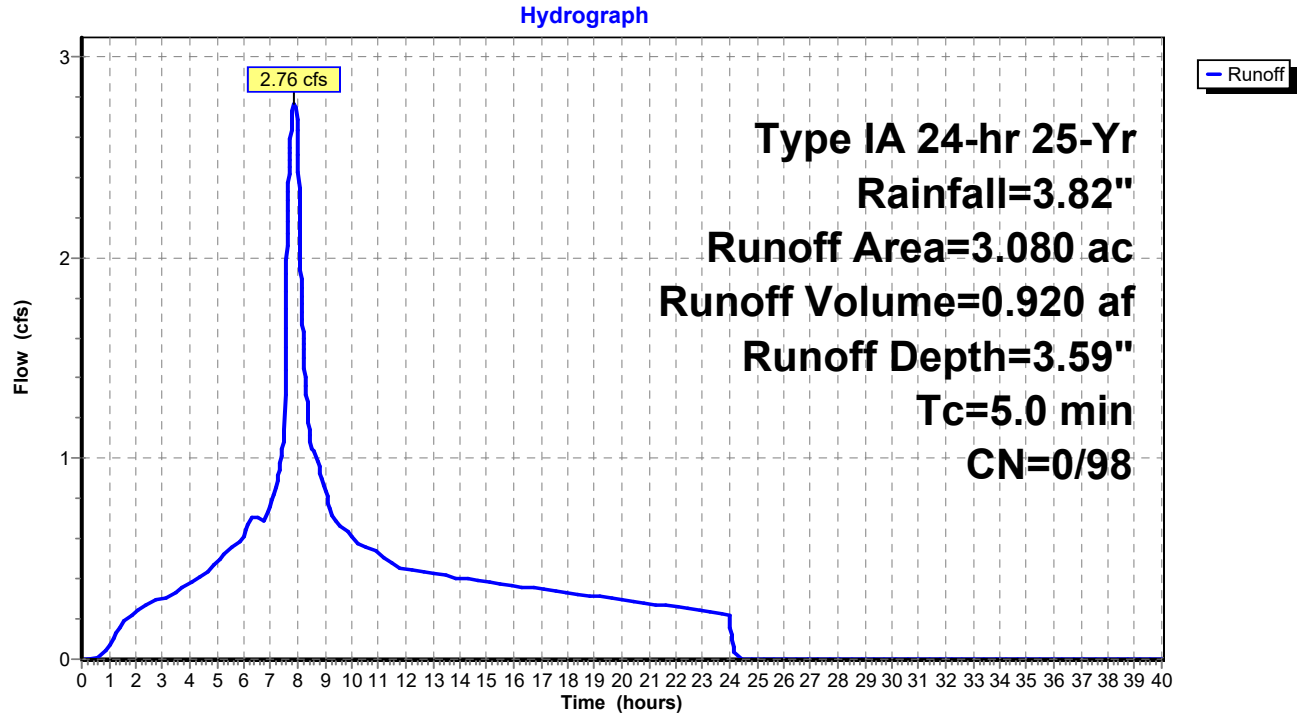
Runoff = 2.76 cfs @ 7.88 hrs, Volume= 0.920 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

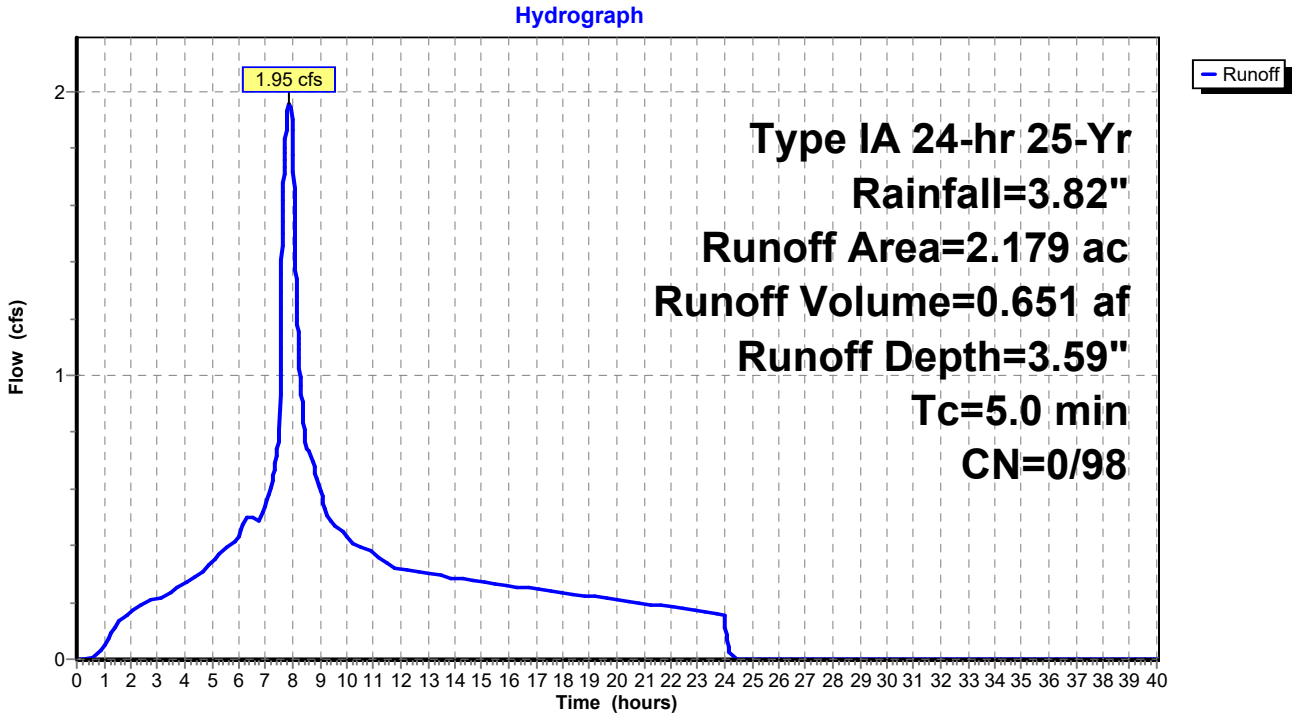
Runoff = 1.95 cfs @ 7.88 hrs, Volume= 0.651 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

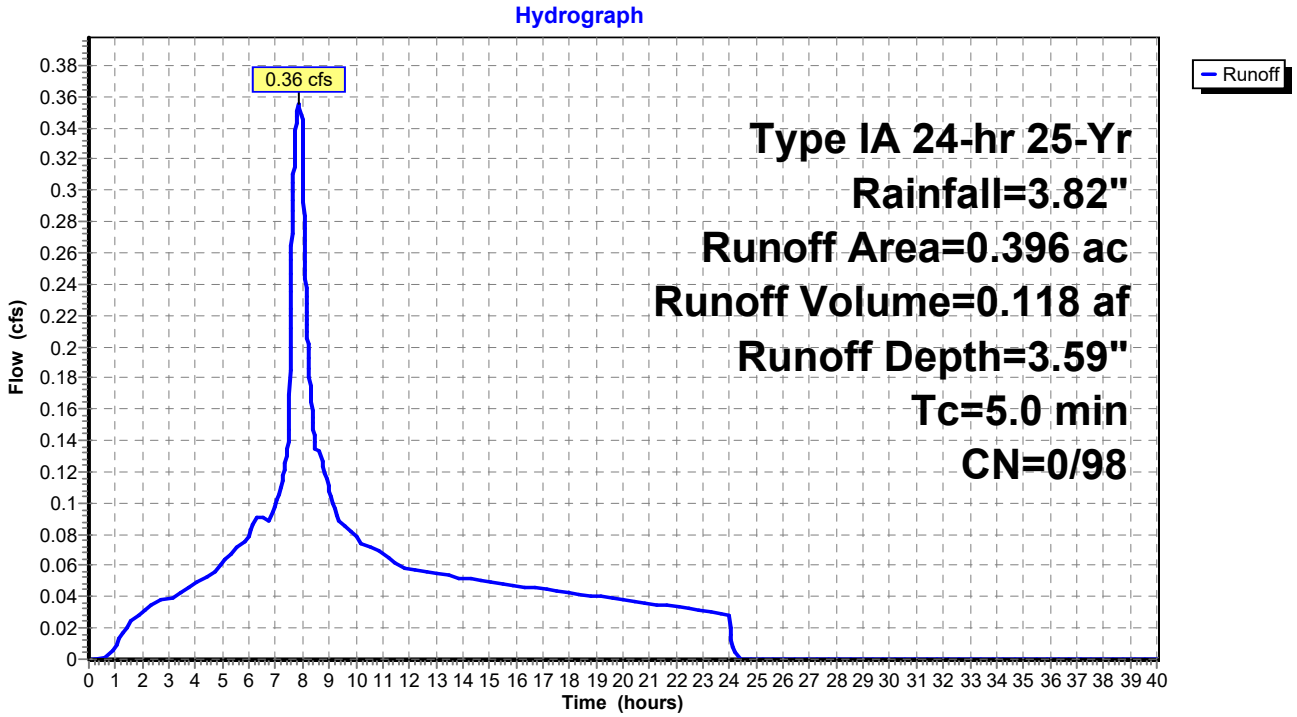
Runoff = 0.36 cfs @ 7.88 hrs, Volume= 0.118 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

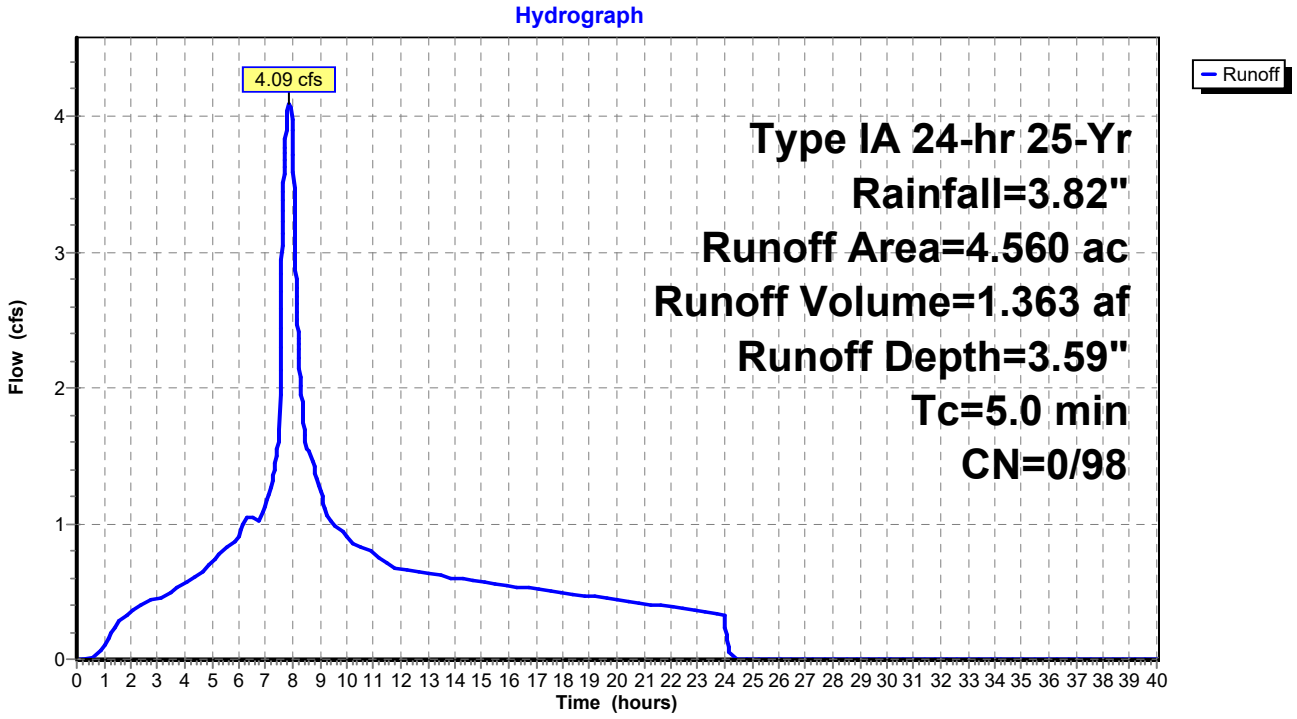
Runoff = 4.09 cfs @ 7.88 hrs, Volume= 1.363 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

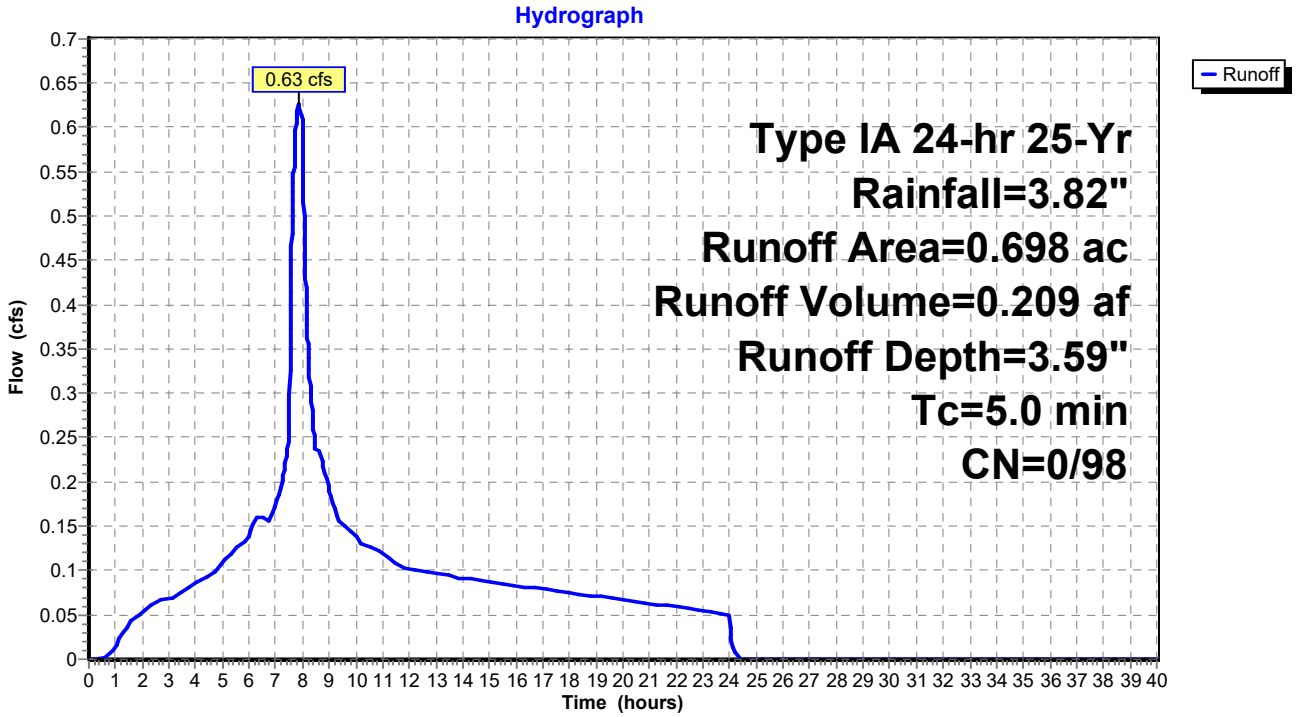
Runoff = 0.63 cfs @ 7.88 hrs, Volume= 0.209 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

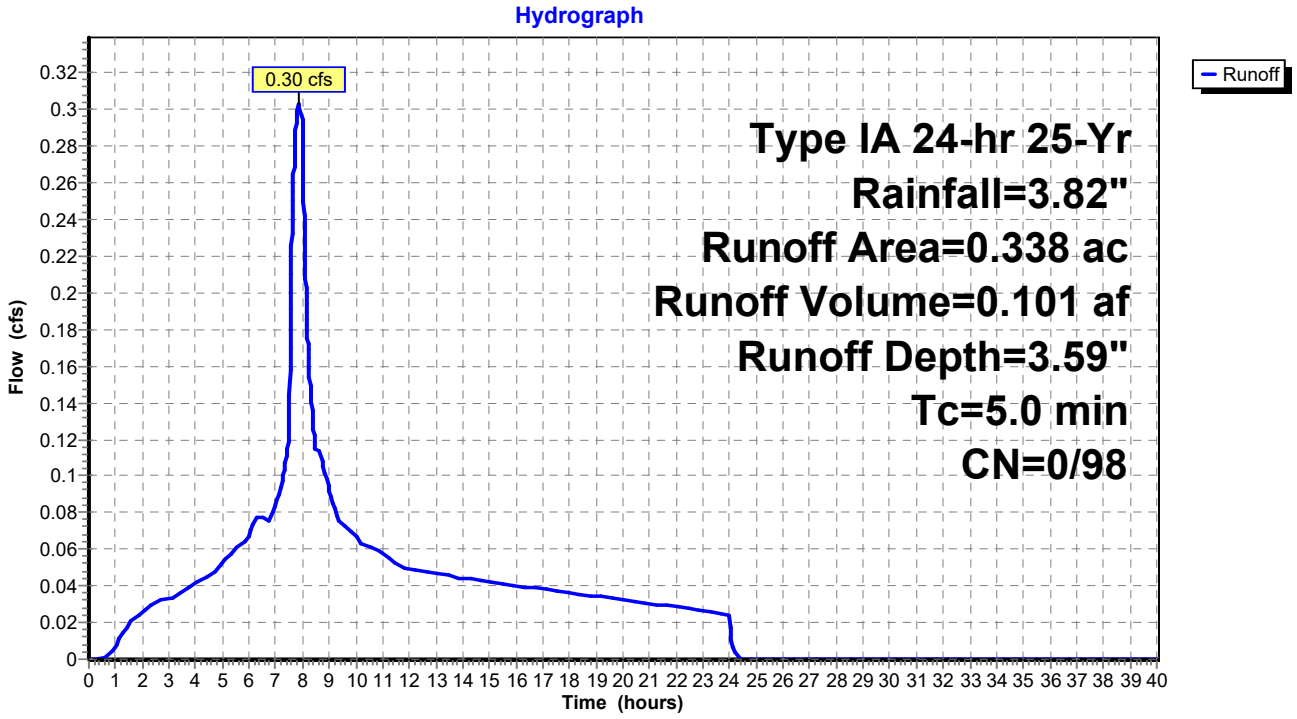
Runoff = 0.30 cfs @ 7.88 hrs, Volume= 0.101 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

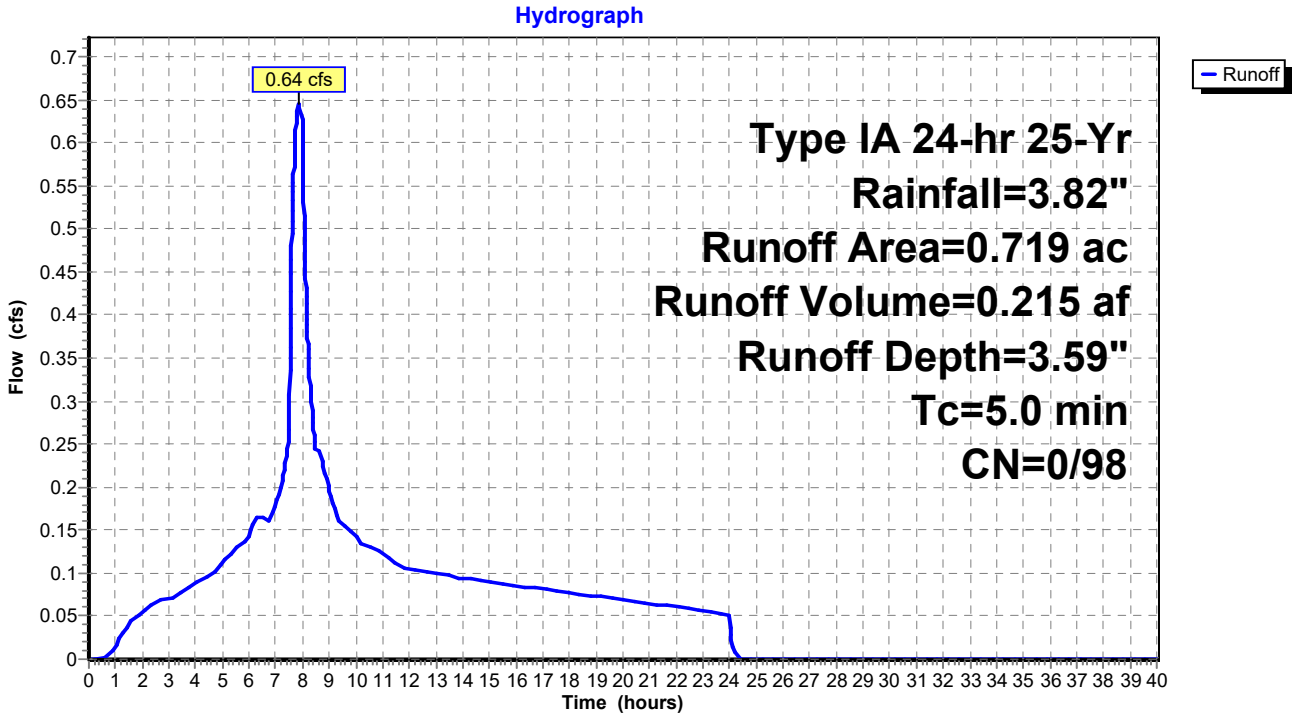
Runoff = 0.64 cfs @ 7.88 hrs, Volume= 0.215 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

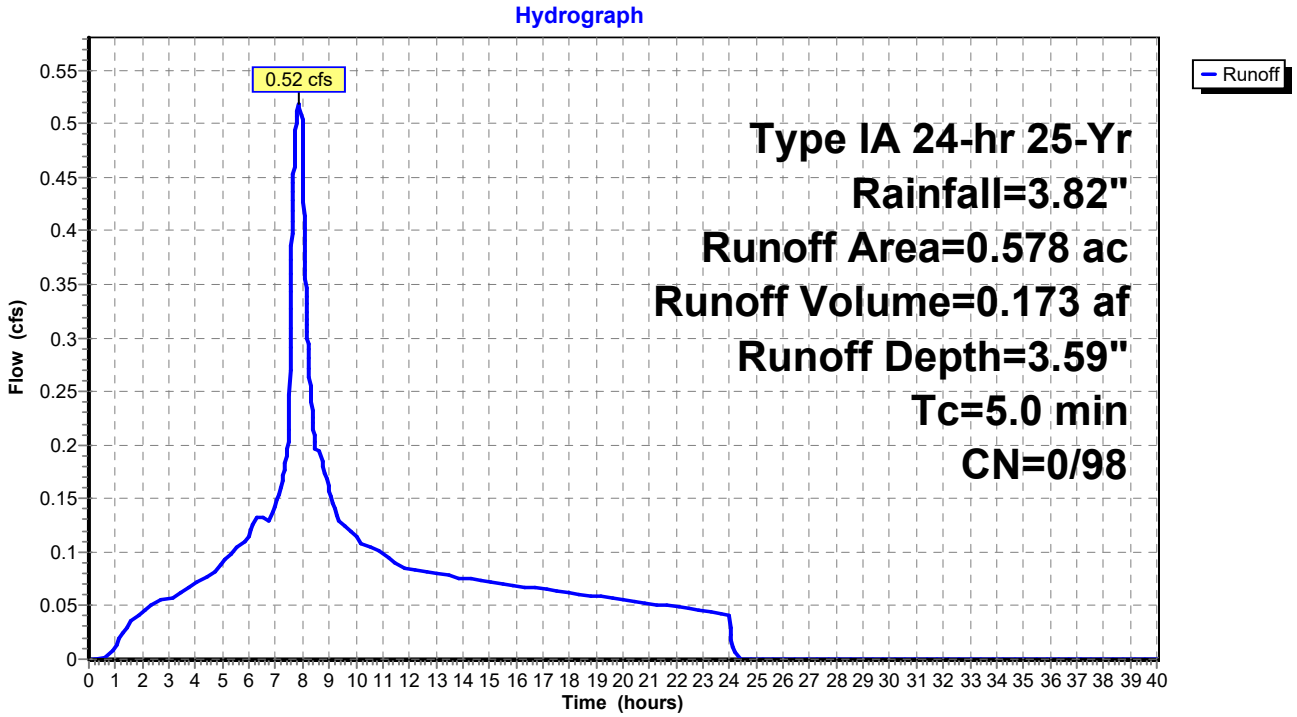
Runoff = 0.52 cfs @ 7.88 hrs, Volume= 0.173 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

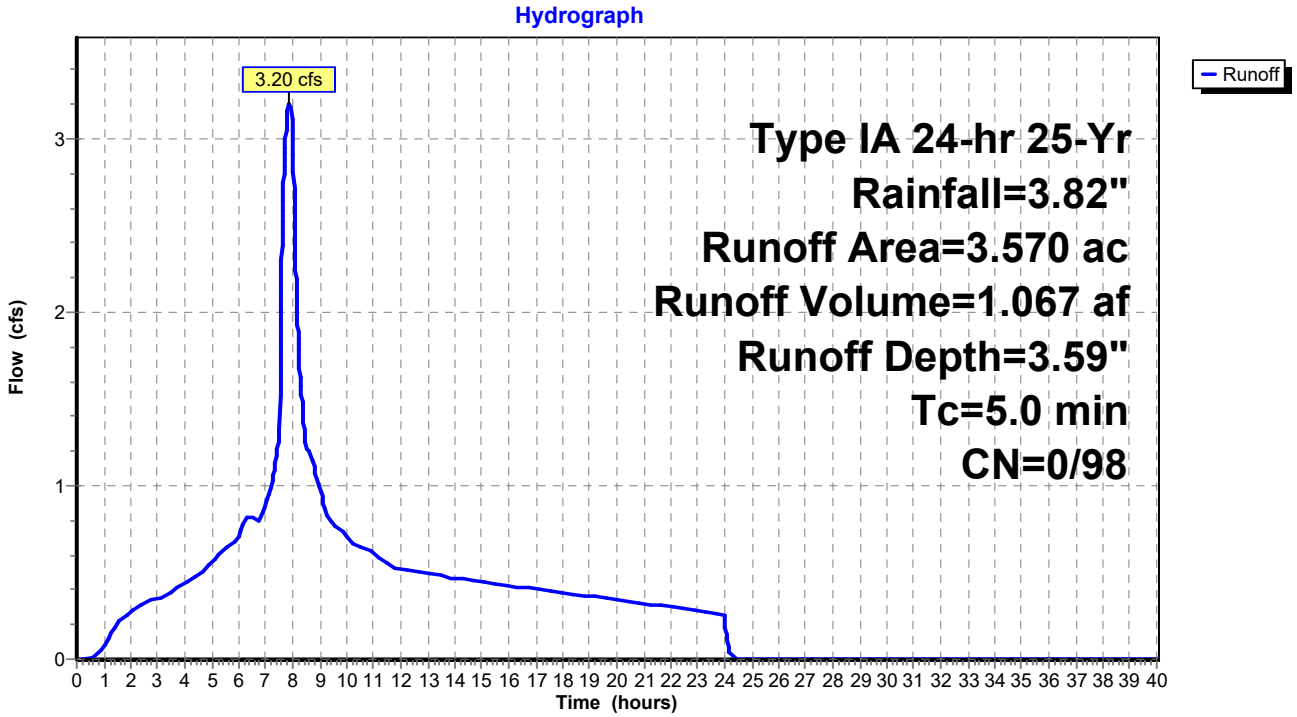
Runoff = 3.20 cfs @ 7.88 hrs, Volume= 1.067 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

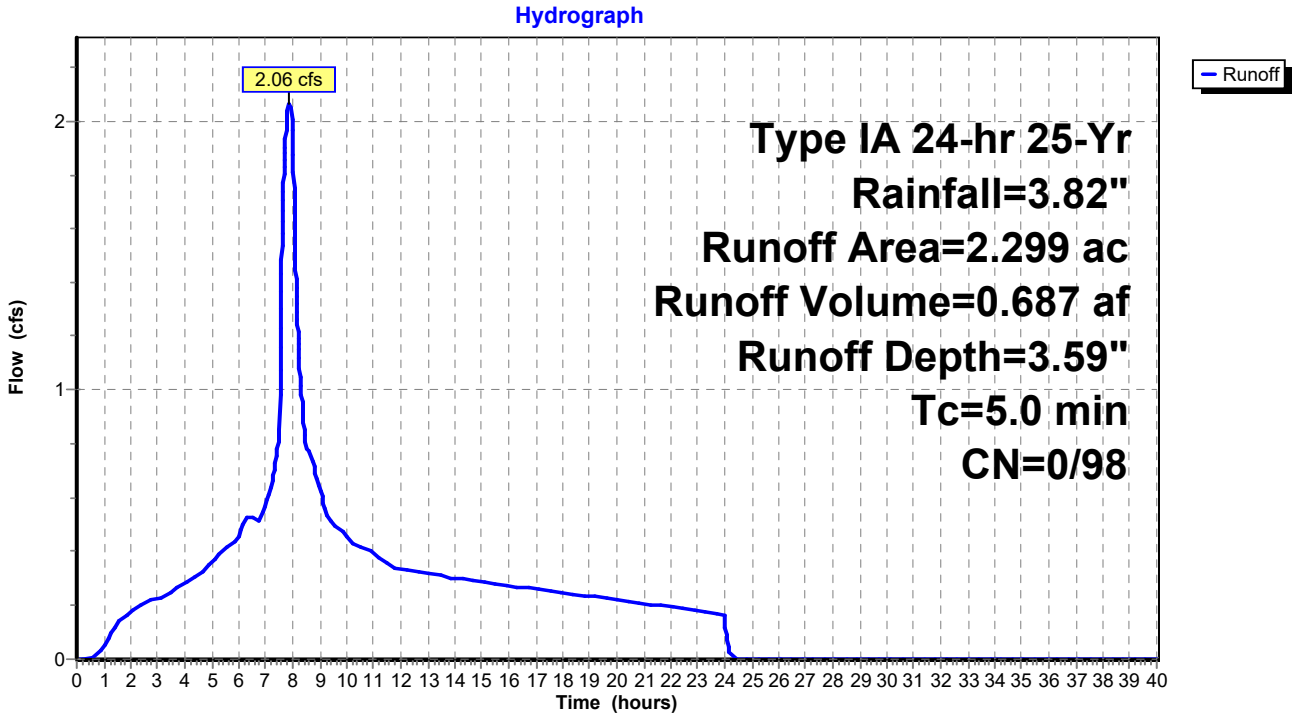
Runoff = 2.06 cfs @ 7.88 hrs, Volume= 0.687 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

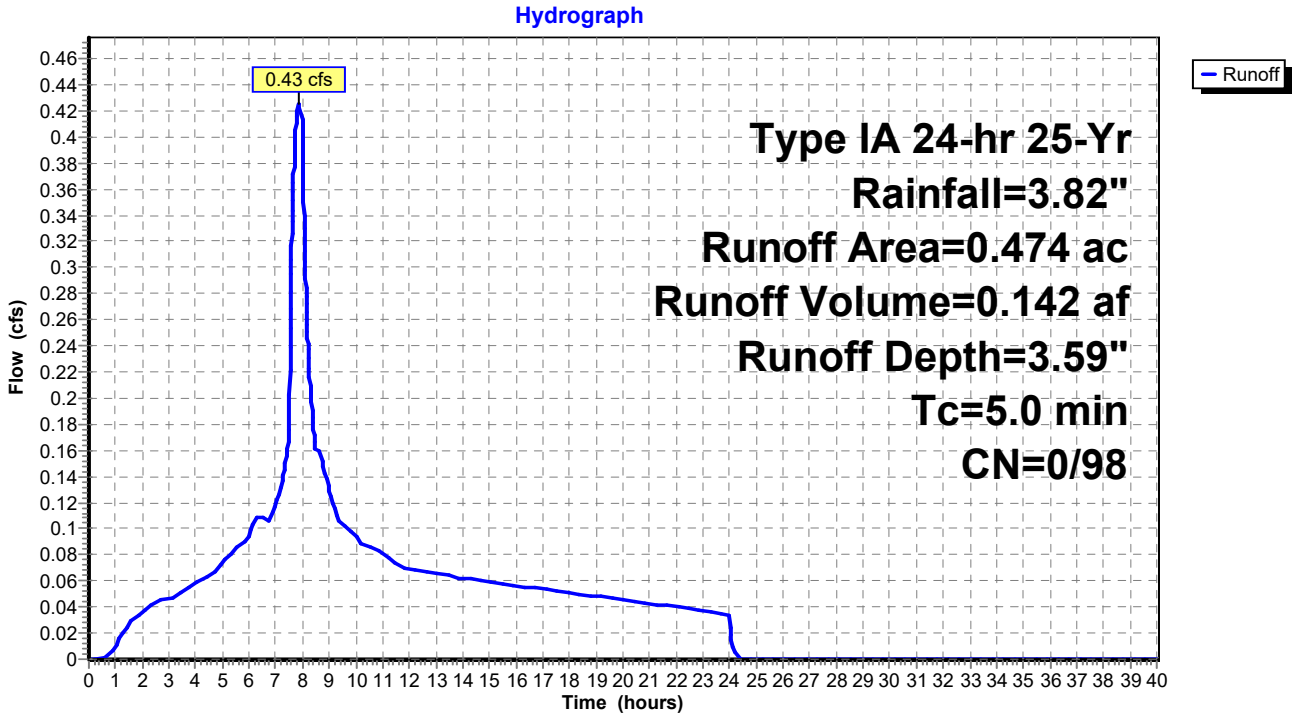
Runoff = 0.43 cfs @ 7.88 hrs, Volume= 0.142 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

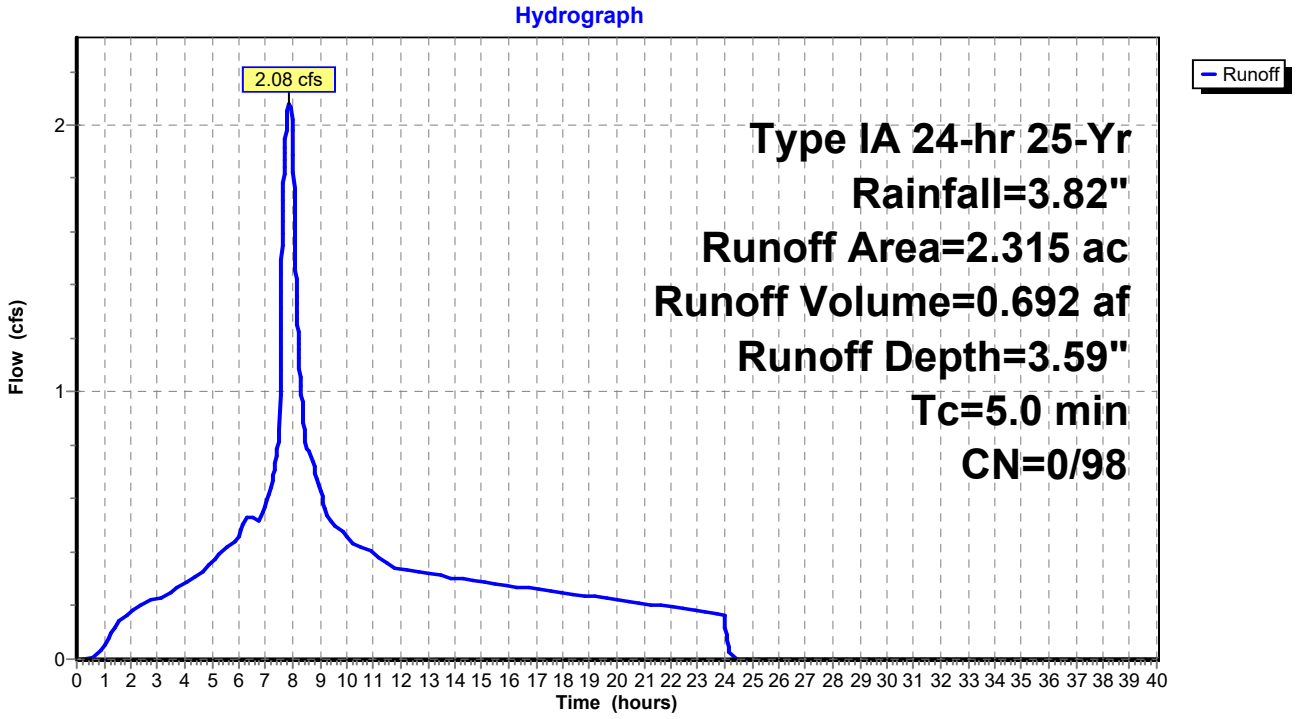
Runoff = 2.08 cfs @ 7.88 hrs, Volume= 0.692 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

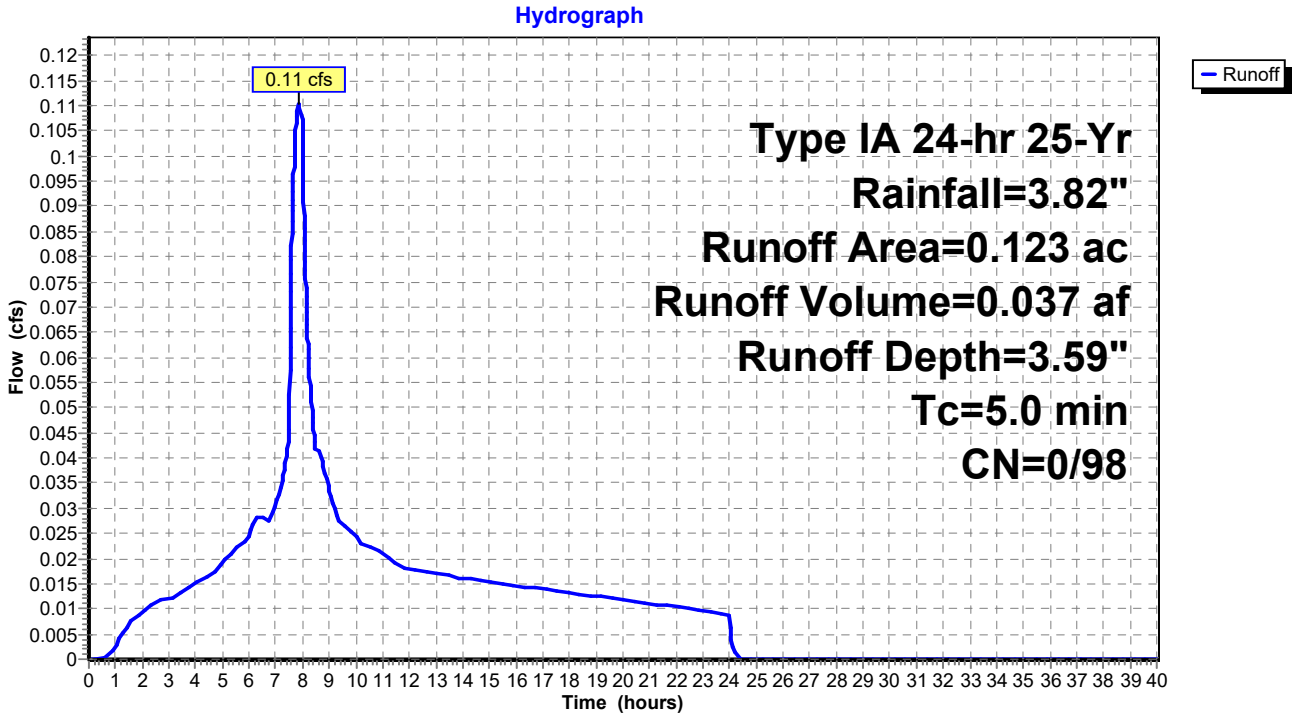
Runoff = 0.11 cfs @ 7.88 hrs, Volume= 0.037 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

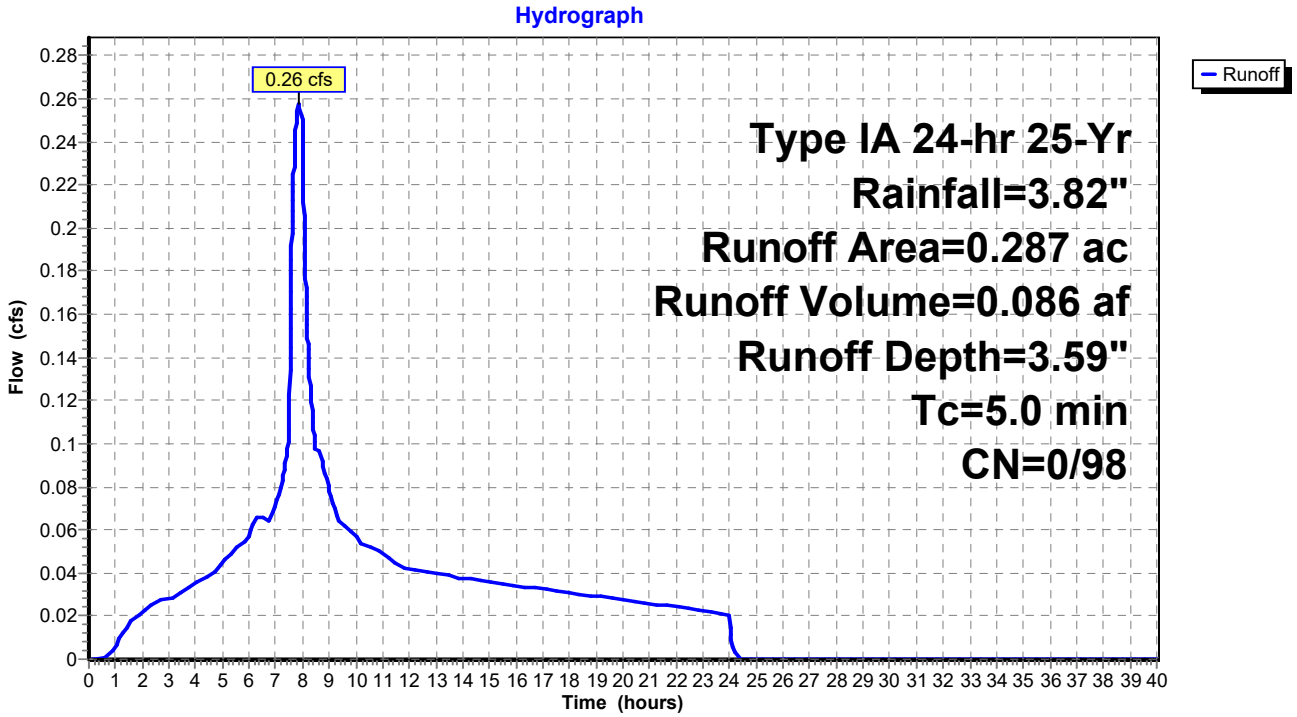
Runoff = 0.26 cfs @ 7.88 hrs, Volume= 0.086 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

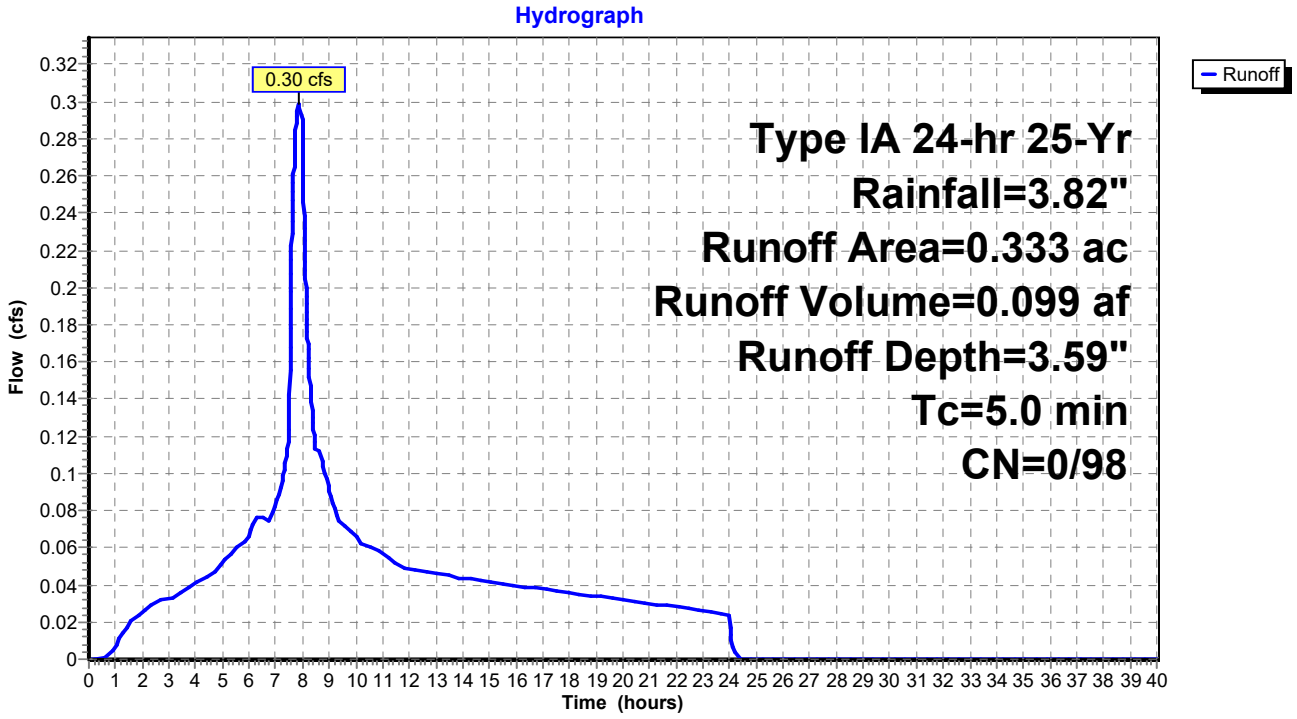
Runoff = 0.30 cfs @ 7.88 hrs, Volume= 0.099 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

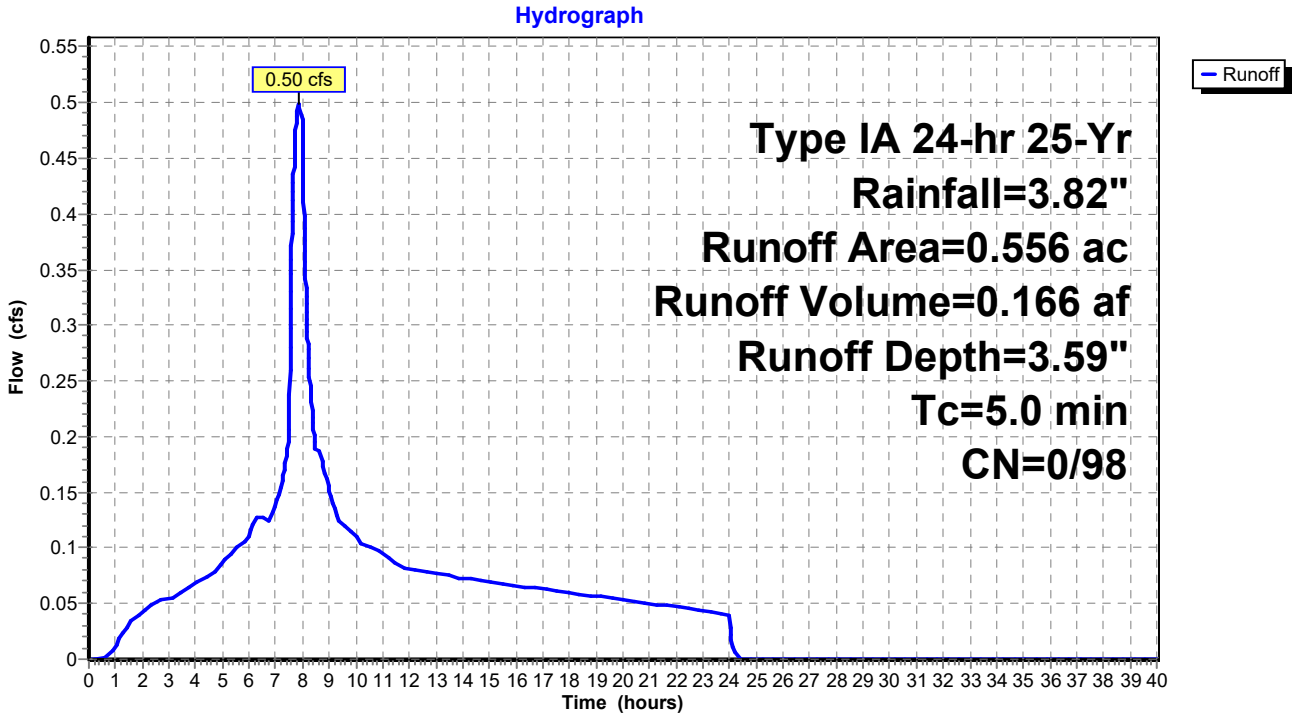
Runoff = 0.50 cfs @ 7.88 hrs, Volume= 0.166 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

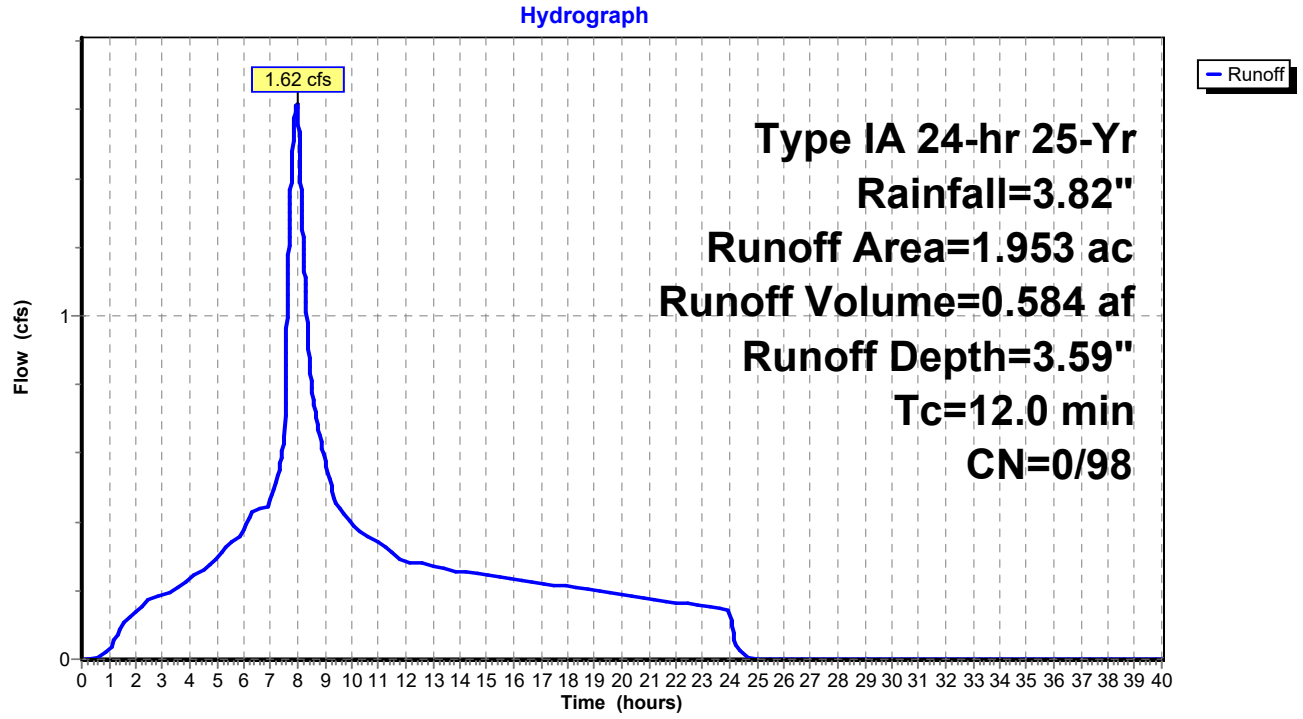
Runoff = 1.62 cfs @ 7.99 hrs, Volume= 0.584 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

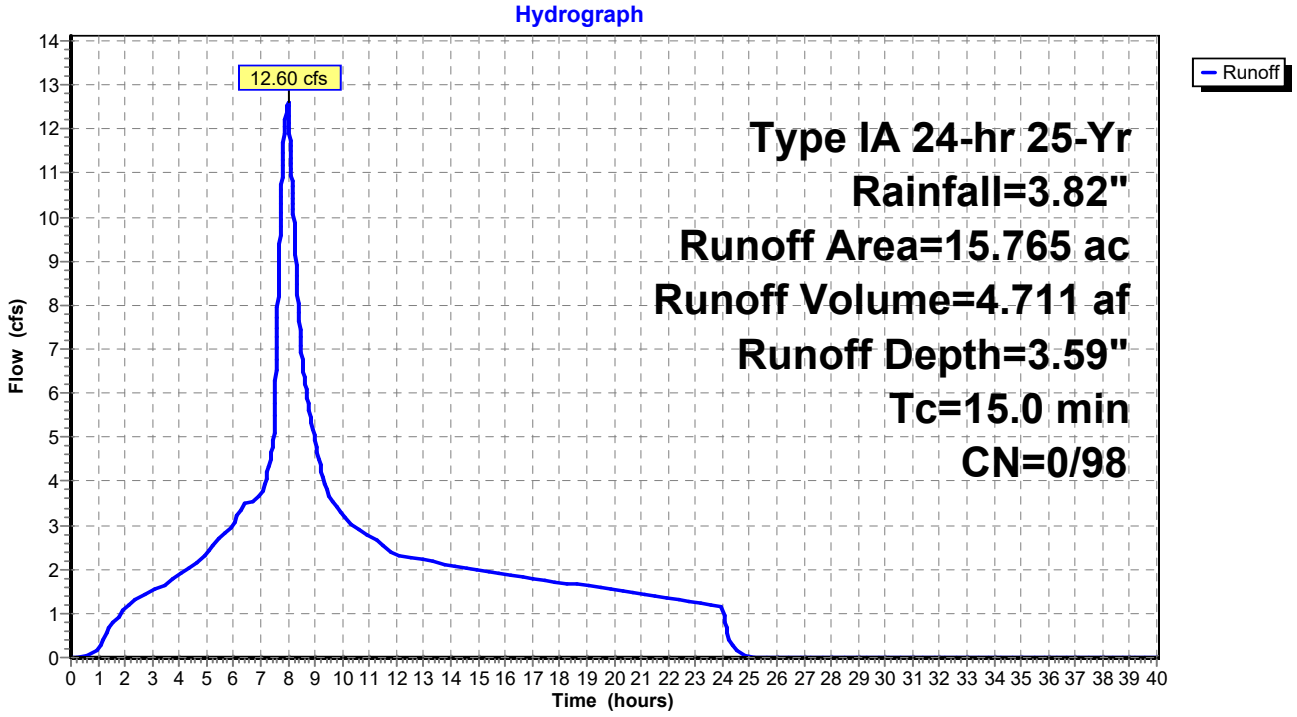
Runoff = 12.60 cfs @ 8.00 hrs, Volume= 4.711 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

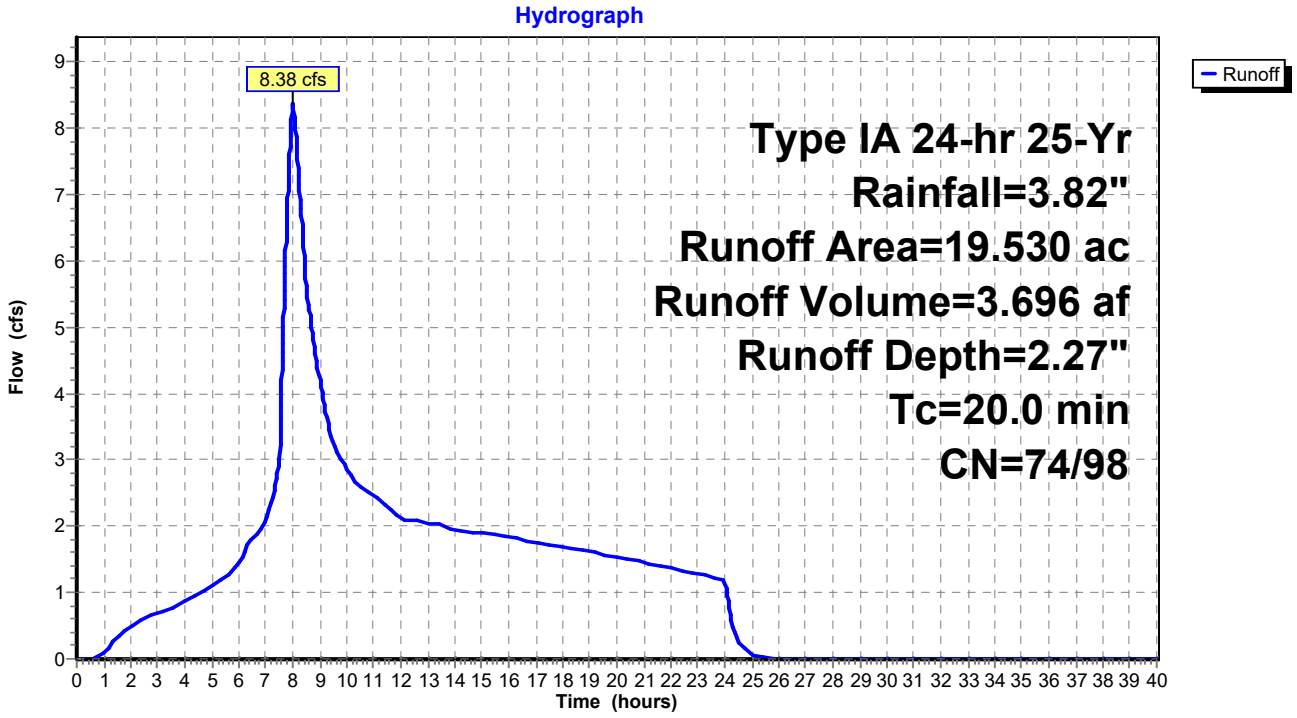
Runoff = 8.38 cfs @ 8.01 hrs, Volume= 3.696 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

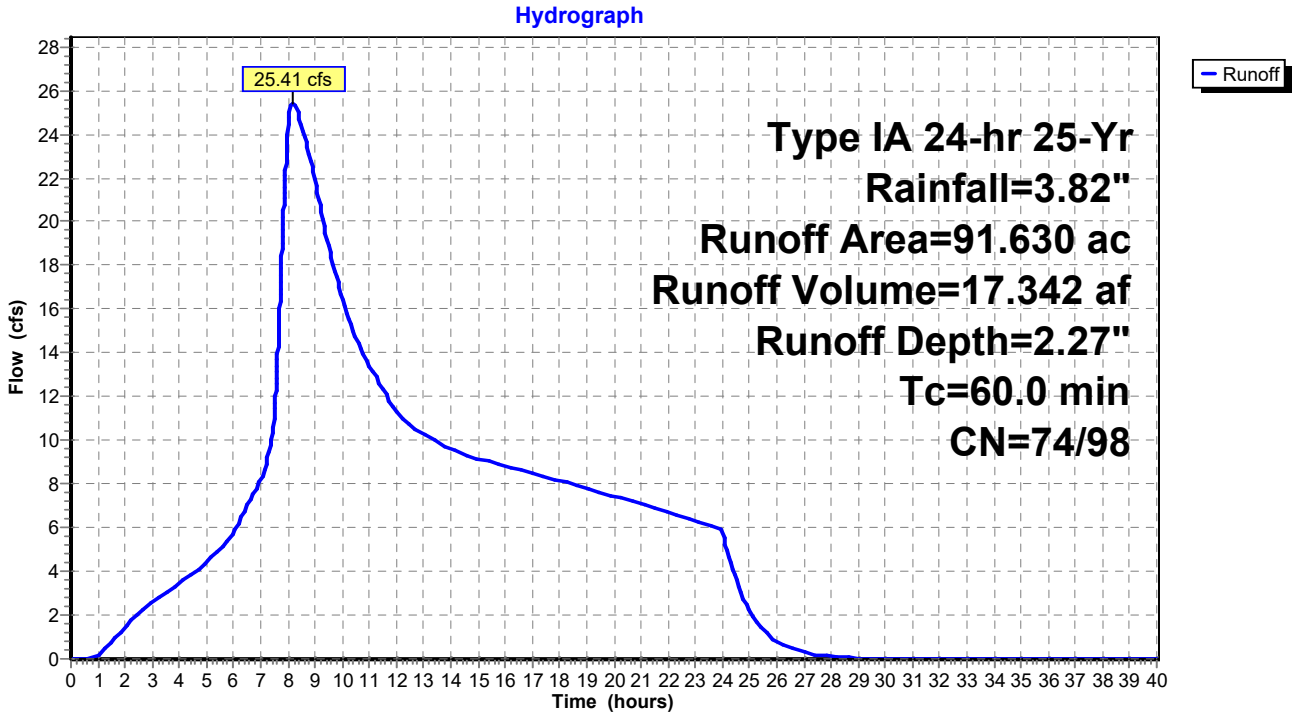
Runoff = 25.41 cfs @ 8.20 hrs, Volume= 17.342 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

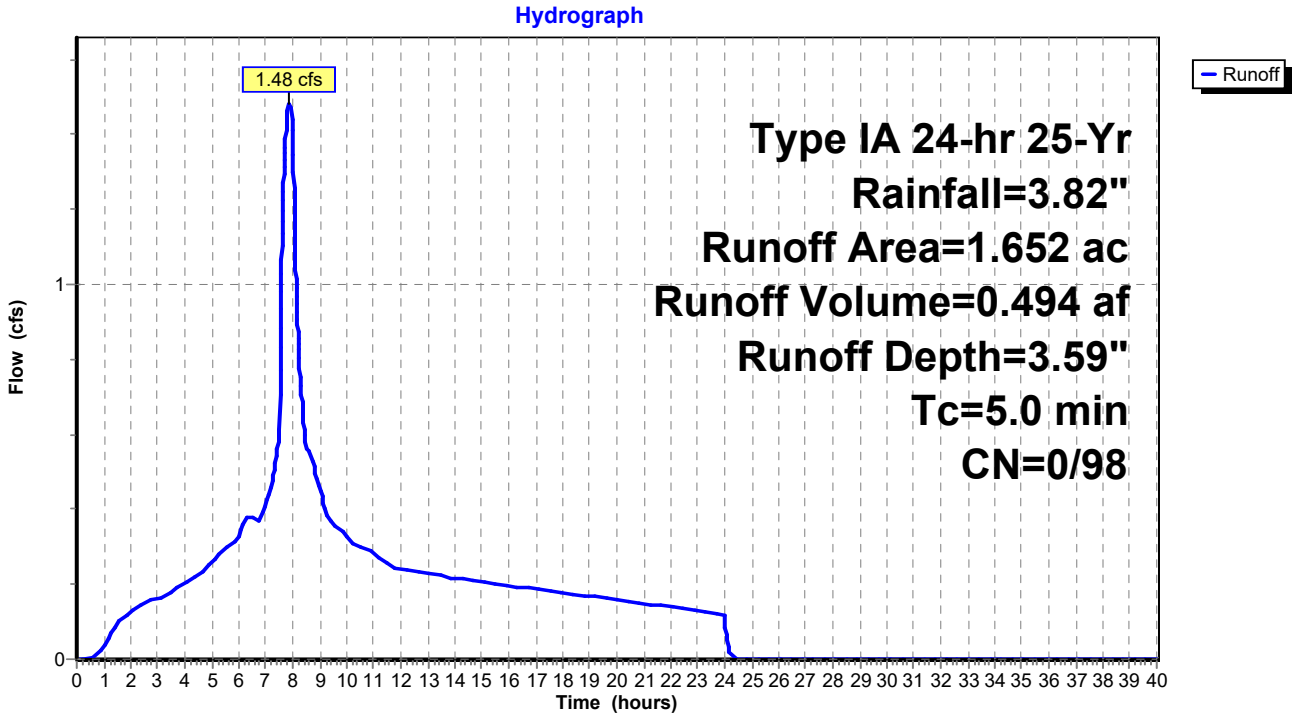
Runoff = 1.48 cfs @ 7.88 hrs, Volume= 0.494 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

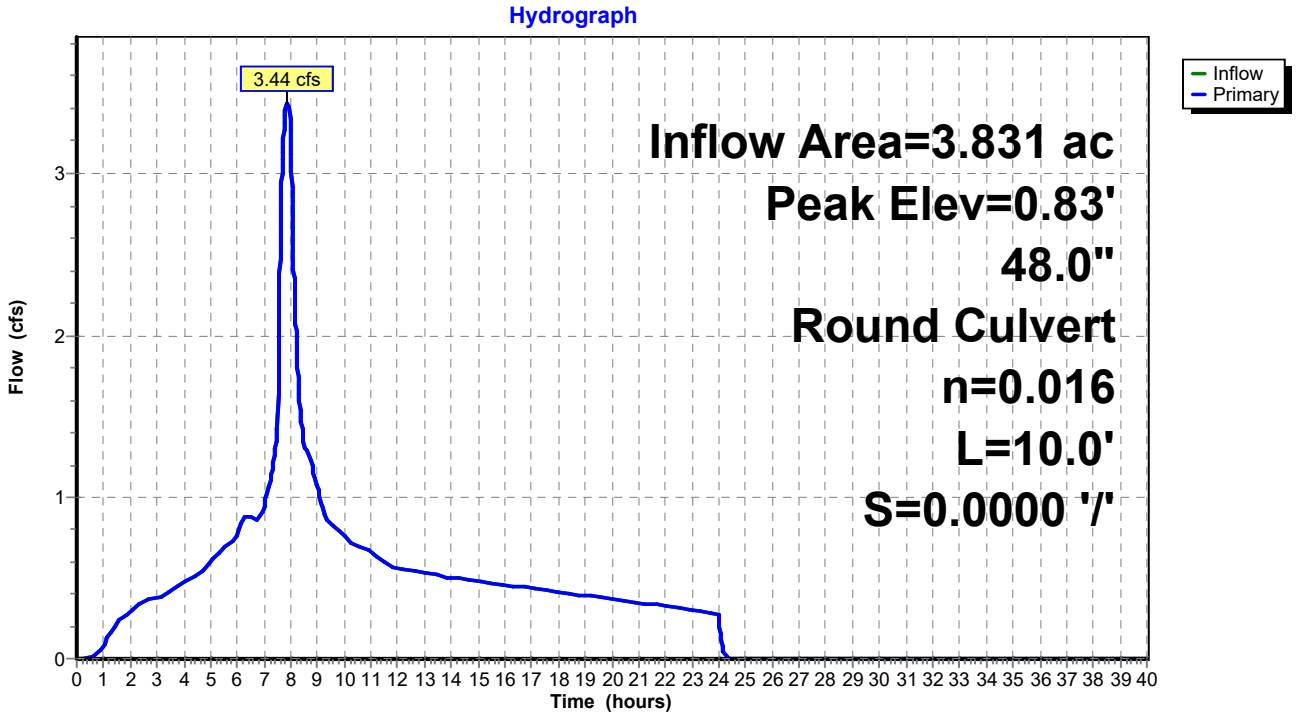
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 3.44 cfs @ 7.88 hrs, Volume= 1.145 af
Outflow = 3.44 cfs @ 7.88 hrs, Volume= 1.145 af, Atten= 0%, Lag= 0.0 min
Primary = 3.44 cfs @ 7.88 hrs, Volume= 1.145 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.83' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=3.43 cfs @ 7.88 hrs HW=0.83' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.43 cfs @ 2.75 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

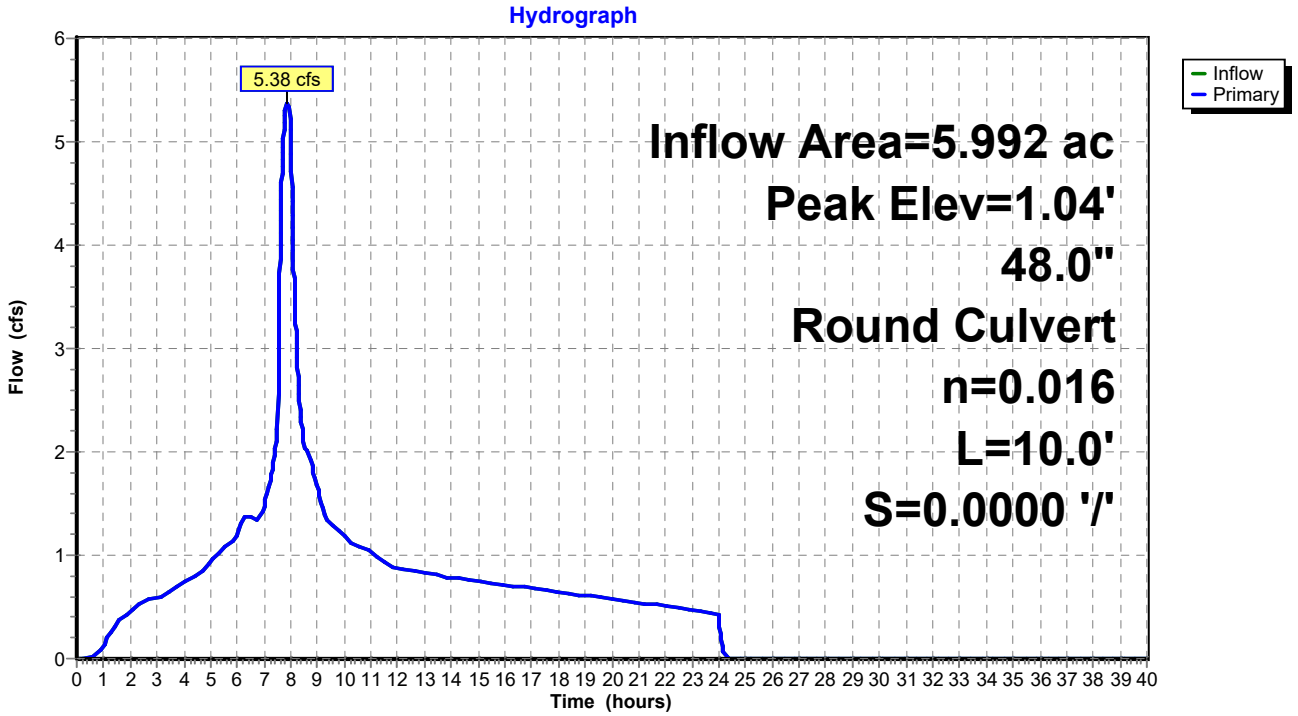
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 5.38 cfs @ 7.88 hrs, Volume= 1.790 af
Outflow = 5.38 cfs @ 7.88 hrs, Volume= 1.790 af, Atten= 0%, Lag= 0.0 min
Primary = 5.38 cfs @ 7.88 hrs, Volume= 1.790 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.04' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=5.37 cfs @ 7.88 hrs HW=1.04' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.37 cfs @ 3.13 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

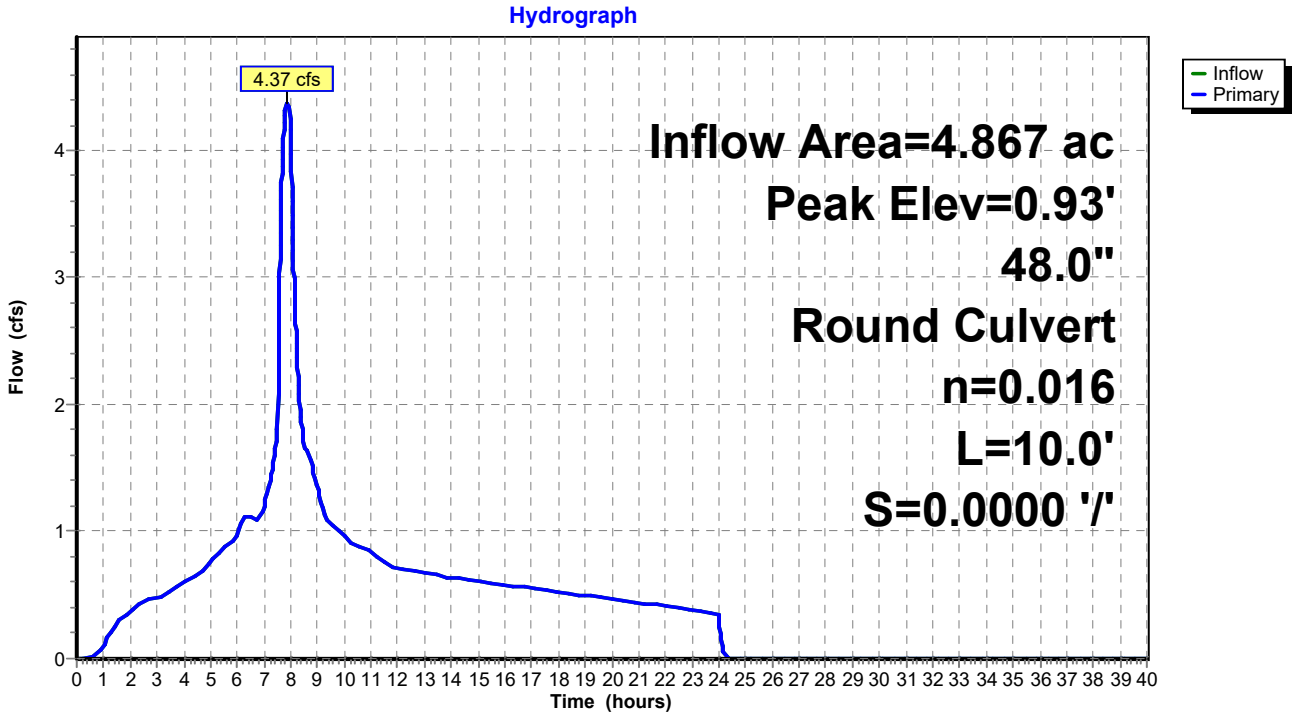
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 4.37 cfs @ 7.88 hrs, Volume= 1.454 af
Outflow = 4.37 cfs @ 7.88 hrs, Volume= 1.454 af, Atten= 0%, Lag= 0.0 min
Primary = 4.37 cfs @ 7.88 hrs, Volume= 1.454 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.93' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.36 cfs @ 7.88 hrs HW=0.93' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.36 cfs @ 2.95 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

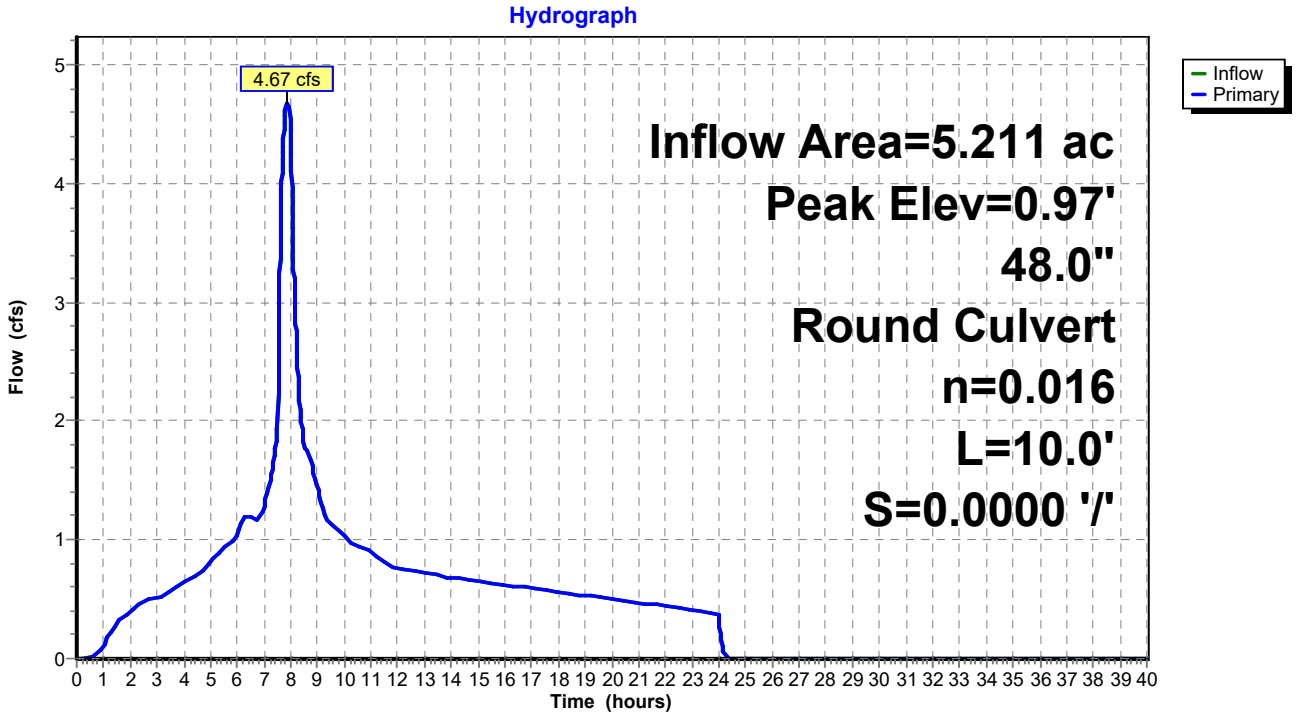
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 4.67 cfs @ 7.88 hrs, Volume= 1.557 af
Outflow = 4.67 cfs @ 7.88 hrs, Volume= 1.557 af, Atten= 0%, Lag= 0.0 min
Primary = 4.67 cfs @ 7.88 hrs, Volume= 1.557 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.97' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.67 cfs @ 7.88 hrs HW=0.97' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.67 cfs @ 3.01 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

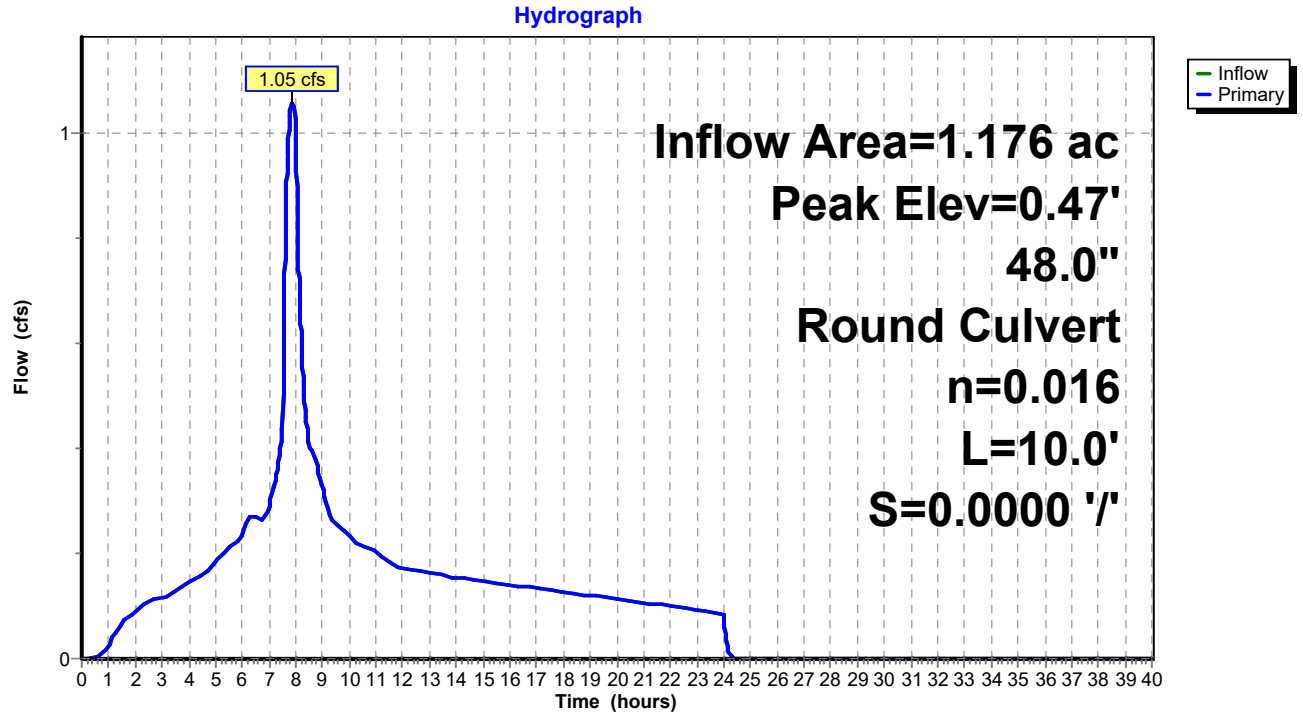
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 1.05 cfs @ 7.88 hrs, Volume= 0.351 af
Outflow = 1.05 cfs @ 7.88 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min
Primary = 1.05 cfs @ 7.88 hrs, Volume= 0.351 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.47' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.05 cfs @ 7.88 hrs HW=0.47' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.05 cfs @ 1.93 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

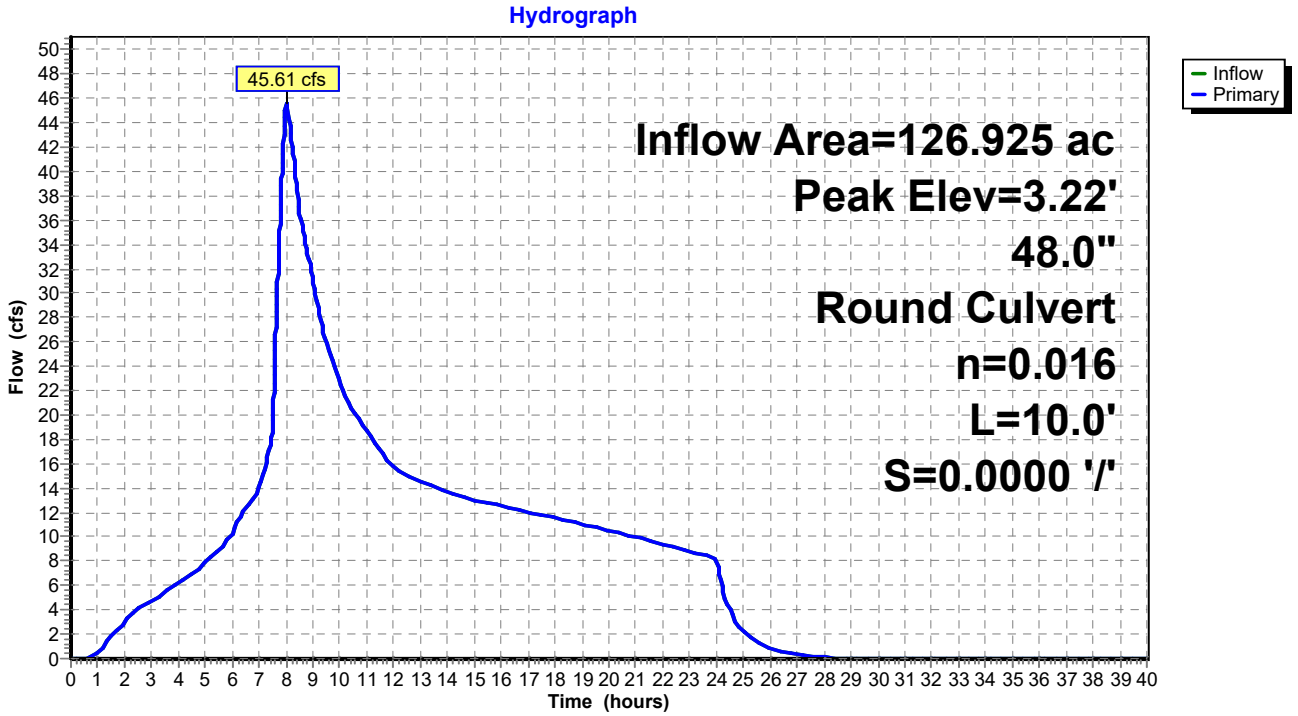
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 2.43" for 25-Yr event
Inflow = 45.61 cfs @ 8.01 hrs, Volume= 25.749 af
Outflow = 45.61 cfs @ 8.01 hrs, Volume= 25.749 af, Atten= 0%, Lag= 0.0 min
Primary = 45.61 cfs @ 8.01 hrs, Volume= 25.749 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 3.22' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=45.60 cfs @ 8.01 hrs HW=3.22' (Free Discharge)
└**1=Culvert** (Barrel Controls 45.60 cfs @ 5.75 fps)

Pond 10P: Offsite Flows



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=3.38 cfs 1.133 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=2.39 cfs 0.801 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.146 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=5.00 cfs 1.677 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.77 cfs 0.257 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.37 cfs 0.124 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.79 cfs 0.264 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.63 cfs 0.213 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=3.92 cfs 1.313 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=2.52 cfs 0.846 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.52 cfs 0.174 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=2.54 cfs 0.851 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.045 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.31 cfs 0.106 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.37 cfs 0.122 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.61 cfs 0.205 af

Subcatchment 8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=4.41"
Tc=12.0 min CN=0/98 Runoff=1.98 cfs 0.718 af

Subcatchment 10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=4.41"
Tc=15.0 min CN=0/98 Runoff=15.42 cfs 5.799 af

Subcatchment A: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=2.97"
Tc=20.0 min CN=74/98 Runoff=11.24 cfs 4.837 af

Subcatchment B: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=2.97"
Tc=60.0 min CN=74/98 Runoff=34.16 cfs 22.694 af

Subcatchment OS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=1.81 cfs 0.608 af

Pond 3P: (new Pond) Peak Elev=0.92' Inflow=4.20 cfs 1.409 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.20 cfs 1.409 af

Pond 4P: (new Pond) Peak Elev=1.15' Inflow=6.58 cfs 2.204 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=6.58 cfs 2.204 af

Pond 5P: (new Pond) Peak Elev=1.03' Inflow=5.34 cfs 1.790 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=5.34 cfs 1.790 af

Pond 6P: (new Pond) Peak Elev=1.07' Inflow=5.72 cfs 1.917 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=5.72 cfs 1.917 af

Pond 7P: (new Pond) Peak Elev=0.52' Inflow=1.29 cfs 0.433 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.29 cfs 0.433 af

Pond 10P: Offsite Flows Peak Elev=3.80' Inflow=59.87 cfs 33.330 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=59.87 cfs 33.330 af

Summary for Subcatchment 2: Basin 20

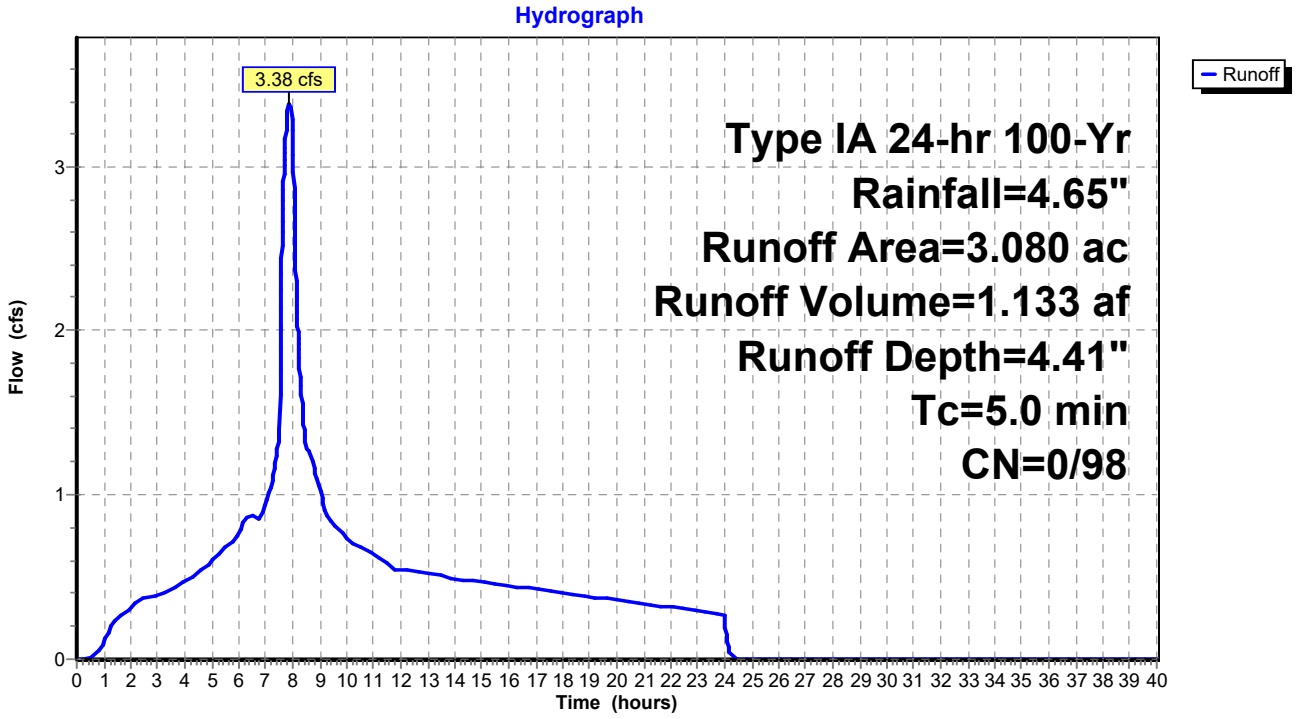
Runoff = 3.38 cfs @ 7.88 hrs, Volume= 1.133 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

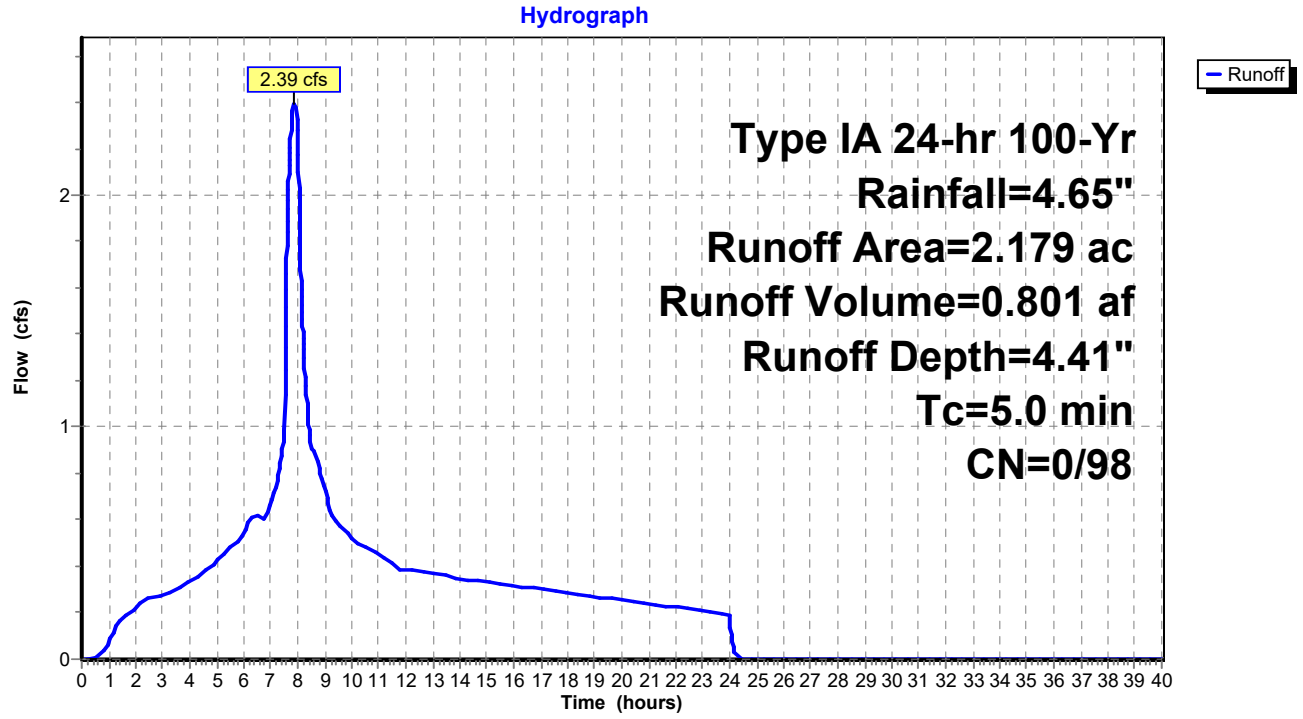
Runoff = 2.39 cfs @ 7.88 hrs, Volume= 0.801 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

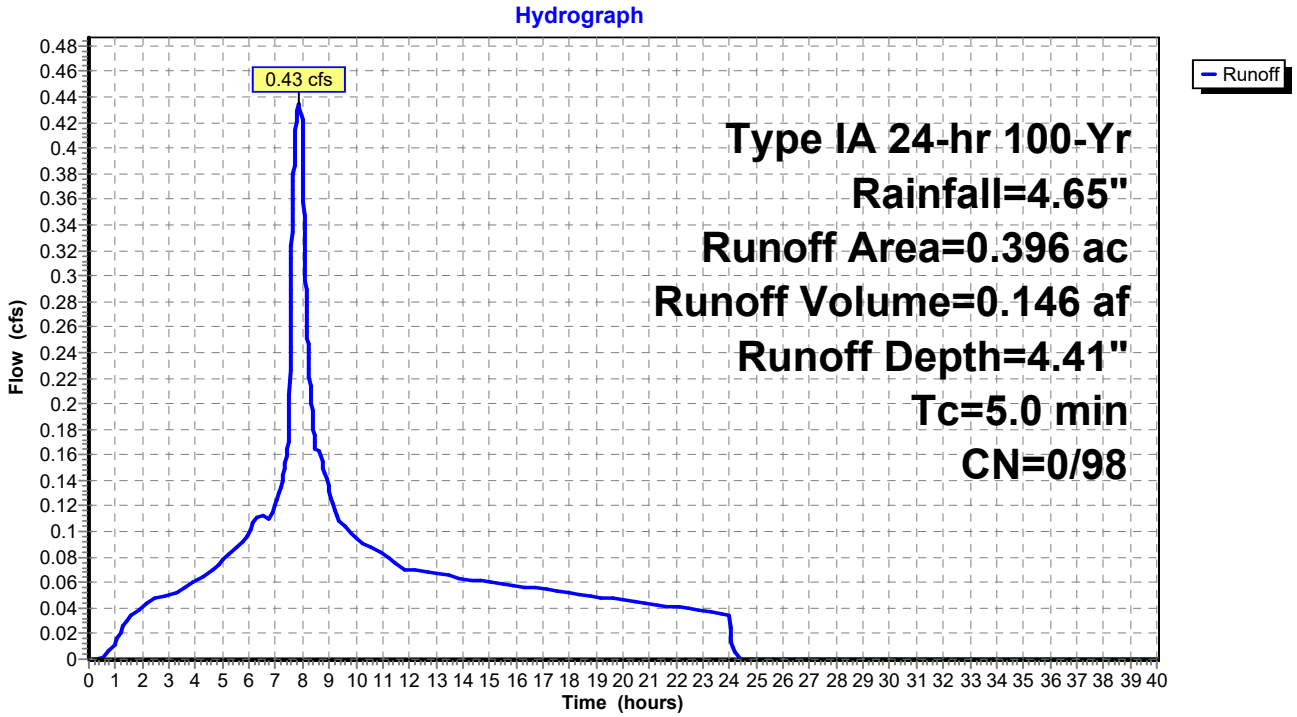
Runoff = 0.43 cfs @ 7.88 hrs, Volume= 0.146 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

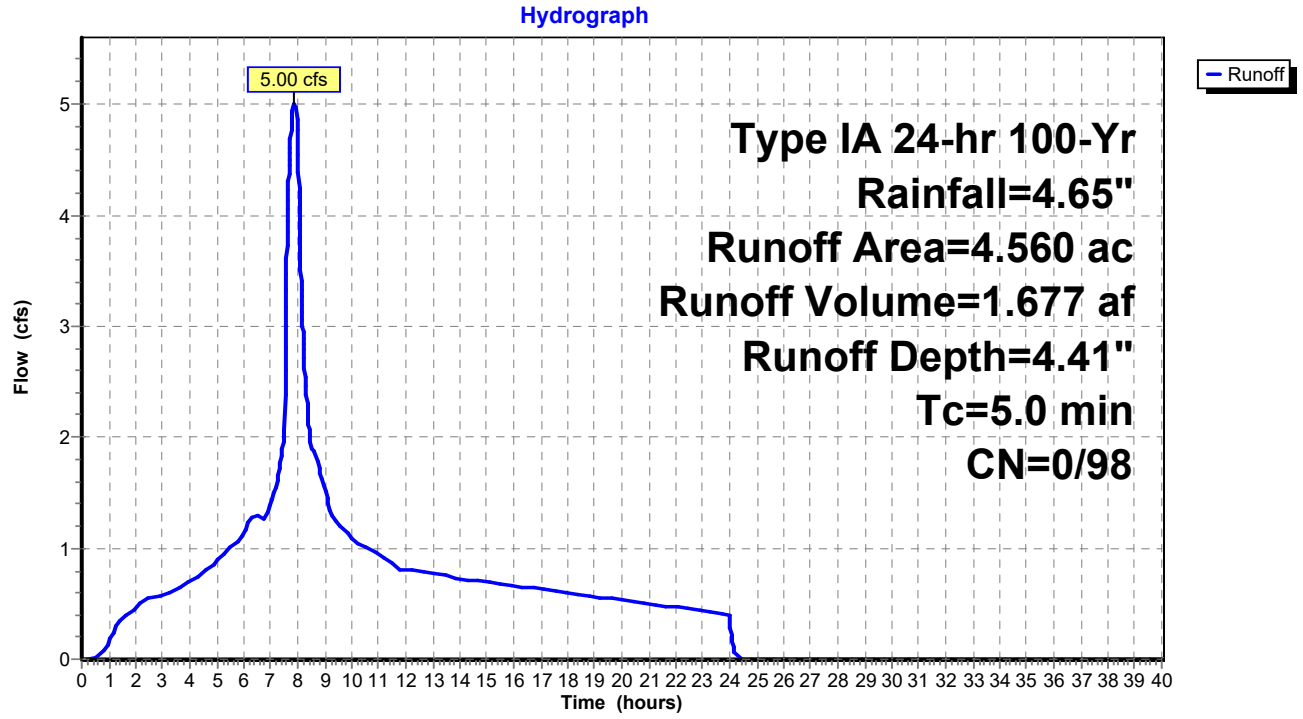
Runoff = 5.00 cfs @ 7.88 hrs, Volume= 1.677 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

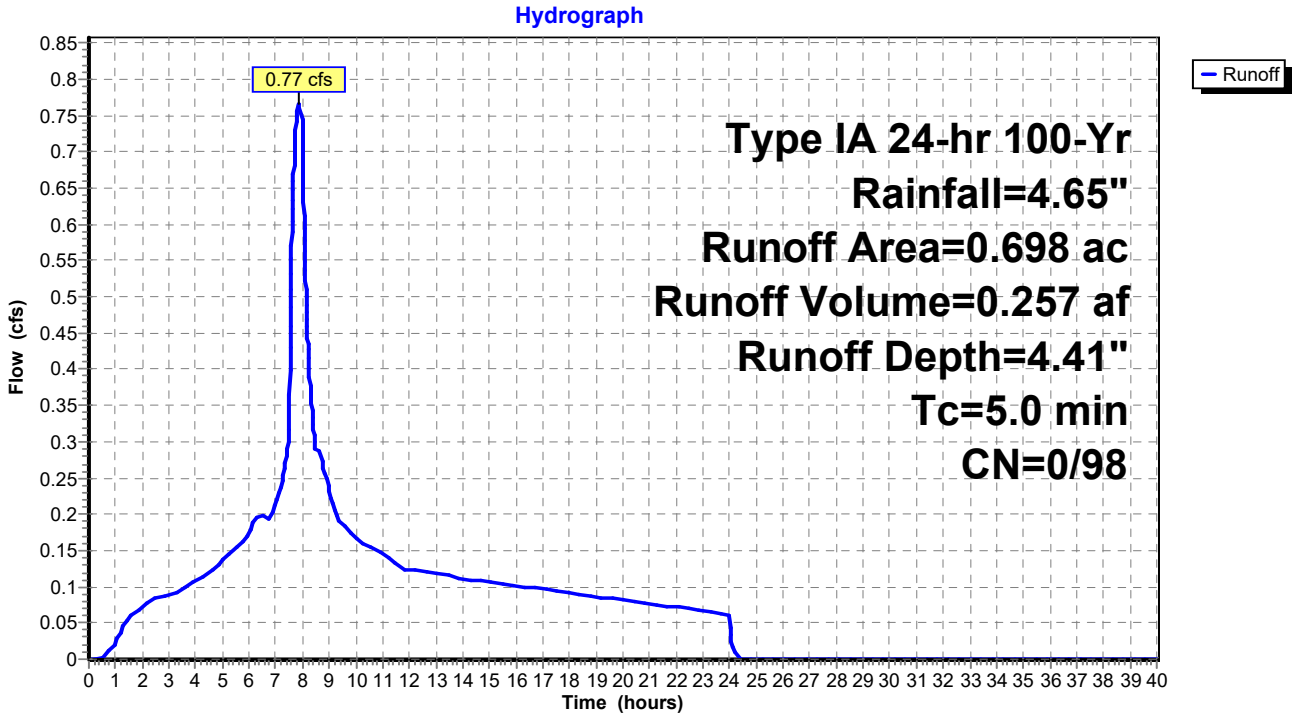
Runoff = 0.77 cfs @ 7.88 hrs, Volume= 0.257 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

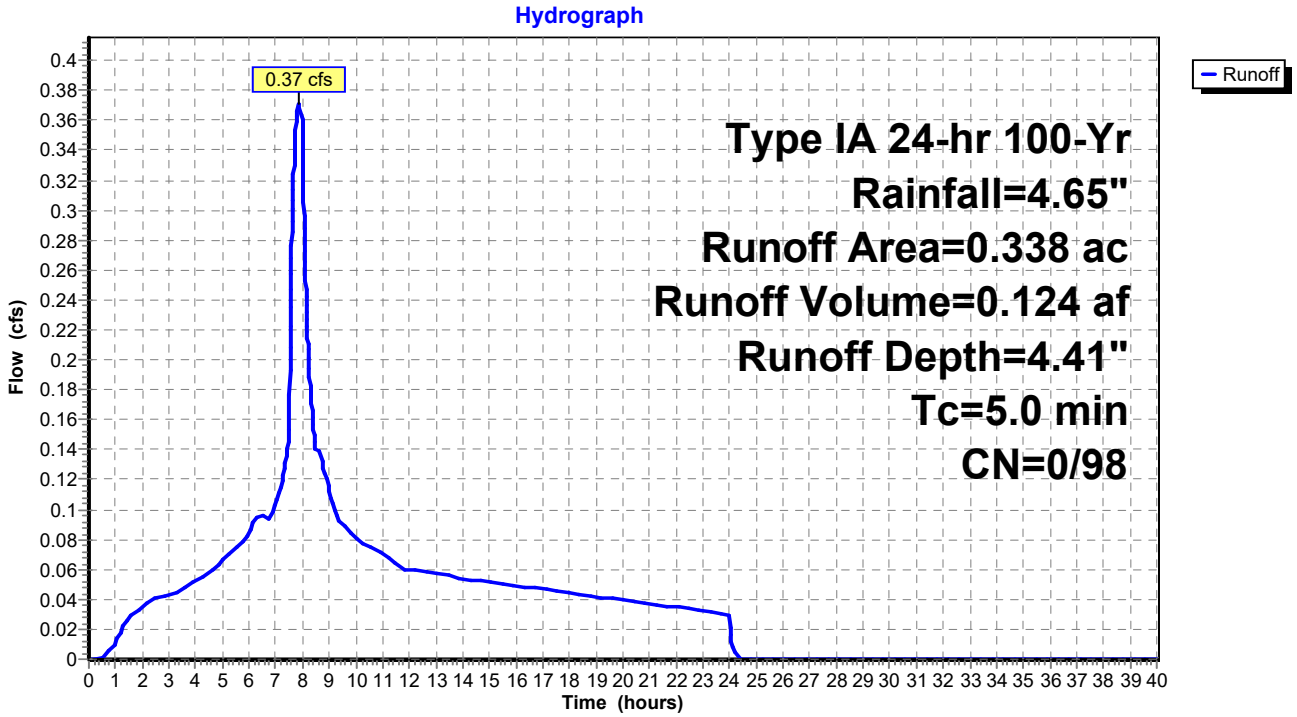
Runoff = 0.37 cfs @ 7.88 hrs, Volume= 0.124 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

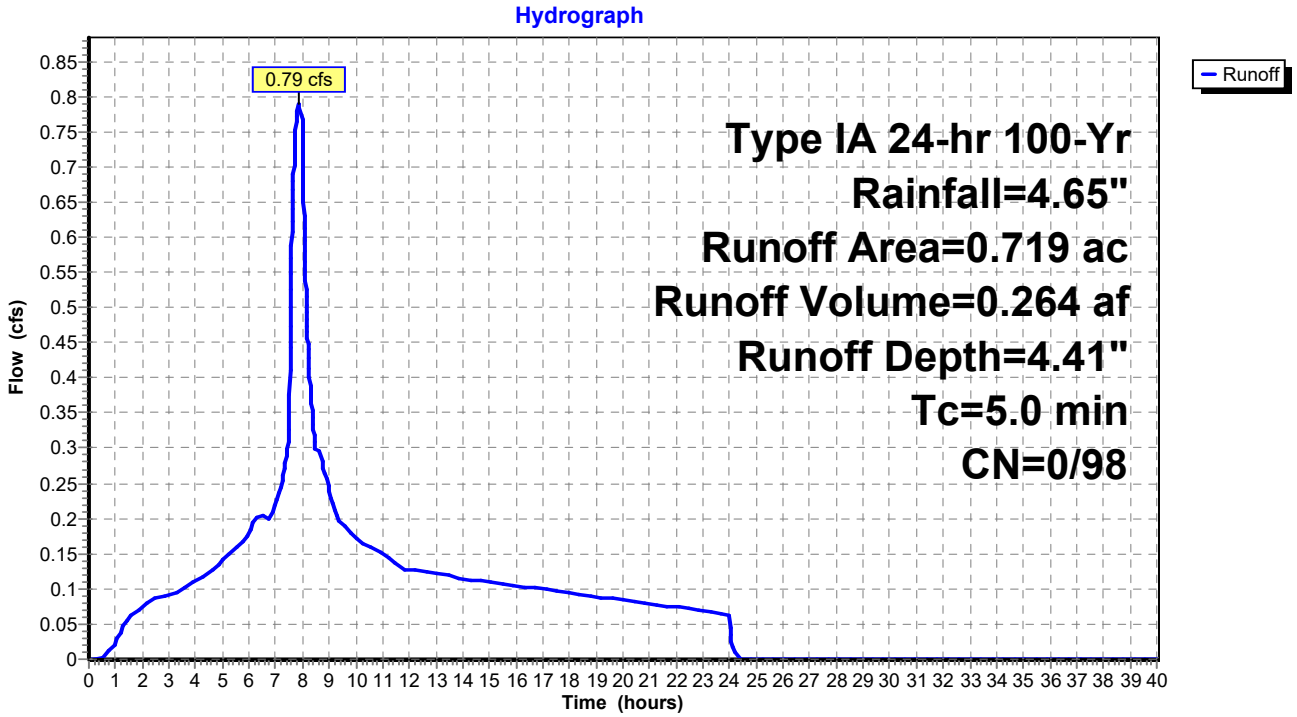
Runoff = 0.79 cfs @ 7.88 hrs, Volume= 0.264 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

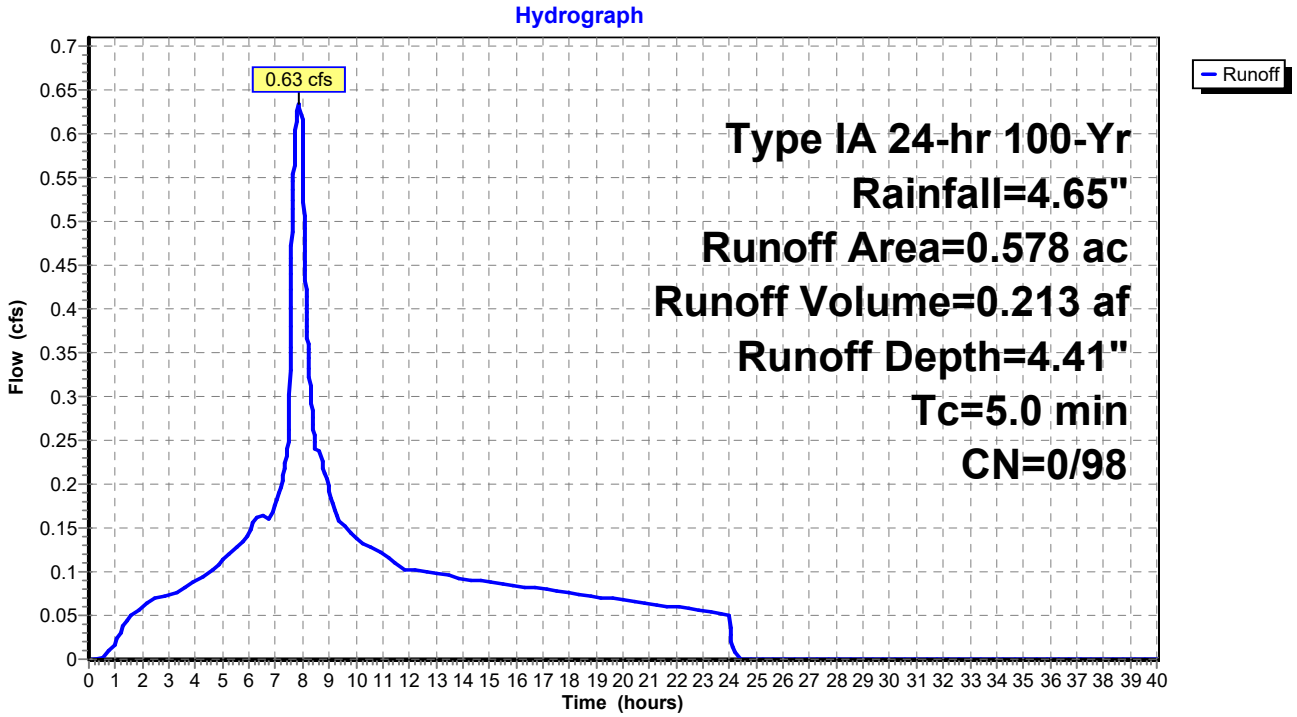
Runoff = 0.63 cfs @ 7.88 hrs, Volume= 0.213 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

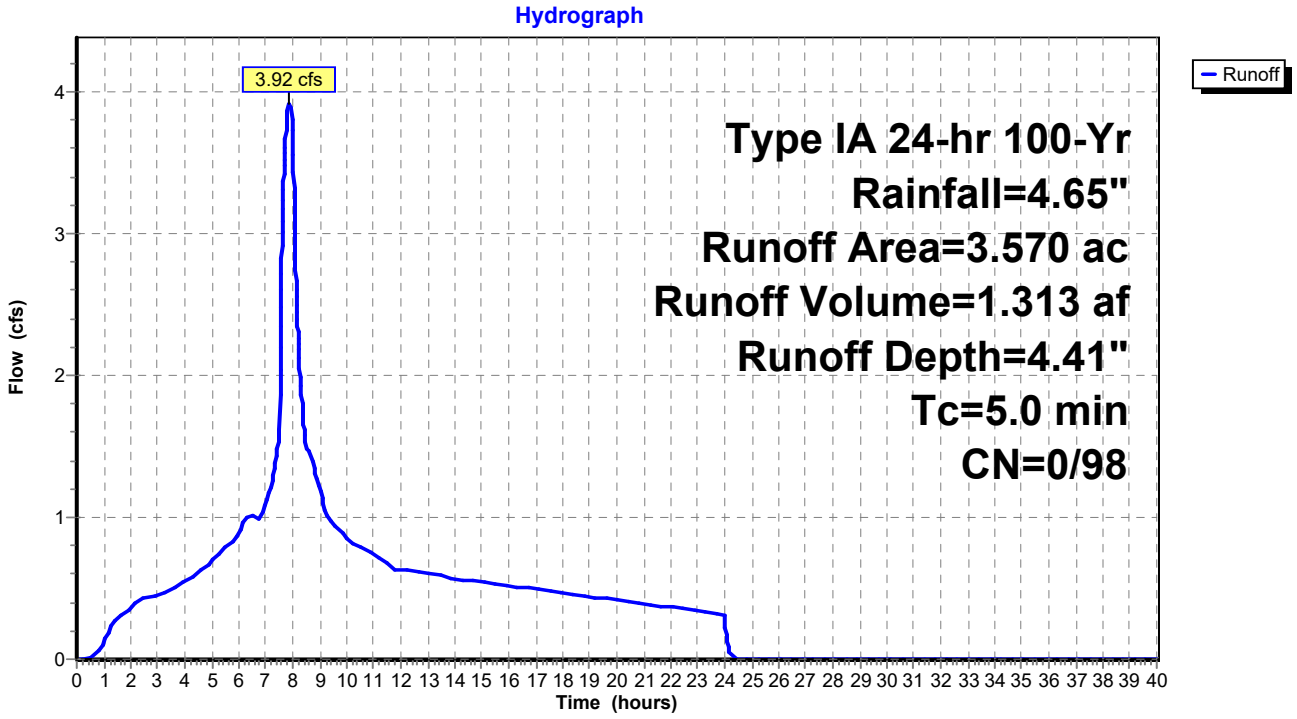
Runoff = 3.92 cfs @ 7.88 hrs, Volume= 1.313 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

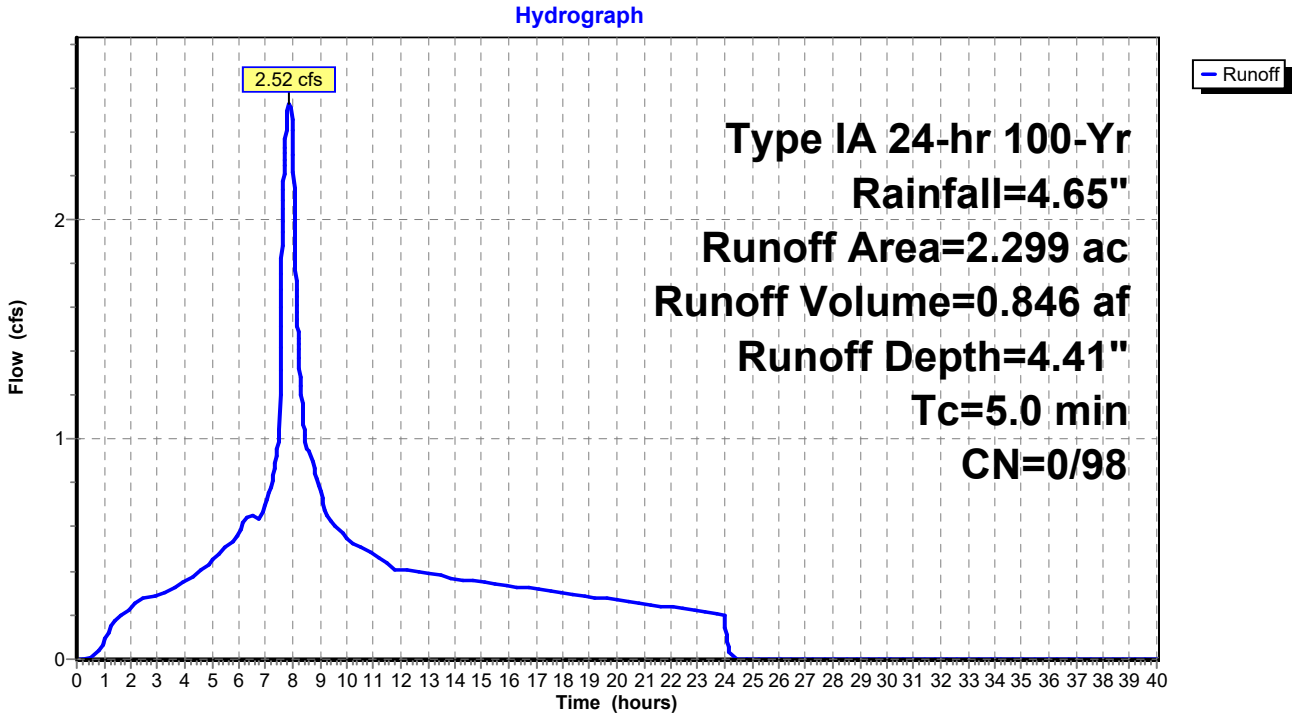
Runoff = 2.52 cfs @ 7.88 hrs, Volume= 0.846 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

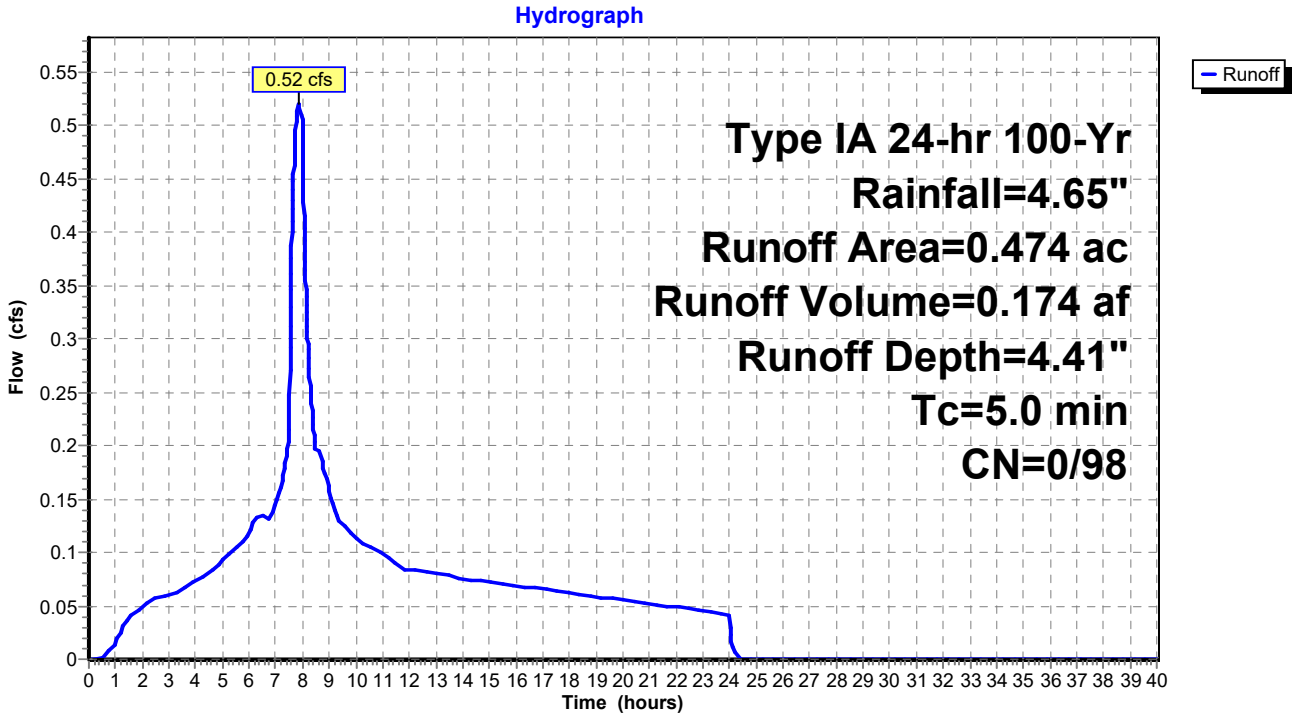
Runoff = 0.52 cfs @ 7.88 hrs, Volume= 0.174 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

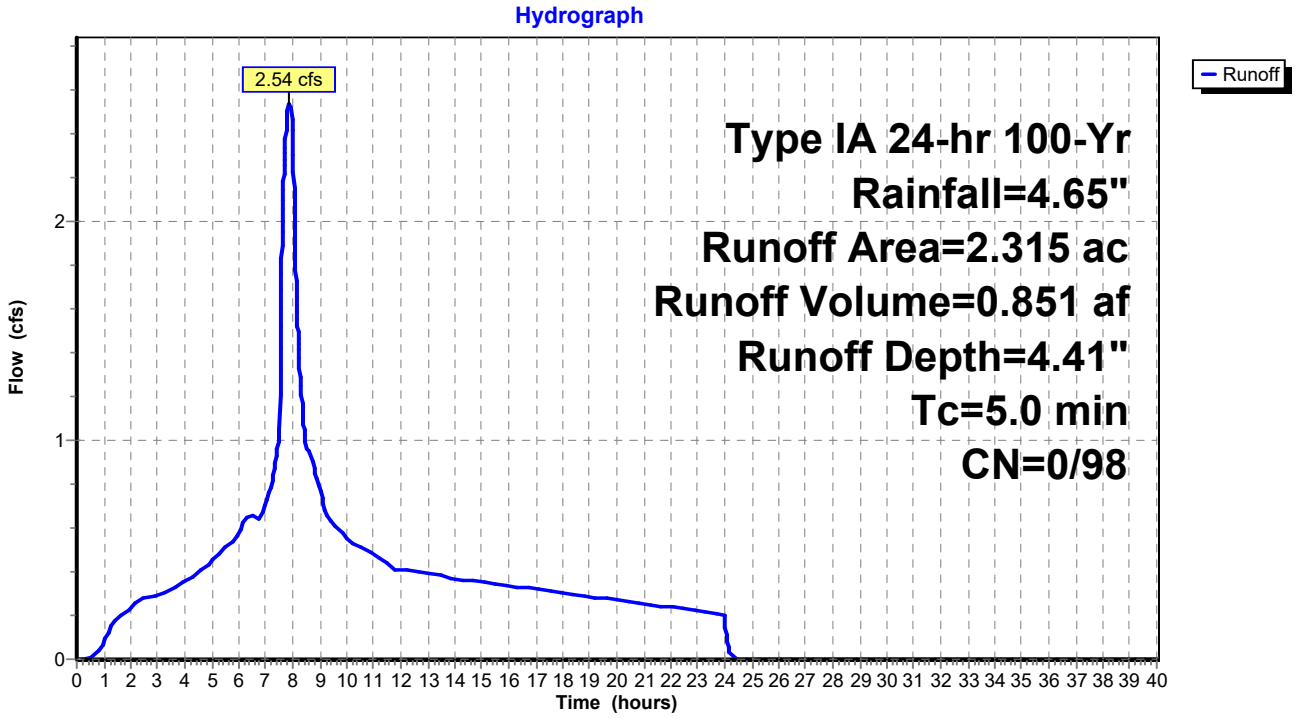
Runoff = 2.54 cfs @ 7.88 hrs, Volume= 0.851 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

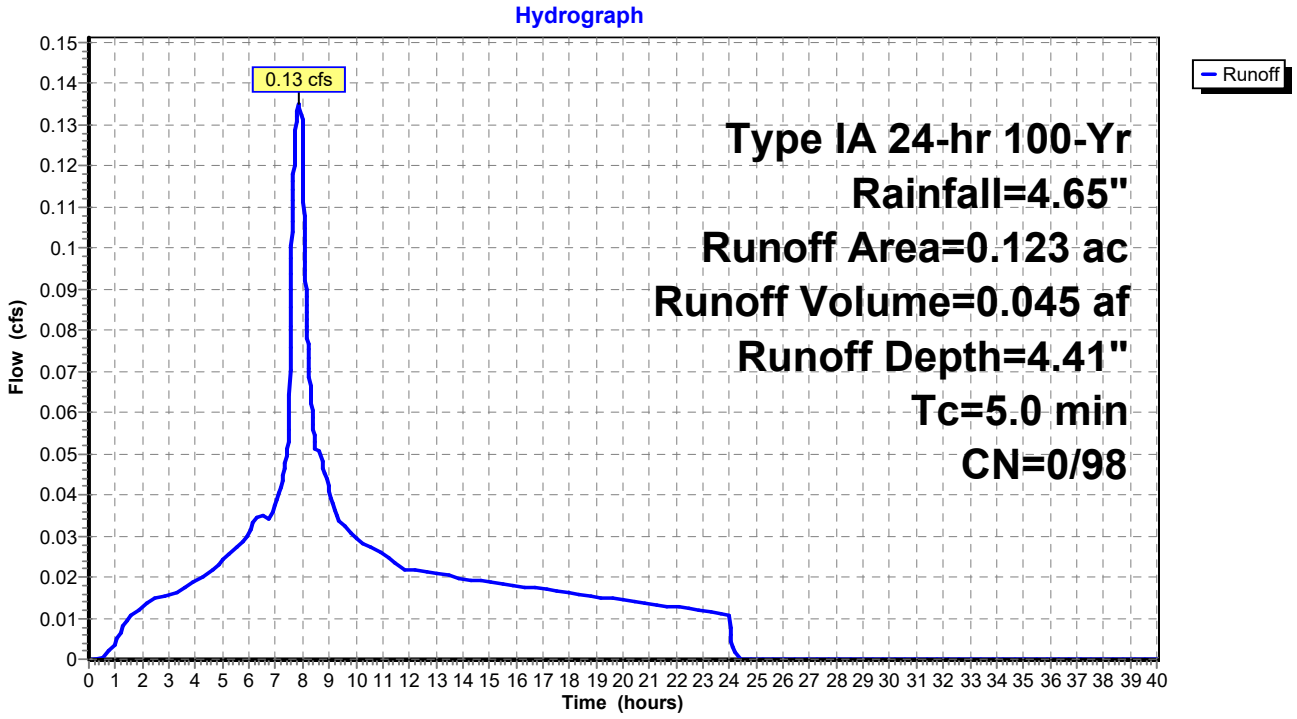
Runoff = 0.13 cfs @ 7.88 hrs, Volume= 0.045 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

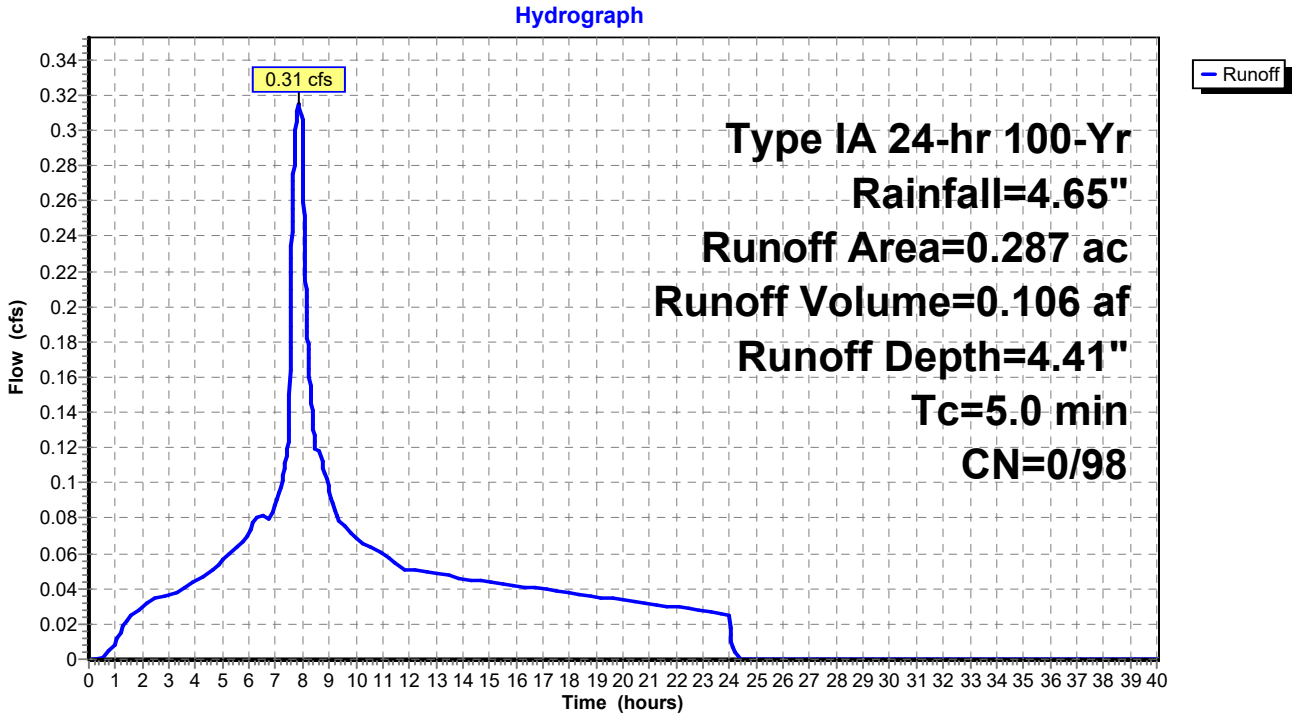
Runoff = 0.31 cfs @ 7.88 hrs, Volume= 0.106 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

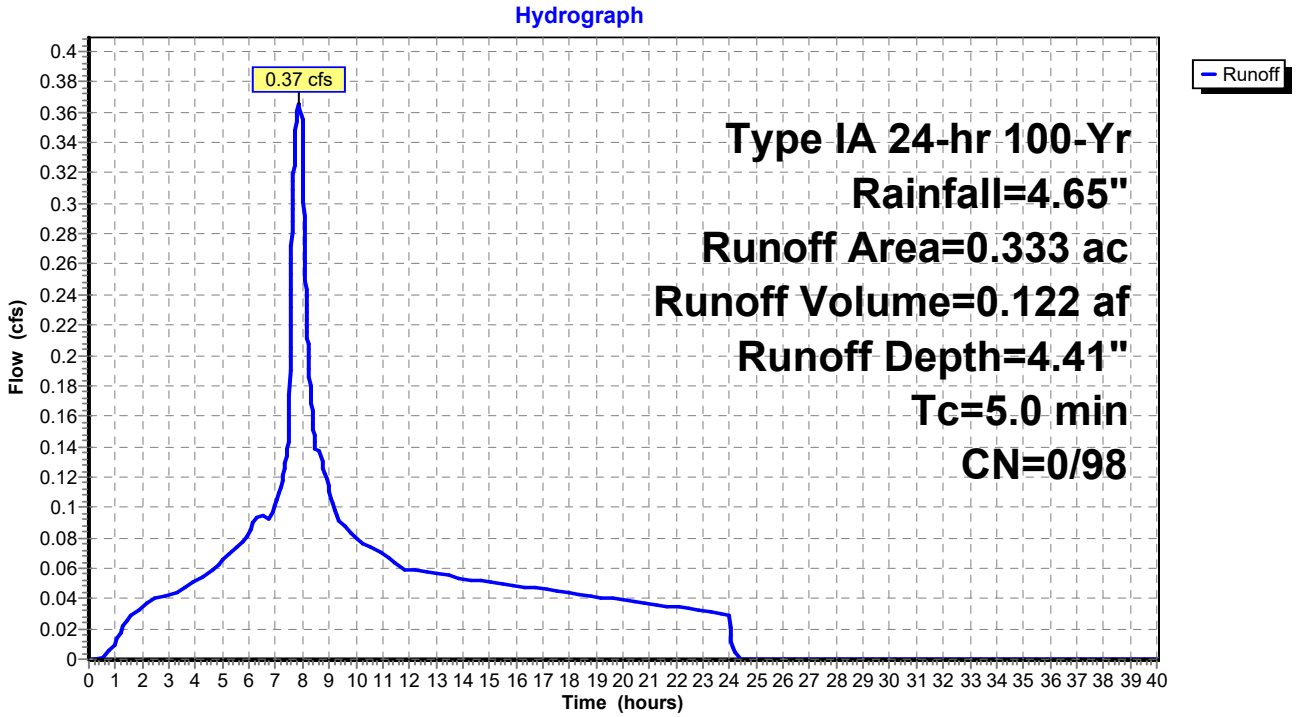
Runoff = 0.37 cfs @ 7.88 hrs, Volume= 0.122 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

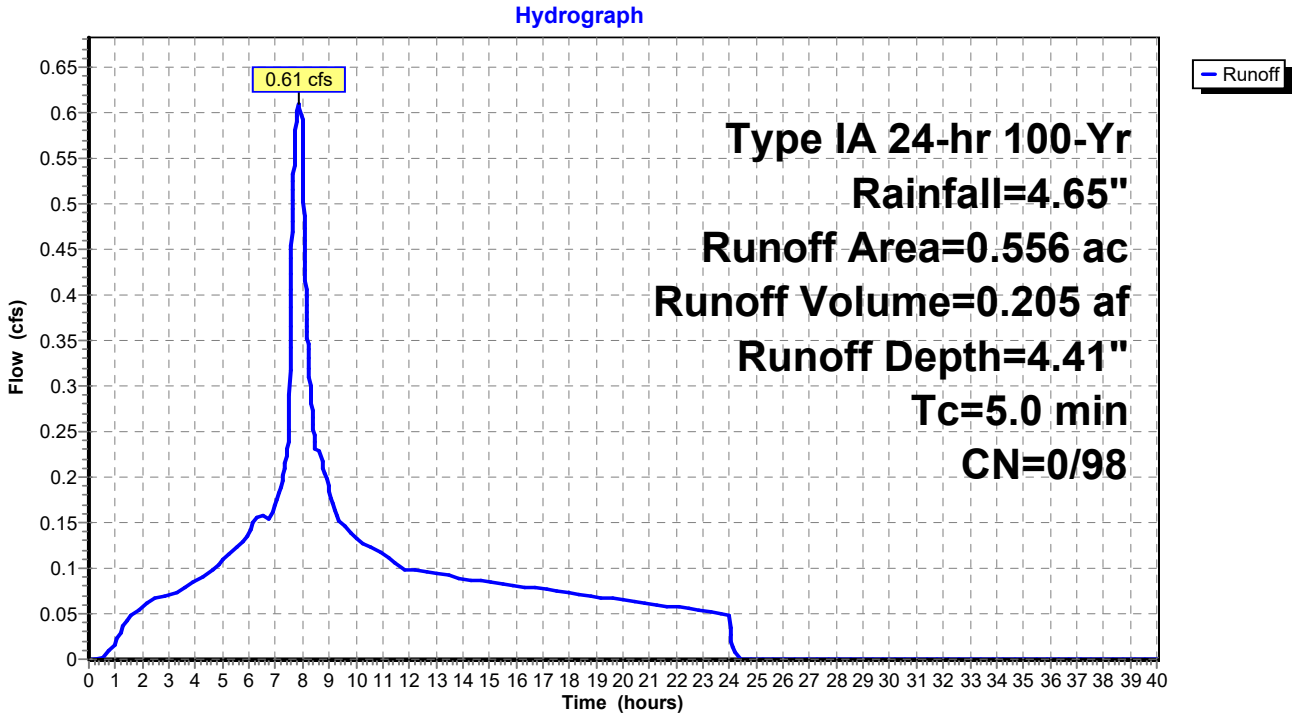
Runoff = 0.61 cfs @ 7.88 hrs, Volume= 0.205 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

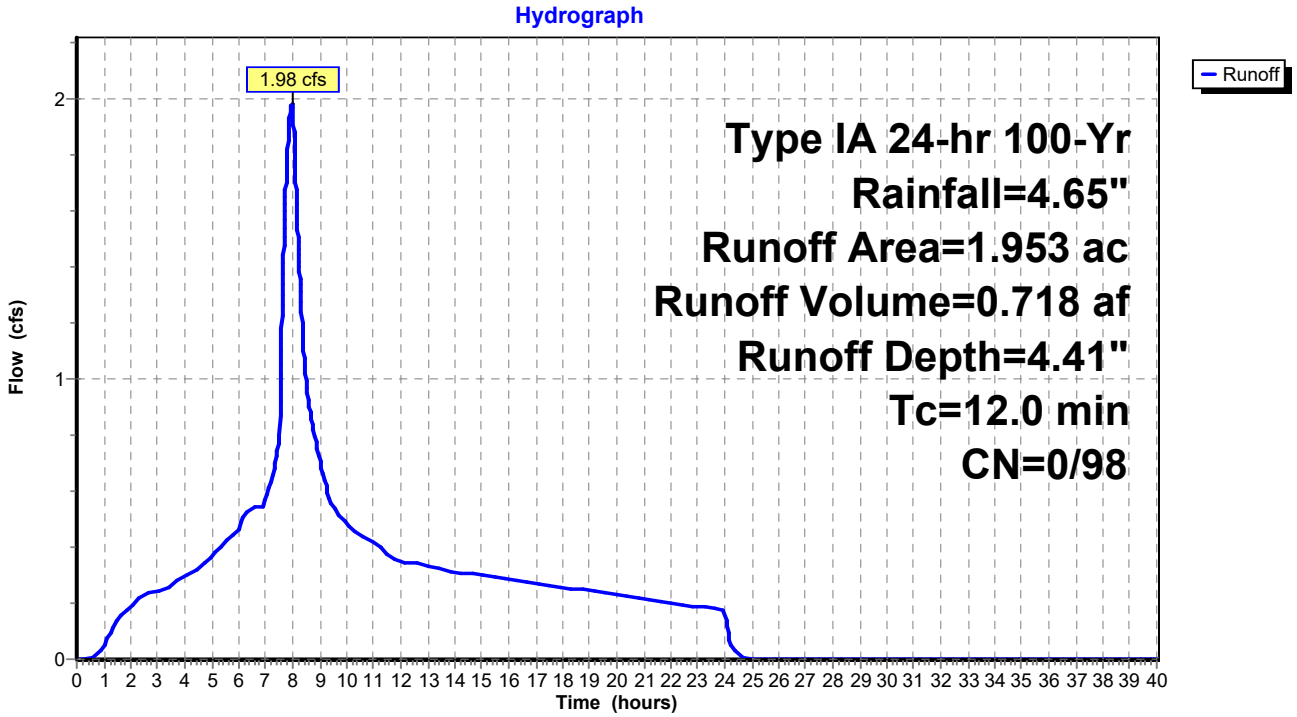
Runoff = 1.98 cfs @ 7.99 hrs, Volume= 0.718 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

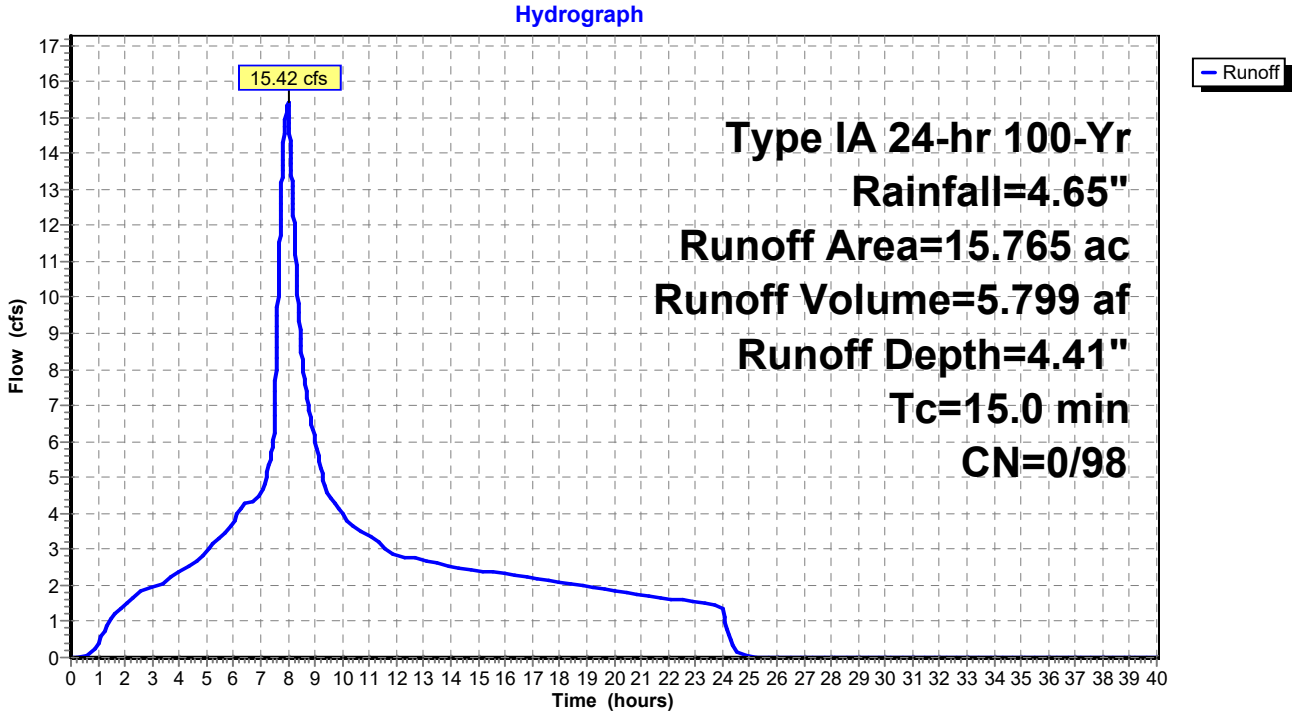
Runoff = 15.42 cfs @ 8.00 hrs, Volume= 5.799 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

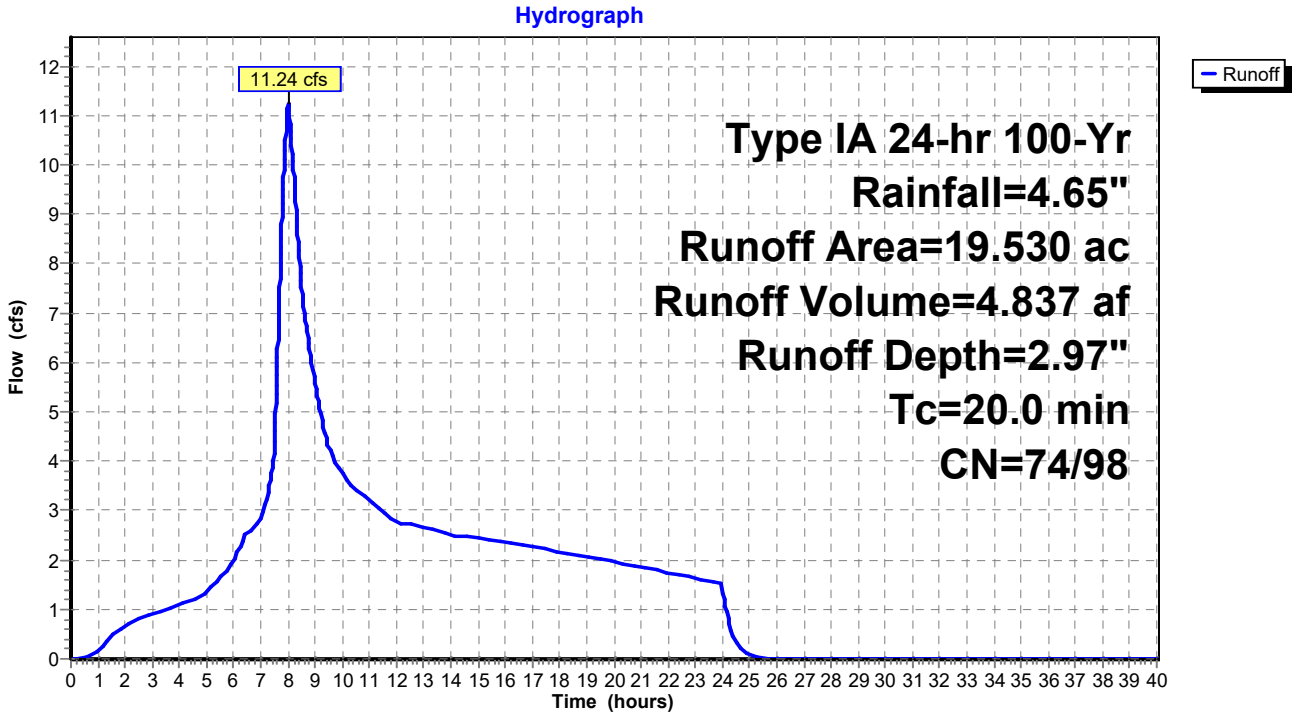
Runoff = 11.24 cfs @ 8.00 hrs, Volume= 4.837 af, Depth= 2.97"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

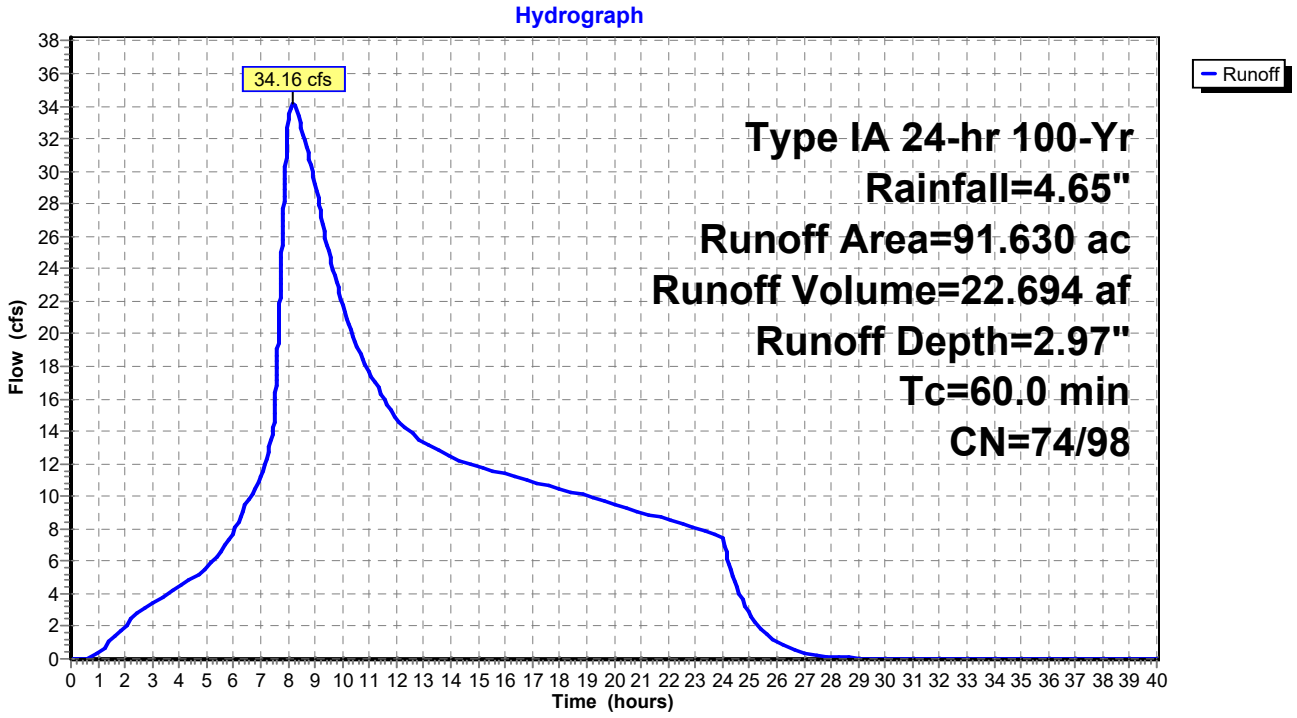
Runoff = 34.16 cfs @ 8.19 hrs, Volume= 22.694 af, Depth= 2.97"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

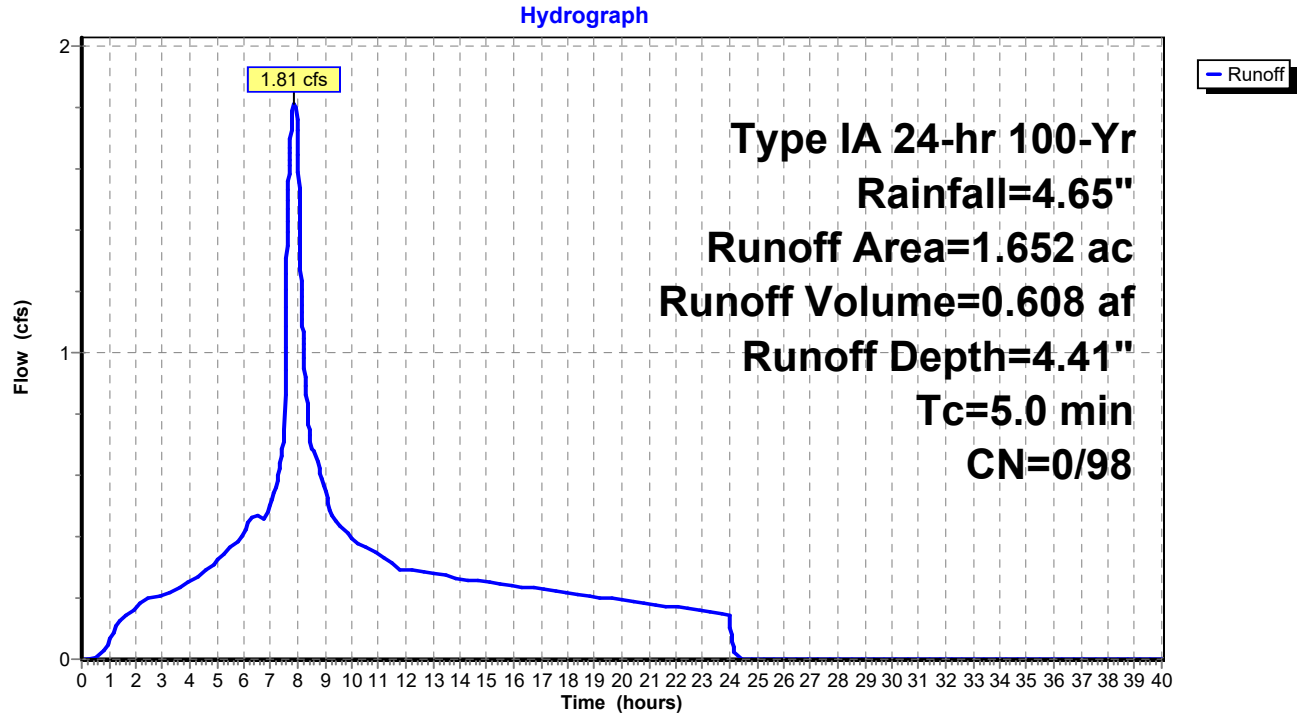
Runoff = 1.81 cfs @ 7.88 hrs, Volume= 0.608 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

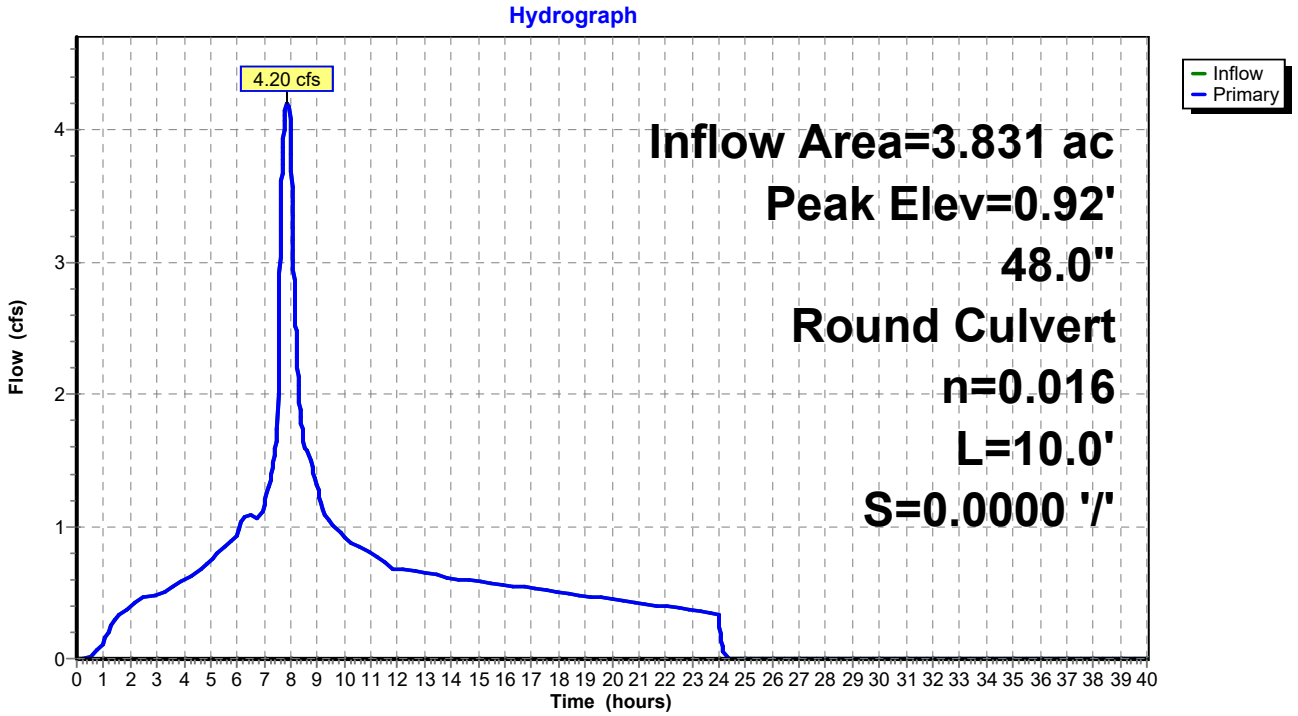
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 4.20 cfs @ 7.88 hrs, Volume= 1.409 af
Outflow = 4.20 cfs @ 7.88 hrs, Volume= 1.409 af, Atten= 0%, Lag= 0.0 min
Primary = 4.20 cfs @ 7.88 hrs, Volume= 1.409 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.92' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.20 cfs @ 7.88 hrs HW=0.92' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.20 cfs @ 2.92 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

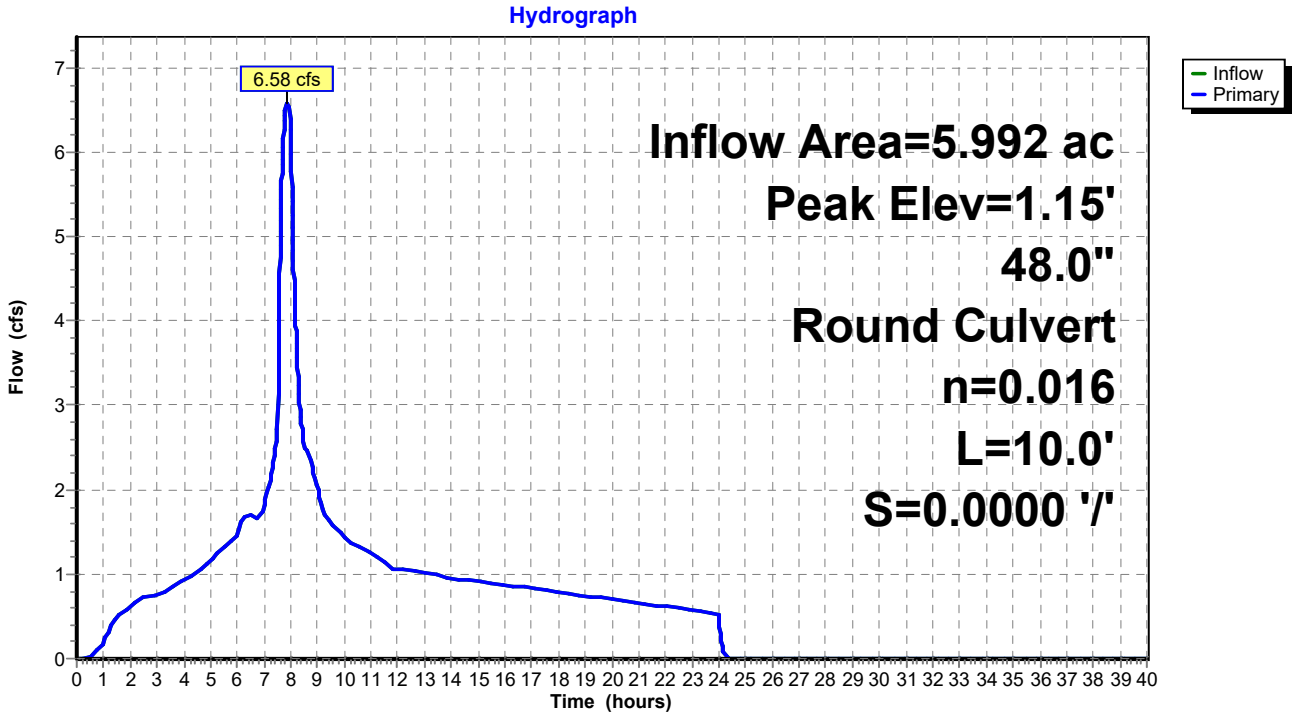
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 6.58 cfs @ 7.88 hrs, Volume= 2.204 af
Outflow = 6.58 cfs @ 7.88 hrs, Volume= 2.204 af, Atten= 0%, Lag= 0.0 min
Primary = 6.58 cfs @ 7.88 hrs, Volume= 2.204 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.15' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=6.57 cfs @ 7.88 hrs HW=1.15' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.57 cfs @ 3.31 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

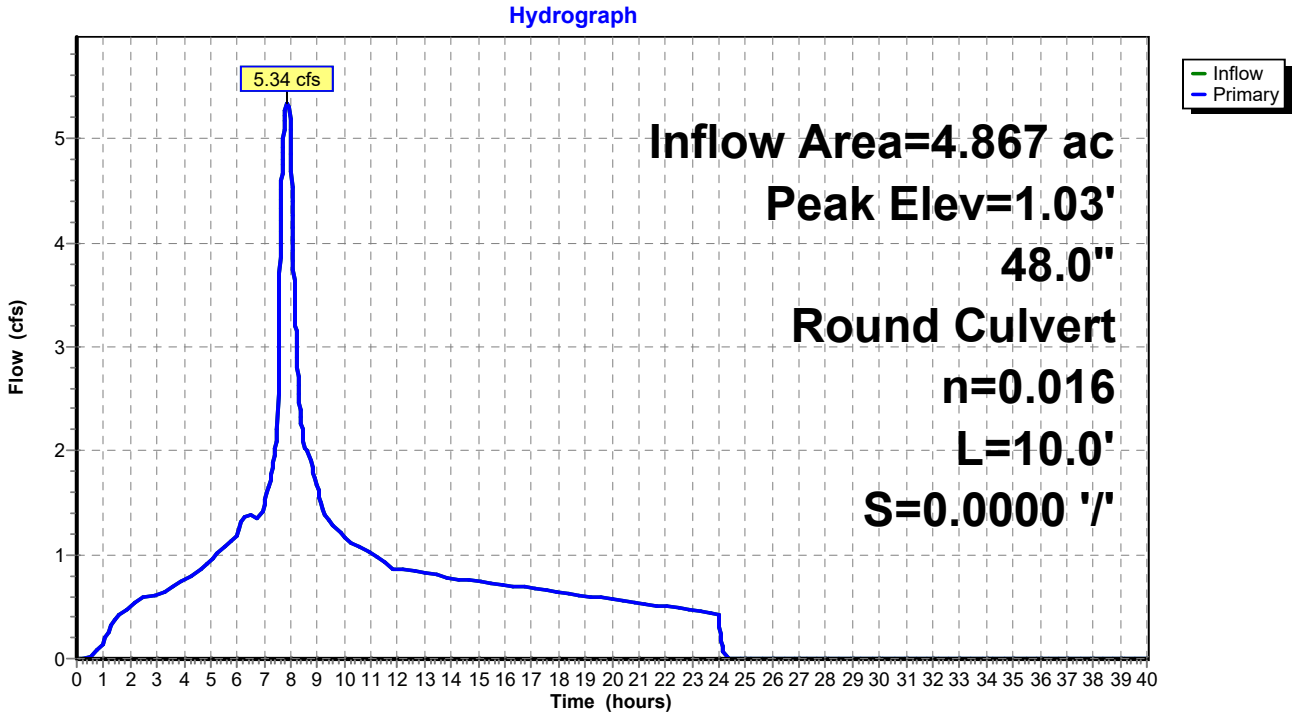
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 5.34 cfs @ 7.88 hrs, Volume= 1.790 af
Outflow = 5.34 cfs @ 7.88 hrs, Volume= 1.790 af, Atten= 0%, Lag= 0.0 min
Primary = 5.34 cfs @ 7.88 hrs, Volume= 1.790 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.03' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=5.34 cfs @ 7.88 hrs HW=1.03' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.34 cfs @ 3.12 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

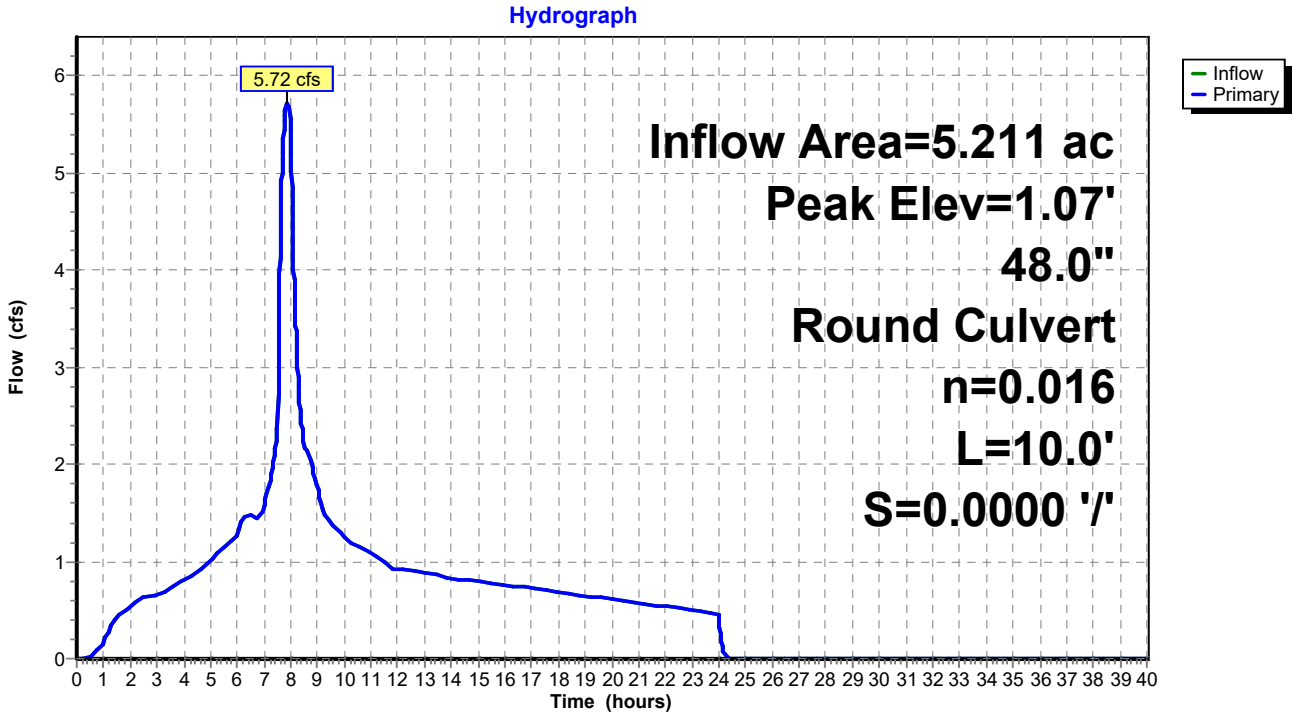
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 5.72 cfs @ 7.88 hrs, Volume= 1.917 af
Outflow = 5.72 cfs @ 7.88 hrs, Volume= 1.917 af, Atten= 0%, Lag= 0.0 min
Primary = 5.72 cfs @ 7.88 hrs, Volume= 1.917 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.07' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=5.72 cfs @ 7.88 hrs HW=1.07' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.72 cfs @ 3.18 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

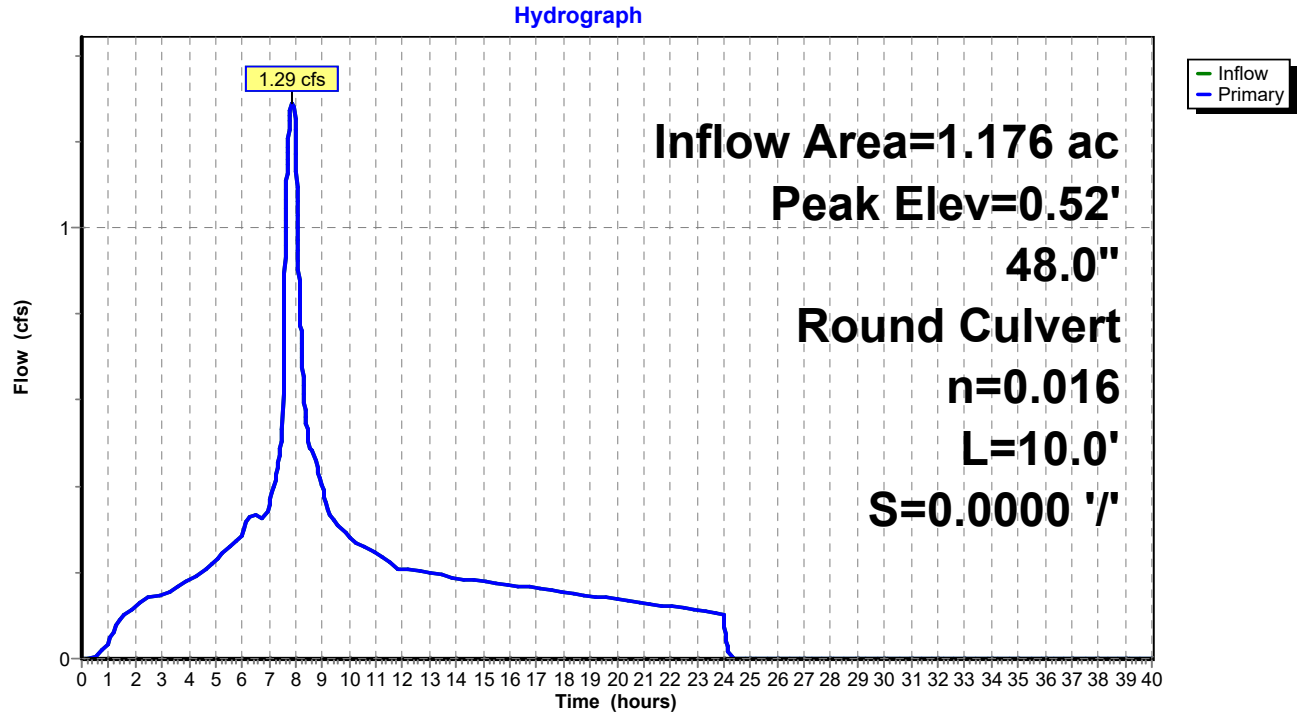
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 1.29 cfs @ 7.88 hrs, Volume= 0.433 af
Outflow = 1.29 cfs @ 7.88 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.0 min
Primary = 1.29 cfs @ 7.88 hrs, Volume= 0.433 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.52' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.29 cfs @ 7.88 hrs HW=0.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.29 cfs @ 2.05 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

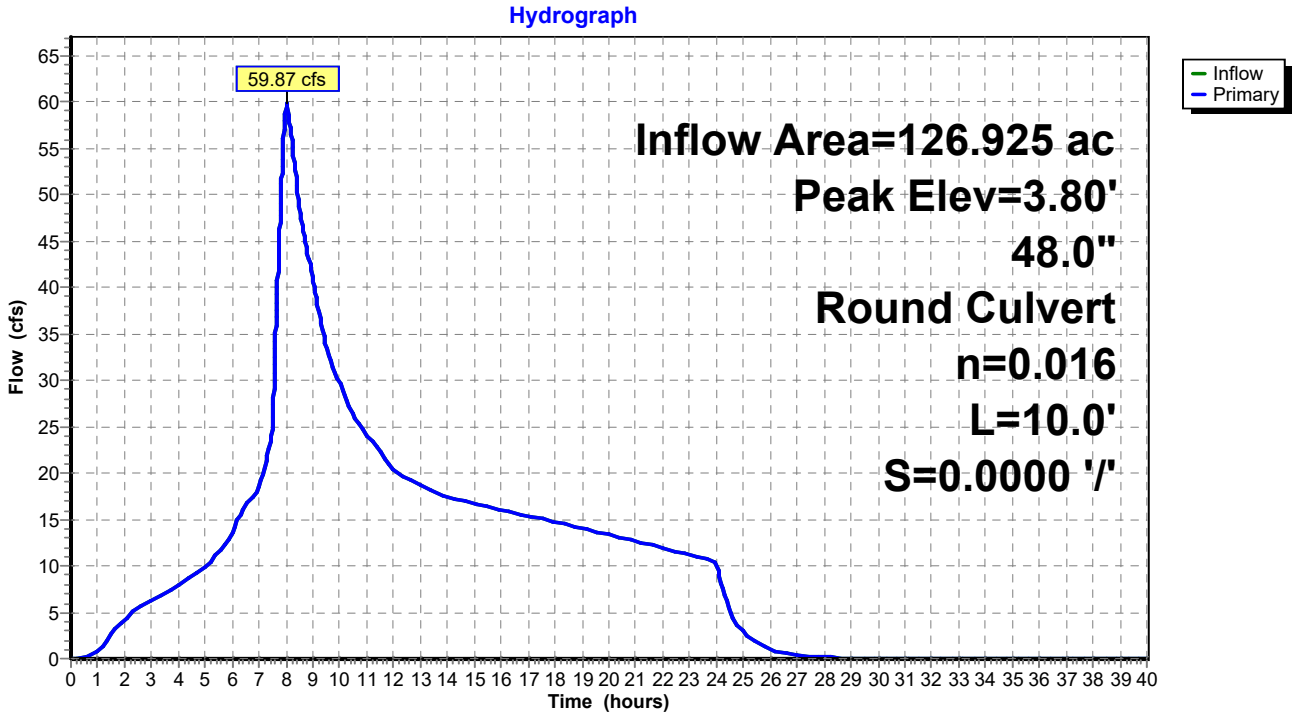
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 3.15" for 100-Yr event
Inflow = 59.87 cfs @ 8.01 hrs, Volume= 33.330 af
Outflow = 59.87 cfs @ 8.01 hrs, Volume= 33.330 af, Atten= 0%, Lag= 0.0 min
Primary = 59.87 cfs @ 8.01 hrs, Volume= 33.330 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 3.80' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=59.87 cfs @ 8.01 hrs HW=3.80' (Free Discharge)
└**1=Culvert** (Barrel Controls 59.87 cfs @ 6.26 fps)

Pond 10P: Offsite Flows



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.80 cfs 0.258 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.57 cfs 0.183 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.10 cfs 0.033 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=1.19 cfs 0.382 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.18 cfs 0.058 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.028 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.19 cfs 0.060 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.15 cfs 0.048 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.93 cfs 0.299 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.60 cfs 0.193 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.12 cfs 0.040 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.60 cfs 0.194 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.024 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.028 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.047 af

Subcatchment 8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=1.01"
Tc=12.0 min CN=0/98 Runoff=0.47 cfs 0.164 af

Subcatchment 10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=1.01"
Tc=15.0 min CN=0/98 Runoff=3.65 cfs 1.321 af

Subcatchment A: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=0.42"
Tc=20.0 min CN=74/98 Runoff=1.60 cfs 0.689 af

Subcatchment B: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=0.42"
Tc=60.0 min CN=74/98 Runoff=4.94 cfs 3.231 af

Subcatchment OS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.138 af

Pond 3P: (new Pond) Peak Elev=0.46' Inflow=1.00 cfs 0.321 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.00 cfs 0.321 af

Pond 4P: (new Pond) Peak Elev=0.57' Inflow=1.56 cfs 0.502 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.56 cfs 0.502 af

Pond 5P: (new Pond) Peak Elev=0.51' Inflow=1.27 cfs 0.408 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.27 cfs 0.408 af

Pond 6P: (new Pond) Peak Elev=0.53' Inflow=1.36 cfs 0.437 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.36 cfs 0.437 af

Pond 7P: (new Pond) Peak Elev=0.27' Inflow=0.31 cfs 0.099 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=0.31 cfs 0.099 af

Pond 10P: Offsite Flows Peak Elev=1.43' Inflow=10.11 cfs 5.240 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=10.11 cfs 5.240 af

Summary for Subcatchment 2: Basin 20

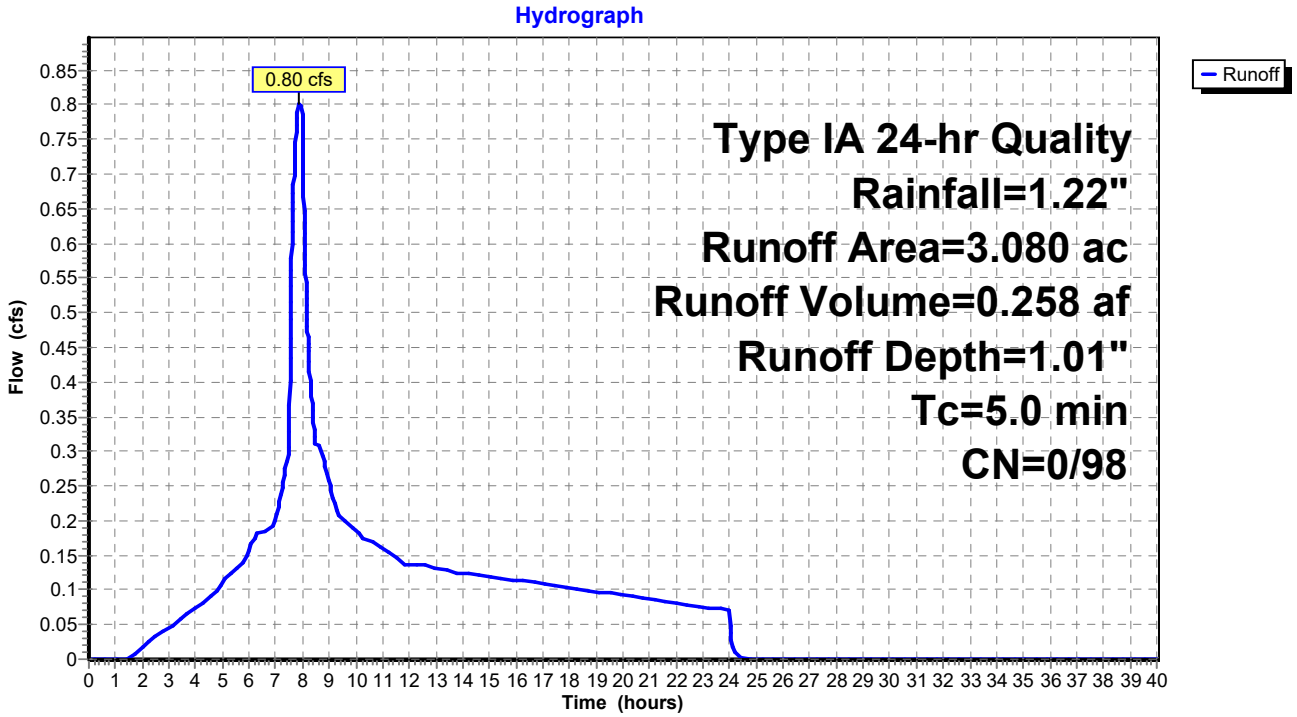
Runoff = 0.80 cfs @ 7.89 hrs, Volume= 0.258 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

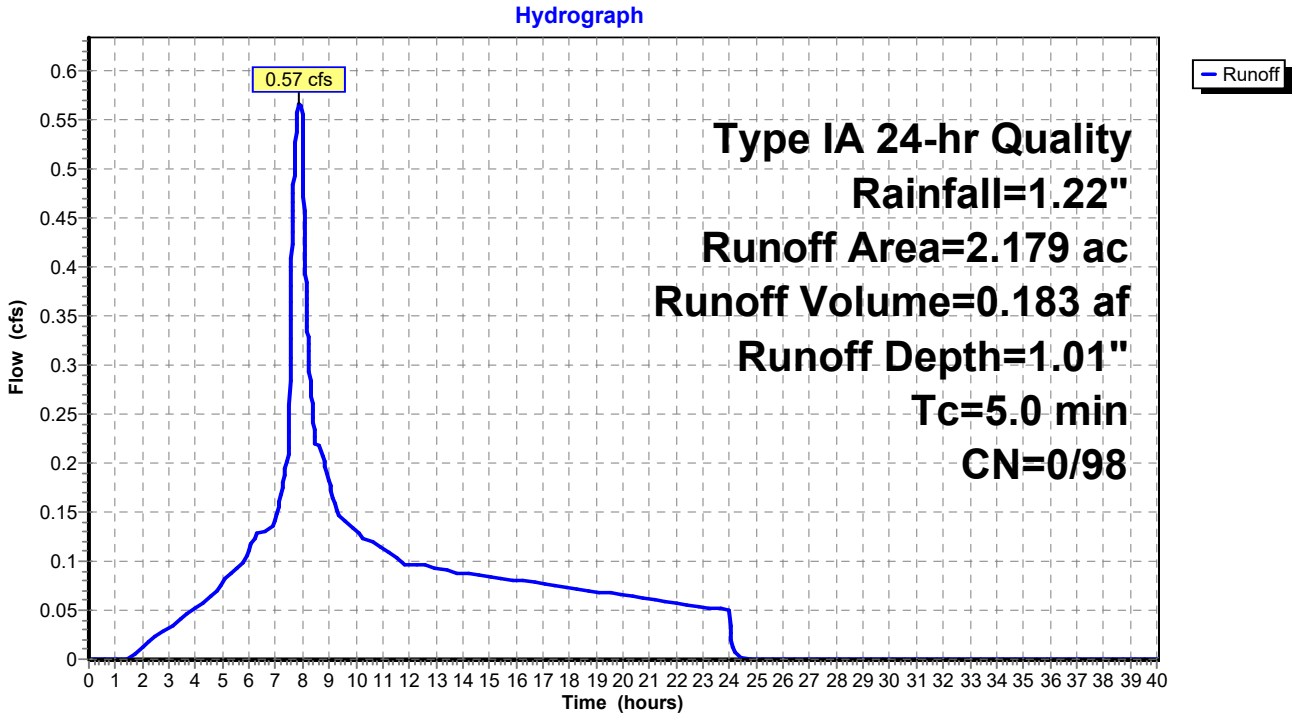
Runoff = 0.57 cfs @ 7.89 hrs, Volume= 0.183 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

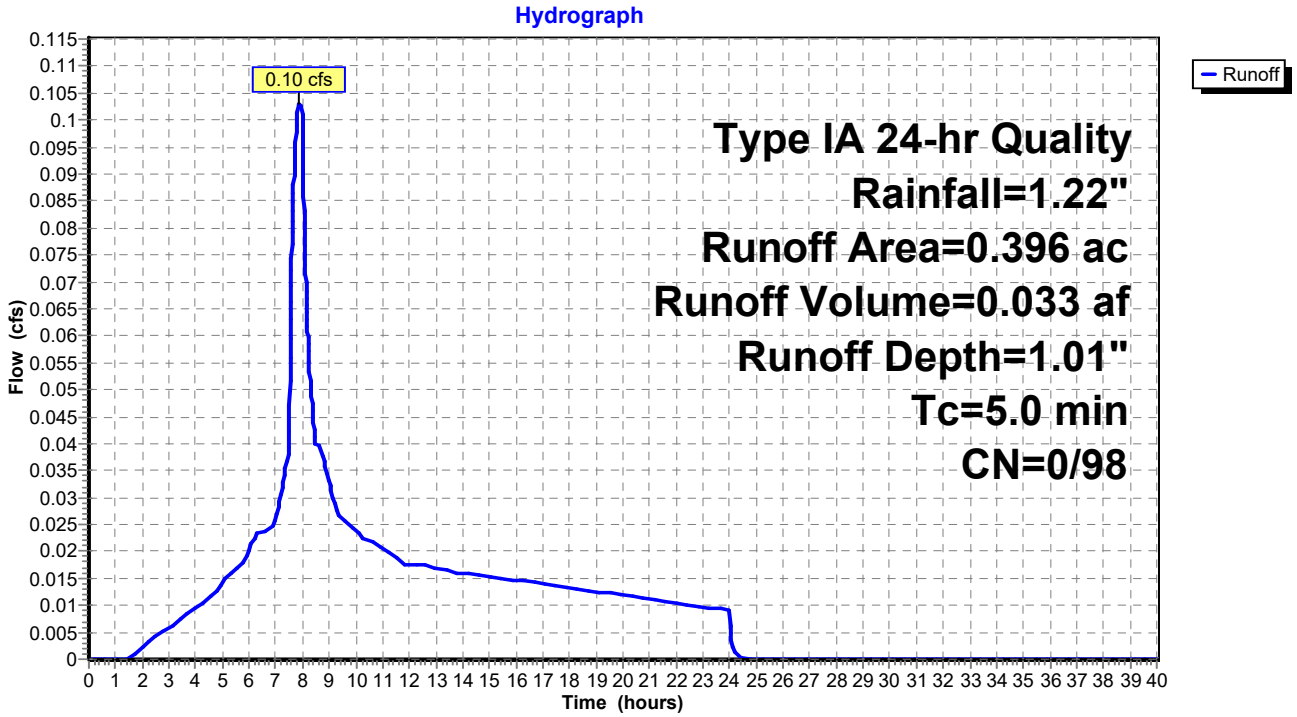
Runoff = 0.10 cfs @ 7.89 hrs, Volume= 0.033 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

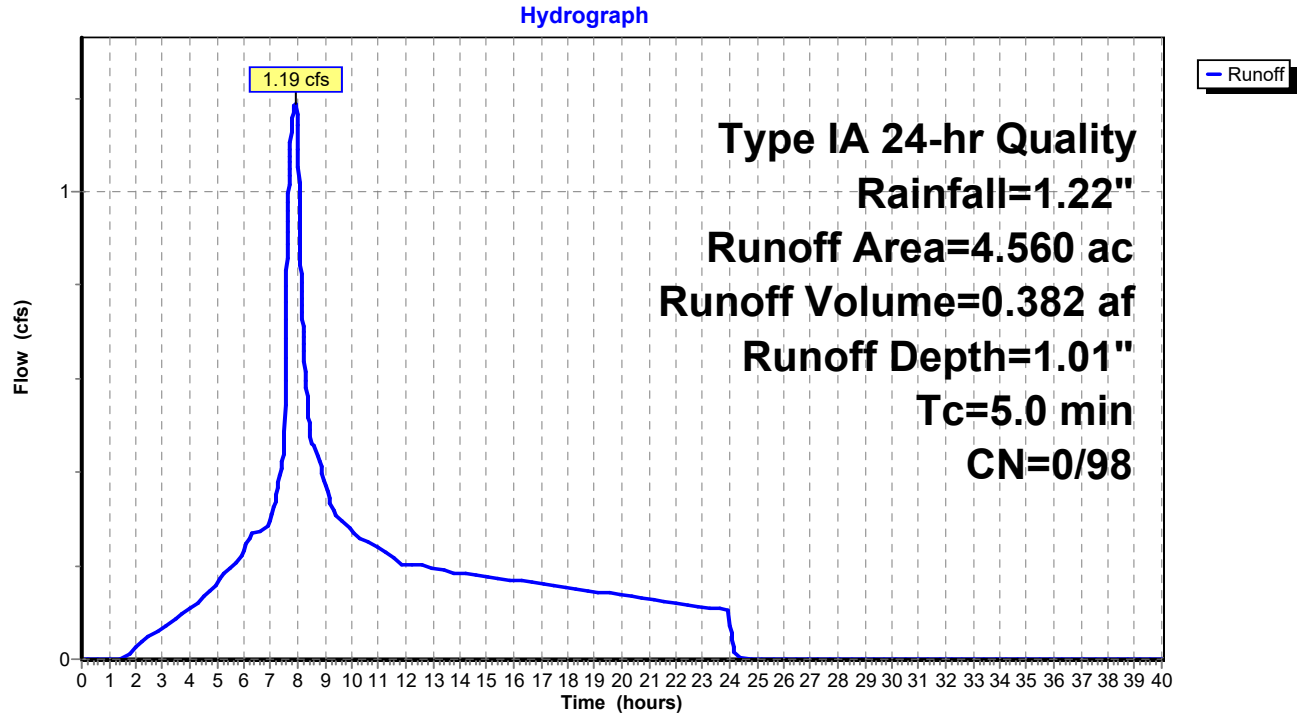
Runoff = 1.19 cfs @ 7.89 hrs, Volume= 0.382 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

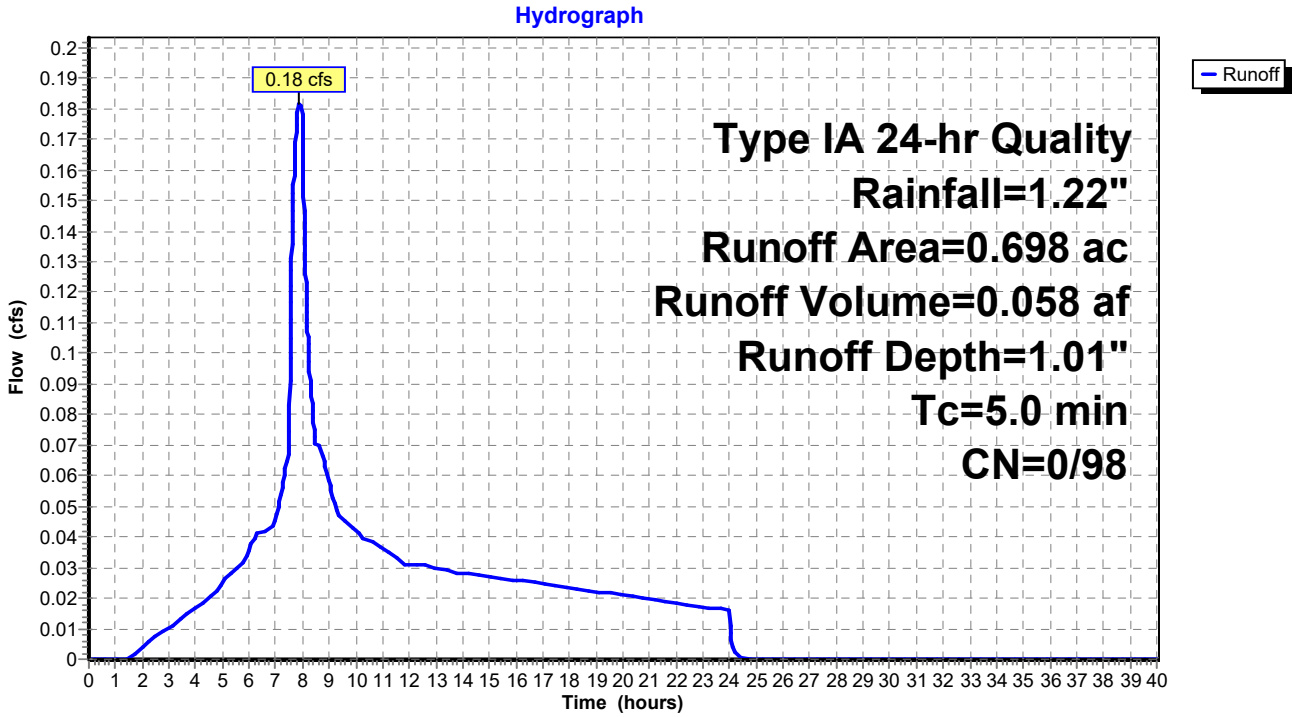
Runoff = 0.18 cfs @ 7.89 hrs, Volume= 0.058 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

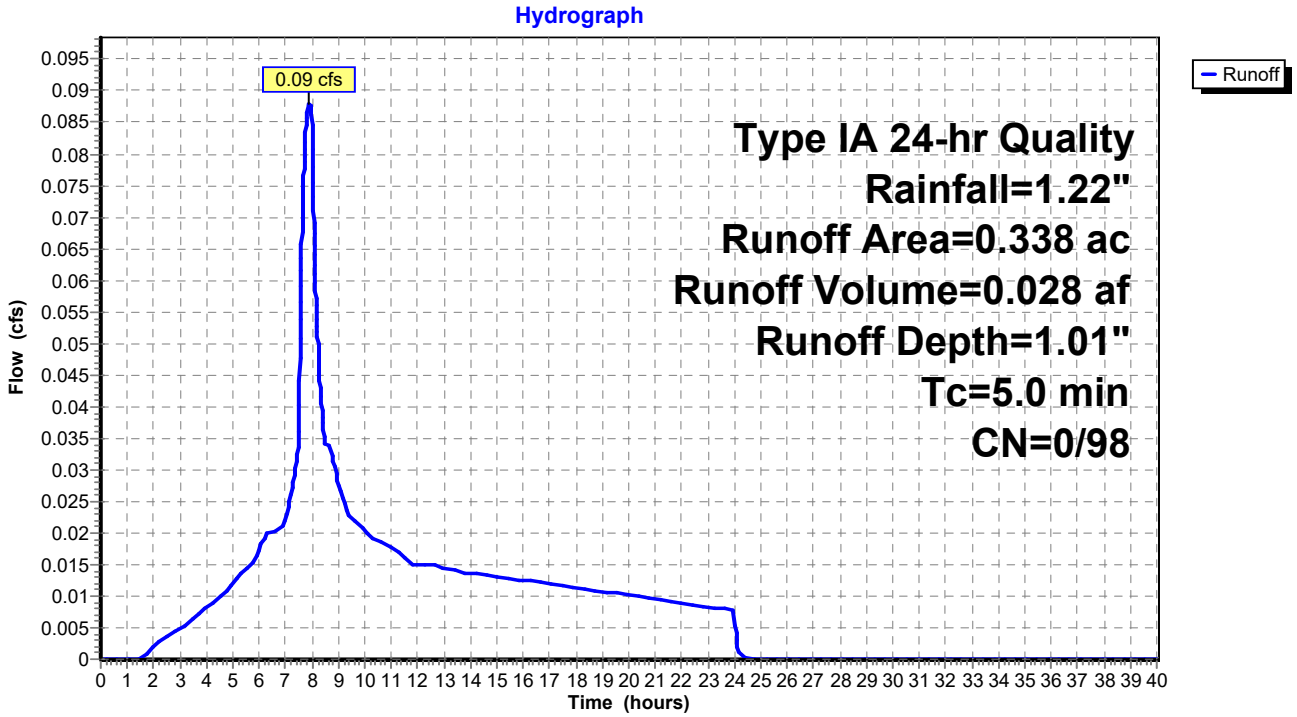
Runoff = 0.09 cfs @ 7.89 hrs, Volume= 0.028 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

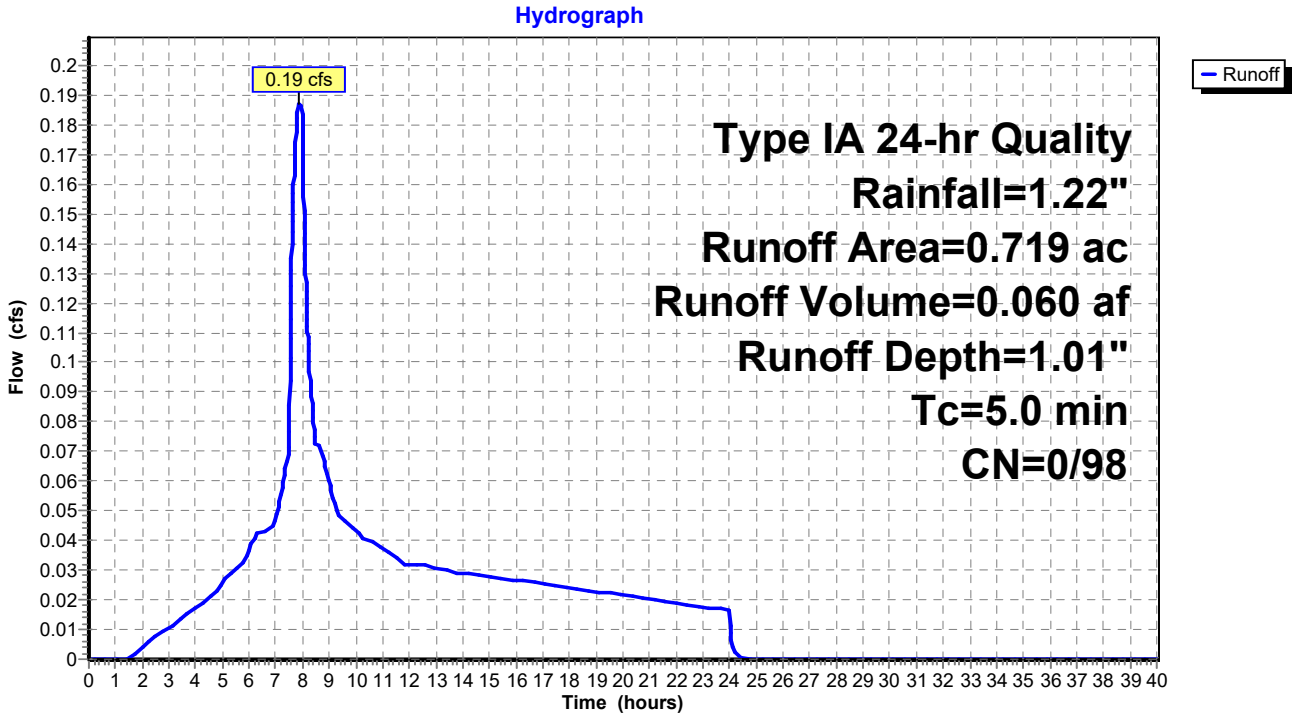
Runoff = 0.19 cfs @ 7.89 hrs, Volume= 0.060 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

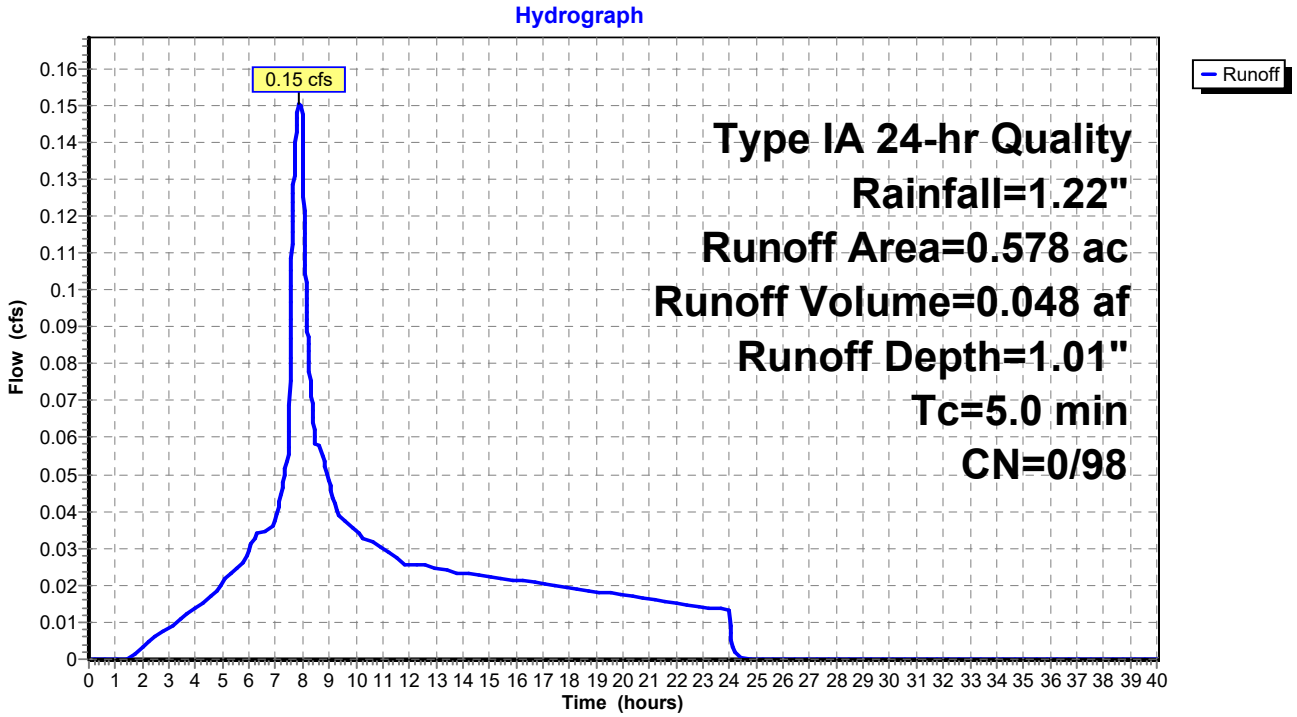
Runoff = 0.15 cfs @ 7.89 hrs, Volume= 0.048 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

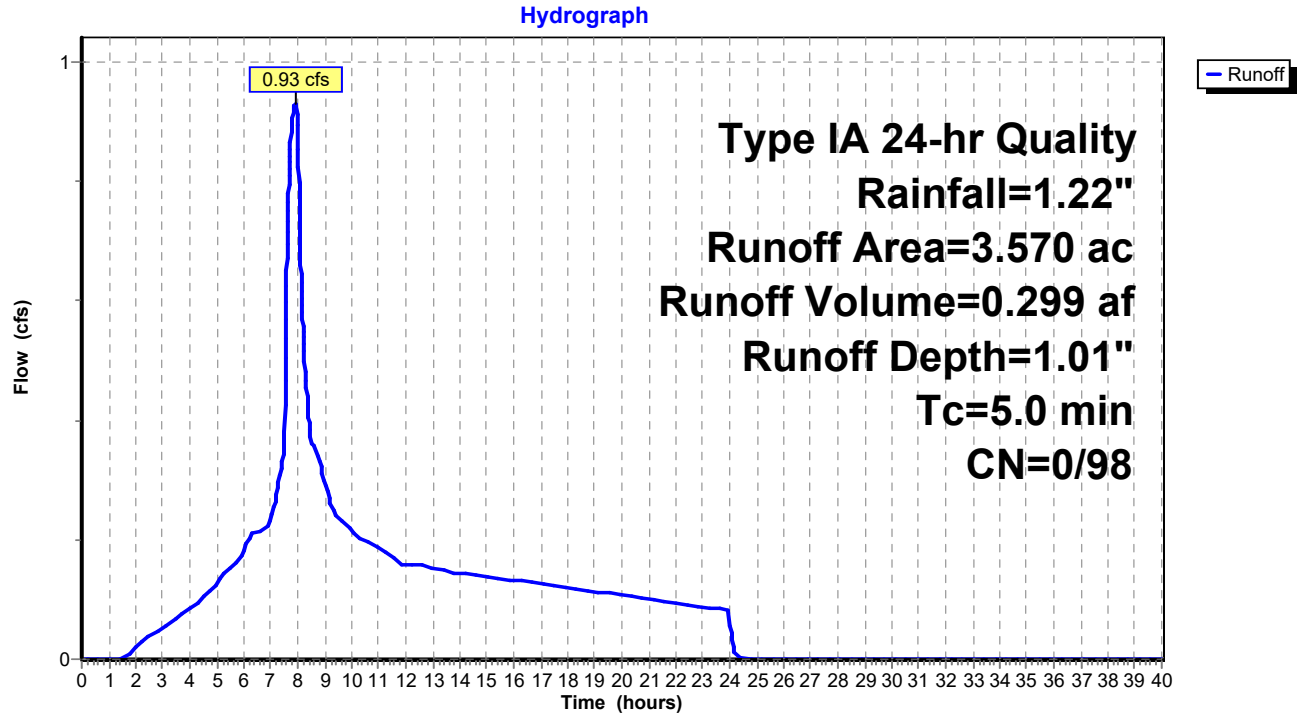
Runoff = 0.93 cfs @ 7.89 hrs, Volume= 0.299 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

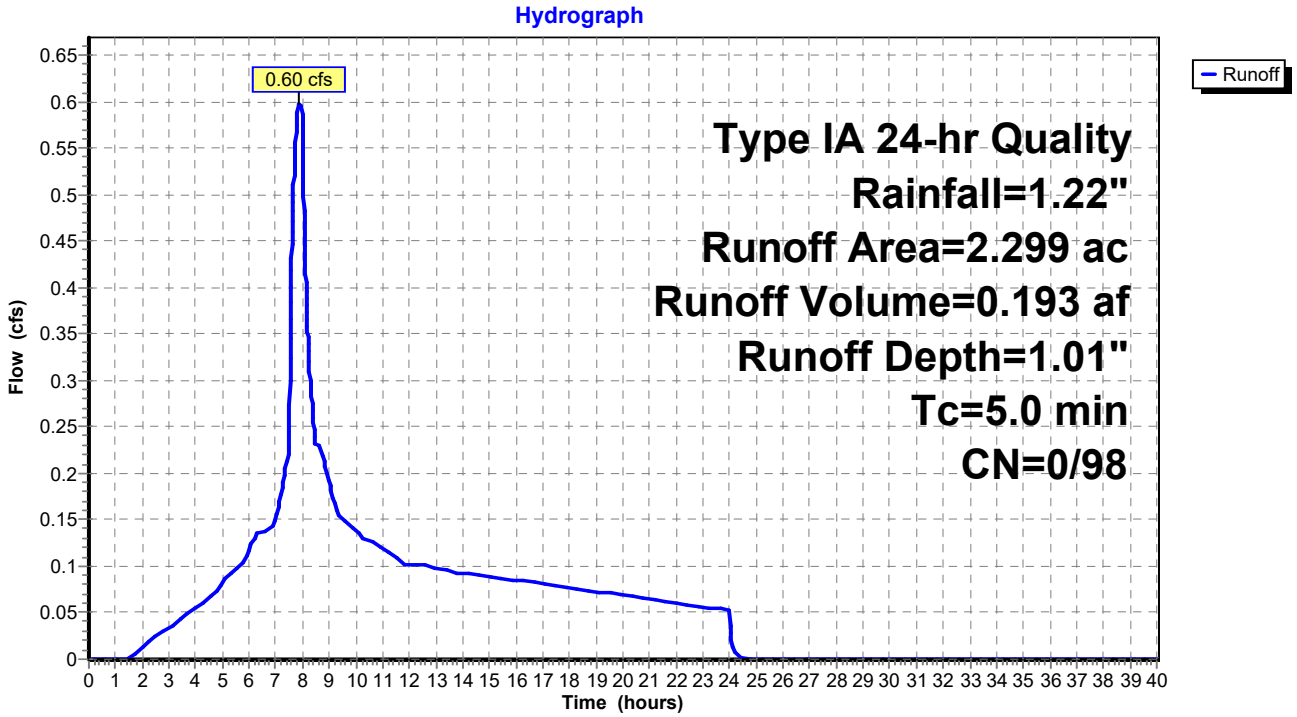
Runoff = 0.60 cfs @ 7.89 hrs, Volume= 0.193 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

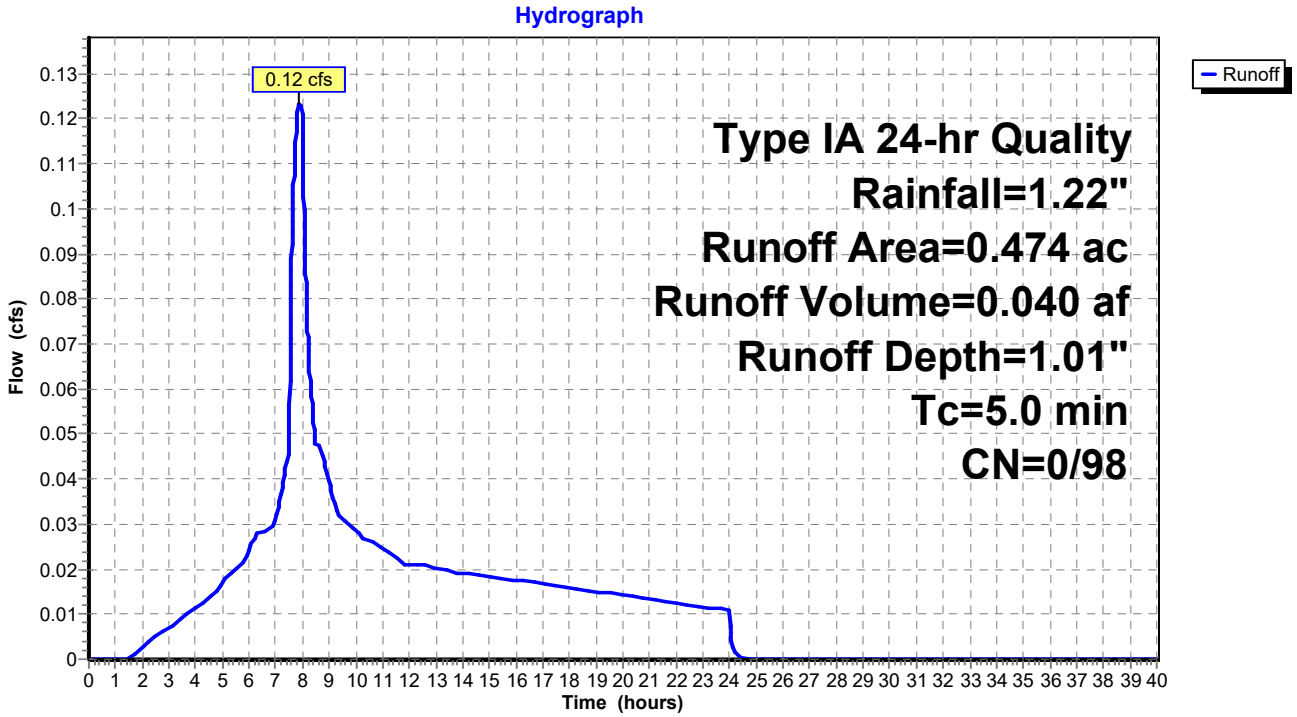
Runoff = 0.12 cfs @ 7.89 hrs, Volume= 0.040 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

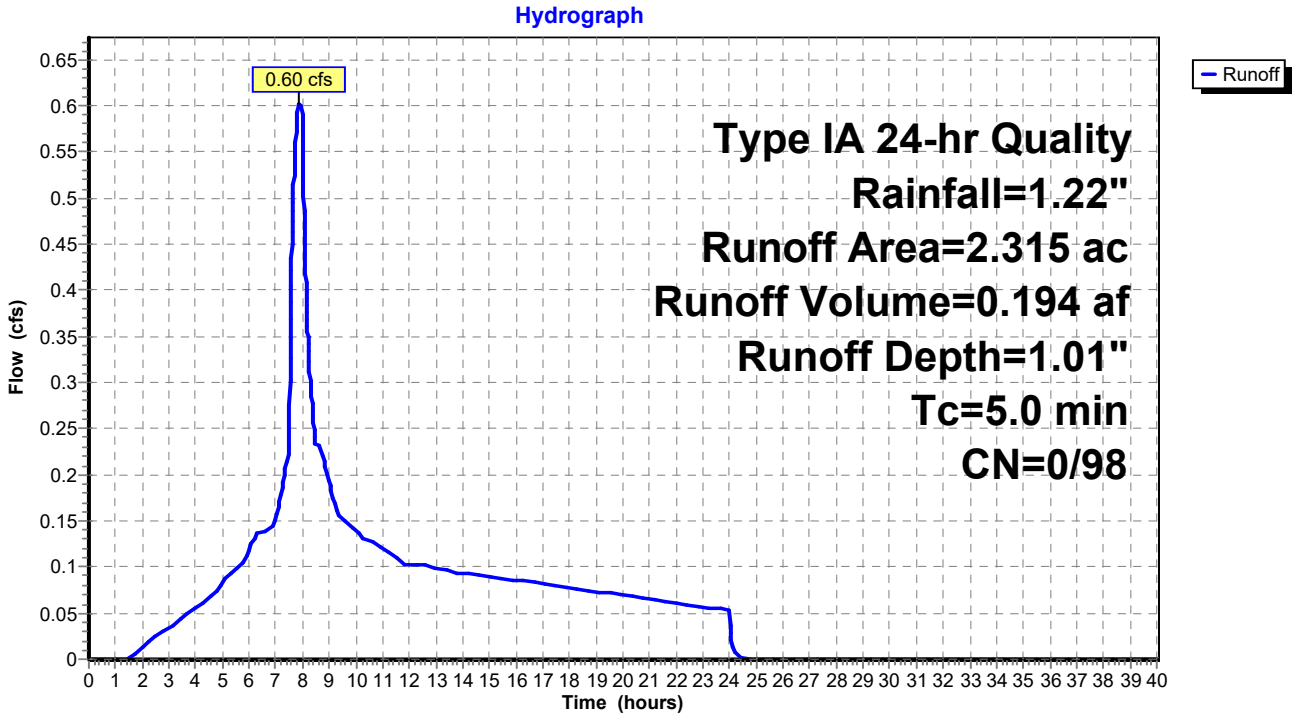
Runoff = 0.60 cfs @ 7.89 hrs, Volume= 0.194 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

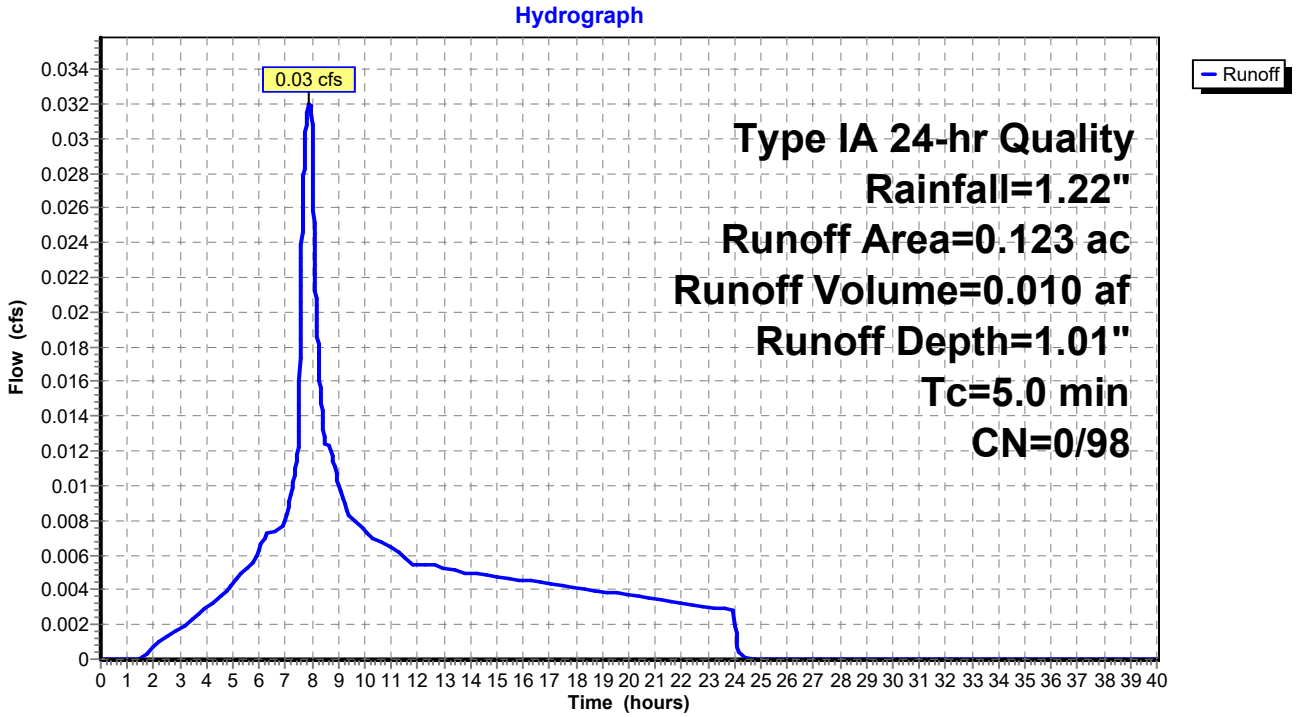
Runoff = 0.03 cfs @ 7.89 hrs, Volume= 0.010 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

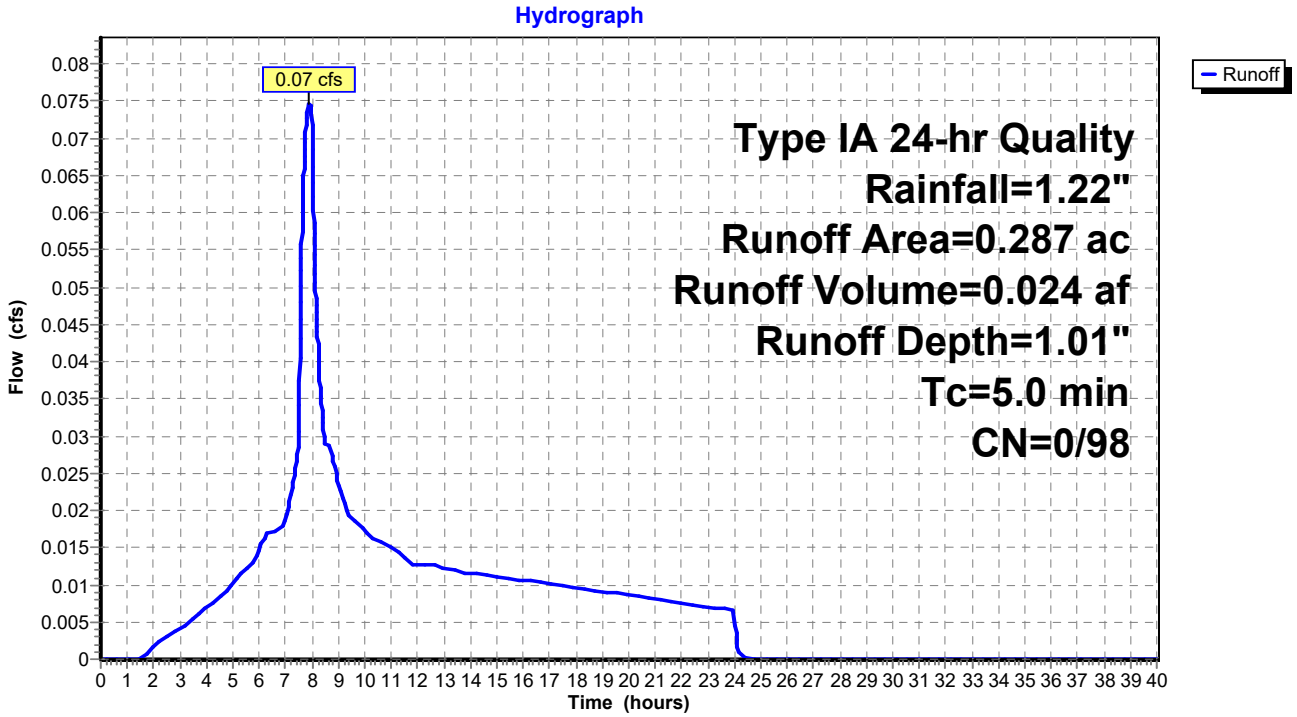
Runoff = 0.07 cfs @ 7.89 hrs, Volume= 0.024 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

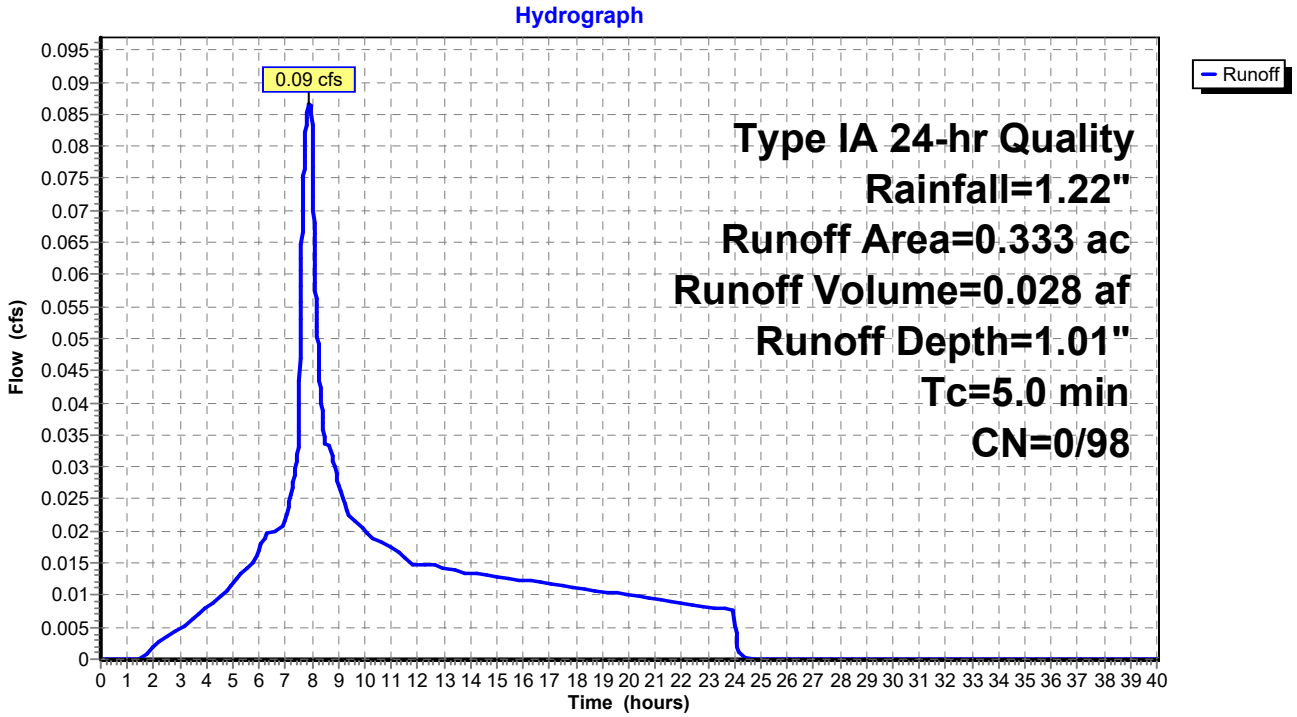
Runoff = 0.09 cfs @ 7.89 hrs, Volume= 0.028 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

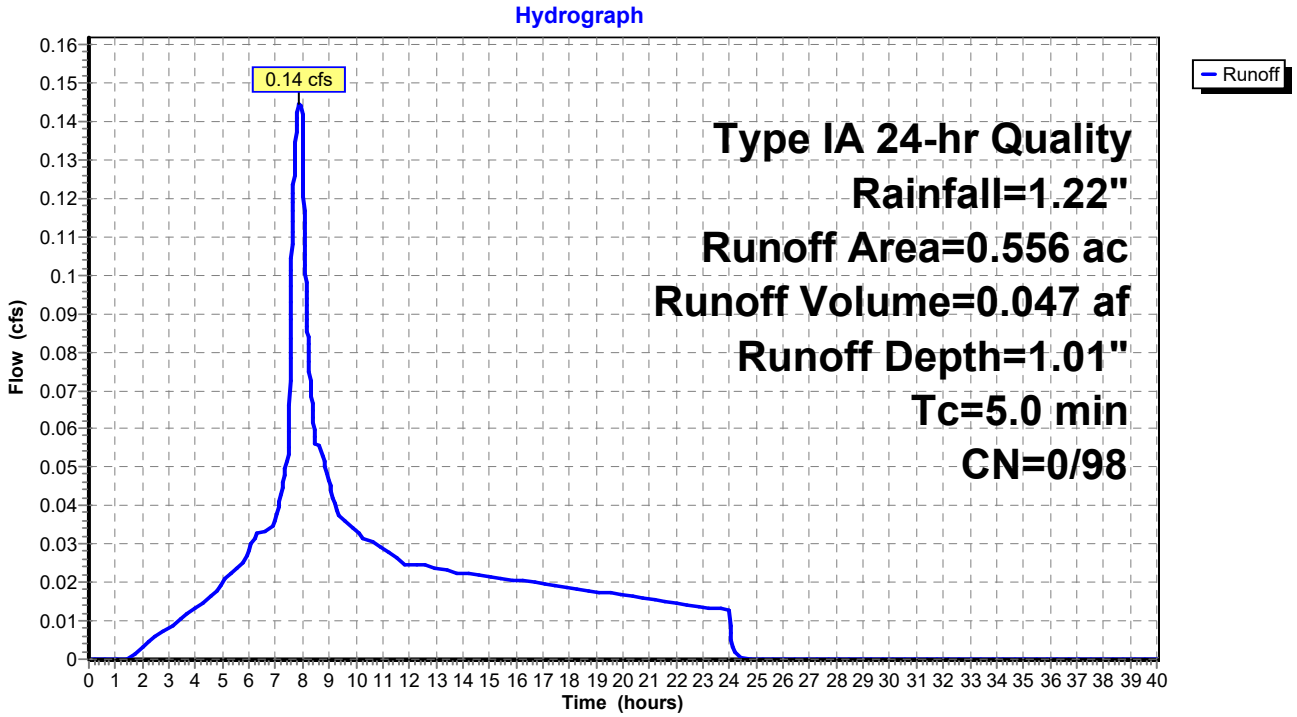
Runoff = 0.14 cfs @ 7.89 hrs, Volume= 0.047 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

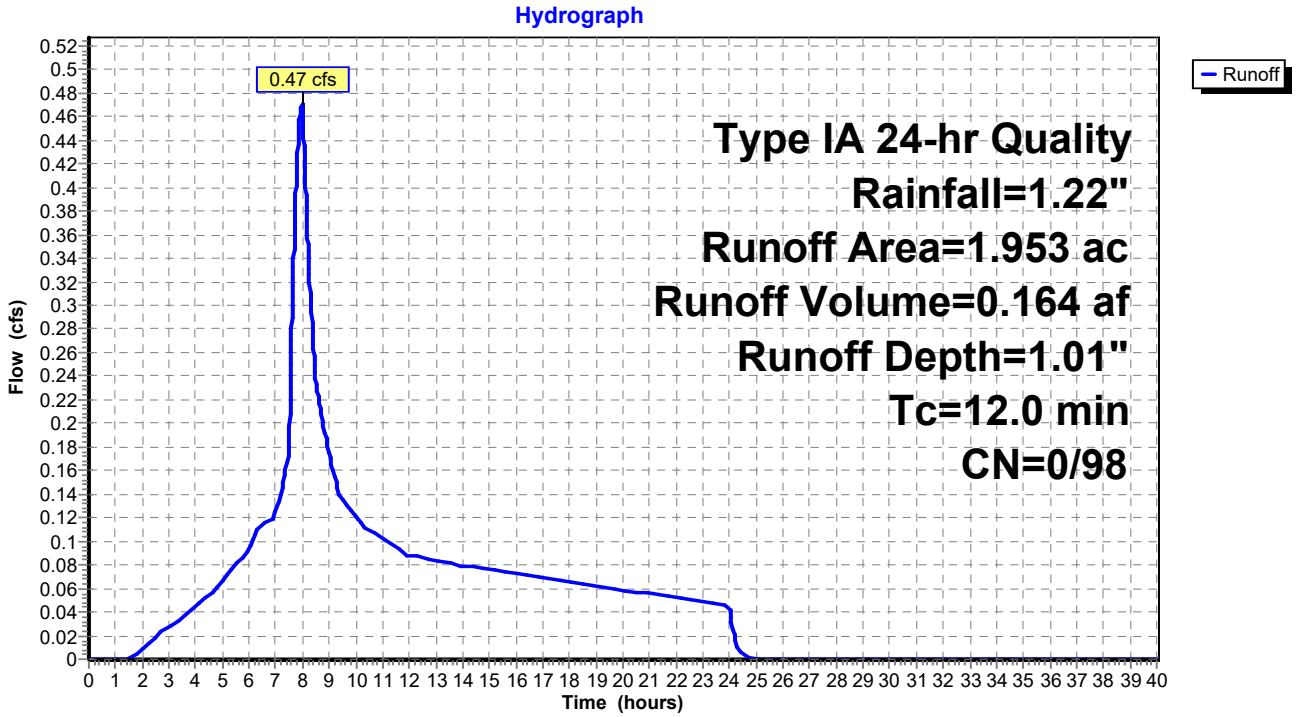
Runoff = 0.47 cfs @ 8.00 hrs, Volume= 0.164 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

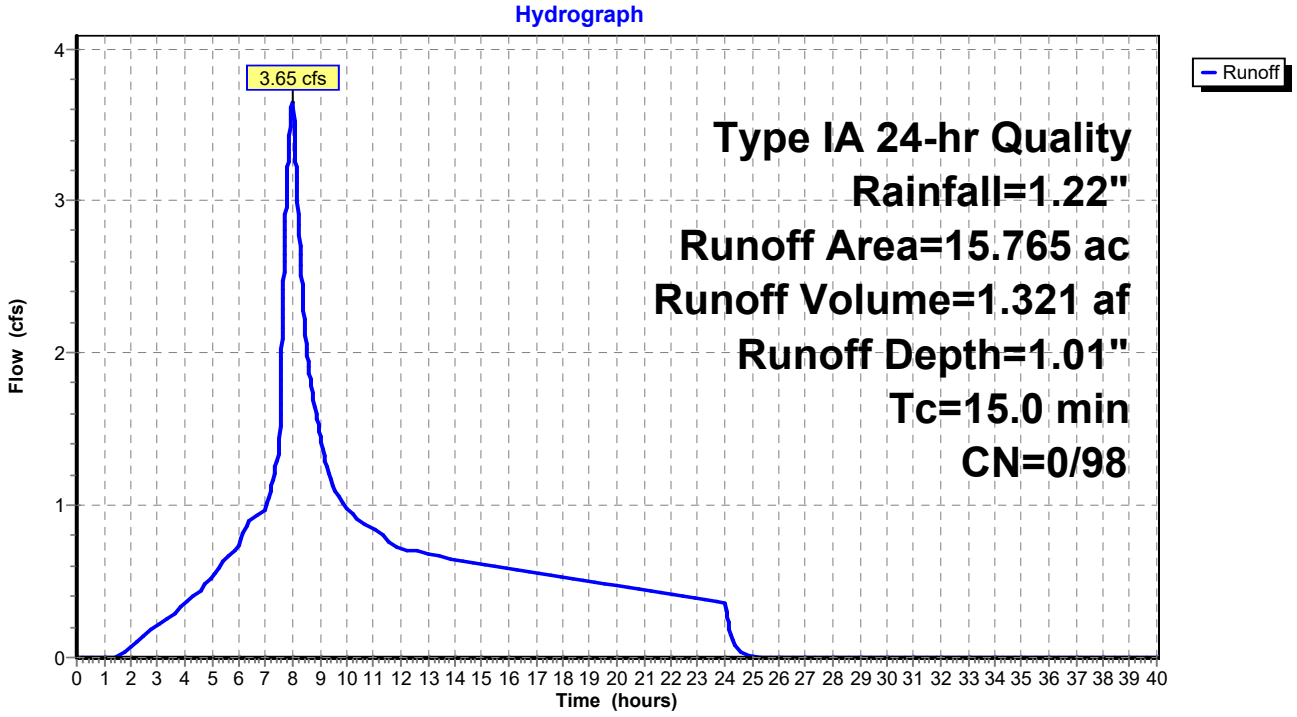
Runoff = 3.65 cfs @ 8.00 hrs, Volume= 1.321 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

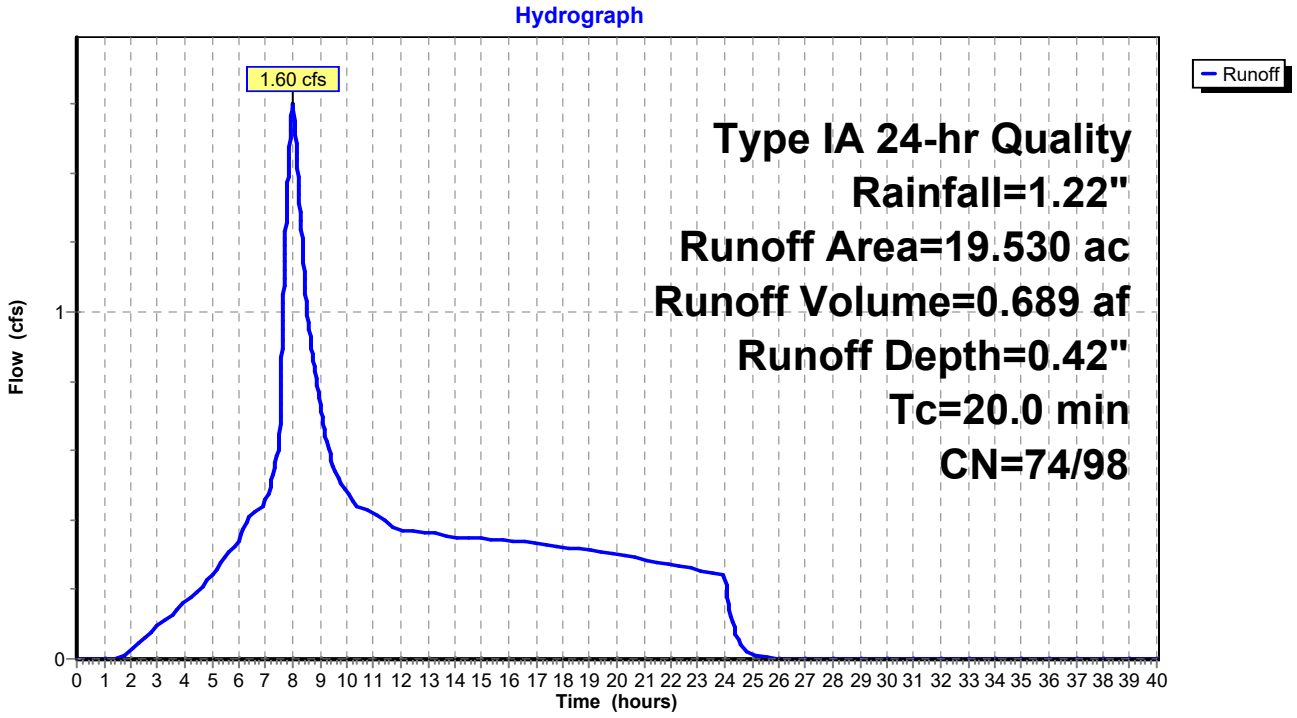
Runoff = 1.60 cfs @ 8.00 hrs, Volume= 0.689 af, Depth= 0.42"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

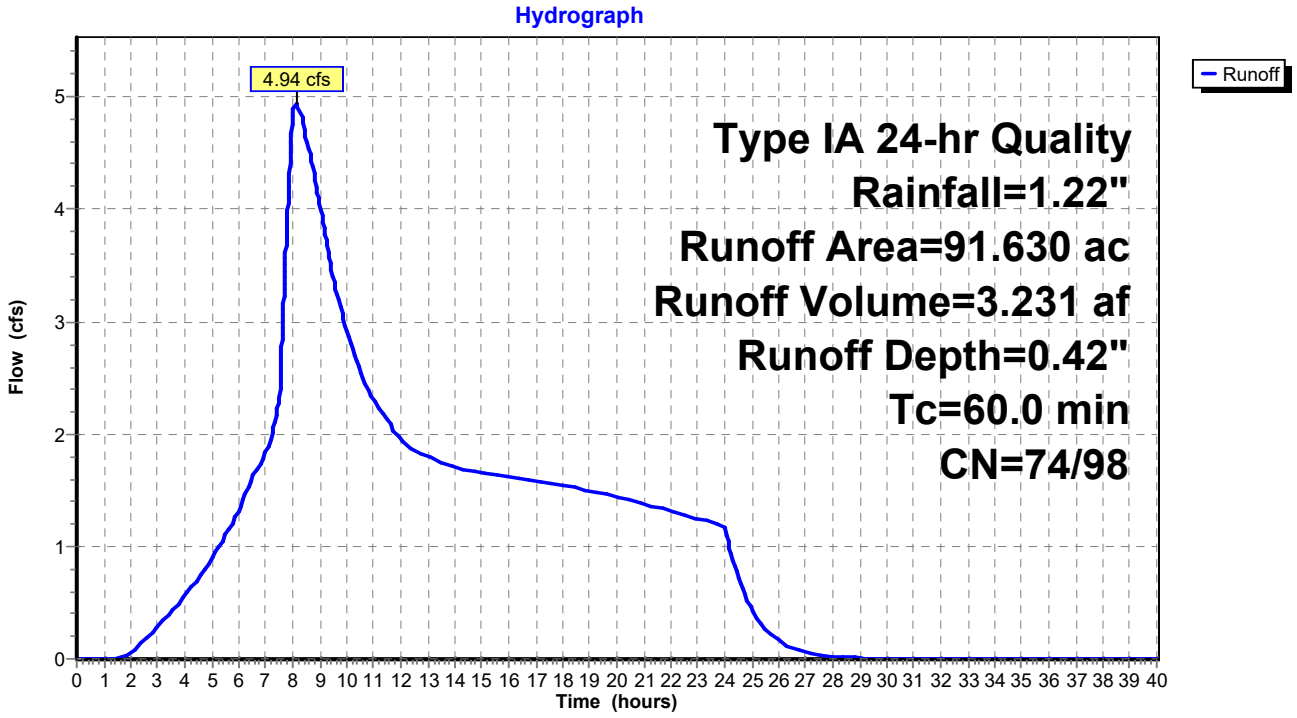
Runoff = 4.94 cfs @ 8.14 hrs, Volume= 3.231 af, Depth= 0.42"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

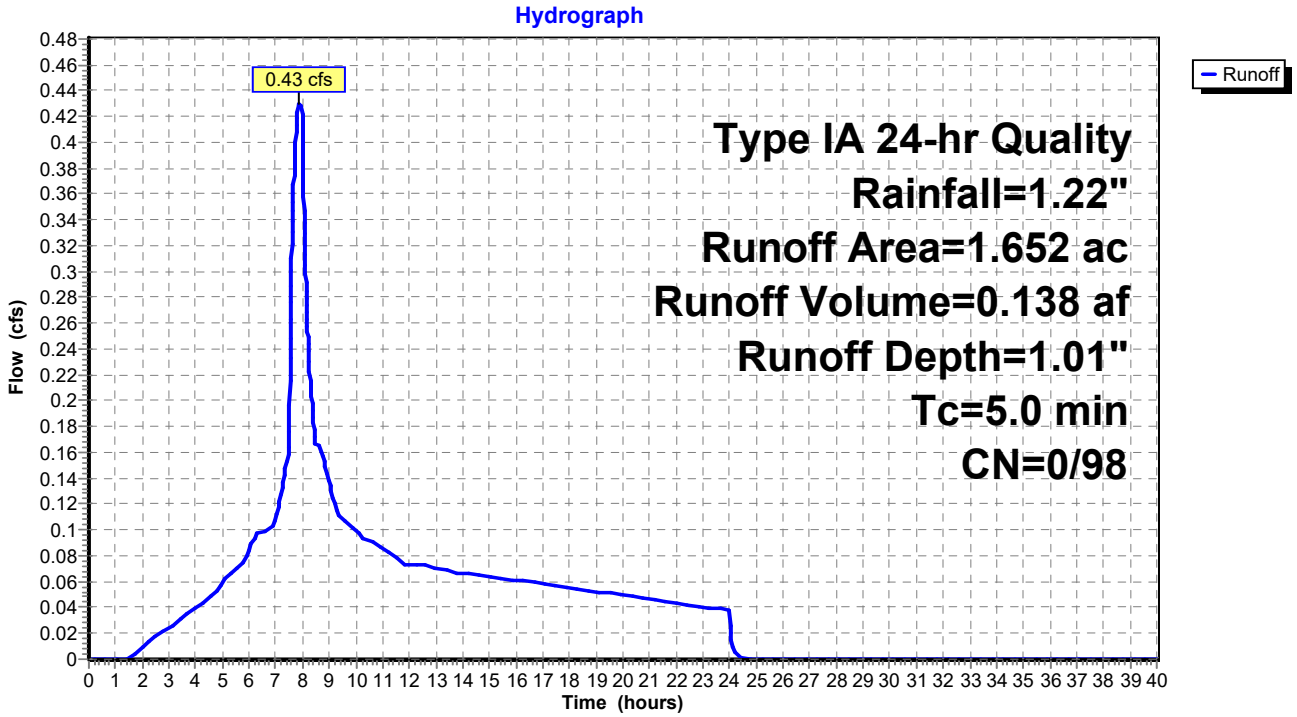
Runoff = 0.43 cfs @ 7.89 hrs, Volume= 0.138 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

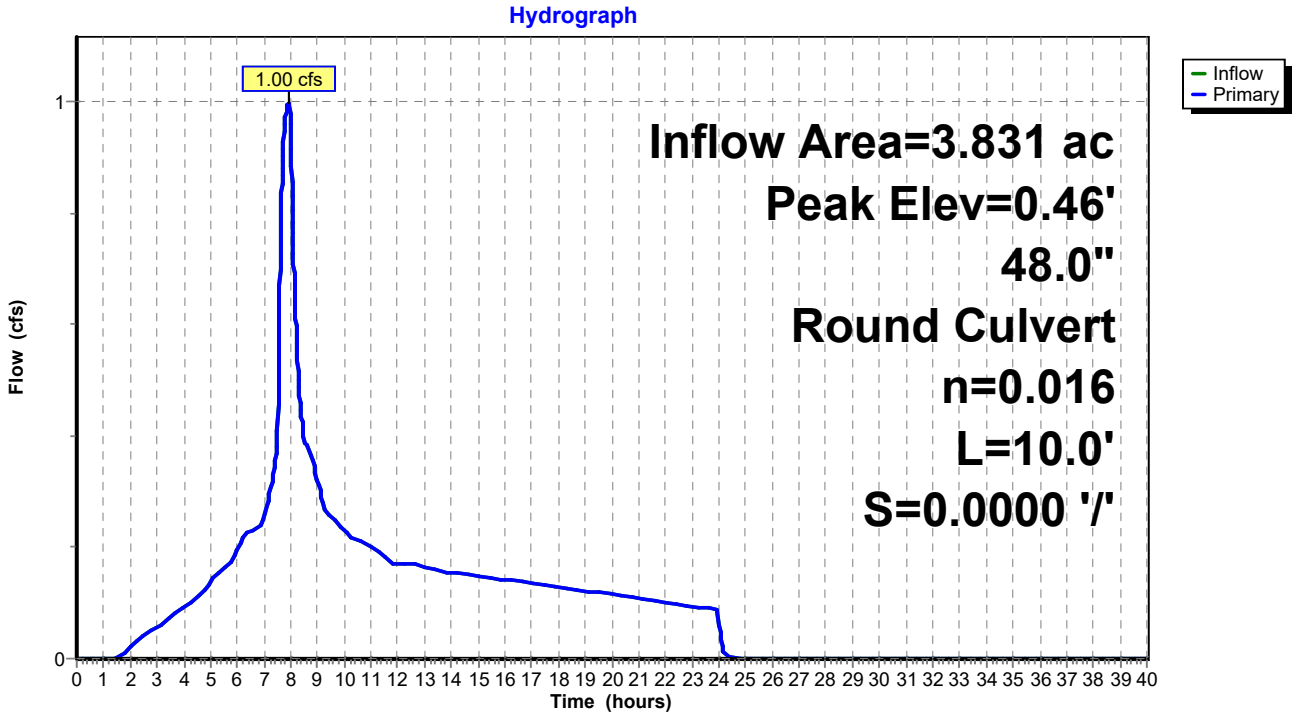
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.00 cfs @ 7.89 hrs, Volume= 0.321 af
Outflow = 1.00 cfs @ 7.89 hrs, Volume= 0.321 af, Atten= 0%, Lag= 0.0 min
Primary = 1.00 cfs @ 7.89 hrs, Volume= 0.321 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.46' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=0.99 cfs @ 7.89 hrs HW=0.46' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.99 cfs @ 1.89 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

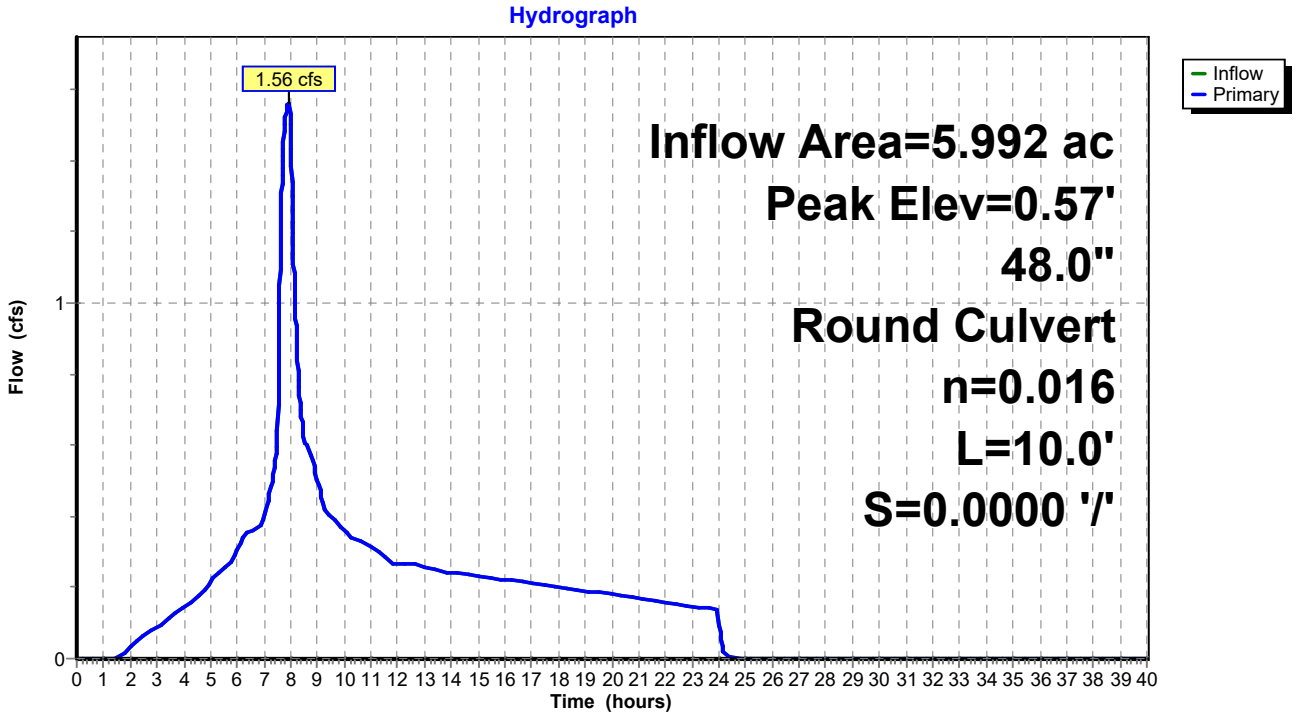
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.56 cfs @ 7.89 hrs, Volume= 0.502 af
Outflow = 1.56 cfs @ 7.89 hrs, Volume= 0.502 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 7.89 hrs, Volume= 0.502 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.57' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.56 cfs @ 7.89 hrs HW=0.57' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.56 cfs @ 2.17 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

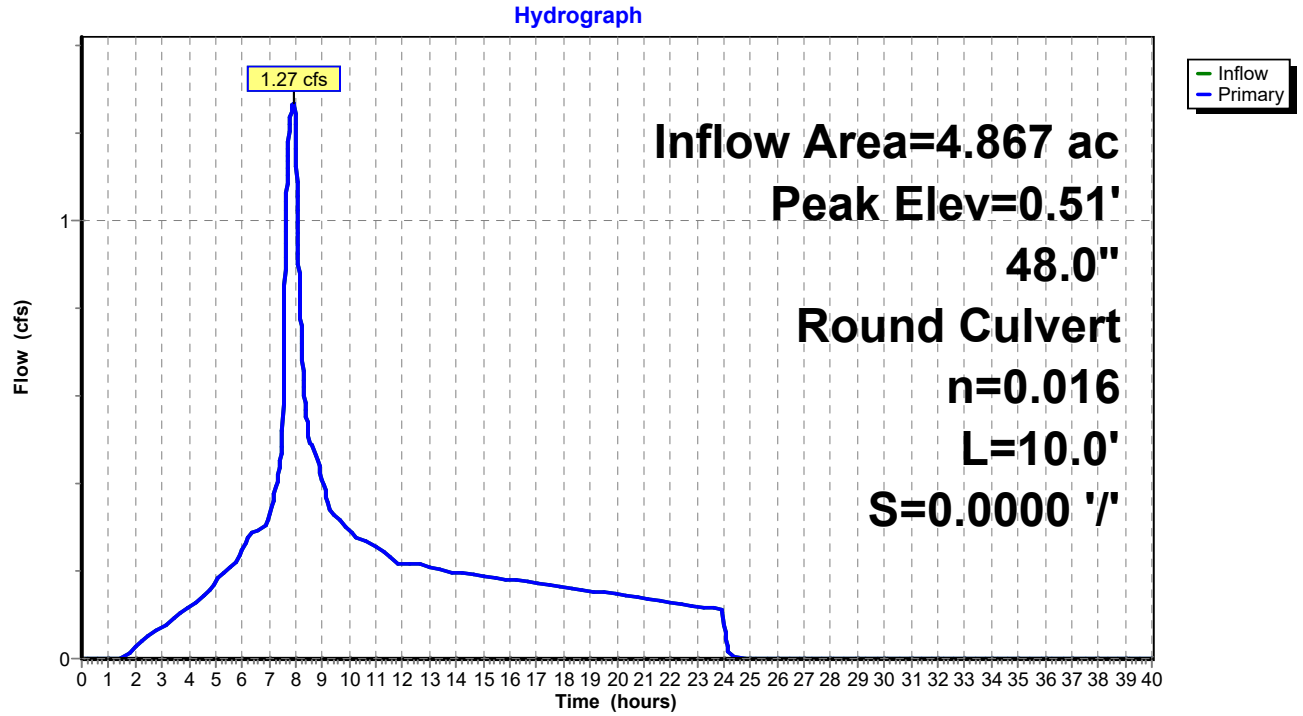
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.27 cfs @ 7.89 hrs, Volume= 0.408 af
Outflow = 1.27 cfs @ 7.89 hrs, Volume= 0.408 af, Atten= 0%, Lag= 0.0 min
Primary = 1.27 cfs @ 7.89 hrs, Volume= 0.408 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.51' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.26 cfs @ 7.89 hrs HW=0.51' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.26 cfs @ 2.04 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

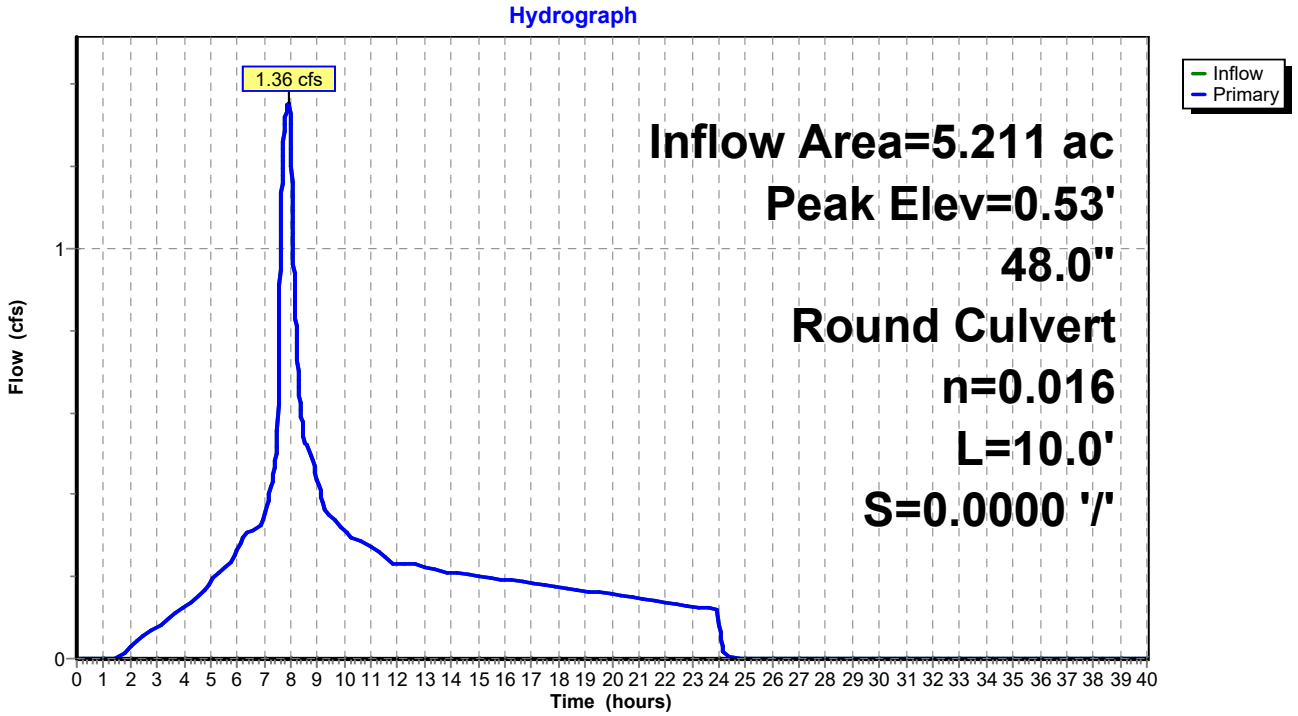
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.36 cfs @ 7.89 hrs, Volume= 0.437 af
Outflow = 1.36 cfs @ 7.89 hrs, Volume= 0.437 af, Atten= 0%, Lag= 0.0 min
Primary = 1.36 cfs @ 7.89 hrs, Volume= 0.437 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.53' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.35 cfs @ 7.89 hrs HW=0.53' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.35 cfs @ 2.08 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

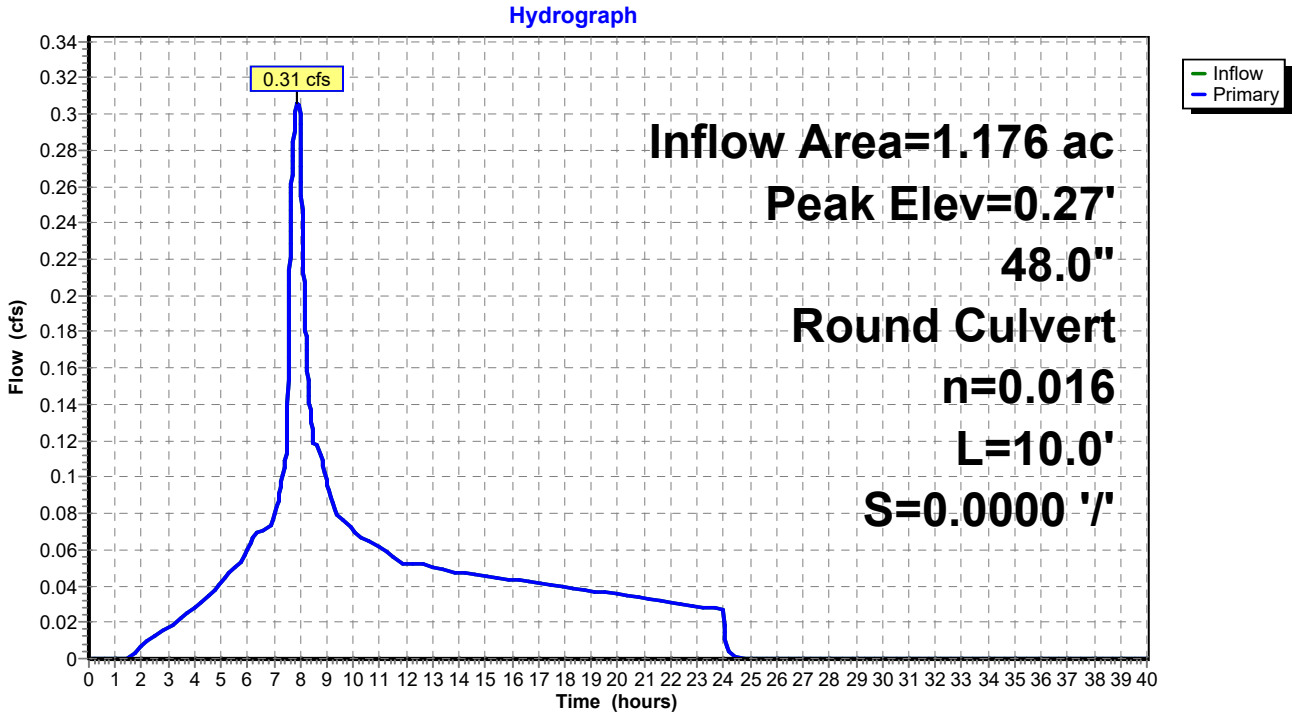
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 0.31 cfs @ 7.89 hrs, Volume= 0.099 af
Outflow = 0.31 cfs @ 7.89 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 7.89 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.27' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=0.30 cfs @ 7.89 hrs HW=0.27' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.30 cfs @ 1.28 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

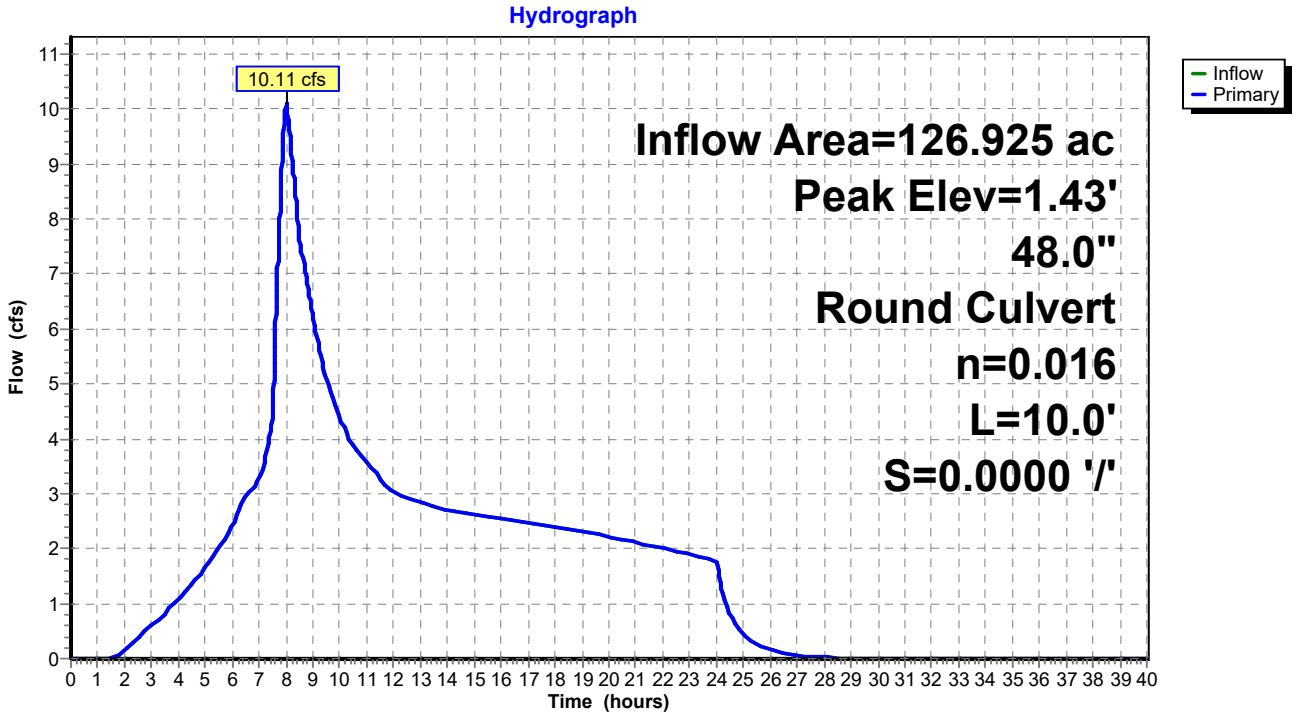
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 0.50" for Quality event
Inflow = 10.11 cfs @ 8.01 hrs, Volume= 5.240 af
Outflow = 10.11 cfs @ 8.01 hrs, Volume= 5.240 af, Atten= 0%, Lag= 0.0 min
Primary = 10.11 cfs @ 8.01 hrs, Volume= 5.240 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.43' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=10.10 cfs @ 8.01 hrs HW=1.43' (Free Discharge)
└**1=Culvert** (Barrel Controls 10.10 cfs @ 3.74 fps)

Pond 10P: Offsite Flows



Appendix D. Stormwater Facility Design Calculations

WQF#1

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	New Project
Project Type	Addition
Location	
Stormwater Management Area	4817
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Pavement	46,407	Grass	ConventionalConcrete	B	BMP(1)
Grass	27,950	Grass	Grass	B	BMP(1)

LID Facility Sizing Details

Pond Sizing Details

Pond ID	Design Criteria(1)	Facility Soil Type	Max Depth (ft)(2)	Top Area (sq-ft)	Side Slope (1:H)	Facility Vol. (cu-ft)(3)	Water Storage Vol. (cu-ft)(4)	Adequate Size?
BMP(1)	FCWQT	A1	7.00	4,817.0	4	13,832.4	12,583.5	Yes

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

WQF#1

Simple Pond Geometry Configuration

Pond ID: BMP(1)
Design: FlowControlAndTreatment

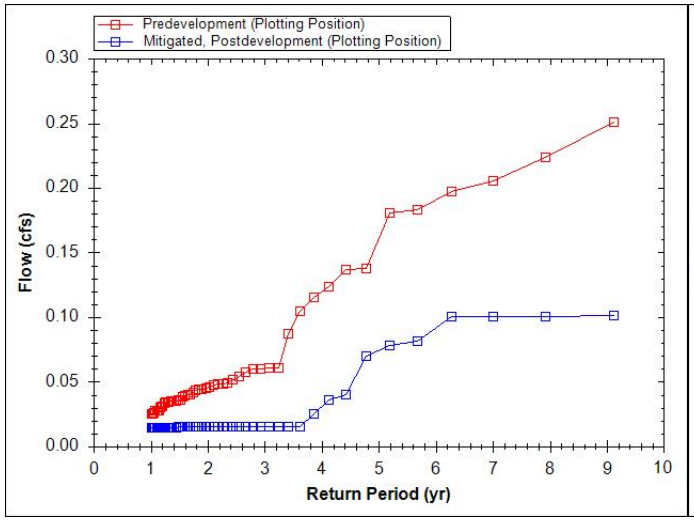
Shape Curve

Depth (ft)	Area (sq ft)
7.0	4,817.0

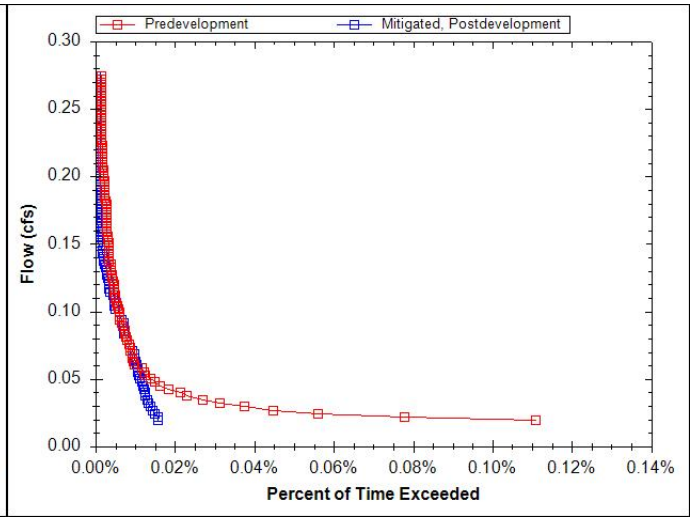
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	0.5
Upper Orifice Invert(ft)	4.7
Upper Orifice Dia (in)	2.5
Overflow Weir Invert(ft)	6.0
Overflow Weir Length (ft)	6.3

Flow Frequency Chart



Flow Duration Chart



ODOT I-205 CW/Abernethy Post-Construction SWMP
Stormwater Facility Design Calculations - WQF #2 (bioslope)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix C

Long term infiltration rate of ecology mix (inches/hour)	10
Length of Bioslope (feet)	1900
Width of bioslope (feet)	4.5
Converstion Factor	43200
Safety Factor	1
$Q_{infiltration}=(LTIR_{EM})(L_{BIO})(W_{BIO})/(C)(SF)$	
Assumed long Term infiltration Capacity $Q_{infiltration}$, cfs	1.98
Required Water Quality Design Flow, cfs	0.80

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF #3 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**7.5**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.018	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	10.2	
XS Area, ft^2	2.96	
Velocity, fps	0.338	v=Q/A
Design flow, cfs	1.00	From HydroCAD output, WQ storm event
Bottom length, ft	**184.6**	L=v*t, Minimum 100 ft
Top length, ft	**195.2**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**18.2**	
Max shear stress, lb/sf	0.372	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	1.16	v=$Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF #4 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**16.0**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.01	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	18.6	
XS Area, ft^2	5.72	
Velocity, fps	0.273	v=Q/A
Design flow, cfs	1.56	From HydroCAD output, WQ storm event
Bottom length, ft	**149.4**	L=v*t, Minimum 100 ft
Top length, ft	**160.0**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**26.6**	
Max shear stress, lb/sf	0.20592	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF#5 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**12.6**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.0107	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	15.2	
XS Area, ft^2	4.59	
Velocity, fps	0.277	v=Q/A
Design flow, cfs	1.27	From HydroCAD output, WQ storm event
Bottom length, ft	**151.3**	L=v*t, Minimum 100 ft
Top length, ft	**162.0**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**23.2**	
Max shear stress, lb/sf	0.220334	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF#6 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**37.8**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.0204	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	40.5	
XS Area, ft^2	13.04	
Velocity, fps	0.410	v=Q/A
Current design flow, cfs	1.35	
Full build out additional flow, cfs	4.00	
Total design flow, cfs	5.35	From HydroCAD output, WQ storm event
Bottom length, ft	**223.5**	L=v*t, Minimum 100 ft
Top length, ft	**234.2**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**48.5**	
Max shear stress, lb/sf	0.42432	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF#7 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**26.6**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.015	Minimum 1.5%, maximum 6%
Water depth, ft	0.25	Max Depth 4-6% is 3", 4" for less than 4%
Top width	28.6	
XS Area, ft^2	6.91	
Velocity, fps	0.289	v=Q/A
Current design flow, cfs	0.30	
Full build out additional flow, cfs	1.70	
Total design flow, cfs	2.00	From HydroCAD output, WQ storm event
Bottom length, ft	**158.3**	L=v*t, Minimum 100 ft
Top length, ft	**168.3**	
Depth w/FB, ft	1.25	
Top width w/ FB, ft	**36.6**	
Max shear stress, lb/sf	0.234	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF #8 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**50.0**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.01	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	52.7	
XS Area, ft^2	17.12	
Velocity, fps	0.290	v=Q/A
Current design flow, cfs	0.47	
Full build out additional flow, cfs	4.49	
Total design flow, cfs	4.96	From HydroCAD output, WQ storm event
Bottom length, ft	**158.4**	L=v*t, Minimum 100 ft
Top length, ft	**169.1**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**60.7**	
Max shear stress, lb/sf	0.208	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	1.88	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

WQF#9

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	Jon Storm Parking Lot
Project Type	RoadProject
Location	
Stormwater Management Area	240
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Parking Lot	10,200	Grass	ConventionalConcrete	D	BMP

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
BMP	WaterQuality	Stormwater Planter - Infiltration	A1	153.0	240.0	0.0

Pond Sizing Details

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

Appendix E. Operation and Maintenance Manuals

OPERATION & MAINTENANCE MANUAL

DFI No. : DXXXXX
Facility Type: Bioretention Pond

MARCH, 2019

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1. IDENTIFICATION 1

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5. FACILITY HAZ MAT SPILL FEATURE(S) 2

6. AUXILIARY OUTLET (HIGH FLOW BYPASS) 3

7. MAINTENANCE REQUIREMENTS 3

8. WASTE MATERIAL HANDLING 4

APPENDIX A: Operational Plan and Profile Drawing(s)

APPENDIX B: ODOT Project Plan Sheets

1. Identification

Drainage Facility ID (DFI):	**[DXXXXX]**
Facility Type:	Bioretention Pond
Construction Drawings:	(V-File Number) [xxV-xxx]
Location:	District: 1
	Highway No.: 064
	Mile Post: [10.15; 10.17 (beg./end)]
	Description: This facility is located in the gore zone between NB I-205 and the exit ramp to OR213.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	[ODOT Designer – [Region 1 Tech. Center, David McDonald Consultant Designer – [HDR, Cory Gieseke, 503.423.3803]
Facility construction:	20__
Contractor:	_____.

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4. Storm Drain System and Facility Overview

A bioretention pond facility provides water quality treatment of the smaller storm events and detention of the larger storm events.

The bioretention pond is a grassy-lined facility with a flat trapezoidal cross section and a flat bottom. Treatment is provided through infiltration processes through the amended soil media. The facility is sized to fully infiltrate the water quality storm event.

When the flows exceed the water quality flows, the facility begins to provide detention. Detention is required to reduce or mitigate the increases in discharge, resulting from development. The facility is designed to store and gradually release (or attenuate) stormwater runoff via a control structure or release mechanism, then releasing it slowly over a more extended period of time. The flow control mechanism for this facility involves an orifice surrounded by a wirecloth strainer assembly. When flows exceed the water quality design flow, the orifice restricts the flow causing the water to backup within the facility.

The outlet of the facility will convert an existing ditch drain to an outlet structure. Discharge is routed through an existing stormwater system and eventually reaches the Clackamas River.

A. Maintenance equipment access:

Maintenance access to the facility will be from the shoulder of I-205 NB.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☐ Allowed (with limitations)
☒ Not allowed

C. Special Features:

☒ Amended Soils
☒ Porous Pavers
☐ Liners
☒ Underdrains

5. Facility Haz Mat Spill Feature(s)

The bioretention pond can be used to store a volume of liquid by blocking the outlet pipe located at the outlet of the facility.

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6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

☒ Designed into facility
The auxiliary outlet feature is built in to the outlet structure. When high flows occur, water will bypass the primary outlet and overtop the auxiliary outlet to be routed downstream.

☐ Other, as noted below

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

☒ Table 1 (general maintenance)
☒ Table 2 (stormwater ponds)
☐ Table 3 (water quality biofiltration swales)
☐ Table 4 (water quality filter strips)
☐ Table 5 (water quality bioslopes)
☐ Table 6 (detention tank)

☐ Table 7 (detention vault)
☐ Appendix C (proprietary structure)

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

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OPERATION & MAINTENANCE MANUAL

DFI No. : [DXXXXX]
Facility Type: Bioslope

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MARCH, 2019

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6. AUXILIARY OUTLET (HIGH FLOW BYPASS) ..... ERROR! BOOKMARK NOT DEFINED.

7. MAINTENANCE REQUIREMENTS 3

8. WASTE MATERIAL HANDLING 3

APPENDIX A: Operational Plan and Profile Drawing(s)

APPENDIX B: ODOT Project Plan Sheets

DRAFT

1. Identification

Drainage Facility ID (DFI):	**[DXXXXX]**
Facility Type:	Bioslope
Construction Drawings:	(V-File Number) [xxV-xxx]
Location:	District: 1
	Highway No.: 064
	Mile Post: 9.76; 10.13 (beg./end)1
	Description: This facility is located along the northbound lanes of I-205 between 99E and OR213.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	ODOT Designer – Region 1 Tech. Center, David McDonald Consultant Designer – HDR, Cory Gieseke, 503.423.3803
Facility construction:	20__
Contractor:	_____.

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4. Storm Drain System and Facility Overview

Bioslopes are flow-through stormwater treatment facilities incorporated into roadside embankments and placed between pavement and a downstream conveyance system. These facilities utilize physical straining or filtration, sorption, carbonate precipitation, vegetative uptake and microbial degradation to provide stormwater treatment. Bioslopes are recommended for highway application because of their minimal right-of-way requirements and maintenance schedule. Other names for bioslopes that have been used include ecology embankment and media filter drain.

Bioslopes are designed to treat sheet flow from an adjacent impervious surface. A typical bioslope has the following facility features and components:

- **Treatment Zone using Ecology mix** – It is provided to remove pollutants as stormwater runoff drains through this zone. The ecology mix is a mixture of aggregate, dolomite, gypsum, and perlite.
- **Sub surface drain** – it is provided to allow positive outflow for runoff at the toe of the bioslope.

This facility is located from Station “L” 665+00 to 684+00. This facility is located adjacent to the roadway shoulder and is 4 feet wide. This facility incorporates 1 foot of water quality soil and 18 inches of granular rock backfill. A 6 inch perforated pipe will be used to drain the facility. The facility will discharge into an adjacent existing roadside ditch which conveys runoff to the Clackamas River through an existing stormwater conveyance system.

A. Maintenance equipment access:
Maintenance of the bioslope will be accessed from the shoulder of the northbound I-205 lanes.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☐ Allowed (with limitations)
☒ Not allowed

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☒ Liners
☒ Underdrains

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5. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☐ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☒ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)

6. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

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OPERATION & MAINTENANCE MANUAL

DFI No. : [DXXXXX]
Facility Type: Water Quality Biofiltration Swale

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MARCH, 2019

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6. AUXILIARY OUTLET (HIGH FLOW BYPASS) ..... ERROR! BOOKMARK NOT DEFINED.

7. MAINTENANCE REQUIREMENTS 2

8. WASTE MATERIAL HANDLING 3

APPENDIX A: Operational Plan and Profile Drawing(s)

APPENDIX B: ODOT Project Plan Sheets

DRAFT

1. Identification

Drainage Facility ID (DFI):	**[DXXXXX]**
Facility Type:	Water Quality Swale
Construction Drawings:	(V-File Number) [xxV-xxx]
Location:	District: 1
	Highway No.: 064
	Mile Post: 9.63; 9.66 (beg./end)
	Description: This facility is located to the north of I-205 between the highway and Main St.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record: ODOT Designer – Region 1 Tech. Center, David McDonald
Consultant Designer – HDR, Cory Gieseke, 503.423.3803

Facility construction: 20__
Contractor: _____.

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4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

The facility is located between the southbound lanes of I-205 and Main St. Access to the facility is provided by an access road off of the northbound shoulder of Main St.

The swale treats 3.2 acres of I-205. Runoff is conveyed to a pollution control manhole located directly upstream of the facility. The swale discharges to an existing stormwater system which is connected to the Clackamas River.

A. Maintenance equipment access:

Maintenance to the facility is provided through a constructed access road off of Main St.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☒ Allowed (with limitations)
☐ Not allowed

C. Special Features:

☒ Amended Soils
☒ Porous Pavers
☐ Liners
☐ Underdrains

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5. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☒ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)

6. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

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OPERATION & MAINTENANCE MANUAL

DFI No. : [DXXXXX]
Facility Type: Stormwater Planter

March 2019

INDEX

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2. FACILITY CONTACT INFORMATION 1

3. CONSTRUCTION 1

4. STORM DRAIN SYSTEM AND FACILITY OVERVIEW 2

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6. WASTE MATERIAL HANDLING 3

Appendix A: Operational Plan and Profile Drawing(s)

Appendix B: ODOT Project Plan Sheets

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1. Identification

Drainage Facility ID (DFI):	**DXXXXX**
Facility Type:	Stormwater Planter
Construction Drawings:	(V-File Number) xxV-xxx
Location:	District: 2B
	Highway No.: xx
	Mile Post: x.xx; x.xx (beg./end)
	Description: This facility is located along the west side of Clackamette Dr. approximately 100 feet north of driveway for John Storm Park.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record: ODOT Designer – Region 1 Tech. Center, David McDonald
Consultant Designer – HDR, Cory Gieseke, 503.423.3803

Facility construction: 20__
Contractor: _____.

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4. Storm Drain System and Facility Overview

Stormwater planters are structural landscaped reservoirs used to collect, filter, and infiltrate stormwater, allowing pollutants to settle and filter out as the water percolates through the vegetation, growing medium, and gravel. Depending on site conditions, planters can be designed to completely or partially infiltrate the stormwater they receive.

This facility is located along the east side of Clackamette Dr. approximately 100 feet north of the driveway for John Storm Park. This facility is designed with 18 inches of water quality soil on top of 18 inches of storage rock.

Stormwater is conveyed into the stormwater planter through evenly spaced curb cut inlets along the side of the stormwater planter adjacent to the roadway. Once the stormwater percolates through the vegetation and water quality soil, it infiltrates into the native subsoil.

A. Maintenance equipment access:
The facility can be accessed from Clackamette Dr.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☐ Allowed (with limitations)
☒ Not allowed

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☒ Liners
☒ Underdrains

5. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

https://www.oregon.gov/ODOT/GeoEnvironmental/Pages/Stormwater.aspx

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The stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual:

Mark as Required and always include Table 1:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☐ Table 3 (water quality biofiltration swales)
- ☒ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)

6. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the Roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:
https://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

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Table 1: General Maintenance			
Maintenance Component	**Defect or Problem**	**Condition When Maintenance is Needed**	**Recommended Maintenance to Correct Problem**
Annual Visual Inspection and Maintenance	Routine inspection	**Facilities should be inspected annually prior to fall rains**. If appropriate, also inspect the facility after the first significant rain event following dry spell (e.g. the first 24-hour rainfall greater then 0.5 inches after summer)	Identify existing and potential operational problems. Repair damaged components that are critical to the operation of the feature (e.g. flow control valves, liners, underdrains, and pipes) as soon as practical. Schedule routine maintenance such as mowing, sump cleanout, lube moving parts, repairs, etc. If the facility is problematic, schedule additional inspections or maintenance. Repair or replace facility field markers according to Technical Bulletin GE10-01(B). A marked facility has an O&M Plan.
	Maintenance of ancillary structures, if present Examples include • Flow splitter manhole • Diversion manhole • Catch basin • Shut-off valve assembly • Pretreatment or primary treatment manhole • Large detention pipe • Vault • Outfall	Damage or problems are observed or anticipated during the annual inspection.	Grease moving parts to ensure proper operation. Remove sediment from sumps, vaults, catch basins, and structures to prevent the release of oil or sediment. Annual cleaning is recommended. The use of a Vactor® truck is allowed unless prohibited in the facility's O&M manual Repair or replace damaged orifice assembly/riser pipe. Restore to design standards. Be aware of possible confined space requirements. Repair or replace damaged gates, locks, chains, etc that are used to secure valves and access points to prevent vandalism
General	Temporary erosion control hampers maintenance	Erosion control remains from project construction (contractor did not remove)	Contact contractor to complete work OR remove temporary erosion control that is not specified in the O&M Plan.

Table 1: General Maintenance			
Maintenance Component	**Defect or Problem**	**Condition When Maintenance is Needed**	**Recommended Maintenance to Correct Problem**
General	Spilled material has entered the pond or structures	Oil, fuel, or other pollutants are evident following a spill event or accident.	Utilize valves or other features, if present, to contain the spilled material. Remove and properly manage spilled material and contaminated soil. Contact Region HazMat or spill response company for spill cleanup assistance where appropriate. Contact a Region Hydraulic Engineer for technical assistance with pond restoration, if necessary.
	Litter (trash and debris)	Trash poses a hazard, inhibits function, or is aesthetically unacceptable (e.g. evidence of dumping).	Remove problematic trash and debris as soon as practical. There should be no evidence of dumping. Remove non-problematic trash in accordance with District litter practices.
	Insects	Insects interfere with maintenance activities.	Implement vector control in accordance with County Health and District practices.
	Vegetation growth (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity.	Mow access, berms, bottom, and side-slopes of the facility as noted in the District Integrated Vegetation Management (IVM) Plan. Remove vegetation in or around grates that obstruct (or could obstruct) flow. Avoid mowing or removing vegetation that does not need to be controlled. Avoid removing vegetation too low to the ground. NOTE: Removing vegetation too near to the ground may result in scalping of the soil, unwanted damaged to vegetation, or growth of unwanted plant species. Heavy equipment is allowed within aboveground water quality and detention facilities unless access restrictions are listed in the O&M Manual.

Table 1: General Maintenance			
Maintenance Component	**Defect or Problem**	**Condition When Maintenance is Needed**	**Recommended Maintenance to Correct Problem**
	Noxious weed growth	Control of noxious weeds is required by law or prescribed in the District IVM Plan	Remove noxious weeds in accordance with the District IVM Plan. Follow Environmental Protection Agency (EPA) label and ODOT policies on herbicide usage.
General	Hazard trees	Trees are found to be weakened, unsound, undermined, leaning, or exposed and may fall across the highway	Remove hazard trees as soon as practical. Where appropriate, consult an ODOT Forester for help identifying or removing hazard trees.
	Tree growth	Tree growth restricts access, obstructs function, jeopardizes infrastructure, or interferes with maintenance actions.	Prune or remove as needed to maintain access, function, and tree health. Manage potentially problematic woody material before the trees reach 6 inches diameter at breast height (DBH). Consult an ODOT Forester for the removal or management of trees greater than 6 inches DBH. Obtain permits where appropriate. Refer to the District IVM Plan for the management of smaller trees. Avoid removing trees that will not interfere with the operation or maintenance of the facility.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Follow applicable Guidance from Table 1 AND applicable guidance from this table.		
	Vegetation growth in **dry ponds** (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Collected water should drain.	Dry ponds need vegetation on the bottom and sides. Vegetation management typically occurs around and within the facility. Mow access, berms, bottom, and side-slopes as noted in the District Integrated Vegetation Management (IVM) Plan. (typically annually) Heavy equipment is allowed on dry pond bottoms unless access restrictions are listed in the O&M Manual.
	Vegetation growth in **wet ponds** (mowing and brushing) NOTE: Wet ponds are not typical.	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Water may be stored year-round without draining.	Wet ponds need vegetation on the bottom and sides. Vegetation management typically occurs around the facility. Mow access and berms as noted in the District Integrated Vegetation Management (IVM) Plan. Ponds bottoms are intended to capture and store water. Vegetation removal from pond bottoms is infrequent.
	Sediment accumulation in pre-treatment features (e.g. forebays, basins, or fully exposed impermeable liners) NOTE: Exposed liners are not typical.	Sediment affects flow. Sediment jeopardizes infrastructure.	Remove sediment from ponds and pipe ends as needed to ensure adequate drainage into treatment pond (grassy or wet pond). Use methods that minimize disturbance to surrounding vegetation. Heavy equipment is allowed on dry pond bottoms unless access restrictions are listed in the O&M Manual. Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual for the disposal of contaminated sediment. Note: Pollutant concentrations may increase if sediment is not routinely removed.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Storage areas	Sediment accumulation along bottom of grassy ponds	Sediment inhibits the flow of water through the grass (>12 inches deep). Sediment inhibits grass growth.	Where practical use a Vactor® truck to remove sediment from grassy areas. When Vactoring® is not practical, follow ditch cleaning practices. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed. Stormwater should infiltrate or flow toward outlet once inflow has ceased. Refer to the general section of this table for side-slope mowing and other routine maintenance actions.
	Sediment accumulation in wet ponds or channels. NOTE: Currently there is limited use of wet ponds to treat stormwater.	Capacity has noticeably decreased (examples below) • low and medium flows go through the bypass, • the ordinary high water level has increased, • flooding occurs when the outflows are not blocked, • pond bottom is level with outlets.	Remove sediment build-up from pipe ends as needed to ensure flow. Use methods that minimize disturbance to surrounding vegetation. Remove sediment to restore designed shape and depth. In high ADT areas, pond dredging may be required every 5 to 10 years to restore the capacity. Cease sediment removal when riprap or liner is encountered. Reseed if necessary to control erosion.
	Erosion	Side slopes show evidence of erosion greater than 4 inches deep and the potential for continued erosion is evident.	Promptly address erosion that causes immediate problems (e.g. damage to highway or highway structure) Schedule non-urgent repairs with routine work. Stabilize slope using appropriate erosion control and repair methods. Repair the cause of the erosion where possible. If necessary, contact the ODOT Erosion Control Coordinator to evaluate the condition.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Storage areas	Beaver dams	Dam inhibits function or jeopardizes the infrastructure.	Dispose of dam debris offsite or outside of the riparian area. Coordinate the removal or relocation of beaver with Oregon Department of Fish and Wildlife (ODFW). Consider installing deterrents where appropriate.
	Flooding	Water is flowing over or is approaching the top of the pond	Check storm drain pipes and structures for blockage. Ensure valves are open. Remove obstructions to restore flow. Evaluate and remove excessive sediment from pond storage areas. Contact the Region Hydraulic Engineer to evaluate the source of flooding or provide design modifications.
Treatment Components	Poor vegetation coverage	Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of pond bottom.	Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed. Trim overhanging limbs and remove brushy vegetation that limit grass growth (provide too much shade).
	Missing or eroded amended soil mix	Bare soil is observed over 10 percent of the amended area.	Identify and resolve erosion problem Add amended soil. Contact a Region Hydraulics Engineer for required material specifications.
	Amended soil mix along pond bottom is clogged	Standing water is observed for seven (7) consecutive days or longer from May through October.	Remove and replace amended soil mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.
	Granular drain backfill material for underdrain pipe plugged	Amended soil mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October.	Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications. Install new drainage geotextile over new granular drain backfill material. Replace amended soil mix.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Treatment Components	Impermeable liner damage NOTE: Liners (if installed) are typically below the grass surface and may not be visible.	Liner is damaged (e.g. during sediment removal or by motoring public). Liner is damaged when condition allows potential contamination to be released to the subsurface.	Repair or replace the liner with similar material. In many cases, rigid plastic liners may be repaired by welding a similar material over the damaged portion or using a non-toxic, waterproof epoxy. If necessary, contact a Region Hydraulics Engineer for technical assistance regarding permanent repair.
Berms and Dikes	Settlement	Any part of the berm has settled 4 inches or lower. Note: Settlement may indicate potential problems with the facility.	Repair berm to design height with similar materials. Contact a Region Hydraulics and Geotechnical Engineer as needed to evaluate the source of the settlement and determine repair options.
	Flow-through	Water is flowing through the pond berm.	Correct cause of flow through (e.g. eliminate burrowing rodents) Install erosion control measures where appropriate. Repair berm with similar materials. If necessary, contact a Region Geotechnical Engineer to evaluate the condition.
	Sloughing	Ongoing erosion is observed with potential for erosion to continue.	Where possible correct the cause of the erosion. Install or replace energy dissipaters where appropriate. Install erosion control measures where appropriate Repair berm with similar materials. If necessary, contact the ODOT Erosion Control Coordinator to evaluate the condition.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Structures and piping Includes • flow splitters • vaults • inlets • bypasses • valves • catch basins • gates	Damaged or missing components	Flow control assembly is not working properly (e.g. loose, bent, unattached, etc.).	Repair or replace valves, gates, orifices and pipes as necessary with similar components. Divert flows when needed.
	Obstruction or blockage	Water does not flow in, through, or out of the structure or piping.	If valves are part of the flow control assembly, verify the valves are open. Refer to the O&M for the location of control valves. Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary). Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.
Outfalls	Insufficient rock armoring at outlets • along channel side slopes and bottom • pipe outlet • along the length of spillway	Minimal layer of rock exists Rock missing along armored area Flow channelization or high flows exposed native soil around the rock armored area	Install erosion control measures Repair or replace rock armoring to original design standard Repair, re-grade, and reseed eroded areas adjacent to rock armoring. Contact a Region Hydraulics Engineer for technical assistance if rock armoring problems continue or a highway structure is at risk

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Follow applicable Guidance from Table 1 AND applicable guidance from this table.		
	Vegetation growth (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. **Swales should be mowed annually.**	Mow access, berms, swale, and side-slopes as noted in the District Integrated Vegetation Management (IVM) Plan. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual.
Swale Components	Sediment accumulation in pre-treatment areas or ancillary structures (e.g. manholes)	Sediment affects flow. Sediment jeopardizes infrastructure.	Remove sediment that prevents adequate drainage into swale. Use methods that minimize disturbance to surrounding vegetation. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual. Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual for the disposal of contaminated sediment. Note: Pollutant concentrations may increase if sediment is not routinely removed.
	Sediment accumulation along swale bottom	Sediment inhibits the flow of water through the grass (e.g. water is ponding or cutting a channel).	Remove sediment from grassy areas. The use of a Vactor® truck is allowed unless access restrictions are listed in the O&M Manual. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed. Stormwater should infiltrate or flow toward outlet once inflow has ceased.

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Swale Components	Erosion	Side slopes show evidence of erosion greater than 2 inches deep and the potential for continued erosion is evident.	Promptly address erosion that causes immediate problems (e.g. damage to highway or highway structure) Schedule non-urgent repairs with routine work. Stabilize slope using appropriate erosion control and repair methods. Repair the cause of the erosion where possible. If necessary, contact the ODOT Erosion Control Coordinator to evaluate the condition.
	Poor vegetation coverage	Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of swale. NOTE: A single incident (e.g. vehicle accident) typically effects less than 10 percent of the area and is unlikely to trigger a repair.	Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed. Trim overhanging limbs and remove brushy vegetation that limit grass growth (provide too much shade).
	Missing or eroded amended soil mix	Bare soil is observed over 10 percent of the amended area.	Identify and resolve erosion problem Add amended soil. Contact a Region Hydraulics Engineer for required material specifications.
	Amended soil mix along swale bottom is clogged	Standing water is observed for seven (7) consecutive days or longer from May through October.	Remove and replace amended soil mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.
	Granular drain backfill material for underdrain pipe plugged	Amended soil mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October.	Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications. Install new drainage geotextile over new granular drain backfill material. Replace amended soil mix.

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Swale Components	Impermeable liner damage NOTE: Liners may not be visible. If present, liners are typically below the grass surface along the bottom of the swale Fabric wrapped around underdrains is not a liner.	Liner is damaged (e.g. during sediment removal or by motoring public). Liner is damaged when condition allows potential contamination to be released to the subsurface.	Repair or replace the liner with similar material. Replace top soil and grass as appropriate. Features with liners, typically have maintenance option limitations; check the O&M Manual. If necessary, contact a Region Hydraulics Engineer for technical assistance.
	Obstruction or blockage of pipes	Water does not flow in, through, or out of the swale.	Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary). Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.
	Flow spreader is uneven or clogged	Water does not flow evenly across the structure	Clean sump or forebay as needed to maintain capacity. Clean or repair spreader as needed to provide a uniform flow and prevent erosion. Level portions of the flow spreader that have settled.

Table 5: Bioslopes

Bioslopes should provide even sheet flow that moves water from edge of pavement.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Follow applicable Guidance from Table 1 AND applicable guidance from this table.		
	Vegetation growth (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. **Slopes should be mowed annually.**	Mow as noted in the District Integrated Vegetation Management (IVM) Plan. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual.
Bioslope Components	Sediment accumulation	Sediment inhibits the flow of water to the bioslope (e.g. water is ponding or cutting a channel).	Remove sediment from grassy areas. The use of a Vactor® truck is allowed unless access restrictions are listed in the O&M Manual. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed.
	Ecology mix is clogged	Standing water is observed for seven (7) consecutive days or longer from May through October.	Remove and replace ecology mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.
	Granular drain backfill material for underdrain pipe plugged	Ecology mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October.	Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications. Install new drainage geotextile over new granular drain backfill material. Replace amended soil mix.
	Poor vegetation coverage	Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of the strip	Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed.

Appendix F. Downstream Analysis

Downstream Conveyance Analysis Memo

Date:	Friday, December 20, 2019
Project:	ODOT | K19786 I-205: I-5 to OR 213, Phase 1
To:	Tom Hamstra, ODOT – PM
From:	Mike Bertram, HDR – PM
Subject:	Task 7 – Hydraulics and Stormwater

Oregon City Downstream Drainage Analysis

The following downstream drainage conveyance system requirements will be incorporated into the design of the stormwater management plan.

- Stormwater runoff discharges will not adversely affect the safety and/or flooding potential of adjacent or downstream property owners.
- A written downstream analysis will document existing conditions and demonstrate adequate conveyance capacity of the natural and constructed drainage system downstream of the project site.
- The downstream analysis will extend to the distance where the project site contributes less than 15 percent of the cumulative tributary drainage area or 1,500 feet downstream of the approved point of discharge, whichever is greater. In capacity constrained areas, the City may extend the distance of the required downstream analysis.
- When downstream drainage conveyance systems are inadequate or systems are determined to be undersized, or when, in the opinion of the City, property or properties may be adversely affected by the existing and/or proposed stormwater release rates, the applicant may provide additional onsite stormwater flow control measures to reduce contributions to the downstream system, or correct and/or improve downstream drainage conditions so that the proposed stormwater release rates do not have to be restricted further.
- The applicant is responsible for replacing, repairing, upsizing, constructing, or reconstructing the downstream conveyance system to provide the capacity necessary to develop the property. The downstream conveyance system may include any open or closed public or private stormwater conveyance system.
- The applicant is required to identify all offsite downstream conveyance restrictions and the cost of upsizing/improving the conveyance systems to meet the minimum conveyance requirements.

Design Methods

The design event is determined by the size of the contributing areas. See Table 1 for a list of design storms for corresponding contributing areas. Conveyance systems will be designed and constructed to carry the design storm flowing full with no pressure flow. Flow conditions in existing pipe systems will be evaluated on a case-by-case basis for adequacy. Conveyance systems in the public right-of-way will be designed as gravity systems. The Rational Method for

computing peak discharge is preferred by the City. The Rational Method will be used for all existing and proposed conveyance systems that receive drainage from contributing areas of 25 acres or less and that have a time of concentration of less than 100 minutes. For all other conditions, an approved hydrograph method (e.g., Santa Barba Urban Hydrograph, Natural Resources Conservation Service Method, or Technical Release 55), stormwater management model, or other standard methods as approved by the City will be used. The Manning's equation generally will be acceptable for determining pipe or open channel capacity for drainageways with a contributing area of 50 acres or less. For larger drainage areas, backwater effects will be included in determining capacity for a drainage way.

Table 1 Conveyance System Design Storms

Contributing Drainage Area	Design Storm for Conveyance System Sizing		
	Storm Sewer, Culverts, and Outfall Pipes[a]	Creek or Stream Channels	Bridges
Less than 40 acres	10-year, 24-hour storm	10-year, 24-hour storm	100-year, 24-hour storm
40 to 640 acres	25-year, 24-hour storm	25-year, 24-hour storm	
640 acres or greater	50-year, 24-hour storm	50-year, 24-hour storm	

[a] *When a backwater condition exists, the storm drain system will be designed to convey and contain at least the peak runoff for the 25-year design storm.*

Main Street Outfall

The portion of the project located between station "L" 661+00 and station "L" 698+00 drains north to the Clackamas River through a stormwater conveyance system owned and maintained by Oregon City. The proposed project would add 1.03 acres of impervious area within the contributing drainage basin. A downstream analysis of the Oregon City conveyance system was preformed to verify that the existing system has adequate capacity to convey the increased runoff volume generated from the new impervious area.

The area that drains to the conveyance system is 138 acres and is composed of impervious, industrial, forested, residential, grassed, and wetland areas. The basin area is shown in Figure 1. The NRCS runoff curve numbers used for the hydrologic analysis are listed in Table 2. Per Oregon City standards for drainage areas between 40 and 640 acres, the design storm for analyzing the conveyance system is the 25-year, 24-hour storm or 4.0 inches over a 24-hour storm event. The Santa Barbara Urban Hydrograph (SBUH) Method using a Type 1A unit hydrograph distribution was used to model the runoff. The existing modeled flow was 41.2 cubic feet per second (cfs) and the proposed modeled flow was 41.9 cfs. (Attachment A)

Table 2 NRCS Curve Number Values

Landcover Classification	NRCS Runoff Curve Number
Impervious	98
Industrial	88
Forested	60
Light Residential	68
Grassed Areas >75% Grass	75
Wetland	55

The existing conveyance system is composed of six pipes. The upstream-most pipe is 42 inches in diameter and the five downstream pipes are 48 inches in diameter. The upstream-most pipe is polyvinyl chloride (PVC) and the remainder of the pipes are reinforced concrete pipe (RCP). A Manning's n value of 0.0110 was used for PVC pipe and 0.0130 was used for the RCP.

The existing conveyance system discharges directly to the Clackamas River and is subject to tailwater conditions that range from free discharge to a completely submerged outfall. The system was modeled using both a free discharge tailwater condition and a tailwater elevation of 30 feet, equal to the ordinary high water on the Willamette River. The stage on the Willamette River was used because of the proximity of the outlet to the Willamette River. Table 3 through Table 6 summarize the hydraulic grade line calculations for the proposed and the existing conditions. The proposed conditions for both the free discharge and the submerged outlet meet Oregon City's design guideline of maintaining one foot of freeboard between the hydraulic grade line and the structure rims. The increase in hydraulic grade line due to the increased runoff from the additional pervious surface ranges from no observed increase at the outlet, to 0.02 foot increase in the first pipe of the conveyance system.

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Figure 1 Drainage Basins

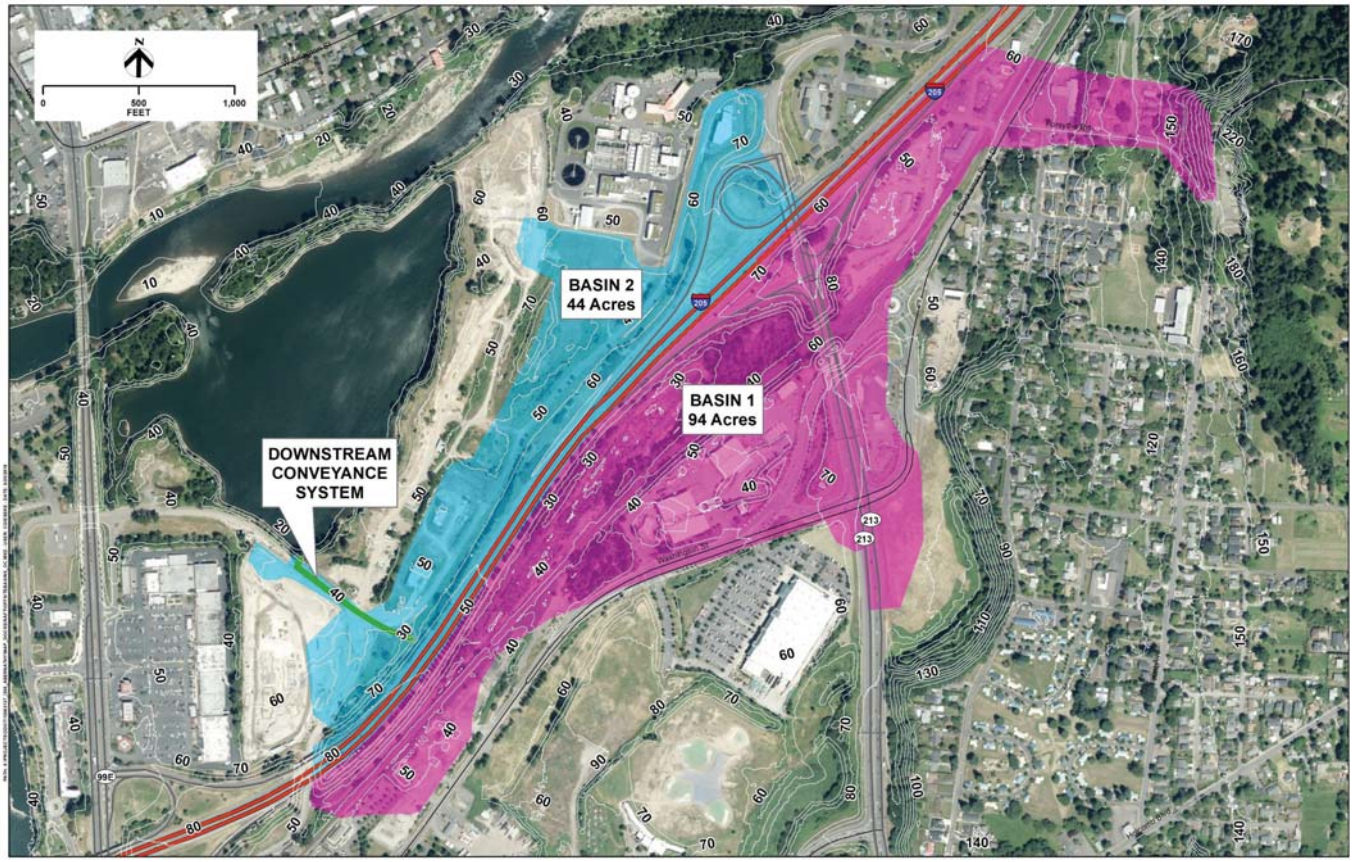


Table 3 Submerged Outlet Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.42	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0012	0.14	41.19	0.9	4.067	41.05	36.67	33.12	30.91	39.00	2.33
PIPE 2	41.42	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0008	0.06	36.98	0.9	0.940	36.93	35.94	31.41	31.07	37.88	1.94
PIPE 3	41.42	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0008	0.11	35.99	0.9	2.098	35.88	33.66	31.07	29.57	34.88	1.22
PIPE 4	41.42	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0008	0.18	33.78	0.9	1.652	33.60	31.95	29.37	27.42	35.17	3.22
PIPE 5	41.42	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0008	0.13	31.95	0.9	1.390	31.82	30.40	27.32	26.11	32.34	1.94
PIPE 6	41.42	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0008	0.04	30.43	0.9	0.391	30.39	29.99	25.91	25.82	31.21	1.22
Outfall										30.00				30.00				

Table 4 Free Discharge Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.42	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0012	0.14	33.01	0.9	4.067	32.87	28.49	33.12	30.91	39.00	10.51
PIPE 2	41.42	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0008	0.06	28.80	0.9	0.940	28.75	27.76	31.41	31.07	37.88	10.12
PIPE 3	41.42	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0008	0.11	27.81	0.9	2.098	27.70	25.48	31.07	29.57	34.88	9.40
PIPE 4	41.42	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0008	0.18	25.60	0.9	1.652	25.42	23.77	29.37	27.42	35.17	11.40
PIPE 5	41.42	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0008	0.13	23.77	0.9	1.390	23.64	22.22	27.32	26.11	32.34	10.12
PIPE 6	41.42	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0008	0.04	22.25	0.9	0.391	22.21	21.81	25.91	25.82	31.21	9.40
Outfall										21.82				21.82				

Table 5 Submerged Outlet Proposed Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.93	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0013	0.15	41.21	0.9	4.067	41.06	36.69	33.12	30.91	39.00	2.31
PIPE 2	41.93	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0009	0.06	37.00	0.9	0.940	36.94	35.95	31.41	31.07	37.88	1.93
PIPE 3	41.93	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0009	0.11	36.00	0.9	2.098	35.89	33.67	31.07	29.57	34.88	1.21
PIPE 4	41.93	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0009	0.18	33.79	0.9	1.652	33.60	31.95	29.37	27.42	35.17	3.22
PIPE 5	41.93	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0009	0.14	31.95	0.9	1.390	31.82	30.41	27.32	26.11	32.34	1.93
PIPE 6	41.93	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0009	0.04	30.43	0.9	0.391	30.39	29.99	25.91	25.82	31.21	1.22
Outfall										30.00				30.00				

Table 6 Free Discharge Proposed Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.93	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0013	0.15	33.03	0.9	4.067	32.88	28.51	33.12	30.91	39.00	10.49
PIPE 2	41.93	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0009	0.06	28.82	0.9	0.940	28.76	27.77	31.41	31.07	37.88	10.11
PIPE 3	41.93	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0009	0.11	27.82	0.9	2.098	27.71	25.49	31.07	29.57	34.88	9.39
PIPE 4	41.93	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0009	0.18	25.61	0.9	1.652	25.42	23.77	29.37	27.42	35.17	11.40
PIPE 5	41.93	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0009	0.14	23.77	0.9	1.390	23.64	22.23	27.32	26.11	32.34	10.11
PIPE 6	41.93	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0009	0.04	22.25	0.9	0.391	22.21	21.81	25.91	25.82	31.21	9.40
Outfall										21.82				21.82				

Jon Storm Park Outfall

The proposed project would add on-street parking along the northbound lane of Clackamette Drive, adjacent to Jon Storm Park. Approximately 2,600 square feet of grassed area is proposed to be converted into paved parking spaces and sidewalk. The area would drain to a stormwater planter located at the northern end of the proposed improvements. Overflows from the stormwater planter would be routed to an existing stormwater conveyance system owned and maintained by Oregon City that discharges directly to the Willamette River.

The changes would not result in additional areas draining to the system; the project would generate additional runoff by converting currently pervious ground into impervious. Currently 1.42 acres drain through the existing conveyance system, as shown in Figure 2. The Rational Method was used to calculate the estimated discharge. Oregon City design guidelines specify that because the drainage area is less than 10 acres, the design storm should be the 10-year, 24-hour storm event. Runoff coefficients of 0.3 and 0.9 were used for grassed and paved areas respectively. A time of concentration of 5 minutes was used, which equates to a rainfall intensity of 2.84 inches per hour. The modeled discharge through the conveyance system for the proposed conditions was 2.32 cfs, which is a 0.10 cfs increase from the existing conditions peak flow of 2.22 cfs.

Table 7 Jon Storm Park Hydrology

Area	Square feet	Acres	Runoff Coefficient	Intensity	Flow
Extg Rdwy North	14,908	0.34	0.90	2.84	0.87
Extg Rdwy South	10,824	0.25	0.90	2.84	0.64
Grassed Offsite	33,613	0.77	0.30	2.84	0.66
Parking Lot	2,622	0.06	0.90	2.84	0.15
Sum					**2.32**

The conveyance system was modeled both as a free discharge and a submerged outlet tailwater condition to account for high stages on the Willamette River. The ordinary high water level of 30 feet was used for the tailwater condition in the submerged outlet scenario. Table 8 through Table 11 summarize the hydraulic grade line calculations for both the free discharge and the submerged outlet condition. Both the free discharge and the submerged outlet meet the Oregon City design guideline of maintaining 1 foot of freeboard between the hydraulic grade line and the structure rims.

Figure 2 Jon Storm Park Drainage Area

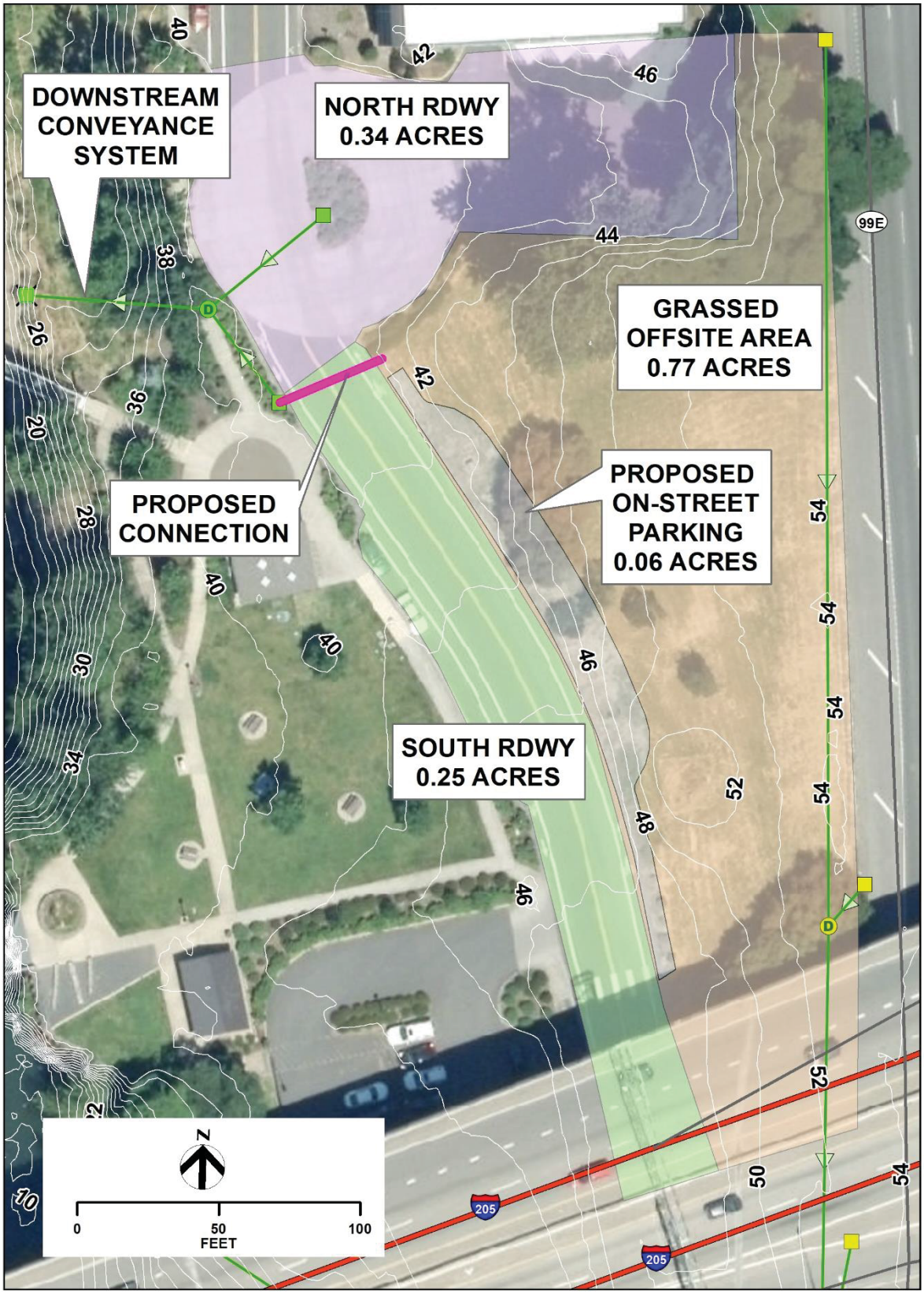


Table 8 Free Discharge Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIPE 2	1.34	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0014	0.06	28.15	0.9	1.045	28.09	26.99	34.31	32.80	35.74	8.75
PIPE 3	2.22	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0039	0.25	27.04	0.9	3.889	26.79	22.72	32.60	23.90	36.70	13.98
Outfall										22.90				22.90				

**Pipe 1 not present in existing conditions*

Table 9 Submerged Outlet Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIPE 2	1.34	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0014	0.06	35.25	0.9	1.045	35.19	34.09	34.31	32.80	35.74	1.65
PIPE 3	2.22	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0039	0.25	34.14	0.9	3.889	33.89	29.82	32.60	23.90	36.70	6.88
Outfall										30.00				30.00				

**Pipe 1 not present in existing conditions*

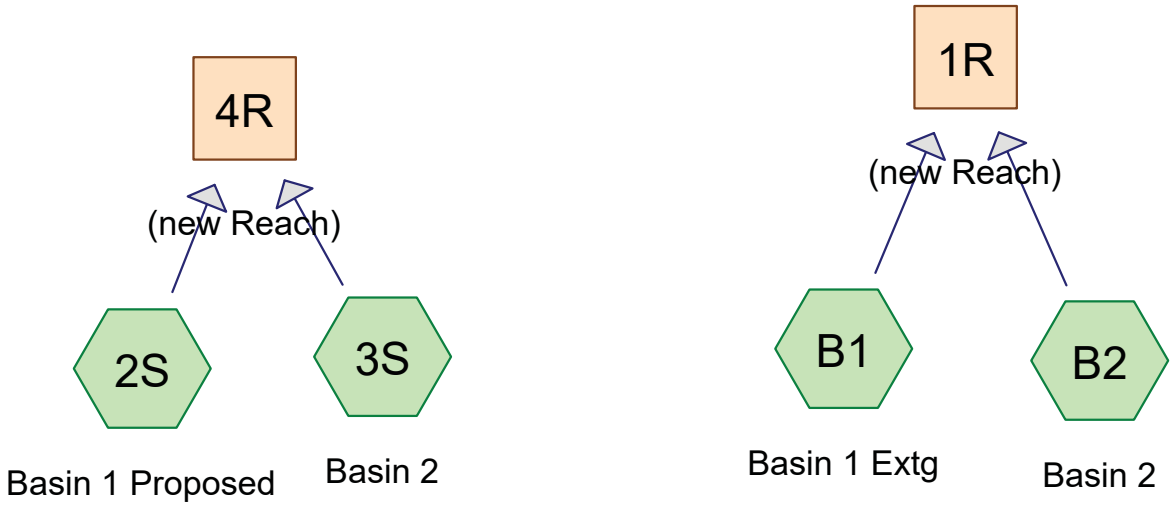
Table 10 Free Discharge Proposed Conditions

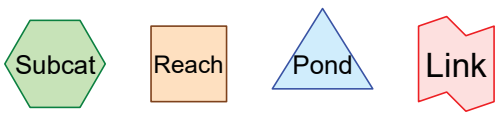
Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	1.11	1.0	51.0	1.0%	4.49	0.3136	0.0000	0.0005	0.0267	28.49	0.9	0.282	28.46	28.18	35.00	34.50	40.00	11.82
PIPE 2	1.74	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0017	0.07	28.18	0.9	1.045	28.11	27.02	34.31	32.80	35.74	8.72
PIPE 3	2.62	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0043	0.28	27.07	0.9	3.889	26.79	22.74	32.60	23.90	36.70	13.96
Outfall										22.90				22.90				

Table 11 Submerged Outlet Proposed Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	0.81	1.0	51.0	1.0%	4.49	0.3136	0.0000	0.0005	0.0267	35.59	0.9	0.282	35.56	35.28	35.00	34.50	40.00	4.72
PIPE 2	1.45	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0017	0.07	35.28	0.9	1.045	35.21	34.12	34.31	32.80	35.74	1.62
PIPE 3	2.32	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0043	0.28	34.17	0.9	3.889	33.89	29.84	32.60	23.90	36.70	6.86
Outfall										30.00				30.00				

Attachment A: HydroCAD Hydrology





Drainage Diagram for OC Offsite Basins
Prepared by HDR, Printed 9/26/2019
HydroCAD® 9.10 s/n 04284 © 2010 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
54.258	55	Forest / wetlands (2S, B1)
9.600	60	Forest (2S, 3S, B1, B2)
1.066	61	Field (2S, B1)
0.798	68	Light residential (2S, B1)
9.840	75	Field (2S, B1)
6.144	75	Field / Ag (2S, B1)
61.355	75	Grass cover>75% (3S, B2)
35.348	88	Dirt / Industrial? (2S, B1)
32.810	88	Industrial (2S, B1)
60.032	98	Impervious (2S, 3S, B1, B2)
1.030	98	Imperviousl (2S)
3.428	98	Open water (2S, B1)

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: Basin 1 Proposed Runoff Area=3,881,588 sf 19.15% Impervious Runoff Depth=1.96"
Flow Length=5,564' Tc=26.3 min CN=73/98 Runoff=27.95 cfs 14.525 af

Subcatchment3S: Basin 2 Runoff Area=48.745 ac 32.19% Impervious Runoff Depth=2.29"
Flow Length=10,300' Tc=52.4 min CN=74/98 Runoff=14.31 cfs 9.320 af

SubcatchmentB1: Basin 1 Extg Runoff Area=3,881,575 sf 18.00% Impervious Runoff Depth=1.93"
Flow Length=5,564' Tc=26.3 min CN=73/98 Runoff=27.43 cfs 14.333 af

SubcatchmentB2: Basin 2 Runoff Area=2,123,346 sf 32.19% Impervious Runoff Depth=2.29"
Flow Length=10,300' Tc=52.4 min CN=74/98 Runoff=14.31 cfs 9.320 af

Reach 1R: (new Reach) Avg. Flow Depth=1.53' Max Vel=10.21 fps Inflow=41.45 cfs 23.653 af
42.0" Round Pipe n=0.013 L=730.0' S=0.0107 '/' Capacity=104.13 cfs Outflow=41.42 cfs 23.653 af

Reach 4R: (new Reach) Avg. Flow Depth=1.55' Max Vel=10.24 fps Inflow=41.96 cfs 23.846 af
42.0" Round Pipe n=0.013 L=730.0' S=0.0107 '/' Capacity=104.13 cfs Outflow=41.93 cfs 23.846 af

Summary for Subcatchment 2S: Basin 1 Proposed

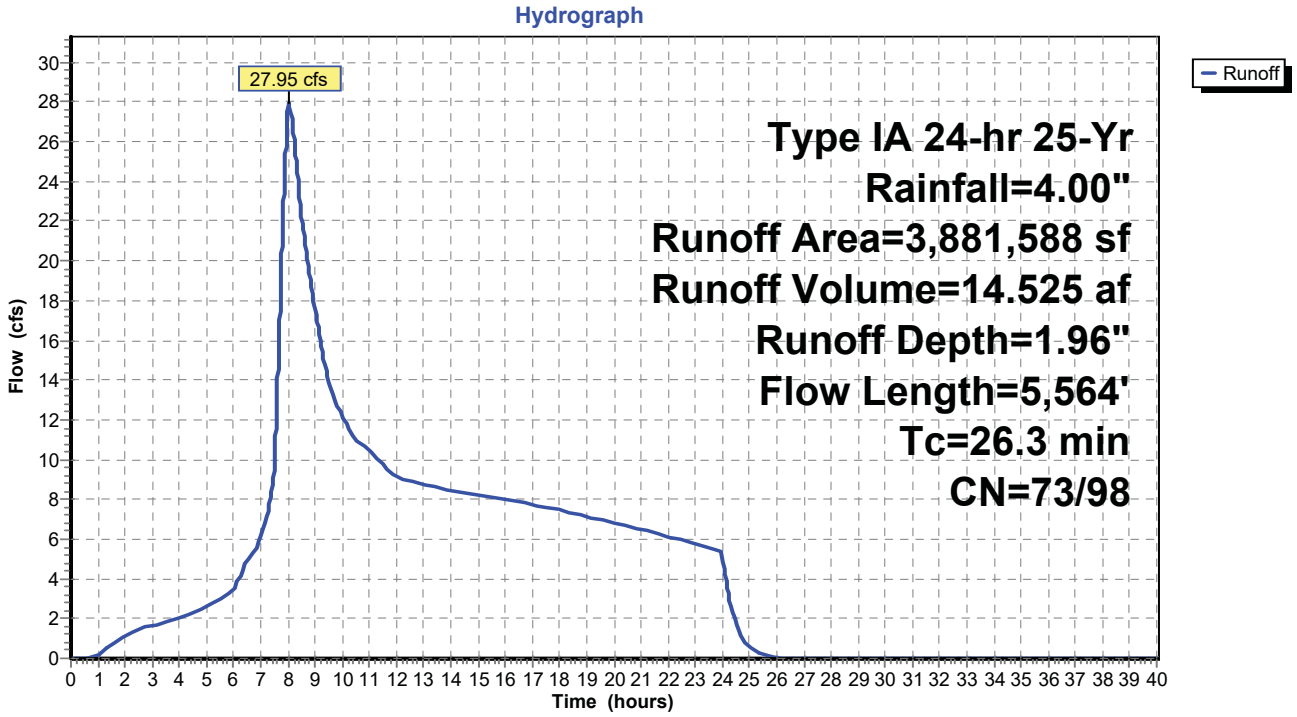
Runoff = 27.95 cfs @ 8.01 hrs, Volume= 14.525 af, Depth= 1.96"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (sf)	CN	Description
*	69,173	60	Forest
*	71,961	98	Impervious
*	95,135	88	Industrial
*	23,217	61	Field
*	17,380	68	Light residential
*	573,990	88	Dirt / Industrial?
*	100,929	98	Impervious
*	36,416	60	Forest
*	28,750	98	Impervious
*	139,740	88	Industrial
*	133,816	75	Field / Ag
*	355,058	98	Impervious
*	48,003	75	Field
*	52,272	98	Impervious
*	85,465	75	Field
*	45,259	75	Field
*	479,726	88	Industrial
*	8,146	98	Impervious
*	6,839	98	Impervious
*	35,589	75	Field
*	1,159,306	55	Forest / wetlands
*	74,662	98	Open water
*	195,889	88	Dirt / Industrial?
*	44,867	98	Imperviousl
	3,881,588	78	Weighted Average
	3,138,104	73	80.85% Pervious Area
	743,484	98	19.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	130	0.4200	0.24		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.44"
17.3	5,434	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035 Earth, dense weeds
26.3	5,564	Total			

Subcatchment 2S: Basin 1 Proposed



Summary for Subcatchment 3S: Basin 2

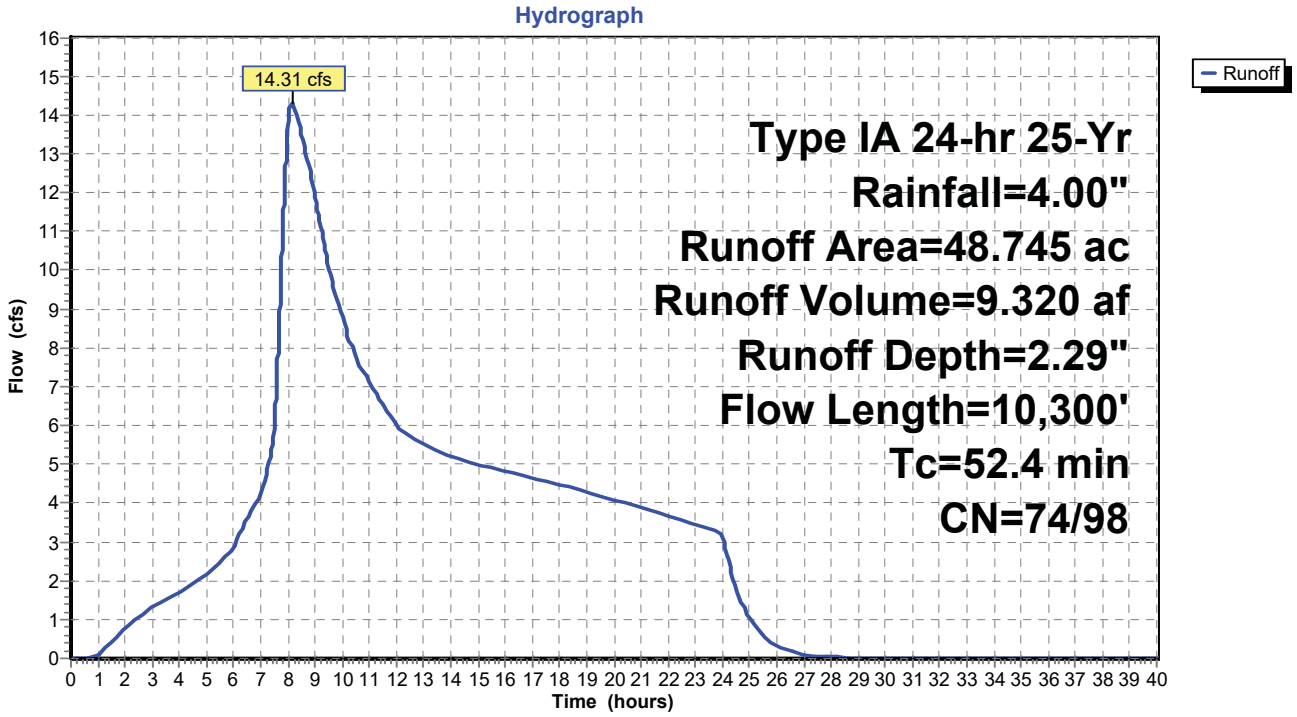
Runoff = 14.31 cfs @ 8.17 hrs, Volume= 9.320 af, Depth= 2.29"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (ac)	CN	Description
*	0.913	98	Impervious
*	2.376	60	Forest
*	5.723	75	Grass cover>75%
*	1.566	98	Impervious
*	22.712	75	Grass cover>75%
*	11.858	98	Impervious
*	1.359	75	Grass cover>75%
*	1.355	98	Impervious
*	0.883	75	Grass cover>75%
	48.745	82	Weighted Average
	33.053	74	67.81% Pervious Area
	15.692	98	32.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	300	0.0400	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.44"
31.9	10,000	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035
52.4	10,300	Total			

Subcatchment 3S: Basin 2



Summary for Subcatchment B1: Basin 1 Extg

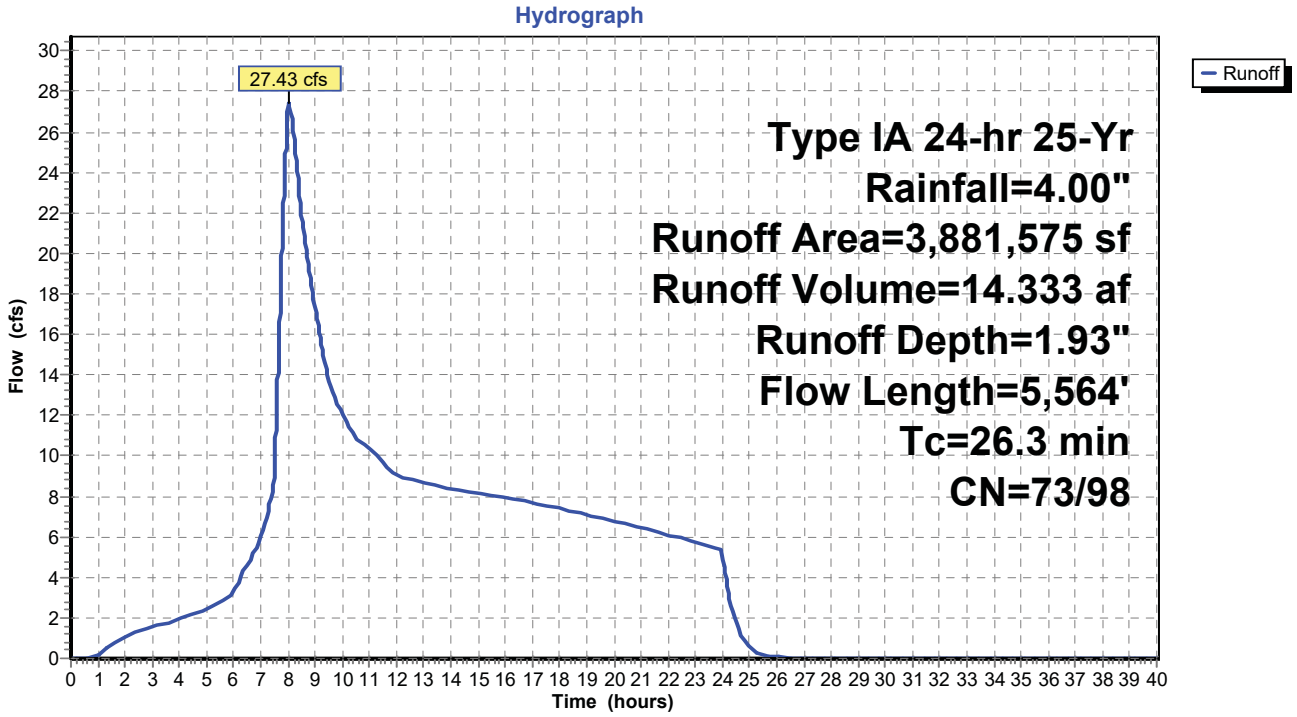
Runoff = 27.43 cfs @ 8.01 hrs, Volume= 14.333 af, Depth= 1.93"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (sf)	CN	Description
*	69,157	60	Forest
*	71,969	98	Impervious
*	95,150	88	Industrial
*	23,198	61	Field
*	17,380	68	Light residential
*	573,999	88	Dirt / Industrial?
*	100,908	98	Impervious
*	36,415	60	Forest
*	28,767	98	Impervious
*	139,747	88	Industrial
*	133,826	75	Field / Ag
*	355,062	98	Impervious
*	47,986	75	Field
*	52,288	98	Impervious
*	85,448	75	Field
*	45,251	75	Field
*	479,718	88	Industrial
*	8,126	98	Impervious
*	6,853	98	Impervious
*	35,609	75	Field
*	1,204,184	55	Forest / wetlands
*	74,646	98	Open water
*	195,888	88	Dirt / Industrial?
	3,881,575	77	Weighted Average
	3,182,956	73	82.00% Pervious Area
	698,619	98	18.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	130	0.4200	0.24		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.44"
17.3	5,434	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035 Earth, dense weeds
26.3	5,564	Total			

Subcatchment B1: Basin 1 Extg



Summary for Subcatchment B2: Basin 2

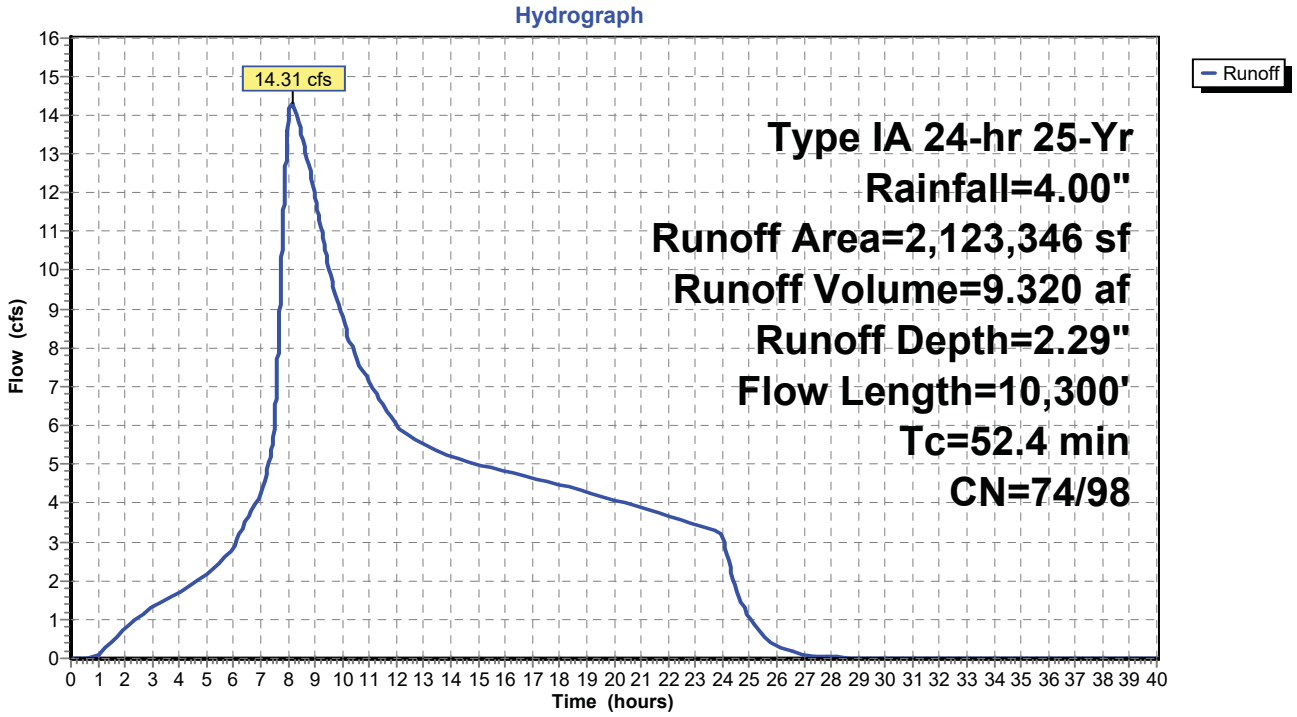
Runoff = 14.31 cfs @ 8.17 hrs, Volume= 9.320 af, Depth= 2.29"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (sf)	CN	Description
*	39,766	98	Impervious
*	103,497	60	Forest
*	249,307	75	Grass cover>75%
*	68,236	98	Impervious
*	989,348	75	Grass cover>75%
*	516,514	98	Impervious
*	59,205	75	Grass cover>75%
*	59,008	98	Impervious
*	38,465	75	Grass cover>75%
	2,123,346	82	Weighted Average
	1,439,822	74	67.81% Pervious Area
	683,524	98	32.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	300	0.0400	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.44"
31.9	10,000	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035
52.4	10,300	Total			

Subcatchment B2: Basin 2



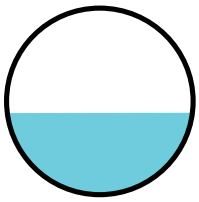
Summary for Reach 1R: (new Reach)

Inflow Area = 137.854 ac, 23.02% Impervious, Inflow Depth = 2.06" for 25-Yr event
Inflow = 41.45 cfs @ 8.03 hrs, Volume= 23.653 af
Outflow = 41.42 cfs @ 8.08 hrs, Volume= 23.653 af, Atten= 0%, Lag= 2.6 min

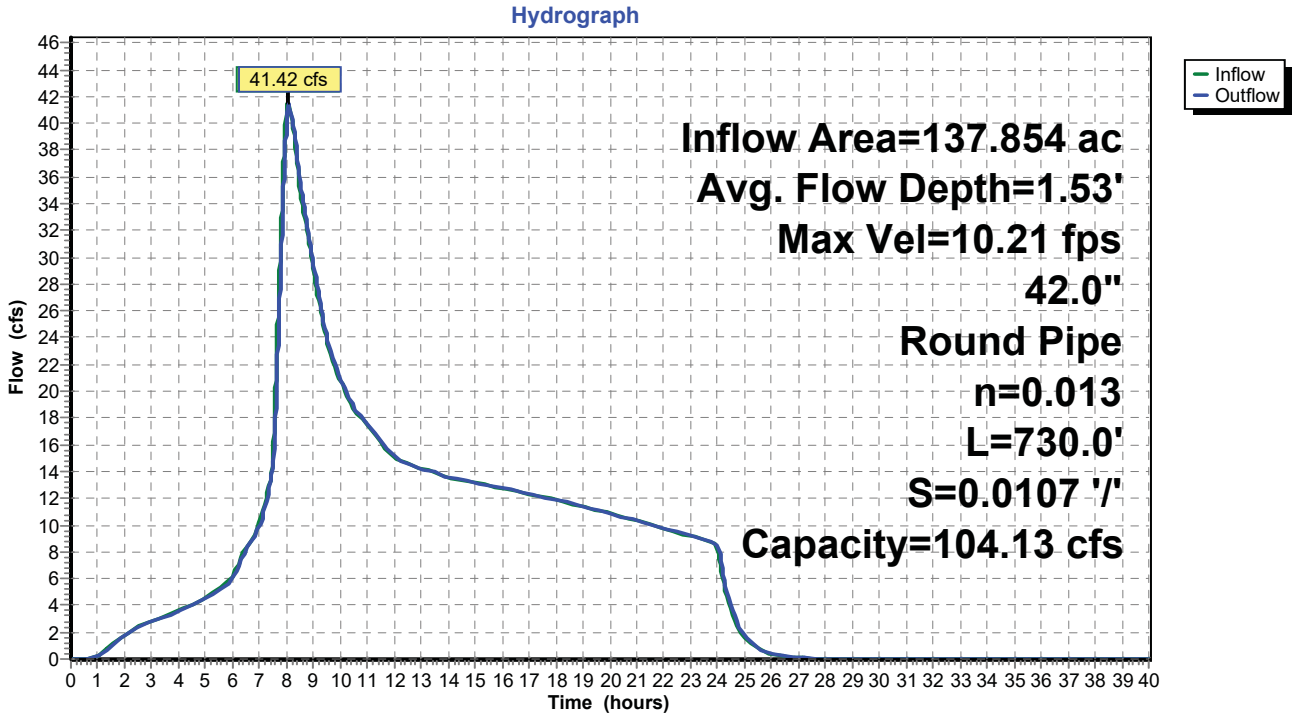
Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.21 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 5.39 fps, Avg. Travel Time= 2.3 min

Peak Storage= 2,963 cf @ 8.06 hrs
Average Depth at Peak Storage= 1.53'
Bank-Full Depth= 3.50', Capacity at Bank-Full= 104.13 cfs

42.0" Round Pipe
n= 0.013
Length= 730.0' Slope= 0.0107 '/'
Inlet Invert= 29.62', Outlet Invert= 21.80'



Reach 1R: (new Reach)



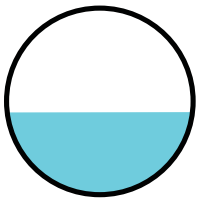
Summary for Reach 4R: (new Reach)

Inflow Area = 137.854 ac, 23.76% Impervious, Inflow Depth = 2.08" for 25-Yr event
Inflow = 41.96 cfs @ 8.03 hrs, Volume= 23.846 af
Outflow = 41.93 cfs @ 8.08 hrs, Volume= 23.846 af, Atten= 0%, Lag= 2.7 min

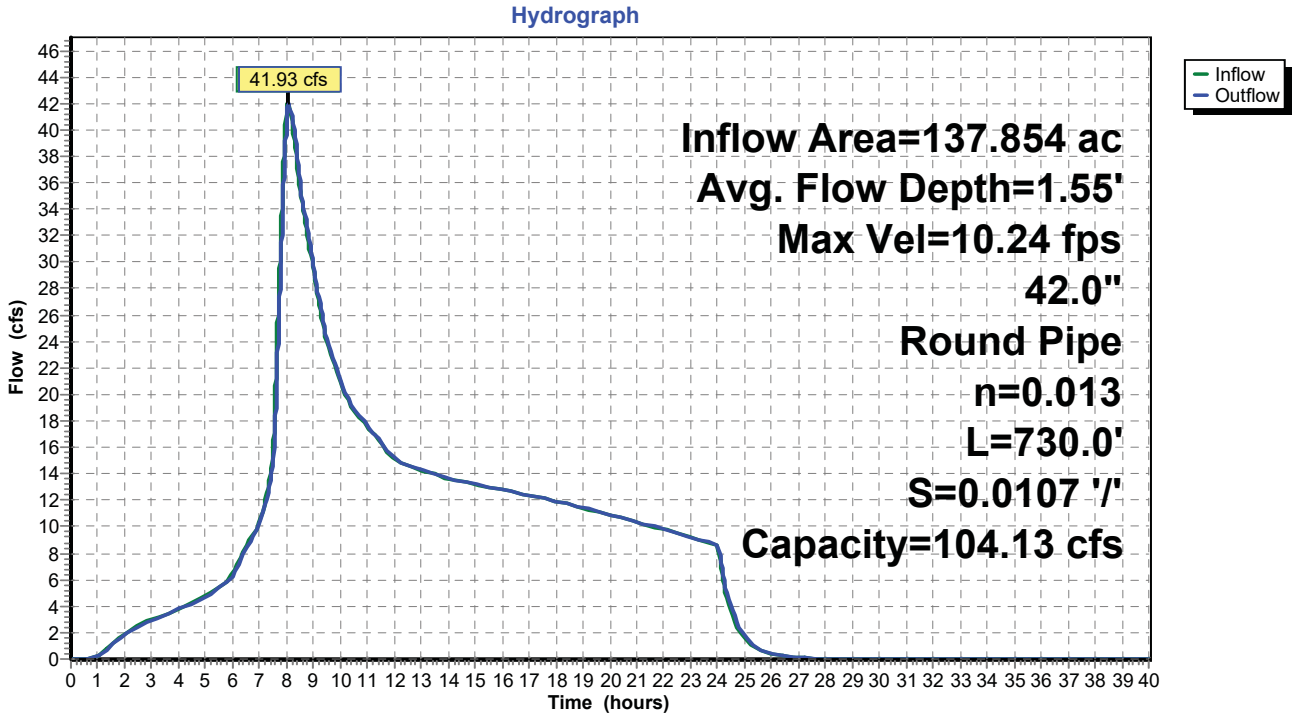
Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.24 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 5.41 fps, Avg. Travel Time= 2.2 min

Peak Storage= 2,990 cf @ 8.06 hrs
Average Depth at Peak Storage= 1.55'
Bank-Full Depth= 3.50', Capacity at Bank-Full= 104.13 cfs

42.0" Round Pipe
n= 0.013
Length= 730.0' Slope= 0.0107 '/'
Inlet Invert= 29.62', Outlet Invert= 21.80'



Reach 4R: (new Reach)



Attachment C(2). Engineered Drainage Plan

SITE ASSESSMENT AND PLANNING CHECKLIST

✓	Information needed	Attach supporting materials as needed
2.2.1 Site Information		
	Applicant contact information	Applicant name: Paul Scarlett Business name: ODOT Contact address, phone number, and e-mail: 123 NW Flanders St, Portland, OR 97209 503-731-3186 paul.scarlett@odot.state.or.us
	Project location	Site address: ODOT Right-of-way (Map 22E29CB, Tax Lots: 300, 500, ROADS; Map 22E29, Tax Lot: ROADS; Map 22E30DD, Tax Lot: ROADS) Site description: ODOT rights-of-way are built transportation environments. The two tax lots being impacted are within City parks. Major drainage basin: Willamette Is the project site located with the WQRA as defined in OCMC 17.49? Y (Y/N) *Include a vicinity map of the site (including location of property in relation to adjacent properties, roads, and pedestrian/bike facilities).*
	Project type	Identify types of development planned for the site such as commercial, industrial, single-family residential, multi-family residential, or other (describe): Transportation improvements - widening of I-205 northbound and southbound; seismic upgrade of Abernethy Bridge
	Size of site	Size of site: ~2900 (acres) Number of existing/proposed tax lots: Existing: 5 Proposed: 0 Amount of new and replaced impervious area: 284,795 (SF)
2.2.2 Site Assessment *Note: Site assessment information may be available from the OCMaps online tool available through the City's website.*		
	Site Assessment Map	*Attach engineered scale Site Assessment Map, showing items below.*
	Topography Evaluate site and map slopes: *Flat: 0-10%* *Moderate: 10-25%* *Steep: 25% and greater*	*Surveyed or aerial-based mapping with 2-foot intervals for slopes 0-25% slope and 10-foot intervals for steeper. Indicate Geologic Hazard Areas as defined by OCMC 17.04.510 and Geologic Hazards Overlay Zone as defined by OCMC 17.04.515.*
	Soils and Groundwater Research and map site soil hydrologic group, depth to groundwater	NRCS Hydrologic Soil Type (show on map if more than one type present): *Attach seasonal groundwater depth evaluation if available or required (site has floodplain and/or wetland).* *Groundwater depth information is available from the City.* Soil types and groundwater depth are included in the Stormwater Report
	Infiltration Assessment Determine soil capacity for onsite infiltration	If an infiltration test is performed, attach the documentation. Report the test type (Basic/Professional) performed and results. See **Appendix D** for the approved infiltration testing methods. Test type: Encased Falling Head/ Open Pit Falling Head See Report (inches/hour)

SITE ASSESSMENT AND PLANNING CHECKLIST		
	Hydrology – Conditions and Natural Features Map site floodplains, wetlands, streams, and location of outfalls	Clearly label on map all intermittent and perennial creeks/streams/rivers and wetlands, FEMA floodplains, and existing drainage systems (pipes, ditches, outfalls). Check here if present on site: X Sensitive area(s) Willamette River, Abernethy Creek, two wetlands Floodplain Willamette River
	Downstream Conveyance	Indicate the proposed point of discharge on the site plan. *Prepare and attach a Downstream Analysis as required by **Chapter 5**.* Check here to verify that adequate downstream capacity is available: X
	Existing Vegetation Map trees and vegetation	Using aerial photos or survey, map all trees and vegetation. Note all existing trees 6-inch caliper and greater (DBH) on map. Delineate and identify other areas and types of existing vegetation. The local planning authority may require a formal tree survey. See attached map (Attachment A)
	Required Vegetated Buffers and Setbacks Assess and map buffers	Identify required vegetated buffer areas and other setback limits as defined by OCMC Title 17. See attached map (Attachment BA
	Land Use and Zoning	Existing Land Use Zoning designation(s): MUD district, I district, NROD, WRG, Flood management overlay district
	Access and Parking	Delineate proposed access points for all transportation modes on map. Indicate amount and area of required parking onsite if applicable, *attach documentation as needed.* Att. B
	Utilities to Site and Surrounding Area	Map existing utilities including stormwater facilities, storm conveyance, sewer, water, electricity, phone/cable, gas, and any public storm system/facility downstream. Att. B
2.2.3 Site Planning Design Objectives *(attach engineered scale Preliminary Site Plan)*		
	1. Preserve existing resources	**Required:** Show sensitive areas and buffers on site plan. Denote buffer areas that require enhancement. Show any proposed areas of encroachment and associated buffer mitigation areas. Attachment A
	2. Minimize site disturbance	**Required:** Delineate protection areas on site plan for areas to remain undisturbed during construction. Attachment C
	3. Minimize soil compaction	**Required:** Delineate and note temporary fencing on site plan for proposed infiltration facilities, vegetated stormwater management facilities, and re-vegetation areas. Att. C
	4. Minimize imperviousness	**Required:** Delineate proposed impervious areas and proposed impervious area reduction methods on the site plan. A. Total proposed new/replaced impervious area: 284,795 (SF) B. Area of proposed Green Roofs: 0 (SF) C. Area of proposed pervious pavements: 0 (SF) D. Describe type of pavers or pavement proposed: _____ E. Impervious area requiring management [A-(B+C)]: 284,795 (SF)

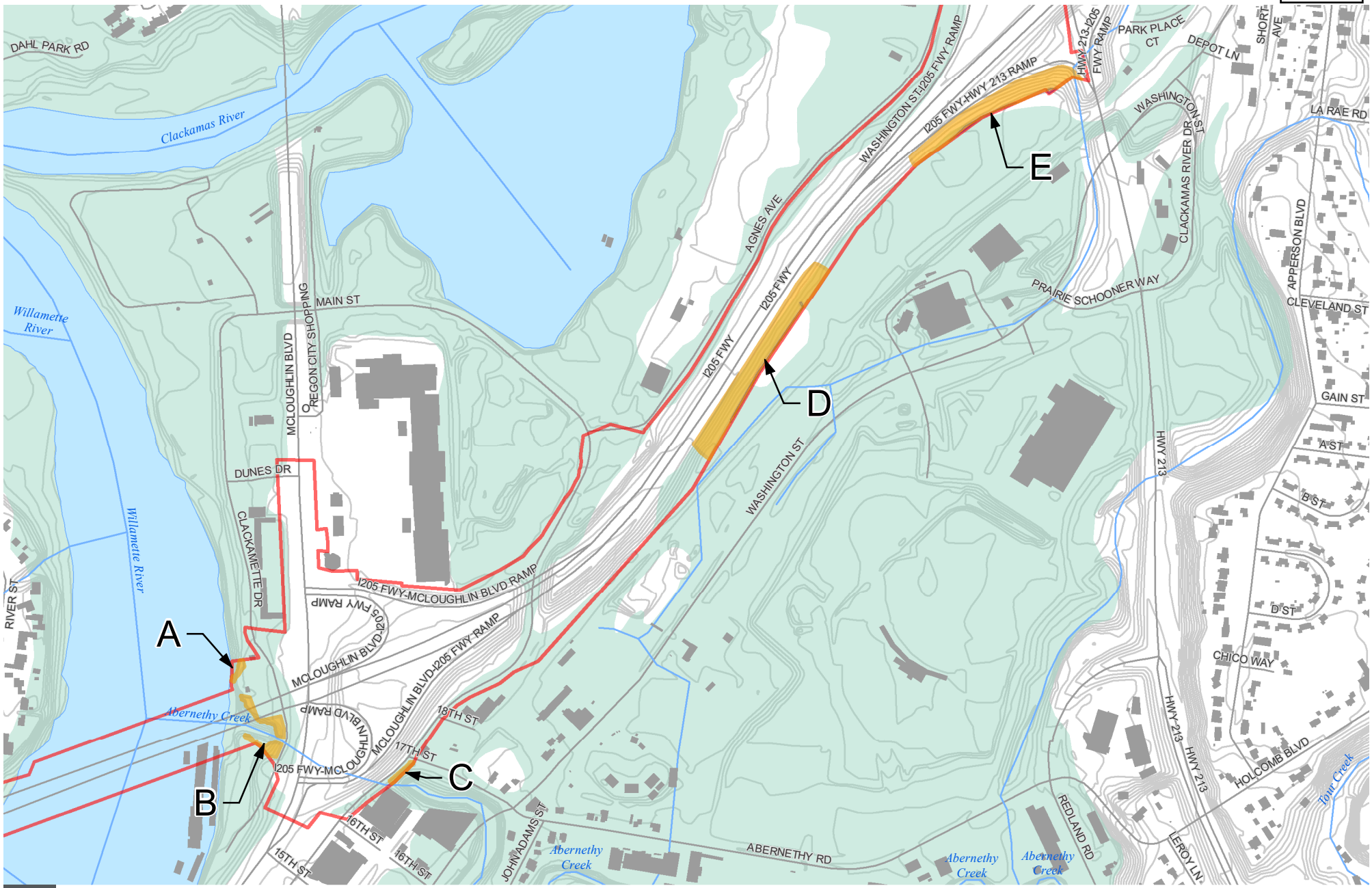
SITE ASSESSMENT AND PLANNING CHECKLIST

2.2.4 Proposed Stormwater Management Strategy

	Proposed Stormwater Management Strategy	X Infiltration facilities _____ Surface Infiltration facilities to the MEP X Full onsite retention/infiltration up to the 10-year storm event X Infiltration facilities are limited by the following conditions *(include documentation to demonstrate the limiting condition and choose an alternate strategy below):* _____ Stormwater management facility to be located on fill _____ Steep slopes X High groundwater _____ Contaminated soils _____ Conflict with required Source Controls (**Chapter 6**) X Onsite Stormwater management facilities (indicate below) _____ Offsite stormwater management facilities/regional facilities _____ Fee in Lieu, as determined by the City
	Preliminary Facility Selection/Sizing	Check all that apply, *attach output from BMP Sizing Tool*, and show proposed Stormwater Management Facilities on Preliminary Site Plan. stormwater Appendix D of report LID facilities: _____ Infiltration Stormwater Planter X Filtration Stormwater Planter WQF #9 _____ Infiltration Rain Garden _____ Filtration Rain Garden X Vegetated Swale WQF #3, Treatment only X Detention Pond WQF #1 _____ Infiltration Trench _____ Manufactured Treatment Technology X Other: Bioslope WQF #2, Treatment only
	Verify Minimum Facility Size	A. Required surface area of onsite surface infiltration facilities: As determined by BMP sizing tool or engineered method: 4,817 (SF) WQF #1 153 WQF #9 B. Calculate MEP surface area of surface infiltration facilities for sites with limiting conditions: Total new/replaced impervious area (SF) x 0.10 = _____ (SF) C. Calculate required surface area of onsite LID facilities: Smaller of [A] or [B]: 4,817 (SF) WQF #1 153 WQF #9 D. Proposed surface infiltration facility size(s): From site plan: 5,400 (SF) *must be larger than [C]* WQF #1 240 WQF #9

SITE ASSESSMENT AND PLANNING CHECKLIST		
2.2.5 Other Project Requirements		
	Grading Permit	Review OCMC 15.48 to determine whether a grading permit will be required. Grading permit required? ___Y___ (Y/N) Type of Grading Plan proposed (see **Chapter 3**): Engineered Grading Plan
	Erosion Prevention and Sediment Control	Identify the required permits: X ESC Permit from the City *(sites that include 1,000+ SF new or replaced impervious area)* X 1200-C Permit from DEQ *(sites that disturb 1 acre or more land surface)*
	Source Control for High Use Sites	Identify whether the proposed development will include any of the following: _____ Fuel Dispensing Facilities and Surrounding Traffic Areas _____ Above-Ground Storage of Liquid Materials _____ Solid Waste Storage Areas, Containers, and Trash Compactors _____ Exterior Storage of Bulk Materials _____ Material Transfer Areas/Loading Docks _____ Equipment and/or Vehicle Washing Facilities _____ Development on Land With Suspected or Known Contamination _____ Covered Vehicle Parking Areas _____ Industrial and Commercial High Traffic Areas _____ Other land uses subject to the ODEQ 1200-Z Industrial Stormwater Permit
	Other Permits	Identify other natural resources related permits from local, state, or federal agencies that may be required as part of the proposed development activity. It is the responsibility of the applicant to identify and obtain required permits prior to project approval. List other anticipated permits: DSL removal/fill, USACE Section 404, NEPA Categorical Exclusion, ESA Biological Opinion, ESA No Effect Determination, DEQ 401 Certification, Section 4(f), Section 6(f), USCG Bridge Permit

Attachment A. Existing Vegetation



NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

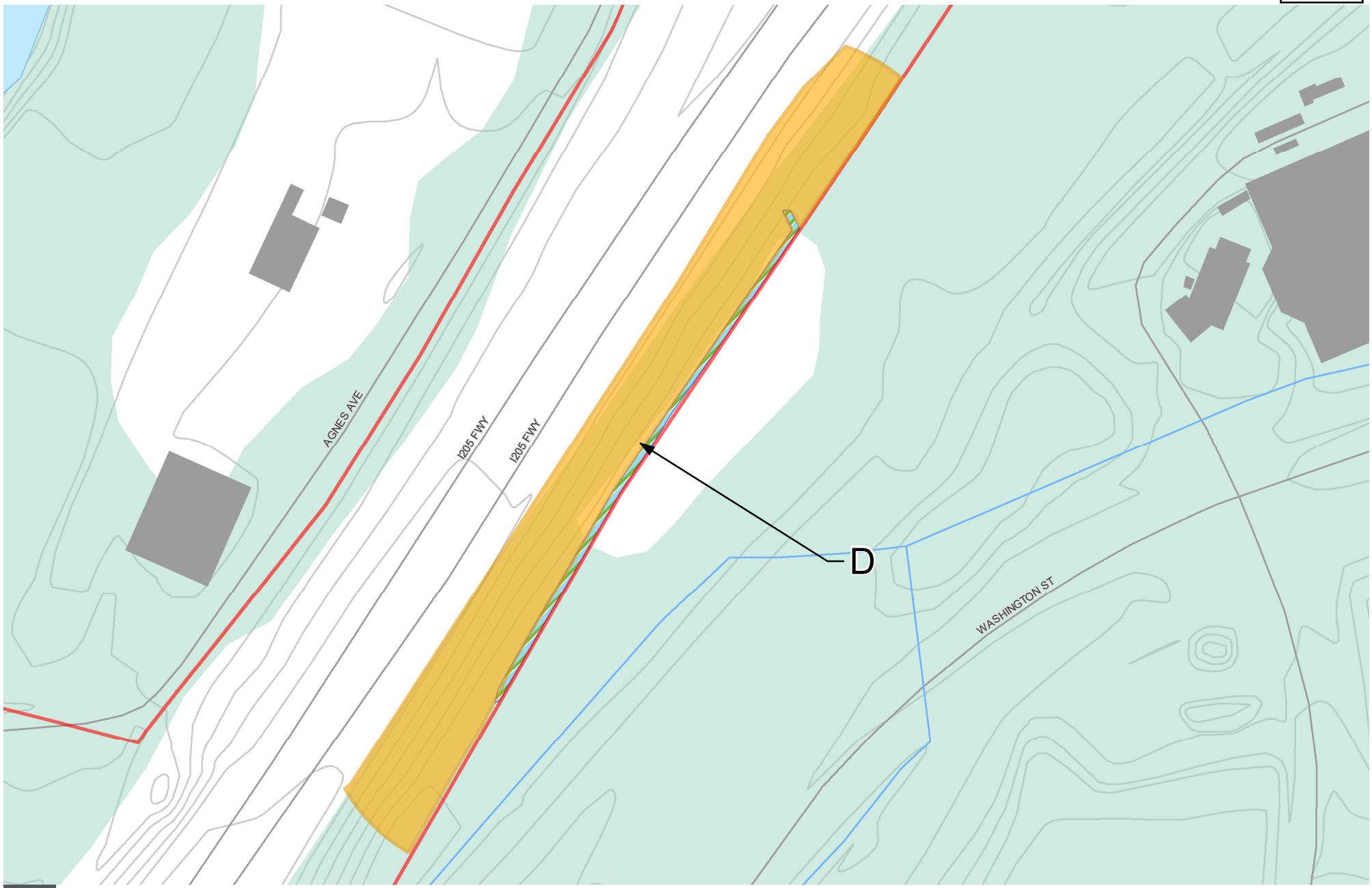
0 Miles 0.1

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITE_PLANRB.MXD - USER: RBARKSDALE - DATE: 7/29/2019

SITE PLAN

OCMC 17.49.220 (A)



NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

0 Miles 0.03

DATA SOURCE: ESRI, HDR, City of Oregon City

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SITE PLAN

OCMC 17.49.220 (A)

NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

0 Miles 0.02

DATA SOURCE: ESRI, HDR, City of Oregon City

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SITE PLAN

OCMC 17.49.220 (A)

NROD SITE PLAN - AREA A

(OCMC 17.49.220 (B))

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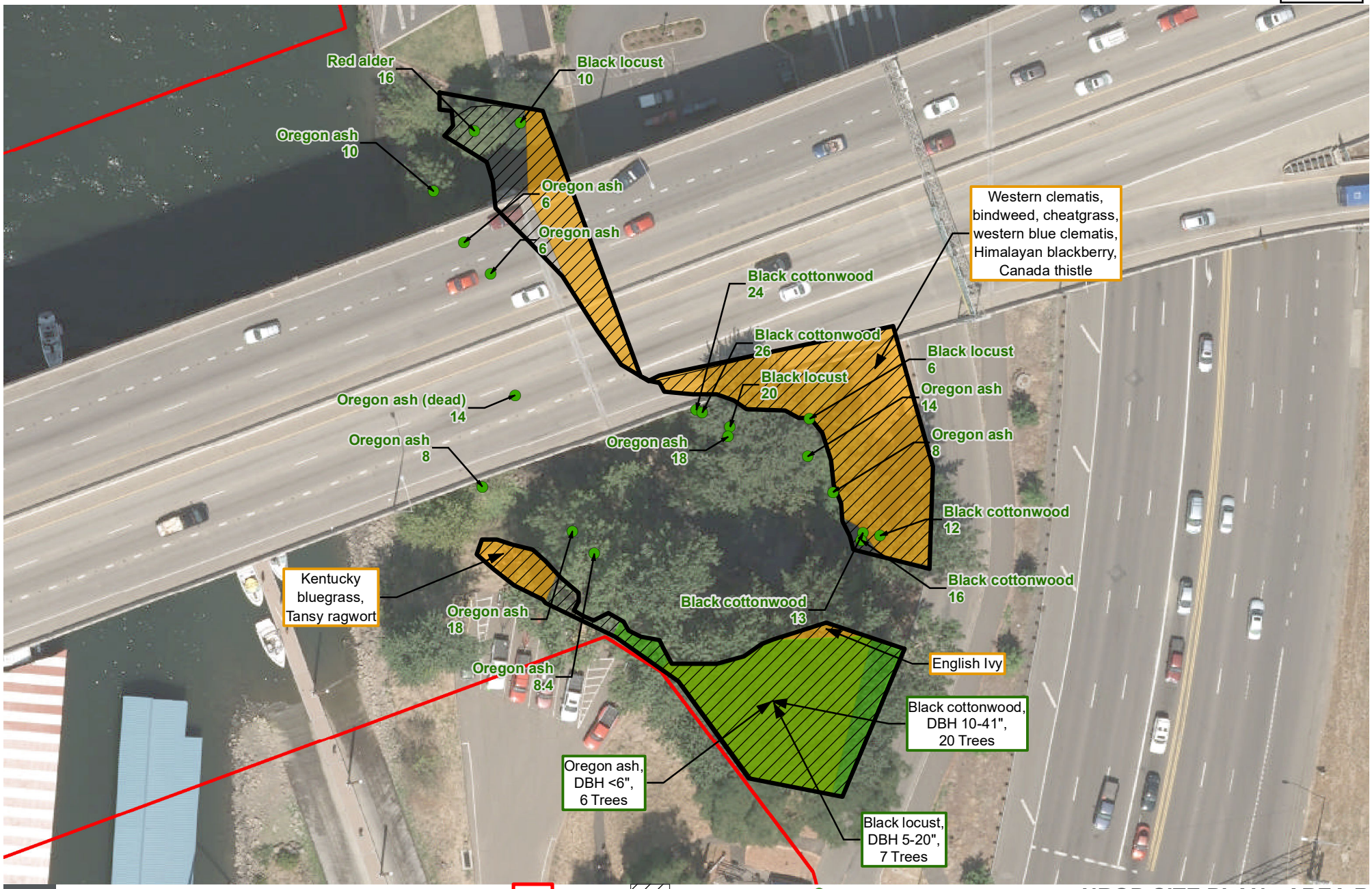

NROD SITE PLAN - AREA B

(OCMC 17.49.220 (B))

DATA SOURCE: ESRI, HDR, City of Oregon City

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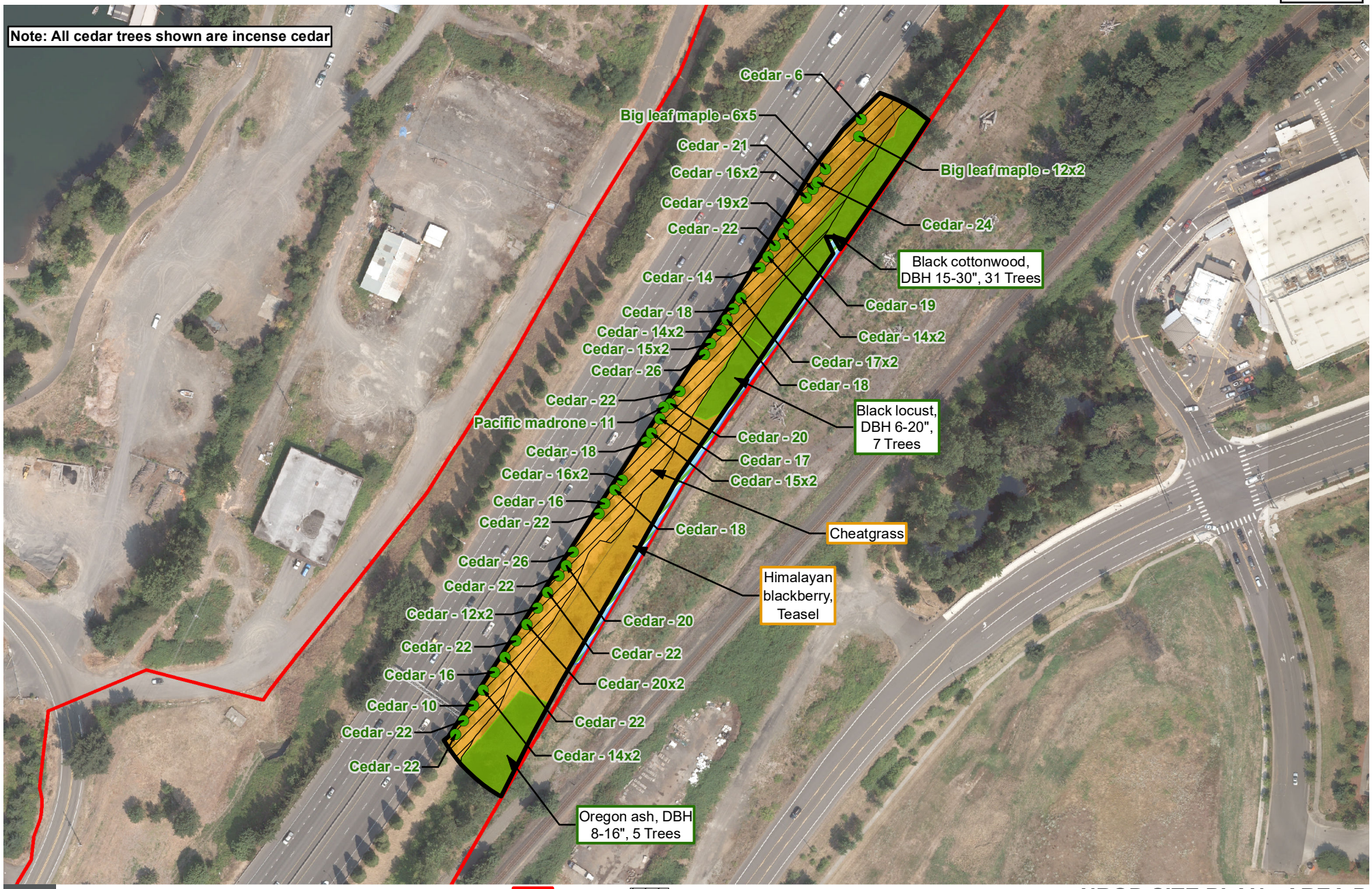


0 105 210 Feet

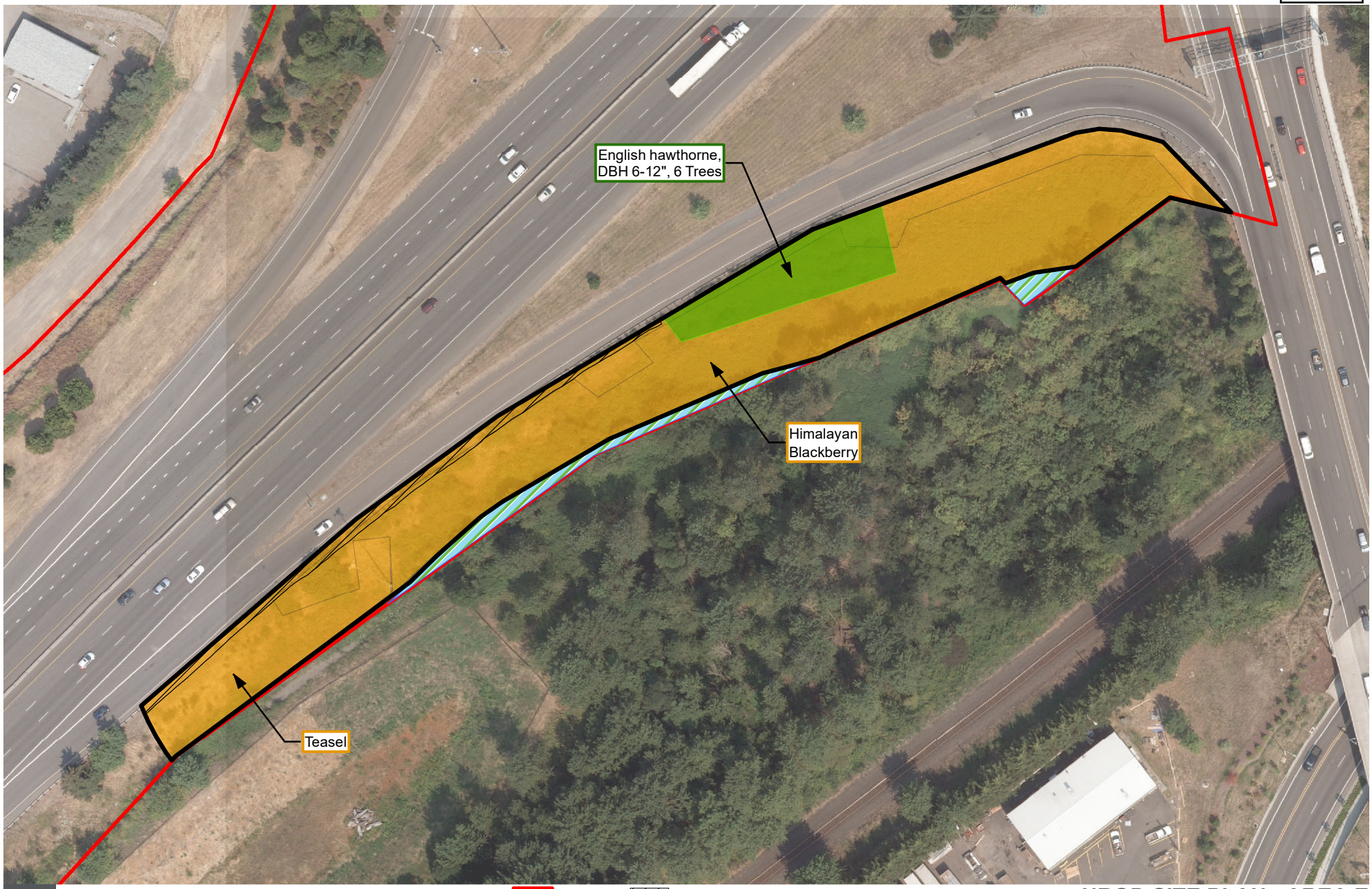
Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed
Wetlands

DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA D

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019



0 60 120 Feet

Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed
Wetlands

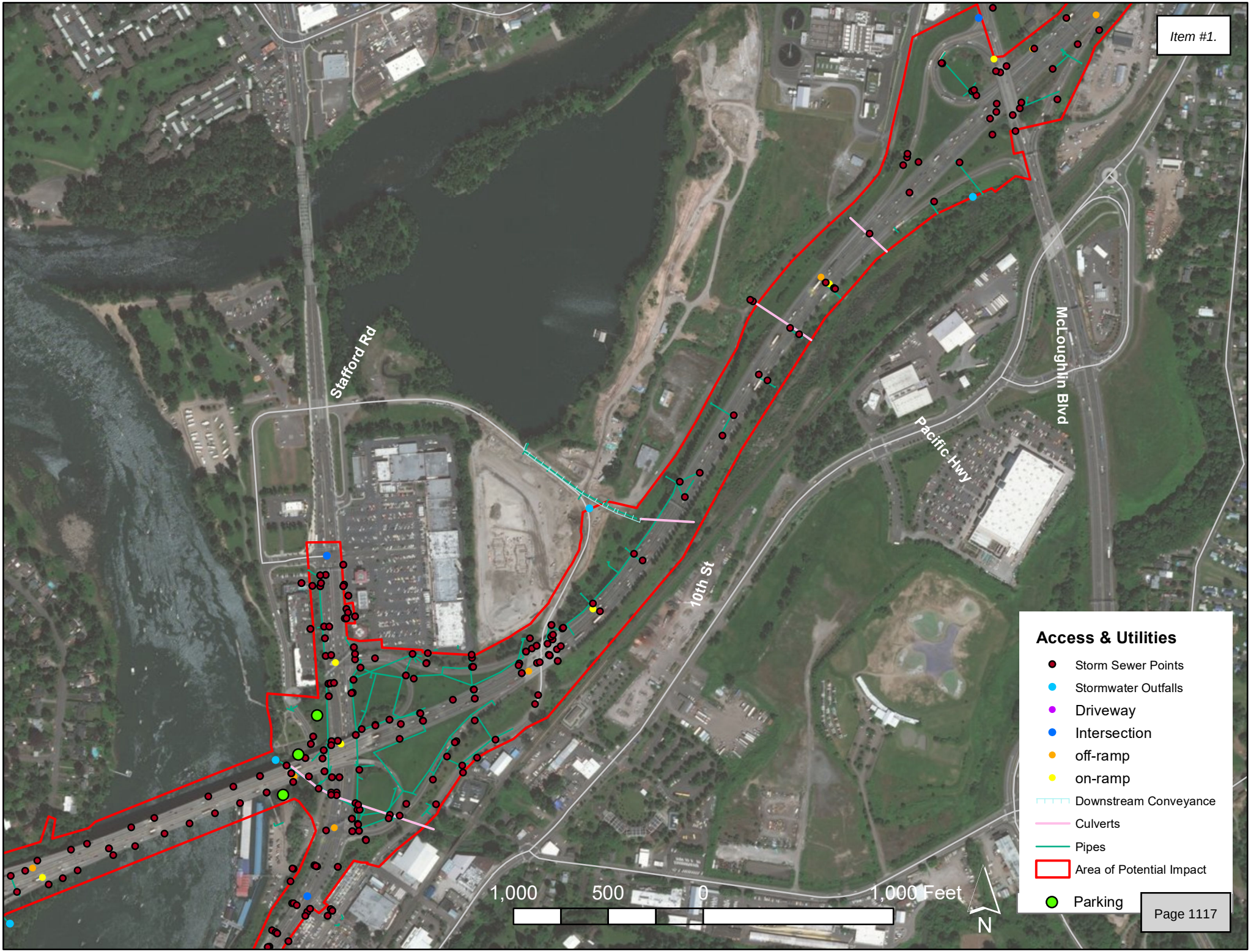
DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA E

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019

Attachment B. Access and Utilities Map


Stafford Rd
10th St
Pacific Hwy
McLoughlin Blvd
Access & Utilities
Storm Sewer Points
Stormwater Outfalls
Driveway
Intersection
off-ramp
on-ramp
Downstream Conveyance
Culverts
Pipes
Area of Potential Impact
Parking
1,000
500
0
1,000 Feet
N

Attachment C. Construction Management Plan

GENERAL NOTES:

The construction, adjustment, maintenance, and upgrading of these Erosion and Sediment Control measures is the responsibility of the contractor for the duration of the project to comply with Section 00280 of the Oregon Standard Specifications for construction and the NPDES 1200-CA permit.

