CITY OF OREGON CITY
PLANNING COMMISSION
AGENDA

Commission Chambers, Libke Public Safety Facility, 1234 Linn Ave, Oregon City
Monday, July 11, 2022 at 7:00 PM

This meeting will be held in person and online via Zoom; please contact ocplanning@orcity.org for the meeting link.

CALL TO ORDER

PUBLIC COMMENT

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

PUBLIC HEARING

1. CONTINUANCE OF GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.

COMMUNICATIONS

ADJOURNMENT

PUBLIC COMMENT GUIDELINES

Complete a Comment Card prior to the meeting and submit it to the City Recorder. When the Mayor/Chair calls your name, proceed to the speaker table, and state your name and city of residence into the microphone. Each speaker is given three (3) minutes to speak. To assist in tracking your speaking time, refer to the timer on the table.

As a general practice, the City 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 Recorder 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 Website.

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

CITY OF OREGON CITY

Staff Report

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

To: Planning Commission **Agenda Date:** 07/11/2022

From: Pete Walter, Planning Manager
Aquilla Hurd-Ravich, Community Development Director

SUBJECT:

CONTINUANCE OF GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.

STAFF RECOMMENDATION:

Staff recommends the Planning Commission open the hearing and continue the public testimony portion of the hearing by receiving information from the applicant, taking public testimony, and asking questions of the applicant. Then continue the hearing until July 25, 2022.

EXECUTIVE SUMMARY:

The public hearing for this application first opened on April 25, 2022. Subsequently the applicant requested continuances and was granted by Planning Commission to May 9, 2022, then to May 23, 2022, and now to July 11, 2022.

At the May 23rd hearing the applicant requested a continuance in order to address concerns expressed by members of the public, staff, and the Planning Commission. The applicant has submitted a revised proposal that addresses four areas:

1. An extension of Holly Lane to Holcomb Blvd
2. Reconfiguration of the proposed portion of the Community Park located at the southwest corner of the Master Plan area.
3. A second street connection to provide additional connectivity to Livesay Rd.
4. A plan that would prevent 2,000 average daily trips (ADT) on Winston Drive, Cattle Drive, Shartner Drive, and Street A.

The revised application materials are attached for your review. However, due to the timing of the applicant's submittal, staff was not able to review and analyze the revisions; therefore, we have not provided revised analysis and findings or conditions of approval.

The purpose of this meeting is for the Planning Commission to hear from the applicant, ask questions of the applicant, and take any public testimony from anyone who may wish to comment.

Staff requests that the Planning Commission continue the hearing to July 25th to allow time for staff to review the applicant's revisions and revise analysis, findings, and conditions of approval as appropriate.

At the last hearing a public comment was submitted concerning *Baker v. City of Milwaukie* and the relevance to this land use review. Assistant City Attorney Carrie Richter provided analysis of that case and its relevance to this land use application in a memo that is attached for your review.

The Park Place Crossing Master Plan consists of 92 acres that will eventually provide 476 residential lots planned over six phases, a community park, open space, regional stormwater management facility, a retail/civic site, and trail components. The Park Place Crossing Master Plan area is within the northernmost portion of the larger Park Place Concept Area established in 2008 through the Park Place Concept Plan. The 92-acres was annexed into the City limits through AN-17-04.

The 92-acre site includes properties zoned Medium Density Residential (R-5), Low Density Residential (R-10), and Neighborhood Commercial (NC).

Staff recommends opening the record to hear a brief staff summary and process explanation and to take public testimony. The record may be left open until the next hearing.

BACKGROUND:

The 92-acre subject property was annexed and assigned zoning in 2018 through AN-17-04 and ZC 17-05; this application for a General Development Plan is the next step in the development of this site. One of the conditions of approval imposed by the City on the approved annexation request was that the applicant obtain General Development Plan approval for the 92-acre area prior to any urban development on the site.

This application includes requests for the following approvals:

- **General Development Plan (GDP)**: The overall long-term approach to development through 2030 for up to 476 residential lots, including supporting parks, trails, and neighborhood commercial and civic spaces. Included in the request for GDP approval is:
    - A modification to street width standards for a limited segment of Holly Lane
    - Adjustments to the following development standards:

  - OCMC Chapter 17.08.040 and 17.10.040 Dimensional Standards, including up to 20% reduction of lot sizes, widths, depths, and setbacks
  - OCMC Chapter 17.21.090.A for garage placement and design
  - OCMC Chapter 17.08.050 and 17.10.050 Density Standards to exceed maximum density by approximately 4%

- **Variance:** Request to reduce the minimum lot size for attached single family lots to 1800 square feet.

The General Development Plan includes the following uses:

- 476 total housing units, including 126 attached dwellings and 350 detached dwellings
- Construction of a segment of Holly Lane, a planned collector street
- A future public park site of 4.4 acres
- Approximately 1.3 acres of commercial/civic space provided in two parcels
- An off-street trail system within protected natural areas

Phase 1 is anticipated to be constructed in 2023, with completion of Phases 2 through 6 accomplished by 2030. Detailed Development Plan applications for each Phase are anticipated to be submitted at a future date following approval of the General Development Plan. The provision of the OCMC 17.65, Master Plans, allow for detailed development plans to be reviewed through a Type II process following the Type III approval of a General Development Plan.

This approach allows staff, the applicant, and the public a clear road map for what is required for future detailed development plans, and clearly specifies the range of development that may be authorized and the levels of public improvements necessary to serve that development.

The applicant has added information to the record in the last week and granted an extension to the 120-day decision deadline to allow time for review and inclusion of the new information in the staff report. Thus, a continuance is needed to allow for staff time to review the recent information and include it in the staff report. Staff recommends opening the record to hear a brief staff summary and process explanation, applicant presentation, and to take public testimony. A full, detailed staff report and recommendation will be included at the continued hearing.

OPTIONS:

1. Open the hearing, take public testimony, and continue the hearing to a date certain of July 25, 2022
2. Open the hearing, take public testimony, and continue to hearing to another date certain

BUDGET IMPACT: N/A

Schwabe
WILLIAMSON & WYATT®

June 29, 2022

Garrett H. Stephenson
Admitted in Oregon
T: 503-796-2893
gstephenson@schwabe.com

VIA EMAIL

Oregon City Planning Commission
c/o Mr. Pete Walter
625 Center Street
Oregon City, OR 97045
kreid@orcity.org

RE: Park Place Crossing General Development Plan
GLUA-21-00045 / MAS-21-00006 / VAR-22-00001

Dear Chair Schlagenhaufer and Planning Commissioners:

This firm represents ICON Construction & Development, LLC, Applicant in the above-referenced General Development Plan application. On May 23, 2022, the Planning Commission granted a continuance to of the hearing in this matter to July 11, 2022 to allow the Applicant to make certain changes to the Application in response to feedback from the Planning Commission. The updated plans are enclosed in this letter.

During the hearing, City staff and the Planning Commission stated certain preferences for the Project that were not embodied in the initial design. These include:

1. An extension of Holly Lane to Holcomb Boulevard.

2. Reconfiguration of the proposed portion of the Community Park located at the southwest corner of the Master Plan area.

3. A second street connection to provide additional connectivity to Livesay Road.

4. A plan that would prevent 2,000 average daily trips (ADT) on Winston Drive, Cattle Drive, Shartner Drive, and Street A.

All four of the above, are addressed in the enclosed materials. Additionally, the proposed mixed-use commercial and civic area(s) located in the SW portion of the Master Plan area have been reconfigured to better meet the maps adopted as part of the Park Place Concept Plan. Further clarification on the reduced Holly Lane Section through the development and alley access is provided.

The Applicant appreciates the additional time the Planning Commission has allowed it to provide these revisions. The Applicant believes that they result in a better project with more convenient transportation connections, more accessible parkland, and better consistency with the

Concept Plan maps. We look forward to discussing these revisions with the Planning Commission on July 11.

Best regards,

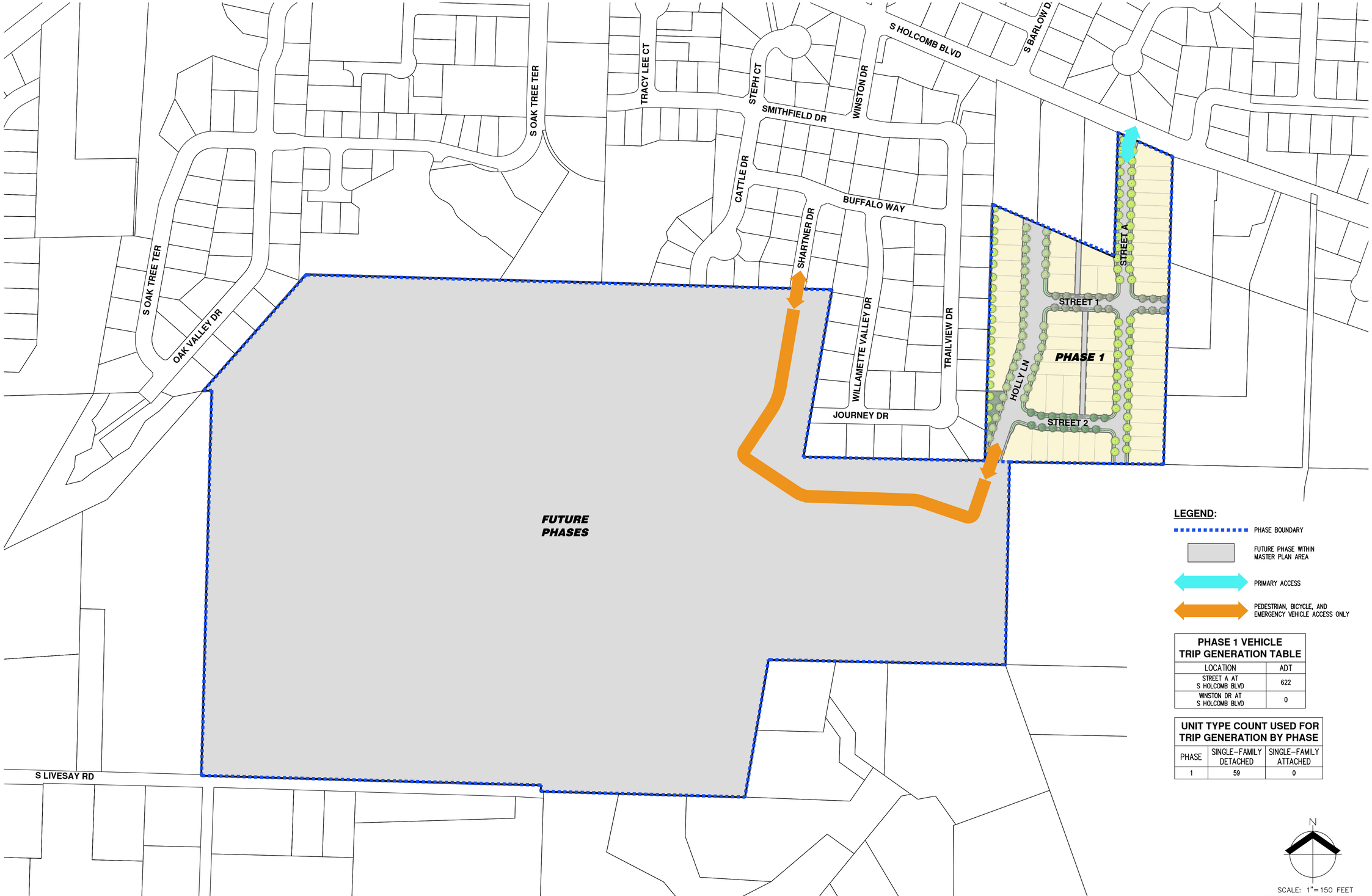


Garrett H. Stephenson

GST:jog/jmhi

cc: Mr. Harlan Borow (*via email*)
Mr. Chris Goodell (*via email*)
Mr. Mark Handris (*via email*)
Mr. Darren Gusdorf (*via email*)
Mr. Joseph O. Gaon (*via email*)
Ms. Carrie Richter *(via email)*

PDX\132873\238782\GST\34150319.1



LEGEND:

- PHASE BOUNDARY
- FUTURE PHASE WITHIN MASTER PLAN AREA
- PRIMARY ACCESS
- PEDESTRIAN, BICYCLE, AND EMERGENCY VEHICLE ACCESS ONLY

PHASE 1 VEHICLE TRIP GENERATION TABLE

LOCATION	ADT
STREET A AT S HOLCOMB BLVD	622
WINSTON DR AT S HOLCOMB BLVD	0

UNIT TYPE COUNT USED FOR TRIP GENERATION BY PHASE

PHASE	SINGLE-FAMILY DETACHED	SINGLE-FAMILY ATTACHED
1	59	0

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PHASED ACCESS EXHIBIT - PHASE 1
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY
NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	06/29/2022
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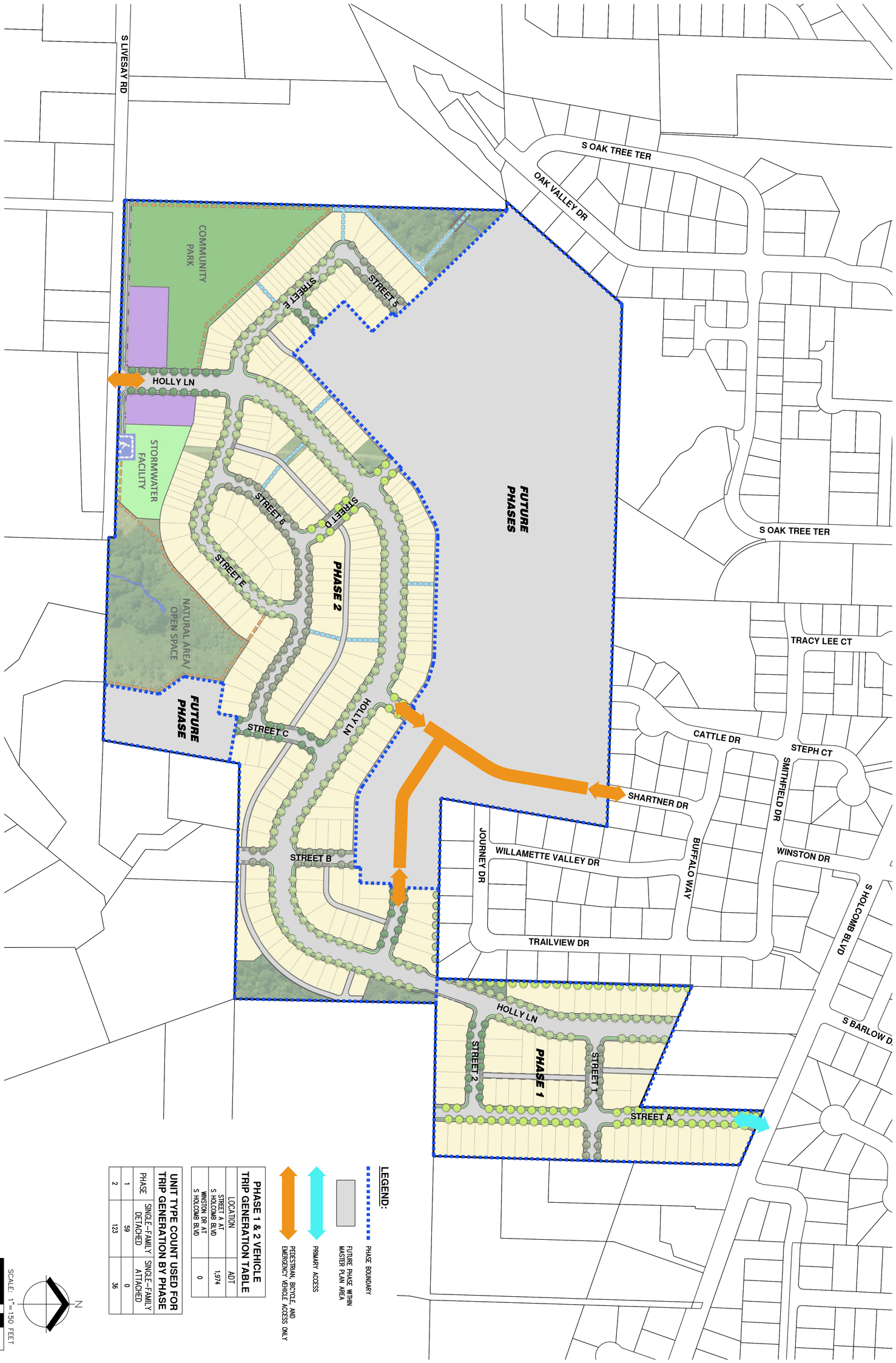
DRAWN BY:	NRA
CHECKED BY:	CMS

EXH-1

AKS DRAWING FILE: 7404 INGRESS-EGRESS.DWG | LAYOUT: EXH1



PHASE 1 & 2 VEHICLE TRIP GENERATION TABLE

LOCATION	ADT
STREET J AT S HOLCOMB BLVD	1,974
WINSTON DR AT S HOLCOMB BLVD	0

UNIT TYPE COUNT USED FOR TRIP GENERATION BY PHASE

PHASE	SINGLE-FAMILY DETACHED	SINGLE-FAMILY ATTACHED
1	59	0
2	123	36

PRELIMINARY NOT FOR CONSTRUCTION

PHASED ACCESS EXHIBIT - PHASES 1 & 2
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

EXH-2

JOB NUMBER:	7404
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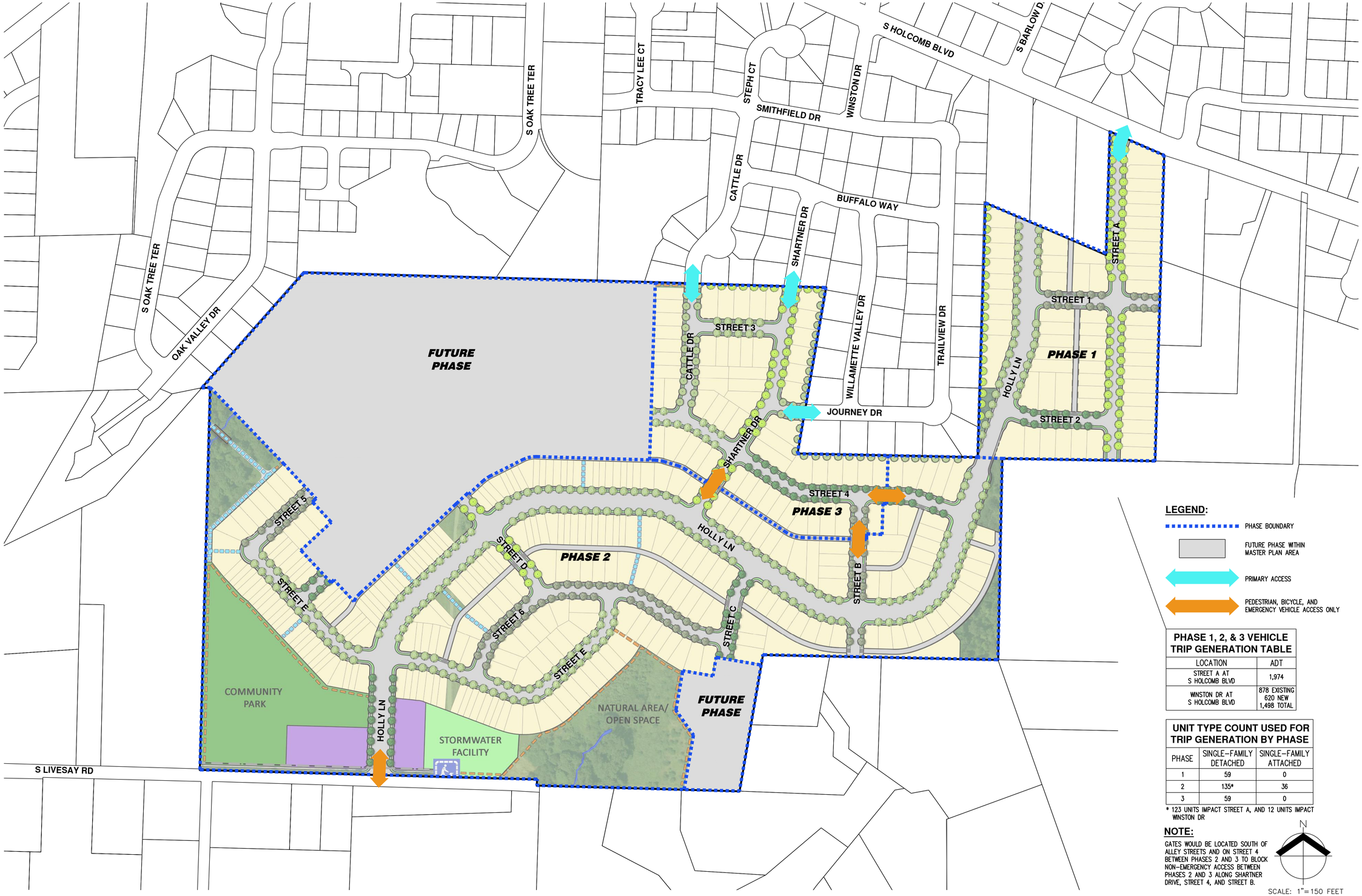

LEGEND:

- PHASE BOUNDARY
- FUTURE PHASE WITHIN MASTER PLAN AREA
- PRIMARY ACCESS
- PEDESTRIAN, BICYCLE, AND EMERGENCY VEHICLE ACCESS ONLY

PHASE 1, 2, & 3 VEHICLE TRIP GENERATION TABLE

LOCATION	ADT
STREET A AT S HOLCOMB BLVD	1,974
WINSTON DR AT S HOLCOMB BLVD	878 EXISTING 620 NEW 1,498 TOTAL

UNIT TYPE COUNT USED FOR TRIP GENERATION BY PHASE

PHASE	SINGLE-FAMILY DETACHED	SINGLE-FAMILY ATTACHED
1	59	0
2	135*	36
3	59	0

* 123 UNITS IMPACT STREET A, AND 12 UNITS IMPACT WINSTON DR

NOTE:

GATES WOULD BE LOCATED SOUTH OF ALLEY STREETS AND ON STREET 4 BETWEEN PHASES 2 AND 3 TO BLOCK NON-EMERGENCY ACCESS BETWEEN PHASES 2 AND 3 ALONG SHARTNER DRIVE, STREET 4, AND STREET B.

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PHASED ACCESS EXHIBIT - PHASES 1, 2, & 3 (ALTERNATE)
PARK PLACE CROSSING MASTER PLAN
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EXH-3

AKS DRAWING FILE: 7404 INGRESS-EGRESS.DWG | LAYOUT: EXH3

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PHASED ACCESS EXHIBIT - ALL PHASES
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY
NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	06/29/2022
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EXH-4

LEGEND:

- PHASE BOUNDARY
- FUTURE PHASE WITHIN MASTER PLAN AREA
- PRIMARY ACCESS
- PEDESTRIAN, BICYCLE, AND EMERGENCY VEHICLE ACCESS ONLY

ALL PHASES VEHICLE TRIP GENERATION TABLE

LOCATION	ADT
STREET A AT S HOLCOMB BLVD	0
WINSTON DR AT S HOLCOMB BLVD	878 EXISTING 631^ NEW 1,509 TOTAL
S HOLLY LN AT S HOLCOMB BLVD	3,483*

^ BASED ON 50% OF TRIPS FROM 147 UNITS IN PHASES 3–5 IMPACTING WINSTON DR
* INCLUDES ALL REMAINING TRIPS GENERATED BY THE FULL BUILD OUT OF 477 TOTAL UNITS

NOTE:

WITH THE CONNECTION OF S HOLLY LANE TO S HOLCOMB BOULEVARD, THE STREET A CONNECTION TO S HOLCOMB BOULDVARD WOULD BE CLOSED AND BECOME AN EMERGENCY ACCESS ONLY.

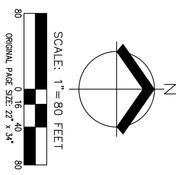
N

SCALE: 1"=150 FEET
150 0 30 75 150
ORIGINAL PAGE SIZE: 22" x 34"

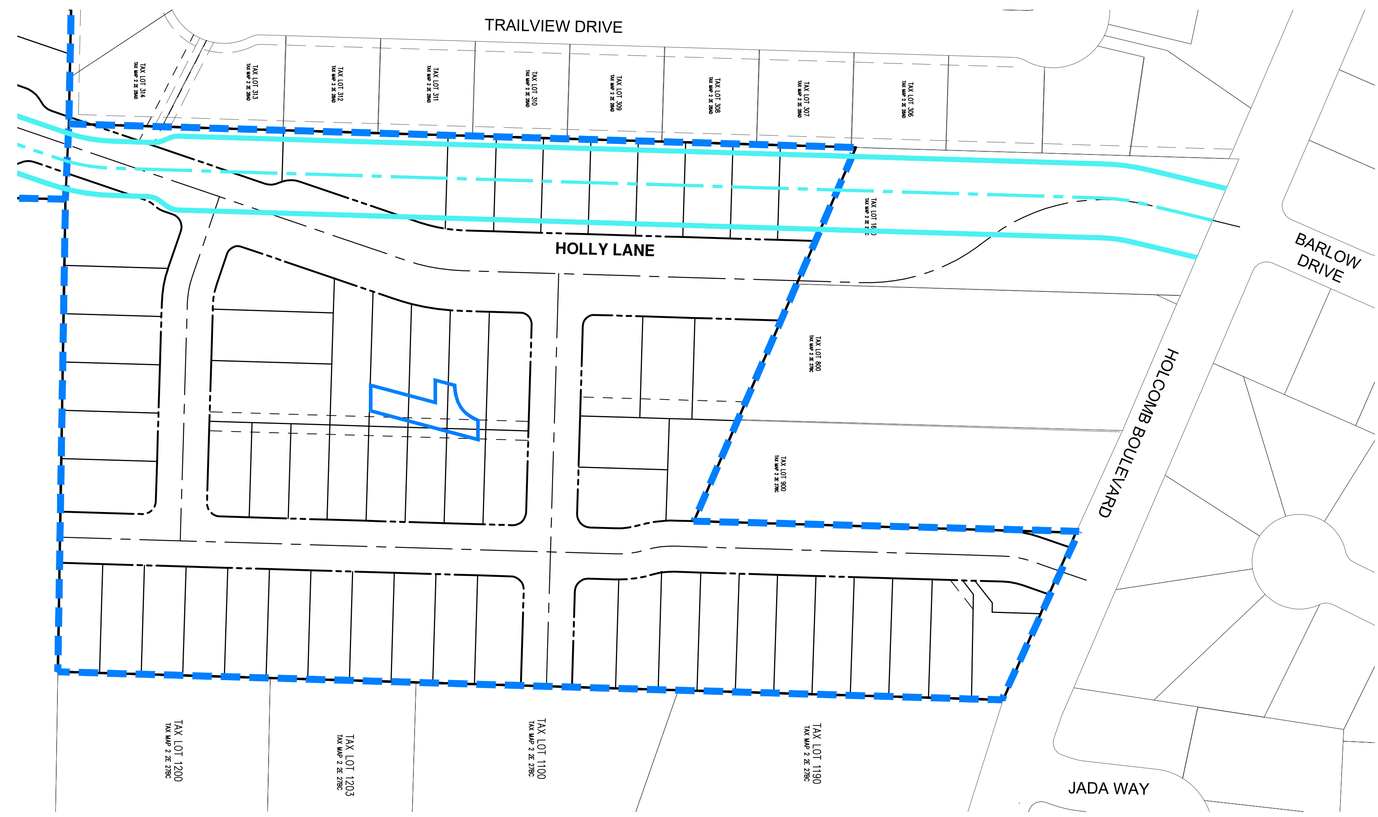
AKS DRAWING FILE: 7404 INGRESS-EGRESS.DWG | LAYOUT: EXH4

PHASE 1 S HOLLY LN
ALTERNATE ALIGNMENT 1





PHASE 1 S HOLLY LN
ALTERNATE ALIGNMENT 2



PRELIMINARY NOT FOR CONSTRUCTION

PHASE 1 ALTERNATE S HOLLY LANE ALIGNMENTS
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

JOB NUMBER: 7404
DATE: 06/29/2022
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EXH-5

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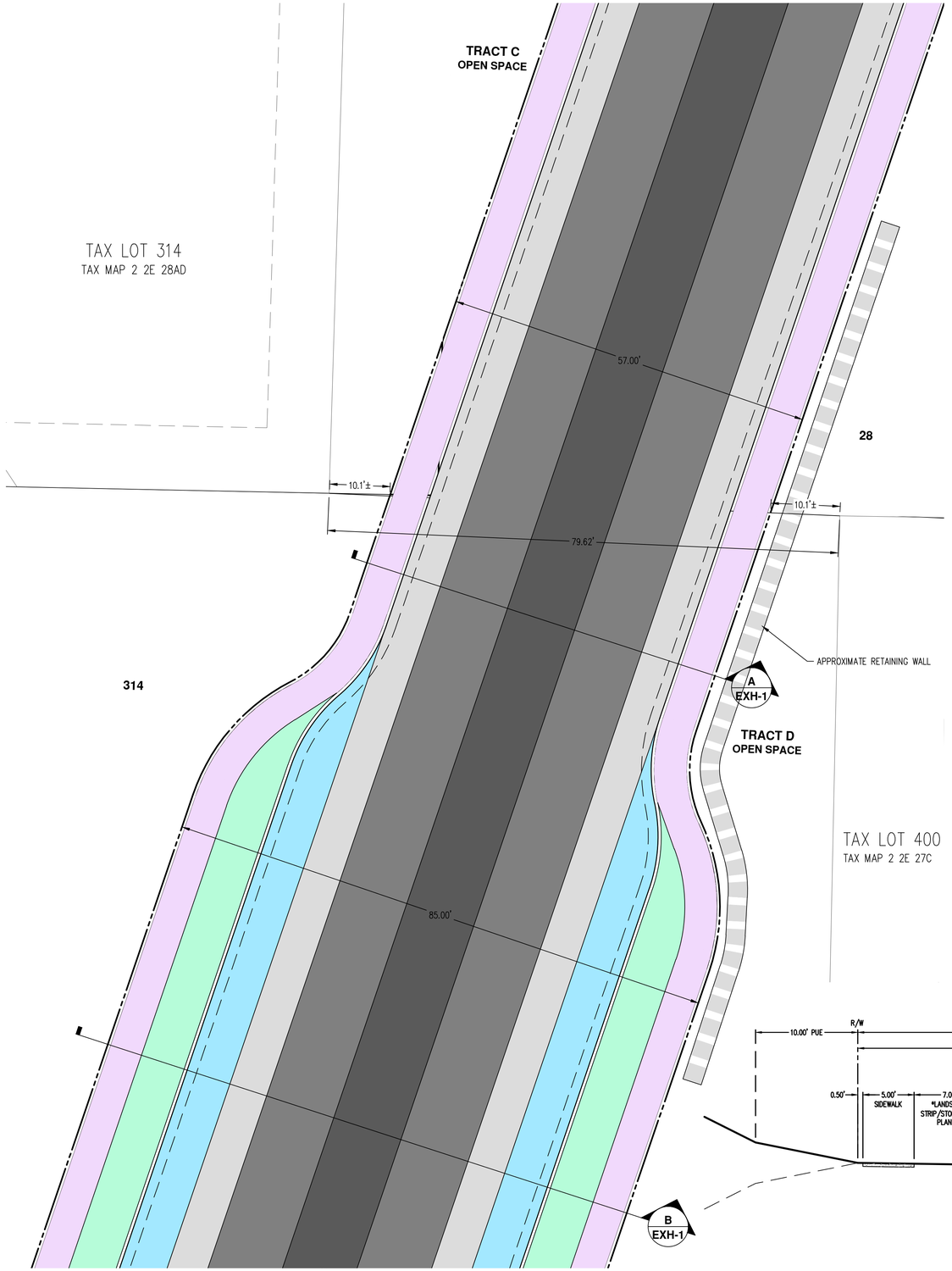

LEGEND:

- CENTER MEDIAN OR TURN LANE
- TRAVEL LANE
- BIKE LANE
- ON-STREET PARKING
- LANDSCAPE STRIP
- SIDEWALK

N

SCALE: 1"=10 FEET

10 0 2 5 10

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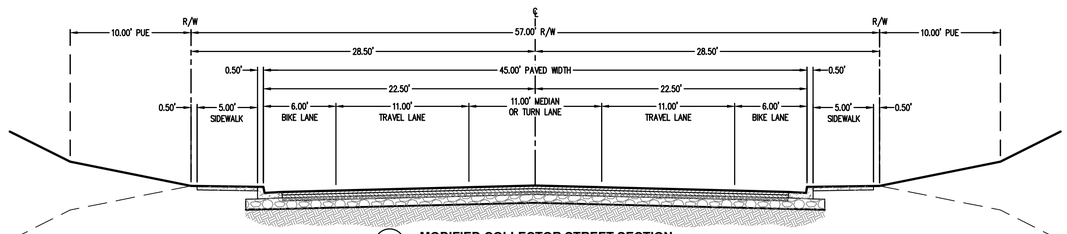
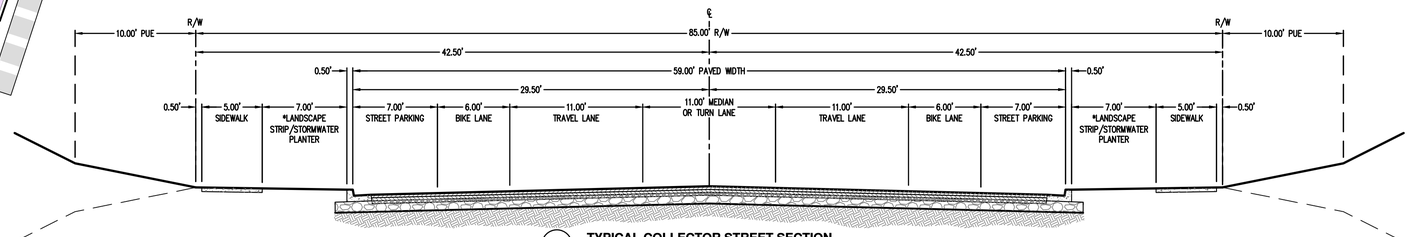


A MODIFIED COLLECTOR STREET SECTION

NOT TO SCALE

S HOLLY LANE (BETWEEN TAX LOT 314 TAX MAP 2 2E 28AD AND TAX LOT 400 TAX MAP 2 2E 27C.)



B TYPICAL COLLECTOR STREET SECTION

NOT TO SCALE

S HOLLY LANE

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S HOLLY LANE PLAN AND CROSS SECTIONS (MODIFIED SECTION)
PARK PLACE CROSSING MASTER PLAN
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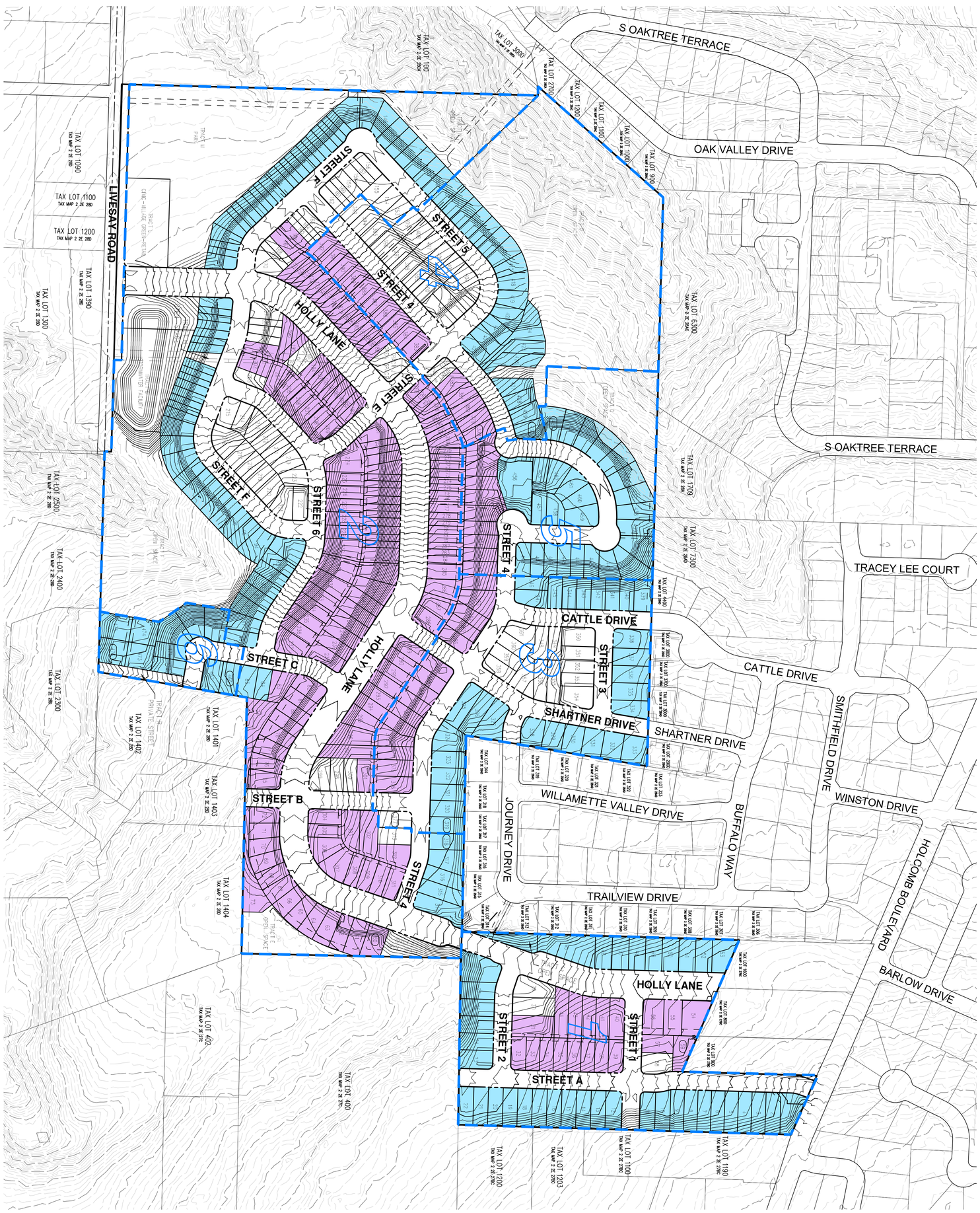
EXH-6

AKS DRAWING FILE: 7404 PINCH POINT EXHIBIT.DWG | LAYOUT: EXH-6



ALLEY-LOADED AND TOPO CONSTRAINED LOT EXHIBIT
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

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EXH-7

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SOUTHERN CONNECTIONS EXHIBIT - AFTER PHASE 3
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

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EXH-8

AKS DRAWING FILE: 7404 SOUTHERN ACCESS OPTIONS.DWG | LAYOUT: EXH-8

S LIVESAY ROAD

S HOLLY LANE

S SWAN AVENUE

S REDLAND ROAD

S Krae

ASSUMED 85.0' RIGHT-OF-WAY

APPROXIMATE EXISTING PGE EASEMENT - WIDTH VARIES

100' OFFSET FROM BACK OF ASSUMED ROW (TYP)

100' OFFSET FROM BACK OF ASSUMED ROW (TYP)

PROPERTY CURRENTLY UNDER ICON CONTROL OR HAVE HAD DISCUSSIONS REGARDING ACQUISITION

LEGEND:

- EXISTING GROUND CONTOUR (5 FT) (LIDAR)
- 200 EXISTING GROUND CONTOUR (25 FT) (LIDAR)
- FINISHED GRADE CONTOUR (5 FT)
- 200 FINISHED GRADE CONTOUR (25 FT)

City Mapped Geologic Hazards - Landslides

- Landslides
- Buffered (200 ft)

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color	
1	-21.41	-20.00		
2	-20.00	-10.00		CUT
3	-10.00	0.00		CUT
4	0.00	10.00		FILL
5	10.00	20.00		FILL
6	20.00	27.38		

N

SCALE: 1"=100 FEET

100 0 20 50 100

ORIGINAL PAGE SIZE: 22" x 34"

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CONCEPTUAL COLOR CUT-FILL MAP - S HOLLY LANE SOUTH CONNECTION
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REVIEW COPY ONLY

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DATE:	06/29/2022
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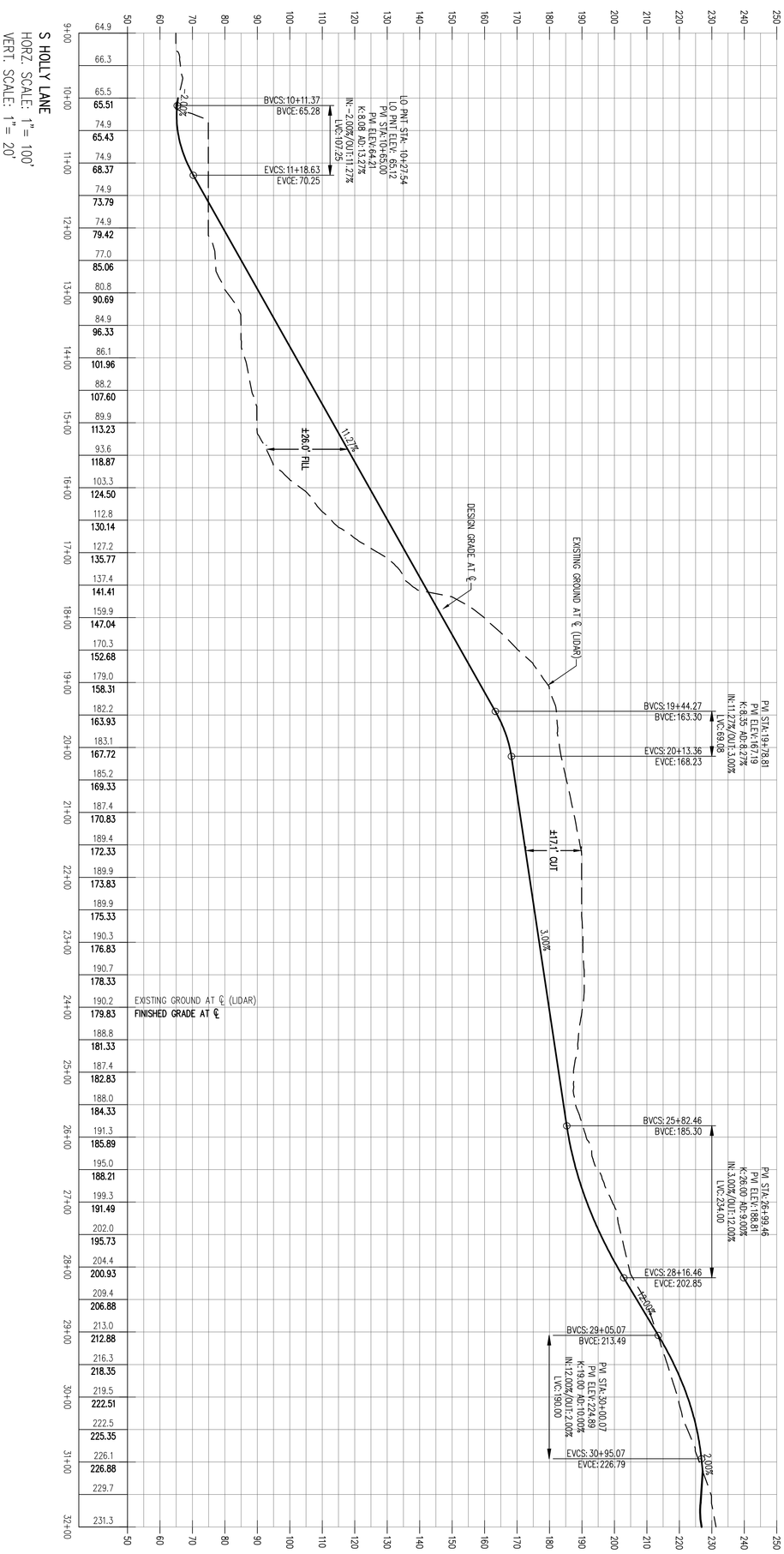
EXH-9

AKS DRAWING FILE: 7404C HOLLY EXT PROFILE W LS OVERLAY-14.DWG | LAYOUT: EXH-9



CONCEPTUAL S HOLLY LANE SOUTH CONNECTION PROFILE
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

REVIEW COPY ONLY

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DATE:	06/29/2022
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EXH-10

Page 18

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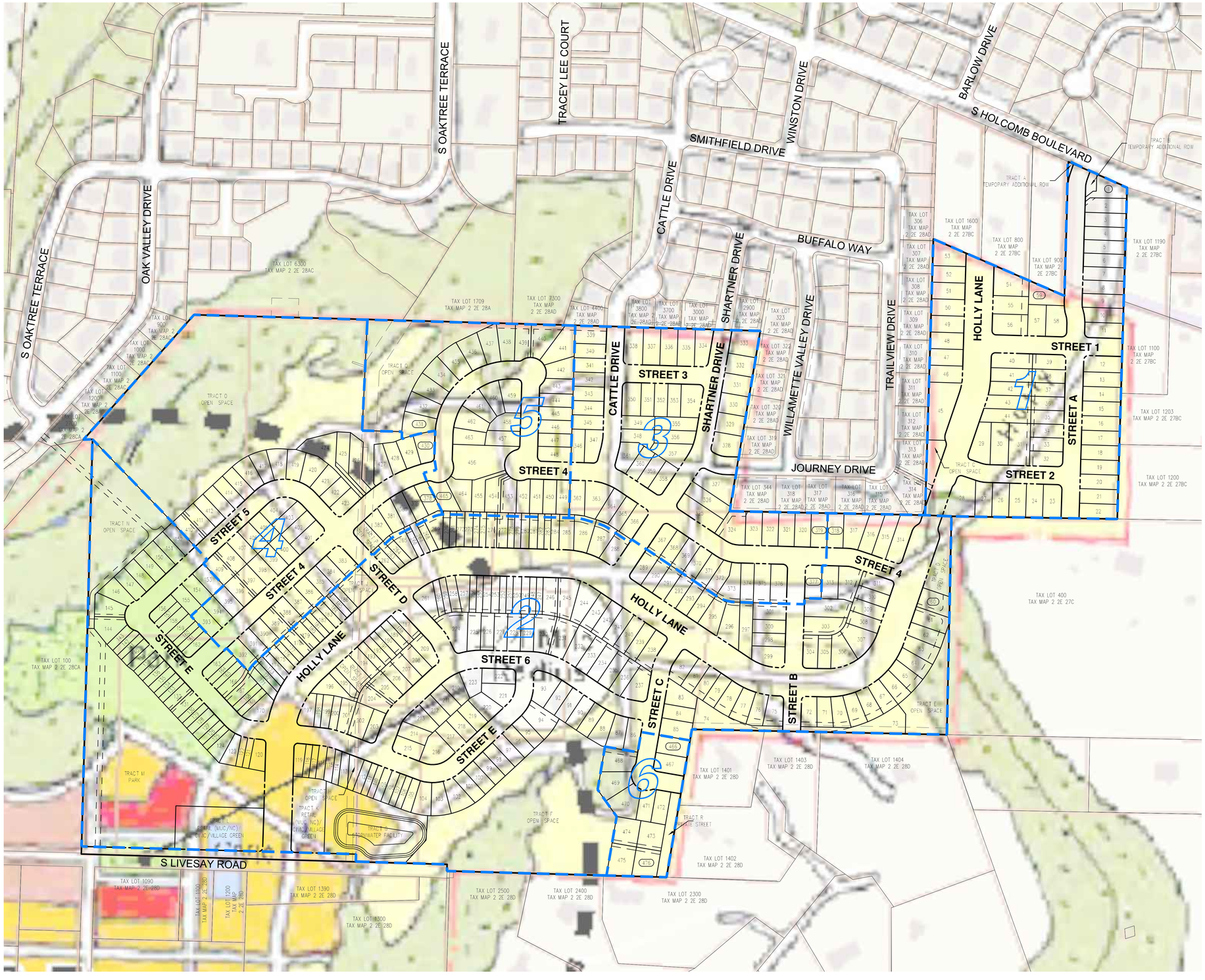
Item #2.



NOTE:

CONCEPT PLAN OVERLAY IS PER OREGON CITY WEBMAPS.

OREGON CITY PARK PLACE CONCEPT PLAN OVERLAY LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- RETAIL (MUC/NC)
- CIVIC

PARK PLACE CROSSING MASTER PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±15.7
STORM FACILITY:	±1.2
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3
COMMUNITY PARK:	±4.4*
REMAINING AREA:	±69.1

OREGON CITY PARK PLACE CONCEPT PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±11.4
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3
COMMUNITY PARK:	±4.1*
REMAINING AREA:	±74.9

NOTE:

*PER DISCUSSIONS WITH CITY STAFF, THE PARK PLACE CROSSING MASTER PLAN IS EXPECTED TO PROVIDE A PROPORTIONATE PERCENTAGE OF PARK LAND FOR ITS RESIDENTS. APPROXIMATELY 51 PERCENT OF THE PLANNED DWELLING UNITS FOR THE PARK PLACE CONCEPT PLAN AREA NORTH VILLAGE ARE INCLUDED WITHIN THIS MASTER PLAN (±476 PLANNED PARK PLACE CROSSING UNITS/937 TOTAL NORTH VILLAGE UNITS). THE NEIGHBORHOOD PARK REPRESENTS ±8.0 ACRES ON THE PARK PLACE CONCEPT PLAN; THEREFORE, PARK PLACE CROSSING WOULD BE EXPECTED TO CONTRIBUTE PROPORTIONALLY ±51 PERCENT OF THE NEEDED AREA, OR ±4.1 ACRES. THIS APPLICATION ANTICIPATES THAT ±4.4 ACRES WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA WILL BE DEDICATED FOR THE PARK LAND. TECHNICAL DETAILS FOR HOW THE PARK LAND WILL BE REQUIRED/TRANSFERRED ARE BEING COORDINATED WITH THE CITY OF OREGON CITY PARKS DEPARTMENT.

LAYOUT SUMMARY:

SINGLE-FAMILY ATTACHED DWELLING UNITS:	126
SINGLE-FAMILY DETACHED DWELLING UNITS:	350
TOTAL DWELLING UNITS:	476

PROPORTIONAL SHARE = 476/937^ = 0.51 = 51%

^937 IS THE ANTICIPATED TOTAL DWELLING UNITS IN THE NORTH VILLAGE PER THE PARK PLACE CONCEPT PLAN

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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CONCEPTUAL PARK AREA EXHIBIT WITH CONCEPT PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY
NOT FOR CONSTRUCTION

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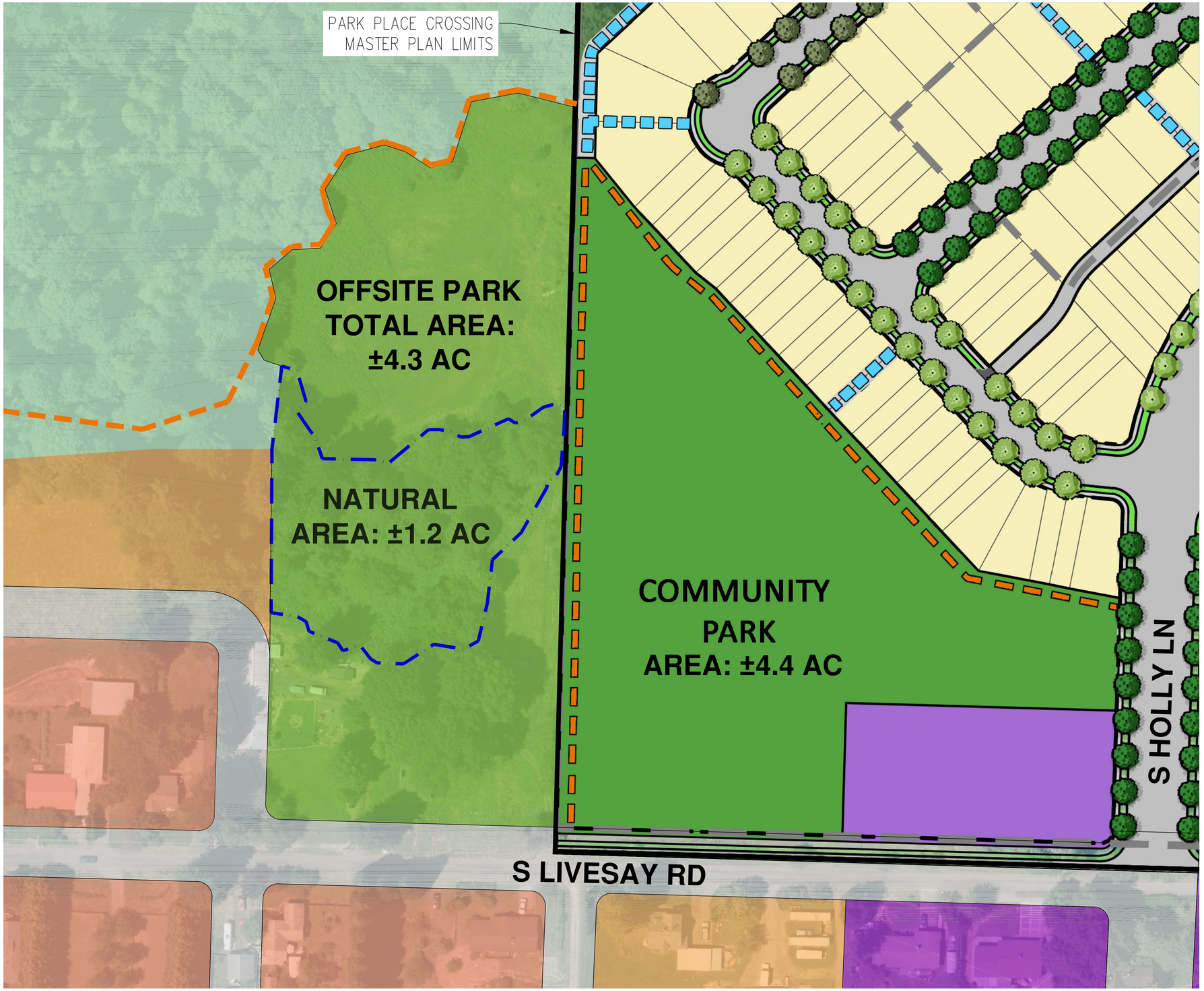
CHECKED BY:	CMS

EXH-11

AKS DRAWING FILE: 7404 CONCEPT EXHIBIT.DWG | LAYOUT: EXH-11



NOTE:

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OREGON CITY PARK PLACE CONCEPT PLAN LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- RETAIL (MUC/NC)/CIVIC/VILLAGE GREEN
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- MIXED-USE COMMERCIAL
- NATURAL AREA (25%+ SLOPE)
- PARK PLACE CROSSING MASTER PLAN LIMITS
- SOFT SURFACE TRAIL
- PAVED PEDESTRIAN ACCESSWAY

PARK PLACE CROSSING MASTER PLAN OPEN SPACE LEGEND

- RESIDENTIAL LOTS
- RETAIL (MUC/NC)/ CIVIC/ VILLAGE GREEN
- COMMUNITY PARK
- NATURAL AREA/ OPEN SPACE
- SOFT SURFACE TRAIL
- PAVED PEDESTRIAN ACCESSWAY
- TRAILHEAD

PARK PLACE CONCEPT PLAN COMMUNITY PARK AREA

	ONSITE:	OFFSITE:	TOTAL:
TOTAL PARK AREA	±4.4 AC	±4.3 AC	±8.7 AC
NATURAL AREA (25%+ SLOPE):	±0.0 AC	±1.2 AC	±1.2 AC

N

SCALE: 1"=50 FEET

50 0 10 25 50

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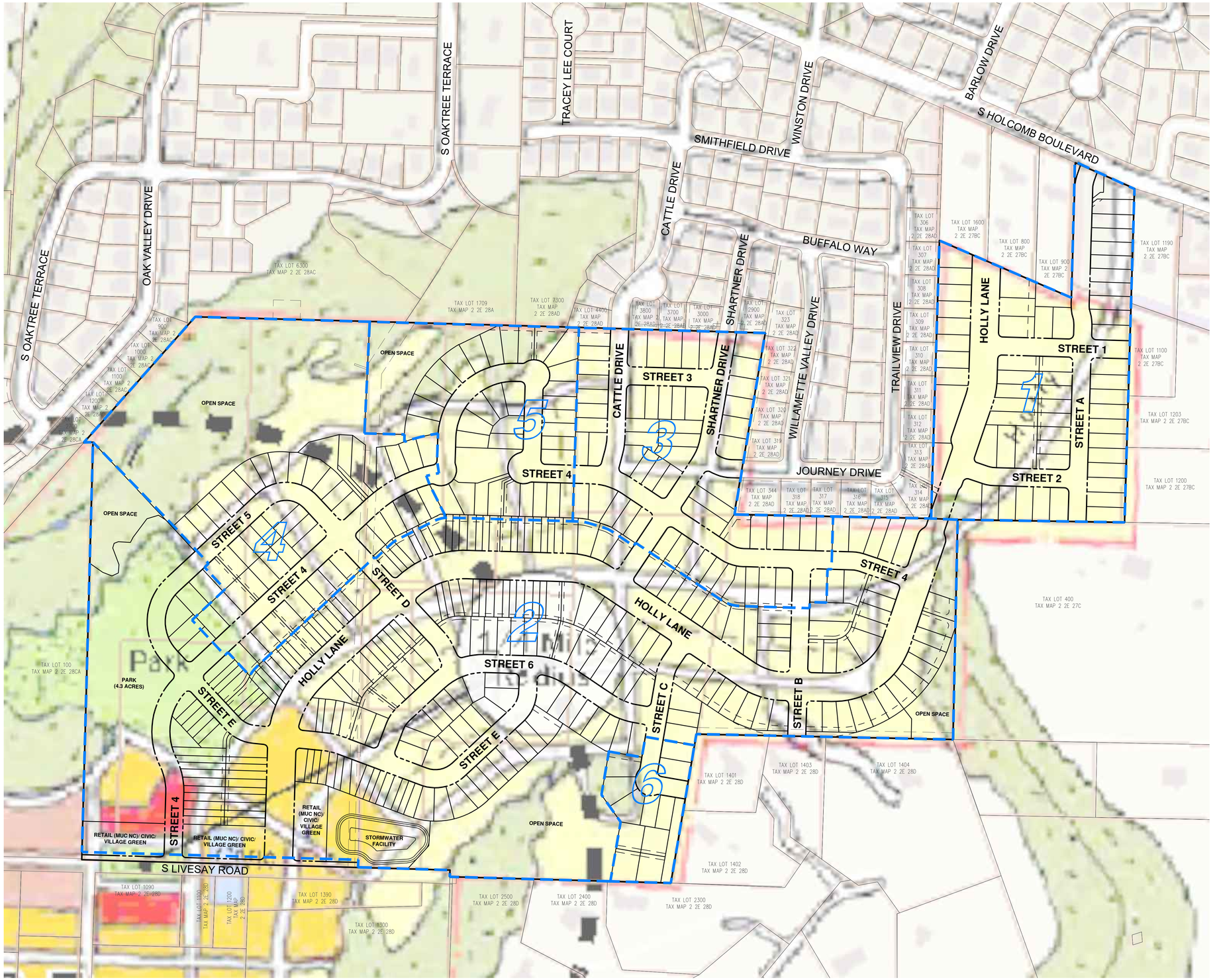
EXH-12

AKS DRAWING FILE: 7404 PARK EXHIBIT.DWG | LAYOUT: EXH-12



NOTE:

CONCEPT PLAN OVERLAY IS PER OREGON CITY WEBMAPS.

OREGON CITY PARK PLACE CONCEPT PLAN OVERLAY LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- RETAIL (MUC/NC)
- CIVIC

PARK PLACE CROSSING MASTER PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±14.6
STORM FACILITY:	±1.2
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.7
COMMUNITY PARK:	±4.3*
REMAINING AREA:	±69.9

OREGON CITY PARK PLACE CONCEPT PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±11.4
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3
COMMUNITY PARK:	±4.0*
REMAINING AREA:	±74.9

NOTE:

*PER DISCUSSIONS WITH CITY STAFF, THE PARK PLACE CROSSING MASTER PLAN IS EXPECTED TO PROVIDE A PROPORTIONATE PERCENTAGE OF PARK LAND FOR ITS RESIDENTS. APPROXIMATELY 49 PERCENT OF THE PLANNED DWELLING UNITS FOR THE PARK PLACE CONCEPT PLAN AREA NORTH VILLAGE ARE INCLUDED WITHIN THIS MASTER PLAN (±463 PLANNED PARK PLACE CROSSING UNITS/937 TOTAL NORTH VILLAGE UNITS). THE NEIGHBORHOOD PARK REPRESENTS ±8.0 ACRES ON THE PARK PLACE CONCEPT PLAN; THEREFORE, PARK PLACE CROSSING WOULD BE EXPECTED TO CONTRIBUTE PROPORTIONALLY ±49 PERCENT OF THE NEEDED AREA, OR ±4.0 ACRES. THIS APPLICATION ANTICIPATES THAT ±4.3 ACRES WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA WILL BE DEDICATED FOR THE PARK LAND. TECHNICAL DETAILS FOR HOW THE PARK LAND WILL BE REQUIRED/TRANSFERRED ARE BEING COORDINATED WITH THE CITY OF OREGON CITY PARKS DEPARTMENT.

LAYOUT SUMMARY:

SINGLE-FAMILY ATTACHED DWELLING UNITS:	121
SINGLE-FAMILY DETACHED DWELLING UNITS:	342
TOTAL DWELLING UNITS:	463

PROPORTIONAL SHARE = 463/937^ = 0.49 = 49%

^937 IS THE ANTICIPATED TOTAL DWELLING UNITS IN THE NORTH VILLAGE PER THE PARK PLACE CONCEPT PLAN

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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CONCEPTUAL ALTERNATE PARK AREA EXHIBIT WITH CONCEPT PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION

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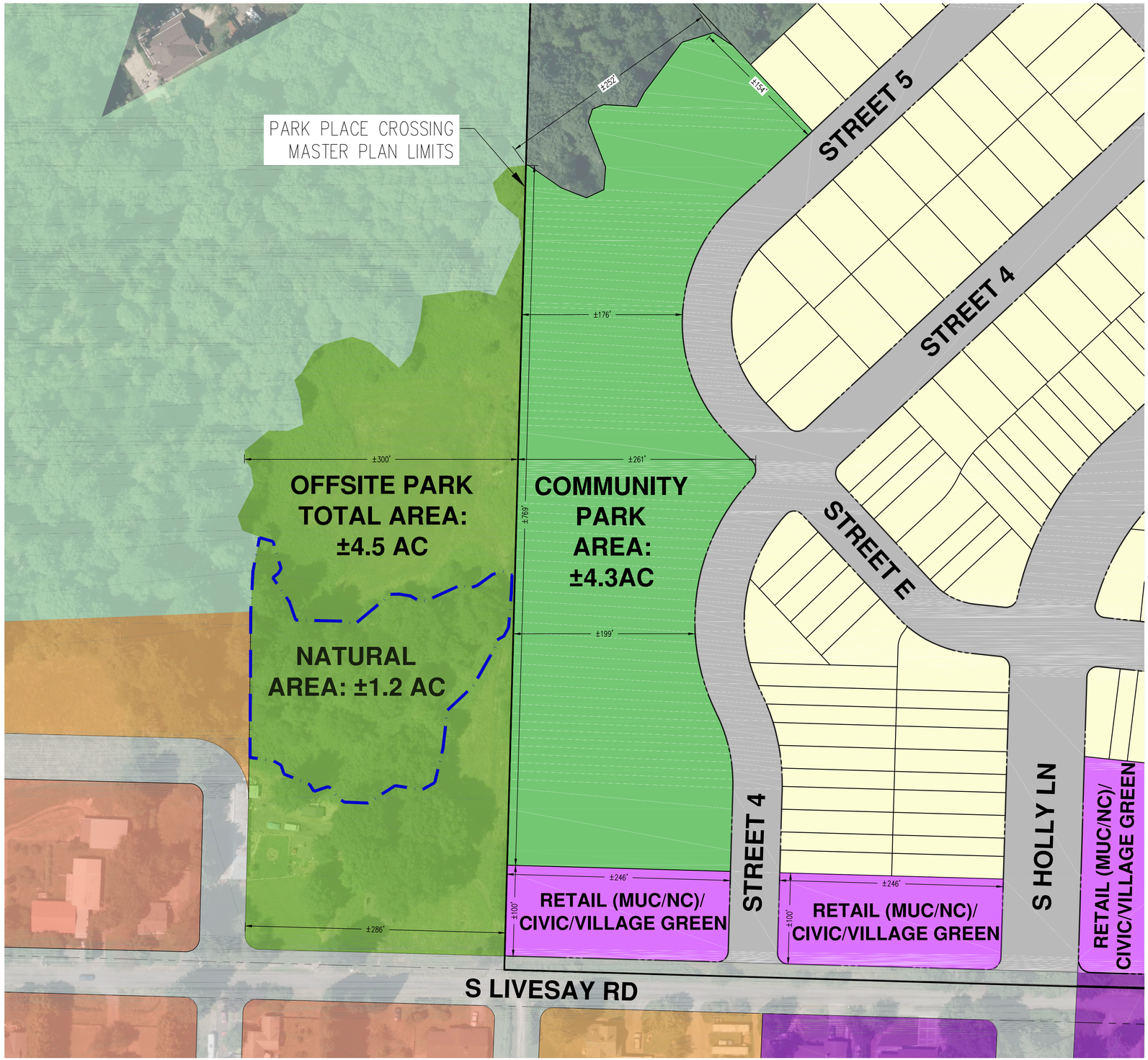
EXH-13

AKS DRAWING FILE: 7404 REVISED CONCEPT.DWG | LAYOUT: EXH-13



NOTE:

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OREGON CITY PARK PLACE CONCEPT PLAN LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- RETAIL (MUC/NC)/CIVIC/VILLAGE GREEN
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- MIXED-USE COMMERCIAL
- NATURAL AREA (25%+ SLOPE)
- PARK PLACE CROSSING MASTER PLAN LIMITS

PARK PLACE CROSSING MASTER PLAN OPEN SPACE LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- RETAIL (MUC/NC)/CIVIC/VILLAGE GREEN
- COMMUNITY PARK

PARK PLACE CONCEPT PLAN
COMMUNITY PARK AREA

	ONSITE:	OFFSITE:	TOTAL:
TOTAL PARK AREA	±4.3 AC	±4.5 AC	±8.8 AC
NATURAL AREA (25%+ SLOPE):	±0.0 AC	±1.2 AC	±1.2 AC

N

SCALE: 1"=60 FEET

60 0 12 30 60

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CONCEPTUAL ALTERNATE PARK AREA EXHIBIT
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EXH-14

AKS DRAWING FILE: 7404 REVISED LAYOUT PARK EXHIBIT.DWG | LAYOUT: EXH-14

lancaster mobley

321 SW 4th Ave., Suite 400
Portland, OR 97204
503.248.0313
lancastermobley.com

Memorandum

REGISTERED PROFESSIONAL ENGINEER 54853

OREGON JULY 9, 2001 TODD E. MOBLEY

EXPIRES 12/31/2022

To: **Oregon City Planning Commission**

Copy: **Harlan Borow, ICON Construction & Development**
Cody Street, AKS Engineering & Forestry

From: **Todd E. Mobley, PE**

Date: **June 29, 2022**

Subject: **Park Place Crossing General Development Plan: Trip Generation & Daily Traffic Volume Analysis**
GLUA-21-00045 / MAS-21-00006 / VAR-22-00001

Introduction

This memorandum is written to provide supplementary transportation analysis for various phasing and street accessibility options for the subject application. The analysis seeks to identify development scenarios that demonstrate how the site could build out without placing a significant traffic burden on local streets, keeping the average daily traffic volume (ADT) on local residential streets at or below 2,000 vehicles per day.

Phased Access Scenarios

The following scenarios are examined in this analysis. Each scenario is shown graphically in the attached exhibits (EXH-1 through EXH-4) prepared by AKS Engineering & Forestry.

Phase 1

This is simply the first phase of development, consisting of a total of 59 detached single-family homes, all with access to Holcomb Boulevard via Street A. Emergency vehicle access will be available via a connection to Shartner Drive. Refer to EXH-1.

Phases 1 & 2

For this scenario, all vehicular access continues to be vis Street A to Holcomb Boulevard with emergency vehicle access available via Shartner Drive. With full buildout of Phase 1 and partial buildout of Phase 2, there will be a total of 182 detached single-family homes and 36 attached single-family homes. Refer to EXH-2.

Phases 1, 2, & 3

With three phases of development, additional street connections will be made to Cattle Drive, Shartner Drive, and Journey Drive. For this scenario, the ADT on Winston Drive is examined, since this is the single point of access to Holcomb Boulevard for the neighborhood and therefore has the highest traffic volume of any of the connecting local streets. It is important to note that volumes on Cattle Drive, Shartner Drive, and Journey Drive will be lower than what is shown here. The three phases, with partial buildout of Phase 2, have a total of 253 detached single-family homes and 36 attached single-family homes. It is important to note that in this scenario,

all Phase 3 trips will utilize Winston Drive since connections to Phase 2 streets (Street 4, Street B, and Shartner Drive) will be limited to pedestrians, bicycles, and emergency vehicles. Refer to EXH-3.

All Phases

This scenario represents full build out of the development that is proposed as part of this General Development Plan. Connection of Holly Lane (Collector) to Holcomb Boulevard (Arterial) will be in place and access restrictions along the local streets between Phases 2 and 3 referenced in the prior scenario will be removed. Refer to Exhibit EXH-4.

Trip Generation & Local Street ADT

As with the original Transportation Impact Study[1], trip generation is calculated based on data available in the Trip Generation Manual[2]. Table 1 below summarizes the findings of each phase.

Table 1: Trip Generation & Local Street ADT Summary

Scenario	Housing Type		ADT at Holcomb Boulevard		
	Detached Single-Family	Attached Single-Family	Street A	Winston Drive	Holly Lane (Collector)
Phase 1	59	0	622	878[1]	-
Phases 1 & 2	182	36	1,974	878[1]	-
Phases 1, 2, & 3	253	36	1,974	1,498[2]	-
Build Out	351	126	0[3]	1,509[4]	3,483

[1] Existing ADT on Winston Drive is 878 vehicles per day

[2] 620 new trips + 878 existing trips = 1,498 trips total

[3] Street A at Holcomb Boulevard restricted to emergency vehicle access with connection of Holly Lane

[4] 631 new trips + 878 existing trips = 1,509 trips total

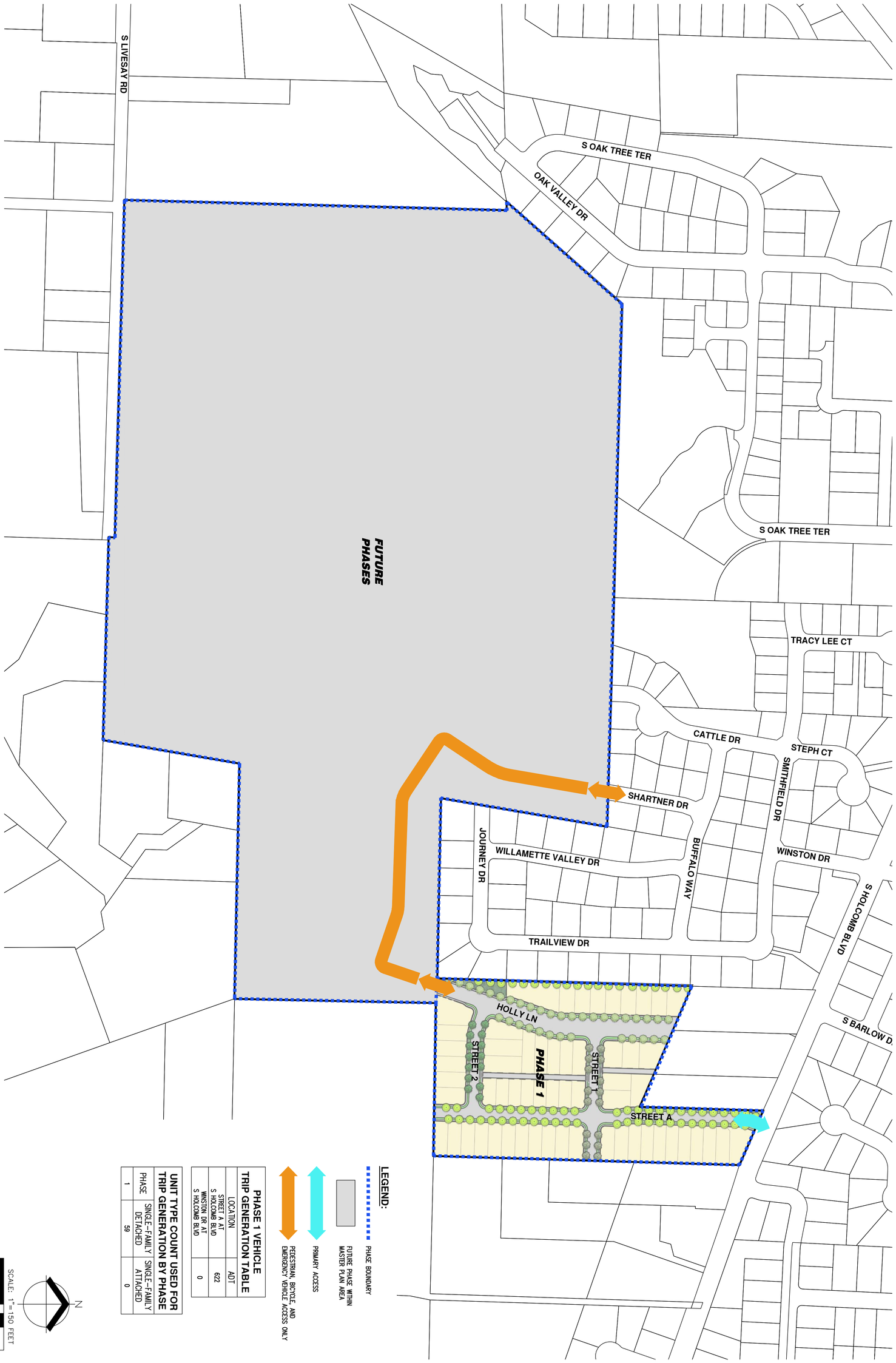
Detailed trip generation calculations by phase are attached to this memo that provide support for the summary provided above.

Under build-out conditions with Holly Lane connected to Holcomb Boulevard, the conservative worst-case assumption was made that half of the trips from phases 3-5 would utilize the existing neighborhood north of the site to reach Holcomb Boulevard. Drivers are better served by Holly Lane, which provides a more direct and higher-speed route. In practice, only the northern lots of phases 3 and 5 would be better served by the existing street network, particularly with traffic calming measures installed on existing streets, which the applicant will be conditioned to provide. However, to provide a worst-case analysis, more conservative assumptions regarding trip routing were made.

As demonstrated in this analysis, all local residential streets in the area including Winston Drive and all streets within the existing neighborhood north of the site will have under 2,000 vehicles per day with the phasing pattern shown and with the connection of Holly Lane to Holcomb Boulevard.

[1] *Park Place Crossing Master Plan*, Transportation Impact Study, dated January 13, 2022, by Lancaster Mobley

[2] *Trip Generation Manual*, 11th Edition, published by the Institute of Transportation Engineers (ITE), 2021



PHASED ACCESS EXHIBIT - PHASE 1
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION

EXH-1

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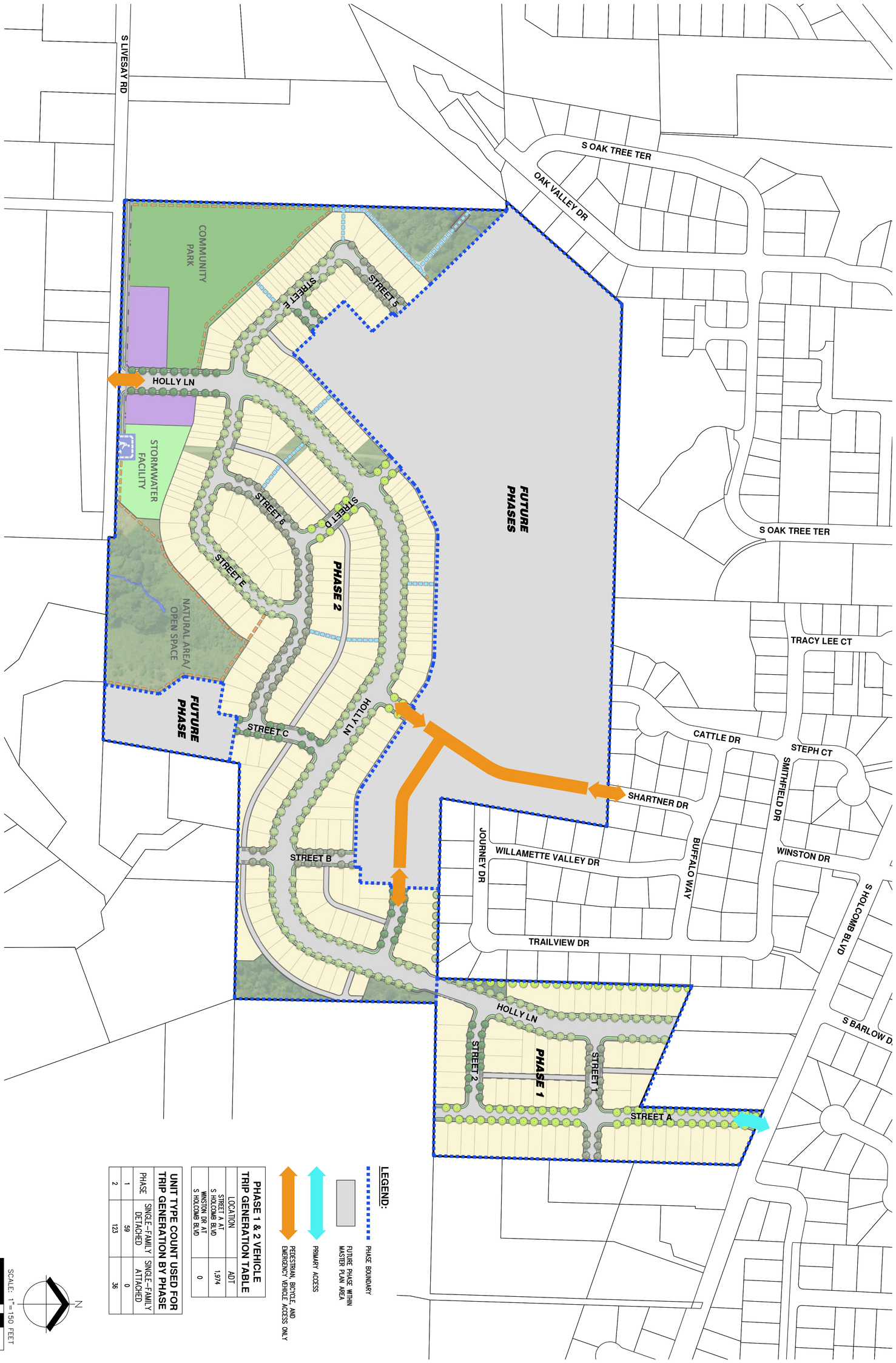

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PHASED ACCESS EXHIBIT - PHASES 1 & 2
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

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EXH-2

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PHASED ACCESS EXHIBIT - PHASES 1, 2, & 3 (ALTERNATE)
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY
NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	06/28/2022
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DRAWN BY:	NRA
CHECKED BY:	CMS

EXH-3

S OAK TREE TER
TRACY LEE CT
STEPH CT
S HOLCOMB BLVD
S BARLOW D
SMITHFIELD DR
WINSTON DR
CATTLE DR
BUFFALO WAY
SHARTNER DR
WILLAMETTE VALLEY DR
TRAILVIEW DR
OAK VALLEY DR
STREET 3
STREET A
STREET 1
HOLLY LN
PHASE 1
JOURNEY DR
STREET 2
FUTURE PHASE
STREET 4
PHASE 3
STREET 5
STREET D
PHASE 2
STREET B
STREET F
STREET 6
STREET C
STREET E
COMMUNITY PARK
NATURAL AREA/ OPEN SPACE
STORMWATER FACILITY
FUTURE PHASE
S LIVESAY RD

LEGEND:

- PHASE BOUNDARY
- FUTURE PHASE WITHIN MASTER PLAN AREA
- PRIMARY ACCESS
- PEDESTRIAN, BICYCLE, AND EMERGENCY VEHICLE ACCESS ONLY

PHASE 1, 2, & 3 VEHICLE TRIP GENERATION TABLE

LOCATION	ADT
STREET A AT S HOLCOMB BLVD	1,974
WINSTON DR AT S HOLCOMB BLVD	878 EXISTING 620 NEW 1,498 TOTAL

UNIT TYPE COUNT USED FOR TRIP GENERATION BY PHASE

PHASE	SINGLE-FAMILY DETACHED	SINGLE-FAMILY ATTACHED
1	59	0
2	135*	36
3	59	0

* 123 UNITS IMPACT STREET A, AND 12 UNITS IMPACT WINSTON DR

NOTE:

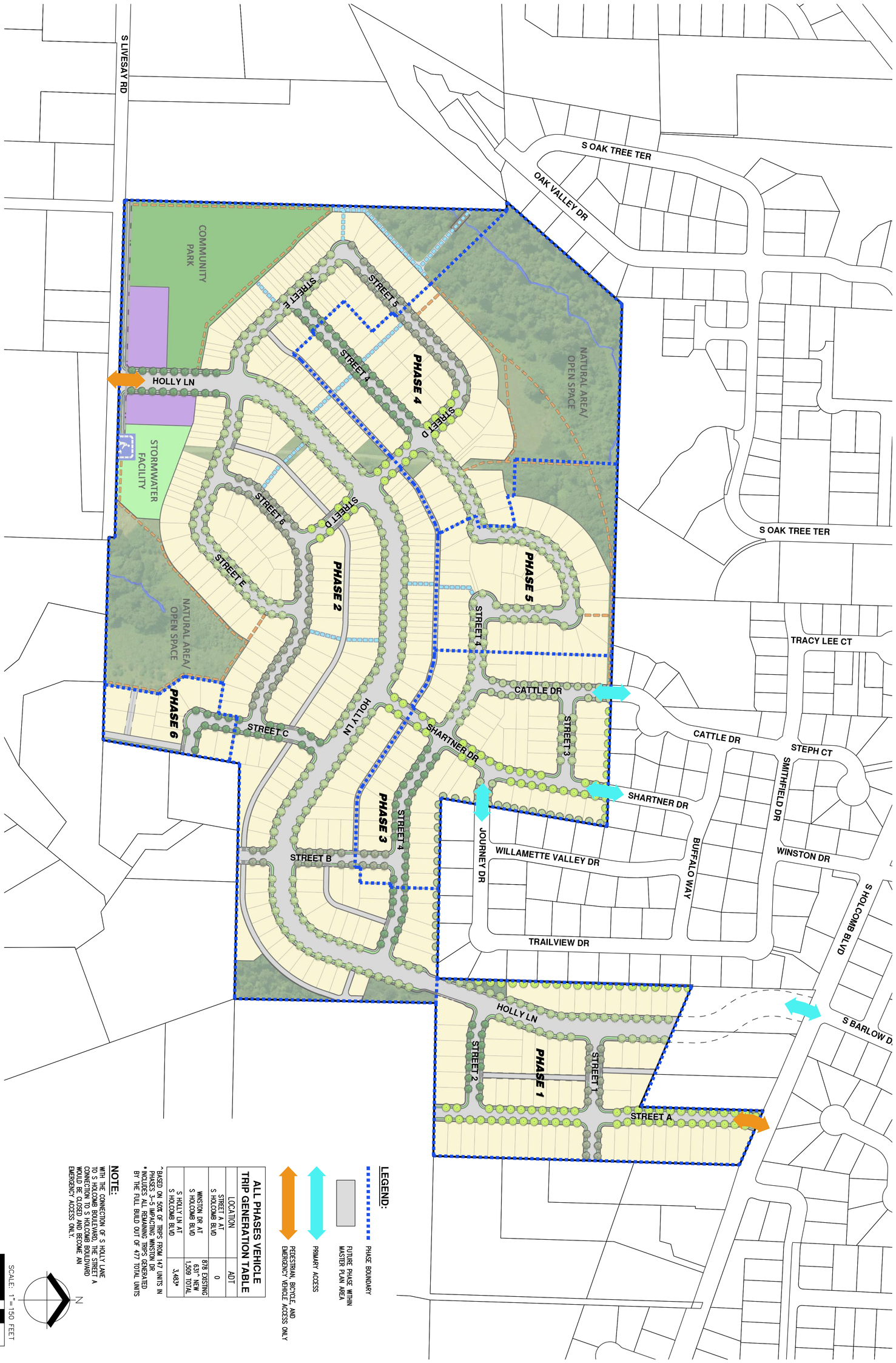
GATES WOULD BE LOCATED SOUTH OF ALLEY STREETS AND ON STREET 4 BETWEEN PHASES 2 AND 3 TO BLOCK NON-EMERGENCY ACCESS BETWEEN PHASES 2 AND 3 ALONG SHARTNER DRIVE, STREET 4, AND STREET B.

N

SCALE: 1"=150 FEET

150 0 30 75 150
ORIGINAL PAGE SIZE: 22" x 34"

AKS DRAWING FILE: 7404 INGRESS-EGRESS.DWG | LAYOUT: EXH3



LEGEND:

- PHASE BOUNDARY
- FUTURE PHASE WITHIN MASTER PLAN AREA
- PRIMARY ACCESS
- PEDESTRIAN, BICYCLE, AND EMERGENCY VEHICLE ACCESS ONLY

ALL PHASES VEHICLE TRIP GENERATION TABLE

LOCATION	ADT
STREET J AT S HOLCOMB BLVD	0
WINSTON DR AT S HOLCOMB BLVD	878 EXISTING 631* NEW 1,509 TOTAL
S HOLLY LN AT S HOLCOMB BLVD	3,483*

*BASED ON 50% OF TRIPS FROM 147 UNITS IN PHASES 3-5 IMPACTING WINSTON DR
**INCLUDES ALL REMAINING TRIPS GENERATED BY THE FULL BUILD OUT OF 477 TOTAL UNITS

NOTE:
WITH THE CONNECTION OF S HOLLY LANE TO S HOLCOMB BOULEVARD, THE STREET A CONNECTION TO S HOLCOMB BOULEVARD WOULD BE CLOSED AND BECOME AN EMERGENCY ACCESS ONLY.

SCALE: 1" = 150' FEET
0 75 150 300
ORIGINAL PAGE SIZE: 22" x 34"

PHASED ACCESS EXHIBIT - ALL PHASES
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

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EXH-4

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TRIP GENERATION CALCULATIONS
Phase 1

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 59

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	12	34	46

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	38	23	61

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	311	311	622

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	288	288	576

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1 & 2

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 182

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	33	95	128

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	110	64	174

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	875	875	1,750

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	858	858	1,716

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1 & 2

Land Use: Single-Family Attached Housing
Land Use Code: 215
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 36

AM PEAK HOUR

Trip Equation: T=0.52(X)-5.70

	Enter	Exit	Total
Directional Distribution	31%	69%	
Trip Ends	4	9	13

PM PEAK HOUR

Trip Equation: T=0.60(X)-3.93

	Enter	Exit	Total
Directional Distribution	57%	43%	
Trip Ends	10	8	18

WEEKDAY

Trip Equation: T=7.62(X)-50.48

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	112	112	224

SATURDAY

Trip Equation: T=13.21(X)-444.34

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	16	16	32

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1, 2 & 3

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 253

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	45	128	173

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	150	88	238

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,185	1,185	2,370

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,181	1,181	2,362

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Build Out

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 351

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	61	173	234

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	203	120	323

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,602	1,602	3,204

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,623	1,623	3,246

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Build Out

Land Use: Single-Family Attached Housing
Land Use Code: 215
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 126

AM PEAK HOUR

Trip Equation: T=0.52(X)-5.70

	Enter	Exit	Total
Directional Distribution	31%	69%	
Trip Ends	19	41	60

PM PEAK HOUR

Trip Equation: T=0.60(X)-3.93

	Enter	Exit	Total
Directional Distribution	57%	43%	
Trip Ends	41	31	72

WEEKDAY

Trip Equation: T=7.62(X)-50.48

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	455	455	910

SATURDAY

Trip Equation: T=13.21(X)-444.34

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	610	610	1,220

Source: Trip Generation Manual, 11th Edition

Bateman Seidel

MEMORANDUM

TO: Oregon City Planning Commission

FROM: Carrie Richter, Deputy City Attorney

DATE: June 30, 2022

RE: Park Place Concept Plan and master plan consistency under *Baker v. City of Milwaukie*

At the last Planning Commission meeting, the City received testimony from Mr. Jim Nicita raising concerns over whether the proposed Park Place Crossing Master Plan application adequately responded to the North Village obligations set forth in the Park Place Concept Plan (PPCP). Mr. Nicita argues that including park land as well as a stormwater treatment facility within the PPCP-identified North Village area creates a conflict between the planning and zoning for the area (what Mr. Nicita calls a "Baker conflict). Chair Schlagenhaufer and others asked for greater explanation of Mr. Nicita's concerns and this memorandum is offered in response. As explained in greater detail below, the degree to which the PPCP demands particular end uses or designs are policy determinations for the Planning Commission and the City Commission, if appealed. Exercising such interpretive discretion does not run afoul of the Oregon Supreme Court's holding in *Baker v. City of Milwaukie*, 271 Or 500, 533 P2d 772 (1975).

What is a *Baker* conflict?

In *Baker v City of Milwaukie*, the city of Milwaukie's zoning ordinance allowed a density of 39 units per acre on a particular piece of property, while the city's later-adopted comprehensive plan allowed only 17 units per acre. After the city issued building permits for neighboring property to develop at the more intensive density provided in the zoning ordinance, the plaintiffs filed a writ of mandamus to compel the city to suspend issuance of the building permits and amend the city's zoning ordinance to conform to the comprehensive plan's less intensive development density. The plaintiffs also sought to compel the city to modify the zoning to conform to the comprehensive plan. Agreeing with the plaintiffs, the Supreme Court explained that zoning is subordinate to planning because zoning is "the means by which the comprehensive plan is effectuated." The court held that the comprehensive plan controlled over the inconsistent and subordinate zoning ordinance that allowed for more intensive development than contemplated in the plan.

That said, in *Marracci v. City of Scappose*, a case decided after *Baker*, the Court of Appeals considered a *Baker* challenge to a city decision to deny a conditional use permit for multi-family housing within a high density residential zone where multi-family development was contemplated. 26 Or App 131, 552 P2d 552, *rev den*, 276 Or 133 (1976). The court explained that *Baker* "does not stand for the proposition that every land-use determination must at all times literally comply with the applicable comprehensive plan." In that case, the Court found that, since the city of Scapoose's plan did not contain a timeline or

other guidance on when more restrictive zoning may evolve into conformity with the plan, the policy judgment about what future use of land was best left to the local government.

Taking these two cases together, the rule in Oregon is that, so long as the proposed development does not allow a more intensive use than the comprehensive plan map designation would allow, there is no *Baker* conflict. Turning to the objections raised by Mr. Nicita, the proposal before the Planning Commission would place a portion of North Village identified lands into park land and a stormwater detention facility,[1] as well as other commercial / retail or civic uses. Both of these uses are less intensive with respect to use and design, and nothing would preclude development of two-to-three story mixed use buildings, with retail on the ground floor, as Mr. Nicita advocates. Further, there is no indication that the PPCP-identified commercial uses cannot be accommodated on the adjacent parcels identified for commercial development. As such, this proposal is unlikely to create a *Baker* conflict.

What does the Concept Plan require for the North Village?

Putting the *Baker* question to the side, OCMC 17.65.050.C.6 does require a finding that the proposed general development plan is consistent with the Oregon City Comprehensive Plan, including the PPCP. Quoting the relevant parts from the Plan introduction:

> "Concept plans describe how an area is expected to develop over time. In general, they identify the *general location and intensity of land uses*, including a variety of housing types (affordable and market-rate), commercial and industrial land uses, parks, open spaces, and schools." (emphasis added) P 7.

And elsewhere:

> "2. Concept Plan
>
> The vision for the Park Place Concept Plan is to provide a framework for growth that respects and augments the area's context, history, and natural systems. The Park Place Concept Plan emphasizes good urban design, connectivity, opportunities for place-making and cultivating community, diversity, and, above all, a way to provide for future growth in a sustainable manner.
>
> The key components of the Concept Plan (Figure 3-1) include:
>
> ***

[1] On June 26, the applicant amended its plan proposal reconfiguring the park and providing a second connection to Livesay Road. It is not clear the degree to which these changes altered the total acreage available for retail, civic or village green uses.

• Two distinct mixed-use neighborhoods (North Village and South Village) that accommodate 1459 new dwelling units

• Neighborhood-oriented commercial nodes that integrate commercial land uses, residential land uses, and public open space." P 21.

The Concept Plan was designed at a high-level without any site-specific assessment of topography or other natural resource or health and safety overlay obligations. The term "framework" is defined by *Merriam Webster's 3rd International Dictionary* as the "a basic conceptional structure (as of ideas)." It is the skeleton or a generalized idea that is intended to subsequently be developed as more detail is available. As such, it would be reasonable to assume that the PPCP does contemplate some variability with respect to uses, their location, and their design.

With respect to the particulars of the North Village design concept, pages 24-25 of the plan, as summarized here, include:

- The Concept Plan allocates enough land for 30,000 square feet of commercial development in the North Village and the Neighborhood Commercial zone was applied to this area to target "primarily retail use." See also p 65.
- "Locate neighborhood commercial and mixed use centers in close proximity to denser residential development, as well as parks and community facilities."
- The creation of the "Livesay Main Street" with identified right-of-way pedestrian amenities
- A Village Green and civic building such as a library or community center
- "Land uses along Livesay Main Street are envisioned to be a mix of residential and commercial uses (e.g. ground-floor, neighborhood-oriented commercial with housing or offices above)," providing "area residents with opportunities to shop and work," with pedestrian-focused design elements to be implemented by "main street" standards to be adopted in the future.

That portion of the land encompassed by the proposed master plan includes about half of the Plan-identified Village Green, a little over half of the land designated for Neighborhood Commercial, as well as half the area identified for a "Civic Center." Although the degree to which the mapped acreages compare between the concept plan and the proposal is not entirely clear, the proposal does locate park land, commercial / retail uses as well as a civic area in separate development tracts within this area to accommodate these uses.[2]

How these areas are organized, their roadway connections, whether they exist to the degree necessary to serve "area residents," and the degree to which this non-residential development must occur concurrent with residential development are all questions for the Planning Commission, and ultimately the City Commission, to determine. It may be that including the park and stormwater facility within this area

[2] Again, the degree to which the June 29 amendments provide greater protection for Neighborhood Commercial zoned lands for retail or civic uses is not clear.

will substantially compromise the desire to accommodate 30,000 square feet of commercial / retail within the North Village.

Staff's analysis concludes that the PPCP-identified Livesay Main Street and commercial development is not compromised by the inclusion of park space. The staff recommendation is to add street connectivity in this area is likely to lead to the relocation or reduction in the size of the storm pond and it appears that in the applicant's June 29 amendments, this changes have been accomplished. Furthermore, the Livesay streetscape would be consistent throughout, regardless of the land use. Shifting these non-commercial uses further to the north would presumably result in a loss of residential housing units, whose numbers are also fairly prescribed within the Concept Plan. It could be that both objectives could be satisfied with an increased density of multi-family housing. All of these objectives must be balanced to best achieve the purpose and policies set forth in the plan.

Moving beyond discrete uses, Mr. Nicita has suggested that certain urban design elements dictate development within the North Village including "an uninterrupted building wall containing two-to-three story mixed use buildings." Mr. Nicita's finds authority for these requirements in a March 27, 2007, memorandum completed by Angelo Planning Group entitled: "Implementation of the Park Place Concept Plan – Development Code Amendments (DRAFT)" that is attached to the PPCP as an Appendix. Both the plan and this memo itself make clear that the identified design changes set forth therein were "recommendations" for plan and code amendments to be accomplished in the future. As such, unless or until these "recommendations" are adopted, they do not establish any mandatory architectural standards in their own right.

A couple of secondary points are worth making with respect to this Angelo Planning memo. First, although the PPCP does talk about the North Village maintaining a design character that is different from the "existing auto-oriented commercial uses and a proposed regional shopping center in the area bounded by Washington Street, Abernethy, and Highway 213," neither the Plan itself, nor the Angelo Planning memo identify a requirement to develop "a solid uninterrupted building wall of two-to three-story buildings." In 2014, the City amended its Neighborhood Commercial standards to address the PPCP requirements. More specifically, the Neighborhood Commercial zone imposes a maximum front setback of 5 feet and the existing design standards do call for locating parking in the rear, orienting building entrances to the main street, and 60% window glazing on the ground floor primary façade – all recommendations set forth in the Angelo memorandum. Second, no actual development is proposed as part of this review. Questions about building height, transparency, materials and streetscape design will be determined in the future as part of the detailed development plan review. If there are particular design elements that the Commission believes the PPCP requires in order to realize the vision identified for the North Village, it may be appropriate to include them as conditions of approval.

What does the Plan require with respect to stormwater?

Mr. Nicita closes his comments with a second observation that allowing a stormwater pond as part of this master plan is not consistent with the approach to stormwater contemplated in the PPCP. The most direct discussion of stormwater in the Plan provides:

> "Stormwater: Develop a stormwater management system that utilizes a combination of regional detention facilities, green streets and on-site stormwater detention and filtration to minimize runoff and impacts on local waterways." P 72

This statement does suggest that on-site stormwater detention was a contemplated and authorized approach for treating stormwater. The proposal includes a single consolidated storm pond facility, along with on-street stormwater planters, on Holly Lane and local streets, that function simultaneously as planter strips with street trees and as stormwater treatment planters. It is up to the Planning Commission to determine if consolidated detention into a single facility and its location satisfies the framework of the PPCP.

Conclusion

Since this application does not approve development that is more intensive than that contemplated by the PPCP, approval is unlikely to run afoul of the holding in *Baker v. City of Milwaukie.* The PPCP does set forth a framework for the North Village that includes commercial and civic spaces that will serve the nearby residential development. Whether the non-residential components of the proposal remaining for development in the future are sufficient to satisfy this vision is a question for the Planning Commission and City Commission to determine.

Public Testimony Summary for GLUA-21-00045: Park Place Crossing General Development Plan

A number of comments cited Statewide Planning Goals. It is important to note here that Statewide goals don't apply to this Master Plan proposal, but rather the adopted Park Place Concept Plan and Comprehensive Plan policies apply, which implement the statewide goals.