Erosion and Sediment Control measures shown on this plan are for anticipated site conditions. Adjust or upgrade these measures for unexpected storm events to ensure that sediment and sediment-laden water does not leave the site.

Develop a revised plan of the Erosion and Sediment Control measures shown as required by Section 00280, Oregon Standard Specifications for Construction. Implement this plan for all clearing and grading activities and in segments applicable to each staging phase. Construct in such a manner so as to ensure that sediment and sediment-laden water does not enter the roadway or drainage system, or violate applicable water standards.

Install measures within the right-of-way unless directed otherwise.

Inlet protection for existing facilities shall be installed before construction begins and shall remain in place until all construction is completed and approved. The contractor shall protect all storm drain inlets within the work area and adjacent to the work limits within 100' outside all working, stockpile, and staging areas, including the first inlet downstream (at any distance). In the case of inlets to be removed, protection measures shall remain in place until the new inlet is constructed and connected to the drainage network, and the existing inlet has been disconnected from the existing drainage network. Inlet protection shall be installed on new inlets before they are connected to the existing drainage network.

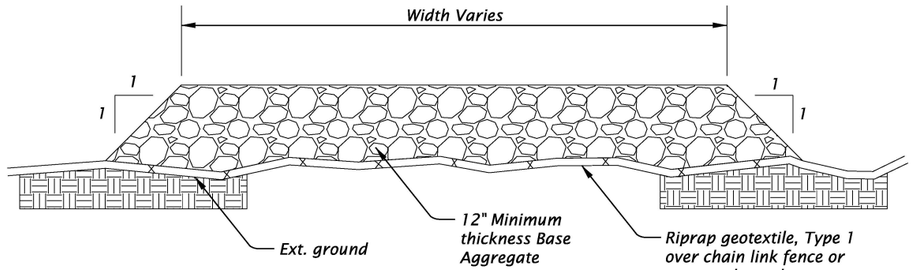
See section 00280 for material not shown in plans.

STANDARD DRAWINGS

- ☒ RD1000 Construction Entrances
- ☐ RD1005 Check Dams Type 1, 3 and 4
- ☒ RD1006 Check Dams Type 2 and 6
- ☒ RD1010 Inlet Protection Type 2, 3, 6 and 7
- ☐ RD1015 Inlet Protection Type 4
- ☒ RD1030 Sediment Barrier Type 2, 3 and 4
- ☐ RD1031 Sediment Barrier Type 5 and 6
- ☒ RD1032 Sediment Barrier Type 8
- ☒ RD1033 Sediment Barrier Type 9
- ☒ RD1040 Sediment Fence
- ☐ RD1045 Temporary Slope Drain With Energy Dissipator
- ☐ RD1050 Temporary Scour Basin
- ☒ RD1055 Slope and Channel Matting
- ☒ RD1060 Tire Wash Facility Type 1 and 2
- ☒ RD1065 Sediment Trap
- ☒ RD1070 Concrete Truck Wash Out

SEQUENCE OF WORK NOTES:

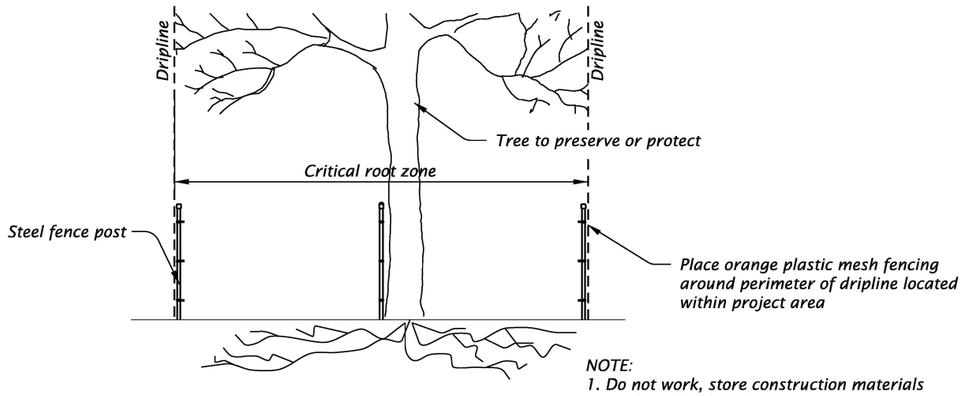
This Erosion and Sediment Control Plan has been prepared based upon the construction sequence represented in the Traffic Control Plan Sheets. This ESCP is not intended to supercede a construction sequencing plan. The ESCP is to be reviewed and revised to fit the actual construction sequence.



1. Existing ground shall grubbed to a depth 6".

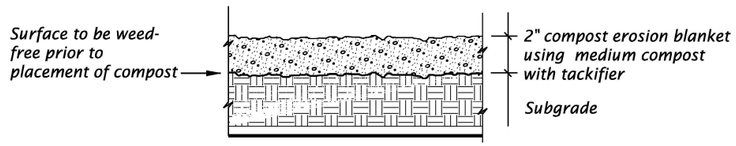
2. Cover existing ground under Staging Area with riprap geotextile and either chain link fence or other approved geogrid type material and cover with Base Aggregate.

STAGING AREA DETAIL
N.T.S.

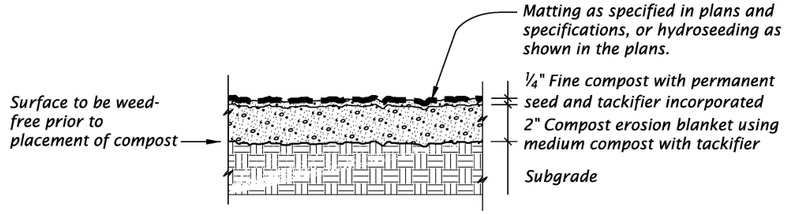


NOTE:
1. Do not work, store construction materials or park within the critical root zone of marked trees unless written approval has been obtained from the Engineer.

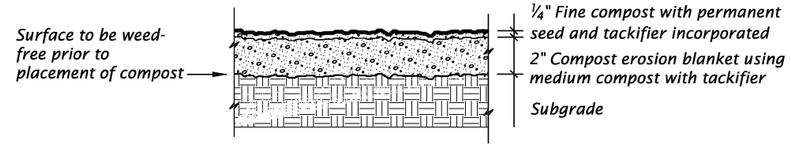
TREE PROTECTION DETAIL
N.T.S.



APPLICATION - TEMPORARY/PERMANENT MULCHING
N.T.S.



APPLICATION - STEEP SLOPES, SHALLOW DITCHES & BIO-SWALES
N.T.S.



APPLICATION – TEMPORARY/PERMANENT VEGETATIVE COVER
N.T.S.

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

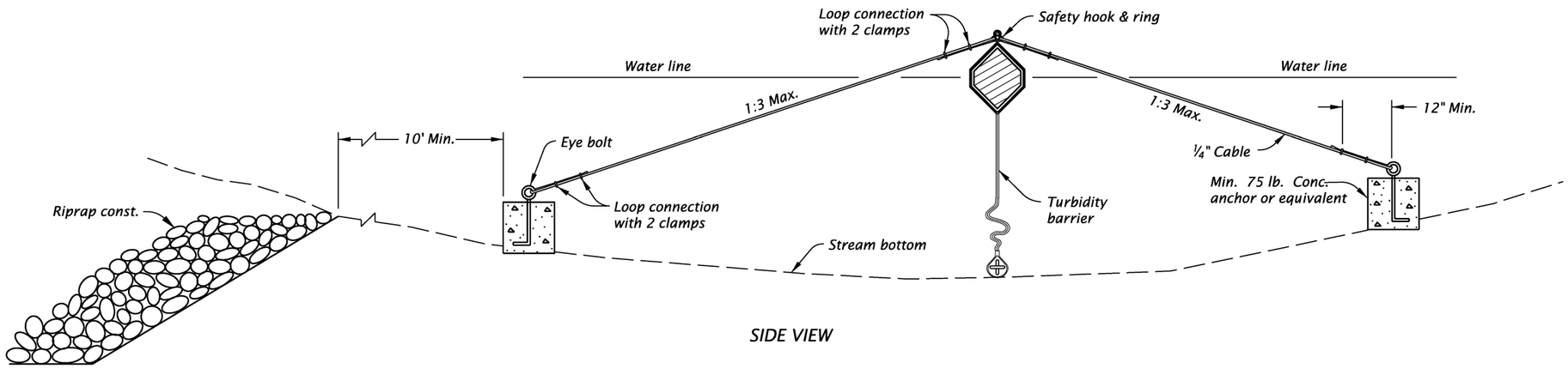
SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB01 6/25/2019 11:15:59 AM CDONOVAN

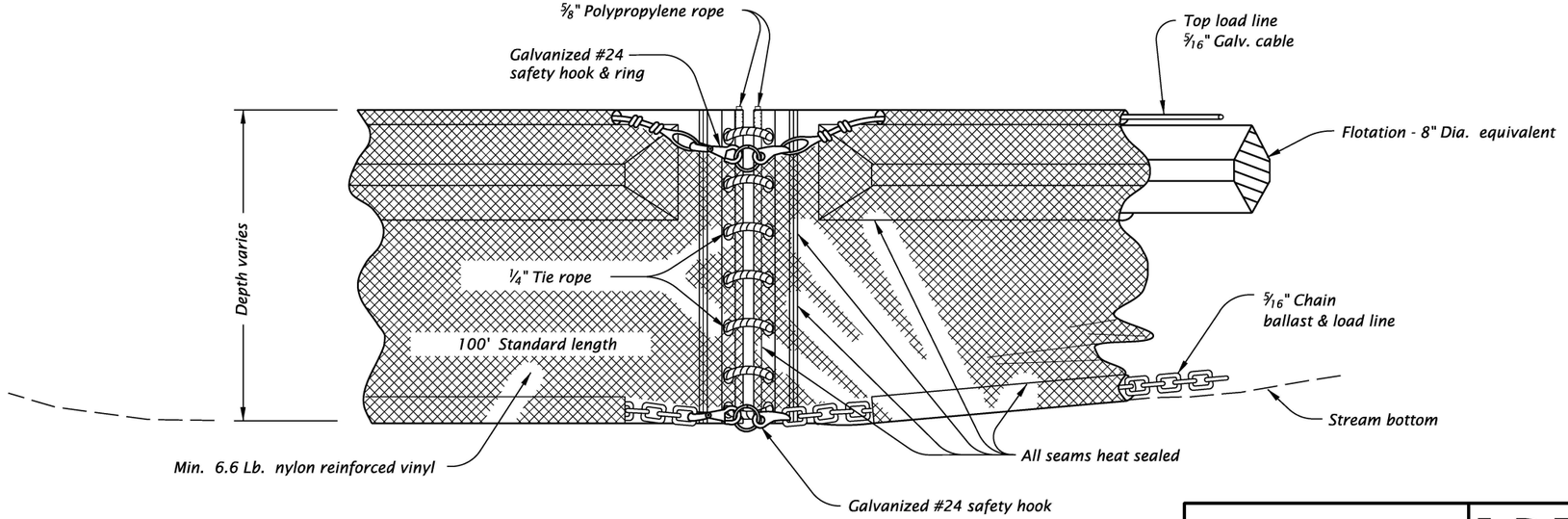
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0°

SEDIMENT BARRIER FLOATING



SIDE VIEW



ANCHOR ASSEMBLY

NOTE:

Components of this barrier may be similar or identical to proprietary designs. Any infringement on the proprietary rights of the designer shall be the sole responsibility of the contractor. Substitutions shall be as approved by the engineer.

TURBIDITY BARRIER

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec01_phase 1.dgn :: FB02 6/25/2019 11:16:01 AM CDONOVAN

Rotation: 0° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

BEGINNING OF PROJECT
S???(???)
STA. "L" 659+00 (M.P. 10.24)

N

Extg. R/W

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Extg. R/W

Extg. R/W

Extg. R/W

Ditch

(1) *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*

(2) *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

(3) *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

(4) *Install orange plastic mesh fencing*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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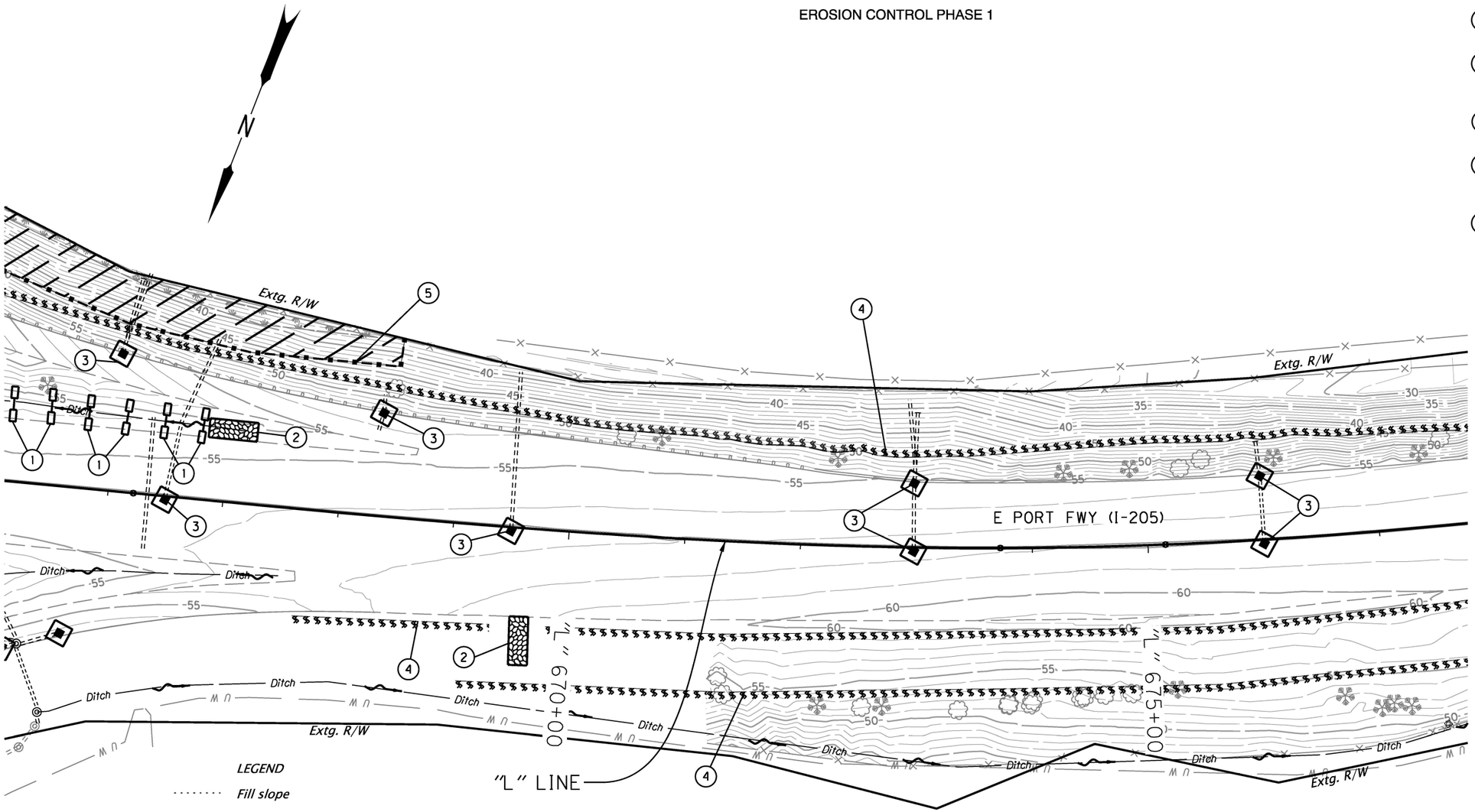
EE_K19786_HDR_ec01_phase 1.dgn :: FB03 6/25/2019 11:16:04 AM CDONOVAN

Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
2. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
3. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
4. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Wetland*
- *Ordinary High Water*
- *Compost filter berm*
- *Flow direction*
- *Construction entrance*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB04 6/25/2019 11:16:17 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost filter berm
- Ordinary High Water
- Flow direction
- Construction entrance

1. Const. construction entrance – xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
3. Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)

"L" LINE

"L" 705+00

"L" 710+00

Extg. R/W

E PORT FWY (I-205)

PACIFIC HWY (OR99E)

Extg. R/W

For creek erosion control plans see shts. FB21, FB22, FB23

ABERNETHY CREEK

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

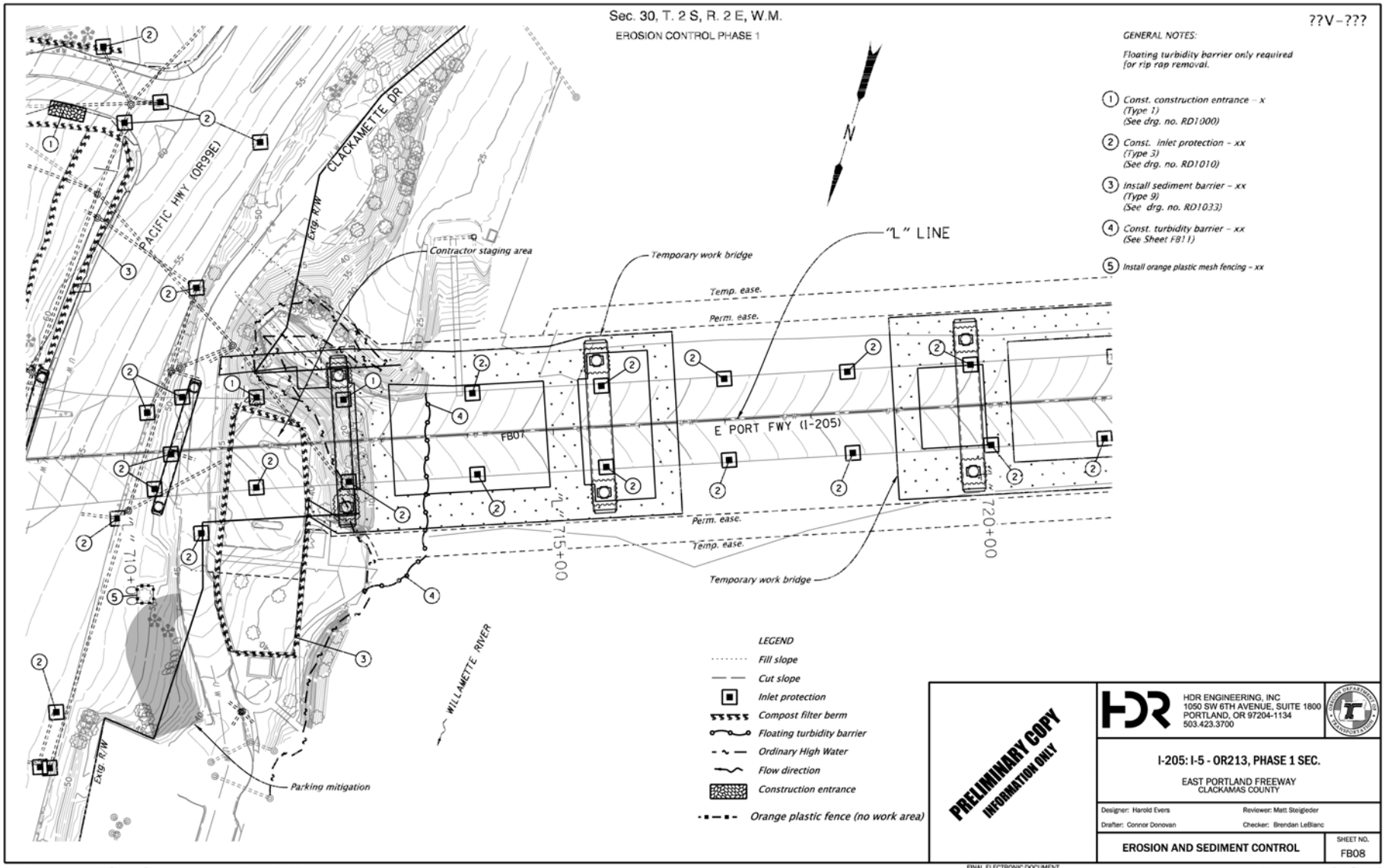
EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB07 6/25/2019 11:16:59 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 272.0412°


Sec. 30, T. 2 S, R. 2 E, W.M.
EROSION CONTROL PHASE 1
??V-???
GENERAL NOTES:
Floating turbidity barrier only required for rip rap removal.
1 Const. construction entrance - x (Type 1) (See drg. no. RD1000)
2 Const. inlet protection - xx (Type 3) (See drg. no. RD1010)
3 Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
4 Const. turbidity barrier - xx (See Sheet FB11)
5 Install orange plastic mesh fencing - xx
N
PACIFIC HWY (OR99E)
CLACKAMETTE DR
EXIST. R/W
Contractor staging area
Temporary work bridge
"L" LINE
Temp. ease.
Perm. ease.
E PORT FWY (I-205)
FB07
"L" 715+00
"L" 720+00
"L" 710+00
Perm. ease.
Temp. ease.
Temporary work bridge
WILLAMETTE RIVER
EXIST. R/W
Parking mitigation
LEGEND
Fill slope
Cut slope
Inlet protection
Compost filter berm
Floating turbidity barrier
Ordinary High Water
Flow direction
Construction entrance
Orange plastic fence (no work area)
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I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY
Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc
EROSION AND SEDIMENT CONTROL
SHEET NO.
FB08
EE_K19786_HDR_ec01_phase 1.dgn :: FB08 6/25/2019 11:17:11 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 198.4431° Scale: 1"=100'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

STA. "L" 659+00 (M.P. 10.24)

BEGINNING OF PROJECT
S???(???)

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Extg. R/W

Ditch

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Erosion control matting*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

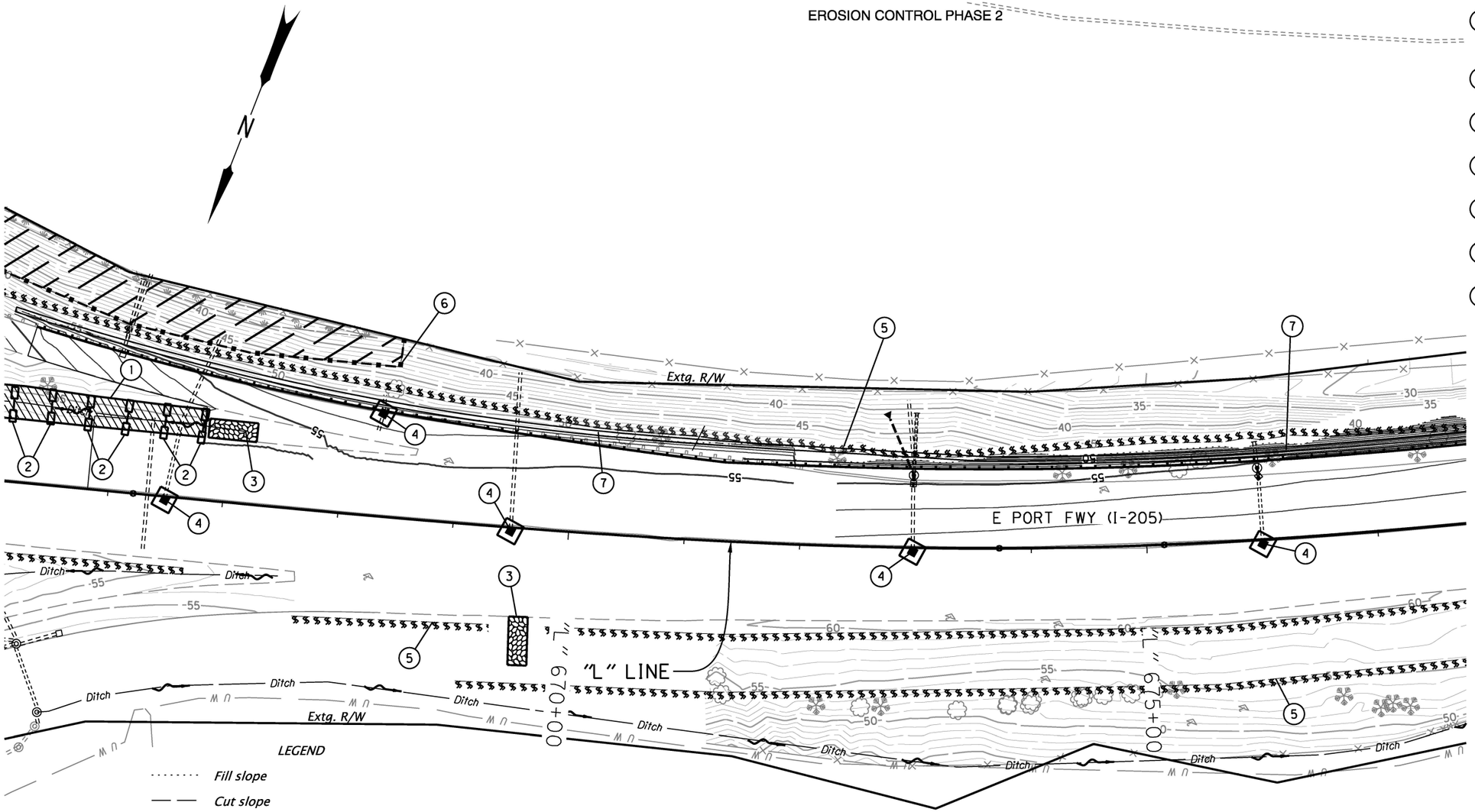
EE_K19786_HDR_ec01_phase 2.dgn :: FB12 6/25/2019 11:18:38 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*
7. *Seeding and mulching – xx*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB13 6/25/2019 11:18:42 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Erosion control matting
- Ordinary High Water
- Construction entrance
- Flow direction
- Compost filter berm
- Orange plastic fence (no work area)

1. Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket – xx For details, see sht. FB-01
3. Const. construction entrance – xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
5. Install sediment barrier – xx (Type 9) (See drg. no. RD1033)
6. Install orange plastic mesh fencing – xx

N

Extg. R/W

E PORT FWY (I-205)

"L" LINE

PACIFIC HWY (OR99E)

"L" 710+00

Extg. R/W

Parking mitigation

Perm. ease

Ditch

ABERNETHY CREEK

Extg. R/W

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

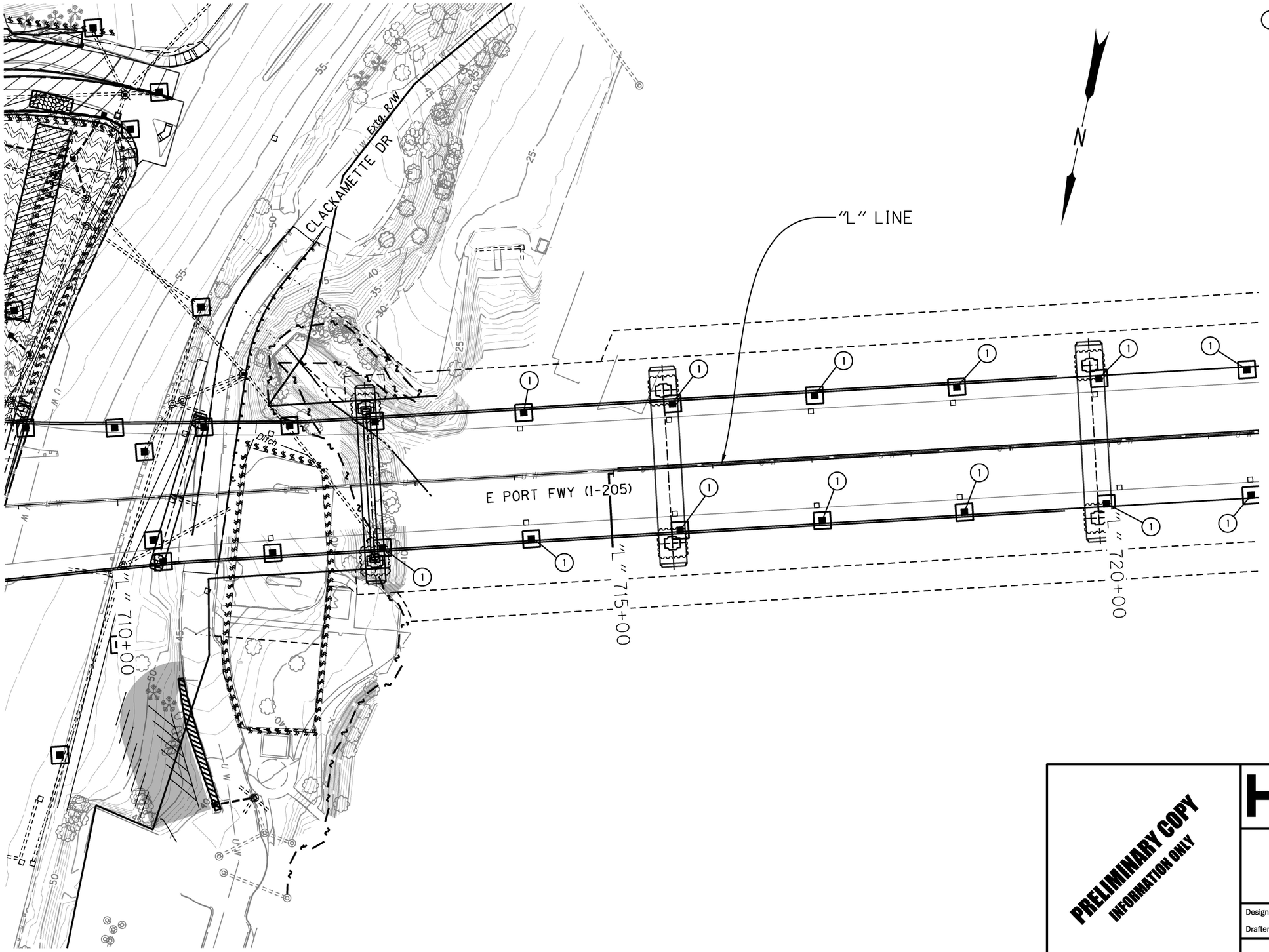
EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB16 6/25/2019 11:19:10 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 272.0412°



1 Const. inlet protection – 25 (Type 3) (See drg. no. RD1010)

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

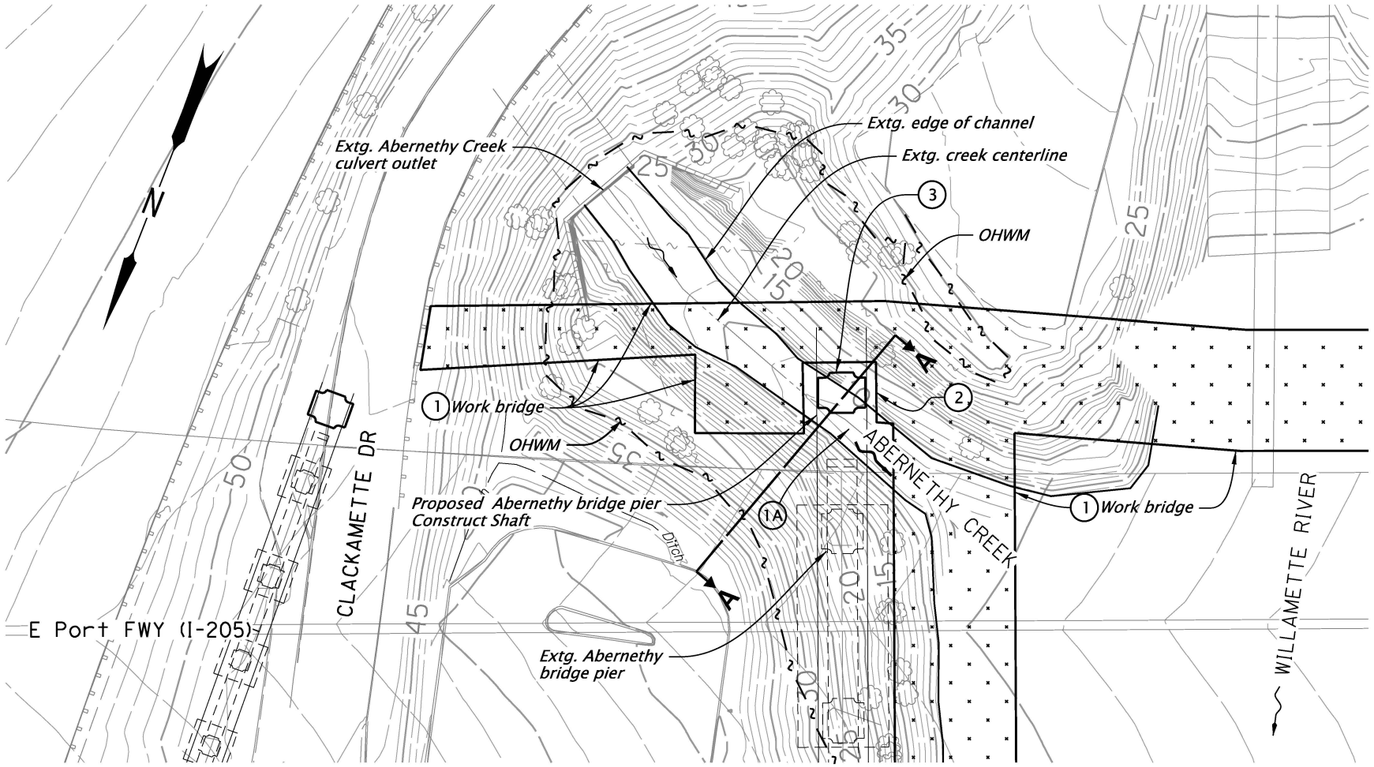
EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB17 6/25/2019 11:19:23 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.3393° 0'



Abernethy Creek - Phase 1
(In-water-work activity)
Construct temporary work bridge and Pier 3, south side.

CONSTRUCTION SEQUENCE

- (1A) *Remove existing rip rap (as required)*
- (1) *Install temporary work bridge*
- (2) *Install temporary shoring at Pier 3*
- (3) *Construct shaft*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

See sht. FB 24 for section A–A.

LEGEND

- ····· *Fill slope*
- — — *Cut slope*
- — ~ - *Ordinary High Water*
- ~~ *Flow direction*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec02.dgn :: FB21 Phase 1 6/25/2019 11:20:04 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
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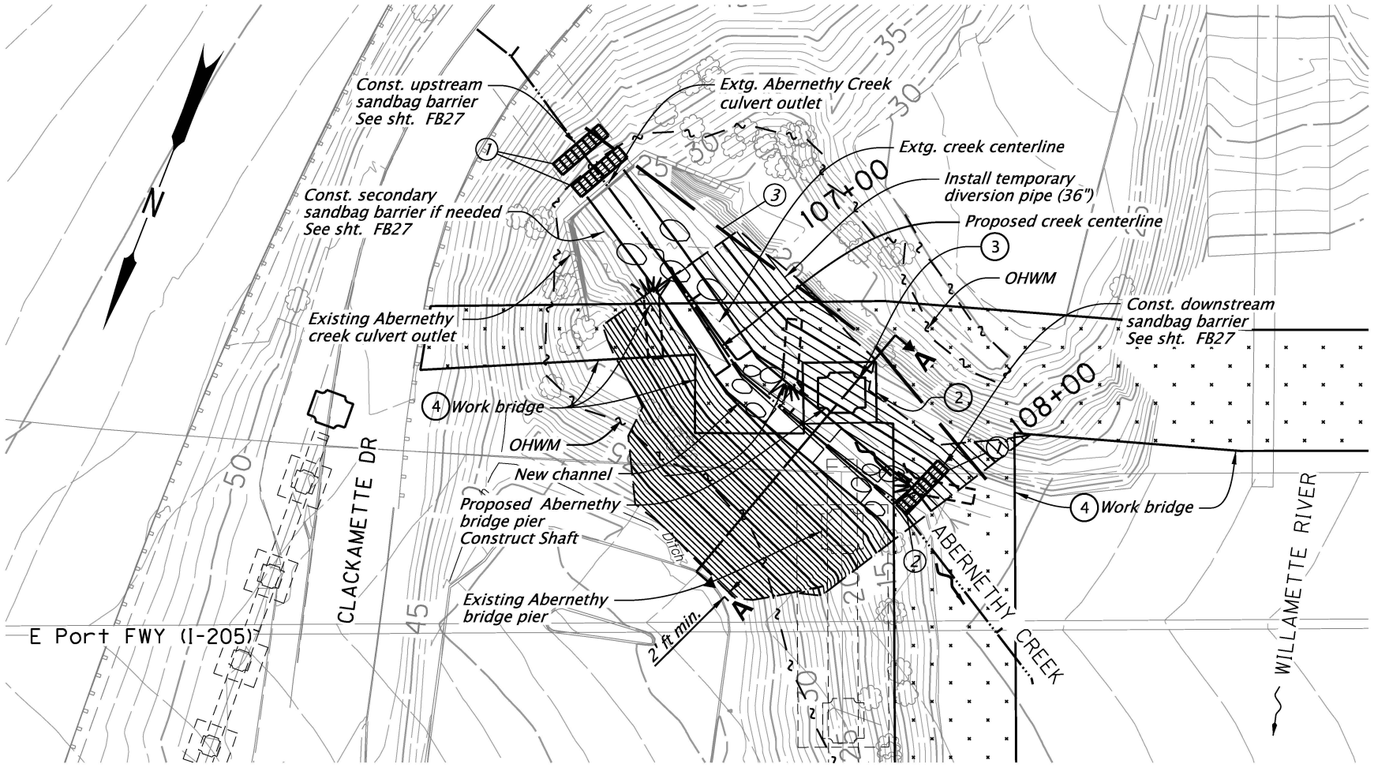
Rotation: 201.4396 0'



Abernethy Creek Construction - Phase 2A
(In-water-work)
Complete Pier 3 south side architetural treatment and channel restoration

CONSTRUCTION SEQUENCE

1. *Complete architectural finish on Pier 3 southern shaft*
2. *Install temporary diversion*
3. *Remove coffer dam at soutern shaft of Pier 3*
4. *Remove work bridge*
5a. *Realign Abernethy Creek*
5b. *Remove temporary water management features*
6. *Install channel restoration features*

FULL ISOLATION NOTES:

1. *Isolating the work site upstream: Install single primary sandbag barrier across the stream channel. If Needed, install secondary sandbag barrier. Downstream: Install sandbag barrier.*
2. *Install sandbag barrier downstream from work area. Location to be set based on topography and easements available.*
3. *Size the temporary water management facility based on site conditions. Route water around work area using pipe, pump or combination. The discharge table below can be used to estimate the size of the bypass pipe and/or pump.*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

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I-205: I-5 - OR213, PHASE 1 SEC.

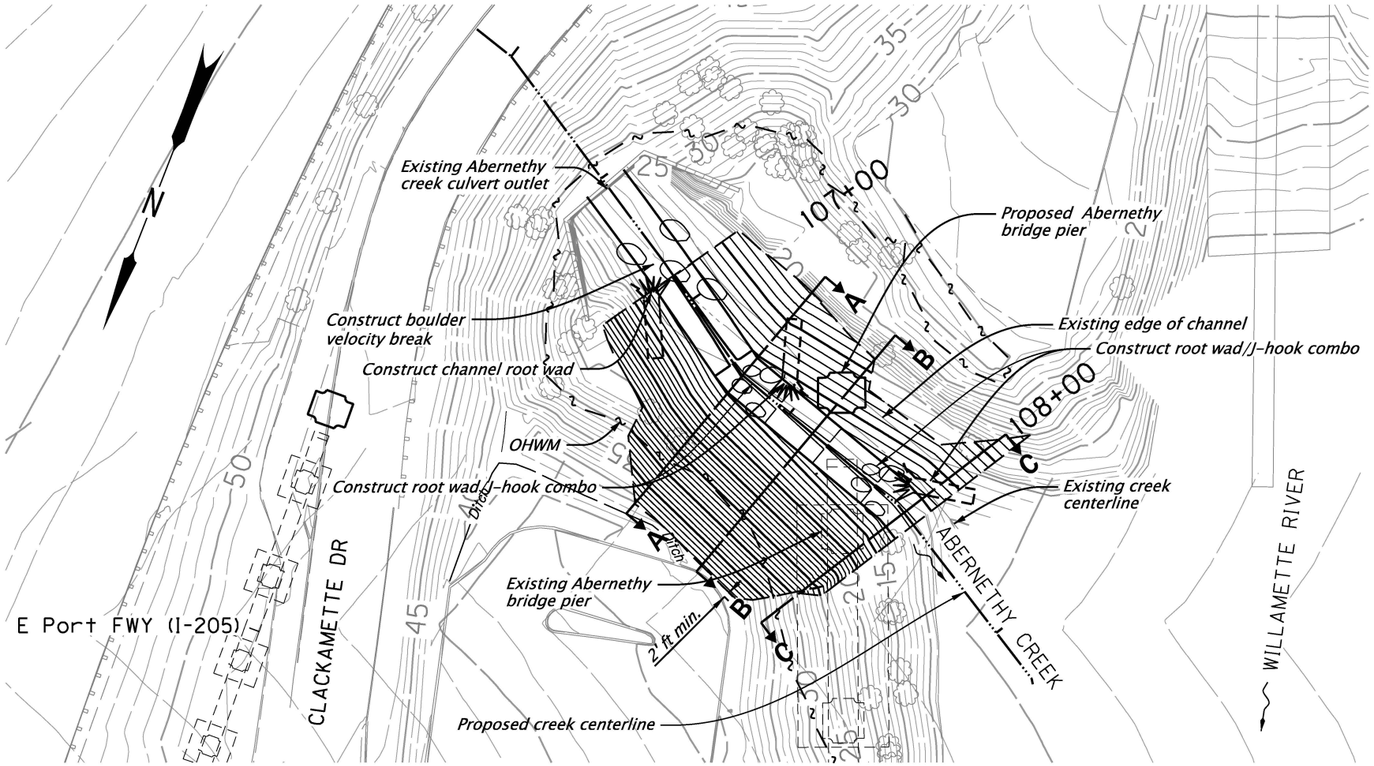
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec02.dgn :: FB22 Phase 2a 6/25/2019 11:20:05 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 201.4396



Notes:
Root wad key pieces should be at least 22 inches in diameter and buried 10-15 feet.

Boulders and structure rocks should be greater than 30 inches in diameter.

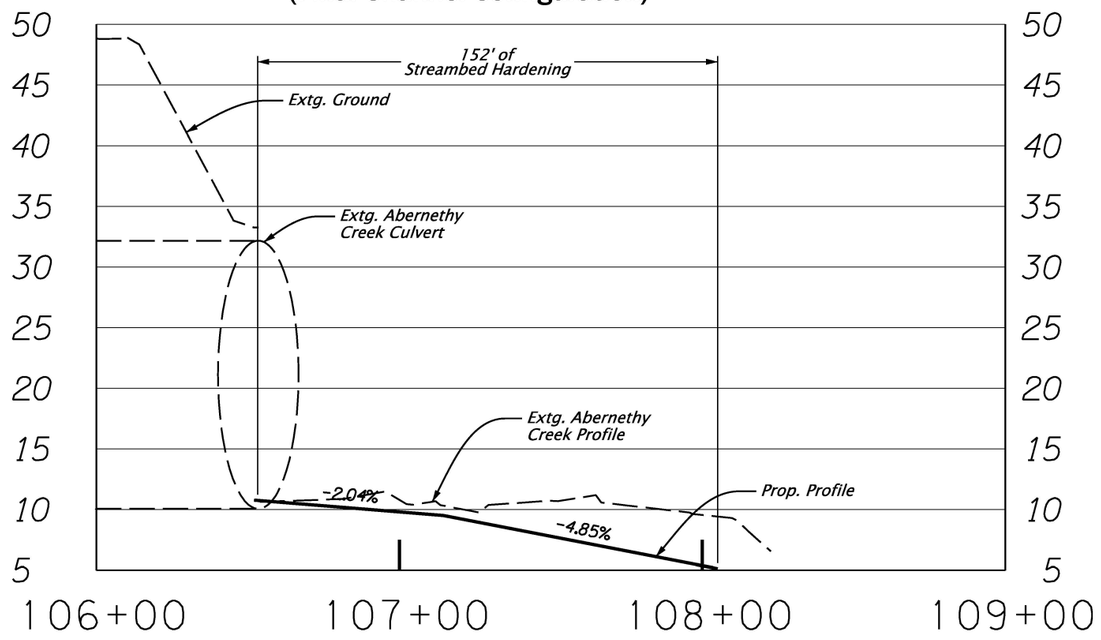
For root wad/J-hook combo, channel root wad, and boulder velocity break, see details XX, XX, and .

For section B-B, see sht. FB24. For section A-A and C-C, see sht. FB25.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

Abernethy Creek - Phase 2B
(Final Channel Configuration)



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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec02.dgn :: FB23 Phase 2b 6/25/2019 11:20:07 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
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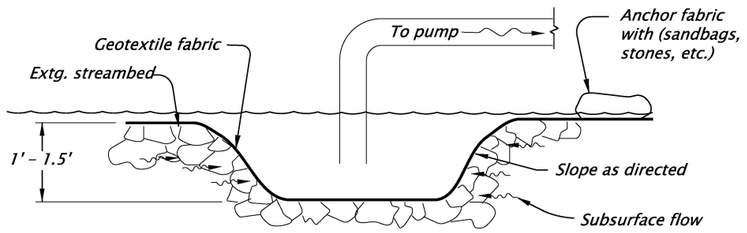
Rotation: 201.4396

TEMPORARY WATER MANAGEMENT FACILITY



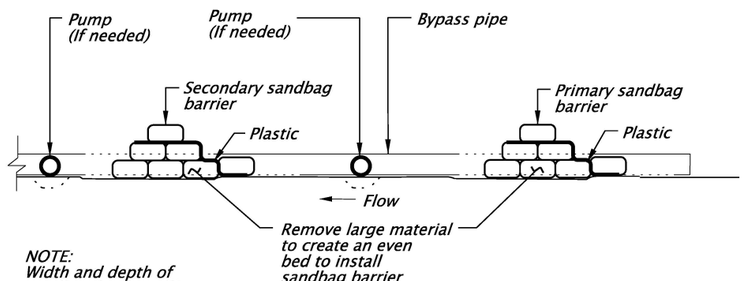
SUMP DETAIL
NTS

GENERAL NOTES:

The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.



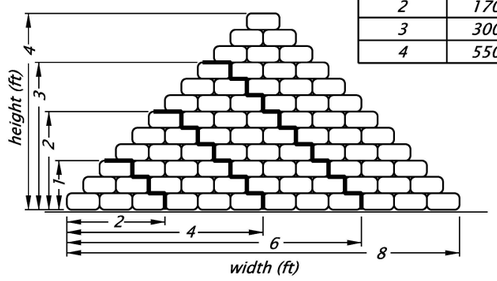
NOTE:
Width and depth of sandbag barrier will vary depending on site and stream flow conditions.

SANDBAG BARRIER SECTION

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500

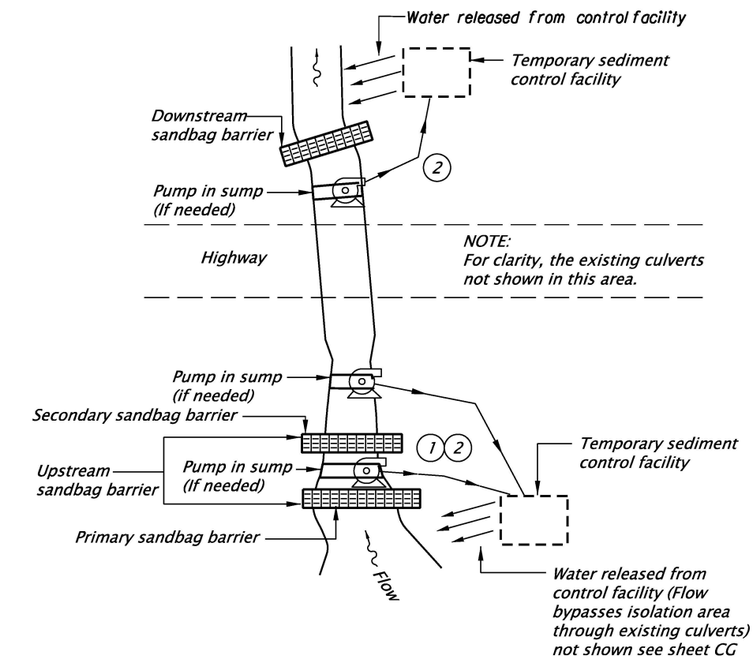


LEGEND:

Sandbag barrier line

Sediment control facility

Sump pump



COMBINED PUMP/GRAVITY BYPASS DETAIL
NTS

FULL ISOLATION NOTES:

(1) *See sheet FB22 note.*

(2) *See sheet FB22 note.*

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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

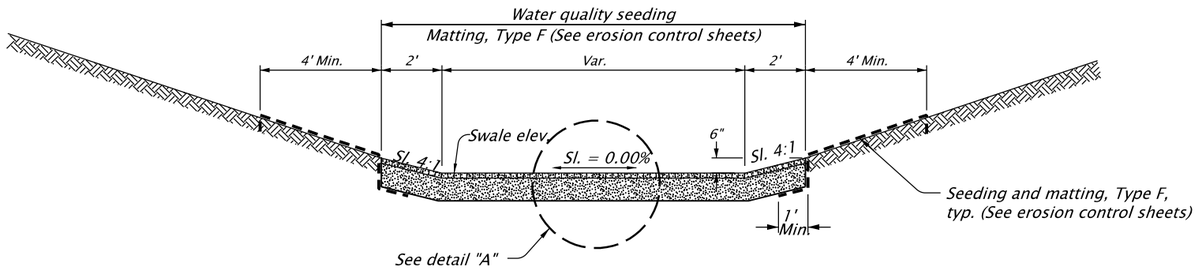
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec02.dgn :: FB27 bypass detail 6/25/2019 11:24:46 AM CDONOVAN

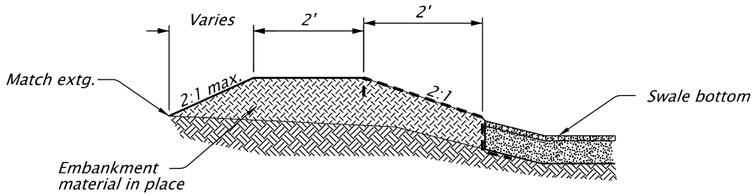
Rotation: 360 0'

Attachment D. Stormwater Plans

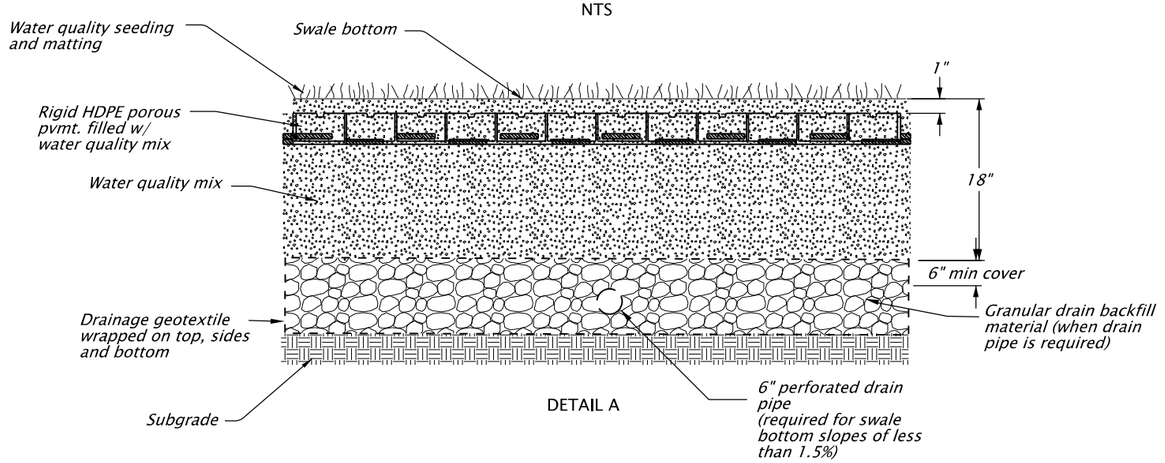
WATER QUALITY SWALE DETAILS



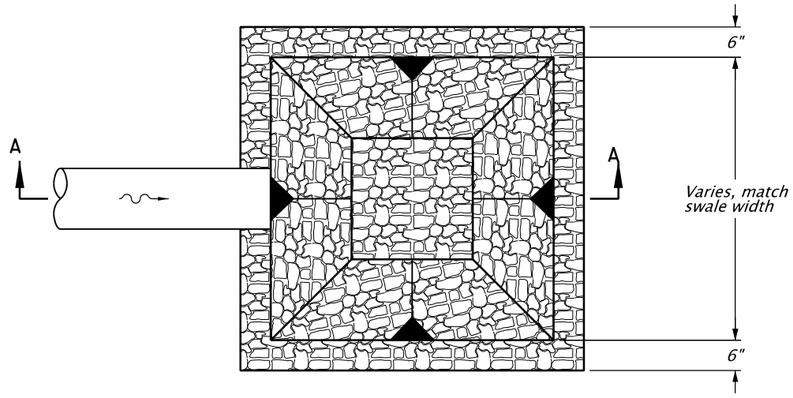
WATER QUALITY SWALE
NTS



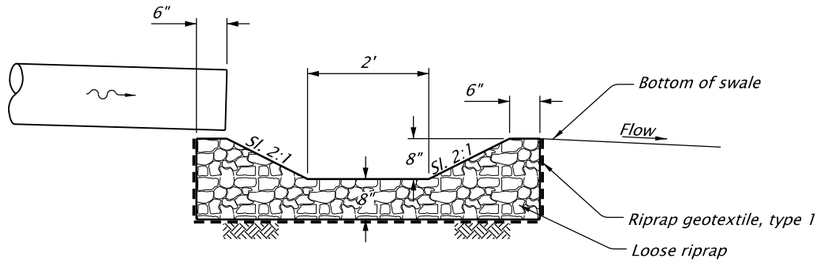
SWALE BERM
NTS



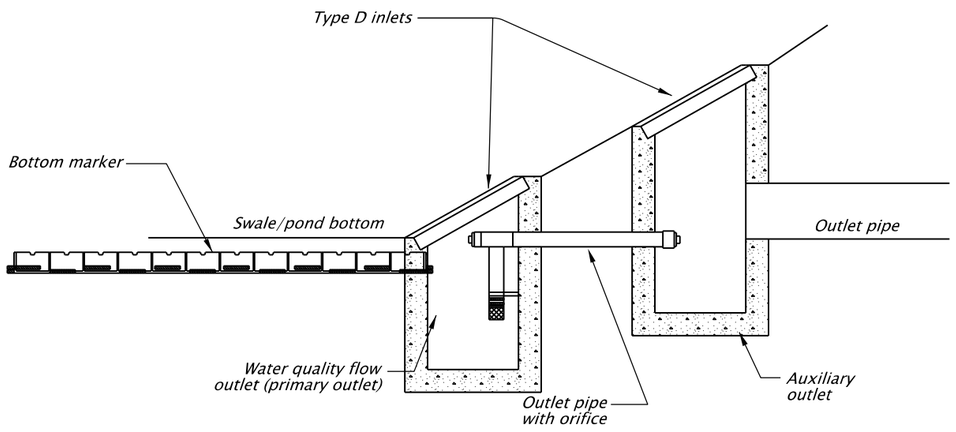
DETAIL A



ROCK BASIN FLOW SPREADER
Scale: NTS



SECTION A–A



SWALE/POND OUTLET STRUCTURE

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

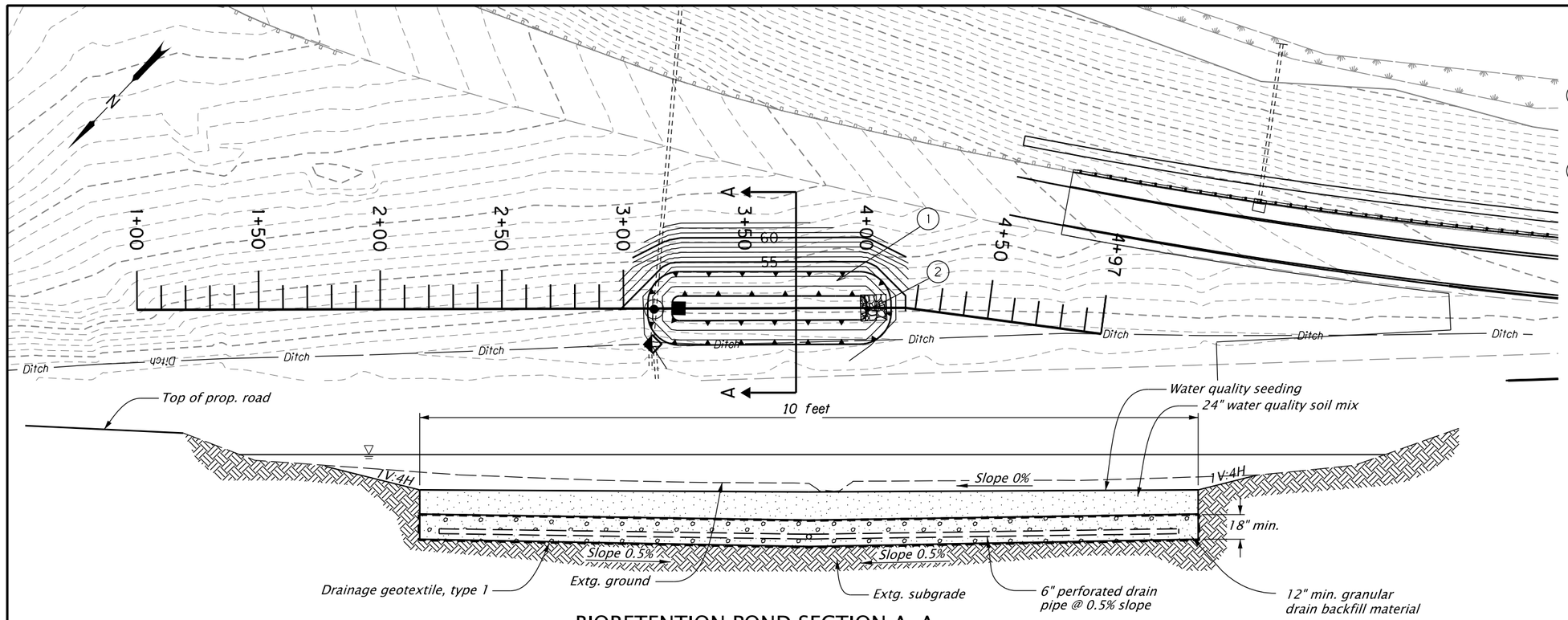
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

STORMWATER DETAILS

SHEET NO.

Rotation: 0

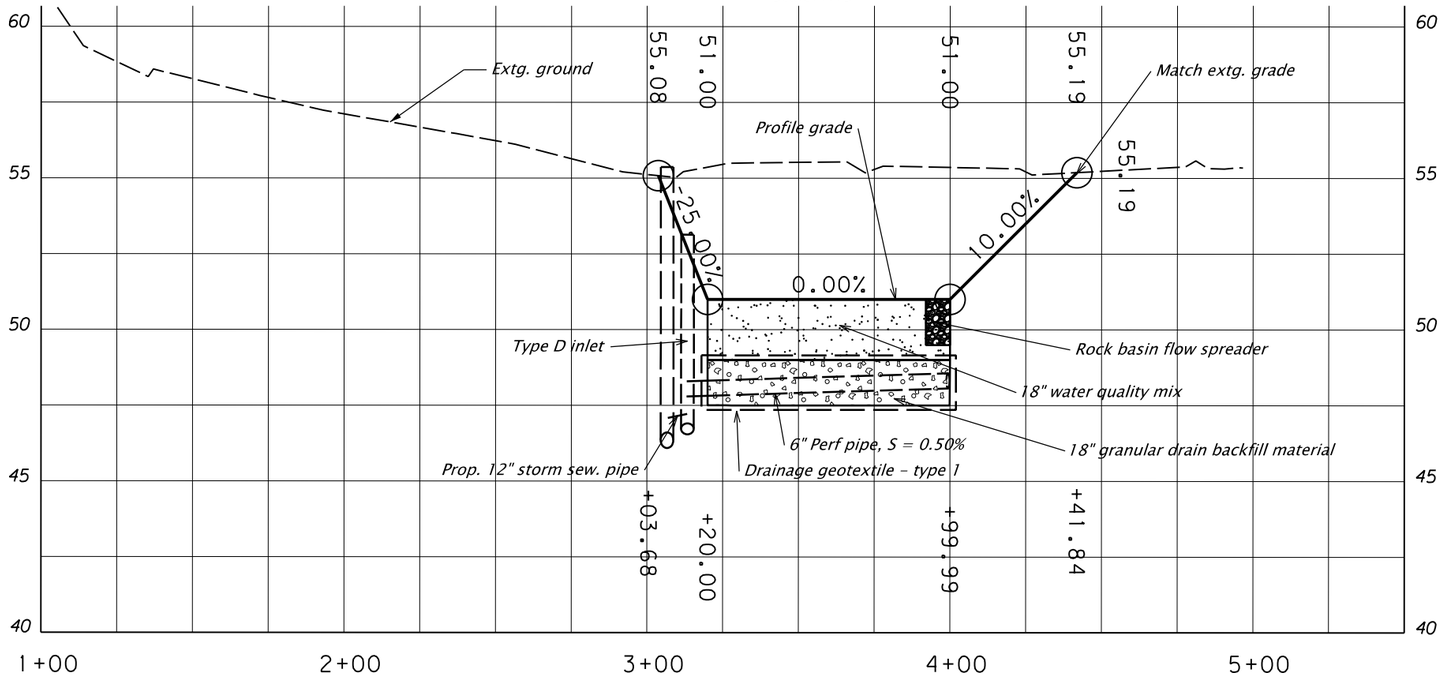


1 Sta. 3+09.86 to Sta. 4+10.05
Construct biorention pond
(For details, see sht. HA01)

2 Sta. 4+02.85, 0.00'
Construct rock basin flow spreader
(For details, see sht. HA01)

BIORETENTION POND SECTION A-A

Scale: NTS



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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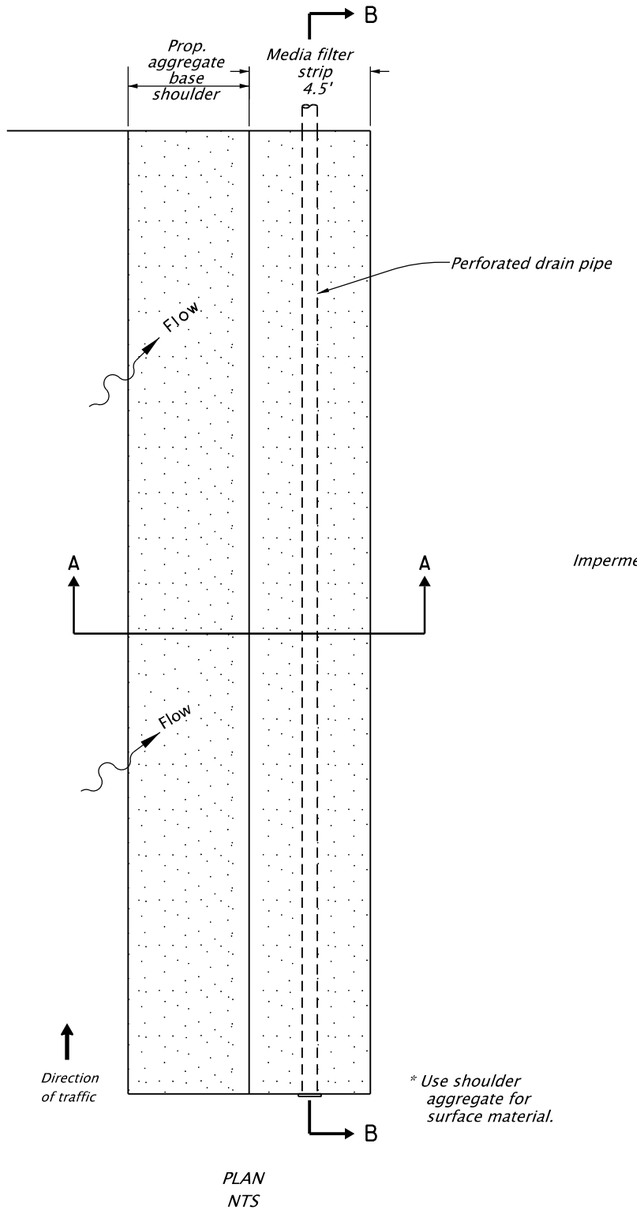
WATER QUALITY PLAN AND PROFILE

SHEET NO.

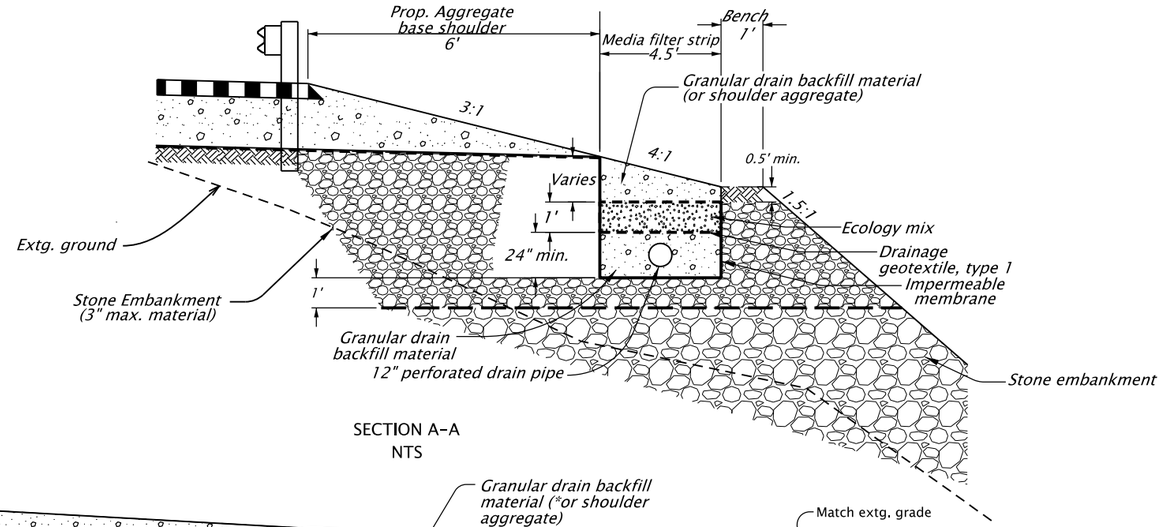
Rotation: 223.5514 0'
Vertical Scale: 1:10

BIOSLOPE DETAILS

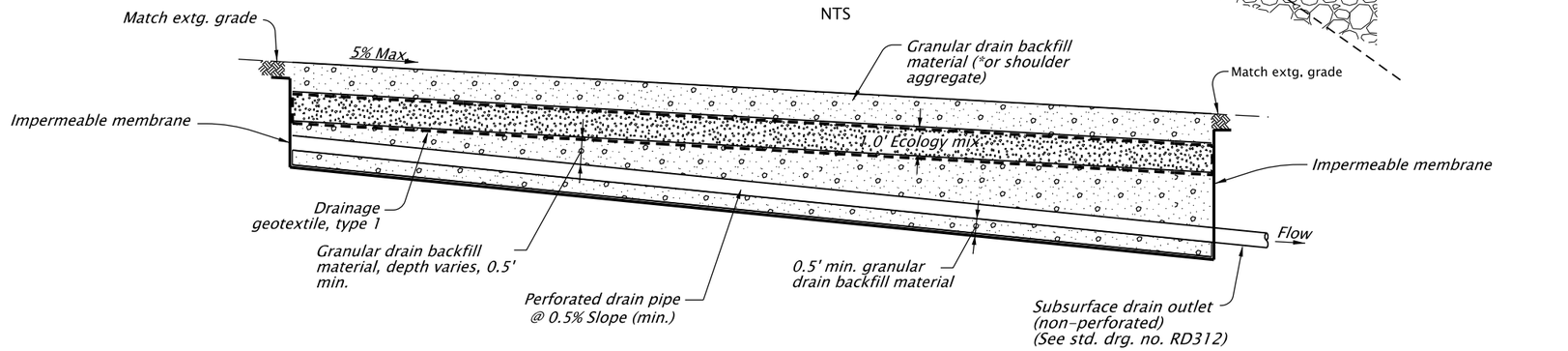
Sta. "L" 665+00 to Sta. "L" 684+00



PLAN
NTS



SECTION A-A
NTS



SECTION B-B
NTS

DFI#XXXXXX

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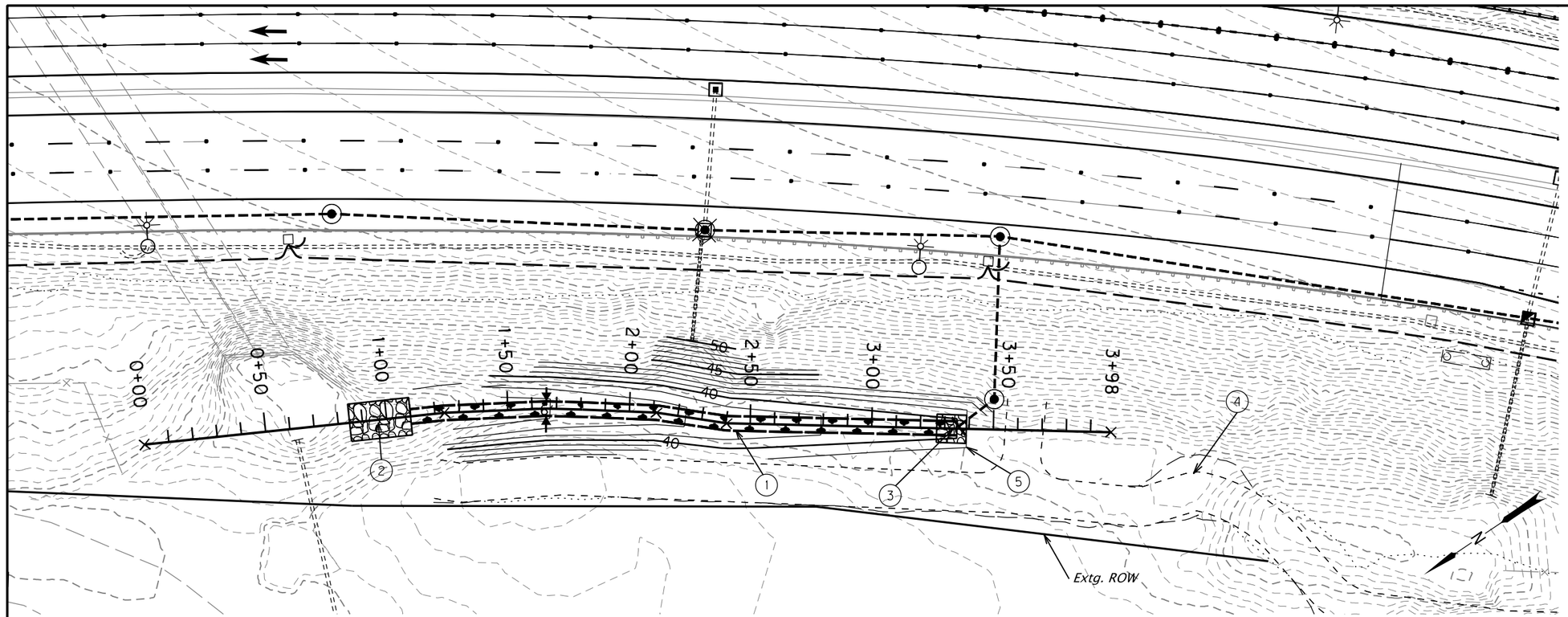
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

STORMWATER DETAILS

SHEET NO.

Rotation: 0



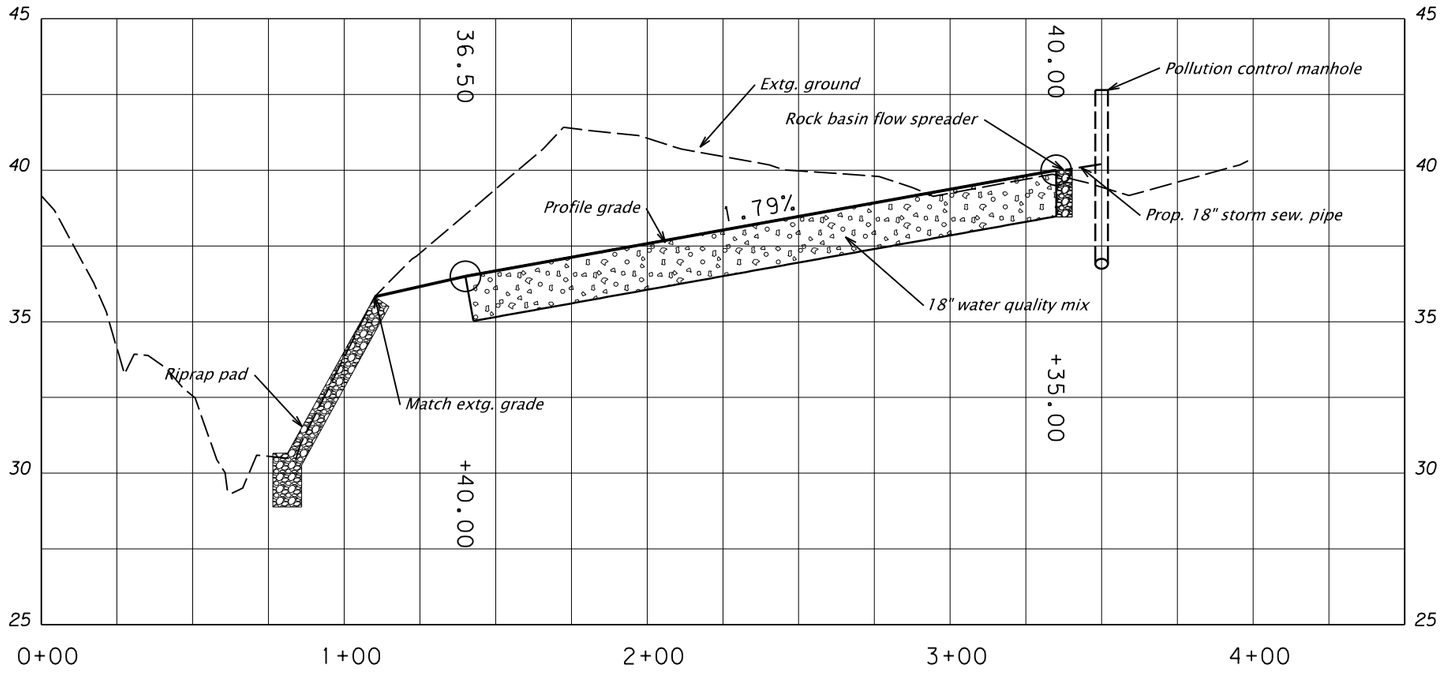
1. *Sta. 3+34.91 to Sta. 1+09.97*
   Const.biofiltration swale
   (For details, see sht. HA01)

2. *Sta. 0+97.37, 0.00'*
   Const. riprap pad
   Loose riprap (class 50) - 5.0 tons|
   (See drg. no. RD317)

3. *Sta. 3+33.58, 0.00'*
   Const. rock basin flow spreader
   (For details, see sht. HA01)

4. *Sta. XX+XX.XX*
   Const. maintenance access road
   (For details, see sht. HAXX)

5. *Sta. XX+XX.XX*
   Const. berm
   (For details, see sht. HA01)



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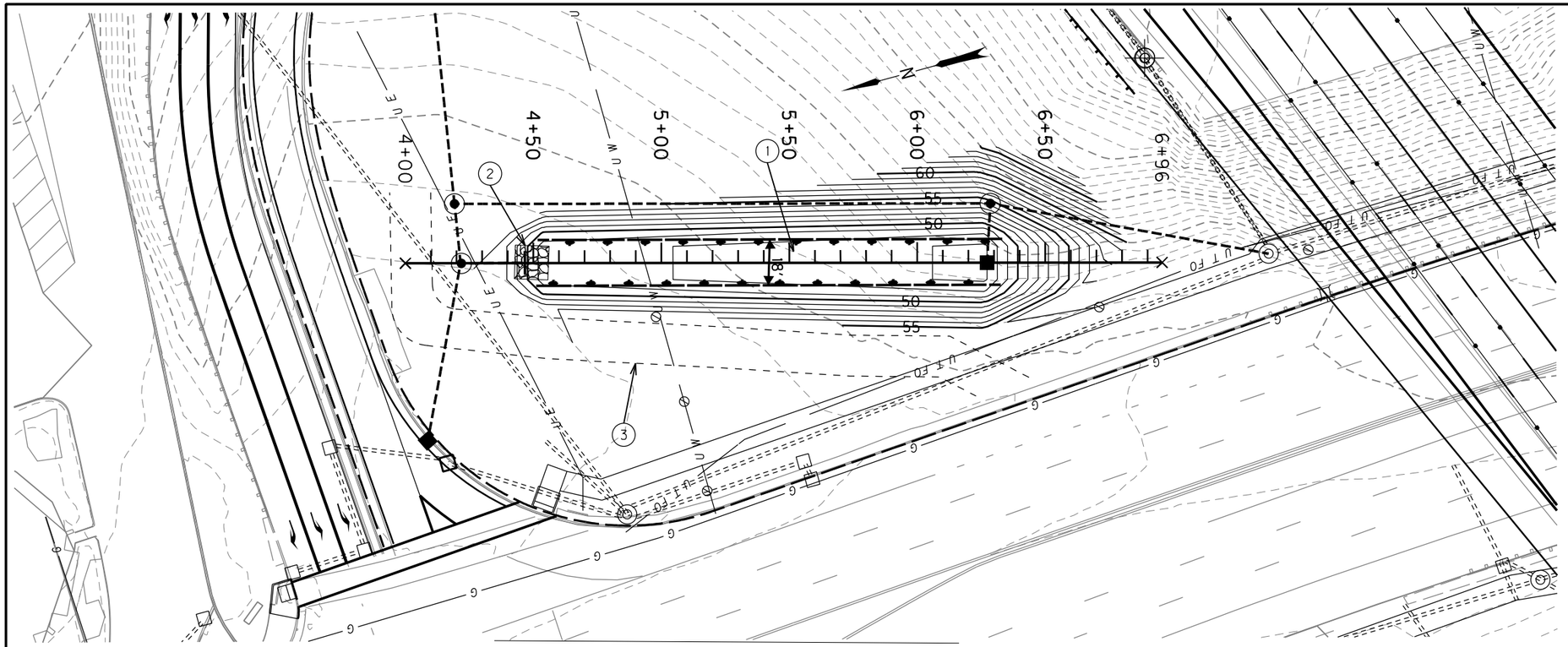
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:	Reviewer:
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

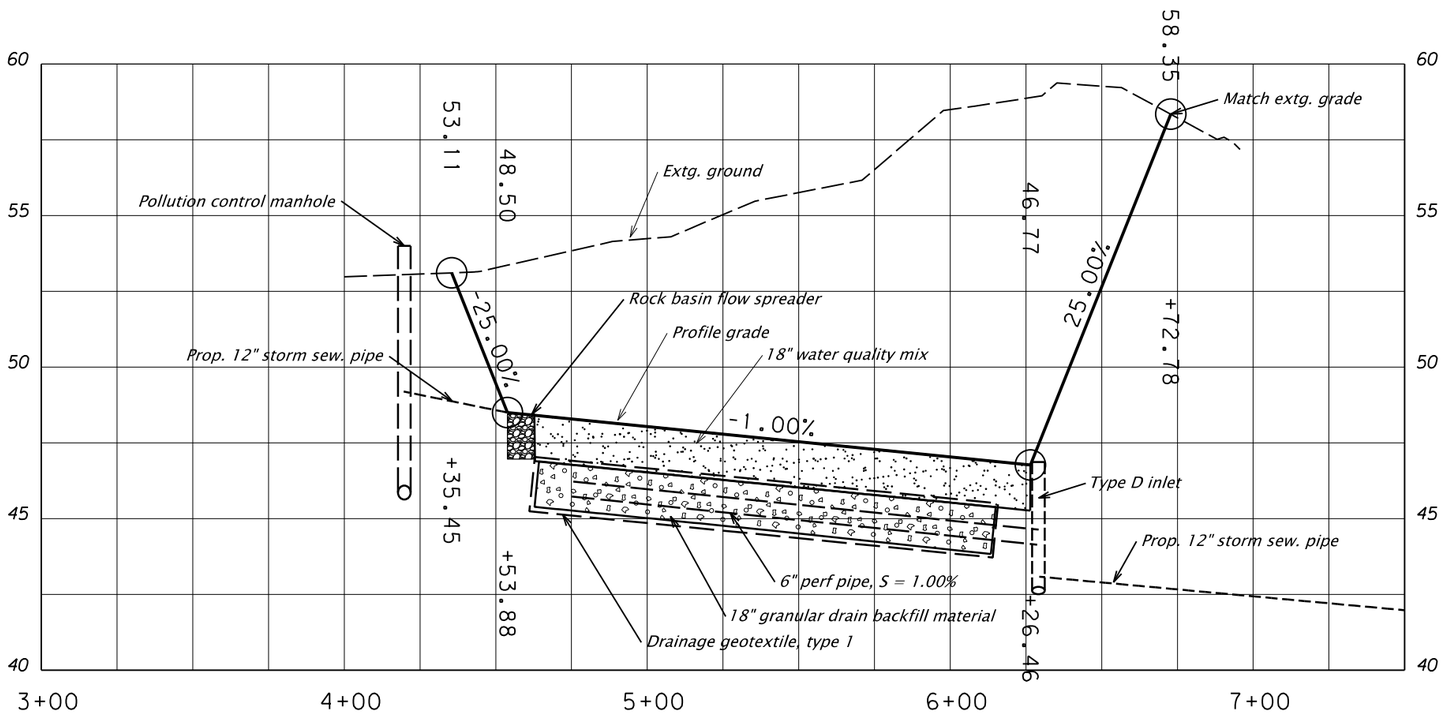
Rotation: 236.1297 0'
Vertical Scale: 1:10



1. *Sta. 4+50.41 to Sta. 6+34.91*
   Const. biofiltration swale
   (For details, see sht. HA01)

2. *Sta. 4+48.95, 0.00'*
   Construct rock basin flow spreader
   (For details, see sht. HA01)

3. *Sta. XX+XX.XX*
   Construct maintenance access road
   (For details, see sht. HAxx)



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I-205: I-5 - OR213, PHASE 1 SEC.

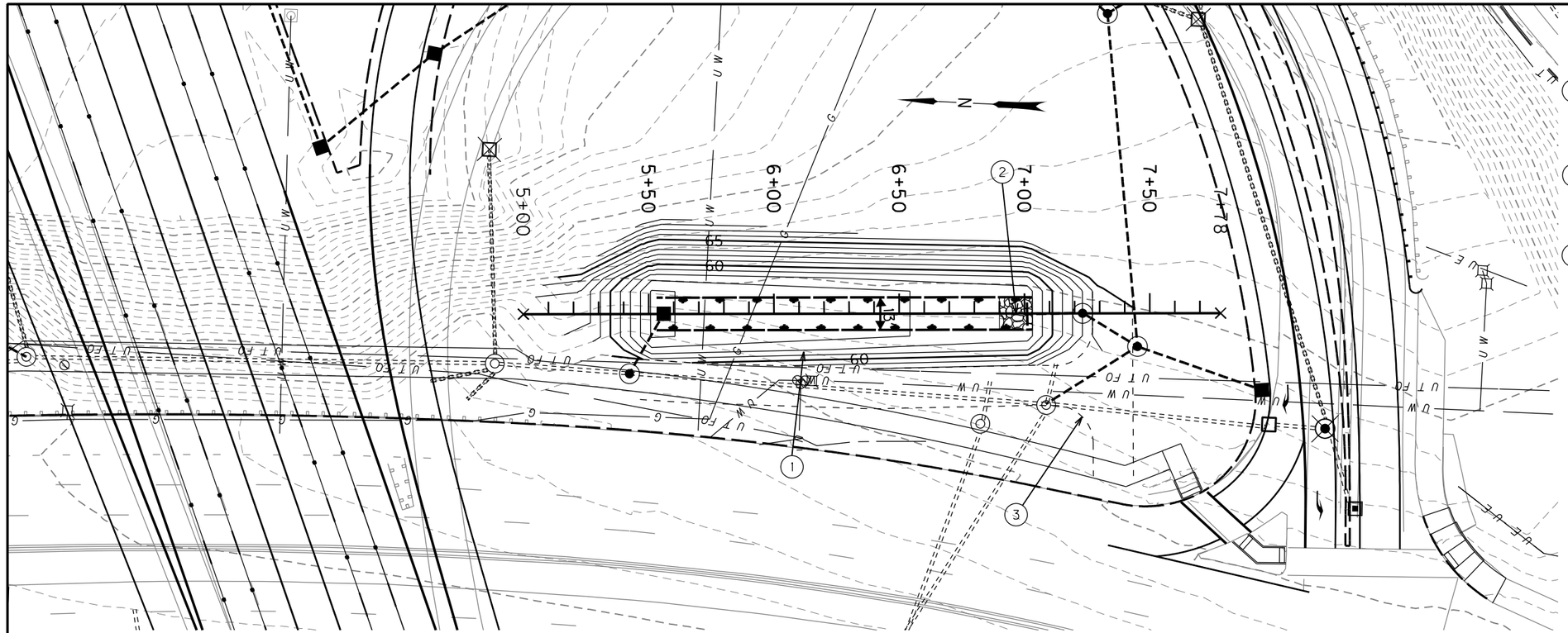
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

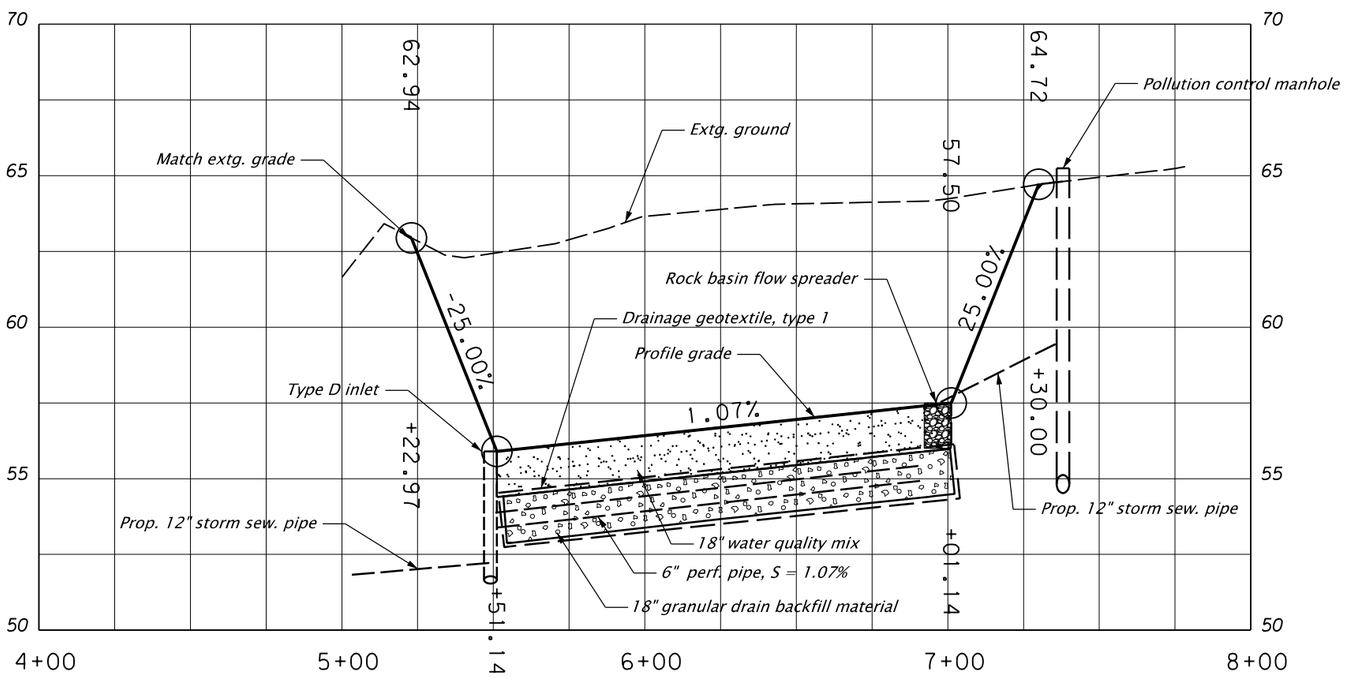
Rotation: 254.7731 Vertical Scale: 1:10



1. Sta. 7+03.50 to 5+52.97
   Construct biofiltration swale
   (For details, see sht. HA02)

2. Sta. 6+95.86, 0.00'
   Construct rock basin flow spreader
   (For details, see sht. HA02)

3. Sta. XX+XX.XX
   Construct maintenance access road
   (For details, see sht. HAxx)



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I-205: I-5 - OR213, PHASE 1 SEC.

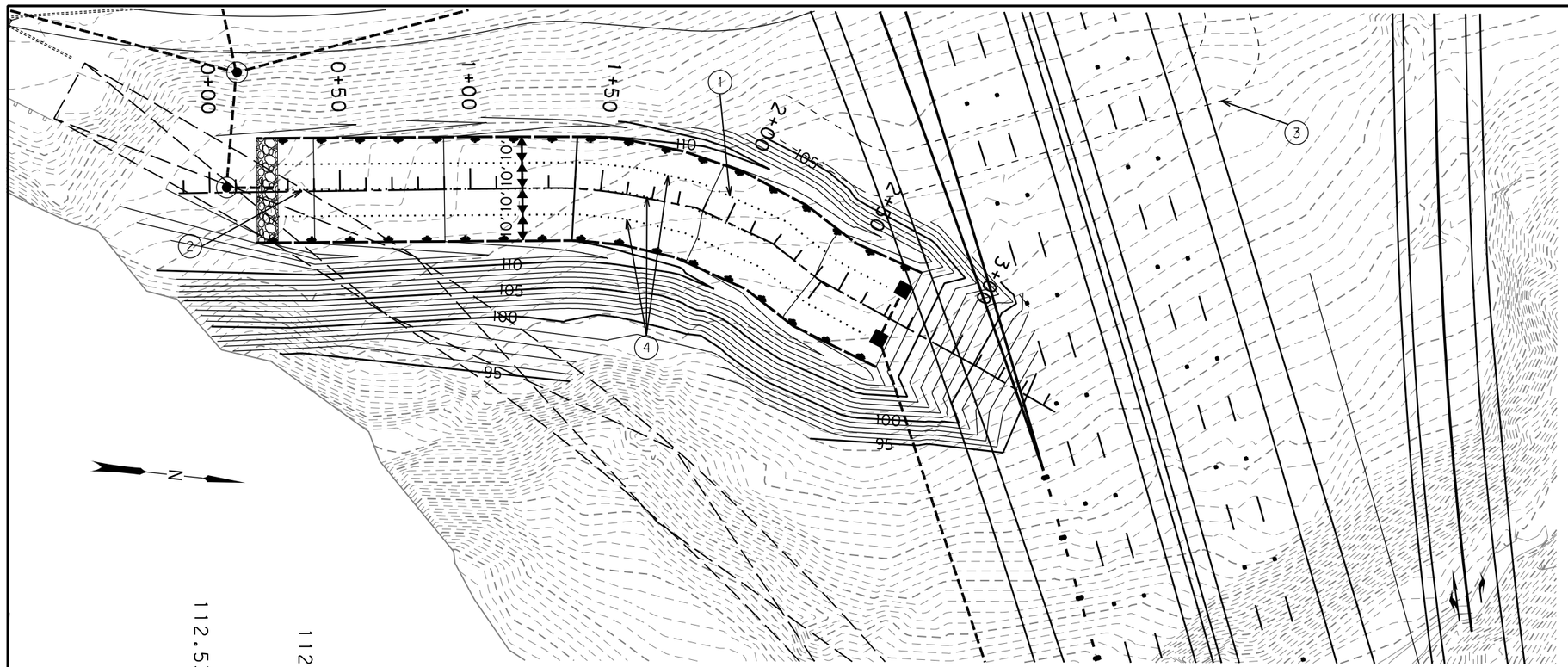
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:	Reviewer:
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 272.7106 0'
Vertical Scale: 1:10



1 *Sta. 0+31.89 to Sta. 2+48.39*
Construct biofiltration swale
(For details, see sht. HA01)

2 *Sta. 0+37.15, 2.22' Lt.*
Construct rock basin flow spreader
(For details, see sht. HA01)

3 *Sta. XX+xx.xx*
Construction maintenance access road
(For details, see sht. HAXX)

4 *Construct dividing berm*
(For details, see sht. HA01)

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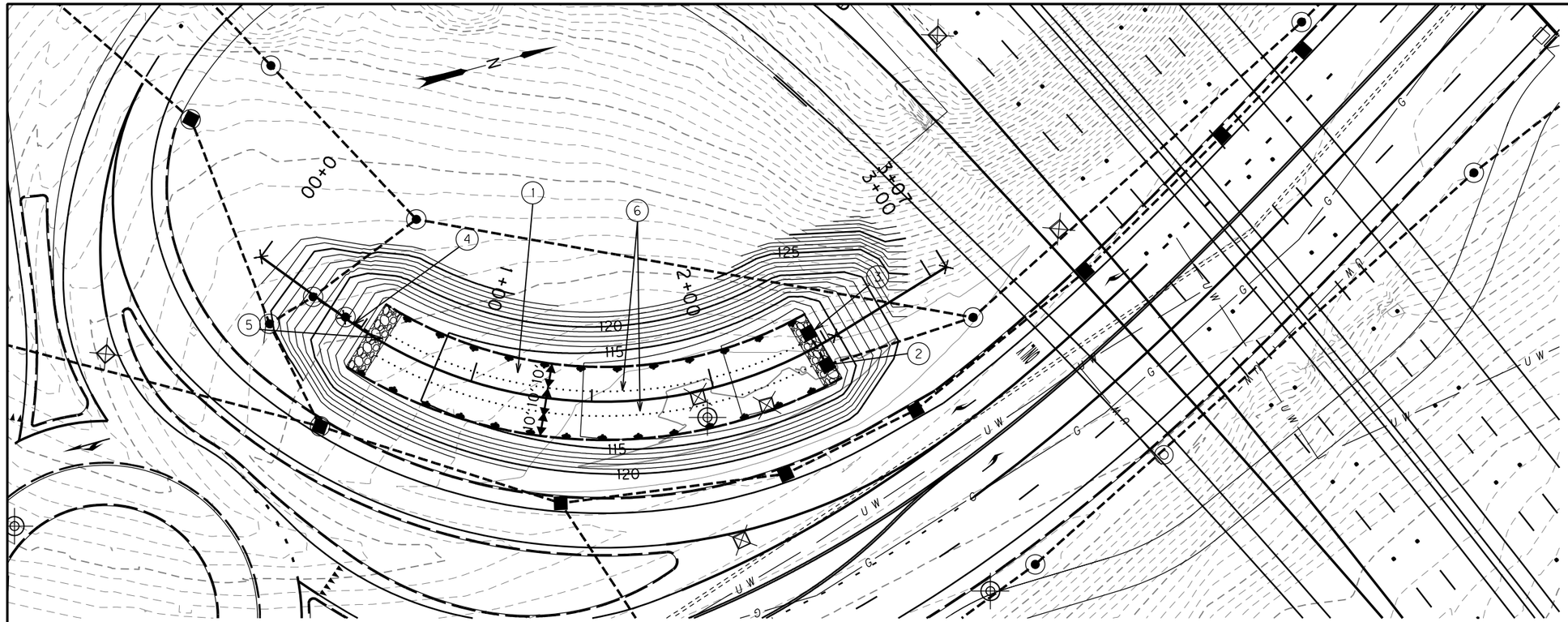
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:	Reviewer:
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE SHEET NO.

Rotation: 96.0998 [illegible]0'
Vertical Scale: 1:10



1. *Sta. 0+54.22 to 2+55.48*
   Construct 30' wide biofiltration swale
   (For details, see sht. HA01)

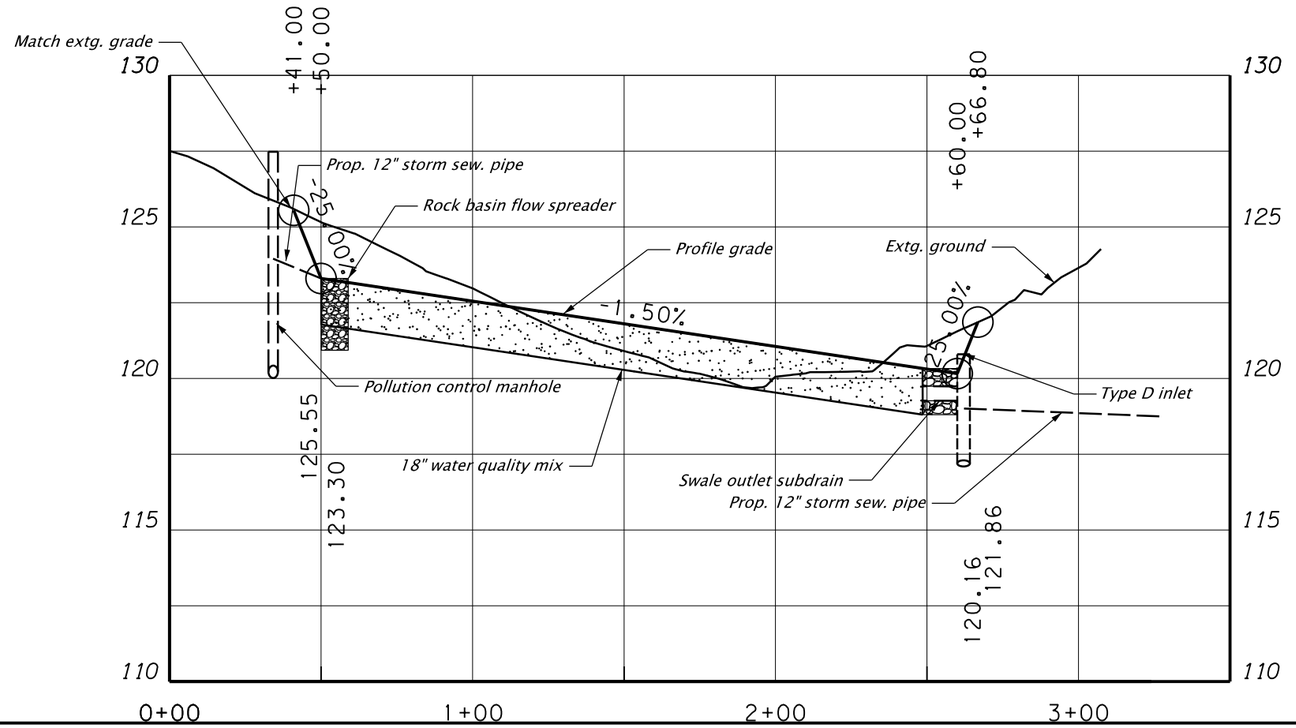
2. *Sta. 2+64.06, 20.53' Lt.*
   Construct type "D" inlet
   (See drg. no. RD370)

3. *Sta. 2+63.54, 5.88' Lt.*
   Construct type "D" inlet

4. *Sta. 0+43.25*
   Construct pollution control manhole
   (See drg. nos. RD340, RD345, RD356 and RD336)

5. *Sta. 0+54.22*
   Construct rock basin flow spreader
   (For details, see sht. HA01)

6. *Construct dividing berm*



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I-205: I-5 - OR213, PHASE 1 SEC.

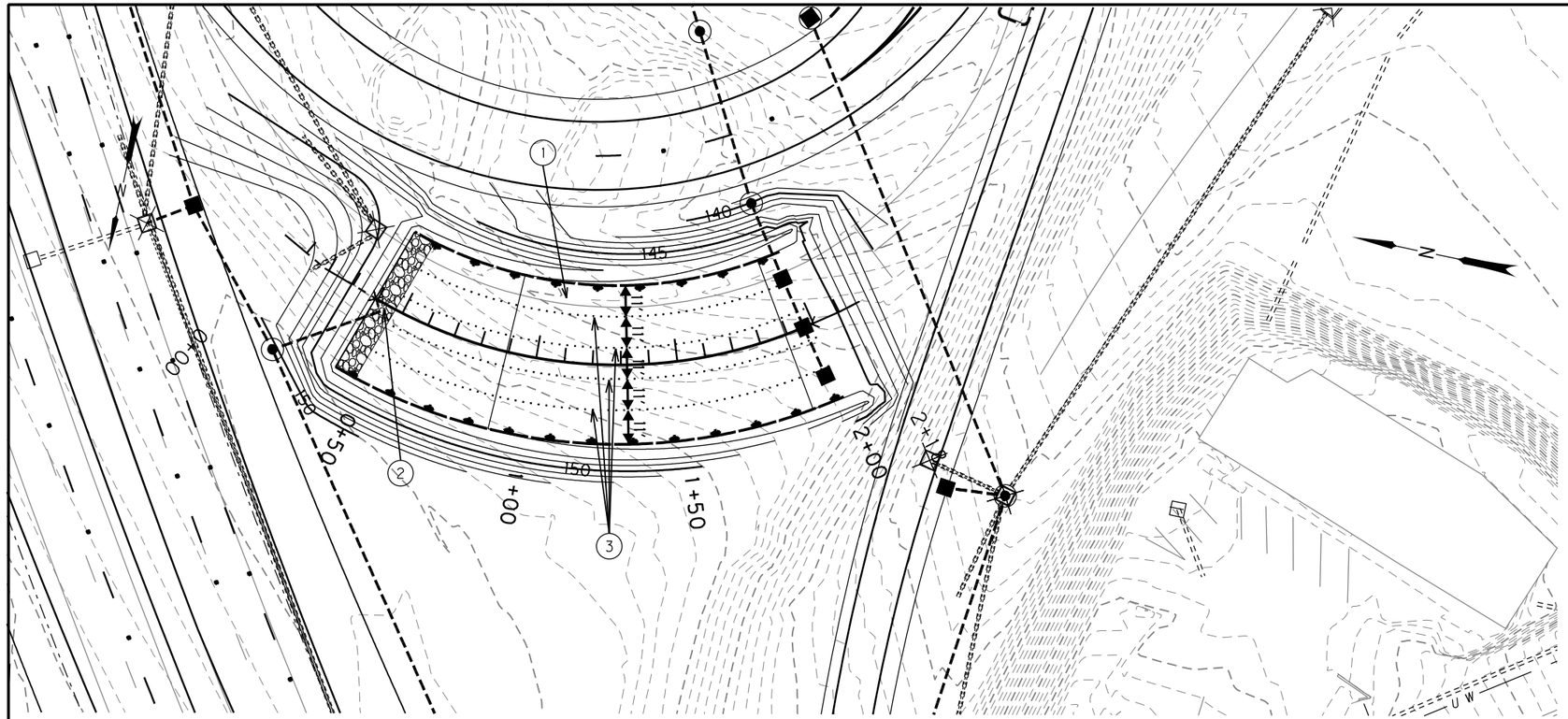
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

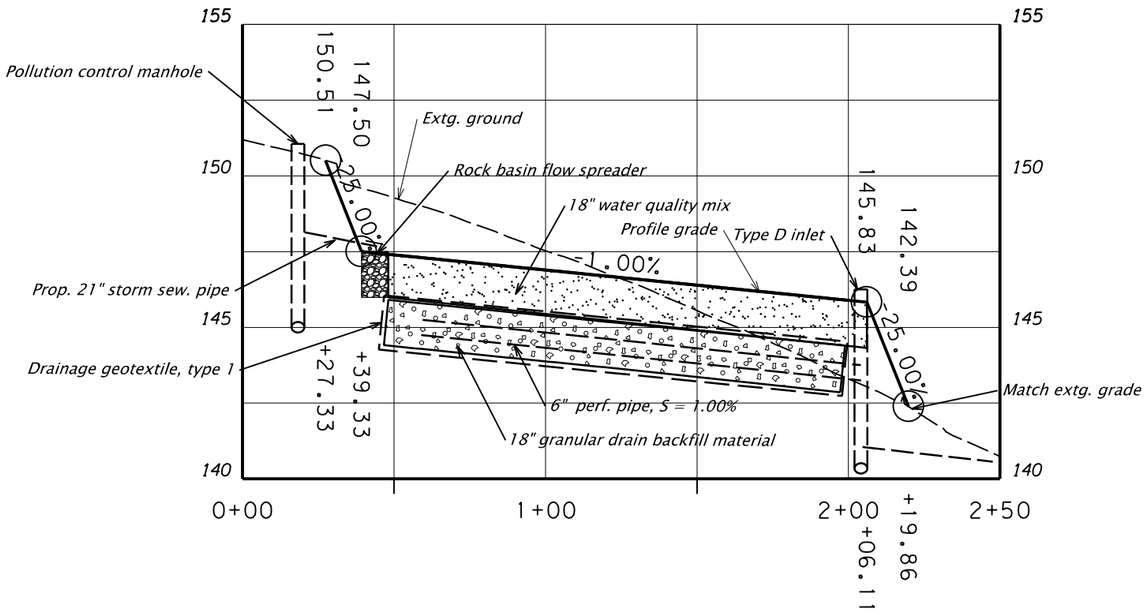
Rotation: 75.0253 0'
Vertical Scale: 1:10



1. *Sta. 0+39.24 to Sta. 1+98.79*
   Construct biofiltration swale
   (For details, see sht. HA01)

2. *Sta. 0+44.18, 0.00'*
   Construct rock basin flow spreader
   (For details, see sht. HA01)

3. *Construct dividing berm*



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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

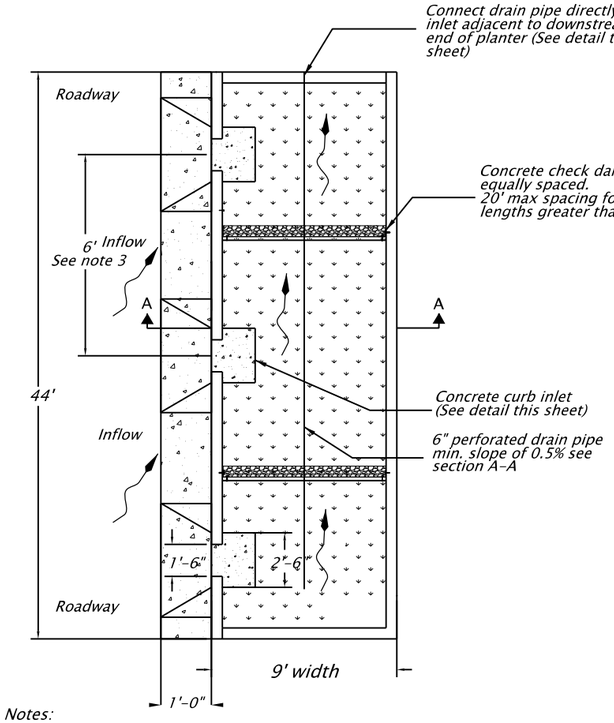
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

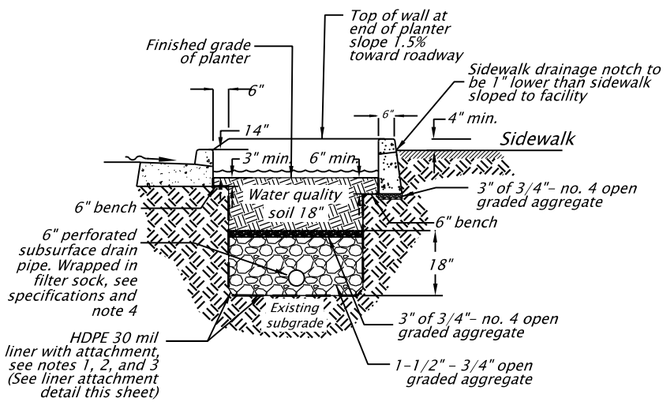
Rotation: 281.7947
Vertical Scale: 1"=5'

STORMWATER PLANTER



Notes:
1. Match longitudinal slope of planter to slope of the road.
2. If less than 18" is between splash pad and planter end wall, extend pad to wall.
3. Install inlets (6' on center) on all sides of facility that are adjacent to parking lot.

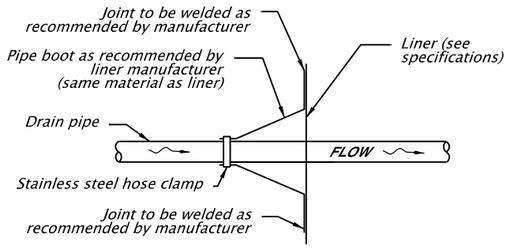
PLAN VIEW



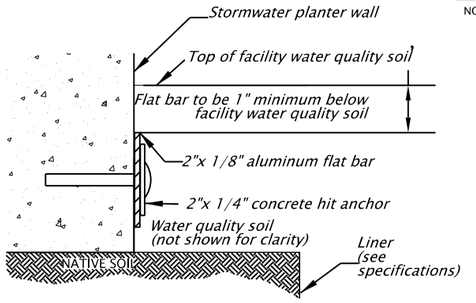
Notes:
1. Partial or full liner required. See stormwater planter table (this sheet) for requirement.
2. Partial liner located along side of planter adjacent to roadway.
3. Full liner located along all sides of planter.
4. Drain pipe only required for fully lined planters.
5. Scarify the native soil 12" following the initial excavation and before installing water quality soil and rock.

SECTION A-A

STORMWATER PLANTER DETAIL
NOT TO SCALE



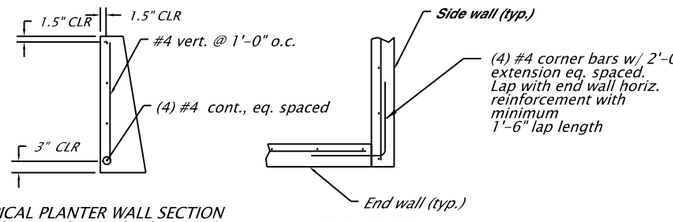
PIPE BOOT
NOT TO SCALE



Notes:
1. Adhere liner to concrete with top coat tc moldable sealant, or approved equal.
2. Liner to extend from top of water quality soil to the bottom of excavation.
3. 3" of concrete is required on all sides of attachment. Adjust sidewalk depth as necessary.
4. Secure liner to concrete with 2" aluminum flat bar, placed as directed (around entire facility).
5. Attach flat bar with concrete hit anchors, 24" o.c.
6. Trim excess liner to the top of the flat bar.

LINER ATTACHMENT DETAIL

NOT TO SCALE



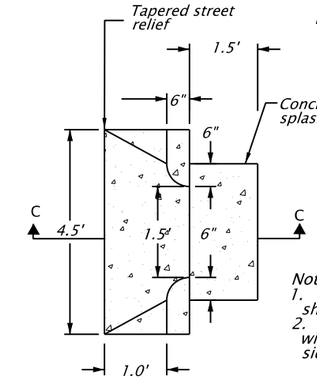
TYPICAL PLANTER WALL SECTION (NOT ADJACENT TO ROADWAY)

WALL CORNER DETAIL

Notes:
1. Top of planter walls to be 4" higher than adjacent sidewalk.
2. Bottom of planter walls to be 6" below top of water quality soil.

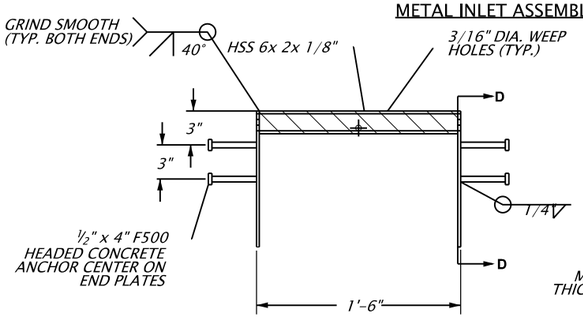
PLANTER WALL

NOT TO SCALE

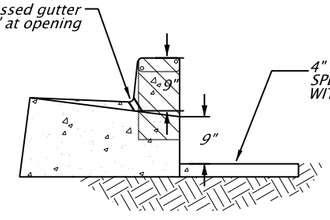


PLAN

METAL INLET ASSEMBLY

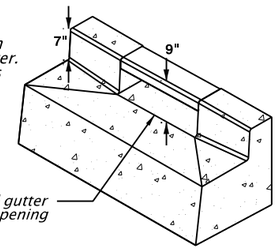


ELEVATION

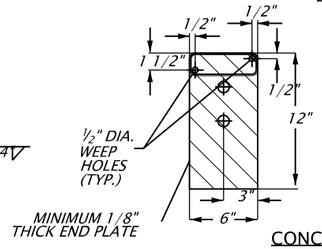


SECTION C-C

Notes:
1. Concrete splash pad elevation shall be level with soil inside planter.
2. Splash pad shall be six inches wider than inlet opening on both sides.



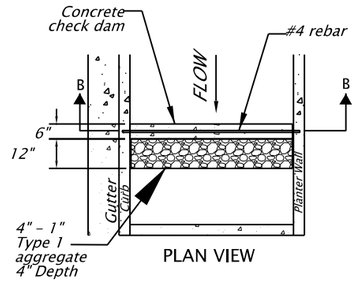
ISOMETRIC



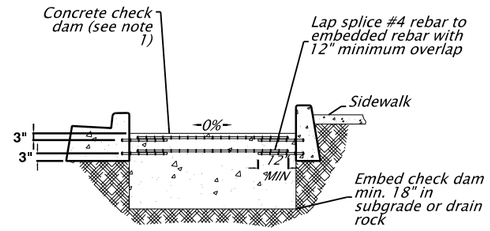
SECTION D-D

CONCRETE CURB INLET

NOT TO SCALE



PLAN VIEW



SECTION B-B

Notes:
1. Top of dam elevation to be 2" lower than upstream curb depression elevation.
2. Concrete to be 3,000 psi.
3. Embed #4 rebar 3" into curb and planter wall.

CONCRETE CHECK DAM

NOT TO SCALE

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

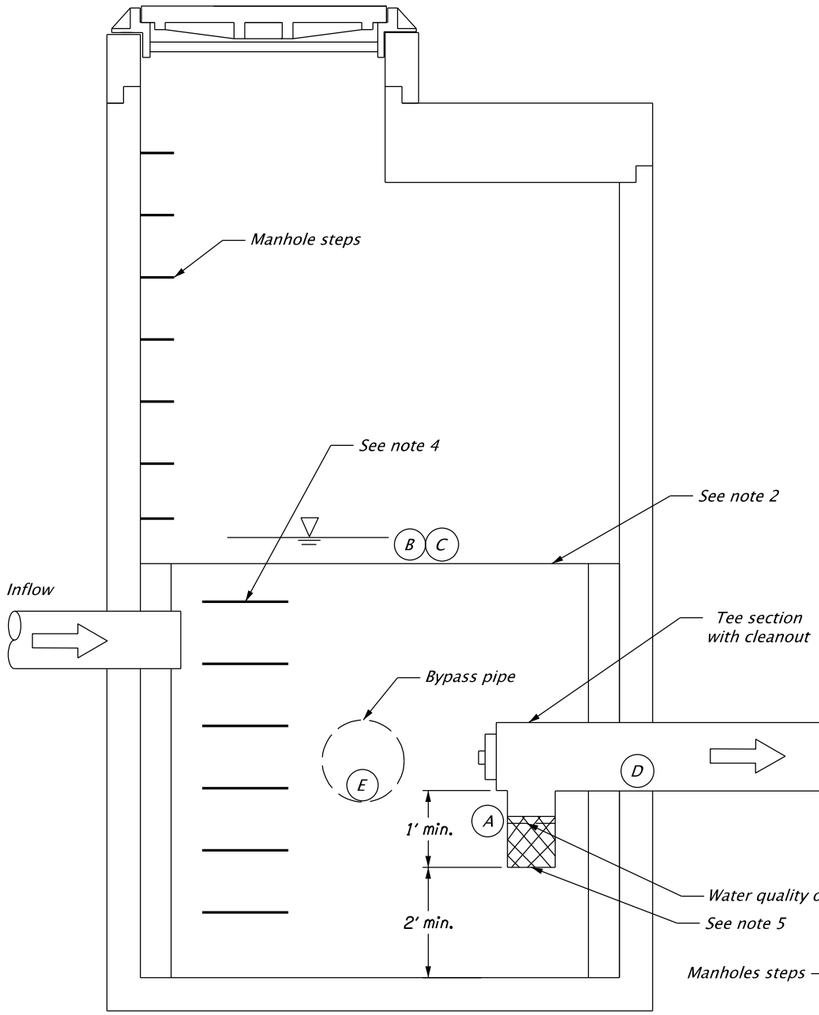
Designer: Reviewer:
Drafter: Checker:

STORMWATER DETAILS

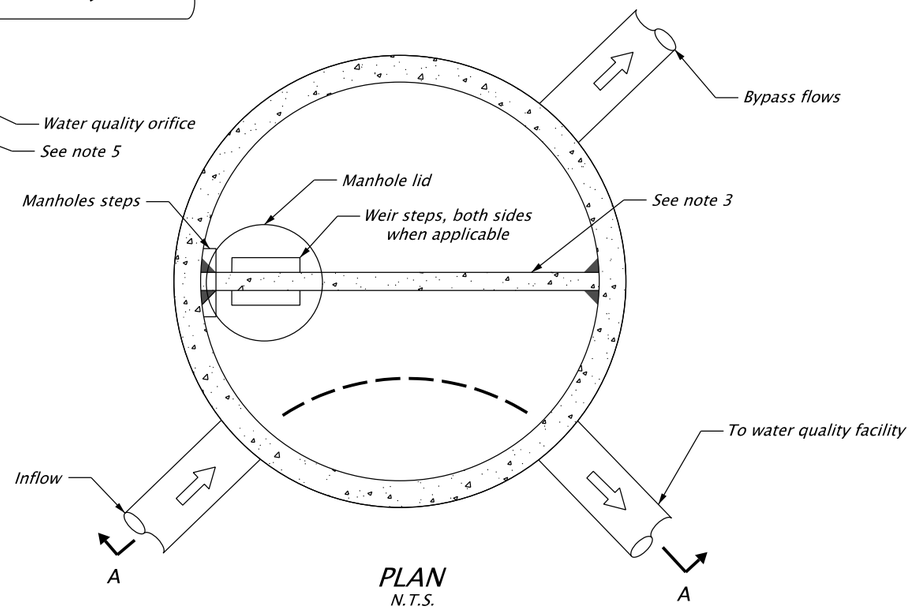
SHEET NO.

Rotation: 0

		WQF#4	WQF#5	WQF#6	WQF#7
DESCRIPTION	LETTER	VALUE	VALUE	VALUE	VALUE
ORIFICE DIAMETER	A	8 1/8"			
WEIR ELEVATION	B	50.83'			
WEIR LENGTH	C	6.0'			
INVERT OF OUTLET PIPE TO WATER QUALITY FACILITY	D	48.7'			
INVERT OF HIGH FLOW BYPASS OUTLET PIPE	E	48.7'			



SECTION A–A
N.T.S.



PLAN
N.T.S.

GENERAL NOTES:

1. *Manhole structure 72 in. min. dia.*
2. *4 in . min. thickness reinforced concrete weir.*
3. *Weir shall be grouted to manhole stucture (both ends)*
4. *Provide weir steps when height of weir is greater than 36 inches, both sides*
5. *Water quality orifice screening. The wire cloth strainer assembly should be secured to pipe with a stainless steel hose clamp. Orifice screening must contain mulitple openings that are equal to or less than the orifice diameter.*
6. *Include tracer wire as shown in Standard Drawing RD336.*

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FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

STORMWATER DETAILS

SHEET NO.

Rotation: 0°

Attachment E. Erosion and Sediment Control Plan

GENERAL NOTES:

1. Plant all trees beyond "clear zone"; verify with engineer prior to planting. Engineer shall approve all work outside designated work limits prior to construction. Do not plant trees within 20' of a bridge/viaduct or within 10' of a trail, waterline, or stormwater line.

2. Locate underground utility lines prior to any digging or ground disturbance.

3. Adjust planting locations so vegetation does not conflict with above- or below-ground utilities.

4. Adjust plant locations to avoid conflict with traffic sight lines and signs or other appurtenances. Adjust plant material in the field to meet setback requirements for signs, lighting, barriers, and other existing and proposed roadside elements.

5. All dimensions shown on details are minimum dimensions.

6. See Plant Schedule FA02, FA03 for plants and landscape material.

7. Plan is schematic. Planting may be adjusted to fit site conditions with prior Agency approval.

8. Lay out plant material in groups as indicated in plant and material schedule, details and plan sheets.

9. Stake all planting areas for review and approval by Area Regional Landscape Architect or Engineer prior to planting.

10. Do not install plant material without prior inspection and approval by Area Regional Landscape Architect.

11. Comply with Oregon Standard Specifications for Construction and Special Provisions for construction applicable to this project.

12. Thoroughly water all plant material (saturated backfill) within 24-hours of installation regardless of rainfall events.

13. Verify field conditions prior to construction with any adjustments to the plans made as directed by the Engineer.

14. Protect all trees and land areas marked for protection. Do not damage natural (non-invasive) vegetation.

15. Comply with erosion control measures per Section 00280 and all applicable permits during construction.

16. Where discrepancies between the Plant Schedule and the plans exist, plans shall prevail.

17. See Special Provision 01030.13(f) for seed mixes

18. Prepare all planting and seeding areas per Method B, see 01040.48(b).

19. Include Mycorrhizal innoculates for all seeding and individual plant installations, apply per manufacturer's recommendation.

20. Flag all planted tree species with color-coded identifyer flags.

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Reviewer: Ben Ngan
Drafter: David Goodyke
Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Plant and Material Schedule

Trees

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
TARME	*Arbutus menziesii*	Madrone	1/2" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	1	-	1
TCADE	*Calocedrus decurrens*	Incense Cedar	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	12	-	-	6	8	26
TCONU	*Cornus nuttallii*	Pacific Dogwood	1" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	7	-	7
TPIPO	*Pinus ponderosa 'Willamette Valley'*	Willamette Ponderosa Pine	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	28	3	-	29	23	89
TPSME	*Pseudotsuga menziesii*	Douglas Fir	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	34	-	34
TQUCH	*Quercus chrysolepis*	Canyon Live Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	46	-	-	-	15	61
TQUGA	*Quercus garryana*	Oregon White Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	54	5	-	23	12	97
TULAM	*Ulmus americana 'Valley Forge'*	Valley Forge American Elm	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	4	-	-	-	4
TUMCA	*Umbellularia californica*	Oregon Myrtle	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	30	-	-	-	-	30

Broadleaf Evergreen Shrubs

Deciduous Shrubs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
ARCO	*Arctostaphylos columbiana x 'Patula'*	Manzanita	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	214	-	-	-	-	214
COSE	*Cornus sericea*	Red Osier Dogwood	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	1,005	-	-	-	-	1,005
FRCA	*Frangula californica 'Eve Case'*	Eve Case Coffeeberry	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	51	-	-	-	-	51
GAEL	*Garrya elliptica 'James Roof'*	Wavyleaf Silktassel	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	61	-	-	-	-	61
MAAQ	*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	397	-	-	-	-	397
MOCA	*Morella californica*	Pacific Wax Myrtle	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	57	-	-	-	-	57

Ornamental Grasses and Forbs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	TOTAL
-	*Asclepias speciosa*	Showy milkweed	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Calamagrostis x acutiflora 'Karl Foerster'*	Feather reed grass	12" Height	2' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Carex glauca*	Blue Sedge	12" Height	1' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Deschampsia cespitosa 'Goldtau'*	Tufted hairgrass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Juncus patens 'Carmen's Grey'*	Carman's Grey Blue Rush	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Solidago 'Goldkind'*	Golden Baby goldenrod	12" Height	1' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Stipa gigantea*	Giant feather grass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Veratrum californicum*	California false hellebore	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248

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Drafter: David Goodyke Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Upland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX A: Trees		*Acer macrophyllum*	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Arbutus menziesii	Pacific Madrone	1/2" Calip.	15'-20' Min.	Container	15%	N/A	-	-	67	67
		Calocedrus decurrens	Incense Cedar	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Corylus cornuta var. californica	Western Hazelnut	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
		Cornus nuttallii	Western Dogwood	1/2" Calip.	15'-20' Min.	Bareroot	5%	N/A	-	-	22	22
		Quercus garryana	Oregon White Oak	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	-	-	116	116
		Pseudotsuga menziesii	Douglas Fir	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
MIX A & B: Shrubs		*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370
		Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370

Lowland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX C: Trees		*Abies grandis*	Grand Fir	18" Height	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Acer macrophyllum	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Alnus rubra	Red Alder	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	22	54	-	76
		Fraxinus latifolia	Oregon Ash	1/2" Calip.	30' Min.	Bareroot	6%	N/A	5	13	-	18
		Prunus emarginata	Bitter Cherry	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	10%	N/A	8	21	-	29
		Salix lucida	Shining Willow	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Thuja plicata	Western Redcedar	18" Height	30' Min.	Bareroot	8%	N/A	7	17	-	24
MIX C & D: Shrubs		*Cornus sericea*	Redtwig Dogwood	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161
		Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161

Roadside Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX E: Trees & Shrubs		*Pinus ponderosa var. willamettensis*	Willamette Ponderosa Pine	3'-4' Height	25'	#5 Container	50%	N/A	12	-	8	20
		Quercus garryana	Oregon White Oak	1/2" caliper	25'	Bareroot	40%	N/A	9	-	7	16
		Arbutus menziesii	Pacific Madrone	1'-2' Height	25'	#1 Container	10%	N/A	2	-	2	4
		Ceanothus velutinus	Snowbrush	12" Height	5' Min.	#1 Container	10%	N/A	7	-	9	16
		Mahonia aquifolium	Tall Oregon Grape	12" Height	5' Min.	#1 Container	60%	N/A	14	-	55	69
		Ribes sanguineum	Redflowering Currant	12" Height	5' Min.	#1 Container	15%	N/A	3	-	14	17
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	#1 Container	15%	N/A	3	-	14	17

SHRUB PLANTING NOTES FOR MIXES A, B, C, D, and E

1. Install shrubs at a density of 108 shrubs per 10,000 s.f.

2. Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to an adjacent tree stem.

3. Spread species throughout the planting area to avoid a monoculture; a random 10,000 s.f. sample shall contain all species.

4. Maintain a 1' diameter plant-free area around each stem and mulch with shredded wood to prevent weeds.

Seed Mix* **See Special Provisions 01030.13(f) for Seed Mix** **Area (square feet)**

Key		FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
	Permanent Seeding	2,066	-	-	1,273	175,749	-	-	-	129,854	309,940
	Water Quality Seeding	787	-	-	1,294	4,934	411	-	8,634	14,616	30,676
Varies	Riparian Seeding	-	-	-	-	-	23,824	42,555	-	-	66,379
	Wildflower Seeding	-	-	-	-	-	21,941	-	144,117	6,082	172,140
Varies	Native Shade Seeding	-	-	-	-	-	-	-	80,985	-	80,985
	Wetland Seeding	-	-	-	-	-	-	-	410	-	410
	Upland Shrub Seeding	-	-	-	-	-	7,672	-	46,091	-	53,763

*** Verify compost erosion blanket is installed prior to applying seed**

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

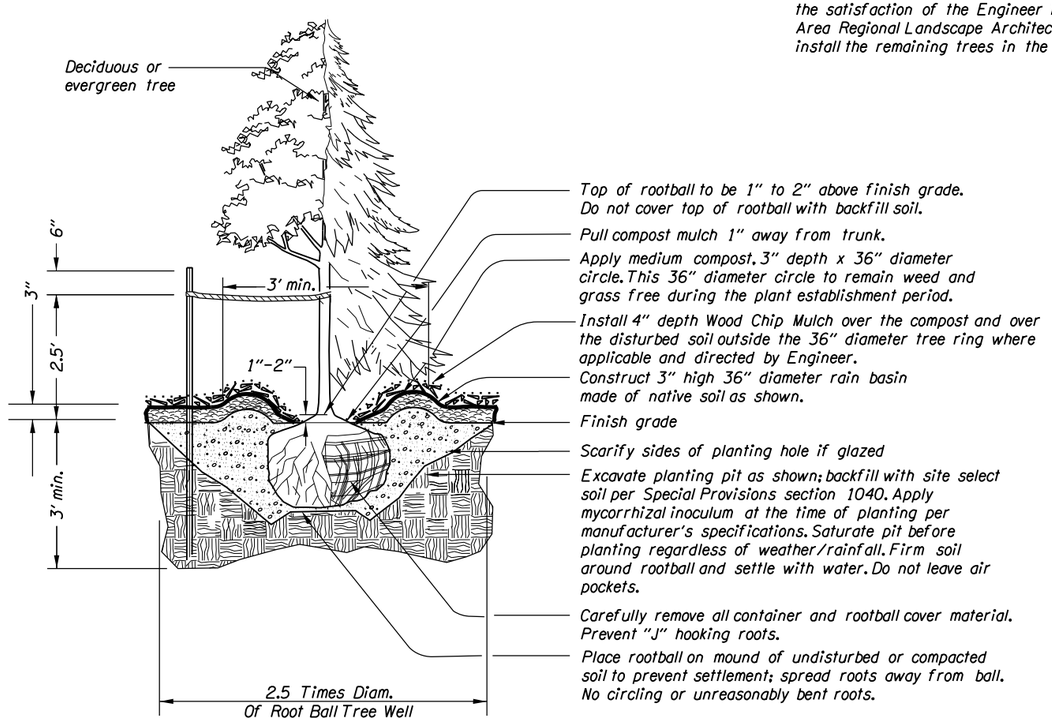
Designer: David Goodyke Reviewer: Ben Ngan
Drafter: David Goodyke Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

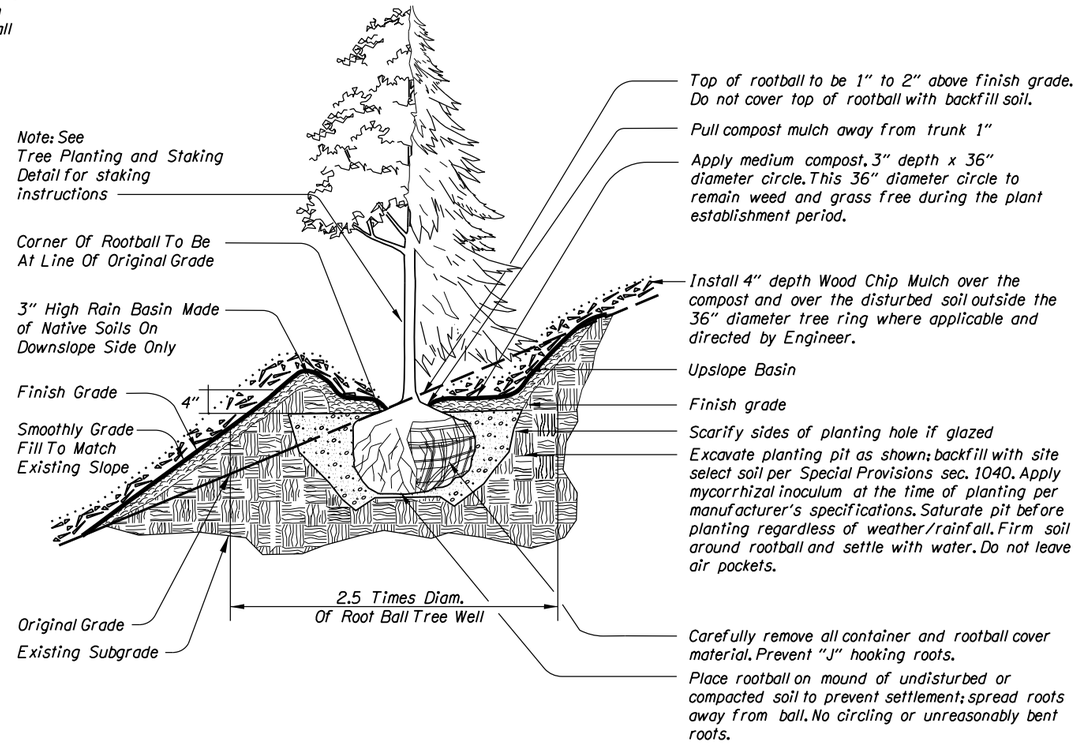
NOTE:

After tree location staking is complete and prior to planting any trees, Contractor shall construct two typical tree planting and staking installations per details and specifications, with Engineer and Area Regional Landscape Architect present. When the installations are complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining trees in the same manner.



TREE PLANTING and STAKING
On Terrain Less Than 5:1

Not To Scale



TREE PLANTING and STAKING on SLOPES
On slopes 5:1 or greater

Not To Scale

TREE STAKING NOTES:

1) Tree ties to be either:

Rigid guy system. Galvanized wire to be approximately 1/8" thickness and 24" length with a plastic sleeve over the portion that goes around tree. The wire tie is to go through the wood stake and be securely fastened.

Plastic chain type, approximately 1" width by 1/8" thickness where two stakes are required. Cross ties between stakes and wrap tie around tree. Fasten securely to stake.

2) Furnish tree stakes on all tree plantings.

Stakes to be construction grade, rough sawn or finished Douglas Fir or Pine. Stain with approved green penetrating oil. Stake Size is to be 1½"x1½" by following lengths:

Trees 36" and shorter - Use one - 6' (approximate) stake
Trees taller than 36" - Use one - 8' (approximate) stake

Drive stakes vertically and at least 24" into undisturbed soil. Do not drive stakes through root ball. Locate stakes to best resist prevailing winds.

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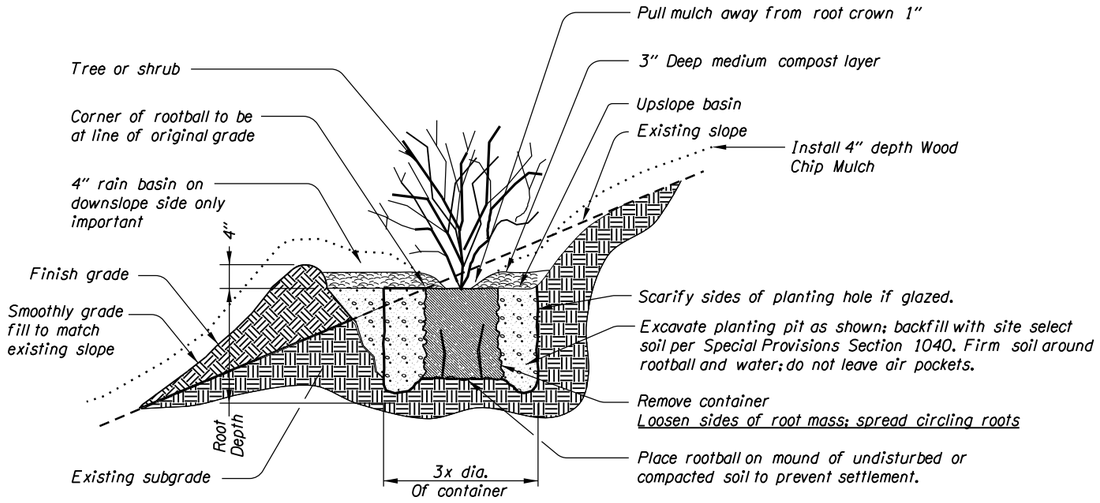
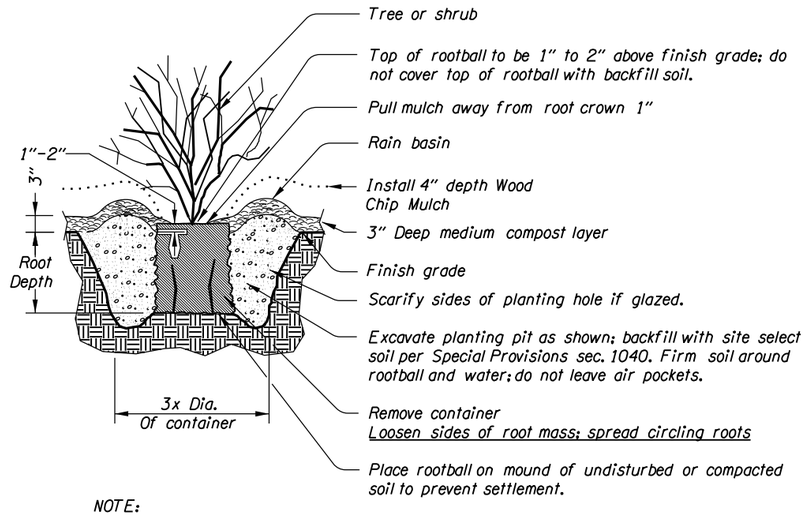


NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2) Apply Mychorrhizae per specifications.

SLOPE PLANTING FOR #1 & #2 CONTAINERS

Not To Scale

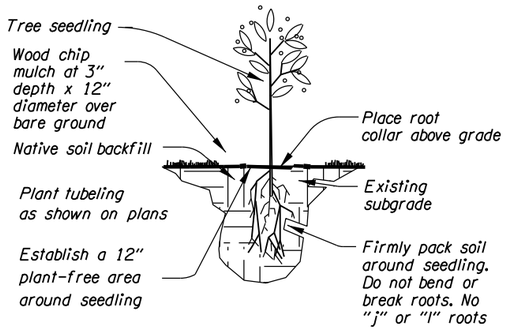


NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2)Apply Mycorrhizae per specifications.

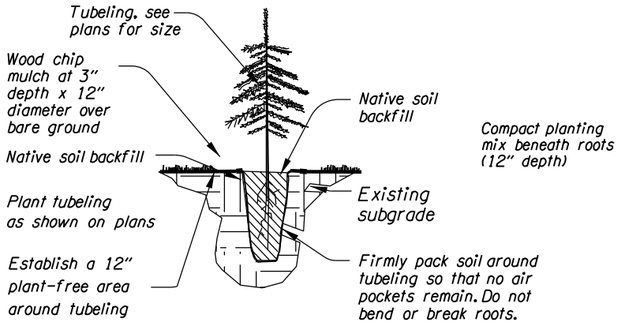
GENERAL PLANTING FOR #1 & #2 CONTAINERS

Not To Scale



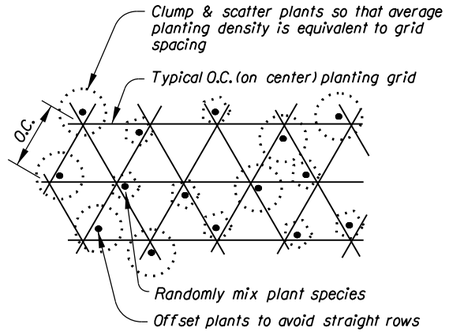
SEEDLING PLANTING

Not To Scale



TUBELING PLANTING

Not To Scale



RANDOM PLANTING PATTERN

Not To Scale

GENERAL NOTE:
1) All dimensions shown on details are minimum dimensions.

2) See "American Standard for Nursery Stock" for plant quality
minimum standards such as size of root ball or caliper of trunk.

3) See plant list or special provisions and identify plant material that may need to be or contract-grown.

4) Important: Excavate all plant wells per detail at 3x diameter of rootball or container & backfill with site select topsoil free of noxious weeds plant material including roots & sprigs.

5) After shrub location staking is complete and prior to planting any shrubs. Contractor shall construct a typical shrub planting per detail and specifications with Engineer and Area Regional Landscape Architect present. When the installation is complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining shrubs in the same manner.

6) Apply Mycorrhizae per specifications.

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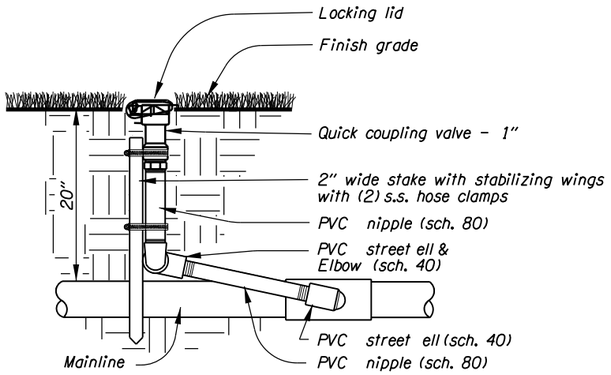
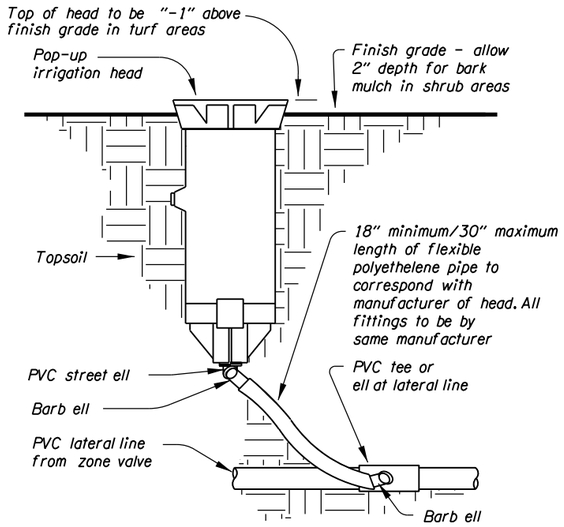


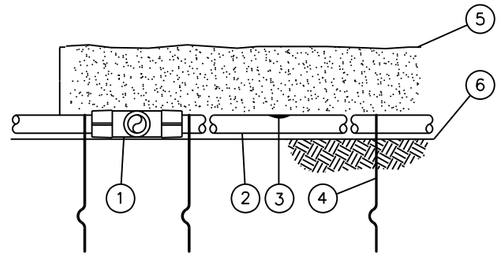
QUICK COUPLING VALVE

Not To Scale



SPRINKLER HEAD AND JOINTS

Not To Scale



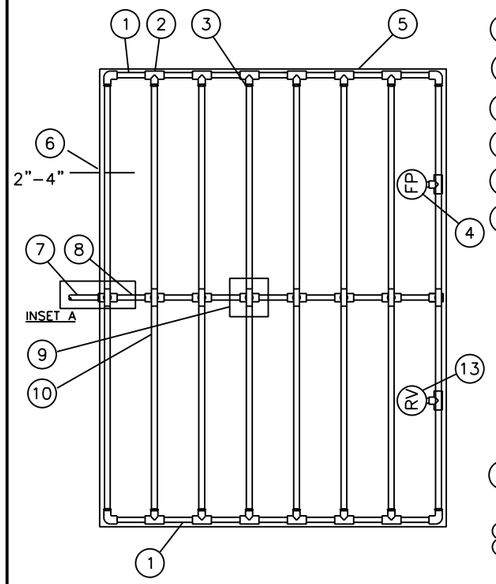
DRIPLINE AT GRADE

Not To Scale

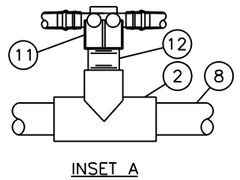
1. Compression Fitting
2. On-Surface Dripline
3. Inline Drip Emitter Outlet
4. Tie-Down Stake
5. Mulch
6. Finish Grade

NOTES:
1) Place tie-down stakes every 3' in sand, 4' in loam, and 5' in clay.

2) At fittings where there is a change of direction, such as tees or elbows, use tie-down stakes on each leg of the change of direction.



1. PVC exhaust header
2. PVC SCH 40 TEE or EL (Typical)
3. Barb x Male Fitting
4. Flush Point (Typical)
5. Perimeter of Area
6. Perimeter Dripline to Pipe to be installed 2"-4" from Perimeter of Area
7. PVC Supply Pipe from Existing Valve
8. PVC Supply Manifold
9. Connection from Supply Manifold to Dripline (Typical) - see Inset A
10. On-Surface Dripline:
11. Barb x Female Fitting
12. ¾" PVC Nipple, length as necessary
13. At ends of area, add air relief valve



NOTE:
1) Provide Low Volume (Drip) Tubing with emitters spaced at 18" and providing a flow rate of 0.9 gallons/hour and spaced at 24", or approved equal.

2) Modify detail to meet the specific requirements of the selected equipment brand's manufacturer and the specific shape and size of the plant bed to be irrigated.

LOW VOLUME (DRIP) TUBING

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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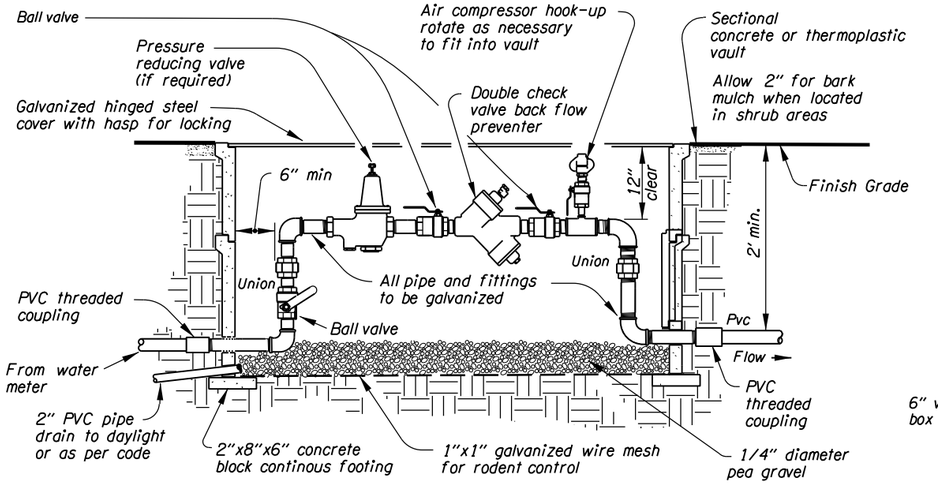
ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.



BACKFLOW PREVENTION ASSEMBLY

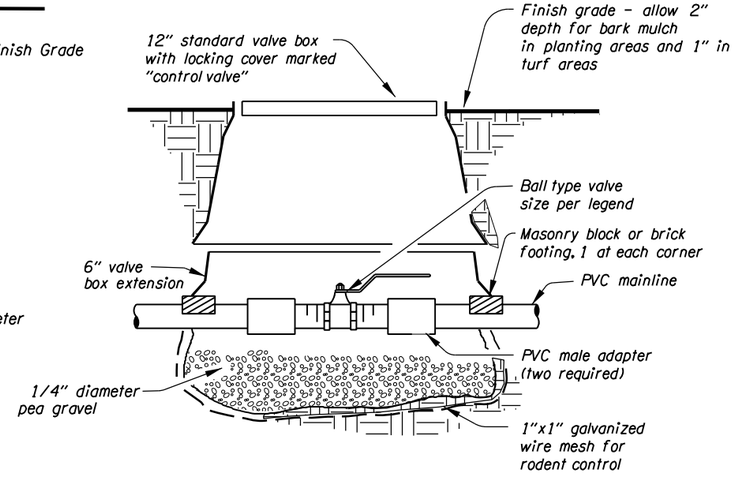
Not To Scale

NOTES:
1) Install backflow prevention assembly in accordance with "accepted procedure and practice in cross connection control manual"

2) Comply with local jurisdiction requirements. These may vary from those shown on drawings. verify compliance.

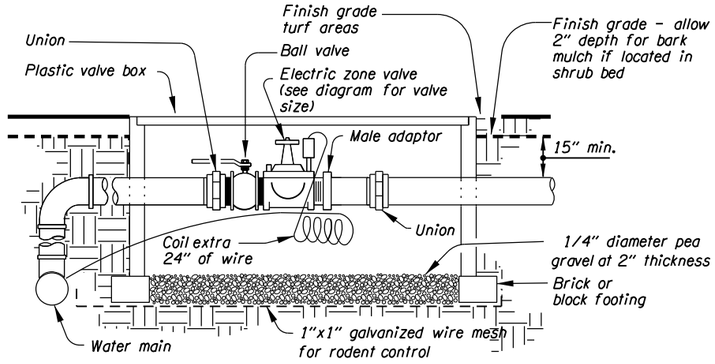
3) Provide 6" access clearance for devices 2" and smaller.

4) Size of double check valve shown on plans or specifications.



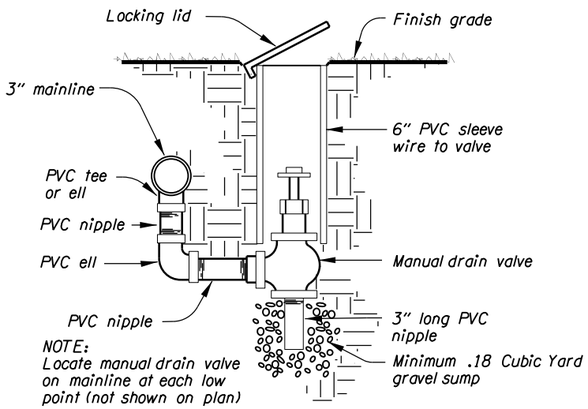
ISOLATION VALVE & BOX

Not To Scale



ELECTRIC ZONE VALVE

Not To Scale



MANUAL DRAIN VALVE

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

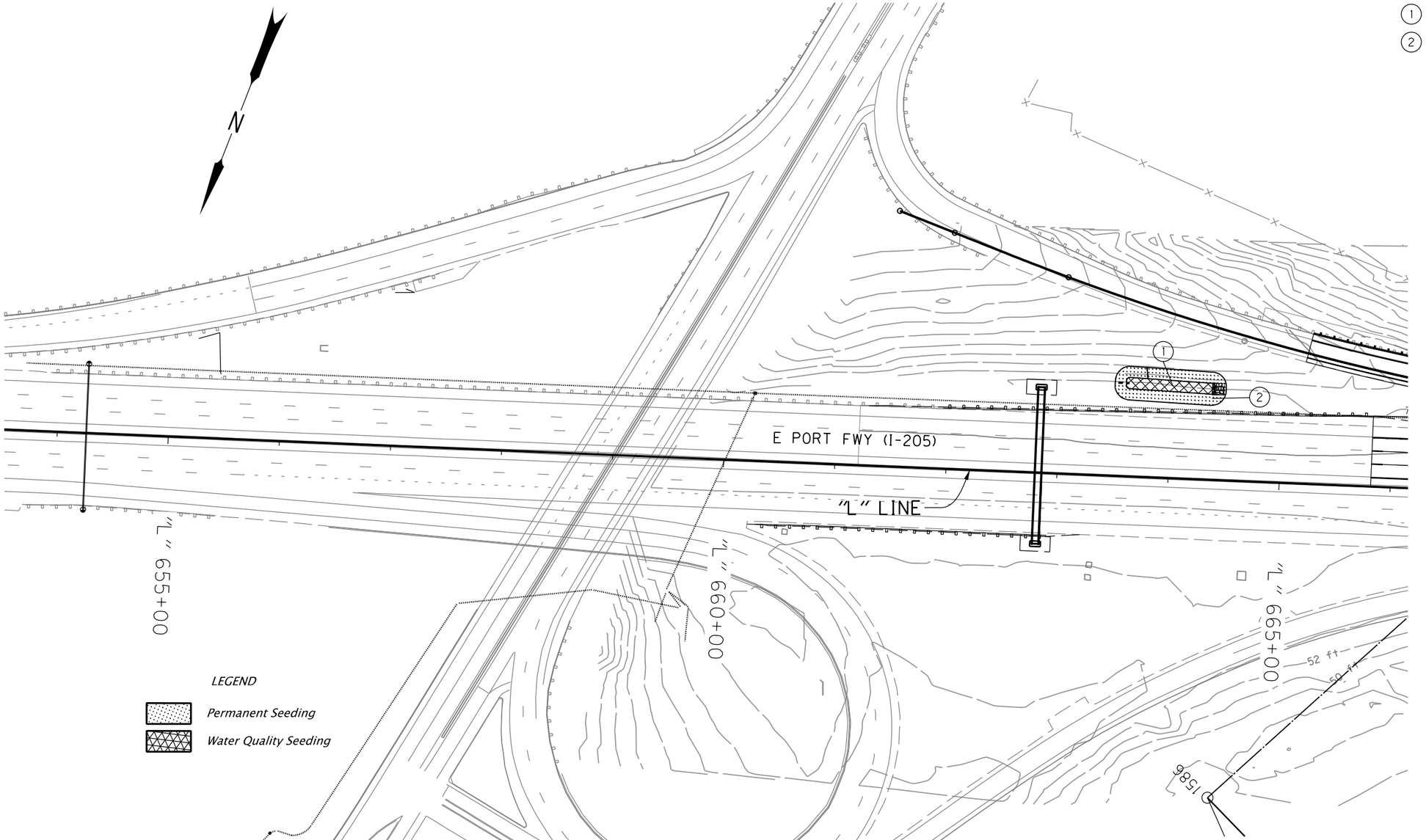
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Sec. 30, T. 2 S, R. 2 E, W.M.

1 *Install 787 s.f. Water Quality Seeding*

2 *Install 2,066 s.f. Permanent Seeding*



LEGEND

Permanent Seeding

Water Quality Seeding

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANNING PLAN/SECTION

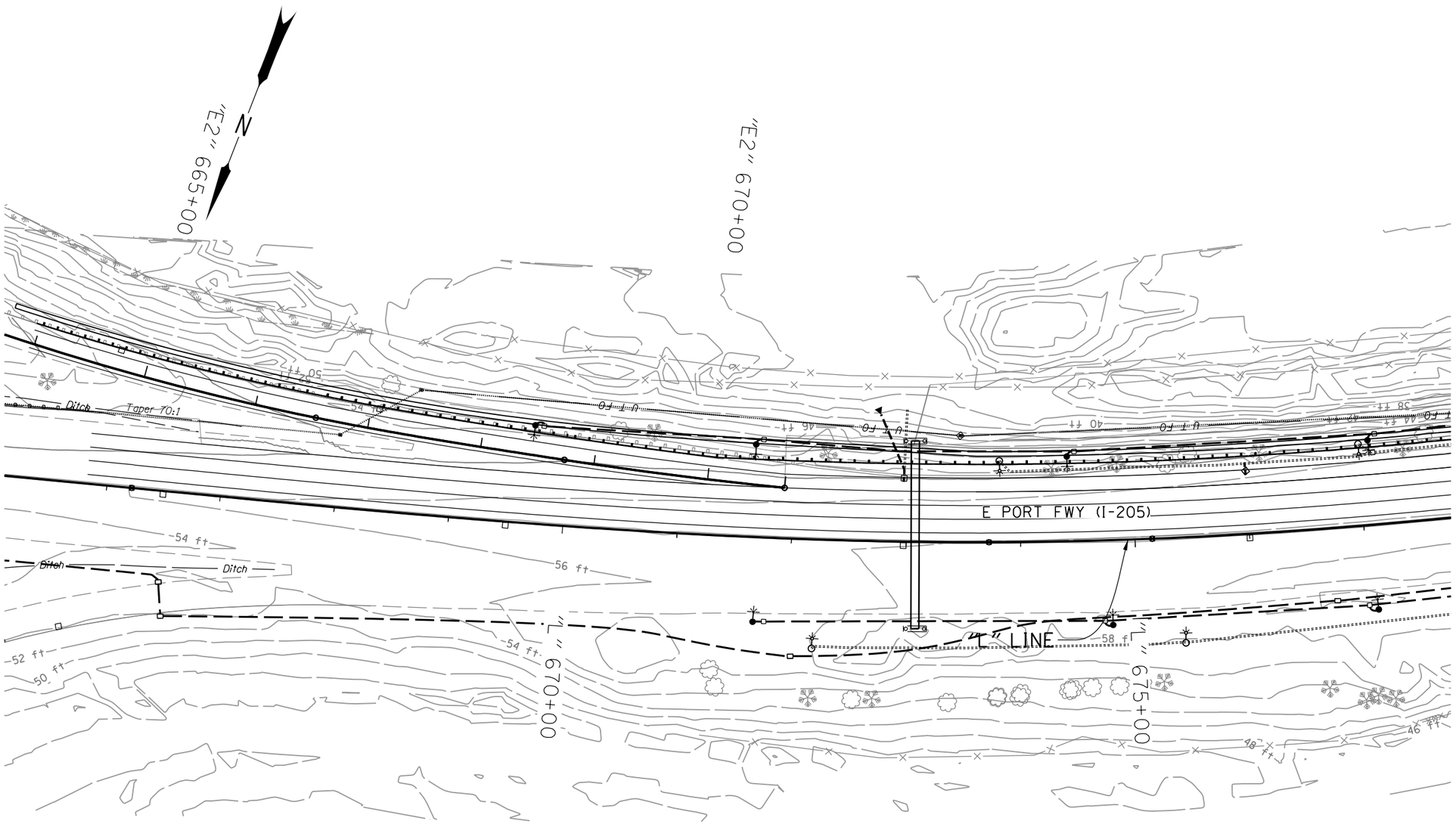
SHEET NO.

NNA_Roadside_Devel :: FA08 6/21/2019 2:51:00 PM Jane

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 227.6721° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



LEGEND

ExistingTrees

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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

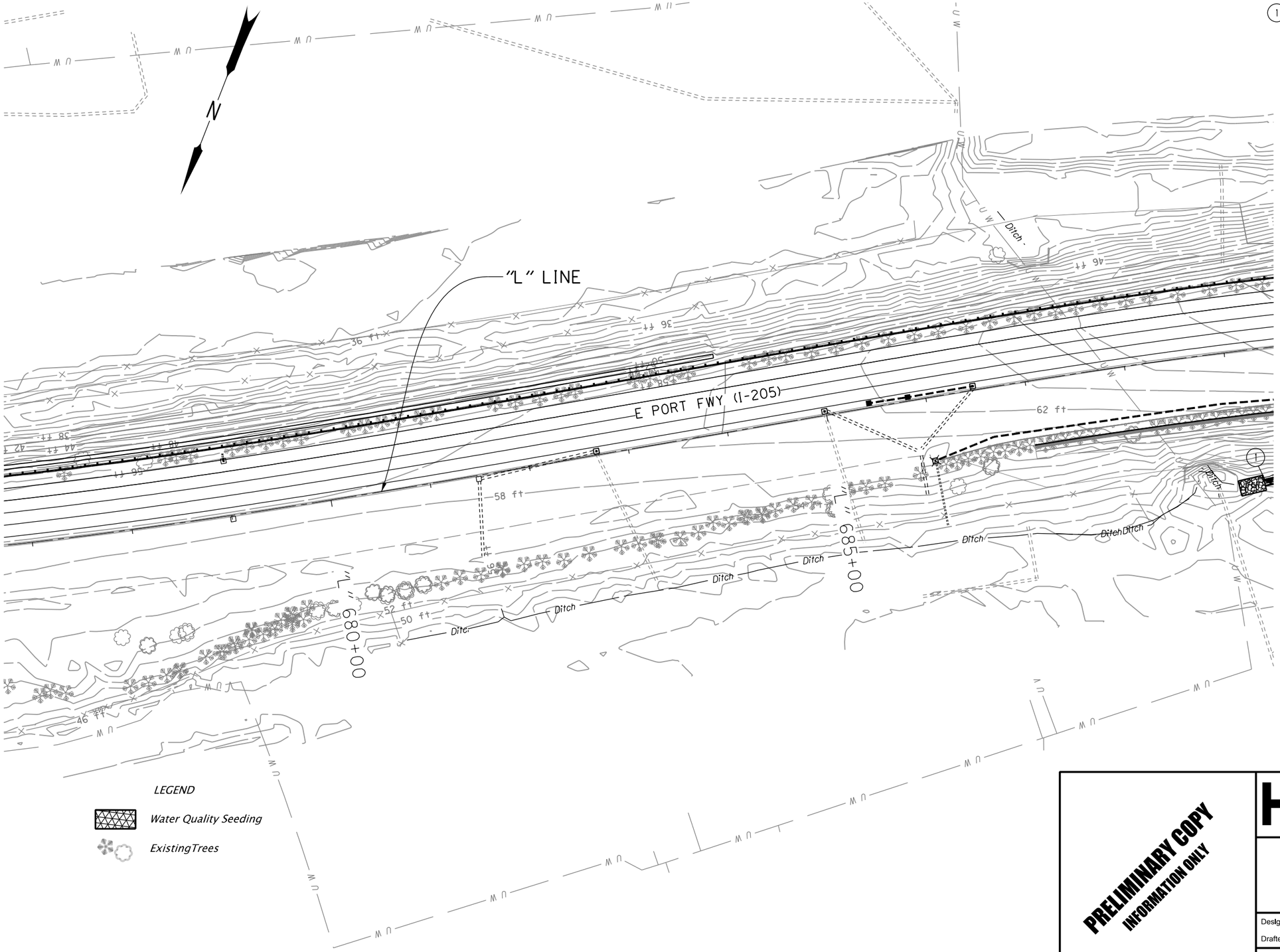
NNA_Roadside_Devel :: FA09 6/21/2019 2:51:05 PM Jane

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962°

Sec. 30, T. 2 S, R. 2 E, W.M.

(1) *Total quantity for area on FA10 and FA11, shown on FA11, note 1*



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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

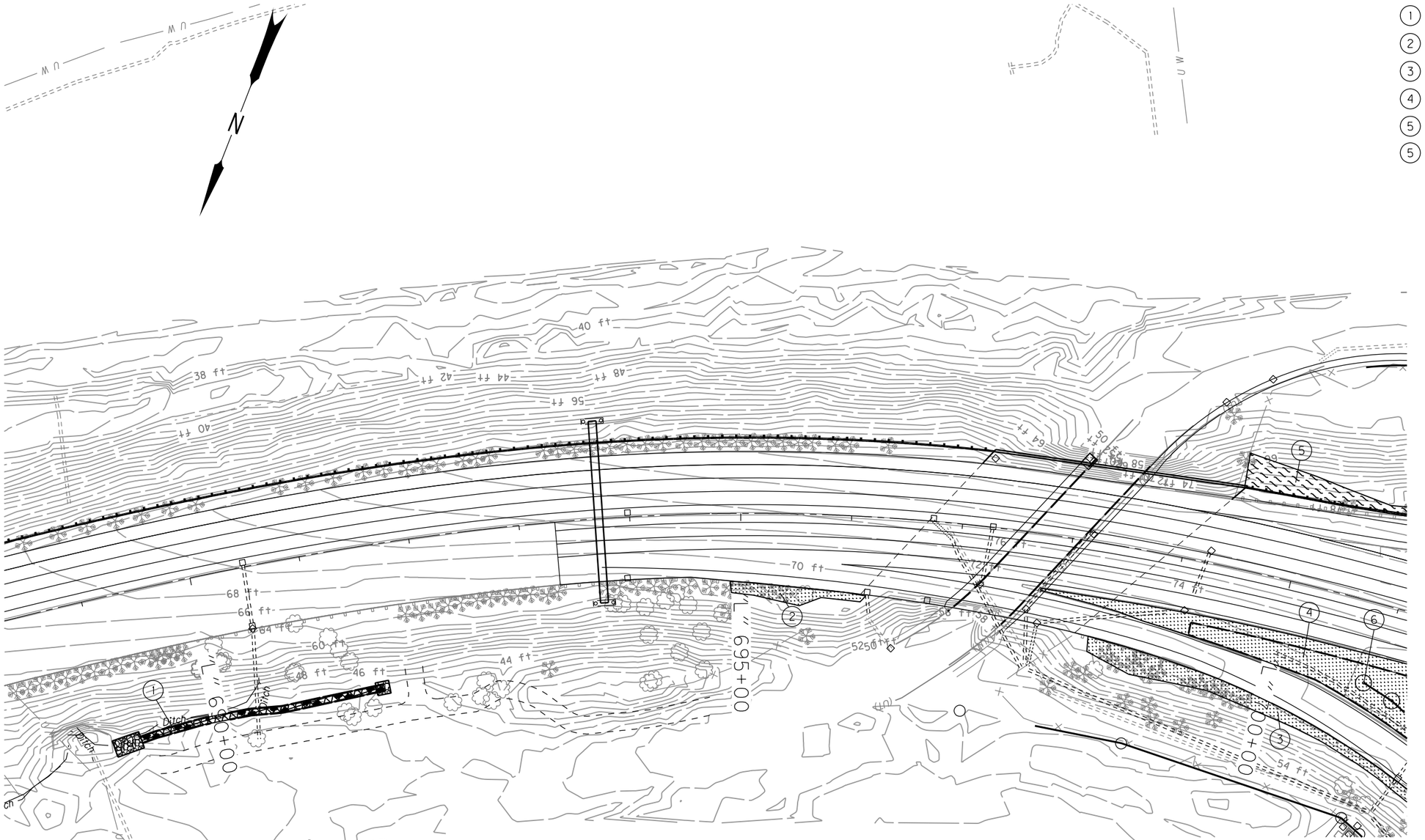
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA10 6/21/2019 2:51:06 PM Jane

Rotation: 228.87° 0'

1. Install 1,294 s.f. Water Quality Seeding
2. Install 1,273 s.f. Permanent Seeding
3. Total area on FA11and FA12, shown on FA12, note 1
4. Total area on FA11 and FA12, shown on FA12, note 2
5. Total area on FA11 and FA12, shown on FA12, note 33
5. Total area on FA11 and FA12, shown on FA12, note 36



LEGEND

- Permanent Seeding
- Water Quality Seeding
- Proposed Trees
- ExistingTrees

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INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

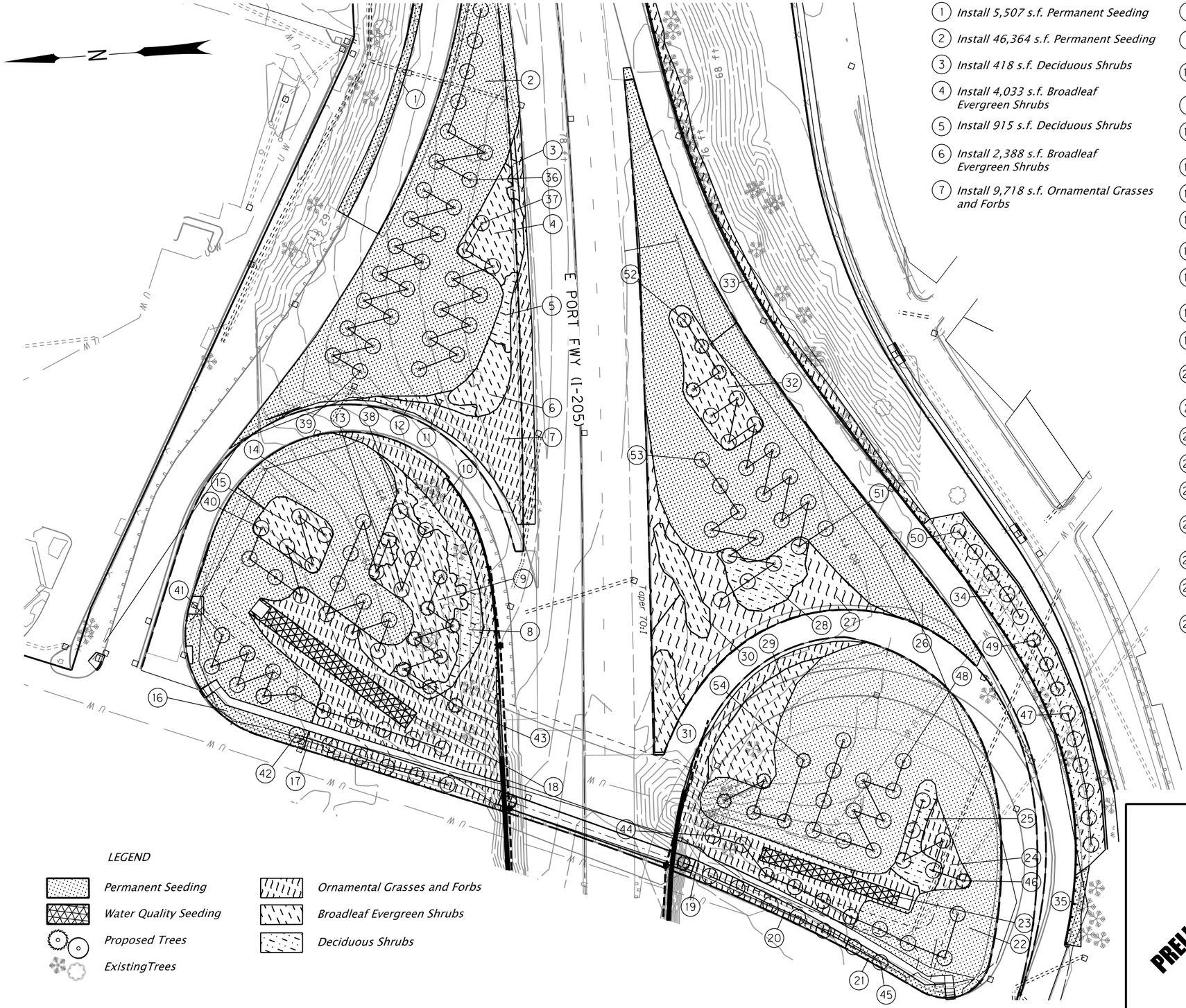
SHEET NO.

NNA_Roadside_Devel :: FA11 6/21/2019 2:51:08 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 222.7112° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



1. Install 5,507 s.f. Permanent Seeding
2. Install 46,364 s.f. Permanent Seeding
3. Install 418 s.f. Deciduous Shrubs
4. Install 4,033 s.f. Broadleaf Evergreen Shrubs
5. Install 915 s.f. Deciduous Shrubs
6. Install 2,388 s.f. Broadleaf Evergreen Shrubs
7. Install 9,718 s.f. Ornamental Grasses and Forbs
8. Install 4,239 s.f. Deciduous Shrubs
9. Install 9,712 s,f, Broadleaf Evergreen Shrubs
10. Install 20,139 s.f. Ornamental Grasses and Shrubs
11. Install 375 s.f. Deciduous Shrubs
12. Install 260 s.f. Broadleaf Evergreen Shrubs
13. Install 648 s.f. Deciduous Shrubs
14. Install 30,343 s.f. Permanent Seeding
15. Install 3,362 s.f. Broadleaf Evergreen Shrubs
16. Install 1,603 s.f. Permanent Seeding
17. Install 3,471 s.f. Ornamental Grasses and Forbs
18. Install 3,153 s.f. Water Quality Seeding
19. Install 10,277 s.f. Ornamental Grasses and Forbs
20. Install 2,319 s.f. Ornamental Grasses and Forbs
21. Install 989 s.f. Permanent Seeding
22. Install 46,511 s.f. Permanent Seeding
23. Install 1,781 s.f. Water Quality Seeding
24. Install 1,923 s.f. Ornamental Grasses and Forbs
25. Install 2,523 s.f. Broadleaf Evergreen Shrubs
26. Install 43,636 s.f. Permanent Seeding
27. Install 12,295 s.f. Ornamental Grasses and Forbs
28. Install 3,629 s.f. Deciduous Shrubs
29. Install 5,407 s.f. Broadleaf Evergreen Shrubs
30. Install 2,113 s.f. Broadleaf Evergreen Shrubs
31. Install 1,994 s.f. Broadleaf Evergreen Shrubs
32. Install 5,574 s.f. Broadleaf Evergreen Shrubs
33. Install 7,431 s.f. Ornamental Grasses and Shrubs
34. Install 11,524 s.f. Deciduous Shrubs
35. Install 796 s.f. Permanent Seeding
36. Install 8 TPIPO
37. Install 10 TQUGA
38. Install 14 TUMCA
39. Install 14 TQUCH
40. Install 8 TQUCH
41. Install 12 TQUGA
42. Install 6 TQUGA
43. Install 8 TPIPO
44. Install 10 TQUGA
45. Install 7 TQUGA
46. Install 6 TQUCH
47. Install 6 TQUCH
48. Install 11 TUMCA
49. Install 3 TPIPO
50. Install 5 TUMCA
51. Install 12 TQUCH
52. Install 4 TPIPO
53. Install 9 TQUGA
54. Install 5 TPIPO

LEGEND

- Permanent Seeding
- Water Quality Seeding
- Proposed Trees
- ExistingTrees
- Ornamental Grasses and Forbs
- Broadleaf Evergreen Shrubs
- Deciduous Shrubs

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1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA12 6/21/2019 2:51:09 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 201.4396°

Sec. 30, T. 2 S, R. 2 E, W.M.

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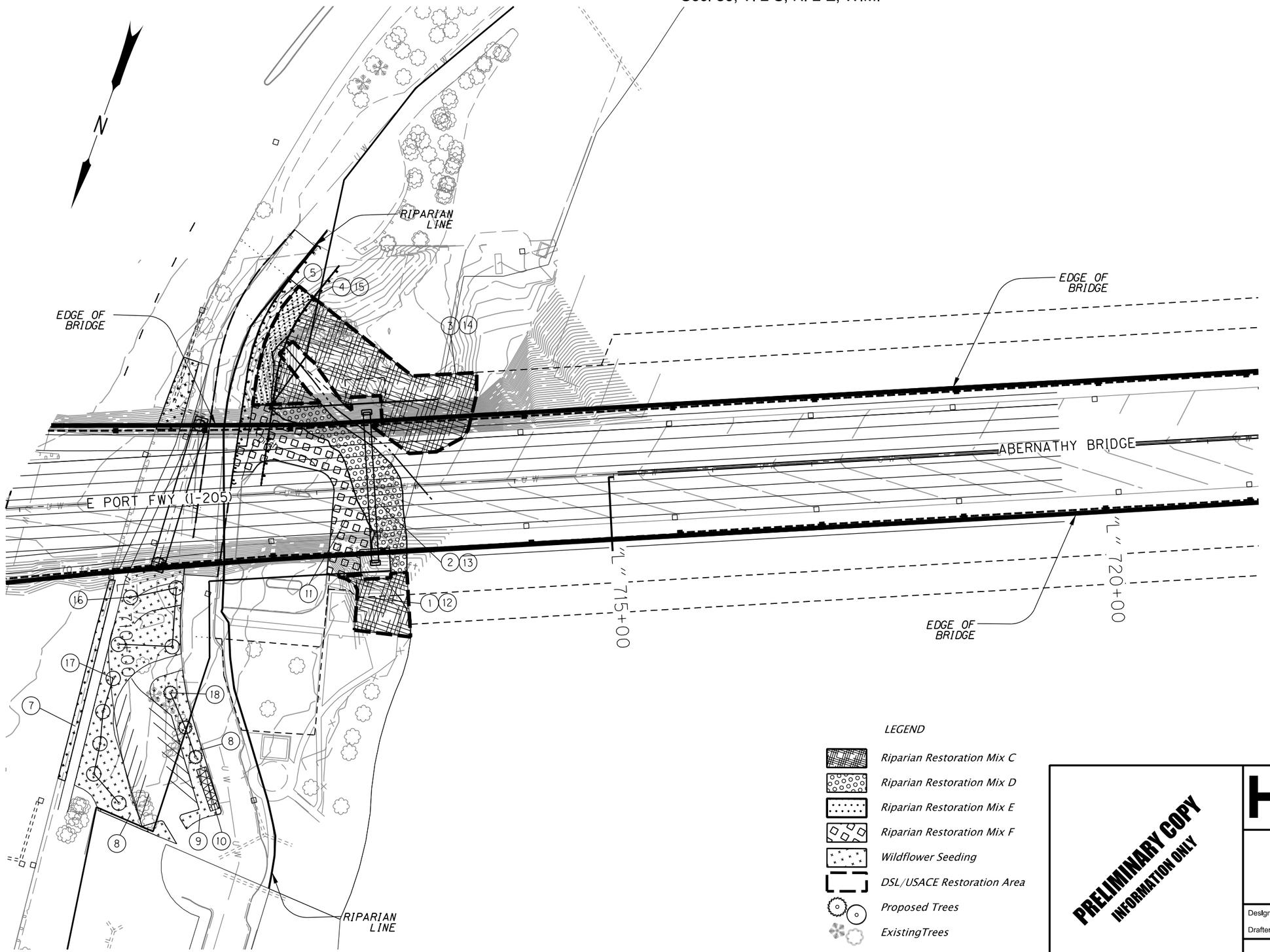

1. *Install 3,144 s.f. Riparian Seeding*
2. *Install 6,769 s.f. Riparian Seeding*
3. *Install 13,911 s.f. Riparian Seeding*
4. *Install 2,132 s.f. Wildflower Seeding*
5. *Install 1,796 s.f. Wildflower Seeding*
6. *Install 1,468 s.f. Wildflower Seeding*
7. *Install 1,414 s.f. Wildflower Seeding*
8. *Install 11,899 s.f. Wildflower Seeding*
9. *Install 3,232 s.f. Wildflower Seeding*
10. *Install 411 s.f. Water Quality Seeding*
11. *Install 7,672 Riparian Restoration Mix F*
12. *Install 3,144 s.f. Riparian Restoration Mix C*
13. *Install 6,769 s.f. Riparian Restoration Mix D*
14. *Install 13,911 s.f. Riparian Restoration Mix C*
15. *Install 2,132 s.f. Riparian Restoration Mix E*
16. *Install 4 TULMA*
17. *Install 5 TQUGA*
18. *Install 3 TPIPO*

LEGEND

- *Riparian Restoration Mix C*
- *Riparian Restoration Mix D*
- *Riparian Restoration Mix E*
- *Riparian Restoration Mix F*
- *Wildflower Seeding*
- *DSL/USACE Restoration Area*
- *Proposed Trees*
- *ExistingTrees*

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503.423.3700

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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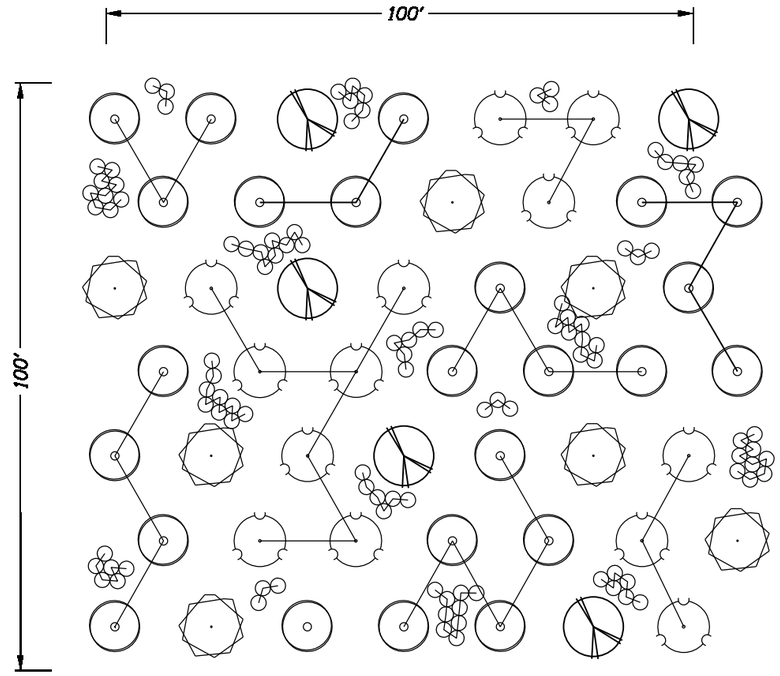
NNA_Roadside_Devel :: FA13-FA13A 6/21/2019 2:51:11 PM Jane

Rotation: 275.7836° 0'



NOTE:
Total quantity of plants per species per area shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Acer macrophyllum (TACMA), 10%*
- *Abies grandis (TABGR), 10%*
- *Thuja plicata (TTHPL), 8%*

Small Trees
- *Fraxinus latifolia (TFRLA), 6%*
- *Prunus emarginata (TPREM), 15%*
- *Salix lucida ssp. Lasiandra(TSALU), 15%*
- *Rhamnus purshiana (TRHPU), 10%*

Fast-Growing Trees
- *Alnus rubra (TALRU), 26%*

Shrubs
- *Assorted Species*

Riparian Restoration Mix C: Lowland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Abies grandis	5 stems / 10,000 s.f.	10%
	Acer macrophyllum	4 stems / 10,000 s.f.	10%
	Thuja plicata	4 stems / 10,000 s.f.	8%
	Small Trees		
	Fraxinus latifolia	3 stems / 10,000 s.f.	6%
	Prunus emarginata	7 stems / 10,000 s.f.	15%
	Salix lucida ssp. lasiandra	7 stems / 10,000 s.f.	15%
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Fast-Growing Trees (13)*		
	Alnus rubra	13 stems / 10,000 s.f.	26%

Riparian Restoration Mix C and D: Lowland Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Cornus sericea	27 stems / 10,000 s.f.	25%
	Physocarpus capitatus	11 stems / 10,000 s.f.	10%
	Rubus spectabilis	16 stems / 10,000 s.f.	15%
	Sambucus racemosa	11 stems / 10,000 s.f.	10%
	Spirea douglasii	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	18 stems / 10,000 s.f.	25%

* Groupings required

DETAIL: LOWLAND TREES AND PLANTING MIX C AND D

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 49 trees/10,000 s.f.

2) Install trees at an average of 15' O.C. with triangular spacing, 49 trees/10,000 s.f. Large, Slow-Growing Trees must be planted at minimum 30' O.C. from one another. Fast-Growing and Small Trees shall be installed at a 10 - 20' O.C. average spacing from others.

3) Install Fast-Growing Trees in groups of 2 - 7

4) Install Small Trees in groups of 2 - 5

5) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

6) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

7) Maintain a 1' diameter plant-free area around all stems and mulch with shredded wood to prevent weeds.

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I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Name
Drafter: David Goodyke | Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Sec. 30, T. 2 S, R. 2 E, W.M.

??

N

WILLAMETTE RIVER

EDGE OF BRIDGE

OHWL

E PORT FWY (I-205) ABERNATHY BRIDGE

"L" 715+00

"L" 720+00

"L" 725+00

EDGE OF BRIDGE

WILLAMETTE RIVER

OHWL

1. Total area on FA14 and FA15, shown on FA15, note 21
2. Total area on FA14 and FA15, shown on FA15, note 1
3. Total area on FA14 and FA15, shown on FA15, note 2
4. Total area on FA14 and FA15, shown on FA15, note 3
5. Total area on FA14 and FA15, shown on FA15, note 18
6. Total area on FA14 and FA15, shown on FA15, note 17
7. Total area on FA14 and FA15, shown on FA15, note 16
8. Install 42,555 s.f. Riparian Seeding
9. Total area on FA14 and FA15, shown on FA15, note 22
10. Total area on FA14 and FA15, shown on FA15, note 20
11. Total area on FA14 and FA15, shown on FA15, note 23
12. Total area on FA14 and FA15, shown on FA15, note 24
13. Total area on FA14 and FA15, shown on FA15, note 47
14. Total area on FA14 and FA15, shown on FA15, note 46
15. Install 42,555 s.f. Riparian Restoration Mix C

LEGEND

- Riparian Restoration Mix A
- Riparian Restoration Mix B
- Riparian Restoration Mix C
- Riparian Restoration Mix F
- DSL/USACE Restoration Area
- ExistingTrees

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Reviewer: Ben Ngan
Drafter: David Goodyke
Checker: Ben Ngan

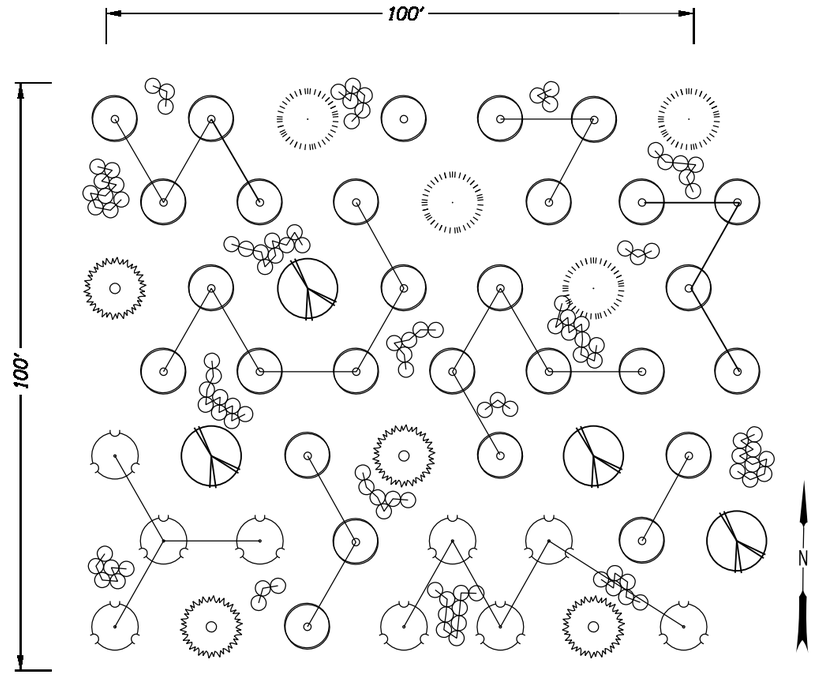
ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA14-FA14A 6/21/2019 2:51:17 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 201.4396° 0'



Riparian Restoration Mix A: Upland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Acer macrophyllum	4 stems / 10,000 s.f.	8%
	Calocedrus decurrens	4 stems / 10,000 s.f.	8%
	Quercus garryana	13 stems / 10,000 s.f.	26%
	Pseudotsuga menziesii	4 stems / 10,000 s.f.	8%
	Small Trees		
	Arbutus menziesii	7 stems / 10,000 s.f.	15%
	Corylus cornuta ssp. californica	7 stems / 10,000 s.f.	15%
	Cornus nuttallii	3 stems / 10,000 s.f.	5%
	Rhamnus purshiana	7 stems / 10,000 s.f.	15%

Riparian Restoration Mix A and B: Upland Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Mahonia aquifolium	27 stems / 10,000 s.f.	25%
	Omeleria ceracisformis	11 stems / 10,000 s.f.	10%
	Rubus parviflorus	16 stems / 10,000 s.f.	15%
	Sambucus racemosa	11 stems / 10,000 s.f.	10%
	Spirea douglasii	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	18 stems / 10,000 s.f.	25%

* Groupings required

NOTE:
Total quantity of plants per species per area shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Acer macrophyllum (TACMA), 8%*
- *Calocedrus decurrens (TCADE), 8%*
- *Pseudotsuga menziesii (TPSME), 8%*
- *Quercus garryana (TQUGA), 26%*

Small Trees
- *Arbutus menziesii (TARME), 15%*
- *Corylus cornuta ssp. californica (TCOCO), 15%*
- *Cornus nuttallii (TCONU), 15%*
- *Rhamnus purshiana (TRHPU), 15%*

Shrubs
- *Assorted Species*

DETAIL: UPLAND TREES AND PLANTING MIX A AND B

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 49 trees/10,000 s.f.

2) Install trees at an average of 15' O.C. with triangular spacing, 49 trees/10,000 s.f. Large, Slow-Growing Trees must be planted at minimum 30' O.C. from one another. Fast-Growing and Small Trees shall be installed at a 10 - 20' O.C. average spacing from others.

3) Concentrate TQUGA in areas with most southern and western sun exposure.

4) Concentrate TPSME North and East of TQUGA.

5) Install Small Trees in groups of 2 - 5

6) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with shredded wood to prevent weeds.

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

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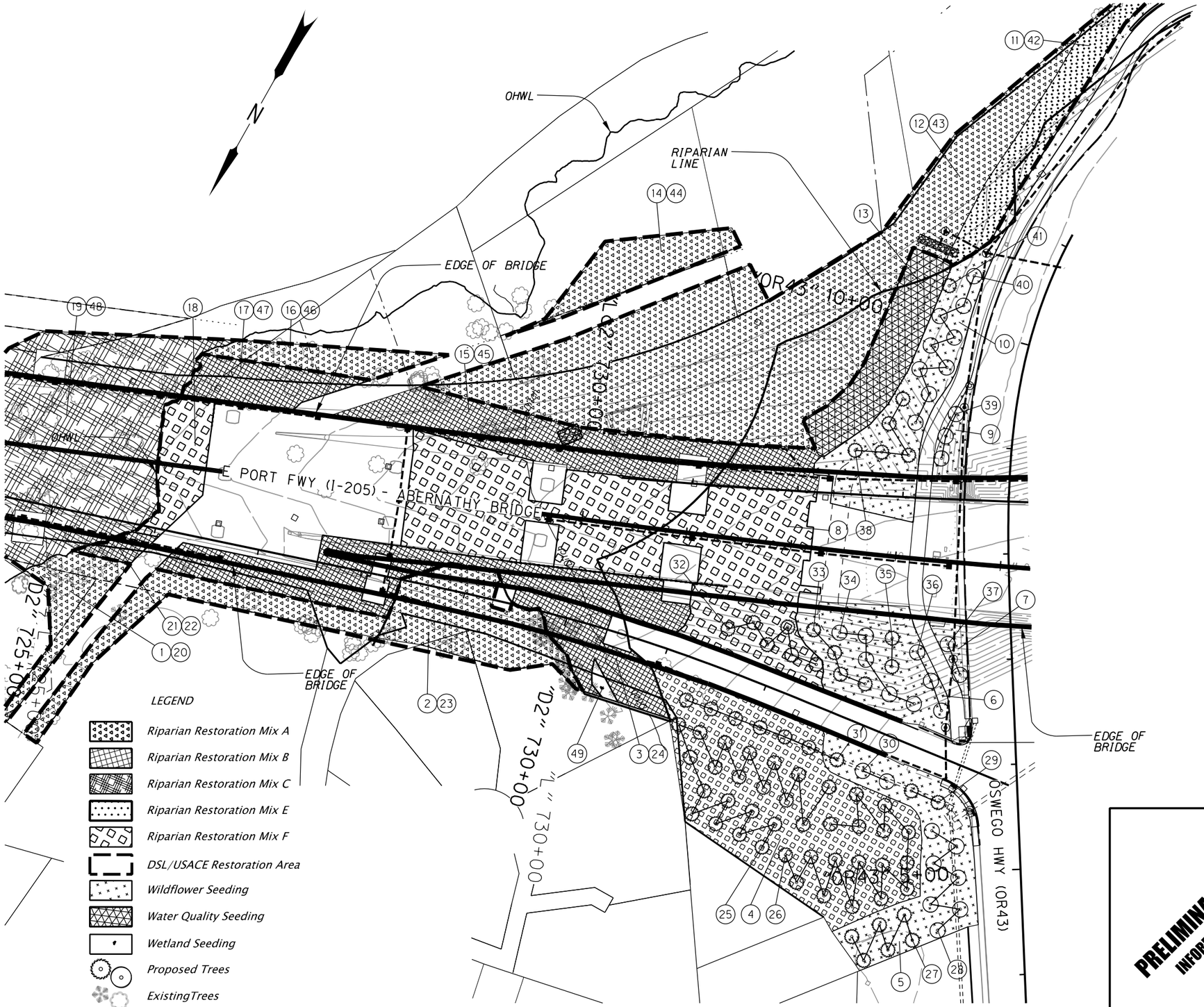

1. Install 5,280 s.f. Native Shade Seeding
2. Install 18,680 s.f. Native Shade Seeding
3. Install 22,350 s.f. Native Shade Seeding
4. Install 33,448 s.f. Native Shade Seeding
5. Install 14,076 s.f. Wildflower Seeding
6. Install 11,537 s.f. Wildflower Seeding
7. Install 1,334 s.f. Wildflower Seeding
8. Install 40,690 s.f. Riparian Restoration Mix F Seeding
9. Install 2,108 s.f. Wildflower Seeding
10. Install 17,209 s.f. Wildflower Seeding
11. Install 8,465 s.f. Wildflower Seeding
12. Install 56,348 s.f. Wildflower Seeding
13. Install 8,634 s.f. Water Quality Seeding
14. Install 6,497 s.f. Wildflower Seeding
15. Install 16,848 s.f. Wildflower Seeding
16. Install 4,415 s.f. Wildflower Seeding
17. Install 5,280 s.f. Wildflower Seeding
18. Install 5,401 s.f. Riparian Restoration Mix F Seeding
19. Total area on FA14 and FA15, shown on FA14, note 8
20. Install 5,280 s.f. Riparian Restoration Mix A
21. Install 1,227 s.f. Native Shade Seeding
22. Install 1,227 s.f. Riparian Restoration Mix B
23. Install 18,680 s.f. Riparian Restoration Mix A
24. Install 22,350 s.f. Riparian Restoration Mix B
25. Install 20 TPSME
26. Install 17 TPIPO
27. Install 6 TPSME
28. Install 7 TQUGA
29. Install 2TPSME

Notes continue on FA15A

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA15-FA15A 6/21/2019 2:51:26 PM Jane

Rotation: 209.2943° 0'

(30) *Install 2 TCONU*

(31) *Install 7 TPIPO*

(32) *Install 6 TPSME*

(33) *Install 4 TCADE*

(34) *Install 5 TCONU*

(35) *Install 2 TCADE*

(36) *Install 3 TQUGA*

(37) *Install 2 TQUGA*

(38) *Install 5 TPIPO*

(39) *Install 3 TQUGA*

(40) *Install 9 TQUGA*

(41) *Install 1 TARME*

(42) *Install 8,465 s.f. Riparian Restoration Mix E*

(41) *Install 56,348 s.f. Riparian Restoration Mix A*

(44) *Install 6,497 s.f. Riparian Restoration Mix A*

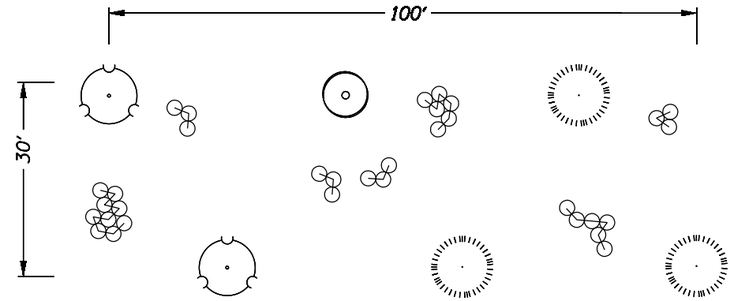
(45) *Install 16,848 s.f. Riparian Restoration MIx B*

(46) *Install 4,415 s.f. Riparian Restoration Mix A*

(47) *Install 5,280 s.f. Riparian Restoration Mix B*

(48) *Total area on FA14 and FA15, shown on FA14, note 15*

(49) *Install 410 s.f. Wetland Seeding*



LEGEND

Large, Slow-Growing Trees

Arbutus menziesii (TARME), 10%

Pinus ponderosa (TPIPO), 50%

Quercus garryana (TQUGA), 40%

Shrubs

Assorted Species

Riparian Restoration Mix E: Upland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Arbutus menziesii	2 stems / 10,000 s.f.	10%
	Quercus garryana	8 stems / 10,000 s.f.	40%
	Pinus ponderosa var. willamettensis	10 stems / 10,000 s.f.	50%
	RIparIan RestoratIon MIx E: Upland Shrubs	Approximate Planting Density	Planting Percentage
	Shrubs*		
	Ceanothus velutinus	11 stems / 10,000 s.f.	10%
	Mahonia aquifolium	65 stems / 10,000 s.f.	60%
	Ribes sanguineum	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	16 stems / 10,000 s.f.	15%

* Groupings required

NOTE:
Total quantity of plants per species per area shown on FA03.

DETAIL: UPLAND TREES AND PLANTING MIX E

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 20 trees/10,000 s.f.

2) Install trees at an average of 25' O.C. with triangular spacing.

3) Concentrate TQUGA in areas with most southern and western sun exposure.

4) Concentrate TPSME North and East of TQUGA.

5) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

6) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

7) Maintain a 1' diameter plant-free area around all stems and mulch with shredded wood to prevent weeds.

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

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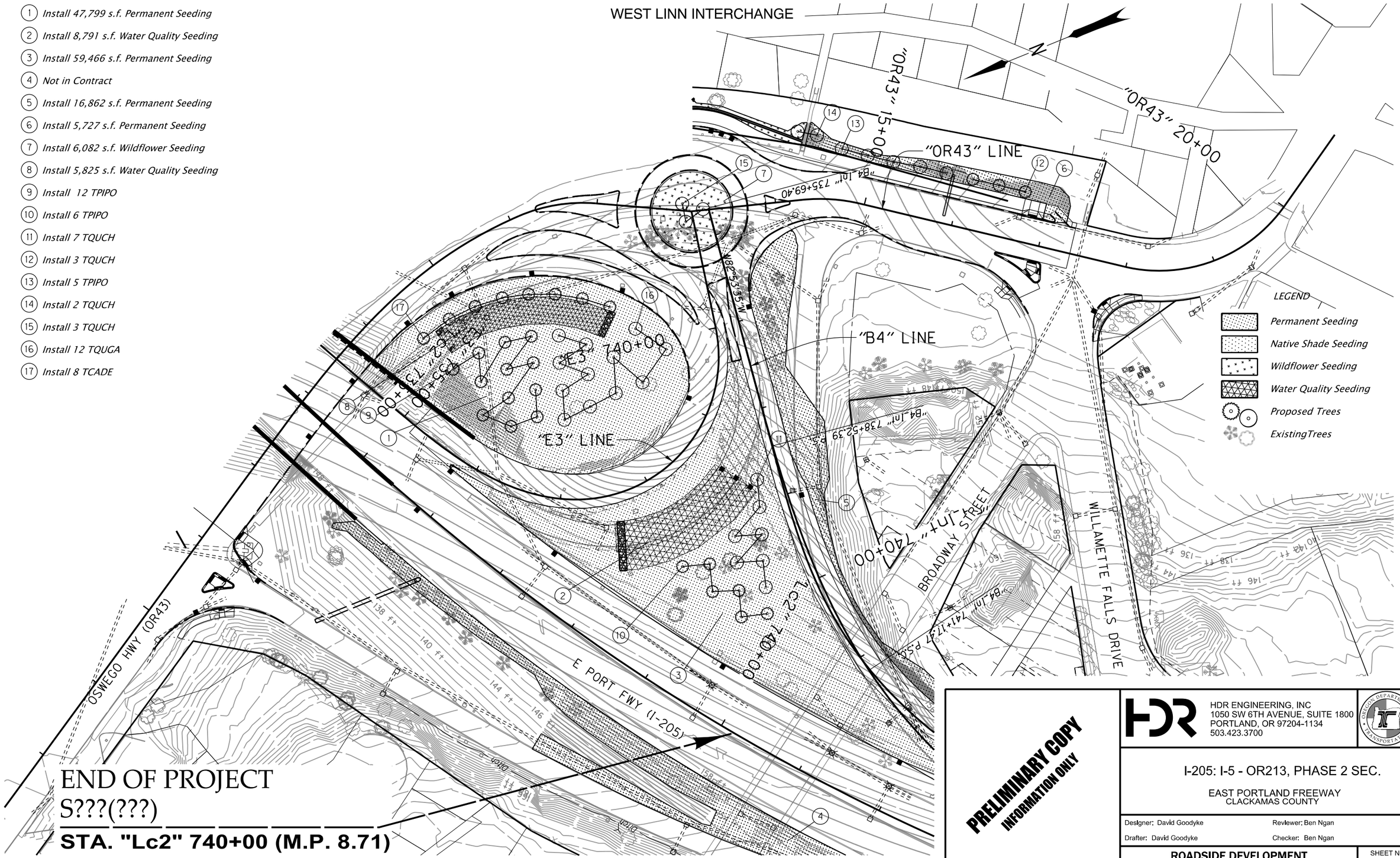
Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

1. Install 47,799 s.f. Permanent Seeding
2. Install 8,791 s.f. Water Quality Seeding
3. Install 59,466 s.f. Permanent Seeding
4. Not in Contract
5. Install 16,862 s.f. Permanent Seeding
6. Install 5,727 s.f. Permanent Seeding
7. Install 6,082 s.f. Wildflower Seeding
8. Install 5,825 s.f. Water Quality Seeding
9. Install 12 TPIPO
10. Install 6 TPIPO
11. Install 7 TQUCH
12. Install 3 TQUCH
13. Install 5 TPIPO
14. Install 2 TQUCH
15. Install 3 TQUCH
16. Install 12 TQUGA
17. Install 8 TCADE



END OF PROJECT

S???(???)

STA. "Lc2" 740+00 (M.P. 8.71)

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke	Reviewer: Ben Ngan
Drafter: David Goodyke	Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA16 6/21/2019 2:51:41 PM Jane

Rotation: 247.8868° 0'

GENERAL NOTES:

The construction, adjustment, maintenance, and upgrading of these Erosion and Sediment Control measures is the responsibility of the contractor for the duration of the project to comply with Section 00280 of the Oregon Standard Specifications for construction and the NPDES 1200-CA permit.

Erosion and Sediment Control measures shown on this plan are for anticipated site conditions. Adjust or upgrade these measures for unexpected storm events to ensure that sediment and sediment-laden water does not leave the site.

Develop a revised plan of the Erosion and Sediment Control measures shown as required by Section 00280, Oregon Standard Specifications for Construction. Implement this plan for all clearing and grading activities and in segments applicable to each staging phase. Construct in such a manner so as to ensure that sediment and sediment-laden water does not enter the roadway or drainage system, or violate applicable water standards.

Install measures within the right-of-way unless directed otherwise.

Inlet protection for existing facilities shall be installed before construction begins and shall remain in place until all construction is completed and approved. The contractor shall protect all storm drain inlets within the work area and adjacent to the work limits within 100' outside all working, stockpile, and staging areas, including the first inlet downstream (at any distance). In the case of inlets to be removed, protection measures shall remain in place until the new inlet is constructed and connected to the drainage network, and the existing inlet has been disconnected from the existing drainage network. Inlet protection shall be installed on new inlets before they are connected to the existing drainage network.

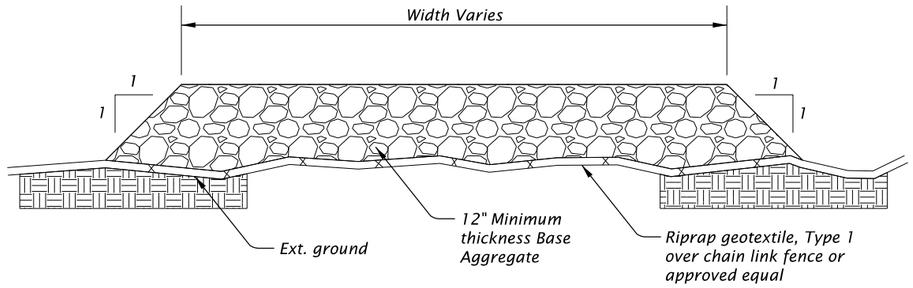
See section 00280 for material not shown in plans.

STANDARD DRAWINGS

☒	*RD1000*	*Construction Entrances*
☐	*RD1005*	*Check Dams Type 1, 3 and 4*
☒	*RD1006*	*Check Dams Type 2 and 6*
☒	*RD1010*	*Inlet Protection Type 2, 3, 6 and 7*
☐	*RD1015*	*Inlet Protection Type 4*
☒	*RD1030*	*Sediment Barrier Type 2, 3 and 4*
☐	*RD1031*	*Sediment Barrier Type 5 and 6*
☒	*RD1032*	*Sediment Barrier Type 8*
☒	*RD1033*	*Sediment Barrier Type 9*
☒	*RD1040*	*Sediment Fence*
☐	*RD1045*	*Temporary Slope Drain With Energy Dissipator*
☐	*RD1050*	*Temporary Scour Basin*
☒	*RD1055*	*Slope and Channel Matting*
☒	*RD1060*	*Tire Wash Facility Type 1 and 2*
☒	*RD1065*	*Sediment Trap*
☒	*RD1070*	*Concrete Truck Wash Out*

SEQUENCE OF WORK NOTES:

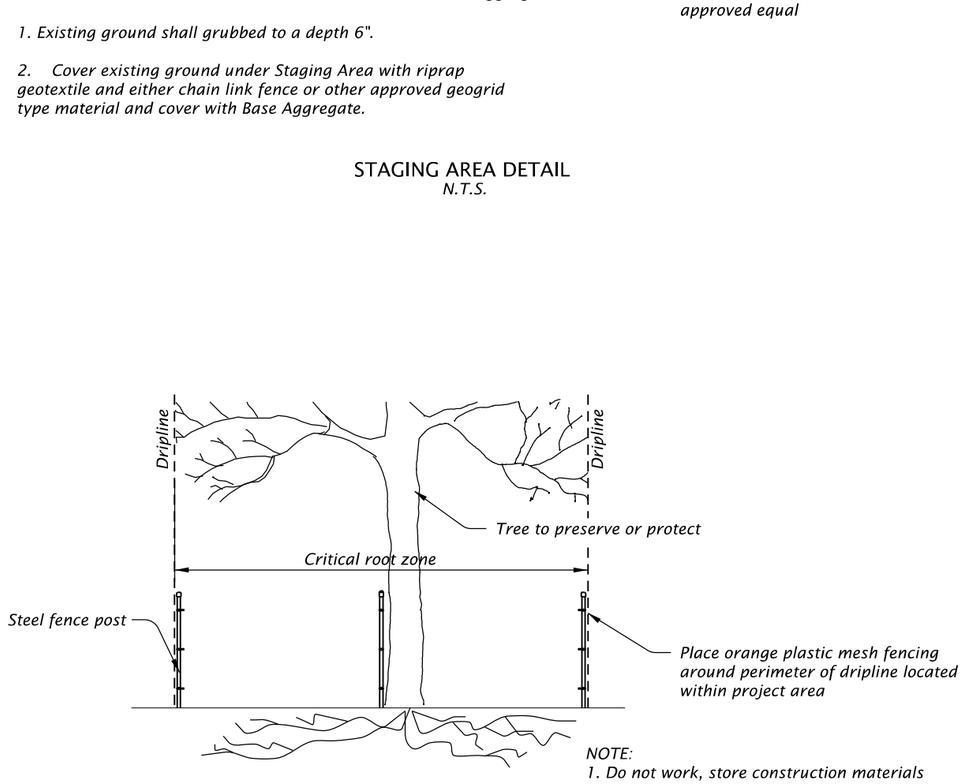
This Erosion and Sediment Control Plan has been prepared based upon the construction sequence represented in the Traffic Control Plan Sheets. This ESCP is not intended to supercede a construction sequencing plan. The ESCP is to be reviewed and revised to fit the actual construction sequence.



1. Existing ground shall grubbed to a depth 6".

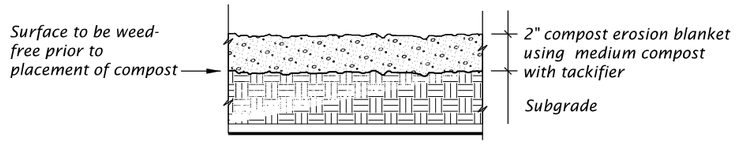
2. Cover existing ground under Staging Area with riprap geotextile and either chain link fence or other approved geogrid type material and cover with Base Aggregate.

STAGING AREA DETAIL
N.T.S.

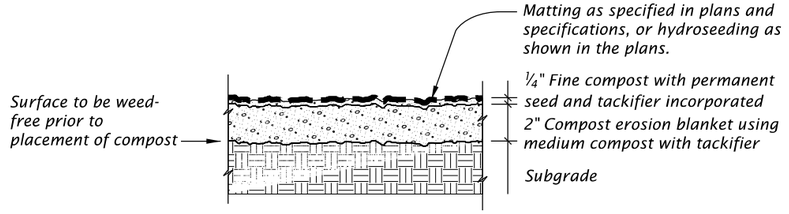


NOTE:
1. Do not work, store construction materials or park within the critical root zone of marked trees unless written approval has been obtained from the Engineer.

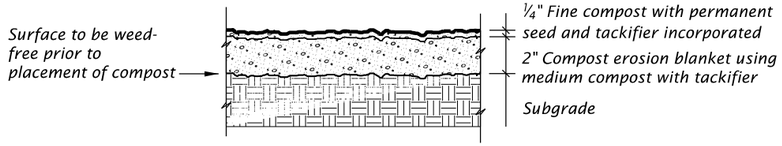
TREE PROTECTION DETAIL
N.T.S.



APPLICATION - TEMPORARY/PERMANENT MULCHING
N.T.S.



APPLICATION - STEEP SLOPES, SHALLOW DITCHES & BIO-SWALES
N.T.S.



APPLICATION – TEMPORARY/PERMANENT VEGETATIVE COVER
N.T.S.

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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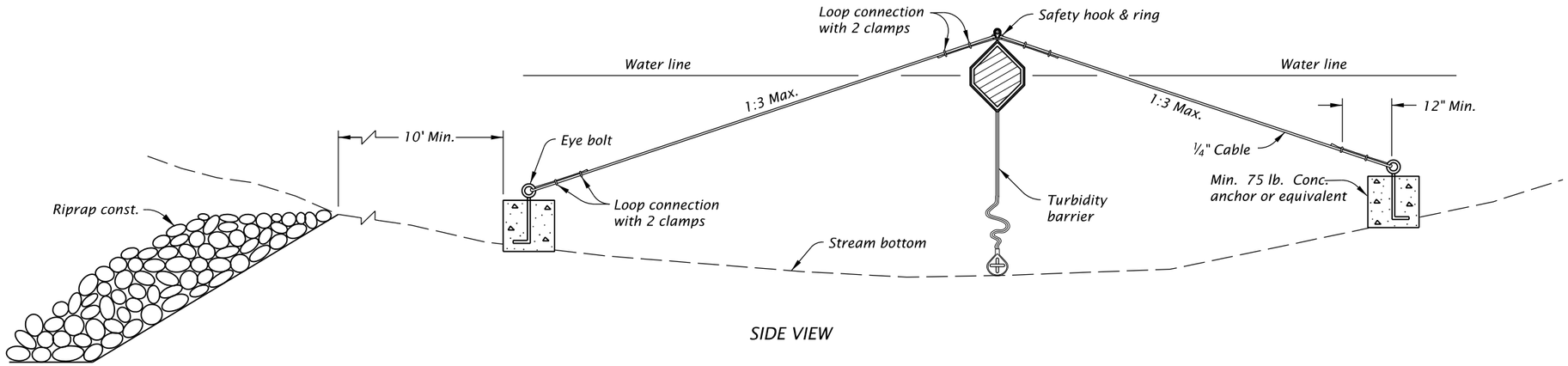
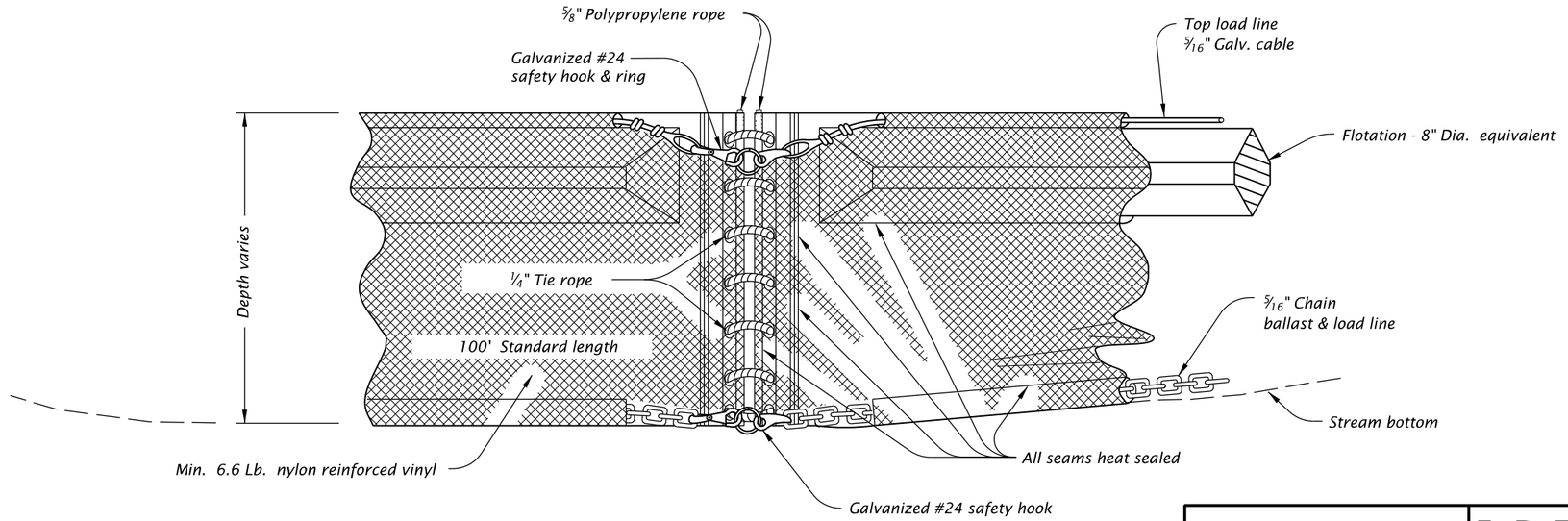
EE_K19786_HDR_ec01_phase 1.dgn :: FB01 6/25/2019 11:15:59 AM CDONOVAN
Rotation: 0°
0'

SEDIMENT BARRIER FLOATING



SIDE VIEW



ANCHOR ASSEMBLY

NOTE:

Components of this barrier may be similar or identical to proprietary designs. Any infringement on the proprietary rights of the designer shall be the sole responsibility of the contractor. Substitutions shall be as approved by the engineer.

TURBIDITY BARRIER

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
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EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec01_phase 1.dgn :: FB02 6/25/2019 11:16:01 AM CDONOVAN

Rotation: 0° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

BEGINNING OF PROJECT
S???(???)
STA. "L" 659+00 (M.P. 10.24)

N

Extg. R/W

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Extg. R/W

Extg. R/W

Extg. R/W

Ditch

(1) *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*

(2) *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

(3) *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

(4) *Install orange plastic mesh fencing*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

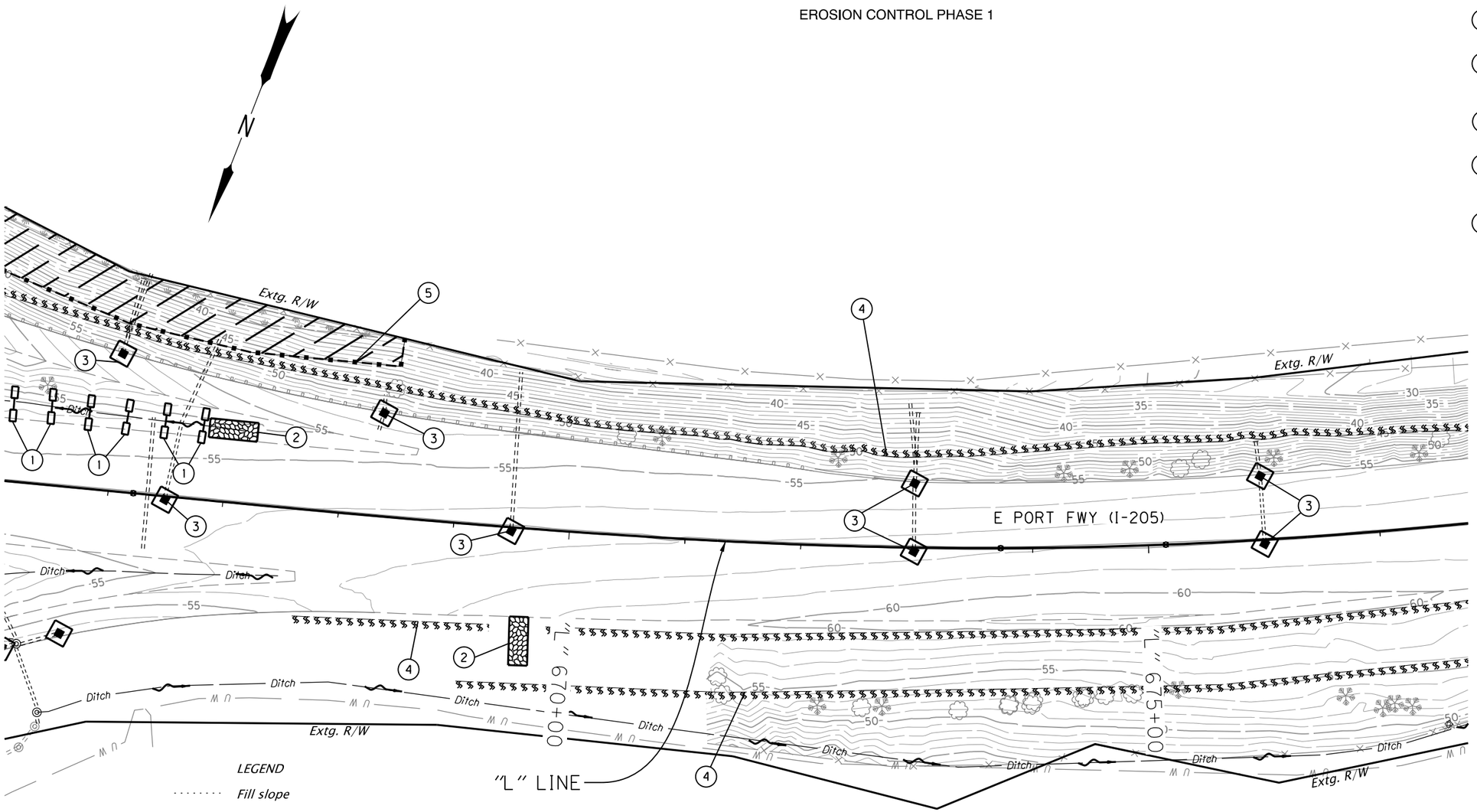
EE_K19786_HDR_ec01_phase 1.dgn :: FB03 6/25/2019 11:16:04 AM CDONOVAN

Rotation: 227.6721° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
2. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
3. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
4. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing*



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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB04 6/25/2019 11:16:17 AM CDONOVAN

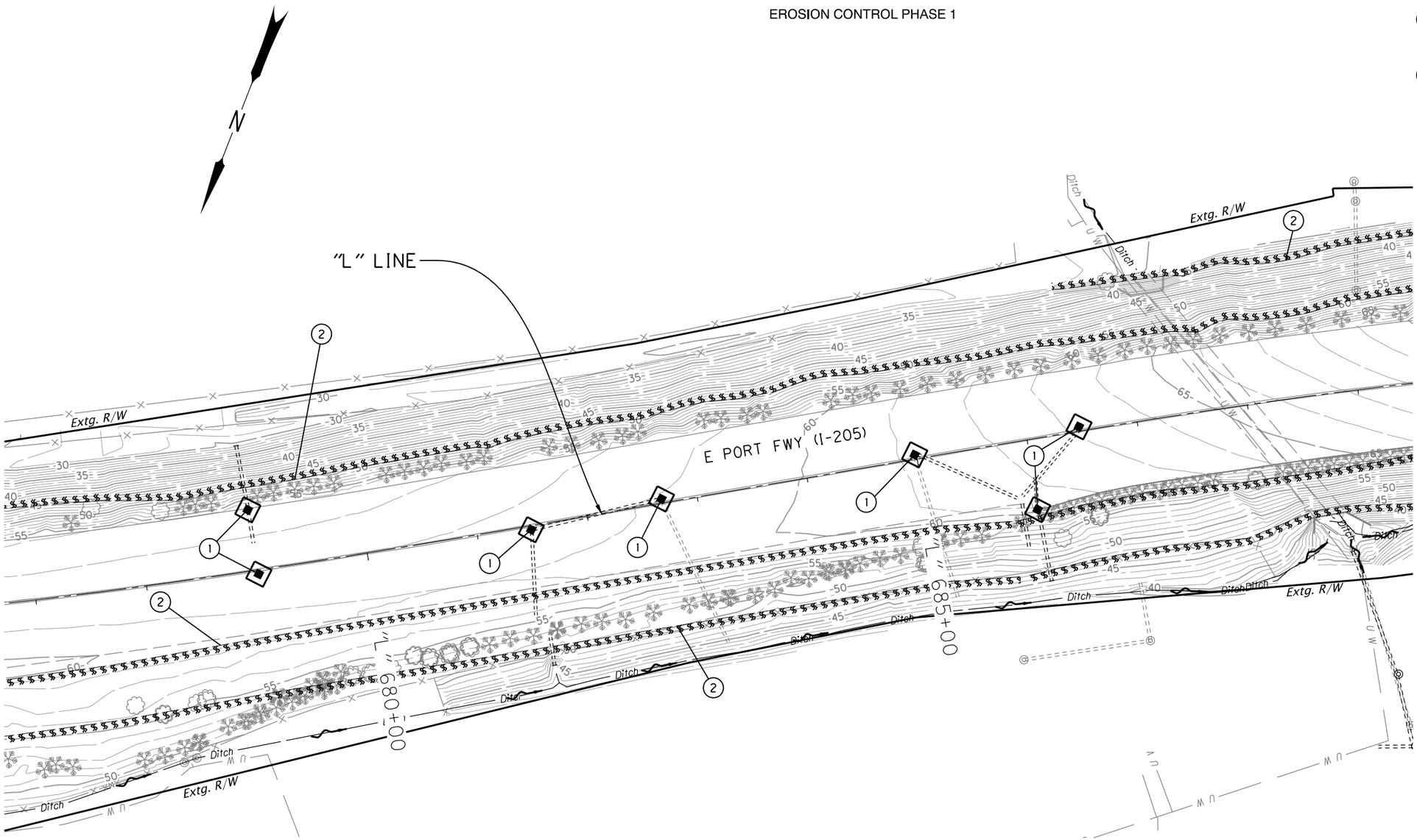
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. inlet protection - xx (Type 3) (See drg. no. RD1010)*
2. *Install sediment barrier, (Type 9) - xx' (See drg. no. RD1033)*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

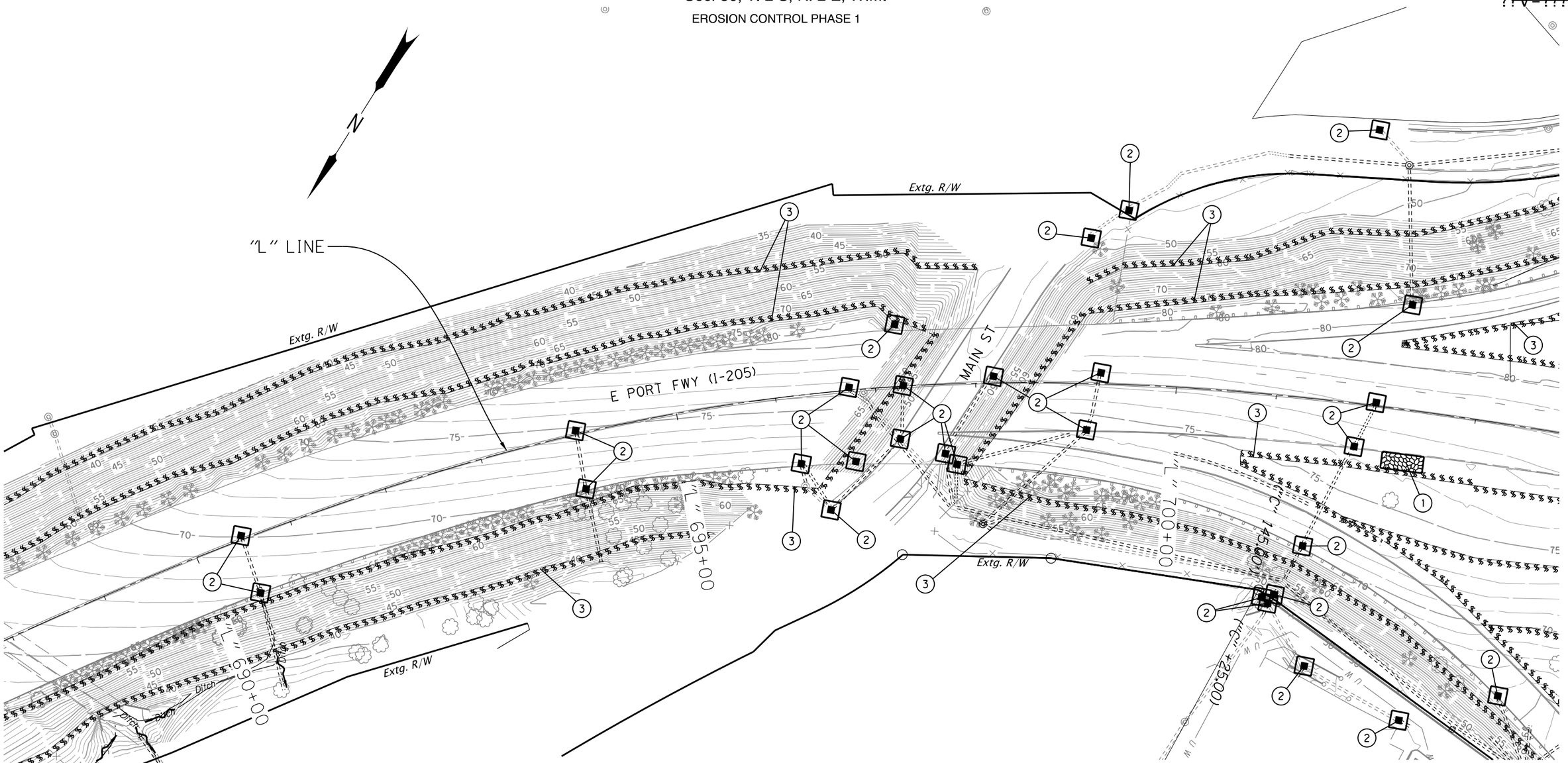
EE_K19786_HDR_ec01_phase 1.dgn :: FB05 6/25/2019 11:16:34 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
3. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB06 6/25/2019 11:16:47 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 212.6746° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost filter berm
- Ordinary High Water
- Flow direction
- Construction entrance

1. Const. construction entrance – xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
3. Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)

"L" LINE

Extg. R/W

E PORTLAND FWY (I-205)

PACIFIC HWY (OR99E)

Extg. R/W

For creek erosion control plans see shts. FB21, FB22, FB23

ABERNETHY CREEK

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

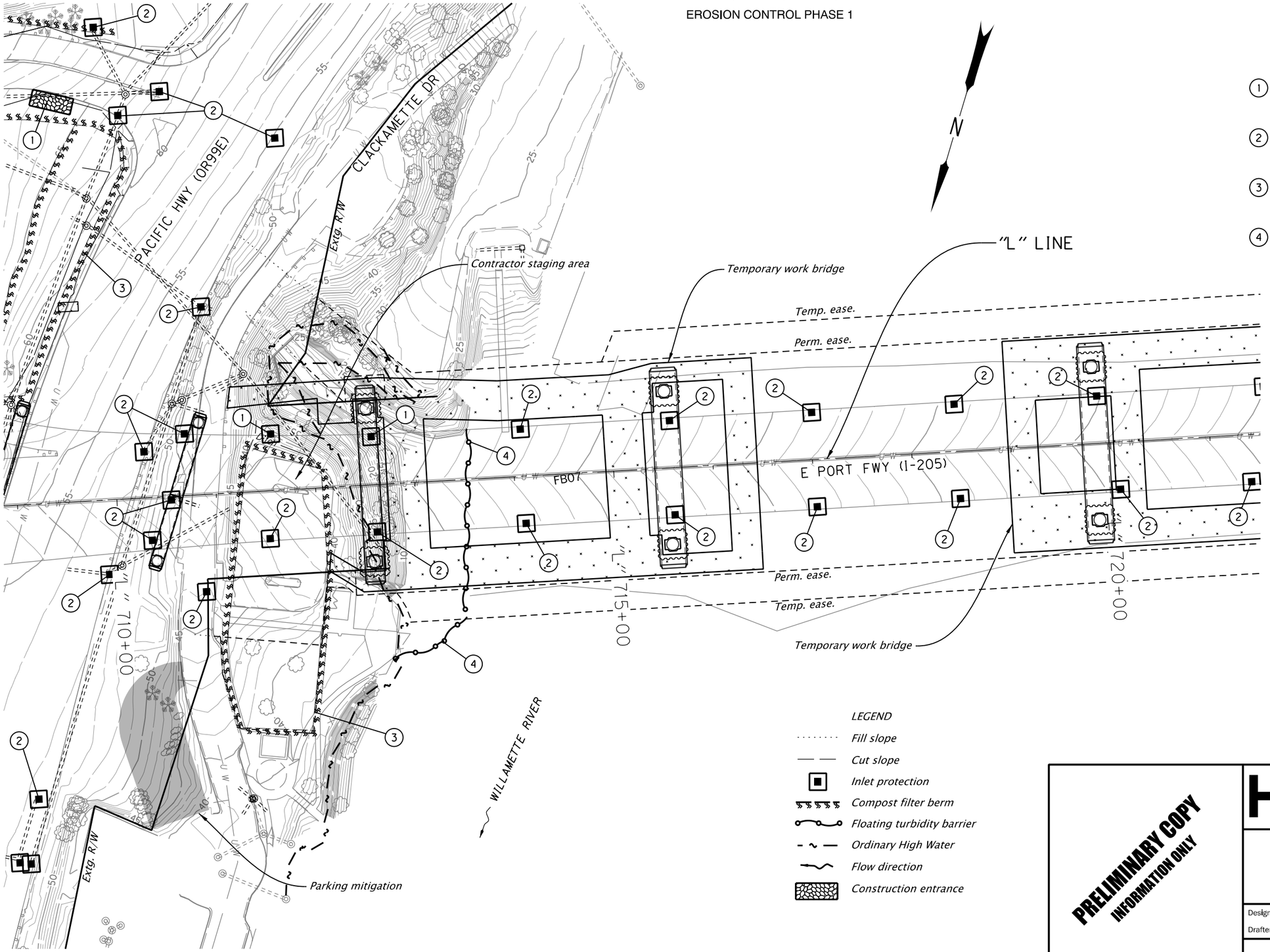
EE_K19786_HDR_ec01_phase 1.dgn :: FB07 6/25/2019 11:16:59 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 272.0412°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1



GENERAL NOTES:

Floating turbidity barrier only required for rip rap removal.

1. *Const. construction entrance – x (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*
4. *Const. turbidity barrier – xx (See Sheet FB11)*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Floating turbidity barrier*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

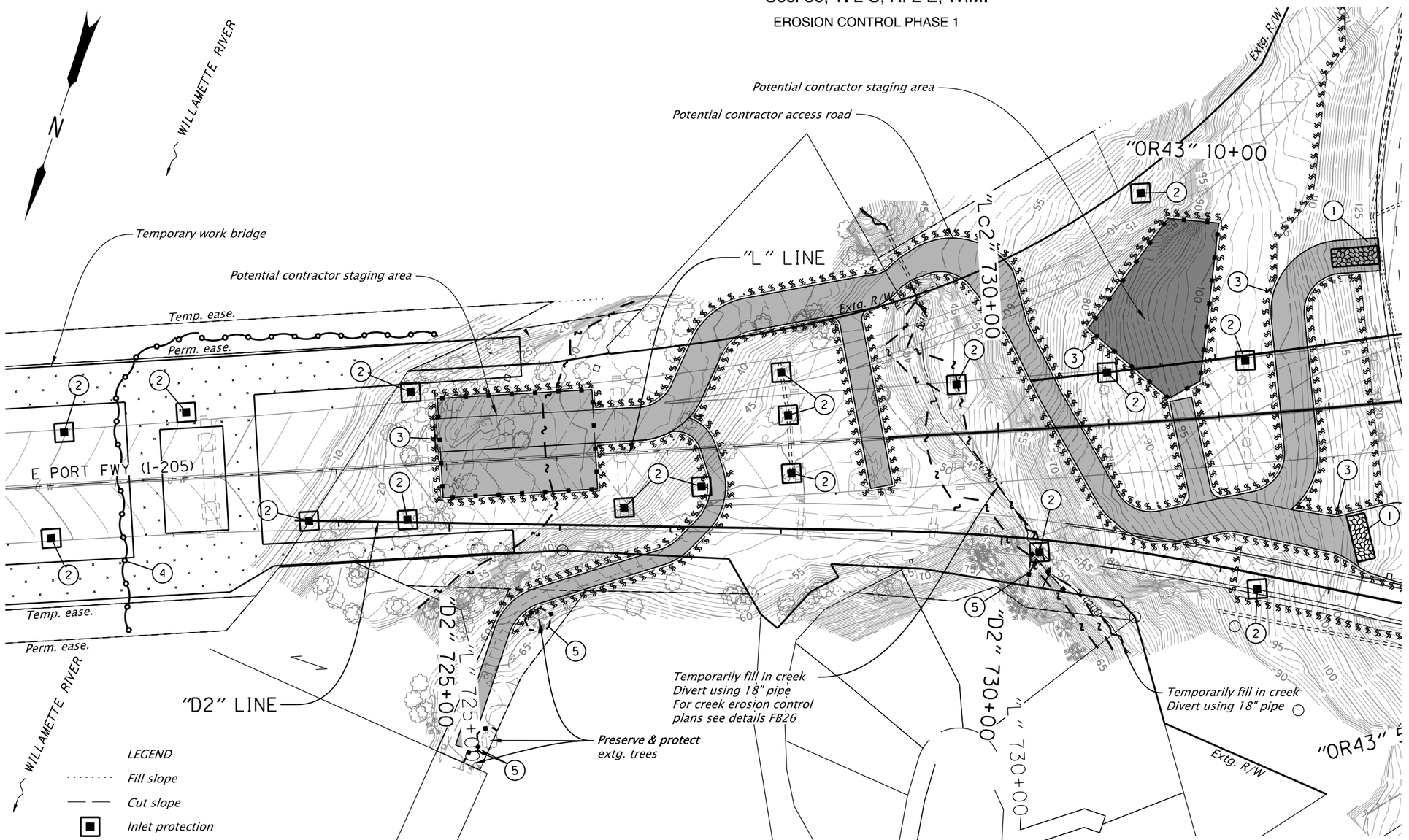
EE_K19786_HDR_ec01_phase 1.dgn :: FB08 6/25/2019 11:17:11 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1



GENERAL NOTES:

Floating turbidity barrier only required for rip rap removal.

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*
4. *Const. turbidity barrier – xx (See Sheet FB11)*
5. *Install orange plastic mesh fencing*

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB09 6/25/2019 11:17:33 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 1

N

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*

"Lc2" LINE

"OR43" 10+00

Potential contractor staging area

WILLAMETTE RIVER

Extg. R/W

"OR43" LINE

"OR43" 15+00

"OR43" 20+00

"D2" LINE

"OR43" 5+00

"E3" 735+00

"Lc2" 735+00

"E3" 740+00

"E3" LINE

OSWEGO HWY (OR43)

E PORT FWY (I-205)

"B4" LINE

"Lc2" 740+00

"B4" 740+00

Extg. R/W

Mid Quadrin Creek

Ditch

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Orange plastic fence (no work area)*
- *No work zone*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*
- *Access road*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB10 6/25/2019 11:17:46 AM CDONOVAN

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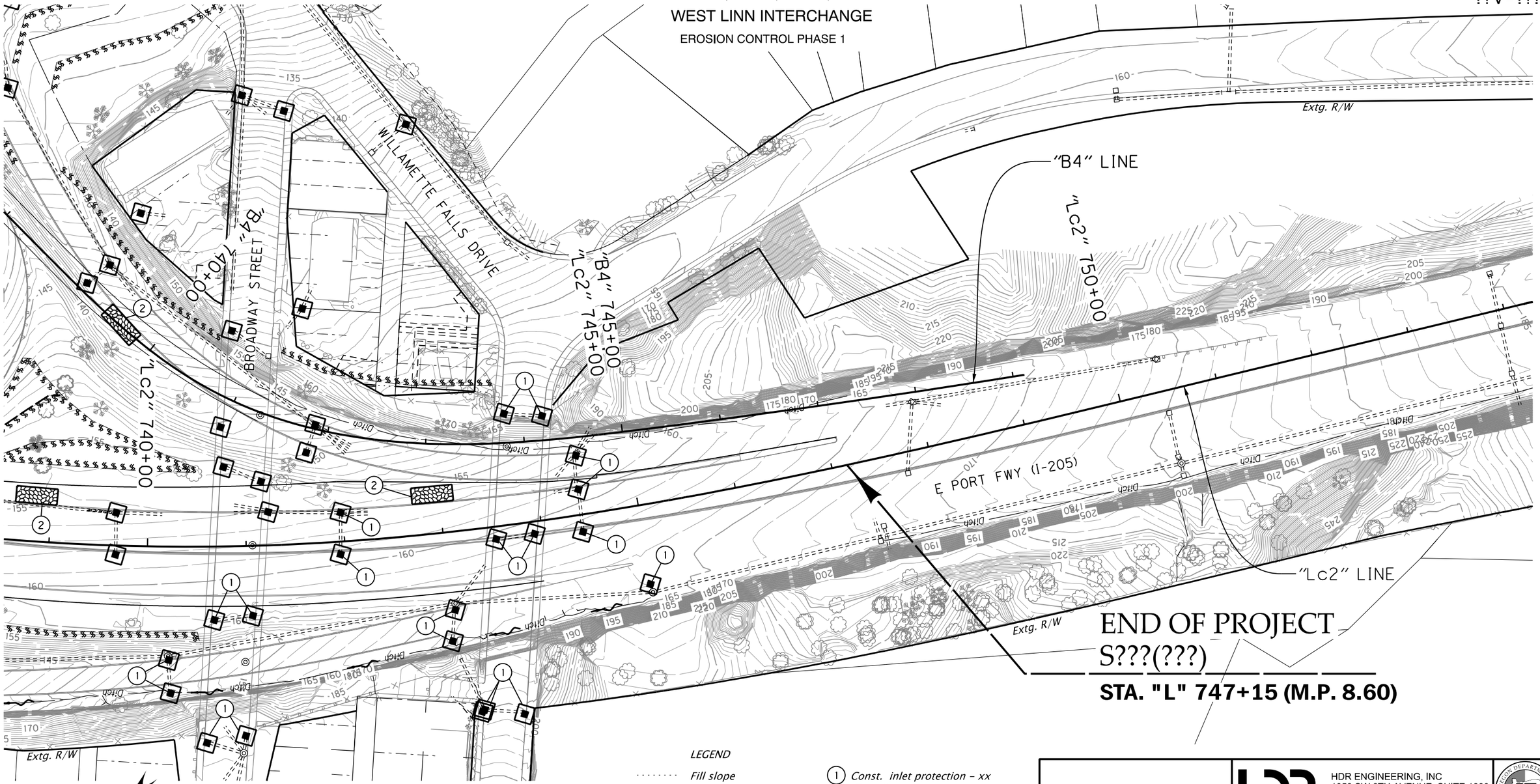
Rotation: 260.6437°

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 1



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

(1) *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*

(2) *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan | Checker: Brendan LeBlanc

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EE_K19786_HDR_ec01_phase 1.dgn :: FB11 6/25/2019 11:17:59 AM CDONOVAN

Rotation: 218.1362° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

STA. "L" 659+00 (M.P. 10.24)

BEGINNING OF PROJECT
S???(???)

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 660+00

"L" 655+00

"L" 665+00

Extg. R/W

Ditch

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Erosion control matting*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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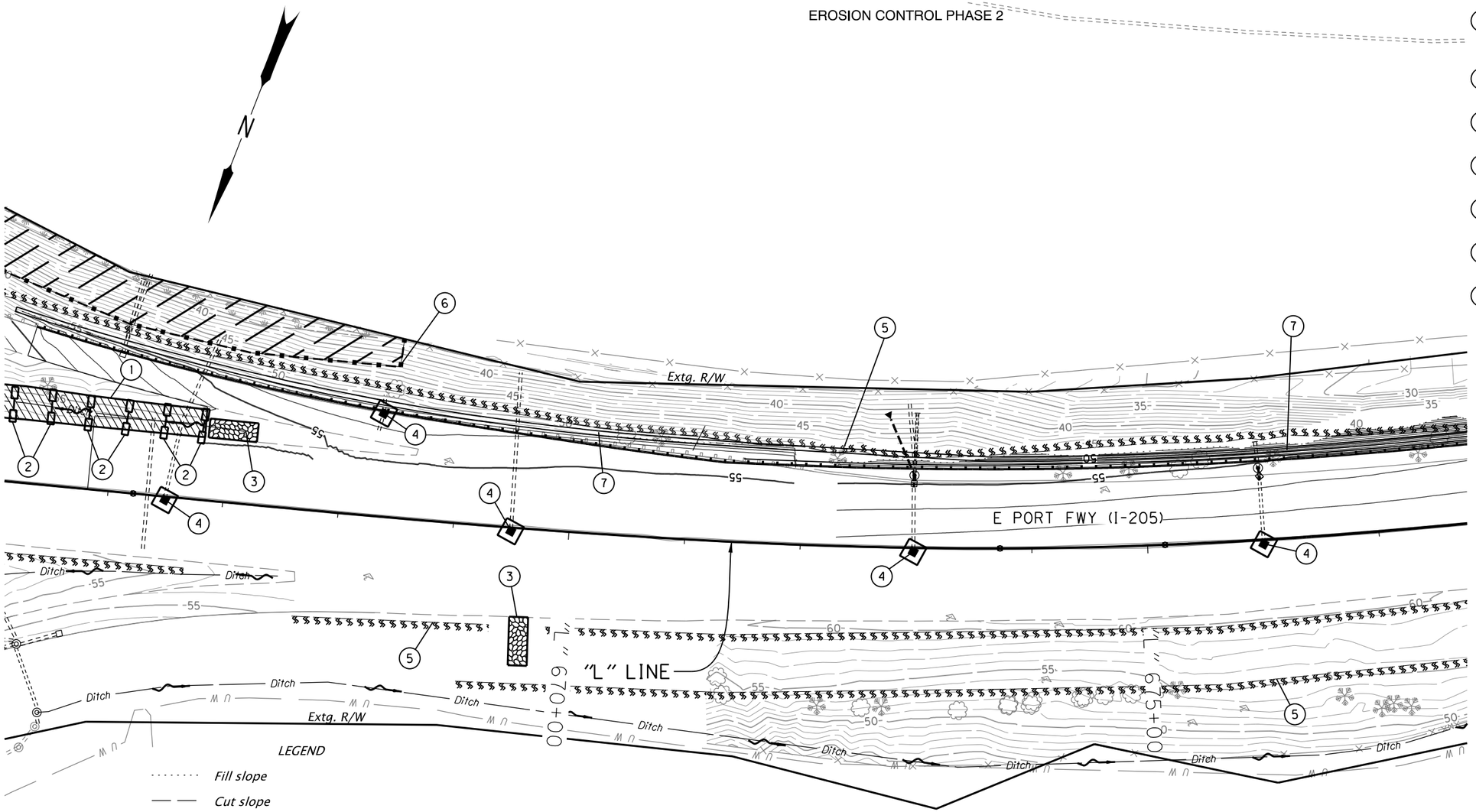
EE_K19786_HDR_ec01_phase 2.dgn :: FB12 6/25/2019 11:18:38 AM CDONOVAN

Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*
7. *Seeding and mulching – xx*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Seeding and mulching*
- *No work zone*
- *Erosion control matting*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Construction entrance*
- *Flow direction*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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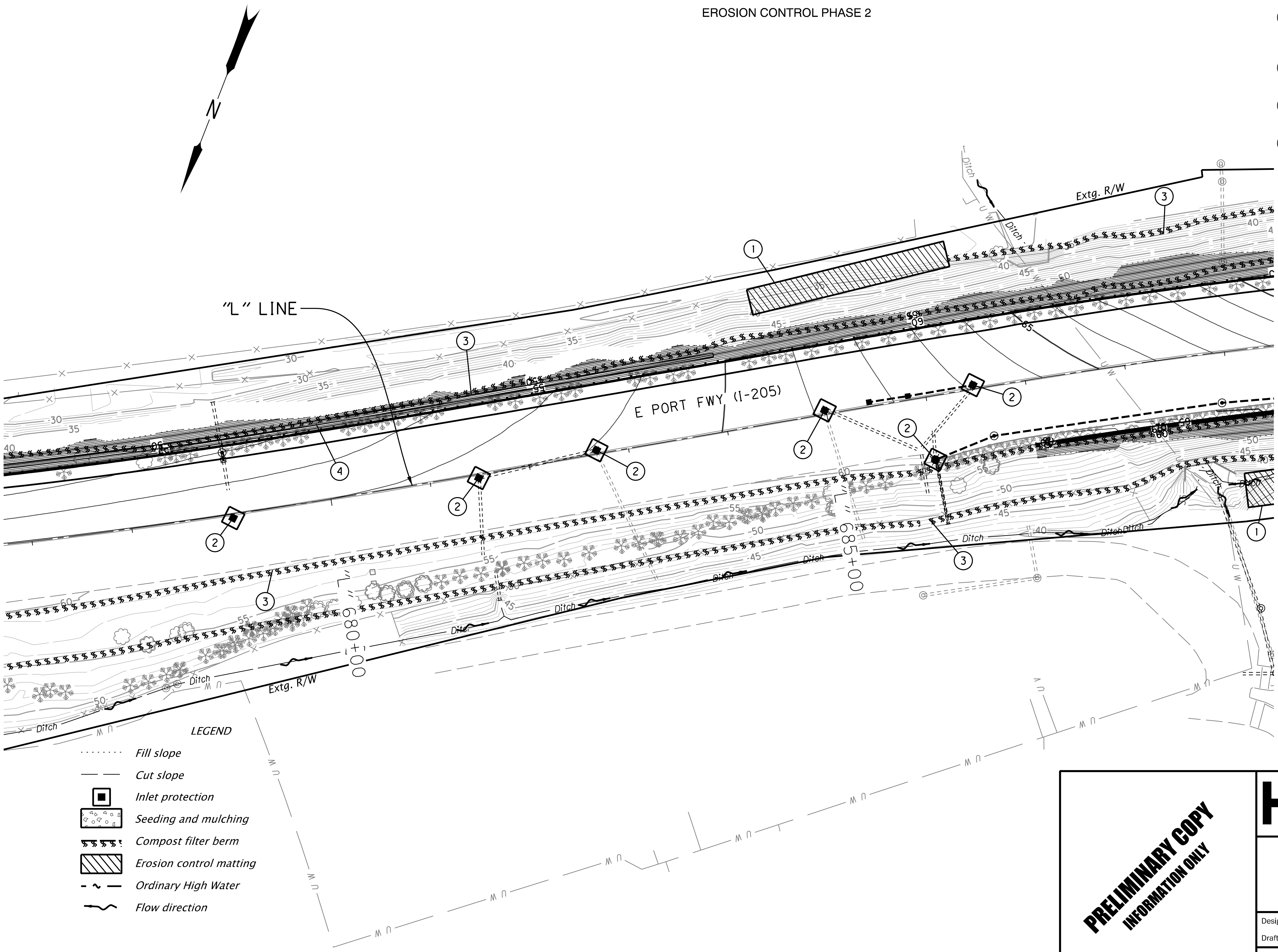
EE_K19786_HDR_ec01_phase 2.dgn :: FB13 6/25/2019 11:18:42 AM CDONOVAN

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



(1) *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*

(2) *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

(3) *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*

(4) *Seeding and mulching – xx*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Seeding and mulching*
- *Compost filter berm*
- *Erosion control matting*
- *Ordinary High Water*
- *Flow direction*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan | Checker: Brendan LeBlanc

SHEET NO.

EROSION AND SEDIMENT CONTROL

Item #1.

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Erosion control matting
- Wetland
- Ordinary High Water
- Flow direction
- Compost filter berm

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Install compost erosion blanket – xx For details, see sht. FB-01*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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EROSION AND SEDIMENT CONTROL

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Erosion control matting
- Ordinary High Water
- Construction entrance
- Flow direction
- Compost filter berm
- Orange plastic fence (no work area)

1. Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket - xx For details, see sht. FB-01
3. Const. construction entrance - xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)
5. Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
6. Install orange plastic mesh fencing - xx

N

Extg. R/W

E PORT FWY (I-205)

"L" LINE

PACIFIC HWY (OR99E)

Parking mitigation

Perm. ease.

Ditch

ABERNETHY CREEK

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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EROSION AND SEDIMENT CONTROL

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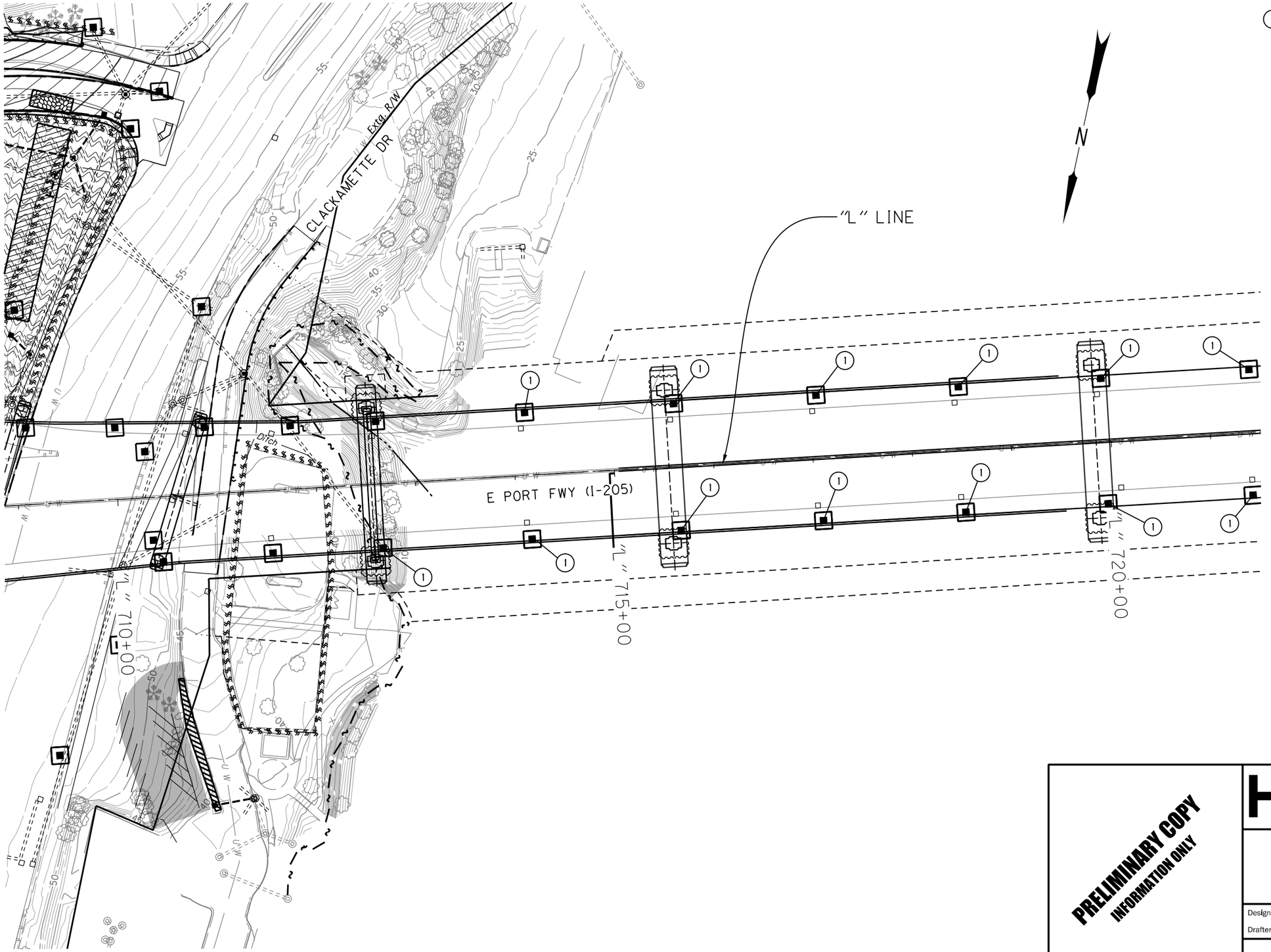
Rotation: 272.0412° 0'



(1) *Const. inlet protection – 25 (Type 3) (See drg. no. RD1010)*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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EE_K19786_HDR_ec01_phase 2.dgn :: FB17 6/25/2019 11:19:23 AM CDONOVAN
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Rotation: 198.3393° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

WILLAMETTE RIVER

N

"L" LINE

"Lc2" LINE

"Lc2" 730+00

For creek erosion control plans see Shts. FB21 - FB25.

Temp. ease. - Work area

Perm. ease.

Extg. R/W

E PORT FWY (I-205)

"D2" LINE

"D2" 725+00

"D2" 730+00

"L" 730+00

1. Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket - xx For details, see sht. FB-01
3. Const. construction entrance - xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Flow direction
- Wetland
- Construction entrance
- Ordinary High Water
- Orange plastic fence (no work area)
- Compost blanket
- Erosion control matting
- No work zone

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB18 6/25/2019 11:19:35 AM CDONOVAN

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Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 2

WILLAMETTE RIVER

N

1. Install matting - xx
   (Flexible channel liner, Type F)
   (See drg. no. RD1055)
2. Install compost erosion blanket - xx
   For details, see sht. FB-01
3. Const. construction entrance - xx
   (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx
   (See drg. no. RD1010)
5. Install sediment barrier - xx
   (Type 9)
   (See drg. no. RD1033)

Extg. R/W

"D2" LINE

"Lc2" LINE

"1" LINE

"C2" 735+00

"E3" LINE

"B4" LINE

"L2" 740+00

"OR43" LINE

OSWEGO HWY (OR43)

Ditch

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Compost filter berm
- Erosion control matting
- Orange plastic fence (no work area)
- Wetland
- Ordinary High Water
- Construction entrance
- Flow direction

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB19 6/25/2019 11:19:47 AM CDONOVAN

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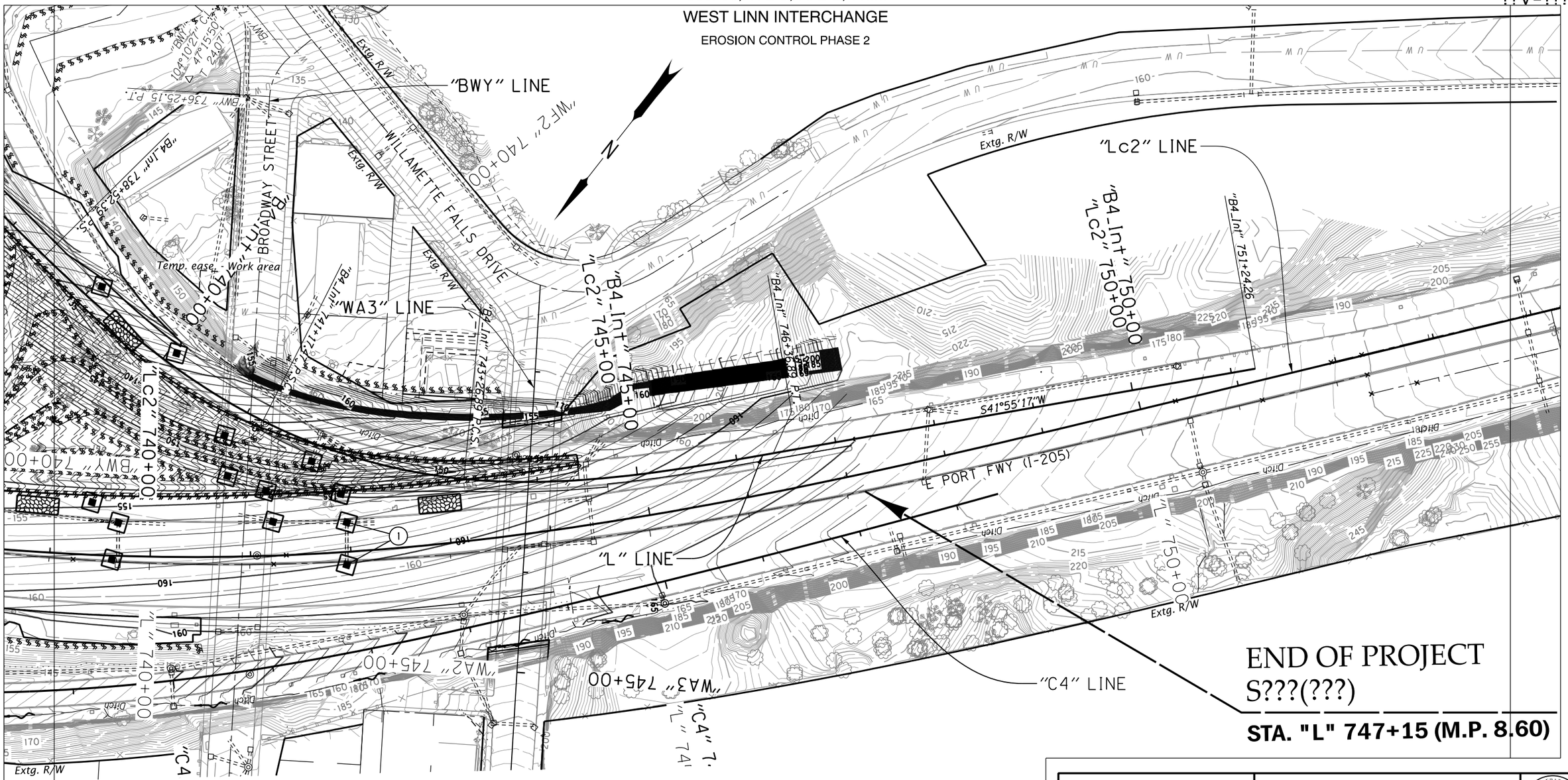
Rotation: 260.6437° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 2



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost blanket*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Construction entrance*
- *Flow direction*
- *Orange plastic fence (no work area)*
- *Erosion control matting*

(1) *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

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CLACKAMAS COUNTY

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Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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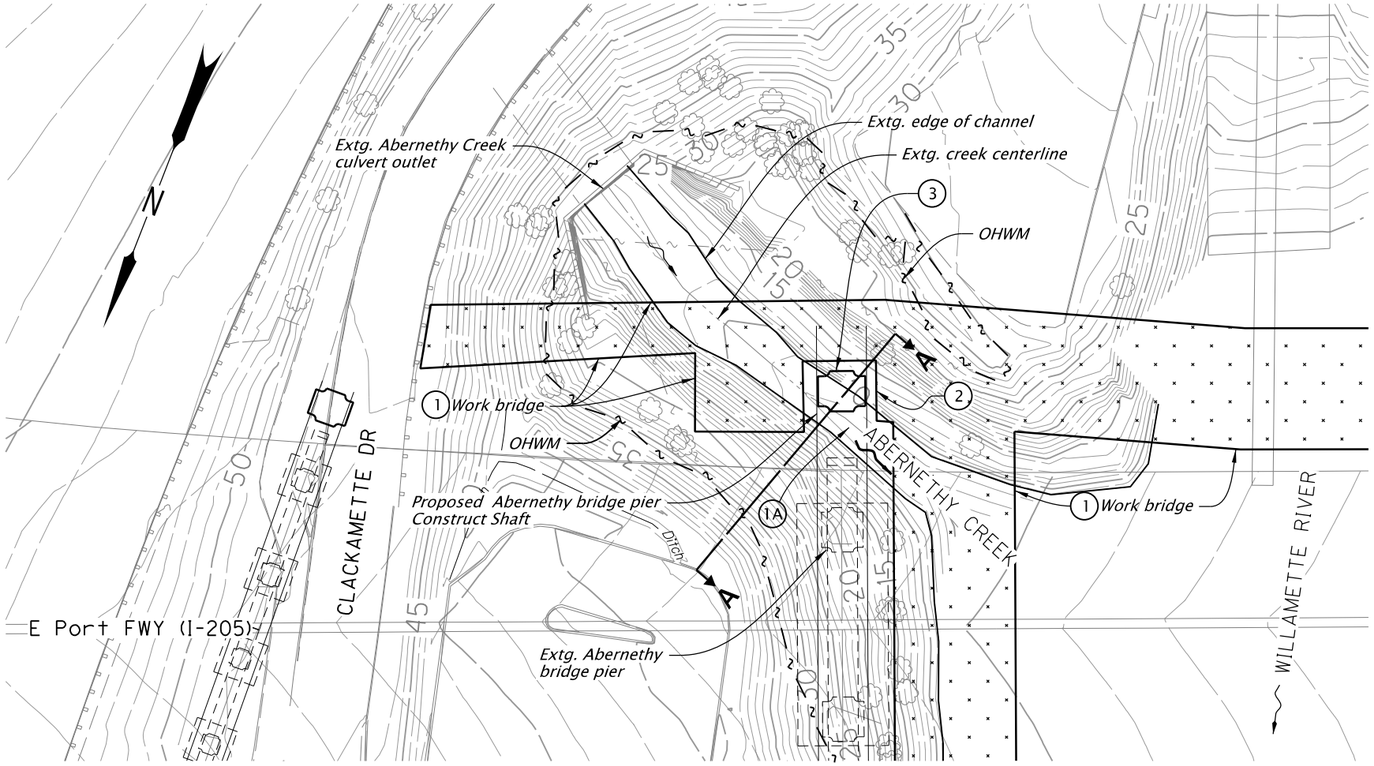
EE_K19786_HDR_ec01_phase 2.dgn :: FB20 6/25/2019 11:19:59 AM CDONOVAN

Rotation: 218.1362°

0'



Abernethy Creek - Phase 1
(In-water-work activity)
Construct temporary work bridge and Pier 3, south side.

CONSTRUCTION SEQUENCE

1A *Remove existing rip rap (as required)*
1 *Install temporary work bridge*
2 *Install temporary shoring at Pier 3*
3 *Construct shaft*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

See sht. FB 24 for section A-A.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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EROSION AND SEDIMENT CONTROL

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EE_K19786_HDR_ec02.dgn :: FB21 Phase 1 6/25/2019 11:20:04 AM CDONOVAN

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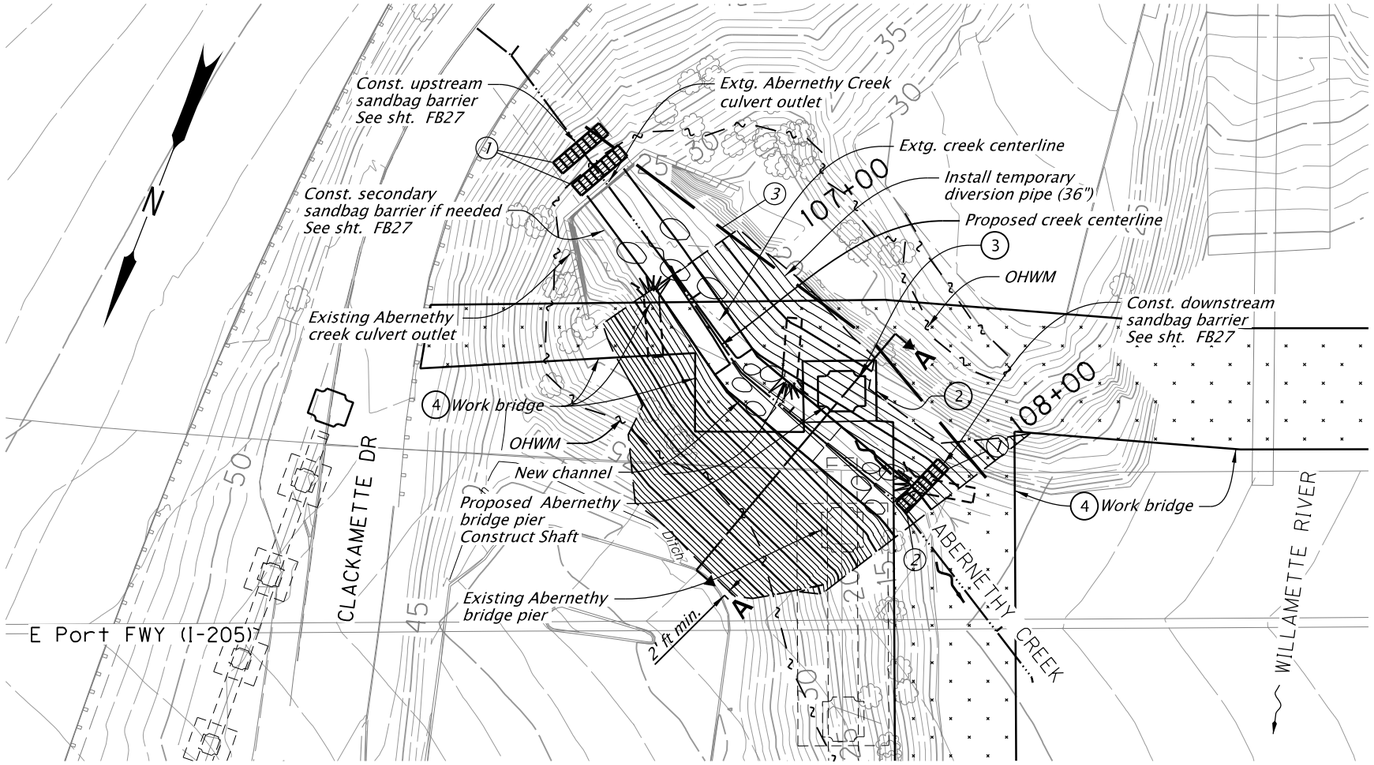

Abernethy Creek Construction - Phase 2A
(In-water-work)
Complete Pier 3 south side architetural treatment and channel restoration

CONSTRUCTION SEQUENCE

1. *Complete architectural finish on Pier 3 southern shaft*
2. *Install temporary diversion*
3. *Remove coffer dam at soutern shaft of Pier 3*
4. *Remove work bridge*
5a. *Realign Abernethy Creek*
5b. *Remove temporary water management features*
6. *Install channel restoration features*

FULL ISOLATION NOTES:

1. *Isolating the work site upstream: Install single primary sandbag barrier across the stream channel. If Needed, install secondary sandbag barrier. Downstream: Install sandbag barrier.*
2. *Install sandbag barrier downstream from work area. Location to be set based on topography and easements available.*
3. *Size the temporary water management facility based on site conditions. Route water around work area using pipe, pump or combination. The discharge table below can be used to estimate the size of the bypass pipe and/or pump.*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

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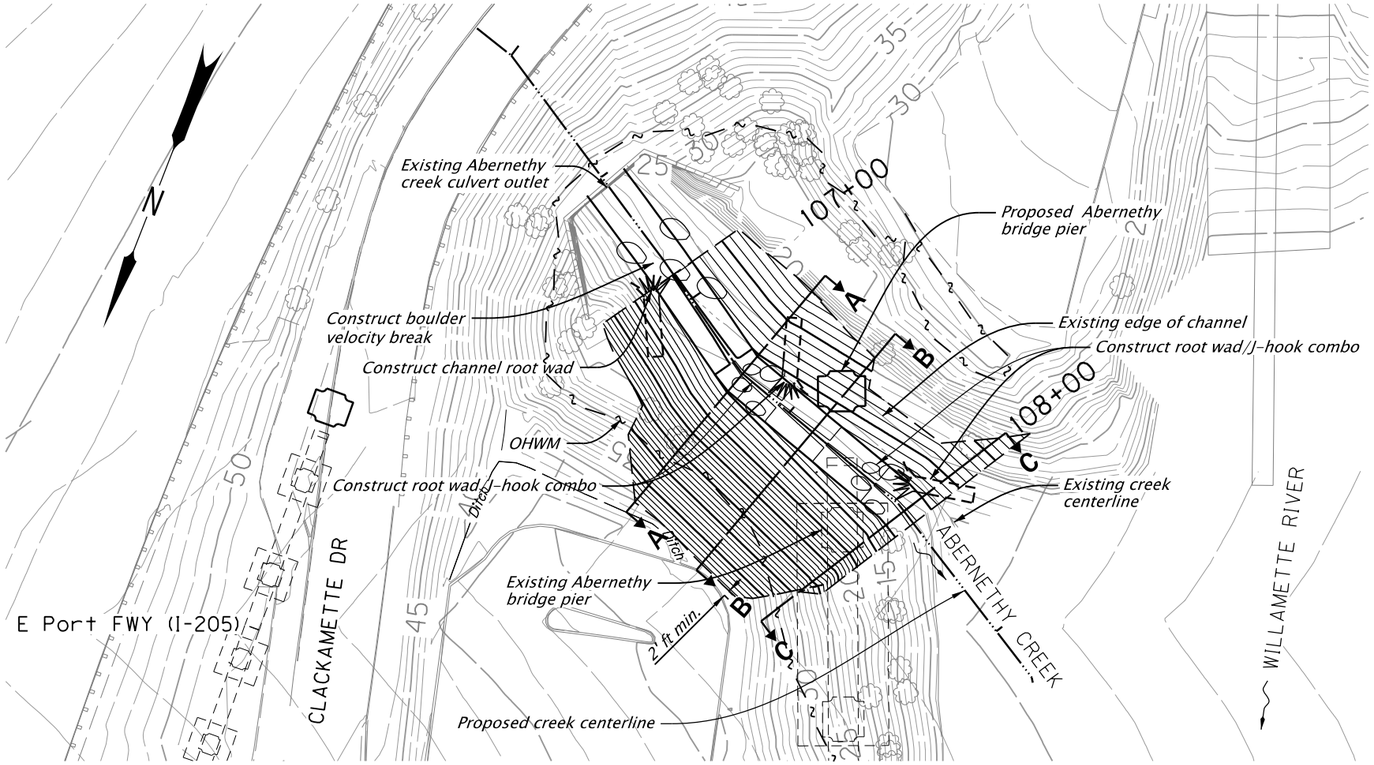
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec02.dgn :: FB22 Phase 2a 6/25/2019 11:20:05 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 201.4396 0'



Notes:
Root wad key pieces should be at least 22 inches in diameter and buried 10-15 feet.

Boulders and structure rocks should be greater than 30 inches in diameter.

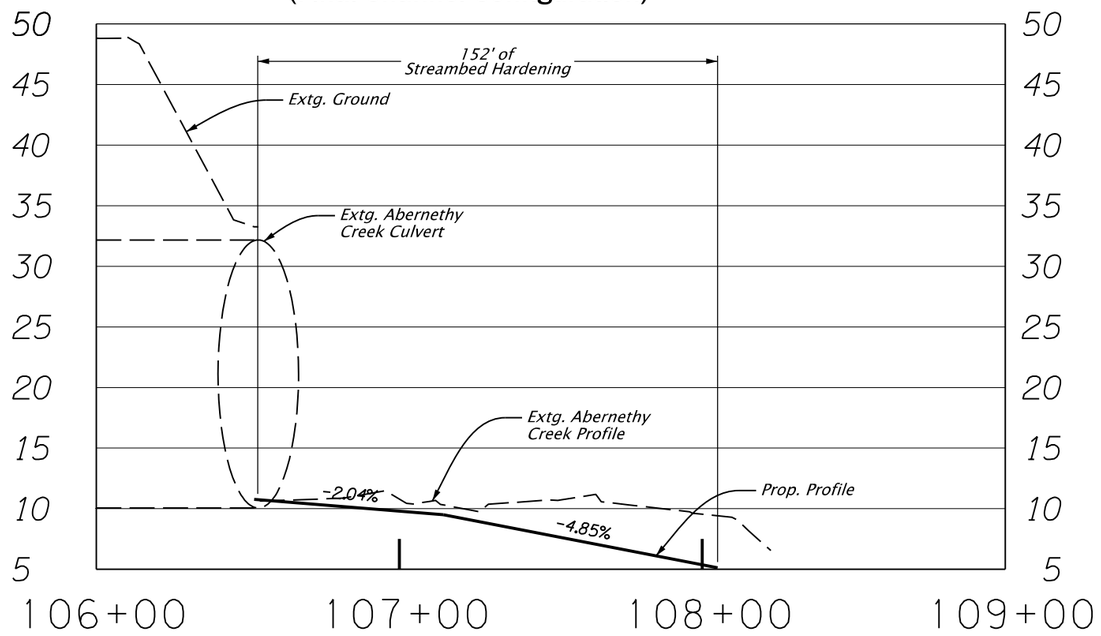
For root wad/J-hook combo, channel root wad, and boulder velocity break, see details XX, XX, and .

For section B-B, see sht. FB24. For section A-A and C-C, see sht. FB25.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

Abernethy Creek - Phase 2B
(Final Channel Configuration)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

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EE_K19786_HDR_ec02.dgn :: FB23 Phase 2b 6/25/2019 11:20:07 AM CDONOVAN

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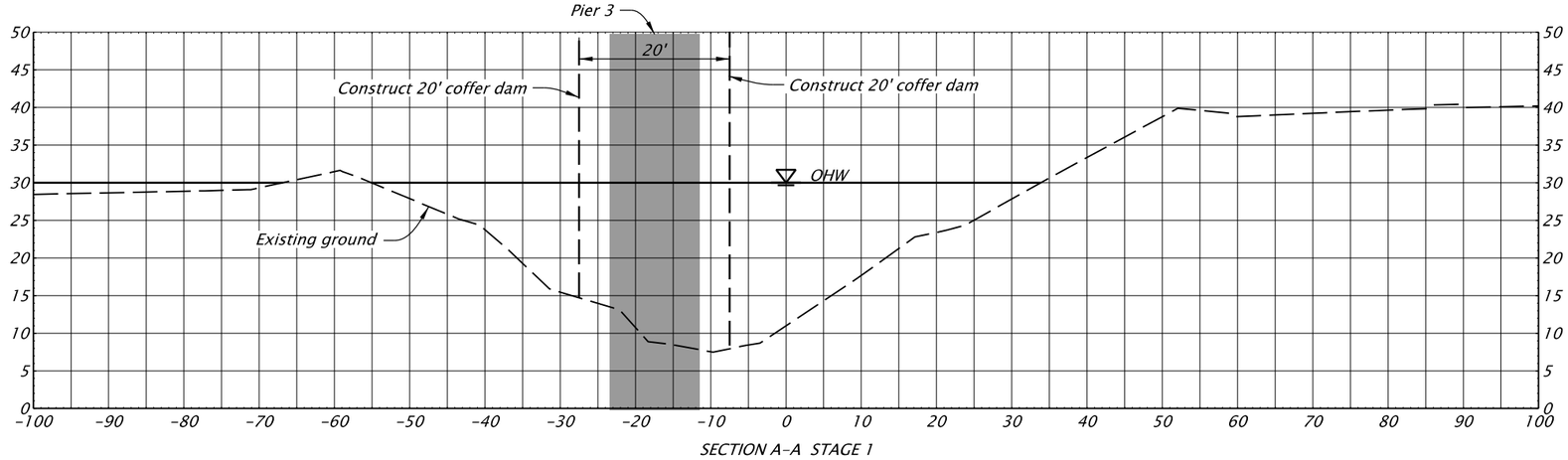
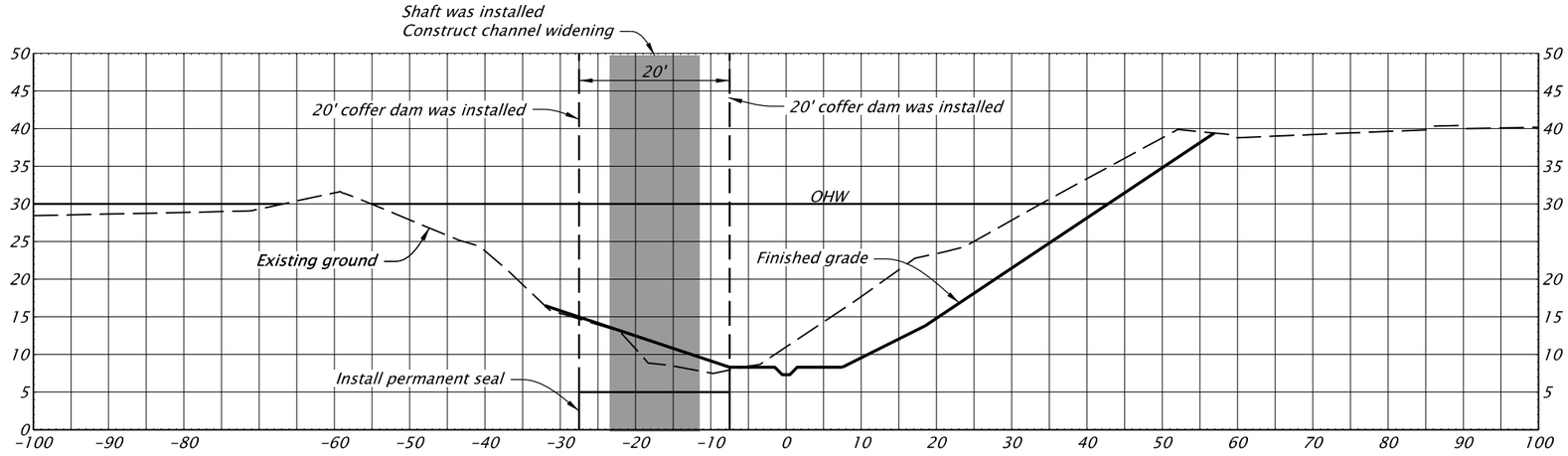


SECTION A-A STAGE 1

Stage 1:

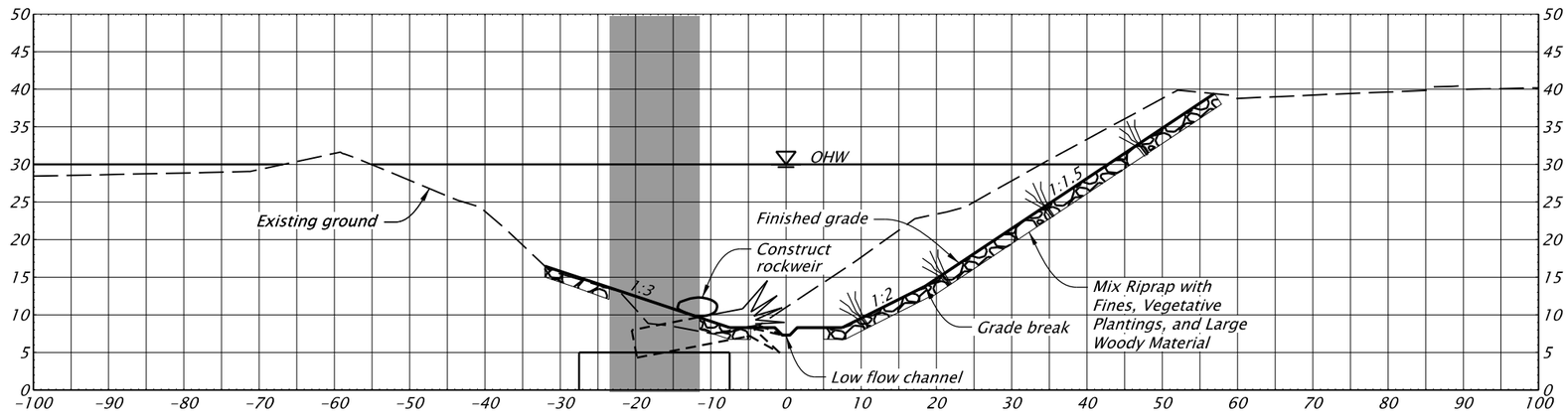
_ Construct shaft
_ Temporary coffer dam



SECTION A-A STAGE 2A

Stage 2A:

- Complete architectural treatment at Pier 3 (south side)
- remove coffer dam and temporary work bridge
- Construct Abernethy Creek channel realignment
- Complete final creek restoration



SECTION B-B STAGE 2B

Stage 2B:

- Complete final creek reconfiguration

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HDR ENGINEERING, INC
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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

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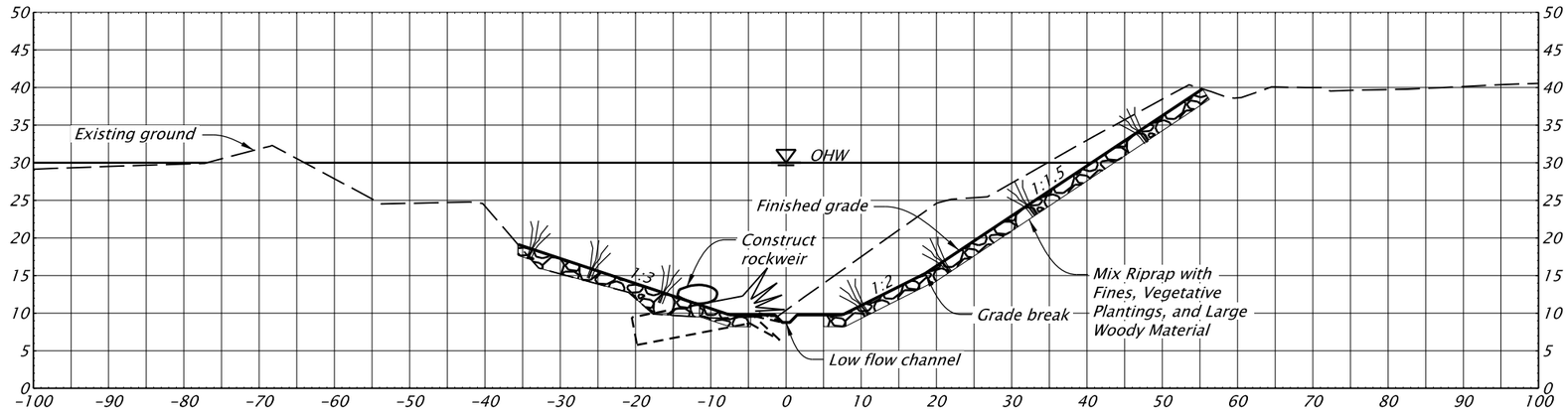
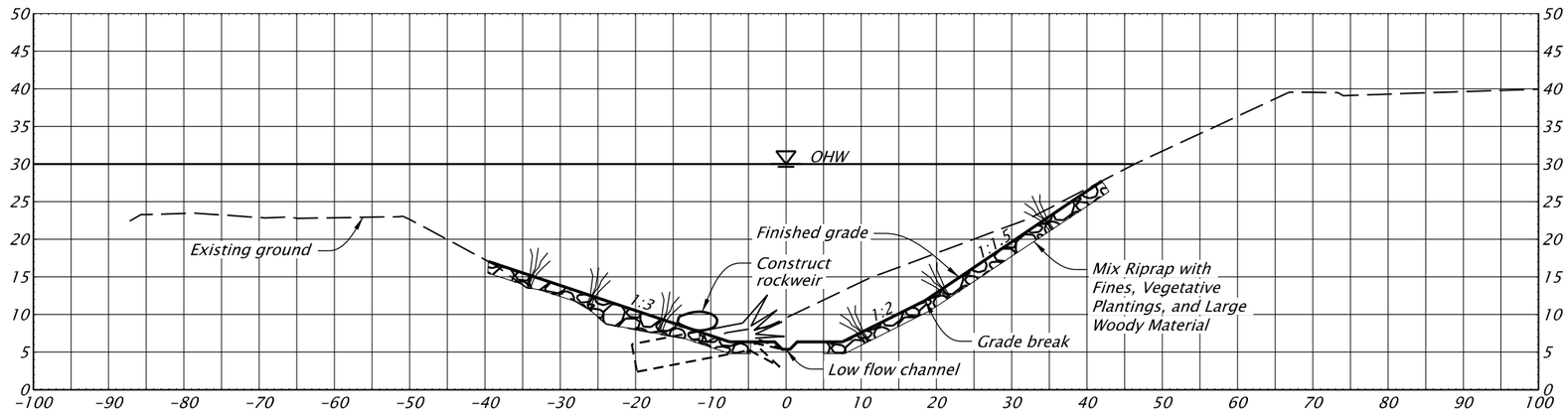


SECTION A–A STAGE 2B



SECTION C–C STAGE 2B

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EAST PORTLAND FREEWAY
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Designer: Harold Evers
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EROSION AND SEDIMENT CONTROL

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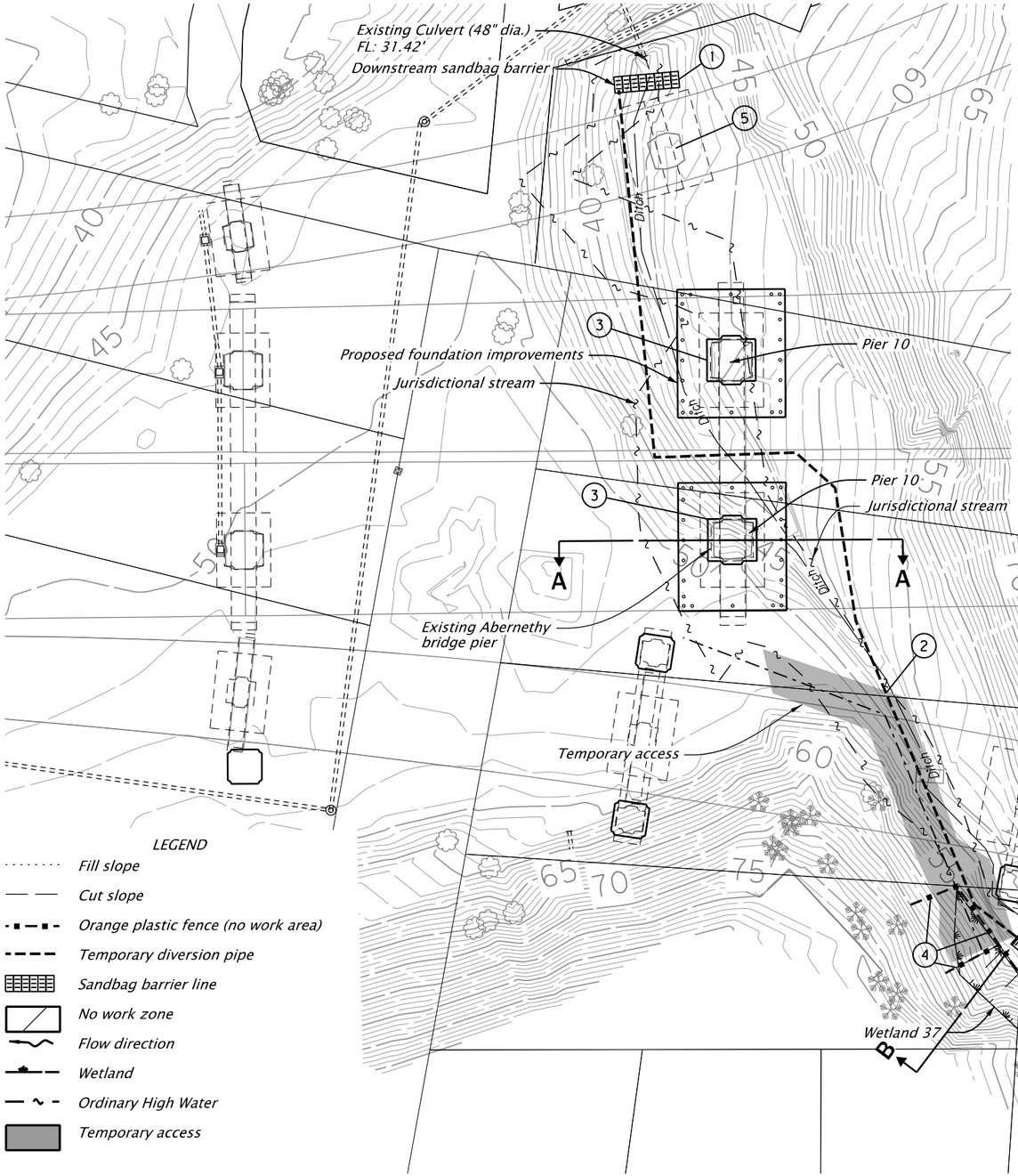
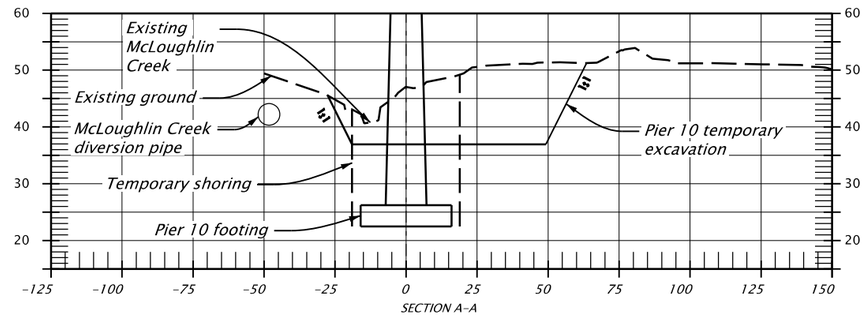
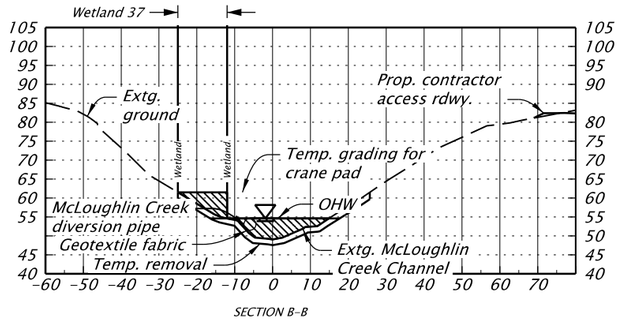
McLoughlin Creek - Phase 1
Construct temporary dike
(In-water-work activities)
Construct shaft







Note:

For additional erosion control details not shown, see FB27.

Work below OHW cannot exceed 18 months. Install and remove temporary water diversion during in-water work window.

1. *Install temporary BMPs and flow diversion*
2. *Install temporary diversion pipe (18" dia.)*
3. *Construct shaft*
4. *Install orange plastic fence (no work area)*
5. *Remove existing pile cap and bridge column*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
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EROSION AND SEDIMENT CONTROL

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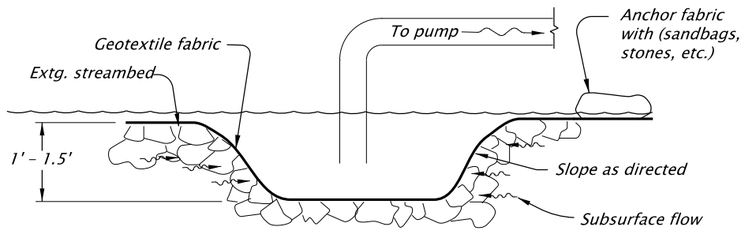
TEMPORARY WATER MANAGEMENT FACILITY



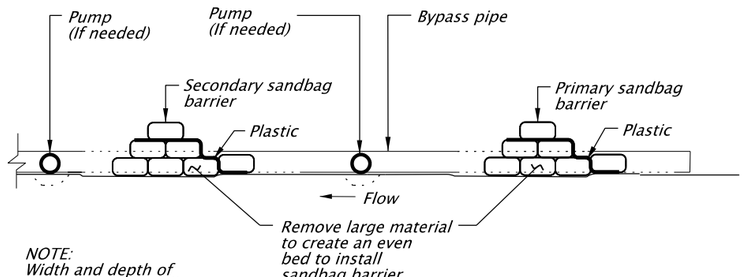
SUMP DETAIL
NTS

GENERAL NOTES:

The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.



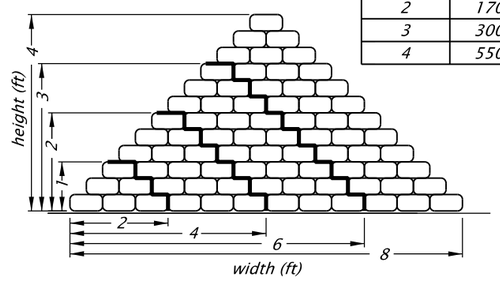
NOTE:
Width and depth of sandbag barrier will vary depending on site and stream flow conditions.

SANDBAG BARRIER SECTION

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500

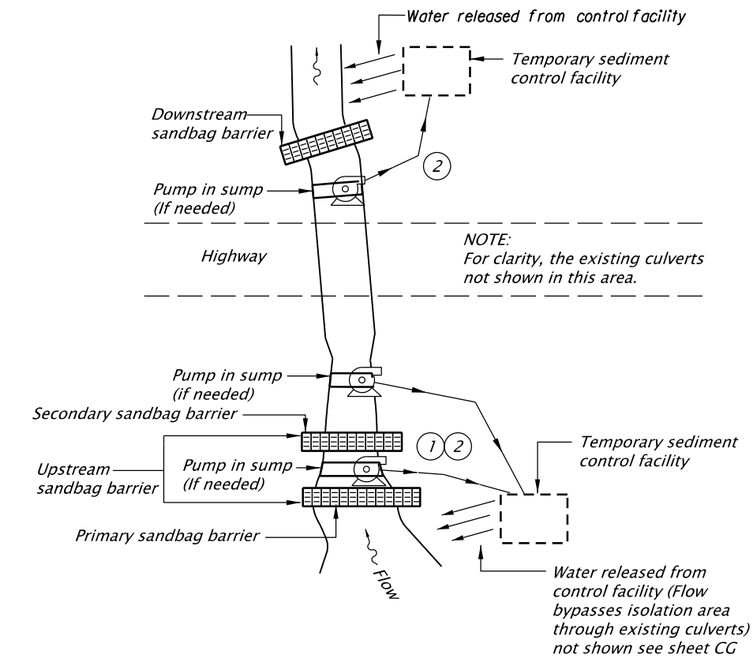


LEGEND:

Sandbag barrier line

Sediment control facility

Sump pump



COMBINED PUMP/GRAVITY BYPASS DETAIL
NTS

FULL ISOLATION NOTES:

(1) *See sheet FB22 note.*

(2) *See sheet FB22 note.*

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Attachment D. Geotechnical Report and Geologic Hazard Waiver Request

SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

August 28, 2019

Michael Bertram
HDR, Inc.
1001 SW 5th Avenue, #1800
Portland, Oregon 97204

RE: REVISED GEOTECHNICAL HAZARD ASSESSMENT OF
PROPOSED CONSTRUCTION AREA
I-205: STAFFORD ROAD TO OR99E WIDENING (K#19786)
CLACKAMAS COUNTY, OREGON

Dear Mr. Bertram:

This letter presents Shannon & Wilson, Inc.'s assessment of the geologic hazards that are expected to be encountered along the proposed construction area within Oregon City currently being considered by Oregon Department of Transportation (ODOT) as part of the I-205: Stafford Road to OR99E Widening Project. HDR, Inc. is the lead consultant for this project and contracted Shannon & Wilson to perform geotechnical services in accordance with Amendment No. 4 (B35005), dated November 1, 2018.

This letter summarizes the typical geology along the project alignment, known geologic hazards within the project area, and our justification for the waiver. The evaluations provided in this letter are based on a preliminary assessment of the geologic hazard maps and our field investigation for the project. The proposed project area is shown on Figure 1, Vicinity Map. The maps, designated Figure 2, Sheets 1 through 6, are included with this letter. The maps include the geologic hazard overlay obtained from the City of Oregon City GIS Department on August 2, 2019. The approximate locations of relevant geotechnical borings are also shown on Figure 2 for reference.

Shannon & Wilson has prepared two reports that discusses the design for the impacted bridges and construction considerations for these structures in Oregon City and have been provided to ODOT for review:

- Draft Geotechnical Engineering Report, I-205: Stafford Road to OR 99E Widening, Abernethy Bridge (Key #19786), Clackamas County, Oregon, dated June 28, 2019.
- Draft Geotechnical Report, I-205: Stafford Road to OR 99E Widening, Main Street Bridge (09702), Clackamas County, Oregon, dated June 17, 2019.

3990 Collins Way ■ Suite 100 ■ Lake Oswego, Oregon 97035-3437 ■ 503 210-4750
■ www.shannonwilson.com ■

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Shannon & Wilson is also preparing a report to discuss the design for several retaining walls and embankment fill and identifies construction considerations for the design:

- Draft Geotechnical Report, I-205: Stafford Road to OR 99E Widening, Retaining Walls and Embankment Fill (K#19786 and 21401), Clackamas County, Oregon

These reports will be referred to in the letter as the *I-205 60% Design Reports*.

GEOLOGY AND SEISMIC SETTING

Regional Geology

The project area within Oregon City is located in the Portland Basin. The most prevalent basement rock of the Portland Basin is a sequence of lava flows of the Columbia River Basalt Group (CRBG), which flowed into the area between about 17 million and 6 million years ago (Beeson and others, 1991). Columbia River Basalt Group flows also underlie the hillsides that border the I-205 alignment north and west of the Willamette River (Madin, 2009; Schlicker and Finlayson, 1979).

The Columbia, Willamette, and Clackamas Rivers converge within the Portland Basin and, with their tributaries, have contributed to an extensive sedimentary fill that overlies the basement rock formations. These basin-fill sediments range in age from approximately 6 million years to the present. Late Miocene to Pliocene-age (6 million- to 2.6-million-year-old) sedimentary units (greater than 2.6 million years old) within the project area include the Troutdale Formation (Mudstone and Siltstone Member). The Troutdale Formation Mudstone and Siltstone Member in the Oregon City area predominantly consists predominantly of sandstone, siltstone, and mudstone.

Toward the end of the Pleistocene, a tremendous load of sediment was deposited in the Portland Basin, Tualatin Basin, and Willamette Valley by a series of catastrophic glacial outburst floods. During the late stages of the last great ice age, between about 18,000 and 15,000 years ago, a lobe of the continental ice sheet repeatedly crossed and dammed the Clark Fork River in western Montana, which then formed an immense glacial lake called Lake Missoula (Allen and others, 2009). Periodically, the ice dam was breached and flood waters from Lake Missoula flowed southwest across portions of eastern Washington and into the Columbia River drainage. Forty or more repetitive outburst floods have been documented (Allen and others, 2009). These repeated floods are collectively referred to as the Missoula Floods.

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Missoula flood waters were channeled through the Columbia River Gorge and then spread out over the Portland Basin. Missoula flood waters scoured off thick soil deposits along high energy channels that connected the Portland Basin with the Tualatin Basin and Willamette Valley. One of these channels is located along the Willamette River between Oregon City and West Linn (Allen and others, 2009).

The Missoula Flood deposits are divided into three facies: Fine-Grained Facies, Coarse-Grained Facies, and Channel Facies (Beeson and others 1989, 1991; Madin 1990). Only the Fine-Grained Facies of the Missoula flood deposits, consisting of layered silt and sand beds, have been mapped in the project area (Madin, 2009).

During and after the Missoula Floods, rivers, streams, and wind have moved and deposited surficial sediment throughout the Portland and Tualatin Basins. In more recent times, humans have changed the landscape, grading cuts and fills for development.

Seismic Setting

Shallow crustal earthquakes within the North American Plate have historically occurred in a diffuse pattern within Pacific Northwest, typically within the upper 4 to 19 miles of the continental crust. Mabey and others (1993) concluded from their analysis of local geologic features that a crustal earthquake of up to Mw 6.5 could occur virtually anywhere in the Portland area. Based on their fault model, Wong and others (2000) determined that an earthquake of up to Mw 6.8 is possible on the Portland Hills Fault, which is mapped within 2.4 miles of the project area. The largest known crustal earthquake in the Pacific Northwest is the 1872 North Cascades earthquake at approximate Mw 6.5 to 7.0. Other examples include the 1993 Mw 5.6 Scotts Mill earthquake and the 1993 Mw 6.0 Klamath Falls earthquake.

Shallow crustal faults and folds throughout Oregon and Washington have been located and characterized by the United States Geological Survey (USGS). The USGS provides approximate fault locations and a detailed summary of available fault information in the USGS Quaternary Fault and Fold Database. The database defines four categories of faults, Class A through D, based on evidence of tectonic movement known or presumed to be associated with large earthquakes during Quaternary time (within the last 2.6 million years). For Class A faults, geologic evidence demonstrates that a tectonic fault exists and that it has likely been active within the Quaternary period. For Class B faults, there is equivocal geologic evidence of Quaternary tectonic deformation, or the fault may not extend deep enough to be considered a source of significant earthquakes. Class C and D faults lack

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convincing geologic evidence of Quaternary tectonic deformation or have been studied carefully enough to determine that they are not likely to generate significant earthquakes.

Potential Seismic Hazards

According to the USGS Quaternary Fault and Fold database (USGS, 2017), there are surface traces of four Class A features within approximately 6 miles of the project site:

- The Oatfield Fault, USGS Fault No. 875, is located approximately 1.28 miles from the project site with a Slip Rate Category < 0.2mm/yr and most recent deformation occurring < 1.6 Ma;
- The Portland Hills Fault, USGS Fault No. 877, is located approximately 2.0 miles from the project site with a Slip Rate Category < 0.2mm/yr and most recent deformation occurring < 1.6 Ma;
- The Damascus-Tickle Creek Fault Zone, USGS Fault No. 879, is located approximately 4.0 miles from the project site with a Slip Rate Category < 0.2mm/yr and most recent deformation occurring < 750 ka; and
- The Canby-Molalla Fault, USGS Fault No. 716, is located approximately 5.1 miles from the project site with a Slip Rate Category < 0.2mm/year and most recent deformation occurring < 15 ka.

The Cascadia Subduction Zone itself is mapped approximately 137 miles west of the project area, with an average slip rate of approximately 40 millimeters (~1.5 inches) per year and the most recent deformation occurring about 300 years ago (Personius and Nelson, 2006).

SUBSURFACE CONDITIONS

Geotechnical Soil Units

The construction for this project will take place in Oregon City from the Abernethy Bridge to the OR213 overcrossing.

We grouped the materials encountered in our project area field explorations into 10 geotechnical units. Our interpretation of the subsurface conditions is based on the explorations, historic borehole data, and regional geologic information from published sources. The geotechnical units are as follows (USCS group symbols are provided in parentheses for respective soil types):

- **Fill:** highly variable mixture of loose to very dense gravel and sand with variable amounts of stiff to very stiff silt and clay, and cobbles and boulders (GP, GM, GC, GP-

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GM, SM, SP-SM, SC); lesser layers of clay (CH, CL) and silt (ML); cobbles are common; trace organics;

- **Sand Alluvium:** very loose to very dense Sand and Silty Sand (SP, SM), Sandy Silt (ML), and Sand with some silt (SP-SM), Silty Gravel (GM), trace organics and scattered thin gravely lenses;
- **Gravel Alluvium:** loose to very dense Sandy Gravel with silt and with cobbles (GP-GM) and Gravel with some sand with cobbles and boulders (GP); occasional gravelly, silty, or clayey Sand (SM, SC, SW-SM), occasional Silt or Silty Clay (ML, CL); weakly cemented layers; trace organics (wood); open gravel and cobble zones with little matrix material;
- **Fine-Grained Alluvium:** very soft to very stiff Silt with trace to some sand (ML), Silty Clay (CL), Clayey Silt (MH), Sandy Silt (ML), Silt (ML), and Silty Clay with some sand (CL), Sandy organic clayey Silt (OH), Sand with some Silt (SP-SM); Silty Sand (SM) interbeds; trace organics and scattered thin gravel lenses;
- **Missoula Flood Deposits - Fine**: loose to medium dense / medium stiff to very stiff Silty Sand, Sandy Silt, Silt, and Silty Clay with variable amounts of sand (SM, ML, CL);
- **Missoula Flood Deposits -** Coarse: very dense Sandy clayey Gravel with cobbles (GC);
- **Troutdale Formation Mudstone and Siltstone Member:** very stiff to hard Clay with trace sand (CL, CH) and Sandy Silt (ML); contains decomposed relict coarse sand grains;
- **Decomposed Basalt:** stiff to very hard mixtures of Clay and Silt with variable amounts of sand and gravel (MH, ML, CH, CL); lesser amounts of medium dense to very dense Silty Sand (SM) and Clayey Silty Sand (SM); visible decomposed relict rock structure, including joint surfaces, interflow breccia, and phenocrysts; multi-colored;
- **Weathered Basalt:** moderately weathered to predominantly decomposed, extremely soft to medium hard (R0-R3) Basalt; and
- **Basalt:** Fresh to slightly weathered (occasionally moderately weathered), very soft to very hard (R1 to R5) Columbia River Basalt Group flow rock; flow contact zones are commonly more weathered and softer; basalt flow tops are vesicular, oxidized, and often overlain by a thin basalt breccia; flow bottoms also show vesicular texture, but the zone of vesicularity is thinner than at the flow top.

Groundwater

The geotechnical borings performed by Shannon & Wilson for this project were drilled using mud rotary drilling techniques, which make it difficult to discern depth to groundwater, if it is encountered, due to the use of drilling fluid in the boreholes. Groundwater measurements made at the OR 99E on-ramp retaining wall and the east

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abutment of Abernethy Bridge, indicate the groundwater table was located at approximately elevation of 13 feet and 10 feet at those locations, respectively.

Groundwater levels at the project site should be expected to vary with topography, seasonally, and with changes in precipitation. Zones of perched water are likely to be encountered above fine-grained layers. Locally, groundwater highs typically occur in the late fall to spring and groundwater lows typically occur in the late summer and early fall.

KEY GEOTECHNICAL ISSUES

The key geotechnical issues addressed for the project construction in our I-205 60% Design Reports are outlined below:

Earthquake-Induced Geologic Hazards

Based on the on our investigation, we evaluated the potential for earthquake-induced geologic hazards, including liquefaction and associated effects such as lateral spreading, liquefaction-induced settlement, slope instability, and ground surface fault rupture. Figure 2 shows the proposed project footprint and the Oregon City Geologic Hazard Overlay District, which is comprised of slopes greater than 25 percent and a slope buffer of 50 feet. The liquefaction and landslide susceptibility maps indicate the relative susceptibility (moderate, high, or very high) between different mapped areas. During our investigation we evaluated the slope stability of the riverbank at the Abernethy Bridge Site and concluded that during a seismic event lateral spreading could occur in the direction of the Willamette River. Shannon & Wilson has recommended ground improvement and provided seismic mitigation alternatives near the Abernethy Bridge Site to control slope stability along the riverbank.

Most faults that are located near the project site have not shown evidence of activity in the Quaternary period, within the last 1.8 million years, and it is our opinion that the risk of fault rupture along these faults is relatively low.

Unstable Slopes (Static)

DOGAMI mapping indicates the slopes in this area generally have moderate to high susceptibility for slope failure; however, Shannon & Wilson evaluated the static slope stability specific to the areas that will be impacted by construction and do not have concerns about this geological hazard during the construction. This area does have seismic hazards along the Willamette River. Please refer to the Earthquake-Induced Geologic Hazards

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Section above for seismic slope instability. Within the project alignment, seismic mitigation solutions are developed for this project.

Our design of the bridges, retaining walls, and embankments through this area have factored in the slope instability concerns and we have provided construction considerations in the areas where the design is impacted. Project areas that exist within the area of unstable slopes are addressed in the I-205 60% Design Reports.

SUMMARY OF GEOTECHNICAL DESIGN RECOMMENDATIONS

Based on our field investigation, Shannon & Wilson provided design recommendations in the I-205 60% Design Reports for the following structures:

- Abernethy Bridge
- Main Street Bridge
- Wall A1 (Main Street)
- Roadway Embankment Widening

The sections below describe our overall design recommendation at each structure.

Abernethy Bridge

Foundation recommendations for the retrofit/widening and seismic mitigation design were selected for each pier based on the results of field exploration, identified geologic hazards, in situ testing, and laboratory testing program in conjunction with relations presented in the AASHTO LRFD Bridge Design Specifications (BDS) and our engineering judgment and experience. The retrofit and widening strategy described in this section is the result of an interactive design process which included analysis of several superstructure, foundation, and ground improvement alternatives. This process is ongoing, and the recommendations provided in this section are subject to change.

The proposed new foundations consist of 6- to 12-foot-diamter drilled shafts that are bearing in rock. Exhibit 1 presents a summary of drilled shaft diameters, lengths, and tip elevations at each pier location. The shaft lengths and tip elevations are preliminary, and generally correspond to the base of shaft embedded 2 feet into intact Basalt. illustrates the drilled shaft layout proposed by the design team for widening and retrofit at Piers 1 through 4. See Figure 2 for the locations of the piers along the Abernethy Bridge Structure. Piers 1 through 3 are in a Geologic Hazard Overlay District for steep slopes as shown in the

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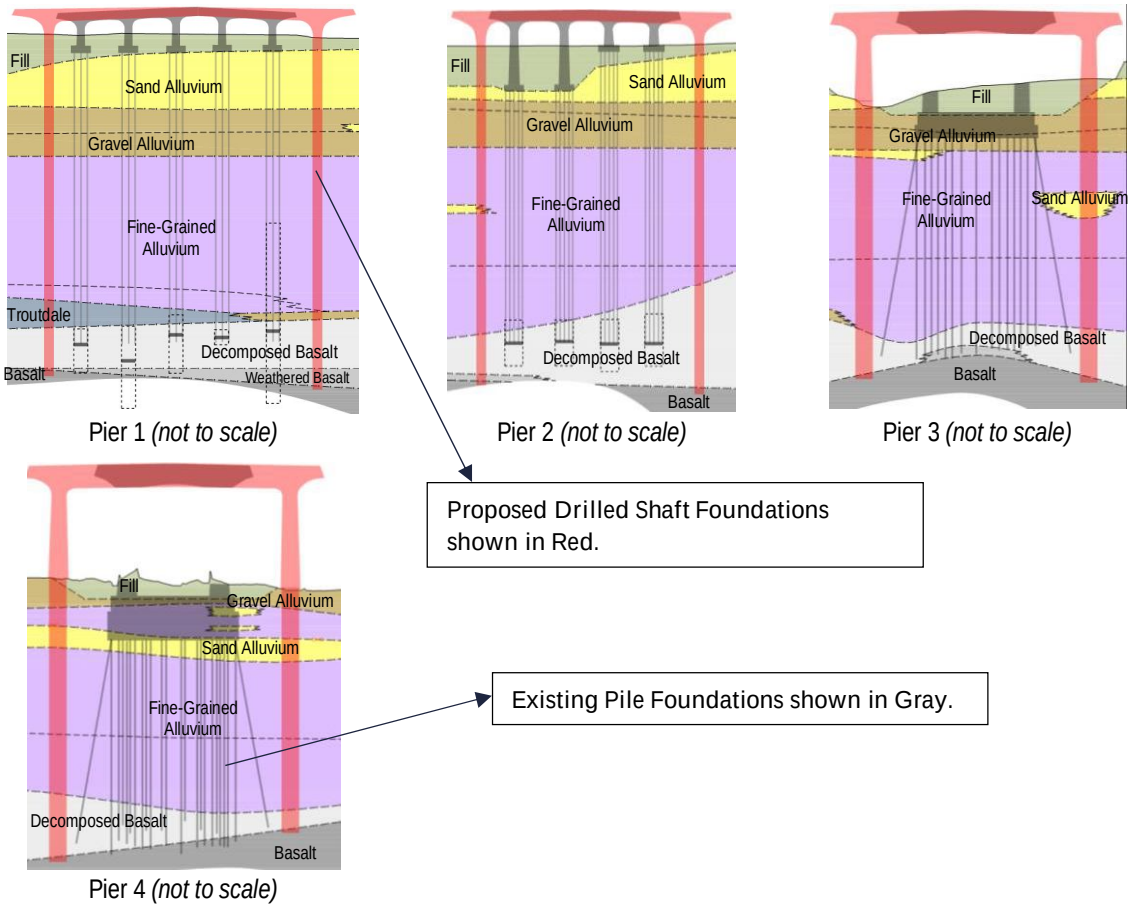
Geologic Hazard Map, Figure 2. The piers will be constructed to maintain slope stability at this location, and it will not affect the existing geologic hazard.

Exhibit 1: Summary of Drilled Shaft Dimensions by Pier

Location	Diameter	Length	Tip Elevation (NAVD 88)
Pier 1 Left	6 ft	222 ft	-164 ft
Pier 1 Right	6 ft	230 ft	-174 ft
Pier 2 Left	6 ft	225 ft	-177 ft
Pier 2 Right	6 ft	232 ft	-182 ft
Pier 3 Left	12 ft	186 ft	-177 ft
Pier 3 Right	12 ft	205 ft	-178 ft
Pier 4 Left	12 ft	194 ft	-175 ft
Pier 4 Right	12 ft	164 ft	-175 ft

Exhibit 2: Illustrations of Proposed Drilled Shaft Foundations for Retrofit and Widening at Piers 1 through 4 and Associated Geologic Contacts. See Figure 2 for Locations of the Piers.



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Ground Improvement

The results of the seismic hazard evaluation indicate that seismic hazard ground improvement mitigation at the east river bank in Oregon City will be needed to achieve the required performance criteria of the large diameter drilled shafts located at the riverbank and river channel due to lateral spreading, and flow failure. To mitigate these hazards, we considered a variety of ground improvement alternatives such as jet grouting, stone columns, and cement deep soil mixing. Ground improvement is planned between Piers 2 and 3. These ground improvement methods contribute to improving performance of the slope by reinforcing the lateral spreading zones to alter the properties of the soil and reduce ground slope lateral movement during the design seismic events. On the riverbank, neither stone column nor cement deep soil mixing can operate in the low overhead area between Piers 2 and 3; and these two ground improvement methods would not be effective at penetrating through dense to very dense gravel alluvium. Therefore, jet grouting is the only feasible option for ground improvement under the east side of the bridge. The ground improvement zone will extend from elevation -20 feet to elevation -100 feet. The ground improvement will be constructed to maintain slope stability at this location, and it will not affect the existing geologic hazard.

Main Street Bridge

We understand the seismic performance of the existing bridge foundations is inadequate for supporting the seismic retrofit and widening design loads. Based on our seismic hazard evaluation and Quincy's evaluation of the seismic performance of the existing bridge foundations, seismic mitigation and retrofit are required at the existing bridge foundations due to inadequate pile lateral strength and uplift resistance. We have recommended an array of 10.75-inch-diameter micropiles (two rows on both east and west side of pile cap with pier wall through the middle) between each of the existing timber pile group foundations. Micropiles should have a minimum bond length of 10 feet in the Gravel Alluvium. Main Street Bridge are in a Geologic Hazard Overlay District for steep slopes as shown in the Geologic Hazard Map, Figure 2. The micropiles will be constructed to maintain slope stability at this location, and it will not affect the existing geologic hazard.

Temporary Shoring and Cut-and-Fill Slopes

Temporary Shoring will be required in order to install the micropiles and enlarge the existing pile caps. The temporary shoring will allow for excavation of the existing slope between Bent 1 and Bent 2, and the slope between Bent 3 and Bent 4. The shoring will retain the soils in front of Bent 1 and Bent 4 and will protect the bridge abutments during the

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bridge foundation retrofit construction. In general, due to vertical constrains, sheet pile or soldier pile walls may be difficult to construct. The temporary shoring and cut-and-fill slopes will be constructed to maintain slope stability at this location during construction, and it will not affect the existing geologic hazard.

Wall A1 (Main Street)

The site for the proposed retaining wall is located along the slope between the OR99E on-ramp to northbound I-205 and Main Street, as shown on the Geologic Hazard Map, Figure 2. An existing retaining wall, which we understand to be a cast-in-place (CIP) semi-gravity wall, is located adjacent to the sidewalk along southbound Main Street at the base of the overlying slope. We estimate that the existing retaining wall is approximately 300 feet long, with a height up to about 7 feet, estimated from the top of the wall to the existing sidewalk grade. The ground surface above the existing retaining wall extends at approximately a 2H:1V (Horizontal:Vertical) slope up to about 30 feet above Main Street, before leveling out at the existing OR99E on-ramp roadway.

A soldier pile wall is the preferred design alternative to retain the additional fill material to be placed for the realignment of the OR99E on-ramp to northbound I-205, adjacent to Main Street. Wall A1 will be located part way up the slope between Main Street and the proposed OR99E on-ramp alignment and behind the existing retaining wall structure located along the sidewalk of southbound Main Street. The wall was evaluated assuming that future work along Main Street may remove the existing CIP wall and retained material up the face of Wall A1. If this work is performed in the future, a row of tiebacks may be required some distance below the deadman anchors. We understand the retained backfill behind the wall will be at 1.5H:1V. The minimum recommended embedment for the soldier piles is 10 feet below the existing grade of Main Street. We recommend the soldier pile tip be located no closer than 5 feet above the top of the existing culvert, which we understand is approximately 15 to 20 feet below the existing roadway grade of Main Street. Retaining Wall A1 is in a Geologic Hazard Overlay District for steep slopes as shown in the Geologic Hazard Map, Figure 2. The wall will be constructed to maintain slope stability at this location, and it will not affect the existing geologic hazard.

Roadway Embankment Widening

Additional embankment fill will be required on the east side of the existing northbound I-205 roadway to accommodate the roadway widening between Main Street and OR213. The maximum thickness of the proposed embankment fill is approximately 8 feet, and the

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maximum embankment slope is 1.5H:1V. We assumed the embankment will be constructed using ODOT Stone Embankment Material meeting ODOT OSSC, Section 00330.16.

The proposed embankment fill designed will satisfy the minimum slope stability FS requirements for long-term and short-term static loading conditions. The roadway embankment widening is in a Geologic Hazard Overlay District for steep slopes as shown in the Geologic Hazard Map, Figure 2. The widening will be constructed to maintain slope stability at this location, and it will not affect the existing geologic hazard.

WAIVER JUSTIFICATION

Per our construction recommendations presented in our I-205 60% Design Reports and summarized herein, we do not anticipate that there will be an impact to the known geologic hazards specified in this letter. In addition, we do not think other geologic hazards will be created due to construction activities during the construction of the project. Based on our findings, we do not think there needs to be a geologic hazards review and ODOT requests a Geological Hazard Waiver for this project.

LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they reportedly exist, and further assume that the information included on the drawings is representative of the subsurface conditions throughout the site; that is, the subsurface conditions everywhere are not significantly different from those inferred from the drawings. For previous explorations, we did not review soil samples and cannot confirm that these previous explorations are representative of the site conditions. The analysis, conclusions, and recommendations contained in this report are also based on the available as-constructed structure information.

Our evaluations were performed for preliminary design purposes and should not be relied upon for final design or construction. Additional explorations are required to develop final design recommendations for this project.

Within the limitations of scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at the time this report was prepared. We make no other warranty, either express or implied. These conclusions and recommendations were based on our understanding of the project as described in this report and the site conditions interpreted from the drawings.

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This report was prepared for the exclusive use of Oregon City and HDR, Inc., and their design team in the design of the I-205: Stafford Rd to OR99E Corridor Widening project. Our report, conclusions, and interpretations should not be construed as a warranty of subsurface conditions, such as those interpreted from the drawings, and discussions of subsurface conditions included in this report.

The scope of our present work did not include environmental assessments or evaluations regarding the presence or absence of wetlands, or hazardous or toxic substances in the soil, surface water, groundwater, or air, on or below or around this site, or for the evaluation or disposal of contaminated soils or groundwater should any be encountered.
Please read the Important Information section at the back of this report to reduce your project risks.

Sincerely,

SHANNON & WILSON

Christina Villeneuve, GIT
Geology Staff

Risheng "Park" Piao, PE, GE
Vice President | Geotechnical Engineer

CLV:JJW/las

Enc. Figure 1 – Vicinity Map
Figure 2 – Geologic Hazard Map
Important Information about your Geotechnical/Environmental Report

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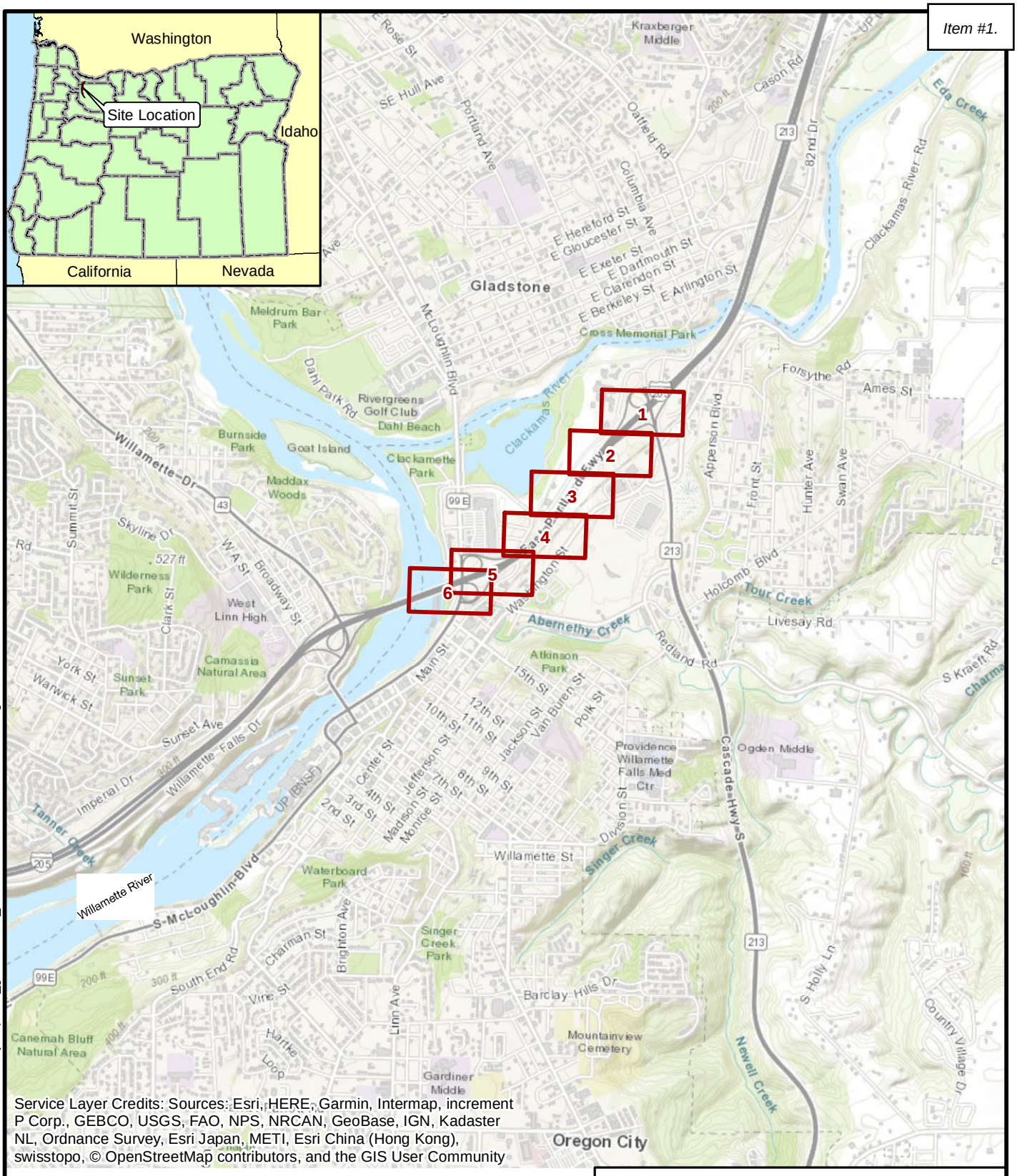

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0 0.25 0.5 1

Scale in Miles

LEGEND

Figure 2 Sheets

I-205: Stafford Road to OR99E Widening
Oregon City Geologic Hazards
Clackamas County, Oregon

VICINITY MAP

August 2019 24-1-04165-008

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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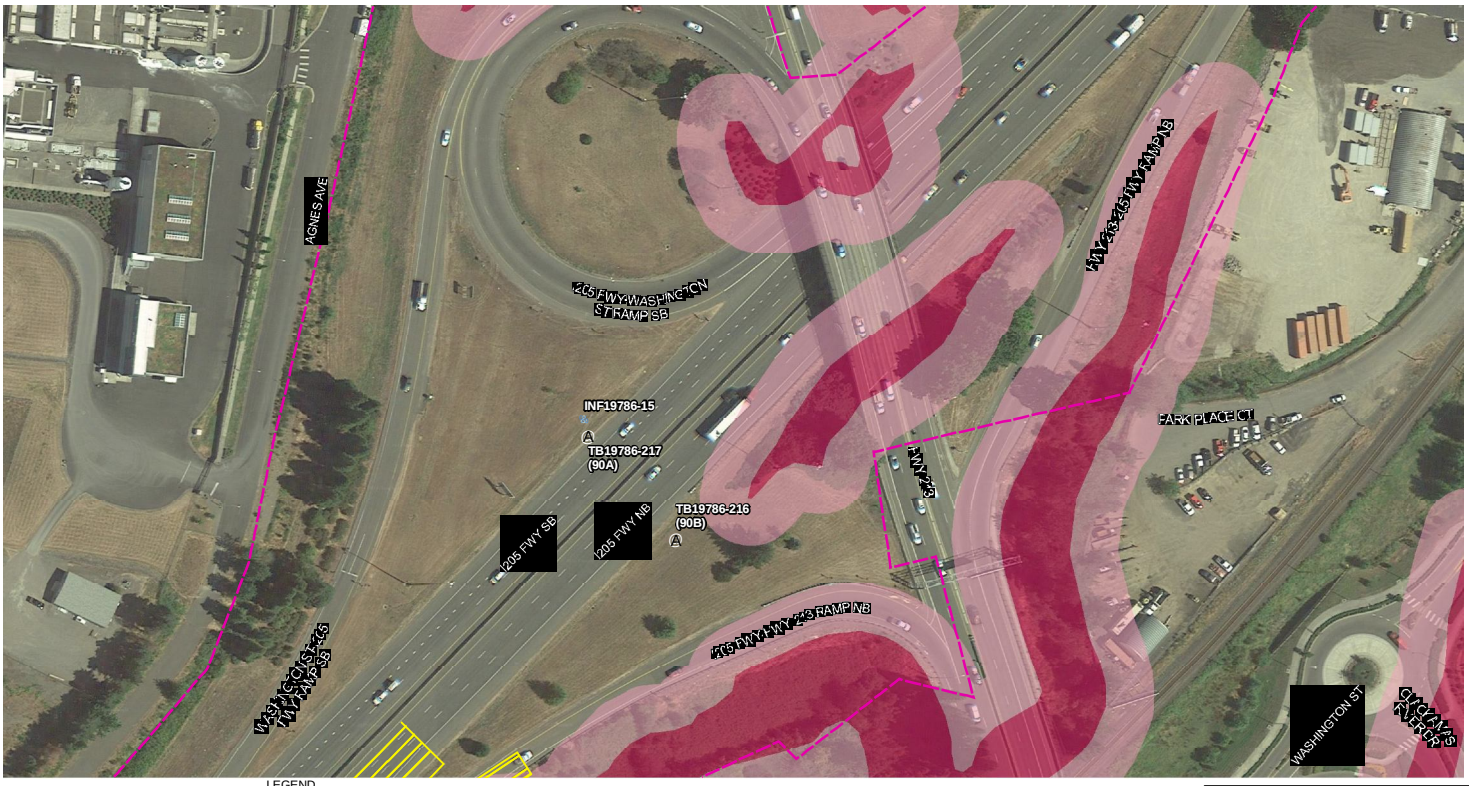

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- Shear Wave Velocity Profile
- Vibrating Wire Piezometer
- Area of Potential Impact (API)
- Proposed Retaining Wall
- Approximate Limits of Proposed Embankment Fill
- Proposed Ground Improvement Zone

Oregon City Geologic Hazard Overlay

- Slopes > 25%
- Slope Buffer (50 feet)

0 50 100 200
Scale in Feet

NOTES

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I-205: Stafford Road to OR99E Widening
Oregon City Geologic Hazards
Clackamas County, Oregon

GEOLOGIC HAZARD MAP

August 2019 24-1-04165-008

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FIG. 2
Sheet 1 of 6

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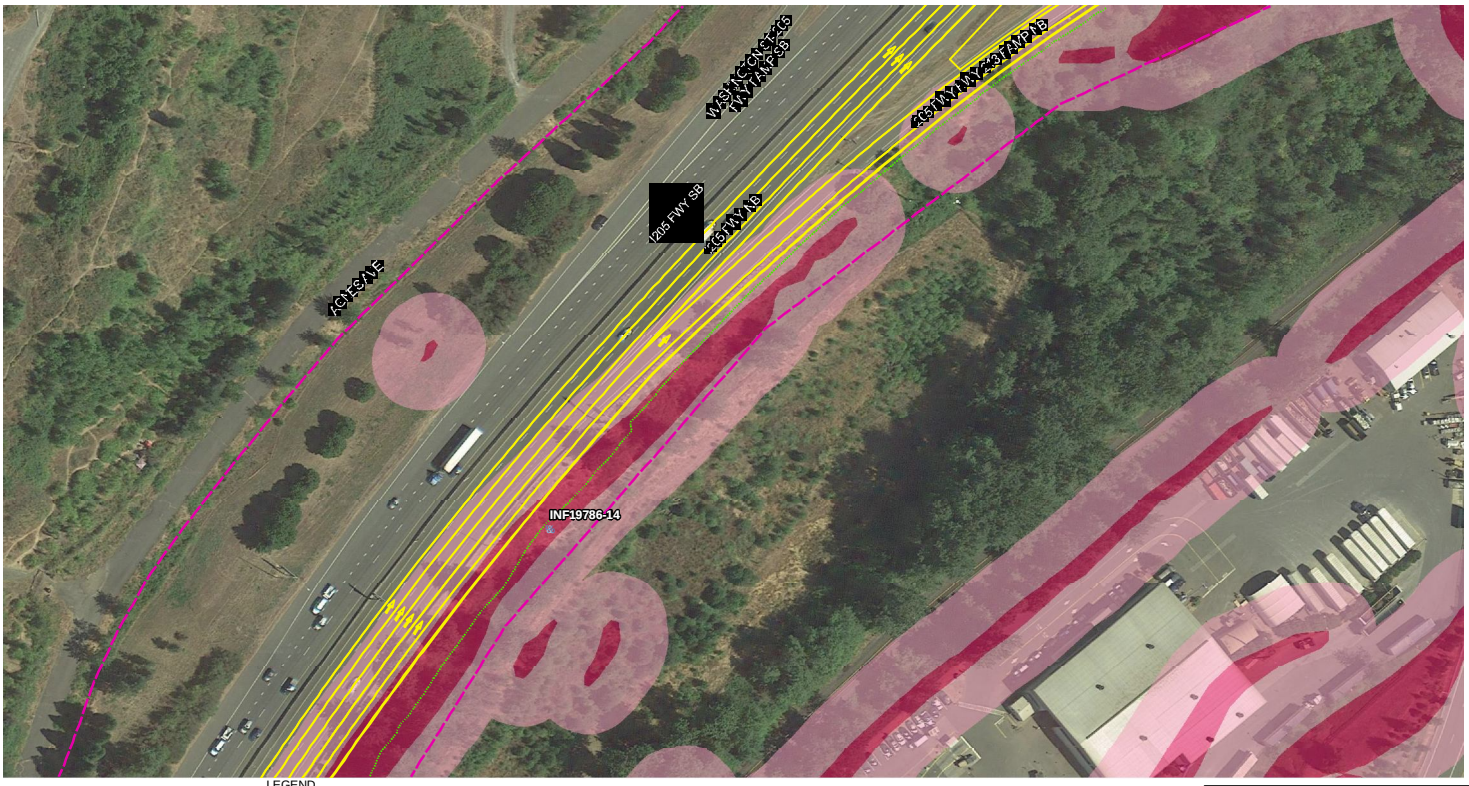

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GEOLOGIC HAZARD MAP

August 2019 24-1-04165-008

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 2 of 6

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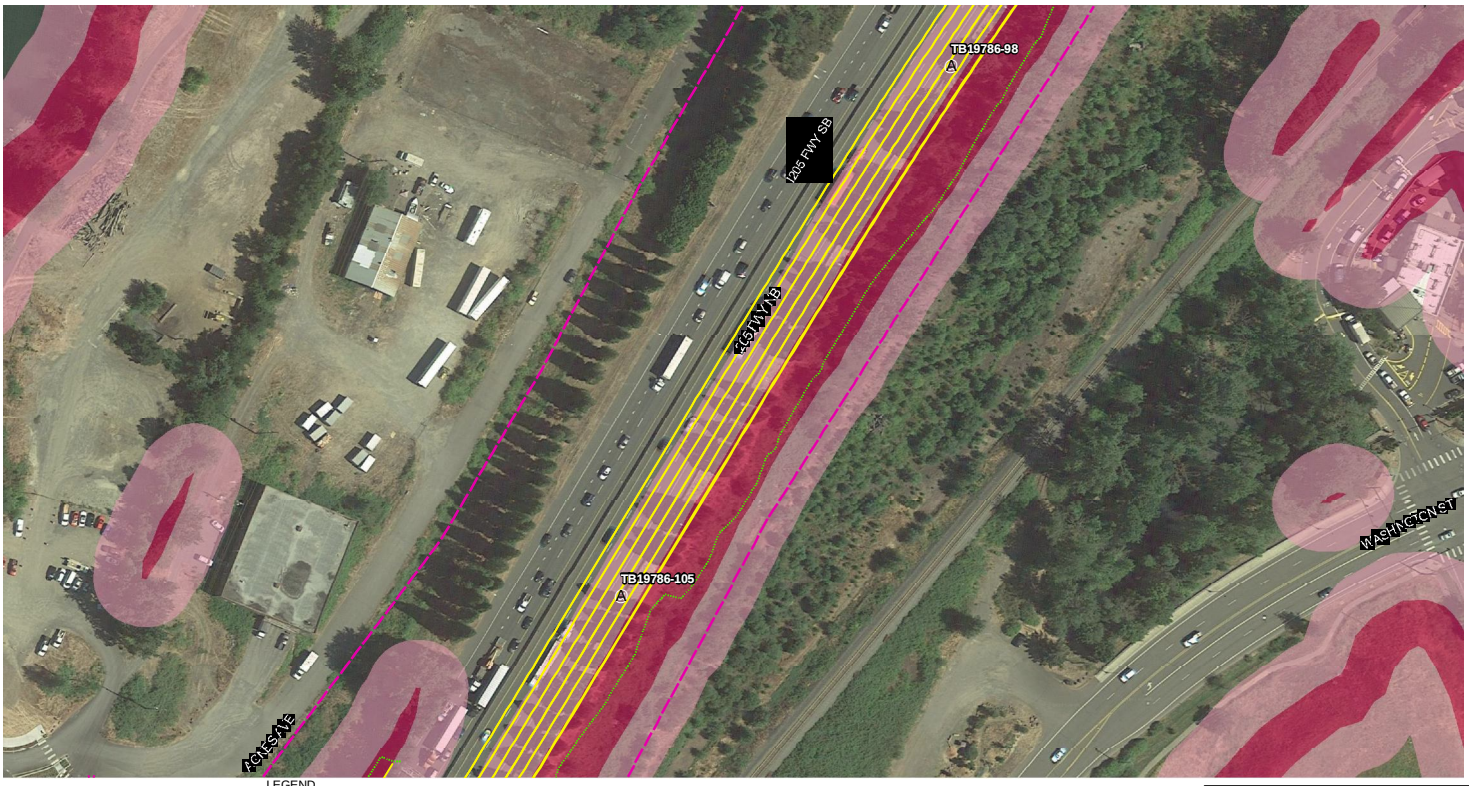

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Clackamas County, Oregon

GEOLOGIC HAZARD MAP

August 2019 24-1-04165-008

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 3 of 6

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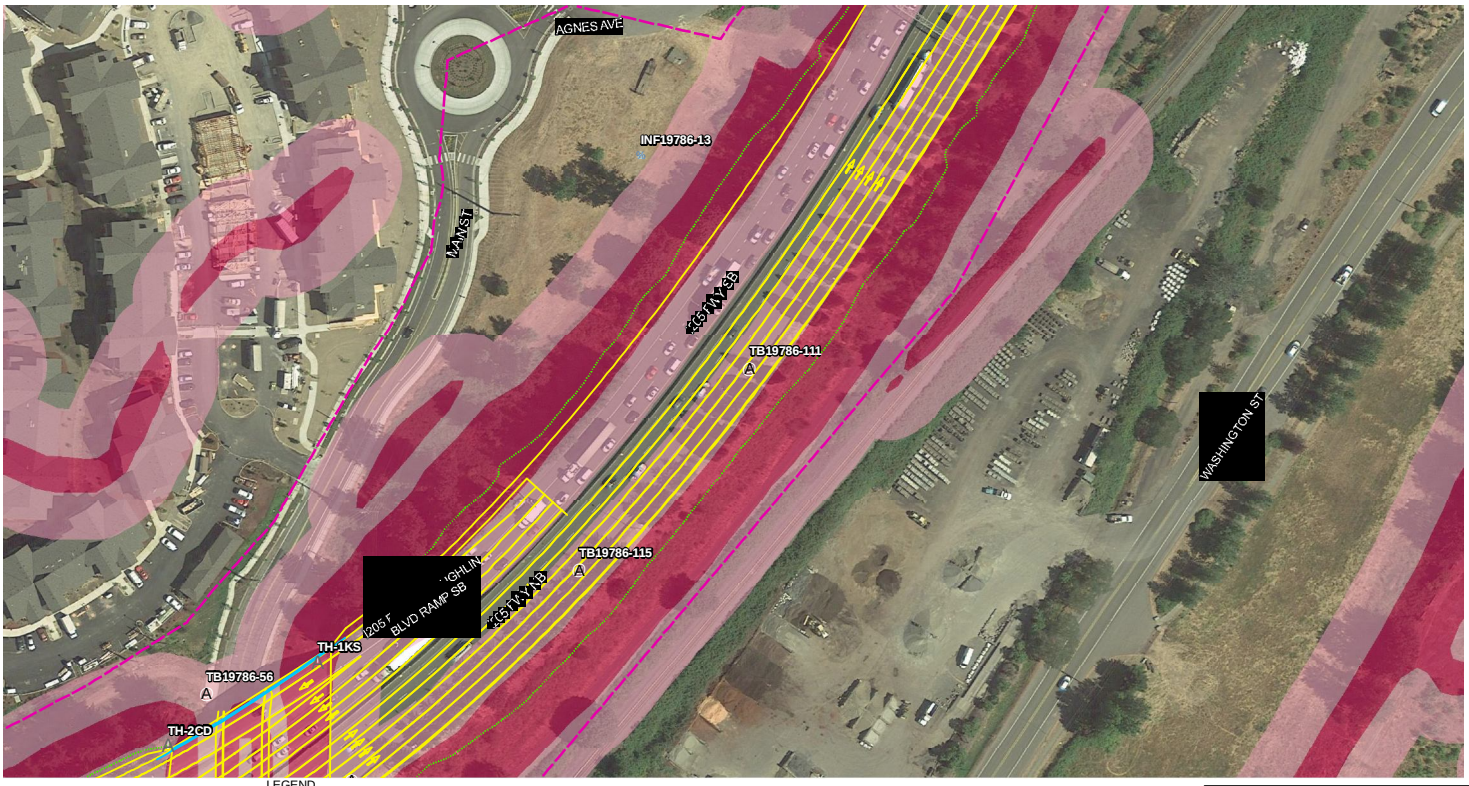

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Clackamas County, Oregon

GEOLOGIC HAZARD MAP

August 2019 24-1-04165-008

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 4 of 6

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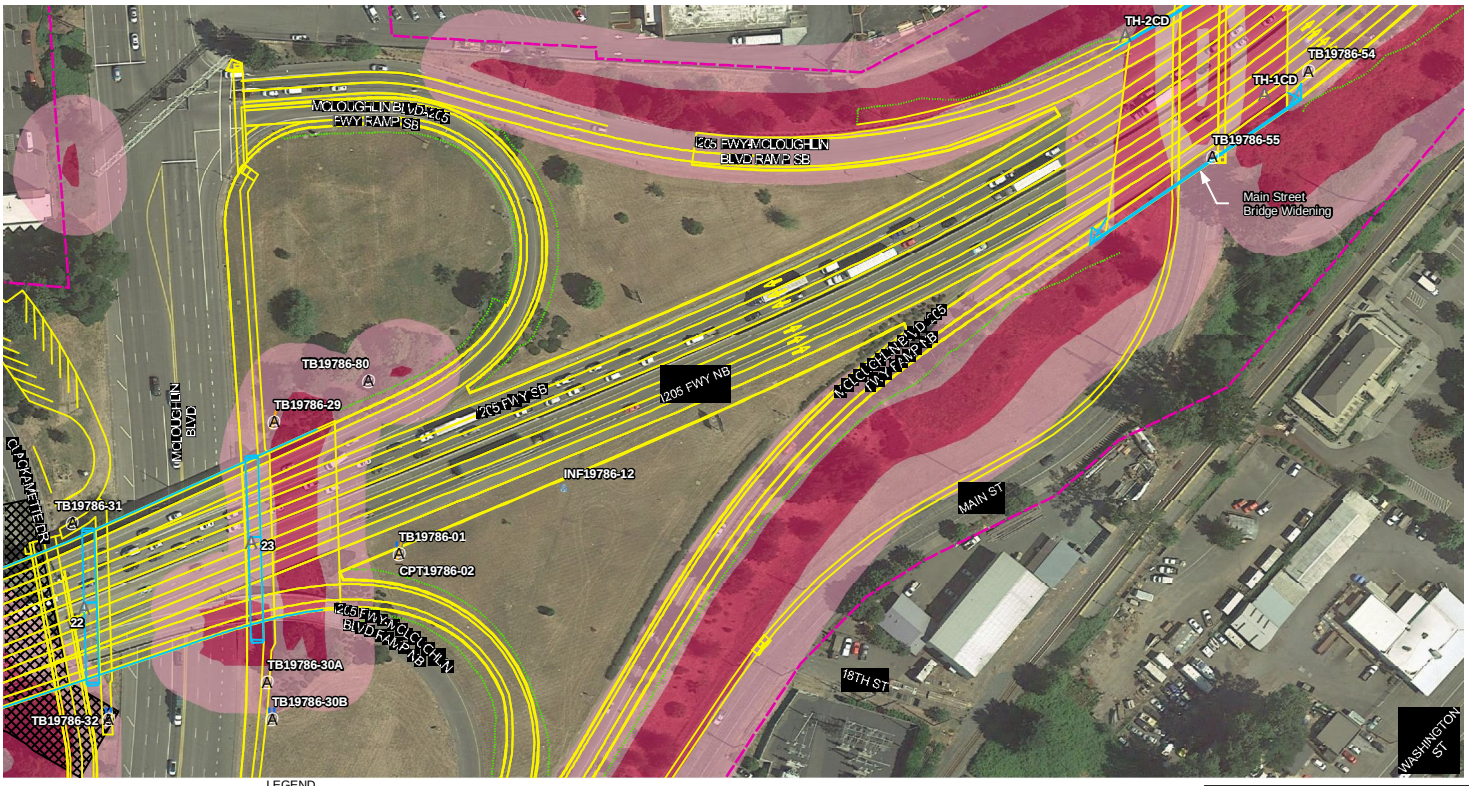

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GEOLOGIC HAZARD MAP

August 2019 24-1-04165-008

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FIG. 2
Sheet 5 of 6

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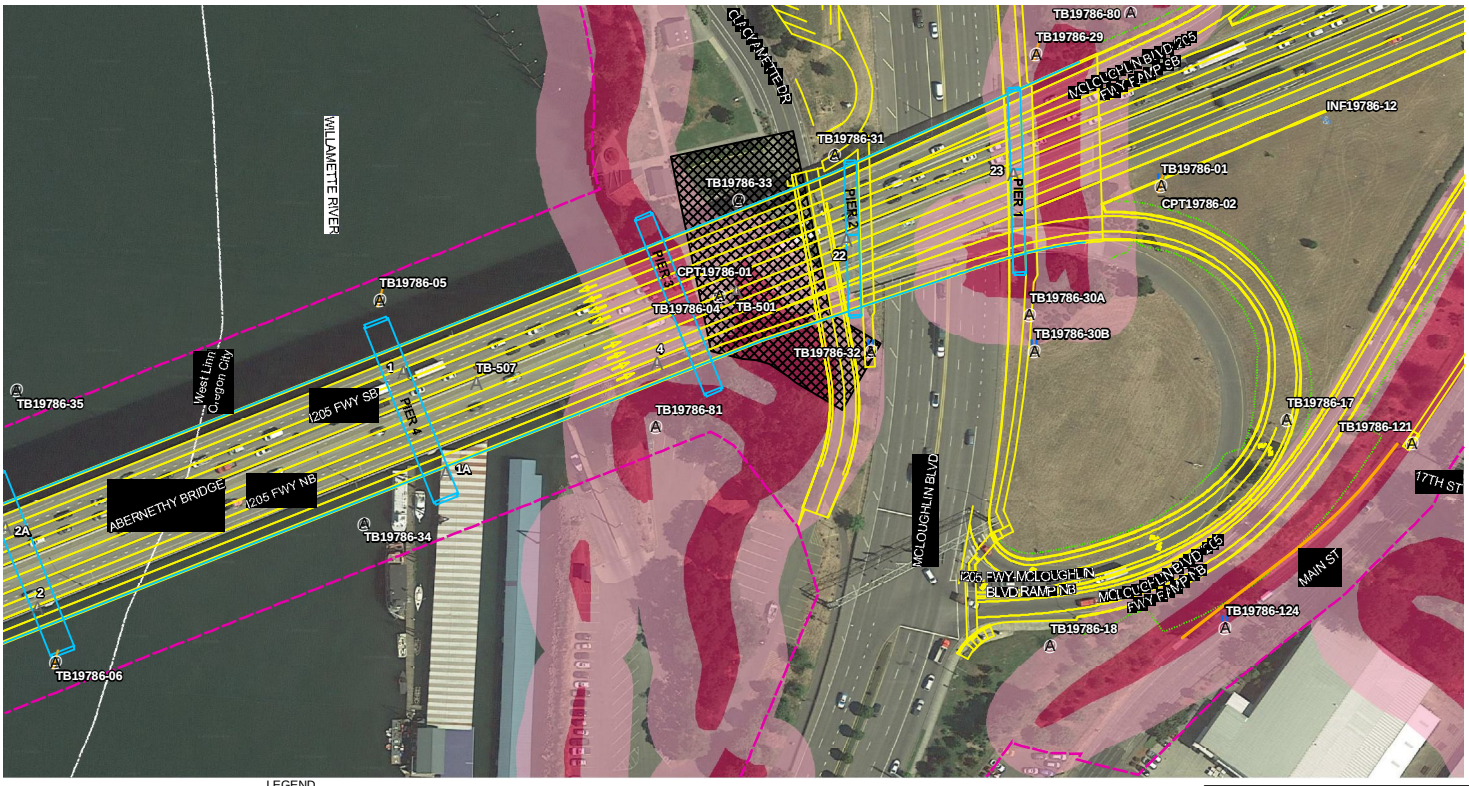

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GEOLOGIC HAZARD MAP

August 2019 24-1-04165-008

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FIG. 2
Sheet 6 of 6

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IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

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A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

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Attachment E(1). Floodplain Cut and Fill Memorandum

Willamette River Floodplain Cut and Fill Memorandum

Date:	Thursday, December 19, 2019
Project:	ODOT | K19786 I-205: I-5 to OR 213, Package A
To:	Michael G. Roberts, MCP - Oregon City
From:	Brian Reis, PE, CFM - HDR Cory Gieseke, PE - HDR Morgan Tholl, EIT - HDR
Subject:	Willamette River Floodplain Cut and Fill Analysis – Oregon City

The Oregon Department of Transportation's proposed improvements to I-205 extend from Stafford Road in Clackamas County, through the City of West Linn, to OR 213 in Oregon City. The purpose of this memorandum is to address site development standards specified in Section 17.42.160 (D) of the Oregon City municipal code with respect to fill within the floodplain including:

- *No net fill in any floodplain is allowed.* 17.42.160 (D)(2)
- *Any excavation (i. e. cut) below bankfull stage shall not count toward compensating for fill. 17.42.160 (D)(3)*
- *The excavation shall be located in the same Oregon City floodplain. 17.42.160 (D)(2)*

In order to demonstrate compliance with these requirements, areas of proposed cut and fill within the floodplain were identified and balanced to achieve no net increase in fill. Based on North American Vertical Datum of 1988, the ordinary high water elevation of 30 feet is used to estimate "bank full", and a flood elevation of 48 feet on Willamette River is taken from the Flood Insurance Rate Map (FIRM) panel dated June 17, 2008. Cut and fill volumes were analyzed between these elevations in the areas shown in Attachment A and Table 1 summarizes the quantities.

Table 1. Cut/Fill Areas In Floodplain

ID	Area (ft^2)	Volume (cu yd)	Description
Area A	32,663	-1,700	Excavation (cut) associated with proposed parking improvements along Clackamas Drive near Jon Storm Park.
Area B	26,169	+1,652	Roadway fill required for proposed additional lanes on I-205CW.
Area C	7,444	-322	Excavation (cut) associated with proposed stormwater treatment facility.
	Balance of cut/fill	-370	Net excavation (cut)

Fill volumes within the floodplain are the result of the proposed addition of a traffic lane along I-205. This was offset by excavation in areas, including a proposed stormwater treatment facility and along the west bank of the river near Jon Storm Park. The total fill volume is estimated to be 1,652 cubic yards, balanced by a cut volume of 2,022 cubic yards which results in a net cut of 370 cubic yards.

Attachment A

PROPOSED FLOODPLAIN CUT AND FILL

PROPOSED I-205 WIDENING: STAFFORD RD TO OR-213

DATA SOURCE: ESRI, HDR, City of Oregon City

Attachment E(2). No-Rise Memorandum

Abernethy Bridge No-Rise Memorandum

Date:	Wednesday, September 04, 2019
Project:	ODOT | K19786 I-205: I-5 to OR 213, Phase 1
To:	Tom Hamstra, ODOT – PM
From:	Mike Bertram, HDR – PM Cory Gieseke, HDR – Hydraulics
Subject:	Task 7.4 Hydraulic Analysis - DRAFT

This memorandum summarizes the approach, analysis, and results associated with the I-205: I-5 to OR 213, Phase 1 project (Project) to satisfy a No-Rise Condition. The Abernethy Bridge crosses the Willamette River between West Linn and Oregon City, Oregon. The Oregon Department of Transportation is currently in the design phase of the Project that includes replacement of piers 3-8, and seismically retrofitting the columns on piers 9 and 10. The proposed construction requires improvements within the Federal Emergency Management Agency (FEMA) 100-year floodway. The Abernethy Bridge has four piers located within the Willamette River channel. Modifications to the structure are limited to one pier located on the west bank of the river.

Because the project features lie within the regulatory floodway as shown on the FEMA Floodway Boundary and Floodway Map (Panel 41005C0276D, dated June 17, 2008 in Attachment A), this project represents an encroachment into the regulatory floodway, requiring it to conform to the requirements of:

Federal Regulation 44 CFR 60.3 (d)(3)

> *(3) Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.*

Oregon City Regulation: 17.42.190 (A)

> *(A) Encroachments, including fill, new construction, substantial improvements and other development shall be prohibited unless certification by a registered professional engineer or architect is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.*

West Linn Regulation: 27.060 (f)

> *(f) Prohibit encroachments, including fill, new construction, substantial improvements, and other development in floodways unless certification by a professional civil engineer licensed to practice in*

the State of Oregon is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

To demonstrate compliance with the requirements of the cited regulations, the existing FEMA effective model was updated following standard procedures to include the additional cross sections and new project survey information necessary to model the proposed pier modifications under the Abernethy Bridge. Existing and proposed conditions results were compared to determine no rise in the 100-year flood elevation and/or the regulatory floodway elevations would occur as the result of the I-205: I-5 to OR 213, Phase 1 project.

The proposed seismic retrofit bridge modifications in the floodway of the Willamette River at the Abernethy Bridge will meet the requirements of 44 CFR 60.3 (d)(3) based on the analyses performed using the FEMA effective model.

Abernethy Bridge

The Project will replace or modify existing piers located within the floodplain with piers at the same roadway stationing, but spaced farther apart than existing columns to support the widened roadway surface. The proposed diameter of the columns within the river channel (piers 3-6) will be slightly increased. Three existing columns for each pier (piers 7 and 8) on the left overbank will be removed and replaced with two columns per pier. Pier 9 will not be modified, pier C3-1 will be replaced with a slightly larger pier, and pier 10 will be fortified by increasing the size of the existing columns. The proposed construction requires improvements within the FEMA floodway.

In relation to the FEMA cross sections shown on the FIRM panels, the Abernethy Bridge is located approximately 3,400 feet upstream of cross section R in the Flood Insurance Study (FIS), measuring along the river centerline. Cross section S is the closest FEMA cross section located approximately 9,500 feet upstream of the Abernethy Bridge. Attachment A provides the effective FIRM panels, floodway and floodplain maps, and model cross sections.

Effective Model

The FEMA Engineering Library provided the effective model, which represents the data published in the latest FIS for Clackamas County dated June 17, 2008. The effective model was completed for a study that concluded in June 1978 using Hydrologic Engineering Center's HEC-2 software. The model was developed using the National Geodetic Vertical Datum of 1929 (NGVD29); however, the FIS provides elevations in the North American Vertical Datum of 1988 (NAVD88). To convert from NGVD29 to NAVD88, FIS added 3.5 feet to NGVD29 values.

FIS elevations and the converted elevations from the effective model are compared in Table 1. The FIS reports water surface elevations to the nearest tenth of a foot. To stay consistent with the values listed in the FIS, the comparative values extracted from the effective model are also provided to the nearest tenth of a foot.

The Abernethy Bridge was not included in the effective model of the Willamette River, but was added to the corrected effective and existing conditions models. Details of the changes made to include the bridge are covered in the Corrected Effective Model and Existing Conditions Model Sections.

Table 1. FEMA FIS Results Compared to the Effective (HEC-2, Nov. 1976 Version) Model Results – Willamette River

Cross Section	River Station	River Mile	Water Surface Elevations NAVD888 (ft)					
			FIS Results without Floodway	Effective Model Results without Floodway	Difference	FIS Results with Floodway	Effective Model Results with Floodway	Difference
M	118034	22.35	44.0	44.0	0.0	44.7	44.7	0.0
N	122034	23.10	46.1	46.1	0.0	46.8	46.8	0.0
O	125434	23.79	46.2	46.2	0.0	46.9	46.9	0.0
P	126834	24.06	46.8	46.8	0.0	47.5	47.5	0.0
Q	129034	24.50	47.2	47.2	0.0	47.9	47.9	0.0
R	131034	24.90	47.7	47.7	0.0	48.4	48.4	0.0

[a] Feet from Columbia River confluence

Duplicate Effective Model

The effective model was imported from a HEC-2 format into HEC-RAS Version 5.0.7 and rerun to create the duplicate effective model. No revisions were made to the imported effective model. There are five cross sections within the effective model not reported in the FIS. These cross sections were added to Table 2 for comparison purposes.

When comparing the models, the duplicate effective model has slightly higher water surface elevations than the effective model. The differences range from 0.0 feet at the downstream end of the model, to 0.3 feet at the upstream end of the reach. These differences can be attributed to the variation (especially near bridges) of the calculation methods and algorithms used by the different programs.

Table 2. Effective (HEC-2, Nov. 1976 Version) model Compared to Duplicate Effective (HEC-RAS Version 5.0.7) Model Results – Willamette River

Cross Section	River Mile	Water Surface Elevations NAVD88 (ft)					
		Effective Model Results without Floodway	Duplicate Effective Model Results without Floodway	Difference	Effective Model Results with Floodway	Duplicate Effective Model Results with Floodway	Difference
M	22.35	44.02	44.02	0.00	44.72	44.72	0.00
N	23.10	46.06	46.10	0.04	46.78	46.81	0.03
O	23.79	46.24	46.30	0.06	46.89	46.91	0.02
P	24.06	46.82	46.89	0.07	47.48	47.52	0.04
Q	24.50	47.20	47.26	0.06	47.91	47.94	0.03
R	24.90	47.69	47.77	0.08	48.38	48.41	0.03
Not included in FIS, but included in the effective model	25.32	48.25	48.39	0.14	48.98	49.01	0.03
	25.73	49.35	49.44	0.09	50.19	50.25	0.06
	25.98	48.79	48.88	0.09	49.64	49.67	0.03
	26.08	49.09	49.20	0.11	49.83	49.92	0.09
	26.42	51.22	51.45	0.23	52.30	52.48	0.18

[a] River miles from Columbia River confluence

Corrected Effective Model

The duplicate effective model was updated to correct known errors and include improved information, creating the corrected effective model. The following updates were made to the duplicate effective model in order to create the corrected effective model:

- Cross sections 22.35 (M), 23.1 (N), 23.79 (O), and 26.42 were removed from the model to condense the number of cross sections to be updated as part of the corrected effective model.
  - This condensed model was rerun and found to match the results of the duplicate effective model.
- Bank stations were adjusted in most cross sections to correct misplaced bank stations (i.e., stations on bottom of river, inconsistent bank station elevations within the same cross sections).
- The Abernethy Bridge was added to the model at Station 25.55.
  - The upstream and downstream cross section geometries, 25.56 and 25.53, respectively, were based on information from the as-built plans for the bridge. The same terrain profile was used for upstream and downstream.

  - Piers were added based on the as-built drawings and existing survey information. A 27-degree skew was assumed. Due to the skew angle, bents were modeled as multiple piers to represent the actual blockages in the direction of flow.
- Cross sections 24.50 and 24.90 (FIS cross sections Q and R) were extended on the right bank to high ground to include the entire flow areas.
- Cross section 26.08 was extended on the left bank to contain the flow. Negative signs at Stations 230 and 370 were removed to correct an assumed error.
- Cross section 25.98 had a station/elevation point removed at Station 250. It was assumed that a negative sign was missed in the original model, there is no evidence that any structure ever protruded out of the water as the cross section represented.
- Cross section 25.73 had a station/elevation point removed at Station 1100. It was assumed that in the original model this feature represented the impact of the floating marinas located in this section of the river, there is no evidence that any structure ever protruded out of the water as the cross section represented. A higher Manning's n value of 0.15 was used for the portion of the cross section where the marina is located.
- At Station 25.53, the downstream face of the Abernethy Bridge had a Manning's n value of 0.15 applied to define a floating marina from an aerial image dated September 13, 1975.
- The encroachment stations for the added bridge cross sections, 25.56 and 25.53, were measured from the published floodway boundaries.

A comparison of the cross sections between the duplicate effective and the corrected effective models are provided in Attachment B. Table 3 compares the modeled water surface elevations between the two models. The most noticeable change in the modeled results is increased water surface elevations in the cross sections directly upstream of the added Abernethy Bridge.

Table 3. Duplicate Effective (HEC-RAS Version 5.0.7) Model Compared to Corrected Effective (HEC-RAS Version 5.0.7) Model Results – Willamette River

Cross Section	River Mile	Water Surface Elevations NAVD88 (ft)					
		Duplicate Effective Model Results without Floodway	Corrected Effective Model Results without Floodway	Difference	Duplicate Effective Model Results with Floodway	Corrected Effective Model Results with Floodway	Difference
P	24.06	46.89	46.89	0.00	47.52	47.52	0.00
Q	24.50	47.26	47.36	0.10	47.94	47.95	0.01
R	24.90	47.77	47.58	-0.19	48.41	48.29	-0.12
*	25.32	48.39	48.17	-0.22	49.01	48.88	-0.13
**	25.53	--	49.51	--	--	50.24	--

Table 3. Duplicate Effective (HEC-RAS Version 5.0.7) Model Compared to Corrected Effective (HEC-RAS Version 5.0.7) Model Results – Willamette River

Cross Section	River Mile	Water Surface Elevations NAVD88 (ft)					
		Duplicate Effective Model Results without Floodway	Corrected Effective Model Results without Floodway	Difference	Duplicate Effective Model Results with Floodway	Corrected Effective Model Results with Floodway	Difference
Abernethy Bridge							
**	25.56	--	49.69	--	--	50.44	--
*	25.73	49.44	49.83	0.39	50.25	50.66	0.41
*	25.98	48.88	49.49	0.61	49.67	50.31	0.64
*	26.08	49.20	49.49	0.29	49.92	49.69	-0.23

[a] River miles from Columbia River confluence
***** Not included in FIS, but included in the effective model
****** Included to model the Abernethy Bridge

Existing Conditions Model

The existing conditions model was created by updating the corrected effective model with new bathymetric survey data collected between cross sections 24.50 and 26.08. Cross sections at the upstream and downstream faces of the bridge were extracted from the recent bathymetric survey to capture effects of riprap removal. In addition to channel survey data, the overbank areas were updated using available light detection and ranging (LiDAR) information for cross sections 24.06, 24.50, 24.90, 25.32, 25.53, and 25.56. The Manning's n value used to represent a floating marina adjacent to the right bank directly downstream of the Abernethy Bridge was removed, because that feature is not present in existing conditions. The increased Manning's n value remained upstream of the bridge for the existing marina.

There are significant differences in the left overbank in cross section 25.53 between the corrected effective and existing conditions models. The elevations in the existing conditions model are up to 30 feet higher than in the corrected effective model. This difference is attributable to the terrain information from as-built plans used for the bounding cross sections profile of the bridge in the corrected effective model, which only provided the centerline profile of the bridge. The existing conditions model was updated with current channel bathymetry information combined with LiDAR data for the overbank areas. There is a significant hillside located on the downstream face of the bridge on the left overbank. This hillside is captured in the LiDAR data but not in the as-built information.

The channel cross sections located at the upstream and downstream faces of the bridge, cross sections 25.56 and 25.53, respectively are at a skew of 27 degrees to the river. To account for this in the

model, the cross sections a skew factor of 27 degrees was applied. This skew factor corrects the cross section to approximate a model cross section normal to the channel.

This model represents the existing condition for the No-Rise Analysis intended to perform a relative comparison of the difference between existing and proposed conditions water surface elevations, not absolute elevations. Table 4 compares the results of the corrected effective and existing conditions models. The largest differences in water surface elevations were found in the cross sections that were updated the most when comparing the original model geometry to recent surveyed cross sections (Attachment B).

Table 4. Corrected Effective (HEC-RAS Version 5.0.7) Model Compared to Existing Conditions (HEC-RAS Version 5.0.7) Model Results – Willamette River

Cross Section	River Mile	Water Surface Elevations NAVD88 (ft)					
		Corrected Effective Model Results without Floodway	Existing Conditions Model Results without Floodway	Difference	Corrected Effective Model Results with Floodway	Existing Conditions Model Results with Floodway	Difference
P	24.06	46.89	46.89	0.00	47.52	47.52	0.00
Q	24.50	47.36	47.54	0.18	47.95	48.26	0.31
R	24.90	47.58	47.26	-0.32	48.29	47.98	-0.31
*	25.32	48.17	47.59	-0.58	48.88	48.36	-0.52
**	25.53	49.51	48.64	-0.87	50.24	49.38	-0.86
Abernethy Bridge							
**	25.56	49.69	48.76	-0.93	50.44	49.54	-0.90
*	25.73	49.83	48.91	-0.92	50.66	49.76	-0.90
*	25.98	49.49	48.70	-0.79	50.31	49.56	-0.75
*	26.08	49.49	47.87	-1.62	49.69	48.61	-1.08

[a] River miles from Columbia River confluence

***** Not included in FIS, but included in the effective model

****** Included to model the Abernethy Bridge

Proposed Conditions Model

The proposed conditions model was created by updating the existing bridge pier geometry to the proposed bridge pier geometry dated August 27, 2019 (Attachment C). Changes included replacing the piers in the river with larger diameter columns spaced farther apart on the same bent; increasing the size of some piers on the left bank of the river to represent fortification of the existing piers; and removing the pier for the northbound entrance ramp that will be removed. Table 5 summarizes and

compares the modeled water surface elevations from the existing and proposed conditions models. The observed differences range from no change to a 0.03-foot decrease in the cross sections upstream of the bridge in the model with floodway encroachments.

The proposed design widens the bridge deck; however, this does not affect the proposed results because the deck and low chord of the Abernethy Bridge are situated above the floodplain. The internal bridge cross sections were updated to include the proposed riprap excavation around the existing piers and in proposed pier locations.

Table 5. Existing Conditions (HEC-RAS Version 5.0.7) Model Compared to Proposed Conditions (HEC-RAS Version 5.0.7) Model Results – Willamette River

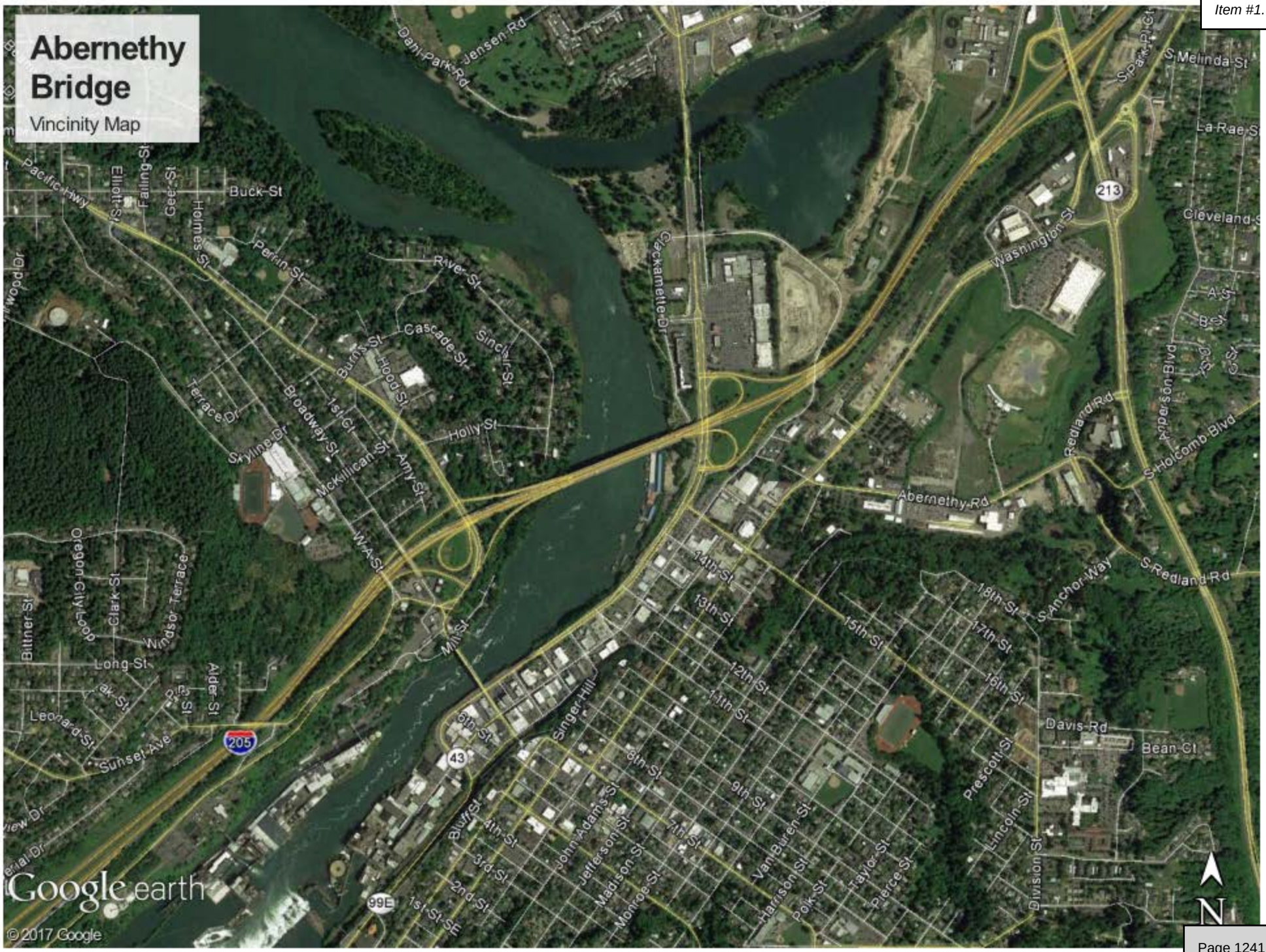
Cross Section	River Mile	Water Surface Elevations NAVD88 (ft)					
		Existing Conditions Model Results without Floodway	Proposed Conditions Model Results without Floodway	Difference	Existing Conditions Model Results with Floodway	Proposed Conditions Model Results with Floodway	Difference
P	24.06	46.89	46.89	0.00	47.52	47.52	0.00
Q	24.50	47.54	47.54	0.00	48.26	48.26	0.00
R	24.90	47.26	47.26	0.00	47.98	47.98	0.00
*	25.32	47.59	47.59	0.00	48.36	48.36	0.00
**	25.53	48.64	48.64	0.00	49.38	49.38	0.00
Abernethy Bridge							
**	25.56	48.76	48.75	-0.01	49.54	49.52	-0.02
*	25.73	48.91	48.90	-0.01	49.76	49.74	-0.02
*	25.98	48.70	48.69	-0.01	49.56	49.53	-0.03
*	26.08	47.87	47.86	-0.01	48.61	48.59	-0.02

[a] River miles from Columbia River confluence
***** Not included in FIS, but included in the effective model
****** Included to model the Abernethy Bridge

Summary and Conclusions

The No-Rise Analysis was performed to verify the project will be in conformance with federal and local regulatory requirements. Oregon City and West Linn are participating communities in the National Flood Insurance Program and have adopted floodplain management ordinances that comply with the minimum federal requirements defined in 44 CFR Part 60. The proposed bridge improvements will result in no rise in FEMA's effective base flood or floodway elevations.

Attachment A. Bridge Location and FIRM Panel


Abernethy Bridge
Vincinity Map
Dahl Park Rd
Jensen Rd
Pacific Hwy
Elliott St
Failing St
Gee St
Holmes St
Buck St
Perrin St
River St
Clackamette Dr
Cascade St
Sinclair St
Burns St
Hood St
Terrace Dr
Broadway St
1st Ct
Skyline Dr
McKillican St
Amy St
Holly St
W A St
Mill St
Washington St
213
Cleveland St
S Melinda St
La Rae St
A St
B St
C St
Anderson Blvd
S Holcomb Blvd
Redland Rd
Abernethy Rd
S Anchor Way
S Redland Rd
14th St
13th St
15th St
18th St
17th St
16th St
12th St
11th St
Davis Rd
Bean Ct
Prescott St
Lincoln St
Division St
Singer Hill
6th St
8th St
9th St
7th St
4th St
3rd St
2nd St
1st St
Bluff St
John Adams St
Jefferson St
Madison St
Monroe St
Van Buren St
Harrison St
Polk St
Taylor St
Pierce St
99E
43
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Oregon City Loop
Clark St
Windsor Terrace
Long St
Oak St
Alder St
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Sunset Ave
Google earth
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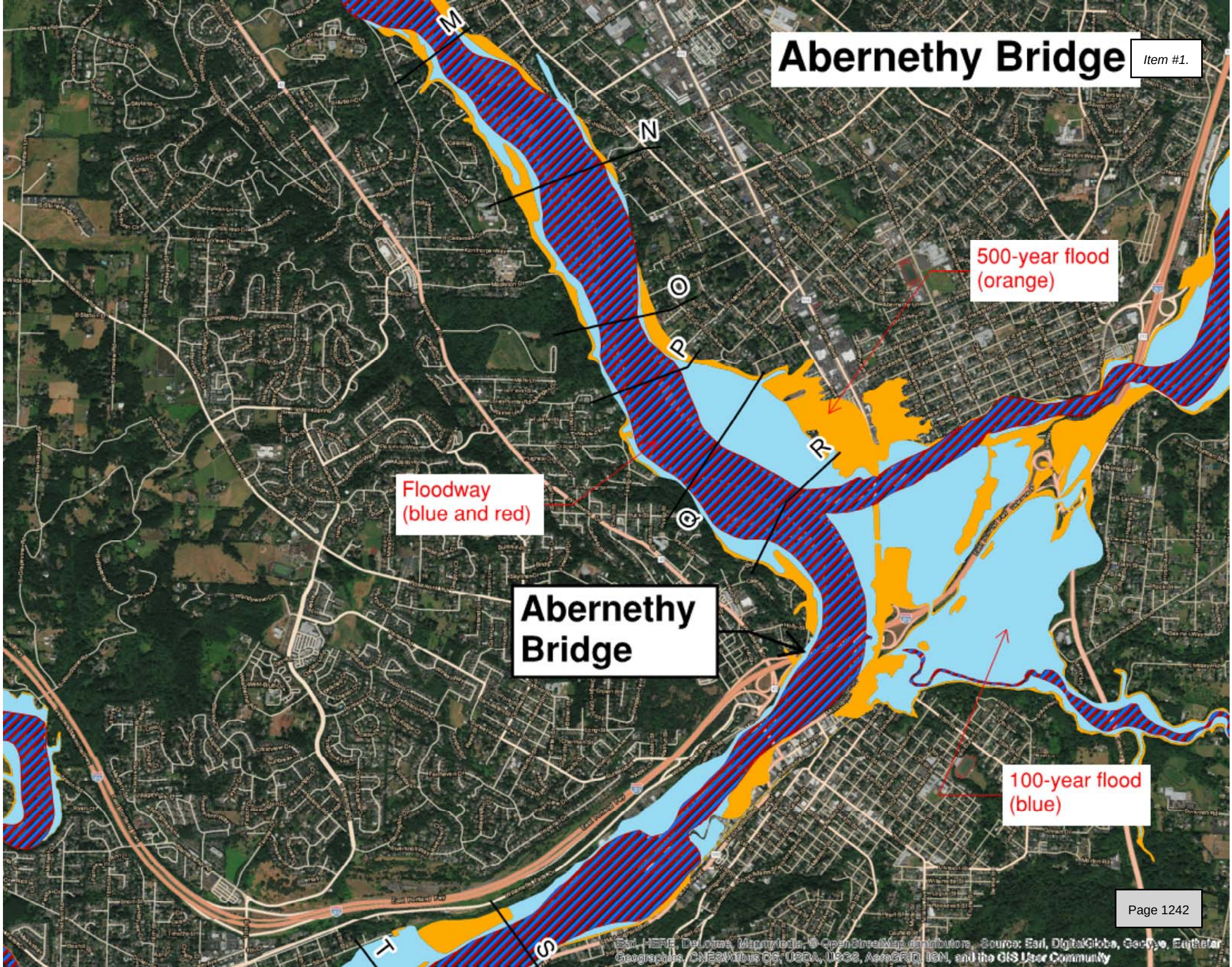

Abernethy Bridge
M
N
O
P
Q
R
S
T
500-year flood
(orange)
Floodway
(blue and red)
Abernethy
Bridge
100-year flood
(blue)

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 10. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from multiple sources. High resolution color orthophotos produced by Merrick & Co., Pixxures, Inc., and Clean Water Services covered portions of the county. USGS Digital Quadrangles at a scale of 1:12000 or less dated 6/20/94 covered the remainder of the county.

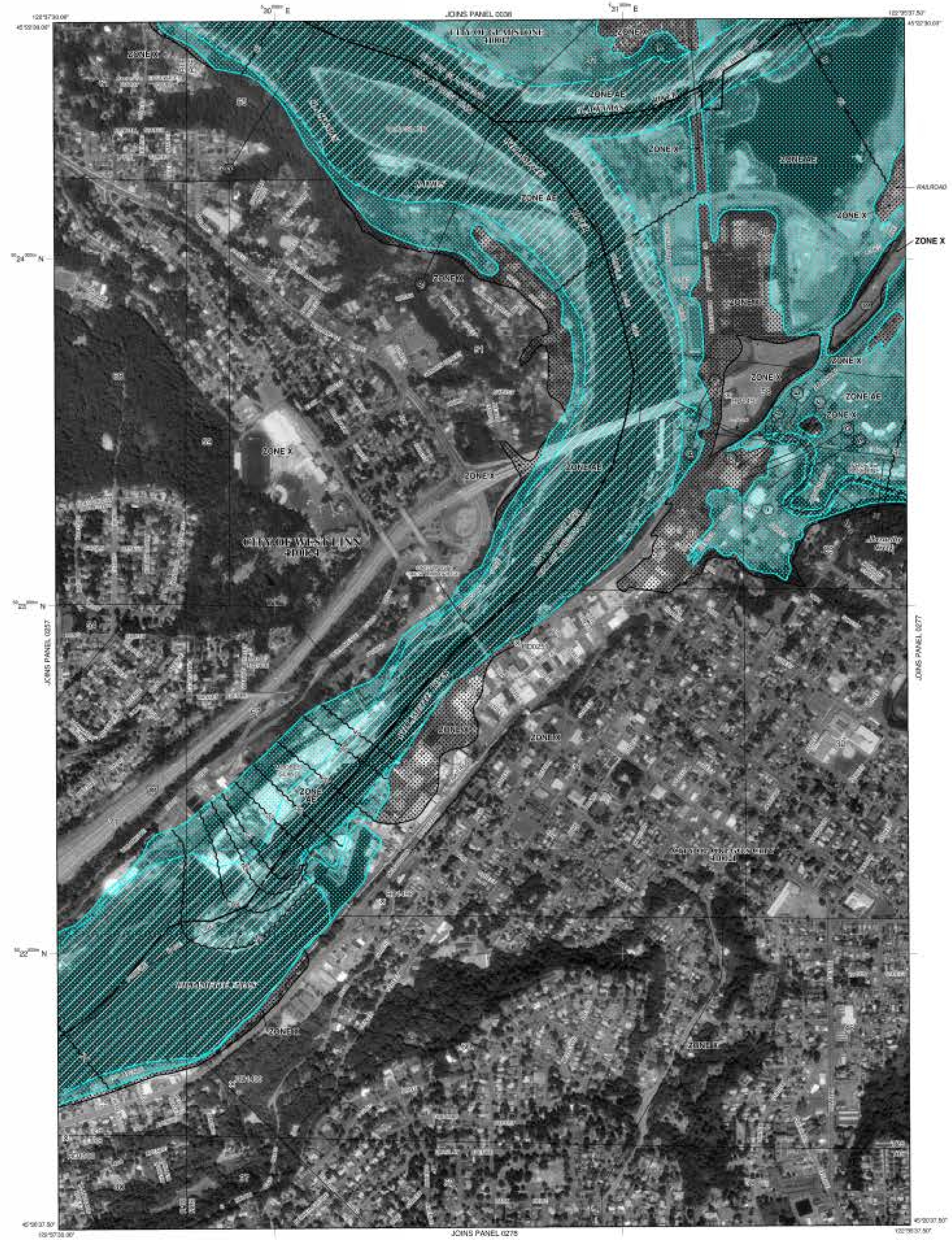
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a *Flood Insurance Study* report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

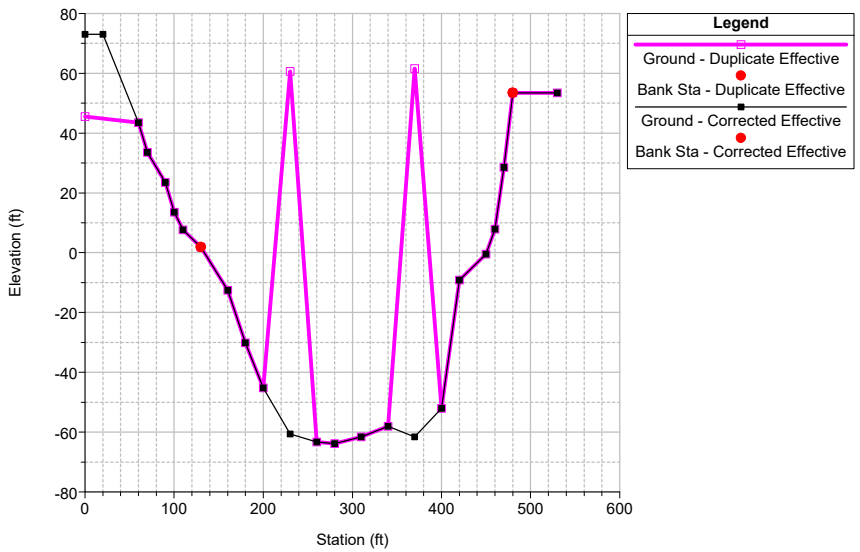
OTHERWISE PROTECTED AREAS (OPAs)

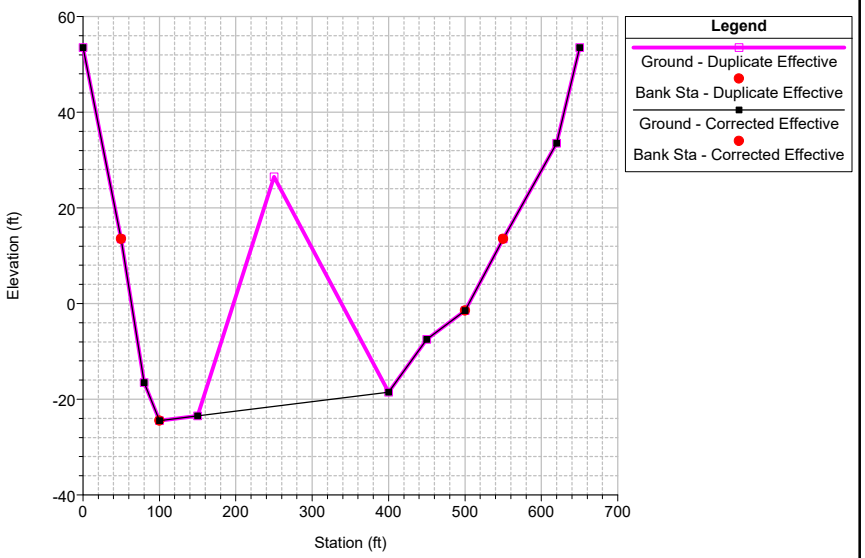
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

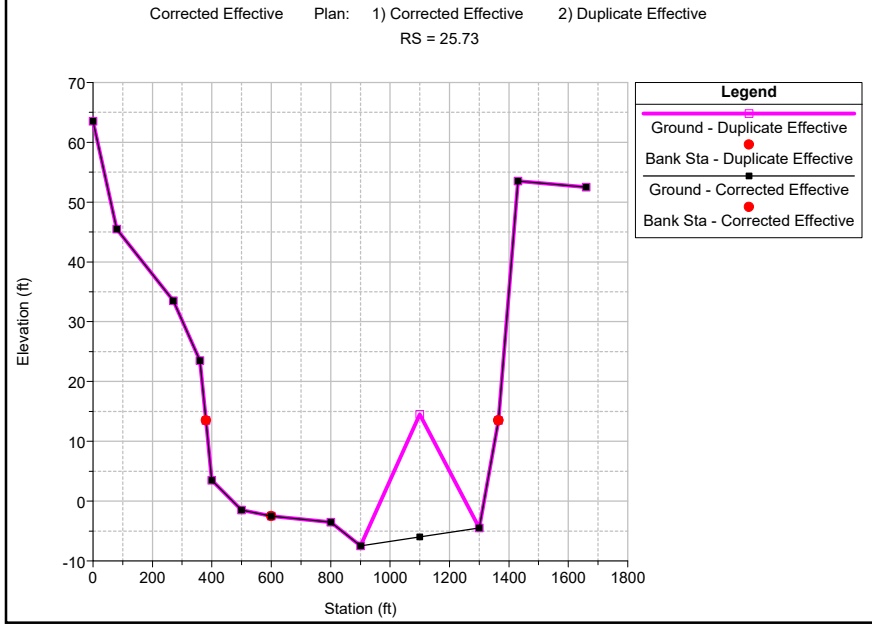
1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~~ 513 ~~~ Base Flood Elevation line and value; elevation in feet*
(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

(A)—(A) Cross section line
(23)- - -(23) Transect line
97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N 1000-meter Universal Transverse Mercator grid ticks, zone 10
6000000 M 5000-foot grid ticks: Oregon State Plane coordinate system, north zone (FIPSZONE 3601), Lambert Conformal Conic
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
June 17, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0276D

FIRM
FLOOD INSURANCE RATE MAP
CLACKAMAS COUNTY, OREGON
AND INCORPORATED AREAS

PANEL 276 OF 1175
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GLADSTONE, CITY OF	410017	0276	D
OREGON CITY, CITY OF	410021	0276	D
WEST LINN, CITY OF	410024	0276	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 41005C0276D