Issue Number	Issue/Comment/Concern	Staff analysis/response	Has this been addressed? How?
1	Public notice/citizen involvement – some commenters did not receive notice, or only learned about the proposal when the notice was mailed.	The City provided notice in compliance with state statute and OCMC 17.50. Notice was mailed to properties within 300 feet both inside and outside of the UGB. Notices were mailed on March 29th, a total of 28 days before the hearing. Notice procedures beyond minimum code requirements also include posting the full application materials on the City website, emailing them to the CIC and neighborhood association officers. The applicant held a meeting with the Park Place neighborhood association in 2021 in compliance with OCMC 17.50.	No additional action needed. The Planning Commission continued the hearing to May 23rd and then to July 11th.
2	School capacity	The School District provided a comment on May 9th indicating that enrollment has been reduced by the pandemic, that recent Park Place developments have resulted in fewer school-age children than is typical, and that capacity is expected to be available to accommodate the new development.	No additional action needed.
3	Impacts on drainage, stormwater runoff, large amount of impervious surfaces. One neighboring property has a former reservoir that collects lots of water from the site as well as other properties	The applicant's proposal addresses stormwater impacts from the greater impervious surface, by accommodating all stormwater into a system to manage and detain stormwater through planters and detention ponds on site. Stormwater management will be required to meet City Standards for treatment and flow control. Each subsequent DDP will submit detailed stormwater management plans for each phase. The Stormwater and Grading Design Standards will require hydrology to be studied as part of the analysis.	Based on the information provided, the City Engineer has concluded that the stormwater management solutions identified will be adequate. Detailed stormwater management review will be required at the Detailed Development Plan phase.
4	Protection of water wells on neighboring properties outside the UGB	As part of the geotechnical and stormwater analyses of the site, the applicant will be required to submit a hydrology report with each DDP. Per OCMC 17.44.050.A.10, the hydrology report must address "*…the effect upon the immediate area's stormwater drainage pattern of flow, the impact of the proposed*	Detailed Hydrology analysis will be required at the Detailed Development Phase.

		development upon downstream areas and upon wetlands and water resources; and the effect upon the groundwater supply."	
5	Impacts of additional traffic on Winston Drive, Shartner Drive, Cattle Drive, and Journey Drive. Traffic being routed through existing neighborhood to get to Holcomb Blvd.	The staff recommendation includes a condition of approval that requires traffic volume counts be taken on these streets and street connection be made to Redland Road if volumes will exceed 2000 trips per day at any point in the development buildout. Traffic calming elements are also recommended.	See findings and conditions of approval in 17.65.050.C.5. Relevant conditions of approval: #7
6	Lack of street connection to Redland Road; all traffic will use Holcomb Blvd. This is not consistent with the Park Place Concept Plan.	The Holly Lane connection to Redland Road is a major element of the Park Place Concept Plan and a critical link in the City's long-term transportation system plan. The applicant's Traffic Impact Analysis indicates that the system can handle the increased traffic volumes form the development without this connection; however, it is clear that the intersection of HWY 213 and Redland Rd, will be over capacity at some point between proposed Phase 1 and Phase 2. This means that the applicant will likely not be able to demonstrate compliance with transportation mobility standards for Phase 2, as proposed, and beyond, unless action is taken to add capacity at the intersection. The staff recommendation includes a condition of approval that requires traffic volume counts be taken on these streets and street connection be made to Redland Road if volumes will exceed 2000 trips per day at any point in the development buildout. Traffic calming elements are also recommended.	See findings and conditions of approval in 17.65.050.C.3. Relevant conditions of approval: #5, 6, and 7
7	Proposed lot sizes are small, yard space is undersized, smaller lots sizes lead to more impervious surfaces; 1800 square feet does not allow for enough space for parking and privacy	The proposed variance allows the applicant to develop additional attached dwellings in the area to meet the density in the Concept Plan while also providing ample open spaces. The applicant points out that the City is proposing to amend its own code in upcoming months to revise the minimum lot size for townhomes, which are synonymous with attached single family homes. The City's plans to change the minimum lot size to	See findings in 17.60; see condition of approval #54

		1500 square feet will comply with state law as well as provide a more practical lot size for attached homes. As the applicant points out, a lot depth of 140+ feet would be required to maintain the current minimum lot size. Decreasing the minimum lot size to 1800 square feet, which is the applicant's request, would mean that lot depth would be 90 feet for a 20-foot-wide lot. A typical townhome footprint is 20' x 45', which would mean that the yard space in front would be likely 5-20 feet in depth and in the rear, 20 to 40 feet in depth. These dimensions are in line with the typical medium density development patterns. The applicant's proposal addresses open space impacts by providing ample open spaces including a public park and numerous natural areas where streams and forested hillsides are maintained. The proposed adjustment to dimensional standards only applies to interior lots, meaning that lots along the perimeter of the site that share property lines with neighbors will be held to the dimensional standards in the code, and cannot be reduced by 20%. Additional mitigation for the proposed lot size variance is required in a new condition of approval #54.	
8	Concerns about high density; population density will be even higher than unit density due to family sizes, 1800 square foot lots will be 20 units per acre.	The proposed development is within the Park Place Concept Plan area; the Concept Plan requires a minimum of 937 units within the North Village area. The applicant is required to meet the density approved in the Park Place Concept Plan (which equates to a minimum of 469 units within the 92 acre area) and has proposed adjustments to standards, an NROD density transfer, and a variance for attached single family lot size in order to do so.	See findings in 17.60 and 17.65.050.C.6
9	Holly Lane street width at the "pinch point" between Taxlot 314	The "pinch point" location for Holly Lane was identified in the Park Place Concept Plan. The applicant has proposed a cross section consistent with the City's residential collector street	The proposed constrained cross section appears to meet the intent of the City's standards for

	Tax Map 2-2E-28AD and Taxlot 400 Tax Map 2-2E-27C	standard for number of travel lanes, lane widths, bicycle lanes, and sidewalks. Street parking and the landscaping strips are proposed to be eliminated at the pinch point to reduce the total width of public right of way in this area. Green space is proposed on the northwest and southeast corners of the pinch point.	safety, accessibility for vehicles, bicycles, and pedestrians. No exception to the proposed preliminary constrained street design is proposed or authorized at this time. Further review of the street design will occur with the Detailed Development Plans.
10	Street extensions shown into neighboring properties	These street extensions into areas of urban reserve are shown for the purposes of demonstrating the feasibility of the proposed development pattern to facilitate connections into neighboring properties that could be eventually included in the UGB. No actual extension or easement to provide such connections will be required.	N/A
11	Deforestation and loss of habitat, fractured habitats. Request for a periodic review of Goal 5 and update of the natural resources inventory.	The City's Goal 5 inventory has been acknowledged by the State Department of Land Conservation and Development including protection of the riparian corridors throughout this site, which this GDP proposal shall retain. It is expected that tree removal will need to occur to make urban development possible. The City and Metro region chose to add this land to the urban growth boundary to allow for urban development for additional housing capacity while maintaining Goal 5 natural resource protections in place. The proposal will be subject to tree removal and mitigation standards in OCMC 17.41 for each phase.	See findings in Comprehensive Plan Goal 5; see NROD review conditions #13 and #17
12	Light pollution	The City's standards for lighting on private property does not apply to residential uses (except multifamily). The City has a nuisance code to provide protection to residential areas from lighting impacts.	See findings in Comprehensive Plan Goal 6
13	Noise	Residential development proposed is typical of the region and no abnormal impacts from noise are expected. No high-traffic corridors are part of the development or adjacent to the development.	See findings in Comprehensive Plan Goal 6

14	Trespassing concerns, privacy concerns for neighboring properties	The City and Metro region chose in 2002 and earlier to add this land to the urban growth boundary to allow for development at urban densities for additional housing capacity while maintaining other farm and forest lands outside the UGB for conservation. Each phase and each lot will be required to show compliance with required setbacks, which are in place to maintain a level of separation and privacy form other properties. Neighboring owners outside the city limits can add fencing as permitted by County zoning regulations if there are trespass concerns.	N/A
15	Traffic impact study is flawed, HWY 213 and Redland needs to be addressed before allowing additional traffic volume	The applicant's Traffic Impact Analysis indicates that the system can handle the increased traffic volumes from the development without this connection; however, it is clear that the intersection of HWY 213 and Redland Rd, will be over capacity at some point between proposed Phase 1 and Phase 2. This means that the applicant will likely not be able to demonstrate compliance with transportation mobility standards for Phase 2, as proposed, and beyond, unless action is taken to add capacity at the intersection.	See findings and conditions of approval in 17.65.050.C.3. Relevant conditions of approval: #5, 6, and 7
16	Consistency with Natural Hazards mitigation plan. Concern that tree removal will increase flooding and landslide risks, paving over wetlands will decrease ability of area to absorb water	The development shall comply with City standards for development in geologic hazard areas (landslides) and Natural Resource Overlay Areas (wetlands). Stormwater management, tree mitigation and Erosion control standards will be required at the detailed development planning level.	See findings in 17.44 and 17.49 of the attached staff report memorandum
16	Emergency evacuation routes in the area are limited, concern that traffic bottlenecks cause large backups on Holcomb and this development will add traffic to the backups	Staff has included findings addressing the concerns about the wildfire evacuations, including a discussion of upcoming efforts by the Clackamas County disaster management division. The County Disaster Management staff have provided information indicating evacuation route planning efforts have been delayed, but are still planned to begin in 2022.	See findings in attached staff memorandum.

17	Plans are difficult to read, legends are missing information. GIS maps are out of date.	Staff is available to help community members get a better understanding of the plans and next steps before development can occur. The City's and applicant maps are up to date. The City's NROD Inventory map has not been updated in many years; however, it appears the mapped streams generally match the conditions on the ground today as reflected by the applicant's NROD Study, and with the conditions of approval, the applicant will be required to verify their exact location and extent with third party review.	See conditions of approval #13 and #17.
18	Why have the NC zone "main street" standards for Park Place not yet been adopted?	The Park Place concept plan states: "As part of the implementation measures proposed for Park Place, the City's existing Neighborhood Commercial (NC) zone will be modified to include "main street" standards for use in creating vibrant neighborhood centers in the North and South Villages. The NC zone was updated as part of L-08-01 and again in 2014 when the City adopted code for the South End Concept Plan. The amendments included OCMC 17.24, OCMC 17.62, and 17.52, with amendments to implement both the Park Place Concept Plan and South End Concept Plan; as described by language in 17.24.010 of the NC zone Chapter, which states, "This district may be applied where it is appropriate to reduce reliance on the automobile for the provision of routine retail and service amenities, and to promote walking and bicycling within comfortable distances of adjacent residential infill neighborhoods, such as within the Park Place and South End Concept Plan areas. Approval of a site plan and design review application pursuant to OCMC 17.62 is required."	N/A
19	Concerns about landslides and lack of availability of landslide insurance	Geologic Hazards within the City of Oregon City are regulated in OCMC 17.44. There is no proposed construction on the mapped landslide deposits within the development area. The proposal includes some impacts to mapped steep slopes within the development area. The project is conditioned (condition 36) to review the	See Findings on Chapter 17.44 on future requirements at the DDP review.

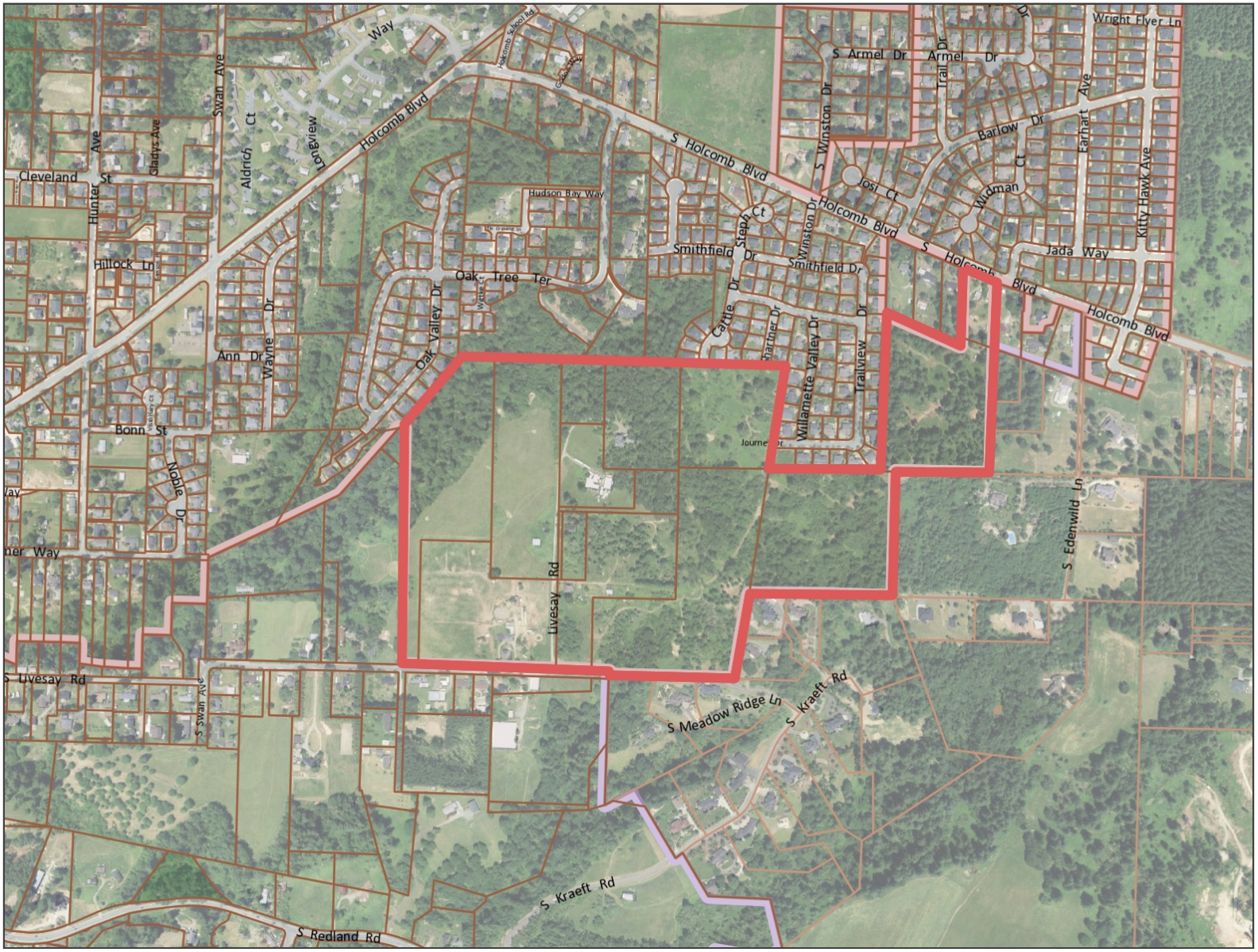
		impacts to the mapped geologic hazard areas within the project area at the time of detailed development plan with respect to City Code 17.44 and has been advised that adjustments to the site plan may be needed at that time. A requirement for landslide insurance is not a part of the City's regulatory requirements and is not something required of the project whether insurance is available or not. However, the City does regulate and require properties to have indemnity documents recorded on their properties where mapped geologic hazard exists. Those documents are recorded at the County and exist with the property in perpetuity and will show on a title report search to a future buyer.	
20	A single large detention facility for stormwater does not represent good stewardship of water resources	A single regional detention facility is an allowed stormwater management strategy as shown in the Stormwater and Grading Design Standards 2.2.4. The applicant is required as conditioned (conditions 30 and 35) to meet the Stormwater and Grading Design standards. The Stormwater Management Strategies are prioritized from Level 1 thru Level 4. The applicant will be required to show why Level 1 and 2 cannot be achieved and why level 3 (regional facilities) meets the requirements of section 2.2.4 as part of reviewing the entire project during each phase and each detailed development plan submittal. Added condition of approval #54 includes a mitigation option to design the storm pond(s) as a wetland; the applicant may choose this option among the three provided.	Stormwater management to be further reviewed at the DDP.
21	Neighbors on the south side of Livesay Road have requested that any right-of-way expansion needed come from the applicant's side of Livesay Road and that the new centerline and any required street	Livesay Road is a County Road. Road improvements to County Roads are regulated by Clackamas County. If the commenter's request is to be considered, it will occur at the DDP level and with Clackamas County staff.	N/A

	improvements not affect their existing frontages.		
22	The adopted Wetland Inventory did not include the full development area because parts of it were outside the UGB at that time. Tributaries of Charman Creek are not included in the city's inventory.	The City added the full UGB area to its Natural Resource Overlay District in 2008, using wetland and stream inventory data from the County and Metro. A recommended condition of approval has been added for formal NROD Verification of Charman Creek before or as part of the Phase 1 DDP, with third party review required.	See revised condition #13
23	The Trailview Heights HOA is unwilling to grant approval for any easements or construction on Lot 14 related to the Park Place Crossing development	While the applicant's plans do appear to show a portion of Holly Lane constructed on Lot 14, the City does not require that the applicant use that property. It appears there is enough width in the main development property to accommodate Holly Lane. The GDP is preliminary, and we do not currently know the exact final alignment of Holly Lane. If the final engineering plans end up requiring that the application use a portion of Lot 14, the use of Lot 14 is between the applicant and the HOA (not the City).	
24	The City should invite Metro, DLCD, and other agencies to discuss this plan.	The City provided notice to affected agencies on March 30th via email. The official land use transmittal email and distribution list is now included in the record. Agencies included in the notice are the County, ODOT, TriMet, Metro, Clackamas River Water, Water Environment Services (Tri-City Sewer), Clackamas Fire District, and Oregon City School District. The City's standard procedures for agency notice were followed. Comments from many of the affected agencies have been received and are in the record.	It is not typical for DLCD to be sent a notice for local land use actions unless there is a proposal to amend the Comprehensive Plan. Nonetheless, the City reached out to the Department of Land Conservation and Development (DLCD) on May 12 and received confirmation that no notice or review by DLCD is required.
25	There is a "Baker Conflict" in the NC-Neighborhood Commercial zone where the applicant has proposed a park and a stormwater pond.	The park and storm facility are permitted uses in the NC zone and do not compromise the ability to have commercial and mixed use development elsewhere in the zone. See attached memorandum from Assistant City Attorney Carrie Richter for more detailed analysis.	N/A
26	Commercial development and amenities – concern over lack of	The staff recommendation includes a condition of approval to require street improvements and utilities be brought to and	See condition of approval #22.

	specific development proposed, lack of neighborhood amenities such as shopping and dining, and request that the commercial parcels be constructed with all infrastructure and that the City have first right of refusal to purchase the parcels.	through the street frontages for the proposed commercial/civic parcels. However, there is no condition in the current recommended list of conditions of approval requiring City's first right of refusal to acquire the sites. The Park Place Concept Plan calls for about 40,00 square feet of retail or commercial space, as well as mixed use development within the North Village central area. The applicant has proposed a proportional amount of acreage for future commercial development, but has not proposed any specific development for the sites. The degree to which the applicant must show compliance with these elements of the Concept Plan is a question for the Planning Commission.	
27	Concern about increased use of existing Holly Lane south of Redland Rd	The proposal does not include an extension of Holly Lane to connect to the existing intersection of Holly and Redland Road. This connection is expected to occur in the future as other parts of the Park Place Concept Plan area are annexed and developed. The Park Place Concept Plan ultimately plans for urban development of areas south of the subject property, including the area around Tumwata (formerly Ogden) Middle School and the Holly Lane area. The adopted Transportation System Plan includes projects that would widen Holly Lane and improve intersections along the corridor to handle increased traffic. None of these projects are designed or scheduled at this time, so the timing is unknown.	N/A
28	The proposal does not include the strategies identified in the Park Place Concept Plan to create a green, low impact, and habitat-friendly neighborhood.	The City's stormwater manual allows for a range of options to manage stormwater. Many of the strategies listed in the Concept Plan are technically voluntary, as they are not required by any development standards in the municipal code. That said, the degree to which the applicant must show compliance with these strategies in the Concept Plan is a question for the Planning Commission. The city's tree code does not require that any specific amount of trees or percentage of tree canopy be preserved; rather,	N/A

		removal of trees is subject to robust mitigation planting in OCMC 17.41.	
29	Is it legally possible for Oregon City to construct a street in areas outside the City limit, with respect to Holly Lane?	The City has had some preliminary discussion with the County regarding options for Holly Lane extension to Redland Road. There are several legal pathways; including having the road be under County jurisdiction; annexing only the roadway itself; and constructing the road only after all the underlying properties are annexed into the City.	N/A
30	Request for analysis of buildable acreage in the Park Place Crossing area versus the entire North Village to determine if the proposed number of units is actually proportional and in keeping with the Concept Plan.	The buildable acreage in the Park Place Crossing Development is approximately 70 buildable acres (out of a total of 92 gross acres). This represents approximately 42% of the total buildable acreage in the North Village. However, due to the variation in land use designations in the Comprehensive Plan, a direct comparison of buildable acreage is not particularly helpful. The zoning in the area occupied by Park Place Crossing Master plan, approved by the City in 2018, includes high amount of acreage as medium density and a very small amount of acreage as low density. South of Livesay Road, in the remaining portion of the North Village, the Comprehensive Plan designations are such that a much higher percentage of land will be zoned as low density than in the Park Place Crossing Master Plan, which reduces the number of units, even though the total acreage is higher. A detailed analysis will be provided by staff in coming weeks as needed.	N/A

Oregon City GIS Map

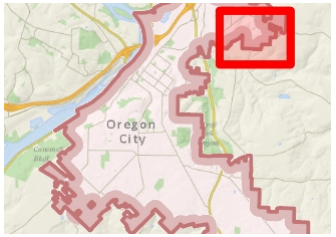


Legend

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

Notes

Overview Map



0 800 1,600 Feet

1: 9,600

The City of Oregon City makes no representations, express or implied, as to the accuracy, completeness and timeliness of the information displayed. This map is not suitable for legal, engineering, surveying or navigation purposes. Notification of any errors is appreciated.

Map created 3/28/2022

City of Oregon City
PO Box 3040
625 Center St
Oregon City
OR 97045
(503) 657-0891
www.orcity.org

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)
- ☐ Compatibility Review
  - ☐ Willamette River Greenway
  - ☐ Communication Facility
- ☐ Lot Line Adjustment
- ☐ Non-Conforming Use Review
- ☐ Natural Resource (NROD) Verification
- ☐ Minor Site Plan & Design Review
- ☐ Historic Review – Remodel
- ☐ Detailed Dev. Plan (DDP)

Type II (OCMC 17.50.030.B)
- ☐ Master Plan / PUD / GDP or Amendment
- ☐ Detailed Development Plan (DDP)
- ☐ Floodplain Review
- ☐ Geologic Hazard Overlay
- ☐ Minor Partition (<4 lots)
- ☐ Minor Site Plan & Design Review
- ☐ Non-Conforming Use Review
- ☐ Site Plan and Design Review / DDP
- ☐ Subdivision (4+ lots)
- ☐ Minor Variance
- ☐ Natural Resource (NROD) Review
- ☐ Public Improvement Modification
- ☐ Willamette River Greenway

ELD Process (OCMC 17.50.030.E)
- ☐ Expedited Land Division

Type III / IV (OCMC 17.50.030.C & D.)
- ☐ Annexation
- ☐ Code Interpretation / Similar Use
- ☑ Master Plan / PUD / GDP Amendment
- ☐ Conditional Use
- ☐ Comprehensive Plan / Legislative Amendment
- ☐ Code ☐ Map
- ☐ Detailed Development Plan DDP
- ☐ Historic Review
- ☐ Municipal Code Amendment
- ☐ Parking Adjustment
- ☑ Variance ☐ Sign Variance
- ☐ Natural Resource (NROD) Review
- ☐ Zone Change (Text/Map)
- ☐ Willamette River Greenway

Legislative Action (OCMC 17.50.170)
- ☐ Legislative

File Number(s): GLUA-20-00045 / MAS-21-00006	**Application Date:** 7/20/2021
Project Name: Park Place Crossing	
Proposed Land Use or Activity: Master Plan (GDP)	**# of Lots Proposed (If Applicable):** ±476
Physical Address(es) of Site: Multiple Properties, see list attached.	
Clackamas County Map and Tax Lot Number(s): 2 2E 27BC Tax Lots 1000, 2000; 2 2E 28D Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 500, 502, 3700, 3701	

Applicant(s)

Applicant(s) Signature:		
Applicant(s) Name Printed: Mark Handris, ICON Construction & Development, LLC		Date: July 12, 2021
Mailing Address: 1969 Willamette Falls Dr., Suite 260, West Linn, OR 97068		
Phone: Please contact Applicant's Con.	Fax: Please contact Applicant's Consultant.	Email: Please contact Applicant's Con.

Property Owner(s) – See reverse for more than two Owners

Property Owner #1 2 2E 28D 100, 190, 302, 400, 500, 3700

Property Owner#1 Signature		
Property Owner#1 Name Printed: Mark Handris, Manager - Hidden Falls LLC		Date: July 12, 2021
Mailing Address: 1969 Willamette Falls Dr., Suite 260, West Linn, OR 97068		
Ownership Address: 16472 & 16582 Livesay Rd, Oregon City, OR 97045 (and other Non Situs properties, see Tax Lot IDs above)		
Phone: Please contact Applicant's Con.	Fax: Please contact Applicant's Consultant	Email: Please contact Applicant's Con.

Property Owner #2 2 2E 27BC 1000, 2000; 2 2E 28D 3701

Property Owner#2 Signature		
Property Owner#2 Name Printed: Mark Handris, Manager - Redland Road LLC		Date: July 12, 2021
Mailing Address: 1969 Willamette Falls Dr., Suite 260, West Linn, OR 97068		
Ownership Address: 15110 Holcomb Blvd, Oregon City, OR 97045 (and other Non Situs properties, see Tax Lot IDs above)		
Phone: Please contact Applicant's Con.	Fax: Please contact Applicant's Consultant	Email: Please contact Applicant's Con.

Consultant

Consultant Signature		
Consultant Name Printed: AKS Engineering & Forestry, LLC - Chris Goodell, AICP, LEED AP		Date: 6/10/21
Mailing Address: 12965 SW Herman Road, Suite 100, Tualatin, OR 97062		
Phone: (503) 563-6151	Fax: (503) 563-6152	Email: ChrisG@aks-eng.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.

Park Place Crossing Master Plan Application Additional Land Owner Signatures

Property Owner # 3 2 2E 28D 300, 301, 303		
Property Owner#3 Signature George C Thomas		
Property Owner#3 Name Printed: George Thomas		Date: 9-15-21
Mailing Address:		
Ownership Address: 16644 Livesay Rd, Oregon City, OR 97045		
Phone: Please contact Applicant's Con.	Fax: Please contact Applicant's Consultant	Email: Please contact Applicant's Con.

Property Owner # 4 2 2E 28D 200		
Property Owner#4 Signature Kirk Tolstrup		
Property Owner#4 Name Printed: Kirk Tolstrup		Date: Sept. 30, 2021
Mailing Address:		
Ownership Address: 16530 Livesay Rd, Oregon City, OR 97045		
Phone: Please contact Applicant's Con.	Fax: Please contact Applicant's Consultant	Email: Please contact Applicant's Con.

Property Owner # 4 2 2E 28D 200		
Property Owner#4 Signature Michelle Tolstrup		
Property Owner#4 Name Printed: MichelleTolstrup		Date: 9-30-21
Mailing Address:		
Ownership Address: 16530 Livesay Rd, Oregon City, OR 97045		
Phone: Please contact Applicant's Con.	Fax: Please contact Applicant's Consultant	Email: Please contact Applicant's Con.

Property Owner # 5 2 2E 28D 502		
Property Owner#5 Signature		
Property Owner#5 Name Printed: Robert Tershel		Date: 9/30/2021
Mailing Address:		
Ownership Address: 14631 Livesay Rd, Oregon City, OR 97045		
Phone: Please contact Applicant's Con.	Fax: Please contact Applicant's Consultant	Email: Please contact Applicant's Con.

Park Place Crossing
General Development Plan/ Master Plan Application

Date: July 2021
Updated March 2022

Submitted to: City of Oregon City
Planning Division
695 Warner Parrott Road
Oregon City, Oregon 97045

Applicant: ICON Construction & Development, LLC
1969 Willamette Falls Drive, Suite 260
West Linn, Oregon 97068

AKS Job Number: 7404



AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

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Exhibit K: Preliminary Geotechnical Report
Exhibit L: Addendum on Slopes
Exhibit M: Geologic Hazard Overlay Zone Memorandum
Exhibit N: Park Place Crossing & the Park Place Concept Plan

Park Place Crossing General Development Plan/Master Plan Application

Submitted to:

City of Oregon City
Planning Division
695 Warner Parrott Road
Oregon City, Oregon 97045

Applicant:

ICON Construction & Development, LLC
1969 Willamette Falls Drive, Suite 260
West Linn, Oregon 97068

Property Owners:

Hidden Falls Development, LLC
1969 Willamette Falls Drive, Suite 260
West Linn, Oregon 97068
(2 2E 28D Tax Lots 100, 190, 302, 400, 500, 3700)

Redland Road, LLC
1980 Willamette Falls Drive, Suite 200
West Linn, Oregon 97068
(2 2E 28D Tax Lot 3701
2 2E 27BC Tax Lots 1000, 2000)

Robert Tershel
5933 SW Ralston Drive
Portland, Oregon 97239
(2 2E 28D Tax Lot 502)

George Thomas
16644 S Livesay Road
Oregon City, OR 97045
(2 2E 28D Tax Lots 300, 301, 303)

Kirk & Michelle Tolstrup
16530 S Livesay Road
Oregon City, OR 97045
(2 2E 28D Tax Lot 200)

Applicant's Consultant:

AKS Engineering & Forestry, LLC
12965 SW Herman Road, Suite 100
Tualatin, OR 97062

Contact(s): Monty Hurley, PE, PLS - Principal
Chris Goodell, AICP, LEED AP – Associate

Email: Monty@AKS-eng.com
ChrisG@AKS-eng.com
Phone: (503) 563-6151

Site Location: North and east S Livesay Road, South of S Holcomb Road, Oregon City, Oregon

Clackamas County Assessor's Map: Map 2 2E 28D: Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 500, 502, 3700, 3701
Map 2 2E 27BC: Tax Lots 1000, 2000

Site Size: A Master Plan affecting ±91.7 acres

Land Use Districts: Medium Density Residential (R-5)
Low Density Residential (R-10)
Neighborhood Commercial (NC)

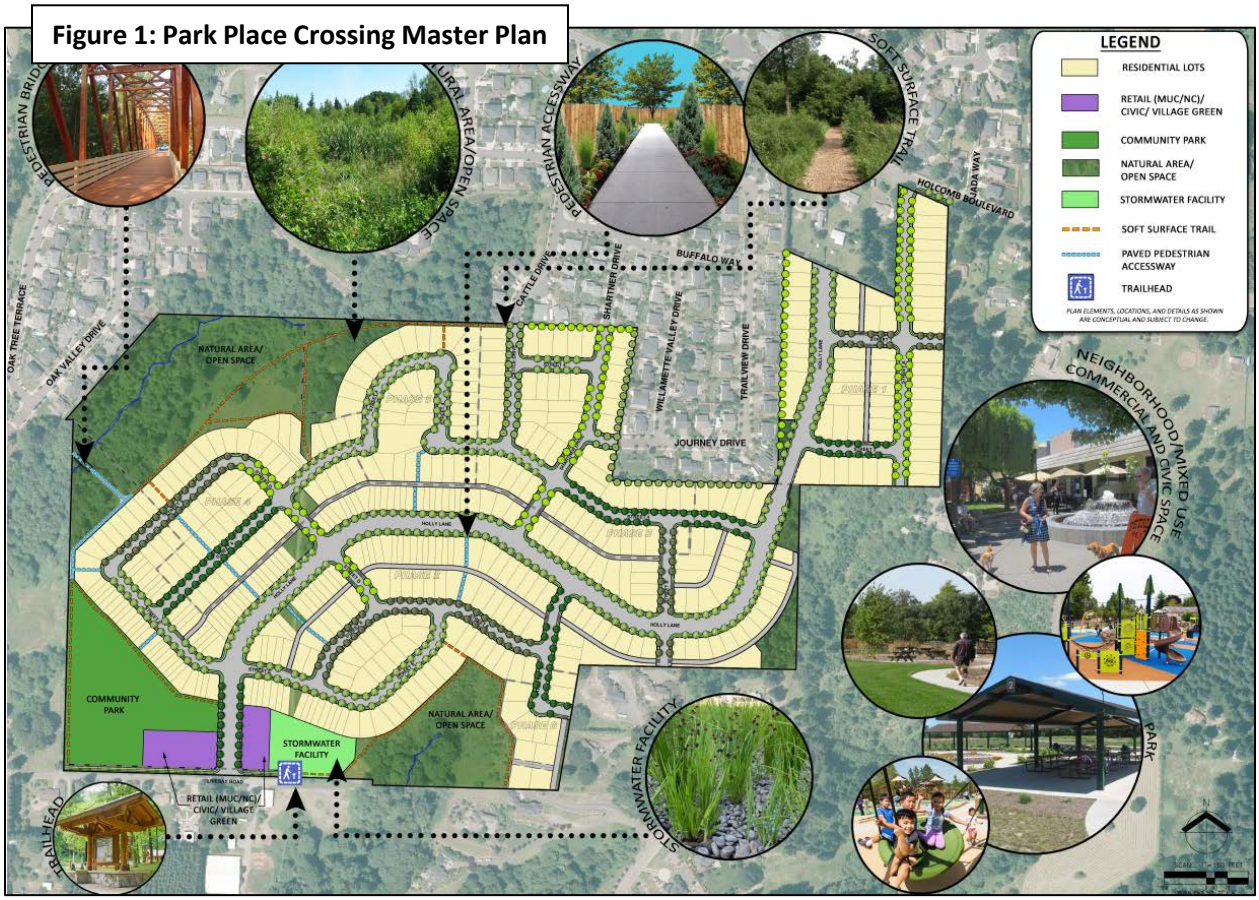
I. Executive Summary

ICON Construction & Development, LLC (Applicant) is submitting this General Development Plan application for a master-planned community within the Park Place Concept Area. The properties were annexed into the City in 2018 by City Commission approval of Ordinance 18-1007 (AN-17-0004 / ZC-17-0005). This application for a General Development Plan/Master Plan does not involve approval of physical alterations to the project site. A General Development Plan/Master Plan was required per Condition of Approval No. 4 of Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005), the Park Place Annexation and Zone Change. General Development Plans require a mixture of housing types to be provided. As a result, a variance is required due to the lot size requirements of the zoning district. It is expected that upcoming code changes will remove the need for this variance with future land use applications. The application does not include an application for approval of a Detailed Development Plan (DDP), Flood Management Overlay District review, Natural Resources Overlay District review, or any construction at this time. The 20-year General Development Plan guides the project through the anticipated build-out timeframe.

The Park Place Crossing (PPC) Master Plan consists of ±476 residential lots planned to be provided in six residential phases. The project also includes a community park, open space, regional stormwater management facility, retail/civic, and trails components. The Park Place Crossing Master Plan area is within the northernmost portion of the Park Place Concept Area (PPCA) established in 2008 through the Park Place Concept Plan (PPCP).

II. Project Description

Figure 1: Park Place Crossing Master Plan



The Park Place Crossing Master Plan (PPCMP) sets up a framework consistent with the PPCP and builds on the following planned and natural elements:

- **Community Park:** The southwestern portion of the site is part of an envisioned Park Place North Village Community Park. This community park would provide ±4.4 acres for the provision of potential sport fields/courts, open lawn areas, and trails. The park will connect to natural preservation areas to the north and to other neighborhoods through its proximity to Holly Lane and S Livesay Road and pedestrian connections to adjacent on and off-street trails.

  The land reserved for the Community Park is located on one of the flattest and most suitable portions of the site for a park. It is also located near other properties which can feasibly connect to and provide additional park area needed for the Park Place Concept Area.

  Per discussions with the City, the Park Place Crossing project is expected to provide a proportional percentage of park land envisioned in the Concept Plan for its residents. Approximately 51 percent of the planned dwelling units for the Park Place Concept Area North Village are included in this master plan (±476 planned PPC units/937 total North Village units). The Community Park represents ±8 acres; therefore, Park Place Crossing would be expected to contribute ±51 percent of the needed area or ±4.0 acres. This application for General Development Plan anticipates that ±4.4 acres will be contributed for park land. Technical details for how the park land will be acquired/transferred are being coordinated with the City of Oregon City Parks Department.

- **Village Green:** A village green, with no specified size, was envisioned by the PPCP at the terminus of S Livesay Road and Holly Lane. This area is intended to anchor the intersection of Holly Lane and the future Livesay Road Main Street, providing the Park Place neighborhood with pedestrian scale lighting, street trees, and benches for the enjoyment of visitors. It is infeasible, however, to achieve the full intent of the PPCP Village Green due to the existing extension of S Livesay Road to serve existing, offsite properties to the southeast of the planned intersection between S Livesay Road and Holly Lane. Until such time those properties develop and S Livesay is vacated east of its intersection of Holly, the envisioned Village Green cannot be achieved. In the interim, Park Place Crossing will meet the amenity need that the Village Green is intended to provide by utilizing the existing terminus of S Livesay Road to serve as a trailhead for City trailways through the natural areas adjacent to the Tract G stormwater facility.

- **Mixed-Use/Neighborhood Commercial/Civic Areas:** The Park Place Concept Plan envisions retail areas to support both the North and South Villages. Within Park Place Crossing, these areas are anticipated to be needed for small-scale commercial businesses such as coffee shops, bookstores, dry cleaners, or cafés. These areas could also be used for services serving the immediate community such as local offices for medical offices, insurance brokerages, and realty companies. The Mixed-Use Commercial (MUC)/Neighborhood Commercial (NC) Area is anticipated to provide an upper-story residential component as outlined within the Oregon City Municipal Code. The location of Park Place Crossing's commercial area was determined by the conceptual location of the Livesay Road Main Street Area within the Park Place Concept Plan. The Park Place Concept Plan imagines this area to be near the intersection of Holly Lane and S Livesay Road. The Civic area was envisioned to serve as the location of a library, community center, environmental interpretive center, or post office. The proximity of the area to the Village Green, local trailhead, regional stormwater facility, and natural areas, lends to this area being created as a plaza or interpretive center.

- **Open Space Preserving Natural Areas and Drainageways:** The site is located between Tour Creek to the north and west of the site and Charman/Abernethy Creek to the south. These areas include sloped and vegetated areas associated with these drainage features. By incorporating progressive planning concepts such as flexible standards and varying lot sizes into the project design, a significant amount of land is being set aside as open space for resource protection, greater than the quantity shown and required by the Park Place Concept Plan.

  Other internal open space areas provide for active and passive recreation for residents and visitors through pedestrian pathways, open areas, seating, and other similar amenities.

- **Trails Network:** The Applicant and PPCP seek to recognize these natural resources and the opportunity to connect residents, visitors, and new and existing neighborhoods to these resources through the inclusion of an interconnected network of trails within the open space areas. These trails, including local and community trails, are consistent with the City's adopted Trails Master Plan and help provide opportunities for residents and visitors to engage in active and passive recreational pursuits, surround homes with areas of green space, and preserve habitat for native flora and fauna.

- **Interconnected Transportation Network:** Consistent with the City of Oregon City's Transportation System Plan (TSP), Park Place Crossing will be served by a comprehensive transportation network connected to Holly Lane, which serves as the Park Place Crossing community backbone. The transportation system features a new City Collector Street (Holly Lane), a grid of Local Streets, and off-street trails and pedestrian pathways. Pedestrian pathways, off-, and on-street trails include both hard and soft-surfaced linkages within Park Place Crossing and between the community and those surrounding. Many of the homes along Holly Lane are anticipated to be served by alleys to aid in circulation and minimize vehicle conflicts. Holly Lane will eventually connect to S Holcomb Road via a roundabout, with temporary connection provided by "Street A."

  Per the City's Transportation System Plan (TSP) and the attached Transportation Impact Study (TIS) (Exhibit E), the project will provide public improvements including the dedication and construction of a new Collector Street with interconnected Local Streets that, upon their extension, are able to enhance neighborhood circulation; provide needed/secondary access to the project and surrounding neighborhoods; and proportionate share payments to be directed towards future intersection improvements identified by the City's TSP. The system is designed to welcome pedestrians, bicyclists, motorists, and public/emergency services and provide safe and efficient connections to surrounding areas.

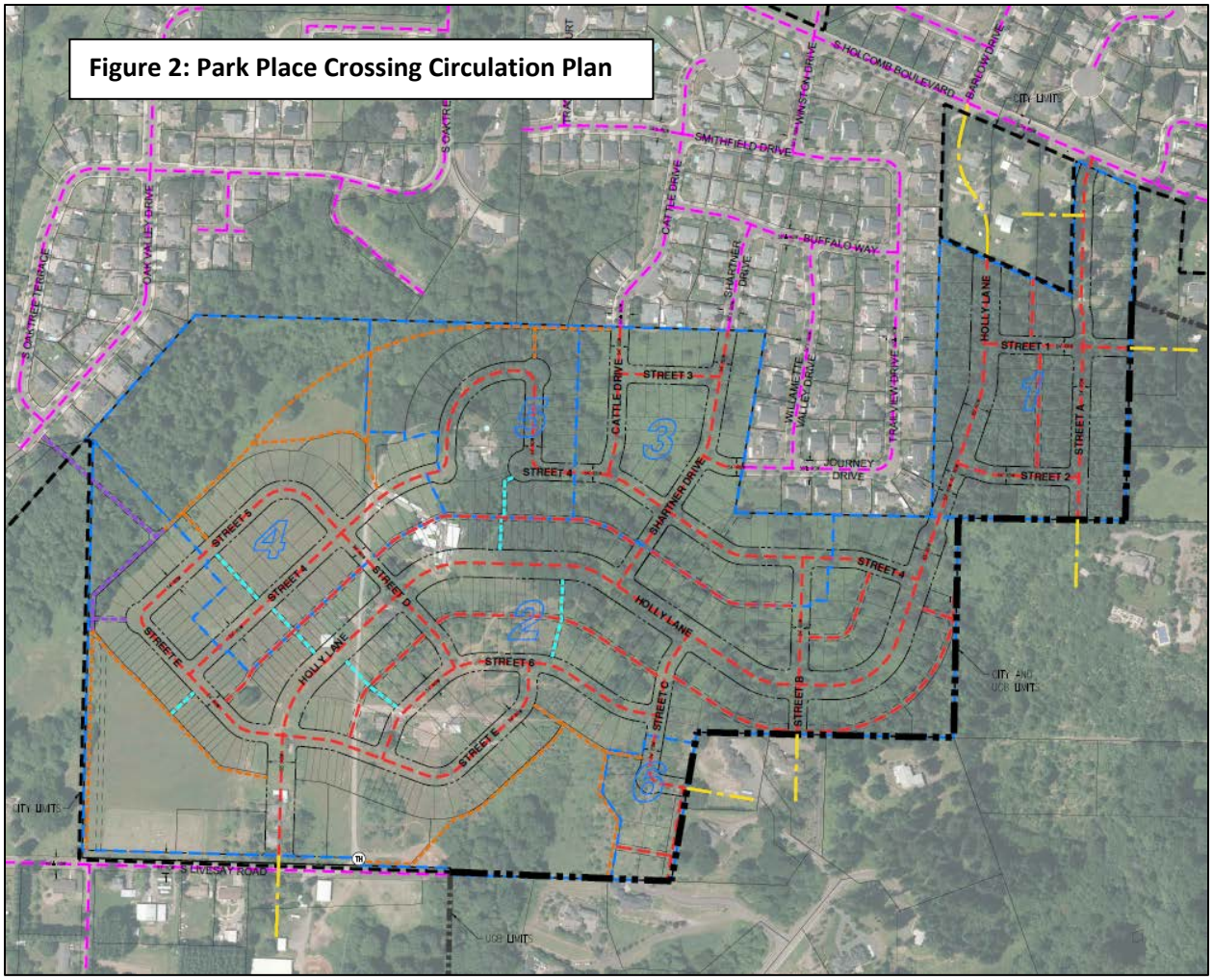


Figure 2: Park Place Crossing Circulation Plan

Regional Stormwater Management and Green Streets: The Park Place Concept Plan envisions stormwater infrastructure that mimics existing hydrology, provides innovative and green on-site stormwater treatment, and implements techniques to attenuate flow rates and provide for pollution control/reduction. Together with these features, a regional stormwater facility is planned for Park Place Crossing in order to manage stormwater.

Housing: The Park Place Crossing Master Plan area includes ±476 lots intended for future single-family homes. This represents ±51 percent (±476 GDP-planned units of the 936 intended units) of the units anticipated for the North Village by the PCCP. An additional lot may be possible following the connection of Holly Lane to S Holcomb Boulevard. A diverse range of lot sizes are planned that can accommodate a mix of home sizes and styles, as well as detached and attached housing types, appealing to a broad variety of people.

The design team worked diligently to transform constraints imposed by natural features, planned and existing infrastructure, and necessary utility facilities into attractive, public, and open-space amenities. Local and community trails along Tour and Abernethy Creeks, a community park, and other high-quality recreational opportunities for area residents and visitors and help promote active use of this area and the future commercial areas. These third place gathering areas will promote social interactions among residents and visitors and strengthen the connection residents feel with their new neighborhood.

The Park Place Concept Plans calls out quantities of parks, open spaces, residential, civic, and commercial lands within the Park Place Concept Area (PPCA). The concept plan anticipates retail sales and service areas and parks to serve residents of the PPCA. The Park Place Crossing Master Plan application aims to provide these areas within the confines of the sloped and vegetated areas interspersed throughout the site.

Approximately 4.3 additional acres, for a total of ±15.7 acres, of Park Place Crossing are planned to be reserved as open space for the conservation of sloped and vegetated areas, greater than the ±11.4 acres of open space envisioned by the Park Place Concept Plan. Space for a regional stormwater facility will be reserved as well, totaling almost two acres of area. Retail and Civic areas are generally consistent with what was originally envisioned, with opportunities for other properties south of S Livesay Road to contribute to the Livesay Road Main Street area. The planned Village Green contained within the bounds of the project site is also consistent with the area imagined with the Concept Plan.

This application for a General Development Plan, required by the City Commission as a condition of approval of the site's annexation, does not involve any physical site alterations. Information provided as part of this application is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or improvements may occur. The Master Plan is consistent with the Park Place Concept Plan and Oregon City Municipal Code (OCMC). This application includes the City forms, written materials, and Preliminary Plans necessary for City staff to review and determine compliance with the applicable approval criteria. The evidence is substantial and supports the City's approval of the application.

III. Site Description/Setting

The project site within the northeast portion of Oregon City. The site is generally situated south of S Holcomb Boulevard and north of S Livesay Road between the Park Place neighborhood and the City's eastern Urban Growth Boundary (UGB). The site is currently divided into 14 properties that are expected to be part of Park Place Crossing in the future. The fourteen properties included in this application comprise a total area of ±91.7 acres.

Properties within Park Place Crossing are generally zoned Medium Density Residential (R-5), Low Density Residential (R-10), and Neighborhood Commercial (NC). The site, summarized below, contains six existing Single-Family Residences (SFR), some of which may be removed as their respective phases of the project are completed.

Table 1: Property Summary by Tax Lot

Map & Tax Lot	Current Use	Planned Use
Map 2 2E 28D		
Tax Lot 100	Vacant	Part of Phases 2, 3, and 6. Interim emergency access for Phase 1.
Tax Lot 190	Vacant	Part of Phases 1 (interim stormwater only), 2, and 3. Interim emergency access for Phase 1.
Tax Lot 200	Single-Family Residence	Phase 5. SFR may be retained as part of Phase 5.
Tax Lot 300	SFR & accessory structures	Part of Phases 2, 4, and 5. Structures to be removed as part of Phase 2.

Tax Lot 301	Vacant	Phase 2.
Tax Lot 302	Vacant	Part of Phase 2.
Tax Lot 303	Vacant	Part of Phase 5.
Tax Lot 400	SFR & accessory structures	Phases 2 and 4. Structures to be removed as part of Phase 2.
Tax Lot 500	Vacant	Part of Phases 2 and 4. Portion of future park.
Tax Lot 502	SFR & accessory structures	Part of Phases 2 and 4. Future park, civic, and retail areas. Structures to be removed as part of Phase 2.
Tax Lot 3700	SFR & accessory structures	Phase 2. Structures to be removed as part of Phase 2.
Tax Lot 3701	Vacant	Part of Phase 3. Interim emergency access for Phase 1.
Map 2 2E 27BC		
Tax Lot 1000	Vacant	Phase 1.
Tax Lot 2000	SFR & accessory structures	Phase 1. Structures to be removed as part of Phase 1.

Properties to the southeast of the site are located within the Holcomb Urban Reserve outside of the UGB. Uses within this area generally consist of rural single-family residences. Properties to the north of the project site are generally zoned Low Density Residential (LR) and are located within the Park Place Neighborhood Association. Other areas south of the site are designated Mixed Use Corridor (MUC) and Low Density Residential (LR). These areas are within the Urban Growth Boundary but currently outside of the City limits within the Park Place Concept Plan Area.

III. Applicable Review Criteria

Oregon City Municipal Code

Title 12 - STREETS, SIDEWALKS AND PUBLIC PLACES

Chapter 12.04 - STREETS, SIDEWALKS AND PUBLIC PLACES

Response: The Park Place Crossing Master Plan does not involve physical alterations to the site. The Master Plan consists of two distinct phases, a General Development Plan and a Detailed Development Plan. This application involves only a General Development Plan; therefore, the information included in this application regarding streets, sidewalks, etc. is provided at a master plan level of detail. Future applications for Detailed Development Plan and Future subdivision review will provide detailed information regarding streets, sidewalks, and public places as is customary and appropriate.

[…]

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.

B. Public rights-of-way include, but are not limited to, streets, roads, highways, bridges, alleys, sidewalks, trails, paths, public easements and all other public ways or areas, including the subsurface under and air space over these areas.

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.

Response: Future work within public rights-of-way will be completed under an applicable public right-of-way permit. These standards are understood.

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.

Response: Conceptual future driveway locations have been identified within the Preliminary Plans (Exhibit A). Specific driveway locations will be determined through future processes, as described above. These standards are understood.

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.

Response: These standards are understood, and to the extent that lots abutting public rights-of-way with retaining walls are necessary, they are anticipated to meet the applicable standards.

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.

Response: The planned streets are demonstrated within the Preliminary Plans (Exhibit A) and are in conformance with the City's public facility master plans, Public Works policies, standard drawings, and engineering specifications. As noted previously, this General Development Plan (Master Plan) application does not involve physical alterations, including streets. That said, the project streets will be reviewed and approved by the City Engineer prior to

construction. These standards are or will be met with future applications for Detailed Development Plan.

12.04.195 - Traffic sight obstructions.

All streets shall comply with the traffic sight obstructions in OCMC 10.32.

Response: Future streets within Park Place Crossing are anticipated to comply with the traffic sight obstruction criteria of OCMC 10.32. Therefore, this criterion is met.

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.

Response: Future applications for Detailed Development Plan are anticipated to comply with these standards.

Chapter 12.08 - PUBLIC AND STREET TREES

12.08.010 - Purpose.

The purpose of this chapter is to:

A. Develop tree-lined streets to protect the living quality and beautify the city;

B. Establish physical separation between pedestrians and vehicular traffic;

C. Create opportunities for solar shading;

D. Improve air and water quality; and

E. Increase the community tree canopy and resource.

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).

Response: The final number and location of street trees and the planting specifications and standards related to street trees will be based on the Detailed Development Plans for each Phase of Park Place Crossing and will be determined with future land use applications. Trees will be selected based upon what is appropriate and permitted for the location. Where needed, street trees are planned to be approved by the associated franchise powerline utility company. This application for a General Development Plan, required by the City Commission as a condition of approval of the site's annexation, does not involve any physical site alterations. Information provided as part of this application is preliminary in nature and will be refined further as part of future Detailed Development Plan applications, where changes or improvements may occur.

[…]

TITLE 16 - LAND DIVISIONS

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.

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 subsections 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.

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 Chapter 12.04 of the Oregon City Municipal Code.

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 Section 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.

Response: As part of the Park Place Crossing Master Plan project, the S Holly Lane collector will be constructed through the site with future connections between S Livesay Road and S Holcomb Boulevard (note the connection to S Livesay Road as part of this Master Plan will be emergency vehicle access only). Per Oregon City Municipal Code Table 16.12.016 a collector right-of-way width is 85 feet, however within the project site where S Holly Lane crosses between tax lots 2-2E-28D-00190 and 2-2E-27BC-01000 there is not adequate room to accommodate this. Given this restriction, a reduced section is necessary to allow room for roadway construction and grading (retaining walls, daylight slopes etc.).

The modification is the minimum necessary to allow safe and efficient movement of pedestrians, motor vehicles, bicyclists, and freight while still meeting the intent of the street standards. For further information regarding this street section, please see the Preliminary Plan Sheet P-07 and P-08 (Exhibit A) and the Transportation Impact Study (Exhibit E). These criteria are met.

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).

Response: The required tasks will be completed as applicable prior to construction. These criteria are met.

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;

Response: Streets are shown on the Preliminary Master Plan drawings as connecting to existing stub streets and providing for future access to adjacent properties where appropriate. These criteria are met.

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.

Response: As described previously, this Master Plan Application does not involve physical site alterations, including street construction. The Preliminary Master Plan drawings illustrate future streets extending to the boundaries of the project site in order to permit access by future adjoining projects. That said, notification of future street extensions will be posted at the end of the stub street. Turnarounds are not required for these length of street stubs. Information provided as part of this application is preliminary in nature and will be refined further as part of future Detailed Development Plan applications, where changes or improvements may occur. Therefore, these criteria are met.

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.

Response: Adequate right-of-way and other transportation facilities consistent with Oregon City Municipal Code (OCMC) and the City's Transportation System Plan are illustrated on the Preliminary Master Plan Drawings. Other improvements are considered within the Transportation Impact Study (Exhibit E). Information provided as part of this application is preliminary in nature and will be refined further as part of future Detailed Development Plan applications, where changes or improvements may occur. These criteria are met.

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

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.
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.
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
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.

Response: Cross sections and other details for future streets are provided in the Preliminary Plan drawings based on the above requirements. Therefore, these criteria are met.

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.

Response: As illustrated on the Preliminary Master Plan drawings, sidewalks are planned per the above section and Table 16.12.016. Details regarding planned sidewalk widths are provided on the Preliminary Street Cross-Sections (Sheet P-07) attached as part of Exhibit A. Information provided as part of this application is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or improvements may occur. Thus, these criteria are met preliminarily and will be met by future Detailed Development Plan applications.

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.

Response: This standard is understood. Pedestrian and bicycle accessways are provided in the Master Plan where appropriate. Information provided as part of this application is preliminary in nature and will be refined further as part of future Detailed Development Plan applications, where changes or improvements may occur. Thus, these criteria are met preliminarily and will be met by future Detailed Development Plan applications.

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.

Response: As described previously, this Master Plan application does not involve physical site alterations, including street construction. That said, street name signs and traffic control devices will be installed as directed by the City Engineer and in conformance with all applicable City regulations and standards. Thus, these criteria will be met.

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.

Response: The Preliminary Master Plan drawings show the general location for future streetlights which are intended to be served with underground supply. These streetlights are anticipated to be in conformance with applicable City regulations. Information provided as part of this application is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or improvements may occur. Therefore, these criteria preliminarily met and will be met by future Detailed Development Plan applications.

> **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.**

Response: Residential Local Streets are planned to be 32 feet in width, per the requirements of OCMC. Adjustments below this standard are not included as part of this application. Therefore, the criteria are met.

> **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.**

Response: Vegetated planter strips 5 feet in width or larger are planned for each right-of-way as indicated by the Preliminary Master Plan Drawings. Street trees, per OCMC 12.08, will be planted within the planter strips. The planters are intended to include ground cover and/or shrubs (±4 feet on-center) as appropriate for the location. Invasive and nuisance plants are not planned. Hence, these criteria are met.

> **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.**
>
> **H.** **Vehicular and pedestrian easements shall allow for public access and shall comply with all applicable pedestrian access requirements.**

Response: Vehicle and pedestrian access easements are planned in lieu of a street within Phase 6. Because of the changes in elevation, Tract R involves a private street which will serve several lots within Phase 6. Construction of a public street is impracticable due to the required grade and available width adjacent to existing homes outside the project boundaries. This criterion is preliminarily met with this application for General Development Plan and will be met with future land use submittals for Detailed Development Plan.

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."

Response: A City-controlled plat restriction is planned at each street stub and half street. Information provided as part of this application is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or improvements may occur. Thus, these criteria are met preliminarily and will be met by future Detailed Development Plan applications.

16.12.018 - Street design—Alignment.

The centerline of streets shall be:

A. Aligned with existing streets by continuation of the centerlines.

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.

Response: Planned streets within the Master Plan will align through continuation of the centerline of the existing streets. Offset streets are not planned as part of this application. Thus, these criteria are met preliminarily and will be met by future Detailed Development Plan applications.

16.12.019 - Traffic sight obstructions.

All new streets shall comply with the traffic sight obstructions in Chapter 10.32.

Response: New streets are planned to comply with the traffic sight obstructions in OCMC 10.32. Thus, these criteria are met preliminarily and will be met by future Detailed Development Plan applications.

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.

16.12.021 - Same—Grades and curves.

Grades and center line radii shall conform to standards approved by the city engineer.

Response: The planned streets will feature adequate intersection angles, grades, and curves. Further information will be available with future Detailed Development Plan applications. Preliminary information is available within the Preliminary Plans attached as part of Exhibit A. Information provided as part of this application is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or improvements may occur. This criterion is met preliminarily with this application for General Development Plan and will be met with future land use submittals for Detailed Development Plan.

16.12.022 - Same—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.

Response: Lots abutting Arterial and Collector Streets are planned to provide limited access to said streets. Access to these lots is primarily provided by rear alleys or adjacent streets with a lesser classification. In some locations, access to the Collector Street is unavoidable because of existing homes or other constraints (i.e. topography). Final driveway locations will be determined through Detailed Development Plan applications. This criterion is preliminarily met with this application for General Development Plan and will be met with future land use submittals for Detailed Development Plan.

16.12.023 - Same—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.

Response: These standards are understood. The layout of Park Place Crossing discourages cut-through by nonlocal automobile traffic, and the construction of adequate facilities are planned for pedestrian and bicyclist safety. This criterion is met by this General Development Plan application and will be met by future Detailed Development Plan applications.

16.12.024 - Same—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.

Response: Upon improvement of Tract K and L(both Retail(MUC/NC)/Civic/Village Green tracts), as well as Tract M (Park), a half street may be provided as part of proportional upgrades to S Livesay Road. Those improvements are not planned as part of the General Development Plan. The listed improvements will be completed at a later date. Therefore, this criterion is met by this General Development Plan application and will be met by future Detailed Development Plan applications.

16.12.025 - Same—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.

Response: Cul-de-sacs are not currently planned as part of Park Place Crossing. Further refinement and updates of the Park Place Crossing layout may occur with future land use submittals for Detailed Development Plan, at which time these criteria will be met, as applicable.

> **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).

Response: Permanent dead-end streets are not currently planned as part of the project layout. Street stubs planned to extend to future streets on adjacent sites will be posted with a MUTCD-compliant barricade with signage indicating that the street is planned for future extension. Information provided as part of this application is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or improvements may occur. Thus, these criteria are met preliminarily and will be met by future Detailed Development Plan applications.

16.12.026 - Same—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.

Response: Alleys with access easements have been provided where appropriate within the Park Place Crossing Master Plan to provide access to off-street parking and loading facilities. The alleys are planned to be a minimum width of 20 feet, and corners of alley intersections are intended to have a radius of greater than 10 feet where required. Access easements and maintenance agreements will be recorded on the affected properties. Thus, these criteria are met preliminarily and will be met by future Detailed Development Plan applications.

16.12.027 - Same—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.

Response: Where identified and required, proportional share for impacts to off-site streets will be provided for operational improvements. Additional information is available within the

Park Place Crossing Transportation Impact Study (Exhibit E). This criterion is met preliminarily and will be met by future Detailed Development Plan applications.

16.12.028 - Same—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.**

Response: Streets have been designed in such a way that pedestrian and bicycle circulation is encouraged. Holly Lane is anticipated as a transit street per the Park Place Concept Plan. Accessways are provided in order to minimize the travel distance to transit streets, transit stops, and activity centers within the neighborhood. Additional information is available within the Park Place Crossing Transportation Impact Study (Exhibit E). These criteria are met.

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.**

Response: Cut pavement is anticipated to be restored in accordance with the City of Oregon City Public Works Pavement Cut Standards. This criterion is met.

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 five hundred thirty feet and the minimum block spacing between streets is one hundred fifty 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 three hundred thirty feet. The spacing standards within this section do not apply to alleys.**

Response: The widths of the planned blocks within the project will generally allow for two tiers of lots with depths consistent with the land use planned. This arrangement of lots is consistent with the needs of detached and attached single-family homes. Therefore, the criteria are met with this application for General Development Plan and will be met with future applications for Detailed Development Plans.

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.

Response: Street names have not yet been selected for this General Development Plan but are not anticipated to duplicate or cause confusion with the names of existing streets and are planned to conform to the established standards of the City. These criteria will be met with future applications for Detailed Development Plans.

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 three hundred thirty feet of frontage; or where the lack of street continuity creates inconvenient or out of direction travel patterns for local pedestrian or bicycle trips.

Response: The planned pedestrian and bicycle accessways are intended to provide direct, safe, and convenient access through Park Place Crossing to connect residential areas with parks and open space. These accessways are also provided where public street connections are unavailable and impractical, or where street continuity creates inconvenient patterns. Accessways will be provided through private property as public access easements. Thus, these criteria are met by this application for General Development Plan and will be met by future Detailed Development Plan applications.

A. Entry points shall align with pedestrian crossing points along adjacent streets and with adjacent street intersections.

Response: Public off-street pedestrian and bicycle accessways are planned to align with pedestrian crossing points along adjacent streets. The alignment of these accessways and surrounding streets are available within the Preliminary Site and Phasing Plan included as part of Exhibit A. These criteria are met.

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.

Response: Accessways have been planned to be free of horizontal obstructions to the specified height and provide at least 7 feet of paved surface within a 15-foot-wide right-of-way or

easement. The General Development Plan Preliminary Plans (Exhibit A) demonstrate accessways meeting the above criteria, as applicable. These criteria will be met by future Detailed Development Plan applications.

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.

Response: Accessways within Park Place Crossing have been planned with at least one end of the accessway visible from any point along the accessway. On-street parking is planned to be prohibited within 15 feet of the intersection of the accessway and public streets in order to preserve sight distance and promote safety. The General Development Plan Preliminary Plans (Exhibit A) demonstrate accessways meeting the above criterion. These criteria will be met by future Detailed Development Plan applications.

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;

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;

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; and4.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.

Response: Accessways have been planned to meet the above standards; however, their review is not part of this General Development Plan application. A conceptual standard detail has been provided for accessways within Exhibit A, and their planned location has been demonstrated within the Conceptual Offsite Development & Neighborhood Circulation Plan (Sheet P-16). Further review of accessways and their design will occur with land use applications for Detailed Development Plan.

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.

[…]

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.

Response: Intersection mobility has been analyzed as part of the Transportation Impact Study (Exhibit E). For further details, please see Exhibit E. These criteria are met.

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 feet
Minor Arterial Streets	Minimum distance from a street corner to a driveway for all uses other than detached single- and two-family dwellings	175 feet
Collector Streets	Minimum distance from a street corner to a driveway for all uses other than detached single- and two-family dwellings	100 feet
Local Streets	Minimum distance from a street corner to a driveway for all uses other than detached single- and two-family dwellings	25 feet

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.

Response: Driveway spacing is planned to meet the applicable requirements for minimum distance between a driveway and a street corner for Collector and Local Streets according to Table 16.12.035.A. Final driveway locations will be determined through Detailed Development Plan applications. This criterion is met with this application for General Development Plan and will be met with future land use submittals for Detailed Development Plans.

[…]

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.**

Response: A single driveway is planned per lot. On corner lots, access is anticipated from the street with the lower classification in order to minimize points of access. A majority of lots fronting Holly Lane, a Collector Street, will have alley access where possible in order to provide safe access without backing movements onto a higher traffic roadway. Conceptual driveway locations have been designated on the Preliminary Site and Phasing Plan (Sheet P-08) within Exhibit A. Final driveway locations will be determined through Detailed Development Plan applications. This criterion is met preliminarily with this application for General Development Plan and will be met with future land use submittals for Detailed Development Plan.

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.

Response: Driveway widths are anticipated to meet the requirements of Table 16.12.035.D. Driveway widths at the sidewalk and property line are anticipated to match the width of the approach. Final driveway locations will be determined through Detailed Development Plan applications. This criterion is preliminarily met with this application for General Development Plan and will be met with future land use submittals for Detailed Development Plan.

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.

Response: These standards are understood. Driveway spacing has been designed to provide on-street parking, street trees, pedestrian and vehicular safety, and sight distance to the greatest degree practicable. Further review of driveways and their design will occur with land use applications for Detailed Development Plan.

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.

Response: Planned driveways will have concrete approaches and asphalted street connections. Hard surfacing is planned for the depth of each driveway as measured from the edge of the sidewalk or street pavement to control gravel tracking onto the public street. Driveway approaches within the public right-of-way are planned to be built and permitted per City requirements. Driveways with a slope greater than 15 percent, if needed, will be submitted to the City Engineer for approval. Further review of driveways and their design will occur with land use applications for Detailed Development Plan.

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.

Response: These standards are understood.

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.

Response: Grading of building sites is planned to conform with Oregon Structural Specialty Code, Title 18, the approved grading plan, and approved residential lot grading plans, when applicable. Grading is also planned to be performed in accordance with the requirements OCMC 13.12, 16.12, 17.47, and the public works stormwater and grading design standards. These criteria will be met with future land use applications for Detailed Development Plans.

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 twenty 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.

Response: These items are not provided as part of this General Development Plan application. Appropriate easements for utilities, unusual facilities, watercourses, access, and natural resources will be provided with Detailed Development Plan and on the final subdivision plat applications. Therefore, these criteria will be met with future Detailed Development Plans.

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.

Response: These standards are understood. Preliminary Plans are attached as part of this application for review. The appropriate construction plan materials will be provided to the City for review and approval prior to work commencing. This criterion will be met with future applications for Detailed Development Plans.

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.

Response: Improvements are anticipated to be constructed under the inspection and approval of the City Engineer. Inspections are also anticipated to be performed by the Applicant's Project Engineer. These criteria will be met during 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.

Response: Erosion control and resource protection facility and measure requirements of OCMC 17.47 and OCMC 17.49 will be reviewed as part of future applications for Detailed Development Plan. Therefore, this criterion is met.

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.

Response: Underground utilities, water lines, sanitary sewers, and storm drains installed within street rights-of-way are anticipated to be constructed prior to surfacing of the streets. Stubs for service connections for underground utilities are planned to be placed beyond the 10-foot-wide franchise utility easement adjacent to street rights-of-way. This criterion will be met with future applications for Detailed Development Plans.

E. As-built construction plans and digital copies of as-built drawings shall be filed with the city engineer upon completion of the improvements.

Response: As-built construction plans are anticipated to be filed with the City Engineer upon completion of the improvements. This criterion will be met upon completion of construction.

F. The city engineer may regulate the hours of construction and access routes for construction equipment to minimize impacts on adjoining residences or neighborhoods.

Response: This standard is understood.

16.12.095 - Same—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.

Response: Public streets with sidewalks are planned to provide connectivity with adjacent development, circulation throughout the project, and access to all future homes. As shown on the Preliminary Site and Phasing Plan, frontage improvements are included along S Holcomb Boulevard. This project will result in the creation of new, fully improved streets and the continuation and improvement of three existing streets. The project will also provide the opportunity for orderly and connected development of adjacent properties. Stormwater facilities will be installed and connected as required. Monument boxes at street centerline intersections and other required locations will be installed and/or protected. Therefore, these criteria are met, will be met with applications for Detailed Development Plans, or will be met upon completion of construction, as applicable.

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.

Response: As shown in the Preliminary Plans and discussed in the Preliminary Stormwater Report (Exhibit F), within Phase 1, on-site stormwater will be collected and conveyed to a temporary stormwater facility. Upon construction of Phase 2, stormwater will be managed within the regional facility in Tract G and then conveyed to the creek within Tract F. The temporary pond for Phase 1 will then be converted to Lots 314-318 as part of Phase 2. Detailed Development Plans and other land use applications have not been submitted for review at this time and will be submitted at a later date. Further refined details will be available with future applications for Detailed Development Plans. Therefore, these criteria are met, will be met with applications for Detailed Development Plans, or will be met upon completion of construction, as applicable.

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.

Response: Sanitary sewer infrastructure within Park Place Crossing is planned to be served through a connection to S Holcomb Boulevard until such time the connection ultimate connection south to Redland Road can be made through the extension of Holly Lane onto off-site properties not under the control of this Master Plan. An initial interim connection will be made with Phase 1 to existing sewer at the intersection of Trail View Drive and Journey Drive. A final interim sewer connection will be made with Phase 2 of Park Place Crossing, rerouting the sewer from Phase 1 to an existing sewer in Oak Valley Drive across Tour Creek via a pedestrian bridge. Sanitary sewer systems within Local Streets are planned to serve all lots within the project area in accordance with the Sanitary Sewer Master Plan and the Park Place Concept Plan. The Sanitary Sewer Capacity Study (Exhibit J) identifies the portions of Park Place Crossing that can be served via this method until connections to sanitary sewer systems south of Park Place Crossing can be completed at a later date. The planned Phase 6 pump station was designed in accordance with the City of Oregon City's Sewage Pump Station and Force Main Design Standards. Detailed Development Plans and other land use applications have not been submitted for review at this time and will be submitted at a later date. Further refined details will be available with future applications for Detailed Development Plans. Therefore, these criteria are met, will be met with applications for Detailed Development Plans, or will be met upon completion of construction, as 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.

Response: Per the January 2021 update of the 2012 Water Distribution System Master Plan, Holly Lane will be the location of a 12-inch water transmission line connecting the 16-inch Barlow Crest Transmission to the Park Place Concept Area and areas south of S Livesay Road. An additional 12-inch transmission line will connect Cattle Drive and Holly Lane. The water infrastructure shown on the Preliminary Plans is planned to serve the project in conformance with the Park Place Concept Plan and the City's Water Capital Improvements Projects Master Plan. Water systems within Local Streets are planned to serve all lots within the project area in accordance with the City's public works water system design standards. The water supply is anticipated to be in conformance with the requirements of Clackamas Fire District No. 1, with fire hydrants located as required. Detailed Development Plans and other land use applications have not been submitted for review at this time and will be submitted at a later date. Further refined details will be

available with future applications for Detailed Development Plans. Therefore, these criteria are met, will be met with applications for Detailed Development Plans, or will be met upon completion of construction, as applicable.

E. Street Trees. Refer to OCMC 12.08, Street Trees.

Response: Conceptual street trees are shown within the Preliminary Plans; however, the provisions of OCMC 12.08 will be addressed with future Detailed Development Plan applications. To the extent that it applies, this criterion is met.

F. Bench Marks. At least one bench mark shall be located within the subdivision boundaries using datum plane specified by the city engineer.

Response: The final plat will reference a benchmark utilizing the datum plane specified by the City Engineer, if required. This criterion will be met.

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.

Response: All appropriate easements will be provided to public and private utility providers. Arrangements will be made with utility providers for the installation of these facilities. Therefore, this criterion is met.

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.

Response: Appropriately sized public facilities will be provided throughout the project to serve future homes. Where oversizing of facilities is required because of the facility's importance to an adopted master plan, the Applicant will receive reimbursement from the City or from intervening properties as they develop. All public improvements will be designed by a registered professional engineer and reviewed and approved by City engineering staff. This application for a General Development Plan complies with the criteria and future Detailed Development Plans are anticipated to meet the criteria.

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.

Response: Erosion control will be addressed with future Detailed Development Plan applications. As described previously, this Master Plan application does not involve physical site alterations, including those which would create erosion conditions on the project site. Therefore, the criteria will met at the time of Detailed Development Plans, to be submitted at a future date.

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.

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.

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.

Response: These standards are understood and will be reviewed for compliance with applications for Detailed Development Plans to be submitted at a later date. Therefore, the criteria applicable at this time are met.

Title 17 – ZONING

Chapter 17.50 - ADMINISTRATION AND PROCEDURES

17.50.010 - Purpose.

This chapter provides the procedures by which Oregon City reviews and decides upon applications for all permits relating to the use of land authorized by ORS 92, 197 and 227. These permits include all form of land divisions, land use, limited land use and expedited land division and legislative enactments and amendments to the Oregon City Comprehensive Plan and Titles 16 and 17 of this code. Pursuant to ORS 227.175, any applicant may elect to consolidate applications for two or more related permits needed for a single development project. Any grading activity associated with development shall be subject to preliminary review as part of the review process for the underlying development. It is the express policy of the city of Oregon City that development review not be segmented into discrete parts in a manner that precludes a comprehensive review of the entire development and its cumulative impacts.

17.50.030 - Summary of the city's decision-making processes.

The following decision-making processes chart shall control the city's review of the indicated permits:

Table 17.50.030
Permit Approval Process

Permit Type	I	II	III	IV	Expedited Land Division
Master plan/planned unit development—General development plan			X		
Master plan/planned unit development—General development plan amendment	X	X	X		
Detailed development plan 1	X	X	X		
Geologic hazards		X			
Variance		X	X		
Natural resource overlay district exemption	X				
Natural resource overlay district review		X	X		

1 If any provision or element of the master plan/planned unit development requires a deferred Type III procedure, the detailed development plan shall be processed through a Type III procedure.

Response: The appropriate permit application for a General Development Plan/Master Plan has been submitted to the City. Detailed Development Plans and other land use applications have not been submitted for review at this time and will be submitted at a later date. The applicable criteria are met.

A. Type I decisions do not require interpretation or the exercise of policy or legal judgment in evaluating approval criteria. Because no discretion is involved, Type I decisions do not qualify as a land use, or limited land use, decision. The decision-making process requires no notice to any party other than the applicant. The community development director's decision is final and not appealable by any party through the normal city land use process.

B. Type II decisions involve the exercise of limited interpretation and discretion in evaluating approval criteria, similar to the limited land use decision-making process under state law. Applications evaluated through this process are assumed to be allowable in the underlying zone, and the inquiry typically focuses on what form the use will take or how it will look. Notice of application and an invitation to comment is mailed to the applicant, recognized active neighborhood association(s) and property owners within three hundred feet. The community development director accepts comments for a minimum of fourteen days and renders a decision. The community development director's decision is appealable to the city commission, by any party who submitted comments in writing before the expiration of the comment period. Review by the city commission shall be on the record pursuant to OCMC 17.50.190 under ORS 197.195(5). The city commission

decision is the city's final decision and is subject to review by the land use board of appeals (LUBA) within twenty-one days of when it becomes final.

C. 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. In the event that any decision is not classified, it shall be treated as a Type III decision. The process for these land use decisions is controlled by ORS 197.763. Notice of the application and the planning commission or the historic review board hearing is published and mailed to the applicant, recognized neighborhood association(s) and property owners within three hundred feet. Notice shall be issued at least twenty days pre-hearing, and the staff report shall be available at least seven days pre-hearing. At the evidentiary hearing held before the planning commission or the historic review board, all issues are addressed. The decision of the planning commission or historic review board is appealable to the city commission, on the record pursuant to OCMC 17.50.190. The city commission decision on appeal from is the city's final decision and is subject to review by LUBA within twenty-one days of when it becomes final, unless otherwise provided by state law.

D. Type IV decisions include only quasi-judicial plan amendments and zone changes. These applications involve the greatest amount of discretion and evaluation of subjective approval standards and shall be heard by the city commission for final action. The process for these land use decisions is controlled by ORS 197.763. Notice of the application and planning commission hearing is published and mailed to the applicant, recognized neighborhood association(s) and property owners within three hundred feet. Notice shall be issued at least twenty days pre-hearing, and the staff report shall be available at least seven days pre-hearing. At the evidentiary hearing held before the planning commission, all issues are addressed. If the planning commission denies the application, any party with standing (i.e., anyone who appeared before the planning commission either in person or in writing within the comment period) may appeal the planning commission denial to the city commission. If the planning commission denies the application and no appeal has been received within fourteen days of the issuance of the final decision, then the action of the planning commission becomes the final decision of the city. If the planning commission votes to approve the application, that decision is forwarded as a recommendation to the city commission for final consideration. In either case, any review by the city commission is on the record and only issues raised before the planning commission may be raised before the city commission. The city commission decision is the city's final decision and is subject to review by LUBA within twenty-one days of when it becomes final.

E. The expedited land division (ELD) process is set forth in ORS 197.360 to 197.380. To qualify for this type of process, the development shall meet the basic criteria in ORS 197.360(1)(a) or (b). While the decision-making process is controlled by state law, the approval criteria are found in this code. The community development director has twenty-one days within which to determine whether an application is complete. Once deemed complete, the community development director has sixty-three days within which to issue a decision. Notice of application and opportunity to comment is mailed to the applicant, recognized neighborhood association and property owners within one hundred feet of the subject site. The community development director will accept written comments on the application for fourteen days and then issues a decision. State law prohibits a hearing. Any party who submitted comments may call for an appeal of the community development director's decision before a hearings referee. The referee need not hold a hearing; the only requirement is that the determination be based on the evidentiary record

established by the community development director and that the process be "fair." The referee applies the city's approval standards, and has forty-two days within which to issue a decision on the appeal. The referee is charged with the general objective to identify means by which the application can satisfy the applicable requirements without reducing density. The referee's decision is appealable only to the court of appeals pursuant to ORS 197.375(8) and 36.355(1).

F. Decisions, completeness reviews, appeals, and notices in this chapter shall be calculated according to OCMC 1.04.070 and shall be based on calendar days, not business days.

17.50.040 - Development review in overlay districts and for erosion control.

For any development subject to regulation of geologic hazards overlay district under OCMC 17.44; natural resource overlay district under OCMC 17.49; Willamette River Greenway Overlay District under OCMC 17.48; historic overlay district under OCMC 17.40, and erosion and sediment control under OCMC 17.47, compliance with the requirements of these chapters shall be reviewed as part of the review process required for the underlying development for the site.

Response: These standards are understood, and the applicable sections of code are addressed within this narrative and the applicable criteria are met.

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.

Response: A pre-application conference was held with City staff on May 5, 2021, prior to submittal of this application. Therefore, these criteria are met.

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.

Response: An application was first submitted on July 20, 2021, less than six months from the date the pre-application conference was held. This criterion is met.

> **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.**

Response: This standard is understood.

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.**

Response: The Park Place Crossing project was required by annexation decision Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005) to submit a master plan application for the area annexed. The applicant held a meeting with the Park Place Neighborhood Association on May 17, 2021. This criterion is met.

> **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.**

Response: Notice and a request to meet with the Neighborhood Association were provided to the Neighborhood Association Chair and the Chair of the Citizen Involvement Committee. These materials are included as Exhibit H. This criterion is met.

> **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.**

Response: A request was emailed to the Park Place Neighborhood Association on May 4, 2021. The meeting was held on May 17, 2021, within thirty days of the date that the notice was sent. These criteria are met.

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.

Response: The applicant participated in a Park Place Neighborhood Association meeting, held on May 17, 2021, to discuss the project. The Park Place Neighborhood Association is an active, City-recognized association. This standard does not apply.

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.

Response: The required materials listed above have been included as part of Exhibit H. This criterion is met.

17.50.060 - Application requirements.

A permit application may only be initiated by the record property owner or contract purchaser, the city commission or planning commission. If there is more than one record owner, then the city will not complete a Type II—IV application without signed authorization from all record owners. All permit applications shall be submitted on the form provided by the city, along with the appropriate fee and all necessary supporting documentation and information, sufficient to demonstrate compliance with all applicable approval criteria. The applicant has the burden of demonstrating, with evidence, that all applicable approval criteria are, or can be, met.

Response: The application has been submitted on the appropriate forms provided by the City with appropriate fees and necessary supporting documentation and information. Signatures of owners of record are included as applicable, with special regard given to the provisions of Section 17.65.020.A for Master Plans/General Development Plans involving land "that is not currently under the applicant's control, but which eventually may be controlled by the applicant during the duration of the master plan." Where applicable, property owner signatures for areas of the Master Plan/General Development Plan have been included. Conceptual project plans have been provided to show that these areas can be built in compliance with the Master Plan/General Development Plan. This criterion is met.

17.50.070 - Completeness review and one hundred twenty-day rule.

A. Upon submission, the community development director shall date stamp the application form and verify that all of the appropriate application review fee(s) have been submitted. Upon receipt of all review fees and an application form, the community development director will then review the application and all information submitted with it and evaluate whether the application is complete enough to process. Within thirty days of receipt of the application and all applicable review fees, the community development director shall complete this initial review and issue to the applicant a written statement indicating whether the application is complete enough to process, and if not, what information shall be submitted to make the application complete.

Response: These standards are understood.

B. The applicant has one hundred eighty days from the date the application was made to submit the missing information or the application shall be rejected

and the unused portion of the application fee returned to the applicant. If the applicant submits the requested information within the one hundred eighty-day period, the community development director shall again verify whether the application, as augmented, is complete. Each such review and verification shall follow the procedure in subsection A of this section.

The application will be deemed complete for the purpose of this section upon receipt by the community development director of:

1. All the missing information;
2. Some of the missing information and written notice from the applicant that no other information will be provided; or
3. Written notice from the applicant that none of the missing information will be provided.

Response: These standards are understood. Additional information is provided for the purpose of allowing the application to be appropriately reviewed. The updated application is accompanied by a memorandum discussing the completeness letter received and the items requested. These criteria are met.

C. Once the community development director determines the application is complete enough to process, or the applicant refuses to submit any more information, the city shall declare the application complete. Pursuant to ORS 227.178, the city will reach a final decision on an application within one hundred twenty calendar days from the date that the application is determined to be or deemed complete unless the applicant agrees to suspend the one hundred twenty-calendar-day timeline or unless state law provides otherwise. The one hundred twenty-day period, however, does not apply in the following situations:

1. Any hearing continuance or other process delay requested by the applicant shall be deemed an extension or waiver, as appropriate, of the one hundred twenty-day period.
2. Any delay in the decision-making process necessitated because the applicant provided an incomplete set of mailing labels for the record property owners within three hundred feet of the subject property shall extend the one hundred twenty-day period for the amount of time required to correct the notice defect.
3. The one hundred twenty-day period does not apply to any application for a permit that is not wholly within the city's authority and control.
4. The one hundred twenty-day period does not apply to any application for an amendment to the city's comprehensive plan or land use regulations nor to any application for a permit, the approval of which depends upon a plan amendment.

Response: These standards are understood and will be followed as applicable.

D. A one hundred day-period applies in place of the one hundred twenty-day period for affordable housing projects where:

1. The project includes five or more residential units, including assisted living facilities or group homes;
2. At least fifty percent of the residential units will be sold or rented to households with incomes equal to or less than sixty percent of the

median family income for Clackamas County or for the state, whichever is greater; and

3. Development is subject to a covenant restricting the owner and successive owner from selling or renting any of the affordable units as housing that is not affordable for a period of sixty years from the date of the certificate of occupancy.

Response: These standards are understood, but not applicable to the project.

E. The one hundred twenty-day period specified in OCMC 17.50.070.C or D may be extended for a specified period of time at the written request of the applicant. The total of all extensions may not exceed two hundred forty-five calendar days.

Response: These standards are understood, but not applicable at this time.

F. The approval standards that control the city's review and decision on a complete application are those which were in effect on the date the application was first submitted.

Response: The applicable standards are those which were in place on the date that the application was first submitted, July 20, 2021.

17.50.080 - Complete application—Required information.

Unless stated elsewhere in OCMC 16 or 17, a complete application includes all the materials listed in this subsection. The community development director may waive the submission of any of these materials if not deemed to be applicable to the specific review sought. Likewise, within thirty days of when the application is first submitted, the community development director may require additional information, beyond that listed in this subsection or elsewhere in Titles 12, 14, 15, 16, or 17, such as a traffic study or other report prepared by an appropriate expert. In any event, the applicant is responsible for the completeness and accuracy of the application and all of the supporting documentation, and the city will not deem the application complete until all information required by the community development director is submitted. At a minimum, the applicant shall submit the following:

A. One copy of a completed application form that includes the following information:

1. An accurate address and tax map and location of all properties that are the subject of the application;

Response: Address, Assessor's Map, as well as general locational information has been provided for the subject properties. This criterion is met.

2. Name, address, telephone number and authorization signature of all record property owners or contract owners, and the name, address and telephone number of the applicant, if different from the property owner(s);

Response: The applicable property and contract owner information has been provided for the project. This criterion is met.

B. A complete list of the permit approvals sought by the applicant;

Response: A complete list of the permit approvals sought is included as part of the application; therefore, this criterion is met.

C. A complete and detailed narrative description of the proposed development;

Response: A complete and detailed narrative description of the project has been included as part of the application; therefore, this criterion is met.

> **D. A discussion of the approval criteria for all permits required for approval of the development proposal that explains how the criteria are or can be met or are not applicable, and any other information indicated by staff at the pre-application conference as being required;**

Response: The approval criteria for the applicable permits sought as part of this project at this time have been included with a discussion of each. Therefore, this criterion is met.

> **E. One copy of all architectural drawings and site plans shall be submitted for Type II—IV applications. One paper copy of all application materials shall be submitted for Type I applications;**

Response: An appropriate number of copies was submitted for this Type III land use application. This criterion is met.

> **F. For all Type II—IV applications, the following is required:**
>
> **1. An electronic copy of all materials.**

Response: An electronic copy of the application materials have been provided to the City. This criterion is met.

> **2. Mailing labels or associated fee for notice to all parties entitled under OCMC 17.50.090 to receive mailed notice of the application. The applicant shall use the names and addresses of property owners within the notice area indicated on the most recent property tax rolls.**

Response: Updated mailing labels were provided to the City as part of the application materials. This criterion is met.

> **3. Documentation indicating there are no liens favoring the city on the subject site.**

Response: Documentation demonstrating that there are no liens favoring the City on the subject site have been provided as part of the application materials. This criterion is met.

> **4. A receipt from the county assessor's office indicating that all taxes for the lot or parcels involved are paid in full for the preceding tax year.**

Response: County tax payment information has been provided as part of the application materials. This criterion is met.

> **5. A current preliminary title report or trio for the subject property(ies);**

Response: A current preliminary title report for the subject properties has been provided. This criterion is met.

> **G. All required application fees;**

Response: The applicable required application fees have been provided for the application. This criterion is met.

> **H. Annexation agreements, traffic or technical studies (if applicable);**

Response: Responses addressing the Conditions of Approval from the annexation of the site Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005), a Transportation Impact Study (Exhibit

E), Preliminary Stormwater Report (Exhibit F), Natural Resources Overlay District Memorandum (Exhibit G), and Sanitary Sewer Capacity Study (Exhibit J) are provided for review. This criterion is met.

I. Additional documentation, as needed and identified by the community development director.

Response: The required applicable information, fees, narrative, and applications for a General Development Plan/Master Plan approval have been provided. This criterion is met.

17.50.090 - Public notices.

17.50.100 - Notice posting requirements.

17.50.110 - Assignment of decision-makers.

17.50.120 - Quasi-judicial hearing process.

17.50.130 - Conditions of approval and notice of decision.

17.50.140 - Financial guarantees.

17.50.141 - Public improvements—Warranty.

17.50.150 - Covenant with the city.

17.50.240 - Conformity of permits.

17.50.280 - Transfer of approval rights.

17.50.290 - Fees.

Response: The standards of the above sections are understood and omitted for brevity. The criteria applicable to this General Development Plan application have been met.

Chapter 17.60 – VARIANCES

17.60.010 - Authority.

According to procedures set forth in OCMC 17.60.030, the planning commission or the community development director may authorize variances from the requirements of this title. In granting a variance, the planning commission or community development director may attach conditions to protect the best interests of the surrounding property or neighborhood and otherwise achieve the purposes of this title. No variances shall be granted to allow the use of property for a purpose not authorized within the zone in which the proposed use would be located.

Response: A General Development Plan/Master Plan was required per Condition of Approval No. 4 of Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005), the Park Place Annexation and Zone Change. Oregon City Municipal Code 17.65.050.C.9 of the General Development Plan code requires that a mix of residential uses be provided for General Development Plan applications, with no single use exceeding 75 percent of the total. The Preliminary Plans provide a mix of attached and detached single-family residential units to meet the criterion. In doing so, the need for a lot size variance to accommodate appropriately sized attached housing was identified.

A variance is necessary due to the lot width requirements and lot area requirements. Staff plans to adjust the lot size and dimensional requirements for single-family attached (townhome) housing in the near future to meet House Bill 2001 standards. At such time, the townhome lot minimum will be 1,500 square feet per the Oregon Administrative Rule.

Because this change is scheduled to be made to the Oregon City Municipal Code prior to June 2022, future Detailed Development Plan applications are anticipated to meet the requirements of OCMC upon their submittal. Therefore, granting the variance makes sense and will allow for residential lots that do not exceed the standard to be in place in the near future; however, since those requirements are not yet codified, this variance is needed at this time.

The need is explained in depth as part of the narrative responses below. The variance application allows a use required by a City Condition of Approval and authorized within the zone in which the use is located. This criterion is met.

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.**

Response: This variance application is submitted by the property owner for Park Place Crossing. The application is accompanied by a scaled site plan. The Applicant notes the zoning requirement and the extent of the variance application and the procedures of Chapter 17.50 are addressed within this narrative. This criterion is met.

B. **A nonrefundable filing fee, as listed in OCMC 17.50.080, shall accompany the application for a variance to defray the costs.**

Response: This variance application is accompanied by the appropriate filing fee. This criterion is met.

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.**

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 17.50.030.B, and shall address the criteria identified in OCMC 17.60.030, Variance—Grounds.**

Response: These standards are understood and the applicable criteria are met by this application.

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.

Response: As part of the completeness review, the need for a variance was identified in order to meet the needs of the General Development Plan section of the Oregon City Municipal Code. The General Development Plan was required as Condition of Approval No. 4 of the annexation approval of the Park Place Crossing area.

Until the City of Oregon City adopts housing regulations to meet the requirements of House Bill 2001, the minimum townhome lot area and dimensions required by current code do not allow for common-sense construction of attached single-family residences required to meet the General Development Plan requirements for variation of housing types. Future code standards are expected to allow lots with dimensions and areas currently planned.

A variance to the lot width and lot area requirements is necessary. Staff plans to adjust the lot requirements for single-family attached (townhome) housing in the near future to meet House Bill 2001 standards. At such time, the townhome lot minimum will be 1,500 square feet per the Oregon Administrative Rule.

The lots, as adjusted (20 percent reduction to dimensional standards) through the Master Plan process, meet the lot width (25 feet × 0.80 = 20 feet) requirements of the zone. Twenty-foot lot widths are typical of attached single-family housing projects. However, the lot sizes would not meet the single-family attached standards for the R-5 zone (3,500 square feet × 0.80 = 2,800 square feet); the lots planned would range from 1,800 square feet for those interior lots to 2,500 square feet for end units and single-family attached corner lots. The R5 dimensional standards do not support typical attached housing townhome product types because of the combination of required lot widths and areas. The resulting lots, if the standard is met, would be excessively long. Lots would be required to be 140 feet deep to meet the 2,500 square foot lot size requirement, an illogical requirement for attached housing.

A variance is needed to allow for single-family attached lots, required by the Master Plan, that meet the adjusted width standards with reasonable lot lengths. As attached homes need no interior side setbacks due to their construction, a reduction in the width of these lots allows the lot area to be reasonably accommodated by a lot which meets the minimum lot depth within the R-5 zone (70 feet). Lots for single-family attached homes are also not reasonably possible due to the topographic constraints, need for alleys, and additional constraints present within Park Place Crossing. While a variance is needed for

the General Development Plan application in order to meet the standards currently in place, future Detailed Development Plan applications are anticipated to meet the anticipated requirements of the updated OCMC. Granting this variance allows Park Place Crossing to provide common-sense construction of housing.

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;

Response: The variance allows for attached residential lots, required by the General Development Plan criteria and which meet other dimensional and design aspects of Oregon City Municipal Code, to meet a common-sense lot area standard. The lot area change will not substantially or adversely affect the neighboring properties from accessing light, air, safe access, or any other desirable or necessary qualities stated within the OCMC. The variance allows single-family attached lots to meet a standard that is likely to be put into place to address state requirements. This criterion is met.

B. That the request is the minimum variance that would alleviate the hardship;

Response: The variance to single-family attached residential lot standards required by the Master Plan is the minimum needed to alleviate the hardship. Single-family detached residential lots will not be affected by the variance, and the reduced standard will not apply to detached lots. The minimum lot requirement of 2,800 square feet per lot (per the adjusted standard established by the General Development Plan) does not make sense when applied to shared-wall fee simple townhomes and other attached residential structures.

City staff is planning to reduce the minimum standard to 1,500 square feet as part of the future House Bill 2001 housing code update in the near future (likely prior to June 2022). Therefore, granting the variance makes sense and will allow for residential lots that do not exceed the standard anticipated to be created in the near future. This criterion is met.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.

Response: Single-family attached residential homes or "Missing Middle" housing, have been identified as an important housing type to provide as part of a City's needed housing. The variance allows attached residences, required by the General Development Plan, to be constructed to a reasonable standard expected to be allowed in the near future. Without a variance to these standards, lots for single-family attached homes are not reasonably possible due to the topographic constraints, need for alleys, and additional constraints present within Park Place Crossing. With the variance, these homes can be feasibly constructed without making unreasonably long lots (140 feet long at 20 feet in width). The adjustment allows for Park Place Crossing to provide the necessary permitted density and other standards and not create unnecessary unusable space. This criterion is met.

D. Any impacts resulting from the adjustment are mitigated;

Response: There are no anticipated impacts resulting from the adjustment. Lot setback requirements are not planned for adjustment, creating lots which do not appear crowded from the street or from adjacent homes. This criterion is met.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance; and

Response: There are no known practical alternatives to meet the minimum lot area requirements of the OCMC without creating lots that are ±50 feet deeper than currently planned. Meeting the lot area requirements without a variance would either create an excessively deep home or unused space at either the front or rear of the lots. These alternatives take away from the aesthetic quality of the neighborhood, create unnecessarily lengthy yards, taking away from area which could otherwise be used for homes, or create larger homes than necessary, which increases their costs. Without a variance to these standards, lots for single-family attached homes are not reasonably possible due to the topographic constraints, need for alleys, and additional constraints present within Park Place Crossing. No practical alternative to a variance in minimum lot area requirements exists; therefore, this criterion is met.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Response: As addressed within narrative responses to the Comprehensive Plan Goals and Policies, the variance and other adjustments planned conform to the plan and the intent of the ordinance being varied. The intent of the lot area standard is not to create excessively large lots, and future code updates are anticipated to reduce the standard to a reasonable quantity. This criterion is met.

Chapter 17.65 - MASTER PLANS AND PLANNED UNIT DEVELOPMENTS

17.65.010 - Purpose and intent.

It is the intent of this chapter to foster the growth of major institutions, phased residential, commercial or mixed-use development, and other large-scale development, while identifying and mitigating the impacts of such growth on surrounding properties and public infrastructure. The city recognizes the valuable housing options, services and/or employment opportunities that these developments bring to Oregon City residents. The master plan or planned unit development process is intended to facilitate an efficient and flexible review process for major developments, support innovative and creative land development, and to provide long-term assurance to plan for and execute developments in a phased manner. To facilitate this, the master plan process is structured to allow an applicant to address larger development issues, such as adequacy of infrastructure and transportation capacity, and reserve capacity of the infrastructure and transportation system before expenditure of final design costs. The master plan or planned unit development process is further intended to promote efficiency in land development, maintenance, street systems and utility networks while providing site layouts that integrate usable and attractive open spaces, site circulation, and the general wellbeing of site users. For the purposes of this chapter planned unit developments are considered the same as master plans.

17.65.020 - What is included in a master plan or planned unit development.

A. A master plan or planned unit development is a two-step process that includes a general development plan and a detailed development plan. A general development plan incorporates the entire area where development is planned

for up to the next twenty years from the date of final approval, including the identification of one or more development phases. The general development plan may encompass land that is not currently under the applicant's control, but which eventually may be controlled by the applicant during the duration of the master plan. The plan shall have no effect for lands not currently controlled by the applicant. "Controlled" shall be defined as leased or owned by the applicant. A detailed development plan is the phase or phases of the general development plan that are proposed for development within two years.

Response: Per Condition of Approval No. 4 of Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005) for the Park Place Annexation and Zone Change, a General Development Plan (Master Plan) was required for the ±92 acres of property. The application for the General Development Plan includes land not currently under the "control" of the Applicant (2 2E 28D Tax Lots 200, 300, 301, 303, and 502). Signatures for the General Development Plan land use application have been obtained from owners of property within the master plan area; however, verification and survey of ground conditions has not taken place at this time and will occur prior to an application for Detailed Development Plan.

A Detailed Development Plan is not included as part of this application. The master plan applies to the area of the application over the duration of the 20-year planning period and over several phases of the project. This criterion is met.

B. A master plan or planned unit development identifies the current and proposed uses of the development, proposed project boundaries, and proposed public and private infrastructure needed to serve the development. If approved, the general development plan may be used to allow existing legal non-conforming uses. If conditions of approval from a previous land use decision have not been completed, they shall be modified through the general development plan or completed with new development.

Response: The project site currently serves residential uses, the planned use of the property will also be primarily residential, but at densities appropriate for the City of Oregon City zoning assigned to the properties through the annexation process. Project boundaries and the planned project infrastructure are shown on the Preliminary Plans attached as Exhibit A. This land use application is submitted to satisfy Condition of Approval 4 from the property's annexation, Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005). Therefore, these criteria are met.

C. A master plan or planned unit development identifies future development impacts, thresholds for mitigation and mitigation improvements and implementation schedules. A threshold for mitigation is the point that determines when or where a mitigation improvement will be required. Examples of "thresholds" include vehicle trips, square feet of mpervious surface area, water usage measured in gallons per minute, construction of a building within a general development plan and construction of a building within a certain distance of a residential lot.

Mitigation improvements are necessary when a threshold for mitigation is reached. Examples include road dedication, intersection improvement, road widening, construction of a stormwater or water quality facility, installation of vegetative buffering and wetland restoration or enhancement.

Response: Approval of the Master Plan in and of itself does not permit physical alterations of the site. That said, this General Development Plan illustrates features that would be necessary in the future with a potential Detailed Development Plan or subdivision application. Relevant information is included within these application materials and the Park Place Crossing Transportation Impact Study (Exhibit E). These criteria are satisfied.

17.65.030 - Applicability of the master plan or planned unit development regulations.

A. Required for Large Institutional Uses. If the boundaries of an institutional development exceed ten acres in size, the proposed development shall be master planned using the regulations of this chapter. No land use review other than a Type I or II Minor Site Plan and Design Review shall be issued for any institutional development in excess of ten acres in total acreage unless it is accompanied by or preceded by a master plan approval under this chapter. This requirement does not apply to modifications to existing institutional developments unless the modification results in a cumulative square footage increase of over ten thousand total building square feet in an existing institutional development over ten acres.

B. When Required as Part of Previous Land Use Review. The master plan or planned unit development regulations may be used to fulfill a condition of approval from a previous land use decision-requiring master planning for a development.

C. When identified in the Oregon City Comprehensive Plan. The master plan regulations are required for all properties identified for master planning in the land use section of the Oregon City Comprehensive Plan.

D. Voluntarily. An applicant may voluntarily submit a master plan or planned unit development as part of a land use review, including for residential projects.

Response: A Master Plan, or General Development Plan, was required as part of Condition of Approval No. 4 of Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005), part of a previous land use review. A Master Plan has been submitted as part of these applications. Therefore, the applicable criteria are met.

17.65.040 - Procedure.

A. Preapplication Review. Prior to filing for either general development plan or detailed development plan approval, the applicant shall file a pre-application conference pursuant to OCMC 17.50.030.

Response: Pre-application conferences were held on April 7, 2020, and May 5, 2021. Therefore, this criterion is met.

B. General Development Plan. An application for a general development plan describing the long-term buildout of the site shall be reviewed through a Type III procedure. An applicant shall have an approved general development plan before any detailed development plan may be approved, unless both are approved or amended concurrently. Amendments to an approved general development plan shall be reviewed under a Type III procedure pursuant to OCMC 17.65.080.

Response: This application includes a General Development Plan (GDP) for Park Place Crossing meeting the requirements of OCMC 17.65.050. Therefore, this criterion is met.

C. Detailed Development Plan. An application for a detailed development plan, is processed through a Type II procedure, as long as it is in conformance with

the approved general development plan. Amendments to an approved detailed development plan shall be processed pursuant to OCMC 17.65.080. Once a development has an approved detailed development plan, OCMC 17.62, Site Plan and Design Review is not required.

Response: This application does not include a Detailed Development Plan at this time. Future applications for Detailed Development Plans are planned for each phase of the project outlined through the submitted General Development Plan. The criterion is expected to be met by these future applications.

D. Concurrent Review. An applicant may concurrently apply for a general development plan and a detailed development plan. Such a concurrent application is reviewed through the highest procedure that applies to any element of the combined application.

Response: This application does not include a Detailed Development Plan at this time and therefore does not require a concurrent review. This criterion does not apply.

E. Relationship to Other Reviews. It is the express policy of the city that development review not be segmented into discrete parts in a manner that precludes a comprehensive review of the entire development and its cumulative impacts.

Response: This standard is understood.

F. Duration of General Development Plan. A general development plan shall involve a planning period of 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 either as stated in the approved master plan or planned unit development application or decision of approval.

Response: These standards are understood.

17.65.050 - General development plan.

A. Existing Conditions Submittal Requirements.

1. Narrative Statement. An applicant shall submit a narrative statement that describes the following:

a. Current uses of and development on the site;

Response: The property consists of multiple individual tax lots/ownerships, some of which have been improved with home sites. These properties were annexed into Oregon City in 2017 (Ordinance 18-1007). A narrative statement describing the current uses on the site has been included with this application. This criterion is met.

[…]

c. A vicinity map showing the location of the general development plan boundary relative to the larger community, along with affected major transportation routes, transit, and parking facilities. At least one copy of the vicinity map shall be eight and one-half inches by eleven inches in size, and black and white reproducible;

Response: A vicinity map is included within the Preliminary Plans (Exhibit A) to illustrate the General Development Plan boundary relative to the larger community, affected major transportation routes, transit, and parking facilities, as applicable. This criterion is met.

d. Land uses that surround the development site. This may also reference submitted maps, diagrams or photographs;

Response: Portions of the subject site are adjacent to single-family residential uses. Other surrounding uses include areas unsuitable for residential uses because of the proximity of slopes and drainageway areas. Land use materials submitted as part of the Preliminary Plans (Exhibit A) include maps, diagrams, and photographs. This criterion is met.

e. Previous land use approvals within the general development plan boundary and related conditions of approval, if applicable;

Response: Several related conditions of approval were created through File No. AN 17-0004/ZC 17-0005, the General Development Plan is a result of and consistent with those conditions reviewed later within this narrative. Other relevant documents include the Park Place Concept Plan adopted by the City in 2008. This criterion is met.

f. Existing utilization of the site;

Response: The subject site is largely currently vacant or underdeveloped with single-family homes with rural densities. Portions of the site are the location of steep slopes and/or natural resources such as riparian areas. Further details are available within this narrative (Section III. Site Description) and as part of Exhibit A – Preliminary Plans. This criterion is met.

g. Site description, including the following items. May also reference submitted maps, diagrams or photographs:

i. Physical characteristics;

ii. Ownership patterns;

iii. Building inventory;

iv. Vehicle/bicycle parking;

v. Landscaping/usable open space;

vi. FAR/lot coverage;

vii. Natural resources that appear on the city's adopted Goal 5 inventory;

viii. Cultural/historic resources that appear on the city's adopted Goal 5 inventory;

ix. Location of existing trees six inches in diameter or greater when measured four feet above the ground. The location of single trees shall be shown. Trees within groves may be clustered together rather than shown individually; and

x. Geologic hazards pursuant to OCMC 17.44.

Response: The applicable site characteristics listed above are illustrated within the Preliminary Plans and other attachments to this narrative. Goal 5 resources, such as Tour and Abernethy

Creeks, are depicted on the Preliminary Plans. Existing trees over six inches in diameter or groves of clustered trees are depicted within the Existing Conditions Plan. Geologic hazards pursuant to OCMC 17.44 are also depicted within the Preliminary Plans. Further details are available within this narrative (Section III. Site Description) and as part of Exhibit A – Preliminary Plans. This criterion is met.

h. Existing transportation analysis, including the following items. May also reference submitted maps, diagrams or photographs.

i. Existing transportation facilities, including highways, local streets and street classifications, and pedestrian and bicycle access points and ways;

ii. Transit routes, facilities and availability;

iii. Alternative modes utilization, including shuttle buses and carpool programs; and

iv. Baseline parking demand and supply study (may be appended to application or waived if not applicable).

Response: A Transportation Impact Study for the project was prepared by Lancaster Mobley (Exhibit E). The Transportation Impact Study meets the City standards for traffic studies and addresses the requirements listed above. This criterion is met.

i. Infrastructure facilities and capacity, including the following items:

i. Water;

ii. Sanitary sewer;

iii. Stormwater management; and

iv. Easements.

Response: Plans illustrating the project infrastructure facilities, phasing, and capacity at a Master Plan level have been prepared and are attached as Exhibit A. Sanitary Sewer has been studied by the City and an appropriate solution determined per the Sanitary Sewer Capacity Study (Exhibit J). A Preliminary Stormwater Report, prepared by AKS Engineering & Forestry, LLC, is also attached as Exhibit F. Descriptions of the conceptual General Development Plan infrastructure is provided later within this narrative and as part of Exhibit A. Future applications for Detailed Development Plans will meet the criteria by further refining the needed infrastructure facilities and capacity. This criterion is met and will be met with future applications for Detailed Development Plans.

2. Maps and Plans.

a. Existing conditions site plan. Drawn at a minimum scale of one-inch equals one hundred feet (one inch equals one hundred feet) that shows the following items. At least one copy shall be eight and one-half inches x eleven inches in size, and black and white reproducible.

i. Date, north point, and scale of drawing.

ii. Identification of the drawing as an existing conditions site plan.

iii. Proposed development boundary.

iv. All parking, circulation, loading and service areas, including locations of all carpool, vanpool and bicycle parking spaces as required in Chapter 52 of this title.

v. Contour lines at two-foot contour intervals for grades zero to ten percent, and five-foot intervals for grades over ten percent.

b. A site plan or plans, to scale, for the general development plan site and surrounding properties containing the required information identified in OCMC 17.62.040.b, Vicinity map. Depicting the location of the site sufficient to define its location, including identification of nearest cross streets. At least one copy of the vicinity map shall be eight and one-half inches by eleven inches in size, and black and white reproducible.

c. Aerial photo. Depicting the subject site and property within two hundred fifty feet of the proposed development boundaries. At least one copy of the aerial photo shall be eight and one-half inches by eleven in size, and black and white reproducible.

Response: These requested materials are attached as part of the Preliminary Plans (Exhibit A), as applicable. Therefore, these criteria are met.

B. Proposed Development Submittal Requirements.

1. Narrative statement. An applicant shall submit a narrative statement that describes the following:

a. The proposed duration of the general development plan.