EFFECTIVE DATE JUNE 17, 2008

Federal Emergency Management Agency
~~~

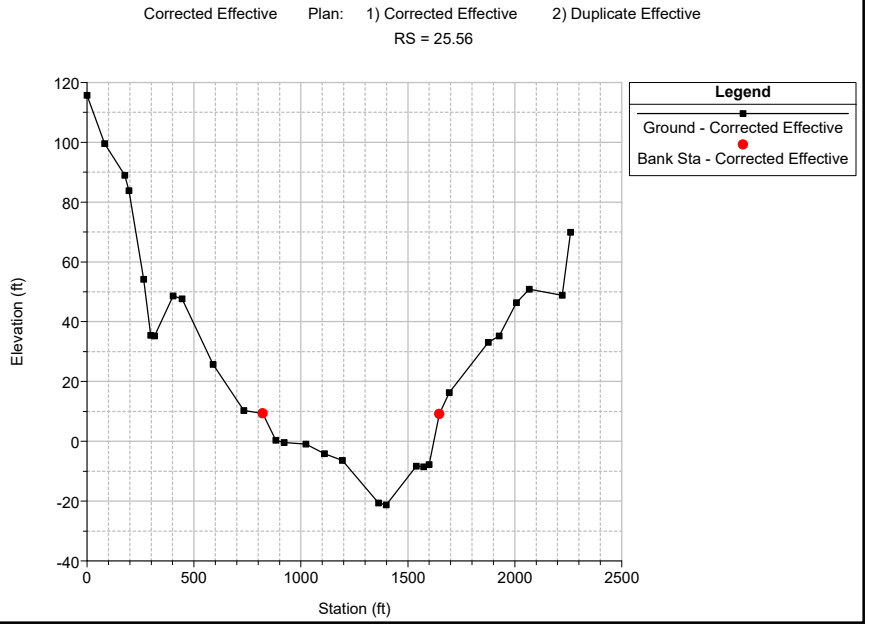
Attachment B. HEC-RAS Cross Sections

Duplicate Effective Compared to Corrected Effective HEC-RAS Cross Sections



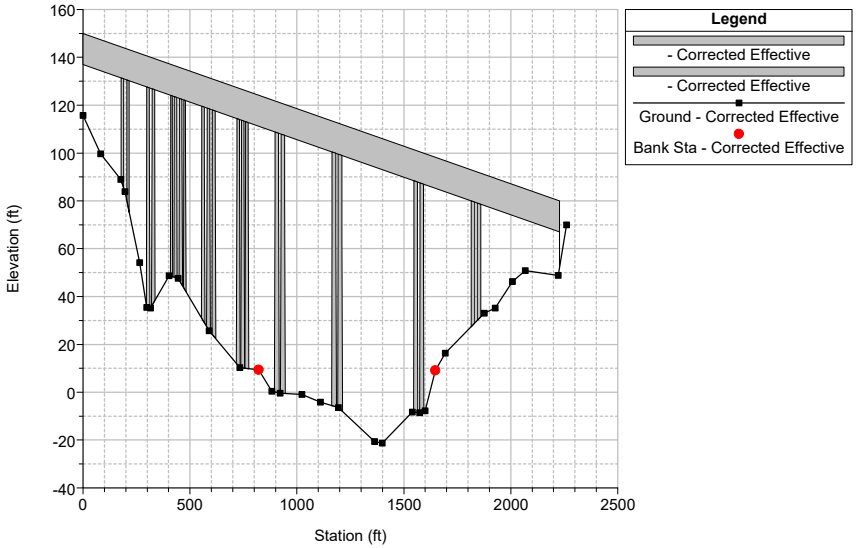




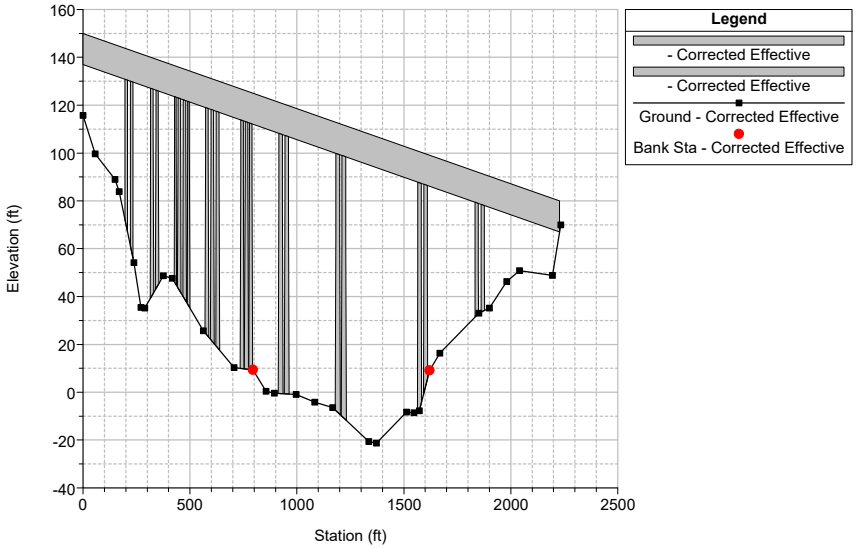


Duplicate Effective Compared to Corrected Effective HEC-RAS Cross Sections

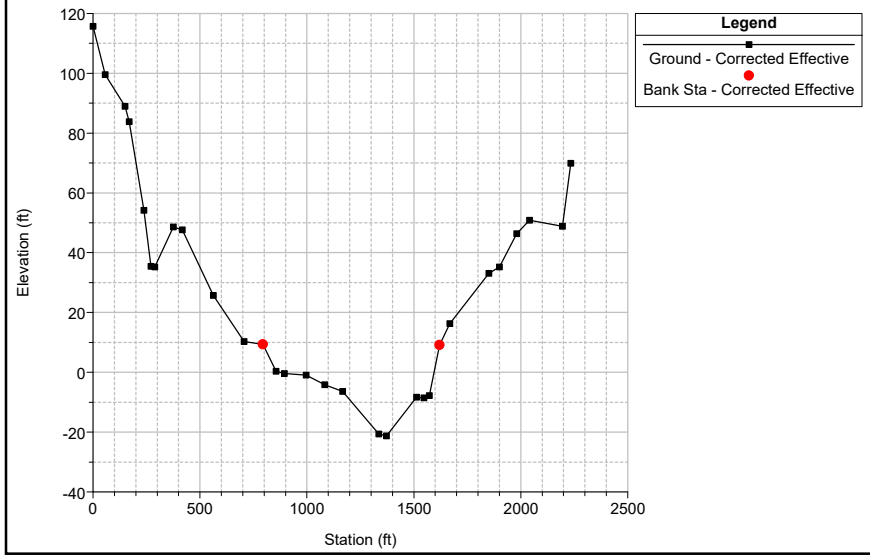
Corrected Effective Plan: 1) Corrected Effective 2) Duplicate Effective
RS = 25.55 BR



Corrected Effective Plan: 1) Corrected Effective 2) Duplicate Effective
RS = 25.55 BR



Corrected Effective Plan: 1) Corrected Effective 2) Duplicate Effective
RS = 25.53



Corrected Effective Plan: 1) Corrected Effective 2) Duplicate Effective
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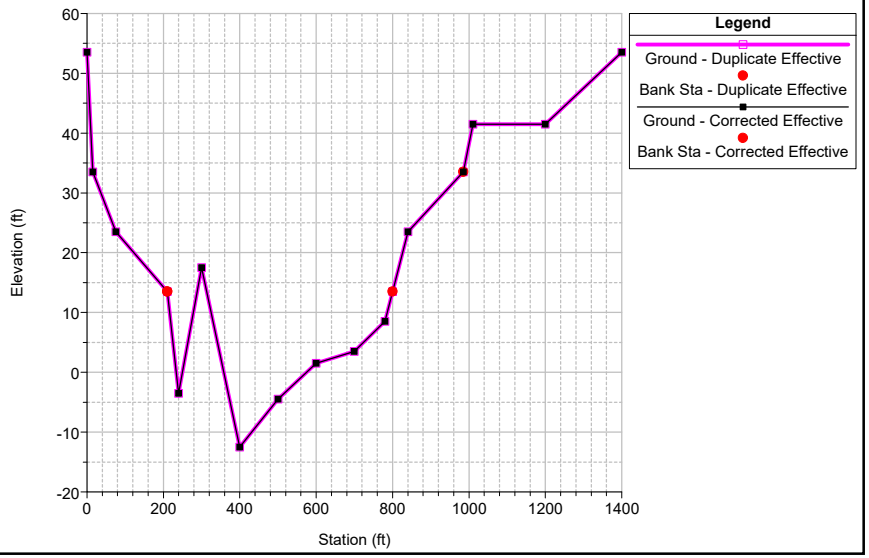
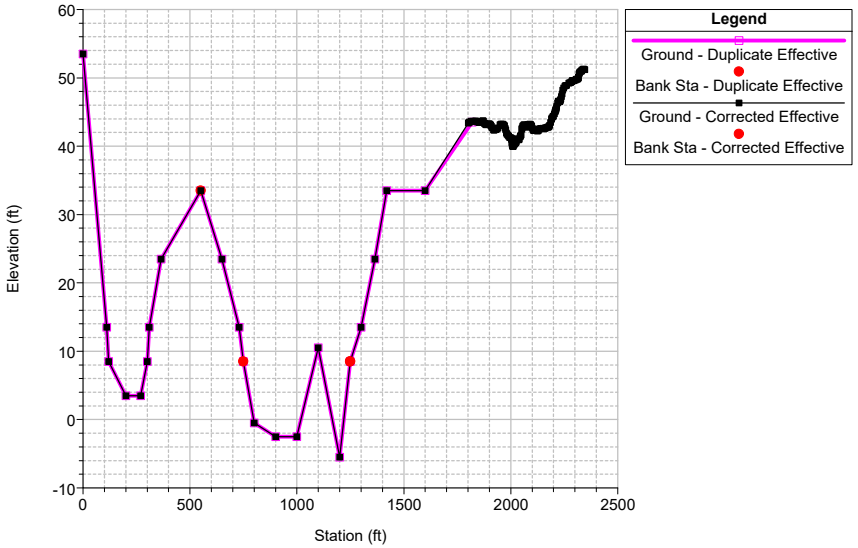
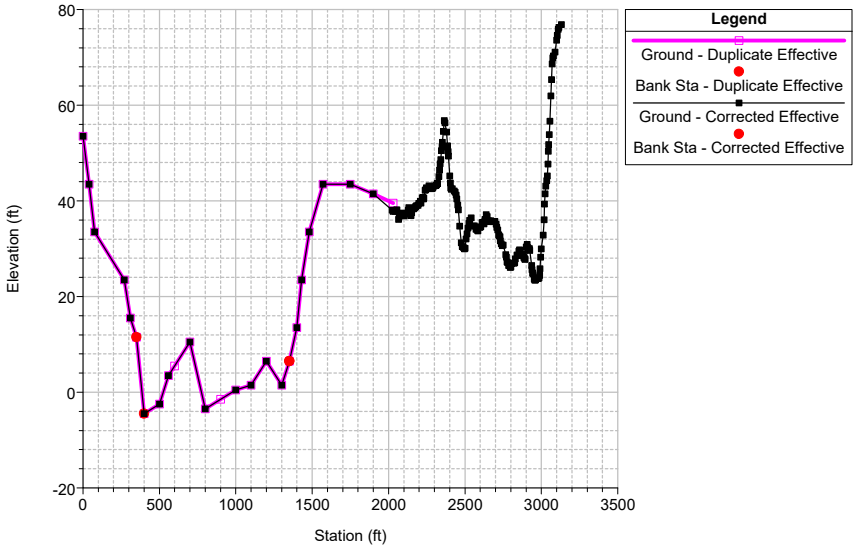


Duplicate Effective Compared to Corrected Effective HEC-RAS Cross Sections

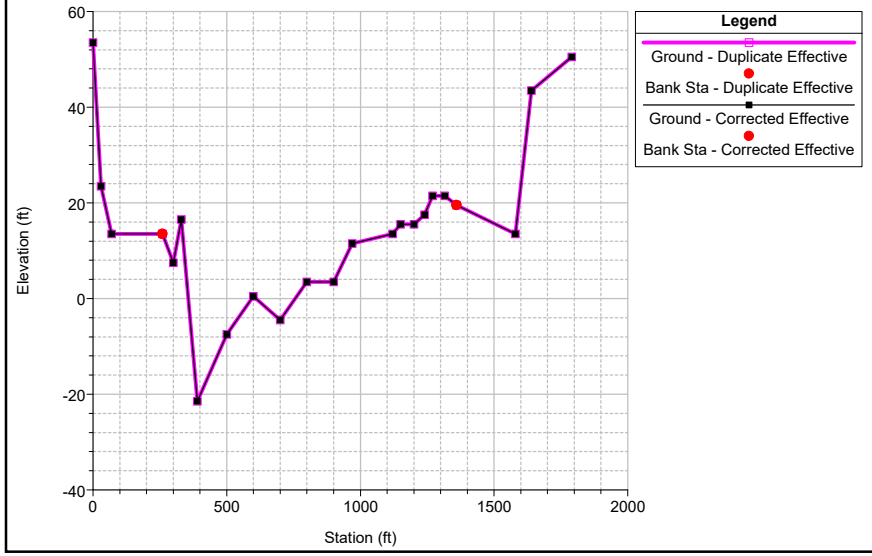
Corrected Effective Plan: 1) Corrected Effective 2) Duplicate Effective
RS = 24.90 CROSS SECTION R



Corrected Effective Plan: 1) Corrected Effective 2) Duplicate Effective
RS = 24.50 CROSS SECTION Q

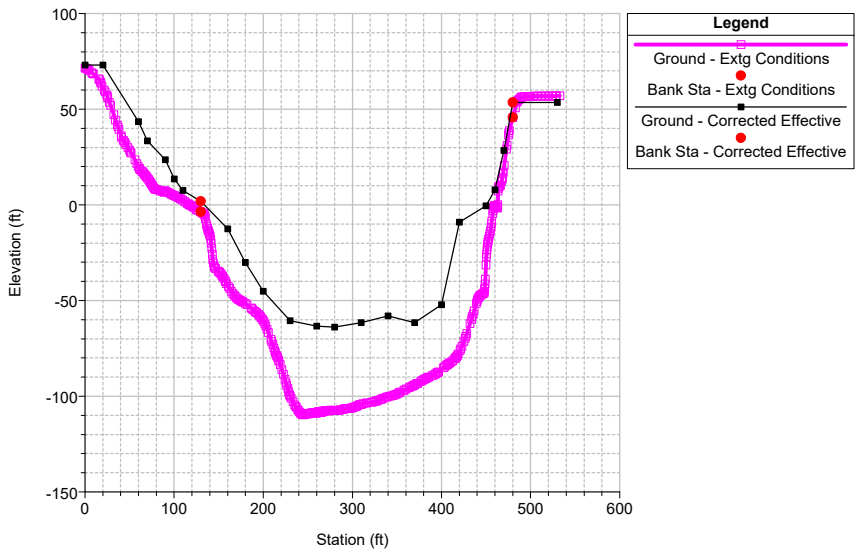


Corrected Effective Plan: 1) Corrected Effective 2) Duplicate Effective
RS = 24.06 CROSS SECTION P



Corrected Effective Compared to Existing Conditions HEC-RAS Cross Sections

Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 26.08



Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
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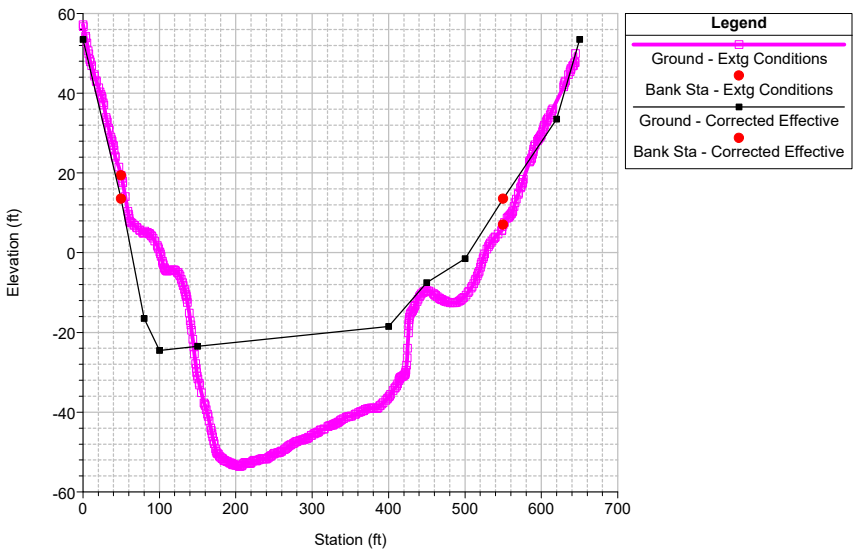

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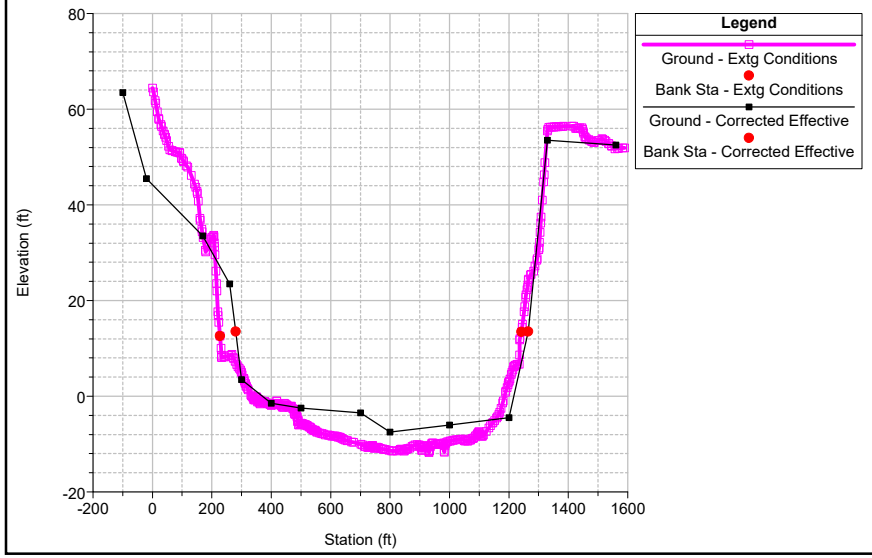

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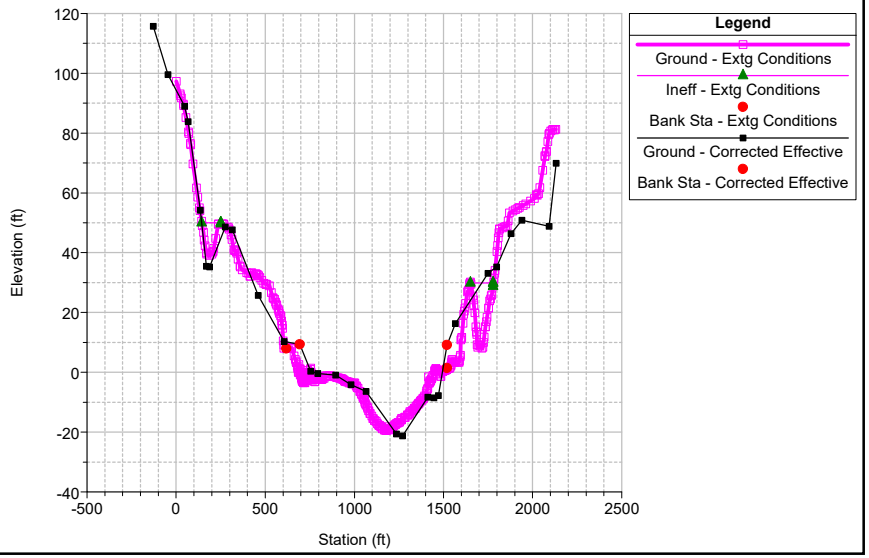
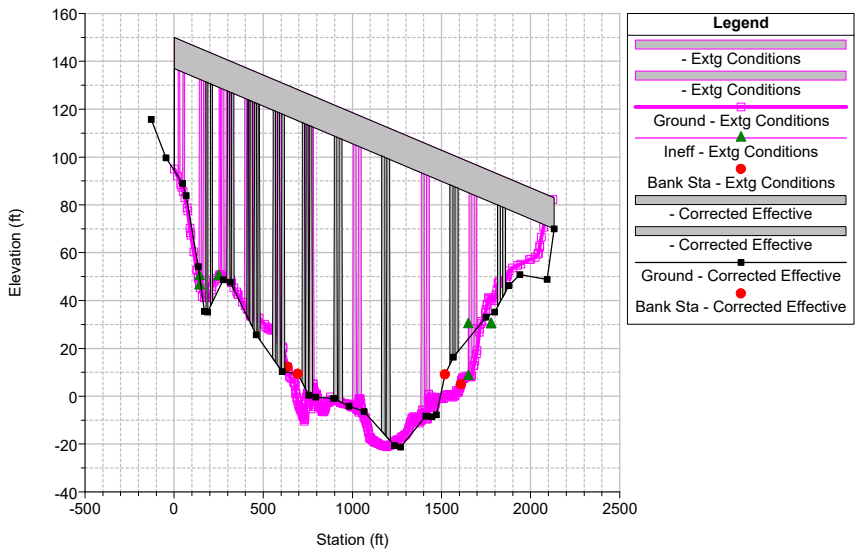
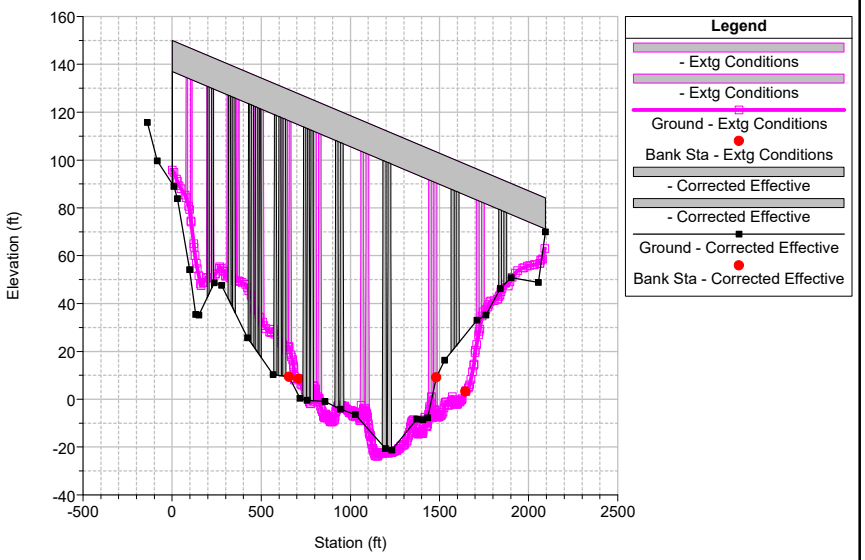


Corrected Effective Compared to Existing Conditions HEC-RAS Cross Sections

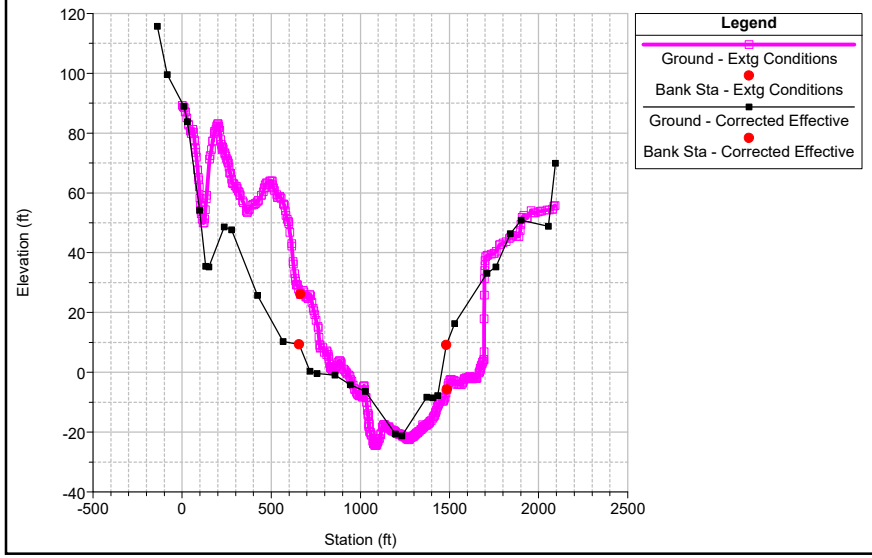
Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 25.55 BR



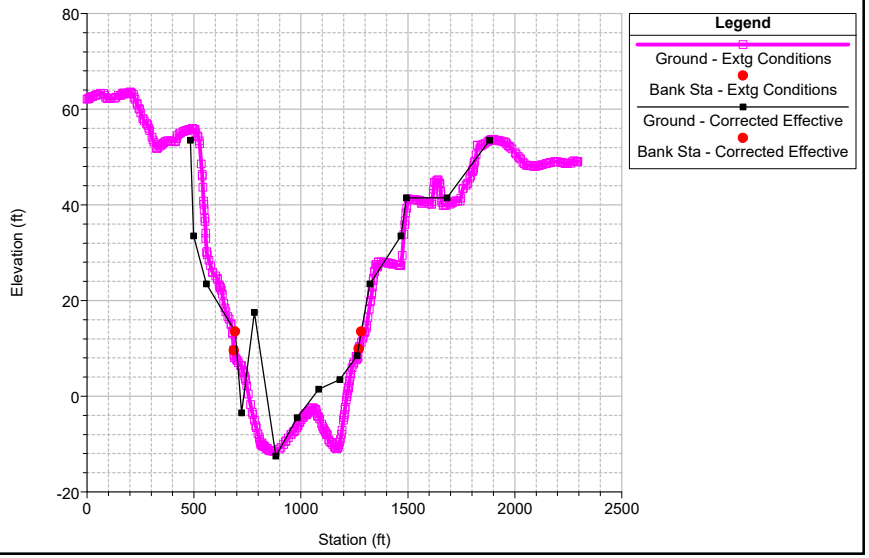
Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 25.55 BR



Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 25.53

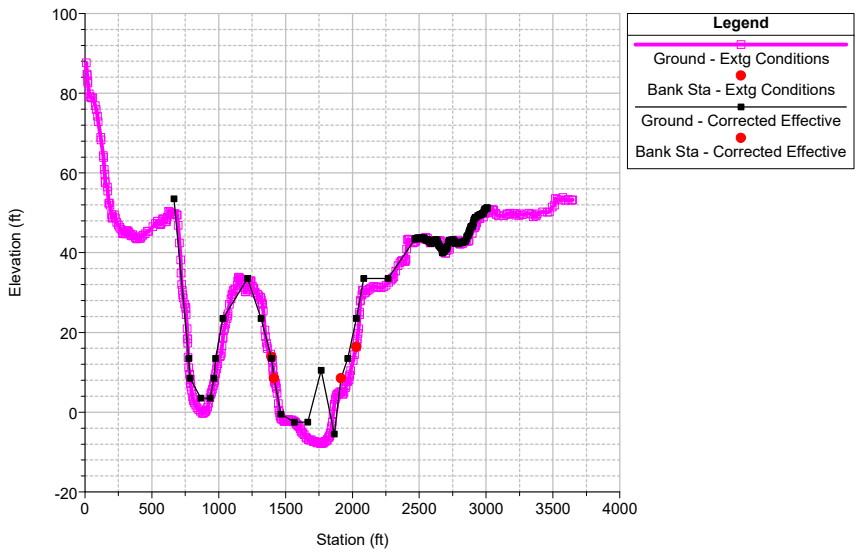


Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 25.32 CROSS SECTION BETWEEN R AND S FROM HEC-2 DATA. NAMED AS R+ IN OU

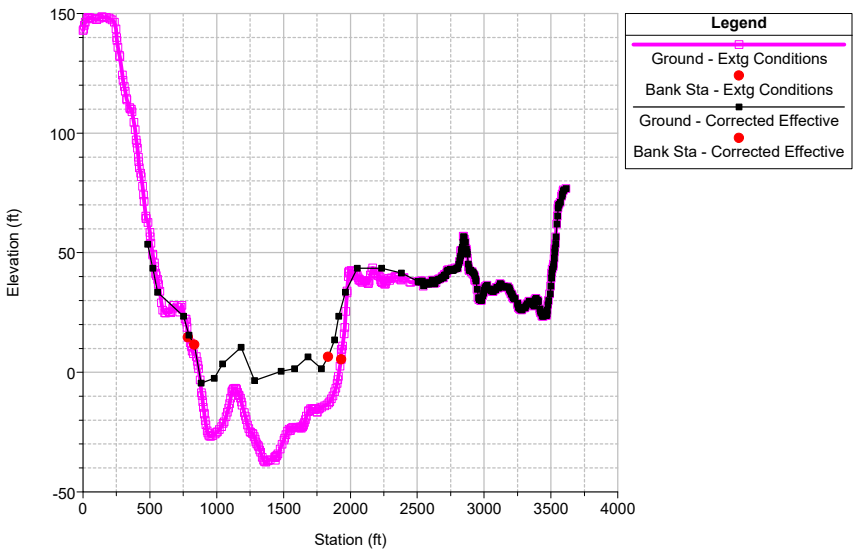


Corrected Effective Compared to Existing Conditions HEC-RAS Cross Sections

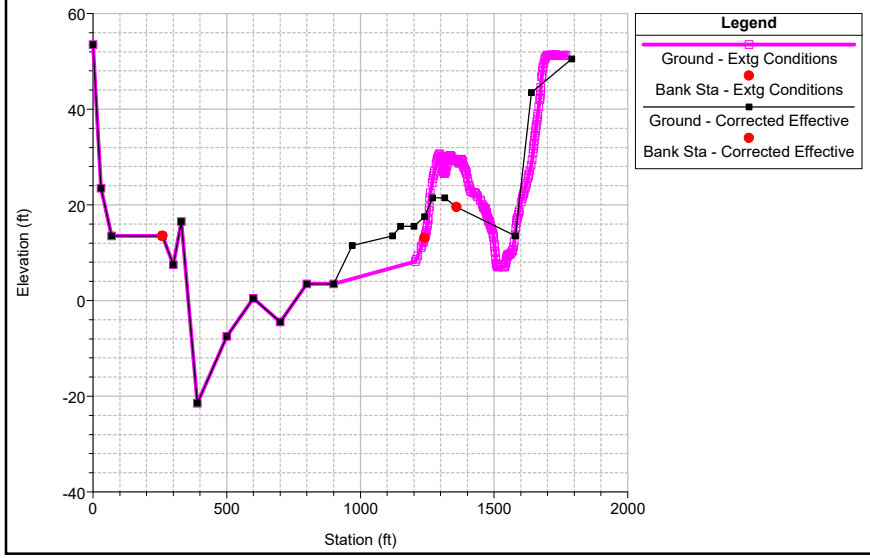
Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 24.90 CROSS SECTION R



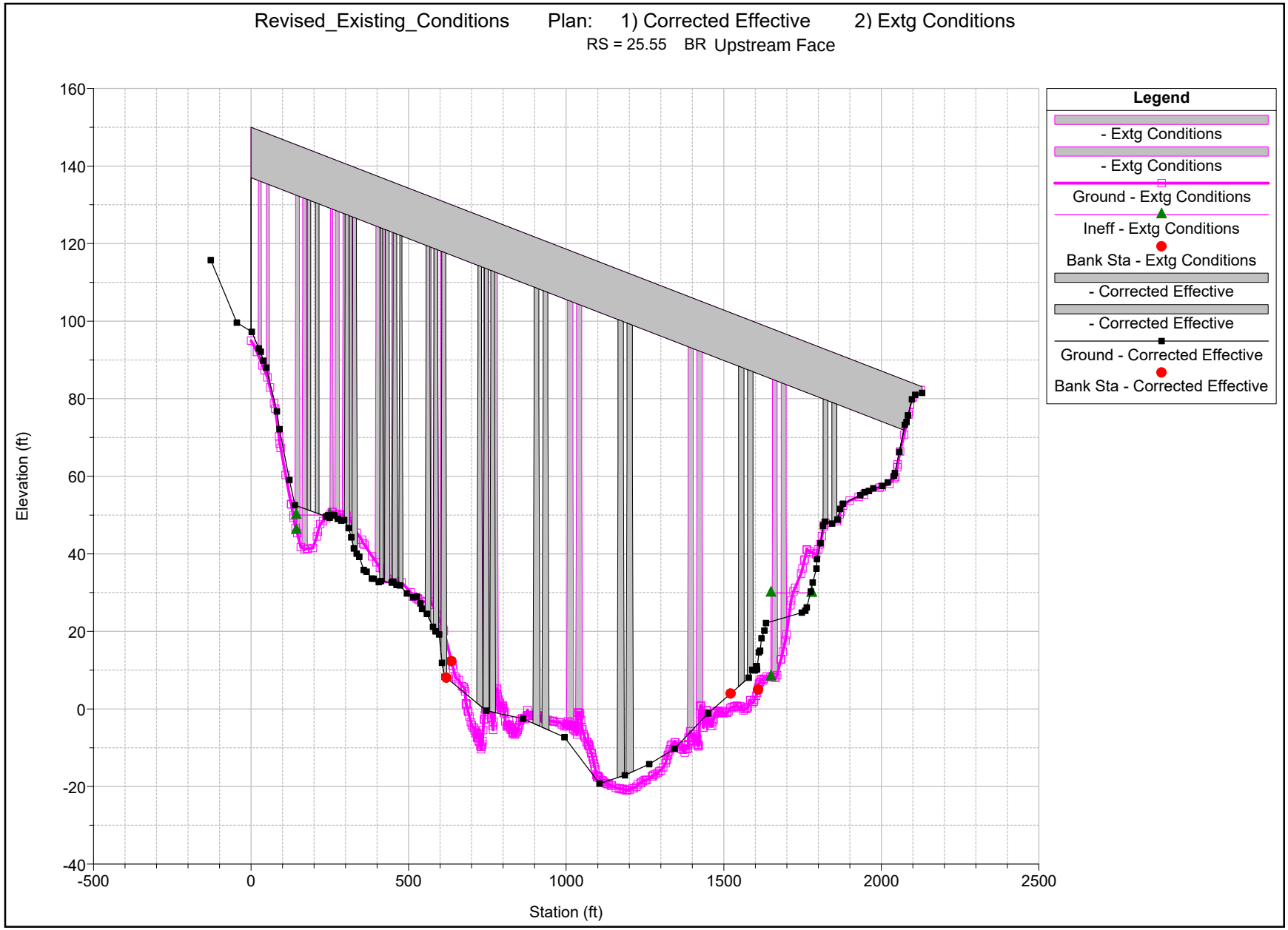
Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 24.50 CROSS SECTION Q



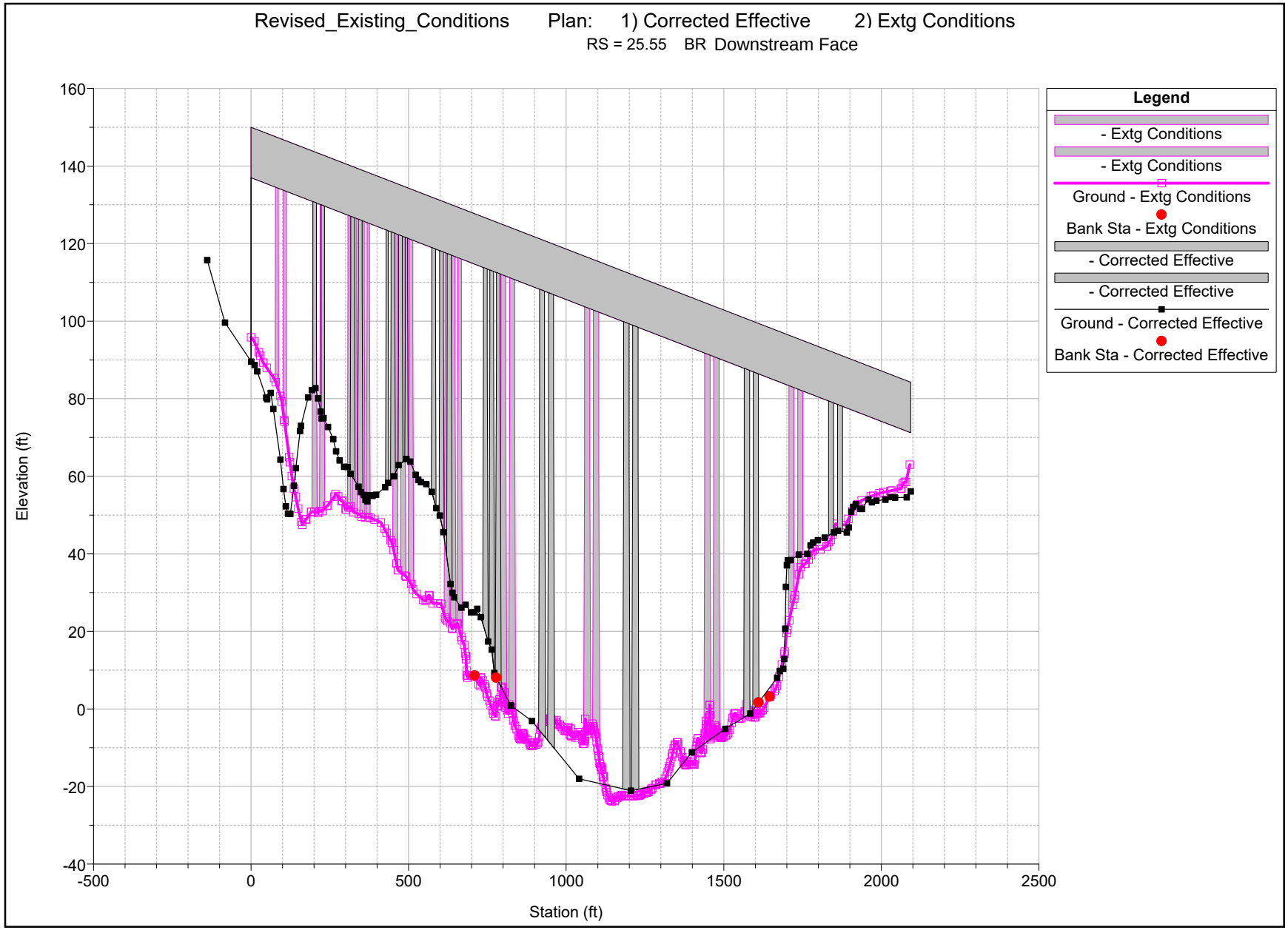
Revised_Existing_Conditions Plan: 1) Corrected Effective 2) Extg Conditions
RS = 24.06 CROSS SECTION P



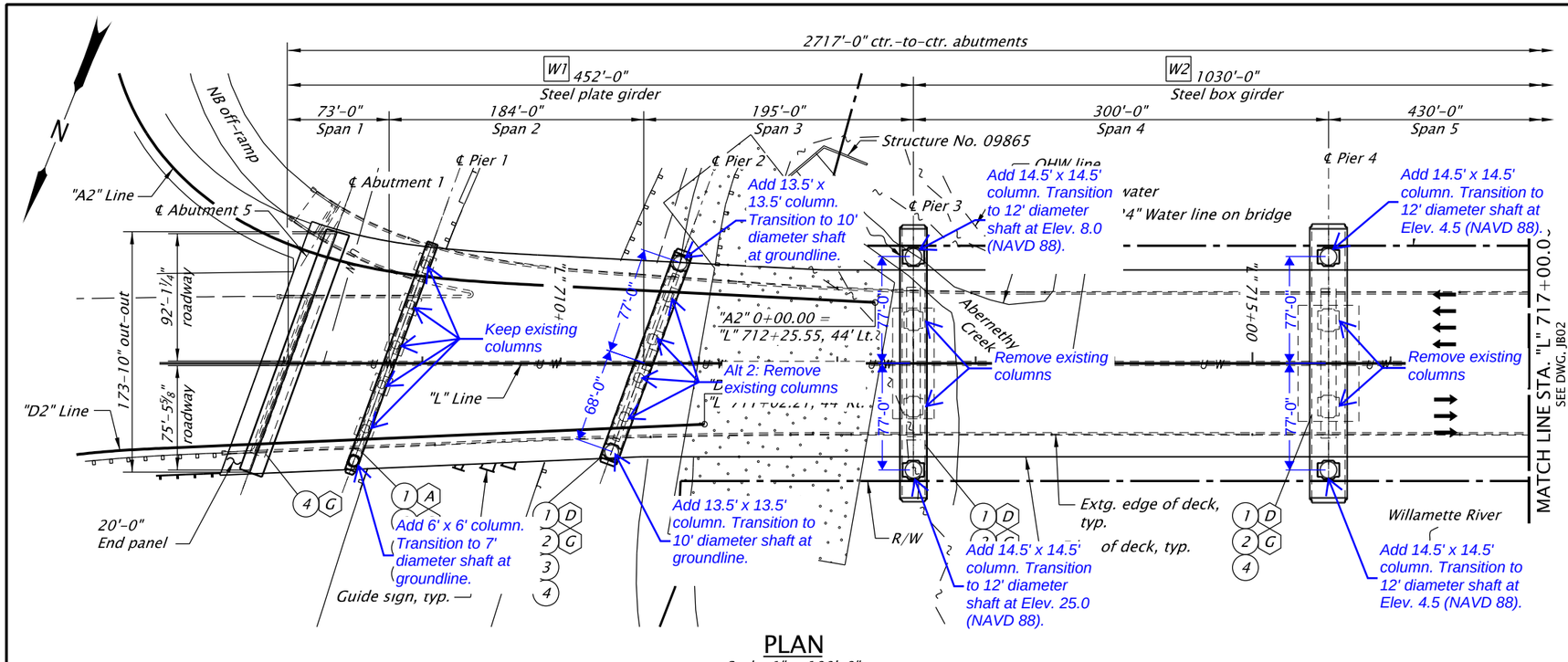
Existing Bridge Compared to Proposed Bridge HEC-RAS Cross Sections



Existing Bridge Compared to Proposed Bridge HEC-RAS Cross Sections

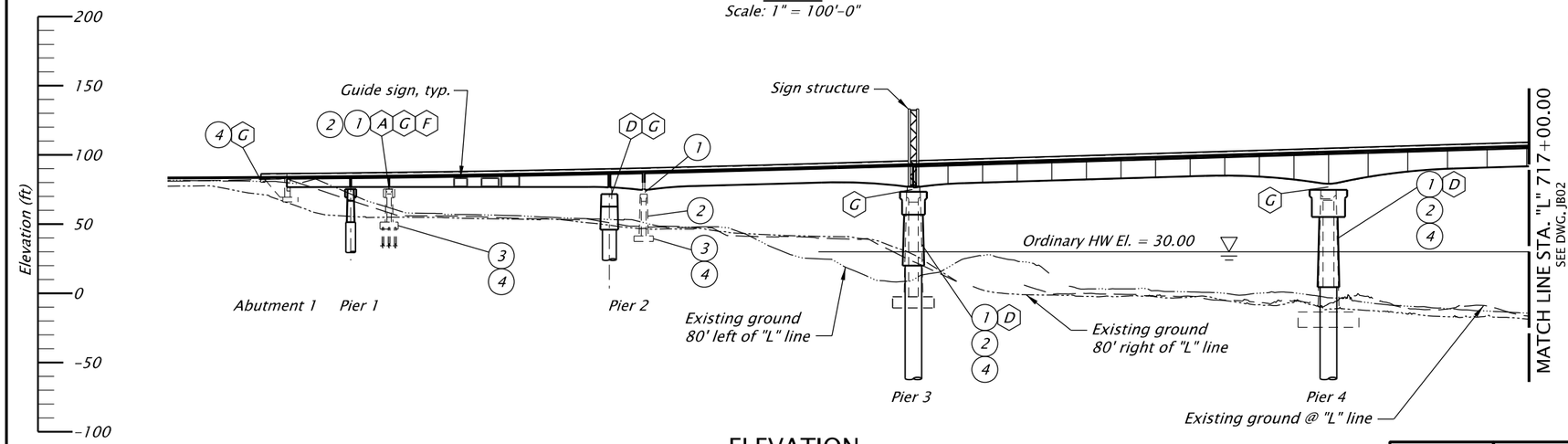


Attachment C. Proposed Bridge Plans



PLAN

Scale: 1" = 100'-0"

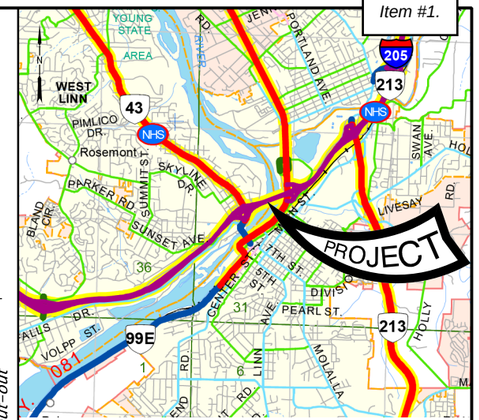


ELEVATION

Scale: 1" = 100'-0"

Existing structure shown approximately at "L" line
Proposed structure shown approximately at right edge of mainline structure

Notes:
1. Elevations shown are based on North American Vertical Datum (1988).



SEC. 29 & 30, T.2S., R.2E., W.M.
LAT. 45.36416, LONG. -122.60513

LOCATION MAP

No Scale

SEISMIC RETROFIT

- (A) *Crossbeam enlargement*
- (B) *Column enlargement*
- (C) *Pile cap enlargement*
- (D) *Substructure replacement*
- (E) *Micropiles*
- (F) *Strengthen footing and pile connection*
- (G) *Isolation bearings*

SEISMIC DEFICIENCY

1. *Crossbeam flexural/shear strength (LL)*
2. *Column flexural/shear strength (LL)*
3. *Lack of top mat pile cap reinforcing (LL)*
4. *Insufficient pile anchorage (LL)*
5. *Spread footing overturning/strength (LL)*

WIDENING

- W1 *Steel girder widening*
- W2 *Cantilever widening*

LEGEND:

Ground improvements

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

ACCOMPANIED BY DWGS.:
See sheets JB01 thru JB4.

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/2019

PRELIMINARY COPY INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: -

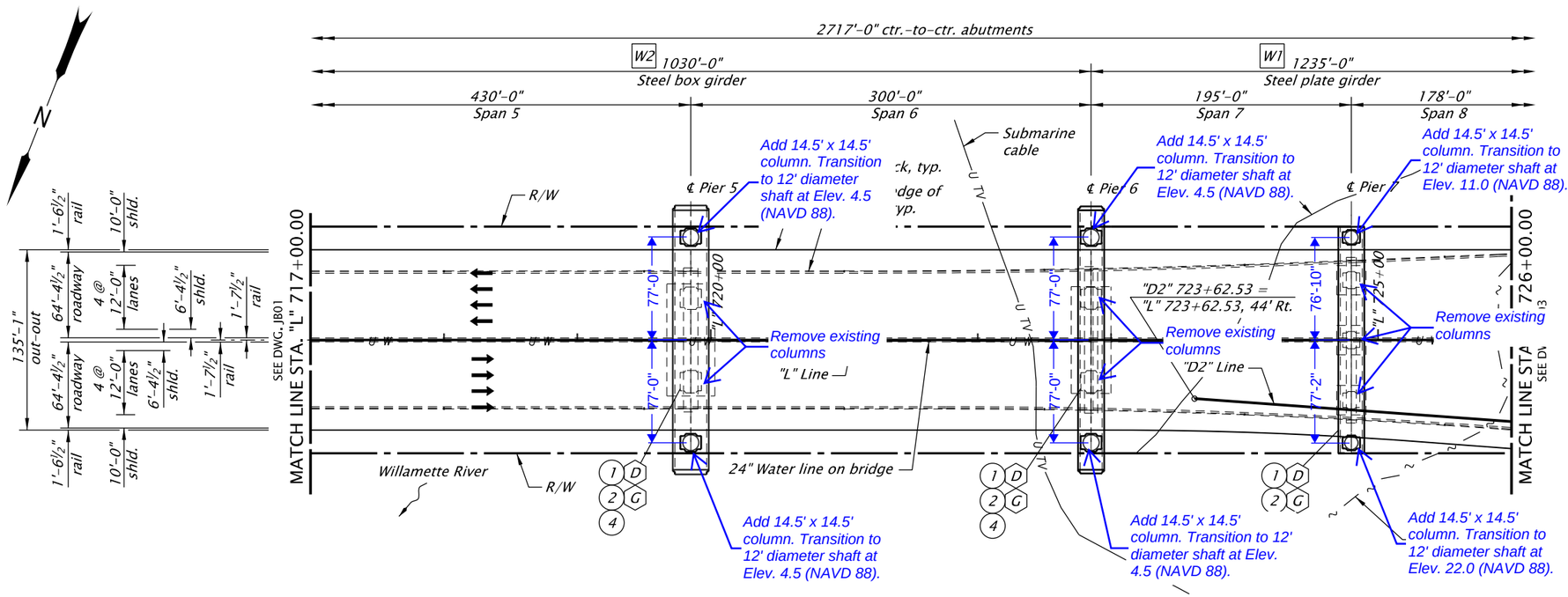
WIDENING AND SEISMIC RETROFIT PLAN AND ELEVATION - 1

SHEET NO.

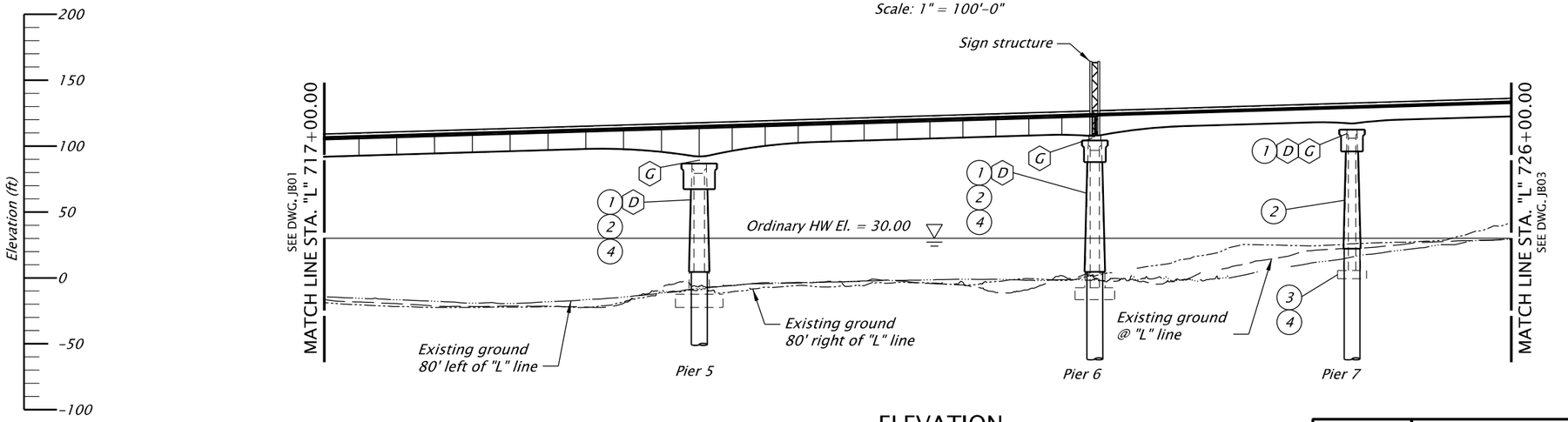
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

BR_K19786_HDR_pe_01.dgn :: Default 7/16/2019 3:25:21 PM LMODEL
Rotation: 201.7268° 0'

Preliminary - For hydraulic team use - 8/27/2019



PLAN
Scale: 1" = 100'-0"



ELEVATION
Scale: 1" = 100'-0"
Existing structure shown approximately at "L" line
Proposed structure shown approximately at right edge of mainline structure

SEISMIC DEFICIENCY

1. Crossbeam flexural/shear strength (LL)
2. Column flexural/shear strength (LL)
3. Lack of top mat pile cap reinforcing (LL)
4. Insufficient pile anchorage (LL)
5. Spread footing overturning/strength (LL)

SEISMIC RETROFIT

- A Crossbeam enlargement
- B Column enlargement
- C Pile cap enlargement
- D Substructure replacement
- E Micropiles
- F Strengthen footing and pile connection
- G Isolation bearings

WIDENING

- W1 Steel girder widening
- W2 Cantilever widening

Notes:
1. Elevations shown are based on North American Vertical Datum (1988).

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

ACCOMPANIED BY DWGS.:
See sheets JB01 thru JB04.

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064	
M.P.: 9.03	
COUNTY	Clackamas
DATE	07/2019

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: -

WIDENING AND SEISMIC RETROFIT PLAN AND ELEVATION - 2

SHEET NO.

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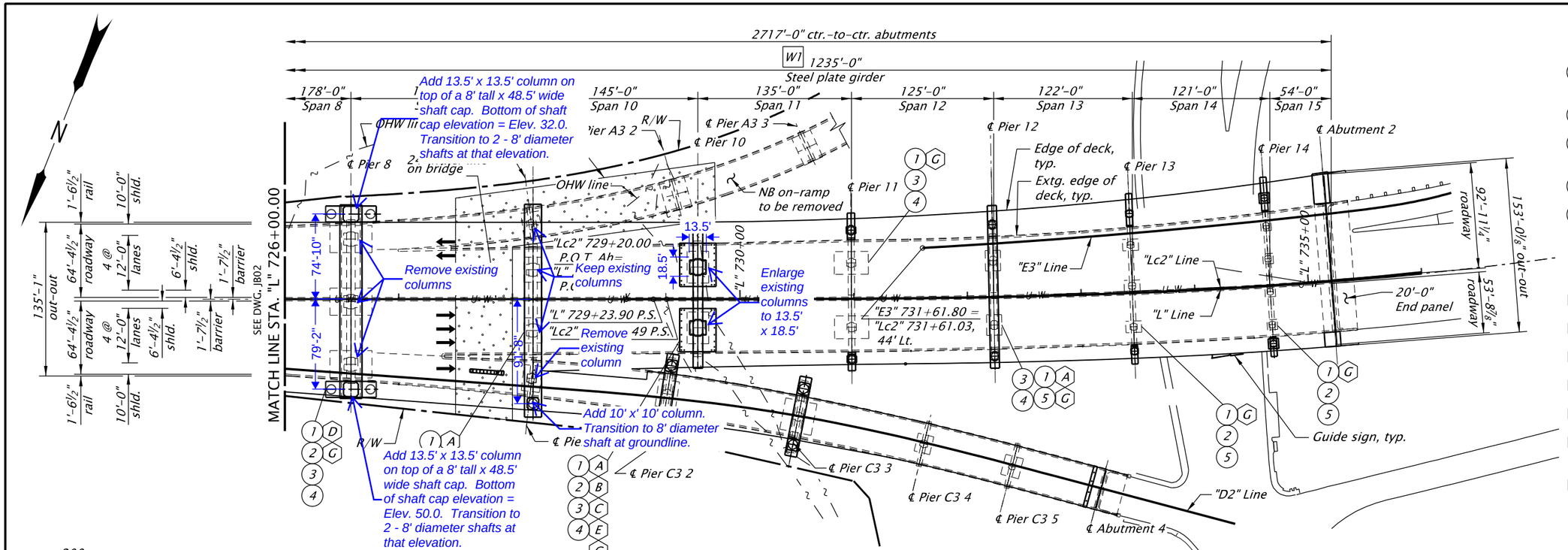
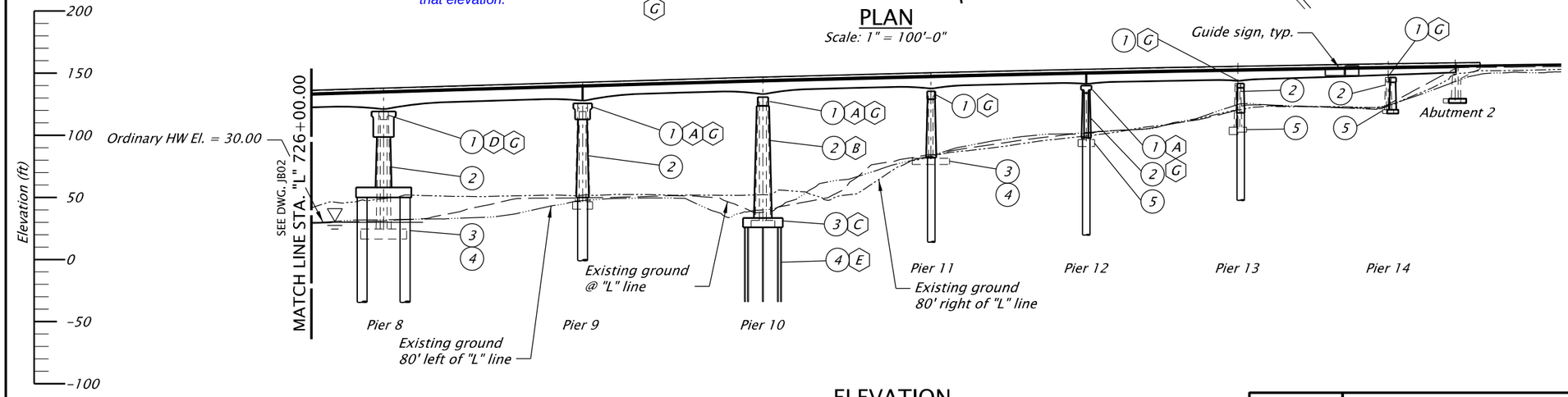


PLAN

Scale: 1" = 100'-0"



ELEVATION

Scale: 1" = 100'-0"

Existing structure shown approximately at "L" line
Proposed structure shown approximately at right edge of mainline structure

SEISMIC DEFICIENCY

1. Crossbeam flexural/shear strength (LL)
2. Column flexural/shear strength (LL)
3. Lack of top mat pile cap reinforcing (LL)
4. Insufficient pile anchorage (LL)
5. Spread footing overturning/strength (LL)

SEISMIC RETROFIT

- A Crossbeam enlargement
- B Column enlargement
- C Pile cap enlargement
- D Substructure replacement
- E Micropiles
- F Strengthen footing and pile connection
- G Isolation bearings

WIDENING

- W1 Steel girder widening
- W2 Cantilever widening

LEGEND:

Ground improvements

Notes:
1. Elevations shown are based on North American Vertical Datum (1988).

SCALE WARNING
If scale bar doesn't measure one inch then drawing is not to scale

ACCOMPANIED BY DWGS.:
See sheets JB01 thru JB04.

STRUCTURE NO.	09403
BDS DWG NO.	00000
CALC. BOOK	0000
HWY: 064 M.P.: 9.03	
COUNTY	Clackamas
DATE	07/2019

PRELIMINARY COPY INFORMATION ONLY

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

WILLAMETTE R & HWYS 1E & 3, HWY 64 (GEO ABERNETHY)

I-205: I-5 - OR213, PHASE 1 SEC.

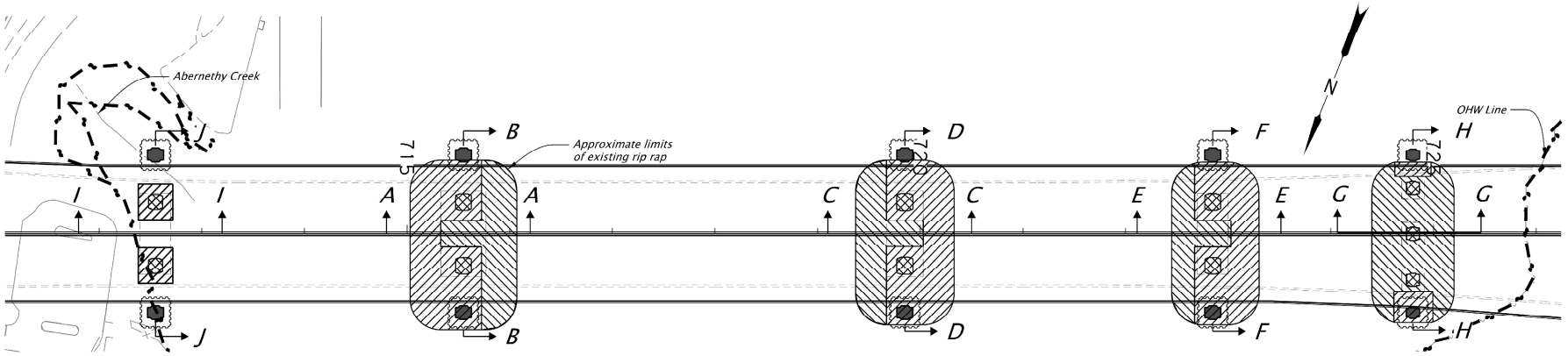
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Mikal Mitchell | Reviewer: Jeff Olson
Drafter: Heather Gonsior | Checker: -

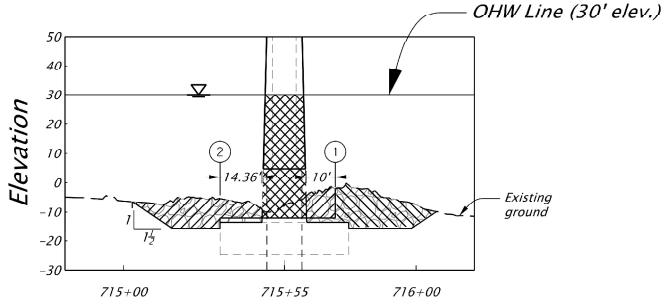
WIDENING AND SEISMIC RETROFIT PLAN AND ELEVATION - 3

SHEET NO.

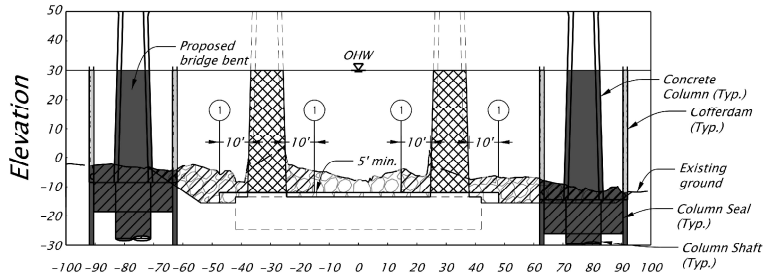
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST



PLAN VIEW
Scale: 1"=100'



SECTION A-A PIER 4 (STA. 715+55)
Scale: 1"=40'



SECTION B-B PIER 4 (STA. 715+55)
Scale: 1"=40'

LEGEND

- PERM REMOVAL
- EXISTING GROUND
- ESTIMATED LIMITS OF EXISTING RIP RAP
- PERM REMOVAL – EXTG. CONCRETE COLUMNS
- PERM FILL
- POTENTIAL PERMANENT RIP RAP REMOVAL
- TEMP. FILL – COFFERDAMS

(1) Remove rip rap 10' surrounding existing column and to a minimum depth of 5'.

(2) Remove rip rap from existing column to edge of footing or a minimum depth of 5'.

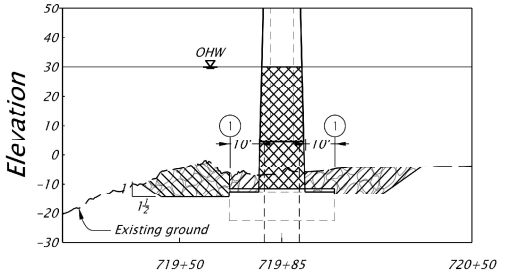
General Note:

Rip rap locations are approximate and for reference only. Actual rip rap location and depths vary.

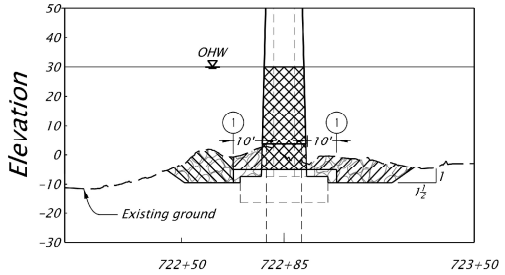
I-205 ABERNETHY
PERMANENT AND TEMPORARY IMPACTS

DATA SOURCE: HDR 2019

PATH: C:\PROJECTS\STAGING_WORKFROMHOME\I205\JPA\MAP_DOCS\JPA\F5 IMPACTS_SHEET_5_4.MXD - USER: JBEARD - DATE: 4/16/2019

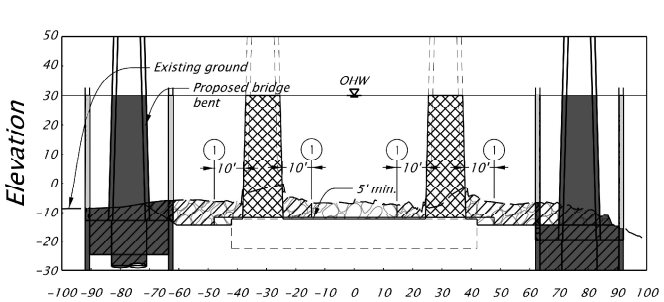


SECTION C-C PIER 5 (STA. 719+85)
Scale: 1"=40'

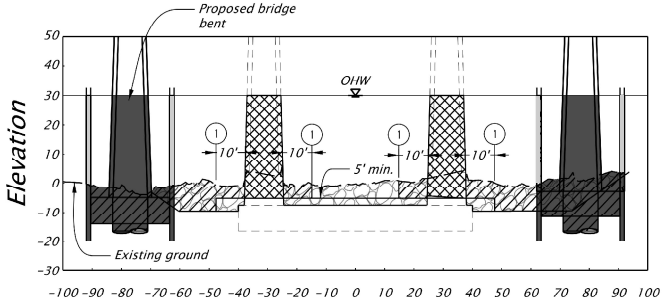


SECTION E-E PIER 6 (STA. 722+85)
Scale: 1"=40'

① Remove rip rap 10' surrounding existing column and to a minimum depth of 5'



SECTION D-D PIER 5 (STA. 719+85)
Scale: 1"=40'



SECTION F-F PIER 6 (STA. 722+85)
Scale: 1"=40'

LEGEND

- PERM REMOVAL
- EXISTING GROUND
- ESTIMATED LIMITS OF EXISTING RIP RAP
- PERM REMOVAL
- PERM FILL
- TEMP. FILL – COFFERDAMS
- POTENTIAL PERMANENT RIP RAP REMOVAL

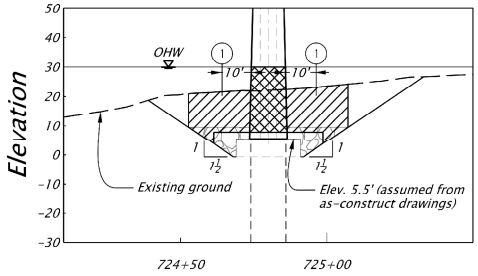
General Note:

Rip rap locations are approximate and for reference only. Actual rip rap location and depths vary.

I-205 ABERNETHY
PERMANENT AND TEMPORARY IMPACTS

DATA SOURCE: HDR 2019

PATH: C:\PROJECTS\STAGING_WORKFROMHOME\I205\JPA\MAP_DOCS\JPA\F5 IMPACTS_SHEET_5_5.MXD - USER: JBEARD - DATE: 4/16/2019



SECTION G-G PIER 7 (STA. 724+80)
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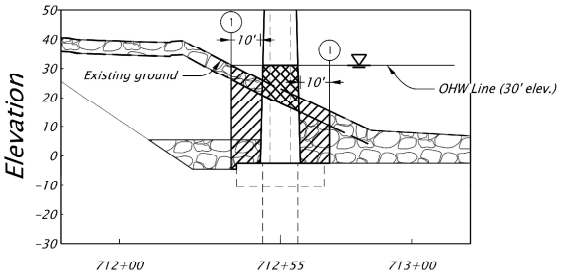

SECTION I-I PIER 3 (STA. 712+55)
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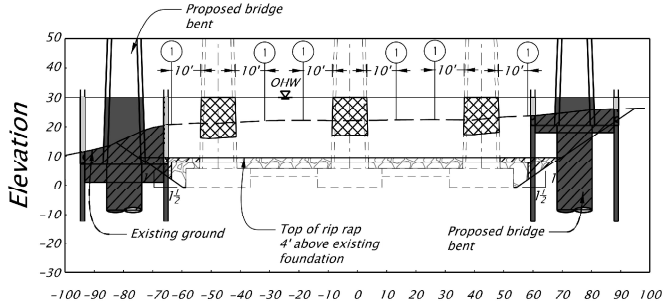

SECTION H-H PIER 7 (STA. 724+80)
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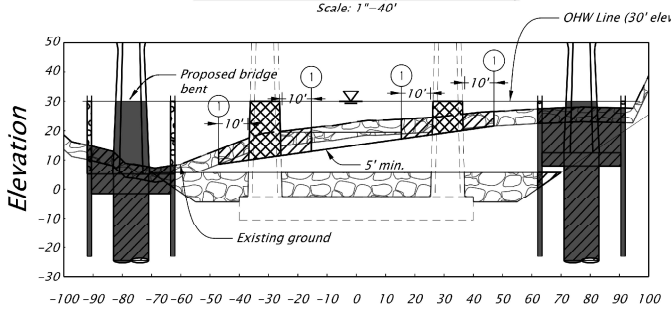


SECTION J-J PIER 3 (STA. 712+55)
Scale: 1"=40'

LEGEND

- PERM REMOVAL
- EXISTING GROUND
- ESTIMATED LIMITS OF EXISTING RIP RAP
- PERM REMOVAL - EXTG. CONCRETE COLUMNS
- PERM FILL
- TEMP. FILL - COFFERDAMS

(1) Remove rip rap 10' surrounding existing column and to a minimum depth of 5'

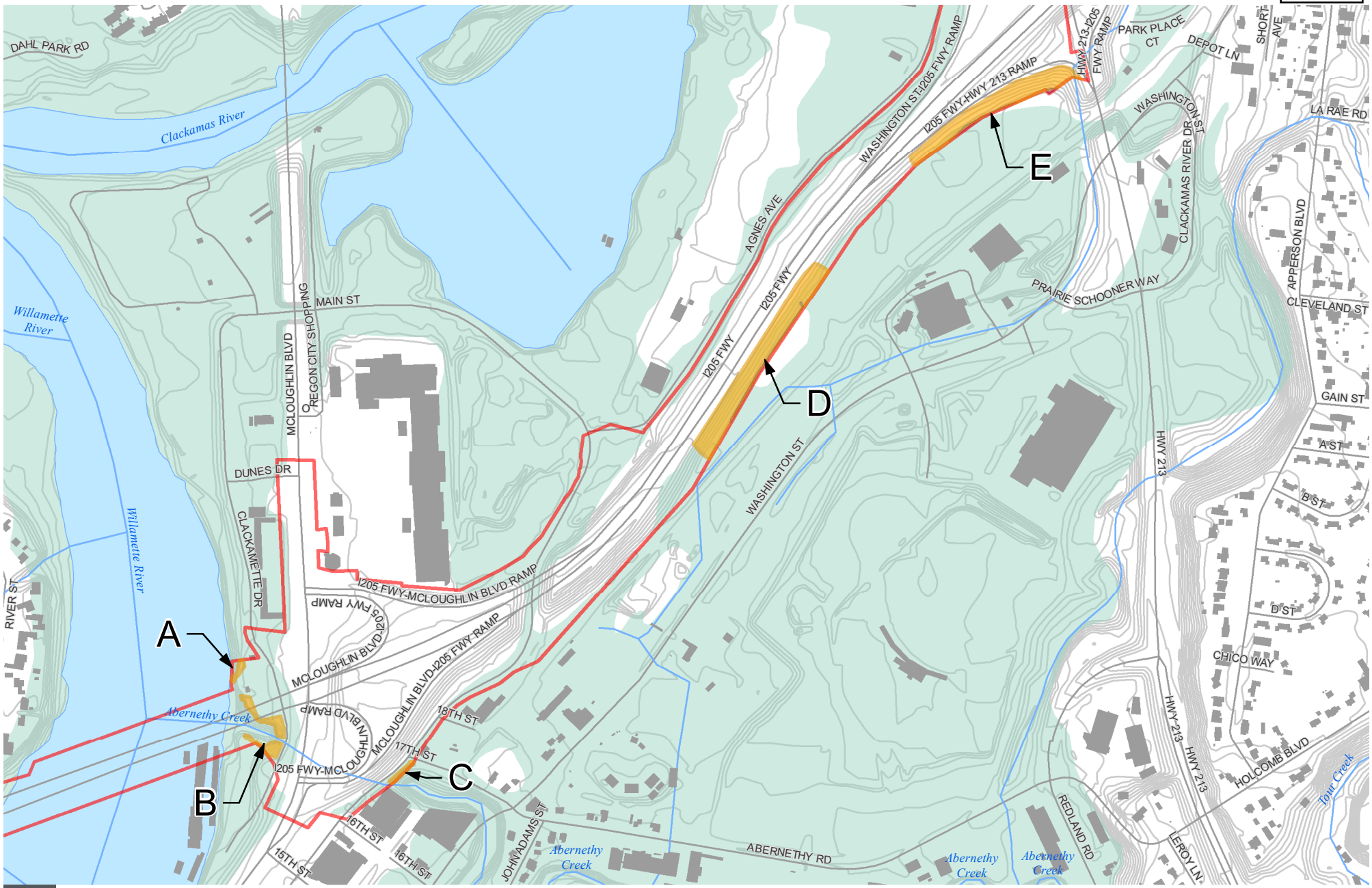
General Note:

Rip rap locations are approximate and for reference only. Actual rip rap location and depths vary.

DATA SOURCE: HDR 2019

PATH: C:\PROJECTS\STAGING_WORKFROMHOME\I205\JPA\MAP_DOCS\JPA\F5 IMPACTS_SHEET_5_6.MXD - USER: JBEARD - DATE: 4/16/2019

Attachment F. Natural Resources Overlay District Site Plans



NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

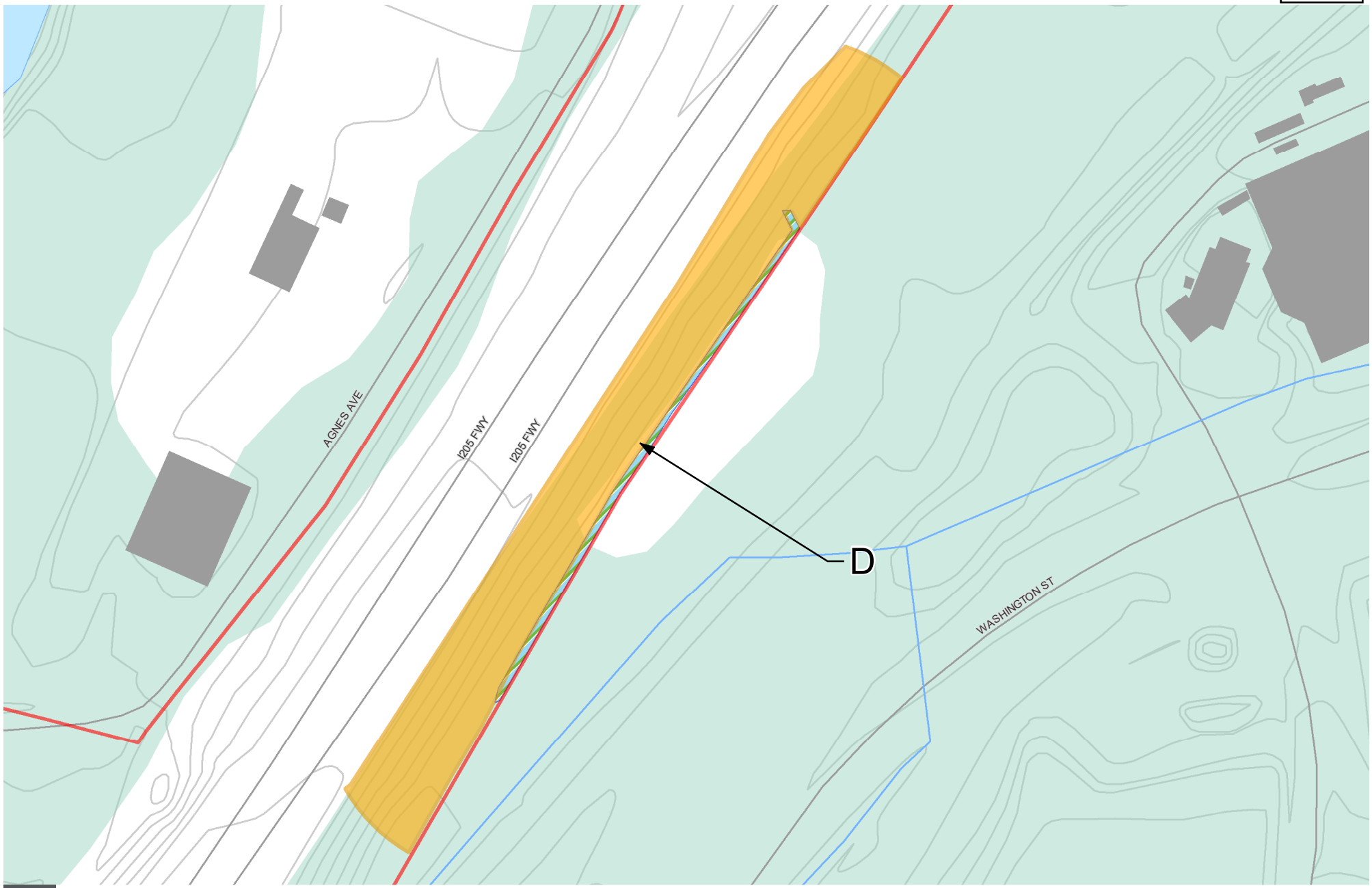
0 Miles 0.1

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITE_PLANRB.MXD - USER: RBARKSDALE - DATE: 7/29/2019

SITE PLAN

OCMC 17.49.220 (A)



NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

0 Miles 0.03

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITE_PLANRB.MXD - USER: RBARKSDALE - DATE: 7/29/2019

SITE PLAN

OCMC 17.49.220 (A)

NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

0 Miles 0.02

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITE_PLANRB.MXD - USER: RBARKSDALE - DATE: 7/29/2019

SITE PLAN

OCMC 17.49.220 (A)

0 12.5 25 Feet

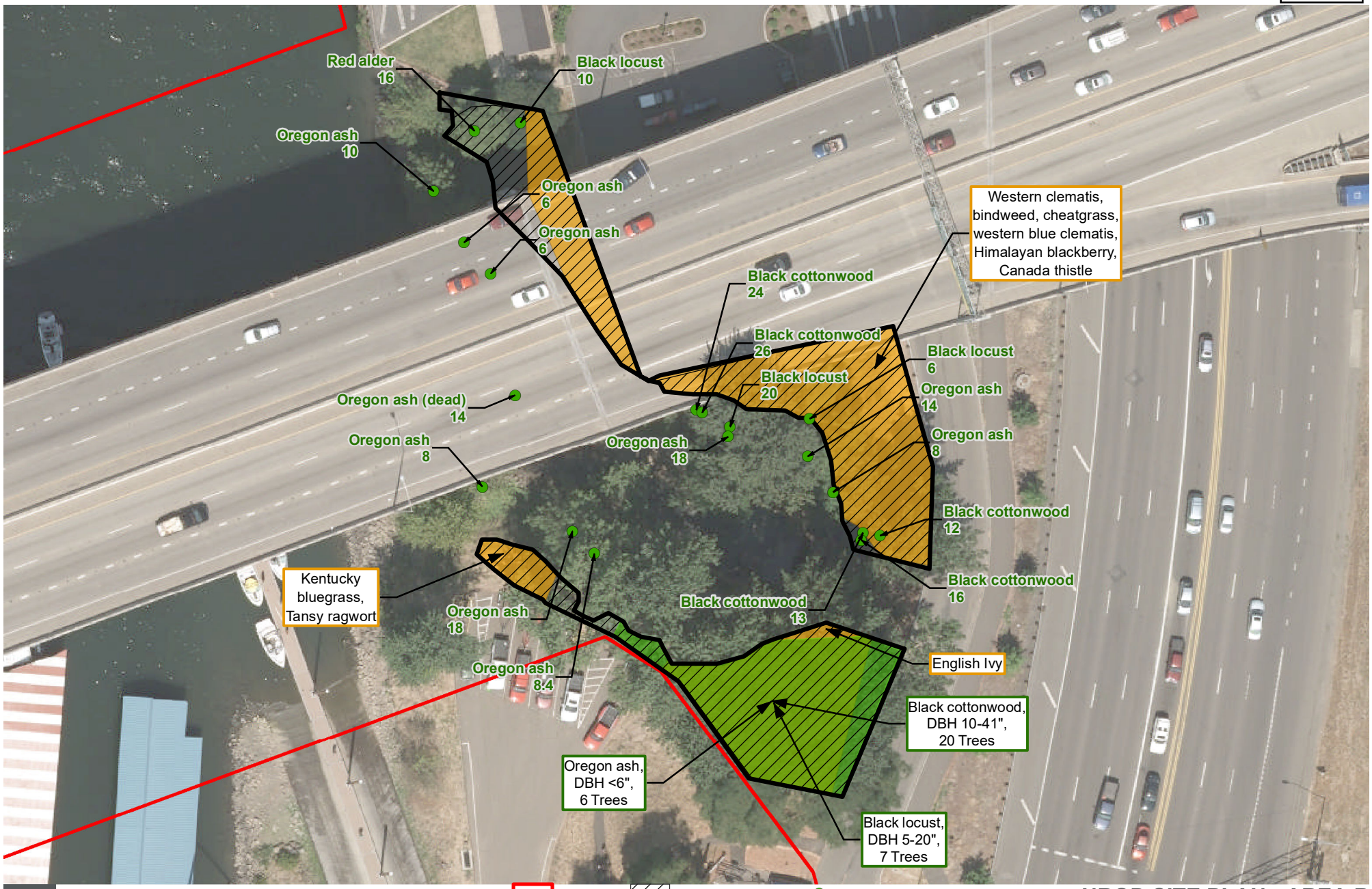
Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed

DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA A

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019

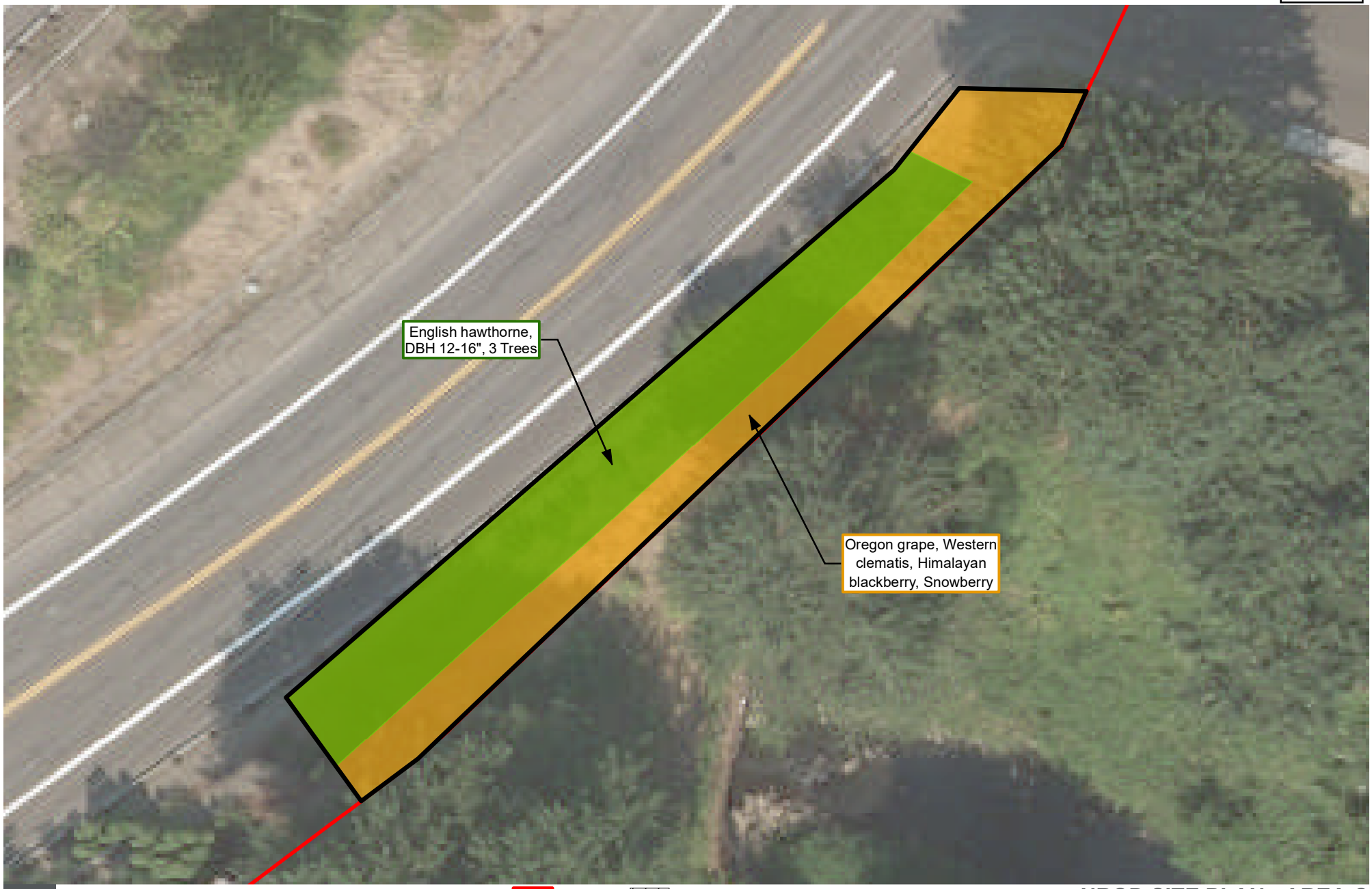


NROD SITE PLAN - AREA B

(OCMC 17.49.220 (B))

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 8/7/2019



0 10 20 Feet

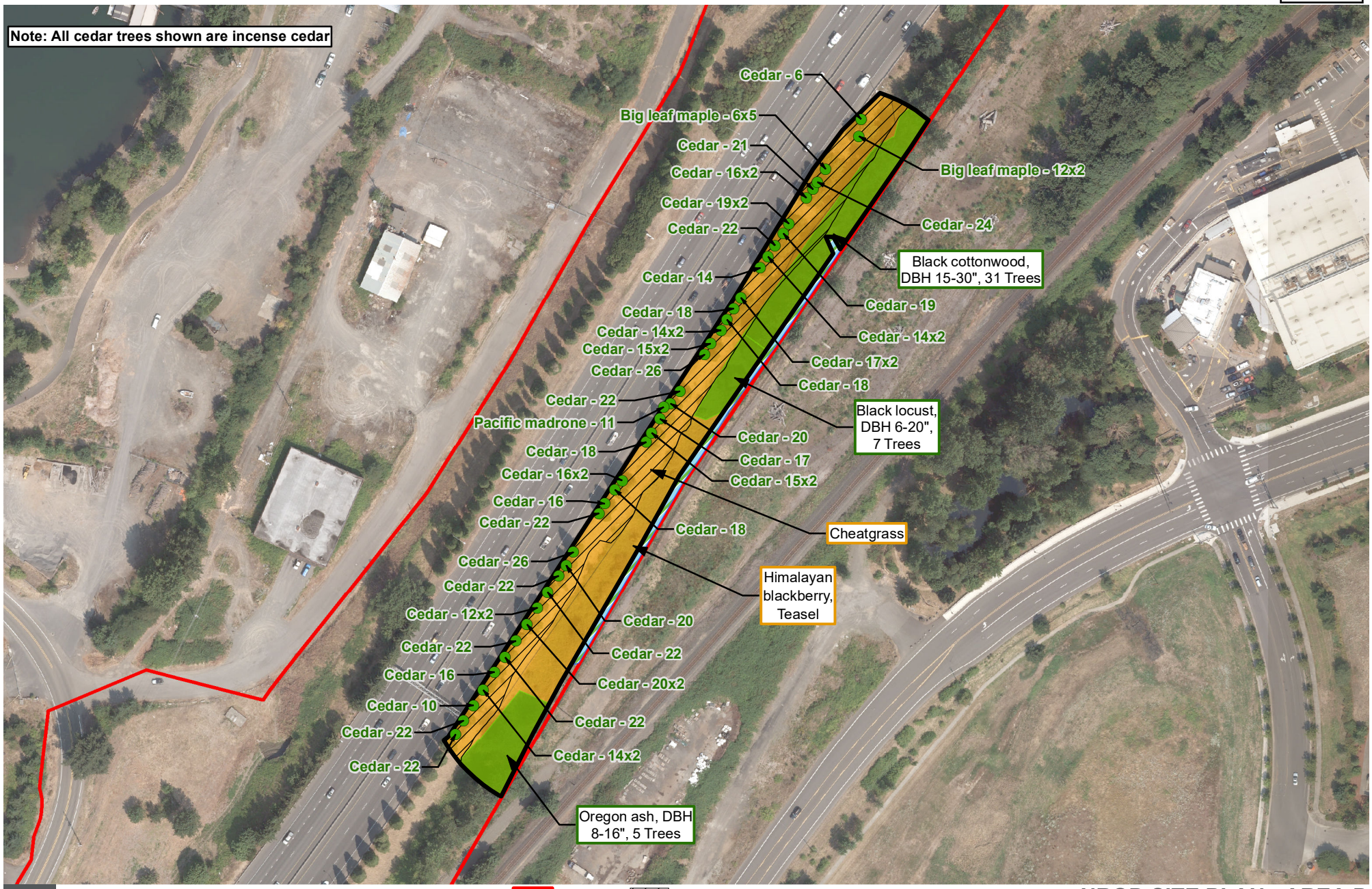
Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed

DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA C

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019



0 105 210 Feet

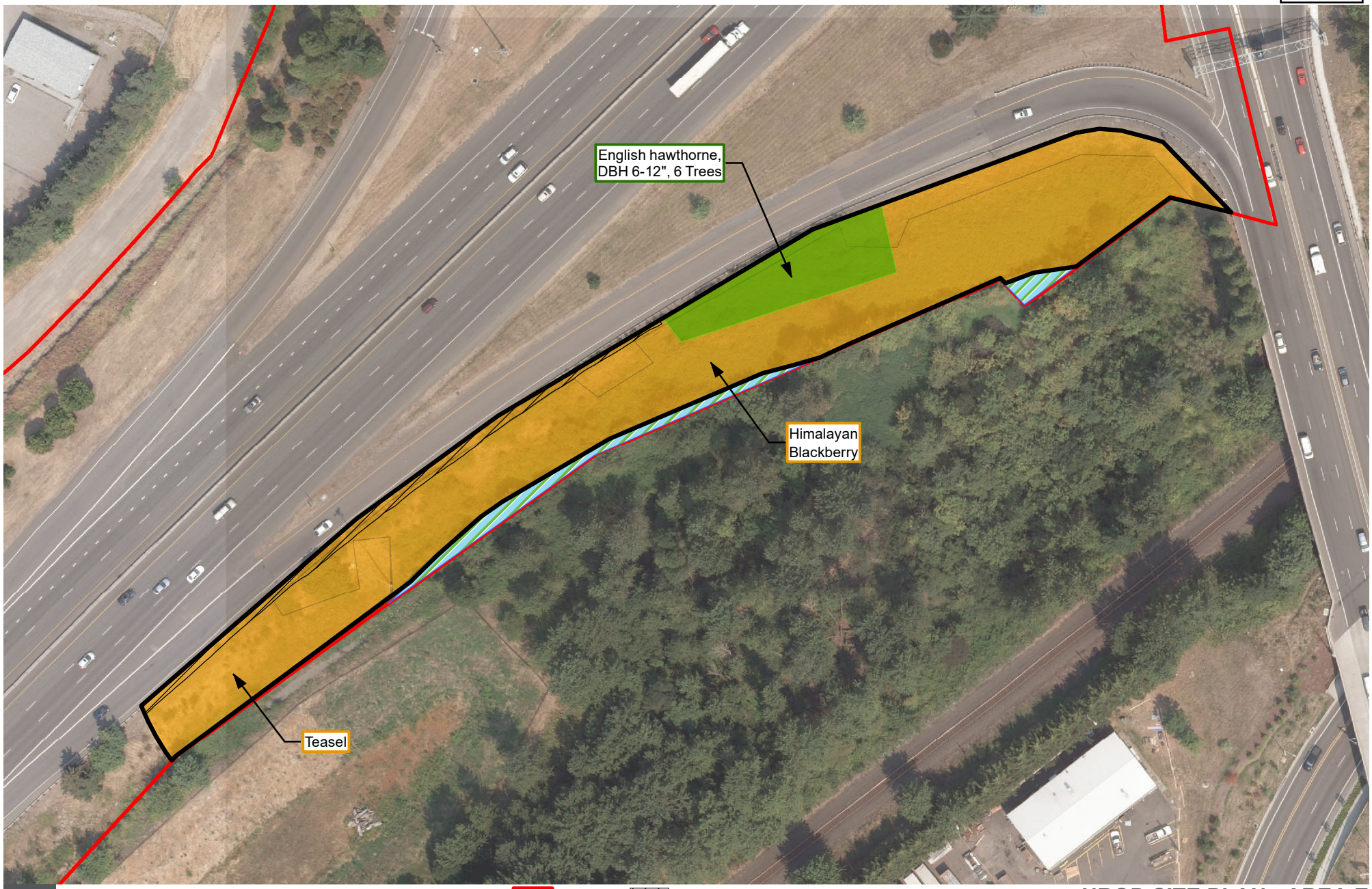
Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed
Wetlands

DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA D

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019



0 60 120 Feet

Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed
Wetlands

DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA E

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019

Attachment G. Natural Resources Overlay District Mitigation Plan and Report

Natural Resource Overlay District Mitigation Plan Report

ODOT | K19786 I-205: Stafford Rd to OR 213 Corridor Road Widening & Retrofit of the Abernethy Bridge Project

ODOT EA: PE003013
HDR Project # 10063137

February 6, 2020

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3 Functions and Values 8
4 Monitoring and Maintenance Plan 12
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Appendices

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Appendix B. Documentation of Agency Coordination B-1
Appendix C. Erosion and Sediment Control Plan C-1

Acronyms

AASHTO	American Association of State Highway and Transportation Officials
BDDM	Bridge Design and Drafting Manual
Consultant	HDR Engineering, Inc. and subconsultant partners
County	Clackamas County, Oregon
ESA	Endangered Species Act
FHWA	Federal Highway Administration
HCA	Habitat Conservation Area
NEPA	National Environmental Policy Act
NROD	Natural Resources Overlay District
ODOT	Oregon Department of Transportation
PS&E	Plans, Specifications, & Estimates
Project	I-205: Stafford Rd to OR213 Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening
ROW	Right of Way
SOW	Statement of Work

1 Introduction

This mitigation plan report addresses proposed impacts to the Natural Resources Overlay District (NROD) within the I-205: Stafford Road to OR213 Corridor Road Widening & Retrofit of the Abernethy Bridge Project (Project) site, and the subsequent mitigation required. The Applicant proposes mitigation compliant with Mitigation Planting Option 2 as outlined in OCMC Section 17.49.180(E)(2). The accompanying mitigation site plans are included in Appendix A.

2 Project Impacts and Mitigation in NROD Areas

The total disturbance area of the proposed project within the NROD boundary is 58,687 square feet. Based on the mitigation calculation, this amount of disturbance requires 587 trees and 2,934 shrubs to be planted for mitigation, in an area equal to 117,374 square feet to comply with the 2:1 mitigation ratio. There are three areas of disturbance, as shown in Figures 1-3 below.

- Area B has approximately 12,907 square feet of disturbance proposed. Trees will be removed as well as existing shrubs and groundcover. Grading is proposed to accommodate installation of piers and realignment of Abernethy Creek.
- Area D has approximately 42,372 square feet of disturbance. The project proposes to remove 39 trees within area D, most of which are incense cedars. Grading will take place to accommodate widening the lanes of I-205. There is existing area outside of the disturbance area that could be used for mitigation.
- Area E has approximately 3,408 square feet of disturbance. Grading will take place to widen the existing lanes of I-205. Area E is mostly open space, covered with blackberry and teasel. The remaining undisturbed portion of the NROD would be a suitable mitigation area.
- Areas A and C are areas within the project limits and the NROD boundary, but no disturbance is proposed in either area.

Figure 1. Site Plan for NROD Area B

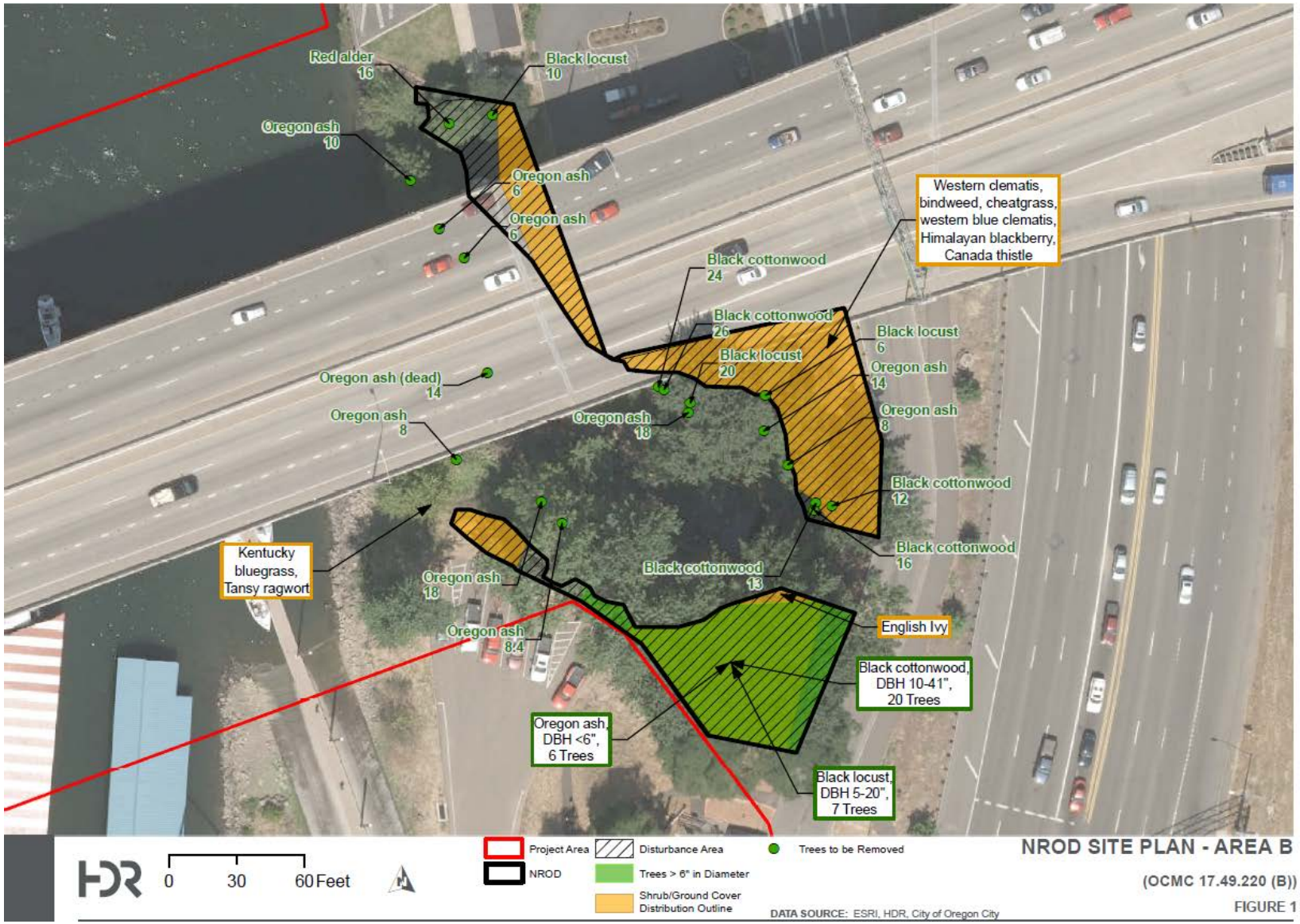
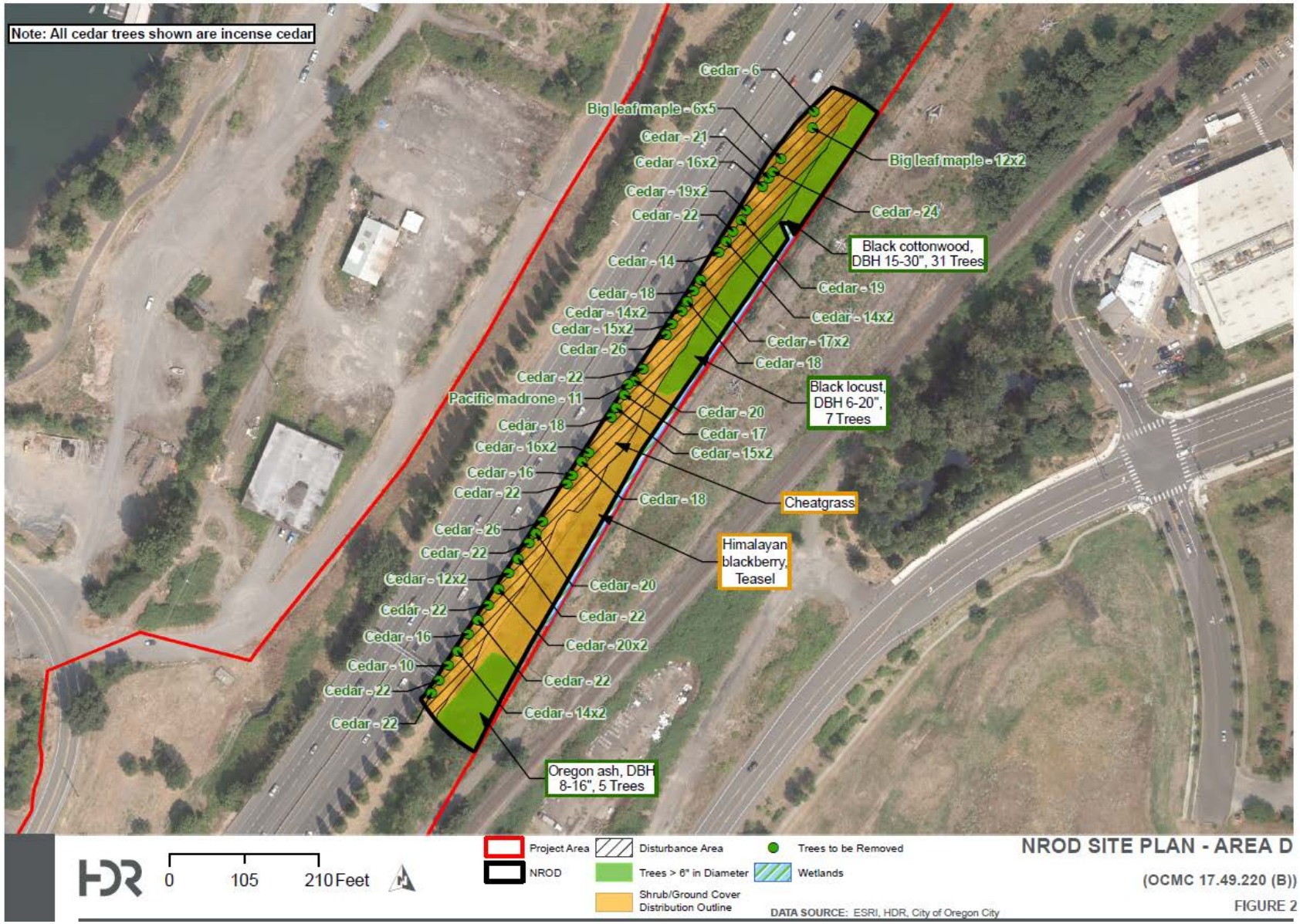
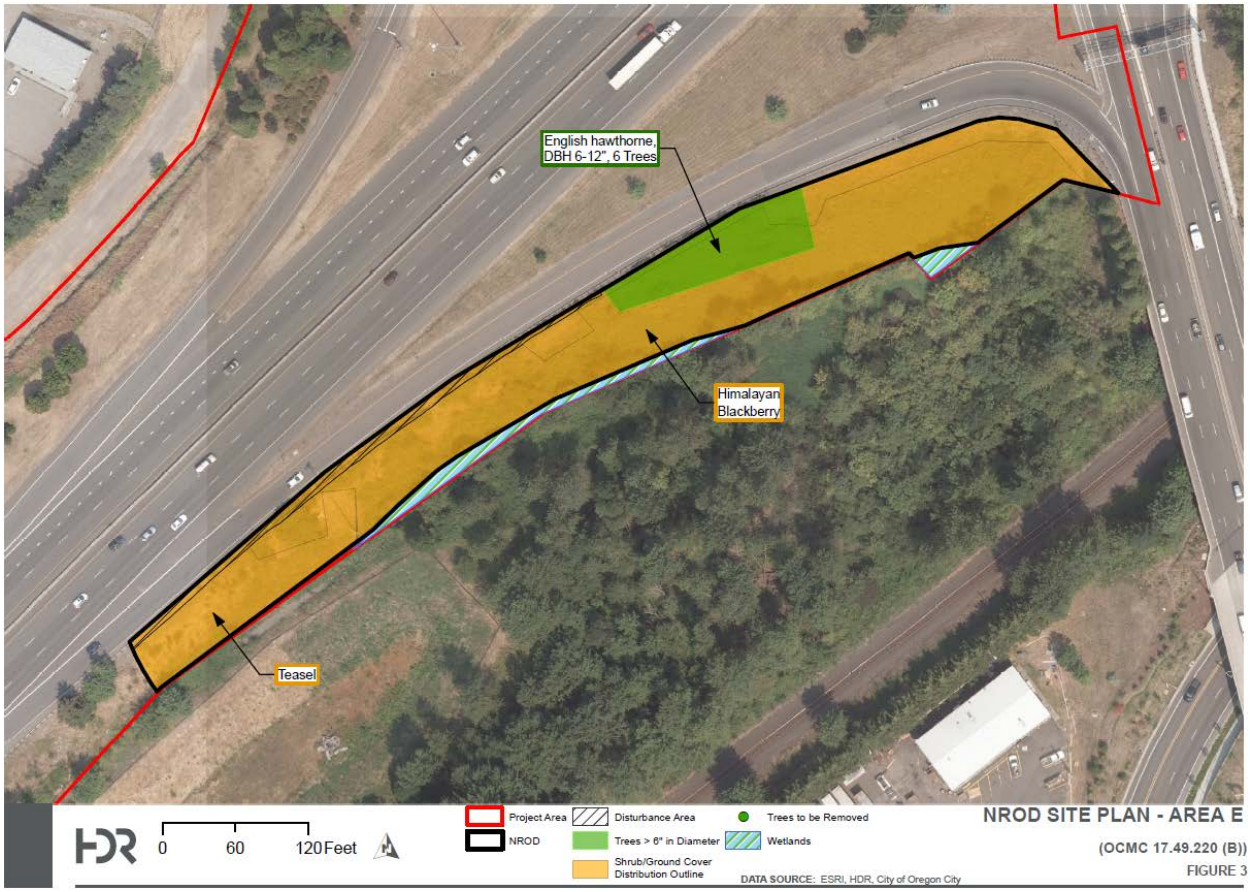


Figure 2. Site Plan for NROD Area D



The existing conditions within area D include several cedar trees, with a groundcover dominated by invasive plant species. Proposed disturbance in this area includes removal of the trees adjacent to the existing road to increase the capacity of I-205. Clearing, grading, and fill will occur in the area of disturbance shown in Figure 2. There is a wetland at the bottom of the slope, which will not be disturbed.

Figure 3. Site Plan for NROD Area E



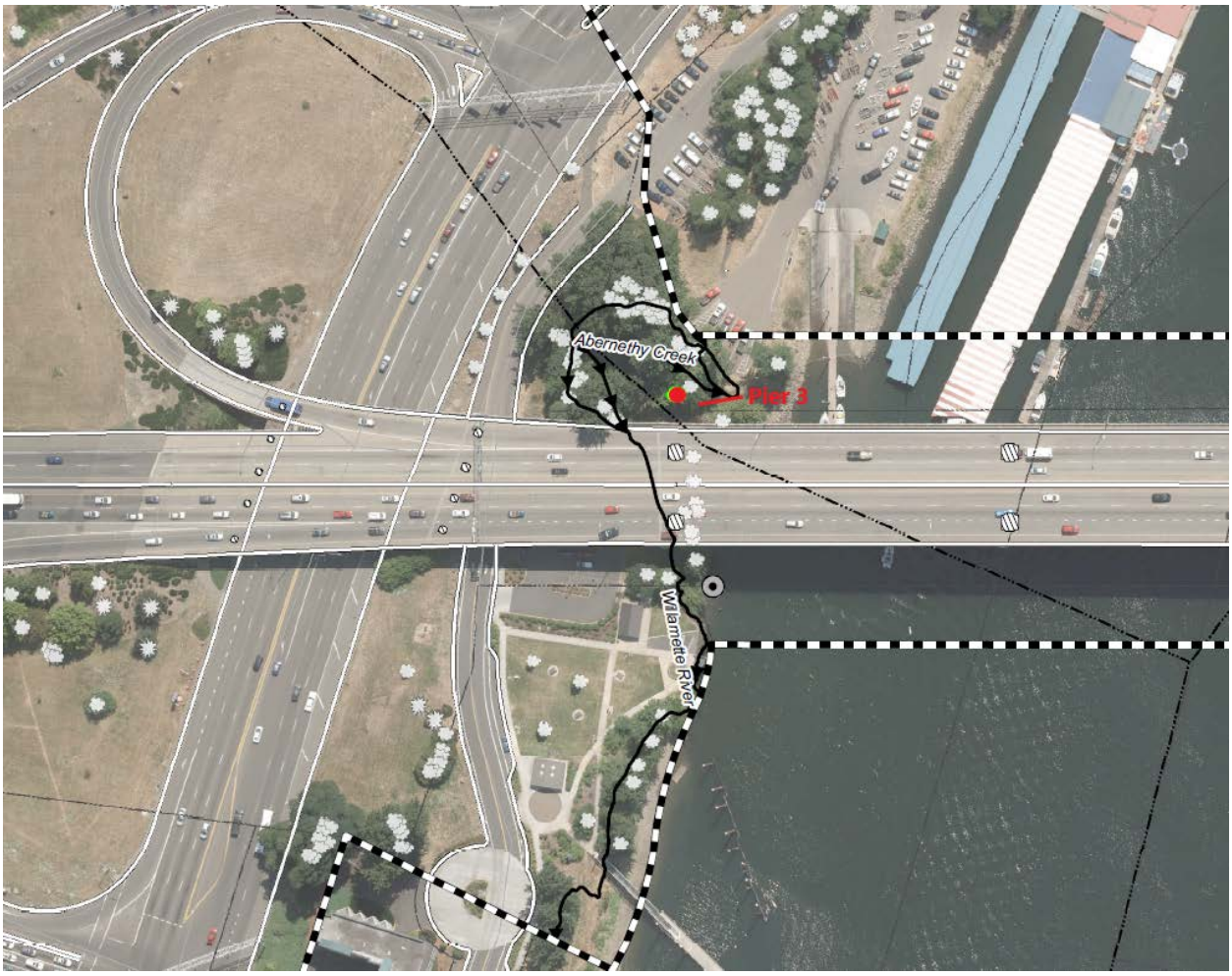
Proposed disturbance within Area E is very minimal, only impacting approximately 3,400 square feet. Himalayan blackberry and teasel cover most of the NROD area. Proposed disturbance includes clearing, grading, and fill, similar to the proposed work at Area D. There is a wetland in the southeast portion of the NROD area which will not be disturbed.

Impacts to NROD areas were avoided and minimized to the extent possible during project design. The current design does impact NROD areas, however, there are no feasible alternatives for the widening of the I-205 corridor and seismic upgrades to the Abernethy Bridge that could be located outside of NROD areas. Due to the existing location of the I-205 roadway, it would not be possible to make the proposed project improvements without impact NROD areas D and E since they are located immediately adjacent to I-205. The location of the existing bridge footings with proposed work in NROD area B is also unavoidable since the work is seismically upgrading the bridge that is already in place.

The NROD layer is in place to protect water features such as streams, rivers, and wetlands. Removal of riparian vegetation during grading and clearing activities can provide opportunity for the introduction of noxious weeds that typically favor disturbed site conditions, and are often inadvertently brought to the site on construction equipment. Vegetation removal may also temporarily affect water quality within the waterbodies through increased erosion and sedimentation. Minimization measures will be implemented to avoid and minimize these effects (see Appendix C for the Erosion and Sediment Control Plan). Additionally, areas that are cleared and grubbed for construction will be restored post-construction, according to the mitigation plan.

To allow construction of a new bridge pier (Pier 3; Figure 4), Abernethy Creek will be realigned to the north to avoid impacting Sportcraft Landing Park and provide ample room for the channel to flow around the new pier. North of the proposed top of bank is a parking lot that is heavily used for recreational activities at Jon Storm and Sportcraft Landing parks. The creek is currently in a degraded condition. Realignment of the creek will include improving the degraded creek and its riparian zone. Additionally, the Abernethy Creek channel from the existing culvert to the Willamette River will be enhanced to provide fish passage. The existing riprap and streambed configuration creates a low flow fish passage barrier. The project will remove the riprap, reconstruct the channel with a low flow channel, and add fish rocks and large woody material to stabilize the channel. As a result, riparian vegetation including the mature trees will be removed. It is not possible to retain the mature trees given the extent of the grading required and access to complete the work.

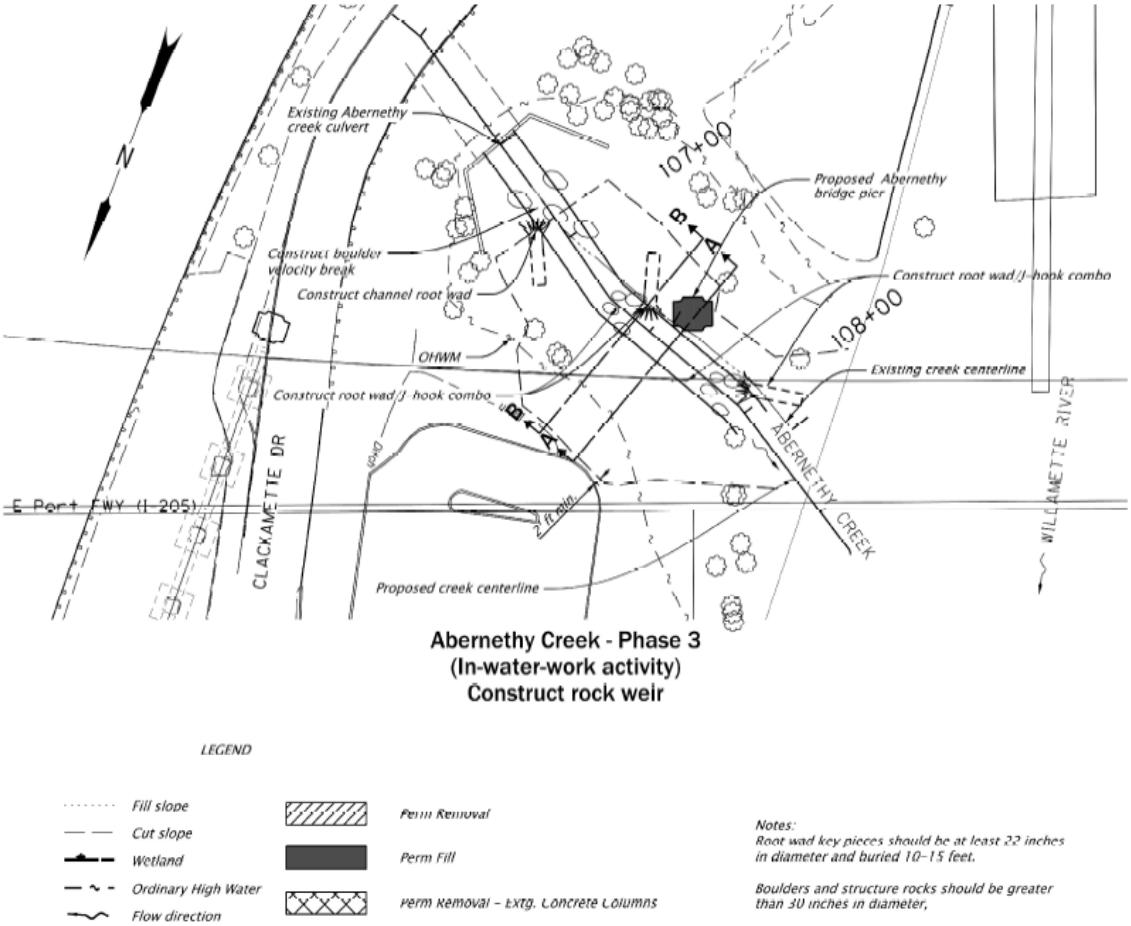
Figure 4. Project Area along the Willamette River and Abernethy Creek



The proposed location for Pier 3 is in red.

After the installation of work area isolation, the channel will be excavated to remove existing riprap and establish a low flow channel. Appropriately sized streambed material, large woody material, and strategically placed fish rocks (to maintain the function of the low flow channel) will then be installed. The existing banks of Abernethy Creek are constructed of riprap to the top of bank. The project will stabilize the channel, but due to existing development on both sides of Abernethy Creek, a natural streambank angle of repose cannot be achieved. To maintain the structural integrity of the banks and avoid damage to existing developments, the streambank will be reconstructed with plantable (dirty) riprap placed from the toe to the top of bank. The riprap will be planted with native riparian plants capable of restoring riparian functions. In addition, intact trees with rootwads will be incorporated into the design to provide stream complexity (Figure 5).

Figure 5. Proposed Design for Abernethy Creek



Construction of the Abernethy Creek channel will occur during the in-water work window of July 1 through October 31, once the existing piers are removed and new piers installed and construction in that area is completed. Once the channel realignment construction is completed, the site will be graded to final contours. The project area will be seeded with native grasses and mulch applied for erosion control. Vegetation will be installed during the wet, winter months following construction to reduce planting shock.

ODOT will manage the re-vegetation efforts. Invasive shrubs will be removed or treated prior to the construction of the project. Temporarily disturbed areas will be re-vegetated with native species at a 2:1 ratio.

Restoration for Abernethy Creek will be addressed through DSL and USACE, however, the mitigation plan is to plant of mix of seeds, including wildflower seeding and several riparian restoration mixes. The area near the proposed on-street parking along Clackamette Drive will be landscaped with wildflower seeding and several trees. See Appendix C for a list of species in each seeding mix. This area east of the proposed on-street parking has a total proposed area of restoration seeding and tree planting is equal to 53,848 square feet, which includes 107 trees and 211 shrubs. Trees will be planted at an overall density of 49 trees per 10,000 square feet and an average of 15 feet on center with triangular spacing. Large, slow-growing trees such as Oregon white oak (*Quercus* garryana) will be planted at a minimum of 30 feet on center from one another. Fast-

growing and small trees such as Scouler's willow (*Salix scouleriana*) will be installed at an average spacing of 10 to 20 feet on center from others. Fast-growing trees will be planted in groups of two to seven, and small trees will be installed in groups of two to five. Shrubs will be planted in groups of three to nine plants per species, at five feet on center, at a density of 108 shrubs per 10,000 square feet. Shrub groups will not be spaced closer than 15 feet apart or closer than five feet to adjacent tree stems. The proposed spacing does not align with the requirements of 17.49.180(E)(2)(c) but provides a better survival rate, as planting at a more open density will yield a healthier, more self-sustaining ecosystem. Overplanting will require removals or result in tree-fall as species crowd each other out. Bareroot material will be planted in winter to facilitate establishment. Each shrub and tree will be mulched with a ring of shredded food to conserve water, resist weeds, and promote health soil culture. The remaining areas will receive a compost blanket for erosion control and will be seeded with a mix of native grasses and forbs.

3 Functions and Values

Abernethy Creek functions were assessed using the Stream Function Assessment Method for Oregon, which includes both office and field components. In general, functions post-Project will increase at Abernethy Creek, compared to pre-Project functions, as shown in Table 1. Improved fish passage and the enhancements provided to stream structure and increased species diversity in the adjacent riparian area will increase biologic functions.

Table 1. Abernethy Creek Function Assessment

SPECIFIC FUNCTIONS	Pre-Project Function	Post-Project Function	
Surface Water Storage (SWS)	Moderate	Moderate	
Sub/Surface Water Transfer (SST)	Moderate	Moderate	
Flow Variation (FV)	Moderate	Moderate	
Sediment Continuity (SC)	Moderate	Moderate	
Sediment Mobility (SM)	Moderate	Moderate	
Maintain Biodiversity (MB)	Lower	Moderate	
Create and Maintain Habitat (CMH)	Lower	Moderate	
Sustain Trophic Structure (STS)	Moderate	Moderate	
Nutrient Cycling (NC)	Moderate	Moderate	
Chemical Regulation (CR)	Higher	Higher	
Thermal Regulation (TR)	Lower	Lower	
GROUPED FUNCTIONS	**REPRESENTATIVE FUNCTION**	**Pre-Project Function**	**Post-Project Function**
Hydrologic Function (SWS, SST, FV)	Flow Variation (FV)	Moderate	Moderate
Geomorphic Function (SC, SM)	Sediment Continuity (SC)	Moderate	Moderate
Biologic Function (MB, CMH, STS)	Sustain Trophic Structure (STS)	Moderate	Moderate
Water Quality Function (NC, CR, TR)	Chemical Regulation (CR)	Higher	Higher

Surrounding Abernethy Creek and the Willamette River, the rest of NROD area B is riparian area, providing habitat for birds and wildlife. The area is relatively degraded and mostly covered with invasive plant species groundcover and several trees, mostly Oregon ash, black cottonwood, and black locust. After disturbance from the project, the area will be cleared of invasive species and replanted with native trees, shrubs, and seed mixes to provide habitat and control erosion.

Areas D and E do not provide the same level of functions or values as area B, since they are along the I-205 corridor rather than a stream. Both areas likely provide habitat that is mostly used by birds, since there is no connectivity across I-205. Area D is on a steep slope, so the existing plants and trees assist in stabilizing the slopes. The NROD regulates water quality before reaching wetlands downhill from both areas. Areas D and E are both largely covered with invasive species such as Himalayan blackberry and teasel. There are trees in both areas, mostly incense cedars in area D, and a few English hawthorns in area E. The cedars will be removed, but will be replaced to the extent possible within the same NROD area, and invasive species will be removed. Wetlands 19 and 21 will not be disturbed (Figure 6, Figure 7). With the removal of invasive species and replanting the area with native shrubs, trees, and groundcover, water quality regulating functions will be restored and overall habitat will be enhanced in these areas.

Figure 6. Wetland 21 as Designated in the Wetland Delineation

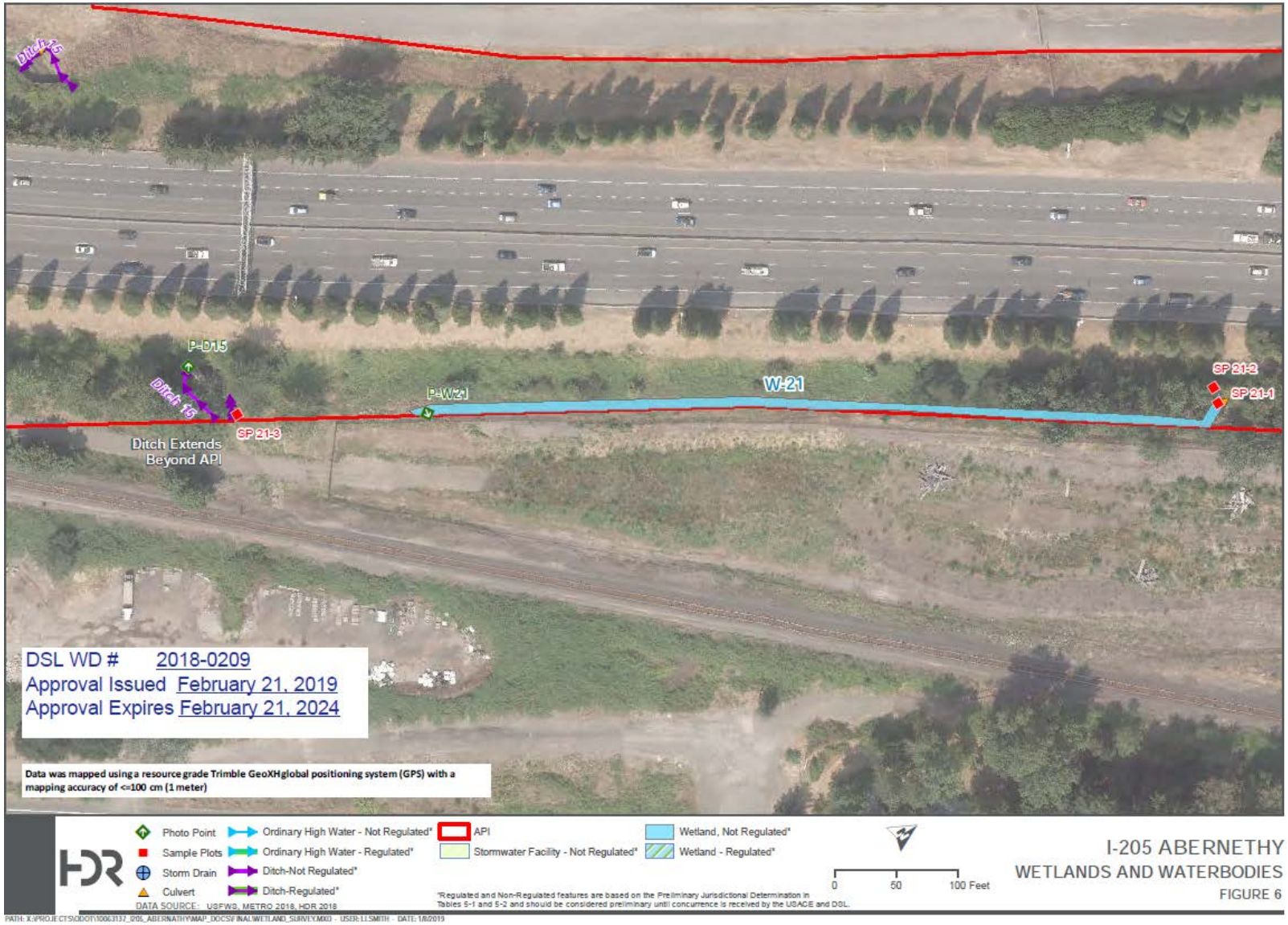
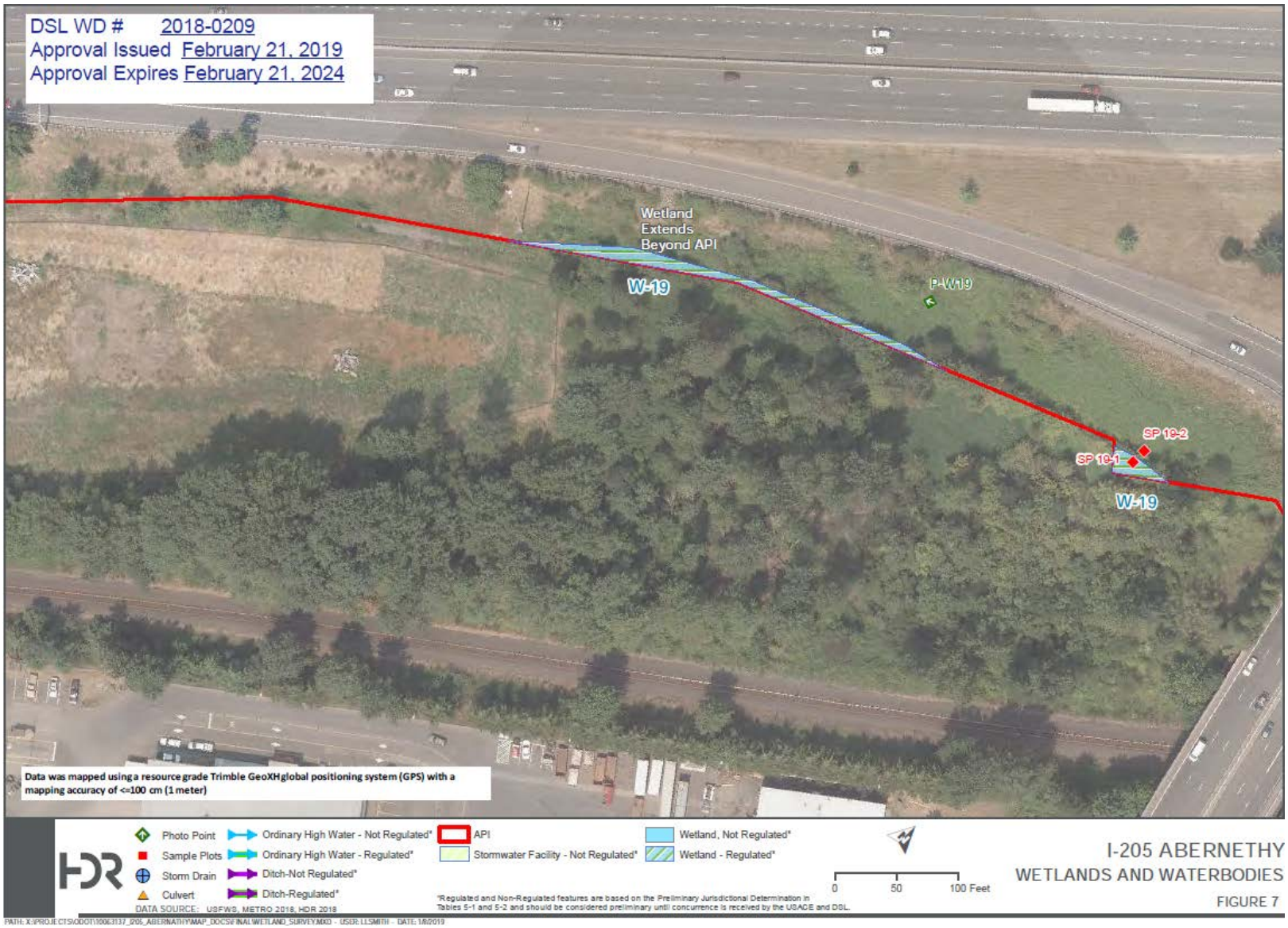


Figure 7. Wetland 19 as Designated in the Wetland Delineation



4 Monitoring and Maintenance Plan

ODOT will conduct monitoring and maintenance for five years after mitigation is complete at all disturbed NROD areas outlined in this report, whether owned by the City or by ODOT. Annual reports will be submitted to the City's planning division, documenting plant survival rates of shrubs and trees on the mitigation sites. The reports will also include photographs of the mitigation sites. Monitoring and maintenance will meet the following requirements, as outlined in OCMC Section 17.49.180(F):

- A minimum of 80 percent survival of trees and shrubs of those species planted at the end of the five-year monitoring and maintenance period
- Invasive species will be removed and plants that die will be replaced in kind
- Bare spots and areas of invasive vegetation larger than 10 square feet that remain at the end of the five-year monitoring period will be replanted or reseeded with native grasses and groundcover species

ODOT will conduct active maintenance to reduce non-native vegetation coverage. Routine maintenance may include limited spot herbicide treatments, mulching undesirable trees and shrubs, and replanting and/or reseeding with native species. Site maintenance will occur on an as-need basis.

Informal hydrology and natural resource observations will be included along with an assessment of performance standards. If performance standards are not met, then remedial actions will be proposed in the annual monitoring report.

No covenant, conservation easement, or financial guarantee will be provided because the project areas are located within State (ODOT) right-of-way. Right-of-way is required for operation, maintenance, and safety of the facility. A covenant or easement can restrict the State's ability to maintain and operate the interstate and is prohibited by the 23 CFR 710.409. Since no covenants or easements are proposed and ODOT is self-insured, no financial guarantees are proposed.

5 Coordination with Agencies

Four work group meetings with DSL and USACE took place to inform the agencies of the project, provide presentations, and conduct site visits. ODFW and NFMS were also present at these meetings. A joint permit application was recently submitted to both agencies. The public review period for DSL closed on July 12, 2019, and a decision was determined on July 18, 2019 (Appendix B).

Coordination with the City of Oregon City and West Linn is ongoing, including several meetings to discuss the project's impacts, proposed mitigation, and the acquisition of required permits.

Documentation of coordination is attached in Appendix B.

6 Construction Schedule

Construction will begin in Fall of 2021 and continue until Fall of 2024. Restoration will be implemented Fall of 2024.

7 Responses to Oregon City Municipal Code Section 17.49.180

17.49.180 - Mitigation standards.

The following standards (or the alternative standards of OCMC 17.49.190) apply to required mitigation:

A. Mitigation shall occur at a two-to-one ratio of mitigation area to proposed NROD disturbance area. Mitigation of the removal or encroachment of a wetland or stream shall not be part of this chapter and will be reviewed by the Division of State Lands or the Army Corp of Engineers during a separate review process;

Applicant's Response: Mitigation for disturbance in the NROD will be implemented at a 2:1 ratio. DSL has reviewed and concurred with the project mitigation for stream impacts. Proposed mitigation for stream impacts was reviewed and approved by USACE during a separate review process. See Attachment L for received permits.

B. Mitigation shall occur on the site where the disturbance occurs, pursuant to the following:

1. The mitigation required for disturbance associated with a right-of-way or utility in the right-of-way shall be located as close to the impact area as possible within the NROD;

2. If not possible to locate mitigation on the same site, the mitigation shall occur first on the same stream tributary, secondly in the Abernethy, Newell or Livesay Creek or a tributary thereof, or thirdly as close to the impact area as possible within the NROD; and

3. An easement that allows access to the mitigation site for monitoring and maintenance shall be provided as part of the mitigation plan.

Applicant's Response: Mitigation for disturbance associated with a right-of-way will occur as close to the impact area as possible within the NROD. ODOT will be responsible for monitoring and maintaining the mitigation area. The Project area is located within right-of-way. Right-of-way access is required for operation, maintenance, and safety of the facility. An easement can restrict the State's ability to maintain and operate the interstate and is not allowed by the Federal Highway Administration, therefore, the Applicant does not propose any easements. See Attachment G for the NROD mitigation site plan and report.

C. Mitigation shall occur within the NROD area of a site unless it is demonstrated that this is not feasible because of a lack of available and appropriate area. In such cases, the proposed mitigation area shall be contiguous to the existing NROD area so the NROD boundary can be easily extended in the future to include the new resource site.

Applicant's Response: Mitigation will occur within the NROD areas of the project site. See Attachment G for the Mitigation Plan and Report.

Invasive and nuisance vegetation shall be removed within the mitigation area;

Applicant's Response: All invasive and nuisance vegetation will be removed within the mitigation area.

D. Required Mitigation Planting. An applicant shall meet Mitigation Planting Option 1 or 2 below, whichever option results in more tree plantings, except that where the disturbance area is one acre or more, Mitigation Option 2 shall be required. All trees, shrubs and ground cover shall be selected from the Oregon City Native Plant List.

Applicant's Response: The disturbance area is more than 1 acre and will comply with Option 2.

NOTE: Applications on sites where no trees are present or which are predominantly covered with invasive species shall be required to mitigate the site, remove the invasive species and plant trees and native plants pursuant to Option 2.

1. Mitigation Planting Option 1.

a. Planting Quantity. This option requires mitigation planting based on the number and size of trees that are removed from the site pursuant to Table 17.49.180E.1.a.

Table 17.49.180E.1.a.—Required Planting

Size of Tree to be Removed (DBH)	*Number of Trees and Shrubs to be Replanted*
6 to 12"	*2 trees and 3 shrubs*
13 to 18"	*3 trees and 6 shrubs*
19 to 24"	*5 trees and 12 shrubs*
25 to 30"	*7 trees and 18 shrubs*
Over 30"	*10 trees and 30 shrubs*

b. Plant Size. Replacement trees shall be at least one-half inch in caliper on average, measured at six inches above the ground level for field grown trees or above the soil line for container grown trees. Oak, madrone, ash or alder may be one gallon size. Conifers shall be a minimum of six feet in height. Shrubs shall be at least one-gallon container size or the equivalent in ball and burlap, and shall be at least twelve inches in height at the time of planting. All other species shall be a minimum of four-inch pots;

Applicant's Response: The applicant will comply with the requirements of Option 2.

c. Plant Spacing. Except for the outer edges of mitigation areas, trees and shrubs shall be planted in a non-linear fashion. Plant spacing for new species shall be measured from the driplines of existing trees when present. Trees shall be planted on average between eight and twelve feet on center, and shrubs shall be planted on average between four and five feet on center, or clustered in single species groups of no more than four plants, with each cluster planted on average between eight and ten feet on center.

Applicant's Response: The applicant will comply with the requirements of Option 2.

d. Mulching and Irrigation. Mulch new plantings a minimum of three inches in depth and eighteen inches in diameter. Water new plantings one inch per week from June 30th to September 15th, for the three years following planting.

Applicant's Response: The applicant will comply with the requirements of Option 2.

e. Plant Species. Shrubs shall consist of at least two different species. If ten trees or more are planted, no more than one-half of the trees may be of the same genus. Conifers shall be replaced with conifers. Bare ground shall be planted or seeded with native grasses and ground cover species.

Applicant's Response: The applicant will comply with the requirements of Option 2.

2. Mitigation Planting Option 2.

a. Planting Quantity. In this option, the mitigation requirement is calculated based on the size of the disturbance area within the NROD. Native trees and shrubs are required to be planted at a rate of five trees and twenty-five shrubs per every five hundred square feet of disturbance area (calculated by dividing the number of square feet of disturbance area by five hundred, and then multiplying that result times five trees and twenty-five shrubs, and rounding all fractions to the nearest whole number of trees and shrubs; for example, if there will be three hundred thirty square feet of disturbance area, then three hundred thirty divided by five hundred equals .66, and .66 times five equals 3.3, so three trees shall be planted, and .66 times twenty-five equals 16.5, so seventeen shrubs shall be planted). Bare ground shall be planted or seeded with native grasses or herbs. Non-native sterile wheat grass may also be planted or seeded, in equal or lesser proportion to the native grasses or herbs.

Applicant's Response: The Project proposes 58,687 square feet of disturbance area within the NROD. Based on the mitigation calculation, a total of 587 trees and 2,934 shrubs will be planted in an area equal to 117,374 square feet to meet the 2:1 mitigation ratio requirement. See Attachment G for the Mitigation Plan.

b. Plant Size. Plantings may vary in size dependent on whether they are live cuttings, bare root stock or container stock, however, no initial plantings may be shorter than twelve inches in height.

Applicant's Response: No initial plantings shorter than 12 inches are proposed.

c. Plant Spacing. Trees shall be planted at average intervals of seven feet on center. Shrubs may be planted in single-species groups of no more than four plants, with clusters planted on average between eight and ten feet on center.

Applicant's Response: Trees are proposed to be planted at an average of 15 feet on center. Shrubs will be installed 5 feet on center, in groups of 3 to 9 plants per species. Shrub groups will be spaced no closer than 15 feet apart and no closer than 5 feet to an adjacent tree. Planting at a more open density will yield a healthier, more self-sustaining ecosystem. Overplanting will require removals or result in tree-fall as species crowd each other out. See Attachment H for the planting plan prepared by a professional landscape architect.

d. Mulching and Irrigation shall be applied in the amounts necessary to ensure eighty percent survival at the end of the required five-year monitoring period.

Applicant's Response: Mulching and irrigation will be applied to ensure 80% survival after 5 years of monitoring.

e. Plant Diversity. Shrubs shall consist of at least three different species. If twenty trees or more are planted, no more than one-third of the trees may be of the same genus.

Applicant's Response: Proposed plantings meet the plant diversity requirements. The Applicant proposes to plan 13 different species of shrubs, 19 species of trees, and a mix of several species of grasses and forbs. See Attachment G for the NROD mitigation landscaping plan.

E. An alternative planting plan using native plants may be approved in order to create a new wetland area, if it is part of a wetlands mitigation plan that has been approved by the DSL or the U.S. Army Corps of Engineers (USACE) in conjunction with a wetland joint removal/fill permit application.

Applicant's Response: No alternative planting plan for wetland creation is proposed.

F. Monitoring and Maintenance. The mitigation plan shall provide for a five-year monitoring and maintenance plan with annual reports in a form approved by the Community Development Director. Monitoring of the mitigation site is the on-going responsibility of the property owner, assign, or designee, who shall submit said annual report to the Planning Division, documenting plant survival rates of shrubs and trees on the mitigation site. Photographs shall accompany the report that indicate the progress of the mitigation. A minimum of eighty percent survival of trees and shrubs of those species planted is required at the end of the five-year maintenance and monitoring period. Any invasive species shall be removed and plants that die shall be replaced in kind to meet the eighty percent survival requirement. Bare spots and areas of invasive vegetation larger than ten square feet that remain at the end the five-year monitoring period shall be replanted or reseeded with native grasses and/or ground cover species.

Applicant's Response: The applicant will provide a 5-year monitoring and maintenance plan, including annual reports. See the NROD Mitigation Plan Report in Attachment G for monitoring and maintenance details.

G. Covenant or Conservation Easement. The applicant shall record a restrictive covenant or conservation easement, in a form provided by the City, requiring the owners and assigns of properties subject to this section to comply with the applicable mitigation requirements of this section. Said covenant shall run with the land, and permit the City to complete mitigation work in the event of default by the responsible party. Costs borne by the City for such mitigation shall be borne by the owner.

Applicant's Response: ODOT will be responsible for monitoring and maintaining the mitigation area. The Project area is located within right-of-way. Right-of-way access is required for operation, maintenance, and safety of the facility. An easement can restrict the State's ability to maintain and operate the interstate and is prohibited by 23 CFR 710.409, therefore, the Applicant does not propose any easements.

H. Financial Guarantee. A financial guarantee for establishment of the mitigation area, in a form approved by the City, shall be submitted before development within the NROD disturbance area commences. The City will release the guarantee at the end of the five-year monitoring period, or before, upon its determination that the mitigation plan has been satisfactorily implemented pursuant to this section.

Applicant's Response: ODOT is responsible for monitoring and maintenance of all NROD mitigation areas. Financial guarantees are not proposed as no easements or covenants are proposed and ODOT is self-insured. See Attachment G for the proposed NROD mitigation plan and report.

Appendix A. Mitigation Site Plans

GENERAL NOTES:

1. Plant all trees beyond "clear zone"; verify with engineer prior to planting. Engineer shall approve all work outside designated work limits prior to construction. Do not plant trees within 20' of a bridge/viaduct or within 10' of a trail, waterline, or stormwater line.

2. Locate underground utility lines prior to any digging or ground disturbance.

3. Adjust planting locations so vegetation does not conflict with above- or below-ground utilities.

4. Adjust plant locations to avoid conflict with traffic sight lines and signs or other appurtenances. Verify location changes with Engineer.

5. All dimensions shown on details are minimum dimensions.

6. See Plant Schedule FA02, FA03 for plants and landscape material.

7. Plan is schematic. Planting may be adjusted to fit site conditions with prior Agency approval.

8. Lay out plant material in groups as indicated in plant and material schedule, details and plan sheets.

9. Stake all planting areas for review and approval by Engineer prior to planting.

10. Do not install plant material without prior inspection and approval as required by 01040.19(d).

11. Comply with Oregon Standard Specifications for Construction and Special Provisions for construction applicable to this project.

12. Thoroughly water all plant material (saturated backfill) within 24-hours of installation regardless of rainfall events.

13. Verify field conditions prior to construction with any adjustments to the plans made as directed by the Engineer.

14. Protect all trees and land areas marked for protection. Do not damage natural (non-invasive) vegetation.

15. Comply with erosion control measures per Section 00280 and all applicable permits during construction.

16. Where discrepancies between the Plant Schedule and the plans exist, plans shall prevail.

17. See Special Provision 01030.13(f) for seed mixes

18. Prepare all planting and seeding areas per Method B, see 01040.48(b) in the Oregon Standard Specifications for Construction.

19. Include Mycorrhizal innoculates for all seeding and individual plant installations. Apply per manufacturer's recommendation.

20. Flag all planted tree species with color-coded identification flags.

Mitigation and Restoration Permitting Requirements

	Area (square feet)							Plant Totals	
	FA08	FA10	FA12	FA13*	FA14	FA15	TOTAL	TREES	SHRUBS
DSL Permit Requirements	-	-	-	19,187	42,555	148,187	209,929	1,004	2,031
NROD Permit Requirements	50,776	53,500	-	4,190	-	-	108,466	745*	3,954
							TOTAL	1,661	5,985

*DSL Restoration Numbers for FA13 are applied to NROD Permit Mitigation Total Requirements

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PORTLAND, OR 97204-1134
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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Plant and Material Schedule

Trees

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
TARME	*Arbutus menziesii*	Madrone	1/2" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	3	-	-	-	1	-	4
TCADE	*Calocedrus decurrens*	Incense Cedar	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	6	8	14
TCONU	*Cornus nuttallii*	Pacific Dogwood	1" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	7	-	7
TPIPO	*Pinus ponderosa 'Willamette Valley'*	Willamette Ponderosa Pine	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	42	14	99	79	26	-	29	23	300
TPSME	*Pseudotsuga menziesii*	Douglas Fir	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	29	-	29
TQUCH	*Quercus chrysolepis*	Canyon Live Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	34	-	-	-	15	49
TQUGA	*Quercus garryana*	Oregon White Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	5	69	12	-	24	12	116
TULAM	*Ulmus americana 'Valley Forge'*	Valley Forge American Elm	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	7	-	-	-	7
TUMCA	*Umbellularia californica*	Oregon Myrtle	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	31	-	-	-	-	31

Broadleaf Evergreen Shrubs

Deciduous Shrubs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
ARCO	*Arctostaphylos columbiana x 'Patula'*	Manzanita	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	214	-	-	-	-	214
COSE	*Cornus sericea*	Red Osier Dogwood	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	1,005	-	-	-	-	1,005
FRCA	*Frangula californica 'Eve Case'*	Eve Case Coffeeberry	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	51	-	-	-	-	51
GAEL	*Garrya elliptica 'James Roof'*	Wavyleaf Silktassel	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	61	-	-	-	-	61
MAAQ	*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	397	-	-	-	-	397
MOCA	*Morella californica*	Pacific Wax Myrtle	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	57	-	-	-	-	57

Ornamental Grasses and Forbs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	TOTAL
-	*Asclepias speciosa*	Showy milkweed	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Calamagrostis x acutiflora 'Karl Foerster'*	Feather reed grass	12" Height	2' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Carex glauca*	Blue Sedge	12" Height	1' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Deschampsia cespitosa 'Goldtau'*	Tufted hairgrass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Juncus patens 'Carmen's Grey'*	Carman's Grey Blue Rush	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Solidago 'Goldkind'*	Golden Baby goldenrod	12" Height	1' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Stipa gigantea*	Giant feather grass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Veratrum californicum*	California false hellebore	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

ROADSIDE DEVELOPMENT PLANT SCHEDULE

City of Oregon NROD Mitigation Trees and Shrubs

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA10	TOTAL
NROD Trees & Shrubs		*Arbutus menziesii*	Pacific Madrone	1/2" Calip.	13.5' O.C.	Bareroot	20%	N/A	64	40	104
		Pinus ponderosa var. willamettensis	Ponderosa Pine	18" Height	13.5' O.C.	Bareroot	30%	N/A	96	60	156
		Quercus garryana	Oregon White Oak	1/2" Calip.	13.5' O.C.	Bareroot	30%	N/A	96	60	156
		Rhamnus purshiana	Cascara	1/2" Calip.	13.5' O.C.	Bareroot	10%	N/A	32	20	52
		Salix scouleriana	Scouler's Willow	1/2" Calip.	13.5' O.C.	Bareroot	10%	N/A	32	20	52
		Arctostaphylos columbiana	Hairy Manzanita	12" Height	6' O.C.	Bareroot	20%	N/A	277	174	451
		Berberis (Mahonia) aquifolium	Tall Oregongrape	12" Height	6' O.C.	Bareroot	30%	N/A	416	261	677
		Ceanothus velutinus	Snowbrush	12" Height	6' O.C.	Bareroot	20%	N/A	277	174	451
		Corylus cornuta var. Californica	Western Hazelnut	12" Height	6' O.C.	Bareroot	15%	N/A	208	130	338
		Ribes lobbii	Gummy Gooseberry	12" Height	6' O.C.	Bareroot	15%	N/A	208	130	338
NROD Shrubs		*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Min.	6' O.C.	Bareroot	20%	N/A	-	118	118
		Cornus sericea	Redtwig Dogwood	12" Min.	6' O.C.	Bareroot	10%	N/A	-	177	177
		Ribes sanguineum	Redflowering Currant	12" Min.	6' O.C.	Bareroot	15%	N/A	-	118	118
		Rubus parviflorus	Thimbleberry	12" Min.	6' O.C.	Bareroot	15%	N/A	-	89	89
		Spirea douglasii	Douglas Spirea	12" Min.	6' O.C.	Bareroot	15%	N/A	-	89	89
		Symphoricarpos albus	Snowberry	12" Min.	6' O.C.	Bareroot	25%	N/A	-	148	148

Upland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX A: Trees		*Acer macrophyllum*	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Arbutus menziesii	Pacific Madrone	1/2" Calip.	15'-20' Min.	Container	15%	N/A	-	-	67	67
		Calocedrus decurrens	Incense Cedar	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Corylus cornuta var. californica	Western Hazelnut	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
		Cornus nuttallii	Western Dogwood	1/2" Calip.	15'-20' Min.	Bareroot	5%	N/A	-	-	22	22
		Quercus garryana	Oregon White Oak	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	-	-	116	116
		Pseudotsuga menziesii	Douglas Fir	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
MIX A & B: Shrubs		*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370
		Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370

Lowland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX C: Trees		*Abies grandis*	Grand Fir	18" Height	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Acer macrophyllum	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Alnus rubra	Red Alder	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	22	54	-	76
		Fraxinus latifolia	Oregon Ash	1/2" Calip.	30' Min.	Bareroot	6%	N/A	5	13	-	18
		Prunus emarginata	Bitter Cherry	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	10%	N/A	8	21	-	29
		Salix lucida	Shining Willow	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Thuja plicata	Western Redcedar	18" Height	30' Min.	Bareroot	8%	N/A	7	17	-	24
MIX C & D: Shrubs		*Cornus sericea*	Redtwig Dogwood	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161
		Physocarpus capitatus	Pacific Ninebark	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Rubus spectabilis	Salmonberry	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161

Roadside Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX E: Trees & Shrubs		*Pinus ponderosa var. willamettensis*	Willamette Ponderosa Pine	3'-4' Height	25'	#5 Container	50%	N/A	2	-	21	23
		Quercus garryana	Oregon White Oak	1/2" caliper	25'	Bareroot	40%	N/A	2	-	16	18
		Arbutus menziesii	Pacific Madrone	1'-2' Height	25'	#1 Container	10%	N/A	-	-	4	4
		Berberis (Mahonia) aquifolium	Tall Oregon Grape	12" Height	5' Min.	#1 Container	60%	N/A	14	-	53	64
		Ceanothus velutinus	Snowbrush	12" Height	5' Min.	#1 Container	10%	N/A	2	-	9	11
		Ribes sanguineum	Redflowering Currant	12" Height	5' Min.	#1 Container	15%	N/A	3	-	13	16
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	#1 Container	15%	N/A	3	-	13	16

SHRUB PLANTING NOTES FOR MIXES A, B, C, D, and E

1. *Install shrubs at a density of 108 shrubs per 10,000 s.f.*
2. *Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to an adjacent tree stem.*
3. *Spread species throughout the planting area to avoid a monoculture; a random 10,000 s.f. sample shall contain all species.*
4. *Maintain a 1' diameter plant-free area around each stem and mulch with shredded wood to prevent weeds.*
5. *See Sheet FA04 for Tree Planting details.*
6. *See Sheet FA05 for Shrub Planting details.*

Seed Mix* **See Special Provisions 01030.13(f) for Seed Mix** **Area (square feet)**

Key		FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
	Permanent Seeding	2,066	-	-	1,273	175,749	-	-	-	129,854	308,942
	Water Quality Seeding	787	-	-	1,294	4,934	440	-	9,971	14,616	31,226
Varies	Riparian Seeding	-	-	-	-	-	23,824	42,555	-	-	66,379
	Wildflower Seeding	64,818	-	75,645	-	1,379	31,172	-	142,999	6,082	314,943
Varies	Native Shade Seeding	-	-	-	-	-	-	-	80,985	-	80,985
	Wetland Seeding	-	-	-	-	-	-	-	410	-	410
	Upland Shrub Seeding	-	-	-	-	-	7,672	-	46,091	-	53,763

*** Verify compost erosion blanket is installed prior to applying seed**

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke Reviewer: Ben Ngan
Drafter: David Goodyke Checker: Ben Ngan

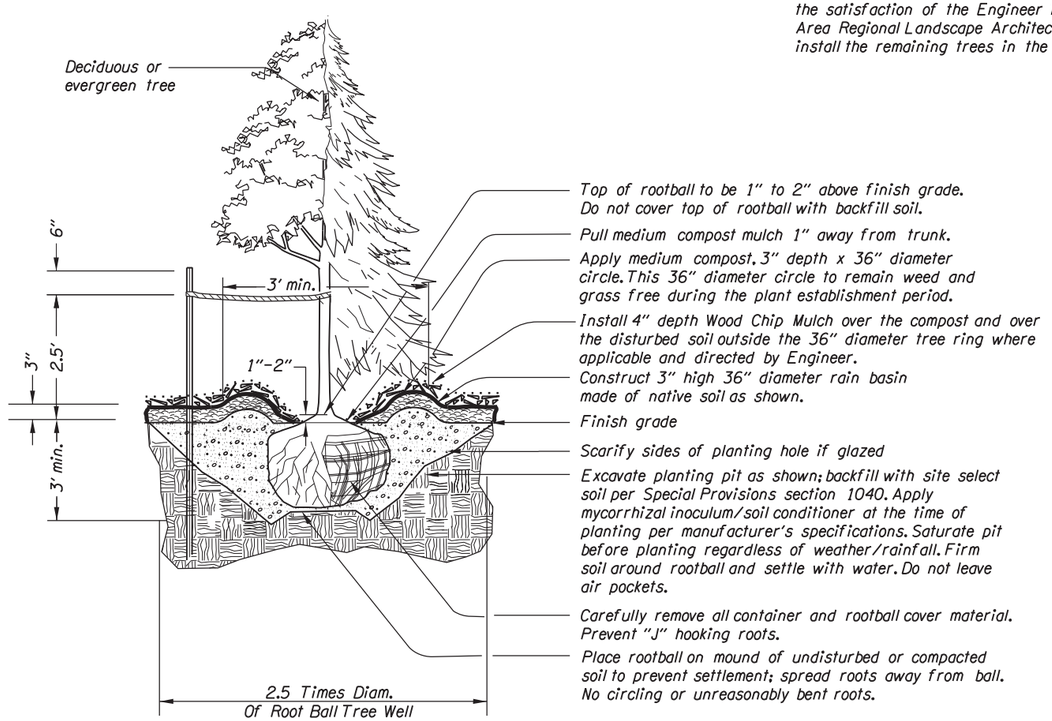
SHEET NO.

ROADSIDE DEVELOPMENT GENERAL NOTES

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

NOTE:

After tree location staking is complete and prior to planting any trees, Contractor shall construct two typical tree planting and staking installations per details and specifications, with Engineer and Area Regional Landscape Architect present. When the installations are complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining trees in the same manner.



TREE PLANTING and STAKING
On Terrain Flatter Than 5H:1V

Not To Scale

TREE STAKING NOTES:

1) Tree ties to be either:

Rigid guy system. Galvanized wire to be approximately 1/8" thickness and 24" length with a plastic sleeve over the portion that contacts the tree. The wire tie is to go through the wood stake and be securely fastened.

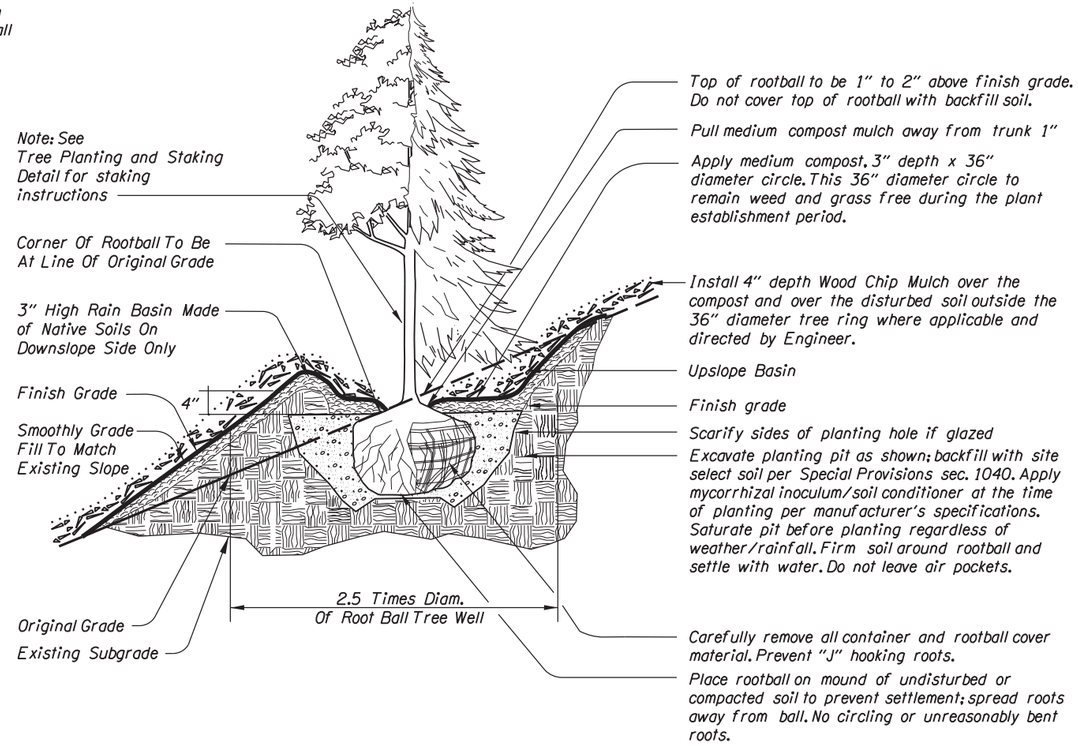
Plastic chain type, approximately 1" width by 1/8" thickness where two stakes are required. Cross ties between stakes and wrap tie around tree. Fasten securely to stake.

2) Furnish tree stakes on all tree plantings.

Stakes to be construction grade, rough sawn or finished Douglas Fir or Pine. Stain with approved green penetrating oil. Stake Size is to be 1½"x1½" by following lengths:

Trees 36" and shorter - Use one - 6' (approximate) stake
Trees taller than 36" - Use one - 8' (approximate) stake

Drive stakes vertically and at least 24" into undisturbed soil. Do not drive stakes through root ball. Locate stakes to best resist prevailing winds.



TREE PLANTING and STAKING on SLOPES
On slopes 5H:1V or steeper

Not To Scale

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

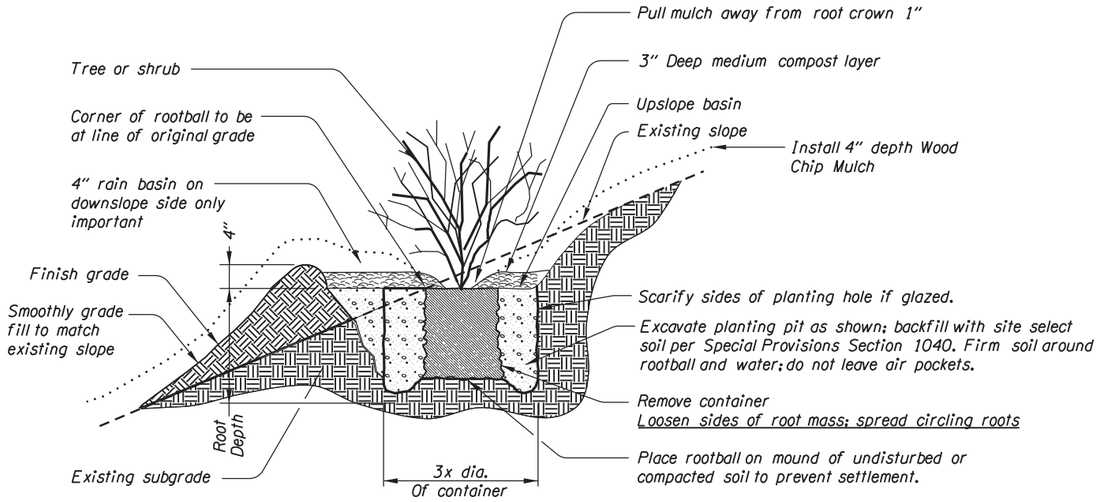
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

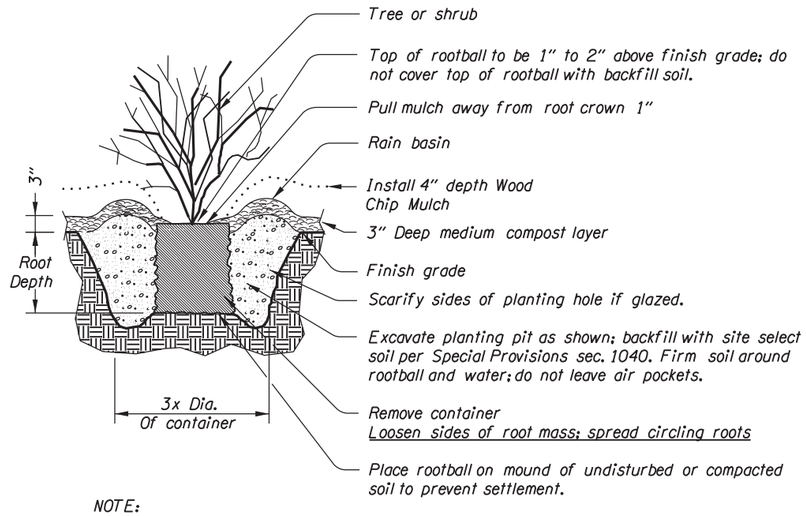


NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2) Apply Mychorrhizae per specifications.

SLOPE PLANTING FOR #1 & #2 CONTAINERS

Not To Scale



NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2)Apply Mycorrhizae per specifications.

GENERAL PLANTING FOR #1 & #2 CONTAINERS

Not To Scale

GENERAL NOTES:
1) All dimensions shown on details are minimum dimensions.

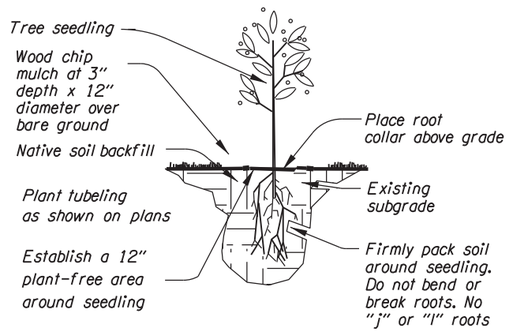
2) See "American Standard for Nursery Stock" for plant quality minimum standards such as size of root ball or caliper of trunk.

3) See plant list or special provisions and identify plant material that may need to be ordered early or contract-grown.

4) Excavate all plant wells per detail at 3x diameter of rootball or container & backfill with site select topsoil free of noxious weeds plant material including roots & sprigs.

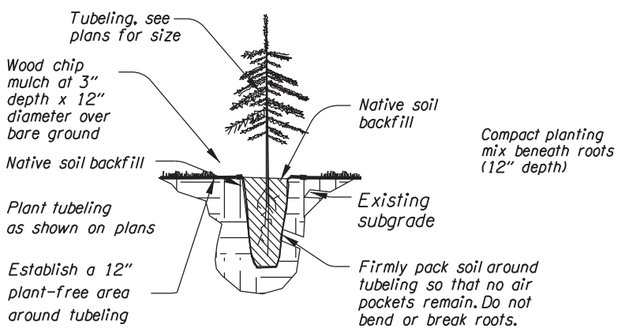
5) After shrub location staking is complete and prior to planting any shrubs. Contractor shall construct a typical shrub planting per detail and specifications with Engineer and Area Regional Landscape Architect present. When the installation is complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining shrubs in the same manner.

6) Apply Mycorrhizae per specifications.



SEEDLING PLANTING

Not To Scale



TUBELING PLANTING

Not To Scale

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503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

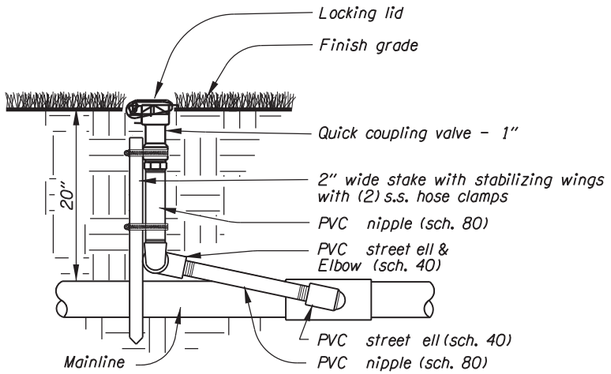
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

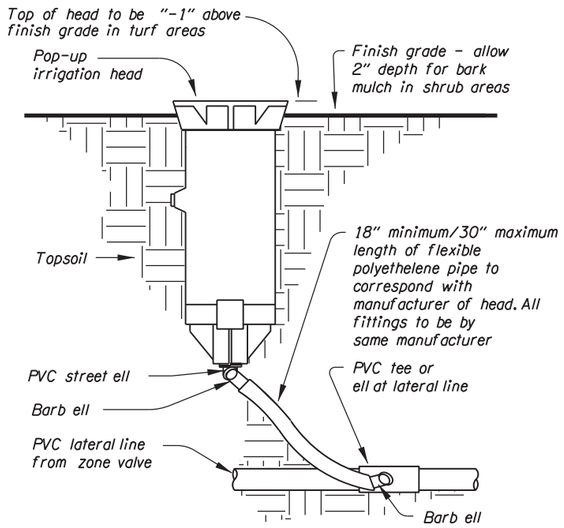
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST



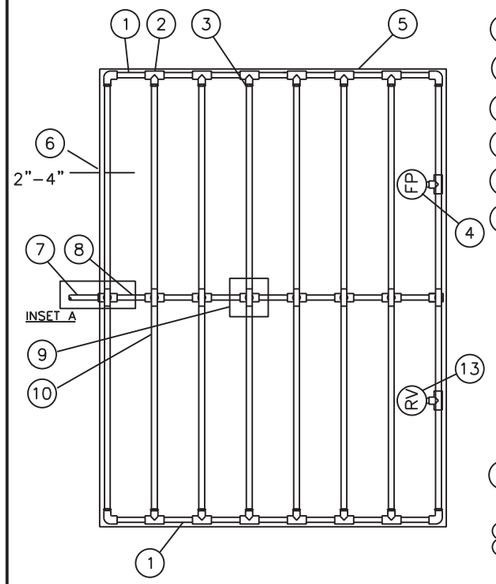
QUICK COUPLING VALVE

Not To Scale

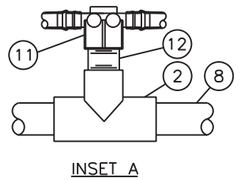


SPRINKLER HEAD AND JOINTS

Not To Scale



1. PVC exhaust header
2. PVC SCH 40 TEE or EL (Typical)
3. Barb x Male Fitting
4. Flush Point (Typical)
5. Perimeter of Area
6. Perimeter Dripline to Pipe to be installed 2"-4" from Perimeter of Area



INSET A

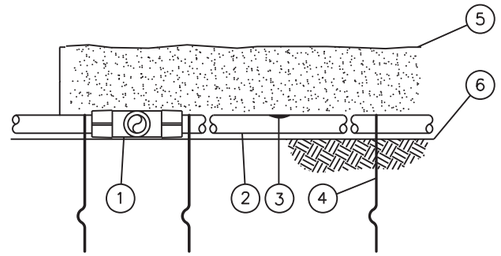
7. PVC Supply Pipe from Existing Valve
8. PVC Supply Manifold
9. Connection from Supply Manifold to Dripline (Typical) - see Inset A
10. On-Surface Dripline
11. Barb x Female Fitting
12. ¾" PVC Nipple, length as necessary
13. At ends of area, add air relief valve

NOTE:
1) Provide Low Volume (Drip) Tubing with emitters spaced at 18" and providing a flow rate of 0.9 gallons/hour and spaced at 24", or approved equal.

2) Modify detail to meet the specific requirements of the selected equipment brand's manufacturer and the specific shape and size of the plant bed to be irrigated.

LOW VOLUME (DRIP) TUBING

Not To Scale



1. Compression Fitting
2. On-Surface Dripline
3. Inline Drip Emitter Outlet
4. Tie-Down Stake
5. Mulch
6. Finish Grade

DRIPLINE AT GRADE

Not To Scale

NOTES:
1) Place tie-down stakes every 3' in sand, 4' in loam, and 5' in clay.

2) At fittings where there is a change of direction, such as tees or elbows, use tie-down stakes on each leg of the change of direction.

NOTE:
Irrigation details are placeholders for 60%

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PORTLAND, OR 97204-1134
503.423.3700

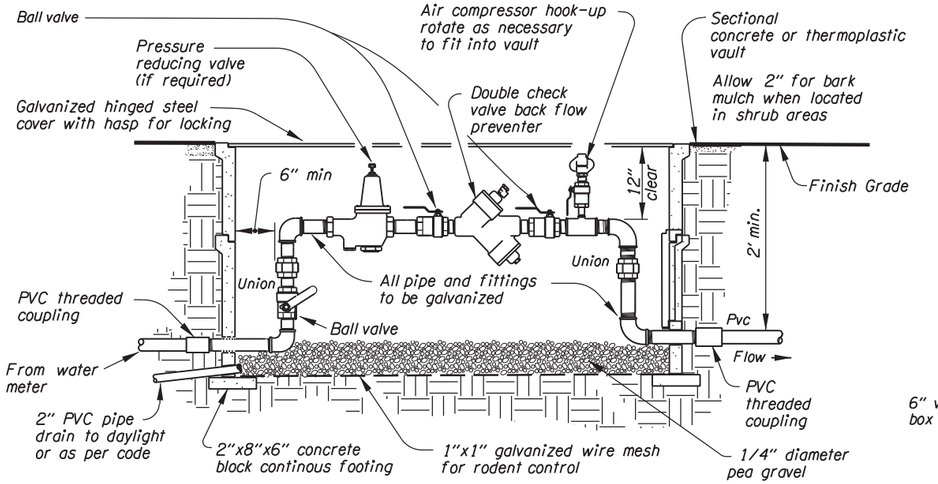
I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.



BACKFLOW PREVENTION ASSEMBLY

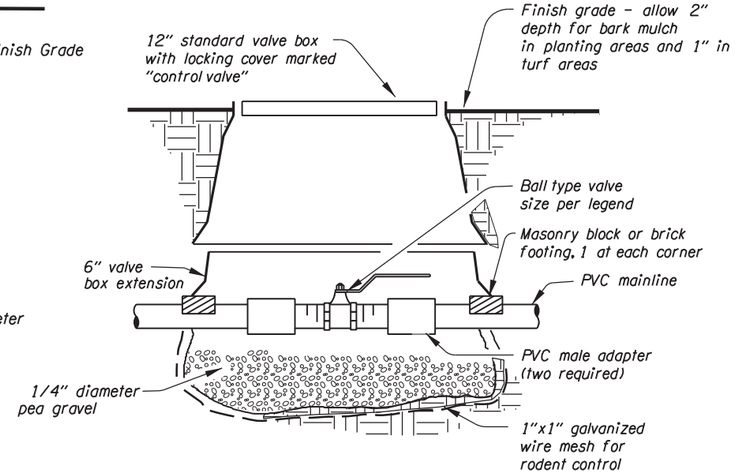
Not To Scale

NOTES:
1) Install backflow prevention assembly in accordance with "accepted procedure and practice in cross connection control manual"

2) Comply with local jurisdiction requirements. These may vary from those shown on drawings. verify compliance.

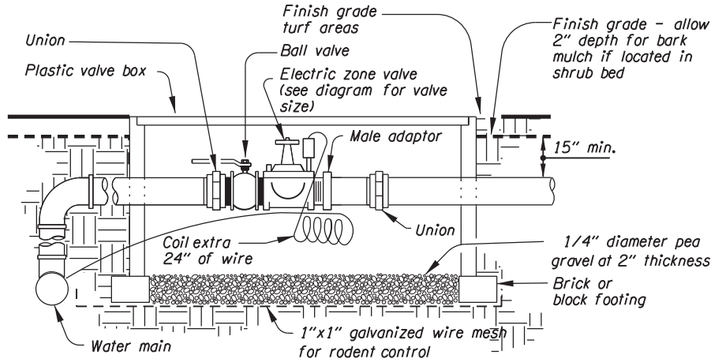
3) Provide 6" access clearance for devices 2" and smaller.

4) Size of double check valve shown on plans or specifications.



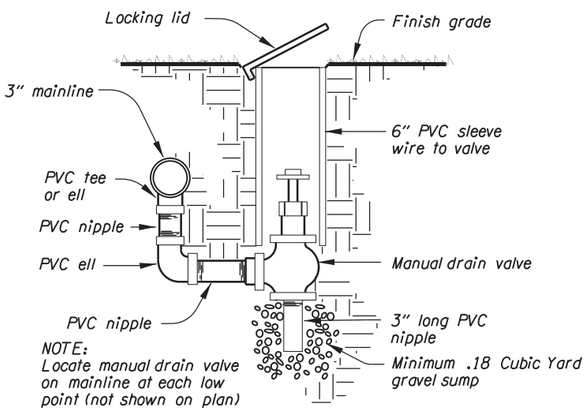
ISOLATION VALVE & BOX

Not To Scale



ELECTRIC ZONE VALVE

Not To Scale



MANUAL DRAIN VALVE

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
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ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 50,776 s.f. Wildflower Seeding
2. Install 14,042 s.f. Wildflower Seeding
3. Install 787 s.f. Water Quality Seeding
4. Install 2,066 s.f. Permanent Seeding
5. Install 50,776 s.f. NROD Mitigation Trees and Shrubs

N

E PORT FWY (I-205)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

"L" 665+00

52 ft

50 ft

LEGEND

- Permanent Seeding
- Water Quality Seeding
- Oregon City NROD Mitigation Trees and Shrubs

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1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

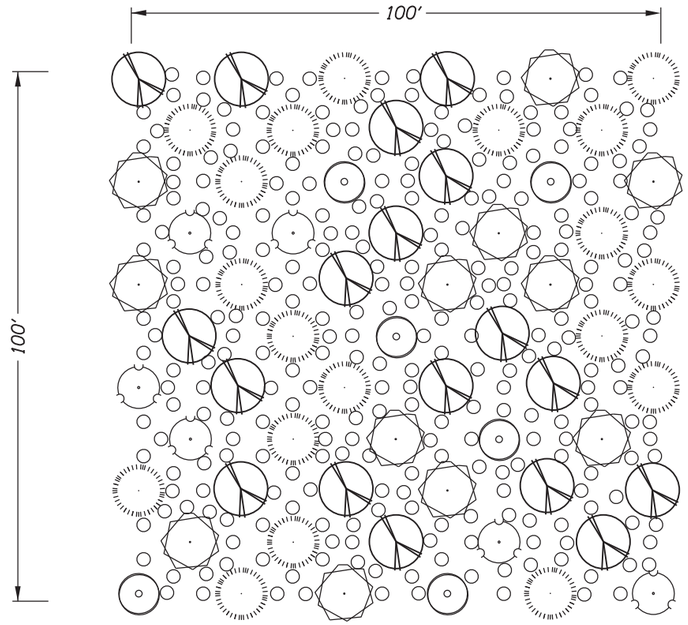
ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA08-FA08A 12/20/2019 12:01:15 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 227.6721° 0'



NROD MItIgatIon PlantIng Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Arbutus menziezii	13 stems / 10,000 s.f.	20%
	Pinus ponderosa	18 stems / 10,000 s.f.	30%
	Quercus garryana	18 stems / 10,000 s.f.	30%
	Small Trees		
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Salix scouleriana	6 stems / 10,000 s.f.	10%
	Shrubs*		
	Arctostaphylos columbiana	55 stems / 10,000 s.f.	20%
	Berberis (Mahonia) aquifolium	82 stems / 10,000 s.f.	30%
	Ceanothus velutinus	55 stems / 10,000 s.f.	20%
	Corylus cornuta var. Californica	41 stems / 10,000 s.f.	15%
	Ribes lobbii	41 stems / 10,000 s.f.	15%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Arbutus menziezii (TARME), 20%*
- *Pinus ponderosa (TPIPO), 30%*
- *Quercus garryana (TQUGA), 30%*

Small Trees
- *Rhamnus purshiana (TRHPU), 10%*
- *Salix scouleriana (TSASC), 10%*

Shrubs
- *Assorted Species*

DETAIL: NROD MITIGATION TREES AND SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 61 trees/10,000 s.f.

2) Install trees at an average of 13.75' O.C. with triangular spacing

3) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

4) Concentrate TQUGA in areas with most southern and western sun exposure.

5) Install trees in groups of up to 4 specimens per species.

6) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

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503.423.3700

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

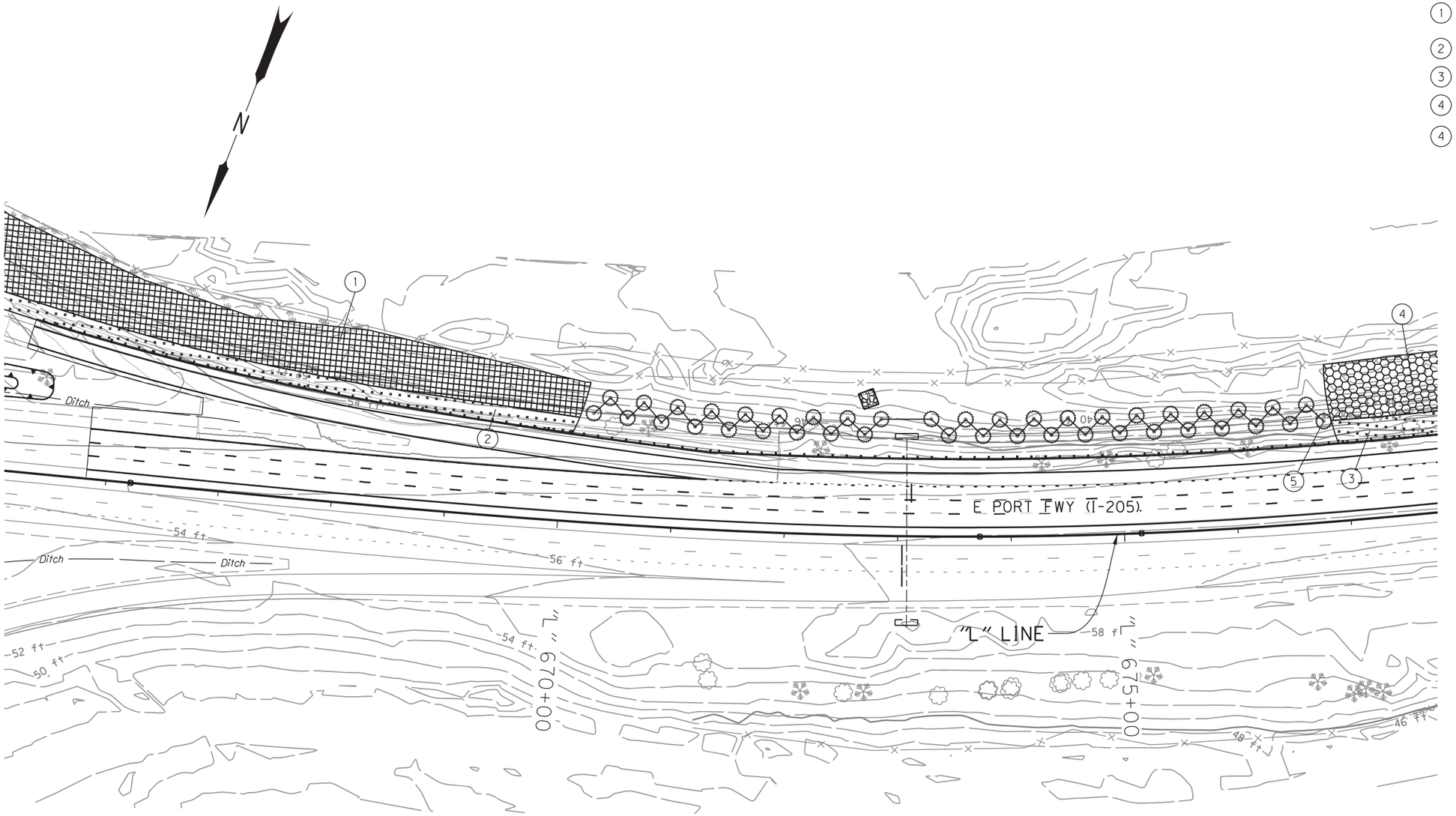
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 227.6721° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

?? v – ???

1. Total area on FA08 and FA09, shown on FA08, notes 1 & 5
2. Total area on FA08 and FA09, shown on FA08, note 2
3. Total area on FA09 and FA10, shown on FA10, note 2
4. Total area on FA09 and FA10, shown on FA10, notes 1 & 4
4. Install 42 TPIPO



LEGEND

Oregon City NROD
Mitigation Trees and Shrubs

ExistingTrees

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

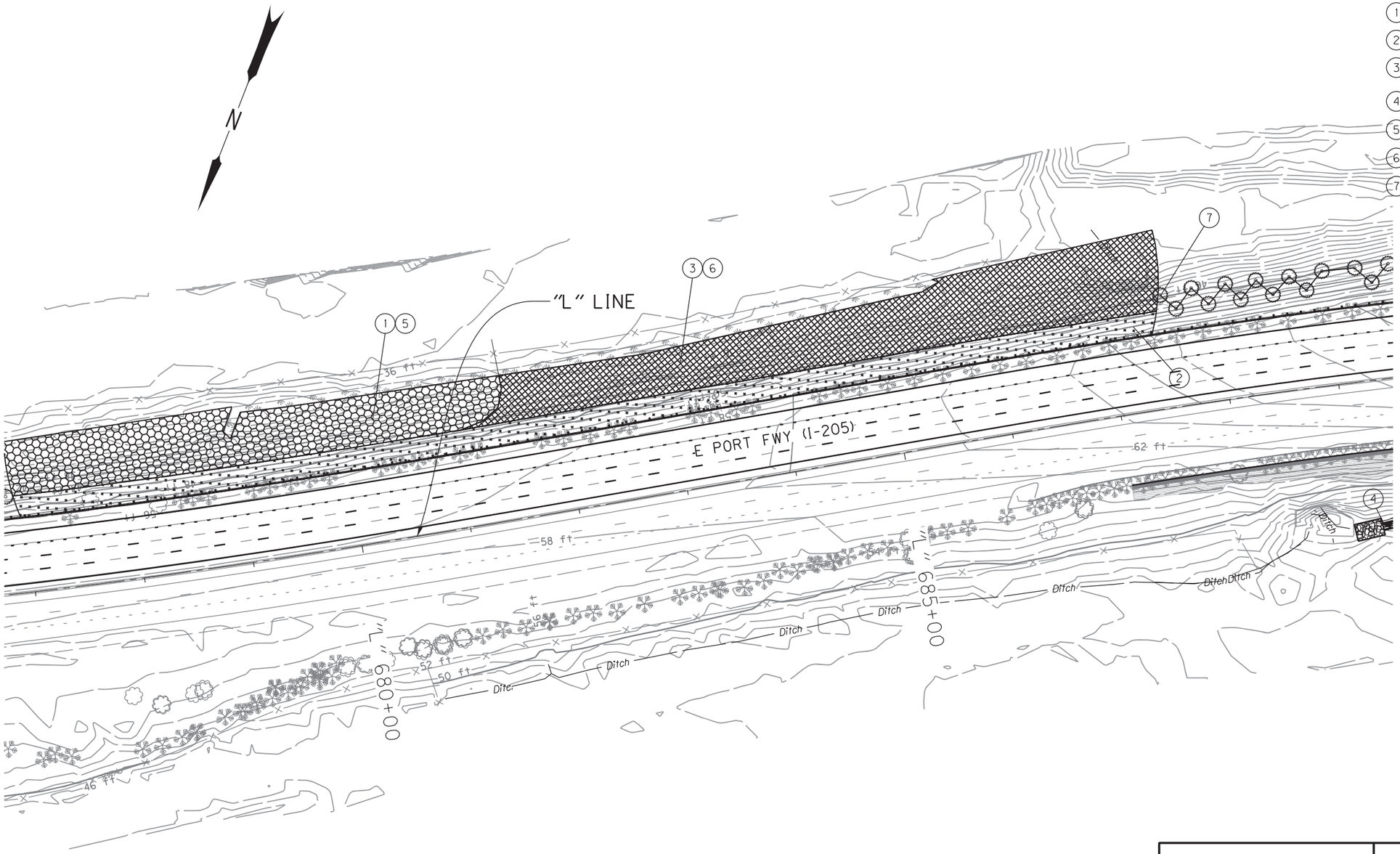
NNA_Roadside_Devel :: FA09 12/20/2019 12:01:20 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 31,833 s.f. Wildflower Seeding
2. Install 22,145 s.f. Wildflower Seeding
3. Install 21,615 s.f. Wildflower Seeding
4. Total quantity for area on FA10 and FA11, shown on FA11, note 1
5. Install 31,833 s.f. NROD Mitigation Trees and Shrubs
6. Install 21,615 s.f. NROD Mitigation Trees and Shrubs
7. Install 14 TPIPO



LEGEND

- Water Quality Seeding
- Oregon City NROD Mitigation Trees and Shrubs
- ExistingTrees

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

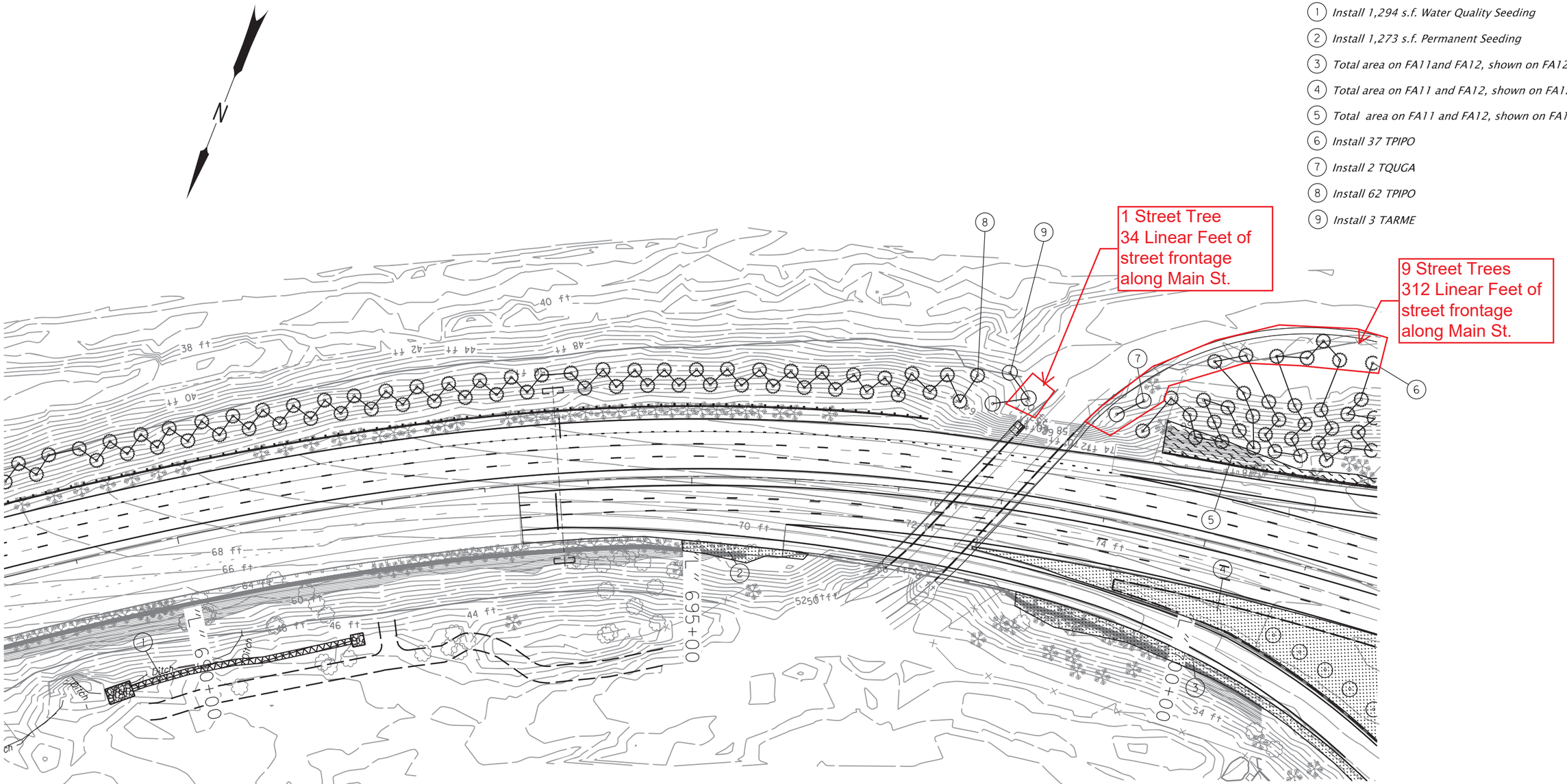
NNA_Roadside_Devel :: FA10 12/20/2019 12:01:21 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 1,294 s.f. Water Quality Seeding
2. Install 1,273 s.f. Permanent Seeding
3. Total area on FA11and FA12, shown on FA12, note 1
4. Total area on FA11 and FA12, shown on FA12, note 2
5. Total area on FA11 and FA12, shown on FA12, note 33
6. Install 37 TPIPO
7. Install 2 TQUGA
8. Install 62 TPIPO
9. Install 3 TARME



LEGEND

- Permanent Seeding
- Water Quality Seeding
- Ornamental Grasses and Forbs
- Proposed Trees
- ExistingTrees

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

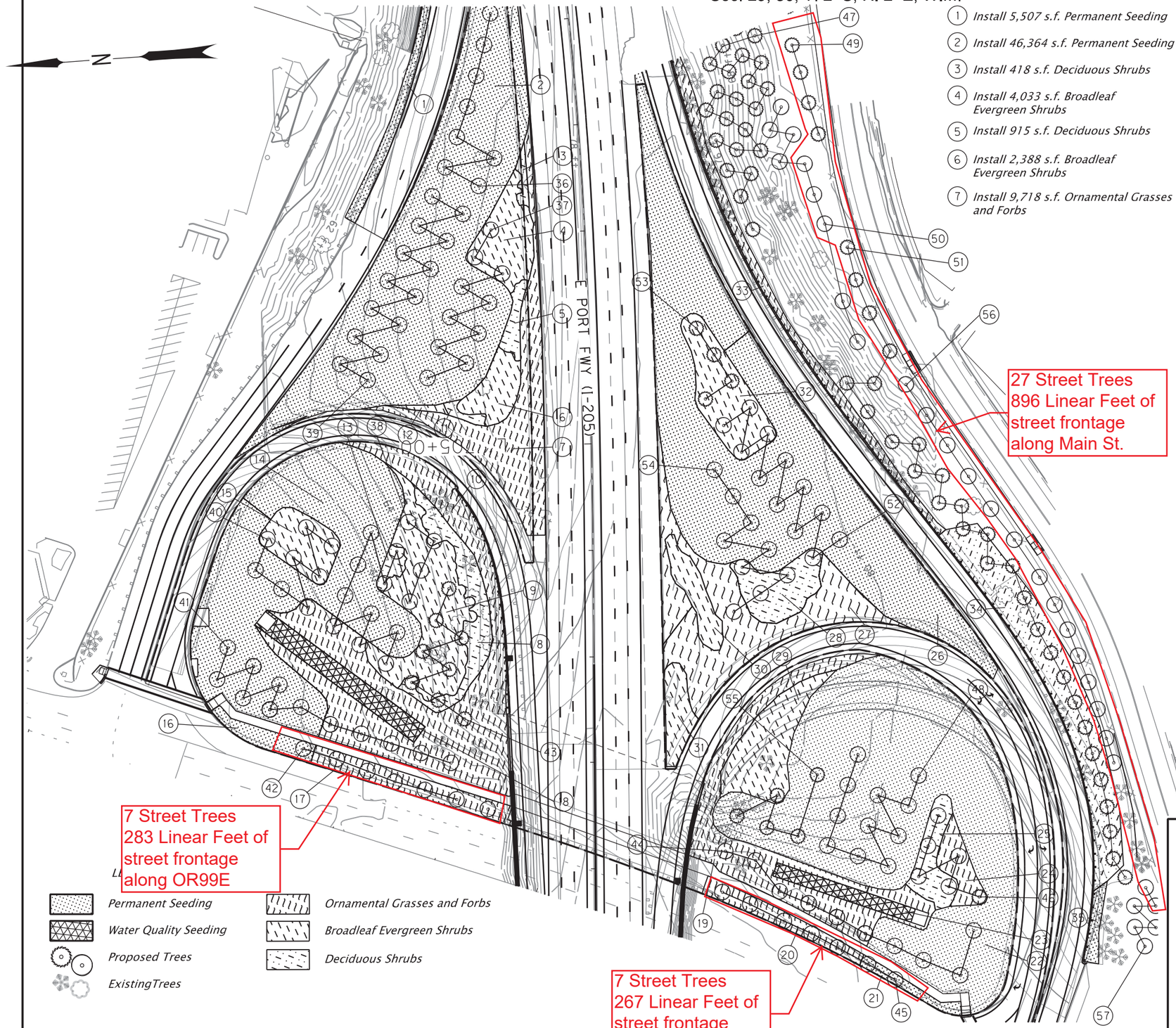
SHEET NO.

NNA_Roadside_Devel :: FA11 12/20/2019 12:01:22 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 222.7112° 0'

Sec. 29, 30, T. 2 S, R. 2 E, W.M.



1. Install 5,507 s.f. Permanent Seeding
2. Install 46,364 s.f. Permanent Seeding
3. Install 418 s.f. Deciduous Shrubs
4. Install 4,033 s.f. Broadleaf Evergreen Shrubs
5. Install 915 s.f. Deciduous Shrubs
6. Install 2,388 s.f. Broadleaf Evergreen Shrubs
7. Install 9,718 s.f. Ornamental Grasses and Forbs
8. Install 4,239 s.f. Deciduous Shrubs
9. Install 9,712 s,f, Broadleaf Evergreen Shrubs
10. Install 20,139 s.f. Ornamental Grasses and Shrubs
11. Install 375 s.f. Deciduous Shrubs
12. Install 260 s.f. Broadleaf Evergreen Shrubs
13. Install 648 s.f. Deciduous Shrubs
14. Install 30,343 s.f. Permanent Seeding
15. Install 3,362 s.f. Broadleaf Evergreen Shrubs
16. Install 1,603 s.f. Permanent Seeding
17. Install 3,471 s.f. Ornamental Grasses and Forbs
18. Install 3,153 s.f. Water Quality Seeding
19. Install 10,277 s.f. Ornamental Grasses and Forbs
20. Install 2,319 s.f. Ornamental Grasses and Forbs
21. Install 989 s.f. Permanent Seeding
22. Install 46,511 s.f. Permanent Seeding
23. Install 1,781 s.f. Water Quality Seeding
24. Install 1,923 s.f. Ornamental Grasses and Forbs
25. Install 2,523 s.f. Broadleaf Evergreen Shrubs
26. Install 43,636 s.f. Permanent Seeding
27. Install 12,295 s.f. Ornamental Grasses and Forbs
28. Install 3,629 s.f. Deciduous Shrubs
29. Install 5,407 s.f. Broadleaf Evergreen Shrubs
30. Install 2,113 s.f. Broadleaf Evergreen Shrubs
31. Install 1,994 s.f. Broadleaf Evergreen Shrubs
32. Install 5,574 s.f. Broadleaf Evergreen Shrubs
33. Install 7,431 s.f. Ornamental Grasses and Shrubs
34. Install 11,524 s.f. Deciduous Shrubs
35. Install 1,379 s.f. NROD Mitigation Shrubs
36. Install 796 s.f. Permanent Seeding
37. Install 8 TPIPO
38. Install 10 TQUGA
39. Install 14 TUMCA
40. Install 14 TQUCH
41. Install 8 TQUCH
42. Install 12 TQUGA
43. Install 6 TQUGA
44. Install 8 TPIPO
45. Install 10 TQUGA
46. Install 6 TQUGA
47. Install 21 TPIPO
48. Install 11 TUMCA
49. Install 4 TPIPO
50. Install 9 TQUGA
51. Install 29 TPIPO
52. Install 12 TQUCH
53. Install 4 TPIPO
54. Install 9 TQUGA
55. Install 5 TPIPO
56. Install 14 TQUGA
57. Install 6 TUMCA

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

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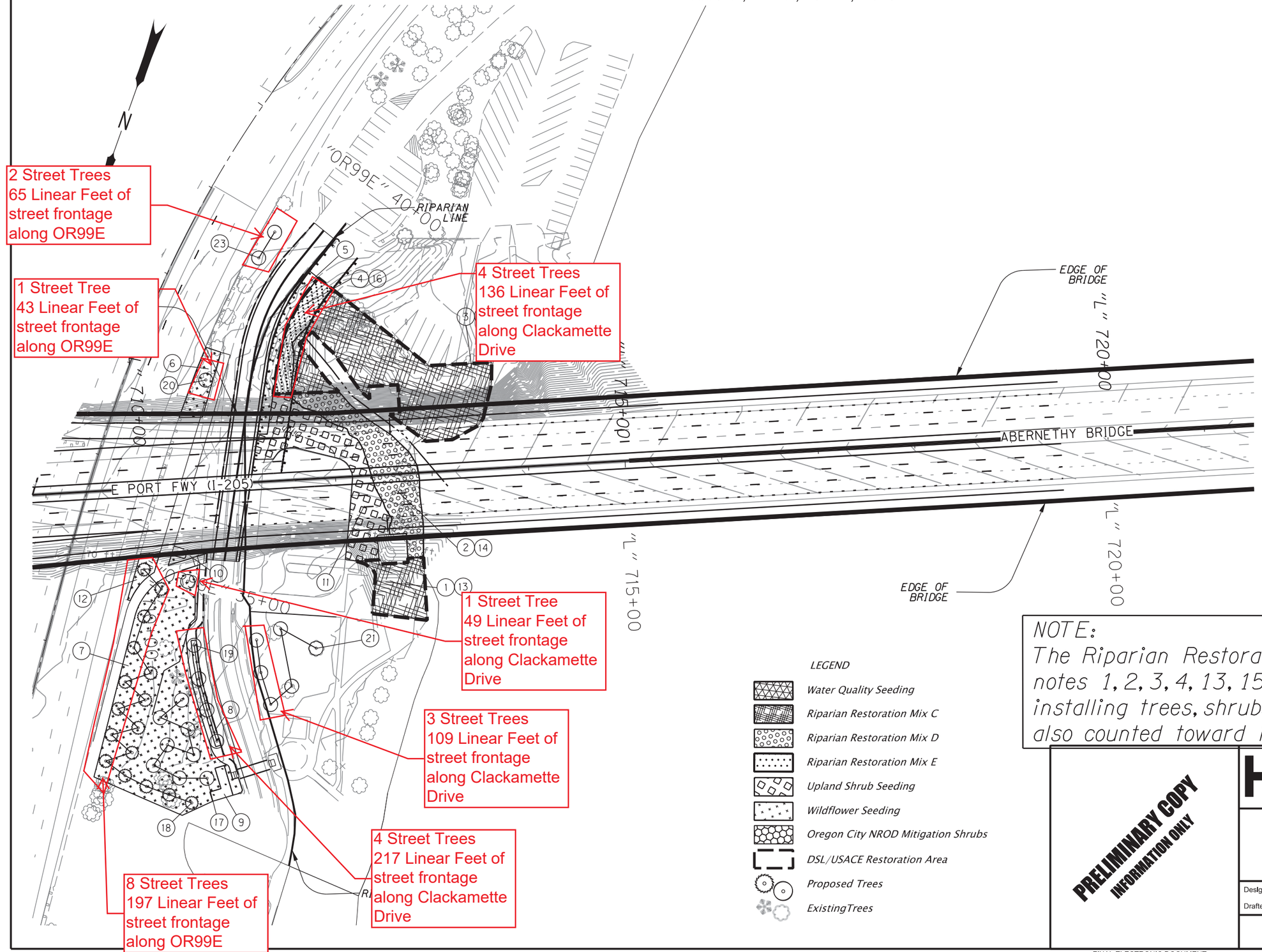

1. Install 3,144 s.f. Riparian Seeding
2. Install 6,769 s.f. Riparian Seeding
3. Install 13,911 s.f. Riparian Seeding
4. Install 2,132 s.f. Wildflower Seeding
5. Install 1,796 s.f. Wildflower Seeding
6. Install 1,468 s.f. Wildflower Seeding
7. Install 20,102 s.f. Wildflower Seeding
8. Install 618 s.f. Wildflower Seeding
9. Install 440 s.f. Water Quality Seeding
10. Install 212 s.f. Wildflower Seeding
11. Install 7,672 s.f. Upland Shrub Seeding
12. Install 654 s.f. Wildflower Seeding
13. Install 3,144 s.f. Riparian Restoration Mix C
14. Install 6,769 s.f. Riparian Restoration Mix D
15. Install 13,911 s.f. Riparian Restoration Mix C
16. Install 2,132 s.f. Riparian Restoration Mix E
17. Install 8 TQUGA
18. Install 16 TPIPO
19. Install 4 TULAM
20. Install 1 TQUGA
21. Install 6 TULAM
22. Install 10 TPIPO
23. Install 2 TQUGA
24. Install 1 TQUGA

LEGEND

- Water Quality Seeding
- Riparian Restoration Mix C
- Riparian Restoration Mix D
- Riparian Restoration Mix E
- Upland Shrub Seeding
- Wildflower Seeding
- Oregon City NROD Mitigation Shrubs
- DSL/USACE Restoration Area
- Proposed Trees
- ExistingTrees

NOTE:
The Riparian Restoration Mixes called out in notes 1, 2, 3, 4, 13, 15, 16, 17, and 18 specify installing trees, shrubs, and groundcover that are also counted toward NROD mitigation totals.

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

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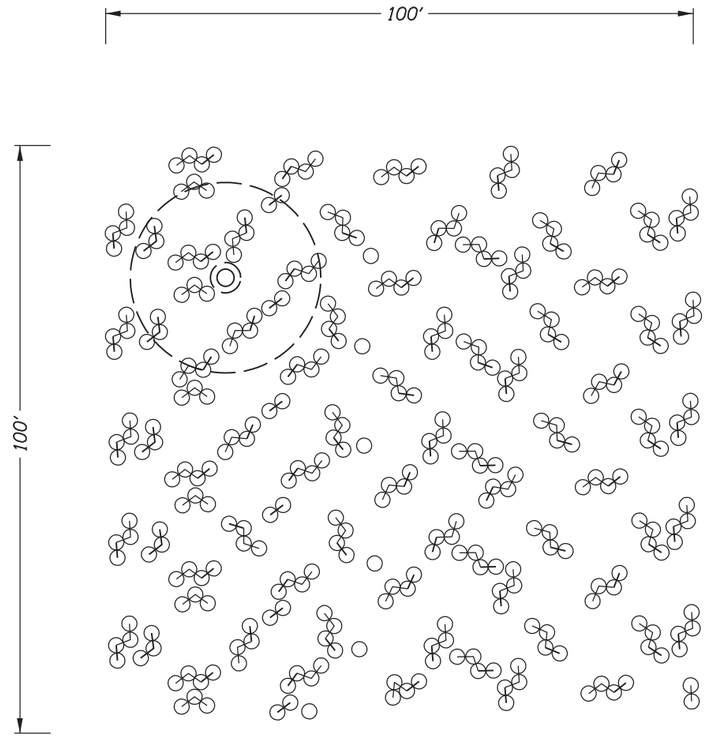

NROD Mitigation Planting Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Berberis (Mahonia) aquifolium	55 stems / 10,000 s.f.	20%
	Cornus sericea	27 stems / 10,000 s.f.	10%
	Ribes sanguineum	41 stems / 10,000 s.f.	15%
	Rubus parviflorus	41 stems / 10,000 s.f.	15%
	Spirea douglasii	41 stems / 10,000 s.f.	15%
	Symphoricarpos albus	68 stems / 10,000 s.f.	25%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND
Shrubs
Assorted Species
5' Buffer
Existing Tree

DETAIL: NROD MITIGATION SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

2) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

3) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

4) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

5) In areas where existing trees are to be preserved, maintain a 5' distance from the adjacent trees trunks to the edge of shrubs.

6) Adjust planting locations as necessary to avoid disturbing mature tree roots over 2" diameter.

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Name
Drafter: David Goodyke | Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

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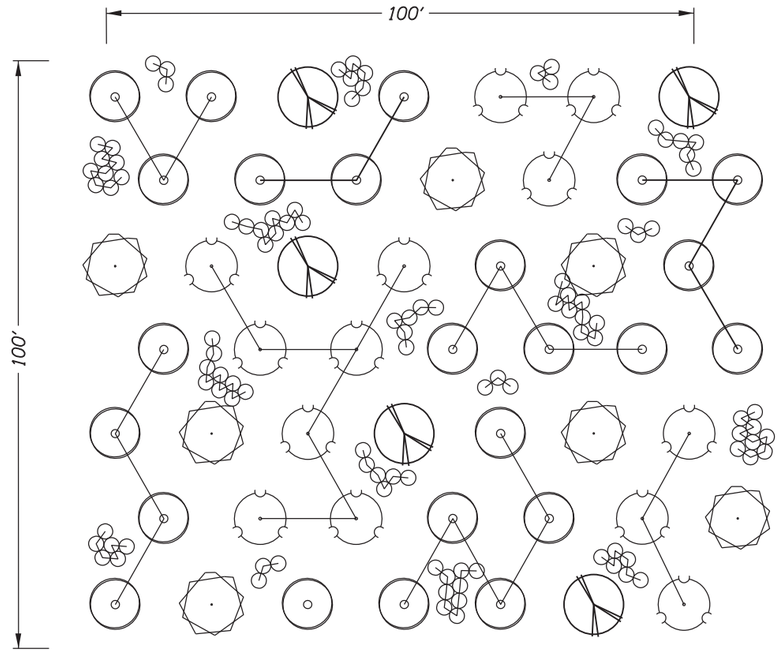

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND

Large, Slow-Growing Trees
- Acer macrophyllum (TACMA), 10%
- Abies grandis (TABGR), 10%
- Thuja plicata (TTHPL), 8%

Small Trees
- Fraxinus latifolia (TFRLA), 6%
- Prunus emarginata (TPREM), 15%
- Salix lucida ssp. Lasiandra(TSALU), 15%
- Rhamnus purshiana (TRHPU), 10%

Fast-Growing Trees
- Alnus rubra (TALRU), 26%

Shrubs
- Lowland Shrubs

Riparian Restoration Mix C: Lowland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Abies grandis	5 stems / 10,000 s.f.	10%
	Acer macrophyllum	4 stems / 10,000 s.f.	10%
	Thuja plicata	4 stems / 10,000 s.f.	8%
	Small Trees		
	Fraxinus latifolia	3 stems / 10,000 s.f.	6%
	Prunus emarginata	7 stems / 10,000 s.f.	15%
	Salix lucida ssp. lasiandra	7 stems / 10,000 s.f.	15%
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Fast-Growing Trees (13)*		
	Alnus rubra	13 stems / 10,000 s.f.	26%

Riparian Restoration Mix C and D: Lowland Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Cornus sericea	27 stems / 10,000 s.f.	25%
	Physocarpus capitatus	11 stems / 10,000 s.f.	10%
	Rubus spectabilis	16 stems / 10,000 s.f.	15%
	Sambucus racemosa	11 stems / 10,000 s.f.	10%
	Spirea douglasii	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	27 stems / 10,000 s.f.	25%

* Groupings required

DETAIL: LOWLAND TREES AND PLANTING MIX C AND D

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 49 trees/10,000 s.f.

2) Install trees at an average of 15' O.C. with triangular spacing, 49 trees/10,000 s.f. Large, Slow-Growing Trees must be planted at minimum 30' O.C. from one another. Fast-Growing and Small Trees shall be installed at a 10 - 20' O.C. average spacing from others.

3) Install Fast-Growing Trees in groups of 2 - 7

4) Install Small Trees in groups of 2 - 5

5) Install shrubs at an overall density of 108 shrubs/10,000 s.f.

6) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Name
Drafter: David Goodyke | Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Appendix B. Documentation of Agency Coordination

Department of State Lands
775 Summer Street, Suite 100
Salem, OR 97301-1279
☎ 503-986-5200

Permit No.:	62035-RF
Permit Type:	Removal/Fill
Waters:	Wetland/Willamette River/ Abernethy Creek/ McLoughlin Creek
County:	Clackamas
Expiration Date:	July 15, 2020

Item #1.

ODOT

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE REFERENCED APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder must obtain all necessary access permits or rights-of-way before entering lands owned by another.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action, which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. Employees of the Department of State Lands (DSL) and all duly authorized representatives of the Director must be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
6. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within twenty-one (21) calendar days of the date this permit was issued.
7. In issuing this permit, DSL makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390, and related administrative rules.
8. Permittee must defend and hold harmless the State of Oregon, and its officers, agents and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.
9. Authorization from the U.S. Army Corps of Engineers may also be required.

NOTICE: If removal is from state-owned submerged and submersible land, the permittee must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 to 274.940 if you want a transfer of title; public rights to such filled lands are not extinguished by issuance of this permit. This permit does not relieve the permittee of an obligation to secure appropriate leases from DSL, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact Department of State Lands, 503-986-5200.

Kirk Jarvie, Southern Operations Manager
Aquatic Resource Management
Oregon Department of State Lands

Kirk Jarvie
Digitally signed by Kirk Jarvie
Date: 2019.07.15 14:49:49 -07'00'

Authorized Signature

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ATTACHMENT A

Permit Holder: ODOT

Project Name: I-205: I-5 – OR 213, Phase I Sec. Abernethy

Special Conditions for Removal/Fill Permit No. 62035-RF

READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT.

The project site may be inspected by the Department of State Lands (DSL) as part of our monitoring program. A copy of this permit must be available at the work site whenever authorized operations are being conducted.

1. Responsible Party: By proceeding under this permit, ODOT agrees to comply with and fulfill all terms and conditions of this permit, unless the permit is officially transferred to another party as approved by DSL. In the event information in the application conflicts with these permit conditions, the permit conditions prevail.

2. Authorization to Conduct Removal and/or Fill: This permit authorizes removal and fill of material in T2S R2E Sections 29/30, many tax lots, in Clackamas County, as referenced in the application, map and drawings (See Attachment B for project location), complete on June 6, 2019 and summarized as follows:

Summary of Authorized Wetland Impacts

Wetland #	Permanent			Temporary		
	Acres	Removal (cy)	Fill (cy)	Acres	Removal (cy)	Fill (cy)
Wetland 37	--	--	--	0.003	9	9

Summary of Authorized Waterway Impacts

Waterway Name	Permanent			Temporary		
	Linear Ft.	Removal (cy)	Fill (cy)	Linear Ft.	Removal (cy)	Fill (cy)
Willamette River	30	40,185	28,696	120	4,305	4,305
Abernathy Creek	30	4,405	3,284	175	420	420
McLoughlin Creek	340	899	784	340	2,437	2,552
Total:	400	45,489	32,764	635	7,162	7,277

*These volumes include removal and fill activities necessary to complete the required restoration and mitigation.

3. Work Period in Jurisdictional Areas: Fill or removal activities below the ordinary high water elevation of Abernathy Creek must be conducted between July 1 and October 31; other than for the activities noted below, fill or removal activities below the ordinary high water elevation of Willamette River must be conducted between July 1 and October 31; drilled shaft oscillation work in the Willamette River behind the constructed coffer dams may occur between July 1 and December 31; use of the barge in the Willamette may occur year round. Extensions to these periods may only occur if coordinated with Oregon Department of Fish and Wildlife and approved

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in writing by DSL. If fish eggs are observed within the project area, work must cease, and DSL contacted immediately.

4. Changes to the Project or Inconsistent Requirements from Other Permits: It is the permittee's responsibility to ensure that all state, federal and local permits are consistent and compatible with the final approved project plans and the project as executed. Any changes made in project design, implementation or operating conditions to comply with conditions imposed by other permits resulting in removal-fill activity must be approved by DSL prior to implementation.

5. DSL May Halt or Modify: DSL retains the authority to temporarily halt or modify the project or require rectification in case of unforeseen adverse effects to aquatic resources or permit non-compliance.

6. DSL May Modify Conditions Upon Permit Renewal: DSL retains the authority to modify conditions upon renewal, as appropriate, pursuant to the applicable rules in effect at the time of the request for renewal or to protect waters of this state.

Pre-Construction

7. Local Government Approval Required Before Beginning Work: Prior to the start of construction, the permittee must obtain a Development permit and Site Plan and Design Review, Variance and Natural Resource Review application required from Oregon City and a development permit from West Linn.

8. DSL Proprietary Authorization Required Before Beginning Work: Prior to the start of work within state-owned submerged and submersible lands, the permittee must obtain an easement from the Department of State Lands.

9. Stormwater Management Approval Required Before Beginning Work: Prior to the start of construction, the permittee must obtain a National Pollution Discharge Elimination System (NPDES) permit from the Oregon Department of Environmental Quality (DEQ), if one is required by DEQ.

10. Authorization to Use Property for Linear Projects: For linear facility projects, the removal-fill activity cannot occur until the person obtains:

    a. The landowner's consent;
    b. A right, title or interest with respect to the property, that is sufficient to undertake the removal or fill activity; or
    c. A court order or judgment authorizing the use of the property

11. Pre-construction Resource Area Fencing or Flagging: Prior to any site grading, the boundaries of the avoided wetlands, waterways, and riparian areas adjacent to the project site must be surrounded by noticeable construction fencing or flagging. The marked areas must be maintained during construction of the project and be removed immediately upon project completion.

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General Construction Conditions

12. Water Quality Certification: The Department of Environmental Quality (DEQ) may evaluate this project for a Clean Water Act Section 401 Water Quality Certification (WQC). If the evaluation results in issuance of a Section 401 WQC, that turbidity condition will govern any allowable turbidity exceedance and monitoring requirements.

13. Erosion Control Methods: The following erosion control measures (and others as appropriate) must be installed prior to construction and maintained during and after construction as appropriate, to prevent erosion and minimize movement of soil into waters of this state.

    a. All exposed soils must be stabilized during and after construction to prevent erosion and sedimentation.
    b. Filter bags, sediment fences, sediment traps or catch basins, leave strips or berms, or other measures must be used to prevent movement of soil into waterways and wetlands.
    c. To prevent erosion, use of compost berms, impervious materials or other equally effective methods, must be used to protect soil stockpiled during rain events or when the stockpile site is not moved or reshaped for more than 48 hours.
    d. Unless part of the authorized permanent fill, all construction access points through, and staging areas in, riparian and wetland areas must use removable pads or mats to prevent soil compaction. However, in some wetland areas under dry summer conditions, this requirement may be waived upon approval by DSL. At project completion, disturbed areas with soil exposed by construction activities must be stabilized by mulching and native vegetative plantings/seeding. Sterile grass may be used instead of native vegetation for temporary sediment control. If soils are to remain exposed more than seven days after completion of the work, they must be covered with erosion control pads, mats or similar erosion control devices until vegetative stabilization is installed.
    e. Where vegetation is used for erosion control on slopes steeper than 2:1, a tackified seed mulch must be used so the seed does not wash away before germination and rooting.
    f. Dredged or other excavated material must be placed on upland areas having stable slopes and must be prevented from eroding back into waterways and wetlands.
    g. Erosion control measures must be inspected and maintained as necessary to ensure their continued effectiveness until soils become stabilized.
    h. All erosion control structures must be removed when the project is complete, and soils are stabilized and vegetated.

14. Fuels, Hazardous, Toxic, and Waste Material Handling: Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, wood treated with leachable preservatives or other deleterious waste materials must not be allowed to enter waters of this state. Machinery and equipment staging, cleaning, maintenance, refueling, and fuel storage must be at least 150 feet from OHW or HMT and wetlands to prevent contaminates from entering waters of the state. Refueling is to be confined to a designated area to prevent spillage into waters of this state. Barges must have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.

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15. Archaeological Resources: If any archaeological resources, artifacts or human remains are encountered during construction, all construction activity must immediately cease. The State Historic Preservation Office must be contacted at 503-986-0674. You may be contacted by a Tribal representative if it is determined by an affected Tribe that the project could affect Tribal cultural or archeological resources.

16. Construction Corridor: There must be no removal of vegetation or heavy equipment operating or traversing outside the designated construction corridor or footprint (Figures 5-3A through 5-18).

17. Hazards to Recreation, Navigation or Fishing: The activity must be timed so as not to unreasonably interfere with or create a hazard to recreational or commercial navigation or fishing.

18. Operation o fEquipment in the Water: Heavy equipment may be positioned below ordinary high water or highest measured tide if the area is isolated from the waterway and aquatic organism salvage is completed. All machinery operated below ordinary high water (OHW) or highest measured tide (HMT) elevation must use vegetable-based hydraulic fluids, be steam cleaned and inspected for leaks prior to each use, and be diapered to prevent leakage of fuels, oils, or other fluids below OHW or HMT elevation. Any equipment found to be leaking fluids must be immediately removed from and kept out of OHW or HMT until repaired.

19. Work Area Isolation: The work area must be isolated from the water during construction by using a coffer dam or similar structure. All structures and materials used to isolate the work area must be removed immediately following construction and water flow returned to pre-construction conditions.

20. Fish Salvage Required: Fish must be salvaged from the isolation area. Permits from NOAA Fisheries and Oregon Department of Fish and Wildlife, Fish Research are required to salvage fish. Fish salvage permit information may be obtained by contacting ODFW Fish Research at 503-947-6254 or Fish.Research@state.or.us.

21. Fish Passage Required: The project must meet Oregon Department of Fish and Wildlife requirements for fish passage.

22. Raising or Redirecting Water: The project must not cause water to rise or be redirected and result in damage to structures or property on the project site as well as adjacent, nearby, upstream, and downstream of the project site.

Pilings

23. Method o fPiling Placement: Pilings must be placed by means of vibratory hammer. An impact hammer is allowed only as necessary for proofing the pile.

24. Sound Reduction: To reduce sound impacts to fish from an impact hammer, a fully-confined bubble curtain will be used if installation requires impact proofing.

25. Method o fPiling Removal: Removal of pile must be conducted by means of vibratory removal and pulling. Piles that cannot be extracted by this method must be cut off 3 feet below the stream bed.

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26. Leachable Preservatives Prohibited: There must be no wood products treated with creosote or other leachable preservatives in the new structure.

27. Waste Pilings Disposal: Old piling and other waste material must be disposed of in a disposal facility approved for this purpose. There must be no temporary storage of piling or other waste material below top of bank or in any wetland, Federal Emergency Management Administration designated floodway, or an area historically subject to landslides.

Site Rectification

28. Abernathy Creek Rectification and Improvements: The existing riprap and streambed must be reconfigured to create a low flow channel; fish rocks and large woody material must be added to provide fish passage and stabilize the channel. The large wood must be incorporated in the form and manner described in the application and Figures 5-14 and 5-15.

29. McLoughlin Creek and Wetland 37 Rectification and Improvements: The final completed contours of the wetland and stream will be restored and planted as described in the application. The slope of the McLoughlin Creek channel must be the same or flatter the pre-construction conditions; the width must be equal to or greater than pre-construction conditions.

30. Trenching in Wetland 37: During trenching or excavation, the top layer of soil must be separated from the rest of the excavated material and put back on top when the trench or pit is back-filled. If the native underlying soils are not used as bedding material and a coarser, non-native soil or other material is used, preventative measures such as clay or concrete plugs must be used so that underground hydraulic piping does not dewater the site and adjacent wetlands.

31. Pre-construction Elevations Must Be Restored Within the Same Construction Season: Construction activities within areas identified as temporary impact must not exceed two construction seasons and rectification of temporary impacts must be completed within 24 months of the initiation of impacts. However, if the temporary impact only requires one construction season, re-establishment of pre-construction contours must be completed within that same construction season, before the onset of fall rains.

32. Planting in Soils and Riprap Required: Disturbed areas above OHW must be planted and seeded immediately following establishment of final contours. Planting of native woody vegetation must be completed during the time of year that provides the optimal chances of survival immediately following construction (Figure FA13 [Abernathy Creek] FA14 and FA15 [McLoughlin Creek and Wetland 37]).

33. Woody Vegetation Planting Required: Planting of native woody vegetation must be completed before the next growing season after re-establishment of the pre-construction contours (Figure FA13 [Abernathy Creek] FA14 and FA15 [McLoughlin Creek and Wetland 37]).

Monitoring and Reporting Requirements

34. Post-Construction Report Required: A post-construction report demonstrating as-built conditions and discussing any variation from the approved plan must be provided to DSL with the first monitoring report. The post-construction report must include:

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a. A scaled drawing, accurate to 1-foot elevation, clearly showing the following:
   1. Finished contours of the site.
   2. The riprap removal area pre- and post-project contours
   3. The streambed as reconfigured, including low flow channel, fish rocks, and large woody material
   4. Photo point locations.
b. Photos from fixed photo points. This should clearly show the site conditions
c. A narrative that describes any deviation from the plan.

35. Annual Monitoring Reports Required: Monitoring is required until DSL has officially released the site from further monitoring. The permittee must monitor the site to determine whether the site is meeting performance standards for a minimum period of 3 growing seasons after completion of all the initial plantings. Annual monitoring reports are required and are due by December 31. Failure to submit the required monitoring report by the due date may result in an extension of the monitoring period or enforcement action.

36. Extension of the Monitoring Period: The monitoring period may be extended, at the discretion of DSL, for failure of the site to meet performance standards for the final two consecutive years without corrective or remedial actions (such as irrigation, significant weed/invasive plants treatment or replanting) or when needed to evaluate corrective or remedial actions.

37. Contents of the Annual Monitoring Report: The annual monitoring report must include the following information:

a. Completed Monitoring Report Cover Sheet, which includes permit number, permit holder name, monitoring date, report year, performance standards, and a determination of whether the site is meeting performance standards.
b. Site location map(s) that clearly shows the site boundaries.
c. Site Plan that clearly shows at least the following.
   1. The area seeded, with the square foot area listed.
   2. The area planted with trees and shrubs, with the square foot area listed.
   3. Permanent monitoring plot locations that correspond to the data collected and fixed photo-points. These points should be overlaid on the as-built map.
d. A brief narrative that describes maintenance activities and recommendations to meet success criteria. This includes when irrigation occurred and when the above ground portion of the irrigation system was or will be removed from the site.
e. Data collected to support the conclusions related to the status of the site relative to the performance standards listed in this permit (include summary/analysis in the report and raw data in the appendix). Data should be submitted using the DSL Mitigation Monitoring Vegetation Spreadsheet or presented in a similar format as described in DSL's Routine Monitoring Guidance for Vegetation.
f. Photos from fixed photo points (include in the appendix).
g. Other information necessary or required to document compliance with the performance standards listed in this permit.

38. Corrective Action May Be Required: DSL retains the authority require corrective action in the event the performance standards are not accomplished at any time within the monitoring period.

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Performance Standards for Wetland 37 Rectification

39. Establishment of Permanent Monitoring Locations Required: Permanent plot locations must be established during the first annual monitoring in sufficient number and locations to be representative of the site. The permanent plot locations must be clearly marked on the ground.

40. Wetland 37 Acreage Required: The proposed impacts at Wetland 37 will have a minimum 0.003 acres as determined by hydrology data collected during spring of a year when precipitation has been near normal, vegetation has been established, and irrigation has been removed for at least two years.

41. Native Species Cover: The cover of native species, as defined in the USDA Plants Database, in the herbaceous stratum is at least 60%.

42. Invasive Species Cover: The cover of invasive species is no more than 20%. A plant species should automatically be labeled as invasive if it appears on the current Oregon Department of Agriculture noxious weed list.

Performance Standards for McLoughlin and Abernethy Creeks Rectification

43. Woody Vegetation: The density of woody vegetation is at least 1 live native shrubs or tree every 6 linear feet on each disturbed waterway bank. Native species volunteering on the site may be included, dead plants do not count, and the standard must be achieved for 2 years without irrigation.

Monitoring and Reporting Schedule

Report	Requirements	Schedule
Post-Construction and First Annual Report	Post-construction report Establishment of permanent monitoring locations Vegetation performance standards Demonstration that wetland hydrology has been accomplished	After one growing season of all proposed plantings
Second Annual Report	Vegetation performance standards	After two growing seasons
Third Annual Report (or final report if the monitoring period has been extended)	Vegetation performance standards Actual acreage achieved by HGM and Cowardin class[1].	After three or final monitoring season

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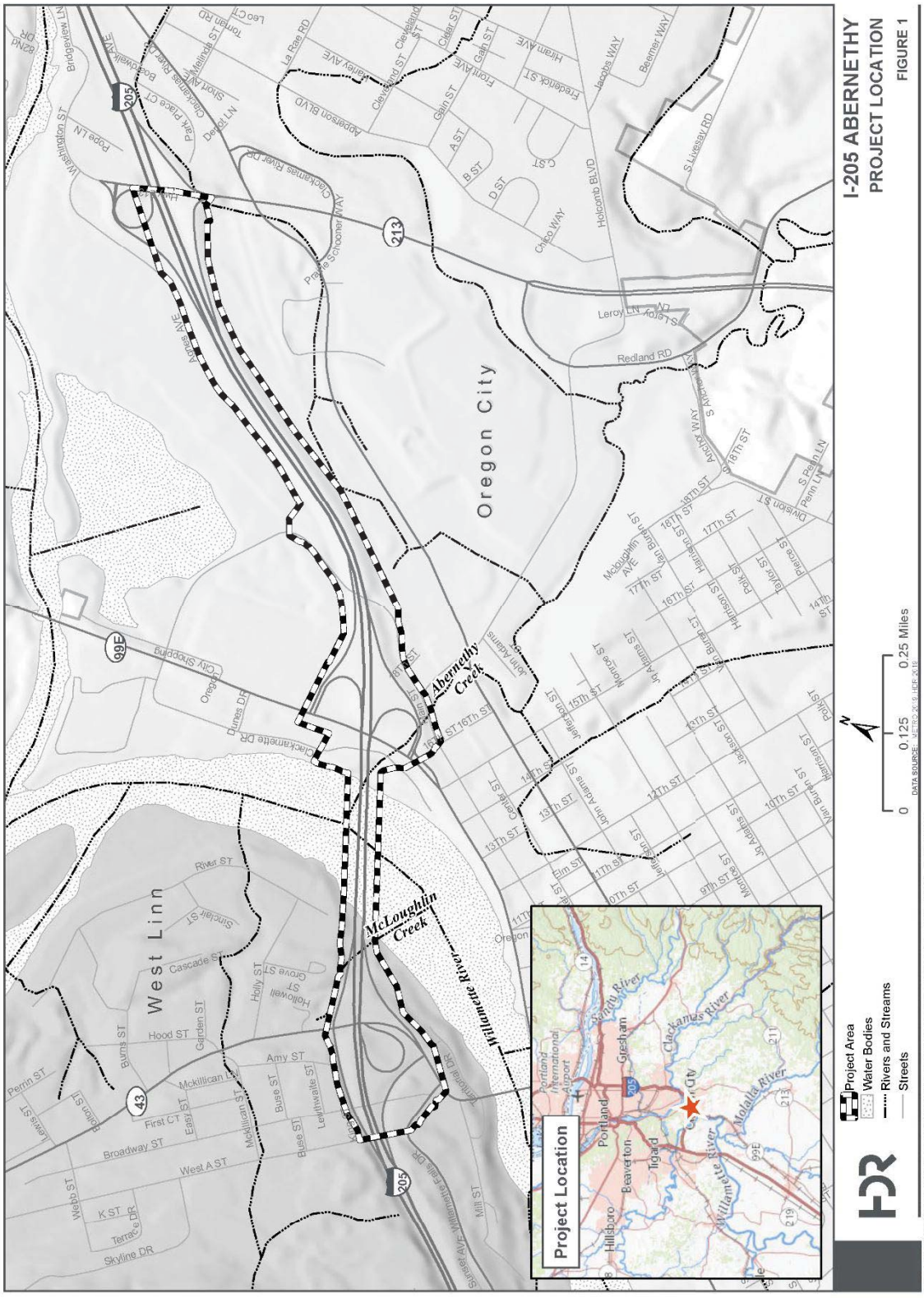
ATTACHMENT B

Permit Holder: ODOT

Project Name: I-205: I-5 – OR 213, Phase I Sec. Abernethy

Maps and Drawings for Removal/Fill Permit No. 62035-RF



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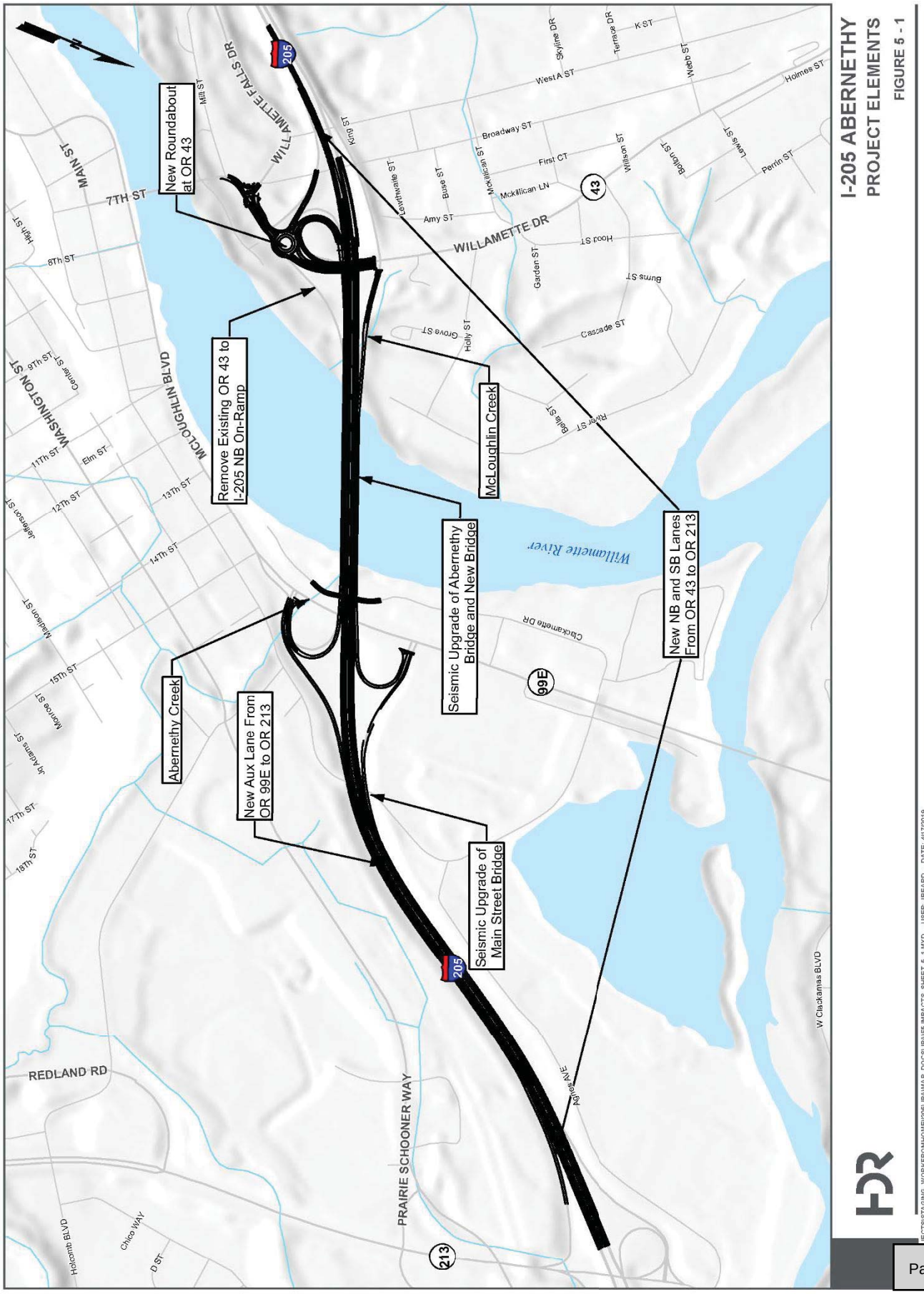

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From: Bauman, Brian S.
To: Barksdale, Rachel
Subject: FW: DSL62035-RF PRP Comments-No Response Required
Date: Wednesday, July 17, 2019 8:19:12 AM
Attachments: Application No. APP0062035 Russ Klassen.msg
DSL 62035 PRP Comments-No Response Required.msg

Brian Bauman
D 503.727.3908 **M** 503.289.1722

hdrinc.com/follow-us

From: KLASSEN Russ [mailto:russ.klassen@state.or.us]
Sent: Monday, July 15, 2019 8:19 AM
To: 'SARGENT Kenneth W' <Kenneth.W.SARGENT@odot.state.or.us>
Cc: Bauman, Brian S. <Brian.Bauman@hdrinc.com>
Subject: DSL62035-RF PRP Comments-No Response Required

Ken,

The Department of State Lands' public review period (PRP) closed on 7/12/2019 for Removal and Fill application 62035 for the proposed Abernethy Bridge project. Attached are copies of all written comments we received. The second attached comment from DSL's Proprietary Section has already been forwarded to you. (It erroneously indicated PRP ended on the 3rd) They are both provided for your information and do not require a response for the Removal and Fill permitting process.

The permit decision will be determined by September 10, 2019 or sooner unless you request to extend that deadline. Please call me at if you have any questions.

Thank you,

Russ Klassen
Department of State Lands
Aquatic Resource Coordinator
PHONE: 503-986-5244

OREGON CITY

Pre-Application Conference Notes
PA 19-08, February 28, 2019

Proposed Project: Addition of general purpose travel lane on I-205 in each direction, and a new northbound auxiliary lane between the OR 99E and OR 213 interchanges, modification of OR 99E interchange ramps and seismic upgrades to the Abernethy Bridge over Main Street.

General Information:

- Location: ODOT Right-of-Way

Clackamas County Map 2-2E-29CB, Tax Lots 300 and 500

- Please note the City limits of Oregon City extend to the midpoint of the river

Review Process:
This application is a Type III process including Natural Resource Overlay District Review, Site Plan and Design Review, Geologic Hazards Review, Floodplain Review and Willamette Greenway Overlay Review. The applicant has **180 days** from the date of submittal to have a complete application.

Upon a complete application submittal, the applicant is entitled to a decision from the city for a decision of approval, approval with conditions or denial within **120 days** of deeming the application complete, by state law.

Type III decisions require a minimum of one public hearing before the Planning Commission and involve the greatest amount of discretion and evaluation of subjective approval standards, yet are not required to be heard by the City Commission except upon appeal.

Jon Storm Park Master Plan and Prior Reviews
Jon Storm Park has an approved master plan (Planning File MC 04-01), which was built out in three phases under Planning files SP 05-05, WR 05-09, SP 07-01 and WR 07-04. Because the development allowed by the Master Plan has been built out, the master plan is no longer in effect in accordance with OCMC 17.65.050.D.

17.65.050.D
Duration of General Development Plan. A general development plan shall involve a planning period of at least five years and up to twenty years. An approved general development plan shall remain in effect until development allowed by the plan has been completed through the detailed development plan process, the plan is amended or superseded, or the plan expires under its stated expiration date.

Application Timing and Expiration
The pre-application conference is valid for six months, but the Community Development Director may extend it to one year. If no application is filed within one year from the date of the meeting, an additional pre-application conference must be held. If within two years of the date of the notice of decision, a building permit associated with the development has not been issued, the land use approval expires, unless a one-year extension is filed and approved prior to the application expiration.

City of West Linn
PRE-APPLICATION CONFERENCE MEETING
SUMMARY NOTES
June 20, 2019

SUBJECT: Proposed I-205 Widening and Seismic Improvements to Abernethy Bridge

FILE: PA-19-15

ATTENDEES: Applicant: Tom Hamstra, Scott Turnoy (ODOT), Karen Tatman (Quincy Eng.), Michael Bertram, Rachel Barksdale, Brian Bauman (HDR)
Public: Kathie Halicki (WNA), Andrew Robins (WES)
Staff: Darren Wyss (Planning), Amy Pepper (Engineering)

The following is a summary of the meeting discussion provided to you from staff meeting notes. Additional information may be provided to address any "follow-up" items identified during the meeting. These comments are PRELIMINARY in nature. Please contact the Planning Department with any questions regarding approval criteria, submittal requirements, or any other planning-related items. Please note disclaimer statement below.

Site Information

Site Address:	I-205 Corridor
Tax Not No.:	ODOT Right-of-Way
Site Area:	~3.5 miles
Neighborhood:	Bolton, Sunset, and Willamette Neighborhood Associations
Comp. Plan:	NA
Zoning:	NA
Applicable code:	CDC Chapter 27: Flood Management Areas CDC Chapter 28: Willamette and Tualatin River Protection CDC Chapter 32: Water Resource Area Protection

Project Details

The applicant proposes to widen I-205 to add a third general purpose travel lane in each direction and conduct a seismic retrofit of the Abernethy Bridge. The project will also modify the OR 43 Interchange ramps and replace the Sunset Ave., West A St., and Woodbine Rd. bridges. Seismic upgrades will be performed on the 10th St. and Blankenship Rd. bridges. The Broadway St. Bridge will be permanently removed. Proposed structural upgrades to the Abernethy Bridge include replacement of piers, adding columns, increasing foundation sizes, enlarging columns and beams, and other substructure improvements. A drill rig will be used to strengthen subsurface soils. A temporary bridge will be installed to facilitate construction activities. The project includes work in the floodplain and water resource areas. There are existing sanitary sewer, stormwater, and municipal water infrastructure traversing the I-205 right-of-way.

Public Comments

Concern about getting freight through the roundabouts, particularly trucks with double and triple trailer loads (ODOT staff responded that triples are not allowed on Willamette Falls Drive and the roundabout is designed to accommodate doubles with rolled curbs/wide inside lanes). Questions about the sound wall voting process and contention in the neighborhood.

Appendix C. Erosion and Sediment Control Plan

GENERAL NOTES:

The construction, adjustment, maintenance, and upgrading of these Erosion and Sediment Control measures is the responsibility of the contractor for the duration of the project to comply with Section 00280 of the Oregon Standard Specifications for construction and the NPDES 1200-CA permit.

Erosion and Sediment Control measures shown on this plan are for anticipated site conditions. Adjust or upgrade these measures for unexpected storm events to ensure that sediment and sediment-laden water does not leave the site.

Develop a revised plan of the Erosion and Sediment Control measures shown as required by Section 00280, Oregon Standard Specifications for Construction. Implement this plan for all clearing and grading activities and in segments applicable to each staging phase. Construct in such a manner so as to ensure that sediment and sediment-laden water does not enter the roadway or drainage system, or violate applicable water standards.

Install measures within the right-of-way unless directed otherwise.

Inlet protection for existing facilities shall be installed before construction begins and shall remain in place until all construction is completed and approved. The contractor shall protect all storm drain inlets within the work area and adjacent to the work limits within 100' outside all working, stockpile, and staging areas, including the first inlet downstream (at any distance). In the case of inlets to be removed, protection measures shall remain in place until the new inlet is constructed and connected to the drainage network, and the existing inlet has been disconnected from the existing drainage network. Inlet protection shall be installed on new inlets before they are connected to the existing drainage network.

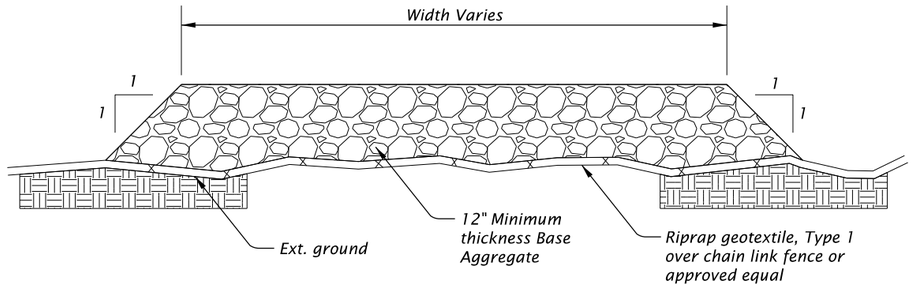
See section 00280 for material not shown in plans.

STANDARD DRAWINGS

☒	*RD1000*	*Construction Entrances*
☐	*RD1005*	*Check Dams Type 1, 3 and 4*
☒	*RD1006*	*Check Dams Type 2 and 6*
☒	*RD1010*	*Inlet Protection Type 2, 3, 6 and 7*
☐	*RD1015*	*Inlet Protection Type 4*
☒	*RD1030*	*Sediment Barrier Type 2, 3 and 4*
☐	*RD1031*	*Sediment Barrier Type 5 and 6*
☒	*RD1032*	*Sediment Barrier Type 8*
☒	*RD1033*	*Sediment Barrier Type 9*
☒	*RD1040*	*Sediment Fence*
☐	*RD1045*	*Temporary Slope Drain With Energy Dissipator*
☐	*RD1050*	*Temporary Scour Basin*
☒	*RD1055*	*Slope and Channel Matting*
☒	*RD1060*	*Tire Wash Facility Type 1 and 2*
☒	*RD1065*	*Sediment Trap*
☒	*RD1070*	*Concrete Truck Wash Out*

SEQUENCE OF WORK NOTES:

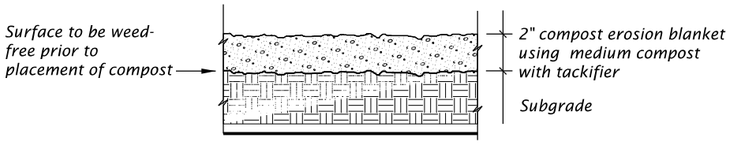
This Erosion and Sediment Control Plan has been prepared based upon the construction sequence represented in the Traffic Control Plan Sheets. This ESCP is not intended to supercede a construction sequencing plan. The ESCP is to be reviewed and revised to fit the actual construction sequence.



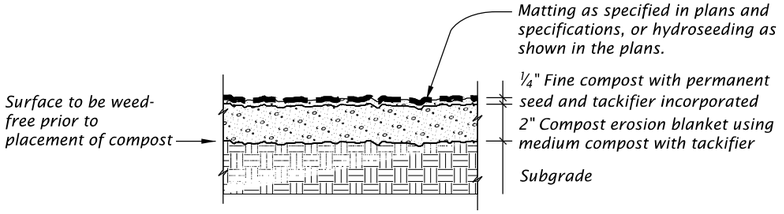
1. Existing ground shall grubbed to a depth 6".

2. Cover existing ground under Staging Area with riprap geotextile and either chain link fence or other approved geogrid type material and cover with Base Aggregate.

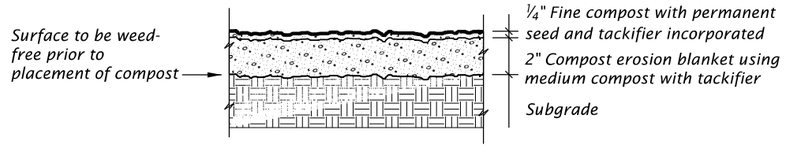
STAGING AREA DETAIL
N.T.S.



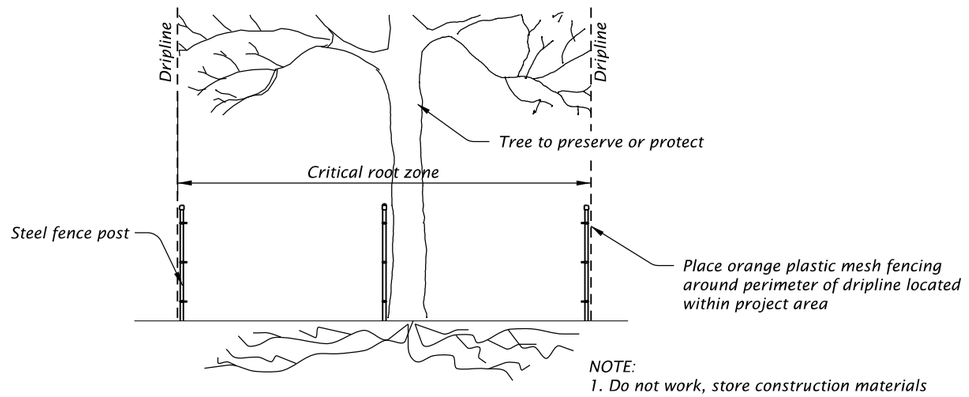
APPLICATION - TEMPORARY/PERMANENT MULCHING
N.T.S.



APPLICATION - STEEP SLOPES, SHALLOW DITCHES & BIO-SWALES
N.T.S.



APPLICATION – TEMPORARY/PERMANENT VEGETATIVE COVER
N.T.S.



NOTE:
1. Do not work, store construction materials or park within the critical root zone of marked trees unless written approval has been obtained from the Engineer.

TREE PROTECTION DETAIL
N.T.S.

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

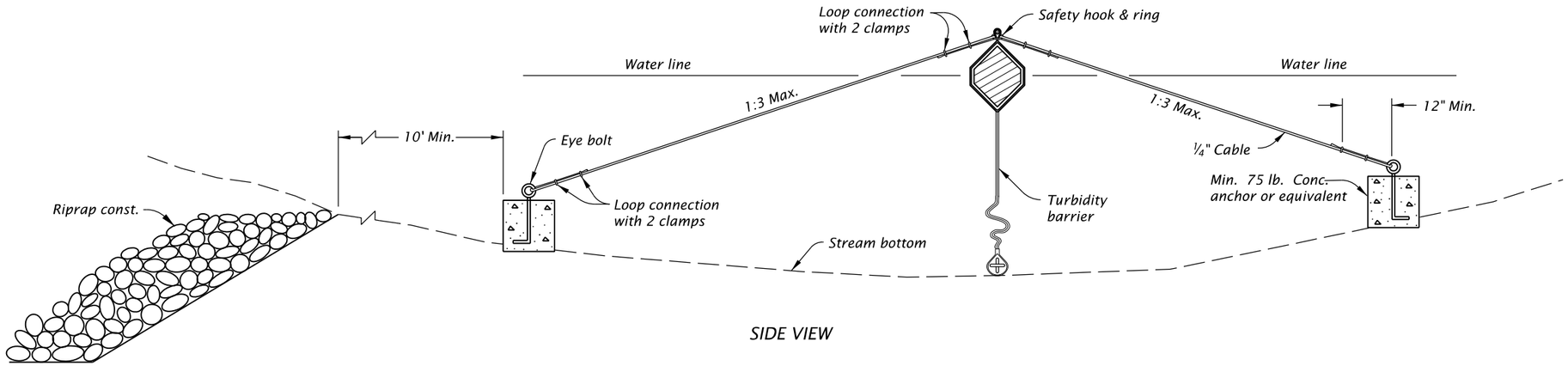
EROSION AND SEDIMENT CONTROL

SHEET NO.

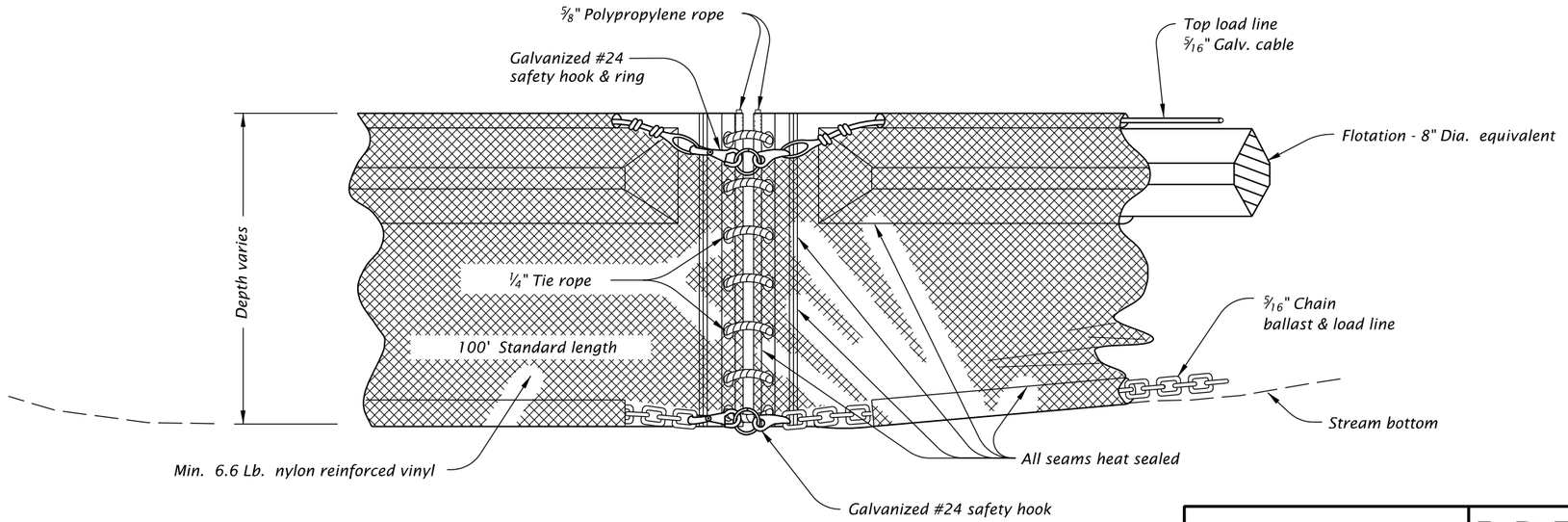
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_01.dgn :: FB01 2/7/2020 4:10:52 PM CDONOVAN
Rotation: 0° 0'

SEDIMENT BARRIER FLOATING



SIDE VIEW



ANCHOR ASSEMBLY

NOTE:

Components of this barrier may be similar or identical to proprietary designs. Any infringement on the proprietary rights of the designer shall be the sole responsibility of the contractor. Substitutions shall be as approved by the engineer.

TURBIDITY BARRIER

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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Rotation: 0° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

BEGINNING OF PROJECT
S???(???)
STA. "L" 655+00 (M.P. 10.24)

N

Extg. R/W

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Ditch

1. *Const. check dam, (Type 6) - xx (See drg. no. RD1006)*
2. *Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)*
3. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
4. *Install orange plastic mesh fencing*

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Check dam in ditch section
- No work zone
- Orange plastic fence (no work area)
- Compost filter berm
- Wetland
- Ordinary High Water
- Flow direction

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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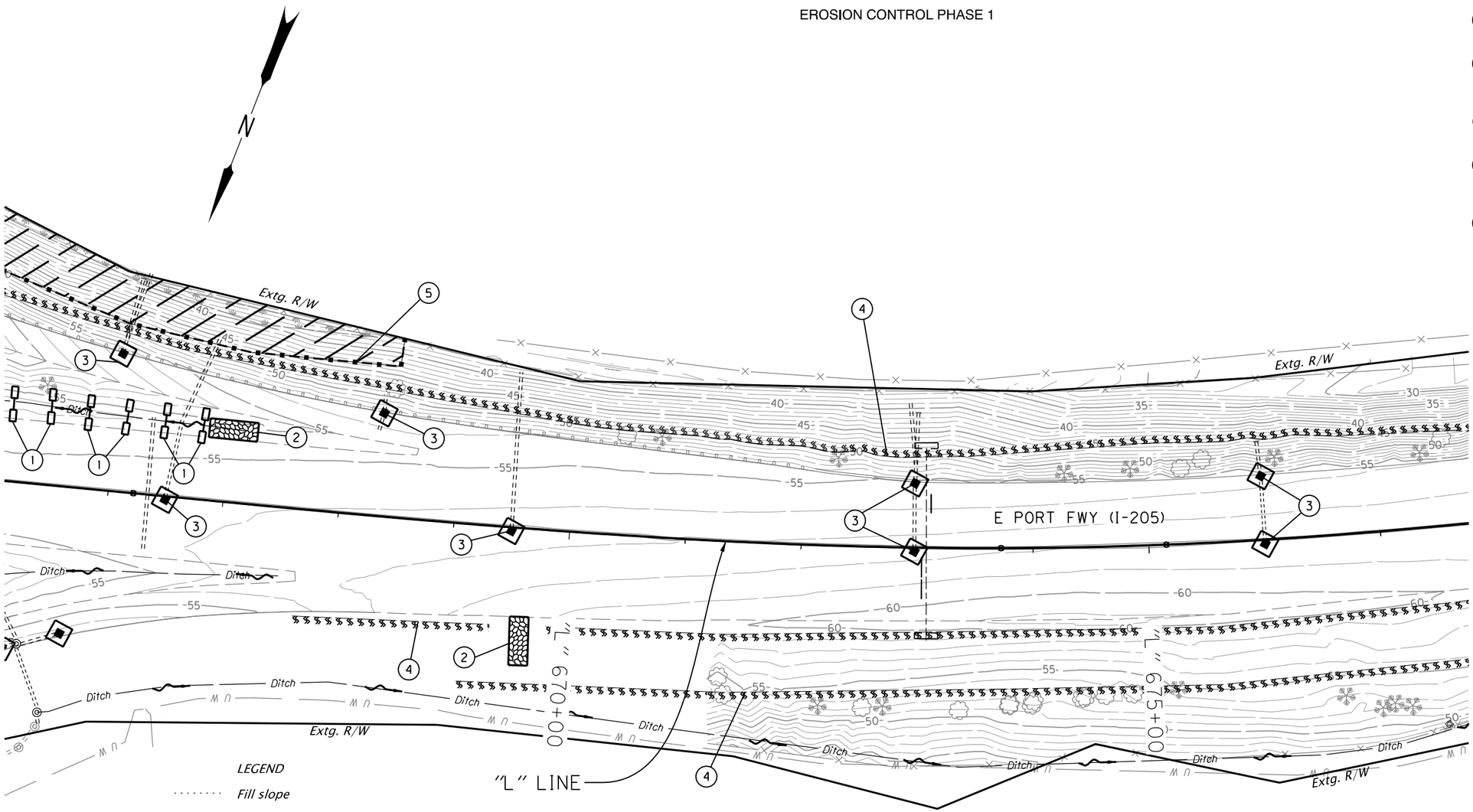
EE_K19786_HDR_ecpl_01.dgn :: FB03 2/7/2020 4:10:57 PM CDONOVAN

Rotation: 227.6721° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
2. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
3. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
4. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Wetland*
- *Ordinary High Water*
- *Compost filter berm*
- *Flow direction*
- *Construction entrance*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB04 2/7/2020 4:11:01 PM CDONOVAN

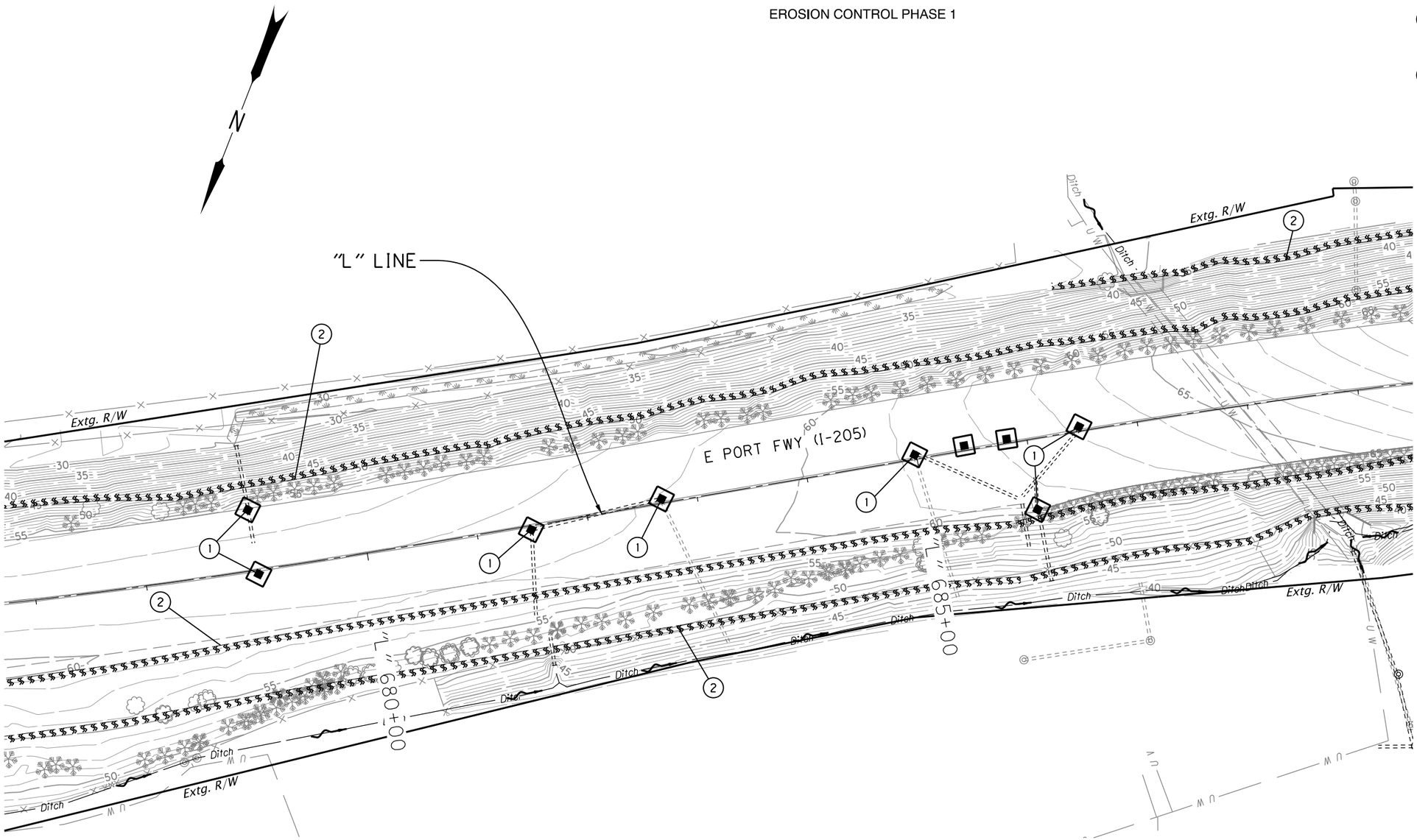
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. inlet protection - xx (Type 3) (See drg. no. RD1010)*
2. *Install sediment barrier, (Type 9) - xx' (See drg. no. RD1033)*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

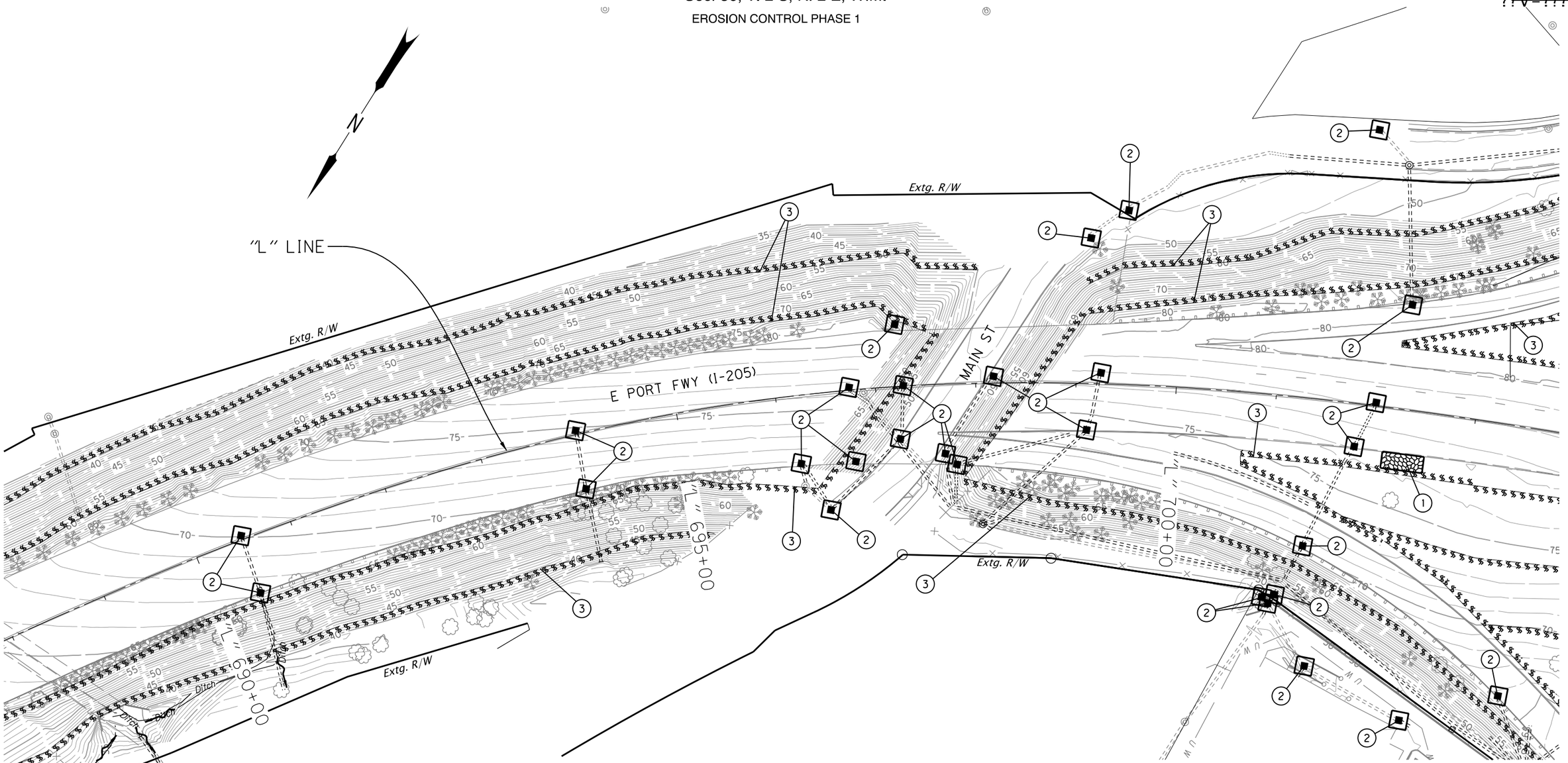
EE_K19786_HDR_ecpl_01.dgn :: FB05 2/7/2020 4:11:05 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
3. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB06 2/7/2020 4:11:09 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 212.6746° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost filter berm
- Ordinary High Water
- Flow direction
- Construction entrance

1. Const. construction entrance – xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
3. Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)

"L" LINE

"L" 705+00

"L" 710+00

Extg. R/W

E PORTLAND FWY (I-205)

PACIFIC HWY (OR99E)

Extg. R/W

For creek erosion control plans see shts. FB21, FB22, FB23

ABERNETHY CREEK

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PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

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Rotation: 272.0412°

Sec. 30, T. 2 S, R. 2 E, W.M.

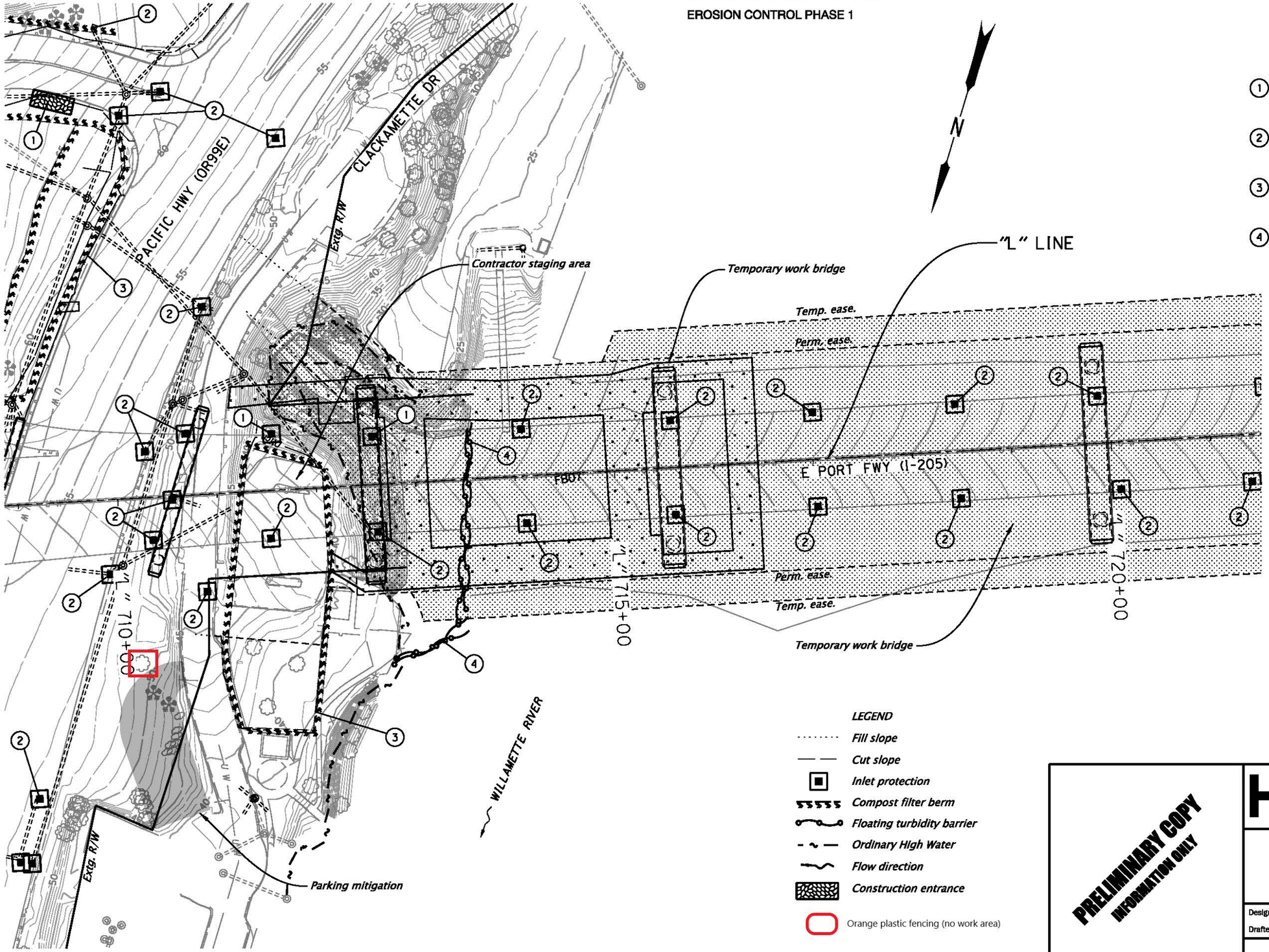
EROSION CONTROL PHASE 1

??? - ???

GENERAL NOTES:

Floating turbidity barrier only required for rip rap removal.

1. *Const. construction entrance – x (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*
4. *Const. turbidity barrier – xx (See Sheet FB11)*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Floating turbidity barrier*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*
- Orange plastic fencing (no work area)

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PORTLAND, OR 97204-1134
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Stelgleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

EE_K19786_HDR_ecpl_01.dgn :: FB08 2/7/2020 4:11:17 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431° Scale: 1"=100'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

N

WILLAMETTE RIVER

Temporary work bridge

Potential contractor staging area

Potential contractor access road

Potential contractor staging area

"L" LINE

"LC2" 730+00

"OR43" 10+00

Extg. R/W

Temp. ease.

Perm. ease.

E PORT FWY (I-205)

Temp. ease.

Perm. ease.

"D2" LINE

"L" 725+00

"D2" 725+00

"L" 730+00

"D2" 730+00

Temporarily fill in creek
Divert using 18" pipe
For creek erosion control
plans see details FB26

Preserve & protect
extg. trees

Temporarily fill in creek
Divert using 18" pipe

Extg. R/W

"OR43"

WILLAMETTE RIVER

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Orange plastic fence (no work area)
- Compost filter berm
- Wetland
- Ordinary High Water
- Flow direction
- Construction entrance
- Access road

GENERAL NOTES:

Floating turbidity barrier only required for rip rap removal.

1. Const. construction entrance - xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection - xx (Type 3) (See drg. no. RD1010)
3. Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
4. Const. turbidity barrier - xx (See Sheet FB11)
5. Install orange plastic mesh fencing

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_01.dgn :: FB09 2/7/2020 4:11:23 PM CDONOVAN

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 1

N

WILLAMETTE RIVER

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*

"Lc2" LINE

"OR43" 10+00

Potential contractor staging area

Extg. R/W

"OR43" LINE

"OR43" 15+00

"OR43" 20+00

"D2" LINE

"OR43" 5+00

OSWEGO HWY (OR43)

"E3" 735+00

"E3" LINE

"E3" 740+00

"Lc2" 740+00

"B4" LINE

"B4" 740+00

E PORT FWY (I-205)

Extg. R/W

Mid Quadrin Creek

Ditch

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost filter berm
- Orange plastic fence (no work area)
- No work zone
- Wetland
- Ordinary High Water
- Flow direction
- Construction entrance
- Access road

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB10 2/7/2020 4:11:28 PM CDONOVAN

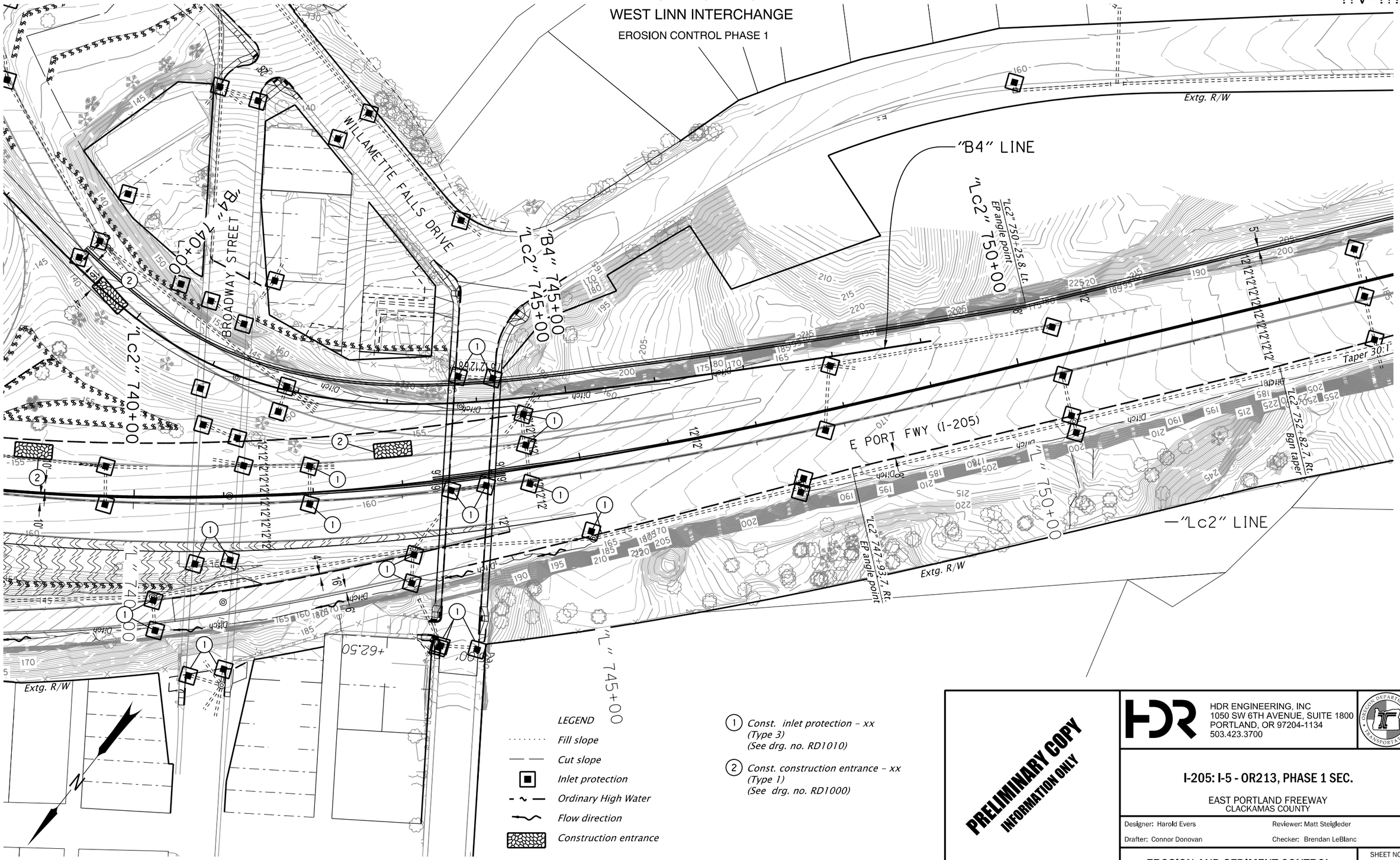
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 260.6437°

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 1



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

(1) *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*

(2) *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

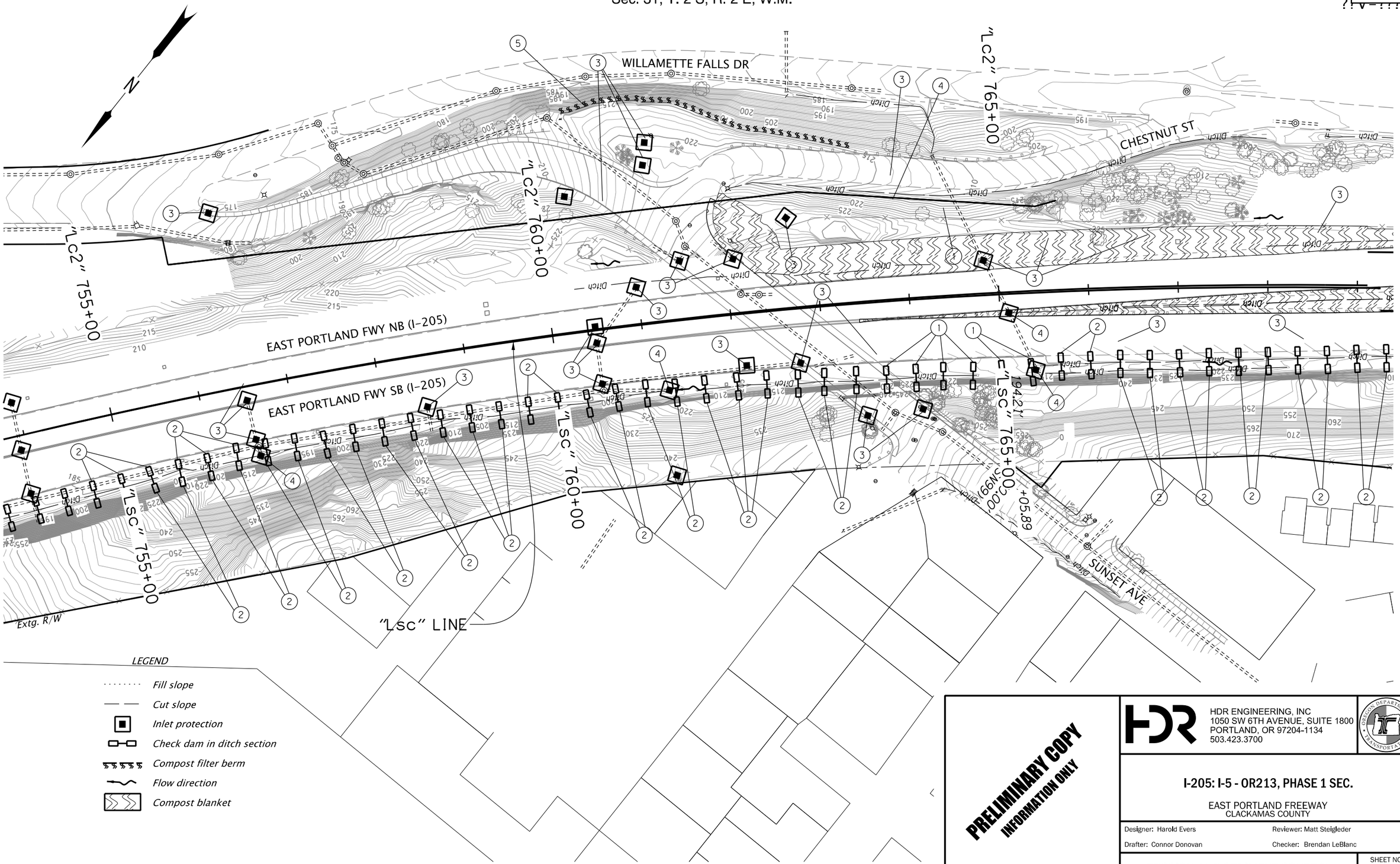
SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB11 2/7/2020 4:11:32 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 218.1362° 0'

Sec. 31, T. 2 S, R. 2 E, W.M.



LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Check dam in ditch section
- Compost filter berm
- Flow direction
- Compost blanket

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB12 2/7/2020 4:11:34 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 218.5198°

?? v = ? ? ?

1. *Install compost erosion blanket - XX*
   (For details, see sht. FB-01)

2. *Const. check dam, (Type 6) - XX*
   (See drg. no. RD1006)

3. *Const. inlet protection - XX*
   (Type 3)
   (See drg. no. RD1010)

4. *Const. inlet protection - XX*
   (Type 4, biofilter bags)
   (See drg. no. RD1015)

5. *Install sediment barrier - XX*
   (Type 9, Compost filter berm)
   (See drg. no. RD1033)

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

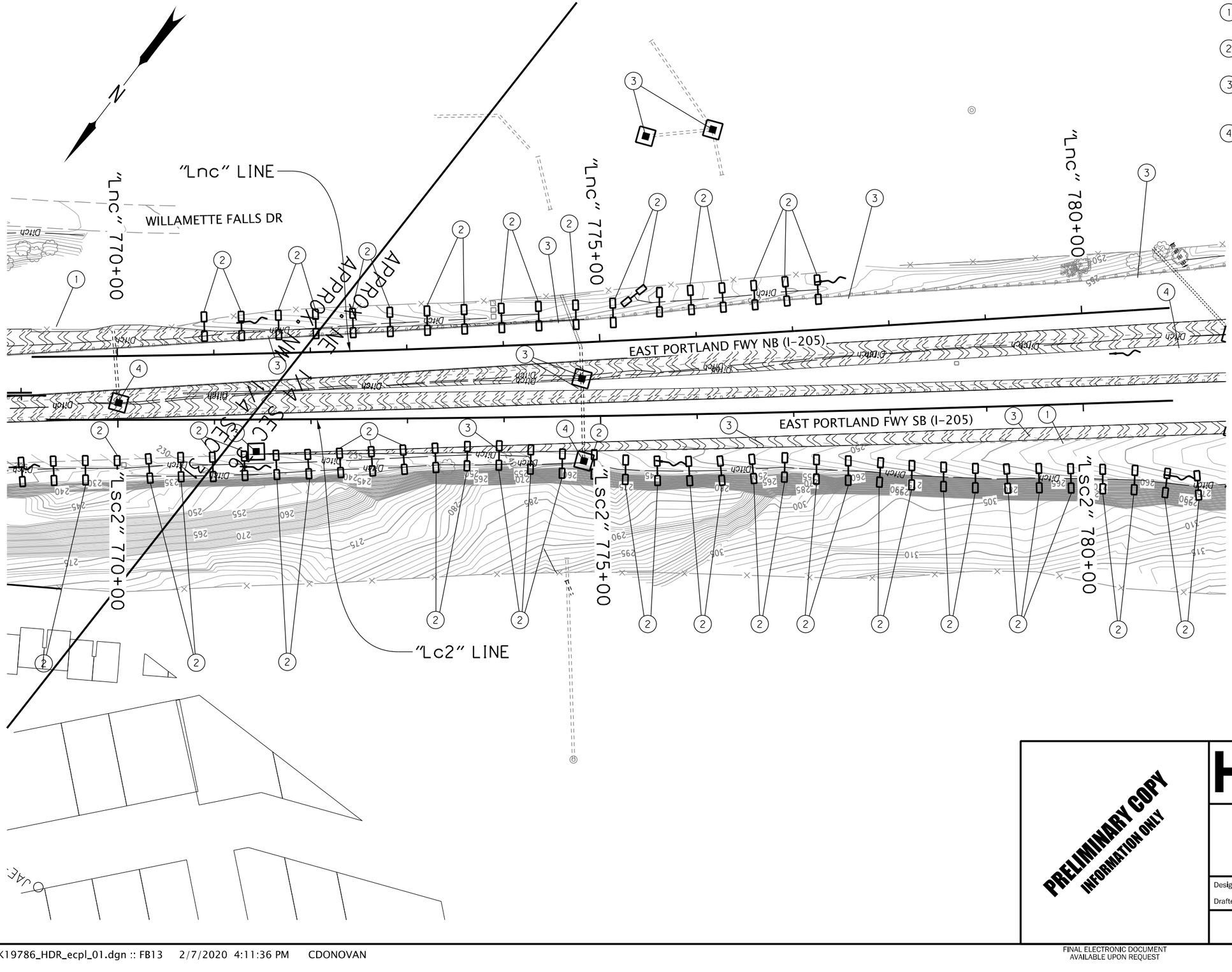
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_01.dgn :: FB12 2/7/2020 4:11:35 PM CDONOVAN

Rotation: 0° 0'

Sec. 31, T. 2 S, R 2 E & Sec. 36, T. 2 S, R. 1 E, W.M.

1. Install compost erosion blanket – XX
   (For details, see sht. FB-01)
2. Const. check dam, (Type 6) – XX
   (See drg. no. RD1006)
3. Const. inlet protection – XX
   (Type 3)
   (See drg. no. RD1010)
4. Const. inlet protection – XX
   (Type 4, biofilter bags)
   (See drg. no. RD1015)



LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Check dam in ditch section
- Flow direction
- Compost blanket

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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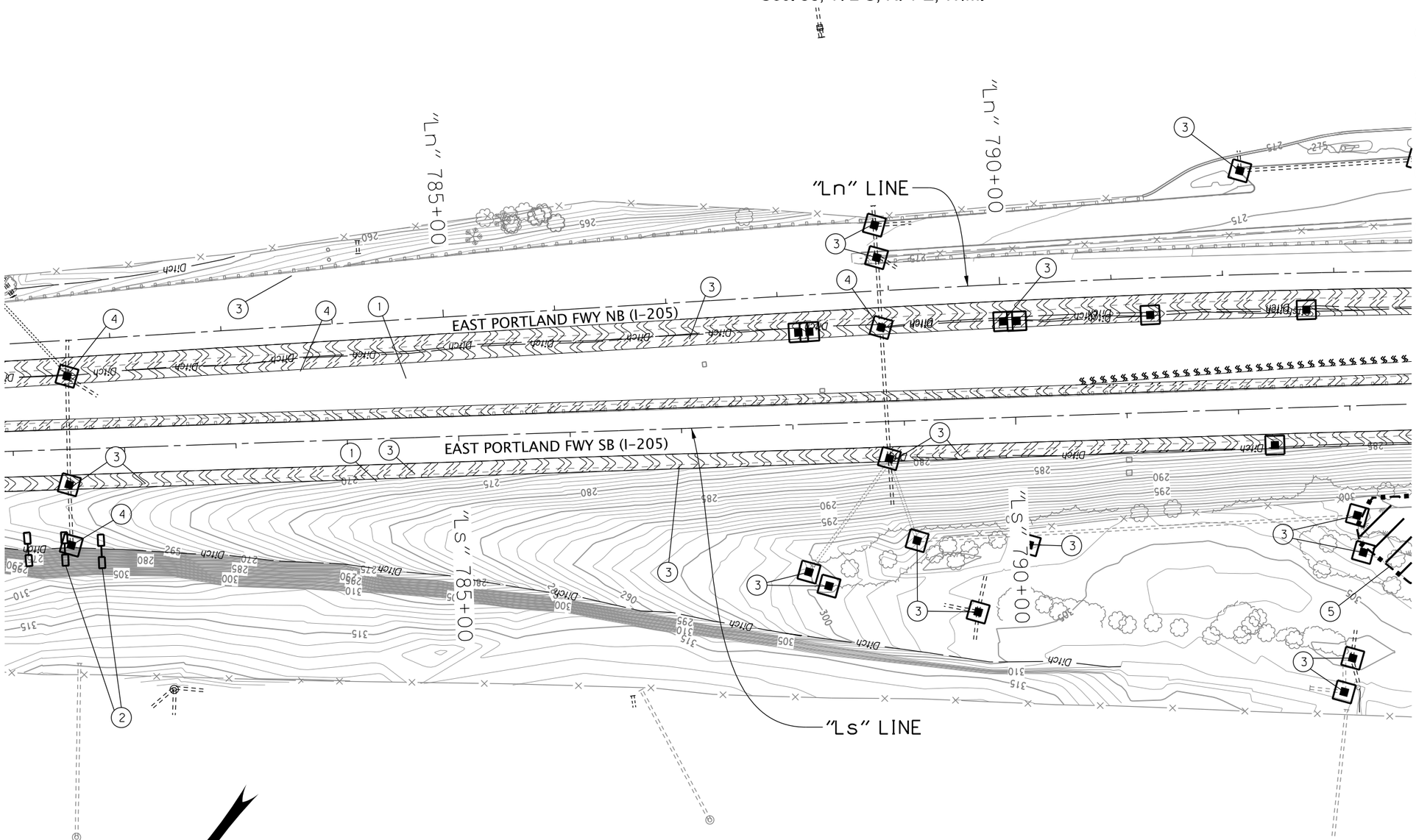
EE_K19786_HDR_ecpl_01.dgn :: FB13 2/7/2020 4:11:36 PM CDONOVAN

Rotation: 217.6195°

Sec. 36, T. 2 S, R. 1 E, W.M.



1. *Install compost erosion blanket - XX*
   (For details, see sht. FB-01)
2. *Const. check dam, (Type 6) - XX*
   (See drg. no. RD1006)
3. *Const. inlet protection - XX*
   (Type 3)
   (See drg. no. RD1010)
4. *Const. inlet protection - XX*
   (Type 4, biofilter bags)
   (See drg. no. RD1015)
5. *Install orange plastic mesh fencing - XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

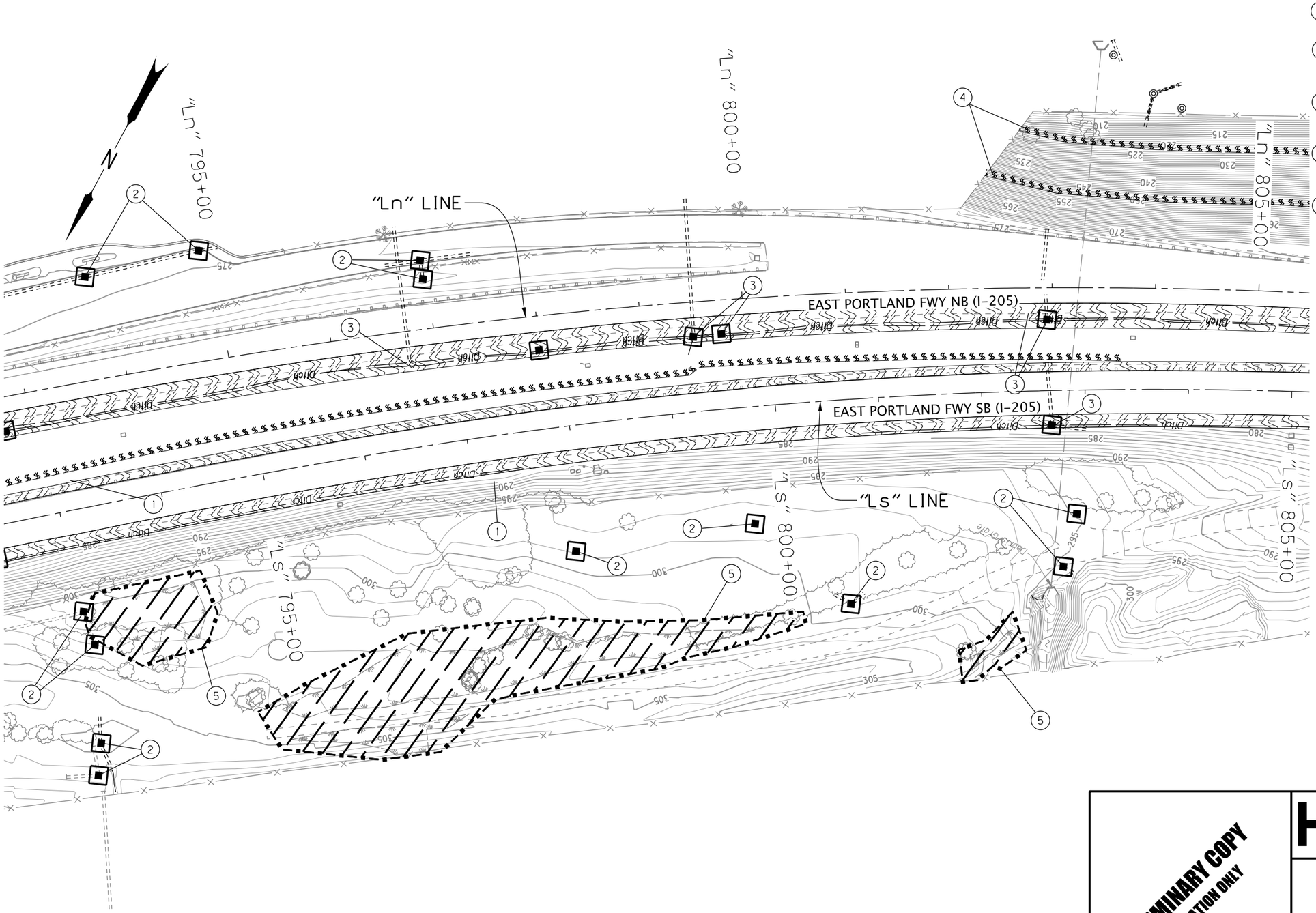
SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB14 2/7/2020 4:11:38 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 217.6195°

Sec. 36, T. 2 S, R. 1 E, W.M.



1. *Install compost erosion blanket – XX (For details, see sht. FB-01)*
2. *Const. inlet protection – XX (Type 3) (See drg. no. RD1010)*
3. *Const. inlet protection – XX (Type 4, biofilter bags) (See drg. no. RD1015)*
4. *Install sediment barrier – XX (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing – XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost filter berm*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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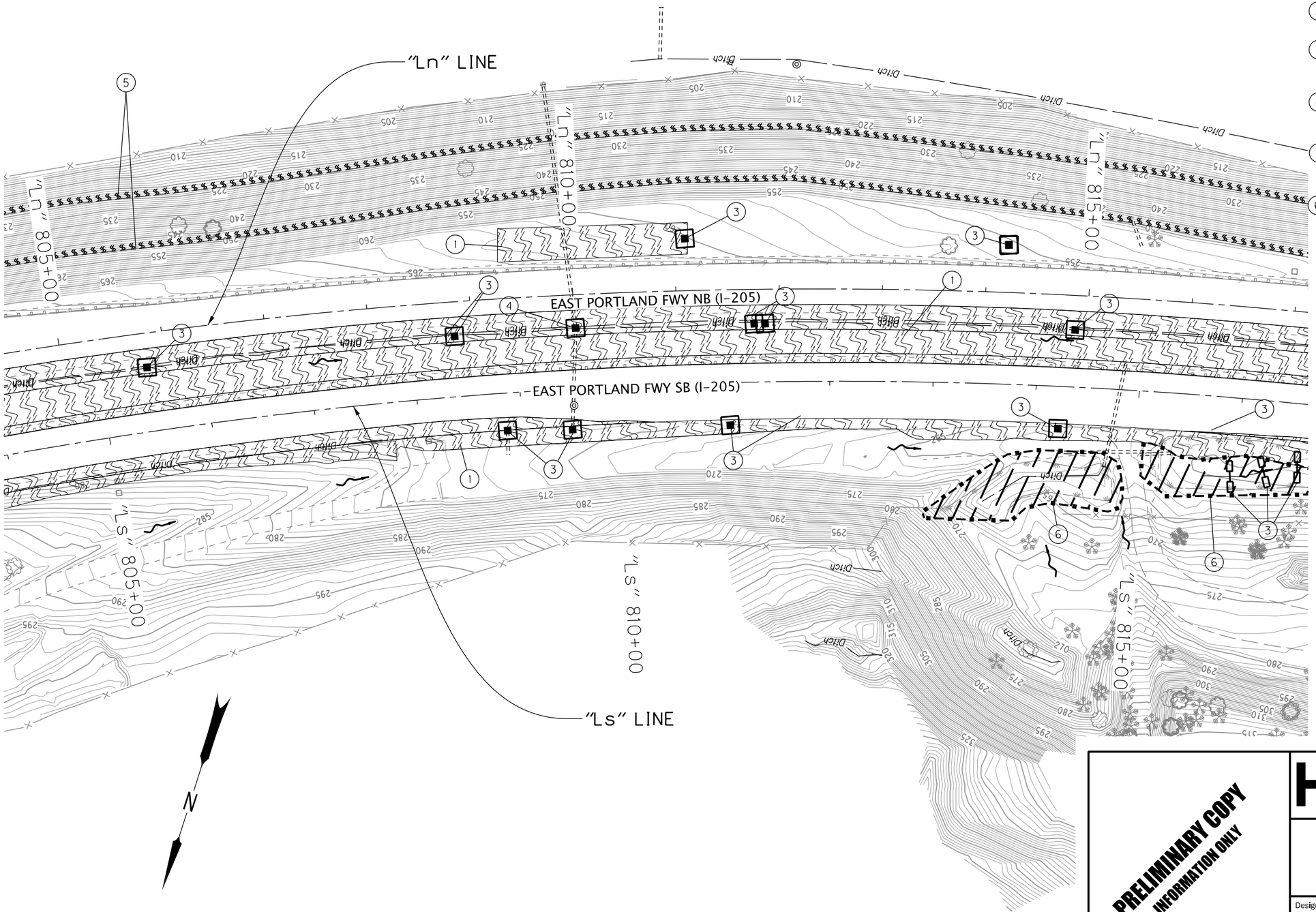
EE_K19786_HDR_ecpl_01.dgn :: FB15 2/7/2020 4:11:40 PM CDONOVAN

Rotation: 208.1457°

Sec. 36, T. 2 S, R. 1 E, W.M.



1. *Install compost erosion blanket – XX (For details, see sht. FB-01)*
2. *Const. check dam, (Type 6) – XX (See drg. no. RD1006)*
3. *Const. inlet protection – XX (Type 3) (See drg. no. RD1010)*
4. *Const. inlet protection – XX (Type 4, biofilter bags) (See drg. no. RD1015)*
5. *Install sediment barrier – XX (Type 9, Compost filter berm) (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost filter berm*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

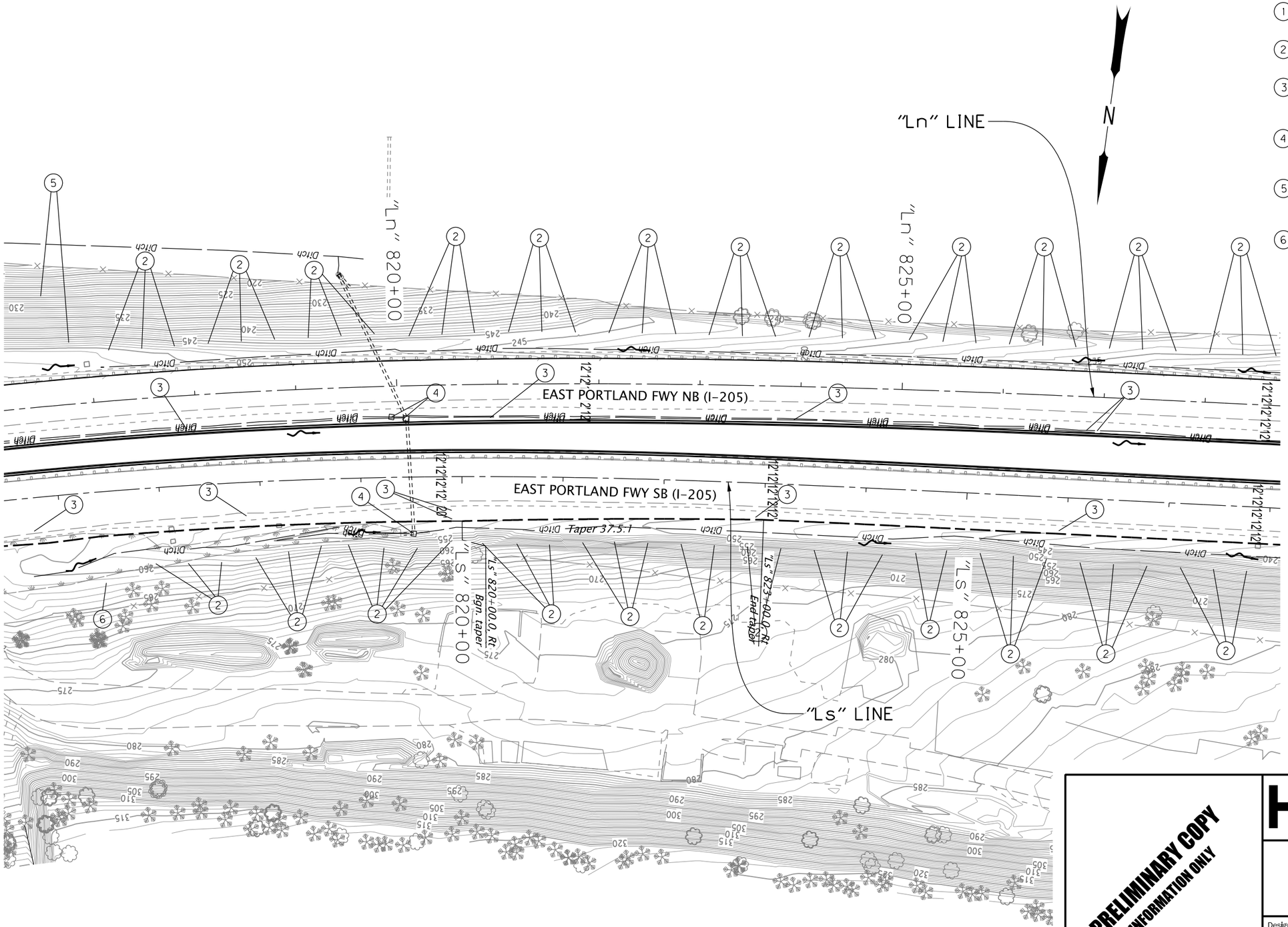
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_01.dgn :: FB16 2/7/2020 4:11:41 PM CDONOVAN

Rotation: 197.6361° 0'

Sec. 36, T. 2 S, R. 1 E, W.M.

?? v = ???



1. *Install compost erosion blanket – XX (For details, see sht. FB-01)*
2. *Const. check dam, (Type 6) – XX (See drg. no. RD1006)*
3. *Const. inlet protection – XX (Type 3) (See drg. no. RD1010)*
4. *Const. inlet protection – XX (Type 4, biofilter bags) (See drg. no. RD1015)*
5. *Install sediment barrier – XX (Type 9, Compost filter berm) (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost filter berm*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

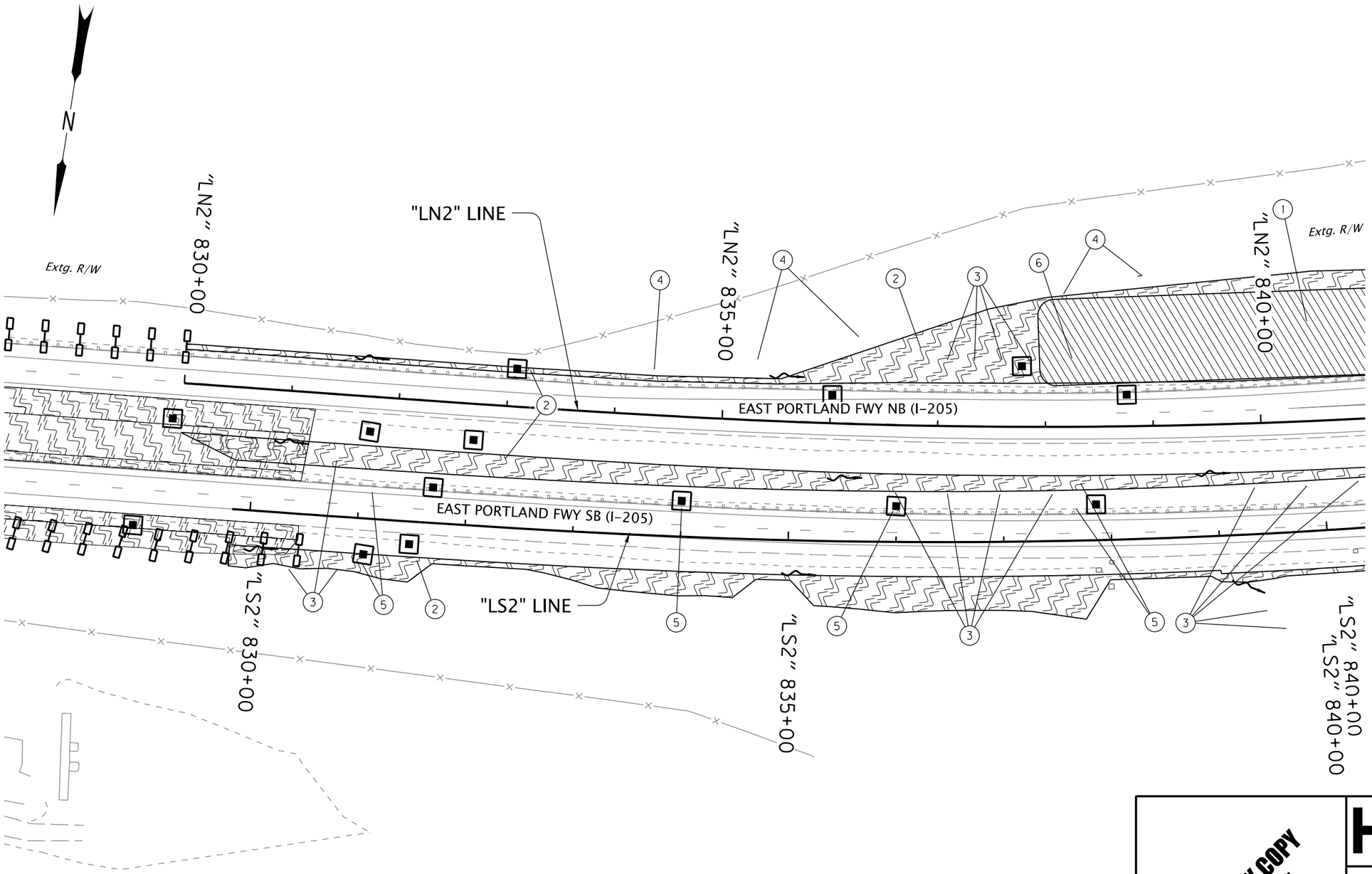
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_01.dgn :: FB17 2/7/2020 4:11:43 PM CDONOVAN

Rotation: 187.5797°

Sec. 35 & 36, T. 2 S, R. 1 E, W.M.



1. *Inst. matting, type E (See drg. no. RD1055)*
2. *Inst. compost erosion blanket*
3. *Const. check dam, type 3 (See drg. no. RD1005)*
4. *Const. compost filter berm (See drg. no. RD1033)*
5. *Const. inlet protection, type 7 (See drg. no. RD1010)*
6. *Inst. temporary sediment trap (See drg. no. RD1065)*

LEGEND

- *Inlet protection*
- *Compost filter berm*
- *Check dam in ditch section*
- *Flow direction*
- *Fill slope*
- *Cut slope*
- *Compost blanket with seeding*
- *Matting with compost blanket and seeding*
- *Sediment trap*
- *Ditch* — *Extg. ditch*
- *Extg. pipe*
- *Extg. pipe to be removed*
- *Extg. inlet to be removed*
- *Proposed pipe*
- *Stormwater Pond*

Notes:
1. *Graphic symbols are approximate. Place erosion control measures as required or directed.*
2. *Apply permanent seeding in stages upon completion of finish grade.*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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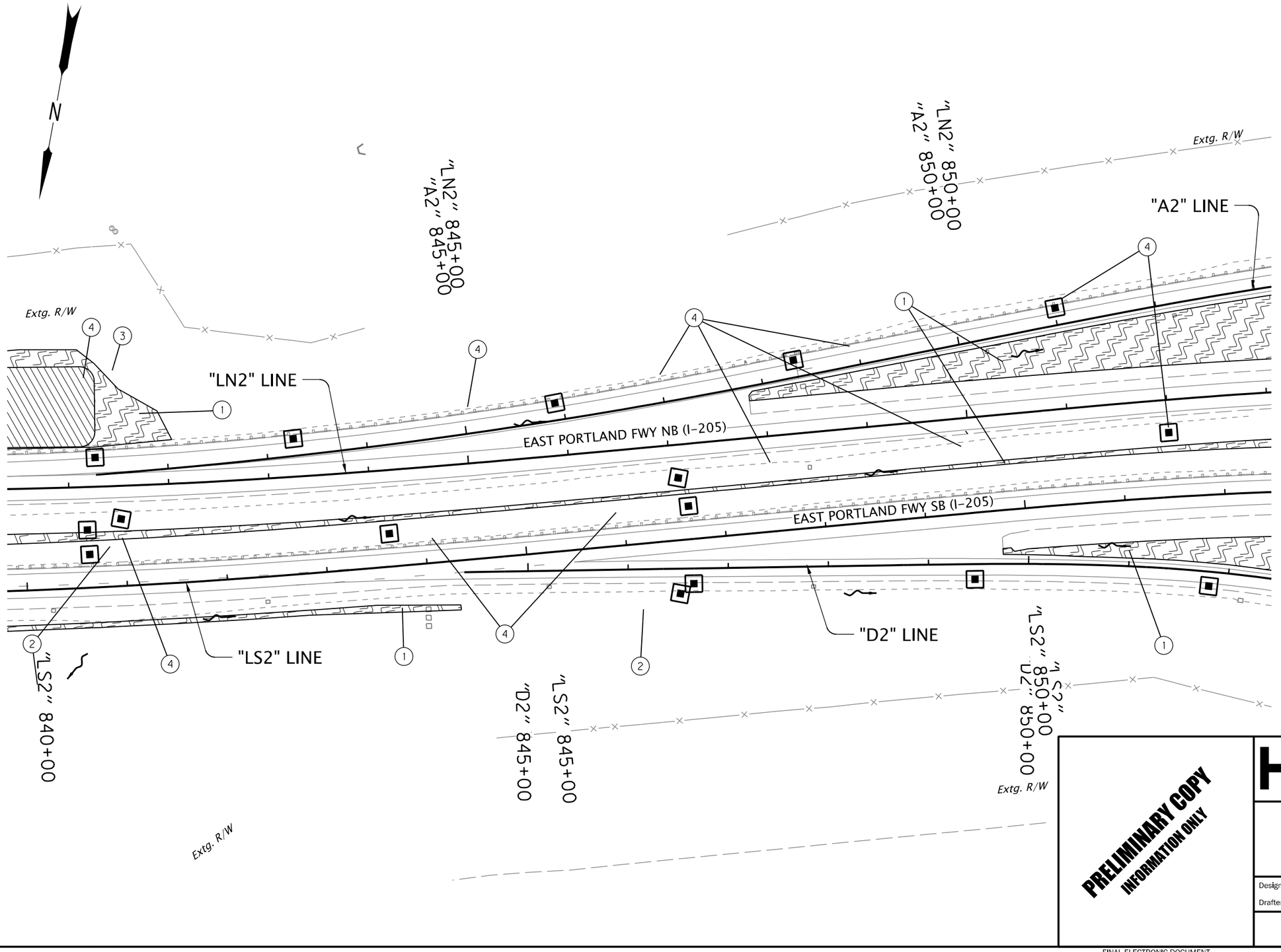
EE_K19786_HDR_ecpl_01.dgn :: FB18 2/7/2020 4:11:45 PM CDONOVAN

Rotation: 188.8482° 0'

Sec. 35, T. 2 S, R. 1 E, W.M.
S. WEST LINN INTERCHANGE

1. *Inst. compost erosion blanket*
2. *Const. check dam, type 3*
3. *Const. compost filter berm*
4. *Const. inlet protection, type 7*



LEGEND

- *Inlet protection*
- *Compost filter berm*
- *Check dam in ditch section*
- *Flow direction*
- *Fill slope*
- *Cut slope*
- *Compost blanket with seeding*
- *Matting with compost blanket and seeding*
- *Soil Removal*
- *Wetlands*
- *Ditch – Extg. ditch*
- *Extg. pipe*
- *Proposed pipe*
- *Stormwater Pond*

Notes:
1. *Graphic symbols are approximate. Place erosion control measures as required or directed.*
2. *Apply permanent seeding in stages upon completion of finish grade.*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_01.dgn :: FB19 2/7/2020 4:13:12 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 190.2392° 0'

Sec. 35, T. 2 S, R. 1 E, W.M.
S. WEST LINN INTERCHANGE

N

"LN2" 855+00
"A2" 855+00
"A2" LINE
"LN2" LINE
"B2" LINE
"LS2" LINE
"D2" LINE
"C2" LINE
"LS2" 850+00
"D2" 855+00
"LS2" 855+00
"LS2" 860+00
"D2" 860+00
+00
+00
Extg. R/W
EAST PORTLAND FWY NB (I-205)
EAST PORTLAND FWY SB (I-205)
10TH STREET

1. Inst. matting, type E
2. Inst. compost erosion blanket
3. Const. check dam, type 3
4. Const. compost filter berm
5. Const. construction entrance, type 2 (See drg. no. RD1000)
6. Const. inlet protection, type 7
7. Inst. temporary sediment trap

LEGEND

- Inlet protection
- Compost filter berm
- Check dam in ditch section
- Flow direction
- Fill slope
- Cut slope
- Construction entrance
- Compost blanket with seeding
- Matting with compost blanket and seeding
- Soil Removal
- Sediment trap
- Ordinary high water
- Wetlands
- Ditch – Extg. ditch
- Proposed ditch
- Extg. pipe
- Proposed pipe
- Stormwater Pond

Notes:
1. Graphic symbols are approximate. Place erosion control measures as required or directed.
2. Apply permanent seeding in stages upon completion of finish grade.

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

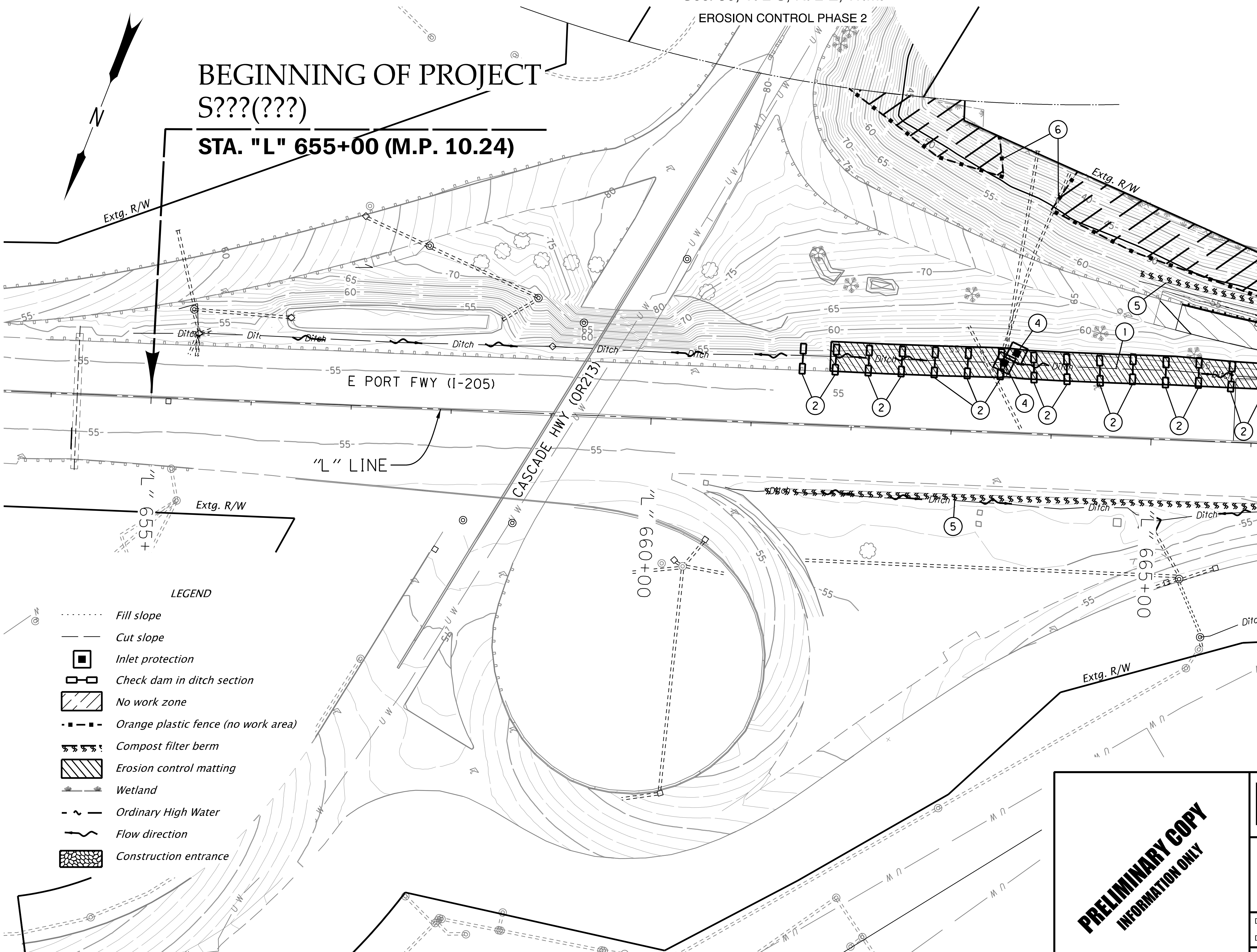
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_01.dgn :: FB20 2/7/2020 4:13:14 PM CDONOVAN

Rotation: 176.5124° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Const. check dam, (Type 6) – xx (See drg. no. RD1006)
3. Const. construction entrance – xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
5. Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)
6. Install orange plastic mesh fencing – xx

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Erosion control matting*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

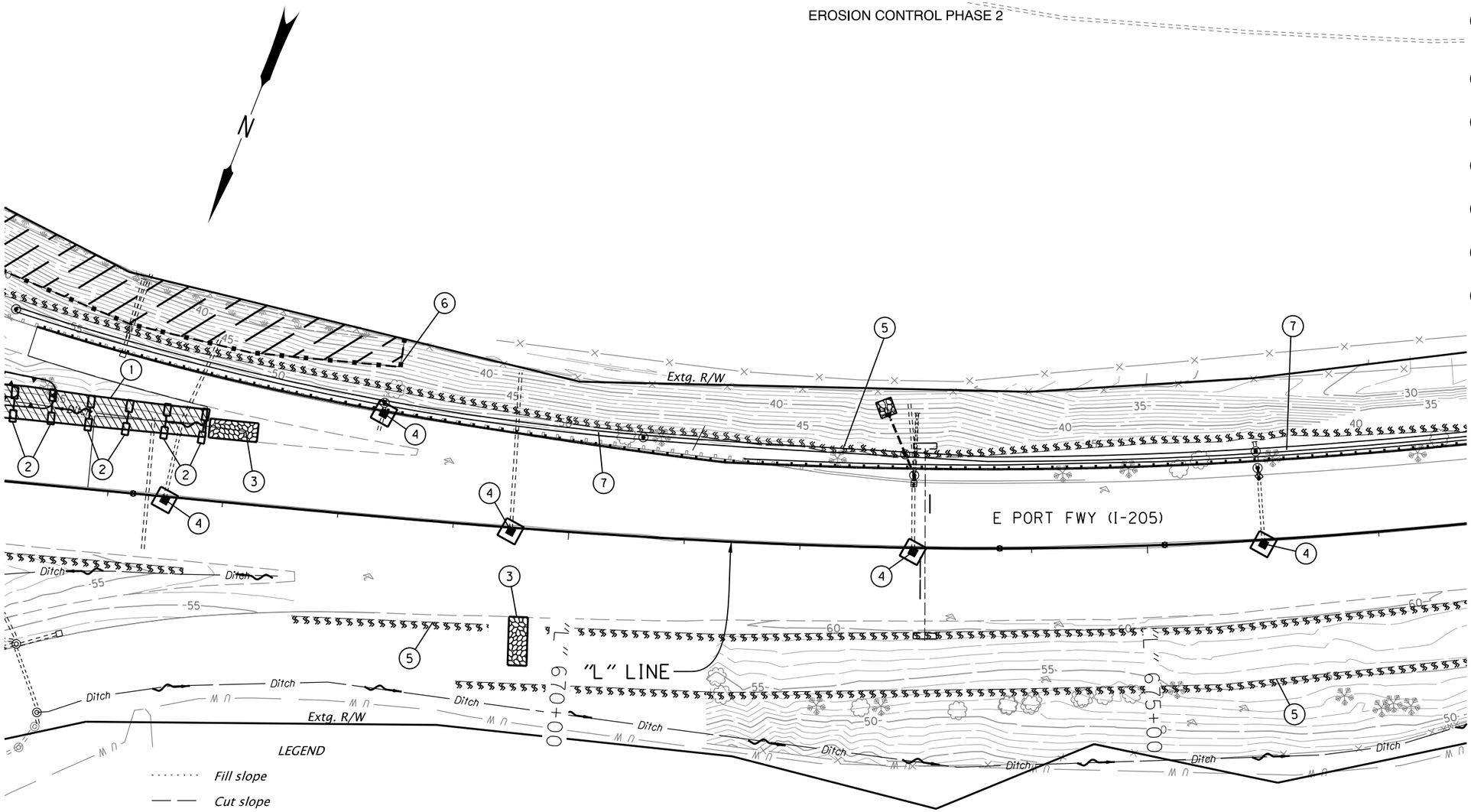
Designer: Harold Evers	Reviewer: Matt Steigleder
Drafter: Connor Donovan	Checker: Brendan LeBlanc

SHEET NO.

EROSION AND SEDIMENT CONTROL

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*
7. *Seeding and mulching – xx*

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HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

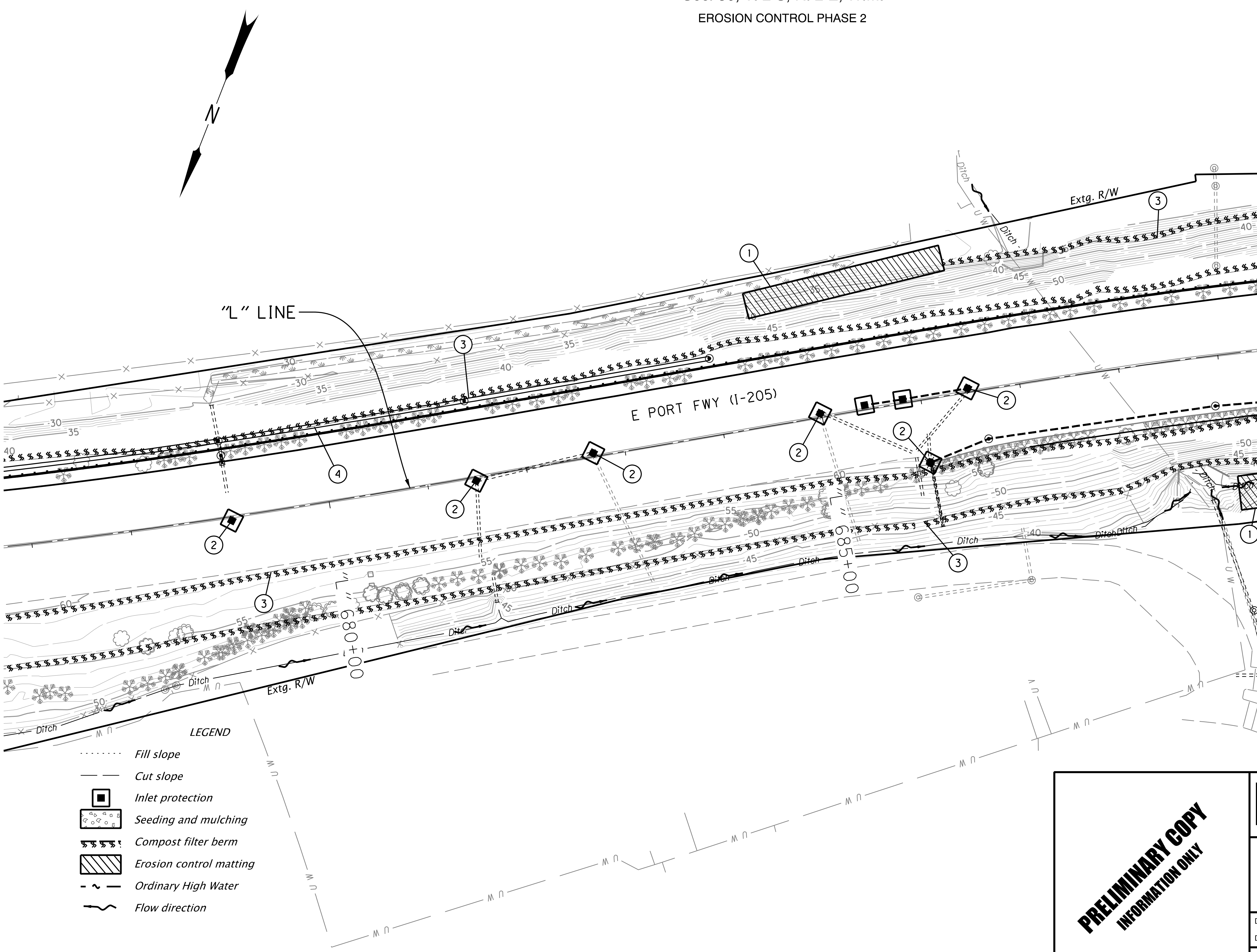
EE_K19786_HDR_ecpl_02.dgn :: FB22 2/7/2020 4:14:32 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
3. Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)
4. Seeding and mulching – xx

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Seeding and mulching
- Compost filter berm
- Erosion control matting
- Ordinary High Water
- Flow direction

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

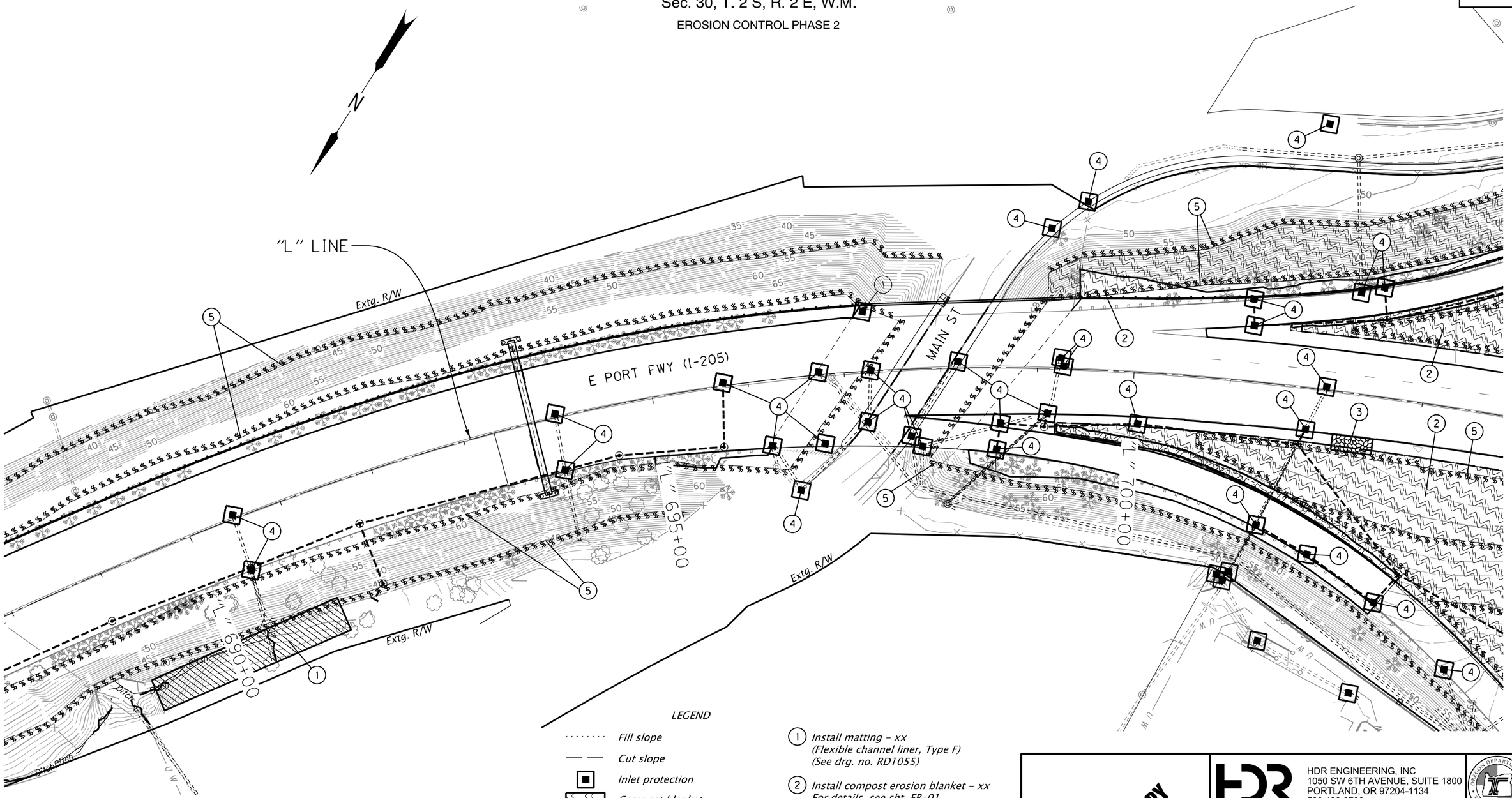
EE_K19786_HDR_ecpl_02.dgn :: FB23 2/7/2020 4:14:36 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 228.87°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost blanket*
- *Erosion control matting*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Compost filter berm*

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Install compost erosion blanket – xx For details, see sht. FB-01*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*

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1050 SW 6TH AVENUE, SUITE 1800
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB24 2/7/2020 4:14:40 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 212.6746° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Erosion control matting
- Ordinary High Water
- Construction entrance
- Flow direction
- Compost filter berm
- Orange plastic fence (no work area)

1. Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket - xx For details, see sht. FB-01
3. Const. construction entrance - xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)
5. Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
6. Install orange plastic mesh fencing - xx

N

Extg. R/W

105+00

E PORT FWY (I-205)

"L" LINE

PACIFIC HWY (OR99E)

710+00

Extg. R/W

Parking mitigation

Perm. ease

Ditch

ABERNETHY CREEK

Extg. R/W

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
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EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB25 2/7/2020 4:14:44 PM CDONOVAN

Rotation: 272.0412°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

?? v – ???

1. *Install matting - xx*
   (Flexible channel liner, Type F)
   (See drg. no. RD1055)

2. *Install compost erosion blanket - xx*
   For details, see sht. FB-01

3. *Const. construction entrance - xx*
   (See drg. no. RD1000)

4. *Const. inlet protection, (Type 3) - xx*
   (See drg. no. RD1010)

5. *Install sediment barrier - xx*
   (Type 9)
   (See drg. no. RD1033)

6. *Install orange plastic mesh fencing - xx*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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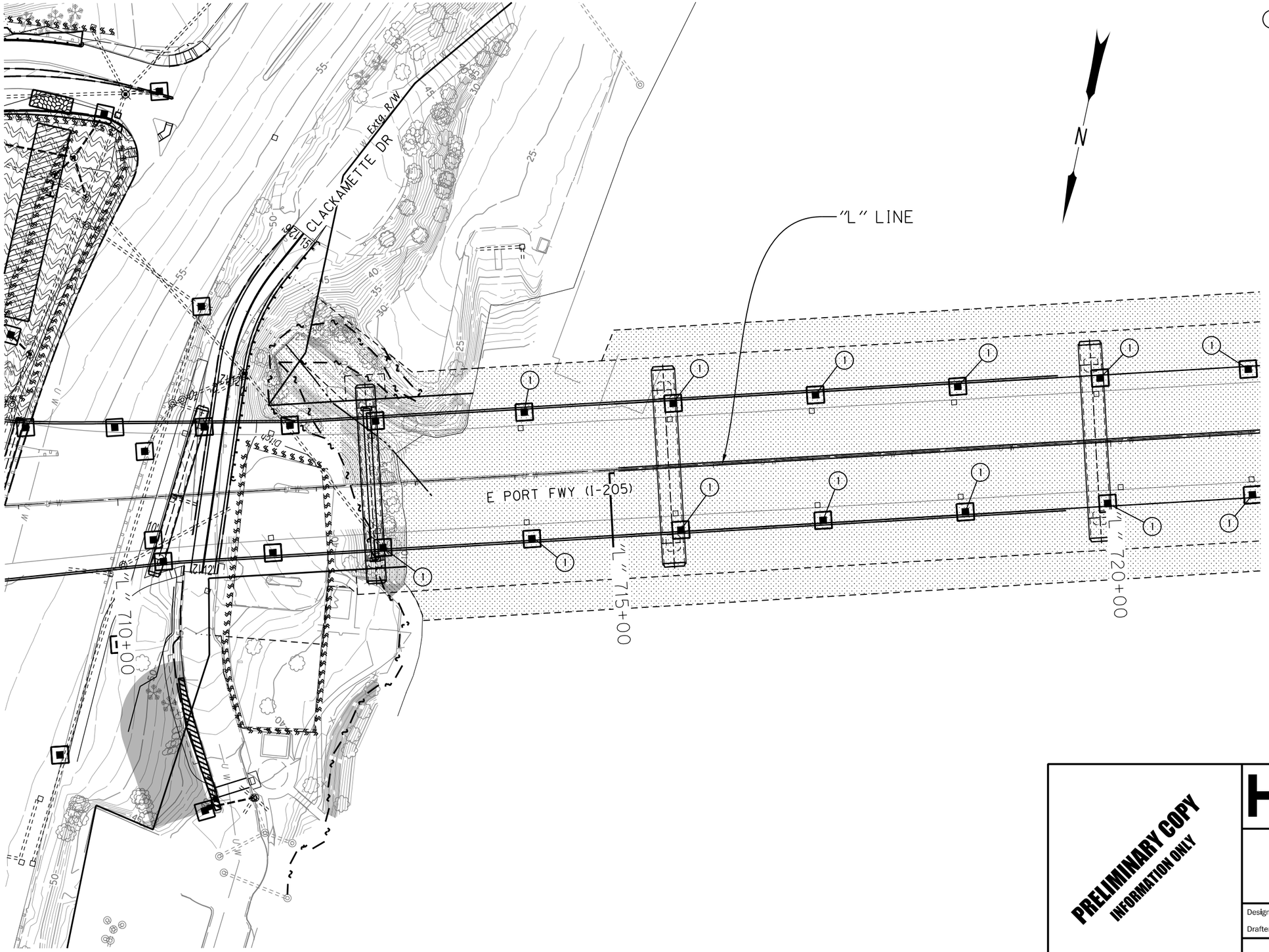
EE_K19786_HDR_ecpl_02.dgn :: FB25A 2/7/2020 4:14:46 PM CDONOVAN

Rotation: 201.4396° 0'



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

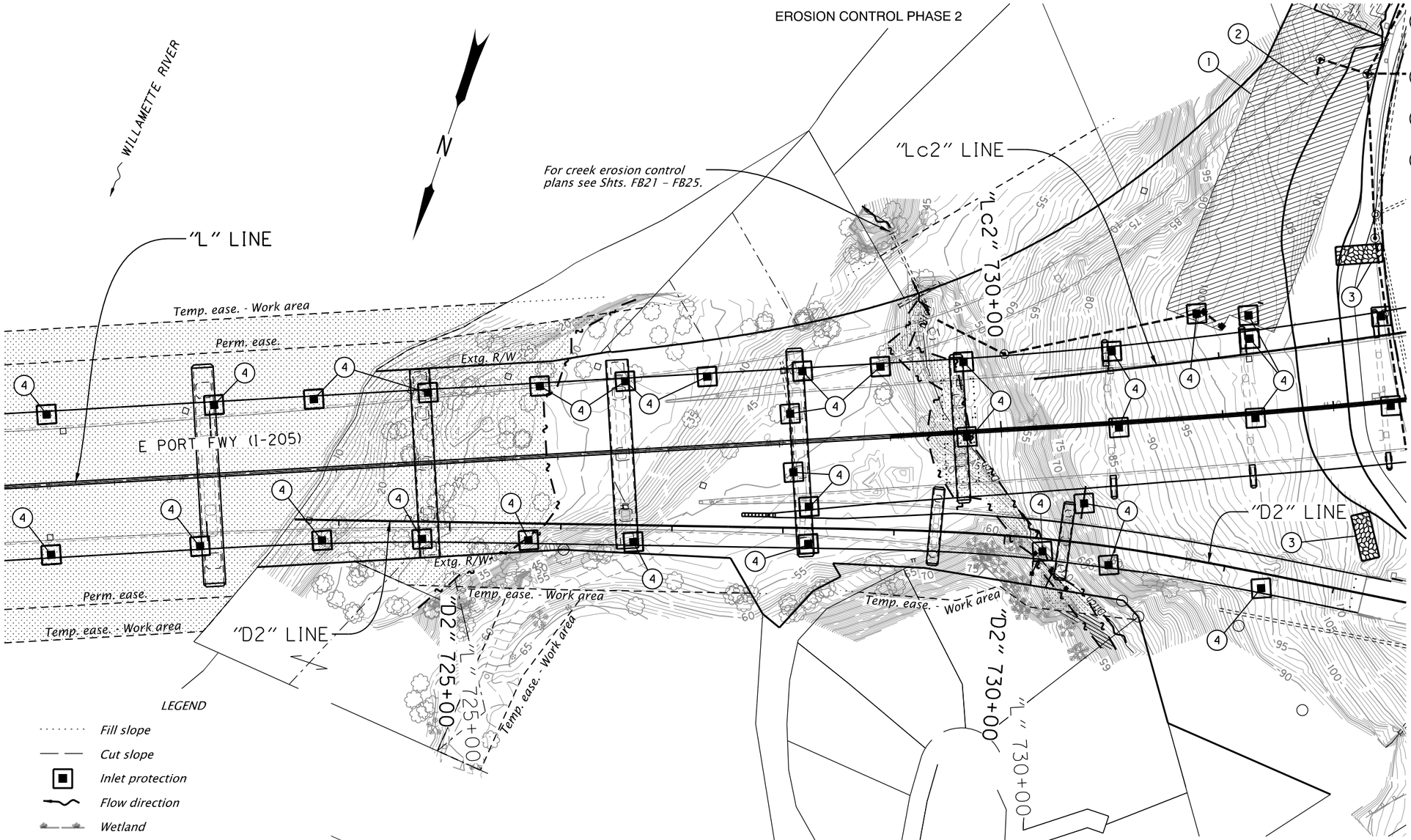
EE_K19786_HDR_ecpl_02.dgn :: FB26 2/7/2020 4:14:50 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.3393° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. *Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Install compost erosion blanket - xx For details, see sht. FB-01*
3. *Const. construction entrance - xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB27 2/7/2020 4:14:55 PM CDONOVAN

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 2

WILLAMETTE RIVER

N

1. Install matting - xx
   (Flexible channel liner, Type F)
   (See drg. no. RD1055)
2. Install compost erosion blanket - xx
   For details, see sht. FB-01
3. Const. construction entrance - xx
   (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx
   (See drg. no. RD1010)
5. Install sediment barrier - xx
   (Type 9)
   (See drg. no. RD1033)

"D2" LINE

"Lc2" LINE

"L" LINE

"E3" LINE

"B4" LINE

"OR43" LINE

Extg. R/W

OSWEGO HWY (OR43)

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Compost filter berm
- Erosion control matting
- Orange plastic fence (no work area)
- Wetland
- Ordinary High Water
- Construction entrance
- Flow direction

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB28 2/7/2020 4:15:00 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 260.6437°

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 2

1. *Install matting - xx*
   (Flexible channel liner, Type F)
   (See drg. no. RD1055)
2. *Install compost erosion blanket - xx*
   For details, see sht. FB-01
3. *Const. construction entrance - xx*
   (See drg. no. RD1000)
4. *Const. inlet protection, (Type 3) - xx*
   (See drg. no. RD1010)
5. *Install sediment barrier - xx*
   (Type 9)
   (See drg. no. RD1033)

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

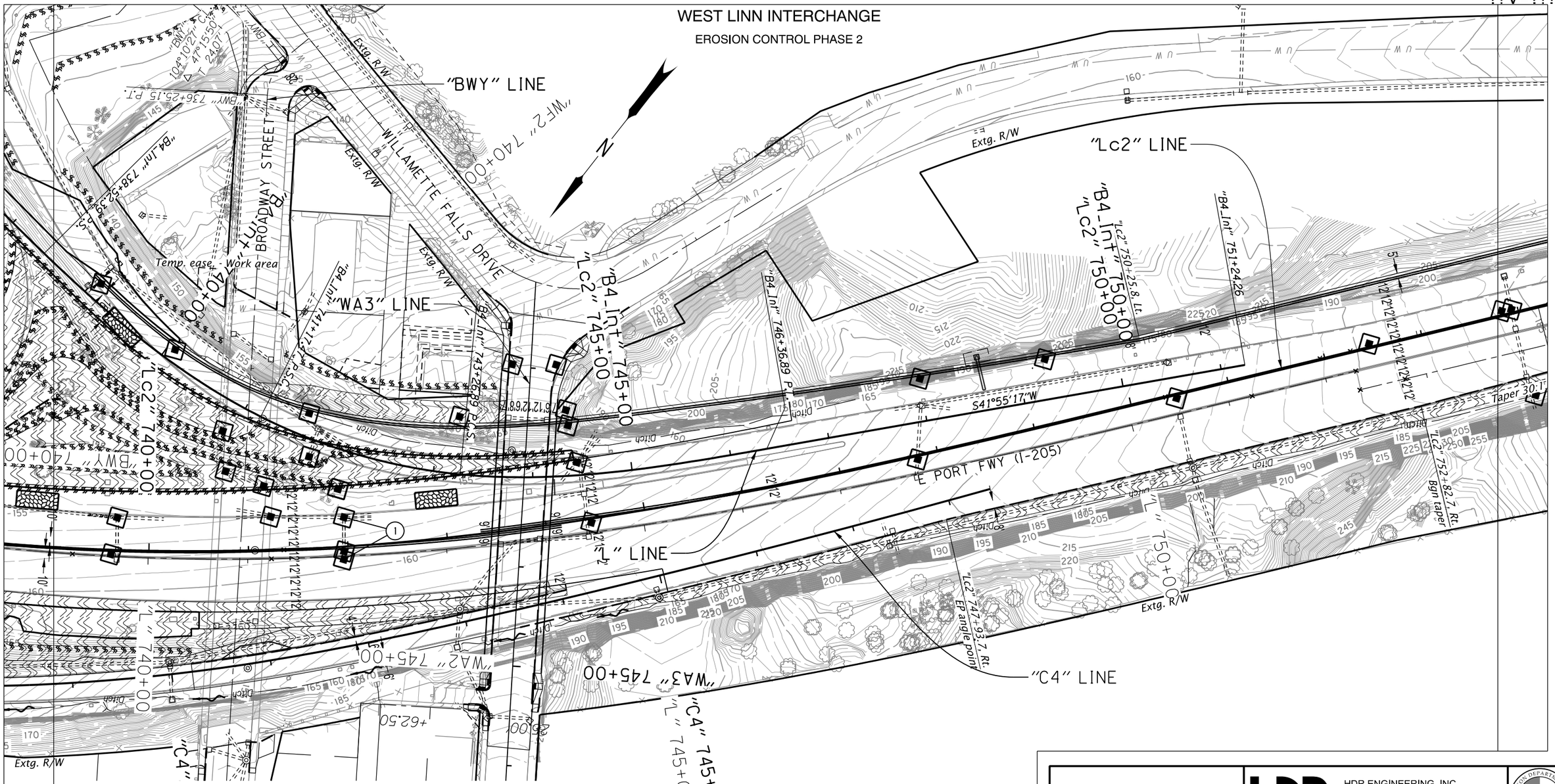
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB28A 2/7/2020 4:15:02 PM CDONOVAN

Rotation: 0°

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 2



LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Check dam in ditch section
- Compost blanket
- Compost filter berm
- Wetland
- Ordinary High Water
- Construction entrance
- Flow direction
- Orange plastic fence (no work area)
- Erosion control matting

① *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

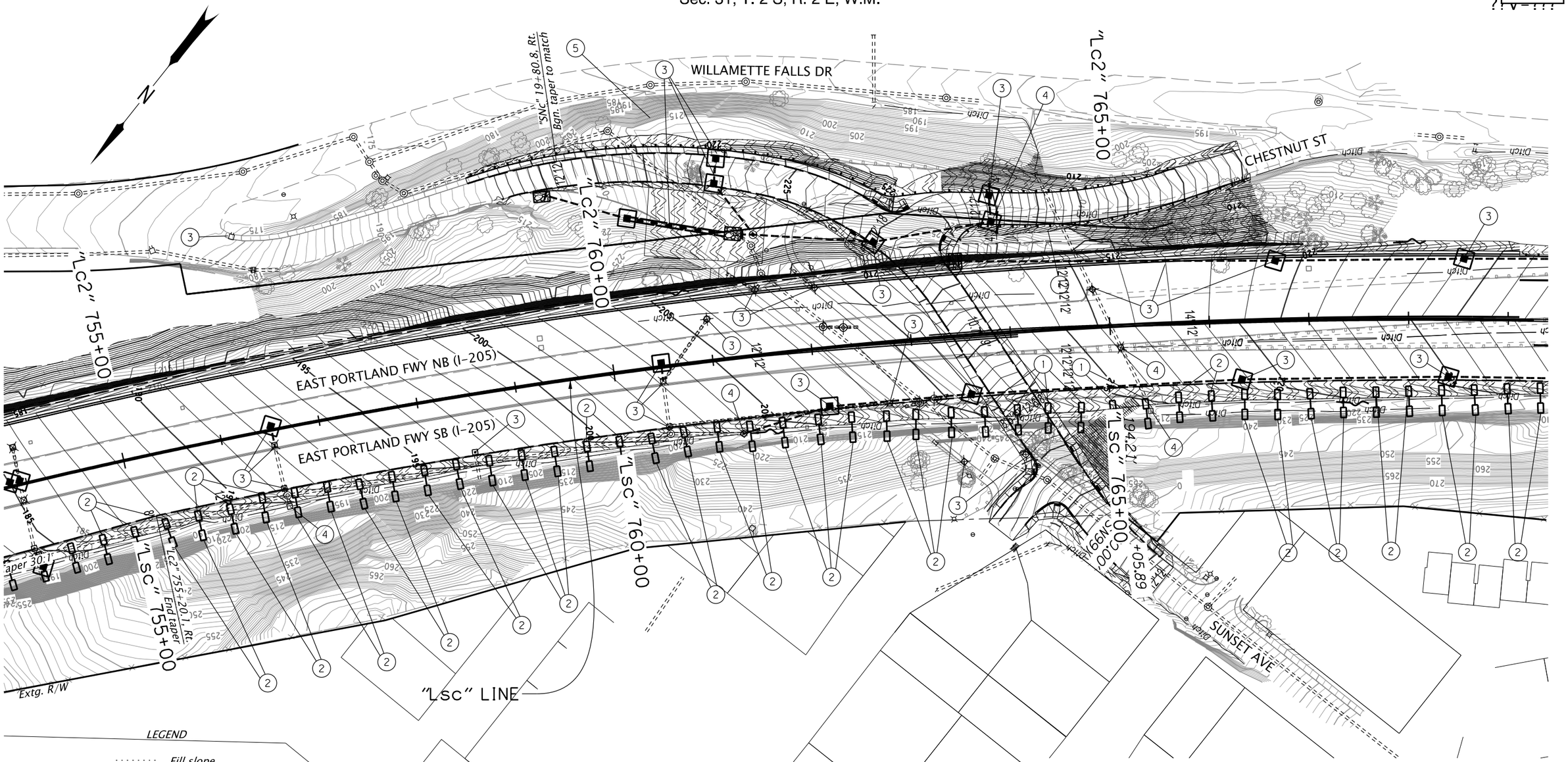
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB29 2/7/2020 4:15:06 PM CDONOVAN

Rotation: 218.1362° 0'

Sec. 31, T. 2 S, R. 2 E, W.M.



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost filter berm*
- *Flow direction*
- *Compost blanket*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB30 2/7/2020 4:15:08 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 218.5198° 0'

?? v = ? ? ?

1. *Install compost erosion blanket - XX*
   (For details, see sht. FB-01)

2. *Const. check dam, (Type 6) - XX*
   (See drg. no. RD1006)

3. *Const. inlet protection - XX*
   (Type 3)
   (See drg. no. RD1010)

4. *Const. inlet protection - XX*
   (Type 4, biofilter bags)
   (See drg. no. RD1015)

5. *Install sediment barrier - XX*
   (Type 9, Compost filter berm)
   (See drg. no. RD1033)

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

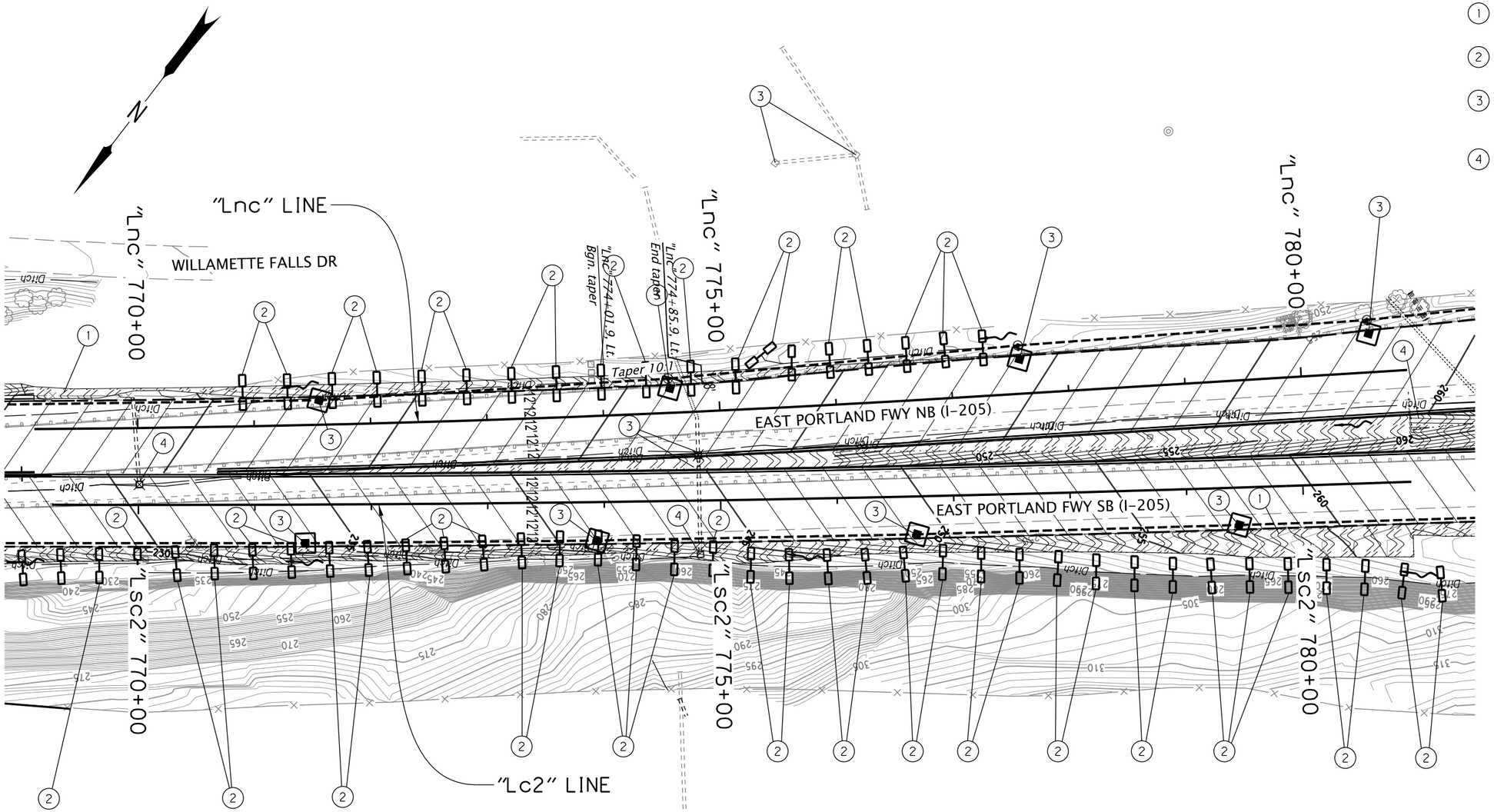
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB30 2/7/2020 4:15:09 PM CDONOVAN

Rotation: 0° 0'

1. *Install compost erosion blanket – XX (For details, see sht. FB-01)*
2. *Const. check dam, (Type 6) – XX (See drg. no. RD1006)*
3. *Const. inlet protection – XX (Type 3) (See drg. no. RD1010)*
4. *Const. inlet protection – XX (Type 4, biofilter bags) (See drg. no. RD1015)*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Flow direction*
- *Compost blanket*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

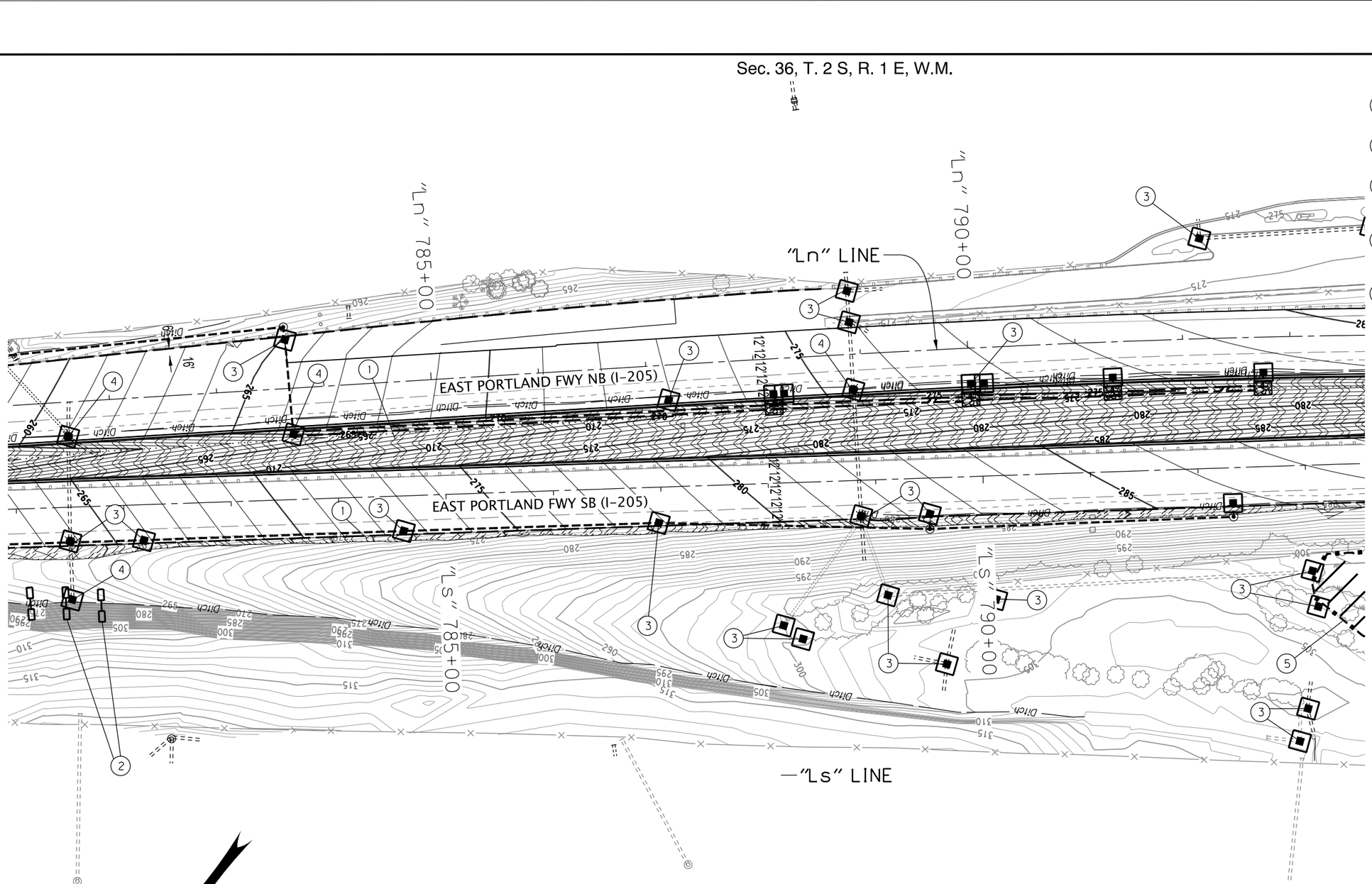
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB31 2/7/2020 4:15:11 PM CDONOVAN

Rotation: 217.6195° 0'

Sec. 36, T. 2 S, R. 1 E, W.M.



1. *Install compost erosion blanket – XX*
   (For details, see sht. FB-01)
2. *Const. check dam, (Type 6) – XX*
   (See drg. no. RD1006)
3. *Const. inlet protection – XX*
   (Type 3)
   (See drg. no. RD1010)
4. *Const. inlet protection – XX*
   (Type 4, biofilter bags)
   (See drg. no. RD1015)
5. *Install orange plastic mesh fencing – XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

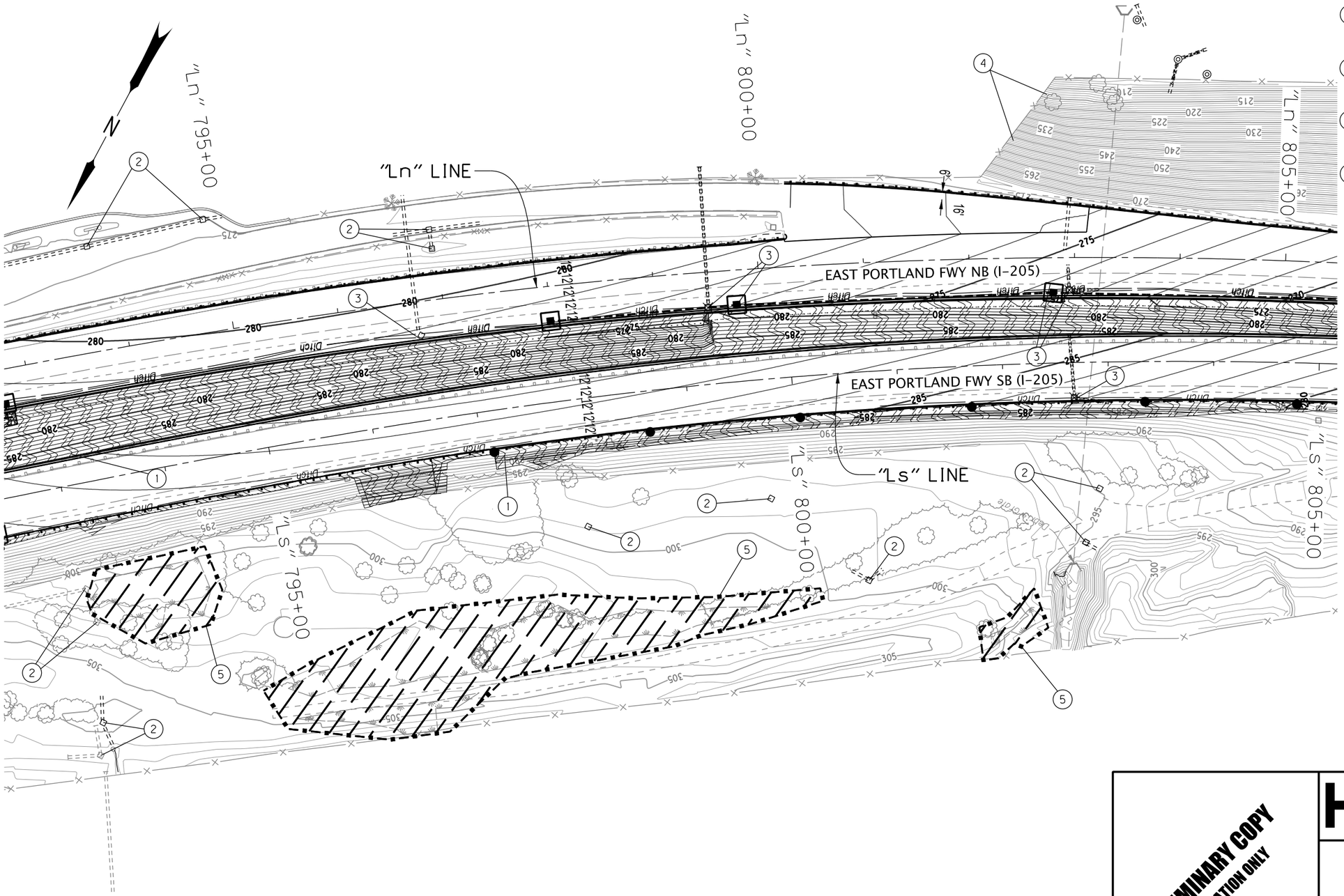
SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB32 2/7/2020 4:15:12 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 217.6195°

Sec. 36, T. 2 S, R. 1 E, W.M.



1. *Install compost erosion blanket – XX (For details, see sht. FB-01)*
2. *Const. inlet protection – XX (Type 3) (See drg. no. RD1010)*
3. *Const. inlet protection – XX (Type 4, biofilter bags) (See drg. no. RD1015)*
4. *Install sediment barrier – XX (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing – XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost filter berm*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
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EROSION AND SEDIMENT CONTROL

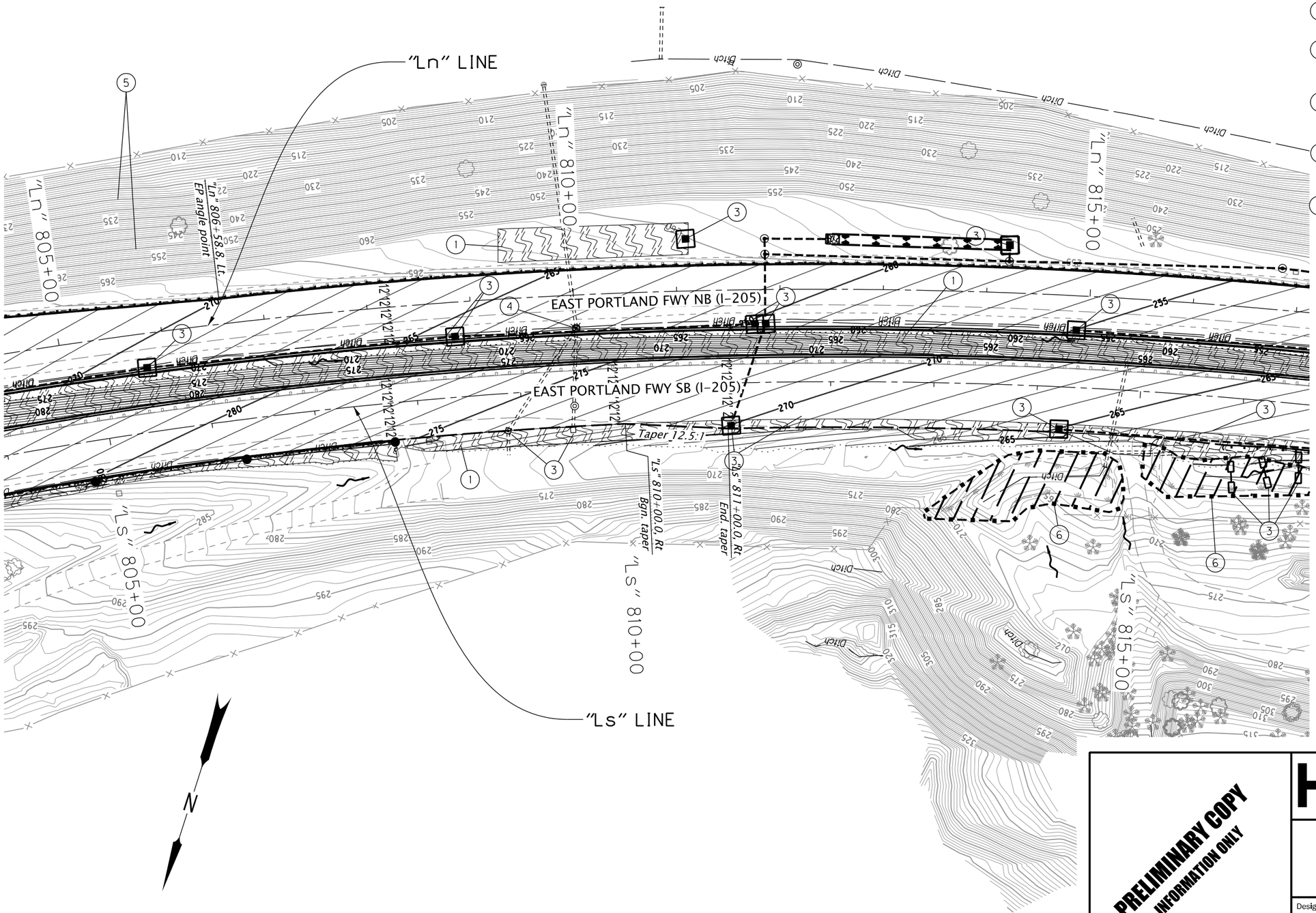
SHEET NO.

EE_K19786_HDR_ecpl_02.dgn :: FB33 2/7/2020 4:15:14 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 208.1457°

Sec. 36, T. 2 S, R. 1 E, W.M.



1. *Install compost erosion blanket – XX (For details, see sht. FB-01)*
2. *Const. check dam, (Type 6) – XX (See drg. no. RD1006)*
3. *Const. inlet protection – XX (Type 3) (See drg. no. RD1010)*
4. *Const. inlet protection – XX (Type 4, biofilter bags) (See drg. no. RD1015)*
5. *Install sediment barrier – XX (Type 9, Compost filter berm) (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost filter berm*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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PORTLAND, OR 97204-1134
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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

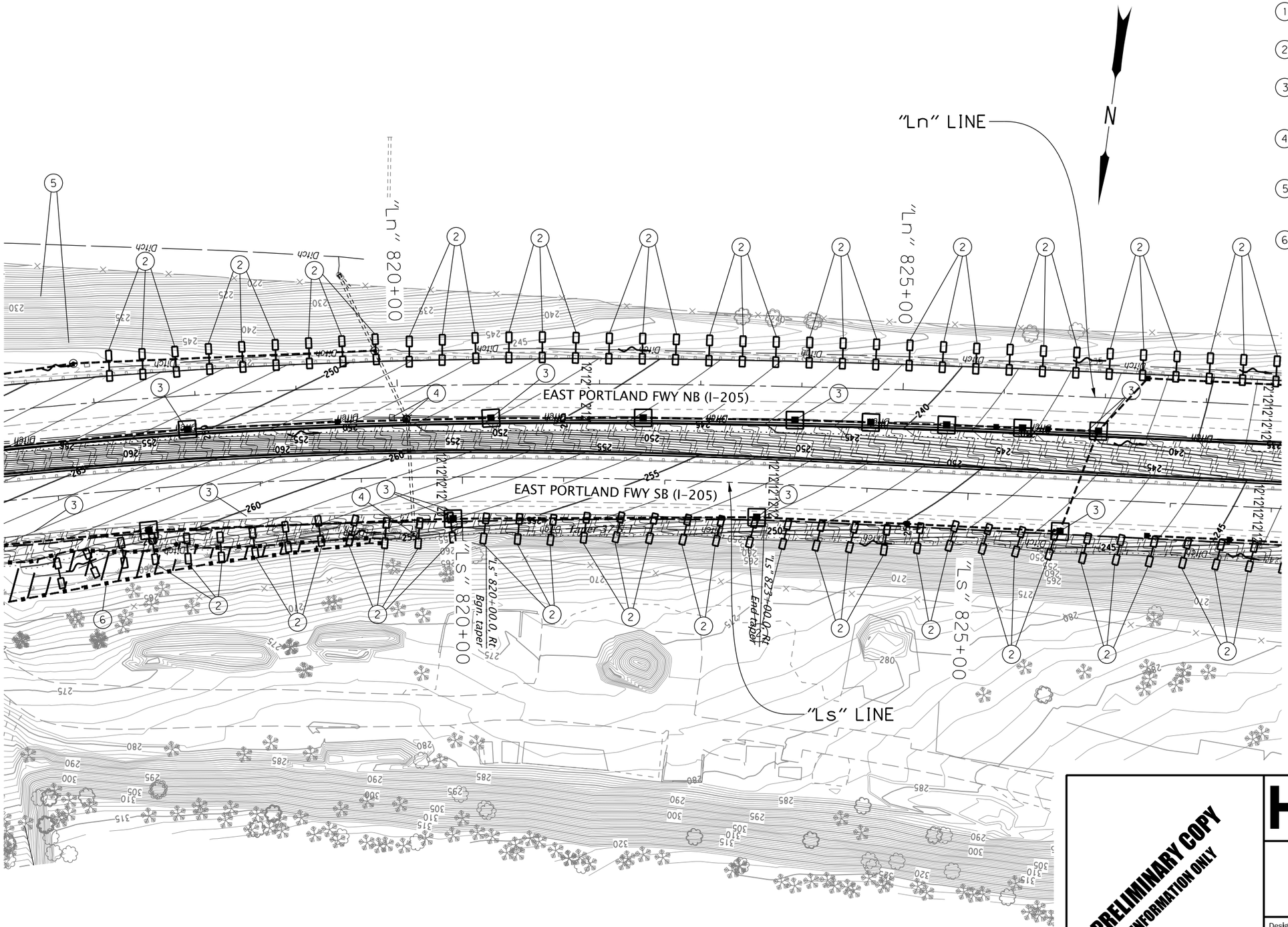
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

EE_K19786_HDR_ecpl_02.dgn :: FB34 2/7/2020 4:15:16 PM CDONOVAN

Rotation: 197.6361° 0'

Sec. 36, T. 2 S, R. 1 E, W.M.



1. *Install compost erosion blanket – XX (For details, see sht. FB-01)*
2. *Const. check dam, (Type 6) – XX (See drg. no. RD1006)*
3. *Const. inlet protection – XX (Type 3) (See drg. no. RD1010)*
4. *Const. inlet protection – XX (Type 4, biofilter bags) (See drg. no. RD1015)*
5. *Install sediment barrier – XX (Type 9, Compost filter berm) (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – XX*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost filter berm*
- *Flow direction*
- *Compost blanket*
- *Orange plastic fence (no work area)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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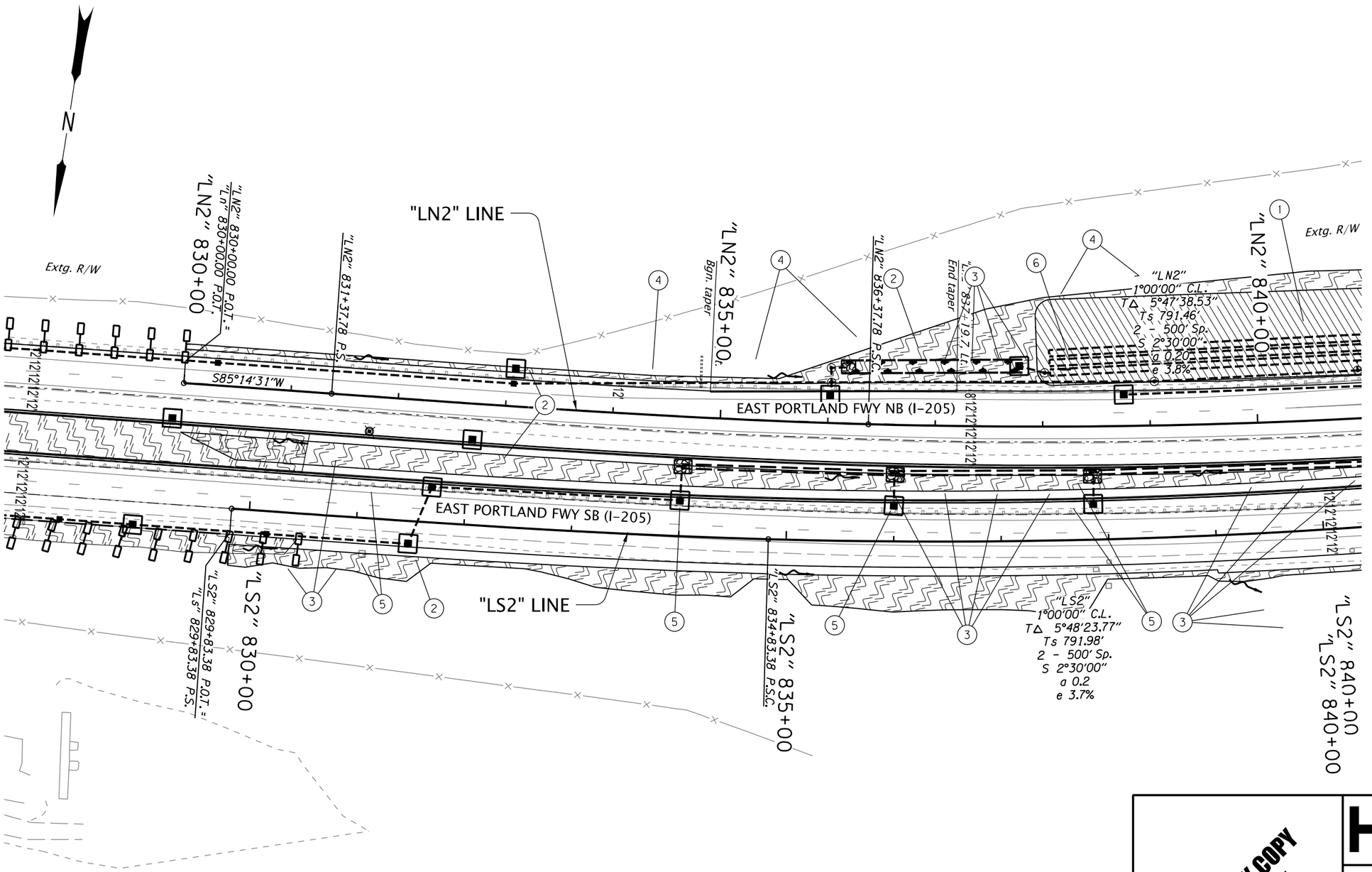
EE_K19786_HDR_ecpl_02.dgn :: FB35 2/7/2020 4:15:18 PM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 187.5797°

Sec. 35 & 36, T. 2 S, R. 1 E, W.M.



1. *Inst. matting, type E (See drg. no. RD1055)*
2. *Inst. compost erosion blanket*
3. *Const. check dam, type 3 (See drg. no. RD1005)*
4. *Const. compost filter berm (See drg. no. RD1033)*
5. *Const. inlet protection, type 7 (See drg. no. RD1010)*
6. *Inst. temporary sediment trap (See drg. no. RD1065)*

LEGEND

- *Inlet protection*
- *Compost filter berm*
- *Check dam in ditch section*
- *Flow direction*
- *Fill slope*
- *Cut slope*
- *Compost blanket with seeding*
- *Matting with compost blanket and seeding*
- *Sediment trap*
- *Ditch – Extg. ditch*
- *Extg. pipe*
- *Extg. pipe to be removed*
- *Extg. inlet to be removed*
- *Proposed pipe*
- *Stormwater Pond*

Notes:
1. *Graphic symbols are approximate. Place erosion control measures as required or directed.*
2. *Apply permanent seeding in stages upon completion of finish grade.*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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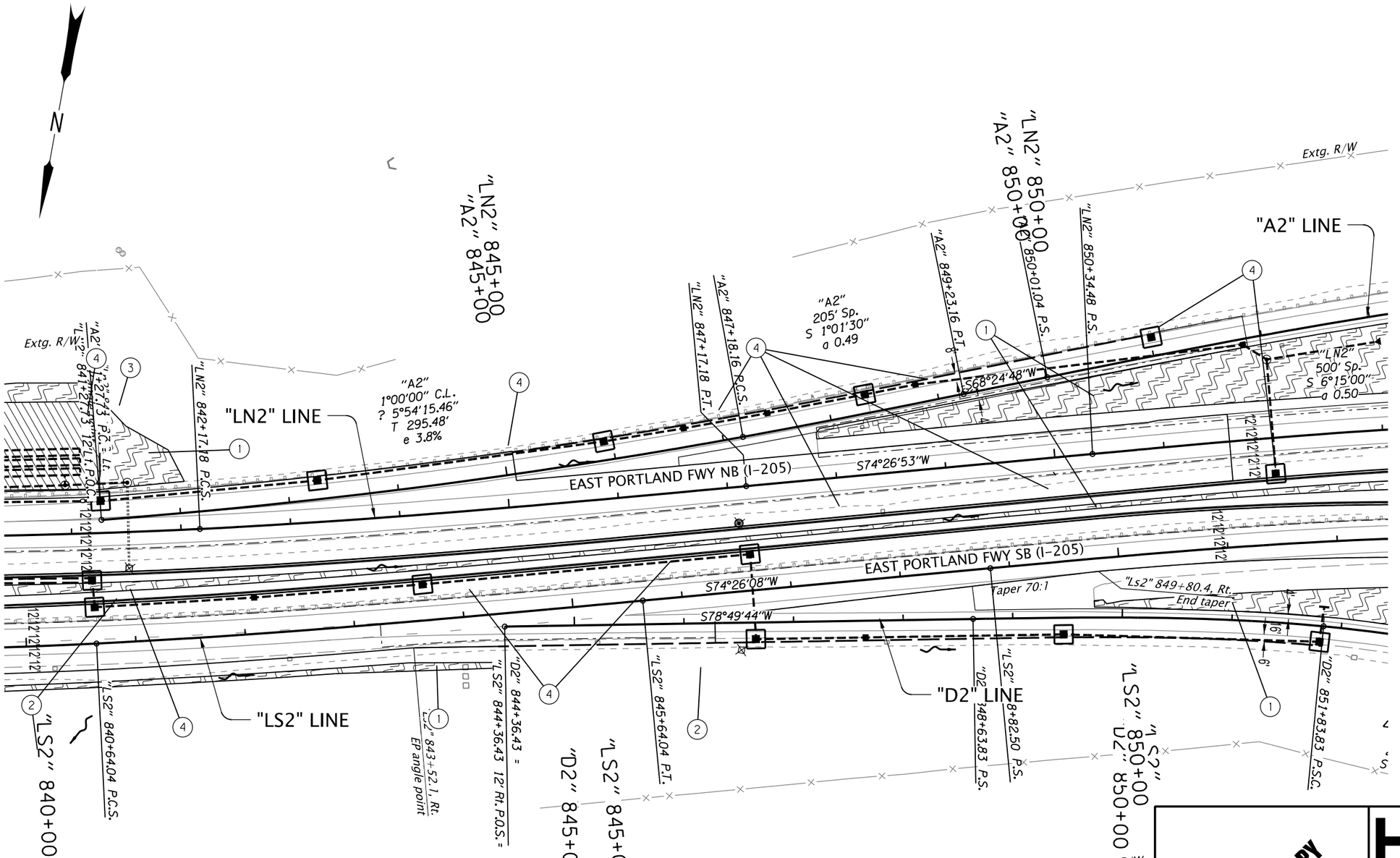
Rotation: 188.8482° 0'

Sec. 35, T. 2 S, R. 1 E, W.M.
S. WEST LINN INTERCHANGE

1. Inst. compost erosion blanket
2. Const. check dam, type 3
3. Const. compost filter berm
4. Const. inlet protection, type 7



LEGEND

- Inlet protection
- Compost filter berm
- Check dam in ditch section
- Flow direction
- Fill slope
- Cut slope
- Compost blanket with seeding
- Matting with compost blanket and seeding
- Soil Removal
- Wetlands
- Ditch – Extg. ditch
- Extg. pipe
- Proposed pipe
- Stormwater Pond

Notes:
1. *Graphic symbols are approximate. Place erosion control measures as required or directed.*
2. *Apply permanent seeding in stages upon completion of finish grade.*

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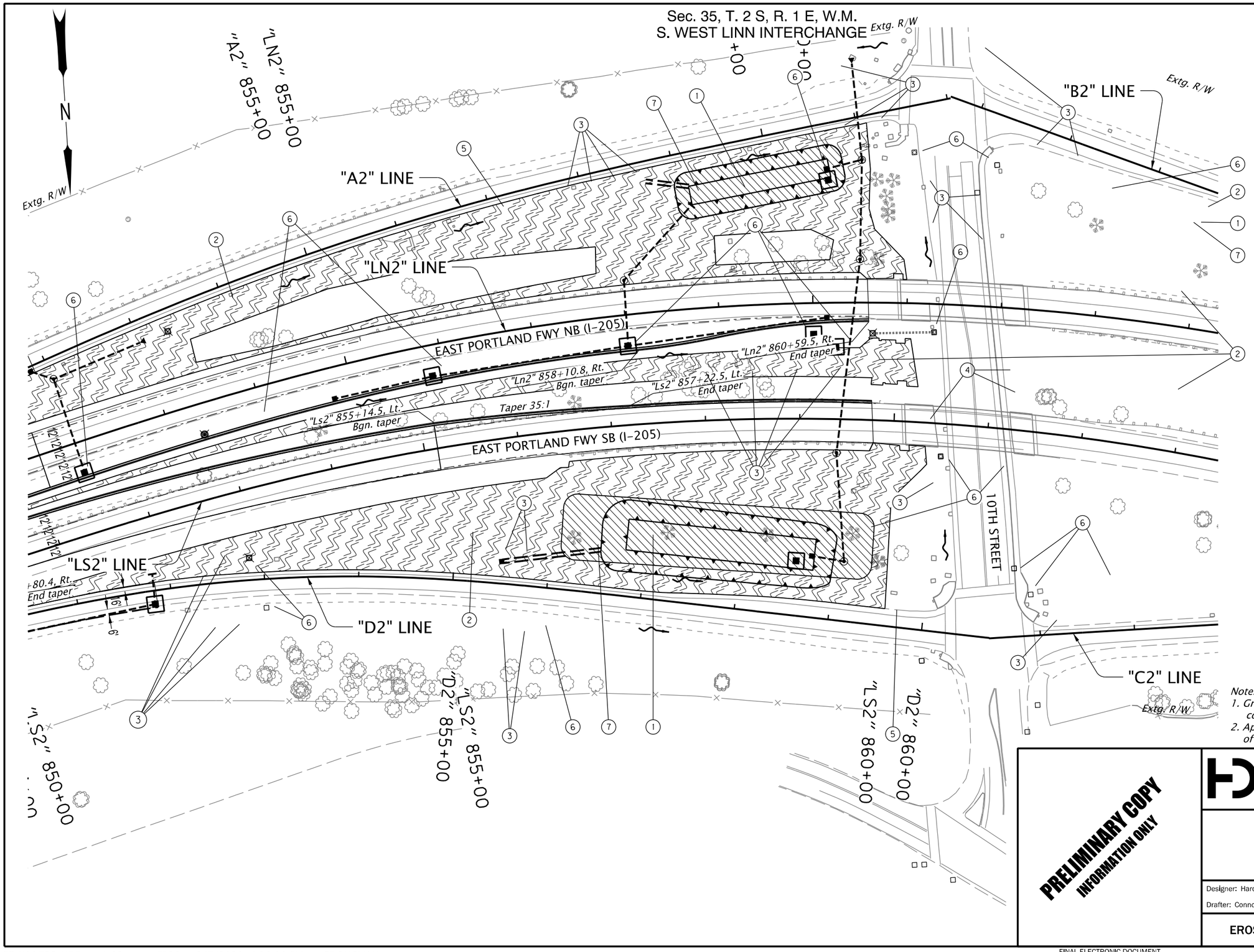
S. WEST LINN INTERCHANGE



1. Inst. matting, type E
2. Inst. compost erosion blanket
3. Const. check dam, type 3
4. Const. compost filter berm
5. Const. construction entrance, type 2 (See drg. no. RD1000)
6. Const. inlet protection, type 7
7. Inst. temporary sediment trap

LEGEND

- Inlet protection
- Compost filter berm
- Check dam in ditch section
- Flow direction
- Fill slope
- Cut slope
- Construction entrance
- Compost blanket with seeding
- Matting with compost blanket and seeding
- Soil Removal
- Sediment trap
- Ordinary high water
- Wetlands
- Ditch – Extg. ditch
- Proposed ditch
- Extg. pipe
- Proposed pipe
- Stormwater Pond

Notes:
1. Graphic symbols are approximate. Place erosion control measures as required or directed.
2. Apply permanent seeding in stages upon completion of finish grade.

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CLACKAMAS COUNTY

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EROSION AND SEDIMENT CONTROL

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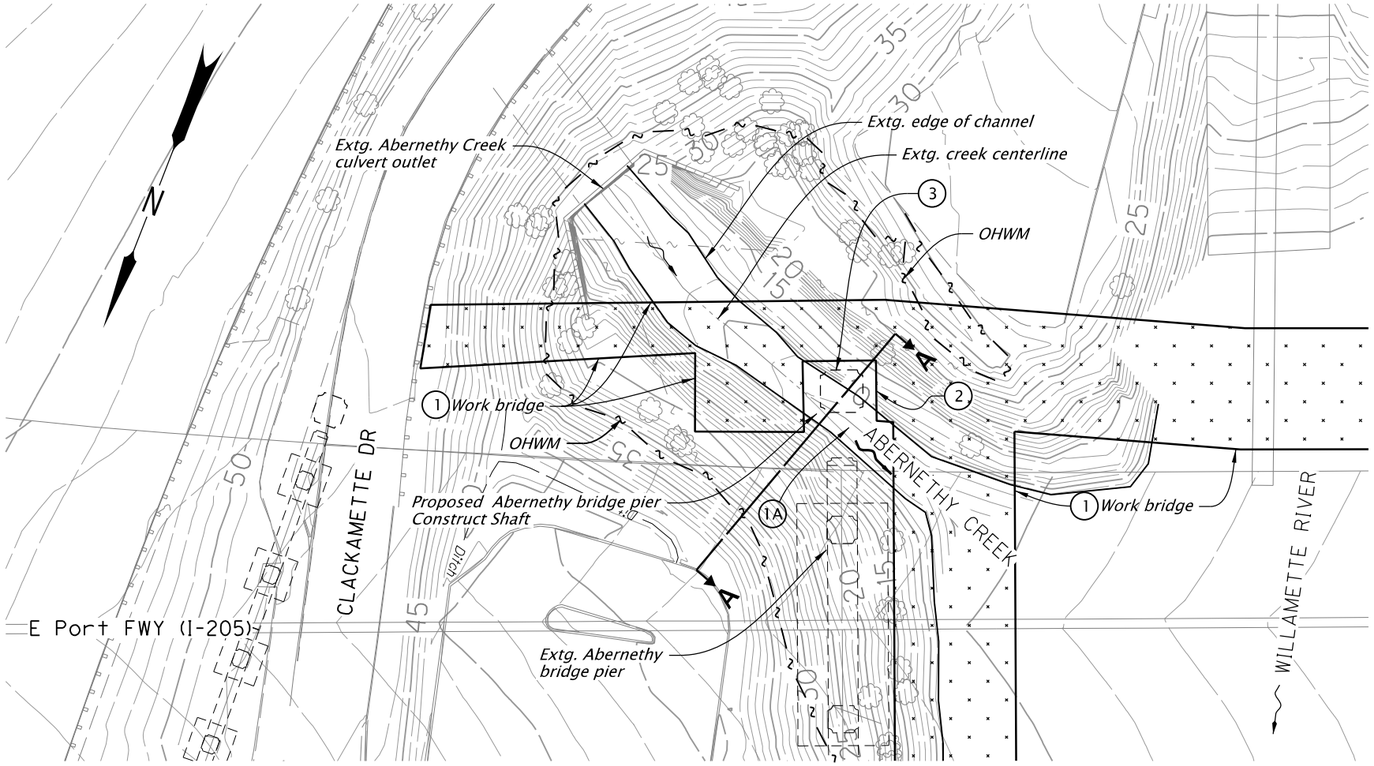

Abernethy Creek - Phase 1
(In-water-work activity)
Construct temporary work bridge and Pier 3, south side.

CONSTRUCTION SEQUENCE

(1A) *Remove existing rip rap (as required)*
(1) *Install temporary work bridge*
(2) *Install temporary shoring at Pier 3*
(3) *Construct shaft*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

See sht. FB 24 for section A-A.

LEGEND

- ····· *Fill slope*
- — — *Cut slope*
- — ~ - *Ordinary High Water*
- ~ *Flow direction*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
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EROSION AND SEDIMENT CONTROL

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EE_K19786_HDR_ecpl_03.dgn :: FB39 Phase 1 2/7/2020 4:16:20 PM CDONOVAN

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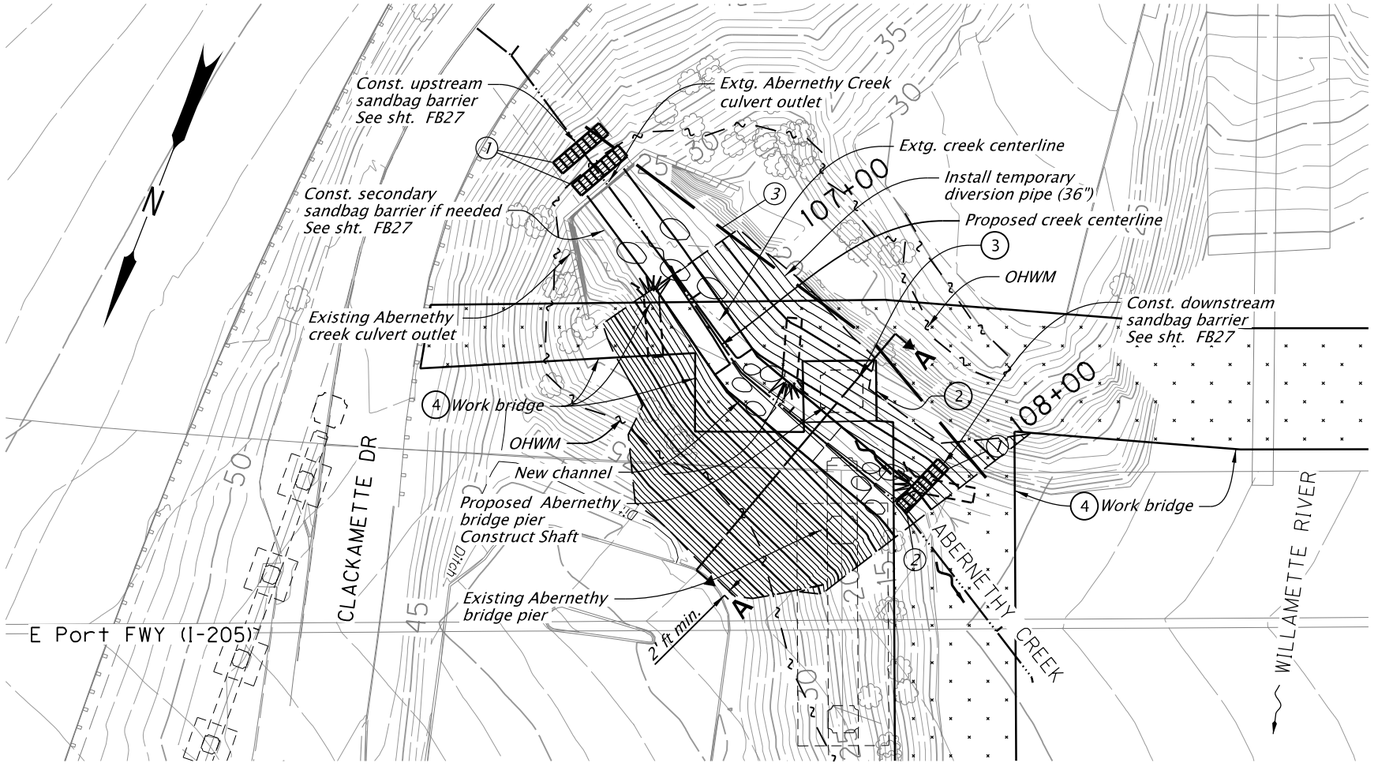

Abernethy Creek Construction - Phase 2A
(In-water-work)
Complete Pier 3 south side architetural treatment and channel restoration

CONSTRUCTION SEQUENCE

1. *Complete architectural finish on Pier 3 southern shaft*
2. *Install temporary diversion*
3. *Remove coffer dam at soutern shaft of Pier 3*
4. *Remove work bridge*
5a. *Realign Abernethy Creek*
5b. *Remove temporary water management features*
6. *Install channel restoration features*

FULL ISOLATION NOTES:

1. *Isolating the work site upstream: Install single primary sandbag barrier across the stream channel. If Needed, install secondary sandbag barrier. Downstream: Install sandbag barrier.*
2. *Install sandbag barrier downstream from work area. Location to be set based on topography and easements available.*
3. *Size the temporary water management facility based on site conditions. Route water around work area using pipe, pump or combination. The discharge table below can be used to estimate the size of the bypass pipe and/or pump.*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
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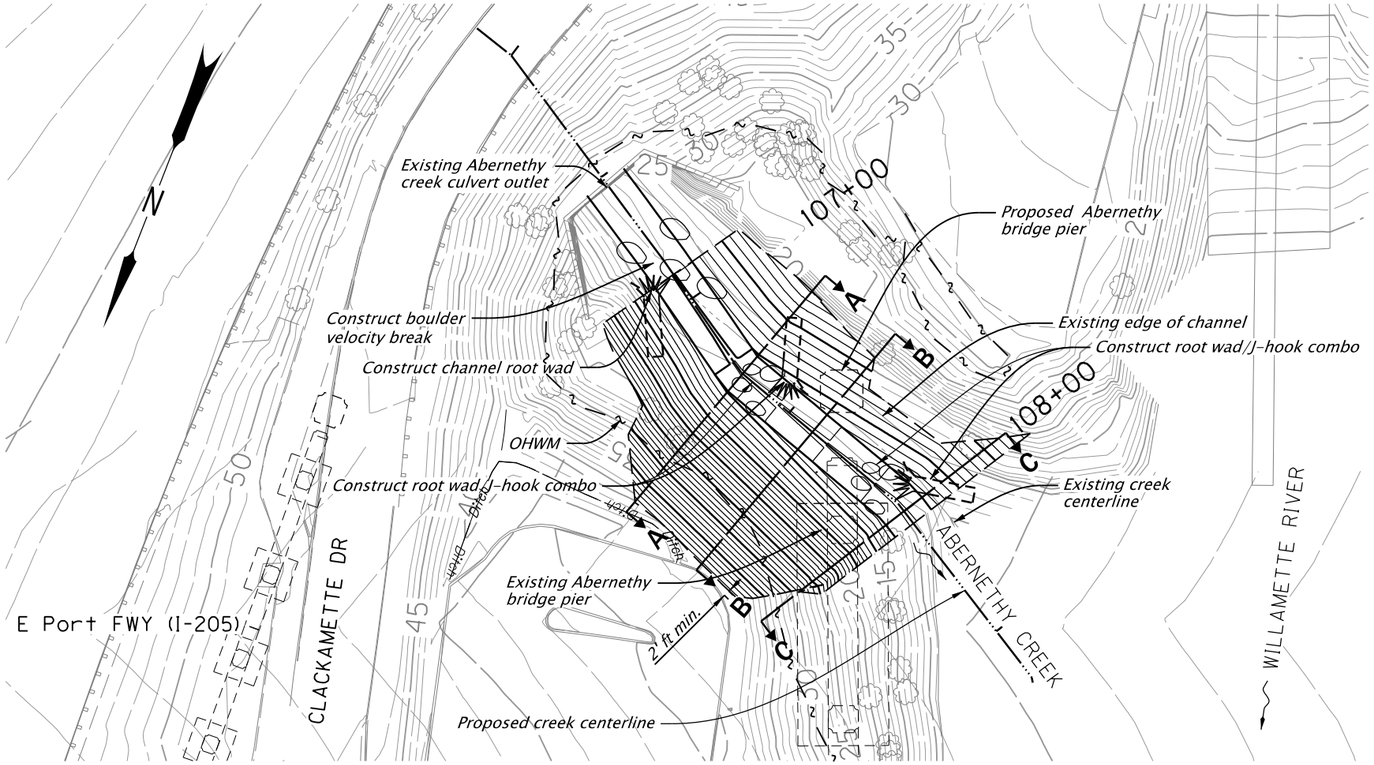


Notes:
Root wad key pieces should be at least 22 inches in diameter and buried 10-15 feet.

Boulders and structure rocks should be greater than 30 inches in diameter.

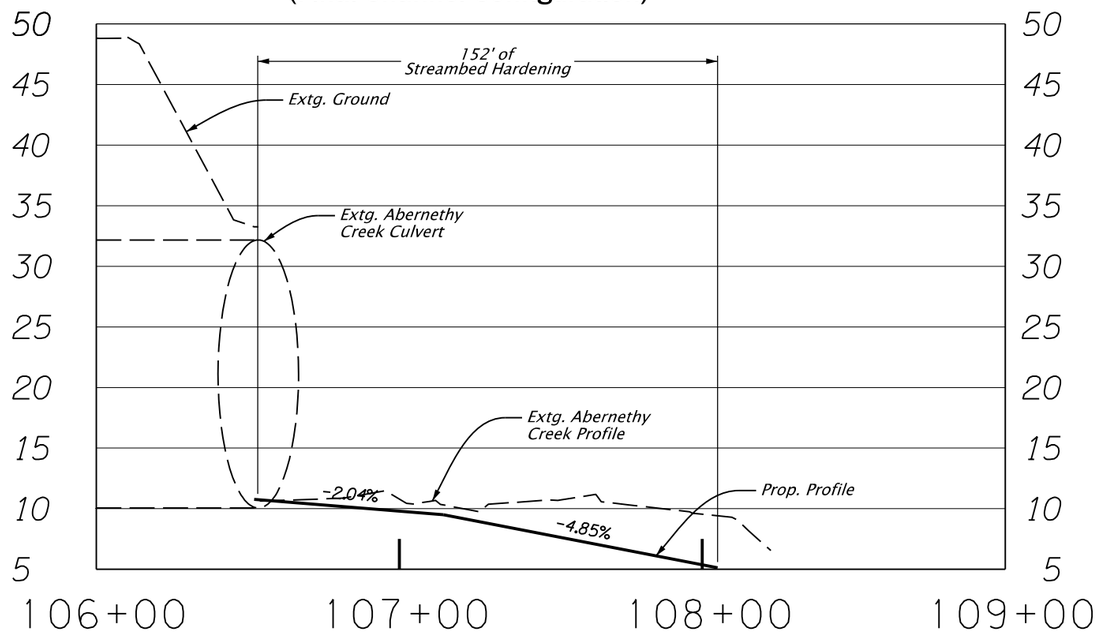
For root wad/J-hook combo, channel root wad, and boulder velocity break, see details XX, XX, and .

For section B-B, see sht. FB24. For section A-A and C-C, see sht. FB25.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

Abernethy Creek - Phase 2B
(Final Channel Configuration)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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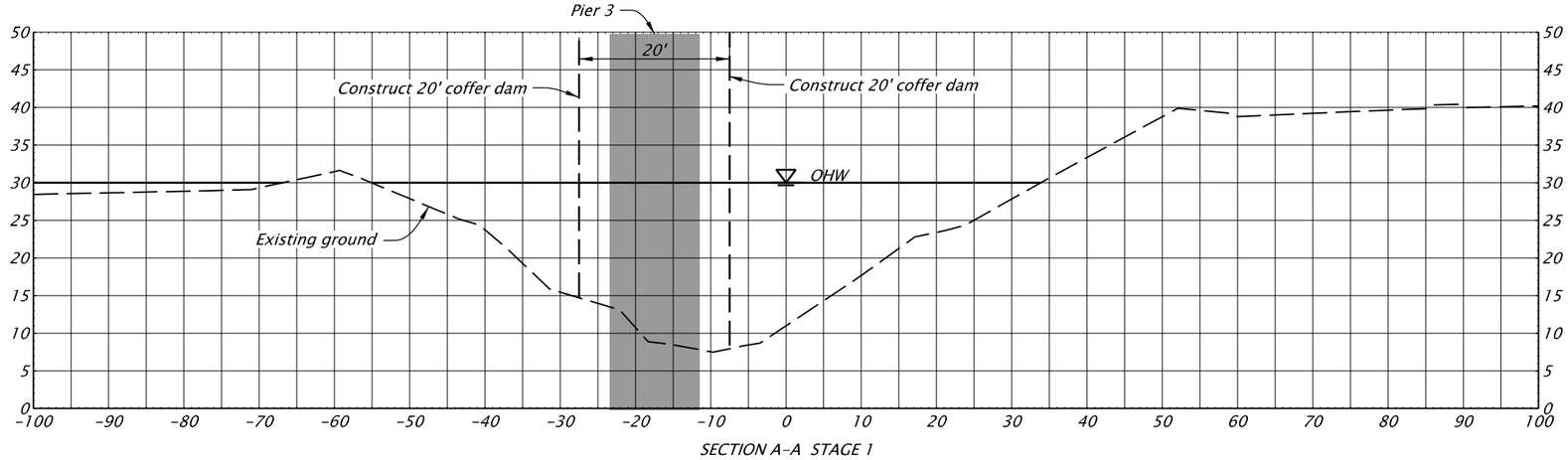
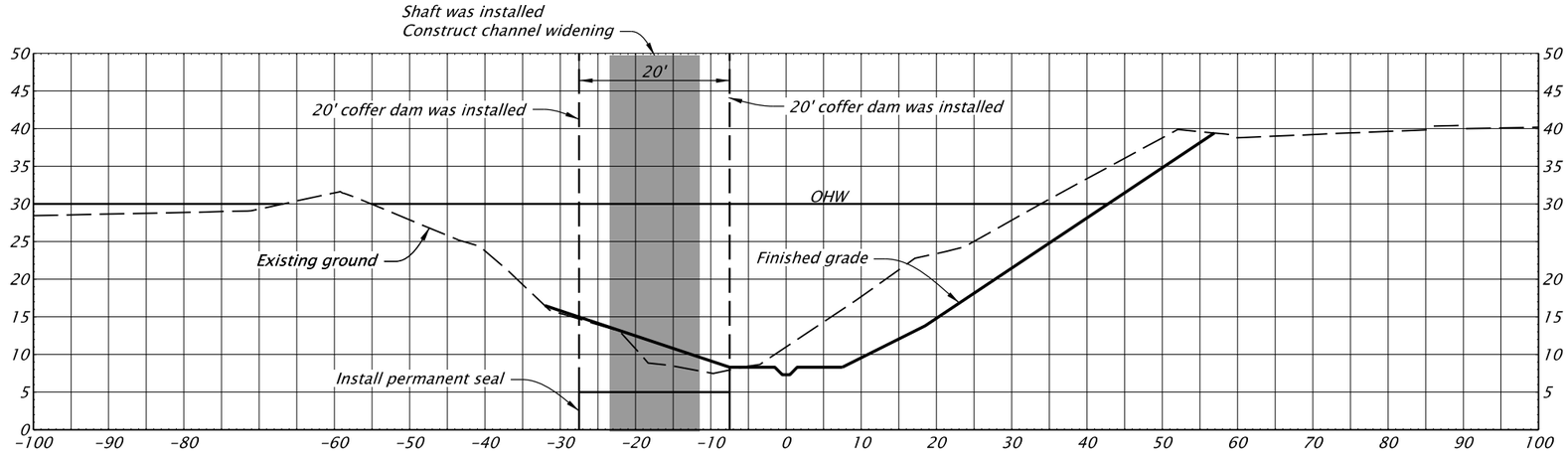


SECTION A-A STAGE 1

Stage 1:

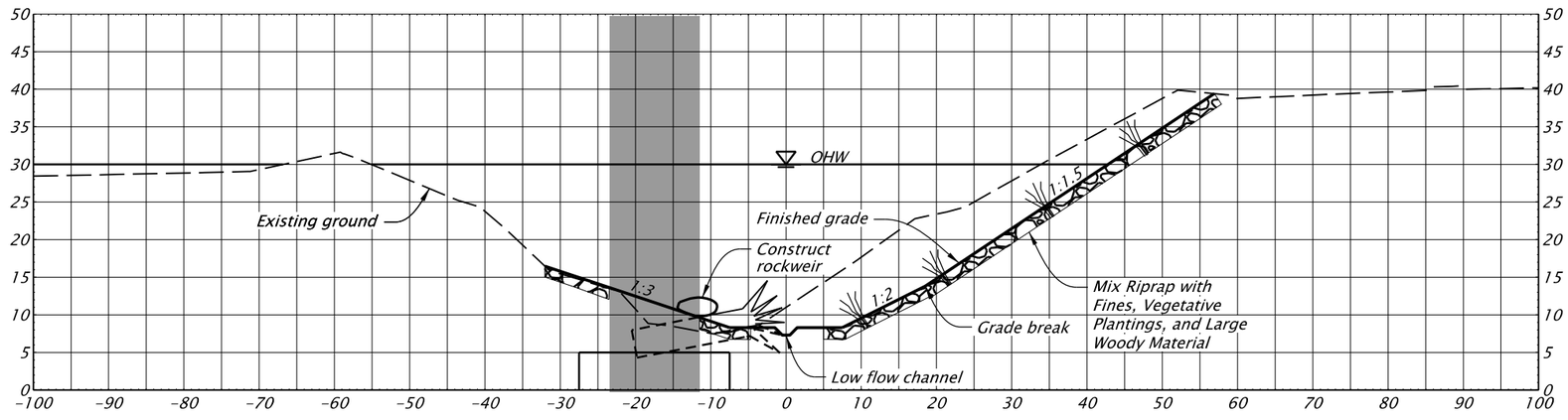
_ Construct shaft
_ Temporary coffer dam



SECTION A-A STAGE 2A

Stage 2A:

- Complete architectural treatment at Pier 3 (south side)
- remove coffer dam and temporary work bridge
- Construct Abernethy Creek channel realignment
- Complete final creek restoration



SECTION B-B STAGE 2B

Stage 2B:

- Complete final creek reconfiguration

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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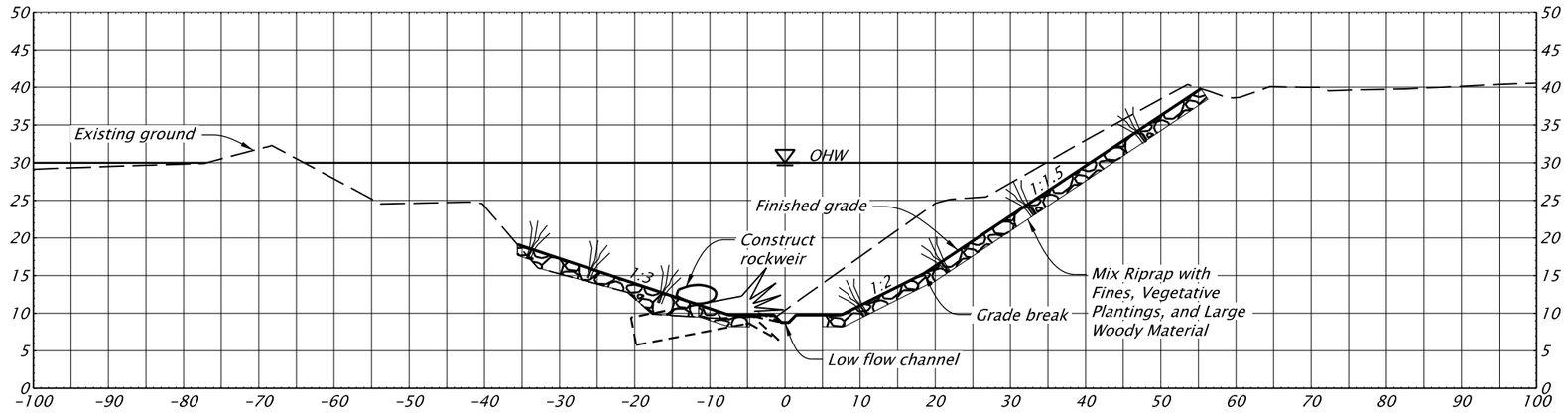
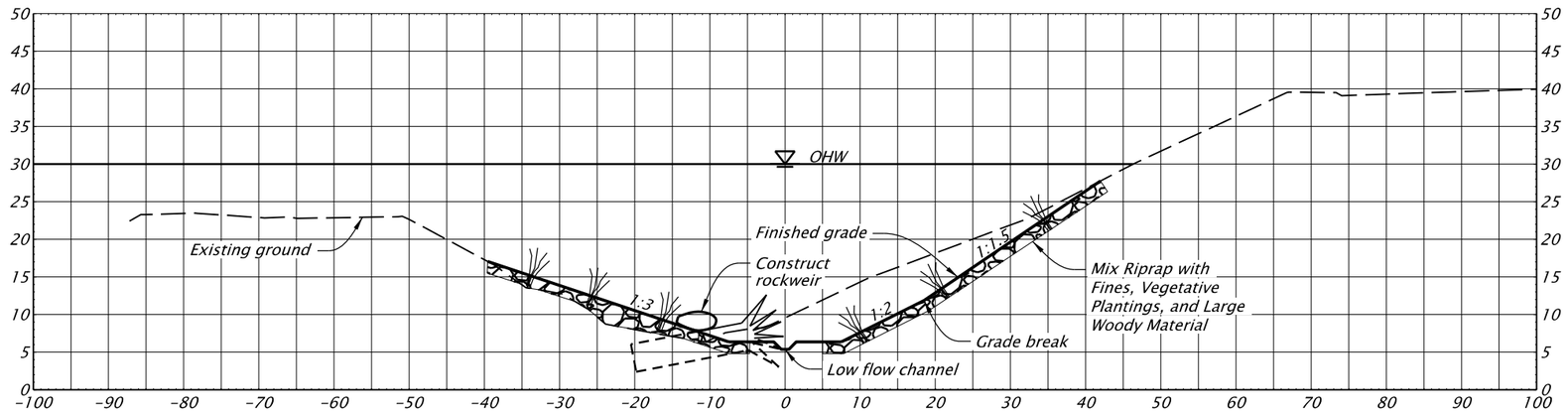
Rotation: 360 0'



SECTION A–A STAGE 2B



SECTION C–C STAGE 2B

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

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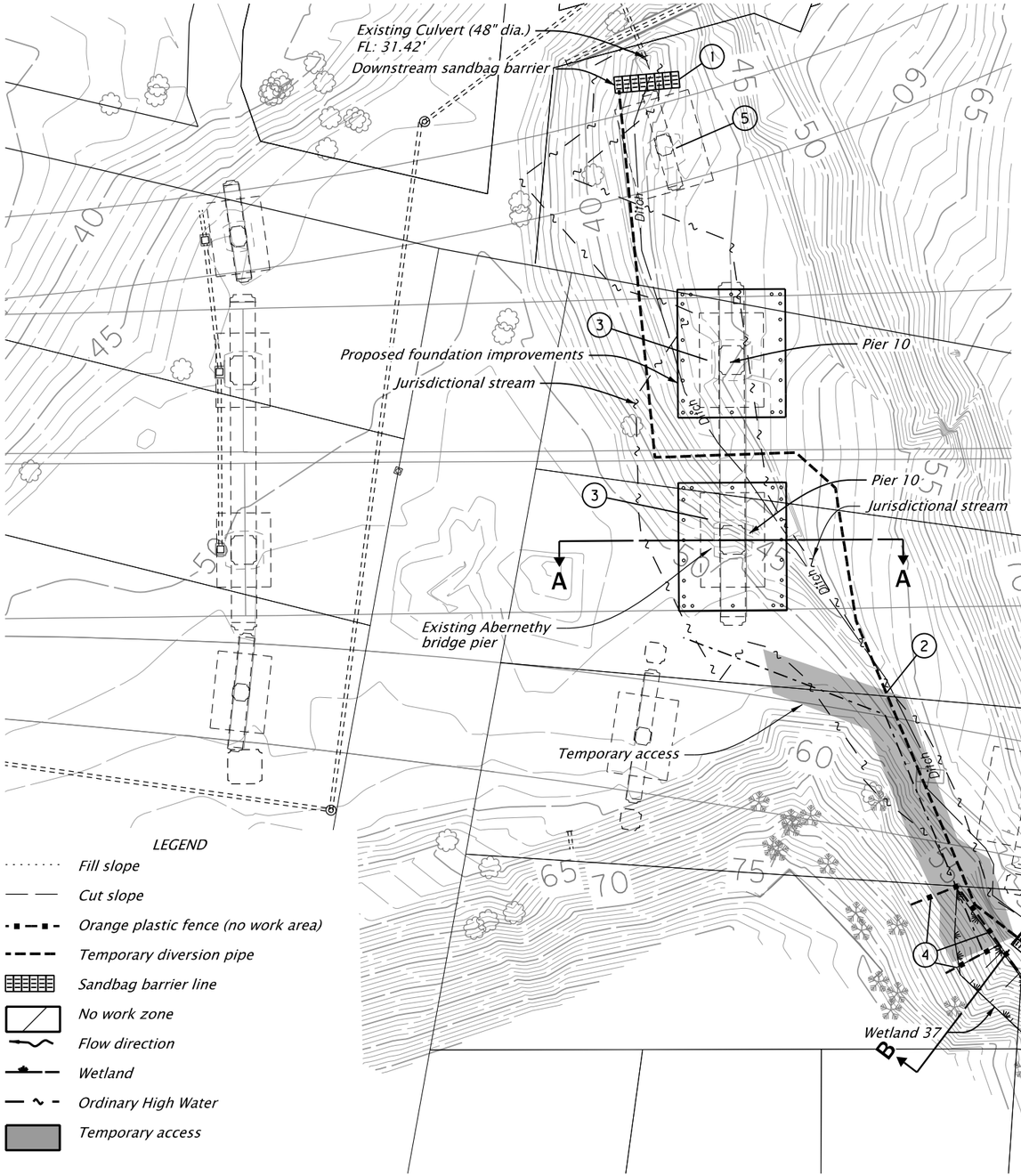
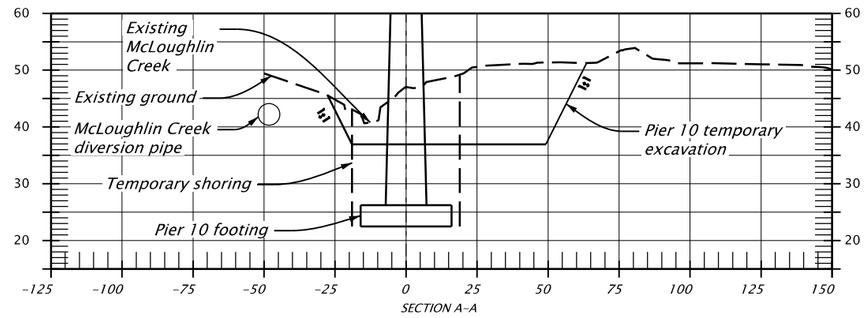
Rotation: 360 0'

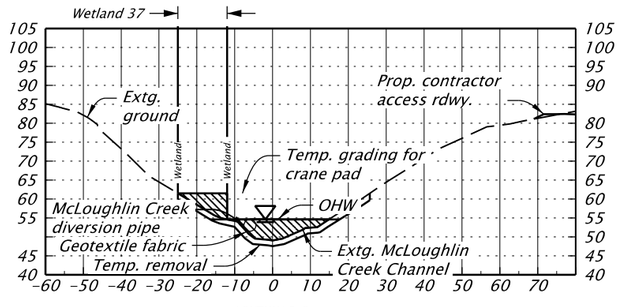
McLoughlin Creek - Phase 1
Construct temporary dike
(In-water-work activities)
Construct shaft



LEGEND

- Fill slope
- Cut slope
- Orange plastic fence (no work area)
- Temporary diversion pipe
- Sandbag barrier line
- No work zone
- Flow direction
- Wetland
- Ordinary High Water
- Temporary access





Note:

For additional erosion control details not shown, see FB27.

Work below OHW cannot exceed 18 months. Install and remove temporary water diversion during in-water work window.

1. *Install temporary BMPs and flow diversion*
2. *Install temporary diversion pipe (18" dia.)*
3. *Construct shaft*
4. *Install orange plastic fence (no work area)*
5. *Remove existing pile cap and bridge column*

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EAST PORTLAND FREEWAY
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EROSION AND SEDIMENT CONTROL

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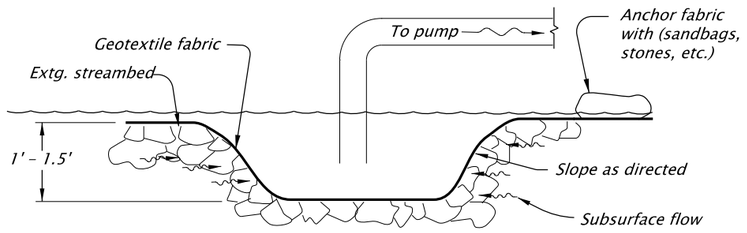
Rotation: 201.4396

TEMPORARY WATER MANAGEMENT FACILITY



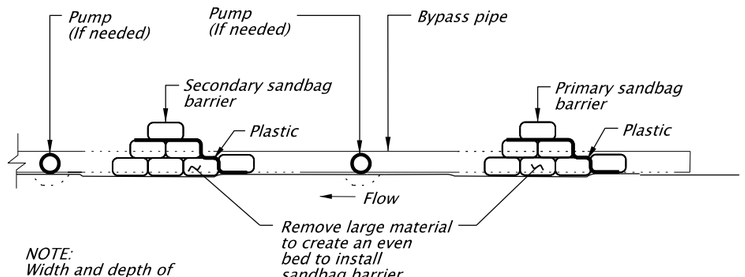
SUMP DETAIL
NTS

GENERAL NOTES:

The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.



NOTE:
Width and depth of sandbag barrier will vary depending on site and stream flow conditions.

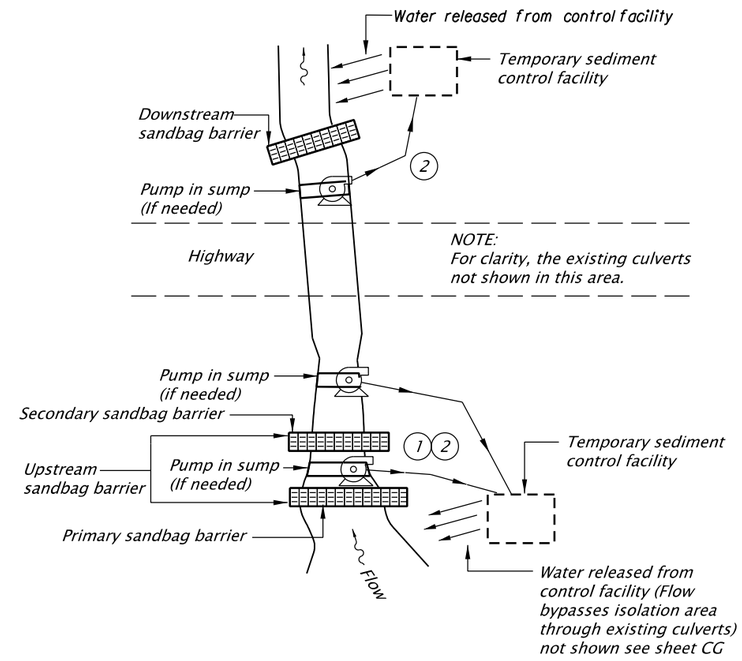
SANDBAG BARRIER SECTION

LEGEND:

Sandbag barrier line

Sediment control facility

Sump pump

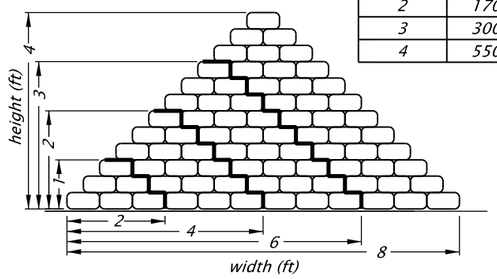


COMBINED PUMP/GRAVITY BYPASS DETAIL
NTS

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500



FULL ISOLATION NOTES:

(1) *See sheet FB22 note.*

(2) *See sheet FB22 note.*

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Rotation: 360 0'

Attachment H. Natural Resources Overlay District Verification

Natural Resource Overlay District Boundary Verification

ODOT | K19786 I-205: Stafford Rd to OR 213

I-205: Stafford Road to OR213 Corridor Road Widening & Retrofit of the Abernethy Bridge Project

ODOT EA: PE003013
HDR Project # 10063137

December 23, 2019

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2 Verification 1
2.1 Requested NROD Boundary Changes and Justification 2

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Figure 3. Currently-mapped NROD boundary, showing the 200-ft buffer from the outdated wetland inventory map. 4
Figure 4. Delineated wetland (Wetland 21) 5
Figure 5. Delineated wetland (Wetland 19) 6

Appendices

Appendix A. Verified NROD Boundaries
Appendix B. Wetland Delineation Report

DRAFT

Acronyms

AASHTO	American Association of State Highway and Transportation Officials
BDDM	Bridge Design and Drafting Manual
Consultant	HDR Engineering, Inc. and subconsultant partners
County	Clackamas County, Oregon
ESA	Endangered Species Act
FHWA	Federal Highway Administration
HCA	Habitat Conservation Area
NEPA	National Environmental Policy Act
NROD	Natural Resource Overlay District
ODOT	Oregon Department of Transportation
PS&E	Plans, Specifications, & Estimates
Project	I-205: Stafford Rd to OR99E Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening
ROW	Right of Way
SOW	Statement of Work

1 Introduction

The Oregon Department of Transportation (ODOT) proposed improvements to I-205 in Clackamas County, the City of West Linn, and the City of Oregon City, Oregon. The I-205: Stafford Road to OR 213 Project (project) will seismically upgrade the I-205 bridge over the Willamette River (Abernethy Bridge) and replace or upgrade eight other bridges that carry I-205 traffic in the project area to withstand a major earthquake. In addition to seismic upgrades of bridges, an additional lane will be added to I-205 in both directions, widening the capacity to three lanes.

The project area within the boundaries of Oregon City is undergoing review by the Oregon City Planning Division and, in that process, ODOT is preparing a Land Use Permit Application. Within Oregon City, portions of the project area are within the City's mapped Natural Resource Overlay District (NROD) boundary. This report presents a Type II Verification of the NROD in accordance with Oregon City Municipal Code (OCMC) 17.49.260.

2 Verification

The NROD boundary is in place to protect habitats and functions of stream, riparian corridors, wetlands, and other water features. Depending on the type of water feature, the NROD consists of a vegetated corridor ranging from 50 to 200 feet surrounding the water-related resource, from the ordinary high water (OHW) mark or delineated edge of the jurisdictional feature. This buffer helps to regulate water quality and ensure habitat protection.

A wetland delineation of the project area was conducted by qualified HDR wetland specialists in November 2017, with concurrence issued from the Oregon Department of State Lands (DSL) in February 2019. Based on the wetland delineation and the existing development, the city's mapped NROD boundary within the project area does not accurately represent existing conditions of the identified resources. ODOT is requesting a determination for areas designated as NROD on Oregon City's OCWebMaps application that do not qualify as NROD areas as outlined by Oregon City Municipal Code (OCMC) Chapter 17.49.010. There are five proposed NROD boundary verifications within the project area, including along the Willamette River, under the Abernethy Bridge at Abernethy Creek, on Main Street at Abernethy Creek, and two locations along I-205 northbound (NROD Areas A-E; Figure 1).

DRAFT

Figure 1. Currently-mapped NROD boundary, the project area, and the five proposed NROD areas A-E.

2.1 Requested NROD Boundary Changes and Justification

The City of Oregon City Local Wetland Inventory map for T 2S R 2E Section 29 shows a wetland along the south side of the I-205 corridor (northbound), east of Main Street to Highway 213 (Figure 2). The currently-mapped NROD associated with this wetland includes a 200-foot buffer (Figure 3). Although mapped as NROD, the 200-foot buffer does not actually exist due to the existing lanes of I-205, which under OCMC 17.49.255(B)(6)(a), are considered to be an existing physical barrier between the site and a protected water feature. The area was previously developed and should not be considered NROD beyond the existing impervious pavement. The wetland currently mapped in the Local Wetland Inventory along the I-205 corridor is not present in areas originally depicted.

The HDR wetland delineation from 2017 determined that there are two small isolated wetlands within the area along the south side of the I-205 corridor between Main Street and Highway 213 (Figures 4 and 5), but they do not cover an area as extensive as shown in the Local Wetland Inventory map. The full wetland delineation report for the project is attached in Appendix B. Based on the small wetlands that remain in this area, HDR developed a proposed verified NROD boundary along I-205 (NROD Areas D and E; Appendix A Figures 4 and 5). These areas are the only undeveloped areas in between the delineated edges of the wetlands and the existing road.

Figure 2. City of Oregon City Local Wetland Inventory Map.

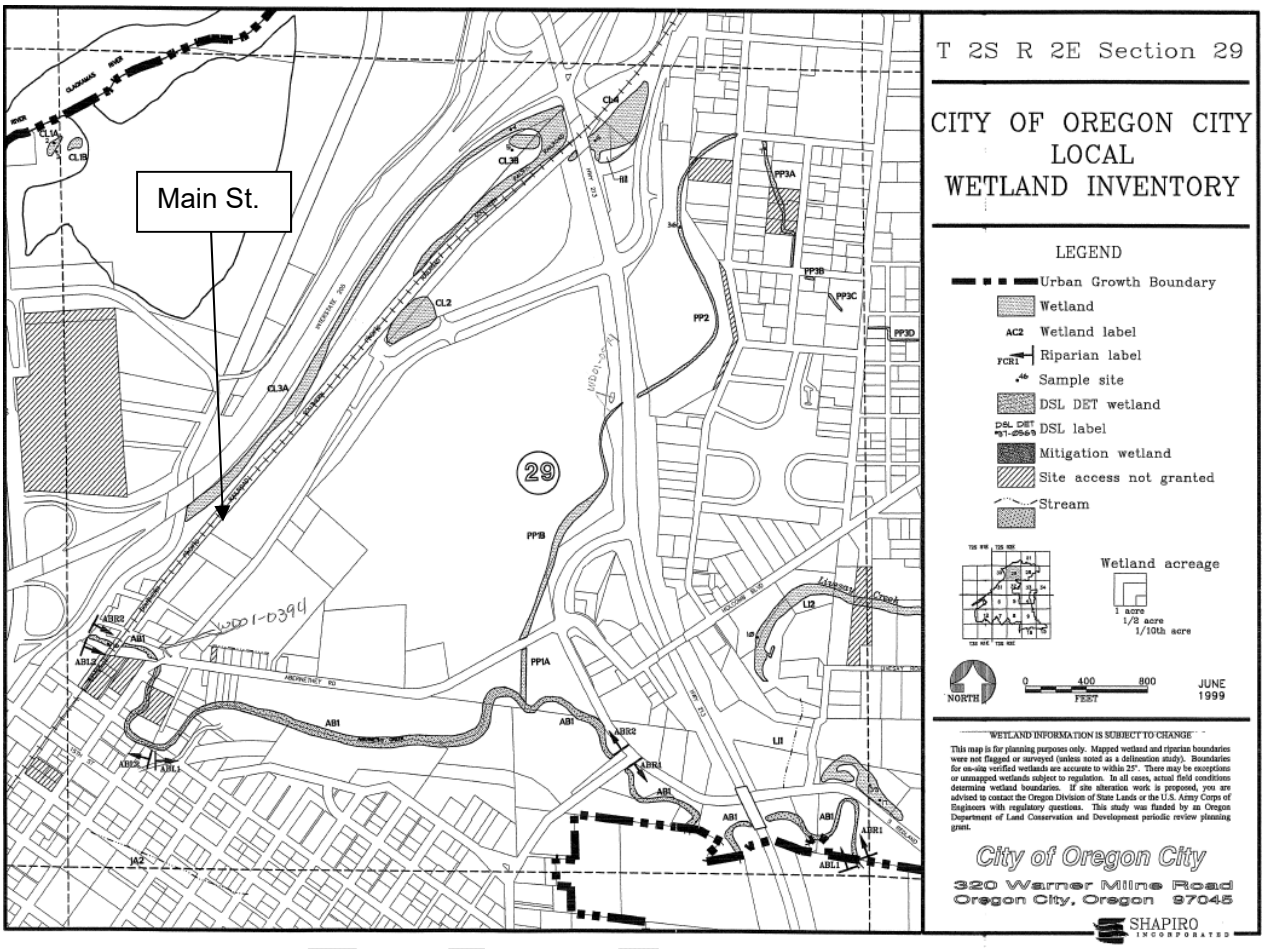


Figure 3. Currently-mapped NROD boundary, showing the 200-ft buffer from the outdated wetland inventory map.

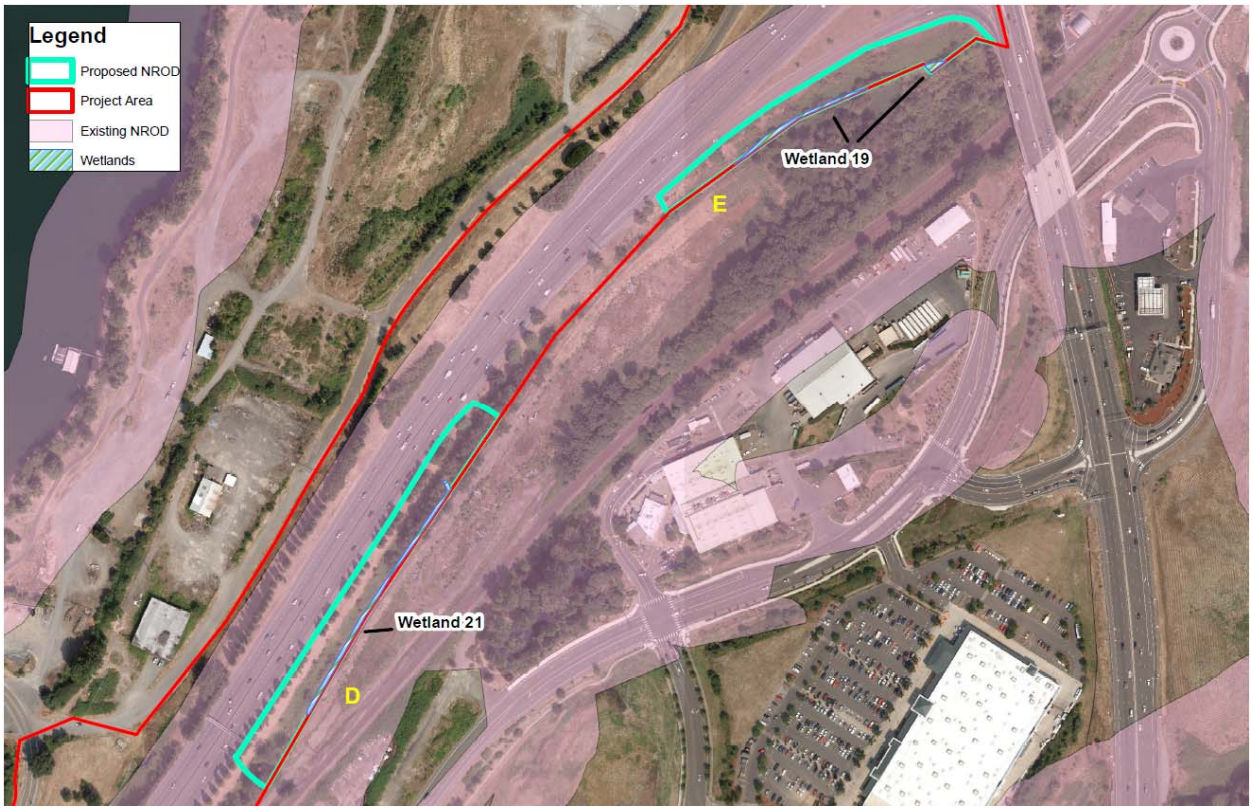


Figure 4. Delineated wetland (Wetland 21).

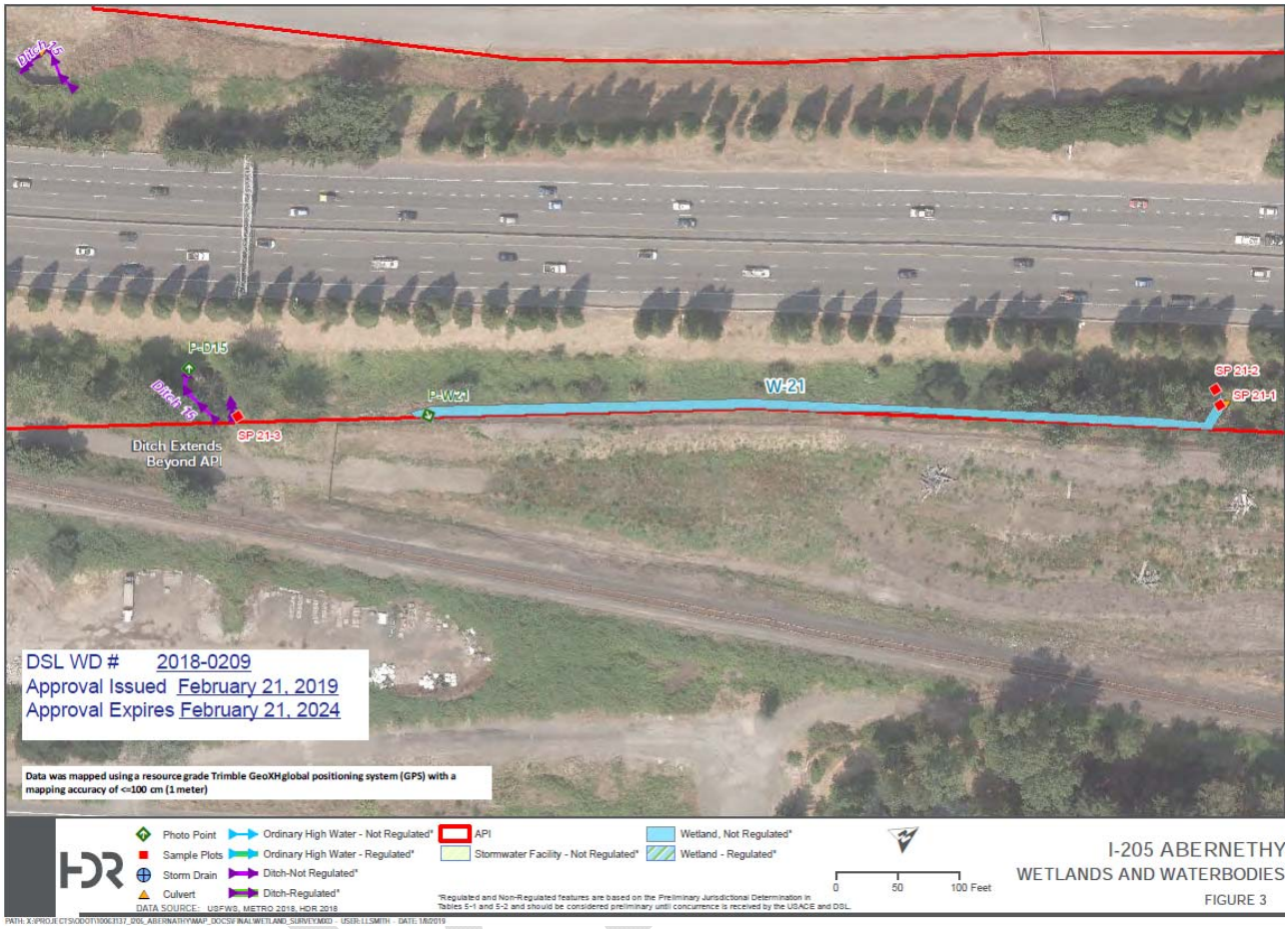
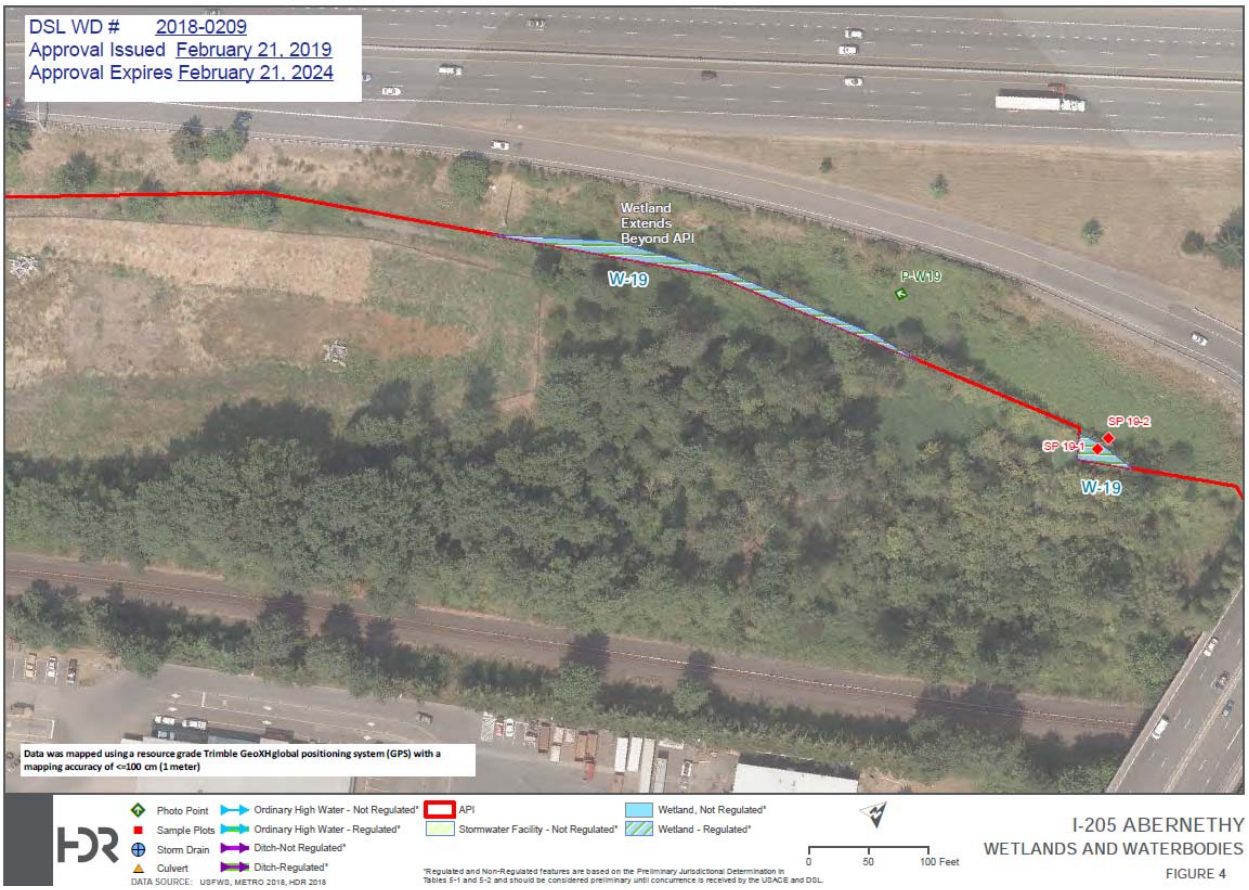


Figure 5. Delineated wetland (Wetland 19).



Another portion of the project area that is currently mapped within the NROD boundary but no longer provides the functional values for NROD protection is the area surrounding the portion of Abernethy Creek that is in a culvert. Since the creek flows through a culvert, as outlined in OCMC Chapter 17.49.255(B)(6)(a), there is an existing physical barrier between the site and the protected water feature, therefore should not be considered to be within an NROD boundary. While sections of Abernethy Creek that are not in a culvert should remain within NROD boundaries, the NROD associated with Abernethy Creek from the culvert outfall west of McLoughlin Boulevard to the culvert inflow on the east side of Main Street should be removed. The majority of that area is developed, including McLoughlin Boulevard, Clackamette Drive, the I-205 off ramp, and Main Street. The NROD boundary currently mapped between Main Street and the riparian area where Abernethy Creek exits the culvert should remain (NROD Area C; Appendix A Figure 3).

Jon Storm Park and Sportcraft Landing underneath the Abernethy Bridge are both located within the currently-mapped NROD boundary due to their proximity to the Willamette River and Abernethy Creek. As outlined in OCMC Chapter 17.49.110(A), the vegetated corridor begins at the edge of bankfull flow (OHW). The OHW of the Willamette River extends landward towards the existing parking lot under the bridge. There is only a small area that was not previously developed in between the OHW and parking lot. The development of the park, including the required NROD mitigation, was completed approximately 10 years ago and should not be considered NROD as outlined

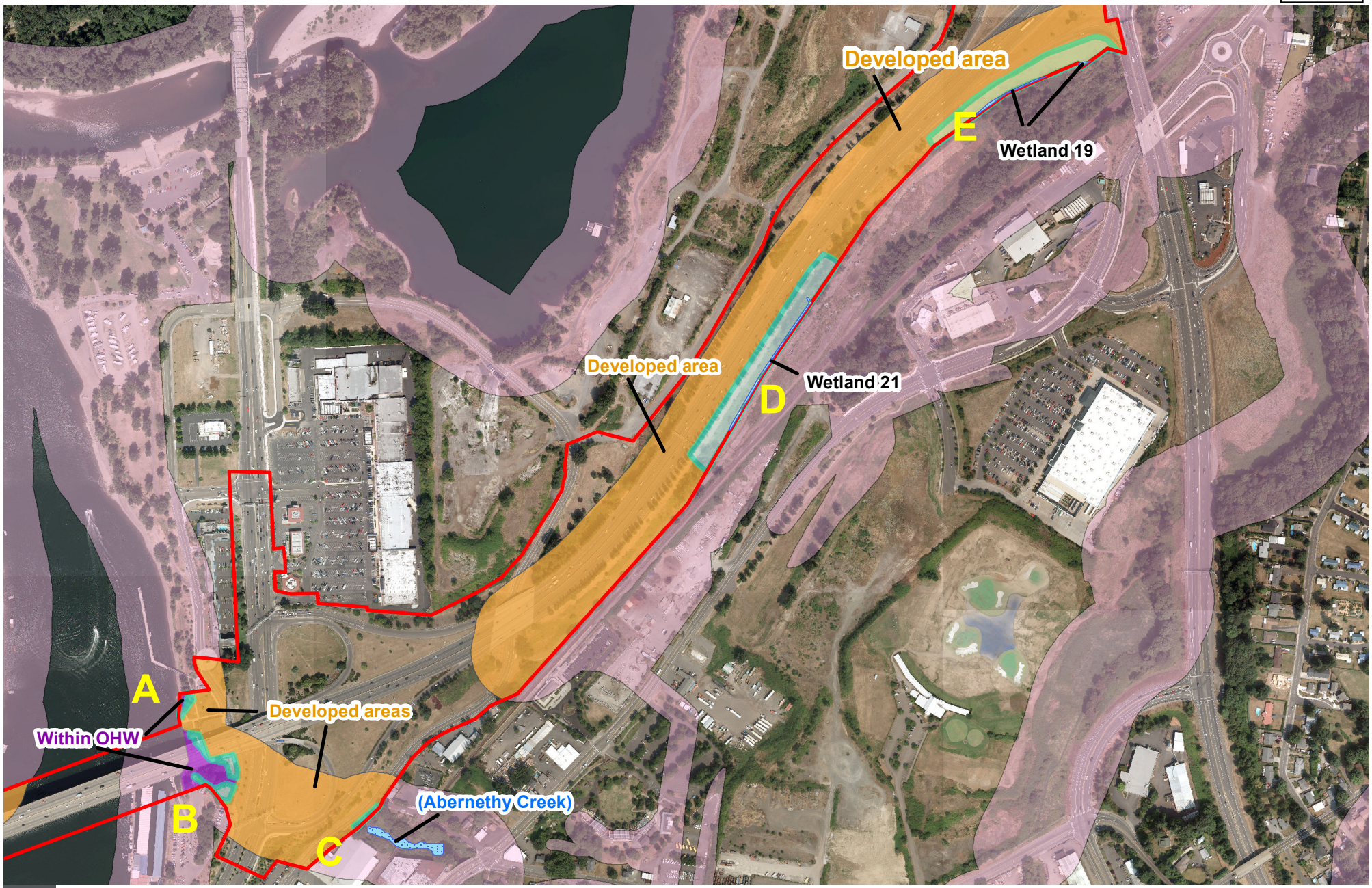
in OCMC Chapter 17.49.260(C). The addition of the parking lot, other impervious surfaces, and the retaining wall on the river bank led to a loss of functions and values that would have existed prior to development. The proposed NROD boundary should include the patch of trees south of the bridge surrounding the OHW of Abernethy Creek, as well as the riparian area beyond the Willamette River OHW below the bridge, up to the north side of the bridge, ending at the south side of the picnic shelter (NROD Area B; Appendix A Figure 2).

The NROD that exists within the project area along the bank of the Willamette River OHW, west of Jon Storm Park is undeveloped and still provides functional values (NROD Area A; Appendix A Figure 2). ODOT requests no additional verification of this portion of the NROD boundaries.

DRAFT

Appendix A. Verified NROD Boundaries

DRAFT



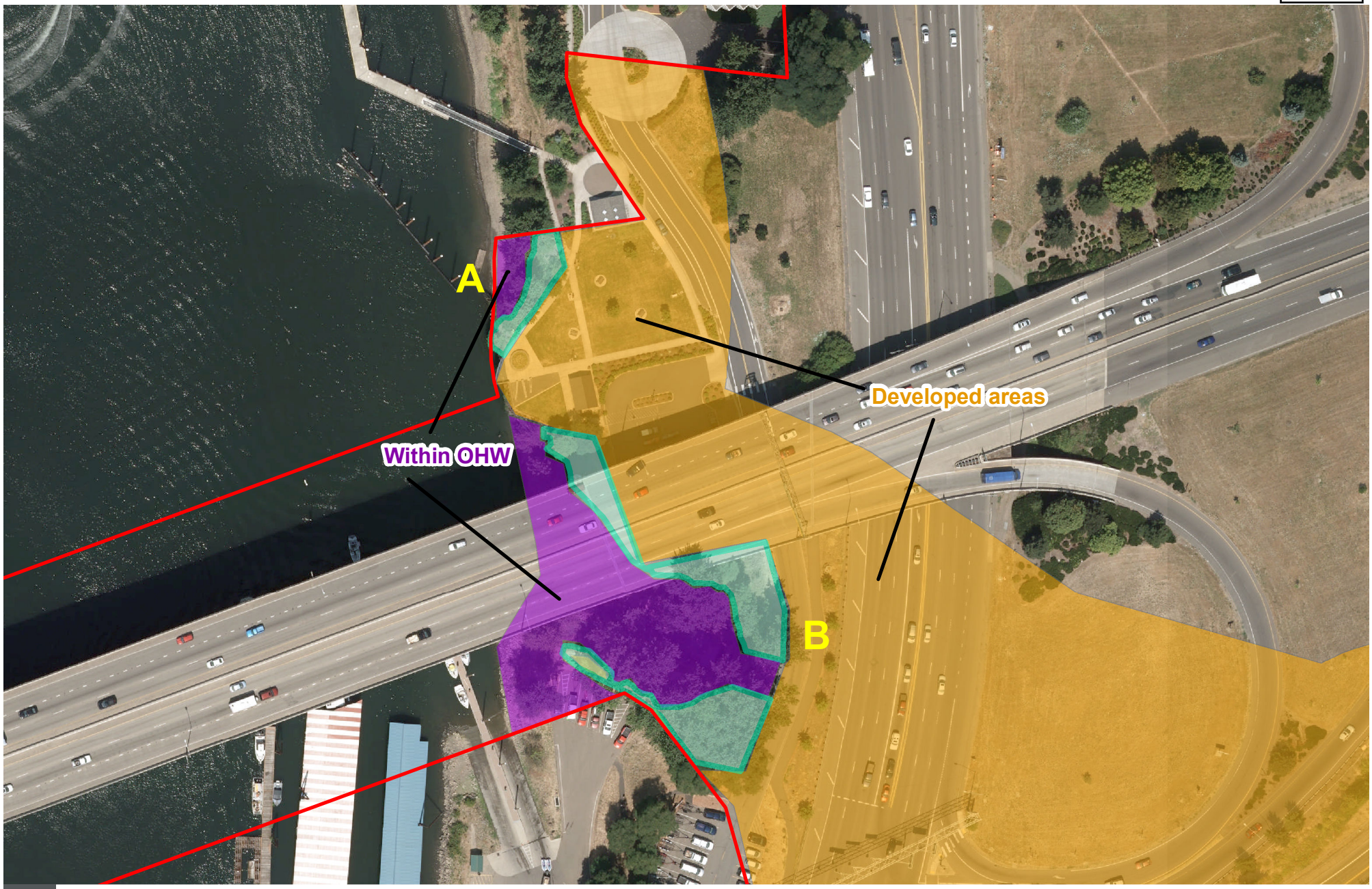
NROD BOUNDARY VERIFICATION

Existing NROD | Project Area | Proposed NROD | Wetlands | Remove NROD - Development | Remove NROD - OHW

0 Miles 0.1

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\VERIFICATION.MXD - USER: RBARKSDALE - DATE: 7/26/2019



NROD BOUNDARY VERIFICATION

Project Area | Proposed NROD | Remove NROD - Development | Remove NROD - OHW

0 Miles 0.02

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\VERIFICATION.MXD - USER: RBARKSDALE - DATE: 7/26/2019

NROD BOUNDARY VERIFICATION

Project Area | Proposed NROD | Remove NROD - Development

0 Miles 0.015

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\VERIFICATION.MXD - USER: RBARKSDALE - DATE: 7/26/2019

NROD BOUNDARY VERIFICATION

Project Area | Proposed NROD | Wetlands | Remove NROD - Development

0 Miles 0.065

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\VERIFICATION.MXD - USER: RBARKSDALE - DATE: 7/26/2019

NROD BOUNDARY VERIFICATION

Project Area | Proposed NROD | Wetlands | Remove NROD - Development

0 Miles 0.03

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\VERIFICATION.MXD - USER: RBARKSDALE - DATE: 7/26/2019

Appendix B. Wetland Delineation Report

DRAFT

Oregon
Kate Brown, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

State Land Board

Kate Brown
Governor

Dennis Richardson
Secretary of State

Tobias Read
State Treasurer

February 21, 2019

ODOT
Attn: Stephen Hay
123 NE Flanders Street
Portland, Oregon 97209

Re: WD # 2018-0209 Wetland Delineation Report for K19786 I-205 Corridor Widening; Clackamas County; T2S R1W Sec. 25; T2S R1E Sec. 27, 28, 29, 30, 34, 35, and 36; T2S R2E Sec. 16, 20, 29, 30, and 31, in ROW and Many Tax Lots

Dear Stephen:

The Department of State Lands has reviewed the wetland delineation report prepared by HDR Engineering, Inc. for the site referenced above. Please see the attached maps for site location information. Based upon the information presented in the report, a site visit on June 28, 2018, and revised report submitted on February 12, 2019, we concur with the wetland and waterway boundaries as mapped in Figures 5-1 through 5-39 of the report.

Within the study area 43 wetlands, 18 waterways, and 18 ditches were identified (see attached table of features). Thirty-three wetlands (Wetlands 1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 17, 19, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, and 43 (totaling approximately 5.92 acres)); 16 waterways (Willamette and Tualatin Rivers; Tanner, McLoughlin, Wilson, Abernathy, and Athey Creeks; Streams 1, 3, 5, 6, 7, 9, 11, 12, and 13); and 4 ditches (Ditches 3, 4, 12, and 17) are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway. (See attached tables)

However, Willamette River and Abernathy Creek are essential salmonid streams; therefore, fill or removal of any amount of material within the OHWL may require a state permit. Eight wetlands (Wetlands 6, 14, 16, 18, 20, 23, 29 and 40) are exempt stormwater features per OAR 141-085-0515(7); 2 wetlands (Wetlands 2 and 21) are exempt created wetlands per 141-085-0515(6); 2 waterways (Streams 4 and 10) are ephemeral and are exempt per OAR 141-085-0515(3), 14 ditches (Ditch 1, 2, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20 and ditch to Athey Creek) were not constructed in wetland or are roadside ditches and are exempt per OAR 141-085-0515(8) and (10); therefore, are not subject to current state Removal-Fill requirements.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will determine jurisdiction for purposes of the Clean Water Act.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

This area of Willamette River is a state-owned waterway; any activity encroaching within the submerged and submersible land may require a lease, registration, or easement to occupy state-owned land. Please contact Justin Russell at (503) 986-5219 for more information.