Response: The Park Place Crossing Master Plan is planned to be effective for the subject site for 20 years; however, the Applicant anticipates that the full build-out of Park Place Crossing could occur sooner, potentially within approximately 8 to 9 years of approval. This criterion is met.

b. The proposed development boundary. May also reference submitted maps or diagrams.

Response: The project boundaries are illustrated within the Preliminary Plans. This criterion is satisfied.

c. A description, approximate location, and timing of each proposed phase of development, and a statement specifying the phase or phases for which approval is sought under the current application. May also reference submitted maps or diagrams.

Response: Park Place Crossing is anticipated to occur in chronological order according to the numbering of the phase. Each phase requires a separate Detailed Development Plan and associated materials. Phases are anticipated to occur as outlined within the following table.

Table 2: Park Place Crossing Anticipated Phasing

Phase	Dwelling Units / Anticipated Uses	Open Space (acres)	Amenities
1	±59 single-family detached homes	±0.14	Open Space and street connections to areas of future development
2	±133 single-family detached homes ±126 single-family attached homes Civic area Retail area Regional stormwater facility	±6.52	Park, civic space, retail area, trails & connection to existing neighborhoods, pedestrian pathways, Open Space Tracts
3	±59 single-family detached homes	±0.00	Street connections to existing neighborhoods
4	±53 single-family detached homes	±7.58	Pedestrian pathways, trails, Open Space
5	±35 single-family detached homes	±1.49	Pedestrian pathways, trails, Open Space
6	±11 single-family detached homes	±0.00	Trail connections & street connections to future UGB expansion area

Phase 1 is anticipated to be constructed in 2023, with completion of Phases 2 through 6 accomplished by 2030. Detailed Development Plan applications are anticipated to be submitted at a future date following approval of the General Development Plan. Descriptions and approximate locations of each phase are included as part of Sheet P-08 within the Preliminary Plans (Exhibit A). This criterion is met.

d. An explanation of how the proposed development is consistent with the purposes of Section 17.65, the applicable zone district or districts, and any applicable overlay district.

Response: An explanation of how this master plan is consistent with the purposes of this section and applicable zoning districts is included within this narrative. This criterion is met.

e. A statement describing the impacts of the proposed development on inventoried Goal 5 natural, historic or cultural resources within the development boundary or within two hundred fifty feet of the proposed development boundary.

Response: Natural resources within 250 feet of the Master Plan boundary are shown in the Preliminary Plans (Exhibit A). Historic and cultural resources have not been found to have been inventoried on the property. Further details will be shown with future applications for Detailed Development Plan. This criterion is met.

f. An analysis of the impacts of the proposed development on the surrounding community and neighborhood, including:

i. **Transportation impacts as prescribed in subsection g below;**

Response: A Transportation Impact Study which contains analysis of the impacts of the planned project on the surrounding community and neighborhood is included as Exhibit E. The impacts described in subsection 17.65.50.B.1.g are addressed below. Park Place Crossing will be contributing to transportation system infrastructure improvements and public projects through the payment of Systems Development Charges and construction of Holly Lane and associated improvements. This criterion is met.

ii. **Internal parking and circulation impacts and connectivity to sites adjacent to the development boundary and public right-of-ways within two hundred fifty feet of the development boundary;**

Response: Circulation to and from the residential project is anticipated according to the scenarios envisioned within the Transportation Impact Study. Parking is planned via off-street parking provided by single-family residences. Surrounding existing development and rights-of-way within 250 feet of the Master Plan boundary are shown within the Preliminary Plans. This criterion is met.

iii. **Public facilities impacts (sanitary sewer, water and stormwater management) both within the development boundary and on city-wide systems; including a phasing plan for all on-site and off-site public improvements, including but not limited to transportation, schools, parks, open space, trails, sewer, water and stormwater, with an analysis of the capacity and improvements required as a result of fully implementing the plan. This analysis shall reference any adopted parks and recreation, public facilities plans and concept plans and identify specific funding mechanisms to address the adequacy of public facilities.**

Response: A General Development Plan/Master Plan was required per Condition of Approval No. 4 of Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005), the Park Place Annexation and Zone Change. Preliminary information regarding public facilities impacts is provided as part of this General Development Plan application. Approval of the Master Plan/General Development Plan will not authorize physical alterations of the site or new use of the property. Further refined information will be provided with future Detailed Development Plan applications.

Sanitary Sewer:

Sanitary Sewer for Phase 1 is available through an interim connection through Map 2 2E 28AD Tax Lot 314 to existing sewer within Trail View Drive. Sanitary Sewer for Phases 2 through 6 is available through an interim connection to the existing sanitary sewer system within Oak Valley Drive. This sanitary sewer system ultimately connects to existing sewer within S Holcomb Boulevard. The interim connection will serve Park Place Crossing until the annexation and improvement of properties to the southwest is completed. A sanitary sewer service is planned to extend through Park Place Crossing where it will connect to a

new service line near S Livesay Road that will eventually connect to an upgraded Tri-City Sewer District trunk line within Redland Road. Sanitary sewer for Phase 6 may require the use of a pump station, which will meet the City's standards. Sanitary sewer sizing is expected to align with those shown within the Park Place Concept Plan.

Details about the planned sanitary sewer utilities can be found on Sheets P-09 through P-15 of the Preliminary Plans, attached as Exhibit A. A Sanitary Sewer Capacity Study is attached as Exhibit J.

Applications for Detailed Development Plan with additional details, including further refinements or improvements, will be submitted prior to each Phase of Park Place Crossing. Adequate sanitary sewer service can be provided to Park Place Crossing. Therefore, this criterion is met.

Water Service:

Water service to the site has been deemed sufficient by the City and Clackamas River Water. According to comments from Development Services in the May 5, 2021, pre-application conference notes, there is an existing 16-inch City of Oregon City ductile iron water line within S Holcomb Boulevard. Other services include 8-inch ductile iron water lines within Cattle and Shartner Drives and a 4-inch water line within S Livesay Road. The northeastern portion of the site is within the Clackamas River Water district.

The Park Place Concept Plan calls for a 10-inch connection to S Holcomb Boulevard, through the Park Place – Intermediate Area leading to S Livesay Road, the Park Place – Livesay Road Area.

Details about the planned water utilities can be found on Sheets P-09 through P-15 of the Preliminary Plans, attached as Exhibit A.

Applications for Detailed Development Plan with additional details, including further refinements or improvements, will be submitted prior to each Phase of Park Place Crossing. Adequate water service can be provided to Park Place Crossing. The improvements shown are consistent with the approved concept plan for Park Place and the Water Master Plan. This criterion is met.

Stormwater:

Stormwater facilities have been planned to be phased, with Phase 1 featuring a temporary stormwater facility which will be converted to residential lots with completion of a permanent regional facility within Phase 2. Green street facilities as outlined within the Preliminary Stormwater Report, are planned within rights-of-way where required, logical, and feasible.

Details about the planned stormwater facilities can be found on Sheets P-09 through P-15 of the Preliminary Plans, attached as Exhibit A, and within the Preliminary Stormwater Report, attached as Exhibit F.

Applications for Detailed Development Plan with additional details, including further refinements or improvements, will be submitted prior to each Phase of Park Place

Crossing. Adequate storm sewer and stormwater drainage can be provided to Park Place Crossing. This criterion is met.

Transportation:

Site access will ultimately be provided through a new street, Holly Lane, connecting to S Holcomb Boulevard. Interim site access to S Holcomb Boulevard will be provided by Street A. As Holly Lane is adequately connected to S Holcomb Boulevard, the Street A area may be converted to a future residential lot. Please see the Transportation Impact Study (Exhibit E) and Preliminary Plans (Exhibit A) for further details.

As shown on the Preliminary Plans, interior Local Streets within the project are anticipated to meet the Local residential street classification cross section and include a 54-foot-wide right-of-way, 16-foot-wide shared travel lanes, 5-foot-wide planter strips, 5-foot wide-sidewalks, and 0.5-foot-wide public access strips.

The Transportation Impact Study (TIS) is included as Exhibit E with the application. Appropriate street improvements, which connect to existing transportation facilities, are planned for the project, as illustrated on the Preliminary Plans. The TIS found that the existing streets in conjunction with those planned are adequate to accommodate the additional amount of traffic that will be generated by this project. In addition, Transportation Systems Development Charges will be paid for each new home prior to issuance of a building permit. These fees will fund future City and County public works street improvement projects. Please see the Transportation Impact Study (Exhibit E) for additional information.

The planned transportation facilities are adequate to provide service to Park Place Crossing and future portions of the Park Place Concept Area. Further refined details will be provided with future applications for Detailed Development Plans. This standard is met.

Emergency Services:

Clackamas County Fire District No. 1 will provide fire services. Property taxes will be paid by future property owners to fund fire protection services, ensuring funding for fire protection services.

The City of Oregon City Police Department will provide police services. Property taxes will be paid by future property owners to fund police protection services, ensuring funding for police protection services.

An interim emergency access will be created with Phase 1 to connect to an existing street stub at Shartner Drive (shown on Sheet P-08). The access will follow the future alignment of Shartner Drive and Street 4 through Phases 2 and 3 to provide emergency access to Phase 1. Holly Lane will feature removable barriers to provide emergency access to/from S Livesay Road until Holly Lane can be extended or S Livesay Road can be upgraded upon completion of Park, Civic, and MUC/NC tract improvements.

There is adequate capacity for public services for Park Place Crossing. Further refined details will be provided with future applications for Detailed Development Plans. Therefore, this criterion is met.

Public Parks:

Per the Park Place Concept Plan, a park is provided at the southwest corner of the subject site. Park lands are planned to be provided to the City of Oregon City with Phase 2 of Park Place Crossing (approximately 2024/2025 planned construction date). It is expected that timing will allow inclusion of the park facility within an update of the City's Parks Capital Improvement Projects list. The details of park construction and SDC-creditable projects are anticipated to be determined at a later date.

Trail connections are being provided through planned open space tracts street and sidewalk connections on Local and Collector Streets as part of their applicable Phase of Park Place Crossing. Additional coordination, including design and Park System Development Charges (SDCs) for the future park will be determined, assessed, and paid at the time building permits are issued. This will ensure funding for parks based on need identified in City plans and on a timeline reflecting City priorities.

Parks, trails, and recreation facilities adequate to serve residents of Park Place Crossing and surrounding areas can be provided. Further refined details will be provided with future applications for Detailed Development Plans. This criterion is met.

Schools:

The project site is served by Oregon City Public Schools, including Redland Elementary School, Holcomb Elementary School, Tumwata Middle School (formerly Ogden Middle School), and Oregon City High School. Comments related to the project from Wes Rogers, Oregon City Public Schools Director of Operations, were received on March 13, 2017, as part of the Park Place Annexation, Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005).

Completion of Park Place Crossing is expected in ±2030. It is anticipated that Phase 1 could be constructed beginning in ±2023, completion of Phase 2 is expected in ±2026, Phase 3 in ±2029, and completion of Phases 4 through 6 beginning in ±2030. The School District stated that its timeline to provide additional school capacity was 5 to 10 years from 2017. The completion timeline is consistent with the School District's ability to provide additional school capacity.

Planned land uses within the Park Place Crossing project have been the subject of a significant public planning process (Park Place Concept Plan, annexation, etc.) The General Development Plan (GDP) is consistent with these uses. The predominantly residential use in the Park Place Crossing GDP is single-family detached homes; therefore, the plan is consistent with the established neighborhoods surrounding the project. Transportation system infrastructure improvements are included, and parks and open spaces are planned to be created for the use of the public. This criterion is met.

iv. Neighborhood livability impacts;

Response: The Master Plan provides for potential transportation improvements included within the City's Transportation System Plan. During the project team's neighborhood meeting with the Park Place Neighborhood Association, comments regarding traffic were provided. The Master Plan envisions connections south from Holcomb Boulevard. Specifically, Park Place Crossing will ultimately allow a connection to S Livesay Road upon completion of Park, Civic, and MUC/NC tracts, and lead to eventual connection to S Redland Road. The Park Place Crossing project improves connectivity throughout the area and is important to the long-term relief of pressure created by traffic on Holcomb Boulevard.

The Park Place Crossing project abuts existing homes and neighborhoods only in a few areas. The Master Plan accommodates these areas by providing lots meeting the zoning standards, vegetative screening, and open spaces adjacent to some existing homes and neighborhoods. Where existing homes abut planned lots, those lots have been designed to be larger to provide a transition in density. This criterion is met.

v. **Natural, cultural and historical resource impacts within the development boundary and within two hundred fifty feet of the development boundary.**

Response: The General Development Plan depicted within the Preliminary Plans (Exhibit A) demonstrates that impacts to known natural resources are planned to be avoided to the greatest extent practicable. Cultural and historical resources are not mapped or known on the site. If encountered during construction, cultural and historic resources are planned to be dealt with in the manner prescribed by Oregon City Municipal Code and other applicable state and federal laws. This criterion is met.

g. **A summary statement describing the anticipated transportation impacts of the proposed development. This summary shall include a general description of the impact of the entire development on the local street and road network, and shall specify the maximum projected average daily trips, projected AM and PM peak hour traffic and the maximum parking demand associated with build-out each phase of the master plan or planned unit development.**

Response: Transportation system related topics are summarized within the Transportation Impact Study (TIS) Executive Summary (Exhibit E). The TIS contains information regarding the master plan and the local street and road network. The anticipated future average daily trips and projected AM and PM peak hour traffic is described for each phase of the master plan. This criterion is met.

h. **In addition to the summary statement of anticipated transportation impacts, an applicant shall provide a traffic impact study as specified by city requirements. The transportation impact study shall either:**

i. **Address the impacts of the development of the site consistent with all phases of the general development plan; or**

ii. **Address the impacts of specific phases if the city engineer determines that the traffic impacts of the**

full development can be adequately evaluated without specifically addressing subsequent phases.

Response: A Transportation Impact Study is provided as Exhibit E which meets the City's standards and describes the project phasing of the planned street network. Where applicable, the study addresses all or specific phases. These requirements are met.

i. If an applicant chooses to pursue option h.1., the applicant may choose among three options for implementing required transportation capacity and safety improvements:

i. The general development plan may include a phasing plan for the proposed interior circulation system and for all on-site and off-site transportation capacity and safety improvements required on the existing street system as a result of fully implementing the plan. If this option is selected, the transportation phasing plan shall be binding on the applicant.

Response: The submitted General Development Plan includes a phasing plan for interior circulation and trip generation for determining on-site and off-site capacity and improvements required with final implementation/completion of the Master Plan. Therefore, this criterion is met.

ii. The applicant may choose to immediately implement all required transportation safety and capacity improvements associated with the fully executed general development plan. If this option is selected, no further transportation improvements will be required from the applicant. However, if a general development plan is later amended in a manner so as to cause the projected average daily trips, the projected a.m. or p.m. peak hour trips, or the peak parking demand of the development to increase over original projections, an additional transportation impact report shall be required to be submitted during the detailed development plan review process for all future phases of the development project and additional improvements may be required.

iii. The applicant may defer implementation of any and all capacity and safety improvements required for any phase until that phase of the development reaches the detailed development plan stage. If this option is selected, the applicant shall submit a table linking required transportation improvements to vehicle trip thresholds for each development phase.

Response: A Transportation Impact Study was required as part the submittal for annexation of the property. Off-site transportation system infrastructure improvements, comparison to the annexation TIS, and planned phasing is discussed in the attached Transportation Impact Study (Exhibit E).

Transportation improvements and resulting proportional shares were determined as part of the annexation of the property. An updated Transportation Impact Study is included as

part of this application for a General Development Plan for Park Place Crossing. Transportation improvements per vehicle trip thresholds for each phase of the Master Plan are included as part of the Transportation Impact Study (Exhibit E). These criteria are met.

j. For residential and mixed-use projects:

i. Proposed minimum lot area, width, frontage and yard requirements.

Response: The lot areas, widths, frontage, and yard requirements are planned to meet the requirements of the R-5 zoning district with allowed adjustments to the listed standards of up to twenty percent as allowed by the master plan process. These are addressed further later within this narrative. A variance for attached residential lots is necessary and is discussed previously within this narrative.

ii. Proposed project density in number of units per acre.

Response: A density of ±9.1 units per net acre is anticipated to fit the planned densities of the zone and the Park Place Concept Plan with an allowed adjustment to the listed standards of less than 10 percent and the transfer of density from NROD conservation areas. This criterion is met.

Table 3: NROD Density Transfer

Area Category	Acreage
Net Developable Area	±47.7
NROD Conservation Tract Areas	±14.3
NROD Density Transfer (1/3 of NROD area)	±4.8
Total Developable Area for Density Calculations	±52.5

Table 4: Allowed Density by Zone

Zoning	Net Acreage	Percentage of Total Acres	Units per Net Acre (Minimum)	Units per Net Acre (Maximum)
Low Density Residential (R-10)	±2.8	5.8%	3.5	4.4
Medium Density Residential (R-5) (Detached)	±36.7	76.9%	7.0	8.7
Medium Density Residential (R-5) (Attached)	±6.9	14.5%	7.0	12.4
Geologic Hazard Areas (Slopes >25%)	±1.3	2.7%	-	2.0

Table 5: Planned Density Calculations

Calculated Minimum Density	±47.7 acres	±6.7 units per acre
Calculated Maximum Density	±47.7 acres	±8.8 units per acre
Calculated Area with NROD Transfer	±52.5 acres	-
Maximum Density with 10% GDP Increase	±52.5 acres	±9.7 units per acre
Planned Density	±52.5 acres	±9.1 units per acre

2. Maps and Diagrams. The applicant shall submit, in the form of scaled maps or diagrams, as appropriate, the following information:

a. A preliminary site circulation plan showing the approximate location of proposed vehicular, bicycle, and pedestrian access points and circulation patterns, parking and loading areas or, in the alternative, proposed criteria for the location of such facilities to be determined during detailed development plan review.

Response: A Conceptual Offsite Development & Neighborhood Circulation Plan showing the location of vehicular, bicycle, pedestrian access points and circulation patterns within Park Place Crossing is included within the Preliminary Plans (Exhibit A). This criterion is met.

b. The approximate location of all proposed streets, alleys, other public ways, sidewalks, bicycle and pedestrian access ways and other bicycle and pedestrian ways, transit streets and facilities, neighborhood activity centers and easements on and within two hundred fifty feet of the site. The map shall identify existing subdivisions and development and un-subdivided or unpartitioned land ownerships adjacent to the proposed development site and show how existing streets, alleys, sidewalks, bike routes, pedestrian/bicycle access ways and utilities within two hundred fifty feet may be extended to and/or through the proposed development.

Response: The approximate location of all planned streets, alleys, sidewalks, bicycle and pedestrian access ways, and easements on and within 250 feet of the site have been illustrated at a Master Plan level on the Preliminary Plans (Exhibit A), as applicable. The map identifies existing subdivisions, unpartitioned land ownerships adjacent to the project site and shows how existing streets may be extended to serve future subdivisions in the area. Therefore, these criteria are met.

c. The approximate location of all public facilities to serve the proposed development, including water, sanitary sewer, stormwater management facilities.

Response: The approximate location of all public facilities included with the Master Plan, including water, sanitary sewer, and stormwater management, have been illustrated on the Preliminary Plans (Exhibit A). Further refined details will be provided with future applications for Detailed Development Plans. This criterion is met.

d. The approximate location, footprint and building square footage of buildings within of each phase of proposed development, and/or proposed lot patterns for each phase of future development.

Response: Lot patterns and layouts for each future phase of the Master Plan have been provided. The approximate location, footprint, and building area within each phase is anticipated to be determined at a later date. This criterion is met.

> e. The approximate locations of proposed parks, playgrounds or other outdoor play areas; outdoor common areas and usable open spaces; and natural, historic and cultural resource areas or features proposed for preservation. This information shall include identification of areas proposed to be dedicated or otherwise preserved for public use and those open areas to be maintained and controlled by the owners of the property and their successors in interest for private use.

Response: The location of planned parks, outdoor common areas, usable open spaces, and natural resources have been indicated on the Preliminary Plans (Exhibit A). Of these areas, those to be provided or preserved for public use and those to be maintained and controlled by the owners of the property for private use by the residents of Park Place Crossing are anticipated to be designated through coordination with the City of Oregon City Parks Department. These criteria are met.

> C. Approval Criteria for a General Development Plan. The planning commission may approve an application for general development plan only upon finding that the following approval criteria are met:
>
> 1. The proposed general development plan is consistent with the purposes of OCMC 17.65.

Response: The General Development Plan is consistent with the purpose statement and applicable requirements of OCMC 17.65. The Park Place Crossing GDP provides valuable housing options within a phased residential Master Plan. The master plan facilitates the efficiency and flexible use of the project site to provide infrastructure, transportation systems, and utility networks while providing site layouts that include useable open space, site circulation, and general wellbeing. This criterion is met.

> 2. Development shall demonstrate compliance with OCMC 12.04 16.12, 17.62, if applicable, and 16.08, if applicable.

Response: The General Development Plan meets the applicable criteria.

- OCMC 12.04: This section generally addresses the public works requirements for streets, sidewalks, and public places. Park Place Crossing is anticipated to meet these requirements with the consideration of adjustment. Further review of specific requirements is anticipated to be reviewed at the time of Detailed Development Plans as customary and appropriate. The specific applicable criteria of OCMC 12.04 are addressed previously within this narrative.
- OCMC 16.08: This section outlines the standards for land divisions. Master plans are outlined as an applicable process for land division and this application meets the requirements for preliminary plat, frontage, building sites, minimum density, et cetera. Flag and through lots are necessary due to natural topographic site constraints and adjacent existing dwellings. The planned flag lots meet the accessway and dimensional requirements of this code section. The criteria of OCMC 16.08 are not

applicable at this time and will be addressed through a future Detailed Development Plan/subdivision application.

- OCMC 16.12: OCMC 16.12 defines the minimum public improvement standards for the Detailed Development Plan application. Streets within Park Place Crossing, with the exception of a confined area which requires the narrowing of a cross section, meet the dimensional and design standards of this section. The specific applicable criteria of OCMC 16.12 are addressed within a previous section of this narrative. These criteria will be met through a future Detailed Development Plan application.
- OCMC 17.62: This section is not applicable at this time, as design review is not required as part of this General Development Plan application. If necessary, the criteria of OCMC 17.62 will be addressed through a future land use application.

These criteria are met.

3. **Public services for transportation, water supply, police, fire, sanitary waste disposal, storm-water disposal, and any other needed public services and facilities including schools and parks for proposed residential uses, are capable of serving the proposed development, or will be made capable by the time each phase of the development is completed.**

Response: Physical alterations to the project site are not included with this application for the Park Place Crossing Master Plan/General Development Plan. Site improvements will be addressed with future applications for Detailed Development Plans. Applicable public services for transportation, water supply, police, fire, sanitary waste disposal, stormwater disposal, and other needed public services and facilities, including parks and schools are capable of serving the planned residential project. Further refined details will be provided with future applications for Detailed Development Plans.

Water: Within the project area, water is provided by the City and Clackamas River Water (CRW) (above 450 feet elevation). Service has been deemed sufficient by the City and CRW. These providers have an Intergovernmental Agreement (IGA) to provide these services. Water supply systems are shown on the Preliminary Plans (Exhibit A). The water infrastructure shown as part of the Park Place Crossing Master Plan is consistent with the Park Place Concept Plan and the City's Water Capital Improvement Projects Master Plan, including the January 2021 Water Distribution System Master Plan Amendment. The improvements shown are consistent with the approved concept plan for Park Place and the Water Master Plan. Further details will be submitted with future Detailed Development Plan applications. This criterion is met.

Sanitary Sewer: Sanitary service for the project area will be provided by the Tri-City Sewer District. Annexation to the sewer district is required in the future prior to subdividing the land. A sanitary sewer modeling analysis has been completed and submitted to the City for review. The project area is planned to be served by several phases of sewer, illustrated on the Preliminary Plans (Exhibit A). Sanitary sewer is planned to be routed across Tour Creek adjacent to Oak Valley Drive until such time that gravity sewer becomes available as a permanent option through the improvement of abutting properties to the south and

east. Due to grade issues in the southeast corner of the site (Phase 6), sanitary sewer will require pumping to gravity systems within an adjacent Phase of Park Place Crossing. The improvements shown are consistent with the approved concept plan and Sanitary Sewer Master Plan. Further details will be submitted with future Detailed Development Plan applications. This criterion is met.

Stormwater: The planned improvements are consistent with the Park Place Concept Plan and the City's Stormwater and Grading Design Standards. Stormwater facilities for the overall project are shown within the Preliminary Plans (Exhibit A). Temporary stormwater facilities for Phase 1 will be decommissioned and routed to regional facilities as part of Phase 2. This area will then be reclaimed for residential lots. Further analysis of the site's stormwater needs, and the prescribed management facilities are included within the Preliminary Stormwater Report (Exhibit F). Phase 6 stormwater, due to the aforementioned grading issues, are not planned to be routed to the regional facility. Phase 6 stormwater is anticipated to be treated and managed within private stormwater planters and directed to the natural area. The planned stormwater management methods and facilities are appropriate and consistent with City requirements. Further details will be submitted with future Detailed Development Plan applications. This criterion is met.

Transportation/Streets: Streets, as illustrated within the Preliminary Plans, are designed to serve the project site and connect it to the surrounding street network. Holly Lane, a planned Collector Street, will ultimately serve as the main thoroughfare through the project site and the "North Village" outlined within the Park Place Concept Plan. Holly Lane is anticipated to connect S Holcomb Boulevard with S Livesay Road within the project site and the portions of the Park Place Concept Area beyond. The planned streets comply with those envisioned within the Park Place Concept Plan and City standards. Further details will be submitted with future Detailed Development Plan applications. This criterion is met.

Parks: Per the Park Place Concept Plan, a park is provided at the southwest corner of the subject site. Approximately 4.4 acres of public park have been anticipated to be provided to the City. Future expansion of the park, as needed to fulfill the Park Place Concept Plan's envisioned final 8–10-acre requirement for the community park and as shown within Exhibit N, is possible through provision by neighboring properties. Park lands are planned to be provided to the City of Oregon City with Phase 2 of Park Place Crossing (approximately 2024/2025 planned construction date). It is expected that timing will allow inclusion of the park facility within an update of the City's Parks Capital Improvement Projects list. The details of park construction and SDC-creditable projects are anticipated to be determined at a later date. Coordination is needed with the Parks Department in order to amend the City's Parks Master Plan/Capital Improvement Projects list and outline the process and details for the transfer of ownership as part of Phase 2.

Trail connections are being provided through planned open space tracts street and sidewalk connections on Local and Collector Streets as part of their applicable Phase of Park Place Crossing. Additional coordination, including design and Park System Development Charges (SDCs) for the future park will be determined, assessed, and paid

at the time building permits are issued. This will ensure funding for parks based on need identified in City plans and on a timeline reflecting City priorities.

Private Utilities: Electric, Gas, and other telecommunications utilities are planned to be routed and arranged as needed and appropriate within right-of-way and adjacent Public Utility Easements (PUEs). The provision of these services is anticipated to be consistent with City requirements. Further details will be submitted with future Detailed Development Plan applications. This criterion is met.

Emergency Services: Police service to the project site will be provided by the Oregon City Police Department (OCPD). OCPD previously submitted a response to Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005) indicating that the resources to serve this area were available.

Park Place Crossing is within Clackamas Fire District #1, which provides fire protection for Oregon City and surrounding areas. Clackamas Fire District #1 provided pre-application conference comments requesting further information about the project, which have been provided within the Preliminary Plans (Exhibit A).

Emergency Medical Services for the area are provided by Clackamas Fire District #1 and American Medical Response (AMR) through contract with Clackamas County.

Emergency services to the planned project are satisfactory and consistent with applicable requirements. Temporary emergency access will be available to Phase 1 from Shartner Drive, as depicted within Sheet P-08 (Exhibit A). Temporary emergency access to Park Place Crossing will be available via the Holly Lane/S Livesay Road connection. At each of these locations, during their appropriate phases, removable barriers will allow emergency traffic to travel to and through Park Place Crossing. Further details will be submitted with future Detailed Development Plan applications. This criterion is met.

Schools: The project site is served by the Oregon City School District. The School District provided comments for the annexation and zone assignment applications for this property. In those comments, the School District voiced no major concerns regarding school capacity or serving the new homes as build-out of the project aligned with the School District's stated timeline to provide additional school capacity and several other methods of providing or shifting capacity are available. This criterion is met.

All applicable public facilities and services to serve the project site have been or will be made available per the adopted public facilities plans; however, since this application is for a Master Plan and does not involve any physical alterations to the site, further details will be submitted with future Detailed Development Plan applications. These criteria are met.

4. **The proposed general development plan protects any inventoried Goal 5 natural, historic or cultural resources within the proposed development boundary consistent with the provisions of applicable overlay districts.**

Response: The General Development Plan included as part of this application lays the foundations for the protection of inventoried Goal 5 natural resources such as those within the Natural

Resources Overlay District (NROD). These areas are preserved within open space areas on the outskirts of the site and are addressed within the NROD Memorandum (Exhibit G) prepared as part of this application for General Development Plan. Future Detailed Development Plans will provide further details regarding these areas. Historic or cultural resources are not known to be present within the site boundaries. Physical alterations are not planned with this application for General Development Plan. Further details will be submitted with future Detailed Development Plan applications. These criteria are met.

5. **The proposed general development plan, including development standards and impact mitigation thresholds and improvements, adequately mitigates identified impacts from each phase of development. For needed housing, as defined in ORS 197.303(1), the development standards and mitigation thresholds shall contain clear and objective standards.**

Response: Phasing of the General Development Plans allows for the orderly provision of transportation facilities and utilities to new areas and eventual connection as planned within the City's Transportation System Plan and Utility Master Plans. Further details are available within the Transportation Impact Study (Exhibit E) and will be submitted with future Detailed Development Plan applications. This criterion is met.

6. **The proposed general development plan is consistent with the Oregon City Comprehensive Plan.**

Response: The General Development Plan is consistent with the Park Place Annexation and Zone Change conditions of approval Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005), the Park Place Concept Plan, the Oregon City Comprehensive Plan, and applicable zoning requirements. Further details will be submitted with future Detailed Development Plan applications. These criteria are met.

7. **The proposed general development plan is consistent with the underlying zoning district(s) and any applicable overlay zone or concept plans.**

Response: With adjustments, as outlined below, the General Development Plan is consistent with applicable underlying zoning district regulations and the Park Place Concept Plan. These criteria are met.

8. **For projects with a residential use component, the proposed general development plan includes common open space for the recreational needs of the development's residents.**

   a. **Required open space shall be located either on-site or off-site within one-quarter mile of the development.**

Response: Open space areas are located on-site and within one-quarter mile of the project and are located consistent with the Park Place Concept Plan. This criterion is met.

   b. **Minimum required open space shall be one hundred square feet per residential unit in the development.**

Response: Park Place Crossing plans ±476 residential units (with one additional future unit possible in the future), this equates to ±47,700 square feet of open space. Over ±496,500 square

feet are provided via open space tracts, public park, and dedicated civic space. Therefore, these criteria are met.

c. The open space area may be in private ownership or proposed for public dedication, at the city's discretion whether to accept.

Response: Approximately 4.4 acres of public park have been anticipated to be provided to the City. Coordination is needed with the Parks Department in order to amend the City's Parks Master Plan/Capital Improvement Projects list and outline the process and details for the transfer of ownership as part of Phase 2. Approximately 11.4 acres of private open space with public access easements for trails have been planned as well. Per the annexation approval for the project site, Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005), the area was required to incorporate park and trail areas generally consistent with the Park Place Concept Plan and Trails Master Plan. These areas have been incorporated into the General Development Plans where applicable and appropriate and therefore, these criteria are met.

d. The open space shall be developed with a unified design to provide for a mix of passive and active uses. Passive uses include, but are not limited to sitting benches, picnicking, reading, bird watching and natural areas. Active uses include, but are not limited to playgrounds, sports fields and courts, running and walking areas.

Response: Open space areas within the Master Plan provide both passive and active areas. These areas connect to regional and local trails and provide walking and running trails through natural areas, benches for sitting, opportunities for birdwatching, et cetera. The Applicant plans to provide parkland consistent with the Park Place Concept Plan for the future purpose of providing other active uses such as playgrounds and sports fields within areas that are appropriately improved for those types of uses. The areas include a unified design to provide a variety of functions within the Park Place Crossing project. These criteria are met.

e. Land area to be used for the open space area that is required in this section shall not include required setback areas, required landscaping, streets, rights-of-way, driveways, or parking spaces.

Response: Land designated as open space has not been included if it was required for a setback area, required landscaping, street, right-of-way, driveway, or parking. Open spaces, however, are located within areas designated as setback for steep slopes and natural resources. This designation helps to provide these areas protection from encroachment. The intent of this criterion is met.

f. Unless dedicated to the public, the applicant shall also provide an irrevocable legal mechanism for the maintenance of the open space and any related landscaping and facilities. The applicant shall submit, for city review and approval, all proposed deed restrictions or other legal instruments used to reserve open space and maintenance of open space and any related landscaping and facilities.

Response: Areas that are acceptable for public use are anticipated to be provided to the City. Other open spaces are planned to be included under irrevocable legal mechanisms for landscaping and maintenance in the future at the appropriate time. Therefore, these criteria are met.

> 9. For projects with a residential use component, the proposed general development plan includes a mix of residential uses such that no single residential use exceeds seventy-five percent of the total proposed units. The mix of residential uses shall provide variety of dwelling types and sizes that are integrated throughout the site, rather than isolated from one another, with smooth transitions between residential types including appropriate setbacks, landscaping or screening as necessary, while maintaining street and pedestrian connectivity between all residential uses. Tenancy (i.e. ownership versus rental) shall not be a consideration in determination of the mix of residential use. For the purposes of this section, residential uses include single-family detached, single-family attached, duplex, 3—4 plex, and multi-family.

Response: As a requirement of providing a Master Plan/General Development Plan, Park Place Crossing includes a mix of residential uses – single-family detached and single-family attached. Of the planned ±476 residential units, ±126 single-family attached units, or ±26.5% of the total units, are planned. No single residential use is planned to exceed 75% of the total units; therefore, this criterion is met.

17.65.070 - Adjustments to development standards.

> A. Purpose. In order to implement the purpose of the city's master plan or planned unit development process, which is to foster the growth of major institutions, major residential, commercial or mixed-use development, and other large-scale development, while identifying and mitigating their impacts on surrounding properties and public infrastructure, an applicant may request one or more adjustments to the applicable development regulations as part of the master planning or planned unit development process, and are not required to go through the variance process pursuant to OCMC Chapter 17.60.
>
> B. Procedure. Requests for adjustments shall be processed concurrently with a general development plan. An adjustment request at the detailed development plan review shall cause the detailed development plan to be reviewed as a Type III application.

Response: In order to properly protect sloped areas and natural resources that exist within the master plan area, adjustments to certain standards are necessary to accommodate residential uses and densities provided for in the Park Place Concept Plan.

> C. Regulations That May be Adjusted. Adjustments may be allowed for the following items:
>
> 1. Dimensional standards of the underlying zone of up to twenty percent, except the perimeter of the development shall meet the underlying zone's setbacks when adjacent to residentially zoned property.

Response: Following underlying zoning by its exact zoning map boundaries would create areas within master plan that did not transition well between housing types within the project as well as new and existing housing. Because the residential developable (net) areas of the site,

per Table 4, amount to 5.8 percent R-10 zoning and 91.4 percent R-5 zoning, Low-Density Residential zoning is considered for the overall density requirements, but not dimensional standards. Master planned communities typically provide their own dimensional standards where the underlying zoning would not fit the current conditions or the future plans for the site.

Adjustments to the dimensional standards of the underlying zone include reduction in minimum lot size from the underlying requirement of the R-5 zone: 5,000 square feet. A portion of the project lots, except for those along the perimeter of the site, are planned to be slightly smaller than required by the R-5 zone. Specific lot sizes, including those requiring adjustment, are anticipated to be determined as part of future Detailed Development Plans for Park Place Crossing.

Lots along the perimeter of the site have been planned to meet the underlying zone's setbacks where adjacent to residentially zoned properties not planned as part of the Park Place Crossing Master Plan. As Detailed Development Plans are submitted and plans for Park Place Crossing become more refined, adjustments to the underlying setback requirements may be required. This criterion for adjustment is met.

2. Site plan and design standards.

Response: Consistent with the Park Place Concept Plan, the Park Place Crossing Master Plan includes a Collector Street extending generally from the northeast portion of the site to the southern portion of the site. There is one small area, however, where the street alignment traverses a geometrically and topographically constrained area (generally between Map 2 2E 28AD Tax Lot 314 and Map 2 2E 27C Tax Lot 400).

A modified street section for this short segment of roadway would benefit the project and surrounding area because it would require reduced alterations to site topography. The modified street section is discussed in greater detail in the Transportation Impact Study, but such a cross section is discussed within and consistent with the Park Place Concept Plan (Figure 3-D pictured below) within this immediate cross section of Holly Lane. This criterion for adjustment is met.



Figures 3-C and 3-D. Narrow Minor Arterial 2-Lane Cross Section and Collector 2-Lane Cross Section

3. Residential design standards.

Response: The Park Place Concept Plan envisions a Collector Street, Holly Lane, residences with rear-load garages abutting in order to minimize the number of driveways and help ensure a safe pedestrian space. The planned General Development Plan/Master Plan provides alleys for lots along Holly Lane, where feasible, to prevent backing movements onto the Collector Street. Other areas of the project abut existing homes and sensitive areas.

Alleys, rear-load, and side-load garages and homes would not be beneficial in these locations.

Similarly, because of the increased site constraints (steep slopes, and natural resources areas) along the project perimeters, blocks with alleys along Local Streets are burdensome and do not work with the constrained layout. The layout abuts several areas with pre-existing homes and the establishment of alleys behind these homes would disturb established residents and patterns of development.

OCMC 17.21.090.A requires that garages be detached, side entry, or rear entry. The Park Place Crossing Master Plan works best with no limitations on garage type or entry, therefore, an adjustment is required, as provided for by OCMC 17.65.070.C.

A mixture of front-entry, attached, side entry, and rear entry, appropriate for the site, is beneficial to the Park Place Crossing neighborhood. The variety of designs allows for site constraints to be best resolved, less paving to be provided, safe accesses to be decided, and appropriate home designs determined to fit the project. Where attached front entry garages are provided, the minimum garage door width required is 16-feet, with a 20-foot width driveway.

Because an exemption is possible due to the topographic and pre-existing lot concerns, this exemption is sought as part of the Park Place Crossing General Development Plan for home sites which require it. Increased garage setbacks, pedestrian accessways, and pedestrian friendly streets with sidewalks and planter strips are planned in order to lessen the impact of these front entry attached garages, as provided in many similar neighborhoods. Garages and their orientation will be determined at submittal of Detailed Development Plans. This criterion for adjustment is met.

4. Increase in allowed maximum residential density of up to ten percent.

Response: Due to greater steep slope and drainageway areas requiring preservation than originally accounted for as part of the Park Place Concept Plan, ±15.7 acres as part of the Park Place Crossing Master Plan versus ±11.4 acres accounted for as part of the PPCP, greater density is required to meet the intent of the Park Place Concept Plan.

As shown in Table 2, Park Place Crossing offers a developable area of ±47.7 acres, resulting in a density of 9.1 dwelling units per net acre. This is an increase over the maximum residential density allowed within the combined underlying zoning districts of fewer than four percent, less than the ten percent maximum (with the NROD Density Transfer) adjustment permitted. This criterion for adjustment is met.

5. Standards for land division approval.

Response: This application for the Park Place Crossing Master Plan/General Development Plan does not include any land divisions or physical alterations to the project site, which will be addressed with future applications. Adjustments to the standards of land division approval may be required with future Detailed Development Plan applications. This criterion for adjustment is met.

6. Additional uses allowed with residential projects, or residential component of projects:

   a. Notwithstanding the use provisions of the underlying zones, neighborhood commercial uses as defined in Chapter 17.24.020, including restaurants and eating and drinking establishments without a drive-through, retail trade, and services, are permitted on up to ten percent of the net developable area. The neighborhood commercial uses shall be planned and constructed so as to support and be compatible with the entire development and shall not alter the character of the surrounding area so as to substantially preclude, impair or limit the use of surrounding properties for the primary uses listed in the underlying district.

   b. Public or private parks and playgrounds, community buildings and/or outdoor recreational facilities, such as swimming pools and tennis courts.

   c. Indoor recreational facilities, such as racquetball or tennis courts, fitness centers or swimming pools.

   d. Common public and private open space including trails.

   e. Primary or accessory uses that are not identified as a permitted or conditional use in the underlying zone but which are defined in the code.

Response: Consistent with the Park Place Concept Plan, this project includes parks, common public and private open spaces with trails and uses appropriate for a master-planned mixed-use/neighborhood commercial areas and civic space. The neighborhood commercial areas are intended to be supportive of and compatible with surrounding areas. Therefore, these criteria are met.

D. Regulations That May Not be Adjusted. Adjustments are prohibited for the following items:

   1. To allow a primary or accessory use that is not identified as a permitted, or conditional use in the underlying zone, with the exception of the additional uses permitted under OCMC 17.65.070.C.6 above;

   2. To any regulation that contains the word "prohibited";

   3. As an exception to a threshold review, such as a Type III review process; and

   4. Minimum density for residential sites may not be reduced.

Response: Adjustments of the listed or prohibited regulations are not planned or anticipated. These criteria are met.

E. Approval Criteria. A request for an adjustment to one or more applicable development regulations under this section shall be approved if the review body finds that the applicant has shown the following criteria to be met:

   1. Granting the adjustment will equally or better meet the purpose of the regulation to be modified;

Response: The existing conditions on-site show that greater areas than originally planned are needed for the protection of natural resource and geologic hazards areas. Granting the

adjustments will allow better use of this highly constrained project site and protection of steep slope and drainageway areas. The Park Place Concept Plan envisions residential areas that can support mixed-use/neighborhood commercial, parks, and other community amenities. These planned factors require that the envisioned density be met to a similar degree.

Due to these constraints, a percentage of smaller lots are necessary in order to balance the minimum density of the underlying zoning and the number of residences envisioned within the Park Place Concept Plan. The purpose of density standards within the Park Place Concept Area is to provide a reasonable transition between existing neighborhoods and future higher density areas near the North and South Village central areas. Zoning densities provide a similar reasoning, establishing a reasonable range of dwelling units per net developable area in order to both provide homes and prevent crowding of existing neighborhoods.

The modified Holly Lane street standard allows the passage of a vital City transportation connection through a narrow area without greatly affecting existing homes or areas that are not within the Urban Growth Boundary. The need for this modification is recognized within the Park Place Concept Plan. As part of the Park Place Crossing Master Plan project, the S Holly Lane collector will be constructed through the site with future connections between S Livesay Road and S Holcomb Boulevard (note the connection to S Livesay Road as part of this Master Plan will be emergency vehicle access only). Per Oregon City Municipal Code Table 16.12.016 a collector right-of-way width is 85 feet, however within the project site where S Holly Lane crosses between tax lots 2-2E-28D-00190 and 2-2E-27BC-01000 there is not adequate room to accommodate this. Given this restriction, a reduced section is necessary to allow room for roadway construction and grading (retaining walls, daylight slopes, etc.).

Similarly, the adjusted standards protect the drainageway and steep slope areas in a superior manner while still achieving the permitted residential uses at the desired densities. Adjustment of residential design standards allows the smart use of the project site without the establishment of alleys and rear-entry garages in locations that would impede on natural resources areas and create greater areas of impervious surface. The outlined adjustments are needed and appropriate and better meet the purpose of the regulations to be modified. This criterion is met.

2. If more than one adjustment is being requested, the cumulative effect of the adjustments results in a project that is still consistent with the overall purpose of the zone;

Response: The needed adjustments are complimentary, and the cumulative effect of the adjustments results in a project that is still consistent with the overall purpose of the zone and the Park Place Concept Plan. The adjustments are small, however, because of the differences between the concept plan and existing conditions, together serve to implement the vision of the Park Place Concept Plan and the Low and Medium-Density Residential zoning districts. The adjustments are within the limits set by OCMC 17.65.070

for General Development Plans and therefore consistent with the intent and purpose of the zone. This criterion is met.

3. City-designated Goal 5 resources are protected to the extent otherwise required by Title 17;

Response: Adjustment of the applicable OCMC regulations allows appropriate improvement and of the land without infringement on City-designated Goal 5 resources, such as within the Natural Resources Overlay District areas present at the northwest and southeast corners of the project site. With these adjustments, open space areas can be created to preserve these natural resources, recreational opportunities can be provided within the newly created open space areas to connect residents with their surroundings, and the open spaces can be structured in such a way that these natural areas are protected, enhanced, and maintained. This criterion is met.

4. Any impacts resulting from the adjustment are mitigated such that the development does not create significant adverse impacts on adjacent properties;

Response: Negative impacts resulting from these adjustments are not anticipated. The adjustments allow for a master plan project that is consistent with the Park Place Concept Plan and is responsive to the existing surrounding environmental constraints, natural resources preservation, avoidance of natural hazards areas, and the needs of abutting existing and future neighborhoods. Mitigation for the increased density planned includes additional traffic mitigation contributions and open spaces beyond those envisioned within the Park Place Concept Plan. These contributions allow for the preservation of more additional natural areas than previously envisioned as part of the Park Place Concept Plan and allow for the continued enjoyment of Park Place's natural beauty and important ecosystem functions.

The needed adjustments, including those related to density, are considered within the provided Transportation Impact Study (Exhibit E). The planned number of units remains below the threshold established by Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005) for the Park Place Crossing annexation area. This criterion is met.

5. If an environmental zone, the proposal has as few significant detrimental environmental impacts on the resource and resource values as is practicable; and

Response: The area includes Natural Resources Overlay District areas within the northwest and southeast portions of the site but does not anticipate impacts to these areas other than for the establishment of trails. Adjustments to the standards affecting the master plan for Park Place Crossing allows these areas to remain largely unaffected by the project. The specific impacts will be reviewed further with successive Detailed Development Plan applications. Please refer to the NROD Memorandum (Exhibit G) for further information. This criterion is met.

6. The proposed adjustment is consistent with the Oregon City Comprehensive Plan and a concept plan if applicable.

Response: The adjustments are consistent with the Oregon City Comprehensive Plan and Park Place Concept Plan. Adjustments to the planned density of the area allow the implementation of the Park Place Concept Plan in creating neighborhoods complete with mixed use/neighborhood commercial centers, civic areas, and parks. The adjustments allow the efficient use of land, which would be of greater difficulty without the adjustments, due to the site's constraints. Specific applicable Comprehensive Plan policies are reviewed later within this narrative. This criterion is met.

[…]

17.65.090 - Regulations that apply.

An applicant is entitled to rely on land use regulations in effect on the date its general development plan application was initially submitted, pursuant to ORS 227.178(3), as that statute may be amended from time to time. After a general development plan is approved, and so long as that general development plan is in effect, an applicant is entitled to rely on the land use regulations in effect on the date its general development plan application was initially submitted, as provided above, when seeking approval of detailed development plans that implement an approved general development plan. At its option, an applicant may request that a detailed development plan be subject to the land use regulations in effect on the date its detailed development plan is initially submitted.

Response: These standards are understood, and the Applicant can choose to rely on land use regulations in effect on the date of submittal of this General Development Plan application, or upon future land use regulations in effect on the date of submittal of further Detailed Development Plans, at their option. This criterion is met.

Oregon City Comprehensive Plan

Section 1 – Citizen Involvement

Goal 1.1: Citizen Involvement Program

Implement a Citizen Involvement Program that will provide an active and systematic process for citizen participation in all phases of the land use process to enable citizens to consider and act upon a broad range of issues affecting the livability, community sustainability, and quality of neighborhoods and the community as a whole.

Policy 1.1.1 Utilize Neighborhood Associations, as the vehicle for neighborhood-based input into the process to meet the requirements of the Land Conservation and Development Commission (LCDC) Statewide Planning Goal 1, Citizen Involvement. The Citizen Involvement Committee (CIC) shall serve as the officially recognized citizen committee needed to meet LCDC Statewide Planning Goal 1.

Goal 1.4: Community Involvement

Provide complete information for individuals, groups, and communities to participate in public policy planning and implementation.

Policy 1.4.1. Provide information and notices on community involvement opportunities when appropriate.

Response: Citizen Involvement was accomplished per the requirements of OCMC 17.50. The Applicant participated in a regularly scheduled Park Place Neighborhood Association meeting (Exhibit H). Public notice of the public hearing will be accomplished per the

requirements for a Type III land use application included in OCMC 17.50. The application is consistent with these Comprehensive Plan policies.

Section 2 – Land Use

Goal 2.1: Efficient Use of Land

Ensure that property planned for residential, commercial, office, and industrial use is used efficiently and that land will be developed following the principles of "Sustainable Development."

Policy 2.1.1 **Create incentives for new development to use land more efficiently, such as by having minimum floor area ratios or maximums for parking and setbacks.**

Response: Minimum floor area ratios, parking maximums, and setback maximums generally apply to multifamily residential, commercial, or industrial uses. The planned single-family detached and attached residential project utilizes existing code provisions for adjustments to allow for more efficient use of the subject site. These adjustments through the master plan process include lot size reductions and density adjustments. Adjustments to density standards of the R-5 zoning district allow for the establishment of residential areas to implement the projected Park Place Concept Plan and support the envisioned Park Place commercial areas while preserving open spaces and natural areas. Reduced lot sizes support the needed densities and housing unit counts anticipated by the City. The needed adjustment to street standards allows for the placement of Holly Lane within a constrained area between the project boundary, Urban Grown Boundary, and existing homes. The housing type mix encourages more efficient housing while encouraging varied home sizes, a variety of product price points, and home ownership. The application is consistent with this policy.

Policy 2.1.2 **Encourage the vertical and horizontal mixing of different land use types in selected areas of the city where compatible uses can be designed to reduce the overall need for parking, create vibrant urban areas, reduce reliance on the private automobile, create more business opportunities and achieve better places to live.**

Response: The Master Plan provides for a mixture of single-family attached, single-family detached, and other possible residential land use types with the future Mixed-Use/Neighborhood Commercial phase. The areas planned are arranged to create vibrant neighborhoods, parks, open spaces, and commercial areas. The General Development Plan is consistent with this policy.

Policy 2.1.3 **Encourage sub-area master planning for larger developments or parcels, including re-development, where it may be feasible to develop more mixed uses, or campus-style industrial parks, with shared parking and landscaping areas. Allow developments to vary from prescriptive standards if planned and approved under this provision.**

Response: As a ±92-acre area with planned mixed uses, the project is a larger development, and therefore requires a master plan. A master plan is also required per Condition of Approval of the project area's annexation Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005). Consistent with this policy and previous approval, the project has created a master plan

which implements the Park Place Concept Plan and creates a sub-area master plan. The application is consistent with this policy.

Goal 2.4: Neighborhood Livability

Provide a sense of place and identity for residents and visitors by protecting and maintaining neighborhoods as the basic unit of community life in Oregon City while implementing the goals and policies of the other sections of the Comprehensive Plan.

Policy 2.4.1 **Develop local neighborhood plans to strengthen and protect residential neighborhoods and historic areas from infill development; such as development along linear commercial corridors.**

Policy 2.4.2 **Strive to establish facilities and land uses in every neighborhood that help give the neighborhoods vibrancy, a sense of place, and a feeling of uniqueness; such as activity centers and points of interest.**

Policy 2.4.3 **Promote connectivity between neighborhoods and neighborhood commercial centers through a variety of transportation modes.**

Response: Park Place Crossing is planned to be a complete and vibrant neighborhood that provides a unique selection of active open spaces and trails, a City park, and MUC/NC areas to support local commerce opportunities. Adjustments to lot size and density requirements allow for the conservation of steep slope and drainageway areas envisioned by the Park Place Concept Plan.

The planned street, pathway, and trail layout allows for connectivity between the project and existing and future neighborhoods using a variety of transportation methods. The planned trail crossing of Tour Creek will allow for connectivity between Park Place Crossing and existing neighborhoods to the northwest of the project. The ease of travel within Park Place Crossing will allow neighborhood residents to stay within the nearby area for recreation, outdoor enjoyment, and shopping within the Park Place North Village. The Park Place Crossing Master Plan is consistent with these policies.

Goal 2.5: Retail and Neighborhood Commercial

Encourage the provision of appropriately scaled services to neighborhoods.

Policy 2.5.2 **Allow and encourage the development of small retail centers in residential neighborhoods, primarily providing goods and services for local residents and workers. Generally, these centers should be located at intersections of two or more streets that are classified neighborhood collector or higher.**

Policy 2.5.4 **Encourage the development of successful commercial areas organized as centers surrounded by higher density housing and office uses, rather than as commercial strips adjacent to low-density housing.**

Response: The Park Place Crossing Master Plan implements the Park Place Concept Plan, which organizes the area into a North and South Village. The North Village, of which this is a part, centers around community needs such as parks, civic and open spaces, shopping, and higher density residential areas. Outer areas, such as Park Place Crossing, are planned as lower density. The Park Place Crossing GDP reserves space for MUC/NC in line with the Park Place Concept Plan and provides pedestrian and vehicular connectivity to the future North Village Town center. The application is consistent with these policies.

Goal 2.7: Comprehensive Plan Map

Maintain and review the comprehensive plan map as the official long-range planning guide for land use development of the city by type, density and location.

Policy 2.7.1 **Maintain a sufficient land supply within the city limits and the Urban Growth Boundary (UGB) to meet local, regional, and state requirements for accommodating growth.**

Policy 2.7.2 **Use the following 11 land use classifications on the comprehensive plan map to determine the zoning classifications that may be applied to parcels:**

Low Density Residential (LR)

Medium Density Residential (MR)

High Density Residential (HR)

Commercial (C)

Mixed Use Corridor (MUC)

Mixed Use Employment (MUE)

Mixed Use Downtown (MUD)

Industrial (I)

Future Urban Holding (FUH)

Public and Quasi-Public (QP)

Parks (P)

Response: The Park Place Crossing Master Plan is designated as Medium Density Residential (MR), Mixed Use Corridor (MUC), and Low Density Residential (LR). The General Development Plan is consistent with the applicable requirements of the Oregon City Municipal Code that implement these Comprehensive Plan designations. The Master Plan includes some necessary adjustments to the specified standards, as permitted by the General Development Plan process. The application is consistent with these policies.

Section 5 – Open Spaces, Scenic and Historic Areas, and Natural Resources

Goal 5.1: Open Space

Establish an open space system that conserves fish and wildlife habitat and provides recreational opportunities, scenic vistas, access to nature and other community benefits.

Policy 5.1.1 **Conserve open space along creeks, urban drainage ways, steep hillsides, and throughout Newell Creek Canyon.**

Policy 5.1.2 **Manage open space areas for their value in linking citizens and visitors with the natural environment, providing solace, exercise, scenic views and outdoor education. Built features in open space sites should harmonize with natural surroundings**

Response: Open spaces along creeks, drainageways, and steep hillsides are set aside for conservation according to the Park Place Concept Plan and the planned Park Place Crossing Master Plan. The site is not within the Newell Creek Canyon. Open spaces are planned to provide conservation areas for streams, wetland, riparian areas, recreational trails, scenic views and outdoor education. Built features, such as the planned bridge

connection across Tour Creek, will be reviewed with an upcoming Detailed Development Plan application and is planned to harmonize with the natural surroundings. The application is consistent with these policies.

Goal 5.3: Historic Resources

Encourage the preservation and rehabilitation of homes and other buildings of historic or architectural significance in Oregon City.

Response: The project site does not contain any homes or other buildings of historic or architectural significance. The General Development Plan is consistent with this goal.

Goal 5.4: Natural Resources

Identify and seek strategies to conserve and restore Oregon City's natural resources, including air, surface and subsurface water, geologic features, soils, vegetation, and fish and wildlife, in order to sustain quality of life for current and future citizens and visitors, and the long-term viability of the ecological systems.

Policy 5.4.1 **Conserve and restore ecological structure, processes and functions within the city to closely approximate natural ecosystem structure, processes, and functions.**

Policy 5.4.4 **Consider natural resources and their contribution to quality of life as a key community value when planning, evaluating or assessing costs of city actions.**

Policy 5.4.5 **Ensure that riparian corridors along streams and rivers are conserved and restored to provide maximum ecological value to aquatic and terrestrial species. This could include an aggressive tree and vegetation planting program to stabilize slopes, reduce erosion, and mitigate against invasive species and stream impacts where appropriate.**

Policy 5.4.8 **Conserve natural resources that have significant functions and values related to flood protection, sediment and erosion control, water quality, groundwater recharge and discharge, education, vegetation and fish, and wildlife habitat.**

Policy 5.4.9 **Protect and enhance riparian corridors along streams in Oregon City to increase shade, reduce streambank erosion and intrusion of sediments, and provide habitat for a variety of plants, animals, and fish.**

Policy 5.4.10 **Encourage and promote the restoration of the hydrologic and ecological character and function of streams and wetlands that have been degraded by channeling or eliminated from the landscape by routing into culverts.**

Policy 5.4.11 **Maintain and enhance the function and quality of natural wetlands and create, where appropriate, wetlands or swales to moderate the quantity and velocity of water runoff entering streams during storm events and to reduce the amount of pollutants carried into streams.**

Response: Verification of wetland and riparian resources designated within the Natural Resource Overlay District will occur with future Detailed Development Plans. For further information with regard to this General Development Plan application, please refer to the NROD Memorandum (Exhibit G). No physical alterations are planned as part of this General Development Plan application. Wetlands are planned for preservation where possible while allowing enjoyment of natural areas. Stormwater management is planned

through detention, treatment, and conveyance to natural, existing drainageways. Water quality standards are planned to be met by the project. Specific review of water quality facilities will occur as part of future applications for Detailed Development Plans. The application is consistent with these Comprehensive Plan policies.

Policy 5.4.16 **Protect surface water quality by:**

- **providing a vegetated corridor to separate protected water features from development;**
- **maintaining or reducing stream temperatures with vegetative shading;**
- **minimizing erosion and nutrient and pollutant loading into water; and**
- **providing infiltration and natural water purification by percolation through soil and vegetation.**

Response: Surface water quality is planned for protection through vegetated corridors, vegetative shading, and prevention of erosion and pollution. Stormwater facilities will be designed for management, detention, and treatment of stormwater to remove sediment and other pollutants in accordance with the City's standards. Erosion related to construction activities is not planned as part of this Master Plan, but will be controlled through silt fences and other methods outlined within the City's standards, to be addressed with future Detailed Development Plans. The master plan implements the required setbacks of OCMC 17.49; however, future Detailed Development Plans will address and conform to the specific standards of the Natural Resource Overlay District contained within OCMC 17.49. The application is consistent with this Comprehensive Plan policy.

Policy 5.4.17 **Protect and maintain groundwater recharge through conservation and enhancement of wetlands and open space.**

Response: The master plan allows for the conservation of wetlands and open spaces near areas designated Natural Resource Overlay District. Green streets and stormwater management will allow for the protection and maintenance of groundwater recharge. Future Detailed Development Plans will address and conform to the specific standards of the Natural Resource Overlay District contained within OCMC 17.49. The General Development Plan application is consistent with this policy.

Policy 5.4.18 **Encourage use of native and hardy plants such as trees, shrubs and ground covers in order to maintain ecological function and reduce maintenance costs and chemical use.**

Response: Specific landscape designs are expected as part of the Detailed Development Plan process. The use of native and hardy trees, shrubs, and ground cover is expected within water quality facilities, parks, and open spaces, where applicable, in order to maintain ecological function and reduce maintenance costs and chemical use. Selections will be made in accordance with the standards established by the Oregon City Municipal Code and the applicable Public Works Stormwater and Grading Design Standards. The application is consistent with this policy.

Section 6 – Quality of Air, Water, and Land Resources

Goal 6.1: Air Quality

Promote the conservation, protection and improvement of the quality of the air in Oregon City.

Policy 6.1.1 **Promote land use patterns that reduce the need for distance travel by single-occupancy vehicles and increases the opportunities for walking, biking and/or transit to destinations such as places of employment, shopping and education.**

Policy 6.1.2 **Ensure that development practices comply with or exceed regional, state, and federal standards for air quality.**

Policy 6.1.4 **Encourage the planting and maintenance of the city's tree canopy to allow natural systems to improve air quality.**

Response: The Park Place Crossing Master Plan will create a portion of the conceived North Village in order to provide commercial retail, civic spaces, parks, and open spaces accessed by a transportation system, which increases the opportunities for walking, biking, and future expansion of transit systems, per the Park Place Concept Plan. New trees and other plant materials will be planted, and areas of trees are planned for preservation within sensitive areas. The specifics of those plantings will be included within landscaping and street tree plans included as part of future Detailed Development Plans. The General Development Plan is consistent with these policies.

Goal 6.2: Water Quality

Control erosion and sedimentation associated with construction and development activities to protect water quality.

Policy 6.2.1 **Prevent erosion and restrict the discharge of sediments into surface or groundwater by requiring erosion prevention measures and sediment control practices.**

Policy 6.2.2 **Where feasible, use open, naturally vegetated drainage ways to reduce stormwater and improve water quality.**

Response: Stormwater within Park Place Crossing is planned for management through stormwater facilities. As stated previously, these facilities will be subject to future Detailed Development Plan applications, OCMC standards, and public works design standards. Stormwater facilities are planned to control sediments and utilize open, naturally vegetated drainage ways. Erosion will be prevented during construction through compliance with the applicable public works standards, but is not planned as part of this Master Plan application. Future Detailed Development Plans will provide further details. The General Development Plan is consistent with these policies.

Goal 6.3: Light

Protect the night skies above Oregon City and facilities that utilize the night sky, such as the Haggart Astronomical Observatory, while providing for night-lighting at appropriate levels to ensure safety for residents, businesses, and users of transportation facilities, reduces light trespass onto neighboring properties, conserves energy, and reduces light pollution via use of night-friendly lighting.

Policy 6.3.1 **Minimize light pollution and reduce glare from reaching the sky and trespassing onto adjacent properties.**

Policy 6.3.2 **Encourage new developments to provide even and energy-efficient lighting that ensures safety and discourages vandalism. Encourage existing developments to retrofit when feasible.**

Response: Lighting, reviewed with future Detailed Development Plan applications, is planned to comply with the Oregon City Municipal Code. The application is consistent with these policies.

Goal 6.4: Noise

To prevent excessive sound that may jeopardize the health, welfare, or safety of the citizens or degrade the quality of life.

Policy 6.4.1 **Provide for noise abatement features such as sound-walls, soil berms, vegetation, and setbacks, to buffer neighborhoods from vehicular noise, and industrial uses.**

Policy 6.4.2 **Encourage land use patterns along high traffic corridors be developed to minimize noise impacts from motorized traffic through building location, design, size and scale.**

Response: The Park Place Crossing Master Plan and planned uses are not expected to create noise in excess of the maximum levels established within Oregon City Municipal Code. The application is consistent with these policies.

Section 7 – Natural Hazards

Goal 7.1: Natural Hazards

Protect life and reduce property loss from the destruction associated with natural hazards.

Policy 7.1.1 **Limit loss of life and property from natural hazards by regulating or prohibiting development in areas of known or potential hazards.**

Policy 7.1.3 **Reduce risk to residents and businesses by maintaining accurate information**

Policy 7.1.5 **Minimize and avoid risk of loss of life and damage from flooding by limiting development in the 100-year flood plain or ensure that accepted methods of flood proofing are utilized.**

Policy 7.1.6 **Encourage uses of areas subject to flooding that are resilient to periodic effects of flooding, such as parking or other uses not normally occupied by humans.**

Policy 7.1.7 **Prohibit uses in areas subject to flooding that would exacerbate or contribute to hazards posed by flooding by introducing hazardous materials, filling or obstructing floodways, modifying drainage channels, and other detrimental actions.**

Policy 7.1.8 **Provide standards in city codes for planning, reviewing, and approving development in areas of potential landslides that will prevent or minimize potential landslides while allowing appropriate development.**

Policy 7.1.9 **Locate, design, and construct structures in conformance with current building codes and standards for seismic-resistant design.**

Response: The Park Place Crossing Master Plan avoids known natural hazards to the extent practicable. Building sites are not located within areas of possible flooding. Future home sites have been located to avoid existing steep slopes and landslide hazards where

possible. Other identified steep slopes are planned for regrading where appropriate. Plans submitted demonstrate the City-mapped geologic hazard areas. Structures will be located, designed, and constructed in accordance with City code, building code, and standards for seismic-resistant design. Specific geologic and other natural hazards will be reviewed with future Detailed Development Plan applications and construction permitting. This application for a General Development Plan is consistent with these Comprehensive Plan policies.

Section 8 – Parks and Recreation

Goal 8.1: Developing Oregon City's Park and Recreation System

Maintain and enhance the existing park and recreation system while planning for future expansion to meet residential growth.

Policy 8.1.1 **Provide an active neighborhood park-type facility and community park-type facility within a reasonable distance (as defined by the Park and Recreation Master Plan or within a reasonable distance to be determined by a future Parks and Recreation Master Plan) to residents of Oregon City.**

Policy 8.1.2 **Whenever property adjacent to an existing neighborhood/community park becomes available, consider adding property to the park and develop it to meet the current needs of existing neighborhoods.**

Policy 8.1.14 **Require or encourage developers to dedicate park sites as part of the subdivision review process. When possible, require or encourage developers to build parks to City standards and give them to the City to operate and maintain.**

Response: Park Place Crossing plans to provide a needed community park at the southwest corner of the project site. Approximately 4.4 acres is planned to be reserved for park purposes with trails, pathways, and street facilities leading to the area to allow for ease of circulation. Streets and trails to be provided have been identified within the Transportation System Plan and Trails Master Plan. Park lands are planned for dedication to the City of Oregon City prior to commencement of Phase 2 of Park Place Crossing (approximately 2024/2025 planned construction date). It is expected that timing will allow inclusion of the park facility within an update of the City's Parks Capital Improvement Projects list. The details of park construction and SDC-creditable projects are anticipated to be determined at a later date with submittal of Detailed Development Plan applications. This application for a General Development Plan is consistent with these Comprehensive Plan policies.

Section 10 – Housing

Goal 10.1: Diverse Housing Opportunities

Provide for the planning, development and preservation of a variety of housing types and lot sizes.

Policy 10.1.3 **Designate residential land for a balanced variety of densities and types of housing, such as single-family attached and detached, and a range of multi-family densities and types, including mixed-use development.**

Policy 10.1.4 Aim to reduce the isolation of income groups within communities by encouraging diversity in housing types within neighborhoods consistent with the Clackamas County Consolidated Plan, while ensuring that needed affordable housing is provided.

Policy 10.1.5 Allow Accessory Dwelling Units under specified conditions in single-family residential designations with the purpose of adding affordable units to the housing inventory and providing flexibility for homeowners to supplement income and obtain companionship and security.

Policy 10.1.7 Use a combination of incentives and development standards to promote and encourage well-designed single-family subdivisions and multi-family developments that result in neighborhood livability and stability.

Response: The Park Place Crossing Master Plan provides for ±476 single-family residences, through ±350 detached and ±126 attached units. This project will provide a variety of housing types and lot sizes. A varied supply within Park Place Crossing will help provide housing for a variety of income groups and help reduce isolation of these groups within the community. The design also accounts for the potential preservation of an existing home in Phase 5. These combined factors, in addition to those previously outlined—such as parks, open space, preserved natural areas, and other amenities—will lead to greater neighborhood livability and stability. Other housing specifics will be addressed at the time of Detailed Development Plan.

The needed adjustments to density, lot size, and street cross section allow for the planned Park Place Crossing project to provide the mix of well-designed single-family housing and open spaces that produces a livable and stable neighborhood. Specific details will be included as part of future Detailed Development Plans. This application for a General Development Plan is consistent with these Comprehensive Plan policies.

Section 11 – Public Facilities

Goal 11.1: Provision of Public Facilities

Serve the health, safety, education, welfare, and recreational needs of all Oregon City residents through the planning and provision of adequate public facilities.

Policy 11.1.3 Confine urban public facilities and services to the city limits except where allowed for safety and health reasons in accordance with state land-use planning goals and regulations. Facilities that serve the public will be centrally located and accessible, preferably by multiple modes of transportation.

Policy 11.1.1 Support development on underdeveloped or vacant buildable land within the City where urban facilities and services are available or can be provided and where land use compatibility can be found relative to the environment, zoning, and comprehensive plan goals.

Policy 11.1.4 Support development on underdeveloped or vacant buildable land within the City where urban facilities and services are available or can be provided and where land use compatibility can be found relative to the environment, zoning, and comprehensive plan goals.

Policy 11.1.5 Design the extension or improvement of any major public facility and service to an area to complement other public facilities and services at uniform levels.

Policy 11.1.6 **Enhance efficient use of existing public facilities and services by encouraging development at maximum levels permitted in the Comprehensive Plan, implementing minimum residential densities, and adopting an Accessory Dwelling Unit Ordinance to infill vacant land.**

Response: This application for a General Development Plan, required by the City Commission as a condition of approval of the site's annexation, does not involve any physical site alterations. The Park Place Crossing Master Plan properties were brought into the City in 2017 through Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005). The properties are undeveloped and are part of the Park Place Concept Area. The annexation approval required that a General Development Plan/Master Plan be submitted for Park Place Crossing. The master plan will allow the efficient urban use of the area in accordance with City regulations and state land use planning goals. The area will be accessible through a variety of transportation modes, and the project will provide transportation infrastructure to serve the project and areas affected by the project. Public facilities and services, with extension by the project, are available for each phase of the project. Utility services are available within S Holcomb Boulevard for Phase 1, via a connection to existing sewer services at the corner of Journey Drive and Trail View Drive. Phases 2 through 6 will extend and expand public services as needed to support the project and future adjacent developments. Information provided as part of this application is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or improvements may occur. This application for a General Development Plan is consistent with the listed policy.

Goal 11.2: Wastewater

Seek the most efficient and economic means available for constructing, operating, and maintaining the City's wastewater collection system while protecting the environment and meeting state and federal standards for sanitary sewer systems.

Policy 11.2.2 **Plan, operate and maintain the wastewater collection system for all current and anticipated city residents within the existing urban growth boundary. Strategically plan for future expansion areas.**

Policy 11.2.5 **Implement the City's wastewater policies through the Wastewater Master Plan.**

Response: The Park Place Crossing Master Plan is located within the City limits and Urban Growth Boundary, and the project is consistent with the City's Sanitary Sewer Master Plan. Extension of sanitary sewer located adjacent to the site will be accomplished according to the phase of the project. Phase 1 will connect via an interim connection to the existing sewer at the corner of Journey Drive and Trail View Drive. Phase 1 will be rerouted to the interim connection within Phase 2 to the connection to an existing sewer system within Oak Valley Drive. Future projects south of Park Place Crossing will establish a permanent solution for wastewater that will convey sanitary sewer to Redland Road/Highway 213 per the Park Place Concept Plan. Specific details will be included as part of future Detailed Development Plans. This application for a General Development Plan is consistent with the listed policy.

Goal 11.3: Water Distribution

Seek the most efficient and economic means available for constructing, operating, and maintaining the City's water distribution system while protecting the environment and meeting state and federal standards for potable water systems.

Policy 11.3.1 **Plan, operate and maintain the water distribution system for all current and anticipated city residents within its existing urban growth boundary and strategically plan for future expansion areas.**

Response: The project site is located within the Urban Growth Boundary and is planned to be served by the extension and improvement of existing water distribution systems located within S Holcomb Boulevard. The project will contribute to the improvement and maintenance of the water system by contributing Systems Development Charges. Expansion of the water system will allow for future expansion throughout the Park Place Concept Area south of S Livesay Road. Specific details will be included as part of future Detailed Development Plans. This application for a General Development Plan is consistent with the listed policy.

Goal 11.4: Stormwater Management

Seek the most efficient and economical means available for constructing, operating, and maintaining the City's stormwater management system while protecting the environment and meeting regional, state, and federal standards for protection and restoration of water resources and fish and wildlife habitat.

Policy 11.4.1 **Plan, operate, and maintain the stormwater management system for all current and anticipated city residents within Oregon City's existing urban growth boundary and strategically plan for future expansion areas.**

Policy 11.4.2 **Adopt "green streets" standards to reduce the amount of impervious surface and increase the use of bioswales for stormwater retention where practicable.**

Policy 11.4.3 **Assure parking lot designs mitigate stormwater impacts. Take measures to reduce waterflow and increase water absorption through the use of bioswales, vegetated landscaped islands with curb cuts to allow water inflow, and tree planting.**

Policy 11.4.4 **Maintain existing drainageways in a natural state for maximum water quality, water resource preservation, and aesthetic benefits.**

Policy 11.4.5 **Design stormwater facilities to discharge surface water at pre-development rates and enhance stormwater quality in accordance with criteria found in the City's Stormwater and Grading Design Standards.**

Response: Park Place Crossing involves the eventual provision and operation of a stormwater management system with future Detailed Development Plan applications. The planned facilities are consistent with the City's Stormwater Master Plan and public works standards. The project will incorporate "green streets" standards to reduce impervious surfaces by incorporating stormwater swales and planters where required, logical, and feasible and a stormwater management facility to manage stormwater. From these management facilities (a temporary Phase 1 facility and permanent Phase 2 facility), stormwater is directed to an existing natural drainageway at the southeast corner of Park Place Crossing. The Preliminary Stormwater Report and the planned drainage systems are consistent with these goals. Specific details will be included as part of future Detailed

Development Plans. This application for a General Development Plan is consistent with the listed policy.

Goal 11.6: Transportation Infrastructure

Optimize the City's investment in transportation infrastructure.

Policy 11.6.1 **Investments will be made to accommodate multi-modal traffic as much as possible to include bike lanes, bus turnouts and shelters, sidewalks, etc., especially on major and minor arterial roads, and in regional and employment centers.**

Response: Park Place Crossing provides for needed transportation infrastructure as well as through the provision of payments for intersection improvements and payment of Systems Development Charges. These investments to the City's transportation infrastructure will allow for the provision of needed projects to multimodal systems, including bus turnouts and shelters, bike lanes, sidewalks, and other improvements. Specific details will be included as part of future Detailed Development Plans. This application for a General Development Plan is consistent with the listed policy.

Goal 11.7: Non-City Utility Operations

Coordinate with utilities that provide electric, gas, telephone and television cable systems, and high speed internet to Oregon City residents to ensure adequate service levels.

Policy 11.7.1 **Require local service lines in new subdivisions be placed underground.**

Policy 11.7.2 **Coordinate with private utility providers to install infrastructure during street construction and maintenance activities to reduce the need to repeatedly cut into newly paved streets.**

Policy 11.7.3 **Adopt lighting practices in street and other public facilities, and encourage it in private development to reduce glare, light pollution, light trespass, and energy use, while maintaining even lighting ensuring good visibility and safety for the public.**

Policy 11.7.4 **Encourage development of broadband networks in street rights-of-way in a coordinated way to provide state of the art technology to its residents.**

Policy 11.7.5 **Maintain and enforce the cell tower ordinance. Innovations in reducing, camouflaging or screening cell towers will be adopted, supported and encouraged.**

Response: The Park Place Crossing Master Plan anticipates the future provision of underground local service lines and provide appropriate lighting for the neighborhood. The specifics of these utility provisions will be included as part of future land use applications but are anticipated to be consistent with City and utility provider standards. Specific details will be included as part of future Detailed Development Plans. The application is consistent with this policy.

Goal 11.9: Fire Protection

Maintain a high level of fire suppression and emergency medical services capacity.

Policy 11.9.1 **Ensure that all areas, including newly annexed areas, receive fire protection and emergency medical services.**

Response: Water and transportation systems are planned to be sufficient to provide appropriate fire protection for Park Place Crossing. Specific details will be included as part of future Detailed Development Plans. The application is consistent with this policy.

Section 12 – Transportation

Goal 12.1: Land Use-Transportation Connection

Ensure that the mutually supportive nature of land use and transportation is recognized in planning for the future of Oregon City.

Policy 12.1.1 **Maintain and enhance citywide transportation functionality by emphasizing multi-modal travel options for all types of land uses.**

Policy 12.1.3 **Support mixed uses with higher residential densities in transportation corridors and include a consideration of financial and regulatory incentives to upgrade existing buildings and transportation systems.**

Policy 12.1.4 **Provide walkable neighborhoods. They are desirable places to live, work, learn and play, and therefore a key component of smart growth.**

Response: Park Place Crossing provides for a network of public streets to serve the master plan area. The planned street network includes multimodal travel options such as bicycle and pedestrian improvements consistent with City code and the City's Transportation System Plan. Necessary right-of-way and easements for transportation improvements will be dedicated with future land use applications. Residential homes of varying types are planned in close proximity to parks, open spaces, civic areas, and mixed-use/neighborhood commercial areas in order to provide close-by destinations. The result of the master plan is a walkable neighborhood that is a desirable place to live, work, learn, and play. Specific details will be included as part of future Detailed Development Plans. This application for a General Development Plan is consistent with these Comprehensive Plan policies.

Goal 12.3: Multi-Modal Travel Options

Develop and maintain a transportation system that provides and encourages a variety of multi-modal travel options to meet the mobility needs of all Oregon City residents.

Policy 12.3.1 **Provide an interconnected and accessible street system that minimizes vehicle miles-traveled and inappropriate neighborhood cut-through traffic.**

Policy 12.3.2 **Provide an interconnected and accessible pedestrian system that links residential areas with major pedestrian generators such as employment centers, public facilities, and recreational areas.**

Policy 12.3.3 **Provide a well-defined and accessible bicycle network that links residential areas, major bicycle generators, employment centers, recreational areas, and the arterial and collector roadway network.**

Policy 12.3.4 **Ensure the adequacy of pedestrian and bicycle connections to local, county, and regional trails.**

Response: The Park Place Crossing GDP provides several projects identified within the TSP and Trails Master Plan that will improve multimodal travel options within the City. The Tour Creek bridge crossing will allow greater pedestrian and bicycle connectivity and reduce out-of-direction travel. The planned connections are in compliance with the applicable codes,

standards, and master plans. Specific details will be included as part of future Detailed Development Plans. This application for a General Development Plan is consistent with these Comprehensive Plan policies.

Goal 12.8: Implementation/Funding

Identify and implement needed transportation system improvements using available funding.

Policy 12.8.3 **Provide incentives for private sector contributions to multi-modal transportation links and facilities, for example, establishing new standards in the zoning code.**

Response: Park Place Crossing provides for necessary future transportation infrastructure as well as through the provision of payments for intersection improvements and payment of Systems Development Charges. These investments to the City's transportation infrastructure will allow for the provision of needed projects to multimodal systems, including bus turnouts and shelters, bike lanes, sidewalks, and other improvements. Specific details will be included as part of future Detailed Development Plans. The application is consistent with this policy.

Section 13 – Energy Conservation

Goal 13.2: Energy Conservation

Plan public and private development to conserve energy.

Policy 13.2.1 **Promote mixed-use development, increased densities near activity centers, and home-based occupations (where appropriate).**

Policy 13.2.5 **Construct bikeways and sidewalks, and require connectivity of these facilities to reduce the use of petroleum-fueled transportation.**

Response: Park Place Crossing has been planned to encourage bicycle and pedestrian connectivity and other facilities to reduce the use of petroleum-fueled transportation. The Park Place Concept Plan envisions mixed-use/neighborhood commercial sales and service to provide opportunities for walkable neighborhoods and reduce the number of vehicle trips necessary for residents to reach services. Specific details will be included as part of future Detailed Development Plans. This application for a General Development Plan is consistent with these Comprehensive Plan policies.

Ordinance No. 18-1007 - AN-17-0004 / ZC-17-0005 Park Place Annexation and Zone Change

Appendix A: Conditions of Approval

1. **Highway 213 at Beavercreek Road intersection (an Oregon Highway intersection) is forecasted to fall below adopted mobility standards prior to year 2035. As a result, the City has adopted a new Refinement Plan and amendments to OCMC Chapter 12.04 implementing the new Refinement Plan, that is not yet acknowledged. This re-zoning shall not be effective until the new Refinement Plan including alternative mobility measures is adopted and acknowledged.**

Response: A final "Highway 213 Corridor Alternative Mobility Targets" report and associated code amendments (City project L 17-03) for the Highway 213/Beavercreek Road intersection were adopted by the City Commission in March 2018. The attached Transportation Impact Study (Exhibit E) reviews the effects of the project in relation to the standards set by the adopted report. This Condition of Approval has been completed.

2. **Prior to the effective date of this zone change, the property will remain zoned FU-10. No new structures or additions to existing structures or site grading that triggers erosion control permits or overlay district review, other than what otherwise would be allowed under the County's applicable FU-10 zoning, will be allowed. In addition the property shall be subject to the City's overlay districts, fence regulations in OCMC 17.54.100 as well as the City's nuisance, business licensing and animal regulations.**

Response: The properties were zoned FU-10 prior to the effective date of the zone change and were changed to City zoning following the completion and adoption of the "Highway 213 Corridor Alternative Mobility Targets" report. The project site is now zoned R-10, R-5, and Neighborhood Commercial. This Condition of Approval has been completed.

3. **A trip cap for the approximate 92-acre annexation shall be imposed on all development as follows: 538 AM peak hour trips; 679 PM peak hour trips; and 7406 total weekday trips. Any proposal involving development exceeding this trip cap will require additional analysis showing compliance with the Transportation Planning Rule, OAR 660-12-0060 subject to review by the Planning Commission and City Commission as a modification.**

Response: The planned residential component of the Park Place Crossing General Development Plan is anticipated to generate 290 morning peak hour trips, 390 evening peak hour trips, and 4,064 average weekday trips, representing only ±54 percent of the trip cap established by Condition of Approval #3 of Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005). A Transportation Impact Study reviewing these requirements and detailing the trip generation for the project is attached as part of Exhibit E. This Condition of Approval has been completed.

4. **Prior to issuing any development approval authorized by this annexation and zone change, the applicant shall obtain General and Detailed Development Plan approval, that includes the approximate 92-acre property, pursuant to OCMC 17.65. Until such time, all development shall be conform to requirements of the County's FU-10 zoning. The General Development Plan and all phases of development authorized by it, must implement the Park Place Concept Plan and Oregon City's adopted Public Facilities Plans with regard to the provision of open space, park and trails, sewer, water, stormwater and transportation improvements. These include, but are not limited to, addressing the timing of parkland acquisitions and development, proposed phasing of major roads to ensure a timely connection to Holly Lane and an analysis of utility phasing that can foster redevelopment of the entire concept plan area. All land division and site plan and design review applications shall be in conformance with the approved Master Plan, although the normal provisions for Amendments to Master Plans apply.**

Response: Development of the site has not occurred since annexation of the property and approval of Ordinance No. 18-1007 and is anticipated once the Park Place Crossing General Development Plan for the overall project and Detailed Development Plans for each phase are completed. A Detailed Development Plan application for Phase 1 will include some additional details regarding the remainder of the Master Plan area with the understanding that each phase will have a further Detailed Development Plan submitted to further refine the design of the Park Place Crossing Master Plan.

The required General Development Plan implements the Park Place Concept Plan and City's Public Facilities Plans through the provision of public improvements, parks, trails, and open spaces. Phasing of parkland acquisitions, road connections and phasing, and

utility phasing are addressed within this narrative and the Preliminary Plans. Future land division, site plan, and design review are planned to be in conformance with this General Development Plan or any future amendments. This Condition of Approval is completed.

5. As a result of future transportation analyses associated with specific development plans for any of the properties subject to this annexation, the applicant may be obligated in subsequent conditions of approval to mitigate for development impacts by participating in funding of both TSP and non-TSP projects regardless of whether those project are listed in the conditions of approval for this annexation and zone change pursuant to the applicable approval criteria for a Master Plan.

Response: This requirement is understood. A Transportation Impact Study (TIS) is included as part of this application as Exhibit E. The applicable transportation projects listed within the conditions for this annexation and zone change and any additional appropriate projects are reviewed as part of the TIS. This Condition of Approval is completed.

6. At such time as a Master Plan is reviewed, the applicant shall submit additional materials to address specific requirements outlined in the city's Guidelines for Transportation Impact Analyses and calculate the proportionate share of transportation impacts of the proposed development including proportional mitigation of the application's impacts on that intersection, or such other mitigation measure(s) as may be approved which assure(s) that the intersection will either meet, or perform no worse than, the then-applicable performance standards. More intense development than identified in this report is likely to increase the applicant's share of project differently than calculated below. The applicant's final share may be modified as necessary when a Master Plan is approved to reflect any a modification of the development's trip generation or a change in project costs resulting from revisions to project costs associated with updates to the City's Transportation System Plan or Capital Improvement program that will be paid on a schedule determined as part of the Master Plan.

Response: The project Transportation Impact Study (Exhibit E) addresses the City's Guidelines for Transportation Impact Analyses (July 2021) and reviews the proportional mitigation of the project's impacts on the studied intersections. The Park Place Crossing Master Plan anticipate significantly fewer vehicle trips, approximately 54 percent of those projected as part of the annexation TIS; therefore, the final share of proportional mitigation will be modified. Transportation Impact Study updates will be submitted with each Detailed Development Plan, as necessary. This Condition of Approval has been completed.

a. Redland Road at Holcomb Boulevard/Abernethy Road (a non-Oregon Highway intersection) is forecasted to fall below adopted performance standards prior to year 2035. The applicant shall demonstrate either of the following:

1. That the City has adopted amendments to the City's Transportation System Plan to include projects that satisfy the applicable mobility standards as specified in OCMC 12.04.205 at this location; or

Response: The City has adopted amendments to the Transportation System Plan as part of the "Highway 213 Corridor Alternative Mobility Targets" report and associated code amendments. The Transportation Impact Study (Exhibit E) addresses these TSP amendments. This Condition of Approval has been completed.

2. Accept a condition of approval for a development application that obligates the applicant to implement a project that satisfies applicable mobility standards at that intersection.

Response: The Applicant has also provided information regarding the proportional mitigation of the Abernethy Road/Holcomb Boulevard/Redland Road intersection. This Condition of Approval has been completed.

b. The developer shall participate in the funding of improvements for the I-205/OR99E ramp terminal projects (TSP Projects D75 and D76) in proportion to the development's traffic volumes as a percentage of total year 2035 intersection volumes from the TSP. The project cost for D75 is $2,990,000. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 0.96 percent of the 2035 volume and the development's share of the project is $28,700. The project cost of D76 is $1,990,000. The development accounts for 0.87 percent of the 2035 volume and the development's share is $17,300.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

c. The developer shall participate in the funding of improvements for the Main Street/14th Street improvements (TSP Projects D7 and D8) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume at the intersection calculated in the TSP. The cost of these projects as listed in the 2017 TSDC Project List is $845,000 and $960,000, respectively. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 3.63 percent of the 2035 volume and the development's share of the project is $65,500.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

d. The developer shall participate in the funding of improvements for the Abernethy/Holcomb/Redland intersection in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. No project is currently identified in the TSP. The project concept is to provide an additional lane on the eastbound approach; it may involve restriping or widening and signal modifications. No project cost is available at this time. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 19.7 percent of the 2035 volume.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

e. The developer shall participate in the funding of improvements for the intersection of OR213/Redland Road (TSP Project D79) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume at the intersection calculated in the TSP. The 2017 TSDC project list shows a project cost of $10,105,000. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 4.77 percent of the 2035 volume and the development's share of the project is $482,000.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

f. The developer shall participate in the funding of improvements for the Holly Lane/Holcomb Boulevard intersection (TSP Project D43) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. Project D43 is a roundabout with an estimated project cost in the TSP of $1,040,000 according to the 2017 TSDC Project List. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 38.1 percent of the 2035 volume and the development's share of the project is $396,000.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

g. The developer shall participate in the funding of improvements for the Holly Lane/Redland Road intersection (TSP Project D36) in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. Project D36 is a roundabout with an estimated project cost $1,040,000 according to the 2017 TSDC Project List. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 28.3 percent of the 2035 volume and the development's share of the project is $294,000.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

h. The developer shall participate in the funding of improvements for the Highway 213/Beavercreek Road intersection in proportion to the development's traffic volume as a percentage of the predicted 2035 traffic volume. A project to add a right-turn lane on westbound Beavercreek Road and a merge lane on northbound Highway 213 was identified in the July 2017 Highway 213 Corridor Alternative Mobility Study and was adopted as Project D95 as an amendment to the TSP. The project's cost listed in the TSP amendment is $2.7 million. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 0.35 percent of the 2035 volume and the development's share of the project is $9,400.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

i. The developer shall participate in the funding of improvements for pedestrian and bicycle projects on Holcomb Boulevard that implement the Holcomb Boulevard Pedestrian Enhancement Concept Plan (HBPECP, adopted by Ord. 05-1003) in accordance with the Transportation System Plan sidewalk Infill projects W11, W12, W13, bike lane project B12, and crossing projects C3, C4, C5 and C6 in proportion to the development's motor vehicle traffic volume using Holcomb Boulevard as a percentage of the total motor vehicle traffic volume on Holcomb Boulevard. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 11.5 percent of the 2035 volume. The combined cost of these seven projects is $3,735,000. The development's share of the projects' cost is calculated to be $429,500. The developer is entitled to System Development Charge credits pursuant to OCMC 13.12.040 for qualified public improvement as part of development.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

j. The developer shall participate in the funding of improvements for the Redland Road/Anchor Way intersection in proportion of the development's traffic as a development's traffic volume as a percentage of the predicted 2035 traffic volume. Project D35 specifies operational improvements at the intersection with an estimated project cost of $425,000 according to the 2017 TSDC Project List. Based on this methodology and the preliminary PM peak hour trip generation from the proposed development, the development accounts for 25.0 percent of the 2035 volume and the development's share of the project is $106,000.

Response: This requirement is understood and will be modified with future Detailed Development Plan applications as noted above.

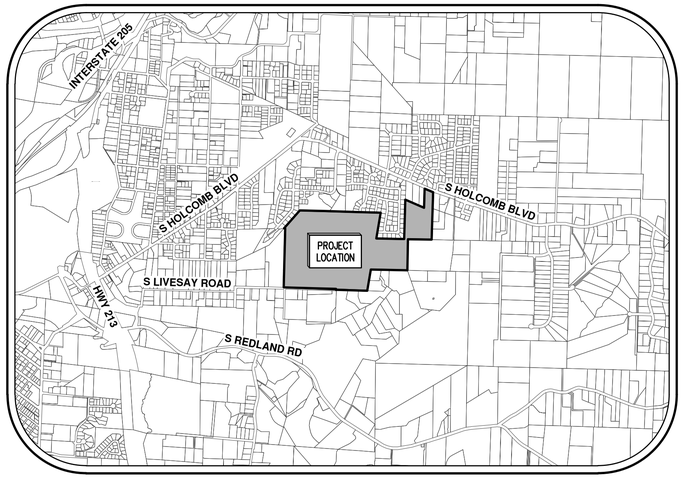
k. The applicant's preliminary proportionate share for project listed above as conditions of approval are based on the total trip generation for the annexation property using the proposed trip cap of 538 AM peak hour trips; 679 PM peak hour trips; and 7,406 total weekday trips. A less intense development is likely to decrease the applicant's share of projects as calculated above. A more intense development, in addition to requiring analysis showing compliance with the Transportation Planning Rule, is likely to increase the applicant's share of projects as calculated above.

Response: These requirements are understood. The Park Place Crossing Master Plan Transportation Impact Study (Exhibit E) anticipates a net additional 290 AM peak hour trips, 390 PM peak hour trips, and 4,064 total weekday trips. These expected trips are equal to ±54.6 percent of the trip cap established by Ordinance No. 18-1007 (AN-17-0004/ZC-17-0005). Because the full build-out planned for Park Place Crossing is significantly less than the trip caps listed above, the result is a decrease in the Applicant's share of the listed projects. A more intense development is not planned; therefore, additional analyses showing compliance with the Transportation Planning Rule is not required. The total of AM peak hour, PM peak hour, and total weekday trips will be determined and updated at each phase of Detailed Development Plan.

IV. Conclusion

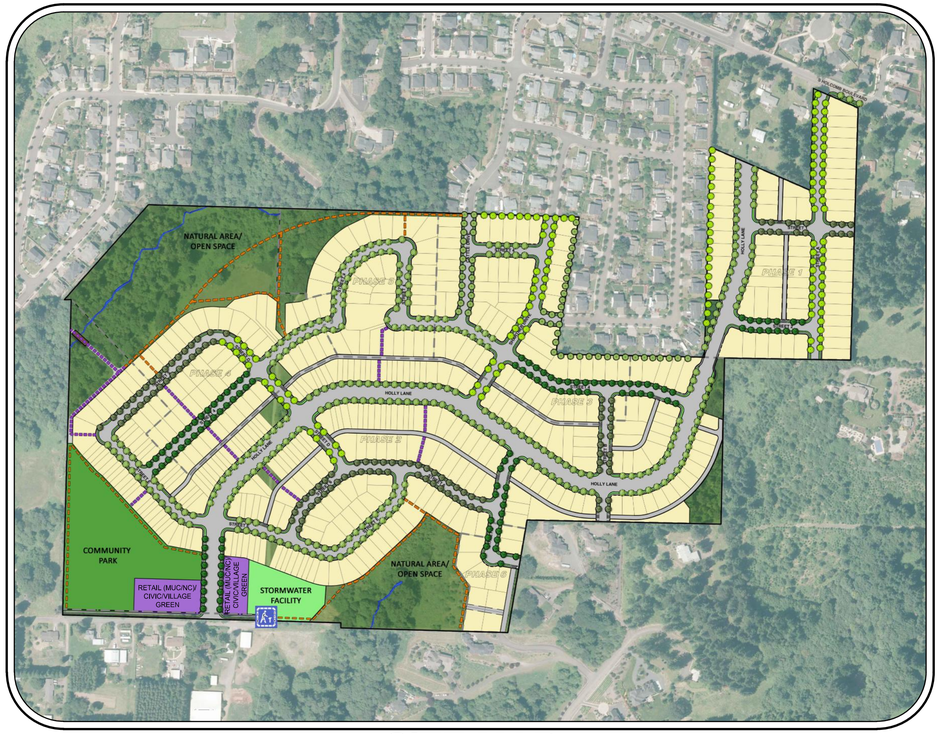
The required findings have been made, and this written narrative and accompanying documentation demonstrate that the application is consistent with the applicable provisions of the Oregon City Municipal Code, Oregon City Comprehensive Plan, Park Place Concept Plan, and the conditions of approval of Ordinance No. 18-1007 (AN-17-0004 / ZC-17-0005). The evidence in the record is substantial and supports approval of the application.

PARK PLACE CROSSING MASTER PLAN



VICINITY MAP

NOT TO SCALE



SITE MAP

SCALE: 1"=300'

LEGEND

	EXISTING	PROPOSED		EXISTING	PROPOSED
DECIDUOUS TREE			STORM DRAIN CLEAN OUT		
CONIFEROUS TREE			STORM DRAIN CATCH BASIN		
FIRE HYDRANT			STORM DRAIN AREA DRAIN		
WATER BLOWOFF			STORM DRAIN MANHOLE		
WATER METER			GAS METER		
WATER VALVE			GAS VALVE		
DOUBLE CHECK VALVE			GUY WIRE ANCHOR		
AIR RELEASE VALVE			UTILITY POLE		
SANITARY SEWER CLEAN OUT			POWER VAULT		
SANITARY SEWER MANHOLE			POWER JUNCTION BOX		
SIGN			POWER PEDESTAL		
STREET LIGHT			COMMUNICATIONS VAULT		
MAILBOX			COMMUNICATIONS JUNCTION BOX		
			COMMUNICATIONS RISER		

	EXISTING	PROPOSED
RIGHT-OF-WAY LINE		
BOUNDARY LINE		
PROPERTY LINE		
CENTERLINE		
DITCH		
CURB		
EDGE OF PAVEMENT		
EASEMENT		
FENCE LINE		
GRAVEL EDGE		
POWER LINE	PWR	PWR
OVERHEAD WIRE	OHW	OHW
COMMUNICATIONS LINE	COM	COM
FIBER OPTIC LINE	CFO	CFO
GAS LINE	GAS	GAS
STORM DRAIN LINE	STM	STM
SANITARY SEWER LINE	SAN	SAN
WATER LINE	WAT	WAT

PARK PLACE CROSSING MASTER PLAN

P-01 COVER SHEET WITH VICINITY & SITE MAPS
P-02 VICINITY MAP
P-03 PRELIMINARY CONCEPT AND OPEN SPACE PLAN
P-04 PRELIMINARY EXISTING CONDITIONS PLAN WITH AERIAL PHOTO
P-05 PRELIMINARY EXISTING CONDITIONS PLAN WITH TREES
P-06 PRELIMINARY GRADING PLAN
P-07 PRELIMINARY STREET CROSS-SECTIONS
P-08 PRELIMINARY SITE AND PHASING PLAN
P-09 PRELIMINARY COMPOSITE UTILITY PLAN – OVERALL
P-10 PRELIMINARY COMPOSITE UTILITY PLAN
P-11 PRELIMINARY COMPOSITE UTILITY PLAN
P-12 PRELIMINARY COMPOSITE UTILITY PLAN
P-13 PRELIMINARY COMPOSITE UTILITY PLAN
P-14 PRELIMINARY COMPOSITE UTILITY PLAN
P-15 PRELIMINARY COMPOSITE UTILITY PLAN
P-16 PRELIMINARY NEIGHBORHOOD CIRCULATION PLAN
P-17 CITY OF OREGON CITY PARK PLACE CONCEPT PLAN OVERLAY MAP
P-18 CITY OF OREGON CITY ZONING OVERLAY MAP AND DENSITY ANALYSIS
P-19 CITY OF OREGON CITY NATURAL RESOURCE OVERLAY DISTRICT MAP
P-20 PRELIMINARY GEOLOGIC HAZARD SLOPE ANALYSIS

APPLICANT:

ICON CONSTRUCTION & DEVELOPMENT, LLC
1969 WILLAMETTE FALLS DRIVE
SUITE 260
WEST LINN, OREGON 97068

PLANNING/ENGINEERING/ SURVEYING FIRM:

AKS ENGINEERING & FORESTRY, LLC.
CONTACTS: MONTY HURLEY/ CHRIS GOODELL
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OREGON 97062
PH: 503-563-6151
FAX: 503-563-6152

PROJECT LOCATION:

SOUTH OF S HOLCOMB BOULEVARD, NORTH AND EAST OF S LIVESAY ROAD OREGON CITY, OREGON

EXISTING LAND USE:

EXISTING HOMES AND OUTBUILDINGS WITH GRASS FIELDS AND TREES

PROJECT PURPOSE:

MASTER PLAN
(GENERAL DEVELOPMENT PLAN)

VERTICAL DATUM:

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION V 723 (PID RD1497) LOCATED AT THE SE CORNER OF HWY 99E AND HWY I-205. ELEVATION = 62.48 FEET (NAVD 88).

PROPERTIES:

TAX LOT	MAP
100	2-2E-28D
190	2-2E-28D
200	2-2E-28D
300	2-2E-28D
301	2-2E-28D
302	2-2E-28D
303	2-2E-28D
400	2-2E-28D
500	2-2E-28D
502	2-2E-28D
1000	2-2E-27BC
2000	2-2E-27BC
3700	2-2E-28D
3701	2-2E-28D

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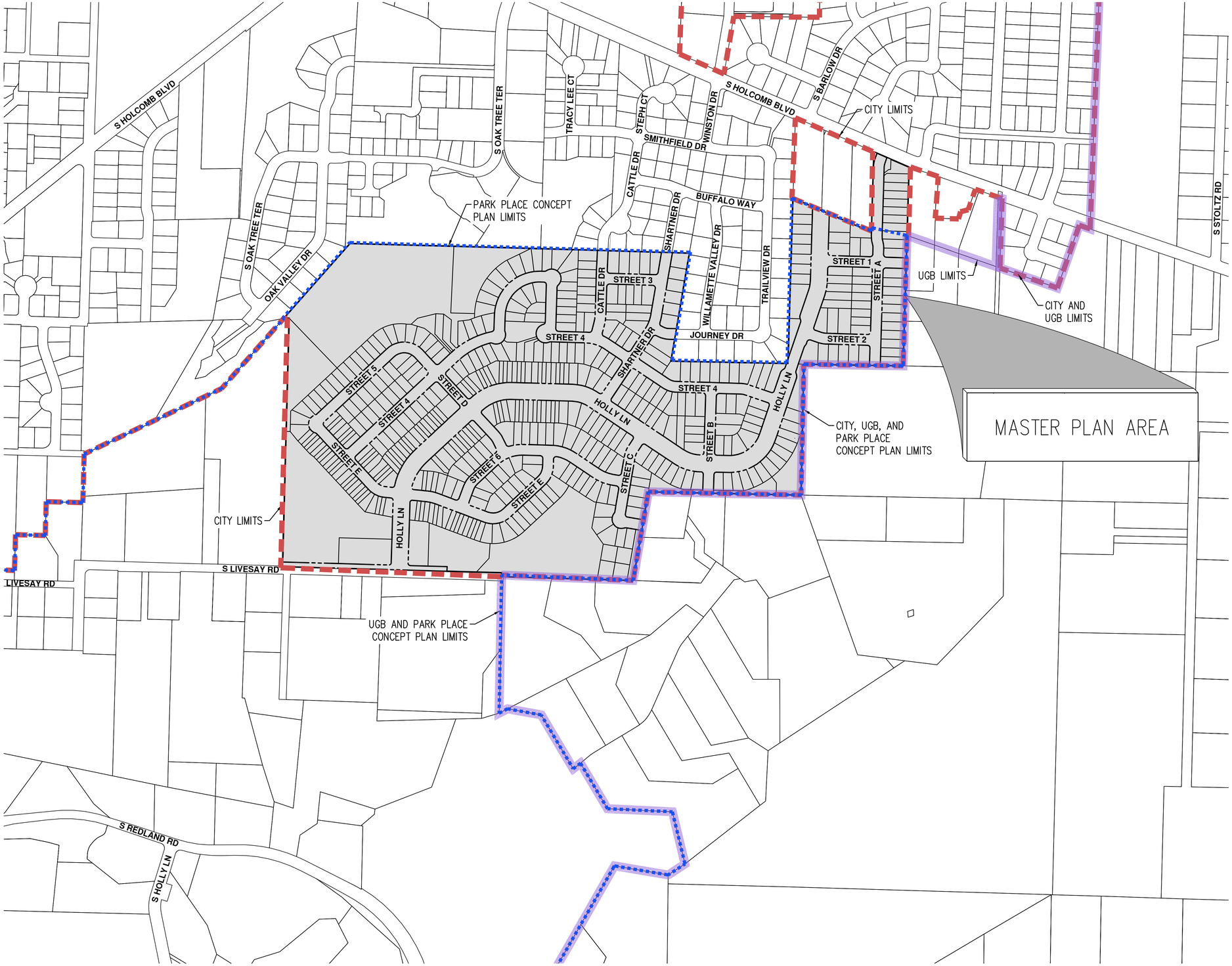
COVER SHEET WITH VICINITY & SITE MAPS
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON JULY 22, 2005 MONTY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-01

AKS DRAWING FILE: 7404 COVERLDWG | LAYOUT: P-01



LEGEND:

- CITY LIMITS
- UGB LIMITS
- PARK PLACE CONCEPT PLAN LIMITS
- AREA SUBJECT TO MASTER PLAN

N

SCALE: 1"= 250 FEET

250 0 50 125 250

ORIGINAL PAGE SIZE: 22" x 34"

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Item #1.

VICINITY MAP
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY

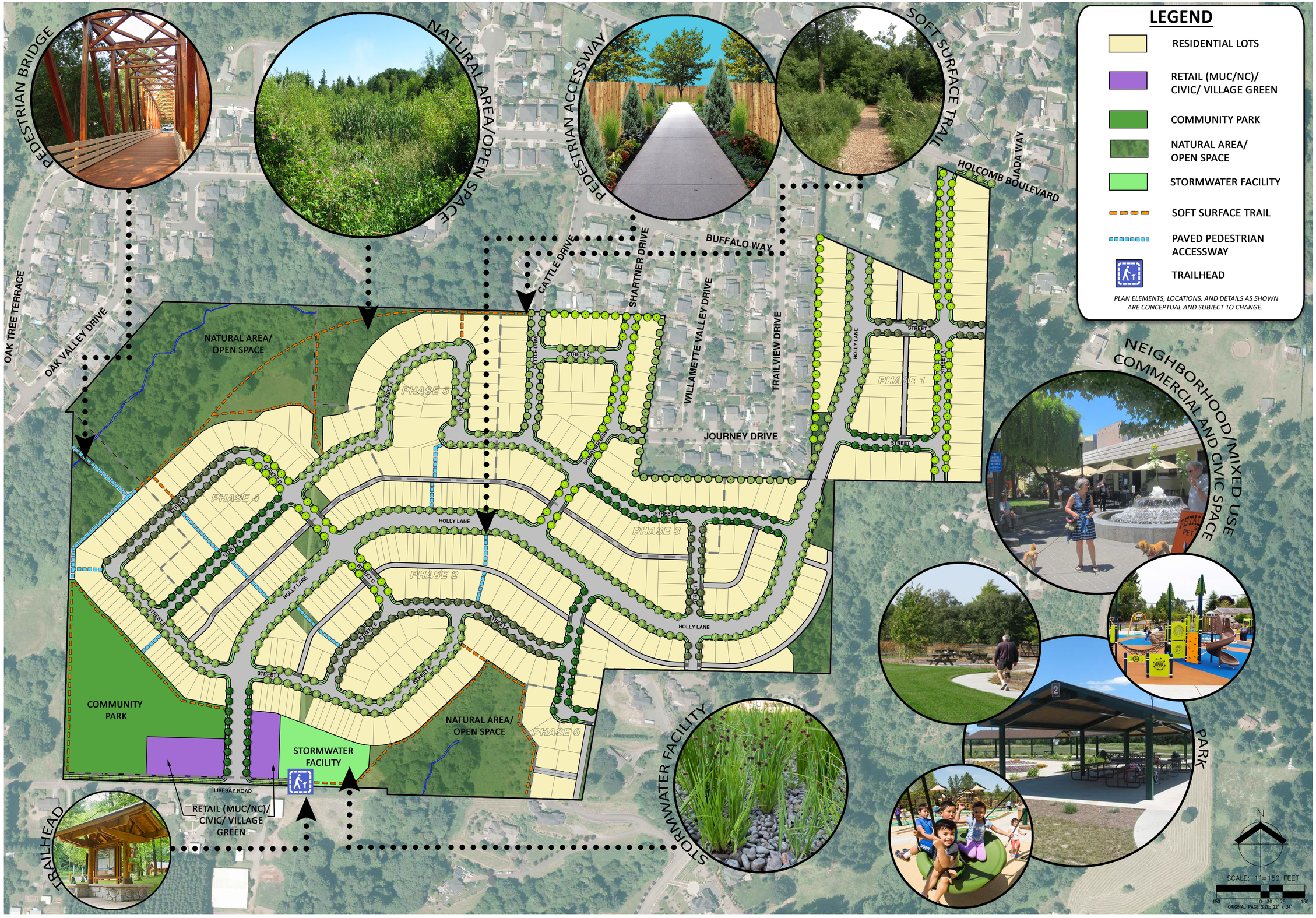
PRELIMINARY NOT FOR CONSTRUCTION

RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-02

AKS DRAWING FILE: 7404 VICINITY.DWG | LAYOUT: P-02



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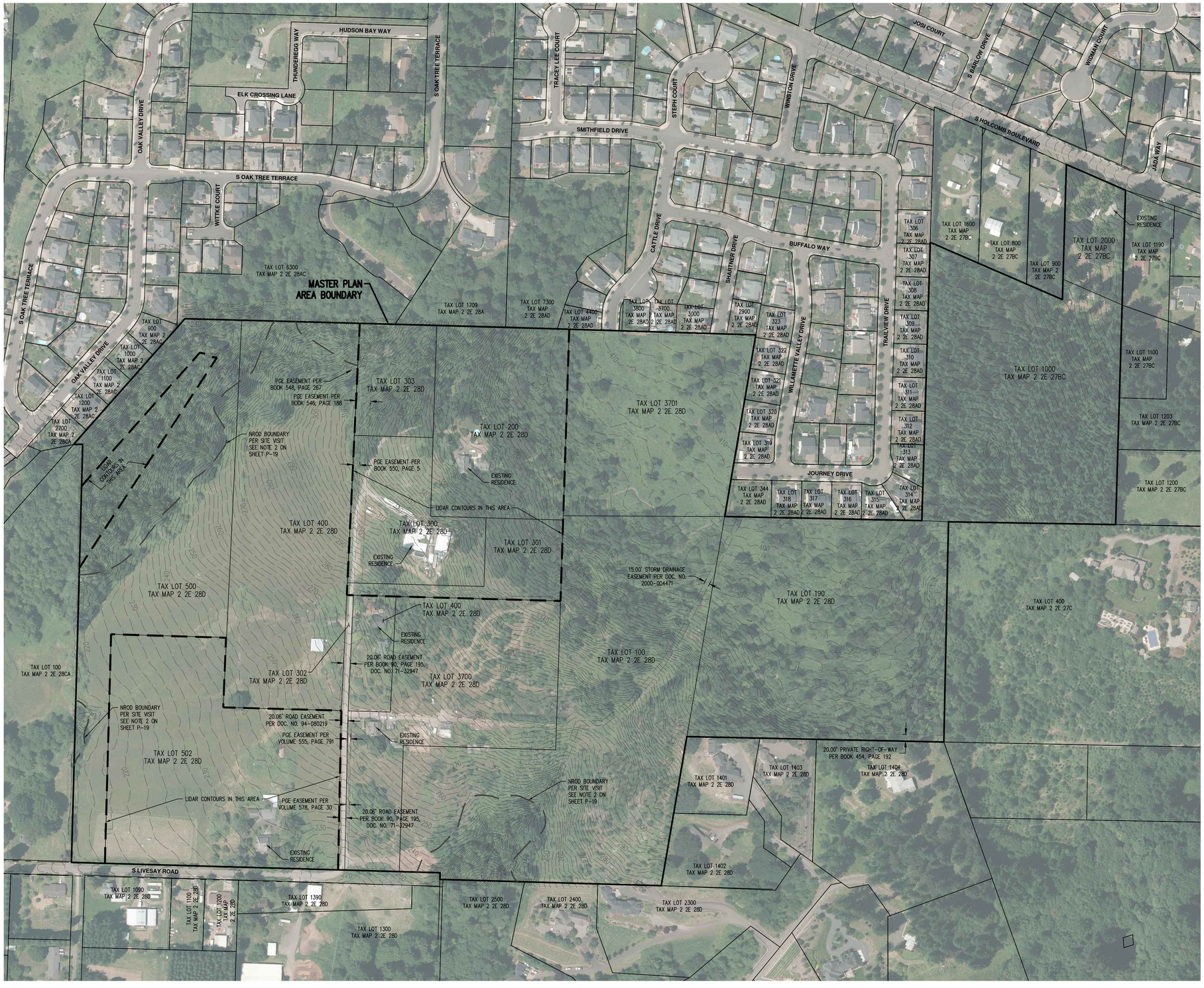
PRELIMINARY CONCEPT AND OPEN SPACE PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED LANDSCAPE ARCHITECT
Jason A. Rodswall
OREGON
05/06/15
PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/18/2022
DESIGNED BY:	ZTN
DRAWN BY:	ZTN
CHECKED BY:	ZTN

P-03

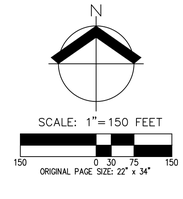


NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 2 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
3. TAXLOTS 200, 300, 301, 303, AND 502 HAVE NOT BEEN SURVEYED, NOR HAVE THEY BEEN EVALUATED FOR NROD AREAS.
4. FOR SLOPE ANALYSIS AND NATURAL RESOURCE OVERLAY INFORMATION PLEASE REFER TO SHEETS P-19 AND P-20.
5. VERTICAL DATUM: ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION V 723 (PID RD1497) LOCATED AT THE SE CORNER OF HWY 99E AND HWY I-205. ELEVATION = 62.48 FEET (NAVD 88).
6. HORIZONTAL DATUM: A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000 BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0001150551 AT A CALCULATED CENTRAL PROJECT POINT WITH GRID VALUES OF (NORTH 628648.798, EAST 7672411.244). THE MERIDIAN CONVERGENCE ANGLE AT THE CALCULATED CENTRAL POINT IS -1°27'43". THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
7. THIS IS NOT A PROPERTY BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY SURVEYOR. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.

EXISTING TAX LOT SUMMARY:

TAX LOT	# OF RESIDENCES	AREA (ACRE)
100:	NONE	14.3±
190:	NONE	10.8±
200:	1 RESIDENCE	5.2±
300:	1 RESIDENCE	3.1±
301:	NONE	1.4±
302:	NONE	0.4±
303:	NONE	1.8±
400:	1 RESIDENCE	10.4±
500:	NONE	10.3±
502:	1 RESIDENCE	9.4±
1000:	NONE	9.7±
2000:	1 RESIDENCE	1.5±
3700:	1 RESIDENCE	6.8±
3701:	NONE	6.6±
TOTAL:	6 RESIDENCES	91.7±



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PRELIMINARY EXISTING CONDITIONS PLAN WITH AERIAL PHOTO
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON JULY 12, 2005 CHRISTOPHER M. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-04

AKS DRAWING FILE: 7404 EXISTING-PHOTO.DWG | LAYOUT: P-04



NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 2 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
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7. THIS IS NOT A PROPERTY BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY SURVEYOR. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.
8. TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY EXISTING CONDITIONS PLAN WITH TREES
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 13, 2005
GREGORY B. HURLEY
RENEWAL DATE: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-05

AKS DRAWING FILE: 7404 EXISTING-TREE.DWG | LAYOUT: P-05

NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 5 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
3. TAXLOTS 200, 300, 301, 303, AND 502 HAVE NOT BEEN SURVEYED, NOR HAVE THEY BEEN EVALUATED FOR NROD AREAS.
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LEGEND

- EXISTING GROUND CONTOUR (5 FT)
- EXISTING GROUND CONTOUR (25 FT) — 350 —
- FINISHED GRADE CONTOUR (5 FT)
- FINISHED GRADE CONTOUR (25 FT) — 325 —

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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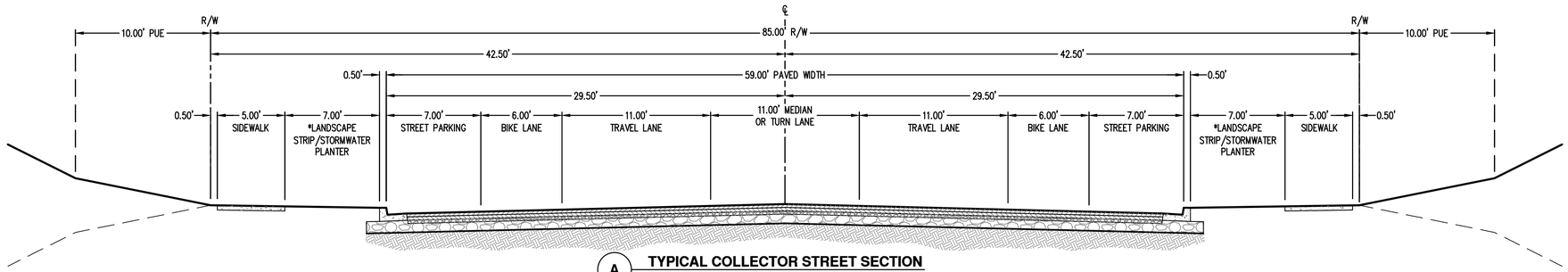
PRELIMINARY GRADING PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER — OREGON — JANUARY 22, 2008 — MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

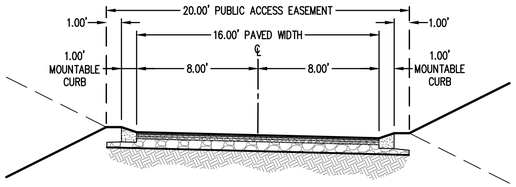
JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-06

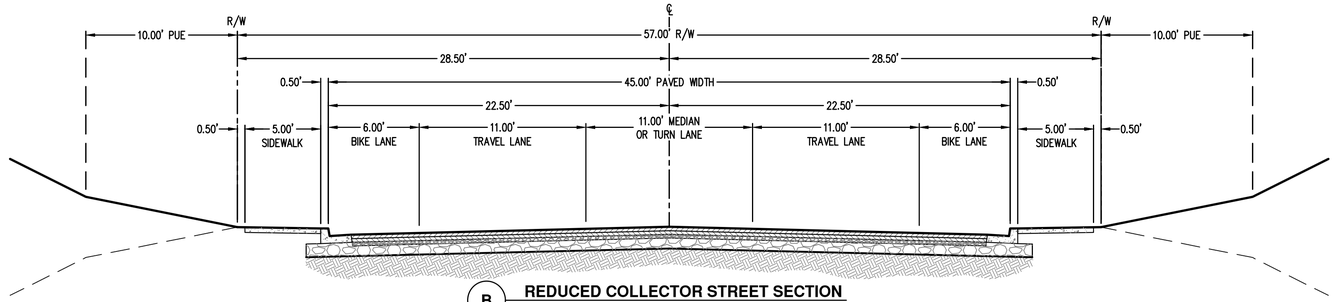
AKS DRAWING FILE: 7404 GRADING.DWG | LAYOUT: P-06



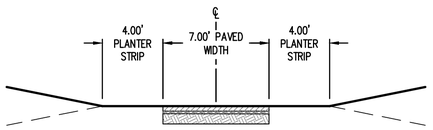
A TYPICAL COLLECTOR STREET SECTION
NOT TO SCALE
HOLLY LANE
*SEE NOTE



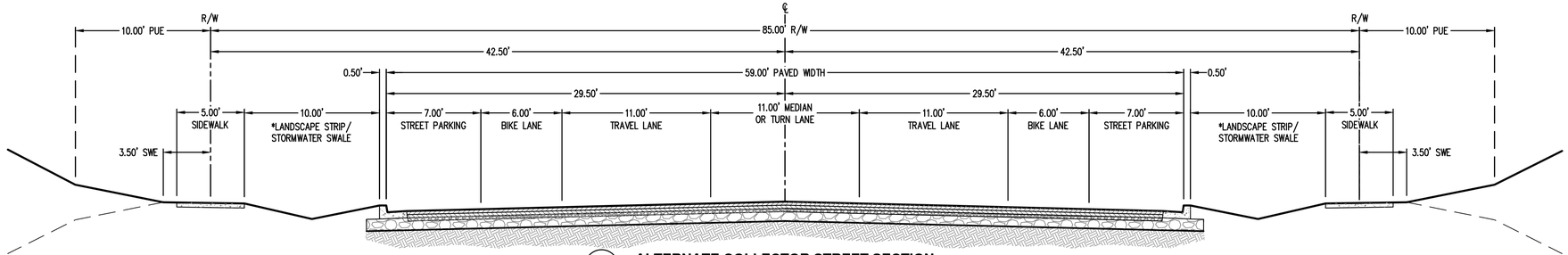
G ALLEY SECTION
NOT TO SCALE



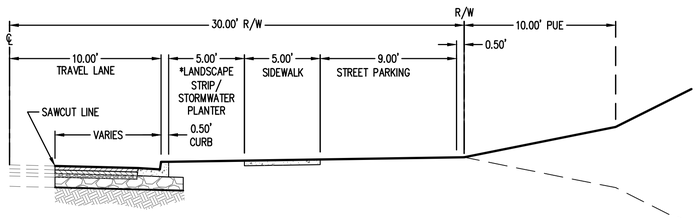
B REDUCED COLLECTOR STREET SECTION
NOT TO SCALE
REDUCED HOLLY LANE (BETWEEN TAX LOT 314 TAX MAP 2 2E 28AD AND TAX LOT 400 TAX MAP 2 2E 27C.)



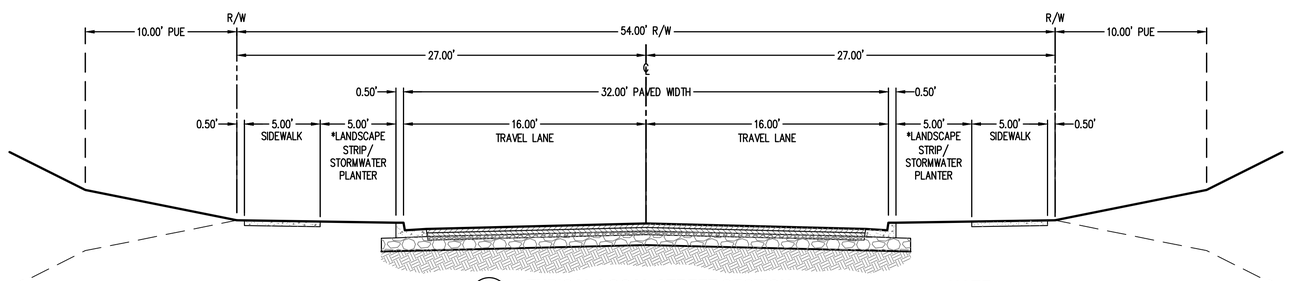
F PEDESTRIAN ACCESSWAY SECTION
NOT TO SCALE



C ALTERNATE COLLECTOR STREET SECTION
NOT TO SCALE
HOLLY LANE
*SEE NOTE



E S HOLCOMB BOULEVARD HALF STREET SECTION
NOT TO SCALE



D TYPICAL LOCAL STREET SECTION
NOT TO SCALE
STREET 1, STREET 2, STREET 3, STREET 4, STREET 5, STREET 6, STREET A, STREET B, STREET C, STREET D, STREET E, CATTLE DRIVE, SHARTNER DRIVE
*SEE NOTE

NOTE:
*STORMWATER PLANTERS/SWALES ARE SHOWN FOR ILLUSTRATIVE PURPOSES. PLANTERS/SWALES WILL BE IMPLEMENTED IN THE LANDSCAPE STRIPS AS DEEMED NECESSARY, REQUIRED, AND PRACTICAL. DETAILED PLANTER/SWALE INFO WILL BE INCLUDED ON FUTURE DETAILED DEVELOPMENT PLANS.

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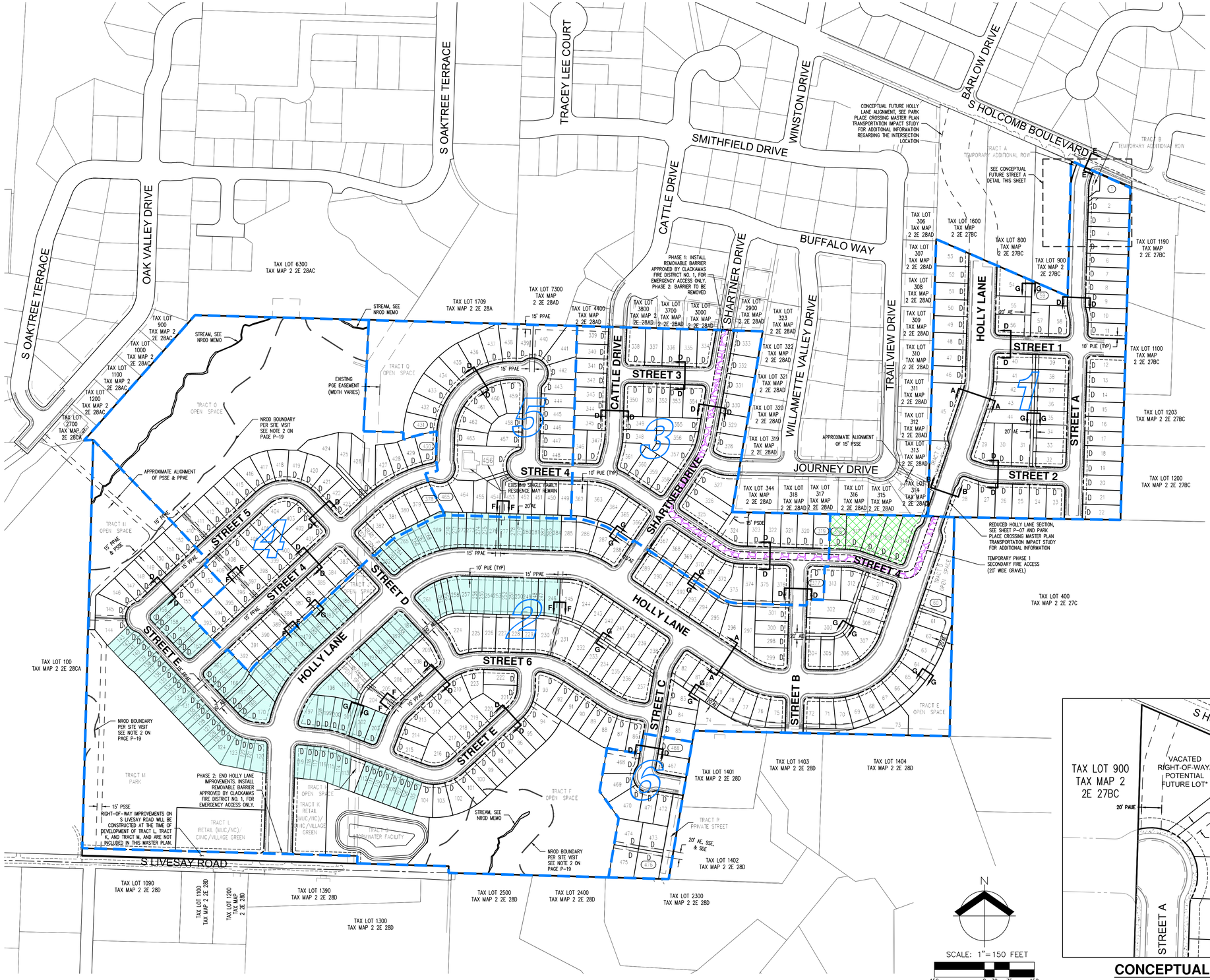
PRELIMINARY STREET CROSS-SECTIONS
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-07

AKS DRAWING FILE: 7404 STREET SECTIONS.DWG | LAYOUT: P-07



EASEMENT LEGEND:

AE	PRIVATE ACCESS EASEMENT (ALLEY)
PAUE	PUBLIC ACCESS AND UTILITY EASEMENT
PSDE	PUBLIC STORM DRAINAGE EASEMENT
PSSE	PUBLIC SANITARY SEWER EASEMENT
PPAE	PUBLIC PEDESTRIAN ACCESS EASEMENT
PUE	PUBLIC UTILITY EASEMENT
SDE	PRIVATE STORM DRAINAGE EASEMENT
SSE	PRIVATE SANITARY SEWER EASEMENT

LEGEND:

TEMPORARY PHASE 1 STORM FACILITY
SEE COMPOSITE UTILITY PLAN FOR ADDITIONAL INFORMATION

TEMPORARY PHASE 1 SECONDARY FIRE ACCESS TO BE REMOVED DURING PHASE 2

D — APPROXIMATE DRIVEWAY LOCATION. LOTS WITHOUT A 'D' DESIGNATION EITHER SHARE ACCESS WITH AN ADJACENT LOT OR ARE ALLEY ACCESS

ATTACHED SINGLE-FAMILY LOT

PARK PLACE CROSSING MASTER PLAN DEVELOPMENT STANDARDS:

LOT DIMENSIONS
- MIN. LOT SIZE
  - SINGLE-FAMILY DETACHED – 4,000 SF
  - SINGLE-FAMILY ATTACHED – 1,800 SF
- MIN. LOT WIDTH AT BUILDING LINE
  - SINGLE-FAMILY DETACHED – 35'
  - SINGLE-FAMILY ATTACHED – 20'
- MIN. LOT DEPTH AT BUILDING LINE – 70'
- MIN. STREET FRONTAGE – 20' UNLESS FLAG LOT

MIN. SETBACKS:
- FRONT – 10', 5' PORCH
- REAR – 20', 15' PORCH, 10' ADU
- GARAGE – 20' FROM ROW, 5' FROM ALLEY
- SIDE – 5' INTERIOR, 7' CORNER

REFER TO THE MASTER PLAN NARRATIVE FOR INFORMATION REGARDING BASE ZONES, DIMENSIONAL STANDARDS, APPLIED ADJUSTMENTS, VARIANCE, AND EXCEPTIONS.

UNIT TYPE AND OPEN SPACE SUMMARY:

PHASE 1:
- SINGLE FAMILY DETACHED: 59
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 0.1± ACRE

PHASE 2:
- SINGLE FAMILY DETACHED: 133
- SINGLE FAMILY ATTACHED: 126
- OPEN SPACE: 6.5± ACRE

PHASE 3:
- SINGLE FAMILY DETACHED: 59
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 0.0± ACRE

PHASE 4:
- SINGLE FAMILY DETACHED: 53
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 7.6± ACRE

PHASE 5:
- SINGLE FAMILY DETACHED: 35
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 1.5± ACRE

PHASE 6:
- SINGLE FAMILY DETACHED: 11
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 0.0± ACRE

TOTAL:

SINGLE FAMILY DETACHED:	350 (74%)
SINGLE FAMILY ATTACHED:	126 (26%)
OPEN SPACE:	15.7± ACRE

CONCEPTUAL FUTURE STREET A DETAIL

SCALE: 1" = 50'

NOTE:

*STREET A CONNECTION TO S HOLCOMB BOULEVARD IS AN INTERIM ACCESS THAT WILL NO LONGER BE NECESSARY UPON THE CONNECTION OF HOLLY LANE TO HOLCOMB BOULEVARD. WHEN THE INTERSECTION OF HOLLY LANE AND HOLCOMB BOULEVARD IS ESTABLISHED, THE NORTH END OF STREET A WILL BE ABANDONED, VACATED, AND OWNERSHIP RETURNED TO THE DECLARANT WITH APPROPRIATE EASEMENTS REMAINING IN PLACE.

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PRELIMINARY SITE AND PHASING PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

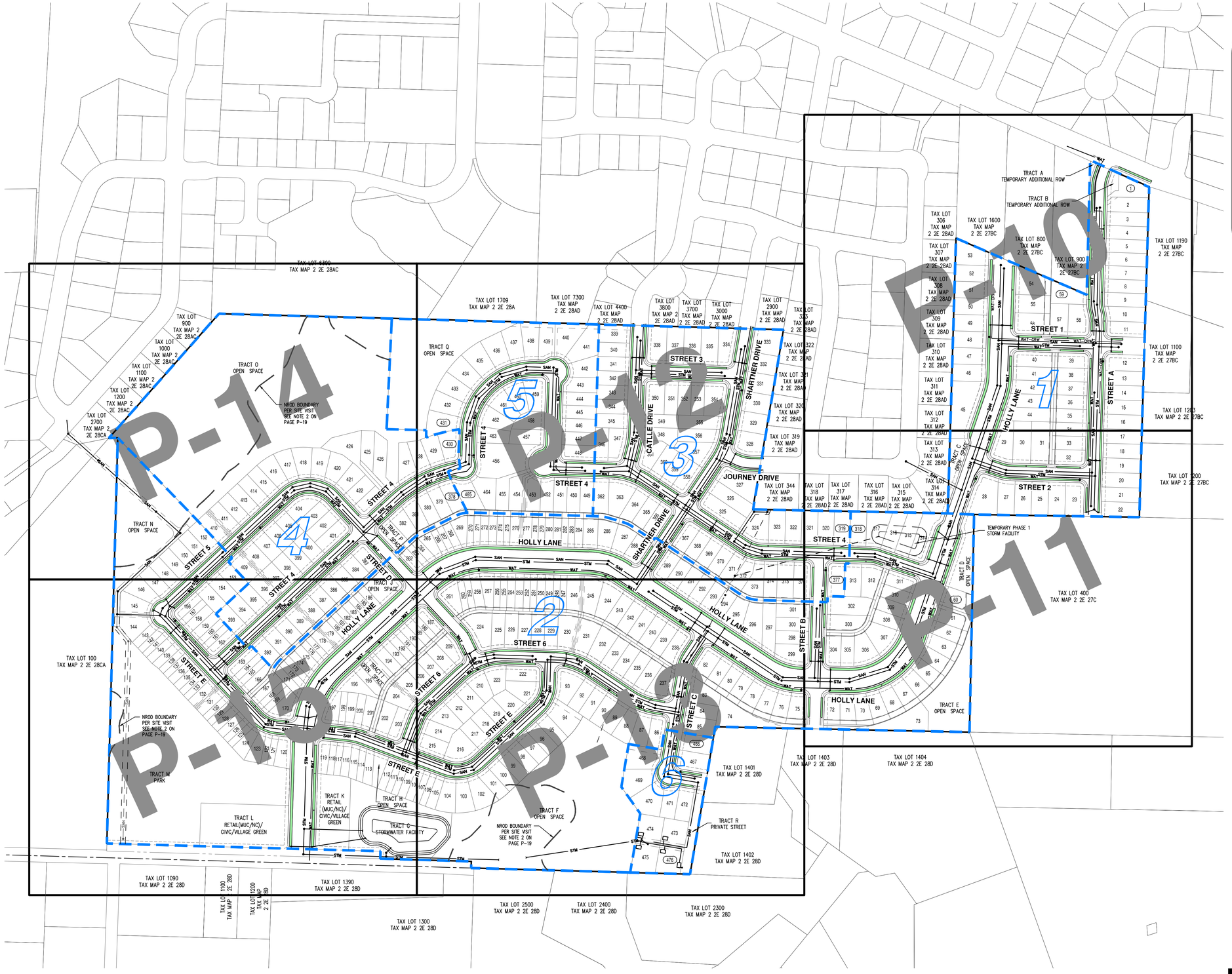
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 12, 2007
GREGORY B. HURLEY
RENEWAL DATE: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-08

AKS DRAWING FILE: 7404 PHASING.DWG | LAYOUT: P-08



UTILITY LEGEND

	EXISTING	PROPOSED
STORM DRAIN DRAIN LINE	STM	STM
STORM DRAIN DRAIN CLEAN OUT	○	●
STORM DRAIN DRAIN CATCH BASIN	□	■
STORM DRAIN DRAIN AREA DRAIN	□	■
STORM DRAIN DRAIN MANHOLE	◎	◉
SANITARY SEWER LINE	SAN	SAN
SANITARY SEWER CLEAN OUT	○	●
SANITARY SEWER MANHOLE	◯	●
WATER LINE	WAT	WAT
FIRE HYDRANT		
WATER BLOWOFF		
WATER METER		
WATER VALVE		



KEY MAP
SCALE: 1" = 1000'

N

SCALE: 1"=150 FEET
150 0 30 75 150
ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY COMPOSITE UTILITY PLAN - OVERALL
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 13, 2009
GREGORY B. HURLEY
RENEWAL DATE: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-09

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-09

S HOLCOMB BLVD

PHASE 1: CONNECT TO EXISTING CITY WATER MAIN

PHASE 1: CONNECT TO EXISTING CRW WATER MAIN

TRACT A
TEMPORARY ADDITIONAL ROW

TRACT B
TEMPORARY ADDITIONAL ROW

TAX LOT 306
TAX MAP 2 2E 28AD

TAX LOT 307
TAX MAP 2 2E 28AD

TAX LOT 308
TAX MAP 2 2E 28AD

TAX LOT 309
TAX MAP 2 2E 28AD

TAX LOT 310
TAX MAP 2 2E 28AD

TAX LOT 311
TAX MAP 2 2E 28AD

TAX LOT 312
TAX MAP
2 2E 28AD

TAX LOT 330
TAX MAP 2 2E 28AD

TAX LOT 331
TAX MAP 2 2E 28AD

TAX LOT 332
TAX MAP 2 2E 28AD

TAX LOT 1600
TAX MAP 2 2E 27BC

TAX LOT 800
TAX MAP 2 2E 27BC

TAX LOT 900
TAX MAP 2 2E 27BC

TAX LOT 1190
TAX MAP 2 2E 27BC

TAX LOT 1100
TAX MAP 2 2E 27BC

TAX LOT 1203
TAX MAP 2 2E 27BC

TRAIL VIEW DRIVE

HOLLY LANE

STREET A

STREET 1

PHASE 1

SANITARY SEWER MANHOLE (TYP)

STORM DRAIN MANHOLE (TYP)

STORM DRAIN CATCH BASIN (TYP)

FIRE HYDRANT (TYP)

APPROXIMATE LOCATION OF STREET LIGHT (TYP)

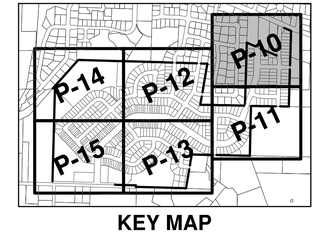
NOTE:

1. UTILITY SERVICES NOT SHOWN ON THIS PLAN. UTILITY SERVICES WILL BE SHOWN ON FUTURE DETAILED DEVELOPMENT PLAN.
2. EXISTING UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 20134946, 20132787, 20132791, 20132798, 20132807, 20132485, 20134960, 20134962, 20132485, 20134972, 20176080, 20134975, 20176082, 20134984, 20134988, 20134992, & 20176027. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
3. FIELD WORK WAS CONDUCTED MAY 13–JULY 15, 2020
4. WATER LINES ALONG THE EAST END OF S LIVESAY ROAD WERE DRAWN PER CITY GIS UTILITY MAPS. LOCATIONS ARE APPROXIMATE.
5. PROPERTIES ABOVE ELEVATION CONTOUR 450 FEET ARE REQUIRED TO BE SERVED OFF OF CRW'S WATER DISTRIBUTION SYSTEM FROM THE BARLOW CREST PUMP STATION AND CRW HUNTER HEIGHTS RESERVOIR.

STORMWATER PLANTER AND/OR SWALE LOCATIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. DETAILED INFORMATION FOR STORMWATER PLANTERS AND/OR SWALES MAY BE PROVIDED IN FUTURE DETAILED DEVELOPMENT PLAN APPLICATIONS IF THEY ARE NECESSARY FOR STORMWATER MANAGEMENT. IF NECESSARY, STORMWATER PLANTERS AND/OR SWALES WILL BE INSTALLED PER OREGON CITY STANDARD DRAWINGS 619–622, WHERE THEY ARE REQUIRED AND PRACTICAL.

EASEMENT LEGEND:

AE	PRIVATE ACCESS EASEMENT (ALLEY)
PAUE	PUBLIC ACCESS AND UTILITY EASEMENT
PSDE	PUBLIC STORM DRAINAGE EASEMENT
PSSE	PUBLIC SANITARY SEWER EASEMENT
PPAE	PUBLIC PEDESTRIAN ACCESS EASEMENT
PUE	PUBLIC UTILITY EASEMENT
SDE	PRIVATE STORM DRAINAGE EASEMENT
SSE	PRIVATE SANITARY SEWER EASEMENT



KEY MAP
SCALE: 1" = 1000'

N

SCALE: 1"=50 FEET
50 0 10 25 50
ORIGINAL PAGE SIZE: 22" x 34"

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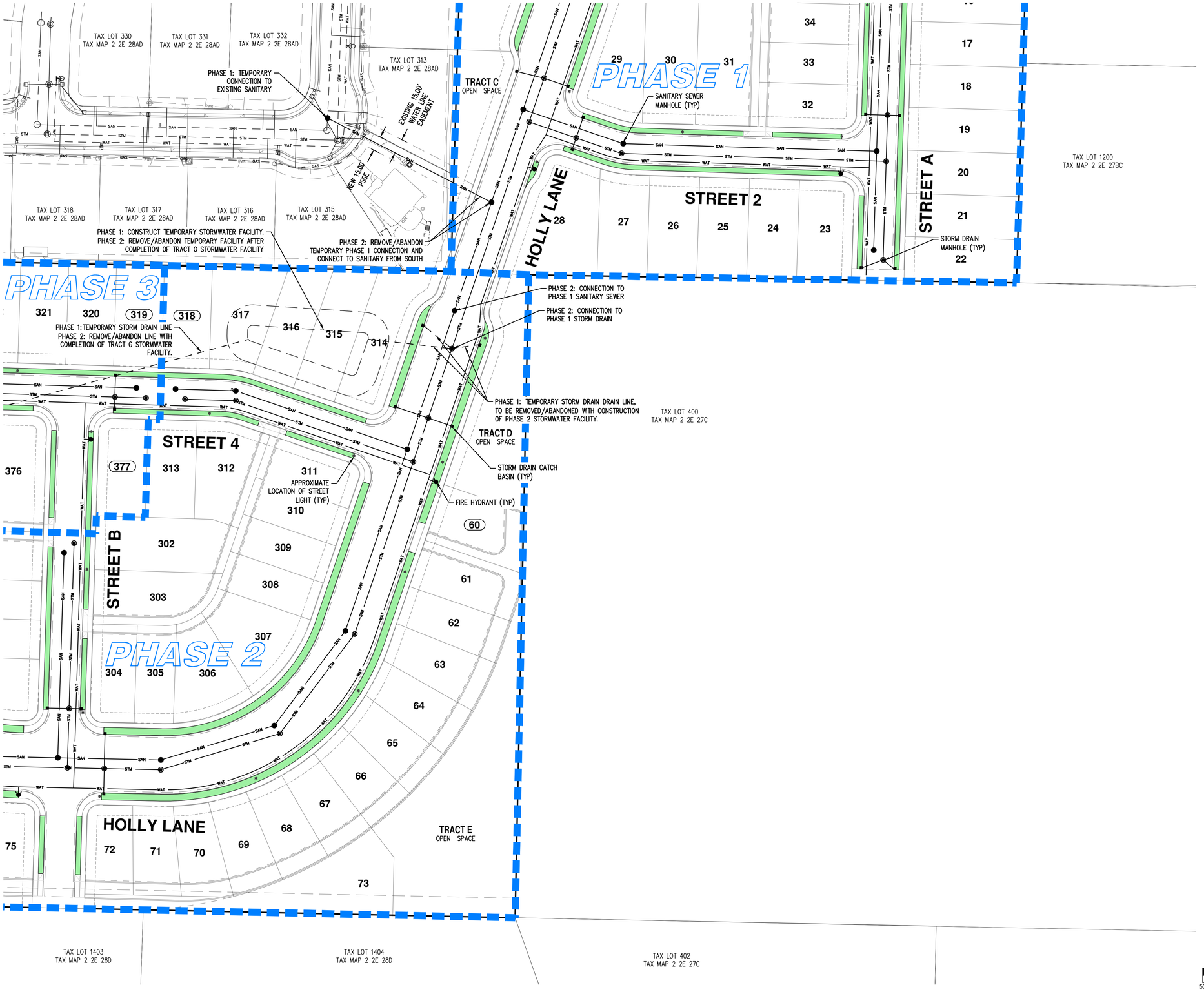
PRELIMINARY COMPOSITE UTILITY PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-10

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-10



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EASEMENT LEGEND:

AE	PRIVATE ACCESS EASEMENT (ALLEY)
PAUE	PUBLIC ACCESS AND UTILITY EASEMENT
PSDE	PUBLIC STORM DRAINAGE EASEMENT
PSSE	PUBLIC SANITARY SEWER EASEMENT
PPAE	PUBLIC PEDESTRIAN ACCESS EASEMENT
PUE	PUBLIC UTILITY EASEMENT
SDE	PRIVATE STORM DRAINAGE EASEMENT
SSE	PRIVATE SANITARY SEWER EASEMENT



KEY MAP
SCALE: 1" = 1000'

N

SCALE: 1"=50 FEET
50 0 10 25 50
ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY COMPOSITE UTILITY PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-11

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-11

TAX LOT 1709
TAX MAP 2 2E 28A

TAX LOT 4600
TAX MAP 2 2E 28AD

TAX LOT 4500
TAX MAP 2 2E 28AD

TAX LOT 4400
TAX MAP 2 2E 28AD

PHASE 3: CONNECT TO EXISTING CITY WATER MAIN

TAX LOT 3800
TAX MAP
2 2E 28AD

TAX LOT 3700
TAX MAP
2 2E 28AD

TAX LOT 3000
TAX MAP 2 2E 28AD

TAX LOT 3200
TAX MAP 2 2E 28AD

SHARTNER DRIVE

TAX LOT 2700
TAX MAP
2 2E 28AD

TAX LOT 3100
TAX MAP
2 2E 28AD

TAX LOT 2800
TAX MAP
2 2E 28AD

TAX LOT 2900
TAX MAP
2 2E 28AD

PHASE 3: CONNECT TO EXISTING CITY WATER MAIN

TAX LOT 323
TAX MAP 2 2E 28AD

TRACT Q
OPEN SPACE

CATTLE DRIVE

STREET 3

TAX LOT 322
TAX MAP 2 2E 28AD

TAX LOT 321 TAX MAP
2 2E 28AD

TAX LOT 320
TAX MAP 2 2E 28AD

PHASE 5

PHASE 3

PHASE 2

STREET 4

HOLLY LANE

APPROXIMATE LOCATION OF STREET LIGHT (TYP)

STORM DRAIN MANHOLE (TYP)

FIRE HYDRANT (TYP)

SANITARY SEWER MANHOLE (TYP)

STORM DRAIN CATCH BASIN (TYP)

TAX LOT 319
TAX MAP 2 2E 28AD

TAX LOT 344
TAX MAP 2 2E 28AD

EXISTING OFFSITE STORMWATER FACILITY

REROUTE EXISTING OFFSITE STORMWATER FACILITY WITH COMPLETION OF TRACT G STORMWATER FACILITY

NEW 15.00' PSDE

PHASE 3: CONNECTION TO PHASE 2 STORM DRAIN

EXISTING STORM DRAIN LINE TO BE REMOVED/ABANDONED WITH COMPLETION OF TRACT G STORMWATER FACILITY.

PHASE 5: CONNECTION TO PHASE 4 SANITARY SEWER

PHASE 5: CONNECTION TO PHASE 4 STORM DRAIN

PHASE 3: CONNECTION TO PHASE 2 STORM DRAIN

PHASE 3: CONNECTION TO PHASE 2 SANITARY SEWER

PHASE 1: TEMPORARY CONNECTION TO EXISTING STORM DRAIN
PHASE 2: REMOVE/ABANDON LINE WITH COMPLETION OF TRACT G STORMWATER FACILITY.

PHASE 1: TEMPORARY STORM DRAIN LINE
PHASE 2: REMOVE/ABANDON LINE WITH COMPLETION OF TRACT G STORMWATER FACILITY.

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PSDE	PUBLIC STORM DRAINAGE EASEMENT
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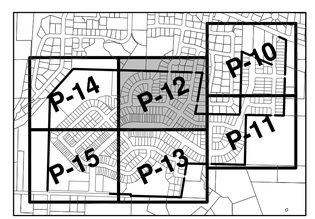

KEY MAP
SCALE: 1" = 1000'

N

SCALE: 1"=50 FEET
50 0 10 25 50
ORIGINAL PAGE SIZE: 22" x 34"

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PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 27, 2006
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-12

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-12

PHASE 2

PHASE 6

STREET D

STREET 6

STREET E

STREET C

HOLLY LANE

TRACT R
PRIVATE STREET

TRACT F
OPEN SPACE

TRACT G
STORMWATER FACILITY

STORM DRAIN CATCH BASIN (TYP)

STORM DRAIN MANHOLE (TYP)

SANITARY SEWER MANHOLE (TYP)

FIRE HYDRANT (TYP)

APPROXIMATE LOCATION OF STREET LIGHT (TYP)

EXISTING STORM DRAIN LINE TO BE REMOVED/ABANDONED WITH COMPLETION OF TRACT G STORMWATER FACILITY.

EXISTING STORM DRAIN LINE TO BE REMOVED/ABANDONED WITH COMPLETION OF TRACT G STORMWATER FACILITY.

PHASE 6: CONNECTION TO PHASE 2 SANITARY SEWER

PHASE 6: CONNECTION TO PHASE 2 STORM DRAIN

PRIVATE SANITARY FORCE MAIN CONNECTION TO PUBLIC SANITARY SEWER MANHOLE

PRIVATE SANITARY FORCE MAIN

PRIVATE STORM WATER PLANTER (TYP)

NEW 20.00' AE, SSE, & SIDE

STREAM, SEE NROD MEMO

PHASE 6 STORMWATER PLANTER OUTFALL

TRACT G STORMWATER FACILITY OUTFALL

NROD BOUNDARY PER SITE VISIT SEE NOTE 2 ON PAGE P-19

TAX LOT 1401
TAX MAP 2 2E 28D

TAX LOT 1402
TAX MAP 2 2E 28D

TAX LOT 1300
TAX MAP 2 2E 28D

TAX LOT 2500
TAX MAP 2 2E 28D

TAX LOT 2400
TAX MAP 2 2E 28D

TAX LOT 2300
TAX MAP 2 2E 28D

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KEY MAP
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N

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OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 12, 2005
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
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DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-13

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-13

OAK TREE TERRACE

OAK VALLEY DRIVE

TAX LOT 3100
TAX MAP 2 2E 28AC

TAX LOT 800
TAX MAP 2 2E 28AC

TAX LOT 6300
TAX MAP 2 2E 28AC

TAX LOT 3200
TAX MAP 2 2E 28AC

TAX LOT 900
TAX MAP 2 2E 28AC

TAX LOT 3300
TAX MAP 2 2E 28AC

TAX LOT 1000
TAX MAP 2 2E 28AC

TAX LOT 1100
TAX MAP 2 2E 28AC

TAX LOT 3400
TAX MAP
2 2E 28CA

TAX LOT 1200
TAX MAP 2 2E 28AC

PHASE 2: INTERIM CONNECTION TO EXISTING SANITARY SEWER. SEE NOTE 3 ON SHEET P-15.

TAX LOT 2700
TAX MAP 2 2E 28CA

TAX LOT 100
TAX MAP 2 2E 28CA

STREAM, SEE NROD MEMO

STREAM, SEE NROD MEMO

TRACT Q
OPEN SPACE

EXISTING PGE EASEMENT
(WIDTH VARIES)

TRACT O
OPEN SPACE

NROD BOUNDARY PER SITE VISIT
SEE NOTE 2 ON PAGE P-19

PHASE 4

SANITARY SEWER MANHOLE (TYP)

STORM DRAIN MANHOLE (TYP)

APPROXIMATE LOCATION OF STREET LIGHT (TYP)

FIRE HYDRANT (TYP)

STORM DRAIN CATCH BASIN (TYP)

STREET 5

STREET D

STREET 4

TRACT N
OPEN SPACE

PHASE 2: APPROXIMATE ALIGNMENT OF PEDESTRIAN BRIDGE/PATHWAY AND SANITARY SEWER

PHASE 4: CONNECTION TO PHASE 2 SANITARY SEWER

PHASE 4: CONNECTION TO PHASE 2 STORM DRAIN

TRACT P
OPEN SPACE

TRACT J
OPEN SPACE

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N

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PRELIMINARY COMPOSITE UTILITY PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

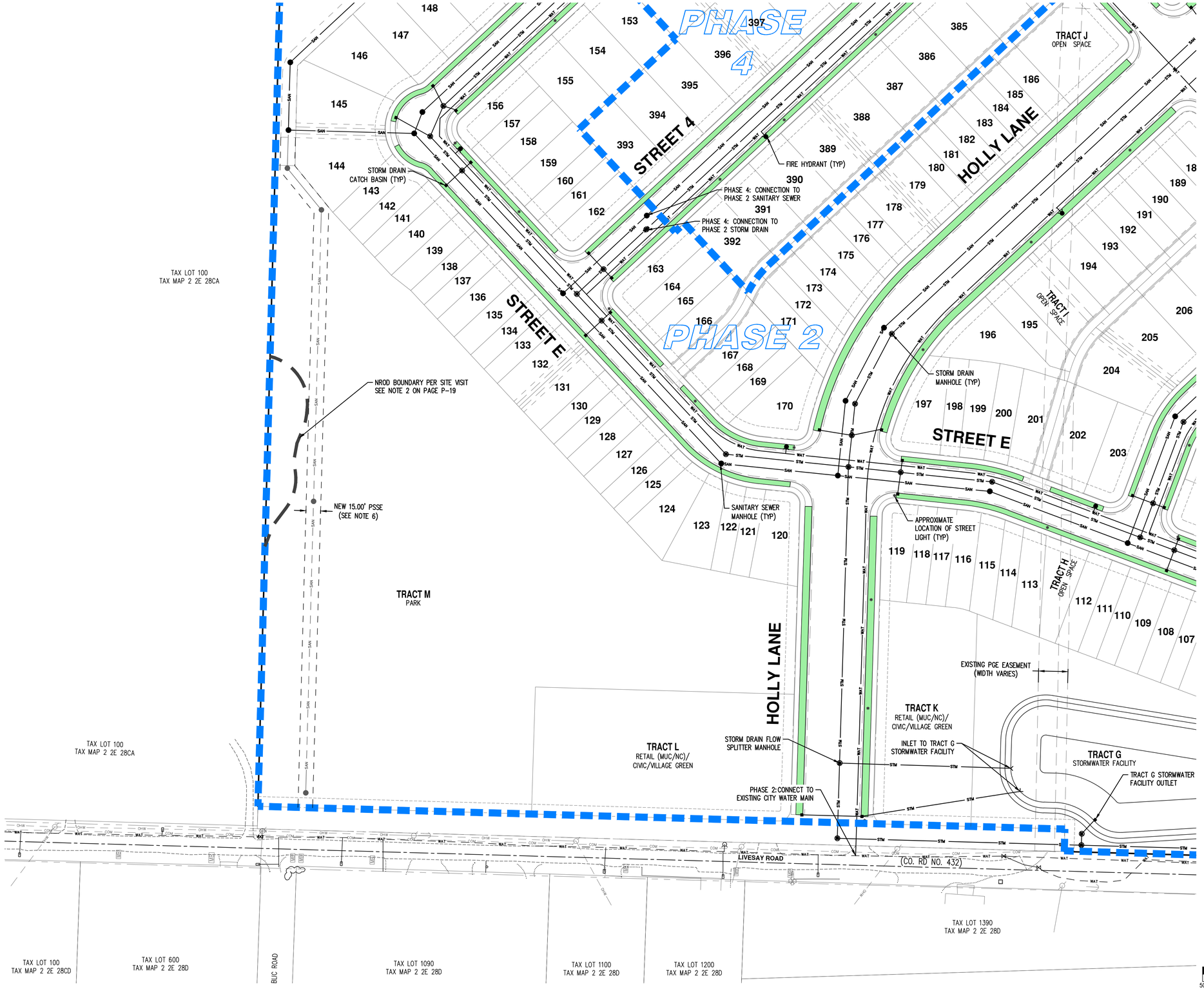
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 13, 2009
GREGORY B. HURLEY
RENEWAL DATE: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-14

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-14



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6. APPROXIMATE FUTURE ROUTE FOR SANITARY SEWER CONNECTION TO REDLAND ROAD PER THE PARK PLACE CONCEPT PLAN. UPON INFRASTRUCTURE AVAILABILITY, THE INTERIM OAK VALLEY DRIVE CONNECTION WILL BE DISCONNECTED, AND SANITARY SEWER REDIRECTED TO THIS FUTURE SEWER LINE.

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50 0 10 25 50
ORIGINAL PAGE SIZE: 22" x 34"

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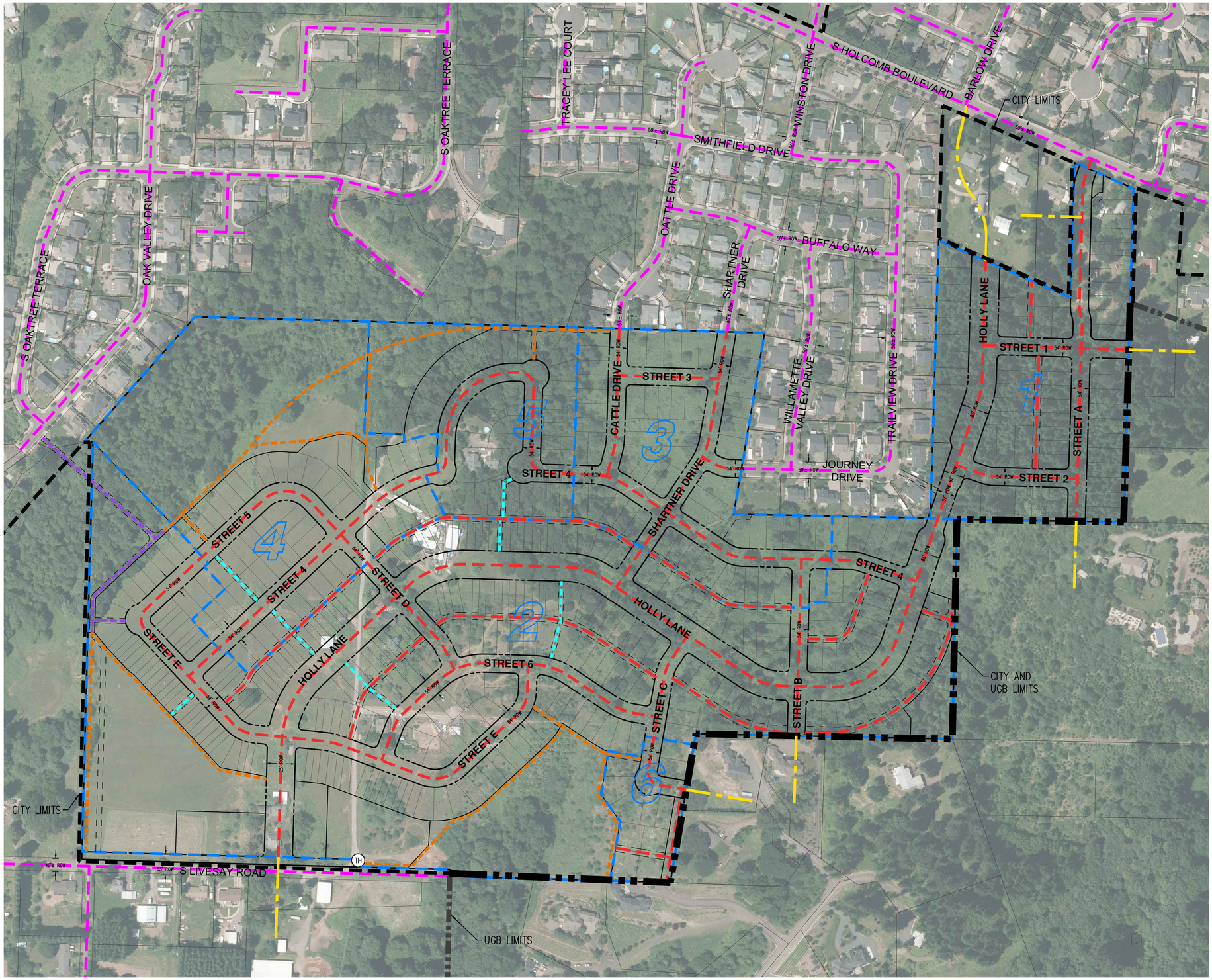
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 13, 2012 CHRISTOPHER M. SHORT
EXPIRES: 6/30/23
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-15

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-15



LEGEND:

- VEHICULAR, PEDESTRIAN, AND BICYCLE ACCESS STREETS, PRIVATE STREETS, AND ALLEYS
- PAVED PEDESTRIAN ACCESSWAY
- SOFT SURFACE TRAIL
- PAVED TRAIL
- EXISTING OFF-SITE STREETS
- FUTURE OFF-SITE STREETS
- TH — TRAILHEAD, SEE SHEET P-11

NOTES:

1. POTENTIAL OFF-SITE FUTURE STREETS ARE FOR ILLUSTRATIVE PURPOSES ONLY. THESE AREAS ARE NOT INCLUDED IN THIS GENERAL DEVELOPMENT PLAN AND DEVELOPMENT OF THESE OFF-SITE PROPERTIES IS NOT INCLUDED WITH THIS PROJECT.
2. STREETS AS SHOWN ARE NOT BINDING ON OFF-SITE PROPERTIES.
3. TRAIL AND PEDESTRIAN BRIDGE ALIGNMENTS ARE PRELIMINARY AND MAY BE ADJUSTED WITH FUTURE DETAILED DEVELOPMENT PLANS.

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY NEIGHBORHOOD CIRCULATION PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

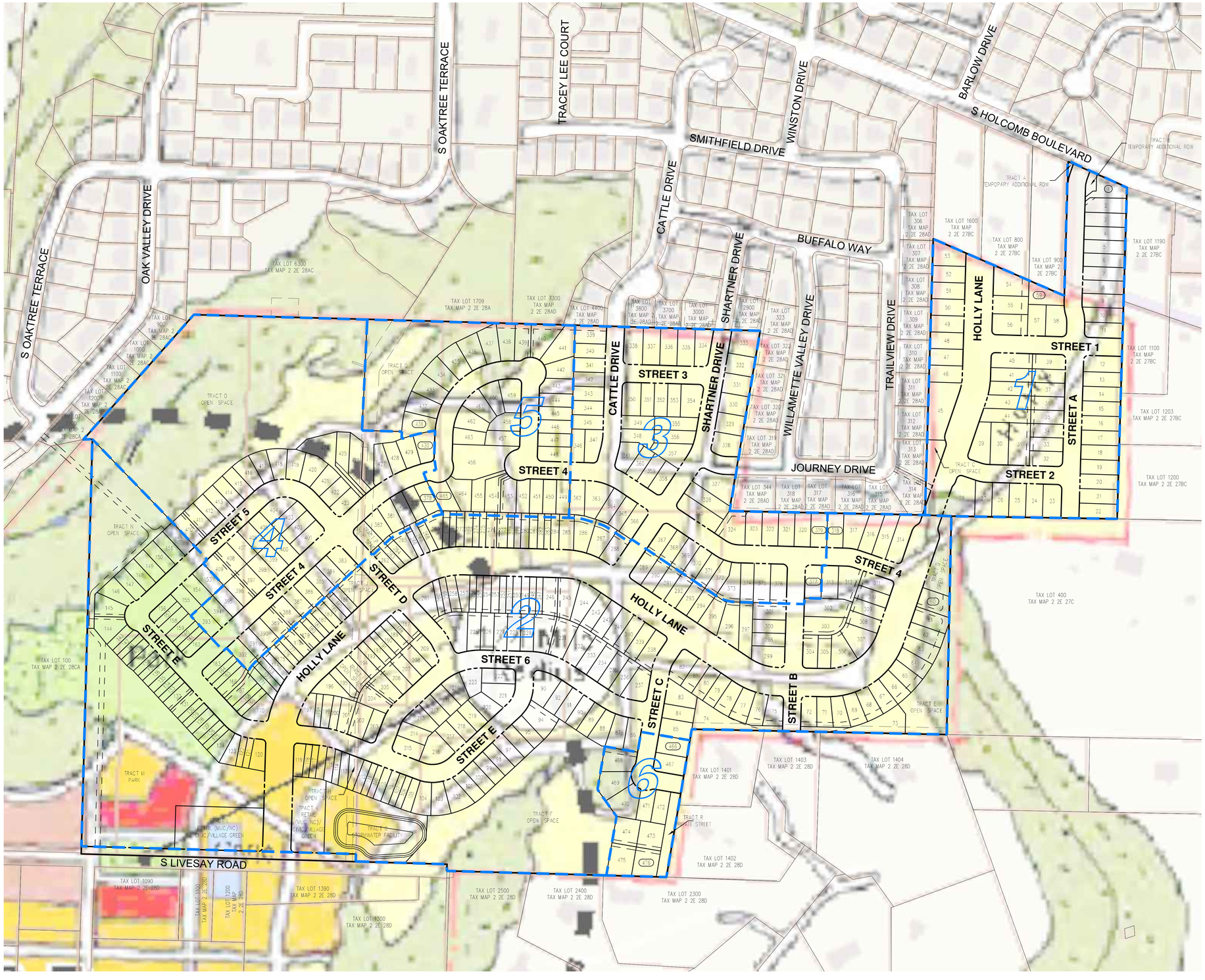
PRELIMINARY NOT FOR CONSTRUCTION

RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-16

AKS DRAWING FILE: 7404 CIRCULATION.DWG | LAYOUT: P-16



NOTE:

CONCEPT PLAN OVERLAY IS PER OREGON CITY WEBMAPS.

OREGON CITY PARK PLACE CONCEPT PLAN OVERLAY LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- RETAIL (MUC/NC)
- CIVIC

PARK PLACE CROSSING MASTER PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±15.7
STORM FACILITY:	±1.2
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3
COMMUNITY PARK:	±4.4*
REMAINING AREA:	±69.1

OREGON CITY PARK PLACE CONCEPT PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±11.4
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3
COMMUNITY PARK:	±4.1*
REMAINING AREA:	±74.9

NOTE:

*PER DISCUSSIONS WITH CITY STAFF, THE PARK PLACE CROSSING MASTER PLAN IS EXPECTED TO PROVIDE A PROPORTIONATE PERCENTAGE OF PARK LAND FOR ITS RESIDENTS. APPROXIMATELY 51 PERCENT OF THE PLANNED DWELLING UNITS FOR THE PARK PLACE CONCEPT PLAN AREA NORTH VILLAGE ARE INCLUDED WITHIN THIS MASTER PLAN (±476 PLANNED PARK PLACE CROSSING UNITS/937 TOTAL NORTH VILLAGE UNITS). THE NEIGHBORHOOD PARK REPRESENTS ±8.0 ACRES ON THE PARK PLACE CONCEPT PLAN; THEREFORE, PARK PLACE CROSSING WOULD BE EXPECTED TO CONTRIBUTE PROPORTIONALLY ±51 PERCENT OF THE NEEDED AREA, OR ±4.1 ACRES. THIS APPLICATION ANTICIPATES THAT ±4.4 ACRES WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA WILL BE DEDICATED FOR THE PARK LAND. TECHNICAL DETAILS FOR HOW THE PARK LAND WILL BE REQUIRED/TRANSFERRED ARE BEING COORDINATED WITH THE CITY OF OREGON CITY PARKS DEPARTMENT.

LAYOUT SUMMARY:

SINGLE-FAMILY ATTACHED DWELLING UNITS:	126
SINGLE-FAMILY DETACHED DWELLING UNITS:	350
TOTAL DWELLING UNITS:	476

PROPORTIONAL SHARE = 476/937^ = 0.51 = 51%

^937 IS THE ANTICIPATED TOTAL DWELLING UNITS IN THE NORTH VILLAGE PER THE PARK PLACE CONCEPT PLAN

N

SCALE: 1"=150 FEET

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ORIGINAL PAGE SIZE: 22" x 34"

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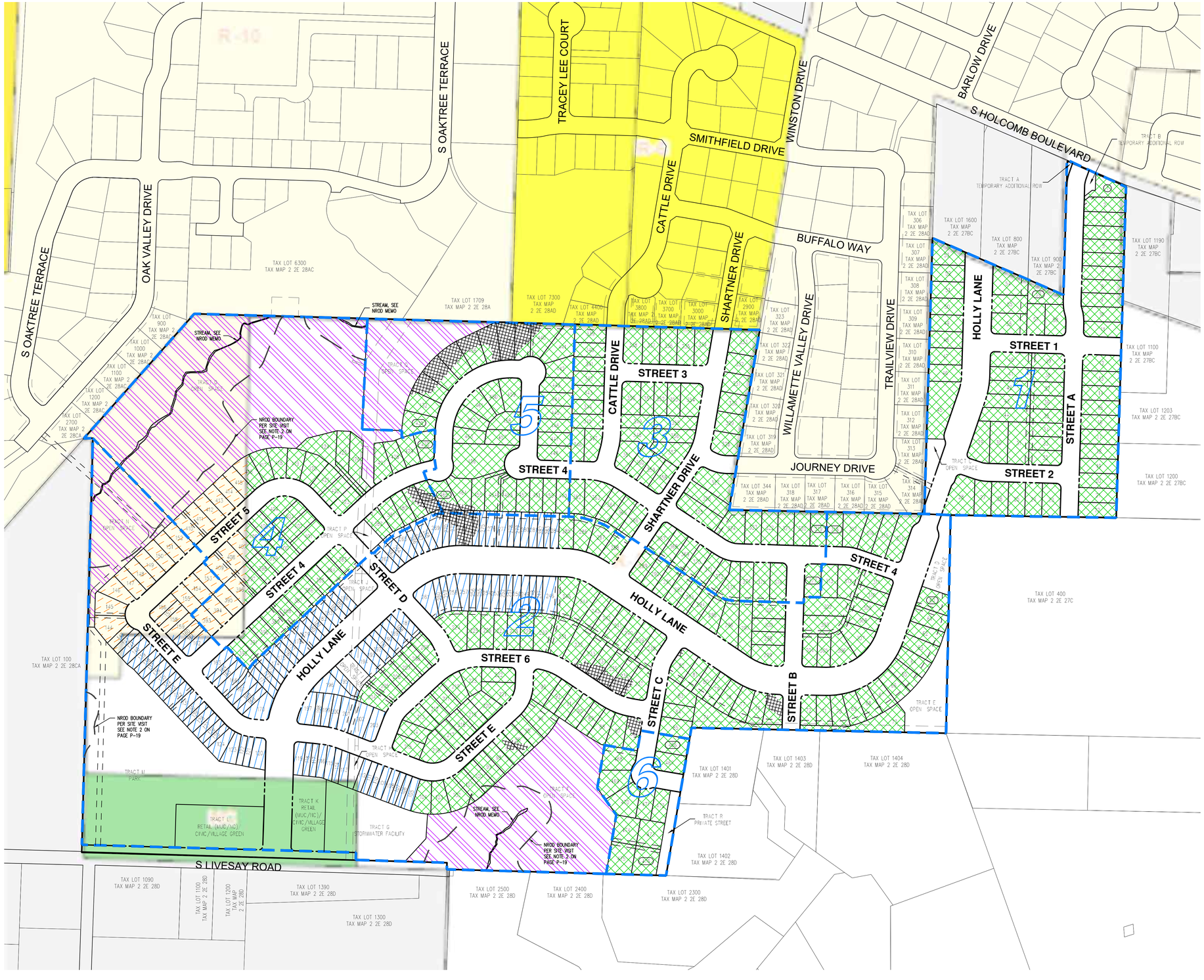
CITY OF OREGON CITY PARK PLACE CONCEPT PLAN OVERLAY MAP
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON JULY 13, 2005 GREGORY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-17

AKS DRAWING FILE: 7404 CONCEPT.DWG | LAYOUT: P-17



NOTE:

1. ZONING OVERLAY AND GEOLOGIC HAZARD AREAS ARE PER OREGON CITY WEBMAPS.
2. PORTIONS OF THE MAPPED GEOLOGIC HAZARD – STEEP SLOPE AREAS WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA PER OREGON CITY WEBMAPS ARE A RESULT OF MAN-MADE ACTIVITIES (I.E. HOUSES, DRIVEWAYS, ROADS, ETC.).

ZONING OVERLAY LEGEND:

- R-5
- R-6
- R-10
- NC

DENSITY STANDARDS:

R-5
- MINIMUM NET DENSITY – 7.0 DU/ACRE
- MAXIMUM NET DENSITY – 8.7 DU/ACRE (DETACHED)
- MAXIMUM NET DENSITY – 12.4 DU/ACRE (ATTACHED)

R-10
- MINIMUM NET DENSITY – 3.5 DU/ACRE
- MAXIMUM NET DENSITY – 4.4 DU/ACRE

CITY GEOLOGIC HAZARD OVERLAY AREA (SLOPES GREATER THAN 25%)
- MAXIMUM NET DENSITY – 2 DU/ACRE

DENSITY AREA SUMMARY:

R-5 ZONE DETACHED HOME AREA:	36.7± ACRE
R-5 ZONE ATTACHED HOME AREA:	6.9± ACRE
R-10 ZONE AREA:	2.8± ACRE
NROD CONSERVATION TRACT AREA:	14.3± ACRE
GEOLOGIC HAZARD AREA WITHIN DEVELOPABLE AREA: (SLOPES GREATER THAN 25%)	1.3± ACRE
RIGHT OF WAY:	21.1± ACRE

DENSITY CALCULATIONS

NET DEVELOPABLE AREA:
36.7 + 6.9 + 2.8 + 1.3 = 47.7 ACRE

COMPOSITE MAXIMUM RESIDENTIAL DENSITY:
((36.7/47.7)*8.7) + ((6.9/47.7)*12.4) +
((2.8/47.7)*4.4) + ((1.3/47.7)*2.0) = 8.8 DU/ACRE

17.65.070.C.4 – INCREASE IN ALLOWED MAXIMUM RESIDENTIAL DENSITY OF UP TO TEN PERCENT:
8.8*110% = 9.7 DU/ACRE

17.49.240 – DENSITY TRANSFER:
14.3*(1/3) = 4.8 ACRE
47.7 + 4.8 = 52.5 ACRE

MAXIMUM DWELLING UNITS:
9.7*52.5 = 509 DU

COMPOSITE MINIMUM RESIDENTIAL DENSITY:
((36.7/47.7)*7.0) + ((6.9/47.7)*7.0) +
((2.8/47.7)*3.5) + ((1.3/47.7)*2.0) = 6.7 DU/ACRE

MINIMUM DWELLING UNITS:
6.7*47.7 = 320 DU

ACHIEVED DENSITY:
476/52.5 = 9.1 DU/ACRE

N

SCALE: 1"=150 FEET

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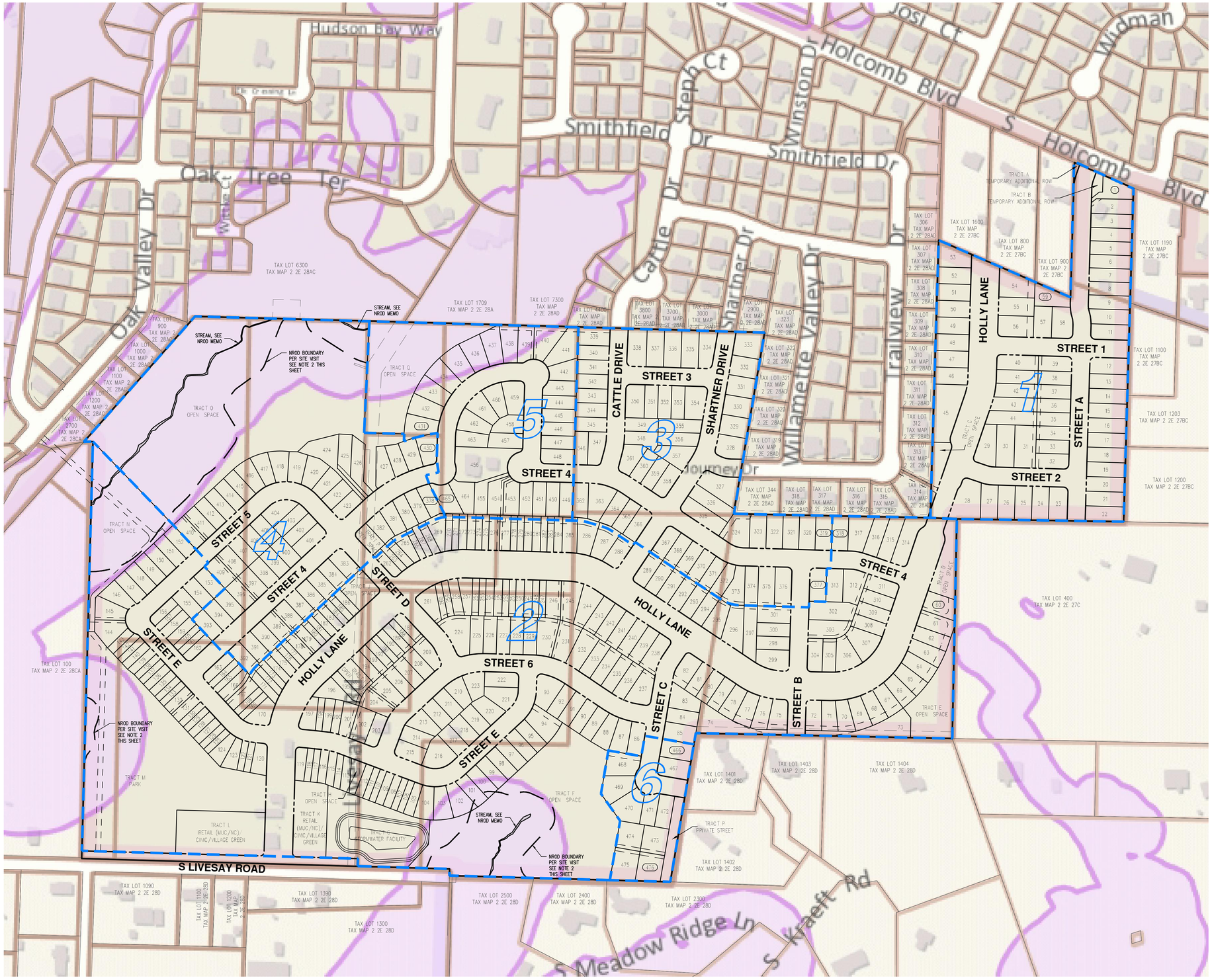
CITY OF OREGON CITY ZONING OVERLAY MAP AND DENSITY ANALYSIS
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 12, 2016
CHERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-18

AKS DRAWING FILE: 7404 DENSITY-ZONING.DWG | LAYOUT: P-18



NOTES:

1. NROD OVERLAY IS PER OREGON CITY WEBMAPS
2. NROD BOUNDARY PER SITE VISIT WILL BE VERIFIED AT THE TIME OF EACH RESPECTIVE PHASES' DETAILED DEVELOPMENT APPLICATIONS. SEE ADDITIONAL INFO IN APPENDIX G OF THIS SUBMITTAL, NATURAL RESOURCES OVERLAY DISTRICT MEMORANDUM.

NROD OVERLAY LEGEND:

NROD – NATURAL RESOURCE OVERLAY DISTRICT

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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Item #1.

CITY OF OREGON CITY NATURAL RESOURCE OVERLAY DISTRICT MAP
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

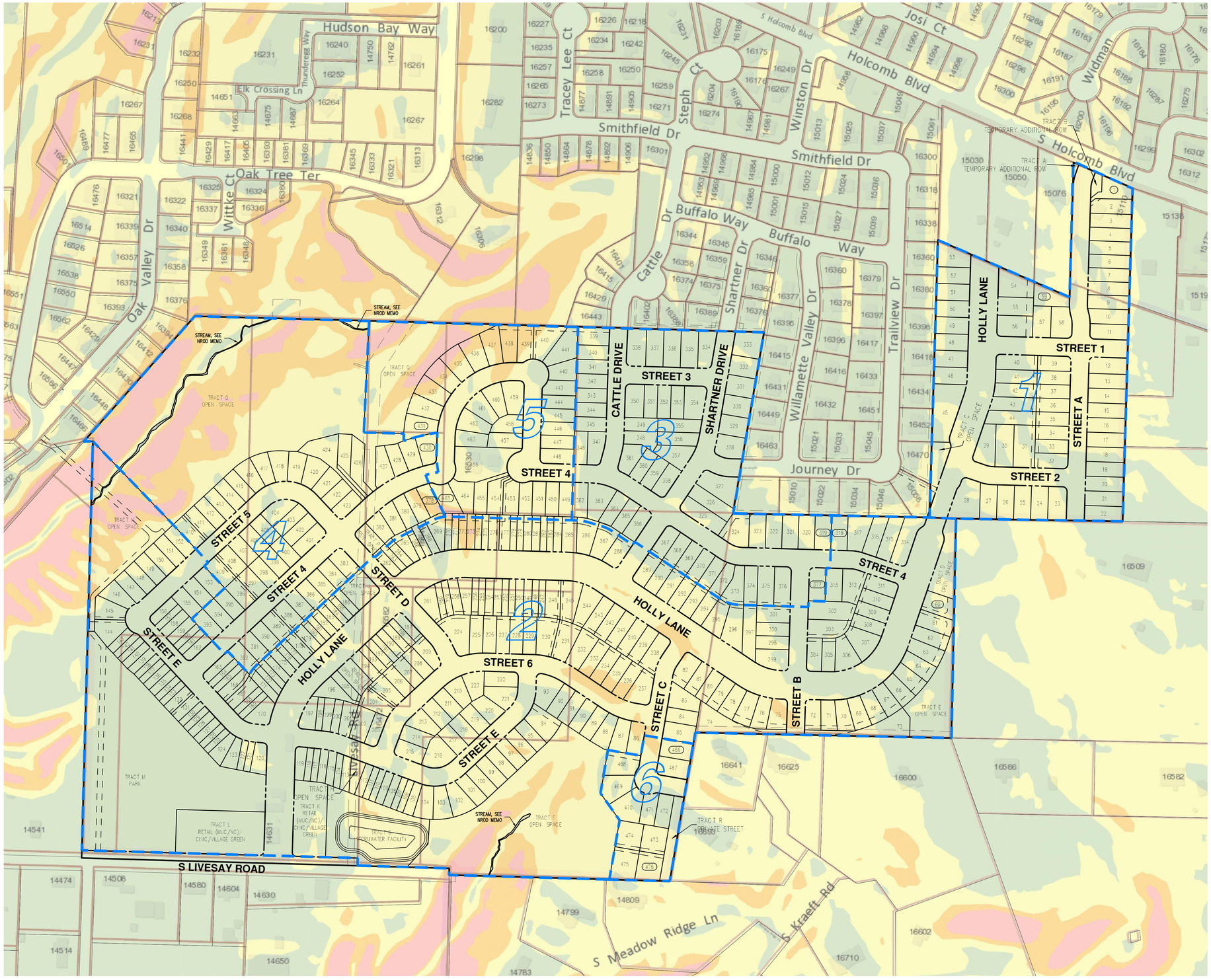
REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY NOT FOR CONSTRUCTION
MONTGOMERY B. HURLEY

RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-19

AKS DRAWING FILE: 7404 NROD.DWG | LAYOUT: P-19



NOTE:

1. GEOLOGIC HAZARD OVERLAY IS PER OREGON CITY WEBMAPS
2. GEOLOGIC HAZARDS WILL BE VERIFIED AT THE TIME OF EACH RESPECTIVE PHASES' DETAILED DEVELOPMENT PLAN APPLICATION. NO GEOLOGIC HAZARD REVIEW APPLICATION OR CHECKLIST IS INCLUDED AT THIS TIME.
3. PORTIONS OF THE MAPPED GEOLOGIC HAZARD – STEEP SLOPE AREAS WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA PER OREGON CITY WEBMAPS ARE A RESULT OF MAN-MADE ACTIVITIES (I.E. HOUSES, DRIVEWAYS, ROADS, ETC.).

SLOPE CATEGORIES LEGEND:

- SLOPES 0–10%
- SLOPES 10–25%
- SLOPES 25–35%
- SLOPES >35%

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY GEOLOGIC HAZARD SLOPE ANALYSIS
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY NOT FOR CONSTRUCTION
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

P-20

AKS DRAWING FILE: 7404 SLOPES.DWG | LAYOUT: P-20

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(360) 882-0419

www.aks-eng.com

Date: 12/8/2021
To: Oregon City Planning Division
From: Stacey Reed, PWS, Senior Wetland Scientist
Project Name: Park Place Crossing General Development Plan / Master Plan
AKS Job No.: 7404
Project Site: Clackamas County Assessor's Map 2 2E 27BC Tax Lots 1000, 2000; 2 2E 28D; Clackamas County Assessor's Map Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 500, 502, 3700, 3701

Subject: General Development Plan / Master Plan NROD Analysis

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Introduction

This memo is in response to the Park Place Crossing General Development Plan / Master Plan, located north and east of S Livesay Road and south of S Holcomb Road in Oregon City, Clackamas County, Oregon; Tax Lots 1000, 2000 of Clackamas County Assessor's Map 2 2E 27BC and Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 401, 500, 502, 3700, and 3701 of Clackamas County Assessor's Map 2 2E 28D. Tax Lots 200, 300, 301, 303, and 502 are not currently controlled by the applicant and therefore are not addressed in this NROD analysis memo. Additional future site visits are necessary to evaluate these tax lots for potential protected water features. The NROD study area boundary for this project site is depicted in Figures 1 through 5.

According to Oregon City's Natural Resource Overlay District (NROD) map, NROD associated with Protected Water Features extends across the northwestern portion of the site, as well as extending slightly into the southwestern and eastern corners of the project site. Our site visit determined Perennial and Intermittent Streams (referred to as Waters 1, 2, and 3) were present within the NROD areas, requiring vegetated corridor buffers.

Three isolated wetlands (referred to as Wetlands A-C) and Wetland D (which extends off-site to the southeast) were delineated on the project site. None of the wetlands delineated on the project site are mapped within an NROD boundary; therefore, according to Chapter 17.49.035 of Oregon City Municipal Code (OCMC), Chapter 17.49 NROD review does not apply to these wetlands. Wetlands A-D are likely to be regulated by the Oregon Department of State Lands (DSL) requiring state authorization for impact.

The preliminary site plan avoids impacts to Protected Water Features, only proposing minor encroachment into the vegetated corridor (NROD) for paved pedestrian paths, including a bridge crossing, and for the development of two residential lots. Vegetated corridor encroachment will require an NROD Permit and Compensatory Mitigation in accordance with Chapter 17.49.180 of OCMC. On-site NROD enhancement mitigation opportunity exits. The project protects Goal 5 inventoried Protected Water Features.

This memo has been prepared to address Oregon City Code of Ordinances requirements listed under Chapter 17.65 Master Plan and Planned Unit Developments. The applicant is not requesting an NROD boundary verification or an NROD permit under this submittal. A separate future NROD permit application

will be submitted to address the prohibited uses within NROD. The applicant will obtain necessary approval from Oregon Department of State Lands (DSL) and/ or the U.S. Army Corps of Engineers (USACE) prior to impact to jurisdictional wetland or water impacts.

Background Mapping and Existing Site Conditions

The western portion of the study area consists of an open field, historically used for grazing. The pasture is dominated by tall fescue (*Schedonorus arundinaceus*, FAC), sweet vernal grass (*Anthoxanthum odoratum*, FACU), common velvet grass (*Holcus lanatus*, FAC), Canadian thistle (*Cirsium arvense* FAC), yellow glandweed (*Parentucellia viscosa*, FAC), and vetch (*Vicia* species, FAC). Scattered patches of Himalayan blackberry (*Rubus armeniacus*, FAC), English hawthorn (*Crataegus monogyna*, FAC), and Oregon white oak (*Quercus garryana*, FACU*)* are present.

The riparian corridor adjacent to Water 1 (tributary to Tour Creek) is dominated by Douglas-fir (*Pseudotsuga menziesii*, FACU), big-leaf maple (*Acer macrophylum*, FACU), red alder (*Alnus rubra*, FAC), Himalayan blackberry, salmon raspberry (*Rubus spectabilis*, FAC), pineland sword fern (*Polystichum munitum*, FACU), bentgrass (*Agrostis* species, FAC), piggyback plant (*Tolmiea menziesii*, FAC), Pacific waterleaf (*Hydrophyllum tenuipes*, FAC), and white insideout flower (*Vancouveria hexandra*, UPL).

The central and eastern portions of the site are heavily dominated by Himalayan blackberry thickets. Scattered patches of Douglas-fir, big-leaf maple, Oregon white oak, English hawthorn, and beaked hazelnut (*Corylus cornuta*, FACU) are present.

The study area is generally undeveloped, except for residences and associated detached buildings in the southern and northeastern portion of the study area. The surrounding land-uses consist of a residential subdivision to the north and rural residential land use to the south. A stormwater drainage easement extends through the center of the site, which conveys stormwater discharge from the residential subdivision to the north into Water 2 delineated under this study.

The following soil units are mapped within the study area, according to the Natural Resources Conservation Service (NRCS) Clackamas County Area Soil Survey Map (Figure 3). According to the NRCS Clackamas County hydric soils list, none of the soils within the study area are mapped as being hydric.

- Helvetia silt loam, (Unit 37C), 8% to 15% slopes—Non-hydric
- Laurelwood silt loam, (Unit 54B), 3% to 8% slopes—Non-hydric
- Saum silt loam, (Unit 78B), 3% to 8% slopes—Non-hydric
- Saum silt loam, (Unit 78C), 8% to 15% slopes—Non-hydric
- Woodburn silt loam, (Unit 91B), 3% to 8% slopes—Non-hydric
- Woodburn silt loam, (Unit 91C), 8% to 15% slopes—Non-hydric
- Xerochrepts and Haploxerolls, (Unit 92F), very steep—Non-hydric

According to Oregon City's 1999 Local Wetland Inventory (LWI) map, only a portion of the study area is within the approved LWI boundary. Within the LWI study area boundary, a stream and wetland feature are mapped in the northwest portion of the site (Figure 4). This feature is in the vicinity of Water 1 delineated in this study.

According to the City's 2009 NROD map, a Title 3 wetland (NROD feature) is mapped on the adjacent property to the north, in the vicinity of the LWI-mapped off-site wetland (Figure 5).

Delineation Site Visit Results

AKS Senior Wetland Scientist Stacey Reed, PWS and Natural Resource Specialist Sonya Templeton conducted site visits on May 28, June 2, and August 5, 2020 to delineate Protected Water Features (wetlands and/or waters) within the project site and assess whether Protected Water Features were present immediately off-site to determine if a vegetated corridor buffer should extend onto the project site.

The methodology used to determine the presence of wetlands followed the Corps' *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*. Soils, vegetation, and indicators of hydrology were recorded at sample plot locations on a standardized wetland determination data form to document conditions. The on-site ordinary high water mark (OHWM) of features with defined bed and banks were delineated based on physical field indicators in accordance with Oregon Administrative Rule (OAR) 141-085-0515(3).

A wetland and waters delineation report in accordance with OAR 141-090-0030 and OAR-141-090-0035 (1-17) was prepared by AKS to describe the results of a wetland and waters delineation. The delineation report was submitted to DSL and is currently under review per DSL File WD 2021-0311. The professional land surveyed wetland and water boundaries are shown on attached Figure 6.

Summary of Features

Wetlands

The boundary of three palustrine emergent (PEM) isolated wetlands (referred to as Wetlands A-C on attached Figure 6) were delineated on the site. Wetlands A-C are located within NRCS mapped non-hydric soils and appear to be artificially created from former land uses. Wetland A is a small artificially created pond, likely a former irrigation or stock watering pond. Wetland B is an isolated wetland dominated by non-native grasses within a hillslope, likely created from disrupted tiling associated from many years of grazing. Wetland C is an excavated feature that is contained within an artificial berm likely created by old dirt logging roads. Wetland D is a PEM wetland situated on a subtle slope in the southeastern portion of the site. Wetland D appears to be fed by a natural spring. Wetland conditions extend off-site to the southeast.

Waters

Water 1 is a perennial tributary to Tour Creek was delineated in the northwestern portion of the site. The tributary enters the site in the north and flows in a southwesterly direction through the site, continuing off-site to the southwest until its confluence with Tour Creek, several hundred feet to the southwest. Within the study area, the channel bed averages approximately 3-6 feet wide with an average of 2-foot-tall banks, which were incised in some portions. An average of approximately 4-6 inches deep continuous flow was present in the channel during the May 2020 site visits.

Water 2 was delineated in the southern portion of the site and is an intermittent tributary to Abernethy Creek. Water 2 originates on-site from a culvert discharging stormwater from upslope development. The upper extent of the drainage was determined to have an ephemeral flow regime (lacks a well-defined

contiguous bed and bank), developing intermittent flow (contains groundwater input with well-defined bed and bank) further downstream. The upstream ephemeral portion of the channel lacked flow during our May 2020 site visits, developing approximately 2-inch-deep flow further downstream. Within the study area Water 2 channel bed is approximately 2-3 feet wide with an average of 1-foot-tall banks. Water 2 continues off-site to the south.

Water 3 is an ephemeral headwater drainage delineated in the southwestern portion of the site. This feature lacked a well-defined OHWM and flow during the May 2020 site visits. Water 3 was approximately 1-2 feet wide, with 6 inches tall banks, and consisted of a silt loam dominated channel bed substrate.

Extent of On-Site NROD

Two Protected Water Features were delineated on the project site. Water 1 (non-fish bearing perennial tributary to Tour Creek) contains adjacent slopes exceeding 25% for more than 150 feet, requiring the vegetated corridor to extend 200 feet from the OHWM/bankfull flow. Water 2 (intermittent stream draining more than 100 acres) also has adjacent slopes exceeding 25% for more than 150 feet, requiring a 200-foot-wide vegetated corridor buffer.

The on-site portions of Water 3 contained an ephemeral flow regime, which does not meet the definition of a Protected Water Feature (per Chapter 17.04.970 of OCMC not a perennial or intermittent stream); therefore, Water 3 may not require a vegetated corridor buffer. A future NROD Permit application can be submitted to amend the NROD map through a Type I or Type II NROD boundary verification. For purposes of this General Development Plan / Master Plan submittal, a 50-foot-wide vegetated corridor has been applied to Water 3. The extent of the on-site vegetated corridor is shown on attached Figure 6.

Preliminary General Development / Master Plan NROD Impacts

The project avoids impacts to Protected Water Features. Permanent encroachment within vegetated corridor adjacent to Water 1 is planned in Phase 4 for a paved pedestrian path and bridge crossing. The paved pedestrian path will be subject to design standards listed under OCMC 17.49.150 for paved pedestrian paths, requiring a NROD Permit and mitigation in accordance with OCMC 17.49.180. It is anticipated the bridge footings will not require removal or fill within Water 1.

Unavoidable encroachment for two residential lots associated with Phase 2 may require impact into the outer edges of the vegetated corridor/NROD, requiring an NROD Permit and mitigation. A potential soft surface pedestrian path may encroach into the outer edges of the vegetated corridor associated with the intermittent stream. It is likely the soft surface trail can be designed to meet the exemption criteria listed in Section 17.49.080.F of City code. If the trail cannot meet the exemption criteria, compensatory mitigation will be required. The General Development / Master Plan includes protection of remaining NROD within open space tracts.

Preliminary General Development / Master Plan NROD Mitigation Plan

Mitigation in accordance with OCMC 17.49.180, consisting of on-site enhancement at 2:1 enhancement to impact ratio is required for portions of the pedestrian trail and lots within vegetated corridor. On-site mitigation opportunity exists within remaining vegetated corridor (NROD) adjacent to both Waters 1 and 2. Required tree and shrub enhancement planting shall be conducted in accordance with Mitigation Option 2, requiring a rate of 5 trees and 25 shrubs to be planted every 500 square feet of disturbance

area. Portions of the remaining on-site vegetated corridor lack native tree canopy and are dominated by invasive Himalayan blackberry. Enhancement consisting of removal of all non-native invasive and nuisance vegetation and densely planting with native woody vegetation per quantity requirements listed under Mitigation Option 2 within the first 50 feet closest to the tributaries will offset the vegetated corridor encroachment and provide a net functional benefit to Waters 1 and 2. All vegetation used for enhancement mitigation must be native and listed on the Oregon City Native Plant List.

A minimum of 5-years of monitoring and maintenance will be required for the vegetated corridor mitigation enhancement areas.