Thank you for having the site evaluated. Please phone me at 503-986-5244 if you have any questions.

Sincerely,

Russell W. Klassen
ODSL-ODOT Liaison
Aquatic Resource Coordinator

Approved by

Peter Ryan
Aquatic Resource Specialist

Enclosures

ec: Natalie Edwards, Corps of Engineers
Brad Livingston, ODOT
Ken Sargent, ODOT
Leandra Cleveland, HDR Engineering, Inc.

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

Fully completed and signed report cover forms and applicable fees are required before report review timelines are initiated by the Department of State Lands. Make checks payable to the Oregon Department of State Lands. To pay fees by credit card, go online at https://apps.oregon.gov/DSL/EPS/program?key=4.

Attach this completed and signed form to the front of an unbound report or include a hard copy with a digital version (single PDF file of the report cover form and report, minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail DSL instructions on how to access the file from your ftp or other file sharing website.

Contact and Authorization Information

☐ Applicant ☐ Owner Name, Firm and Address:

Business phone #
Mobile phone # (optional)
E-mail:

☐ Authorized Legal Agent, Name and Address (if different):

Business phone #
Mobile phone # (optional)
E-mail:

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: _____ **Signature:** _____
Date: _____ Special instructions regarding site access: _____

Project and Site Information

Project Name:

Latitude: Longitude:
decimal degree - centroid of site or start & end points of linear project

Proposed Use:

Tax Map #
Tax Lot(s)

Tax Map #
Tax Lot(s)

Project Street Address (or other descriptive location):

Township Range Section QQ
Use separate sheet for additional tax and location information

City: County:

Waterway: River Mile:

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:

Phone #
Mobile phone # (if applicable)
E-mail:

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.

Consultant Signature: Date:

Primary Contact for report review and site access is ☐ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☐ Yes ☐ No | Study Area size: Total Wetland Acreage:

Check Applicable Boxes Below

☐ R-F permit application submitted
☐ Mitigation bank site
☐ Industrial Land Certification Program Site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Previous delineation/application on parcel
If known, previous DSL # _____

☐ Fee payment submitted **$** _____
☐ Fee ($100) for resubmittal of rejected report
☐ Request for Reissuance. See eligibility criteria. (no fee)
DSL # _____ Expiration date _____
☐ LWI shows wetlands or waters on parcel
Wetland ID code _____

For Office Use Only

DSL Reviewer: _____ Fee Paid Date: _____ / _____ / _____ DSL WD # _____

Date Delineation Received: ___/___/___ Scanned: ☐ Electronic: ☐ DSL App.# _____

Wetland Delineation Report Cover Form Additional Information

Project:

K19786 how I-205: Stafford Rd to OR 213 Corridor Widening and Abernethy Bridge Seismic Retrofit / Widening

Latitude and Longitude:

West end of Project: 45.369107, -122.754285

East end of Project: 45.379477, -122.581428

Township Range Section:

Township 2 South, Range 1 West, Section 25

Township 2 South, Range 1 East, Section 27, 28, 29, 30, 34, 35, 36

Township 2 South, Range 2 East, Section 20, 29, 30, 31

Tax Map#	Tax Lots
21E30B	Roads
21E30A	Roads
21E29B	Roads
21E29A	Roads
21E28	Roads
21E28C	Roads
21E28D	Roads
21E28DA	Roads
21E28DD	Roads
21E27C	00200, Roads
21E27B	Roads
21E27D	Roads
21E34A	Roads
21E34AC	Roads
21E34AD	Roads
21E34DA	Roads
21E35CB	Roads
21E35CC	Roads
21E35C	Roads
21E35D	Roads
21E36	Roads
22E31	Roads
22E31BB	05200, Roads
22E30CD	Roads
22E31BA	Roads
22E30DB	Roads
22E30	Roads
22E29CB	00300, 00500, Roads
22E30DD	00401, Roads
22E29	01510, 02100, 02300, Roads
22E20	Roads
22E20DC	01600, Roads
22E20DD	Roads
22E20DA	Roads
22E20S1	Roads

Table 1. Wetland Features Identified in the Study Area

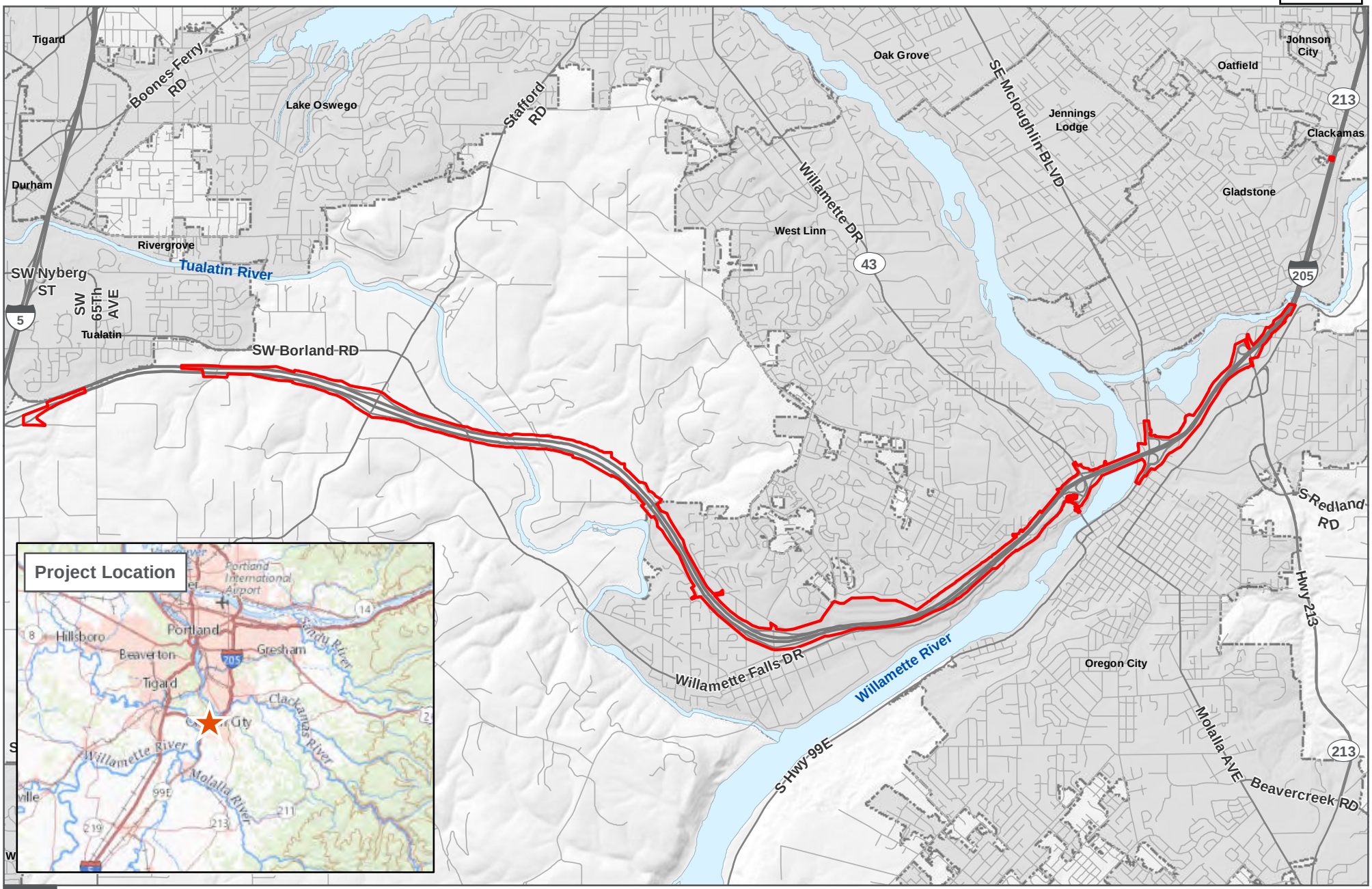
Wetland ID	Size (acres)	Cowardin	HGM	Stormwater Feature or Wetland	DSL Jurisdiction	Figure Number	Photo Number	Latitude and longitude
W-1	0.09	PEM	slope	Wetland	Yes	5-6	P-W1	45.37081528 -122.7102356
W-2	0.03	PEM	depressional	Created Wetland	No	5-3	P-W2	45.37326813 -122.7217026
W-3	0.04	PEM	slope	Wetland	Yes	5-8	P-W3	45.37048340 -122.7093582
W-4	0.03	PEM	depressional	Wetland	Yes	5-9	P-W4	45.37014389 -122.7055283
W-5	0.01	PEM	depressional	Wetland	Yes	5-8	P-WW5 / D3	45.36986160 -122.7086182
W-6	00.01	PEM	depressional	Stormwater feature	No	5-13	P-W6	45.36697006 -122.6915894
W-7	0.68	PEM	depressional	Wetland	Yes	5-9	P-W7	45.36888504 -122.7055435
W-8	0.08	PEM	depressional	Wetland	Yes	5-14	P-W8	45.36697006 -122.6915894
W-9	0.01	PFO	slope	Wetland	Yes	5-17	P-W9	45.36888504 -122.7055435
W-10	0.06	PFO/PSS	depressional	Wetland	Yes	5-14	P-W10	45.36615753 -122.6879883
W-11	0.02	PFO	riverine	Wetland	Yes	5-20	P-W11	45.35829926 -122.6673508
W-12	0.01	PEM	depressional	Wetland	Yes	5-15	P-W12	45.36610794 -122.6811752
W-13	0.04	PFO	Riverine	Wetland	Yes	5-21	P-W13	45.35651779 -122.6655655
W-14	0.18	PEM	depressional	Stormwater feature	No	5-24	P-W14	45.34877396 -122.6563721
W-15	0.07	PEM	riverine	Wetland	Yes	5-24 5-25	P-WW15	45.34706497 -122.6534348
W-16	0.22	PEM	depressional	Stormwater feature	No	5-25	P-W16	45.34766769 -122.6532898
W-17	0.48	PEM	riverine	Wetland	Yes	5-26	P-W17	45.34689713 -122.6484833
W-18	0.29	PEM	depressional	Stormwater feature	No	5-26	P-W18	45.34745026 -122.6501160
W-19	2.40	PEM	depressional	Wetland	Yes	5-39	PW-19	45.37318802 -122.5884171
W-20	0.06	PEM	depressional	Stormwater feature	No	5-18	P-W20	45.36209869 -122.6704788
W-21	0.13	PEM/PSS	depressional	Created Wetland	No	5-38	P-W21	45.36985016 -122.5925140
W-22	0.52	PEM/PFO	depressional	Wetland	Yes	5-17	P-W22	45.36362839 -122.6730270
W-23	0.83	PSS	depressional	Stormwater feature	No	5-33 5-34	P-W23	45.35669327 -122.6194000
W-24	0.03	PSS	depressional	Wetland	Yes	5-17	P-W24	45.36421585 -122.6739273
W-25	0.31	PFO/PEM	depressional	Wetland	Yes	5-30	P-W25	45.35209274 -122.6284561
W-26	0.95	PSS	depressional	Wetland	Yes	5-16	P-W26	45.36549377 -122.6781616
W-27	0.06	PSS/PFO	depressional	Wetland	Yes	5-30	P-W27	45.35237503 -122.6282501
W-28	0.10	PEM	depressional	Wetland	Yes	5-30	P-W28	45.35238266 -122.6272507
W-29	0.14	PEM/PSS	depressional	Stormwater feature	No	5-31 5-32	P-W29	45.35374451 -122.6251602
W-30	0.01	PFO	depressional	Wetland	Yes	5-30	P-W30	45.35142136 -122.6301041
W-31	0.11	PFO	depressional	Wetland	Yes	5-29	P-W1	45.34978485 -122.6340866
W-32	0.25	PEM	depressional	Stormwater feature	Yes	5-29	P-W32	45.34956741 -122.6349640
W-33	0.11	PEM	depressional	Wetland	Yes	5-24	P-W33	45.34879303 -122.6546402
W-34	0.42	PFO/PSS	depressional	Wetland	Yes	5-23 5-24	P-W34	45.35037231 -122.6578064
W-35	0.77	PFO	depressional	Wetland	Yes	5-17	P-W35	45.36416626 -122.6726685
W-36	0.04	PFO/PSS	depressional	Wetland	Yes	5-19	P-W36	45.36116409 -122.6677246
W-37	0.01	PFO	riverine	Wetland	Yes	5-36	none	45.36369324 -122.6085815
W-38	0.13	PFO/PSS	depressional	Wetland	Yes	5-19	P-W38	45.35955048 -122.6664200
W-39	0.01	PFO	depressional	Wetland	Yes	5-15	P-W39	45.36672974 -122.6806870

W-40	0.35	PEM	depressional	Stormwater feature	No	5-10	P-W40	45.36967087 -122.7018661
W-41	0.01	PFO/PSS	depressional	Wetland	Yes	5-7	P-W41	45.37165070 -122.7081223
W-42	0.03	PSS/EM	depressional	Wetland	Yes	5-15	P-W42	45.3661500 -122.689390
W-43	0.36	PFO/EM	depressional	Wetland	Yes	5-15	P-W43	45.3667400 -122.681250

Table 2. Waterways Identified in the Study Area

Waterway Reach ID	Flow Regime	Width @ Widest Point (feet)	DSL Jurisd-iction	Figure Number	Photo Number	Latitude and longitude
Willamette River	Perennial	1,500	Yes	5-36, 5-37	P-11	45.36377335 -122.6067429
Tualatin River	Perennial	200	Yes	5-14	P-5	45.36661148 -122.6881561
Abernethy Creek	Perennial	50	Yes	5-37	P-12	45.36493301 -122.6015396
Athey Creek	Perennial	30	Yes	5-6	P-3	45.37218857 -122.7103195
Tanner Creek	Perennial	6.5	Yes	5-30	P-9	45.35130692 -122.6302185
McLoughlin Creek	Intermittent	10	Yes	5-36	P-10	45.36351395 -122.6080933
Stream 1	Intermittent	14	Yes	5-12 and 5-13	P-S1	45.36784363 -122.6934586
Stream 2 (Wilson Creek)	Intermittent	3	Yes	5-14	none	45.36707687 -122.6876221
Stream 3	Intermittent	2.5	Yes	5-17	P-S3	45.36375427 -122.6750259
Stream 4	Ephemeral	6	No	5-25	P-S4	45.34849548 -122.6532593
Stream 5	Intermittent	45	Yes	5-19, 5-20	P-S5a P-S5b	45.35834503 -122.6673508
Stream 6	Intermittent	6	Yes	5-19	P-W36	-45.36115646 -122.6677628
Stream 7	Intermittent	10	Yes	5-21	P-S7a P-S7b	45.35720062 -122.6644516
Stream 9	Intermittent	5	Yes	5-24, 5-25, 5-26	P-S9	45.34718323 -122.6536942
Stream 10	Ephemeral	15	No	5-7	P-W41	45.37166214 -122.7081451
Stream 11	Intermittent	3	Yes	5-22, 5-23, 5-24, 5-25, 5-26, 5-27	P-D9	45.35359192 -122.6618881
Stream 12	Intermittent	3	Yes	5-29	P-S12	45.35024900 -122.6340720
Stream 13	Intermittent	5	Yes	5-2	P-S13	45.37286500 -122.7274740
Ditch 1	Ephemeral	1.5	No	5-5	P-D1	45.37159729 -122.7130966

Ditch 2 and 2b	Ephemeral	6.5	No	5-3, 5-4, 5-5, 5-6, 5-7, 5-8	P-D2	45.37285233 -122.7176285
Ditch 3	Intermittent	3	Yes	5-8	P-WW5/D3	45.36985779 -122.7085280
Ditch 4	Intermittent	5	Yes	5-17	P-D4a	45.36325073 -122.6735229
Ditch 5	Ephemeral	1.5	No	5-9	P-D5A	45.36874008 -122.7043457
Ditch 6	Ephemeral	6	No	5-15	P-D6	45.36585236 -122.6806793
Ditch 7	Ephemeral	4	No	5-18	P-D7	45.36110687 -122.6701584
Ditch 8	Ephemeral	5	No	5-12	P-D8	45.36803055 -122.6976318
Ditch 10	Ephemeral	5	No	5-34, 5-35	P-D10	45.35934067 -122.6156006
Ditch 11	Ephemeral	1	No	5-20	P-D11	45.35982895 -122.6689148
Ditch 12	Intermittent	4	Yes	5-24	none	45.34905243 -122.6553574
Ditch 14	Ephemeral	5	No	5-28	P-D14	45.34898376 -122.6420517
Ditch 15	Intermittent	65	No	5-38	P-D15	45.36874771 -122.5946960
Ditch 17	Ephemeral	8	Yes	5-15	P-D17	45.36658478 -122.6808243
Ditch 18	Ephemeral	2	No	5-3	P-D18	45.37366486 -122.7209549
Ditch 19	Ephemeral	4	No	5-2	P-D19	45.37360382 -122.7272568
Ditch 20	Intermittent	8	No	5-22	P-D20	45.35247803 -122.6608505
Ditch to Athey Creek	Intermittent	2	No	5-6	P-2	45.37108231 -122.7113495



Legend

Area of Potential Impact (API)

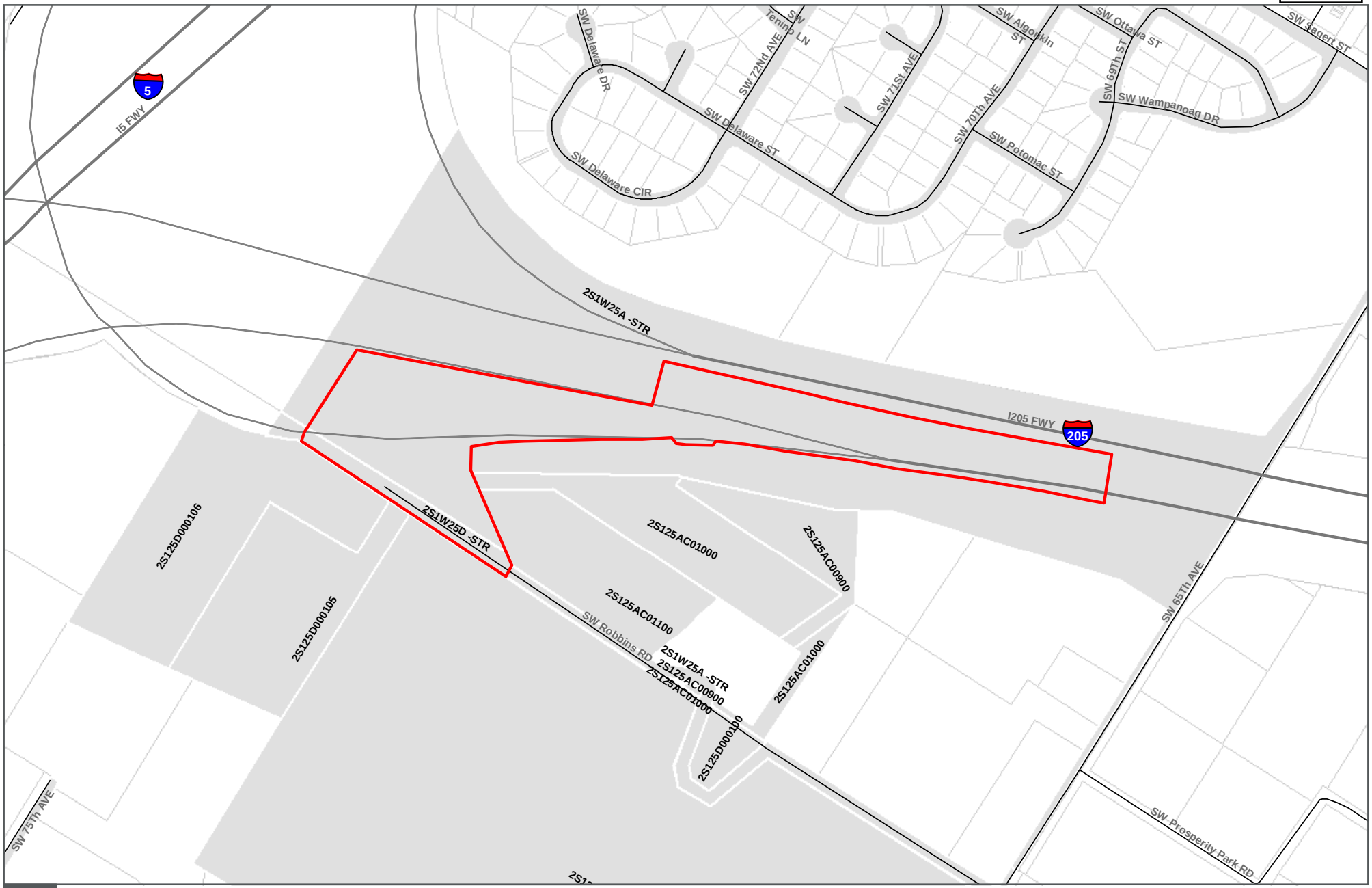
DATA SOURCE: METRO 2018, HDR 2018

0 0.5 1 Miles

I-205 ABERNETHY

PROJECT LOCATION

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F1 PROJECT_LOCATION.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

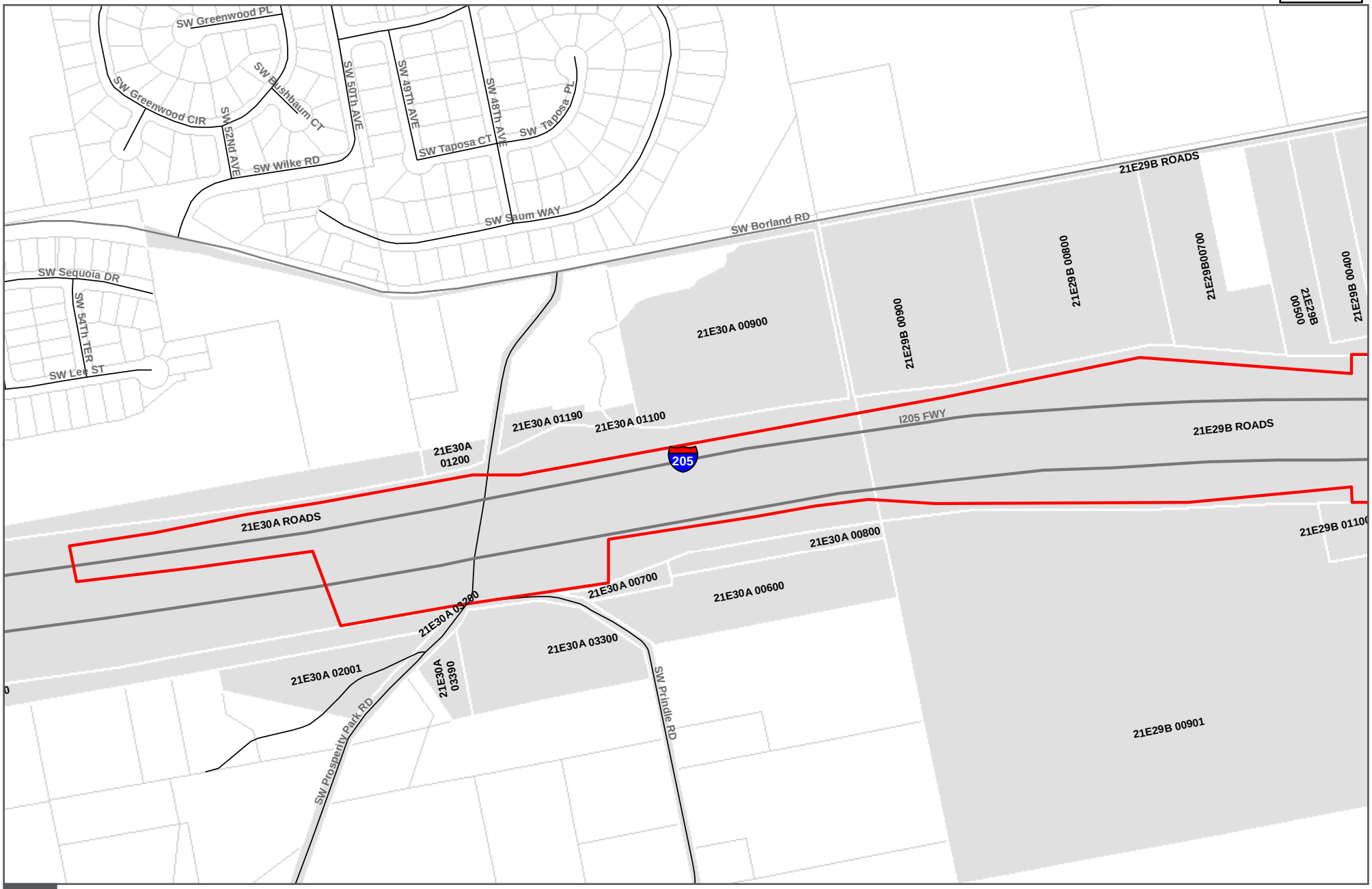
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

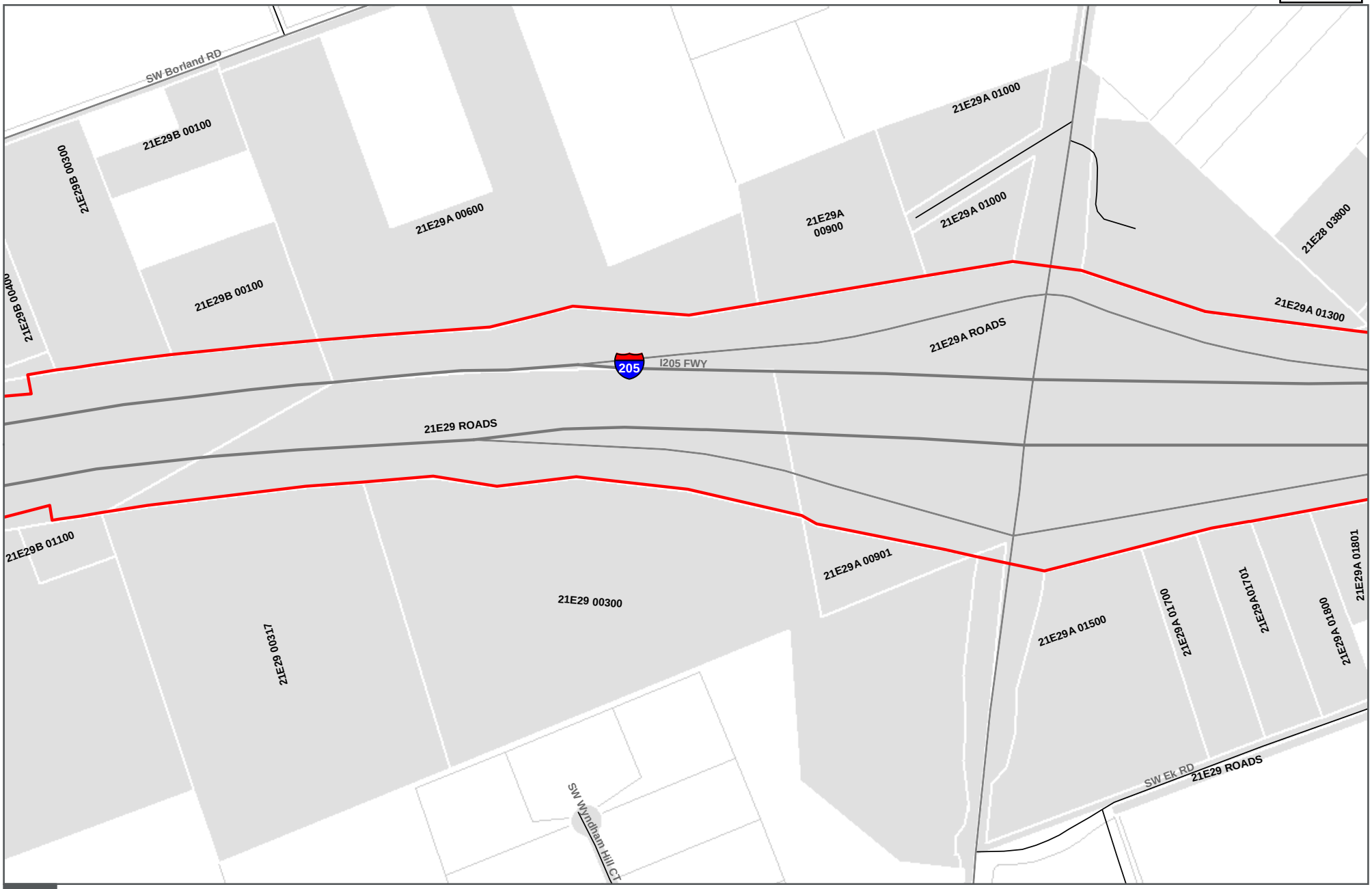
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

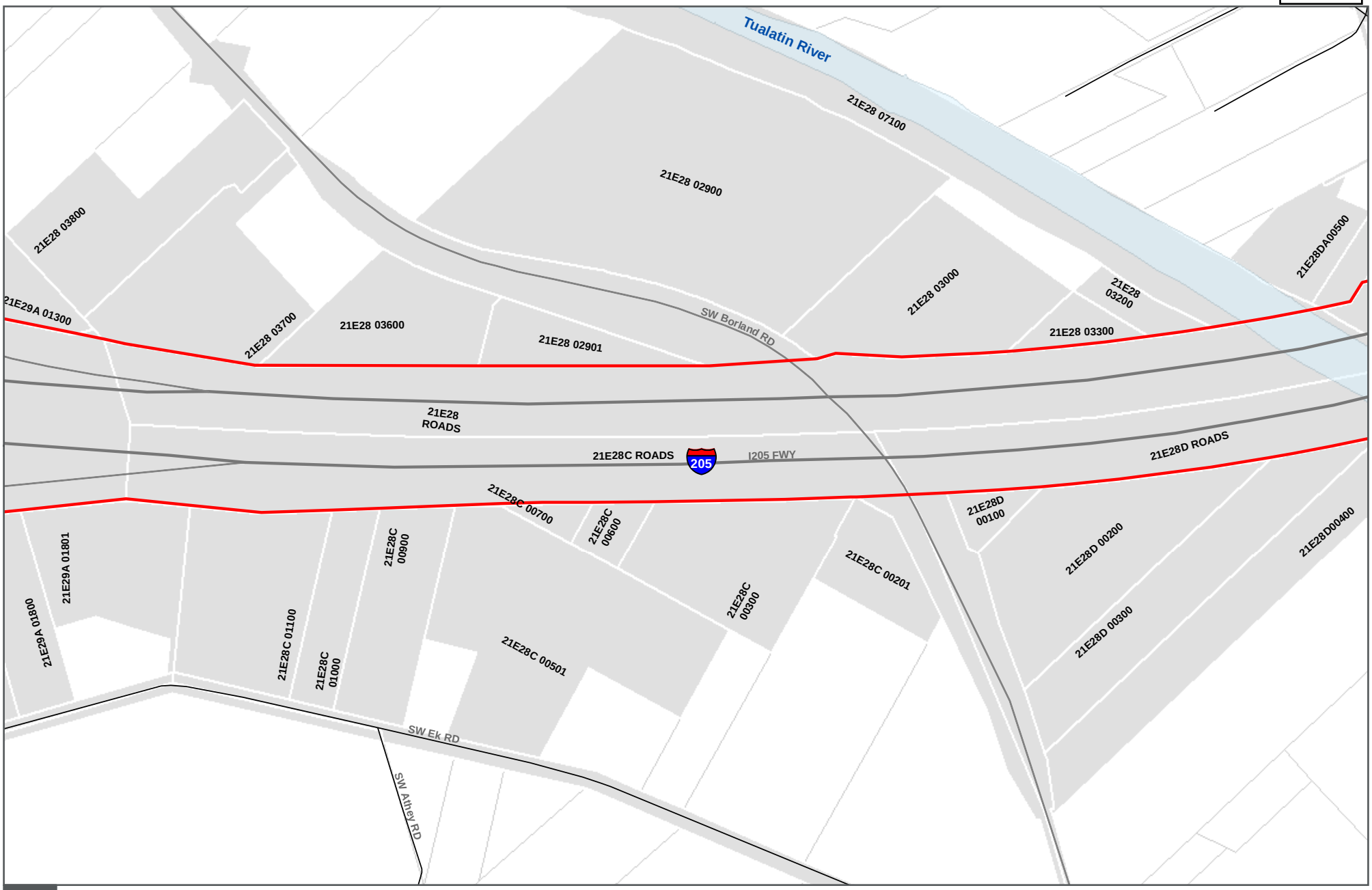
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

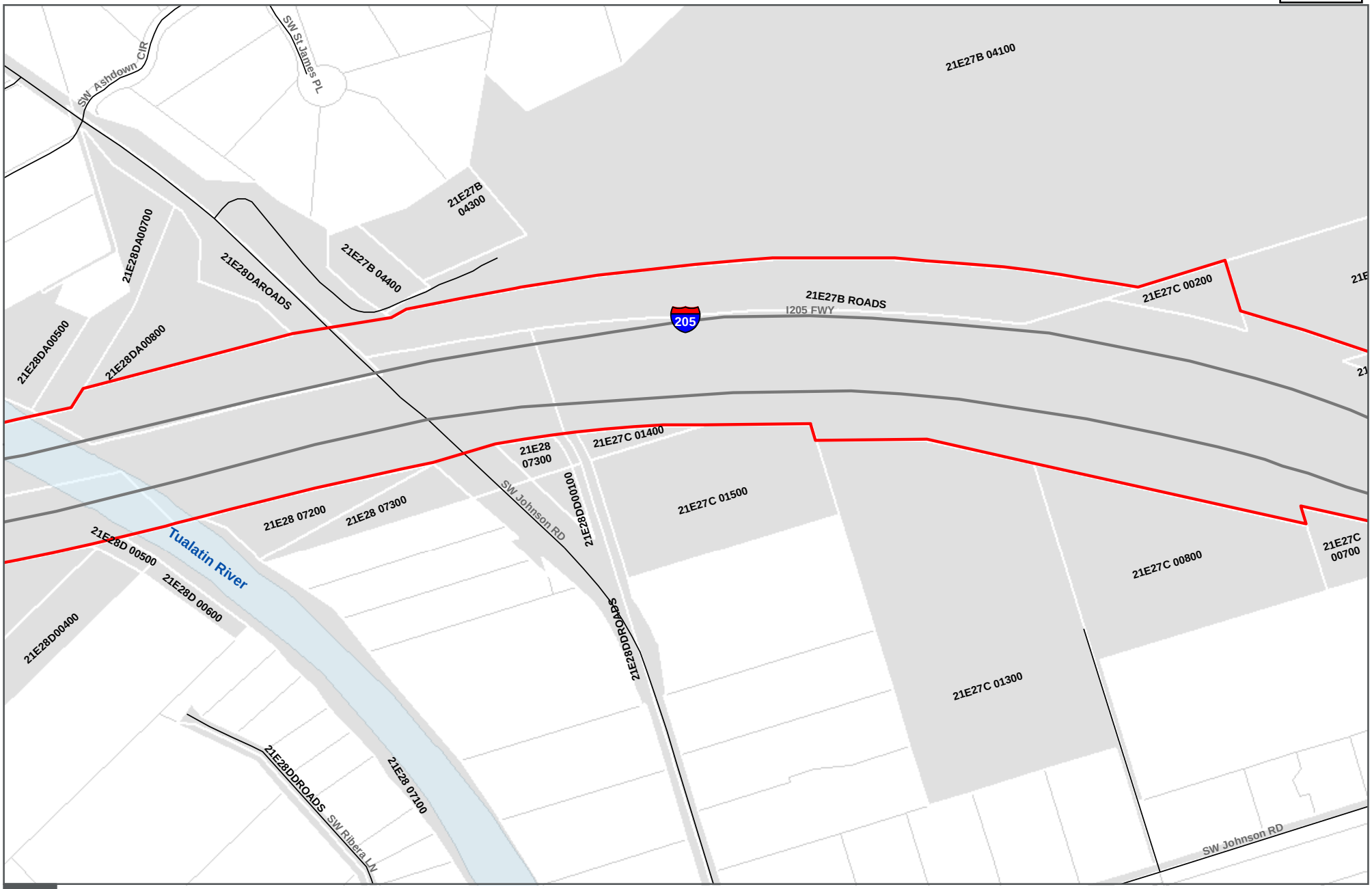
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

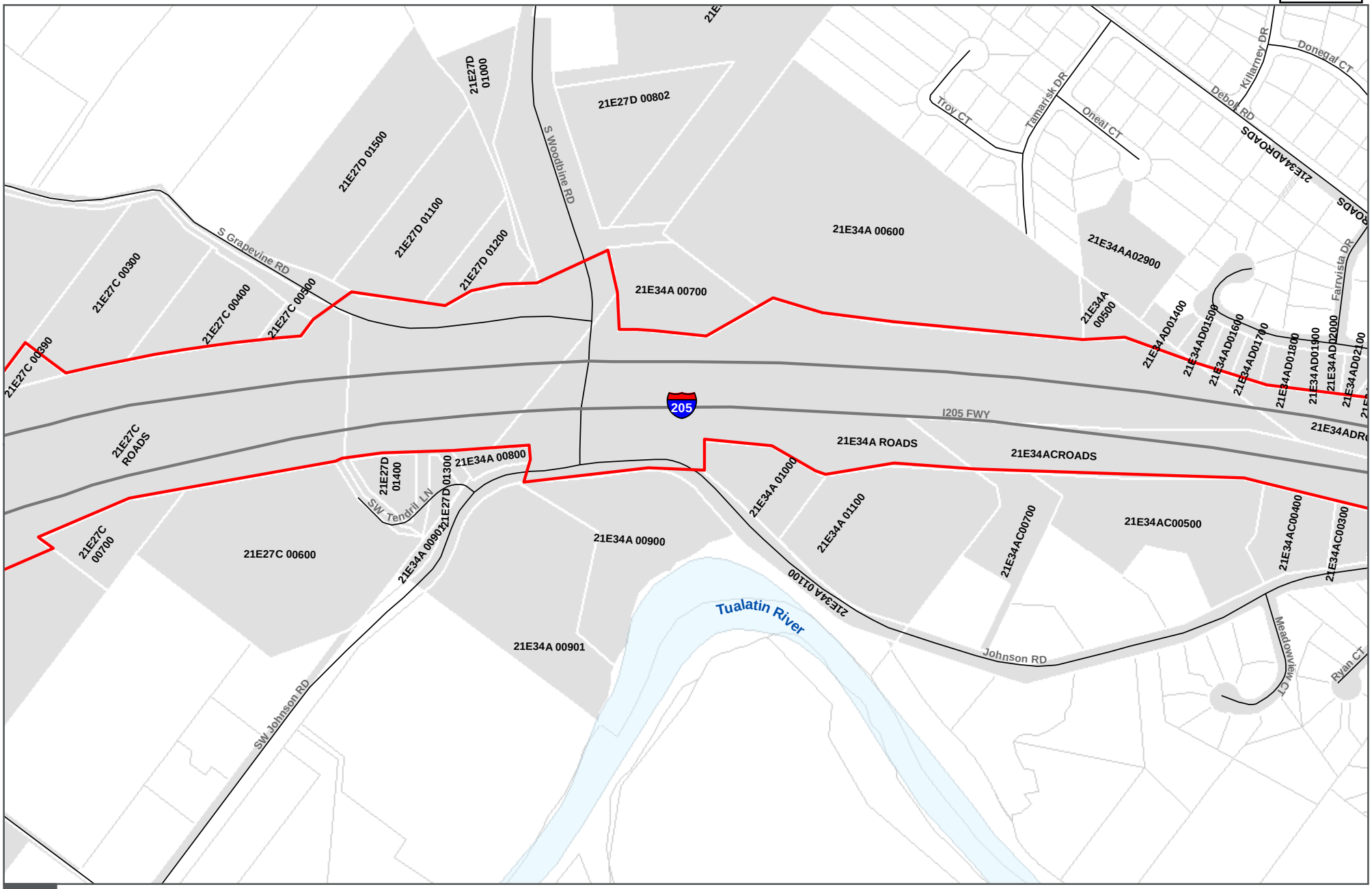
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

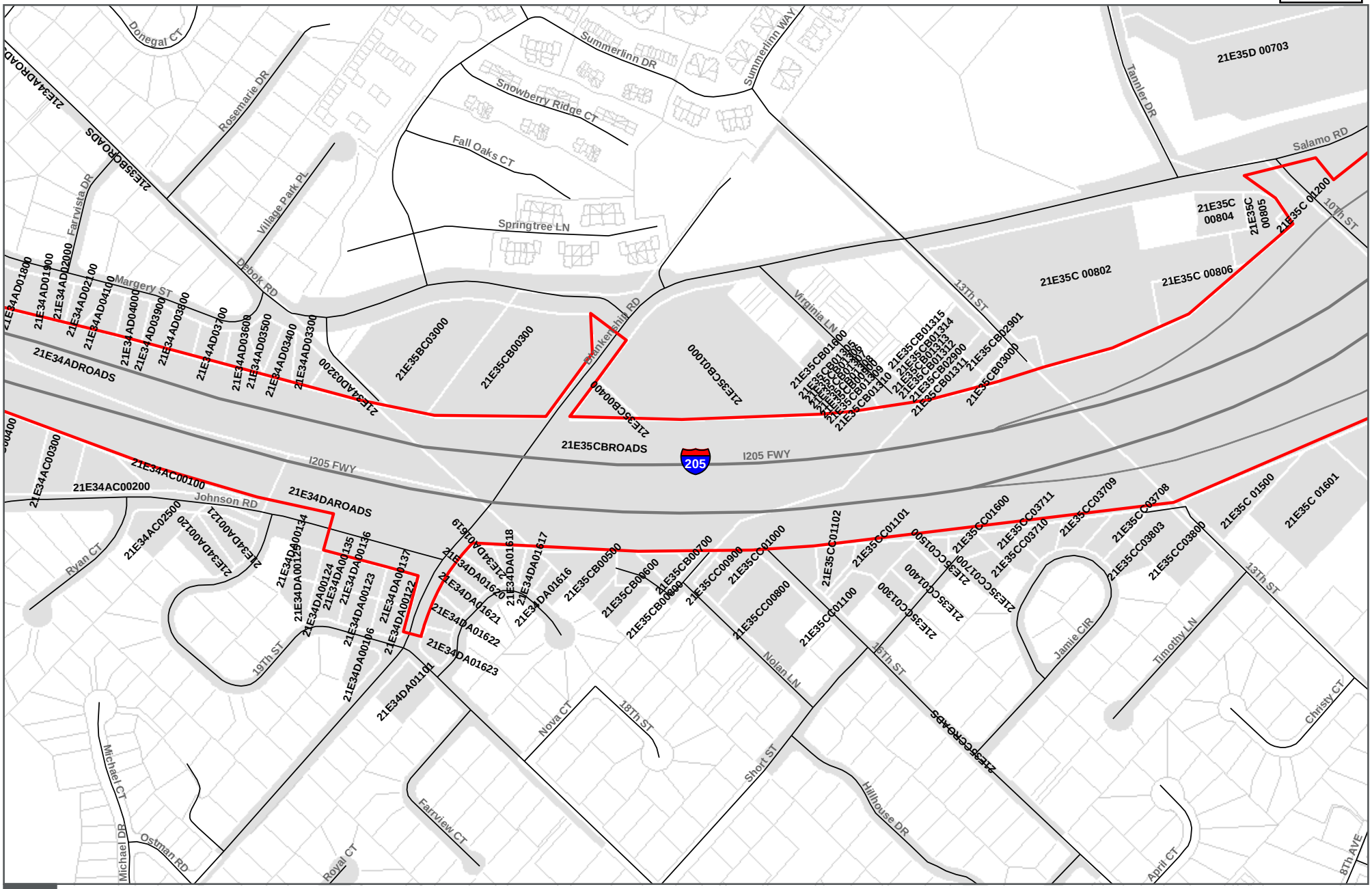
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

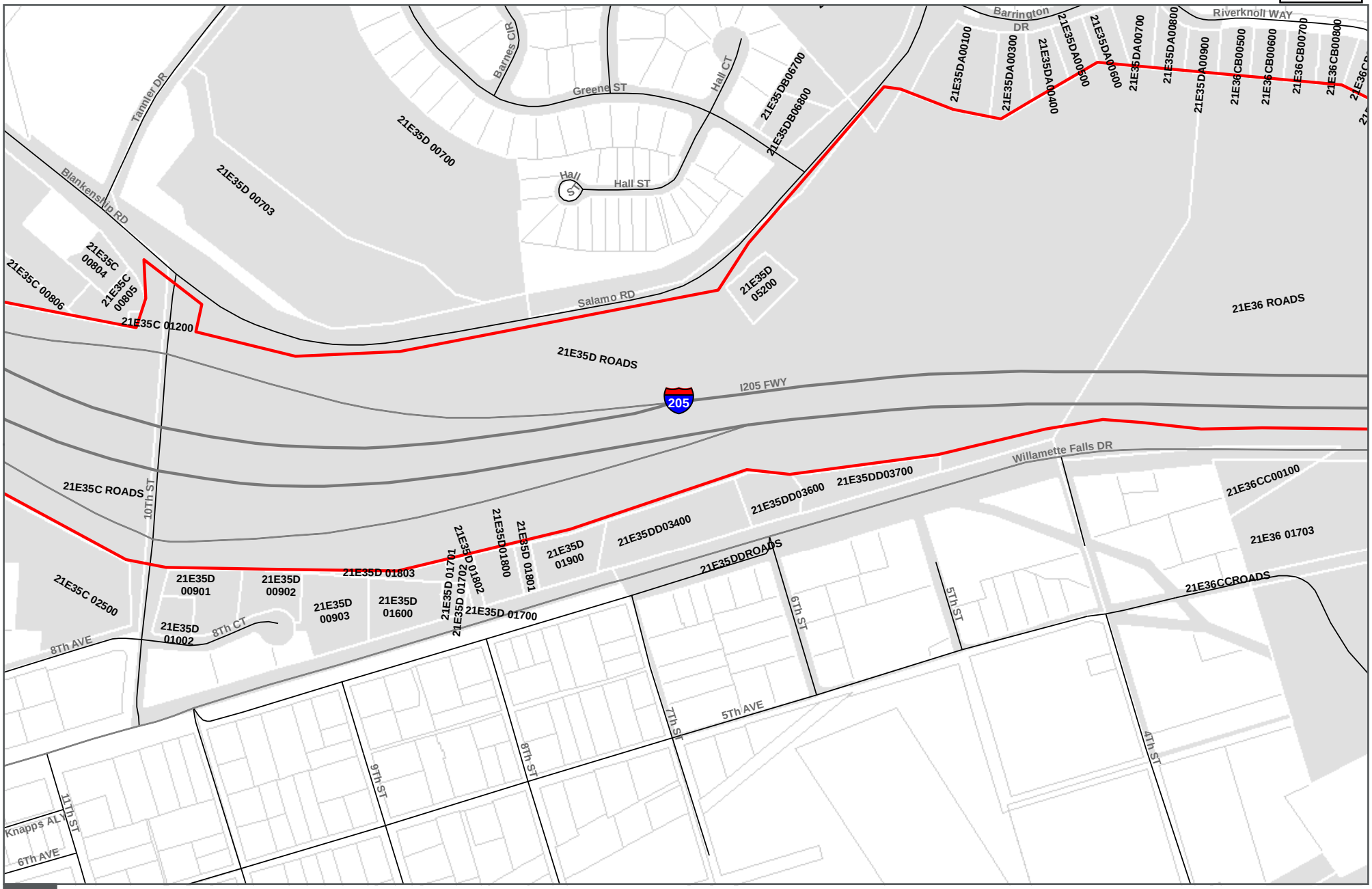
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

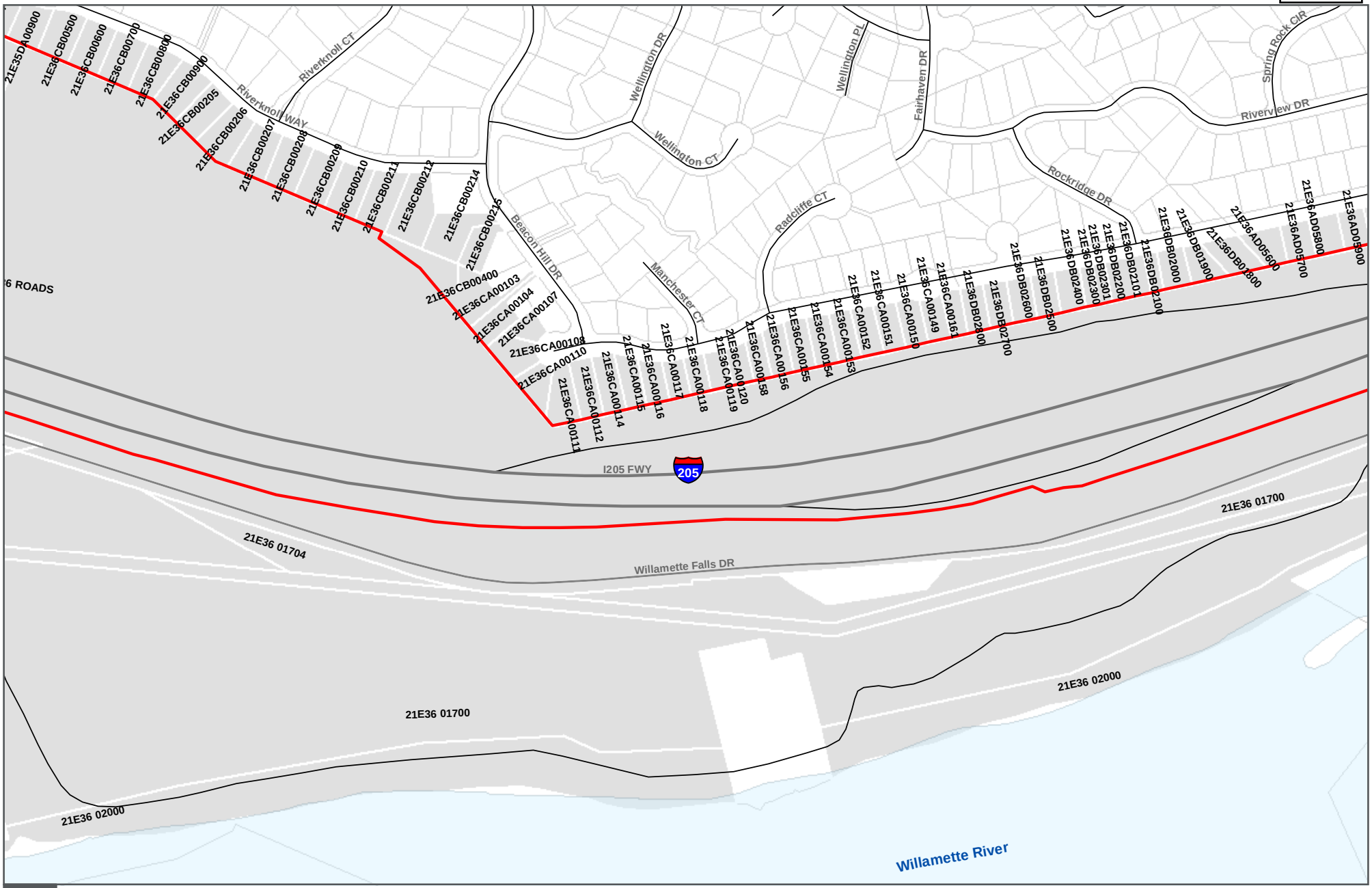
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

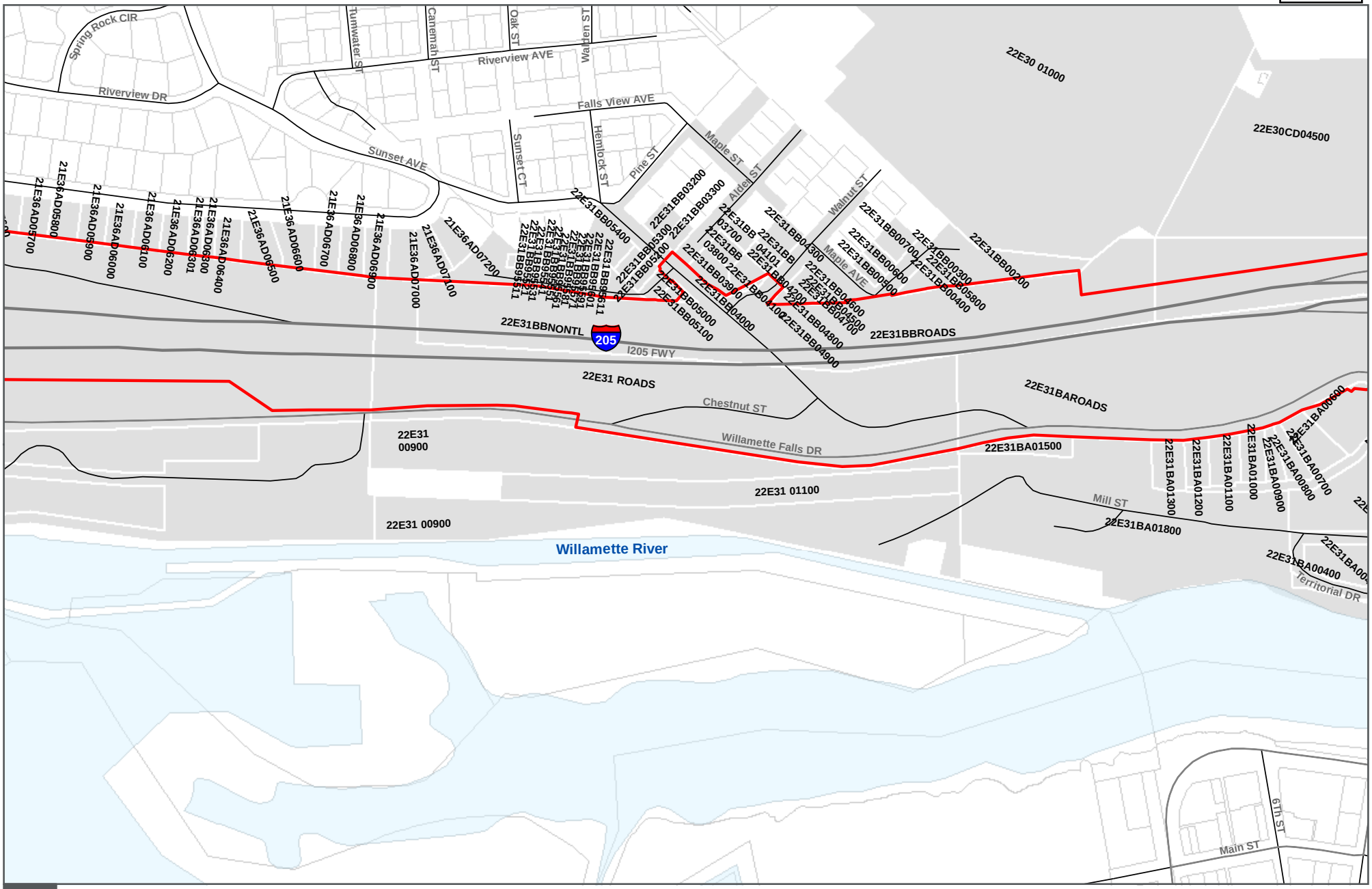
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

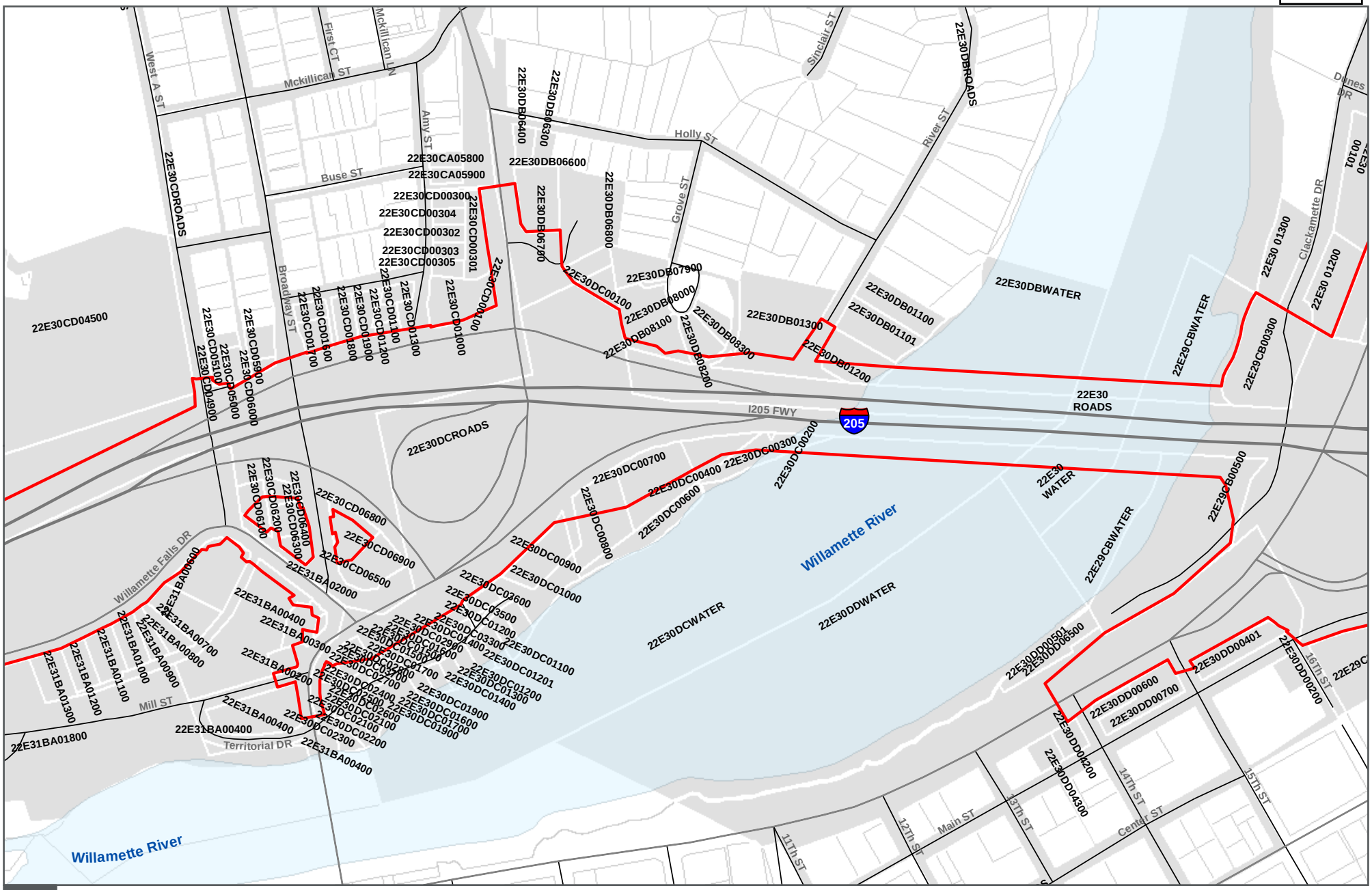
- Area of Potential Impact (API)
- Tax Lots with in 100 feet to API

DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY
TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

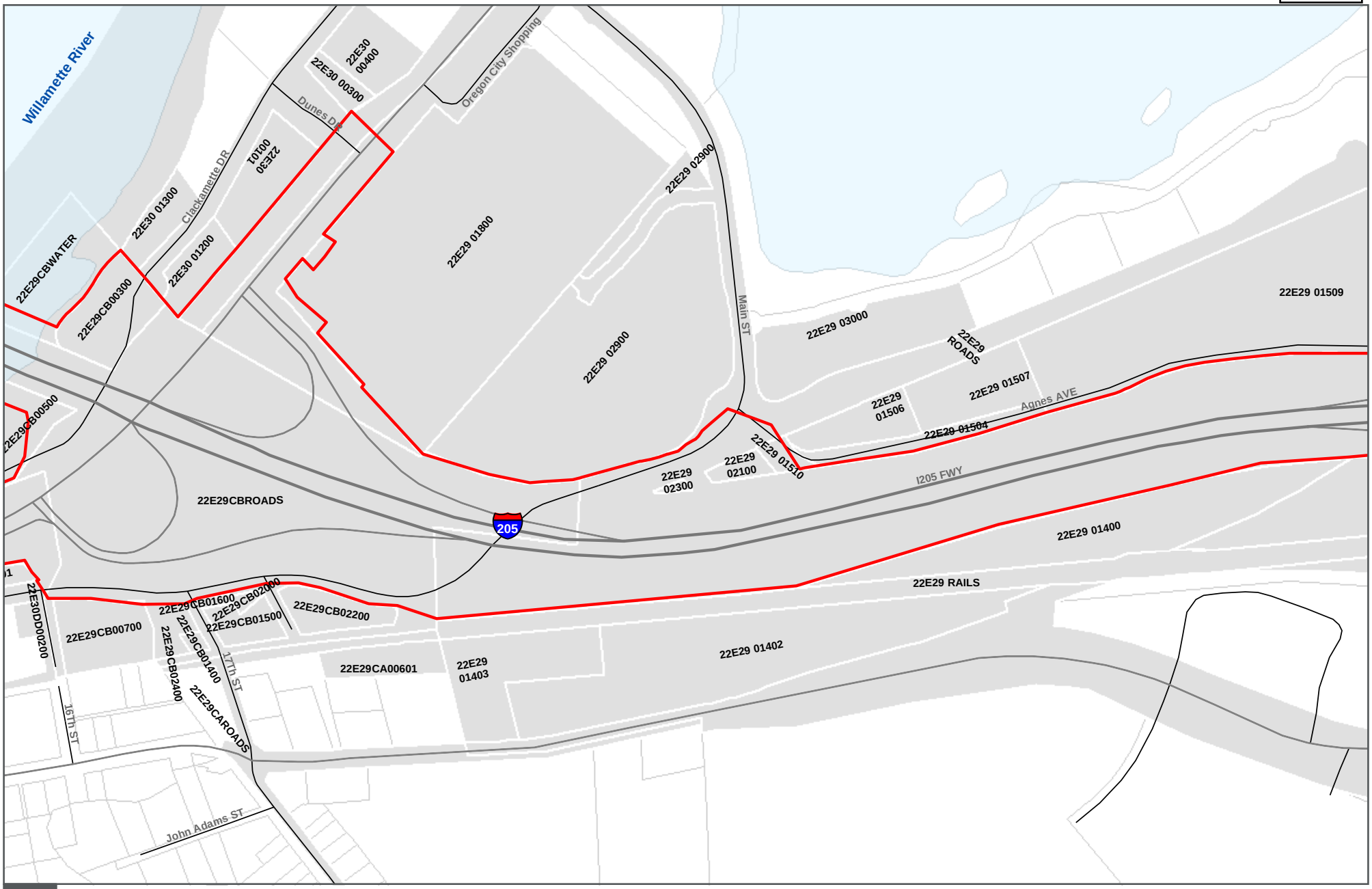
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

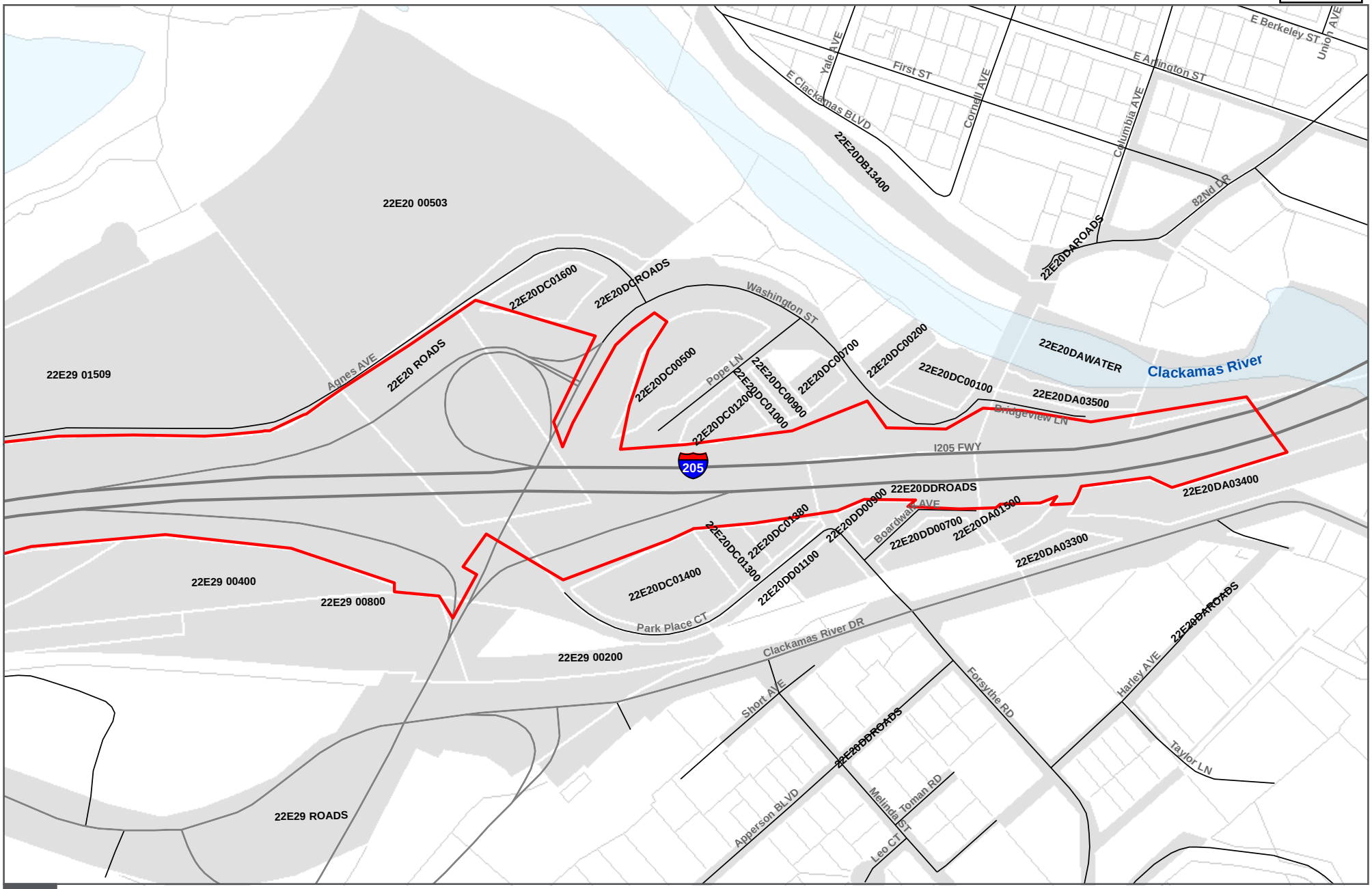
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

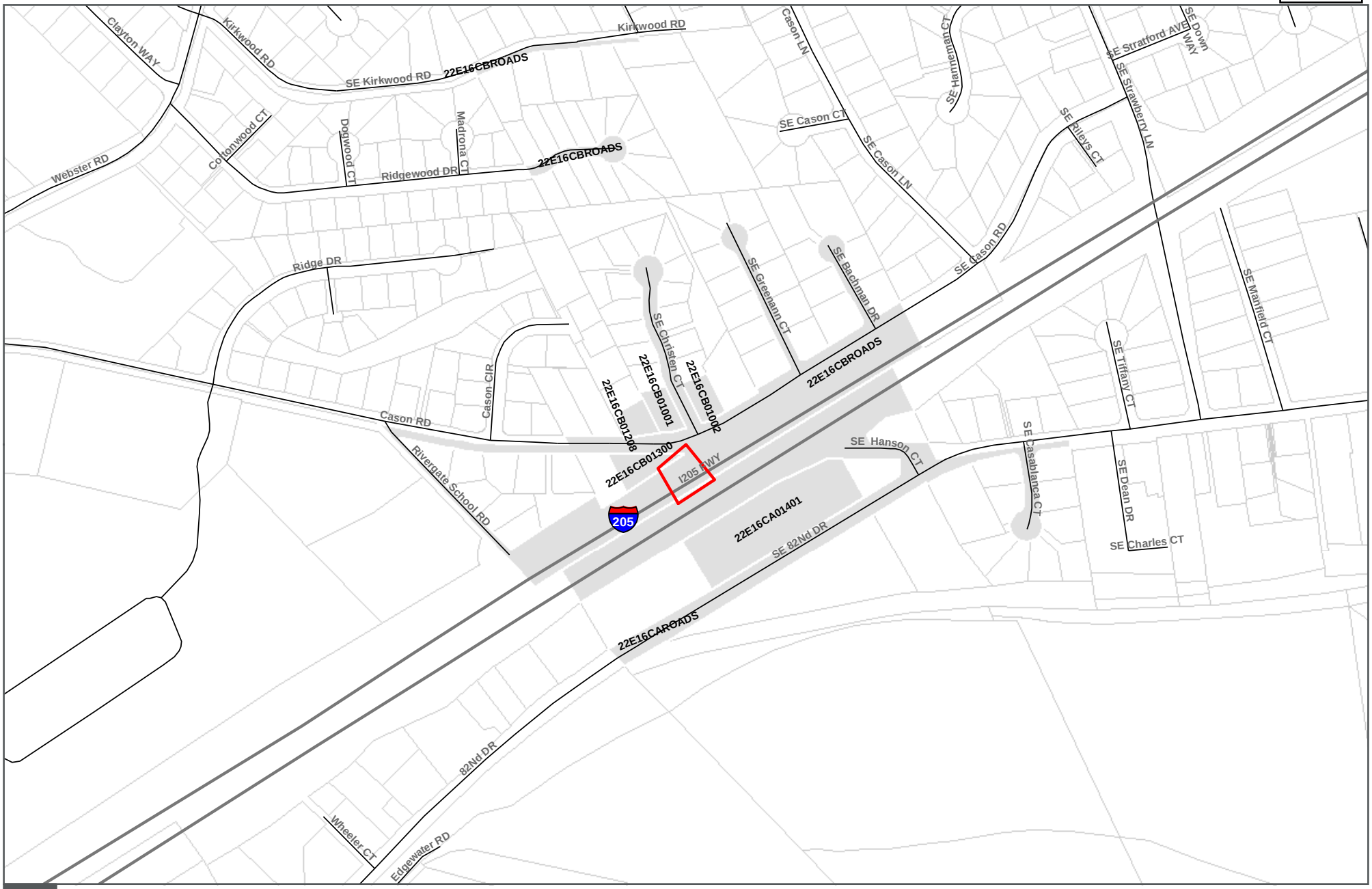
Tax Lots with in 100 feet to API

DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY
TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



Legend

Area of Potential Impact (API)

Tax Lots with in 100 feet to API

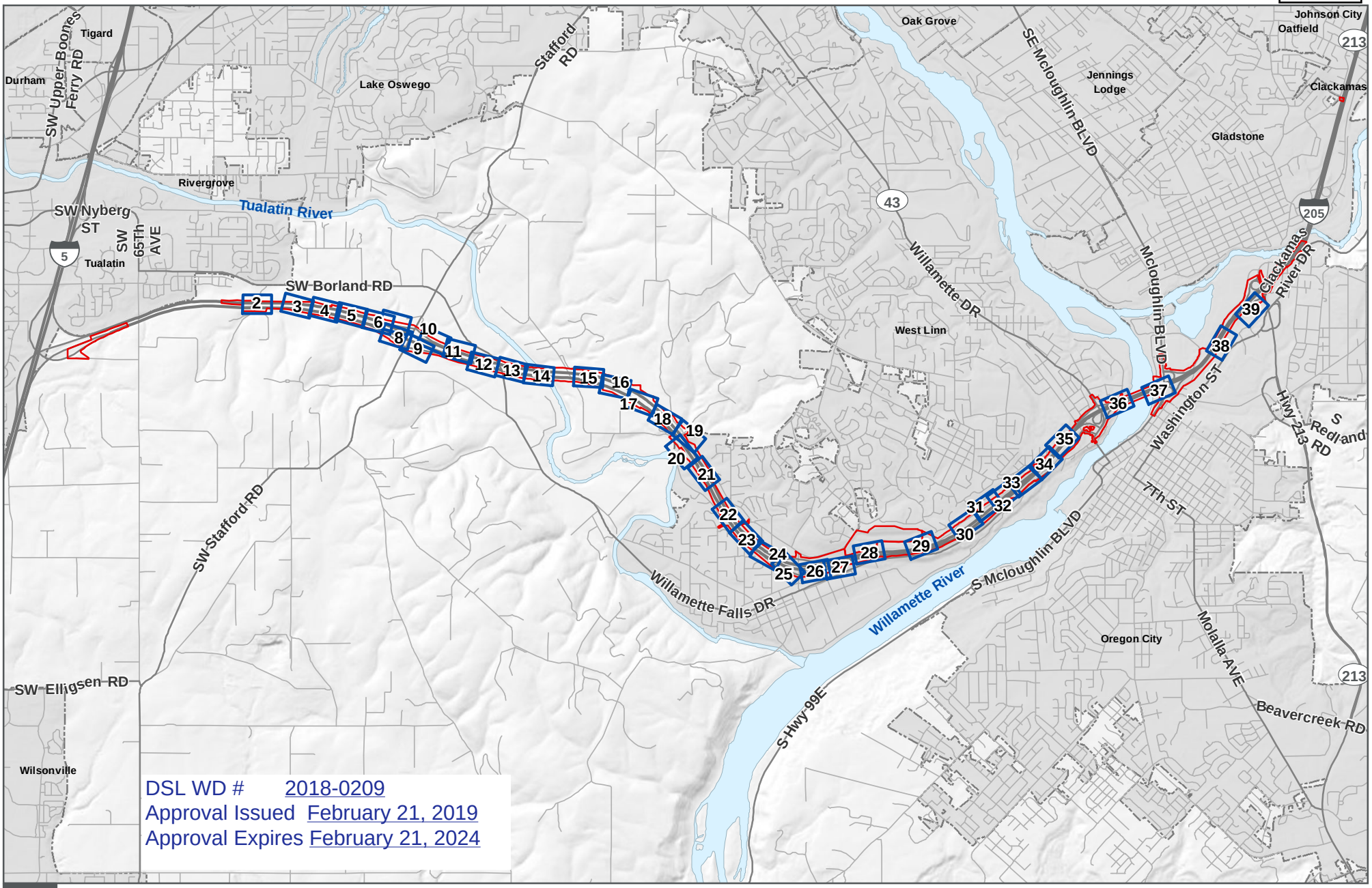
DATA SOURCE: METRO 2018, HDR 2018

0 250 500 Feet

I-205 ABERNETHY

TAX LOTS

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\F2 TAXLOTS.MXD - USER: LLSMITH - DATE: 1/9/2019



DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024

Area of Potential Impact (API)
Sheet Location

0 0.5 1 Miles

DATA SOURCE: METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES INDEX

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_EXTENT_SHEET.MXD - USER: LLSMITH - DATE: 12/3/2018

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024

Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

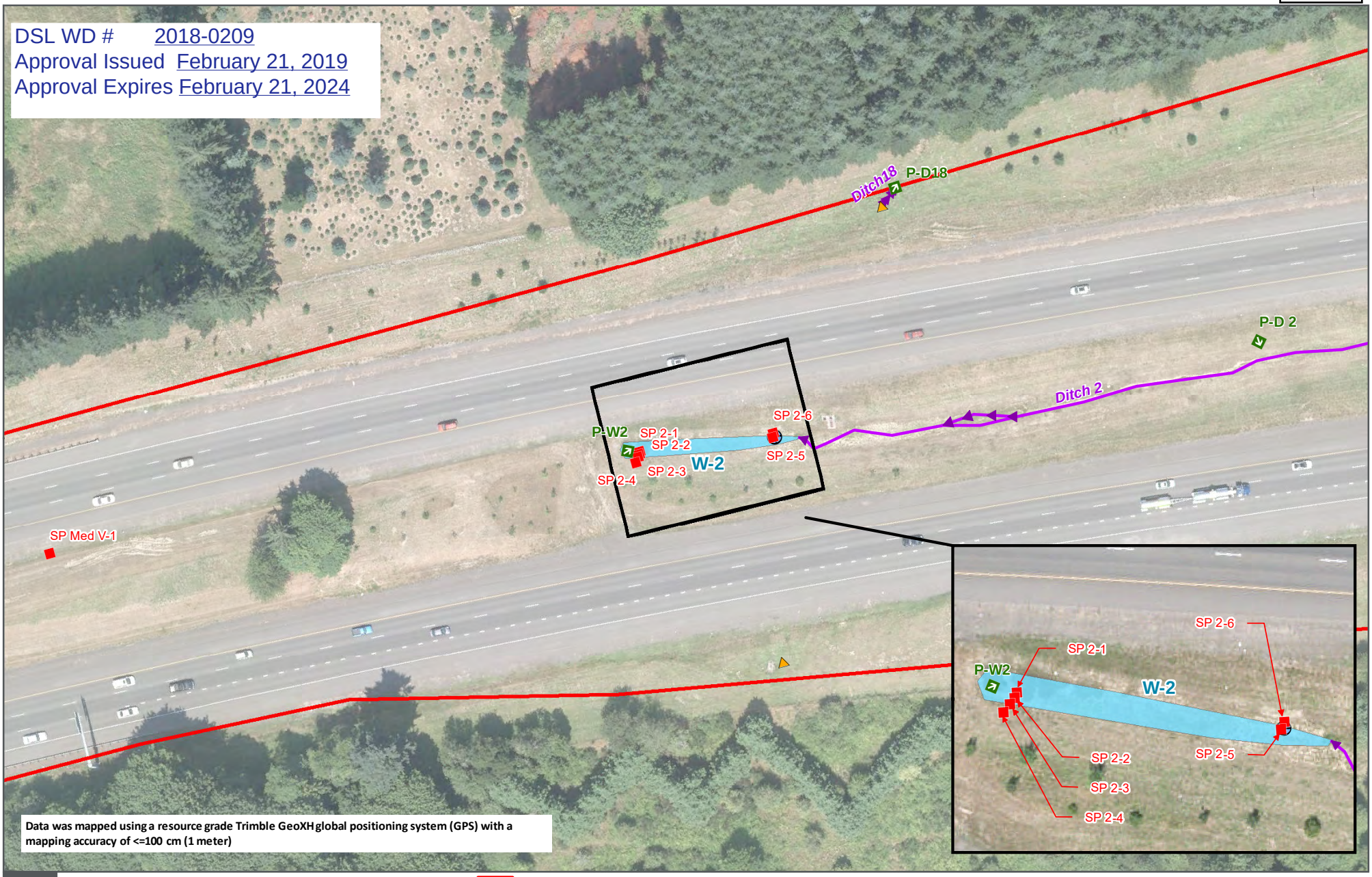
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

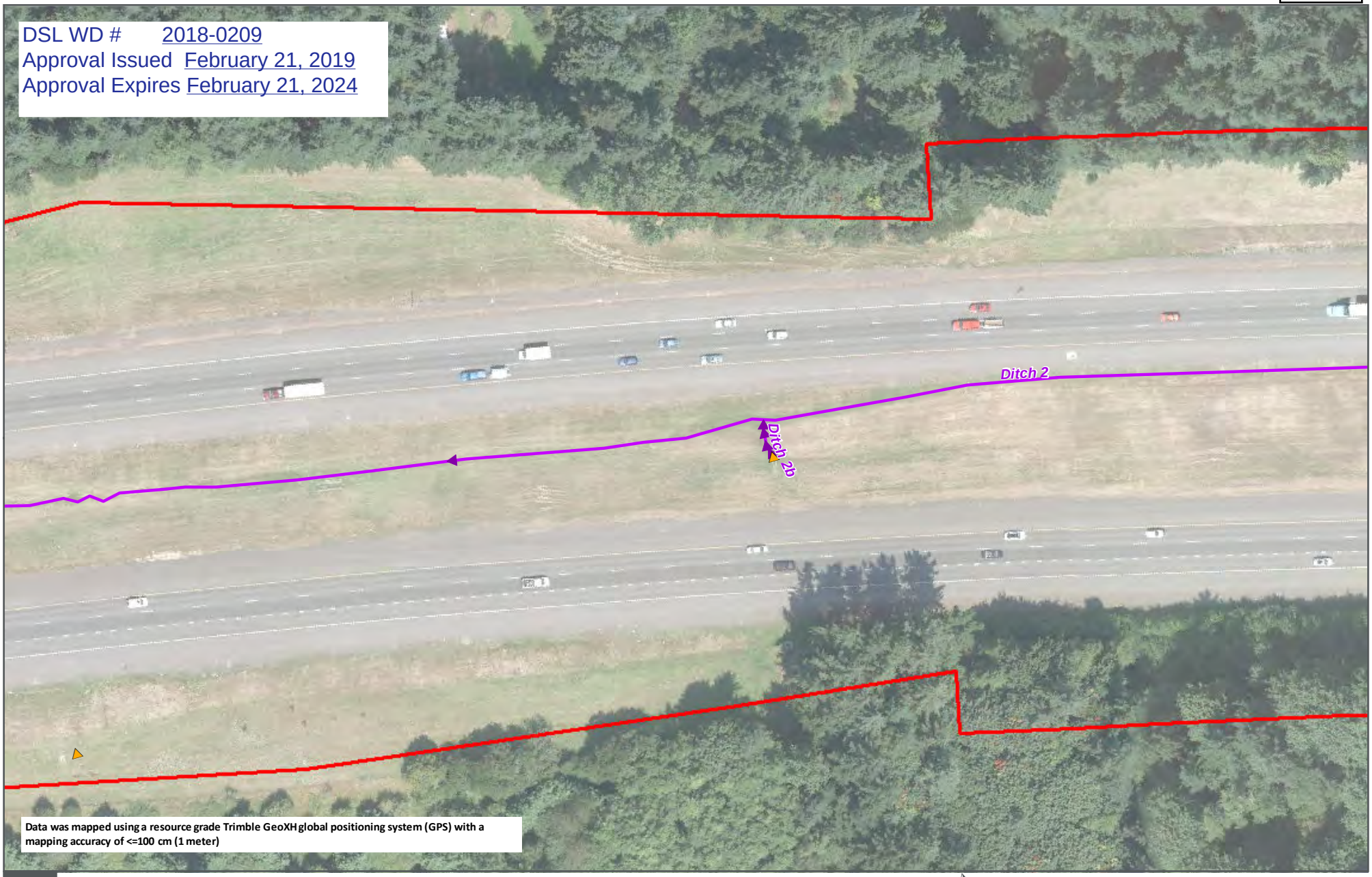
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE03.MXD - USER: LLSMITH - DATE: 12/4/2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

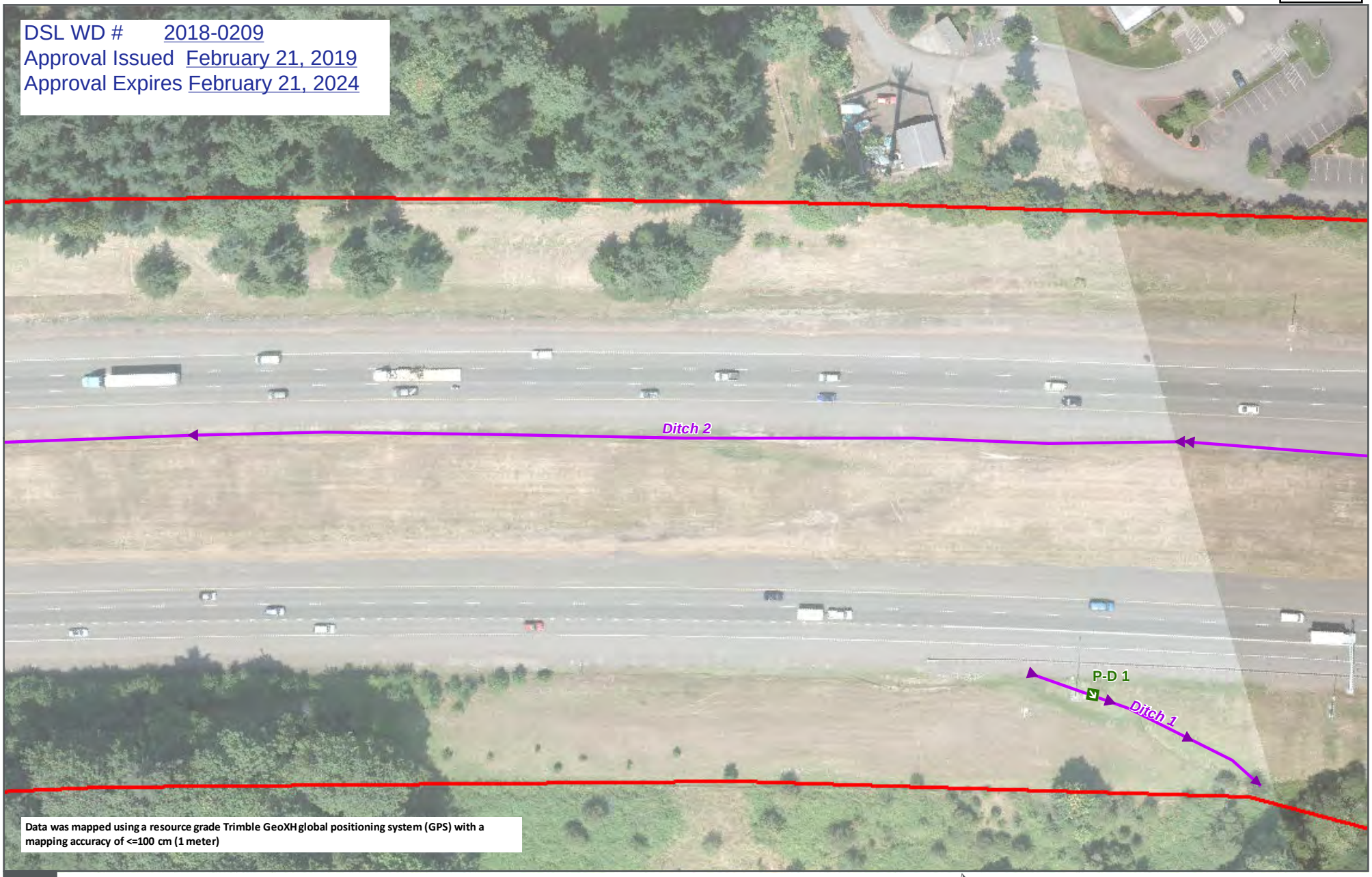
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024

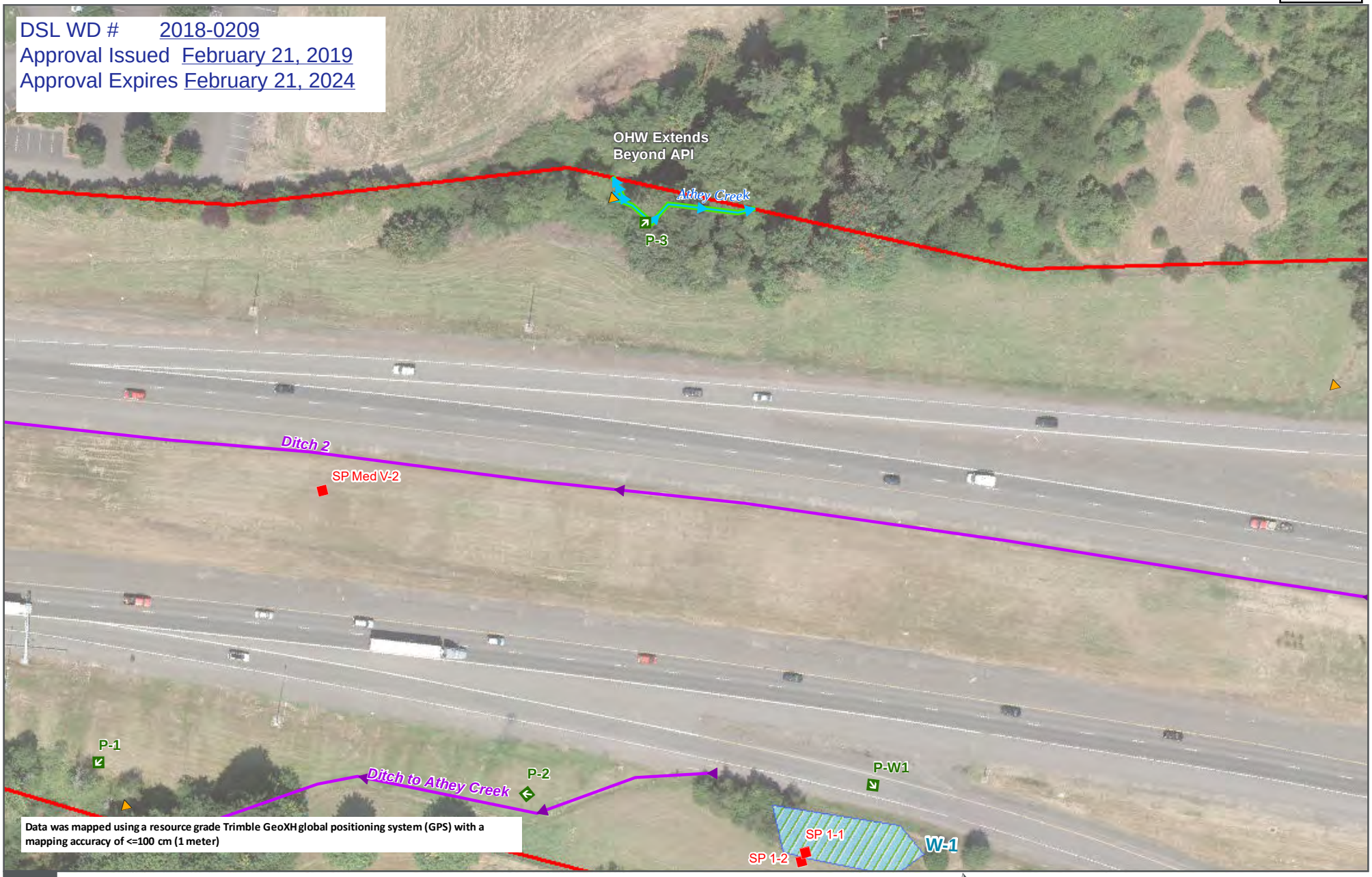


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

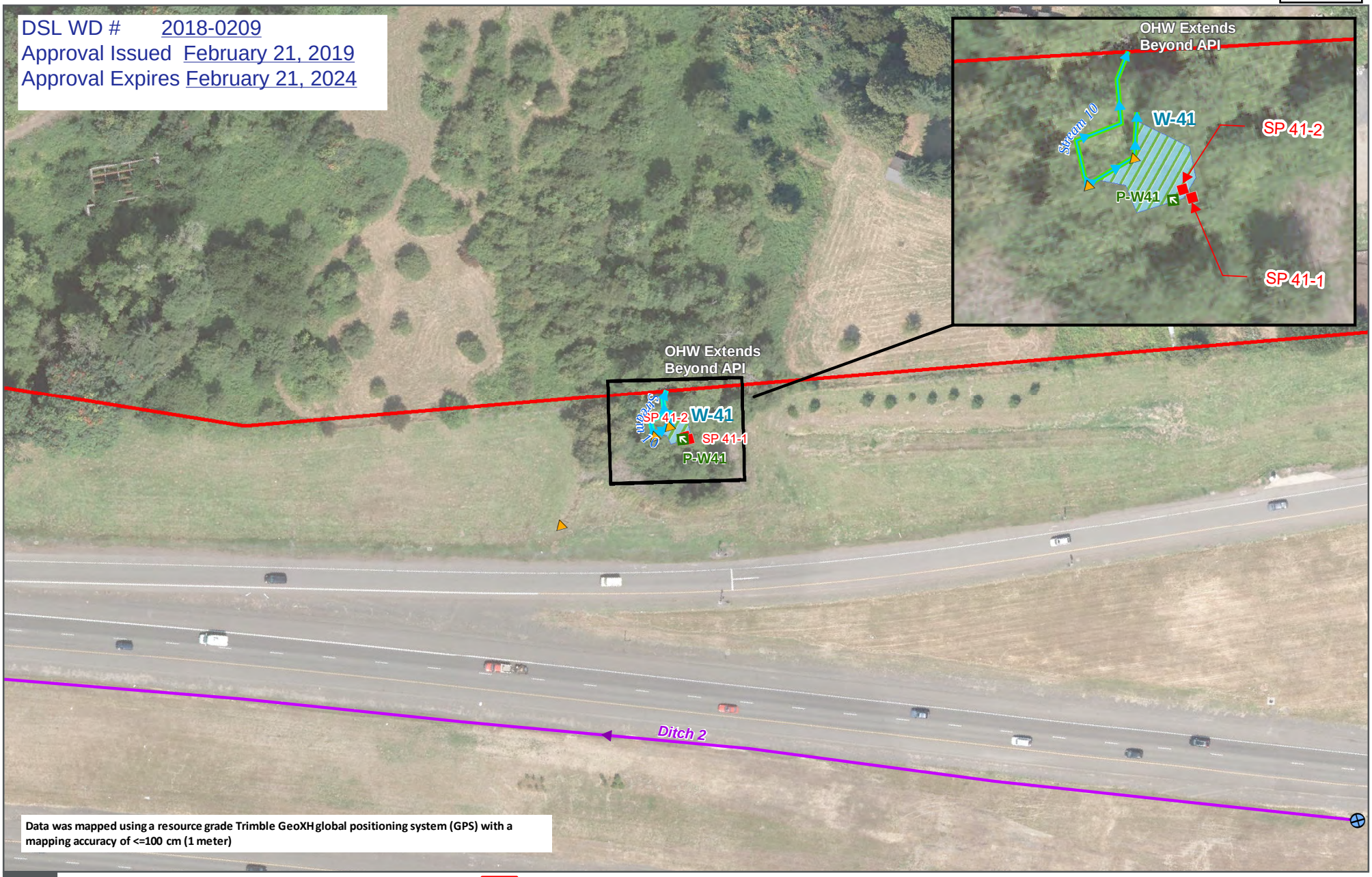
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

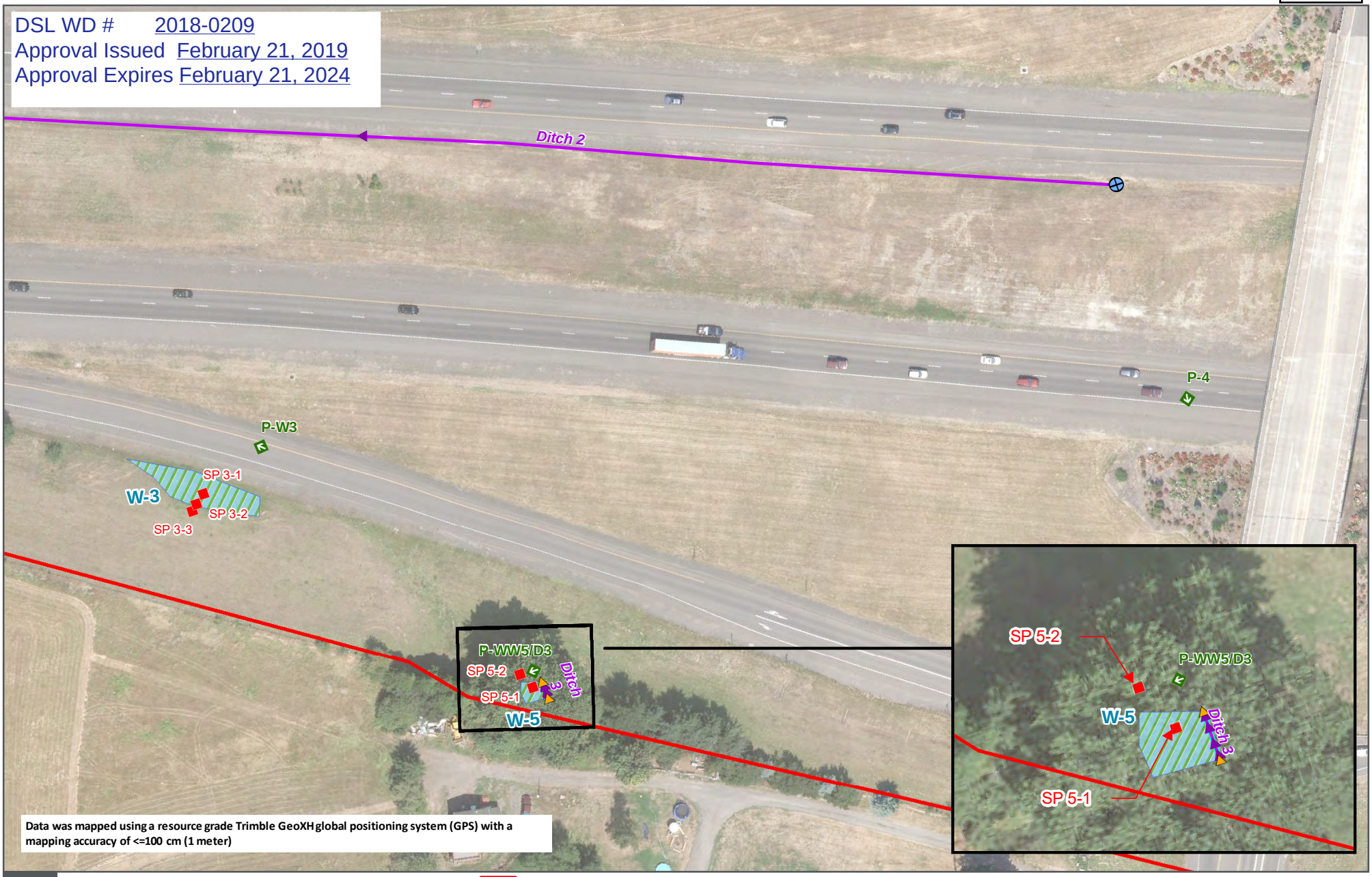
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE07.MXD - USER: LLSMITH - DATE: 12/4/2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE08.MXD - USER: LLSMITH - DATE: 12/4/2018

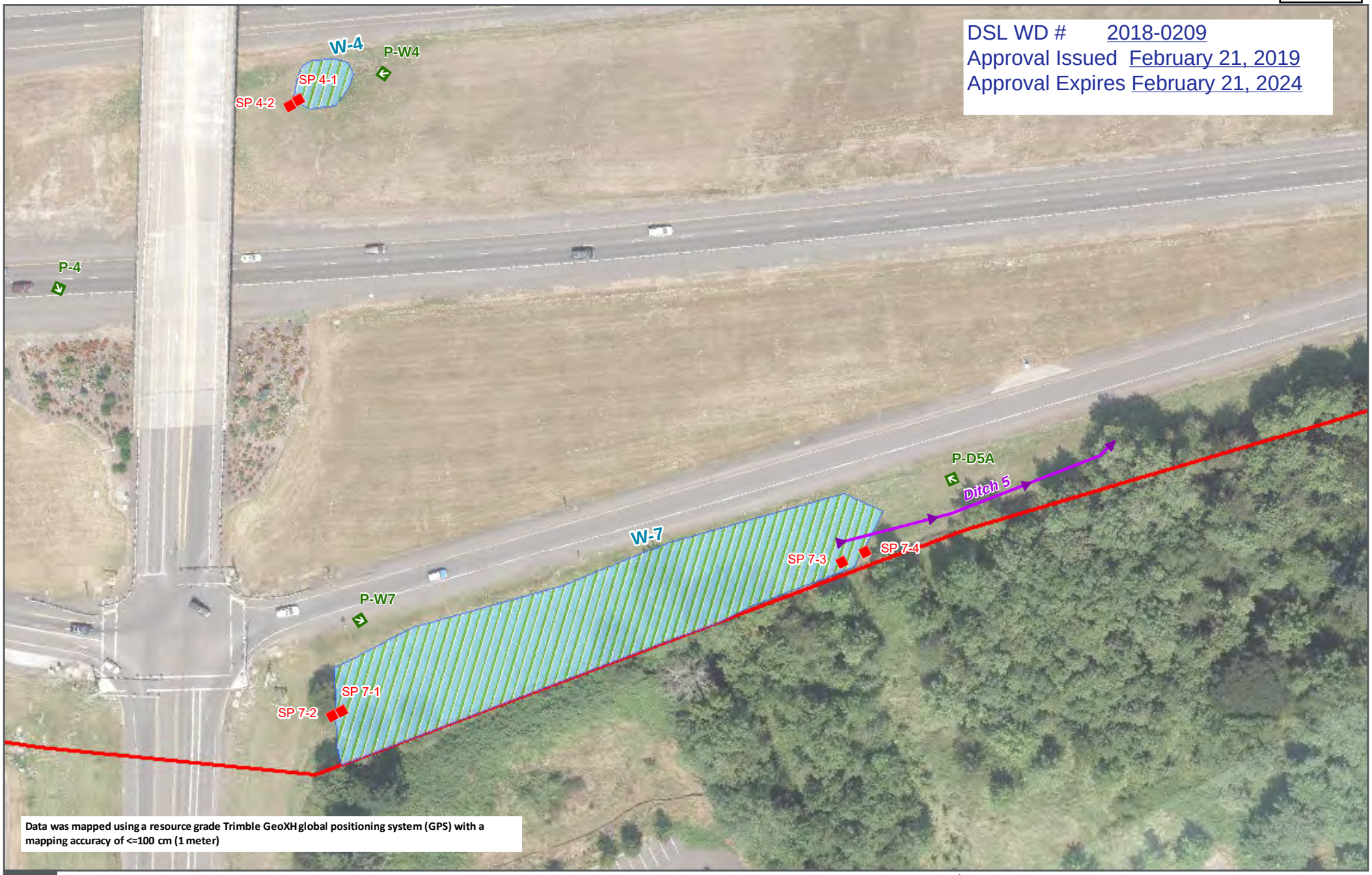


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

DATA SOURCE: USFWS, METRO 2018, HDR 2018

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024

Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

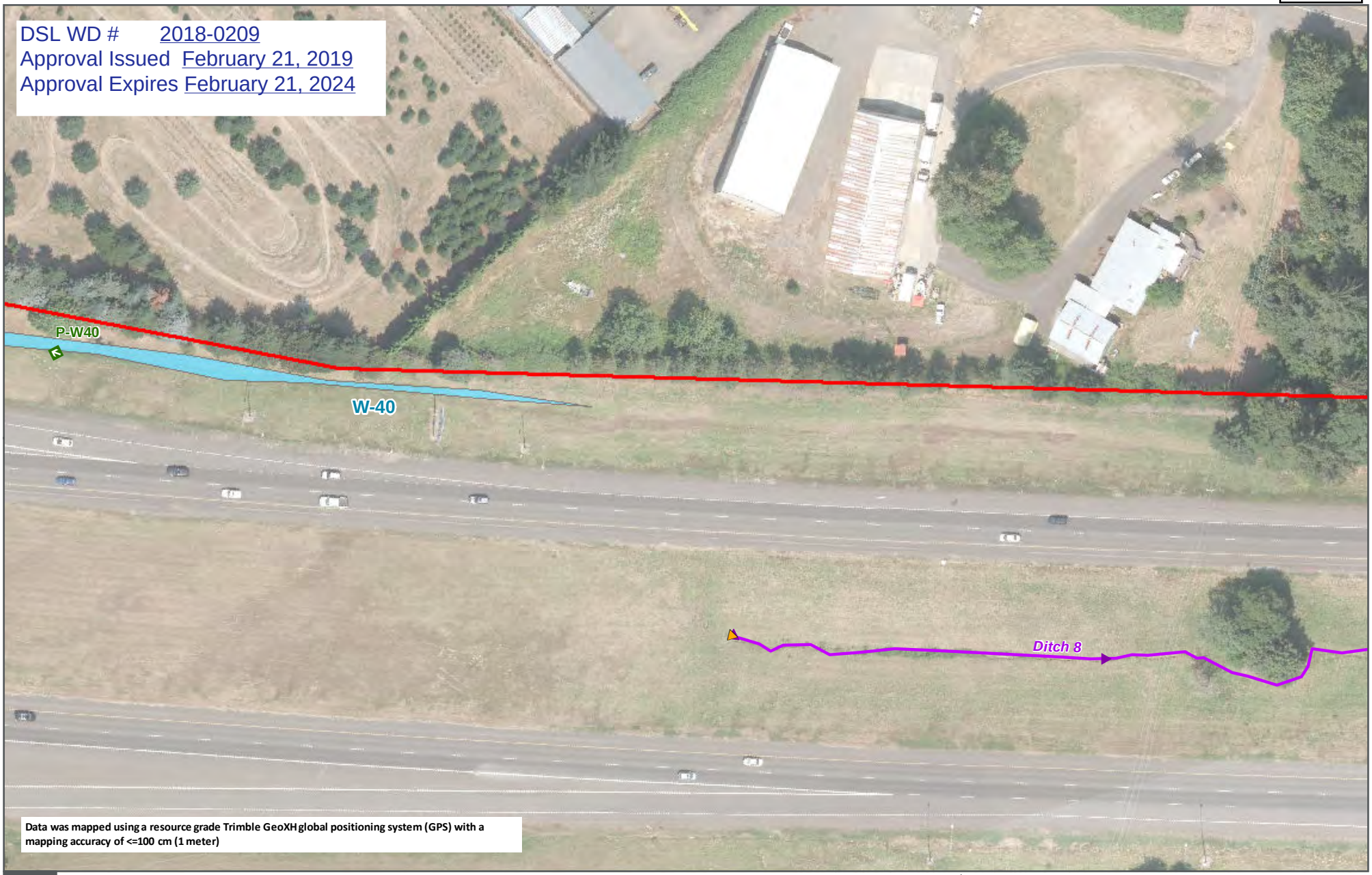
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

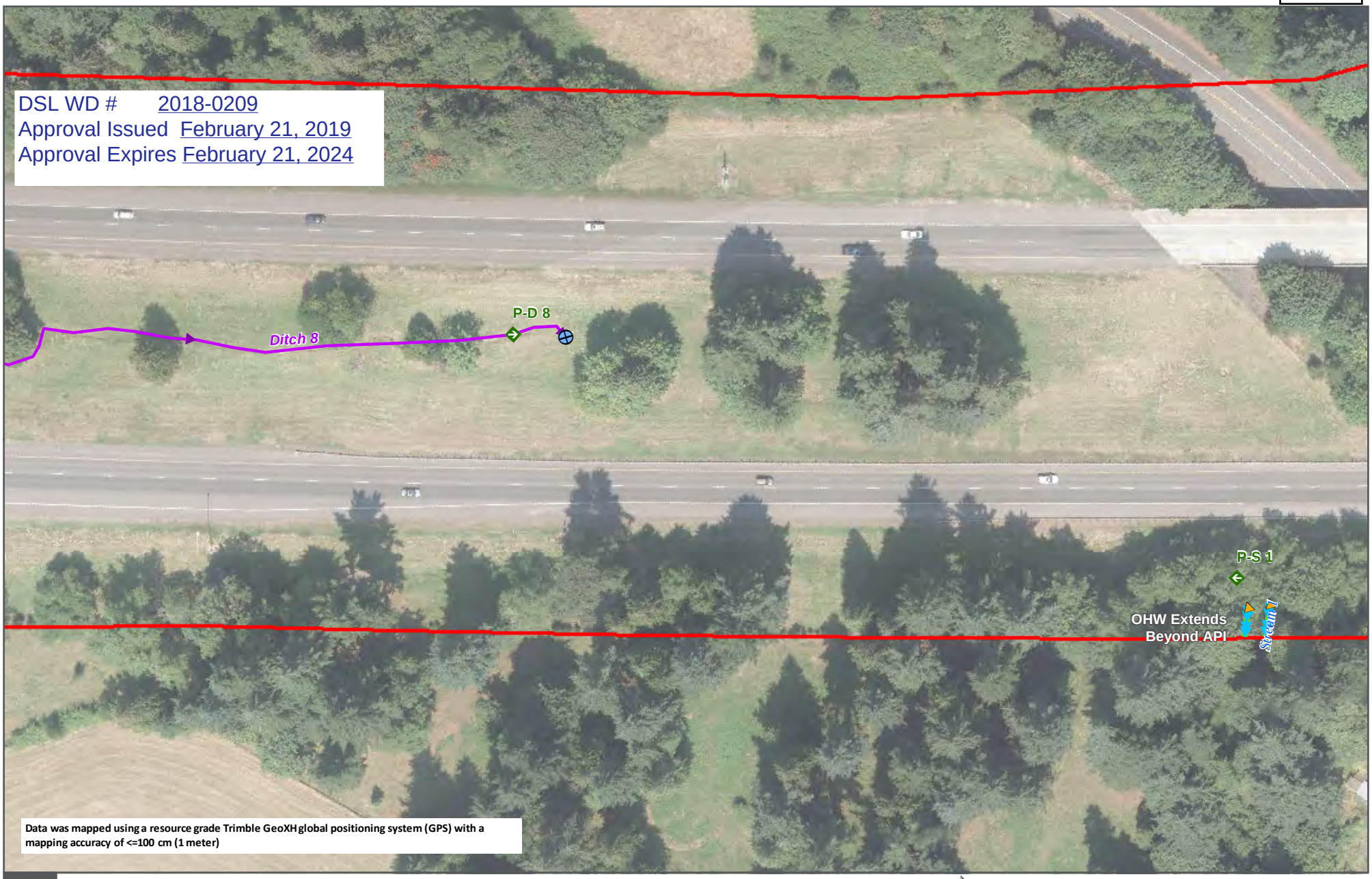


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

I-205 ABERNETHY
WETLANDS AND WATERBODIES

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Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

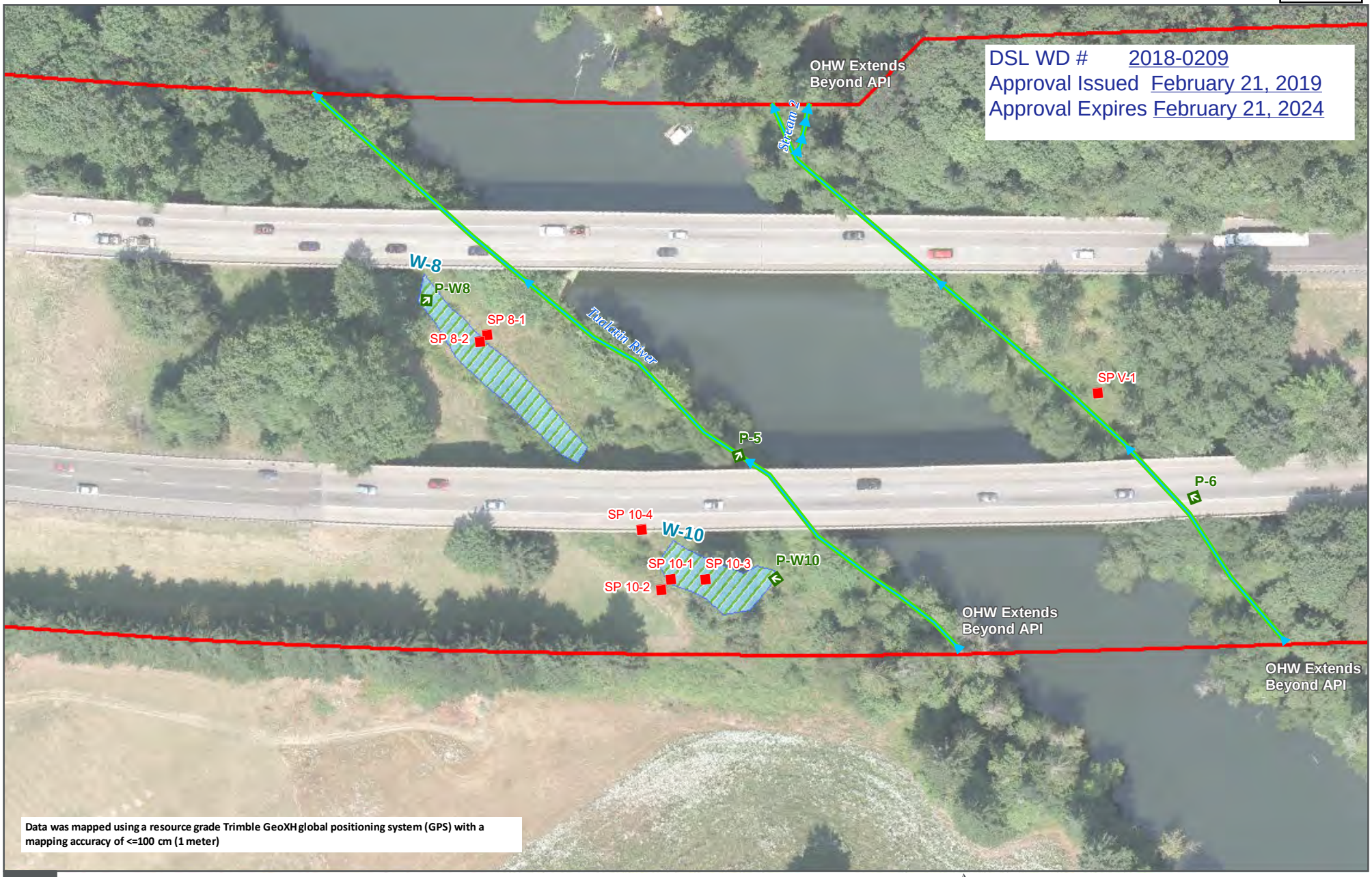

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

I-205 ABERNETHY
WETLANDS AND WATERBODIES

DSL WD # 2018-0209
Approval Issued February 21, 2019
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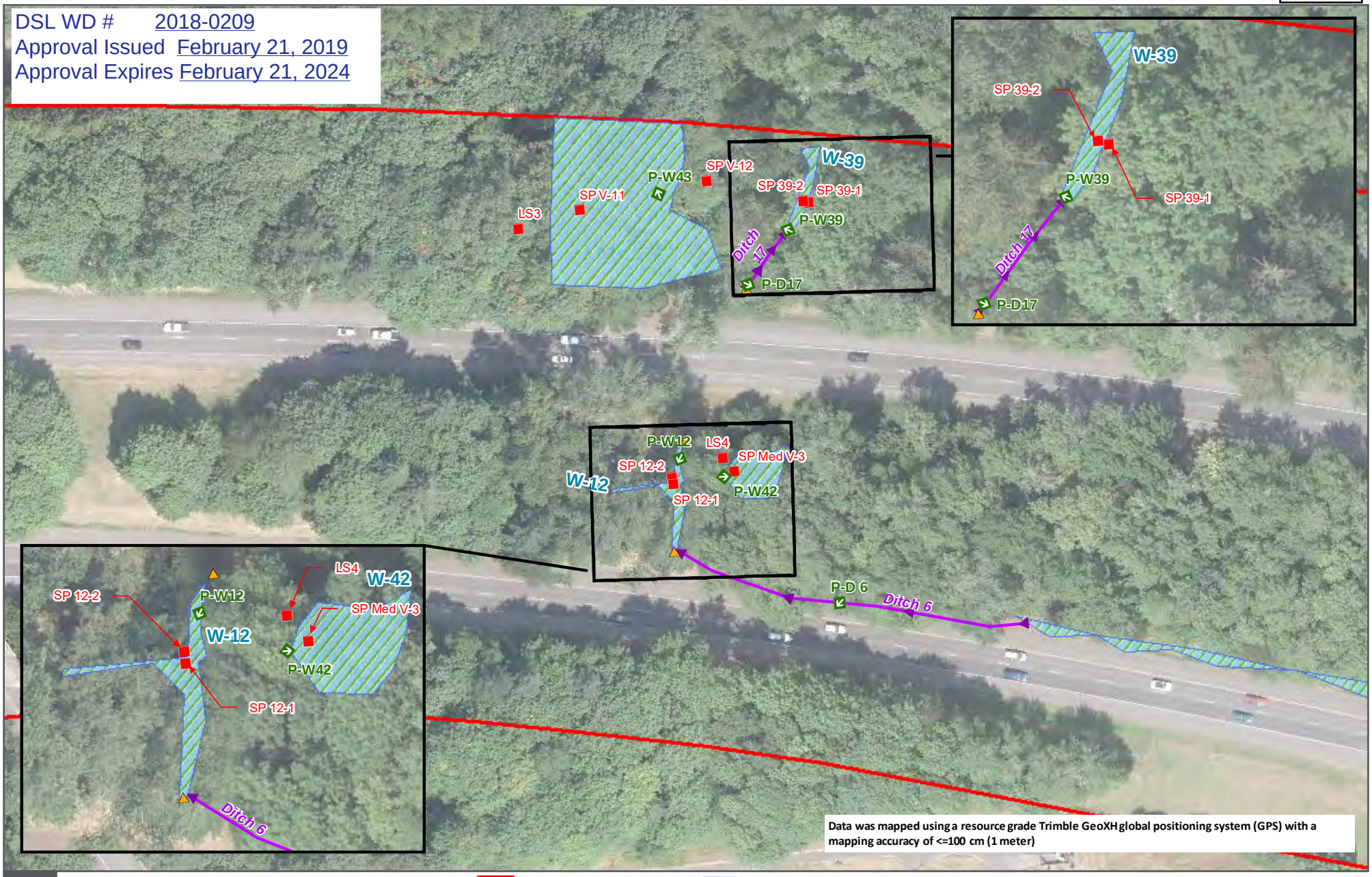

Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland - Regulated*
Wetland, Not Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE15.MXD - USER: LLSMITH - DATE: 1/8/2019

I-205 ABERNETHY
WETLANDS AND WATERBODIES

DSL WD # 2018-0209
Approval Issued February 21, 2019
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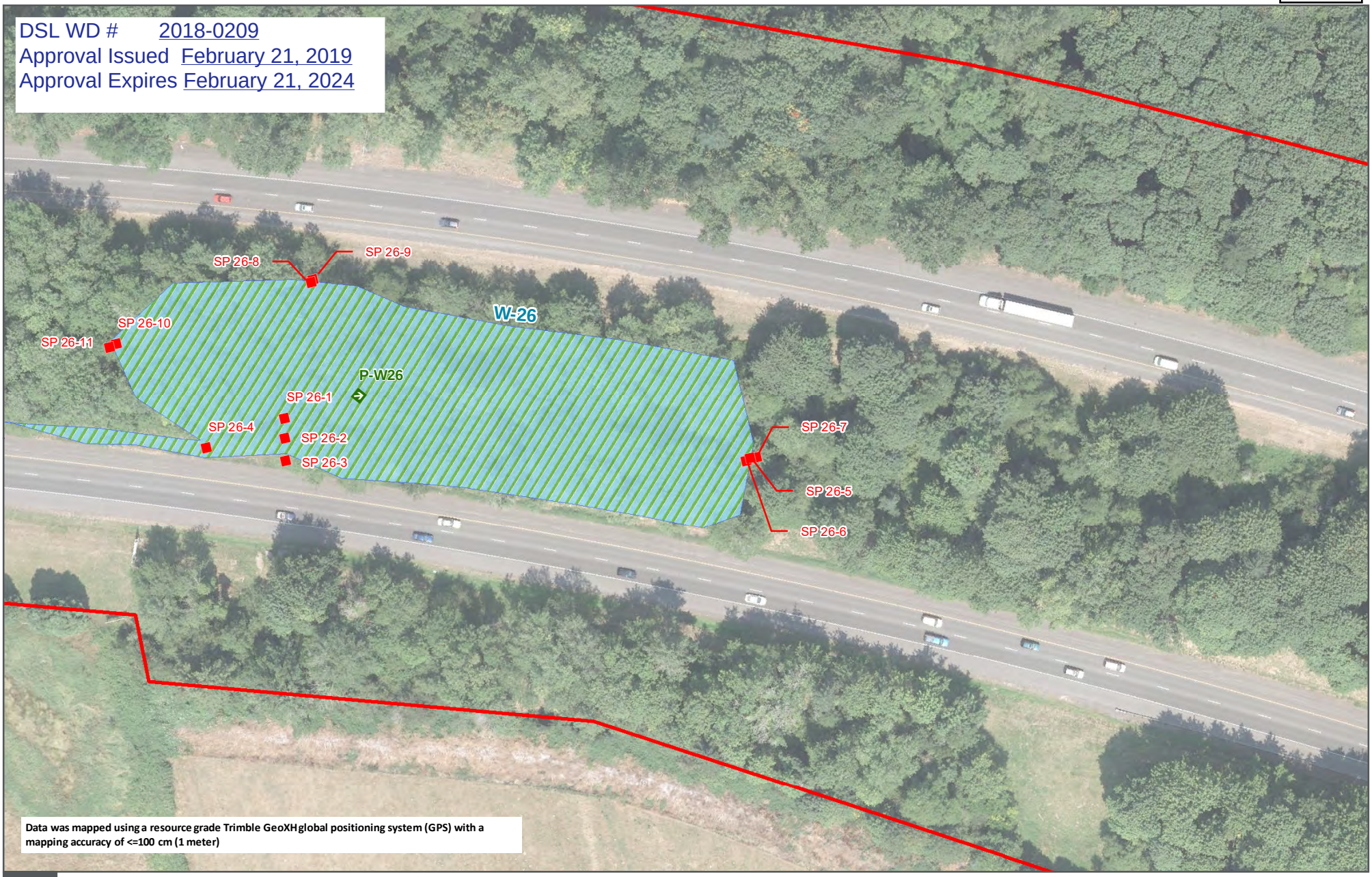


Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
<all other values>
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

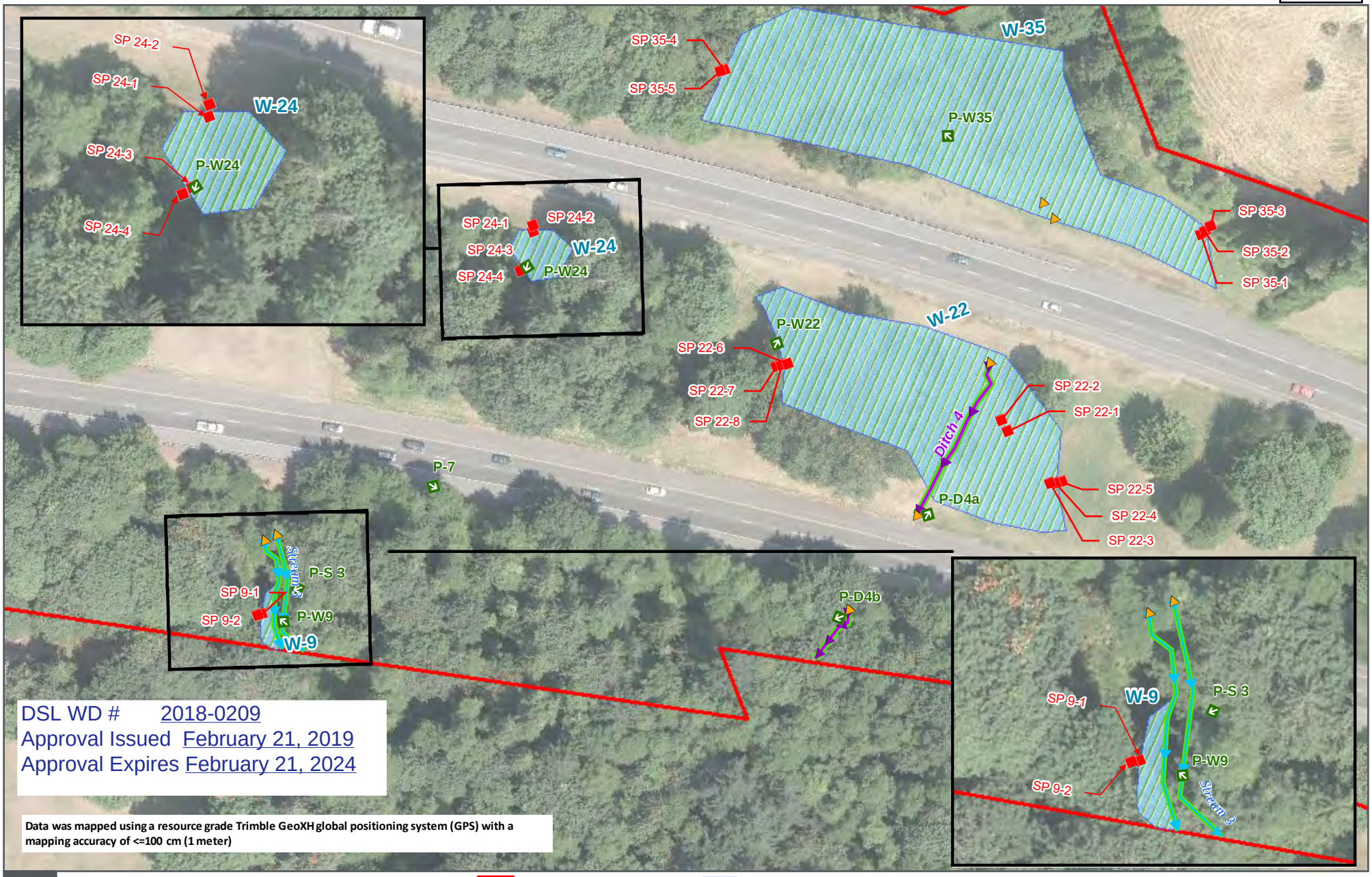
0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE16.MXD - USER: LLSMITH - DATE: 12/12/2018



DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024

Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland - Regulated*
Wetland, Not Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2017, HDR 2017

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE17.MXD - USER: LLSMITH - DATE: 1/8/2019

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W-20
P-W20
SP 20-2
SP 20-1
P-D 7
Ditch 7

Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

DATA SOURCE: USFWS, METRO 2018, HDR 2018

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
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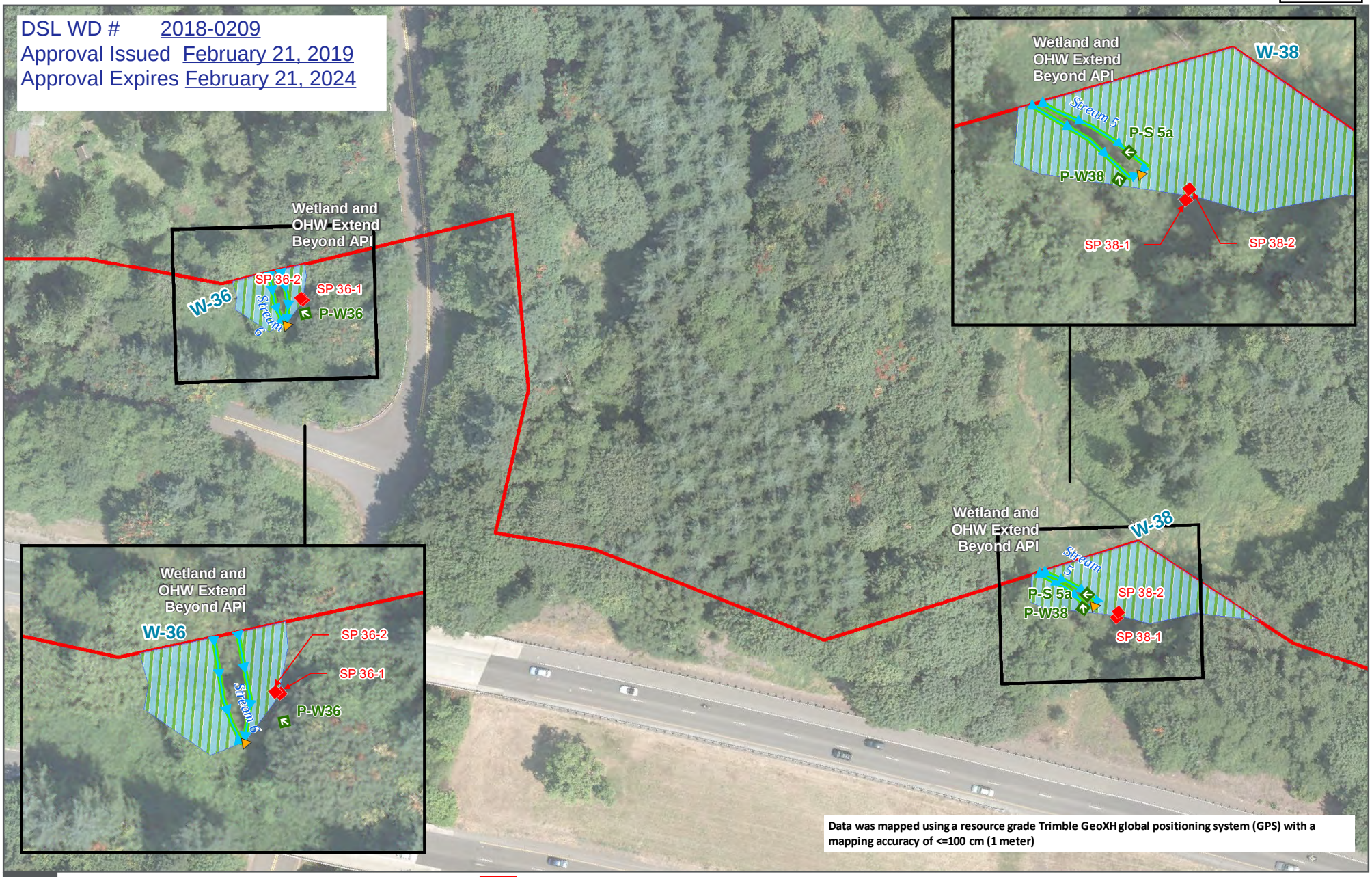


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland - Regulated*
Wetland, Not Regulated*

0 50 100 Feet

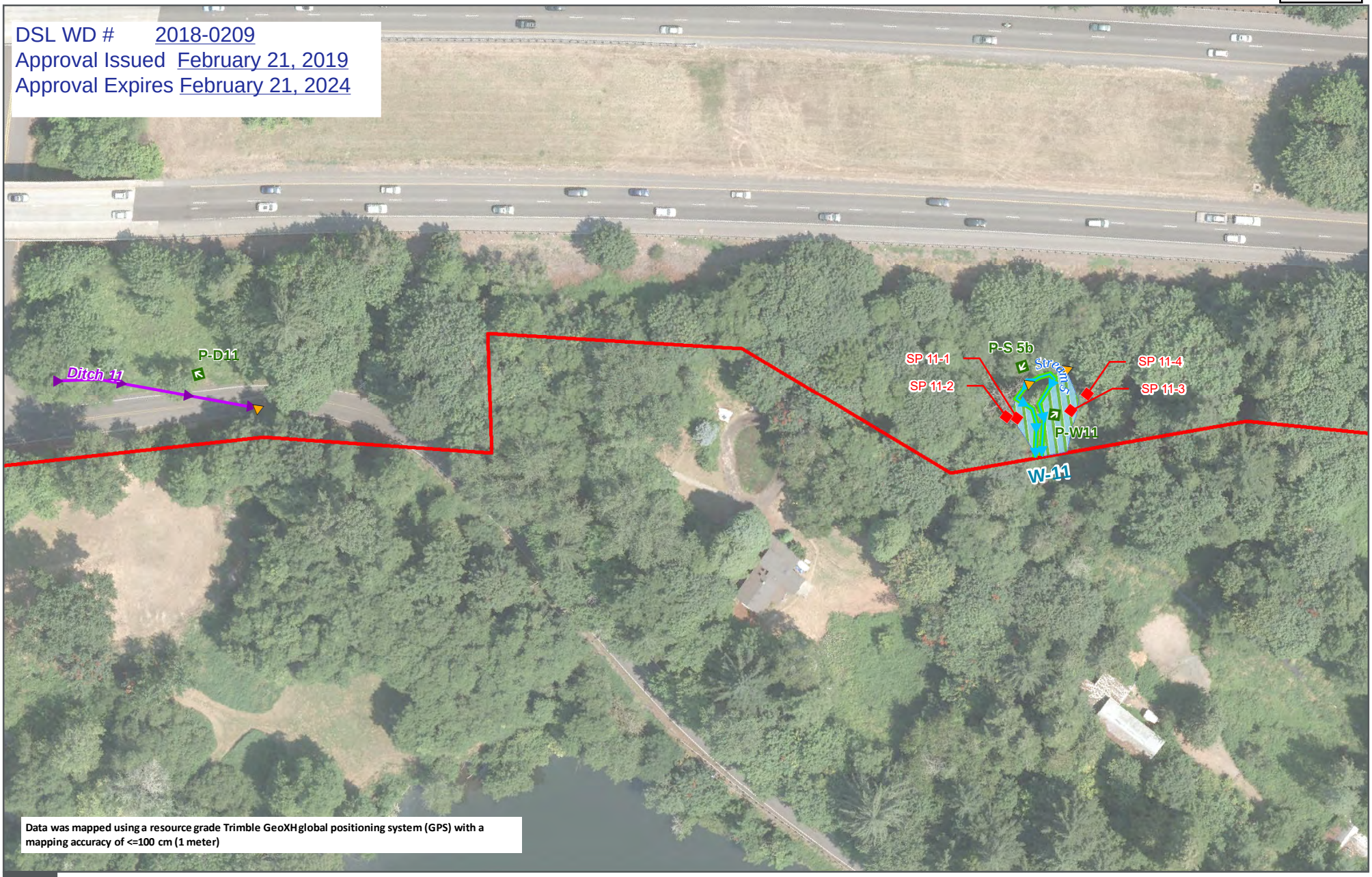
I-205 ABERNETHY
WETLANDS AND WATERBODIES

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE19.MXD - USER: LLSMITH - DATE: 12/4/2018

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
<all other values>
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

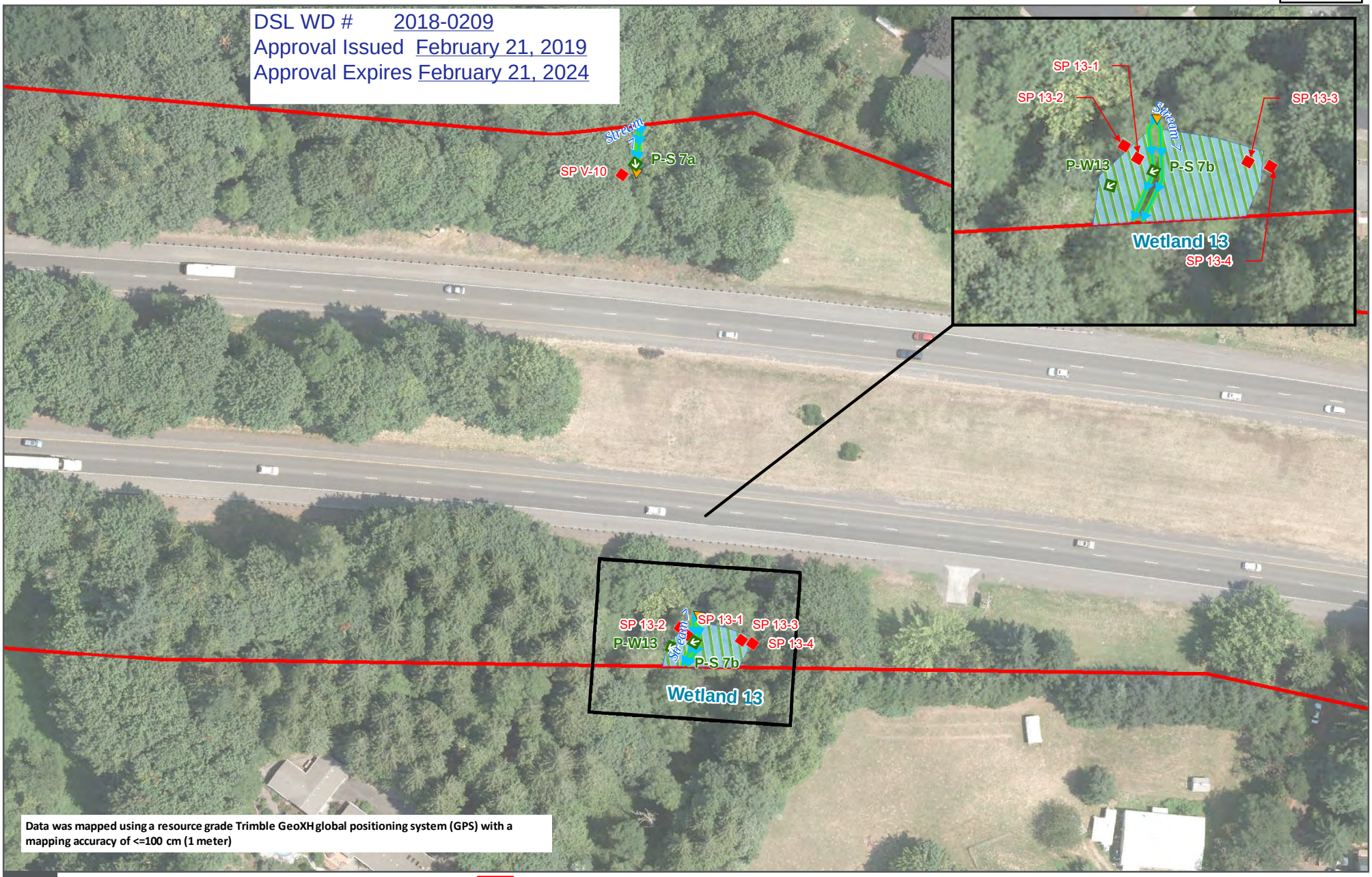
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE20.MXD - USER: LLSMITH - DATE: 12/12/2018

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland - Regulated*
Wetland, Not Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE21.MXD - USER: LLSMITH - DATE: 12/4/2018

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024

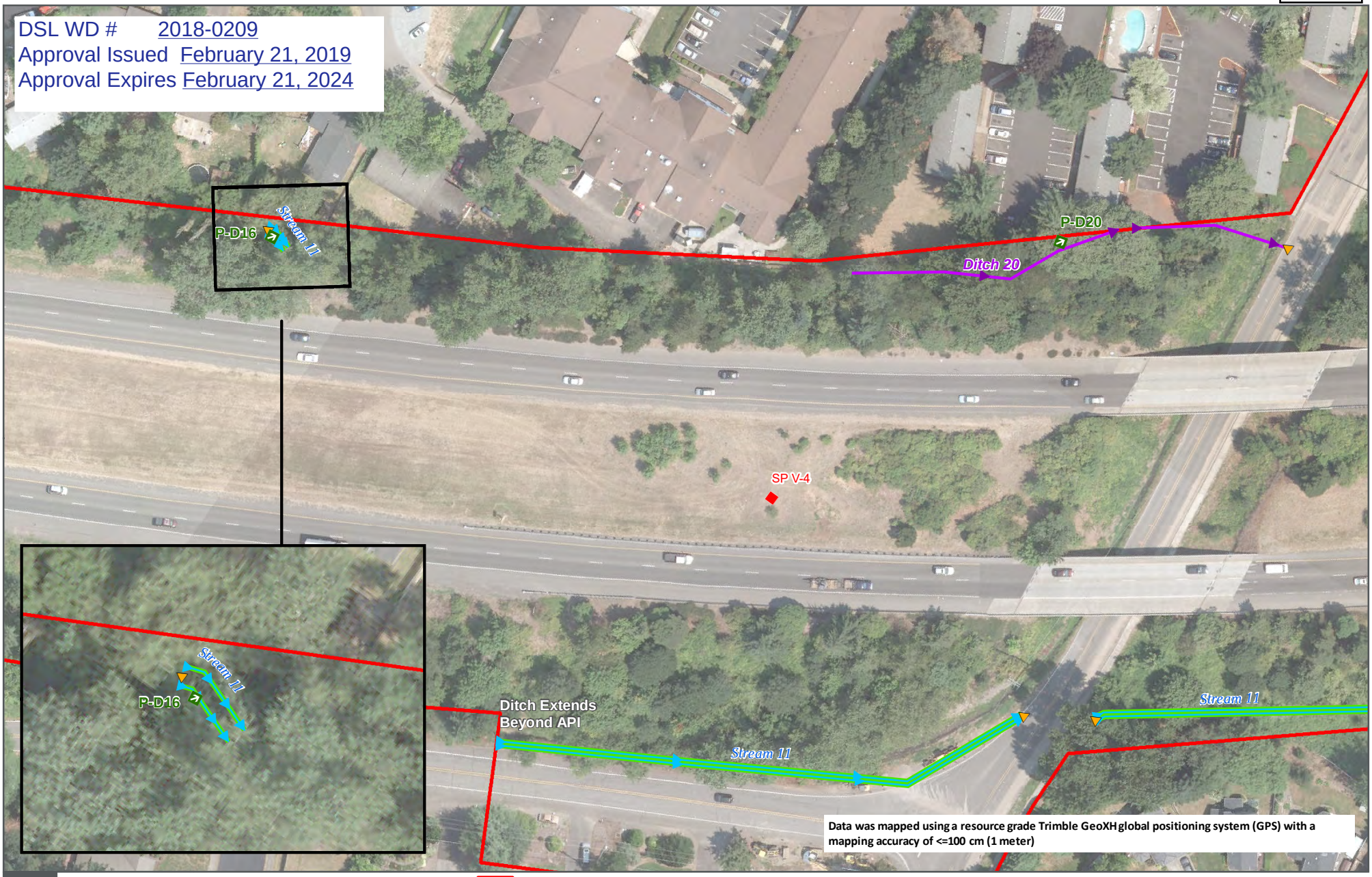


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland - Regulated*
Wetland, Not Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE22.MXD - USER: LLSMITH - DATE: 12/4/2018

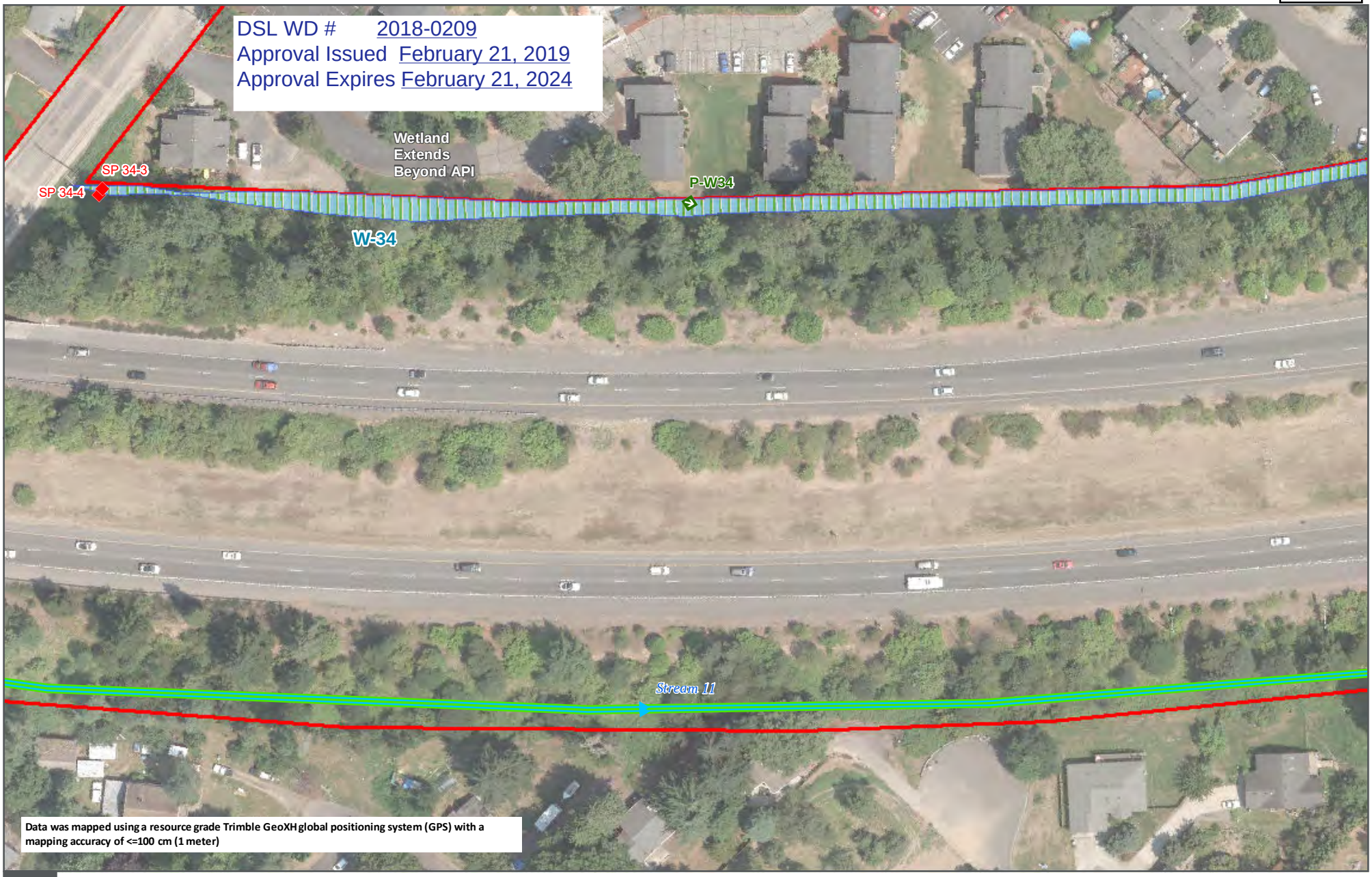


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

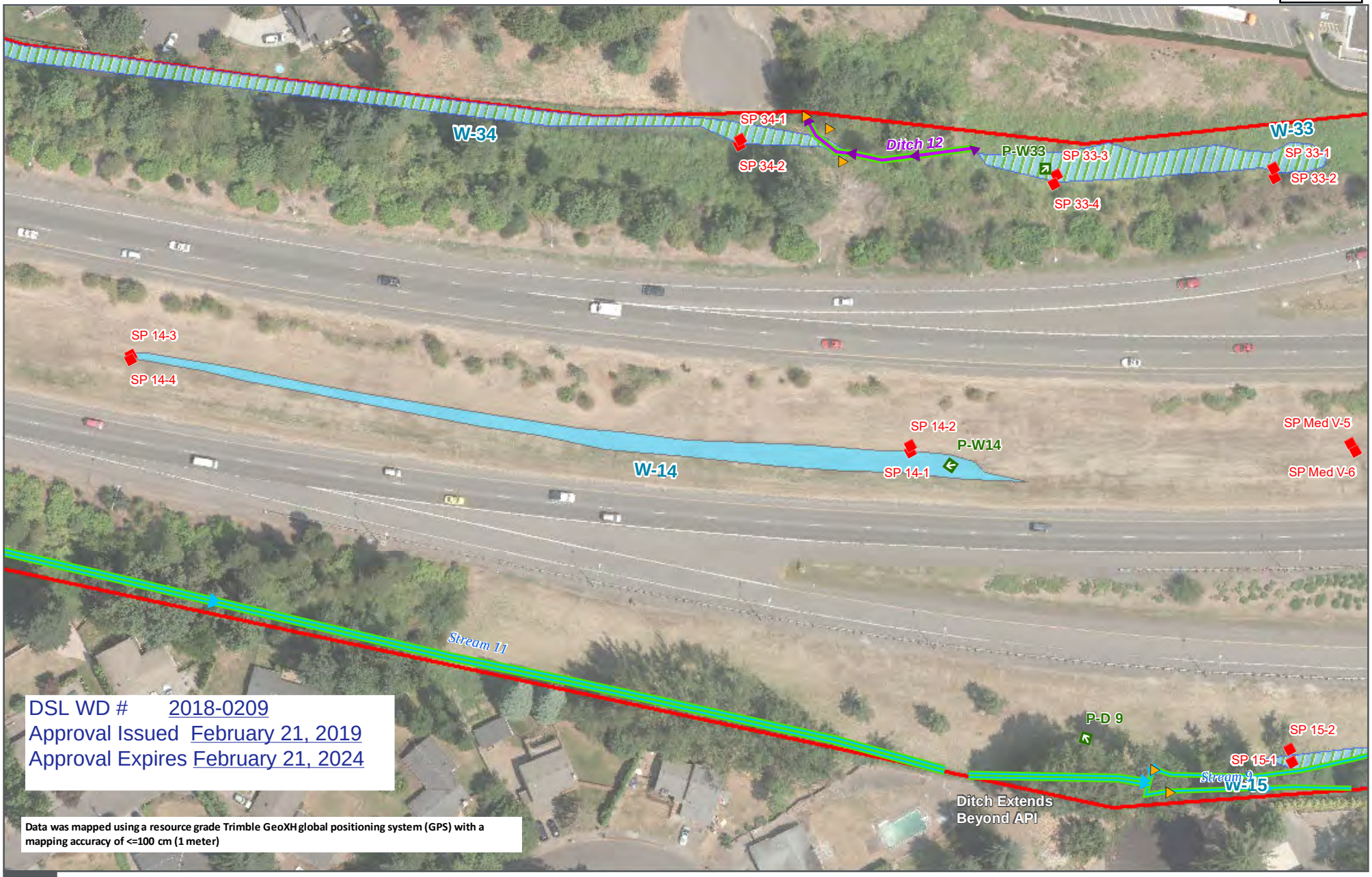
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

3

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019



DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024

Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

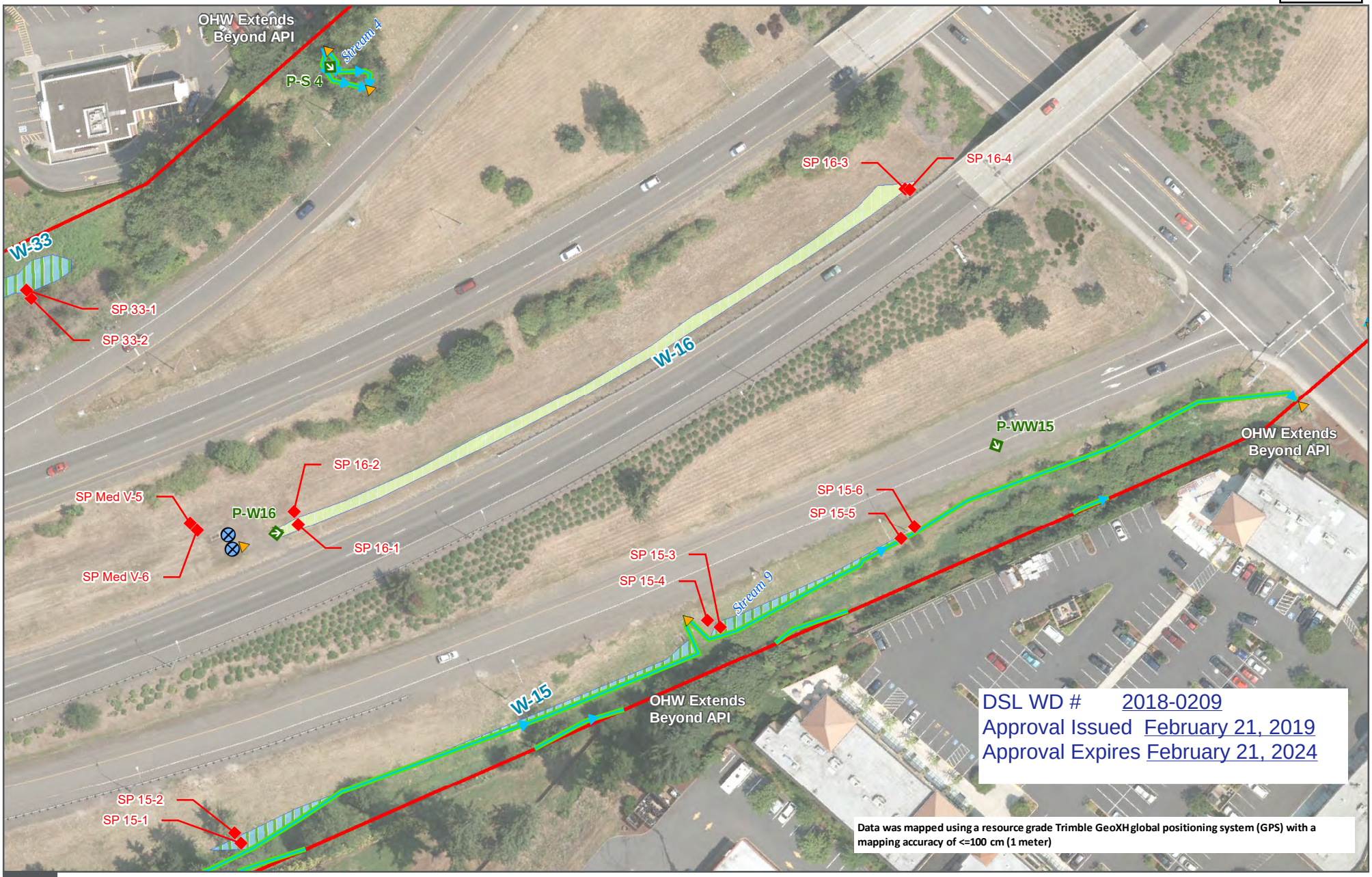


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
<all other values>
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE25.MXD - USER: LLSMITH - DATE: 12/12/2018

DSL WD # 2018-0209
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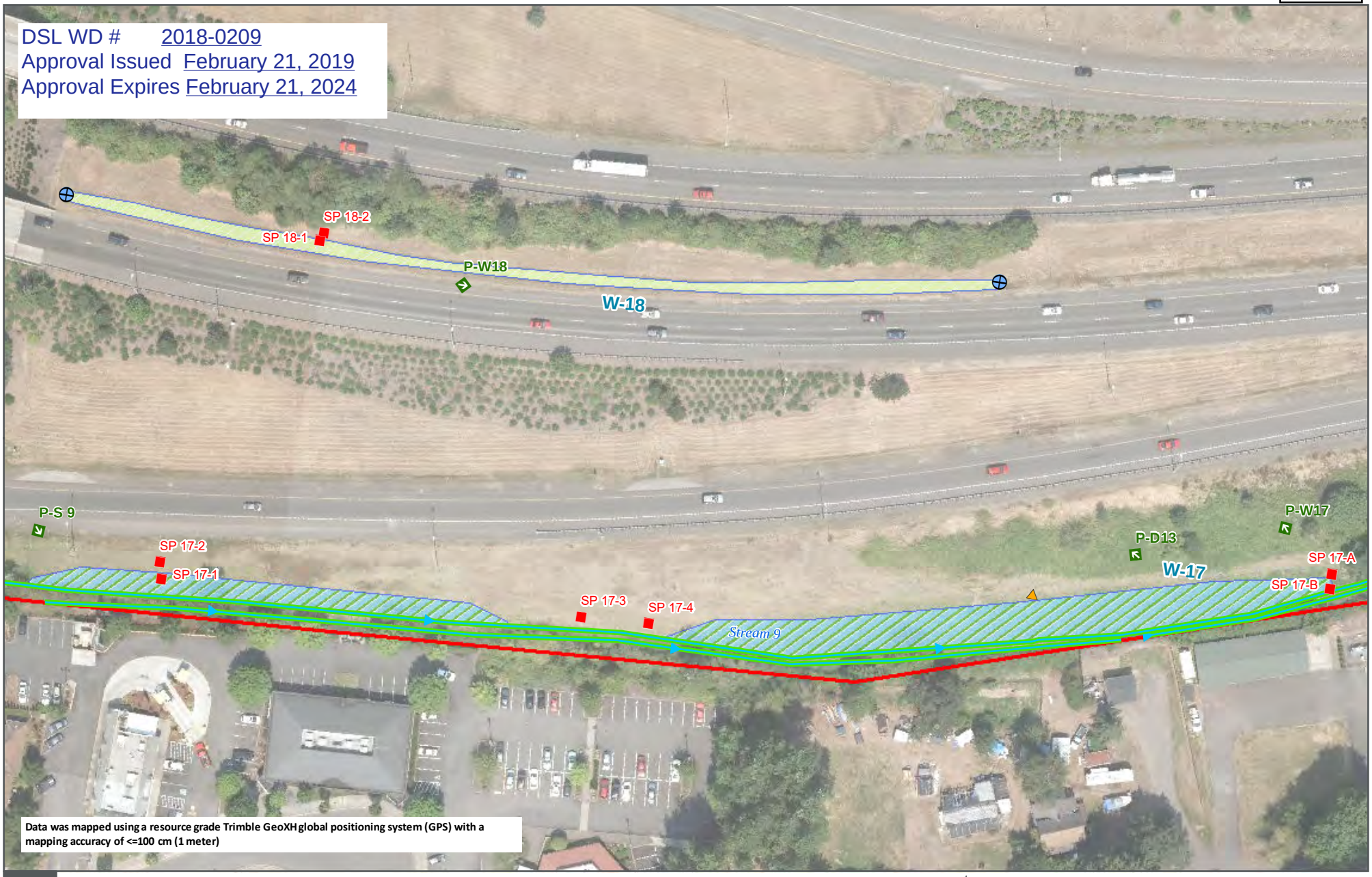

Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

I-205 ABERNETHY
WETLANDS AND WATERBODIES

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Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

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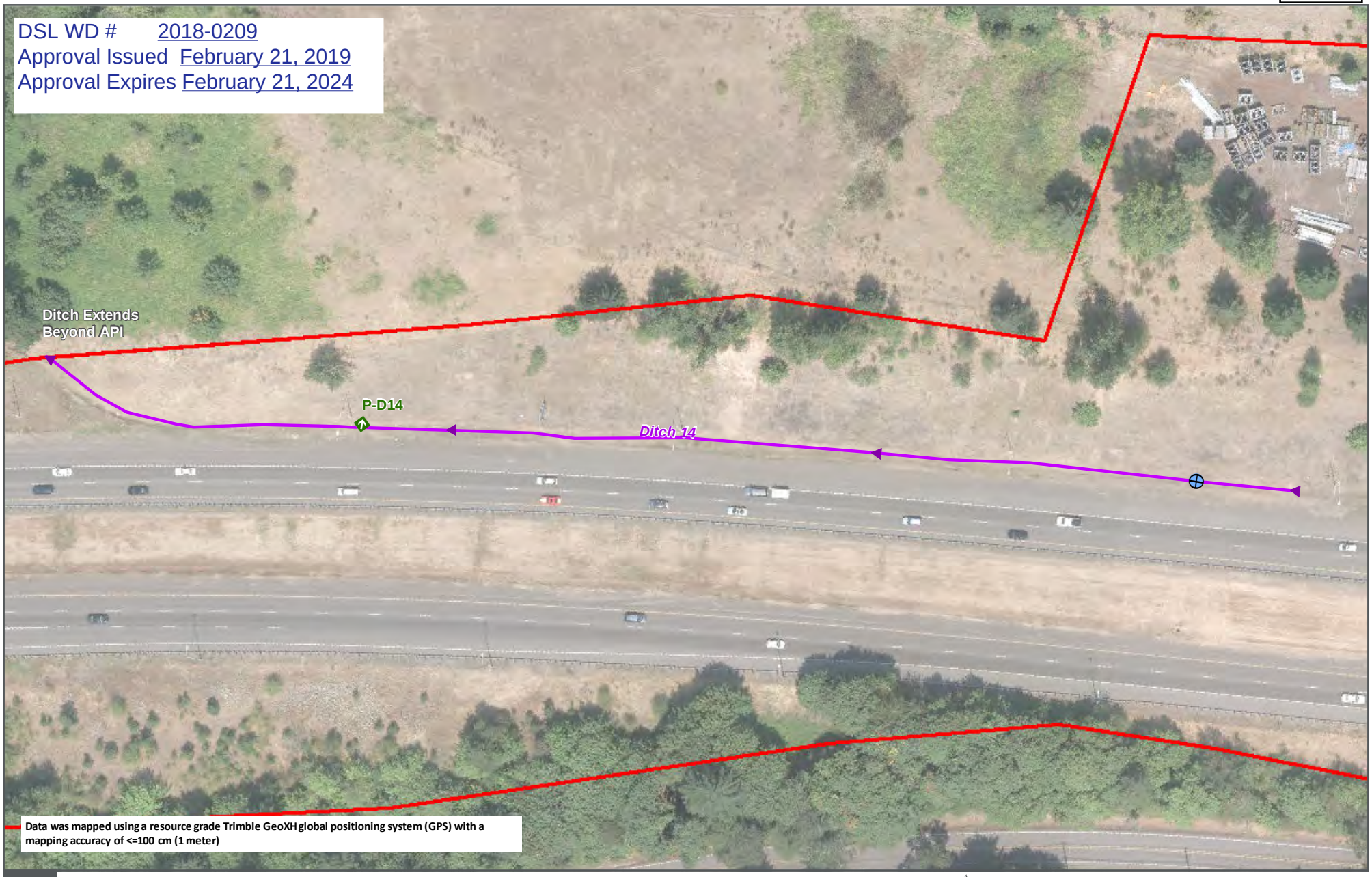

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

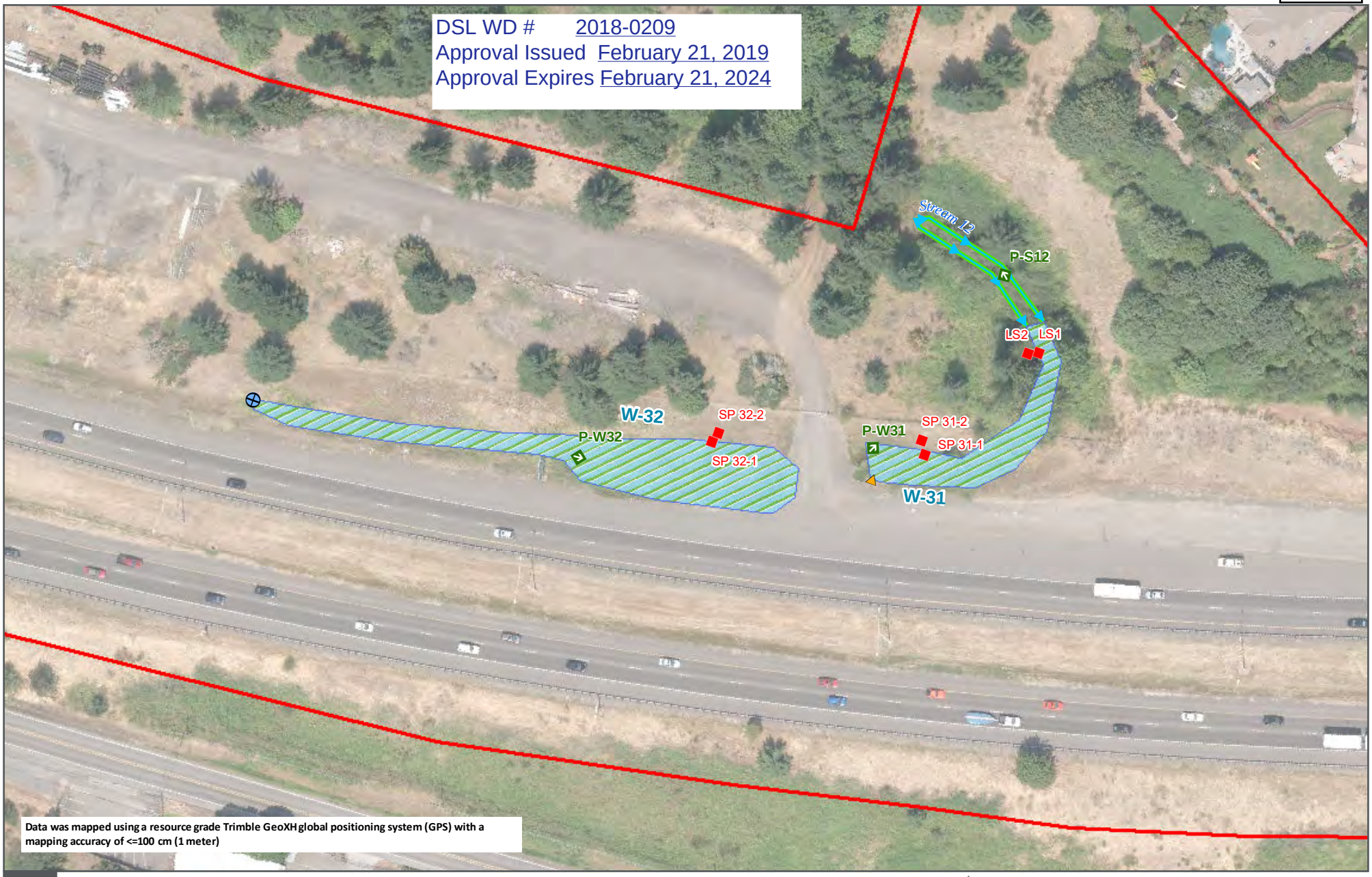

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

DATA SOURCE: USFWS, METRO 2018, HDR 2018

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

DATA SOURCE: USFWS, METRO 2018, HDR 2018

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

DSL WD # 2018-0209
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Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

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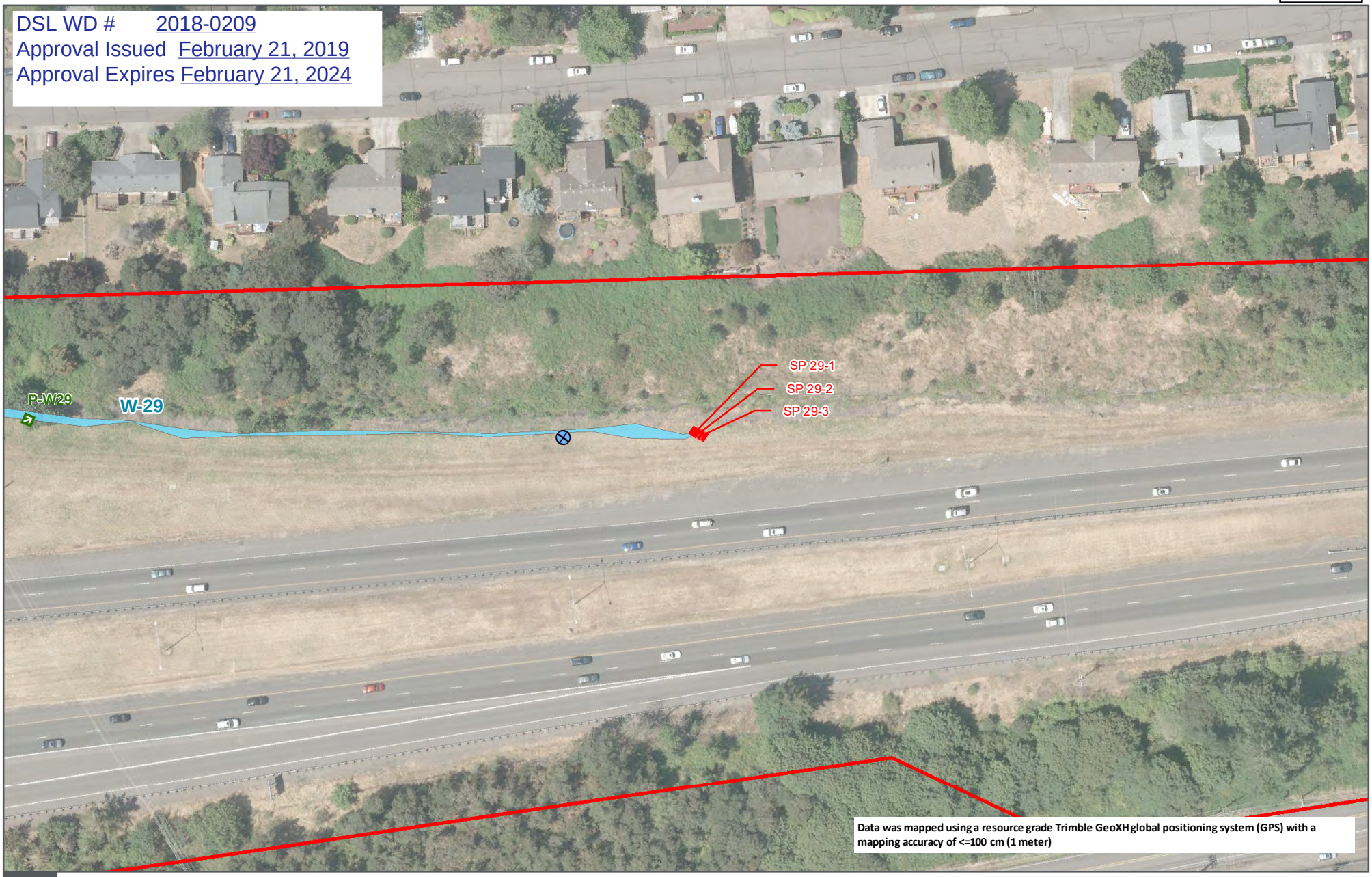


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
<all other values>
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

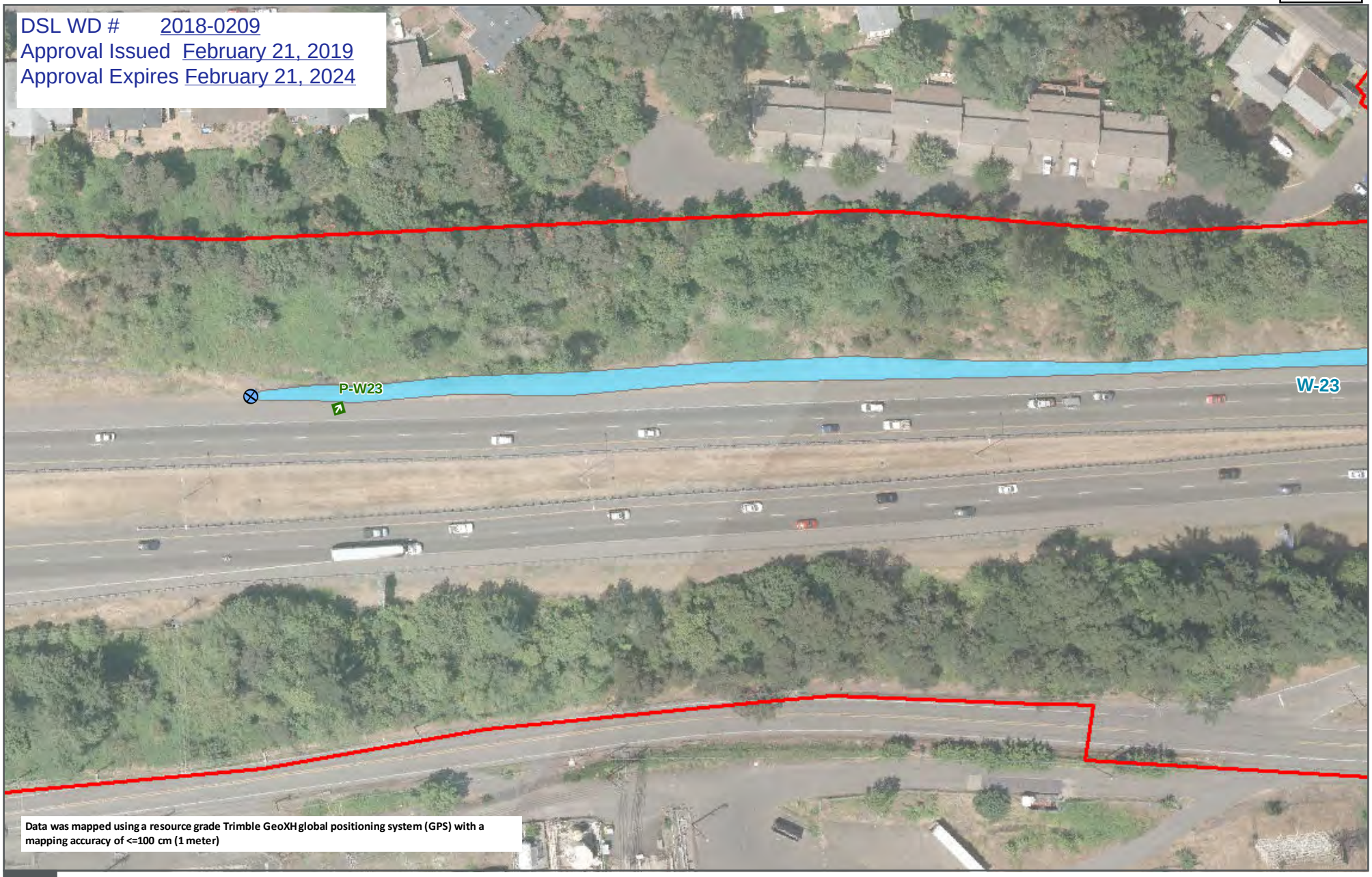
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE32.MXD - USER: LLSMITH - DATE: 12/12/2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

3

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

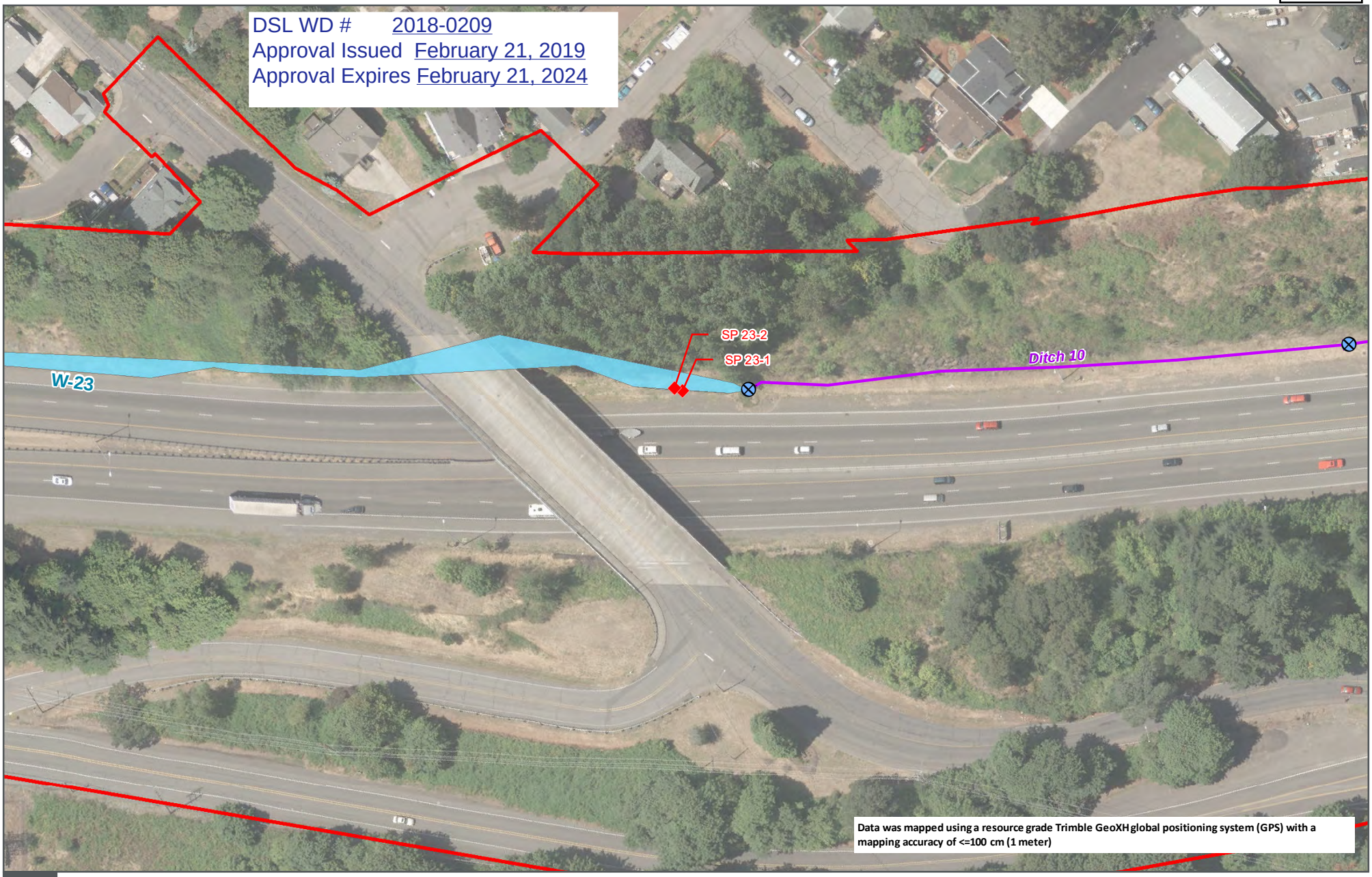


Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
<all other values>
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

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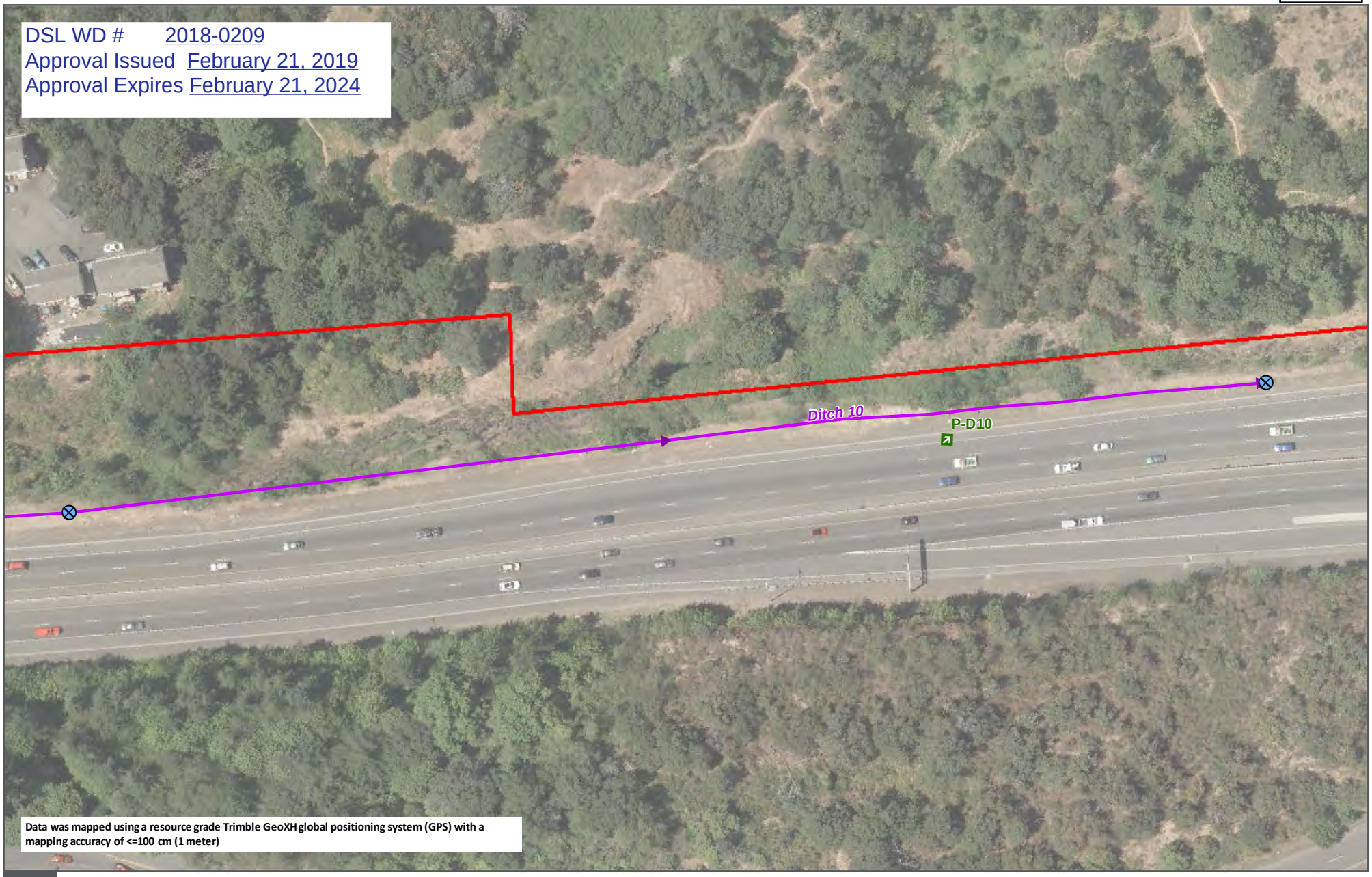
DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_INSETS\WETLAND_SURVEY_ADJUSTED_FIGURE34.MXD - USER: LLSMITH - DATE: 12/12/2018

DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

Photo Point
Sample Plots
Storm Drain
Culvert
Ordinary High Water - Not Regulated*
Ordinary High Water - Regulated*
Ditch-Not Regulated*
Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland, Not Regulated*
Wetland - Regulated*

0 50 100 Feet

*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.

DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

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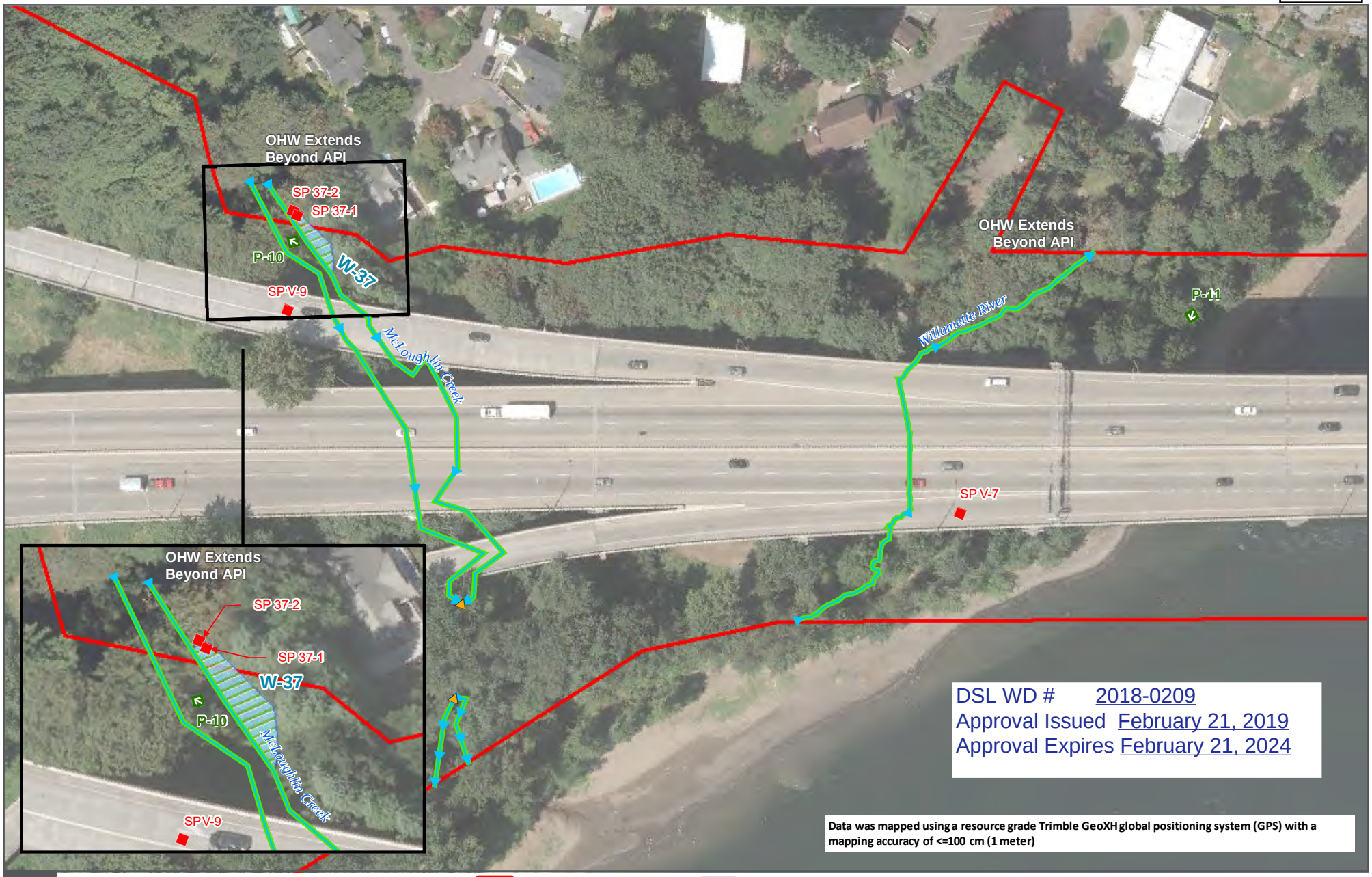
OHW Extends Beyond API
SP 37-2
SP 37-1
P-10
W-37
SP V-9
McLoughlin Creek
OHW Extends Beyond API
P-11
Willamette River
SP V-7
OHW Extends Beyond API
SP 37-2
SP 37-1
W-37
P-10
McLoughlin Creek
SP V-9
DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024
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Culvert
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Ordinary High Water - Regulated*
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Ditch-Regulated*
API
Stormwater Facility - Not Regulated*
Wetland - Regulated*
Wetland, Not Regulated*
0
50
100 Feet
I-205 ABERNETHY
WETLANDS AND WATERBODIES
*Regulated and Non-Regulated features are based on the Preliminary Jurisdictional Determination in Tables 5-1 and 5-2 and should be considered preliminary until concurrence is received by the USACE and DSL.
DATA SOURCE: USFWS, METRO 2018, HDR 2018
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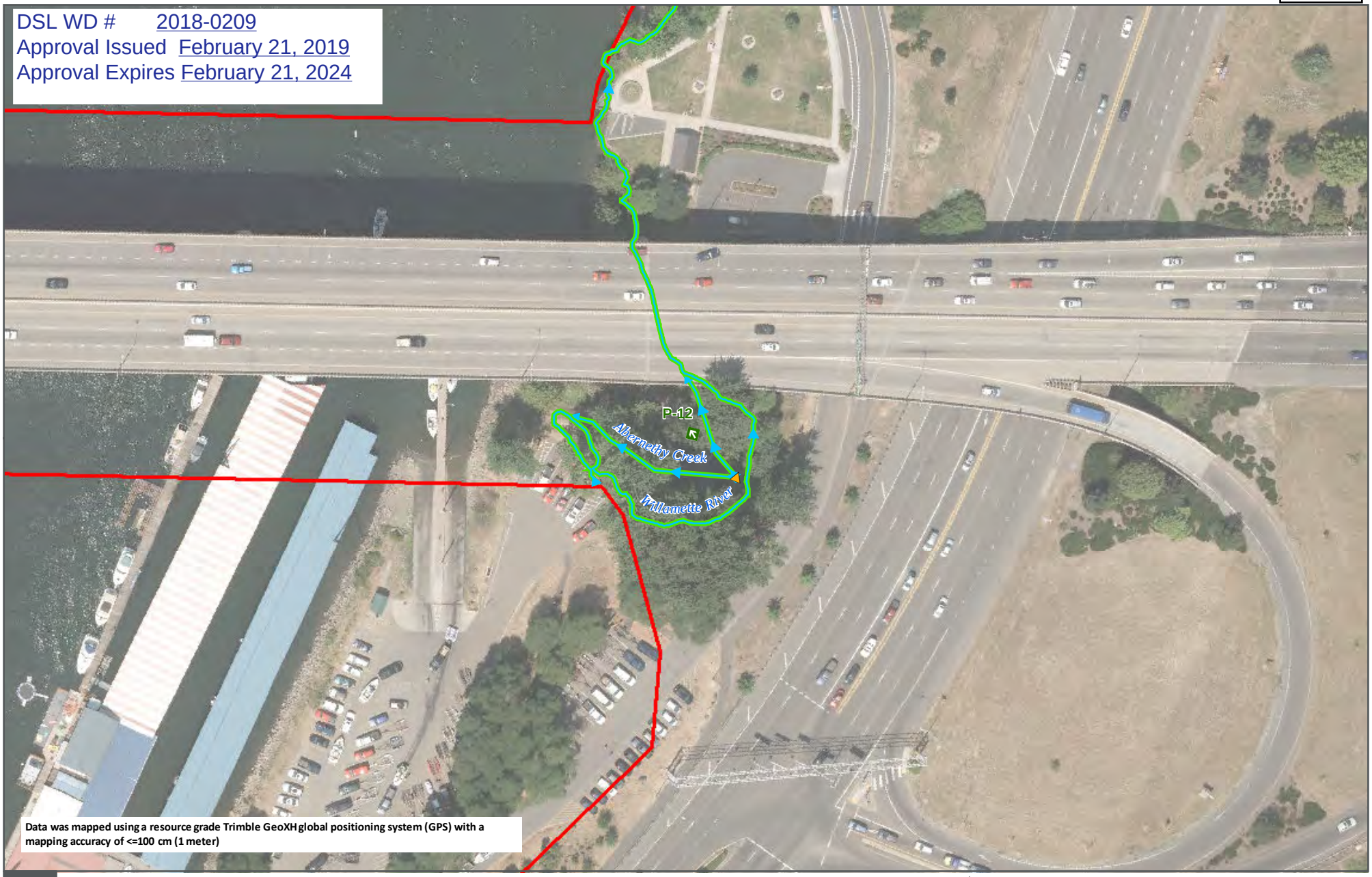
DSL WD # 2018-0209
Approval Issued February 21, 2019
Approval Expires February 21, 2024



Data was mapped using a resource grade Trimble GeoXH global positioning system (GPS) with a mapping accuracy of <=100 cm (1 meter)

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Ordinary High Water - Regulated*
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Ditch-Regulated*
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Stormwater Facility - Not Regulated*
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Wetland - Regulated*

0 50 100 Feet

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DATA SOURCE: USFWS, METRO 2018, HDR 2018

I-205 ABERNETHY
WETLANDS AND WATERBODIES

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\MAP_DOCS\FINAL\WETLAND_SURVEY.MXD - USER: LLSMITH - DATE: 1/8/2019

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WETLANDS AND WATERBODIES

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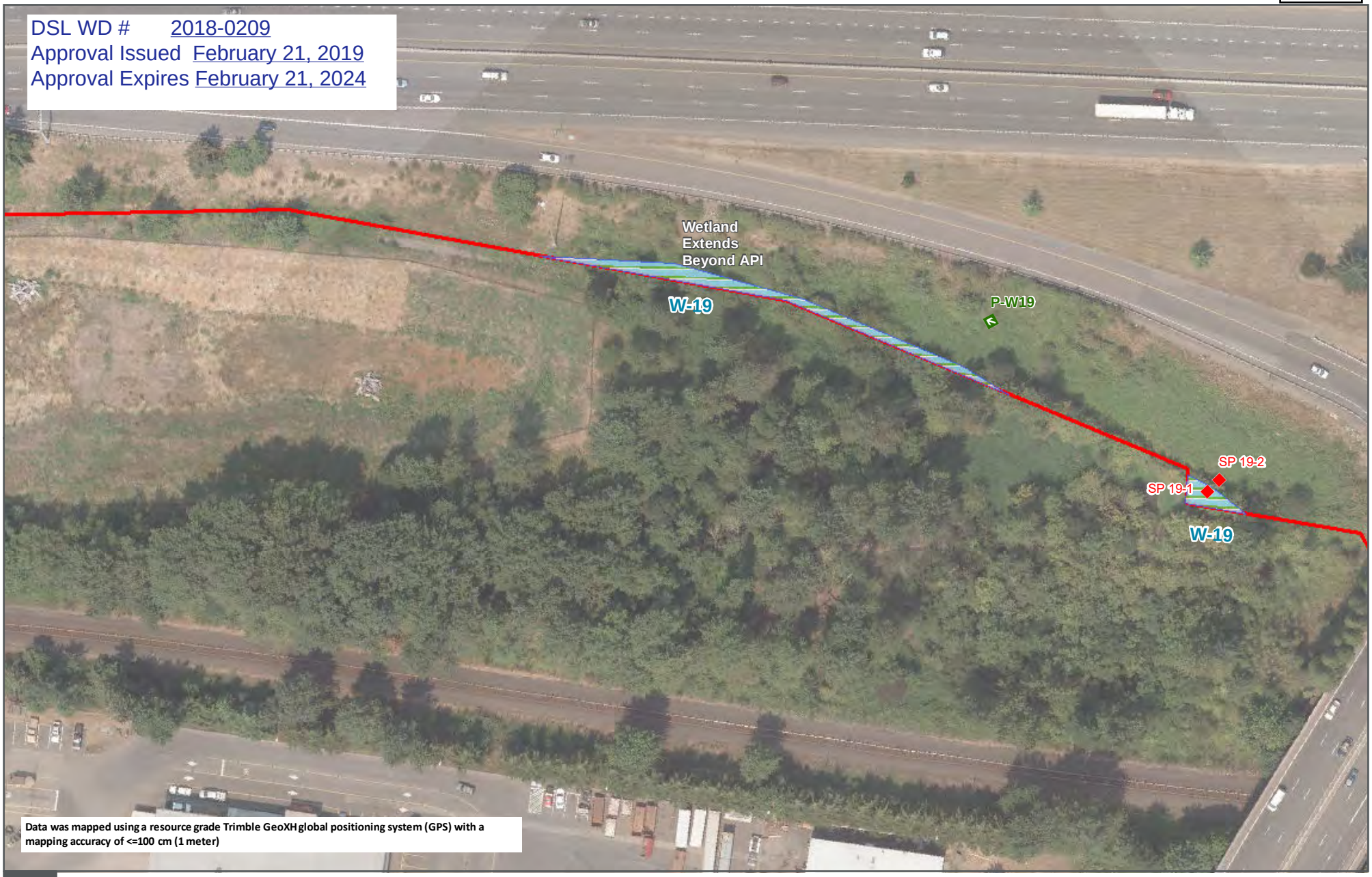

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I-205 ABERNETHY
WETLANDS AND WATERBODIES

Attachment I. Pre-App (PA 19-08) Conference Summaries

OREGON CITY

Pre-Application Conference Notes
PA 19-08, February 28, 2019

Proposed Project: Addition of general purpose travel lane on I-205 in each direction, and a new northbound auxiliary lane between the OR 99E and OR 213 interchanges, modification of OR 99E interchange ramps and seismic upgrades to the Abernethy Bridge over Main Street.

General Information:

- Location: ODOT Right-of-Way

Clackamas County Map 2-2E-29CB, Tax Lots 300 and 500

- Please note the City limits of Oregon City extend to the midpoint of the river

Review Process:
This application is a Type III process including Natural Resource Overlay District Review, Site Plan and Design Review, Geologic Hazards Review, Floodplain Review and Willamette Greenway Overlay Review. The applicant has **180 days** from the date of submittal to have a complete application.

Upon a complete application submittal, the applicant is entitled to a decision from the city for a decision of approval, approval with conditions or denial within **120 days** of deeming the application complete, by state law.

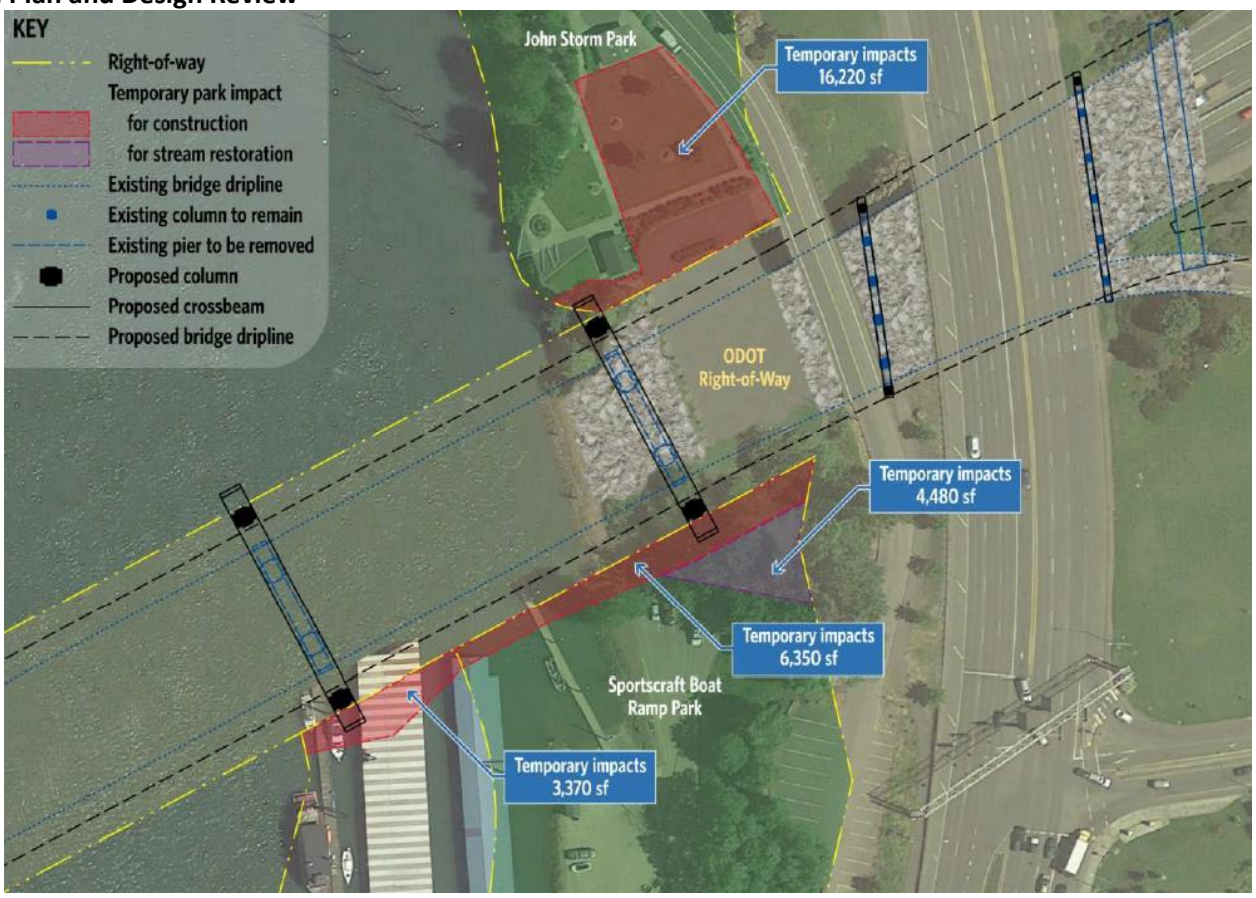
Type III decisions require a minimum of one public hearing before the Planning Commission and involve the greatest amount of discretion and evaluation of subjective approval standards, yet are not required to be heard by the City Commission except upon appeal.

Jon Storm Park Master Plan and Prior Reviews
Jon Storm Park has an approved master plan (Planning File MC 04-01), which was built out in three phases under Planning files SP 05-05, WR 05-09, SP 07-01 and WR 07-04. Because the development allowed by the Master Plan has been built out, the master plan is no longer in effect in accordance with OCMC 17.65.050.D.

17.65.050.D
Duration of General Development Plan. A general development plan shall involve a planning period of at least five years and up to twenty years. An approved general development plan shall remain in effect until development allowed by the plan has been completed through the detailed development plan process, the plan is amended or superseded, or the plan expires under its stated expiration date.

Application Timing and Expiration
The pre-application conference is valid for six months, but the Community Development Director may extend it to one year. If no application is filed within one year from the date of the meeting, an additional pre-application conference must be held. If within two years of the date of the notice of decision, a building permit associated with the development has not been issued, the land use approval expires, unless a one-year extension is filed and approved prior to the application expiration.

Site Plan and Design Review



- Under the current code, site plan and design review is required for work in the right-of-way (retaining walls, removal of landscaping, expansion of roadways, etc.). The City is currently reviewing code amendments, which specify that the site plan and design review process does not apply to activities occurring within the right-of-way, except communication facilities. The earliest that the proposed code amendments are likely to be effective is June, 2019. Please note that the code is subject to change as the code amendments go through the public hearing process.
- Site Plan and Design Review is required for development within the Institutional and Mixed Use Downtown zoning district, including alterations to the bridge, fencing and walls.
- Based on the pre-application conference submittal, the extent of site alterations to Jon Storm Park is unclear. The application should identify all proposed modifications, including permanent and temporary loss of parking, proposed new parking, new or removal of landscaping, lighting, staging areas, fences, retaining walls, demolition of structures, etc.
- The applicable design standards are limited. Applicable criteria include building materials, lighting, retaining walls, etc.
- Note that fencing or retaining walls shall comply with the height requirements in OCMC 17.54.100 and chain-link fencing is a prohibited material, except for temporary purposes during construction.

Parking Lot:

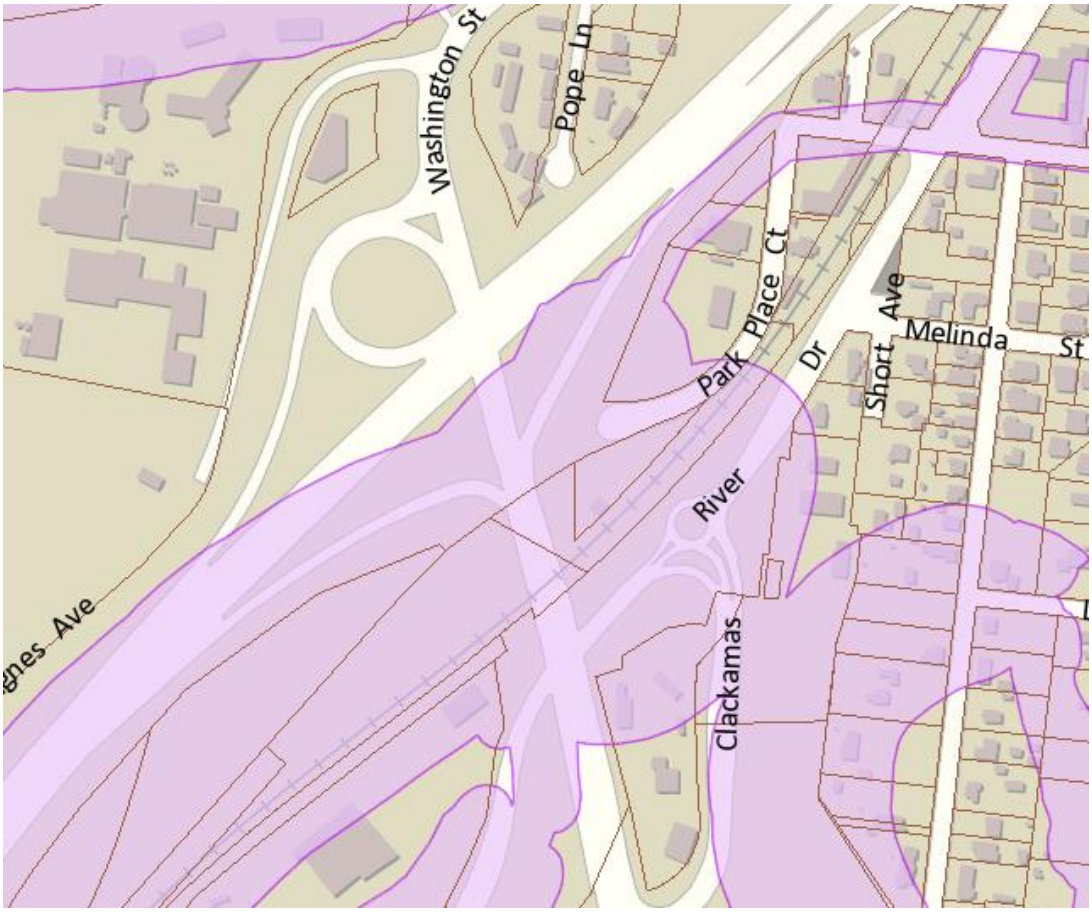
17.52.020 – Number of automobile spaces required

A. The number of parking spaces shall comply with the minimum and maximum standards listed in Table 17.52.020. The parking requirements are based on spaces per one thousand square feet net leasable area unless otherwise stated.

Use	*Minimum*	*Maximum*
Sports Club, Recreational Facilities	*Case Specific*	*5.40*

• The Oregon City Municipal Code does not identify minimum parking requirements for recreational facilities, or minimum/maximum parking requirements for parks. The application should include minimum/maximum parking requirements from other jurisdictions for review by the Community Development Director, in order to demonstrate that the park does not exceed maximum parking allowed.
• The application should identify all proposed and existing uses (Sportcraft Landing, park, etc.) and include a parking calculation for all uses demonstrating that the proposal complies with minimum and maximum parking stall requirements.
• Compliance with dimensional standards for automobile parking areas could not be confirmed. Dimensional standards for automobile parking can be found in OCMC 17.52.030.
• All areas in a parking lot not used for parking, maneuvering, or circulation shall be landscaped. Parking lot landscaping standards can be found in OCMC 17.52.060, and require perimeter parking lot landscaping, parking area/building buffer landscaping, and interior parking lot landscaping.
• No more than eight contiguous parking spaces shall be created without providing an interior parking lot landscaping strip between them.
• Parking areas shall be located behind buildings, below buildings or on one or both sides of buildings. The proposed parking lot appears to not comply with this standard and would require a variance. Please refer to the variance section of these notes.
• Please note, the parking lot appears to encroach into the Mixed Use Downtown zone. Parks and parking lots not in conjunction with a primary use require a conditional use permit in the Mixed Use Downtown District. If the parking lot associated with the park is proposed within the MUD District, the application should include an explanation about whether or not the parking lot constitutes an expansion of the park within the MUD District.

Natural Resources Overlay District:



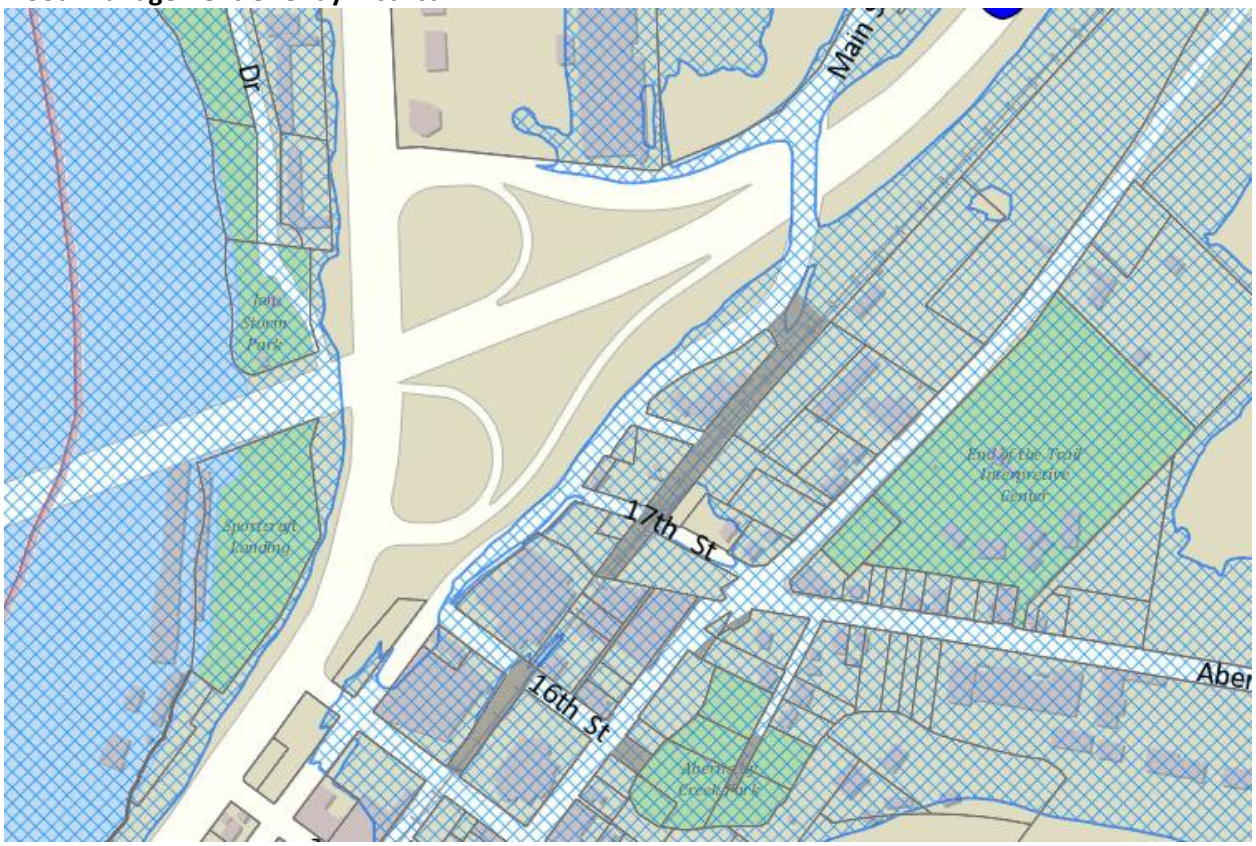
- The Oregon City Municipal Code protects degradation of water features enforcing a vegetated corridor consisting of native plantings adjacent to protected features to improve water quality and functions. A study is required to determine where the vegetated corridor is located onsite, the location of the development within the NROD boundary and associated mitigation.
- The City's jurisdiction is within the vegetated corridor surrounding the protected features, however, activities within wetlands, streams or other protected water features are regulated by the Department of State Lands (DSL) and the Army Corps of Engineers. Permit applications or other review with these agencies may be required. The City has provided notice to DSL of the proposed development and will forward any comments received to the applicant.
- The City regulates both temporary and permanent disturbances within the NROD, including new structures, grading and fill, staging areas.
- OCMC 17.04.1465 defines vegetated corridor as the area of setback between the top of bank of a protected water feature and the delineated edge of the water quality resource area as defined in Table 17.49-1 of this chapter.
- OCMC 17.04.1300 defines top of bank as bankfull stage.
- OCMC 17.04.125 defines bankfull stage as the stage or elevation of a stream at which water overflows the natural banks of streams or other waters of the state. The bankfull stage or flow may be approximated using either the two-year recurrence interval flood elevation or one foot measured vertically above the ordinary mean high water line.
- The width of the vegetated corridor was identified as 200 feet under prior NROD reviews associated with the Jon Storm Park Master Plan (Planning Files WR 05-09 and WR 07-04)
- The following uses are exempt from NROD review in accordance with OCMC 17.49.080:
    - Routine repair and maintenance of existing structures, roadways, driveways and utilities
    - Replacement, additions, alterations and rehabilitation of existing structures, roadways, utilities, etc., where the ground level impervious surface area is not increased.
- Uses or activities not specifically exempt pursuant with OCMC 17.49.080, a Type II or III NROD application prepared by a qualified professional delineating the natural features and identifying the width of the vegetated corridor must be submitted with the land use application
    - A construction management plan prepared in accordance with OCMC Section 17.49.220
    - Mitigation is required for temporary construction and permanent disturbance at a 2:1 ratio for the associated vegetated corridor. Mitigation is generally required at the location of the disturbance area, though the code allows for alternative locations.
    - A mitigation plan for all permanent and temporary disturbance prepared by a qualified professional in accordance with OCMC 17.49.180.
    - A 5-year financial guarantee and monitoring is required.
- New roadways, bridges/creek crossings, utilities or alterations to such facilities are uses allowed under prescribed conditions subject to OCMC 17.49.100 through 17.49.190
- The following alterations and additions to existing development are permitted subject to the following standards:
    - Alterations or additions that cumulatively total up to a maximum of 500 SF of additional disturbance area shall be processed as a Type II permit. The new disturbance area shall not encroach closer than one-half of the distance of the regulated NROD buffer.
    - Alterations or additions that cumulatively exceed five hundred square feet of additional disturbance area or which propose encroachment closer than one-half of the distance of the regulated NROD buffer shall be processed as a Type III permit pursuant to Section 17.49.200, Adjustment from Standards.
    - Mitigation is required subject to OCMC 17.49.180 or 17.49.190
- In accordance with 17.49.150, the following standards apply to public rights-of-way and private roads within the NROD, including roads, bridges/stream crossings, driveways and pedestrian paths with impervious surfaces:

- Stream crossings shall be limited to the minimum number and width necessary to ensure safe and convenient pedestrian, bicycle and vehicle connectivity, and shall cross the stream at an angle as close to perpendicular to the stream channel as practicable. Bridges shall be used instead of culverts wherever practicable.
- Where the right-of-way or private road crosses a stream the crossing shall be by bridge or bottomless culvert
- No fill or excavation shall occur within the ordinary high water mark of a stream without the approval of the Division of State Lands and/or the US Army Corps of Engineers
- If the Oregon Department of State Lands has jurisdiction over any work that requires excavation or fill in wetland, required permits or authorization shall be obtained from DSL prior to release of a grading permit
- Any work that will take place within the banks of a stream shall be conducted between June 1 and August 31, or shall be approved by the Oregon Department of Fish and Wildlife
- Mitigation is required pursuant to OCMC 17.49.180 or 17.49.190

• A construction management plan meeting the following must be submitted with the land use application:

- Location of site access and egress that construction equipment will use
- Equipment and material staging and stockpile areas
- Erosion control measures that conform to the City of Oregon City erosion control standards
- Measures to protect trees and other vegetation located outside the disturbance area

Flood Management Overlay District



• The Flood Management Overlay District protects/limits floodplain development.
• Based on the 1996 flood, the base flood elevation is 50.7’ in this area.
• The subject site is located within the 1996 flood inundation area and the FEMA 100-year floodplain, therefore, compliance with Chapter 17.42 of the Oregon City Municipal Code is required.
• Balanced cut and fill is required for new construction within the floodplain.

Dimensional Standards of Underlying Zoning District

- Height limits of the underlying zone are applicable to the bridge support columns
    - Maximum building height within the Institutional District: Within 100 feet of any district boundary, not to exceed 35 feet; elsewhere, not to exceed 70 feet
    - Maximum building height: 75 feet
    - The height standards apply to buildings, and based on the definitions of building and structure, the bridge supports would be subject to height requirements.
        - OCMC 17.04.154 defines building as structure
        - OCMC 17.04.1215 defines structure as anything constructed or erected that requires location on the ground or attached to something having location on the ground.
- Bridge supports are also subject to compliance with setbacks, however, setbacks are measured to a lot line, therefore, setbacks would not apply in the right-of-way.
    - OCMC 17.04.1110 defines setbacks as the minimum distance by which the footprint of all buildings or structures shall be separated from a lot line.
- If setback or height requirements are not met, a Type III Planning Commission Variance is required. Please refer to the variance section of these notes.

Willamette River Greenway

- The subject site is located within the Willamette River Greenway Overlay District. The purpose of the Willamette River Greenway Overlay District is to protect, conserve, enhance, and maintain the natural scenic, historical, agricultural, economic and recreation qualities of land along the Willamette River, while maintaining the integrity of the Willamette River by minimizing erosion, promoting bank stability and maintaining and enhancing water quality and fish and wildlife habitats.
- Compliance with OCMC 17.48 is required. The application must include code responses to applicable sections of Chapter 17.48.

Geologic Hazards Overlay

- Please refer to the Development Services Division's notes
- Tim Pfeiffer is the City's Geotechnical Consultant. The applicant's Geotechnical Engineer may contact Tim at tjp@foundationengr.com or 503-643-1541.

Variance

- A Type III Planning Commission Variance application would be required for the location of parking in front of the building and may be required if additional Site Plan and Design Review standards are not met.
- Please address the approval criteria as they relate to the proposal and the requirement being varied.
    - That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access, or other desirable or necessary qualities;
    - That the request is the minimum variance that would alleviate the hardship;
    - Granting the variance will equal or exceed the regulation to be modified;
    - Any impacts resulting from the adjustment are mitigated;
    - No practical alternatives have been identified which would accomplish the same purpose and not require a variance.
    - That the variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Tree Protection/Mitigation and Street Trees

Tree removal during the land development process is subject to compliance with tree protection and mitigation standards.

- Street trees are subject to OCMC Chapter 12.08
- A street tree plan demonstrating compliance with OCMC 12.08 is required
- The applicant's submittal should identify species and size of all trees onsite greater than 6" DBH.
- Tree removal is subject to OCMC Chapter 17.41.
- Tree removal within the Natural Resource Overlay District is subject to OCMC 17.49 and mitigation standards in OCMC 17.49.180.
- Tree protection , removal and mitigation standards can be found in OCMC Section 17.41.130
- A mitigation plan prepared by a qualified professional (certified arborist, horticulturalist or forester or other environmental professional) is required in accordance with OCMC Chapter 17.41

Other notes:

• A neighborhood association meeting is required for full Site Plan and Design Review or Planning Commission Variance applications. The proposed development is within the Two Rivers Neighborhood Association.

Neighborhood Association: Two Rivers NA
Chair: Bryon Boyce, bryony@birdlink.net
Secretary: Margie Hughes, margiehughes1@aol.com
CIC Primary Representative: Bryon Boyce, bryony@birdlink.net
Meetings: Held the fourth Wednesday of January, April, July and October
Location: Rivershore Bar & Grill, 1900 Clackamette Drive, Oregon City, OR
Meeting Time: 7:00 PM

• Please include the Citizen Involvement Committee Chair, Amy Willhite, in any Neighborhood Association meeting requests, notifications or correspondence. Amy can be reached at awillhit@yahoo.com.

• OCMC 17.50.055 requires submittal of the meeting sign-in sheet, a summary of issues discussed, and a letter from the neighborhood association indicating that a meeting was held.

• Your application was transmitted to the State Historic Preservation Office (SHPO) and affected tribes for review. Comments received will be provided to the applicant.

Code Amendments:

The City is proposing Housing and Development Code Amendments which may affect your proposal. The application is subject to the code that is in place on the date that the land use application is submitted. Depending on the date of submittal, the applicant may contact staff for an updated code criteria template. The earliest that the proposed code amendments are likely to be effective is June, 2019. Please note that the code is subject to change as the code amendments go through the public hearing process.

For details on the proposed code amendments, please visit the following site:
https://www.orcity.org/planning/housing-and-other-development-and-zoning-code-amendments

Planning Review and Application Fees:

The anticipated Planning applications and fees include:

• Site Plan and Design Review

Construction Cost	Application Fee
Less than $500,000	$2,156 plus 0.007 x project cost
$500,000 to $3,000,000	$3,591 plus 0.005 x project cost
Over $3,000,000	$12,215 plus 0.003 x project cost
Maximum fee	$57,296

- Natural Resource Overlay District Review
  - Type II/III for Non-Single-Family: $2,114
- Flood Management Overlay District Review: No fee*
- Willamette River Greenway Type II: No fee*
- Willamette River Greenway Type III: $1,649
- Planning Commission Variance: $2,693 per application
- Geologic Hazards Overlay District: See Development Services Notes
- Mailing Labels: $17 – or provided by applicant
- Minor Pre-Application Fee: $594

An additional minor pre-application conference is required if the application is being submitted under the new code, if the proposal changes, or if the scope of work includes additional activities not discussed in the first pre-application meeting.

- 2019 Planning Fee Schedule

***** Please note the City will likely be adopting fees for these applications with upcoming code amendments.

Oregon City Municipal Code Criteria:

The following chapters of the Oregon City Municipal Code (OCMC) may be applicable to this proposal:

OCMC 12.04 - Streets, Sidewalks and Public Places
OCMC 12.08 - Public and Street Trees
OCMC 13.12 – Stormwater Management
OCMC 17.41- Tree Protection Standards
OCMC 17.42 – Flood Management Overly District
OCMC 17.44 – Geologic Hazards Overlay District
OCMC 17.48 – Willamette River Greenway
OCMC 17.49 – Natural Resources Overlay District
OCMC 17.50 – Administrative Processes
OCMC 17.52 – Off-Street parking and Loading
OCMC 17.54.100 – Fences and Retaining Walls
OCMC 17.60 – Variances
OCMC 17.62 – Site Plan and Design Review

Planning Division

Diliana Vassileva, Assistant Planner with the Oregon City Planning Division reviewed your pre-application. Email dvassileva@orcity.org / Phone 503.974.5501

Development Services Division

Sang Pau, Development Engineer with the Oregon City Development Services Division, reviewed your pre-application. Sang can be reached at 503-974-5503 or spau@orcity.org.

Building Division:

Your application was transmitted to our Building Official. You may contact Mike Roberts, Building Official, at 503.496.1517 or mroberts@orcity.org if you have any building related questions.

Clackamas County Fire:

Your application was transmitted to Mike Boumann, Lieutenant Deputy Fire Marshal of Clackamas County Fire District #1. No comments were returned regarding your application. You may contact Mr. Boumann at 503.742.2660 or at mike.boumann@ClackamasFire.com .

Pre-application conferences are required by Section 17.50.050 of the City Code, as follows:

A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a

preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.
B. A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the City will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.

NOTICE TO APPLICANT: A property owner may apply for any permit they wish for their property. HOWEVER, THERE ARE NO GUARANTEES THAT ANY APPLICATION WILL BE APPROVED. No decisions are made until all reports and testimony have been submitted. This form will be kept by the Community Development Department. A copy will be given to the applicant. IF the applicant does not submit an application within six (6) months from the Pre-application Conference meeting date, a NEW Pre-Application Conference will be required.

OREGON CITY

Public Works – Development Services

625 Center Street | Oregon City OR 97045
Ph (503) 657-0891 | Fax (503) 657-7829

DEVELOPMENT SERVICES
PRE-APPLICATION MEETING NOTES

Planning Project Number:	PA 19-08
Address:	NA
Map Number(s):	2S-2E-29CB
Tax Lot(s):	I-205 at 00300, 00500 (Jon Storm Park & Sportcraft Landing) to Main St
Project Name:	I-205 Widening
Meeting Date:	February 28, 2019
Reviewer(s):	Sang Pau

General Comments

1. A complete land use application will typically include a preliminary stormwater report and preliminary construction plans showing all public improvements, including sewer, water, grading and erosion control, and stormwater facilities. The application should also include a narrative responding to all sections of the Oregon City Municipal Code (OCMC) applicable to the proposed development.

2. The City will issue a Staff Report in response to the contents of the application package provided by the applicant. Once a Staff Report is issued, staff strongly encourages a pre-design meeting with the project engineer to discuss plan requirements, conditions of approval, and process.

3. All applicable conditions of approval contained in the Staff Report must be addressed by providing the appropriate document (E.G. construction plans, reports, etc.) which must be reviewed and approved prior to issuance of building permits.

4. The contractor for the applicant will be required to attend a pre-construction meeting prior to any work beginning onsite.

5. All newly constructed public improvements shall be maintained for a two year period following their acceptance of construction with a 15% maintenance bond. Newly constructed public improvements consist of those improvements within existing right of way will be owned by the City. This bond is released at the end of the maintenance period.

6. An erosion control application and review must be completed prior to issuance of construction permit : https://www.orcity.org/publicworks/erosion-control-0

Streets

1. Portions of Clackamette Drive is within City Park owned property. The applicant proposes to utilize Clackamette Drive and the adjacent park near the south end of the road for staging construction.

The applicant proposes to realign Clackamette Drive to accommodate the placement of support columns for the I-205 overpass. The realigned and reconstructed portion of Clackamette Drive shall consist of two 12-foot-wide travel lanes with 6" curbs on each side of the roadway.

2. The applicant also proposes to realign the existing shared use path which runs along the east side of Clackamette Drive. The shared used path shall be at least 10 feet in width. A new parking area for Jon Storm Park is proposed on the east side of Clackamette Drive west of Mcloughlin Boulevard. An extension of the existing pedestrian or shared use path leading into this new parking area shall be provided. The applicant shall demonstrate how the existing shared use path from Sportscraft Landing may be extended north as a separate, or shared, pedestrian and bike path along Mcloughlin Boulevard which connects with the existing sidewalk and bike lane at Dunes Drive. The applicant shall demonstrate how this path can be aligned in such a way that it allows for the widening of Mcloughlin Boulevard to accommodate dual left turn lanes.

3. Main Street has right-of-way (ROW) that is, approximately, 60 to 70 feet in width and has 30 feet on the subject property side of the centerline. Existing improvements on the subject property side of the centerline of Main Street consist of approximately 18' of pavement (12' drive lane and 6' bike lane) and curb with some parts of the frontage having a 5-foot-wide sidewalk. The applicant may be required to improve the entire frontage of Main Street where construction is proposed. This includes areas which are adjacent to the proposed retaining wall improvements and under the I-205 overpass at Main Street. The improvements shall consist of a 6-foot-wide sidewalk with 4.5-foot-wide planter strip behind a 0.5' curb. Under the overpass, the width of the sidewalk may be reduced to 5 feet and placed curb-tight.

4. The applicant proposes to construct a retaining wall adjacent to Main Street. This retaining wall shall be terraced per the requirements of City code or the entirety of the retaining wall shall be located outside of City ROW.

5. Main Street has had surface treatment applied to it within the last 6 months. If construction activates cause damage to Main Street. The applicant shall provide surface treatment to the road.

6. Reduction to the standard improvements, ROW dedication and other deviations from the City's street design standards may be requested through the modification process outlined in section 12.04.007 of the Oregon City Municipal Code. Proposed modifications may require additional evidence and analysis for review.

Stormwater

1. The following are General Thresholds from the Stormwater and Grading Design Standard (Section 1.2.1), which can be found online at: https://www.orcity.org/sites/default/files/fileattachments/public_works/page/4224/final_manual_0.pdf

A. Development activities that result in 5,000 square feet of new or replaced impervious surface, cumulative over a 5-year period.

B. Development activities that will result in the **creation of more than 500 square feet of new impervious surface within a Natural Resource Overlay District (NROD)** (as defined by Oregon City Municipal Code [OCMC] 17.49), cumulative over a 5-year period.

C. Development activities that will **disturb 1,000 square feet of existing impervious surface within a Natural Resource Overlay District (NROD)** (as defined by Oregon City Municipal Code [OCMC] 17.49), cumulative over a 5-year period.

2. The project, as described in the Pre-Application submittal, appears to trigger all parts of the above General Thresholds. Projects within the General Thresholds are subject to the requirements of the City's Stormwater and Grading Design Standards.

3. Where compliance with the Stormwater and Grading Design Standards is required, applicants must submit a completed Site Assessment and Planning Checklist (and other items as described in Section 9.1.1 of the Stormwater and Grading Design Standards) as part of the land use application review process. At a minimum the applicant should submit a preliminary stormwater report addressing the following items from Section 9.1.1 of the City's Stormwater and Grading Design Standards.
   A. Stormwater management strategy
   B. A site plan showing an adequately sized stormwater facility based on Stormwater Best Management Practices (BMP) Sizing Tool or sized using the Engineered Method (as defined by City's Stormwater and Grading Design Standards).
   C. A geotechnical report or a Natural Resource Conservation Service (NRCS) soils report documenting onsite infiltration and soil conditions in support of a proposed stormwater management strategy.
   D. Downstream analysis which extends to the distance where the project site contributes less than 15 percent of the cumulative tributary drainage area or 1,500 feet downstream of the approved point of discharge, whichever is greater, as required by Chapter 5 of the Stormwater and Grading Design Standards.

4. The project is within the Abernethy drainage basin. ODOT owns several stormwater pipes which send storm water into the Willamette River.

Utilities

1. All utility conflicts shall be resolved with the City prior to approval of construction plans.

Other

1. The proposed development resides within the Natural Resource Overlay District (NROD); therefore, additional requirements from Planning shall be addressed.

2. Some areas of proposed construction reside within Geologic Hazard areas. If development of the area is determined to possibly not be detrimental to public safety or the adjacent properties, the applicant may apply for a Geologic Hazard review waiver. The fee for the City to process a Geologic Hazard Waiver is $642 and an indemnity agreement must be recorded on the property removing the City from any future liability. If the project cannot meet the requirements of the waiver the applicant will be required to address Chapter 17.44 of the Oregon City Municipal Code (OCMC). The City's geotechnical consultant will review the development for compliance with Chapter 17.44 of the OCMC and review fees shall be borne by the developer.

3. The proposed development resides within a floodplain or floodway. The applicant shall demonstrate adherence to City Code section 17.42.160 - Flood management area standards.

4. All traffic control plans and proposed road closures and detours which increase use of City roads shall be approved by the City.

5. Pedestrian access to boat ramps and docks at City parks shall be maintained.

Supplemental Information:

I. Documentation required before any construction plan review can begin by Public Works (which is after a land use decision has been made):

   a. Complete Engineering Plans (Public Improvements, all stormwater facilities, site grading and erosion control)
   b. Preliminary Cost Estimate for construction of Public Improvements, all stormwater facilities, site grading and erosion control.
   c. Plan Review Fee (to be implemented through an Intergovernmental Agreement)
   d. Complete Storm Water Report and Site Assessment and Planning Checklist
   e. Geotechnical Report (if required)

II. Documentation required before any construction plan can be deemed approved by Public Works (to be able to start construction or obtain a building permit):

   a. Inspection Fee
   b. Final Cost Estimate of Public Improvements
   c. Approved Engineering Plan stamped and signed by an Oregon Professional Engineer
   d. Approved Storm Water Report stamped and signed by an Oregon Professional Engineer
   e. DEQ Permit
   f. NPDES Permit
   g. Fish and Wildlife Permit
   h. Department of State Lands Permit
   i. Developer/Engineer Agreement
   j. Indemnity Agreement

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

Site Plan & Design Review Checklist

1. X **A Completed Application Form with All Property Owner Signatures** *(P)*

2. X **Narrative** *(P/DS)* Template Provided
A complete and detailed narrative description of the proposed development and an explanation addressing all applicable approval criteria. A template is provided at the Pre-Application Conference.

3. X **Site Plan and Design Review Construction Cost Form** *(P)*

4. X **Site Plan** *(P/DS)*
A detailed site development plan showing:
   - ❑ Vicinity information showing streets and access points, pedestrian and bicycle pathways, transit stops and utility locations
   - ❑ The site size, dimensions, and zoning, including dimensions and gross area of each lot or parcel and tax lot and assessor map designations for the proposed site and adjoining properties
   - ❑ Contour lines at 2 foot intervals for grades 0-10%, and 5-foot intervals for grades over 10%
   - ❑ The location of natural hazard areas on and within 100 feet of the boundaries of the site, including areas within the following overlay districts:
     - ❑ Flood Management Overlay District
     - ❑ Geologic Hazards Overlay District
     - ❑ Flood Management Overlay
     - ❑ Historic Overlay District
   - ❑ The location of inventoried historic or cultural resources on and within 100 feet of the site
   - ❑ The location, dimensions, and setback distances of all existing permanent structures, improvements and utilities on or within twenty-five feet of the site, and the current or proposed uses of the structures
   - ❑ The location, dimensions, square footage, building orientation and setback distances of proposed structure, improvements and utilities, and the proposed uses of the structures by square footage
   - ❑ The location, dimension and names, as appropriate, of all existing and platted streets, other public ways, sidewalks, bike routes and bikeways, pedestrian/bicycle accessways and other pedestrian and bicycle ways, transit street and facilities, neighborhood activity centers, and easements on and within two hundred fifty feet of the boundaries of the site
   - ❑ The location, dimension and names, as appropriate, of all proposed streets, other public ways, sidewalks, bike routes and bikeways, pedestrian/bicycle accessways and other pedestrian and bicycle ways, transit streets and facilities, neighborhood activity centers, and easements on and within two hundred fifty feet of the boundaries of the site
   - ❑ All parking, circulation, loading and servicing areas, including the locations of all carpool, vanpool and bicycle parking spaces as required
   - ❑ Site access points for automobiles, pedestrians, bicycles and transit
   - ❑ On-site pedestrian and bicycle circulation
   - ❑ Outdoor common areas proposed as open space
   - ❑ Total impervious surface created (including buildings and hard ground surfaces)

5. X **Landscaping Plan** *(P)*
A landscaping plan prepared by a registered landscape architect, drawn to scale, showing the location and types of existing trees (six inches or greater in caliper measured four feet above ground level) and vegetation proposed to be removed and to be retained on the site, the location and design of landscaped areas, the varieties, sizes and spacings of trees and plant materials to be planted on the site, other pertinent landscape features, and irrigation systems required to maintain plant materials.

5. X **Tree Removal and Mitigation Plan** *(P)*
A tree removal and mitigation plan must include the setbacks, easements and the location and caliper of all trees as well as identification of the trees 6" DBH and greater prepared in accordance with OCMC 17.41. A plan shall also be submitted identifying the location, species and caliper of trees replanted onsite. The tree mitigation plan report shall be prepared by a certified arborist, horticulturalist or forester or other environmental professional with experience and academic credentials in forestry or arborculture.

6. X **Street Tree Plan** *(P)*
A street tree plan, drawn to scale, identifying size and species of street trees, and location of trees, streetlights, and fire hydrants.

7. X **Exterior Lighting Plan** *(P)*
Photometric Plan drawn to scale, showing type, height, and area of illumination.

8. X **Architectural Drawings** *(P)*
Architectural drawings or sketches, drawn to scale and showing floor plans, elevations accurately reflected to grade, and exterior materials of all proposed structures and other improvements as they will appear on completion of construction.

9. X **Erosion and Sediment Control Plan** *(DS)*
In accordance with the requirements of Chapter 17.47 and the Public Works Erosion and Sediment Control Standards, and a drainage plan developed in accordance with city drainage master plan requirements, Chapter 13.12 and the Public Works Stormwater and Grading Design Standards. The drainage plan shall identify the location of drainage patterns and drainage courses on and within one hundred feet of the boundaries of the site. Where development is proposed within an identified hazard area, these plans shall reflect concerns identified in the hydrological/geological/ geotechnical development impact statement.

10. N/A **Materials Board** *(P)*
A materials board, no longer in size than eight and one-half inches by fourteen inches clearly depicting all building materials with specifications as to type, color and texture of exterior materials of proposed structures.

11. DS NOAKS **Preliminary Storm Calculations if Water Quality Detention is Required** *(DS)*

12. X **Neighborhood Association Meeting** *(P)*
- ❑ A sign-in sheet of meeting attendees
- ❑ A summary of issues discussed
- ❑ A letter from the neighborhood association or CIC indicating that a neighborhood meeting was held.
- ❑ If the applicant held a separately noticed meeting, the applicant shall submit a copy of the meeting flyer, a sign in sheet of attendees and a summary of issues discussed.

13. X **Pre-Application Conference Summary Sheet** *(P/DS)*

14. ___ **Additional Information or Reports** *(P/DS)*
If Required in Pre-Application Conference.

15. X **A Current Preliminary Title Report or Trio for the Subject Property(ies)** *(P)*

16. X **Mailing Labels for Owners within 300 Feet of the Subject Site or Fee for City-Provided Labels** *(P)*
The names and addresses of property owners within 300 feet of the site from a title company.

17. ___ **Copies** *(P)*
Two (2) copies of all information, reports, and drawings (full-sized and 8.5" by 11") pertaining to this application.

18. X **Electronic Version of All Application Materials** *(P/DS)*

19. X **All Required Application Fees** *(P)*

(P) = Contact the Planning Division at (503) 722.3789 with any questions regarding this item.
(DS) = Contact the Development Services Division at (503) 657.0891 with any questions regarding this item.
Incomplete applications will not be processed.

NATURAL RESOURCE OVERLAY DISTRICT
OCMC 17.49
APPLICATION CHECKLIST

The application will not be deemed complete without all of the requirements proceeding.

1. X **Complete Land Use Application Form**
List all applicable concurrent permit requests on the application form (e.g. Partition, Subdivision, Site Plan and Design Review)

2. X **Narrative** Template Provided
A complete and detailed narrative description of the proposed development that describes existing site conditions, existing buildings, public facilities and services, presence of streams, creeks wetlands, steep slopes and other natural features.

3. X **Code Criteria** Template Provided
A narrative explaining all aspects of the proposal in detail and addressing each of the criteria listed in Chapter 17.49, 17.50 and any other applicable section of the Oregon City Municipal Code.

4. X **Site Plans**
Site plans showing the following required items shall be part of the application:

X **A. For the entire subject property (NROD and non-NROD areas):**
- ❑ The NROD district boundary. This may be scaled in relation to property lines from the NROD Map;
- ❑ 100-year floodplain and floodway boundary (if determined by FEMA)
- ❑ Creeks and other waterbodies.
- ❑ Any wetlands, with the boundary of the wetland determined in a wetlands delineation report prepared by a professional wetland specialist and following the Oregon Division of State Lands wetlands delineation procedures
- ❑ Topography shown by contour lines of two or one foot intervals for slopes less than fifteen percent and by ten-foot intervals for slopes fifteen percent or greater
- ❑ Existing improvements such as structures or buildings, utility lines, fences, driveways, parking areas, etc.
- ❑ Extent of the required Vegetated Corridor required by Table 17.49.110.

X **B. Within the NROD area of the subject property:**
- ❑ The distribution outline of shrubs and ground covers, with a list of most abundant species.
- ❑ Trees six inches or greater in diameter, identified by species. When trees are located in clusters they may be described by the approximate number of trees, the diameter range, and a listing of dominant species;
- ❑ An outline of the disturbance area that identifies the vegetation that will be removed. All trees to be removed with a diameter of six inches or greater shall be specifically identified as to number, trunk diameters and species;
- ❑ If grading will occur within the NROD, a grading plan showing the proposed alteration of the ground at two-foot vertical contours in areas of slopes less than fifteen percent and at five-foot vertical contours of slopes fifteen percent or greater.

5. X **Construction Management Plan:**
   - ❑ Location of site access and egress that construction equipment will use;
   - ❑ Equipment and material staging and stockpile areas;
   - ❑ Erosion control measures that conform to City of Oregon City erosion control standards;
   - ❑ Measures to protect trees and other vegetation located outside the disturbance area.

6. X **Mitigation Site Plan demonstrating compliance with Section 17.49.180 or 17.49.190, including:**
   - ❑ Dams, weirs or other in-water features;
   - ❑ Distribution, species composition, and percent cover of ground covers to be planted or seeded;
   - ❑ Distribution, species composition, size, and spacing of shrubs to be planted;
   - ❑ Location, species and size of each tree to be planted;
   - ❑ Stormwater management features, including retention, infiltration, detention, discharges and outfalls;
   - ❑ Water bodies or wetlands to be created, including depth;
   - ❑ Water sources to be used for irrigation of plantings or for a water source for a proposed wetland.

7. X **Mitigation plan report**

The mitigation plan report shall be prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. The mitigation plan report shall, at a minimum, discuss:
   - ❑ Written responses to OCMC 17.49.180 or 17.49.190
   - ❑ A description of the resources and functional values to be restored, created, or enhanced
   - ❑ Documentation of coordination with appropriate local, regional, state and federal agencies such as the Oregon Department of State Lands (DSL) and the United States Army Crops of Engineers (USACE);
   - ❑ Construction timetables;
   - ❑ Monitoring and Maintenance practices pursuant to Section 17.49.230 and a
   - ❑ Contingency plan for undertaking remedial actions that might be needed to correct unsuccessful mitigation actions during the first five years of the mitigation area establishment.

8. X **Pre-Application Conference Summary Sheet**

9. _____ **Additional Information or Reports (If Required in Pre-Application Conference)**

10. X **Sheet Summary of the Meeting with the Applicable Neighborhood Association**

11. X **A Current Preliminary Title Report for the Subject Property(ies)**

12. X **Mailing Labels for Owners Within 300 Feet of the Subject Site**
   - ❑ The names and addresses of property owners within 300 feet of the site indicated on the most recent property tax rolls.

13. _____ **Copies**
   - ❑ Twelve (12) copies of all information, reports, and drawings (full-sized and 8.5" by 11") pertaining to this application.

14. X **Electronic Version of All Application Materials**

15. X **All Required Application Fees**

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

Variance Checklist

1. X **A Completed Application Form with All Property Owner Signatures** *(P)*

2. X **Narrative** *(P/DS)* Template Provided
A complete and detailed narrative description of the proposed development and an explanation addressing all applicable approval criteria. A template is provided at the Pre-Application Conference.

3. X **Site Plan Drawings** *(P)*
A scale-drawing of the property, displaying the dimensions and arrangements of the existing and proposed uses.

4. X **Architectural Drawings** *(P)*
Building elevations and envelopes, if architectural work is proposed.

5. X **For Planning Commission Variances: Neighborhood Association Meeting** *(P)*
   - ❑ A sign-in sheet of meeting attendees
   - ❑ A summary of issues discussed
   - ❑ A letter from the neighborhood association or CIC indicating that a neighborhood meeting was held.
   - ❑ If the applicant held a separately noticed meeting, the applicant shall submit a copy of the meeting flyer, a sign in sheet of attendees and a summary of issues discussed.

6. X **Pre-Application Conference Summary Sheet** *(P/DS)*

7. ___ **Additional Information or Reports** *(P/DS)*
If Required in Pre-Application Conference.

8. X **A Current Preliminary Title Report or Trio for the Subject Property(ies)** *(P)*

9. X **Mailing Labels for Owners within 300 Feet of the Subject Site or Fee for City-Provided Labels** *(P)*
The names and addresses of property owners within 300 feet of the site from a title company.

10. ___ **Copies** *(P)*
Two (2) copies of all information, reports, and drawings (full-sized and 8.5" by 11") pertaining to this application.

11. X **Electronic Version of All Application Materials** *(P/DS)*

12. X **All Required Application Fees** *(P)*

(P) = Contact the Planning Division at (503) 722.3789 with any questions regarding this item.
(DS) = Contact the Development Services Division at (503) 657.0891 with any questions regarding this item.
Incomplete applications will not be processed.

From: Diliana Vassileva
To: Snead, Carol V
Cc: Bauman, Brian S.; Barksdale, Rachel
Subject: RE: Pre-app
Date: Monday, August 12, 2019 2:10:53 PM
Attachments: image002.jpg
image003.jpg

Thanks, Carol. PA-19-08 is valid until February 28, 2020. If a land use application has not been submitted by then, a second pre-application conference will need to be scheduled.
Thanks,
Diliana

Email Signature Logo

Diliana Vassileva
Assistant Planner
Planning Division
City of Oregon City
PO Box 3040
698 Warner Parrott Road,
Oregon City, Oregon 97045
Direct - 503.974.5501
Planning Division - 503.722.3789
Fax 503.722.3880

Website: www.orcity.org | webmaps.orcity.org | Follow us on: Facebook!|Twitter
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From: Snead, Carol V <Carol.Snead@hdrinc.com>
Sent: Thursday, August 08, 2019 12:03 PM
To: Diliana Vassileva <dvassileva@orcity.org>
Cc: Bauman, Brian S. <Brian.Bauman@hdrinc.com>; Barksdale, Rachel <Rachel.Barksdale@hdrinc.com>
Subject: RE: Pre-app

Thanks for this information, Diliana.
To be clear, on behalf of the Applicant, we request a one-year extension. We recognize a second pre-app will be needed if we do not submit by February 28, 2020. Please acknowledge this extension via email for our records.

Many thanks,
Carol

Carol Snead
Environmental Project Manager

HDR
1050 SW 6th Avenue, Suite 1800
Portland OR 97204

D 503.423.3748 **M** 907.538.5425
carol.snead@hdrinc.com

hdrinc.com/follow-us

From: Diliana Vassileva [mailto:dvassileva@orcity.org]
Sent: Thursday, August 8, 2019 11:45 AM
To: Snead, Carol V <Carol.Snead@hdrinc.com>
Subject: Pre-app

Hi Carol,
I got your voicemail about the pre-app. There is no formal process and we can extend the validity of the pre-app to a year. However, if you exceed a year from the original pre-app you will need to schedule a second one.

Also, I confirmed with our director that the parks in MUD was inadvertently added to the permitted uses in the new code. The parking lot would still be considered a parking structure or lot not in conjunction with a primary use and would require a conditional use permit in the MUD zone.

Please let me know if you have any questions or if you need anything else from me.

Thanks,
Diliana

Email Signature Logo

Diliana Vassileva
Assistant Planner
Planning Division
City of Oregon City
PO Box 3040
698 Warner Parrott Road,
Oregon City, Oregon 97045
Direct - 503.974.5501
Planning Division - 503.722.3789
Fax 503.722.3880

Website: www.orcity.org | webmaps.orcity.org | Follow us on: Facebook!|Twitter
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Attachment J. Neighborhood Association Meeting Documentation

OREGON CITY

Two Rivers Neighborhood

625 Center Street | PO Box 3040 | Oregon City OR 97045
Ph (503) 657-0891 | Fax (503) 657-7026 | recorder@orcity.org

July 24, 2019

To: Diliana Vassileva
Assistant Planner
Oregon City Planning Division

Dear Ms. Vassileva:

This letter is to inform you that the Two Rivers Neighborhood Association held a meeting on Wednesday, July 24, 2019, at the Rivershore Bar & Grill at 199 Clackamette Drive, Oregon City, Oregon. The meeting was called to order at 7:00pm.

The meeting included a presentation of the I-205 Widening and Seismic Improvements Project to the Two Rivers Neighborhood Association members in attendance.

We understand this letter is required per Oregon City Municipal Code 17.50.055.

Signed,

Representative, Two Rivers Neighborhood Association

TWO RIVERS NEIGHBORHOOD ASSOCIATION

13285 S. Clackamas River Drive
Oregon City, OR 97045

AGENDA
JULY 24, 2019
7:00PM

CALL TO ORDER - Bryan Boyce, Chairman
SELF- INTRODUCTIONS

I-205 Abernethy Bridge Project
Lauren Wilbur, HDR

BUILDING & PLANNING UPDATE – Pete Walters, Oregon City Planning Department
The Cove Project Phase II
Re-Sale of Blue Herring Property

OREGON CITY POLICE UPDATE

OTHER ITEMS NOT ON THE AGENDA

ANNOUNCEMENTS

NEXT MEETING OF TWO RIVERS NA – October 23, 2019

MEETING ADJOURNED

I-205 Widening and Seismic Improvements Project Presentation

Two Rivers Neighborhood Association Meeting

Wednesday, July 24, 2019

Rivershore Bar & Grill
199 Clackamette Drive, Oregon City, Oregon.

Meeting Notes

Attendees:

Neighborhood Association Members and Guests	ODOT	HDR
Bryan Boyce, Chairman	Ellen Sweeney	Brian Bauman
Jerry Herman		Carol Snead
Jim Nicita		
Matthew Riegg		
Nancy Spanovich		
Gary Spanovich		

Issues Discussed (ODOT comments in *italics*)

1. Main Street Bridge Improvements
    a. The area under the bridge could attract people who might use the space for extended periods, creating a safety concern. *ODOT confirmed that security fencing will block areas behind bridge columns to prevent people from using that space.*
    b. Fires under bridges have occurred in other place and could happen here if the area is open to use.
    c. Noise walls are recommended to mitigate traffic noise for apartments. *ODOT will contact benefited receivers of noise mitigation walls to vote on wall design*.
2. Retaining Wall between 99E NB onramp and Main Street retaining wall
    a. Will this be in the ODOT right-of-way? *ODOT confirmed that the new wall will be in ODOT right-of-way.*
3. Abernethy Creek Culvert
    a. It would be good to daylight the culvert where it passes under the cloverleaf/99E onramp. *ODOT will not change the culvert.*
4. Abernethy Bridge Improvements
    a. Construction impacts could affect local businesses. *ODOT is coordinating with marina owner, considering appropriate compensation for adverse impacts.*
    b. Construction will affect park use and possibly the shelter. *ODOT intends to avoid interfering with trails leading to the shelter and the shelter and restroom facilities during construction. ODOT is coordinating with the Oregon City Parks Department.*
    c. The bridge improvements could be an educational opportunity for local students, particularly Clackamas Community College, to understand engineering practices related to reducing seismic hazards. *ODOT will take this under consideration.*
    d. Construction of bridge piers may cause bank scour. *ODOT has studied potential impacts to bank features, scour, and sedimentation. They do not expect scour and sedimentation on the river banks.*

e. What is the duration of construction? *ODOT estimates it will take four years for the entire project. There is no start date for construction because it is not funded for construction. Design (through final design) and right-of-way acquisition are funded. Construction will be scheduled to avoid closures during peak hours.*
f. What is being considered for funding? Tolls? *Funding sources are unknown at this time.*

5. Jim Nicita had the following recommendations for ODOT:
   a. Include access under I-205 from S. Agnes Avenue to Washington Street via an existing viaduct. This would improve access to End of the Oregon Trail. *It is not likely that there will be funding to add this element to the design. It is not identified as a need for ODOT.*
   b. For cut fill balance, dig out old dump off of Agnes and create a wetland, restoring the area to predevelopment conditions. *The site of the old dump is at high risk for presence of hazardous waste, which would add to the cost and schedule for ODOT.*
   c. The green spaces in cloverleaf areas (exit and on ramps) could be converted to rain gardens. *Those areas are planned for improvement as part of ODOT's landscaping plan.*

TWO RIVERS NA

MEETING

	A	B	C	D	E	
1		NAME	ADDRESS	ZIP	TELEPHONE	EMAIL ADDRESS
2	1	Matthew Riegg	PO Box 124 West Linn	97068	503-309-7600	riversoflifecenter@gmail.com
3	2	Jerry Herrmann	~~PO Box~~ 19475 Main St.	97045	503-260-3432	riversoflifecenter@gmail.com
4	3	Jim Nicita	302 Bluff St. Oregon City, OR	97045		jim_nicita@hotmail.com
5	4	GARY SPANOVICH	PO Box 597 Wilsonville, OR 97068		503-314-5955	JARYNANCY FAMILY@ gmail.com
6	5	NANCY SPANOVICH	OLMSTED LEGACY PO BOX 597 WILSONVILLE OR	97068	5037019987	olmstedlegacy7@gmail.com
7	6	Bryan Boyce		97045		
8	7	BRIAN BAUMAN	HDR 1050 SW Main St, PDX	97204	503.423.3700	brian.bauman@hdrinc.com
9	8	Carol Snead	"	"	"	carol.snead@hdrinc.com
10	9	Ellen Sweeney			503-731-8230	ellen.sweeney@odot.state.or.us
11	10					
12	11					

Attachment K. Section 106 Consultation

Oregon
Kate Brown, Governor

Department of Transportation
Highway Division/Technical Services
Geo-Environmental Section, MS#6
4040 Fairview Industrial Dr SE
Salem, OR 97302
Phone: (503) 986-3252
Fax: (503) 986-3249

August 2, 2018

Christine Curran
Deputy State Historic Preservation Officer
State Historic Preservation Office
725 Summer Street NE, Suite C
Salem, OR 97310-1271

Clackamas, Washington Counties

Canby, Oregon City, Sherwood Quads

T2S, R1W, Sec 25;
T2S, R1E, Sec 27-30, 34-36;
T2S, R2E, Sec 20, 29-31

SUBJECT **Request for Concurrence**
Joint Finding of No Adverse Effect
I_205: Stafford Road—OR213 Project
Clackamas and Washington Counties, Oregon
ODOT Key No. 19786
Federal Aid No. S064(057)PE
SHPO Case No. 17-0757

Dear Ms. Curran,

The Oregon Department of Transportation (ODOT), in cooperation with the Federal Highway Administration (FHWA), prepared the following letter in compliance with Section 106 of the National Historic Preservation Act. The letter includes a combined Finding of No Adverse Effect for historic properties (built environment and archaeological resources) for the I-205: Stafford Road—OR213 project.

Project Description:

ODOT proposes to alleviate traffic issues by widening I-205 (the East Portland Freeway) in Clackamas County, Oregon. The I-205: Stafford Road—OR213 project would widen the highway by adding both a northbound (NB) and southbound (SB) travel lane between MP 0.73 and 10.69 of I-205 (the East Portland Freeway) in Clackamas and Washington Counties, Oregon (Figure 1). The Abernethy Bridge over the Willamette River will also be widened and the NB and SB bridges over the Tualatin River will likely be replaced.

Consulting Parties:

Confederated Tribes and Bands of the Yakama Nation
Confederated Tribes of the Grand Ronde Community of Oregon

Confederated Tribes of Siletz Indians
Confederated Tribes of the Warm Springs Reservation of Oregon

Summary of Resources Present:

Archaeological Resources: [redacted] Multiple archaeological surveys have been conducted that overlap parts of the Area of Potential Effect (APE) [redacted] A comprehensive survey of the original planned project area of potential effect (APE) and subsequent expansions were conducted in May and August of 2017 [redacted] and in January of 2018 [redacted] Additional subsurface exploratory of testing was also conducted at some localities along the corridor [redacted]

In sum, 156 30x30cm exploratory probes were excavated [redacted] 50x50cm test units were excavated within the boundaries of [redacted] These investigations indicated that the portions of sites [redacted] within the project area [redacted] The site was judged to be not significant. [redacted]

As design of the project advanced, the APE was expanded in June 2018. Therefore, in July, 2018, OSMA conducted pedestrian survey of two small parcels [redacted] exploratory subsurface probing of two areas identified as high probability [redacted] and test excavations [redacted] The additional pedestrian survey and exploratory probing failed to identify any archaeological materials and no further work is recommended. [redacted] No evidence of intact site deposits were encountered and no further work is recommended. [redacted] No further work was recommended [redacted]

[redacted]

limits, the proposed undertaking will have No-Adverse Effect on those properties.

Built Environment Resources: ODOT contracted with the consulting firm HDR to prepare Section 106 compliance documentation for built resources on the I-205: Stafford Rd—OR213 Project. ODOT and HDR historians identified eight built historic resources in the project APE that were potentially eligible for the National Register of Historic Places. Upon evaluation of these resources, HDR and ODOT concluded that three of the built historic resources (two individual dwellings and one apartment building) had irretrievable integrity loss and were not eligible for the National Register. In addition, two dwellings were eligible for the National Register as part of a potential historic residential district. Finally, the Historic West Linn City Hall and the nearby Lynn View Apartments were individually eligible for the National Register. There are no other built historic properties in the project APE that were documented as eligible for or listed in the National Register. Please see the enclosed Section 106 Documentation Forms (DOEs) for those built historic resources that ODOT and HDR evaluated.

Upon evaluation of project effects on the five National Register-eligible properties in the APE, ODOT and HDR historians recommend that the project will have No Adverse Effect on all of them. Please see the enclosed Section 106 Findings of Effect Forms (FOE) for the five eligible properties that are in the project's APE.

The project APE has been revised to include a shoulder along OR213 at I-205 for installation of an electrical conduit to a utility pole that is next to a manufactured home sales facility. The electricity is needed for project construction. This site is at the north end of the project. There are no built environment historic properties within the OR213 shoulder or adjacent to the shoulder at this location. See Figure 2.

Based on the current project area, the findings from the current survey report, DOEs, and FOEs indicate that this project will have No Adverse Effect to historic properties. **However, if the scope of work for the project changes, additional archaeological and built environment investigations will be necessary.**

Finding of Effect:

Application of Section 106 Criteria for Identification and Evaluation of Historic Properties [36 CFR 800.4(d)] indicates a finding of "No Adverse Effect" for the I-205: Stafford Road—OR213 project, based on the findings outlined above. ODOT, acting as an agent of FHWA, requests your concurrence with a FINDING OF NO ADVERSE EFFECT on historic properties for the project.

If you have any questions, please contact Tobin C. Bottman, RPA, ODOT Archaeologist, at (503) 986-3783; Robert W. Hadlow, Ph.D., ODOT Senior Historian, at (503) 731-8239; or

Emily Cline, FHWA Environmental Specialist, at (503) 316-2547. You can reach me at (503) 986-3370.

Sincerely,

John Raasch
Environmental Resources Unit Manager

The State Historic Preservation Office concurs that the I-205: Stafford Road—OR213 project will have a No-Adverse Effect on Historic Properties (Archaeology).

SHPO Official (Archaeology) 8-17-18 **Date**

The State Historic Preservation Office concurs that the I-205: Stafford Road—OR213 project will have a No-Adverse Effect on Historic Properties (Built Environment).

SHPO Official (Built Environment 8/17/18 **Date**

Attachments:

Connolly 2018c
Connolly & Knowles 2018
Section 106 DOE, 1987 King St., West Linn
Section 106 DOE, 4600 Alder St., West Linn
Section 106 DOE, 5000 Broadway St., West Linn
Section 106 DOE, 5345 Grove St., West Linn
Section 106 DOE, 5370 Grove St., West Linn
Section 106 DOE, 5350 River St., West Linn
Section 106 DOE, 22825 Willamette Dr., West Linn
Section 106 DOE, 22840 Willamette Dr., West Linn
Section 106 FOE, 5345 Grove St., West Linn
Section 106 FOE, 5370 Grove St., West Linn
Section 106 FOE 5370 River St., West Linn
Section 106 FOE, 22825 Willamette Dr., West Linn
Section 106 FOE, 22840 Willamette Dr., West Linn
Key 19786, File Type C

Attachment L. Permits

DSL Permit #62035-RF

Department of State Lands
775 Summer Street, Suite 100
Salem, OR 97301-1279
☎ 503-986-5200

Permit No.:	**62035-RF**
Permit Type:	**Removal/Fill**
Waters:	**Wetland/Willamette River/ Abernethy Creek/ McLoughlin Creek**
County:	**Clackamas**
Expiration Date:	**July 15, 2020**

ODOT

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE REFERENCED APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder must obtain all necessary access permits or rights-of-way before entering lands owned by another.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action, which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. Employees of the Department of State Lands (DSL) and all duly authorized representatives of the Director must be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
6. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within twenty-one (21) calendar days of the date this permit was issued.
7. In issuing this permit, DSL makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390, and related administrative rules.
8. Permittee must defend and hold harmless the State of Oregon, and its officers, agents and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.
9. Authorization from the U.S. Army Corps of Engineers may also be required.

NOTICE: If removal is from state-owned submerged and submersible land, the permittee must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 to 274.940 if you want a transfer of title; public rights to such filled lands are not extinguished by issuance of this permit. This permit does not relieve the permittee of an obligation to secure appropriate leases from DSL, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact Department of State Lands, 503-986-5200.

Kirk Jarvie, Southern Operations Manager
Aquatic Resource Management
Oregon Department of State Lands

Kirk Jarvie
Digitally signed by Kirk Jarvie
Date: 2019.07.15 14:49:49 -07'00'

Authorized Signature

ATTACHMENT A

Permit Holder: ODOT

Project Name: I-205: I-5 – OR 213, Phase I Sec. Abernethy

Special Conditions for Removal/Fill Permit No. 62035-RF

READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT.

The project site may be inspected by the Department of State Lands (DSL) as part of our monitoring program. A copy of this permit must be available at the work site whenever authorized operations are being conducted.

1. **Responsible Party:** By proceeding under this permit, ODOT agrees to comply with and fulfill all terms and conditions of this permit, unless the permit is officially transferred to another party as approved by DSL. In the event information in the application conflicts with these permit conditions, the permit conditions prevail.

2. **Authorization to Conduct Removal and/or Fill:** This permit authorizes removal and fill of material in T2S R2E Sections 29/30, many tax lots, in Clackamas County, as referenced in the application, map and drawings (See Attachment B for project location), complete on June 6, 2019 and summarized as follows:

Summary of Authorized Wetland Impacts

Wetland #	Permanent			Temporary		
	Acres	Removal (cy)	Fill (cy)	Acres	Removal (cy)	Fill (cy)
Wetland 37	**--**	**--**	**--**	**0.003**	**9**	**9**

Summary of Authorized Waterway Impacts

Waterway Name	Permanent			Temporary		
	Linear Ft.	Removal (cy)	Fill (cy)	Linear Ft.	Removal (cy)	Fill (cy)
Willamette River	30	40,185	28,696	120	4,305	4,305
Abernathy Creek	30	4,405	3,284	175	420	420
McLoughlin Creek	340	899	784	340	2,437	2,552
Total:	**400**	**45,489**	**32,764**	**635**	**7,162**	**7,277**

*These volumes include removal and fill activities necessary to complete the required restoration and mitigation.

3. **Work Period in Jurisdictional Areas:** Fill or removal activities below the ordinary high water elevation of Abernathy Creek must be conducted between July 1 and October 31; other than for the activities noted below, fill or removal activities below the ordinary high water elevation of Willamette River must be conducted between July 1 and October 31; drilled shaft oscillation work in the Willamette River behind the constructed coffer dams may occur between July 1 and December 31; use of the barge in the Willamette may occur year round. Extensions to these periods may only occur if coordinated with Oregon Department of Fish and Wildlife and approved

in writing by DSL. If fish eggs are observed within the project area, work must cease, and DSL contacted immediately.

4. **Changes to the Project or Inconsistent Requirements from Other Permits:** It is the permittee's responsibility to ensure that all state, federal and local permits are consistent and compatible with the final approved project plans and the project as executed. Any changes made in project design, implementation or operating conditions to comply with conditions imposed by other permits resulting in removal-fill activity must be approved by DSL prior to implementation.

5. **DSL May Halt or Modify:** DSL retains the authority to temporarily halt or modify the project or require rectification in case of unforeseen adverse effects to aquatic resources or permit non-compliance.

6. **DSL May Modify Conditions Upon Permit Renewal:** DSL retains the authority to modify conditions upon renewal, as appropriate, pursuant to the applicable rules in effect at the time of the request for renewal or to protect waters of this state.

Pre-Construction

7. **Local Government Approval Required Before Beginning Work:** Prior to the start of construction, the permittee must obtain a Development permit and Site Plan and Design Review, Variance and Natural Resource Review application required from Oregon City and a development permit from West Linn.

8. **DSL Proprietary Authorization Required Before Beginning Work:** Prior to the start of work within state-owned submerged and submersible lands, the permittee must obtain an easement from the Department of State Lands.

9. **Stormwater Management Approval Required Before Beginning Work:** Prior to the start of construction, the permittee must obtain a National Pollution Discharge Elimination System (NPDES) permit from the Oregon Department of Environmental Quality (DEQ), if one is required by DEQ.

10. **Authorization to Use Property for Linear Projects**: For linear facility projects, the removal-fill activity cannot occur until the person obtains:

    a. The landowner's consent;
    b. A right, title or interest with respect to the property, that is sufficient to undertake the removal or fill activity; or
    c. A court order or judgment authorizing the use of the property

11. **Pre-construction Resource Area Fencing or Flagging:** Prior to any site grading, the boundaries of the avoided wetlands, waterways, and riparian areas adjacent to the project site must be surrounded by noticeable construction fencing or flagging. The marked areas must be maintained during construction of the project and be removed immediately upon project completion.

General Construction Conditions

12. **Water Quality Certification:** The Department of Environmental Quality (DEQ) may evaluate this project for a Clean Water Act Section 401 Water Quality Certification (WQC). If the evaluation results in issuance of a Section 401 WQC, that turbidity condition will govern any allowable turbidity exceedance and monitoring requirements.

13. **Erosion Control Methods:** The following erosion control measures (and others as appropriate) must be installed prior to construction and maintained during and after construction as appropriate, to prevent erosion and minimize movement of soil into waters of this state.

    a. All exposed soils must be stabilized during and after construction to prevent erosion and sedimentation.
    b. Filter bags, sediment fences, sediment traps or catch basins, leave strips or berms, or other measures must be used to prevent movement of soil into waterways and wetlands.
    c. To prevent erosion, use of compost berms, impervious materials or other equally effective methods, must be used to protect soil stockpiled during rain events or when the stockpile site is not moved or reshaped for more than 48 hours.
    d. Unless part of the authorized permanent fill, all construction access points through, and staging areas in, riparian and wetland areas must use removable pads or mats to prevent soil compaction. However, in some wetland areas under dry summer conditions, this requirement may be waived upon approval by DSL. At project completion, disturbed areas with soil exposed by construction activities must be stabilized by mulching and native vegetative plantings/seeding. Sterile grass may be used instead of native vegetation for temporary sediment control. If soils are to remain exposed more than seven days after completion of the work, they must be covered with erosion control pads, mats or similar erosion control devices until vegetative stabilization is installed.
    e. Where vegetation is used for erosion control on slopes steeper than 2:1, a tackified seed mulch must be used so the seed does not wash away before germination and rooting.
    f. Dredged or other excavated material must be placed on upland areas having stable slopes and must be prevented from eroding back into waterways and wetlands.
    g. Erosion control measures must be inspected and maintained as necessary to ensure their continued effectiveness until soils become stabilized.
    h. All erosion control structures must be removed when the project is complete, and soils are stabilized and vegetated.

14. **Fuels, Hazardous, Toxic, and Waste Material Handling:** Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, wood treated with leachable preservatives or other deleterious waste materials must not be allowed to enter waters of this state. Machinery and equipment staging, cleaning, maintenance, refueling, and fuel storage must be at least 150 feet from OHW or HMT and wetlands to prevent contaminates from entering waters of the state. Refueling is to be confined to a designated area to prevent spillage into waters of this state. Barges must have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.

15. **Archaeological Resources:** If any archaeological resources, artifacts or human remains are encountered during construction, all construction activity must immediately cease. The State Historic Preservation Office must be contacted at 503-986-0674. You may be contacted by a Tribal representative if it is determined by an affected Tribe that the project could affect Tribal cultural or archeological resources.

16. **Construction Corridor:** There must be no removal of vegetation or heavy equipment operating or traversing outside the designated construction corridor or footprint (Figures 5-3A through 5-18).

17. **Hazards to Recreation, Navigation or Fishing:** The activity must be timed so as not to unreasonably interfere with or create a hazard to recreational or commercial navigation or fishing.

18. **Operation of Equipment in the Water:** Heavy equipment may be positioned below ordinary high water or highest measured tide if the area is isolated from the waterway and aquatic organism salvage is completed. All machinery operated below ordinary high water (OHW) or highest measured tide (HMT) elevation must use vegetable-based hydraulic fluids, be steam cleaned and inspected for leaks prior to each use, and be diapered to prevent leakage of fuels, oils, or other fluids below OHW or HMT elevation. Any equipment found to be leaking fluids must be immediately removed from and kept out of OHW or HMT until repaired.

19. **Work Area Isolation:** The work area must be isolated from the water during construction by using a coffer dam or similar structure. All structures and materials used to isolate the work area must be removed immediately following construction and water flow returned to pre-construction conditions.

20. **Fish Salvage Required:** Fish must be salvaged from the isolation area. Permits from NOAA Fisheries and Oregon Department of Fish and Wildlife, Fish Research are required to salvage fish. Fish salvage permit information may be obtained by contacting ODFW Fish Research at 503-947-6254 or Fish.Research@state.or.us.

21. **Fish Passage Required:** The project must meet Oregon Department of Fish and Wildlife requirements for fish passage.

22. **Raising or Redirecting Water:** The project must not cause water to rise or be redirected and result in damage to structures or property on the project site as well as adjacent, nearby, upstream, and downstream of the project site.

Pilings

23. **Method of Piling Placement:** Pilings must be placed by means of vibratory hammer. An impact hammer is allowed only as necessary for proofing the pile.

24. **Sound Reduction:** To reduce sound impacts to fish from an impact hammer, a fully-confined bubble curtain will be used if installation requires impact proofing.

25. **Method of Piling Removal:** Removal of pile must be conducted by means of vibratory removal and pulling. Piles that cannot be extracted by this method must be cut off 3 feet below the stream bed.

26. **Leachable Preservatives Prohibited:** There must be no wood products treated with creosote or other leachable preservatives in the new structure.

27. **Waste Pilings Disposal:** Old piling and other waste material must be disposed of in a disposal facility approved for this purpose. There must be no temporary storage of piling or other waste material below top of bank or in any wetland, Federal Emergency Management Administration designated floodway, or an area historically subject to landslides.

Site Rectification

28. **Abernathy Creek Rectification and Improvements:** The existing riprap and streambed must be reconfigured to create a low flow channel; fish rocks and large woody material must be added to provide fish passage and stabilize the channel. The large wood must be incorporated in the form and manner described in the application and Figures 5-14 and 5-15.

29. **McLoughlin Creek and Wetland 37 Rectification and Improvements:** The final completed contours of the wetland and stream will be restored and planted as described in the application. The slope of the McLoughlin Creek channel must be the same or flatter the pre-construction conditions; the width must be equal to or greater than pre-construction conditions.

30. **Trenching in Wetland 37:** During trenching or excavation, the top layer of soil must be separated from the rest of the excavated material and put back on top when the trench or pit is back-filled. If the native underlying soils are not used as bedding material and a coarser, non-native soil or other material is used, preventative measures such as clay or concrete plugs must be used so that underground hydraulic piping does not dewater the site and adjacent wetlands.

31. **Pre-construction Elevations Must Be Restored Within the Same Construction Season:** Construction activities within areas identified as temporary impact must not exceed two construction seasons and rectification of temporary impacts must be completed within 24 months of the initiation of impacts. However, if the temporary impact only requires one construction season, re-establishment of pre-construction contours must be completed within that same construction season, before the onset of fall rains.

32. **Planting in Soils and Riprap Required:** Disturbed areas above OHW must be planted and seeded immediately following establishment of final contours. Planting of native woody vegetation must be completed during the time of year that provides the optimal chances of survival immediately following construction (Figure FA13 [Abernathy Creek], FA14 and FA15 [McLoughlin Creek and Wetland 37]).

33. **Woody Vegetation Planting Required:** Planting of native woody vegetation must be completed before the next growing season after re-establishment of the pre-construction contours (Figure FA13 [Abernathy Creek], FA14 and FA15 [McLoughlin Creek and Wetland 37]).

Monitoring and Reporting Requirements

34. **Post-Construction Report Required:** A post-construction report demonstrating as-built conditions and discussing any variation from the approved plan must be provided to DSL with the first monitoring report. The post-construction report must include:

a. A scaled drawing, accurate to 1-foot elevation, clearly showing the following:
    1. Finished contours of the site.
    2. The riprap removal area pre- and post-project contours
    3. The streambed as reconfigured, including low flow channel, fish rocks, and large woody material
    4. Photo point locations.
b. Photos from fixed photo points. This should clearly show the site conditions
c. A narrative that describes any deviation from the plan.

35. **Annual Monitoring Reports Required:** Monitoring is required until DSL has officially released the site from further monitoring. The permittee must monitor the site to determine whether the site is meeting performance standards for a minimum period of 3 growing seasons after completion of all the initial plantings. Annual monitoring reports are required and are due by December 31. Failure to submit the required monitoring report by the due date may result in an extension of the monitoring period or enforcement action.

36. **Extension of the Monitoring Period:** The monitoring period may be extended, at the discretion of DSL, for failure of the site to meet performance standards for the final two consecutive years without corrective or remedial actions (such as irrigation, significant weed/invasive plants treatment or replanting) or when needed to evaluate corrective or remedial actions.

37. **Contents of the Annual Monitoring Report:** The annual monitoring report must include the following information:

    a. Completed Monitoring Report Cover Sheet, which includes permit number, permit holder name, monitoring date, report year, performance standards, and a determination of whether the site is meeting performance standards.
    b. Site location map(s) that clearly shows the site boundaries.
    c. Site Plan that clearly shows at least the following.
        1. The area seeded, with the square foot area listed.
        2. The area planted with trees and shrubs, with the square foot area listed.
        3. Permanent monitoring plot locations that correspond to the data collected and fixed photo-points. These points should be overlaid on the as-built map.
    d. A brief narrative that describes maintenance activities and recommendations to meet success criteria. This includes when irrigation occurred and when the above ground portion of the irrigation system was or will be removed from the site.
    e. Data collected to support the conclusions related to the status of the site relative to the performance standards listed in this permit (include summary/analysis in the report and raw data in the appendix). Data should be submitted using the DSL Mitigation Monitoring Vegetation Spreadsheet or presented in a similar format as described in DSL's Routine Monitoring Guidance for Vegetation.
    f. Photos from fixed photo points (include in the appendix).
    g. Other information necessary or required to document compliance with the performance standards listed in this permit.

38. **Corrective Action May Be Required:** DSL retains the authority require corrective action in the event the performance standards are not accomplished at any time within the monitoring period.

Performance Standards for Wetland 37 Rectification

39. **Establishment of Permanent Monitoring Locations Required:** Permanent plot locations must be established during the first annual monitoring in sufficient number and locations to be representative of the site. The permanent plot locations must be clearly marked on the ground.

40. **Wetland 37 Acreage Required:** The proposed impacts at Wetland 37 will have a minimum 0.003 acres as determined by hydrology data collected during spring of a year when precipitation has been near normal, vegetation has been established, and irrigation has been removed for at least two years.

41. **Native Species Cover:** The cover of native species, as defined in the USDA Plants Database, in the herbaceous stratum is at least 60%.

42. **Invasive Species Cover:** The cover of invasive species is no more than 20%. A plant species should automatically be labeled as invasive if it appears on the current Oregon Department of Agriculture noxious weed list.

Performance Standards for McLoughlin and Abernethy Creeks Rectification

43. **Woody Vegetation:** The density of woody vegetation is at least 1 live native shrubs or tree every 6 linear feet on each disturbed waterway bank. Native species volunteering on the site may be included, dead plants do not count, and the standard must be achieved for 2 years without irrigation.

Monitoring and Reporting Schedule

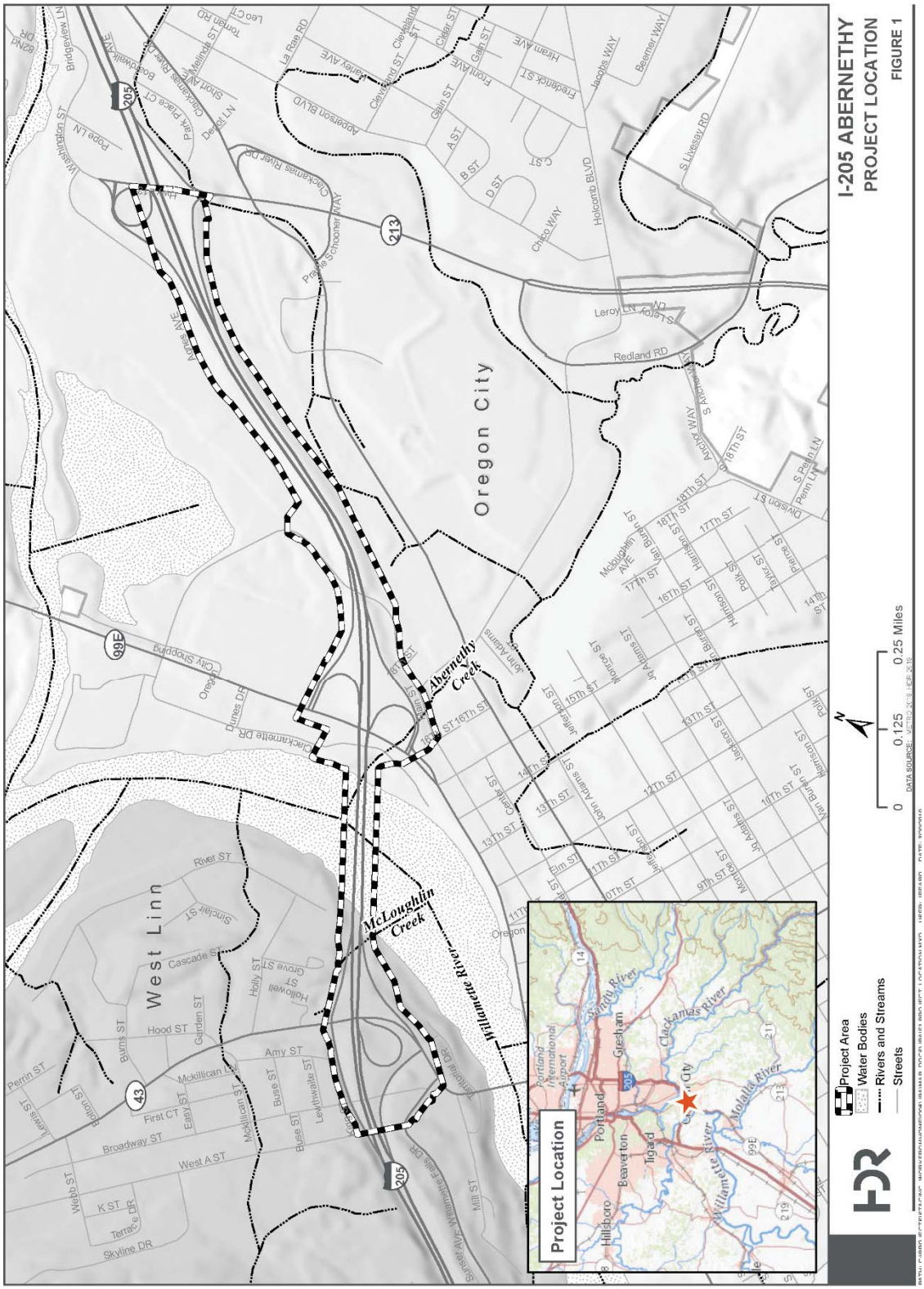
Report	Requirements	Schedule
Post-Construction and First Annual Report	Post-construction report Establishment of permanent monitoring locations Vegetation performance standards Demonstration that wetland hydrology has been accomplished	After one growing season of all proposed plantings
Second Annual Report	Vegetation performance standards	After two growing seasons
Third Annual Report (or final report if the monitoring period has been extended)	Vegetation performance standards Actual acreage achieved by HGM and Cowardin class[1].	After three or final monitoring season

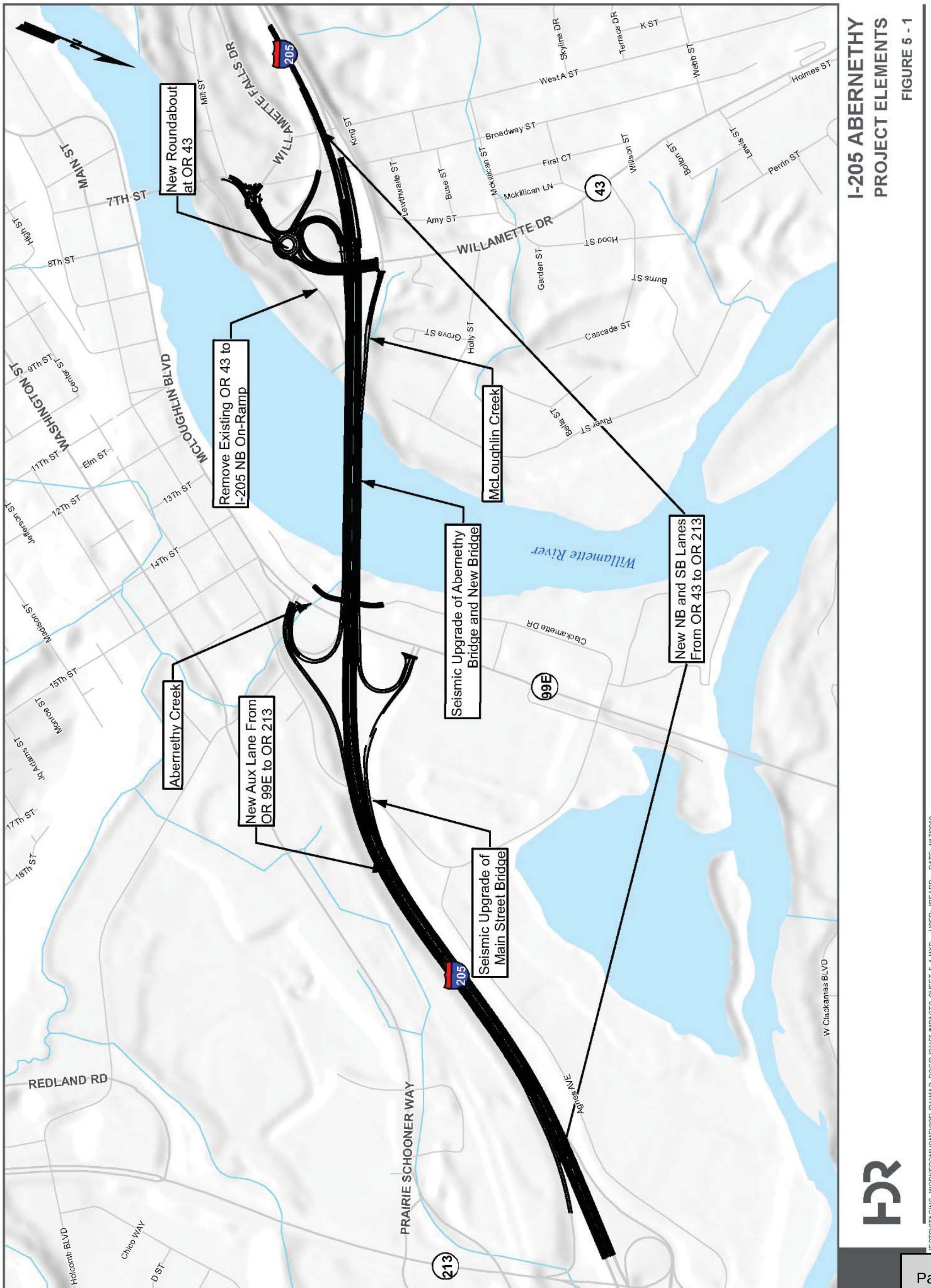
ATTACHMENT B

Permit Holder: ODOT

Project Name: I-205: I-5 – OR 213, Phase I Sec. Abernethy

Maps and Drawings for Removal/Fill Permit No. 62035-RF




I-205 ABERNETHY
PROJECT ELEMENTS
FIGURE 5 - 1
New Roundabout at OR 43
Remove Existing OR 43 to I-205 NB On-Ramp
McLoughlin Creek
Seismic Upgrade of Abernethy Bridge and New Bridge
New NB and SB Lanes From OR 43 to OR 213
Abernethy Creek
New Aux Lane From OR 99E to OR 213
Seismic Upgrade of Main Street Bridge
Willamette River
WILLAMETTE DR
WILLAMETTE FALLS DR
MCLOUGHLIN BLVD
WASHINGTON ST
MAIN ST
7TH ST
REDLAND RD
PRAIRIE SCHOONER WAY
205
43
99E
213

DEQ 401 Water Quality Certification

Oregon
Kate Brown, Governor

Department of Environmental Quality
Northwest Region Portland Office/Water Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100
(503) 229-5263
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TTY 711

November 26, 2019

Denis Reich, Environmental Manager
Oregon Department of Transportation (ODOT), Region 1
123 NW Flanders Street
Portland, OR 97209-4012

RE: NWP-2016-00458-4; I-205: I-5 – OR 213, Phase I Sec. Abernethy 401 Water Quality Certification

The Oregon Department of Environmental Quality (DEQ) has reviewed the U.S. Army Corps of Engineers (USACE) permit application #NWP-2016-458-4 (Department of State Lands [DSL] #62035), pursuant to a request for a Clean Water Act Section 401 Water Quality Certification (WQC) received on July 30, 2019. DEQ's 401 Water Quality Certification circulated with the Corps' public notice, and DEQ received no water quality comments.

According the Joint Permit Application, The Oregon Department of Transportation (the "Applicant") proposes to impact the Willamette River, McLoughlin Creek, Abernethy Creek, and a wetland adjacent to McLoughlin Creek, by excavating 52,660 cubic yards (cy) of earthen material and discharging 40,050 cy of fill material. The purpose of the project is to seismically retrofit and widen the Abernethy and Main Street Bridges, and create auxiliary lanes proximal to these bridges. The project is located in wetlands adjacent, and tributaries that discharge to the Willamette River at river mile 25, West Linn, Clackamas County, Oregon (Sections 29 and 30, Township 2S/ Range 2E).

Project Description: The proposed project work will impact 1.85 acres of waterbodies in order to seismically retrofit and widen the Abernethy and Main Street Bridges. The Applicant will construct five new in-water support piers adjacent to existing piers. The existing piers will then be cut to a depth of approximately 5 feet below existing ground. Riprap will be removed from the existing pier sites as well, to a depth of 5-feet below ground surface and 10-feet in diameter around each removed in-water pier. Approximately 33,375 to 50,733 square feet of riprap is expected to be removed from the Willamette River to allow for pile and drilled shaft installation. The Applicant will also widen the bridge, adding northbound and southbound lanes to I-205 between the OR 43 Interchange and the OR 99 Interchange, and an auxiliary lane on I-205 between OR 99 and OR 213. The purpose of this project is to reduce congestion and provide necessary seismic upgrades to the structural supports to the Abernethy and Main Street Bridges. In addition, Abernathy Creek will be re-aligned and riprap will be removed to accommodate the Pier 3 drilled shaft. A temporary work bridge will be required for work within the Willamette River, and is expected to remain in place for up to 4 years. Construction activities will result in a total of 21 acres of ground disturbance.

The project will create 31.336-acres of impervious surface. As mitigation for this loss, the Applicant has proposed compensatory wetland mitigation through on-site permittee responsible mitigation, including riparian bank work along Abernethy Creek, the realignment of Abernethy

Creek with improved fish passage and enhancements, the realignment of McLoughlin Creek, and the restoration of a wetland identified as Wetland 37.

Status of Affected Waters of the State: The Willamette River is classified as water quality limited under the Federal Clean Water Act and is listed on the Section 303(d) List of impaired water bodies for the parameters of aldrin, biological criteria, chlordane, chlorophyll a, copper, cyanide, DDE 4,4, DDT 4,4, dieldrin, hexachlorobenzene, iron, lead, pentachlorophenol, PCBs, and PAHs; and has Environmental Protection Agency Total Maximum Daily Loads (TMDLs) developed for the parameters of temperature, dioxin, mercury, and *E.coli*.

The above listed parameters impair the following beneficial uses in the Willamette River: public domestic water supply, private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, and wildlife and hunting. Additional beneficial uses include: fishing, boating, water contact recreation, and aesthetic quality, hydropower, commercial navigation and transportation.

Certification Decision: Based on the information provided by the Applicant and the USACE, DEQ is reasonably assured that implementation of the project will be consistent with applicable provisions of Sections 301, 302, 303, 306 and 307 of the federal Clean Water Act, state water quality standards set forth in Oregon Administrative Rules Chapter 340 Division 41 and other requirements of state law, provided the following conditions are strictly adhered to by the Applicant.

401 WQC GENERAL CONDITIONS

1) **Responsible parties:** This 401 WQC applies to the Applicant. The Applicant is responsible for the work of its contractors and subcontractors, as well as any other entity that performs work related to this Water Quality Certification.

2) **Work Authorized:** Work authorized by this 401 Water Quality Certification is limited to the work described in the Joint Permit Application signed on May 9, 2019 and additional application materials (hereafter "the permit application materials"), unless otherwise authorized by DEQ. If the project is operated in a manner that's not consistent with the project description in the permit application materials, the Applicant is not in compliance with this 401 Water Quality Certification and may be subject to enforcement.

3) **Duration of Certificate:** This 401 Water Quality Certification for impacts to waters, including dredge and fill activities, is valid until closure of the in-water timing window (see Condition 2) of the fifth year from the date of issuance of the USACE 404 permit. A new or modified 401 certification must be requested before any modification of the US Army Corps of Engineers 404 permit. Post construction stormwater facilities must be maintained for the life of the facility.

4) **401 WQC on Site:** A copy of this 401 Water Quality Certification letter must be kept on the job site and readily available for reference by the Applicant and its contractors and subcontractors, as well as by DEQ, USACE, National Marine Fisheries Service, Oregon Department of Fish and Wildlife and other state and local government inspectors.

5) **Modification:** Any approved modifications to this certification will incur a Tier 1 fee of $985 at a minimum. Complex modifications may be charged a higher fee.

6) **Notification:** The Applicant must notify DEQ of any change in ownership or control of this project within 30 days, and obtain DEQ review and approval before undertaking any change to the project that may potentially affect water quality.

7) **Project Changes:** DEQ may modify or revoke this certification, in accordance with Oregon Administrative Rules 340-048-0050, if the project changes or project activities are having an adverse impact on state water quality or beneficial uses, or if the Applicant violates any of the conditions of this certification.

8) **Access:** The Applicant and its contractors must allow DEQ access to the project site with or without prior notice, including staging areas, and mitigation sites to monitor compliance with these certification conditions, including:
   a. Access to any records, logs, and reports that must be kept under the conditions of this certification
   b. To inspect best management practices, monitoring or equipment or methods
   c. To collect samples or monitor any discharge of pollutants.

9) Failure of any person or entity to comply with this order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.

CONSTRUCTION SPECIFIC CONDITIONS

10) **Erosion Control**: During construction, erosion control measures must be implemented to prevent soil from entering waters of the state. The Applicant is required to develop and implement an effective erosion and sediment control plan. Refer to DEQ's Oregon Sediment and Erosion Control Manual, January, 2013 at: https://www.oregon.gov/deq/FilterPermitsDocs/ErosionSedimentControl.pdf
Any project that disturbs more than one acre is required to obtain a National Pollutant Discharge Elimination System 1200-C construction stormwater general permit from DEQ. Contact DEQ for more information (Contact information can be found at: https://www.oregon.gov/deq/wq/wqpermits/Pages/Stormwater-Construction.aspx

In addition, the Applicant must do the following, unless otherwise authorized by DEQ:

   a. Maintain an adequate supply of materials necessary to control erosion at the construction site
   b. Deploy compost berms, impervious materials, or other effective methods during rain or when stockpiles are not moved or reshaped for more than 48 hours. Erosion of stockpiles is prohibited
   c. Inspect erosion control measures daily and maintain erosion control measures as often as necessary to ensure the continued effectiveness of measures. Erosion control measures must remain in place until all exposed soil is stabilized;
      i. If monitoring or inspection shows that the erosion and sediment controls are ineffective, the Applicant must act immediately to make repairs, install replacements, or install additional controls as necessary.
      ii. If sediment has reached a third of the exposed height of a sediment or erosion control, the Applicant must remove the sediment to its original contour.
   d. Use removable pads or mats to prevent soil compaction at all construction access points through, and staging areas in, riparian or wetland areas to prevent soil compaction, unless otherwise authorized by DEQ.

e. Flag or fence off wetlands not specifically authorized to be impacted to protect from disturbance and/or erosion.
f. Place dredged or other excavated material on upland areas with stable slopes to prevent materials from eroding back into waterways or wetlands.
g. Place clean aggregate at all construction entrances, and utilize other best management practices, including, but not limited to truck or wheel washes, when earth-moving equipment is leaving the site and traveling on paved surfaces. Vehicles are prohibited from tracking sediment off site.
h. This certification *does not* authorize the placement of best management practices into waters of the state unless specifically outlined in the application and authorized by DEQ.
i. Upon completion of construction activities, stormwater facilities must be inspected and tested to ensure they are working and adequately prepared for post-construction stormwater treatment.

11) **Deleterious waste materials**: The Applicant is prohibited from placing biologically harmful materials and construction debris including, but not limited to: petroleum products, chemicals, cement cured less than 24 hours, welding slag and grindings, concrete saw cutting by-products, sandblasted materials, chipped paint, tires, wire, steel posts, and asphalt and waste concrete where such materials could enter waters of the state, including wetlands (wetlands are waters of the state).

The Applicant must:

a. Cure concrete, cement, or grout for at least 24 hours before any contact with flowing waters;
b. Use only clean fill, free of waste and polluted substances
c. Employ all practicable controls to prevent discharges of spills of harmful materials to surface or groundwater
d. Maintain at the project construction site, and deploy as necessary, an adequate supply of materials needed to contain deleterious materials during a weather event
e. Remove all foreign materials, refuse, and waste from the project area
f. Employ general good housekeeping practices at all times

12) **Spill Prevention:** The Applicant must have a spill prevention and control plan. The Applicant must fuel, operate, maintain and store vehicles and equipment, and must store construction materials, in areas that will not disturb habitat directly or result in potential discharges. In general, reasonable precautions and controls must be used to prevent any discharges of petroleum products or other harmful or toxic materials from entering the water as a result of any in-water activities. In addition, the following specific requirements apply:

a. Vehicle and motorized equipment staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area 150 feet or more from any waters of the state. DEQ may approve in writing exceptions to this distance if all practical prevention measures are employed and this distance is not possible because of any of the following site conditions:
    i. Physical constraints that make this distance not feasible (e.g., steep slopes, rock outcroppings)
    ii. Natural resource features would be degraded as a result of this setback

iii. Equal or greater spill containment and effect avoidance is provided even if staging area is less than 150 feet away from waters of the state

b. If staging areas are within 150 feet of any waters of the state, as allowed under subsection (a)(iii) of this condition, full containment of potential contaminants must be provided to prevent soil and water contamination, as appropriate
c. All vehicles operated within 150 feet of any waters of the state must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected in the vehicle-staging area must be repaired before the vehicle resumes operation
d. Before operations begin and as often as necessary during operation, equipment must be steam cleaned (or undergo an approved equivalent cleaning) until all visible oil, grease, mud, and other visible contaminants are removed if the equipment will be used below the bank of a waterbody
e. All stationary power equipment (e.g., generators, cranes, stationary drilling equipment) operated within 150 feet of any waters of the state must be covered by an absorbent mat to prevent leaks, unless other suitable containment is provided to prevent potential spills from entering any waters of the state
f. An adequate supply of materials (such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials) needed to contain spills must be maintained at the project construction site and deployed as necessary
g. All equipment operated in state waters must use bio-degradable hydraulic fluid
h. A maintenance log documenting equipment maintenance inspections and actions must be kept on-site and available upon request

13) **Spill & Incident Reporting**:

a. In the event that petroleum products, chemicals, or any other harmful materials are discharged into state waters, or onto land with a potential to enter state waters, the Applicant must promptly report the discharge to the Oregon Emergency Response System (800-452-0311). The Applicant must immediately begin containment and complete cleanup as soon as possible.
b. If the project operations cause a water quality problem which results in distressed or dying fish, the Applicant must immediately:
    - Cease operations
    - Take appropriate corrective measures to prevent further environmental damage
    - Note condition of fish (dead, dying, decaying, erratic, or unusual behavior)
    - Note the number, species, and size of fish in each condition
    - Note the location of fish relative to operations
    - Note the presence of any apparently healthy fish in the area at the same time
    - Collect fish specimens and water samples
    - Notify DEQ, Oregon Department of Fish and Wildlife, National Marine Fisheries Service and U.S. Fish and Wildlife Service as appropriate (reporting of listed fish mortality to National Marine Fisheries Service is required).

14) **Vegetation Protection and Restoration:**

a. The Applicant must protect riparian, wetland, and shoreline vegetation in the authorized project area (as defined in the permit application materials) from disturbance through one or more of the following:
   i. Minimization of project and impact footprint
   ii. Designation of staging areas and access points in open, upland areas
   iii. Fencing and other barriers demarcating construction areas
   iv. Use of alternative equipment (e.g., spider hoe or crane)

b. If authorized work results in vegetative disturbance and the disturbance has not been accounted for in planned mitigation actions, the Applicant must successfully reestablish vegetation to a degree of function equivalent or better than before the disturbance. The standard for success is 80 percent cover for native plant species. The vegetation must be reestablished by the completion of authorized work and include:
   i. Restoring damaged streambanks to a natural slope, pattern, and profile suitable for establishment of permanent woody vegetation, unless precluded by pre-project conditions (e.g., a natural rock wall)
   ii. Replanting or reseeding each area requiring revegetation before the end of the first planting season following construction
   iii. Planting disturbed areas with native plants and trees in all cases except where the use of non-native plant materials may be essential for erosion control
   iv. The use of invasive species to re-establish vegetation is prohibited
   v. Herbicides, pesticides and fertilizers must be applied per manufacturer's instructions, and only if neccesary for vegetation establishment. If chemical treatment is necessary, the Applicant is responsible for ensuring that pesticide application laws, including with the National Pollutant Discharge Eliminations System 2300-A general permit are met. Please review the information on the following website for more information: https://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx

      Additionally:

      1. Unless otherwise approved in writing by DEQ, applying surface fertilizer within stormwater treatment facilities or within 50 feet of any stream channel is prohibited.
      2. Other than spot application to cut stems, no herbicides are allowed within stormwater treatment facilites or within 150 feet of waters of the state. Mechanical, hand, or other methods may be used to control weeds and unwanted vegetation within stormwater treatment facilites or within 150 feet of waters of the state; and
      3. No pesticides may be used within stormwater treatment facilities or within 150 feet of waters of the state.
   vi. Install wildlife-friendly fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons
   vii. Minimize soil compaction, especially in areas that are designated for replanting. If soils are compacted, Loosen and aerate compacted soil in staging areas and work construction areas prior to replanting. Leave

topsoil when possible. Chip materials from clear and grub operation and spread on soil surface, unless cleared areas contained invasive species.

15) Maintain existing vegetative buffers to a minimum of 50 feet during construction and post-construction to protect riparian areas and wetlands, unless described in the application and authorized in writing by DEQ.

16) **Previously Contaminated Soil and Groundwater:** If any contaminated soil or groundwater is encountered, it must be handled and disposed of in accordance with the soil and groundwater management plan for the site, as well as local, state and federal regulations. The Applicant must notify the Environmental Cleanup Section of DEQ at 800-452-4011 Ex.6258.

17) **Notification to DEQ:** The Applicant must provide pre-construction notification to DEQ one week before construction starts. Contact information can be found at the end of the certification.

SPECIFIC CONDITIONS FOR IN-STREAM WORK

18) **Fish Protection/ Oregon Department of Fish and Wildlife Timing:** The Applicant must perform in-water work only within the Oregon Department of Fish and Wildlife preferred time window as specified in the *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources* (please follow the link: https://www.dfw.state.or.us/lands/inwater/Oregon_Guidelines_for_Timing_of_%20InWater_Work2008.pdf) or as authorized otherwise under a Department of State Lands removal/fill permit. Exceptions to the timing window must be recommended by Oregon Department of Fish and Wildlife and/or the National Marine Fisheries Services as appropriate.

19) **Aquatic Life Movements:** Any activity that may disrupt the movement of aquatic life living in the water body, including those species that normally migrate through the area, is prohibited. The Applicant must provide unobstructed fish passage at all times during any authorized activity. Exceptions must be reviewed and recommended by Oregon Department of Fish Wildlife and/or the National Marine Fisheries Service as appropriate.

20) **Isolation of In-Water Work Areas:** The Applicant must isolate in-water work areas from the active flowing stream, unless otherwise authorized as part of the approved application, or authorized by DEQ.

21) **Cessation of Work:** The Applicant must cease project operations under high-flow conditions that will result in inundation of the project area. Only efforts to avoid or minimize turbidity or other resource damage as a result of inundation of the exposed project area are allowed during high-flow conditions.

22) **Turbidity**: The Applicant must implement best management practices to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10 percent above natural stream turbidity is prohibited except as specifically noted below:

    a. **Monitoring**: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two-hour intervals each day when in-water work is being conducted. A properly calibrated turbidimeter is

required. Visual gauging may be acceptable with prior written approval from DEQ; however, *turbidity that is visible over background is prohibited.*

i. **Representative Background Point**: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area 100 feet up-current from the in-water disturbance, in order to establish background turbidity levels. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring down-current at the compliance point described below.

ii. **Compliance Point**: The Applicant must monitor every two hours, 100 feet downcurrent from the disturbance, at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.

b. **Compliance**: The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two hour monitoring interval. Pursuant to Oregon Administrative Rules 340-041-0036, short-term exceedances are allowed as followed:

MONITORING WITH A TURBIDIMETER		
ALLOWABLE EXCEEDANCE TURBIDITY LEVEL	ACTION REQUIRED AT 1ST MONITORING INTERVAL	ACTION REQUIRED AT 2ND MONITORING INTERVAL
0 to 5 NTU above background	Continue to monitor every 2 hours	Continue to monitor every 2 hours
6 to 29 NTU above background	Modify BMPs & continue to monitor every 2 hours	Stop work after 4 hours at 6-29 NTU above background
30 to 49 NTU above background	Modify BMPs & continue to monitor every 2 hours	Stop work after 2 confirmed hours at 30-49 NTU above background
50 NTU or more above background	Stop work	Stop work immediately and inform DEQ

If an exceedance occurs at: 50 NTU or more over background; 30 NTU over background for two hours; or 5-29 NTU over background for four hours, the activity must stop immediately and the Applicant must inform DEQ.

c. **Reporting**: The Applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Oregon Department of Fish and Wildlife upon request. An example turbidity log is attached to this certification.

If turbidity monitoring cannot be conducted due to dry conditions, the Applicant must provide photo documentation with a date and time stamp.

d. **Best Management Practices to Minimize In-stream Turbidity:** The Applicant must implement the following best management practices, unless accepted in writing by DEQ:
   i. Sequence/Phasing of work – The Applicant must schedule work activities to minimize in-water disturbance and duration of in-water disturbances.
   ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed to minimize turbidity. All practical techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented.
   iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary at the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate, to discharge sediments to the waterbody.
   iv. Machinery may not be driven into the flowing channel, unless authorized in writing by DEQ.
   v. Excavated material must be placed so that it is isolated from the water's edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.
   vi. Containment measures such as silt curtains, geotextile fabric, and silt fences must be in place and properly maintained in order to minimize in-stream sediment suspension and resulting turbidity.

SPECIFIC CONDITIONS FOR POST CONSTRUCTION STORMWATER MANAGEMENT

23) **Post Construction Stormwater Management:** The Applicant must implement and comply with the terms of the approved post construction stormwater management plan, which describes best management practices to prevent or treat pollution in stormwater anticipated to be generated by the project, in order to comply with state water quality standards. The Applicant must implement best management practices as proposed in the stormwater management plan, including operation and maintenance, dated October 1, 2019. If proposed stormwater facilities change due to site conditions, the Applicant must receive approval in writing from DEQ to make changes.

Stormwater Facility Description: The Appplicant will implement nine water quality treatment facilities (WQF) to adequately treat stormwater runoff generated by this project.

WQF #1 is a vegetated bioinfiltration swale/detention basin that discharges to Abernathy Creek.
WQF #2 is a bioslope that discharges to an existing roadside ditch before conveyance to the Clackamas River.
WQF #3 is a bioinfiltration swale that discharges to the Clackamas River.
WQF #4 is a bioinfiltration swale that discharges to the Willamette River.
WQF #5 is a bioinfiltration swale that discharges to the Willamette river.
WQF #6 is a bioinfiltration swale that discharges upland of an unnamed creek.
WQF #7 and #8 are bioinfiltration swales that discharges to a proposed riprap pad underneath the Abernathy Bridge before entering the Willamette River.

WQF #9 is a stormwater planter that discharges into the Willamette River.

Stormwater facilities designed to infiltrate runoff must be delineated with orange construction fencing to avoid compaction until completion of the project.

Within 30 days of project completion, the Applicant must submit a copy of the "as-builts" or red-lined construction drawings showing all stormwater management facilities.

24) **Stormwater Management & System Maintenance:** The Applicant is required to implement effective operation and maintenance practices for the lifetime of the proposed facility. These include but are not limited to:
   a. Maintenance techniques and frequency for each system component must follow appropriate recommendations in accepted manuals.
   b. Long-term operation and maintenance of stormwater treatment facilities will be the responsibility of ODOT, unless and until an agreement transferring that responsibility to another entity is submitted to DEQ.

25) **Corrective Action May Be Required:** DEQ retains the authority to require corrective action in the event the stormwater management facilities are not built or performing as described in the plan.

If the Applicant is dissatisfied with the conditions contained in this certification, a contested case hearing may be requested in accordance with Oregon Administrative Rule 340-048-0045. Such requests must be made in writing to the DEQ Office of Compliance and Enforcement at 700 NE Multnomah St, Suite 600, Portland Oregon 97232 within 20 days of the mailing of this certification.

DEQ hereby certifies this project, with the above conditions, in accordance with the Clean Water Act and state rules. If you have any questions, please contact Noosheen Pouya at Pouya.Noosheen@DEQ.state.or.us, by phone at (503)229-5785, or at the address on this letterhead.

Sincerely,

Steve Mrazik
Water Quality Manager
Northwest Region

ec: Melody White, USACE
Melinda Butterfield, DSL
Cory Gieseke, HDR

USACE Permit # NWP-2016-458-2

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OR 97208-2946

December 18, 2019

Regulatory Branch
Corps No. NWP-2016-458-2

Denis Reich
ODOT Region 1
123 NW Flanders Street
Portland OR 97209
Denis.A.Reich@odot.state.or.us

Dear Mr. Reich:

Enclosed is your fully executed Department of the Army Permit. Please carefully read the permit and its conditions. This permit is based on the project description and construction methods provided in your permit application. If you propose changes to the project, you must submit revised plans to this office and receive our approval of the revisions prior to performing the work.

The time limit to complete the authorized work is in General Condition 1. If the work cannot be completed prior to the time limit, you may apply for a time extension. We recommend you apply for a time extension at least 90 days before the time limit is reached.

Failure to comply with all terms and conditions of this permit could result in a violation of Section 404 of the Clean Water Act. You must also obtain all local, State, and other Federal permits that apply to this project.

We would like to hear about your experience working with the Portland District Regulatory Branch. Please complete a customer service survey form at the following address: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

If you have any questions, please contact me at the letterhead address, by telephone at (503) 808-4387, or email Carrie.L.Bond@usace.army.mil.

Sincerely,

Kristen Hafer
Policy and Compliance Section Chief

Enclosures

cc:
Oregon Department of Transportation (Sargent)
Oregon Department of State Lands (Klassen)
Oregon Department of Environmental Quality (401applications@deq.state.or.us)
HDR, Inc. (Brian Bauman, Brian.Bauman@hdrinc.com)

DEPARTMENT OF THE ARMY PERMIT

Permittee: Oregon Department of Transportation, Region 1
123 NW Flanders Street
Portland, Oregon 97209

Permit No: NWP-2016-458-2

Issuing Office: U.S. Army Corps of Engineers, Portland District

NOTE: The term "you" and its derivatives as used in this permit means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

The project would result in construction related activities below the ordinary high water mark (OHWM) in a total of 1.8 acres of tributaries and wetlands to seismically retrofit and widen two bridges while reducing traffic congestion in the project area with additional through lanes. The I-205 Abernethy Bridge across the Willamette River and the I-205 Bridge over Main Street would be seismically retrofitted to withstand the Cascadia Seismic Event. Additionally, the project would add a northbound and southbound travel lane to I-205 between the OR 43 interchange and OR 99 interchange, and an I-205 northbound auxiliary lane between OR 99 and OR 213. The Abernethy Bridge would be widened to include an additional through-lane and wider shoulder in both northbound and southbound lanes (additional 16 feet of roadway width in both directions). The widening would be supported by larger in-water support piers upstream and downstream of current piers.

Willamette River: The applicant would construct new drill shafts and columns that would result in permanent fill of 0.146 acre below the OWHM of the Willamette River. Each pier will consist of two, 12-foot diameter drilled shafts. Prior to drilling, a casing will be placed to contain sediment generated during drilling activities; the casings would affect 0.18 acre below the OHWM of the Willamette River. When drilled shafts and columns are constructed, a 30-square-foot coffer dam would be placed around each structure, and sediments within each coffer dam will be removed.

Each pile footing cap for the bridge has existing riprap in place. Construction of the new drilled shafts may require the removal of the riprap. Riprap would be removed using a clamshell bucket and placing the removed material in uplands. Removal activities would affect up to 1.16 acres of the Willamette River around the existing piers.

Construction of the new piers would require a temporary work bridge to be constructed. The temporary bridge would remain in place for 4 years and would require the installation of 740, 24-inch-diameter steel piles installed and removed with the use of a vibratory hammer.

Upon completion of the new piers, the existing piers would be removed. Removal activities include removing the columns to five feet below the existing substrate and leaving the footings in place. Any remaining existing riprap would also be removed to five feet below the existing ground surface within a ten-foot diameter around each pier. This would result in the removal of 0.14 acre of pier material and an additional 1.16 acres of riprap, as described above.

Abernethy Creek: Pier three is located within the Abernethy Creek channel. Construction of the new pier and channel grading activities would result in a total discharge of fill material into 0.48 acre below the OHWM of Abernethy Creek. The applicant would remove the existing rip-rap and 0.25 acres of soil to reconstruct and grade the new stream channel. The reconstructed stream channel would become a low flow channel and will include rocks with large wood to stabilize the channel. A temporary work bridge with steel piles would be constructed and in place for 4 years within Abernethy Creek .

McLoughlin Creek and adjacent wetland: The proposed project would place permanent foundations below the OWHM of the creek for the required footing expansions for Pier 10. The permanent discharge of fill would be placed below the OHWM in 53 square feet of the creek. McLoughlin Creek would be temporarily piped for 340 linear feet to avoid and minimize sedimentation during pier construction. A diversion pipe to redirect flow during construction will be placed in Wetland 37 (W-37). A 145 square foot temporary construction pad for the crane will also be placed in W-37 for the duration of the construction period. W-37 will be restored to preconstruction conditions following the completion of construction activities and removal of the temporary fills. Sandbag barriers would be placed upstream and downstream of McLoughlin Creek. The diversion pipe and sandbags constitute a temporary discharge of 28 cubic yards of fill material over 2 square feet below the OHWM. Pier C3-3 would be removed and re-installed in the creek resulting in 1489 square feet of fill below the OWHM.

In-water work window (IWW) extensions were requested for the following activities:
1) Use of a barge all year long.
2) To complete drilled shafts - July 1 to December 31, 2020 (extending preferred IWW of October 31 to December 31)
3) Drilled shaft construction below the OHWM of the Willamette River but outside and above the actively flowing channel – any time during the year. Outside of the preferred IWW will occur within an isolation structure.

Purpose: To reduce congestion and provide seismic upgrades to the structural supports of the Abernethy and Main Street Bridges.

Project Location: The project is located in the Willamette River, McLoughlin Creek, Abernethy Creek, and Wetland-37 (W-37) at I-205 from the OR 43 interchange north to the OR 213 interchange, near West Linn in Clackamas County, Oregon at Latitude/Longitude 45.3644, -122.6045.

Drawings: Twenty (20) drawings/maps (Attachment 1)

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 18, 2024. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition No. 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions (Attachment 2).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

a. Upon starting the activities authorized by this permit, Permittee shall notify the U.S. Army Corps of Engineers, Portland District, Regulatory Branch that the work has started. Notification shall be provided by e-mail to cenwp.notify@usace.army.mil and the email subject line shall include: NWP-2016-458-2, ODOT Clackamas County.

b. Permittee shall complete and sign the enclosed Compliance Certification (Attachment 3). Permittee shall submit the completed certification to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch within 30 days of completion of the authorized activity. The completed certification shall be provided by e-mail to cenwp.notify@usace.army.mil and the email subject line shall include: NWP-2016-458-2, ODOT Clackamas County. If you are submitting files larger than 10 MB, contact your county Regulatory Project Manager for instructions.

c. All in-water work shall be performed during the in-water work period of July 1 to December 31, to minimize impacts to aquatic species. Exceptions to this time period requires specific approval from the Corps and the National Marine Fisheries Service.

d. This Corps permit does not authorize you to take an endangered species. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a biological opinion under ESA Section 7, with “incidental take” provisions with which you must comply). The Federal Highway Administration (FHWA) is the lead federal agency for ESA consultation for this project. The FHWA, or its designee, has determined the proposed project meets the requirements of the programmatic opinion prepared by the National Marine Fisheries Service (NMFS), titled *Endangered Species Act Programmatic Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response Federal-Aid Highway Program in the State of Oregon* dated November 28, 2012 (NMFS Reference Number 2011/02095) which contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with the “incidental take” that is also specified in the opinions. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the referenced opinion, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the opinion, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute noncompliance with your Corps permit. It is your responsibility to obtain a copy of the terms and conditions from the lead federal agency. The NMFS is the appropriate authority to determine compliance with the terms and conditions its opinion, and with the ESA.

e. Permittee shall dispose of excavated materials at a suitable upland location, and materials shall be adequately stabilized to minimize increases in turbidity levels and indirect impacts to wetlands and other aquatic systems. The material shall be placed in a location and manner that prevents its discharge into waterways or wetlands. In the event of spills, affected material shall be taken to an appropriate upland location (and properly disposed of in accordance with any state standards or requirements).

f. Permittee shall ensure all appropriate sediment and erosion control devices are installed and in proper working order prior to construction. Devices shall remain in place until the area is stabilized and construction is complete. If necessary, sediment and erosion control may be left in place after construction is complete to facilitate stabilization. However, upon stabilization all devices shall be removed from the area and disposed of in and upland location.

g. Permittee shall isolate and confine the worksite from the active channel to minimize turbidity and prevent pollutants from entering the waterbody, except in the Willamette River.

h. Permittee shall take the necessary precautions to prevent any petroleum products, chemicals, or deleterious or toxic materials from entering waterways during construction.

i. Heavy equipment shall be clean and free of leaks when operated in or near the active channel. All vehicles shall be stored and fueled a minimum of 150 feet from any waterbody unless there is secondary containment.

j. All practicable erosion control devices shall be installed and maintained in good working order throughout construction to prevent the unauthorized discharge of material into a wetland or tributary and minimize increases in turbidity resulting from the work. The devices shall be installed in a manner to maximize their effectiveness, e.g., sediment fences shall generally be buried or similarly secured. These controls shall be maintained until permanent erosion controls are in-place or are no longer necessary.