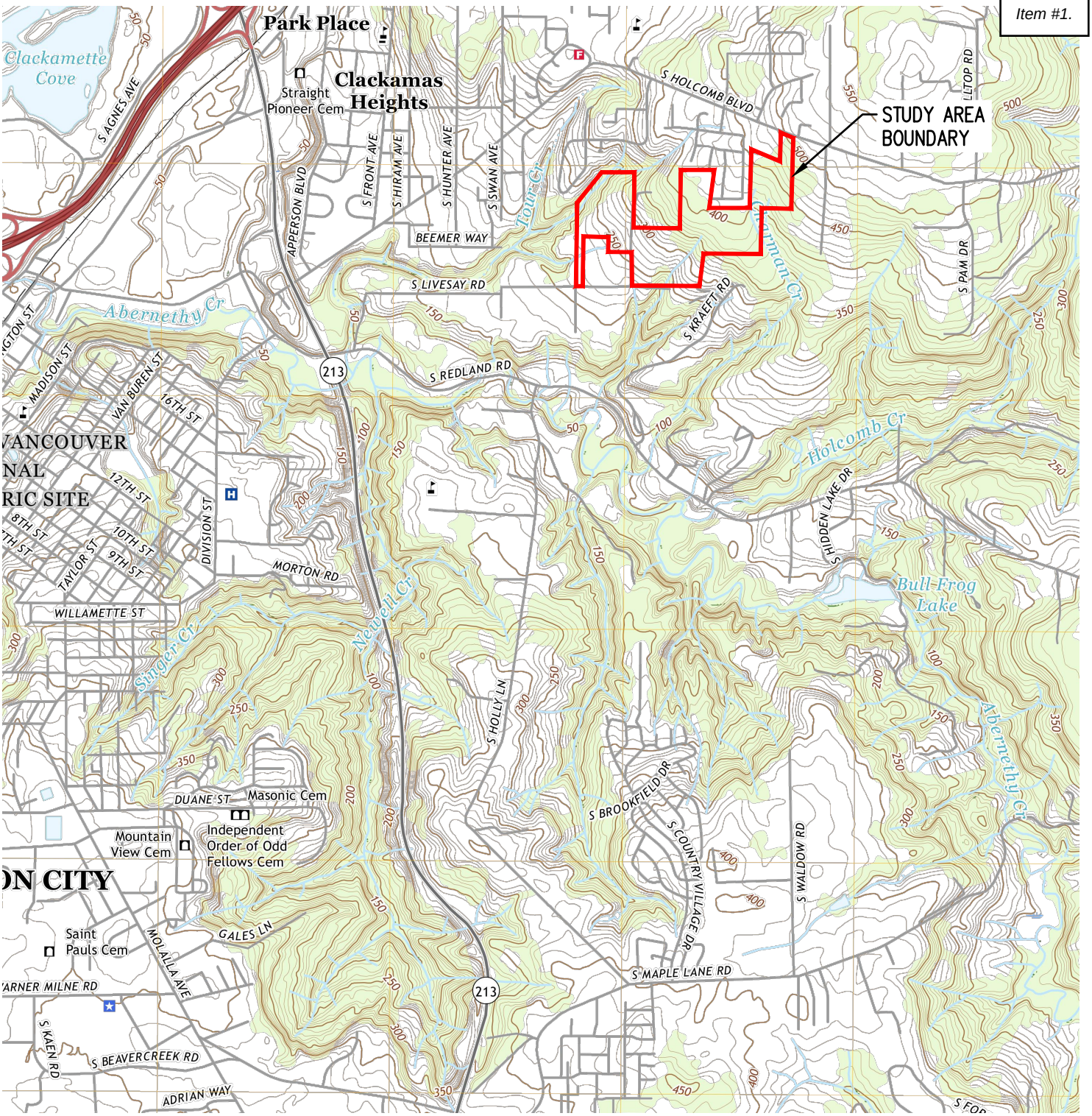
List of Preparers



Stacey Reed, PWS
Senior Wetland Scientist

List of Attached Figures

Figure 1. USGS Vicinity Map
Figure 2A-2B. County Assessor's Tax Map
Figure 3. NRCS Soil Survey Map
Figure 4. Local Wetland Inventory (LWI) Map
Figure 5. Natural Resource Overlay District (NROD) Map
Figure 6. Natural Resource Existing Conditions Map
Figure 7. Preliminary Site and Phasing Plan



N

USGS 7.5' TOPOGRAPHIC SERIES
QUADRANGLE: OREGON CITY, OR (2020)

DATE: 07/16/2021

SCALE: 1"= 2000 FEET

2000 0 400 1000 2000

ORIGINAL PAGE SIZE: 8.5" x 11"

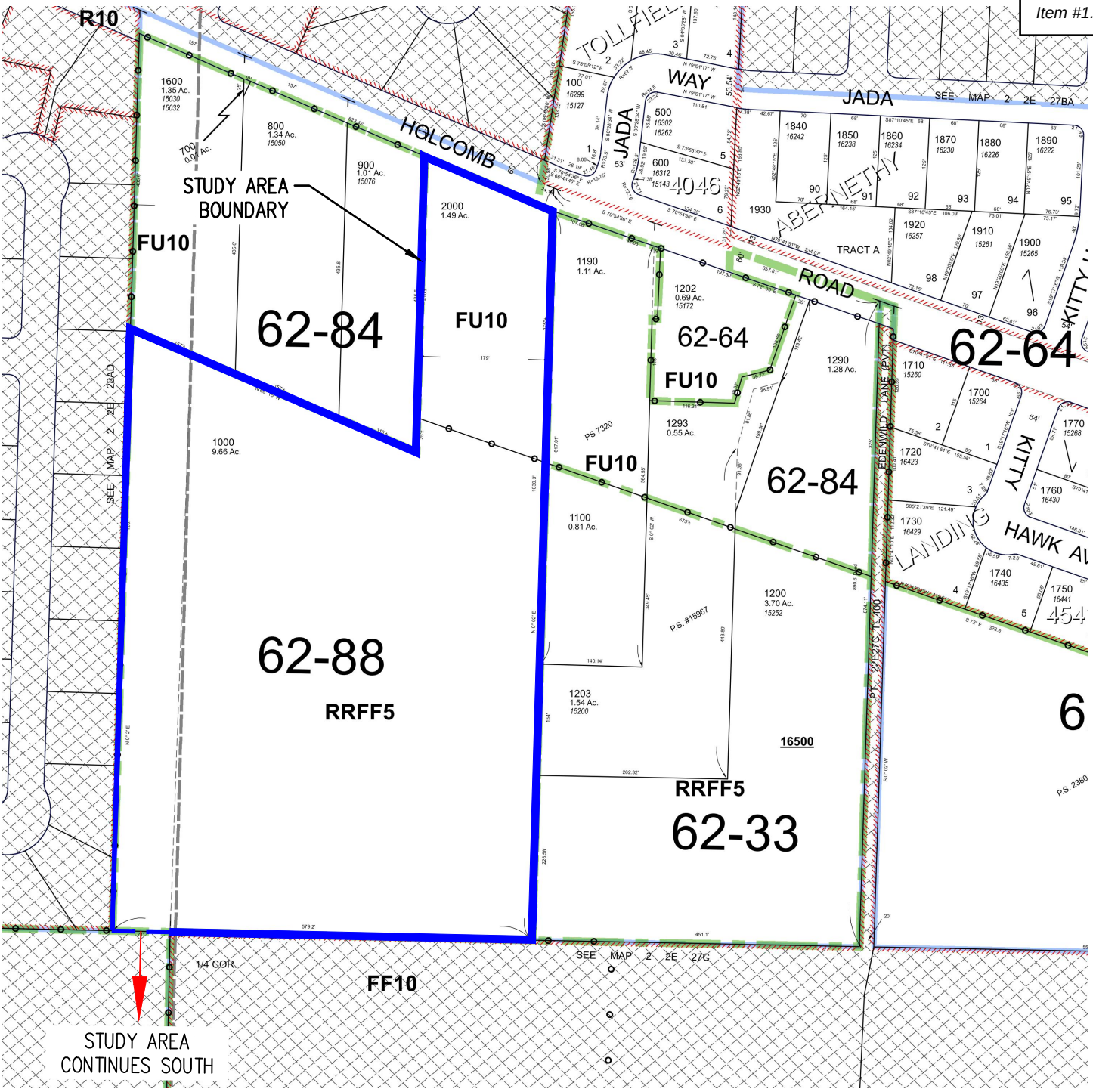
USGS VICINITY MAP
PARK PLACE CROSSING GENERAL DEVELOPMENT NROD ANALYSIS

FIGURE 1

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: SKT
CHKD: SAR

DWG: 7404 BACKGROUND FIGURES | FIGURE 1



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SCALE: 1"= 200 FEET

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ORIGINAL PAGE SIZE: 8.5" x 11"

CLACKAMAS COUNTY
TAX LOTS 1000 AND 2000
TAX MAP 2 2E 27BC

DATE: 07/16/2021

TAX MAP (MAP 2 2E 27BC)
PARK PLACE CROSSING GENERAL DEVELOPMENT NROD ANALYSIS

FIGURE **2A**

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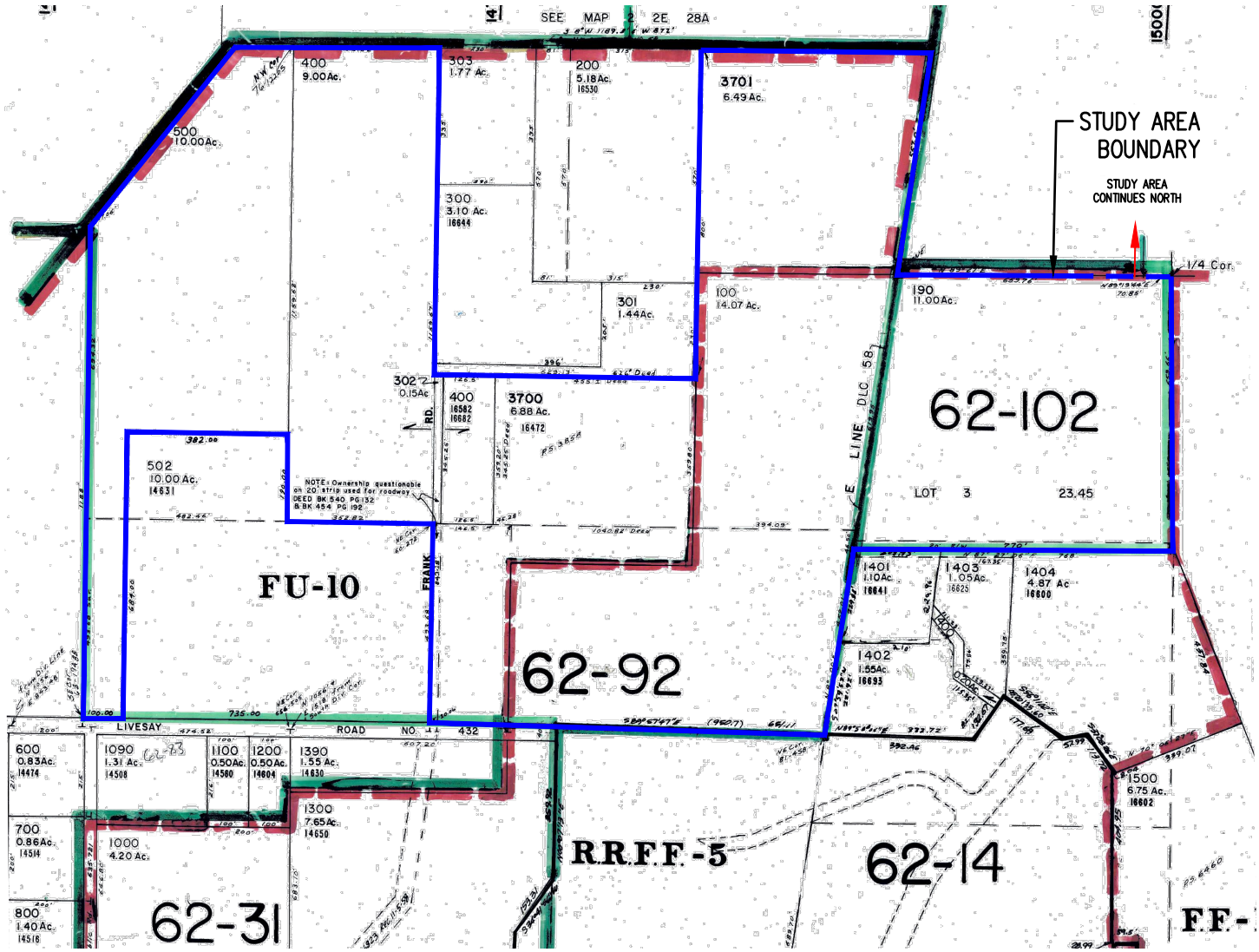
DRWN: SKT
CHKD: SAR

DWG: 7404 BACKGROUND FIGURES | FIGURE 2A



CLACKAMAS COUNTY
TAX LOTS 100, 190, 302,
400, 500, 3700, 3701
TAX MAP 2 2E 28D

N

SCALE: 1"= 400 FEET

400 0 80 200 400

ORIGINAL PAGE SIZE: 8.5" x 11"

DATE: 07/16/2021

TAX MAP (MAP 2 2E 28D)
PARK PLACE CROSSING GENERAL DEVELOPMENT NROD ANALYSIS

FIGURE **2B**

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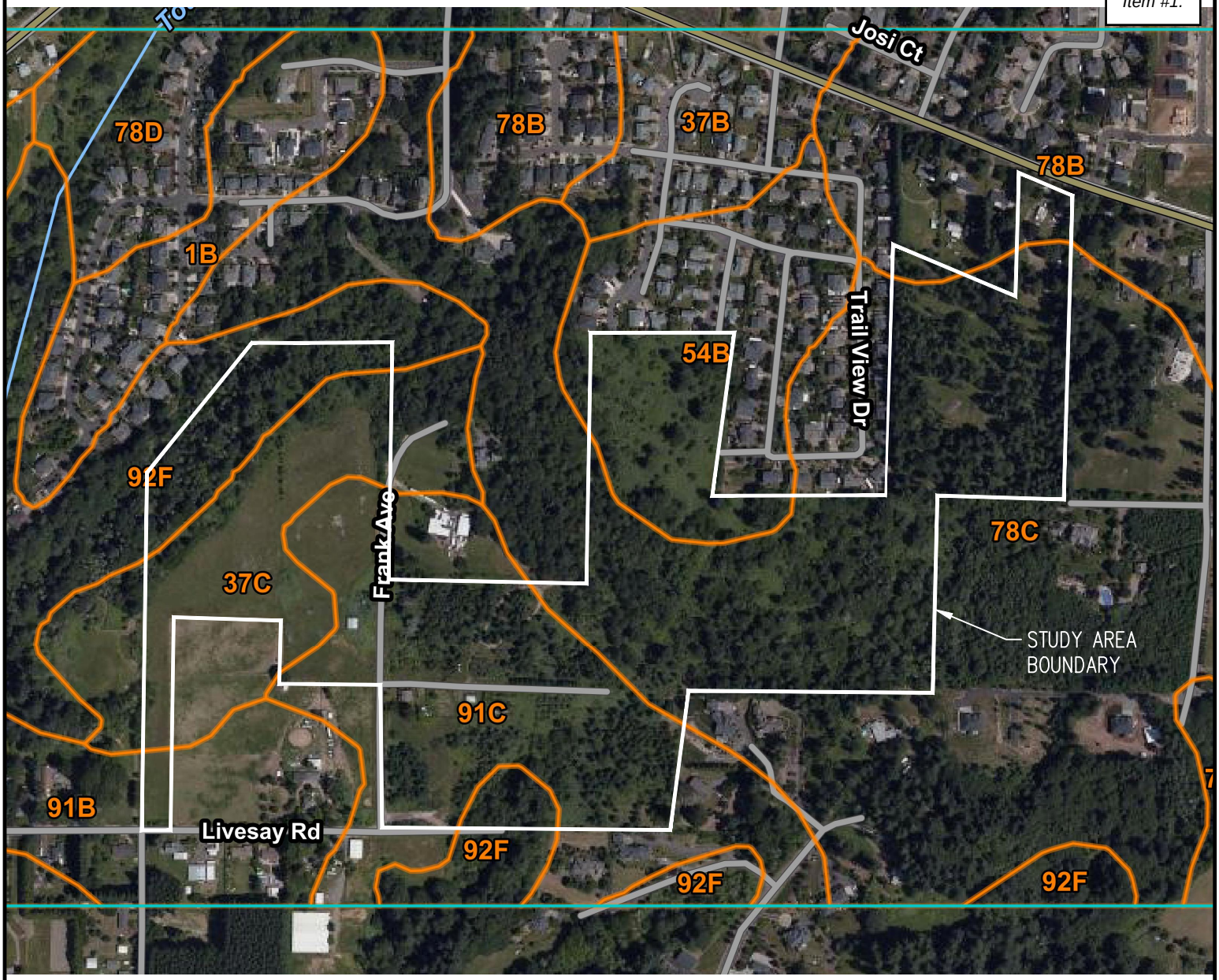

MAP UNIT SYMBOL	MAP UNIT NAME
37C	HELVETIA SILT LOAM, 8% TO 15% SLOPES; NON-HYDRIC
54B	LAURELWOOD SILT LOAM, 3% TO 8% SLOPES; NON-HYDRIC
78B	SAUM SILT LOAM, 3% TO 8% SLOPES; NON-HYDRIC
78C	SAUM SILT LOAM, 8% TO 15% SLOPES; NON-HYDRIC
91B	WOODBURN SILT LOAM, 3% TO 8% SLOPES; NON-HYDRIC
91C	WOODBURN SILT LOAM, 8% TO 15% SLOPES; NON-HYDRIC
92F	XEROCHREPTS AND HAPLOXEROLLS, VERY STEEP; NON-HYDRIC

N

SCALE: 1"= 500 FEET

500 0 100 250 500

ORIGINAL PAGE SIZE: 8.5" x 11"

NRCS WEB SOIL SURVEY FOR
CLACKAMAS COUNTY

DATE: 07/16/2021

NRCS SOIL SURVEY MAP
PARK PLACE CROSSING GENERAL DEVELOPMENT NROD ANALYSIS

FIGURE 3

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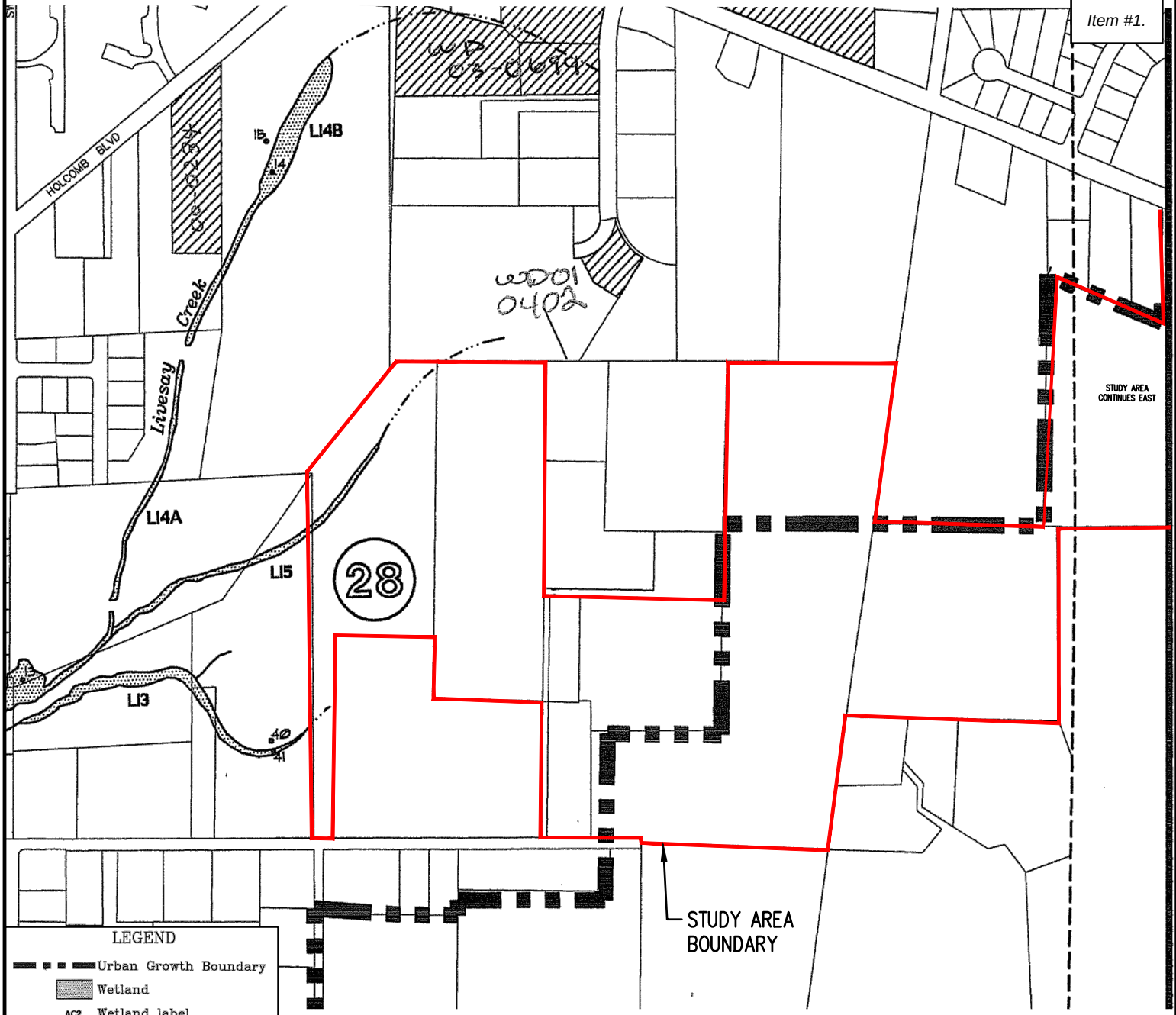
DRWN: SKT
CHKD: SAR

DWG: 7404 BACKGROUND FIGURES | FIGURE 3



CITY OF OREGON CITY LOCAL WETLAND INVENTORY (1999)

DATE: 07/16/2021

SCALE: 1"= 500 FEET

500 0 100 250 500

ORIGINAL PAGE SIZE: 8.5" x 11"

LOCAL WETLAND INVENTORY MAP
PARK PLACE CROSSING GENERAL DEVELOPMENT NROD ANALYSIS

FIGURE 4

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
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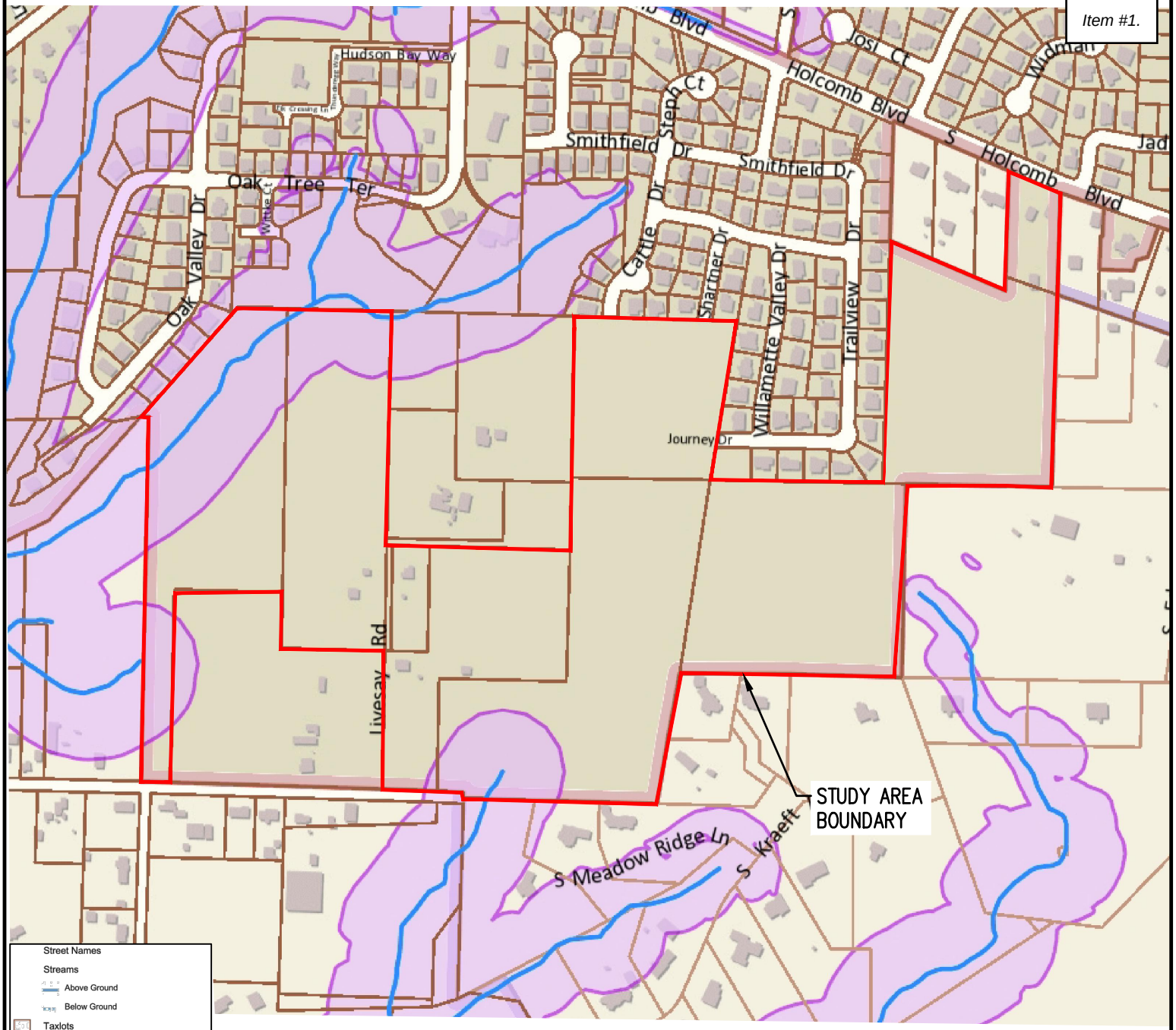
CHKD: SAR

DWG: 7404 BACKGROUND FIGURES | FIGURE 4



OREGON CITY GIS MAPPING
NATURAL RESOURCE OVERLAY DISTRICT

N

SCALE: 1"= 500 FEET

500 0 100 250 500

ORIGINAL PAGE SIZE: 8.5" x 11"

DATE: 07/16/2021

NROD MAP
PARK PLACE CROSSING GENERAL DEVELOPMENT NROD ANALYSIS

FIGURE **5**

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DRWN: SKT
CHKD: SAR

DWG: 7404 BACKGROUND FIGURES | FIGURE 5



NOTE:
TAXLOTS 200, 300, 301, 303, AND 502 WERE EXCLUDED FROM THIS NROD ANALYSIS. A FULL WETLAND AND WATER DELINEATION IS REQUIRED PRIOR TO SITE DEVELOPMENT.

LEGEND:

TOTAL WETLAND AREA ON-SITE: 17,716 SF± (0.41 ACRES±)

WETLAND A: 362 SF± (0.01 ACRES±)
WETLAND B: 5,560 SF± (0.13 ACRES±)
WETLAND C: 7,345 SF± (0.17 ACRES±)
WETLAND D: 4,449 SF± (0.10 ACRES±)

TOTAL ON-SITE WATERS: 4,481 SF± / 1,434 LF± (0.10 ACRES±)

WATER 1: 3,493 SF± / 960 LF± (0.08 ACRES±)
WATER 2: 988 SF± / 474 LF± (0.02 ACRES±)

APPROXIMATE NROD AREA

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28/29 AND JUNE 2, 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29-JUNE 15, 2020.

DATE: 07/19/2021

NROD EXISTING CONDITIONS MAP

PARK PLACE CROSSING - OREGON CITY

FIGURE 6

AKS ENGINEERING & FORESTRY, LLC
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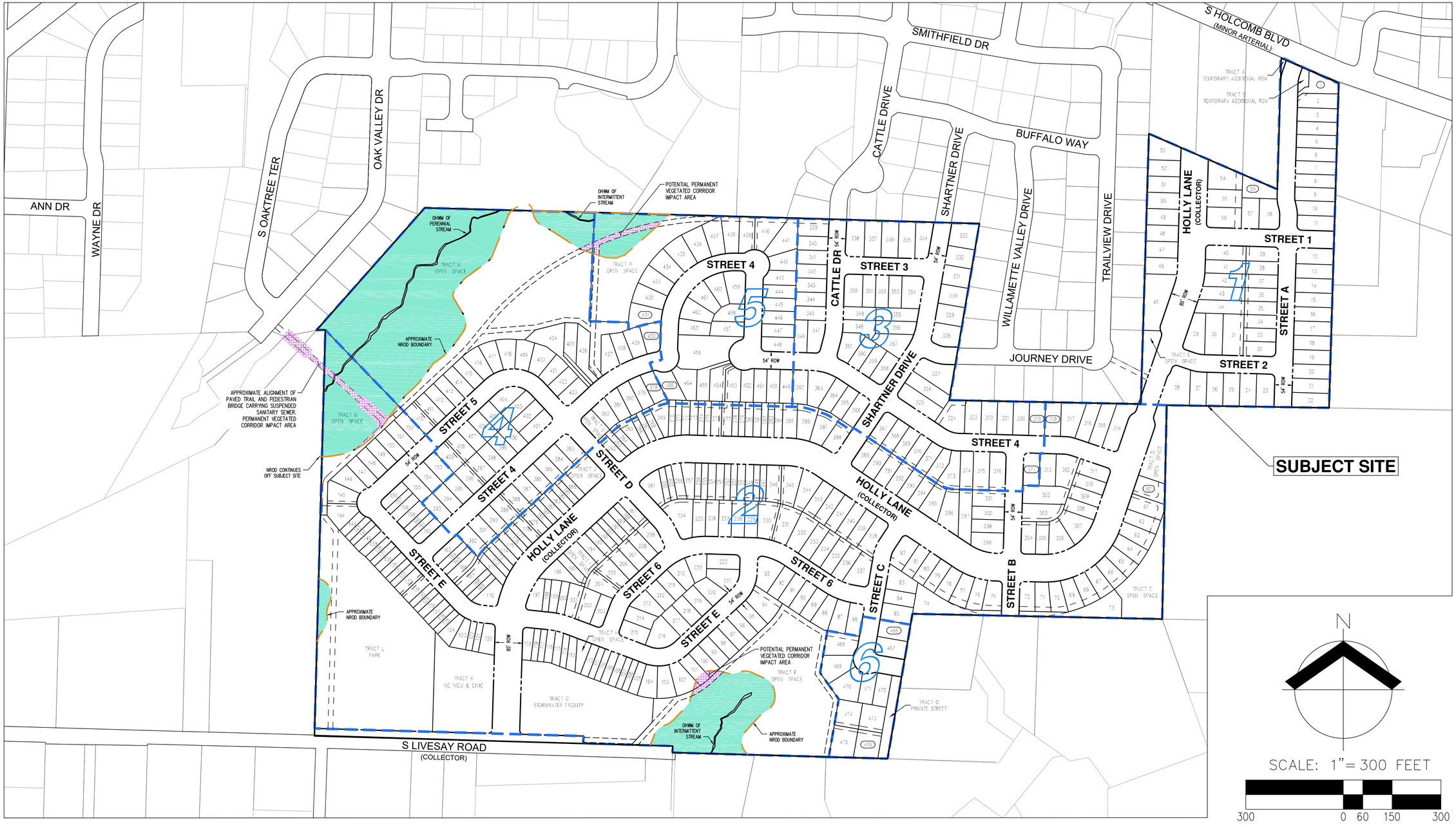
DRWN: NRA
CHKD: CMS
AKS JOB: 7404

DWG: 7404 EXISTING CONDITIONS NROD EXHIBIT | 1



N

SCALE: 1"= 300 FEET

300 0 60 150 300

NOTE:
TAXLOTS 200, 300, 301, 303, AND 502 WERE EXCLUDED FROM THIS NROD ANALYSIS. A FULL WETLAND AND WATER DELINEATION IS REQUIRED PRIOR TO SITE DEVELOPMENT.

LEGEND:

- APPROXIMATE NROD AREA
- POTENTIAL NROD IMPACT AREA

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28/29 AND JUNE 2, 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29–JUNE 15, 2020.

DATE: 01/03/2022

SITE PLAN NROD IMPACT MAP

FIGURE 7

PARK PLACE CROSSING - OREGON CITY

AKS ENGINEERING & FORESTRY, LLC
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CHKD: CMS
AKS JOB: 7404

DWG: 7404 SITE PLAN NROD EXHIBIT | 2

Park Place Crossing
Oregon City, Oregon

General Development Plan/Master Plan
Stormwater Report

Date: Updated January 2022

Client: Icon Construction & Development, LLC

Engineering Contacts: Monty Hurley, PE

Prepared By: Vu Nguyen, PE

Engineering Firm: AKS Engineering & Forestry, LLC
12965 SW Herman Road Suite 100
Tualatin, OR 97062

AKS Job Number: 7404



RENEWAL DATE: 06/30/2023

AKS ENGINEERING & FORESTRY

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2.0 Project Location/Description 2
3.0 Regulatory Design Criteria 2
3.1. Stormwater Quantity Management Criteria 2
3.2. Stormwater Quality Management Criteria 3
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5.1.2. Upstream and Off-site Basin 3
5.2. Predeveloped Site Topography and Land Use 3
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Appendix B: Predeveloped Catchment Map and Detail
Appendix C.1: Post-developed Catchment Map and Detail
Appendix C.2: BMP Sizing Tool Report
Appendix C.3: Stormwater Facilities Location and Detail
Appendix D: Emergency Overflow Calculations
Appendix E: Soils Information from the NRCS Soil Survey of Clackamas County, Oregon
Appendix F: Relevant Information from the City
Appendix G: Phase 1 Temporary Stormwater Facility Sizing

Park Place Crossing General Development Plan/Master Plan Stormwater Report

OREGON CITY, OREGON

1.0 Purpose of Report

The purpose of this report is to analyze the effect development of Park Place Crossing will have on the downstream stormwater conveyance system, document the criteria the proposed stormwater system was designed to meet, identify the sources of information on which the analysis was based, detail the design methodology, and document the results of the analysis. This report is prepared for a General Development Plan, required by the City Commission as a condition of approval of the site's annexation, and does not involve any physical site alterations. Information provided as part of this report is preliminary in nature and will be further refined as part of future Detailed Development Plan applications, where changes or modifications may occur.

2.0 Project Location/Description

The development is located on Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 500, 502, 3700, and 3701 of Clackamas County Assessor's Map 2 2E 28D and Tax Lots 1000 and 2000 of Clackamas County Assessor's Map 2 2E 27BC. The subject site is located north and east of S Livesay Road and south of S Holcomb Road in Oregon City, Oregon. The total site area is ±91.7 acres. Upon completion of the development, stormwater runoff from this development's lots and transportation infrastructure will be collected and routed to a new low impact development (LID) stormwater facility for treatment and detention, prior to release into an existing drainage channel on the south side of the site. A temporary stormwater facility will detain and treat runoff from Park Place Phase 1 until the permanent stormwater facility is constructed with Phase 2. Due to topographic constraints, stormwater runoff from part of Phase 6, park, and civic area cannot be collected and routed to the permanent LID stormwater facility. However, these areas will have their own LID stormwater facilities.

3.0 Regulatory Design Criteria

3.1. Stormwater Quantity Management Criteria

The stormwater quantity management criteria required by the Oregon City Public Works *Stormwater and Grading Design Standards* (March 2020) are summarized below:

> *Flow control facilities shall be designed so that the duration of peak flow rates from post-development conditions shall 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. […] The BMP Sizing Tool addresses these flow control requirements to size stormwater management facilities.*

Clackamas County Water Environment Services (WES) BMP Sizing Tool software was used to size the permanent stormwater quantity management facility for this project. The permanent LID stormwater facility was designed to meet the above criteria for detention, conveyance, and overflow. Slopes in the facility that are below the top of the water surface elevation will be no steeper than 3:1. Beyond the top of the water surface elevation, the ground will rise to meet the existing ground surface at a slope of 2:1, or retaining walls will be installed.

3.2. Stormwater Quality Management Criteria

The stormwater quality management criteria required by the *Stormwater and Grading Design Standards* are summarized below:

> *Water quality facilities shall be designed to capture and treat 80 percent of the average annual runoff volume to the MEP with the goal of 70 percent total suspended solids removal. […] The BMP Sizing Tool addresses these water quality requirements to size stormwater management facilities.*

The BMP Sizing Tool was used to size stormwater facility for stormwater quality management.

3.3. Stormwater Infiltration Criteria

Per the infiltration test result prepared by GeoPacific Engineering, Inc. dated July 14, 2021, falling-head infiltration testing conducted on the project site demonstrated a measured infiltration rate of 0.0 inches per hour.

4.0 Design Methodology

The BMP Sizing Tool was used to design all the LID stormwater facilities. The Santa Barbara Urban Hydrograph (SBUH) method will be used for the stormwater conveyance system analysis of the subject site. The SBUH method uses the Soil Conservation Service (SCS) Type 1A 24-hour storm. HydroCAD computer software aided in the analysis.

5.0 Design Parameters

5.1. Design Storm

5.1.1. On-Site Inlet and Conduit Sizing

Stormwater inlets (curb inlet catch basins) for the site will be placed in streets at all low points in grade and other necessary locations, and will be adequately sized to manage the stormwater for the site. The distance between curb inlet catch basins along streets will generally be 400 feet or less.

The stormwater pipes will be sized using the SBUH method to adequately convey the 25-year (4.0-inch) storm event (gravity flow).

5.1.2. Upstream and Off-site Basin

The existing stormwater outfall from Trail View subdivision's stormwater facility will be connected and routed through new stormwater pipes, which will be installed under this project.

5.2. Predeveloped Site Topography and Land Use

5.2.1. Site Topography

The site area generally slopes toward the existing drainage channels in the south and northwest corner of the site. Vegetative cover on the site consists of trees and grass.

5.2.2. Land Use

Currently, the site is vacant land.

5.3. Soil Type

According to the Natural Resources Conservation Service (NRCS) Soil Survey for Clackamas County, the soils on-site are classified as Helvetia silt loam, Laurelwood silt loam, Saum silt loam, Woodburn silt loam, and Xerochrepts. Information on this soil type is provided in Appendix E. Final hydrologic soil group will

be further evaluated and determined by Geotech Engineering as part of future Detailed Development Plan applications.

5.4. Post-developed Site Topography and Land Use

5.4.1. Site Topography

The post-developed site topography will be altered from the predeveloped site topography to allow the construction of public and private streets, private alleys, single-family homes, and other associated infrastructure and features.

5.4.2. Land Use

The post-developed land use will consist of approximately ±476 lots for single-family homes, public and private streets, private alleys, open space tracts, and stormwater facilities

5.4.3. Post-Developed Input Parameters

Per the Oregon City *Stormwater Master Plan* (July 2019), the following calculation method was used to determine the impervious area of the post-developed site:

- New public rights-of-way areas are assumed to have 90 percent impervious coverage.
- The average impervious coverage for all the lots is 45 percent.

6.0 Calculation Methodology

6.1. Proposed Stormwater Conduit Sizing and Inlet Spacing

The on-site stormwater conduit pipes will be sized using Manning's equation for the 25-year storm event. Stormwater inlets will be placed at locations to adequately capture stormwater runoff from the streets.

6.2. Proposed Stormwater Quantity Control Facility Design

The permanent LID stormwater facility was sized with the BMP Sizing Tool to provide flow control for the stormwater runoff from impervious areas within the new rights-of-way and lots (area of Phase 1, 2, 3, 4, 5, and part of Phase 6). Stormwater quantity facility design parameters were determined from topographic survey information, aerial photographs, hydrologic soil group, contours, design, and analysis. The LID stormwater facility was designed to address the stormwater quantity and detention requirements of the *Stormwater and Grading Design Standards*.

A temporary LID stormwater facility will be constructed with Phase 1 to provide flow control for the stormwater runoff from impervious areas within the new rights-of-way and lots of Phase 1. Stormwater runoff from this temporary LID stormwater facility will be routed and discharged into the existing stormwater line of the Trail View subdivision. This temporary LID stormwater facility will be decommissioned and converted to lots when Park Place Crossing Phase 2 is constructed and the permanent LID stormwater facility is installed. Sizing of the Phase 1 temporary LID stormwater facility is provided in Appendix G.

Due to topographic constraints, stormwater runoff from part of Phase 6, park, and civic area cannot be collected and routed to the permanent LID stormwater facility. However, these areas will have their own LID stormwater facilities to address the stormwater quantity and detention requirements of the *Stormwater and Grading Design Standards*.

6.3. Proposed Stormwater Quality Facility Design

The permanent LID stormwater facility were sized with the BMP Sizing Tool to provide water quality management for the stormwater runoff from future impervious areas of roofs constructed on the lots of Phases 1, 2, 3, 4, and 5, as well as part of Phase 6. LID filtration stormwater planters and swales between the curb and sidewalk of the streets within the development were sized using the BMP Sizing Tool to provide water quality management of stormwater runoff from impervious areas within the new street rights-of-way. Preliminary information regarding these LID filtration stormwater planters and swales is provided per the General Development Plan. Changes or modifications to the LID filtration stormwater planters and swales may occur if the evaluation conducted as part of future Detailed Development Plan applications determines changes are necessary. Stormwater quality facility design parameters were determined from topographic survey information, aerial photographs, hydrologic soil group, contours, design, and analysis. The LID stormwater facilities were designed to address the stormwater quality requirements of the *Stormwater and Grading Design Standards*.

A temporary LID stormwater facility will be constructed with Phase 1 to provide water quality management of the stormwater runoff from impervious (roof) areas on lots of Phase 1. Stormwater runoff from this temporary LID stormwater facility will be routed and discharged into existing stormwater line of the Trail View subdivision. This temporary LID stormwater facility will be decommissioned and converted to lots when Park Place Crossing Phase 2 is constructed and the permanent LID stormwater facility is installed. Sizing of the Phase 1 temporary LID stormwater facility is provided in Appendix G.

Due to topographic constraints, stormwater runoff from part of Phase 6, park, and civic area cannot be collected and routed to the permanent LID stormwater facility. However, these areas will have their own LID stormwater facilities to address the stormwater quality requirements of the *Stormwater and Grading Design Standards*.

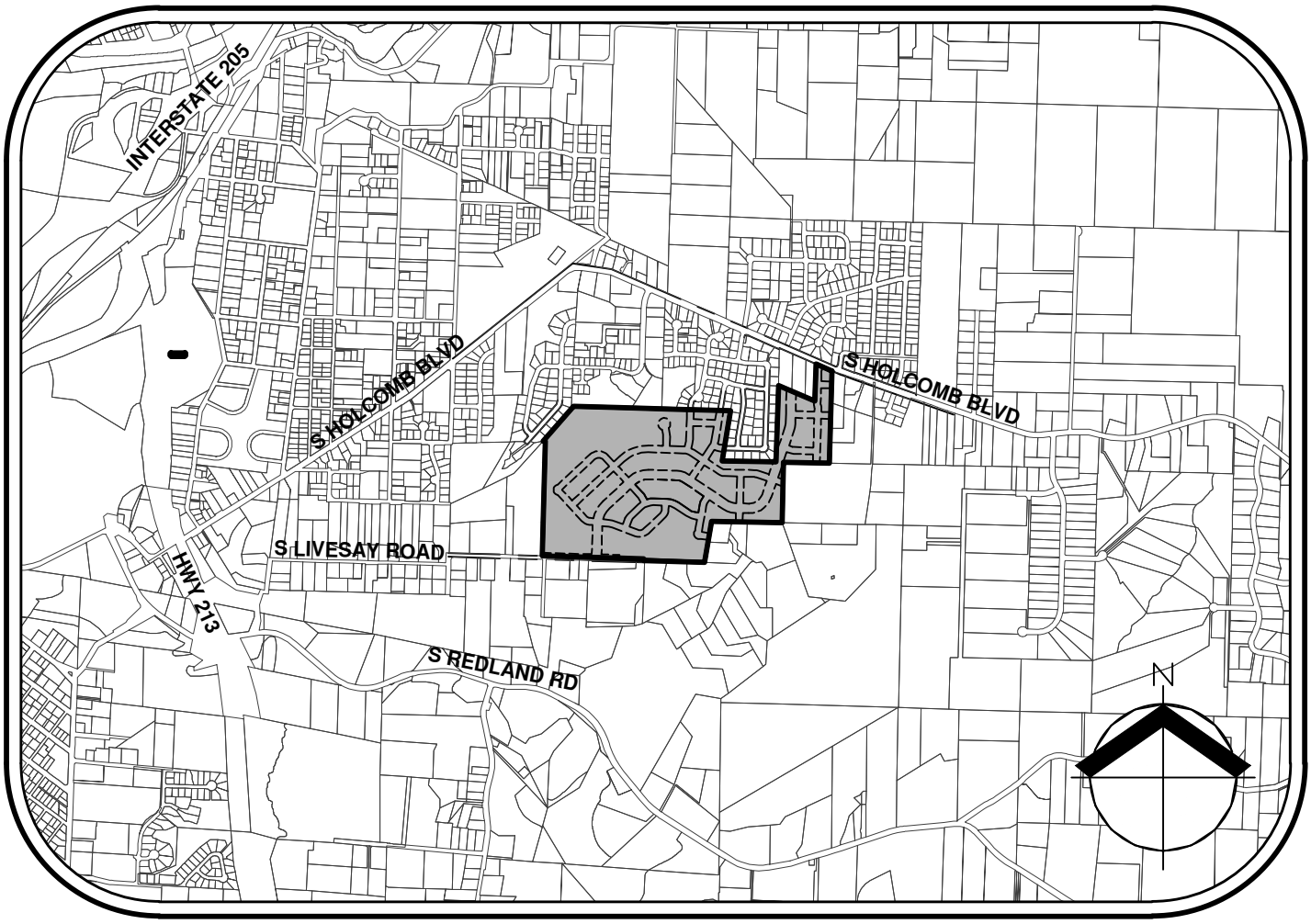
6.4. Emergency Overflow Calculations

The emergency overflow weir for the permanent LID stormwater facility was sized to convey the 100-year storm event. Calculations are included in Appendix D. If the permanent stormwater facility's outlet structures become plugged and cannot convey runoff from the site, the stormwater will overflow through the emergency overflow and to the downstream drainage.

6.5. Downstream Analysis

Peak flow discharges from the stormwater facilities will be detained and metered out at or below the predevelopment runoff condition for all peak flows between 42 percent of the 2-year storm up to the 10-year storm event. Therefore, this project will not negatively impact downstream capacity.

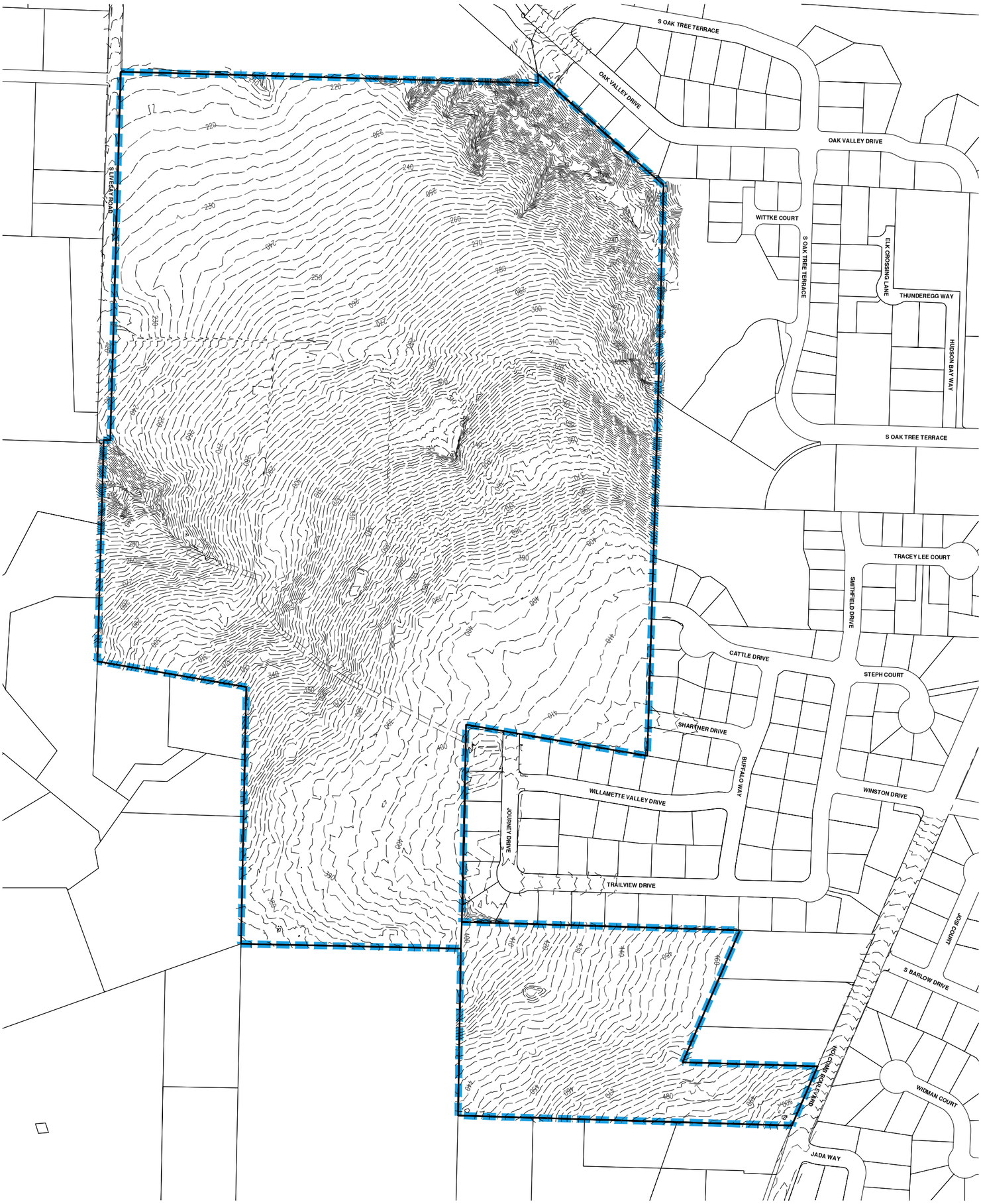
Appendix A: Vicinity Map



VICINITY MAP

NOT TO SCALE

Appendix B: Pre-developed Catchment Map and Detail



SCALE: 1" = 150 FEET

ORIGINAL PAGE SIZE: 22" x 34"

PRELIMINARY NOT FOR CONSTRUCTION

EXISTING CONDITIONS PLAN
PARK PLACE CROSSING
ICON CONSTRUCTION & DEVELOPMENT, LLC
OREGON CITY, OR

JOB NUMBER: 7404
DATE: 07/15/2021
DESIGNED BY: CMS
DRAWN BY: NRA
CHECKED BY: DHS

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151
WWW.AKS-ENG.COM

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Appendix C.1: Post-developed Catchment Map and Detail

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POST-DEVELOPED BASIN MAP
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY
NOT FOR
CONSTRUCTION

JOB NUMBER:	7404
DATE:	07/15/2021
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

HUDSON BAY WAY
ELK CROSSING LANE
OAK TREE TERRACE
TRACEY LEE COURT
STEPH COURT
HOLCOMB BLVD
WINSTON DRIVE
S BARLOW DRIVE
SMITHFIELD DRIVE
BUFFALO WAY
OAK VALLEY DRIVE
SHARTNER DRIVE
CATTLE DRIVE
WILLAMETTE VALLEY DRIVE
TRAIL VIEW DRIVE
HOLLY LANE
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET A
STREET B
STREET C
STREET D
STREET E
STREET F
STREET G
TRACT A
TRACT B
TRACT C
TRACT D
TRACT E
TRACT F
TRACT G
TRACT J
TRACT K
TRACT L
TRACT M
TRACT N
TRACT O
TRACT P
STM
TAX LOT 100
TAX MAP 2 2E 28CA
TAX LOT 900
TAX LOT 1000
TAX LOT 1100
TAX LOT 1200
TAX LOT 3000
TAX LOT 6300
TAX MAP 2 2E 28AC
TAX LOT 1709
TAX MAP 2 2E 28A
TAX LOT 7300
TAX MAP 2 2E 28AD
TAX LOT 4400
TAX LOT 1090
TAX MAP 2 2E 28D
TAX LOT 1390
TAX MAP 2 2E 28D
TAX LOT 1300
TAX MAP 2 2E 28D
TAX LOT 2500
TAX MAP 2 2E 28D
TAX LOT 2400
TAX MAP 2 2E 28D
TAX LOT 2300
TAX MAP 2 2E 28D
TAX LOT 1401
TAX MAP 2 2E 28D
TAX LOT 1403
TAX MAP 2 2E 28D
TAX LOT 1402
TAX MAP 2 2E 28D
TAX LOT 1404
TAX MAP 2 2E 28D
TAX LOT 1190
TAX MAP 2 2E 27BC
TAX LOT 1100
TAX MAP 2 2E 27BC
TAX LOT 1203
TAX MAP 2 2E 27BC
TAX LOT 1200
TAX MAP 2 2E 27BC
TAX LOT 400
TAX MAP 2 2E 27C
TAX LOT 1600
TAX MAP 2 2E 27BC
TAX LOT 800
TAX MAP 2 2E 27BC
TAX LOT 900
TAX MAP 2 2E 27BC

FLOW SPLITTER MANHOLE
PERMANENT STORMWATER FACILITY
APPROXIMATE SIZE AND LOCATION OF TEMPORARY STORMWATER FACILITY FOR PHASE 1
POST-DEVELOPED DRAINAGE BASIN THAT DRAINS TO PERMANENT STORMWATER FACILITY
CONCEPTUAL STORMWATER PLANTER/SWALE ARE FOR ILLUSTRATIVE PURPOSES ONLY. THESE FACILITIES WILL BE DETERMINED LATER IN THE FUTURE DETAILED DEVELOPMENT PLAN

N
SCALE: 1"=150 FEET
150 0 30 75 150
ORIGINAL PAGE SIZE: 22" x 34"

AKS DRAWING FILE: 7404 POST-MAP UPDATED.DWG | LAYOUT: POST-MAP

Appendix C.2: BMP Sizing Tool Report

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	Park Place Crossing Master Plan
Project Type	Subdivision
Location	
Stormwater Management Area	35500
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Impervious in ROW (C soil)	718,660	Forested	ConventionalConcrete	C	LID Stormwater Planter/Swale in ROW
Impervious in ROW (B soil)	98,000	Forested	ConventionalConcrete	B	LID Stormwater Planter/Swale in ROW
Pervious in ROW (C soil)	79,852	Forested	Grass	C	LID Stormwater Planter/Swale in ROW
Pervious in ROW (B soil)	10,888	Forested	Grass	B	LID Stormwater Planter/Swale in ROW
Pervious in Lots (C soil)	978,455	Forested	Grass	C	LID Stormwater Planter/Swale in ROW
Pervious in Lots (B soil)	133,426	Forested	Grass	B	LID Stormwater Planter/Swale in ROW
Impervious in Lots (C soil)	800,553	Forested	Roofs	C	LID Stormwater Pond
Impervious in Lots (B soil)	109,166	Forested	Roofs	B	LID Stormwater Pond
Impervious Alley (C soil)	77,615	Forested	ConventionalConcrete	C	LID Stormwater Pond
Impervious Alley (B soil)	10,585	Forested	ConventionalConcrete	B	LID Stormwater Pond

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
LID Stormwater Planter/Swale in ROW	WaterQuality	Stormwater Planter - Filtration	D1	17,481.3	17,500.0	6.0

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?
LID Storm water Pond	FCWQT	Lined	13.00	35,029.0	3	291,960.5	266,780.5	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.

Simple Pond Geometry Configuration

Pond ID: LID Stormwater Pond
Design: FlowControlAndTreatment

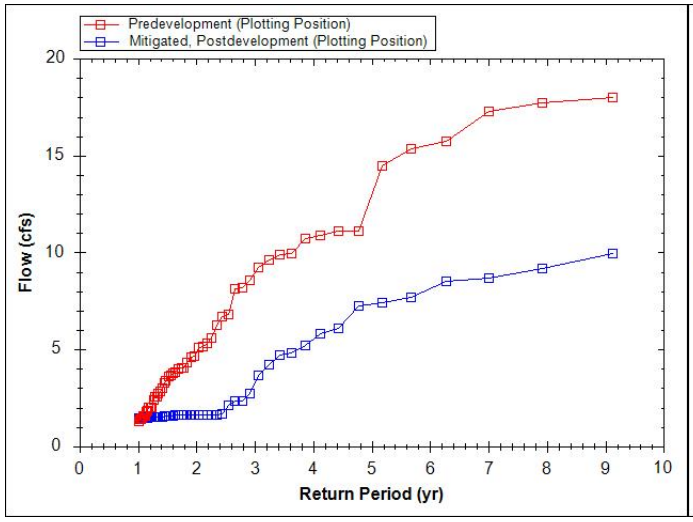
Shape Curve

Depth (ft)	Area (sq ft)
13.0	35,029.0

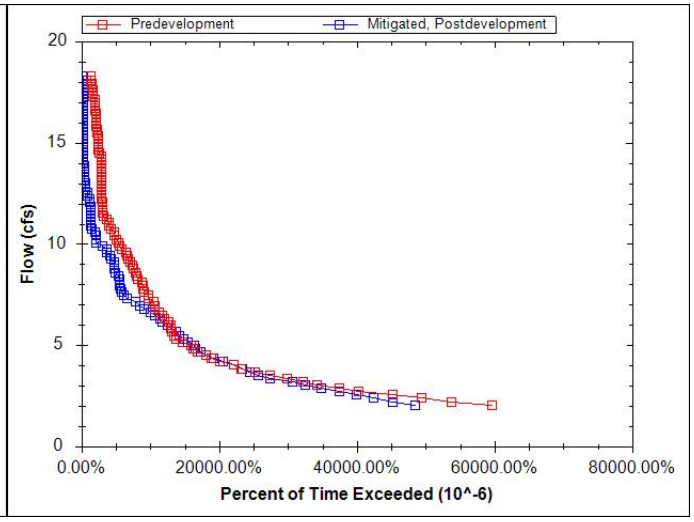
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	4.6
Upper Orifice Invert(ft)	8.7
Upper Orifice Dia (in)	17.4
Overflow Weir Invert(ft)	12.0
Overflow Weir Length (ft)	6.3

Flow Frequency Chart



Flow Duration Chart



Appendix C.3: Stormwater Facilities Location and Detail

HUDSON BAY WAY
ELK CROSSING LANE
OAK TREE TERRACE
TRACEY LEE COURT
STEPH COURT
HOLCOMB BLVD
WINSTON DRIVE
S BARLOW DRIVE
SMITHFIELD DRIVE
BUFFALO WAY
SHARTNER DRIVE
OAK VALLEY DRIVE
CATTLE DRIVE
WILLAMETTE VALLEY DRIVE
TRAIL VIEW DRIVE
HOLLY LANE
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET A
STREET B
STREET C
STREET D
STREET E
STREET F
STREET G
TRACT C
TRACT D
TRACT E
TRACT F
TRACT G
TRACT J
TRACT K
TRACT L
TRACT M
TRACT N
TRACT O
TRACT P
TAX LOT 100
TAX MAP 2 2E 28CA
TAX LOT 900
TAX MAP 2 2E 28AC
TAX LOT 1000
TAX MAP 2 2E 28AC
TAX LOT 1100
TAX MAP 2 2E 28AC
TAX LOT 1200
TAX MAP 2 2E 28AC
TAX LOT 3000
TAX MAP 2 2E 28AC
TAX LOT 6300
TAX MAP 2 2E 28AC
TAX LOT 1709
TAX MAP 2 2E 28A
TAX LOT 7300
TAX MAP 2 2E 28AD
TAX LOT 4400
TAX MAP 2 2E 28AD
TAX LOT 1600
TAX MAP 2 2E 27BC
TAX LOT 800
TAX MAP 2 2E 27BC
TAX LOT 900
TAX MAP 2 2E 27C
TAX LOT 1190
TAX MAP 2 2E 27BC
TAX LOT 1100
TAX MAP 2 2E 27BC
TAX LOT 1203
TAX MAP 2 2E 27BC
TAX LOT 1200
TAX MAP 2 2E 27BC
TAX LOT 400
TAX MAP 2 2E 27C
TAX LOT 1401
TAX MAP 2 2E 28D
TAX LOT 1403
TAX MAP 2 2E 28D
TAX LOT 1404
TAX MAP 2 2E 28D
TAX LOT 1402
TAX MAP 2 2E 28D
TAX LOT 1090
TAX MAP 2 2E 28D
TAX LOT 1100
TAX MAP 2 2E 28D
TAX LOT 1200
TAX MAP 2 2E 28D
TAX LOT 1390
TAX MAP 2 2E 28D
TAX LOT 1300
TAX MAP 2 2E 28D
TAX LOT 2500
TAX MAP 2 2E 28D
TAX LOT 2400
TAX MAP 2 2E 28D
TAX LOT 2300
TAX MAP 2 2E 28D

FLOW SPLITTER MANHOLE
PERMANENT STORMWATER FACILITY
APPROXIMATE SIZE AND LOCATION OF TEMPORARY STORMWATER FACILITY FOR PHASE 1
POST-DEVELOPED DRAINAGE BASIN THAT DRAINS TO PERMANENT STORMWATER FACILITY
CONCEPTUAL STORMWATER PLANTER/SWALE ARE FOR ILLUSTRATIVE PURPOSES ONLY. THESE FACILITIES WILL BE DETERMINED LATER IN THE FUTURE DETAILED DEVELOPMENT PLAN

N
SCALE: 1"=150 FEET
150 0 30 75 150
ORIGINAL PAGE SIZE: 22" x 34"

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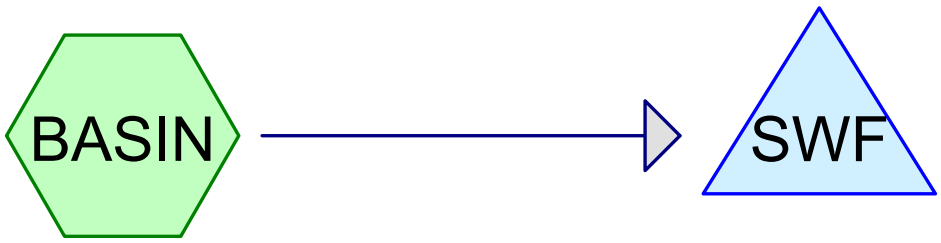
STORMWATER FACILITIES LOCATION
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY
NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	07/15/2021
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

AKS DRAWING FILE: 7404 POST-MAP UPDATED.DWG | LAYOUT: LOCATION

Appendix D: Emergency Overflow Calculations



DRAINAGE BASIN LID Stormwater Facility

Subcat Reach Pond Link

7404 Master Overflow HydroCad
Prepared by AKS Engineering & Forestry, LLC
Printed 1/12/2022
HydroCAD® 10.00-22 s/n 01338 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
22.910	98	Impervious (BASIN)
18.750	98	Impervious in ROW (BASIN)
3.310	61	Lawn - B Soil (BASIN)
24.290	74	Lawn - C Soil (BASIN)

7404 Master Overflow HydroCad *Type IA 24-hr 100-yr Rainfall=4.50"*
Prepared by AKS Engineering & Forestry, LLC Printed 1/12/2022
HydroCAD® 10.00-22 s/n 01338 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment BASIN: DRAINAGE BASIN Runoff Area=69.260 ac 60.15% Impervious Runoff Depth>3.28"
Tc=10.0 min CN=72/98 Runoff=50.52 cfs 18.916 af

Pond SWF: LID Stormwater Facility Peak Elev=223.33' Storage=299,123 cf Inflow=50.52 cfs 18.916 af
Outflow=26.52 cfs 12.238 af

Summary for Subcatchment BASIN: DRAINAGE BASIN

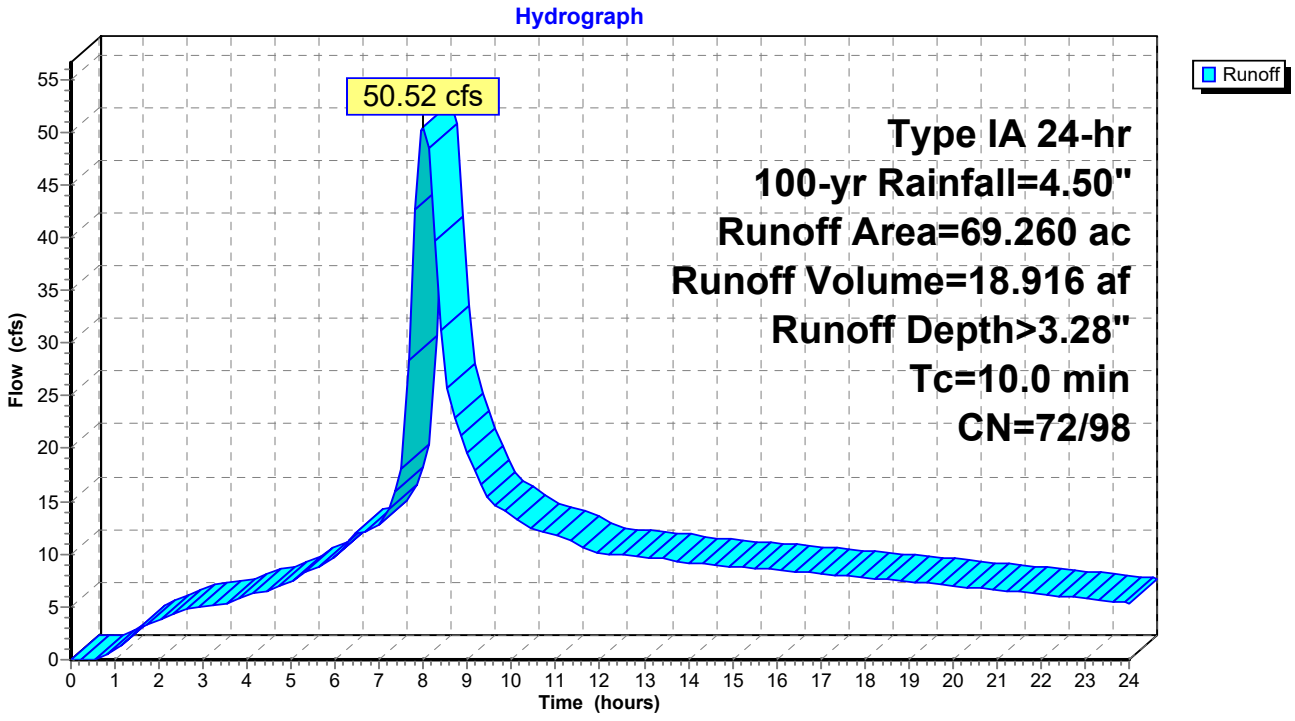
Runoff = 50.52 cfs @ 8.00 hrs, Volume= 18.916 af, Depth> 3.28"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
Type IA 24-hr 100-yr Rainfall=4.50"

	Area (ac)	CN	Description
*	18.750	98	Impervious in ROW
*	22.910	98	Impervious
*	24.290	74	Lawn - C Soil
*	3.310	61	Lawn - B Soil
	69.260	88	Weighted Average
	27.600		39.85% Pervious Area
	41.660		60.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment BASIN: DRAINAGE BASIN



Summary for Pond SWF: LID Stormwater Facility

Inflow Area = 69.260 ac, 60.15% Impervious, Inflow Depth > 3.28" for 100-yr event
Inflow = 50.52 cfs @ 8.00 hrs, Volume= 18.916 af
Outflow = 26.52 cfs @ 8.62 hrs, Volume= 12.238 af, Atten= 47%, Lag= 37.2 min
Primary = 26.52 cfs @ 8.62 hrs, Volume= 12.238 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
Peak Elev= 223.33' @ 8.55 hrs Surf.Area= 39,084 sf Storage= 299,123 cf

Plug-Flow detention time= 388.4 min calculated for 12.162 af (64% of inflow)
Center-of-Mass det. time= 179.3 min (881.2 - 701.9)

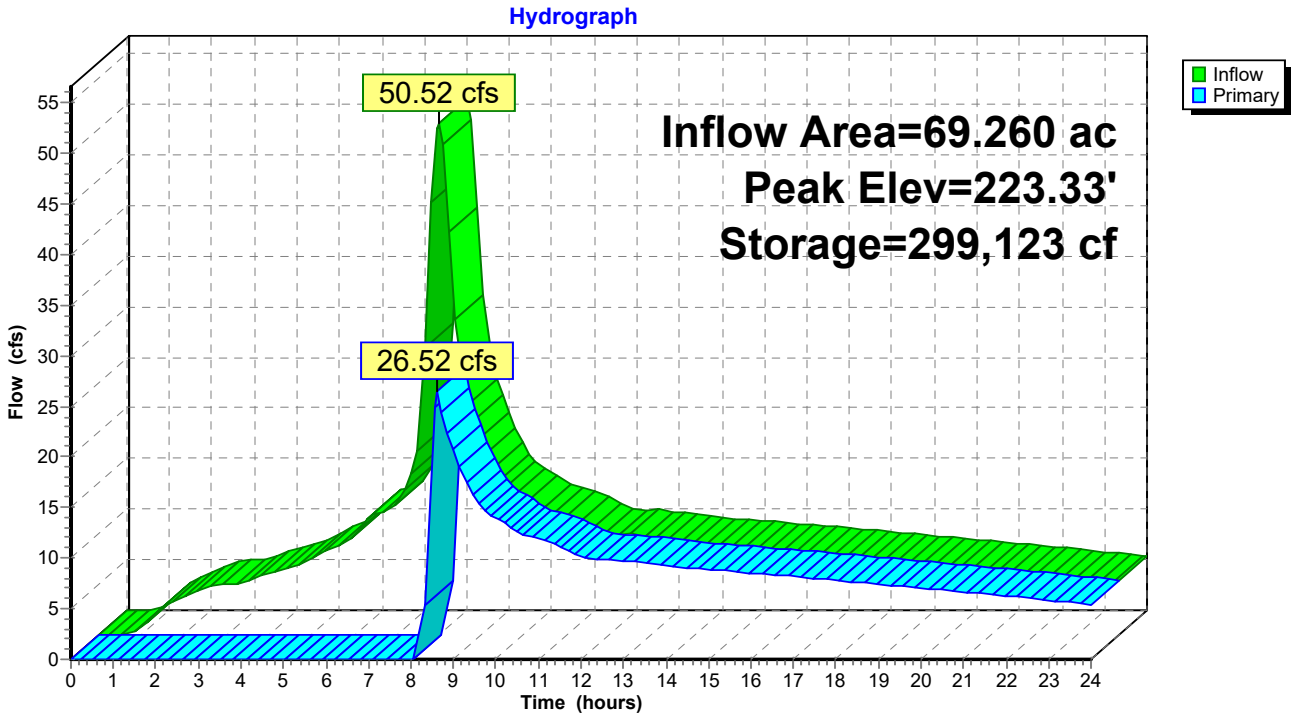
Volume	Invert	Avail.Storage	Storage Description
#1	209.00'	326,019 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.00	12,700	0.0	0	0
211.90	12,700	30.0	11,049	11,049
212.00	12,700	100.0	1,270	12,319
213.00	14,800	100.0	13,750	26,069
214.00	16,900	100.0	15,850	41,919
215.00	19,000	100.0	17,950	59,869
216.00	21,200	100.0	20,100	79,969
217.00	23,500	100.0	22,350	102,319
218.00	25,800	100.0	24,650	126,969
219.00	28,200	100.0	27,000	153,969
220.00	30,600	100.0	29,400	183,369
221.00	33,100	100.0	31,850	215,219
222.00	35,600	100.0	34,350	249,569
223.00	38,200	100.0	36,900	286,469
224.00	40,900	100.0	39,550	326,019

Device	Routing	Invert	Outlet Devices
#1	Primary	223.00'	**40.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=24.19 cfs @ 8.62 hrs HW=223.32' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 24.19 cfs @ 1.86 fps)

Pond SWF: LID Stormwater Facility



Appendix E: Soils Information from the USDA Soil Survey of Clackamas County, Oregon

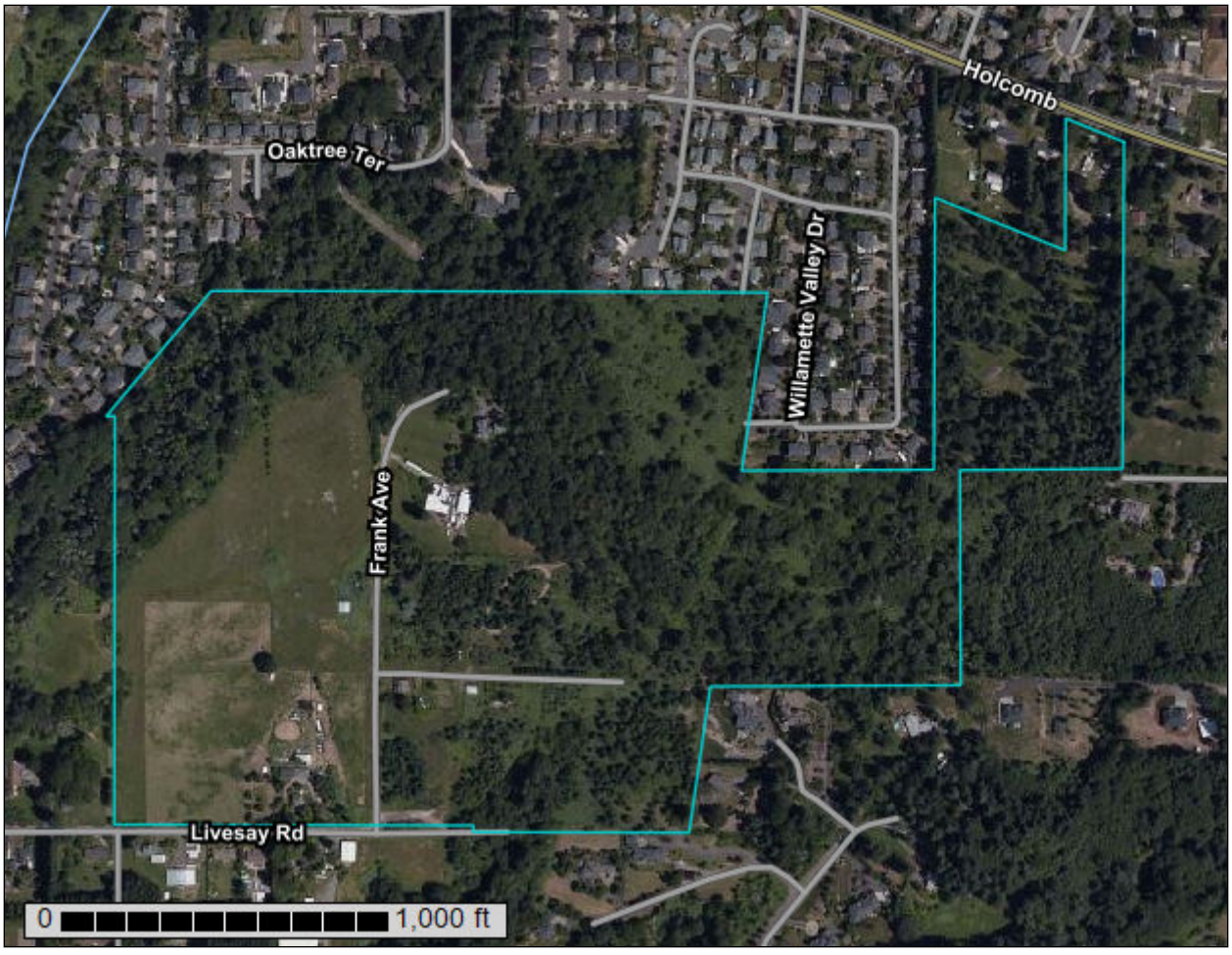
United States Department of Agriculture

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



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.

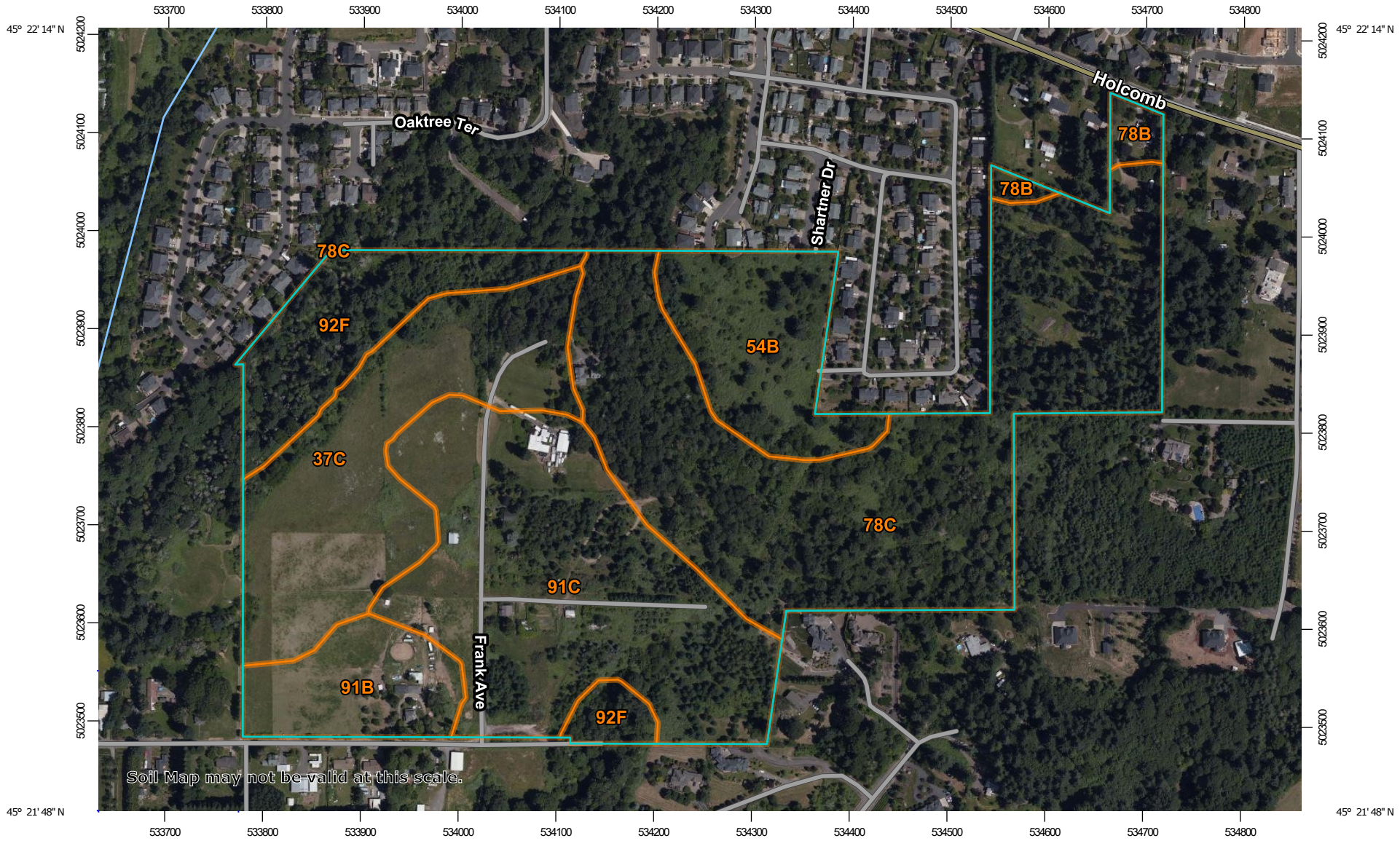
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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: 1:5,620 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 13, 2019—Jul 25, 2019

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
37C	Helvetia silt loam, 8 to 15 percent slopes	15.1	16.5%
54B	Laurelwood silt loam, 3 to 8 percent slopes	7.8	8.5%
78B	Saum silt loam, 3 to 8 percent slopes	1.2	1.3%
78C	Saum silt loam, 8 to 15 percent slopes	31.6	34.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	5.4	5.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	22.3	24.3%
92F	Xerochrepts and Haploxerolls, very steep	8.2	8.9%
Totals for Area of Interest		**91.7**	**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

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
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 capacity: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
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

54B—Laurelwood silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 225n
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: All areas are prime farmland

Map Unit Composition

Laurelwood and similar soils: 85 percent
Minor components: 2 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: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
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 capacity: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Aqualfs

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

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
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 capacity: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
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
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 capacity: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

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
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 capacity: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
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

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

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
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
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 capacity: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
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
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 capacity: 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
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 capacity: 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

Soil Information for All Uses

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.

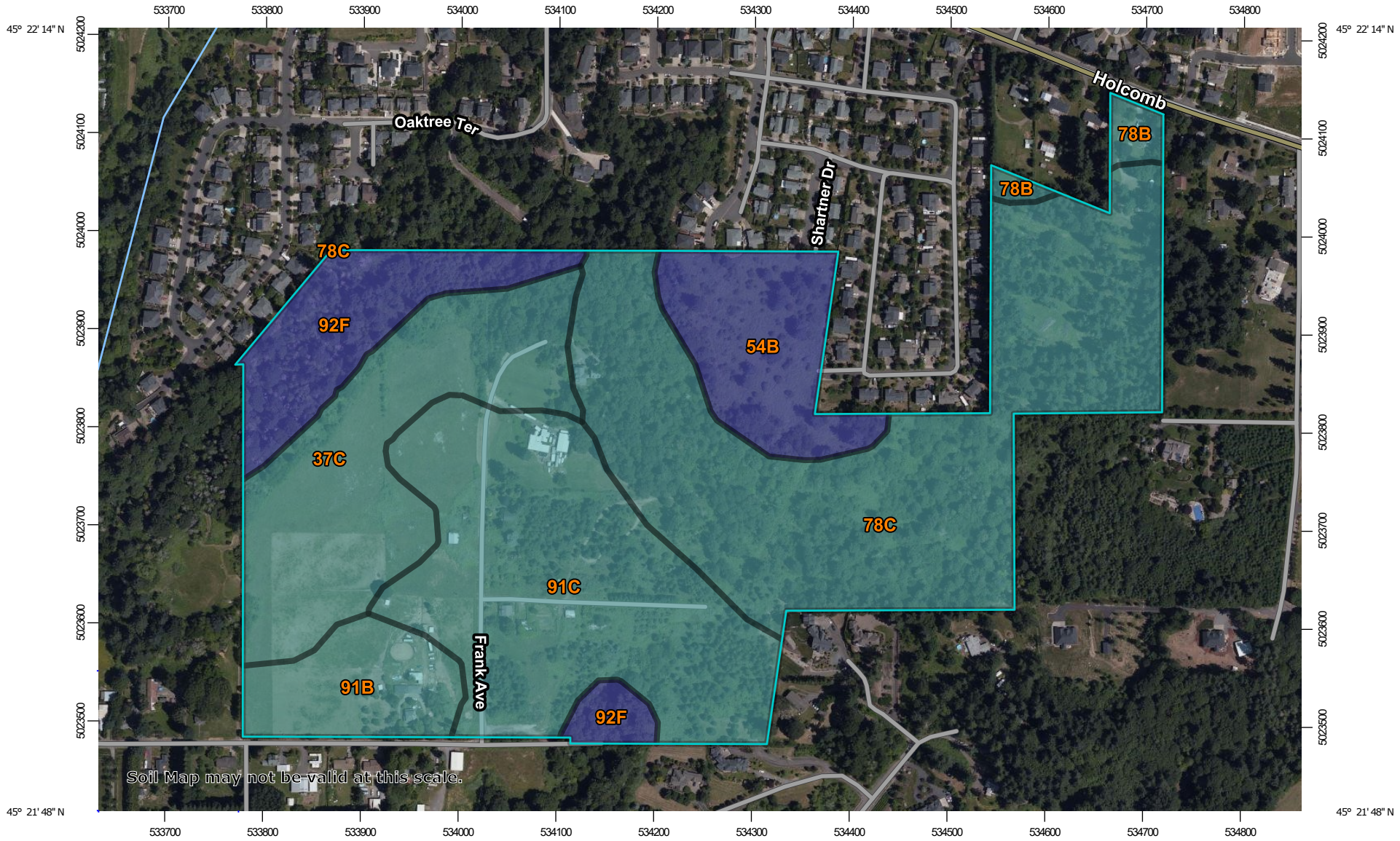
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:5,620 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 13, 2019—Jul 25, 2019

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

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
37C	Helvetia silt loam, 8 to 15 percent slopes	C	15.1	16.5%
54B	Laurelwood silt loam, 3 to 8 percent slopes	B	7.8	8.5%
78B	Saum silt loam, 3 to 8 percent slopes	C	1.2	1.3%
78C	Saum silt loam, 8 to 15 percent slopes	C	31.6	34.5%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	5.4	5.9%
91C	Woodburn silt loam, 8 to 15 percent slopes	C	22.3	24.3%
92F	Xerochrepts and Haploxerolls, very steep	B	8.2	8.9%
Totals for Area of Interest			**91.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Appendix F: Relevant Information from the City

Brown AND Caldwell

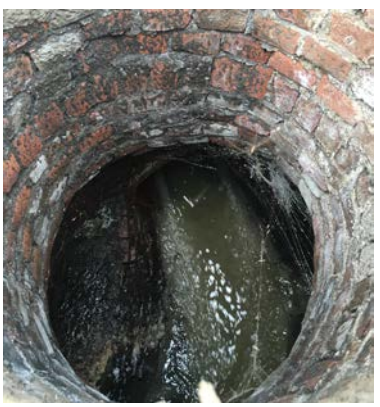
FINAL REPORT | Prepared for
The City of Oregon City

Stormwater Master Plan

July 2019









2.3 Existing Conditions Land Use

During development of the 2015 *Pollutant Load Reduction Evaluation* the City generated an updated GIS layer to represent existing land use coverage (City 2015b). The land use coverage is based on the City's *Oregon City Comprehensive Plan* land use data and also incorporated vacant land data from Metro, which is based on 2013 aerial photos (City 2004). The land use categories from the *Oregon City Comprehensive Plan* were grouped into the land use modeling categories as shown in Figure 3. These updated GIS layers formed the basis of the existing condition land use analysis.

2.4 Future Conditions Land Use

For future conditions land use, it is assumed all vacant lands under existing conditions land use will be developed to match the City's comprehensive plan zoning. An additional shapefile was provided by the City for future land use, which is shown in Figure 4.

2.5 Impervious Coverage

The City calculated the impervious cover percentage for each modeled land use category in 2015. Each parcel in the city was assigned an impervious area percentage based on either Metro impervious area coverages or Clackamas County Assessor's data. Roads were assumed to have a 90 percent impervious coverage. The average impervious coverage for all parcels within each modeled land use category was then calculated as shown in Table 1.

Table 1. Modeled Land Use Categories

Comprehensive plan land use category	Modeled land use category	2015 modeled impervious percentage
Low-density residential (LR)	Single-family residential	45
Medium-density residential (MR)	Single-family residential	
High-density residential (HR)	Multi-family residential	57
Commercial (COM)	Commercial	74
Mixed-use corridor (MUC)	Commercial	
Mixed-use downtown (MUD)	Commercial	
Industrial (IND)	Industrial	63
Mixed-use employment (MUE)	Industrial	
Quasi-public	Public facility	34
Parks	Parks and open space	19
Future urban holding (FUH)	Agriculture [a]	48
All vacant	Vacant [b]	21

a. The impervious percentage for agriculture is higher than expected because the only areas designated as agriculture are portions of small farms along Beavercreek Road in the southeast corner of Oregon City. The areas included in Oregon City limits are typically driveways and houses, which include the bulk of the impervious area for those properties.

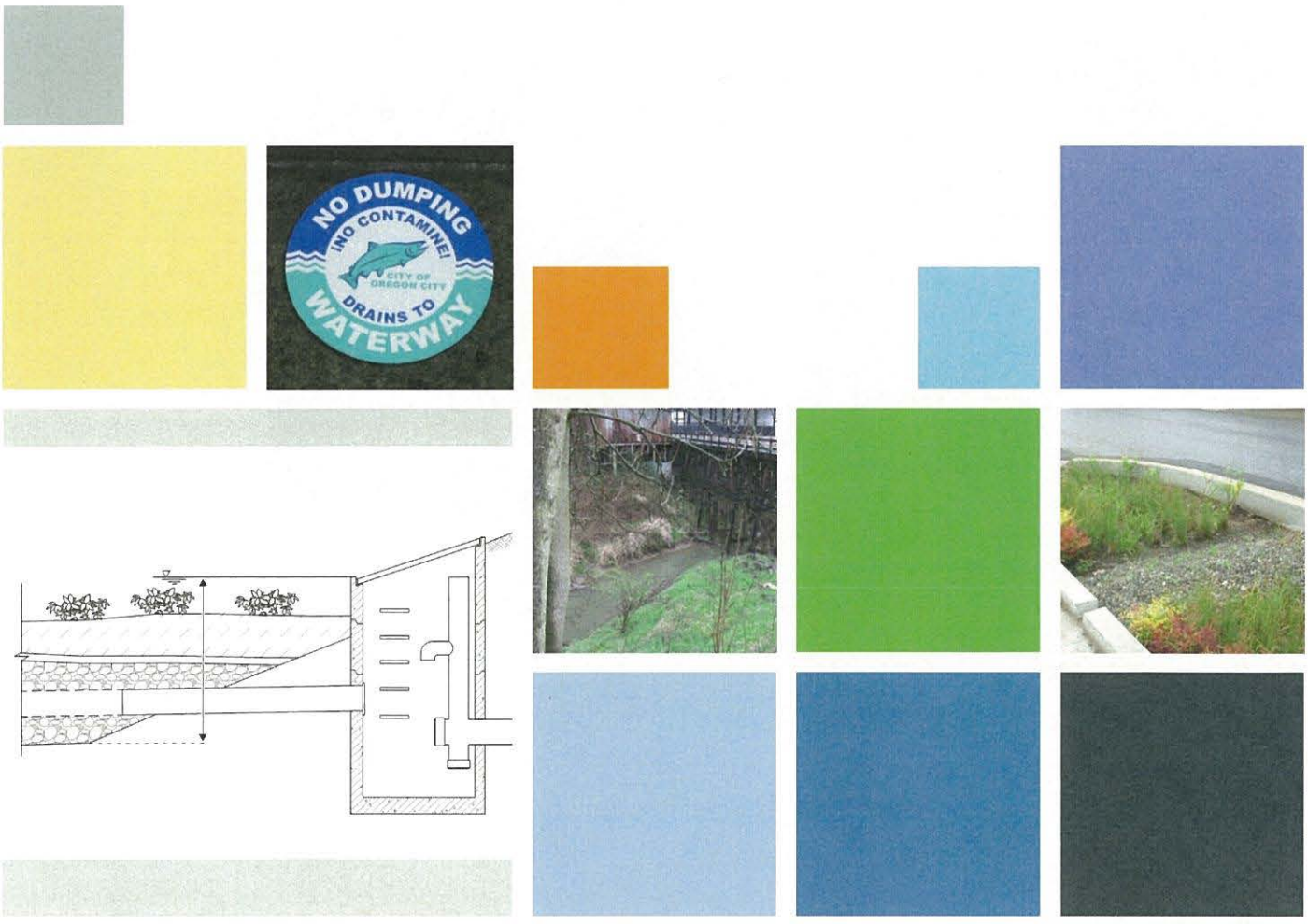
b. Vacant lands include areas of all land use categories that are not currently developed or are not developed to the density indicated in the comprehensive plan (City 2004). Vacant land includes unused COM and IND land along the Oregon Highway 205 corridor.

Use of contents on this sheet is subject to the limitations specified at the beginning of this document.

Stormwater and Grading Design Standards

March 2020

OREGON CITY



ance system being designed. The design events for conveyance system sizing are listed in **Table 5-1**. Design rainfall intensities and 24-hour storm events are included in **Section 5.3.3 and 5.3.4**.

Table 5-1. 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 shall be designed to convey and contain at least the peak runoff for the 25-year design storm as described in* ***Section 5.3.6.***

5.3.2 Design Methodology

The following are general design considerations for conveyance sizing requirements:

A. Conveyance systems shall 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.

B. Conveyance systems in the public right-of-way (ROW) shall be designed as gravity systems, without the use of stormwater pumps. Privately-owned and maintained stormwater pumps may be allowed with City approval as described in **Section 5.13**.

C. The Rational Method for computing peak discharge is preferred by the City. The Rational Method shall 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 (Tc) of less than 100 minutes. For all other conditions, an approved hydrograph method (ex. Santa Barbara Urban Hydrograph (SBUH), Natural Resources Conservation Service (NRCS) Method, or Technical Release 55 (TR-55)), stormwater management model (SWMM), or other standard method as approved by the City shall be used.

D. Manning's equation generally shall 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 shall be included in determining capacity for a drainageway, typically using HEC RAS or equivalent computer modeling software.

5.3.3 Rational Method

The Rational Method is most applicable for runoff estimates from small drainages with large amounts of impervious area, as is typical within Oregon City. When using the Rational Method, refer to the Oregon Department of Transportation (ODOT) *Hydraulics Manual* for calculation formulas and tables of coefficients.

APPENDIX H. HYDROGRAPH METHOD GUIDELINES

The Santa Barbara Urban Hydrograph (SBUH) method was developed by the Santa Barbara County Flood Control and Water Conservation District to determine a runoff hydrograph for an urbanized area. It is a simpler method than some other approaches, as it computes a hydrograph directly without going through intermediate steps (i.e., a unit hydrograph) to determine the runoff hydrograph.

The SBUH method is a popular method for calculating runoff, since it can be done with a spreadsheet or by hand relatively easily. The SBUH method can be used to calculate peak flows and runoff volumes for sizing conveyance systems or stormwater management facilities when flow-duration matching is not required.

Elements of the SBUH Method

The SBUH method depends on several variables:

- Design storm
- Pervious (A_p) and impervious (A_{imp}) land areas
- Time of concentration (Tc) calculations
- Runoff curve numbers (CN) applicable to the site

These elements shall all be presented as part of the submittal process. In addition, maps showing the pre-development and post-development conditions shall be presented to help in the review.

Design Storm

The SBUH method also requires a design storm to perform the runoff calculations. Oregon City uses a NRCS Type 1A 24-hour storm distribution. This storm is shown in **Figure H-1** at the end of this appendix. The depth of rainfall for the water quality design storm shall be 1.0 inches[1] in 24 hours. The depth of rainfall for the 2 through 100-year 24-hour storm events is shown below in **Table H-1.**

Table H-1. 24-hour Rainfall Depths in Oregon City

Recurrence Interval, Years	24-Hour Depth, Inches
2	2.8
10	3.5
25	4.0
50	4.4
100	4.5

Source: NOAA Atlas 2, Volume X

[1] The water quality design storm rainfall depth as documented in a technical memorandum: *Selection of Representative Rainfall Volume and Rainfall Intensities to result in Capture and Treatment of 80% of the Average Annual Runoff Volume*, Brown and Caldwell, May 11, 2010.

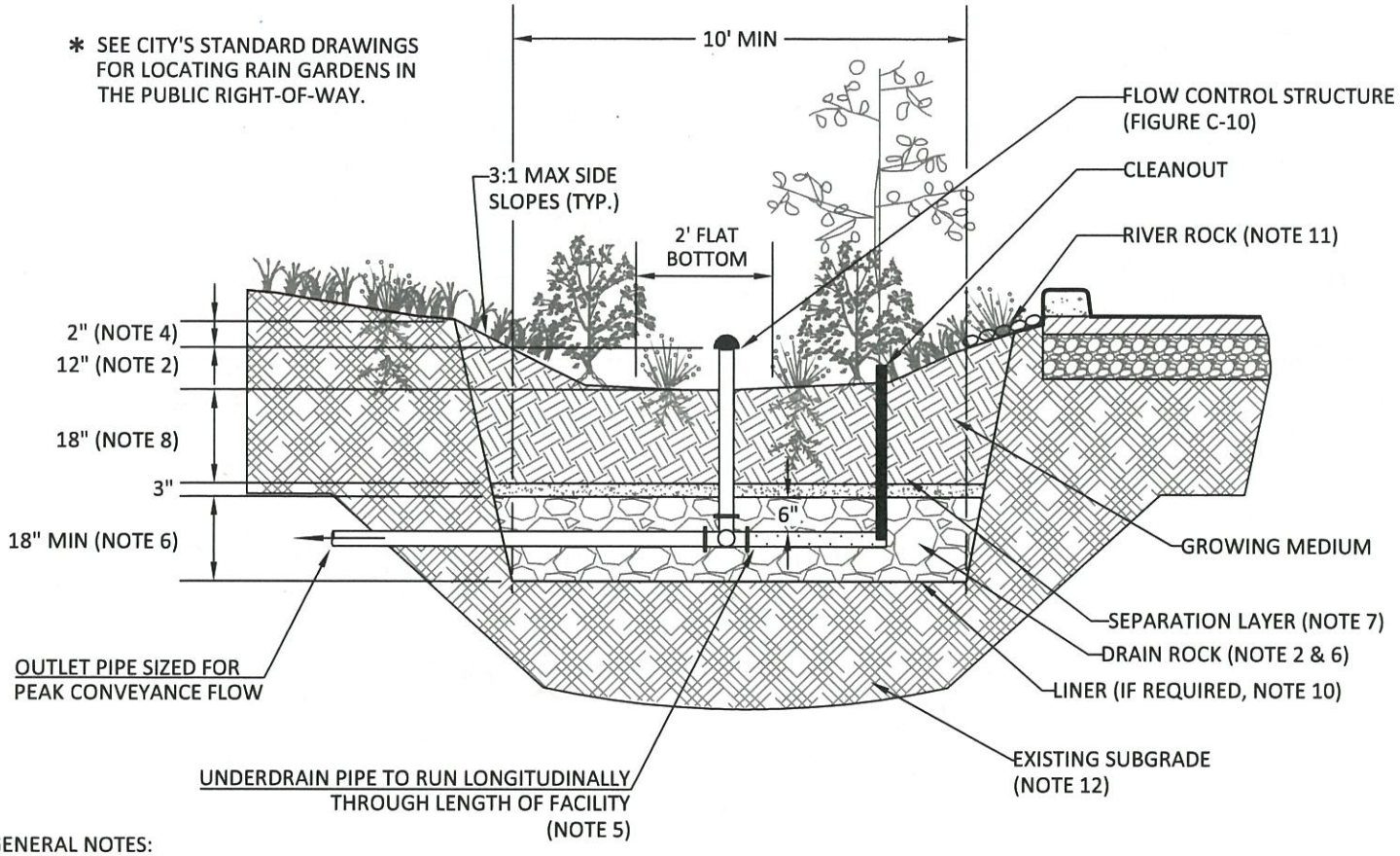
The curve numbers presented in **Tables H-2 and H-3** are for wet antecedent moisture conditions. Wet conditions assume previous rainstorms have reduced the capacity of soil to absorb water. Given the frequency of rainstorms in the Portland area, wet conditions are most likely, and give conservative hydrographic values.

Hydrologic Soil Group descriptions, critical to determining the appropriate curve numbers are included in **Table H-4**.

Table H-2. Runoff Curve Numbers for Urban Areas*

Cover Descriptions	Average Percent Impervious Area	Curve Numbers for Hydrologic Soil Group			
Cover Type and Hydrologic Condition		A	B	C	D
Open space (lawns, parks, golf courses, cemeteries, etc.)					
Poor condition (grass cover <50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads					
Paved: curbs and stone sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Urban districts					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82

**Soil Conservation Service, Urban Hydrology for Small Watersheds, Technical Release 55, pp. 2.5-2.8, June 1986.*

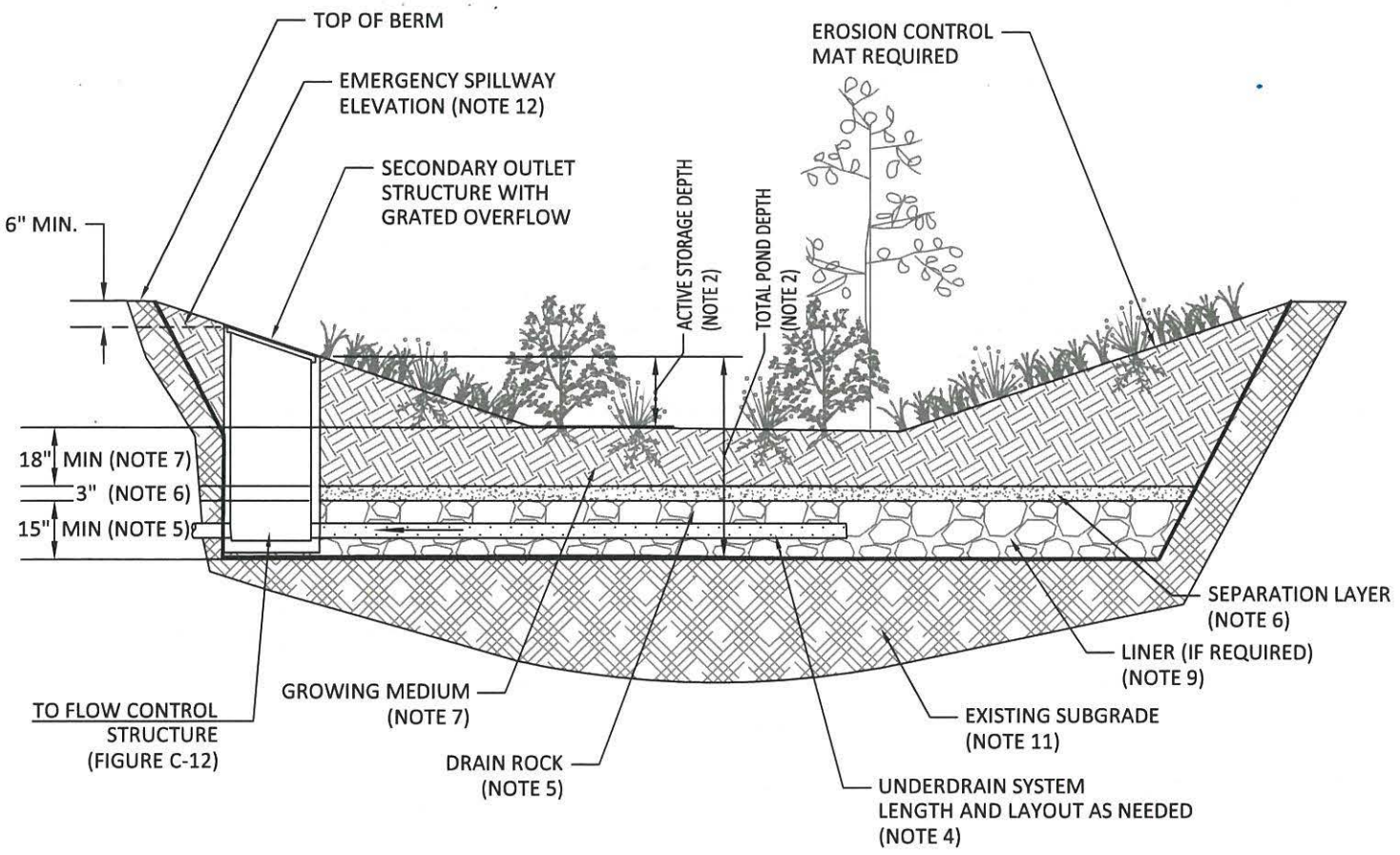


GENERAL NOTES:

1. **PROVIDE PROTECTION** FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC IN PROPOSED INFILTRATION AREAS PRIOR TO, DURING AND AFTER CONSTRUCTION. UNLESS REQUIRED BY SITE CONDITIONS, UNLINED SWALES ARE PREFERRED TO ALLOW MAXIMUM INFILTRATION.
2. **DIMENSIONS:**
   -DEPTH OF SWALE (FROM TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION): 12"
   -LONGITUDINAL SLOPE OF SWALE: 6.0% OR LESS
   -FLAT BOTTOM WIDTH: 2' MINIMUM
   -SIDE SLOPES OF SWALE: 3:1 MAXIMUM
   -FACILITY AREA SHALL BE MEASURED AT THE DEEPEST SECTION (DRAIN ROCK) OF FACILITY
3. **SETBACKS:**
   -FILTRATION SWALES MUST BE 10' FROM FOUNDATIONS AND 5' FROM PROPERTY LINES UNLESS APPROVED BY BUILDING OFFICIAL.
4. **OVERFLOW:**
   -INLET ELEVATION MUST ALLOW FOR 2" OF FREEBOARD, MINIMUM. PROTECT FROM DEBRIS AND SEDIMENT WITH STRAINER OR GRATE.
   -IDENTIFY EMERGENCY OVERFLOW ROUTE ON THE STORMWATER MANAGEMENT PLAN.
5. **PIPING:**
   -PERFORATED UNDERDRAIN PIPING: SHALL BE ABS SCH. 40, DUCTILE IRON, OR PVC SCH.40. MINIMUM DIAMETER IS 6". PIPING MUST HAVE 1% GRADE AND FOLLOW THE UNIFORM PLUMBING CODE. PVC NOT ALLOWED ABOVE GROUND.
   -OVERFLOW PIPING: SHALL BE ABS SCH. 40, DUCTILE IRON, OR PVC SCH. 40 AND SHALL NOT BE PERFORATED. MINIMUM DIAMETER IS 6". PIPING MUST HAVE 1% GRADE AND FOLLOW THE UNIFORM PLUMBING CODE. PVC NOT ALLOWED ABOVE GROUND.
6. **DRAIN ROCK:**
   -SIZE: 1 1/2" - 3/4" WASHED
   -DEPTH: 12"
7. **SEPARATION** BETWEEN DRAIN ROCK AND GROWING MEDIUM: SHALL BE A 3" LAYER OF 3/4" - 1/4" OPEN GRADED AGGREGATE.
8. **GROWING MEDIUM:**
   -18" MINIMUM
   -SEE APPENDIX A FOR SPECIFICATION OR USE SAND/LOAM/COMPOST 3-WAY MIX.
   -FACILITY SURFACE AREA MAY BE REDUCED BY 20% WHEN GROWING MEDIA DEPTH IS INCREASED TO 30" OR MORE.
9. **VEGETATION:** FOLLOW LANDSCAPE PLANS OR REFER TO PLANTING REQUIREMENTS IN APPENDIX A.
10. **WATERPROOF LINER (IF REQUIRED):** SHALL BE 30 MIL PVC OR EQUIVALENT.
11. **INSTALL RIVER ROCK** OR SPLASH PAD TO TRANSITION FROM INLETS TO GROWING MEDIUM. SIZE OF ROCK SHALL BE 1" TO 3".
12. **SEASONAL HIGH GROUNDWATER SEPARATION:**
    -SEPARATION DISTANCE AS REQUIRED BY CITY.
13. **CHECK DAMS:** SHALL BE PLACED ACCORDING TO FACILITY DESIGN.

Vegetated Swale - Filtration
Figure C-7

OREGON CITY
STORMWATER AND GRADING DESIGN STANDARDS

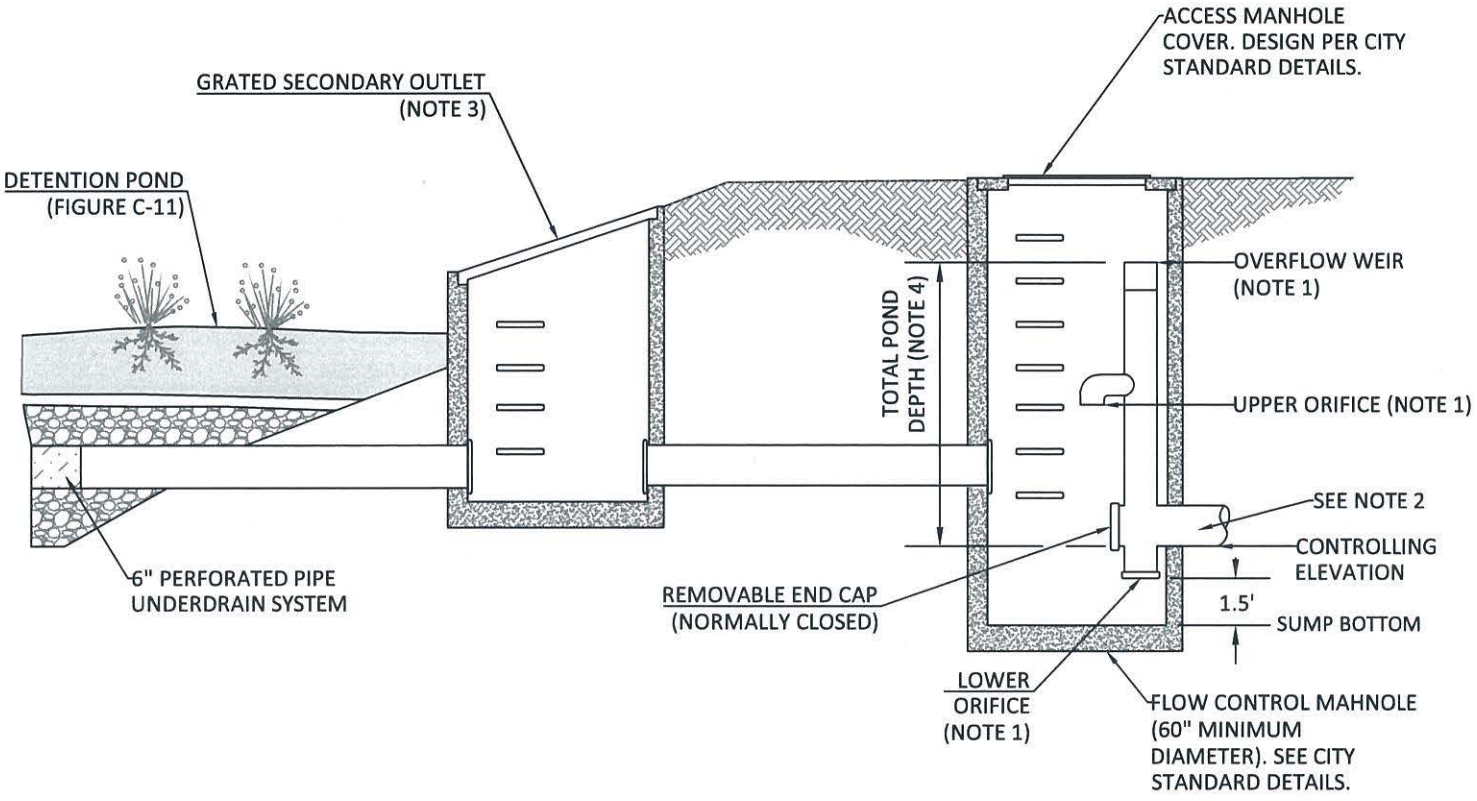


GENERAL NOTES:

1. **PROVIDE PROTECTION** FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC IN PROPOSED INFILTRATION AREAS PRIOR TO, DURING AND AFTER CONSTRUCTION. UNLESS REQUIRED BY SITE CONDITIONS, UNLINED PONDS ARE PREFERRED TO ALLOW MAXIMUM INFILTRATION.
2. **DIMENSIONS:**
   -ACTIVE STORAGE DEPTH (FROM TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION): PER FACILITY SIZING MODEL
   -FACILITY AREA SHALL BE MEASURED AT THE DEEPEST SECTION (DRAIN ROCK) OF FACILITY.
   -TOTAL POND DEPTH: 4' MINIMUM, PER FACILITY SIZING MODEL
   -BOTTOM SLOPE: 2.0% OR LESS
   -SIDE SLOPES OF DETENTION POND: 3:1 MAXIMUM
3. **SETBACKS:**
   -DETENTION POND MUST BE 10' FROM FOUNDATIONS AND 5' FROM PROPERTY LINES UNLESS APPROVED BY BUILDING OFFICIAL.
4. **PIPING:**
   -PERFORATED UNDERDRAIN PIPING: SHALL BE ABS SCH. 40, DUCTILE IRON OR PVC SCH. 40. 6" MINIMUM DIAMETER. PIPING MUST HAVE 1% GRADE AND FOLLOW THE UNIFORM PLUMBING CODE. PVC NOT ALLOWED ABOVE GROUND.
5. **DRAIN ROCK:**
   -SIZE: 1 1/2" - 3/4" WASHED
   -DEPTH: 15" MINIMUM
6. **SEPARATION** BETWEEN DRAIN ROCK AND GROWING MEDIUM: SHALL BE A 3" LAYER OF 3/4" - 1/4" OPEN GRADED AGGREGATE.
7. **GROWING MEDIUM:**
   -18" MINIMUM
   -SEE APPENDIX A FOR SPECIFICATION OR USE SAND/LOAM/COMPOST 3-WAY MIX.
8. **VEGETATION:** FOLLOW LANDSCAPE PLANS OR REFER TO PLANTING REQUIREMENTS IN APPENDIX A.
9. **WATERPROOF LINER (IF REQUIRED):** SHALL BE 30 MIL PVC OR EQUIVALENT FOR DETENTION POND.
10. **INSTALL RIVER ROCK** OR SPLASH PAD TO TRANSITION FROM INLETS TO GROWING MEDIUM. SIZE OF ROCK SHALL BE 1" TO 3".
11. **SEASONAL HIGH GROUNDWATER SEPARATION:**
    -SEPARATION DISTANCE AS REQUIRED BY CITY.
12. **EMERGENCY SPILLWAY** SIZED TO CONVEY THE 100 - YEAR DESIGN STORM. PROVIDE 6" MINIMUM FREEBOARD ABOVE THE 100 - YEAR DESIGN STORM.

Detention Pond
Figure C-11

DETENTION POND FLOW CONTROL STRUCTURE



NOTES:

1. ORIFICE AND WEIR DIMENSIONS AND ELEVATION DETERMINED THROUGH FACILITY SIZING MODEL.
2. PIPE SIZING DETERMINED BY ENGINEER.
3. SECONDARY OUTLET SIZED FOR PEAK DESIGN STORM.
4. TOTAL POND DEPTH, PER FACILITY SIZING MODEL, INCLUDES GROWING MEDIA, SEPARATION LAYER, AND DRAIN ROCK AS SHOWN ON FIGURE C-11.

Detention Pond
Operations & Maintenance Plan

Detention Ponds remove pollutants through several processes: sedimentation, filtration, and biological processes. The facility owner must keep a log, recording all inspection dates, observations, and maintenance activities. The following items shall be inspected and maintained as stated:

What to Look For	What to Do
Structural Components, including inlets and outlets/overflows, shall freely convey stormwater.	
Clogged inlets or outlets	-Remove sediment and debris from catch basins, trench drains, curb inlets and pipes to maintain at least 50% conveyance capacity at all times.
Cracked Drain Pipes	-Repair/seal cracks. Replace when repair is insufficient.
Clogged Control Structures	-Remove accumulated sediment and debris.
Vegetation shall cover 90% of the facility.	
Dead or strained vegetation	-Replant per original planting plan, or substitute from Appendix A. -Irrigate as needed. Mulch banks annually. DO NOT apply fertilizers, herbicides, or pesticides.
Tall Grass and Vegetation	-Cut back grass and prune overgrowth 1-2 times per year. Remove cuttings.
Weeds	-Manually remove weeds. Remove all plant debris.
Growing/Filter Medium, including soil and gravels, shall sustain healthy plant cover and infiltrate within 72 hours.	
Gullies	-Fill, lightly compact, and plant vegetation to disperse flow.
Erosion	-Replace splash blocks or inlet gravel/rock.
Slope Slippage	-Stabilize 3:1 Slopes/banks with plantings from Appendix A.
Ponding	-Rake, till, or amend to restore infiltration rate.

Annual Maintenance Schedule:

All facility components, vegetation, and source controls shall be inspected for proper operations and structural stability. These inspections shall occur, at a minimum, quarterly for the first 2 years from the date of installation, and 2 times per year thereafter, and within 48 hours after each major storm event.

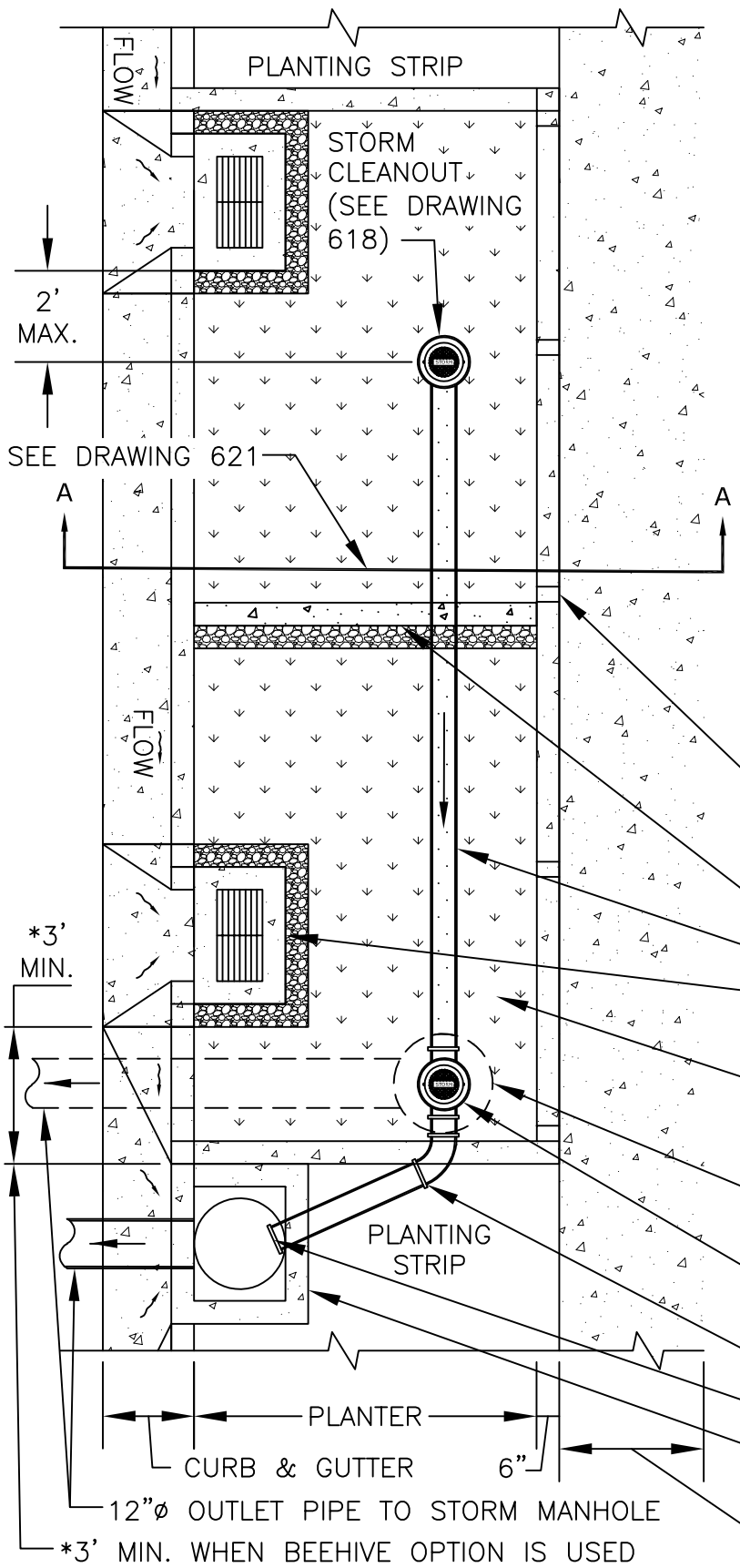
Access: Maintain ingress/egress to design standards.

Infiltration/Flow Control: All facilities shall drain within 72 hours. Record time/date, weather, and site conditions when ponding occurs.

Pollution Prevention: All sites shall implement best management practices to prevent hazardous or solid wastes or excessive oil and sediment from contaminating stormwater. Contact emergency response agencies for immediate assistance responding to spills. Record time/date, weather, and site conditions if site activities contaminate stormwater.

Vectors (Mosquitoes & Rodents): Stormwater facilities shall not harbor mosquito larvae or rats that pose a threat to public health or that undermine the facility structure. Monitor standing water for small wiggling sticks perpendicular to the water's surface. Note holes/burrows in and around facilities. Call Clackamas County Vector Control for immediate assistance to eradicate vectors. Record time/date, weather, and site conditions when vector activity observed.

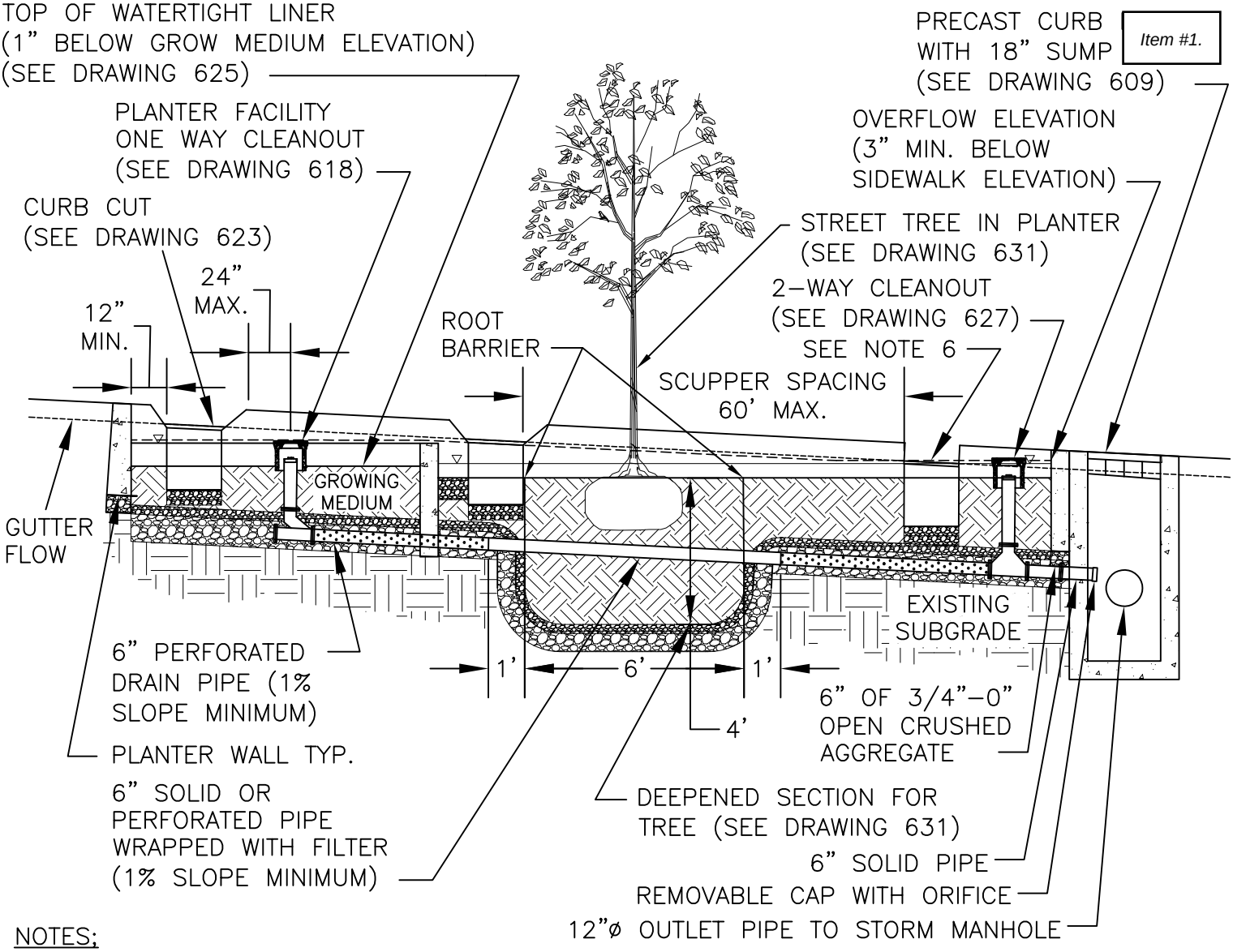
PLAN VIEW



NOTES:

1. THIS PLAN VIEW IS ONLY AN EXAMP GUIDE ENGINEERED DESIGN.
2. PROVIDE BEGINNING AND ENDING STATIONS FOR EACH FACILITY. PROVIDE STATIONING AND/OR DIMENSIONS AND ELEVATIONS AT EACH INLET, OUTLET, CHECK DAM, PLANTER CORNER.
3. SIDEWALK ELEVATION MUST BE SET ABOVE CHECK DAM AND INLET ELEVATIONS TO ALLOW OVERFLOW TO DRAIN TO STREET BEFORE SIDEWALK.
4. PROPOSED UTILITY LINES TO BE LOCATED OUT OF FACILITY.
5. 4" WIDE NOTCH AT LOW POINT(S) OF SIDEWALK AND/OR EVERY 6FT.
6. BEEHIVE STRUCTURE TO BE UTILIZED WHEN OVERFLOW CANNOT BE CONVEYED TO AN APPROVED STORM INLET STRUCTURE IN LIEU OF DRAIN PIPE CONNECTING TO AN APPROVED STORM INLET STRUCTURE. BEEHIVE STRUCTURE TO HAVE 12"ø OUTLET PIPE CONNECTING TO AN APPROVED OUTLET STRUCTURE SUCH AS A STORM MANHOLE, SEE DRAWING 626.
7. STORMWATER FACILITY GROWING MEDIUM SHALL MEET REQUIREMENTS OF APPENDIX A OF CITY STORMWATER MANUAL.
8. SEE DRAWING 620 FOR ROADSIDE STORMWATER PLANTER ELEVATION.

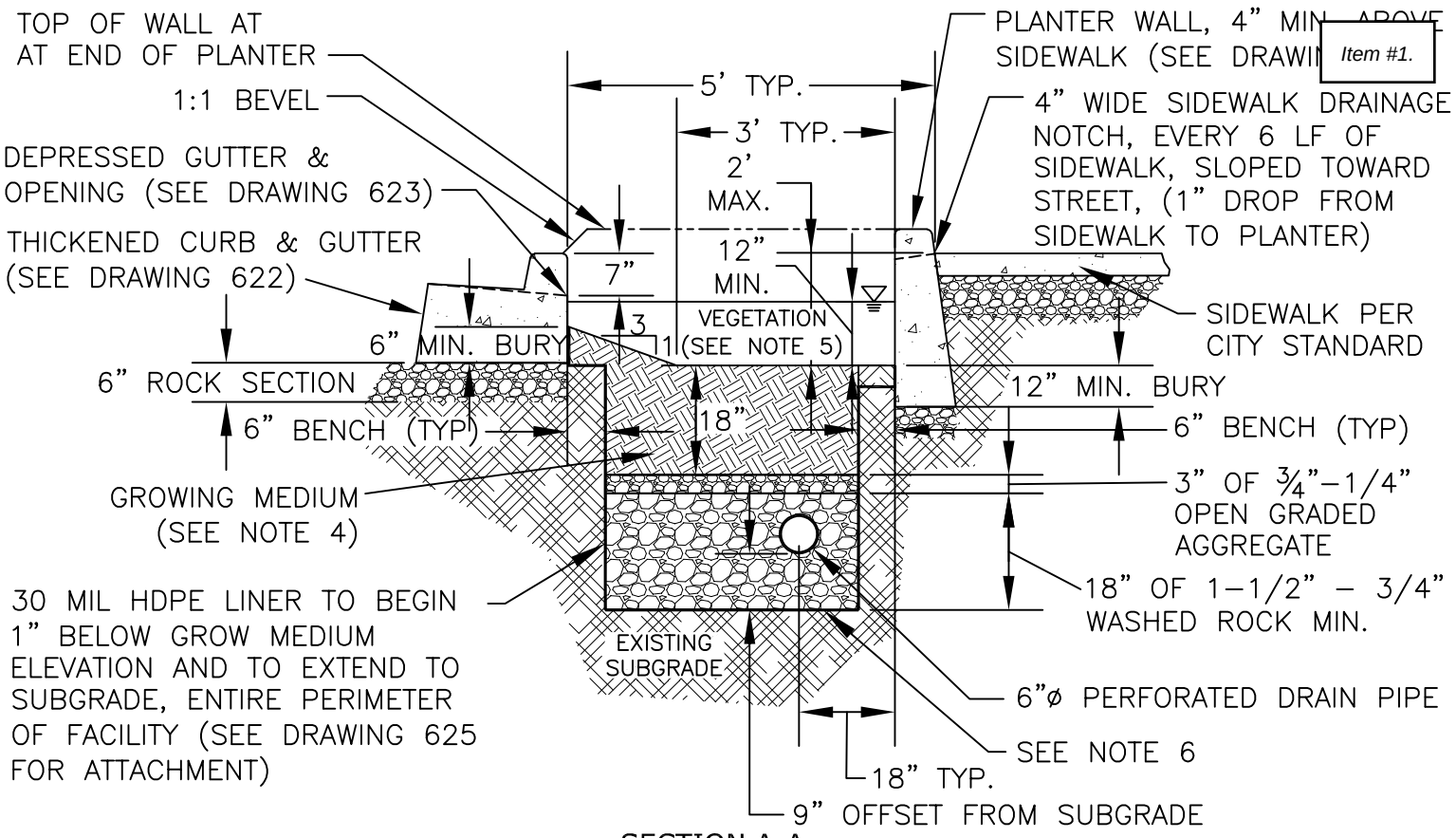
DRAWN	SP		City of Oregon City Public Works Standard Drawings	SCALE	N.T.S.
ENGR.	A.F.G.			DATE	JUNE 2017
REV.	DATE	APPR.	ROADSIDE STORMWATER PLANTER PLAN VIEW	APPR.	A.F.G.
				DWG. NO.	619



NOTES;

1. PROVIDE PROTECTION FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC PRIOR TO, DURING AND AFTER CONSTRUCTION.
2. SCUPPERS SHALL BE SPACED NO MORE THAN 60 FEET APART AND ONE AT EACH END OF A PLANTER.
3. SLOPE OF PLANTER TO NOT EXCEED 0.5%.
4. PIPE SHALL BE PVC D3034 SDR 35, 6" MINIMUM DIAMETER. PIPING MUST HAVE 1% SLOPE MINIMUM, BOTTOM OF PIPE SHALL BE SET AT 9" ABOVE EXISTING SUBGRADE.
5. ALL PIPE TO HAVE GASKET JOINTS AND GASKETED JOINT FITTINGS.
6. OVERFLOW
   - MUST FLOW TO APPROVED OUTLET STRUCTURE PER OREGON CITY STORMWATER MANUAL
   - BEEHIVE STRUCTURE TO BE UTILIZED WHEN OVERFLOW CANNOT BE CONVEYED TO CURB INLET OR AN APPROVED STORM INLET STRUCTURE. SEE DRAWING 619 AND 626.
7. THIS ELEVATION VIEW IS ONLY AN EXAMPLE, TO GUIDE ENGINEERED DESIGN.

DRAWN	SP		City of Oregon City Public Works Standard Drawings	SCALE	N.T.S.
ENGR.	A.F.G.			DATE	JUNE 2017
REV.	DATE	APPR.		APPR.	A.F.G
1	06/20	DW	ROADSIDE STORMWATER PLANTER ELEVATION	DWG. NO.	620

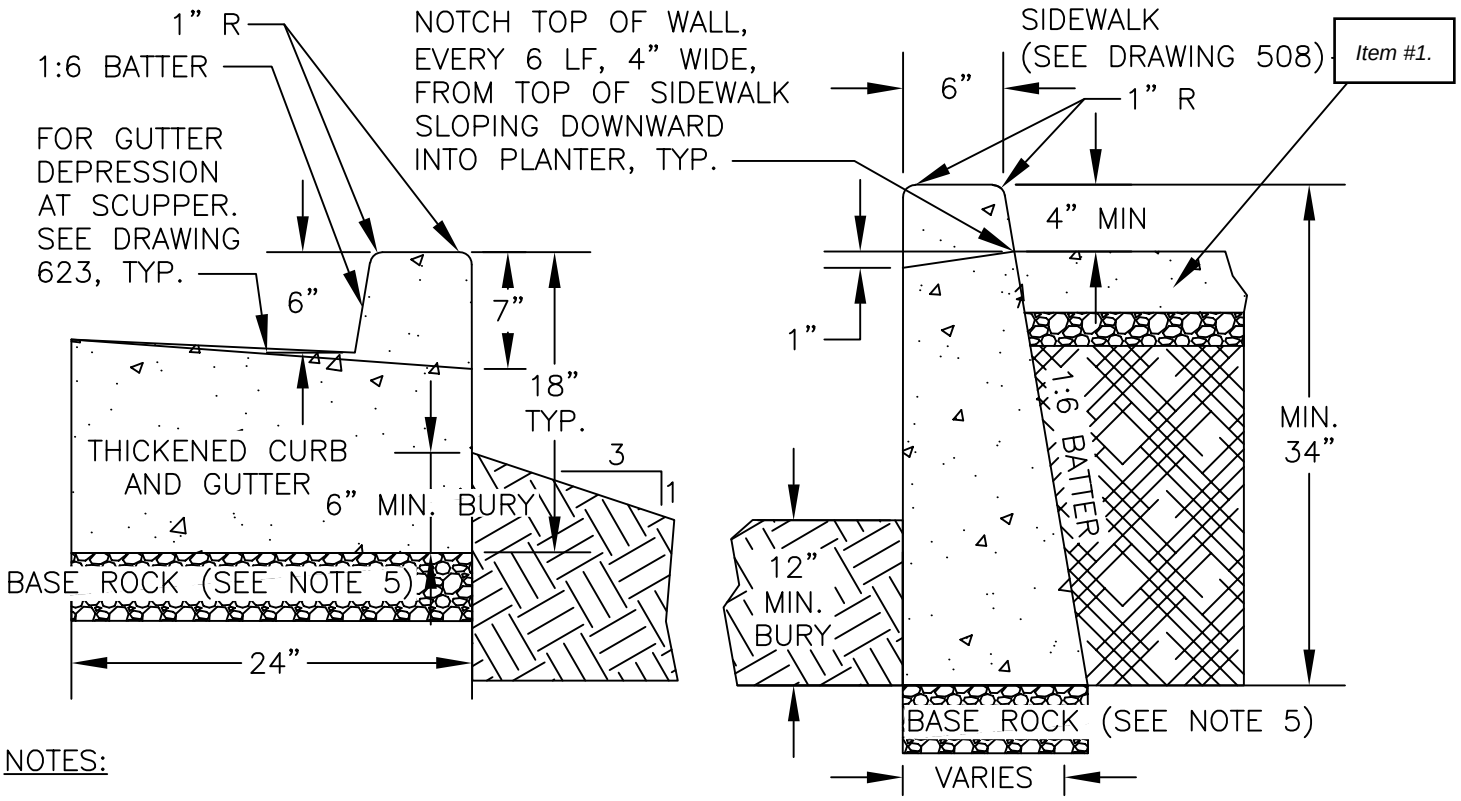


SECTION A-A
PLANTER

NOTES:

1. PROVIDE PROTECTION FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC PRIOR TO, DURING AND AFTER CONSTRUCTION.
2. DIMENSIONS:
   - TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION SHALL BE A MINIMUM OF 12".
   - TOP OF SIDEWALK ELEVATION ADJACENT TO PLANTER SHALL BE NO LESS THAN 3" ABOVE GUTTER ELEVATION.
   - TOP OF SIDEWALK ELEVATION ADJACENT TO PLANTER SHALL BE NO GREATER THAN 24" FROM TOP OF PLANTER GROWTH MEDIUM.
3. PIPING:
   - PIPE SHALL BE PVC D3034 SDR 35, 6" MINIMUM DIAMETER WITHIN PLANTER. PIPING MUST HAVE 1% SLOPE, BOTTOM OF PIPE SHALL BE SET AT 9" ABOVE EXISTING SUBGRADE.
   - OVERFLOW SHALL BE PIPED TO A STANDARD CURB INLET/CATCH BASIN STRUCTURE OR STORM MANHOLE, SEE DRAWING 619.
4. GROWING MEDIUM: SEE APPENDIX A OF STORMWATER MANUAL FOR SPECIFICATION.
5. VEGETATION: REFER TO PLANTING REQUIREMENTS IN APPENDIX A OF STORMWATER MANUAL, SEE DRAWING 630 FOR PLANT SPACING REQUIREMENTS.
6. WATERTIGHT LINER (SEE DRAWING 625 FOR LINER ATTACHMENT REQUIREMENTS):
   - WHEN WITHIN CONTAMINATED SOIL OR 10' OF STRUCTURE FOUNDATION OR PAVED STRUCTURAL SECTION OR UNDERGROUND STRUCTURES, BOTTOM OF FACILITY MUST BE LINED WITH A WATERTIGHT LINER.
   - LINER SHALL BE 30 MIL HDPE OR APPROVED EQUAL.
   - LINER SHALL BE PLACED AROUND ENTIRE PERIMETER OF FACILITY.
   - LINER REQUIRED UNLESS FACILITY'S BOTTOM AND SIDES ARE MONOLITHIC CONCRETE.
7. CHECK DAMS:
   - REINFORCED CONCRETE CHECK DAMS SHALL BE PLACED AT LEAST EVERY 30 FEET.
8. MINIMUM PLANTER WALL HEIGHT OF 34".

DRAWN	SP		City of Oregon City	SCALE	N.T.S.
ENGR.	A.F.G.		Public Works Standard Drawings	DATE	JUNE 2017
REV.	DATE	APPR.		APPR.	A.F.G
1	08/17	AFG	ROADSIDE STORMWATER PLANTER SECTION	DWG. NO.	621
2	06/20	DW			



NOTES:

1. CONCRETE SHALL BE AIR–ENTRAINED MINIMUM 4.5% AND HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AFTER 28 DAYS.
2. ALL CONCRETE SURFACES SHALL BE SMOOTH AND FREE FROM DEFECTS AND SHALL HAVE A LIGHT BROOM TEXTURED FINISH.
3. EXPANSION JOINTS (CURB AND SIDEWALK ONLY):
   A. TO BE PROVIDED:
      1) AT EACH COLD JOINT.
      2) AT EACH END OF DRIVEWAYS.
      3) AT EACH POINT OF TANGENCY OF THE CURB.
      4) AT LOCATIONS NECESSARY TO LIMIT SPACING TO 45 FEET.
   B. MATERIAL TO BE USED IS "REFLEX RUBBER JOINT EXPANSION" JOINT MATERIAL, OR CITY APPROVED EQUAL, WITH A THICKNESS OF 1/2 INCH.
4. CONTRACTION JOINTS (CURB AND SIDEWALK ONLY):
   A. SPACING TO BE NOT MORE THAN 10 FEET REGARDLESS OF LOCATION OF DRAINAGE NOTCH
   B. THE DEPTH OF THE JOINT SHALL BE AT LEAST 1–1/2 INCHES WITH 1/2–INCH MAXIMUM RADIUS TROWEL JOINT.
   C. PLACE JOINT ON EACH SIDE OF SCUPPER INLET (SEE DRAWING 623)
5. BASE ROCK TO BE 3/4"–0", 95% COMPACTION PER AASHTO T 180. BASE ROCK SHALL BE 6" MINIMUM IN DEPTH.
6. SIDEWALK CONTRACTION JOINTS SHALL BE PLACED IN LINE WITH ONE OF THE DRAINAGE NOTCH CORNERS.
7. SIDEWALK ELEVATION MUST BE SET ABOVE STREET INLET/OULET ELEVATIONS TO ALLOW OVERFLOW TO DRAIN TO STREET OR PIPED OVERFLOW SYSTEM AS APPLICABLE.
8. CHECK DAMS:
   –REINFORCED CONCRETE CHECK DAMS SHALL BE PLACED EVERY 30 FEET STARTING FROM UPPER END WALL
   –CHECK DAMS SPACING MAY BE DECREASED TO KEEP LONGITUDINAL SLOPE OF PLANTER FROM EXCEEDING .05%

DRAWN	SP	
ENGR.	A.F.G.	
REV.	DATE	APPR.
1	8/18	AFG
2	6/19	DW
3	6/20	DW

City of Oregon City
Public Works Standard Drawings

ROADSIDE STORMWATER PLANTER WALL DETAIL

SCALE	N.T.S.
DATE	JUNE 2017
APPR.	A.F.G
DWG. NO.	622

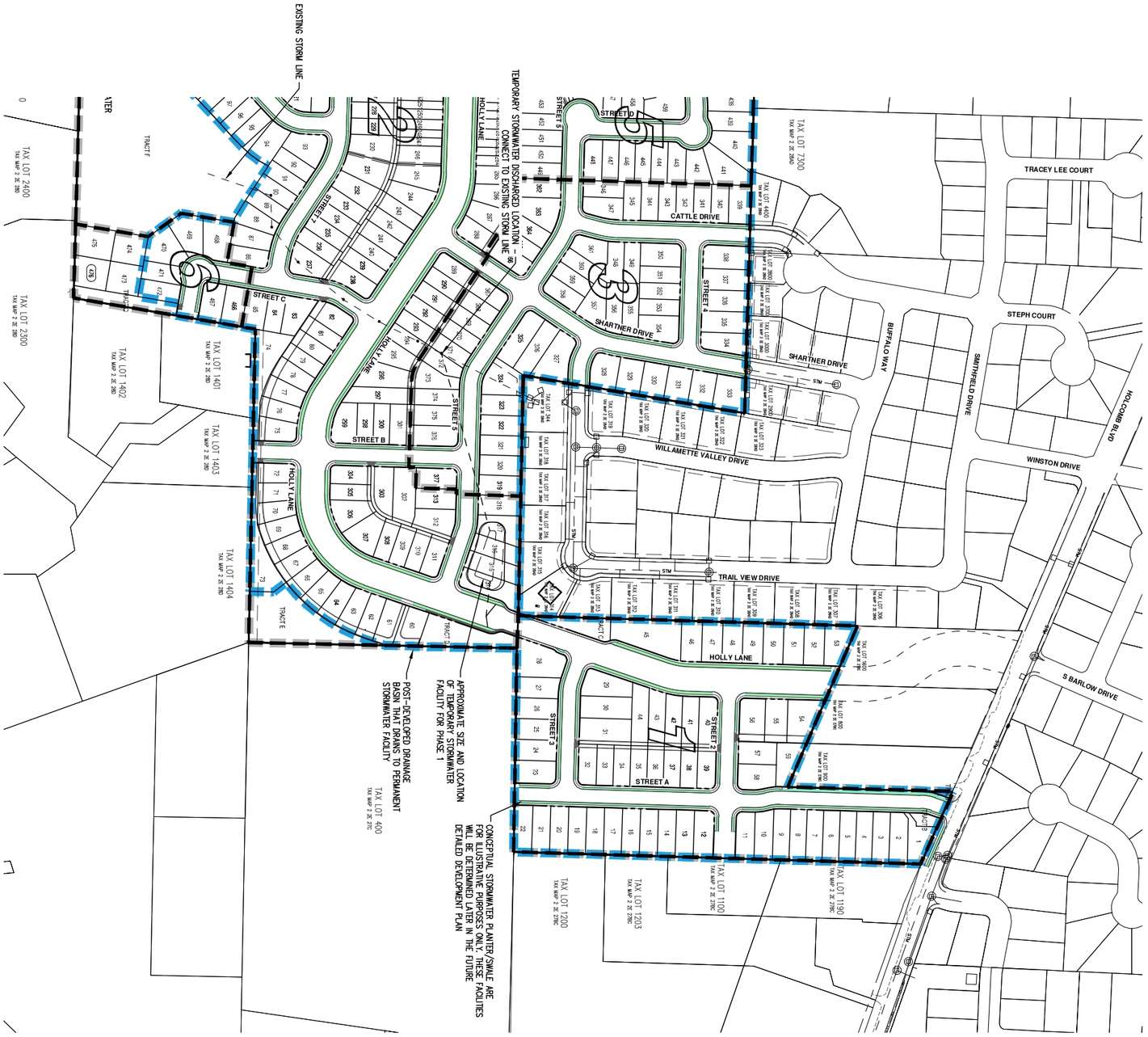
Stormwater Planters
Operations & Maintenance Plan

What to Look For	What to Do
Structural Components, including inlets and outlets/overflows, shall freely convey stormwater.	
Clogged inlets or outlets	-Remove sediment and debris from catch basins, trench drains and curb inlets and pipes to maintain at least 50% conveyance capacity at all times.
Cracked Drain Pipes	-Repair/seal cracks. Replace when repair is insufficient.
Check Dams	-Maintain 4 to 10 inch deep rock check dams at design intervals.
Vegetation	
Dead or strained vegetation	-Replant per original planting plan, or substitute from Appendix A. -Irrigate as needed. Mulch banks annually. DO NOT apply fertilizers, herbicides, or pesticides.
Tall Grass and Vegetation	-Cut back grass and prune overgrowth 1-2 times per year. Remove cuttings.
Weeds	-Manually remove weeds. Remove all plant debris.
Growing/Filter Medium, including soil and gravels, shall sustain healthy plant cover and infiltrate within 72 hours.	
Gullies	-Fill, lightly compact, and plant vegetation to disperse flow.
Erosion	-Replace splash blocks or inlet gravel/rock.
Slope Slippage	-Stabilize 3:1 slopes/banks with plantings from Appendix A.
Ponding	-Rake, till, or amend to restore infiltration rate.

Annual Maintenance Schedule:

Summer. Make any structural repairs. Improve filter medium as needed. Clear drain. Irrigate as needed.
Fall. Replant exposed soil and replace dead plants. Remove sediment and plant debris.
Winter. Monitor infiltration/flow-through rates. Clear inlets and outlets/overflows to maintain conveyance.
Spring. Remove sediment and plant debris. Replant exposed soil and replace dead plants. Mulch.
All seasons. Weed as necessary. Clean scuppers or curb inlets as needed.
Maintenance Records: Record date, description, and contractor (if applicable) for all structural repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the inspector.
Access: Maintain ingress/egress to design standards.
Infiltration/Flow Control: All facilities shall drain within 72 hours. Record time/date, weather, and site conditions when ponding occurs.
Pollution Prevention: All sites shall implement best management practices to prevent hazardous or solid wastes or excessive oil and sediment from contaminating stormwater. Contact emergency response agencies for immediate assistance responding to spills. Record time/date, weather, and site conditions if site activities contaminate stormwater.
Vectors (Mosquitoes & Rodents): Stormwater facilities shall not harbor mosquito larvae or rats that pose a threat to public health or that undermine the facility structure. Monitor standing water for small wiggling sticks perpendicular to the water's surface. Note holes/burrows in and around facilities. Call Clackamas County Vector Control for immediate assistance to eradicate vectors. Record time/date, weather, and site conditions when vector activity observed.

Appendix G: Phase 1 Temporary Stormwater Facility Sizing



SCALE: 1" = 150 FEET

ORIGINAL PAGE SIZE: 22" x 34"

POST-DEVELOPED BASIN MAP FOR PHASE 1
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	07/15/2021
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151
WWW.AKS-ENG.COM

ENGINEERING • SURVEYING • NATURAL RESOURCES
FORESTRY • PLANNING • LANDSCAPE ARCHITECTURE

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	Park Place Crossing Phase 1 Temporay Stormwater Facility
Project Type	Subdivision
Location	
Stormwater Management Area	8100
Project Applicant	
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
Impervious in ROW (C soil)	161,730	Forested	ConventionalConcrete	C	LID Stormwater Planter/Swale in ROW
Pervious in ROW (C soil)	17,970	Forested	Grass	C	LID Stormwater Planter/Swale in ROW
Pervious in Lots (C soil)	175,318	Forested	Grass	C	LID Stormwater Planter/Swale in ROW
Impervious in Lots (C soil)	143,442	Forested	Roofs	C	LID Stormwater Pond
Impervious Alley (C soil)	9,200	Forested	ConventionalConcrete	C	LID Stormwater Planter/Swale in ROW

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
LID Stormwater Planter/Swale in ROW	WaterQuality	Stormwater Planter - Filtration	Lined	3,404.8	3,410.0	2.7

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?
LID Storm water Pond	FCWQT	Lined	8.00	8,024.0	3	35,940.6	31,286.9	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.

Simple Pond Geometry Configuration

Pond ID: LID Stormwater Pond
Design: FlowControlAndTreatment

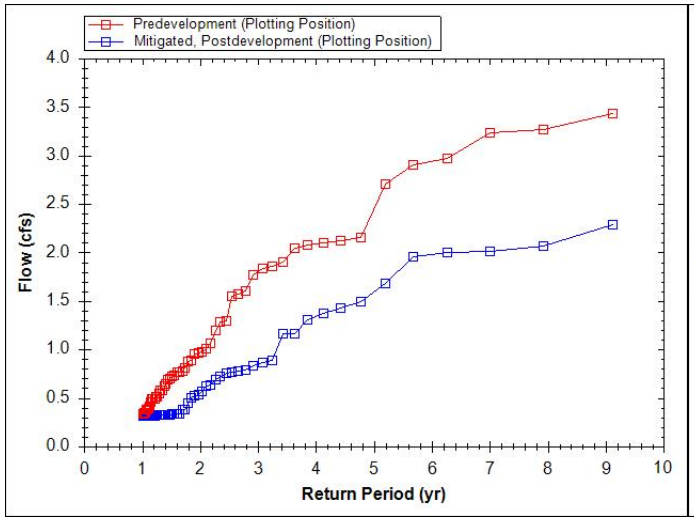
Shape Curve

Depth (ft)	Area (sq ft)
8.0	8,024.0

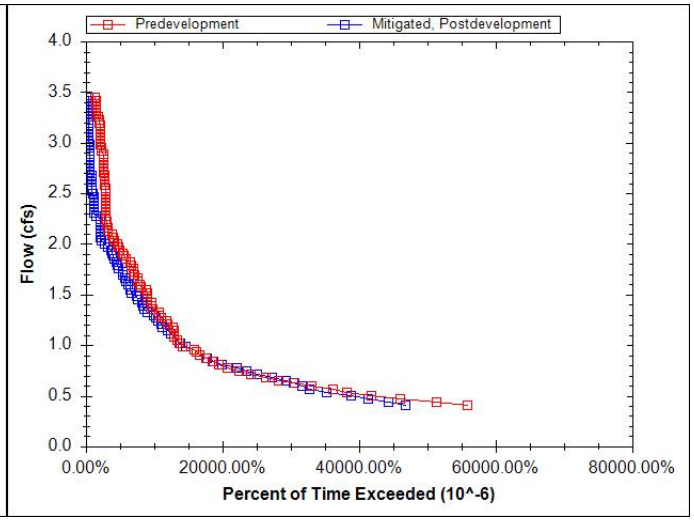
Outlet Structure Details

Lower Orifice Invert (ft)	0.0
Lower Orifice Dia (in)	2.3
Upper Orifice Invert(ft)	5.4
Upper Orifice Dia (in)	8.5
Overflow Weir Invert(ft)	7.0
Overflow Weir Length (ft)	6.3

Flow Frequency Chart



Flow Duration Chart



lancaster mobley

Park Place Crossing Master Plan

Transportation Impact Study

Oregon City, Oregon



Date:
January 13, 2022

Prepared for:
Harlan Borow
ICON Construction & Development, LLC

Prepared by:
Daniel Stumpf, PE
Todd Mobley, PE

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Executive Summary

1. This transportation impact study supports the General Development Plan for Park Place Crossing. No homes can be constructed, and the project will not generate any traffic impacts until a Detailed Development Plan is submitted, reviewed, and approved in the future.
2. The Park Place Crossing Master Plan project includes the construction of a 477-lot residential subdivision over six phases on multiple properties located at or near 15110 S Holcomb Boulevard in Oregon City, Oregon. Portions of the site near the southern edge of the Master Plan area will be dedicated for future development of retail, civic, and park land area.
3. Access to the site will be provided via the proposed interim Street A and S Winston Drive intersections along S Holcomb Boulevard. Additional emergency vehicle access will be available via Shartner Drive for Phase 1; however, this access will be closed once emergency access to S Livesay Road is opened during Phase 2. Following future development of properties addressed at 15030/15050 S Holcomb Boulevard, the Street A access along S Holcomb Boulevard will close following completion of the new access (S Holly Lane extension) located opposite of S Barlow Drive. The location of the interim Street A and the future alignment of S Holly Lane were recommended by Oregon City staff. Until the S Holly Lane extension is constructed, the interim Street A access will need to be maintained to provide sufficient access and circulation to and within the site.
4. The trip generation calculations show that the site is projected to generate a net additional 290 morning peak hour trips, 390 evening peak hour trips, and 4,064 average weekday trips.
5. No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns.
6. Provided any obstructing foliage near the access locations and along the south side of S Holcomb Boulevard are removed or properly maintained, adequate sight distances can be made available to ensure safe operation of the temporary Street A intersection, while adequate sight distances can be made available at the S Barlow Drive intersection to allow safe and efficient operation of the future S Holly Lane approach. No other sight distance related mitigation is necessary or recommended.
7. Left-turn lane warrants are not projected to be met at any of the study intersections under any analysis scenario.
8. Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at the access study intersections under any of the analysis scenarios.
9. All access study intersections are currently operating acceptably per Oregon City standards and are projected to continue operating acceptably through the 2030 site buildout year, regardless of whether the S Holly Lane connection to S Holcomb Boulevard is constructed.
10. The intersections of Redland Road at OR-213 and Redland Road at Holcomb Boulevard/Abernethy Road are projected to operate acceptably per jurisdictional standards for all analysis scenarios during the peak hour (1st hour) through year 2030.

11. The following mitigation measures were reviewed for demonstrative purposes only to show the study intersections can operate acceptably per City and ODOT standards. Applicable agencies may consider alternative mitigation as preferential to those described below. If any mitigation is required for either or both of the intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan

    For the intersection of Redland Road at OR-213, the intersection is projected to operate in excess of acceptable per jurisdictional standards during the 2nd evening peak hour under 2026 buildout conditions (Phase 1) and for all succeeding analysis scenarios through year 2030. Additionally, extended queuing beyond available lane storage is expected to occur at some of the turn lanes of the two Redland Road study intersections. Although no specific mitigation is planned at either intersection, the following may potentially be implemented to address these capacity and potential queuing issues:

    a. Redland Road at OR-213
        i. Add an additional eastbound left-turn lane for a total of three left-turn lanes.
        ii. Restripe the north intersection leg to include three receiving lanes.
        iii. Extend the northbound left-turn storage lane to accommodate 95th percentile queues.
    b. Redland Road at Holcomb Boulevard/Abernethy Road
        i. Revise the west intersection leg to include one receiving travel lane, one left-turn lane, one through lane, and one right-turn lane.
        ii. Extend the eastbound left-turn storage into the center two-way left-turn turn to accommodate 95th percentile queues.

    Note the aforementioned mitigation were reviewed for demonstrative purposes to show the study intersections could operate acceptably per City and ODOT standards. Applicable agencies may consider alternative mitigation as preferential to those detailed above. Once appropriate mitigation have been determined for both intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan.

12. Conditions of Approval from the annexation detailed proportional share contributions are to be collected for several transportation facilities requiring mitigation which could be impacted by the Park Place Crossing Master Plan. Oregon City staff have indicated that proportional share contributions were subsequently modified in the Pre-Application notes. In addition, the current trip generation are lower than those anticipated at the time of the annexation, which may further decrease the proportional share amounts associated with the Park Place Crossing Master Plan. As part of each future Detailed Development Plan, proportional share fees will be contributed to the following facilities:

    a. 14th Street and 15th Street, between OR-99E and John Adams Street (TSP Project D7 and D8)
    b. S Redland Road at S Holly Lane (TSP Project D36)
    c. S Holcomb Boulevard at S Holly Lane (TSP Project D43)
    d. I-205 SB Ramps at OR-99E (TSP Project D75)
    e. I-205 NB Ramps at OR-99E (TSP Project D76)
    f. OR-213, near the S Redland Road Undercrossing (TSP Project D79)
    g. S Holcomb Boulevard at S Redland Road
    h. OR-213 at Beavercreek Road

13. The analysis in this Master Plan study does not consider the S Holly Lane connection to S Redland Road as was previously assumed for the Park Place Annexation project. Therefore, some of the proportionate share fees, and particularly additional mitigation at the two Redland Road study intersections, may be reduced or possibly become unnecessary. To address this uncertainty, it is recommended that a trip accounting letter, and if necessary, an updated traffic analysis, be prepared as each phase of the project is constructed. This will enable accurate tracking of projected impacts to the two Redland Road intersections and other transportation projects.

Project Description

Introduction

The Park Place Crossing Master Plan project includes the construction of a 477-lot residential subdivision over six phases on multiple properties located at or near 15110 S Holcomb Boulevard in Oregon City, Oregon. Each phase will include the following:

- Phase 1: 60 single-family detached dwelling units
- Phase 2: 133 single-family detached dwelling units and 126 single-family attached dwelling units
- Phase 3: 59 single-family detached dwelling units
- Phase 4: 53 single-family detached dwelling units
- Phase 5: 35 single-family detached dwelling units
- Phase 6: 11 single-family detached dwelling units

Portions of the site near the southern edge of the Master Plan area will be dedicated for future development of retail, civic, and park land area. Access to the site will be provided via the proposed interim Street A and S Winston Drive intersections along S Holcomb Boulevard. Additional emergency vehicle access will be available via Shartner Drive for Phase 1; however, this access will be closed once emergency access to S Livesay Road is opened during Phase 2 Following future development of properties addressed at 15030/15050 S Holcomb Boulevard, the Street A access along S Holcomb Boulevard will be closed and a new access (S Holly Lane extension) located opposite of S Barlow Drive will be constructed. The location of the interim Street A and the future alignment of Holly Lane were recommended by Oregon City staff. Until the S Holly Lane extension is constructed, the interim Street A access will need to be maintained to provide sufficient access and circulation to and within the site. Following the closure of the Street A access, the 60th lot of Phase 1 will be constructed.

Based on correspondence with Oregon City's transportation consultant, the transportation study includes an analysis of the following:

- An estimate of site trip generation and distribution.
- Tracking of trip impacts at intersections determined as requiring mitigation per the previously prepared *Park Place Annexation Transportation Impact Study* (TIS).
- A review of crash history, sight distances, turn lane warrants, and access spacing standards at proposed access locations.
- Review of the S Holly Lane collector through the site and a review of the future capacity/operation of S Holly Lane's future intersection with S Holcomb Boulevard.

- A capacity/operation analysis at the following intersections:
    1. S Winston Drive at S Holcomb Boulevard
    2. S Barlow Drive at S Holcomb Boulevard
    3. Proposed Street A at S Holcomb Boulevard
    4. Redland Road at OR-213 (Capacity and Queuing Analysis Only)
    5. Redland Road at Holcomb Boulevard/Abernethy Road (Capacity and Queuing Analysis Only)

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses, and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Location Description

Project Site Description

The project site is located north of S Livesay Road and south of S Holcomb Boulevard in Oregon City, Oregon. The site consists of 14 tax lots which encompass an approximate total of 92± acres. The site is currently developed with six single-family houses, five of which may be removed in order to accommodate redevelopment of the site.

Access to the site will be provided via the existing intersection of S Winston Drive at S Holcomb Boulevard, after the Phase 3 street connections are constructed, and the proposed interim Street A intersection at S Holcomb Boulevard. Prior to construction of Phase 3, Phases 1 and 2 will be served by the Street A connection and an emergency vehicle access in the form of a gravel road to Shartner Drive (closed once emergency access to S Livesay Road becomes available during construction of Phase 2). All subsequent Phases will take access via S Winston Drive and the interim Street A; however, emergency vehicle access to S Livesay Road will remain available.

Note the location of the interim Street A was selected based on discussions with Oregon City staff. Following future development of properties opposite of S Barlow Drive along S Holcomb Boulevard (tax lots 800 and 1600), the Street A connection to S Holcomb Boulevard will be removed and a new connection (S Holly Lane) will be constructed opposite of S Barlow Drive (see the *S Holly Lane Intersection Location* section of the report for further details). With removal of the Street A connection, the 60th lot of Phase 1 will be constructed.

Figure 1 presents an aerial image of the nearby vicinity with the General Development Plan Area outlined in yellow.

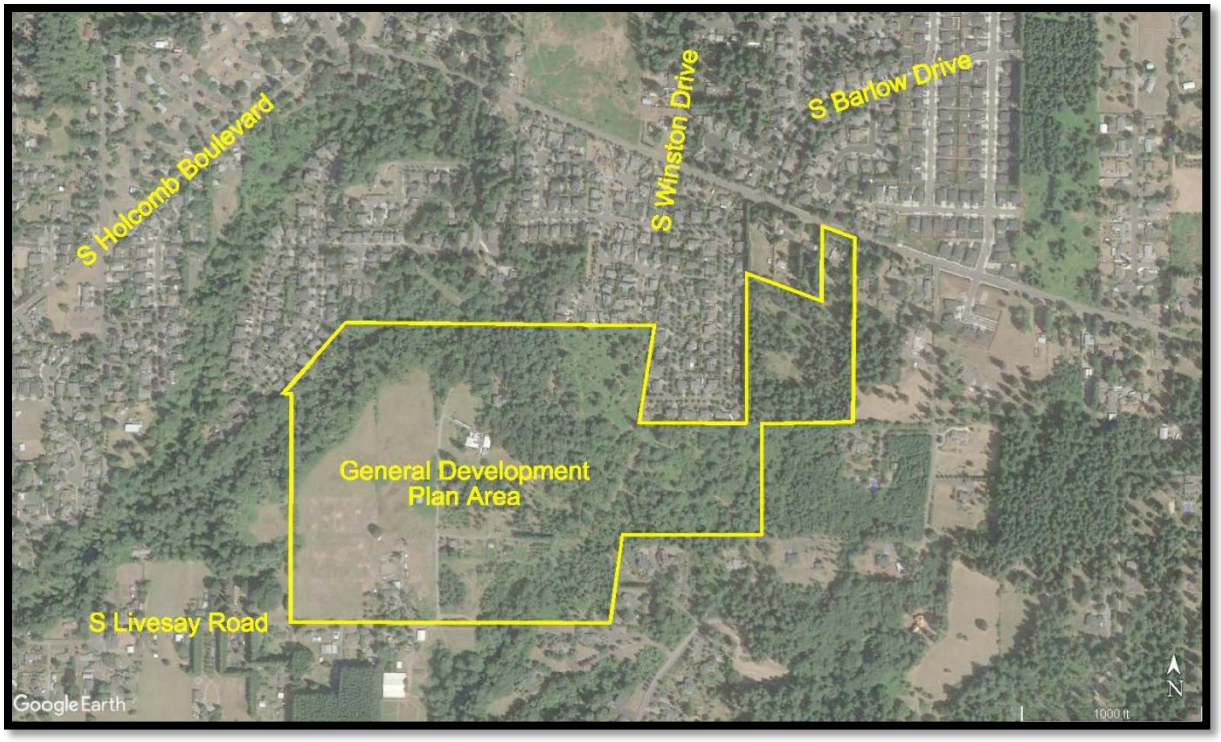

Figure 1: Aerial Photo of Site Vicinity (Image from Google Earth)

Vicinity Roadways

In the future, with Detailed Development Plans, this Master Plan may impact the nearby roadways of S Holcomb Boulevard, S Barlow Drive, and S Winston Drive. Table 1 provides a description of these vicinity roadways.

Table 1: Vicinity Roadway Descriptions

Street Name	Jurisdiction	Functional Classification	Speed (MPH)	Curbs & Sidewalks	On-Street Parking	Bicycle Lanes
OR-213	ODOT	Expressway/ District Hwy	55	None	Not Permitted	Both Sides
Redland Road	Clackamas County/ODOT	Minor Arterial	45	Partial Both Sides	Not Permitted	Both Sides
S Barlow Drive	Oregon City	Local Street	25	Both Sides	Permitted	None
S Winston Drive	Oregon City	Local Street	25	Partial Both Sides	Permitted	None

Table Notes: Functional Classification and Jurisdiction based on Oregon City's TSP and ODOT's Online TransGIS map.

Table 1: Vicinity Roadway Descriptions (Continued)

Street Name	Jurisdiction	Functional Classification	Speed (MPH)	Curbs & Sidewalks	On-Street Parking	Bicycle Lanes
Abernethy Road	Clackamas County	Minor Arterial	35	Partial Both Sides	Not Permitted	Both Sides
S Holcomb Boulevard	Oregon City	Minor Arterial	35	Partial Both Sides	Partially Permitted	Partial Both Sides

Table Notes: Functional Classification and Jurisdiction based on Oregon City's TSP and ODOT's Online TransGIS map.

Study Intersections

Based on coordination with Oregon City's transportation consultant, analysis of site access intersections is required. There are two intersections which currently exist where a summarized description of these study intersections is provided in Table 2.

Table 2: Study Intersection Descriptions

Number	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
1	S Winston Drive at S Holcomb Boulevard	Four-Legged	Stop-Controlled	NB/SB Stop-Controlled Approaches
2	S Barlow Drive at S Holcomb Boulevard	Three-Legged	Stop-Controlled	SB Stop-Controlled Approach
4	Redland Road at OR-213	Three-Legged	Signal	Protected NB/EB Left-turns, Permitted/Overlap SB/EB Right-turns
5	Redland Road at Holcomb Boulevard/Abernethy Road	Four-Legged	Signal	Protected Left-turns on All Approaches

Two vicinity maps showing the project site, vicinity streets, and study intersections under their existing/planned configurations are shown in Figure 2 and Figure 3. Specifically, Figure 2 depicts the access intersections along S Holcomb Boulevard while Figure 3 depicts the Redland Road study intersections.

Figure 2

Park Place Crossing Master

1/13/2

S Holcomb Boulevard

S Winston Drive

S Barlow Drive

Kitty Hawk Avenue

Jada Way

S Livesay Road

1

2

3

GENERAL DEVELOPMENT PLAN AREA

LEGEND

- STUDY INTERSECTION (EXISTING)
- STUDY INTERSECTION (FUTURE/PLANNED)
- STOP SIGN
- BIKE LANE
- GENERAL DEVELOPMENT PLAN AREA
- ARTERIAL ROADWAY
- LOCAL ROADWAY
- FUTURE/PLANNED ROADWAY

No Scale

VICINITY MAP

Site Access Intersections

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Figure 3

Park Place Crossing Master Plan

1/13/25

LEGEND

- STUDY INTERSECTION
- TRAFFIC SIGNAL
- BIKE LANE
- ARTERIAL ROADWAY
- COLLECTOR ROADWAY
- LOCAL ROADWAY

OR-213

Abernethy Road

Holcomb Boulevard

Redland ROad

Apperson Boulevard

4

5

4

5

No Scale

VICINITY MAP

Redland Road Intersections

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Site Trips

Trip Generation

The Park Place Crossing Master Plan project will include the construction of 351 single-family detached houses and 126 single-family attached houses over six phases of development, removing and/or maintaining 6 existing single-family detached houses for a net increase of 471 dwelling units. To estimate the number of trips that are currently and will be generated by the existing and proposed uses, trip equations from the *Trip Generation Manual*[1] were used. Specifically, data from land use code 210, *Single-Family Detached Housing*, and 215, *Single-Family Attached Housing*, were used to estimate site trip generation based on the number of dwelling units. For the purposes of simplicity and for maintaining a conservative analysis, it is assumed that all 60 houses in Phase 1 will developed, regardless of whether the Street A connection is maintained or removed pending construction of the S Holly Lane intersection at S Holcomb Boulevard.

The trip generation calculations show that the proposed project will generate an additional 290 morning peak hour trips, 390 evening peak hour trips, and 4,064 average weekday trips. The trip generation estimates are summarized in Table 3. Detailed trip generation calculations are included in the technical appendix.

Table 3: Trip Generation Summary

	ITE Code	Size/ Variable	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Phase 1									
SFD[1]	210	59 units	12	34	46	38	23	61	622
Cumulative SFD		59 units	12	34	46	38	23	61	622
Phase 2									
SFD	210	135 units	23	67	90	79	45	124	1,234
Cumulative SFD		194 units	35	101	136	117	68	185	1,856
SFA	215	124 units	18	41	59	40	30	70	894
Total Site Trip Generation			53	142	195	157	98	255	2,750
Phase 3									
SFD[2]	210	55 units	9	26	35	30	19	49	480
Cumulative SFD		249 units	44	127	171	147	87	234	2,336
Total Site Trip Generation			62	168	230	187	117	304	3,230
Phase 4									
SFD	210	53 units	9	24	33	30	17	47	454
Cumulative SFD		302 units	53	151	204	177	104	281	2,790
Total Site Trip Generation			71	192	263	217	134	351	3,684

Table Notes:

[1] *One existing house may be removed or maintained.*

[2] *Four existing houses may be removed or maintained.*

Single-Family Detached Housing denoted as SFD. Single-Family Attached Housing denoted as SFA.

[1] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 11th Edition, 2021.

Table 3: Trip Generation Summary (Continued)

	ITE Code	Size/ Variable	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Phase 5									
SFD[1]	210	34 units	5	15	20	18	11	29	288
Cumulative SFD		336 units	58	166	224	195	115	310	3,078
Total Site Trip Generation			76	207	283	235	145	380	3,972
Phase 6									
SFD	210	11 units	2	5	7	7	3	10	92
Cumulative SFD		347 units	60	171	231	202	118	320	3,170
Total Site Trip Generation			78	212	290	242	148	390	4,064

Table Notes:

[1] *One existing house may be removed or maintained.*

Single-Family Detached Housing denoted as SFD. Single-Family Attached Housing denoted as SFA.

Note that the trip generation estimates for Phase 2 in Table 3 assume the development of two additional single-family detached houses and two fewer single-family attached houses. However, since detached houses generate more trips than attached houses per the *Trip Generation Manual*, the analysis findings above may slightly overestimate site trip generation whereby all succeeding analyses which are based on this trip generation may be considered conservative.

Trip Distribution

The directional distribution of site trips to and from the Park Place Crossing Master Plan was referenced and generally based on the distribution utilized in the *Park Place Annexation TIS* and succeeding addendum. The trip distribution in the TIS was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at studied intersections. The following trip distribution is projected:

- Approximately 25 percent of site trips will travel to/from the northeast along I-205;
- Approximately 18 percent of site trips will travel to/from the east along S Holcomb Boulevard;
- Approximately 15 percent of site trips will travel to/from the southwest along I-205;
- Approximately 13 percent of site trips will travel to/from the southwest along Washington Street;
- Approximately 8 percent of site trips will travel to/from the north along OR-99E;
- Approximately 4 percent of site trips will travel to/from the south along OR-213;
- Approximately 3 percent of site trips will travel to/from the southwest along Main Street;
- Approximately 3 percent of site trips will travel to/from the southwest along S Anchor Way;
- Approximately 3 percent of site trips will travel to/from the west along Beavercreek Road;
- Approximately 1 percent of site trips will travel to/from the southwest along OR-99E;

- Approximately 1 percent of site trips will travel to/from the south along S Holly Lane;
- Approximately 1 percent of site trips will travel to/from the east along Beavercreek Road; and
- Approximately 5 percent of site trips will travel to/from locales within the immediate vicinity, including surrounding residential areas, Holcomb Elementary School, and other land-uses.

Master Plan site trips are expected to be distributed between the Street A connection and S Winston Drive as follows:

- Phase 1: All site trips will utilize Street A.
- Phase 2: All site trips will utilize Street A.
- Phase 3: All site trips will utilize S Winston Drive. Additionally, approximately 75 percent of site trips generated by Phase 2 will reroute from Street A to S Winston Drive.
- Phase 4: All site trips will utilize S Winston Drive.
- Phase 5: All site trips will utilize S Winston Drive.
- Phase 6: All site trips will utilize Street A.

Provided the S Holly Lane connection to S Holcomb Boulevard is constructed following full buildout of the Master Plan and development of tax lots 800 and 1600, the interim Street A connection will be closed, and a majority of trips projected to utilize S Winston Drive are expected to reroute to S Holly Lane. Trips are expected to be redistributed as follows:

- Phase 1: All site trips will utilize S Holly Lane.
- Phase 2: All site trips will utilize S Holly Lane.
- Phase 3: Approximately 50 percent of site trips will utilize S Holly Lane and the other 50 percent will utilize S Winston Drive.
- Phase 4: Approximately 50 percent of site trips will utilize S Holly Lane and the other 50 percent will utilize S Winston Drive.
- Phase 5: Approximately 50 percent of site trips will utilize S Holly Lane and the other 50 percent will utilize S Winston Drive.
- Phase 6: All site trips will utilize S Holly Lane.

Note that in either scenario, with or without the S Holly Lane connection to S Holcomb Boulevard, access to S Livesay Road will be restricted to emergency vehicle access only whereby nominal trip impacts will occur along S Livesay Road until such a time that this connection is fully developed.

The site trip distribution at studied intersections identified for mitigation in the *Park Place Annexation TIS* are shown in Figure 4. The trip assignment for site trips generated during the morning and evening peak hours without the S Holly Lane connection are shown in Figure 5 at the study intersection. The site trip assignment for the morning and evening peak hours with the S Holly Lane connection in place are shown in Figure 6.

Figure 4

Park Place Crossing Master

1/13/2

SITE TRIP DISTRIBUTION

Inbound and Outbound Percentage Impacts

AM & PM Peak Hours

No Scale

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NET TOTAL TRIP GENERATION			
	IN	OUT	TOTAL
AM	78	212	290
PM	242	148	390

AM PEAK HOUR

PM PEAK HOUR

Figure 5

Park Place Crossing Master Plan

1/13/2

SITE TRIP ASSIGNMENT

Master Plan - Without S Holly Lane Connection

AM & PM Peak Hours

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NET TOTAL TRIP GENERATION			
	IN	OUT	TOTAL
AM	78	212	290
PM	242	148	390

AM PEAK HOUR

PM PEAK HOUR

Figure 6

Park Place Crossing Master

1/13/2

SITE TRIP ASSIGNMENT

Master Plan - With S Holly Lane Con

AM & PM Peak Hours

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Off-Site Trip Impacts

Per the City's final pre-application meeting notes, dated May 5, 2021, Oregon City staff have identified eight improvement projects where proportionate share impact fees are being collected. No specific methodology was outlined in the pre-application notes which identified how these fees were calculated; therefore, evening peak trip impacts at these transportation facilities were reported on a phase-by-phase basis. Table 4 summarizes these evening peak hour trip impacts and compares them to the prior analyzed *Park Place Annexation TIS* evening peak hour trip impacts.

Table 4: Trip Impact Analysis

Transportation Facility		TSP Project	% Impact	Trip Impacts (PM Trips)							Annexation PM Trips
				Ph. 1	Ph. 2	Ph. 3	Ph. 4	Ph. 5	Ph. 6	Total	
A	14th Street and 15th Street (between OR-99E & John Adams Street)	D7, D8	12%	7	23	6	6	3	1	46	82
B	S Redland Road at Holly Lane	D36	1%	1	2	0	0	0	0	3	489
C*	S Holcomb Boulevard at S Holly Lane	D43	59% (100%)	61	194	29	28	17	10	339	190
D	I-205 SB Ramps at OR-99E	D75	8%	5	16	4	4	2	1	32	54
E	I-205 NB Ramps at OR-99E	D76	8%	5	16	4	4	2	1	32	54
F	OR-213 (near the S Redland Road Undercrossing)	D79	8%	5	16	4	4	2	1	32	27
G	S Holcomb Boulevard at S Redland Road	N/A	77%	47	149	38	36	22	8	300	469
H	OR-213 at Beavercreek Road	N/A	8%	5	16	4	4	2	1	32	27

Table Notes: 59% applied to Phases 3, 4, and 5. 100% applied to all other Phases.

** Assumes trip impacts to S Holly Lane intersection at S Holcomb Boulevard is constructed.*

Traffic Volumes

Existing Conditions

Due to the ongoing COVID-19 viral pandemic, traffic volumes around Oregon have been depressed relative to normal conditions. A review of available traffic count data yielded 24-hour traffic counts along S Holcomb Boulevard east of S Barlow Drive from November 2, 2017, and year 2019 annual average daily traffic (AADT) along OR-213, just south of Redland Road from ODOT's Transportation Volume Tables. Given these available counts, the following methodology for data collection and volume adjustment was utilized:

Site Access Intersections (Intersections 1-3)

- The historical traffic counts from 2017 along S Holcomb Boulevard were grown to reflect 2021 existing conditions by applying a two percent per year compounded growth rate over a four-year period.
- Since recent/historical traffic counts are not available at the study intersections, current year 2021 morning and evening peak hour counts were collected. These counts were collected on Thursday, April 15, 2021, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Additionally, 24-hour roadway volumes were collected on S Winston Drive on the same day.
- The 2017 historical count data (grown to reflect 2021 conditions) were compared to the traffic volumes at the intersection of S Barlow Drive at S Holcomb Boulevard, specifically traffic traveling to/from the east of the intersection. Based on the difference in the morning and evening peak period volumes, the following adjustment factors were calculated:
    - Morning Peak Hour: 1.20.
    - Evening Peak Hour: No reduction in volumes determined.

  These adjustment factors are intended to estimate normal traffic conditions without impacts from the COVID-19 virus (i.e. normal commuter patterns, businesses open, etc).
- The calculated adjustment factors were applied to the traffic counts at all the site access study intersections along S Holcomb Boulevard where 2021 count data was collected.

Data was used from each study intersection's respective morning and evening peak hours.

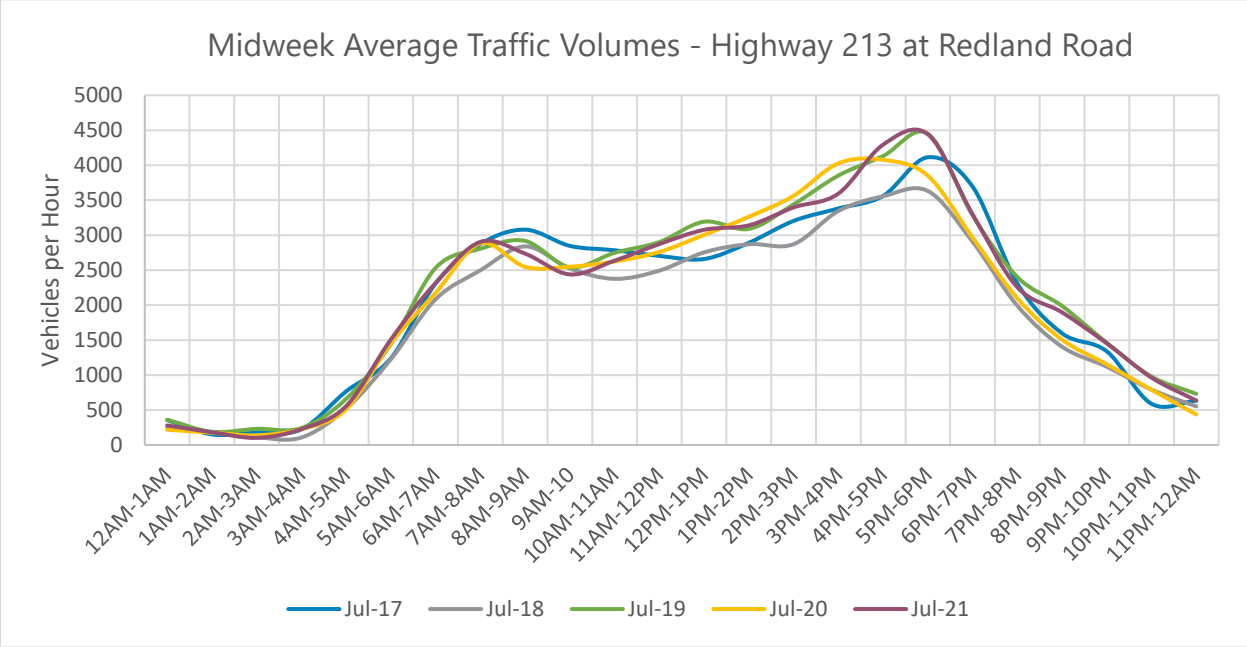
Redland Road Intersections (Intersections 4-5)

- The historical traffic counts from 2019 along OR-213 were grown to reflect 2021 existing conditions by applying a 0.0118 percent per year linear growth rate over a two-year period, calculated in accordance with ODOT's *Future Volumes Table*.
- As requested by the Oregon City's transportation consultant, current year 2021 weekday morning and evening peak hour counts were collected at the study intersections. These counts were collected on Thursday, July 22, 2021, from 7:00 AM to 10:00 AM and from 3:00 PM to 6:00 PM.

- The 2019 historical count data (grown to reflect 2021 conditions) and the recently collected 2021 evening peak hour counts at the intersection of Redland Road at OR-213 were compared. Specifically, it is assumed that the evening peak hour counts represent approximately ten percent of AADT. Based on the difference in traffic volumes traveling between the intersection and ODOT count location, an adjustment factor of 1.0765 was calculated. This adjustment factor is intended to estimate normal traffic conditions without impacts from the COVID-19 virus (i.e. normal commuter patterns, businesses open, etc).
- The calculated adjustment factor was applied to the collected 2021 peak hour intersection traffic counts.

To further investigate the effect of the COVID-19 pandemic on traffic volumes along OR-213 and near the Redland Road study intersections, data was obtained through StreetLight Insight, which is a "big data" company that utilizes primarily cell phone data to derive traffic volumes that are based on millions of data points across a broad range of time, rather than just a single count on a single day over a few hours of time.

Since the traffic counts at the subject intersections were collected in July of 2021, traffic volumes from each July from 2017 through 2021 were compared. In fact, the data set represented below includes every Tuesday, Wednesday, and Thursday in the month of July, which serves to average out any peaks or valleys that may occur on individual days or hours, resulting in a reliable, robust data set. The chart on the following page shows the average daily traffic volume profile for each year.



As shown in the chart above, July traffic volumes have been reasonably consistent with the exception of July 2020 being predictably lower than July of 2019 and 2021, both which are very similar in volume particularly during the evening peak period. Permanent traffic recorder data on OR-213 south of Oregon City shows that July is nearly the peak month, exceeded only slightly by August. July is considerably higher in volume than other months of the year when school is in session.

This data shows us that the July 2021 traffic count data used in this transportation study is reliable and that the influence of COVID-19 near the Redland Road study intersections is at best, very minor. Therefore, the calculated adjustment factor described in the previous section provides a reasonable high-end estimate of evening peak conditions.

Future Conditions

Traffic Growth

To provide analysis of the potential impact of the Master Plan on the nearby transportation facilities, an estimate of future traffic volumes is required. It is anticipated that the entire Master Plan (Phases 1 through 6) could be constructed by year 2030. Intermittently, it is assumed each Phase will be completed by the following years:

- Phase 1: 2023 (2 years growth)
- Phase 2: 2026 (5 years of growth)
- Phase 3: 2027 (6 years of growth)
- Phase 4: 2029 (8 years of growth)
- Phase 5: 2030 (9 years of growth)
- Phase 6: 2030 (9 years of growth)

In order to approximate future year traffic volumes at the study intersections, the following growth rates were applied to the study intersections:

- Site Access Intersections (Intersections 1-3): A compounded growth rate of two percent per year was applied to the adjusted 2021 existing traffic volumes over each Phase's assumed year of completion.
- Redland Road at OR-213 (Intersection 4): In accordance with the *The North End Master Plan Transportation Impact Analysis Report*, dated March 23, 2021, a linear growth rate of 0.31 percent per year was applied to the adjusted 2021 existing traffic volumes over each Phase's assumed year of completion.
- Redland Road at Holcomb Boulevard/Abernethy Road: In accordance with the *The North End Master Plan Transportation Impact Analysis Report*, dated March 23, 2021, a linear growth rate of 1.15 percent per year was applied to the adjusted 2021 existing traffic volumes over each Phase's assumed year of completion.

In-Process Trips

In addition to the traffic growth described above, the nearby Serres Farm Master Plan project and The North End Master Plan will be developing at a similar time as Park Place Crossing. Both in-process development projects are currently not fully contributing trips to the transportation system but may potentially be by the assumed 2030 buildout year of the Park Place Crossing. Additional trips corresponding to the in-process developments were added to the 2021 existing year traffic volumes in addition to the traffic growth at each of the applicable study intersections. In-process trips were added as follows:

- Serres Farm Master Plan: To maintain a conservative analysis of operation at the study intersections, the in-process development was assumed to be fully built-out by year 2023 (actual full buildout is anticipated by year 2025).
- The North End Master Plan: According to the project's revised staff report, dated July 19, 2021, conditions of approval 78.b, "*for development phases with planned occupancy dates before the end of 2022 and for development phases totaling 40 percent or less of the total trips generated by the buildout values in the TIA (both date and volume conditions must be met), the applicant will not be required to undertake additional traffic operations analysis or implement off-site mitigation measures for traffic operations or safety*." Since the North End project can construct a portion of their project to utilize up to 40 percent of the total trip generation without conducting further traffic analysis or providing any off-site mitigation, 40 percent of the North End Master Plan trips were included as in-process trips. Beyond 40 percent, the North End project will be required to conduct additional traffic analysis and/or construct additional off-site improvement.

These in-process development volumes were added to the 2021 existing year traffic volumes in addition to the four years of traffic growth at each of the applicable study intersections.

Site Trips

Peak hour trips calculated to be generated by each Phase of the Master Plan, as described earlier within the *Site Trips* section, were added to each Phase's respective projected year background traffic volumes. The following future year analysis scenarios were considered:

- Year 2023 background conditions
- Year 2023 buildout conditions (Phase 1)
- Year 2026 background conditions (Phase 1)
- Year 2026 buildout conditions (Phase 1 & 2)
- Year 2027 background conditions (Phase 1 & 2)
- Year 2027 buildout conditions (Phases 1 through 3)
- Year 2029 background conditions (Phases 1 through 3)
- Year 2029 buildout conditions (Phases 1 through 4)
- Year 2030 background conditions (Phases 1 through 4)
- Year 2030 buildout conditions (Phases 1 through 5)
- Year 2030 buildout conditions (Phases 1 through 6)

Following redevelopment of properties north/west of the project site, south of S Holcomb Boulevard, and near S Barlow Drive (tax lots 800 and 1600), the interim Street A connection will be closed, and future access relocated to the S Holly Lane extension, located opposite of S Barlow Drive (see the *S Holly Lane Intersection Location* section of the report for further details). Assuming this connection occurs by the 2030 buildout year of the entire site (Phases 1 through 6), an estimate of traffic volumes with development of under this scenario was determined.

Figure 7 shows the morning and evening peak hour traffic volumes at the intersections under year 2021 existing conditions and future year traffic conditions through 2027, with Phase 1 and 2, complete. Figure 8 presents the morning and evening peak hour volumes from year 2027, with Phases 1 through 3, complete through year 2030, with Phases 1 through 6 completed. In addition, Figure 8 presents full build volumes under 2030 conditions with the assumed S Holly Lane connection to S Holcomb Boulevard constructed.

Figure 7

Park Place Crossing Master

1/13/2

AM PEAK HOUR

PM PEAK HOUR

2021 EXISTING

2023 BACKGROUND

2023 BUILDOUT (PHASE 1)

2026 BACKGROUND (PHASE 1)

2026 BUILDOUT (PHASE 1–2)

2027 BACKGROUND (PHASE 1–2)

No Scale

TRAFFIC VOLUMES

Existing through 2027 Conditions

AM & PM Peak Hours

lancaster mobley

Figure 8

Park Place Crossing Master

1/13/2

TRAFFIC VOLUMES

2027 through 2030 Conditions

AM & PM Peak Hours

lancaster mobley

Safety Analysis

Crash History Review

Using data obtained from ODOT's Crash Analysis and Reporting Unit, a review was performed of the most recent five years of available crash data at the study intersections of S Winston Drive at S Holcomb Boulevard and S Barlow Drive at S Holcomb Boulevard (January 2015 through December 2019). The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for each intersection.

Following a review of the available data, no crashes were reported to have occurred at either intersection during the analysis period whereby no significant trends or crash patterns could be identified that are indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

Sight Distance Evaluation

Sight distances were measured at the interim Street A intersection along S Holcomb Boulevard as well as the future S Holly Lane connection along S Holcomb Boulevard (opposite of S Barlow Drive) and evaluated in accordance with the standards established in *A Policy of Geometric Design of Highways and Streets*[2]. According to AASHTO, the driver's eye is assumed to be 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The vehicle driver's eye height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

Based on the posted speed of 35 mph along S Holcomb Boulevard, the minimum recommended intersection sight distance is 390 feet to the east and west of each intersection. Provided any obstructing foliage near the access locations (along the south side of S Holcomb Boulevard) are removed or properly maintained, sight distances at the S Barlow Drive intersection were measured to be in excess of 500 feet to the east and west, while at the Street A intersection sight distances were measured to be in excess of 500 feet to the west and approximately 294 feet to the east, limited by a crest vertical curve along S Holcomb Boulevard.

Although the minimum recommended intersection sight distance standard is not met, intersection sight distance is considered an operational measure intended to provide sufficient line of sight along the major-street so that a vehicle can enter the roadway without impeding the flow of through traffic. Conversely, stopping sight distance is considered the minimum requirement to ensure safe operation of the intersection. This distance allows the driver of a vehicle traveling on the major-street to react to a turning vehicle or other object in the roadway and come to a complete stop to avoid a collision. To ensure safe operation of an intersection, the extent of available intersection sight distance must at least equal the minimum required stopping sight distance. Taking into consideration a downhill, westbound approach grade of 4.36 percent, the minimum required stopping sight distance is 265 feet. Therefore, there is sufficient stopping sight distance to accommodate westbound approaching vehicles.

[2] American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

Based on the sight distance measurements and provided any obstructing foliage near the access locations and along the south side of S Holcomb Boulevard are removed or properly maintained, adequate sight distances can be made available at the S Barlow Drive intersection to allow safe and efficient operation of the S Holly Lane approach, while adequate sight distances can be made available to ensure safe operation of the temporary Street A intersection. No other sight distance related mitigation is necessary or recommended.

Warrant Analysis

Left-turn lane and preliminary traffic signal warrants were examined for the study intersections where such treatments would be applicable.

Left-Turn Lane Warrant

A left-turn refuge lane is primarily a safety consideration for the major-street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants used were developed from the *National Cooperative Highway Research Project's* (NCHRP) *Report 457*. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Based on the analysis, left-turn lane warrants are not projected to be met at any of the study intersections under any analysis scenario. Accordingly, no new turn lanes are necessary or recommended as part of the Master Plan.

Preliminary Traffic Signal Warrant

Preliminary traffic signal warrants were examined for the unsignalized study intersections to determine whether the installation of a new traffic signal will be warranted at the intersections upon completion of the Park Place Crossing Master Plan project, with or without the S Holly Lane connection to S Holcomb Boulevard. Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at the study intersections under any of the analysis scenarios.

Access Spacing

According to Oregon City's Transportation System Plan (TSP) S Holcomb Boulevard operates under the jurisdiction of Oregon City within the City's urban growth boundary (UGB) and is classified as a Minor Arterial. Subsequently the City's spacing standards apply to this section of S Holcomb Boulevard. Per the TSP, the following spacing standards apply along S Holcomb Boulevard (measured centerline to centerline):

- Maximum Block Size: 530 feet;
- Minimum Block Size: 150 feet; and
- Minimum Driveway Spacing (between other streets and driveways): 175 feet. Note that single and two-family dwellings are exempt from the driveway to driveway spacing standard.

Regarding the maximum block length standard, there is a provision to allow a longer block length given that a mid-block pedestrian/bicycle accessway is provided intermittently at a spacing no greater than 330 feet (unless the connection is impractical due to existing development, topography, or environmental constraints).

For the Street A connection onto S Holcomb Boulevard, the roadway will be spaced approximately 220 feet from Jada Way to the east and 400 feet from S Barlow Drive to the west. Additionally, no private driveways that serve land uses other than one to two-family dwellings are located within 175 feet of the Street A connection. Therefore, spacing standards will be met for the Street A intersection.

For the future planned S Holly Lane connection to S Holcomb Boulevard, opposite of S Barlow Drive, the roadway will be spaced approximately 620 feet from Jada Way to the east and 500 feet from S Winston Drive to the west. There is an intermittent pedestrian/bicycle accessway between S Barlow Drive and Jada Way along the north side of S Holcomb Boulevard approximately 160 feet east of S Barlow Drive; however, with the planned construction of the S Holly Lane connection a pedestrian/bicycle accessway may need to be constructed/maintained (e.g. the Street A connection restricted to pedestrians/bicyclists) along the south side of the road. Additionally, no private driveways that serve land uses other than one to two-family dwellings are located within 175 feet of the future planned S Holly Lane connection. Therefore, spacing standards will be met for the future planned S Holly Lane intersection.

Reduced S Holly Lane Cross-Section

As part of the Park Place Crossing Master Plan project, the S Holly Lane collector will be constructed through the site with future connections between S Livesay Road and S Holcomb Boulevard (note the connection to S Livesay Road as part of this Master Plan will be emergency vehicle access only). Per Oregon City Municipal Code Table 16.12.016 a collector right-of-way width is 85 feet, however within the project site where S Holly Lane crosses between tax lots 2-2E-28D-00190 and 2-2E-27BC-01000 there is not adequate room to accommodate this. Given this restriction, a reduced section is necessary to allow room for roadway construction and grading (retaining walls, daylight slopes etc.).

Table 5 presents the typical cross-section for a Collector roadway compared the narrow section proposed for the segment of S Holly Lane.

Table 5: S Holly Lane Cross-Section

Cross-Section	Road Classification	Zoning	ROW Width	Road Width	Public Access	Side walk	Landscape Strip & Curb	Bike Lane	Street Parking	Travel Lanes	Median
Typical Section	Collector	Residential	85'	59'	0.5'	5'	7.5'	6'	7'	11' (×3)	N/A
Narrow Section	Collector	Residential	57'	45'	0.5'	5'	0.5'	6'	0'	11' (×3)	N/A

Per the above, on-street parking along this segment of S Holly Lane will be prohibited along both sides of the roadway. Figure 8 depicts this reduced cross-section of S Holly Lane.

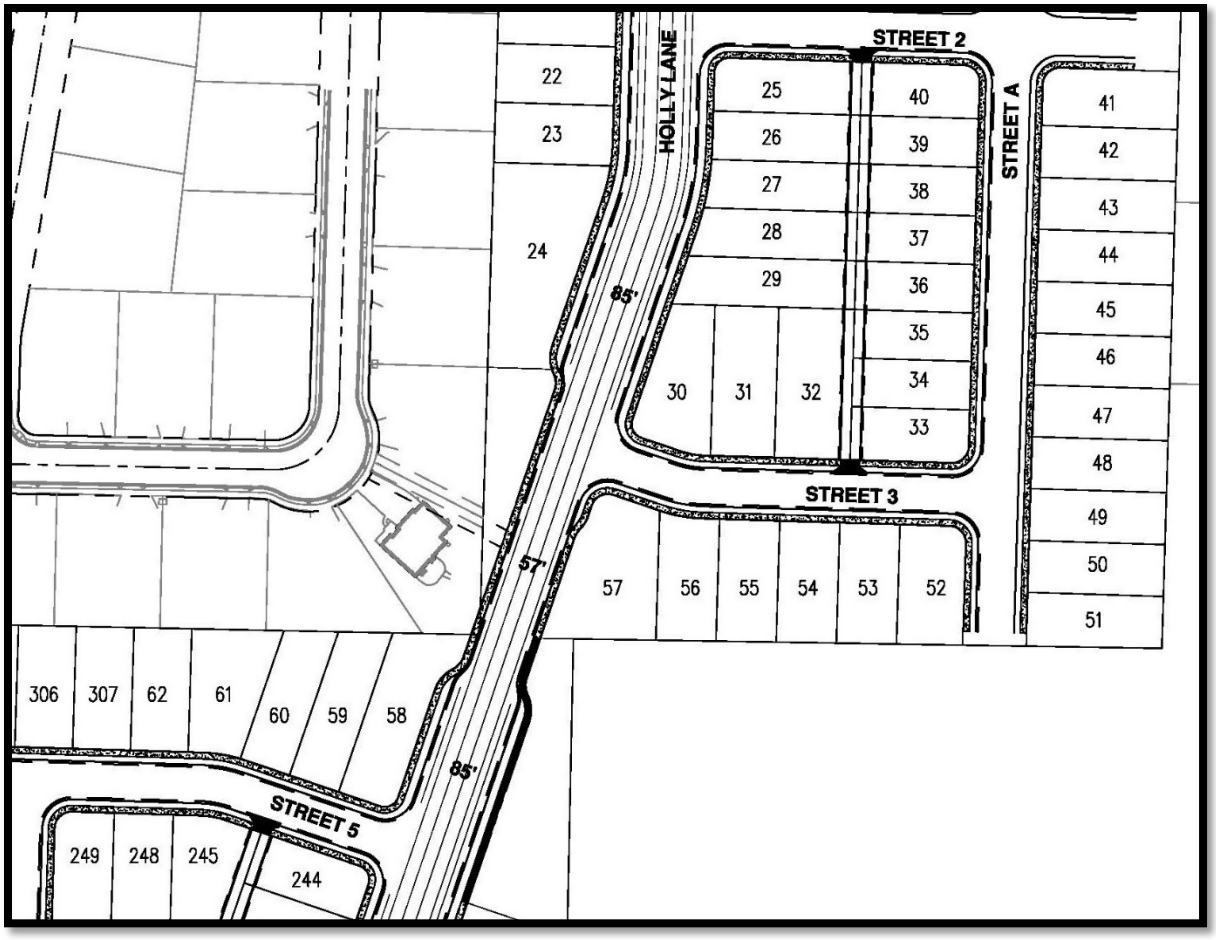


Figure 9: Reduced S Holly Lane Cross-Section

S Holly Lane Intersection Location

A safety and operation review for S Holly Lane connection along S Holcomb Boulevard was conducted where two potential locations for the connection were considered: opposite of S Barlow Drive and opposite of S Jada Way. This analysis is detailed in a technical memorandum from Lancaster Mobley, dated July 24, 2020. Based on the analysis findings and correspondence with Oregon City staff, the location of S Holly Lane opposite of S Barlow Drive was determined as the preferred location by City staff.

For analysis review and consideration for the preferred S Holly Lane location, refer to the detailed technical memorandum which is included in the attached technical appendix.

Operational Analysis

Intersection Capacity Analysis

A capacity and delay analysis were conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual* (HCM)[3]. Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

Performance Standards

Per Oregon City's Transportation System Plan and Metro's online 2018 Regional Transportation Plan (RTP) Network maps, the access study intersections along S Holcomb Boulevard are located outside of the City's regional center and S Holcomb Boulevard is not designated on the arterial and throughway network. Comparatively, the Redland Road study intersections are located within the regional center. Per Section *16.12.033 – Mobility Standards* of the Oregon City Municipal Code, the following minimum acceptable operation standards apply to the study intersections.

- 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:
    - For signalized intersections:
        - During the 1st 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.
        - During the 2nd 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.
    - For unsignalized intersections outside of the boundaries of the regional center:
        - 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.

[3] Transportation Research Board, *Highway Capacity Manual 6th Edition*, 2016.

- For intersections within the regional center, the following mobility standards apply:
    - During the 1st 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.
    - During the 2nd 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.

Delay & Capacity Analysis

Peak Hour Analysis (1st Hour)

The LOS, delay, and v/c results of the capacity analysis are shown in Table 5 for the morning and evening peak hours. The TrafficWare Synchro software utilized for analysis does not report the overall v/c ratio of signalized intersections in the HCM 6th Edition capacity reports. For these intersections, the v/c ratio was calculated based on methods detailed in ODOT's APM *Section 13 Signalized Intersection Analysis*. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

Table 6: Intersection Capacity Analysis Summary

	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
1. S Winston Drive at S Holcomb Boulevard						
2021 Existing Conditions	B	12	0.08	B	12	0.07
2023 Background Conditions	B	12	0.09	B	13	0.08
2023 Buildout Conditions (Phase 1)	B	13	0.09	B	14	0.08
2026 Background Conditions (Phase 1)	B	13	0.10	B	14	0.09
2026 Buildout Conditions (Phase 1-2)	C	15	0.13	C	17	0.12
2027 Background Conditions (Phase 1-2)	C	16	0.13	C	17	0.12
2027 Buildout Conditions (Phase 1-3)	C	17	0.37	C	20	0.34
2029 Background Conditions (Phase 1-3)	C	18	0.38	C	21	0.35
2029 Buildout Conditions (Phase 1-4)	C	19	0.45	C	24	0.42
2030 Background Conditions (Phase 1-4)	C	20	0.45	C	24	0.43
2030 Buildout Conditions (Phase 1-5)	C	21	0.50	D	26	0.48
2030 Buildout Conditions (Phase 1-6)	C	21	0.50	D	27	0.48
2030 Buildout Conditions (w/ Holly Lane)	C	18	0.25	C	23	0.24

Table 6: Intersection Capacity Analysis Summary (Continued)

	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
2. S Barlow Drive at S Holcomb Boulevard						
2021 Existing Conditions	A	9	0.03	A	9	0.04
2023 Background Conditions	A	10	0.05	A	10	0.05
2023 Buildout Conditions (Phase 1)	A	10	0.05	B	10	0.06
2026 Background Conditions (Phase 1)	B	10	0.06	B	10	0.06
2026 Buildout Conditions (Phase 1-2)	B	11	0.06	B	11	0.07
2027 Background Conditions (Phase 1-2)	B	11	0.07	B	11	0.07
2027 Buildout Conditions (Phase 1-3)	B	10	0.06	B	11	0.06
2029 Background Conditions (Phase 1-3)	B	11	0.06	B	11	0.07
2029 Buildout Conditions (Phase 1-4)	B	11	0.06	B	11	0.07
2030 Background Conditions (Phase 1-4)	B	11	0.06	B	11	0.07
2030 Buildout Conditions (Phase 1-5)	B	11	0.06	B	11	0.07
2030 Buildout Conditions (Phase 1-6)	B	11	0.06	B	11	0.07
2030 Buildout Conditions (w/ Holly Lane)*	C	20	0.50	D	27	0.49
3. Street A at S Holcomb Boulevard						
2023 Buildout Conditions (Phase 1)	B	11	0.07	B	11	0.05
2026 Background Conditions (Phase 1)	B	11	0.07	B	11	0.05
2026 Buildout Conditions (Phase 1-2)	B	13	0.30	B	14	0.23
2027 Background Conditions (Phase 1-2)	B	14	0.30	B	14	0.23
2027 Buildout Conditions (Phase 1-3)	B	12	0.13	B	13	0.09
2029 Background Conditions (Phase 1-3)	B	12	0.13	B	13	0.10
2029 Buildout Conditions (Phase 1-4)	B	12	0.13	B	13	0.10
2030 Background Conditions (Phase 1-4)	B	12	0.13	B	13	0.10
2030 Buildout Conditions (Phase 1-5)	B	12	0.14	B	13	0.10
2030 Buildout Conditions (Phase 1-6)	B	12	0.15	B	13	0.11

* *Intersection converted to four-legs.*

Table 6: Intersection Capacity Analysis Summary (Continued)

	LOS	Delay (s)	v/c		LOS	Delay (s)	v/c
4. Redland Road at OR-213 (1st Hour)							
2021 Existing Conditions	B	19	0.911		C	31	0.974
2023 Background Conditions	C	21	0.938		D	42	1.029
2023 Buildout Conditions (Phase 1)	C	21	0.943		D	44	1.034
2026 Background Conditions (Phase 1)	C	21	0.952		D	46	1.042
2026 Buildout Conditions (Phase 1-2)	C	22	0.968		D	50	1.058
2027 Background Conditions (Phase 1-2)	C	22	0.971		D	50	1.061
2027 Buildout Conditions (Phase 1-3)	C	23	0.976		D	50	1.065
2029 Background Conditions (Phase 1-3)	C	24	0.981		D	52	1.071
2029 Buildout Conditions (Phase 1-4)	C	24	0.985		D	52	1.075
2030 Background Conditions (Phase 1-4)	C	24	0.987		D	53	1.079
2030 Buildout Conditions (Phase 1-5)	C	24	0.990		D	53	1.081
2030 Buildout Conditions (Phase 1-6)	C	24	0.991		D	53	1.082
5. Redland Road at Holcomb Boulevard/Abernethy Road							
2021 Existing Conditions	C	21	0.556		D	47	0.705
2023 Background Conditions	C	24	0.624		D	52	0.778
2023 Buildout Conditions (Phase 1)	C	24	0.636		D	53	0.800
2026 Background Conditions (Phase 1)	C	24	0.654		D	54	0.825
2026 Buildout Conditions (Phase 1-2)	C	26	0.695		E	58	0.891
2027 Background Conditions (Phase 1-2)	C	26	0.702		E	59	0.899
2027 Buildout Conditions (Phase 1-3)	C	23	0.713		E	61	0.915
2029 Background Conditions (Phase 1-3)	C	27	0.725		E	62	0.930
2029 Buildout Conditions (Phase 1-4)	C	27	0.734		E	64	0.947
2030 Background Conditions (Phase 1-4)	C	28	0.740		E	64	0.955
2030 Buildout Conditions (Phase 1-5)	C	28	0.746		E	66	0.965
2030 Buildout Conditions (Phase 1-6)	C	28	0.747		E	66	0.969

Based on the results of the operational analysis, all access study intersections along S Holcomb Boulevard are currently operating acceptably per Oregon City standards and are projected to continue operating acceptably through the 2030 site buildout year, regardless of whether the S Holly Lane connection to S Holcomb Boulevard is constructed. No operational mitigation is necessary or recommended at these intersections.

Additionally, the two Redland Road study intersections are projected to operate acceptably during the peak hour (1st hour) per jurisdictional standards through the 2030 site buildout year.

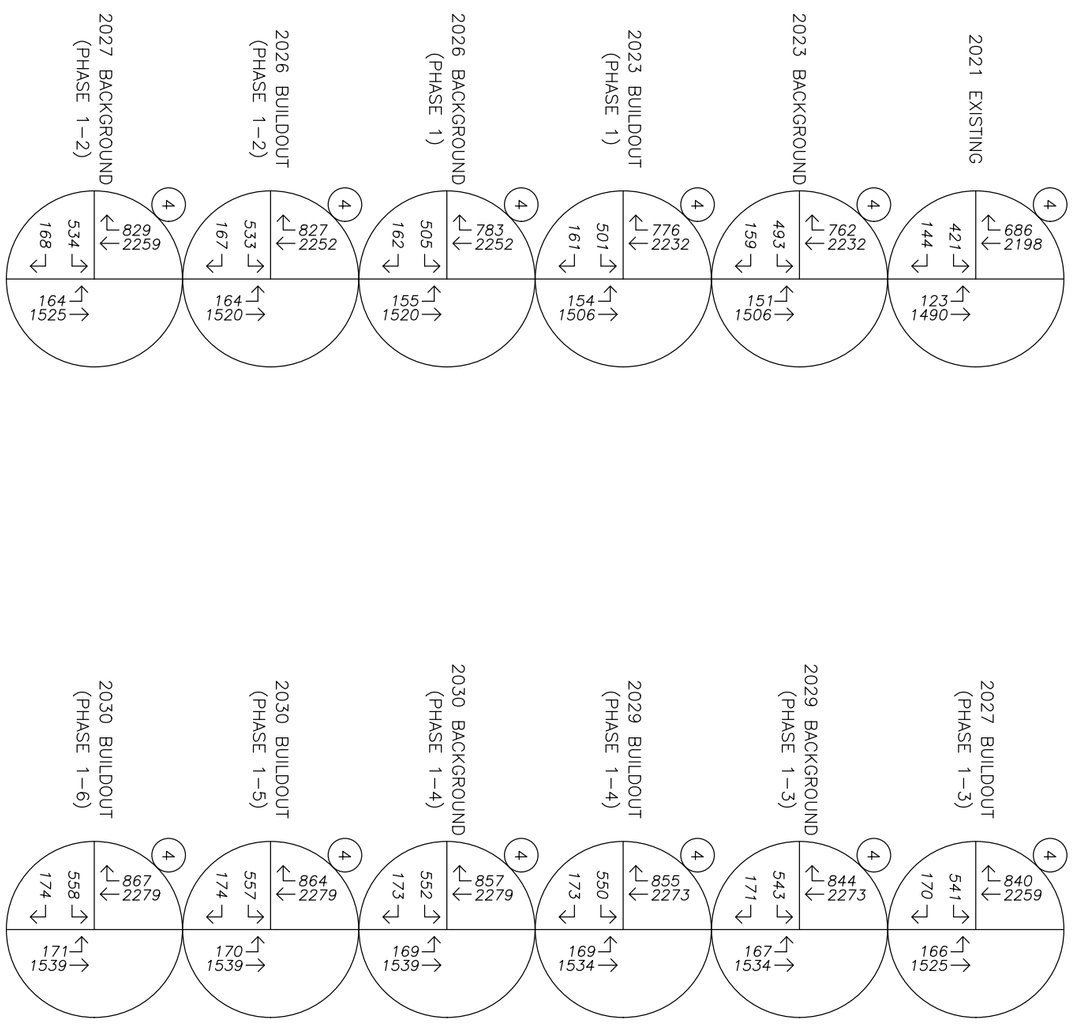
2nd Hour Analysis

Although the intersection of Redland Road at OR-213 operates within acceptable standards during the 1st hour of analysis, since it operates with a v/c ratio greater than 1.00 during the evening peak hour for all future year analysis scenarios, the 2nd hour of analysis was evaluated for these scenarios to determine whether the intersection meets the 0.99 v/c ratio 2nd hour standard.

To develop the 2nd hour of traffic volumes, the hour before and after the peak hour (4:35 PM to 5:35 PM) were considered.

- Based on the collected count data, the peak hour had a measured 5,029 vehicles entering the intersection. For the hour prior to the peak (3:35 PM to 4:35 PM), the total entering volumes were 4,714 vehicles.
- Although a full hour of data was not captured after the intersection's evening peak hour, approximately 25 minutes worth of counts were collected (i.e. 5:35 PM to 6:00 PM). To provide a reasonable estimate of post peak hour volumes, these volumes were increased by multiplying the intersection entering volumes during the available 5:35 PM to 6:00 PM period by a ratio of 60 minutes to 25 minutes (note this would be a conservative estimate of post peak hour volumes since this method doesn't consider a continuous downtrend of entering volumes as time progresses further from the peak hour).
- Based on a comparison of the pre and post peak hour volumes, the intersection volumes between 3:35 PM to 4:35 PM were higher whereby these volumes were utilized to analyze the 2nd hour.
- To estimate what in-process volumes and site trip volumes would be during the 2nd hour, these volumes were decreased by applying a ratio of total entering intersection volumes between the two analysis hours (i.e. a ratio of 4,714 total entering vehicles during the 2nd hour to 5,029 total entering vehicles during the 1st hour).

Figure 10 presents the 2nd evening peak hour volumes at the intersection of Redland Road at OR-213. The LOS, delay, and v/c results of the 2nd hour capacity analysis are shown in Table 7 for the evening peak hour. Note that only the future analysis scenarios where the v/c ratio exceeded 1.00 during the 1st hour were evaluated. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.



No Scale

TRAFFIC VOLUMES

2021 through 2030 Conditions - Redland Road at OR-213

PM 2nd Peak Hour

Figure 10

Park Place Crossing Master P

1/13/2

Table 7: Intersection Capacity Analysis Summary (2nd Hour)

	PM Peak Hour		
	LOS	Delay (s)	v/c
4. Redland Road at OR-213 (2nd Hour)			
2023 Background Conditions	C	34	0.982
2023 Buildout Conditions (Phase 1)	C	34	0.986
2026 Background Conditions (Phase 1)	D	37	**0.995**
2026 Buildout Conditions (Phase 1-2)	D	39	**1.011**
2027 Background Conditions (Phase 1-2)	D	39	**1.013**
2027 Buildout Conditions (Phase 1-3)	D	41	**1.017**
2029 Background Conditions (Phase 1-3)	D	41	**1.023**
2029 Buildout Conditions (Phase 1-4)	D	43	**1.026**
2030 Background Conditions (Phase 1-4)	D	43	**1.029**
2030 Buildout Conditions (Phase 1-5)	D	43	**1.031**
2030 Buildout Conditions (Phase 1-6)	D	43	**1.032**

Table Notes: ***BOLDED*** *text indicates interseciton operation above jurisdictional standards.*

Based on the results of the operational analysis, the intersection of Redland Road at OR-213 is projected to operate in excess of acceptable per jurisdictional standards during the 2nd evening peak hour under 2026 buildout conditions (Phase 1) and for all succeeding analysis scenarios through year 2030. A detailed review of potential mitigation at the intersection is discussed in the *Mitigation Analysis* section.

Queuing Analysis

A queuing analysis was conducted at the study intersections to determine whether sufficient storage is available at applicable turning movements to accommodate projected queues. The queue lengths were projected based on the results of a Synchro/SimTraffic simulation, with the reported values representing the 95th percentile queue length. The 95th percentile queue is a statistical measurement which indicate there is a 5 percent chance that the queue may exceed this length during the analysis period; however, given this is a probability, the 95th percentile queue length may theoretically never be met or observed in the field.

The projected 95th percentile queue lengths reported in the simulation are presented in Table 8 for the morning and evening peak hours. Note the reported queue lengths were rounded up to the nearest five feet while the available lane storage was rounded to the nearest five feet. Detailed queuing analysis worksheets are included in the technical appendix to this report.