k. Permittee shall inspect the erosion control devices on a frequency basis to confirm that they are in proper working order. Any maintenance necessary shall be implemented immediately prior to the continuation of construction activities.

l. Immediately upon completion of the work in wetlands, permittee shall fully remove the temporary fill, restore the grade and re-vegetate the project area, including the specific area to prevent degradation of the aquatic habitat/resource.

m. Permittee shall fully implement the Restoration Plan included in

Attachment 4.

n. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the U.S Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this Authorization:

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

	12-18-19
(PERMITTEE SIGNATURE)	**(DATE)**
DENIS REICH	ODOT REGION 1 ENVIRONMENTAL MANAGER
(PRINTED NAME)	**(TITLE)**

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

FOR THE COMMANDER, AARON L. DORF, COLONEL, CORPS OF ENGINEERS, DISTRICT COMMANDER:

	18 December 2019
(DISTRICT COMMANDER)	**(DATE)**

William D. Abadie
Chief, Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred , the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign below.

PERMIT TRANSFEREE:

_____ _____

Transferee Signature **DATE**

_____

Name (Please print)

_____

Address

_____

City, State, and Zip Code

Attachment M. Traffic Analysis Memo

Traffic Analysis Memorandum

Date:	Friday, February 16, 2018
Project:	ODOT | K19786 I-205: Stafford Rd to OR 213 Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening
To:	Tom Hamstra, ODOT – PM
From:	Steve Drahota, HDR – PM
Subject:	Traffic Operations Analysis for Design Verification Package

Introduction

The Interstate 205 (I-205) Stafford Road to Oregon Route (OR) 213 Project (the Project) area consists of an urban freeway segment that generally includes two travel lanes in each direction with auxiliary lanes at the Abernethy Bridge. The existing third general-purpose lane currently drops from the north end of the project at the OR 213 interchange area. The section of I-205 from Stafford Road to OR 213 is the last remaining bottleneck on the I-205 corridor and experiences significant congestion during peak periods. Regional growth is expected to expand the congested peak periods, further reducing mobility and travel time reliability within the corridor. The project will reduce congestion by adding a third general-purpose travel lane in each direction, and will minimally adjust impacted interchanges to conform to the third lane. This memorandum documents the traffic analysis performed to support the Design Verification Package (DVP) for the Project.

Methodology and Assumptions

Study Area

The analysis study area includes the I-205 mainline between Stafford Road and OR 213, as well as the 10th Street, OR 43, and OR 99E interchanges. The interchange study areas included the following intersections:

- 10th Street Interchange
  - 10th Street at I-205 southbound ramps
  - 10th Street at I-205 northbound ramps
- OR 43 Interchange
  - OR 43 at McKillican Street
  - OR 43 at I-205 southbound ramps
  - OR 43 at I-205 northbound ramps
  - OR 43 at Willamette Falls Drive (WFD)
  - WFD at Broadway Street
  - WFD at West A Street
- OR 99E interchange
  - OR 99E at Dunes Drive

- OR 99E at I-205 southbound ramps
- OR 99E at I-205 northbound ramps
- OR 99E at 14th Street

The mainline analysis included all merge, diverge, basic freeway, and weaving segments (auxiliary lanes) within the study area for existing and future no-build and build conditions. The interchange analysis focused on the ramp terminal intersections, but included adjacent intersections at the OR 43 and OR 99E interchanges.

Data Collection

Traffic data collection consisted of intersection turning movement counts and mainline counts on I-205. Mainline counts were collected by ODOT on I-205 between 10th Street and OR 43 on May 3, 2017. The intersection turning movement counts were collected by ODOT throughout the study area on May 23, 2017, during the AM and PM peak periods. The AM and PM peak hours to be used for analysis were determined by ODOT[1]. The AM peak hour was determined to occur between 7:30 a.m. and 8:30 a.m. and the PM peak hour was between 4:30 p.m. and 5:30 p.m. The I-205 mainline has directional peaks (southbound in the AM and northbound in the PM), while the highest volumes were observed at the interchanges during the PM peak hour.

Traffic Volume Development

Traffic volumes were developed for existing year (2017) and design year (2045) AM and PM peak hour conditions as discussed below. Opening year (2023) traffic volumes were also developed to analyze key study area intersections that do not meet mobility standards in the design year.

EXISTING YEAR TRAFFIC

Existing year traffic volumes for the study area were developed for the AM and PM peak hours using the I-205 mainline and intersection turning movement counts collected in May 2017. Traffic volumes were balanced between intersections and along I-205. The existing average daily traffic volume (ADT) on I-205 in both directions ranges from approximately 90,000 to 119,000 vehicles per day[2].

SEASONAL ADJUSTMENTS

Traffic volumes for the project were not seasonally adjusted. Per ODOT Analysis Procedures Manual (APM) methodology, traffic analysis should be performed using the 30th highest hour (design hour) volumes. Design hour volumes are typically determined by seasonally adjusting the traffic counts to the peak traffic month using data from an automatic traffic recorder (ATR). After reviewing the hourly traffic counts from the Stafford ATR on I-205, it was determined that the peak hour volumes do not vary significantly between May (the month the counts were taken)

[1] Email from Simon Eng on Tuesday, August 1, 2017: I-205 CW - Peak Hour and Methodology to develop Future Traffic Volume using the Metro Regional Travel Demand Model
[2] 2016 AADT from ODOT Transportation Volume Tables published in November 2017

and July (peak month from the ATR). Per discussions with ODOT[3], it was recommended that no seasonal adjustments be used for this project.

DESIGN YEAR TRAFFIC

As per the APM procedures, the Metro regional travel demand models were used to forecast project future year demands. ODOT provided the Metro travel demand Visum models for existing year 2010 and future year 2040 AM and PM peak period conditions. These models encompass freeways, arterials, local streets, and intersections within the Portland region. The future year regional models integrate planned transportation projects outside of the project study area to generate reliable and realistic future volume forecasts. The future year Metro models were reviewed and adjusted with appropriate capacity and lane configurations for the no-build baseline scenario. Future build scenario models were developed by updating the no-build model with the widened I-205 freeway segment between OR 99E and Stafford Road. Lane capacity and number of lanes were updated per the proposed roadway design. Examination of the updated regional models identified that no local streets were missing in either the no-build or build scenarios.

The Difference (Incremental) Method was used to forecast future volumes as recommended by ODOT[4]. This method is best suited to the study area because the other future demand forecasting method, the Growth Method, tends to severely overestimate growth on lower volume roadways. In the Difference Method, future year demand volumes are determined by adding the existing traffic counts and the differences between existing and future model volumes. If the difference between the existing and future models resulted in a negative value, the existing count volume was used. Design year 2045 traffic volumes were developed through interpolation using the differences between the 2010 and 2040 travel demand models. After developing the future year volumes, volume balancing was performed to obtain a set of cohesive network volumes.

Opening year (2023) volumes were developed using linear interpolation between the existing year and design year 2045 volumes. The existing and design year AM and PM peak hour volumes, as well as ADT volumes for the I-205 mainline and ramps, are provided in Figure 1 and Figure 2. Design year ADT volumes were developed by calculating the ratio between existing peak hour volumes and existing ADT volumes, and applying that ratio to the design year peak hour volumes to determine design year ADT volumes. Existing and design year AM and PM peak hour turning movement volumes at the 10th Street, OR 43, and OR 99E interchanges are provided in Figure 3 through Figure 5.

[3] Email from Simon Eng on Thursday, August 24, 2017: RE: K19786 I-205 CW: Stafford Rd - O99E - Seasonal Factor
[4] Email from Simon Eng on Tuesday, August 1, 2017: email attachment Future Volume Development Methodology.pdf.

Figure 1. I-205 Northbound Weekday Peak Hour Traffic Volumes

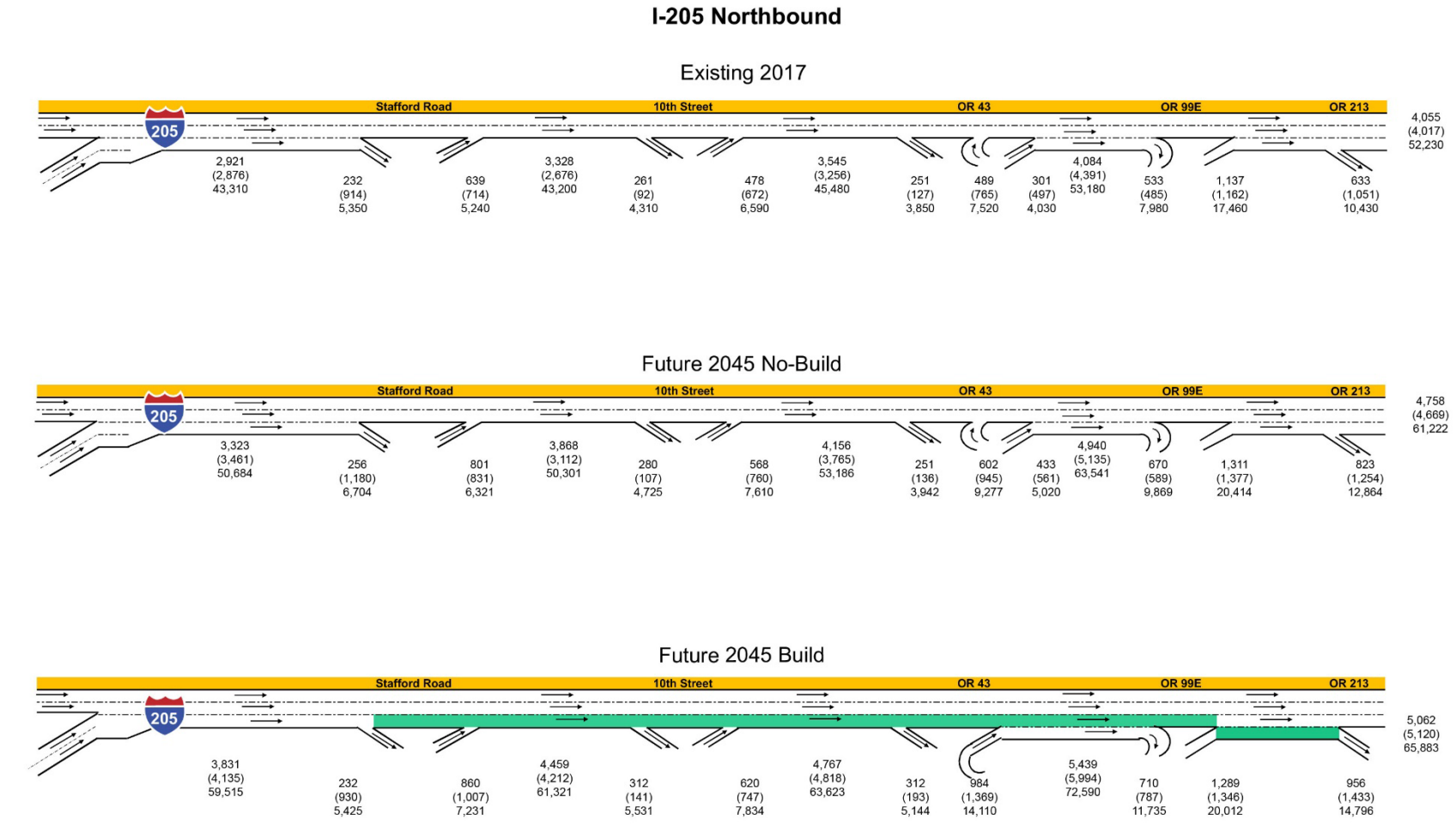
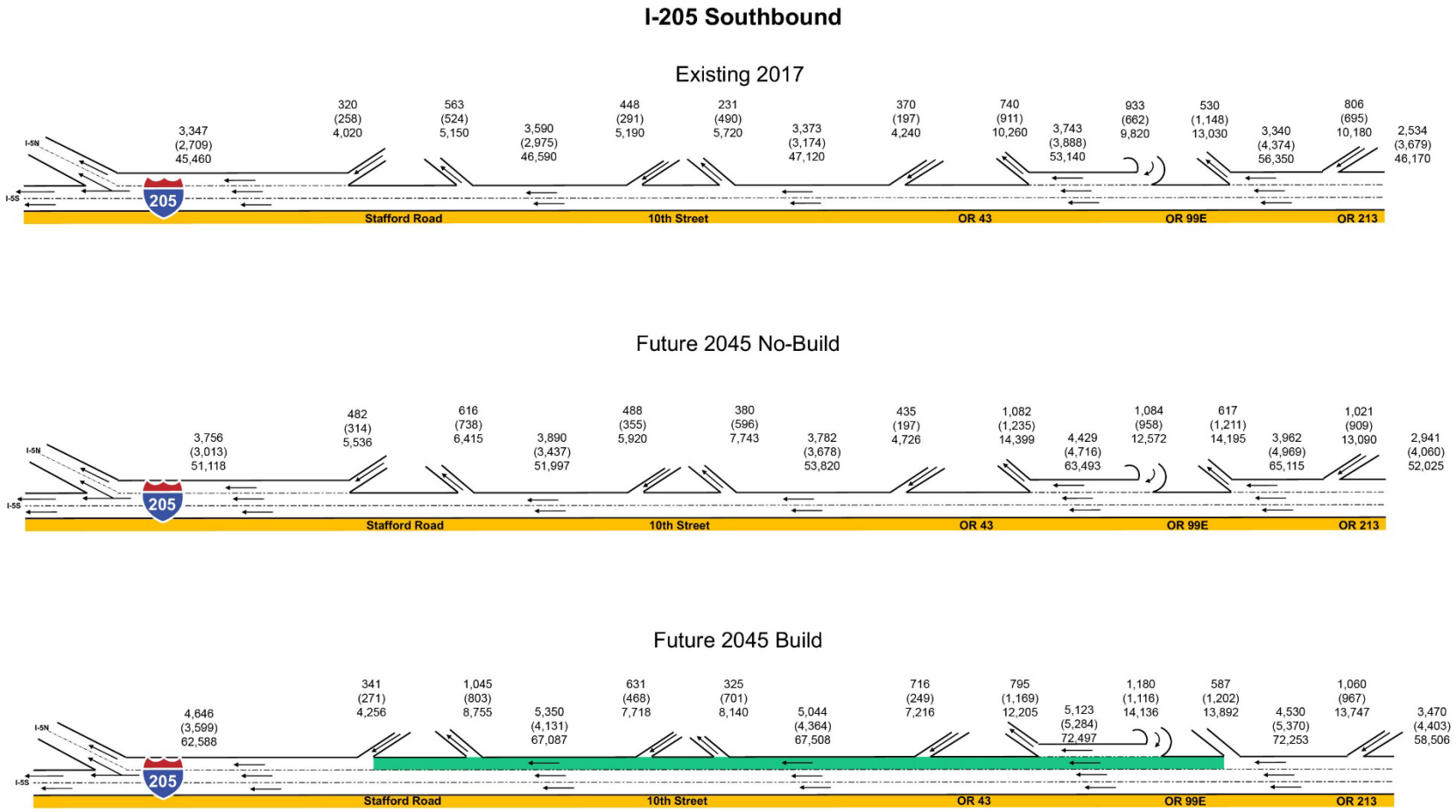


Figure 2. I-205 Southbound Weekday Peak Hour Traffic Volumes



N

XX = Weekday AM Peak Hour Volume
(XX) = Weekday PM Peak Hour Volume
X,XXX = Average Daily Traffic

*2017 ADT was assumed to be the same as 2016 ADT

Figure 3. 2017 Existing Interchange Weekday Peak Hour Traffic Volumes

Figure 4. 2045 No-Build Interchange Weekday Peak Hour Traffic Volumes

Figure 5. 2045 Build Interchange Weekday Peak Hour Traffic Volumes

Origin-Destination

Origin-destination (OD) data for the weaving segments on I-205 was obtained from StreetLight Data. The OD data was used to determine the percentage of on-ramp traffic that remains in the auxiliary lane to exit at the downstream interchange, otherwise known as “ramp-to-ramp” traffic. The StreetLight OD data indicated that ramp-to-ramp traffic between the OR 43 and OR 99E interchanges, across the Abernethy Bridge, was up to 23 percent in the northbound direction and 38 percent in the southbound direction. The ramp-to-ramp movements between the OR 99E and OR213 interchanges were also obtained to evaluate existing and future conditions. The StreetLight OD data indicated that ramp-to-ramp traffic was up to 19 percent in the northbound direction and 17 percent in the southbound direction.

Mobility Standards

The mobility standard is expressed in terms of volume-to-capacity (v/c) ratio. Under existing and design year no-build conditions, or for intersections that are not proposed to be modified from their existing conditions, mobility standards from Table 7 of the Oregon Highway Plan (OHP) are used. Under the design year build condition, for intersections that are proposed to be modified as part of the project, mobility standards from Table 10-2 of the Highway Design Manual (HDM) are to be used. In the case of the I-205 Stafford Road to OR 99E Project, no improvements are proposed to the 10th Street and OR 99E ramp terminal intersections. Therefore, the OHP (no-build) mobility targets were used for the build condition at these locations. A summary of the various project locations and applicable mobility targets is provided in Table 1.

Table 1. Project Mobility Targets

Location	Intersections	Existing	No-Build	Build
I-205 Mainline	N/A	0.99	0.99	0.75
10th Street Interchange	10th Street/I-205 Ramps	0.99	0.99	0.99
OR 43 Interchange	OR 43/I-205 Ramps	0.99	0.99	0.75
OR 99E Interchange[1]	OR 99E/I-205 Ramps	1.1	1.1	1.1

[1]Mobility targets based on Regional Center classification in the OHP

Analysis Methods

Traffic analysis was performed using Synchro/SimTraffic, Highway Capacity Software (HCS7), and Sidra. Synchro (version 9.2) is a traffic analysis and signal optimization software that emulates the methodology from the Highway Capacity Manual (HCM) and SimTraffic is the accompanying micro-simulation application. Synchro was used primarily to analyze intersection operations. SimTraffic was used to simulate alternatives and provide queue length statistics. HCS7 is a software application of the HCM and was used to analyze the I-205 mainline. Sidra (version 7) is primarily used to evaluate roundabouts and was used to evaluate the I-205 northbound ramp terminal intersection in the OR 43 interchange build alternative. The Sidra results are based on HCM 6 output, which incorporates the latest NCHRP research and methodology for analyzing roundabouts in the U.S.

The results of the analysis are expressed in v/c ratios and level of service (LOS). The LOS reported has a range of “A” to “F” with LOS A representing the best operation and LOS F

representing the poorest operation. The LOS reported for the I-205 mainline is based on density in passenger cars per mile per lane (pc/mi/ln). The LOS reported for signalized intersections is based on average control delay (seconds) for all vehicles. The LOS reported for unsignalized intersections is based on the average delay for the worst stop-controlled movement.

In addition to the Synchro/SimTraffic and Sidra analysis for the OR 43 interchange, a supplemental analysis was performed using Vissim, a widely-used, behavior-based, multi-purpose traffic microsimulation program. Vissim tracks individual vehicle movements and interactions more realistically than typical HCM methods, and due to the limitations of modeling roundabouts in Synchro/SimTraffic, Vissim was used to evaluate the build alternative for the OR 43 interchange. An existing conditions Vissim model was developed for the OR 43 interchange study area, excluding the I-205 mainline, following the guidance in the 2011 ODOT Vissim Protocol. The existing conditions model was qualitatively calibrated based on field observations and served as the basis for developing the future build condition model.

Analysis Assumptions

The following assumptions were used for the traffic analysis:

- Existing truck percentages were used for both existing and future year analysis
- Existing peak hour factors (PHFs) were used for existing year analysis
- 0.95 PHFs were used for future year analysis (unless existing was higher)
- Existing signal timing was used for existing year analysis
- Optimized signal timing was used for future year analysis (where appropriate)
- Basic freeway segment capacity is 2,300 pc/hr/ln
- Merge area capacity is 4,600 pc/hr/ln
- Diverge area capacity is 4,400 pc/hr/ln
- Free Flow Speed (FFS) is 5 mph over posted speed

These assumptions were used in the different traffic analysis methods, where appropriate.

Project Alternatives

Two alternatives were evaluated for the project in addition to existing conditions; a future no-build alternative and a future build alternative.

No-Build Alternative

The no-build alternative assumes no improvements to the I-205 mainline or to the study area interchanges. The no-build alternative is the same as existing conditions, but with future no-build traffic volumes. The lane configurations on I-205 for the existing and no-build alternatives are provided in Figure 1 and Figure 2.

Build Alternative

The build alternative will widen I-205 from two general-purpose lanes to three general-purpose lanes between Stafford Road and OR 99E. The Abernethy Bridge will be widened on each side to accommodate the additional through lanes on I-205 and auxiliary lanes between the OR 43 and OR 99E interchanges. In the northbound direction, the existing northbound OR 43 to

northbound I-205 entrance ramp will be removed. This movement will be redirected to the reconstructed entrance loop, which currently only serves the southbound OR 43 to northbound I-205 movement. At the north end of the project, a northbound auxiliary lane will be added between the OR 99E and OR 213 interchanges. In the southbound direction, the widening of I-205 will modify the existing OR 213 to OR 99E segment from a weave to a merge/diverge. The lane configurations on I-205 for the build alternative are provided in Figure 1 and Figure 2.

No improvements are proposed at the OR 99E or 10th Street interchanges in the build alternative, other than connecting the interchange ramps into the widened Abernethy Bridge and I-205 mainline. No ramp widening is included other than to meet geometric standards. At the OR 43 interchange, the northbound entrance ramps will be combined and a roundabout will replace the existing free-flow entrance ramps and signal-controlled northbound exit ramp. Improvements at the I-205 southbound exit ramp include restriping to provide a dedicated right-turn lane and a shared left/through/right-turn lane. No improvements are proposed at the OR 43 and WFD intersection.

The build alternative also assumes that the Broadway Street Bridge over I-205 will be removed as part of the project. The Broadway Street and West A Street bridges provide redundant crossings of the I-205 mainline, and traffic from the Broadway Street Bridge will be required to use the West A Street overcrossing.

Traffic Analysis Results

I-205 Southbound

The I-205 southbound operational performance results for the freeway mainline, merge, diverge, and weave segments are provided in Table 2. As shown below, many segments operate at or near capacity in the future no-build AM and PM peak hour conditions. With the proposed improvements, the future build condition is operating better than the no-build condition for most segments. The OR 213 to OR 99E segment is operating similarly to the no-build, but the configuration is different. The existing condition operates as a weaving segment between the OR 213 entrance ramp and the OR 99E exit ramp. In the build condition, both ramps will operate as a merge and diverge. With the change in lane configurations, the OR 213 entrance ramp merge is operating slightly worse than the existing weaving segment, but the downstream mainline and diverge segments are operating equal to or better than the no-build condition.

Since the HDM mobility standard (v/c ratio) for the future build alternative is 0.75, the segments with v/c ratios exceeding 0.75, identified in red text below, will require design exceptions.

Table 2. I-205 Southbound Traffic Operations Analysis Results

Location	2017 Existing AM (PM)			2045 No-Build AM (PM)			2045 Build AM (PM)		
	V/C	Volume Density (pc/mi/ln)	LOS	V/C	Volume Density (pc/mi/ln)	LOS	V/C	Volume Density (pc/mi/ln)	LOS
I-205 SB Weave: OR213 Entrance Ramp to OR99E Exit Ramp	0.62	25.2	C	0.74	31.1	D	-	-	-
	(0.86)	(33.8)	(D)	(0.95)	(39.0)	(E)	-	-	-
I-205 SB at OR213 Entrance Ramp Merge	-	-	-	-	-	-	0.78	29.1	D
	-	-	-	-	-	-	(0.98)	(36.2)	(E)
I-205 SB Freeway Mainline: OR213 Entrance Ramp to OR99 Exit Ramp	-	-	-	-	-	-	0.75	30.7	D
	-	-	-	-	-	-	(0.90)	(37.8)	(E)
I-205 SB at OR99E Exit Ramp Diverge	-	-	-	-	-	-	0.75	31.2	D
	-	-	-	-	-	-	(0.89)	(36.5)	(E)
I-205 SB Weave: OR99E Entrance Ramp to OR43 Exit Ramp	0.73	32.0	D	0.84	38.0	E	0.70	31.3	D
	(0.76)	(33.4)	(D)	(0.90)	(41.5)	(E)	(0.74)	(33.9)	(D)
I-205 SB at OR43 Entrance Ramp Merge	0.81	29.3	D	0.91	32.8	D	0.79	28.3	D
	(0.81)	(29.4)	(D)	(0.90)	(32.7)	(D)	(0.67)	(24.0)	(C)
I-205 SB Freeway Mainline: OR43 Entrance Ramp to 10th Street Exit Ramp	0.83	33.6	D	0.93	39.3	E	0.82	33.5	D
	(0.82)	(33.3)	(D)	(0.92)	(38.8)	(E)	(0.73)	(29.4)	(D)
I-205 SB at 10th St Exit Ramp Diverge	0.85	34.1	D	0.95	38.0	E	0.80	33.0	D
	(0.84)	(33.8)	(D)	(0.95)	(37.7)	(E)	(0.74)	(30.9)	(D)
I-205 SB at 10th St Entrance Ramp Merge	0.87	32.5	D	0.93	34.8	D	0.83	29.7	D
	(0.75)	(28.4)	(D)	(0.84)	(31.5)	(D)	(0.66)	(23.4)	(C)
I-205 SB Freeway Mainline: 10th St Entrance Ramp to Stafford Rd Exit Ramp	0.84	32.4	D	0.91	37	E	0.83	32.0	D
	(0.73)	(26.6)	(D)	(0.82)	(31.2)	(D)	(0.66)	(23.3)	(C)
I-205 SB at Stafford Rd Exit Ramp Diverge	0.90	35.5	E	0.98	38.4	E	0.87	35.6	E
	(0.79)	(31.1)	(D)	(0.88)	(34.7)	(D)	(0.72)	(30.0)	(D)
I-205 SB at Stafford Rd Entrance Ramp Merge	-	-	-	-	-	-	0.71	25.3	C
	-	-	-	-	-	-	(0.56)	(20.2)	(C)

Notes:
Level of Service is based on the calculated volume density and not based on v/c ratio shown.
Orange = v/c ratio exceeds OHP mobility target of 0.99 for no-build alternative.
Red = v/c ratio exceeds HDM mobility target of 0.75 for build alternative.
* = Volume density not reported (demand exceeds capacity).

I-205 Northbound

The I-205 northbound operational performance results for the freeway mainline, merge, diverge, and weave segments are provided in Table 3. As shown below, many segments operate over capacity (v/c > 1) in the future, no-build AM and PM peak hour conditions. With the proposed improvements, the future build condition is operating significantly better than the no-build condition, with most segments operating at a v/c ratio of 0.85 or less. One segment operating over capacity in both the no-build and build conditions is the weave section between the OR 99E entrance ramp and the OR 213 exit ramp. In the no-build condition, the OR 99E entrance ramp is an add-lane, resulting in a weaving segment where the entrance ramp does not have to make a lane change. In the build condition, the additional through lane on the I-205 mainline results in a standard weave between interchanges. This segment has the highest northbound traffic volumes in the study area, and the build condition includes 11 percent more traffic than the no-build condition. While this segment is operating at a v/c of 1.02 in the build condition (compared to 1.06 for the no-build condition), the weaving conflicts occur mostly in the auxiliary lane, where the majority of potential slowing would be anticipated to occur (as compared to through freeway lanes). Additionally, due to limitations of the HCS software for merge/diverge conditions, the unique complexities of the interchange configurations, such as interchange density and lane balance, are not fully characterized in the analysis results and may represent a slightly more optimistic output in the no-build condition than may be realized in actual operations.

Since the HDM mobility standard (v/c ratio) for the future build alternative is 0.75, the segments with v/c ratios exceeding 0.75, identified in red text below, will require design exceptions.

Table 3. I-205 Northbound Traffic Operations Analysis Results

Location	2017 Existing AM (PM)			2045 No-Build AM (PM)			2045 Build AM (PM)		
	V/C	Volume Density (pc/mi/ln)	LOS	V/C	Volume Density (pc/mi/ln)	LOS	V/C	Volume Density (pc/mi/ln)	LOS
I-205 NB at Stafford Rd Exit Ramp Diverge	-	-	-	-	-	-	0.63	27.7	C
	-	-	-	-	-	-	(0.71)	29.7	D
I-205 NB at Stafford Rd Entrance Ramp Merge	0.84	30.5	D	0.96	34.7	D	0.75	26.5	C
	(0.65)	(23.7)	(C)	(0.74)	(27.1)	(C)	(0.71)	(29.7)	(D)
I-205 NB Freeway Mainline: Stafford Rd Entrance Ramp to 10th St Exit Ramp	0.80	30.4	D	0.93	39.1	E	0.72	26.2	D
	(0.62)	(22.1)	(C)	(0.72)	(26.4)	(D)	(0.65)	(23.3)	(C)
I-205 NB at 10th Street Exit Ramp Diverge	0.86	34.5	D	1.01	39.8	E	0.75	31.0	D
	(0.68)	(27.3)	(C)	(0.78)	(31.2)	(D)	(0.68)	(28.6)	(D)
I-205 NB at 10th Street Entrance Ramp Merge	0.88	32.5	D	1.02	*	F	0.77	27.3	C
	(0.77)	(28.6)	(D)	(0.90)	(32.9)	(D)	(0.76)	(27.1)	(C)
I-205 NB Freeway Mainline: 10th St Entrance Ramp to OR43 Exit Ramp	0.90	37.9	E	1.06	*	F	0.77	29.1	D
	(0.80)	(32.8)	(D)	(0.92)	(39.1)	(E)	(0.79)	(32.1)	(D)
I-205 NB at OR43 Exit Ramp Diverge	0.92	36.8	E	1.08	*	F	0.78	32.4	D
	(0.81)	(32.8)	(D)	(0.94)	(37.6)	(E)	(0.76)	(31.6)	(D)
I-205 NB Weave: OR43 Entrance Ramp to OR99E Exit Ramp	0.79	34.9	D	0.92	42.1	E	0.77	46.7	E
	(0.80)	(35.5)	(E)	(0.92)	(39.1)	(E)	(0.84)	(41.0)	(E)
I-205 NB Weave: OR99E Exit Ramp to OR213 Entrance Ramp	0.91	38.3	E	1.06	*	F	1.02	*	F
	(0.91)	(39.7)	(E)	(1.06)	(*)	(F)	(1.02)	(*)	(F)

Notes:
Level of Service is based on the calculated volume density and not based on v/c ratio shown.
Orange = v/c ratio exceeds OHP mobility target of 0.99 for no-build alternative.
Red = v/c ratio exceeds HDM mobility target of 0.75 for build alternative.
* = Volume density not reported (demand exceeds capacity).

10th Street Interchange

The AM and PM peak hour operational performance results for the 10th Street interchange for existing, future no-build, and future build conditions are provided in Table 4 and Table 5. No improvements are proposed to the 10th Street ramp terminal intersections in the build alternative. Both intersections are operating at an LOS D or better in the future build condition.

Table 4. 10th Street Interchange AM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2045 No-Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
10th St & I-205 SB Terminal	28.3	C	0.64	35.1	D	0.73	32.0	C	0.72
10th St & I-205 NB Terminal	13.4	B	0.57	11.9	B	0.54	14.3	B	0.61

Table 5. 10th Street Interchange PM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2045 No-Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
10th St & I-205 SB Terminal	32.8	C	0.73	41.7	D	0.83	50.0	D	0.90
10th St & I-205 NB Terminal	8.3	A	0.53	9.7	A	0.60	11.9	B	0.66

OR 99E Interchange

The AM and PM peak hour operational performance results for the OR 99E interchange for existing, future no-build, and future build conditions are provided in Table 6 and Table 7. No improvements are proposed to the OR 99E ramp terminal intersections in the build alternative. Under future year no-build and build conditions, both ramp terminal intersections are operating over capacity (v/c > 1) in the AM peak hour, and the I-205 southbound ramp terminal intersection is operating over capacity in the PM peak hour.

Table 6. OR 99E Interchange AM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2045 No-Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
OR99E & Dunes Dr	10.4	B	0.60	9.2	A	0.53	9.2	A	0.53
OR99E & I-205 SB Terminal	29.6	C	0.96	63.0	E	1.09	65.3	E	1.10
OR99E & I-205 NB Terminal	13.8	B	0.89	15.6	B	1.03	15.6	B	1.03
OR99E & 14th St	22.8	C	0.91	73.5	E	1.12	81.5	F	1.15

Notes:
Orange = v/c ratio for ramp terminal intersections exceeds OHP mobility target for no-build alternative.
Red = v/c ratio for ramp terminal intersections exceeds OHP mobility target for build alternative.

Table 7. OR 99E Interchange PM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2045 No-Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
OR99E & Dunes Dr	20.2	C	0.77	21.7	C	0.80	23.0	C	0.84
OR99E & I-205 SB Terminal	28.0	C	0.91	72.2	E	1.09	79.7	E	1.13
OR99E & I-205 NB Terminal	14.9	B	0.82	23.3	C	0.99	28.7	C	0.96
OR99E & 14th St	14.9	B	0.78	21.5	C	0.86	22.9	C	0.97

Notes:
Orange = v/c ratio for ramp terminal intersections exceeds OHP mobility target for no-build alternative.
Red = v/c ratio for ramp terminal intersections exceeds OHP mobility target for build alternative.

OR 43 Interchange

In the build alternative, the northbound entrance ramps will be combined and a roundabout will replace the existing free-flow entrance ramps and signal-controlled northbound exit ramp. Improvements also include restriping the I-205 southbound exit ramp to provide a dedicated right-turn lane and a shared left/through/right-turn lane. No improvements are proposed at the OR 43 and WFD intersection.

FUTURE YEAR ANALYSIS

The AM and PM peak hour operational performance results for the OR 43 interchange for existing, future no-build, and future build conditions are provided in Table 8 and Table 9. As shown below, the existing interchange operates well, except for the WFD intersection. The existing I-205 northbound entrance ramps operate with little to no delay due to these movements being free-flow, and the signalized northbound exit ramp and southbound entrance/exit ramp terminal intersections are operating at LOS B or better under existing conditions. At the WFD intersection, the existing stop-controlled movement is failing and experiences delays exceeding 2 minutes for the side street approach. The delays for this intersection are primarily influenced by insufficient gaps in southbound OR 43 traffic resulting in substantial delays for left-turning vehicles from OR 43 during peak periods, despite having a two-stage median turn lane.

In the future no-build alternative, the OR 43 and WFD intersection continues to operate poorly, as does the unsignalized West A Street and WFD intersection. With a substantial increase in traffic volumes between existing and future year conditions, the I-205 southbound ramp terminal is also failing (LOS F) in the no-build alternative, with a v/c ratio of 1.19 and 1.06 in the AM and PM peak hours, respectively. This exceeds the OHP mobility standard (v/c ratio) of 0.99.

In the future build alternative, the I-205 northbound ramp terminal roundabout intersection (as reported in Sidra) is operating at an LOS A and a v/c ratio that is below the HDM mobility standard of 0.75. The I-205 southbound ramp terminal is operating better than the no-build alternative, but is still operating at or over capacity. The OR 43 and WFD intersection continues to experience significant delays during both peak hours, and the West A Street and WFD intersection experiences significant delays during the PM peak hour. Although WFD is operating

poorly, it is important to note that improvements on I-205 result in less traffic on WFD in the future build alternative compared to the no-build alternative. Based on the future volume development, adding capacity on the freeway reduces traffic on WFD by up to 23 percent in the PM peak hour.

Since the HDM mobility standard (v/c ratio) for the future build alternative is 0.75, the OR 43 and I-205 southbound ramp terminal intersection will require a design exception.

Table 8. OR 43 Interchange AM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2045 No-Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
OR43 & McKillican St	29.0	C	0.83	56.1	E	0.98	32.4	C	0.86
OR43 & I-205 SB Terminal	17.8	B	0.86	81.3	F	1.19	47.2	D	1.03
OR43 & I-205 NB Terminal	6.0	A	0.39	6.3	A	0.47	5.7	A	0.72
OR43 & WFD	>120	F	*	>120	F	*	>120	F	*
West A St & WFD	22.8	C	*	>120	F	*	44.1	E	*

Notes:
Orange = v/c ratio for ramp terminal intersections exceeds OHP mobility target for no-build alternative.
Red = v/c ratio for ramp terminal intersections exceeds OHP or HDM mobility target for build alternative.
* = v/c not reported for unsignalized intersections.

Table 9. OR 43 Interchange PM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2045 No-Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
OR43 & McKillican St	32.9	C	0.79	76.8	E	1.02	63.0	E	0.96
OR43 & I-205 SB Terminal	16.9	B	0.69	81.6	F	1.06	50.4	D	0.99
OR43 & I-205 NB Terminal	4.6	A	0.33	4.6	A	0.36	5.4	A	0.52
OR43 & WFD	>120	F	*	>120	F	*	>120	F	*
West A St & WFD	13.3	B	*	>120	F	*	>120	F	*

Notes:
Orange = v/c ratio for ramp terminal intersections exceeds OHP mobility target for no-build alternative.
Red = v/c ratio for ramp terminal intersections exceeds OHP or HDM mobility target for build alternative.
* = v/c not reported for unsignalized intersections.

OPENING YEAR ANALYSIS

With the OR 43 and I-205 southbound ramp terminal intersection operating over capacity in the future year build alternative, an opening year (2023) analysis was performed to determine how the interchange would operate on the day of opening. Table 10 and Table 11 provide a comparison of the existing, opening year build, and future year build alternatives for the AM and PM peak hours for the OR 43 interchange area. As shown below, the I-205 southbound ramp

terminal intersection will operate at a v/c ratio of 0.85 in the opening year AM peak and a v/c ratio of 0.72 in the PM peak. These results are very similar to existing conditions.

The opening year analysis also indicates that the OR 43 and WFD intersection will continue to operate poorly. With no improvements over existing conditions, delays for the stop-controlled movements on WFD will only degrade as traffic volumes increase. At the West A Street and WFD intersection, delays for the stop-controlled movements more than double between the existing year and opening year in the PM peak hour, but do not degrade beyond 2 minutes of delay until after opening year.

Table 10. OR 43 Interchange Opening Year AM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2023 Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
OR43 & McKillican St	29.0	C	0.83	28.9	C	0.79	32.4	C	0.86
OR43 & I-205 SB Terminal	17.8	B	0.86	24.4	C	0.85	47.2	D	1.03
OR43 & I-205 NB Terminal	6.0	A	0.39	5.3	A	0.38	5.7	A	0.72
OR43 & WFD	>120	F	*	>120	F	*	>120	F	*
West A St & WFD	22.8	C	*	22.4	C	*	44.1	E	*

Notes:
Red = v/c ratio for ramp terminal intersections exceeds HDM mobility target of 0.75 for build alternatives.
* = v/c not reported for unsignalized intersections.

Table 11. OR 43 Interchange Opening Year PM Peak Hour Traffic Operations Analysis Results

Intersection	2017 Existing			2023 Build			2045 Build		
	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
OR43 & McKillican St	32.9	C	0.79	33.9	C	0.80	63.0	E	0.96
OR43 & I-205 SB Terminal	16.9	B	0.69	18.9	B	0.72	50.4	D	0.99
OR43 & I-205 NB Terminal	4.6	A	0.33	5.3	A	0.49	5.4	A	0.52
OR43 & WFD	>120	F	*	>120	F	*	>120	F	*
West A St & WFD	13.3	B	*	32.9	D	*	>120	F	*

Notes:
Red = v/c ratio for ramp terminal intersections exceeds HDM mobility target of 0.75 for build alternatives.
* = v/c not reported for unsignalized intersections.

WILLAMETTE FALLS DRIVE

As noted in the interchange analysis summary tables, overall intersection v/c ratios are not reported for the OR 43 and WFD, and West A Street and WFD intersections. HCM methodology does not report an overall intersection v/c ratio for unsignalized intersections. For comparison purposes, the LOS and v/c ratios for the individual turning movements at each intersection are provided in Table 12 and Table 12 for the AM and PM peak hours.

The interchange analysis showed that the OR 43 and WFD intersection is failing in existing, opening year, and future year conditions based on the worst intersection movement, the WFD stop-controlled approach. As shown below, however, the northbound left-turn movement from OR 43 to WFD is operating at an LOS B or better in the opening year and future year build alternatives. At the West A Street and WFD intersection, the stop-controlled movement off West A Street fails in the future year build condition, but the eastbound left turn onto West A Street is operating at an LOS B or better. It should be noted that the Broadway Street overcrossing will be removed as part of the project. For analysis purposes, traffic to and from Broadway Street was added to West A Street. Despite the increase in traffic volumes with the removal of the Broadway Street overcrossing, the West A Street and WFD intersection has acceptable traffic operations in the opening year build condition.

Table 12. Intersection AM Peak Hour Traffic Operations Analysis Results

Intersection	Movement	2017 Existing		2045 No-Build		2023 Build		2045 Build	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
OR43 & WFD	NBL	B	0.41	D	0.81	A	0.39	B	0.53
	EBL	F	>1.00	F	>1.00	F	>1.00	F	>1.00
	EBR	B	0.29	C	0.50	B	0.33	C	0.44
West A St & WFD	EBL	B	0.20	B	0.24	A	0.17	B	0.18
	SBL/SBR	C	0.43	F	>1.00	C	0.46	E	>1.00

Table 13. Intersection PM Peak Hour Traffic Operations Analysis Results

Intersection	Movement	2017 Existing		2045 No-Build		2023 Build		2045 Build	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
OR43 & WFD	NBL	B	0.27	C	0.59	A	0.25	B	0.35
	EBL	F	>1.00	F	>1.00	F	>1.00	F	>1.00
	EBR	D	0.74	F	>1.00	E	0.87	F	>1.00
West A St & WFD	EBL	A	0.04	A	0.05	A	0.05	A	0.09
	SBL/SBR	B	0.29	F	>1.00	D	0.71	F	>1.00

VISSIM ANALYSIS

Due to the limitations of modeling roundabouts in Synchro/SimTraffic, Vissim was used to evaluate the future build alternative for the OR 43 interchange. This supplemental analysis was performed in addition to the Synchro and Sidra analysis, and provided an assessment of overall interchange operations. The Vissim analysis also included the impacts of ramp metering, which could not be evaluated using HCM methods. Key findings and observations from the Vissim analysis include the following:

- Overall Observations:
  - The proposed roundabout has sufficient capacity to address through and turning movements at the I-205 northbound ramp terminal intersection.
  - Turning movements from WFD are not improved over existing conditions and future growth will result in significant queuing on WFD that obstructs West A Street turning movements (field observations indicate existing queuing on WFD periodically extends beyond West A Street).
  - I-205 southbound exit has notable queuing in the future build alternative because of the heavy southbound I-205 to northbound OR 43 right-turn movement.
- OR 43 at WFD:
  - Heavy northbound left-turn and southbound through volumes on OR 43 limit the number of gaps for traffic turning from WFD.
  - Heavy left- and right-turn volumes from WFD result in large queue lengths that eventually block the West A Street intersection.
- OR 43 at I-205 Northbound Ramp Terminal:
  - Ramp metering resulted in significant queuing due to heavy southbound right- and northbound left-turn volumes accessing the freeway. It is assumed that ramp metering will not to be implemented on the reconstructed loop ramp due to impacts to OR 43.
  - The roundabout performs well overall, but the high-volume southbound approach experiences queuing due to limited gaps in northbound left-turning traffic, and negative operations due to platooning of traffic from the upstream signal.
  - Potential mitigation includes modifying the northbound entering geometry to influence gaps or designing the roundabout to accommodate a future second southbound through lane (drop at WFD).
- OR 43 at I-205 Southbound Ramp Terminal:
  - The intersection experiences significant queuing on southbound OR 43 and on the I-205 exit ramp, resulting in poor operations. Synchro results also show over-capacity conditions in the future year analysis.
  - Southbound OR 43 traffic queues back to McKillican Street and requires multiple signal cycles to get through the intersection.
  - The northbound lane drop on OR 43 and queue spillback from the McKillican Street intersection impacts the heavy right turn from the I-205 exit ramp.
- OR 43 at McKillican Street:
  - Existing geometry does not meet capacity standards, resulting in significant queuing on OR 43 in both directions.

  - Northbound queuing, at times, affects the ability to clear the I-205 southbound exit ramp right-turn volume.
- West A Street at WFD:
  - West A Street is not heavily impacted by the removal of the Broadway Street overcrossing. The intersection is primarily affected by queuing from the OR 43 and WFD intersection.
  - Satisfactory operations were observed until queuing on WFD extended beyond the intersection.

The results of the Vissim analysis are consistent with the Synchro and Sidra analysis, but do show that the roundabout is susceptible to impacts from platooning of southbound traffic and insufficient gaps in northbound left-turning traffic under future year conditions. Based on average delays reported in Vissim, the roundabout is operating at an estimated LOS of B or better in the future build condition. Queues on southbound OR 43 approaching the roundabout were also observed extending, at times, to the I-205 southbound ramp terminal intersection in the PM peak hour. This impacts the ability of traffic to turn left from the exit ramp to southbound OR 43, resulting in longer queues on the ramp.

The I-205 southbound ramp terminal intersection is operating over capacity, as indicated by the Synchro analysis, but is also impacted by the northbound lane drop on OR 43 and capacity constraints at the McKillican Street intersection. The Vissim analysis also confirmed that with no improvements, WFD will continue to experience significant delays and queuing.

Queue Length Analysis

A queue length analysis was performed using SimTraffic at the OR 99E and OR 43 interchanges for the existing, future no-build, and future build conditions. The 95th percentile queue lengths, as reported in SimTraffic, were used to identify turning movements that are anticipated to exceed the available storage. A comparison of the 95th percentile queue lengths for the AM and PM peak hours are provided in Table 14 and Table 15. Due to the limitations of modeling roundabouts in SimTraffic, the 95th percentile queue lengths from Sidra are reported for the I-205 northbound exit ramp in the future build alternative.

The available storage distance shown below is an approximate distance that includes deceleration length, but does not include taper distance. The storage lengths are based on existing conditions, which are generally more conservative than build conditions, and will be updated as the design is prepared for draft DAP. For the exit ramp turning movements that do not have a dedicated storage lane, the available storage distance was assumed to be the approximate distance from the stop bar to the painted gore. Based on design best practices for interchange design, additional deceleration area from the point at which the vehicle is leaving the freeway to the back of the ramp terminal queue should be provided. The AASHTO deceleration distance to come to a full stop from 70 mph is 470 feet. Queue lengths in the future build alternative that exceed the available storage lengths are highlighted in red text below.

Table 14. AM Peak Hour 95th Percentile Queues

Intersection	Movement	Available Storage (feet)	Existing	No-Build	Build
			95th Percentile Queue (feet)		
OR 99E at I-205 Southbound Ramps	WBL	410	210	283	215
	WBR	1325**	121	218	146
	SBL	410	487	488	489
OR 99E at I-205 Northbound Ramps	WBL	180	176	189	193
	WBR	920**	92	219	132
	NBR	175	325	336	334
	SBL	500	233	225	224
OR 43 at I-205 Southbound Ramps	WBL*	500	156	804	599
	WBR	925**	268	#1391	#1184
	NBL	250	188	262	276
OR 43 at I-205 Northbound Ramps	EBL/R	1430**	89	102	54
OR 43 at WFD	NBL	200	131	290	380
	SBR	215	20	46	134

Notes:
EB = Eastbound, WB = Westbound, L = Left-Turn Lane, R = Right-Turn Lane
Red = Queue length longer than available turn lane storage. #Red = Queue length exceeded modeled ramp storage; queue length may be longer than shown.
* = Westbound left turn is a dedicated left in no-build and shared left/right in build.
** = Approximate exit ramp storage distance from stop bar to painted gore. Typically, an additional 470 feet for breaking distance should also be provided.

Table 15. PM Peak Hour 95th Percentile Queues

Intersection	Movement	Available Storage (feet)	Existing	No-Build	Build
			95th Percentile Queue (feet)		
OR 99E at I-205 Southbound Ramps	WBL	410	564	570	553
	WBR	1325**	1351	1442	1352
	SBL	410	505	488	481
OR 99E at I-205 Northbound Ramps	WBL	180	199	184	283
	WBR	920**	338	225	#1075
	NBR	175	333	337	328
	SBL	500	412	325	301
OR 43 at I-205 Southbound Ramps	WBL*	500	208	723	599
	WBR	925**	284	#1228	#1156
	NBL	250	86	85	103
OR 43 at I-205 Northbound Ramps	EBL/R	1430**	66	68	33
OR 43 at WFD	NBL	200	93	183	146
	SBR	215	14	30	100

Notes:
EB = Eastbound, WB = Westbound, L = Left-Turn Lane, R = Right-Turn Lane
Red = Queue length longer than available turn lane storage. #Red = Queue length exceeded modeled ramp storage; queue length may be longer than shown.
* = Westbound left turn is a dedicated left in no-build and shared left/right in build.
** = Approximate exit ramp storage distance from stop bar to painted gore. Typically, an additional 470 feet for breaking distance should also be provided.

As shown in Table 14 and Table 15, multiple turning movements are anticipated to exceed the available storage bay lengths at the OR 99E interchange. No improvements are proposed at the OR 99E ramp terminal intersections in the future build alternative. At the I-205 southbound exit ramp to OR 99E, the SimTraffic results indicate that queuing will exceed the available ramp storage in the PM peak hour, even under existing conditions. The queuing results are based on an average of ten simulation runs, and the 95th-percentile queue lengths varied significantly between runs (590 feet to 1,880 feet). When viewing the simulation, the excessive queue lengths appear to be the result of the left-turn movement blocking the right-turn movement, and depends heavily on the arrival patterns of traffic at the signal. The physical storage distance for left-turning traffic also has a significant impact on the results. Left-turning vehicles may be able to queue farther than what is provided in the model while still allowing the right-turn movement to reach the signal. The ability for traffic to get around the queue is not accounted for in SimTraffic. In comparison, the 95th-percentile queue reported in Synchro is only 370 feet for the exit ramp left-turn movement and 150 feet for the right-turn movement. The methodology for determining ramp queuing may require further discussion prior to draft DAP to better evaluate the potential need for mitigation.

At the I-205 northbound exit ramp to OR 99E, the SimTraffic results also indicate that queuing will exceed the available storage in the PM peak hour in the future build alternative. Similar to the I-205 southbound exit ramp, the excessive queue lengths appear to be the result of the left-turn movement blocking the right-turn movement. The exit ramp left-turn volume more than doubled between the no-build and build alternatives, and is operating over capacity. The physical storage distance for left-turning traffic has a significant impact on the results, and vehicles may be able to queue farther than what is provided in the model, while still allowing the right-turn movement to get around the queue; something that is not accounted for in SimTraffic. The 95th-percentile queue reported in Synchro is 400 feet for the exit ramp left-turn movement and 380 feet for the right-turn movement, but the left-turn movement is operating over capacity and Synchro indicates that the left-turn queue may in fact be longer. The methodology for determining ramp queuing may require further discussion prior to draft DAP to better evaluate the potential need for mitigation.

At the OR 43 interchange, queuing at the I-205 southbound exit ramp is anticipated to exceed the available ramp storage distance. Since this interchange ramp is serviced by a proposed auxiliary lane, any potential queuing near the freeway exit point would occur within the auxiliary lane. As discussed in the traffic operations analysis section, the southbound ramp terminal intersection is operating over capacity, and significant queuing will occur in both the future build and no-build alternatives. Restriping the ramp to provide a dedicated right- and a shared left/through/right-turn lane helps increase capacity, but the anticipated future build volumes at the intersection are simply too high for the existing number of lanes. As traffic volumes increase, signal-timing modifications may be required to minimize queue spillback onto the freeway. Additional mitigation could include improvements at McKillican Street and widening OR 43 northbound to two lanes, to minimize queue spillback that affects the exit ramp right-turn movement. Queues on southbound OR 43 approaching the roundabout were also observed in Vissim extending, at times, to the I-205 southbound ramp terminal intersection in the PM peak hour. This impacts the ability of traffic to turn left from the exit ramp to southbound OR 43, resulting in longer queues on the ramp.

No queuing impacts are anticipated at the I-205 northbound exit ramp based on the Sidra analysis. The Vissim analysis confirmed that queuing is limited to 200 feet or less for the exit ramp left- and right-turn movements. At the OR 43 and WFD intersection, queuing for the southbound right-turn movement is within the available storage distance, but the northbound left-turn movement is anticipated to exceed the available storage length in the AM peak hour. No improvements are proposed at the OR 43 and WFD intersection in the build alternative, however, and the existing queue length does not exceed the available storage. The Vissim analysis concluded that the heavy northbound left-turn and southbound through volumes on OR 43 limit the number of gaps for traffic turning from WFD, resulting in large queue lengths on WFD that eventually block the West A Street intersection.

Attachment A. Chapter 17.52 Code Responses

OCMC 17.52 – OFF-STREET PARKING AND LOADING

17.52.010 - Applicability.

The construction of a new structure or parking lot, or alterations to the size or use of an existing structure, parking lot or property use shall require site plan review approval and compliance with this chapter. This chapter does not apply to single-family attached, detached residential dwellings and duplexes.
Applicant's Response: This chapter is applicable to the proposed parking area on Clackamette Drive, within Jon Storm Park.

17.52.015 - Planning commission adjustment of parking standards.

A. Purpose: The purpose of permitting a Planning Commission adjustment to parking standards is to provide for flexibility in modifying parking standards in all zoning districts, without permitting an adjustment that would adversely impact the surrounding or planned neighborhood. Adjustments provide flexibility to those uses which may be extraordinary, unique, or provide greater flexibility for areas that can accommodate a denser development pattern based on existing infrastructure and ability to access the site by means of walking, biking or transit. An adjustment to a minimum parking standard may be approved based on a determination by the Planning Commission that the adjustment is consistent with the purpose of this Code, and the approval criteria can be met.

B. Procedure: A request for a Planning Commission parking adjustment shall be initiated by a property owner or authorized agent by filing a land use application. The application shall be accompanied by a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development and parking plan, the extent of the adjustment requested along with findings for each applicable approval criteria. A request for a parking adjustment shall be processed as a Type III application as set forth in Chapter 17.50.

C. Approval criteria for the adjustment are as follows:

1. Documentation: The applicant shall document that the individual project will require an amount of parking that is different from that required after all applicable reductions have been taken.

2. Parking analysis for surrounding uses and on-street parking availability: The applicant shall show that there is a continued fifteen percent parking vacancy in the area adjacent to the use during peak parking periods and that the applicant has permission to occupy this area to serve the use pursuant to the procedures set forth by the Community Development Director.

a. For the purposes of demonstrating the availability of on street parking as defined in OCMC 17.52.020.B.3., the applicant shall undertake a parking study during time periods specified by the Community Development Director. The time periods shall include those during which the highest parking demand is anticipated by the proposed use. Multiple observations during multiple days shall be required. Distances are to be calculated as traversed by a pedestrian that utilizes sidewalks and legal crosswalks or an alternative manner as accepted by the Community Development Director.

b. The onsite parking requirements may be reduced based on the parking vacancy identified in the parking study. The amount of the reduction in onsite parking shall be calculated as follows:

i. Vacant on-street parking spaces within three hundred feet of the site will reduce onsite parking requirements by 0.5 parking spaces; and

ii. *Vacant on-street parking spaces between three hundred and six hundred feet of the site will reduce onsite parking requirements by 0.2 parking spaces.*

3. *Function and Use of Site: The applicant shall demonstrate that modifying the amount of required parking spaces will not significantly impact the use or function of the site and/or adjacent sites.*
4. *Compatibility: The proposal is compatible with the character, scale and existing or planned uses of the surrounding neighborhood.*
5. *Safety: The proposal does not significantly impact the safety of adjacent properties and rights-of-way.*
6. *Services: The proposal will not create a significant impact to public services, including fire and emergency services.*

Applicant's Response: The Applicant proposes providing parking facilities at Jon Storm Park as a benefit to the City. The parking facilities are not required. There is no adjustment to parking standards.

17.52.020 - Number of automobile spaces required.

A. The number of parking spaces shall comply with the minimum and maximum standards listed in Table 17.52.020. The parking requirements are based on spaces per one thousand square feet net leasable area unless otherwise stated.

Table 17.52.020		
LAND USE	*PARKING REQUIREMENTS*	
	MINIMUM	*MAXIMUM*
Multifamily Residential	*1.00 per unit*	*2.5 per unit*
3-4 Plex Residential	*2.00*	*4*
Hotel, Motel	*1.0 per guest room*	*1.25 per guest room*
Correctional Institution	*1 per 7 beds*	*1 per 5 beds*
Senior housing, including congregate care, residential care and assisted living facilities; nursing homes and other types of group homes	*1 per 7 beds*	*1 per 5 beds*
Hospital	*2.00*	*4.00*
Preschool Nursery/Kindergarten	*2.00*	*3.00*
Elementary/Middle School	*1 per classroom*	*1 per classroom + 1 per administrative employee + 0.25 per seat in auditorium/assembly room/stadium*
High School, College, Commercial School for Adults	*0.20 per # staff and students*	*0.30 per # staff and students*
Auditorium, Meeting Room, Stadium, Religious Assembly Building, movie theater,	*.25 per seat*	*0.5 per seat*
Retail Store, Shopping Center, Restaurants	*4.10*	*5.00*

Office	*2.70*	*3.33*
Medical or Dental Clinic	*2.70*	*3.33*
Sports Club, Recreation Facilities	*Case Specific*	*5.40*
Storage Warehouse, Freight Terminal	*0.30*	*0.40*
Manufacturing, Wholesale Establishment	*1.60*	*1.67*
Light Industrial, Industrial Park	*1.3*	*1.60*

Applicant's Response: Table 17.52.020 does not include minimum parking requirements for recreation facilities or minimum/maximum parking requirements for parks. The proposed parking area on the east side of Clackamette Drive would have no demarcated parking spaces, similar to the parking area on the west side of Clackamette Drive. The length of curb for the added parallel parking facilities is approximately 100 feet. Using dimensional standards for parallel parking stalls in OCMC 17.52.030.D, the project would add five parking stalls, which is less than the 5.4 maximum for recreation facilities.

1. *Multiple Uses. In the event several uses occupy a single structure or parcel of land, the total requirements for off-street parking shall be the sum of the requirements of the several uses computed separately.*

Applicant's Response: The parcel of land on which the parking is proposed is a city park dedicated for park use only.

2. *Requirements for types of buildings and uses not specifically listed herein shall be determined by the Community Development Director, based upon the requirements of comparable uses listed.*

Applicant's Response: The Applicant's proposal does not include buildings. The Applicant has applied the requirements for recreation facilities.

3. *Where calculation in accordance with the above list results in a fractional space, any fraction less than one-half shall be disregarded and any fraction of one-half or more shall require one space.*

Applicant's Response: The Applicant has applied this requirement to its calculation of the number of spaces.

4. *The minimum required parking spaces shall be available for the parking of operable passenger automobiles of residents, customers, patrons and employees only, and shall not be used for storage of vehicles or materials or for the parking of vehicles used in conducting the business or use.*

Applicant's Response: The Applicant does not propose the storage of vehicles or materials in the proposed parking area.

5. *A change in use within an existing habitable building located in the MUD Design District or the Willamette Falls Downtown District is exempt from additional parking requirements. Additions to an existing building and new construction are required to meet the minimum parking requirements for the areas as specified in Table 17.52.020 for the increased square footage.*

Applicant's Response: This section does not apply to the Applicant's proposal as no changes to habitable buildings are proposed.

B. Parking requirements can be met either onsite, or offsite by meeting one or multiple of the following conditions:

1. Parking may be located on the same site as the associated use which it is supporting.

2. Mixed Uses. If more than one type of land use occupies a single structure or parcel of land, the total requirements for off-street automobile parking shall be the sum of the requirements for all uses, unless it can be shown that the peak parking demands are actually less (e.g. the uses operate on different days or at different times of the day). In that case, the total requirements shall be reduced accordingly, up to a maximum reduction of fifty percent, as determined by the Community Development Director.

3. Shared Parking. Required parking facilities for two or more uses, structures, or parcels of land may be satisfied by the same parking facilities used jointly, to the extent that the owners or operators show that the need for parking facilities does not materially overlay (e.g., uses primarily of a daytime versus nighttime nature), that the shared parking facility is within one thousand feet of the potential uses, and provided that the right of joint use is evidenced by a recorded deed, lease, contract, or similar written instrument authorizing the joint use.

4. On-Street Parking. On-street parking may be counted toward the minimum standards when it is on the street face abutting the subject land use. An on-street parking space shall not obstruct a required clear vision area and it shall not violate any law or street standard. On-street parking for commercial uses shall conform to the following standards:

a. Dimensions. The following constitutes one on-street parking space:

1. Parallel parking: twenty-two feet of uninterrupted and available curb;

2. Forty-five and/or sixty-degree diagonal parking: Fifteen feet of curb;

3. Ninety-degree (perpendicular) parking: Twelve feet of curb.

4. Public Use Required for Credit. On-street parking spaces counted toward meeting the parking requirements of a specific use may not be used exclusively by that use, but shall be available for general public use at all times. Signs or other actions that limit general public use of on-street spaces are prohibited.

Applicant's Response: The Applicant proposes parking on the same site as its associated use: Jon Storm Park.

C. Reduction of the Number of the Minimum Automobile Spaces Required. Any combination of the reductions below is permitted unless otherwise noted.

1. Downtown Parking Overlay. The minimum required number of parking stalls is reduced within the Downtown Parking Overlay by fifty percent.

2. Transit Oriented Development. For projects not located within the Downtown Parking Overlay District, the minimum required number of parking stalls is reduced up to twenty-five percent when:

a. In a commercial center (sixty thousand square feet or greater of retail or office use measured cumulatively within a five hundred foot radius) or

b. When adjacent to multi-family development with over eighty units or

c. Within 1,320 feet of an existing or planned public transit street and within 1,320 feet of the opposite use (commercial center or multi-family development with over eighty units).

3. Tree Preservation. The Community Development Director may grant an adjustment to any standard of this requirement provided that the adjustment preserves a designated heritage tree or grove so that the reduction in the amount of required pavement can help preserve existing healthy trees in an undisturbed, natural condition.

4. Transportation Demand Management. The Community Development Director shall reduce the required number of parking stalls up to twenty-five percent when a parking-traffic study

prepared by a traffic engineer demonstrates alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to standard Institute of Transportation Engineers vehicle trip generation rates and further that the transportation demand management program promotes or achieves parking utilization lower than minimum city parking requirements. A transportation demand management (TDM) program shall be developed to include strategies for reducing vehicle use and parking demand generated by the development and will be measured annually. If, at the annual assessment, the City determines the plan is not successful, the plan may be revised. If the City determines that no good-faith effort has been made to implement the plan, the City may take enforcement actions.

4. *The minimum required number of stalls may be reduced by up to ten percent when the subject property is adjacent to an existing or planned fixed public transit route or within one thousand feet of an existing or planned transit stop.*

Applicant's Response: There is no minimum requirement for purposes of the proposed parking area. This section does not apply to the Applicant's proposal.

17.52.030 - Standards for automobile parking.

A. Access. Ingress and egress locations on public thoroughfares shall be located in the interests of public traffic safety and meet requirements of OCMC 16.12.035. Groups of more than four parking spaces shall be so located and served by driveways so that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley.

Applicant's Response: The proposed parking area is located on Clackamette Drive; therefore, it does not have proposed ingress and egress locations typical for a parking lot.

B. Surfacing. Required off-street parking spaces and access aisles shall have paved surfaces adequately maintained. The use of pervious asphalt/concrete and alternative designs that reduce storm water runoff and improve water quality pursuant to the City's stormwater and low impact development design standards are encouraged.

Applicant's Response: The proposal does not require off-street parking spaces nor access aisles. The proposed parking will be paved in accordance with City requirements.

C. Drainage. Drainage shall be designed in accordance with the requirements of OCMC 13.12 and the City public works stormwater and grading design standards.

Applicant's Response: The parking area will be designed in compliance with the requirements of OCMC 13.12 and the City public works stormwater and grading design standards. The parking area is continuous with Clackamette Drive and all drainage from the parking area would be captured and treated with drainage from the road in the City's drainage and treatment facility. The stormwater report (Attachment C of the Applicant's Land Use application) includes the modeling outputs used to design the stormwater facility and demonstrates that the facility is appropriately sized to accommodate stormwater from the parking area.

D. Dimensional Standards.

1. *Requirements for parking developed at varying angles are according to the table included in this section. A parking space shall not be less than seven feet in height when within a building or structure, and shall have access by an all-weather surface to a street or alley. Parking stalls in compliance with the American with Disabilities Act may vary in size in order*

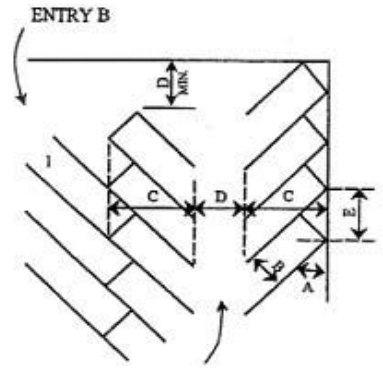
to comply with the building division requirements. Up to thirty-five percent of the minimum required parking may be compact, while the remaining required parking stalls are designed to standard dimensions. The Community Development Director may approve alternative dimensions for parking stalls in excess of the minimum requirement which comply with the intent of this chapter.

2. *Alternative parking/plan. Any applicant may propose an alternative parking plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. In such situations, the Community Development Director may approve an alternative parking lot plan with variations to parking dimensions of this section. The alternative shall be consistent with the intent of this chapter and shall create a safe space for automobiles and pedestrians while providing landscaping to the quantity and quality found within parking lot landscaping requirements.*

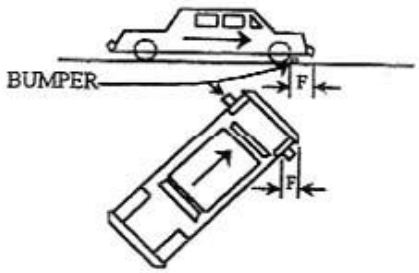
PARKING STANDARD
PARKING ANGLE SPACE DIMENSIONS

A Parking Angle		*B Stall Width*	*C Stall to Curb*	*D Aisle Width*	*E Curb Length*	*F Overhang*
0 degrees		*8.5*	*9.0*	*12*	*20*	*0*
30 degrees	*Standard Compact*	*9' 8'*	*17.3' 14.9'*	*11' 11'*	*18' 16'*	
45 degrees	*Standard Compact*	*8.5 8.5*	*19.8' 17.0'*	*13' 13'*	*12.7' 11.3'*	*1.4*
60 degrees	*Standard Compact*	*9' 8'*	*21' 17.9'*	*18' 16'*	*10.4' 9.2'*	*1.7*
90 degrees	*Standard Compact*	*9' 8'*	*19.0' 16.0'*	*24' 22'*	*9' 8'*	*1.5*

All dimensions are to the nearest tenth of a foot.



TYPICAL PARKING LAYOUT
ENTRY A



NOTE: SPACE 1 CONTINGENT UPON ENTRY B
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OVERHANG

NOTE: Overhang dimensions are intended to indicate possible location from parking area edge for location of bumpers.

Applicant's Response: The proposed parking area located on the east side of Clackamette Drive would allow parallel parking (0 degrees) along approximately 100 feet of curb length. Using the Parking Angle Space Dimensions in the table above, there would be five parking spaces that are a minimum of 8.5 feet wide.

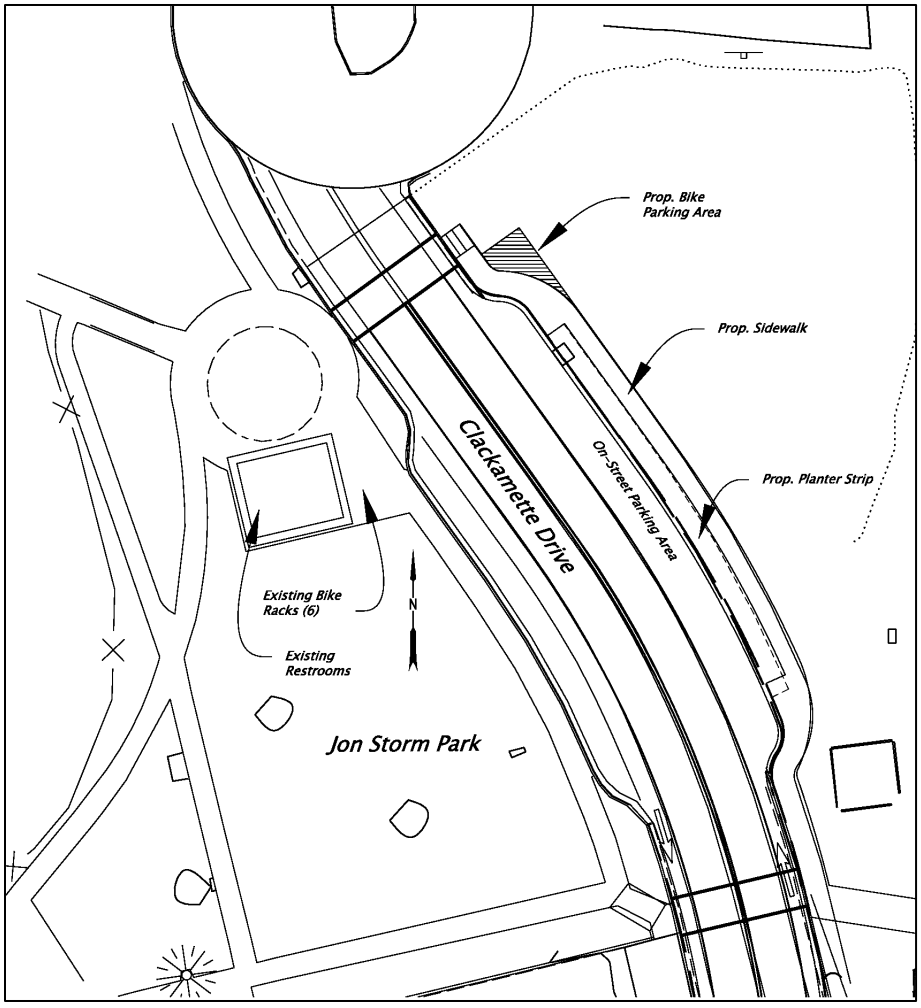
E. Carpool and Vanpool Parking. New developments with seventy-five or more parking spaces, excluding projects where seventy-five percent or more of the total floor area is residential , and new hospitals, government offices, group homes, nursing and retirement homes, schools and transit park-and-ride facilities with fifty or more parking spaces, shall identify the spaces available for employee, student and commuter parking and designate at least five percent, but not fewer than two, of those spaces for exclusive carpool and vanpool parking. Carpool and vanpool parking spaces shall be located closer to the main employee, student or commuter entrance than all other employee, student or commuter parking spaces with the exception of ADA accessible parking spaces. The carpool/vanpool spaces shall be clearly marked "Reserved - Carpool/Vanpool Only."

Applicant's Response: This section does not apply to the Applicant's proposal as no new developments with 75 or more parking spaces are proposed.

17.52.040 - Bicycle parking standards.

A. Purpose-Applicability. To encourage bicycle transportation to help reduce principal reliance on the automobile, and to ensure bicycle safety and security, bicycle parking shall be provided in conjunction with all uses other than exclusively residential use with less than five dwellings onsite (excluding cluster housing).

Applicant's Response: Additional bicycle parking is proposed with the additional parking spaces at Jon Storm Park to encourage bicycle transportation. The bicycle parking location is shown in the diagram below.



B. Number of Bicycle Spaces Required. For any use not specifically mentioned in Table A, the bicycle parking requirements shall be the same as the use which, as determined by the Community Development Director, is most similar to the use not specifically mentioned. Calculation of the number of bicycle parking spaces required shall be determined in the manner established in OCMC 17.52.020 for determining automobile parking space requirements. Modifications to bicycle parking requirements may be made through the site plan and design, conditional use, or master plan review process.

*TABLE A Required Bicycle Parking Spaces**

Where two options for a requirement are provided, the option resulting in more bicycle parking applies. Where a calculation results in a fraction, the result is rounded up to the nearest whole number.

USE	*MINIMUM BICYCLE PARKING*	*MINIMUM BICYCLE PARKING - COVERED - The following percentage of bicycle parking is required to be covered*
Multi-family (five or more units)	*1 per 10 units (minimum of 2)*	*50% (minimum of 1)*

Correctional institution	*1 per 15 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Nursing home or care facility	*1 per 30 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Hospital	*1 per 20 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Park-and-ride lot	*1 per 5 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Transit center	*1 per 5 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Parks and open space	*1 per 10 auto spaces (minimum of 2)*	*0%*
Public parking lots	*1 per 10 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Automobile parking structures	*1 per 10 auto spaces (minimum of 4)*	*80% (minimum of 2)*
Religious institutions, movie theater, auditorium or meeting room	*1 per 10 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Libraries, museums	*1 per 5 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Preschool, nursery, kindergarten	*2 per classroom (minimum of 2)*	*50% (minimum of 1)*
Elementary	*4 per classroom (minimum of 2)*	*50% (minimum of 1)*
Junior high and High school	*2 per classroom (minimum of 2)*	*50% (minimum of 2)*
College, business/commercial schools	*2 per classroom (minimum of 2)*	*50% (minimum of 1)*
Swimming pools, gymnasiums, ball courts	*1 per 10 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Retail stores and shopping centers	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 2)*
Retail stores handling exclusively bulky merchandise such as automobile, boat or trailer sales or rental	*1 per 40 auto spaces (minimum of 2)*	*0%*
Bank, office	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 1)*

Medical and dental clinic	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Eating and drinking establishment	*1 per 20 auto spaces (minimum of 2)*	*0%*
Gasoline service station	*1 per 10 auto spaces (minimum of 2)*	*0%*

* *Covered bicycle parking is not required for developments with two or fewer parking stalls.*

Applicant's Response: The Applicant proposes adding two bicycle parking spaces just north of the proposed parking area located on the east side of Clackamette Drive. Because the parking is associated with a park, there will be no covered bicycle parking spaces.

C. Design Standards.

1. *Bicycle parking facilities shall be in the form of a lockable enclosure onsite, secure room in a building onsite, a covered or uncovered rack onsite, or within the adjacent right-of-way.*

Applicant's Response: Bicycle parking will be in the form of an uncovered rack on-site.

2. *Bicycle parking areas shall be clearly marked or visible from on-site buildings or the street. If a bicycle parking area is not plainly visible from the street or main building entrance, a sign shall be posted indicating the location of the bicycle parking area. Indoor bicycle parking areas shall not require stairs to access the space. If sites have more than one building, bicycle parking shall be distributed as appropriate to serve all buildings.*

Applicant's Response: Bicycle parking will be clearly visible from the street.

3. *All bicycle racks shall be designed so that:*
   a. *The bicycle frame is supported horizontally at two or more places.*
   b. *The frame and at least one wheel of the bicycle can be locked to the rack with a standard U-type lock.*
   c. *The user is not required to lift the bicycle onto the bicycle rack.*
   d. *Each bicycle parking space is accessible without moving another bicycle.*
   e. *It is a minimum of thirty inches tall and eighteen inches wide between the two points of contact.*
   f. *Provides an area of six feet by two feet per bicycle.*
   g. *All bicycle racks and lockers shall be securely anchored to the ground or to a structure.*

Applicant's Response: Bicycle parking will be constructed to (a) support the bicycle frame horizontally at two or more places, (b) allow use of a U-type lock attaching to the frame, at least one wheel, and the rack, (c) allow the user to secure the bicycle without lifting it, (d) make each space accessible without moving a bicycle (e) a minimum of 30 inches tall and 18 inches wide, (f) provide an area of six feet by two feet for each bicycle, and (g) be securely anchored to the ground or to a structure.

17.52.060 - Parking lot landscaping.

Purpose. The purpose of this code section includes the following:

1. *To enhance and soften the appearance of parking lots;*
2. *To limit the visual impact of parking lots from sidewalks, streets and particularly from residential areas;*

3. *To shade and cool parking areas;*
4. *To reduce air and water pollution;*
5. *To reduce storm water impacts and improve water quality; and*
6. *To establish parking lots that are more inviting to pedestrians and bicyclists.*

A. *Applicability. Unless otherwise specified, construction of new parking lots and alterations of existing parking lots shall comply with parking lot landscaping standards. Parking lot landscaping requirements within this section do not apply to parking structures or parking garages, except landscaping as required in OCMC 17.62.*

Applicant's Response: The Applicant's design of the parking area will provide landscaping through an alternative landscaping plan as outlined in OCMC 17.52.060.F.

B. *Development Standards.*

1. *The landscaping shall be located in defined landscaped areas that are uniformly distributed throughout the parking or loading area.*

Applicant's Response: This section does not apply because the parking area is linear and along the side of Clackamette Drive. The Applicant is proposing an alternative landscaping plan as outlined in OCMC 17.52.060.F.

2. *All areas in a parking lot not used for parking, maneuvering, or circulation shall be landscaped.*

Applicant's Response: This section does not apply because the parking area is linear and along the side of Clackamette Drive. The Applicant is proposing an alternative landscaping plan as outlined in OCMC 17.52.060.F.

3. *Parking lot trees shall be a mix of deciduous shade trees and coniferous trees. The trees shall be evenly distributed throughout the parking lot as both interior and perimeter landscaping.*

Applicant's Response: Four deciduous shade trees will be planted in the planting strip adjacent to the parking area. They will be evenly spaced. Because the parking area is linear and along the side of Clackamette Drive, the trees will not be distributed throughout the parking lot as either interior or perimeter landscaping. The Applicant is proposing an alternative landscaping plan as outlined in OCMC 17.52.060.F.

4. *Required landscaping trees shall be of a minimum two-inch minimum caliper size (though it may not be standard for some tree types to be distinguished by caliper), planted according to American Nurseryman Standards, and selected from the Oregon City Street Tree List or approved by an arborist;*

Applicant's Response: Trees proposed to be planted that are associated with the parking area will be a minimum of two-inch caliper size, planted according to American Nurseryman Standards, and selected from the Oregon City Street Tree List.

5. *At maturity, all of the landscaped area shall be planted in ground cover plants, which includes grasses. Mulch (as a ground cover) shall only be allowed underneath plants at full growth and within two feet of the base of a tree and is not a substitute for ground cover.*

Applicant's Response: The Applicant's landscaping plan proposes a landscaped area associated with the parking area to include a compact ground cover under four deciduous shade trees to reduce maintenance and keep the sidewalk passable. See Attachment D, Sheet FA13. The ground cover

plants would be low, evergreen and native (Mahonia repens), and will cover the landscaped area at maturity.

6. *Landscaped areas shall include irrigation systems unless an alternate plan is submitted, and approved by the Community Development Director, that can demonstrate adequate maintenance;*

Applicant's Response: The planting strip adjacent to the parking area on the east side of Clackamette Drive will not have permanent irrigation installed. To establish the plants, the Applicant proposes the following strategies:

- Select drought tolerant species.
- Include mycorrhyzal inoculates to support water and nutrient uptake.
- Mulch with arbor chips, a long-lasting mulch to suppress weeds, retain soil moisture, avoid compaction, and improve soil structure and health.
- Contractor to supply water as needed to establish trees and shrubs during the establishment period (up to 2 years).

7. *All landscaping shall be installed according to accepted planting procedures, according to American Nurseryman Standards.*

Applicant's Response: The Applicant will install all landscaping according to accepted planting procedures, according to American Nurseryman Standards.

C. *Perimeter Parking Lot Landscaping and Parking Lot Entryway/Right-of-Way Screening. Parking lots shall include a five-foot wide landscaped buffer where the parking lot abuts the right-of-way and/or adjoining properties. In order to provide connectivity between non-single-family sites, the Community Development Director may approve an interruption in the perimeter parking lot landscaping for a single driveway where the parking lot abuts property designated as multi-family, commercial or industrial. Shared driveways and parking aisles that straddle a lot line do not need to meet perimeter landscaping requirements.*

1. *The perimeter parking lot are[a] shall include:*
   a. *Trees spaced a maximum of thirty feet apart (minimum of one tree on either side of the entryway is required). When the parking lot is adjacent to a public right-of-way, the parking lot trees shall be offset from the street trees;*
   b. *An evergreen hedge screen of thirty to forty-two inches high or shrubs spaced no more than four feet apart on average. The hedge/shrubs shall be parallel to and not nearer than two feet from the right-of-way line. The required screening shall be designed to allow for free access to the site and sidewalk by pedestrians. Visual breaks, no more than five feet in width, shall be provided every thirty feet within evergreen hedges abutting public right-of-ways.*

Applicant's Response: This section does not apply because the parking area is linear and along the side of Clackamette Drive. The Applicant is proposing an alternative landscaping plan as outlined in OCMC 17.52.060.F.

D. *Parking Area/Building Buffer. Except for parking lots with fewer than five parking stalls, parking areas shall be separated from the exterior wall of a structure, exclusive of pedestrian entranceways or loading areas, by one of the following:*

1. *Minimum five-foot wide landscaped planter strip (excluding areas for pedestrian connection) meeting the standards for perimeter parking lot area landscaping; or:*

2. *Minimum seven foot sidewalks with shade trees spaced a maximum of thirty feet apart in three-foot by five-foot tree wells.*

Applicant's Response: The proposed parking lot is not adjacent to a building. This section is not applicable to the Applicant's proposal.

E. *Interior Parking Lot Landscaping. Surface parking lots with more than five parking stalls shall include at least forty-five square feet of interior parking lot landscaping per parking stall to improve the water quality, reduce storm water runoff, and provide pavement shade. Pedestrian walkways or any impervious surface in the landscaped areas are not to be counted in the percentage. Fractions shall be rounded up when calculating the required number of plantings. Interior parking lot landscaping shall include:*
   a. *A minimum of one tree per four parking spaces.*
   b. *A minimum of 1.5 shrubs per parking space.*
   c. *No more than eight contiguous parking spaces shall be created without providing an interior landscape strip between them. Landscape strips shall be provided between rows of parking shall be a minimum of six feet in width and a minimum of ten feet in length.*

Applicant's Response: This section does not apply because the Applicant is not proposing a surface parking lot with more than five stalls. The Applicant's proposal is on-street linear parking with no interior space.

F. *Alternative landscaping plan.*
Any applicant may propose an alternative landscaping plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. Alternative plans may include the use of low impact development techniques and minimized landscaping requirements. In such situations, the Community Development Director may approve variations to the landscaping standards of OCMC 17.52.060 in accordance with A and/or B below.
   1. *General Review Standard. The alternative shall meet the standards in OCMC 17.62.015-Modifications that will better meet design review requirements.*
   2. *Credit for Pervious/Low Impact Development. The Community Development Director may count up to fifty percent of the square footage of any pervious hardscaped landscape material within a parking lot that is designed and approved pursuant to the City's adopted stormwater and low impact development design standards toward minimum landscaping requirements for the site. (This includes porous pavement detention, open celled block pavers, porous asphalt, porous concrete pavement, porous turf, porous gravel, etc.).*

Applicant's Response: The Applicant proposes an alternative landscaping plan that meets the standards in OCMC 17.62.015. The alternative landscaping plan is a modification that will better meet design review requirements and meets the intent of the standards in OCMC 17.52.060. The Applicant proposes a modification to 17.62.015.A.h (parking lot landscaping in OCMC 17.52.060) that will better meet design review requirements. The proposed parking area on Clackamette Drive adjacent to Jon Storm Park is not a lot, but a parking area on the street. Parking lot landscaping requirements outlined in 17.52.060 cannot be met due to the size constraints and the design of the parking area. Specifically, there is no perimeter parking nor interior to accommodate landscaping. Instead, a five-foot planter strip is proposed along the entire length of the parking area, between the parking and the sidewalk. Trees and ground cover are proposed to be planted in the planter strip. See Attachment D, Sheet FA13 for the proposed landscaping plan.

17.52.080 - Maintenance.

The owner, tenant and their agent, if any, shall be jointly and severally responsible for the maintenance of the site including but not limited to the off-street parking and loading spaces, bicycle parking and all landscaping which shall be maintained in good condition so as to present a healthy, neat and orderly appearance and shall be kept free from refuse and debris.
All plant growth in interior landscaped areas shall be controlled by pruning, trimming, or otherwise so that:

a. It will not interfere with the maintenance or repair of any public utility;
b. It will not restrict pedestrian or vehicular access; and
c. It will not constitute a traffic hazard due to reduced visibility.

Applicant's Response: The parking area will be commissioned to Oregon City for long-term maintenance.

17.52.090 - Loading areas.

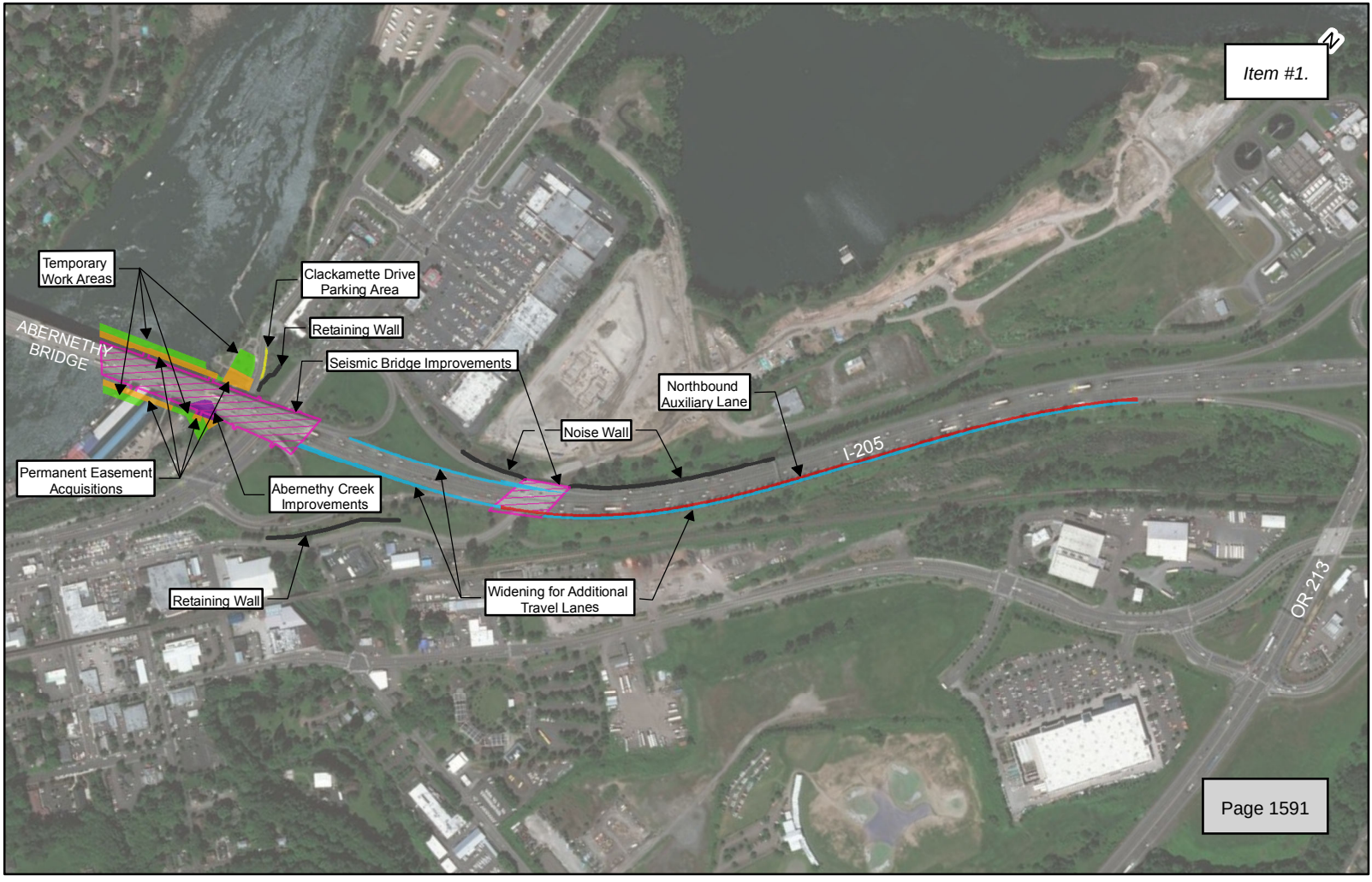
A. Purpose.
The purpose of this section is to provide adequate loading areas for commercial, office, retail and industrial uses that do not interfere with the operation of adjacent streets.

B. Applicability.
OCMC 17.52.090 applies to uses that are expected to have service or delivery truck visits with a forty-foot or longer wheelbase, at a frequency of one or more vehicles per week. The City Engineer and decision maker shall determine through site plan and design review the number, size, and location of required loading areas, if any.

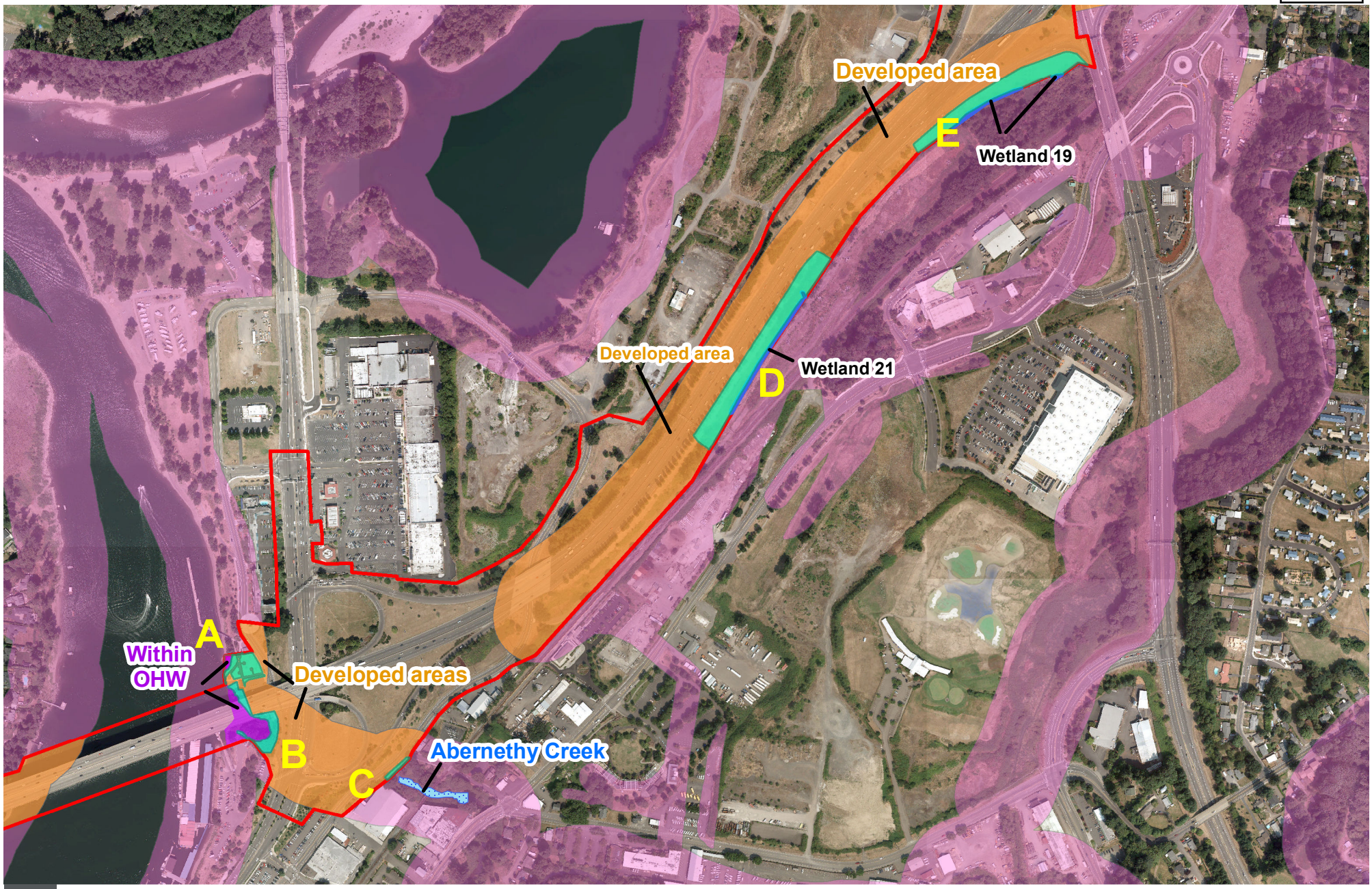
C. Standards.
1. The off-street loading space shall be large enough to accommodate the largest vehicle that is expected to serve the use without obstructing vehicles or pedestrian traffic on adjacent streets and driveways. Applicants are advised to provide complete and accurate information about the potential need for loading spaces because the City Engineer or decision maker may restrict the use of other public right-of-way to ensure efficient loading areas and reduce interference with other uses.
2. Where parking areas are prohibited between a building and the street, loading areas or drive isles are also prohibited.
3. The City Engineer and decision maker, through site plan and design review, may approve a loading area adjacent to or within a street right-of-way when all of the following loading and unloading operations conditions are met:
a. Short in duration (i.e., less than one hour);
b. Infrequent (less than three operations daily between 5:00 a.m. and 12:00 a.m. or all operations between 12:00 a.m. and 5:00 a.m. at a location that is not adjacent to a residential zone);
c. Does not obstruct traffic during peak traffic hours;
d. Does not interfere with emergency response services; and
e. Is acceptable to the applicable roadway authority.

Applicant's Response: The Applicant's proposal does not include loading areas. This section of the code does not apply.

Attachment B. Site Plan


Temporary Work Areas
Clackamette Drive Parking Area
Retaining Wall
Seismic Bridge Improvements
ABERNETHY BRIDGE
Northbound Auxiliary Lane
Noise Wall
I-205
Permanent Easement Acquisitions
Abernethy Creek Improvements
Retaining Wall
Widening for Additional Travel Lanes
OR 213

Attachment C. NROD Verification



HDR

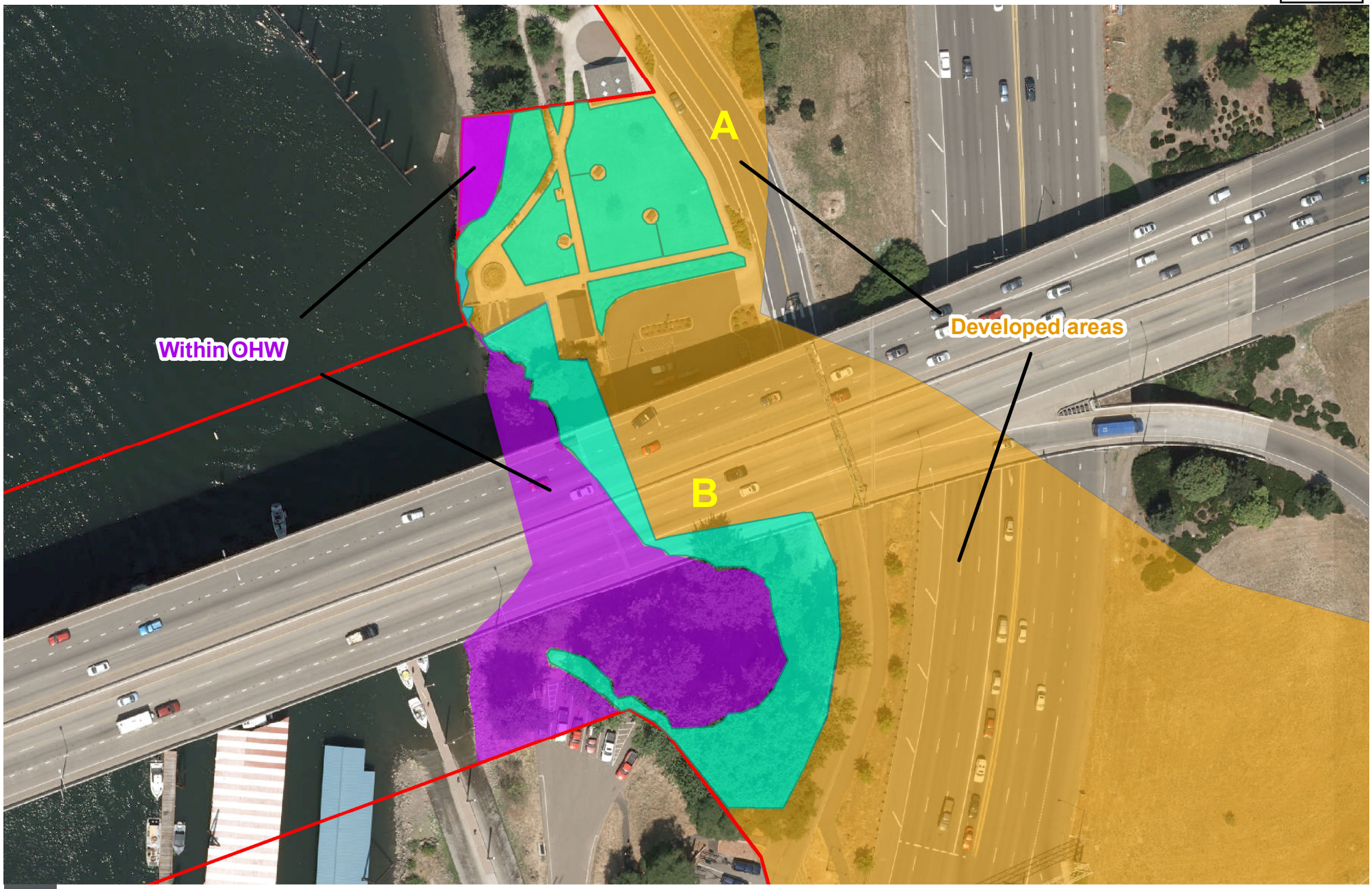
0 Miles 0.1

Project Area
Existing NROD
Remove NROD - Development
Remove NROD - OHW
Proposed NROD
Wetlands

NROD VERIFICATION
Revised April 2020

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\OREGON CITY\OC LU AMENDMENT\NROD_VERIFICATION_REVISED_10.6.MXD - USER: RBARKSDALE - DATE: 4/22/2020



Project Area
Remove NROD - Development
Proposed NROD
Remove NROD - OHW

0 Miles 0.015

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\OREGON CITY\OC LU AMENDMENT\NROD_VERIFICATION_REVISED_10.6.MXD - USER: RBARKSDALE - DATE: 4/22/2020

NROD VERIFICATION
Revised April 2020

Attachment D. Landscaping Plan

GENERAL NOTES:

1. Plant all trees beyond "clear zone"; verify with engineer prior to planting. Engineer shall approve all work outside designated work limits prior to construction. Do not plant trees within 20' of a bridge/viaduct or within 10' of a trail, waterline, or stormwater line.

2. Locate underground utility lines prior to any digging or ground disturbance.

3. Adjust planting locations so vegetation does not conflict with above- or below-ground utilities.

4. Adjust plant locations to avoid conflict with traffic sight lines and signs or other appurtenances. Verify location changes with Engineer.

5. All dimensions shown on details are minimum dimensions.

6. See Plant Schedule FA02, FA03 for plants and landscape material.

7. Plan is schematic. Planting may be adjusted to fit site conditions with prior Agency approval.

8. Lay out plant material in groups as indicated in plant and material schedule, details and plan sheets.

9. Stake all planting areas for review and approval by Engineer prior to planting.

10. Do not install plant material without prior inspection and approval as required by 01040.19(d).

11. Comply with Oregon Standard Specifications for Construction and Special Provisions for construction applicable to this project.

12. Thoroughly water all plant material (saturated backfill) within 24-hours of installation regardless of rainfall events.

13. Verify field conditions prior to construction with any adjustments to the plans made as directed by the Engineer.

14. Protect all trees and land areas marked for protection. Do not damage natural (non-invasive) vegetation.

15. Comply with erosion control measures per Section 00280 and all applicable permits during construction.

16. Where discrepancies between the Plant Schedule and the plans exist, plans shall prevail.

17. See Special Provision 01030.13(f) for seed mixes

18. Prepare all planting and seeding areas per Method B, see 01040.48(b) in the Oregon Standard Specifications for Construction.

19. Include Mycorrhizal innoculates for all seeding and individual plant installations. Apply per manufacturer's recommendation.

20. Flag all planted tree species with color-coded identification flags.

Mitigation and Restoration Permitting Requirements									
	Area (square feet)							Plant Totals	
	FA08	FA10	FA12	FA13*	FA14	FA15	TOTAL	TREES	SHRUBS
DSL Permit Requirements	-	-	-	25,956	42,555	148,187	209,929	1,004	2,031

OREGON CITY LAND USE APPLICATION: **PLANTING TOTALS**

	TREES	SHRUBS
NROD Mitigation Planting **quantities** (includes Off-Site Mitigation)	708	3642
Oregon City Street Trees (OCMC 12.08)	70	
Oregon City R.O.W. Trees (OCMC 12.08)	110	

NROD Mitigation Planting **areas**	
On-Site NROD Mitigation Area	108, 914 s.f.
Off-Site NROD Mitigation Area	37,513 s.f.
NROD Area (restoration)**	21,401 s.f.
TOTAL AREA	**167,828 s.f.**

*** ON-SITE NROD** *being restored after construction*

PRELIMINARY COPY
INFORMATION ONLY

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NNA Landscape Architecture
1125 SE Madison St, Suite 201
Portland, OR 97214
503.239.0600

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Plant and Material Schedule

Trees

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
TARME	*Arbutus menziesii*	Madrone	1/2" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	3	-	-	-	1	-	4
TCADE	*Calocedrus decurrens*	Incense Cedar	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	6	8	14
TCONU	*Cornus nuttallii*	Pacific Dogwood	1" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	7	-	7
TPIPO	*Pinus ponderosa 'Willamette Valley'*	Willamette Ponderosa Pine	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	14	99	79	16	-	29	23	248
TPSME	*Pseudotsuga menziesii*	Douglas Fir	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	29	-	29
TQUCH	*Quercus chrysolepis*	Canyon Live Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	34	-	-	-	15	49
TQUGA	*Quercus garryana*	Oregon White Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	5	69	12	-	24	12	116
TULAM	*Ulmus americana 'Valley Forge'*	Valley Forge American Elm	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	10	-	-	-	7
TUMCA	*Umbellularia californica*	Oregon Myrtle	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	31	-	-	-	-	31

Broadleaf Evergreen Shrubs

Deciduous Shrubs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
ARCO	*Arctostaphylos columbiana x 'Patula'*	Manzanita	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	214	-	-	-	-	214
COSE	*Cornus sericea*	Red Osier Dogwood	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	1,005	-	-	-	-	1,005
FRCA	*Frangula californica 'Eve Case'*	Eve Case Coffeeberry	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	51	-	-	-	-	51
GAEL	*Garrya elliptica 'James Roof'*	Wavyleaf Silktassel	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	61	-	-	-	-	61
MAAQ	*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	397	-	-	-	-	397
MOCA	*Morella californica*	Pacific Wax Myrtle	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	57	-	-	-	-	57

Ornamental Grasses and Forbs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	TOTAL
-	*Asclepias speciosa*	Showy milkweed	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Calamagrostis x acutiflora 'Karl Foerster'*	Feather reed grass	12" Height	2' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Carex glauca*	Blue Sedge	12" Height	1' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Deschampsia cespitosa 'Goldtau'*	Tufted hairgrass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Juncus patens 'Carmen's Grey'*	Carman's Grey Blue Rush	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Solidago 'Goldkind'*	Golden Baby goldenrod	12" Height	1' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Stipa gigantea*	Giant feather grass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Veratrum californicum*	California false hellebore	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

ROADSIDE DEVELOPMENT PLANT SCHEDULE

City of Oregon NROD Mitigation Trees and Shrubs

	Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA10	TOTAL
NROD Trees & Shrubs		*Arbutus menziesii*	Pacific Madrone	1/2" Calip.	13.5' O.C.	Bareroot	20%		84	40	124
		Pinus ponderosa var. willamettensis	Ponderosa Pine	18" Height	13.5' O.C.	Bareroot	30%		127	60	187
		Quercus garryana	Oregon White Oak	1/2" Calip.	13.5' O.C.	Bareroot	30%		127	60	187
		Rhamnus purshiana	Cascara	1/2" Calip.	13.5' O.C.	Bareroot	10%		42	20	62
		Salix scouleriana	Scouler's Willow	1/2" Calip.	13.5' O.C.	Bareroot	10%		42	20	62
		Arctostaphylos columbiana	Hairy Manzanita	12" Height	6' O.C.	Bareroot	20%		366	174	540
		Berberis (Mahonia) aquifolium	Tall Oregongrape	12" Height	6' O.C.	Bareroot	30%		549	261	810
		Ceanothus velutinus	Snowbrush	12" Height	6' O.C.	Bareroot	20%		366	174	540
		Corylus cornuta var. Californica	Western Hazelnut	12" Height	6' O.C.	Bareroot	15%		274	130	404
		Ribes lobbii	Gummy Gooseberry	12" Height	6' O.C.	Bareroot	15%		274	130	404
NROD Shrubs		*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Min.	6' O.C.	Bareroot	20%		-	118	118
		Cornus sericea	Redtwig Dogwood	12" Min.	6' O.C.	Bareroot	10%		-	177	177
		Ribes sanguineum	Redflowering Currant	12" Min.	6' O.C.	Bareroot	15%		-	118	118
		Rubus parviflorus	Thimbleberry	12" Min.	6' O.C.	Bareroot	15%		-	89	89
		Spirea douglasii	Douglas Spirea	12" Min.	6' O.C.	Bareroot	15%		-	89	89
		Symphoricarpos albus	Snowberry	12" Min.	6' O.C.	Bareroot	25%		-	148	148

Upland Riparian Restoration Mix

	Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX A: Trees		*Acer macrophyllum*	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	8%		-	-	36	36
		Arbutus menziesii	Pacific Madrone	1/2" Calip.	15'-20' Min.	Container	15%		-	-	67	67
		Calocedrus decurrens	Incense Cedar	18" Height	30' Min.	Bareroot	8%		-	-	36	36
		Corylus cornuta var. californica	Western Hazelnut	1/2" Calip.	15'-20' Min.	Bareroot	15%		-	-	67	67
		Cornus nuttallii	Western Dogwood	1/2" Calip.	15'-20' Min.	Bareroot	5%		-	-	22	22
		Quercus garryana	Oregon White Oak	1/2" Calip.	15'-20' Min.	Bareroot	26%		-	-	116	116
		Pseudotsuga menziesii	Douglas Fir	18" Height	30' Min.	Bareroot	8%		-	-	36	36
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	15%		-	-	67	67
MIX A & B: Shrubs		*Berberis (Mahonia) aquifolium*	Tall Oregongrape	12" Height	5' Min.	Bareroot	25%		-	-	370	370
		Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%		-	-	148	148
		Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%		-	-	222	222
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%		-	-	148	148
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%		-	-	222	222
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%		-	-	370	370

Lowland Riparian Restoration Mix

	Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX C: Trees		*Abies grandis*	Grand Fir	18" Height	30' Min.	Bareroot	10%		8	21	-	29
		Acer macrophyllum	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	10%		8	21	-	29
		Alnus rubra	Red Alder	1/2" Calip.	15'-20' Min.	Bareroot	26%		22	54	-	76
		Fraxinus latifolia	Oregon Ash	1/2" Calip.	30' Min.	Bareroot	6%		5	13	-	18
		Prunus emarginata	Bitter Cherry	1/2" Calip.	15'-20' Min.	Bareroot	15%		13	31	-	44
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	10%		8	21	-	29
		Salix lucida	Shining Willow	1/2" Calip.	15'-20' Min.	Bareroot	15%		13	31	-	44
		Thuja plicata	Western Redcedar	18" Height	30' Min.	Bareroot	8%		7	17	-	24
MIX C & D: Shrubs		*Cornus sericea*	Redtwig Dogwood	12" Height	5' Min.	Bareroot	25%		46	115	-	161
		Physocarpus capitatus	Pacific Ninebark	12" Height	5' Min.	Bareroot	10%		18	46	-	64
		Rubus spectabilis	Salmonberry	12" Height	5' Min.	Bareroot	15%		28	69	-	97
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%		18	46	-	64
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%		28	69	-	97
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%		46	115	-	161

Roadside Riparian Restoration Mix

	Key			Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX E: Trees & Shrubs		*Pinus ponderosa var. willamettensis*	Willamette Ponderosa Pine	3'-4' Height	25'	#5 Container	50%		2	-	21	23
		Quercus garryana	Oregon White Oak	1/2" caliper	25'	Bareroot	40%		2	-	16	18
		Arbutus menziesii	Pacific Madrone	1'-2' Height	25'	#1 Container	10%		-	-	4	4
		Berberis (Mahonia) aquifolium	Tall Oregon Grape	12" Height	5' Min.	#1 Container	60%		14	-	53	64
		Ceanothus velutinus	Snowbrush	12" Height	5' Min.	#1 Container	10%		2	-	9	11
		Ribes sanguineum	Redflowering Currant	12" Height	5' Min.	#1 Container	15%		3	-	13	16
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	#1 Container	15%		3	-	13	16

OREGON CITY LAND USE APPLICATION NOTATION LEGEND

OC 17.49

- NROD Tree and Shrub Mitigation Planting
- NROD Shrub Mitigation Planting (existing trees)

OC 12.08

- Oregon City Street Trees
- Oregon City R.O.W. Trees

Seed Mix* **See Special Provisions 01030.13(f) for Seed Mix** **Area (square feet)**

Key		FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
	Permanent Seeding	2,066	-	-	1,273	175,749	-	-	-	129,854	308,942
	Water Quality Seeding	787	-	-	1,294	4,934	176	-	9,971	14,616	31,226
Varies	Riparian Seeding	-	-	-	-	-	23,824	42,555	-	-	66,379
	Wildflower Seeding	66,987	-	81,714	-	1,379	33,804	-	142,999	6,082	326,821
Varies	Native Shade Seeding	-	-	-	-	-	-	-	80,985	-	80,985
	Wetland Seeding	-	-	-	-	-	-	-	410	-	410
	Upland Shrub Seeding	-	-	-	-	-	7,672	-	46,091	-	53,763

*** Verify compost erosion blanket is installed prior to applying seed**

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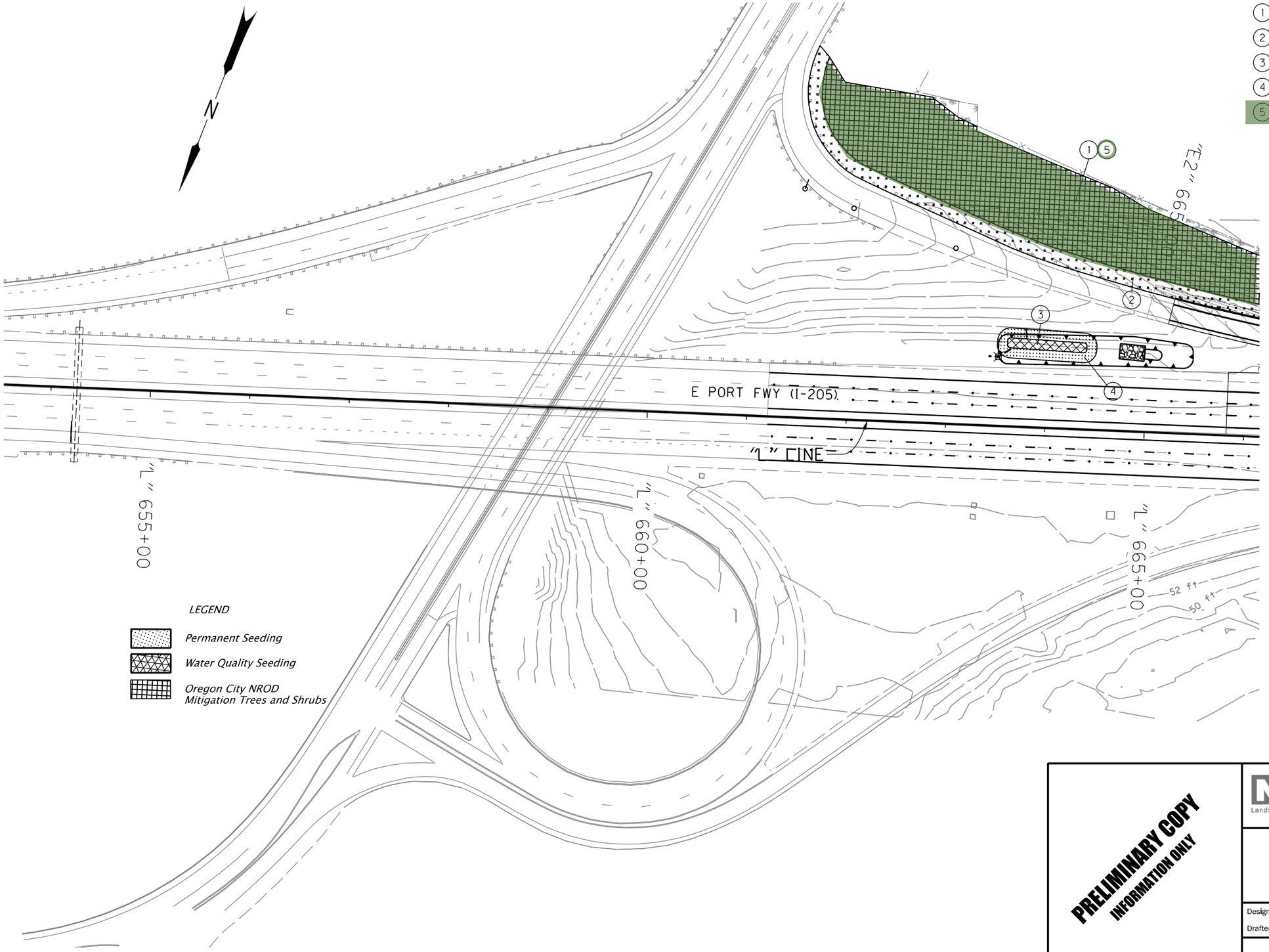
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke Reviewer: Ben Ngan
Drafter: David Goodyke Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

Sec. 29, T. 2 S, R. 2 E, W.M.



1. Install 66,987 s.f. Wildflower Seeding
2. Install 18,761 s.f. Wildflower Seeding
3. Install 787 s.f. Water Quality Seeding
4. Install 2,066 s.f. Permanent Seeding
5. Install 66,987 s.f. NROD Mitigation Trees and Shrubs

LEGEND

- Permanent Seeding
- Water Quality Seeding
- Oregon City NROD Mitigation Trees and Shrubs

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Reviewer: Ben Ngan
Drafter: David Goodyke
Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

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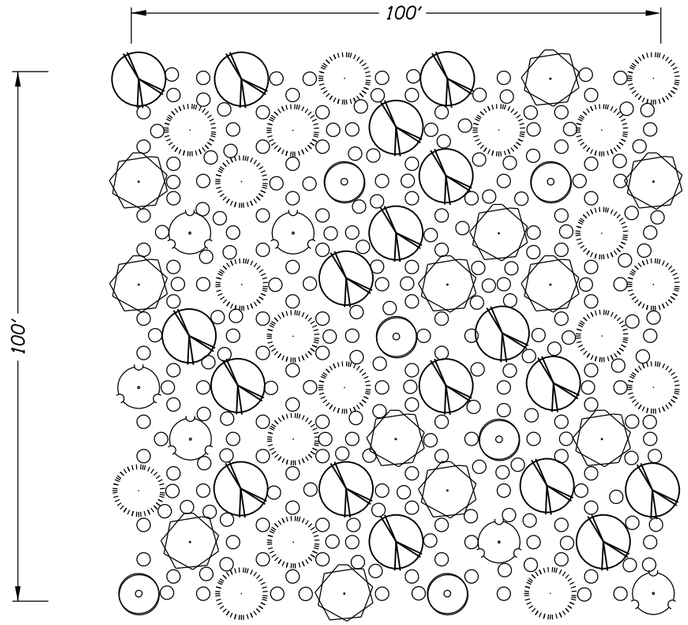
Rotation: 227.6721° 0'



NROD Mitigation Planting Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Arbutus menziezii	13 stems / 10,000 s.f.	20%
	Pinus ponderosa	18 stems / 10,000 s.f.	30%
	Quercus garryana	18 stems / 10,000 s.f.	30%
	Small Trees		
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Salix scouleriana	6 stems / 10,000 s.f.	10%
	Shrubs*		
	Arctostaphylos columbiana	55 stems / 10,000 s.f.	20%
	Berberis (Mahonia) aquifolium	82 stems / 10,000 s.f.	30%
	Ceanothus velutinus	55 stems / 10,000 s.f.	20%
	Corylus cornuta var. Californica	41 stems / 10,000 s.f.	15%
	Ribes lobbii	41 stems / 10,000 s.f.	15%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Arbutus menziezii (TARME), 20%*
- *Pinus ponderosa (TPIPO), 30%*
- *Quercus garryana (TQUGA), 30%*

Small Trees
- *Rhamnus purshiana (TRHPU), 10%*
- *Salix scouleriana (TSASC), 10%*

Shrubs
- *Assorted Species*

DETAIL: NROD MITIGATION TREES AND SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 61 trees/10,000 s.f.

2) Install trees at an average of 13.75' O.C. with triangular spacing

3) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

4) Concentrate TQUGA in areas with most southern and western sun exposure.

5) Install trees in groups of up to 4 specimens per species.

6) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

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CLACKAMAS COUNTY

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Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

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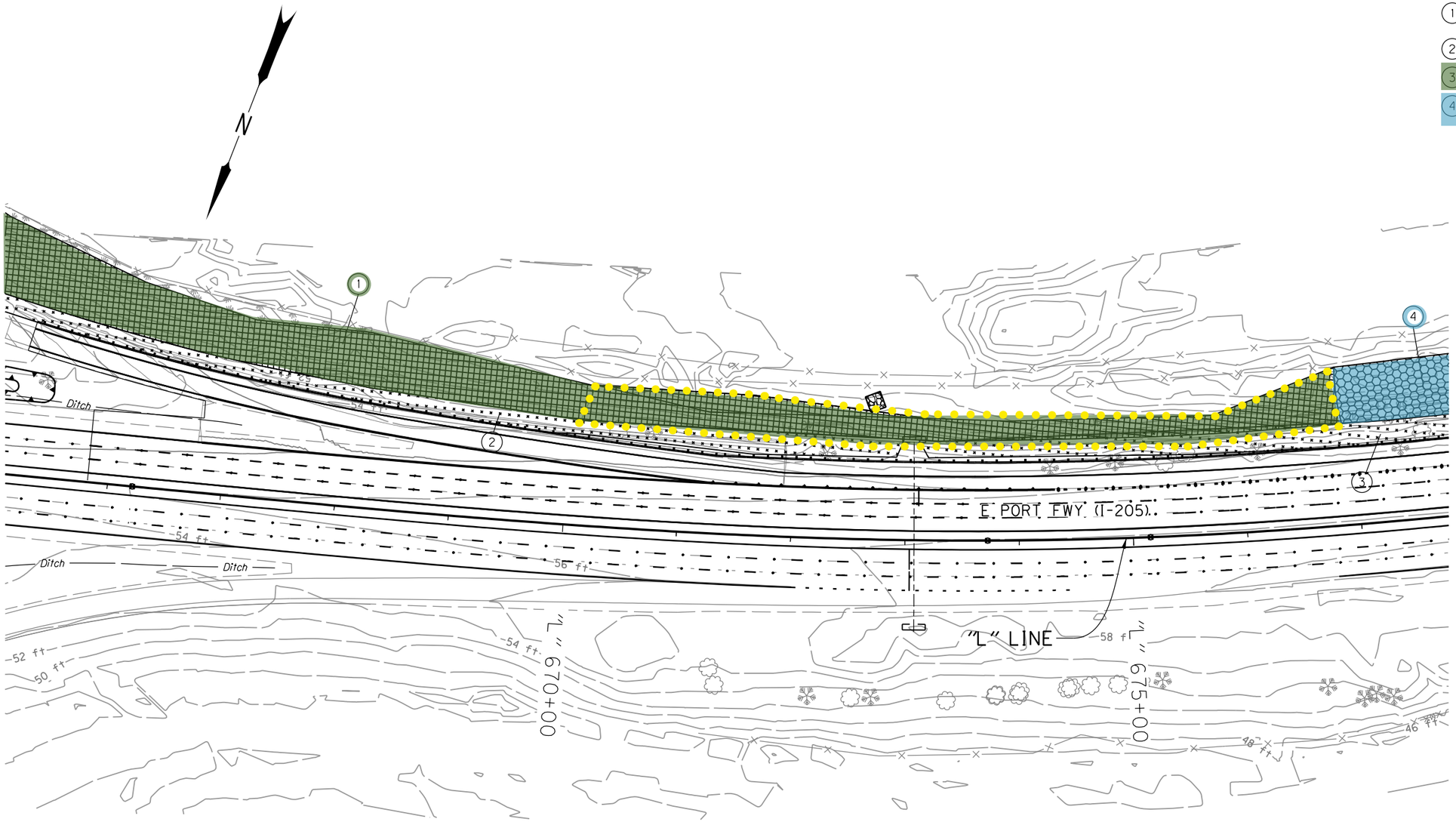
Rotation: 227.6721° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

?? ? – ???

1. *Total area on FA08 and FA09, shown on FA08, notes 1 & 5*
2. *Total area on FA08 and FA09, shown on FA08, note 2*
3. *Total area on FA09 and FA10, shown on FA10, note 2*
4. *Total area on FA09 and FA10, shown on FA10, notes 1 & 4*



Off-Site NROD
Mitigation Area
16,867 SF

LEGEND

Oregon City NROD Mitigation Trees and Shrubs

ExistingTrees

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

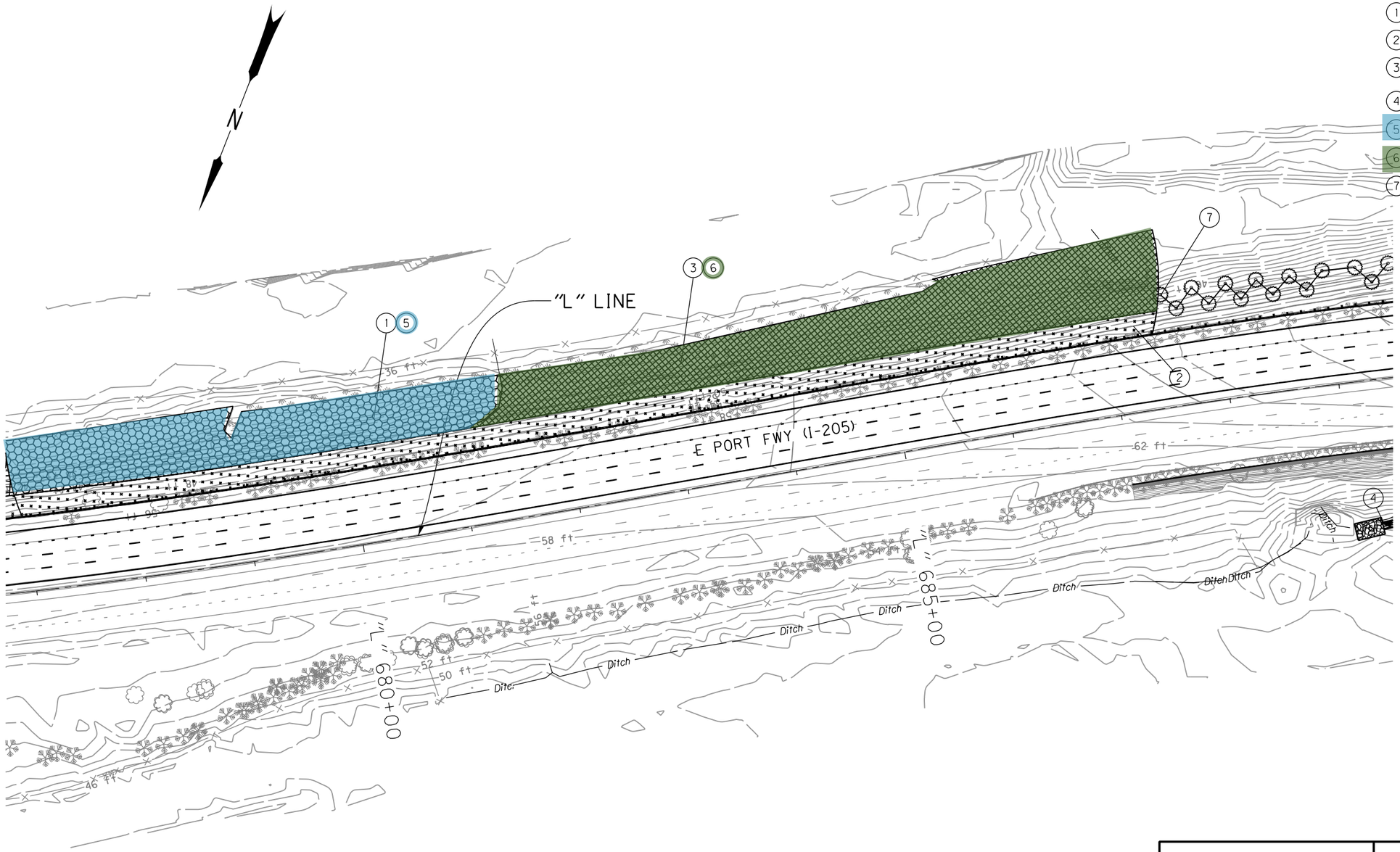
NNA_Roadside_Devel :: FA09 4/24/2020 10:29:32 AM DAVID

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 31,833 s.f. Wildflower Seeding
2. Install 28,219 s.f. Wildflower Seeding
3. Install 21,615 s.f. Wildflower Seeding
4. Total quantity for area on FA10 and FA11, shown on FA11, note 1
5. Install 31,833 s.f. NROD Mitigation Trees and Shrubs
6. Install 21,615 s.f. NROD Mitigation Trees and Shrubs
7. Install 14 TPIPO



LEGEND

- Water Quality Seeding
- Oregon City NROD Mitigation Trees and Shrubs
- ExistingTrees

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

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NNA_Roadside_Devel :: FA10 4/9/2020 6:06:09 PM DAVID

Rotation: 228.87°

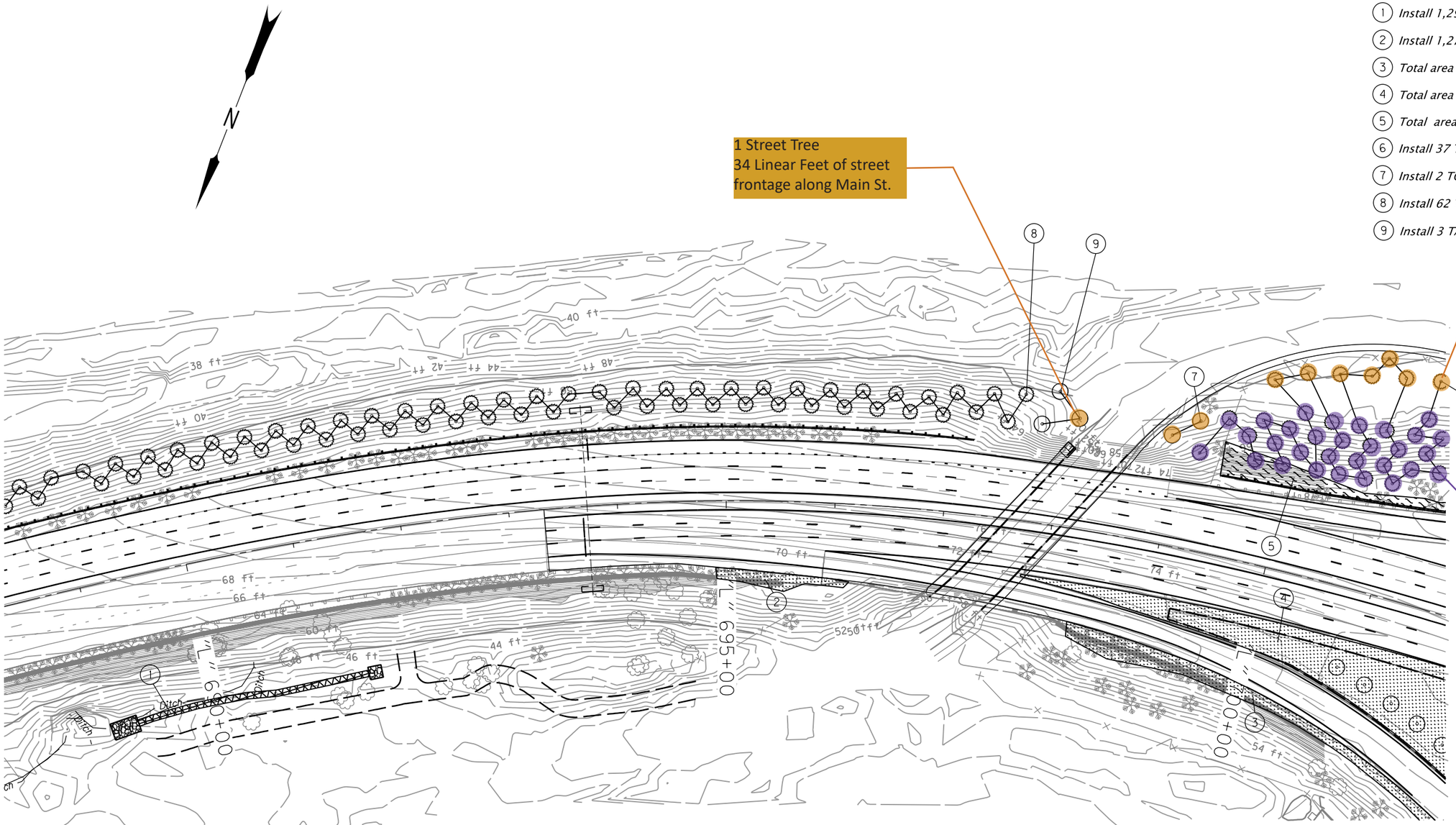
Sec. 29, T. 2 S, R. 2 E, W.M.

1. Install 1,294 s.f. Water Quality Seeding
2. Install 1,273 s.f. Permanent Seeding
3. Total area on FA11and FA12, shown on FA12, note 1
4. Total area on FA11 and FA12, shown on FA12, note 2
5. Total area on FA11 and FA12, shown on FA12, note 33
6. Install 37 TPIPO
7. Install 2 TQUGA
8. Install 62 TPIPO
9. Install 3 TARME

1 Street Tree
34 Linear Feet of street frontage along Main St.

9 Street Trees
312 Linear Feet of street frontage along Main St.

30 R.O.W Trees



LEGEND

- *Permanent Seeding*
- *Water Quality Seeding*
- *Ornamental Grasses and Forbs*
- *Proposed Trees*
- *ExistingTrees*
- Oregon City: New Street Tree

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

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NNA_Roadside_Devel :: FA11 12/20/2019 12:01:22 PM Jane

Rotation: 222.7112° 0'

Sec. 29, 30, T. 2 S, R. 2 E, W.M.

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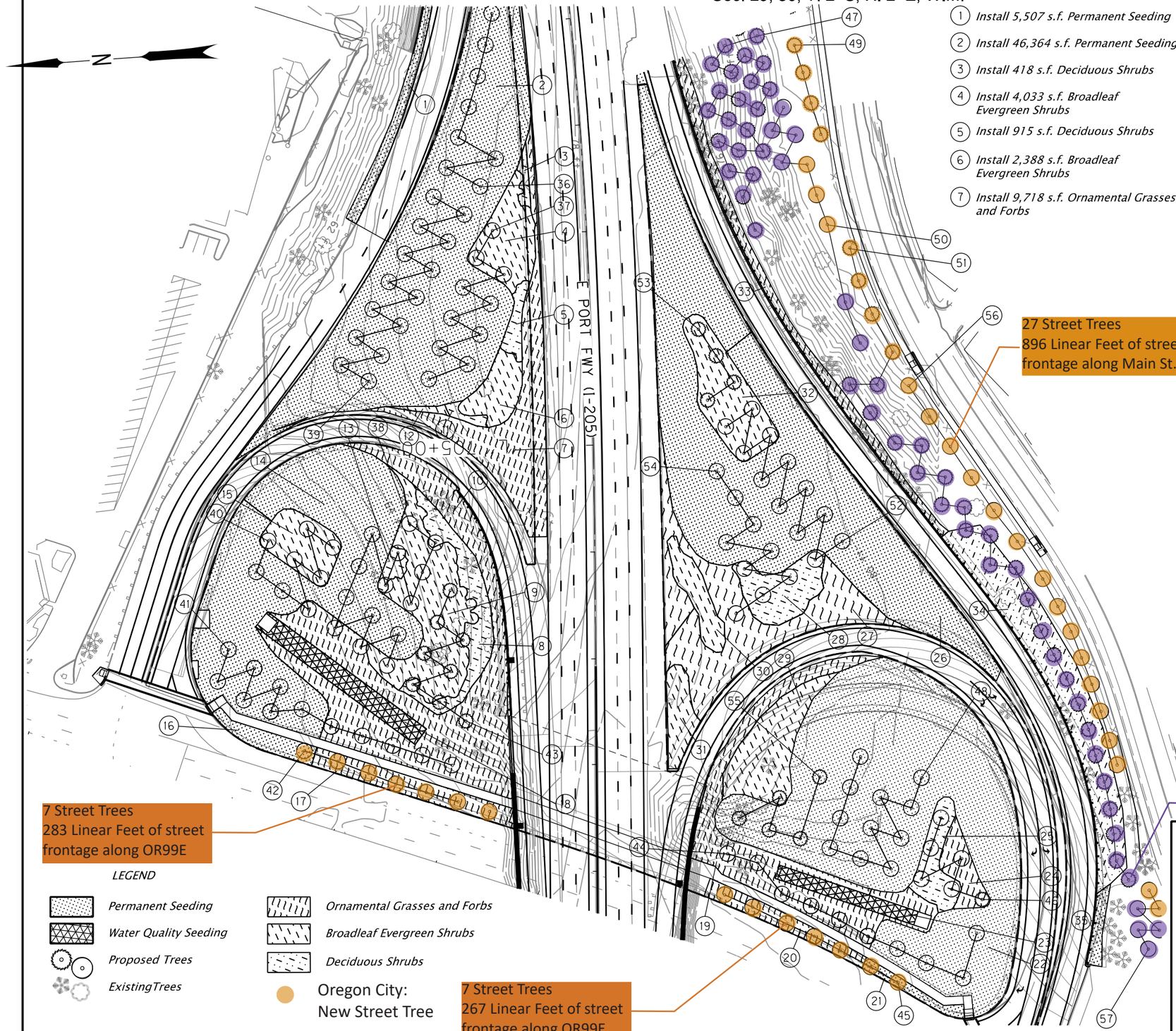

1. Install 5,507 s.f. Permanent Seeding
2. Install 46,364 s.f. Permanent Seeding
3. Install 418 s.f. Deciduous Shrubs
4. Install 4,033 s.f. Broadleaf Evergreen Shrubs
5. Install 915 s.f. Deciduous Shrubs
6. Install 2,388 s.f. Broadleaf Evergreen Shrubs
7. Install 9,718 s.f. Ornamental Grasses and Forbs
8. Install 4,239 s.f. Deciduous Shrubs
9. Install 9,712 s,f, Broadleaf Evergreen Shrubs
10. Install 20,139 s.f. Ornamental Grasses and Shrubs
11. Install 375 s.f. Deciduous Shrubs
12. Install 260 s.f. Broadleaf Evergreen Shrubs
13. Install 648 s.f. Deciduous Shrubs
14. Install 30,343 s.f. Permanent Seeding
15. Install 3,362 s.f. Broadleaf Evergreen Shrubs
16. Install 1,603 s.f. Permanent Seeding
17. Install 3,471 s.f. Ornamental Grasses and Forbs
18. Install 3,153 s.f. Water Quality Seeding
19. Install 10,277 s.f. Ornamental Grasses and Forbs
20. Install 2,319 s.f. Ornamental Grasses and Forbs
21. Install 989 s.f. Permanent Seeding
22. Install 46,511 s.f. Permanent Seeding
23. Install 1,781 s.f. Water Quality Seeding
24. Install 1,923 s.f. Ornamental Grasses and Forbs
25. Install 2,523 s.f. Broadleaf Evergreen Shrubs
26. Install 43,636 s.f. Permanent Seeding
27. Install 12,295 s.f. Ornamental Grasses and Forbs
28. Install 3,629 s.f. Deciduous Shrubs
29. Install 5,407 s.f. Broadleaf Evergreen Shrubs
30. Install 2,113 s.f. Broadleaf Evergreen Shrubs
31. Install 1,994 s.f. Broadleaf Evergreen Shrubs
32. Install 5,574 s.f. Broadleaf Evergreen Shrubs
33. Install 7,431 s.f. Ornamental Grasses and Shrubs
34. Install 11,524 s.f. Deciduous Shrubs
35. Install 1,379 s.f. NROD Mitigation Shrubs
36. Install 796 s.f. Permanent Seeding
37. Install 8 TPIPO
38. Install 10 TQUGA
39. Install 14 TUMCA
40. Install 14 TQUCH
41. Install 8 TQUCH
42. Install 12 TQUGA
43. Install 6 TQUGA
44. Install 8 TPIPO
45. Install 10 TQUGA
46. Install 6 TQUGA
47. Install 21 TPIPO
48. Install 11 TUMCA
49. Install 4 TPIPO
50. Install 9 TQUGA
51. Install 29 TPIPO
52. Install 12 TQUCH
53. Install 4 TPIPO
54. Install 9 TQUGA
55. Install 5 TPIPO
56. Install 14 TQUGA
57. Install 6 TUMCA

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA12 12/20/2019 12:01:23 PM Jane

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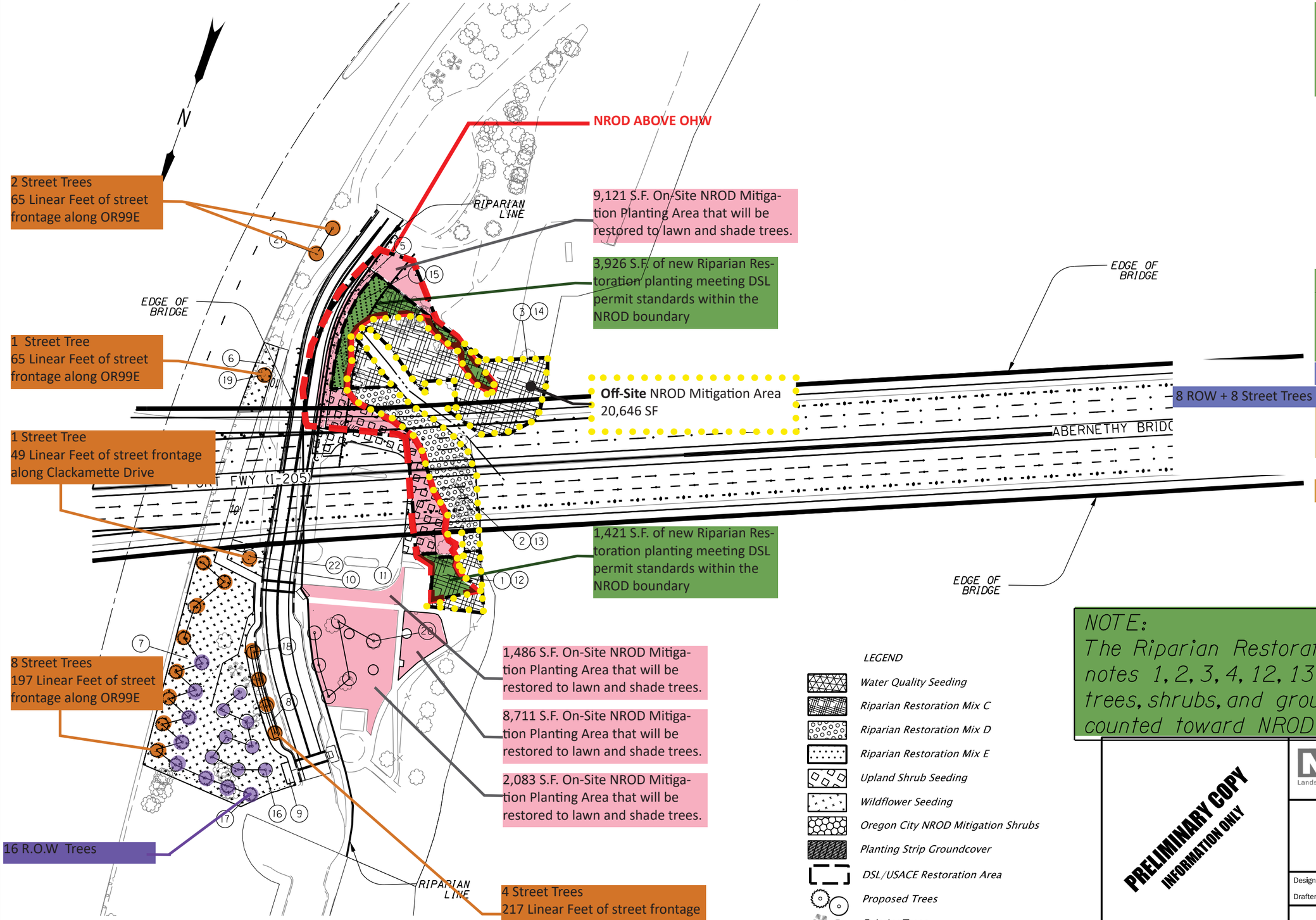
Rotation: 201.4396° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



1. Install 3,144 s.f. Riparian Seeding
2. Install 6,769 s.f. Riparian Seeding
3. Install 13,911 s.f. Riparian Seeding
4. Install 2,132 s.f. Wildflower Seeding
5. Install 1,796 s.f. Wildflower Seeding
6. Install 1,468 s.f. Wildflower Seeding
7. Install 22,958 s.f. Wildflower Seeding
8. Install 547 s.f. Planting Strip Groundcover
9. Install 440 s.f. Water Quality Seeding
10. Install 813 s.f. Wildflower Seeding
11. Install 7,672 s.f. Upland Shrub Seeding
12. Install 3,144 s.f. Riparian Restoration Mix C
13. Install 6,769 s.f. Riparian Restoration Mix D
14. Install 13,911 s.f. Riparian Restoration Mix C
15. Install 2,132 s.f. Riparian Restoration Mix E
16. Install 8 TQUGA
17. Install 16 TPIPO
18. Install 4 TULAM
19. Install 1 TQUGA
20. Install 6 TULAM
21. Install 2 TQUGA
22. Install 1 TQUGA

LEGEND

- Water Quality Seeding
- Riparian Restoration Mix C
- Riparian Restoration Mix D
- Riparian Restoration Mix E
- Upland Shrub Seeding
- Wildflower Seeding
- Oregon City NROD Mitigation Shrubs
- Planting Strip Groundcover
- DSL/USACE Restoration Area
- Proposed Trees
- ExistingTrees
- Oregon City: New Street Tree

NOTE:
The Riparian Restoration Mixes called out in notes 1, 2, 3, 4, 12, 13, and 14 specify installing trees, shrubs, and groundcover that are also counted toward NROD mitigation totals.

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

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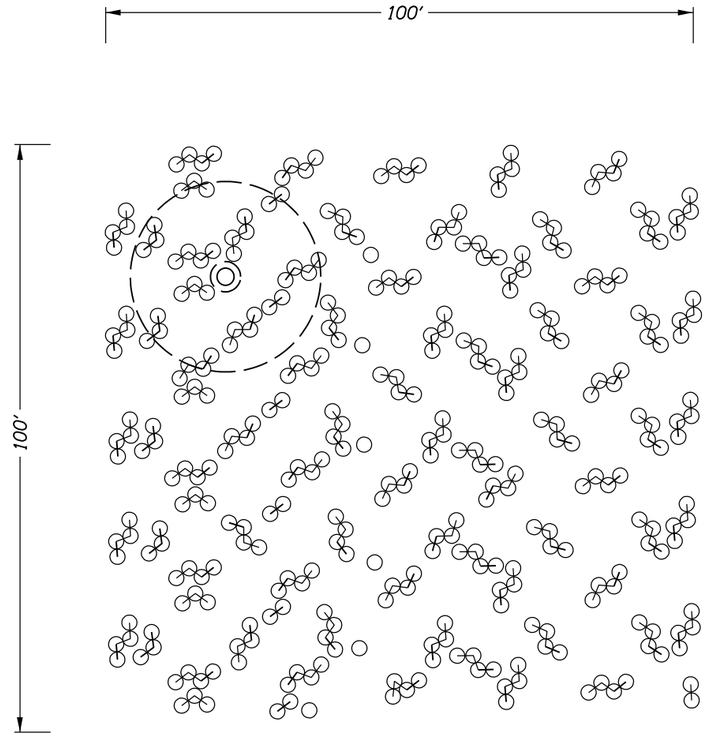

NROD Mitigation Planting Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Berberis (Mahonia) aquifolium	55 stems / 10,000 s.f.	20%
	Cornus sericea	27 stems / 10,000 s.f.	10%
	Ribes sanguineum	41 stems / 10,000 s.f.	15%
	Rubus parviflorus	41 stems / 10,000 s.f.	15%
	Spirea douglasii	41 stems / 10,000 s.f.	15%
	Symphoricarpos albus	68 stems / 10,000 s.f.	25%

* Groupings required

NOTE:
Total quantity of species per sheet shown on FA03.

LEGEND
Shrubs
Assorted Species
5' Buffer
Existing Tree

DETAIL: NROD MITIGATION SHRUBS

Not To Scale

TREE PLANTING NOTES

1) Install shrubs at an overall density of 273 shrubs/10,000 s.f.

2) Install shrubs at an average of 6'.5 O.C. with triangular spacing, no closer than 3' O.C.. Install shrubs in groups of up to 4 specimens per species. Install shrubs 5' minimum from adjacent tree stems.

3) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

4) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

5) In areas where existing trees are to be preserved, maintain a 5' distance from the adjacent trees trunks to the edge of shrubs.

6) Adjust planting locations as necessary to avoid disturbing mature tree roots over 2" diameter.

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Name
Drafter: David Goodyke | Checker: Name

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

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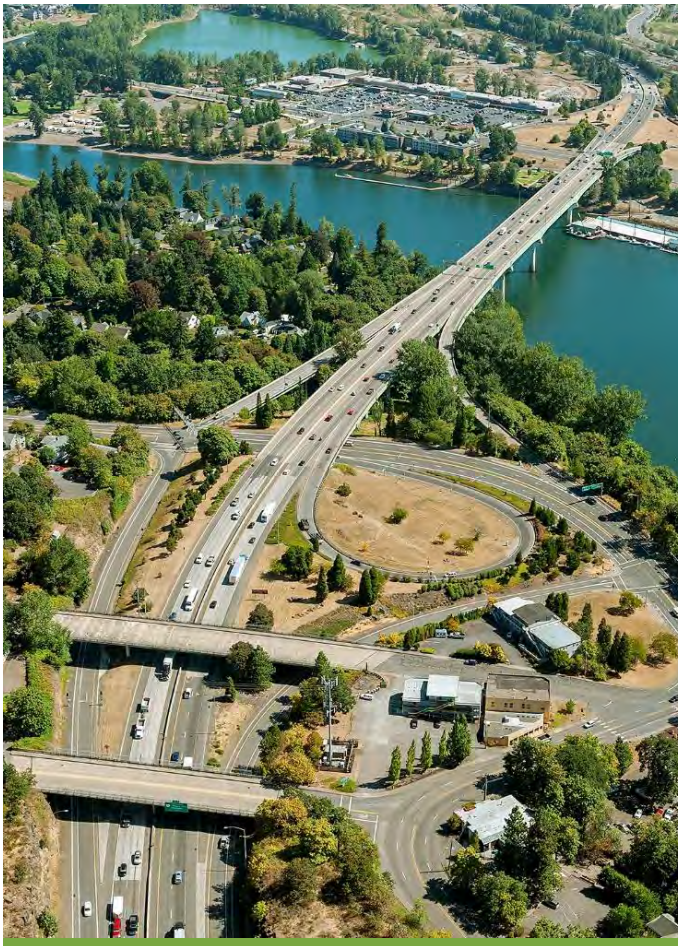
Attachment E. Stormwater Report



Preliminary Stormwater Report

ODOT | K19786 I-205: I-5 – OR 213, Phase 1

Combined I-205 Freeway Widening and Abernethy Bridge Project

ODOT EA: PE003013
HDR Project # 10063137

April 24, 2020

Prepared by: Cory Gieseke, PE – HDR

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1.2 Project Description 1
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Appendix A. NRCS Soil Survey Report, Draft Infiltration Testing Memo, and Groundwater Well Locations

Appendix B. Contributing Impervious Area, Impervious Surface Area, and Water Quality Facility Figures

Appendix C. Hydrology Calculations

Appendix D. Stormwater Facility Design Calculations

Appendix E. Operation and Maintenance Manuals

Appendix F. Downstream Analysis

Acronyms

BMP	Best Management Practice
cfs	cubic feet per second
CIA	contributing impervious area
DDE	dichloro-2,2-bis(p-chlorophenyl) ethylene
DDT	dichlorodiphenyltrichloroethane
MP	mile post
NAVD88	North American Vertical Datum of 1988
NB	northbound
NRCS	Natural Resources Conservation Service
ODOT	Oregon Department of Transportation
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
project	I-205: I-5 – OR 213, Phase 1
ROW	right-of-way
SB	southbound
STA	Station
USGS	U.S. Geological Survey

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1 Introduction

1.1 Purpose

This report provides a water quality impact assessment and post-construction stormwater management plan for the I-205: I-5 – OR 213, Phase 1 (project). The report summarizes the project stormwater management plan and discusses minimization of water quality impacts.

1.2 Project Description

This project is located on I-205 from mile post (MP) 8.71 to MP 10.24 in Clackamas County, Oregon.

Main components of the project include:

- Reconstructing the I-205 southbound (SB) auxiliary lane from the OR 99E exit ramp to the OR 43 entrance ramp (across the Abernethy Bridge)
- Reconstructing and extending the I-205 northbound (NB) auxiliary lane from the OR 43 entrance ramp to the OR 99E exit ramp (across the Abernethy Bridge)
- Constructing the NB auxiliary lane from OR 99E entrance ramp to OR 213 exit ramp
- Adjusting the OR 99E interchange ramp geometries to conform to the additional freeway lanes
- Modifying the OR 43 interchange by consolidating the entrance and exit ramps and removing the existing OR 43 NB entrance ramp that connects to the Abernethy Bridge
- Widening and seismically retrofitting the following bridges:
    - I-205 over Willamette River (Abernethy Bridge) – MP 9.03
    - I-205 SB Connector #2 to OR 43 (West Linn interchanges) – MP 9.14
    - I-205 NB Connector #1 to OR 99E (Oregon City interchange) – MP 9.30
    - I-205 over Main Street (Oregon City) – MP 9.51

2 Stormwater Design Requirements

The project will be designed to meet stormwater management design standards outlined in Oregon Department of Transportation's (ODOT) *Hydraulics Manual* (2014), Oregon City Public Works *Stormwater and Grading Design Standards* (2020), or City of Portland *Stormwater Management Manual (2016)*, as amended and adopted by the City of West Linn and the requirements in the City of West Linn Public Works *Design Standards* (2010). In the event design standards are different for the two agencies in overlapping coverage areas, the most conservative standard will be used. The following sections address preliminary water quality and quantity control design criteria.

2.1 Water Quality Standards

Stormwater treatment within ODOT's right-of-way (ROW) is required to meet water quality control standards (ODOT 2014). The project water quality goal is met if "…treatment is provided for all of the runoff generated by the Water Quality Design Storm from the contributing impervious area (CIA) using Best Management Practices (BMPs) that utilize infiltration, media filtration, or vegetative filtration." The project's CIA consists of all impervious surfaces within the project limits and impervious surfaces owned or operated by ODOT outside the project limits that drain to the project via direct flow or discrete conveyance.

Stormwater quality treatment facilities will be designed based on a water quality design flow rate and volume. Per the City of West Linn and Oregon City, the water quality design storm is 0.83 and 1.0 inch, respectively. However, ODOT's *Hydraulics Manual*s water quality design storm is one-half of the 2-year, 24-hour storm event, or 1.22 inches. Water quality facilities will be designed using the ODOT water quality design storm of 1.22 inches. Table 1 provides additional project design rainfall depths.

Table 1. Design Rainfall Depth

Return Interval	Rainfall Depth ODOT (inches)[1]	Rainfall Depth West Linn (inches)[2]	Rainfall Depth Oregon City (inches)[3]
Water Quality	1.22	0.83	1.0
2	2.44	2.4	2.8
10	3.28	3.4	3.5
25	3.82	3.9	4.0
50	4.17	N/A	4.4
100	4.65	4.4	4.5

[1] ODOT Hydraulics Manual Chapter 7 Appendix H, Oregon 24-Hour Precipitation Maps
[2] City of Portland Stormwater Management Manual Appendix A, Table A-1
[3] Oregon City Stormwater and Grading Design Standards Chapter 5, Table 5-2

2.1.1 Target Pollutant Removal

Pollutants of concern typically expected in highway runoff are sediment, nutrients, oil and grease, polycyclic aromatic hydrocarbons (PAH), and particulate and dissolved metals (such as copper and lead). Because I-205 has a high average daily traffic, high pollutant loads and concentrations are expected.

2.1.2 Receiving Waterbodies

The proposed receiving waterbody is the Willamette River. Table 2 lists the beneficial uses and water quality impairments for the receiving waterbody.

Table 2. Receiving Waters Beneficial Uses and Water Quality Impairments

Waterbody	Beneficial Uses[1]	Listed Water Quality Impairments[2]
Willamette River	Public/private/industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, commercial navigation and transportation	aldrin, chlorophyll a, chlordane, DDE, DDT, dieldrin, dioxin, e coli, hexachlorobenzene, iron, lead, manganese, mercury, PCB, pentachlorophenol, polynuclear aromatic hydrocarbons, temperature

[1] Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines, Appendix 3 Designated Beneficial Uses(Oregon Department of Environmental Quality [DEQ] 2018)

[2] Water Quality Assessment – Oregon's 2012 Integrated Report Assessment Database and 303(d) List (DEQ 2014)

DDE=Dichloro-2,2-bis(p-chlorophenyl) ethylene

DDT=Dichlorodiphenyltrichloroethane

PCB=Polychlorinated Biphenyls

2.2 Water Quantity Standards

2.2.1 Detention

ODOT requires detention when one of the following criteria is met (ODOT 2014):

- Required by a local jurisdiction
- Drainage deficiencies, such as flooding, have been documented
- Discharge into an intermittent or perennial waterbody with an upstream drainage basin less than 100 square miles
- Uncontrolled peak post-construction discharge rate during the design storm increases 0.5 cubic feet per second or more
- Total contributing area after the proposed development is 0.25 acres or more

ODOT detention guidelines are in place to reduce streambed and bank impacts to the receiving streams. The project should not increase peak flows or duration of flows for a recurrence interval that corresponds to a flow resulting in sediment transport. ODOT defines sediment transport flows from a lower end of 42 percent of the 2-year event to an upper threshold of the 10-year event for incised streams or bank overtopping for minimally incised streams.

ODOT does not require detention if the site discharges into a waterbody with an upstream drainage basin greater than 100 square miles.

Oregon City uses the same flow control guidelines as ODOT, and exempts systems that discharge directly to the Clackamas River, Willamette River, and Abernethy Creek from flow control if the development lies within the 100-year floodplain or is up to 10 feet above the design flood elevation of 50.7 feet North American Vertical Datum of 1988 (NAVD88), and the entire project is drained through a manmade conveyance system with sufficient hydraulic capacity. If detention is required, facilities should be sized using

the BMP Sizing Tool explained in the Oregon City Public Works *Stormwater and Grading Design Standards*.

The City of West Linn requires the post-project runoff from a 2-year, 24-hour storm event to be less than or equal to one-half the runoff from a 2-year, 24-hour storm for pre-development conditions. The facilities must also control the post-development peak flows from the 5-, 10-, and 25-year, 24-hour storm to the predevelopment 5-, 10-, and 25-year, 24-hour design storm events. Systems that discharge stormwater runoff directly into the Willamette River or through a conveyance system that has adequate capacity to convey the 10-year storm event to the Willamette River are exempt from detention requirements.

2.2.2 Infiltration Design Standards

The City of West Linn and Oregon City stormwater design guidance materials both recommend the use of infiltration as a stormwater treatment and disposal technique above other methods. Both the City of Portland *Stormwater Management Manual*, as modified by the City of West Linn and the Oregon City Public Works *Stormwater and Grading Design Standards* state that infiltration may not be required if site conditions make infiltration infeasible. Examples include:

- The site has seasonally high groundwater of less than 5 feet below the lowest elevation of the infiltration facility,
- The site has low infiltration rates of less than 2.0 inches per hour,
- The facility would be located on fill, and
- The site is located near steep slopes or does not meet slope setbacks.

Infiltration testing is discussed in Section 3.1.1; none of the tests had infiltration rates above 2.0 inches per hour. Because of the low onsite infiltration rates, infiltration will not be utilized as a treatment and disposal technique. Infiltration will be allowed to the extent that passive infiltration occurs. Because the proposed stormwater facilities are flow-through treatment facilities, very little to zero infiltration is anticipated to occur.

3 Existing and Proposed Conditions

3.1 Existing Conditions

The project is located along the existing I-205 corridor, between the Park Place Interchange and West A Street. The roadway topography varies between flat and 3 percent slopes and generally slopes downhill in a west to east direction. The embankment side slopes range from flat to retaining walls. The roadway surface is located in both cut and fill sections in relation to the adjacent ground. In general, the northern side of the highway is at a higher elevation than the southern side. Elevations along the project range from 50 to 160 feet.

3.1.1 Geotechnical Investigations

Soils within the project area generally consist of the Hydrologic Soil Groups C and D, and a few pockets of B. The entire Natural Resources Conservation Service (NRCS) Soil Survey Report can be found in Appendix A (NRCS 2017).

In-situ infiltration tests were completed in several locations throughout the project. Locations of the tests are shown in the Stormwater CIA Exhibit (Appendix B) and summarized in Table 3. Multiple tests were conducted at each location. The average infiltration rates during the August 2018 geotechnical investigation ranged from 0.24 to 1.44 inches per hour.

Table 3. In-Situ Infiltration Test Results

Designation	Approximate Depth (feet)	Infiltration Testing Method	Final Infiltration Rate for each Trial (inches/hour)			Average Infiltration Rate (inches/hour)
			1	2	3	
INF19786-11	2.0	Open Pit Falling Head Test	0.72	0.36	0.36	0.48
INF19786-12	2.0	Open Pit Falling Head Test	1.44	0.72	1.44	1.20
INF19786-13	3.0	Open Pit Falling Head Test	1.44	1.44	1.44	1.44
INF19786-14	3.5	Open Pit Falling Head Test	1.44	0.72	1.44	1.20
INF19786-15	2.0	Open Pit Falling Head Test	0.36	0.00	0.36	0.24

Groundwater wells were installed in October of 2017 and November of 2018, and elevations of seasonal groundwater levels have been measured periodically since installation. The piezometers were installed near the west and east ends of the Abernethy Bridge. See Table 4 for measured seasonal high groundwater elevations and Appendix A for locations of wells. For locations not in the vicinity of the test wells, the U.S. Geological Survey (USGS) groundwater elevation maps are referenced for approximate groundwater elevations (USGS 2009). The portion of the project located within West Linn will have groundwater located between 60 and 70 feet below ground surface. The portion of the project located in Oregon City will have groundwater located between 12 and 20 feet below ground surface.

Table 4. Measured Seasonal High Groundwater Elevations

Facility Number	Anticipated Seasonal High Groundwater Elevation (feet NAVD88)
TB19786-01	13.8
TB19786-09	27.4
TB19786-30B	17.5
TB19786-32	17.6
TB19786-40	26.1
TB19786-44	36.5

3.2 Existing Facilities

The existing project area consists of approximately 22 acres of CIA, including pavement, gravel shoulders, overpasses that drain to the project, and bridges.

The existing stormwater management features only consist of conveyance systems; there are no existing water quality facilities within the project footprint. The existing conveyance systems will be utilized to the extent feasible; however, incorporating new water quality facilities and providing a conveyance system that meets current design standards will require construction of additional conveyance networks.

3.3 Pre-development Conditions

The City of West Linn water quantity design criteria requires the post-project runoff from a 2-, 10-, and 25-year, 24-hour storm event be less than or equal to the runoff from the corresponding storm event for pre-development conditions. ODOT and Oregon City water quantity design criteria require the duration of peak flow rates from post-development conditions to be less than or equal to the duration of peak flow rates from pre-development conditions for all peak flows between 42 percent of the 2-year peak flow rate up to the 10-year peak flow rate. Pre-development refers to what the landscape was before any human alterations took place. To compare pre-development conditions to post-project discharge values, the assumed undisturbed project area is a forest or woods in good hydraulic condition.

3.4 Proposed Conditions

The proposed changes to existing conditions that could potentially affect water quality or hydrology include widening the roadway surface an additional travel lane in both directions and, to a lesser extent, removing and relocating existing bridges and ramps.

There are some proposed temporary construction impacts on Main Street below the highway crossing. To widen and seismically retrofit the existing highway bridge, the existing curb and sidewalk will be removed and replaced in the same location. For

constructing the replacement curb, 2 feet of roadway will be sawcut to form and pour the curb and gutter. The anticipated roadway replacement area is approximately 800 square feet, below the area threshold that requires stormwater management per Section 1.2.1A of the Oregon City Public Works *Stormwater and Grading Design Standards*.

The City also requested the project construct approximately 1,000 feet of sidewalk infill on Main Street. These improvements are considered a standalone project and exempt from stormwater management requirements per Section 1.2.2F of the Oregon City Public Works *Stormwater and Grading Design Standards*.

The proposed project area will consist of 26.6 acres of CIA. The additional travel lanes will not change existing roadway drainage patterns. In some areas along the project, drainage ditches will be replaced with closed conduit conveyance systems due to lack of available space. To meet the stormwater design criteria, water quality facilities are proposed along the length of the project and a water quality/detention facility is proposed at one location. These facilities are generally located in areas with adequate available ROW to construct and safely maintain the facilities following ODOT guidelines.

Drainage curbs and inlets will be utilized to the extent practicable to capture only runoff from the roadway surface and not capture or convey runoff from non-roadway surfaces to water quality facilities. This will help reduce the required amount of ROW for the overall water quality facilities footprints.

4 Preliminary Stormwater Recommendation

The project has been divided into basins based on topography and the proposed conveyance system. Appendix B provides a map of basin and facility locations. Table 5 provides a summary of proposed drainage basins.

Table 5. Basin Summary

Basin	Treatment Facility	Treated CIA (acres)	Untreated CIA (acres)	Offset Treatment Impervious Area (acres)	Comments
10	1	1.065	0	0	—
20	2	3.080	0	0	—
30	3	2.179	0	0	—
0S-31	3	0	0	1.652	—
40	4	0.396	0	0	—
41	4	4.560	0	0	—
42	4	0.698	0	0	—
43	4	0.338	0	0	—

Basin	Treatment Facility	Treated CIA (acres)	Untreated CIA (acres)	Offset Treatment Impervious Area (acres)	Comments
50	5	0.719	0	0	—
51	5	0.578	0	0	—
52	5	3.570	0	0	—
53	—	0	0.273	0	Not feasible to provide treatment due to maintenance access concerns and lack of elevation to convey to proposed regional facilities.
60	6	2.299	0	0	—
61	6	0.474	0	0	—
62	6	2.315	0	0	—
63	6	0.123	0	0	—
64	—	0	0.592	0	Not feasible to provide engineered treatment due to lack of suitable ROW and proximity to Willamette River. Non-engineered dispersion is expected to occur before runoff reaches receiving water.
70	7	0.287	0	0	—
71	7	0.333	0	0	—
72	7	0.556	0	0	—
80	8	1.953	0	0	—
90	9	0.134	0	0	—
Totals		**25.658**	**0.865**	**1.652**	**—**

For the basins where treatment is proposed, the runoff is conveyed to a water quality facility for treatment. The facilities are sized using guidelines from ODOT's *Hydraulics Manual* (2014) based on the volumetric flow rate expected to result from the water quality storm event in the corresponding basins. Flow rate calculations for each basin can be found in Appendix C. Key design considerations for the biofiltration swales included a minimum residence time of 9 minutes and a maximum velocity of 3 feet per second in a 25-year storm event. Swale and bioslope sizing calculations are included in Appendix D. The bioretention ponds were sized, using the BMP Sizing Tool per Oregon City design standards, to infiltrate the water quality storm event and provide enough detention to

achieve a 10-year storm outflow rate equal to the preconstruction outflow rate. Inflow and outflow hydrographs for the proposed detention facility are provided in Appendix C. The bioslope and stormwater planter were sized to infiltrate the peak flows anticipated during the water quality storm event.

Table 6 details the stormwater management facilities and includes a description, specifications, and maintenance considerations for each facility.

Table 6. Stormwater Management Facility Summary

Facility	Treated Area (Acres)	Description	Specifications	Maintenance
1	1.065	Combination biofiltration swale/detention pond located between Station (STA) “L” 663+47 and STA “L” 665+04. The pond receives runoff from Basin 10 via sheet flow and conveyance in an existing ditch, and outfalls to a tributary to Abernethy Creek (Appendix B).	Bottom width is 10 feet and bottom length is 157 feet. Stormwater pretreatment will be accomplished by sheet flow over vegetation. A 6-inch perforated drain pipe with a slope of 0.5% will be installed in granular drain backfill material to prevent standing water conditions due to the low infiltration rate. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 1 in Appendix C for design flow rates.	Routine maintenance for detention ponds such as mowing, debris removal, and sediment removal. Maintenance access to the facility will be from the shoulder of I-205 NB.
2	3.080	Bioslope located between STA. “L” 665+00 and STA. “L” 684+00. The Bioslope receives runoff from Basin 20 via sheet flow. The bioslope outfalls to an existing roadside ditch, which is connected to the Clackamas River via an existing stormwater conveyance system (Appendix B).	The length of roadway treated by the bioslope is 1,900 feet. The width is 4.5 feet. One foot of ecology mix soil will be used to treat the runoff. A 12- inch perforated drain pipe located in an 24-inch layer of granular backfill material will be used to drain the bioslope (Appendix B).	Routine maintenance for bioslopes such as debris and sediment removal. Maintenance access to the facility will be from the I-205 NB shoulder.
3	3.831	Combination biofiltration swale/detention pond located between STA “L” 688+98 and STA “L” 691+78. The swale receives runoff from Basin 30 via the proposed pipe network, which utilizes existing pipes and structures where possible, and outfalls to an existing system leading to Clackamas River (Appendix B).	Bottom width is 10 feet and bottom length is 180 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the pond. There will be a rock basin flow spreader at the pond inlet. A 6-inch perforated drain pipe with a slope of 0.5% will be installed in granular drain backfill material to prevent standing water conditions due to the low infiltration rate. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 3 in Appendix C for design flow rates.	Routine maintenance for ponds such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road to be constructed in ODOT ROW from Main Street.
4	5.992	Biofiltration swale located between STA “99E2” 109+30 and STA “99E2” 111+03. Runoff from Basins 40, 41, 42, and 43 is collected and piped to the low end of the I-205 SB on-ramp from OR 99E. After treatment, the proposed network connects to an existing system that outfalls to the Willamette River (Appendix B).	Bottom width is 20 feet total, divided into two 10-foot-wide sections with a center flow separator, and bottom length is 180 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet and additional flow spreaders at 50-foot intervals. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 4 in Appendix C for design flow rates.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road from 99E.
5	4.867	Biofiltration swale located between STA “99E2” 114+47 and STA “99E2” 115+86. Runoff from Basins 50, 51, and 52 is collected and piped under the on- and off-ramps connecting I-205 NB to OR99E. The conveyance system consolidates at the low end of the off-ramp prior to the swale inlet. After treatment, the proposed network connects to an existing system that outfalls to the Willamette River (Appendix B).	Bottom width is 14 feet and bottom length is 150 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet and additional flow spreaders at 50-foot intervals. A sub-surface drain pipe is required because the bottom slope is less than 1.5%. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 5 in Appendix C for design flow rates.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road from 99E.
6	5.211	Biofiltration swale located between STA “OR43” 10+52 and STA “OR43” 8+97. Runoff from Basins 60, 61, 62, and 63 is conveyed to the swale via a pipe network. After treatment, the proposed system outfalls to the Willamette River at a proposed riprap pad underneath Abernethy Bridge (Appendix B).	Bottom width is 40 feet total, divided into four 10-foot-wide sections with flow separators, and bottom length is 250 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. Planting will be accomplished with an 18-inch layer of water quality mix and seeding. See Basin 6 in Appendix C for design flow rates. The swale is designed to treat runoff from offsite area and future development.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be via an access road to be constructed in ODOT ROW underneath Abernethy Bridge.
7	1.176	Biofiltration swale located between STA “OR43” 9+55 and STA “OR43” 12+30. Runoff from Basin 72 is captured and conveyed via a ditch to a ditch inlet at the high end of the I-205 NB off-ramp to OR43. The stormwater is conveyed through the proposed pipe network and picks up flow from Basins 70 and 71. A flow splitter manhole diverts the volumetric flow rate generated by the water quality storm event in Basins 70, 71, and 72 to the swale. After treatment, the proposed system outfalls to the Willamette River at a proposed riprap pad underneath Abernethy Bridge (Appendix B).	Bottom width is 30 feet total, divided into three 10-foot-wide sections with flow separators, and bottom length is 210 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet and additional flow spreaders at 50-foot intervals. A sub-surface drain pipe is required because the bottom slope is less than 1.5%. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 7 in Appendix C for design flow rates. The swale is designed to treat runoff from offsite area and future development.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be from the OR43 on-ramp to I-205 NB shoulder.
8	1.953	Biofiltration swale located between STA “E3” 737+51 and STA “E3” 738+64. Runoff from Basin 80 is conveyed to the swale in a pipe network. The swale is sized to treat runoff from improvements further upstream, as well as some of the offsite flow from a large residential area. After treatment, the proposed system outfalls to the Willamette River at a proposed riprap pad underneath Abernethy Bridge (Appendix B).	Bottom width is 55 feet total, divided into five 11-foot-wide sections with flow separators, and bottom length is 142 feet. Pretreatment will be accomplished using a pollution control manhole upstream of the swale. There will be a rock basin flow spreader at the swale inlet. A sub-surface drain pipe is required because the bottom slope is less than 1.5%. Planting will be accomplished with an 18-inch layer of water quality mix and seeding (Appendix B). See Basin 8 in Appendix C for design flow rates. The swale is designed to treat runoff from offsite area and future development.	Routine maintenance for swales such as mowing, debris removal, and sediment removal. Maintenance access to the facilities will be from the OR43 on-ramp to I-205 NB shoulder.
9	0.134	Stormwater planter located behind curbline of proposed on-street parking spaces and sidewalk in John Storm Park. Runoff from Basin 90 is conveyed via sheet flow and curb drops. The stormwater planter is sized to treat runoff from the proposed impervious area from the new parking. After treatment, the proposed facility connects to an existing stormwater network and discharges into the Willamette River (Appendix B).	Bottom width is 6 feet and bottom length is 20 feet. The primary outlet will be a perforated sub drain. There will be a high flow outlet located above the water quality treatment depth. Curb cuts and splash pads will be the primary inlets to the facility.	Routine maintenance for stormwater planters such as weed, debris, and sediment removal. Maintenance access to the facilities will be from the shoulder of Clackamette Drive.

4.1 Future Build-out Accommodation

Water quality facilities 6, 7, and 8 are sized to incorporate additional flows from an adjacent proposed project (I-205: I-5 to OR213, Phase 2 Section). The adjacent proposed project footprint does not have enough available space to construct water quality facilities. Therefore, the I-205: I-5 to OR213, Phase 1 Section Project is being designed to divert runoff for the water quality storm event from the adjacent project into the proposed conveyance system and treatment facilities located at the OR 43 interchange.

4.2 Groundwater Considerations

Stormwater facilities were designed to not infiltrate in areas with high groundwater tables. Table 7 summarizes the anticipated seasonal high groundwater elevations at each facility and whether or not a liner is proposed for each water quality facility. It is proposed that Facilities 2 and 6 have impermeable membranes for structural purposes as both facilities are located on fill. Because the groundwater elevation was obtained from the USGS Depth to Groundwater maps and the anticipated close proximity of the groundwater to the facility invert, an impermeable membrane is proposed for Facility 3 to prevent migration to the groundwater.

Table 7 Water Quality Facility Depth to Groundwater

Facility ID	Facility Invert Elevation	Anticipated High Seasonal Groundwater Elevation	Depth to Groundwater	Impermeable Liner
WQF #1	48.5	33.7*	14.8*	No
WQF #2	Varies	Varies	Varies	Yes
WQF #3	36.6	29.3*	7.3*	Yes
WQF #4	43.8	17.5	26.3	No
WQF #5	52.9	17.5	35.4	No
WQF #6	105.8	36.5	69.3	Yes
WQF #7	118.7	66.2*	52.5*	No
WQF #8	142.8	74.3*	68.5*	No
WQF #9	37.9	17.6	20.3	No

* Groundwater elevation from USGS Depth to Groundwater Interactive Maps

4.3 Planting Plan

The stormwater facilities will be planted in accordance to ODOT standard practices. Vegetation will be established prior to operation. Permanent seeding should be performed March 1 through May 15 and September 1 through October 31. The seeding mix proposed for the vegetated water quality facility bottoms and sides is shown in Table 8.

Table 8. Water Quality Facility Seeding

Common Name	Botanical Name	Pounds per Acre
California Oatgrass	*Danthonia californica*	5
Tufted Hairgrass	*Deschampsia cespitosa*	4
Slender Hairgrass	*Deschampsia elongata*	4
Red Fescue	*Festuca rubra var. rubra*	10
Meadow Barley	*Hordeum brachyantherum*	10
Dense Sedge	*Carex densa*	1
Slough Sedge	*Carex obnupta*	1
Slender Rush	*Juncus patens*	0.5
Spreading Rush	*Juncus tenuis*	0.5
Broadleaf Lupine	*Lupinus latifolius*	0.25
Graceful Cinquefoil	*Potentilla gracilis*	0.25

4.4 Maintenance Plan

4.4.1 Responsible Party

ODOT staff will provide oversight during project construction to ensure that the water quality and stormwater management elements of the project are properly constructed following project plans and specifications. Vegetation will be established prior to use. Planting should take place from March 1 through May 15 or September 1 through October 31. During this post-construction period, ODOT construction inspection staff will conduct inspections to determine if the water quality and stormwater management swales are vegetated according to specifications and treatment needs. After construction, ODOT maintenance staff will review the facilities at intervals sufficient to ensure continued functioning as designed.

4.4.2 Routine Maintenance Actions

As part of the final plans package, templates for each stormwater facility will be provided. After the facilities have been constructed, a comprehensive Operations and Maintenance Manual will be completed by ODOT staff for each facility using standards described in the ODOT Hydraulics Manual. Appendix E provides tables of routine maintenance for the applicable stormwater facilities.

4.4.3 Maintenance Activity Schedule

Maintenance activities will follow the schedule outline in the tables provided in Appendix E as well as the maintenance schedules determined by ODOT District 2B.

4.5 Downstream Analysis

The project proposes to connect and discharge stormwater into existing drainage systems owned and maintained by Oregon City. A downstream analysis was completed for both drainage systems that the project proposes to connect. Both existing stormwater systems were found to have adequate capacity and no improvements downstream of the project are proposed. Appendix F summarizes the methodology and the results of the downstream analysis.

5 References

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Appendix A. NRCS Soil Survey Report, Draft Infiltration Testing Memo, and Groundwater Well Locations

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Clackamas County Area, Oregon

I-205 Abernethy to Stafford Widening

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

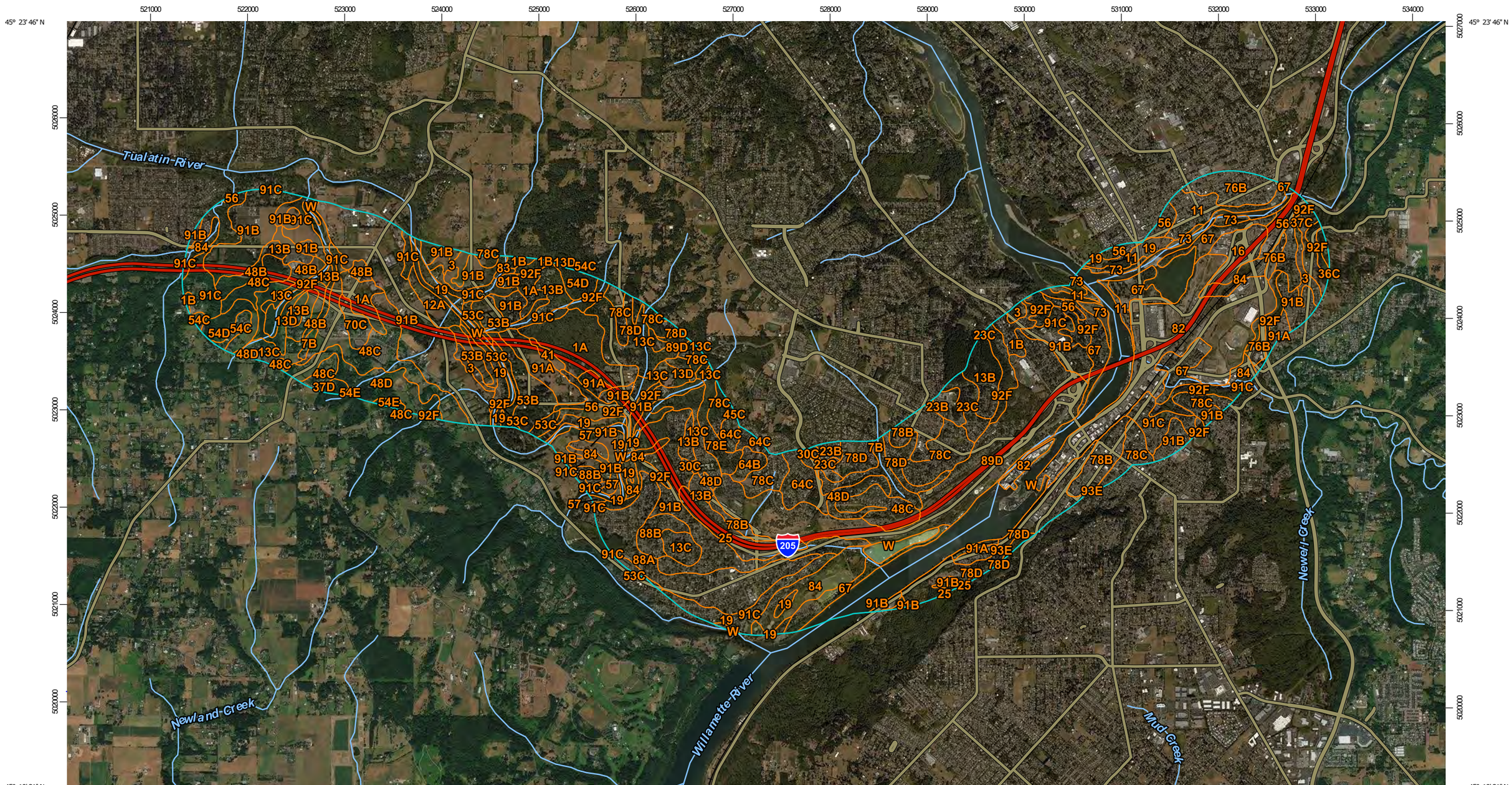
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1A	Aloha silt loam, 0 to 3 percent slopes	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	34.9	0.6%
3	Amity silt loam	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	47.0	0.8%
11	Camas gravelly sandy loam	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	53.4	0.9%
16	Chehalis silt loam	50.7	0.8%
19	Cloquato silt loam	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	48.2	0.8%
25	Cove silty clay loam	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	7.9	0.1%
41	Huberly silt loam	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	94.8	1.6%

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
53C	Latourell loam, 8 to 15 percent slopes	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	6.5	0.1%
56	McBee silty clay loam	74.6	1.2%
57	McBee variant loam	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	61.0	1.0%
67	Newberg fine sandy loam	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	23.5	0.4%
73	Riverwash	39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	39.9	0.7%
82	Urban land	363.1	6.0%
83	Wapato silt loam	6.5	0.1%
84	Wapato silty clay loam	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	287.0	4.7%
93E	Xerochrepts-Rock outcrop complex, moderately steep	115.8	1.9%

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
W	Water	477.5	7.9%
Totals for Area of Interest		**6,050.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clackamas County Area, Oregon

1A—Aloha silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 223l
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Aloha and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aloha

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 51 inches: silt loam
H3 - 51 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 3 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

1B—Aloha silt loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 223m
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Aloha and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aloha

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 51 inches: silt loam
H3 - 51 to 80 inches: silt loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 3 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

3—Amity silt loam

Map Unit Setting

National map unit symbol: 2247
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Amity and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amity

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 22 inches: silt loam
H2 - 22 to 62 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Dayton

Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Huberly

Percent of map unit: 2 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

7B—Borges silty clay loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2277
Elevation: 250 to 1,400 feet
Mean annual precipitation: 48 to 65 inches
Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 140 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Borges and similar soils: 80 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Borges

Setting

Landform: Depressions on terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 18 inches: silty clay loam
H2 - 18 to 45 inches: silty clay
H3 - 45 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Delena

Percent of map unit: 6 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

11—Camas gravelly sandy loam

Map Unit Setting

National map unit symbol: 2231
Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Camas and similar soils: 80 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Camas

Setting

Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 10 inches: gravelly sandy loam
H2 - 10 to 17 inches: gravelly sandy loam
H3 - 17 to 60 inches: stratified extremely gravelly coarse sand to very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 9 to 17 inches to strongly contrasting textural stratification
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

12A—Canderly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2232
Elevation: 120 to 250 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Canderly and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canderly

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: sandy loam
H2 - 7 to 46 inches: sandy loam
H3 - 46 to 60 inches: stratified gravelly sand to coarse sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

13B—Cascade silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2234
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Cascade and similar soils: 80 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cascade

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 21 inches: silt loam
H3 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

13C—Cascade silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2235
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cascade and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cascade

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 21 inches: silt loam
H3 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

13D—Cascade silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2236
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cascade and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cascade

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 21 inches: silt loam
H3 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

16—Chehalis silt loam

Map Unit Setting

National map unit symbol: 223g
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Chehalis and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chehalis

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 44 inches: silty clay loam
H3 - 44 to 60 inches: stratified fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

19—Cloquato silt loam

Map Unit Setting

National map unit symbol: 223k