Table 8: 95th Percentile Intersection Queuing Analysis Summary

		Available Storage (ft)	2021 Existing Conditions	2023 Background Conditions	2023 Buildout Conditions (Phase 1)
1. Redland Road at OR-213					
AM Peak Hour	EB LT Lanes	335/760*	195/210	210/220	225/235
	EB RT Lane	760*	55	65	65
	NB LT Lane	350	110	140	115
	NB Th Lanes	-	300	400	290
	SB Th Lanes	-	225	240	225
	SB RT Lane	-	70	85	85
PM Peak Hour	EB LT Lanes	335/760*	305/320	**460**/470	**385**/405
	EB RT Lane	760*	145	175	155
	NB LT Lane	350	265	**425**	**440**
	NB Th Lanes	-	145	160	160
	SB Th Lanes	-	>1600	>1600	>1600
	SB RT Lane	-	>1600	>1600	>1600
2. Redland Road at Holcomb Boulevard/Abernethy Road					
AM Peak Hour	EB LT Lane	115	65	95	90
	EB Th/RT Lane	-	105	105	105
	WB LT Lane	90	45	60	55
	WB Th Lane	-	100	135	120
	WB RT Lane	90	90	**95**	**95**
	NB LT Lane	130	130	**140**	**135**
	NB Th/RT Lane	-	195	205	215
	SB LT Lane	320	115	130	140
	SB Th Lane	820*	155	185	180
	SB RT Lane	255	40	45	40
PM Peak Hour	EB LT Lane	115	95	**175**	**185**
	EB Th/RT Lane	-	325	340	410
	WB LT Lane	90	85	85	80
	WB Th Lane	-	125	155	180
	WB RT Lane	90	85	85	90
	NB LT Lane	130	130	**165**	**175**
	NB Th/RT Lane	-	340	380	385
	SB LT Lane	320	**325**	**370**	**370**
	SB Th Lane	820*	375	400	380
	SB RT Lane	255	55	55	65

Table Notes: ***BOLDED*** *text indicates queue length exceeds avaialble storage.*

* *Available vehicle storage between study intersections.*

Table 8: 95th Percentile Intersection Queuing Analysis Summary (Continued)

		Available Storage (ft)	2026 Background Conditions (Phase 1)	2026 Buildout Conditions (Phase 1-2)	2027 Background Conditions (Phase 1-2)
1. Redland Road at OR-213					
AM Peak Hour	EB LT Lanes	335/760*	215/230	255/260	225/245
	EB RT Lane	760*	65	70	70
	NB LT Lane	350	120	125	125
	NB Th Lanes	-	290	355	345
	SB Th Lanes	-	235	230	245
	SB RT Lane	-	90	85	90
PM Peak Hour	EB LT Lanes	335/760*	**430**/450	**605**/620	**480**/500
	EB RT Lane	760*	155	335	245
	NB LT Lane	350	**405**	**415**	**420**
	NB Th Lanes	-	165	170	170
	SB Th Lanes	-	>1600	>1600	>1600
	SB RT Lane	-	>1600	>1600	>1600
2. Redland Road at Holcomb Boulevard/Abernethy Road					
AM Peak Hour	EB LT Lane	115	95	95	95
	EB Th/RT Lane	-	130	120	125
	WB LT Lane	90	55	55	60
	WB Th Lane	-	140	155	145
	WB RT Lane	90	**105**	**115**	**130**
	NB LT Lane	130	**150**	**150**	**150**
	NB Th/RT Lane	-	220	235	240
	SB LT Lane	320	140	155	155
	SB Th Lane	820*	175	185	185
	SB RT Lane	255	45	45	45
PM Peak Hour	EB LT Lane	115	**185**	**375**	**515**
	EB Th/RT Lane	-	415	740	810
	WB LT Lane	90	**100**	**105**	**95**
	WB Th Lane	-	180	190	185
	WB RT Lane	90	**95**	**100**	**100**
	NB LT Lane	130	**175**	**235**	**155**
	NB Th/RT Lane	-	410	500	440
	SB LT Lane	320	**355**	**405**	**465**
	SB Th Lane	820*	410	400	390
	SB RT Lane	255	70	65	90

Table Notes: ***BOLDED*** *text indicates queue length exceeds avaialble storage.*

* *Available vehicle storage between study intersections.*

Table 8: 95th Percentile Intersection Queuing Analysis Summary (Continued)

		Available Storage (ft)	2027 Buildout Conditions (Phase 1-3)	2029 Background Conditions (Phase 1-3)	2029 Buildout Conditions (Phase 1-4)
1. Redland Road at OR-213					
AM Peak Hour	EB LT Lanes	335/760*	235/250	245/255	255/270
	EB RT Lane	760*	70	75	70
	NB LT Lane	350	165	145	160
	NB Th Lanes	-	460	395	490
	SB Th Lanes	-	275	260	265
	SB RT Lane	-	85	90	85
PM Peak Hour	EB LT Lanes	335/760*	**585**/600	**620**/635	**745**/755
	EB RT Lane	760*	305	300	535
	NB LT Lane	350	**405**	**515**	**365**
	NB Th Lanes	-	170	175	180
	SB Th Lanes	-	>1600	>1600	>1600
	SB RT Lane	-	>1600	>1600	>1600
2. Redland Road at Holcomb Boulevard/Abernethy Road					
AM Peak Hour	EB LT Lane	115	100	90	105
	EB Th/RT Lane	-	125	125	130
	WB LT Lane	90	60	60	60
	WB Th Lane	-	155	150	155
	WB RT Lane	90	**125**	**130**	**130**
	NB LT Lane	130	**150**	**155**	**150**
	NB Th/RT Lane	-	245	270	275
	SB LT Lane	320	155	160	145
	SB Th Lane	820*	170	185	195
	SB RT Lane	255	50	45	45
PM Peak Hour	EB LT Lane	115	**375**	**645**	**805**
	EB Th/RT Lane	-	830	860	945
	WB LT Lane	90	**110**	**105**	**115**
	WB Th Lane	-	205	205	210
	WB RT Lane	90	**100**	**115**	**125**
	NB LT Lane	130	**240**	**210**	**465**
	NB Th/RT Lane	-	585	550	650
	SB LT Lane	320	**490**	**450**	**495**
	SB Th Lane	820*	400	400	425
	SB RT Lane	255	70	70	75

Table Notes: ***BOLDED*** *text indicates queue length exceeds avaialble storage.*

* *Available vehicle storage between study intersections.*

Table 8: 95th Percentile Intersection Queuing Analysis Summary (Continued)

		Available Storage (ft)	2030 Background Conditions (Phase 1-4)	2030 Buildout Conditions (Phase 1-5)	2030 Buildout Conditions (Phase 1-6)
1. Redland Road at OR-213					
AM Peak Hour	EB LT Lanes	335/760*	230/245	290/300	265/280
	EB RT Lane	760*	65	70	75
	NB LT Lane	350	115	150	120
	NB Th Lanes	-	525	415	440
	SB Th Lanes	-	260	260	285
	SB RT Lane	-	85	100	100
PM Peak Hour	EB LT Lanes	335/760*	**705**/710	**795/805**	**795/800**
	EB RT Lane	760*	415	620	590
	NB LT Lane	350	**420**	**450**	**560**
	NB Th Lanes	-	260	170	170
	SB Th Lanes	-	>1600	>1600	>1600
	SB RT Lane	-	>1600	>1600	>1600
2. Redland Road at Holcomb Boulevard/Abernethy Road					
AM Peak Hour	EB LT Lane	115	95	90	90
	EB Th/RT Lane	-	145	130	135
	WB LT Lane	90	60	65	65
	WB Th Lane	-	175	170	165
	WB RT Lane	90	**130**	**130**	**130**
	NB LT Lane	130	**185**	**140**	**165**
	NB Th/RT Lane	-	245	245	245
	SB LT Lane	320	160	180	155
	SB Th Lane	820*	180	200	185
	SB RT Lane	255	50	50	50
PM Peak Hour	EB LT Lane	115	**710**	**730**	**780**
	EB Th/RT Lane	-	960	965	935
	WB LT Lane	90	**120**	**120**	**115**
	WB Th Lane	-	190	200	190
	WB RT Lane	90	**120**	**145**	**135**
	NB LT Lane	130	**220**	**515**	**555**
	NB Th/RT Lane	-	645	720	765
	SB LT Lane	320	**550**	**500**	**550**
	SB Th Lane	820*	435	400	445
	SB RT Lane	255	125	65	75

Table Notes: ***BOLDED*** *text indicates queue length exceeds avaialble storage.*

* *Available vehicle storage between study intersections.*

Based on the queuing analysis, several turning movements at the study intersections are projected to exceed available lane storages. The following describe where and when this extended queuing occurs:

1. Redland Road at OR-213
    - Northbound left-turn lane under 2023 background conditions through 2030 (evening peak hour).
    - Eastbound left-turns lane under 2023 background conditions through 2030 (evening peak hour).
2. Redland Road at Holcomb Boulevard/Abernethy Road
    - Westbound right-turn lane under 2023 background conditions through 2030 (morning and evening peak hours).
    - Northbound left-turn lane under 2023 background conditions through 2030 (morning and evening peak hours).
    - Eastbound left-turn lane under 2025 background and buildout conditions (evening peak hour).
    - Southbound left-turn lane for all scenarios (evening peak hour).

A detailed review of potential mitigation at the two intersections is discussed in the *Mitigation Analysis* section. All other queues projected at the Redland Road study intersections are not expected to create significant safety concerns or hazards. Accordingly, no other mitigation is necessary or recommended.

Mitigation Analysis

As determined within the *Delay & Capacity Analysis* and *Queuing Analysis* sections, the intersection of Redland Road at OR-213 is projected to exceed capacity standards during the 2nd evening peak hour and both Redland Road intersections are expected to experience extended queuing at some pocket turn lanes during future year conditions; however, this extended queuing at may be attributable to both intersections operating near or above a v/c ratio of 1.00. Although no specific mitigation is planned at either intersection to alleviate these issues, discussions regarding possible improvements were noted in the Park Place Crossing Master Plan's draft pre-application meeting notes (PA 20-12), dated April 7, 2020. For the purposes of this analysis, the following mitigation were considered at both intersections:

1. Redland Road at OR-213
    - Add an additional eastbound left-turn lane for a total of three left-turn lanes. In addition, restripe the north intersection leg to include three receiving lanes.
    - Note that a similar three left-turn lane design is currently implemented along SE Sunnyside Road at the Clackamas Town Center access intersection, located just west of the Interstate 205 interchange.
2. Redland Road at Holcomb Boulevard/Abernethy Road
    - Revise the west intersection leg to include one receiving westbound travel lane, one eastbound left-turn lane, one eastbound through lane, and one eastbound right-turn lane.

- Note that the Park Place Crossing Master Plan's draft pre-application meeting notes indicates an additional eastbound turn lane may be added for potential mitigation; however, no specifics regarding the type of turn lane were discussed.

Note that these analyzed mitigation scenarios are only conducted for demonstrative purposes whereby alternative mitigation may be considered or found preferential to those detailed above. Once appropriate mitigation have been determined for both intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan.

The LOS, delay, and v/c results of the 1st and 2nd hour capacity analysis is shown in Table 9 for the morning and evening peak hour for the 2030 full buildout scenario. Table 10 shows the projected 95th percentile queue lengths for the morning and evening peak hours under year 2030 full buildout conditions.

Table 9: Mitigated Intersection Capacity Analysis Summary (2nd Hour)

	PM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
4. Redland Road at OR-213 (1st Hour)						
2030 Buildout Conditions (Phase 1-6)	C	24	0.991	D	53	1.082
2030 Buildout Conditions (Phase 1-6)	B	18	0.952	D	46	1.022
5. Redland Road at Holcomb Boulevard/Abernethy Road						
2030 Buildout Conditions (Phase 1-6)	C	28	0.747	E	66	0.969
2030 Buildout Conditions (Phase 1-6)	C	27	0.747	D	40	0.843
4. Redland Road at OR-213 (2nd Hour)						
2030 Buildout Conditions (Phase 1-6)	-	-	-	D	43	**1.032**
2030 Mitigated Conditions (Phase 1-6)	-	-	-	C	34	0.973

Table Notes: ***BOLDED*** *text indicates interseciton operation above jurisdictional standards.*

Based on the capacity results shown in Table 9, the intersection of Redland Road at OR-213 is projected to operate within acceptable levels of capacity following implementation of the suggested mitigation. Additional, both Redland Road intersections will continue operating acceptable during the 1st hour of analysis with suggested mitigation in place.

Table 10: Mitigated Intersection Queuing Analysis Summary

		Available Storage (ft)	2030 Buildout Conditions (Phase 1-6)	2030 Mitigated Conditions (Phase 1-6)
1. Redland Road at OR-213				
AM Peak Hour	EB LT Lanes	335/760*	265/280	135/175/185
	EB RT Lane	760*	75	80
	NB LT Lane	350	120	120
	NB Th Lanes	-	440	225
	SB Th Lanes	-	285	225
	SB RT Lane	-	100	100
PM Peak Hour	EB LT Lanes	335/760*	**795/800**	175/200/220
	EB RT Lane	760*	590	170
	NB LT Lane	350	**560**	**570**
	NB Th Lanes	-	170	170
	SB Th Lanes	-	>1600	>1600
	SB RT Lane	-	>1600	>1600
2. Redland Road at Holcomb Boulevard/Abernethy Road				
AM Peak Hour	EB LT Lane	115	90	100
	EB Th/RT Lane	-	135	110
	EB RT Lane	-	-	55
	WB LT Lane	90	65	50
	WB Th Lane	-	165	185
	WB RT Lane	90	**130**	**110**
	NB LT Lane	130	**165**	**150**
	NB Th/RT Lane	-	245	240
	SB LT Lane	320	155	165
	SB Th Lane	820*	185	190
	SB RT Lane	255	50	50
PM Peak Hour	EB LT Lane	115	**780**	**225**
	EB Th/RT Lane	-	935	280
	EB RT Lane	-	-	120
	WB LT Lane	90	**115**	90
	WB Th Lane	-	190	235
	WB RT Lane	90	**135**	**95**
	NB LT Lane	130	**555**	**150**
	NB Th/RT Lane	-	765	405
	SB LT Lane	320	**550**	**350**
	SB Th Lane	820*	445	290
	SB RT Lane	255	75	60

Table Notes: ***BOLDED*** *text indicates queue length exceeds avaialble storage.*

* *Available vehicle storage between study intersections.*

Based on the queuing analysis results shown in Table 10, both of the study intersections still experience 95th percentile queues at some turn lanes which exceed available lane storage; however, these queues are generally found to be significantly shorter with suggested mitigation in place.

1. Redland Road at OR-213
    - Northbound left-turn lane (evening peak hour).
        - The maximum projected 570-foot-long queue exceeds available lane storage by approximately 220 feet. Note that this extended queuing is likely due to the intersection projected to continue operating above a 1.00 v/c ratio where the standard of operation is a v/c ratio of 1.10; therefore, under these conditions extended queuing is anticipated. If necessary and in conjunction with planned mitigation, the northbound left-turn storage lane may need to be extended to accommodate potential 95th percentile queues.
2. Redland Road at Holcomb Boulevard/Abernethy Road
    - Eastbound left-turn lane (evening peak hour).
        - The 225-foot queue exceeds the available lane storage by 110 feet. However, these extended queues may be stored within the center two-way left-turn turn (TWLTL) whereby no obstructions to the shared through/right-turn travel lane at the intersection will occur.
    - Westbound right-turn lane (morning and evening peak hours).
        - The highest reported queue of 110 feet exceeds the available lane storage by approximately 20 feet. Although this queuing exceeds the available storage striping at this turn lane, there is additional space beyond this striping to accommodate up to approximately 20 feet of additional queuing without these queues creating significant impacts or obstructing the through travel lane at the intersection. Therefore, no queuing related mitigation is necessary.
    - Northbound left-turn lane (morning and evening peak hours).
        - The highest reported queue of 150 feet exceeds the available lane storage by approximately 20 feet. Although this queuing exceeds the available lane storage striping, there is additional space beyond this striping to accommodate up to approximately 80 feet of additional queuing without these queues creating significant impacts or obstructing the shared through/right-turn travel lane at the intersection. Therefore, no queuing related mitigation is necessary.

- Southbound left-turn lane (evening peak hour).
    - The projected 350-foot queue will exceed the available lane storage by approximately 30 feet. There is an additional space beyond the striped storage area to accommodate up to approximately 25 feet of additional queuing without queues potentially disrupting southbound through traffic. In the event queues were to exceed available storage by 30 feet, there is sufficient storage within the southbound through travel lane to accommodate this excess queuing without spillback to the adjacent intersection of Redland Road at OR-213. Therefore, no mitigation is necessary or recommended.

Prior Annexation & Future Connectivity

Regarding the analyzed mitigation at the intersections of Redland Road at OR-213 and Redland Road at Holcomb Boulevard/Abernethy Road, as well as the proportionate share fee contributions being collected at other transportation facilities in Oregon City (refer to the Off-site Trip Impacts section), the impact analysis detailed in this TIS for the Park Place Crossing Master Plan project may be overestimating trip impacts to some of these facilities.

The subject property was annexed into the City of Oregon City in 2018. At that time, a comprehensive transportation impact analysis was conducted that examined build out of the master plan area[4]. Conditions of approval for the annexation require the contribution of proportional share payments for traffic impacts at offsite intersections. However, the annexation TIS assumed the S Holly Lane connection between S Holcomb Boulevard and S Redland Road would have been constructed prior to or concurrent with full buildout of the Park Place Crossing Master Plan project.

Because this application precedes the construction of the S Holly Lane connection, this TIS assumes all site-generated traffic uses S Holcomb Boulevard and the intersections of Redland Road at OR-213 and Redland Road at Holcomb Boulevard/Abernethy Road. Once the S Holly Lane connection is available, which is very likely to occur before the Park Place Crossing Master Plan site reaches full build out, some of the proportionate share fees, and particularly additional mitigation at these two off site intersections, may be reduced or possibly become unnecessary.

To address this uncertainty, it is recommended that a trip accounting letter, and if necessary, an updated traffic analysis, be prepared as each phase of the project is constructed. Appropriate mitigation and proportionate share fee contributions will be evaluated on a phase-by-phase basis and collected at the time of each phase's final plat application. This will enable accurate tracking of projected impacts to the two Redland Road intersections and other transportation projects as well as provide the flexibility to allocate fee contributions based on the re-evaluated traffic analysis by phase.

[4] *Park Place Annexation*, Transportation Impact Study, August 2, 2017 (and addendum) by Lancaster Engineering

Conclusions

No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns.

Provided any obstructing foliage near the access locations and along the south side of S Holcomb Boulevard are removed or properly maintained, adequate sight distances can be made available to ensure safe operation of the temporary Street A intersection, while adequate sight distances can be made available at the S Barlow Drive intersection to allow safe and efficient operation of the future S Holly Lane approach. No other sight distance related mitigation is necessary or recommended.

Left-turn lane warrants are not projected to be met at any of the study intersections under any analysis scenario.

Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at the access study intersections under any of the analysis scenarios.

All access study intersections are currently operating acceptably per Oregon City standards and are projected to continue operating acceptably through the 2030 site buildout year, regardless of whether the S Holly Lane connection to S Holcomb Boulevard is constructed.

The intersections of Redland Road at OR-213 and Redland Road at Holcomb Boulevard/Abernethy Road are projected to operate acceptably per jurisdictional standards for all analysis scenarios during the peak hour (1st hour) through year 2030.

The following mitigation measures were reviewed for demonstrative purposes only to show the study intersections can operate acceptably per City and ODOT standards. Applicable agencies may consider alternative mitigation as preferential to those described below. If any mitigation is required for either or both of the intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan

For the intersection of Redland Road at OR-213, the intersection is projected to operate in excess of acceptable per jurisdictional standards during the 2nd evening peak hour under 2026 buildout conditions (Phase 1) and for all succeeding analysis scenarios through year 2030. Additionally, extended queuing beyond available lane storage is expected to occur at some of the turn lanes of the two Redland Road study intersections. Although no specific mitigation is planned at either intersection, the following may potentially be implemented to address these capacity and potential queuing issues:

4. Redland Road at OR-213
    - Add an additional eastbound left-turn lane for a total of three left-turn lanes.
    - Restripe the north intersection leg to include three receiving lanes.
    - Extend the northbound left-turn storage lane to accommodate 95th percentile queues.
5. Redland Road at Holcomb Boulevard/Abernethy Road
    - Revise the west intersection leg to include one receiving travel lane, one left-turn lane, one through lane, and one right-turn lane.
    - Extend the eastbound left-turn storage into the center two-way left-turn turn to accommodate 95th percentile queues.

Note the aforementioned mitigation were reviewed for demonstrative purposes to show the study intersections could operate acceptably per City and ODOT standards. Applicable agencies may consider alternative mitigation as preferential to those detailed above. Once appropriate mitigation have been determined for both intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan.

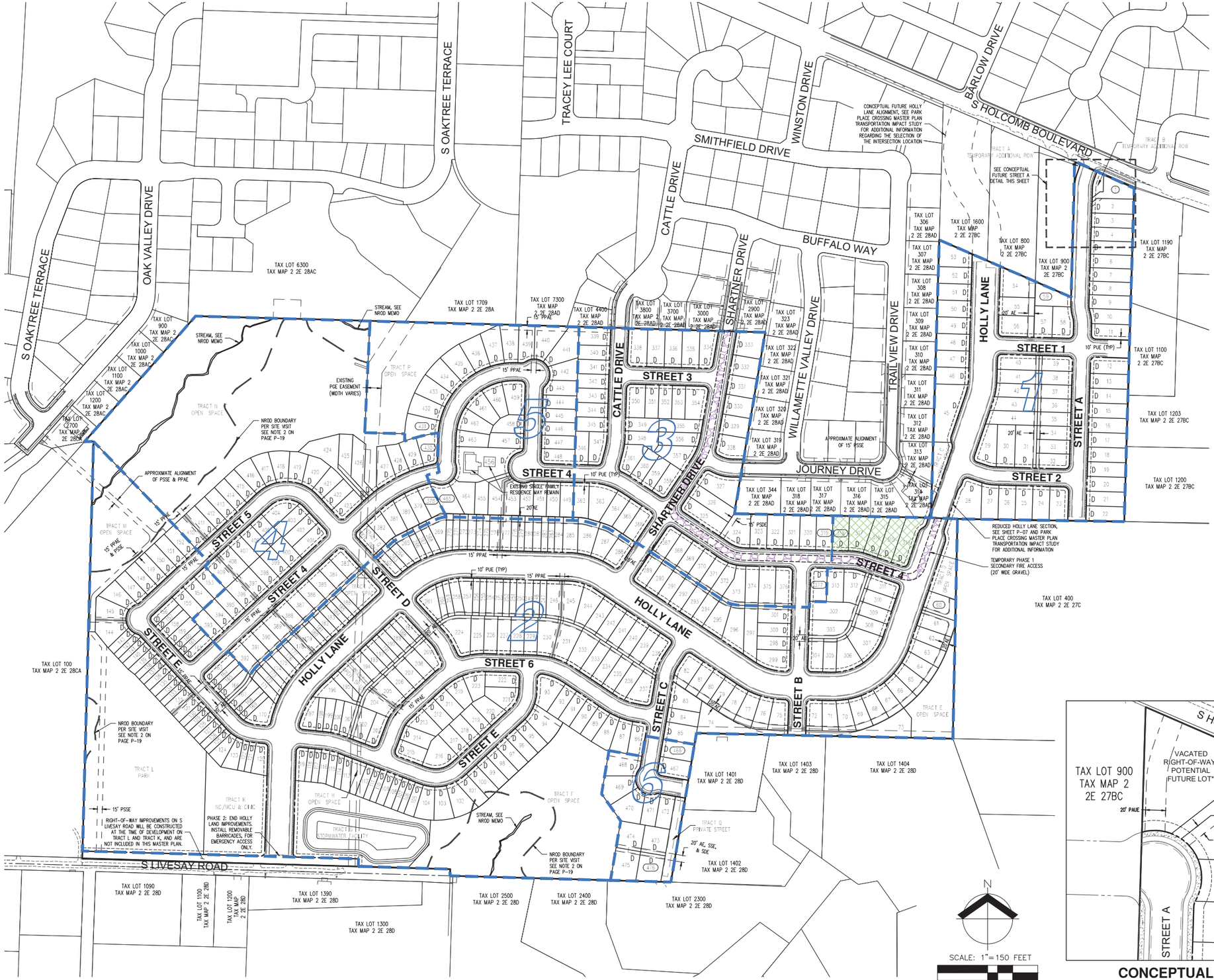
Conditions of Approval from the annexation detailed proportional share contributions are to be collected for several transportation facilities requiring mitigation which could be impacted by the Park Place Crossing Master Plan. Oregon City staff have indicated that proportional share contributions were subsequently modified in the Pre-Application notes. In addition, the current trip generation are lower than those anticipated at the time of the annexation, which may further decrease the proportional share amounts associated with the Park Place Crossing Master Plan. As part of each future Detailed Development Plan, proportional share fees will be contributed to the following facilities:

a. 14th Street and 15th Street, between OR-99E and John Adams Street (TSP Project D7 and D8)
b. S Redland Road at S Holly Lane (TSP Project D36)
c. S Holcomb Boulevard at S Holly Lane (TSP Project D43)
d. I-205 SB Ramps at OR-99E (TSP Project D75)
e. I-205 NB Ramps at OR-99E (TSP Project D76)
f. OR-213, near the S Redland Road Undercrossing (TSP Project D79)
g. S Holcomb Boulevard at S Redland Road
h. OR-213 at Beavercreek Road

The analysis in this Master Plan study does not consider the S Holly Lane connection to S Redland Road as was previously assumed for the Park Place Annexation project. Therefore, some of the proportionate share fees, and particularly additional mitigation at the two Redland Road study intersections, may be reduced or possibly become unnecessary. To address this uncertainty, it is recommended that a trip accounting letter, and if necessary, an updated traffic analysis, be prepared as each phase of the project is constructed. This will enable accurate tracking of projected impacts to the two Redland Road intersections and other transportation projects.

Appendix A

Site Plan



EASEMENT LEGEND:

AE	PRIVATE ACCESS EASEMENT (ALLEY)
PAUE	PUBLIC ACCESS AND UTILITY EASEMENT
PSDE	PUBLIC STORM DRAINAGE EASEMENT
PSSE	PUBLIC SANITARY SEWER EASEMENT
PPAE	PUBLIC PEDESTRIAN ACCESS EASEMENT
PUE	PUBLIC UTILITY EASEMENT
SDE	PRIVATE STORM DRAINAGE EASEMENT
SSE	PRIVATE SANITARY SEWER EASEMENT

LEGEND:

TEMPORARY PHASE 1 STORM FACILITY
SEE COMPOSITE UTILITY PLAN FOR ADDITIONAL INFORMATION

TEMPORARY PHASE 1 SECONDARY FIRE ACCESS

D — APPROXIMATE DRIVEWAY LOCATION. LOTS WITHOUT A 'D' DESIGNATION EITHER SHARE ACCESS WITH AN ADJACENT LOT OR ARE ALLEY ACCESS

PARK PLACE CROSSING MASTER PLAN DEVELOPMENT STANDARDS:

LOT DIMENSIONS
- MIN. LOT SIZE
  - SINGLE-FAMILY DETACHED – 4,000 SF
  - SINGLE-FAMILY ATTACHED – 1,800 SF
- MIN. LOT WIDTH AT BUILDING LINE
  - SINGLE-FAMILY DETACHED – 35'
  - SINGLE-FAMILY ATTACHED – 20'
- MIN. LOT DEPTH AT BUILDING LINE – 70'
- MIN. STREET FRONTAGE – 20' UNLESS FLAG LOT

MIN. SETBACKS:
- FRONT – 10', 5' PORCH
- REAR – 20', 15' PORCH, 10' ADU
- GARAGE – 20' FROM ROW, 5' FROM ALLEY
- SIDE – 5' INTERIOR, 7' CORNER

REFER TO THE MASTER PLAN NARRATIVE FOR INFORMATION REGARDING BASE ZONES, DIMENSIONAL STANDARDS, APPLIED ADJUSTMENTS, VARIANCE, AND EXCEPTIONS.

UNIT TYPE AND OPEN SPACE SUMMARY:

PHASE 1:		
•	SINGLE FAMILY DETACHED:	59
•	SINGLE FAMILY ATTACHED:	0
•	OPEN SPACE:	0.1± ACRE
PHASE 2:		
•	SINGLE FAMILY DETACHED:	133
•	SINGLE FAMILY ATTACHED:	126
•	OPEN SPACE:	6.5± ACRE
PHASE 3:		
•	SINGLE FAMILY DETACHED:	59
•	SINGLE FAMILY ATTACHED:	0
•	OPEN SPACE:	0.0± ACRE
PHASE 4:		
•	SINGLE FAMILY DETACHED:	53
•	SINGLE FAMILY ATTACHED:	0
•	OPEN SPACE:	7.6± ACRE
PHASE 5:		
•	SINGLE FAMILY DETACHED:	35
•	SINGLE FAMILY ATTACHED:	0
•	OPEN SPACE:	1.5± ACRE
PHASE 6:		
•	SINGLE FAMILY DETACHED:	11
•	SINGLE FAMILY ATTACHED:	0
•	OPEN SPACE:	0.0± ACRE
TOTAL:		
SINGLE FAMILY DETACHED:		350 (74%)
SINGLE FAMILY ATTACHED:		126 (26%)
OPEN SPACE:		15.7± ACRE

CONCEPTUAL FUTURE STREET A DETAIL
SCALE: 1" = 50'

NOTE:
*STREET A CONNECTION TO S HOLCOMB BOULEVARD IS AN INTERIM ACCESS THAT WILL NO LONGER BE NECESSARY UPON THE CONNECTION OF HOLLY LANE TO HOLCOMB BOULEVARD. WHEN THE INTERSECTION OF HOLLY LANE AND HOLCOMB BOULEVARD IS ESTABLISHED, STREET A WILL BE ABANDONED, VACATED, AND OWNERSHIP RETURNED TO THE DECLARANT WITH APPROPRIATE EASEMENTS REMAINING IN PLACE.

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ENGINEERING • SURVEYING • NATURAL RESOURCES
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PRELIMINARY SITE AND PHASING PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 2005
GREGORY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	01/04/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

AKS DRAWING FILE: 7404 PHASING.DWG | LAYOUT: P-08

Appendix B

Trip Generation Calculations

TRIP GENERATION CALCULATIONS
Phase 1

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 59

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	12	34	46

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	38	23	61

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	311	311	622

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	288	288	576

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1-2

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 194

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	**35**	**101**	**136**

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**117**	**68**	**185**

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**928**	**928**	**1,856**

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**913**	**913**	**1,826**

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phase 2

Land Use: Single-Family Attached Housing
Land Use Code: 215
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 124

AM PEAK HOUR

Trip Equation: T=0.52(X)-5.70

	Enter	Exit	Total
Directional Distribution	31%	69%	
Trip Ends	18	41	59

PM PEAK HOUR

Trip Equation: T=0.60(X)-3.93

	Enter	Exit	Total
Directional Distribution	57%	43%	
Trip Ends	40	30	70

WEEKDAY

Trip Equation: T=7.62(X)-50.48

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	447	447	894

SATURDAY

Trip Equation: T=13.21(X)-444.34

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	597	597	1,194

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1-3

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 249

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	44	127	171

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	147	87	234

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,168	1,168	2,336

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,163	1,163	2,326

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1-4

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 302

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	53	151	204

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	177	104	281

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,395	1,395	2,790

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,402	1,402	2,804

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1-5

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 336

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	58	166	224

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	195	115	310

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,539	1,539	3,078

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,555	1,555	3,110

Source: Trip Generation Manual, 11th Edition

TRIP GENERATION CALCULATIONS
Phases 1-6

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 347

AM PEAK HOUR

Trip Equation: Ln(T)=0.91Ln(X)+0.12

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	60	171	231

PM PEAK HOUR

Trip Equation: Ln(T)=0.94Ln(X)+0.27

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	202	118	320

WEEKDAY

Trip Equation: Ln(T)=0.92Ln(X)+2.68

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,585	1,585	3,170

SATURDAY

Trip Equation: Ln(T)=0.97Ln(X)+2.40

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1,605	1,605	3,210

Source: Trip Generation Manual, 11th Edition

Appendix C

Traffic Counts

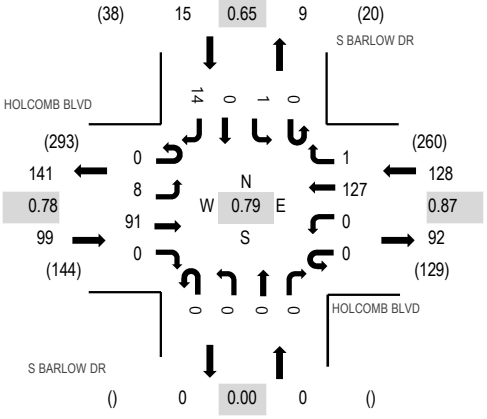
In-Process Data

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

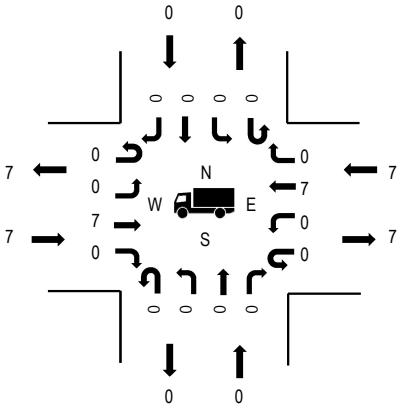
Location: 1 S BARLOW DR & HOLCOMB BLVD AM
Date: Thursday, April 15, 2021
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

Peak Hour

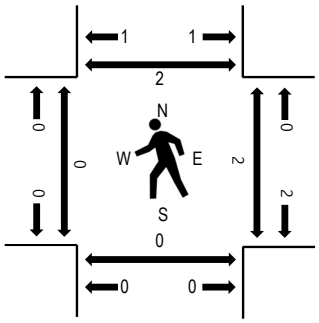
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	7.1%	0.78
WB	5.5%	0.87
NB	0.0%	0.00
SB	0.0%	0.65
All	5.8%	0.79

Traffic Counts - Motorized Vehicles

Interval Start Time	HOLCOMB BLVD Eastbound				HOLCOMB BLVD Westbound				S BARLOW DR Northbound				S BARLOW DR Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	1	0	0	0	8	0	0	0	0	0	0	0	0	1	10	200
7:05 AM	0	0	2	0	0	0	8	0	0	0	0	0	0	0	0	2	12	207
7:10 AM	0	2	1	0	0	0	13	0	0	0	0	0	0	0	0	1	17	218
7:15 AM	0	1	2	0	0	0	15	0	0	0	0	0	0	0	0	0	18	217
7:20 AM	0	0	4	0	0	0	8	0	0	0	0	0	0	0	0	2	14	215
7:25 AM	0	0	1	0	0	0	10	1	0	0	0	0	0	0	0	1	13	228
7:30 AM	0	1	4	0	0	0	13	1	0	0	0	0	0	0	0	2	21	233
7:35 AM	0	0	1	0	0	0	8	1	0	0	0	0	0	0	0	2	12	229
7:40 AM	0	0	5	0	0	0	10	0	0	0	0	0	0	0	0	2	17	228
7:45 AM	0	2	6	0	0	0	11	0	0	0	0	0	0	0	0	4	23	231
7:50 AM	0	2	5	0	0	0	18	0	0	0	0	0	0	0	0	4	29	241
7:55 AM	0	0	5	0	0	0	7	0	0	0	0	0	0	0	0	2	14	229
8:00 AM	0	2	4	0	0	0	9	1	0	0	0	0	0	0	0	1	17	242
8:05 AM	0	0	11	0	0	0	9	0	0	0	0	0	0	1	0	2	23	
8:10 AM	0	1	5	0	0	0	9	0	0	0	0	0	0	0	0	1	16	
8:15 AM	0	0	2	0	0	0	12	0	0	0	0	0	0	0	0	2	16	
8:20 AM	0	1	13	0	0	0	12	0	0	0	0	0	0	0	0	1	27	
8:25 AM	0	1	8	0	0	0	9	0	0	0	0	0	0	0	0	0	18	
8:30 AM	0	0	9	0	0	0	8	0	0	0	0	0	0	0	0	0	17	
8:35 AM	0	0	4	0	0	0	7	0	0	0	0	0	0	0	0	0	11	
8:40 AM	0	1	9	0	0	0	8	0	0	0	0	0	0	0	0	2	20	
8:45 AM	0	1	16	0	0	0	14	0	0	0	0	0	0	0	0	2	33	
8:50 AM	0	0	5	0	0	0	10	0	0	0	0	0	0	0	0	2	17	
8:55 AM	0	1	5	0	0	0	20	0	0	0	0	0	0	0	0	1	27	
Count Total	0	16	128	0	0	0	256	4	0	0	0	0	0	1	0	37	442	
Peak Hour	0	8	91	0	0	0	127	1	0	0	0	0	0	1	0	14	242	

Location: 1 S BARLOW DR & HOLCOMB BLVD AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

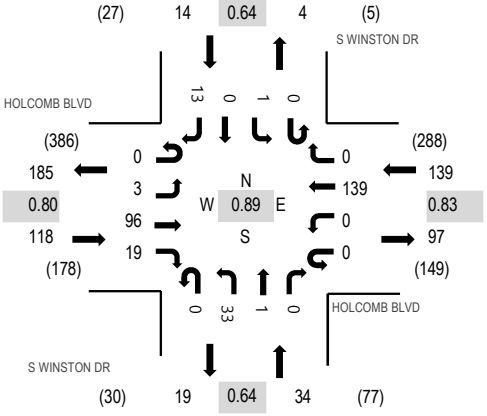
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	1	1
7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	1	0	0	0	1	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	1	0	0	0	1	7:20 AM	0	0	0	0	0	7:20 AM	0	0	1	0	1
7:25 AM	0	0	2	0	2	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	1	1
7:40 AM	0	0	0	0	0	7:40 AM	0	0	2	0	2	7:40 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	1	0	1	0	2	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	1	0	0	0	1	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	2	0	0	0	2	8:05 AM	0	0	0	0	0	8:05 AM	0	0	1	0	1
8:10 AM	0	0	0	0	0	8:10 AM	2	0	0	0	2	8:10 AM	0	0	0	0	0
8:15 AM	0	0	1	0	1	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	0	0	3	0	3	8:20 AM	0	0	0	0	0	8:20 AM	0	0	1	0	1
8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	1	0	0	0	1	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	1	1
8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	2	0	3	0	5	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	1	0	0	0	1	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	1	1
8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	10	0	10	0	20	Count Total	2	0	2	0	4	Count Total	0	0	3	4	7
Peak Hour	7	0	7	0	14	Peak Hour	2	0	0	0	2	Peak Hour	0	0	2	2	4

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

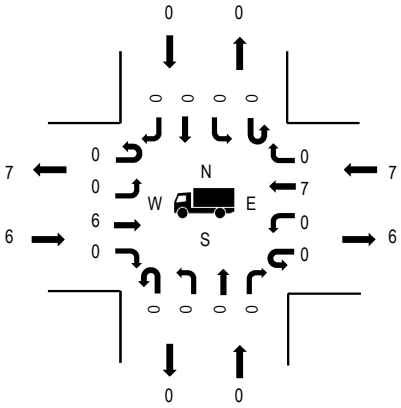
Location: 2 S WINSTON DR & HOLCOMB BLVD AM
Date: Thursday, April 15, 2021
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

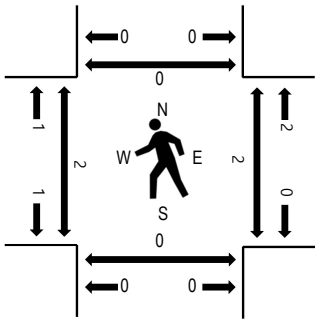
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	5.1%	0.80
WB	5.0%	0.83
NB	0.0%	0.64
SB	0.0%	0.64
All	4.3%	0.89

Traffic Counts - Motorized Vehicles

Interval Start Time	HOLCOMB BLVD Eastbound				HOLCOMB BLVD Westbound				S WINSTON DR Northbound				S WINSTON DR Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	1	1	0	0	9	0	0	3	0	0	0	0	0	1	15	269
7:05 AM	0	0	3	0	0	0	11	0	0	3	0	0	0	0	0	0	17	273
7:10 AM	0	0	3	0	0	0	14	0	0	3	0	0	0	0	0	2	22	283
7:15 AM	0	0	5	0	0	0	14	0	0	5	0	0	0	0	0	2	26	279
7:20 AM	0	0	2	0	0	0	10	0	0	1	0	0	0	0	0	1	14	281
7:25 AM	0	0	2	0	0	0	12	0	0	1	0	0	0	0	0	0	15	298
7:30 AM	0	0	3	0	0	0	17	0	0	3	0	0	0	0	0	1	24	304
7:35 AM	0	0	3	2	0	0	10	0	0	6	0	0	0	0	0	3	24	303
7:40 AM	0	0	3	4	0	0	9	0	0	8	0	0	0	1	0	1	26	302
7:45 AM	0	0	9	0	0	0	17	0	0	2	0	0	0	0	0	2	30	305
7:50 AM	0	0	8	2	0	0	18	0	0	1	0	0	0	0	0	2	31	304
7:55 AM	0	0	5	4	0	0	11	0	0	3	0	0	0	0	0	2	25	300
8:00 AM	0	1	6	1	0	0	8	0	0	2	0	0	0	0	0	1	19	301
8:05 AM	0	0	11	2	0	0	13	0	0	1	0	0	0	0	0	0	27	
8:10 AM	0	0	5	1	0	0	8	0	0	4	0	0	0	0	0	0	18	
8:15 AM	0	0	7	1	0	0	14	0	0	3	1	0	0	0	0	2	28	
8:20 AM	0	1	8	2	0	0	14	0	0	5	0	0	0	1	0	0	31	
8:25 AM	0	0	9	1	0	0	9	0	0	1	0	0	0	0	0	1	21	
8:30 AM	0	0	8	1	0	0	8	0	0	4	0	0	0	0	0	2	23	
8:35 AM	0	0	9	1	0	0	7	0	0	5	0	0	0	0	0	1	23	
8:40 AM	0	1	11	3	0	0	12	0	0	2	0	0	0	0	0	0	29	
8:45 AM	0	0	13	0	0	0	13	0	0	2	0	1	0	0	0	0	29	
8:50 AM	0	0	4	3	0	0	17	0	0	2	0	1	0	0	0	0	27	
8:55 AM	0	0	7	1	0	0	13	0	0	3	1	0	0	0	0	1	26	
Count Total	0	3	145	30	0	0	288	0	0	73	2	2	0	2	0	25	570	
Peak Hour	0	3	96	19	0	0	139	0	0	33	1	0	0	1	0	13		

Location: 2 S WINSTON DR & HOLCOMB BLVD AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

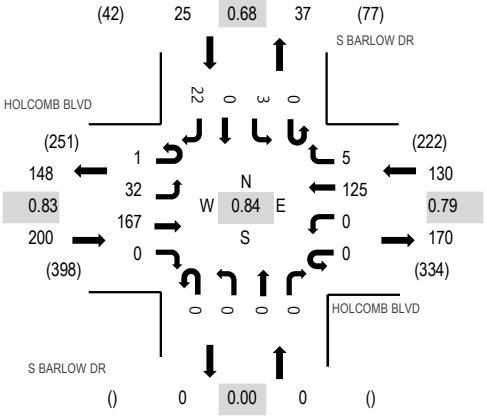
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	1	0	0	0	1	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	1	0	0	0	1	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	0	0	2	0	2	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	1	0	0	0	1	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	1	1
7:45 AM	2	0	0	0	2	7:45 AM	0	0	0	0	0	7:45 AM	1	0	0	0	1
7:50 AM	0	0	1	0	1	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0	7:55 AM	0	0	1	0	1
8:00 AM	0	0	1	0	1	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	1	0	0	0	1	8:05 AM	0	0	0	0	0	8:05 AM	1	0	0	0	1
8:10 AM	0	0	0	0	0	8:10 AM	2	0	0	0	2	8:10 AM	0	0	1	1	2
8:15 AM	0	0	1	0	1	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	0	0	3	0	3	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	2	0	0	0	2	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	1	0	1	0	2	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	0	0	1	0	1	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0	8:50 AM	0	0	1	0	1
8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	9	0	10	0	19	Count Total	2	0	0	0	2	Count Total	2	0	3	2	7
Peak Hour	6	0	7	0	13	Peak Hour	2	0	0	0	2	Peak Hour	2	0	2	1	5

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

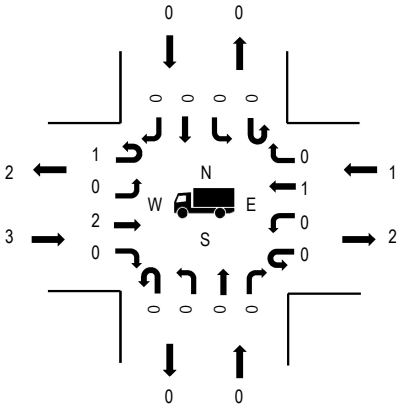
Location: 1 S BARLOW DR & HOLCOMB BLVD PM
Date: Thursday, April 15, 2021
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:30 PM - 05:45 PM

Peak Hour

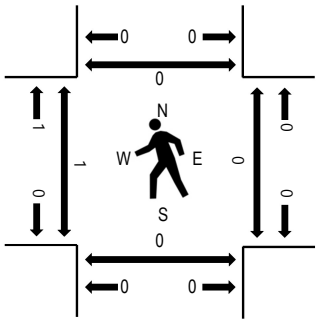
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.5%	0.83
WB	0.8%	0.79
NB	0.0%	0.00
SB	0.0%	0.68
All	1.1%	0.84

Traffic Counts - Motorized Vehicles

Interval Start Time	HOLCOMB BLVD Eastbound				HOLCOMB BLVD Westbound				S BARLOW DR Northbound				S BARLOW DR Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	6	8	0	0	0	7	1	0	0	0	0	0	1	0	4	27	333
4:05 PM	0	4	16	0	0	0	10	1	0	0	0	0	0	0	0	2	33	329
4:10 PM	0	4	13	0	0	0	7	0	0	0	0	0	0	0	0	0	24	327
4:15 PM	0	6	15	0	0	0	6	0	0	0	0	0	0	0	0	1	28	337
4:20 PM	0	1	19	0	0	0	8	1	0	0	0	0	0	0	0	2	31	336
4:25 PM	0	4	17	0	0	0	6	0	0	0	0	0	0	0	0	0	27	322
4:30 PM	0	2	10	0	0	0	8	0	0	0	0	0	0	0	0	0	20	317
4:35 PM	0	4	13	0	0	0	4	0	0	0	0	0	0	0	0	1	22	340
4:40 PM	0	1	11	0	0	0	10	1	0	0	0	0	0	0	0	3	26	349
4:45 PM	0	3	15	0	0	0	11	1	0	0	0	0	0	0	0	0	30	355
4:50 PM	0	1	16	0	0	0	13	1	0	0	0	0	0	0	0	1	32	349
4:55 PM	0	3	13	0	0	0	15	0	0	0	0	0	0	0	0	2	33	334
5:00 PM	0	5	11	0	0	0	5	0	0	0	0	0	0	0	0	2	23	329
5:05 PM	1	4	10	0	0	0	14	1	0	0	0	0	0	0	0	1	31	
5:10 PM	0	2	20	0	0	0	9	0	0	0	0	0	0	0	0	3	34	
5:15 PM	0	4	12	0	0	0	9	0	0	0	0	0	0	0	0	2	27	
5:20 PM	0	2	7	0	0	0	6	0	0	0	0	0	0	1	0	1	17	
5:25 PM	0	1	10	0	0	0	7	0	0	0	0	0	0	1	0	3	22	
5:30 PM	0	3	26	0	0	0	11	1	0	0	0	0	0	0	0	2	43	
5:35 PM	0	2	10	0	0	0	15	0	0	0	0	0	0	0	0	4	31	
5:40 PM	0	2	17	0	0	0	10	1	0	0	0	0	0	1	0	1	32	
5:45 PM	0	1	11	0	0	0	11	0	0	0	0	0	0	1	0	0	24	
5:50 PM	0	2	9	0	0	0	4	0	0	0	0	0	0	0	0	2	17	
5:55 PM	0	1	20	0	0	0	7	0	0	0	0	0	0	0	0	0	28	
Count Total	1	68	329	0	0	0	213	9	0	0	0	0	0	5	0	37	662	
Peak Hour	1	32	167	0	0	0	125	5	0	0	0	0	0	3	0	22	355	

Location: 1 S BARLOW DR & HOLCOMB BLVD PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

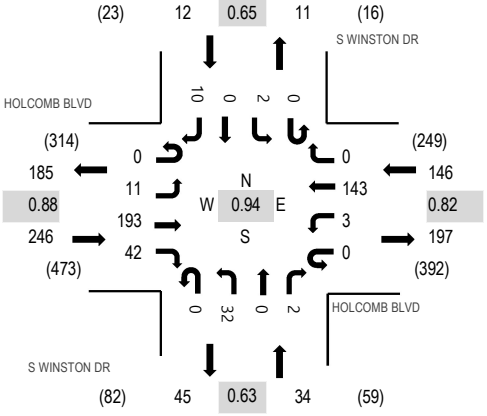
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	1	1
4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	1	0	1	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	1	1
4:20 PM	1	0	0	0	1	4:20 PM	0	0	0	0	0	4:20 PM	1	0	0	2	3
4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	0	0	4:35 PM	0	0	1	0	1	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	2	2
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	1	0	0	0	1
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	1	0	0	0	1	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	2	0	0	0	2	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	1	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	1	1
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	4	0	2	0	6	Count Total	0	0	1	0	1	Count Total	2	0	0	7	9
Peak Hour	3	0	1	0	4	Peak Hour	0	0	0	0	0	Peak Hour	1	0	0	1	2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

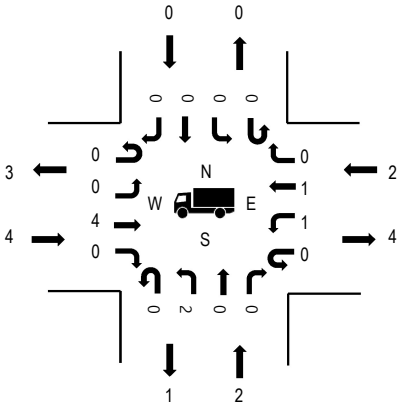
Location: 2 S WINSTON DR & HOLCOMB BLVD PM
Date: Thursday, April 15, 2021
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:25 PM - 05:40 PM

Peak Hour

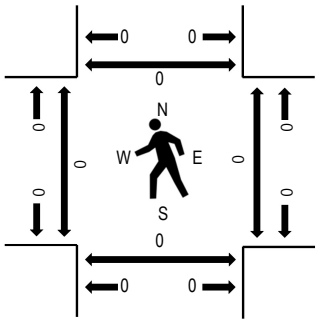
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.6%	0.88
WB	1.4%	0.82
NB	5.9%	0.63
SB	0.0%	0.65
All	1.8%	0.94

Traffic Counts - Motorized Vehicles

Interval Start Time	HOLCOMB BLVD Eastbound				HOLCOMB BLVD Westbound				S WINSTON DR Northbound				S WINSTON DR Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	12	3	0	0	13	0	0	2	0	0	0	0	0	2	32	393
4:05 PM	0	0	20	2	0	1	9	0	0	0	1	0	0	0	0	1	34	389
4:10 PM	0	0	15	2	0	0	6	0	0	1	0	1	0	0	0	0	25	397
4:15 PM	0	0	19	4	0	0	9	0	0	2	0	1	0	0	0	0	35	411
4:20 PM	0	0	17	2	0	0	8	0	0	1	0	1	0	1	0	0	30	411
4:25 PM	0	0	23	6	0	0	7	0	0	1	0	0	0	0	0	0	37	412
4:30 PM	0	0	11	3	0	0	7	0	0	4	0	0	0	0	0	0	25	407
4:35 PM	0	1	17	4	0	0	7	0	0	1	0	1	0	1	0	0	32	429
4:40 PM	0	1	9	4	0	0	11	1	0	0	0	0	0	0	0	1	27	435
4:45 PM	0	0	16	1	0	0	14	0	0	4	0	1	0	0	0	1	37	438
4:50 PM	0	0	16	4	0	1	11	0	0	2	0	0	0	1	0	2	37	433
4:55 PM	0	1	21	3	0	0	16	0	0	0	0	0	0	0	0	1	42	422
5:00 PM	0	1	13	5	0	1	8	0	0	0	0	0	0	0	0	0	28	411
5:05 PM	0	3	13	4	0	1	15	0	0	5	0	0	0	0	0	1	42	
5:10 PM	0	3	19	5	0	0	9	0	0	1	0	0	0	1	0	1	39	
5:15 PM	0	0	16	4	0	0	11	0	0	4	0	0	0	0	0	0	35	
5:20 PM	0	0	11	7	0	0	6	0	0	5	0	0	0	0	0	2	31	
5:25 PM	0	0	15	1	0	0	12	0	0	4	0	0	0	0	0	0	32	
5:30 PM	0	0	24	3	0	0	14	0	0	4	0	1	0	0	0	1	47	
5:35 PM	0	1	13	2	0	0	20	0	0	1	0	0	0	0	0	1	38	
5:40 PM	0	2	16	3	0	0	7	0	0	2	0	0	0	0	0	0	30	
5:45 PM	0	0	12	2	0	0	12	0	0	4	0	0	0	0	0	2	32	
5:50 PM	0	1	14	2	0	0	6	0	0	1	0	0	0	0	0	2	26	
5:55 PM	0	0	19	2	0	0	6	0	0	2	0	1	0	0	0	1	31	
Count Total	0	14	381	78	0	4	244	1	0	51	1	7	0	4	0	19	804	
Peak Hour	0	11	193	42	0	3	143	0	0	32	0	2	0	2	0	10		

Location: 2 S WINSTON DR & HOLCOMB BLVD PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	1	0	1	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	1	0	0	0	1	4:20 PM	0	0	0	0	0	4:20 PM	2	1	1	0	4
4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	0	0	1	4:30 PM	0	0	0	0	0	4:30 PM	1	0	0	0	1
4:35 PM	0	0	0	0	0	4:35 PM	0	0	1	0	1	4:35 PM	0	0	1	0	1
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0	4:40 PM	0	0	2	0	2
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	1	0	0	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	0	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	1	0	1	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	1	0	0	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	3	0	0	0	3	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	1	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	6	2	3	0	11	Count Total	0	0	1	0	1	Count Total	3	1	4	0	8
Peak Hour	4	2	2	0	8	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

Quality Counts, LLC
7409 SW Tech Center Drive, Suite B150
Tigard, OR, 97223
www.qualitycounts.net

Oregon City 2017
Volume Traffic Survey

Site Code: 14507995
Station ID: # 89
Holcomb Blvd E of Barlow Dr

Start Time	02-Nov-17 Thu	EB Morning	EB Afternoon	Hour Totals Morning	Hour Totals Afternoon	WB Morning	WB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		1	18			1	23				
12:15		3	20			1	28				
12:30		1	16			1	24				
12:45		1	25	6	79	3	21	6	96	12	175
01:00		2	25			1	22				
01:15		1	27			0	24				
01:30		1	25			0	20				
01:45		2	29	6	106	0	25	1	91	7	197
02:00		1	26			0	22				
02:15		0	25			1	19				
02:30		0	32			0	22				
02:45		2	20	3	103	1	12	2	75	5	178
03:00		1	40			1	23				
03:15		1	31			2	15				
03:30		0	30			1	27				
03:45		0	36	2	137	0	19	4	84	6	221
04:00		0	45			2	26				
04:15		0	42			10	26				
04:30		1	31			5	21				
04:45		1	36	2	154	7	15	24	88	26	242
05:00		4	49			13	28				
05:15		1	47			15	26				
05:30		1	40			16	21				
05:45		2	21	8	157	30	20	74	95	82	252
06:00		5	35			30	27				
06:15		2	36			33	25				
06:30		8	27			26	17				
06:45		6	22	21	120	24	12	113	81	134	201
07:00		14	20			49	15				
07:15		19	19			55	10				
07:30		14	21			44	12				
07:45		19	16	66	76	37	11	185	48	251	124
08:00		24	17			32	5				
08:15		13	23			19	10				
08:30		14	13			30	8				
08:45		15	18	66	71	33	7	114	30	180	101
09:00		18	13			23	3				
09:15		9	10			25	2				
09:30		10	15			18	5				
09:45		12	8	49	46	16	7	82	17	131	63
10:00		15	8			14	3				
10:15		20	11			22	3				
10:30		18	6			25	3				
10:45		11	7	64	32	21	2	82	11	146	43
11:00		14	4			24	2				
11:15		9	3			22	1				
11:30		28	3			21	1				
11:45		19	2	70	12	23	1	90	5	160	17
Total		363	1093			777	721			1140	1814
Percent		24.9%	75.1%			51.9%	48.1%			38.6%	61.4%
Grand Total		363	1093			777	721			1140	1814
Percent		24.9%	75.1%			51.9%	48.1%			38.6%	61.4%
ADT		ADT 2,953		AADT 2,953							

All Traffic Data Services, LLC
alltrafficdata.net

Date Start: 15-Apr-21
Date End: 15-Apr-21
Winston Dr South of Holcomb Blvd

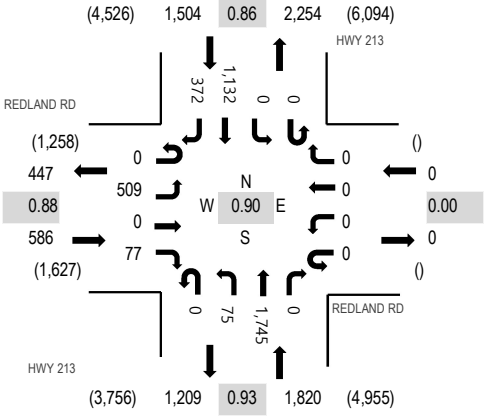
Start Time	15-Apr-21 Thu	NB	SB							Total
12:00 AM		0	1							1
01:00		0	2							2
02:00		1	0							1
03:00		1	1							2
04:00		1	1							2
05:00		15	0							15
06:00		31	7							38
07:00		**40**	14							54
08:00		38	21							**59**
09:00		24	12							36
10:00		23	21							44
11:00		32	**27**							59
12:00 PM		22	26							48
01:00		24	22							46
02:00		29	39							68
03:00		29	30							59
04:00		26	42							68
05:00		**36**	**46**							**82**
06:00		24	37							61
07:00		16	29							45
08:00		15	23							38
09:00		9	25							34
10:00		3	7							10
11:00		0	6							6
Total		439	439							878
Percent		50.0%	50.0%							
AM Peak	-	07:00	11:00	-	-	-	-	-	-	08:00
Vol.	-	40	27	-	-	-	-	-	-	59
PM Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	36	46	-	-	-	-	-	-	82
Total		439	439							878
Percent		50.0%	50.0%							
ADT		ADT 878		AADT 878						

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

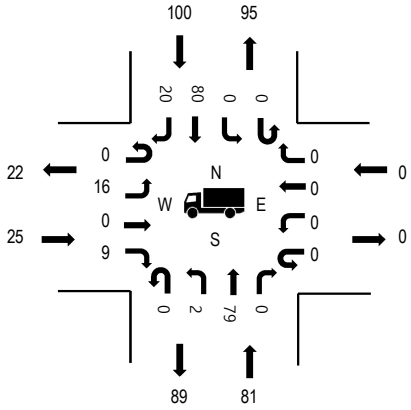
Location: 1 HWY 213 & REDLAND RD AM
Date: Thursday, July 22, 2021
Peak Hour: 07:05 AM - 08:05 AM
Peak 15-Minutes: 07:35 AM - 07:50 AM

Peak Hour

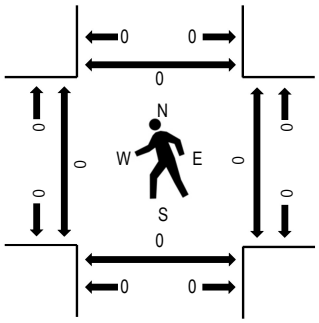
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.3%	0.88
WB	0.0%	0.00
NB	4.5%	0.93
SB	6.6%	0.86
All	5.3%	0.90

Traffic Counts - Motorized Vehicles

Interval Start Time	REDLAND RD Eastbound				REDLAND RD Westbound				HWY 213 Northbound				HWY 213 Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	36	0	3	0	0	0	0	0	4	139	0	0	0	83	13	278	3,898
7:05 AM	0	56	0	6	0	0	0	0	0	8	133	0	0	0	68	15	286	3,910
7:10 AM	0	35	0	3	0	0	0	0	0	3	185	0	0	0	74	32	332	3,894
7:15 AM	0	32	0	3	0	0	0	0	0	10	157	0	0	0	90	26	318	3,827
7:20 AM	0	56	0	12	0	0	0	0	0	3	117	0	0	0	84	26	298	3,857
7:25 AM	0	44	0	4	0	0	0	0	0	11	165	0	0	0	88	34	346	3,858
7:30 AM	0	38	0	7	0	0	0	0	0	6	151	0	0	0	115	26	343	3,792
7:35 AM	0	61	0	5	0	0	0	0	0	2	145	0	0	0	88	35	336	3,768
7:40 AM	0	34	0	8	0	0	0	0	0	4	160	0	0	0	122	40	368	3,746
7:45 AM	0	42	0	17	0	0	0	0	0	6	166	0	0	0	108	44	383	3,680
7:50 AM	0	33	0	5	0	0	0	0	0	6	121	0	0	0	108	37	310	3,625
7:55 AM	0	42	0	1	0	0	0	0	0	12	124	0	0	0	88	33	300	3,637
8:00 AM	0	36	0	6	0	0	0	0	0	4	121	0	0	0	99	24	290	3,614
8:05 AM	0	33	0	7	0	0	0	0	0	4	128	0	0	0	81	17	270	3,571
8:10 AM	0	40	0	8	0	0	0	0	0	7	110	0	0	0	76	24	265	3,591
8:15 AM	0	42	0	8	0	0	0	0	0	6	129	0	0	0	126	37	348	3,576
8:20 AM	0	38	0	6	0	0	0	0	0	4	127	0	0	0	93	31	299	3,521
8:25 AM	0	44	0	5	0	0	0	0	0	5	118	0	0	0	68	40	280	3,522
8:30 AM	0	25	0	3	0	0	0	0	0	4	136	0	0	0	117	34	319	3,530
8:35 AM	0	42	0	6	0	0	0	0	0	10	128	0	0	0	103	25	314	3,510
8:40 AM	0	49	0	7	0	0	0	0	0	7	128	0	0	0	79	32	302	3,511
8:45 AM	0	26	0	6	0	0	0	0	0	13	146	0	0	0	111	26	328	3,531
8:50 AM	0	36	0	3	0	0	0	0	0	12	128	0	0	0	110	33	322	3,570
8:55 AM	0	44	0	11	0	0	0	0	0	4	102	0	0	0	97	19	277	3,578
9:00 AM	0	29	0	6	0	0	0	0	0	3	93	0	0	0	90	26	247	3,596
9:05 AM	0	35	0	9	0	0	0	0	0	4	114	0	0	0	103	25	290	
9:10 AM	0	20	0	9	0	0	0	0	0	1	110	0	0	0	89	21	250	
9:15 AM	0	56	0	12	0	0	0	0	1	11	119	0	0	0	77	17		

Location: 1 HWY 213 & REDLAND RD AM

9:20 AM	0	26	0	8	0	0	0	0	0	6	130	0	0	0	110	20	[illegible]
9:25 AM	0	28	0	5	0	0	0	0	0	5	120	0	0	0	101	29	288
9:30 AM	0	45	0	7	0	0	0	0	0	8	116	0	0	0	107	16	299
9:35 AM	0	27	0	7	0	0	0	0	1	11	126	0	0	0	107	36	315
9:40 AM	0	39	0	10	0	0	0	0	0	6	131	0	0	0	105	31	322
9:45 AM	0	45	0	7	0	0	0	0	0	9	160	0	0	0	107	39	367
9:50 AM	0	32	0	13	0	0	0	0	0	7	118	0	0	0	124	36	330
9:55 AM	0	30	0	8	0	0	0	0	1	8	117	0	0	0	106	25	295
Count Total	0	1,376	0	251	0	0	0	0	3	234	4,718	0	0	0	3,502	1,024	11,108
Peak Hour	0	509	0	77	0	0	0	0	0	75	1,745	0	0	0	1,132	372	3,910

Location: 1 HWY 213 & REDLAND RD AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	8	0	6	14	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	1	7	0	6	14	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	1	5	0	7	13	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	9	0	7	16	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	6	7	0	6	19	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	0	5	0	10	15	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	1	10	0	16	27	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	3	3	0	7	13	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	3	10	0	1	14	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	1	6	0	10	17	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	3	5	0	11	19	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	2	10	0	8	20	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	4	4	0	11	19	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	2	6	0	7	15	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	0	5	0	8	13	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	4	6	0	13	23	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	0	9	0	3	12	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	2	4	0	10	16	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	0	12	0	17	29	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	3	10	0	9	22	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	1	9	0	11	21	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	2	8	0	5	15	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	1	4	0	12	17	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	2	7	0	8	17	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
9:00 AM	1	7	0	6	14	9:00 AM	0	0	0	0	0	9:00 AM	0	0	0	0	0
9:05 AM	1	4	0	11	16	9:05 AM	0	0	0	0	0	9:05 AM	0	0	0	0	0
9:10 AM	2	5	0	12	19	9:10 AM	0	0	0	0	0	9:10 AM	0	0	0	0	0
9:15 AM	2	12	0	9	23	9:15 AM	0	0	0	0	0	9:15 AM	0	0	0	0	0
9:20 AM	1	7	0	11	19	9:20 AM	0	0	0	0	0	9:20 AM	0	0	0	0	0
9:25 AM	2	7	0	14	23	9:25 AM	0	0	0	0	0	9:25 AM	0	0	0	0	0
9:30 AM	2	8	0	9	19	9:30 AM	0	0	0	0	0	9:30 AM	1	1	0	0	2
9:35 AM	0	9	0	6	15	9:35 AM	0	0	0	0	0	9:35 AM	0	0	0	0	0
9:40 AM	1	5	0	13	19	9:40 AM	0	0	0	0	0	9:40 AM	0	0	0	0	0
9:45 AM	1	15	0	11	27	9:45 AM	0	0	0	0	0	9:45 AM	0	0	0	0	0
9:50 AM	0	6	0	15	21	9:50 AM	0	0	0	0	0	9:50 AM	0	0	0	0	0
9:55 AM	2	8	0	11	21	9:55 AM	0	0	0	0	0	9:55 AM	0	0	0	0	0
Count Total	57	262	0	337	656	Count Total	0	0	0	0	0	Count Total	1	1	0	0	2
Peak Hour	25	81	0	100	206	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

ALL TRAFFIC DATA SERVICES
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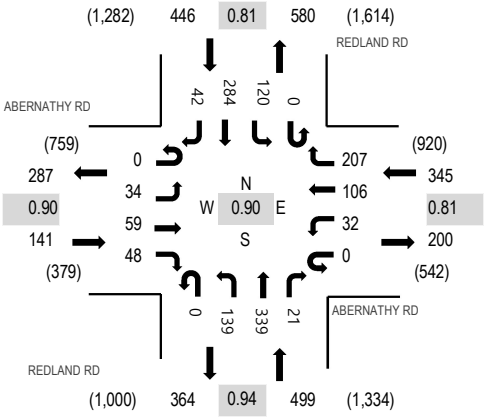
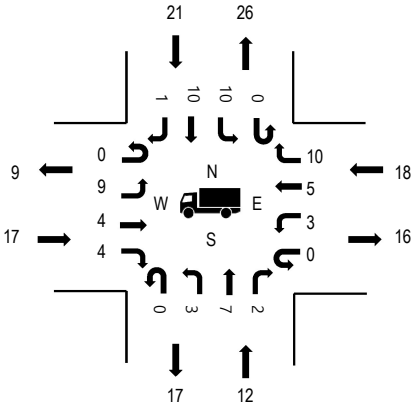
Location: 2 REDLAND RD & ABERNATHY RD AM
Date: Thursday, July 22, 2021
Peak Hour: 07:25 AM - 08:25 AM
Peak 15-Minutes: 07:40 AM - 07:55 AM

Peak Hour

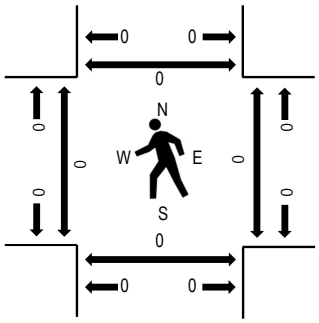
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	12.1%	0.90
WB	5.2%	0.81
NB	2.4%	0.94
SB	4.7%	0.81
All	4.8%	0.90

Traffic Counts - Motorized Vehicles

Interval Start Time	ABERNATHY RD Eastbound				ABERNATHY RD Westbound				REDLAND RD Northbound				REDLAND RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	1	2	1	0	0	6	14	0	10	28	2	0	10	15	6	95	1,359
7:05 AM	0	1	3	1	0	0	2	16	0	8	32	0	0	6	9	5	83	1,388
7:10 AM	0	2	6	0	0	3	7	21	0	8	18	1	0	6	13	4	89	1,393
7:15 AM	0	1	3	2	0	1	3	15	0	5	35	2	0	1	28	6	102	1,405
7:20 AM	0	3	5	3	0	1	7	11	0	10	29	0	0	10	19	6	104	1,417
7:25 AM	0	3	4	3	0	3	7	22	0	11	39	2	0	14	18	3	129	1,431
7:30 AM	0	0	3	3	0	3	14	20	0	7	25	4	0	11	27	2	119	1,402
7:35 AM	0	3	7	8	0	3	13	21	0	13	26	0	0	8	16	4	122	1,400
7:40 AM	0	6	4	1	0	2	10	14	0	10	37	1	0	13	32	3	133	1,394
7:45 AM	0	4	8	9	0	5	4	21	0	13	25	0	0	13	24	2	128	1,360
7:50 AM	0	3	1	4	0	5	12	16	0	14	34	1	0	6	36	5	137	1,352
7:55 AM	0	0	6	2	0	2	6	13	0	14	25	2	0	11	32	5	118	1,321
8:00 AM	0	3	5	5	0	0	9	15	0	9	27	5	0	14	27	5	124	1,332
8:05 AM	0	0	8	2	0	2	4	12	0	10	25	3	0	3	16	3	88	1,321
8:10 AM	0	5	4	1	0	4	7	10	0	14	30	0	0	8	14	4	101	1,326
8:15 AM	0	5	3	5	0	3	10	22	0	13	20	2	0	9	21	1	114	1,322
8:20 AM	0	2	6	5	0	0	10	21	0	11	26	1	0	10	21	5	118	1,319
8:25 AM	0	5	4	3	0	2	6	18	0	5	20	0	0	6	27	4	100	1,282
8:30 AM	0	2	3	1	0	3	10	12	0	11	23	4	0	11	32	5	117	1,282
8:35 AM	0	1	7	11	0	3	14	19	0	5	25	1	0	6	19	5	116	1,264
8:40 AM	0	0	4	2	0	1	5	14	0	10	23	3	0	11	18	8	99	1,233
8:45 AM	0	1	3	2	0	0	9	15	0	10	36	0	0	11	23	10	120	1,239
8:50 AM	0	1	12	9	0	1	6	13	0	8	21	1	0	10	20	4	106	1,234
8:55 AM	0	2	3	4	0	1	10	20	0	11	28	4	0	9	28	9	129	1,245
9:00 AM	0	0	4	6	0	1	11	17	0	8	20	0	0	17	23	6	113	1,224
9:05 AM	0	0	4	1	0	3	4	17	0	11	24	1	0	10	15	3	93	
9:10 AM	0	2	5	7	0	0	10	19	0	6	19	1	0	7	17	4		

Location: 2 REDLAND RD & ABERNATHY RD AM

9:15 AM	0	1	4	7	0	2	7	20	0	11	33	0	0	8	16	2	111
9:20 AM	0	3	1	6	0	0	7	14	0	3	18	1	0	10	13	5	81
9:25 AM	0	2	2	8	0	1	4	13	0	12	26	2	0	13	13	4	100
9:30 AM	0	1	4	5	0	1	4	16	0	10	24	1	0	7	23	3	99
9:35 AM	0	3	1	10	0	2	4	12	0	1	28	0	0	3	16	5	85
9:40 AM	0	2	3	3	0	1	7	17	0	5	20	2	0	7	32	6	105
9:45 AM	0	3	2	8	0	4	6	14	0	6	31	1	0	12	21	7	115
9:50 AM	0	4	1	3	0	0	2	18	0	9	25	7	0	13	29	6	117
9:55 AM	0	1	4	3	0	5	7	16	0	6	25	1	0	13	25	2	108
Count Total	0	76	149	154	0	68	264	588	0	328	950	56	0	337	778	167	3,915
Peak Hour	0	34	59	48	0	32	106	207	0	139	339	21	0	120	284	42	1,431

Location: 2 REDLAND RD & ABERNATHY RD AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	1	1	1	3	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	2	1	0	2	5	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	0	1	0	1	2	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	1	2	1	4	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	1	0	2	2	5	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	2	1	1	1	5	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	1	1	1	2	5	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	2	0	1	3	6	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	3	0	0	3	6	7:40 AM	0	0	1	0	1	7:40 AM	0	0	0	0	0
7:45 AM	4	2	2	0	8	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	2	0	0	3	5	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	2	0	3	5	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	2	2	5	1	10	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	0	1	1	1	3	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	0	0	3	1	4	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	1	0	3	0	4	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	0	3	1	3	7	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	0	1	1	2	4	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	1	2	0	0	3	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	1	0	3	1	5	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	0	1	0	3	4	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	0	2	0	0	2	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	1	0	2	2	5	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	1	2	1	1	5	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
9:00 AM	1	1	1	4	7	9:00 AM	0	0	0	0	0	9:00 AM	0	0	0	0	0
9:05 AM	0	0	1	0	1	9:05 AM	0	0	0	0	0	9:05 AM	0	0	0	0	0
9:10 AM	0	1	1	0	2	9:10 AM	0	0	1	0	1	9:10 AM	0	0	0	0	0
9:15 AM	0	3	1	3	7	9:15 AM	0	0	0	0	0	9:15 AM	0	0	0	0	0
9:20 AM	0	0	0	1	1	9:20 AM	0	0	0	0	0	9:20 AM	0	0	0	0	0
9:25 AM	1	1	2	0	4	9:25 AM	0	0	0	0	0	9:25 AM	0	0	0	0	0
9:30 AM	1	1	0	2	4	9:30 AM	0	0	0	0	0	9:30 AM	0	0	0	0	0
9:35 AM	0	2	0	0	2	9:35 AM	0	0	0	1	1	9:35 AM	0	0	0	0	0
9:40 AM	0	0	0	1	1	9:40 AM	0	0	0	0	0	9:40 AM	0	0	0	0	0
9:45 AM	0	1	0	4	5	9:45 AM	0	0	0	0	0	9:45 AM	0	0	0	0	0
9:50 AM	2	0	0	4	6	9:50 AM	0	0	0	0	0	9:50 AM	0	0	0	0	0
9:55 AM	1	1	0	3	5	9:55 AM	0	0	0	0	0	9:55 AM	0	0	0	0	0
Count Total	30	35	36	59	160	Count Total	0	0	2	1	3	Count Total	0	0	0	0	0
Peak Hour	17	12	18	21	68	Peak Hour	0	0	1	0	1	Peak Hour	0	0	0	0	0

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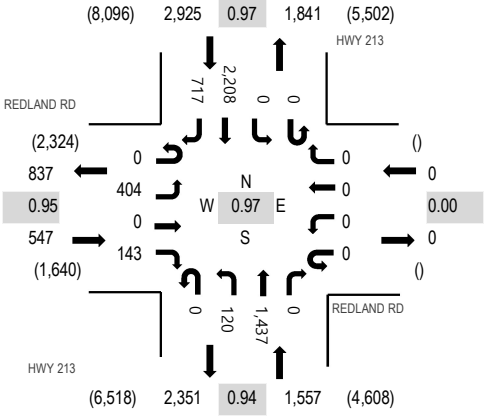
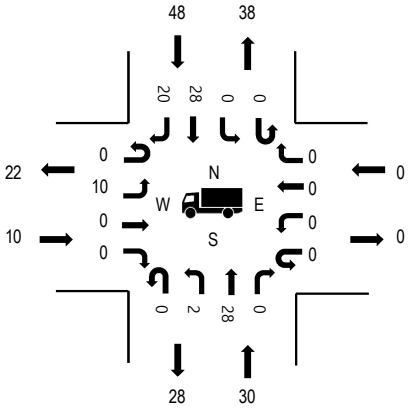
Location: 1 HWY 213 & REDLAND RD PM
Date: Thursday, July 22, 2021
Peak Hour: 04:35 PM - 05:35 PM
Peak 15-Minutes: 05:05 PM - 05:20 PM

Peak Hour

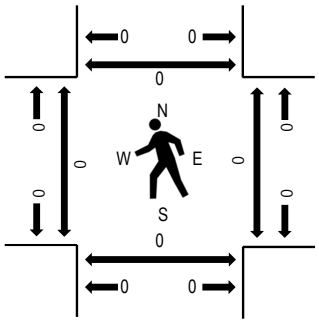
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.8%	0.95
WB	0.0%	0.00
NB	1.9%	0.94
SB	1.6%	0.97
All	1.7%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	REDLAND RD Eastbound				REDLAND RD Westbound				HWY 213 Northbound				HWY 213 Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
3:00 PM	0	32	0	10	0	0	0	0	0	6	128	0	0	0	157	44	377	4,487
3:05 PM	0	27	0	5	0	0	0	0	0	12	144	0	0	0	156	51	395	4,507
3:10 PM	0	44	0	17	0	0	0	0	0	13	119	0	0	0	135	28	356	4,515
3:15 PM	0	26	0	4	0	0	0	0	0	13	135	0	0	0	165	54	397	4,587
3:20 PM	0	35	0	6	0	0	0	0	0	7	127	0	0	0	170	40	385	4,597
3:25 PM	0	45	0	12	0	0	0	0	0	6	105	0	0	0	156	49	373	4,620
3:30 PM	0	42	0	5	0	0	0	0	0	15	128	0	0	0	139	41	370	4,679
3:35 PM	0	31	0	9	0	0	0	0	0	4	112	0	0	0	197	50	403	4,714
3:40 PM	0	32	0	15	0	0	0	0	0	11	98	0	0	0	131	38	325	4,722
3:45 PM	0	32	0	9	0	0	0	0	0	15	115	0	0	0	134	40	345	4,845
3:50 PM	0	29	0	3	0	0	0	0	0	8	113	0	0	0	161	66	380	4,906
3:55 PM	0	25	0	15	0	0	0	0	0	10	100	0	0	0	181	50	381	4,912
4:00 PM	0	51	0	15	0	0	0	0	0	14	124	0	0	0	150	43	397	4,968
4:05 PM	0	24	0	5	0	0	0	0	0	8	132	0	0	0	179	55	403	4,959
4:10 PM	0	30	0	11	0	0	0	0	0	9	133	0	0	0	188	57	428	4,979
4:15 PM	0	50	0	21	0	0	0	0	0	3	95	0	0	0	194	44	407	5,017
4:20 PM	0	24	0	12	0	0	0	0	0	16	127	0	0	0	162	67	408	5,021
4:25 PM	0	22	0	13	0	0	0	0	0	6	121	0	0	0	196	74	432	5,010
4:30 PM	0	41	0	18	0	0	0	0	0	10	114	0	0	0	169	53	405	5,010
4:35 PM	0	37	0	17	0	0	0	0	0	16	128	0	0	0	150	63	411	5,029
4:40 PM	0	29	0	9	0	0	0	0	0	3	137	0	0	0	221	49	448	5,016
4:45 PM	0	33	0	13	0	0	0	0	0	8	105	0	0	0	186	61	406	4,955
4:50 PM	0	35	0	6	0	0	0	0	0	10	115	0	0	0	163	57	386	4,994
4:55 PM	0	32	0	11	0	0	0	0	0	10	128	0	0	0	197	59	437	4,955
5:00 PM	0	25	0	12	0	0	0	0	0	12	99	0	0	0	183	57	388	4,889
5:05 PM	0	56	0	14	0	0	0	0	0	13	120	0	0	0	168	52	423	
5:10 PM	0	27	0	18	0	0	0	0	0	9	136	0	0	0	191	85	466	
5:15 PM	0	19	0	8	0	0	0	0	0	8	119	0	0	0	199	58		

Location: 1 HWY 213 & REDLAND RD PM

5:20 PM	0	50	0	12	0	0	0	0	0	11	112	0	0	0	154	58	[illegible]
5:25 PM	0	31	0	15	0	0	0	0	0	12	124	0	0	0	190	60	432
5:30 PM	0	30	0	8	0	0	0	0	0	8	114	0	0	0	206	58	424
5:35 PM	0	46	0	13	0	0	0	0	0	9	109	0	0	0	158	63	398
5:40 PM	0	39	0	5	0	0	0	0	0	6	120	0	0	0	149	68	387
5:45 PM	0	35	0	13	0	0	0	0	0	8	131	0	0	0	194	64	445
5:50 PM	0	28	0	15	0	0	0	0	0	8	85	0	0	0	143	68	347
5:55 PM	0	45	0	7	0	0	0	0	0	8	111	0	0	0	145	55	371
Count Total	0	1,239	0	401	0	0	0	0	0	345	4,263	0	0	0	6,117	1,979	14,344
Peak Hour	0	404	0	143	0	0	0	0	0	120	1,437	0	0	0	2,208	717	5,029

Location: 1 HWY 213 & REDLAND RD PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

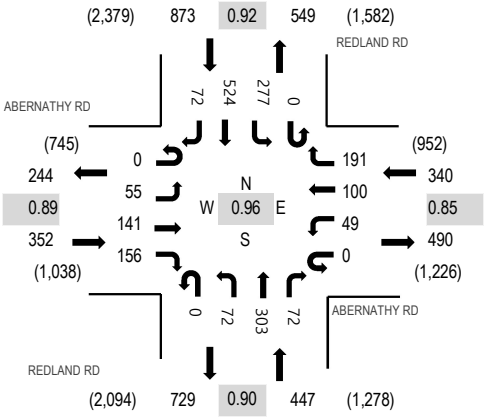
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
3:00 PM	0	7	0	8	15	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	0	5	0	6	11	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	1	5	0	7	13	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	1	4	0	6	11	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	1	2	0	8	11	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	3	3	0	1	7	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	4	3	0	1	8	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	1	3	0	5	9	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	1	2	0	3	6	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	2	4	0	3	9	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	0	4	0	5	9	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	2	3	0	5	10	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	3	6	0	6	15	4:00 PM	0	0	0	0	0	4:00 PM	0	1	0	0	1
4:05 PM	3	5	0	8	16	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	1	1	0	6	8	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	1	4	0	8	13	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	8	0	5	13	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	7	0	6	13	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	2	4	0	8	14	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	4	0	5	9	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	1	1	0	2	4	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	3	2	0	5	10	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	2	3	0	1	6	4:50 PM	0	0	0	0	0	4:50 PM	0	1	0	0	1
4:55 PM	0	3	0	5	8	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	3	0	5	9	5:00 PM	0	0	0	1	1	5:00 PM	0	0	0	0	0
5:05 PM	0	2	0	3	5	5:05 PM	0	0	0	1	1	5:05 PM	0	0	0	0	0
5:10 PM	2	3	0	9	14	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	4	0	2	7	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	4	4	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	3	0	2	5	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	2	0	5	7	5:30 PM	0	1	0	0	1	5:30 PM	0	0	0	0	0
5:35 PM	0	3	0	4	7	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	1	0	5	6	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	2	0	8	11	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	2	0	4	6	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	1	3	0	3	7	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	38	121	0	177	336	Count Total	0	1	0	2	3	Count Total	0	2	0	0	2
Peak Hour	10	30	0	48	88	Peak Hour	0	1	0	2	3	Peak Hour	0	1	0	0	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

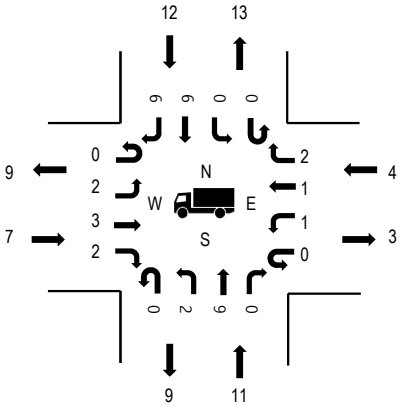
Location: 2 REDLAND RD & ABERNATHY RD PM
Date: Thursday, July 22, 2021
Peak Hour: 04:25 PM - 05:25 PM
Peak 15-Minutes: 05:10 PM - 05:25 PM

Peak Hour

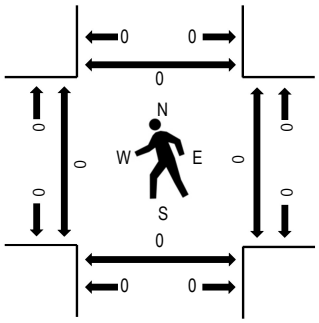
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.0%	0.89
WB	1.2%	0.85
NB	2.5%	0.90
SB	1.4%	0.92
All	1.7%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	ABERNATHY RD Eastbound				ABERNATHY RD Westbound				REDLAND RD Northbound				REDLAND RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
3:00 PM	0	0	10	19	0	1	4	15	0	8	25	3	0	17	44	9	155	1,721
3:05 PM	0	6	7	21	0	2	7	16	0	7	21	0	0	12	25	6	130	1,708
3:10 PM	0	4	5	5	0	8	6	17	0	10	24	1	0	22	35	7	144	1,743
3:15 PM	0	1	5	12	0	1	2	15	0	12	22	6	0	9	34	8	127	1,770
3:20 PM	0	4	7	21	0	4	9	17	0	9	16	4	0	22	29	12	154	1,805
3:25 PM	0	8	13	11	0	4	5	17	0	4	28	3	0	10	34	2	139	1,811
3:30 PM	0	6	7	10	0	5	9	24	0	9	19	3	0	20	35	8	155	1,851
3:35 PM	0	4	7	6	0	3	15	14	0	8	25	1	0	9	30	4	126	1,844
3:40 PM	0	4	12	20	0	0	4	12	0	11	23	4	0	13	38	5	146	1,893
3:45 PM	0	3	11	13	0	2	10	14	0	10	24	3	0	18	31	9	148	1,920
3:50 PM	0	4	20	16	0	3	6	15	0	8	16	5	0	18	30	11	152	1,942
3:55 PM	0	2	16	20	0	3	7	12	0	11	22	0	0	13	35	4	145	1,964
4:00 PM	0	4	9	16	0	3	8	7	0	7	26	4	0	20	36	2	142	1,990
4:05 PM	0	5	15	12	0	5	11	16	0	5	17	3	0	25	47	4	165	1,990
4:10 PM	0	4	8	15	0	6	9	20	0	4	26	2	0	17	55	5	171	1,982
4:15 PM	0	2	14	16	0	0	7	20	0	6	27	4	0	18	43	5	162	1,991
4:20 PM	0	5	8	11	0	3	5	17	0	10	23	1	0	12	57	8	160	2,005
4:25 PM	0	5	12	14	0	3	10	17	0	6	29	7	0	25	42	9	179	2,012
4:30 PM	0	2	8	14	0	1	8	11	0	8	23	4	0	22	45	2	148	1,989
4:35 PM	0	4	20	18	0	7	9	25	0	0	25	3	0	20	35	9	175	2,001
4:40 PM	0	2	10	11	0	5	13	19	0	13	22	4	0	18	48	8	173	1,988
4:45 PM	0	3	11	5	0	3	8	15	0	6	32	5	0	27	52	3	170	1,969
4:50 PM	0	4	8	16	0	2	9	16	0	4	32	6	0	22	49	6	174	1,956
4:55 PM	0	3	9	14	0	6	12	15	0	5	25	8	0	22	46	6	171	1,959
5:00 PM	0	8	11	13	0	4	6	9	0	2	23	6	0	14	37	9	142	1,936
5:05 PM	0	6	16	8	0	4	8	19	0	5	24	7	0	27	29	4	157	
5:10 PM	0	6	14	7	0	6	4	21	0	9	24	7	0	29	49	4		

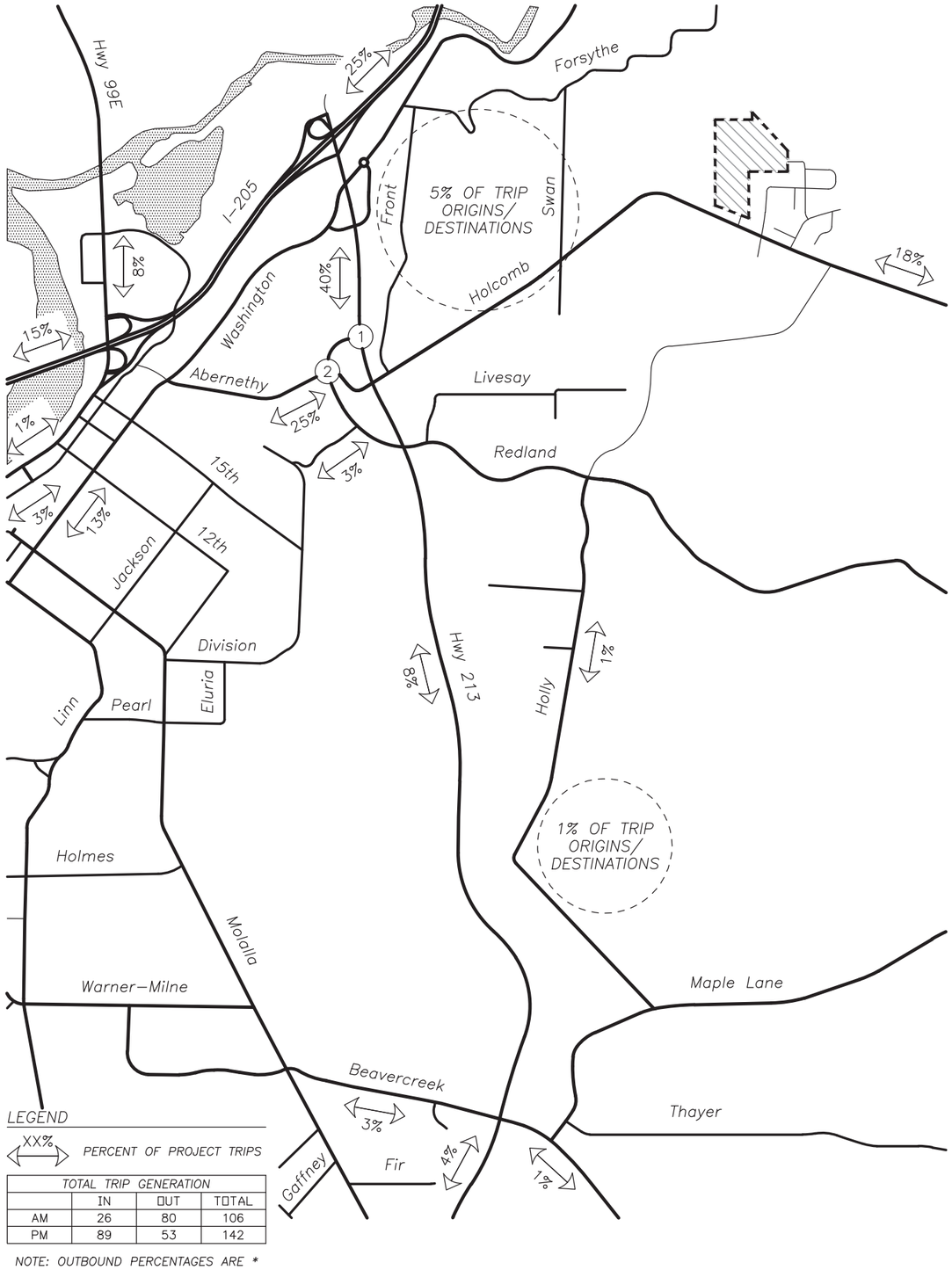
Location: 2 REDLAND RD & ABERNATHY RD PM

5:15 PM	0	8	16	17	0	5	5	11	0	7	18	8	0	20	53	8	[illegible]
5:20 PM	0	4	6	19	0	3	8	13	0	7	26	7	0	31	39	4	167
5:25 PM	0	1	11	12	0	1	6	16	0	5	29	6	0	24	40	5	156
5:30 PM	0	9	8	26	0	1	6	19	0	8	19	6	0	21	35	2	160
5:35 PM	0	9	7	15	0	5	5	14	0	12	16	3	0	20	55	1	162
5:40 PM	0	5	4	18	0	2	5	15	0	11	19	3	0	16	49	7	154
5:45 PM	0	4	17	15	0	1	9	17	0	9	31	3	0	13	34	4	157
5:50 PM	0	2	7	11	0	2	5	17	0	4	32	6	1	34	53	3	177
5:55 PM	0	3	9	9	0	2	7	12	0	5	25	9	0	13	44	10	148
Count Total	0	154	378	506	0	116	267	569	0	265	858	155	1	693	1,472	213	5,647
Peak Hour	0	55	141	156	0	49	100	191	0	72	303	72	0	277	524	72	2,012

Location: 2 REDLAND RD & ABERNATHY RD PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

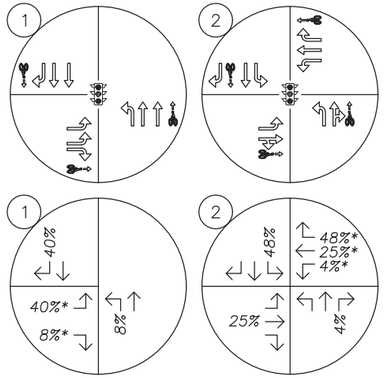
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
3:00 PM	0	0	2	4	6	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	2	0	0	0	2	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	0	1	1	3	5	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	0	1	0	1	2	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	1	2	1	0	4	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	1	0	1	2	4	3:25 PM	0	0	0	0	0	3:25 PM	0	0	1	0	1
3:30 PM	2	1	4	0	7	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	0	1	2	0	3	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	1	0	0	1	2	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	0	0	2	1	3	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	2	1	0	1	4	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	0	0	0	3	3	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	1	1	1	1	4	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	1	0	0	0	1	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	1	0	0	1	2	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	2	1	0	2	5	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	1	0	2	4:25 PM	0	1	0	0	1	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	2	2	4:30 PM	1	0	0	0	1	4:30 PM	0	0	0	0	0
4:35 PM	1	1	0	0	2	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	1	1	1	1	4	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	1	0	0	3	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	1	0	0	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	2	0	1	3	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	2	0	0	2	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	1	0	3	4	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	1	2	1	4	5:10 PM	1	0	0	0	1	5:10 PM	0	0	0	0	0
5:15 PM	2	1	0	4	7	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	3	1	0	1	5	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	2	0	1	3	5:30 PM	0	0	0	0	0	5:30 PM	0	0	1	0	1
5:35 PM	0	0	1	2	3	5:35 PM	1	0	0	0	1	5:35 PM	0	1	0	0	1
5:40 PM	0	1	2	0	3	5:40 PM	0	0	1	0	1	5:40 PM	0	1	0	0	1
5:45 PM	0	0	0	1	1	5:45 PM	0	1	0	0	1	5:45 PM	0	0	1	0	1
5:50 PM	0	1	1	0	2	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	2	2	0	0	4	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	26	27	22	37	112	Count Total	3	2	1	0	6	Count Total	0	2	3	0	5
Peak Hour	7	11	4	12	34	Peak Hour	2	1	0	0	3	Peak Hour	0	0	0	0	0



TOTAL TRIP GENERATION			
	IN	OUT	TOTAL
AM	26	80	106
PM	89	53	142

NOTE: OUTBOUND PERCENTAGES ARE *

EXISTING LANE CONFIGURATION

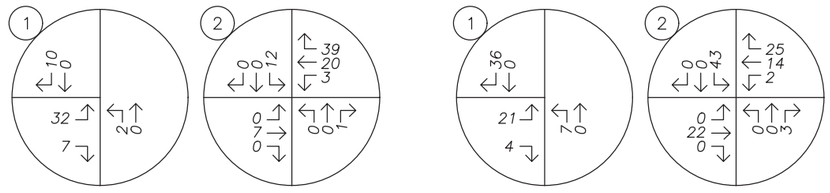


SITE TRIP DISTRIBUTION

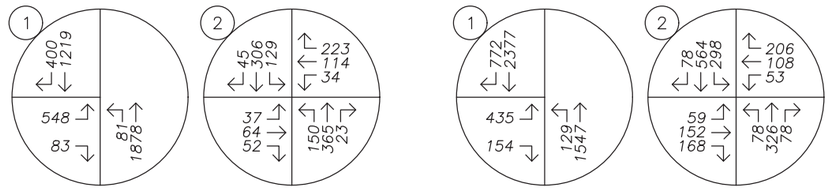
AM PEAK HOUR

PM PEAK HOUR

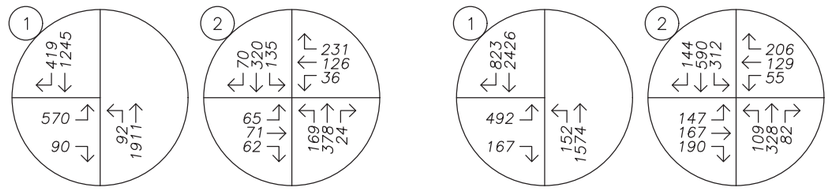
SITE TRIP ASSIGNMENT



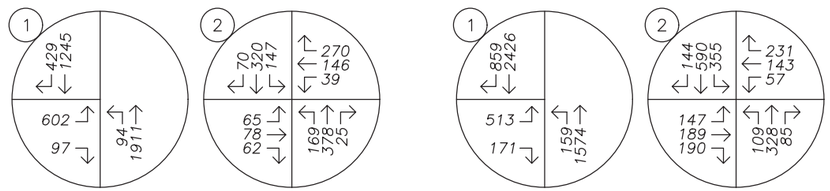
2021 EXISTING CONDITIONS



2025 BACKGROUND CONDITIONS



2025 BUILDOUT CONDITIONS



No Scale

Figure 1

Serres Farm Master P

9/15/2

TRAFFIC VOLUMES

Year 2021 Existing, 2025 Backgr

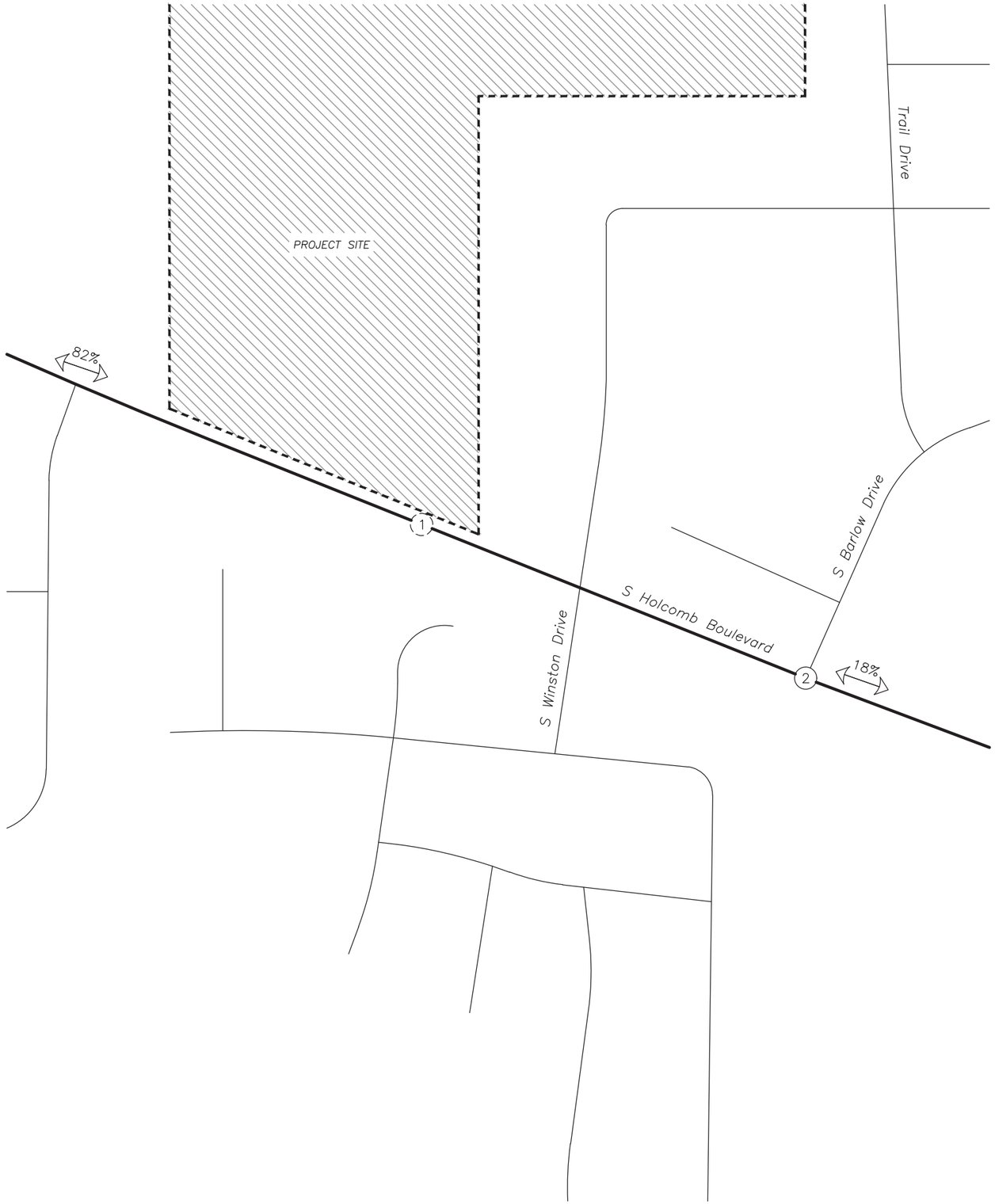
AM & PM Peak Hours

lancaster mobley

Figure 3

Serres Farm Master P

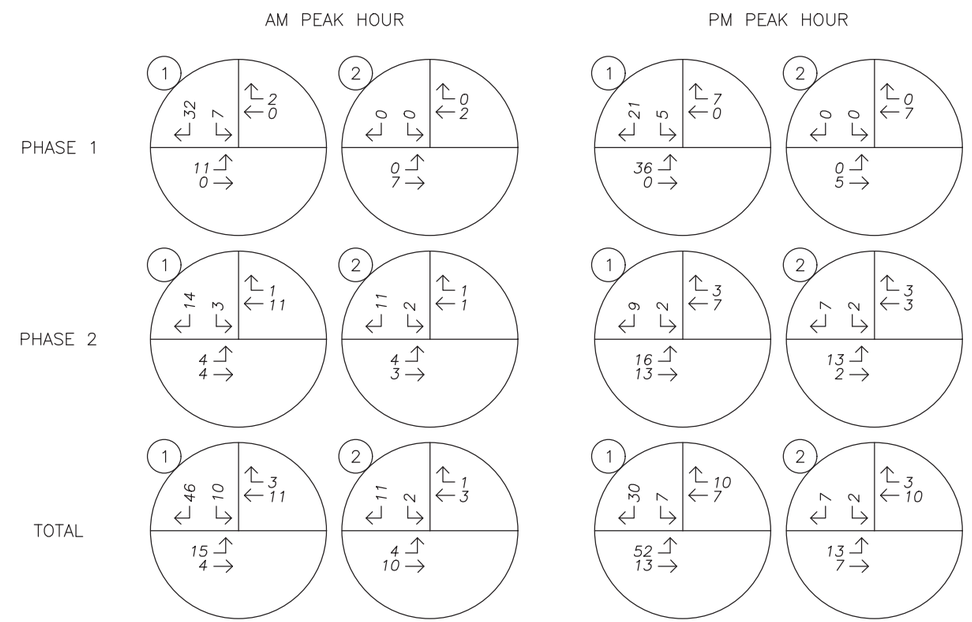
5/19/2



LEGEND

XX% PERCENT OF PROJECT TRIPS

TOTAL TRIP GENERATION			
	IN	OUT	TOTAL
AM	23	69	92
PM	78	46	124



No Scale

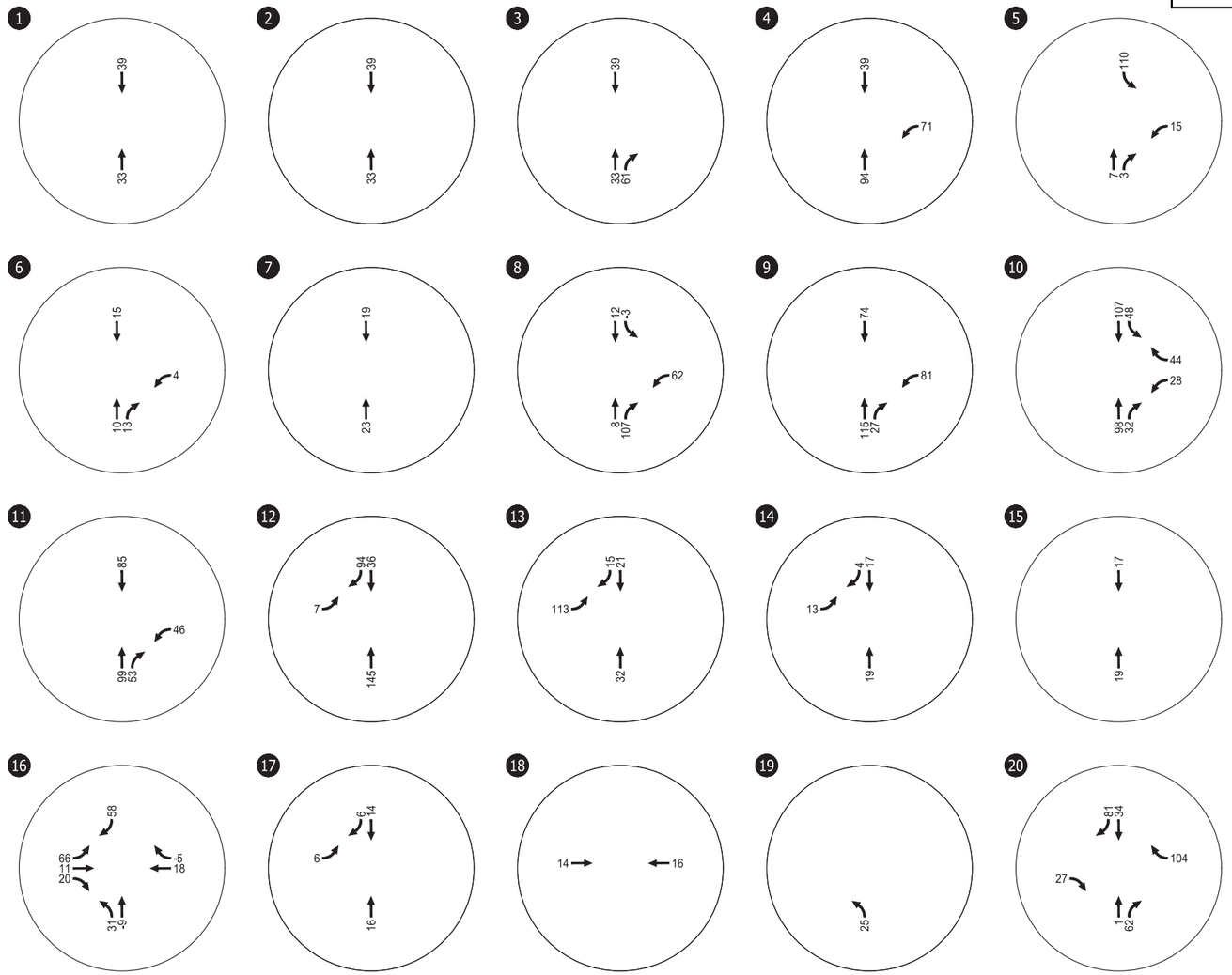
SITE TRIP ASSIGNMENT

Proposed Development Plan - Site Trip

AM & PM Peak Hours

lancaster mobley

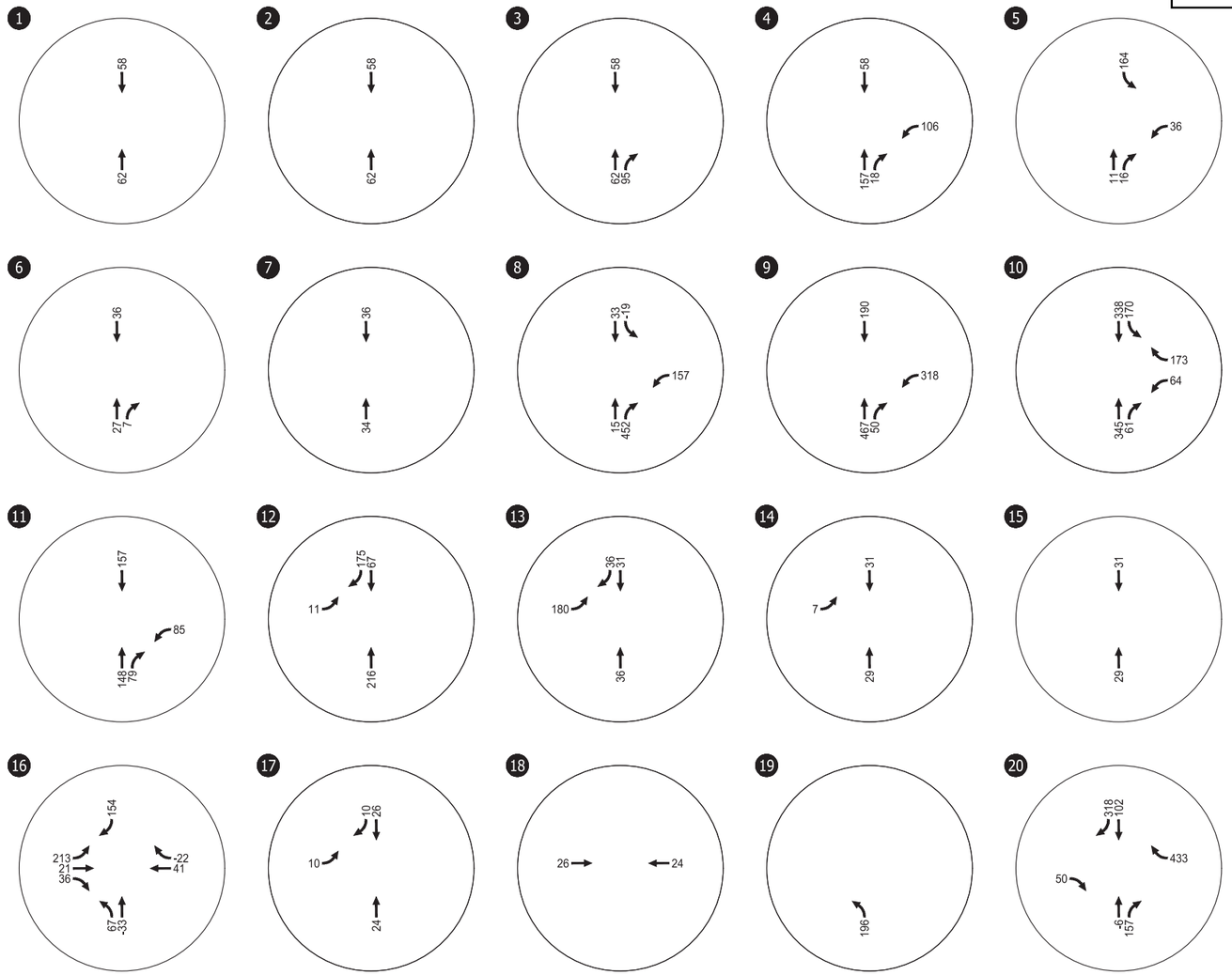




Total External Site Trip Assignment
Weekday AM Peak Hour
Oregon City, Oregon

Figure
20





Total External Site Trip Assignment
Weekday PM Peak Hour
Oregon City, Oregon

Figure
22

H:\24\24824 - Rivers Edge Development\report\figs\24824 Fig.dwg Mar 17, 2021 - 10:12am - mruiz-leon Layout Tab: TA_PM1