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cloquato and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cloquato

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 42 inches: silt loam
H3 - 42 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

23B—Cornelius silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 223r
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cornelius and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cornelius

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 16 inches: silt loam

H2 - 16 to 34 inches: silty clay loam
H3 - 34 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

23C—Cornelius silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 223s
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cornelius and similar soils: 80 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cornelius

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 34 inches: silty clay loam
H3 - 34 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 4 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

25—Cove silty clay loam

Map Unit Setting

National map unit symbol: 223y

Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cove and similar soils: 85 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cove

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Wapato

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Conser

Percent of map unit: 4 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Concord

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 1 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

30C—Delena silt loam, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2248
Elevation: 250 to 1,400 feet
Mean annual precipitation: 48 to 65 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 140 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Delena and similar soils: 80 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delena

Setting

Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 25 inches: silty clay loam
H3 - 25 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Borges

Percent of map unit: 8 percent
Landform: Depressions on terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

36C—Hardscrabble silt loam, 7 to 20 percent slopes

Map Unit Setting

National map unit symbol: 224k
Elevation: 150 to 600 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hardscrabble and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hardscrabble

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 14 inches: silty clay loam
H3 - 14 to 60 inches: clay

Properties and qualities

Slope: 7 to 20 percent
Depth to restrictive feature: 12 to 24 inches to abrupt textural change
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

37C—Helvetia silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 224m
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Helvetia and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Helvetia

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed old alluvium

Typical profile

H1 - 0 to 14 inches: silt loam

H2 - 14 to 21 inches: silty clay loam
H3 - 21 to 40 inches: silty clay
H4 - 40 to 60 inches: silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 2 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

37D—Helvetia silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 224n
Elevation: 250 to 500 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Helvetia and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Helvetia

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed old alluvium

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 21 inches: silty clay loam
H3 - 21 to 40 inches: silty clay
H4 - 40 to 60 inches: silty clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)
Hydric soil rating: No

41—Huberly silt loam

Map Unit Setting

National map unit symbol: 224s
Elevation: 150 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Huberly and similar soils: 85 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huberly

Setting

Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 24 inches: silt loam
H3 - 24 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Dayton

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Delena

Percent of map unit: 2 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

45C—Jory silty clay loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 224y
Elevation: 250 to 1,200 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Jory and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jory

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

H1 - 0 to 13 inches: silty clay loam
H2 - 13 to 60 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

48B—Kinton silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2256
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kinton and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kinton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 35 inches: silt loam
H3 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

48C—Kinton silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2257
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kinton and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kinton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 35 inches: silt loam
H3 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

48D—Kinton silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2258
Elevation: 250 to 1,400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kinton and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kinton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 35 inches: silt loam

H3 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 30 to 40 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 27 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 2 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

53B—Latourell loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 225k
Elevation: 50 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Latourell and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Latourell

Setting

Landform: Terraces

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 48 inches: loam
H3 - 48 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

53C—Latourell loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 225l
Elevation: 50 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Latourell and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Latourell

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 48 inches: loam

H3 - 48 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

54C—Laurelwood silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 225p
Elevation: 200 to 1,500 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Laurelwood and similar soils: 85 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laurelwood

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material over older clayey material

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 18 inches: silty clay loam
H3 - 18 to 46 inches: silty clay loam
H4 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Aqualfs

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

54D—Laurelwood silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 225q
Elevation: 200 to 1,500 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Laurelwood and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laurelwood

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material over older clayey material

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 18 inches: silty clay loam
H3 - 18 to 46 inches: silty clay loam
H4 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)
Hydric soil rating: No

54E—Laurelwood silt loam, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: 225r
Elevation: 200 to 1,500 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 51 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Laurelwood and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laurelwood

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty material over older clayey material

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 18 inches: silty clay loam
H3 - 18 to 46 inches: silty clay loam
H4 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

56—McBee silty clay loam

Map Unit Setting

National map unit symbol: 225t
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Mcbee and similar soils: 85 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbee

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 48 inches: silty clay loam
H3 - 48 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

57—McBee variant loam

Map Unit Setting

National map unit symbol: 225v
Elevation: 50 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Mcbee, variant, and similar soils: 90 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbee, Variant

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 28 inches: loam

H2 - 28 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

64B—Nekia silty clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2268
Elevation: 250 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Nekia and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nekia

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, crest, interfluve

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from basalt

Typical profile

H1 - 0 to 19 inches: silty clay loam
H2 - 19 to 39 inches: clay
H3 - 39 to 43 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

64C—Nekia silty clay loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2269
Elevation: 250 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nekia and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nekia

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, crest, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from basalt

Typical profile

H1 - 0 to 19 inches: silty clay loam

H2 - 19 to 39 inches: clay
H3 - 39 to 43 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

67—Newberg fine sandy loam

Map Unit Setting

National map unit symbol: 226g
Elevation: 30 to 1,200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Newberg and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newberg

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 23 inches: fine sandy loam
H3 - 23 to 42 inches: fine sand
H4 - 42 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

70C—Powell silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 226m
Elevation: 250 to 1,400 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Powell and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Powell

Setting

Landform: Terraces
Landform position (three-dimensional): Riser

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material over old silty alluvium

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 15 inches: silt loam
H3 - 15 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 15 to 23 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

Minor Components

Delena

Percent of map unit: 3 percent
Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

73—Riverwash

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: stratified sand to gravel

Properties and qualities

Slope: 0 to 3 percent
Natural drainage class: Well drained
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Yes

76B—Salem silt loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 226y
Elevation: 200 to 650 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Salem and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salem

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 24 inches: gravelly clay loam
H3 - 24 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

78B—Saum silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2271
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

78C—Saum silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2272
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

78D—Saum silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2273
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)
Hydric soil rating: No

78E—Saum silt loam, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2274
Elevation: 250 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Saum and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saum

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Material silty and colluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 26 inches: silty clay loam
H3 - 26 to 50 inches: gravelly silty clay loam
H4 - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

82—Urban land

Map Unit Setting

National map unit symbol: 227g
Elevation: 50 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

83—Wapato silt loam

Map Unit Setting

National map unit symbol: 227h
Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Wapato and similar soils: 90 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wapato

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 41 inches: silty clay loam
H3 - 41 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Cove

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

84—Wapato silty clay loam

Map Unit Setting

National map unit symbol: 227j
Elevation: 100 to 1,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Wapato and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wapato

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 18 inches: silty clay loam
H2 - 18 to 45 inches: silty clay loam
H3 - 45 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Cove

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Humaquepts

Percent of map unit: 4 percent
Landform: Flood plains
Hydric soil rating: Yes

88A—Willamette silt loam, wet, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 227q

Elevation: 150 to 350 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Willamette, wet, and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willamette, Wet

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

88B—Willamette silt loam, wet, 3 to 7 percent slopes

Map Unit Setting

National map unit symbol: 227r
Elevation: 150 to 350 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Willamette, wet, and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willamette, Wet

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

89D—Witzel very stony silt loam, 3 to 40 percent slopes

Map Unit Setting

National map unit symbol: 227s
Elevation: 300 to 1,000 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Witzel and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Witzel

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, nose slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from basalt

Typical profile

H1 - 0 to 4 inches: very stony silt loam
H2 - 4 to 16 inches: very stony silty clay loam
H3 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 40 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)
Hydric soil rating: No

91A—Woodburn silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 227y
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodburn and similar soils: 85 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 38 inches: silty clay loam
H3 - 38 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 3 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

91B—Woodburn silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227z
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodburn and similar soils: 90 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 38 inches: silty clay loam
H3 - 38 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 2 percent
Landform: Swales on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

Dayton

Percent of map unit: 1 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

91C—Woodburn silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2280
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodburn and similar soils: 90 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified glaciolacustrine deposits

Typical profile

H1 - 0 to 16 inches: silt loam
H2 - 16 to 38 inches: silty clay loam
H3 - 38 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Dayton

Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

92F—Xerochrepts and Haploxerolls, very steep

Map Unit Setting

National map unit symbol: 2281
Elevation: 50 to 1,000 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerochrepts and similar soils: 50 percent
Haploxerolls and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerochrepts

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from igneous rock

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 48 inches: gravelly clay loam
H3 - 48 to 60 inches: very cobbly clay loam

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Haploxerolls

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium derived from igneous rock

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 60 inches: very gravelly loam

Properties and qualities

Slope: 20 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 36 to 48 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

93E—Xerochrepts-Rock outcrop complex, moderately steep

Map Unit Setting
National map unit symbol: 2282
Elevation: 100 to 500 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition
Xerochrepts and similar soils: 60 percent
Rock outcrop: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerochrepts

Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from andesite and/or basalt

Typical profile
H1 - 0 to 26 inches: gravelly loam
H2 - 26 to 30 inches: unweathered bedrock

Properties and qualities
Slope: 0 to 30 percent
Depth to restrictive feature: 10 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rock Outcrop

Typical profile
R - 0 to 60 inches: unweathered bedrock

Properties and qualities
Slope: 0 to 30 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

W—Water

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Yes

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

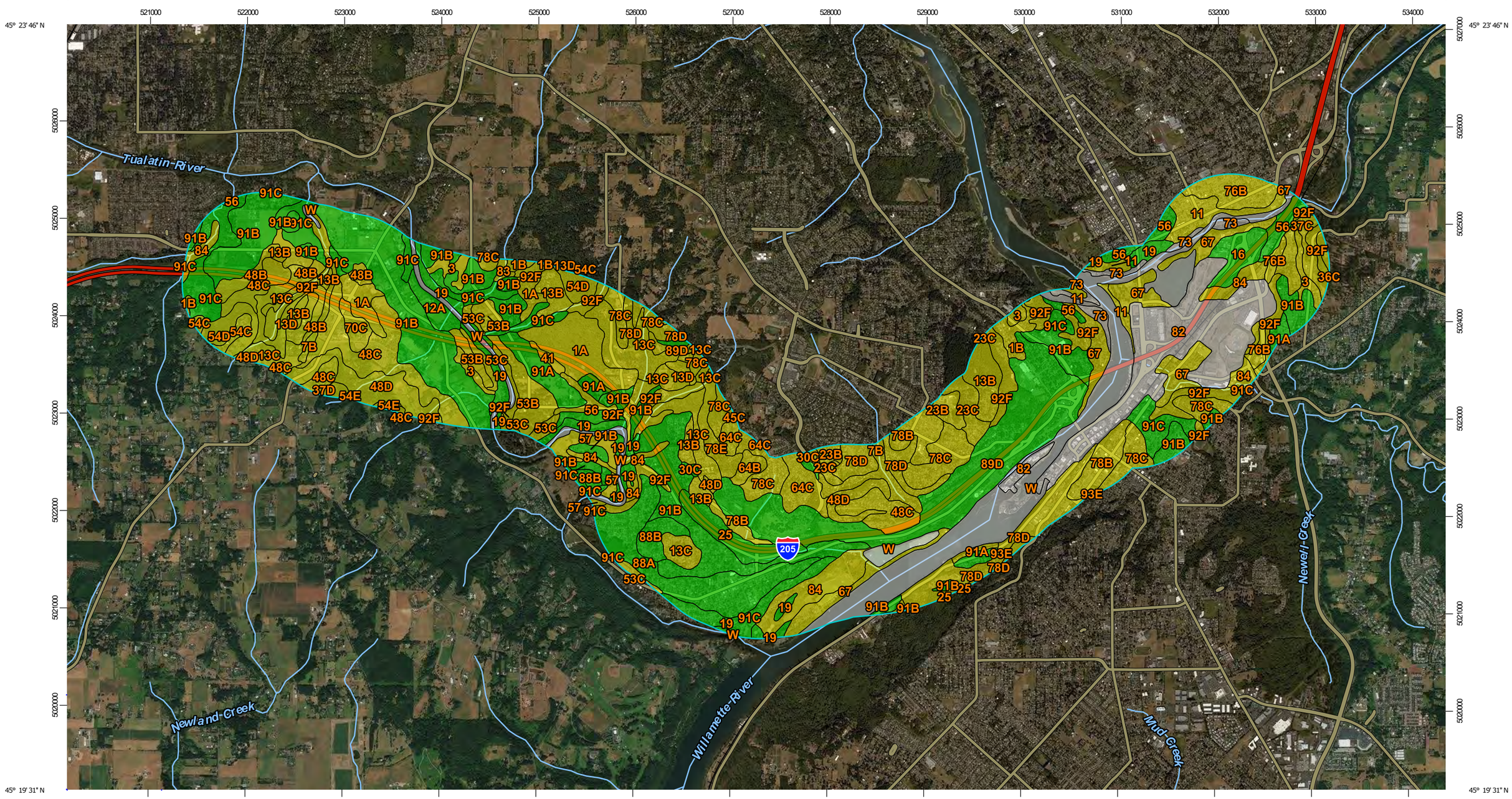
Building Site Development

Building site development interpretations are designed to be used as tools for evaluating soil suitability and identifying soil limitations for various construction purposes. As part of the interpretation process, the rating applies to each soil in its described condition and does not consider present land use. Example interpretations can include corrosion of concrete and steel, shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

Corrosion of Concrete

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- High
- Moderate
- Low
- Not rated or not available

Soil Rating Lines
- High
- Moderate
- Low
- Not rated or not available

Soil Rating Points
- High
- Moderate
- Low
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Corrosion of Concrete

Corrosion of Concrete— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	Moderate	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	Moderate	34.9	0.6%
3	Amity silt loam	Moderate	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	Moderate	47.0	0.8%
11	Camas gravelly sandy loam	Moderate	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	Low	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	Moderate	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	Moderate	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	Moderate	53.4	0.9%
16	Chehalis silt loam	Low	50.7	0.8%
19	Cloquato silt loam	Low	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	Moderate	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	Moderate	48.2	0.8%
25	Cove silty clay loam	Low	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	Low	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	High	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	Moderate	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	Moderate	7.9	0.1%
41	Huberly silt loam	Moderate	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	Moderate	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	Moderate	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	Moderate	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	Moderate	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	Moderate	94.8	1.6%

Corrosion of Concrete— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	Moderate	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	Moderate	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	Moderate	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	Moderate	6.5	0.1%
56	McBee silty clay loam	Low	74.6	1.2%
57	McBee variant loam	Moderate	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	Moderate	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	Moderate	61.0	1.0%
67	Newberg fine sandy loam	Moderate	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	Moderate	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	Moderate	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	Moderate	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	Moderate	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	Moderate	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	Moderate	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	Moderate	6.5	0.1%
84	Wapato silty clay loam	Moderate	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	Low	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	Low	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	Low	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	Low	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	Low	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	Low	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	Moderate	287.0	4.7%

Corrosion of Concrete— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93E	Xerochrepts-Rock outcrop complex, moderately steep	Moderate	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Corrosion of Concrete

Aggregation Method: Dominant Condition

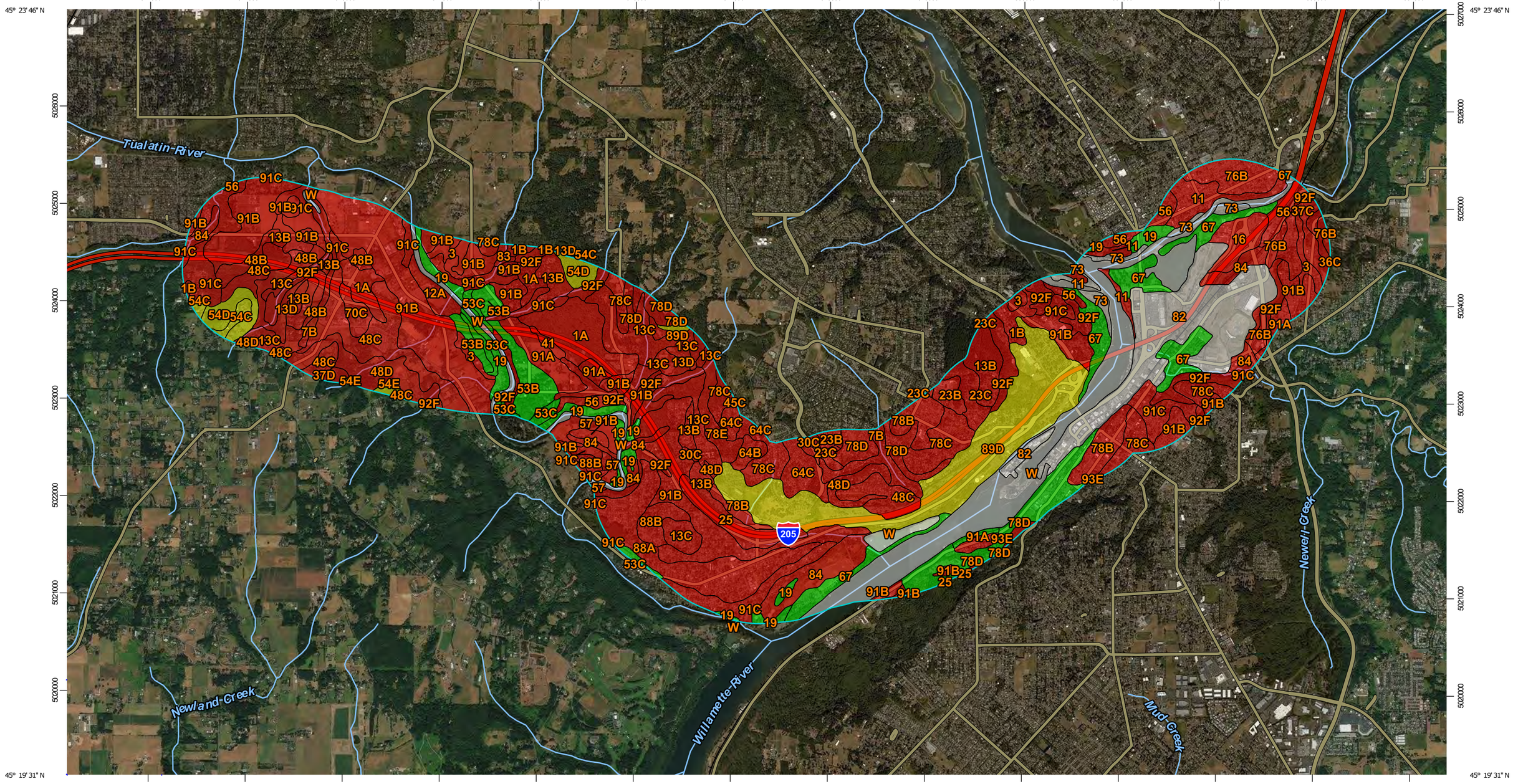
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Corrosion of Steel

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

0 500 1000 2000 3000 Meters

0 1500 3000 6000 9000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- High
- Moderate
- Low
- Not rated or not available

Soil Rating Lines
- High
- Moderate
- Low
- Not rated or not available

Soil Rating Points
- High
- Moderate
- Low
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Corrosion of Steel

Corrosion of Steel— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
1A	Aloha silt loam, 0 to 3 percent slopes	High	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	High	34.9	0.6%
3	Amity silt loam	High	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	High	47.0	0.8%
11	Camas gravelly sandy loam	High	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	High	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	High	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	High	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	High	53.4	0.9%
16	Chehalis silt loam	High	50.7	0.8%
19	Cloquato silt loam	Low	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	High	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	High	48.2	0.8%
25	Cove silty clay loam	High	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	High	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	High	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	High	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	High	7.9	0.1%
41	Huberly silt loam	High	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	High	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	High	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	High	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	High	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	Low	94.8	1.6%

Corrosion of Steel— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	Low	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	Moderate	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	Moderate	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	Moderate	6.5	0.1%
56	McBee silty clay loam	High	74.6	1.2%
57	McBee variant loam	High	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	High	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	High	61.0	1.0%
67	Newberg fine sandy loam	Low	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	High	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	High	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	High	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	High	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	High	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	High	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	High	6.5	0.1%
84	Wapato silty clay loam	High	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	High	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	High	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	Moderate	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	High	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	High	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	High	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	High	287.0	4.7%

Corrosion of Steel— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93E	Xerochrepts-Rock outcrop complex, moderately steep	Low	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Corrosion of Steel

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Water Management

Water Management interpretations are tools for evaluating the potential of the soil in the application of various water management practices. Example interpretations include pond reservoir area, embankments, dikes, levees, and excavated ponds.

Subsurface Water Management, Outflow Quality

The ratings for Subsurface Water Management, Outflow Quality are based on the soil properties that affect the capacity of the soil to convey surface and subsurface water and on the properties that affect water quality. The properties that affect the conveyance and water quality include salinity, sodicity, soil reaction, soil taxonomic great group placement, gypsum content, shrink-swell potential, soil saturation, and surface erosion.

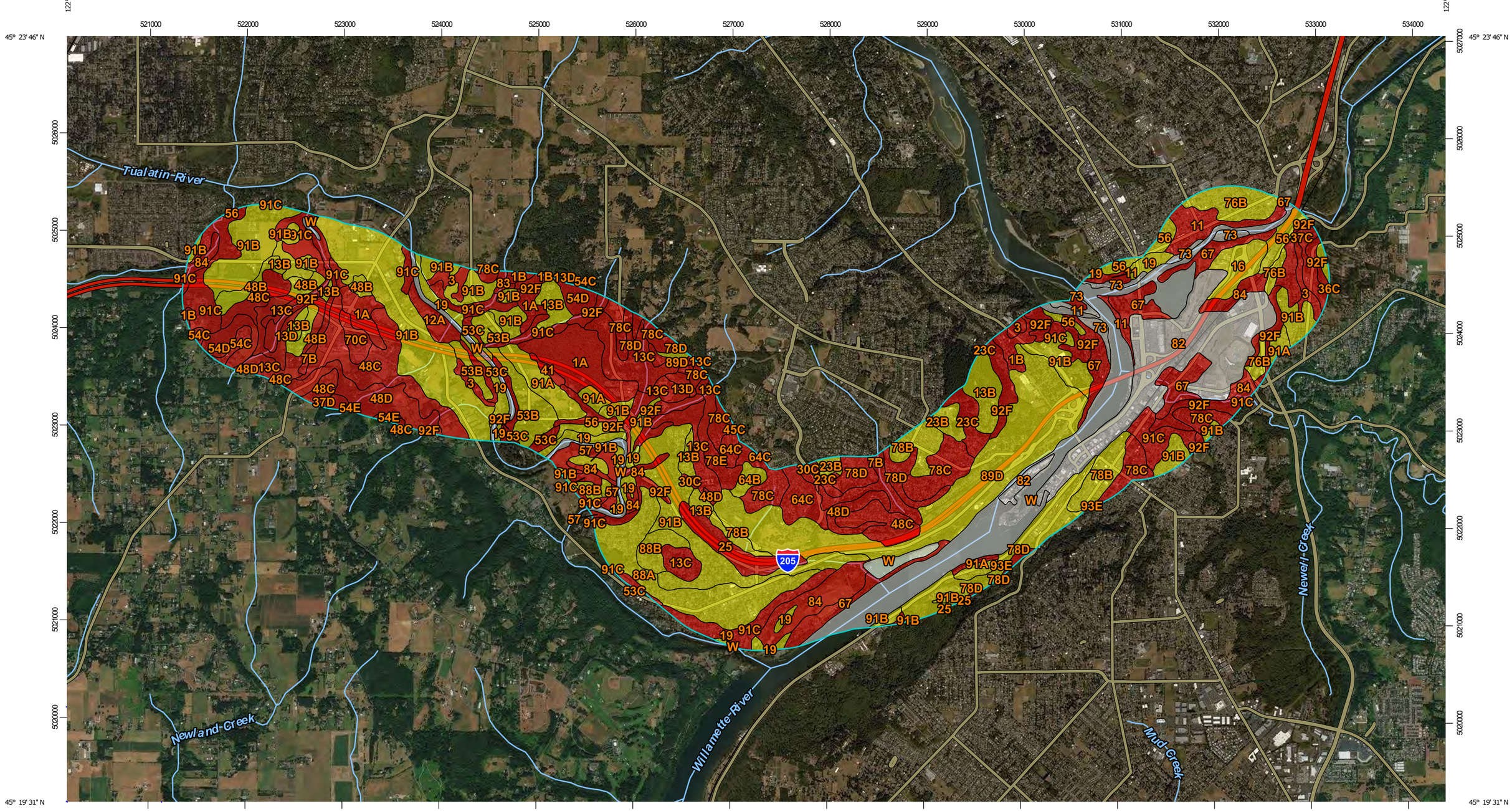
The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor water quality can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as that listed for the map unit. The percent composition of each component in a particular map unit is given so that the user will realize the percentage of each map unit that has the specified rating.

A map unit may have other components with different ratings. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report
Map—Subsurface Water Management, Outflow Quality



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Lines

- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Soil Rating Points

- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Subsurface Water Management, Outflow Quality

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
1A	Aloha silt loam, 0 to 3 percent slopes	Very limited	Aloha (85%)	Pesticide and nutrient movement (1.00)	161.9	2.7%
			Huberly (3%)	Pesticide and nutrient movement (1.00)		
			Dayton (2%)	Pesticide and nutrient movement (1.00)		
1B	Aloha silt loam, 3 to 6 percent slopes	Very limited	Aloha (85%)	Pesticide and nutrient movement (1.00)	34.9	0.6%
				Water Erosion (0.46)		
			Huberly (3%)	Pesticide and nutrient movement (1.00)		
			Dayton (2%)	Pesticide and nutrient movement (1.00)		
3	Amity silt loam	Very limited	Amity (85%)	Pesticide and nutrient movement (1.00)	51.2	0.8%
			Dayton (3%)	Pesticide and nutrient movement (1.00)		
			Huberly (2%)	Pesticide and nutrient movement (1.00)		
7B	Borges silty clay loam, 0 to 8 percent slopes	Very limited	Borges (80%)	Pesticide and nutrient movement (1.00)	47.0	0.8%
				Water Erosion (0.12)		
			Delena (6%)	Pesticide and nutrient movement (1.00)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Water Erosion (1.00)		
11	Camas gravelly sandy loam	Very limited	Camas (80%)	Pesticide and nutrient movement (1.00)	78.0	1.3%
			Wapato (2%)	Pesticide and nutrient movement (1.00)		
12A	Canderly sandy loam, 0 to 3 percent slopes	Very limited	Canderly (90%)	Pesticide and nutrient movement (1.00)	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	Somewhat limited	Cascade (80%)	Pesticide and nutrient movement (0.99)	130.4	2.2%
				Water Erosion (0.12)		
13C	Cascade silt loam, 8 to 15 percent slopes	Very limited	Cascade (80%)	Water Erosion (1.00)	134.6	2.2%
				Pesticide and nutrient movement (0.99)		
13D	Cascade silt loam, 15 to 30 percent slopes	Very limited	Cascade (80%)	Water Erosion (1.00)	53.4	0.9%
				Pesticide and nutrient movement (0.99)		
16	Chehalis silt loam	Somewhat limited	Chehalis (85%)	Pesticide and nutrient movement (0.22)	50.7	0.8%
19	Cloquato silt loam	Somewhat limited	Cloquato (85%)	Pesticide and nutrient movement (0.22)	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	Somewhat limited	Cornelius (85%)	Pesticide and nutrient movement (0.71)	30.8	0.5%
				Water Erosion (0.12)		
23C	Cornelius silt loam, 8 to 15 percent slopes	Very limited	Cornelius (80%)	Water Erosion (1.00)	48.2	0.8%
				Pesticide and nutrient movement (0.71)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Delena (4%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
25	Cove silty clay loam	Very limited	Cove (85%)	Pesticide and nutrient movement (1.00)	63.3	1.0%
			Wapato (5%)	Pesticide and nutrient movement (1.00)		
			Conser (4%)	Pesticide and nutrient movement (1.00)		
			Concord (2%)	Pesticide and nutrient movement (1.00)		
			Dayton (1%)	Pesticide and nutrient movement (1.00)		
30C	Delena silt loam, 3 to 12 percent slopes	Very limited	Delena (80%)	Pesticide and nutrient movement (1.00)	9.9	0.2%
				Water Erosion (0.90)		
			Borges (8%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (0.04)		
36C	Hardscrabble silt loam, 7 to 20 percent slopes	Very limited	Hardscrabble (85%)	Pesticide and nutrient movement (1.00)	0.0	0.0%
				Water Erosion (1.00)		
				Too acid (0.04)		
37C	Helvetia silt loam, 8 to 15 percent slopes	Very limited	Helvetia (85%)	Water Erosion (1.00)	51.0	0.8%
				Pesticide and nutrient movement (0.14)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Delena (2%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
37D	Helvetia silt loam, 15 to 30 percent slopes	Very limited	Helvetia (85%)	Water Erosion (1.00)	7.9	0.1%
				Pesticide and nutrient movement (0.14)		
41	Huberly silt loam	Very limited	Huberly (85%)	Pesticide and nutrient movement (1.00)	8.3	0.1%
			Dayton (5%)	Pesticide and nutrient movement (1.00)		
			Delena (2%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
45C	Jory silty clay loam, 8 to 15 percent slopes	Very limited	Jory (90%)	Water Erosion (1.00)	0.7	0.0%
				Pesticide and nutrient movement (0.00)		
48B	Kinton silt loam, 3 to 8 percent slopes	Somewhat limited	Kinton (85%)	Pesticide and nutrient movement (0.71)	67.3	1.1%
				Water Erosion (0.42)		
48C	Kinton silt loam, 8 to 15 percent slopes	Very limited	Kinton (85%)	Water Erosion (1.00)	247.5	4.1%
				Pesticide and nutrient movement (0.71)		
			Delena (3%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
48D	Kinton silt loam, 15 to 30 percent slopes	Very limited	Kinton (85%)	Water Erosion (1.00)	125.4	2.1%
				Pesticide and nutrient movement (0.71)		
			Delena (2%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
53B	Latourell loam, 3 to 8 percent slopes	Somewhat limited	Latourell (90%)	Water Erosion (0.42)	94.8	1.6%
				Pesticide and nutrient movement (0.22)		
53C	Latourell loam, 8 to 15 percent slopes	Very limited	Latourell (85%)	Water Erosion (1.00)	37.2	0.6%
				Pesticide and nutrient movement (0.22)		
54C	Laurelwood silt loam, 8 to 15 percent slopes	Very limited	Laurelwood (85%)	Water Erosion (1.00)	16.3	0.3%
				Pesticide and nutrient movement (0.00)		
54D	Laurelwood silt loam, 15 to 30 percent slopes	Very limited	Laurelwood (80%)	Water Erosion (1.00)	62.1	1.0%
				Pesticide and nutrient movement (0.00)		
54E	Laurelwood silt loam, 30 to 60 percent slopes	Very limited	Laurelwood (80%)	Water Erosion (1.00)	6.5	0.1%
				Pesticide and nutrient movement (0.00)		
56	McBee silty clay loam	Somewhat limited	McBee (85%)	Pesticide and nutrient movement (0.82)	74.6	1.2%
57	McBee variant loam	Very limited	McBee, Variant (90%)	Pesticide and nutrient movement (1.00)	35.5	0.6%

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Wapato (3%)	Pesticide and nutrient movement (1.00)		
64B	Nekia silty clay loam, 2 to 8 percent slopes	Somewhat limited	Nekia (80%)	Water Erosion (0.08)	17.7	0.3%
				Pesticide and nutrient movement (0.00)		
64C	Nekia silty clay loam, 8 to 15 percent slopes	Very limited	Nekia (80%)	Water Erosion (1.00)	61.0	1.0%
				Pesticide and nutrient movement (0.00)		
67	Newberg fine sandy loam	Very limited	Newberg (85%)	Pesticide and nutrient movement (1.00)	189.0	3.1%
			Wapato (2%)	Pesticide and nutrient movement (1.00)		
70C	Powell silt loam, 8 to 15 percent slopes	Very limited	Powell (85%)	Pesticide and nutrient movement (1.00)	23.5	0.4%
				Water Erosion (1.00)		
			Delena (3%)	Pesticide and nutrient movement (1.00)		
				Water Erosion (1.00)		
73	Riverwash	Not rated	Riverwash (100%)		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	Somewhat limited	Salem (85%)	Pesticide and nutrient movement (0.22)	89.8	1.5%
				Water Erosion (0.12)		
78B	Saum silt loam, 3 to 8 percent slopes	Somewhat limited	Saum (80%)	Water Erosion (0.42)	110.0	1.8%
				Pesticide and nutrient movement (0.22)		

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
78C	Saum silt loam, 8 to 15 percent slopes	Very limited	Saum (80%)	Water Erosion (1.00)	229.2	3.8%
				Pesticide and nutrient movement (0.22)		
78D	Saum silt loam, 15 to 30 percent slopes	Very limited	Saum (80%)	Water Erosion (1.00)	157.1	2.6%
				Pesticide and nutrient movement (0.22)		
78E	Saum silt loam, 30 to 60 percent slopes	Very limited	Saum (80%)	Water Erosion (1.00)	39.9	0.7%
				Pesticide and nutrient movement (0.22)		
82	Urban land	Not rated	Urban land (100%)		363.1	6.0%
83	Wapato silt loam	Very limited	Wapato (90%)	Pesticide and nutrient movement (1.00)	6.5	0.1%
			Cove (6%)	Pesticide and nutrient movement (1.00)		
84	Wapato silty clay loam	Very limited	Wapato (85%)	Pesticide and nutrient movement (1.00)	146.1	2.4%
			Cove (6%)	Pesticide and nutrient movement (1.00)		
			Humaquepts (4%)	Pesticide and nutrient movement (1.00)		
88A	Willamette silt loam, wet, 0 to 3 percent slopes	Somewhat limited	Willamette, wet (85%)	Pesticide and nutrient movement (0.64)	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	Somewhat limited	Willamette, wet (85%)	Pesticide and nutrient movement (0.64)	42.8	0.7%
				Water Erosion (0.36)		
89D	Witzel very stony silt loam, 3 to	Somewhat limited	Witzel (80%)	Water Erosion (0.68)	439.2	7.3%

Subsurface Water Management, Outflow Quality— Summary by Map Unit — Clackamas County Area, Oregon (OR610)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
	40 percent slopes			Pesticide and nutrient movement (0.22)		
91A	Woodburn silt loam, 0 to 3 percent slopes	Somewhat limited	Woodburn (85%)	Pesticide and nutrient movement (0.96)	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	Somewhat limited	Woodburn (90%)	Pesticide and nutrient movement (0.96)	779.4	12.9%
				Water Erosion (0.12)		
91C	Woodburn silt loam, 8 to 15 percent slopes	Very limited	Woodburn (90%)	Water Erosion (1.00)	283.3	4.7%
				Pesticide and nutrient movement (0.96)		
			Dayton (2%)	Pesticide and nutrient movement (1.00)		
92F	Xerochrepts and Haploxerolls, very steep	Very limited	Xerochrepts (50%)	Water Erosion (1.00)	287.0	4.7%
				Pesticide and nutrient movement (0.14)		
			Haploxerolls (35%)	Water Erosion (1.00)		
				Pesticide and nutrient movement (0.48)		
93E	Xerochrepts-Rock outcrop complex, moderately steep	Somewhat limited	Xerochrepts (60%)	Water Erosion (0.72)	115.8	1.9%
				Pesticide and nutrient movement (0.00)		
W	Water	Not rated	Water (100%)		477.5	7.9%
Totals for Area of Interest					**6,050.5**	**100.0%**

Subsurface Water Management, Outflow Quality— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Very limited	2,732.4	45.2%
Somewhat limited	2,437.8	40.3%

Subsurface Water Management, Outflow Quality— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Null or Not Rated	880.4	14.5%
Totals for Area of Interest	**6,050.5**	**100.0%**

Rating Options—Subsurface Water Management, Outflow Quality

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

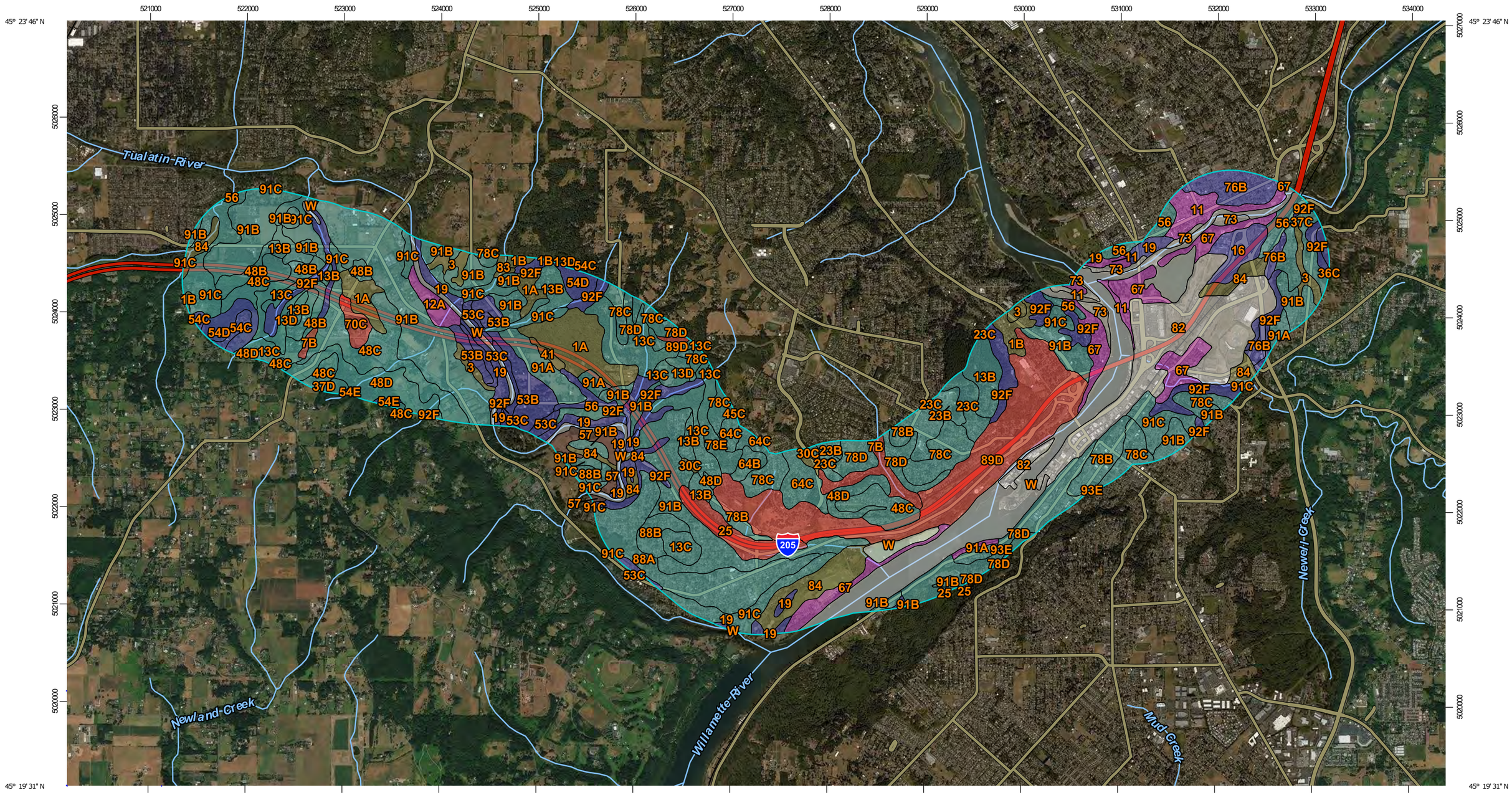
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at

or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	C/D	34.9	0.6%
3	Amity silt loam	C/D	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	D	47.0	0.8%
11	Camas gravelly sandy loam	A	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	A	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	C	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	C	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	C	53.4	0.9%
16	Chehalis silt loam	B	50.7	0.8%
19	Cloquato silt loam	B	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	C	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	C	48.2	0.8%
25	Cove silty clay loam	D	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	C/D	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	D	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	C	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	C	7.9	0.1%
41	Huberly silt loam	C/D	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	C	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	C	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	C	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	C	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	B	94.8	1.6%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	B	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	B	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	B	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	B	6.5	0.1%
56	McBee silty clay loam	C	74.6	1.2%
57	McBee variant loam	B/D	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	C	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	C	61.0	1.0%
67	Newberg fine sandy loam	A	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	D	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	B	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	C	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	C	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	C	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	C	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	C/D	6.5	0.1%
84	Wapato silty clay loam	C/D	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	C	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	C	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	D	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	C	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	C	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	B	287.0	4.7%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93E	Xerochrepts-Rock outcrop complex, moderately steep	C	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

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Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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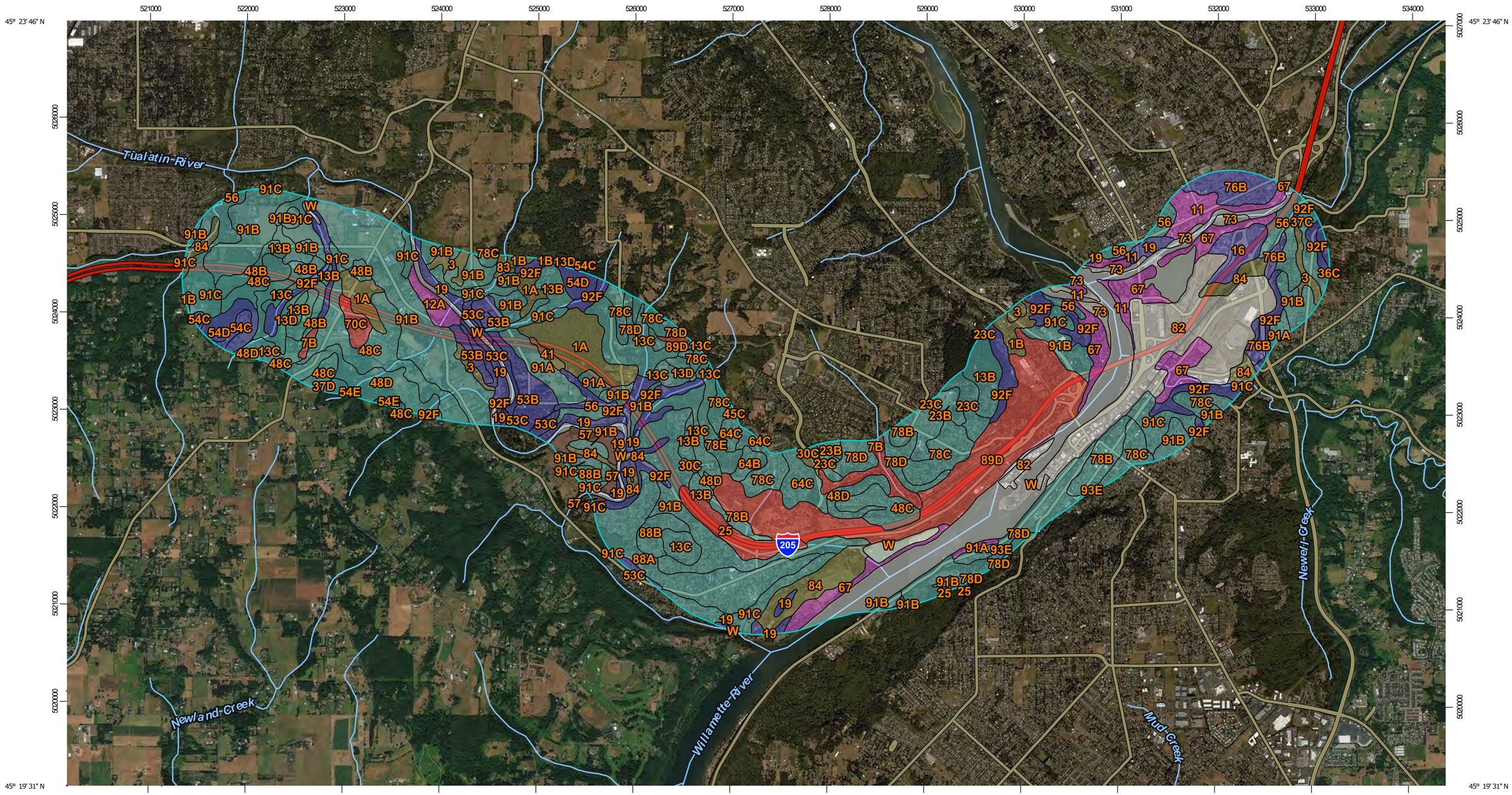

Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

0 500 1000 2000 3000 Meters

0 1500 3000 6000 9000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	C/D	34.9	0.6%
3	Amity silt loam	C/D	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	D	47.0	0.8%
11	Camas gravelly sandy loam	A	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	A	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	C	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	C	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	C	53.4	0.9%
16	Chehalis silt loam	B	50.7	0.8%
19	Cloquato silt loam	B	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	C	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	C	48.2	0.8%
25	Cove silty clay loam	D	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	C/D	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	D	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	C	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	C	7.9	0.1%
41	Huberly silt loam	C/D	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	C	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	C	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	C	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	C	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	B	94.8	1.6%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	B	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	B	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	B	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	B	6.5	0.1%
56	McBee silty clay loam	C	74.6	1.2%
57	McBee variant loam	B/D	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	C	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	C	61.0	1.0%
67	Newberg fine sandy loam	A	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	D	23.5	0.4%
73	Riverwash		39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	B	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	C	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	C	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	C	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	C	39.9	0.7%
82	Urban land		363.1	6.0%
83	Wapato silt loam	C/D	6.5	0.1%
84	Wapato silty clay loam	C/D	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	C	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	C	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	D	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	C	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	C	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	B	287.0	4.7%

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93E	Xerochrepts-Rock outcrop complex, moderately steep	C	115.8	1.9%
W	Water		477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Water Features

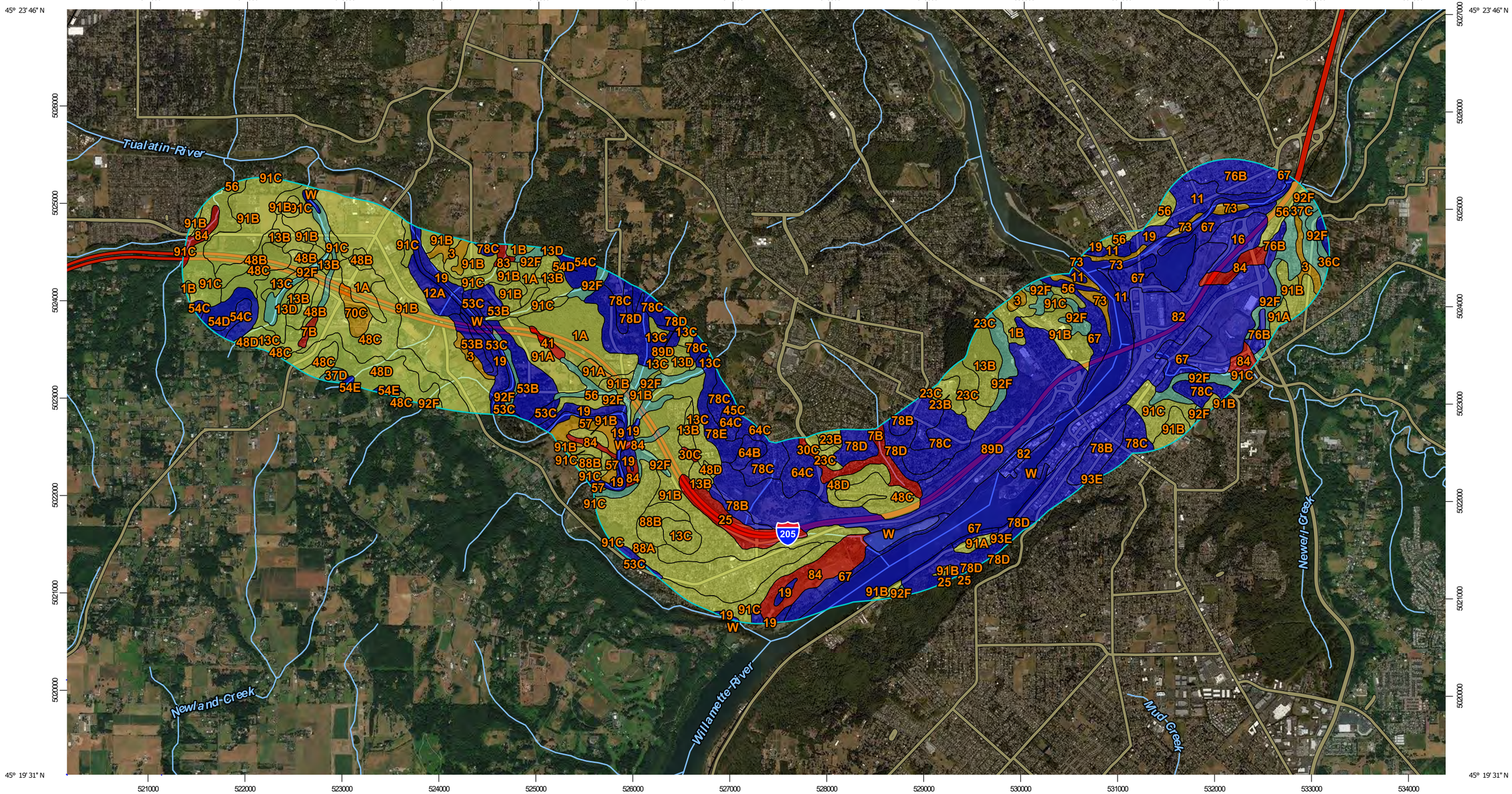
Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Water Table



Map Scale: 1:38,300 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 13, 2016

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Table—Depth to Water Table

Depth to Water Table— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	54	161.9	2.7%
1B	Aloha silt loam, 3 to 6 percent slopes	54	34.9	0.6%
3	Amity silt loam	31	51.2	0.8%
7B	Borges silty clay loam, 0 to 8 percent slopes	8	47.0	0.8%
11	Camas gravelly sandy loam	>200	78.0	1.3%
12A	Canderly sandy loam, 0 to 3 percent slopes	>200	29.1	0.5%
13B	Cascade silt loam, 3 to 8 percent slopes	61	130.4	2.2%
13C	Cascade silt loam, 8 to 15 percent slopes	61	134.6	2.2%
13D	Cascade silt loam, 15 to 30 percent slopes	61	53.4	0.9%
16	Chehalis silt loam	>200	50.7	0.8%
19	Cloquato silt loam	>200	113.2	1.9%
23B	Cornelius silt loam, 3 to 8 percent slopes	86	30.8	0.5%
23C	Cornelius silt loam, 8 to 15 percent slopes	86	48.2	0.8%
25	Cove silty clay loam	15	63.3	1.0%
30C	Delena silt loam, 3 to 12 percent slopes	23	9.9	0.2%
36C	Hardscrabble silt loam, 7 to 20 percent slopes	31	0.0	0.0%
37C	Helvetia silt loam, 8 to 15 percent slopes	137	51.0	0.8%
37D	Helvetia silt loam, 15 to 30 percent slopes	137	7.9	0.1%
41	Huberly silt loam	23	8.3	0.1%
45C	Jory silty clay loam, 8 to 15 percent slopes	>200	0.7	0.0%
48B	Kinton silt loam, 3 to 8 percent slopes	86	67.3	1.1%
48C	Kinton silt loam, 8 to 15 percent slopes	86	247.5	4.1%
48D	Kinton silt loam, 15 to 30 percent slopes	86	125.4	2.1%
53B	Latourell loam, 3 to 8 percent slopes	>200	94.8	1.6%

Depth to Water Table— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
53C	Latourell loam, 8 to 15 percent slopes	>200	37.2	0.6%
54C	Laurelwood silt loam, 8 to 15 percent slopes	>200	16.3	0.3%
54D	Laurelwood silt loam, 15 to 30 percent slopes	>200	62.1	1.0%
54E	Laurelwood silt loam, 30 to 60 percent slopes	>200	6.5	0.1%
56	McBee silty clay loam	76	74.6	1.2%
57	McBee variant loam	31	35.5	0.6%
64B	Nekia silty clay loam, 2 to 8 percent slopes	>200	17.7	0.3%
64C	Nekia silty clay loam, 8 to 15 percent slopes	>200	61.0	1.0%
67	Newberg fine sandy loam	>200	189.0	3.1%
70C	Powell silt loam, 8 to 15 percent slopes	38	23.5	0.4%
73	Riverwash	31	39.8	0.7%
76B	Salem silt loam, 0 to 7 percent slopes	>200	89.8	1.5%
78B	Saum silt loam, 3 to 8 percent slopes	>200	110.0	1.8%
78C	Saum silt loam, 8 to 15 percent slopes	>200	229.2	3.8%
78D	Saum silt loam, 15 to 30 percent slopes	>200	157.1	2.6%
78E	Saum silt loam, 30 to 60 percent slopes	>200	39.9	0.7%
82	Urban land	>200	363.1	6.0%
83	Wapato silt loam	0	6.5	0.1%
84	Wapato silty clay loam	8	146.1	2.4%
88A	Willamette silt loam, wet, 0 to 3 percent slopes	92	192.6	3.2%
88B	Willamette silt loam, wet, 3 to 7 percent slopes	92	42.8	0.7%
89D	Witzel very stony silt loam, 3 to 40 percent slopes	>200	439.2	7.3%
91A	Woodburn silt loam, 0 to 3 percent slopes	64	88.6	1.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	64	779.4	12.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	64	283.3	4.7%
92F	Xerochrepts and Haploxerolls, very steep	137	287.0	4.7%

Depth to Water Table— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating (centimeters)**	**Acres in AOI**	**Percent of AOI**
93E	Xerochrepts-Rock outcrop complex, moderately steep	>200	115.8	1.9%
W	Water	>200	477.5	7.9%
Totals for Area of Interest			**6,050.5**	**100.0%**

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

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SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

August 22, 2018

Mr. Steve Drahota
HDR, Inc.
1001 SW 5th Avenue, Suite 1800
Portland, Oregon 97204

RE: DRAFT PRELIMINARY INFILTRATION TESTING RESULTS MEMORANDUM CLACKAMAS COUNTY, OREGON

Dear Mr. Drahota:

This letter report summarizes results of infiltration testing performed by Shannon & Wilson, Inc. (Shannon & Wilson), to support design of stormwater management facilities for the I-205: Stafford Road to OR99E Corridor Widening Project. The project area is shown on the Vicinity Map, Figure 1. We understand the Oregon Department of Transportation (ODOT) is planning to widen the Interstate-205 (I-205) corridor from Stafford Road to OR99E. This project will widen I-205 to three lanes northbound and three lanes southbound from Stafford Road to OR213. We also understand the project will include proposed facilities such as detention ponds and swales which will be deeper than 3 feet.

To assist HDR, Inc. (HDR), for the design of the proposed stormwater management facilities, Shannon & Wilson is providing geotechnical field explorations and infiltration testing services. Our services were performed in accordance with the scope of services defined in the HDR Subconsultant Task Order No.10063137-001, dated June 14, 2018.

INFILTRATION TESTING

Shannon & Wilson is currently performing a subsurface investigation for Amendment 3 at the project site. As part of the ongoing subsurface investigation, we completed 15 infiltration tests. Approximate locations of the infiltration test sites are shown on the Site and Exploration Plan, Figure 2. A Shannon & Wilson representative was on site to perform each infiltration test.

Infiltration Testing

Infiltration tests were conducted in accordance with the procedures described in the Infiltration Testing Guide, of the *Stormwater Standards, Clackamas County Stormwater Service District No.*

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LAKE OSWEGO, OREGON 97035-3480
503-210-4750
www.shannonwilson.com

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1(E.2.2). Infiltration tests must be performed at the base of the proposed facilities, which is anticipated to be approximately six feet. As shown in Table 1 below, nine of the holes were excavated to less than 3.5 feet. At these locations, we encountered refusal conditions after several attempts due to gravels, cobbles, and boulders, at or near the surface.

The test hole was advanced using a gasoline-powered auger and hand tools. A 6-inch-diameter PVC casing was embedded into the underlying soil to perform the Encased Falling Head Test method. This method is not appropriate in gravelly soils or conditions in which a good seal with the casing cannot be established. In these cases, the Open Pit Falling Head Test method was followed.

The excavated hole was then filled with clean water a minimum of 12 inches deep, and this depth was maintained for at least 4 hours to presoak the native material. After the presaturation period, the holes were refilled with water to 6 inches (12 inches for Open Pit Falling Head Test Method) and the drawdown time was measured. Measurements were made every 10 minutes for one hour in faster draining soils, or 20 minutes for two hours in slower draining soils.

The process of refilling the hole and taking measurements (a trial) is repeated until the change in measured infiltration rate between two successive trials is no more than five percent. At least three trials were conducted for each test.

The infiltration test results of all infiltration tests are presented on Figures 3 through 17.

RESULTS

According to the *Stormwater Standards, Clackamas County Stormwater Service District No. 1(E.2.2),* the final infiltration rates were calculated using the following standard calculation. The calculation is performed for each water level drop and is outlined below:

= (Drop in water level/Time interval) x conversion

= 0.055ft/20min x (12in/ft) x (60min/hr)

= 1.98 inches per hour

Field-measured infiltration rates in the final test of each trial for each test location are provided in Table 1 below.

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TABLE 1
INFILTRATION TESTING SUMMARY

Designation	Approximate Depth (feet)	Infiltration Testing Method	Final Infiltration Rate (inches/hour) for each Trial		
			1	2	3
INF19786-01	5.0	Encased Falling Head Test	0.06	0.00	0.00
INF19786-02	5.5	Encased Falling Head Test	0.72	0.36	0.72
INF19786-03	5.5	Encased Falling Head Test	0.09	0.18	0.0
INF19786-04	6	Encased Falling Head Test	1.44	1.44	0.72
INF19786-05	5.25	Encased Falling Head Test	0.00	0.00	0.00
INF19786-06	2.5	Open Pit Falling Head Test	0.36	0.17	0.36
INF19786-07	5.5	Encased Falling Head Test	0.72	0.72	0.72
INF19786-08	2.0	Open Pit Falling Head Test	1.44	1.44	1.44
INF19786-09	2.0	Open Pit Falling Head Test	3.60	3.60	2.88
INF19786-10	2.0	Open Pit Falling Head Test	2.88	2.88	2.88
INF19786-11	2.0	Open Pit Falling Head Test	0.72	0.36	0.36
INF19786-12	2.0	Open Pit Falling Head Test	1.44	0.72	1.44
INF19786-13	3.0	Open Pit Falling Head Test	1.44	1.44	1.44
INF19786-14	3.5	Open Pit Falling Head Test	1.44	0.72	1.44
INF19786-15	2.0	Open Pit Falling Head Test	0.36	0.00	0.36

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LIMITATIONS

Shannon & Wilson has prepared this report in a professional manner, using a level of skill and care normally exercised for similar projects under similar conditions by reputable and competent geotechnical consultants currently practicing in the area, and in accordance with the terms and conditions set forth in our proposal. The facts and conditions referenced in this report may change over time, and the conclusions set forth herein are applicable to the facts and conditions

as described only at the time of this report. Conclusions were made within the operative constraints of the scope, budget, and schedule for this project. We believe that the conditions stated here are factual, but no guarantee is made or implied. This report is for the exclusive use of HDR, Inc. We have prepared an enclosure, "Important Information About Your Geotechnical/Environmental Report," to help you and others understand the use and limitations of our reports.

Sincerely,

SHANNON & WILSON, INC.

Cody Sorensen, CEG
Senior Engineering Geologist

Christina Villeneuve, GIT
Staff Geologist

CLV:NMV/mmm

Enc: Figure 1: Vicinity Map
Figure 2: Site and Exploration Plan
Figures 3 through 17: Infiltration Test Results
Important Information About Your Geotechnical/Environmental Report

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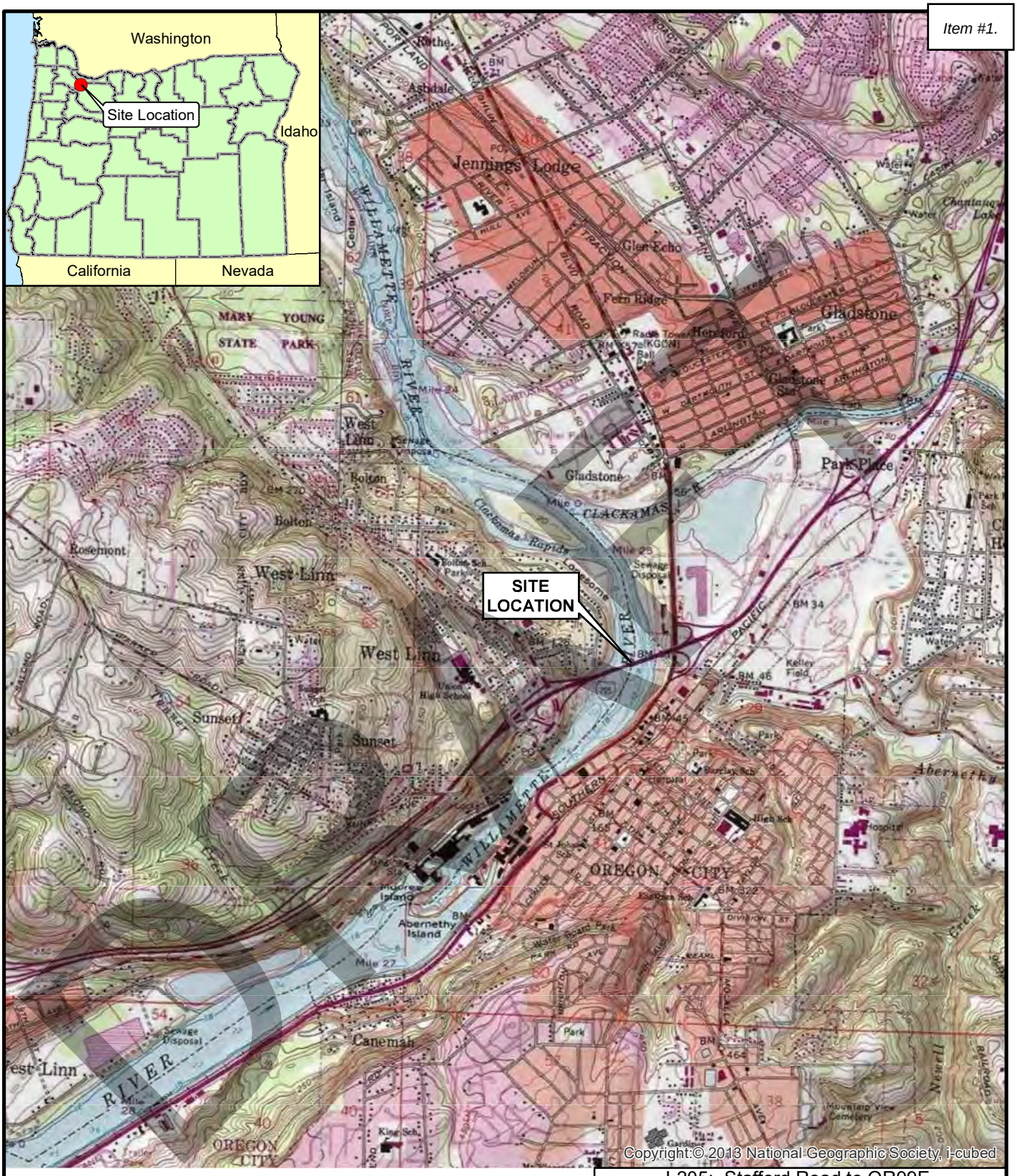

0 0.25 0.5 1

Scale in Miles

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

VICINITY MAP

August 2018 24-1-04165-006

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LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200
Scale in Feet

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

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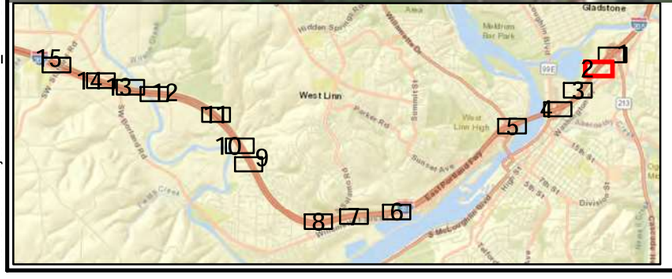

LEGEND

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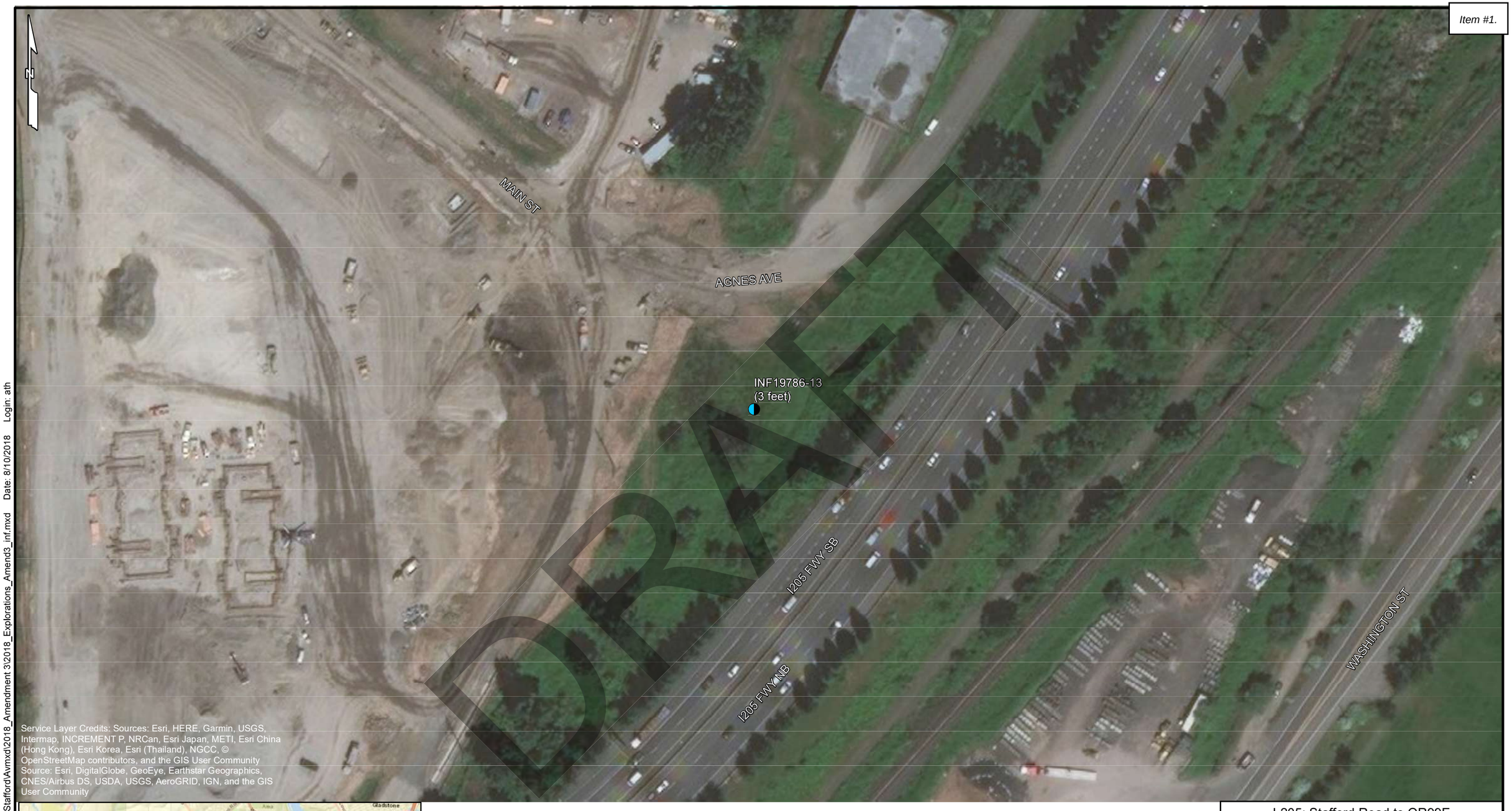

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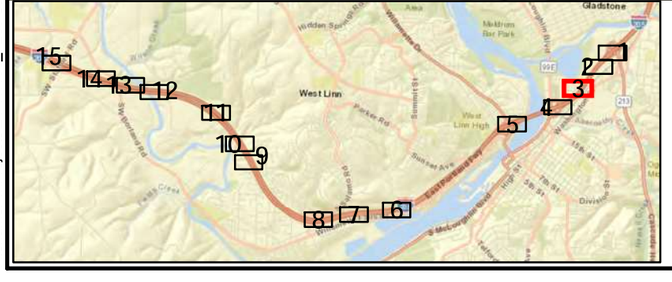

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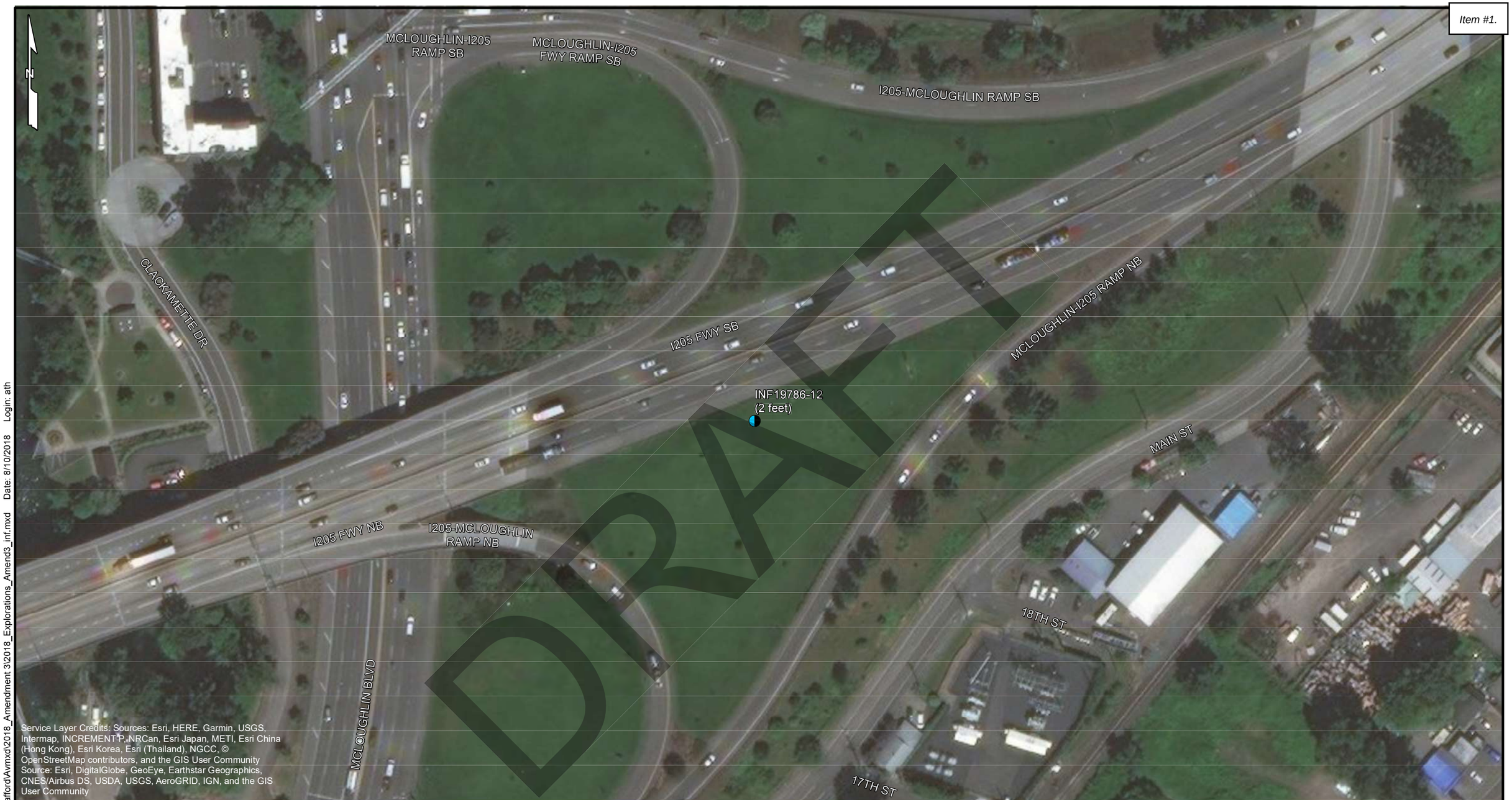

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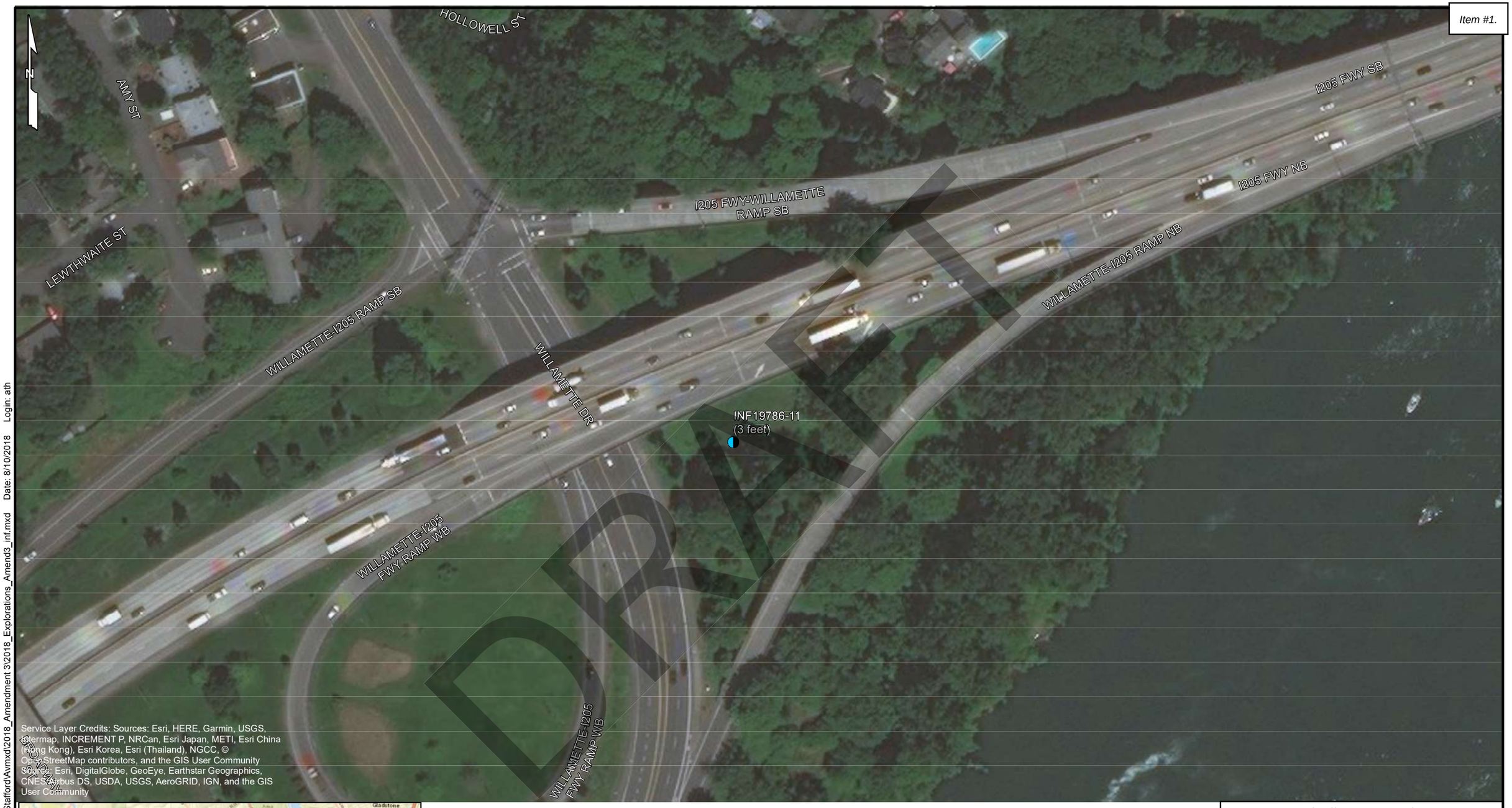

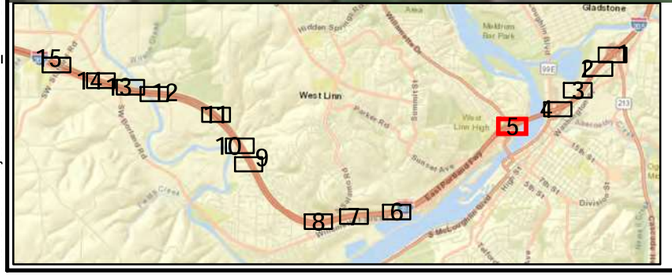

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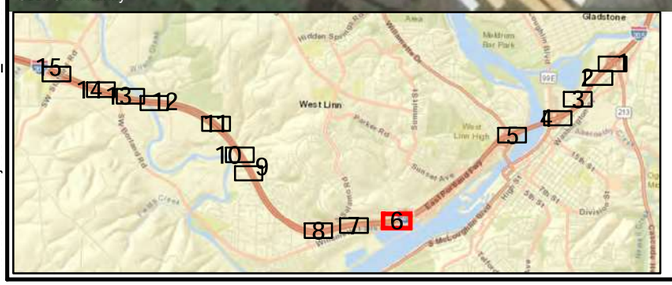

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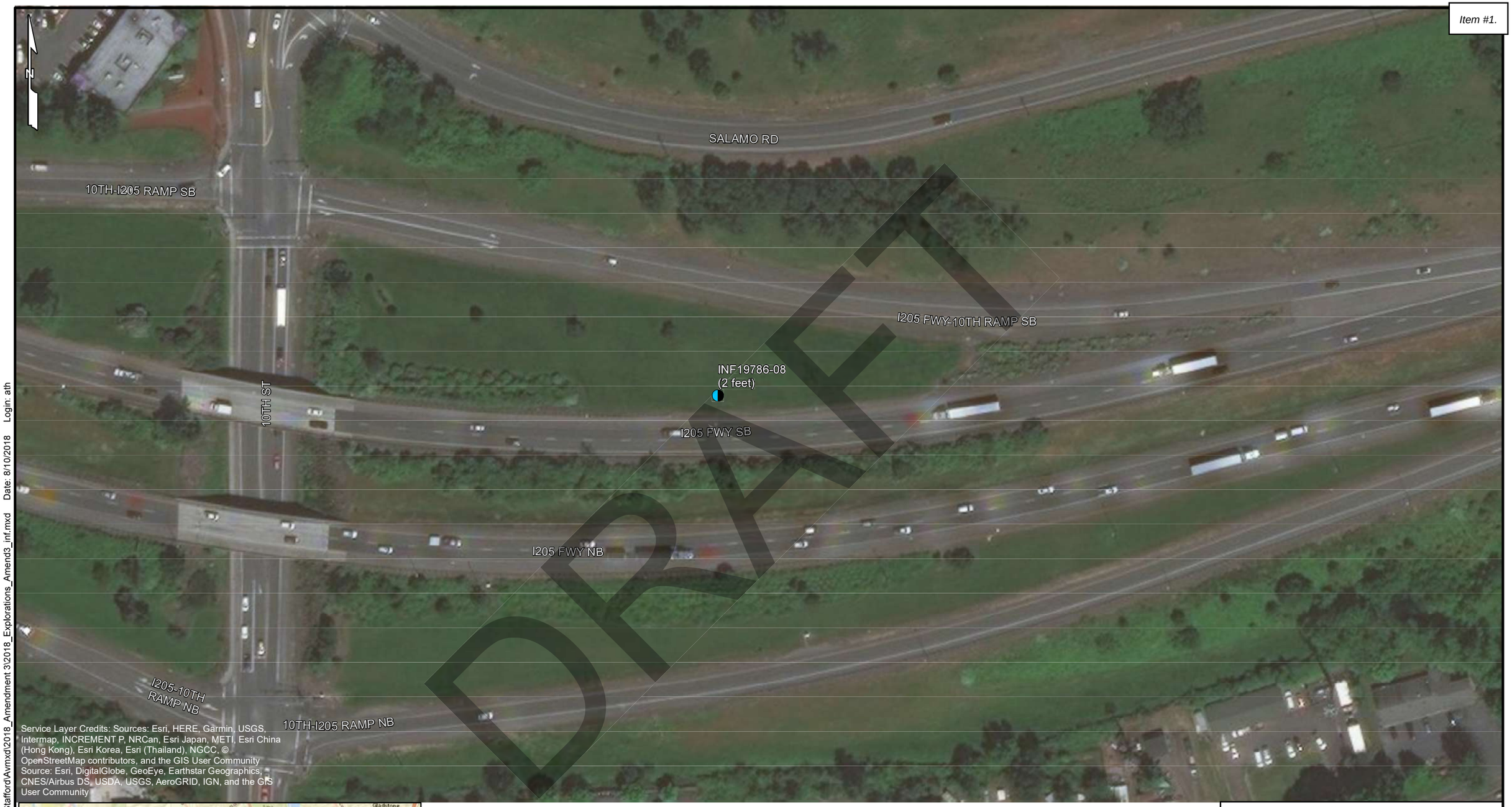

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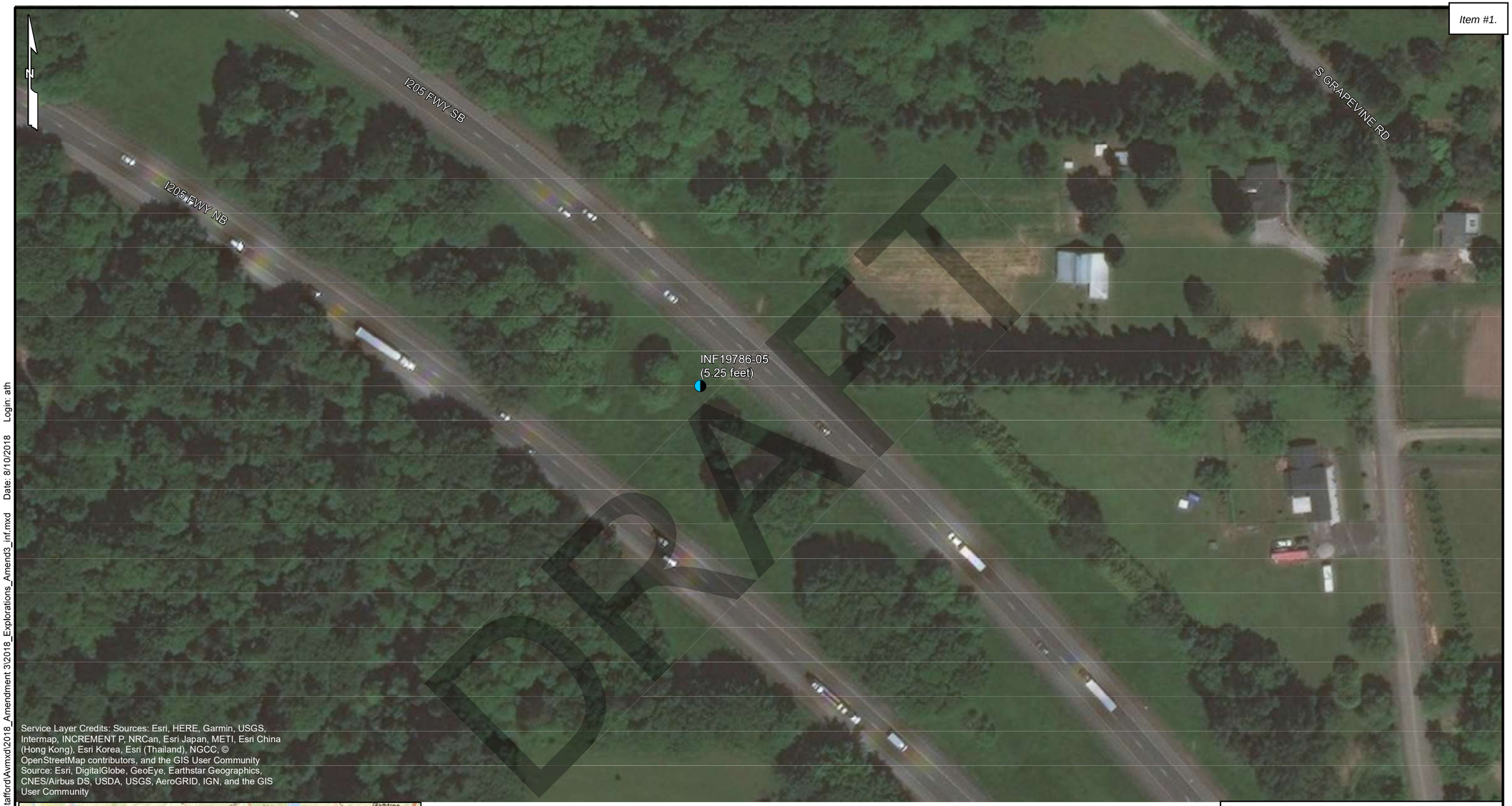

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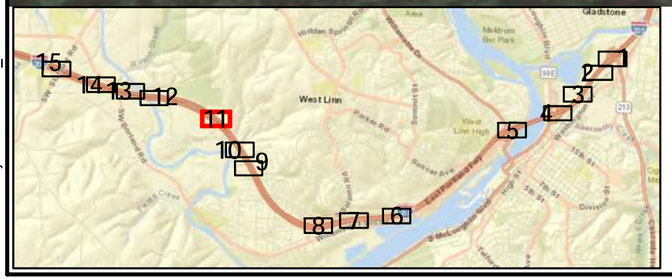

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August 2018 24-1-04165-006

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sheet

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LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200

Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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LEGEND

INF19786-15A
(Final Depth)
Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sheet

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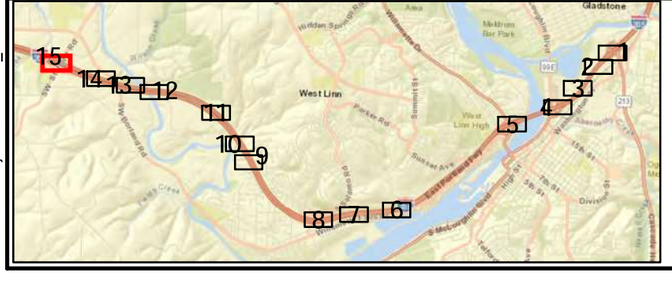

LEGEND

INF19786-15A
(Final Depth)

Approximate Infiltration Location

0 50 100 200
Scale in Feet

N

I-205: Stafford Road to OR99E
Corridor Widening
Clackamas County, Oregon

EXPLORATION PLAN
INFILTRATION TESTING

August 2018 24-1-04165-006

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sheet

Filename: T:\Projects\24-1\4165_I-205 Stafford\Avmxd\2018_Amendment 3\2018_Explorations_Amend3_inf.mxd Date: 8/10/2018 Login: ath

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/6/2018

Location: I-205 northbound median mile marker 3.0

Test Hole Number: INF19786-01

Depth to bottom of hole: 5.0 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 2.0	Sandy SILT; ML; Light brown; Moist
2.0 - 5.0	Silty SAND; SM; Brown; Nonplastic fines; Moist; Fine to medium sand

Presaturation Start Time: 8:00 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	5.40	-	-	-	Trial #1
12:20	20	5.40	0.00	0.01	0.06	
12:40	20	5.40	0.00			
13:00	20	5.40	0.00			
13:20	20	5.40	0.00			
13:40	20	5.40	0.00			
14:00	20	5.41	0.01			
14:00	0	5.40		-	-	Trial #2
14:20	20	5.40	0.00	0.00	0.00	
14:40	20	5.40	0.00			
15:00	20	5.40	0.00			
15:20	20	5.40	0.00			
15:40	20	5.40	0.00			
16:00	20	5.40	0.00			
16:00	0	5.40		-	-	Trial #3
16:20	20	5.40	0.00	0.00	0.00	
16:40	20	5.40	0.00			
17:00	20	5.40	0.00			
17:20	20	5.40	0.00			
17:40	20	5.40	0.00			
18:00	20	5.40	0.00			

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-01

August 2018 24-1-04165-006

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FIG. 3

DRAFT

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/9/2018

Location: I-205 southbound median mile marker 3.5

Test Hole Number: INF19786-02

Depth to bottom of hole: 5.5 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 -5.5	SILT with trace sand; ML; Brown; Nonplastic fines; Moist

Presaturation Start Time: 8:15 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:02	0	5.45	-	-	-	Trial #1
12:12	10	5.46	0.01	0.01	0.72	
12:22	10	5.47	0.01	0.01	0.72	
12:32	10	5.48	0.01	0.01	0.72	
12:42	10	5.48	0.00	0.01	0.36	
12:52	10	5.49	0.01			
13:02	10	5.50	0.01	0.01	0.72	
13:06	0	5.45	-	-	-	Trial #2
13:26	20	5.47	0.02		0.72	
13:46	20	5.48	0.01		0.36	
14:06	20	5.50	0.02		0.72	
14:26	20	5.52	0.02		0.72	
14:46	20	5.54	0.02		0.72	
15:06	20	5.55	0.01		0.36	
15:10	0	5.45	-	-	-	Trial #3
15:30	20	5.47	0.02		0.72	
15:50	20	5.49	0.02		0.72	
16:10	20	5.50	0.01		0.36	
16:30	20	5.52	0.02		0.72	
16:50	20	5.54	0.02		0.72	
17:10	20	5.56	0.02		0.72	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-02

August 2018 24-1-04165-006

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FIG. 4

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/10/2018

Location: I-205 southbound shoulder mile marker 4.0

Test Hole Number: INF19786-03

Depth to bottom of hole: 5.5 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 2.0	SILT; ML; Light brown; Moist
2.0 - 5.5	Sandy SILT; ML; Brown; Nonplastic fines; Moist; Fine to medium sand

Presaturation Start Time: 8:09 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	5.97	-	-	-	Trial #1
12:20	20	5.97	0.00	0.01	0.36	
12:40	20	5.98	0.01	0.01	0.36	
13:00	20	5.99	0.01	0.01	0.36	
13:20	20	5.99	0.00			
13:40	20	5.99	0.00	0.01	0.09	
14:00	20	6.00	0.01			
14:00	0	5.97	-	-	-	Trial #2
14:20	20	5.97	0.00			
14:40	20	5.97	0.00	0.01	0.09	
15:00	20	5.98	0.01			
15:40	20	5.99	0.00	0.01	0.18	
16:00	20	6.00	0.01			
16:00	0	5.97	-	-	-	Trial #3
16:20	20	5.97	0.00			
16:40	20	5.97	0.00	0.01	0.09	
17:00	20	5.98	0.01			
17:40	20	5.99	0.01	0.01	0.18	
18:00	20	5.99	0.00	0.00	0.00	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-03

August 2018 24-1-04165-006

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FIG. 5

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/11/2018

Location: I-205 northbound median mile marker 4.1

Test Hole Number: INF19786-04

Depth to bottom of hole: 6.0 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 1.5	Sandy SILT; ML; Light brown; Moist
1.5 - 6.0	Silty SAND; ML; Light brown; Moist; Fine to medium sand

Presaturation Start Time: 8:07 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
12:02	0	6.14	-	-	Trial #1
12:12	10	6.15	0.01	0.72	
12:22	10	6.17	0.02	1.44	
12:32	10	6.19	0.02	1.44	
12:42	10	6.20	0.01	0.72	
12:52	10	6.22	0.02	1.44	
13:02	10	6.24	0.02	1.44	
13:03	0	6.14	-	-	Trial #2
13:13	10	6.15	0.01	0.72	
13:23	10	6.16	0.01	0.72	
13:33	10	6.18	0.02	1.44	
13:43	10	6.19	0.01	0.72	
13:53	10	6.21	0.02	1.44	
14:03	10	6.23	0.02	1.44	
14:05	0	6.14	-	-	Trial #3
14:15	10	6.16	0.02	1.44	
14:25	10	6.17	0.01	0.72	
14:35	10	6.19	0.02	1.44	
14:45	10	6.20	0.01	0.72	
14:55	10	6.22	0.02	1.44	
15:05	10	6.23	0.01	0.72	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-04

August 2018 24-1-04165-006

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FIG. 6

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/12/2018

Location: I-205 southbound median mile marker 4.7

Test Hole Number: INF19786-05

Depth to bottom of hole: 5.25 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 0.5	SILT; ML; Light brown; Moist
0.5 - 5.25	SILT with some sand; ML; Light brown; Moist

Presaturation Start Time: 8:17 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	6.04	-	-	-	Trial #1
12:20	20	6.04	0.00	0.00	0.00	
12:40	20	6.04	0.00			
13:00	20	6.04	0.00			
13:20	20	6.04	0.00			
13:40	20	6.04	0.00			
14:00	20	6.04	0.00			
14:00	0	6.04	-	-	-	Trial #2
14:20	20	6.04	0.00	0.01	0.09	
14:40	20	6.04	0.00			
15:00	20	6.04	0.00			
15:20	20	6.05	0.01			
15:40	20	6.05	0.00	0.00	0.00	
16:00	20	6.05	0.00			
16:00	0	6.04	-	-	-	Trial #3
16:20	20	6.04	0.00	0.00	0.00	
16:40	20	6.04	0.00			
17:00	20	6.04	0.00			
17:20	20	6.04	0.00			
17:40	20	6.04	0.00			
18:00	20	6.04	0.00			

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-05

August 2018 24-1-04165-006

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FIG. 7

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/16/2018

Location: I-205 northbound median mile marker 5.4

Test Hole Number: INF19786-06

Depth to bottom of hole: 2.5 feet

Diameter of hole: 8 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 1.0	SILT; ML; Light brown; Moist
0.5 - 2.5	SILT with trace sand and gravel, with cobbles; ML; Light brown; Moist
2.5	Silty GRAVEL with Cobbles; GM; Refusal

Presaturation Start Time: 8:20 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
11:24	0	4.01	-	-	-	Trial #1
11:44	20	4.01	0.00	0.02	0.24	
12:04	20	4.01	0.00			
12:24	20	4.03	0.02			
12:44	20	4.03	0.00	0.02	0.36	
13:04	20	4.05	0.02			
13:24	20	4.06	0.01	0.01	0.36	
13:25	0	4.01	-	-	-	Trial #2
13:45	20	4.01	0.00	0.01	0.17	
14:05	20	4.02	0.01			
14:25	20	4.03	0.01	0.01	0.36	
14:45	20	4.04	0.01	0.01	0.36	
15:05	20	4.04	0.00	0.01	0.17	
15:25	20	4.05	0.01			
15:26	0	4.01	-	-	-	Trial #3
15:46	20	4.02	0.01	0.01	0.36	
16:06	20	4.02	0.00	0.01	0.17	
16:26	20	4.03	0.01			
16:46	20	4.03	0.00	0.01	0.17	
17:06	20	4.04	0.01			
17:26	20	4.05	0.01	0.01	0.36	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-06

August 2018 24-1-04165-006

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FIG. 8

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/13/2018

Location: I-205 northbound shoulder mile marker 5.5

Test Hole Number: INF19786-07

Depth to bottom of hole: 5.5 feet

Diameter of hole: 6 inches

Test method: Encased Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 5.5	Sandy SILT; ML; Light brown; Moist

Presaturation Start Time: 8:40 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
12:00	0	5.91	-	-	-	Trial #1
12:10	10	5.93	0.02	0.02	1.44	
12:20	10	5.93	0.00	0.01	0.36	
12:30	10	5.94	0.01			
12:40	10	5.96	0.02	0.02	1.44	
12:50	10	5.97	0.01	0.01	0.72	
13:00	10	5.98	0.01	0.01	0.72	
13:01	0	5.91	-	-	-	Trial #2
13:11	10	5.92	0.01	0.01	0.72	
13:21	10	5.93	0.01	0.01	0.72	
13:31	10	5.94	0.01	0.01	0.72	
13:41	10	5.95	0.01	0.03	2.15	
13:51	10	5.97	0.02	0.02	0.72	
14:01	10	5.97	0.00			
14:02	0	5.91	-	-	-	Trial #3
14:12	10	5.92	0.01	0.01	0.72	
14:22	10	5.93	0.01	0.01	0.72	
14:32	10	5.94	0.01	0.01	0.72	
14:42	10	5.96	0.02	0.02	1.44	
14:52	10	5.97	0.01	0.01	0.72	
15:02	10	5.98	0.01	0.01	0.72	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-07

August 2018 24-1-04165-006

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FIG. 9

DRAFT

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/19/2018

Location: I-205 southbound median mile marker 6.5

Test Hole Number: INF19786-08

Depth to bottom of hole: 2.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 0.5	SILT; ML; Light brown; Moist
0.5-2.0	SILT with trace sand and gravel, with cobbles; ML; Light brown; Moist
2.0	Silty GRAVEL with Cobbles; ML; Refusal

Presaturation Start Time: 8:25 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
12:01	0	3.81	-	-	Trial #1
12:11	10	3.83	0.02	1.44	
12:21	10	3.87	0.04	2.88	
12:31	10	3.90	0.03	2.16	
12:41	10	3.92	0.02	1.44	
12:51	10	3.94	0.02	1.44	
13:01	10	3.96	0.02	1.44	
13:02	0	3.83	-	-	Trial #2
13:12	10	3.86	0.03	2.16	
13:22	10	3.89	0.03	2.16	
13:32	10	3.91	0.02	1.44	
13:42	10	3.93	0.02	1.44	
13:52	10	3.95	0.02	1.44	
14:02	10	3.97	0.02	1.44	
14:04	0	3.83	-	-	Trial #3
14:14	10	3.85	0.02	1.44	
14:24	10	3.87	0.02	1.44	
14:34	10	3.89	0.02	1.44	
14:44	10	3.92	0.03	2.16	
14:54	10	3.93	0.01	0.72	
15:04	10	3.95	0.02	1.44	

DRAFT

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-08

August 2018 24-1-04165-006

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FIG. 10

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/17/2018

Location: I-205 northbound median mile marker 7.0

Test Hole Number: INF19786-09

Depth to bottom of hole: 2.0 feet

Diameter of hole: 12 inches

Test method: Open Pit Falling Head Test

Depth (feet):	Soil Texture:
0.0 - 0.5	SILT; ML; Light brown; Moist
0.5-2.0	Gravelly SILT with some sand, with cobbles; ML; Light brown; **Moist**
2.0	Silty GRAVEL with Cobbles; GM; Refusal

Presaturation Start Time: 9:00 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
13:00	0	3.43	-	-	Trial #1
13:10	10	3.64	0.21	15.12	
13:20	10	3.75	0.11	7.92	
13:30	10	3.83	0.08	5.76	
13:40	10	3.91	0.08	5.76	
13:50	10	3.97	0.06	4.32	
14:00	10	4.02	0.05	3.60	
14:34	0	3.44	-	-	Trial #2
14:44	10	3.59	0.15	10.80	
14:54	10	3.69	0.10	7.20	
15:04	10	3.77	0.08	5.76	
15:14	10	3.84	0.07	5.04	
15:24	10	3.90	0.06	4.32	
15:34	10	3.95	0.05	3.60	
15:37	0	3.42	-	-	Trial #3
15:47	10	3.57	0.15	10.80	
15:57	10	3.67	0.10	7.20	
16:07	10	3.74	0.07	5.04	
16:17	10	3.81	0.07	5.04	
16:27	10	3.87	0.06	4.32	
16:37	10	3.91	0.04	2.88	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-09

August 2018 24-1-04165-006

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FIG. 11

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/20/2018

Location: I-205 southbound shoulder mile marker 7.2

Test Hole Number: INF19786-10

Depth to bottom of hole: 2.0 feet

Diameter of hole: 14 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 2.0	GRAVEL with some silt and sand, with Cobbles; GP-GM; Light brown, Moist
2.0	GRAVEL with Cobbles; Refusal

Presaturation Start Time: 9:20 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
13:01	0	3.88	-	-	Trial #1
13:11	10	3.99	0.11	7.92	
13:21	10	4.06	0.07	5.04	
13:31	10	4.12	0.06	4.32	
13:41	10	4.18	0.06	4.32	
13:51	10	4.22	0.04	2.88	
14:01	10	4.26	0.04	2.88	
14:03	0	3.88	-	-	Trial #2
14:13	10	3.98	0.10	7.20	
14:23	10	4.04	0.06	4.32	
14:33	10	4.10	0.06	4.32	
14:43	10	4.14	0.04	2.88	
14:53	10	4.19	0.05	3.60	
15:03	10	4.23	0.04	2.88	
15:05	0	3.82	-	-	Trial #3
15:15	10	3.93	0.11	7.92	
15:25	10	4.01	0.08	5.76	
15:35	10	4.07	0.06	4.32	
15:45	10	4.11	0.04	2.88	
15:55	10	4.16	0.05	3.60	
16:05	10	4.20	0.04	2.88	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-10

August 2018 24-1-04165-006

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FIG. 12

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/23/2018

Location: I-205 northbound beneath east Abernethy Bridge abutment mile marker 8.9

Test Hole Number: INF19786-11

Depth to bottom of hole: 2.0 feet

Diameter of hole: 14 inches

Test method: Open Pit Falling Head Test

Depth (feet):	Soil Texture:
0.0 - 1.5	GRAVEL with some silt and sand, with Cobbles; GP-GM; Light brown, Moist
1.5-3.0	SILT with some sand and gravel, with Cobbles; ML, Light brown, Moist
3.0	GRAVEL and Cobbles; Refusal

Presaturation Start Time: 9:05 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
13:00	0	4.44	-	-	-	Trial #1
13:10	10	4.45	0.01	0.01	0.72	
13:20	10	4.45	0.00	0.01	0.36	
13:30	10	4.46	0.01			
13:40	10	4.46	0.00	0.02	0.72	
13:50	10	4.48	0.02			
14:00	10	4.49	0.01	0.01	0.72	
14:02	0	4.43	-		-	Trial #2
14:22	20	4.45	0.02		0.72	
14:42	20	4.47	0.02		0.72	
15:02	20	4.48	0.01		0.36	
15:22	20	4.49	0.01		0.36	
15:42	20	4.51	0.02		0.72	
16:02	20	4.52	0.01		0.36	
16:04	0	4.44	-		-	Trial #3
16:24	20	4.46	0.02		0.72	
16:44	20	4.47	0.01		0.36	
17:04	20	4.49	0.02		0.72	
17:24	20	4.50	0.01		0.36	
17:44	20	4.51	0.01		0.36	
18:04	20	4.52	0.01		0.36	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-11

August 2018 24-1-04165-006

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FIG. 13

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/24/2018

Location: I-205 northbound shoulder mile marker 9.4

Test Hole Number: INF19786-12

Depth to bottom of hole: 2.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 2.0	SILT; ML; Light brown, Moist
2.0	BASALT fragments and GRAVEL; GP; Refusal

Presaturation Start Time: 8:05 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
11:31	0	4.01	-	-	Trial #1
11:41	10	4.03	0.02	1.44	
11:51	10	4.06	0.03	2.16	
12:01	10	4.08	0.02	1.44	
12:11	10	4.11	0.03	2.16	
12:21	10	4.14	0.03	2.16	
12:31	10	4.16	0.02	1.44	
12:32	0	4.01	-	-	Trial #2
12:42	10	4.03	0.02	1.44	
12:52	10	4.05	0.02	1.44	
13:02	10	4.08	0.03	2.16	
13:12	10	4.10	0.02	1.44	
13:22	10	4.13	0.03	2.16	
13:32	10	4.14	0.01	0.72	
13:33	0	4.01	-	-	Trial #3
13:33	10	4.03	0.02	1.44	
13:33	10	4.06	0.03	2.16	
14:03	10	4.08	0.02	1.44	
14:13	10	4.10	0.02	1.44	
14:23	10	4.12	0.02	1.44	
14:33	10	4.15	0.02	1.44	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-12

August 2018 24-1-04165-006

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FIG. 14

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/25/2018

Location: I-205 southbound south of Agnes Avenue mile marker 9.7

Test Hole Number: INF19786-13

Depth to bottom of hole: 3.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 3.0	SILT with some sand and gravel; ML; Light brown, Moist
3.0	GRAVEL and Cobbles; Refusal

Presaturation Start Time: 7:55 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
11:30	0	3.86	-	-	Trial #1
11:40	10	3.89	0.03	2.16	
11:50	10	3.92	0.03	2.16	
12:00	10	3.95	0.03	2.16	
12:10	10	3.97	0.02	1.44	
12:20	10	3.99	0.02	1.44	
12:30	10	4.01	0.02	1.44	
12:31	0	3.85	-	-	Trial #2
12:41	10	3.88	0.03	2.16	
12:51	10	3.91	0.03	2.16	
13:01	10	3.94	0.03	2.16	
13:11	10	3.96	0.02	1.44	
13:21	10	3.98	0.02	1.44	
13:31	10	4.00	0.02	1.44	
13:32	0	3.86	-	-	Trial #3
13:32	10	3.89	0.03	2.16	
13:32	10	3.92	0.03	2.16	
14:02	10	3.94	0.02	1.44	
14:12	10	3.97	0.03	2.16	
14:22	10	3.99	0.02	1.44	
14:32	10	4.01	0.02	1.44	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-13

August 2018 24-1-04165-006

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FIG. 15

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/26/2018

Location: I-205 northbound shoulder mile marker 10.0

Test Hole Number: INF19786-14

Depth to bottom of hole: 3.5 feet

Diameter of hole: 8 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0.0 - 2.0	SILT with some gravel, ML, Brown, Moist
2.0-3.5	SILT with some gravel, with Cobbles; trace organics, ML, **Dark brown,** Moist
3.5	GRAVEL with Cobbles; Refusal

Presaturation Start Time: 9:12 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Infiltration rate (inches per hour):	Remarks:
13:00	0	3.78	-	-	Trial #1
13:10	10	3.82	0.04	2.88	
13:20	10	3.86	0.04	2.88	
13:30	10	3.89	0.03	2.16	
13:40	10	3.91	0.02	1.44	
13:50	10	3.93	0.02	1.44	
14:00	10	3.95	0.02	1.44	
14:01	0	3.82	-	-	Trial #2
14:11	10	3.84	0.02	1.44	
14:21	10	3.87	0.03	2.16	
14:31	10	3.88	0.01	0.72	
14:41	10	3.90	0.02	1.44	
14:51	10	3.92	0.02	1.44	
15:01	10	3.93	0.01	0.72	
15:02	0	3.81	-	-	Trial #3
15:12	10	3.82	0.01	0.72	
15:22	10	3.84	0.02	1.44	
15:32	10	3.87	0.03	2.16	
15:42	10	3.89	0.02	1.44	
15:52	10	3.90	0.01	0.72	
16:02	10	3.92	0.02	1.44	

I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-14

August 2018 24-1-04165-006

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FIG. 16

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Job #:	24-1-04165-006
Field Rep.:	PJS
Date	7/16/2018

Location: I-205 southbound shoulder mile marker 10.1

Test Hole Number: INF19786-15A

Depth to bottom of hole: 2.0 feet

Diameter of hole: 10 inches

Test method: Open Pit Falling Head Test

Depth (feet):	**Soil Texture:**
0 - 2.0	SILT with some sand and gravel, with Cobbles; ML; Light brown; Moist
2.0	GRAVEL with Cobbles; Refusal

Presaturation Start Time: 8:30 AM

Time:	Time Interval (minutes):	Measurement (feet):	Drop in water level (feet):	Drop in water level - Corrected (feet):	Infiltration rate (inches per hour):	Remarks:
11:30	0	3.98	-		-	Trial #1
11:50	20	3.99	0.01		0.36	
12:10	20	4.00	0.01		0.36	
12:30	20	4.01	0.01		0.36	
12:50	20	4.03	0.02		0.72	
13:10	20	4.04	0.01		0.36	
13:30	20	4.05	0.01		0.36	
13:31	0	3.98	-	-	-	Trial #2
13:51	20	3.99	0.01	0.01	0.36	
14:11	20	4.01	0.02	0.02	0.72	
14:31	20	4.02	0.01	0.01	0.36	
14:51	20	4.03	0.01	0.02	0.36	
15:11	20	4.04	0.01			
15:31	20	4.04	0.00	0.00	0.00	
15:32	0	3.98	-		-	Trial #3
15:52	20	3.99	0.01		0.36	
16:12	20	4.00	0.01		0.36	
16:32	20	4.01	0.01		0.36	
16:52	20	4.02	0.01		0.36	
17:12	20	4.03	0.01		0.36	
17:32	20	4.04	0.01		0.36	

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I-205: Stafford Road to OR99E Corridor Widening
Clackamas County, Oregon

INFILTRATION TEST RESULTS
INF19786-15

August 2018 24-1-04165-006

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FIG. 17

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Geotechnical and Environmental Consultants

Attachment to and part of Report 24-1-04165-006 Draft Infiltration Testing – Abernethy
Date: August 2018
To: HDR, Inc.
Mr. Steve Drahota, PE

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

DRAFT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

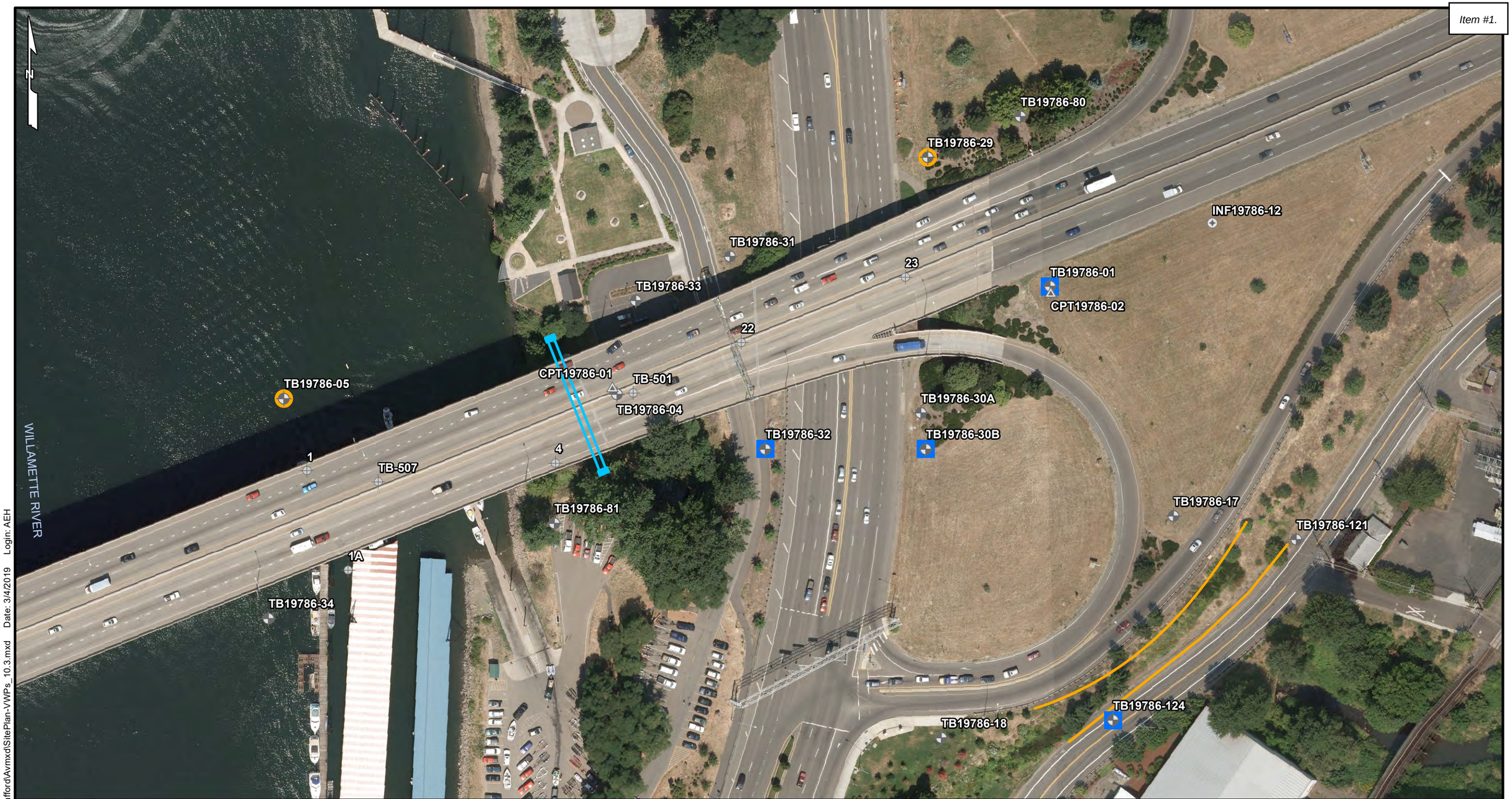
To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

DRAFT



LEGEND

- Boring (Shannon & Wilson, 2017-2019)
- CPT (Shannon & Wilson, 2017)
- Historic Boring (ODOT or Dames & Moore)
- Infiltration Test (Shannon & Wilson, 2017)
- Vibrating Wire Piezometer
- Shear Wave Velocity Profile
- Proposed Retaining Wall
- Proposed Sound Wall
- Proposed Traffic Sign

0 50 100 200

Scale in Feet

NOTES

1. Locations of proposed features from files downloaded from ProjectWise: TN_K19786_OBEC_snd_bas_01.dgn, TN_K21400_OBEC_snd_bas_01.dgn, TN_K21401_OBEC_snd_bas_01.dgn, R_K19786_rtw_bas_01.dgn, and R_K21401_rtw_bas_01.dgn, on December 10, 2018, file R_K19786_QEI_bas_03.dgn, on December 26, 2018, and file R_K21401_OBEC_bas_01.dgn, on December 31, 2018.

I-205: Stafford Road to OR99E Widening
Clackamas County, Oregon

SITE AND EXPLORATION PLAN

March 2019 24-1-04165

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sh

Filename: T:\Projects\24-1\4165_I-205 Stafford\Avmxd\SitePlan-VWPs_10.3.mxd Date: 3/4/2019 Login: AEH

LEGEND

- Boring (Shannon & Wilson, 2017-2019)
- CPT (Shannon & Wilson, 2017)
- Historic Boring (ODOT or Dames & Moore)
- Infiltration Test (Shannon & Wilson, 2017)
- Vibrating Wire Piezometer
- Shear Wave Velocity Profile
- Proposed Retaining Wall
- Proposed Sound Wall
- Proposed Traffic Sign

0 50 100 200
Scale in Feet

NOTES

1. Locations of proposed features from files downloaded from ProjectWise: TN_K19786_OBEC_snd_bas_01.dgn, TN_K21400_OBEC_snd_bas_01.dgn, TN_K21401_OBEC_snd_bas_01.dgn, R_K19786_rtw_bas_01.dgn, and R_K21401_rtw_bas_01.dgn, on December 10, 2018, file R_K19786_QEI_bas_03.dgn, on December 26, 2018, and file R_K21401_OBEC_bas_01.dgn, on December 31, 2018.

I-205: Stafford Road to OR99E Widening
Clackamas County, Oregon

SITE AND EXPLORATION PLAN

March 2019 24-1-04165

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Sh

Filename: T:\Projects\24-1\4165_I-205 Stafford\Avmxd\SitePlan-VWPs_10.3.mxd Date: 3/4/2019 Login: AEH

Appendix B. Contributing Impervious Area, Impervious Surface Area, and Water Quality Facility Figures

Existing FEMA 100 Year Floodplain Boundary

Willamette River

Subbasin 61
CIA = 0.474 acres

Subbasin 70
CIA = 0.287 acres

Subbasin 60
CIA = 2.299 acres

Subbasin 41
CIA = 4.560 acres

Subbasin 52
CIA = 3.570 acres

Prop. Water Quality Swale for CIA "80" treatment.

Subbasin 80
CIA = 1.953 acres

Subbasin 71
CIA = 0.333 acres

Subbasin 63
CIA = 0.123 acres

Subbasin 72
CIA = 0.556 acres

Subbasin 62
CIA = 2.315 acres

Subbasin 64
CIA = 0.592 acres

Prop. outlet to Willamette River

BH.# INF19786-11

Prop. Water Quality Swale for CIA "60", "61", "62" and "63" treatment.

Prop. Water Quality Swale for CIA "70", "71" and "72" treatment.

Edge of Water

Total Treated CIA - 25.658 Acres

Total Not Treated CIA - 0.847 Acres

Total Offset Treatment CIA - 1.652 Acres

Legend

- Existing Pipe
- Bioslope
- Wetland Boundary
- Proposed Pipe
- CIA basin
- Proposed Inlet
- Non-triggered treated areas
- Proposed Manhole
- Conveyance Direction
- Surface Flow
- Not Treated CIA
- Water quality swale boundary
- Combination detention pond/ water quality swale boundary
- Existing FEMA 100 Year Floodplain Boundary

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

STORMWATER CIA EXHIBIT

SHEET NO.

Edge of Water

Willamette River

Prop. Water Quality Swale for CIA "40", "41", "42" and "43" treatment.

Existing FEMA 100 Year Floodplain Boundary

Subbasin 43
CIA = 0.338 acres

Prop. stormwater planter for CIA "90" treatment.

Extg. outfall to Willamette River

Subbasin 90
CIA = 0.134 acres

Subbasin 40
CIA = 0.396 acres

Subbasin 42
CIA = 0.698 acres

Extg. outfall to Clackamas River

BH.# INF19786-13

Prop. Bioretention Facility and Detention Pond for CIA "30" and "OS-31" treatment.

Subbasin OS-31
CIA = 1.652 acres

Subbasin 41
CIA = 4.560 acres

Extg. outlet pipe to Willamette River

Subbasin 20
CIA = 3.080 acres

Subbasin 30
CIA = 2.179 acres

Subbasin 52
CIA = 3.570 acres

Abernethy Creek

Subbasin 53
CIA = 0.273 acres

Prop. Water Quality Swale for CIA "50", "51" and "52" treatment.

BH.# INF19786-12

Subbasin 50
CIA = 0.719 acres

Subbasin 51
CIA = 0.578 acres

Legend

- Wetland Boundary
- CIA basin
- Non-triggered treated areas
- Not Treated CIA
- Water quality swale boundary
- Bioslope
- Existing Pipe
- Proposed Pipe
- Proposed Inlet
- Proposed Manhole
- Conveyance Direction
- Surface Flow
- Combination detention pond/ water quality swale boundary
- Existing FEMA 100 Year Floodplain Boundary

Total Treated CIA - 25.658 Acres

Total Not Treated CIA - 0.847 Acres

Total Offset Treatment CIA - 1.652 Acres

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PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:

Drafter: Checker:

STORMWATER CIA EXHIBIT

SHEET NO.

Edge of Water

Clackamas River

Extg. outfall to Clackamas River

Existing FEMA 100 Year Floodplain Boundary

Subbasin 10
CIA = 1.065 acres

BH.* INF19786-15

BH.* INF19786-13

BH.* INF19786-14

WQF #1

WQF #2

WQF #3

Water Quality Facility #1
Prop. Bioretention Facility and Detention Pond for CIA "10" treatment.

Subbasin 20
CIA = 3.080 acres

Water Quality Facility #2
Prop. Bioslope for CIA "20" treatment.

Ditch

40 ft

60 ft

50 ft

"L" 660+00

"L" 665+00

"L" 670+00

"L" 675+00

"L" 680+00

"L" 685+00

"L" 690+00

Legend

- Wetland Boundary
- CIA basin
- Non-triggered treated areas
- Not Treated CIA
- Water quality swale boundary
- Bioslope
- Existing Pipe
- Proposed Pipe
- Proposed Inlet
- Proposed Manhole
- Conveyance Direction
- Surface Flow
- Combination detention pond/ water quality swale boundary
- Existing FEMA 100 Year Floodplain Boundary

Total Treated CIA - 25.658 Acres

Total Not Treated CIA - 0.847 Acres

Total Offset Treatment CIA - 1.652 Acres

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Checker:

STORMWATER CIA EXHIBIT

SHEET NO.

Rotation: 44.768°

Total pre-project ISA - 22.339 Acres

Total post project ISA - 26.456 Acres

Subbasin 72
Prop. full depth reconstruction of extg. ISA. - 0.556 acres

Subbasin 70
Prop. new ISA. - 0.265 acres

Subbasin 70
Prop. removal of ISA. - 0.294 acres

Subbasin 70
Prop. full depth reconstruction of extg. ISA. - 0.024 acres

Subbasin 61
Prop. full depth reconstruction of extg. ISA. - 0.422 acres

Subbasin 61
Prop. removal of ISA. - 0.048 acres

Subbasin 61
Prop. new ISA. - 0.049 acres

Subbasin 41
Prop. full depth reconstruction of ISA. - 3.606 acres

Subbasin 41
Prop. new ISA. - 0.938 acres

Subbasin 80
Prop. full depth reconstruction of extg. ISA. - 1.698 acres

Subbasin 80
Prop. new ISA. - 0.193 acres

Subbasin 60
Prop. new ISA. - 0.582 acres

Subbasin 60
Prop. full depth reconstruction of extg. ISA.- 1.717 acres

Subbasin 52
Prop. new ISA. - 0.737 acres

Subbasin 52
Prop. full depth reconstruction of ISA. - 2.847 acres

Subbasin 62
Prop. removal of ISA. - 0.407 acres

Subbasin 62
Prop. full depth reconstruction of extg. ISA. - 1.647 acres

Subbasin 62
Prop. new ISA. - 0.670 acres

Subbasin 63
Prop. full depth reconstruction of extg. ISA. - 0.039 acres

Subbasin 71
Prop. full depth reconstruction of extg. ISA. - 0.289 acres

Subbasin 71
Prop. new ISA. - 0.042 acres

Subbasin 63
Prop. new ISA. - 0.083 acres

Subbasin 63
Prop. removal of ISA. - 0.278 acres

Subbasin 64
Prop. new ISA. - 0.060 acres

Subbasin 64
Prop. full depth reconstruction of extg. ISA. - 0.529 acres

Edge of Water

Willamette River

"L" 730+00
"L" 725+00
"L" 720+00
"L" 735+00
"L" 740+00
"L" 745+00

61
60
41
52
80
70
72
71
62
63
64

N

Legend

- New ISA
- Existing ISA
- Removed ISA
- Wetland Boundary
- Subbasin Boundary

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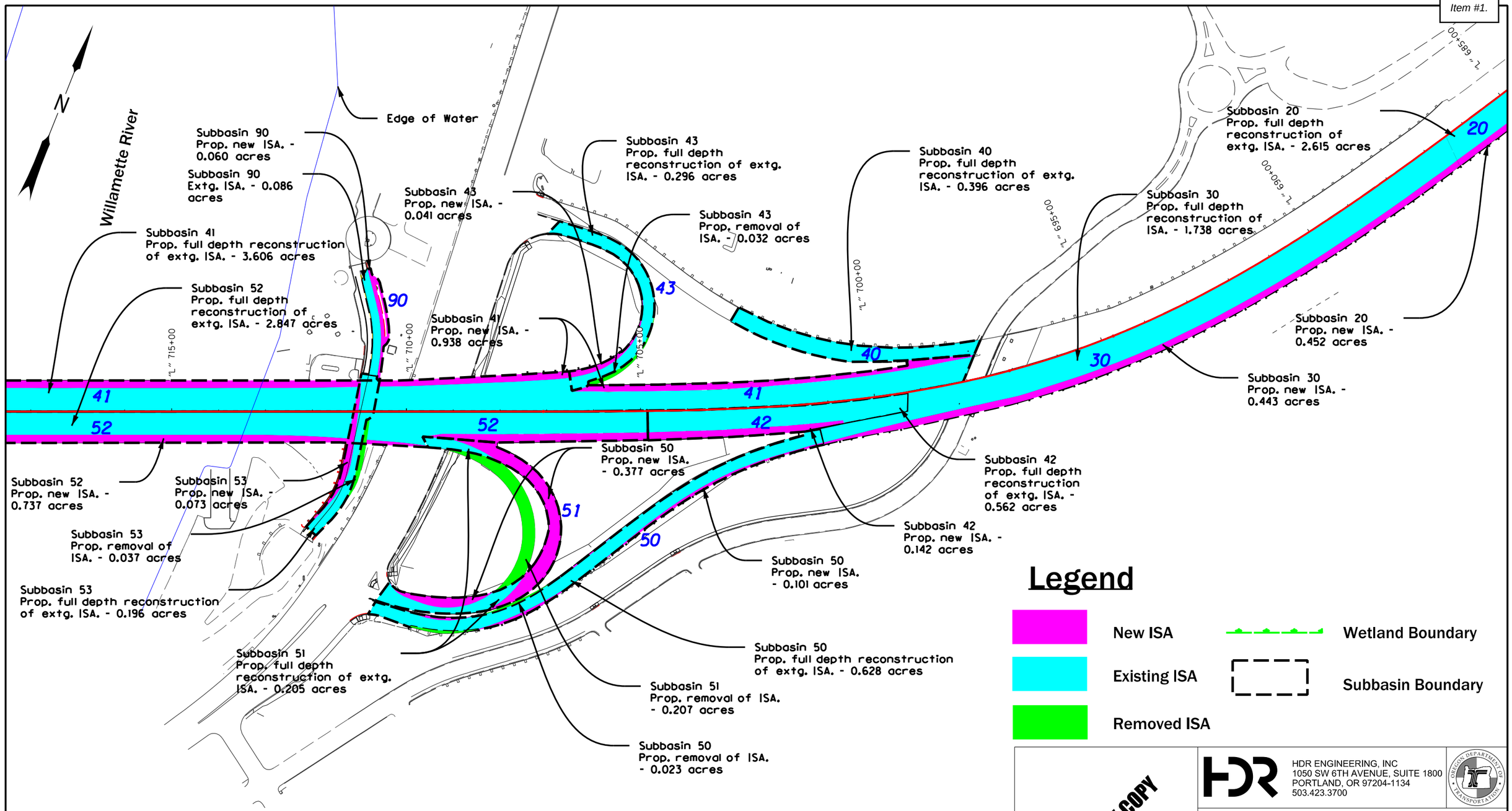
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

STORMWATER CIA EXHIBIT

SHEET NO.

Rotation: 21.7268° Sc



Legend

- New ISA
- Existing ISA
- Removed ISA
- Wetland Boundary
- Subbasin Boundary

Total pre-project ISA - 22.339 Acres

Total post project ISA - 26.456 Acres

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

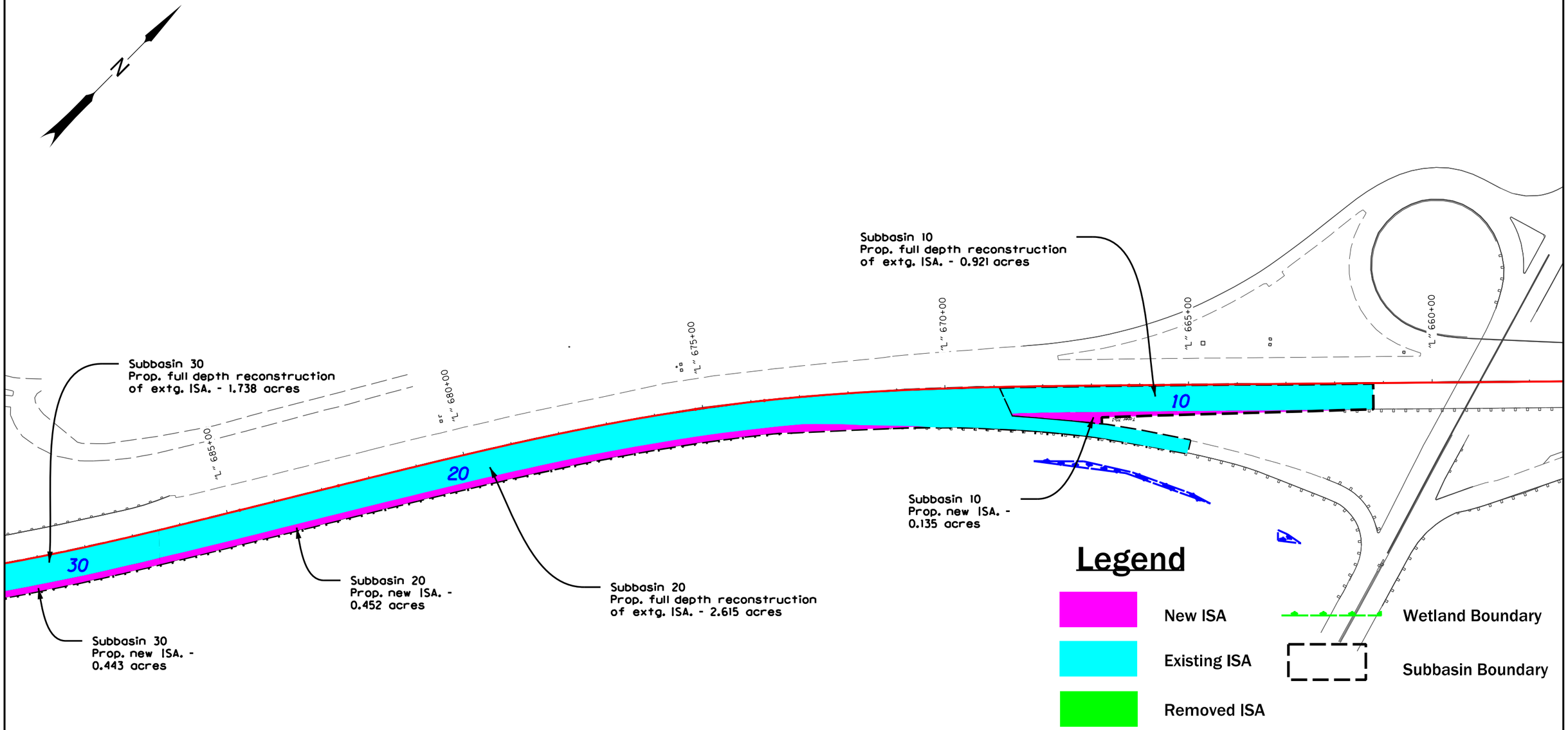
Designer: Reviewer:

Drafter: Checker:

STORMWATER CIA EXHIBIT

SHEET NO.

Rotation: 21.7268° 0'



Legend

- New ISA
- Existing ISA
- Removed ISA
- Wetland Boundary
- Subbasin Boundary

Total pre-project ISA - 22.339 Acres

Total post project ISA - 26.456 Acres

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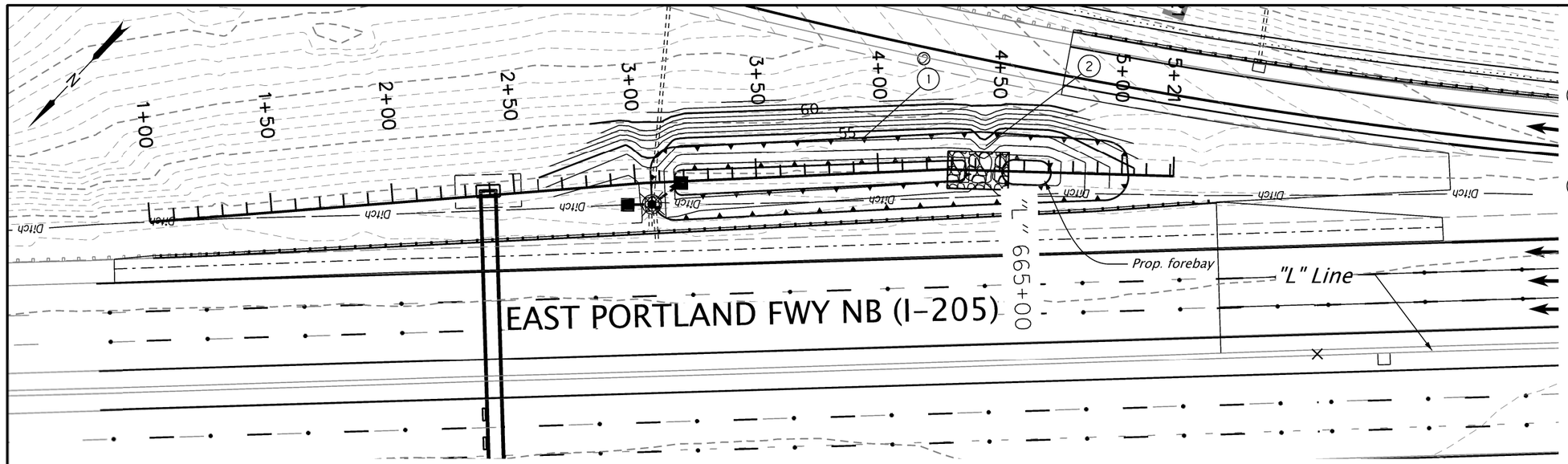
STORMWATER CIA EXHIBIT

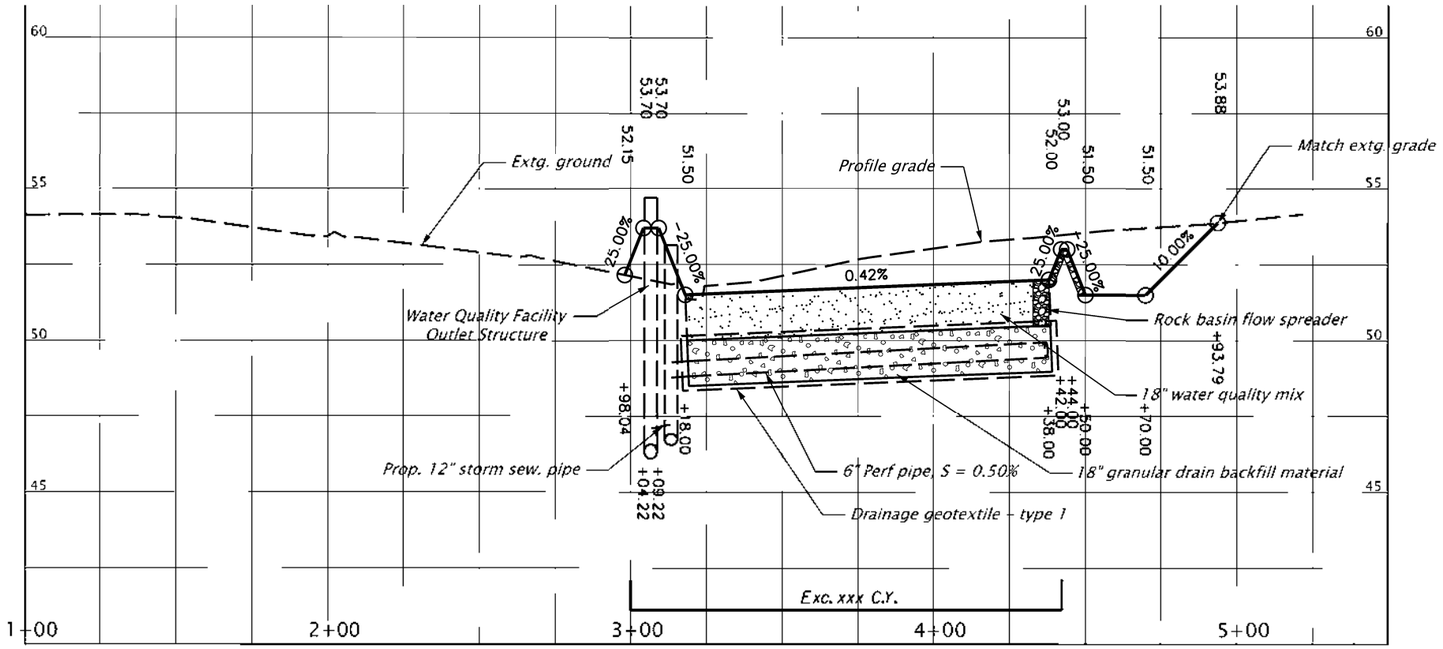
SHEET NO.

Rotation: 44.768° 0'



1 Sta. 3+09.86 to Sta. 4+10.05 = Sta. "L" 664+49.08, 81.53' Lt. to Sta. "L" 663+49.06, 84.27' Lt.
Const. bioretention pond
(For details, see sht. HAxx)

2 Sta. 4+50.00, 0.00'
Const. forebay berm
(For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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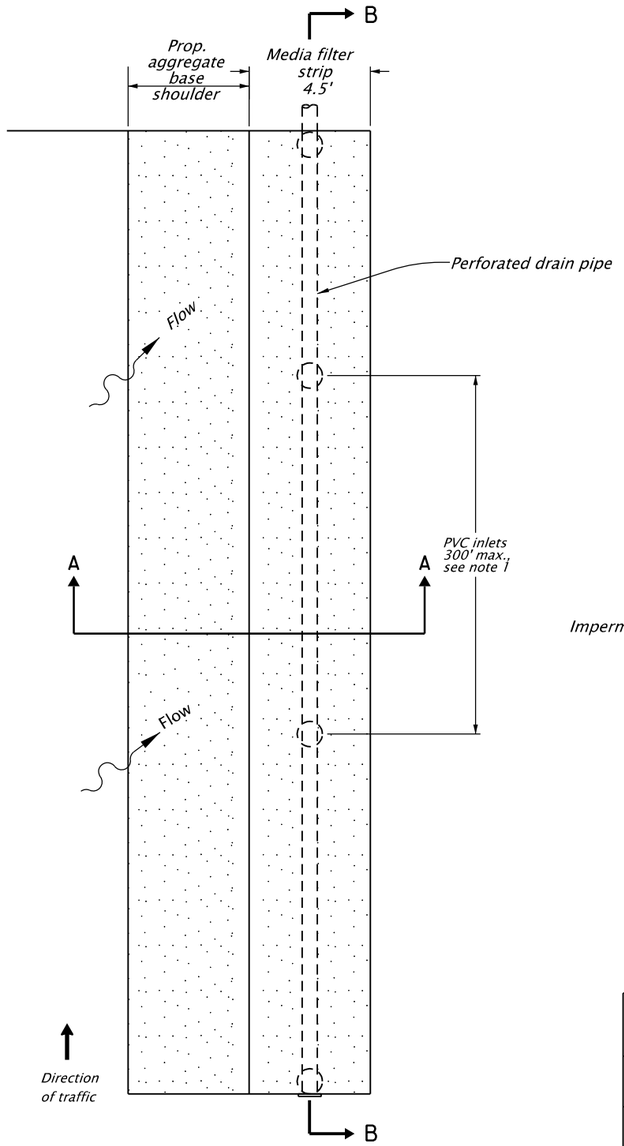
WATER QUALITY PLAN AND PROFILE

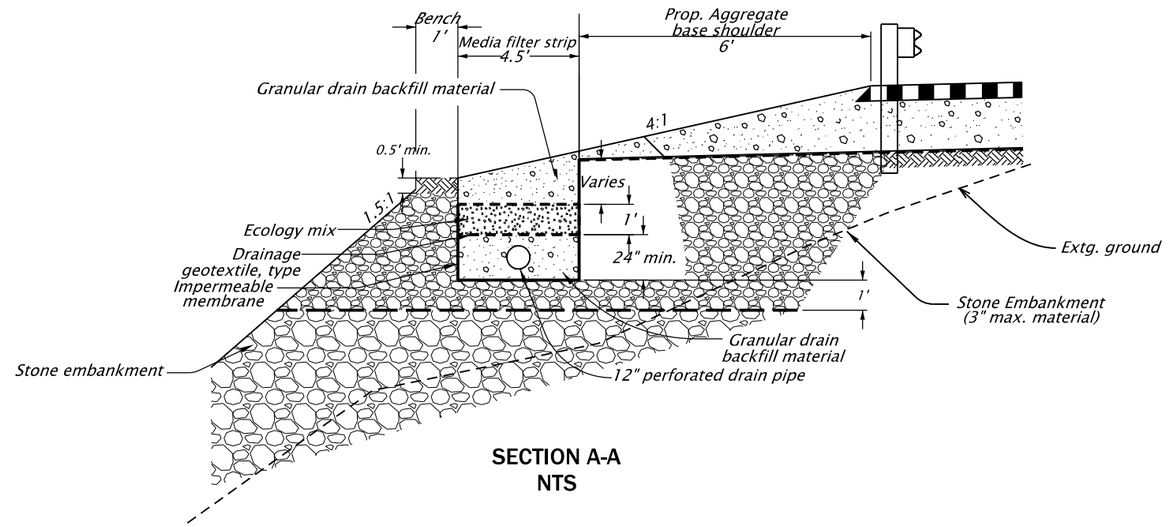
SHEET NO.

Rotation: 223.5514 0'
Vertical Scale: 1:10

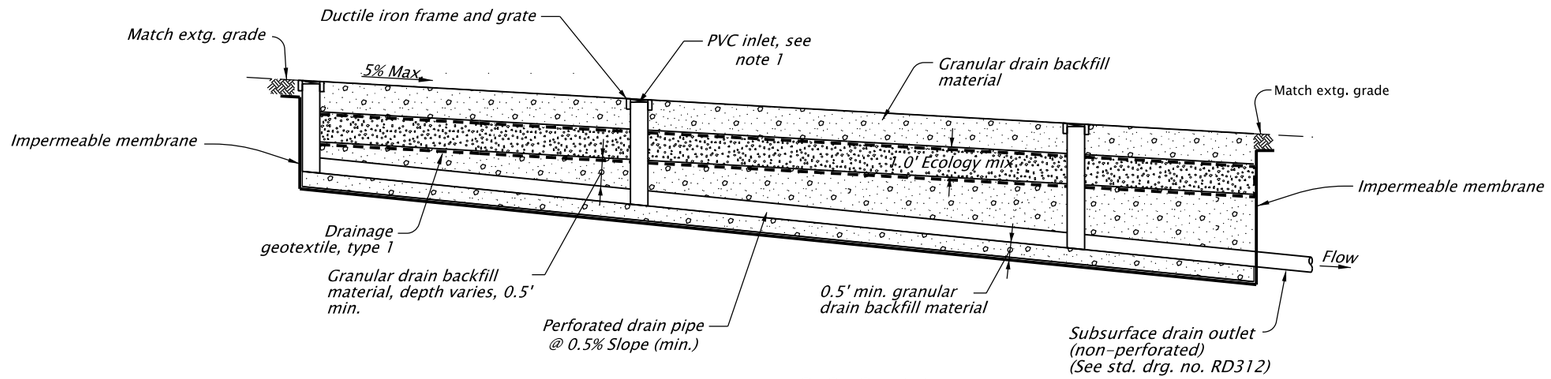
BIOSLOPE
STA. "L" 665+00 TO STA. "L" 684+00



PLAN
NTS



SECTION A-A
NTS



SECTION B-B
NTS

Bioslope I.D.	Basin Area (acres)	2-Year Peak Flow (cfs)	Length (ft)	Assumed Long Term * Infiltration Capacity (cfs)	Rdwy Slope	Pipe Slope	Pipe ** Capacity (cfs)
Bioslope #1	0.253	0.14	333	0.35	1.9%	1.9%	2.37
Bioslope #2	0.840	0.47	459	0.48	0.2%	0.5%	1.22
Bioslope #3	0.517	0.29	307	0.32	0.2%	0.5%	1.22
Bioslope #4	0.496	0.28	301	0.31	0.3%	0.5%	1.22
Bioslope #5	0.871	0.49	500	0.52	0.8%	0.8%	1.54

* assumes 4.5 feet wide infilration trench as shown in detail
** assumes 12 inch pipe and 0.027 mannings coefficient

Notes:

1. Install PVC inlets as shown along perforated drain pipe. PVC inlet should be flush to ground surface. See sheet HAXX and HAXX for details.

DFI#XXXXXX

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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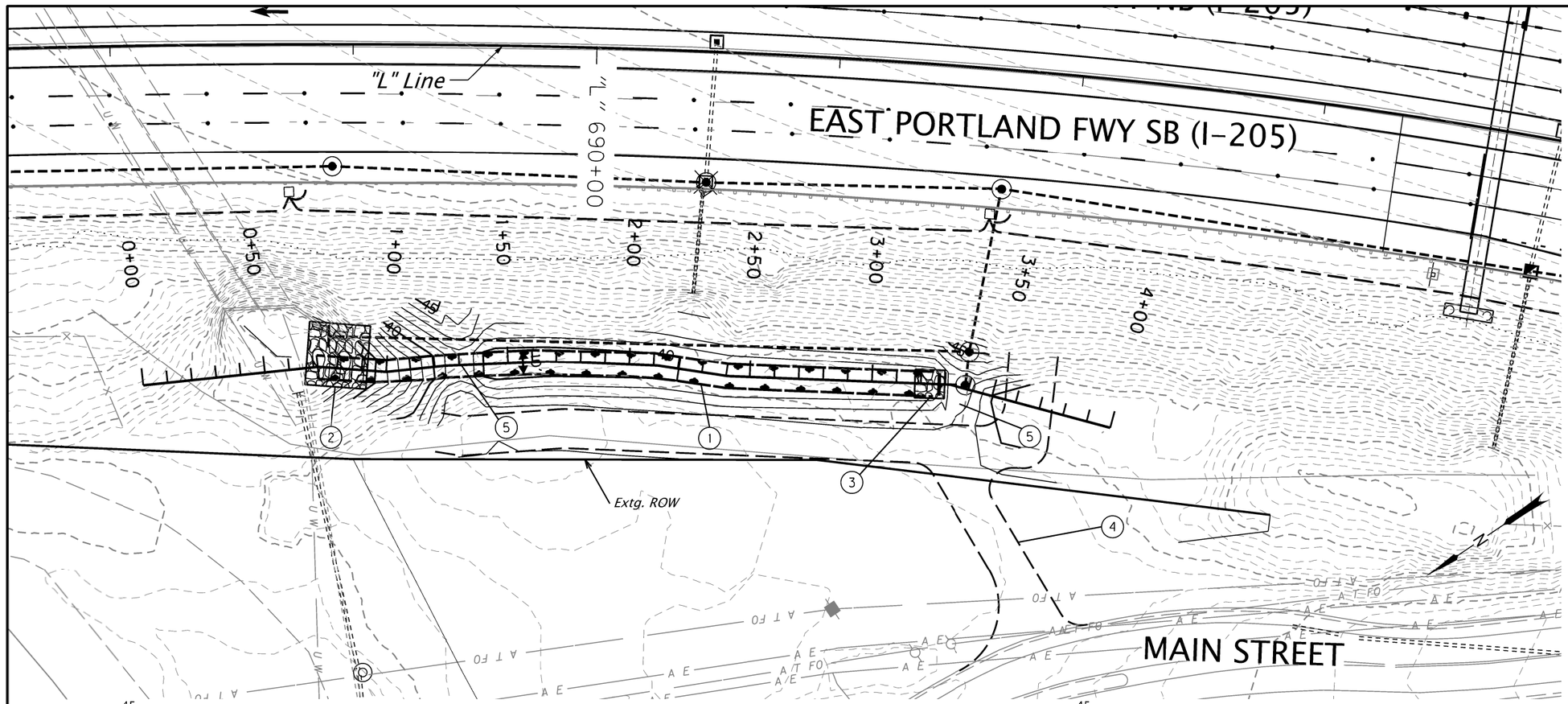
WATER QUALITY DETAILS

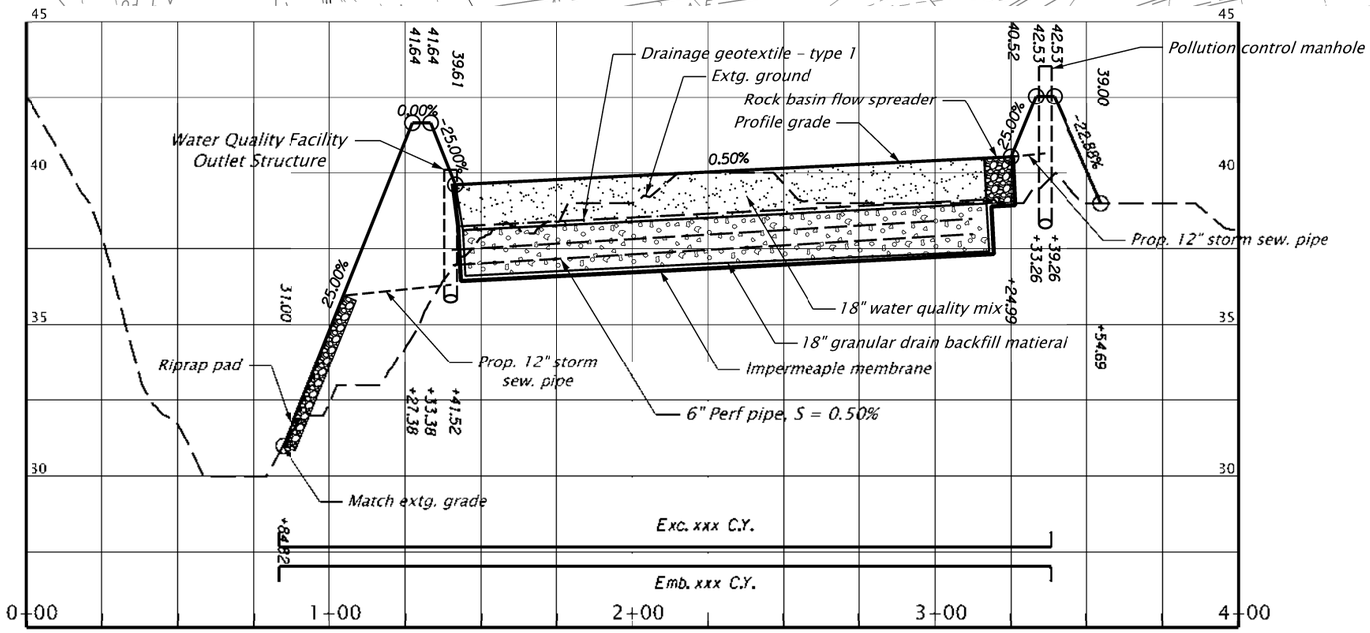
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0



1. *Sta. 0+84.82 to Sta. 3+54.69 = Sta. "L" 688+98.57, 133.24' Rt. to Sta. "L" 691+78.46, 134.75' Rt. Const. bioretention pond (For details, see sht. HAxx)*
2. *Sta. 0+97.37, 0.00' Const. riprap pad Loose riprap (class 50) - 5.0 tons (See drg. no. RD317)*
3. *Sta. 3+33.58, 0.00' Const. rock basin flow spreader (For details, see sht. HAxx)*
4. *Sta. XX+XX.XX Const. maintenance access road (For details, see sht. HAxx)*
5. *Sta. XX+XX.XX Const. biofiltration pond berm (For details, see sht. HAxx)*



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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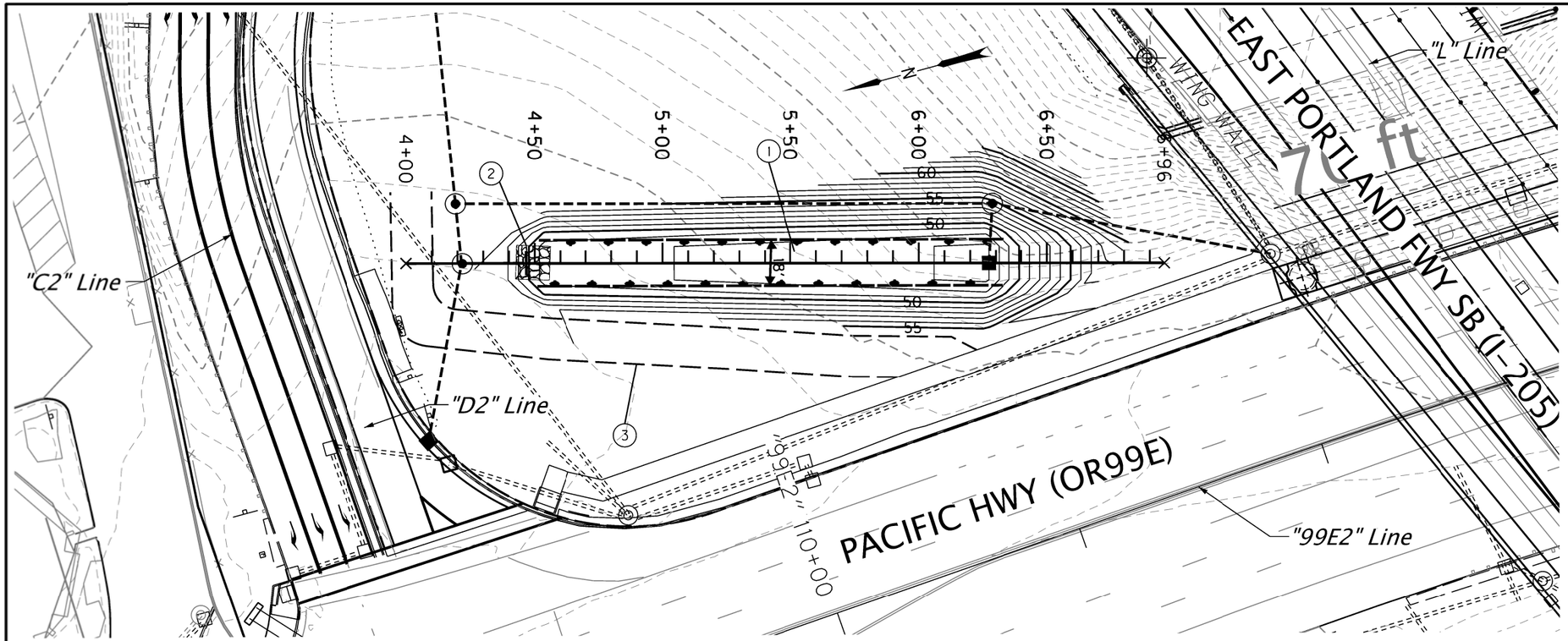
WATER QUALITY PLAN AND PROFILE

SHEET NO.

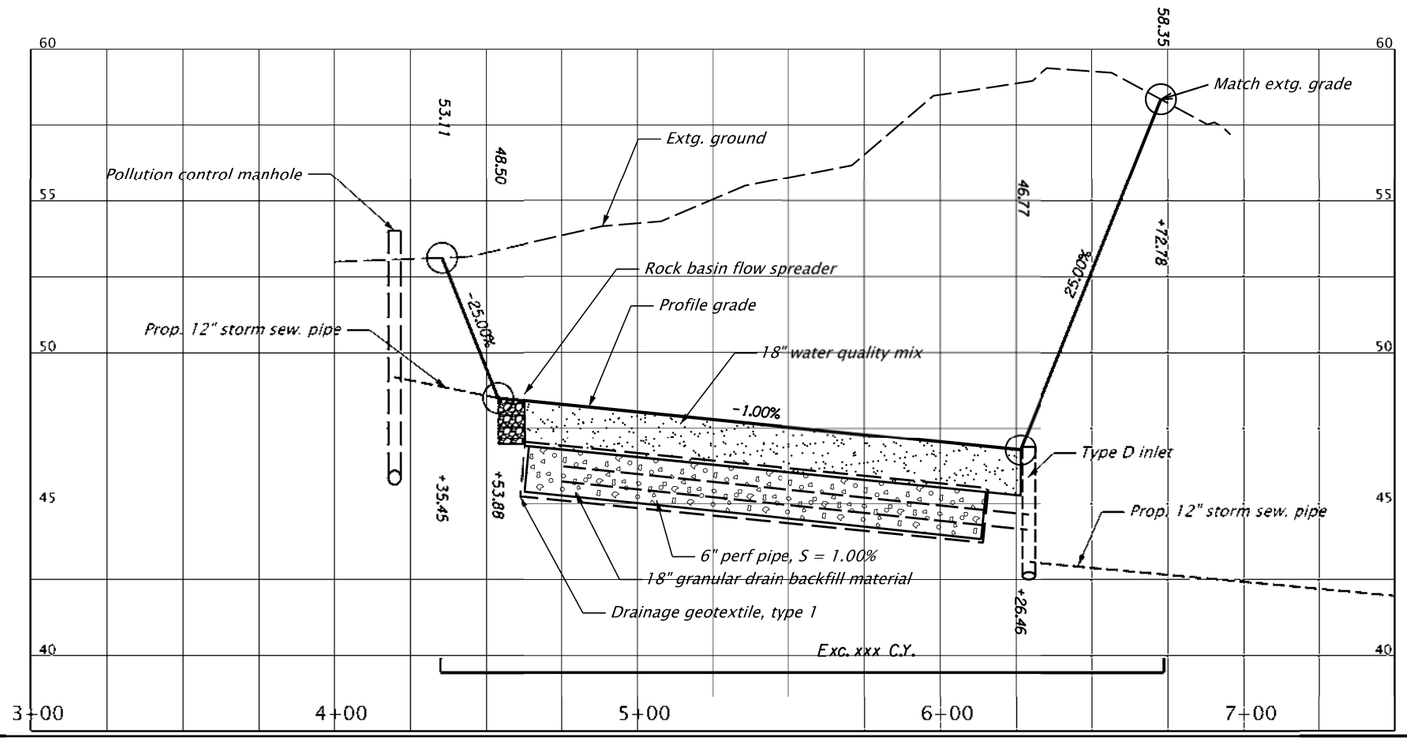
Rotation: 236.1297[illegible]0'
Vertical Scale: 1:10



1. Sta. 4+50.41 to Sta. 6+34.91 = Sta. "99E2" 109+34.68, 167.57' Lt. to Sta. "99E2" 111+06.11, 107.62' Lt.
   Const. biofiltration swale
   (For details, see sht. HAxx)

2. Sta. 4+48.95, 0.00'
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. Sta. XX+XX.XX
   Construct maintenance access road
   (For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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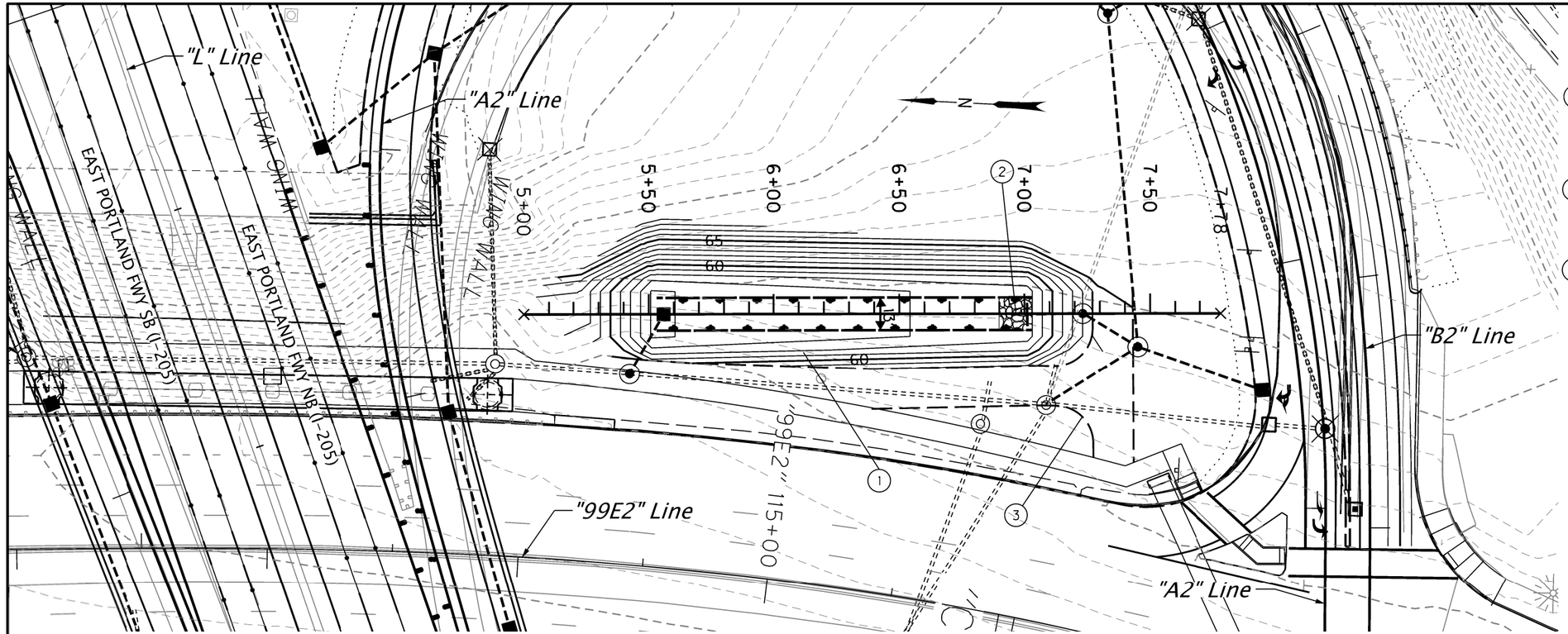
WATER QUALITY PLAN AND PROFILE

SHEET NO.

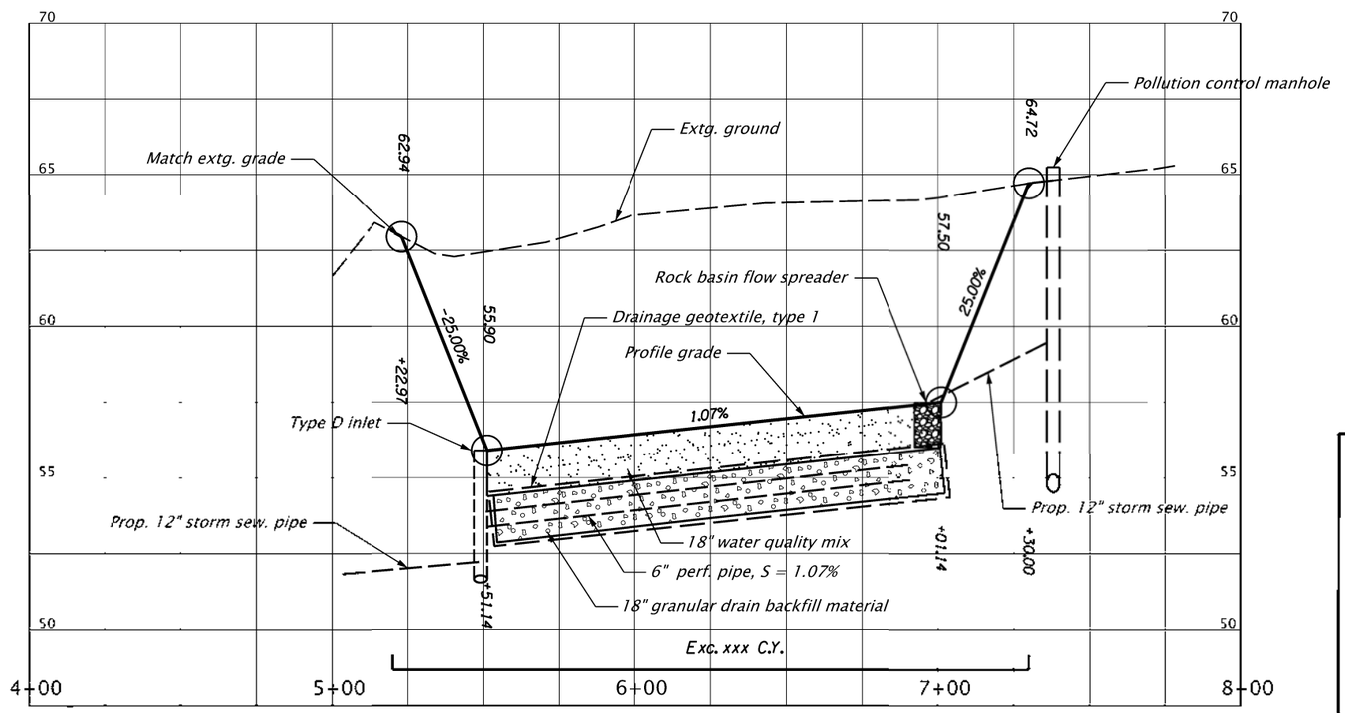
Rotation: 254.7731
Vertical Scale: 1:10



1. Sta. 7+03.50 to 5+52.97 = Sta. "99E2" 115+84.70, 120.53' Lt. to Sta. "99E2" 114+47.00, 100.54' Lt.
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. Sta. 6+95.86, 0.00'
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. Sta. XX+XX.XX
   Construct maintenance access road
   (For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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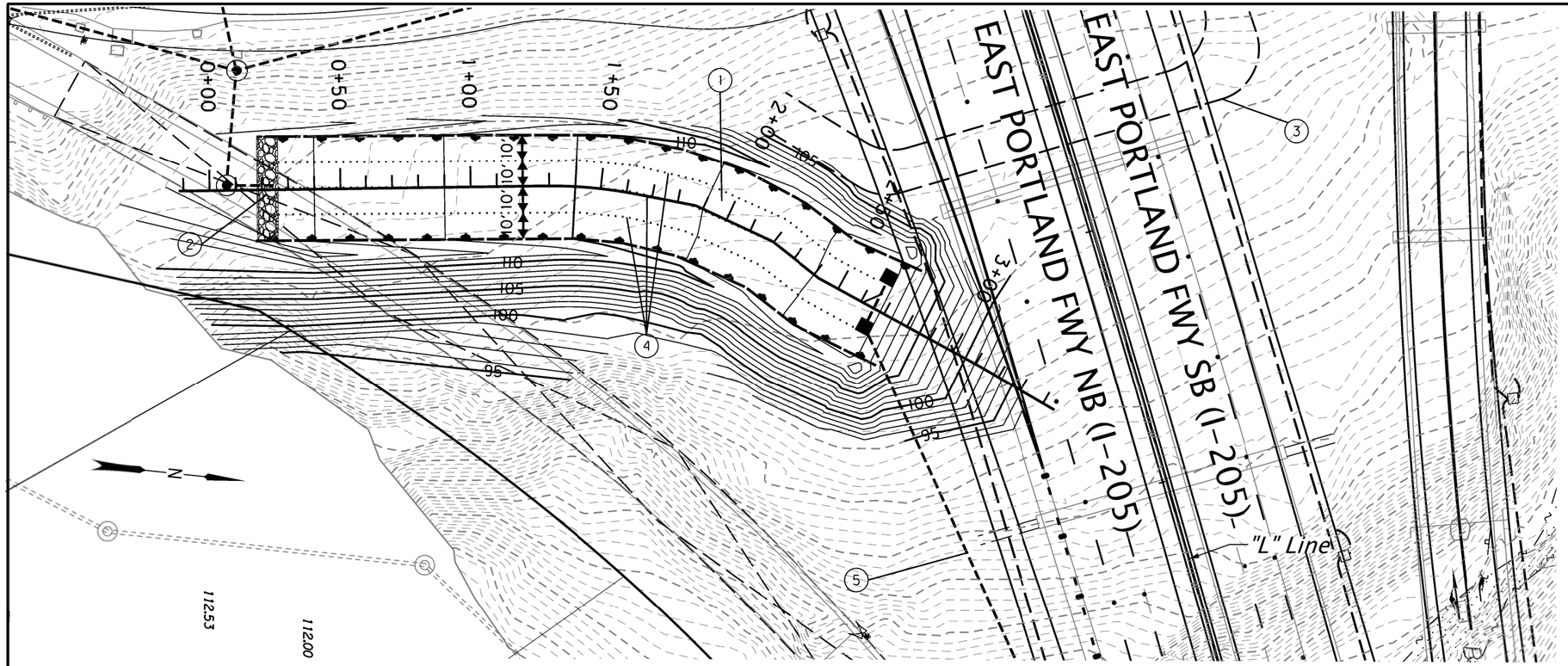
Drafter:	Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 272.7106 [illegible]0'
Vertical Scale: 1:10



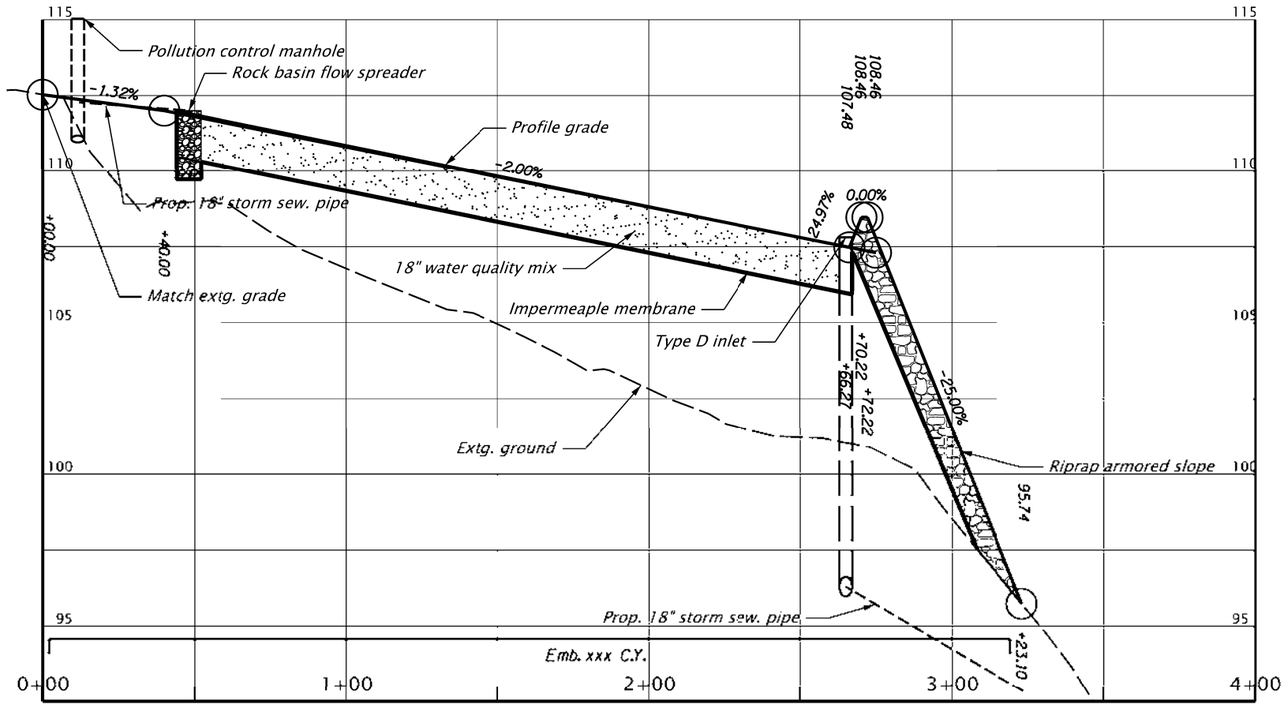
1. *Sta. 0+31.89 to Sta. 2+48.39 = Sta. "OR43" 10+59.46, 110.66' Lt. to Sta. "OR43" 8+78.88, 209.80' Lt.*
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 0+37.15, 2.22' Lt.*
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. *Sta. XX+xx.xx*
   Construction maintenance access road
   (For details, see sht. HAxx)

4. *Construct biofiltration swale divider*
   (For details, see sht. HAxx)

5. *Construct pipe and outfall*
   (For details, see sht. HA11)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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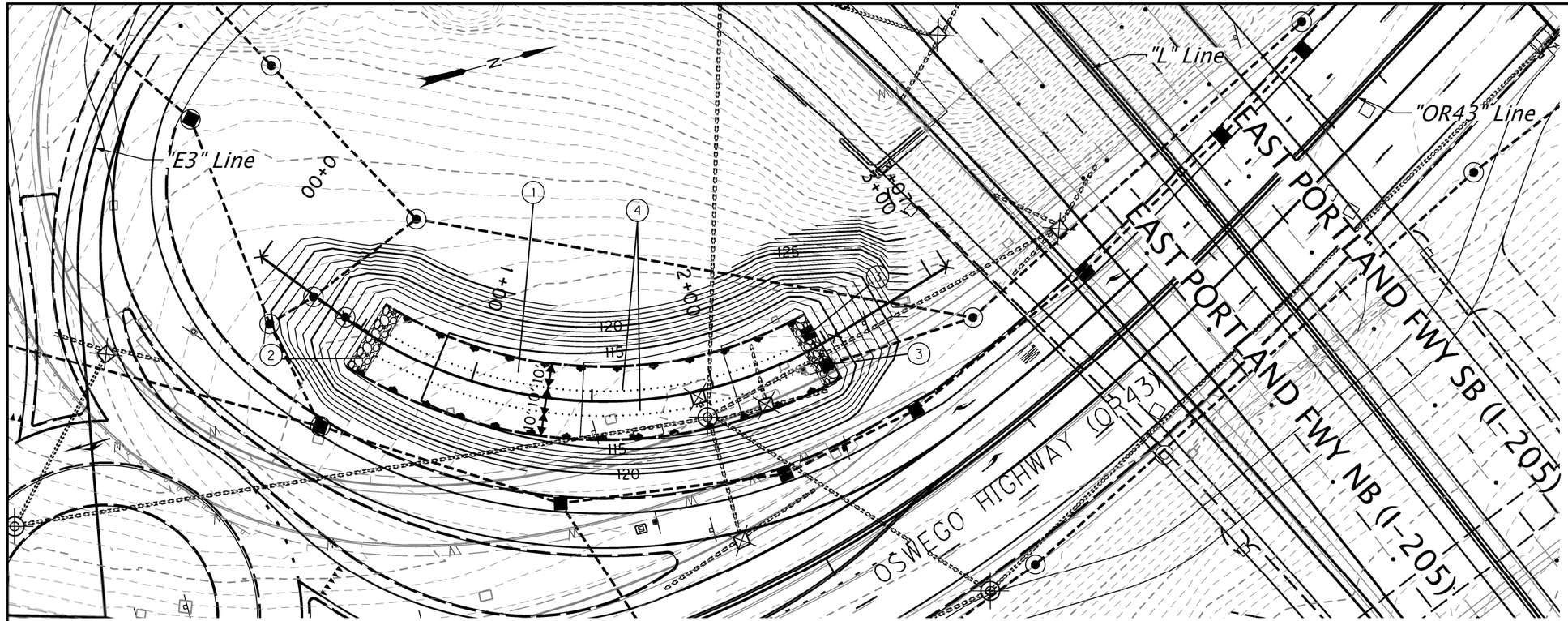
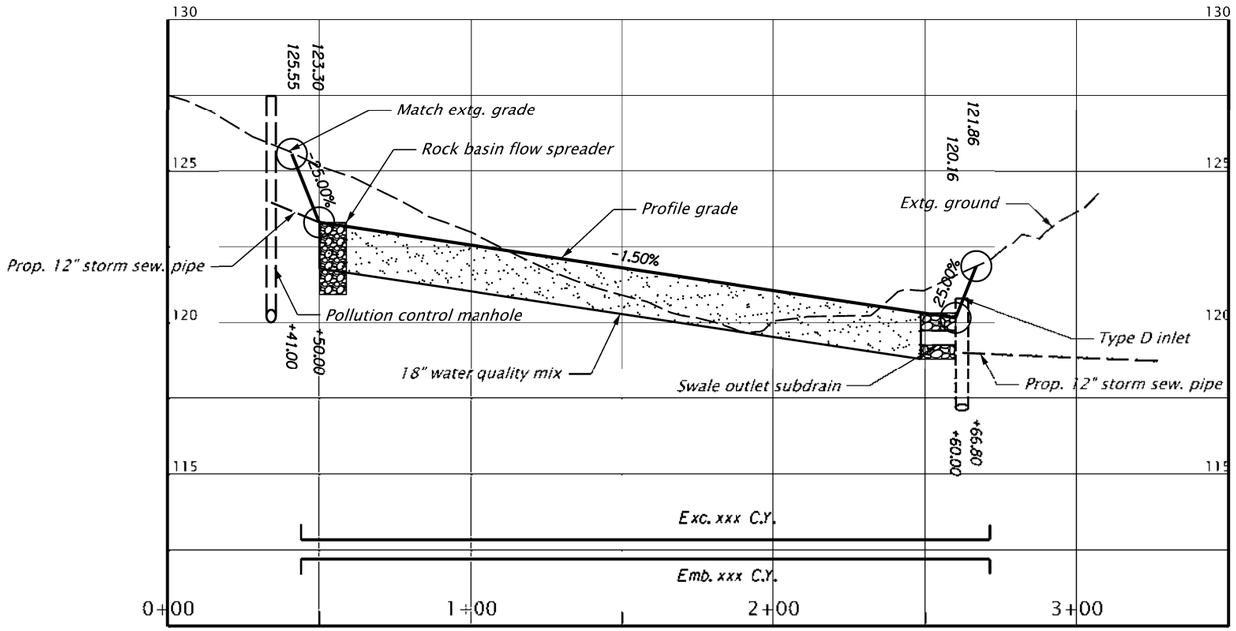
WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 96.0998 [illegible]0'
Vertical Scale: 1:10



1. Sta. 0+54.22 to 2+55.48 = Sta. "E3" 740+37.28, 107.23' Lt. to Sta. "OR43" 9+52.79, 60.58' Rt.
   Construct 30' wide biofiltration swale
   (For details, see sht. HAxx)
2. Sta. 0+58.54
   Construct rock basin flow spreader
   (For details, see sht. HA10)
3. Sta. 2+60.28
   Construct rock basin flow spreader
   (For details, see sht. HA10)
4. Construct biofiltration swale divider
   (For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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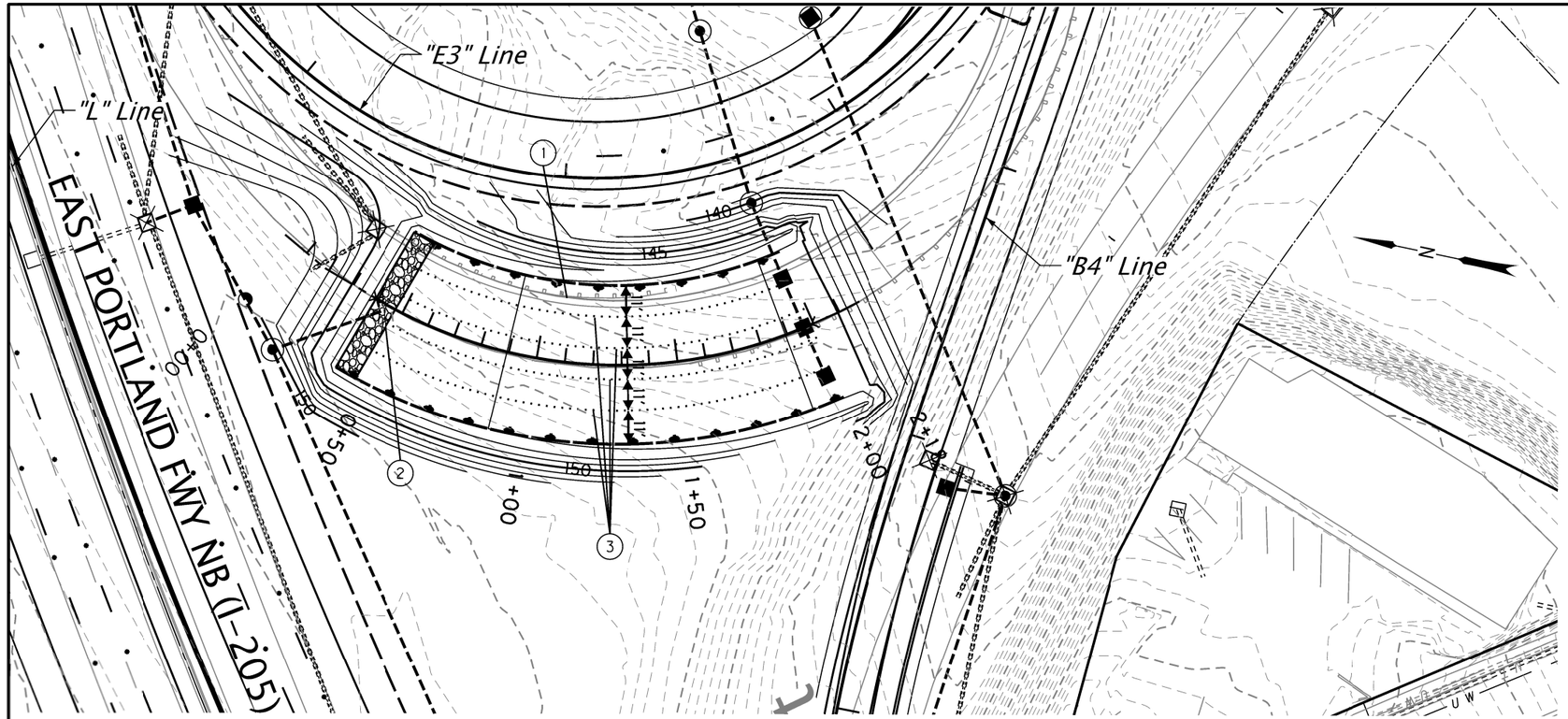
WATER QUALITY PLAN AND PROFILE

SHEET NO.

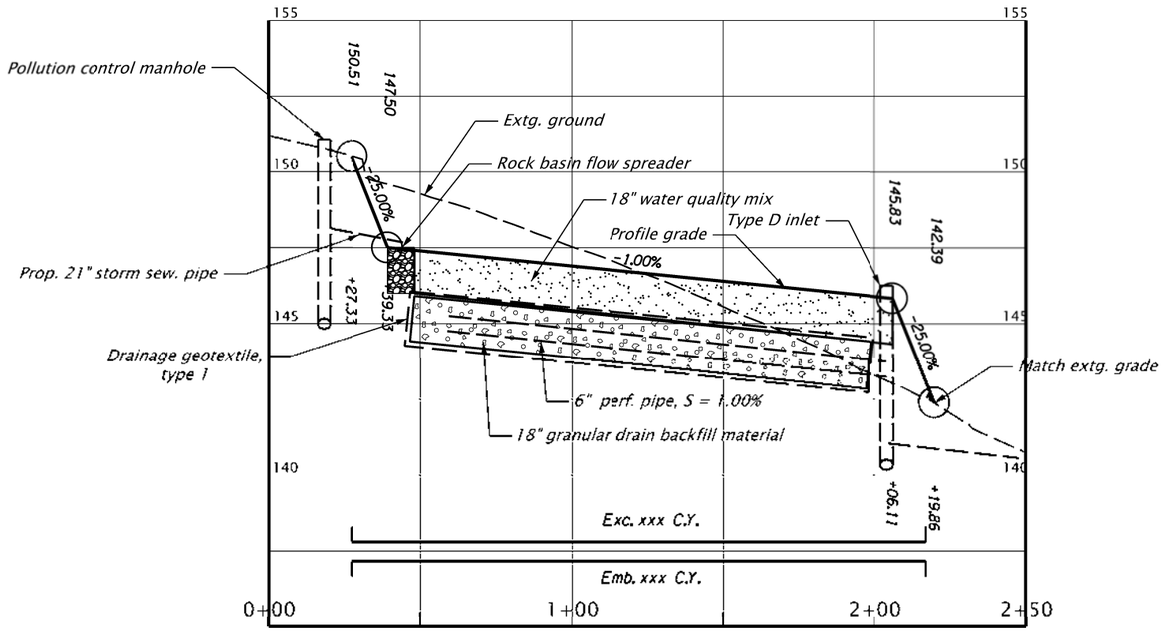
Rotation: 75.0253 0'
Vertical Scale: 1:10



(1) *Sta. 0+39.24 to Sta. 1+98.79 = Sta. "E3" 737+52.57, 56.87' Rt. to Sta. "E3" 738+66.37, 64.42' Rt.*
Construct biofiltration swale
(For details, see sht. HAxx)

(2) *Sta. 0+44.18, 0.00'*
Construct rock basin flow spreader
(For details, see sht. HAxx)

(3) *Construct biofiltratoin swale divider*
(For details, see sht. HAxx)



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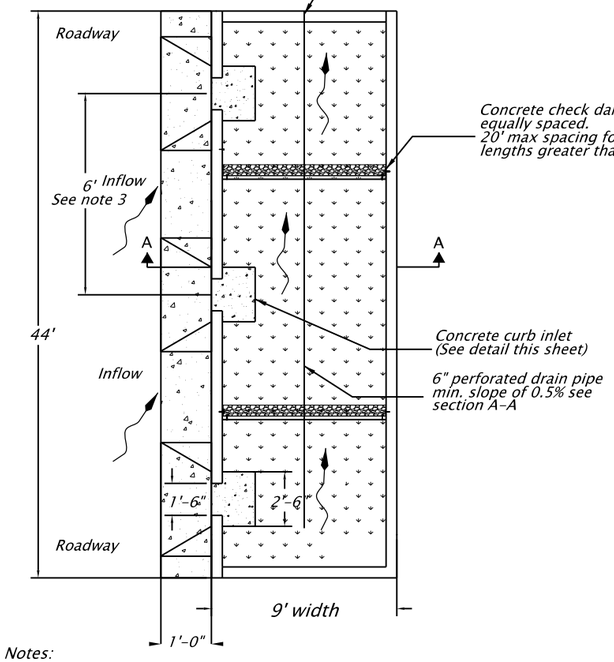
WATER QUALITY PLAN AND PROFILE

SHEET NO.

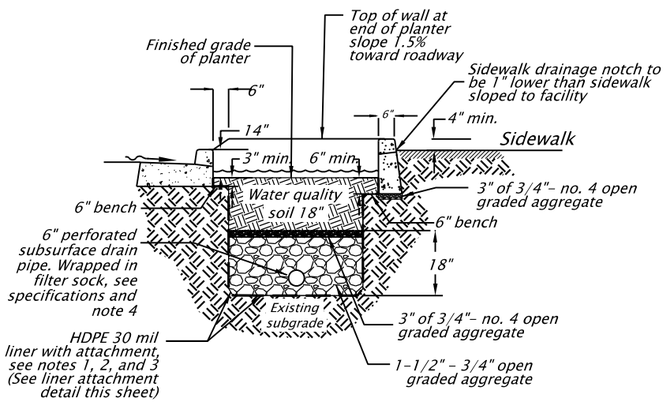
Rotation: 281.7947 [illegible]0'
Vertical Scale: 1"=5'

STORMWATER PLANTER



Notes:
1. Match longitudinal slope of planter to slope of the road.
2. If less than 18" is between splash pad and planter end wall, extend pad to wall.
3. Install inlets (6' on center) on all sides of facility that are adjacent to parking lot.

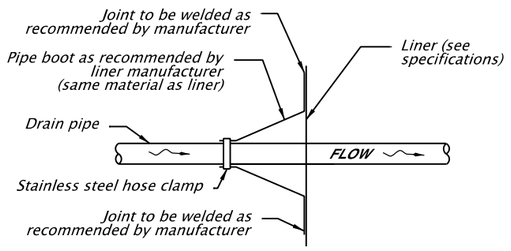
PLAN VIEW



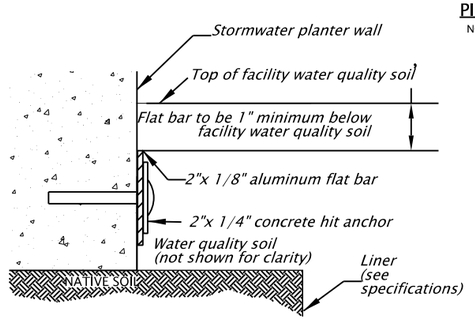
Notes:
1. Partial or full liner required. See stormwater planter table (this sheet) for requirement.
2. Partial liner located along side of planter adjacent to roadway.
3. Full liner located along all sides of planter.
4. Drain pipe only required for fully lined planters.
5. Scarify the native soil 12" following the initial excavation and before installing water quality soil and rock.

SECTION A-A

STORMWATER PLANTER DETAIL
NOT TO SCALE



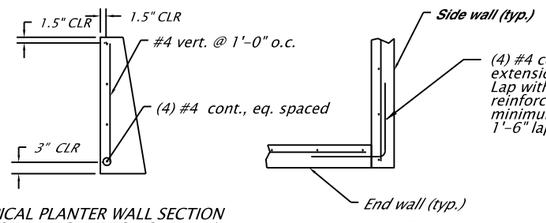
PIPE BOOT
NOT TO SCALE



Notes:
1. Adhere liner to concrete with top coat tc moldable sealant, or approved equal.
2. Liner to extend from top of water quality soil to the bottom of excavation.
3. 3" of concrete is required on all sides of attachment. Adjust sidewalk depth as necessary.
4. Secure liner to concrete with 2" aluminum flat bar, placed as directed (around entire facility).
5. Attach flat bar with concrete hit anchors, 24" o.c.
6. Trim excess liner to the top of the flat bar.

LINER ATTACHMENT DETAIL

NOT TO SCALE



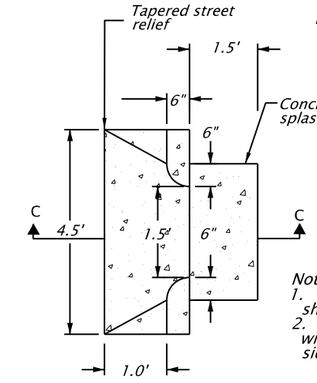
TYPICAL PLANTER WALL SECTION (NOT ADJACENT TO ROADWAY)

WALL CORNER DETAIL

Notes:
1. Top of planter walls to be 4" higher than adjacent sidewalk.
2. Bottom of planter walls to be 6" below top of water quality soil.

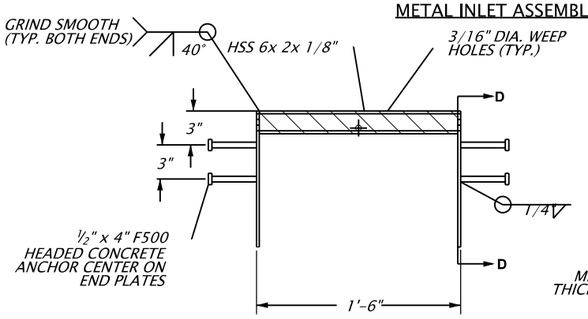
PLANTER WALL

NOT TO SCALE

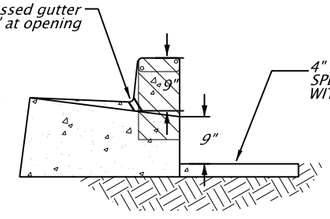


PLAN

METAL INLET ASSEMBLY

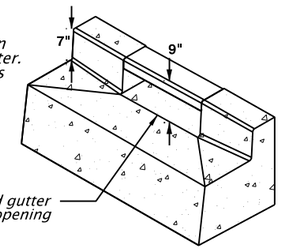


ELEVATION

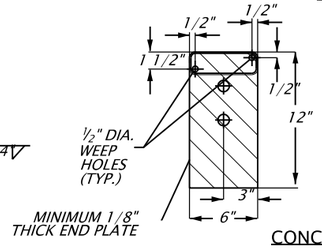


SECTION C-C

Notes:
1. Concrete splash pad elevation shall be level with soil inside planter.
2. Splash pad shall be six inches wider than inlet opening on both sides.



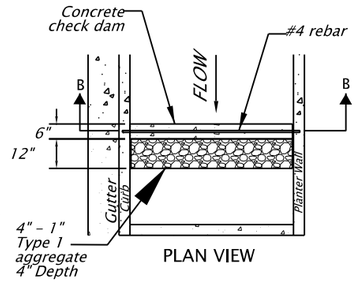
ISOMETRIC



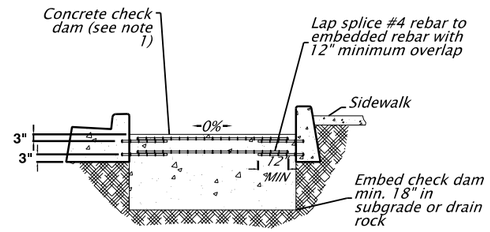
SECTION D-D

CONCRETE CURB INLET

NOT TO SCALE



PLAN VIEW



SECTION B-B

Notes:
1. Top of dam elevation to be 2" lower than upstream curb depression elevation.
2. Concrete to be 3,000 psi.
3. Embed #4 rebar 3" into curb and planter wall.

CONCRETE CHECK DAM

NOT TO SCALE

PRELIMINARY COPY
INFORMATION ONLY

DFI no. ######

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

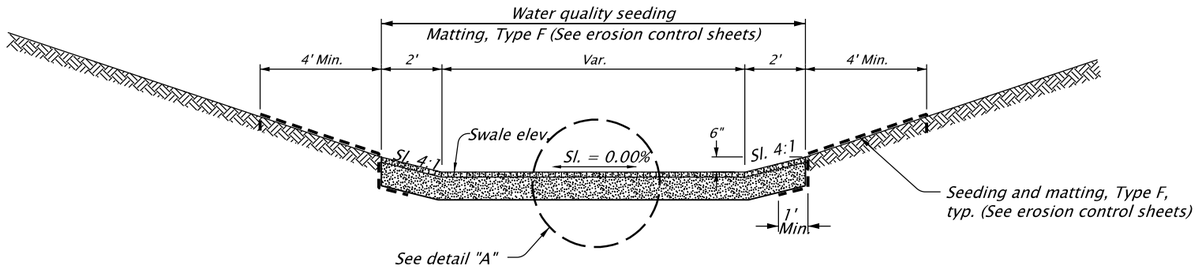
Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

SHEET NO.

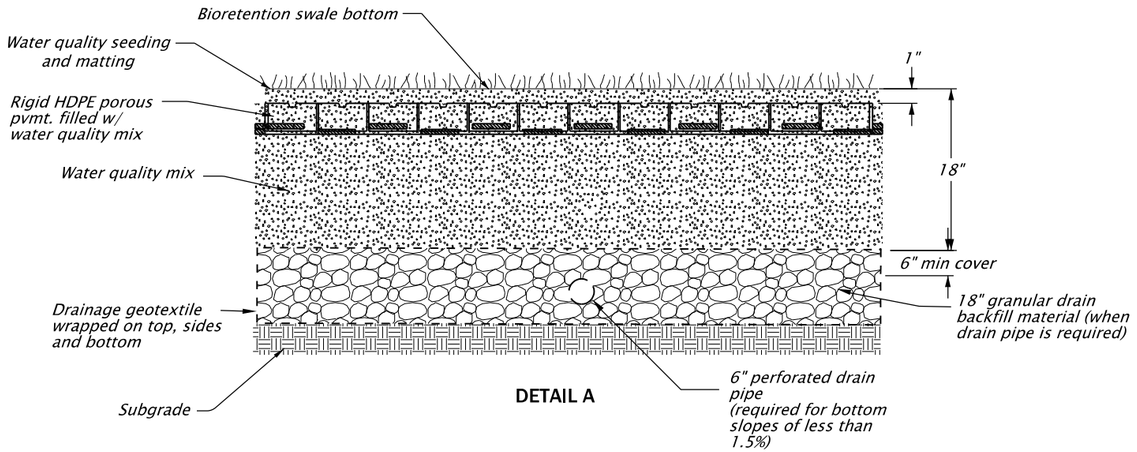
WATER QUALITY DETAILS

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

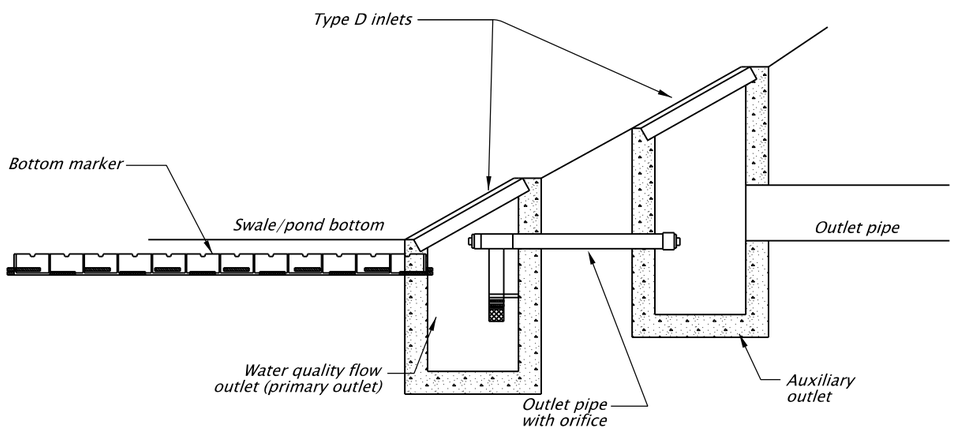
Rotation: 0



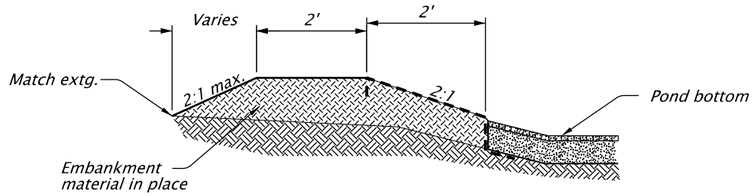
BIORETENTION SWALE
NTS



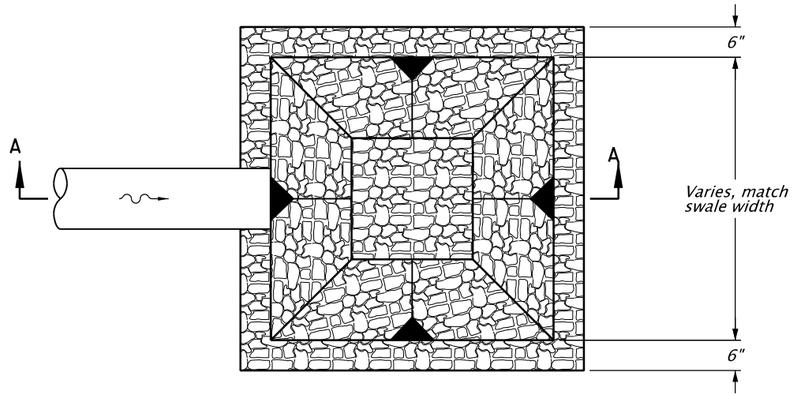
DETAIL A



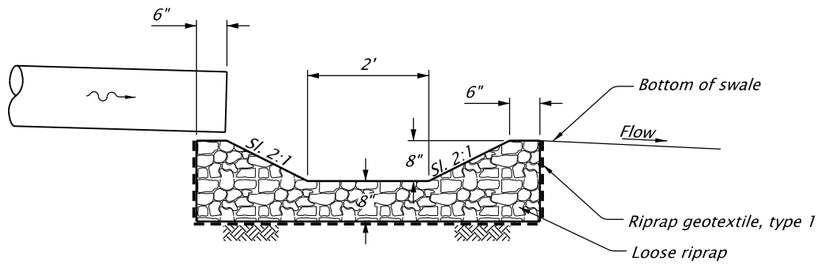
WATER QUALITY FACILITY OUTLET STRUCTURE
NTS



BIORETENTION POND BERM
NTS



ROCK BASIN FLOW SPREADER
NTS



SECTION A-A

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

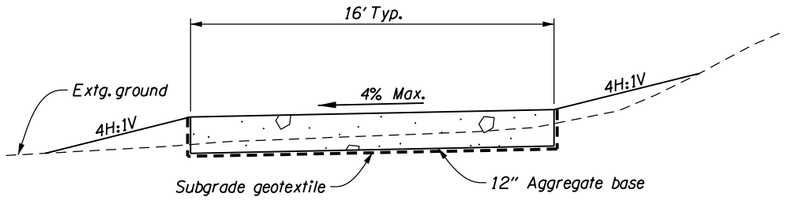
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer:
Reviewer:
Drafter:
Checker:

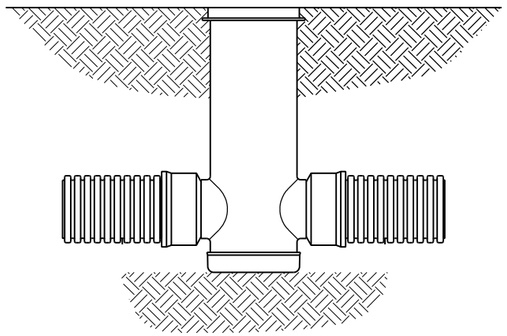
WATER QUALITY DETAILS

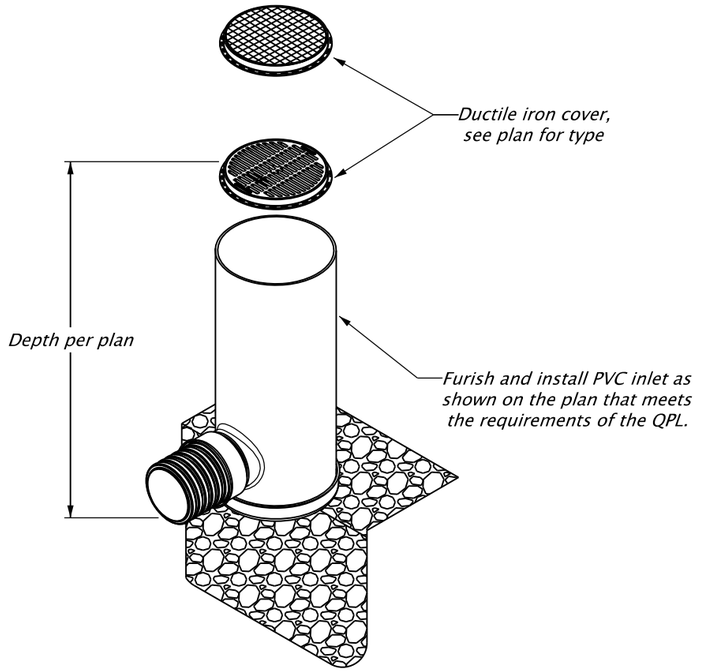
SHEET NO.

Rotation: 0

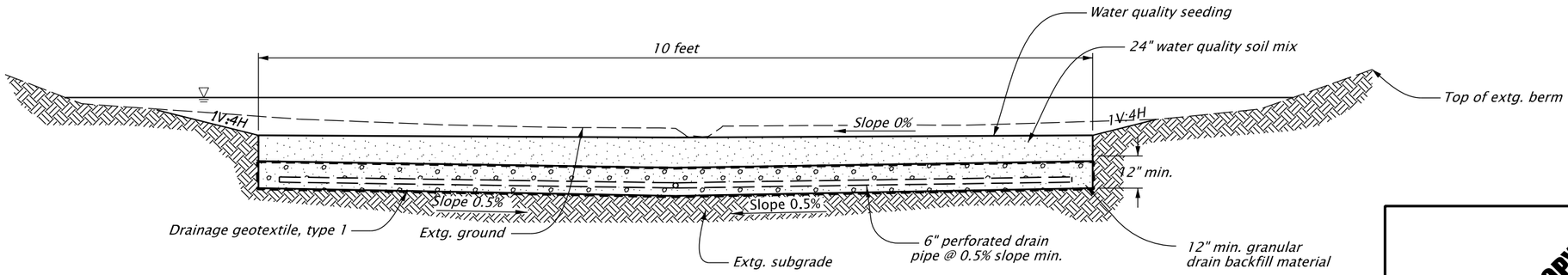


MAINTENANCE ACCESS ROAD SECTION
NTS





PVC INLET
NTS



DETENTION POND WITH BIOFILTRATION SECTION
Scale: NTS

PRELIMINARY COPY
INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

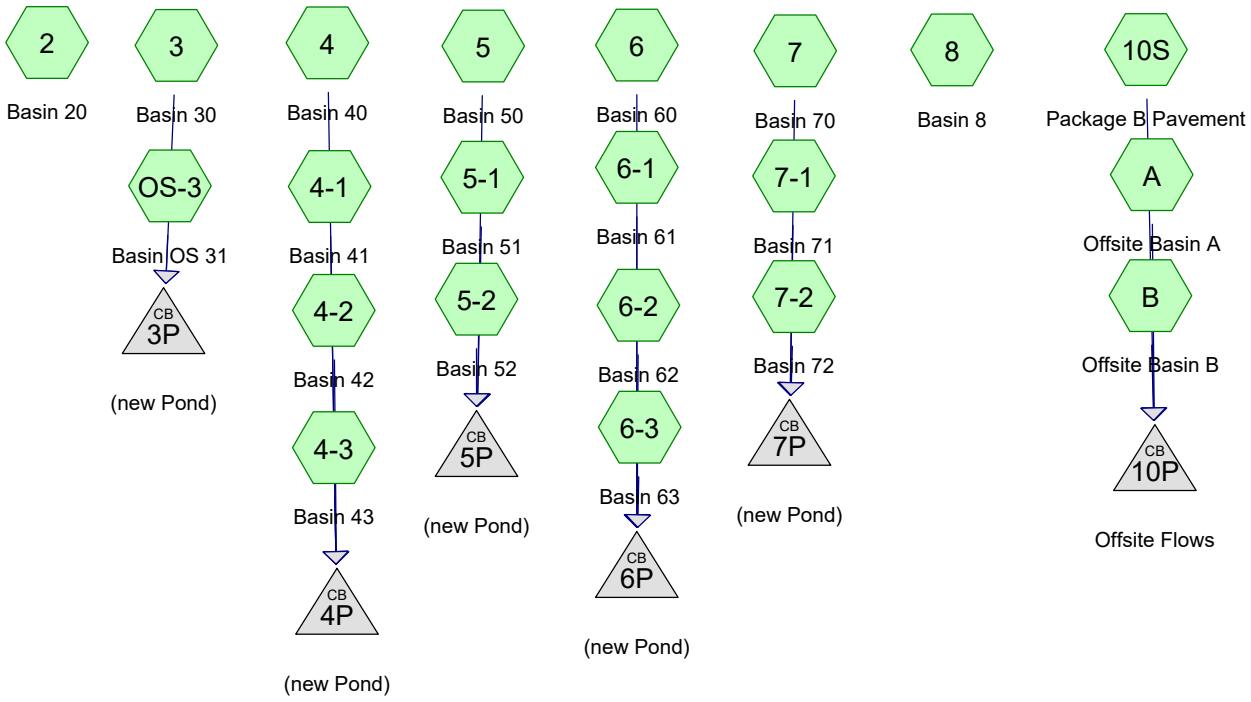
WATER QUALITY DETAILS

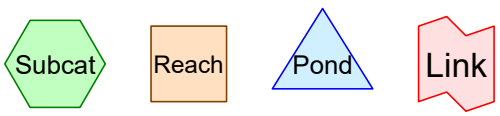
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° Sc = 1

Appendix C. Hydrology Calculations





Drainage Diagram for Abernethy Basins
Prepared by HDR, Printed 3/28/2019
HydroCAD® 9.10 s/n 04284 © 2010 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
111.160	83	1/4 acre lots, 38% imp, HSG C (A, B)
24.458	98	(2, 3, 4, 4-1, 4-2, 4-3, 5, 5-1, 5-2, 6, 6-1, 6-2, 6-3, 7, 7-1, 7-2, 8)
17.417	98	Paved roads w/curbs & sewers, HSG B (10S, OS-3)

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=2.36 cfs 0.782 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.67 cfs 0.553 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.30 cfs 0.101 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=3.49 cfs 1.158 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.53 cfs 0.177 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.26 cfs 0.086 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.55 cfs 0.183 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.44 cfs 0.147 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=2.74 cfs 0.907 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.76 cfs 0.584 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 0.120 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.77 cfs 0.588 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.031 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.22 cfs 0.073 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.26 cfs 0.085 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.141 af

Subcatchment8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=3.05"
Tc=12.0 min CN=0/98 Runoff=1.38 cfs 0.496 af

Subcatchment10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=3.05"
Tc=15.0 min CN=0/98 Runoff=10.77 cfs 4.003 af

SubcatchmentA: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=1.83"
Tc=20.0 min CN=74/98 Runoff=6.61 cfs 2.985 af

SubcatchmentB: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=1.83"
Tc=60.0 min CN=74/98 Runoff=20.05 cfs 14.005 af

SubcatchmentOS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=3.05"
Tc=5.0 min CN=0/98 Runoff=1.27 cfs 0.419 af

Pond 3P: (new Pond) Peak Elev=0.77' Inflow=2.94 cfs 0.973 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=2.94 cfs 0.973 af

Pond 4P: (new Pond) Peak Elev=0.96' Inflow=4.59 cfs 1.522 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.59 cfs 1.522 af

Pond 5P: (new Pond) Peak Elev=0.86' Inflow=3.73 cfs 1.236 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=3.73 cfs 1.236 af

Pond 6P: (new Pond) Peak Elev=0.89' Inflow=3.99 cfs 1.323 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=3.99 cfs 1.323 af

Pond 7P: (new Pond) Peak Elev=0.44' Inflow=0.90 cfs 0.299 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=0.90 cfs 0.299 af

Pond 10P: Offsite Flows Peak Elev=2.84' Inflow=36.77 cfs 20.993 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=36.77 cfs 20.993 af

Summary for Subcatchment 2: Basin 20

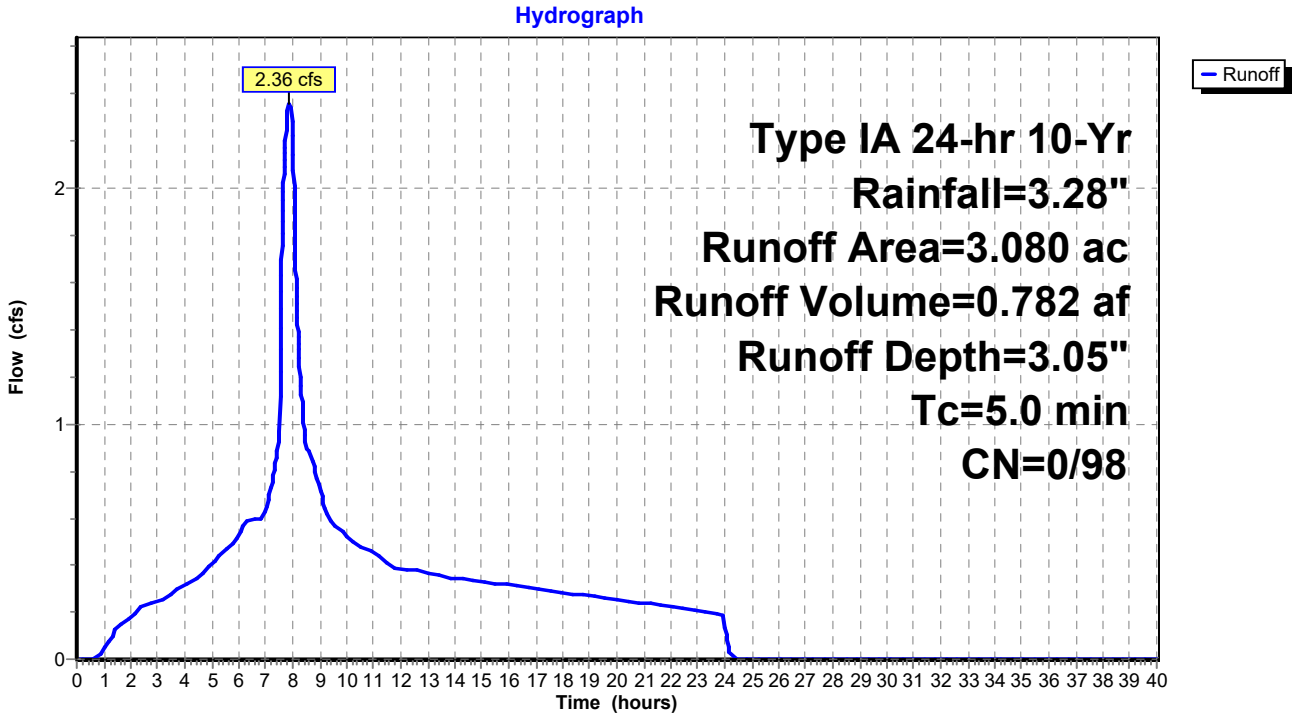
Runoff = 2.36 cfs @ 7.88 hrs, Volume= 0.782 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

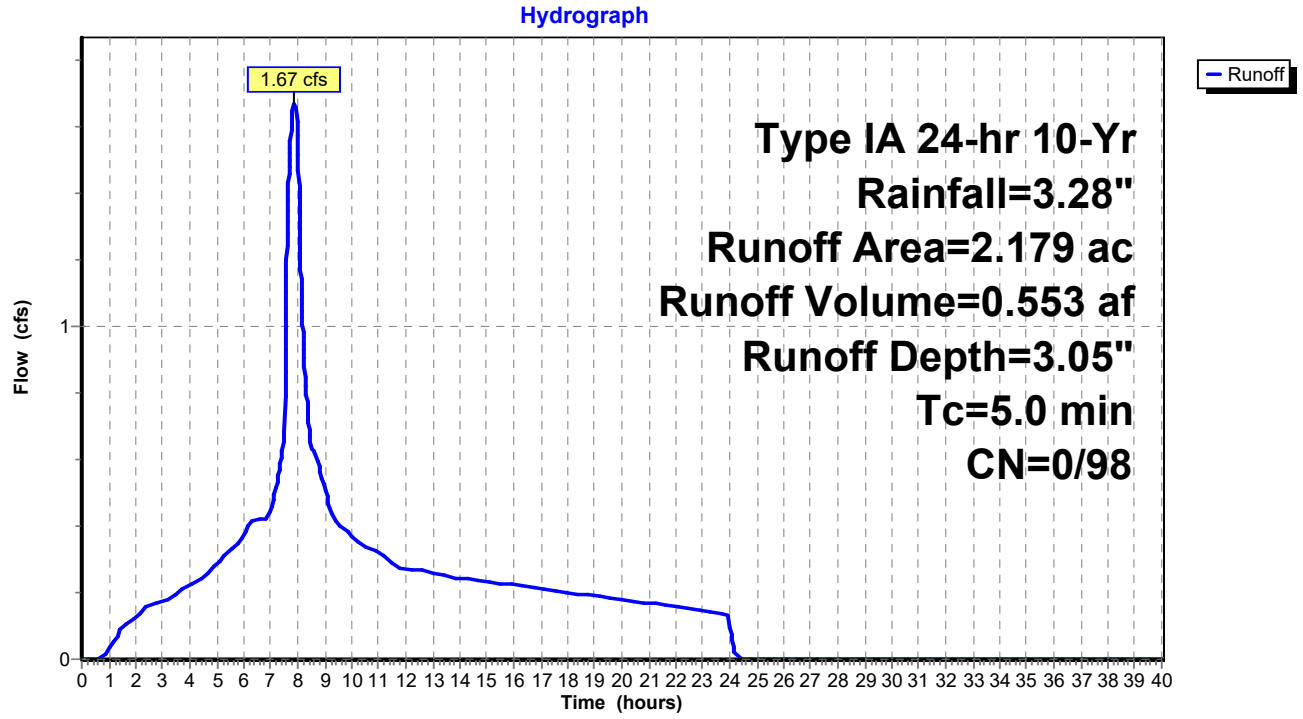
Runoff = 1.67 cfs @ 7.88 hrs, Volume= 0.553 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

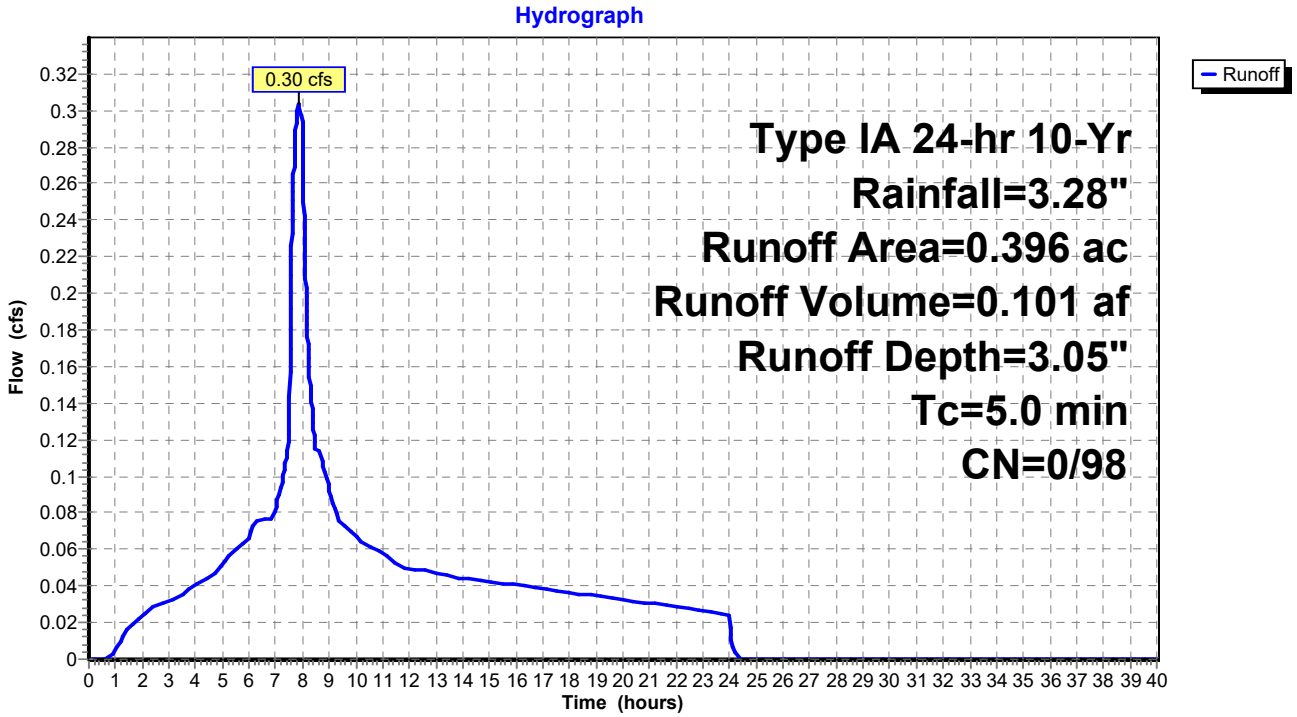
Runoff = 0.30 cfs @ 7.88 hrs, Volume= 0.101 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

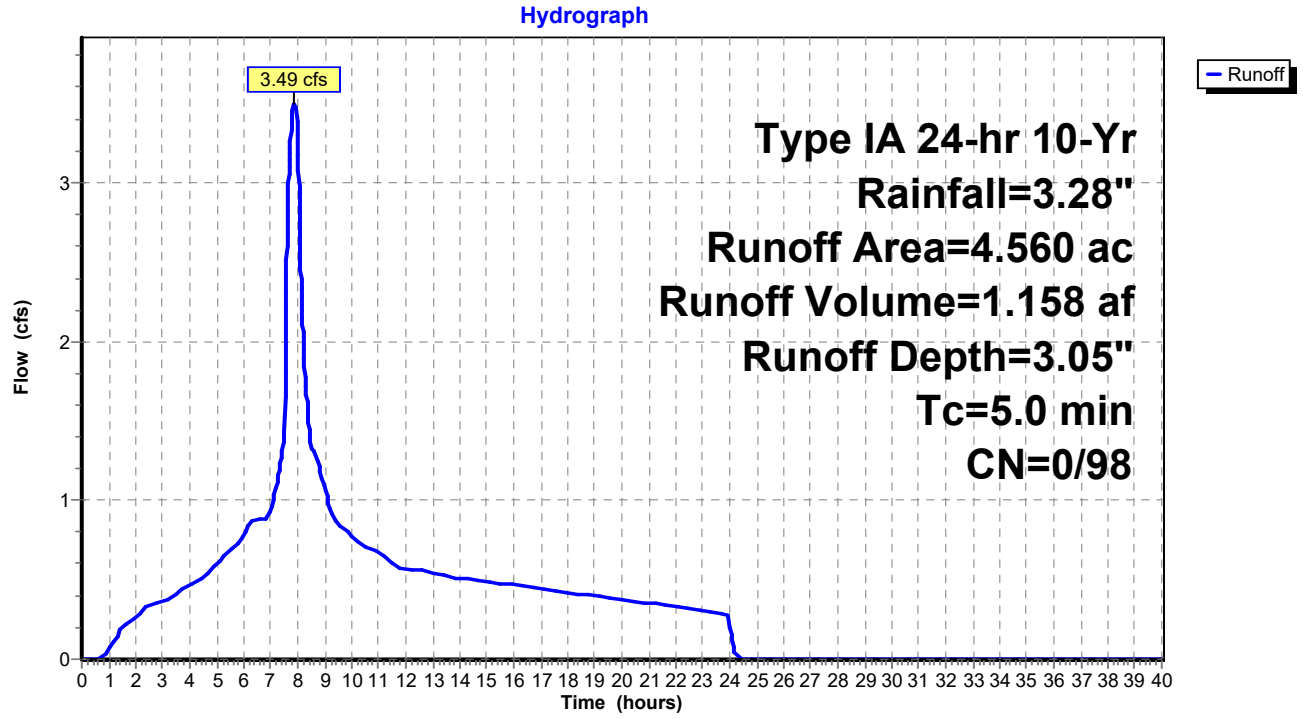
Runoff = 3.49 cfs @ 7.88 hrs, Volume= 1.158 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

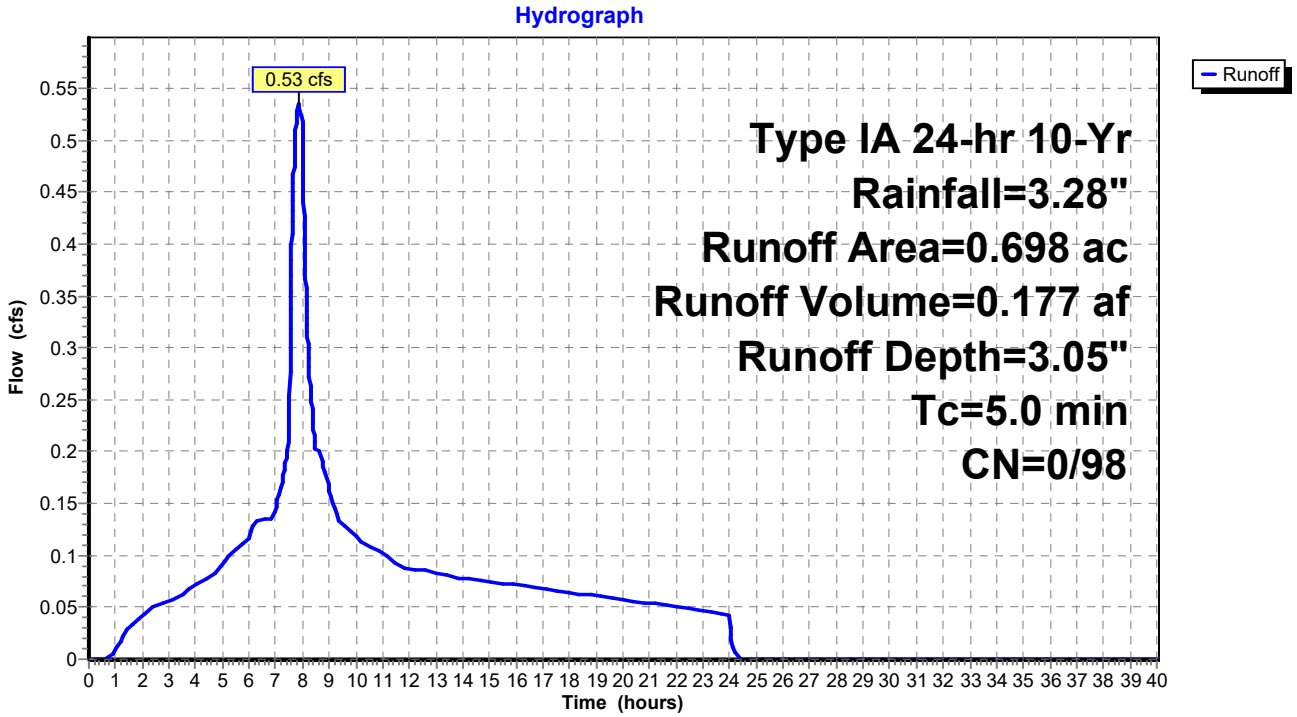
Runoff = 0.53 cfs @ 7.88 hrs, Volume= 0.177 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

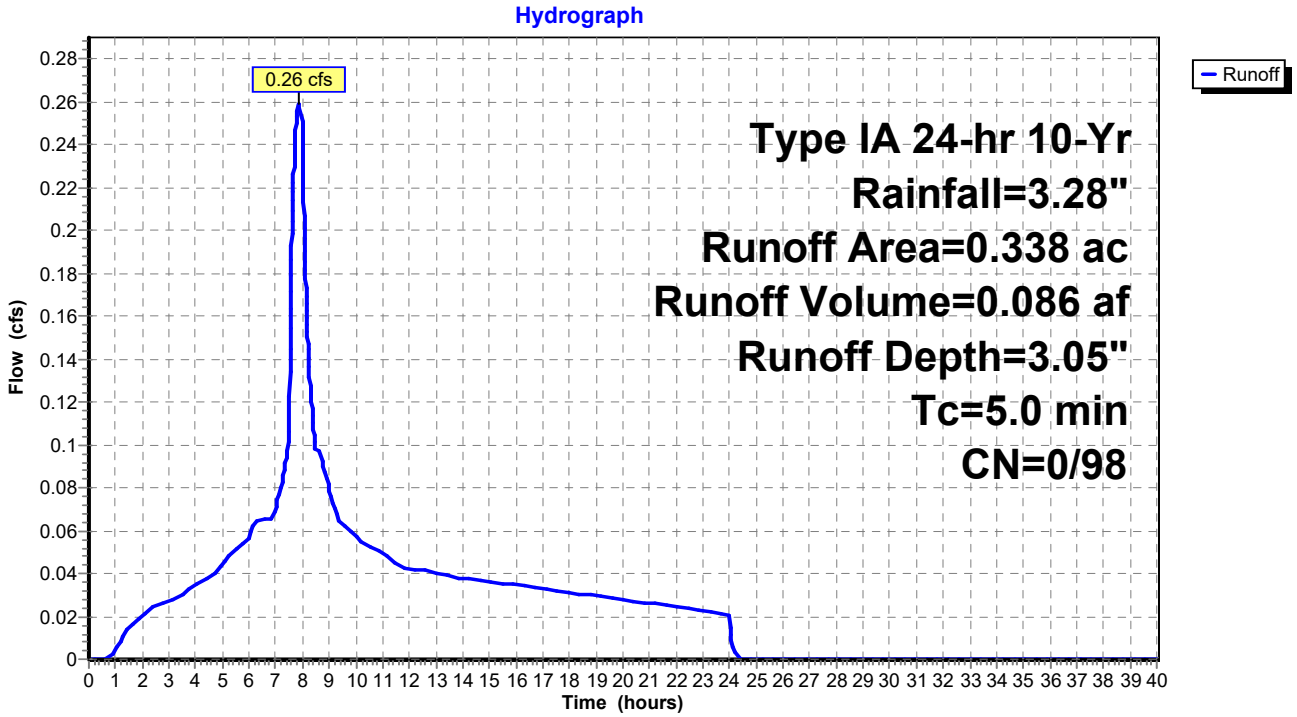
Runoff = 0.26 cfs @ 7.88 hrs, Volume= 0.086 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

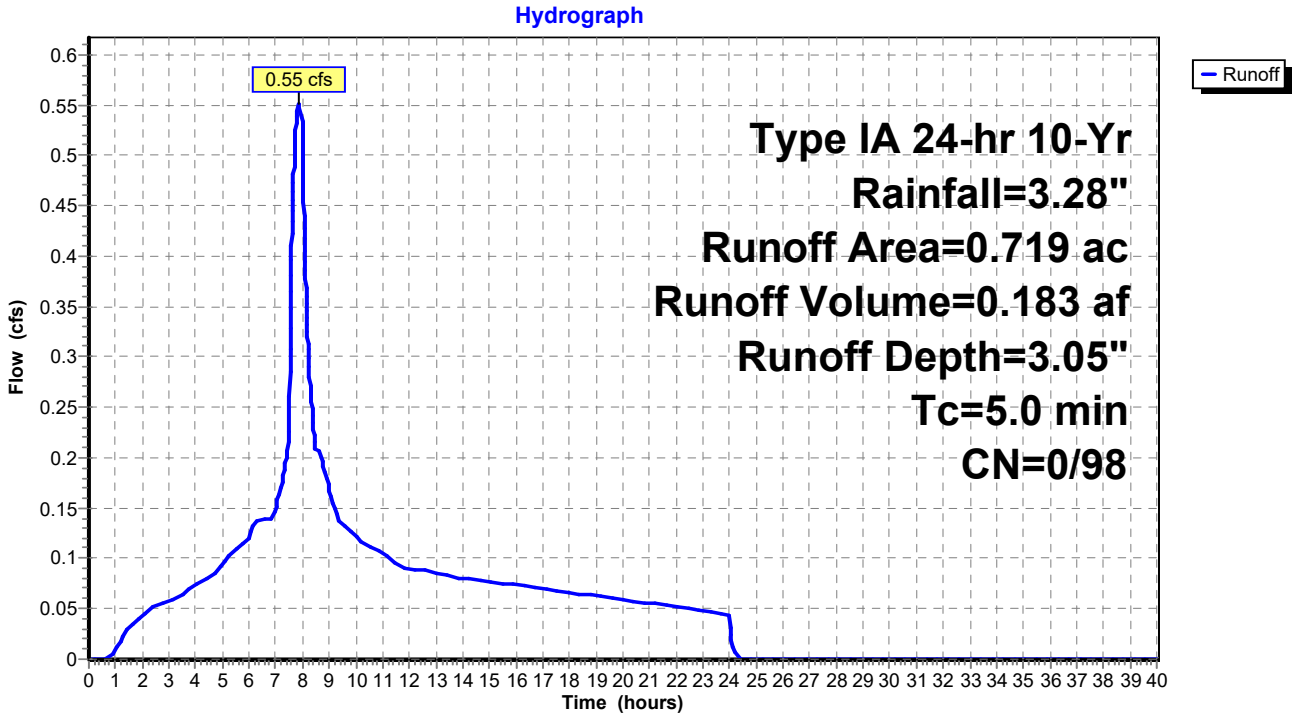
Runoff = 0.55 cfs @ 7.88 hrs, Volume= 0.183 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

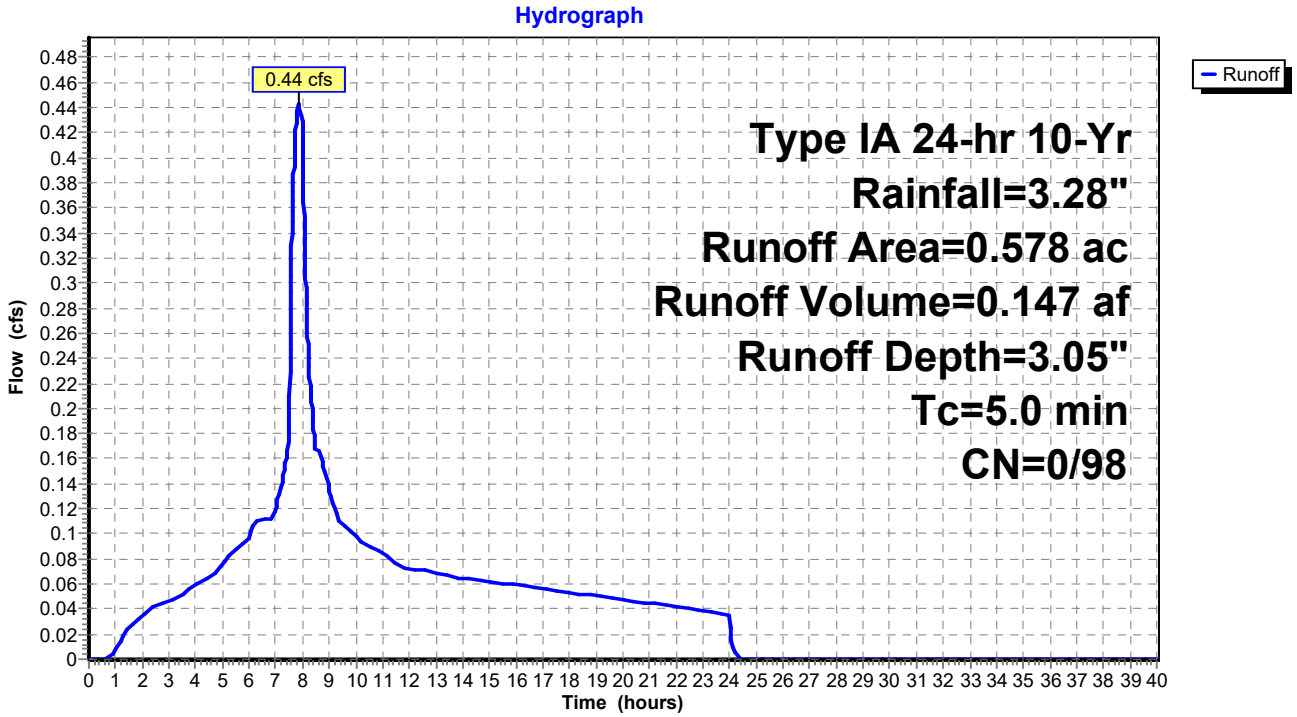
Runoff = 0.44 cfs @ 7.88 hrs, Volume= 0.147 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

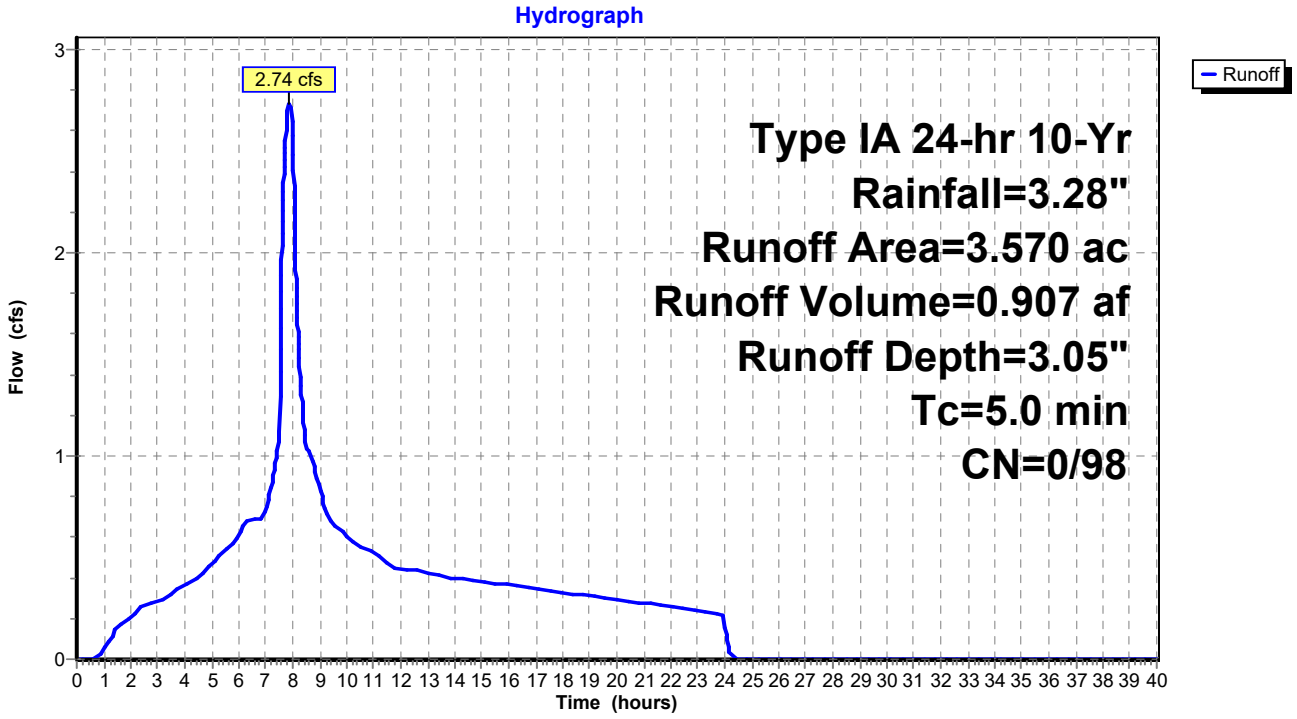
Runoff = 2.74 cfs @ 7.88 hrs, Volume= 0.907 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

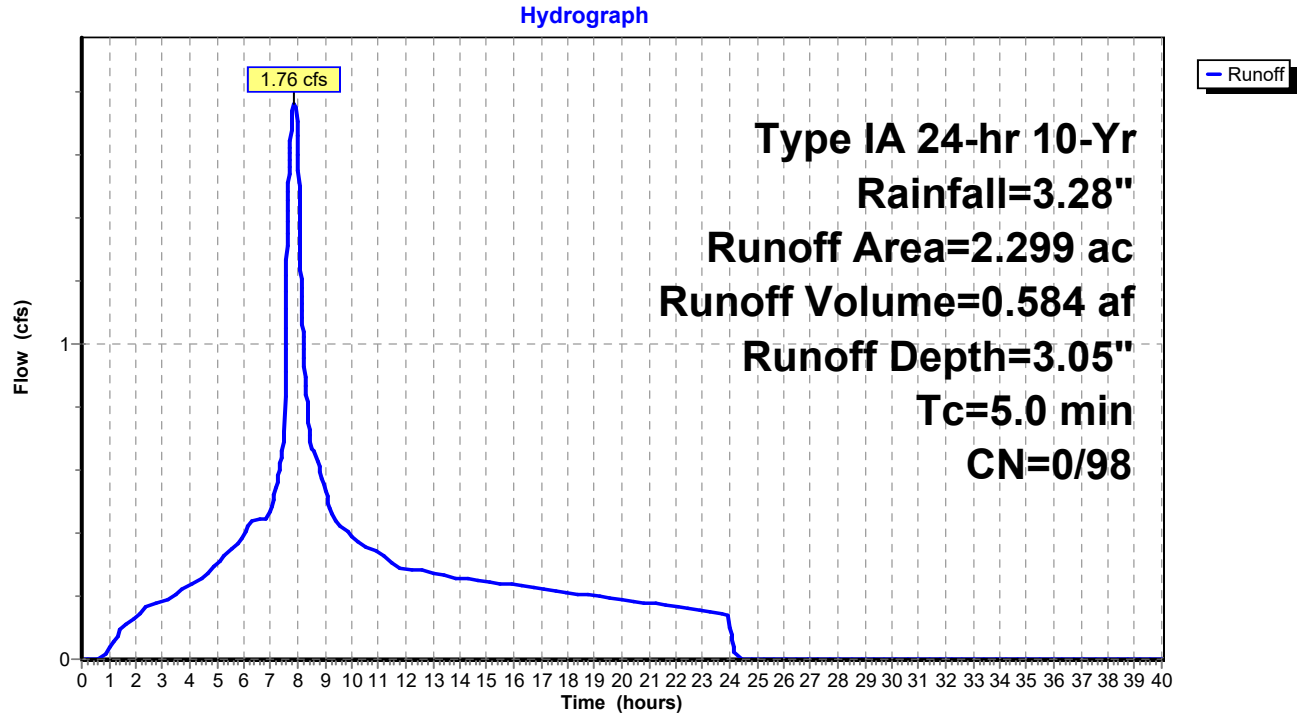
Runoff = 1.76 cfs @ 7.88 hrs, Volume= 0.584 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

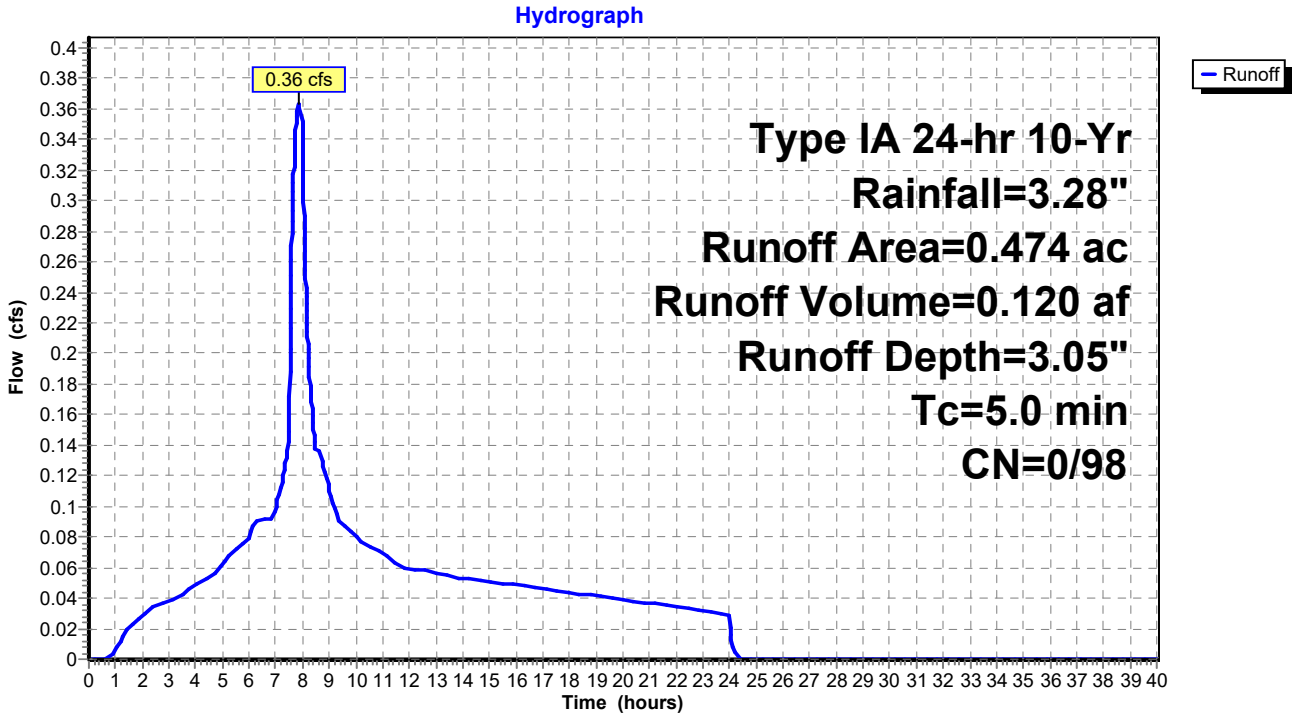
Runoff = 0.36 cfs @ 7.88 hrs, Volume= 0.120 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

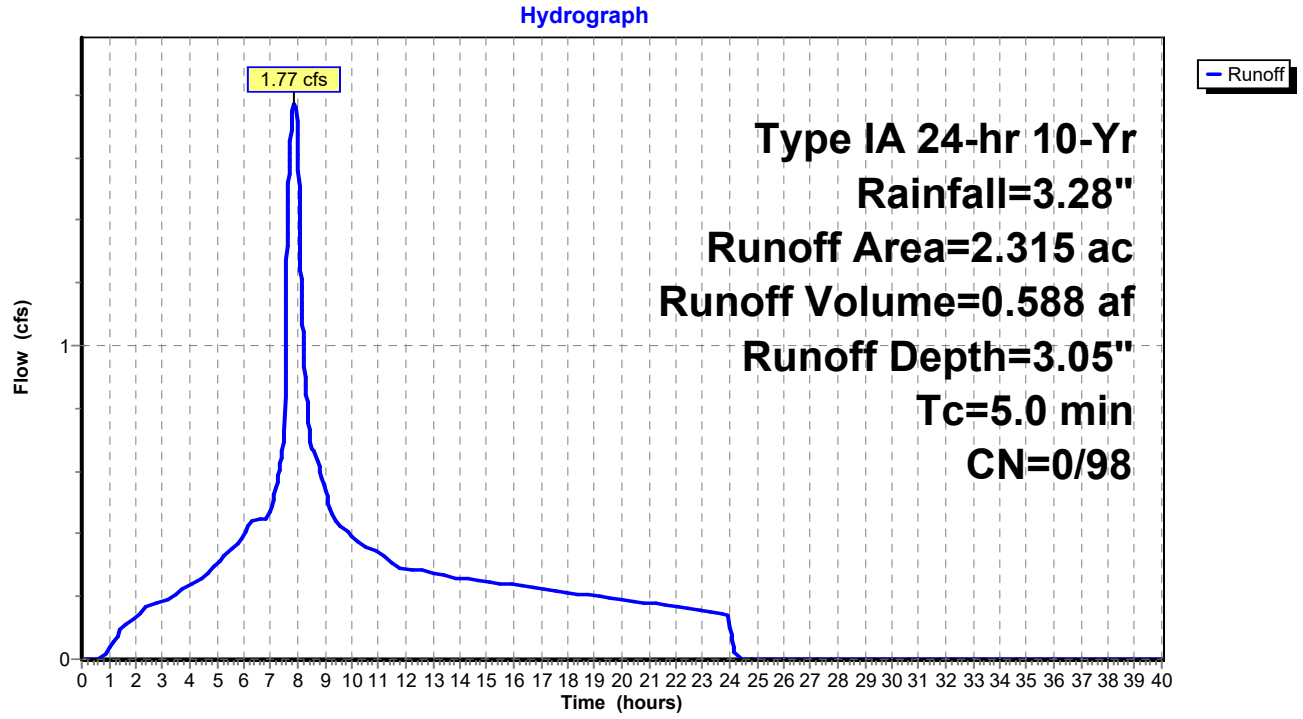
Runoff = 1.77 cfs @ 7.88 hrs, Volume= 0.588 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

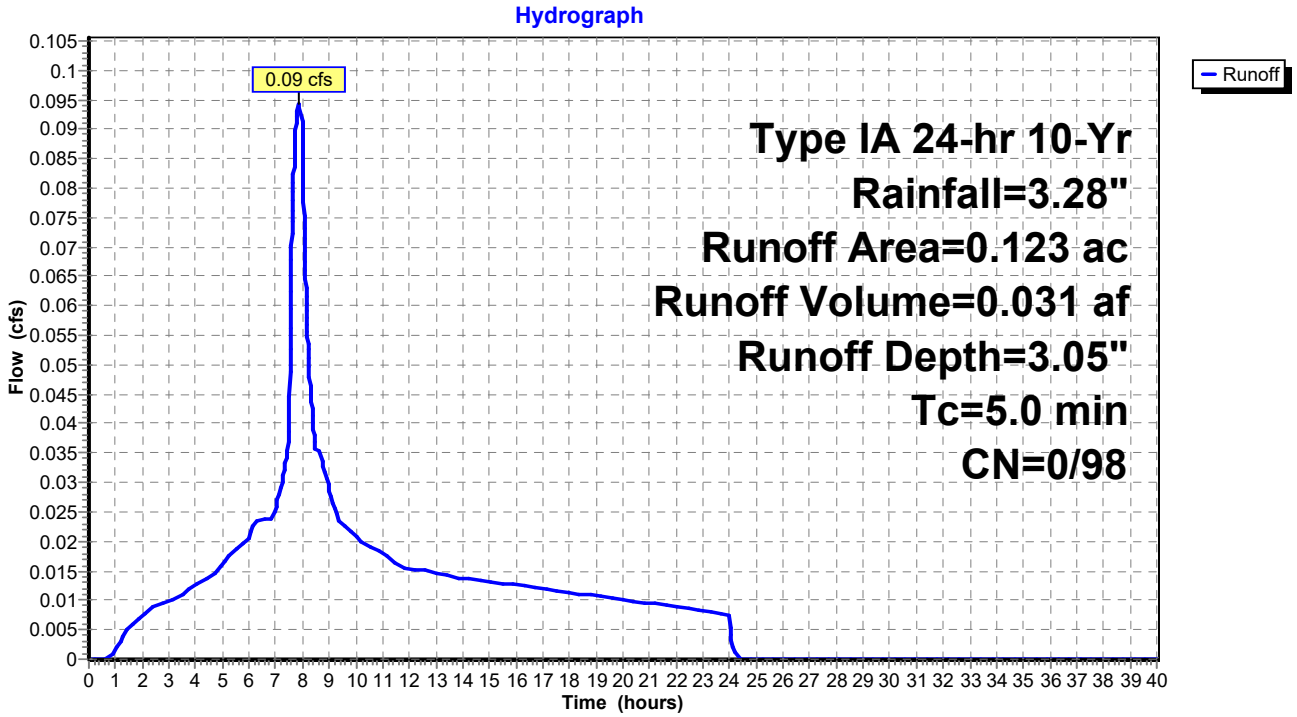
Runoff = 0.09 cfs @ 7.88 hrs, Volume= 0.031 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

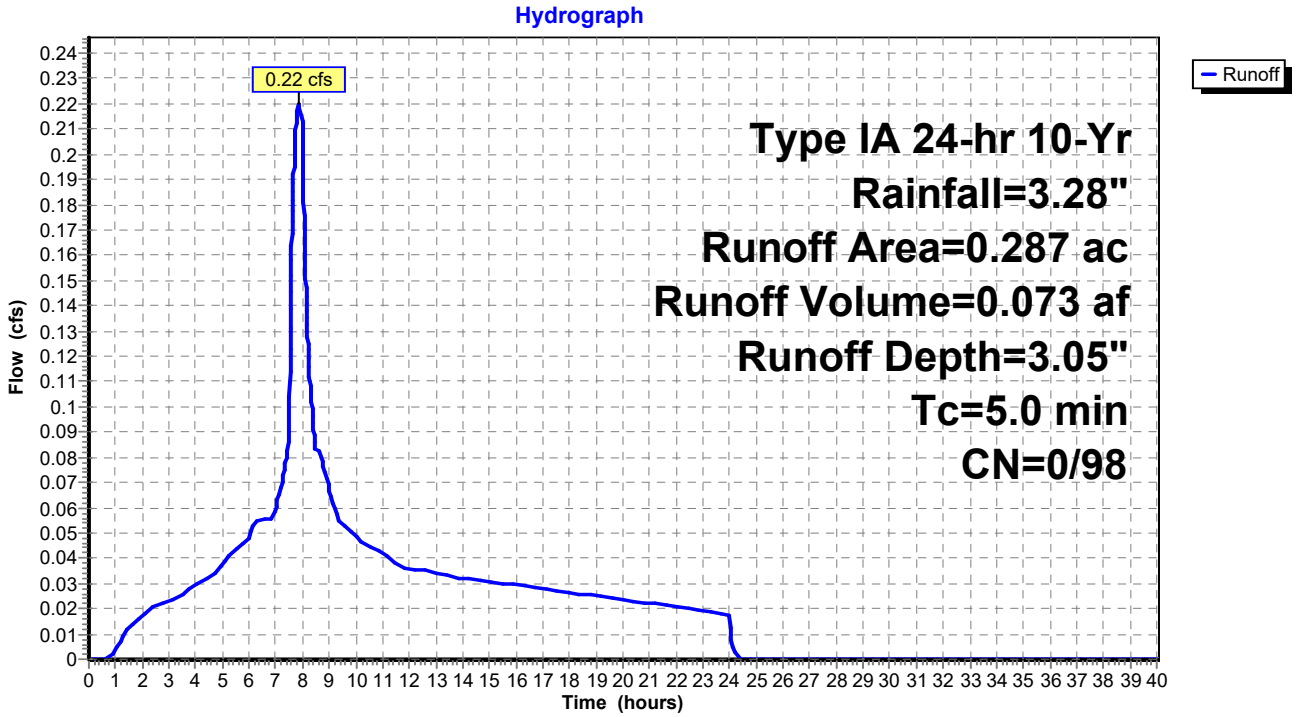
Runoff = 0.22 cfs @ 7.88 hrs, Volume= 0.073 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

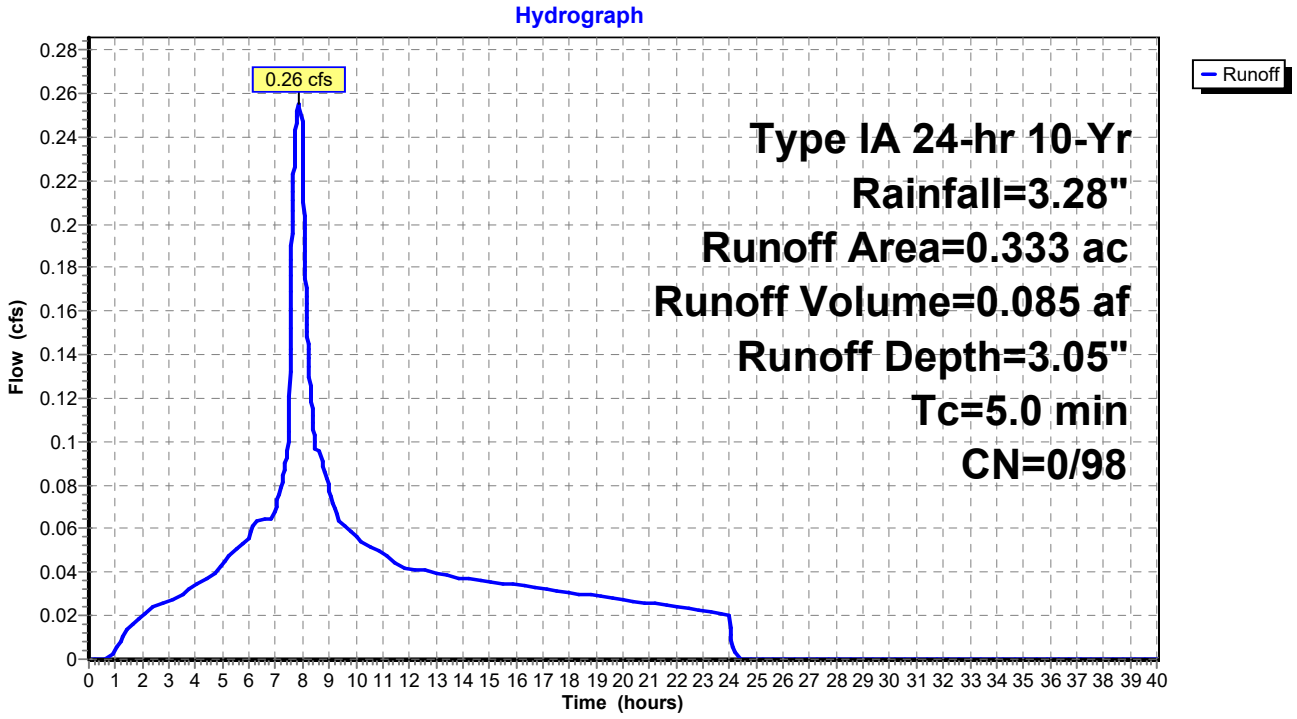
Runoff = 0.26 cfs @ 7.88 hrs, Volume= 0.085 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

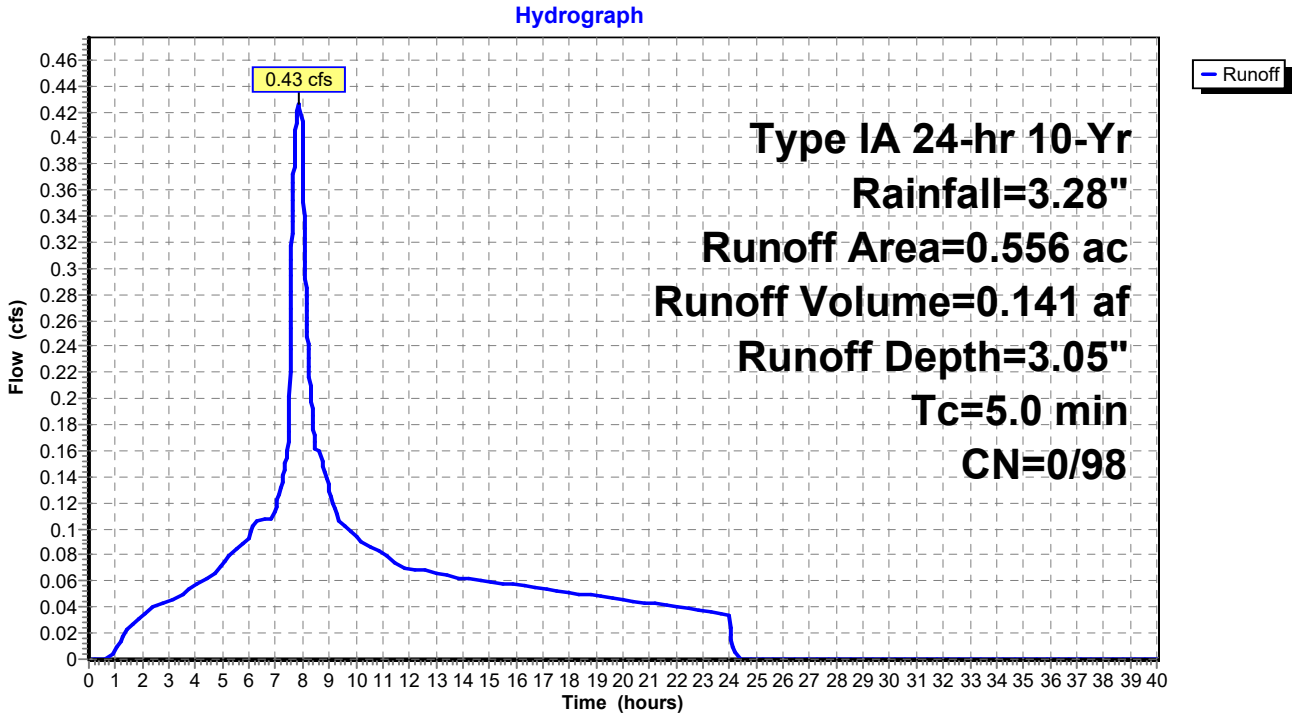
Runoff = 0.43 cfs @ 7.88 hrs, Volume= 0.141 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

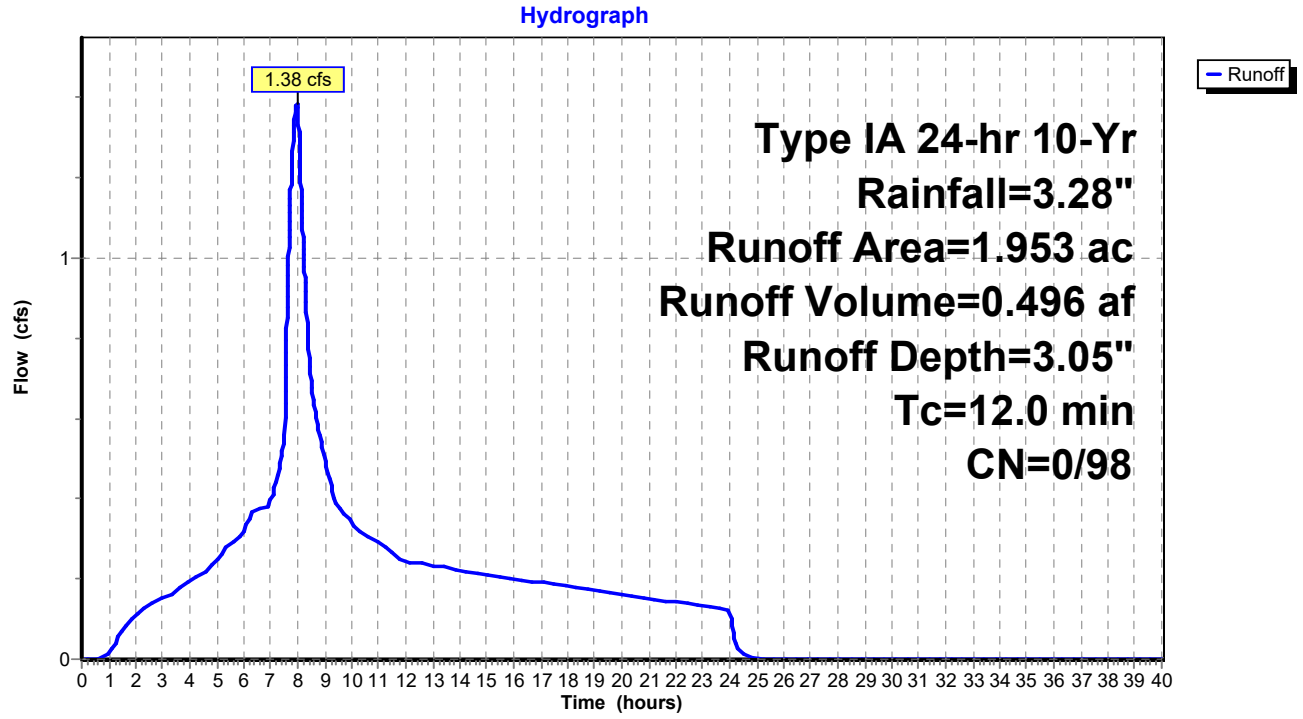
Runoff = 1.38 cfs @ 7.99 hrs, Volume= 0.496 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

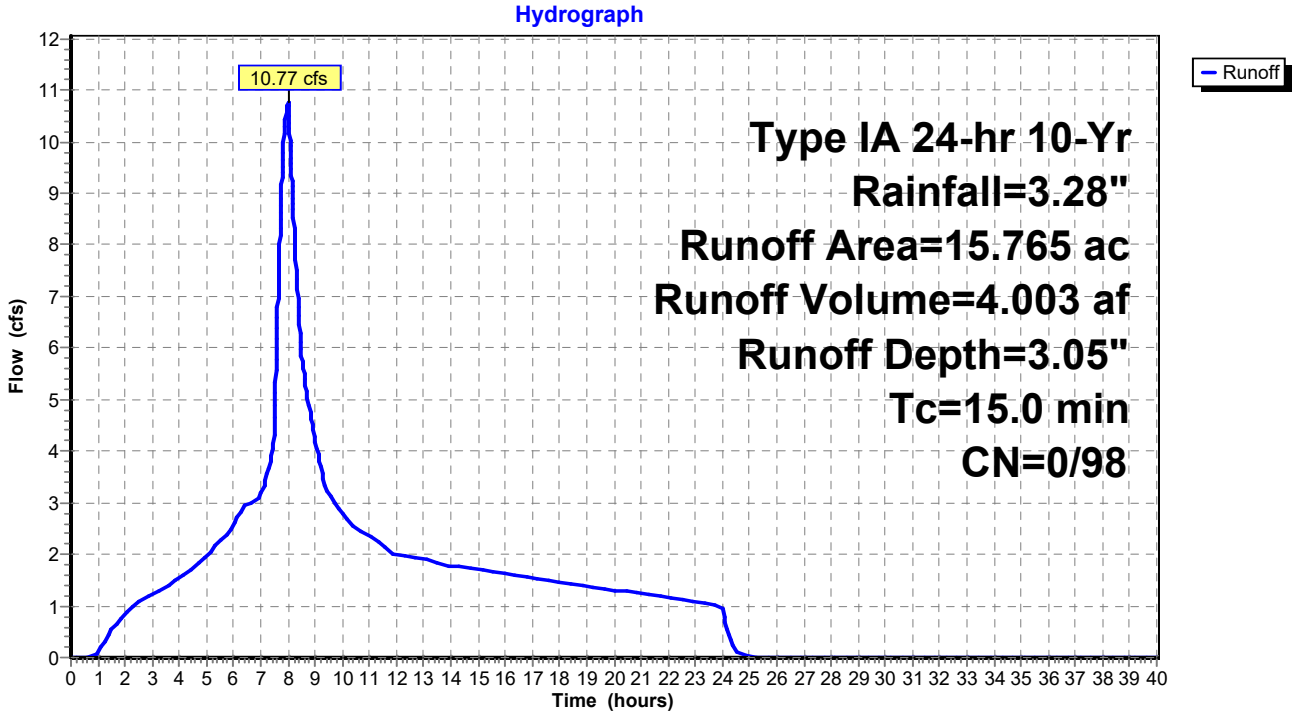
Runoff = 10.77 cfs @ 8.00 hrs, Volume= 4.003 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

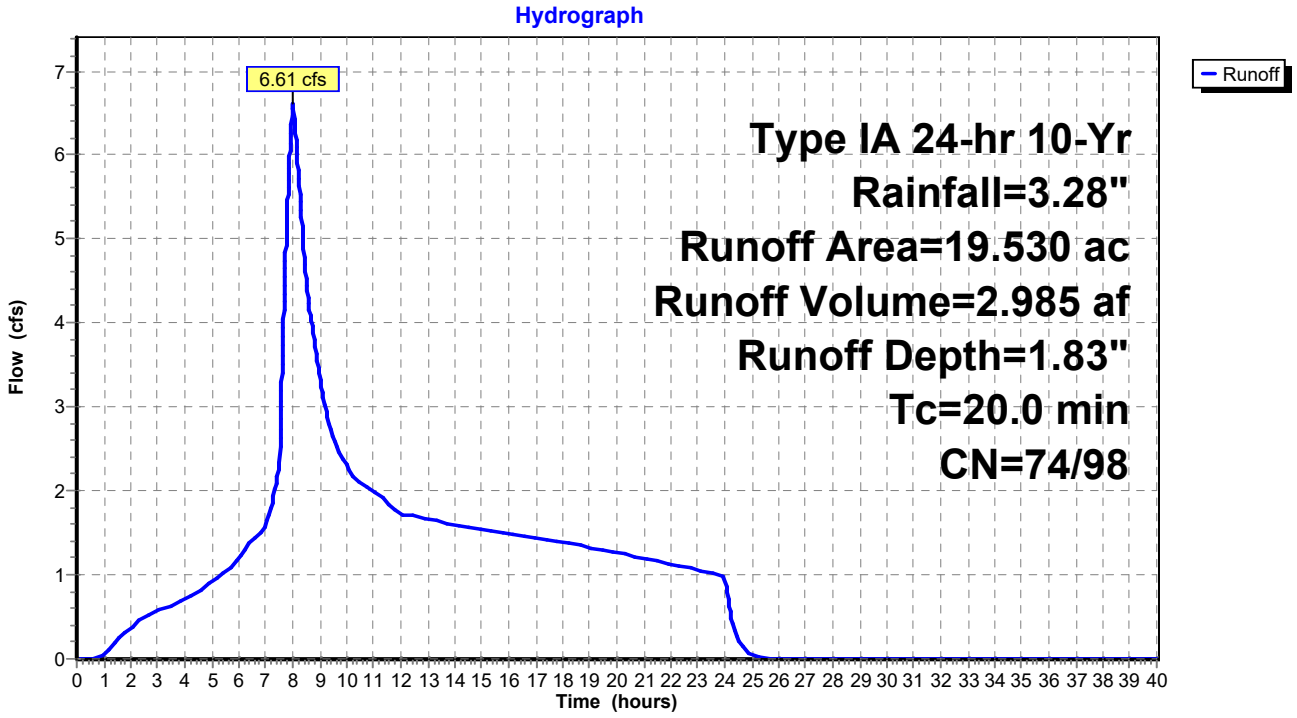
Runoff = 6.61 cfs @ 8.01 hrs, Volume= 2.985 af, Depth= 1.83"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

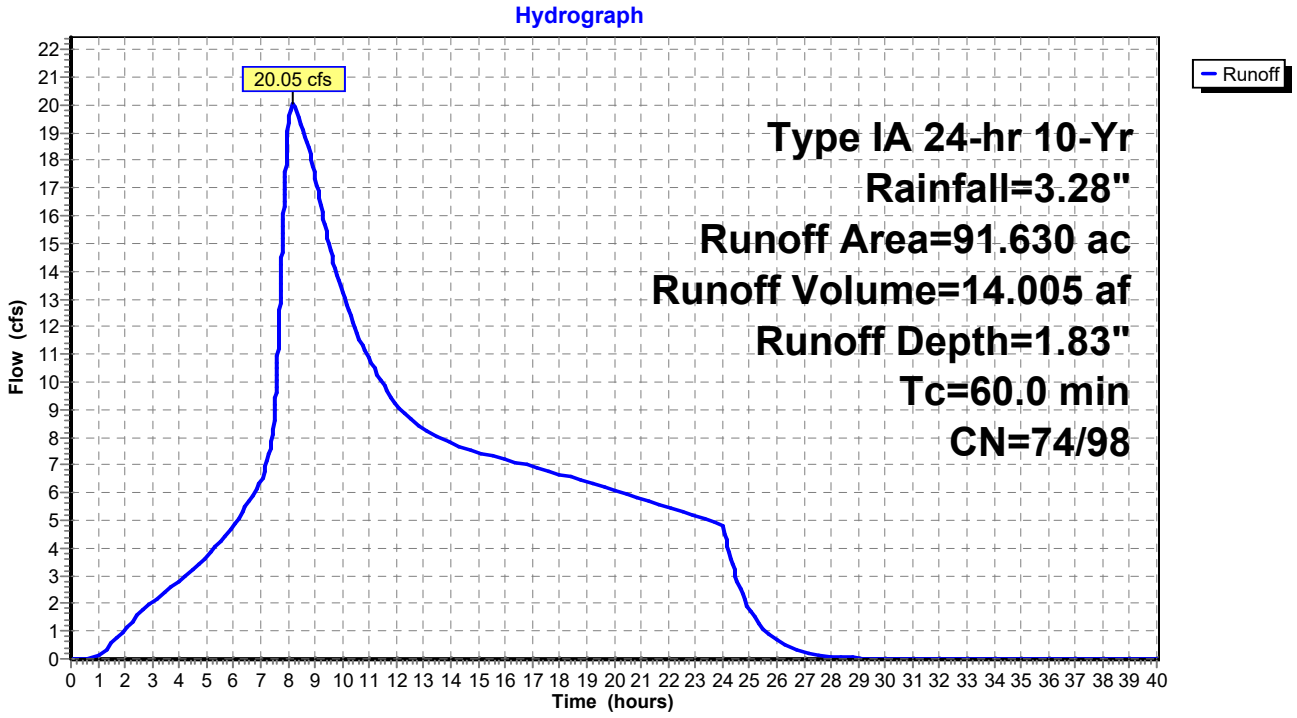
Runoff = 20.05 cfs @ 8.20 hrs, Volume= 14.005 af, Depth= 1.83"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

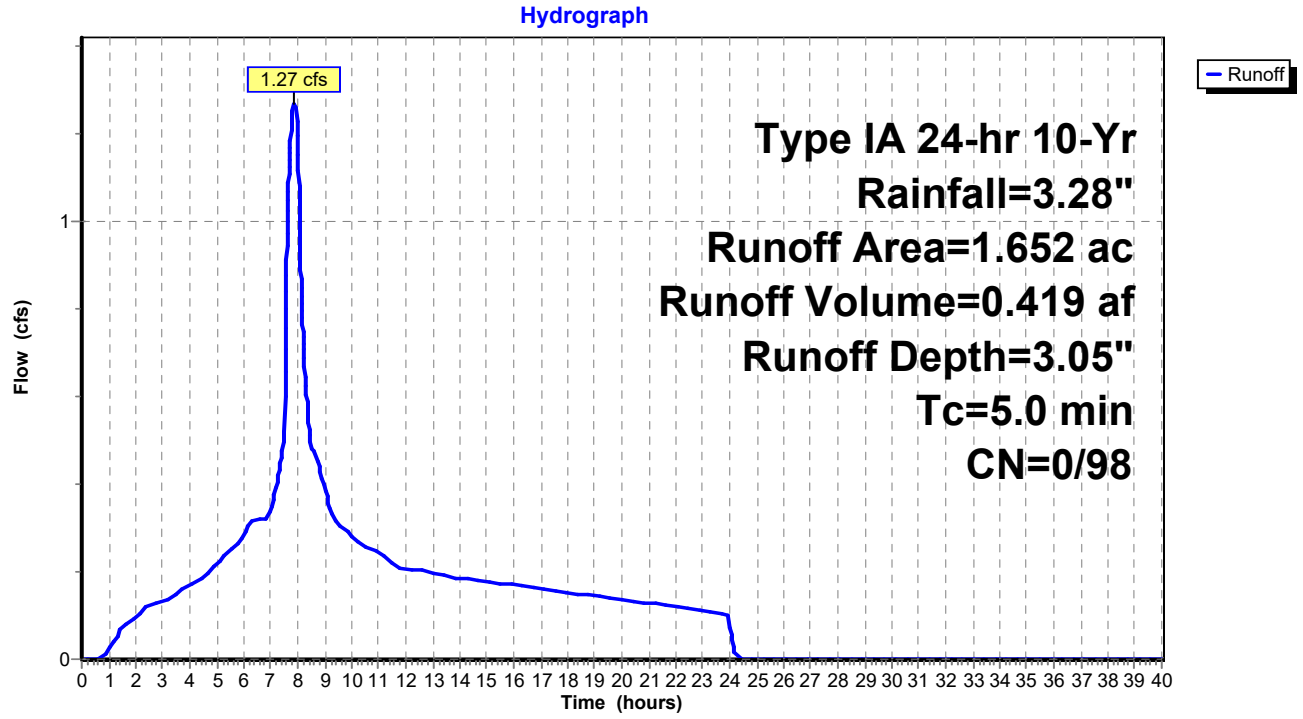
Runoff = 1.27 cfs @ 7.88 hrs, Volume= 0.419 af, Depth= 3.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Yr Rainfall=3.28"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

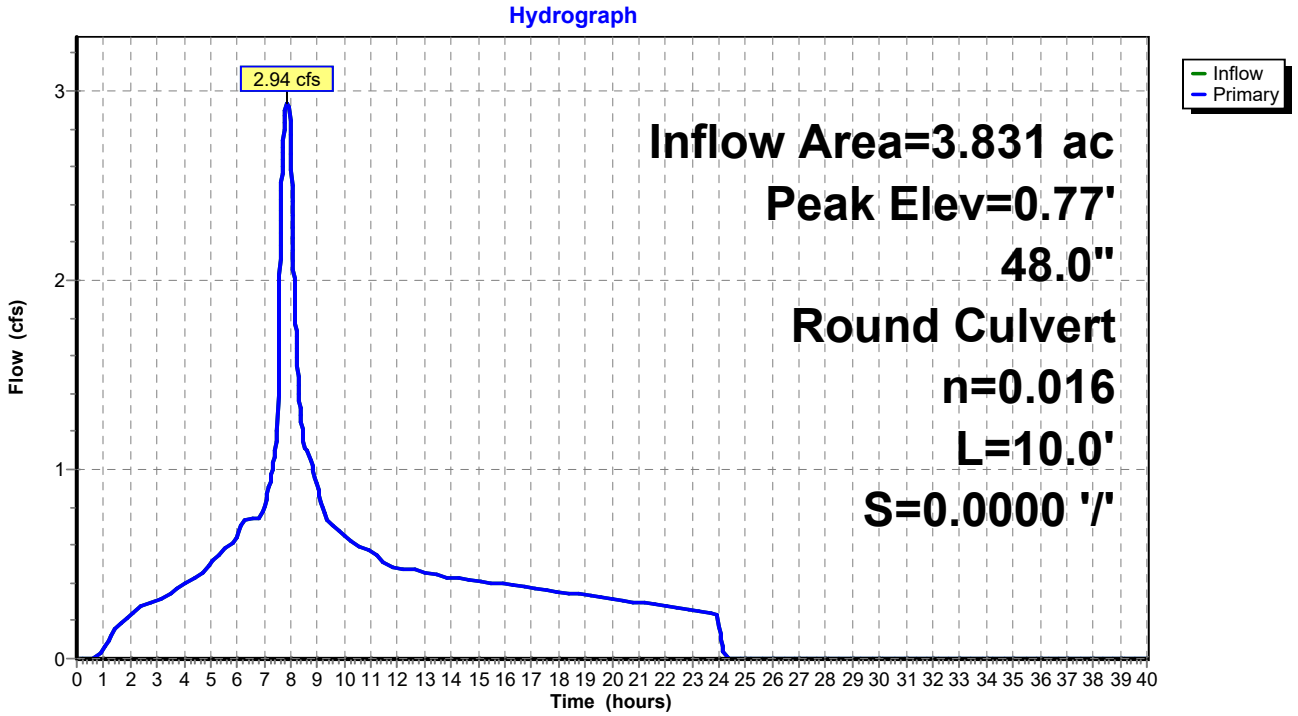
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 2.94 cfs @ 7.88 hrs, Volume= 0.973 af
Outflow = 2.94 cfs @ 7.88 hrs, Volume= 0.973 af, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 7.88 hrs, Volume= 0.973 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.77' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=2.93 cfs @ 7.88 hrs HW=0.77' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.93 cfs @ 2.63 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

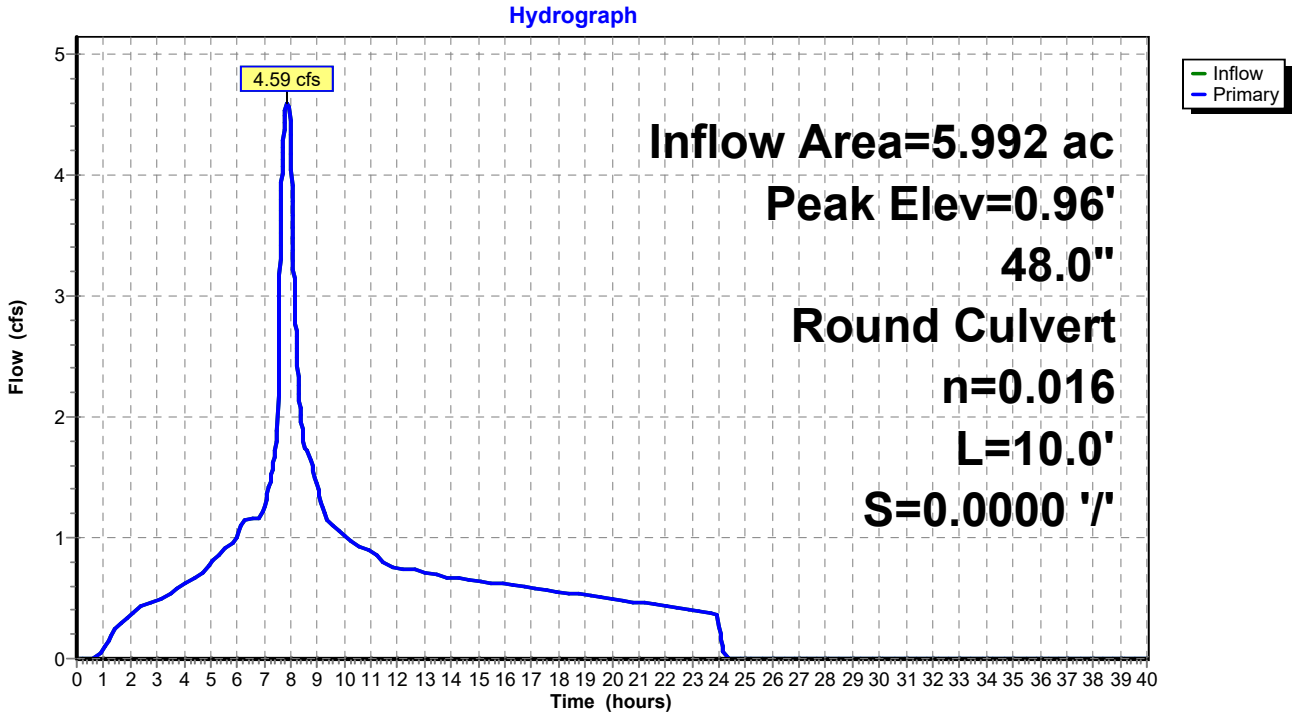
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 4.59 cfs @ 7.88 hrs, Volume= 1.522 af
Outflow = 4.59 cfs @ 7.88 hrs, Volume= 1.522 af, Atten= 0%, Lag= 0.0 min
Primary = 4.59 cfs @ 7.88 hrs, Volume= 1.522 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.96' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.59 cfs @ 7.88 hrs HW=0.96' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.59 cfs @ 2.99 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

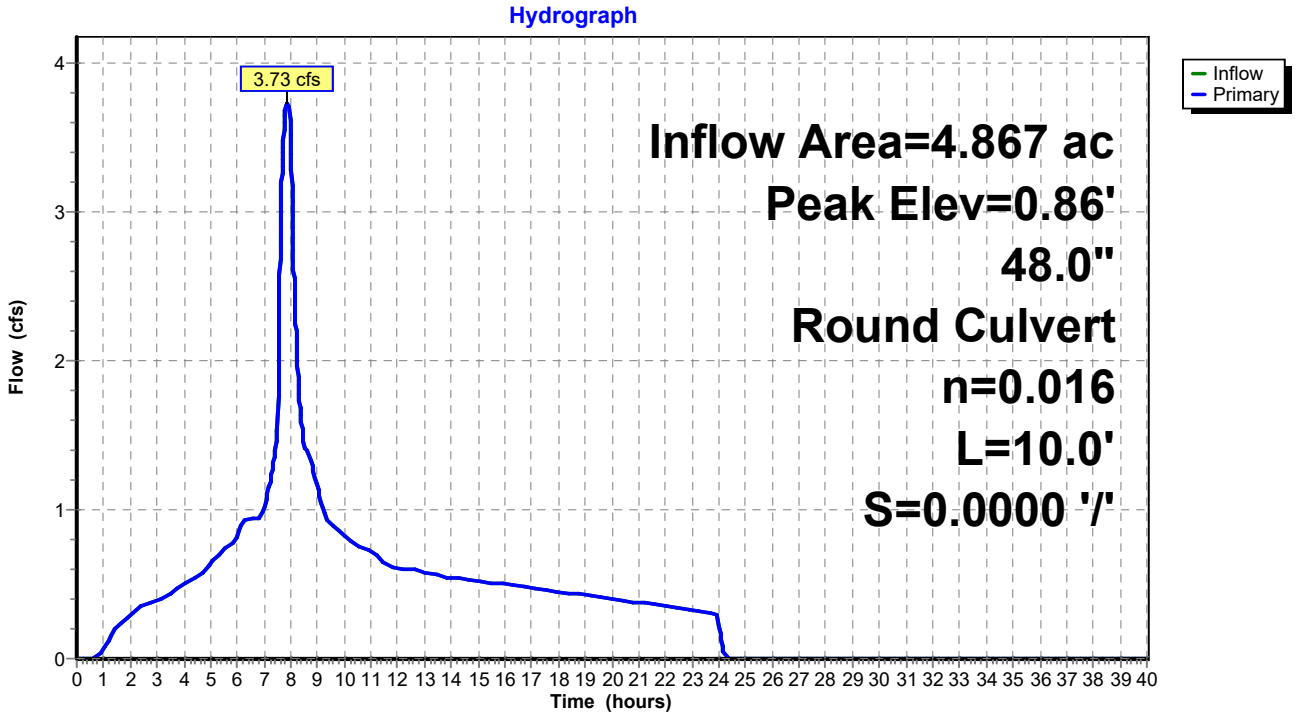
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 3.73 cfs @ 7.88 hrs, Volume= 1.236 af
Outflow = 3.73 cfs @ 7.88 hrs, Volume= 1.236 af, Atten= 0%, Lag= 0.0 min
Primary = 3.73 cfs @ 7.88 hrs, Volume= 1.236 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.86' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=3.73 cfs @ 7.88 hrs HW=0.86' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.73 cfs @ 2.82 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

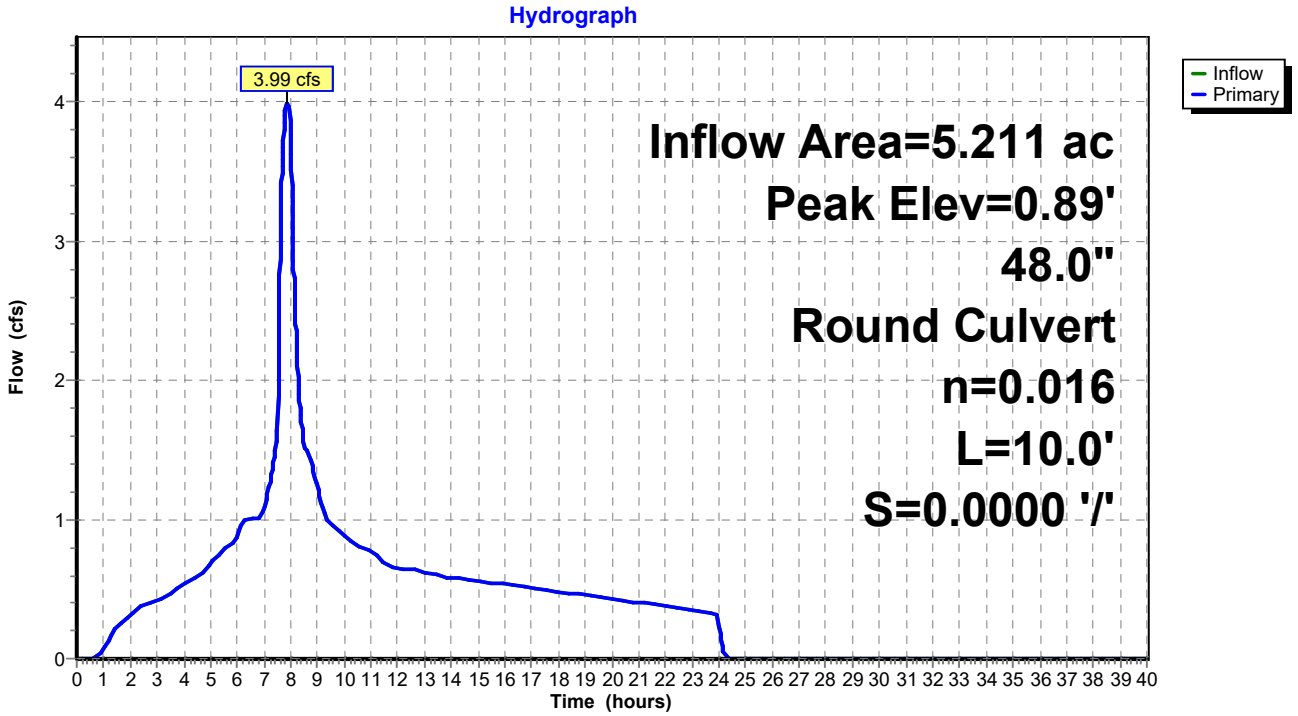
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 3.99 cfs @ 7.88 hrs, Volume= 1.323 af
Outflow = 3.99 cfs @ 7.88 hrs, Volume= 1.323 af, Atten= 0%, Lag= 0.0 min
Primary = 3.99 cfs @ 7.88 hrs, Volume= 1.323 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.89' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=3.99 cfs @ 7.88 hrs HW=0.89' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.99 cfs @ 2.87 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

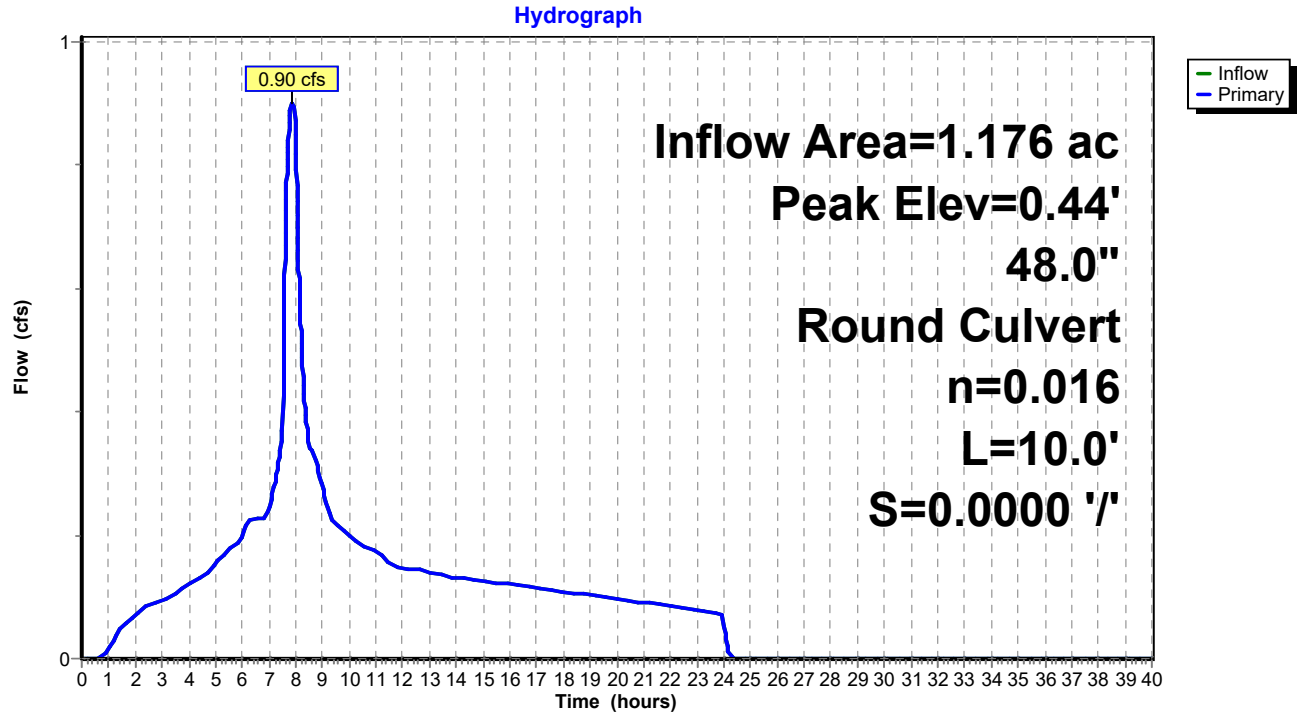
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 3.05" for 10-Yr event
Inflow = 0.90 cfs @ 7.88 hrs, Volume= 0.299 af
Outflow = 0.90 cfs @ 7.88 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 7.88 hrs, Volume= 0.299 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.44' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=0.90 cfs @ 7.88 hrs HW=0.44' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.90 cfs @ 1.84 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

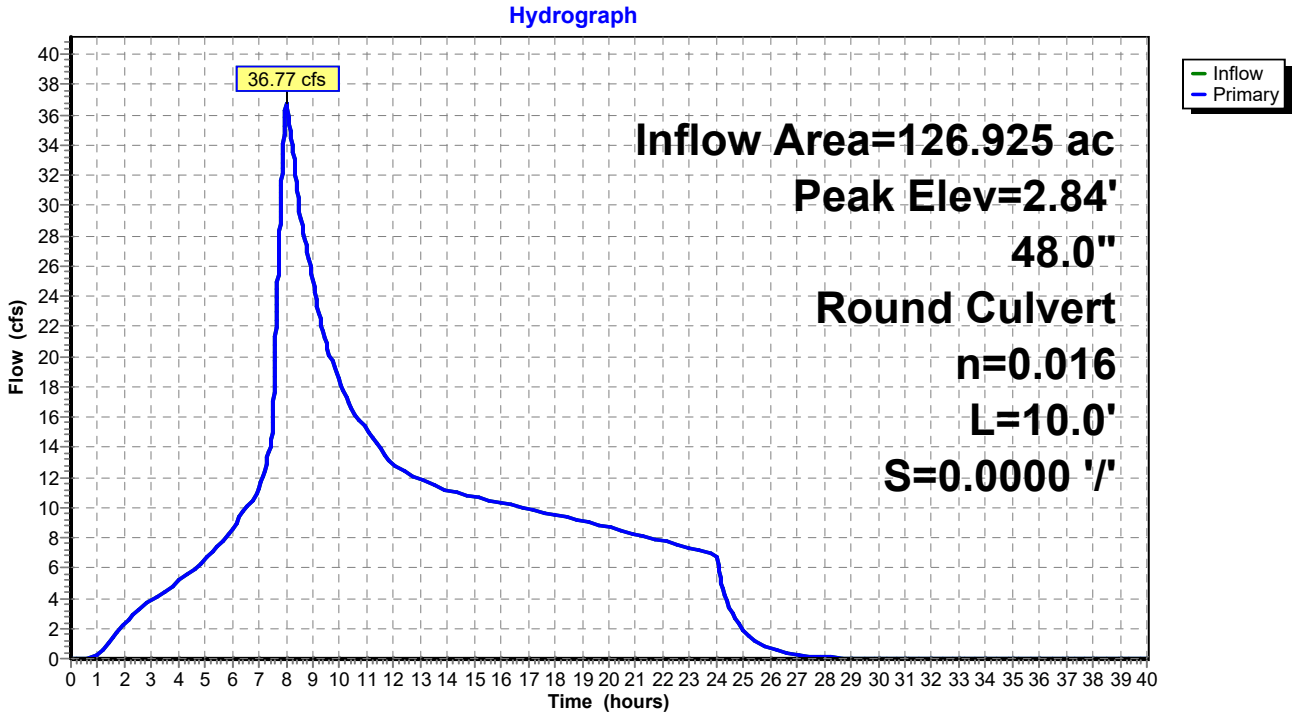
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 1.98" for 10-Yr event
Inflow = 36.77 cfs @ 8.01 hrs, Volume= 20.993 af
Outflow = 36.77 cfs @ 8.01 hrs, Volume= 20.993 af, Atten= 0%, Lag= 0.0 min
Primary = 36.77 cfs @ 8.01 hrs, Volume= 20.993 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 2.84' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=36.77 cfs @ 8.01 hrs HW=2.84' (Free Discharge)
└**1=Culvert** (Barrel Controls 36.77 cfs @ 5.40 fps)

Pond 10P: Offsite Flows



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=2.76 cfs 0.920 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=1.95 cfs 0.651 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 0.118 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=4.09 cfs 1.363 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.63 cfs 0.209 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.30 cfs 0.101 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.64 cfs 0.215 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.52 cfs 0.173 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=3.20 cfs 1.067 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=2.06 cfs 0.687 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.142 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=2.08 cfs 0.692 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.037 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.26 cfs 0.086 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.30 cfs 0.099 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=0.50 cfs 0.166 af

Subcatchment 8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=3.59"
Tc=12.0 min CN=0/98 Runoff=1.62 cfs 0.584 af

Subcatchment 10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=3.59"
Tc=15.0 min CN=0/98 Runoff=12.60 cfs 4.711 af

Subcatchment A: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=2.27"
Tc=20.0 min CN=74/98 Runoff=8.38 cfs 3.696 af

Subcatchment B: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=2.27"
Tc=60.0 min CN=74/98 Runoff=25.41 cfs 17.342 af

Subcatchment OS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=0/98 Runoff=1.48 cfs 0.494 af

Pond 3P: (new Pond) Peak Elev=0.83' Inflow=3.44 cfs 1.145 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=3.44 cfs 1.145 af

Pond 4P: (new Pond) Peak Elev=1.04' Inflow=5.38 cfs 1.790 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=5.38 cfs 1.790 af

Pond 5P: (new Pond) Peak Elev=0.93' Inflow=4.37 cfs 1.454 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.37 cfs 1.454 af

Pond 6P: (new Pond) Peak Elev=0.97' Inflow=4.67 cfs 1.557 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.67 cfs 1.557 af

Pond 7P: (new Pond) Peak Elev=0.47' Inflow=1.05 cfs 0.351 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.05 cfs 0.351 af

Pond 10P: Offsite Flows Peak Elev=3.22' Inflow=45.61 cfs 25.749 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=45.61 cfs 25.749 af

Summary for Subcatchment 2: Basin 20

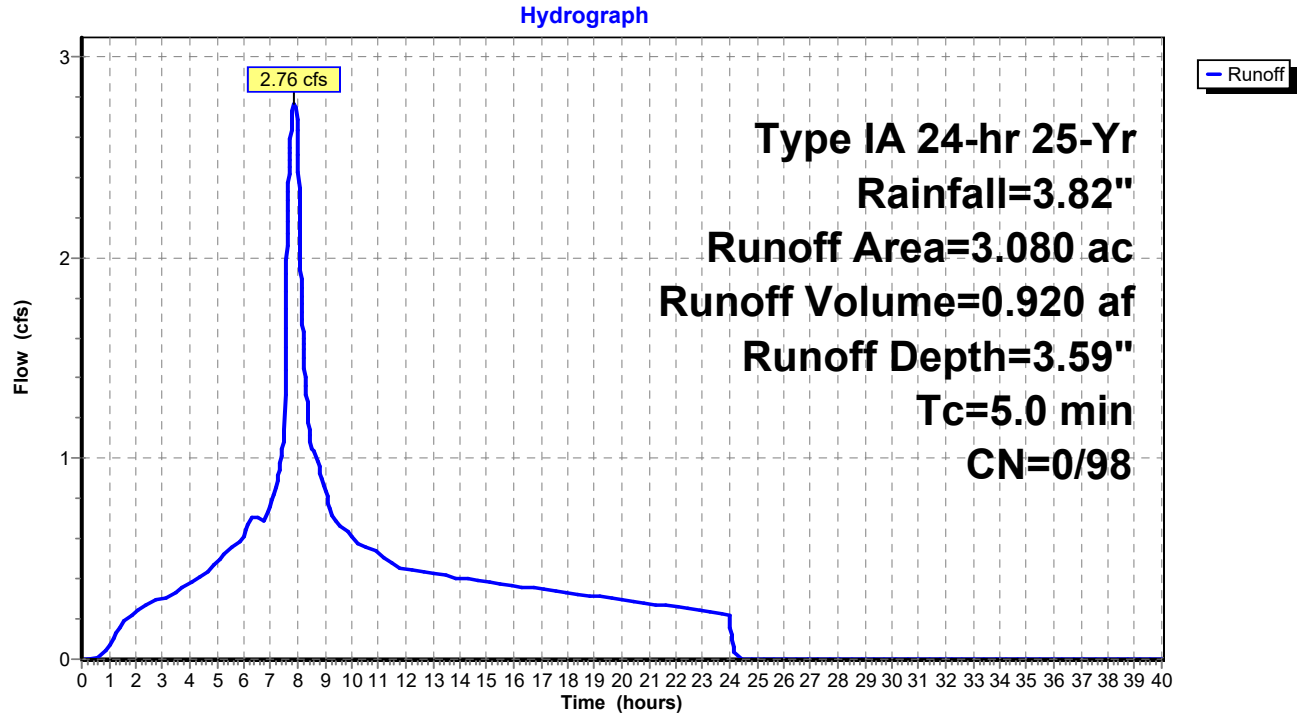
Runoff = 2.76 cfs @ 7.88 hrs, Volume= 0.920 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

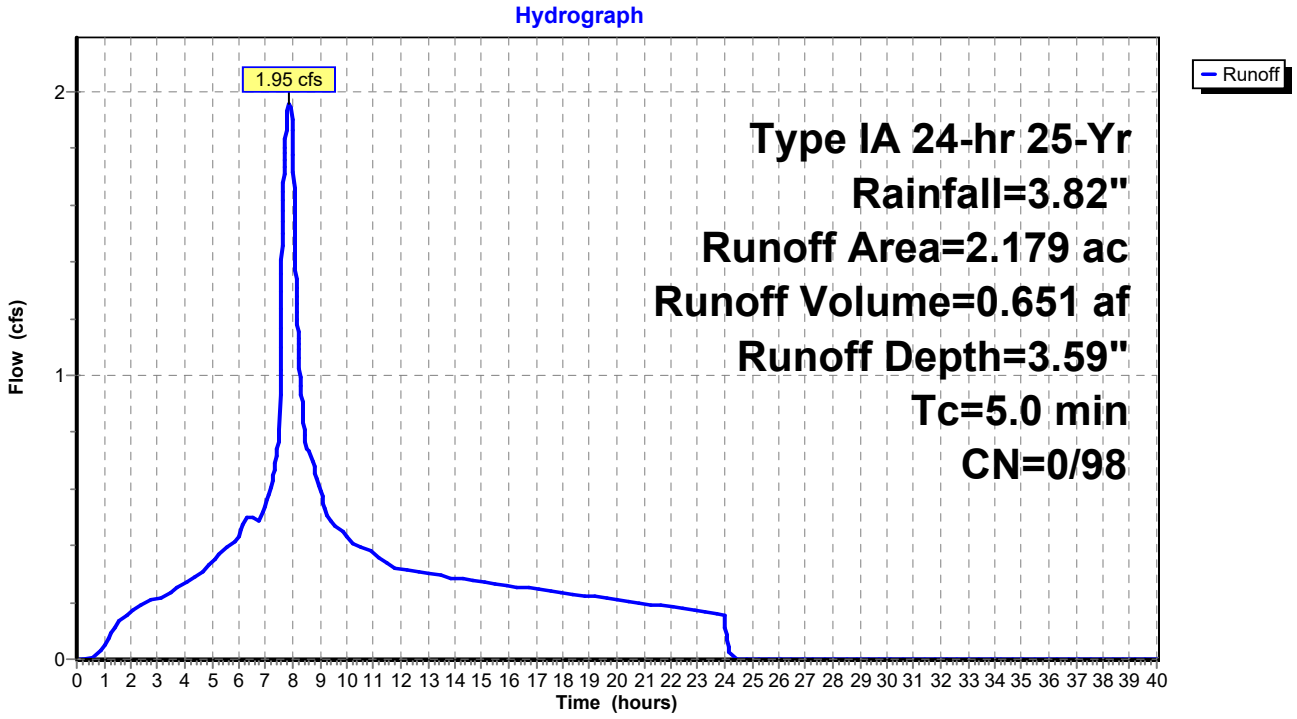
Runoff = 1.95 cfs @ 7.88 hrs, Volume= 0.651 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

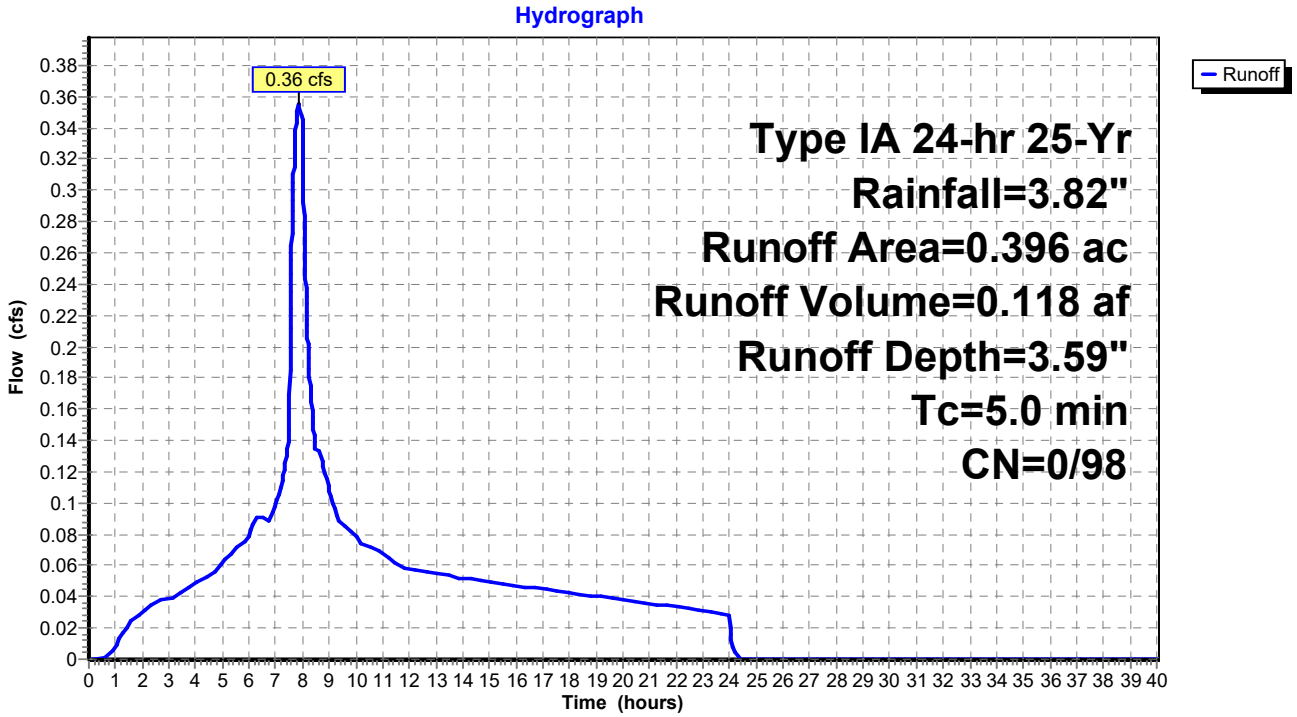
Runoff = 0.36 cfs @ 7.88 hrs, Volume= 0.118 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

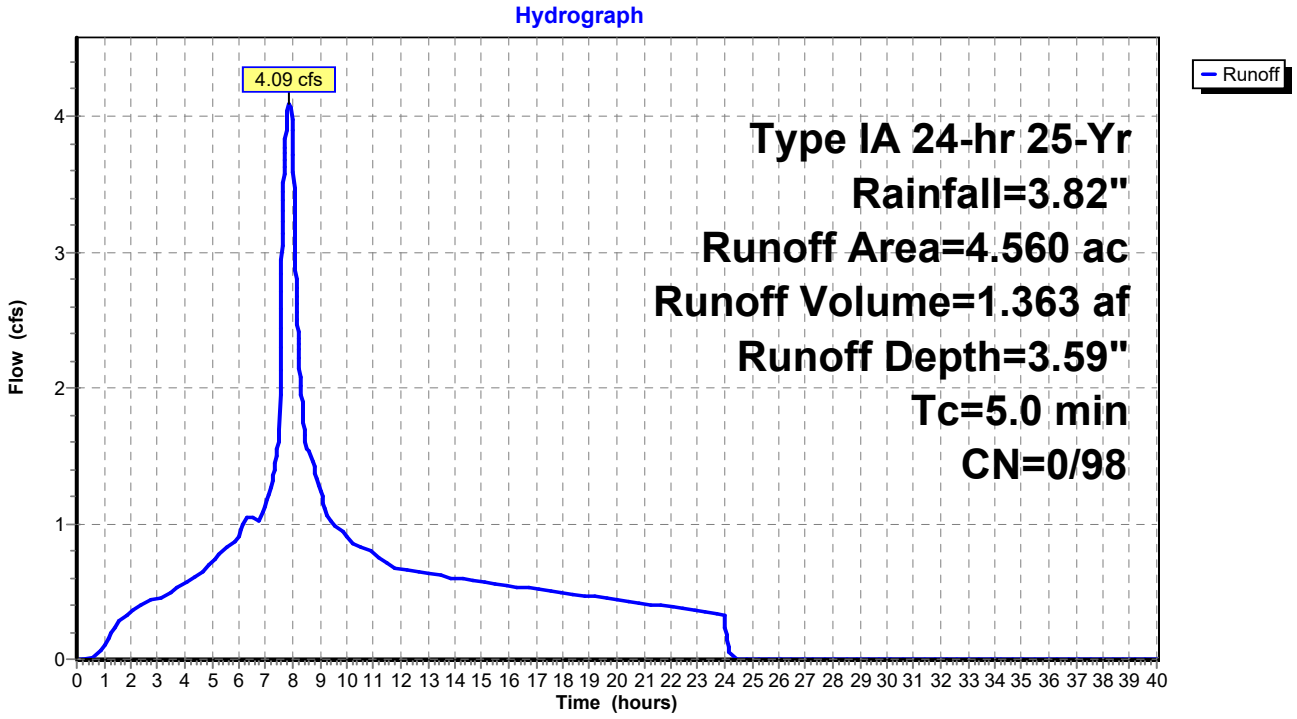
Runoff = 4.09 cfs @ 7.88 hrs, Volume= 1.363 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

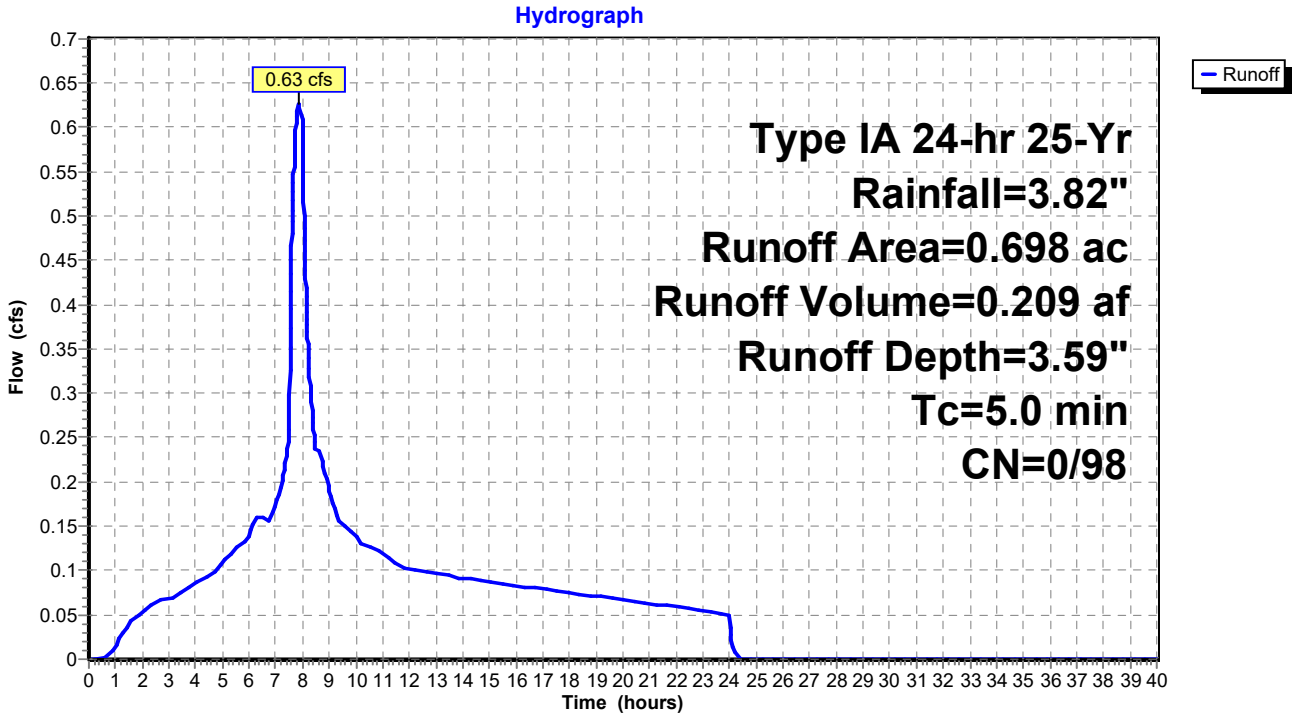
Runoff = 0.63 cfs @ 7.88 hrs, Volume= 0.209 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

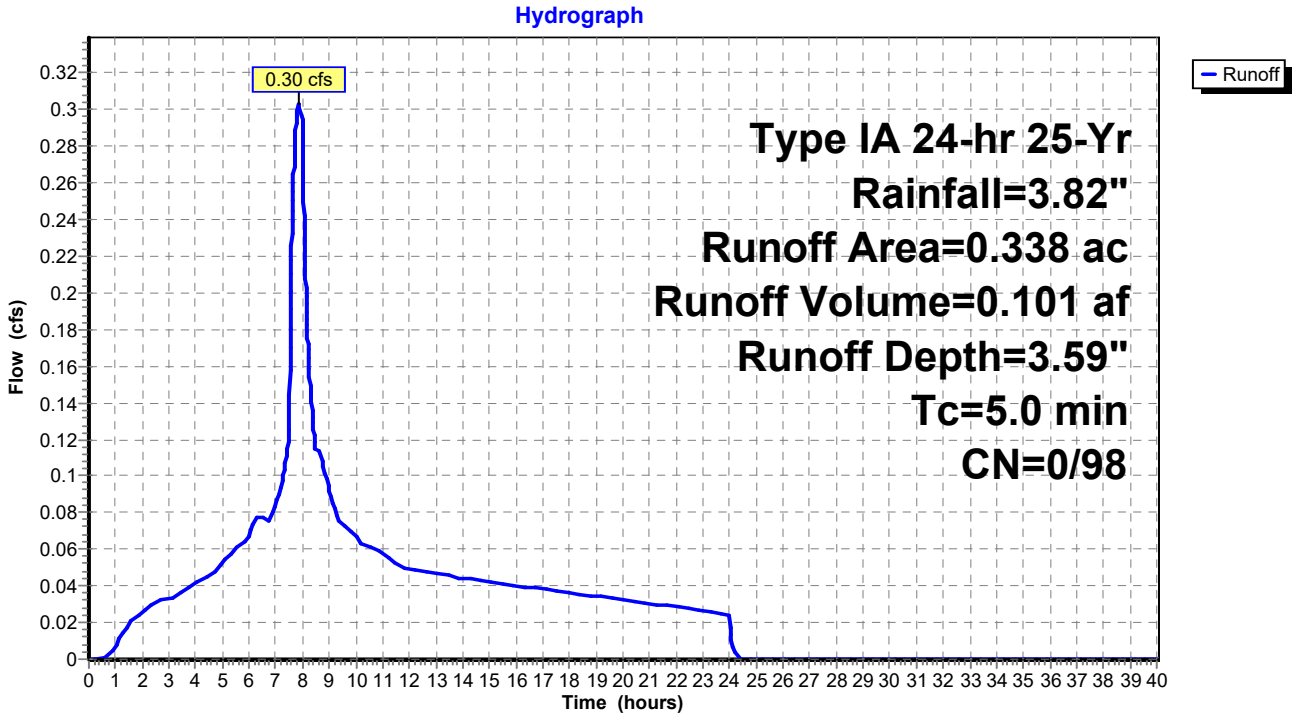
Runoff = 0.30 cfs @ 7.88 hrs, Volume= 0.101 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

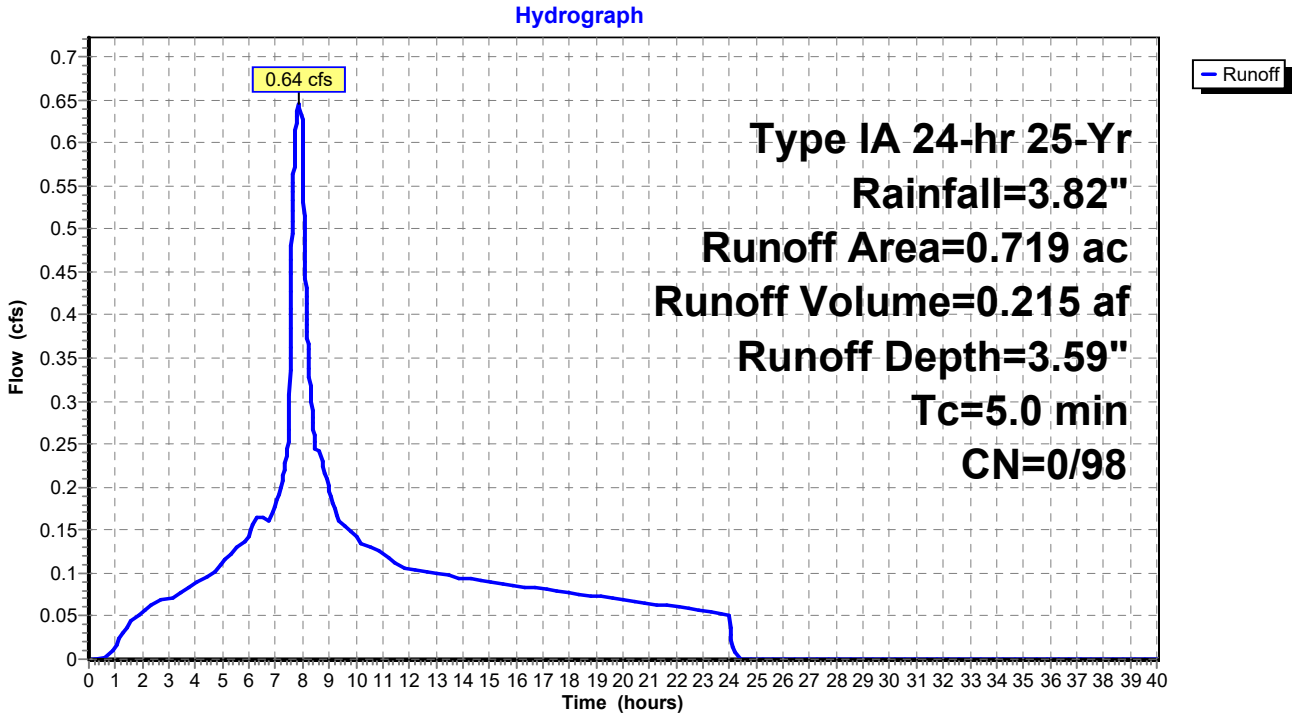
Runoff = 0.64 cfs @ 7.88 hrs, Volume= 0.215 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

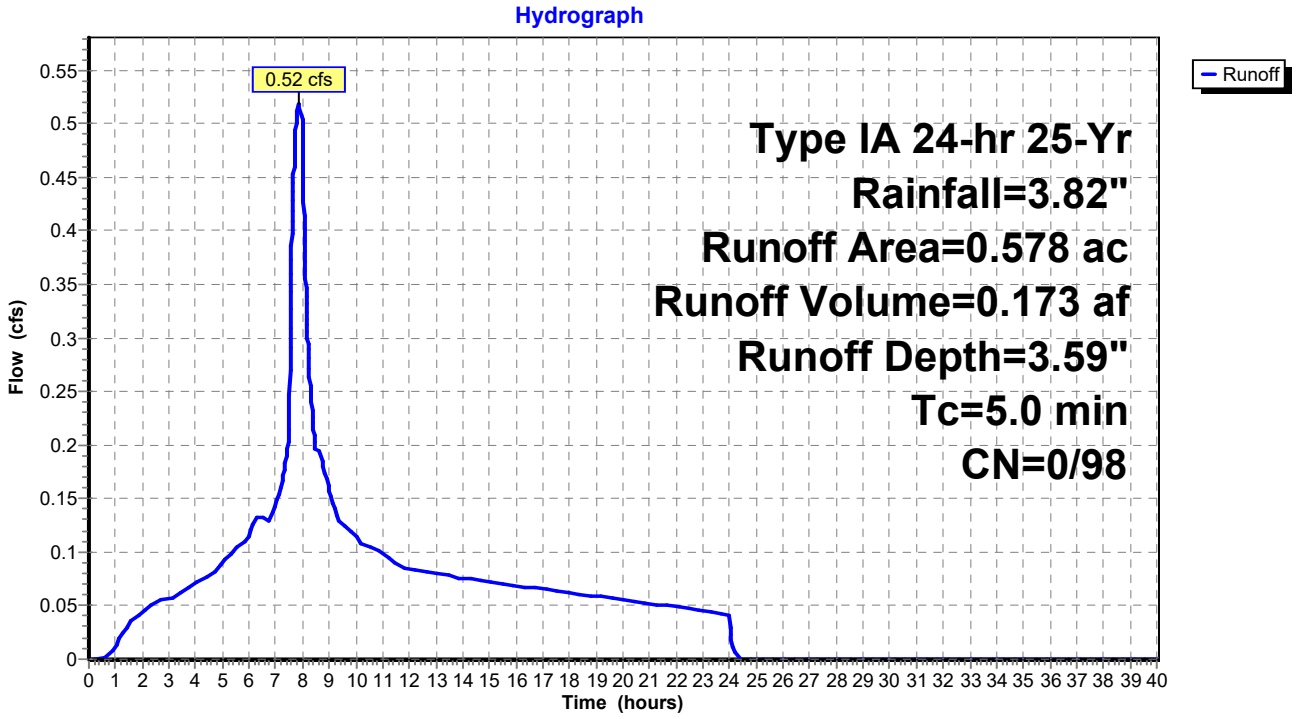
Runoff = 0.52 cfs @ 7.88 hrs, Volume= 0.173 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

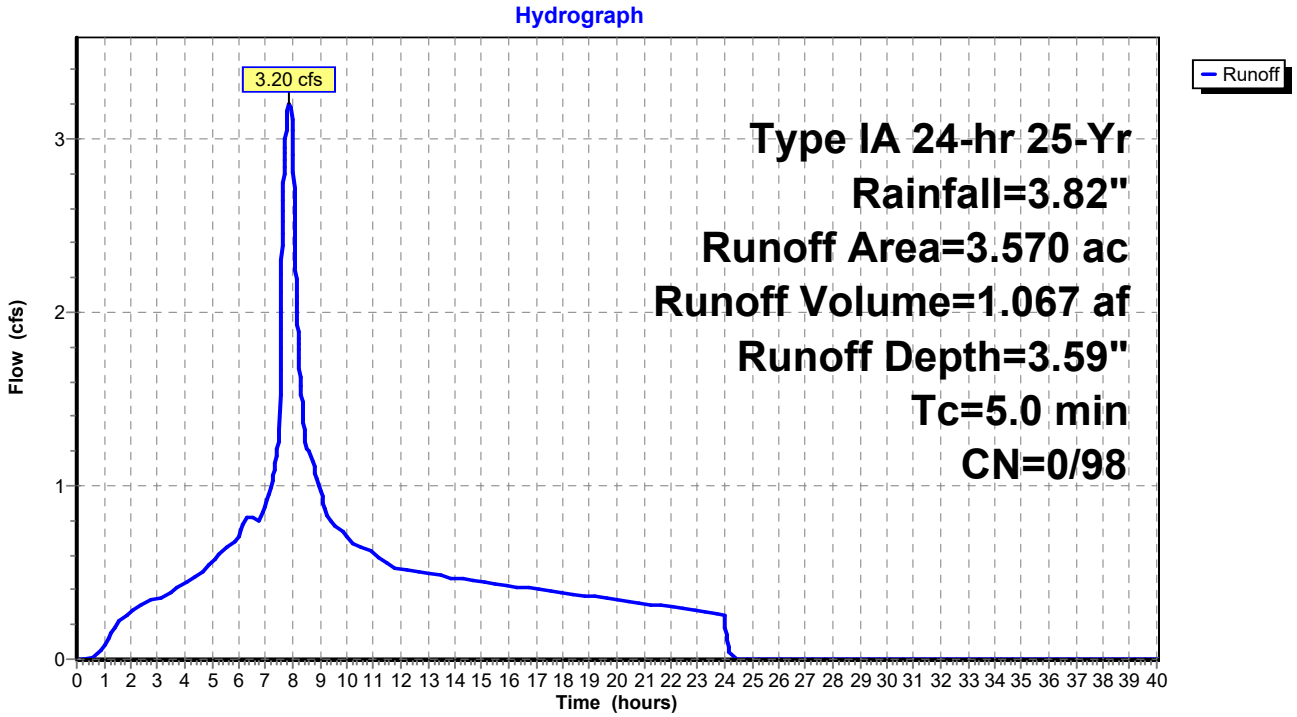
Runoff = 3.20 cfs @ 7.88 hrs, Volume= 1.067 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

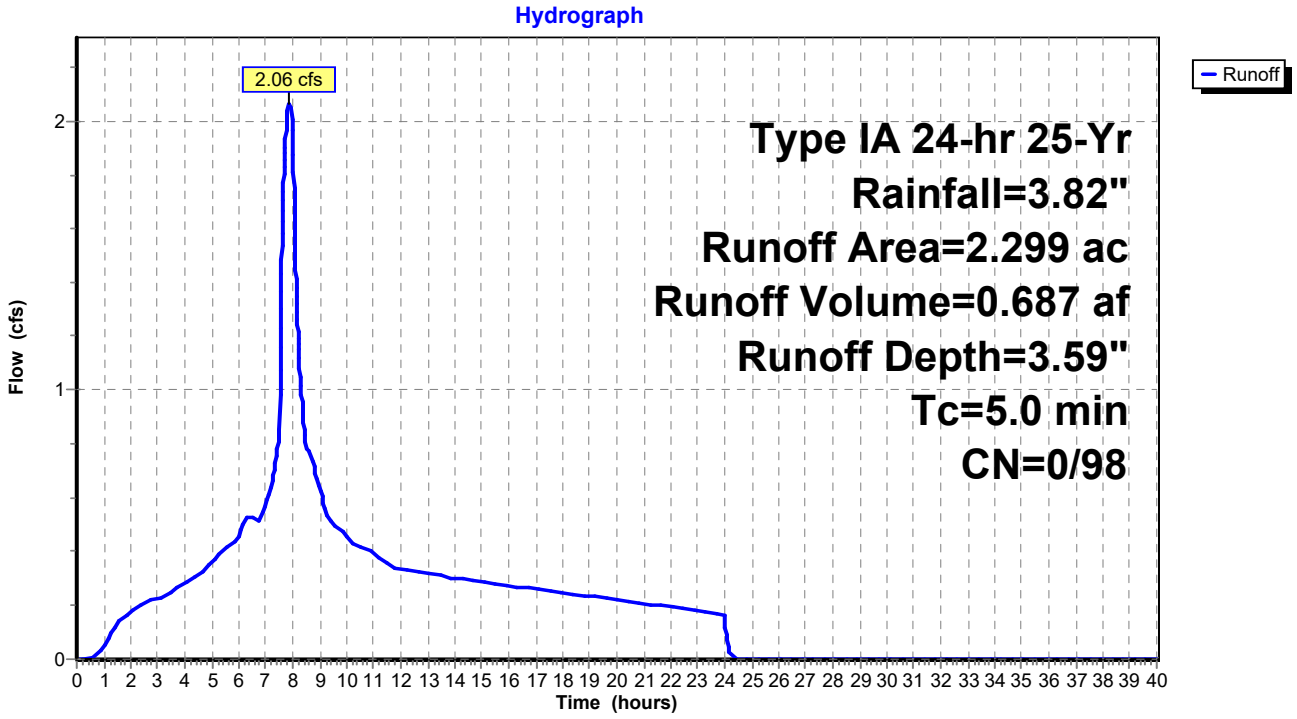
Runoff = 2.06 cfs @ 7.88 hrs, Volume= 0.687 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

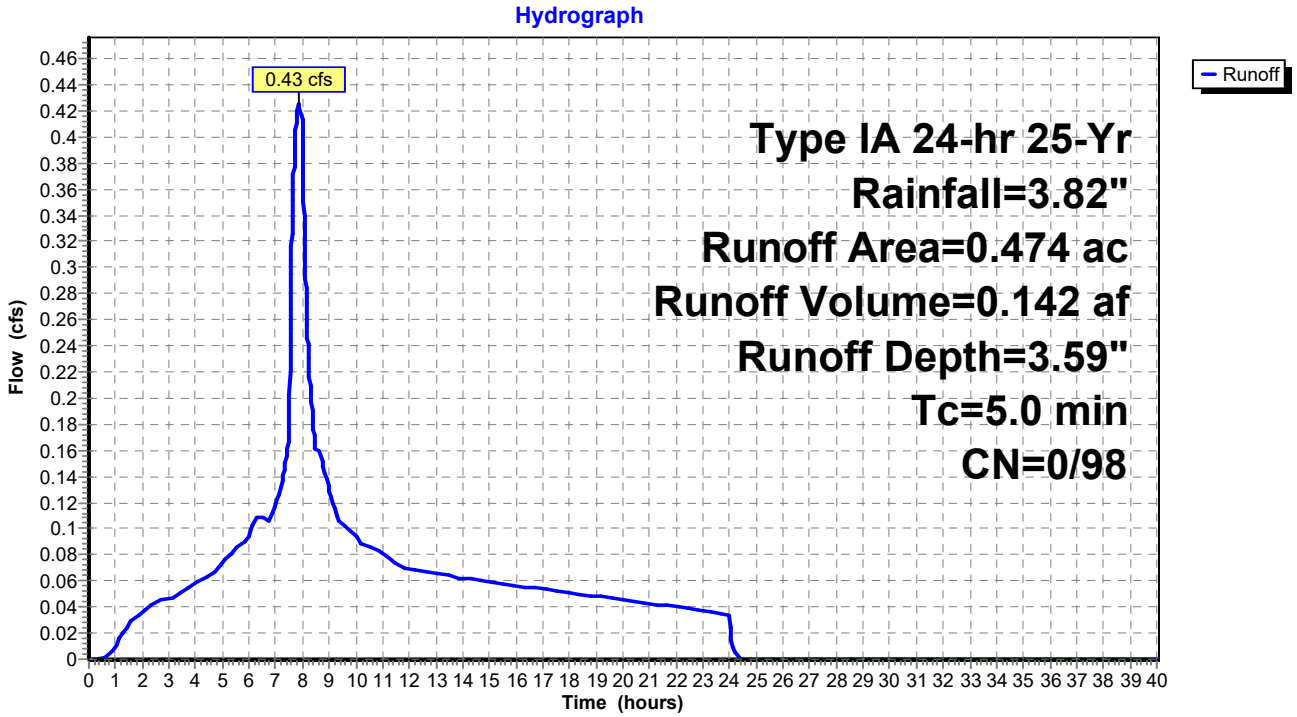
Runoff = 0.43 cfs @ 7.88 hrs, Volume= 0.142 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

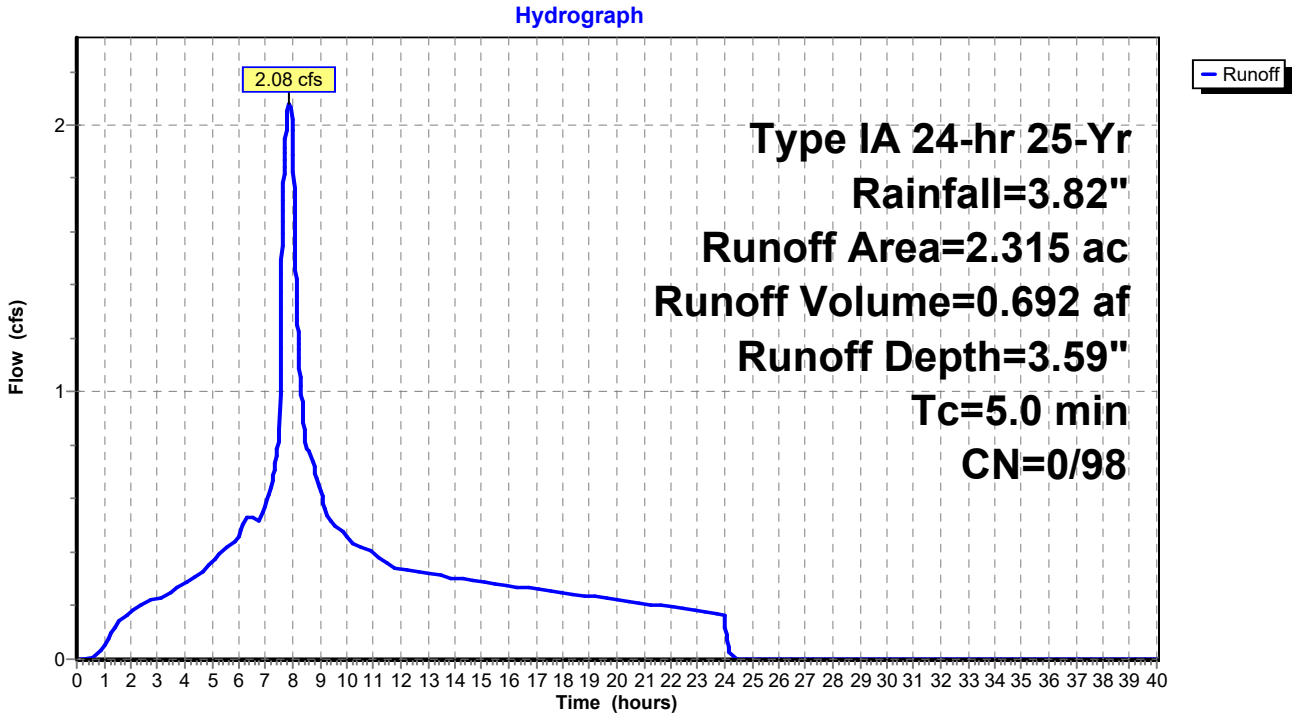
Runoff = 2.08 cfs @ 7.88 hrs, Volume= 0.692 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

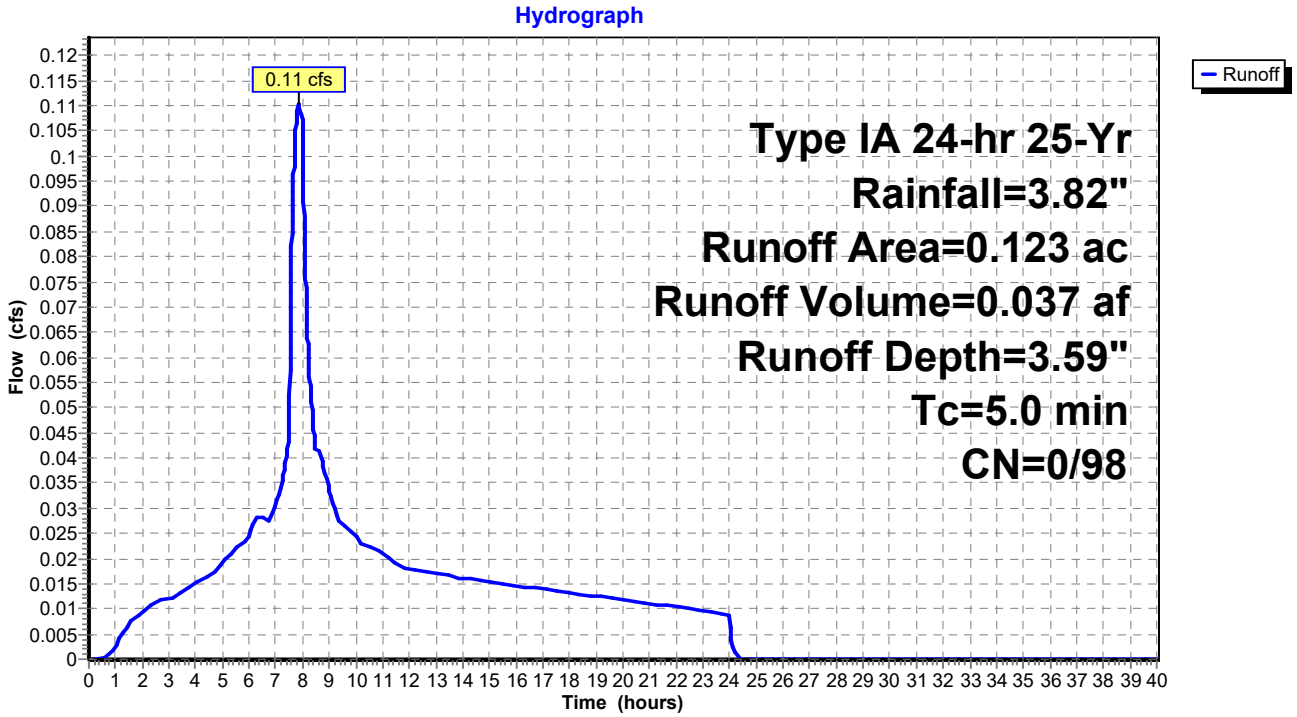
Runoff = 0.11 cfs @ 7.88 hrs, Volume= 0.037 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

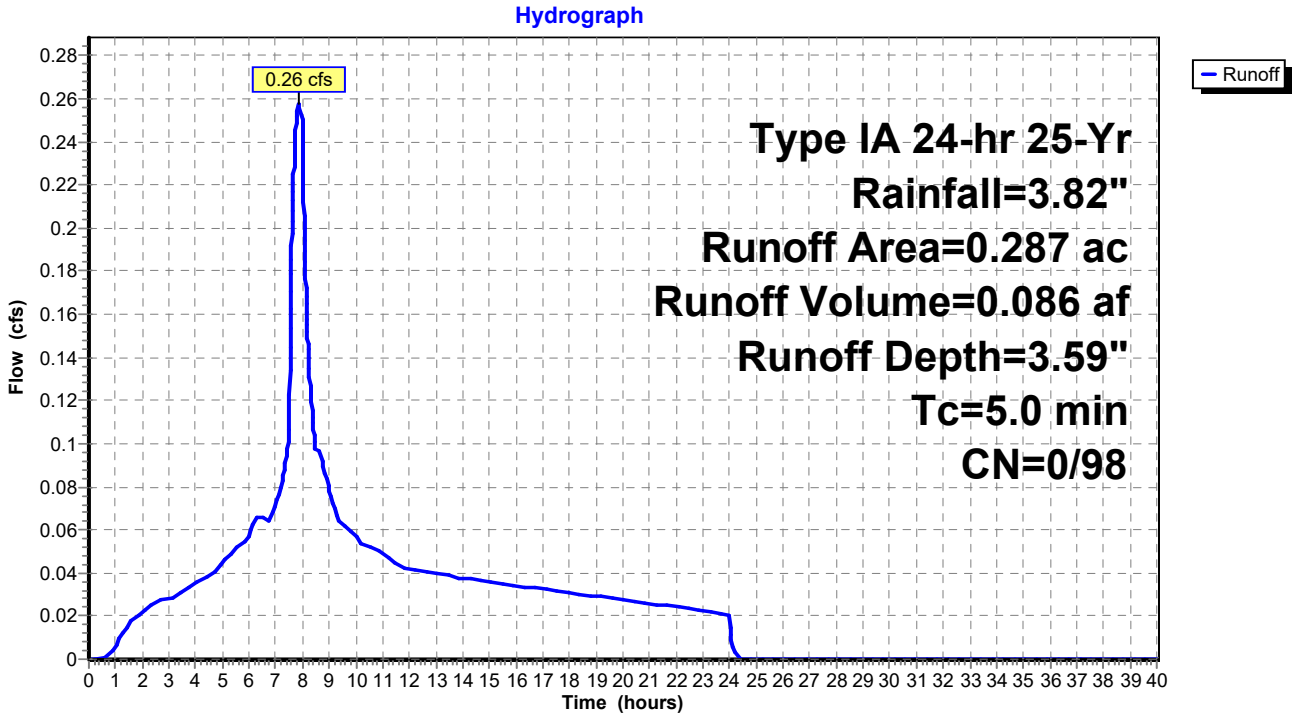
Runoff = 0.26 cfs @ 7.88 hrs, Volume= 0.086 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

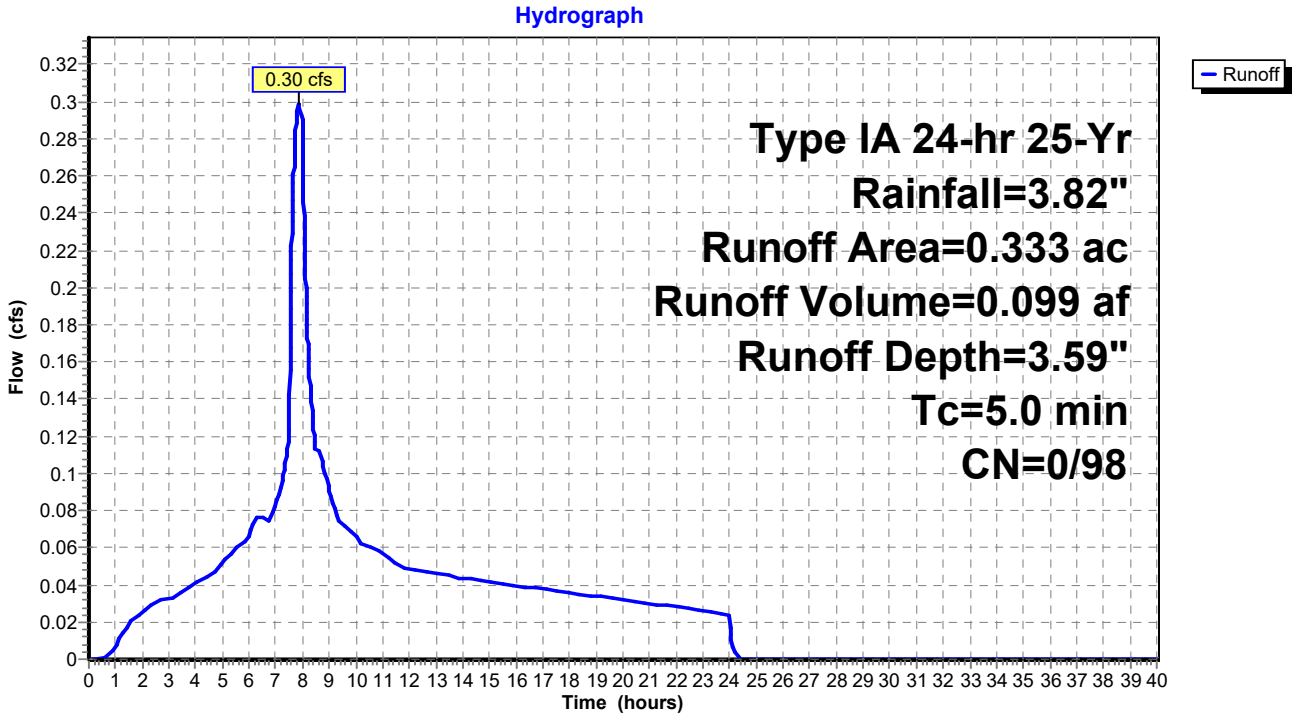
Runoff = 0.30 cfs @ 7.88 hrs, Volume= 0.099 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

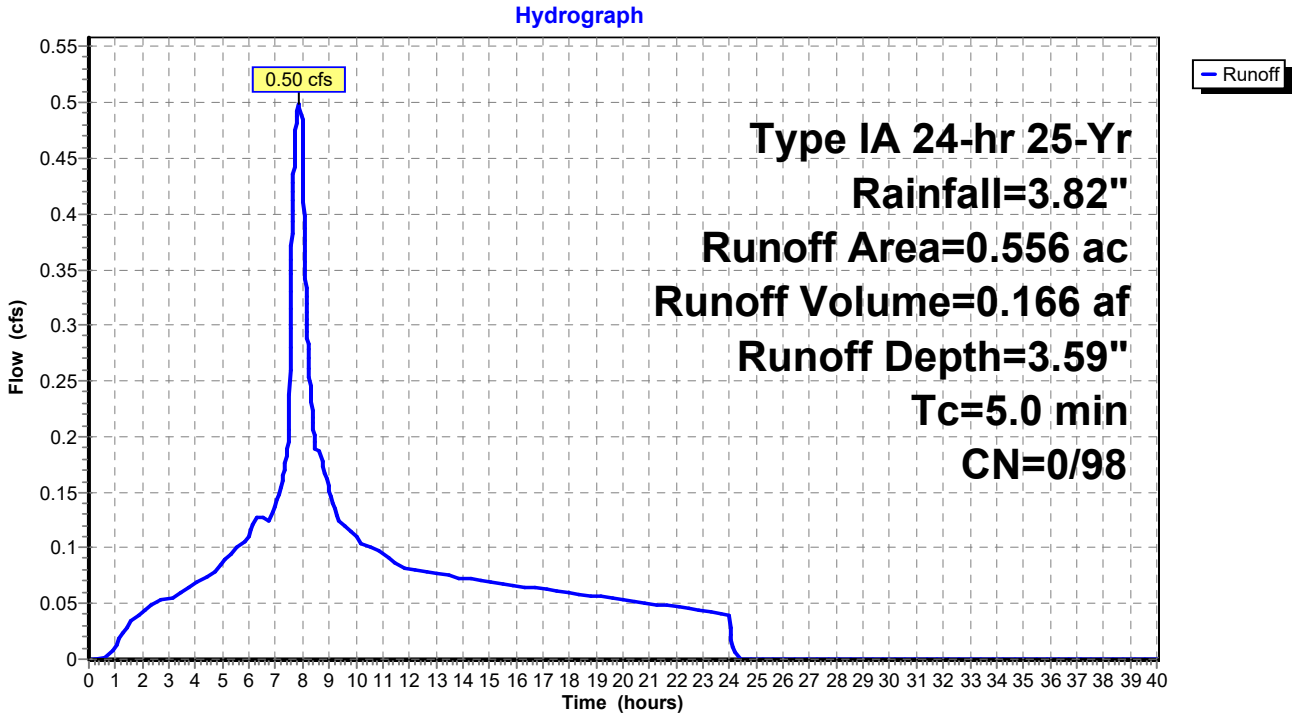
Runoff = 0.50 cfs @ 7.88 hrs, Volume= 0.166 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

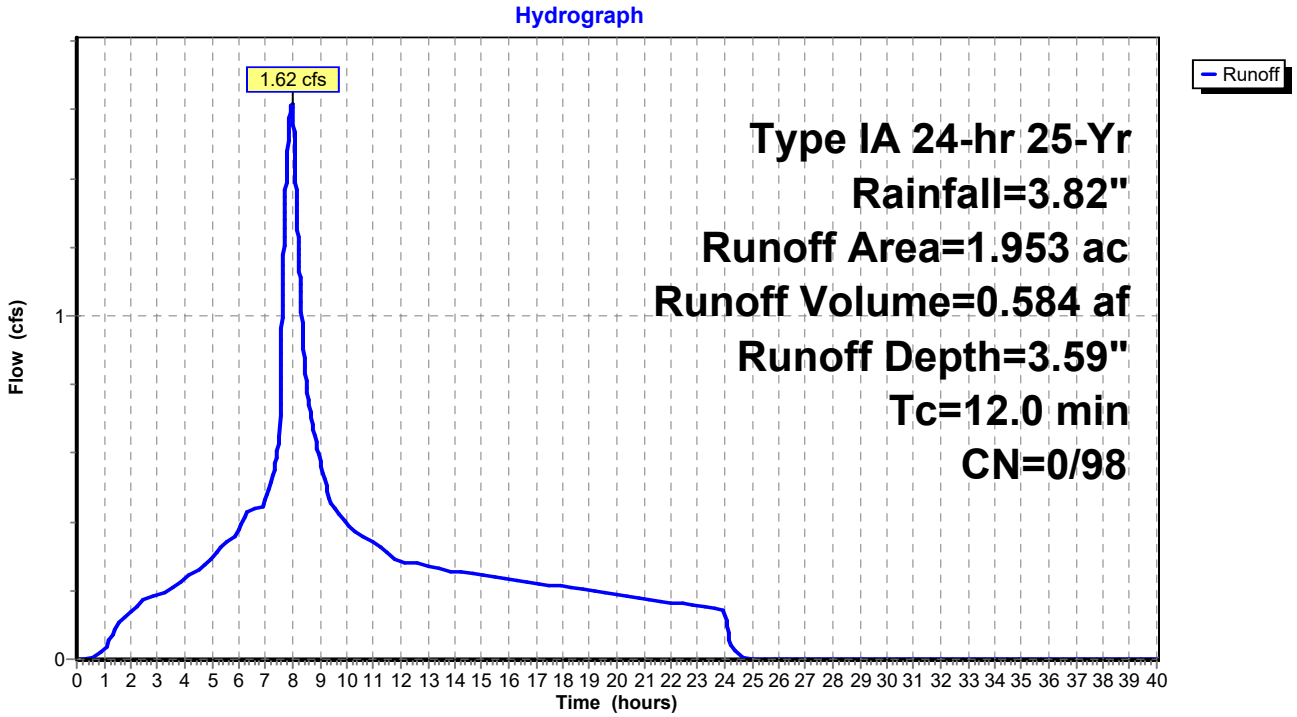
Runoff = 1.62 cfs @ 7.99 hrs, Volume= 0.584 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

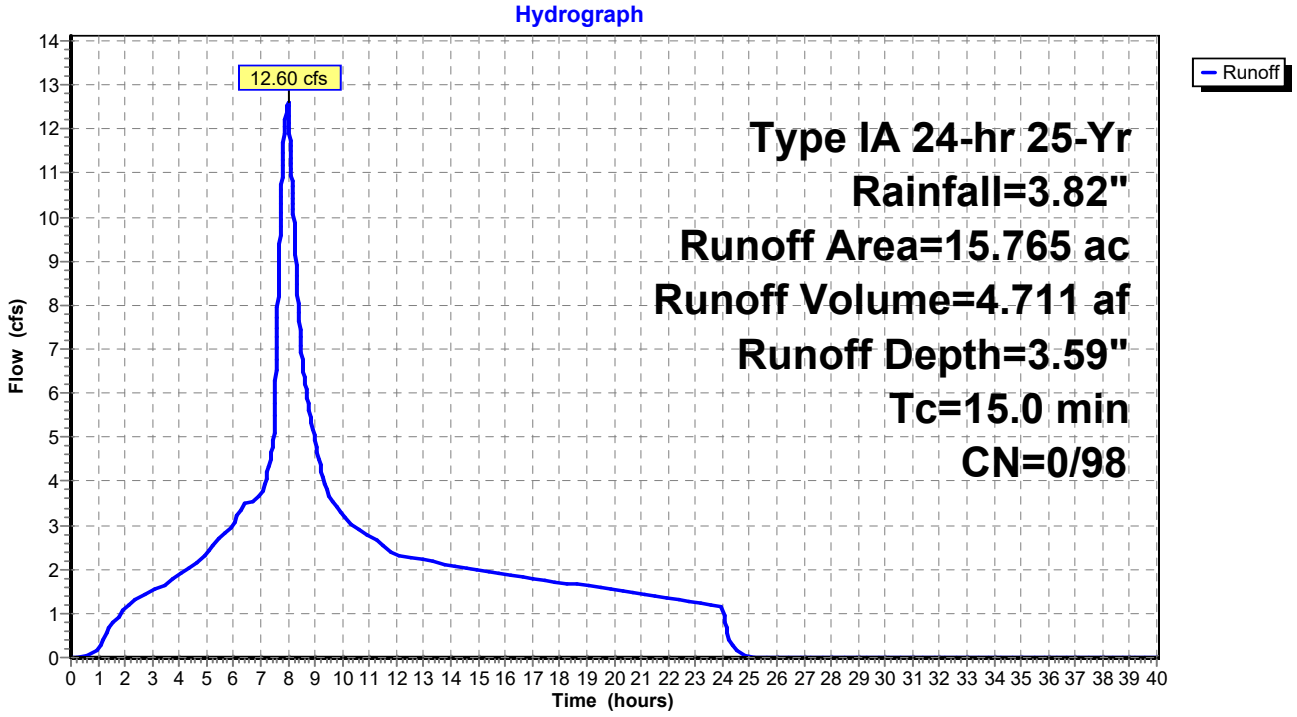
Runoff = 12.60 cfs @ 8.00 hrs, Volume= 4.711 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

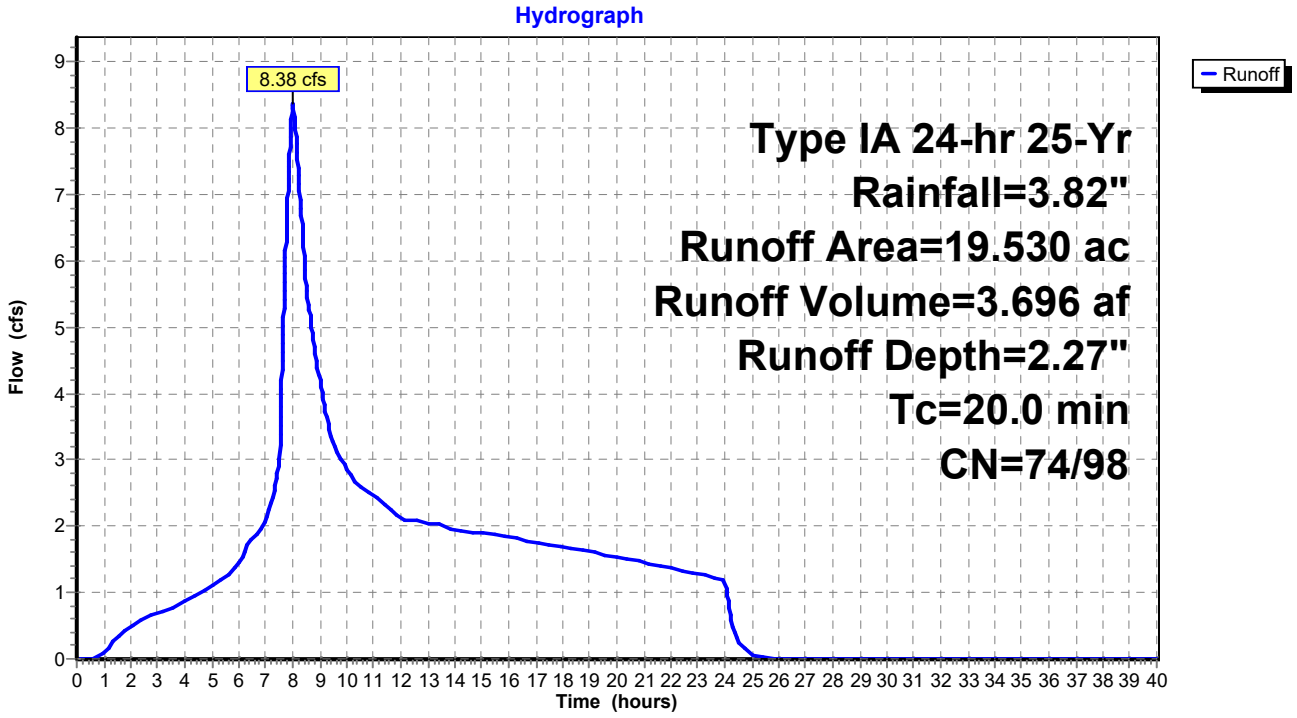
Runoff = 8.38 cfs @ 8.01 hrs, Volume= 3.696 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

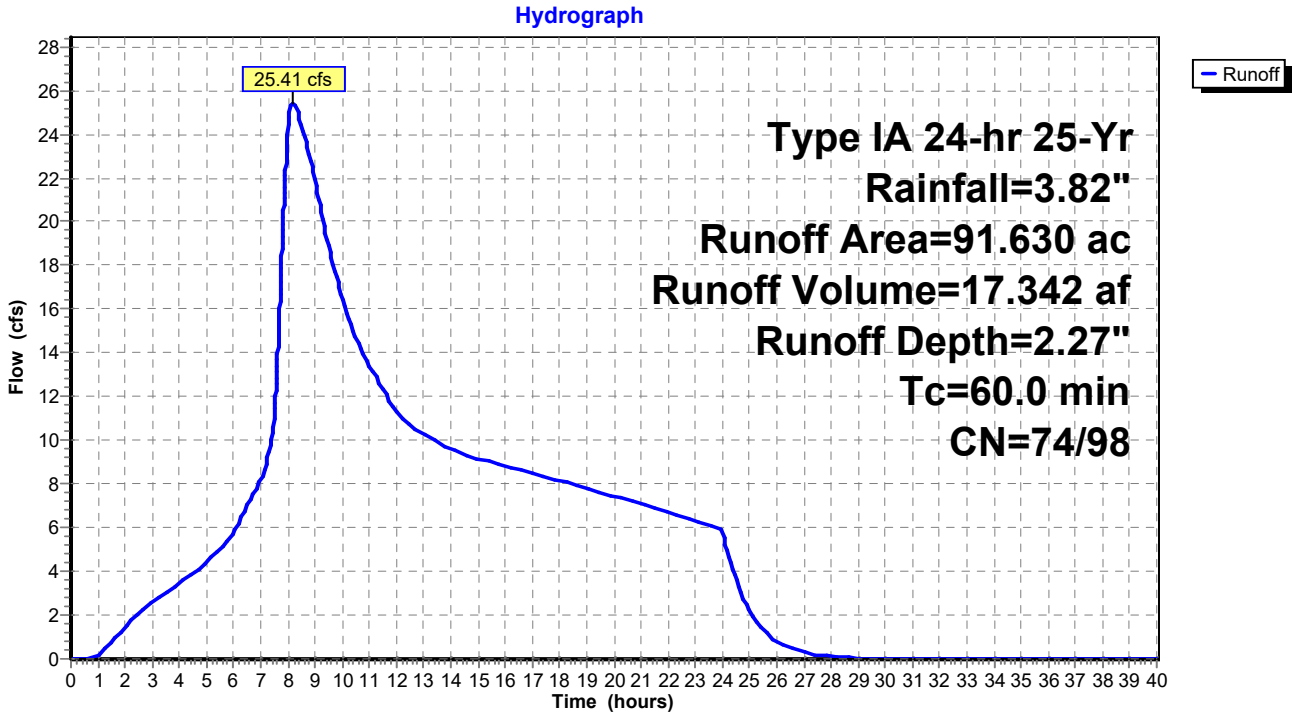
Runoff = 25.41 cfs @ 8.20 hrs, Volume= 17.342 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

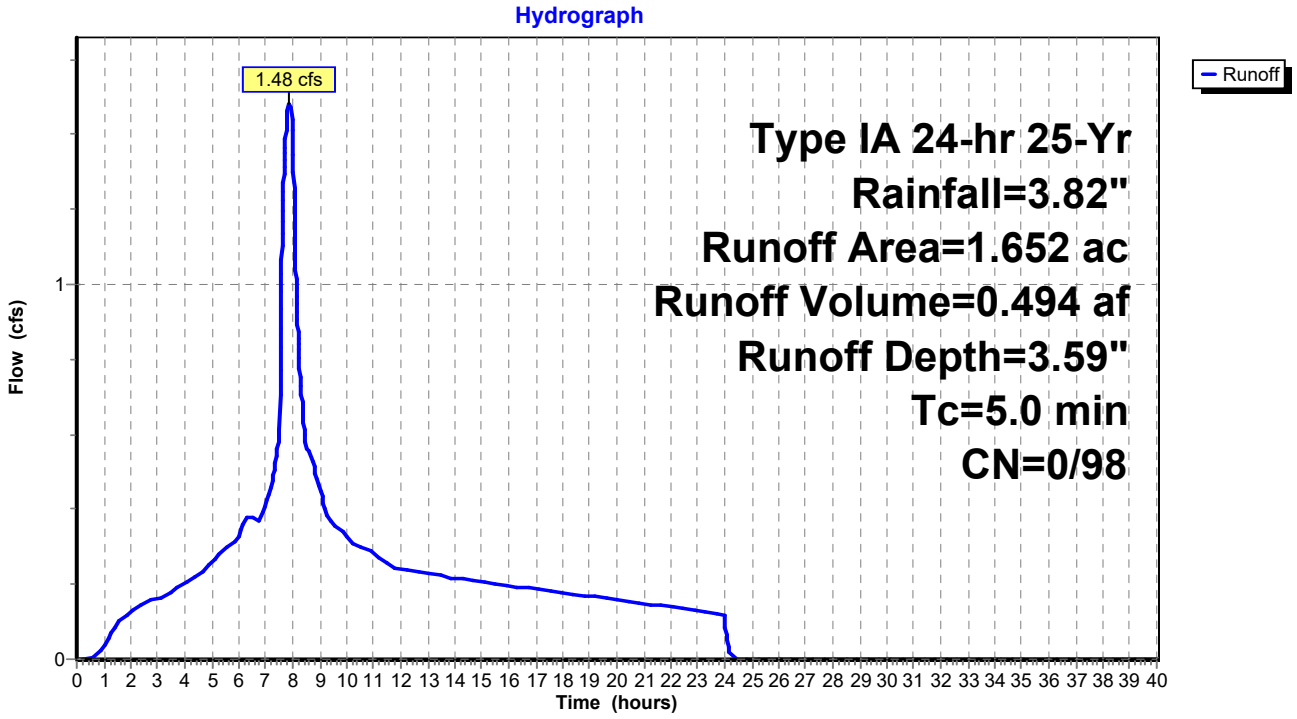
Runoff = 1.48 cfs @ 7.88 hrs, Volume= 0.494 af, Depth= 3.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=3.82"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

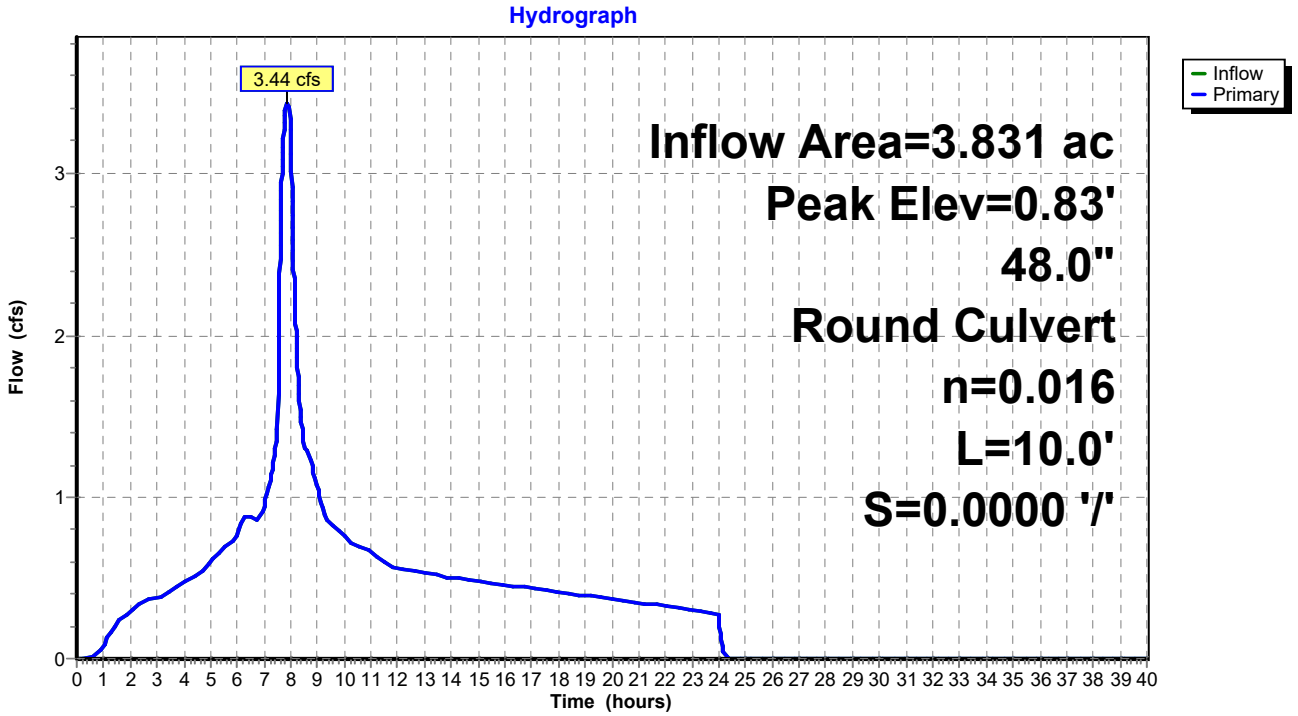
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 3.44 cfs @ 7.88 hrs, Volume= 1.145 af
Outflow = 3.44 cfs @ 7.88 hrs, Volume= 1.145 af, Atten= 0%, Lag= 0.0 min
Primary = 3.44 cfs @ 7.88 hrs, Volume= 1.145 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.83' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=3.43 cfs @ 7.88 hrs HW=0.83' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.43 cfs @ 2.75 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

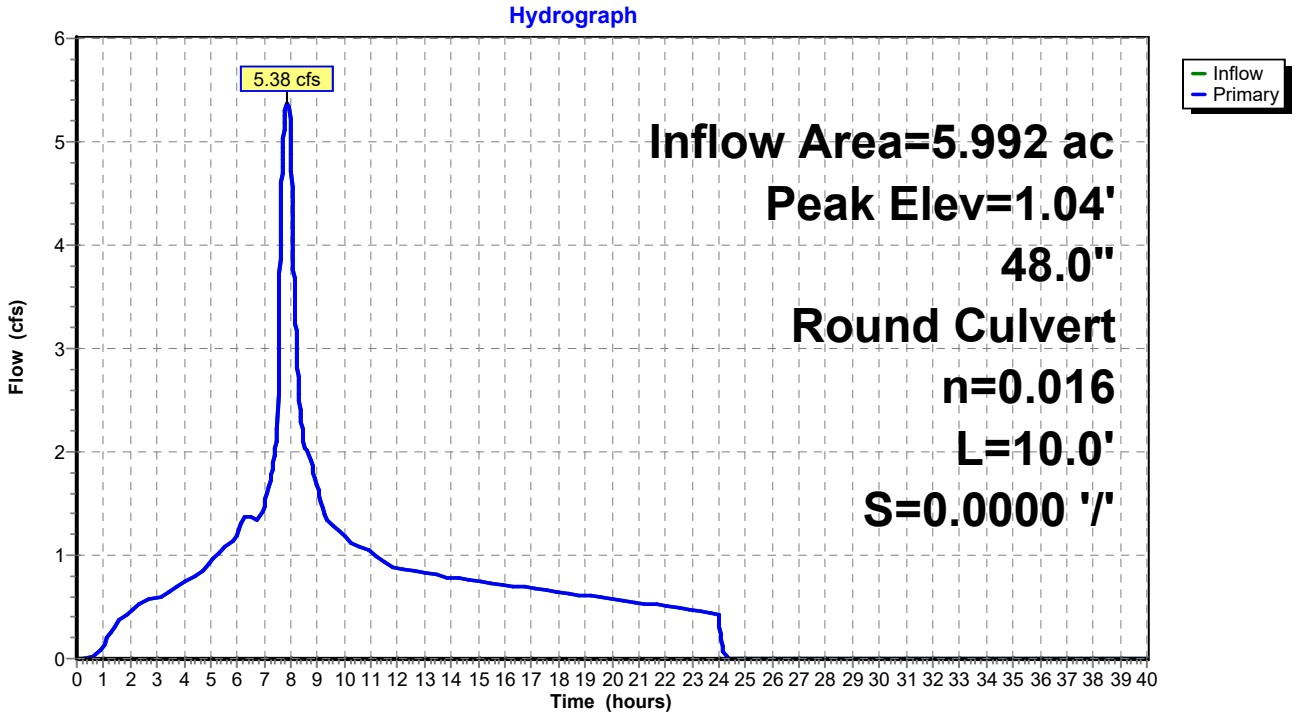
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 5.38 cfs @ 7.88 hrs, Volume= 1.790 af
Outflow = 5.38 cfs @ 7.88 hrs, Volume= 1.790 af, Atten= 0%, Lag= 0.0 min
Primary = 5.38 cfs @ 7.88 hrs, Volume= 1.790 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.04' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=5.37 cfs @ 7.88 hrs HW=1.04' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.37 cfs @ 3.13 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

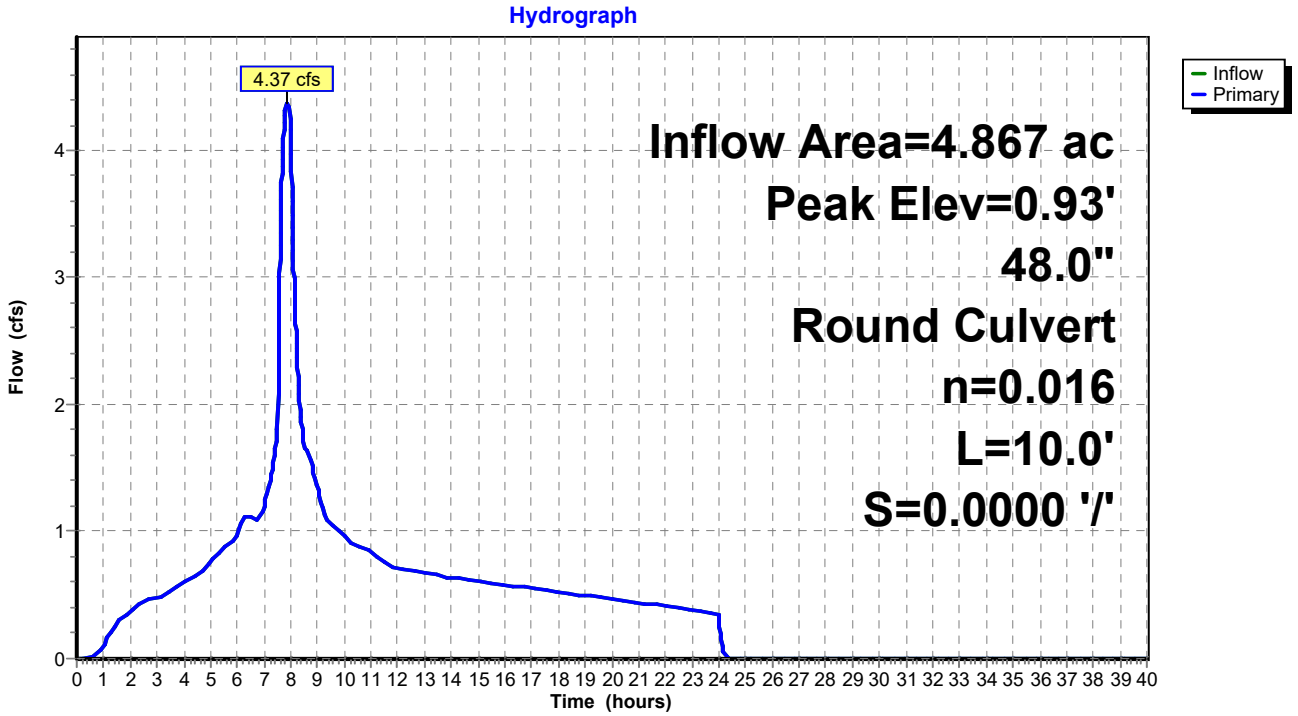
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 4.37 cfs @ 7.88 hrs, Volume= 1.454 af
Outflow = 4.37 cfs @ 7.88 hrs, Volume= 1.454 af, Atten= 0%, Lag= 0.0 min
Primary = 4.37 cfs @ 7.88 hrs, Volume= 1.454 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.93' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.36 cfs @ 7.88 hrs HW=0.93' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.36 cfs @ 2.95 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

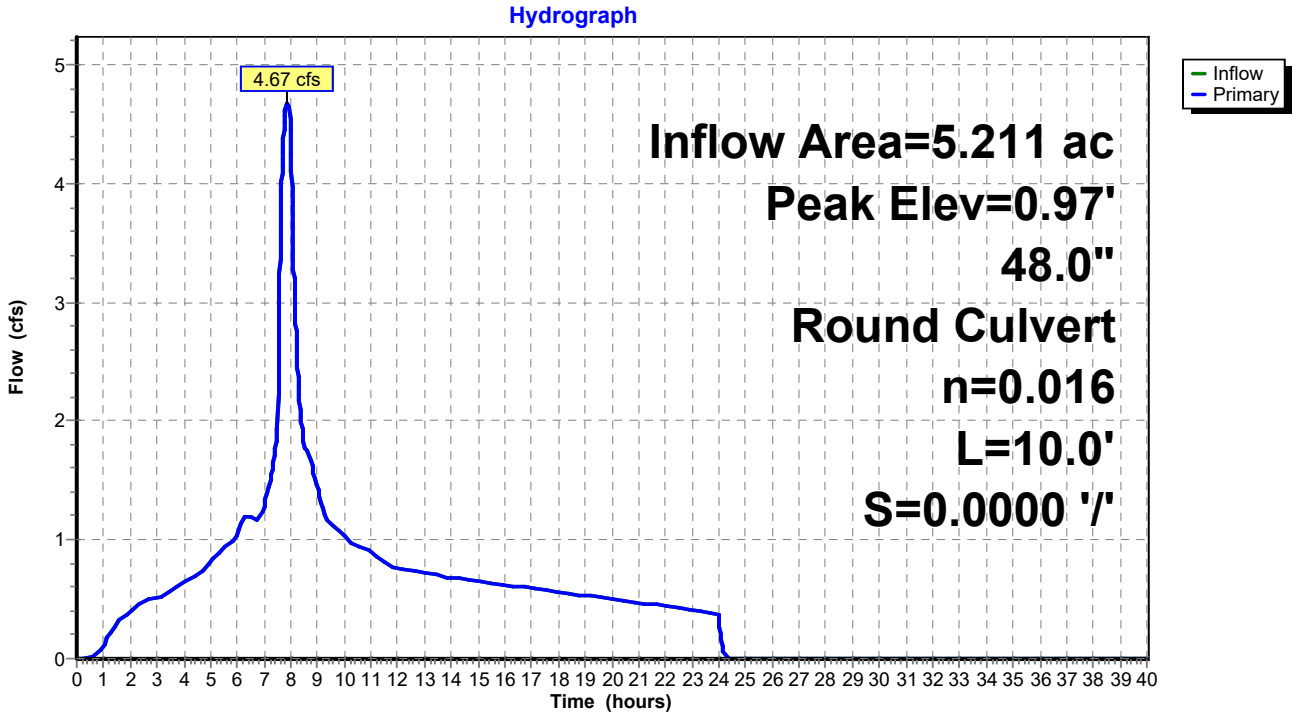
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 4.67 cfs @ 7.88 hrs, Volume= 1.557 af
Outflow = 4.67 cfs @ 7.88 hrs, Volume= 1.557 af, Atten= 0%, Lag= 0.0 min
Primary = 4.67 cfs @ 7.88 hrs, Volume= 1.557 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.97' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.67 cfs @ 7.88 hrs HW=0.97' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.67 cfs @ 3.01 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

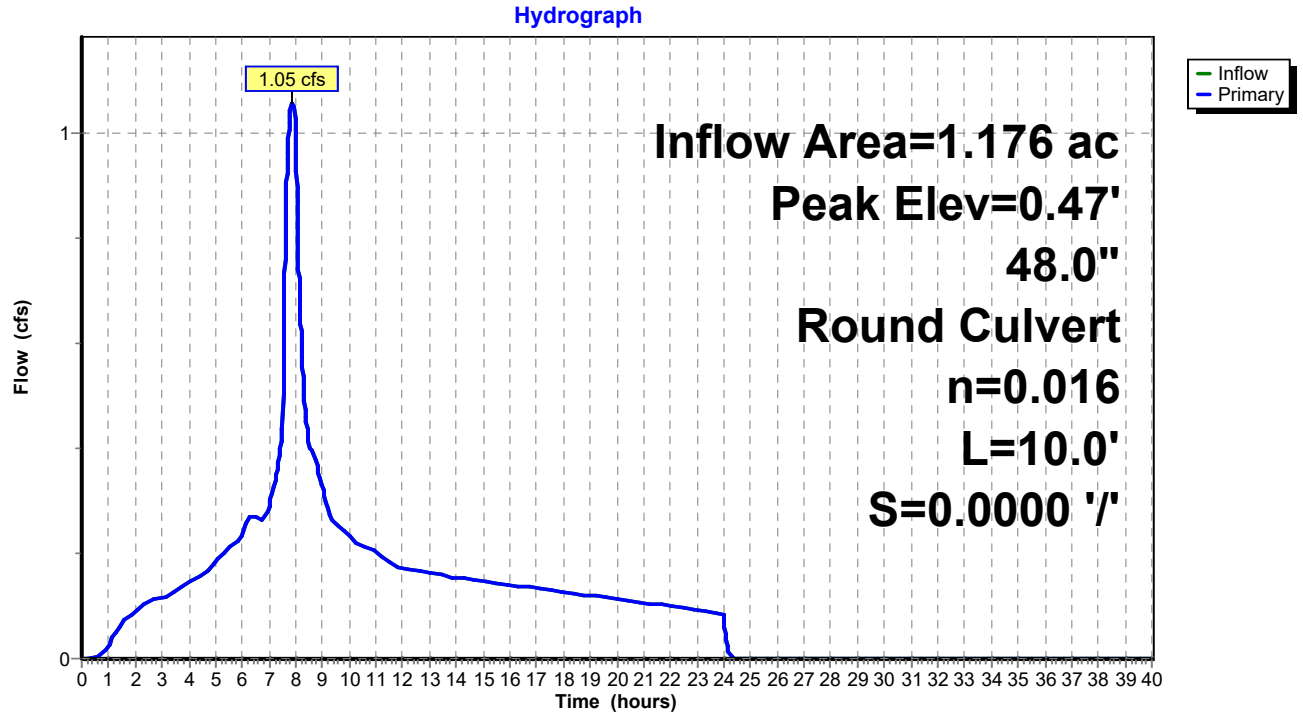
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 3.59" for 25-Yr event
Inflow = 1.05 cfs @ 7.88 hrs, Volume= 0.351 af
Outflow = 1.05 cfs @ 7.88 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min
Primary = 1.05 cfs @ 7.88 hrs, Volume= 0.351 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.47' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.05 cfs @ 7.88 hrs HW=0.47' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.05 cfs @ 1.93 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

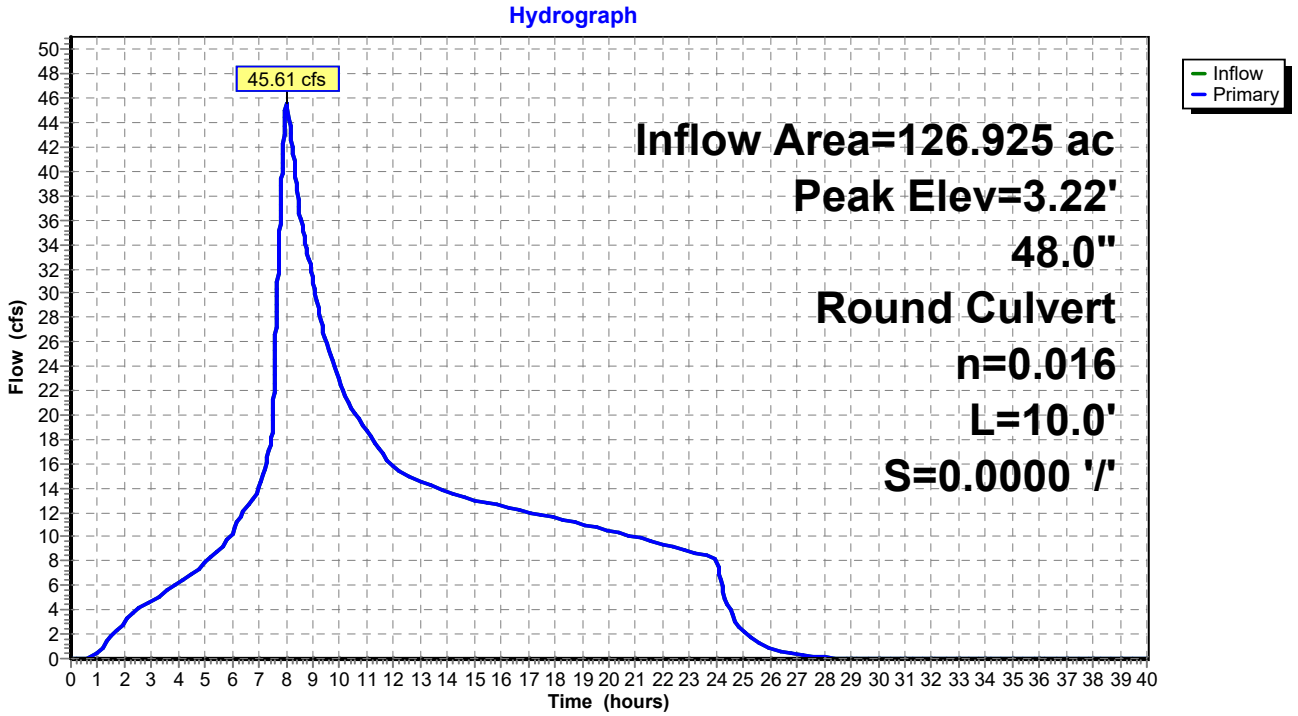
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 2.43" for 25-Yr event
Inflow = 45.61 cfs @ 8.01 hrs, Volume= 25.749 af
Outflow = 45.61 cfs @ 8.01 hrs, Volume= 25.749 af, Atten= 0%, Lag= 0.0 min
Primary = 45.61 cfs @ 8.01 hrs, Volume= 25.749 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 3.22' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=45.60 cfs @ 8.01 hrs HW=3.22' (Free Discharge)
└**1=Culvert** (Barrel Controls 45.60 cfs @ 5.75 fps)

Pond 10P: Offsite Flows



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=3.38 cfs 1.133 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=2.39 cfs 0.801 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.146 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=5.00 cfs 1.677 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.77 cfs 0.257 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.37 cfs 0.124 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.79 cfs 0.264 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.63 cfs 0.213 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=3.92 cfs 1.313 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=2.52 cfs 0.846 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.52 cfs 0.174 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=2.54 cfs 0.851 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.045 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.31 cfs 0.106 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.37 cfs 0.122 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=0.61 cfs 0.205 af

Subcatchment 8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=4.41"
Tc=12.0 min CN=0/98 Runoff=1.98 cfs 0.718 af

Subcatchment 10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=4.41"
Tc=15.0 min CN=0/98 Runoff=15.42 cfs 5.799 af

Subcatchment A: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=2.97"
Tc=20.0 min CN=74/98 Runoff=11.24 cfs 4.837 af

Subcatchment B: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=2.97"
Tc=60.0 min CN=74/98 Runoff=34.16 cfs 22.694 af

Subcatchment OS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=0/98 Runoff=1.81 cfs 0.608 af

Pond 3P: (new Pond) Peak Elev=0.92' Inflow=4.20 cfs 1.409 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=4.20 cfs 1.409 af

Pond 4P: (new Pond) Peak Elev=1.15' Inflow=6.58 cfs 2.204 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=6.58 cfs 2.204 af

Pond 5P: (new Pond) Peak Elev=1.03' Inflow=5.34 cfs 1.790 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=5.34 cfs 1.790 af

Pond 6P: (new Pond) Peak Elev=1.07' Inflow=5.72 cfs 1.917 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=5.72 cfs 1.917 af

Pond 7P: (new Pond) Peak Elev=0.52' Inflow=1.29 cfs 0.433 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.29 cfs 0.433 af

Pond 10P: Offsite Flows Peak Elev=3.80' Inflow=59.87 cfs 33.330 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=59.87 cfs 33.330 af

Summary for Subcatchment 2: Basin 20

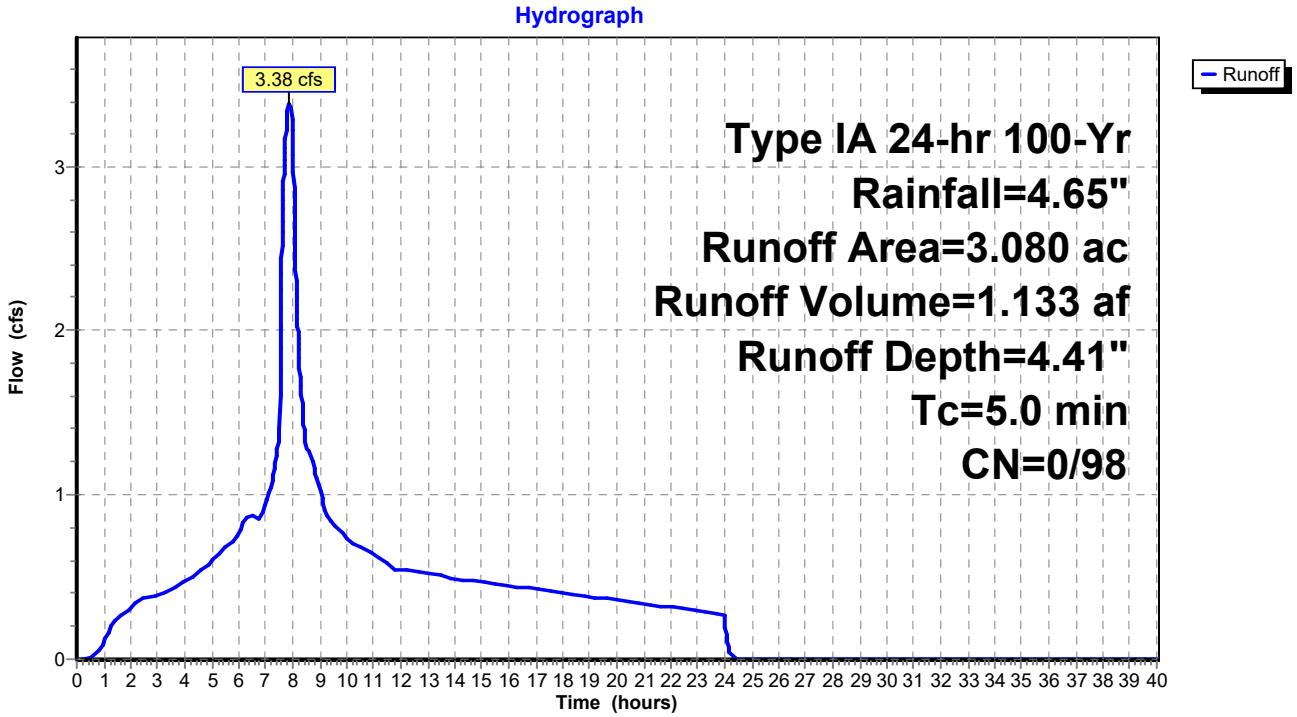
Runoff = 3.38 cfs @ 7.88 hrs, Volume= 1.133 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

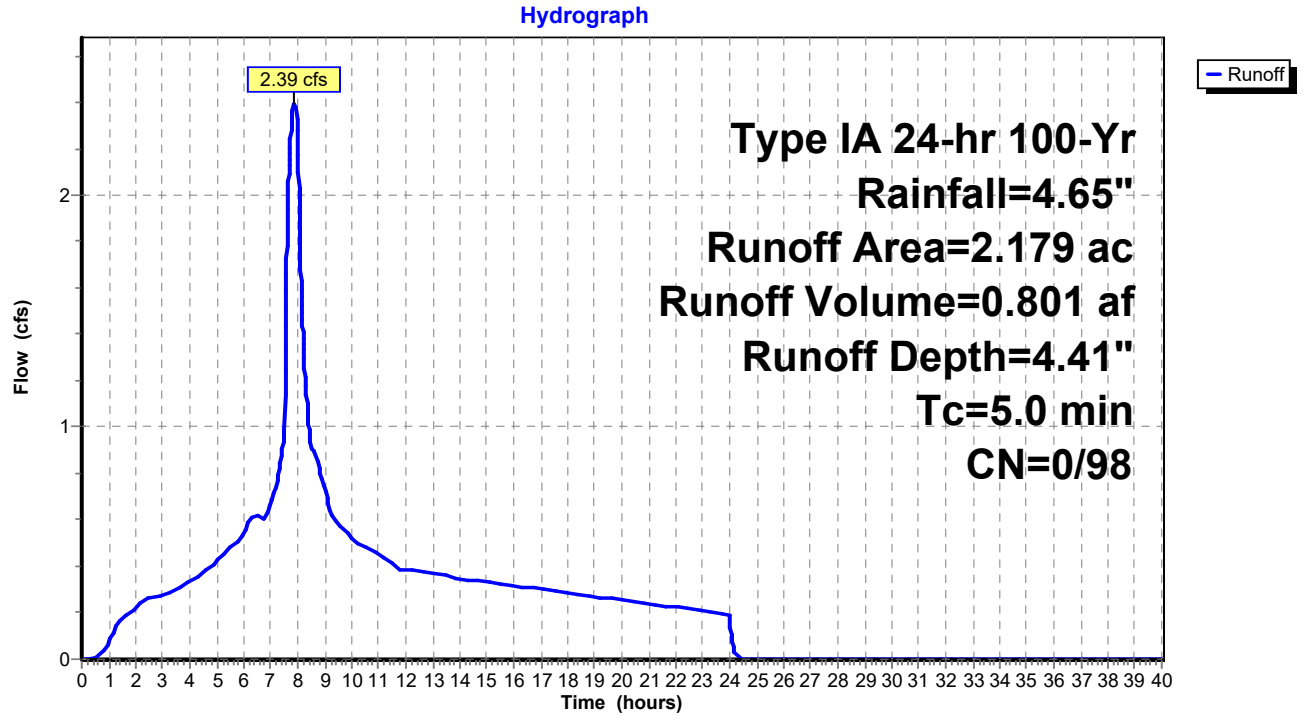
Runoff = 2.39 cfs @ 7.88 hrs, Volume= 0.801 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

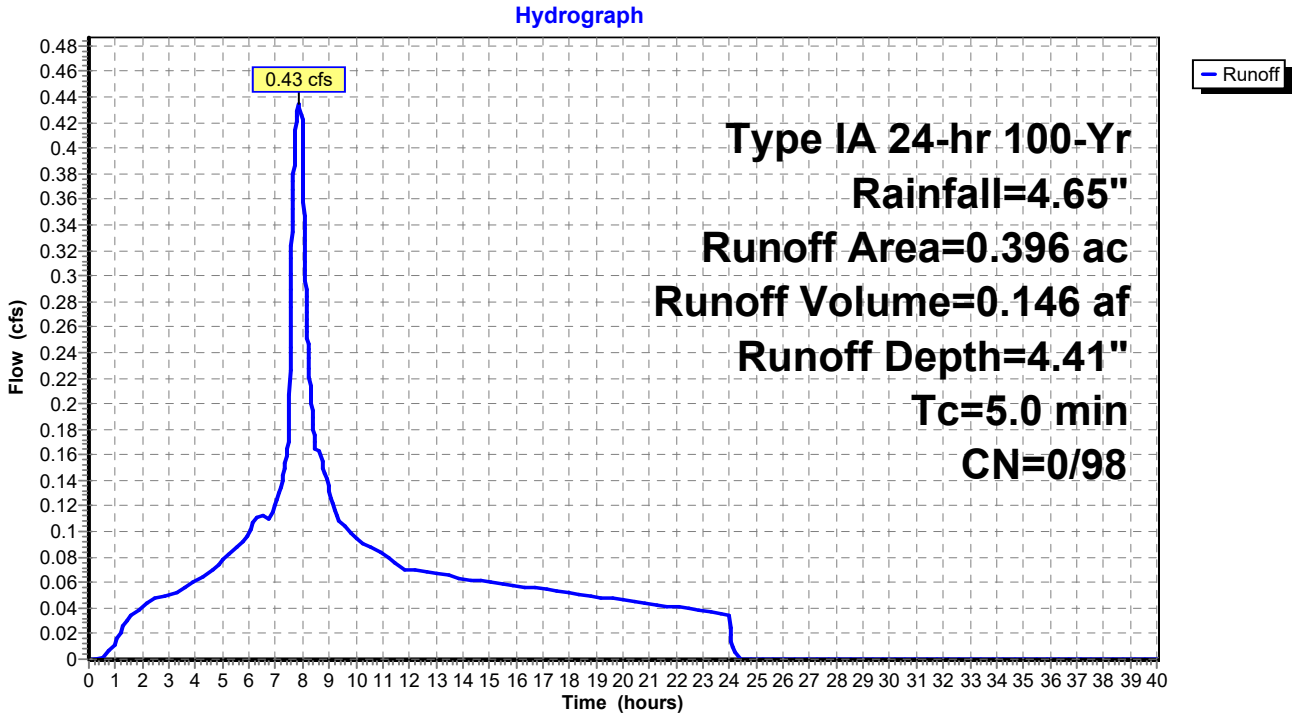
Runoff = 0.43 cfs @ 7.88 hrs, Volume= 0.146 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

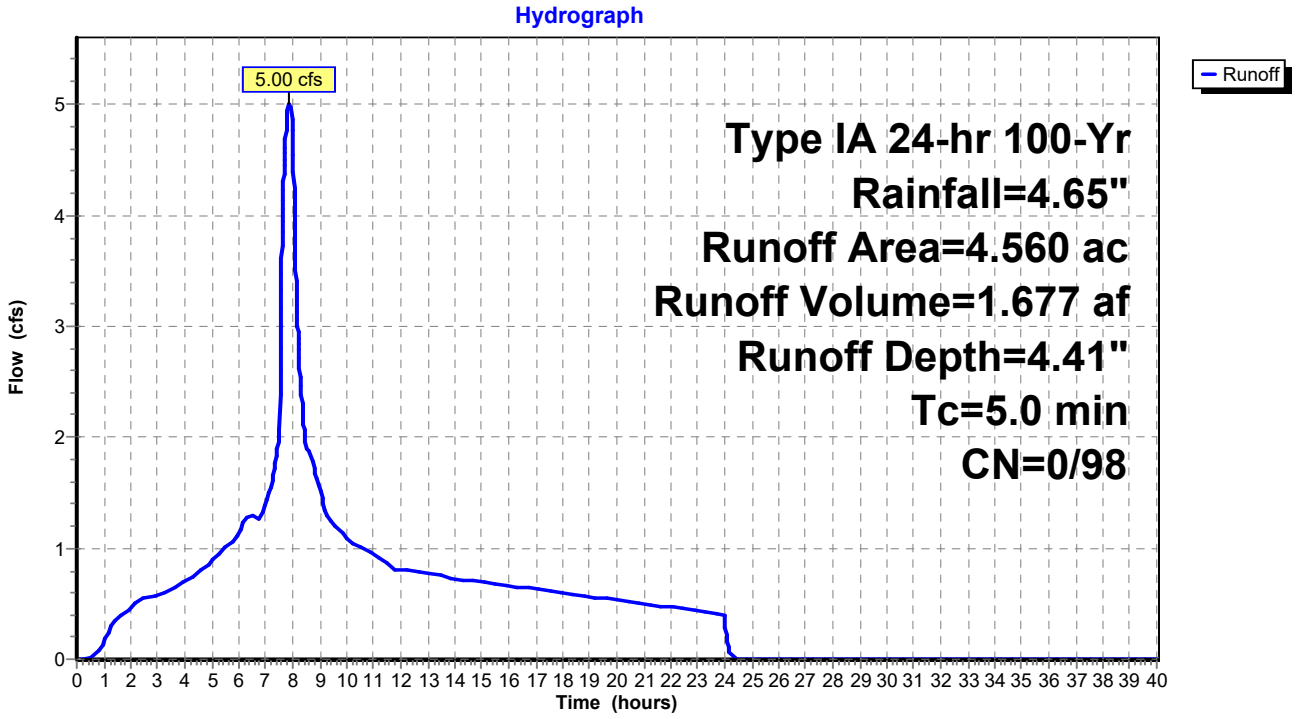
Runoff = 5.00 cfs @ 7.88 hrs, Volume= 1.677 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

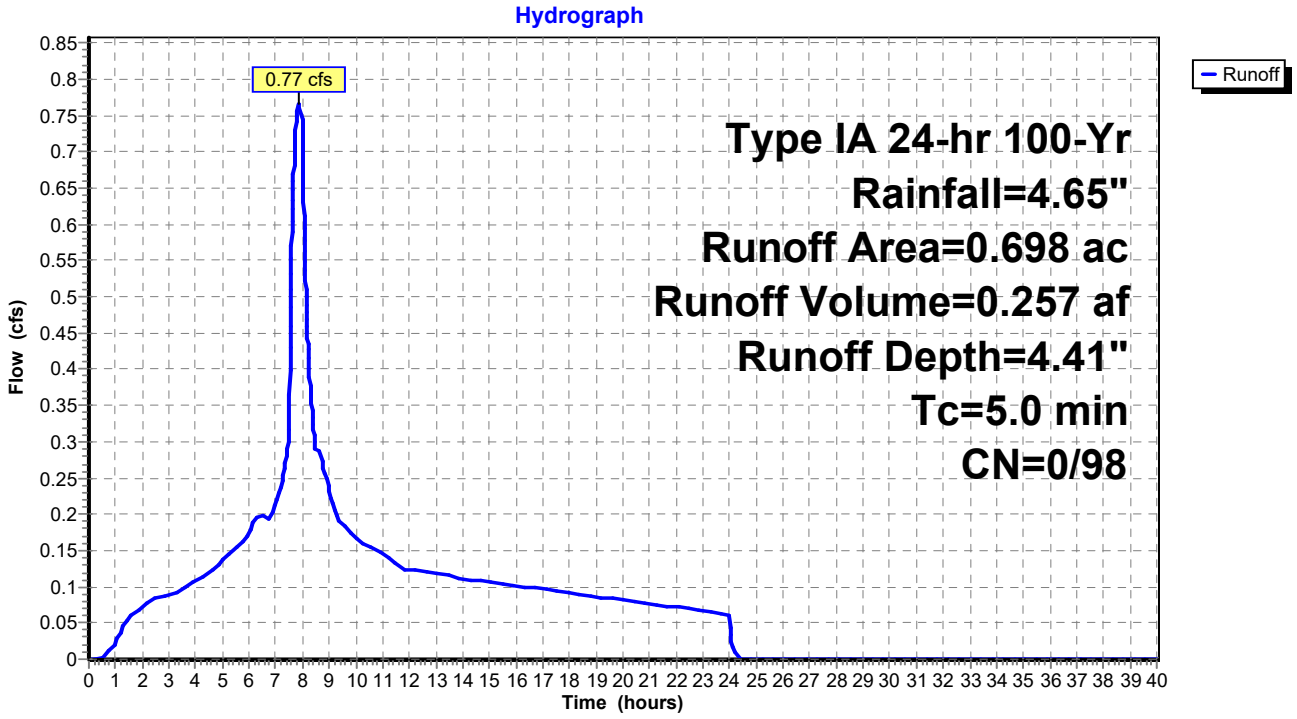
Runoff = 0.77 cfs @ 7.88 hrs, Volume= 0.257 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

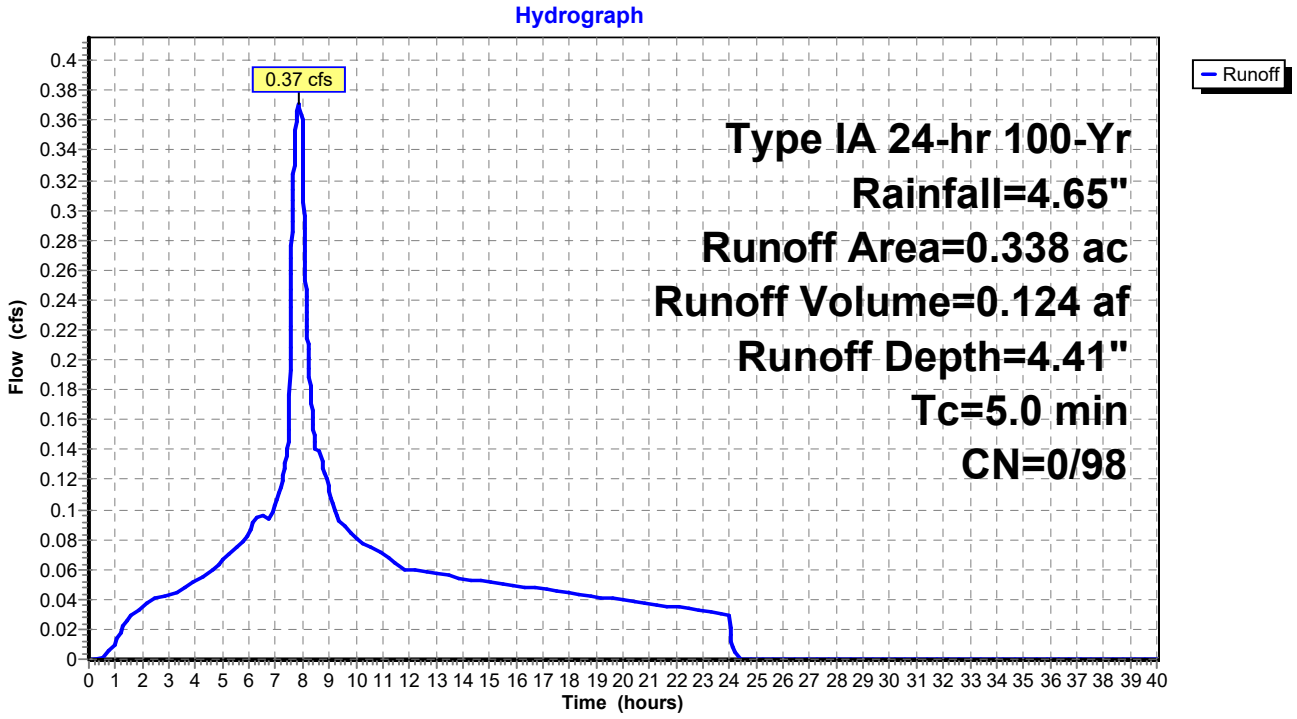
Runoff = 0.37 cfs @ 7.88 hrs, Volume= 0.124 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

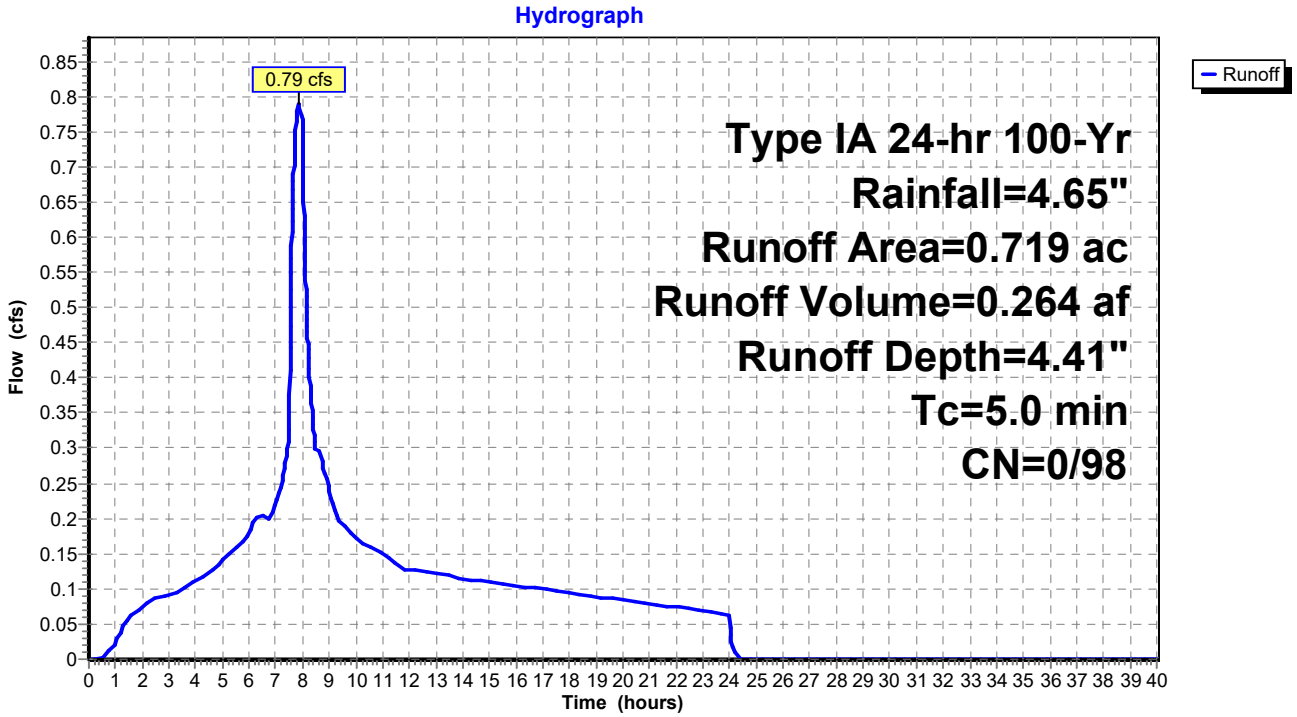
Runoff = 0.79 cfs @ 7.88 hrs, Volume= 0.264 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

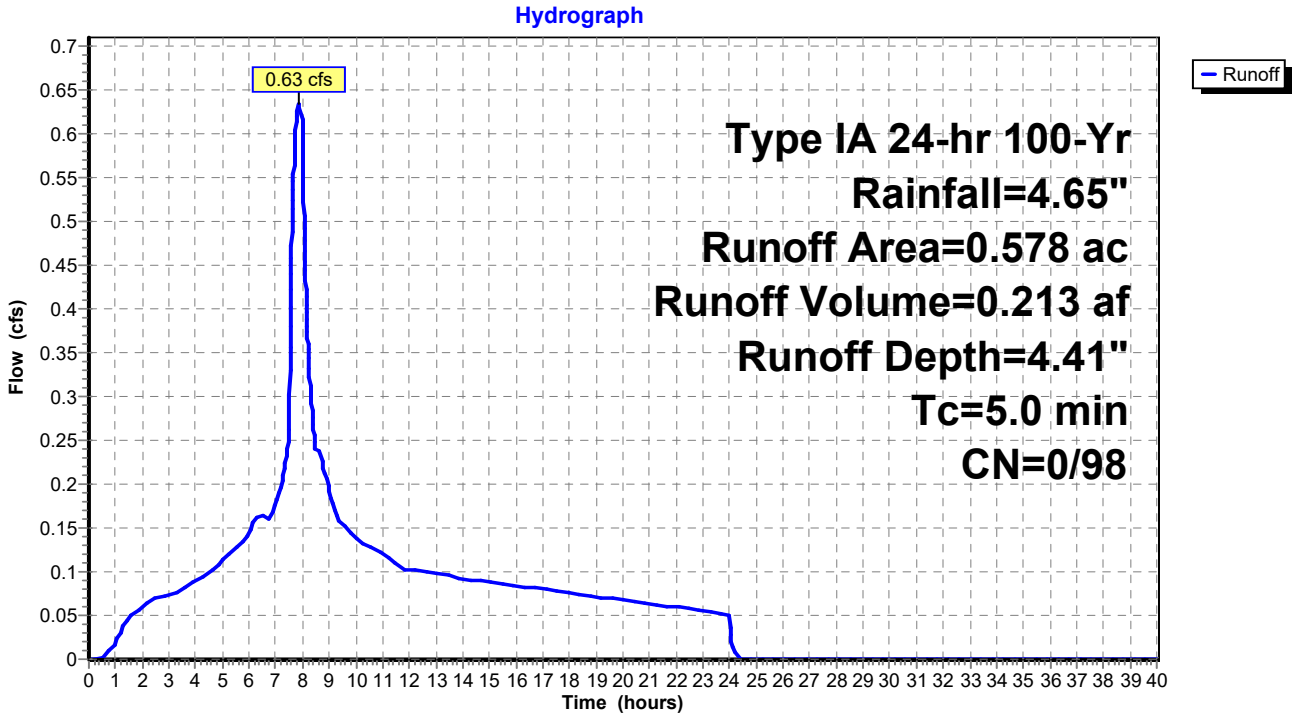
Runoff = 0.63 cfs @ 7.88 hrs, Volume= 0.213 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

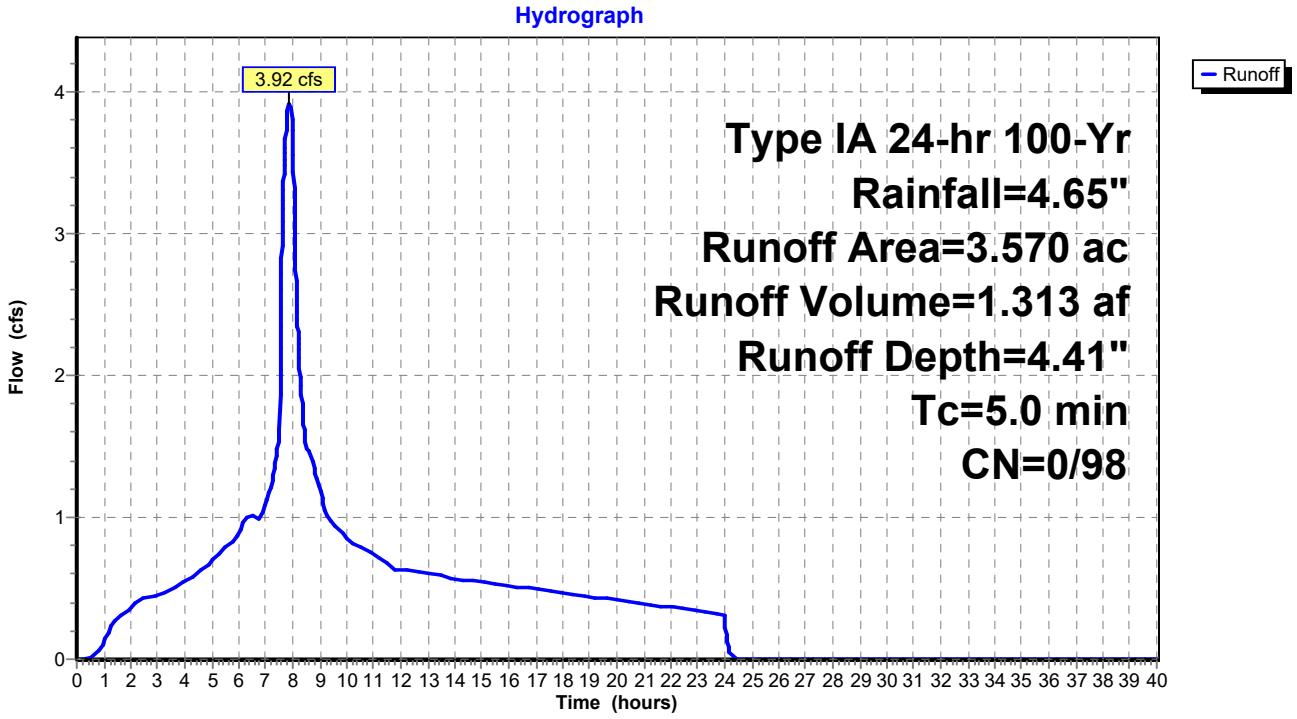
Runoff = 3.92 cfs @ 7.88 hrs, Volume= 1.313 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

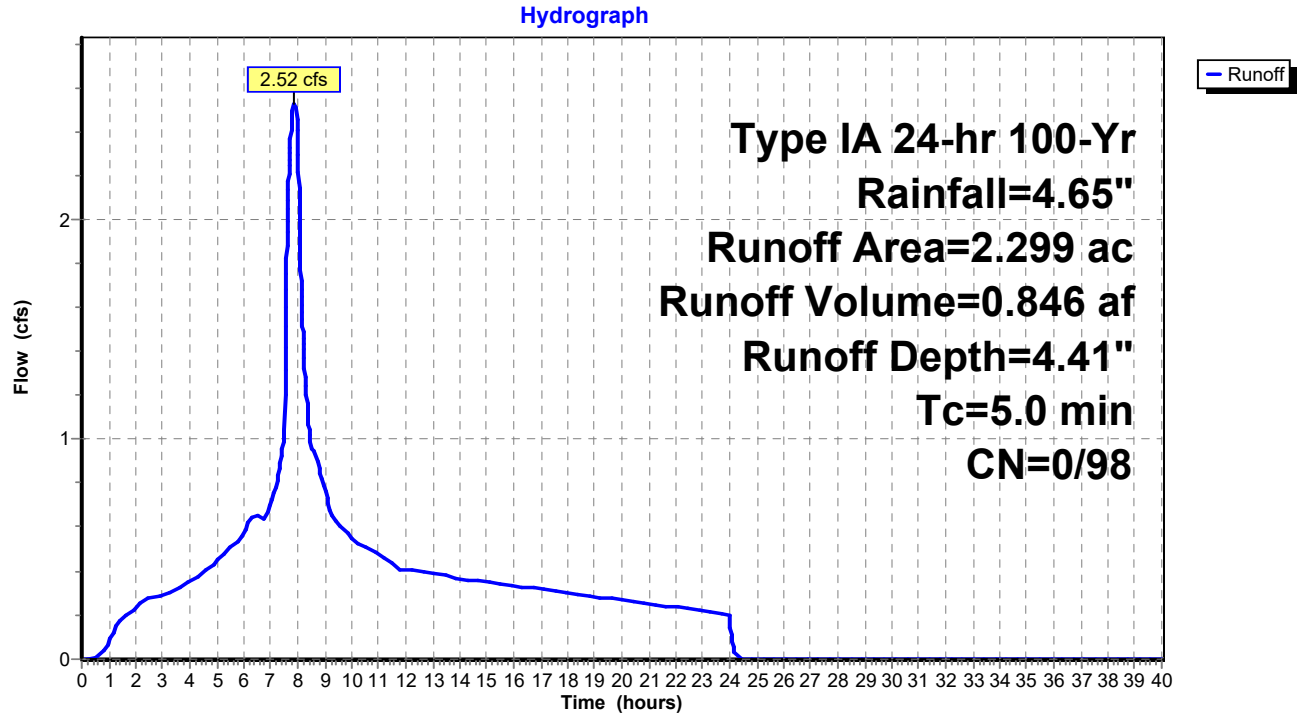
Runoff = 2.52 cfs @ 7.88 hrs, Volume= 0.846 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

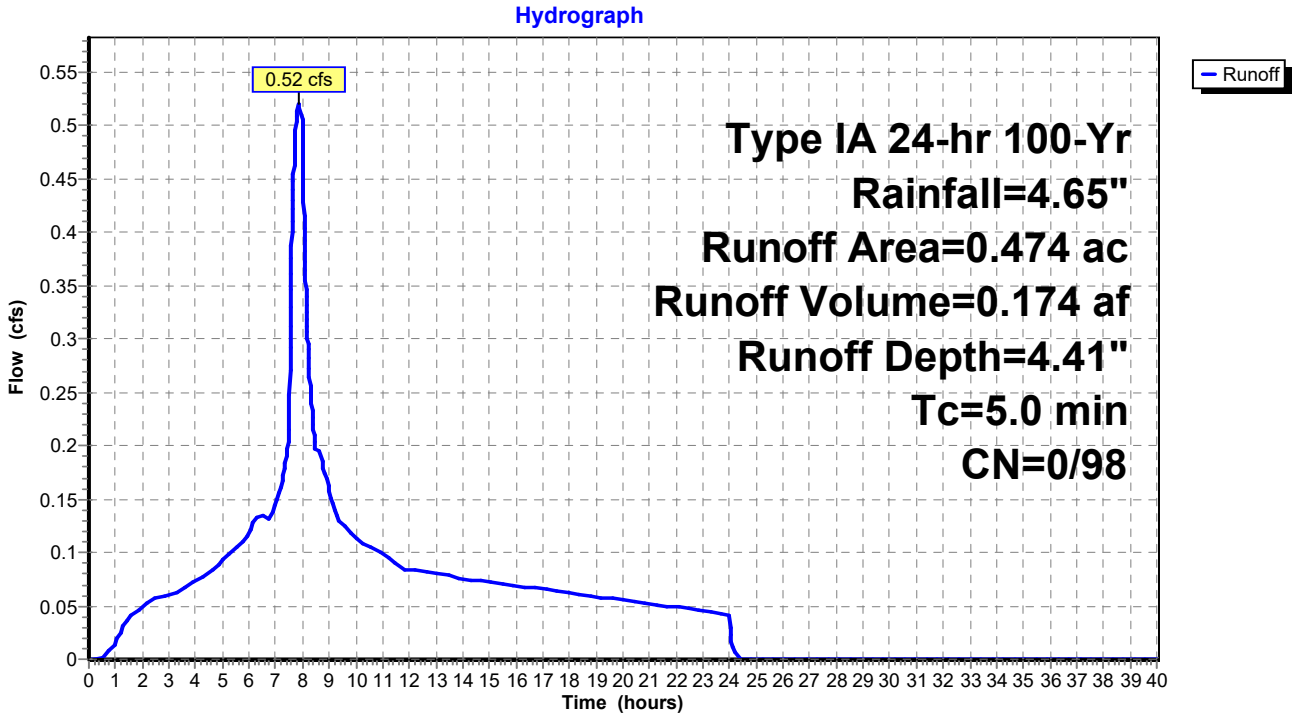
Runoff = 0.52 cfs @ 7.88 hrs, Volume= 0.174 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

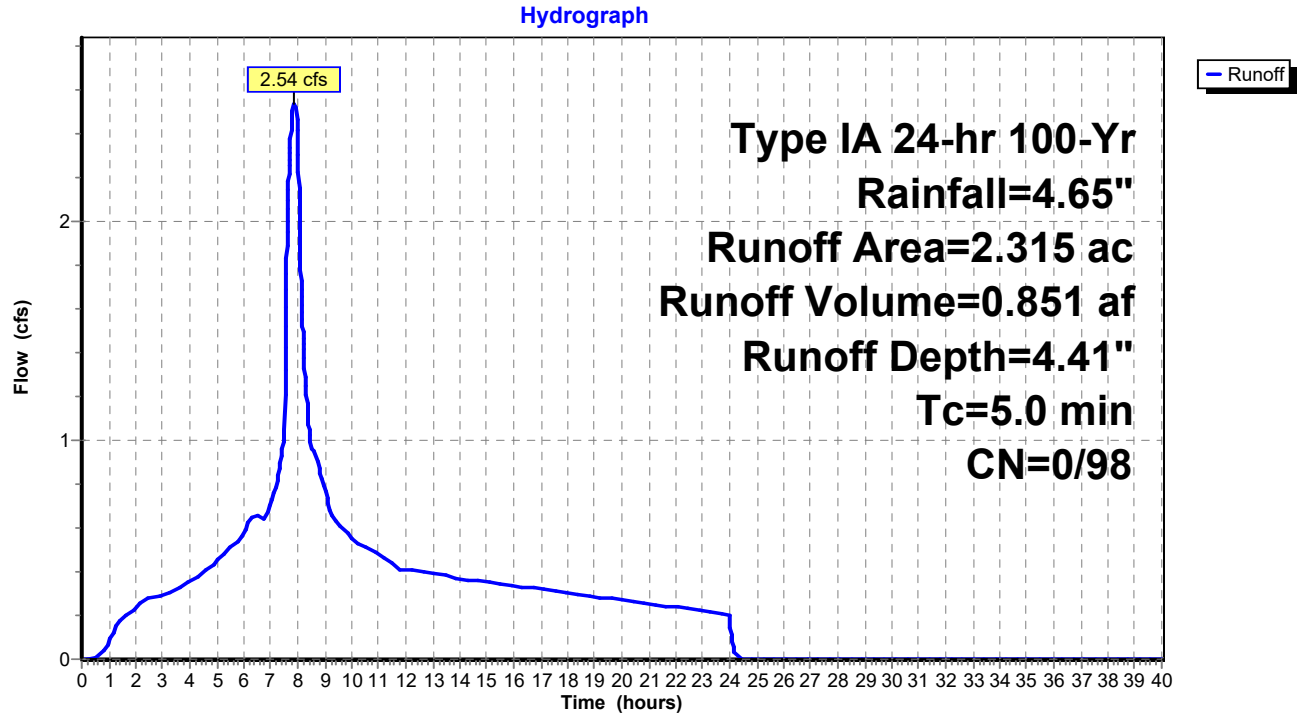
Runoff = 2.54 cfs @ 7.88 hrs, Volume= 0.851 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

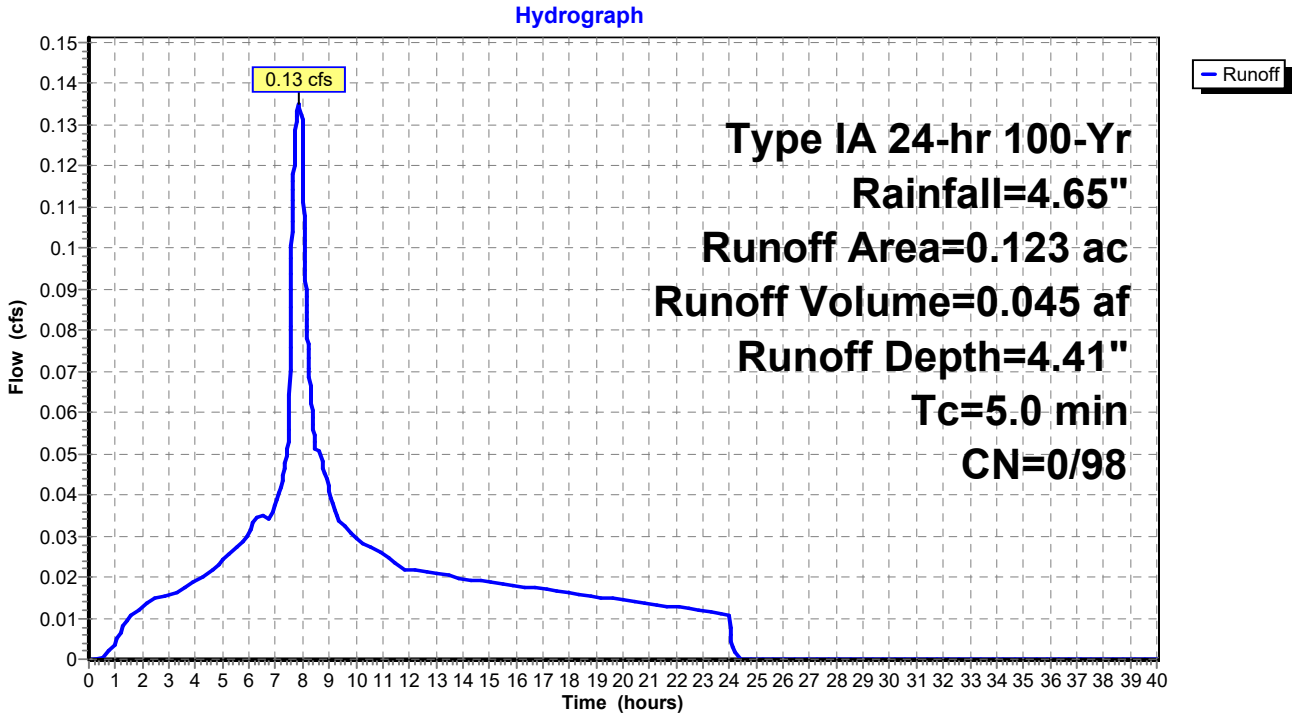
Runoff = 0.13 cfs @ 7.88 hrs, Volume= 0.045 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

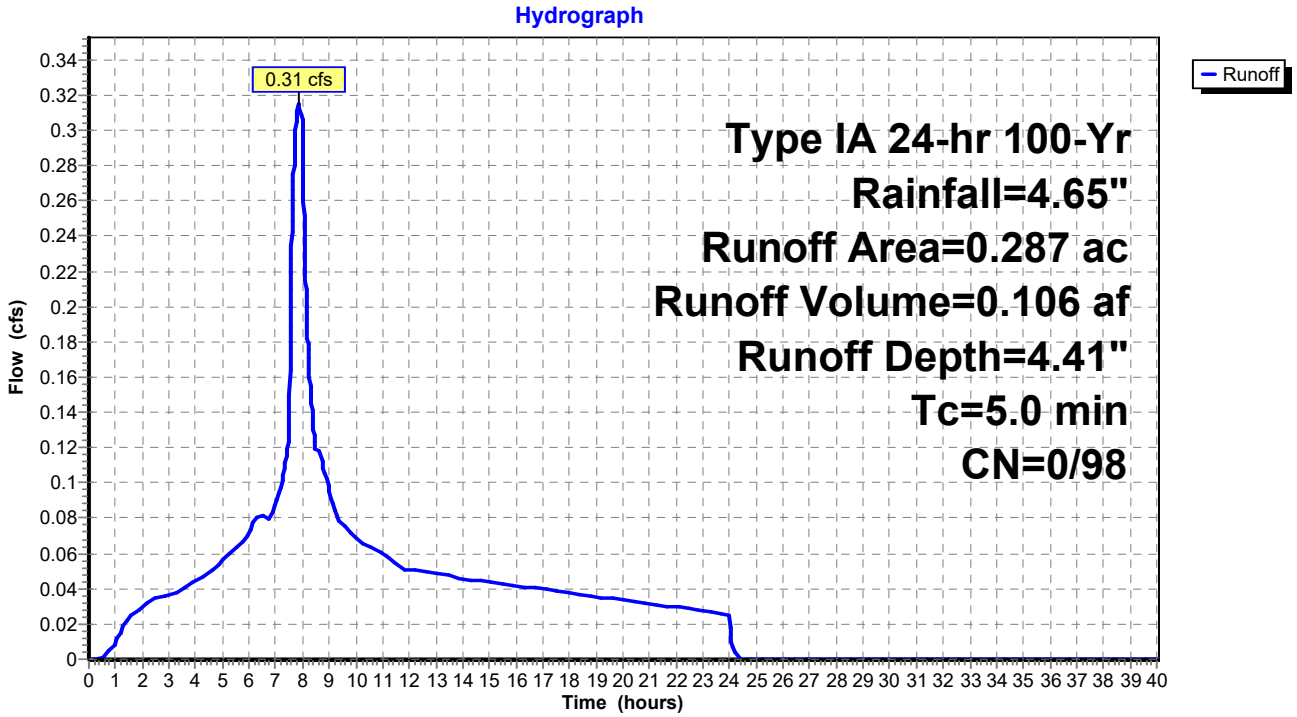
Runoff = 0.31 cfs @ 7.88 hrs, Volume= 0.106 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

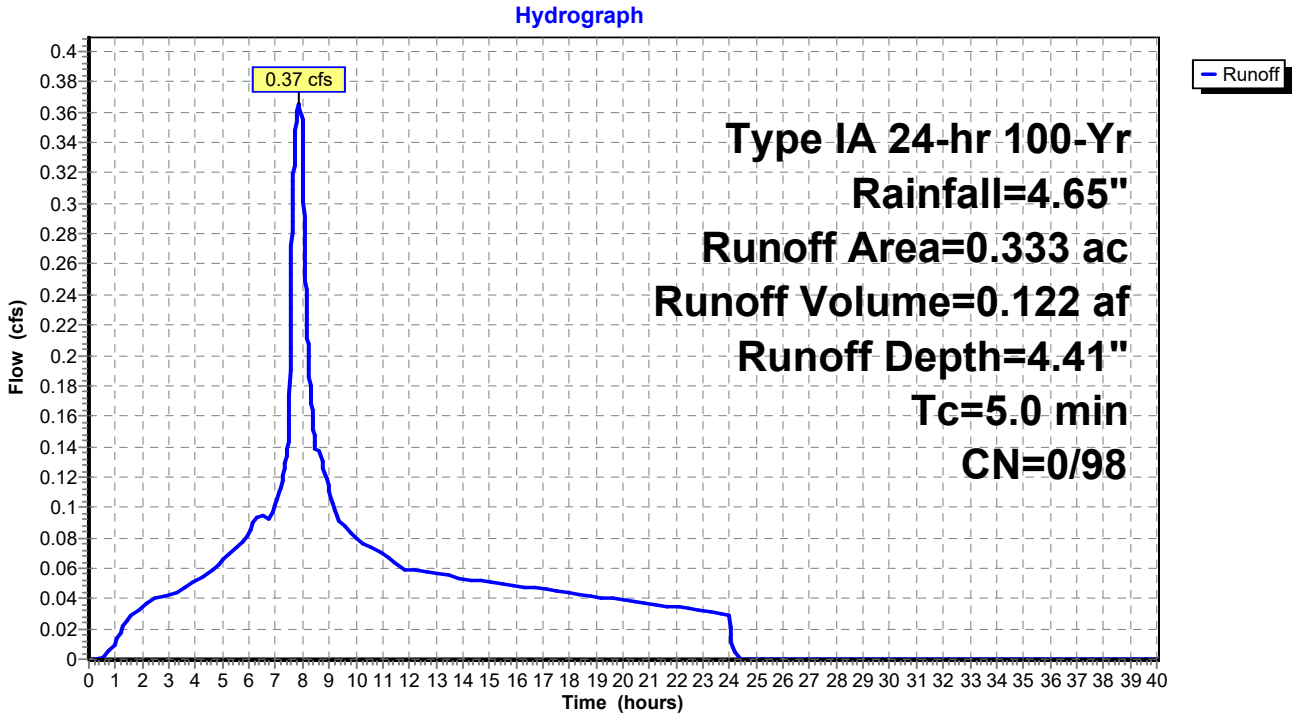
Runoff = 0.37 cfs @ 7.88 hrs, Volume= 0.122 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

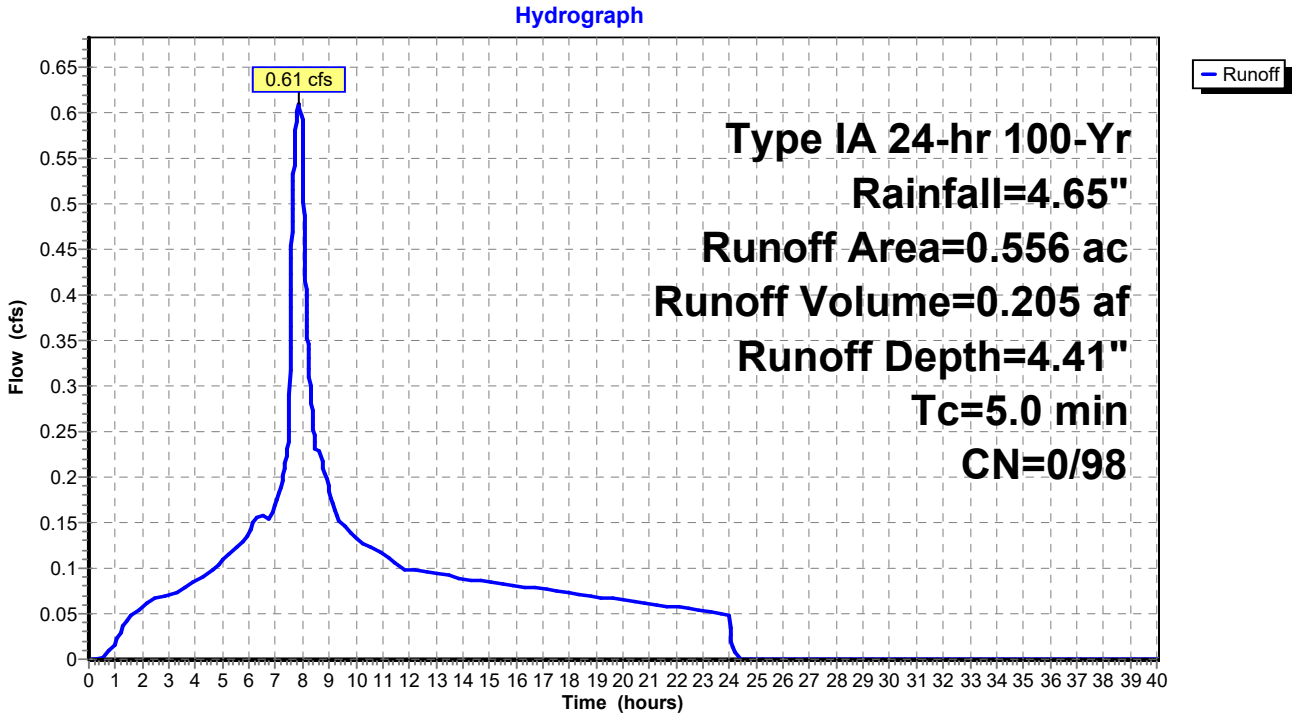
Runoff = 0.61 cfs @ 7.88 hrs, Volume= 0.205 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

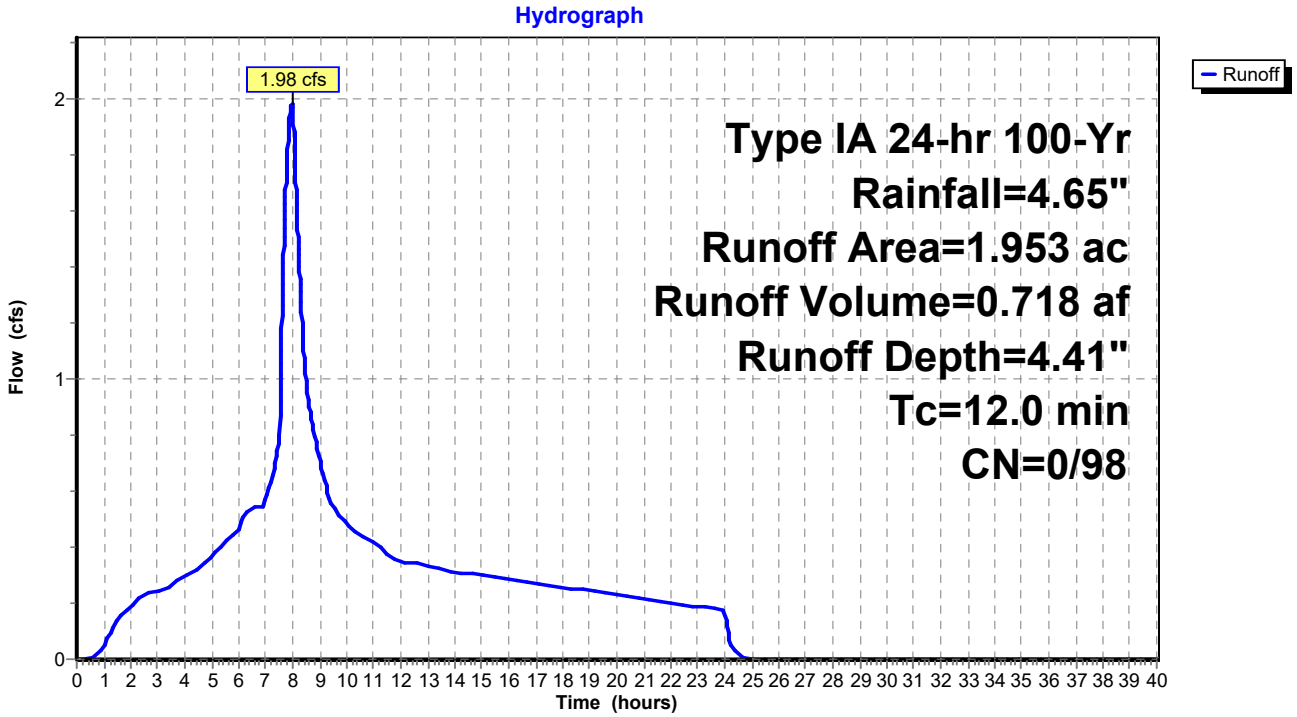
Runoff = 1.98 cfs @ 7.99 hrs, Volume= 0.718 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

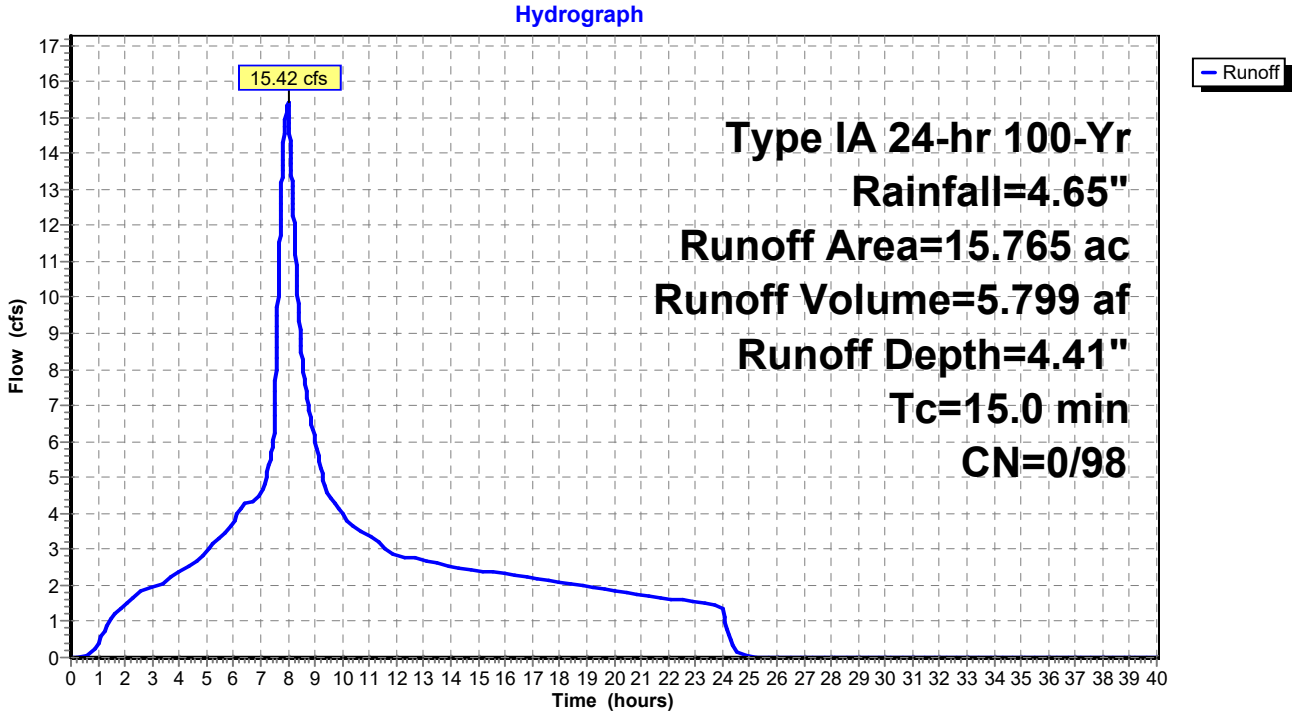
Runoff = 15.42 cfs @ 8.00 hrs, Volume= 5.799 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

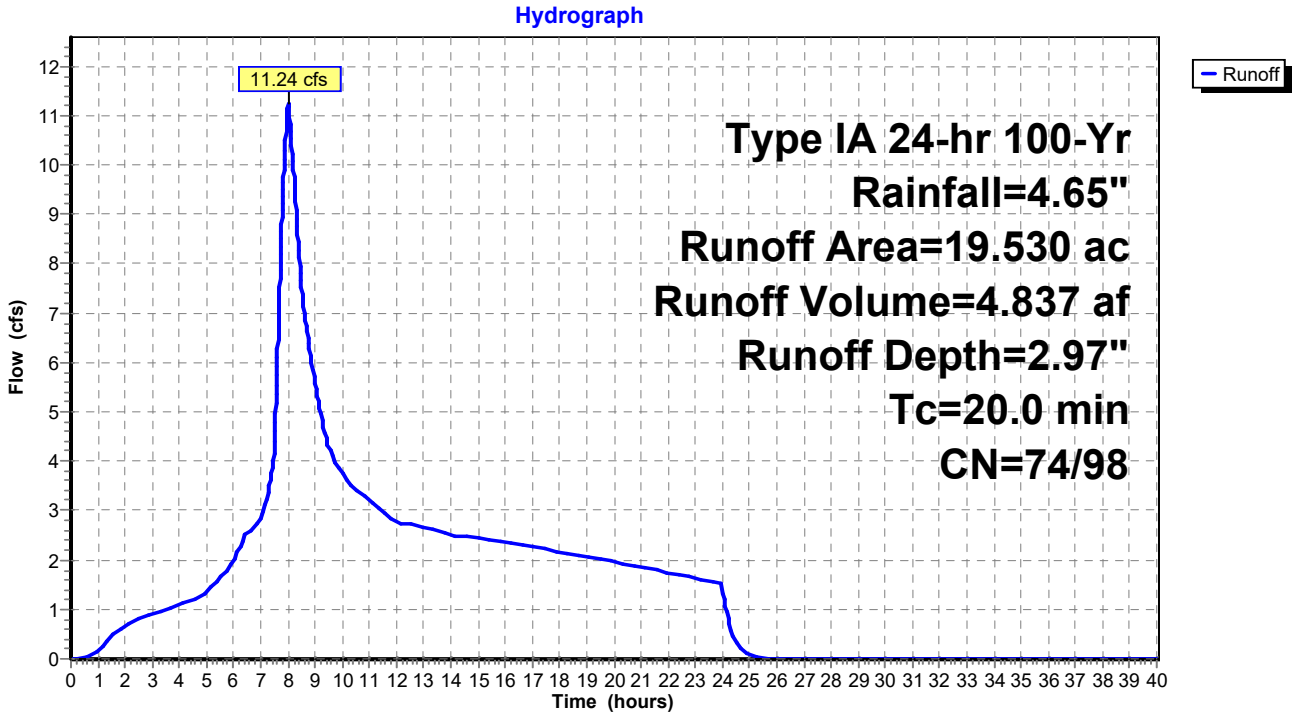
Runoff = 11.24 cfs @ 8.00 hrs, Volume= 4.837 af, Depth= 2.97"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

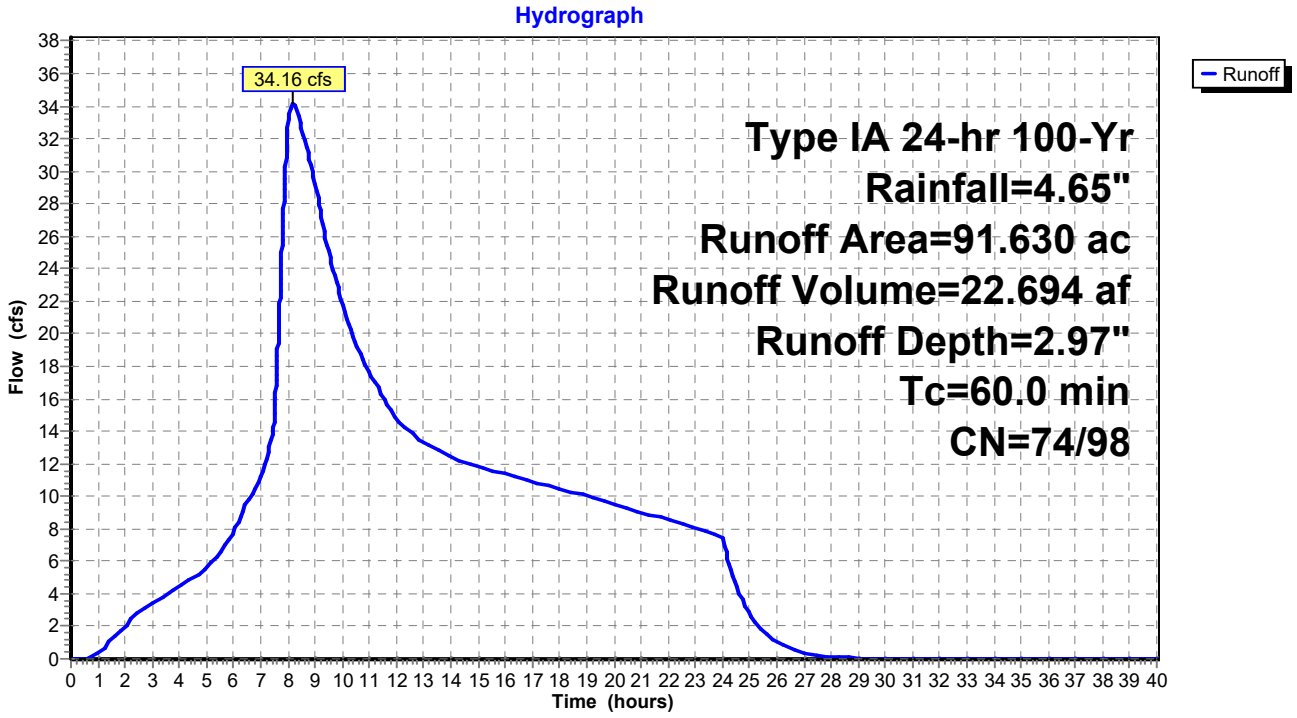
Runoff = 34.16 cfs @ 8.19 hrs, Volume= 22.694 af, Depth= 2.97"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

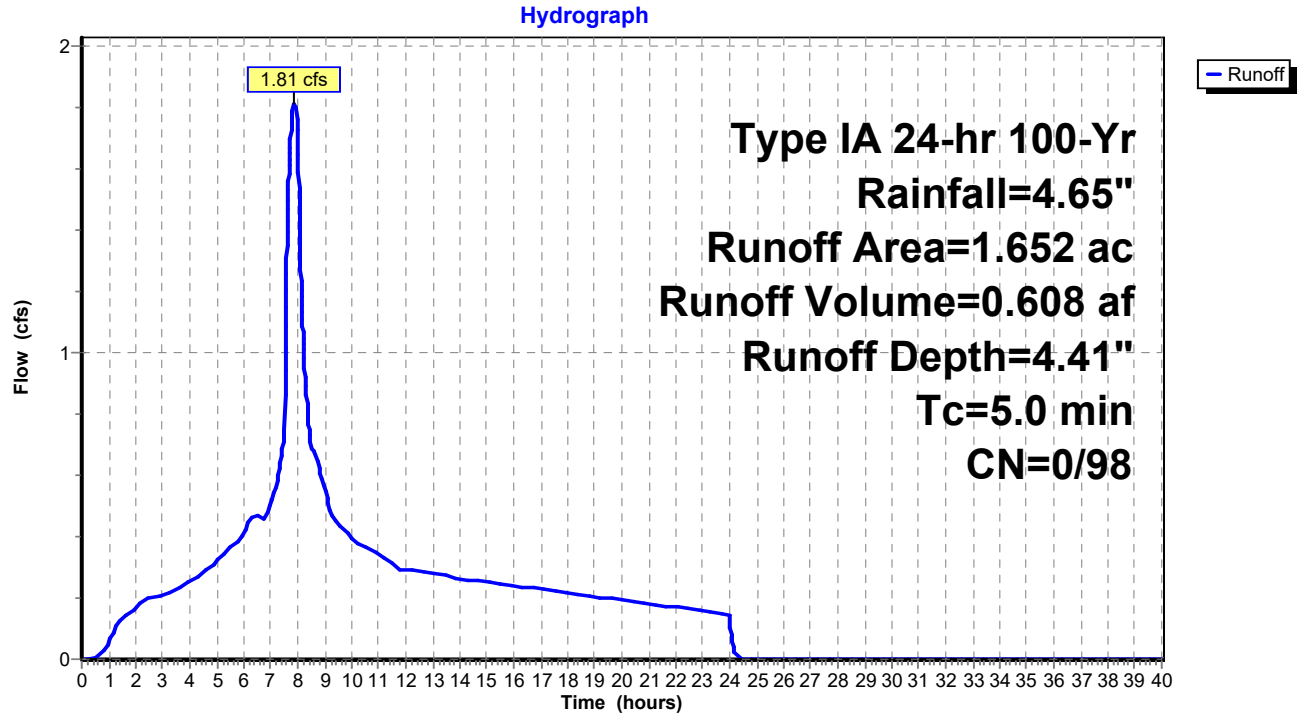
Runoff = 1.81 cfs @ 7.88 hrs, Volume= 0.608 af, Depth= 4.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-Yr Rainfall=4.65"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

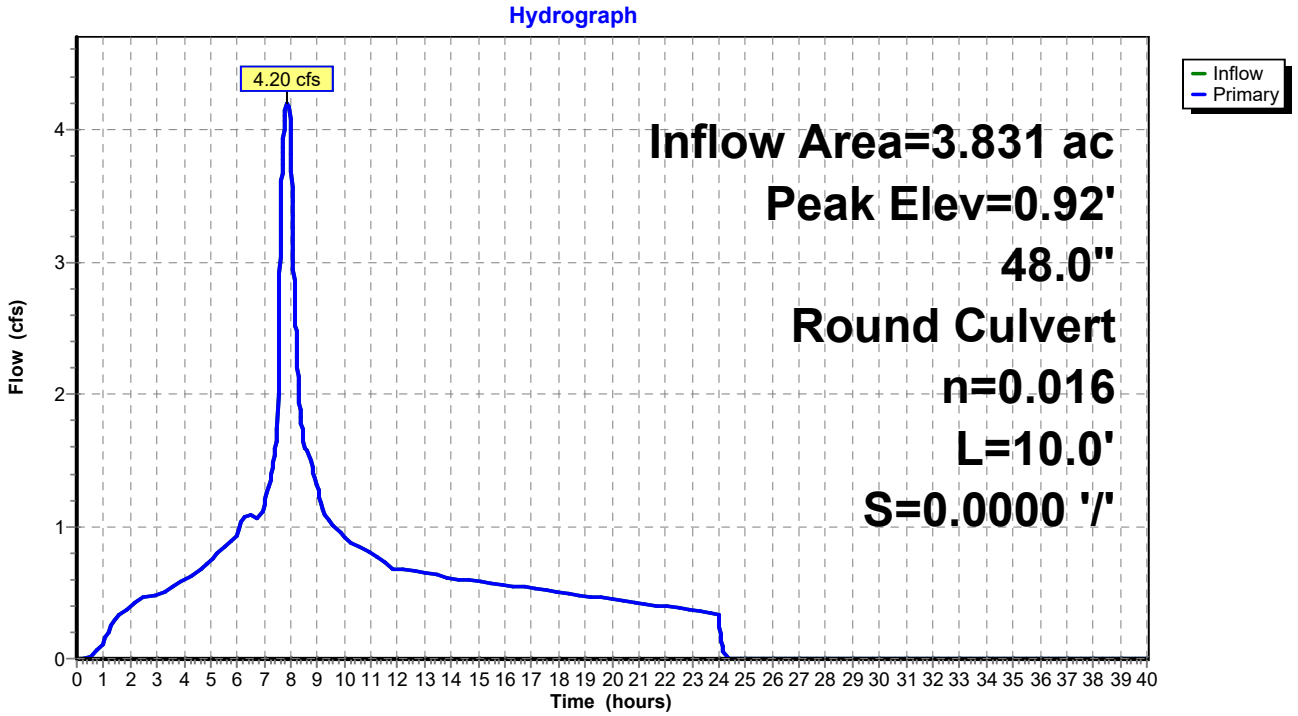
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 4.20 cfs @ 7.88 hrs, Volume= 1.409 af
Outflow = 4.20 cfs @ 7.88 hrs, Volume= 1.409 af, Atten= 0%, Lag= 0.0 min
Primary = 4.20 cfs @ 7.88 hrs, Volume= 1.409 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.92' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=4.20 cfs @ 7.88 hrs HW=0.92' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.20 cfs @ 2.92 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

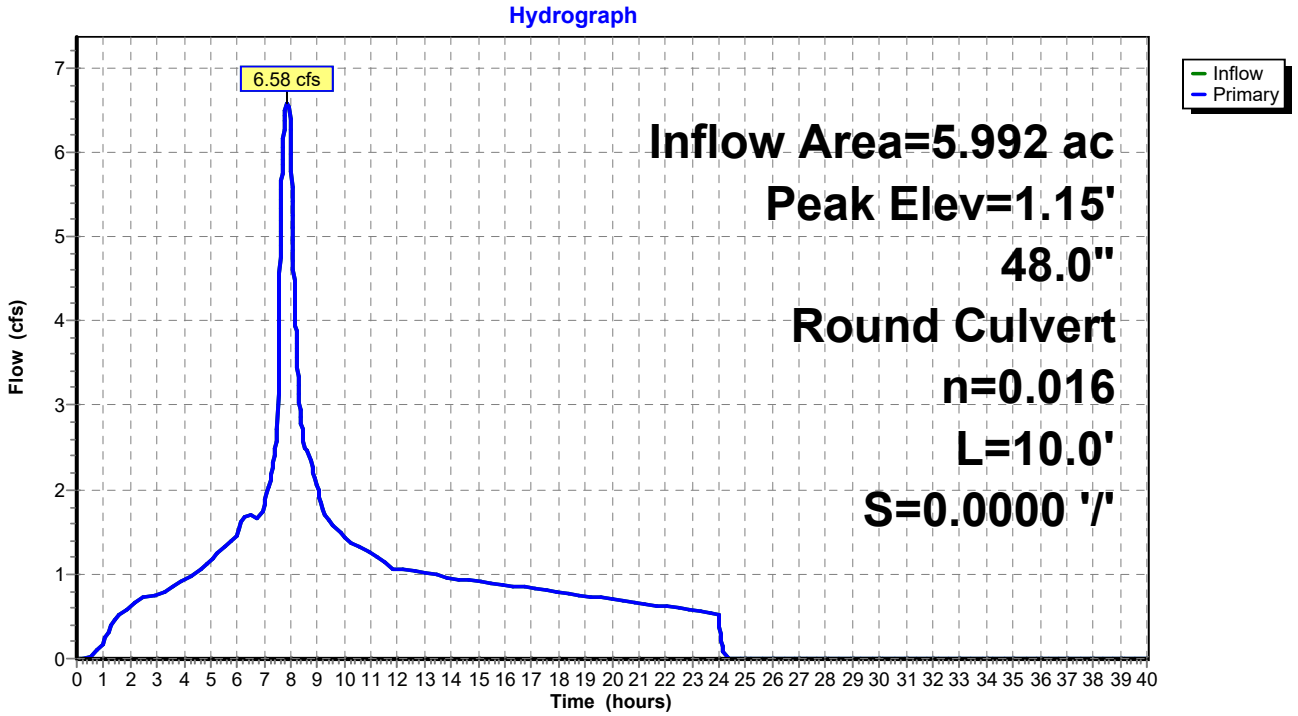
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 6.58 cfs @ 7.88 hrs, Volume= 2.204 af
Outflow = 6.58 cfs @ 7.88 hrs, Volume= 2.204 af, Atten= 0%, Lag= 0.0 min
Primary = 6.58 cfs @ 7.88 hrs, Volume= 2.204 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.15' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=6.57 cfs @ 7.88 hrs HW=1.15' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.57 cfs @ 3.31 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

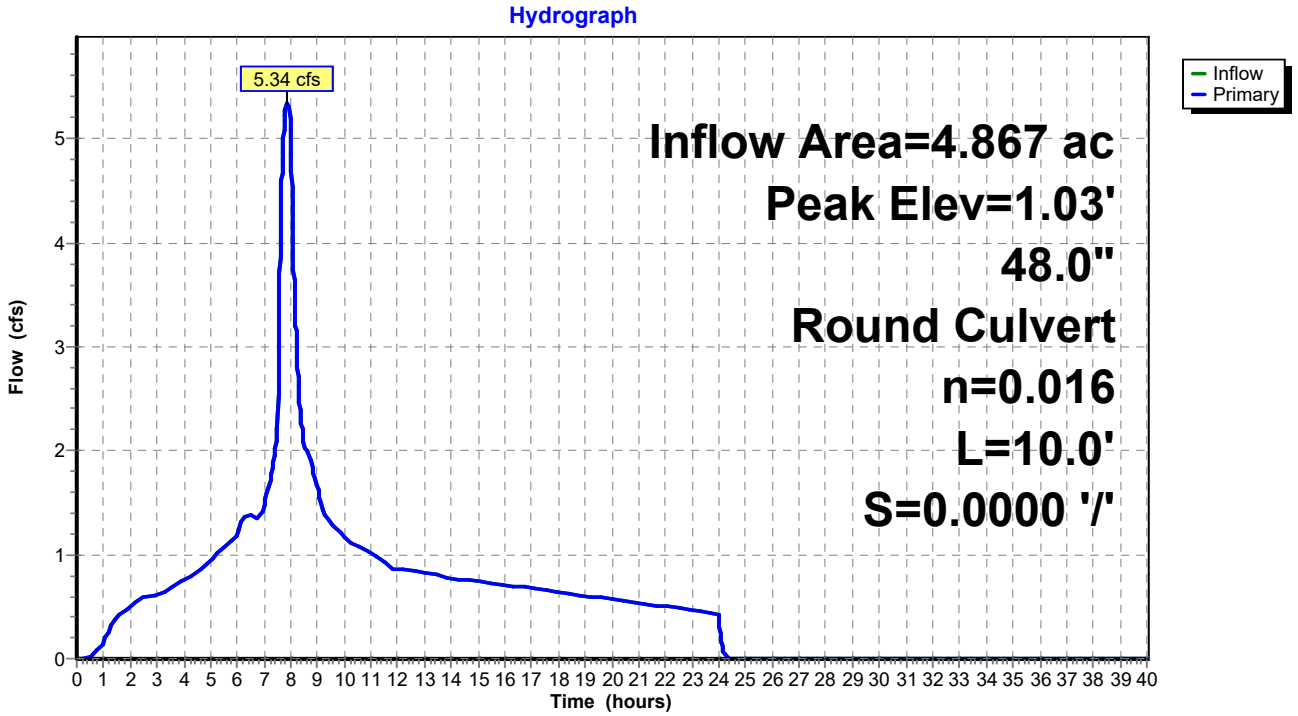
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 5.34 cfs @ 7.88 hrs, Volume= 1.790 af
Outflow = 5.34 cfs @ 7.88 hrs, Volume= 1.790 af, Atten= 0%, Lag= 0.0 min
Primary = 5.34 cfs @ 7.88 hrs, Volume= 1.790 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.03' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=5.34 cfs @ 7.88 hrs HW=1.03' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.34 cfs @ 3.12 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

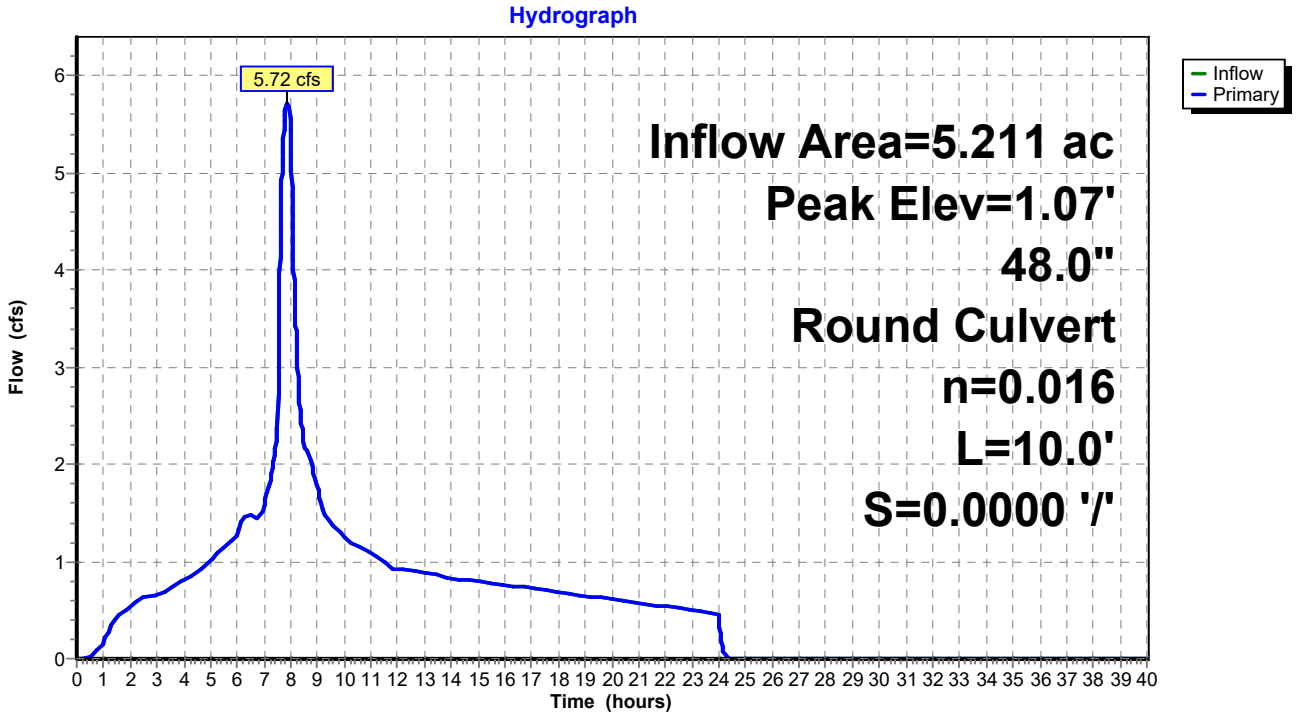
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 5.72 cfs @ 7.88 hrs, Volume= 1.917 af
Outflow = 5.72 cfs @ 7.88 hrs, Volume= 1.917 af, Atten= 0%, Lag= 0.0 min
Primary = 5.72 cfs @ 7.88 hrs, Volume= 1.917 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.07' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=5.72 cfs @ 7.88 hrs HW=1.07' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.72 cfs @ 3.18 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

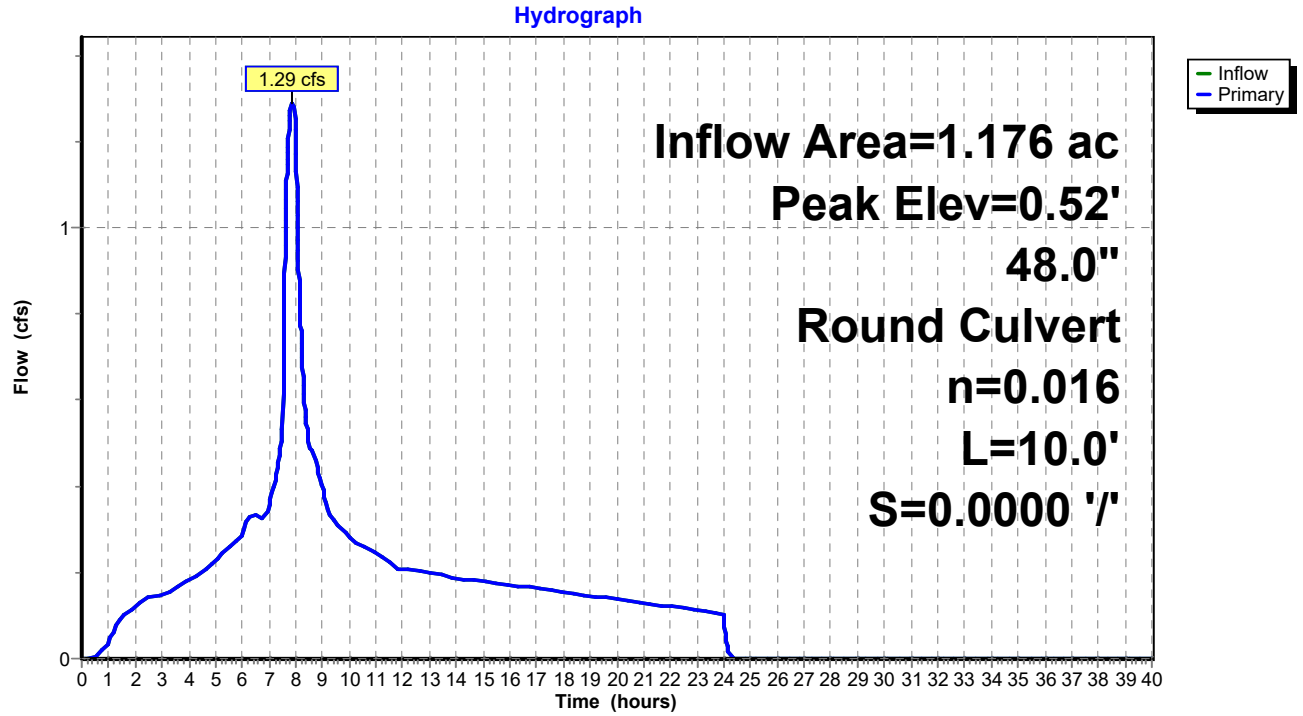
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 4.41" for 100-Yr event
Inflow = 1.29 cfs @ 7.88 hrs, Volume= 0.433 af
Outflow = 1.29 cfs @ 7.88 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.0 min
Primary = 1.29 cfs @ 7.88 hrs, Volume= 0.433 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.52' @ 7.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.29 cfs @ 7.88 hrs HW=0.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.29 cfs @ 2.05 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

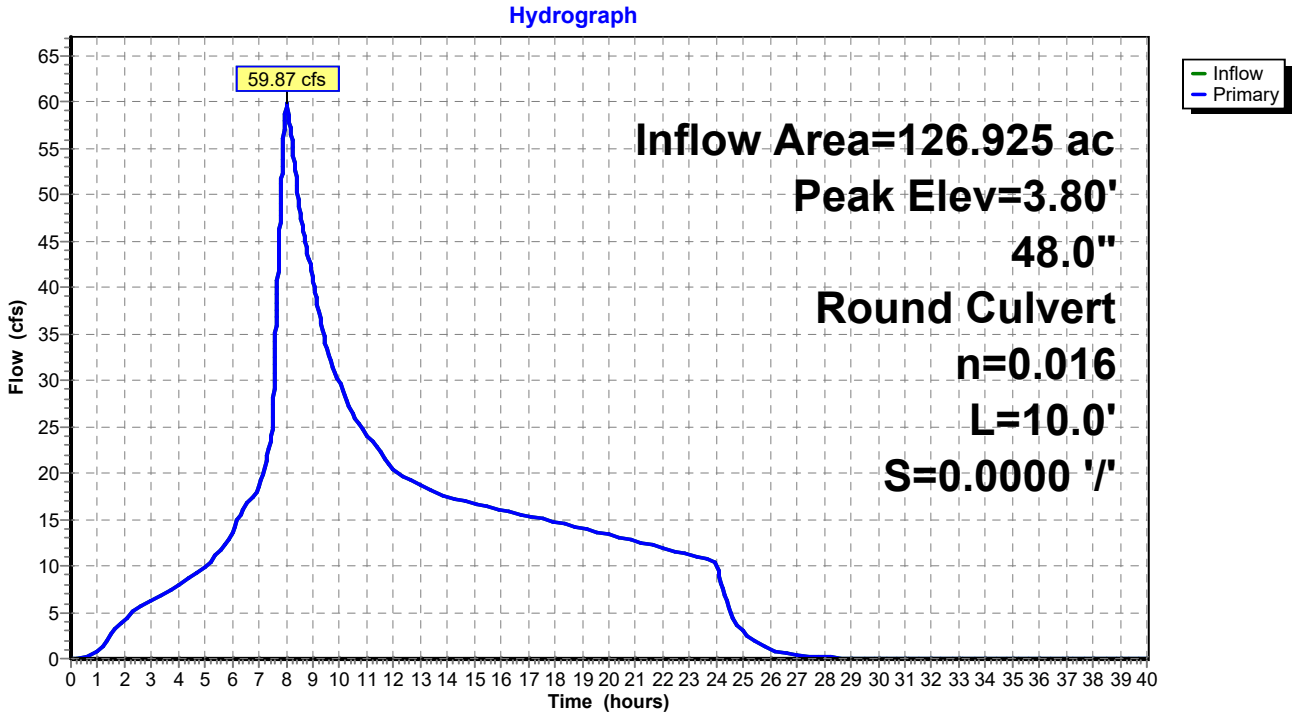
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 3.15" for 100-Yr event
Inflow = 59.87 cfs @ 8.01 hrs, Volume= 33.330 af
Outflow = 59.87 cfs @ 8.01 hrs, Volume= 33.330 af, Atten= 0%, Lag= 0.0 min
Primary = 59.87 cfs @ 8.01 hrs, Volume= 33.330 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 3.80' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=59.87 cfs @ 8.01 hrs HW=3.80' (Free Discharge)
└**1=Culvert** (Barrel Controls 59.87 cfs @ 6.26 fps)

Pond 10P: Offsite Flows



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2: Basin 20 Runoff Area=3.080 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.80 cfs 0.258 af

Subcatchment3: Basin 30 Runoff Area=2.179 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.57 cfs 0.183 af

Subcatchment4: Basin 40 Runoff Area=0.396 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.10 cfs 0.033 af

Subcatchment4-1: Basin 41 Runoff Area=4.560 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=1.19 cfs 0.382 af

Subcatchment4-2: Basin 42 Runoff Area=0.698 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.18 cfs 0.058 af

Subcatchment4-3: Basin 43 Runoff Area=0.338 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.028 af

Subcatchment5: Basin 50 Runoff Area=0.719 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.19 cfs 0.060 af

Subcatchment5-1: Basin 51 Runoff Area=0.578 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.15 cfs 0.048 af

Subcatchment5-2: Basin 52 Runoff Area=3.570 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.93 cfs 0.299 af

Subcatchment6: Basin 60 Runoff Area=2.299 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.60 cfs 0.193 af

Subcatchment6-1: Basin 61 Runoff Area=0.474 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.12 cfs 0.040 af

Subcatchment6-2: Basin 62 Runoff Area=2.315 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.60 cfs 0.194 af

Subcatchment6-3: Basin 63 Runoff Area=0.123 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment7: Basin 70 Runoff Area=0.287 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.024 af

Subcatchment7-1: Basin 71 Runoff Area=0.333 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.028 af

Subcatchment7-2: Basin 72 Runoff Area=0.556 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.047 af

Subcatchment 8: Basin 8 Runoff Area=1.953 ac 100.00% Impervious Runoff Depth=1.01"
Tc=12.0 min CN=0/98 Runoff=0.47 cfs 0.164 af

Subcatchment 10S: Package B Pavement Runoff Area=15.765 ac 100.00% Impervious Runoff Depth=1.01"
Tc=15.0 min CN=0/98 Runoff=3.65 cfs 1.321 af

Subcatchment A: Offsite Basin A Runoff Area=19.530 ac 38.00% Impervious Runoff Depth=0.42"
Tc=20.0 min CN=74/98 Runoff=1.60 cfs 0.689 af

Subcatchment B: Offsite Basin B Runoff Area=91.630 ac 38.00% Impervious Runoff Depth=0.42"
Tc=60.0 min CN=74/98 Runoff=4.94 cfs 3.231 af

Subcatchment OS-3: Basin OS 31 Runoff Area=1.652 ac 100.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=0/98 Runoff=0.43 cfs 0.138 af

Pond 3P: (new Pond) Peak Elev=0.46' Inflow=1.00 cfs 0.321 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.00 cfs 0.321 af

Pond 4P: (new Pond) Peak Elev=0.57' Inflow=1.56 cfs 0.502 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.56 cfs 0.502 af

Pond 5P: (new Pond) Peak Elev=0.51' Inflow=1.27 cfs 0.408 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.27 cfs 0.408 af

Pond 6P: (new Pond) Peak Elev=0.53' Inflow=1.36 cfs 0.437 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=1.36 cfs 0.437 af

Pond 7P: (new Pond) Peak Elev=0.27' Inflow=0.31 cfs 0.099 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=0.31 cfs 0.099 af

Pond 10P: Offsite Flows Peak Elev=1.43' Inflow=10.11 cfs 5.240 af
48.0" Round Culvert n=0.016 L=10.0' S=0.0000 '/' Outflow=10.11 cfs 5.240 af

Summary for Subcatchment 2: Basin 20

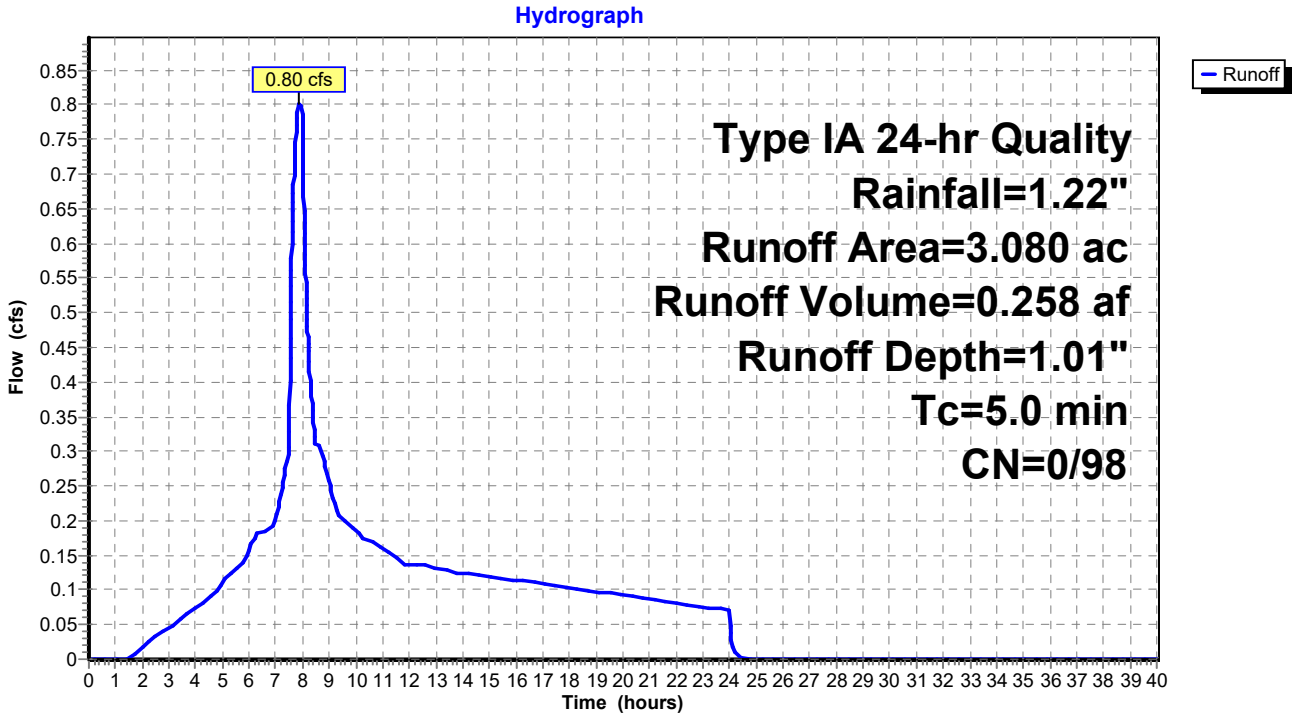
Runoff = 0.80 cfs @ 7.89 hrs, Volume= 0.258 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	3.080	98	
	3.080	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Basin 20



Summary for Subcatchment 3: Basin 30

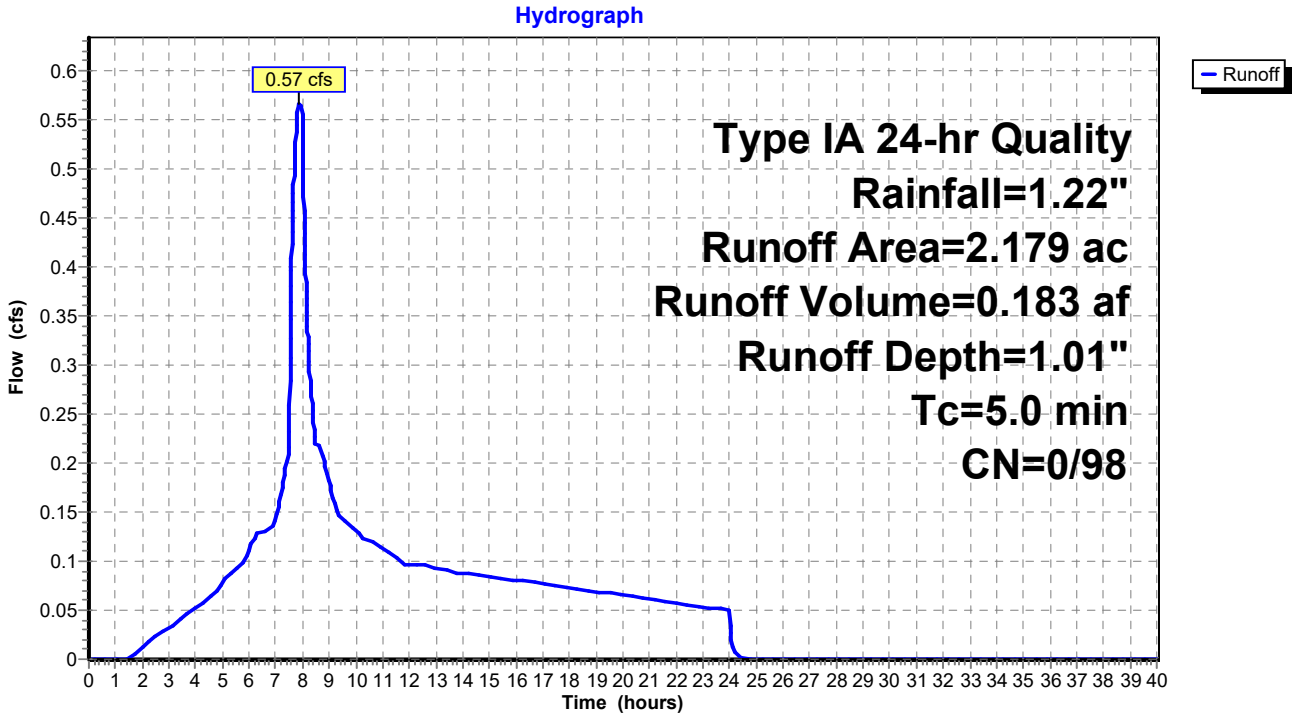
Runoff = 0.57 cfs @ 7.89 hrs, Volume= 0.183 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	2.179	98	
	2.179	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Basin 30



Summary for Subcatchment 4: Basin 40

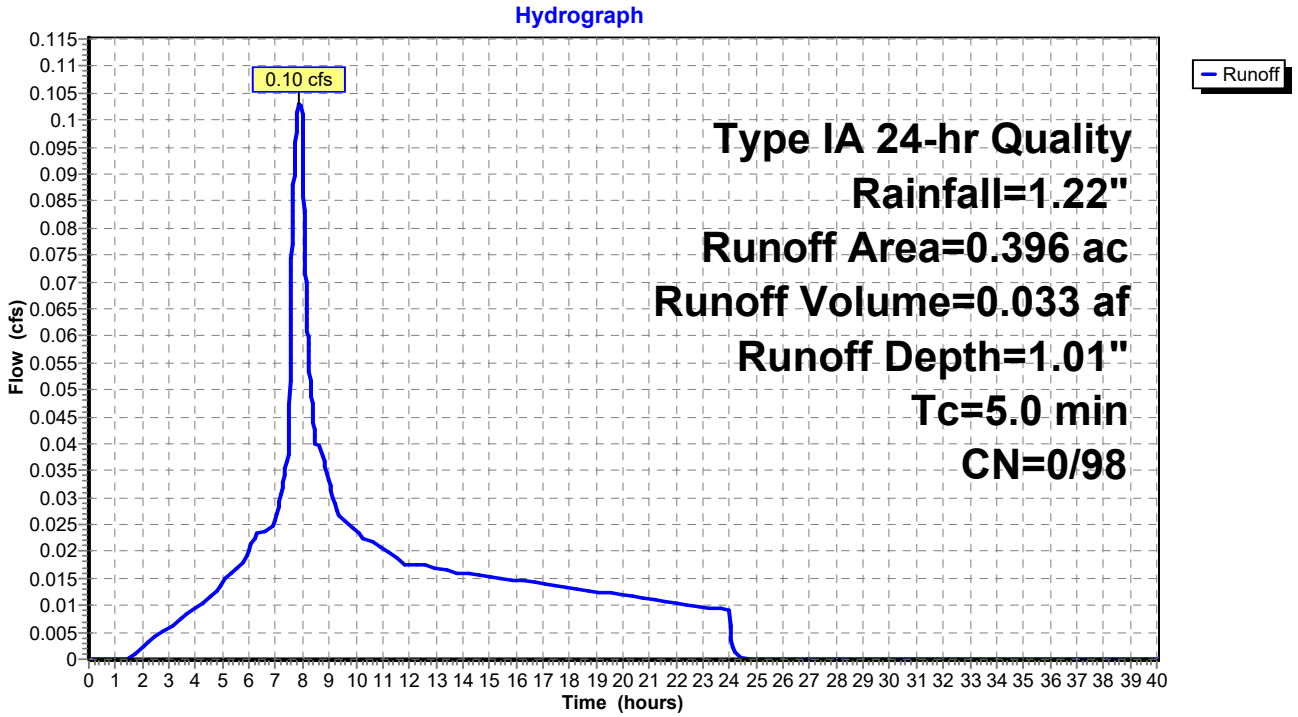
Runoff = 0.10 cfs @ 7.89 hrs, Volume= 0.033 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.396	98	
	0.396	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Basin 40



Summary for Subcatchment 4-1: Basin 41

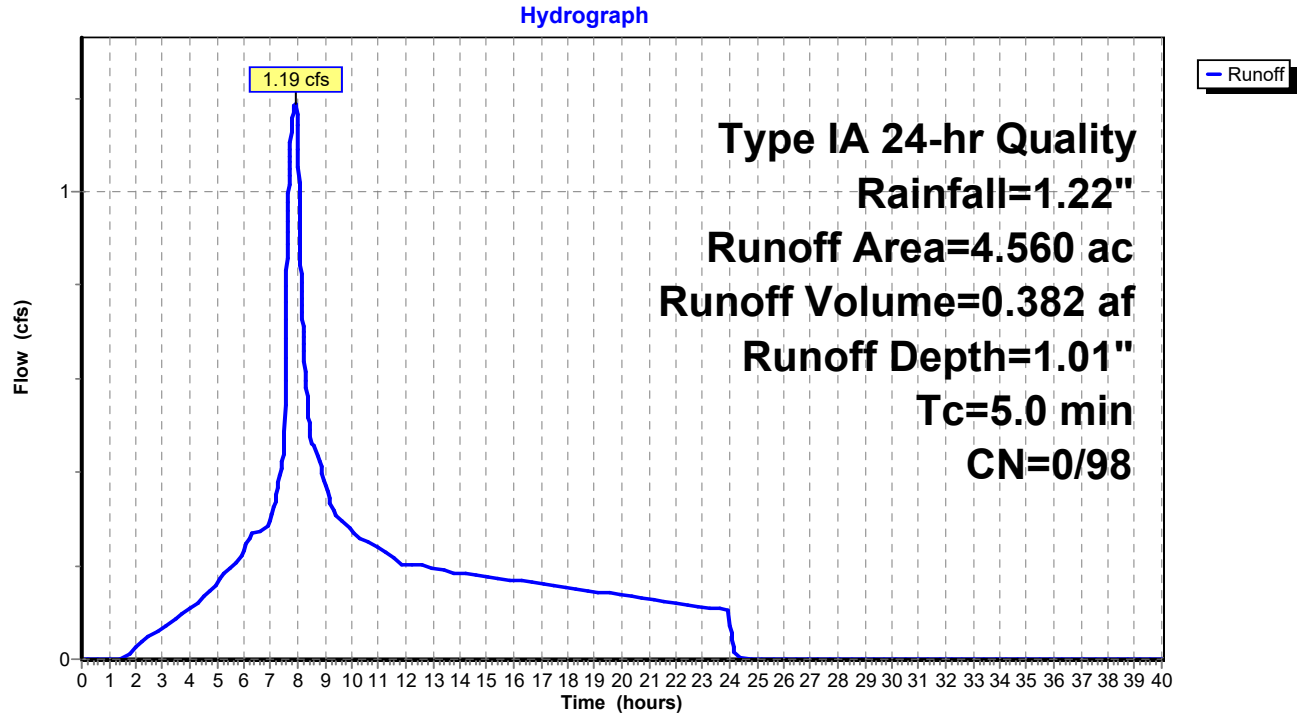
Runoff = 1.19 cfs @ 7.89 hrs, Volume= 0.382 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	4.560	98	
	4.560	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-1: Basin 41



Summary for Subcatchment 4-2: Basin 42

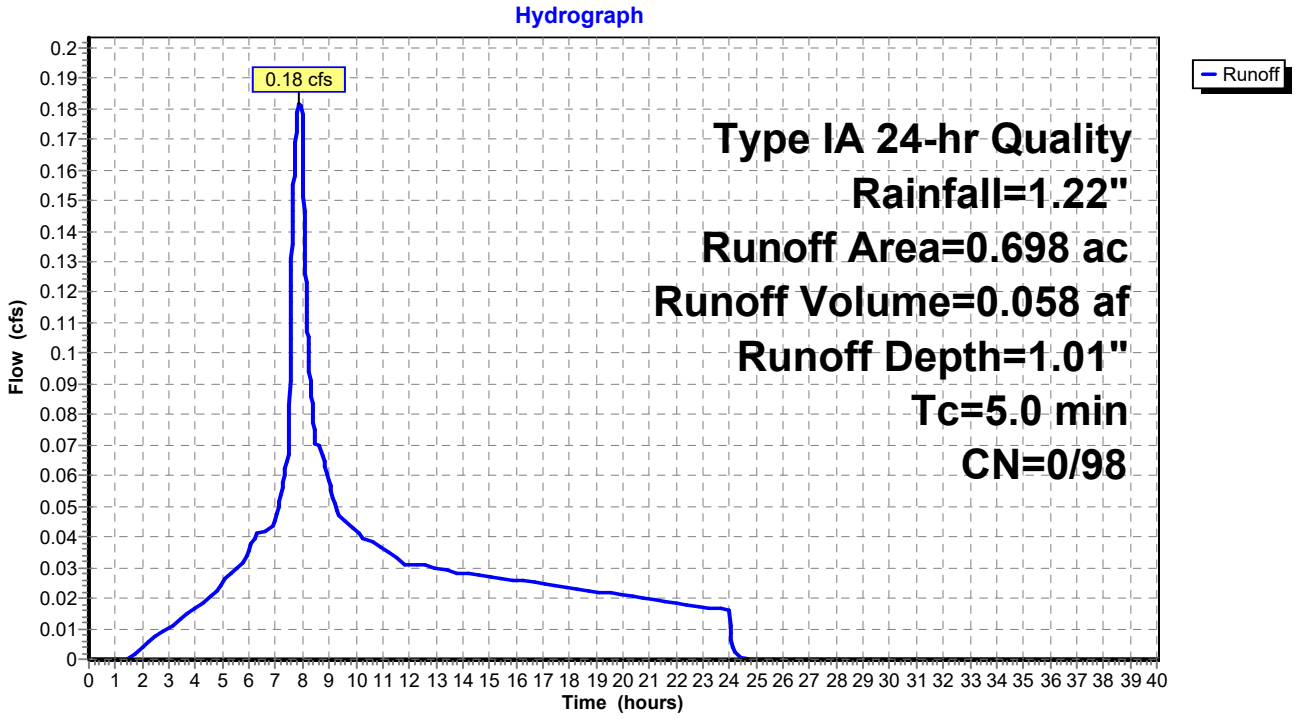
Runoff = 0.18 cfs @ 7.89 hrs, Volume= 0.058 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.698	98	
	0.698	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-2: Basin 42



Summary for Subcatchment 4-3: Basin 43

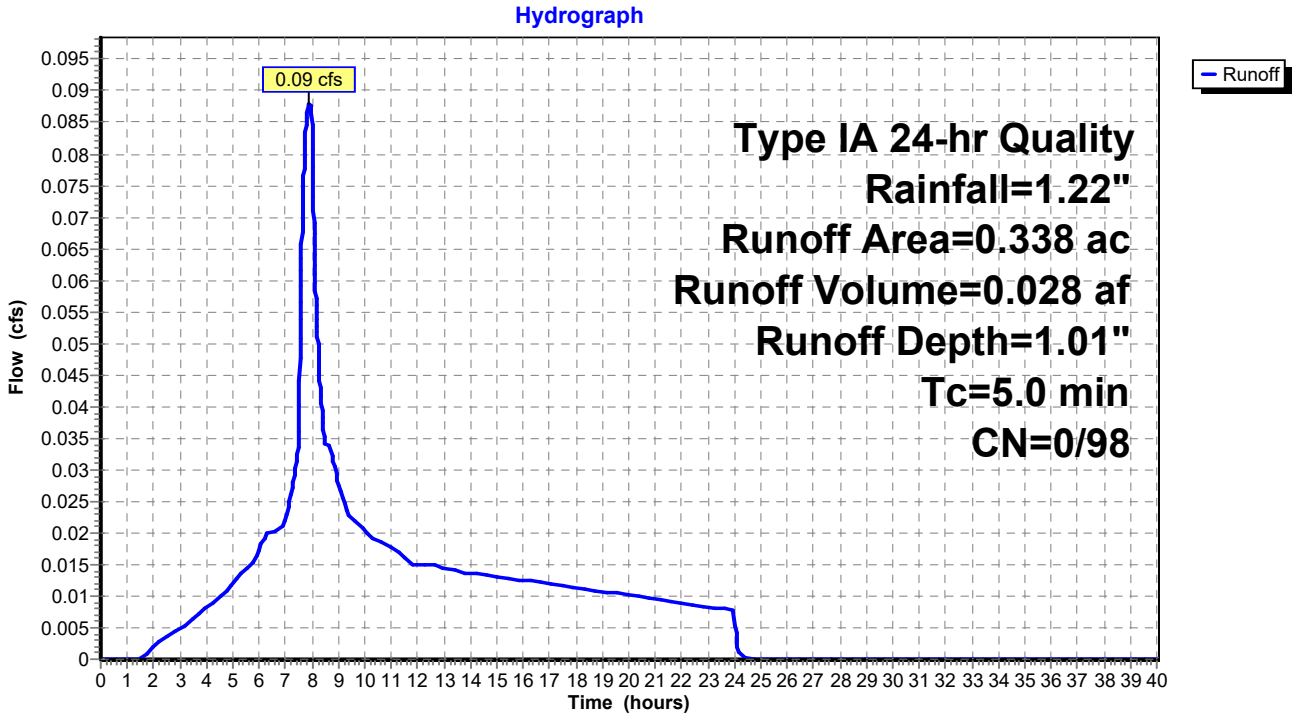
Runoff = 0.09 cfs @ 7.89 hrs, Volume= 0.028 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.338	98	
	0.338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4-3: Basin 43



Summary for Subcatchment 5: Basin 50

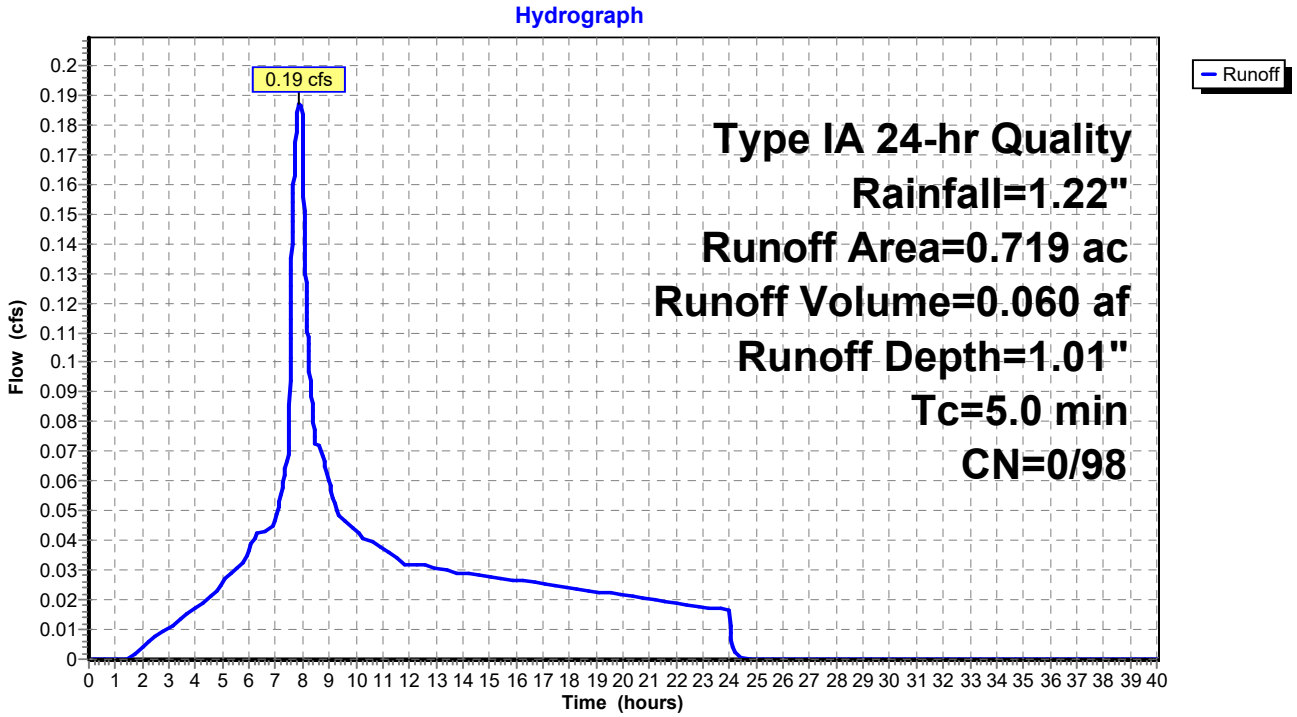
Runoff = 0.19 cfs @ 7.89 hrs, Volume= 0.060 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.719	98	
	0.719	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Basin 50



Summary for Subcatchment 5-1: Basin 51

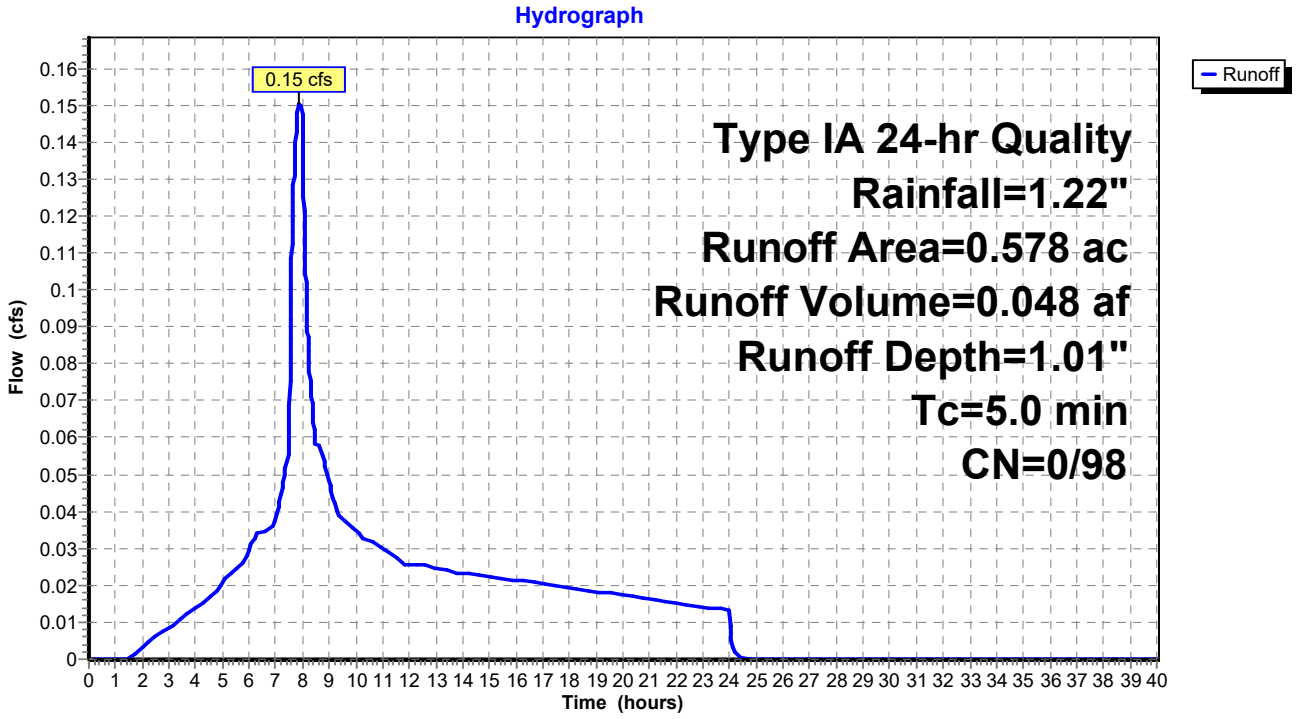
Runoff = 0.15 cfs @ 7.89 hrs, Volume= 0.048 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.578	98	
	0.578	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-1: Basin 51



Summary for Subcatchment 5-2: Basin 52

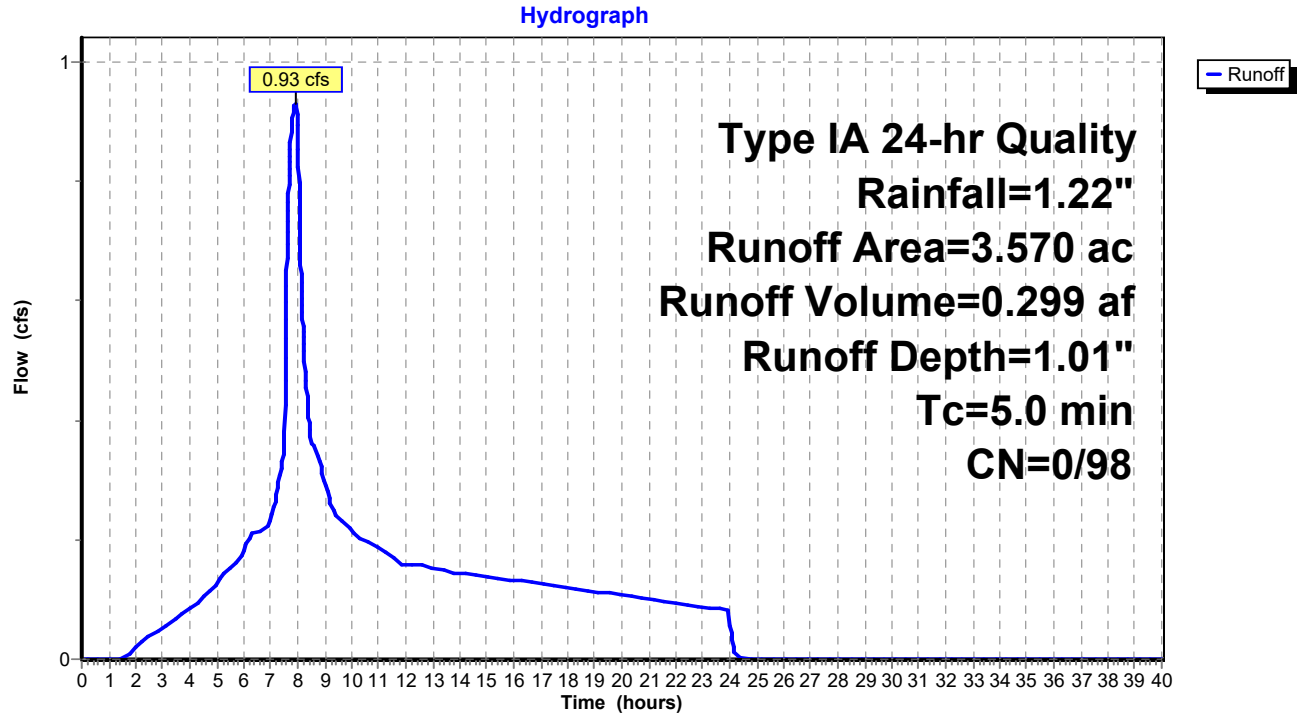
Runoff = 0.93 cfs @ 7.89 hrs, Volume= 0.299 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	3.570	98	
	3.570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5-2: Basin 52



Summary for Subcatchment 6: Basin 60

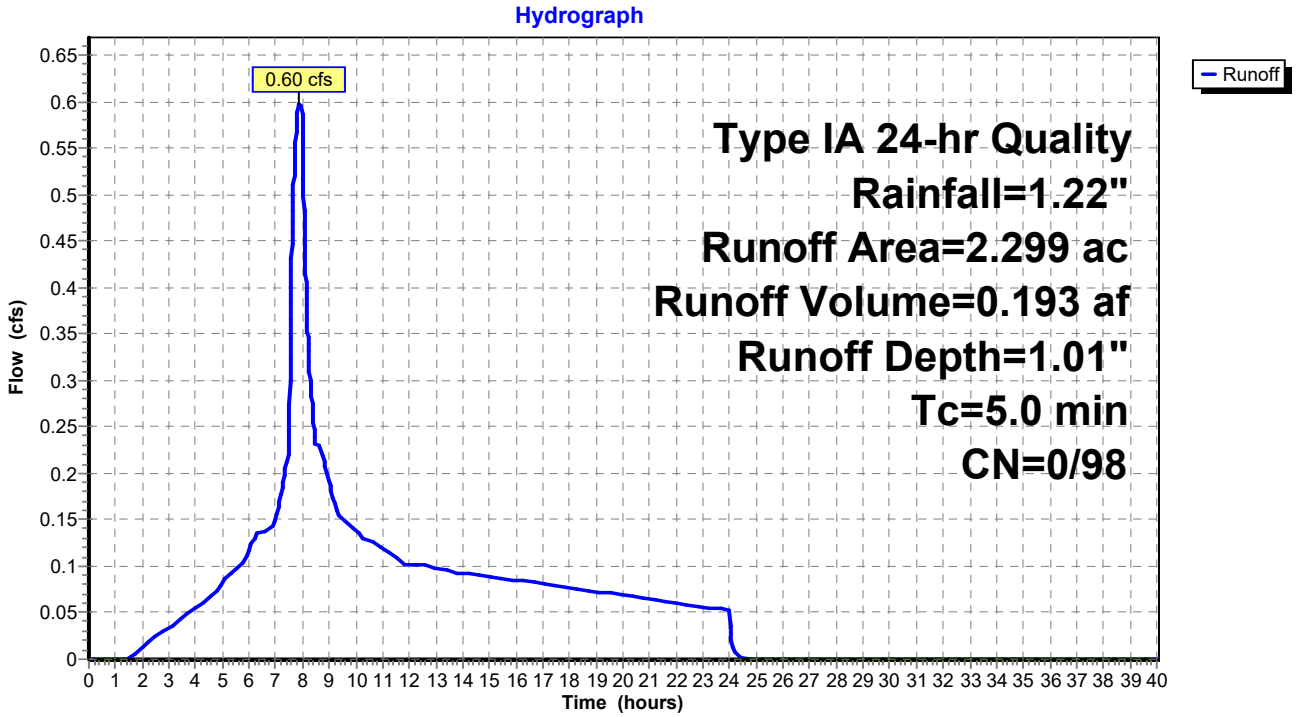
Runoff = 0.60 cfs @ 7.89 hrs, Volume= 0.193 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	2.299	98	
	2.299	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Basin 60



Summary for Subcatchment 6-1: Basin 61

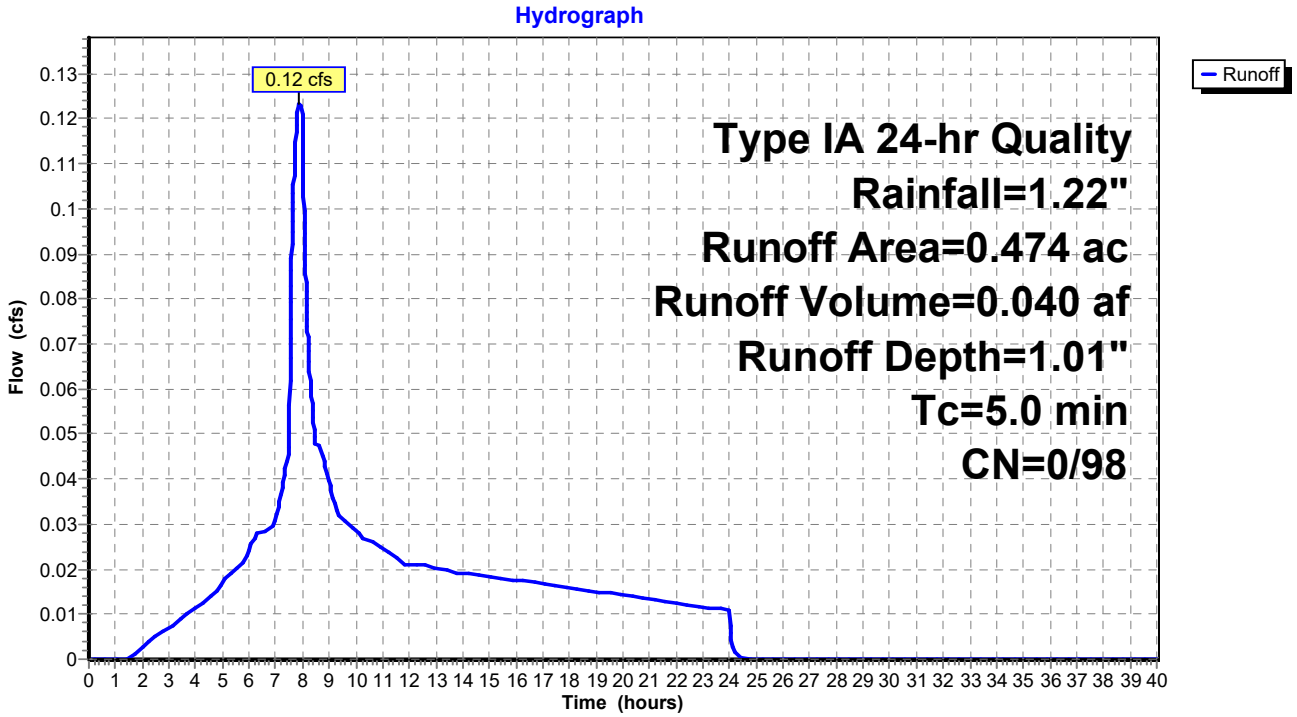
Runoff = 0.12 cfs @ 7.89 hrs, Volume= 0.040 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.474	98	
	0.474	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-1: Basin 61



Summary for Subcatchment 6-2: Basin 62

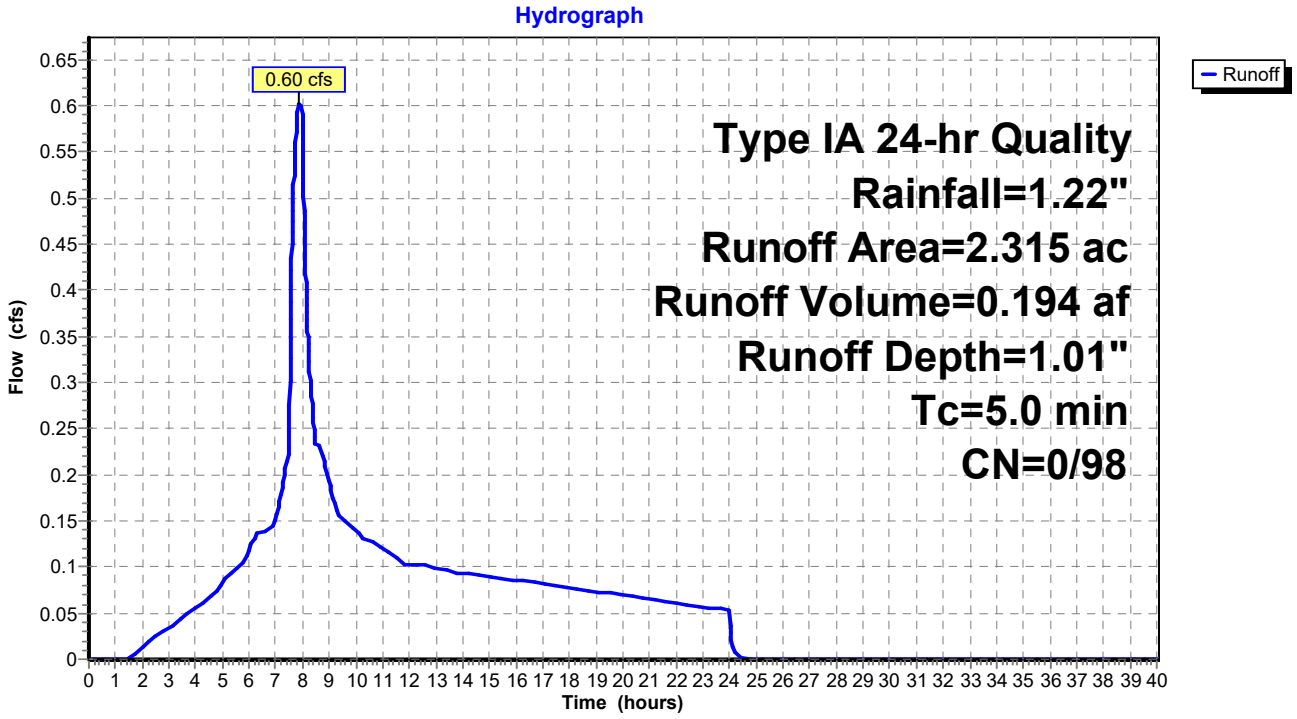
Runoff = 0.60 cfs @ 7.89 hrs, Volume= 0.194 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	2.315	98	
	2.315	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-2: Basin 62



Summary for Subcatchment 6-3: Basin 63

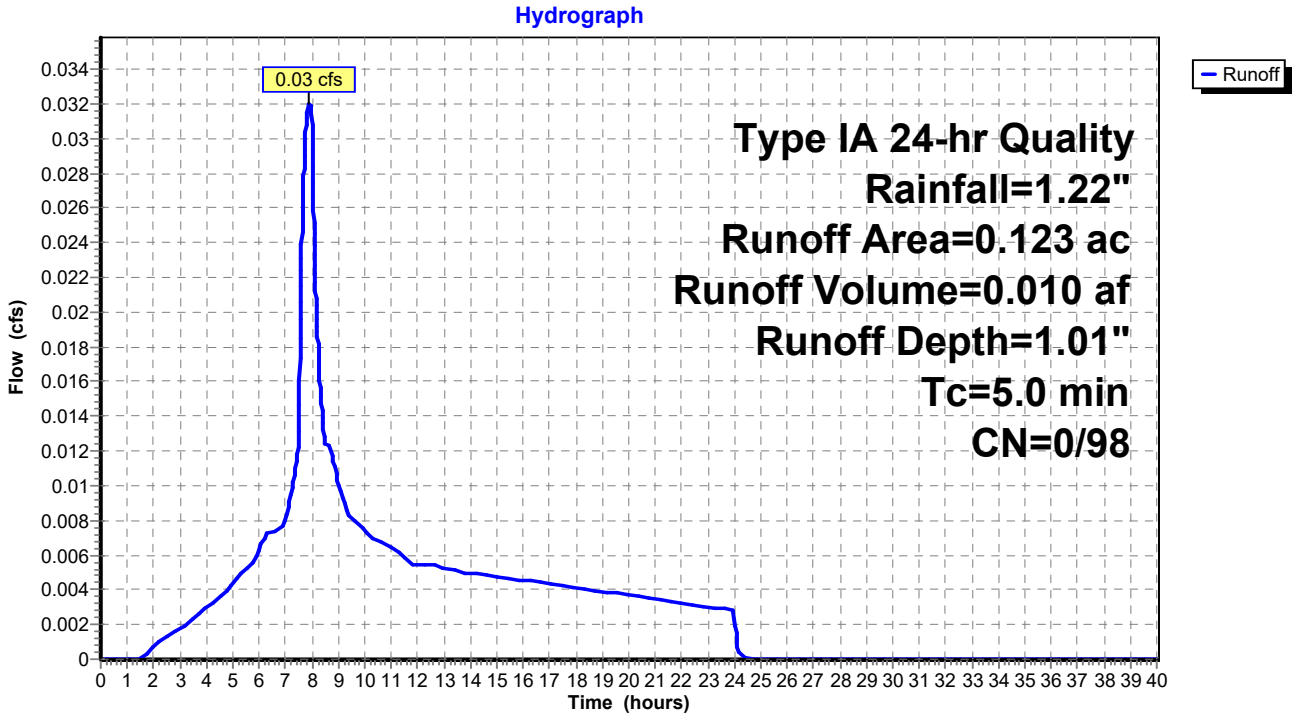
Runoff = 0.03 cfs @ 7.89 hrs, Volume= 0.010 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.123	98	
	0.123	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6-3: Basin 63



Summary for Subcatchment 7: Basin 70

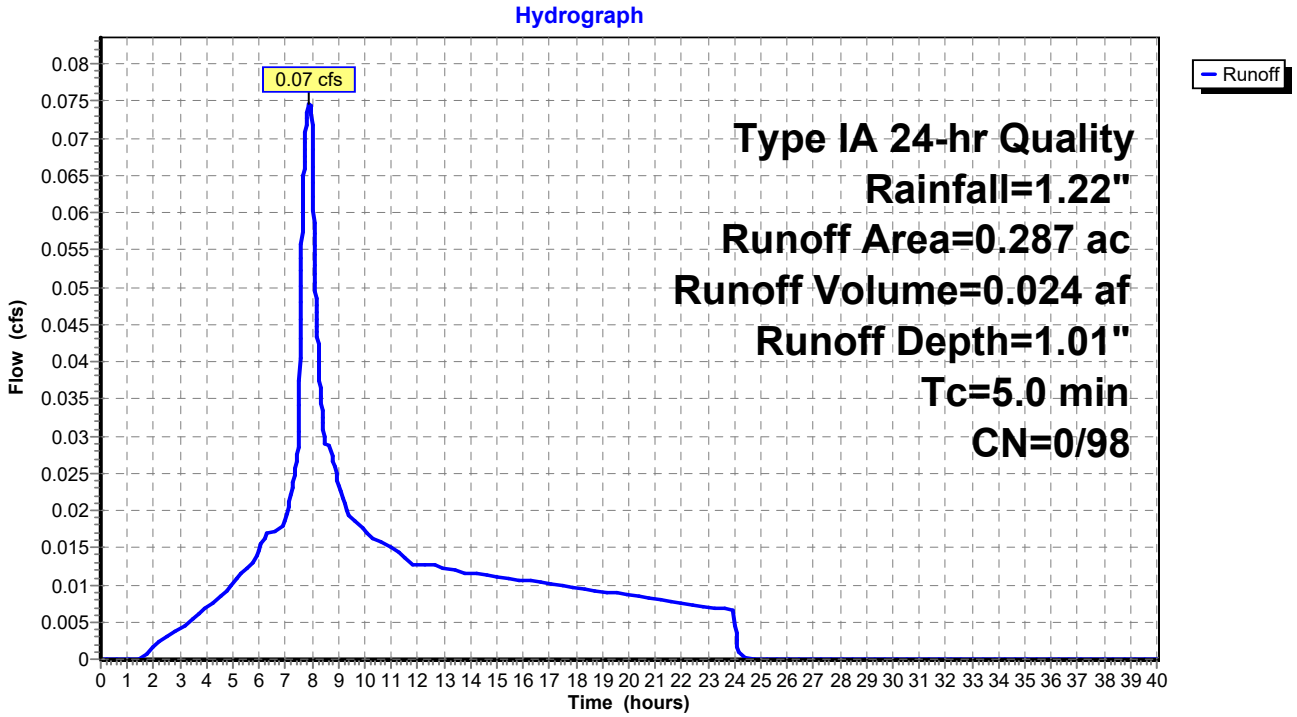
Runoff = 0.07 cfs @ 7.89 hrs, Volume= 0.024 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.287	98	
	0.287	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Basin 70



Summary for Subcatchment 7-1: Basin 71

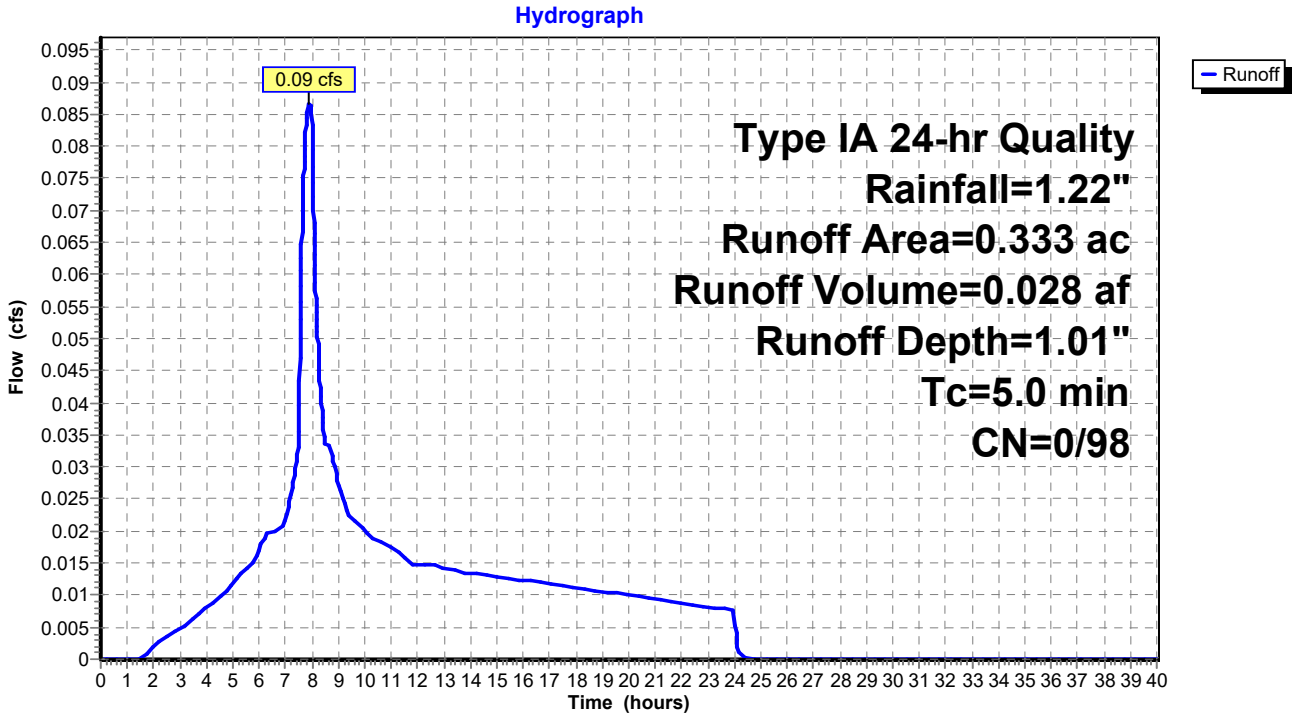
Runoff = 0.09 cfs @ 7.89 hrs, Volume= 0.028 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.333	98	
	0.333	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-1: Basin 71



Summary for Subcatchment 7-2: Basin 72

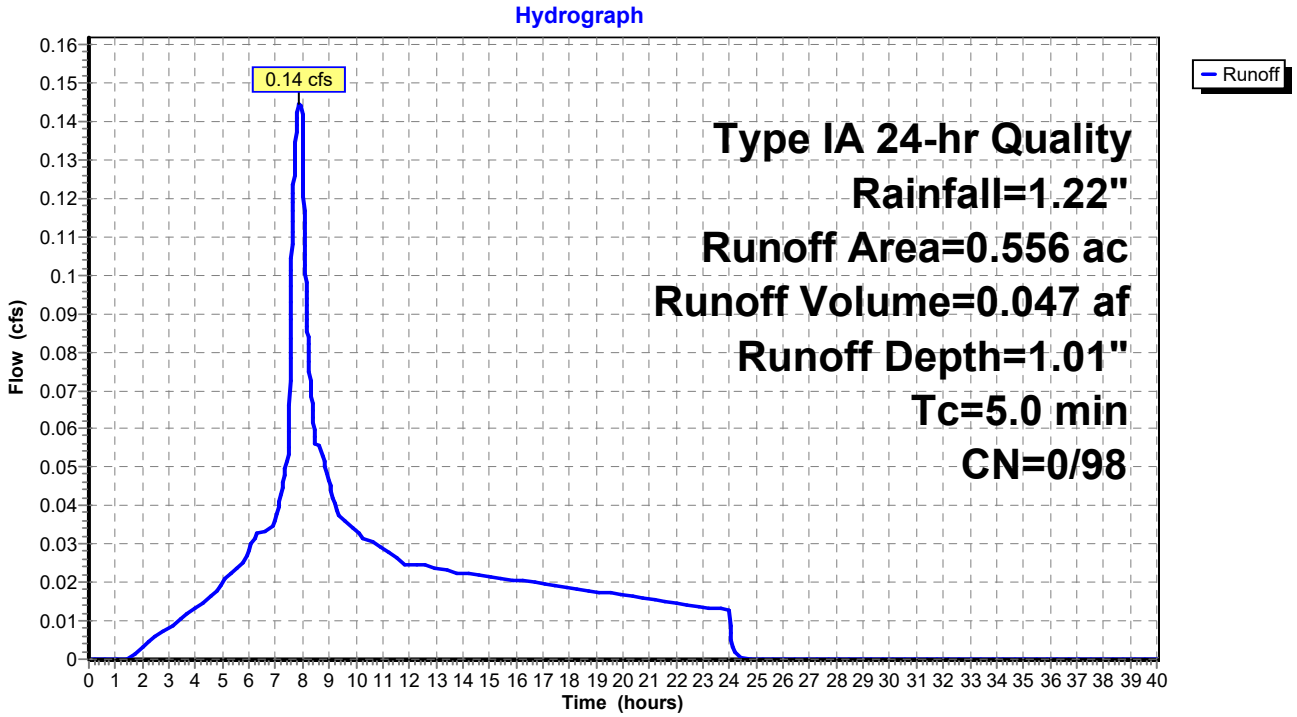
Runoff = 0.14 cfs @ 7.89 hrs, Volume= 0.047 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	0.556	98	
	0.556	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7-2: Basin 72



Summary for Subcatchment 8: Basin 8

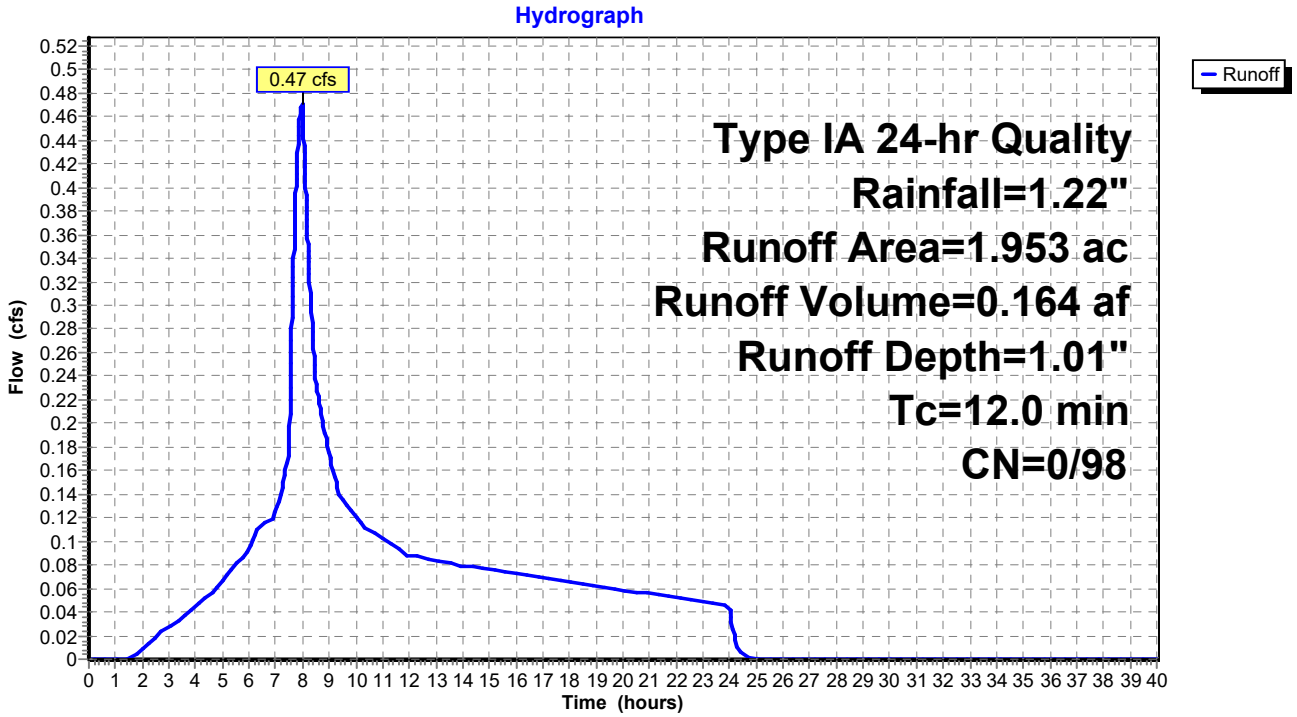
Runoff = 0.47 cfs @ 8.00 hrs, Volume= 0.164 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

	Area (ac)	CN	Description
*	1.953	98	
	1.953	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry, 8C**

Subcatchment 8: Basin 8



Summary for Subcatchment 10S: Package B Pavement

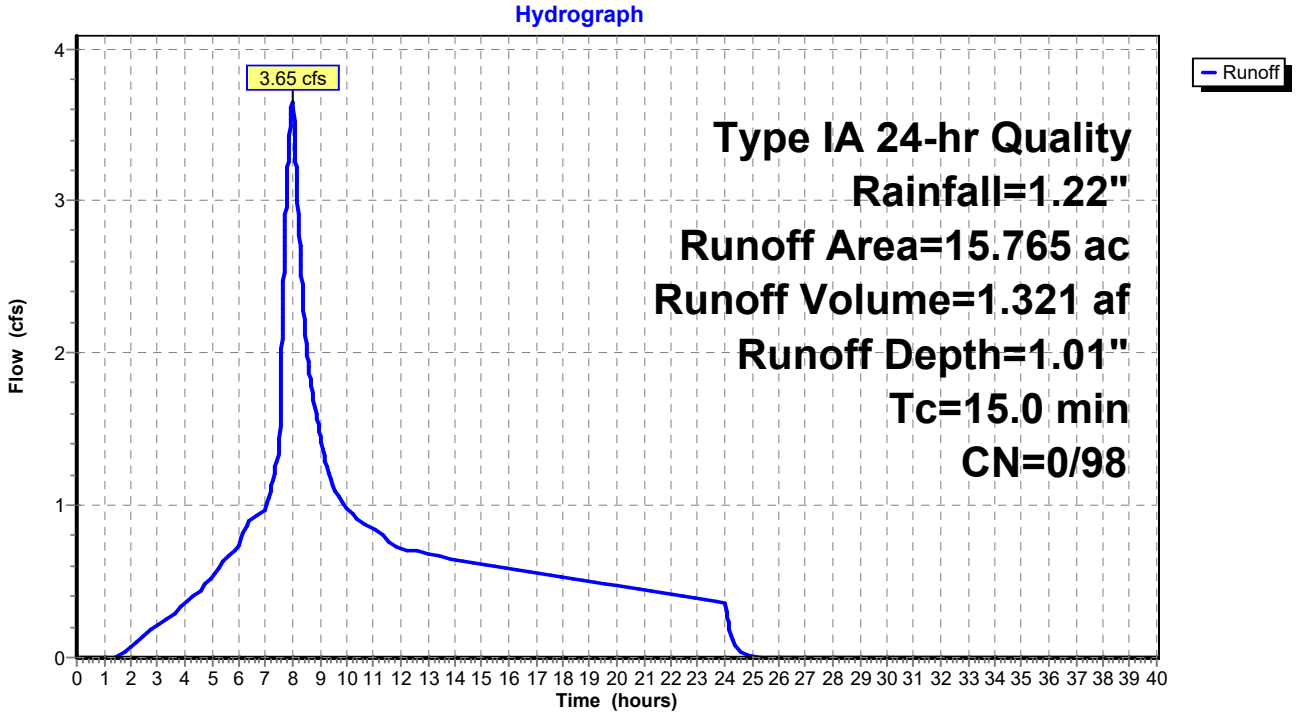
Runoff = 3.65 cfs @ 8.00 hrs, Volume= 1.321 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
2.296	98	Paved roads w/curbs & sewers, HSG B
2.629	98	Paved roads w/curbs & sewers, HSG B
2.078	98	Paved roads w/curbs & sewers, HSG B
2.195	98	Paved roads w/curbs & sewers, HSG B
3.686	98	Paved roads w/curbs & sewers, HSG B
0.913	98	Paved roads w/curbs & sewers, HSG B
1.968	98	Paved roads w/curbs & sewers, HSG B
15.765	98	Weighted Average
15.765	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment 10S: Package B Pavement



Summary for Subcatchment A: Offsite Basin A

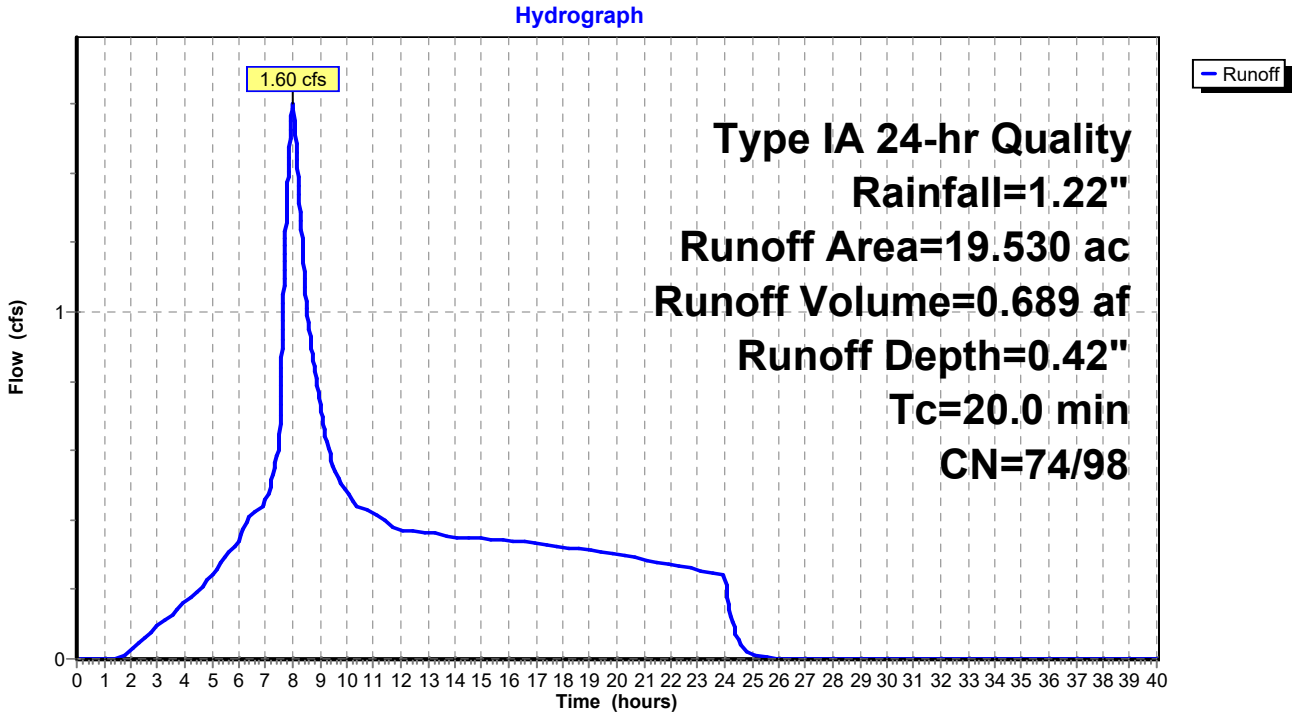
Runoff = 1.60 cfs @ 8.00 hrs, Volume= 0.689 af, Depth= 0.42"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
19.530	83	1/4 acre lots, 38% imp, HSG C
12.109	74	62.00% Pervious Area
7.421	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment A: Offsite Basin A



Summary for Subcatchment B: Offsite Basin B

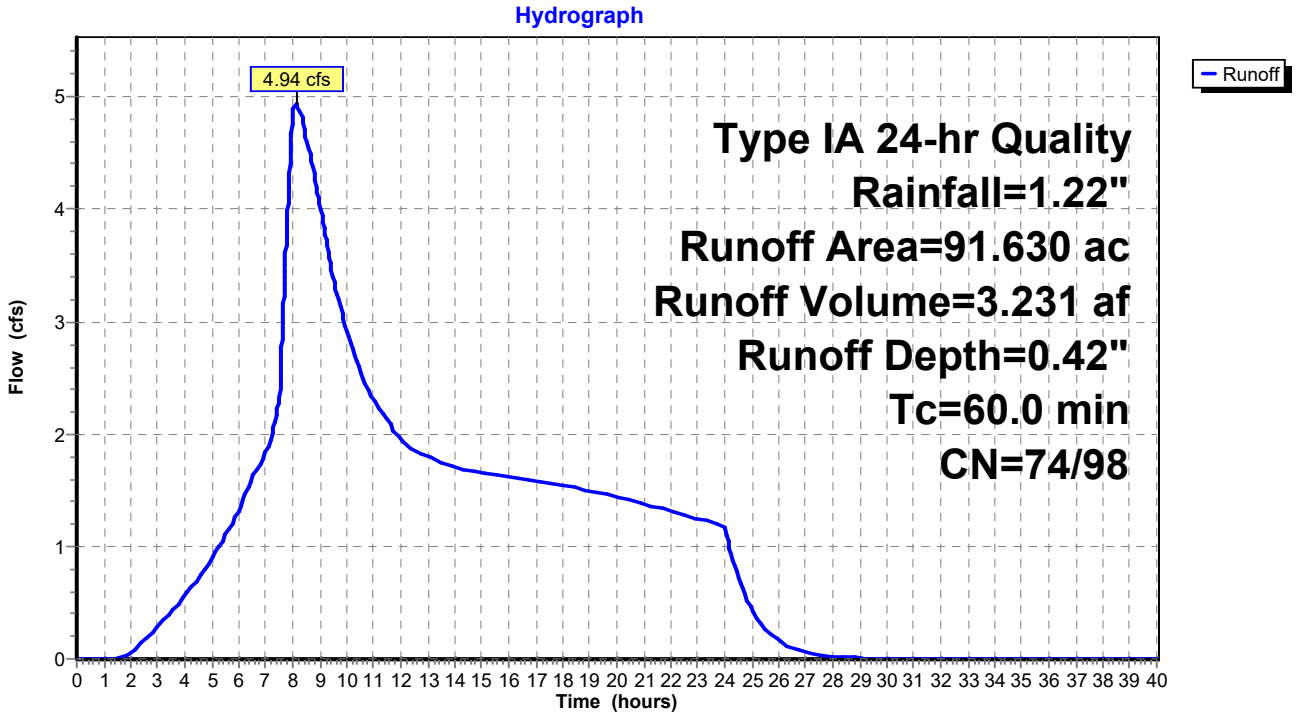
Runoff = 4.94 cfs @ 8.14 hrs, Volume= 3.231 af, Depth= 0.42"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
91.630	83	1/4 acre lots, 38% imp, HSG C
56.811	74	62.00% Pervious Area
34.819	98	38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry, Rough estimate based on SCF formula**

Subcatchment B: Offsite Basin B



Summary for Subcatchment OS-3: Basin OS 31

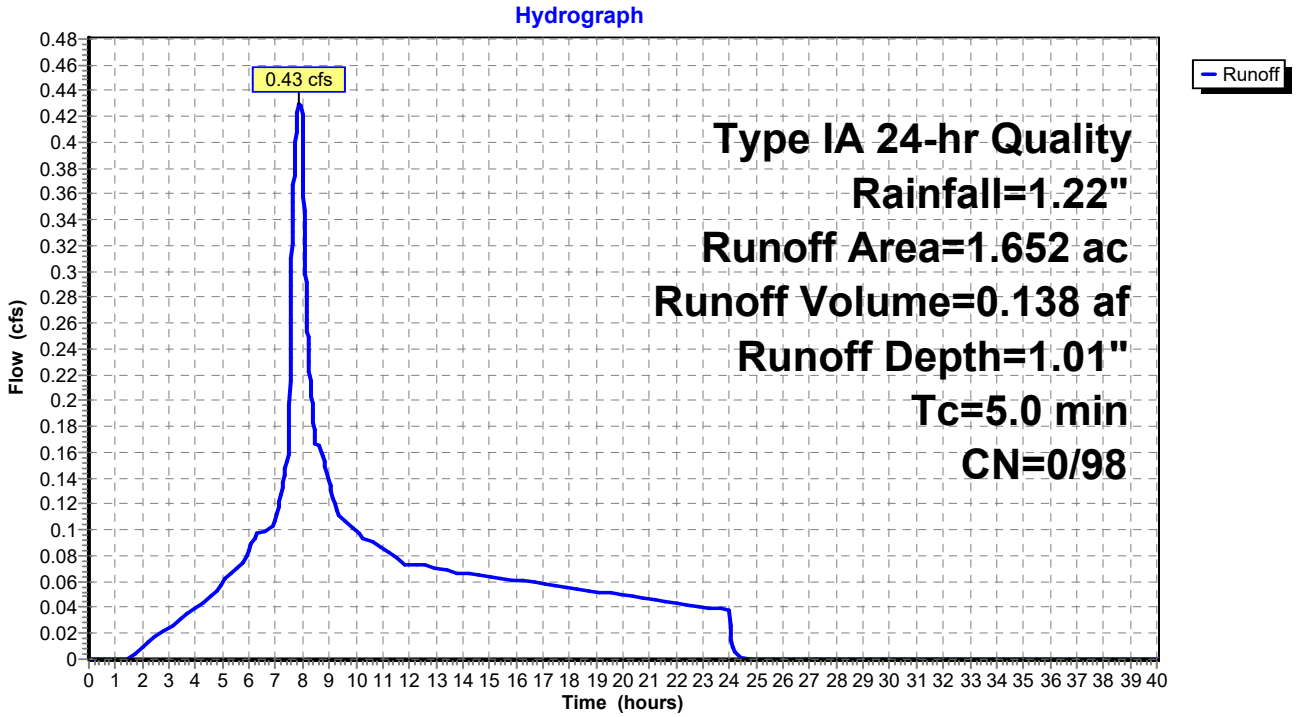
Runoff = 0.43 cfs @ 7.89 hrs, Volume= 0.138 af, Depth= 1.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr Quality Rainfall=1.22"

Area (ac)	CN	Description
1.652	98	Paved roads w/curbs & sewers, HSG B
1.652	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment OS-3: Basin OS 31



Summary for Pond 3P: (new Pond)

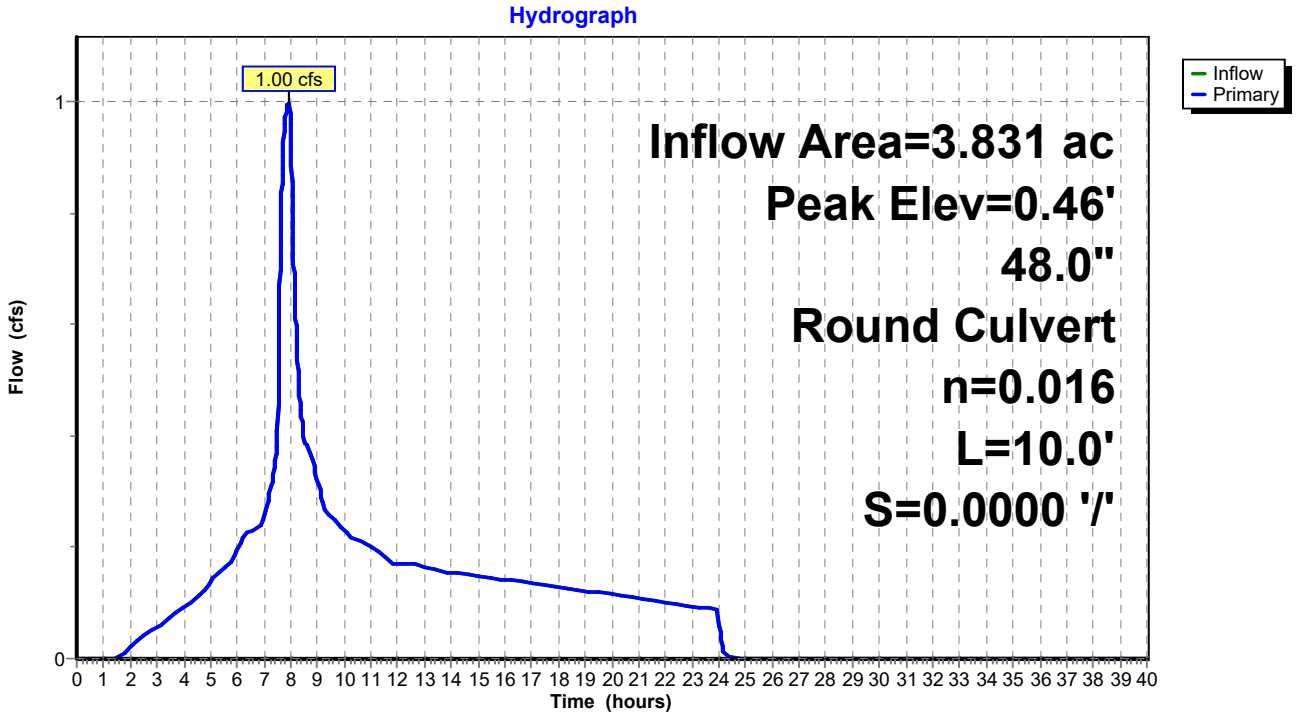
Inflow Area = 3.831 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.00 cfs @ 7.89 hrs, Volume= 0.321 af
Outflow = 1.00 cfs @ 7.89 hrs, Volume= 0.321 af, Atten= 0%, Lag= 0.0 min
Primary = 1.00 cfs @ 7.89 hrs, Volume= 0.321 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.46' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=0.99 cfs @ 7.89 hrs HW=0.46' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.99 cfs @ 1.89 fps)

Pond 3P: (new Pond)



Summary for Pond 4P: (new Pond)

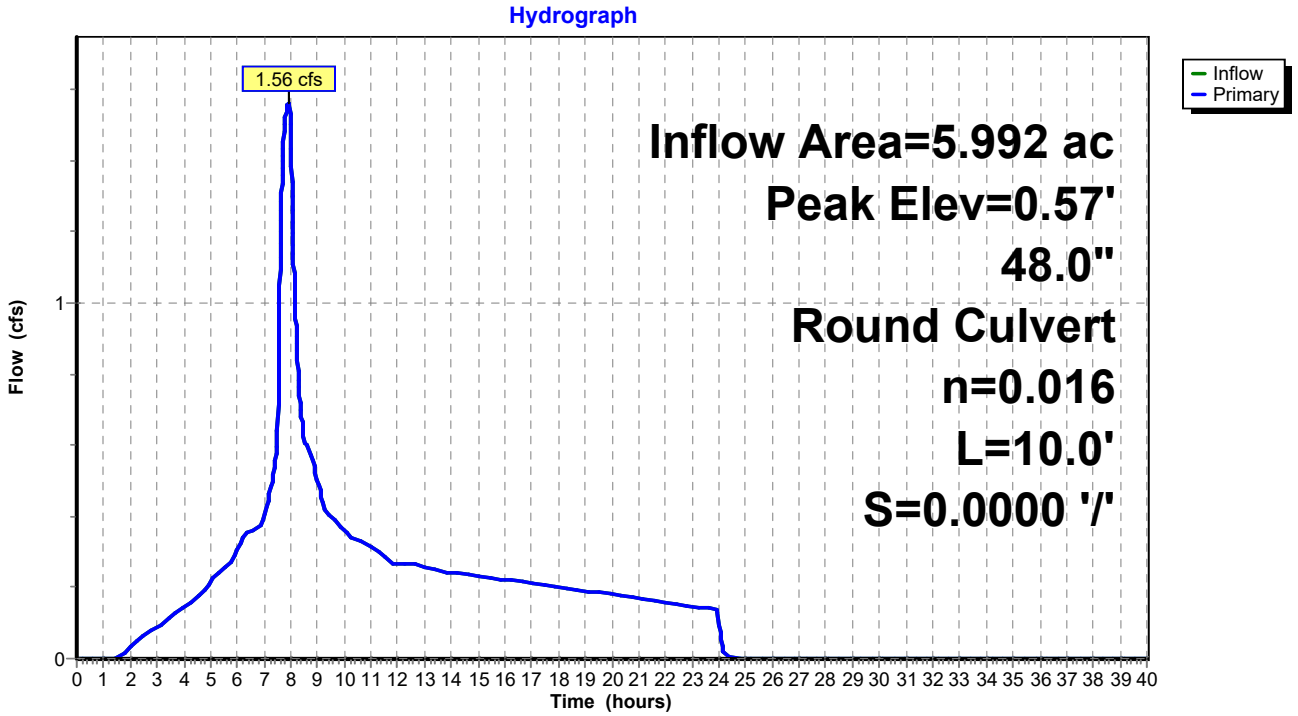
Inflow Area = 5.992 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.56 cfs @ 7.89 hrs, Volume= 0.502 af
Outflow = 1.56 cfs @ 7.89 hrs, Volume= 0.502 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 7.89 hrs, Volume= 0.502 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.57' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.56 cfs @ 7.89 hrs HW=0.57' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.56 cfs @ 2.17 fps)

Pond 4P: (new Pond)



Summary for Pond 5P: (new Pond)

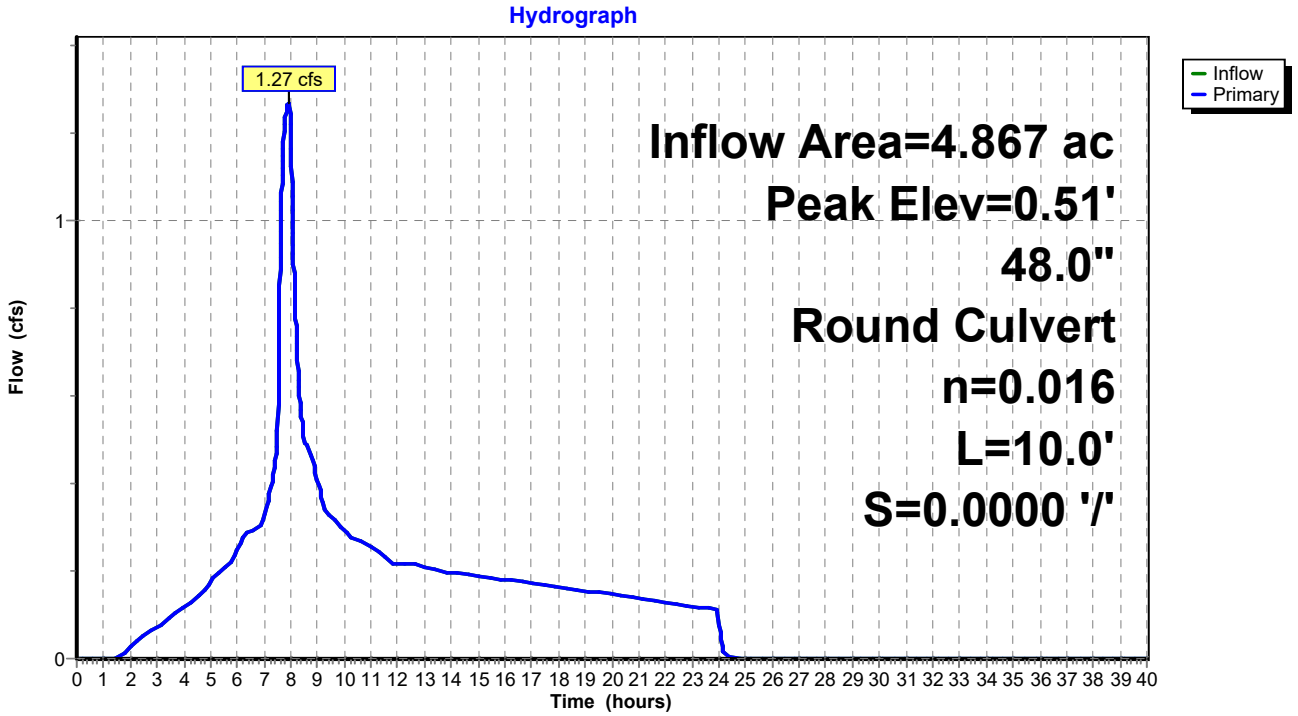
Inflow Area = 4.867 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.27 cfs @ 7.89 hrs, Volume= 0.408 af
Outflow = 1.27 cfs @ 7.89 hrs, Volume= 0.408 af, Atten= 0%, Lag= 0.0 min
Primary = 1.27 cfs @ 7.89 hrs, Volume= 0.408 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.51' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.26 cfs @ 7.89 hrs HW=0.51' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.26 cfs @ 2.04 fps)

Pond 5P: (new Pond)



Summary for Pond 6P: (new Pond)

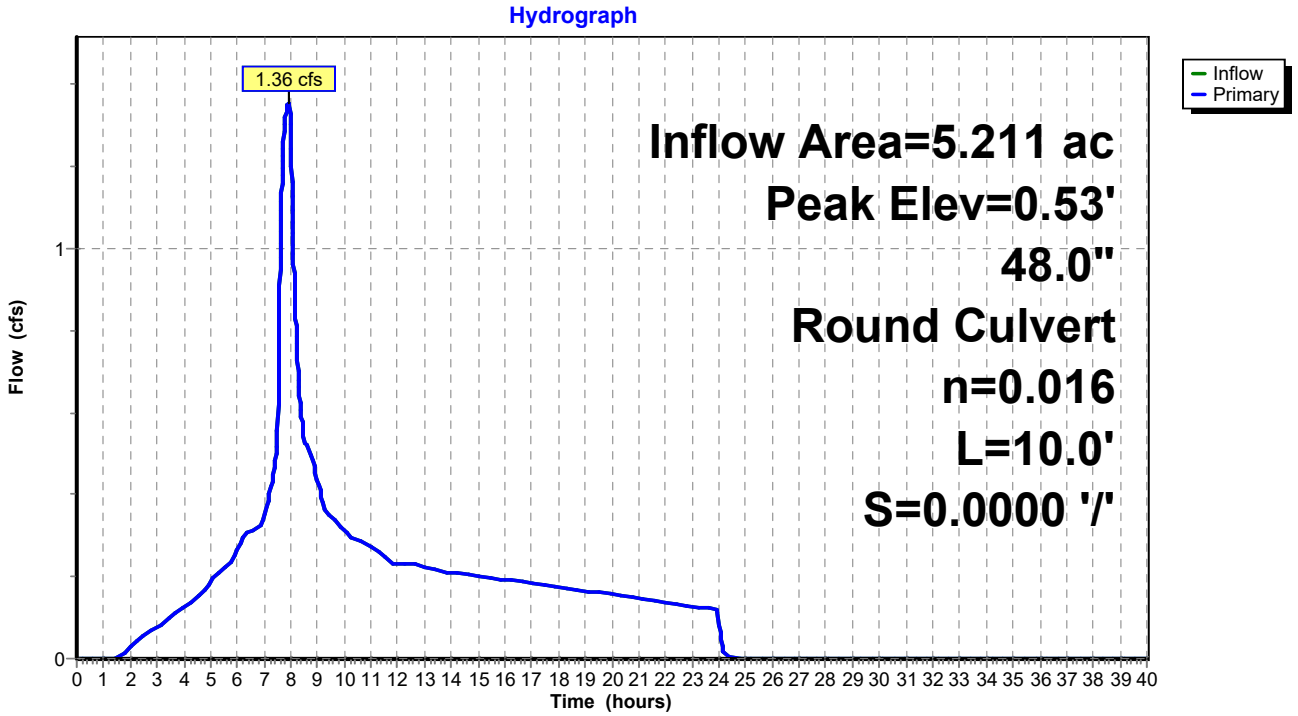
Inflow Area = 5.211 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 1.36 cfs @ 7.89 hrs, Volume= 0.437 af
Outflow = 1.36 cfs @ 7.89 hrs, Volume= 0.437 af, Atten= 0%, Lag= 0.0 min
Primary = 1.36 cfs @ 7.89 hrs, Volume= 0.437 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.53' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=1.35 cfs @ 7.89 hrs HW=0.53' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.35 cfs @ 2.08 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

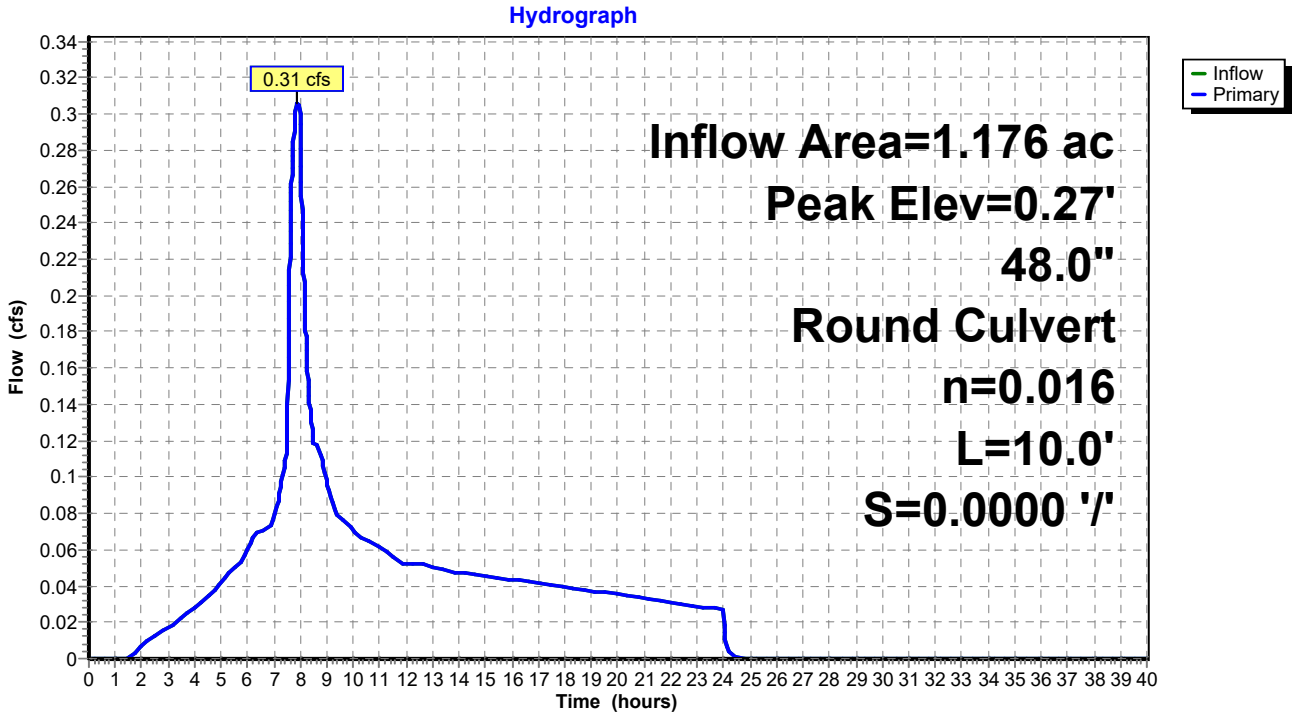
Inflow Area = 1.176 ac,100.00% Impervious, Inflow Depth = 1.01" for Quality event
Inflow = 0.31 cfs @ 7.89 hrs, Volume= 0.099 af
Outflow = 0.31 cfs @ 7.89 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 7.89 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 0.27' @ 7.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=0.30 cfs @ 7.89 hrs HW=0.27' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.30 cfs @ 1.28 fps)

Pond 7P: (new Pond)



Summary for Pond 10P: Offsite Flows

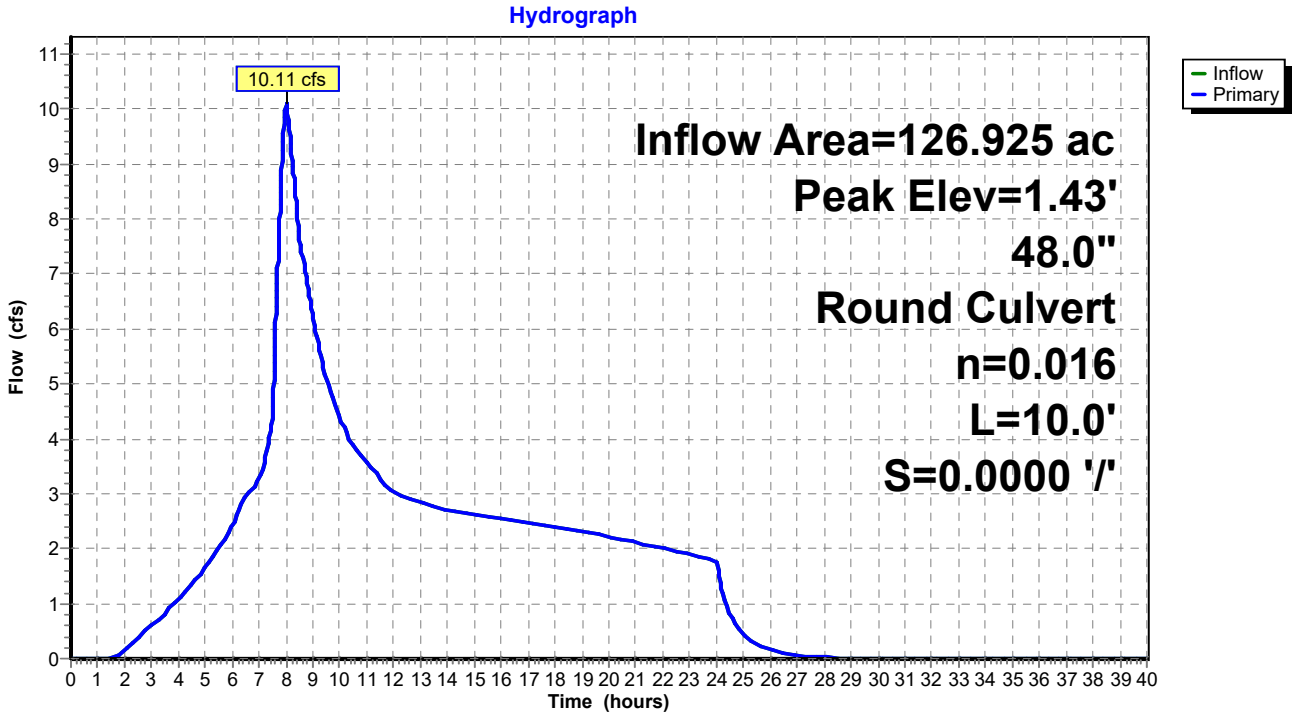
Inflow Area = 126.925 ac, 45.70% Impervious, Inflow Depth = 0.50" for Quality event
Inflow = 10.11 cfs @ 8.01 hrs, Volume= 5.240 af
Outflow = 10.11 cfs @ 8.01 hrs, Volume= 5.240 af, Atten= 0%, Lag= 0.0 min
Primary = 10.11 cfs @ 8.01 hrs, Volume= 5.240 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1.43' @ 8.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**48.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 0.00' / 0.00' S= 0.0000 '/' Cc= 0.900 n= 0.016

Primary OutFlow Max=10.10 cfs @ 8.01 hrs HW=1.43' (Free Discharge)
└**1=Culvert** (Barrel Controls 10.10 cfs @ 3.74 fps)

Pond 10P: Offsite Flows



Appendix D. Stormwater Facility Design Calculations

WQF#1

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	New Project
Project Type	RoadProject
Location	
Stormwater Management Area	2135
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Extg Pavement	40,119	Impervious	ConventionalConcrete	B	BMP(1)
Grass	27,951	Grass	Grass	B	BMP(1)
Proposed Pavement	5,881	Forested	ConventionalConcrete	B	BMP(1)

LID Facility Sizing Details

Pond Sizing Details

Pond ID	Design Criteria(1)	Facility Soil Type	Max Depth (ft)(2)	Top Area (sq-ft)	Side Slope (1:H)	Facility Vol. (cu-ft)(3)	Water Storage Vol. (cu-ft)(4)	Adequate Size?
BMP(1)	FCWQT	D1	5.00	2,135.0	4	4,104.3	3,419.6	Yes

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

WQF#1

Simple Pond Geometry Configuration

Pond ID: BMP(1)
Design: FlowControlAndTreatment

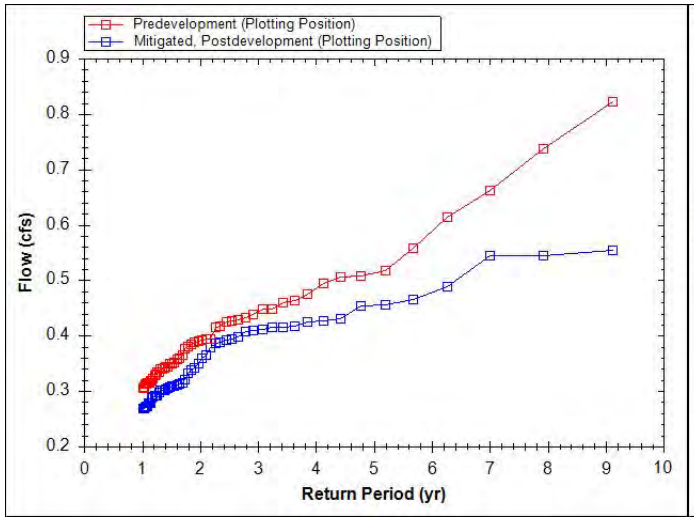
Shape Curve

Depth (ft)	Area (sq ft)
5.0	2,135.0

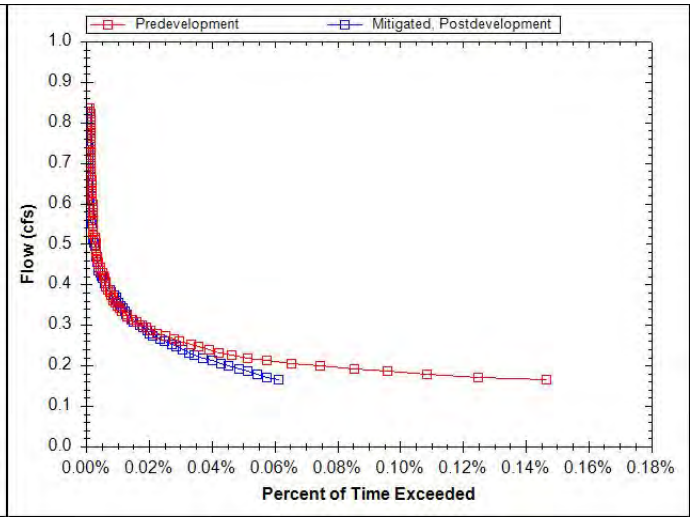
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	1.7
Upper Orifice Invert(ft)	3.4
Upper Orifice Dia (in)	4.5
Overflow Weir Invert(ft)	4.0
Overflow Weir Length (ft)	6.3

Flow Frequency Chart



Flow Duration Chart



ODOT I-205 CW/Abernethy Post-Construction SWMP
Stormwater Facility Design Calculations - WQF #2 (bioslope)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix C

Long term infiltration rate of ecology mix (inches/hour)	10
Length of Bioslope (feet)	1900
Width of bioslope (feet)	4.5
Converstion Factor	43200
Safety Factor	1

$$Q_{infiltration}=(LTIR_{EM})(L_{BIO})(W_{BIO})/(C)(SF)$$

Assumed long Term infiltration Capacity $Q_{infiltration}$, cfs	1.98
Required Water Quality Design Flow, cfs	0.80

WQF#3

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	WQF#3
Project Type	RoadProject
Location	
Stormwater Management Area	4639
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Existing Pavement Basin 3	71,961	Impervious	ConventionalConcrete	B	BMP(1)
New Pavement Basin 3	19,297	Forested	ConventionalConcrete	B	BMP(1)
OS-3 Basin	75,707	Impervious	ConventionalConcrete	B	BMP(1)

LID Facility Sizing Details

Pond Sizing Details

Pond ID	Design Criteria(1)	Facility Soil Type	Max Depth (ft)(2)	Top Area (sq-ft)	Side Slope (1:H)	Facility Vol. (cu-ft)(3)	Water Storage Vol. (cu-ft)(4)	Adequate Size?
BMP(1)	FCWQT	D1	5.36	4,639.0	4	12,497.8	9,915.6	Yes

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

WQF#3

Simple Pond Geometry Configuration

Pond ID: BMP(1)
Design: FlowControlAndTreatment

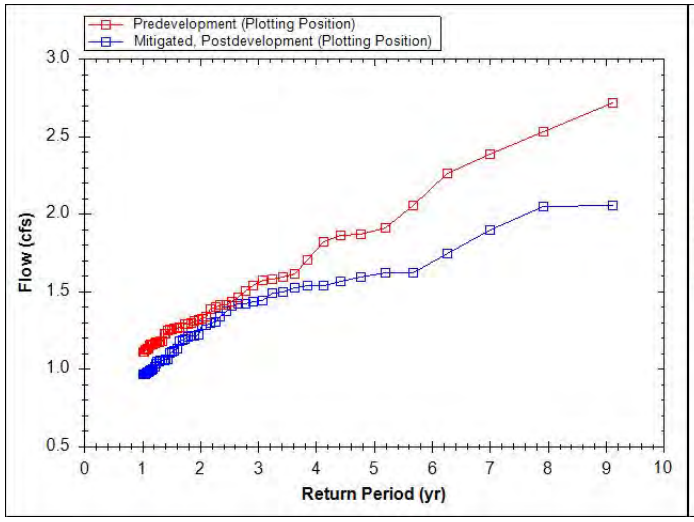
Shape Curve

Depth (ft)	Area (sq ft)
5.4	4,639.0

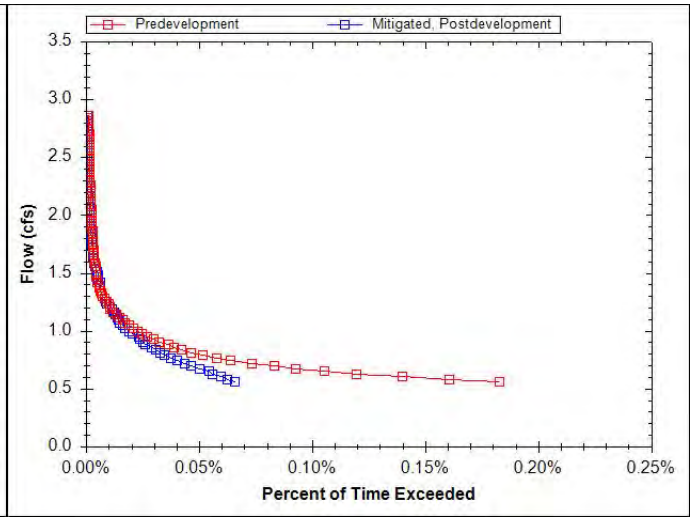
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	3.0
Upper Orifice Invert(ft)	3.6
Upper Orifice Dia (in)	8.2
Overflow Weir Invert(ft)	4.4
Overflow Weir Length (ft)	6.3

Flow Frequency Chart



Flow Duration Chart



ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF #4 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**16.0**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.01	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	18.6	
XS Area, ft^2	5.72	
Velocity, fps	0.273	v=Q/A
Design flow, cfs	1.56	From HydroCAD output, WQ storm event
Bottom length, ft	**149.4**	L=v*t, Minimum 100 ft
Top length, ft	**160.0**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**26.6**	
Max shear stress, lb/sf	0.20592	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF#5 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**12.6**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.0107	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	15.2	
XS Area, ft^2	4.59	
Velocity, fps	0.277	v=Q/A
Design flow, cfs	1.27	From HydroCAD output, WQ storm event
Bottom length, ft	**151.3**	L=v*t, Minimum 100 ft
Top length, ft	**162.0**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**23.2**	
Max shear stress, lb/sf	0.220334	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF#6 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**37.8**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.0204	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	40.5	
XS Area, ft^2	13.04	
Velocity, fps	0.410	v=Q/A
Current design flow, cfs	1.35	
Full build out additional flow, cfs	4.00	
Total design flow, cfs	5.35	From HydroCAD output, WQ storm event
Bottom length, ft	**223.5**	L=v*t, Minimum 100 ft
Top length, ft	**234.2**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**48.5**	
Max shear stress, lb/sf	0.42432	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF#7 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**26.6**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.015	Minimum 1.5%, maximum 6%
Water depth, ft	0.25	Max Depth 4-6% is 3", 4" for less than 4%
Top width	28.6	
XS Area, ft^2	6.91	
Velocity, fps	0.289	v=Q/A
Current design flow, cfs	0.30	
Full build out additional flow, cfs	1.70	
Total design flow, cfs	2.00	From HydroCAD output, WQ storm event
Bottom length, ft	**158.3**	L=v*t, Minimum 100 ft
Top length, ft	**168.3**	
Depth w/FB, ft	1.25	
Top width w/ FB, ft	**36.6**	
Max shear stress, lb/sf	0.234	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	N/A	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

ODOT I-205 CW/Abernethy Post-Construction SWMP

Stormwater Facility Design Calculations - WQF #8 (biofiltration swale)

Theory: ODOT Hydraulics Manual - Chapter 14, Appendix B

Manning's n	0.24	
Bottom width, ft	**50.0**	B=nQ/(1.49*$y^{1.67}$*$s^{0.5}$), Minimum 4 ft
Side slope	4	Maximum 4
Bottom slope, ft/ft	0.01	Minimum 1.5%, maximum 6%
Water depth, ft	0.33	Max Depth 4-6% is 3", 4" for less than 4%
Top width	52.7	
XS Area, ft^2	17.12	
Velocity, fps	0.290	v=Q/A
Current design flow, cfs	0.47	
Full build out additional flow, cfs	4.49	
Total design flow, cfs	4.96	From HydroCAD output, WQ storm event
Bottom length, ft	**158.4**	L=v*t, Minimum 100 ft
Top length, ft	**169.1**	
Depth w/FB, ft	1.33	
Top width w/ FB, ft	**60.7**	
Max shear stress, lb/sf	0.208	
Residence time, min	9	Minimum t= 9 minutes
25-year v, fps	1.88	$v=Q_{25\text{-}yr}/A_{XS}$, Max 3 ft/s

WQF#9

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	Jon Storm Parking Lot
Project Type	RoadProject
Location	
Stormwater Management Area	240
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Parking Lot	10,200	Grass	ConventionalConcrete	D	BMP

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
BMP	WaterQuality	Stormwater Planter - Infiltration	A1	153.0	240.0	0.0

Pond Sizing Details

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

Appendix E. Operation and Maintenance Manuals

OPERATION & MAINTENANCE MANUAL

DFI No. : DXXXXX
Facility Type: Bioretention Pond

MARCH, 2019

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1. IDENTIFICATION 1
2. FACILITY CONTACT INFORMATION 1
3. CONSTRUCTION 1
4. STORM DRAIN SYSTEM AND FACILITY OVERVIEW 2
5. FACILITY HAZ MAT SPILL FEATURE(S) 2
6. AUXILIARY OUTLET (HIGH FLOW BYPASS) 3
7. MAINTENANCE REQUIREMENTS 3
8. WASTE MATERIAL HANDLING 4

APPENDIX A: Operational Plan and Profile Drawing(s)

APPENDIX B: ODOT Project Plan Sheets

1. Identification

Drainage Facility ID (DFI):	**[DXXXXX]**
Facility Type:	Bioretention Pond
Construction Drawings:	(V-File Number) [xxV-xxx]
Location:	District: 1
	Highway No.: 064
	Mile Post: [10.15; 10.17 (beg./end)]
	Description: This facility is located in the gore zone between NB I-205 and the exit ramp to OR213.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	[ODOT Designer – [Region 1 Tech. Center, David McDonald Consultant Designer – [HDR, Cory Gieseke, 503.423.3803]
Facility construction:	20__
Contractor:	_____.

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4. Storm Drain System and Facility Overview

A bioretention pond facility provides water quality treatment of the smaller storm events and detention of the larger storm events.

The bioretention pond is a grassy-lined facility with a flat trapezoidal cross section and a flat bottom. Treatment is provided through infiltration processes through the amended soil media. The facility is sized to fully infiltrate the water quality storm event.

When the flows exceed the water quality flows, the facility begins to provide detention. Detention is required to reduce or mitigate the increases in discharge, resulting from development. The facility is designed to store and gradually release (or attenuate) stormwater runoff via a control structure or release mechanism, then releasing it slowly over a more extended period of time. The flow control mechanism for this facility involves an orifice surrounded by a wirecloth strainer assembly. When flows exceed the water quality design flow, the orifice restricts the flow causing the water to backup within the facility.

The outlet of the facility will convert an existing ditch drain to an outlet structure. Discharge is routed through an existing stormwater system and eventually reaches the Clackamas River.

A. Maintenance equipment access:

Maintenance access to the facility will be from the shoulder of I-205 NB.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☐ Allowed (with limitations)
☒ Not allowed

C. Special Features:

☒ Amended Soils
☒ Porous Pavers
☐ Liners
☒ Underdrains

5. Facility Haz Mat Spill Feature(s)

The bioretention pond can be used to store a volume of liquid by blocking the outlet pipe located at the outlet of the facility.

DRAFT

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

☒ Designed into facility
The auxiliary outlet feature is built in to the outlet structure. When high flows occur, water will bypass the primary outlet and overtop the auxiliary outlet to be routed downstream.

☐ Other, as noted below

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

☒ Table 1 (general maintenance)
☒ Table 2 (stormwater ponds)
☐ Table 3 (water quality biofiltration swales)
☐ Table 4 (water quality filter strips)
☐ Table 5 (water quality bioslopes)
☐ Table 6 (detention tank)

☐ Table 7 (detention vault)
☐ Appendix C (proprietary structure)

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

DRAFT

OPERATION & MAINTENANCE MANUAL

DFI No. : [DXXXXX]
Facility Type: Bioslope

DRAFT

MARCH, 2019

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2. FACILITY CONTACT INFORMATION 1

3. CONSTRUCTION 1

4. STORM DRAIN SYSTEM AND FACILITY OVERVIEW..... 2

5. FACILITY HAZ MAT SPILL FEATURE(S)ERROR! BOOKMARK NOT DEFINED.

6. AUXILIARY OUTLET (HIGH FLOW BYPASS)..... ERROR! BOOKMARK NOT DEFINED.

7. MAINTENANCE REQUIREMENTS 3

8. WASTE MATERIAL HANDLING 3

APPENDIX A: **Operational Plan and Profile Drawing(s)**

APPENDIX B: **ODOT Project Plan Sheets**

DRAFT

1. Identification

Drainage Facility ID (DFI):	**[DXXXXX]**
Facility Type:	Bioslope
Construction Drawings:	(V-File Number) [xxV-xxx]
Location:	District: 1
	Highway No.: 064
	Mile Post: 9.76; 10.13 (beg./end)1
	Description: This facility is located along the northbound lanes of I-205 between 99E and OR213.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	ODOT Designer – Region 1 Tech. Center, David McDonald Consultant Designer – HDR, Cory Gieseke, 503.423.3803
Facility construction:	20__
Contractor:	_____.

DRAFT

4. Storm Drain System and Facility Overview

Bioslopes are flow-through stormwater treatment facilities incorporated into roadside embankments and placed between pavement and a downstream conveyance system. These facilities utilize physical straining or filtration, sorption, carbonate precipitation, vegetative uptake and microbial degradation to provide stormwater treatment. Bioslopes are recommended for highway application because of their minimal right-of-way requirements and maintenance schedule. Other names for bioslopes that have been used include ecology embankment and media filter drain.

Bioslopes are designed to treat sheet flow from an adjacent impervious surface. A typical bioslope has the following facility features and components:

- **Treatment Zone using Ecology mix** – It is provided to remove pollutants as stormwater runoff drains through this zone. The ecology mix is a mixture of aggregate, dolomite, gypsum, and perlite.
- **Sub surface drain** – it is provided to allow positive outflow for runoff at the toe of the bioslope.

This facility is located from Station “L” 665+00 to 684+00. This facility is located adjacent to the roadway shoulder and is 4 feet wide. This facility incorporates 1 foot of water quality soil and 18 inches of granular rock backfill. A 6 inch perforated pipe will be used to drain the facility. The facility will discharge into an adjacent existing roadside ditch which conveys runoff to the Clackamas River through an existing stormwater conveyance system.

A. Maintenance equipment access:
Maintenance of the bioslope will be accessed from the shoulder of the northbound I-205 lanes.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☐ Allowed (with limitations)
☒ Not allowed

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☒ Liners
☒ Underdrains

DRAFT

5. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☐ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☒ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)

6. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

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OPERATION & MAINTENANCE MANUAL

DFI No. : [DXXXXX]
Facility Type: Water Quality Biofiltration Swale

DRAFT

MARCH, 2019

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APPENDIX A: Operational Plan and Profile Drawing(s)

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DRAFT

1. Identification

Drainage Facility ID (DFI):	**[DXXXXX]**
Facility Type:	Water Quality Swale
Construction Drawings:	(V-File Number) [xxV-xxx]
Location:	District: 1
	Highway No.: 064
	Mile Post: 9.63; 9.66 (beg./end)
	Description: This facility is located to the north of I-205 between the highway and Main St.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record: ODOT Designer – Region 1 Tech. Center, David McDonald
Consultant Designer – HDR, Cory Gieseke, 503.423.3803

Facility construction: 20__
Contractor: _____.

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4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

The facility is located between the southbound lanes of I-205 and Main St. Access to the facility is provided by an access road off of the northbound shoulder of Main St.

The swale treats 3.2 acres of I-205. Runoff is conveyed to a pollution control manhole located directly upstream of the facility. The swale discharges to an existing stormwater system which is connected to the Clackamas River.

A. Maintenance equipment access:

Maintenance to the facility is provided through a constructed access road off of Main St.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☒ Allowed (with limitations)
☐ Not allowed

C. Special Features:

☒ Amended Soils
☒ Porous Pavers
☐ Liners
☐ Underdrains

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5. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☒ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)

6. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

DRAFT

OPERATION & MAINTENANCE MANUAL

DFI No. : [DXXXXX]
Facility Type: Stormwater Planter

March 2019

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Appendix A: Operational Plan and Profile Drawing(s)

Appendix B: ODOT Project Plan Sheets

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1. Identification

Drainage Facility ID (DFI):	**DXXXXX**
Facility Type:	Stormwater Planter
Construction Drawings:	(V-File Number) xxV-xxx
Location:	District: 2B
	Highway No.: xx
	Mile Post: x.xx; x.xx (beg./end)
	Description: This facility is located along the west side of Clackamette Dr. approximately 100 feet north of driveway for John Storm Park.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record: ODOT Designer – Region 1 Tech. Center, David McDonald
Consultant Designer – HDR, Cory Gieseke, 503.423.3803

Facility construction: 20__
Contractor: _____.

DRAFT

4. Storm Drain System and Facility Overview

Stormwater planters are structural landscaped reservoirs used to collect, filter, and infiltrate stormwater, allowing pollutants to settle and filter out as the water percolates through the vegetation, growing medium, and gravel. Depending on site conditions, planters can be designed to completely or partially infiltrate the stormwater they receive.

This facility is located along the east side of Clackamette Dr. approximately 100 feet north of the driveway for John Storm Park. This facility is designed with 18 inches of water quality soil on top of 18 inches of storage rock.

Stormwater is conveyed into the stormwater planter through evenly spaced curb cut inlets along the side of the stormwater planter adjacent to the roadway. Once the stormwater percolates through the vegetation and water quality soil, it infiltrates into the native subsoil.

A. Maintenance equipment access:
The facility can be accessed from Clackamette Dr.

B. Heavy equipment access into facility:

☐ Allowed (no limitations)
☐ Allowed (with limitations)
☒ Not allowed

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☒ Liners
☒ Underdrains

5. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

https://www.oregon.gov/ODOT/GeoEnvironmental/Pages/Stormwater.aspx

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The stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual:

Mark as Required and always include Table 1:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☐ Table 3 (water quality biofiltration swales)
- ☒ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)

6. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the Roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:
https://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf

Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

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Table 1: General Maintenance			
Maintenance Component	**Defect or Problem**	**Condition When Maintenance is Needed**	**Recommended Maintenance to Correct Problem**
Annual Visual Inspection and Maintenance	Routine inspection	**Facilities should be inspected annually prior to fall rains**. If appropriate, also inspect the facility after the first significant rain event following dry spell (e.g. the first 24-hour rainfall greater then 0.5 inches after summer)	Identify existing and potential operational problems. Repair damaged components that are critical to the operation of the feature (e.g. flow control valves, liners, underdrains, and pipes) as soon as practical. Schedule routine maintenance such as mowing, sump cleanout, lube moving parts, repairs, etc. If the facility is problematic, schedule additional inspections or maintenance. Repair or replace facility field markers according to Technical Bulletin GE10-01(B). A marked facility has an O&M Plan.
	Maintenance of ancillary structures, if present Examples include • Flow splitter manhole • Diversion manhole • Catch basin • Shut-off valve assembly • Pretreatment or primary treatment manhole • Large detention pipe • Vault • Outfall	Damage or problems are observed or anticipated during the annual inspection.	Grease moving parts to ensure proper operation. Remove sediment from sumps, vaults, catch basins, and structures to prevent the release of oil or sediment. Annual cleaning is recommended. The use of a Vactor® truck is allowed unless prohibited in the facility's O&M manual Repair or replace damaged orifice assembly/riser pipe. Restore to design standards. Be aware of possible confined space requirements. Repair or replace damaged gates, locks, chains, etc that are used to secure valves and access points to prevent vandalism
General	Temporary erosion control hampers maintenance	Erosion control remains from project construction (contractor did not remove)	Contact contractor to complete work OR remove temporary erosion control that is not specified in the O&M Plan.

Table 1: General Maintenance			
Maintenance Component	**Defect or Problem**	**Condition When Maintenance is Needed**	**Recommended Maintenance to Correct Problem**
General	Spilled material has entered the pond or structures	Oil, fuel, or other pollutants are evident following a spill event or accident.	Utilize valves or other features, if present, to contain the spilled material. Remove and properly manage spilled material and contaminated soil. Contact Region HazMat or spill response company for spill cleanup assistance where appropriate. Contact a Region Hydraulic Engineer for technical assistance with pond restoration, if necessary.
	Litter (trash and debris)	Trash poses a hazard, inhibits function, or is aesthetically unacceptable (e.g. evidence of dumping).	Remove problematic trash and debris as soon as practical. There should be no evidence of dumping. Remove non-problematic trash in accordance with District litter practices.
	Insects	Insects interfere with maintenance activities.	Implement vector control in accordance with County Health and District practices.
	Vegetation growth (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity.	Mow access, berms, bottom, and side-slopes of the facility as noted in the District Integrated Vegetation Management (IVM) Plan. Remove vegetation in or around grates that obstruct (or could obstruct) flow. Avoid mowing or removing vegetation that does not need to be controlled. Avoid removing vegetation too low to the ground. NOTE: Removing vegetation too near to the ground may result in scalping of the soil, unwanted damaged to vegetation, or growth of unwanted plant species. Heavy equipment is allowed within aboveground water quality and detention facilities unless access restrictions are listed in the O&M Manual.

Table 1: General Maintenance			
Maintenance Component	**Defect or Problem**	**Condition When Maintenance is Needed**	**Recommended Maintenance to Correct Problem**
	Noxious weed growth	Control of noxious weeds is required by law or prescribed in the District IVM Plan	Remove noxious weeds in accordance with the District IVM Plan. Follow Environmental Protection Agency (EPA) label and ODOT policies on herbicide usage.
General	Hazard trees	Trees are found to be weakened, unsound, undermined, leaning, or exposed and may fall across the highway	Remove hazard trees as soon as practical. Where appropriate, consult an ODOT Forester for help identifying or removing hazard trees.
	Tree growth	Tree growth restricts access, obstructs function, jeopardizes infrastructure, or interferes with maintenance actions.	Prune or remove as needed to maintain access, function, and tree health. Manage potentially problematic woody material before the trees reach 6 inches diameter at breast height (DBH). Consult an ODOT Forester for the removal or management of trees greater than 6 inches DBH. Obtain permits where appropriate. Refer to the District IVM Plan for the management of smaller trees. Avoid removing trees that will not interfere with the operation or maintenance of the facility.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Follow applicable Guidance from Table 1 AND applicable guidance from this table.		
	Vegetation growth in **dry ponds** (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Collected water should drain.	Dry ponds need vegetation on the bottom and sides. Vegetation management typically occurs around and within the facility. Mow access, berms, bottom, and side-slopes as noted in the District Integrated Vegetation Management (IVM) Plan. (typically annually) Heavy equipment is allowed on dry pond bottoms unless access restrictions are listed in the O&M Manual.
	Vegetation growth in **wet ponds** (mowing and brushing) NOTE: Wet ponds are not typical.	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Water may be stored year-round without draining.	Wet ponds need vegetation on the bottom and sides. Vegetation management typically occurs around the facility. Mow access and berms as noted in the District Integrated Vegetation Management (IVM) Plan. Ponds bottoms are intended to capture and store water. Vegetation removal from pond bottoms is infrequent.
	Sediment accumulation in pre-treatment features (e.g. forebays, basins, or fully exposed impermeable liners) NOTE: Exposed liners are not typical.	Sediment affects flow. Sediment jeopardizes infrastructure.	Remove sediment from ponds and pipe ends as needed to ensure adequate drainage into treatment pond (grassy or wet pond). Use methods that minimize disturbance to surrounding vegetation. Heavy equipment is allowed on dry pond bottoms unless access restrictions are listed in the O&M Manual. Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual for the disposal of contaminated sediment. Note: Pollutant concentrations may increase if sediment is not routinely removed.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Storage areas	Sediment accumulation along bottom of grassy ponds	Sediment inhibits the flow of water through the grass (>12 inches deep). Sediment inhibits grass growth.	Where practical use a Vactor® truck to remove sediment from grassy areas. When Vactoring® is not practical, follow ditch cleaning practices. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed. Stormwater should infiltrate or flow toward outlet once inflow has ceased. Refer to the general section of this table for side-slope mowing and other routine maintenance actions.
	Sediment accumulation in wet ponds or channels. NOTE: Currently there is limited use of wet ponds to treat stormwater.	Capacity has noticeably decreased (examples below) • low and medium flows go through the bypass, • the ordinary high water level has increased, • flooding occurs when the outflows are not blocked, • pond bottom is level with outlets.	Remove sediment build-up from pipe ends as needed to ensure flow. Use methods that minimize disturbance to surrounding vegetation. Remove sediment to restore designed shape and depth. In high ADT areas, pond dredging may be required every 5 to 10 years to restore the capacity. Cease sediment removal when riprap or liner is encountered. Reseed if necessary to control erosion.
	Erosion	Side slopes show evidence of erosion greater than 4 inches deep and the potential for continued erosion is evident.	Promptly address erosion that causes immediate problems (e.g. damage to highway or highway structure) Schedule non-urgent repairs with routine work. Stabilize slope using appropriate erosion control and repair methods. Repair the cause of the erosion where possible. If necessary, contact the ODOT Erosion Control Coordinator to evaluate the condition.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Storage areas	Beaver dams	Dam inhibits function or jeopardizes the infrastructure.	Dispose of dam debris offsite or outside of the riparian area. Coordinate the removal or relocation of beaver with Oregon Department of Fish and Wildlife (ODFW). Consider installing deterrents where appropriate.
	Flooding	Water is flowing over or is approaching the top of the pond	Check storm drain pipes and structures for blockage. Ensure valves are open. Remove obstructions to restore flow. Evaluate and remove excessive sediment from pond storage areas. Contact the Region Hydraulic Engineer to evaluate the source of flooding or provide design modifications.
Treatment Components	Poor vegetation coverage	Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of pond bottom.	Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed. Trim overhanging limbs and remove brushy vegetation that limit grass growth (provide too much shade).
	Missing or eroded amended soil mix	Bare soil is observed over 10 percent of the amended area.	Identify and resolve erosion problem Add amended soil. Contact a Region Hydraulics Engineer for required material specifications.
	Amended soil mix along pond bottom is clogged	Standing water is observed for seven (7) consecutive days or longer from May through October.	Remove and replace amended soil mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.
	Granular drain backfill material for underdrain pipe plugged	Amended soil mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October.	Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications. Install new drainage geotextile over new granular drain backfill material. Replace amended soil mix.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Treatment Components	Impermeable liner damage NOTE: Liners (if installed) are typically below the grass surface and may not be visible.	Liner is damaged (e.g. during sediment removal or by motoring public). Liner is damaged when condition allows potential contamination to be released to the subsurface.	Repair or replace the liner with similar material. In many cases, rigid plastic liners may be repaired by welding a similar material over the damaged portion or using a non-toxic, waterproof epoxy. If necessary, contact a Region Hydraulics Engineer for technical assistance regarding permanent repair.
Berms and Dikes	Settlement	Any part of the berm has settled 4 inches or lower. Note: Settlement may indicate potential problems with the facility.	Repair berm to design height with similar materials. Contact a Region Hydraulics and Geotechnical Engineer as needed to evaluate the source of the settlement and determine repair options.
	Flow-through	Water is flowing through the pond berm.	Correct cause of flow through (e.g. eliminate burrowing rodents) Install erosion control measures where appropriate. Repair berm with similar materials. If necessary, contact a Region Geotechnical Engineer to evaluate the condition.
	Sloughing	Ongoing erosion is observed with potential for erosion to continue.	Where possible correct the cause of the erosion. Install or replace energy dissipaters where appropriate. Install erosion control measures where appropriate Repair berm with similar materials. If necessary, contact the ODOT Erosion Control Coordinator to evaluate the condition.

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Structures and piping Includes • flow splitters • vaults • inlets • bypasses • valves • catch basins • gates	Damaged or missing components	Flow control assembly is not working properly (e.g. loose, bent, unattached, etc.).	Repair or replace valves, gates, orifices and pipes as necessary with similar components. Divert flows when needed.
	Obstruction or blockage	Water does not flow in, through, or out of the structure or piping.	If valves are part of the flow control assembly, verify the valves are open. Refer to the O&M for the location of control valves. Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary). Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.
Outfalls	Insufficient rock armoring at outlets • along channel side slopes and bottom • pipe outlet • along the length of spillway	Minimal layer of rock exists Rock missing along armored area Flow channelization or high flows exposed native soil around the rock armored area	Install erosion control measures Repair or replace rock armoring to original design standard Repair, re-grade, and reseed eroded areas adjacent to rock armoring. Contact a Region Hydraulics Engineer for technical assistance if rock armoring problems continue or a highway structure is at risk

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Follow applicable Guidance from Table 1 AND applicable guidance from this table.		
	Vegetation growth (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. **Swales should be mowed annually.**	Mow access, berms, swale, and side-slopes as noted in the District Integrated Vegetation Management (IVM) Plan. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual.
Swale Components	Sediment accumulation in pre-treatment areas or ancillary structures (e.g. manholes)	Sediment affects flow. Sediment jeopardizes infrastructure.	Remove sediment that prevents adequate drainage into swale. Use methods that minimize disturbance to surrounding vegetation. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual. Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual for the disposal of contaminated sediment. Note: Pollutant concentrations may increase if sediment is not routinely removed.
	Sediment accumulation along swale bottom	Sediment inhibits the flow of water through the grass (e.g. water is ponding or cutting a channel).	Remove sediment from grassy areas. The use of a Vactor® truck is allowed unless access restrictions are listed in the O&M Manual. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed. Stormwater should infiltrate or flow toward outlet once inflow has ceased.

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Swale Components	Erosion	Side slopes show evidence of erosion greater than 2 inches deep and the potential for continued erosion is evident.	Promptly address erosion that causes immediate problems (e.g. damage to highway or highway structure) Schedule non-urgent repairs with routine work. Stabilize slope using appropriate erosion control and repair methods. Repair the cause of the erosion where possible. If necessary, contact the ODOT Erosion Control Coordinator to evaluate the condition.
	Poor vegetation coverage	Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of swale. NOTE: A single incident (e.g. vehicle accident) typically effects less than 10 percent of the area and is unlikely to trigger a repair.	Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed. Trim overhanging limbs and remove brushy vegetation that limit grass growth (provide too much shade).
	Missing or eroded amended soil mix	Bare soil is observed over 10 percent of the amended area.	Identify and resolve erosion problem Add amended soil. Contact a Region Hydraulics Engineer for required material specifications.
	Amended soil mix along swale bottom is clogged	Standing water is observed for seven (7) consecutive days or longer from May through October.	Remove and replace amended soil mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.
	Granular drain backfill material for underdrain pipe plugged	Amended soil mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October.	Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications. Install new drainage geotextile over new granular drain backfill material. Replace amended soil mix.

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Swale Components	Impermeable liner damage NOTE: Liners may not be visible. If present, liners are typically below the grass surface along the bottom of the swale Fabric wrapped around underdrains is not a liner.	Liner is damaged (e.g. during sediment removal or by motoring public). Liner is damaged when condition allows potential contamination to be released to the subsurface.	Repair or replace the liner with similar material. Replace top soil and grass as appropriate. Features with liners, typically have maintenance option limitations; check the O&M Manual. If necessary, contact a Region Hydraulics Engineer for technical assistance.
	Obstruction or blockage of pipes	Water does not flow in, through, or out of the swale.	Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary). Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.
	Flow spreader is uneven or clogged	Water does not flow evenly across the structure	Clean sump or forebay as needed to maintain capacity. Clean or repair spreader as needed to provide a uniform flow and prevent erosion. Level portions of the flow spreader that have settled.

Table 5: Bioslopes

Bioslopes should provide even sheet flow that moves water from edge of pavement.

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Follow applicable Guidance from Table 1 AND applicable guidance from this table.		
	Vegetation growth (mowing and brushing)	Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. **Slopes should be mowed annually.**	Mow as noted in the District Integrated Vegetation Management (IVM) Plan. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual.
Bioslope Components	Sediment accumulation	Sediment inhibits the flow of water to the bioslope (e.g. water is ponding or cutting a channel).	Remove sediment from grassy areas. The use of a Vactor® truck is allowed unless access restrictions are listed in the O&M Manual. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed.
	Ecology mix is clogged	Standing water is observed for seven (7) consecutive days or longer from May through October.	Remove and replace ecology mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.
	Granular drain backfill material for underdrain pipe plugged	Ecology mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October.	Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications. Install new drainage geotextile over new granular drain backfill material. Replace amended soil mix.
	Poor vegetation coverage	Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of the strip	Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed.

Appendix F. Downstream Analysis

Downstream Conveyance Analysis Memo

Date:	Friday, December 20, 2019
Project:	ODOT | K19786 I-205: I-5 to OR 213, Phase 1
To:	Tom Hamstra, ODOT – PM
From:	Mike Bertram, HDR – PM
Subject:	Task 7 – Hydraulics and Stormwater

Oregon City Downstream Drainage Analysis

The following downstream drainage conveyance system requirements will be incorporated into the design of the stormwater management plan.

- ≠ Stormwater runoff discharges will not adversely affect the safety and/or flooding potential of adjacent or downstream property owners.
- ≠ A written downstream analysis will document existing conditions and demonstrate adequate conveyance capacity of the natural and constructed drainage system downstream of the project site.
- ≠ The downstream analysis will extend to the distance where the project site contributes less than 15 percent of the cumulative tributary drainage area or 1,500 feet downstream of the approved point of discharge, whichever is greater. In capacity constrained areas, the City may extend the distance of the required downstream analysis.
- ≠ When downstream drainage conveyance systems are inadequate or systems are determined to be undersized, or when, in the opinion of the City, property or properties may be adversely affected by the existing and/or proposed stormwater release rates, the applicant may provide additional onsite stormwater flow control measures to reduce contributions to the downstream system, or correct and/or improve downstream drainage conditions so that the proposed stormwater release rates do not have to be restricted further.
- ≠ The applicant is responsible for replacing, repairing, upsizing, constructing, or reconstructing the downstream conveyance system to provide the capacity necessary to develop the property. The downstream conveyance system may include any open or closed public or private stormwater conveyance system.
- ≠ The applicant is required to identify all offsite downstream conveyance restrictions and the cost of upsizing/improving the conveyance systems to meet the minimum conveyance requirements.

Design Methods

The design event is determined by the size of the contributing areas. See Table 1 for a list of design storms for corresponding contributing areas. Conveyance systems will be designed and constructed to carry the design storm flowing full with no pressure flow. Flow conditions in existing pipe systems will be evaluated on a case-by-case basis for adequacy. Conveyance systems in the public right-of-way will be designed as gravity systems. The Rational Method for

computing peak discharge is preferred by the City. The Rational Method will be used for all existing and proposed conveyance systems that receive drainage from contributing areas of 25 acres or less and that have a time of concentration of less than 100 minutes. For all other conditions, an approved hydrograph method (e.g., Santa Barba Urban Hydrograph, Natural Resources Conservation Service Method, or Technical Release 55), stormwater management model, or other standard methods as approved by the City will be used. The Manning's equation generally will be acceptable for determining pipe or open channel capacity for drainageways with a contributing area of 50 acres or less. For larger drainage areas, backwater effects will be included in determining capacity for a drainage way.

Table 1 Conveyance System Design Storms

Contributing Drainage Area	Design Storm for Conveyance System Sizing		
	Storm Sewer, Culverts, and Outfall Pipes[a]	Creek or Stream Channels	Bridges
Less than 40 acres	10-year, 24-hour storm	10-year, 24-hour storm	100-year, 24-hour storm
40 to 640 acres	25-year, 24-hour storm	25-year, 24-hour storm	
640 acres or greater	50-year, 24-hour storm	50-year, 24-hour storm	

[a] *When a backwater condition exists, the storm drain system will be designed to convey and contain at least the peak runoff for the 25-year design storm.*

Main Street Outfall

The portion of the project located between station "L" 661+00 and station "L" 698+00 drains north to the Clackamas River through a stormwater conveyance system owned and maintained by Oregon City. The proposed project would add 1.03 acres of impervious area within the contributing drainage basin. A downstream analysis of the Oregon City conveyance system was preformed to verify that the existing system has adequate capacity to convey the increased runoff volume generated from the new impervious area.

The area that drains to the conveyance system is 138 acres and is composed of impervious, industrial, forested, residential, grassed, and wetland areas. The basin area is shown in Figure 1. The NRCS runoff curve numbers used for the hydrologic analysis are listed in Table 2. Per Oregon City standards for drainage areas between 40 and 640 acres, the design storm for analyzing the conveyance system is the 25-year, 24-hour storm or 4.0 inches over a 24-hour storm event. The Santa Barbara Urban Hydrograph (SBUH) Method using a Type 1A unit hydrograph distribution was used to model the runoff. The existing modeled flow was 41.2 cubic feet per second (cfs) and the proposed modeled flow was 41.9 cfs. (Attachment A)

Table 2 NRCS Curve Number Values

Landcover Classification	NRCS Runoff Curve Number
Impervious	98
Industrial	88
Forested	60
Light Residential	68
Grassed Areas >75% Grass	75
Wetland	55

The existing conveyance system is composed of six pipes. The upstream-most pipe is 42 inches in diameter and the five downstream pipes are 48 inches in diameter. The upstream-most pipe is polyvinyl chloride (PVC) and the remainder of the pipes are reinforced concrete pipe (RCP). A Manning's n value of 0.0110 was used for PVC pipe and 0.0130 was used for the RCP.

The existing conveyance system discharges directly to the Clackamas River and is subject to tailwater conditions that range from free discharge to a completely submerged outfall. The system was modeled using both a free discharge tailwater condition and a tailwater elevation of 30 feet, equal to the ordinary high water on the Willamette River. The stage on the Willamette River was used because of the proximity of the outlet to the Willamette River. Table 3 through Table 6 summarize the hydraulic grade line calculations for the proposed and the existing conditions. The proposed conditions for both the free discharge and the submerged outlet meet Oregon City's design guideline of maintaining one foot of freeboard between the hydraulic grade line and the structure rims. The increase in hydraulic grade line due to the increased runoff from the additional pervious surface ranges from no observed increase at the outlet, to 0.02 foot increase in the first pipe of the conveyance system.

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Figure 1 Drainage Basins

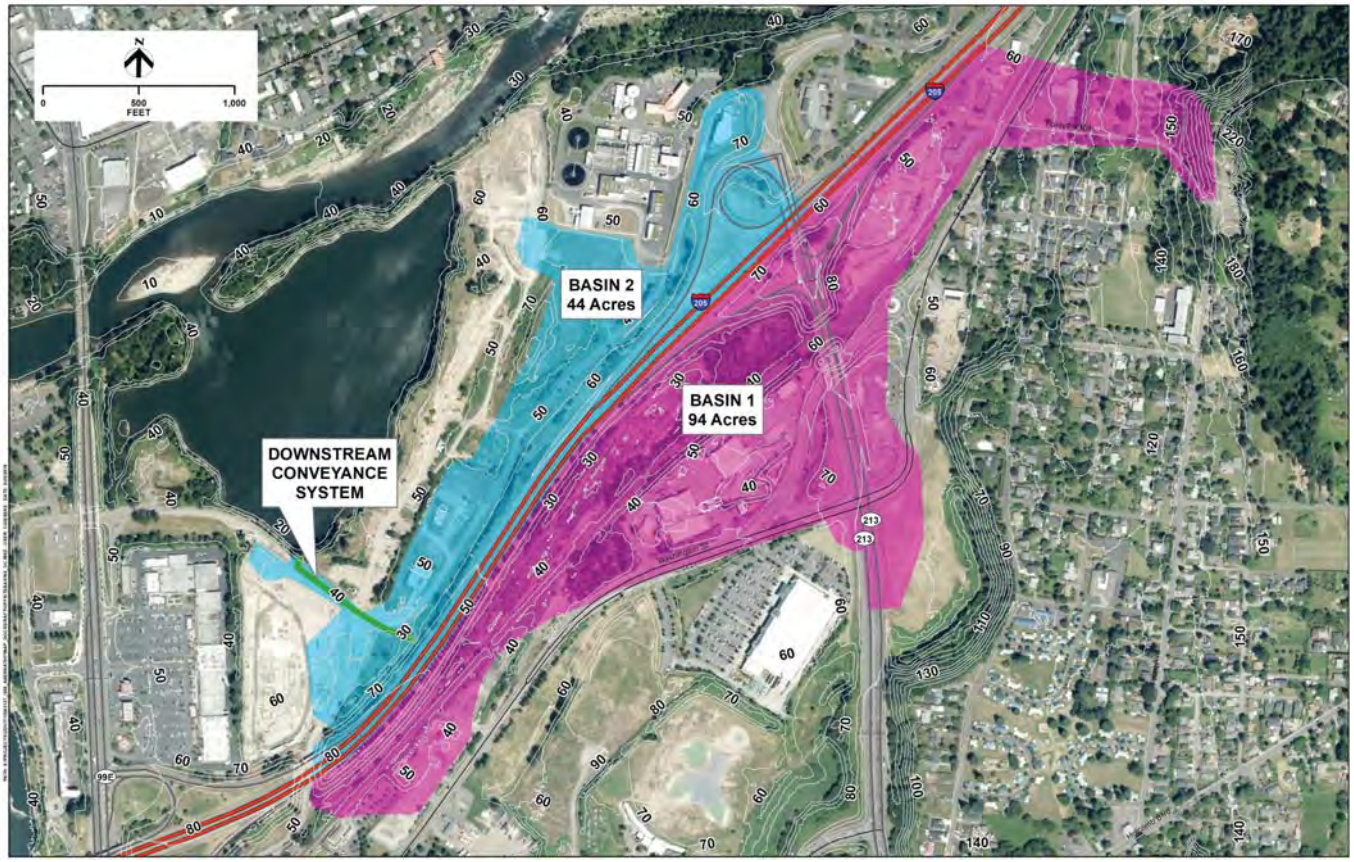


Table 3 Submerged Outlet Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.42	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0012	0.14	41.19	0.9	4.067	41.05	36.67	33.12	30.91	39.00	2.33
PIPE 2	41.42	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0008	0.06	36.98	0.9	0.940	36.93	35.94	31.41	31.07	37.88	1.94
PIPE 3	41.42	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0008	0.11	35.99	0.9	2.098	35.88	33.66	31.07	29.57	34.88	1.22
PIPE 4	41.42	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0008	0.18	33.78	0.9	1.652	33.60	31.95	29.37	27.42	35.17	3.22
PIPE 5	41.42	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0008	0.13	31.95	0.9	1.390	31.82	30.40	27.32	26.11	32.34	1.94
PIPE 6	41.42	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0008	0.04	30.43	0.9	0.391	30.39	29.99	25.91	25.82	31.21	1.22
Outfall										30.00				30.00				

Table 4 Free Discharge Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.42	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0012	0.14	33.01	0.9	4.067	32.87	28.49	33.12	30.91	39.00	10.51
PIPE 2	41.42	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0008	0.06	28.80	0.9	0.940	28.75	27.76	31.41	31.07	37.88	10.12
PIPE 3	41.42	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0008	0.11	27.81	0.9	2.098	27.70	25.48	31.07	29.57	34.88	9.40
PIPE 4	41.42	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0008	0.18	25.60	0.9	1.652	25.42	23.77	29.37	27.42	35.17	11.40
PIPE 5	41.42	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0008	0.13	23.77	0.9	1.390	23.64	22.22	27.32	26.11	32.34	10.12
PIPE 6	41.42	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0008	0.04	22.25	0.9	0.391	22.21	21.81	25.91	25.82	31.21	9.40
Outfall										21.82				21.82				

Table 5 Submerged Outlet Proposed Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.93	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0013	0.15	41.21	0.9	4.067	41.06	36.69	33.12	30.91	39.00	2.31
PIPE 2	41.93	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0009	0.06	37.00	0.9	0.940	36.94	35.95	31.41	31.07	37.88	1.93
PIPE 3	41.93	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0009	0.11	36.00	0.9	2.098	35.89	33.67	31.07	29.57	34.88	1.21
PIPE 4	41.93	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0009	0.18	33.79	0.9	1.652	33.60	31.95	29.37	27.42	35.17	3.22
PIPE 5	41.93	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0009	0.14	31.95	0.9	1.390	31.82	30.41	27.32	26.11	32.34	1.93
PIPE 6	41.93	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0009	0.04	30.43	0.9	0.391	30.39	29.99	25.91	25.82	31.21	1.22
Outfall										30.00				30.00				

Table 6 Free Discharge Proposed Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	V1	V12/2g	Slope	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	41.93	3.5	116.2	17.06	4.52	1.90%	0.0000	0.0013	0.15	33.03	0.9	4.067	32.88	28.51	33.12	30.91	39.00	10.49
PIPE 2	41.93	4.0	66.2	8.20	1.04	0.51%	0.0000	0.0009	0.06	28.82	0.9	0.940	28.76	27.77	31.41	31.07	37.88	10.11
PIPE 3	41.93	4.0	130.8	12.25	2.33	1.15%	0.0000	0.0009	0.11	27.82	0.9	2.098	27.71	25.49	31.07	29.57	34.88	9.39
PIPE 4	41.93	4.0	216.0	10.87	1.84	0.90%	0.0000	0.0009	0.18	25.61	0.9	1.652	25.42	23.77	29.37	27.42	35.17	11.40
PIPE 5	41.93	4.0	159.3	9.97	1.54	0.76%	0.0000	0.0009	0.14	23.77	0.9	1.390	23.64	22.23	27.32	26.11	32.34	10.11
PIPE 6	41.93	4.0	42.1	5.29	0.43	0.21%	0.0000	0.0009	0.04	22.25	0.9	0.391	22.21	21.81	25.91	25.82	31.21	9.40
Outfall										21.82				21.82				

Jon Storm Park Outfall

The proposed project would add on-street parking along the northbound lane of Clackamette Drive, adjacent to Jon Storm Park. Approximately 2,600 square feet of grassed area is proposed to be converted into paved parking spaces and sidewalk. The area would drain to a stormwater planter located at the northern end of the proposed improvements. Overflows from the stormwater planter would be routed to an existing stormwater conveyance system owned and maintained by Oregon City that discharges directly to the Willamette River.

The changes would not result in additional areas draining to the system; the project would generate additional runoff by converting currently pervious ground into impervious. Currently 1.42 acres drain through the existing conveyance system, as shown in Figure 2. The Rational Method was used to calculate the estimated discharge. Oregon City design guidelines specify that because the drainage area is less than 10 acres, the design storm should be the 10-year, 24-hour storm event. Runoff coefficients of 0.3 and 0.9 were used for grassed and paved areas respectively. A time of concentration of 5 minutes was used, which equates to a rainfall intensity of 2.84 inches per hour. The modeled discharge through the conveyance system for the proposed conditions was 2.32 cfs, which is a 0.10 cfs increase from the existing conditions peak flow of 2.22 cfs.

Table 7 Jon Storm Park Hydrology

Area	Square feet	Acres	Runoff Coefficient	Intensity	Flow
Extg Rdwy North	14,908	0.34	0.90	2.84	0.87
Extg Rdwy South	10,824	0.25	0.90	2.84	0.64
Grassed Offsite	33,613	0.77	0.30	2.84	0.66
Parking Lot	2,622	0.06	0.90	2.84	0.15
Sum					**2.32**

The conveyance system was modeled both as a free discharge and a submerged outlet tailwater condition to account for high stages on the Willamette River. The ordinary high water level of 30 feet was used for the tailwater condition in the submerged outlet scenario. Table 8 through Table 11 summarize the hydraulic grade line calculations for both the free discharge and the submerged outlet condition. Both the free discharge and the submerged outlet meet the Oregon City design guideline of maintaining 1 foot of freeboard between the hydraulic grade line and the structure rims.

Figure 2 Jon Storm Park Drainage Area

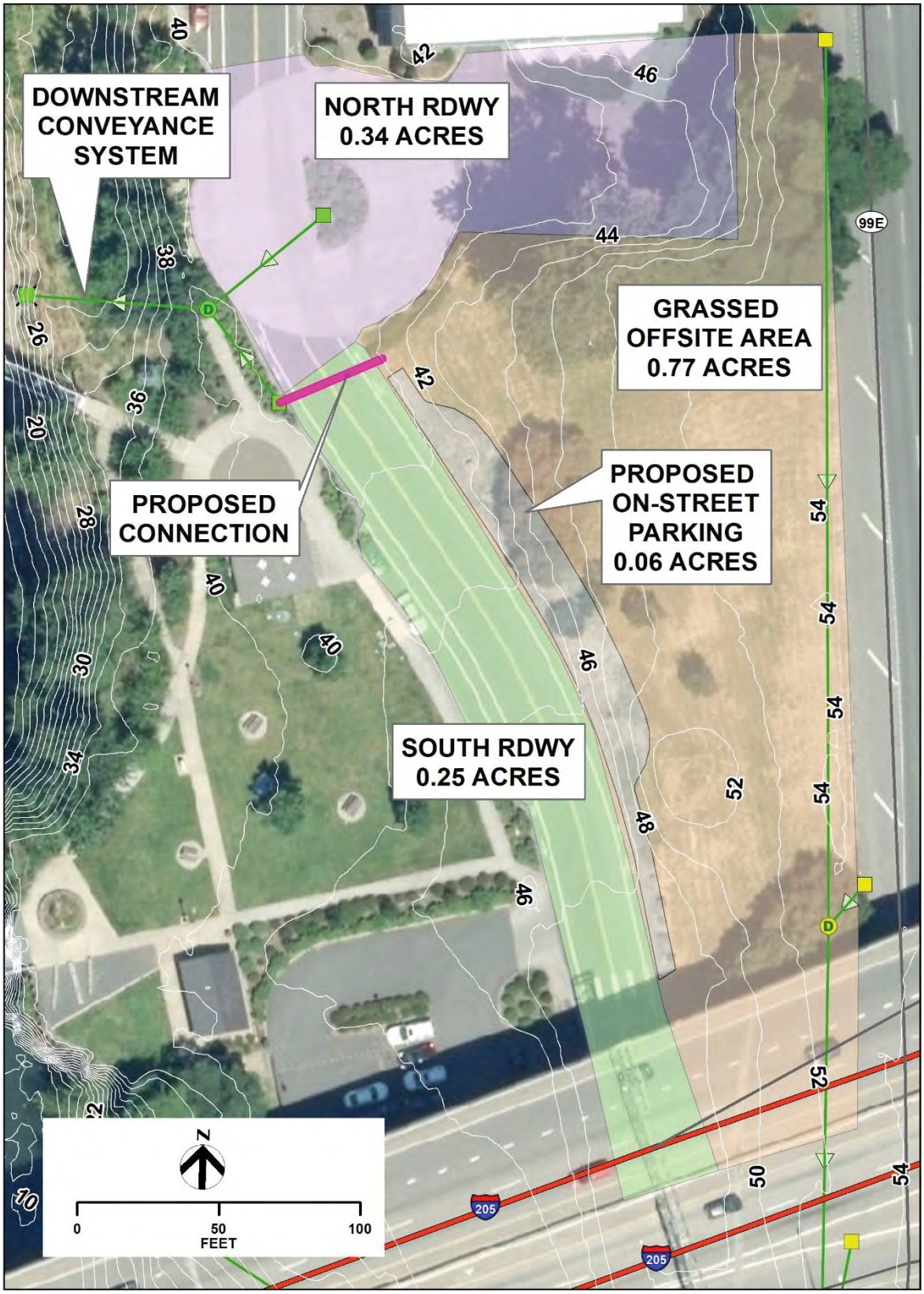


Table 8 Free Discharge Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIPE 2	1.34	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0014	0.06	28.15	0.9	1.045	28.09	26.99	34.31	32.80	35.74	8.75
PIPE 3	2.22	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0039	0.25	27.04	0.9	3.889	26.79	22.72	32.60	23.90	36.70	13.98
Outfall										22.90				22.90				

**Pipe 1 not present in existing conditions*

Table 9 Submerged Outlet Existing Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIPE 2	1.34	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0014	0.06	35.25	0.9	1.045	35.19	34.09	34.31	32.80	35.74	1.65
PIPE 3	2.22	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0039	0.25	34.14	0.9	3.889	33.89	29.82	32.60	23.90	36.70	6.88
Outfall										30.00				30.00				

**Pipe 1 not present in existing conditions*

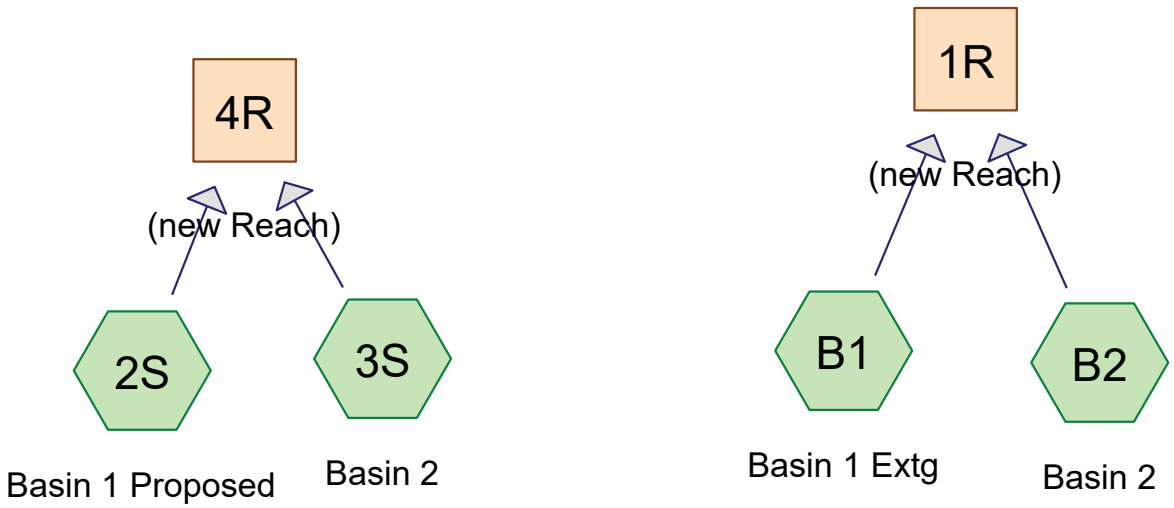
Table 10 Free Discharge Proposed Conditions

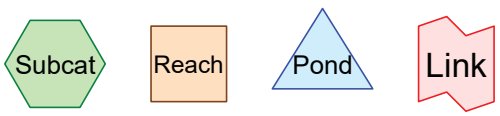
Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	1.11	1.0	51.0	1.0%	4.49	0.3136	0.0000	0.0005	0.0267	28.49	0.9	0.282	28.46	28.18	35.00	34.50	40.00	11.82
PIPE 2	1.74	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0017	0.07	28.18	0.9	1.045	28.11	27.02	34.31	32.80	35.74	8.72
PIPE 3	2.62	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0043	0.28	27.07	0.9	3.889	26.79	22.74	32.60	23.90	36.70	13.96
Outfall										22.90				22.90				

Table 11 Submerged Outlet Proposed Conditions

Node	Design Q (cfs)	Diameter (ft)	Length (ft)	Slope	V1	V12/2g	Minor Pipe Losses	Sf = (Qn/ 0.46d2.67)2	Hf = Sf x L	EGL0	K	K*V22/2g	EGLi	HGL (ft)	Crown of pipe US	Crown of pipe DS	Rim or Surface Elev. (ft)	Freeboard (ft)
PIPE 1	0.81	1.0	51.0	1.0%	4.49	0.3136	0.0000	0.0005	0.0267	35.59	0.9	0.282	35.56	35.28	35.00	34.50	40.00	4.72
PIPE 2	1.45	1.0	41.6	3.6%	8.65	1.1610	0.0000	0.0017	0.07	35.28	0.9	1.045	35.21	34.12	34.31	32.80	35.74	1.62
PIPE 3	2.32	1.0	64.4	13.5%	16.68	4.3208	0.0000	0.0043	0.28	34.17	0.9	3.889	33.89	29.84	32.60	23.90	36.70	6.86
Outfall										30.00				30.00				

Attachment A: HydroCAD Hydrology





Drainage Diagram for OC Offsite Basins
Prepared by HDR, Printed 9/26/2019
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OC Offsite Basins
Prepared by HDR
Printed 9/26/2019
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
54.258	55	Forest / wetlands (2S, B1)
9.600	60	Forest (2S, 3S, B1, B2)
1.066	61	Field (2S, B1)
0.798	68	Light residential (2S, B1)
9.840	75	Field (2S, B1)
6.144	75	Field / Ag (2S, B1)
61.355	75	Grass cover>75% (3S, B2)
35.348	88	Dirt / Industrial? (2S, B1)
32.810	88	Industrial (2S, B1)
60.032	98	Impervious (2S, 3S, B1, B2)
1.030	98	Imperviousl (2S)
3.428	98	Open water (2S, B1)

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: Basin 1 Proposed Runoff Area=3,881,588 sf 19.15% Impervious Runoff Depth=1.96"
Flow Length=5,564' Tc=26.3 min CN=73/98 Runoff=27.95 cfs 14.525 af

Subcatchment3S: Basin 2 Runoff Area=48.745 ac 32.19% Impervious Runoff Depth=2.29"
Flow Length=10,300' Tc=52.4 min CN=74/98 Runoff=14.31 cfs 9.320 af

SubcatchmentB1: Basin 1 Extg Runoff Area=3,881,575 sf 18.00% Impervious Runoff Depth=1.93"
Flow Length=5,564' Tc=26.3 min CN=73/98 Runoff=27.43 cfs 14.333 af

SubcatchmentB2: Basin 2 Runoff Area=2,123,346 sf 32.19% Impervious Runoff Depth=2.29"
Flow Length=10,300' Tc=52.4 min CN=74/98 Runoff=14.31 cfs 9.320 af

Reach 1R: (new Reach) Avg. Flow Depth=1.53' Max Vel=10.21 fps Inflow=41.45 cfs 23.653 af
42.0" Round Pipe n=0.013 L=730.0' S=0.0107 '/' Capacity=104.13 cfs Outflow=41.42 cfs 23.653 af

Reach 4R: (new Reach) Avg. Flow Depth=1.55' Max Vel=10.24 fps Inflow=41.96 cfs 23.846 af
42.0" Round Pipe n=0.013 L=730.0' S=0.0107 '/' Capacity=104.13 cfs Outflow=41.93 cfs 23.846 af

Summary for Subcatchment 2S: Basin 1 Proposed

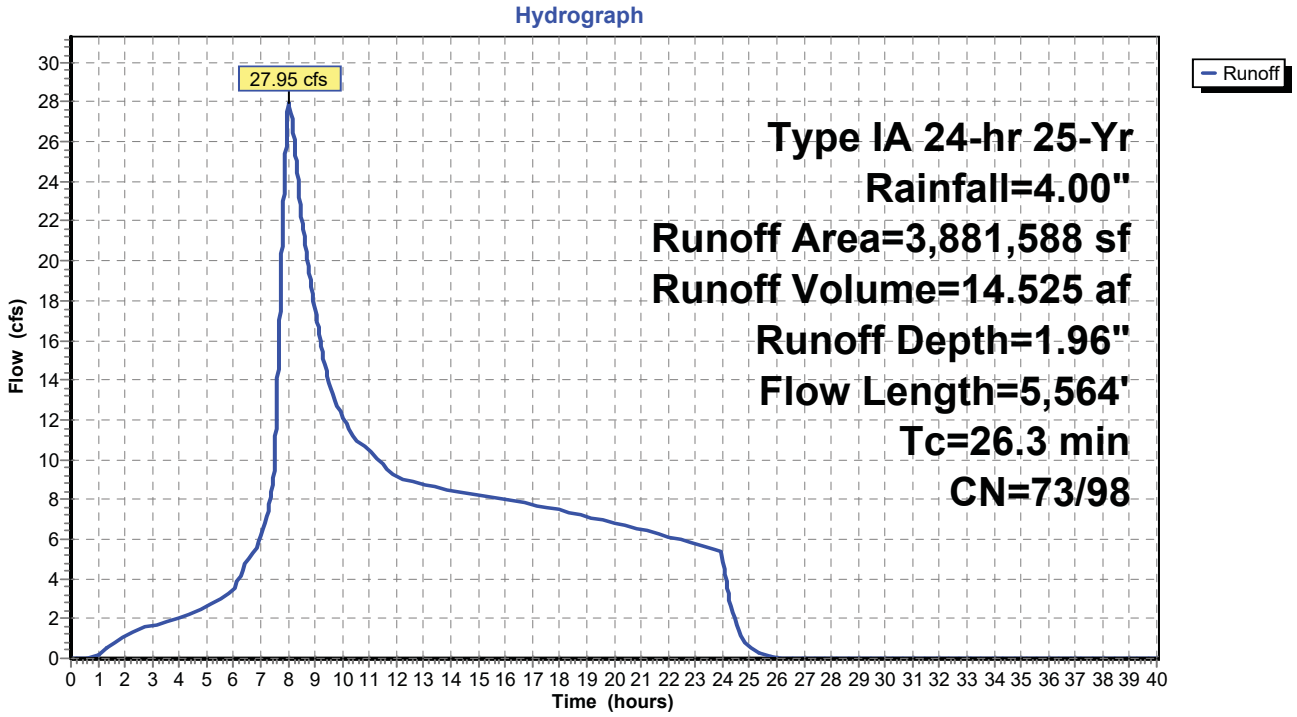
Runoff = 27.95 cfs @ 8.01 hrs, Volume= 14.525 af, Depth= 1.96"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (sf)	CN	Description
*	69,173	60	Forest
*	71,961	98	Impervious
*	95,135	88	Industrial
*	23,217	61	Field
*	17,380	68	Light residential
*	573,990	88	Dirt / Industrial?
*	100,929	98	Impervious
*	36,416	60	Forest
*	28,750	98	Impervious
*	139,740	88	Industrial
*	133,816	75	Field / Ag
*	355,058	98	Impervious
*	48,003	75	Field
*	52,272	98	Impervious
*	85,465	75	Field
*	45,259	75	Field
*	479,726	88	Industrial
*	8,146	98	Impervious
*	6,839	98	Impervious
*	35,589	75	Field
*	1,159,306	55	Forest / wetlands
*	74,662	98	Open water
*	195,889	88	Dirt / Industrial?
*	44,867	98	Imperviousl
	3,881,588	78	Weighted Average
	3,138,104	73	80.85% Pervious Area
	743,484	98	19.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	130	0.4200	0.24		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.44"
17.3	5,434	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035 Earth, dense weeds
26.3	5,564	Total			

Subcatchment 2S: Basin 1 Proposed



Summary for Subcatchment 3S: Basin 2

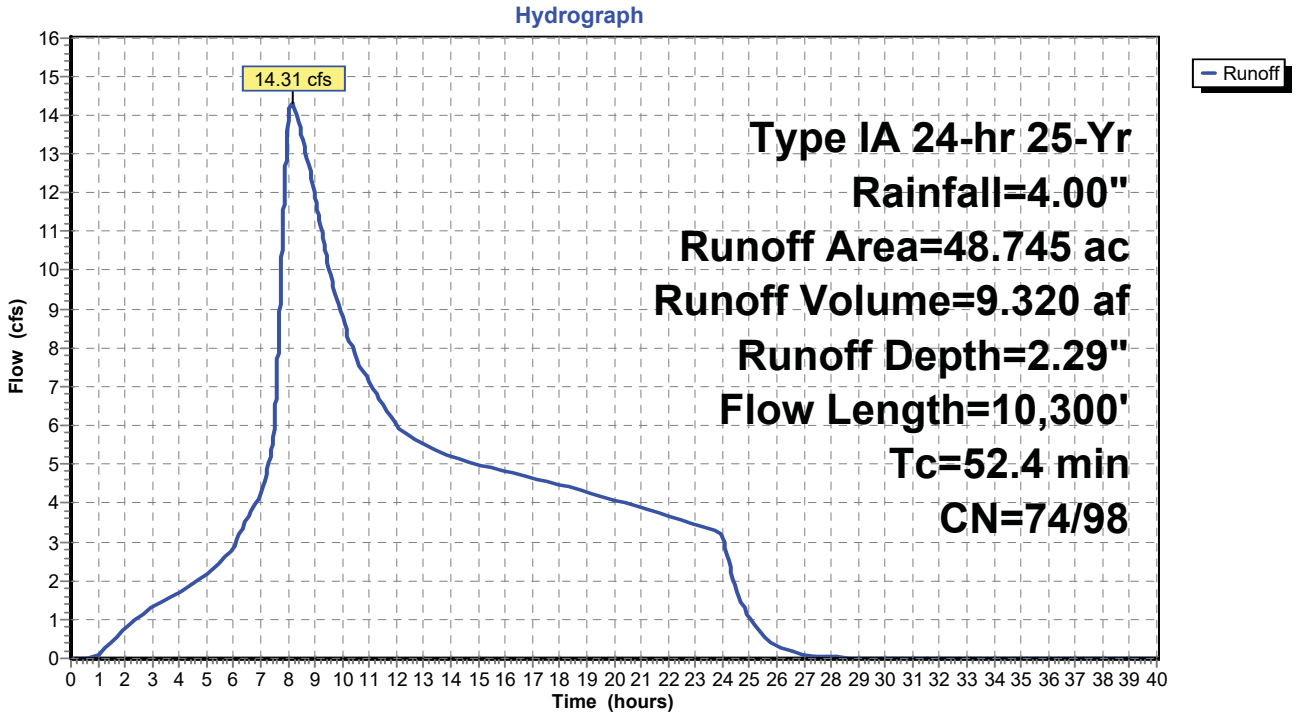
Runoff = 14.31 cfs @ 8.17 hrs, Volume= 9.320 af, Depth= 2.29"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (ac)	CN	Description
*	0.913	98	Impervious
*	2.376	60	Forest
*	5.723	75	Grass cover>75%
*	1.566	98	Impervious
*	22.712	75	Grass cover>75%
*	11.858	98	Impervious
*	1.359	75	Grass cover>75%
*	1.355	98	Impervious
*	0.883	75	Grass cover>75%
	48.745	82	Weighted Average
	33.053	74	67.81% Pervious Area
	15.692	98	32.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	300	0.0400	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.44"
31.9	10,000	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035
52.4	10,300	Total			

Subcatchment 3S: Basin 2



Summary for Subcatchment B1: Basin 1 Extg

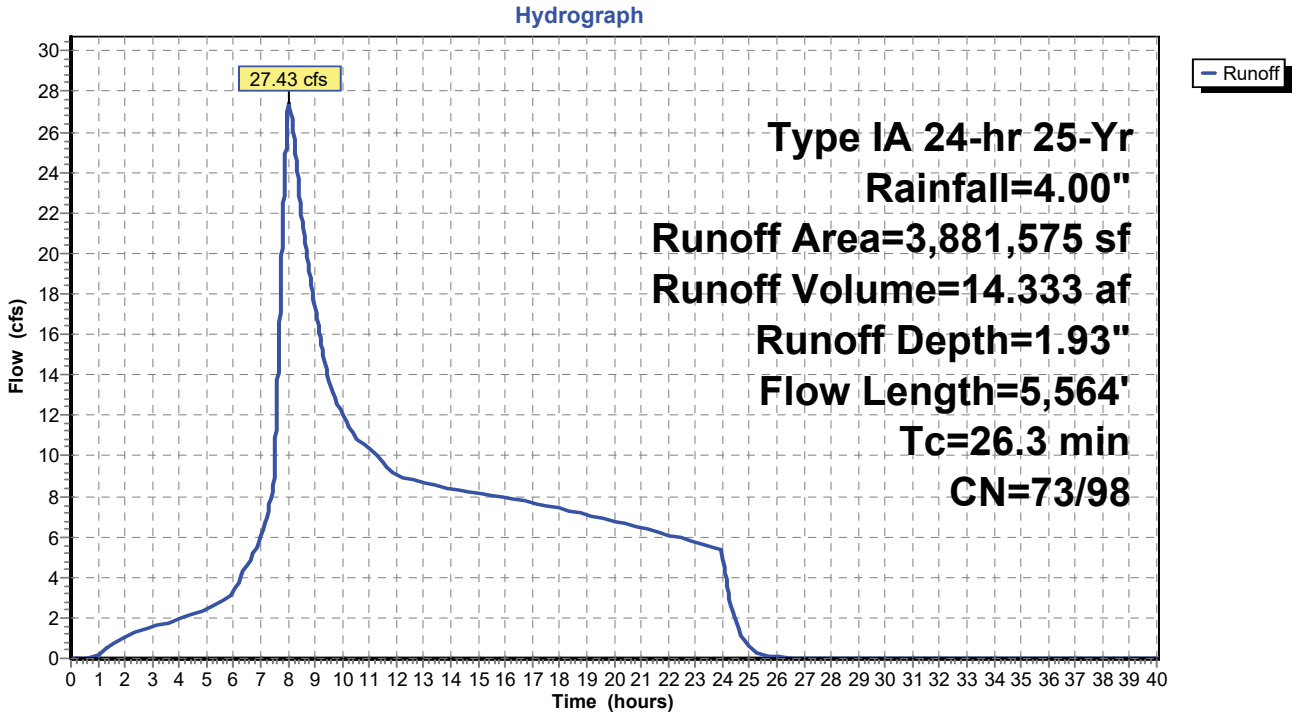
Runoff = 27.43 cfs @ 8.01 hrs, Volume= 14.333 af, Depth= 1.93"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (sf)	CN	Description
*	69,157	60	Forest
*	71,969	98	Impervious
*	95,150	88	Industrial
*	23,198	61	Field
*	17,380	68	Light residential
*	573,999	88	Dirt / Industrial?
*	100,908	98	Impervious
*	36,415	60	Forest
*	28,767	98	Impervious
*	139,747	88	Industrial
*	133,826	75	Field / Ag
*	355,062	98	Impervious
*	47,986	75	Field
*	52,288	98	Impervious
*	85,448	75	Field
*	45,251	75	Field
*	479,718	88	Industrial
*	8,126	98	Impervious
*	6,853	98	Impervious
*	35,609	75	Field
*	1,204,184	55	Forest / wetlands
*	74,646	98	Open water
*	195,888	88	Dirt / Industrial?
	3,881,575	77	Weighted Average
	3,182,956	73	82.00% Pervious Area
	698,619	98	18.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	130	0.4200	0.24		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.44"
17.3	5,434	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035 Earth, dense weeds
26.3	5,564	Total			

Subcatchment B1: Basin 1 Extg



Summary for Subcatchment B2: Basin 2

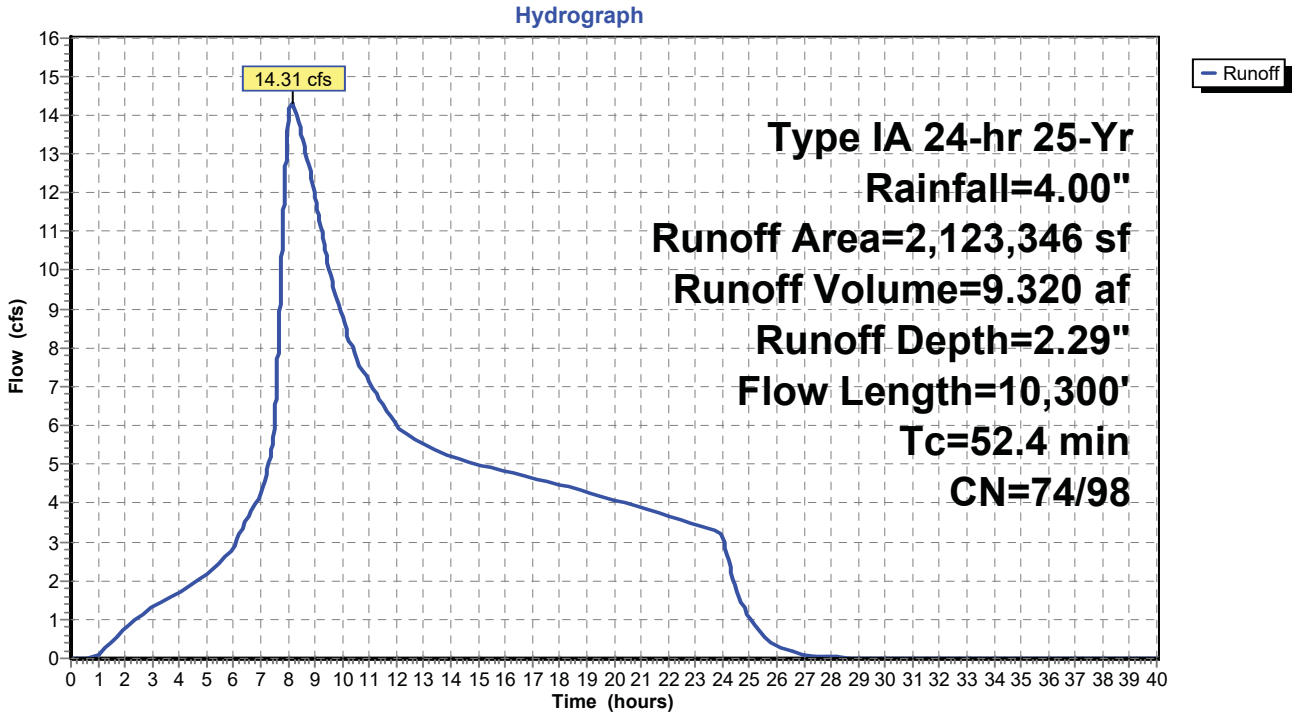
Runoff = 14.31 cfs @ 8.17 hrs, Volume= 9.320 af, Depth= 2.29"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Yr Rainfall=4.00"

	Area (sf)	CN	Description
*	39,766	98	Impervious
*	103,497	60	Forest
*	249,307	75	Grass cover>75%
*	68,236	98	Impervious
*	989,348	75	Grass cover>75%
*	516,514	98	Impervious
*	59,205	75	Grass cover>75%
*	59,008	98	Impervious
*	38,465	75	Grass cover>75%
	2,123,346	82	Weighted Average
	1,439,822	74	67.81% Pervious Area
	683,524	98	32.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	300	0.0400	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.44"
31.9	10,000	0.0100	5.22	78.31	**Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.035
52.4	10,300	Total			

Subcatchment B2: Basin 2



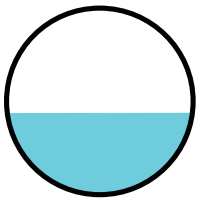
Summary for Reach 1R: (new Reach)

Inflow Area = 137.854 ac, 23.02% Impervious, Inflow Depth = 2.06" for 25-Yr event
Inflow = 41.45 cfs @ 8.03 hrs, Volume= 23.653 af
Outflow = 41.42 cfs @ 8.08 hrs, Volume= 23.653 af, Atten= 0%, Lag= 2.6 min

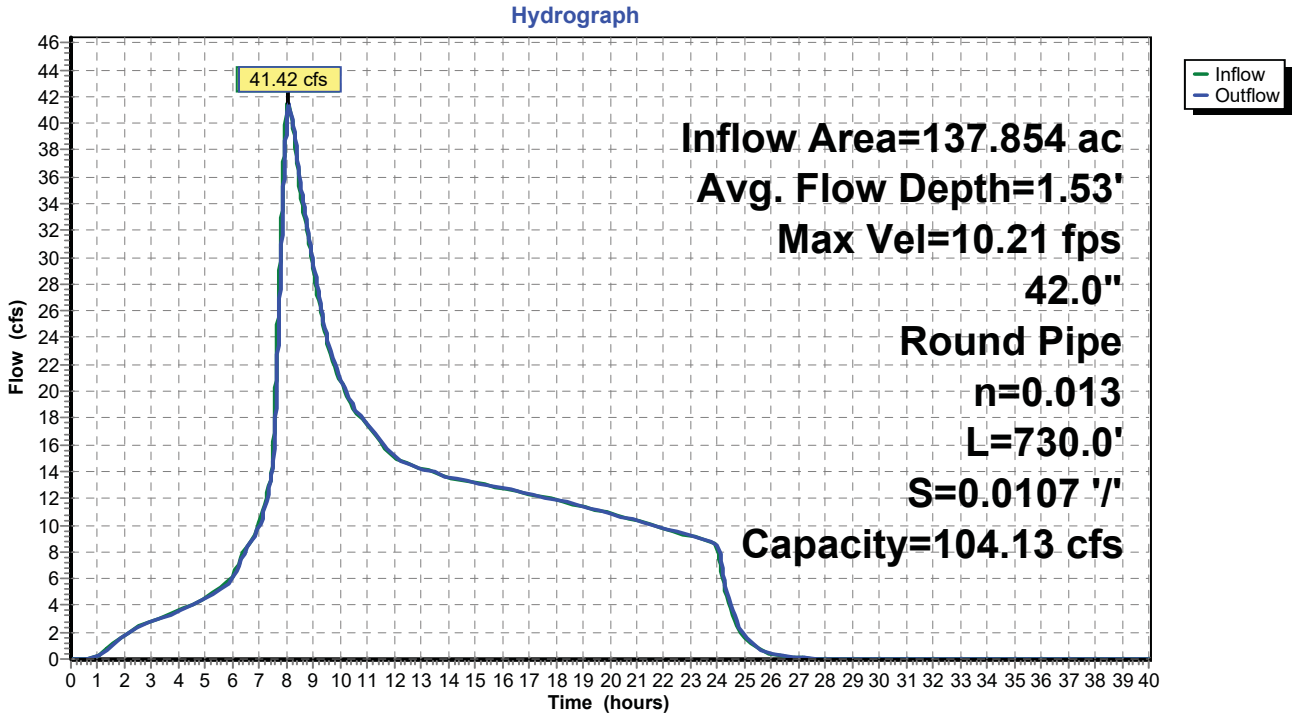
Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.21 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 5.39 fps, Avg. Travel Time= 2.3 min

Peak Storage= 2,963 cf @ 8.06 hrs
Average Depth at Peak Storage= 1.53'
Bank-Full Depth= 3.50', Capacity at Bank-Full= 104.13 cfs

42.0" Round Pipe
n= 0.013
Length= 730.0' Slope= 0.0107 '/'
Inlet Invert= 29.62', Outlet Invert= 21.80'



Reach 1R: (new Reach)



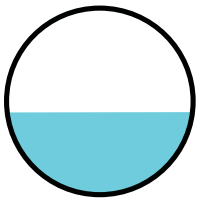
Summary for Reach 4R: (new Reach)

Inflow Area = 137.854 ac, 23.76% Impervious, Inflow Depth = 2.08" for 25-Yr event
Inflow = 41.96 cfs @ 8.03 hrs, Volume= 23.846 af
Outflow = 41.93 cfs @ 8.08 hrs, Volume= 23.846 af, Atten= 0%, Lag= 2.7 min

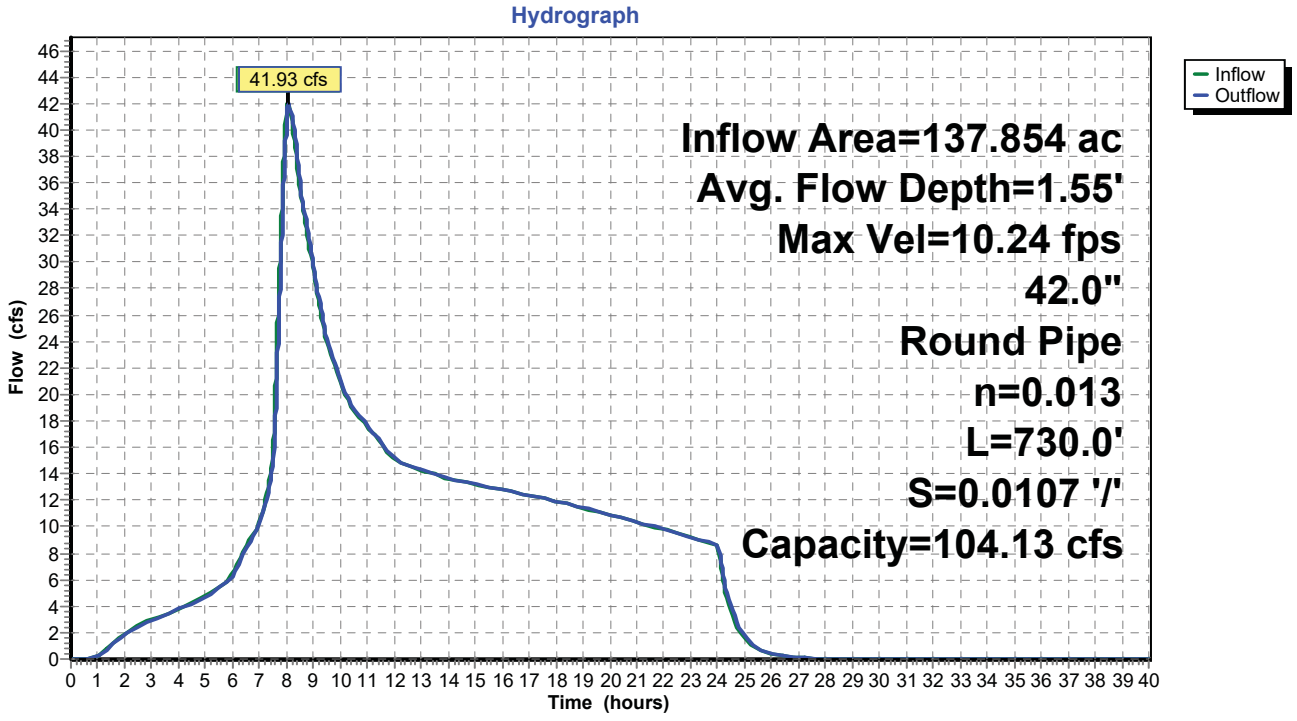
Routing by Stor-Ind+Trans method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.24 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 5.41 fps, Avg. Travel Time= 2.2 min

Peak Storage= 2,990 cf @ 8.06 hrs
Average Depth at Peak Storage= 1.55'
Bank-Full Depth= 3.50', Capacity at Bank-Full= 104.13 cfs

42.0" Round Pipe
n= 0.013
Length= 730.0' Slope= 0.0107 '/'
Inlet Invert= 29.62', Outlet Invert= 21.80'



Reach 4R: (new Reach)



Attachment C(2). Engineered Drainage Plan

SITE ASSESSMENT AND PLANNING CHECKLIST

✓	Information needed	Attach supporting materials as needed
2.2.1 Site Information		
	Applicant contact information	Applicant name: Tom Hamstra Business name: ODOT Contact address, phone number, and e-mail: 123 NW Flanders St, Portland, OR 97209 503-731-3015 thomas.hamstra@odot.state.or.us
	Project location	Site address: ODOT Right-of-way (Map 22E29CB, Tax Lots: 300, 500, ROADS; Map 22E29, Tax Lot: ROADS; Map 22E30DD, Tax Lot: ROADS) Site description: ODOT rights-of-way are built transportation environments. The two tax lots being impacted are within City parks. Major drainage basin: Willamette Is the project site located with the WQRA as defined in OCMC 17.49? Y (Y/N) *Include a vicinity map of the site (including location of property in relation to adjacent properties, roads, and pedestrian/bike facilities).*
	Project type	Identify types of development planned for the site such as commercial, industrial, single-family residential, multi-family residential, or other (describe): Transportation improvements - widening of I-205 northbound and southbound; seismic upgrade of Abernethy Bridge
	Size of site	Size of site: ~2900 (acres) Number of existing/proposed tax lots: Existing: 5 Proposed: 0 Amount of new and replaced impervious area: 284,795 (SF)
2.2.2 Site Assessment *Note: Site assessment information may be available from the OCMaps online tool available through the City's website.*		
	Site Assessment Map	*Attach engineered scale Site Assessment Map, showing items below.*
	Topography Evaluate site and map slopes: *Flat: 0-10%* *Moderate: 10-25%* *Steep: 25% and greater*	*Surveyed or aerial-based mapping with 2-foot intervals for slopes 0-25% slope and 10-foot intervals for steeper. Indicate Geologic Hazard Areas as defined by OCMC 17.04.510 and Geologic Hazards Overlay Zone as defined by OCMC 17.04.515.* See attached stormwater land use site map (figure __)
	Soils and Groundwater Research and map site soil hydrologic group, depth to groundwater	NRCS Hydrologic Soil Type (show on map if more than one type present): *Attach seasonal groundwater depth evaluation if available or required (site has floodplain and/or wetland).* *Groundwater depth information is available from the City.* Soil types and groundwater depth are included in the attached Stormwater Report (Attachment A)
	Infiltration Assessment Determine soil capacity for onsite infiltration	If an infiltration test is performed, attach the documentation. Report the test type (Basic/Professional) performed and results. See **Appendix D** for the approved infiltration testing methods. Test type: Encased Falling Head/ Open Pit Falling Head See Report (inches/hour)

SITE ASSESSMENT AND PLANNING CHECKLIST

	Hydrology – Conditions and Natural Features Map site floodplains, wetlands, streams, and location of outfalls	Clearly label on map all intermittent and perennial creeks/streams/rivers and wetlands, FEMA floodplains, and existing drainage systems (pipes, ditches, outfalls). Check here if present on site: X Sensitive area(s) Willamette River, Abernethy Creek, two wetlands Floodplain Willamette River
	Downstream Conveyance	Indicate the proposed point of discharge on the site plan. *Prepare and attach a Downstream Analysis as required by **Chapter 5**.* Check here to verify that adequate downstream capacity is available: X
	Existing Vegetation Map trees and vegetation	Using aerial photos or survey, map all trees and vegetation. Note all existing trees 6-inch caliper and greater (DBH) on map. Delineate and identify other areas and types of existing vegetation. The local planning authority may require a formal tree survey. See attached map (Attachment B)
	Required Vegetated Buffers and Setbacks Assess and map buffers	Identify required vegetated buffer areas and other setback limits as defined by OCMC Title 17. See attached map (Attachment B)
	Land Use and Zoning	Existing Land Use Zoning designation(s): MUD district, I district, NROD, WRG, Flood management overlay district
	Access and Parking	Delineate proposed access points for all transportation modes on map. Indicate amount and area of required parking onsite if applicable, *attach documentation as needed.* Att. C
	Utilities to Site and Surrounding Area	Map existing utilities including stormwater facilities, storm conveyance, sewer, water, electricity, phone/cable, gas, and any public storm system/facility downstream. Att. C
2.2.3 Site Planning Design Objectives *(attach engineered scale Preliminary Site Plan)*		
	1. Preserve existing resources	**Required:** Show sensitive areas and buffers on site plan. Denote buffer areas that require enhancement. Show any proposed areas of encroachment and associated buffer mitigation areas. Attachment B
	2. Minimize site disturbance	**Required:** Delineate protection areas on site plan for areas to remain undisturbed during construction. Attachment D
	3. Minimize soil compaction	**Required:** Delineate and note temporary fencing on site plan for proposed infiltration facilities, vegetated stormwater management facilities, and re-vegetation areas. Att. D
	4. Minimize imperviousness	**Required:** Delineate proposed impervious areas and proposed impervious area reduction methods on the site plan. A. Total proposed new/replaced impervious area: 284,795 (SF) B. Area of proposed Green Roofs: 0 (SF) C. Area of proposed pervious pavements: 0 (SF) D. Describe type of pavers or pavement proposed: _____ E. Impervious area requiring management [A-(B+C)]: 284,795 (SF)

SITE ASSESSMENT AND PLANNING CHECKLIST

2.2.4 Proposed Stormwater Management Strategy

Proposed Stormwater Management Strategy

- [X] Infiltration facilities
- [ ] Surface Infiltration facilities to the MEP
- [X] Full onsite retention/infiltration up to the 10-year storm event
- [X] Infiltration facilities are limited by the following conditions *(include documentation to demonstrate the limiting condition and choose an alternate strategy below):*
  - [ ] Stormwater management facility to be located on fill
  - [ ] Steep slopes
  - [X] High groundwater
  - [ ] Contaminated soils
  - [ ] Conflict with required Source Controls (**Chapter 6**)
- [X] Onsite Stormwater management facilities (indicate below)
- [ ] Offsite stormwater management facilities/regional facilities
- [ ] Fee in Lieu, as determined by the City

Preliminary Facility Selection/Sizing

Check all that apply, *attach output from BMP Sizing Tool*, and show proposed Stormwater Management Facilities on Preliminary Site Plan.

Appendix D of report

LID facilities:

- [ ] Infiltration Stormwater Planter
- [X] Filtration Stormwater Planter WQF #9
- [ ] Infiltration Rain Garden
- [ ] Filtration Rain Garden
- [ ] Vegetated Swale
- [X] Detention Pond WQF #1 and WQF #3
- [ ] Infiltration Trench
- [ ] Manufactured Treatment Technology
- [X] Other: Bioslope WQF #2, Treatment only

Verify Minimum Facility Size

A. Required surface area of onsite surface infiltration facilities: 2,135 WQF #1; 4,639 WQF #3; 153 (SF) WQF #9
As determined by BMP sizing tool or engineered method:

B. Calculate MEP surface area of surface infiltration facilities for sites with limiting conditions:

Total new/replaced impervious area (SF) x 0.10 = _____ (SF)

C. Calculate required surface area of onsite LID facilities:

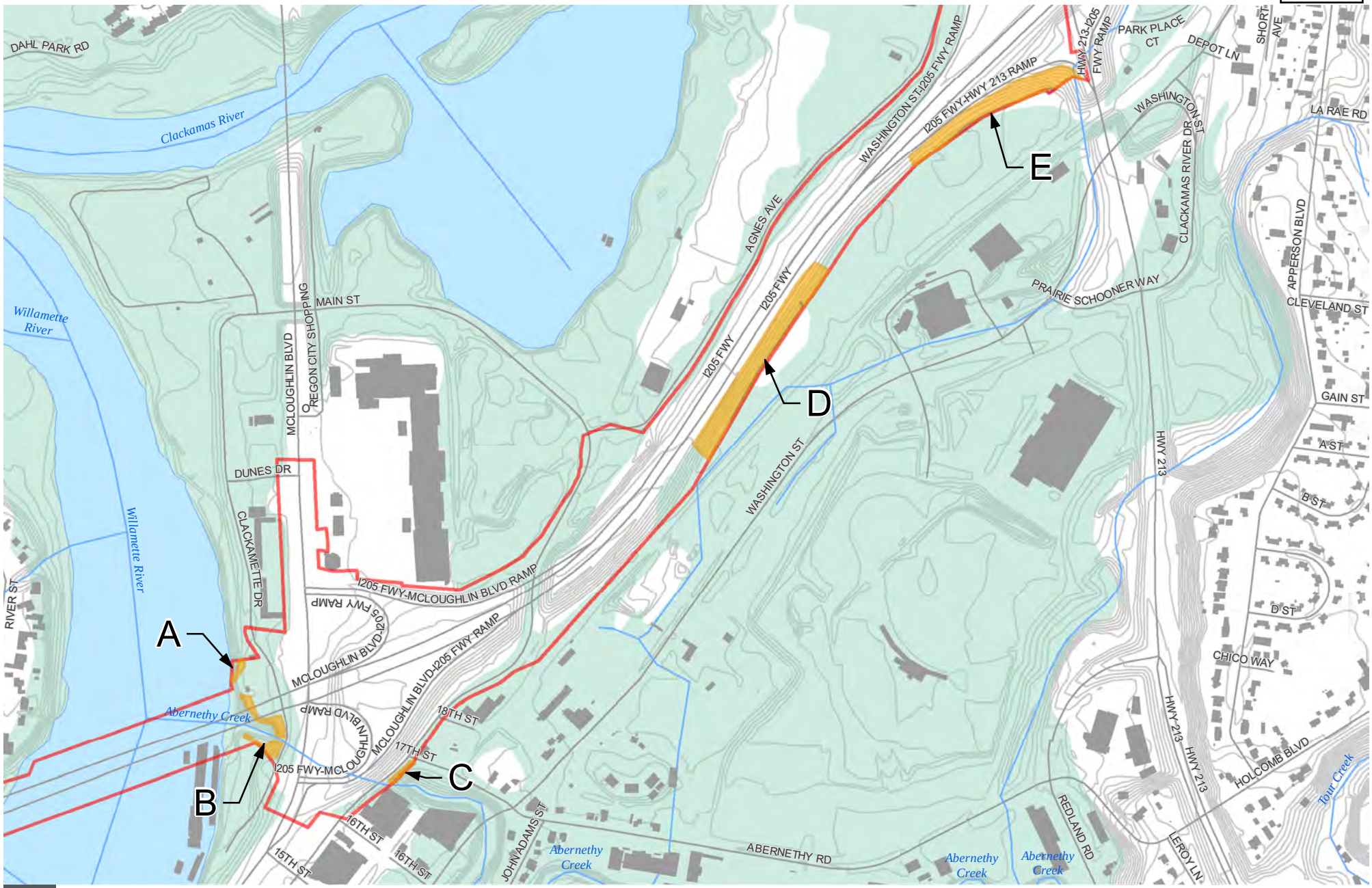
Smaller of [A] or [B]: 2,135 WQF #1; 4,639 (SF) WQF #3; 153 WQF #9

D. Proposed surface infiltration facility size(s):

From site plan: 5,400 WQF #1; 4,915 (SF) *must be larger than [C]* WQF #3; 240 WQF #9

SITE ASSESSMENT AND PLANNING CHECKLIST		
2.2.5 Other Project Requirements		
	Grading Permit	Review OCMC 15.48 to determine whether a grading permit will be required. Grading permit required? ___Y___ (Y/N) Type of Grading Plan proposed (see **Chapter 3**): Engineered Grading Plan
	Erosion Prevention and Sediment Control	Identify the required permits: X ESC Permit from the City *(sites that include 1,000+ SF new or replaced impervious area)* X 1200-C Permit from DEQ *(sites that disturb 1 acre or more land surface)*
	Source Control for High Use Sites	Identify whether the proposed development will include any of the following: _____ Fuel Dispensing Facilities and Surrounding Traffic Areas _____ Above-Ground Storage of Liquid Materials _____ Solid Waste Storage Areas, Containers, and Trash Compactors _____ Exterior Storage of Bulk Materials _____ Material Transfer Areas/Loading Docks _____ Equipment and/or Vehicle Washing Facilities _____ Development on Land With Suspected or Known Contamination _____ Covered Vehicle Parking Areas _____ Industrial and Commercial High Traffic Areas _____ Other land uses subject to the ODEQ 1200-Z Industrial Stormwater Permit
	Other Permits	Identify other natural resources related permits from local, state, or federal agencies that may be required as part of the proposed development activity. It is the responsibility of the applicant to identify and obtain required permits prior to project approval. List other anticipated permits: DSL removal/fill, USACE Section 404, NEPA Categorical Exclusion, ESA Biological Opinion, ESA No Effect Determination, DEQ 401 Certification, Section 4(f), Section 6(f), USCG Bridge Permit

Attachment A. Existing Vegetation



NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

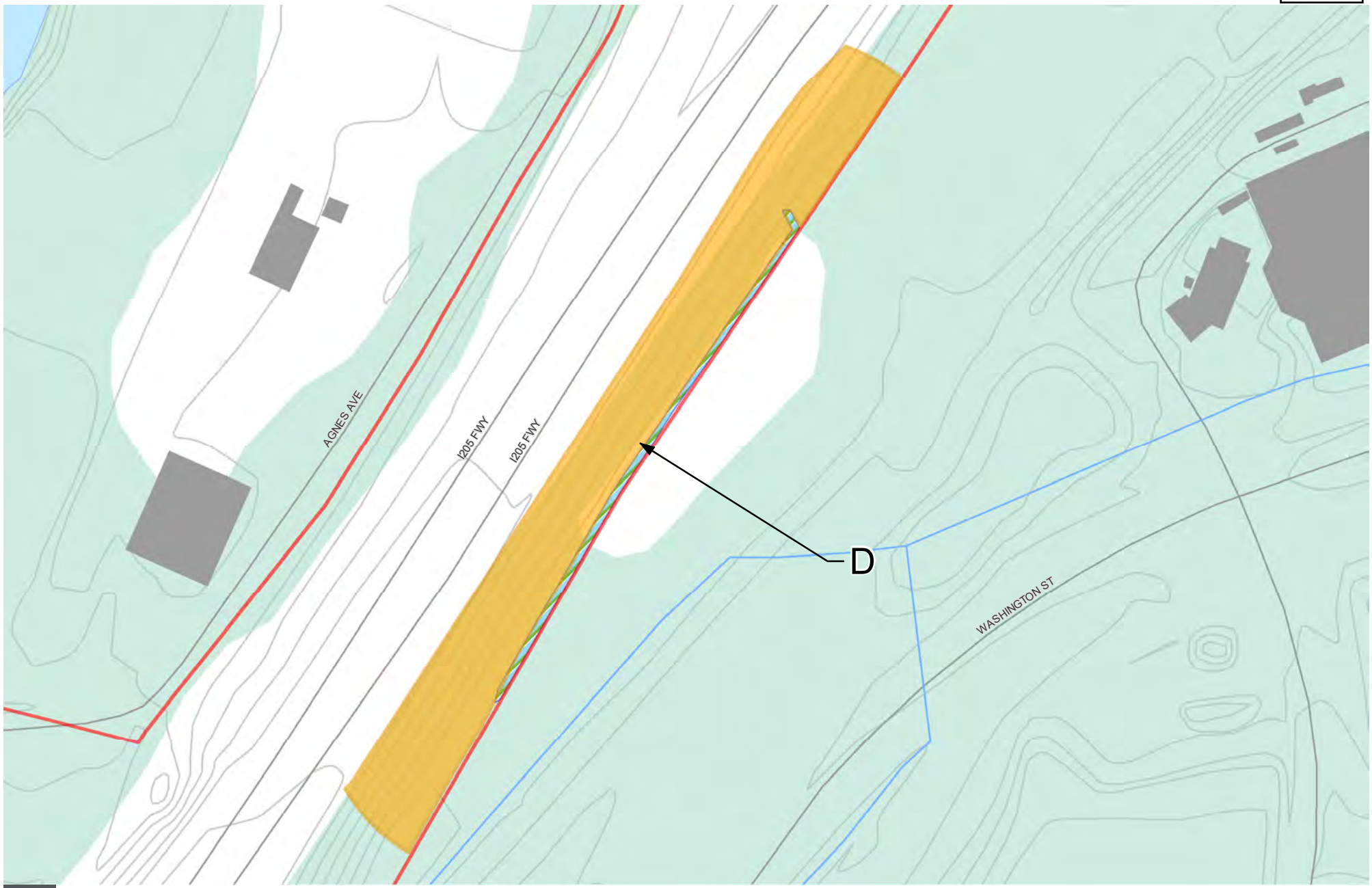
0 Miles 0.1

DATA SOURCE: ESRI, HDR, City of Oregon City

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITE_PLANRB.MXD - USER: RBARKSDALE - DATE: 7/29/2019

SITE PLAN

OCMC 17.49.220 (A)



NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

0 Miles 0.03

DATA SOURCE: ESRI, HDR, City of Oregon City

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SITE PLAN

OCMC 17.49.220 (A)

NROD Boundary
Project Area
Buildings
Streams, Rivers, Waterbodies
Wetlands
100-Year Floodplain

0 Miles 0.02

DATA SOURCE: ESRI, HDR, City of Oregon City

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SITE PLAN

OCMC 17.49.220 (A)

HDR

0 12.5 25 Feet

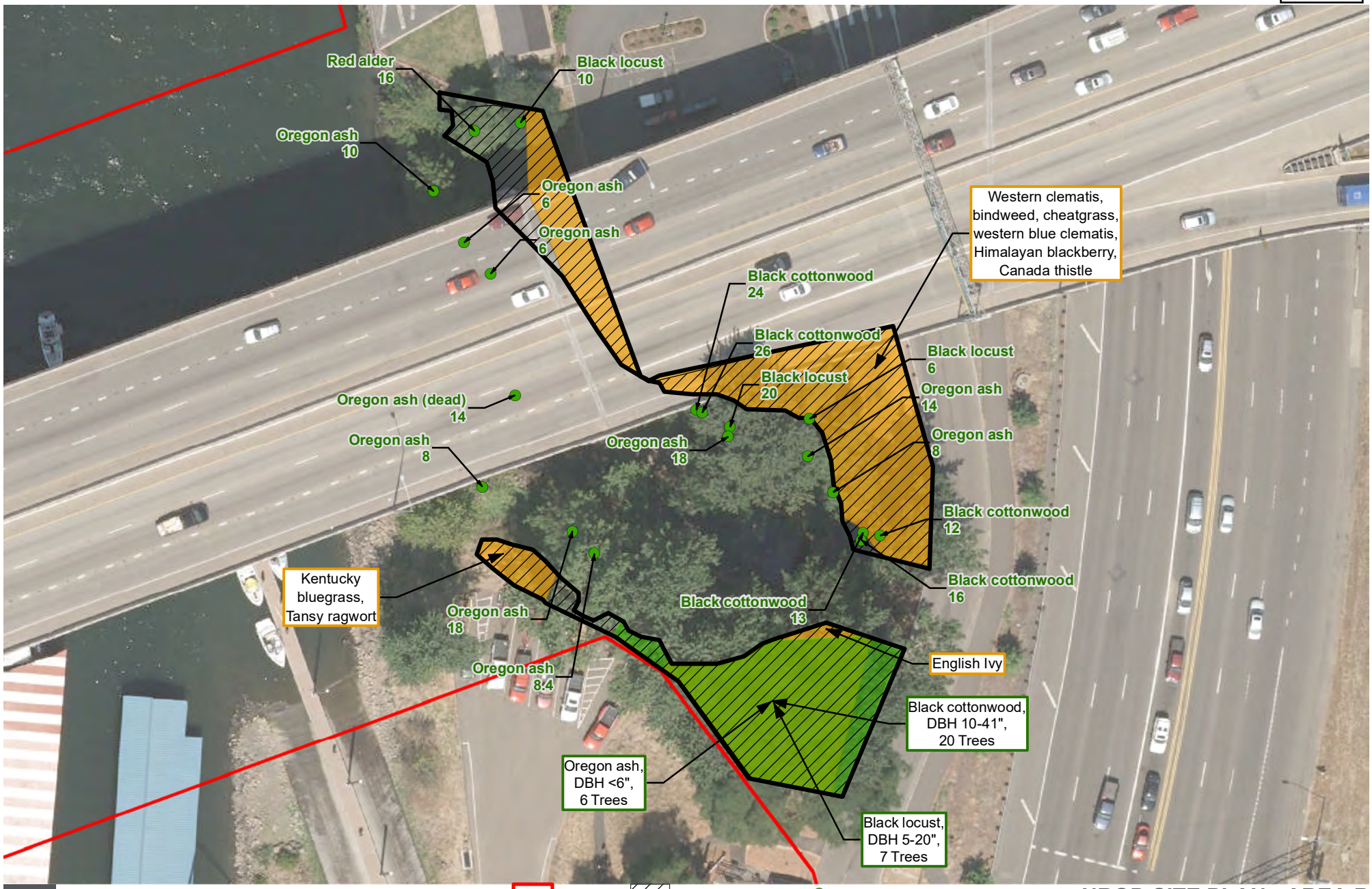
Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed

DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA A

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019



NROD SITE PLAN - AREA B

(OCMC 17.49.220 (B))

DATA SOURCE: ESRI, HDR, City of Oregon City

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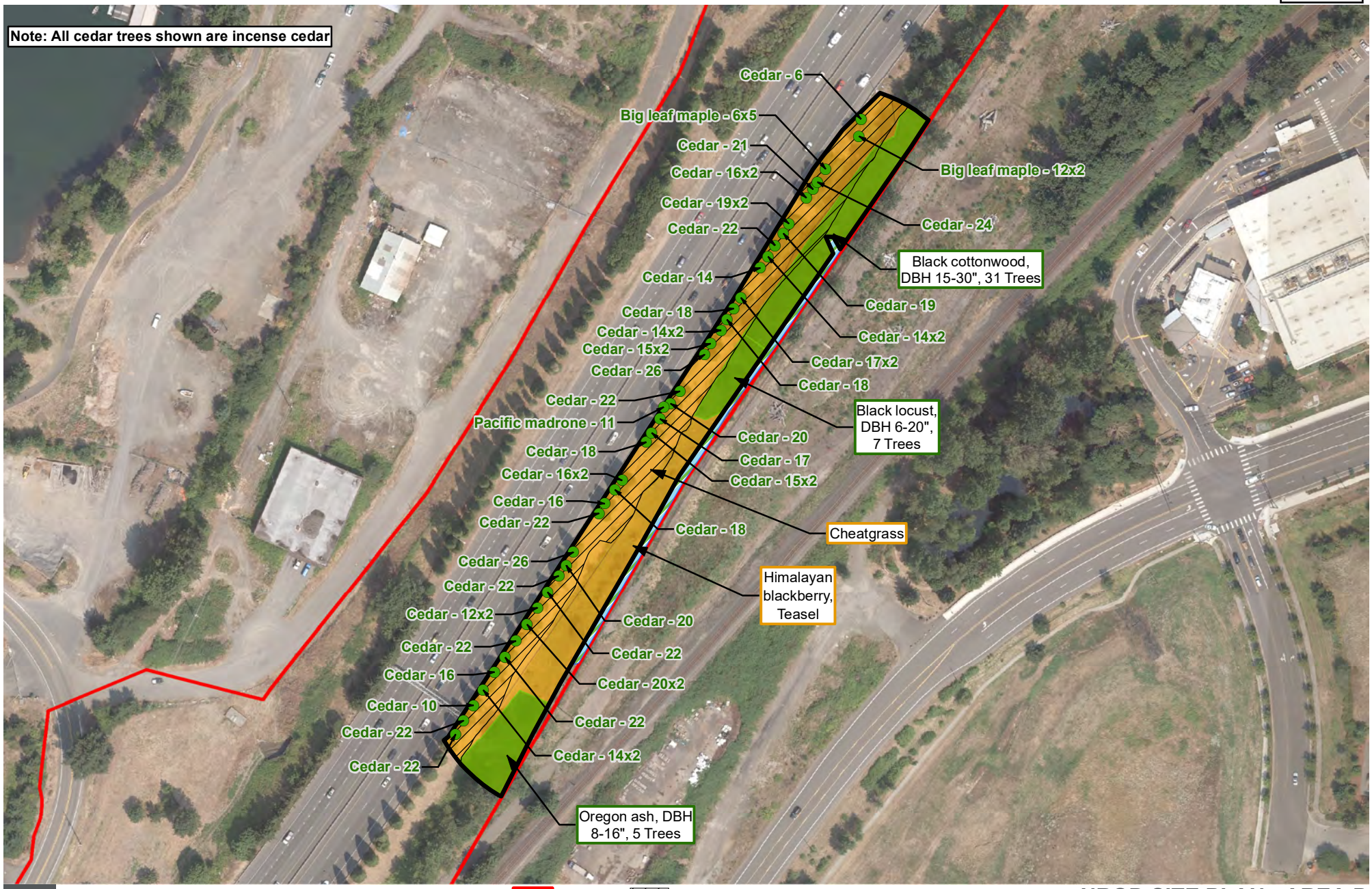


HDR

0 105 210 Feet

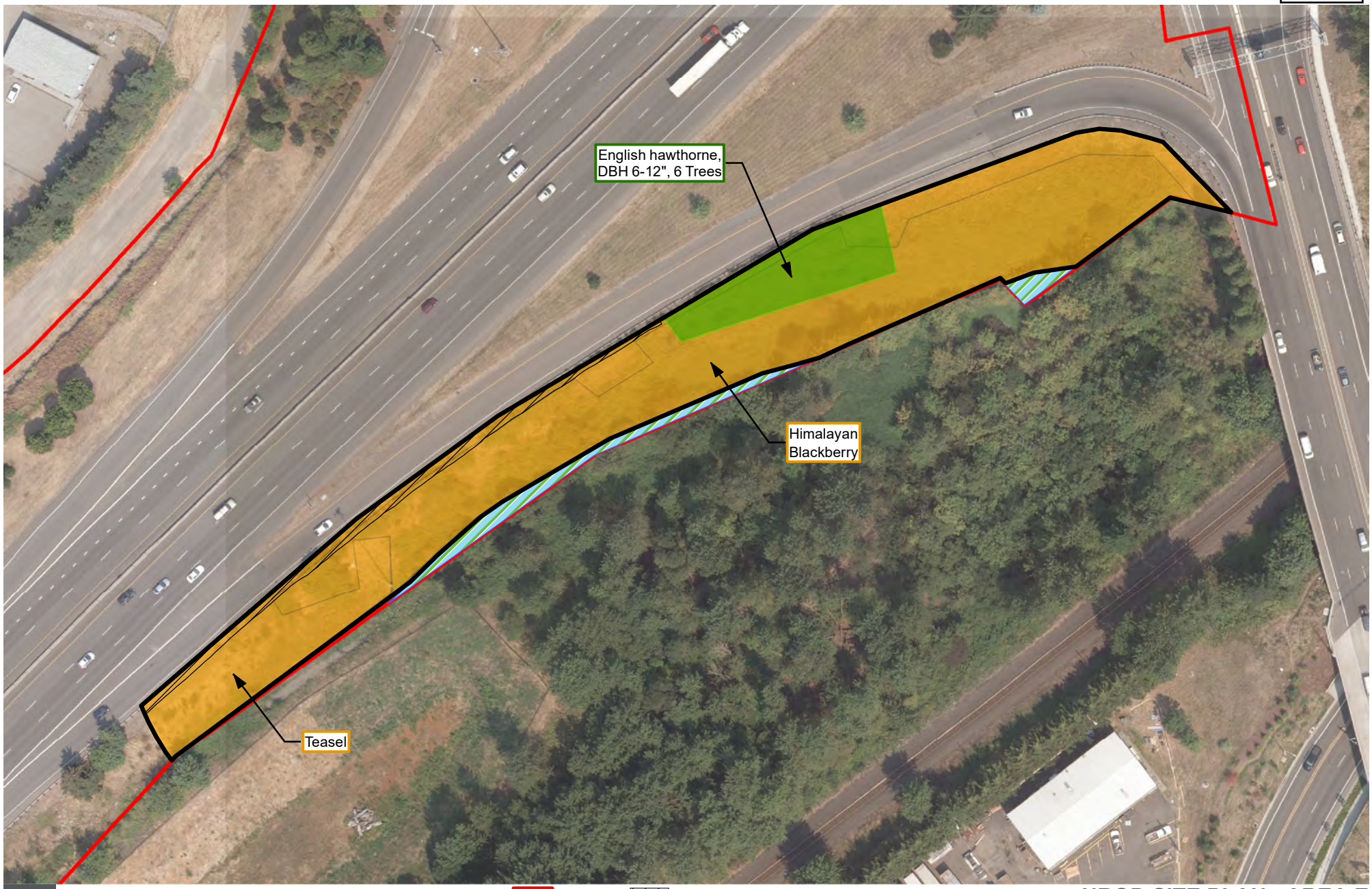
Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed
Wetlands

DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA D

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019



0 60 120 Feet

Project Area
NROD
Disturbance Area
Trees > 6" in Diameter
Shrub/Ground Cover Distribution Outline
Trees to be Removed
Wetlands

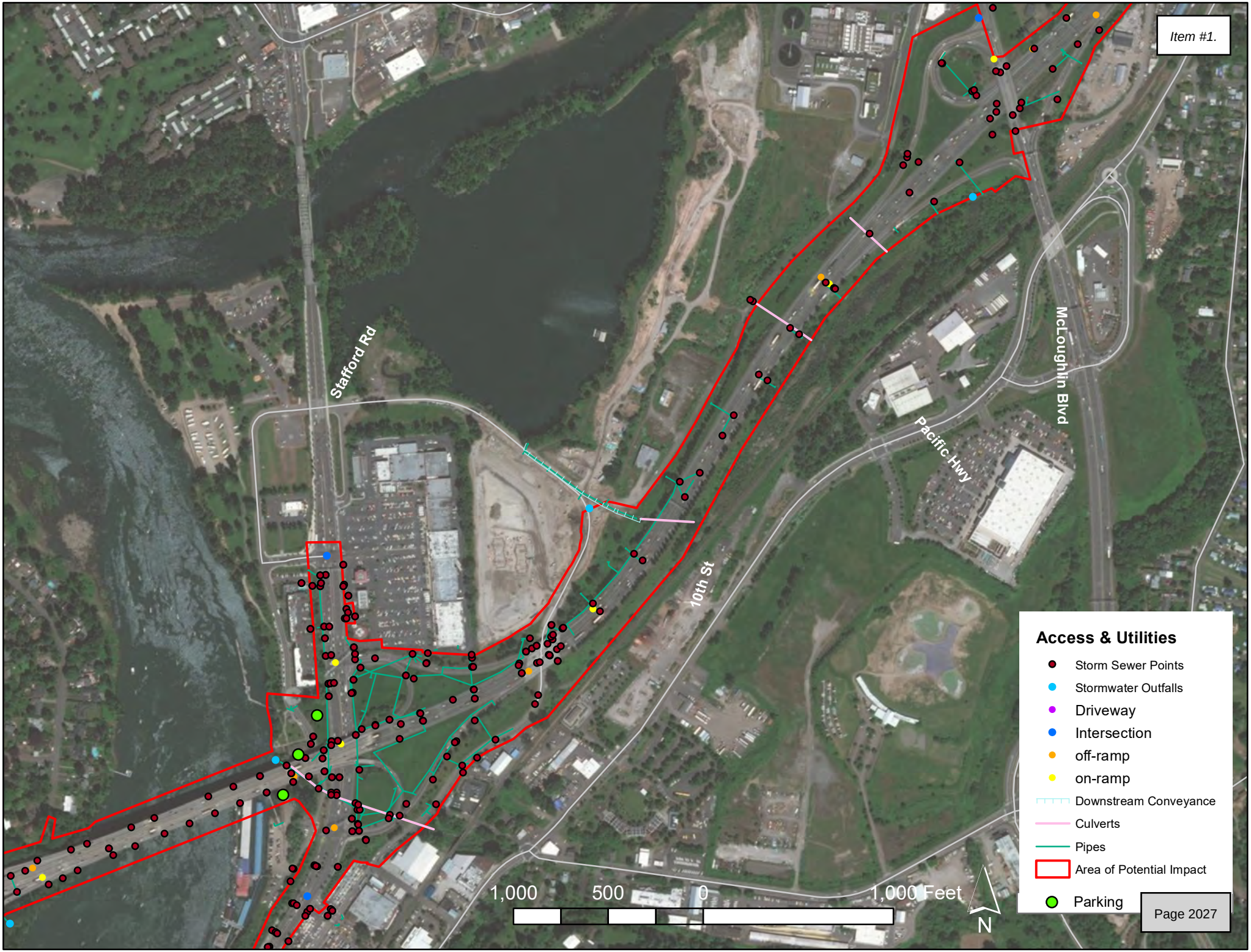
DATA SOURCE: ESRI, HDR, City of Oregon City

NROD SITE PLAN - AREA E

(OCMC 17.49.220 (B))

PATH: X:\PROJECTS\ODOT\10063137_I205_ABERNATHY\WORKING\RB\NROD_SITEPLAN_UPDATED.MXD - USER: RBARKSDALE - DATE: 7/29/2019

Attachment B. Access and Utilities Map


Stafford Rd
10th St
Pacific Hwy
McLoughlin Blvd
Access & Utilities
Storm Sewer Points
Stormwater Outfalls
Driveway
Intersection
off-ramp
on-ramp
Downstream Conveyance
Culverts
Pipes
Area of Potential Impact
Parking
1,000
500
0
1,000 Feet
N

Attachment C. Construction Management Plan

GENERAL NOTES:

The construction, adjustment, maintenance, and upgrading of these Erosion and Sediment Control measures is the responsibility of the contractor for the duration of the project to comply with Section 00280 of the Oregon Standard Specifications for construction and the NPDES 1200-CA permit.

Erosion and Sediment Control measures shown on this plan are for anticipated site conditions. Adjust or upgrade these measures for unexpected storm events to ensure that sediment and sediment-laden water does not leave the site.

Develop a revised plan of the Erosion and Sediment Control measures shown as required by Section 00280, Oregon Standard Specifications for Construction. Implement this plan for all clearing and grading activities and in segments applicable to each staging phase. Construct in such a manner so as to ensure that sediment and sediment-laden water does not enter the roadway or drainage system, or violate applicable water standards.

Install measures within the right-of-way unless directed otherwise.

Inlet protection for existing facilities shall be installed before construction begins and shall remain in place until all construction is completed and approved. The contractor shall protect all storm drain inlets within the work area and adjacent to the work limits within 100' outside all working, stockpile, and staging areas, including the first inlet downstream (at any distance). In the case of inlets to be removed, protection measures shall remain in place until the new inlet is constructed and connected to the drainage network, and the existing inlet has been disconnected from the existing drainage network. Inlet protection shall be installed on new inlets before they are connected to the existing drainage network.

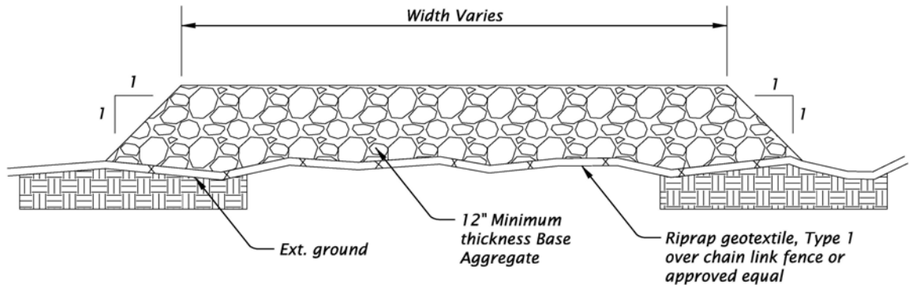
See section 00280 for material not shown in plans.

STANDARD DRAWINGS

- ☒ RD1000 Construction Entrances
- ☐ RD1005 Check Dams Type 1, 3 and 4
- ☒ RD1006 Check Dams Type 2 and 6
- ☒ RD1010 Inlet Protection Type 2, 3, 6 and 7
- ☐ RD1015 Inlet Protection Type 4
- ☒ RD1030 Sediment Barrier Type 2, 3 and 4
- ☐ RD1031 Sediment Barrier Type 5 and 6
- ☒ RD1032 Sediment Barrier Type 8
- ☒ RD1033 Sediment Barrier Type 9
- ☒ RD1040 Sediment Fence
- ☐ RD1045 Temporary Slope Drain With Energy Dissipator
- ☐ RD1050 Temporary Scour Basin
- ☒ RD1055 Slope and Channel Matting
- ☒ RD1060 Tire Wash Facility Type 1 and 2
- ☒ RD1065 Sediment Trap
- ☒ RD1070 Concrete Truck Wash Out

SEQUENCE OF WORK NOTES:

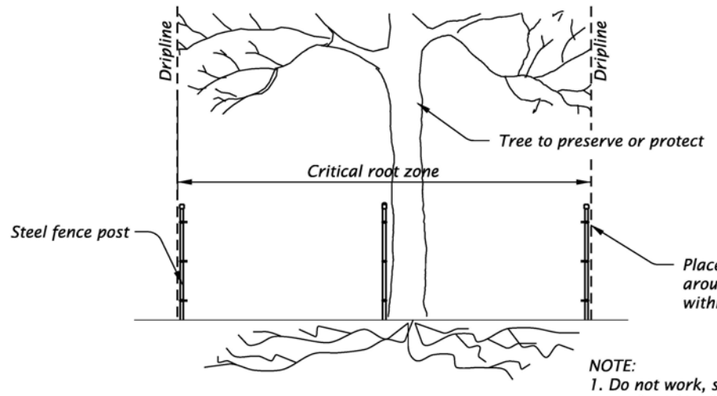
This Erosion and Sediment Control Plan has been prepared based upon the construction sequence represented in the Traffic Control Plan Sheets. This ESCP is not intended to supercede a construction sequencing plan. The ESCP is to be reviewed and revised to fit the actual construction sequence.



1. Existing ground shall grubbed to a depth 6".

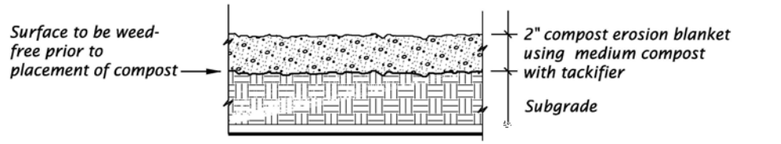
2. Cover existing ground under Staging Area with riprap geotextile and either chain link fence or other approved geogrid type material and cover with Base Aggregate.

STAGING AREA DETAIL
N.T.S.

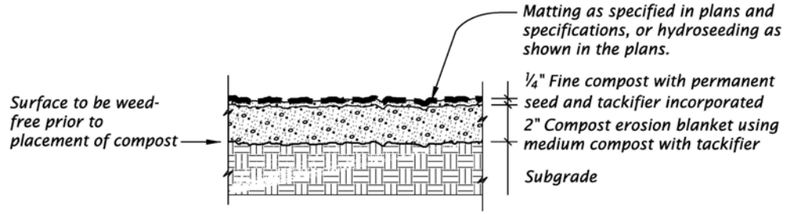


NOTE:
1. Do not work, store construction materials or park within the critical root zone of marked trees unless written approval has been obtained from the Engineer.

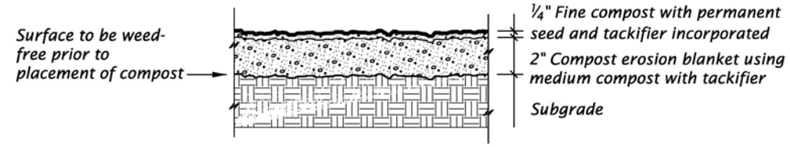
TREE PROTECTION DETAIL
N.T.S.



APPLICATION - TEMPORARY/PERMANENT MULCHING
N.T.S.



APPLICATION - STEEP SLOPES, SHALLOW DITCHES & BIO-SWALES
N.T.S.



APPLICATION – TEMPORARY/PERMANENT VEGETATIVE COVER
N.T.S.

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503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

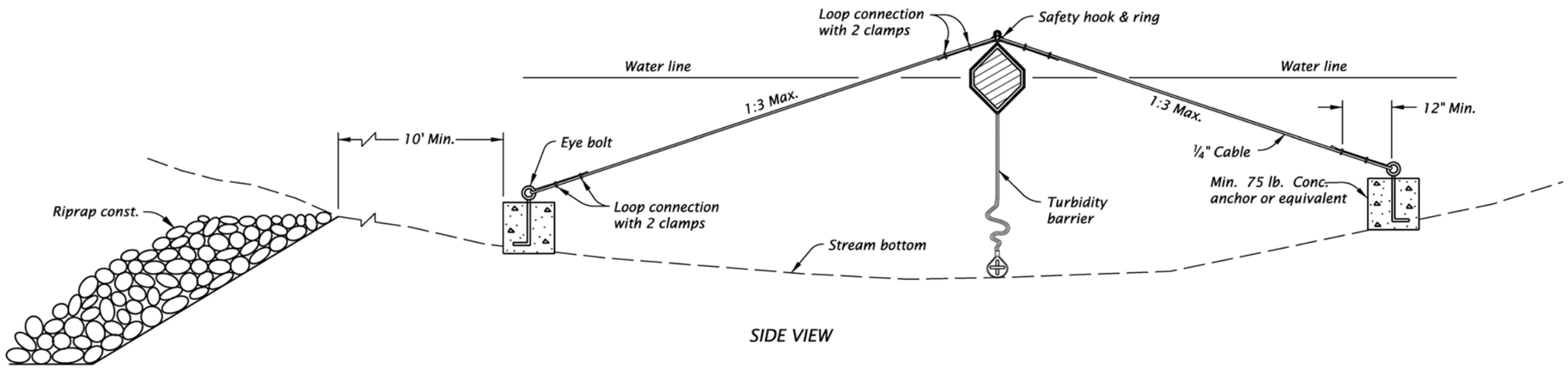
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

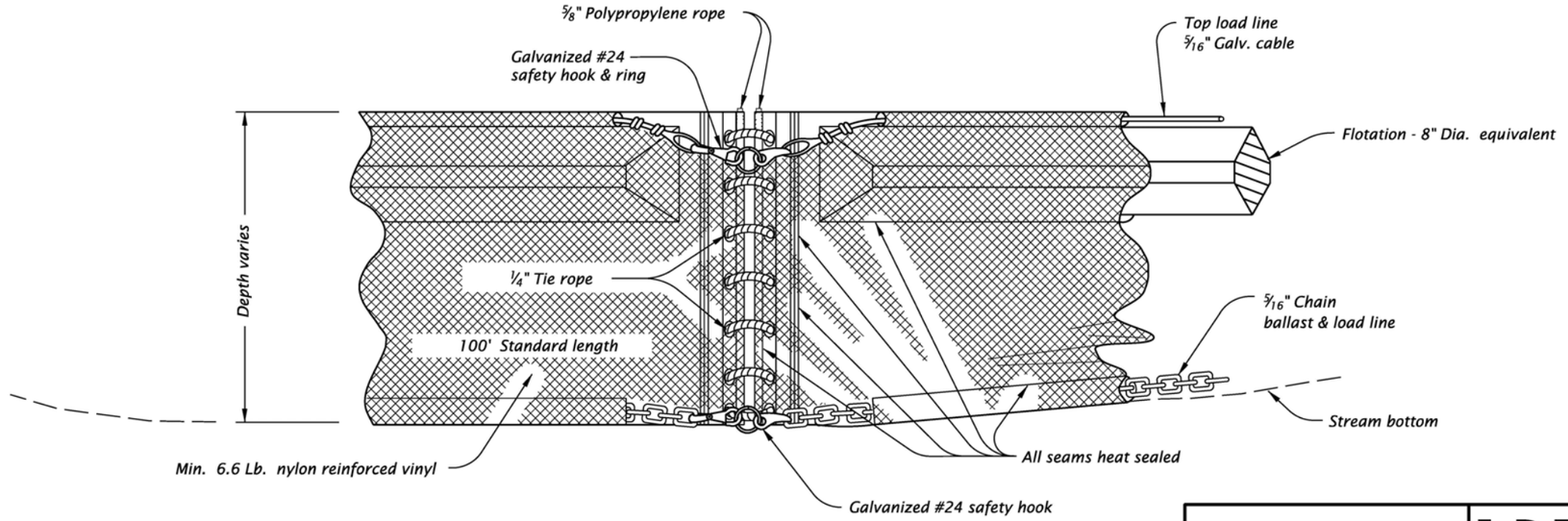
EE_K19786_HDR_ec01_phase 1.dgn :: FB01 6/25/2019 11:15:59 AM CDONOVAN

Rotation: 0° 0'

SEDIMENT BARRIER FLOATING



SIDE VIEW



ANCHOR ASSEMBLY

NOTE:

Components of this barrier may be similar or identical to proprietary designs. Any infringement on the proprietary rights of the designer shall be the sole responsibility of the contractor. Substitutions shall be as approved by the engineer.

TURBIDITY BARRIER

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL | SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec01_phase 1.dgn :: FB02 6/25/2019 11:16:01 AM CDONOVAN
Rotation: 0°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

BEGINNING OF PROJECT
S???(???)
STA. "L" 659+00 (M.P. 10.24)

N

Extg. R/W

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Ditch

Extg. R/W

(1) *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*

(2) *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

(3) *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

(4) *Install orange plastic mesh fencing*

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Check dam in ditch section
- No work zone
- Orange plastic fence (no work area)
- Compost filter berm
- Wetland
- Ordinary High Water
- Flow direction

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB03 6/25/2019 11:16:04 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

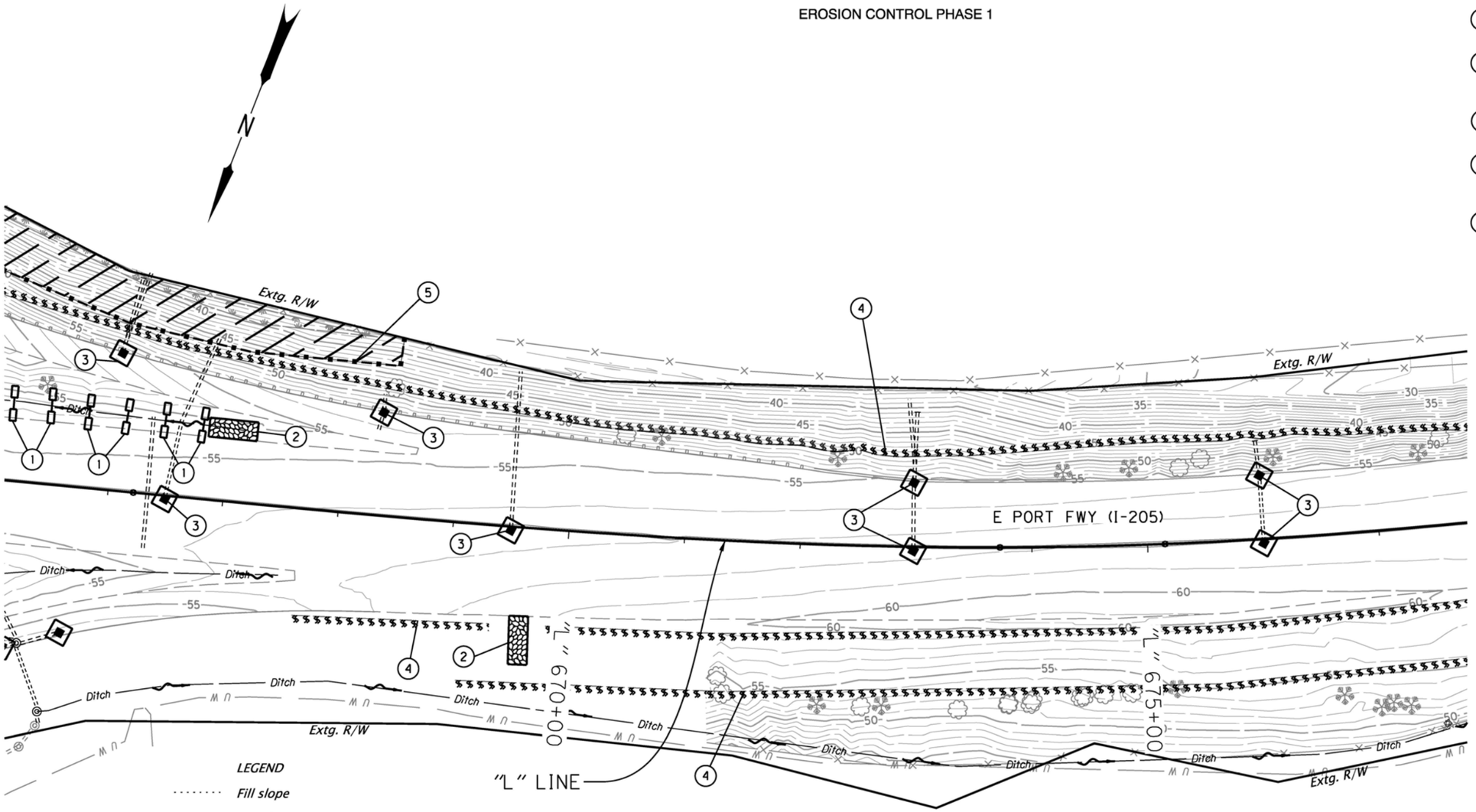
Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

?? V = ???

1. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
2. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
3. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
4. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing*



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB04 6/25/2019 11:16:17 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost filter berm
- Ordinary High Water
- Flow direction
- Construction entrance

1. Const. construction entrance – xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
3. Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)

"L" LINE

"L" 705+00

"L" 710+00

E PORT FWY (I-205)

PACIFIC HWY (OR99E)

Extg. R/W

Extg. R/W

For creek erosion control plans see shts. FB21, FB22, FB23

ABERNETHY CREEK

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

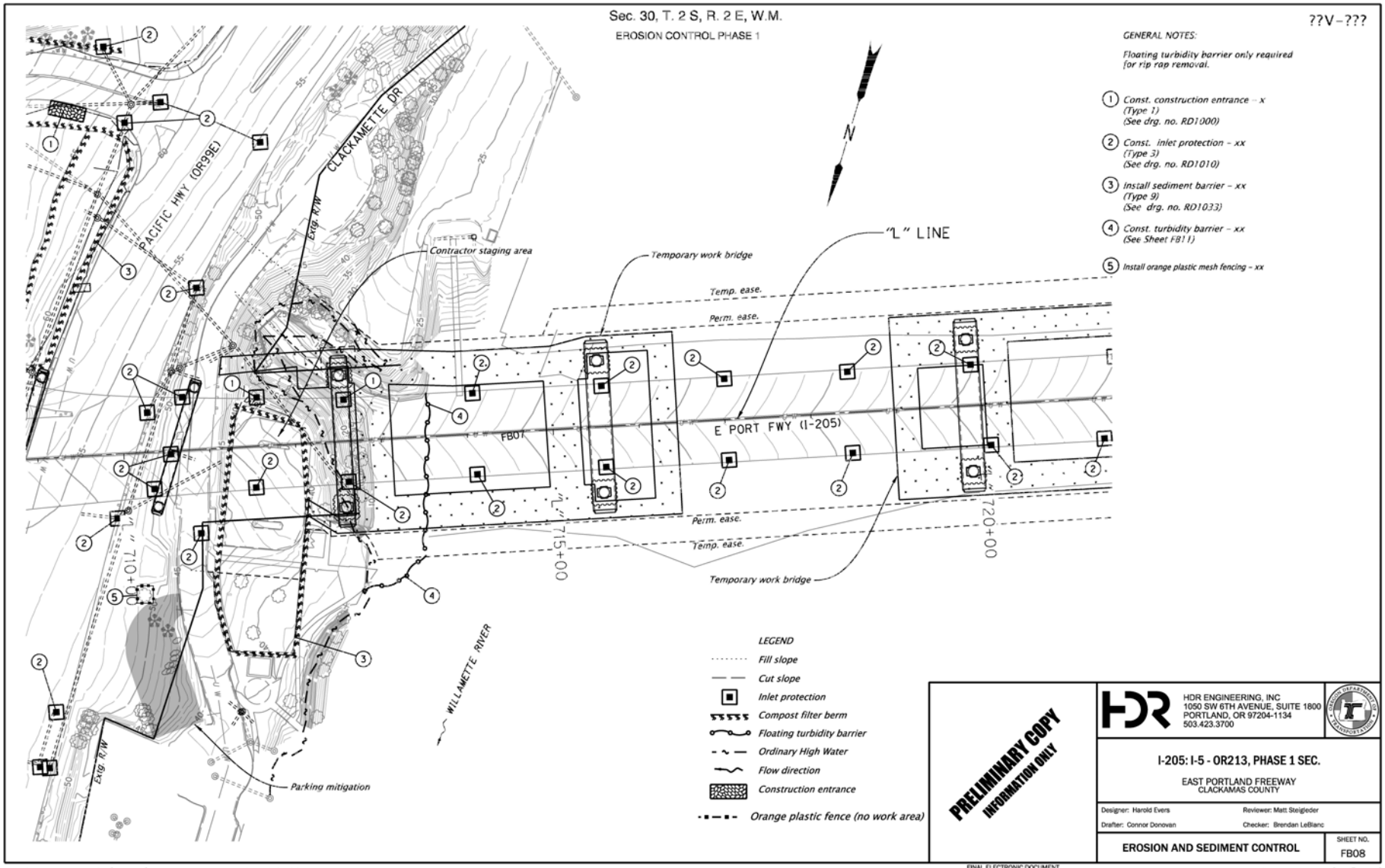
EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB07 6/25/2019 11:16:59 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 272.0412°


Sec. 30, T. 2 S, R. 2 E, W.M.
EROSION CONTROL PHASE 1
??V-???
GENERAL NOTES:
Floating turbidity barrier only required for rip rap removal.
1 Const. construction entrance - x (Type 1) (See drg. no. RD1000)
2 Const. inlet protection - xx (Type 3) (See drg. no. RD1010)
3 Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
4 Const. turbidity barrier - xx (See Sheet FB11)
5 Install orange plastic mesh fencing - xx
N
PACIFIC HWY (OR99E)
CLACKAMETTE DR
ENG. R/W
Contractor staging area
Temporary work bridge
"L" LINE
Temp. ease.
Perm. ease.
E PORT FWY (I-205)
FB07
"L" 715+00
720+00
"L" 710+00
Perm. ease.
Temp. ease.
Temporary work bridge
WILLAMETTE RIVER
ENG. R/W
Parking mitigation
LEGEND
Fill slope
Cut slope
Inlet protection
Compost filter berm
Floating turbidity barrier
Ordinary High Water
Flow direction
Construction entrance
Orange plastic fence (no work area)
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I-205: I-5 - OR213, PHASE 1 SEC.
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY
Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc
EROSION AND SEDIMENT CONTROL
SHEET NO.
FB08
EE_K19786_HDR_ec01_phase 1.dgn :: FB08 6/25/2019 11:17:11 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 198.4431° Scale: 1"=100'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

STA. "L" 659+00 (M.P. 10.24)

BEGINNING OF PROJECT
S???(???)

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Extg. R/W

Ditch

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Check dam in ditch section
- No work zone
- Orange plastic fence (no work area)
- Compost filter berm
- Erosion control matting
- Wetland
- Ordinary High Water
- Flow direction
- Construction entrance

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB12 6/25/2019 11:18:38 AM CDONOVAN

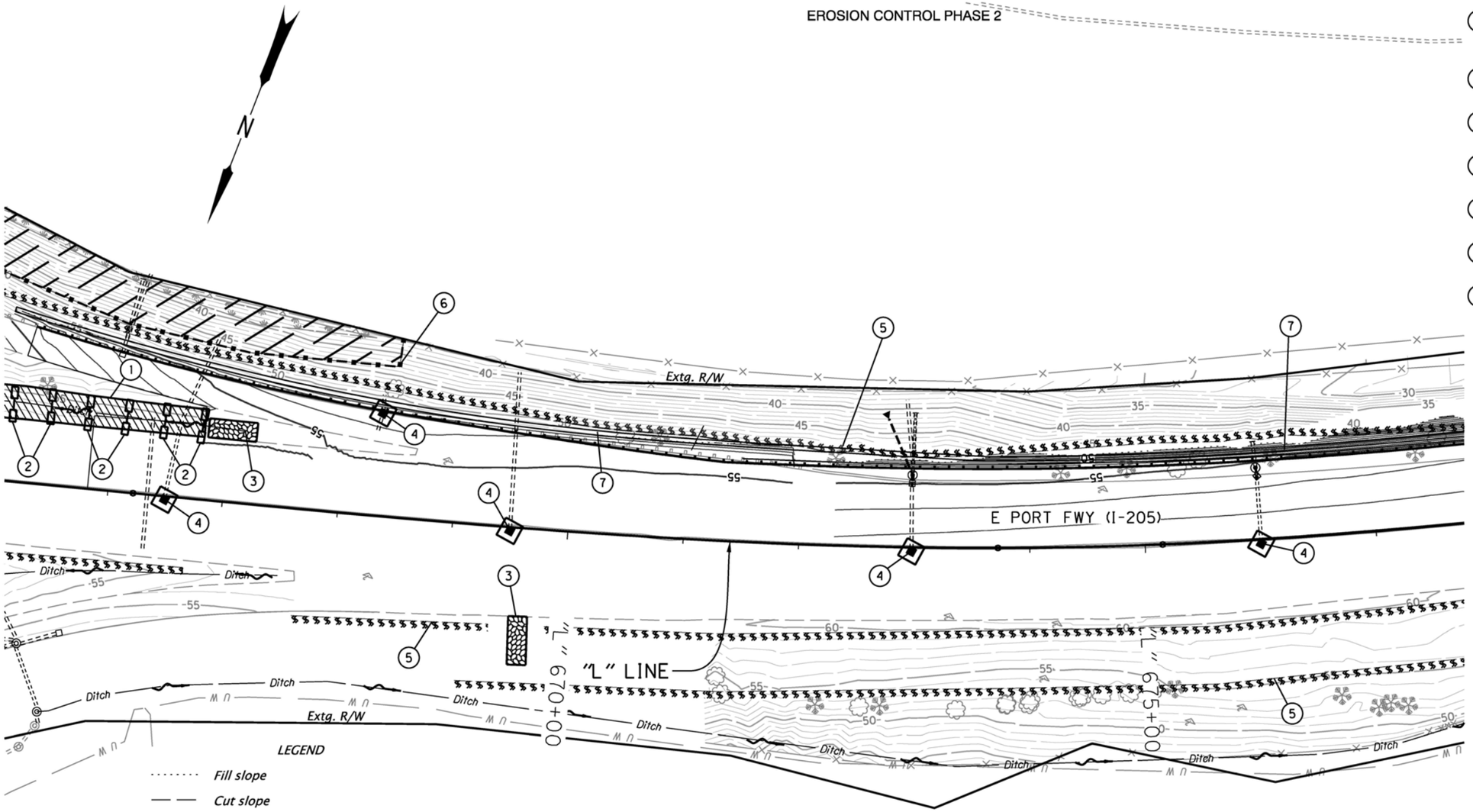
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*
7. *Seeding and mulching – xx*



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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB13 6/25/2019 11:18:42 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Erosion control matting
- Ordinary High Water
- Construction entrance
- Flow direction
- Compost filter berm
- Orange plastic fence (no work area)

1. Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket – xx For details, see sht. FB-01
3. Const. construction entrance – xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
5. Install sediment barrier – xx (Type 9) (See drg. no. RD1033)
6. Install orange plastic mesh fencing – xx

Extg. R/W

E PORT FWY (I-205)

"L" LINE

PACIFIC HWY (OR99E)

"L" 710+00

Parking mitigation

Perm. ease

Ditch

ABERNETHY CREEK

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

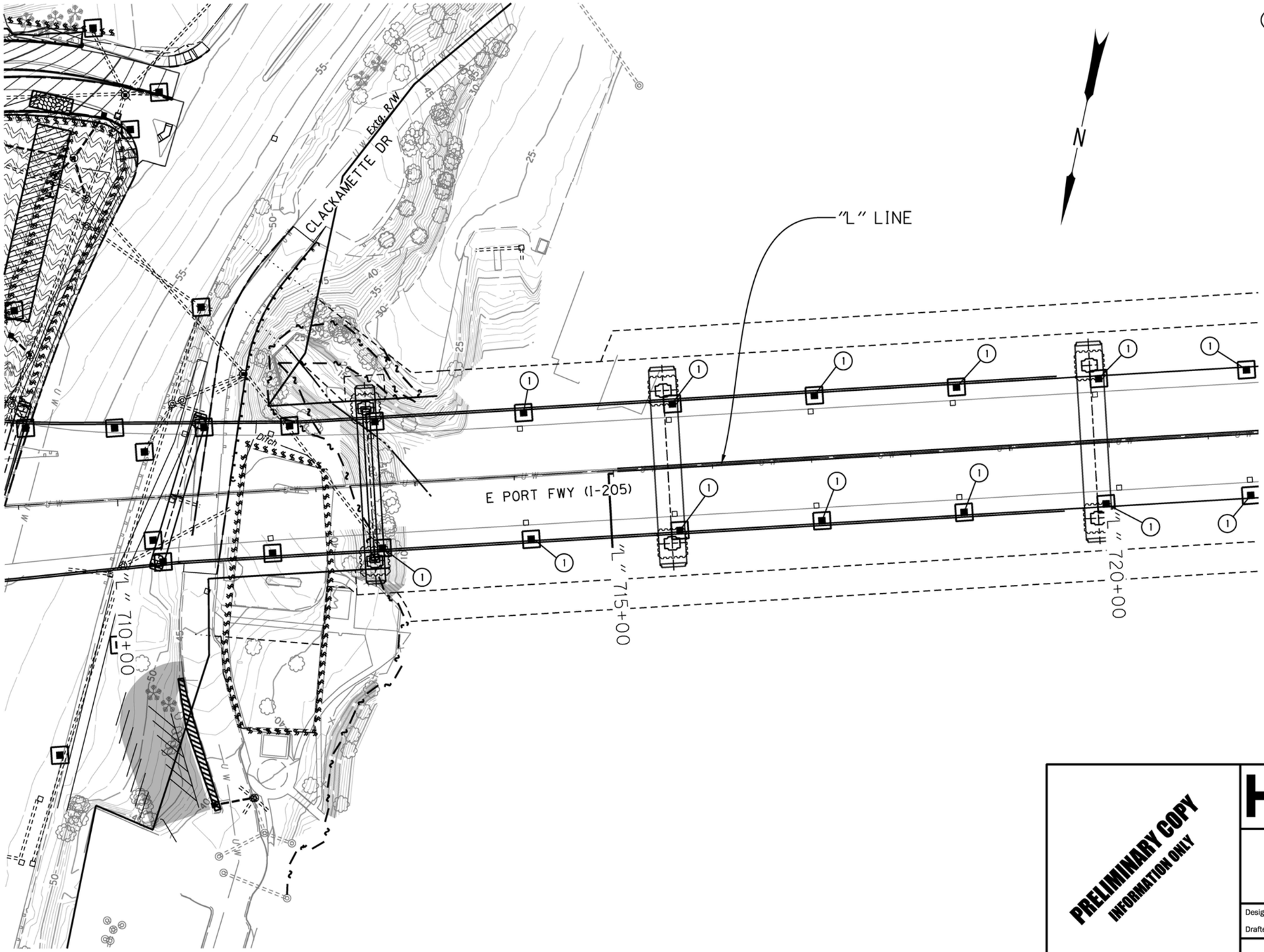
EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB16 6/25/2019 11:19:10 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 272.0412°



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

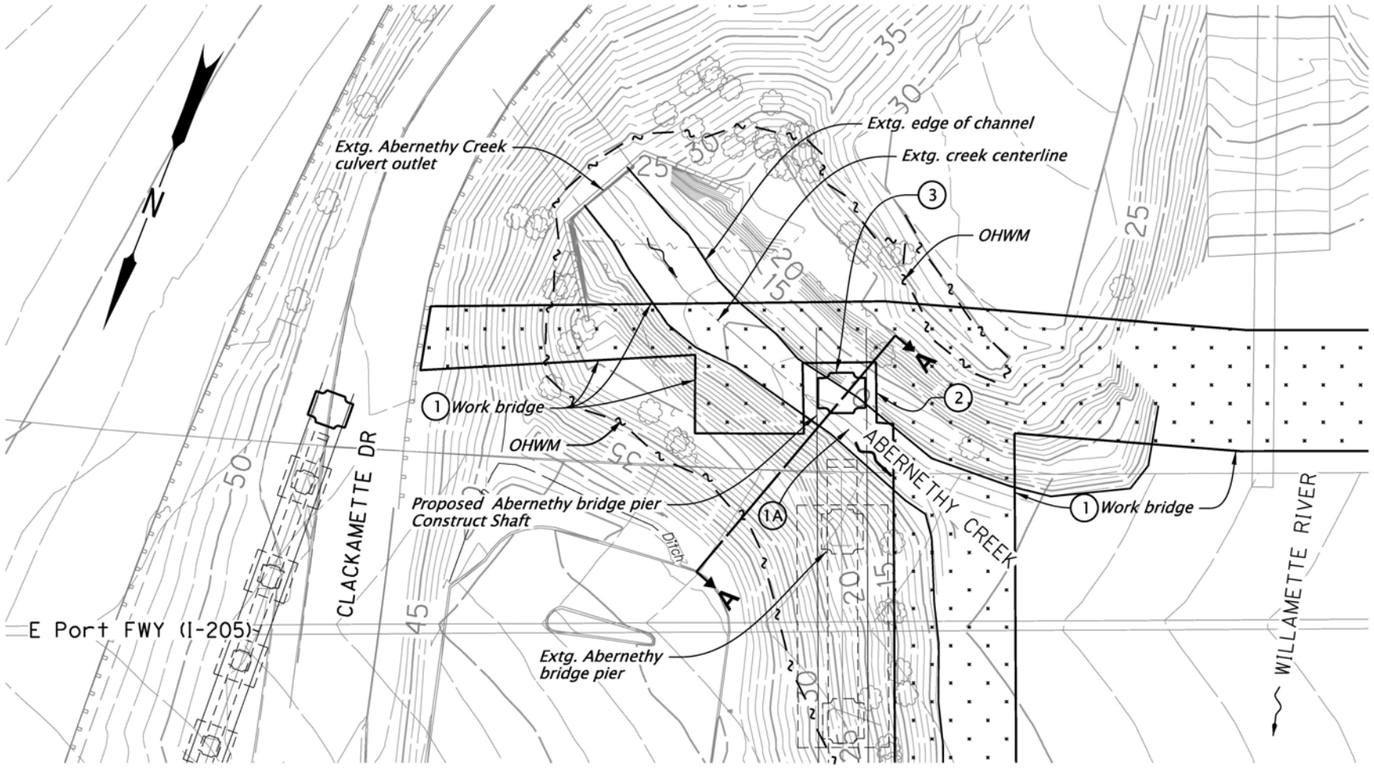
EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB17 6/25/2019 11:19:23 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.3393°



Abernethy Creek - Phase 1
(In-water-work activity)
Construct temporary work bridge and Pier 3, south side.

CONSTRUCTION SEQUENCE

- (1A) *Remove existing rip rap (as required)*
- (1) *Install temporary work bridge*
- (2) *Install temporary shoring at Pier 3*
- (3) *Construct shaft*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

See sht. FB 24 for section A–A.

LEGEND

- ····· *Fill slope*
- — — *Cut slope*
- — ~ - *Ordinary High Water*
- ~~ *Flow direction*

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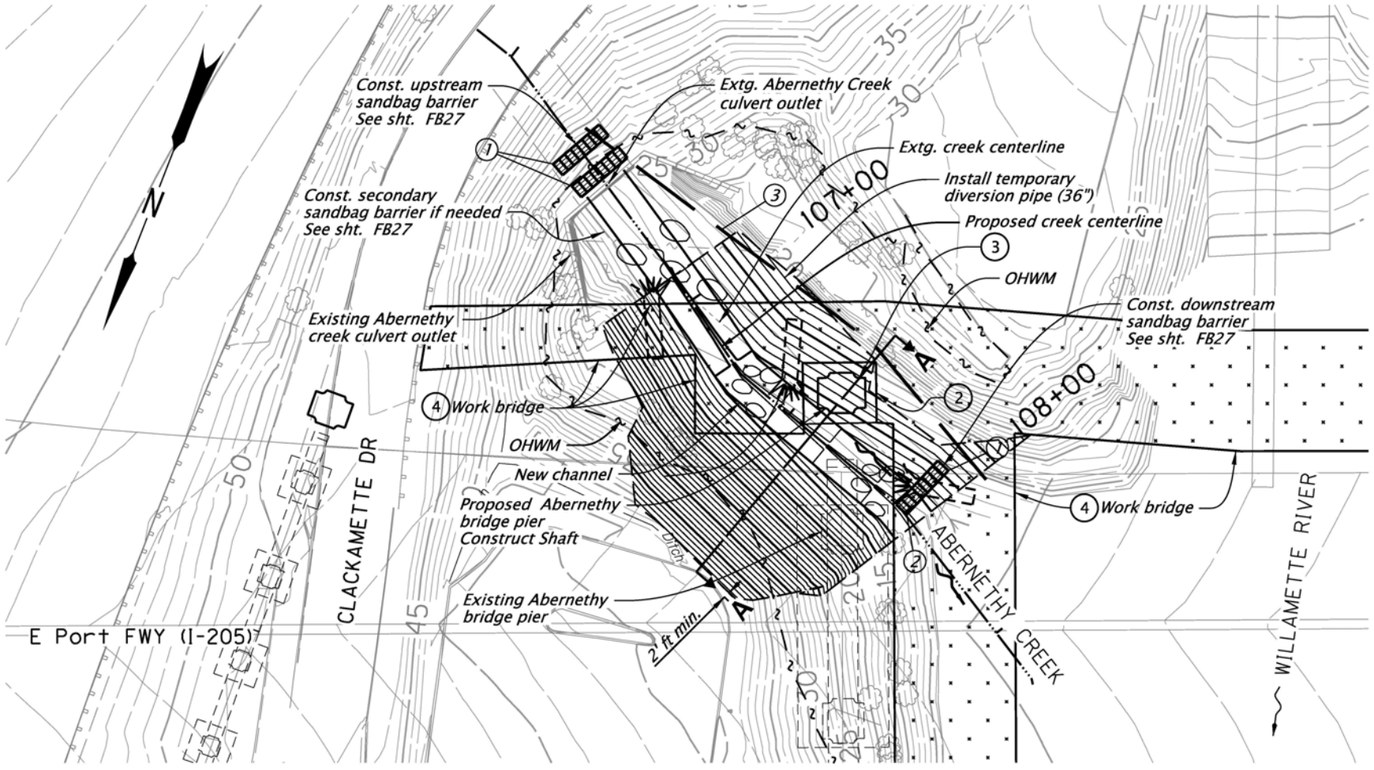
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.



Abernethy Creek Construction - Phase 2A
(In-water-work)
Complete Pier 3 south side architetural treatment and channel restoration

CONSTRUCTION SEQUENCE

1. *Complete architectural finish on Pier 3 southern shaft*
2. *Install temporary diversion*
3. *Remove coffer dam at soutern shaft of Pier 3*
4. *Remove work bridge*
5a. *Realign Abernethy Creek*
5b. *Remove temporary water management features*
6. *Install channel restoration features*

FULL ISOLATION NOTES:

1. *Isolating the work site upstream: Install single primary sandbag barrier across the stream channel. If Needed, install secondary sandbag barrier. Downstream: Install sandbag barrier.*
2. *Install sandbag barrier downstream from work area. Location to be set based on topography and easements available.*
3. *Size the temporary water management facility based on site conditions. Route water around work area using pipe, pump or combination. The discharge table below can be used to estimate the size of the bypass pipe and/or pump.*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

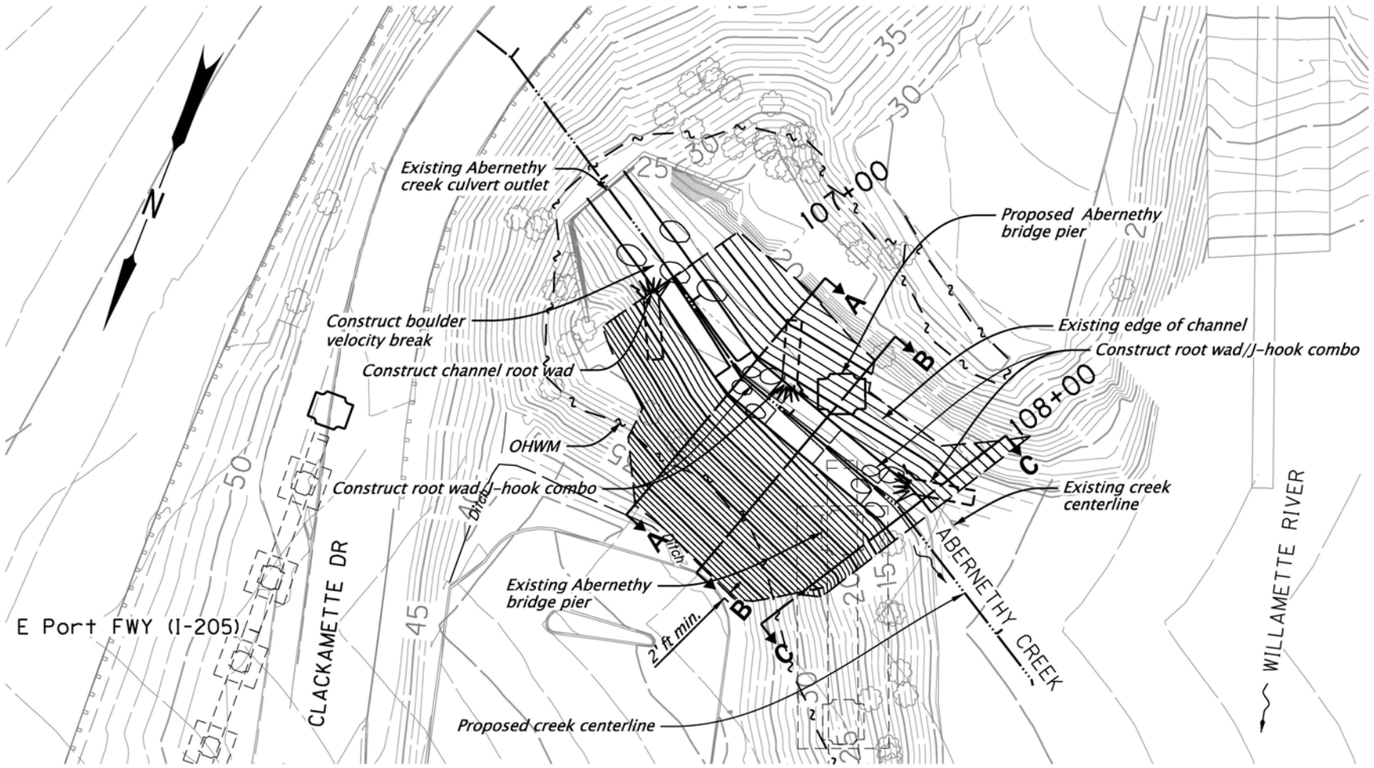
EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec02.dgn :: FB22 Phase 2a 6/25/2019 11:20:05 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 201.4396



Notes:
Root wad key pieces should be at least 22 inches in diameter and buried 10-15 feet.

Boulders and structure rocks should be greater than 30 inches in diameter.

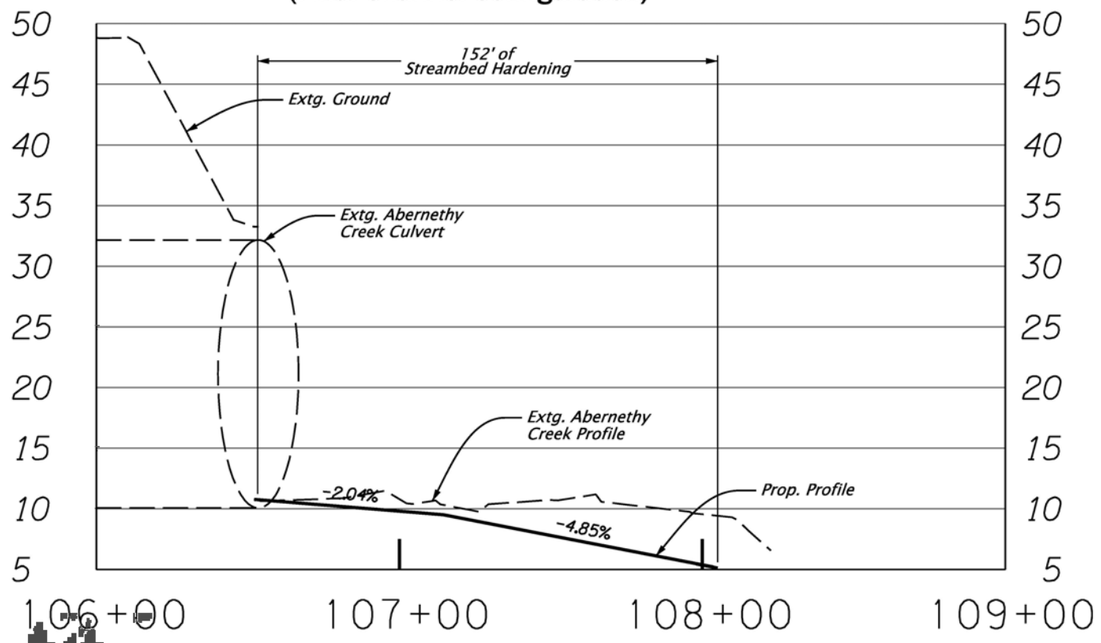
For root wad/J-hook combo, channel root wad, and boulder velocity break, see details XX, XX, and .

For section B-B, see sht. FB24. For section A-A and C-C, see sht. FB25.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

Abernethy Creek - Phase 2B
(Final Channel Configuration)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

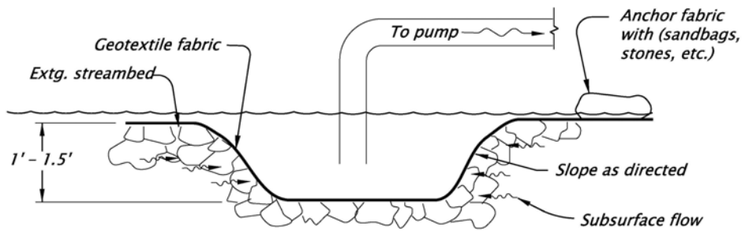
SHEET NO.

EE_K19786_HDR_eco.dgn :: FB23_Phase2b | 6/25/2019 11:20:07 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 201.4396

TEMPORARY WATER MANAGEMENT FACILITY



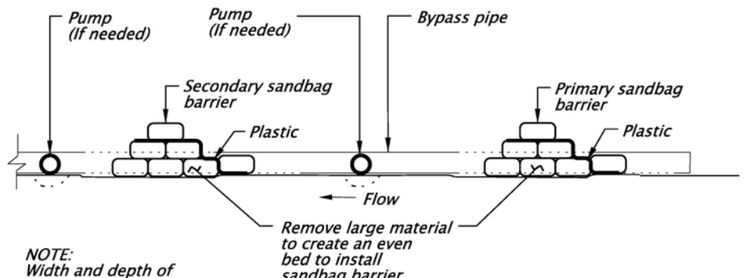
SUMP DETAIL
NTS

GENERAL NOTES:

The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.



NOTE:
Width and depth of sandbag barrier will vary depending on site and stream flow conditions.

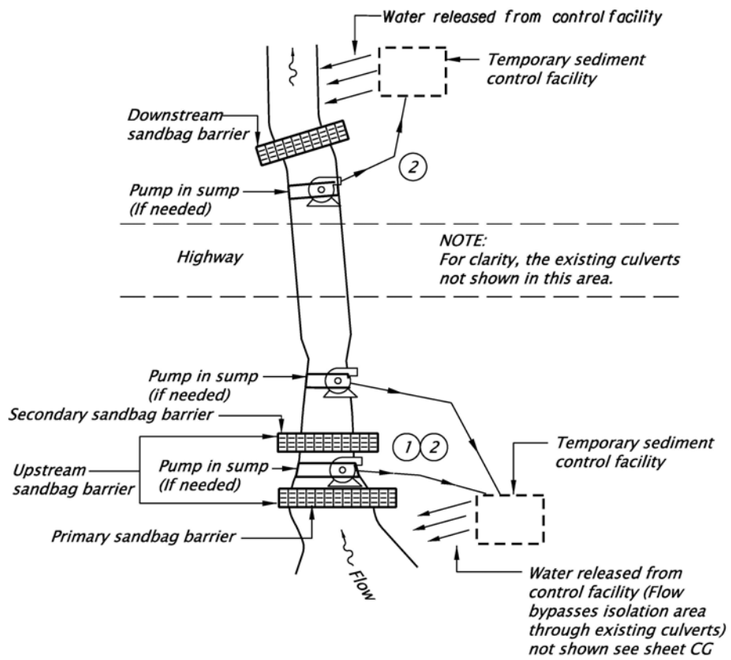
SANDBAG BARRIER SECTION

LEGEND:

Sandbag barrier line

Sediment control facility

Sump pump

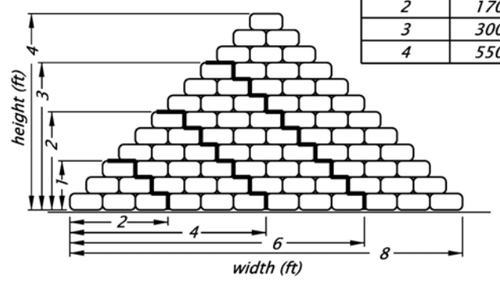


COMBINED PUMP/GRAVITY BYPASS DETAIL
NTS

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500



FULL ISOLATION NOTES:

(1) *See sheet FB22 note.*

(2) *See sheet FB22 note.*

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

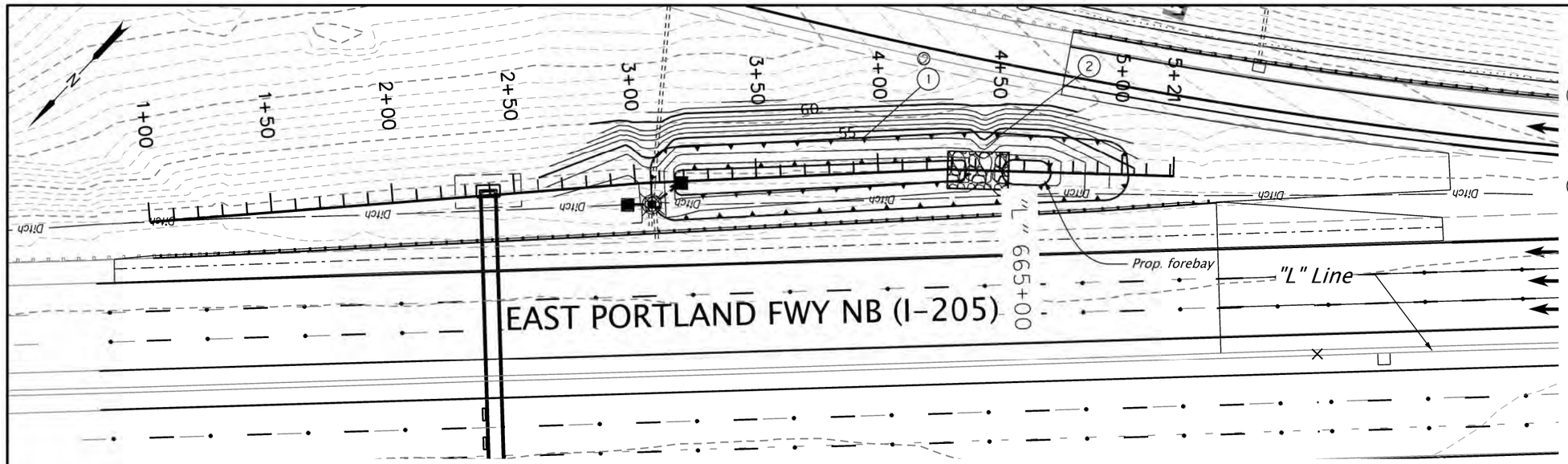
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec02.dgn :: FB27 bypass detail 6/25/2019 11:24:46 AM CDONOVAN

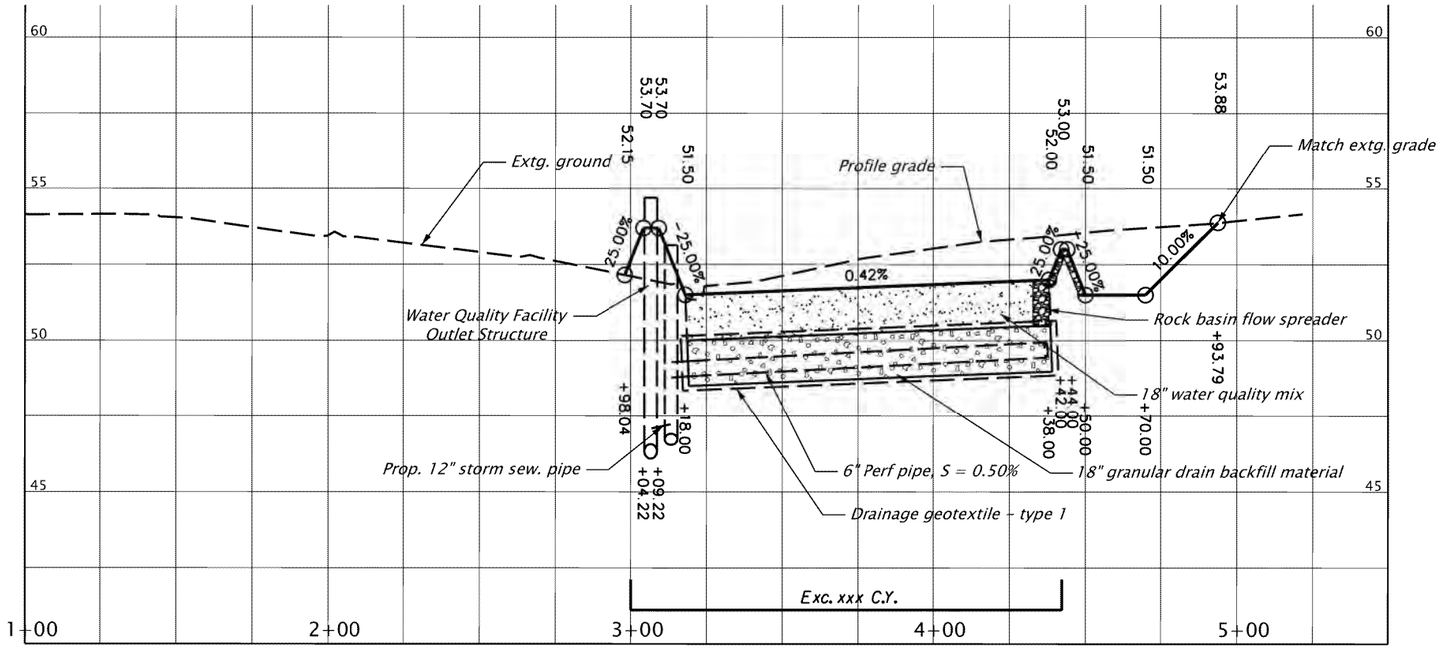
Rotation: 360 0'

Attachment D. Stormwater Plans



1 Sta. 3+09.86 to Sta. 4+10.05 = Sta. "L" 664+49.08, 81.53' Lt. to Sta. "L" 663+49.06, 84.27' Lt.
Const. bioretention pond
(For details, see sht. HAxx)

2 Sta. 4+50.00, 0.00'
Const. forebay berm
(For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

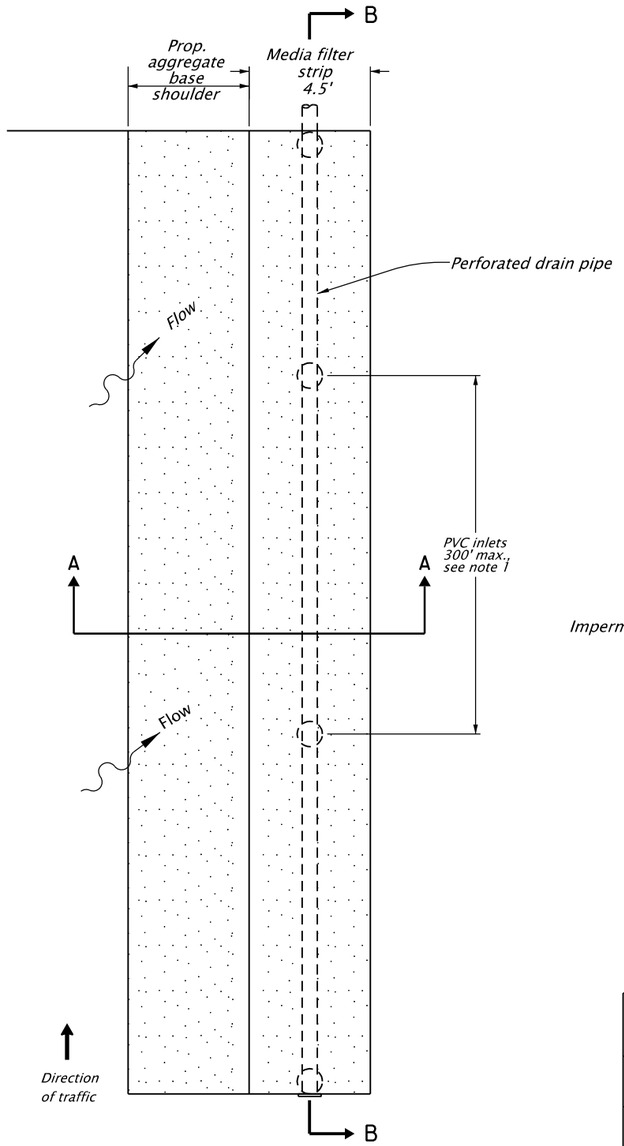
Designer: Reviewer:
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

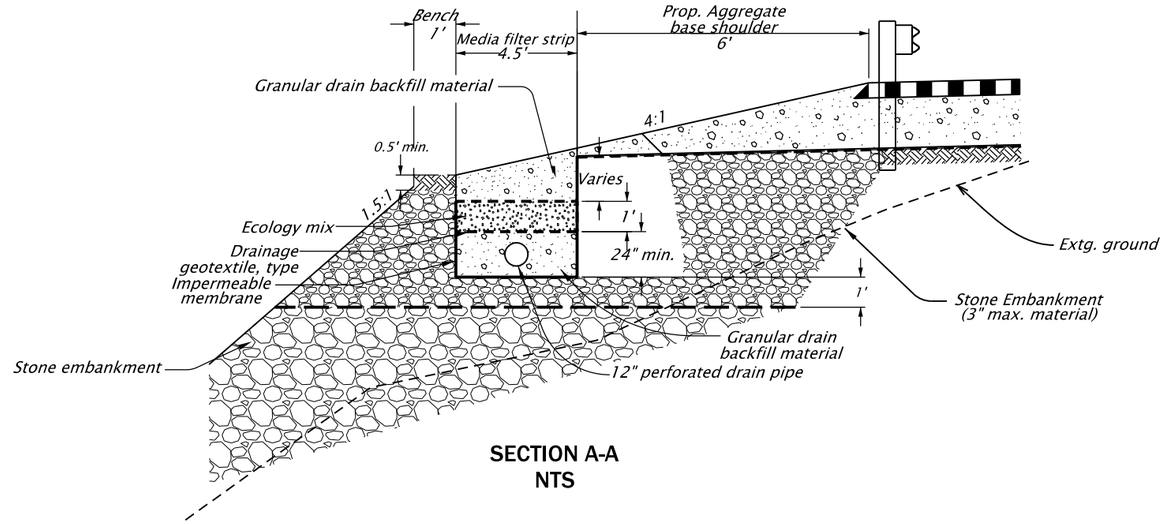
SHEET NO.

Rotation: 223.5514 0'
Vertical Scale: 1:10

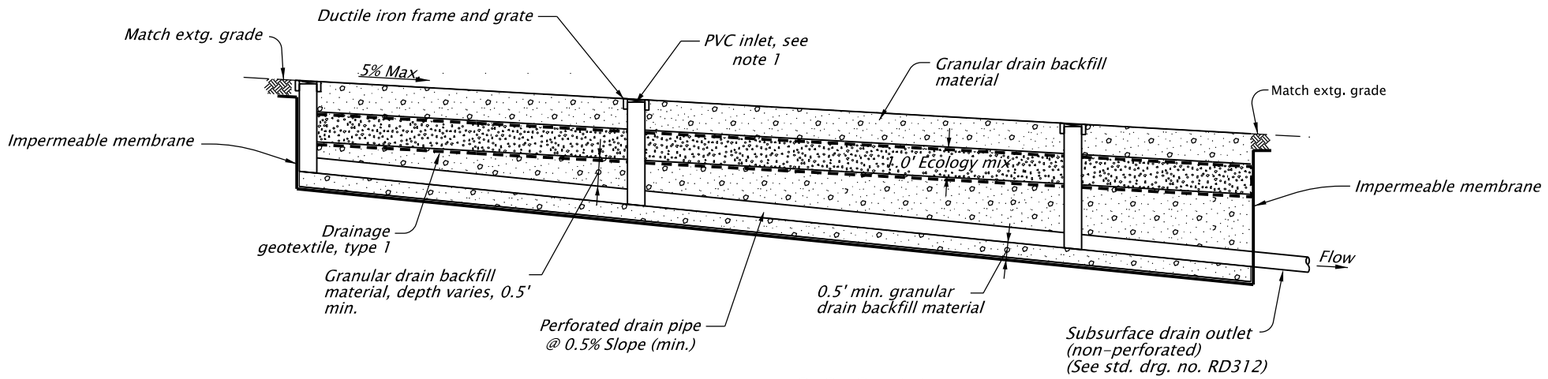
BIOSLOPE
STA. "L" 665+00 TO STA. "L" 684+00



PLAN
NTS



SECTION A-A
NTS



SECTION B-B
NTS

Bioslope I.D.	Basin Area (acres)	2-Year Peak Flow (cfs)	Length (ft)	Assumed Long Term * Infiltration Capacity (cfs)	Rdwy Slope	Pipe Slope	Pipe ** Capacity (cfs)
Bioslope #1	0.253	0.14	333	0.35	1.9%	1.9%	2.37
Bioslope #2	0.840	0.47	459	0.48	0.2%	0.5%	1.22
Bioslope #3	0.517	0.29	307	0.32	0.2%	0.5%	1.22
Bioslope #4	0.496	0.28	301	0.31	0.3%	0.5%	1.22
Bioslope #5	0.871	0.49	500	0.52	0.8%	0.8%	1.54

* assumes 4.5 feet wide infilration trench as shown in detail
** assumes 12 inch pipe and 0.027 mannings coefficient

Notes:

1. Install PVC inlets as shown along perforated drain pipe. PVC inlet should be flush to ground surface. See sheet HAXX and HAXX for details.

DFI#XXXXXX

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CLACKAMAS COUNTY

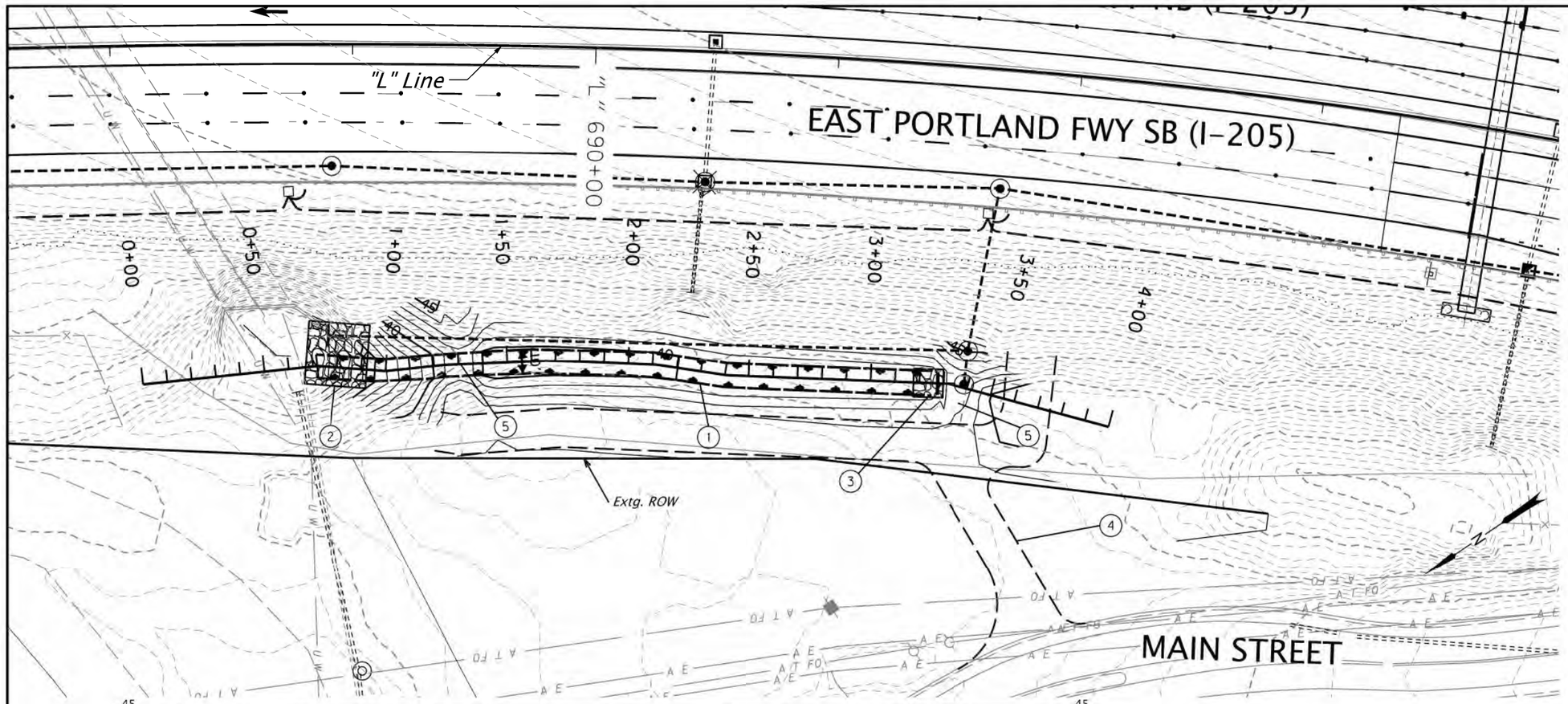
Designer: Reviewer:
Drafter: Checker:

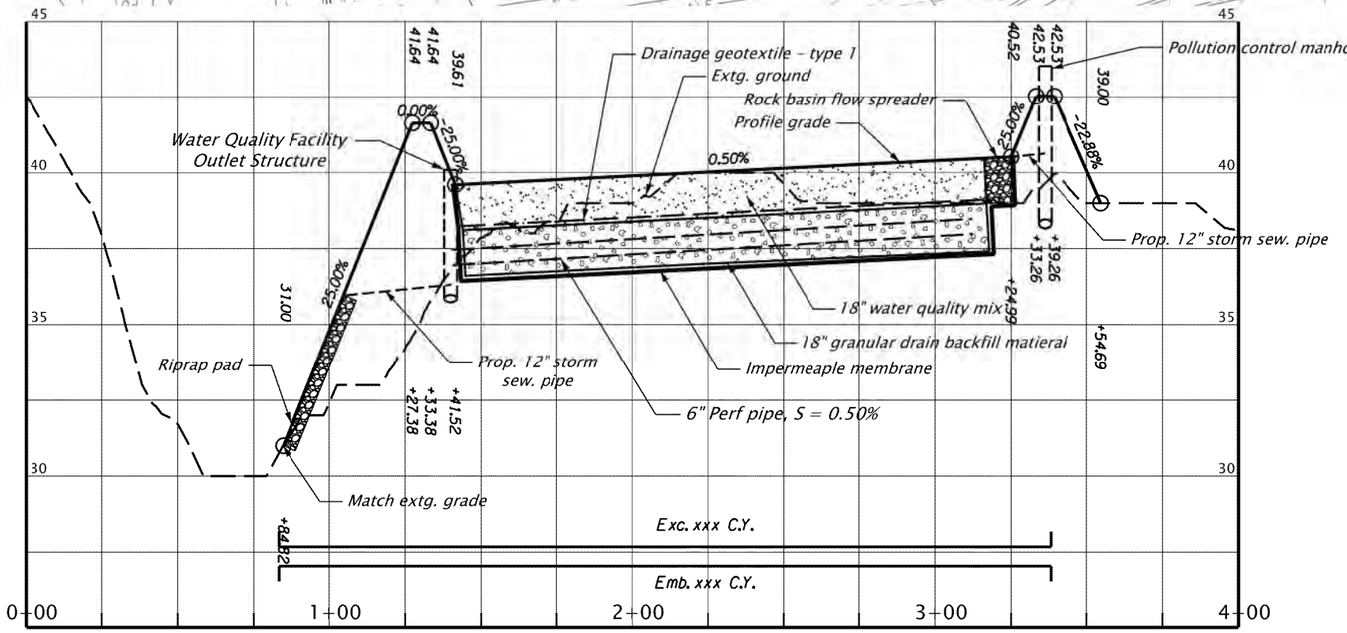
WATER QUALITY DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0





1. *Sta. 0+84.82 to Sta. 3+54.69 = Sta. "L" 688+98.57, 133.24' Rt. to Sta. "L" 691+78.46, 134.75' Rt. Const. bioretention pond (For details, see sht. HAxx)*
2. *Sta. 0+97.37, 0.00' Const. riprap pad Loose riprap (class 50) - 5.0 tons (See drg. no. RD317)*
3. *Sta. 3+33.58, 0.00' Const. rock basin flow spreader (For details, see sht. HAxx)*
4. *Sta. XX+XX.XX Const. maintenance access road (For details, see sht. HAxx)*
5. *Sta. XX+XX.XX Const. biofiltration pond berm (For details, see sht. HAxx)*

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
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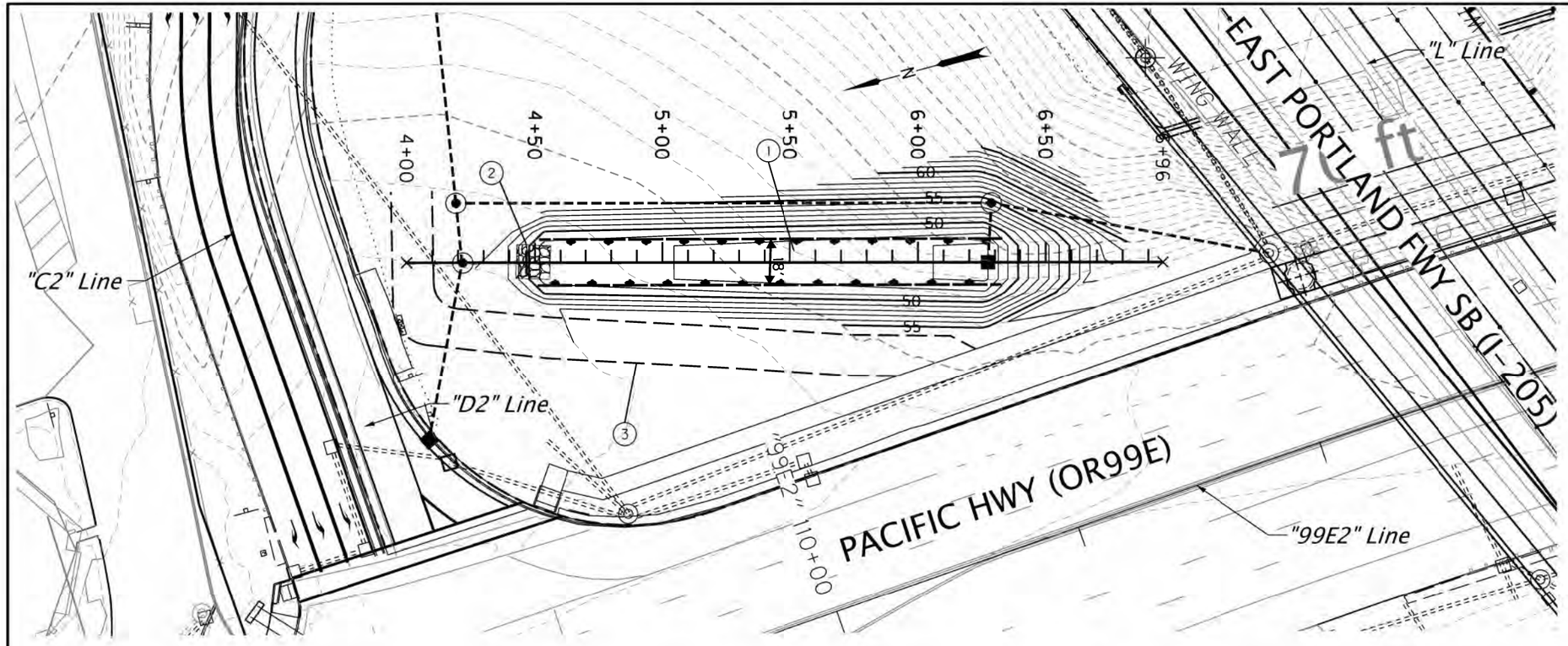
WATER QUALITY PLAN AND PROFILE

SHEET NO.

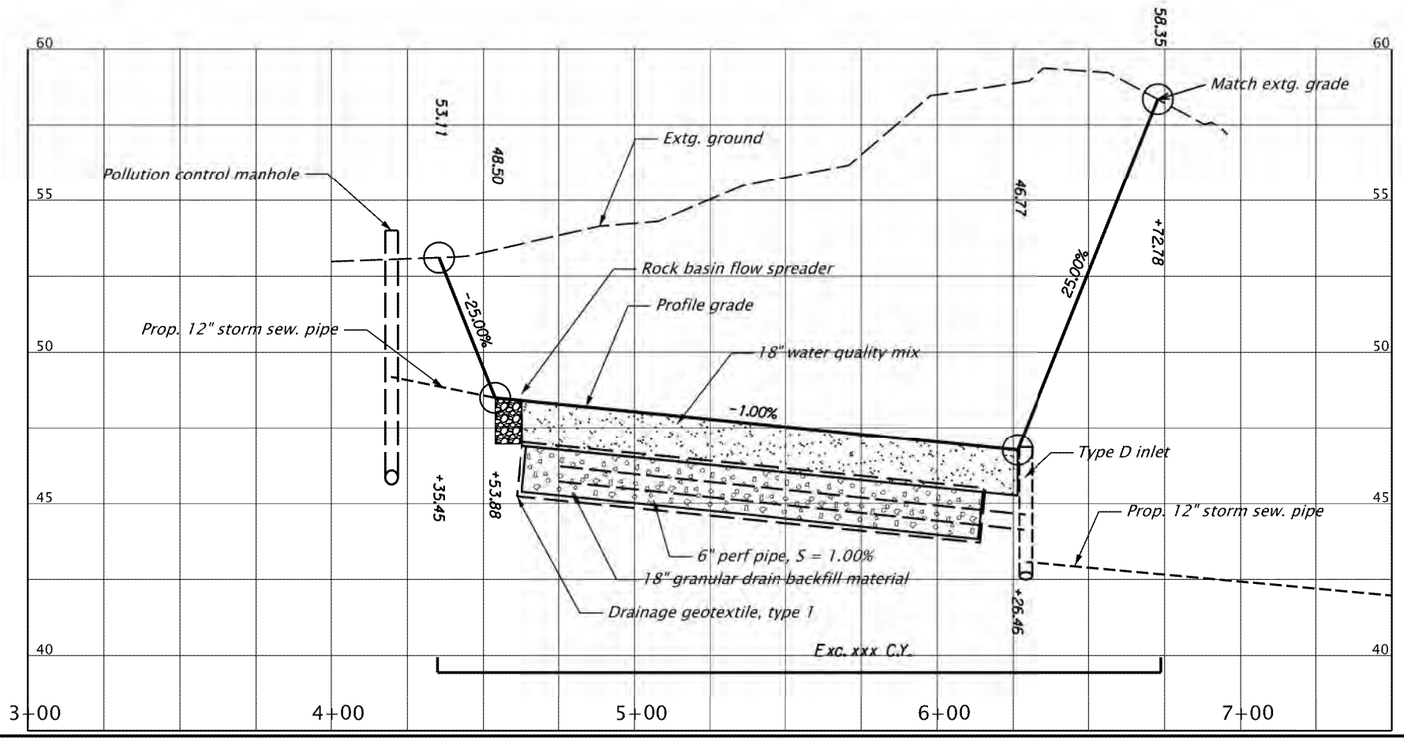
Rotation: 236.1297 [illegible]0'
Vertical Scale: 1:10



(1) *Sta. 4+50.41 to Sta. 6+34.91 = Sta. "99E2" 109+34.68, 167.57' Lt. to Sta. "99E2" 111+06.11, 107.62' Lt.*
Const. biofiltration swale
(For details, see sht. HAxx)

(2) *Sta. 4+48.95, 0.00'*
Construct rock basin flow spreader
(For details, see sht. HAxx)

(3) *Sta. XX+XX.XX*
Construct maintenance access road
(For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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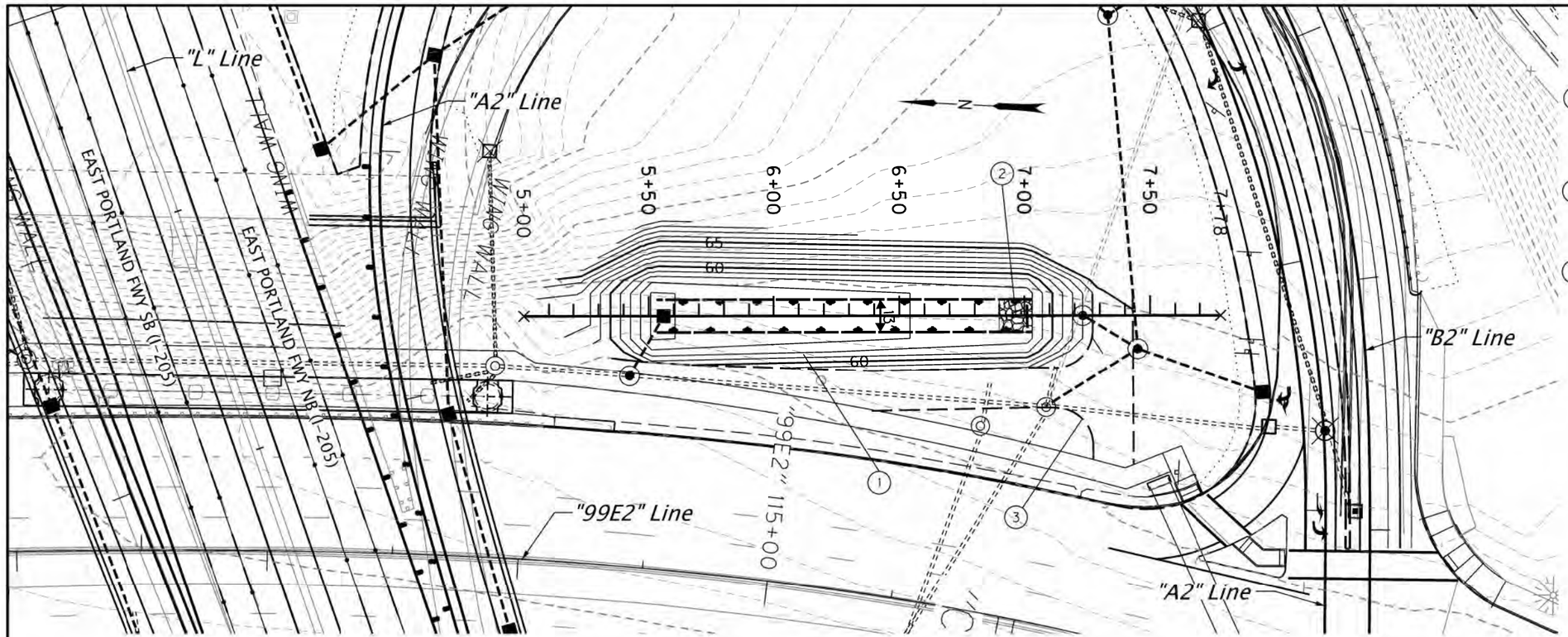
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

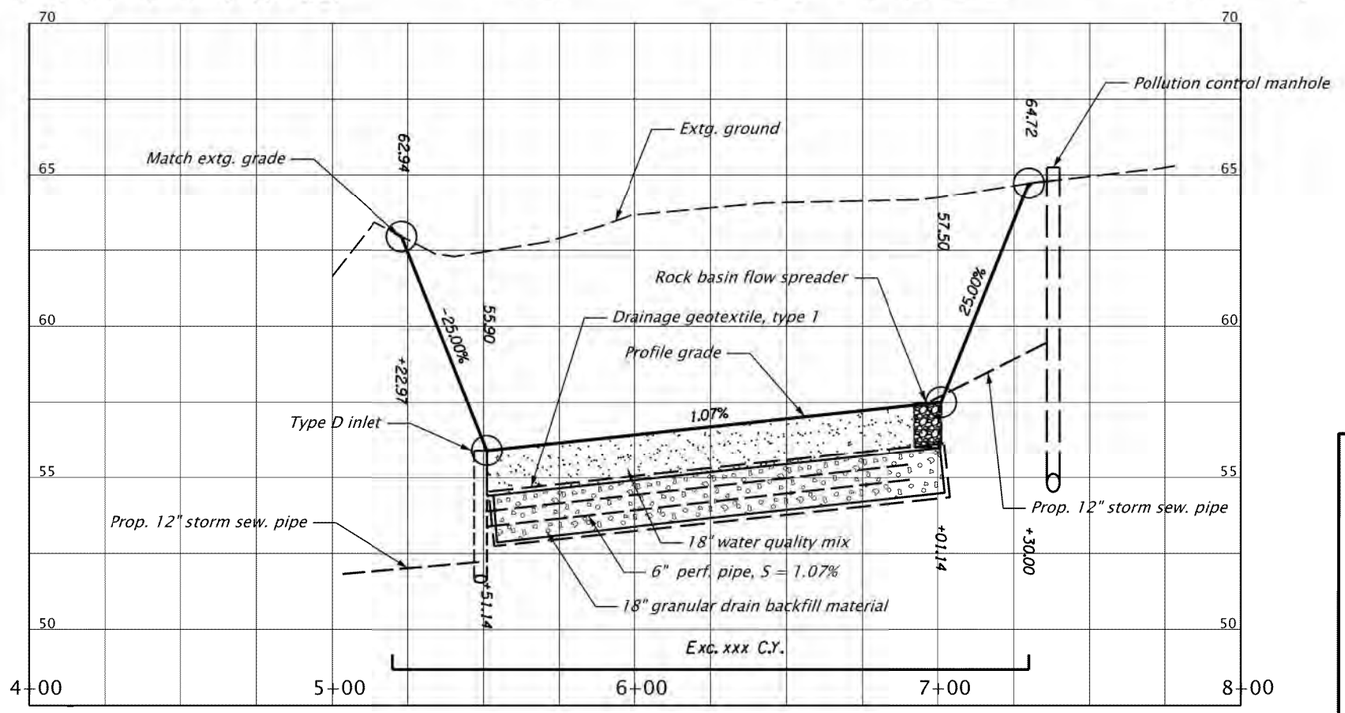
Rotation: 254.7731 0'
Vertical Scale: 1:10



1. *Sta. 7+03.50 to 5+52.97 = Sta. "99E2" 115+84.70, 120.53' Lt. to Sta. "99E2" 114+47.00, 100.54' Lt.*
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 6+95.86, 0.00'*
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. *Sta. XX+XX.XX*
   Construct maintenance access road
   (For details, see sht. HAxx)



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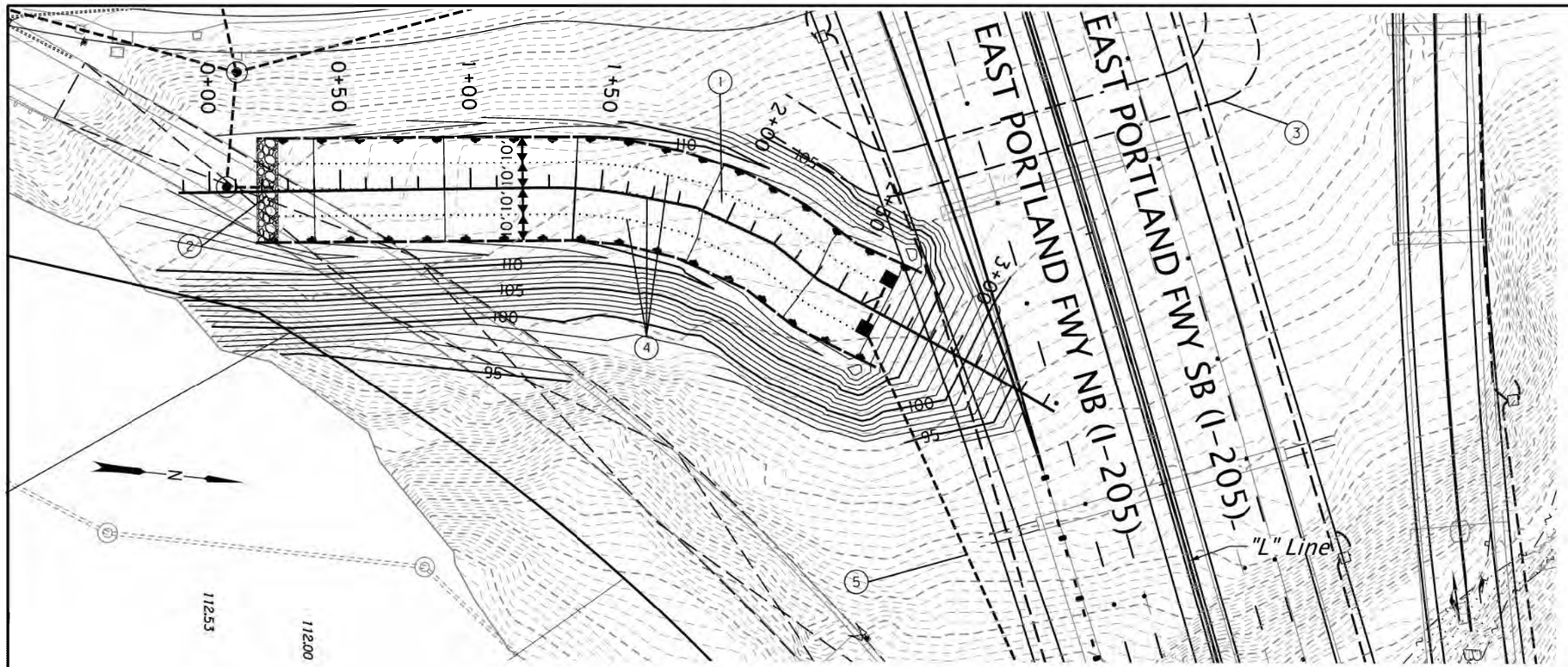
WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 272.7106 [illegible] 0'
Vertical Scale: 1:10



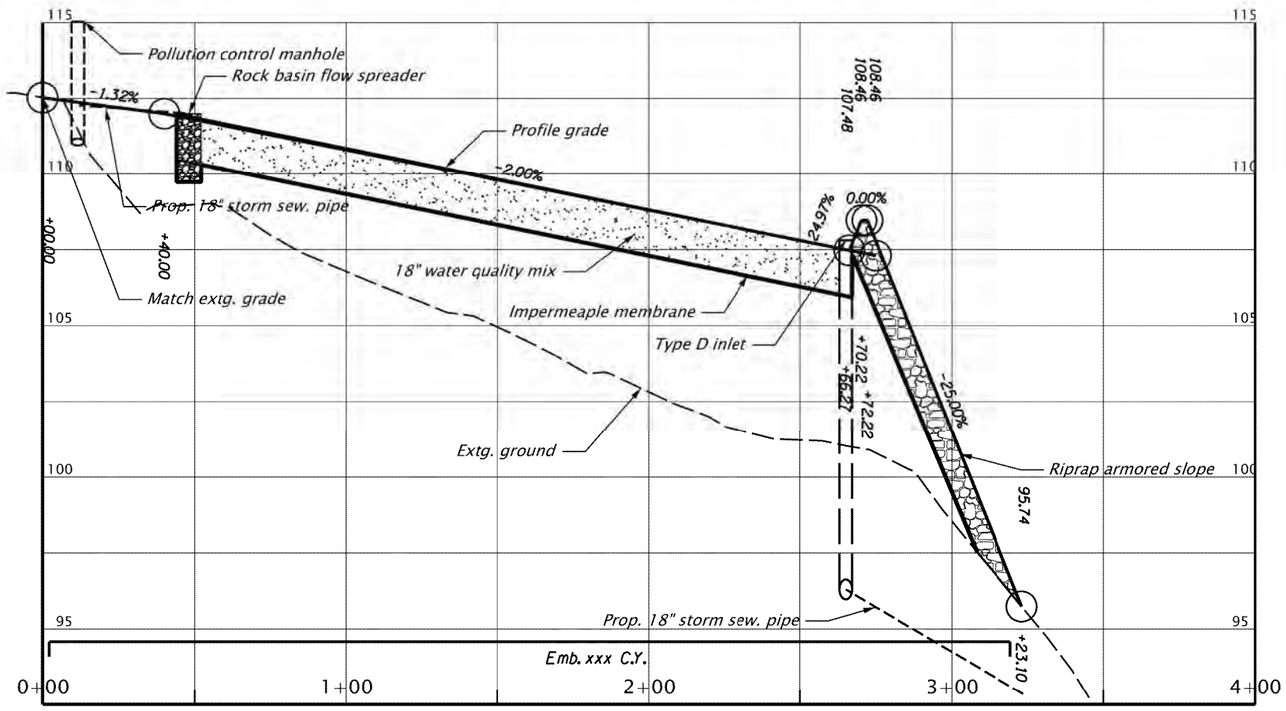
1. *Sta. 0+31.89 to Sta. 2+48.39 = Sta. "OR43" 10+59.46, 110.66' Lt. to Sta. "OR43" 8+78.88, 209.80' Lt.*
   Construct biofiltration swale
   (For details, see sht. HAxx)

2. *Sta. 0+37.15, 2.22' Lt.*
   Construct rock basin flow spreader
   (For details, see sht. HAxx)

3. *Sta. XX+xx.xx*
   Construction maintenance access road
   (For details, see sht. HAxx)

4. *Construct biofiltration swale divider*
   (For details, see sht. HAxx)

5. *Construct pipe and outfall*
   (For details, see sht. HA11)



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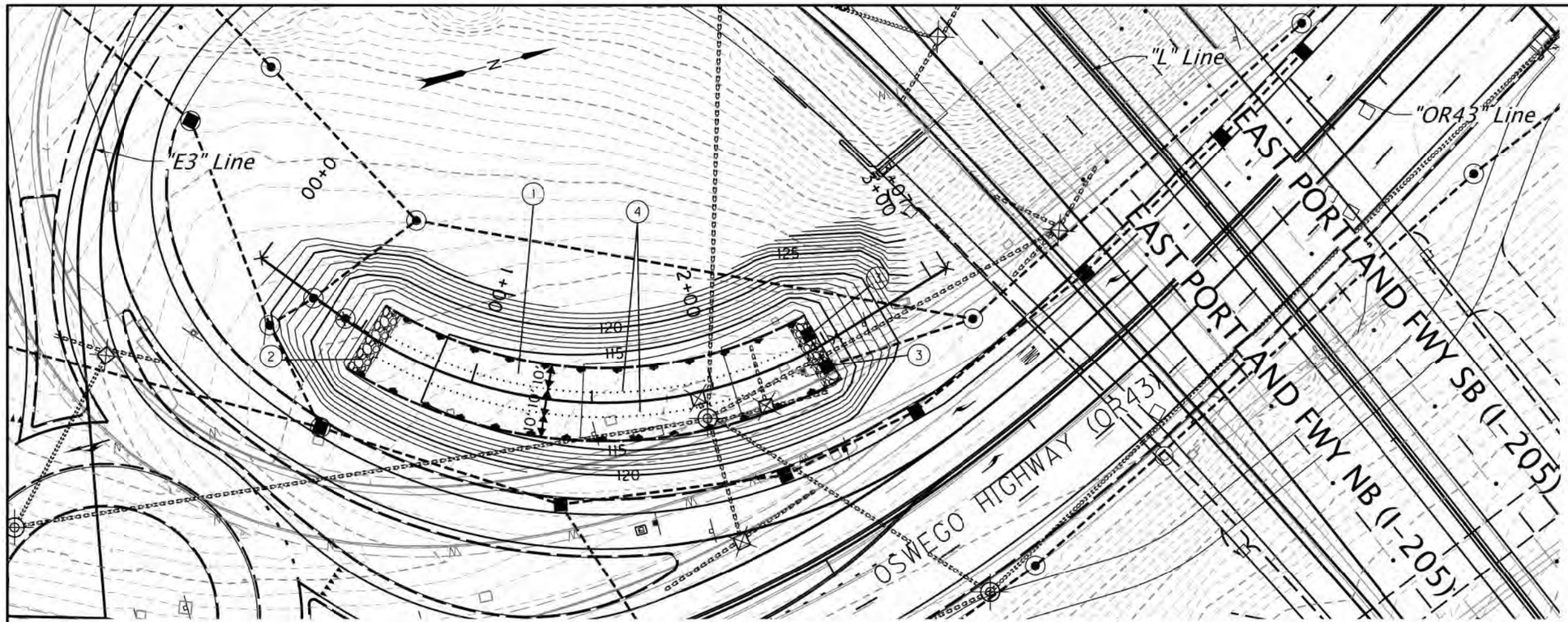
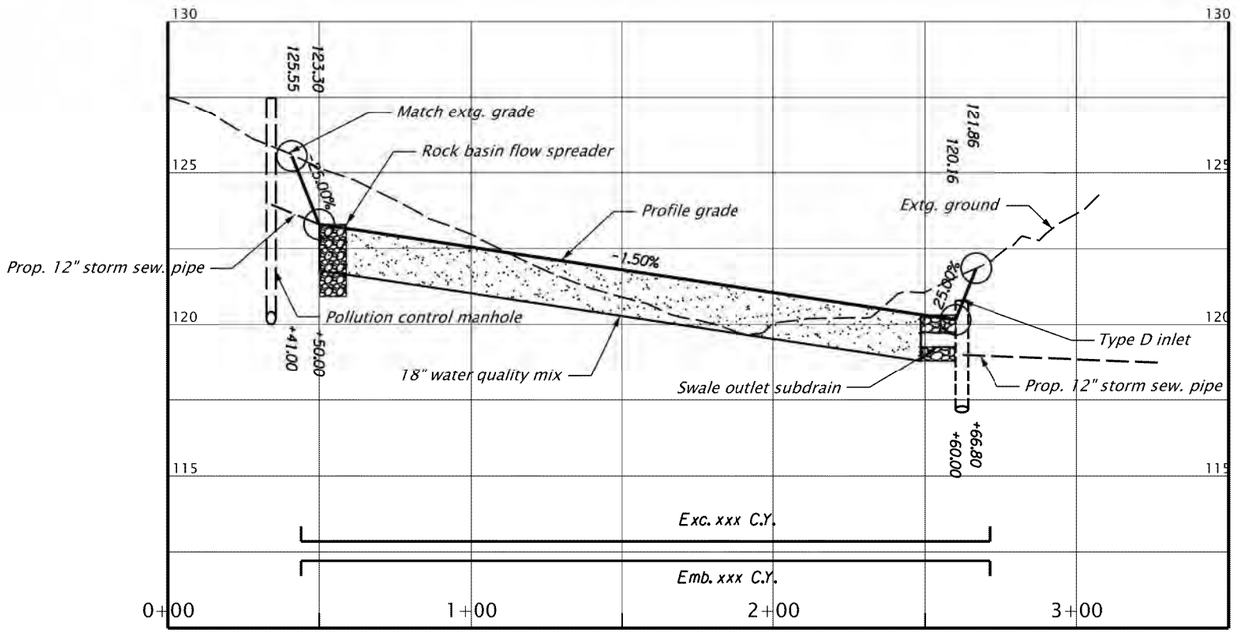
WATER QUALITY PLAN AND PROFILE

SHEET NO.

Rotation: 96.0998 [illegible]0'
Vertical Scale: 1:10



1. Sta. 0+54.22 to 2+55.48 = Sta. "E3" 740+37.28, 107.23' Lt. to Sta. "OR43" 9+52.79, 60.58' Rt.
   Construct 30' wide biofiltration swale
   (For details, see sht. HAxx)
2. Sta. 0+58.54
   Construct rock basin flow spreader
   (For details, see sht. HA10)
3. Sta. 2+60.28
   Construct rock basin flow spreader
   (For details, see sht. HA10)
4. Construct biofiltration swale divider
   (For details, see sht. HAxx)



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

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Drafter: Checker:

WATER QUALITY PLAN AND PROFILE

SHEET NO.

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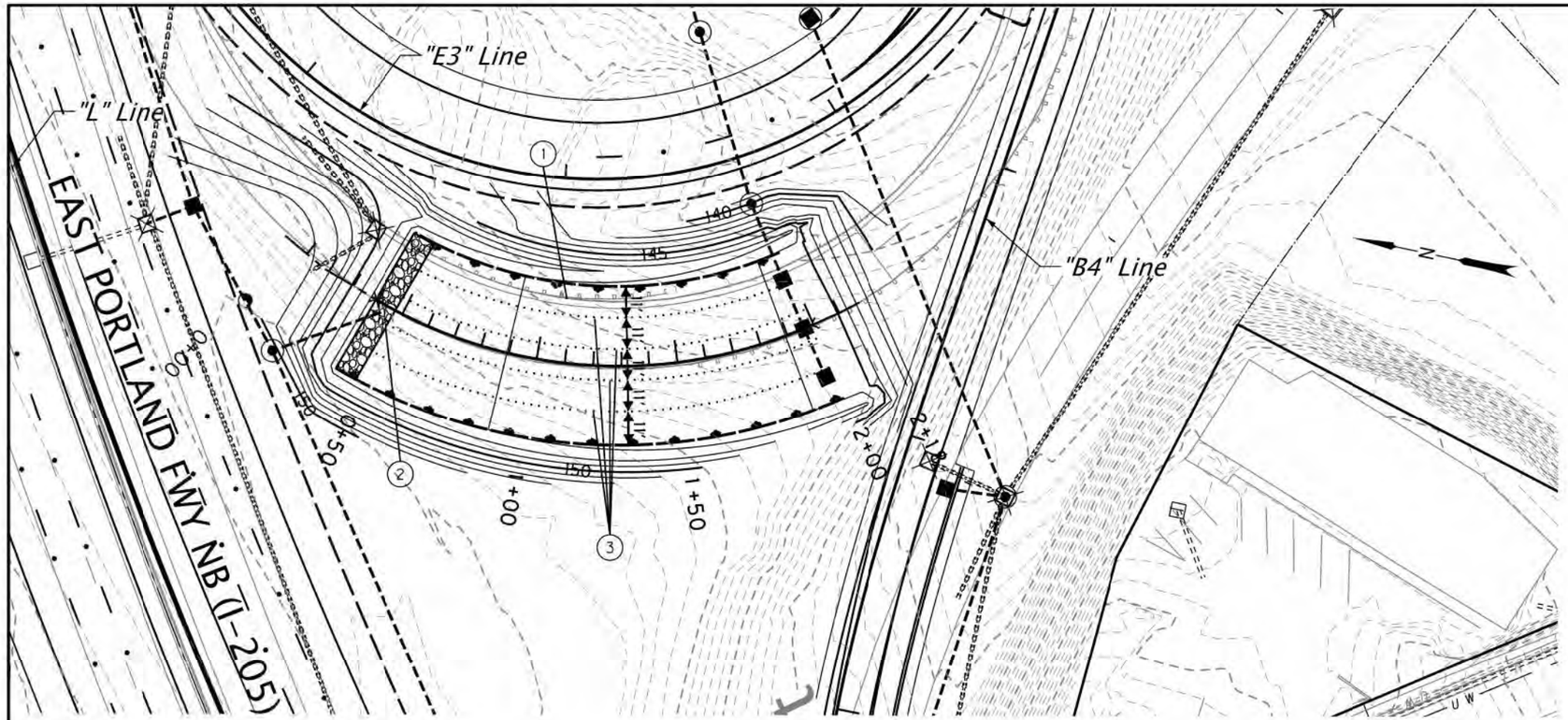
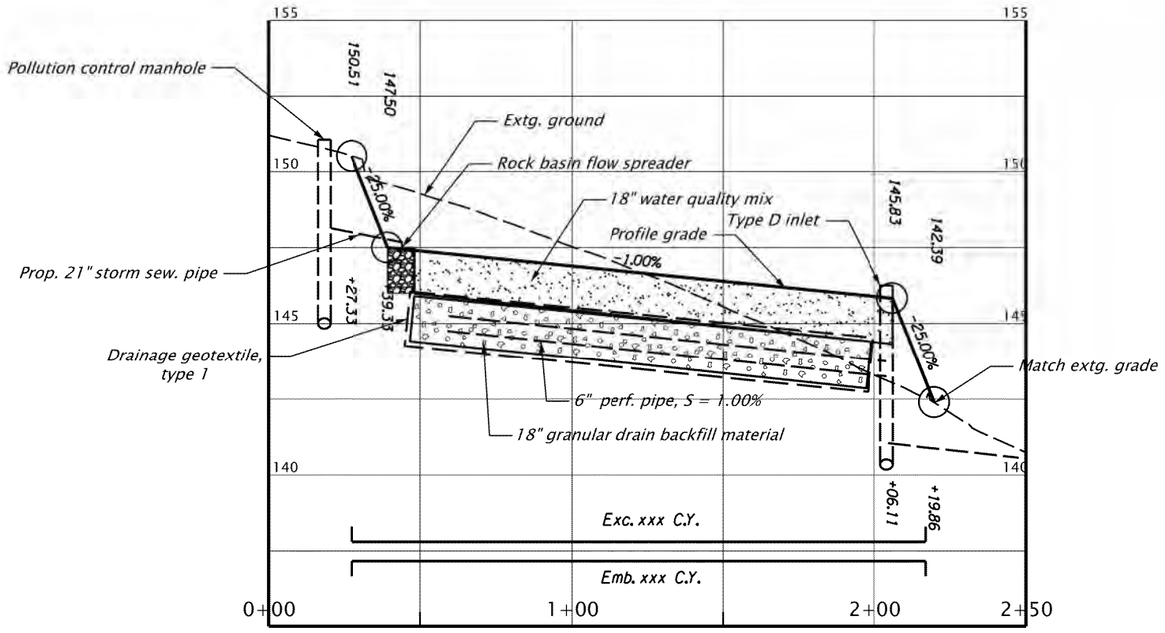
Vertical Scale: 1:10



(1) *Sta. 0+39.24 to Sta. 1+98.79 = Sta. "E3" 737+52.57, 56.87' Rt. to Sta. "E3" 738+66.37, 64.42' Rt.*
Construct biofiltration swale
(For details, see sht. HAxx)

(2) *Sta. 0+44.18, 0.00'*
Construct rock basin flow spreader
(For details, see sht. HAxx)

(3) *Construct biofiltratoin swale divider*
(For details, see sht. HAxx)



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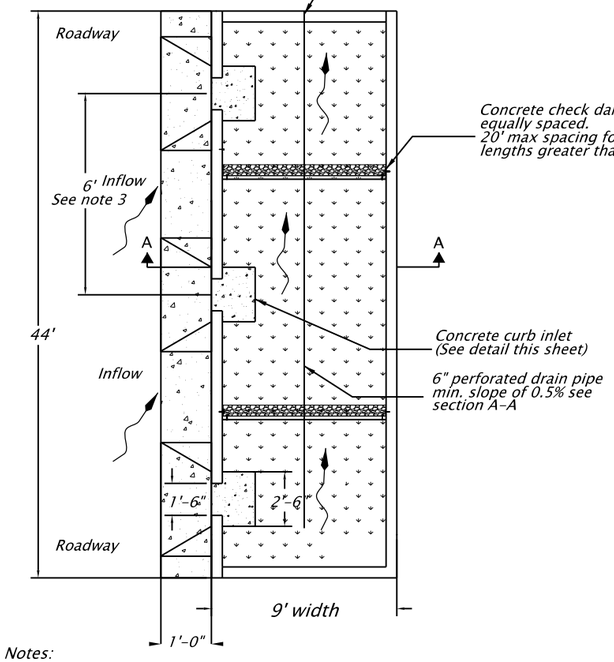
Drafter: Checker:

WATER QUALITY PLAN AND PROFILE SHEET NO.

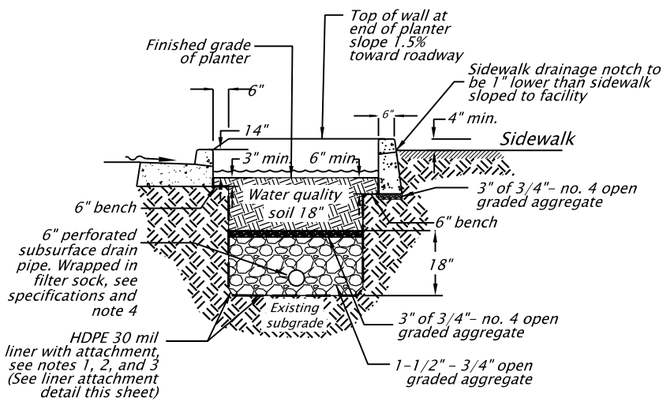
Rotation: 281.7947 [illegible] 0'
Vertical Scale: 1"=5'

STORMWATER PLANTER



Notes:
1. Match longitudinal slope of planter to slope of the road.
2. If less than 18" is between splash pad and planter end wall, extend pad to wall.
3. Install inlets (6' on center) on all sides of facility that are adjacent to parking lot.

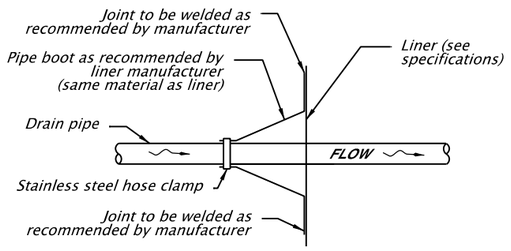
PLAN VIEW



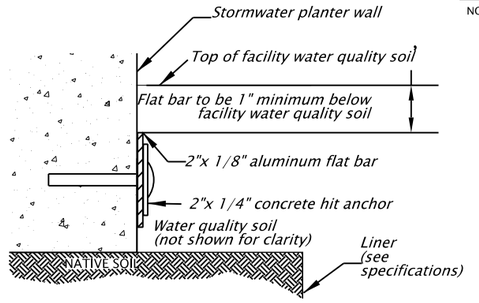
Notes:
1. Partial or full liner required. See stormwater planter table (this sheet) for requirement.
2. Partial liner located along side of planter adjacent to roadway.
3. Full liner located along all sides of planter.
4. Drain pipe only required for fully lined planters.
5. Scarify the native soil 12" following the initial excavation and before installing water quality soil and rock.

SECTION A-A

STORMWATER PLANTER DETAIL
NOT TO SCALE



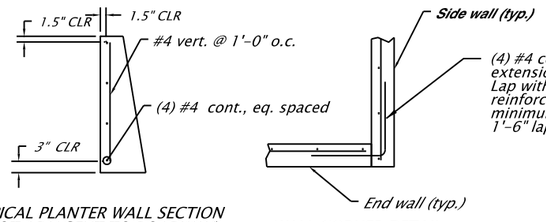
PIPE BOOT
NOT TO SCALE



Notes:
1. Adhere liner to concrete with top coat tc moldable sealant, or approved equal.
2. Liner to extend from top of water quality soil to the bottom of excavation.
3. 3" of concrete is required on all sides of attachment. Adjust sidewalk depth as necessary.
4. Secure liner to concrete with 2" aluminum flat bar, placed as directed (around entire facility).
5. Attach flat bar with concrete hit anchors, 24" o.c.
6. Trim excess liner to the top of the flat bar.

LINER ATTACHMENT DETAIL

NOT TO SCALE



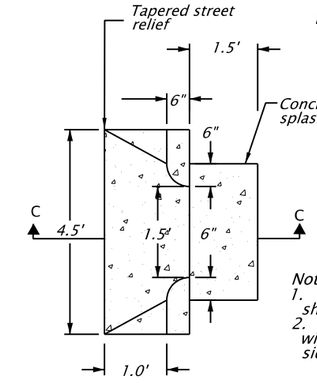
TYPICAL PLANTER WALL SECTION (NOT ADJACENT TO ROADWAY)

WALL CORNER DETAIL

Notes:
1. Top of planter walls to be 4" higher than adjacent sidewalk.
2. Bottom of planter walls to be 6" below top of water quality soil.

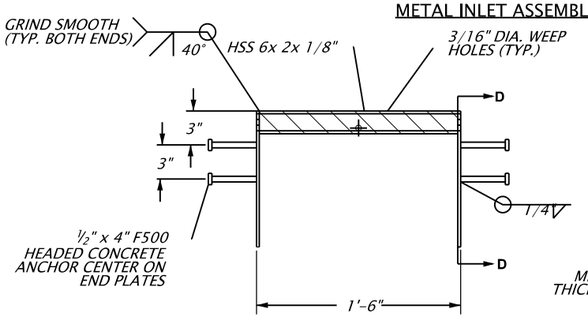
PLANTER WALL

NOT TO SCALE

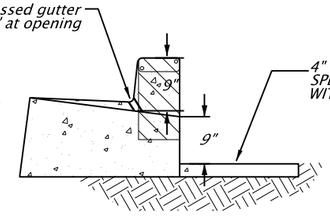


PLAN

METAL INLET ASSEMBLY

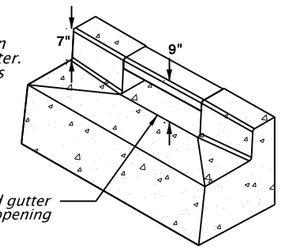


ELEVATION

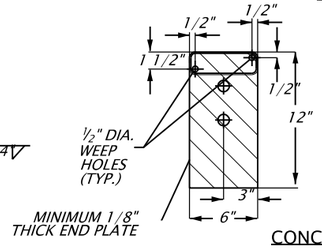


SECTION C-C

Notes:
1. Concrete splash pad elevation shall be level with soil inside planter.
2. Splash pad shall be six inches wider than inlet opening on both sides.



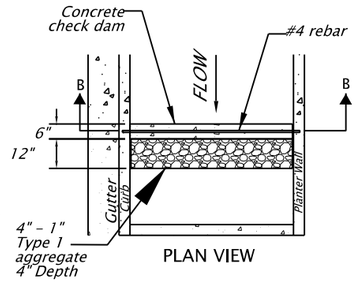
ISOMETRIC



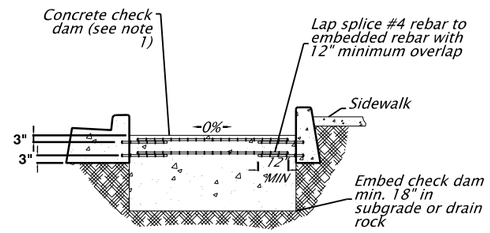
SECTION D-D

CONCRETE CURB INLET

NOT TO SCALE



PLAN VIEW



SECTION B-B

Notes:
1. Top of dam elevation to be 2" lower than upstream curb depression elevation.
2. Concrete to be 3,000 psi.
3. Embed #4 rebar 3" into curb and planter wall.

CONCRETE CHECK DAM

NOT TO SCALE

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

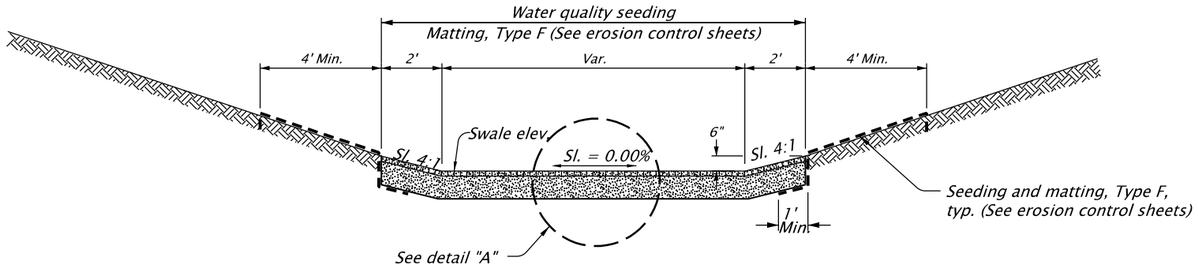
Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

SHEET NO.

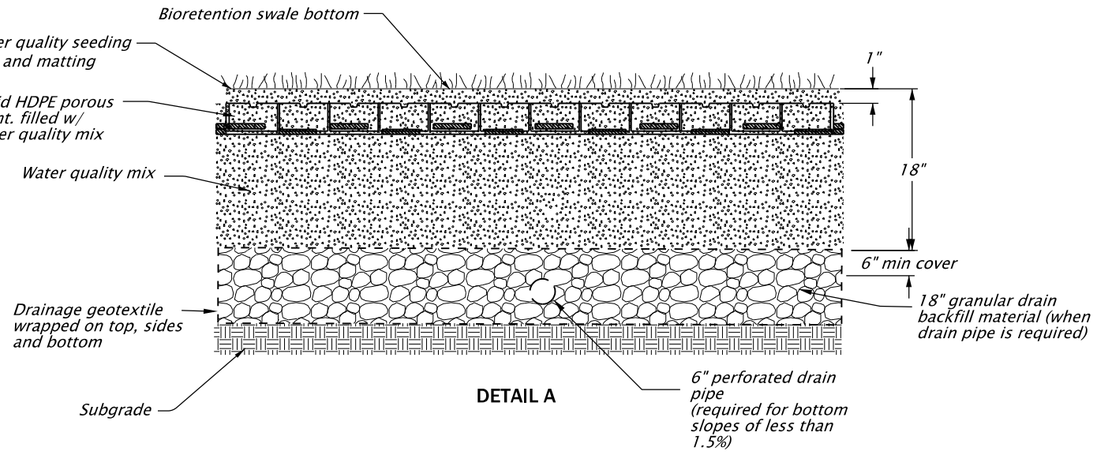
WATER QUALITY DETAILS

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

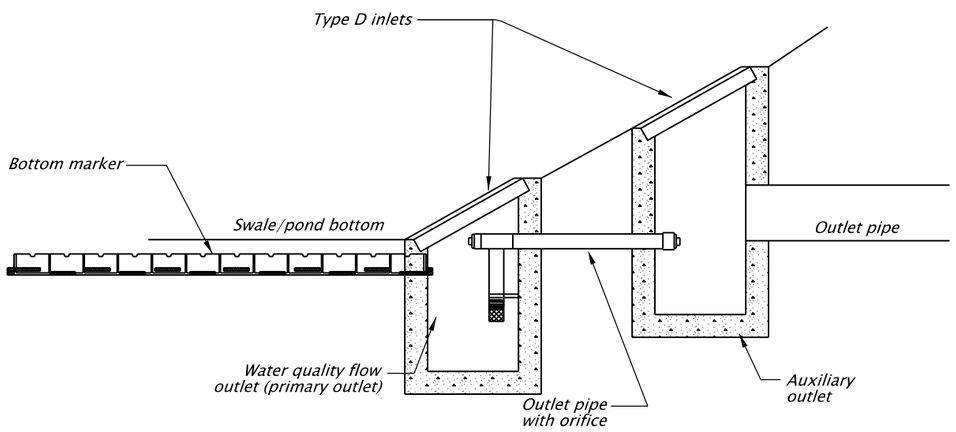
Rotation: 0



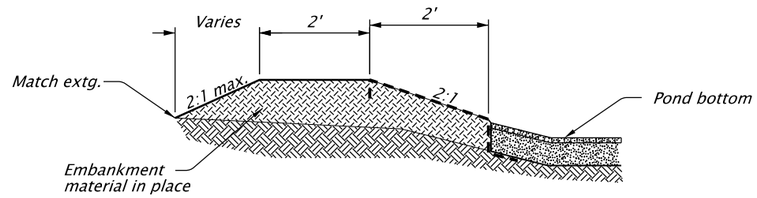
BIORETENTION SWALE
NTS



DETAIL A



WATER QUALITY FACILITY OUTLET STRUCTURE
NTS



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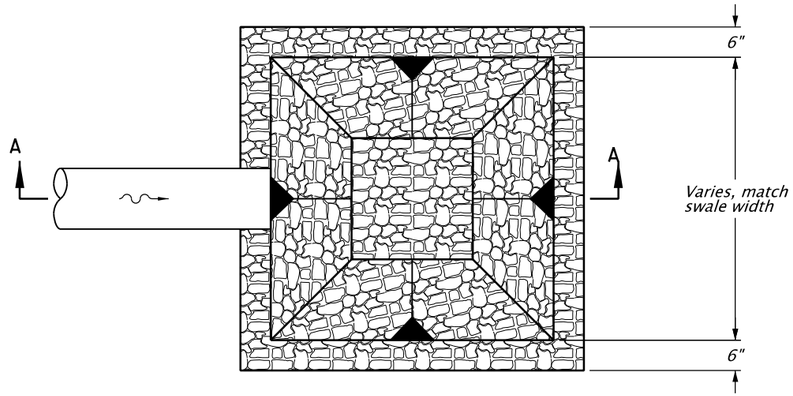

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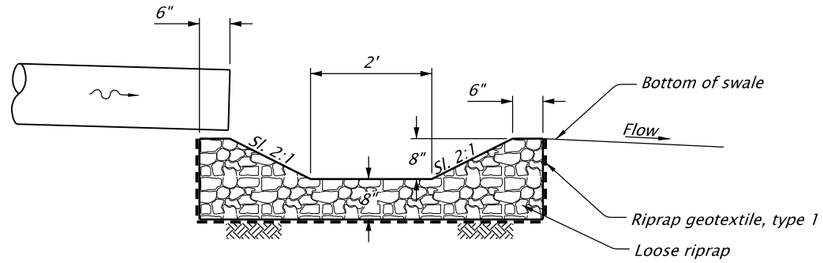

SECTION A-A

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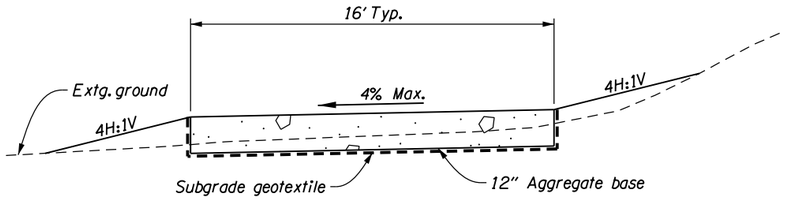
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Reviewer:
Drafter: Checker:

WATER QUALITY DETAILS

SHEET NO.

Rotation: 0



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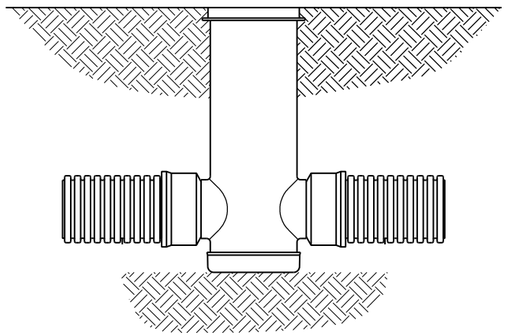

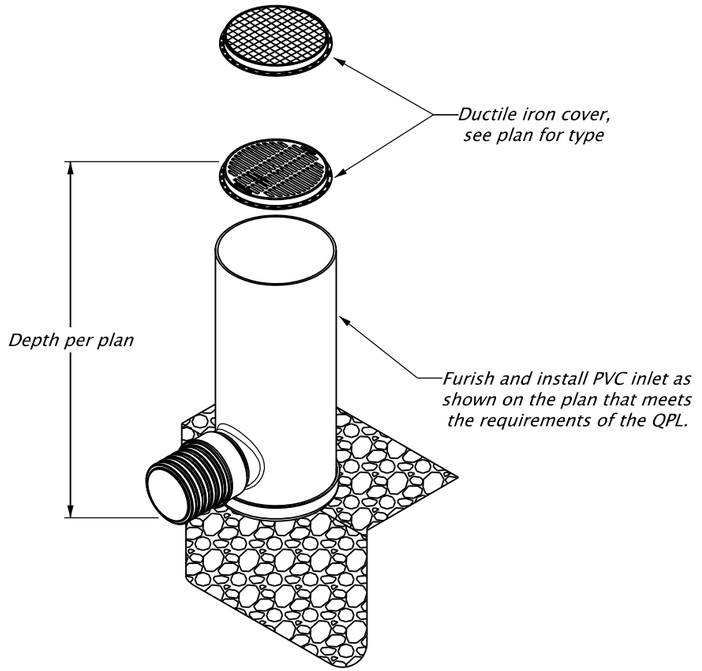

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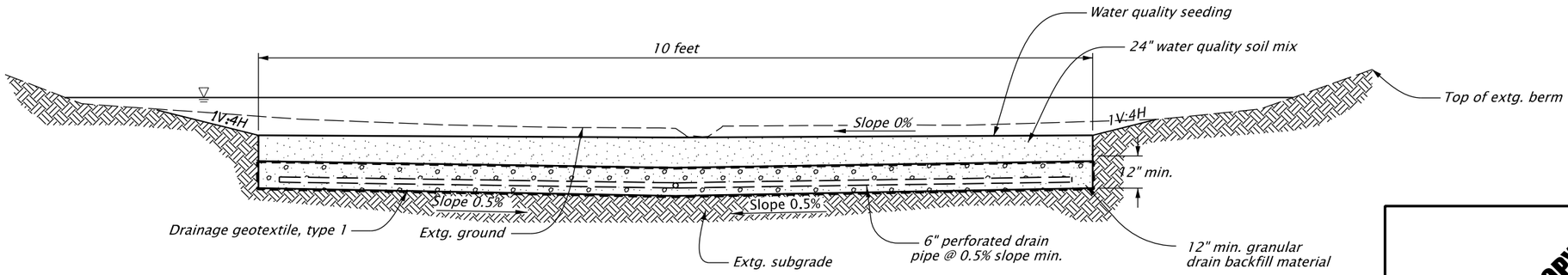

DETENTION POND WITH BIOFILTRATION SECTION
Scale: NTS

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Cory Gieseke
Reviewer: Karen Tatman
Drafter: Morgan Tholl
Checker: Christine Higgins

WATER QUALITY DETAILS

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 0° Sc = 1

Land Use Application Addendum

ODOT | K19786 I-205: Stafford Rd to OR 213

I-205: Stafford Road to OR 213 Corridor Road Widening & Retrofit of the Abernethy Bridge Project

City of Oregon City Project GLUA-20-00014/SP-20-00025/VAR-20-00005/WRG-20-00001/NROD-20-00008/FP-20-00001

April 24, 2020

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Figures

Figure 3-1 . Revised NROD Boundary 2
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Attachments

Attachment A. Chapter 17.52 Code Responses

Attachment B. Site Plan

Attachment C. NROD Verification

Attachment D. Landscaping Plan

Attachment E. Stormwater Report

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1 Introduction

On February 27, 2020, HDR submitted a Land Use Permit application to Oregon City's Community Development Department, Planning Division, on behalf of the Oregon Department of Transportation (ODOT) for the I-205: Stafford Road to OR 213 Corridor Road Widening & Retrofit of the Abernethy Bridge Project. This document provides the Applicant's responses to the Planning Division's Determination of Application Incompleteness on March 26, 2020.

2 Site Plan and Design Review

2.1 Code Responses to Chapter 17.52 – Off-Street Parking and Loading

The Applicant prepared code responses to Oregon City Municipal Code (OCMC) Chapter 17.52 for the proposed parking area at Jon Storm Park. These are included as Attachment A.

2.2 Site Plan

The Applicant created a simplified site plan that provides an overview of work proposed from the Project. See Attachment B.

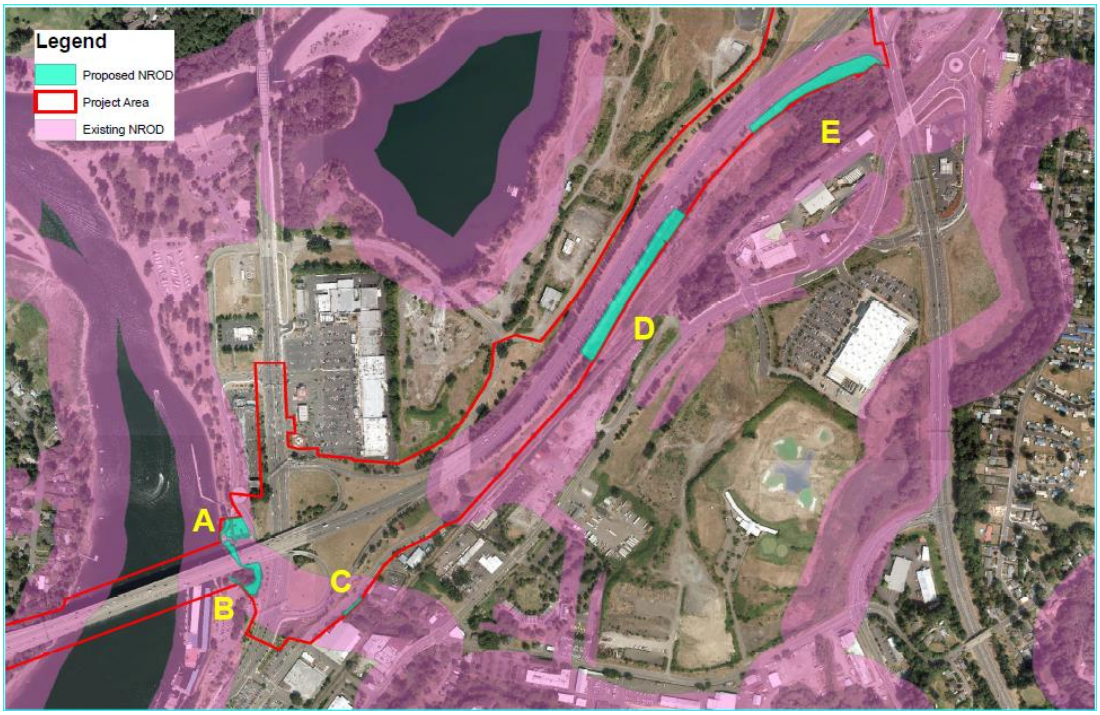
3 Natural Resources Overlay District (NROD)

3.1 NROD Verification and Delineation of Natural Features

The NROD Verification submitted with the Land Use Application included only a portion of Jon Storm Park. The Applicant determined these area should not have been excluded and revised the NROD Boundary Verification. The revised NROD Verification includes vegetated areas within 200 feet of the Willamette River. All areas of impervious surfaces are excluded from the NROD boundary. Vegetated areas lying within 200 feet of the ordinary high water mark (OHWM) of the Willamette River but with a physical barrier of at least 15 feet of impervious surfaces are also excluded, based on Oregon City Municipal Code Chapter 17.49.255.B.7.a.

The revised areas are designated as areas A and B in Figure 3-1 below and in the attached Revised NROD Verification (Attachment C). NROD areas designated C, D, and E in the original Land Use Application remain unchanged.

Figure 3-1 . Revised NROD Boundary



4 NROD Mitigation Plan

The Applicant has revised the Landscaping Plans to clearly identify proposed landscaping in compliance with NROD mitigation requirements. See Attachment D, Landscaping Plan.

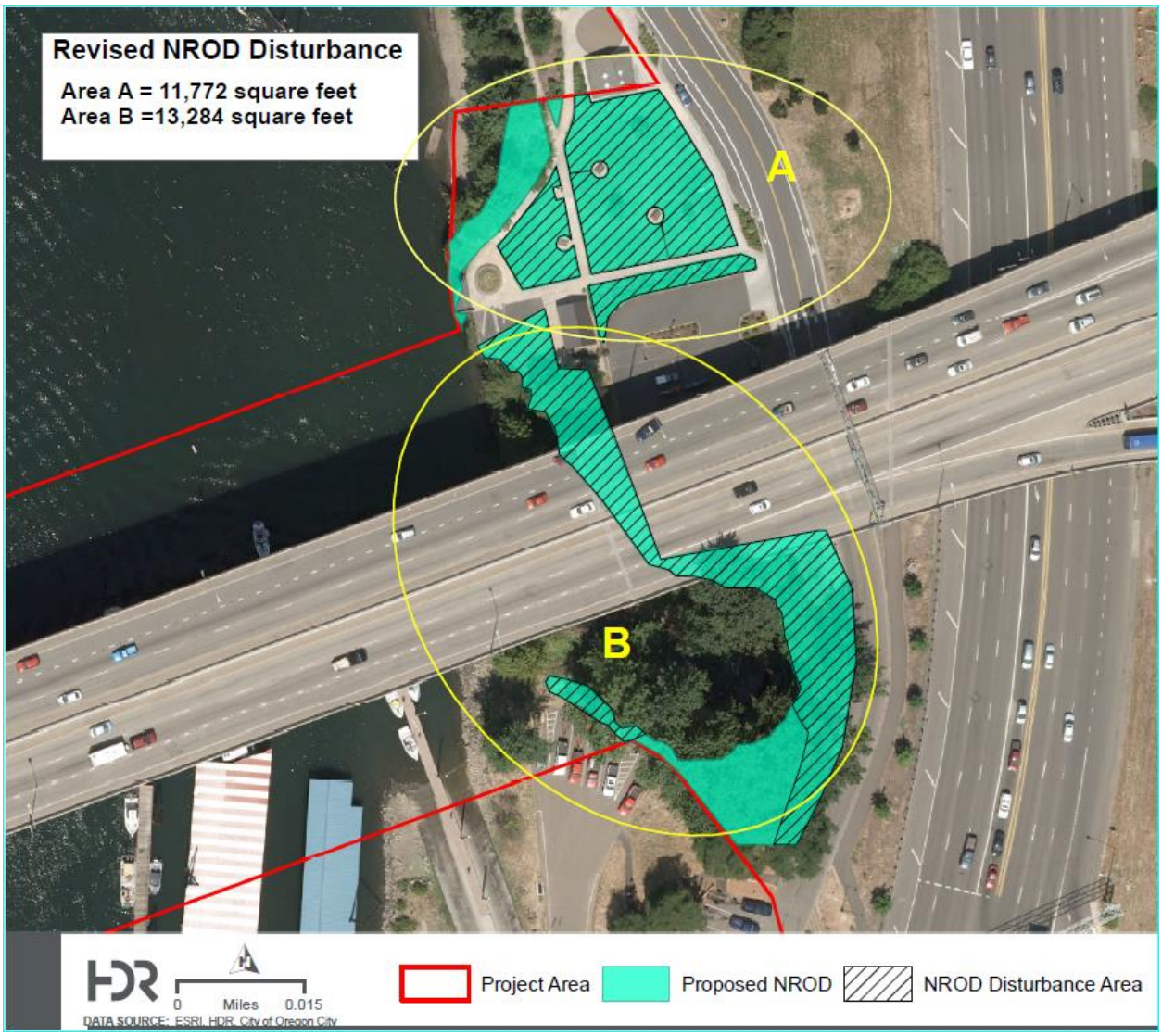
The revised NROD Boundary Verification includes new NROD disturbance areas and new amounts of required NROD mitigation (Figure 4-1). Per the revised NROD Verification (Attachment C), vegetated areas in Jon Storm Park are within the NROD boundary. With the revised NROD boundary, the disturbance area of the Project would increase by approximately 12,149 square feet. This revised area added to the NROD areas identified in the original NROD Verification creates a total disturbance area within the NROD overlay of approximately 70,836 square feet. Based on the density requirements outlined in OCMC Chapter 17.49.180.E.2.a., 70,836 square feet of disturbance area requires 708 trees and 3,542 shrubs to be planted for mitigation in an area twice as large as the disturbance area, which is approximately 141,672 square feet. The disturbance area within the NROD boundary is as follows:

- Area A: 11,772 square feet (SF; revised)
- Area B: 13,284 SF (revised)
- Area C: 0 Sf (unchanged)
- Area D: 42,372 SF (unchanged)
- Area E: 3,408 SF (unchanged)
- Total NROD disturbance: 70,836 SF

Oregon City Parks and Recreation Department, in discussions with ODOT, has requested that areas within Jon Storm Park used for temporary construction staging be returned to pre-construction conditions. This includes the lawn area located south of the restroom. Because it will be returned to pre-construction conditions, the planting quantity requirements for NROD mitigation cannot be applied there. Mitigation plantings compensating for impacts to Jon Storm Park will be included in other NROD mitigation areas within the project area.

The proposed NROD mitigation area is 167,828 square feet, which is comprised of 130,315 square feet of on-site mitigation, and 37,513 square feet of off-site mitigation. Off-site mitigation is in areas that are contiguous to existing NROD areas, as outlined in OCMC Chapter 17.49.180.C. The proposed number of NROD mitigation trees is 708 and the proposed number of NROD mitigation shrubs is 3,642. The revised Landscaping Plan in Attachment D shows the proposed NROD mitigation.

Figure 4-1. Revised NROD Disturbance Area



5 Stormwater Report

The Applicant has revised the Stormwater Report to clearly address how the stormwater design complies with the Oregon City Stormwater and Grading Design Standards. The report was also revised to clearly address how stormwater management facilities were sized using the BMP sizing tool. The flow control exemption requirement section was revised to better align with the language in the Oregon City Stormwater and Grading Design Standards. The revisions included adding detention to a facility that was previously only designed for water quality.

The design parameters used as inputs for the BMP sizing tool were revised to match the parameters identified in the Oregon City Stormwater and Grading Design Standards.

The Stormwater Report was also revised to include a discussion of proposed work near the I-205 Bridge over Main Street. Temporary roadway impacts of approximately 800 square feet are anticipated to allow for work access to the bridge footings. The report also describes the 1,000 linear feet of sidewalk infill along Main Street that has been requested by Oregon City. The sidewalk improvements are considered a standalone project and are exempt from stormwater management requirements per Section 1.2.2F of the Oregon City Public Works Stormwater and Grading Design Standards. See Attachment E for the revised Stormwater Report.

Attachment E. Erosion and Sediment Control Plan

GENERAL NOTES:

1. Plant all trees beyond "clear zone"; verify with engineer prior to planting. Engineer shall approve all work outside designated work limits prior to construction. Do not plant trees within 20' of a bridge/viaduct or within 10' of a trail, waterline, or stormwater line.

2. Locate underground utility lines prior to any digging or ground disturbance.

3. Adjust planting locations so vegetation does not conflict with above- or below-ground utilities.

4. Adjust plant locations to avoid conflict with traffic sight lines and signs or other appurtenances. Adjust plant material in the field to meet setback requirements for signs, lighting, barriers, and other existing and proposed roadside elements.

5. All dimensions shown on details are minimum dimensions.

6. See Plant Schedule FA02, FA03 for plants and landscape material.

7. Plan is schematic. Planting may be adjusted to fit site conditions with prior Agency approval.

8. Lay out plant material in groups as indicated in plant and material schedule, details and plan sheets.

9. Stake all planting areas for review and approval by Area Regional Landscape Architect or Engineer prior to planting.

10. Do not install plant material without prior inspection and approval by Area Regional Landscape Architect.

11. Comply with Oregon Standard Specifications for Construction and Special Provisions for construction applicable to this project.

12. Thoroughly water all plant material (saturated backfill) within 24-hours of installation regardless of rainfall events.

13. Verify field conditions prior to construction with any adjustments to the plans made as directed by the Engineer.

14. Protect all trees and land areas marked for protection. Do not damage natural (non-invasive) vegetation.

15. Comply with erosion control measures per Section 00280 and all applicable permits during construction.

16. Where discrepancies between the Plant Schedule and the plans exist, plans shall prevail.

17. See Special Provision 01030.13(f) for seed mixes

18. Prepare all planting and seeding areas per Method B, see 01040.48(b).

19. Include Mycorrhizal innoculates for all seeding and individual plant installations, apply per manufacturer's recommendation.

20. Flag all planted tree species with color-coded identifyer flags.

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

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FINAL ELECTRONIC DOCUMENT
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Rotatio A

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Plant and Material Schedule

Trees

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
TARME	*Arbutus menziesii*	Madrone	1/2" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	1	-	1
TCADE	*Calocedrus decurrens*	Incense Cedar	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	12	-	-	6	8	26
TCONU	*Cornus nuttallii*	Pacific Dogwood	1" Calip.	As Shown	Container	N/A	Single trunk	-	-	-	-	-	-	-	7	-	7
TPIPO	*Pinus ponderosa 'Willamette Valley'*	Willamette Ponderosa Pine	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	28	3	-	29	23	89
TPSME	*Pseudotsuga menziesii*	Douglas Fir	4' Height	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	-	-	34	-	34
TQUCH	*Quercus chrysolepis*	Canyon Live Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	46	-	-	-	15	61
TQUGA	*Quercus garryana*	Oregon White Oak	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	54	5	-	23	12	97
TULAM	*Ulmus americana 'Valley Forge'*	Valley Forge American Elm	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	-	4	-	-	-	4
TUMCA	*Umbellularia californica*	Oregon Myrtle	1" Calip.	As Shown	Container or B&B	N/A	Single trunk	-	-	-	-	30	-	-	-	-	30

Broadleaf Evergreen Shrubs

Deciduous Shrubs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
ARCO	*Arctostaphylos columbiana x 'Patula'*	Manzanita	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	214	-	-	-	-	214
COSE	*Cornus sericea*	Red Osier Dogwood	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	1,005	-	-	-	-	1,005
FRCA	*Frangula californica 'Eve Case'*	Eve Case Coffeeberry	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	51	-	-	-	-	51
GAEL	*Garrya elliptica 'James Roof'*	Wavyleaf Silktassel	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	61	-	-	-	-	61
MAAQ	*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' O.C.	#1 Container	N/A	N/A	-	-	-	-	397	-	-	-	-	397
MOCA	*Morella californica*	Pacific Wax Myrtle	12" Height	10' O.C.	#1 Container	N/A	N/A	-	-	-	-	57	-	-	-	-	57

Ornamental Grasses and Forbs

Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA08	FA09	FA10	FA11	FA12	TOTAL
-	*Asclepias speciosa*	Showy milkweed	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Calamagrostis x acutiflora 'Karl Foerster'*	Feather reed grass	12" Height	2' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Carex glauca*	Blue Sedge	12" Height	1' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Deschampsia cespitosa 'Goldtau'*	Tufted hairgrass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Juncus patens 'Carmen's Grey'*	Carman's Grey Blue Rush	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Solidago 'Goldkind'*	Golden Baby goldenrod	12" Height	1' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248
-	*Stipa gigantea*	Giant feather grass	12" Height	3' O.C.	#1 Container	15%	N/A	-	-	-	-	1,873	1,873
-	*Veratrum californicum*	California false hellebore	12" Height	2' O.C.	#1 Container	10%	N/A	-	-	-	-	1,248	1,248

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OREGON DEPARTMENT OF TRANSPORTATION

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke
Drafter: David Goodyke
Reviewer: Ben Ngan
Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

ROADSIDE DEVELOPMENT PLANT SCHEDULE

Upland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX A: Trees		*Acer macrophyllum*	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Arbutus menziesii	Pacific Madrone	1/2" Calip.	15'-20' Min.	Container	15%	N/A	-	-	67	67
		Calocedrus decurrens	Incense Cedar	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Corylus cornuta var. californica	Western Hazelnut	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
		Cornus nuttallii	Western Dogwood	1/2" Calip.	15'-20' Min.	Bareroot	5%	N/A	-	-	22	22
		Quercus garryana	Oregon White Oak	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	-	-	116	116
		Pseudotsuga menziesii	Douglas Fir	18" Height	30' Min.	Bareroot	8%	N/A	-	-	36	36
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	-	-	67	67
MIX A & B: Shrubs		*Mahonia aquifolium*	Tall Oregon Grape	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370
		Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	-	-	148	148
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	-	-	222	222
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	-	-	370	370

Lowland Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX C: Trees		*Abies grandis*	Grand Fir	18" Height	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Acer macrophyllum	Bigleaf Maple	1/2" Calip.	30' Min.	Bareroot	10%	N/A	8	21	-	29
		Alnus rubra	Red Alder	1/2" Calip.	15'-20' Min.	Bareroot	26%	N/A	22	54	-	76
		Fraxinus latifolia	Oregon Ash	1/2" Calip.	30' Min.	Bareroot	6%	N/A	5	13	-	18
		Prunus emarginata	Bitter Cherry	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Rhamnus purshiana	Cascara	1/2" Calip.	15'-20' Min.	Bareroot	10%	N/A	8	21	-	29
		Salix lucida	Shining Willow	1/2" Calip.	15'-20' Min.	Bareroot	15%	N/A	13	31	-	44
		Thuja plicata	Western Redcedar	18" Height	30' Min.	Bareroot	8%	N/A	7	17	-	24
MIX C & D: Shrubs		*Cornus sericea*	Redtwig Dogwood	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161
		Oemleria cerasiformis	Osoberry	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Rubus parviflorus	Thimbleberry	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Sambucus racemosa	Red Elderberry	12" Height	5' Min.	Bareroot	10%	N/A	18	46	-	64
		Spiraea douglasii	Western Spirea	12" Height	5' Min.	Bareroot	15%	N/A	28	69	-	97
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	Bareroot	25%	N/A	46	115	-	161

Roadside Riparian Restoration Mix

	Key	Botanical Name	Common Name	Size	Spacing	Root Type	Percent Mix	Plant Condition	FA13	FA14	FA15	TOTAL
MIX E: Trees & Shrubs		*Pinus ponderosa var. willamettensis*	Willamette Ponderosa Pine	3'-4' Height	25'	#5 Container	50%	N/A	12	-	8	20
		Quercus garryana	Oregon White Oak	1/2" caliper	25'	Bareroot	40%	N/A	9	-	7	16
		Arbutus menziesii	Pacific Madrone	1'-2' Height	25'	#1 Container	10%	N/A	2	-	2	4
		Ceanothus velutinus	Snowbrush	12" Height	5' Min.	#1 Container	10%	N/A	7	-	9	16
		Mahonia aquifolium	Tall Oregon Grape	12" Height	5' Min.	#1 Container	60%	N/A	14	-	55	69
		Ribes sanguineum	Redflowering Currant	12" Height	5' Min.	#1 Container	15%	N/A	3	-	14	17
		Symphoricarpos albus	Snowberry	12" Height	5' Min.	#1 Container	15%	N/A	3	-	14	17

SHRUB PLANTING NOTES FOR MIXES A, B, C, D, and E

1. Install shrubs at a density of 108 shrubs per 10,000 s.f.

2. Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to an adjacent tree stem.

3. Spread species throughout the planting area to avoid a monoculture; a random 10,000 s.f. sample shall contain all species.

4. Maintain a 1' diameter plant-free area around each stem and mulch with shredded wood to prevent weeds.

Seed Mix* **See Special Provisions 01030.13(f) for Seed Mix** **Area (square feet)**

Key		FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16	TOTAL
	Permanent Seeding	2,066	-	-	1,273	175,749	-	-	-	129,854	309,940
	Water Quality Seeding	787	-	-	1,294	4,934	411	-	8,634	14,616	30,676
Varies	Riparian Seeding	-	-	-	-	-	23,824	42,555	-	-	66,379
	Wildflower Seeding	-	-	-	-	-	21,941	-	144,117	6,082	172,140
Varies	Native Shade Seeding	-	-	-	-	-	-	-	80,985	-	80,985
	Wetland Seeding	-	-	-	-	-	-	-	410	-	410
	Upland Shrub Seeding	-	-	-	-	-	7,672	-	46,091	-	53,763

*** Verify compost erosion blanket is installed prior to applying seed**

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke Reviewer: Ben Ngan
Drafter: David Goodyke Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

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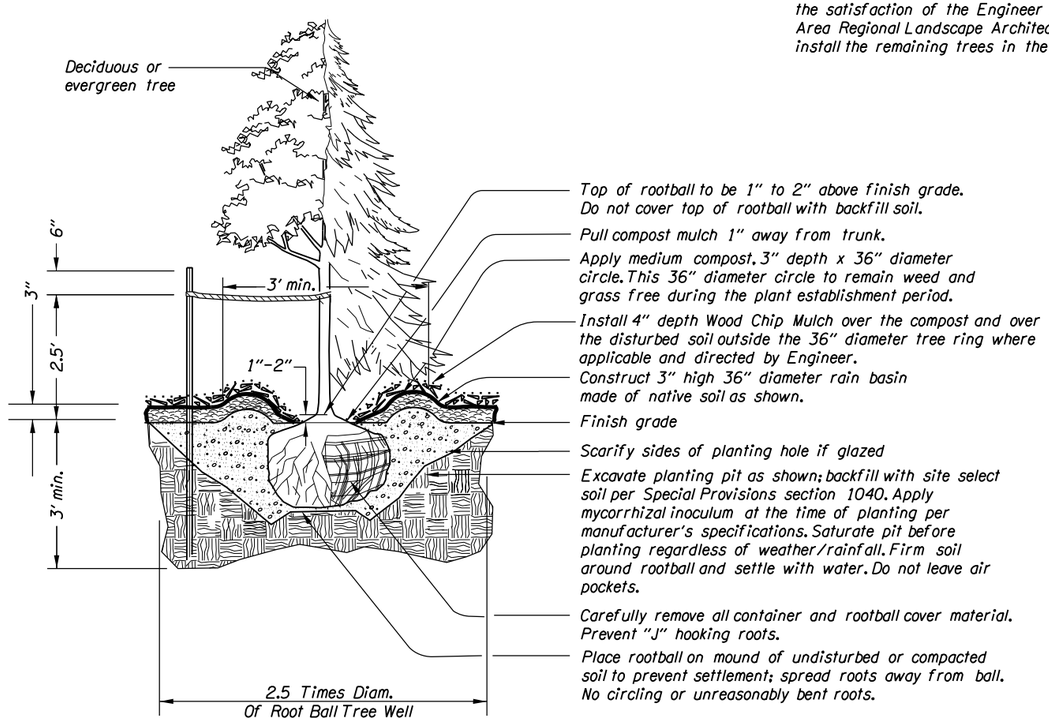
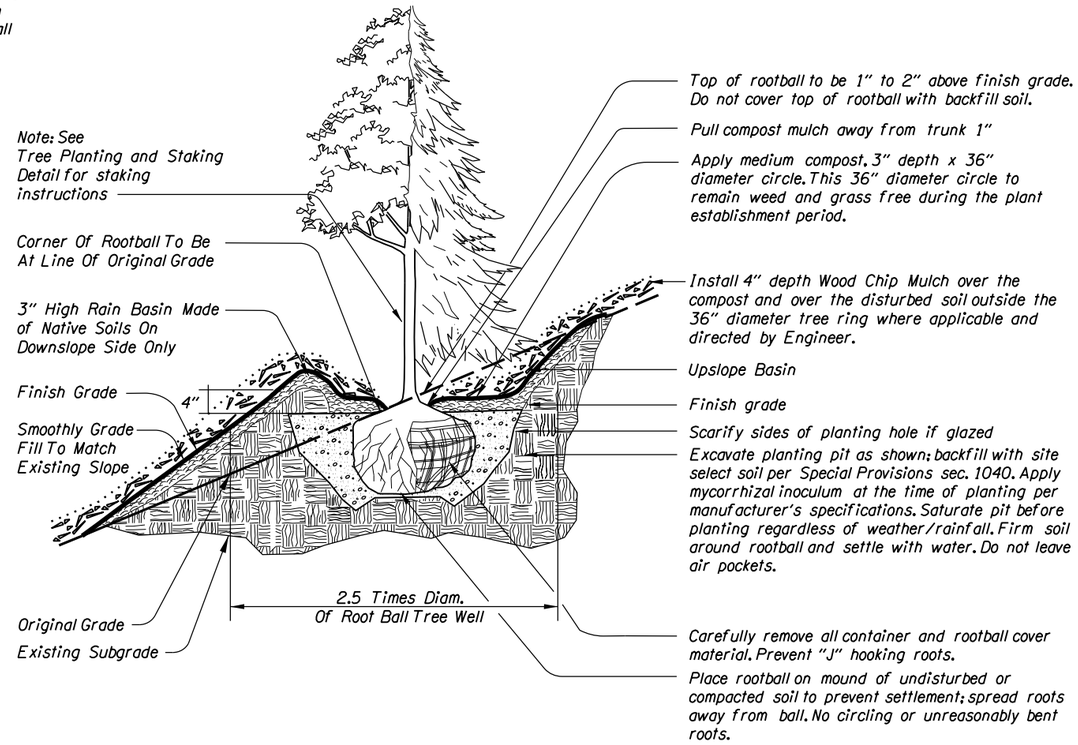
NOTE:

After tree location staking is complete and prior to planting any trees, Contractor shall construct two typical tree planting and staking installations per details and specifications, with Engineer and Area Regional Landscape Architect present. When the installations are complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining trees in the same manner.



TREE PLANTING and STAKING
On Terrain Less Than 5:1

Not To Scale



TREE PLANTING and STAKING on SLOPES
On slopes 5:1 or greater

Not To Scale

TREE STAKING NOTES:

1) Tree ties to be either:

Rigid guy system. Galvanized wire to be approximately 1/8" thickness and 24" length with a plastic sleeve over the portion that goes around tree. The wire tie is to go through the wood stake and be securely fastened.

Plastic chain type, approximately 1" width by 1/8" thickness where two stakes are required. Cross ties between stakes and wrap tie around tree. Fasten securely to stake.

2) Furnish tree stakes on all tree plantings.

Stakes to be construction grade, rough sawn or finished Douglas Fir or Pine. Stain with approved green penetrating oil. Stake Size is to be 1½"x1½" by following lengths:

Trees 36" and shorter - Use one - 6' (approximate) stake
Trees taller than 36" - Use one - 8' (approximate) stake

Drive stakes vertically and at least 24" into undisturbed soil. Do not drive stakes through root ball. Locate stakes to best resist prevailing winds.

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 2 SEC.

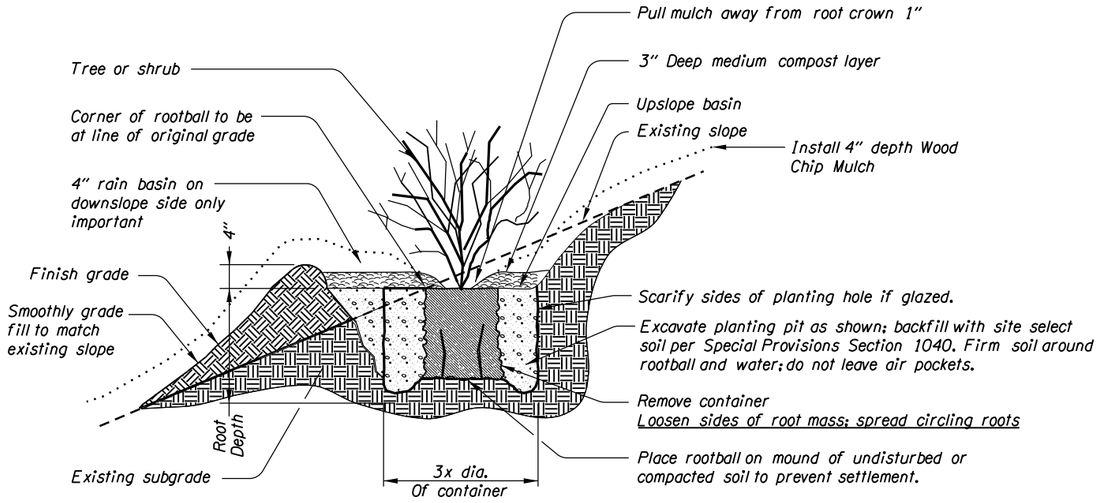
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

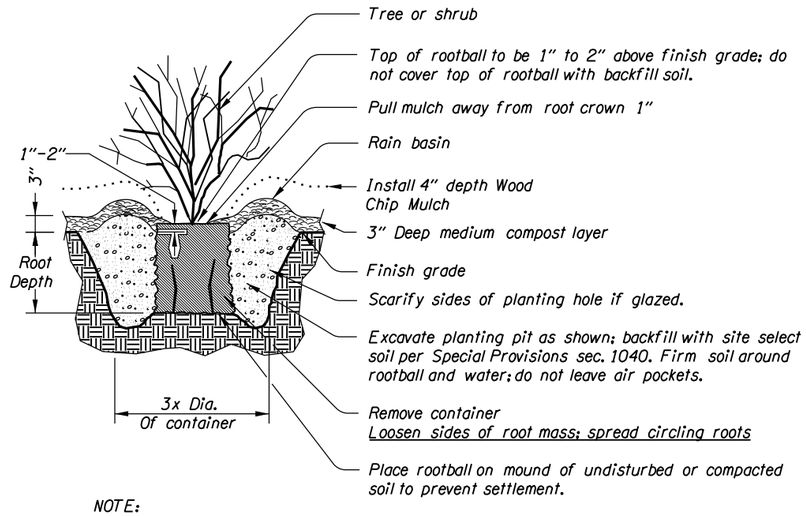


NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2) Apply Mychorrhizae per specifications.

SLOPE PLANTING FOR #1 & #2 CONTAINERS

Not To Scale

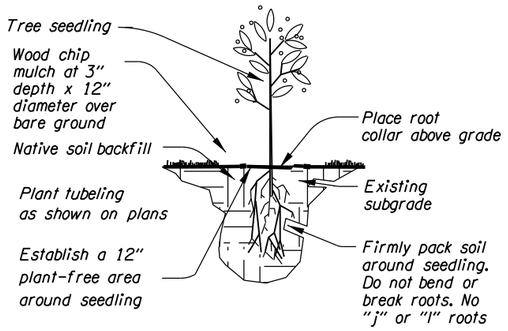


NOTE:
1) 3" Medium Compost layer to be uniform and completely cover planting holes.

2)Apply Mycorrhizae per specifications.

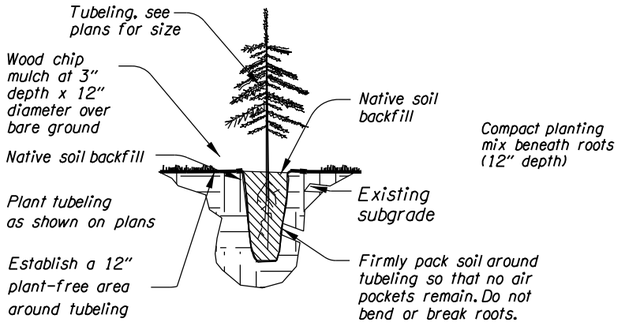
GENERAL PLANTING FOR #1 & #2 CONTAINERS

Not To Scale



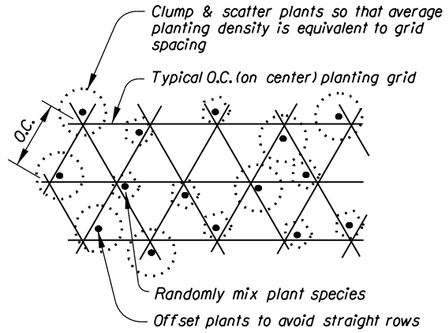
SEEDLING PLANTING

Not To Scale



TUBELING PLANTING

Not To Scale



RANDOM PLANTING PATTERN

Not To Scale

GENERAL NOTE:
1) All dimensions shown on details are minimum dimensions.

2) See "American Standard for Nursery Stock" for plant quality
minimum standards such as size of root ball or caliper of trunk.

3) See plant list or special provisions and identify plant material that may need to be or contract-grown.

4) Important: Excavate all plant wells per detail at 3x diameter of rootball or container & backfill with site select topsoil free of noxious weeds plant material including roots & sprigs.

5) After shrub location staking is complete and prior to planting any shrubs. Contractor shall construct a typical shrub planting per detail and specifications with Engineer and Area Regional Landscape Architect present. When the installation is complete to the satisfaction of the Engineer in coordination with Area Regional Landscape Architect, the Contractor shall install the remaining shrubs in the same manner.

6) Apply Mycorrhizae per specifications.

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ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

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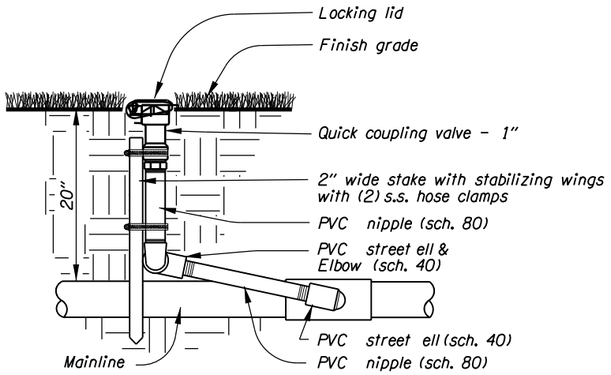
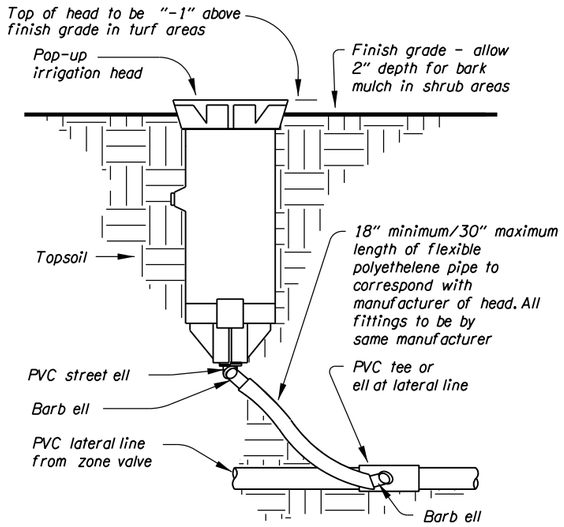


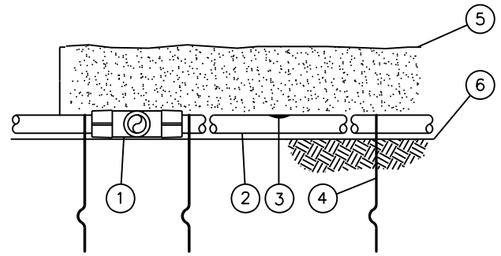
QUICK COUPLING VALVE

Not To Scale



SPRINKLER HEAD AND JOINTS

Not To Scale



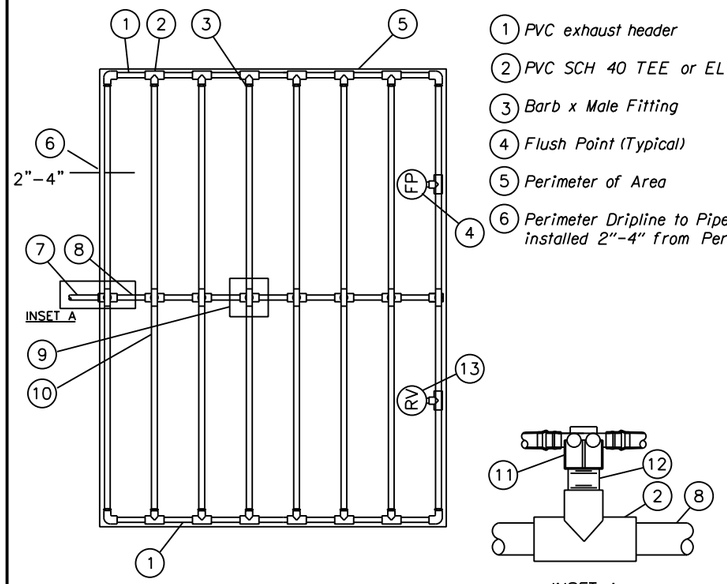
1. Compression Fitting
2. On-Surface Dripline
3. Inline Drip Emitter Outlet
4. Tie-Down Stake
5. Mulch
6. Finish Grade

DRIPLINE AT GRADE

Not To Scale

NOTES:
1) Place tie-down stakes every 3' in sand, 4' in loam, and 5' in clay.

2) At fittings where there is a change of direction, such as tees or elbows, use tie-down stakes on each leg of the change of direction.



1. PVC exhaust header
2. PVC SCH 40 TEE or EL (Typical)
3. Barb x Male Fitting
4. Flush Point (Typical)
5. Perimeter of Area
6. Perimeter Dripline to Pipe to be installed 2"-4" from Perimeter of Area
7. PVC Supply Pipe from Existing Valve
8. PVC Supply Manifold
9. Connection from Supply Manifold to Dripline (Typical) - see Inset A
10. On-Surface Dripline:
11. Barb x Female Fitting
12. ¾" PVC Nipple, length as necessary
13. At ends of area, add air relief valve

NOTE:
1) Provide Low Volume (Drip) Tubing with emitters spaced at 18" and providing a flow rate of 0.9 gallons/hour and spaced at 24", or approved equal.

2) Modify detail to meet the specific requirements of the selected equipment brand's manufacturer and the specific shape and size of the plant bed to be irrigated.

LOW VOLUME (DRIP) TUBING

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

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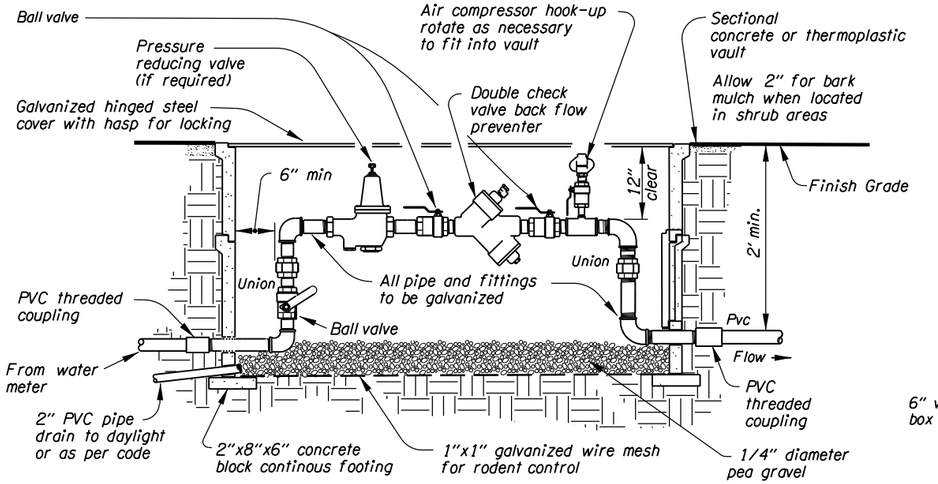


BACKFLOW PREVENTION ASSEMBLY

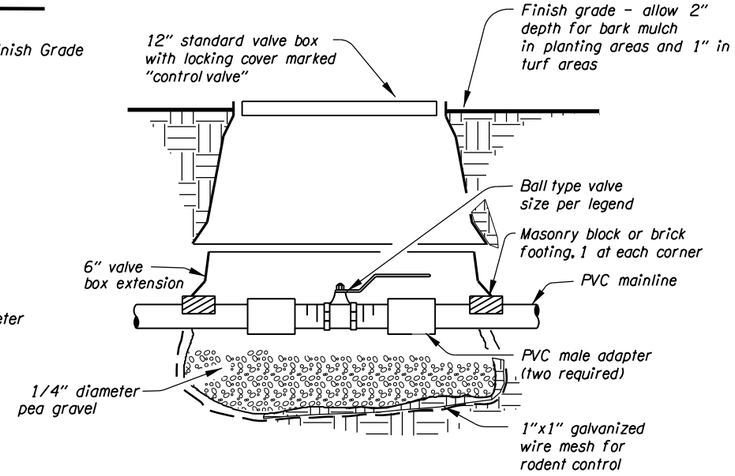
Not To Scale

NOTES:
1) Install backflow prevention assembly in accordance with "accepted procedure and practice in cross connection control manual"

2) Comply with local jurisdiction requirements. These may vary from those shown on drawings. verify compliance.

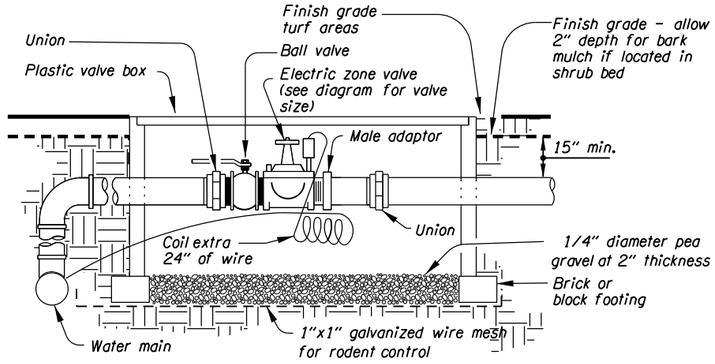
3) Provide 6" access clearance for devices 2" and smaller.

4) Size of double check valve shown on plans or specifications.



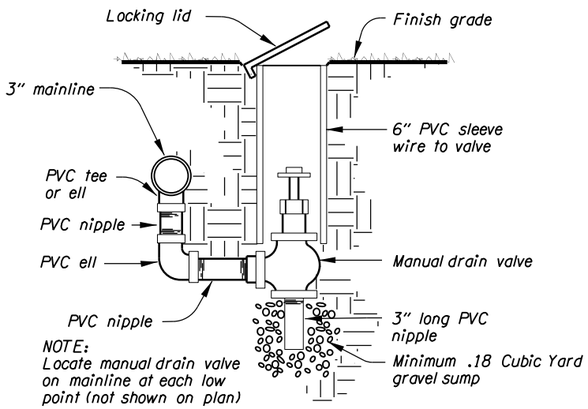
ISOLATION VALVE & BOX

Not To Scale



ELECTRIC ZONE VALVE

Not To Scale



MANUAL DRAIN VALVE

Not To Scale

NOTE:
Irrigation details are placeholders for 60%

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT GENERAL NOTES

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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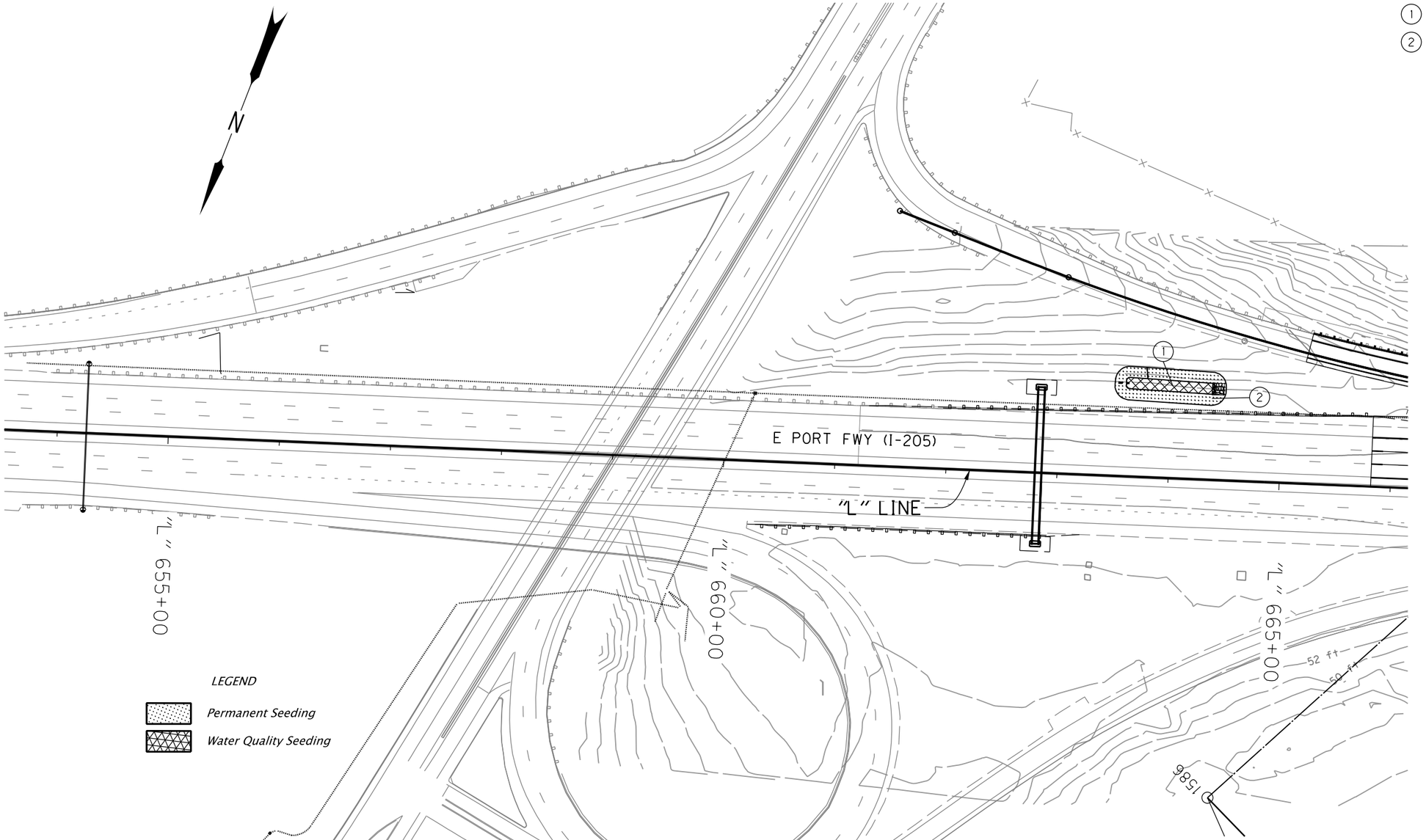
Sec. 30, T. 2 S, R. 2 E, W.M.

1 *Install 787 s.f. Water Quality Seeding*

2 *Install 2,066 s.f. Permanent Seeding*



LEGEND

Permanent Seeding

Water Quality Seeding

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANNING PLAN/SECTION

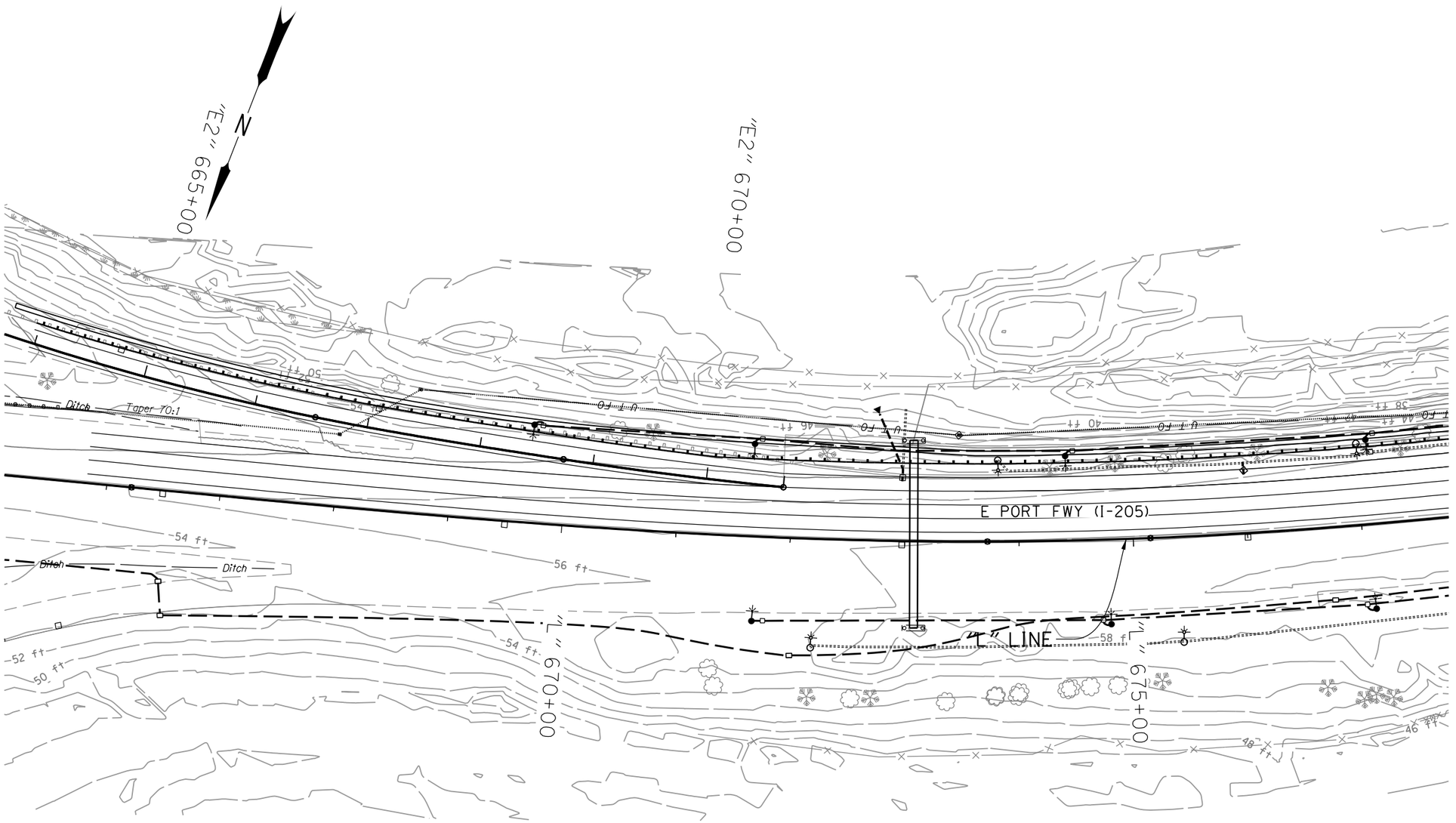
SHEET NO.

NNA_Roadside_Devel :: FA08 6/21/2019 2:51:00 PM Jane

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 227.6721° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



LEGEND

ExistingTrees

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

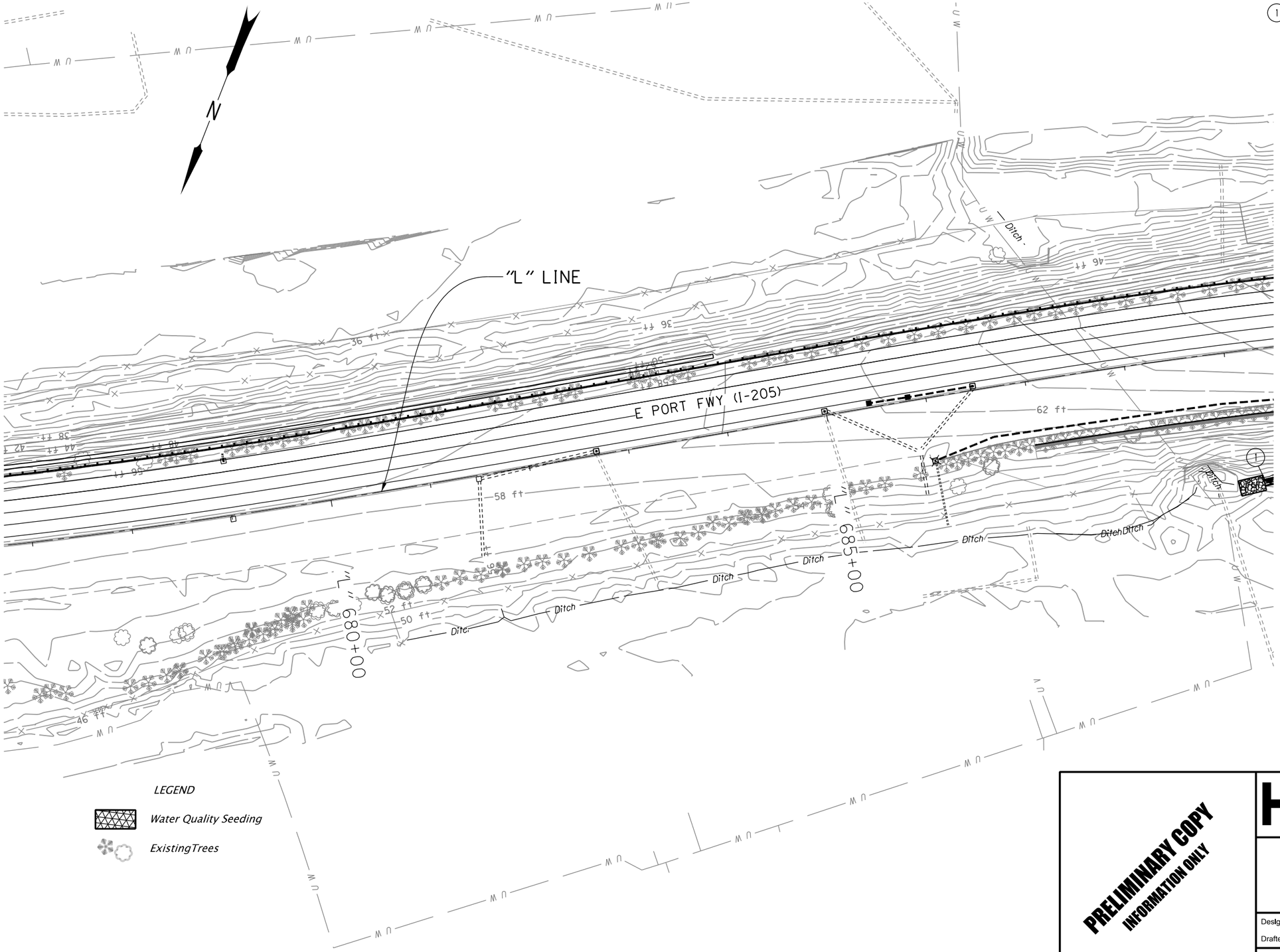
NNA_Roadside_Devel :: FA09 6/21/2019 2:51:05 PM Jane

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962°

Sec. 30, T. 2 S, R. 2 E, W.M.

(1) *Total quantity for area on FA10 and FA11, shown on FA11, note 1*



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I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

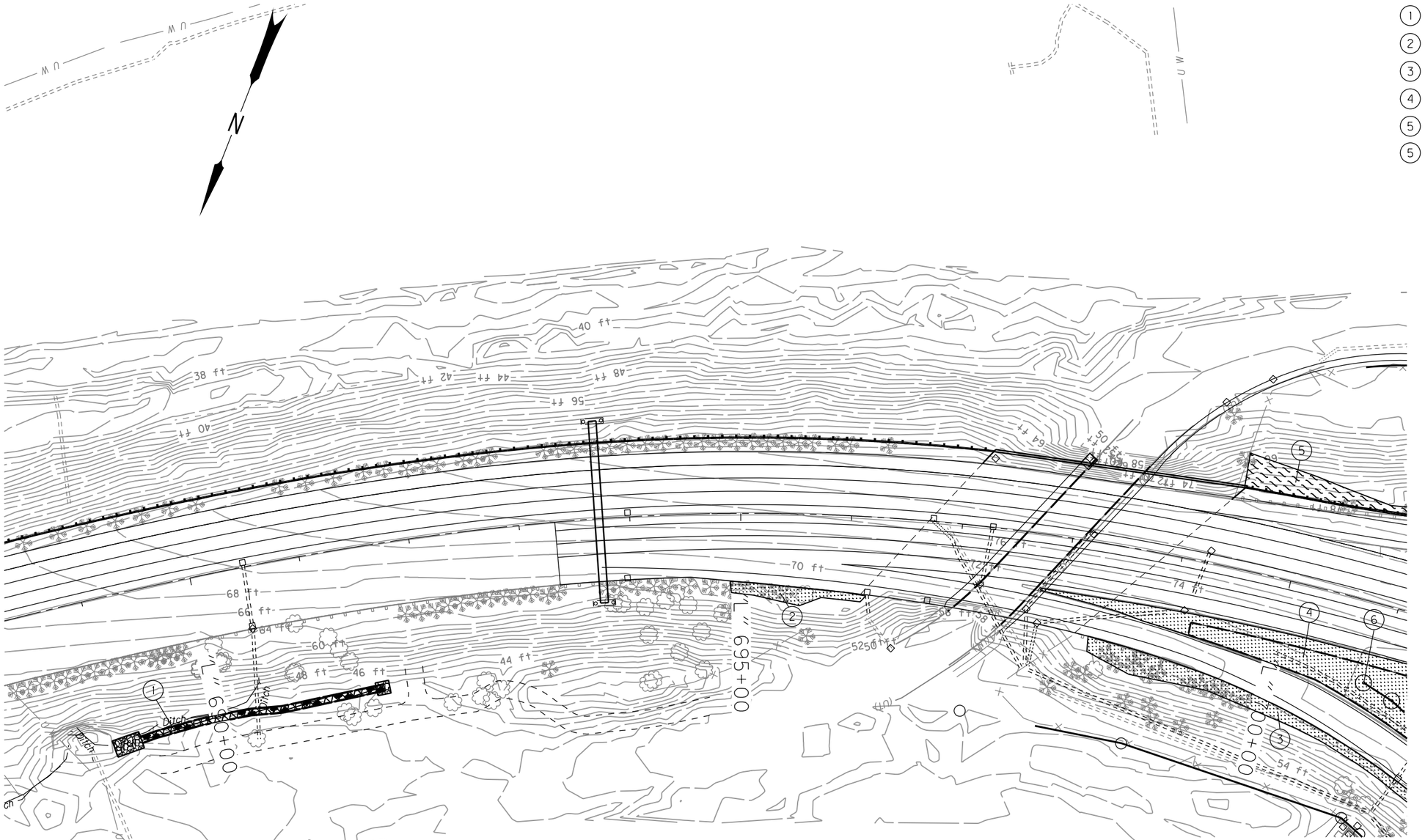
SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA10 6/21/2019 2:51:06 PM Jane

Rotation: 228.87° 0'

1. Install 1,294 s.f. Water Quality Seeding
2. Install 1,273 s.f. Permanent Seeding
3. Total area on FA11and FA12, shown on FA12, note 1
4. Total area on FA11 and FA12, shown on FA12, note 2
5. Total area on FA11 and FA12, shown on FA12, note 33
5. Total area on FA11 and FA12, shown on FA12, note 36



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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

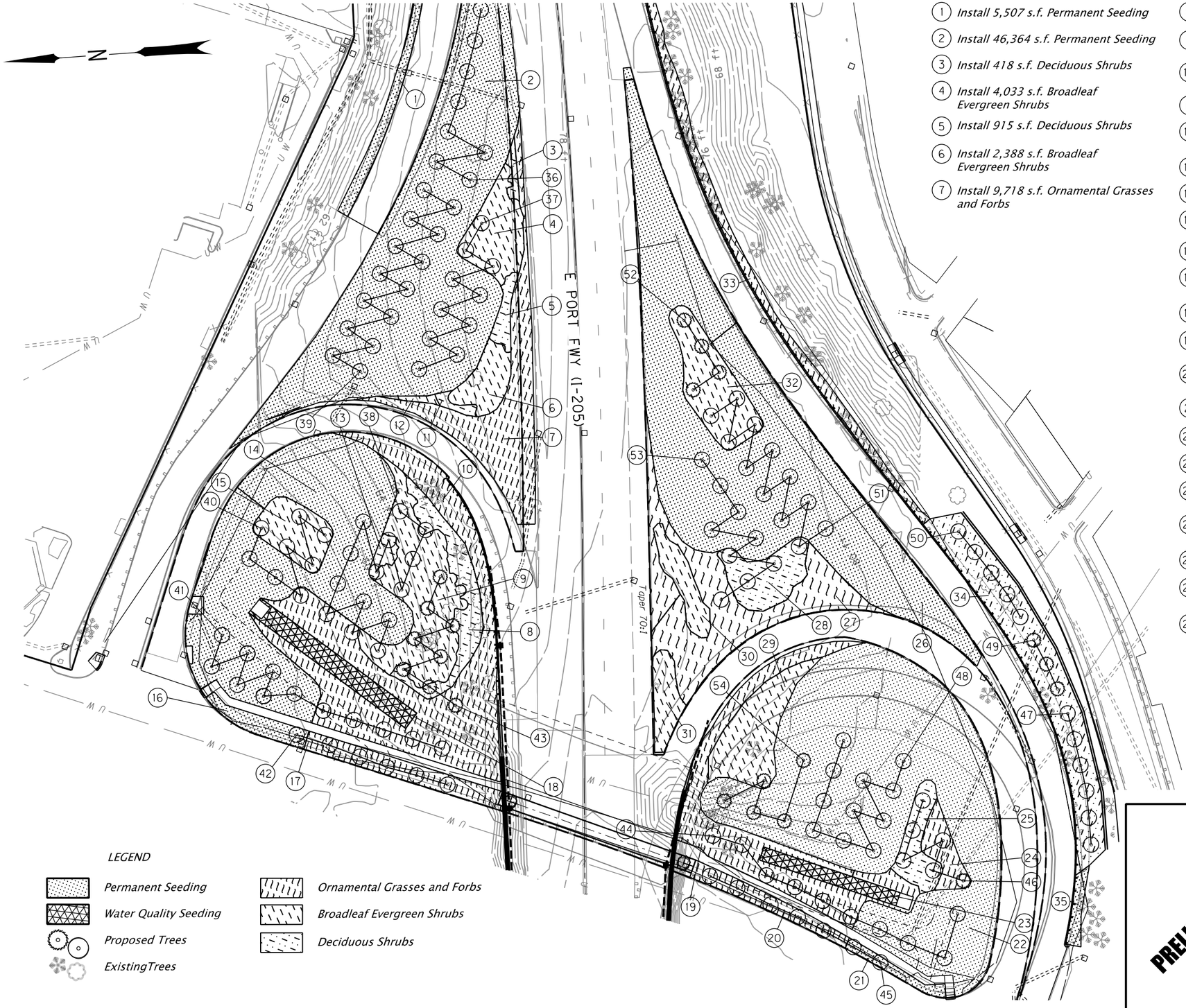
SHEET NO.

NNA_Roadside_Devel :: FA11 6/21/2019 2:51:08 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 222.7112° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.



1. Install 5,507 s.f. Permanent Seeding
2. Install 46,364 s.f. Permanent Seeding
3. Install 418 s.f. Deciduous Shrubs
4. Install 4,033 s.f. Broadleaf Evergreen Shrubs
5. Install 915 s.f. Deciduous Shrubs
6. Install 2,388 s.f. Broadleaf Evergreen Shrubs
7. Install 9,718 s.f. Ornamental Grasses and Forbs
8. Install 4,239 s.f. Deciduous Shrubs
9. Install 9,712 s,f, Broadleaf Evergreen Shrubs
10. Install 20,139 s.f. Ornamental Grasses and Shrubs
11. Install 375 s.f. Deciduous Shrubs
12. Install 260 s.f. Broadleaf Evergreen Shrubs
13. Install 648 s.f. Deciduous Shrubs
14. Install 30,343 s.f. Permanent Seeding
15. Install 3,362 s.f. Broadleaf Evergreen Shrubs
16. Install 1,603 s.f. Permanent Seeding
17. Install 3,471 s.f. Ornamental Grasses and Forbs
18. Install 3,153 s.f. Water Quality Seeding
19. Install 10,277 s.f. Ornamental Grasses and Forbs
20. Install 2,319 s.f. Ornamental Grasses and Forbs
21. Install 989 s.f. Permanent Seeding
22. Install 46,511 s.f. Permanent Seeding
23. Install 1,781 s.f. Water Quality Seeding
24. Install 1,923 s.f. Ornamental Grasses and Forbs
25. Install 2,523 s.f. Broadleaf Evergreen Shrubs
26. Install 43,636 s.f. Permanent Seeding
27. Install 12,295 s.f. Ornamental Grasses and Forbs
28. Install 3,629 s.f. Deciduous Shrubs
29. Install 5,407 s.f. Broadleaf Evergreen Shrubs
30. Install 2,113 s.f. Broadleaf Evergreen Shrubs
31. Install 1,994 s.f. Broadleaf Evergreen Shrubs
32. Install 5,574 s.f. Broadleaf Evergreen Shrubs
33. Install 7,431 s.f. Ornamental Grasses and Shrubs
34. Install 11,524 s.f. Deciduous Shrubs
35. Install 796 s.f. Permanent Seeding
36. Install 8 TPIPO
37. Install 10 TQUGA
38. Install 14 TUMCA
39. Install 14 TQUCH
40. Install 8 TQUCH
41. Install 12 TQUGA
42. Install 6 TQUGA
43. Install 8 TPIPO
44. Install 10 TQUGA
45. Install 7 TQUGA
46. Install 6 TQUCH
47. Install 6 TQUCH
48. Install 11 TUMCA
49. Install 3 TPIPO
50. Install 5 TUMCA
51. Install 12 TQUCH
52. Install 4 TPIPO
53. Install 9 TQUGA
54. Install 5 TPIPO

LEGEND

- Permanent Seeding
- Water Quality Seeding
- Proposed Trees
- ExistingTrees
- Ornamental Grasses and Forbs
- Broadleaf Evergreen Shrubs
- Deciduous Shrubs

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA12 6/21/2019 2:51:09 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 201.4396°

Sec. 30, T. 2 S, R. 2 E, W.M.

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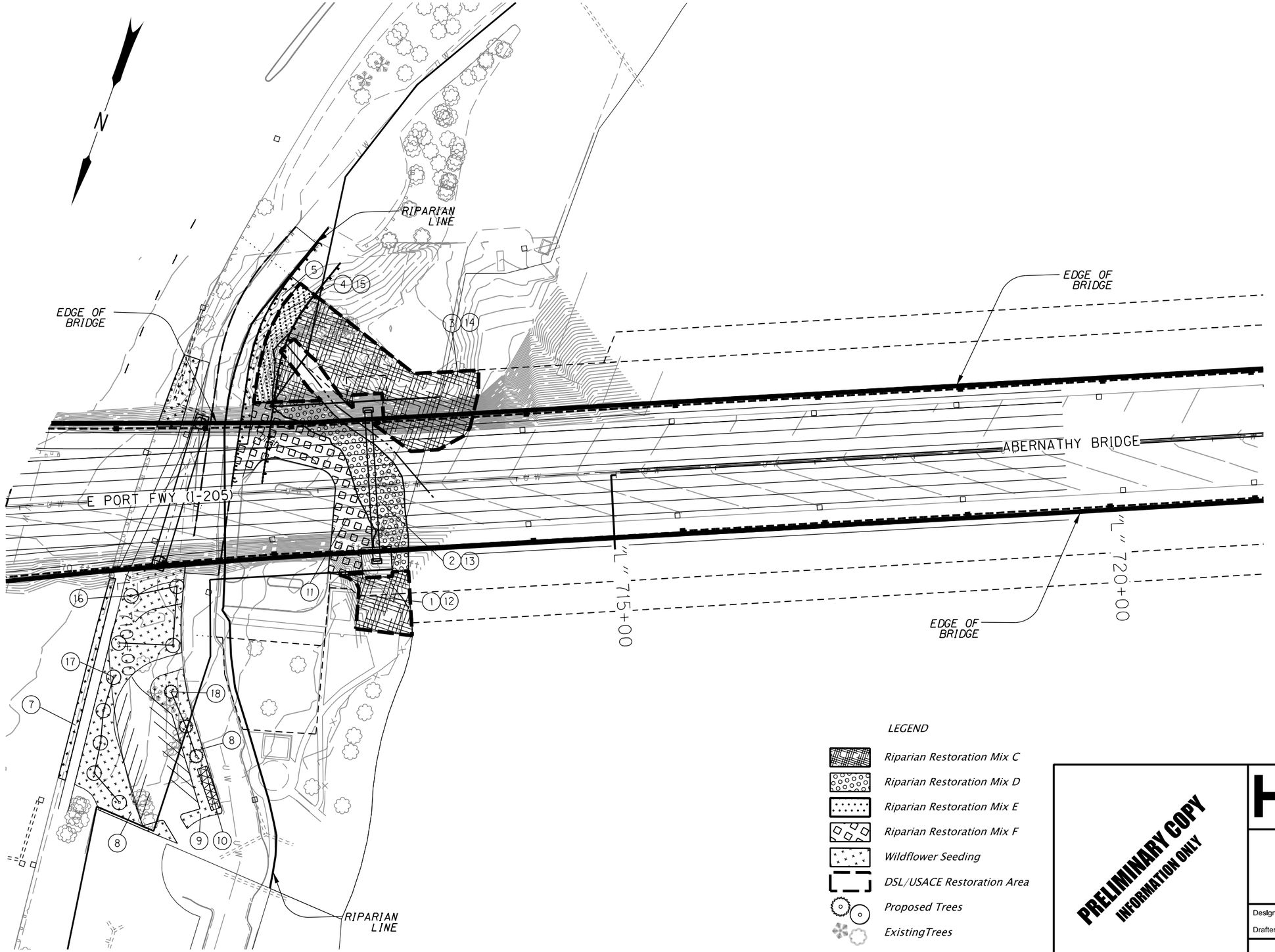

1. *Install 3,144 s.f. Riparian Seeding*
2. *Install 6,769 s.f. Riparian Seeding*
3. *Install 13,911 s.f. Riparian Seeding*
4. *Install 2,132 s.f. Wildflower Seeding*
5. *Install 1,796 s.f. Wildflower Seeding*
6. *Install 1,468 s.f. Wildflower Seeding*
7. *Install 1,414 s.f. Wildflower Seeding*
8. *Install 11,899 s.f. Wildflower Seeding*
9. *Install 3,232 s.f. Wildflower Seeding*
10. *Install 411 s.f. Water Quality Seeding*
11. *Install 7,672 Riparian Restoration Mix F*
12. *Install 3,144 s.f. Riparian Restoration Mix C*
13. *Install 6,769 s.f. Riparian Restoration Mix D*
14. *Install 13,911 s.f. Riparian Restoration Mix C*
15. *Install 2,132 s.f. Riparian Restoration Mix E*
16. *Install 4 TULMA*
17. *Install 5 TQUGA*
18. *Install 3 TPIPO*

LEGEND

- *Riparian Restoration Mix C*
- *Riparian Restoration Mix D*
- *Riparian Restoration Mix E*
- *Riparian Restoration Mix F*
- *Wildflower Seeding*
- *DSL/USACE Restoration Area*
- *Proposed Trees*
- *ExistingTrees*

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CLACKAMAS COUNTY

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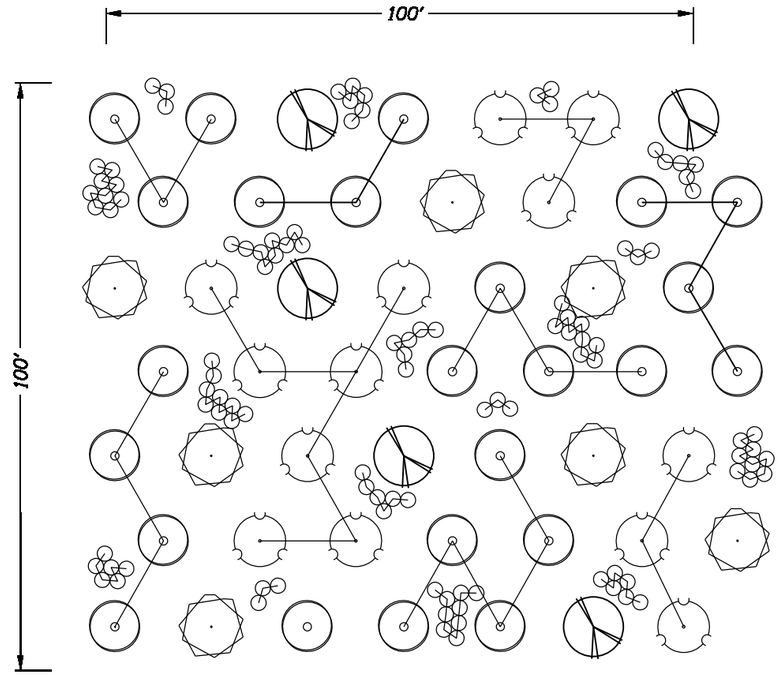
ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA13-FA13A 6/21/2019 2:51:11 PM Jane

Rotation: 275.7836° 0'



NOTE:
Total quantity of plants per species per area shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Acer macrophyllum (TACMA), 10%*
- *Abies grandis (TABGR), 10%*
- *Thuja plicata (TTHPL), 8%*

Small Trees
- *Fraxinus latifolia (TFRLA), 6%*
- *Prunus emarginata (TPREM), 15%*
- *Salix lucida ssp. Lasiandra(TSALU), 15%*
- *Rhamnus purshiana (TRHPU), 10%*

Fast-Growing Trees
- *Alnus rubra (TALRU), 26%*

Shrubs
- *Assorted Species*

Riparian Restoration Mix C: Lowland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Abies grandis	5 stems / 10,000 s.f.	10%
	Acer macrophyllum	4 stems / 10,000 s.f.	10%
	Thuja plicata	4 stems / 10,000 s.f.	8%
	Small Trees		
	Fraxinus latifolia	3 stems / 10,000 s.f.	6%
	Prunus emarginata	7 stems / 10,000 s.f.	15%
	Salix lucida ssp. lasiandra	7 stems / 10,000 s.f.	15%
	Rhamnus purshiana	6 stems / 10,000 s.f.	10%
	Fast-Growing Trees (13)*		
	Alnus rubra	13 stems / 10,000 s.f.	26%

Riparian Restoration Mix C and D: Lowland Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Cornus sericea	27 stems / 10,000 s.f.	25%
	Physocarpus capitatus	11 stems / 10,000 s.f.	10%
	Rubus spectabilis	16 stems / 10,000 s.f.	15%
	Sambucus racemosa	11 stems / 10,000 s.f.	10%
	Spirea douglasii	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	18 stems / 10,000 s.f.	25%

* Groupings required

DETAIL: LOWLAND TREES AND PLANTING MIX C AND D

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 49 trees/10,000 s.f.

2) Install trees at an average of 15' O.C. with triangular spacing, 49 trees/10,000 s.f. Large, Slow-Growing Trees must be planted at minimum 30' O.C. from one another. Fast-Growing and Small Trees shall be installed at a 10 - 20' O.C. average spacing from others.

3) Install Fast-Growing Trees in groups of 2 - 7

4) Install Small Trees in groups of 2 - 5

5) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

6) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

7) Maintain a 1' diameter plant-free area around all stems and mulch with shredded wood to prevent weeds.

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INFORMATION ONLY

HDR ENGINEERING, INC
1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Name
Drafter: David Goodyke | Checker: Name

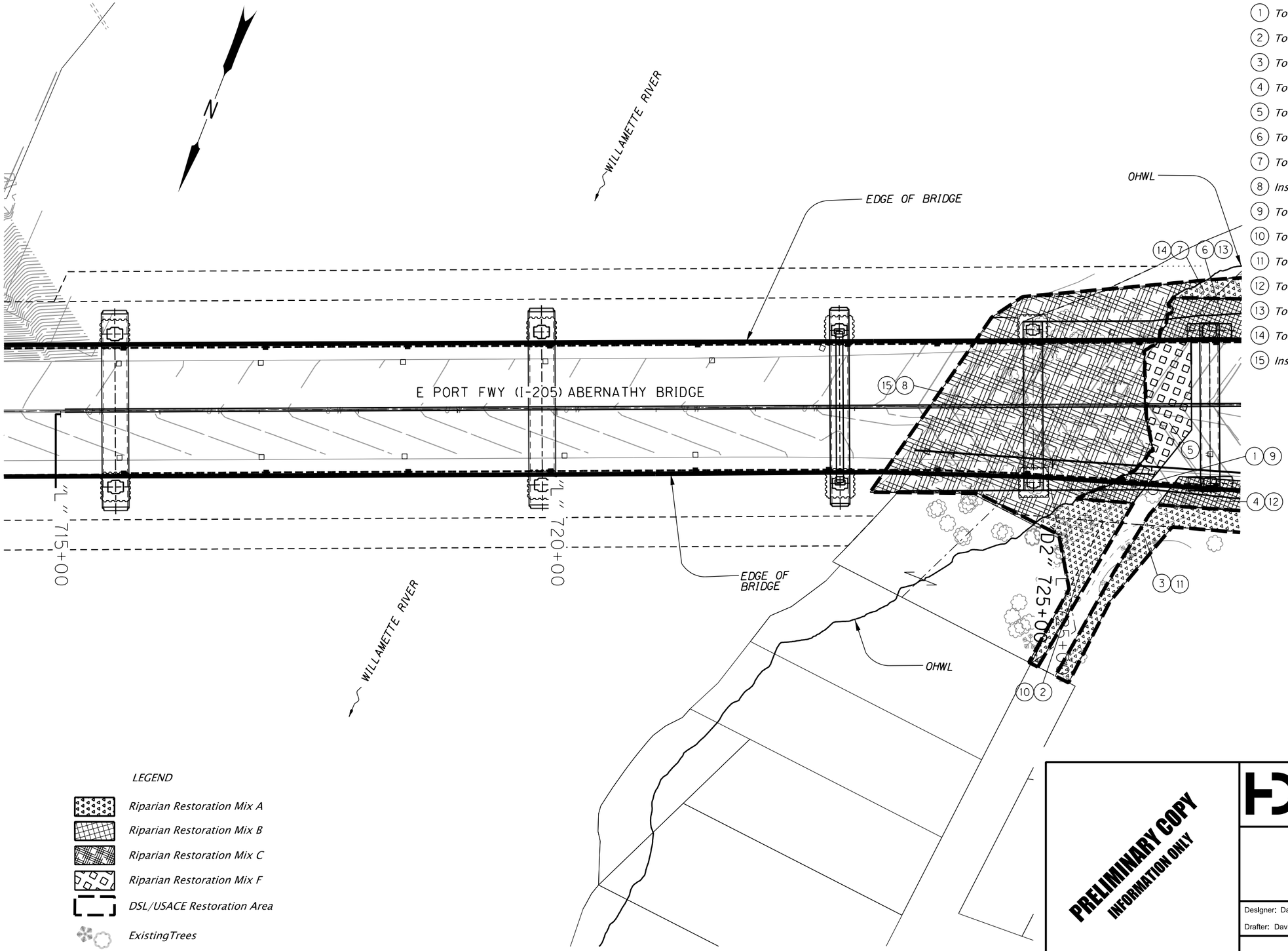
ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Sec. 30, T. 2 S, R. 2 E, W.M.

??



1. Total area on FA14 and FA15, shown on FA15, note 21
2. Total area on FA14 and FA15, shown on FA15, note 1
3. Total area on FA14 and FA15, shown on FA15, note 2
4. Total area on FA14 and FA15, shown on FA15, note 3
5. Total area on FA14 and FA15, shown on FA15, note 18
6. Total area on FA14 and FA15, shown on FA15, note 17
7. Total area on FA14 and FA15, shown on FA15, note 16
8. Install 42,555 s.f. Riparian Seeding
9. Total area on FA14 and FA15, shown on FA15, note 22
10. Total area on FA14 and FA15, shown on FA15, note 20
11. Total area on FA14 and FA15, shown on FA15, note 23
12. Total area on FA14 and FA15, shown on FA15, note 24
13. Total area on FA14 and FA15, shown on FA15, note 47
14. Total area on FA14 and FA15, shown on FA15, note 46
15. Install 42,555 s.f. Riparian Restoration Mix C

LEGEND

- Riparian Restoration Mix A
- Riparian Restoration Mix B
- Riparian Restoration Mix C
- Riparian Restoration Mix F
- DSL/USACE Restoration Area
- ExistingTrees

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

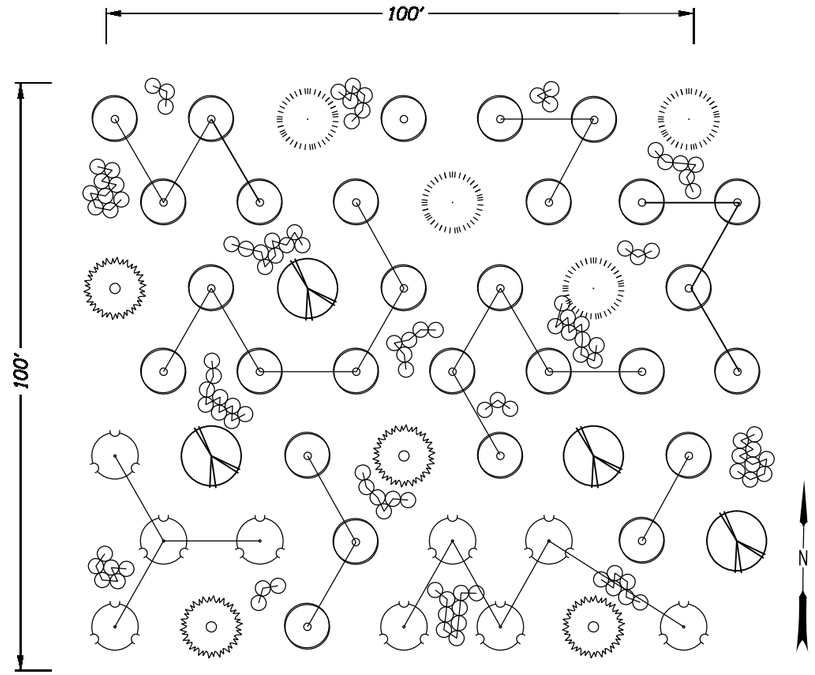
ROADSIDE DEVELOPMENT
PLANTING PLAN/SECTION

SHEET NO.

NNA_Roadside_Devel :: FA14-FA14A 6/21/2019 2:51:17 PM Jane

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 201.4396° 0'



Riparian Restoration Mix A: Upland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Acer macrophyllum	4 stems / 10,000 s.f.	8%
	Calocedrus decurrens	4 stems / 10,000 s.f.	8%
	Quercus garryana	13 stems / 10,000 s.f.	26%
	Pseudotsuga menziesii	4 stems / 10,000 s.f.	8%
	Small Trees		
	Arbutus menziesii	7 stems / 10,000 s.f.	15%
	Corylus cornuta ssp. californica	7 stems / 10,000 s.f.	15%
	Cornus nuttallii	3 stems / 10,000 s.f.	5%
	Rhamnus purshiana	7 stems / 10,000 s.f.	15%

Riparian Restoration Mix A and B: Upland Shrubs

Key	Shrubs*	Approximate Planting Density	Planting Percentage
	Mahonia aquifolium	27 stems / 10,000 s.f.	25%
	Omeleria ceracisformis	11 stems / 10,000 s.f.	10%
	Rubus parviflorus	16 stems / 10,000 s.f.	15%
	Sambucus racemosa	11 stems / 10,000 s.f.	10%
	Spirea douglasii	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	18 stems / 10,000 s.f.	25%

* Groupings required

NOTE:
Total quantity of plants per species per area shown on FA03.

LEGEND

Large, Slow-Growing Trees
- *Acer macrophyllum (TACMA), 8%*
- *Calocedrus decurrens (TCADE), 8%*
- *Pseudotsuga menziesii (TPSME), 8%*
- *Quercus garryana (TQUGA), 26%*

Small Trees
- *Arbutus menziesii (TARME), 15%*
- *Corylus cornuta ssp. californica (TCOCO), 15%*
- *Cornus nuttallii (TCONU), 15%*
- *Rhamnus purshiana (TRHPU), 15%*

Shrubs
- *Assorted Species*

DETAIL: UPLAND TREES AND PLANTING MIX A AND B

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 49 trees/10,000 s.f.

2) Install trees at an average of 15' O.C. with triangular spacing, 49 trees/10,000 s.f. Large, Slow-Growing Trees must be planted at minimum 30' O.C. from one another. Fast-Growing and Small Trees shall be installed at a 10 - 20' O.C. average spacing from others.

3) Concentrate TQUGA in areas with most southern and western sun exposure.

4) Concentrate TPSME North and East of TQUGA.

5) Install Small Trees in groups of 2 - 5

6) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

7) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with shredded wood to prevent weeds.

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

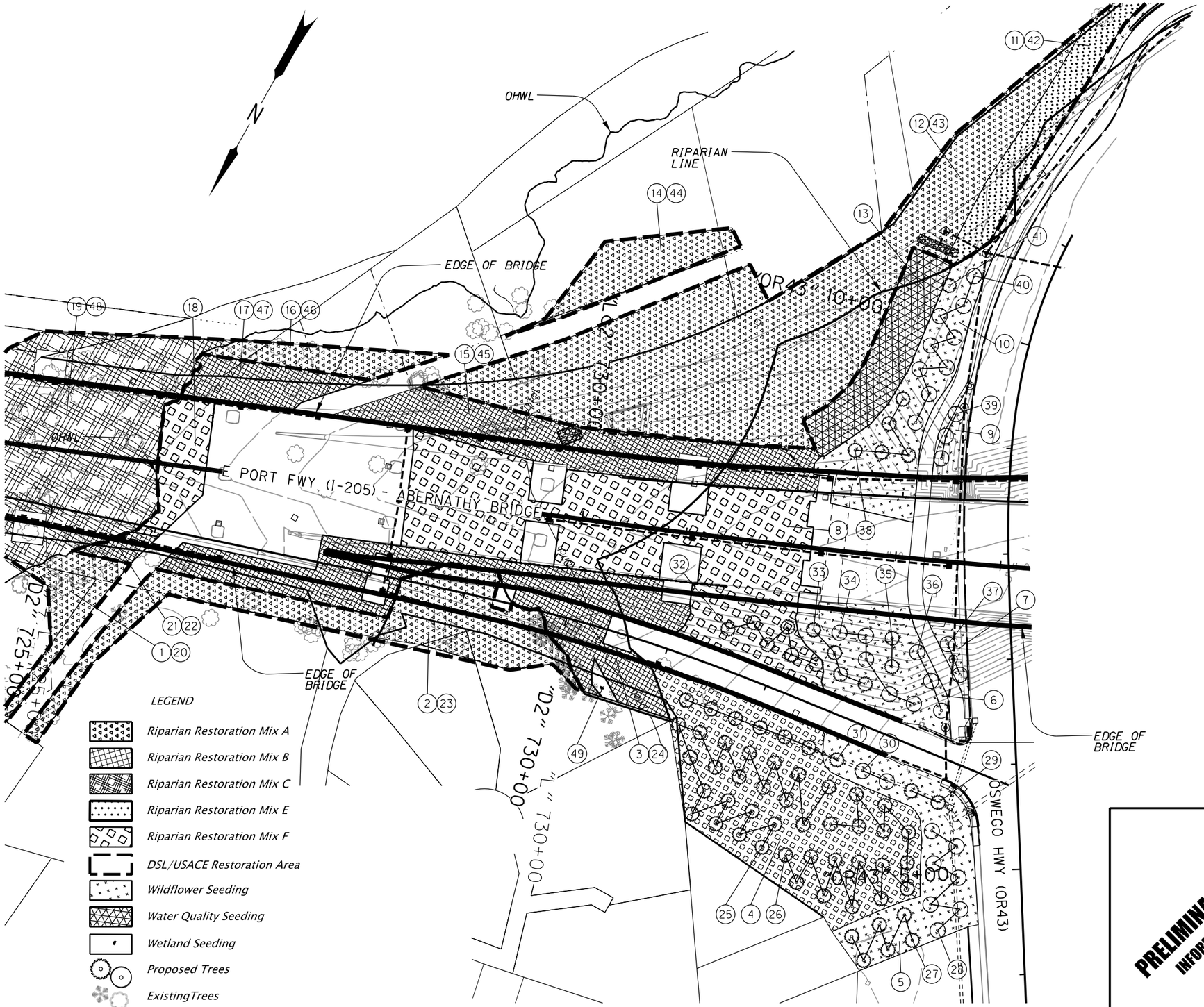
ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA14-FA14A 6/21/2019 2:51:19 PM Jane

Rotation: 201.4396° 0'



1. Install 5,280 s.f. Native Shade Seeding
2. Install 18,680 s.f. Native Shade Seeding
3. Install 22,350 s.f. Native Shade Seeding
4. Install 33,448 s.f. Native Shade Seeding
5. Install 14,076 s.f. Wildflower Seeding
6. Install 11,537 s.f. Wildflower Seeding
7. Install 1,334 s.f. Wildflower Seeding
8. Install 40,690 s.f. Riparian Restoration Mix F Seeding
9. Install 2,108 s.f. Wildflower Seeding
10. Install 17,209 s.f. Wildflower Seeding
11. Install 8,465 s.f. Wildflower Seeding
12. Install 56,348 s.f. Wildflower Seeding
13. Install 8,634 s.f. Water Quality Seeding
14. Install 6,497 s.f. Wildflower Seeding
15. Install 16,848 s.f. Wildflower Seeding
16. Install 4,415 s.f. Wildflower Seeding
17. Install 5,280 s.f. Wildflower Seeding
18. Install 5,401 s.f. Riparian Restoration Mix F Seeding
19. Total area on FA14 and FA15, shown on FA14, note 8
20. Install 5,280 s.f. Riparian Restoration Mix A
21. Install 1,227 s.f. Native Shade Seeding
22. Install 1,227 s.f. Riparian Restoration Mix B
23. Install 18,680 s.f. Riparian Restoration Mix A
24. Install 22,350 s.f. Riparian Restoration Mix B
25. Install 20 TPSME
26. Install 17 TPIPO
27. Install 6 TPSME
28. Install 7 TQUGA
29. Install 2TPSME

Notes continue on FA15A

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA15-FA15A 6/21/2019 2:51:26 PM Jane

Rotation: 209.2943° 0'

(30) *Install 2 TCONU*

(31) *Install 7 TPIPO*

(32) *Install 6 TPSME*

(33) *Install 4 TCADE*

(34) *Install 5 TCONU*

(35) *Install 2 TCADE*

(36) *Install 3 TQUGA*

(37) *Install 2 TQUGA*

(38) *Install 5 TPIPO*

(39) *Install 3 TQUGA*

(40) *Install 9 TQUGA*

(41) *Install 1 TARME*

(42) *Install 8,465 s.f. Riparian Restoration Mix E*

(41) *Install 56,348 s.f. Riparian Restoration Mix A*

(44) *Install 6,497 s.f. Riparian Restoration Mix A*

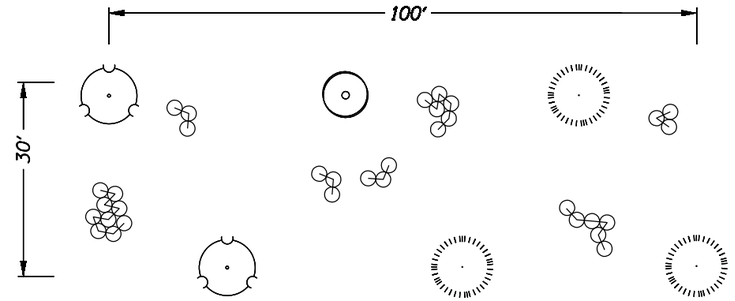
(45) *Install 16,848 s.f. Riparian Restoration MIx B*

(46) *Install 4,415 s.f. Riparian Restoration Mix A*

(47) *Install 5,280 s.f. Riparian Restoration Mix B*

(48) *Total area on FA14 and FA15, shown on FA14, note 15*

(49) *Install 410 s.f. Wetland Seeding*



LEGEND

Large, Slow-Growing Trees

Arbutus menziesii (TARME), 10%

Pinus ponderosa (TPIPO), 50%

Quercus garryana (TQUGA), 40%

Shrubs

Assorted Species

Riparian Restoration Mix E: Upland Trees and Shrubs

Key	Tree	Approximate Planting Density	Planting Percentage
	Large, Slow-Growing Trees		
	Arbutus menziesii	2 stems / 10,000 s.f.	10%
	Quercus garryana	8 stems / 10,000 s.f.	40%
	Pinus ponderosa var. willamettensis	10 stems / 10,000 s.f.	50%
	RIparIan RestoratIon MIx E: Upland Shrubs	Approximate Planting Density	Planting Percentage
	Shrubs*		
	Ceanothus velutinus	11 stems / 10,000 s.f.	10%
	Mahonia aquifolium	65 stems / 10,000 s.f.	60%
	Ribes sanguineum	16 stems / 10,000 s.f.	15%
	Symphoricarpos albus	16 stems / 10,000 s.f.	15%

* Groupings required

NOTE:
Total quantity of plants per species per area shown on FA03.

DETAIL: UPLAND TREES AND PLANTING MIX E

Not To Scale

TREE PLANTING NOTES

1) Install trees at an overall density of 20 trees/10,000 s.f.

2) Install trees at an average of 25' O.C. with triangular spacing.

3) Concentrate TQUGA in areas with most southern and western sun exposure.

4) Concentrate TPSME North and East of TQUGA.

5) Install shrubs 5' O.C. in groups of three to nine plants per species. Space shrub groups no closer than 15' apart and no closer than 5' to adjacent tree stems.

6) Spread species throughtout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

7) Maintain a 1' diameter plant-free area around all stems and mulch with shredded wood to prevent weeds.

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I-205: I-5 - OR213, PHASE 2 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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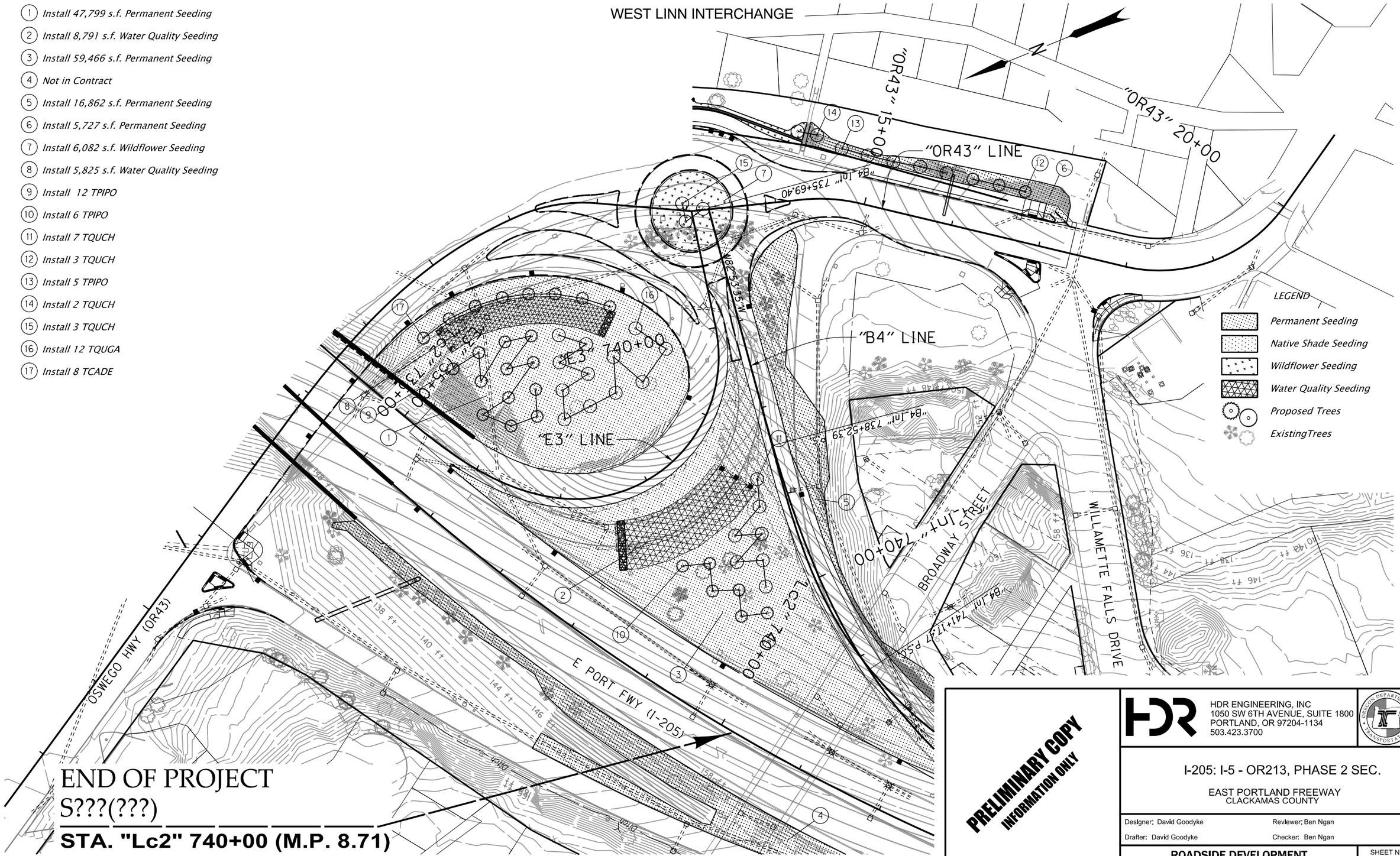
Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

1. Install 47,799 s.f. Permanent Seeding
2. Install 8,791 s.f. Water Quality Seeding
3. Install 59,466 s.f. Permanent Seeding
4. Not in Contract
5. Install 16,862 s.f. Permanent Seeding
6. Install 5,727 s.f. Permanent Seeding
7. Install 6,082 s.f. Wildflower Seeding
8. Install 5,825 s.f. Water Quality Seeding
9. Install 12 TPIPO
10. Install 6 TPIPO
11. Install 7 TQUCH
12. Install 3 TQUCH
13. Install 5 TPIPO
14. Install 2 TQUCH
15. Install 3 TQUCH
16. Install 12 TQUGA
17. Install 8 TCADE



END OF PROJECT

S???(???)

STA. "Lc2" 740+00 (M.P. 8.71)

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EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: David Goodyke | Reviewer: Ben Ngan
Drafter: David Goodyke | Checker: Ben Ngan

ROADSIDE DEVELOPMENT PLANTING PLAN/SECTION

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

NNA_Roadside_Devel :: FA16 6/21/2019 2:51:41 PM Jane

Rotation: 247.8868° 0'

GENERAL NOTES:

The construction, adjustment, maintenance, and upgrading of these Erosion and Sediment Control measures is the responsibility of the contractor for the duration of the project to comply with Section 00280 of the Oregon Standard Specifications for construction and the NPDES 1200-CA permit.

Erosion and Sediment Control measures shown on this plan are for anticipated site conditions. Adjust or upgrade these measures for unexpected storm events to ensure that sediment and sediment-laden water does not leave the site.

Develop a revised plan of the Erosion and Sediment Control measures shown as required by Section 00280, Oregon Standard Specifications for Construction. Implement this plan for all clearing and grading activities and in segments applicable to each staging phase. Construct in such a manner so as to ensure that sediment and sediment-laden water does not enter the roadway or drainage system, or violate applicable water standards.

Install measures within the right-of-way unless directed otherwise.

Inlet protection for existing facilities shall be installed before construction begins and shall remain in place until all construction is completed and approved. The contractor shall protect all storm drain inlets within the work area and adjacent to the work limits within 100' outside all working, stockpile, and staging areas, including the first inlet downstream (at any distance). In the case of inlets to be removed, protection measures shall remain in place until the new inlet is constructed and connected to the drainage network, and the existing inlet has been disconnected from the existing drainage network. Inlet protection shall be installed on new inlets before they are connected to the existing drainage network.

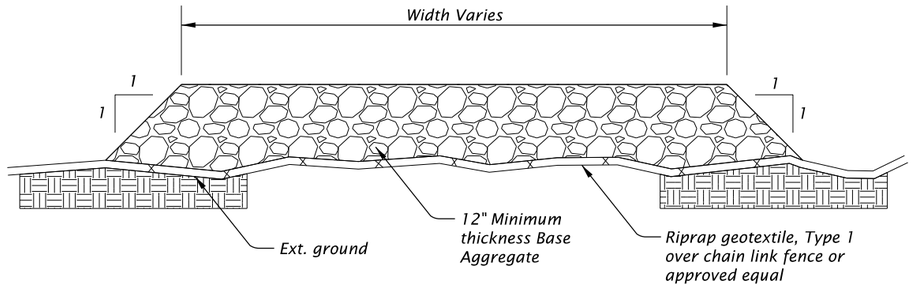
See section 00280 for material not shown in plans.

STANDARD DRAWINGS

☒	RD1000	Construction Entrances
☐	RD1005	Check Dams Type 1, 3 and 4
☒	RD1006	Check Dams Type 2 and 6
☒	RD1010	Inlet Protection Type 2, 3, 6 and 7
☐	RD1015	Inlet Protection Type 4
☒	RD1030	Sediment Barrier Type 2, 3 and 4
☐	RD1031	Sediment Barrier Type 5 and 6
☒	RD1032	Sediment Barrier Type 8
☒	RD1033	Sediment Barrier Type 9
☒	RD1040	Sediment Fence
☐	RD1045	Temporary Slope Drain With Energy Dissipator
☐	RD1050	Temporary Scour Basin
☒	RD1055	Slope and Channel Matting
☒	RD1060	Tire Wash Facility Type 1 and 2
☒	RD1065	Sediment Trap
☒	RD1070	Concrete Truck Wash Out

SEQUENCE OF WORK NOTES:

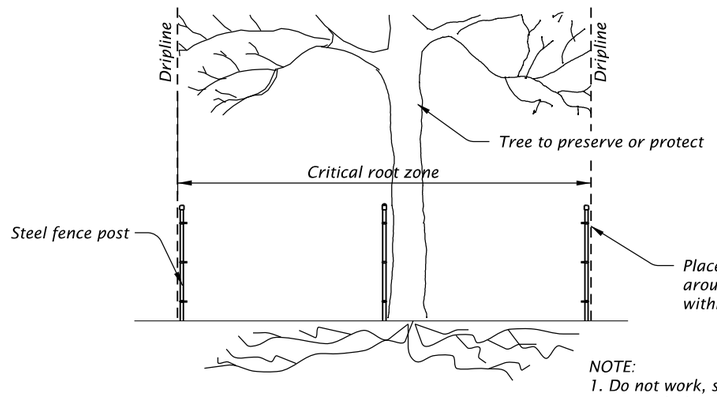
This Erosion and Sediment Control Plan has been prepared based upon the construction sequence represented in the Traffic Control Plan Sheets. This ESCP is not intended to supercede a construction sequencing plan. The ESCP is to be reviewed and revised to fit the actual construction sequence.



1. Existing ground shall grubbed to a depth 6".

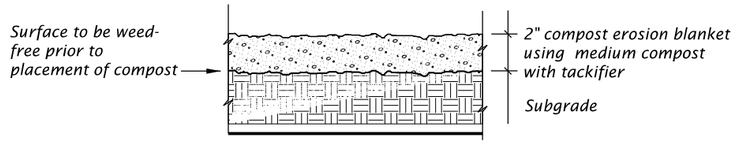
2. Cover existing ground under Staging Area with riprap geotextile and either chain link fence or other approved geogrid type material and cover with Base Aggregate.

STAGING AREA DETAIL
N.T.S.

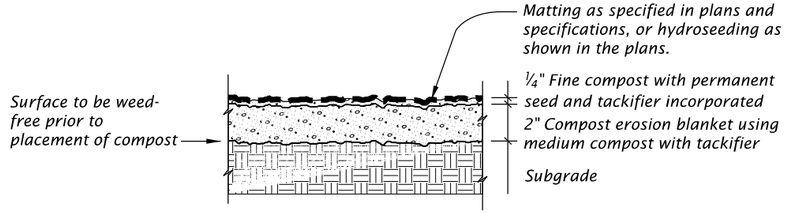


NOTE:
1. Do not work, store construction materials or park within the critical root zone of marked trees unless written approval has been obtained from the Engineer.

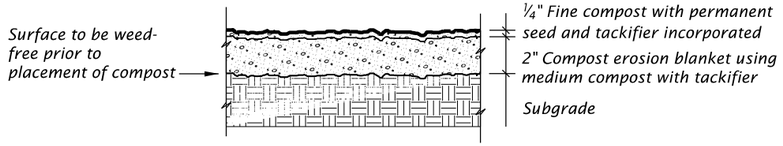
TREE PROTECTION DETAIL
N.T.S.



APPLICATION - TEMPORARY/PERMANENT MULCHING
N.T.S.



APPLICATION - STEEP SLOPES, SHALLOW DITCHES & BIO-SWALES
N.T.S.



APPLICATION – TEMPORARY/PERMANENT VEGETATIVE COVER
N.T.S.

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

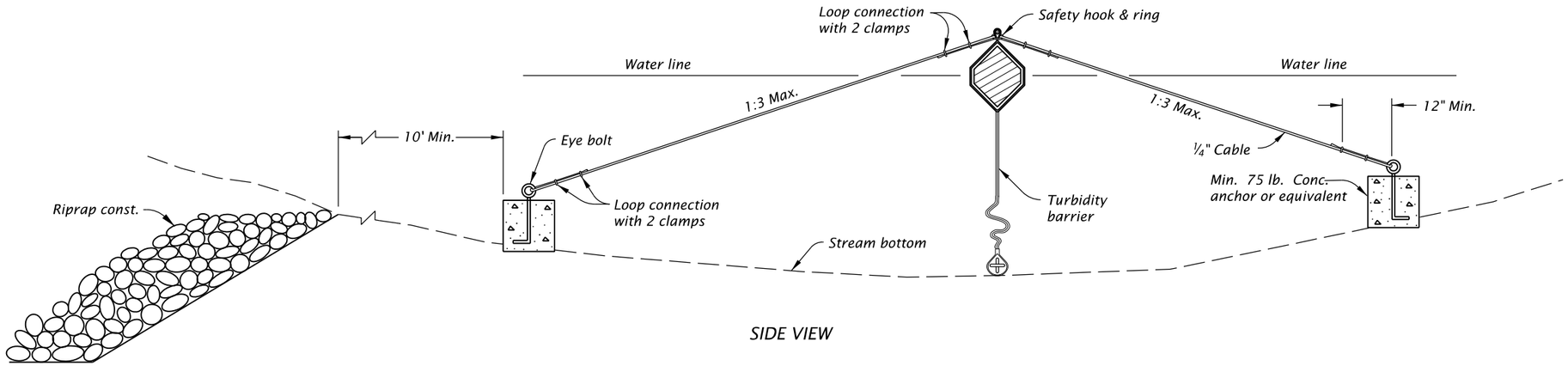
EROSION AND SEDIMENT CONTROL

SHEET NO.

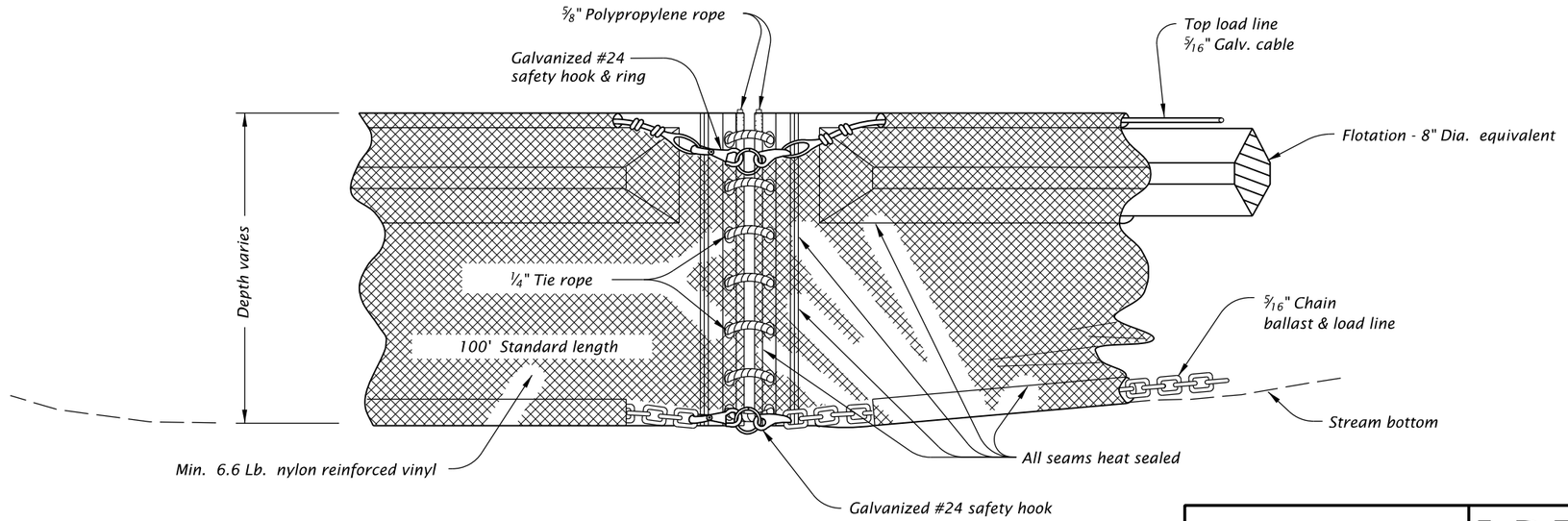
FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec01_phase 1.dgn :: FB01 6/25/2019 11:15:59 AM CDONOVAN
Rotation: 0° 0'

SEDIMENT BARRIER FLOATING



SIDE VIEW



ANCHOR ASSEMBLY

NOTE:

Components of this barrier may be similar or identical to proprietary designs. Any infringement on the proprietary rights of the designer shall be the sole responsibility of the contractor. Substitutions shall be as approved by the engineer.

TURBIDITY BARRIER

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec01_phase 1.dgn :: FB02 6/25/2019 11:16:01 AM CDONOVAN

Rotation: 0° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

BEGINNING OF PROJECT
S???(???)
STA. "L" 659+00 (M.P. 10.24)

N

Extg. R/W

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

"L" 655+00

"L" 660+00

"L" 665+00

Extg. R/W

Extg. R/W

Ditch

(1) *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*

(2) *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

(3) *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

(4) *Install orange plastic mesh fencing*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*

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1050 SW 6TH AVENUE, SUITE 1800
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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

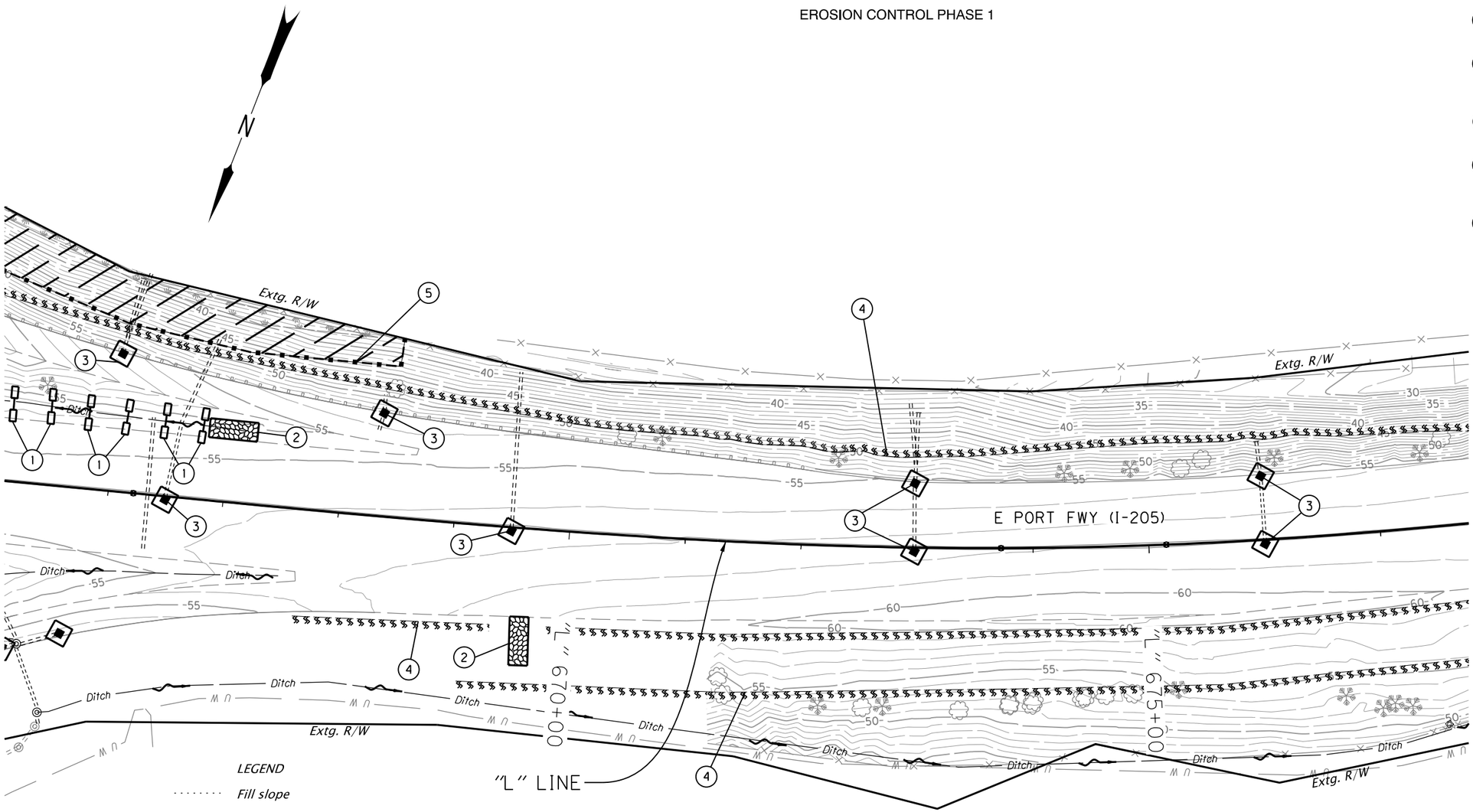
EE_K19786_HDR_ec01_phase 1.dgn :: FB03 6/25/2019 11:16:04 AM CDONOVAN

Rotation: 227.6721° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
2. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
3. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
4. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*
5. *Install orange plastic mesh fencing*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Wetland*
- *Ordinary High Water*
- *Compost filter berm*
- *Flow direction*
- *Construction entrance*

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1050 SW 6TH AVENUE, SUITE 1800
PORTLAND, OR 97204-1134
503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB04 6/25/2019 11:16:17 AM CDONOVAN

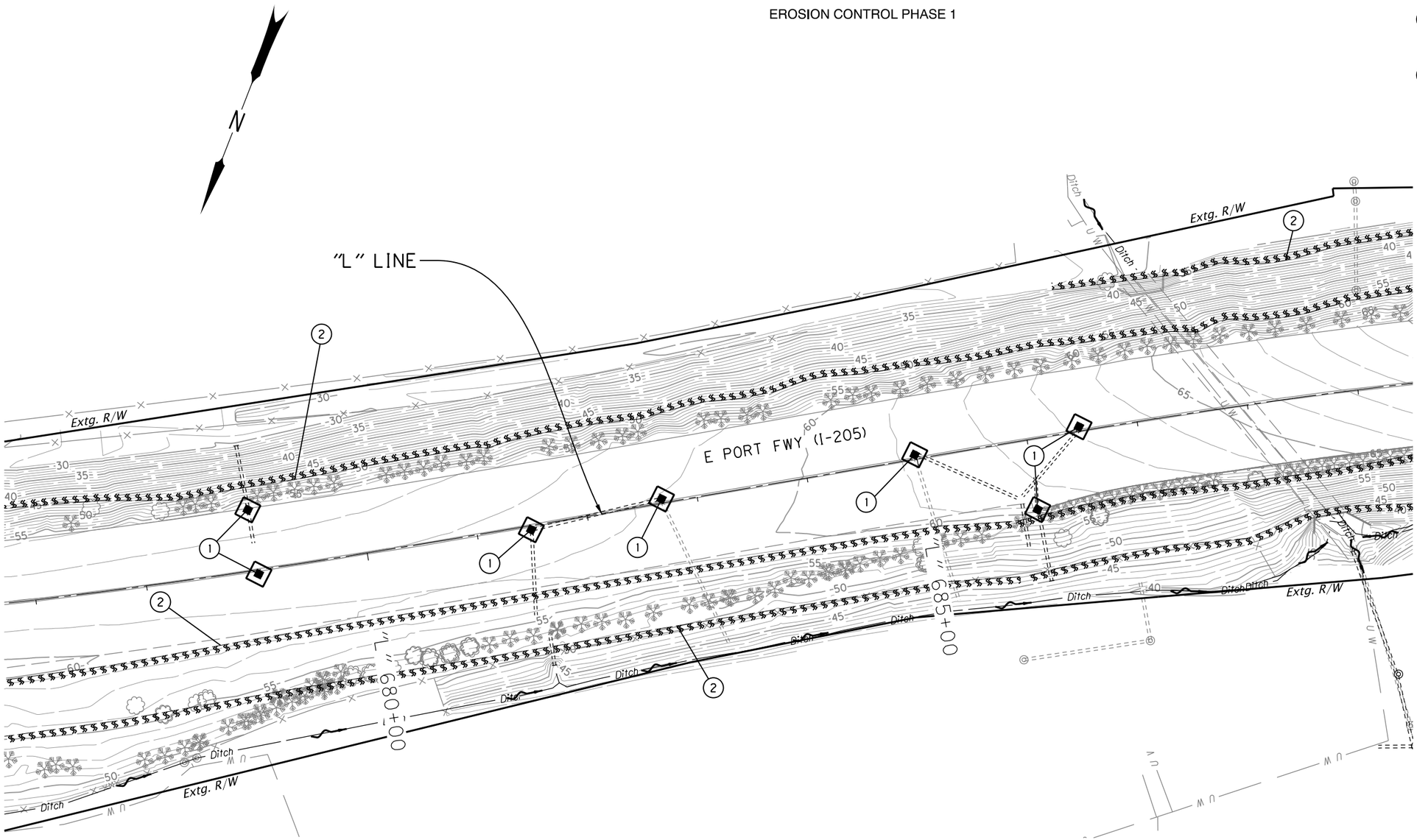
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

1. *Const. inlet protection - xx (Type 3) (See drg. no. RD1010)*
2. *Install sediment barrier, (Type 9) - xx' (See drg. no. RD1033)*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

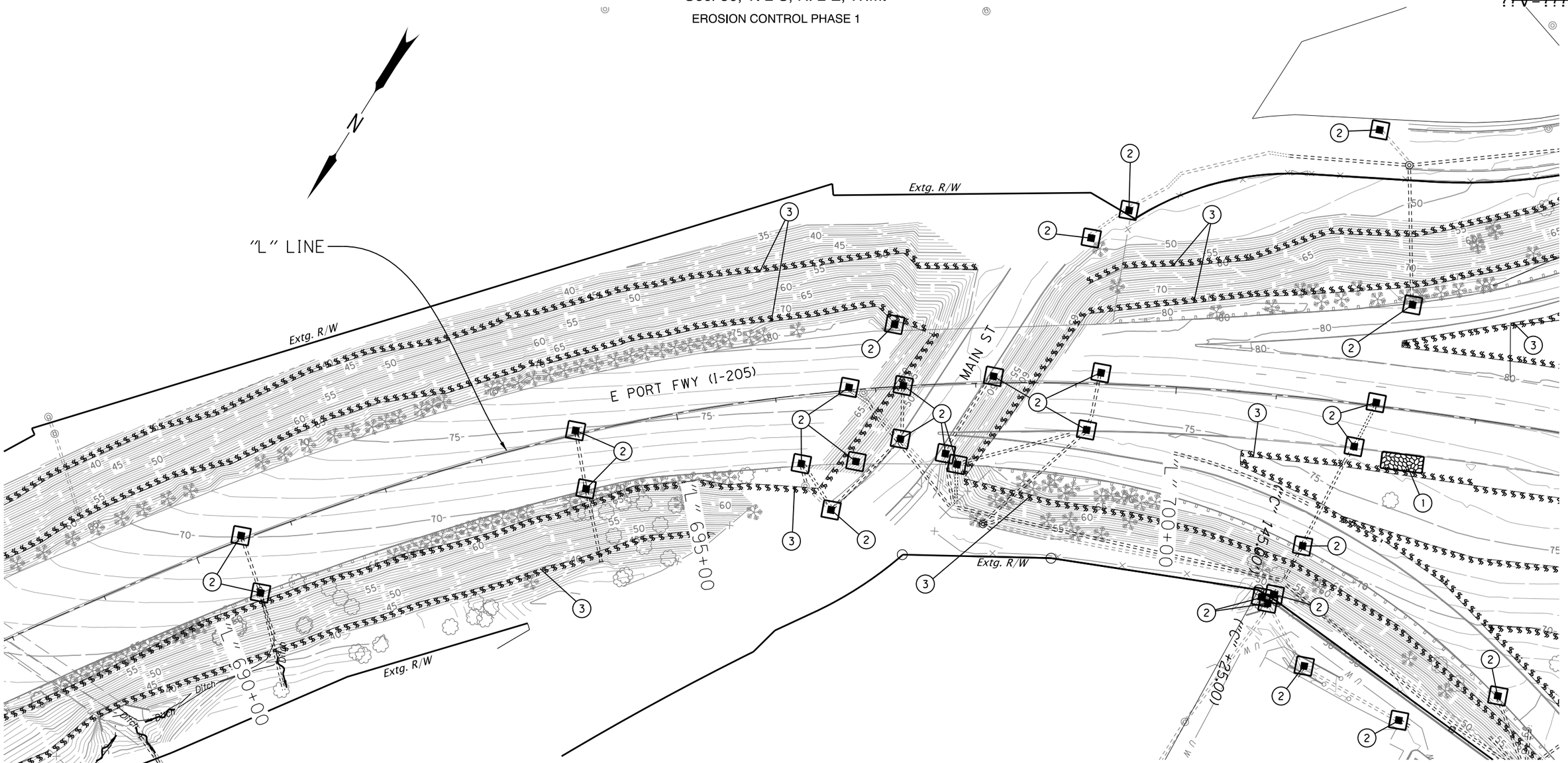
EE_K19786_HDR_ec01_phase 1.dgn :: FB05 6/25/2019 11:16:34 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 228.87° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
3. *Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB06 6/25/2019 11:16:47 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 212.6746° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost filter berm
- Ordinary High Water
- Flow direction
- Construction entrance

1. Const. construction entrance – xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)
3. Install sediment barrier (Type 9, Compost filter berm) (See drg. no. RD1033)

"L" LINE

"L" 705+00

"L" 710+00

Extg. R/W

E PORTLAND FWY (I-205)

PACIFIC HWY (OR99E)

Extg. R/W

For creek erosion control plans see shts. FB21, FB22, FB23

ABERNETHY CREEK

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

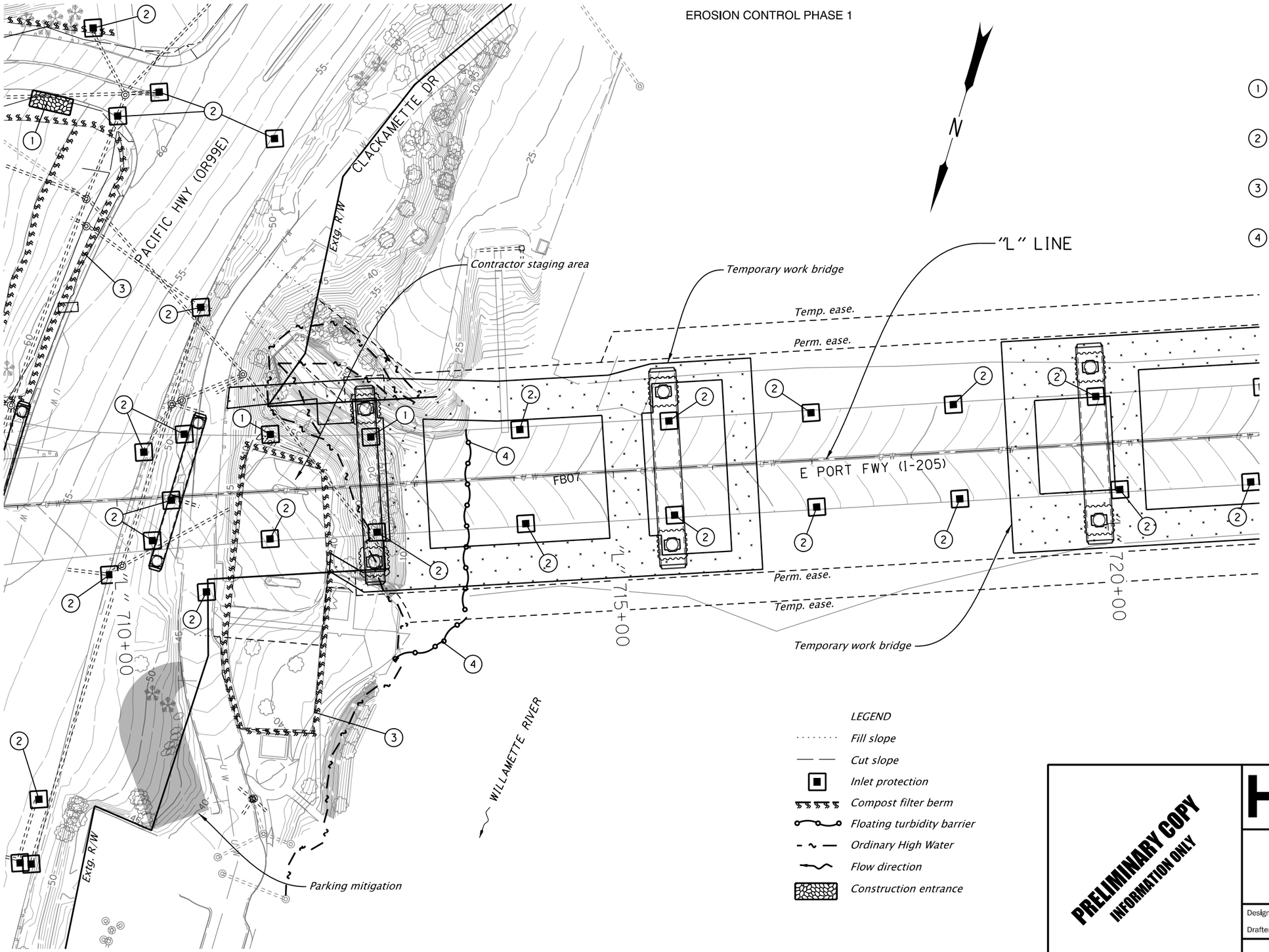
EE_K19786_HDR_ec01_phase 1.dgn :: FB07 6/25/2019 11:16:59 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 272.0412°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1



GENERAL NOTES:

Floating turbidity barrier only required for rip rap removal.

1. *Const. construction entrance – x (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*
4. *Const. turbidity barrier – xx (See Sheet FB11)*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Floating turbidity barrier*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB08 6/25/2019 11:17:11 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 1

N

WILLAMETTE RIVER

Temporary work bridge

Potential contractor staging area

Potential contractor access road

Potential contractor staging area

"L" LINE

"LC2" 730+00

"OR43" 10+00

Extg. R/W

Temp. ease.

Perm. ease.

E PORT FWY (I-205)

Temp. ease.

Perm. ease.

"D2" LINE

"L" 725+00

"D2" 725+00

"L" 730+00

"D2" 730+00

Temporarily fill in creek
Divert using 18" pipe
For creek erosion control
plans see details FB26

Preserve & protect
extg. trees

Temporarily fill in creek
Divert using 18" pipe

Extg. R/W

"OR43"

WILLAMETTE RIVER

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Orange plastic fence (no work area)
- Compost filter berm
- Wetland
- Ordinary High Water
- Flow direction
- Construction entrance
- Access road

GENERAL NOTES:

Floating turbidity barrier only required for rip rap removal.

1. Const. construction entrance - xx (Type 1) (See drg. no. RD1000)
2. Const. inlet protection - xx (Type 3) (See drg. no. RD1010)
3. Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
4. Const. turbidity barrier - xx (See Sheet FB11)
5. Install orange plastic mesh fencing

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB09 6/25/2019 11:17:33 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 1

N

1. *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*
2. *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*
3. *Install sediment barrier – xx (Type 9) (See drg. no. RD1033)*

"Lc2" LINE

"OR43" 10+00

Potential contractor staging area

WILLAMETTE RIVER

Extg. R/W

"OR43" LINE

"OR43" 15+00

"OR43" 20+00

"D2" LINE

"OR43" 5+00

"E3" 735+00

"Lc2" 735+00

"E3" 740+00

"E3" LINE

OSWEGO HWY (OR43)

E PORT FWY (I-205)

"B4" LINE

"B4" 740+00

"Lc2" 740+00

Extg. R/W

Mid Quadrin Creek

Ditch

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Compost filter berm*
- *Orange plastic fence (no work area)*
- *No work zone*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*
- *Access road*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB10 6/25/2019 11:17:46 AM CDONOVAN

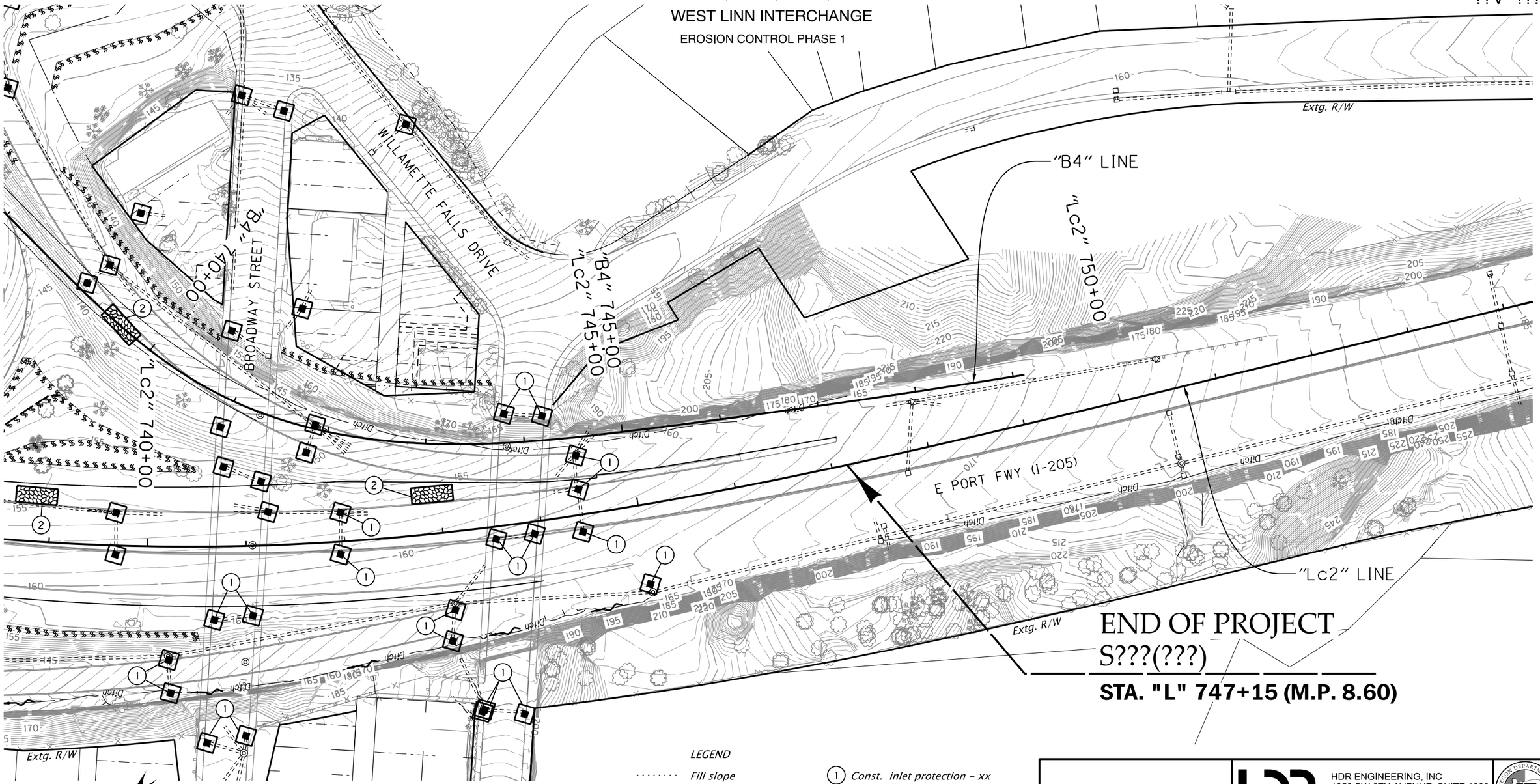
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 260.6437°

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 1



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

(1) *Const. inlet protection – xx (Type 3) (See drg. no. RD1010)*

(2) *Const. construction entrance – xx (Type 1) (See drg. no. RD1000)*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 1.dgn :: FB11 6/25/2019 11:17:59 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 218.1362° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

STA. "L" 659+00 (M.P. 10.24)

BEGINNING OF PROJECT
S???(???)

E PORT FWY (I-205)

CASCADE HWY (OR213)

"L" LINE

Extg. R/W

Ditch

1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *No work zone*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Erosion control matting*
- *Wetland*
- *Ordinary High Water*
- *Flow direction*
- *Construction entrance*

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

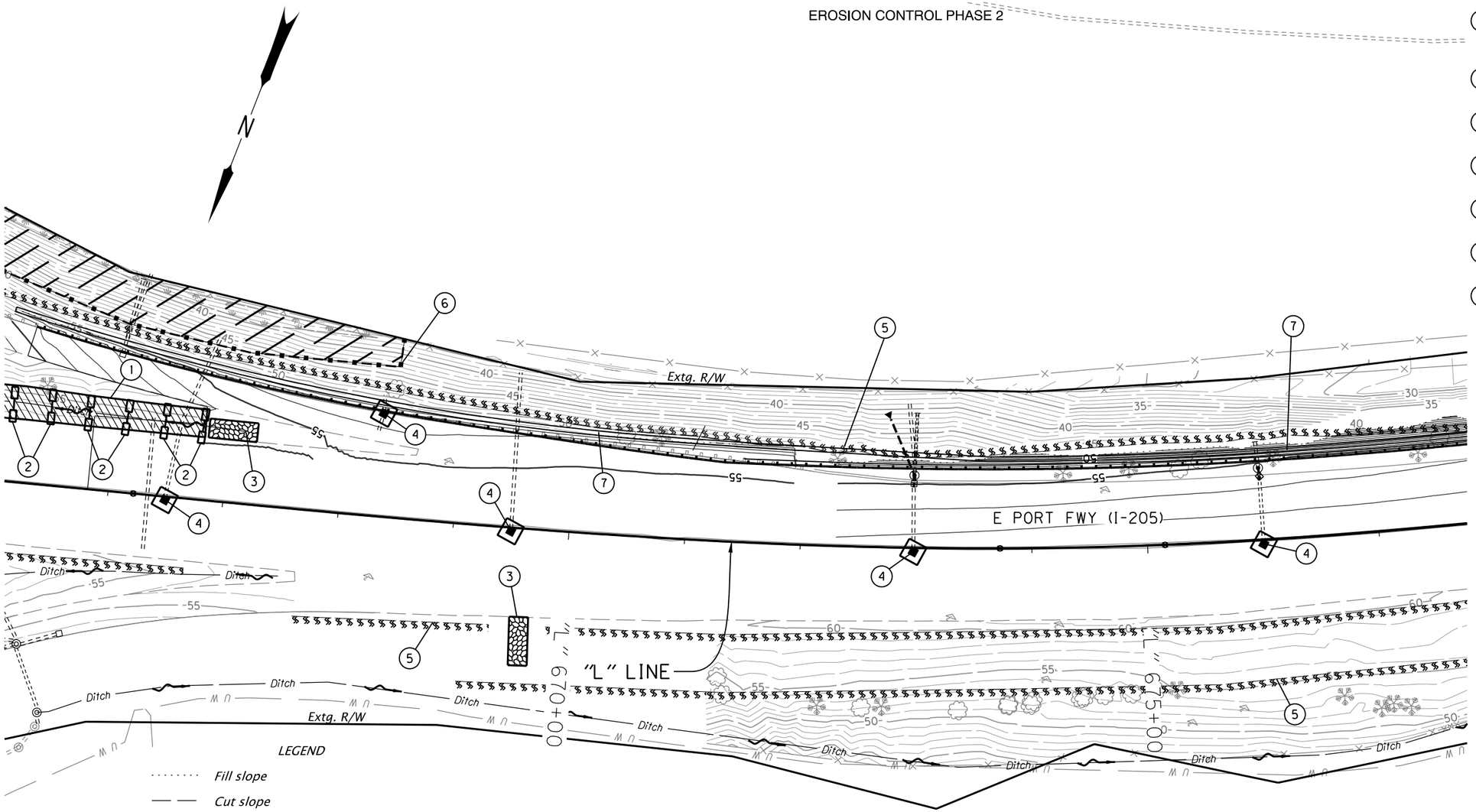
EE_K19786_HDR_ec01_phase 2.dgn :: FB12 6/25/2019 11:18:38 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

Rotation: 227.6721°

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



1. *Install matting – xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. check dam, (Type 6) – xx (See drg. no. RD1006)*
3. *Const. construction entrance – xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) – xx (See drg. no. RD1033)*
6. *Install orange plastic mesh fencing – xx*
7. *Seeding and mulching – xx*

LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Seeding and mulching*
- *No work zone*
- *Erosion control matting*
- *Orange plastic fence (no work area)*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Construction entrance*
- *Flow direction*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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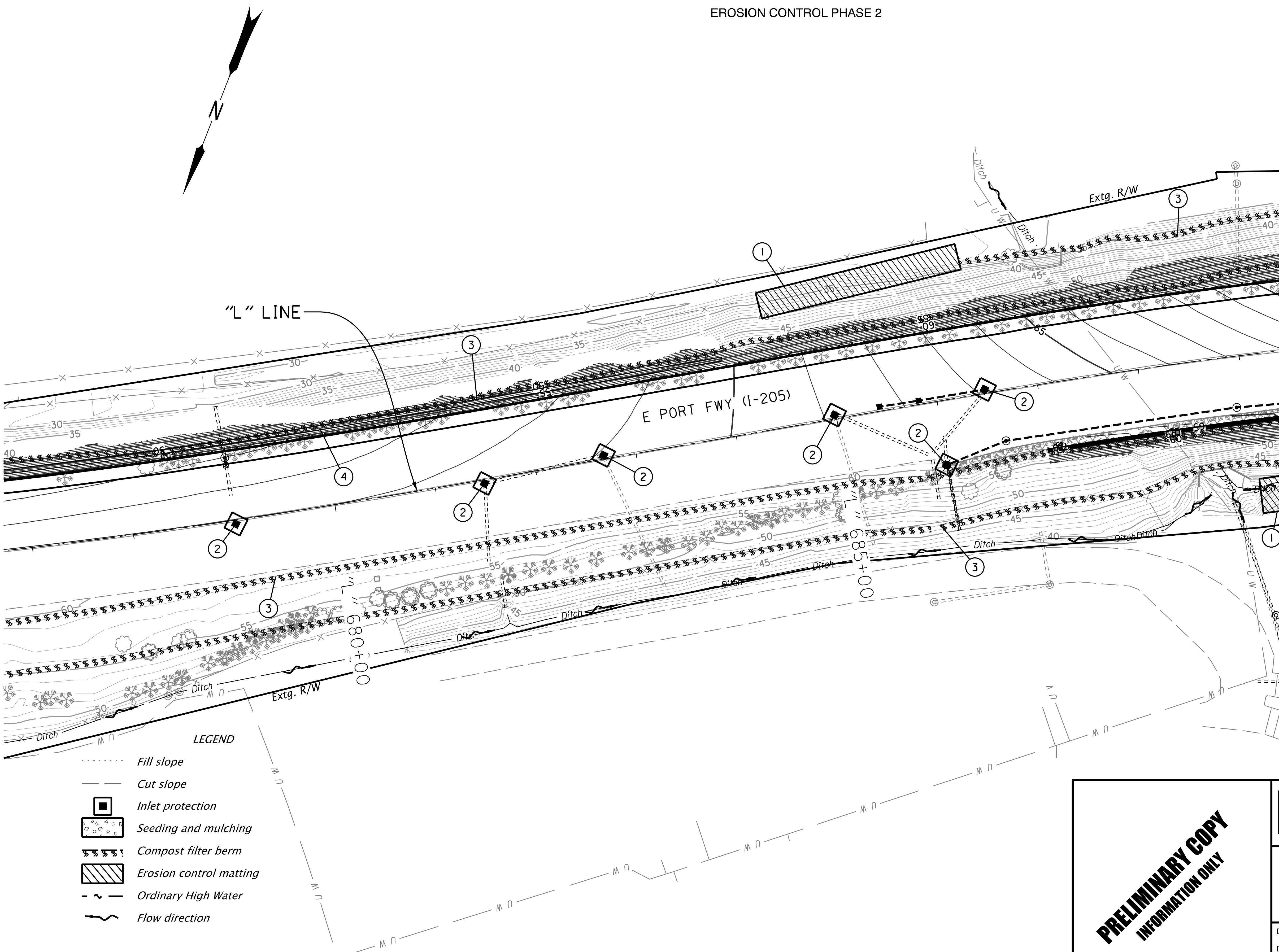
EE_K19786_HDR_ec01_phase 2.dgn :: FB13 6/25/2019 11:18:42 AM CDONOVAN

Rotation: 230.7962° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

1. *Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)*
3. *Install sediment barrier, (Type 9) - xx (See drg. no. RD1033)*
4. *Seeding and mulching - xx*



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Seeding and mulching*
- *Compost filter berm*
- *Erosion control matting*
- *Ordinary High Water*
- *Flow direction*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

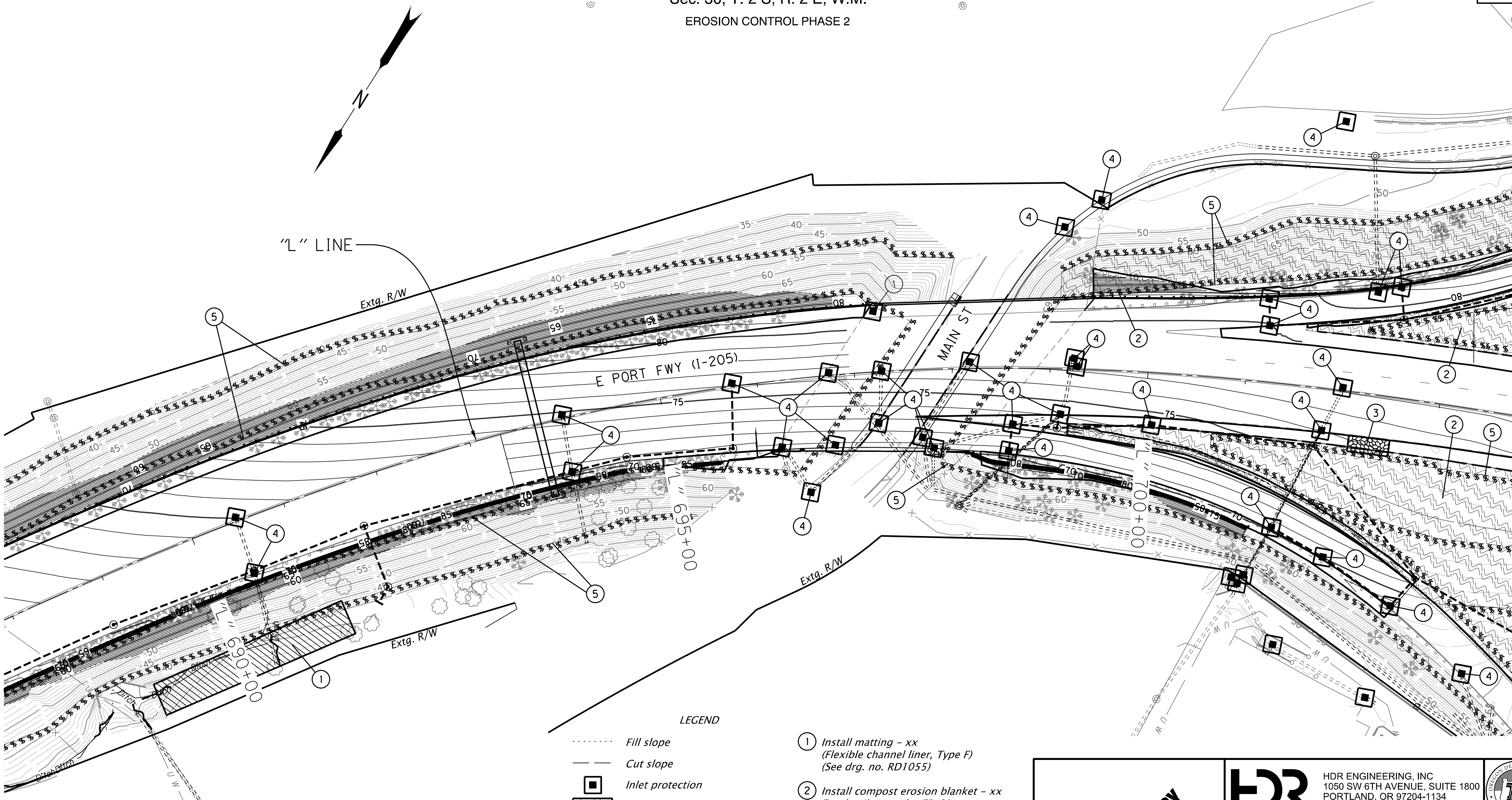
SHEET NO.

EROSION AND SEDIMENT CONTROL

Item #1.

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2



LEGEND

Fill slope	
Cut slope	
Inlet protection	
Compost blanket	
Erosion control matting	
Wetland	
Ordinary High Water	
Flow direction	
Compost filter berm	

1. *Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)*
2. *Install compost erosion blanket - xx For details, see sht. FB-01*
3. *Const. construction entrance - xx (See drg. no. RD1000)*
4. *Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)*
5. *Install sediment barrier, (Type 9) - xx (See drg. no. RD1033)*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

SHEET NO.

EROSION AND SEDIMENT CONTROL

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Erosion control matting
- Ordinary High Water
- Construction entrance
- Flow direction
- Compost filter berm
- Orange plastic fence (no work area)

1. Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket - xx For details, see sht. FB-01
3. Const. construction entrance - xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)
5. Install sediment barrier - xx (Type 9) (See drg. no. RD1033)
6. Install orange plastic mesh fencing - xx

N

Extg. R/W

E PORT FWY (I-205)

"L" LINE

PACIFIC HWY (OR99E)

Parking mitigation

Perm. ease

Ditch

ABERNETHY CREEK

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

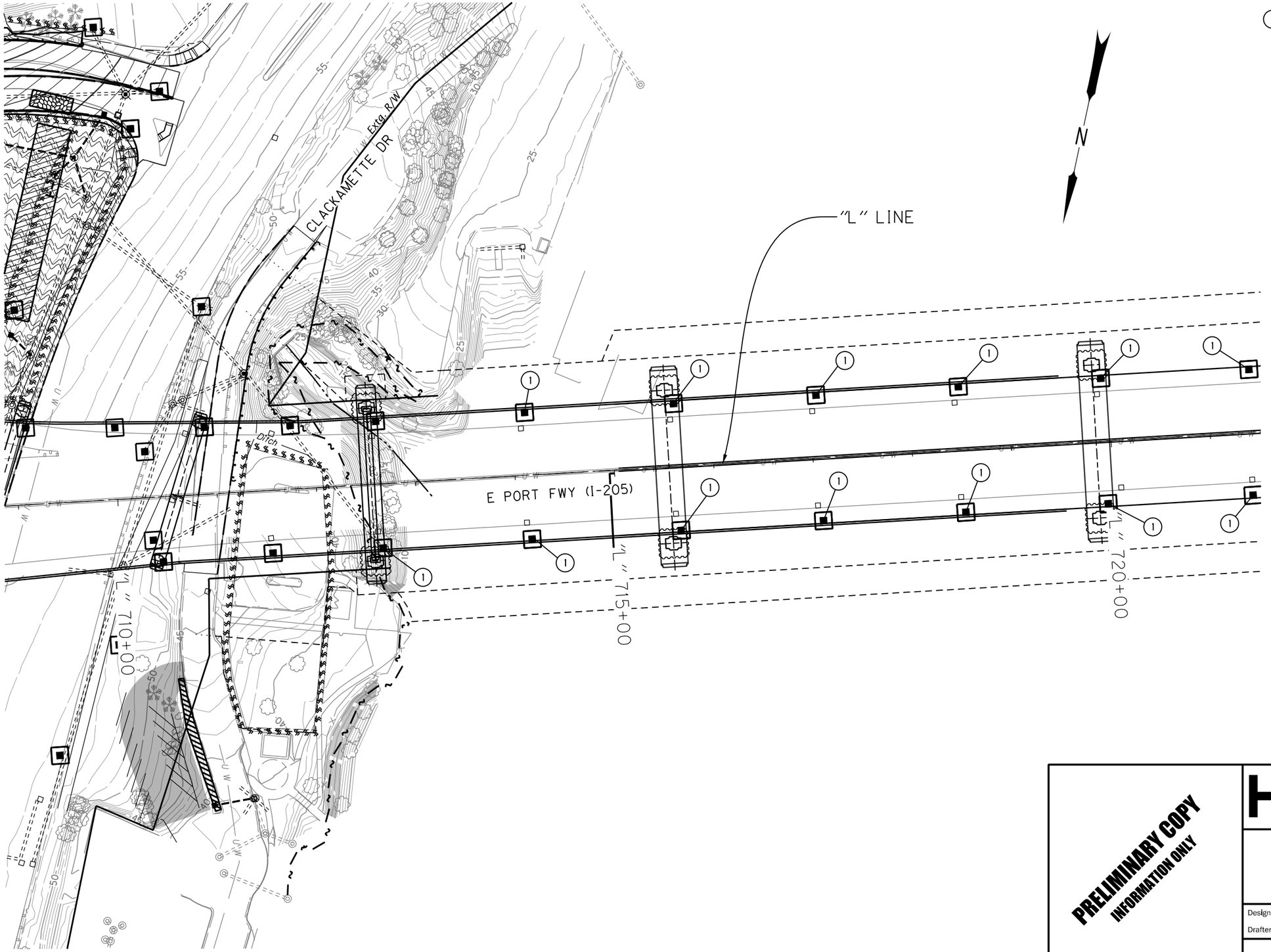
EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec01_phase 2.dgn :: FB16 6/25/2019 11:19:10 AM CDONOVAN

Rotation: 272.0412°



(1) *Const. inlet protection – 25 (Type 3) (See drg. no. RD1010)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB17 6/25/2019 11:19:23 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 198.3393° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

EROSION CONTROL PHASE 2

WILLAMETTE RIVER

N

"L" LINE

"Lc2" LINE

"Lc2" 730+00

For creek erosion control plans see Shts. FB21 - FB25.

Temp. ease. - Work area

Perm. ease.

Extg. R/W

E PORT FWY (I-205)

"D2" LINE

"D2" 725+00

"D2" 730+00

"L" 730+00

1. Install matting - xx (Flexible channel liner, Type F) (See drg. no. RD1055)
2. Install compost erosion blanket - xx For details, see sht. FB-01
3. Const. construction entrance - xx (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx (See drg. no. RD1010)

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Flow direction
- Wetland
- Construction entrance
- Ordinary High Water
- Orange plastic fence (no work area)
- Compost blanket
- Erosion control matting
- No work zone

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB18 6/25/2019 11:19:35 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 198.4431° 0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 2

WILLAMETTE RIVER

N

1. Install matting - xx
   (Flexible channel liner, Type F)
   (See drg. no. RD1055)
2. Install compost erosion blanket - xx
   For details, see sht. FB-01
3. Const. construction entrance - xx
   (See drg. no. RD1000)
4. Const. inlet protection, (Type 3) - xx
   (See drg. no. RD1010)
5. Install sediment barrier - xx
   (Type 9)
   (See drg. no. RD1033)

Extg. R/W

"D2" LINE

"Lc2" LINE

"1" LINE

"E3" LINE

"B4" LINE

"Lc2" 735+00

"1" 735+00

"Lc2" 740+00

"OR43" LINE

OSWEGO HWY (OR43)

Ditch

LEGEND

- Fill slope
- Cut slope
- Inlet protection
- Compost blanket
- Compost filter berm
- Erosion control matting
- Orange plastic fence (no work area)
- Wetland
- Ordinary High Water
- Construction entrance
- Flow direction

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503.423.3700

OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec01_phase 2.dgn :: FB19 6/25/2019 11:19:47 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

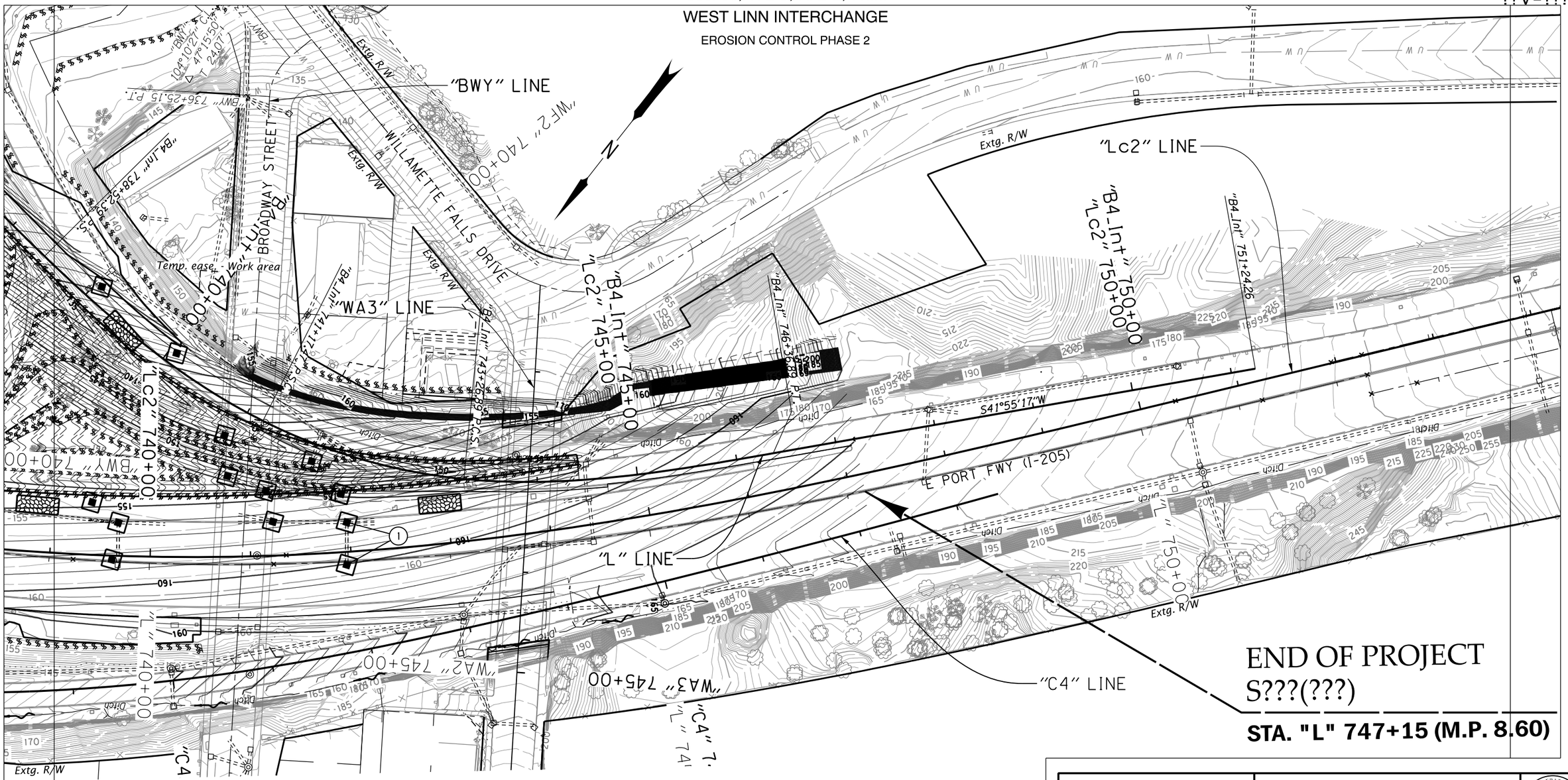
Rotation: 260.6437°

0'

Sec. 30, T. 2 S, R. 2 E, W.M.

WEST LINN INTERCHANGE

EROSION CONTROL PHASE 2



LEGEND

- *Fill slope*
- *Cut slope*
- *Inlet protection*
- *Check dam in ditch section*
- *Compost blanket*
- *Compost filter berm*
- *Wetland*
- *Ordinary High Water*
- *Construction entrance*
- *Flow direction*
- *Orange plastic fence (no work area)*
- *Erosion control matting*

(1) *Const. inlet protection, (Type 3) – xx (See drg. no. RD1010)*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

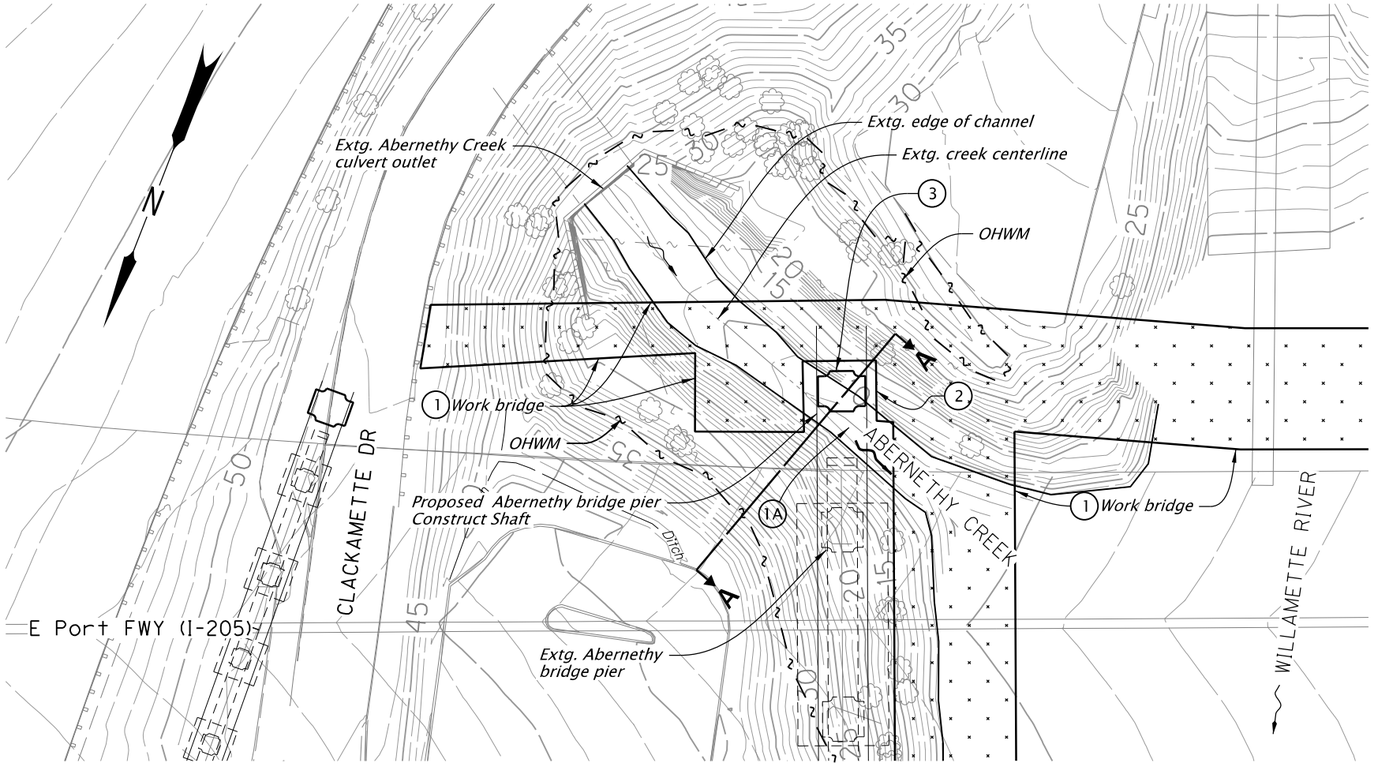
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec01_phase 2.dgn :: FB20 6/25/2019 11:19:59 AM CDONOVAN

Rotation: 218.1362°

0'



Abernethy Creek - Phase 1
(In-water-work activity)
Construct temporary work bridge and Pier 3, south side.

CONSTRUCTION SEQUENCE

1A *Remove existing rip rap (as required)*
1 *Install temporary work bridge*
2 *Install temporary shoring at Pier 3*
3 *Construct shaft*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

See sht. FB 24 for section A-A.

LEGEND

Fill slope
Cut slope
Ordinary High Water
Flow direction

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

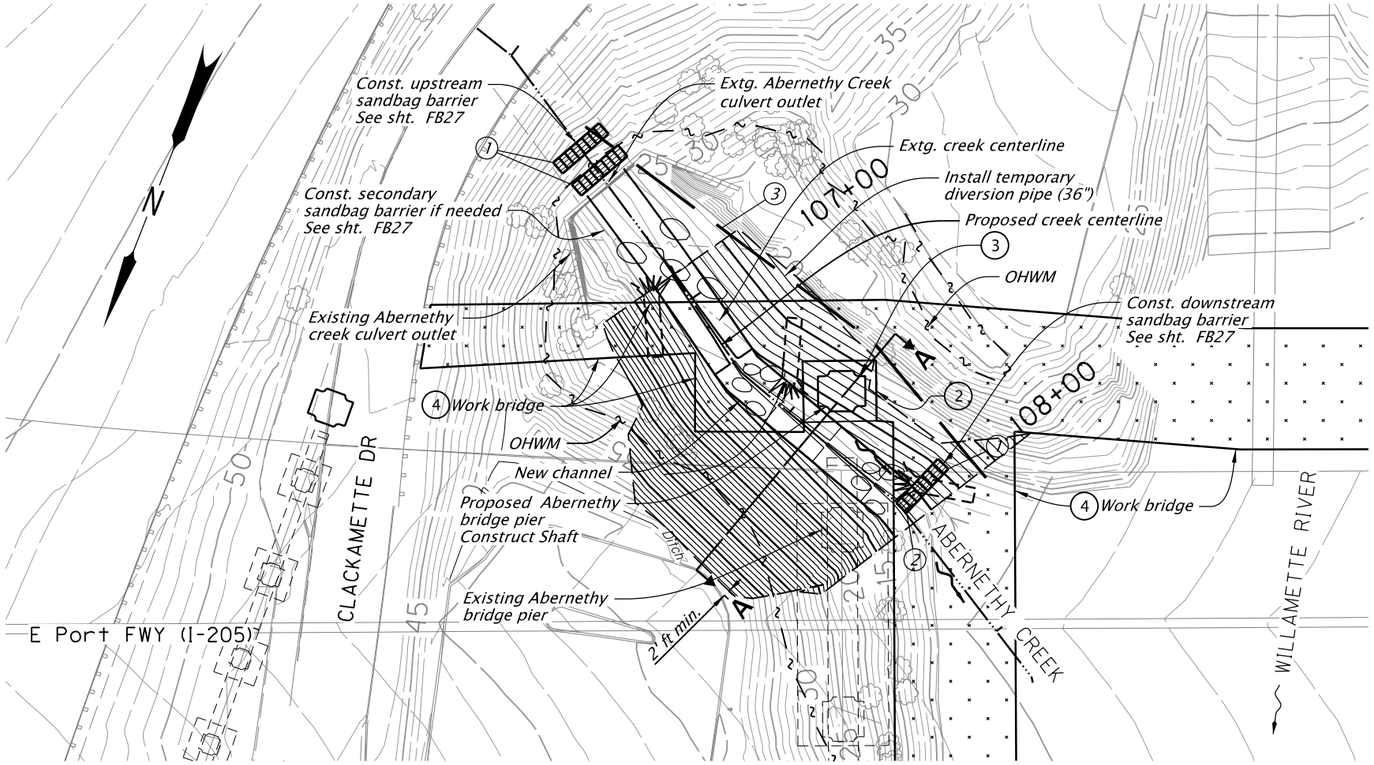
EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec02.dgn :: FB21 Phase 1 6/25/2019 11:20:04 AM CDONOVAN

Rotation: 201.4396 0'



Abernethy Creek Construction - Phase 2A
(In-water-work)
Complete Pier 3 south side architetural treatment and channel restoration

CONSTRUCTION SEQUENCE

1. *Complete architectural finish on Pier 3 southern shaft*
2. *Install temporary diversion*
3. *Remove coffer dam at soutern shaft of Pier 3*
4. *Remove work bridge*
5a. *Realign Abernethy Creek*
5b. *Remove temporary water management features*
6. *Install channel restoration features*

FULL ISOLATION NOTES:

1. *Isolating the work site upstream: Install single primary sandbag barrier across the stream channel. If Needed, install secondary sandbag barrier. Downstream: Install sandbag barrier.*
2. *Install sandbag barrier downstream from work area. Location to be set based on topography and easements available.*
3. *Size the temporary water management facility based on site conditions. Route water around work area using pipe, pump or combination. The discharge table below can be used to estimate the size of the bypass pipe and/or pump.*

Note:
Work bridge location and temporary work access is shown for reference only and is subject to change.

Temporary work access must accommodate existing flow rates for Abernethy Creek
See sht. XX for additional shoring details.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

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I-205: I-5 - OR213, PHASE 1 SEC.

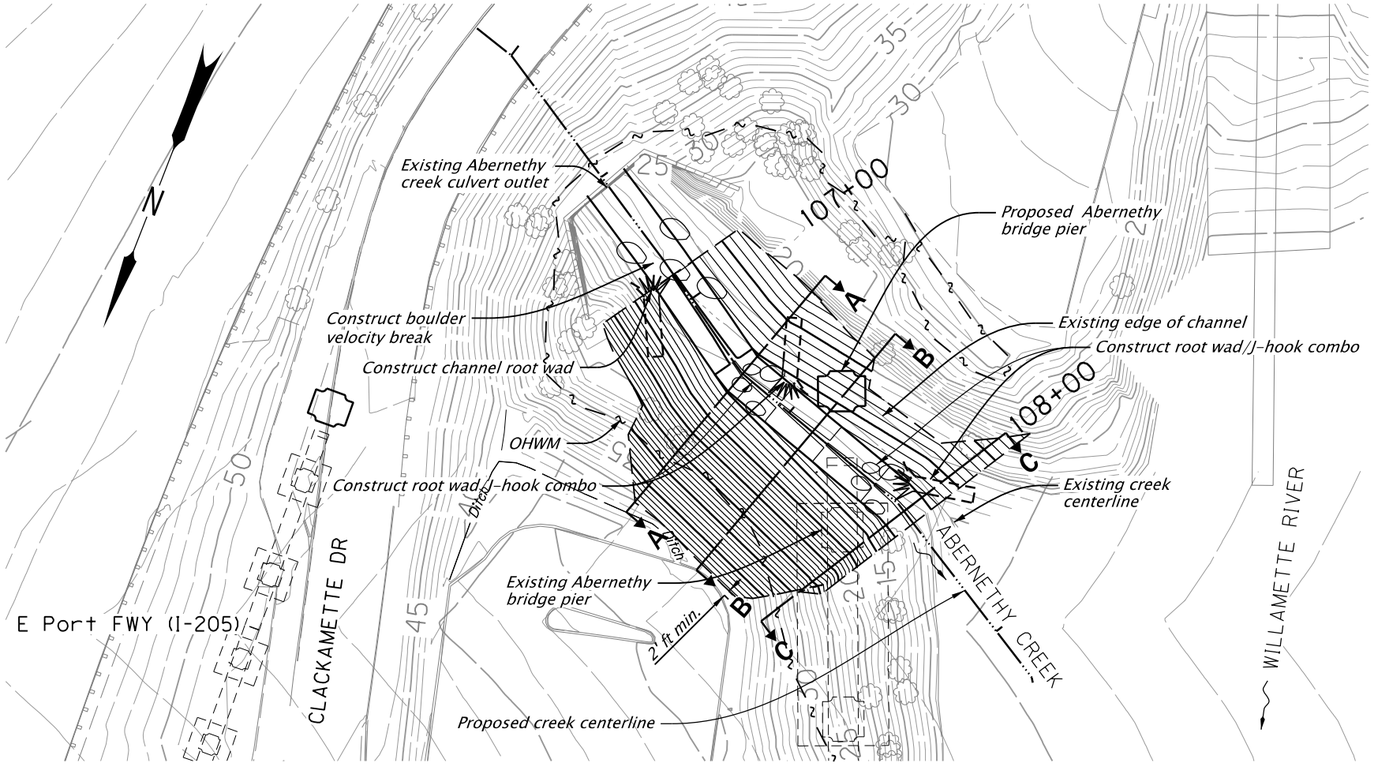
EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec02.dgn :: FB22 Phase 2a 6/25/2019 11:20:05 AM CDONOVAN
FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST
Rotation: 201.4396 0'



Notes:
Root wad key pieces should be at least 22 inches in diameter and buried 10-15 feet.

Boulders and structure rocks should be greater than 30 inches in diameter.

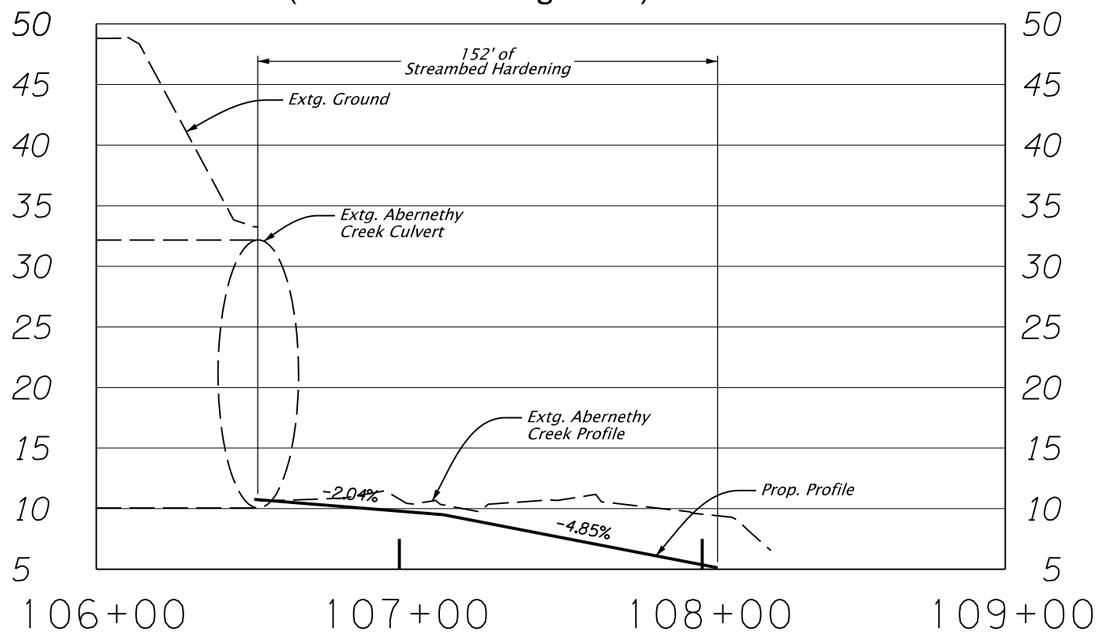
For root wad/J-hook combo, channel root wad, and boulder velocity break, see details XX, XX, and .

For section B-B, see sht. FB24. For section A-A and C-C, see sht. FB25.

LEGEND

- *Fill slope*
- *Cut slope*
- *Ordinary High Water*
- *Flow direction*

Abernethy Creek - Phase 2B
(Final Channel Configuration)



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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

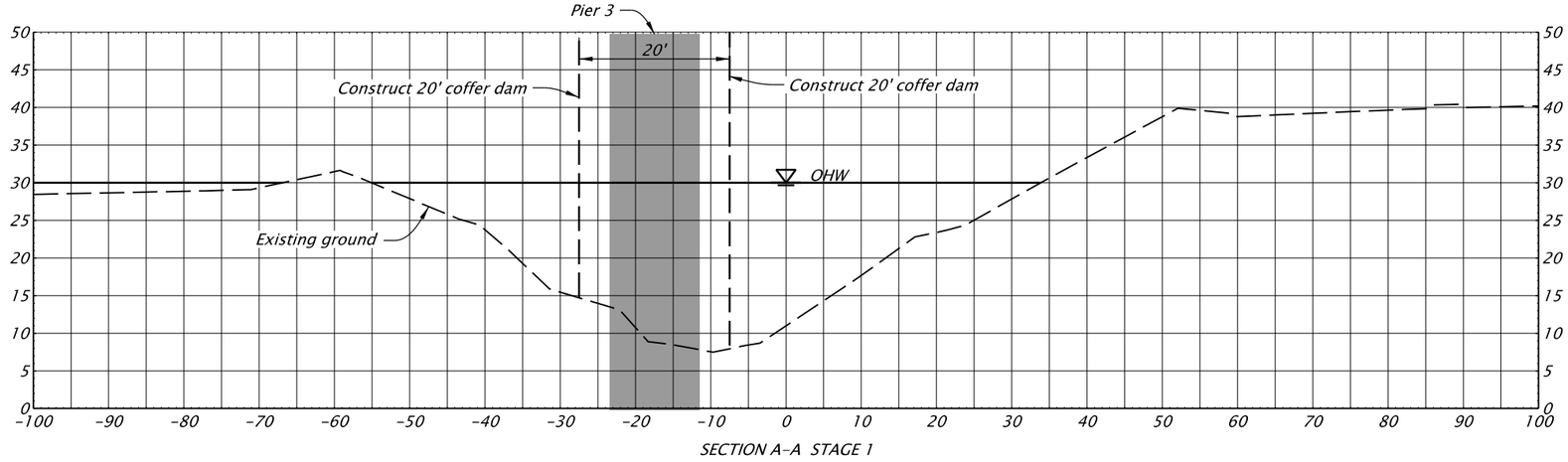
EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec02.dgn :: FB23 Phase 2b 6/25/2019 11:20:07 AM CDONOVAN

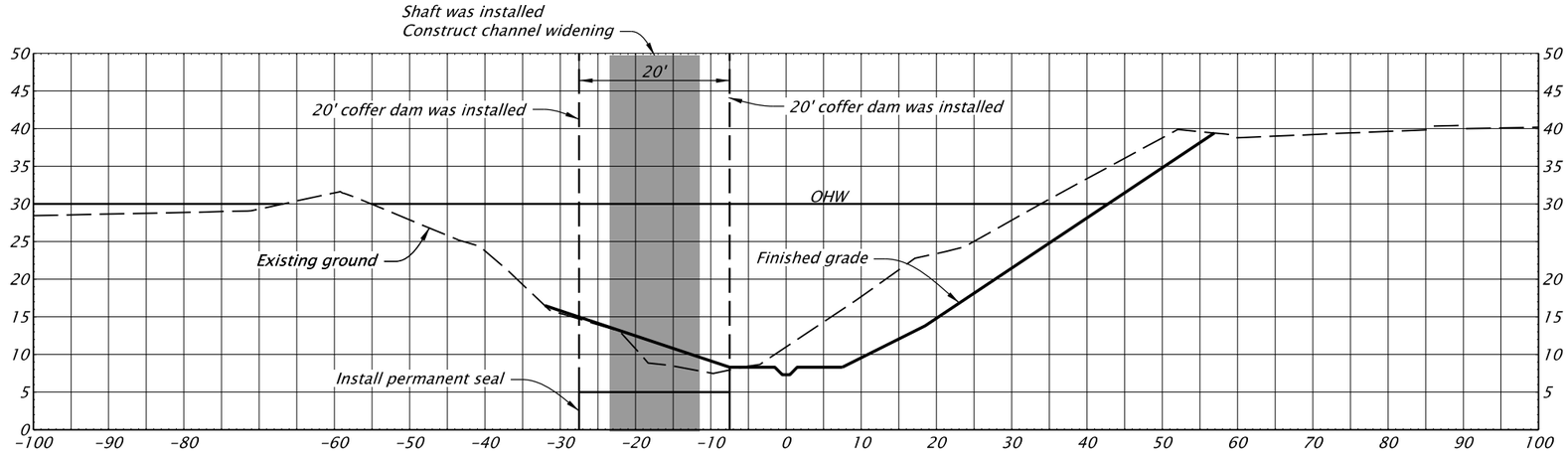
Rotation: 201.4396 0'



SECTION A-A STAGE 1

Stage 1:

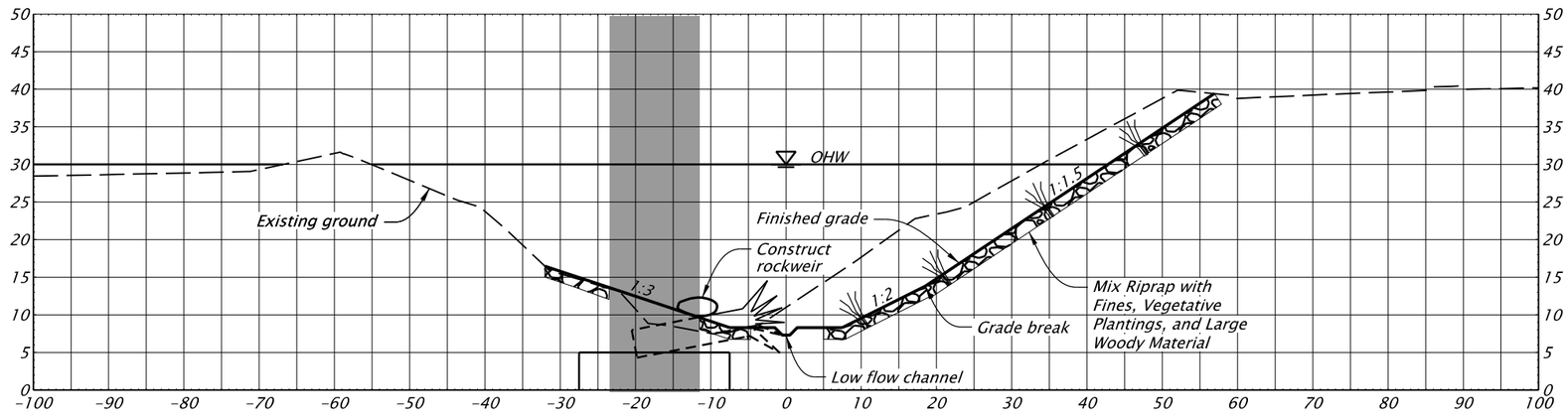
_ Construct shaft
_ Temporary coffer dam



SECTION A-A STAGE 2A

Stage 2A:

- Complete architectural treatment at Pier 3 (south side)
- remove coffer dam and temporary work bridge
- Construct Abernethy Creek channel realignment
- Complete final creek restoration



SECTION B-B STAGE 2B

Stage 2B:

- Complete final creek reconfiguration

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Drafter: Connor Donovan
Reviewer: Matt Steigleder
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

EE_K19786_HDR_ec02.dgn :: FB24 6/25/2019 11:20:07 AM CDONOVAN

FINAL ELECTRONIC DOCUMENT
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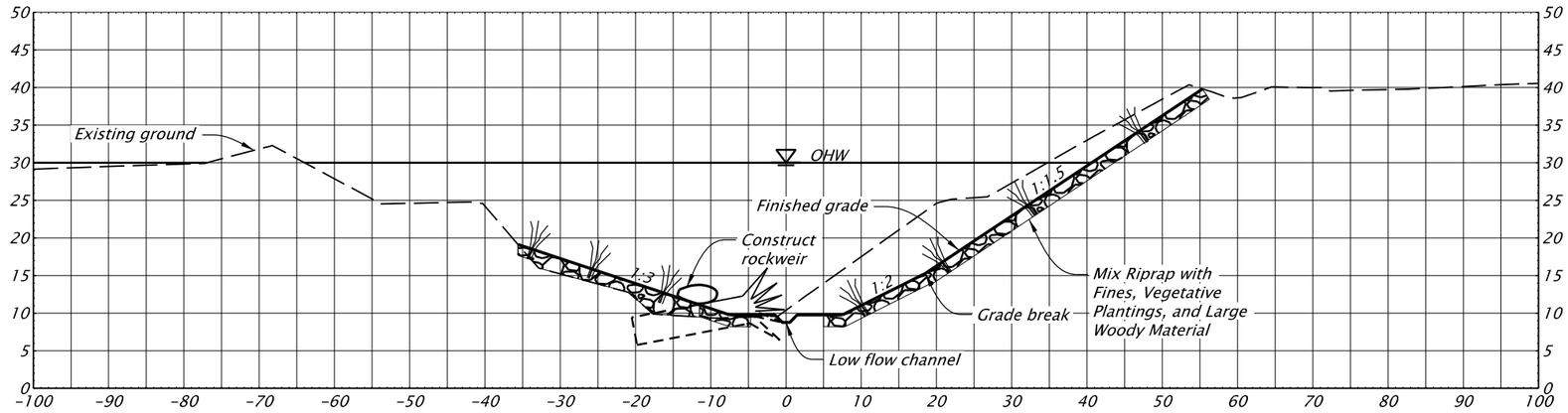
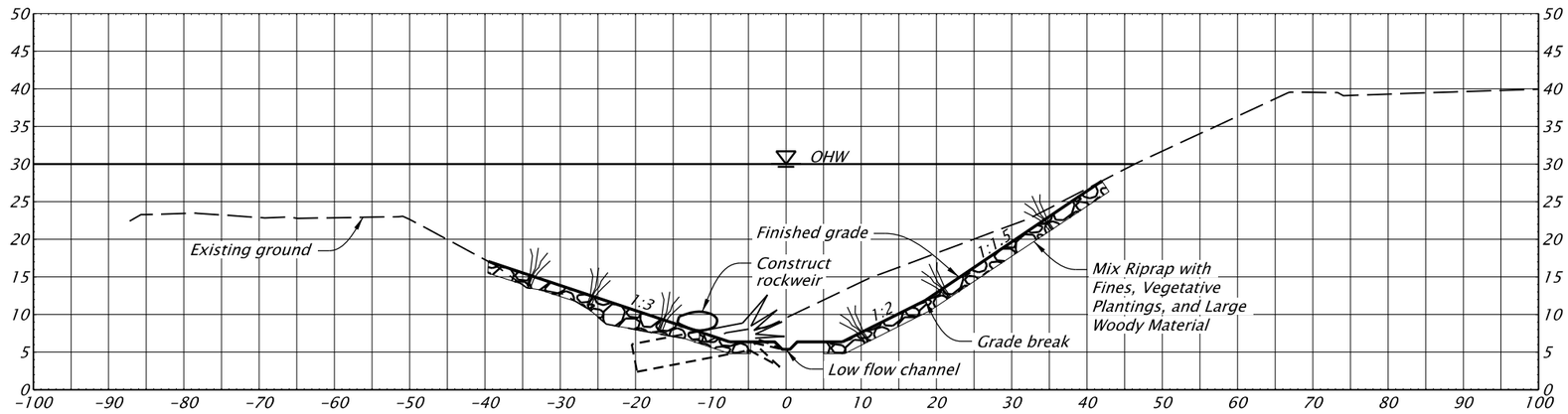
Rotation: 360 0'



SECTION A–A STAGE 2B



SECTION C–C STAGE 2B

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

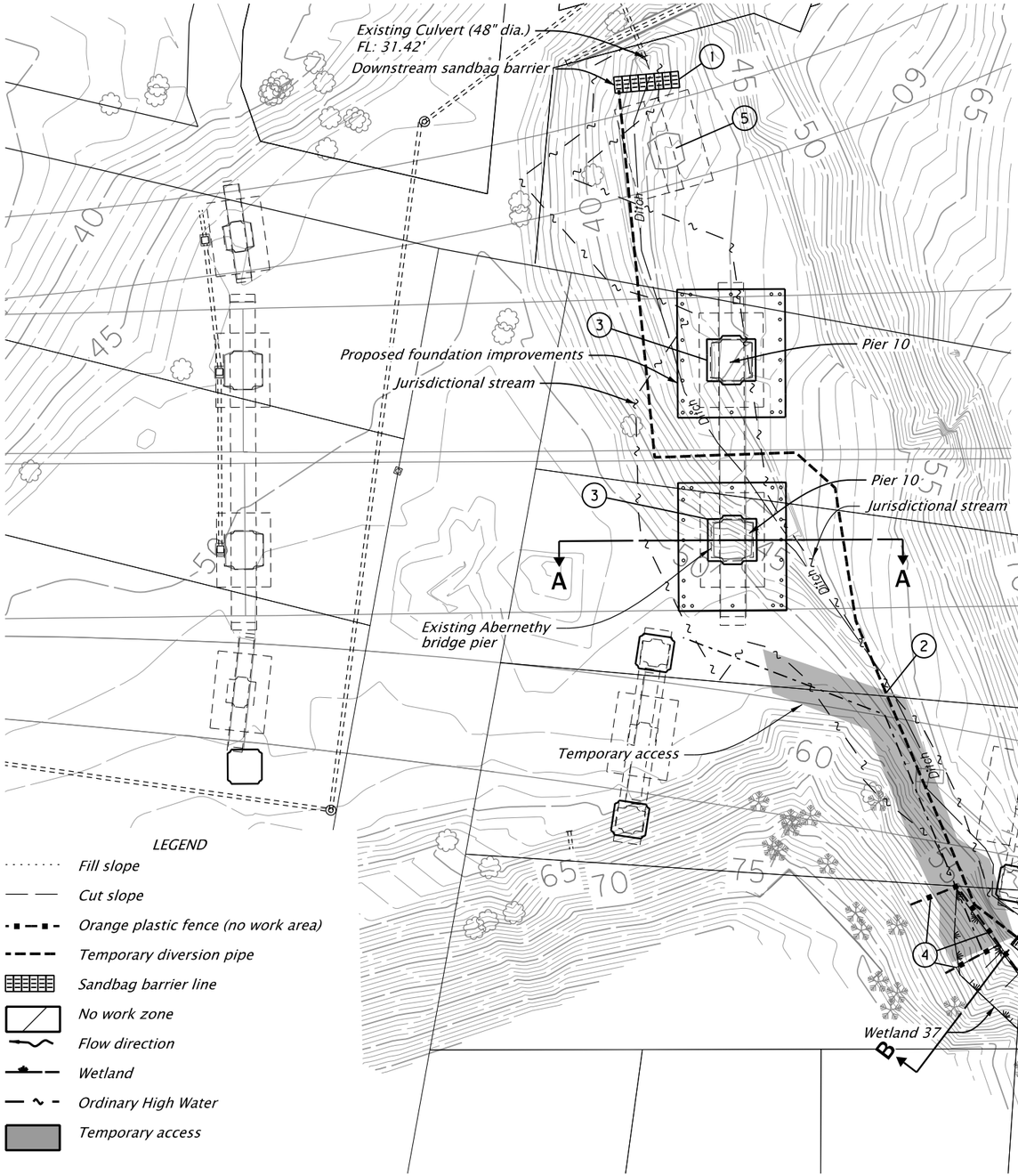
SHEET NO.

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec02.dgn :: FB25 6/25/2019 11:20:08 AM CDONOVAN

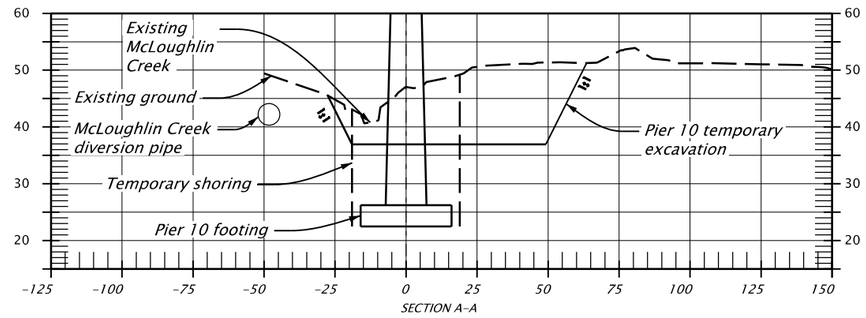
Rotation: 360 0'

McLoughlin Creek - Phase 1
Construct temporary dike
(In-water-work activities)
Construct shaft

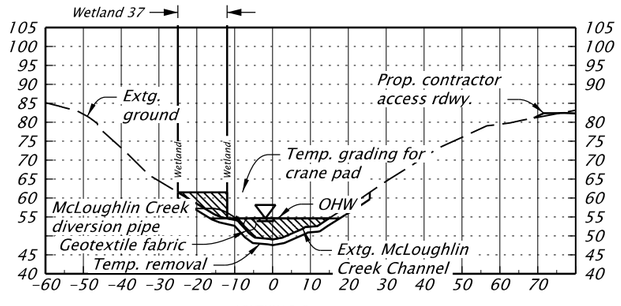


LEGEND

- Fill slope
- Cut slope
- Orange plastic fence (no work area)
- Temporary diversion pipe
- Sandbag barrier line
- No work zone
- Flow direction
- Wetland
- Ordinary High Water
- Temporary access



SECTION A–A



SECTION B–B

Note:

For additional erosion control details not shown, see FB27.

Work below OHW cannot exceed 18 months. Install and remove temporary water diversion during in-water work window.

1. *Install temporary BMPs and flow diversion*
2. *Install temporary diversion pipe (18" dia.)*
3. *Construct shaft*
4. *Install orange plastic fence (no work area)*
5. *Remove existing pile cap and bridge column*

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I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers | Reviewer: Matt Steigleder
Drafter: Connor Donovan | Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

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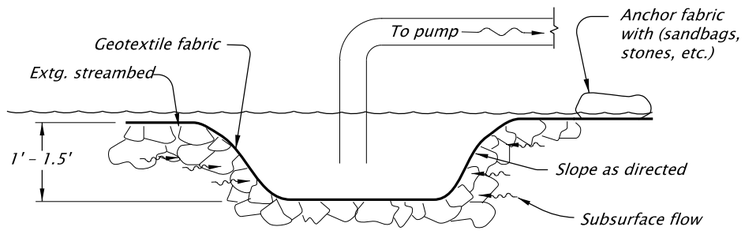
AVAILABLE UPON REQUEST

EE_K19786_HDR_ec02.dgn :: FB26 6/25/2019 11:26:15 AM CDONOVAN

Rotation: 201.4396[illegible]0'

TEMPORARY WATER MANAGEMENT FACILITY



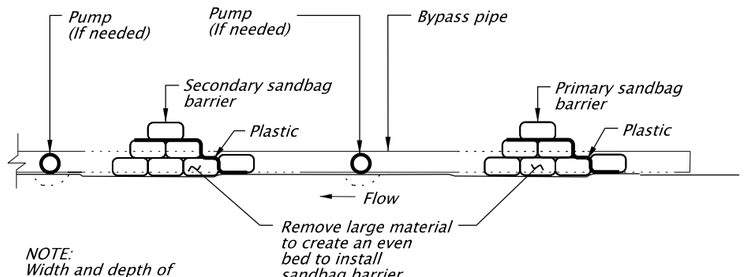
SUMP DETAIL
NTS

GENERAL NOTES:

The implementation of this Temporary Water Management Plan and the construction, maintenance, replacement and upgrading of this facility is the responsibility of the contractor until all construction is completed and approved.

The Temporary Water Management Facility shown on this plan is the minimum requirements for anticipated site conditions. During the construction periods, this facility shall be upgraded for unexpected storm events and to insure that sediment and sediment-laden water does not leave the site.

Remove all Temporary Water Management features and restore site as per plans and specifications.



NOTE:
Width and depth of sandbag barrier will vary depending on site and stream flow conditions.

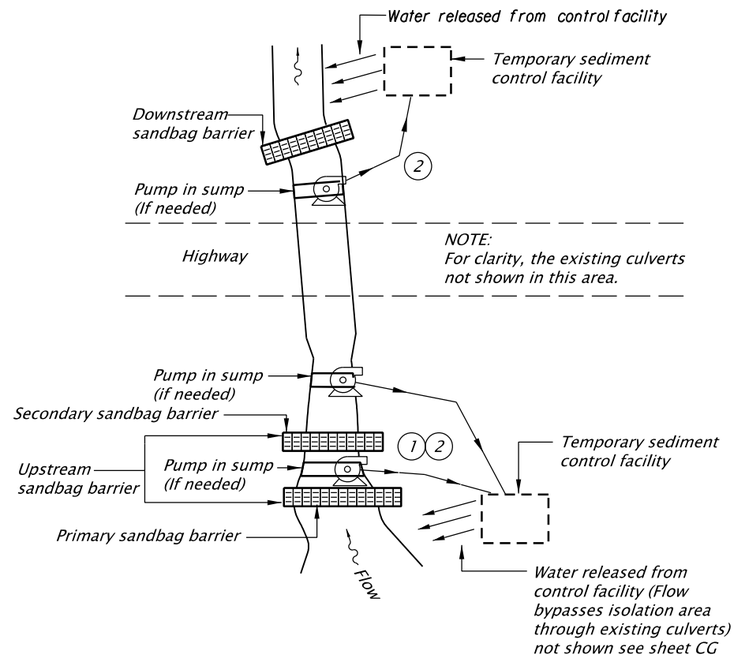
SANDBAG BARRIER SECTION

LEGEND:

Sandbag barrier line

Sediment control facility

Sump pump

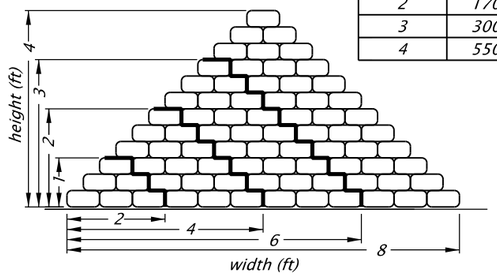


COMBINED PUMP/GRAVITY BYPASS DETAIL
NTS

A common recommendation is to make the sandbag barrier twice as wide as its height (e.g., a one foot high wall would have a base width of 2 feet). This is the minimum width-to-height ratio that should be used to construct a sandbag barrier. This is based on each bag having a placed dimension of about 4 to 5 inches high by 9 to 10 inches wide by 14 inches long. This is a 30 pound bag of dry sand.

The estimated number of bags needed for 100 linear feet of barrier that is twice as wide as its height is:

Height (ft)	# bags
1	600
2	1700
3	3000
4	5500



FULL ISOLATION NOTES:

(1) *See sheet FB22 note.*

(2) *See sheet FB22 note.*

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OREGON DEPARTMENT OF TRANSPORTATION

I-205: I-5 - OR213, PHASE 1 SEC.

EAST PORTLAND FREEWAY
CLACKAMAS COUNTY

Designer: Harold Evers
Reviewer: Matt Steigleder
Drafter: Connor Donovan
Checker: Brendan LeBlanc

EROSION AND SEDIMENT CONTROL

SHEET NO.

FINAL ELECTRONIC DOCUMENT
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EE_K19786_HDR_ec02.dgn :: FB27 bypass detail 6/25/2019 11:24:46 AM CDONOVAN

Rotation: 360 0'

REPLINGER & ASSOCIATES LLC
TRANSPORTATION ENGINEERING

June 29, 2020

Ms. Diliana Vassileva
City of Oregon City
PO Box 3040
Oregon City, OR 97045

SUBJECT: REVIEW OF PROJECT – I-205 WIDENING AND ABERNETHY BRIDGE SEISMIC UPGRADES – GLUA20-14

Dear Ms. Vassileva:

In response to your request, I have reviewed the materials submitted in support of the proposed I-205 Widening and Abernethy Bridge Seismic Upgrade project. The relevant materials included the project narrative and supporting drawings and documents prepared and submitted by the Oregon Department of Transportation (ODOT).

Following ODOT's naming convention that specifies the facility and project termini, the formal name of the project is "The I-205: Stafford Road to OR 213 Corridor Road Widening and Retrofit of the Abernethy Bridge." The project consists of a 7-mile widening of I-205 in each direction and a widening and seismic upgrade of Abernethy Bridge over the Willamette River.

The major elements of the project are the addition of a third general purpose travel lane on I-205 in each direction and a new northbound auxiliary lane between OR 99E and OR 213 interchanges. Because of the additional lanes, additional elements necessary to match the new lanes on I-205 are the modification of the OR 43 and OR 99E interchange ramps.

In addition to widening and seismic upgrades of the Abernethy Bridge that carries I-205 over the Willamette River, the project includes the widening and seismic upgrades of other I-205 bridge sites in the project area.

Comments

ODOT's project seeks to implement project and policy elements of Metro's Regional Transportation Plan (RTP), adopted July 17, 2014 and Oregon City's Transportation System Plan (TSP) adopted in 2013.

Metro's RTP discussion of Mobility Corridors #7, 8 and 9 (in RTP Section 5) suggests "adding general purpose lanes to I-205 as well as interchange improvements, auxiliary

lanes, and other major operational improvements such as ramp improvements and weaving area improvements."
The need for improvements in the I-205 Corridor and the OR99E/I-205 interchange were also identified in the City's TSP. The OR99E/I-205 ramp terminals were among the "intersection capacity deficiencies" identified in the Oregon City's TSP. The TSP identified "corridor deficiencies" to include I-205 and OR99E.

Conclusion and Recommendations

Based on the inclusion of the project in both Metro's RTP and the City's TSP, I think ODOT's current project can be described as a mitigation measure that helps address the region's growth and supports its land use plans rather than as a typical land use action that requires separate evaluation and mitigation.

I do not see need for specific transportation analysis to support land use decisions associated with GLUA20-14.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,

John Replinger, PE
Principal

Oregon City\2020\GLUA20-14

OREGON CITY

Planning Commission

695 Warner Parrott Road | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

July 6, 2020

To:	City Manager Tony Konkol, Mayor Dan Holladay, and City Commissioners
From:	Oregon City Planning Commission
Re:	Support for Diversity, Equity and Inclusion

The members of the Oregon City Planning Commission wish to express our support of the letter of June 7, 2020 written by four members of the city's planning staff to Mr. Konkol and the City Commissioners.

As stated in their letter, the history of zoning codes and planning in this country is troubling. It is our desire as the Planning Commission to ensure that all voices in Oregon City are heard in our public processes, and that our codes and policies are inclusive and equitable for all our residents regardless of race, origin, or economic status. Our work depends on public input, and the opinions and feelings of all citizens matter.

As we begin the OC2040 visioning process to update our Comprehensive Plan, we have a unique and critical opportunity to create a guiding document for our city that will truly represent the needs and wishes of all of our citizens. Planning Commission members are committed to doing all we can to ensure that the public process is inclusive of all viewpoints and the final outcome is a document that will guide the future of Oregon City in a just and equitable manner.

Mike Mitchell, Chair

For the Oregon City Planning Commission

June 7, 2020

Tony Konkol, City Manager
City of Oregon City
PO Box 3040, Oregon City, OR 97045

Dear Mr. Konkol,

Planners and the planning profession owe their communities an honest discussion about the way racism has helped shape the built environment. Redline zoning, the razing of vibrant neighborhoods in the name of progress, and the enforcement of large-lot requirements that exclude low- and middle-income residents are some of the methods that planners and governments have used and continue to use to discriminate against immigrants, people of color, and the poor.

As we embark on this new Comprehensive Plan update, we are committed to ensuring that we not only improve our outreach efforts to those who have historically been left out of the public engagement process but also that we allow time and space to listen. To carry out our responsibilities as planners, we need to continually ask what Oregon City can do to help create a more equitable community and collectively work to find ways to engage with communities that are wary of government, may not speak English as their first language, or may never have been asked for their input before.

The recent comments by the Mayor of Oregon City do not acknowledge the lived experiences of communities of color and do nothing to address the centuries of systemic racism that have led to the disparities we see in our society today. Our country is at a tipping point in the discussion of racism, white privilege, and the systemic oppression of black people. To remain silent and inactive during this time only perpetuates the cycle of oppression.

The American Institute of Certified Planners (AICP) Code of Ethics compels us as professional planners to "*seek social justice by working to expand choice and opportunity for all persons, recognizing a special responsibility to plan for the needs of the disadvantaged and to promote racial and economic integration. We shall urge the alteration of policies, institutions, and decisions that oppose such needs.*"

As our community begins to craft a shared vision for the next 20 years, we ask for the City Commission's acknowledgment of the need to place equity at the center of our plan, and for them to renew their support for diversity, inclusion, and equity in the planning process. We stand ready to amplify the voices of people of color and actively work towards racial equity in Oregon City.

We ask that you forward this letter to the City Commission on our behalf.

Sincerely,

Pete Walter AICP, Senior Planner

Christina Robertson-Gardiner AICP, Senior Planner

Kelly Reid AICP, Planner

Diliana Vassileva, Assistant Planner

CC:
Laura Terway AICP, Community Development Director
Mike Mitchell, Chair, Oregon City Planning Commission
Aaron Ray, AICP, President, Oregon Chapter APA
Dennis Egner, FAICP, Ethics Committee Chair, Oregon Chapter APA