Appendix D

Crash History Data

CITY OF OREGON CITY, CLACKAMAS COUNTY

HOLCOMB BLVD at WINSTON DR, City of Oregon City, Clackamas County, 01/01/2015 to 12/31/2019

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R G S	M J N V	S I H L	W C O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V#	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report information is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash [illegible] is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CITY OF OREGON CITY, CLACKAMAS COUNTY

HOLCOMB BLVD at BARLOW DR, City of Oregon City, Clackamas County, 01/01/2015 to 12/31/2019

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V#	MOVE / FROM / TO / TYPE	P# / PRTC / INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash reports is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CITY OF OREGON CITY, CLACKAMAS COUNTY

HOLCOMB BLVD at BARLOW DR, City of Oregon City, Clackamas County, 01/01/2015 to 12/31/2019

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash reports is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Appendix E

Left-turn Lane Warrant Analysis

Preliminary Signal Warrant Analysis

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (EB)

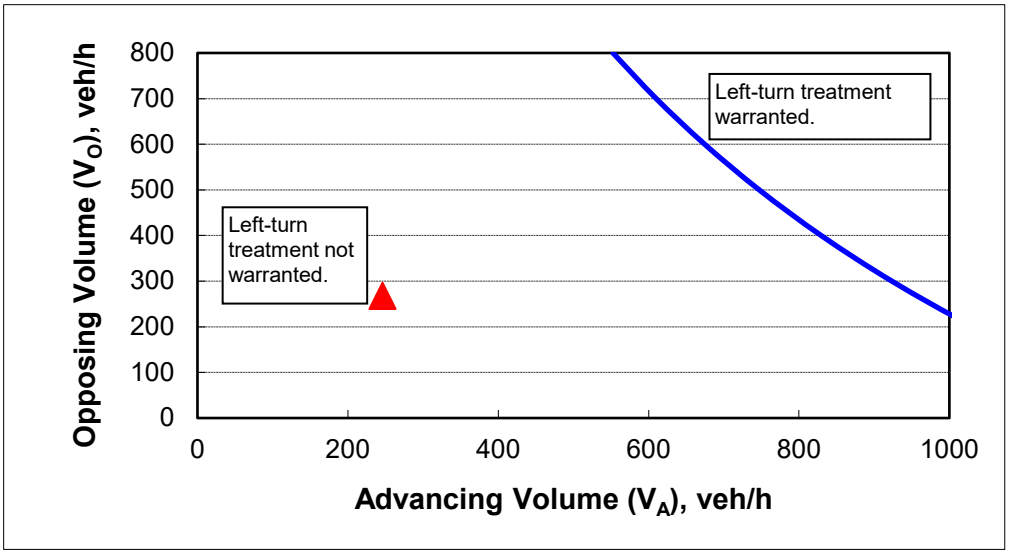
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	246
Opposing volume (V_O), veh/h:	268

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	957
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (WB)

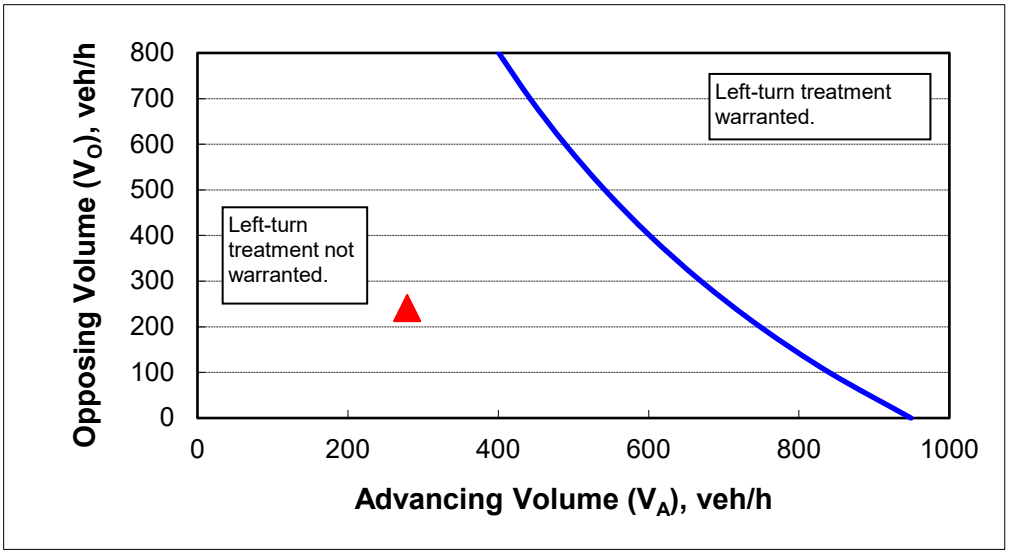
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	279
Opposing volume (V_O), veh/h:	241

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	715
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (EB)

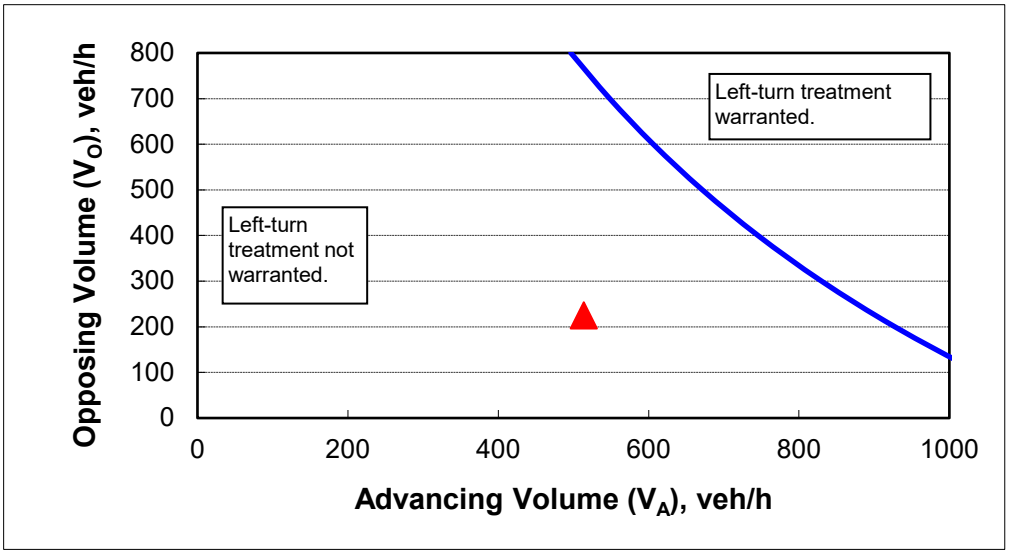
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	514
Opposing volume (V_O), veh/h:	225

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	902
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (WB)

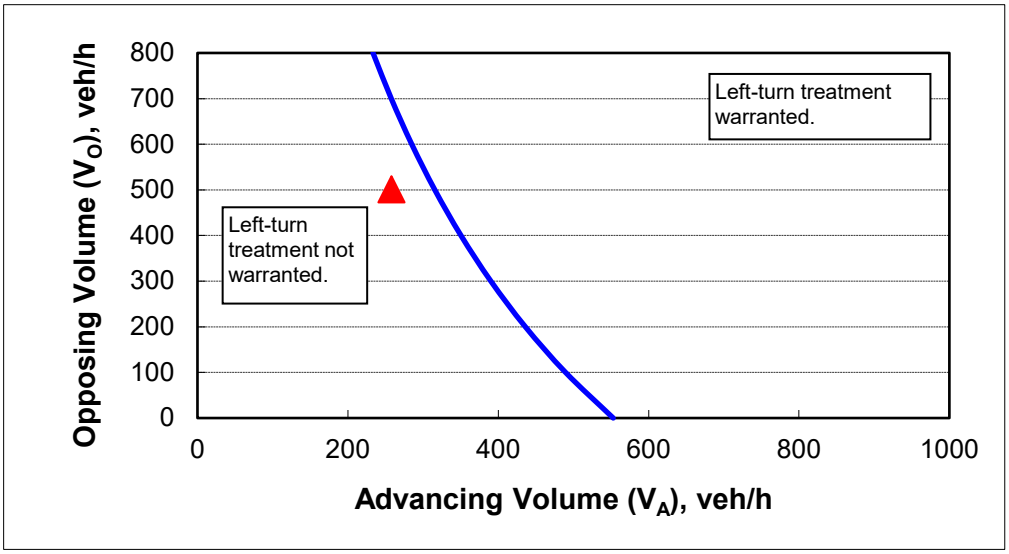
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	13%
Advancing volume (V_A), veh/h:	258
Opposing volume (V_O), veh/h:	501

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	315
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 2. S Barlow Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (EB)

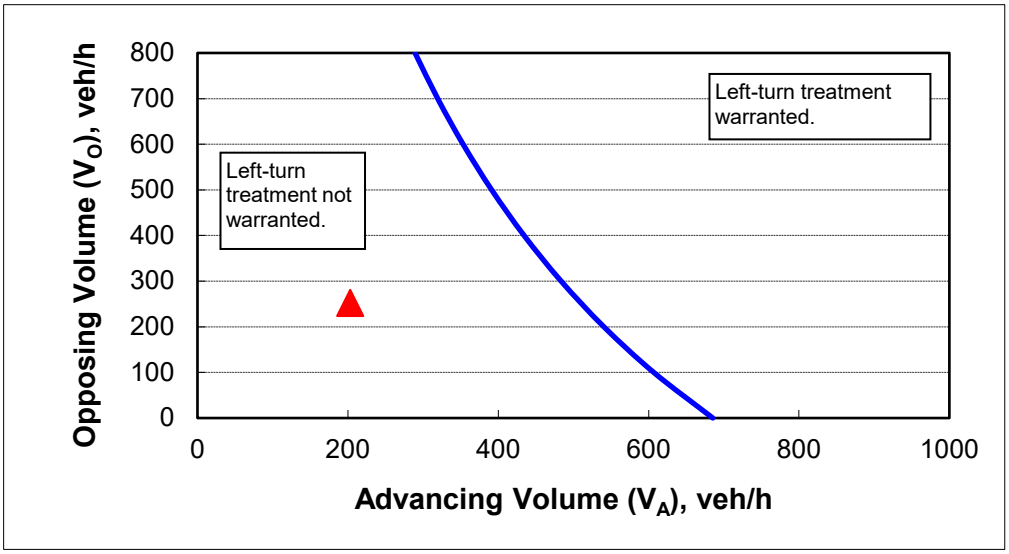
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	8%
Advancing volume (V_A), veh/h:	203
Opposing volume (V_O), veh/h:	252

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	510
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 2. S Barlow Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (EB)

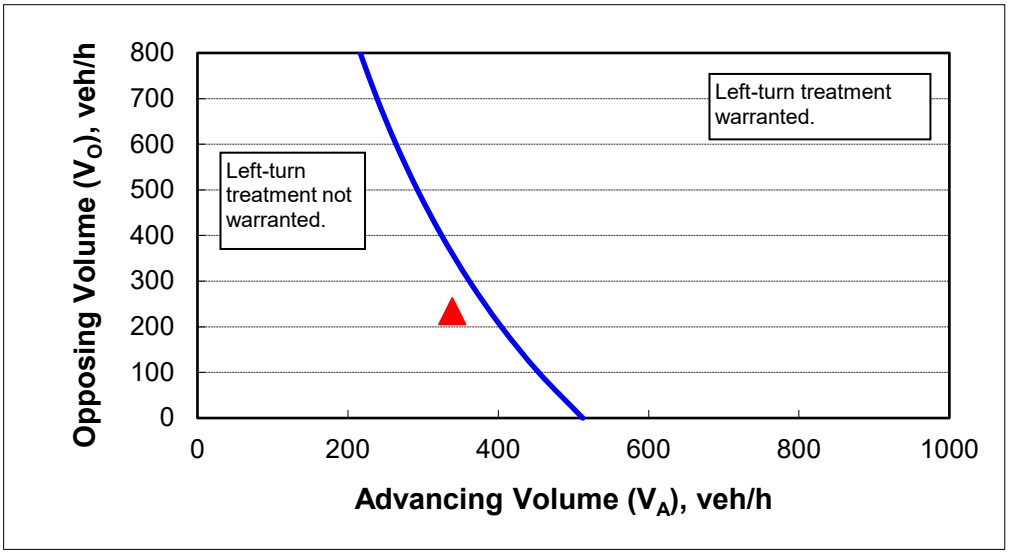
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	15%
Advancing volume (V_A), veh/h:	339
Opposing volume (V_O), veh/h:	234

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	389
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 3. Street A at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (WB)

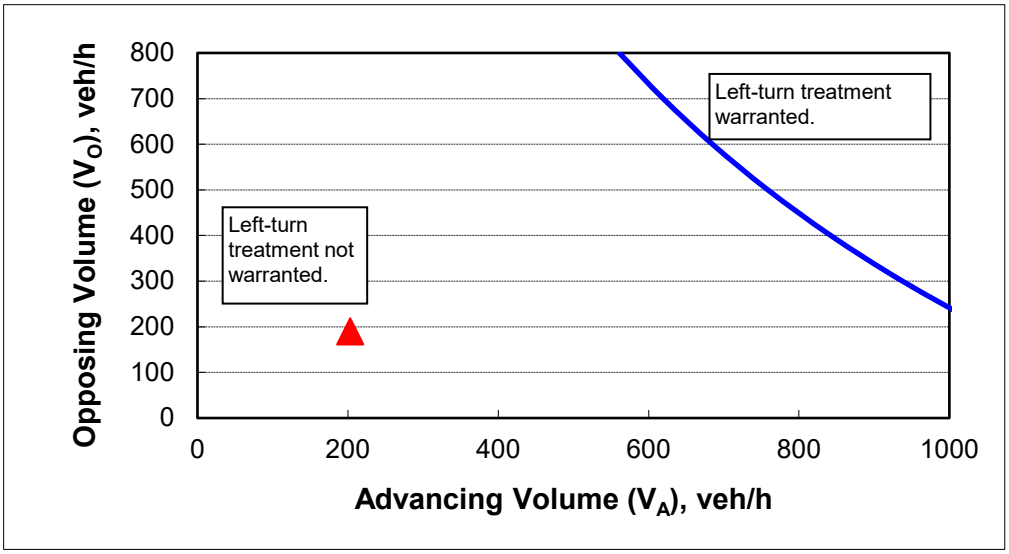
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	203
Opposing volume (V_O), veh/h:	190

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1060
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 3. Street A at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (WB)

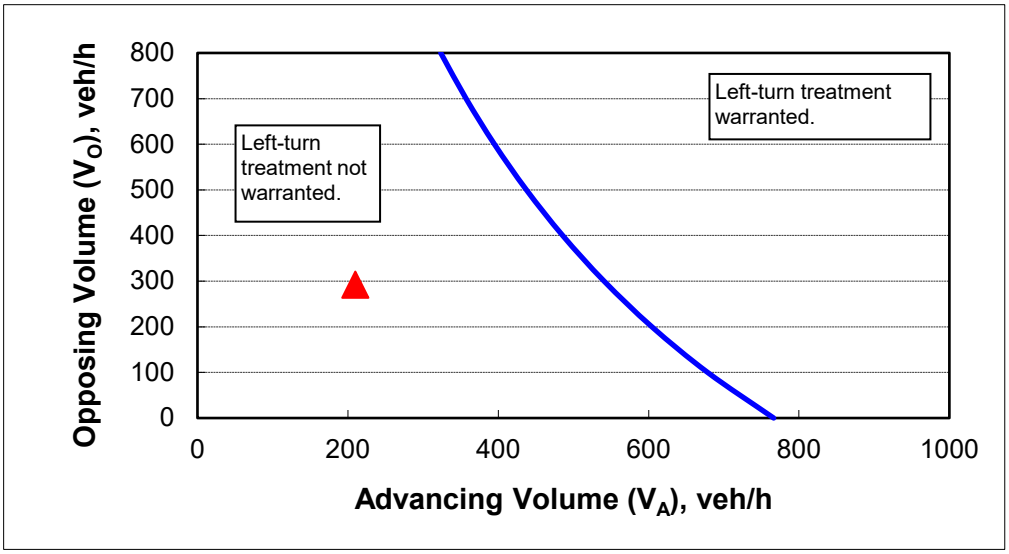
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	6%
Advancing volume (V_A), veh/h:	210
Opposing volume (V_O), veh/h:	292

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	546
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (EB)
(with S Holly Lane Connection)

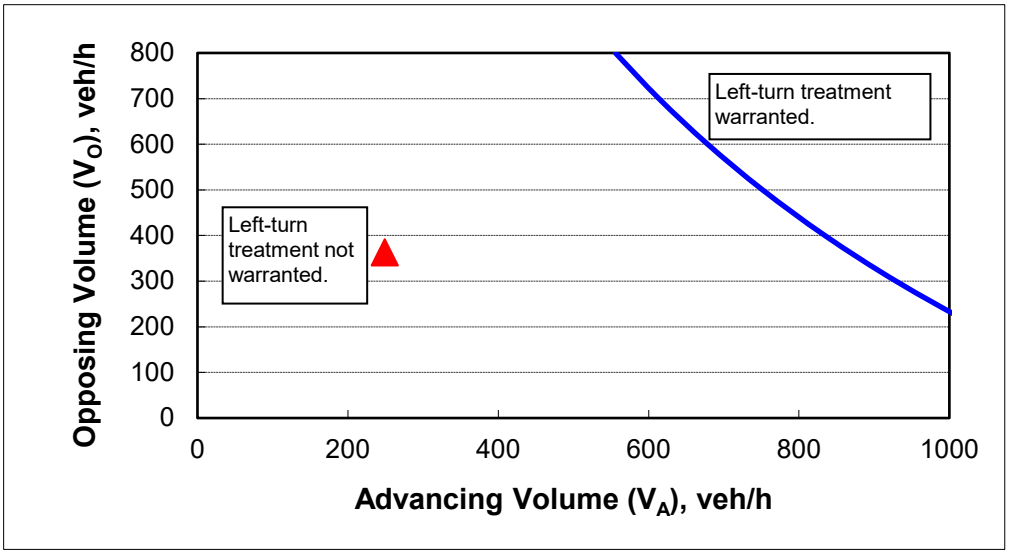
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	249
Opposing volume (V_O), veh/h:	363

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	868
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (WB)
(with S Holly Lane Connection)

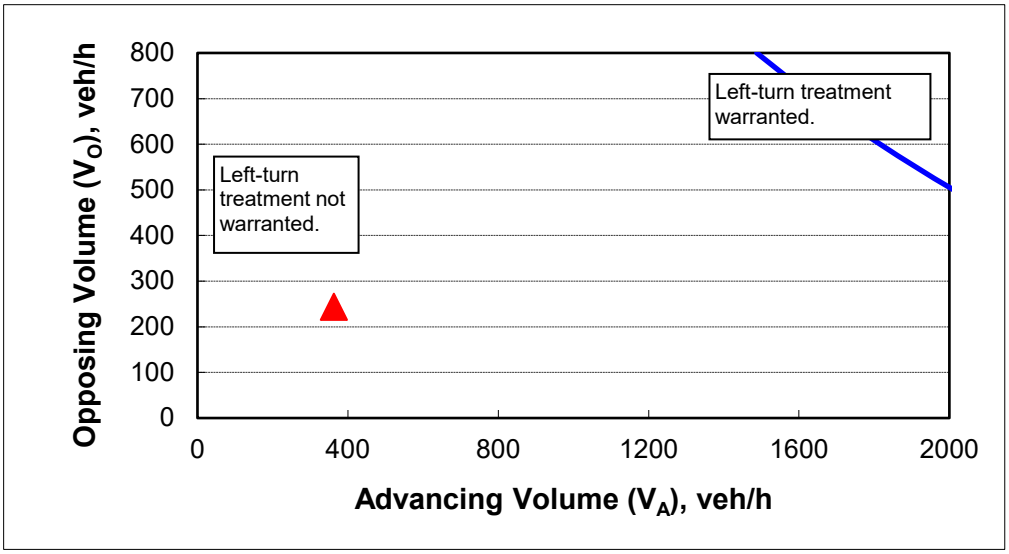
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	363
Opposing volume (V_O), veh/h:	244

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	2645
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (EB)
(with S Holly Lane Connection)

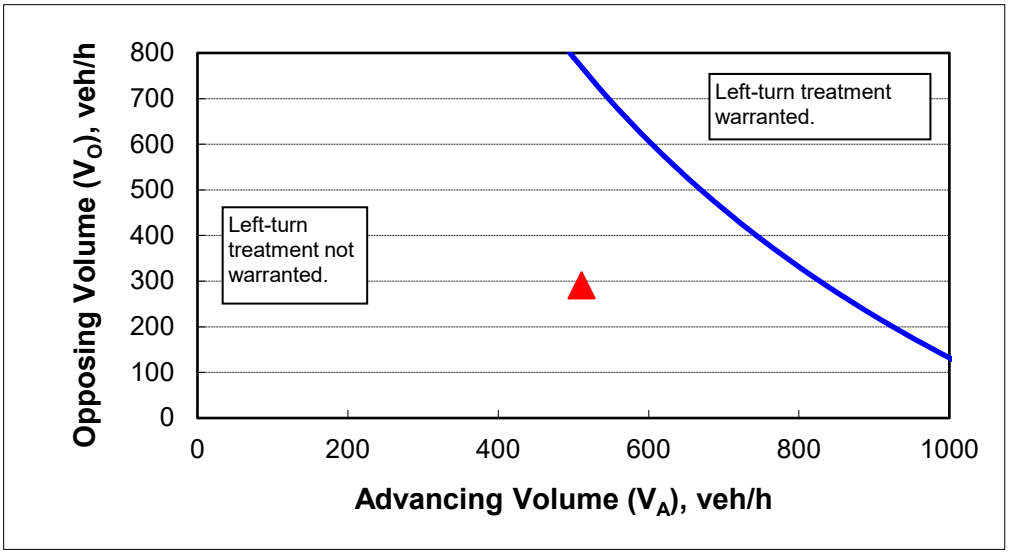
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	511
Opposing volume (V_O), veh/h:	291

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	836
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 1. S Winston Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (WB)
(with S Holly Lane Connection)

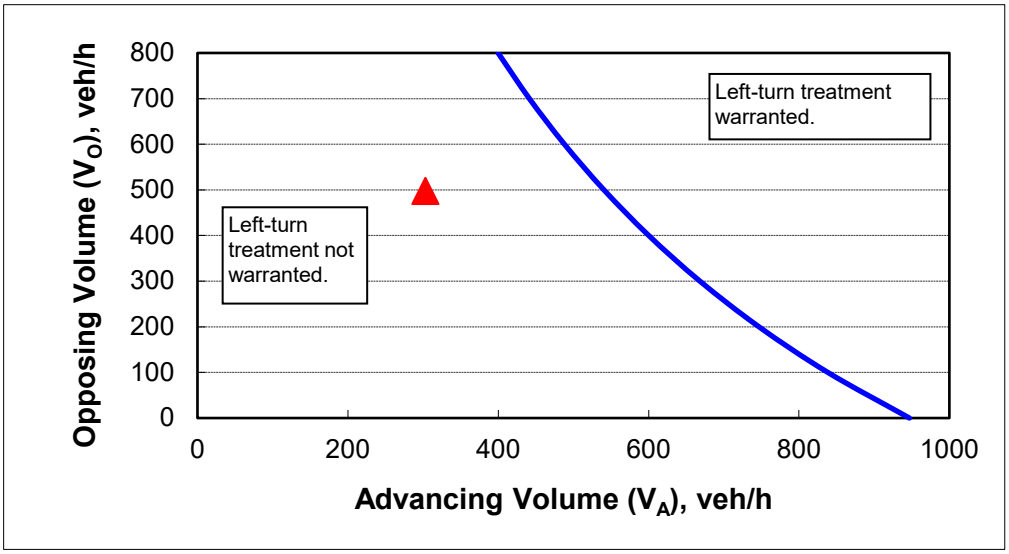
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	303
Opposing volume (V_O), veh/h:	498

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	542
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 2. S Barlow Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (EB)
(with S Holly Lane Connection)

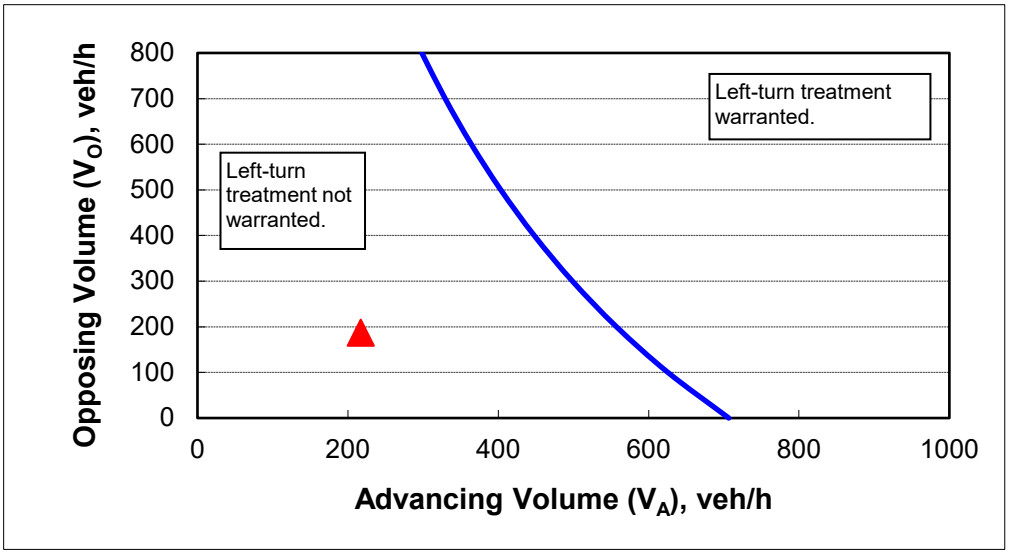
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	7%
Advancing volume (V_A), veh/h:	217
Opposing volume (V_O), veh/h:	187

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	566
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 2. S Barlow Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - AM Peak Hour (WB)
(with S Holly Lane Connection)

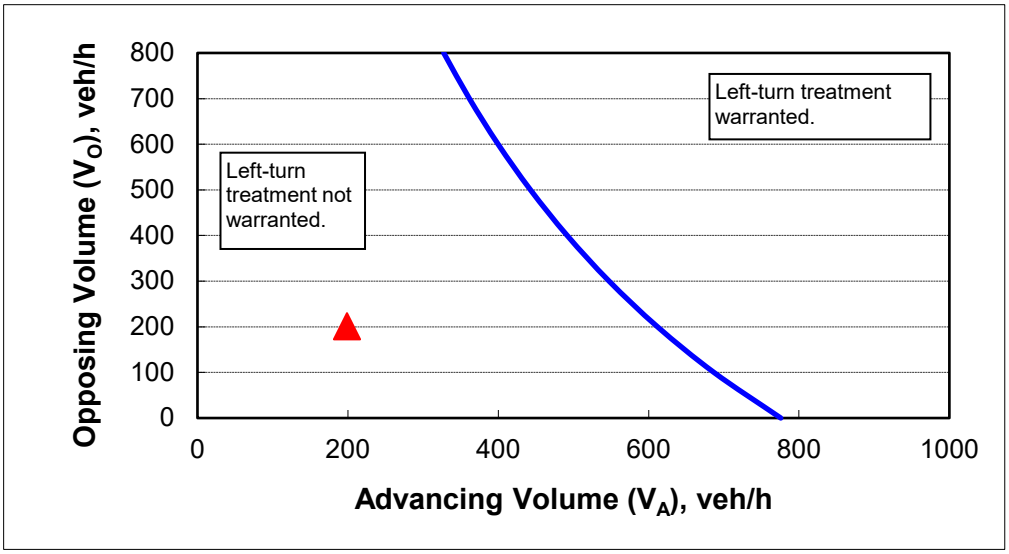
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	6%
Advancing volume (V_A), veh/h:	199
Opposing volume (V_O), veh/h:	201

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	611
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 2. S Barlow Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (EB)
(with S Holly Lane Connection)

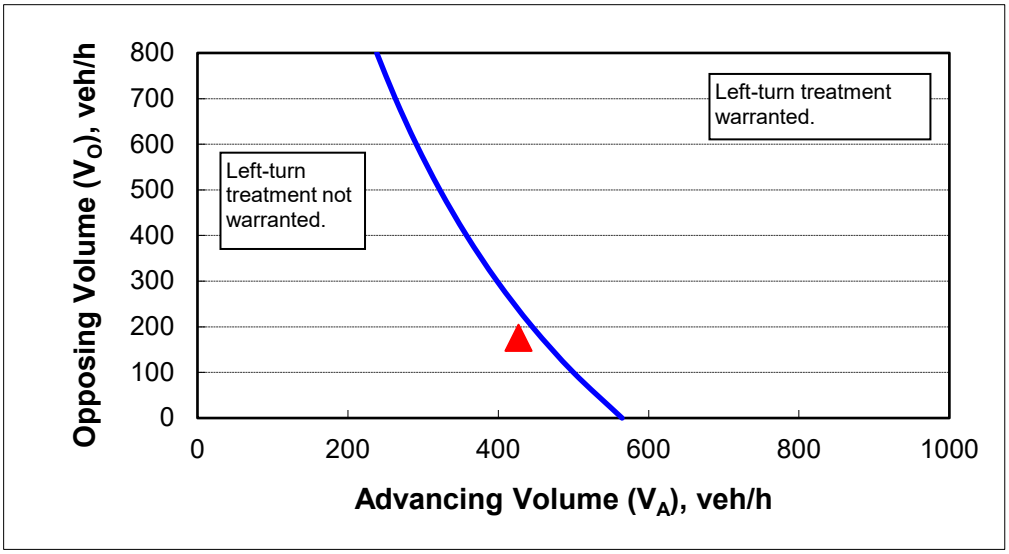
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	12%
Advancing volume (V_A), veh/h:	427
Opposing volume (V_O), veh/h:	176

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	458
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: Park Place Master Plan
Intersection: 2. S Barlow Drive at S Holcomb Boulevard
Date: 11/30/2021
Scenario: 2030 Buildout Conditions - PM Peak Hour (WB)
(with S Holly Lane Connection)

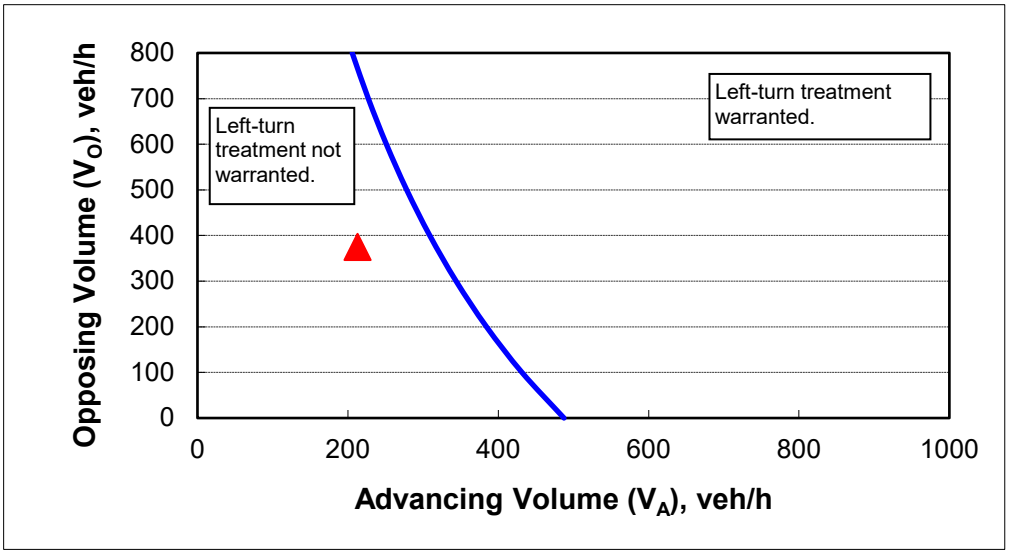
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	17%
Advancing volume (V_A), veh/h:	213
Opposing volume (V_O), veh/h:	375

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	317
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Traffic Signal Warrant Analysis

Project: Park Place Master Plan
Date: 11/30/2021
Scenario: 2030 Buildout Conditions with Lot 200 (without S Holly Lane connection)

Major Street:	S Holcomb Boulevard	Minor Street:	S Winston Drive
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	772	PM Peak Hour Volumes:	138

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	7,720	8,850	
Minor Street*	1,380	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	7,720	13,300	
Minor Street*	1,380	1,350	**No**
Combination Warrant			
Major Street	7,720	10,640	
Minor Street*	1,380	2,120	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: Park Place Master Plan
Date: 11/30/2021
Scenario: 2030 Buildout Conditions with Lot 200 (with S Holly Lane connection)

Major Street:	S Holcomb Boulevard	Minor Street:	S Winston Drive
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	814	PM Peak Hour Volumes:	61

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	8,140	8,850	
Minor Street*	610	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	8,140	13,300	
Minor Street*	610	1,350	**No**
Combination Warrant			
Major Street	8,140	10,640	
Minor Street*	610	2,120	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: Park Place Master Plan
Date: 11/30/2021
Scenario: 2030 Buildout Conditions with Lot 200 (without S Holly Lane connection)

Major Street:	S Holcomb Boulevard	Minor Street:	S Barlow Drive
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	573	PM Peak Hour Volumes:	31

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	5,730	8,850	
Minor Street*	310	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	5,730	13,300	
Minor Street*	310	1,350	**No**
Combination Warrant			
Major Street	5,730	10,640	
Minor Street*	310	2,120	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: Park Place Master Plan
Date: 11/30/2021
Scenario: 2030 Buildout Conditions with Lot 200 (with S Holly Lane connection)

Major Street:	S Holcomb Boulevard	Minor Street:	S Barlow Drive
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	640	PM Peak Hour Volumes:	120

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	6,400	8,850	
Minor Street*	1,200	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	6,400	13,300	
Minor Street*	1,200	1,350	**No**
Combination Warrant			
Major Street	6,400	10,640	
Minor Street*	1,200	2,120	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: Park Place Master Plan
Date: 11/30/2021
Scenario: 2030 Buildout Conditions with Lot 200 (without S Holly Lane connection)

Major Street:	S Holcomb Boulevard	Minor Street:	Street A
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	502	PM Peak Hour Volumes:	43

Warrant Used:

X 100 percent of standard warrants used

_____ 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	5,020	8,850	
Minor Street*	430	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	5,020	13,300	
Minor Street*	430	1,350	**No**
Combination Warrant			
Major Street	5,020	10,640	
Minor Street*	430	2,120	**No**

Note: Minor street right-turning traffic volumes reduced by 25%.

Appendix F

Level of Service Descriptions

Capacity Reports

Queuing Reports

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	115	23	0	167	0	40	1	0	1	0	16
Future Vol, veh/h	4	115	23	0	167	0	40	1	0	1	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	4	129	26	0	188	0	45	1	0	1	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	188	0	0	155	0	0	349	338	144	341	351	190
Stage 1	-	-	-	-	-	-	150	150	-	188	188	-
Stage 2	-	-	-	-	-	-	199	188	-	153	163	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1368	-	-	1407	-	-	609	586	909	617	577	857
Stage 1	-	-	-	-	-	-	857	777	-	818	748	-
Stage 2	-	-	-	-	-	-	807	748	-	854	767	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1368	-	-	1407	-	-	594	584	907	613	575	855
Mov Cap-2 Maneuver	-	-	-	-	-	-	594	584	-	613	575	-
Stage 1	-	-	-	-	-	-	854	775	-	816	748	-
Stage 2	-	-	-	-	-	-	789	748	-	849	765	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	11.6	9.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	594	1368	-	-	1407	-	-	836
HCM Lane V/C Ratio	0.078	0.003	-	-	-	-	-	0.023
HCM Control Delay (s)	11.6	7.6	0	-	0	-	-	9.4
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	109	152	1	1	17
Future Vol, veh/h	10	109	152	1	1	17
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	13	138	192	1	1	22

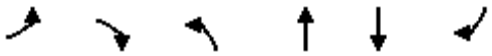
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	195	0	-	0	361	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	166	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1349	-	-	-	642	851
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	868	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1346	-	-	-	633	849
Mov Cap-2 Maneuver	-	-	-	-	633	-
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	866	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1346	-	-	-	833
HCM Lane V/C Ratio	0.009	-	-	-	0.027
HCM Control Delay (s)	7.7	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	548	83	81	1878	1219	400
Future Volume (veh/h)	548	83	81	1878	1219	400
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	609	71	90	2087	1354	397
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	826	491	126	2257	1792	1169
Arrive On Green	0.24	0.24	0.07	0.65	0.52	0.52
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	609	71	90	2087	1354	397
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	12.4	2.4	3.8	39.6	23.4	6.1
Cycle Q Clear(g_c), s	12.4	2.4	3.8	39.6	23.4	6.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	826	491	126	2257	1792	1169
V/C Ratio(X)	0.74	0.14	0.72	0.92	0.76	0.34
Avail Cap(c_a), veh/h	826	491	155	2313	1792	1169
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	18.4	34.0	11.5	14.0	2.7
Incr Delay (d2), s/veh	5.0	0.5	11.4	6.9	1.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	2.6	1.9	10.8	7.1	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.2	19.0	45.4	18.4	15.9	2.9
LnGrp LOS	C	B	D	B	B	A
Approach Vol, veh/h	680			2177	1751	
Approach Delay, s/veh	29.9			19.5	13.0	
Approach LOS	C			B	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	22.2	52.8	9.4	43.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	49.5	6.2	38.8
Max Q Clear Time (g_c+I1), s	14.4	41.6	5.8	25.4
Green Ext Time (p_c), s	0.6	6.7	0.0	8.1

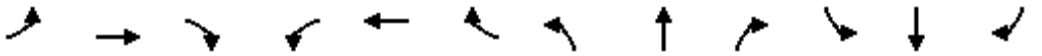
Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	64	52	34	114	223	150	365	23	129	306	45
Future Volume (veh/h)	37	64	52	34	114	223	150	365	23	129	306	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	41	71	7	38	127	32	167	406	22	143	340	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	81	172	17	82	200	167	224	813	44	194	819	694
Arrive On Green	0.05	0.11	0.10	0.05	0.11	0.11	0.13	0.46	0.45	0.11	0.45	0.00
Sat Flow, veh/h	1640	1538	152	1739	1826	1526	1781	1758	95	1739	1826	1547
Grp Volume(v), veh/h	41	0	78	38	127	32	167	0	428	143	340	0
Grp Sat Flow(s),veh/h/ln	1640	0	1690	1739	1826	1526	1781	0	1853	1739	1826	1547
Q Serve(g_s), s	1.5	0.0	2.6	1.3	4.0	1.1	5.4	0.0	9.7	4.8	7.6	0.0
Cycle Q Clear(g_c), s	1.5	0.0	2.6	1.3	4.0	1.1	5.4	0.0	9.7	4.8	7.6	0.0
Prop In Lane	1.00		0.09	1.00		1.00	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	81	0	189	82	200	167	224	0	857	194	819	694
V/C Ratio(X)	0.50	0.00	0.41	0.46	0.63	0.19	0.75	0.00	0.50	0.74	0.42	0.00
Avail Cap(c_a), veh/h	150	0	251	162	274	229	297	0	857	261	819	694
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.93	0.93	0.00
Uniform Delay (d), s/veh	27.8	0.0	24.8	27.8	25.6	24.3	25.3	0.0	11.3	25.8	11.2	0.0
Incr Delay (d2), s/veh	4.8	0.0	1.4	4.0	3.3	0.5	7.0	0.0	2.1	6.7	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	1.0	0.6	1.8	0.4	2.5	0.0	3.5	2.1	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.6	0.0	26.3	31.8	28.9	24.8	32.3	0.0	13.4	32.4	12.7	0.0
LnGrp LOS	C	A	C	C	C	C	C	A	B	C	B	A
Approach Vol, veh/h		119			197			595			483	
Approach Delay, s/veh		28.4			28.8			18.7			18.5	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	31.7	6.8	10.7	11.5	30.9	7.0	10.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.5	20.0	5.1	8.4	9.5	19.0	5.0	8.5
Max Q Clear Time (g_c+I1), s	6.8	11.7	3.3	4.6	7.4	9.6	3.5	6.0
Green Ext Time (p_c), s	0.1	1.5	0.0	0.1	0.1	1.2	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	20.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	11	193	42	3	143	0	32	0	2	2	0	10
Future Vol, veh/h	11	193	42	3	143	0	32	0	2	2	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	12	205	45	3	152	0	34	0	2	2	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	250	0	0	416	410	228	411	432	152
Stage 1	-	-	-	-	-	-	252	252	-	158	158	-
Stage 2	-	-	-	-	-	-	164	158	-	253	274	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1429	-	-	1321	-	-	540	525	801	555	519	900
Stage 1	-	-	-	-	-	-	743	691	-	849	771	-
Stage 2	-	-	-	-	-	-	829	759	-	756	687	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1429	-	-	1321	-	-	529	519	801	548	513	900
Mov Cap-2 Maneuver	-	-	-	-	-	-	529	519	-	548	513	-
Stage 1	-	-	-	-	-	-	736	684	-	841	769	-
Stage 2	-	-	-	-	-	-	818	757	-	746	680	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	12.1	9.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	540	1429	-	-	1321	-	-	813
HCM Lane V/C Ratio	0.067	0.008	-	-	0.002	-	-	0.016
HCM Control Delay (s)	12.1	7.5	0	-	7.7	0	-	9.5
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	33	167	125	5	3	22
Future Vol, veh/h	33	167	125	5	3	22
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	39	199	149	6	4	26

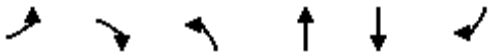
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	155	0	-	0	429	153
Stage 1	-	-	-	-	152	-
Stage 2	-	-	-	-	277	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1425	-	-	-	587	898
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	774	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1425	-	-	-	569	897
Mov Cap-2 Maneuver	-	-	-	-	569	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	774	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1425	-	-	-	839
HCM Lane V/C Ratio	0.028	-	-	-	0.035
HCM Control Delay (s)	7.6	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	435	154	129	1547	2377	772
Future Volume (veh/h)	435	154	129	1547	2377	772
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	448	154	133	1595	2451	783
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	504	357	141	2799	2399	1278
Arrive On Green	0.05	0.05	0.08	0.79	0.68	0.68
Sat Flow, veh/h	3456	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	448	154	133	1595	2451	783
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1552
Q Serve(g_s), s	15.5	10.4	8.9	20.8	81.0	21.9
Cycle Q Clear(g_c), s	15.5	10.4	8.9	20.8	81.0	21.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	504	357	141	2799	2399	1278
V/C Ratio(X)	0.89	0.43	0.94	0.57	1.02	0.61
Avail Cap(c_a), veh/h	504	357	141	2799	2399	1278
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	44.7	55.0	4.9	19.5	3.9
Incr Delay (d2), s/veh	17.6	3.1	58.6	0.3	24.1	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	9.9	6.1	4.5	33.2	11.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	73.7	47.8	113.6	5.2	43.6	4.8
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	602			1728	3234	
Approach Delay, s/veh	67.1			13.5	34.2	
Approach LOS	E			B	C	

Timer - Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		21.5		98.5			13.5	85.0
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		17.0		94.0			9.0	80.5
Max Q Clear Time (g_c+I1), s		17.5		22.8			10.9	83.0
Green Ext Time (p_c), s		0.0		16.9			0.0	0.0

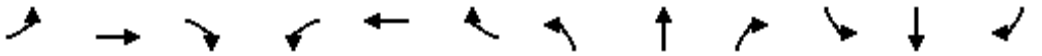
Intersection Summary	
HCM 6th Ctrl Delay	31.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	152	168	53	108	206	78	326	78	298	564	78
Future Volume (veh/h)	59	152	168	53	108	206	78	326	78	298	564	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	61	158	142	55	112	45	81	340	74	310	588	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	86	178	160	78	366	310	110	630	137	352	1060	899
Arrive On Green	0.05	0.20	0.19	0.04	0.19	0.19	0.06	0.43	0.42	0.06	0.19	0.19
Sat Flow, veh/h	1781	896	806	1795	1885	1598	1767	1470	320	1795	1885	1598
Grp Volume(v), veh/h	61	0	300	55	112	45	81	0	414	310	588	32
Grp Sat Flow(s),veh/h/ln	1781	0	1702	1795	1885	1598	1767	0	1790	1795	1885	1598
Q Serve(g_s), s	4.1	0.0	20.6	3.6	6.1	2.8	5.4	0.0	20.6	20.6	34.0	2.0
Cycle Q Clear(g_c), s	4.1	0.0	20.6	3.6	6.1	2.8	5.4	0.0	20.6	20.6	34.0	2.0
Prop In Lane	1.00		0.47	1.00		1.00	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	86	0	338	78	366	310	110	0	767	352	1060	899
V/C Ratio(X)	0.71	0.00	0.89	0.70	0.31	0.15	0.74	0.00	0.54	0.88	0.55	0.04
Avail Cap(c_a), veh/h	145	0	397	105	396	335	175	0	767	434	1060	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.70	0.70	0.70
Uniform Delay (d), s/veh	56.3	0.0	46.9	56.6	41.4	40.1	55.3	0.0	25.5	54.7	35.2	22.2
Incr Delay (d2), s/veh	10.3	0.0	18.9	12.7	0.5	0.2	9.3	0.0	2.7	12.0	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	10.4	1.9	2.9	1.1	2.6	0.0	8.9	11.0	17.5	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.6	0.0	65.8	69.3	41.9	40.3	64.6	0.0	28.2	66.7	36.7	22.2
LnGrp LOS	E	A	E	E	D	D	E	A	C	E	D	C
Approach Vol, veh/h		361			212			495			930	
Approach Delay, s/veh		65.9			48.7			34.2			46.2	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.5	55.4	9.2	27.8	11.5	71.5	9.8	27.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	28.5	39.5	6.5	27.5	11.4	56.6	9.3	24.7
Max Q Clear Time (g_c+I1), s	22.6	22.6	5.6	22.6	7.4	36.0	6.1	8.1
Green Ext Time (p_c), s	0.5	2.1	0.0	0.7	0.0	3.5	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	47.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	134	24	0	188	0	42	1	0	1	0	17
Future Vol, veh/h	4	134	24	0	188	0	42	1	0	1	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	4	151	27	0	211	0	47	1	0	1	0	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	211	0	0	178	0	0	396	384	167	386	397	213
Stage 1	-	-	-	-	-	-	173	173	-	211	211	-
Stage 2	-	-	-	-	-	-	223	211	-	175	186	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1342	-	-	1380	-	-	568	553	882	576	544	832
Stage 1	-	-	-	-	-	-	834	760	-	796	731	-
Stage 2	-	-	-	-	-	-	784	731	-	832	750	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1342	-	-	1380	-	-	553	551	880	573	542	830
Mov Cap-2 Maneuver	-	-	-	-	-	-	553	551	-	573	542	-
Stage 1	-	-	-	-	-	-	831	758	-	794	731	-
Stage 2	-	-	-	-	-	-	764	731	-	827	748	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	12.1	9.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	553	1342	-	-	1380	-	-	810
HCM Lane V/C Ratio	0.087	0.003	-	-	-	-	-	0.025
HCM Control Delay (s)	12.1	7.7	0	-	0	-	-	9.6
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	123	161	2	3	29
Future Vol, veh/h	14	123	161	2	3	29
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	18	156	204	3	4	37

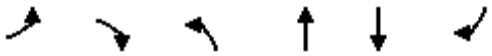
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	209	0	-	0	402	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1333	-	-	-	608	837
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	844	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1330	-	-	-	596	835
Mov Cap-2 Maneuver	-	-	-	-	596	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	842	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1330	-	-	-	805
HCM Lane V/C Ratio	0.013	-	-	-	0.05
HCM Control Delay (s)	7.7	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	598	97	94	1900	1238	426
Future Volume (veh/h)	598	97	94	1900	1238	426
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	664	91	104	2111	1376	427
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	844	515	143	2238	1740	1154
Arrive On Green	0.25	0.25	0.08	0.65	0.51	0.51
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	664	91	104	2111	1376	427
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	13.7	3.1	4.4	41.4	24.8	7.1
Cycle Q Clear(g_c), s	13.7	3.1	4.4	41.4	24.8	7.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	844	515	143	2238	1740	1154
V/C Ratio(X)	0.79	0.18	0.73	0.94	0.79	0.37
Avail Cap(c_a), veh/h	844	515	169	2267	1740	1154
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	17.9	33.6	12.1	15.1	3.1
Incr Delay (d2), s/veh	6.0	0.6	12.2	8.8	2.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	3.2	2.2	12.0	7.8	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.3	18.5	45.8	20.9	17.7	3.3
LnGrp LOS	C	B	D	C	B	A
Approach Vol, veh/h	755			2215	1803	
Approach Delay, s/veh	30.7			22.1	14.2	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	22.6	52.4	10.2	42.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	48.5	6.8	37.2
Max Q Clear Time (g_c+I1), s	15.7	43.4	6.4	26.8
Green Ext Time (p_c), s	0.6	4.5	0.0	6.9

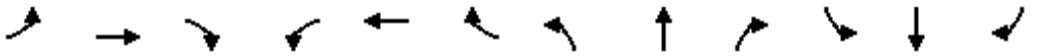
Intersection Summary	
HCM 6th Ctrl Delay	20.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	76	61	38	144	265	165	369	25	144	313	69
Future Volume (veh/h)	64	76	61	38	144	265	165	369	25	144	313	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	71	84	19	42	160	33	183	410	24	160	348	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	108	192	43	87	230	192	241	732	43	213	741	628
Arrive On Green	0.07	0.14	0.13	0.05	0.13	0.13	0.14	0.42	0.41	0.12	0.41	0.00
Sat Flow, veh/h	1640	1352	306	1739	1826	1526	1781	1750	102	1739	1826	1547
Grp Volume(v), veh/h	71	0	103	42	160	33	183	0	434	160	348	0
Grp Sat Flow(s),veh/h/ln	1640	0	1658	1739	1826	1526	1781	0	1852	1739	1826	1547
Q Serve(g_s), s	2.5	0.0	3.4	1.4	5.0	1.2	5.9	0.0	10.7	5.3	8.4	0.0
Cycle Q Clear(g_c), s	2.5	0.0	3.4	1.4	5.0	1.2	5.9	0.0	10.7	5.3	8.4	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	108	0	235	87	230	192	241	0	775	213	741	628
V/C Ratio(X)	0.65	0.00	0.44	0.48	0.70	0.17	0.76	0.00	0.56	0.75	0.47	0.00
Avail Cap(c_a), veh/h	164	0	235	162	243	203	297	0	775	261	741	628
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	27.3	0.0	23.6	27.7	25.1	23.4	25.0	0.0	13.3	25.4	13.1	0.0
Incr Delay (d2), s/veh	6.5	0.0	1.3	4.0	7.9	0.4	8.6	0.0	2.9	8.4	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.3	0.6	2.5	0.4	2.8	0.0	4.1	2.4	3.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	0.0	24.9	31.8	33.0	23.8	33.6	0.0	16.2	33.8	15.0	0.0
LnGrp LOS	C	A	C	C	C	C	C	A	B	C	B	A
Approach Vol, veh/h		174			235			617			508	
Approach Delay, s/veh		28.6			31.5			21.3			21.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	29.1	7.0	12.5	12.1	28.3	8.0	11.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.5	20.5	5.1	7.9	9.5	19.5	5.5	7.5
Max Q Clear Time (g_c+I1), s	7.3	12.7	3.4	5.4	7.9	10.4	4.5	7.0
Green Ext Time (p_c), s	0.0	1.5	0.0	0.1	0.1	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	11	221	44	3	166	0	33	0	2	2	0	10
Future Vol, veh/h	11	221	44	3	166	0	33	0	2	2	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	12	235	47	3	177	0	35	0	2	2	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	177	0	0	282	0	0	472	466	259	467	489	177
Stage 1	-	-	-	-	-	-	283	283	-	183	183	-
Stage 2	-	-	-	-	-	-	189	183	-	284	306	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1399	-	-	1286	-	-	496	488	770	509	482	871
Stage 1	-	-	-	-	-	-	715	670	-	823	752	-
Stage 2	-	-	-	-	-	-	804	741	-	727	665	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1399	-	-	1286	-	-	485	482	770	502	476	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	485	482	-	502	476	-
Stage 1	-	-	-	-	-	-	708	663	-	815	750	-
Stage 2	-	-	-	-	-	-	792	739	-	718	658	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	12.9	9.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	495	1399	-	-	1286	-	-	776
HCM Lane V/C Ratio	0.075	0.008	-	-	0.002	-	-	0.016
HCM Control Delay (s)	12.9	7.6	0	-	7.8	0	-	9.7
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	181	140	8	5	30
Future Vol, veh/h	47	181	140	8	5	30
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	56	215	167	10	6	36

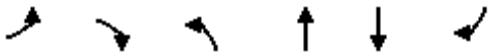
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	177	0	-	0	499	173
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	327	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1399	-	-	-	535	876
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	735	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1399	-	-	-	511	875
Mov Cap-2 Maneuver	-	-	-	-	511	-
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	735	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1399	-	-	-	794
HCM Lane V/C Ratio	0.04	-	-	-	0.052
HCM Control Delay (s)	7.7	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	511	170	158	1565	2412	854
Future Volume (veh/h)	511	170	158	1565	2412	854
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	527	172	163	1613	2487	867
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	547	396	163	2754	2310	1259
Arrive On Green	0.05	0.05	0.09	0.77	0.65	0.65
Sat Flow, veh/h	3456	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	527	172	163	1613	2487	867
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1552
Q Serve(g_s), s	18.3	11.4	11.0	22.4	78.0	29.1
Cycle Q Clear(g_c), s	18.3	11.4	11.0	22.4	78.0	29.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	547	396	163	2754	2310	1259
V/C Ratio(X)	0.96	0.43	1.00	0.59	1.08	0.69
Avail Cap(c_a), veh/h	547	396	163	2754	2310	1259
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	42.8	54.5	5.6	21.0	5.0
Incr Delay (d2), s/veh	25.2	2.6	69.9	0.3	43.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	10.9	7.9	5.3	39.1	15.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	81.8	45.4	124.4	5.9	64.2	6.6
LnGrp LOS	F	D	F	A	F	A
Approach Vol, veh/h	699			1776	3354	
Approach Delay, s/veh	72.8			16.8	49.3	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.0	97.0	15.0	82.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	92.5	10.5	77.5
Max Q Clear Time (g_c+I1), s	20.3	24.4	13.0	80.0
Green Ext Time (p_c), s	0.0	17.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	42.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	185	186	56	140	227	107	320	83	348	577	142
Future Volume (veh/h)	145	185	186	56	140	227	107	320	83	348	577	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	151	193	164	58	146	34	111	333	79	362	601	71
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	186	211	179	82	320	271	143	531	126	404	965	817
Arrive On Green	0.10	0.23	0.22	0.05	0.17	0.17	0.08	0.37	0.36	0.07	0.17	0.17
Sat Flow, veh/h	1781	923	784	1795	1885	1598	1767	1443	342	1795	1885	1598
Grp Volume(v), veh/h	151	0	357	58	146	34	111	0	412	362	601	71
Grp Sat Flow(s),veh/h/ln	1781	0	1707	1795	1885	1598	1767	0	1785	1795	1885	1598
Q Serve(g_s), s	10.0	0.0	24.5	3.8	8.4	2.2	7.4	0.0	22.8	24.0	35.5	4.5
Cycle Q Clear(g_c), s	10.0	0.0	24.5	3.8	8.4	2.2	7.4	0.0	22.8	24.0	35.5	4.5
Prop In Lane	1.00		0.46	1.00		1.00	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	186	0	390	82	320	271	143	0	656	404	965	817
V/C Ratio(X)	0.81	0.00	0.92	0.71	0.46	0.13	0.78	0.00	0.63	0.90	0.62	0.09
Avail Cap(c_a), veh/h	273	0	413	105	320	271	177	0	656	464	965	817
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.60	0.60	0.60
Uniform Delay (d), s/veh	52.6	0.0	45.3	56.5	44.8	42.3	54.1	0.0	31.2	54.2	39.1	26.2
Incr Delay (d2), s/veh	11.0	0.0	24.1	14.3	1.0	0.2	15.8	0.0	4.5	12.1	1.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	12.8	2.0	4.0	0.9	3.8	0.0	10.2	12.9	18.3	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.5	0.0	69.4	70.8	45.9	42.5	69.9	0.0	35.7	66.3	41.0	26.4
LnGrp LOS	E	A	E	E	D	D	E	A	D	E	D	C
Approach Vol, veh/h		508			238			523			1034	
Approach Delay, s/veh		67.6			51.5			43.0			48.8	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.0	48.1	9.5	31.4	13.7	65.4	16.5	24.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	30.5	36.5	6.5	28.5	11.5	55.5	17.9	17.1
Max Q Clear Time (g_c+I1), s	26.0	24.8	5.8	26.5	9.4	37.5	12.0	10.4
Green Ext Time (p_c), s	0.5	1.8	0.0	0.4	0.0	3.6	0.2	0.4

Intersection Summary	
HCM 6th Ctrl Delay	51.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	144	24	0	216	0	42	1	0	1	0	17
Future Vol, veh/h	4	144	24	0	216	0	42	1	0	1	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	4	162	27	0	243	0	47	1	0	1	0	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	243	0	0	189	0	0	439	427	178	429	440	245
Stage 1	-	-	-	-	-	-	184	184	-	243	243	-
Stage 2	-	-	-	-	-	-	255	243	-	186	197	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1306	-	-	1367	-	-	532	523	870	540	514	799
Stage 1	-	-	-	-	-	-	822	751	-	765	708	-
Stage 2	-	-	-	-	-	-	754	708	-	820	742	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1306	-	-	1367	-	-	517	521	868	537	512	797
Mov Cap-2 Maneuver	-	-	-	-	-	-	517	521	-	537	512	-
Stage 1	-	-	-	-	-	-	820	749	-	763	708	-
Stage 2	-	-	-	-	-	-	735	708	-	815	740	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	12.7	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	517	1306	-	-	1367	-	-	776
HCM Lane V/C Ratio	0.093	0.003	-	-	-	-	-	0.026
HCM Control Delay (s)	12.7	7.8	0	-	0	-	-	9.8
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	133	189	2	3	29
Future Vol, veh/h	14	133	189	2	3	29
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	18	168	239	3	4	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	244	0	-	0	449	243
Stage 1	-	-	-	-	243	-
Stage 2	-	-	-	-	206	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1293	-	-	-	571	801
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	833	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1291	-	-	-	560	799
Mov Cap-2 Maneuver	-	-	-	-	560	-
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	831	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1291	-	-	-	768
HCM Lane V/C Ratio	0.014	-	-	-	0.053
HCM Control Delay (s)	7.8	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	126	10	2	164	28	6
Future Vol, veh/h	126	10	2	164	28	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	159	13	3	208	35	8

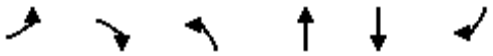
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	172	0	380	166
Stage 1	-	-	-	-	166	-
Stage 2	-	-	-	-	214	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1381	-	622	878
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	822	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1381	-	621	878
Mov Cap-2 Maneuver	-	-	-	-	621	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	820	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	655	-	-	1381	-
HCM Lane V/C Ratio	0.066	-	-	0.002	-
HCM Control Delay (s)	10.9	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	611	100	95	1900	1238	431
Future Volume (veh/h)	611	100	95	1900	1238	431
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	679	95	106	2111	1376	433
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	844	517	145	2238	1735	1152
Arrive On Green	0.25	0.25	0.08	0.65	0.51	0.51
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	679	95	106	2111	1376	433
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	14.1	3.3	4.5	41.4	24.9	7.3
Cycle Q Clear(g_c), s	14.1	3.3	4.5	41.4	24.9	7.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	844	517	145	2238	1735	1152
V/C Ratio(X)	0.80	0.18	0.73	0.94	0.79	0.38
Avail Cap(c_a), veh/h	844	517	172	2267	1735	1152
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	17.8	33.5	12.1	15.2	3.1
Incr Delay (d2), s/veh	6.4	0.6	12.2	8.8	2.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	3.4	2.2	12.0	7.8	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.9	18.4	45.8	20.9	17.8	3.3
LnGrp LOS	C	B	D	C	B	A
Approach Vol, veh/h	774			2217	1809	
Approach Delay, s/veh	31.1			22.1	14.3	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	22.6	52.4	10.3	42.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	48.5	6.9	37.1
Max Q Clear Time (g_c+I1), s	16.1	43.4	6.5	26.9
Green Ext Time (p_c), s	0.5	4.5	0.0	6.8

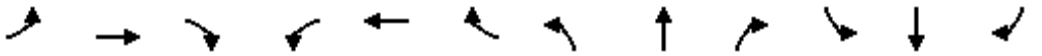
Intersection Summary	
HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	79	61	39	153	281	165	369	25	150	313	69
Future Volume (veh/h)	64	79	61	39	153	281	165	369	25	150	313	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	71	88	20	43	170	34	183	410	24	167	348	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	108	197	45	89	239	200	241	716	42	221	732	620
Arrive On Green	0.07	0.15	0.14	0.05	0.13	0.13	0.14	0.41	0.40	0.13	0.40	0.00
Sat Flow, veh/h	1640	1351	307	1739	1826	1526	1781	1750	102	1739	1826	1547
Grp Volume(v), veh/h	71	0	108	43	170	34	183	0	434	167	348	0
Grp Sat Flow(s),veh/h/ln	1640	0	1657	1739	1826	1526	1781	0	1852	1739	1826	1547
Q Serve(g_s), s	2.5	0.0	3.6	1.4	5.4	1.2	5.9	0.0	10.9	5.6	8.5	0.0
Cycle Q Clear(g_c), s	2.5	0.0	3.6	1.4	5.4	1.2	5.9	0.0	10.9	5.6	8.5	0.0
Prop In Lane	1.00		0.19	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	108	0	242	89	239	200	241	0	758	221	732	620
V/C Ratio(X)	0.65	0.00	0.45	0.49	0.71	0.17	0.76	0.00	0.57	0.75	0.48	0.00
Avail Cap(c_a), veh/h	164	0	242	162	243	203	297	0	758	261	732	620
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	27.3	0.0	23.4	27.7	25.0	23.2	25.0	0.0	13.7	25.3	13.3	0.0
Incr Delay (d2), s/veh	6.5	0.0	1.3	4.1	9.2	0.4	8.6	0.0	3.1	9.2	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.4	0.7	2.7	0.4	2.8	0.0	4.2	2.6	3.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	0.0	24.7	31.8	34.2	23.6	33.6	0.0	16.8	34.5	15.3	0.0
LnGrp LOS	C	A	C	C	C	C	C	A	B	C	B	A
Approach Vol, veh/h		179			247			617			515	
Approach Delay, s/veh		28.4			32.3			21.8			21.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	28.6	7.1	12.8	12.1	28.1	8.0	11.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.5	20.5	5.1	7.9	9.5	19.5	5.5	7.5
Max Q Clear Time (g_c+I1), s	7.6	12.9	3.4	5.6	7.9	10.5	4.5	7.4
Green Ext Time (p_c), s	0.0	1.4	0.0	0.1	0.1	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	11	252	44	3	185	0	33	0	2	2	0	10
Future Vol, veh/h	11	252	44	3	185	0	33	0	2	2	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	12	268	47	3	197	0	35	0	2	2	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	197	0	0	315	0	0	525	519	292	520	542	197
Stage 1	-	-	-	-	-	-	316	316	-	203	203	-
Stage 2	-	-	-	-	-	-	209	203	-	317	339	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1376	-	-	1251	-	-	457	455	738	470	450	849
Stage 1	-	-	-	-	-	-	687	648	-	804	737	-
Stage 2	-	-	-	-	-	-	784	726	-	698	643	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1376	-	-	1251	-	-	446	449	738	463	444	849
Mov Cap-2 Maneuver	-	-	-	-	-	-	446	449	-	463	444	-
Stage 1	-	-	-	-	-	-	679	641	-	795	735	-
Stage 2	-	-	-	-	-	-	772	724	-	688	636	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	13.6	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	456	1376	-	-	1251	-	-	745
HCM Lane V/C Ratio	0.082	0.009	-	-	0.003	-	-	0.017
HCM Control Delay (s)	13.6	7.6	0	-	7.9	0	-	9.9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	212	159	8	5	30
Future Vol, veh/h	47	212	159	8	5	30
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	56	252	189	10	6	36

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	199	0	-	0	558	195
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	364	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1373	-	-	-	494	851
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1373	-	-	-	471	850
Mov Cap-2 Maneuver	-	-	-	-	471	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1373	-	-	-	762
HCM Lane V/C Ratio	0.041	-	-	-	0.055
HCM Control Delay (s)	7.7	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	186	31	7	148	19	4
Future Vol, veh/h	186	31	7	148	19	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	221	37	8	176	23	5

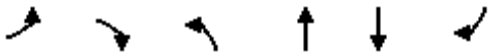
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	258	0	432	240
Stage 1	-	-	-	-	240	-
Stage 2	-	-	-	-	192	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1313	-	581	799
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1313	-	577	799
Mov Cap-2 Maneuver	-	-	-	-	577	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	835	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	606	-	-	1313	-
HCM Lane V/C Ratio	0.045	-	-	0.006	-
HCM Control Delay (s)	11.2	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	520	172	161	1565	2412	869
Future Volume (veh/h)	520	172	161	1565	2412	869
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	536	174	166	1613	2487	884
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	576	409	163	2724	2280	1260
Arrive On Green	0.06	0.06	0.09	0.77	0.64	0.64
Sat Flow, veh/h	3456	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	536	174	166	1613	2487	884
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1552
Q Serve(g_s), s	18.5	11.5	11.0	23.3	77.0	30.5
Cycle Q Clear(g_c), s	18.5	11.5	11.0	23.3	77.0	30.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	576	409	163	2724	2280	1260
V/C Ratio(X)	0.93	0.42	1.02	0.59	1.09	0.70
Avail Cap(c_a), veh/h	576	409	163	2724	2280	1260
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.0	42.3	54.5	6.0	21.5	5.1
Incr Delay (d2), s/veh	18.8	2.3	74.9	0.3	48.7	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	10.9	8.1	5.7	40.7	16.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	74.8	44.6	129.4	6.3	70.2	6.9
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	710			1779	3371	
Approach Delay, s/veh	67.4			17.8	53.6	
Approach LOS	E			B	D	

Timer - Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		24.0		96.0			15.0	81.0
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		19.5		91.5			10.5	76.5
Max Q Clear Time (g_c+I1), s		20.5		25.3			13.0	79.0
Green Ext Time (p_c), s		0.0		17.1			0.0	0.0

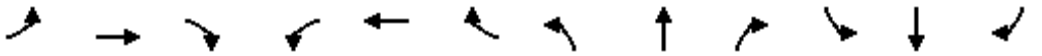
Intersection Summary	
HCM 6th Ctrl Delay	44.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	194	186	57	146	238	107	320	85	366	577	142
Future Volume (veh/h)	145	194	186	57	146	238	107	320	85	366	577	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	151	202	166	59	152	38	111	333	82	381	601	71
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	186	220	181	83	333	282	143	501	123	422	951	806
Arrive On Green	0.10	0.23	0.23	0.05	0.18	0.18	0.08	0.35	0.35	0.08	0.17	0.17
Sat Flow, veh/h	1781	939	771	1795	1885	1598	1767	1431	352	1795	1885	1598
Grp Volume(v), veh/h	151	0	368	59	152	38	111	0	415	381	601	71
Grp Sat Flow(s),veh/h/ln	1781	0	1710	1795	1885	1598	1767	0	1783	1795	1885	1598
Q Serve(g_s), s	10.0	0.0	25.2	3.9	8.7	2.4	7.4	0.0	23.7	25.3	35.6	4.5
Cycle Q Clear(g_c), s	10.0	0.0	25.2	3.9	8.7	2.4	7.4	0.0	23.7	25.3	35.6	4.5
Prop In Lane	1.00		0.45	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	186	0	402	83	333	282	143	0	625	422	951	806
V/C Ratio(X)	0.81	0.00	0.92	0.71	0.46	0.13	0.78	0.00	0.66	0.90	0.63	0.09
Avail Cap(c_a), veh/h	273	0	427	102	333	282	168	0	625	470	951	806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.58	0.58	0.58
Uniform Delay (d), s/veh	52.6	0.0	44.9	56.4	44.2	41.7	54.1	0.0	33.0	54.0	39.6	26.7
Incr Delay (d2), s/veh	11.0	0.0	23.6	16.0	1.0	0.2	17.6	0.0	5.5	12.6	1.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	13.2	2.1	4.1	1.0	3.9	0.0	10.8	13.6	18.4	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.5	0.0	68.4	72.4	45.2	41.9	71.7	0.0	38.5	66.6	41.5	26.8
LnGrp LOS	E	A	E	E	D	D	E	A	D	E	D	C
Approach Vol, veh/h		519			249			526			1053	
Approach Delay, s/veh		67.0			51.1			45.5			49.6	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.2	46.0	9.6	32.2	13.7	64.5	16.5	25.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	30.9	35.3	6.3	29.5	10.9	55.3	17.9	17.9
Max Q Clear Time (g_c+I1), s	27.3	25.7	5.9	27.2	9.4	37.6	12.0	10.7
Green Ext Time (p_c), s	0.4	1.6	0.0	0.5	0.0	3.6	0.2	0.5

Intersection Summary	
HCM 6th Ctrl Delay	52.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	151	25	0	226	0	44	1	0	1	0	18
Future Vol, veh/h	4	151	25	0	226	0	44	1	0	1	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	4	170	28	0	254	0	49	1	0	1	0	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	254	0	0	198	0	0	458	446	186	449	460	256
Stage 1	-	-	-	-	-	-	192	192	-	254	254	-
Stage 2	-	-	-	-	-	-	266	254	-	195	206	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1294	-	-	1357	-	-	516	510	861	524	501	788
Stage 1	-	-	-	-	-	-	814	745	-	755	701	-
Stage 2	-	-	-	-	-	-	744	701	-	811	735	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1294	-	-	1357	-	-	501	508	859	521	499	786
Mov Cap-2 Maneuver	-	-	-	-	-	-	501	508	-	521	499	-
Stage 1	-	-	-	-	-	-	812	743	-	753	701	-
Stage 2	-	-	-	-	-	-	723	701	-	806	733	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	13	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	501	1294	-	-	1357	-	-	766
HCM Lane V/C Ratio	0.101	0.003	-	-	-	-	-	0.028
HCM Control Delay (s)	13	7.8	0	-	0	-	-	9.8
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	140	199	2	3	30
Future Vol, veh/h	15	140	199	2	3	30
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	19	177	252	3	4	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	257	0	-	0	473	256
Stage 1	-	-	-	-	256	-
Stage 2	-	-	-	-	217	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1279	-	-	-	553	788
Stage 1	-	-	-	-	791	-
Stage 2	-	-	-	-	824	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1277	-	-	-	541	786
Mov Cap-2 Maneuver	-	-	-	-	541	-
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	822	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1277	-	-	-	755
HCM Lane V/C Ratio	0.015	-	-	-	0.055
HCM Control Delay (s)	7.9	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	133	10	2	174	28	6
Future Vol, veh/h	133	10	2	174	28	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	168	13	3	220	35	8

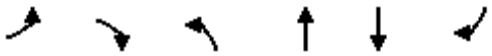
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	181	0	401	175
Stage 1	-	-	-	-	175	-
Stage 2	-	-	-	-	226	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1371	-	605	868
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1371	-	604	868
Mov Cap-2 Maneuver	-	-	-	-	604	-
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	810	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	638	-	-	1371	-
HCM Lane V/C Ratio	0.067	-	-	0.002	-
HCM Control Delay (s)	11.1	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	616	100	95	1917	1249	435
Future Volume (veh/h)	616	100	95	1917	1249	435
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	684	95	106	2130	1388	437
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	838	514	145	2245	1741	1152
Arrive On Green	0.25	0.25	0.08	0.65	0.51	0.51
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	684	95	106	2130	1388	437
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	14.2	3.3	4.5	42.1	25.2	7.4
Cycle Q Clear(g_c), s	14.2	3.3	4.5	42.1	25.2	7.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	838	514	145	2245	1741	1152
V/C Ratio(X)	0.82	0.18	0.73	0.95	0.80	0.38
Avail Cap(c_a), veh/h	838	514	172	2267	1741	1152
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	17.9	33.5	12.1	15.2	3.1
Incr Delay (d2), s/veh	7.0	0.6	12.2	9.5	2.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	3.4	2.2	12.2	7.9	3.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.6	18.6	45.8	21.6	17.9	3.3
LnGrp LOS	C	B	D	C	B	A
Approach Vol, veh/h	779			2236	1825	
Approach Delay, s/veh	31.8			22.8	14.4	
Approach LOS	C			C	B	

Timer - Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		22.5		52.5			10.3	42.3
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		17.5		48.5			6.9	37.1
Max Q Clear Time (g_c+I1), s		16.2		44.1			6.5	27.2
Green Ext Time (p_c), s		0.5		3.9			0.0	6.7

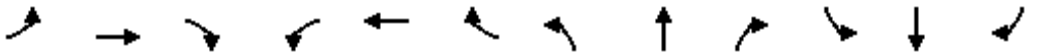
Intersection Summary	
HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	82	63	40	157	289	171	382	25	154	324	71
Future Volume (veh/h)	65	82	63	40	157	289	171	382	25	154	324	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	72	91	23	44	174	35	190	424	24	171	360	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	109	195	49	90	242	203	249	708	40	227	720	610
Arrive On Green	0.07	0.15	0.14	0.05	0.13	0.13	0.14	0.40	0.40	0.13	0.39	0.00
Sat Flow, veh/h	1640	1319	333	1739	1826	1526	1781	1753	99	1739	1826	1547
Grp Volume(v), veh/h	72	0	114	44	174	35	190	0	448	171	360	0
Grp Sat Flow(s),veh/h/ln	1640	0	1652	1739	1826	1526	1781	0	1852	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	3.8	1.5	5.5	1.2	6.2	0.0	11.4	5.7	8.9	0.0
Cycle Q Clear(g_c), s	2.6	0.0	3.8	1.5	5.5	1.2	6.2	0.0	11.4	5.7	8.9	0.0
Prop In Lane	1.00		0.20	1.00		1.00	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	109	0	244	90	242	203	249	0	748	227	720	610
V/C Ratio(X)	0.66	0.00	0.47	0.49	0.72	0.17	0.76	0.00	0.60	0.75	0.50	0.00
Avail Cap(c_a), veh/h	153	0	244	162	243	203	297	0	748	290	720	610
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	27.3	0.0	23.5	27.7	24.9	23.1	24.9	0.0	14.1	25.2	13.7	0.0
Incr Delay (d2), s/veh	6.6	0.0	1.4	4.1	9.7	0.4	9.3	0.0	3.5	7.4	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.5	0.7	2.8	0.4	2.9	0.0	4.5	2.5	3.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	0.0	24.8	31.8	34.6	23.5	34.2	0.0	17.6	32.6	16.0	0.0
LnGrp LOS	C	A	C	C	C	C	C	A	B	C	B	A
Approach Vol, veh/h		186			253			638			531	
Approach Delay, s/veh		28.4			32.6			22.5			21.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	28.2	7.1	12.9	12.4	27.7	8.0	12.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	19.9	5.1	7.5	9.5	19.9	5.1	7.5
Max Q Clear Time (g_c+I1), s	7.7	13.4	3.5	5.8	8.2	10.9	4.6	7.5
Green Ext Time (p_c), s	0.1	1.3	0.0	0.1	0.1	1.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	12	264	46	3	194	0	35	0	2	2	0	11
Future Vol, veh/h	12	264	46	3	194	0	35	0	2	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	13	281	49	3	206	0	37	0	2	2	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	206	0	0	330	0	0	550	544	306	545	568	206
Stage 1	-	-	-	-	-	-	332	332	-	212	212	-
Stage 2	-	-	-	-	-	-	218	212	-	333	356	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1365	-	-	1235	-	-	440	441	725	452	435	840
Stage 1	-	-	-	-	-	-	673	637	-	795	731	-
Stage 2	-	-	-	-	-	-	775	720	-	685	633	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1365	-	-	1235	-	-	429	434	725	446	428	840
Mov Cap-2 Maneuver	-	-	-	-	-	-	429	434	-	446	428	-
Stage 1	-	-	-	-	-	-	665	629	-	785	729	-
Stage 2	-	-	-	-	-	-	762	718	-	675	625	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	14	10
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	439	1365	-	-	1235	-	-	739
HCM Lane V/C Ratio	0.09	0.009	-	-	0.003	-	-	0.019
HCM Control Delay (s)	14	7.7	0	-	7.9	0	-	10
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	222	167	9	5	31
Future Vol, veh/h	49	222	167	9	5	31
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	58	264	199	11	6	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	210	0	-	0	585	206
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	380	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1361	-	-	-	477	840
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	696	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1361	-	-	-	453	839
Mov Cap-2 Maneuver	-	-	-	-	453	-
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	696	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1361	-	-	-	750
HCM Lane V/C Ratio	0.043	-	-	-	0.057
HCM Control Delay (s)	7.8	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Item #1.

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	197	31	7	157	19	4
Future Vol, veh/h	197	31	7	157	19	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	235	37	8	187	23	5

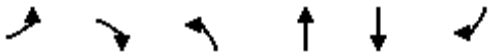
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	272	0	457	254
Stage 1	-	-	-	-	254	-
Stage 2	-	-	-	-	203	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1297	-	562	785
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	831	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1297	-	558	785
Mov Cap-2 Maneuver	-	-	-	-	558	-
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	825	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	588	-	-	1297	-
HCM Lane V/C Ratio	0.047	-	-	0.006	-
HCM Control Delay (s)	11.4	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	524	173	162	1579	2434	876
Future Volume (veh/h)	524	173	162	1579	2434	876
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	540	175	167	1628	2509	890
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	570	409	166	2730	2280	1257
Arrive On Green	0.05	0.05	0.09	0.77	0.64	0.64
Sat Flow, veh/h	3456	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	540	175	167	1628	2509	890
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1552
Q Serve(g_s), s	18.7	11.5	11.2	23.5	77.0	31.2
Cycle Q Clear(g_c), s	18.7	11.5	11.2	23.5	77.0	31.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	570	409	166	2730	2280	1257
V/C Ratio(X)	0.95	0.43	1.00	0.60	1.10	0.71
Avail Cap(c_a), veh/h	570	409	166	2730	2280	1257
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.2	42.2	54.4	5.9	21.5	5.3
Incr Delay (d2), s/veh	20.8	2.2	71.0	0.4	52.6	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	11.0	8.1	5.8	41.9	17.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	77.0	44.5	125.4	6.3	74.1	7.1
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	715			1795	3399	
Approach Delay, s/veh	69.0			17.4	56.5	
Approach LOS	E			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.8	96.2	15.2	81.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.3	91.7	10.7	76.5
Max Q Clear Time (g_c+I1), s	20.7	25.5	13.2	79.0
Green Ext Time (p_c), s	0.0	17.5	0.0	0.0

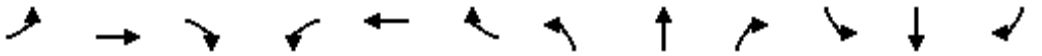
Intersection Summary	
HCM 6th Ctrl Delay	46.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	200	192	59	150	245	109	332	87	376	596	144
Future Volume (veh/h)	147	200	192	59	150	245	109	332	87	376	596	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	153	208	171	61	156	41	114	346	84	392	621	71
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	188	227	186	86	346	293	146	482	117	433	932	790
Arrive On Green	0.11	0.24	0.24	0.05	0.18	0.18	0.08	0.34	0.33	0.08	0.16	0.16
Sat Flow, veh/h	1781	938	772	1795	1885	1598	1767	1435	348	1795	1885	1598
Grp Volume(v), veh/h	153	0	379	61	156	41	114	0	430	392	621	71
Grp Sat Flow(s),veh/h/ln	1781	0	1710	1795	1885	1598	1767	0	1784	1795	1885	1598
Q Serve(g_s), s	10.1	0.0	25.9	4.0	8.8	2.6	7.6	0.0	25.3	26.0	37.1	4.5
Cycle Q Clear(g_c), s	10.1	0.0	25.9	4.0	8.8	2.6	7.6	0.0	25.3	26.0	37.1	4.5
Prop In Lane	1.00		0.45	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	188	0	413	86	346	293	146	0	599	433	932	790
V/C Ratio(X)	0.81	0.00	0.92	0.71	0.45	0.14	0.78	0.00	0.72	0.91	0.67	0.09
Avail Cap(c_a), veh/h	276	0	442	105	346	293	171	0	599	482	932	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.57	0.57	0.57
Uniform Delay (d), s/veh	52.5	0.0	44.4	56.3	43.6	41.0	54.0	0.0	34.9	53.9	40.9	27.3
Incr Delay (d2), s/veh	11.0	0.0	23.1	15.9	0.9	0.2	17.8	0.0	7.2	12.4	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	13.5	2.2	4.2	1.0	4.0	0.0	11.7	14.0	19.2	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.5	0.0	67.6	72.2	44.5	41.2	71.8	0.0	42.1	66.3	43.1	27.4
LnGrp LOS	E	A	E	E	D	D	E	A	D	E	D	C
Approach Vol, veh/h		532			258			544			1084	
Approach Delay, s/veh		66.4			50.5			48.3			50.4	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.9	44.3	9.7	33.0	13.9	63.4	16.7	26.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	31.7	33.3	6.5	30.5	11.1	53.9	18.1	18.9
Max Q Clear Time (g_c+I1), s	28.0	27.3	6.0	27.9	9.6	39.1	12.1	10.8
Green Ext Time (p_c), s	0.5	1.2	0.0	0.6	0.0	3.5	0.2	0.5

Intersection Summary	
HCM 6th Ctrl Delay	53.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	185	25	0	314	0	44	1	0	1	0	18
Future Vol, veh/h	4	185	25	0	314	0	44	1	0	1	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	4	208	28	0	353	0	49	1	0	1	0	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	353	0	0	236	0	0	595	583	224	586	597	355
Stage 1	-	-	-	-	-	-	230	230	-	353	353	-
Stage 2	-	-	-	-	-	-	365	353	-	233	244	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1189	-	-	1314	-	-	419	427	820	425	419	693
Stage 1	-	-	-	-	-	-	777	718	-	668	634	-
Stage 2	-	-	-	-	-	-	658	634	-	775	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1189	-	-	1314	-	-	405	425	818	422	417	692
Mov Cap-2 Maneuver	-	-	-	-	-	-	405	425	-	422	417	-
Stage 1	-	-	-	-	-	-	774	715	-	665	634	-
Stage 2	-	-	-	-	-	-	638	634	-	769	705	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	15.2	10.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	405	1189	-	-	1314	-	-	669
HCM Lane V/C Ratio	0.125	0.004	-	-	-	-	-	0.032
HCM Control Delay (s)	15.2	8	0	-	0	-	-	10.6
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	174	287	2	3	30
Future Vol, veh/h	15	174	287	2	3	30
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	19	220	363	3	4	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	368	0	-	0	627	367
Stage 1	-	-	-	-	367	-
Stage 2	-	-	-	-	260	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1163	-	-	-	451	683
Stage 1	-	-	-	-	705	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1161	-	-	-	441	682
Mov Cap-2 Maneuver	-	-	-	-	441	-
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	786	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1161	-	-	-	650
HCM Lane V/C Ratio	0.016	-	-	-	0.064
HCM Control Delay (s)	8.2	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	133	44	9	174	116	26
Future Vol, veh/h	133	44	9	174	116	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	168	56	11	220	147	33

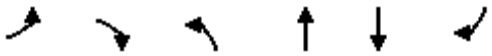
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	224	0	438	196
Stage 1	-	-	-	-	196	-
Stage 2	-	-	-	-	242	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1321	-	576	845
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1321	-	571	845
Mov Cap-2 Maneuver	-	-	-	-	571	-
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	791	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	607	-	-	1321	-
HCM Lane V/C Ratio	0.296	-	-	0.009	-
HCM Control Delay (s)	13.4	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	659	109	98	1917	1249	452
Future Volume (veh/h)	659	109	98	1917	1249	452
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	732	105	109	2130	1388	458
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	838	518	149	2245	1734	1149
Arrive On Green	0.25	0.25	0.09	0.65	0.51	0.51
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	732	105	109	2130	1388	458
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	15.5	3.6	4.6	42.1	25.3	7.9
Cycle Q Clear(g_c), s	15.5	3.6	4.6	42.1	25.3	7.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	838	518	149	2245	1734	1149
V/C Ratio(X)	0.87	0.20	0.73	0.95	0.80	0.40
Avail Cap(c_a), veh/h	838	518	174	2267	1734	1149
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	17.9	33.5	12.1	15.3	3.2
Incr Delay (d2), s/veh	9.2	0.6	12.5	9.5	2.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	3.7	2.3	12.2	8.0	4.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.4	18.6	45.9	21.6	18.1	3.5
LnGrp LOS	D	B	D	C	B	A
Approach Vol, veh/h	837			2239	1846	
Approach Delay, s/veh	34.1			22.8	14.4	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	22.5	52.5	10.4	42.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	48.5	7.0	37.0
Max Q Clear Time (g_c+I1), s	17.5	44.1	6.6	27.3
Green Ext Time (p_c), s	0.0	3.9	0.0	6.7

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	92	63	44	184	341	171	382	27	174	324	71
Future Volume (veh/h)	65	92	63	44	184	341	171	382	27	174	324	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	72	102	28	49	204	56	190	424	26	193	360	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	109	210	58	95	275	230	248	649	40	250	688	583
Arrive On Green	0.07	0.16	0.15	0.05	0.15	0.15	0.14	0.37	0.36	0.14	0.38	0.00
Sat Flow, veh/h	1640	1293	355	1739	1826	1527	1781	1744	107	1739	1826	1547
Grp Volume(v), veh/h	72	0	130	49	204	56	190	0	450	193	360	0
Grp Sat Flow(s),veh/h/ln	1640	0	1648	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.3	1.6	6.4	1.9	6.2	0.0	12.1	6.4	9.2	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.3	1.6	6.4	1.9	6.2	0.0	12.1	6.4	9.2	0.0
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	109	0	268	95	275	230	248	0	689	250	688	583
V/C Ratio(X)	0.66	0.00	0.49	0.51	0.74	0.24	0.76	0.00	0.65	0.77	0.52	0.00
Avail Cap(c_a), veh/h	153	0	275	162	304	254	285	0	689	290	688	583
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh	27.3	0.0	22.9	27.6	24.4	22.5	24.9	0.0	15.6	24.7	14.5	0.0
Incr Delay (d2), s/veh	6.6	0.0	1.4	4.2	8.4	0.5	10.3	0.0	4.8	9.5	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.6	0.8	3.2	0.7	3.0	0.0	5.0	3.0	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	0.0	24.3	31.8	32.8	23.0	35.1	0.0	20.4	34.3	17.1	0.0
LnGrp LOS	C	A	C	C	C	C	D	A	C	C	B	A
Approach Vol, veh/h		202			309			640			553	
Approach Delay, s/veh		27.7			30.9			24.8			23.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	26.3	7.3	13.7	12.4	26.6	8.0	13.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	17.9	5.1	9.5	9.1	18.3	5.1	9.5
Max Q Clear Time (g_c+I1), s	8.4	14.1	3.6	6.3	8.2	11.2	4.6	8.4
Green Ext Time (p_c), s	0.1	0.9	0.0	0.2	0.0	1.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	25.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	362	46	3	255	0	35	0	2	2	0	11
Future Vol, veh/h	12	362	46	3	255	0	35	0	2	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	13	385	49	3	271	0	37	0	2	2	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	271	0	0	434	0	0	719	713	410	714	737	271
Stage 1	-	-	-	-	-	-	436	436	-	277	277	-
Stage 2	-	-	-	-	-	-	283	277	-	437	460	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1292	-	-	1131	-	-	339	352	633	349	348	773
Stage 1	-	-	-	-	-	-	591	573	-	734	685	-
Stage 2	-	-	-	-	-	-	715	674	-	602	569	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1292	-	-	1131	-	-	330	346	633	344	342	773
Mov Cap-2 Maneuver	-	-	-	-	-	-	330	346	-	344	342	-
Stage 1	-	-	-	-	-	-	583	566	-	724	683	-
Stage 2	-	-	-	-	-	-	702	672	-	592	562	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	17	10.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	339	1292	-	-	1131	-	-	649
HCM Lane V/C Ratio	0.116	0.01	-	-	0.003	-	-	0.021
HCM Control Delay (s)	17	7.8	0	-	8.2	0	-	10.7
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	320	228	9	5	31
Future Vol, veh/h	49	320	228	9	5	31
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	58	381	271	11	6	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	282	0	-	0	774	278
Stage 1	-	-	-	-	277	-
Stage 2	-	-	-	-	497	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1280	-	-	-	370	766
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	615	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1280	-	-	-	349	765
Mov Cap-2 Maneuver	-	-	-	-	349	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	615	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1280	-	-	-	656
HCM Lane V/C Ratio	0.046	-	-	-	0.065
HCM Control Delay (s)	7.9	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	197	129	28	157	80	18
Future Vol, veh/h	197	129	28	157	80	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	235	154	33	187	95	21

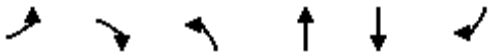
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	389	0	565	312
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	253	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1175	-	486	728
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	789	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1175	-	471	728
Mov Cap-2 Maneuver	-	-	-	-	471	-
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	765	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	14.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	-	-	1175	-
HCM Lane V/C Ratio	0.231	-	-	0.028	-
HCM Control Delay (s)	14.3	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	554	179	172	1579	2434	923
Future Volume (veh/h)	554	179	172	1579	2434	923
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	571	182	177	1628	2509	940
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	587	423	172	2713	2251	1252
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	571	182	177	1628	2509	940
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	19.8	11.9	11.6	24.0	76.0	36.3
Cycle Q Clear(g_c), s	19.8	11.9	11.6	24.0	76.0	36.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	587	423	172	2713	2251	1252
V/C Ratio(X)	0.97	0.43	1.03	0.60	1.11	0.75
Avail Cap(c_a), veh/h	587	423	172	2713	2251	1252
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.3	41.7	54.2	6.2	22.0	5.9
Incr Delay (d2), s/veh	23.4	2.0	76.1	0.4	58.5	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	11.4	8.6	6.0	43.5	20.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	79.8	43.7	130.3	6.6	80.5	8.5
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	753			1805	3449	
Approach Delay, s/veh	71.1			18.7	60.9	
Approach LOS	E			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.4	95.6	15.6	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.9	91.1	11.1	75.5
Max Q Clear Time (g_c+I1), s	21.8	26.0	13.6	78.0
Green Ext Time (p_c), s	0.0	17.4	0.0	0.0

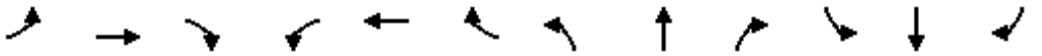
Intersection Summary	
HCM 6th Ctrl Delay	49.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	229	192	62	169	281	109	332	92	433	596	144
Future Volume (veh/h)	147	229	192	62	169	281	109	332	92	433	596	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	153	239	175	65	176	63	114	346	88	451	621	71
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	187	255	187	90	381	323	146	410	104	487	899	762
Arrive On Green	0.10	0.26	0.25	0.05	0.20	0.20	0.08	0.29	0.28	0.09	0.16	0.16
Sat Flow, veh/h	1781	993	727	1795	1885	1598	1767	1420	361	1795	1885	1598
Grp Volume(v), veh/h	153	0	414	65	176	63	114	0	434	451	621	71
Grp Sat Flow(s),veh/h/ln	1781	0	1719	1795	1885	1598	1767	0	1781	1795	1885	1598
Q Serve(g_s), s	10.1	0.0	28.3	4.3	9.9	3.9	7.6	0.0	27.5	29.9	37.4	4.6
Cycle Q Clear(g_c), s	10.1	0.0	28.3	4.3	9.9	3.9	7.6	0.0	27.5	29.9	37.4	4.6
Prop In Lane	1.00		0.42	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	187	0	442	90	381	323	146	0	514	487	899	762
V/C Ratio(X)	0.82	0.00	0.94	0.72	0.46	0.20	0.78	0.00	0.84	0.93	0.69	0.09
Avail Cap(c_a), veh/h	211	0	444	90	381	323	168	0	514	494	899	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.51	0.51	0.51
Uniform Delay (d), s/veh	52.6	0.0	43.7	56.2	42.1	39.8	54.0	0.0	40.2	53.4	42.2	28.4
Incr Delay (d2), s/veh	20.0	0.0	27.5	24.9	0.9	0.3	18.5	0.0	15.6	14.3	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	15.2	2.5	4.7	1.6	4.0	0.0	13.8	16.3	19.3	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.6	0.0	71.2	81.1	43.0	40.0	72.4	0.0	55.8	67.8	44.4	28.5
LnGrp LOS	E	A	E	F	D	D	E	A	E	E	D	C
Approach Vol, veh/h		567			304			548			1143	
Approach Delay, s/veh		71.6			50.5			59.2			52.7	
Approach LOS		E			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.5	38.6	10.0	34.8	13.9	61.3	16.6	28.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	32.5	33.5	5.5	30.5	10.9	55.1	13.7	22.3
Max Q Clear Time (g_c+I1), s	31.9	29.5	6.3	30.3	9.6	39.4	12.1	11.9
Green Ext Time (p_c), s	0.1	0.9	0.0	0.1	0.0	3.6	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	58.0
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	188	26	0	318	0	45	1	0	1	0	18
Future Vol, veh/h	5	188	26	0	318	0	45	1	0	1	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	211	29	0	357	0	51	1	0	1	0	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	357	0	0	240	0	0	607	595	228	597	609	359
Stage 1	-	-	-	-	-	-	238	238	-	357	357	-
Stage 2	-	-	-	-	-	-	369	357	-	240	252	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1185	-	-	1309	-	-	411	420	816	418	412	690
Stage 1	-	-	-	-	-	-	770	712	-	665	632	-
Stage 2	-	-	-	-	-	-	655	632	-	768	702	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1185	-	-	1309	-	-	396	417	814	414	410	689
Mov Cap-2 Maneuver	-	-	-	-	-	-	396	417	-	414	410	-
Stage 1	-	-	-	-	-	-	765	708	-	661	632	-
Stage 2	-	-	-	-	-	-	635	632	-	761	698	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	15.5	10.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	396	1185	-	-	1309	-	-	666
HCM Lane V/C Ratio	0.131	0.005	-	-	-	-	-	0.032
HCM Control Delay (s)	15.5	8.1	0	-	0	-	-	10.6
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	177	290	2	3	30
Future Vol, veh/h	15	177	290	2	3	30
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	19	224	367	3	4	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	372	0	-	0	635	371
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	264	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1159	-	-	-	446	679
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	785	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1157	-	-	-	436	678
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	783	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1157	-	-	-	645
HCM Lane V/C Ratio	0.016	-	-	-	0.065
HCM Control Delay (s)	8.2	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	136	44	9	177	116	26
Future Vol, veh/h	136	44	9	177	116	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	172	56	11	224	147	33

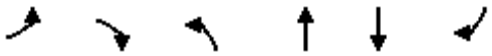
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	228	0	446	200
Stage 1	-	-	-	-	200	-
Stage 2	-	-	-	-	246	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1317	-	570	841
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	795	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1317	-	564	841
Mov Cap-2 Maneuver	-	-	-	-	564	-
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	787	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	600	-	-	1317	-
HCM Lane V/C Ratio	0.3	-	-	0.009	-
HCM Control Delay (s)	13.5	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	661	110	99	1923	1253	453
Future Volume (veh/h)	661	110	99	1923	1253	453
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	734	106	110	2137	1392	459
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	836	518	150	2247	1734	1147
Arrive On Green	0.25	0.25	0.09	0.65	0.51	0.51
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	734	106	110	2137	1392	459
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	15.6	3.7	4.6	42.4	25.4	8.0
Cycle Q Clear(g_c), s	15.6	3.7	4.6	42.4	25.4	8.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	836	518	150	2247	1734	1147
V/C Ratio(X)	0.88	0.20	0.73	0.95	0.80	0.40
Avail Cap(c_a), veh/h	836	518	174	2267	1734	1147
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.71	0.71	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	18.0	33.4	12.1	15.3	3.3
Incr Delay (d2), s/veh	9.4	0.6	12.7	9.8	2.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	3.8	2.3	12.4	8.0	4.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.6	18.6	46.1	21.9	18.1	3.5
LnGrp LOS	D	B	D	C	B	A
Approach Vol, veh/h	840			2247	1851	
Approach Delay, s/veh	34.4			23.1	14.5	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	22.4	52.6	10.5	42.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	48.5	7.0	37.0
Max Q Clear Time (g_c+I1), s	17.6	44.4	6.6	27.4
Green Ext Time (p_c), s	0.0	3.7	0.0	6.6

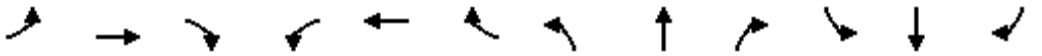
Intersection Summary	
HCM 6th Ctrl Delay	21.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	92	64	44	185	343	172	386	28	176	327	71
Future Volume (veh/h)	66	92	64	44	185	343	172	386	28	176	327	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	73	102	29	49	206	57	191	429	27	196	363	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	110	210	60	95	277	232	249	643	40	253	684	580
Arrive On Green	0.07	0.16	0.16	0.05	0.15	0.15	0.14	0.37	0.36	0.15	0.37	0.00
Sat Flow, veh/h	1640	1281	364	1739	1826	1527	1781	1741	110	1739	1826	1547
Grp Volume(v), veh/h	73	0	131	49	206	57	191	0	456	196	363	0
Grp Sat Flow(s),veh/h/ln	1640	0	1646	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.3	1.6	6.5	2.0	6.2	0.0	12.4	6.5	9.3	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.3	1.6	6.5	2.0	6.2	0.0	12.4	6.5	9.3	0.0
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	110	0	270	95	277	232	249	0	683	253	684	580
V/C Ratio(X)	0.66	0.00	0.49	0.51	0.74	0.25	0.77	0.00	0.67	0.77	0.53	0.00
Avail Cap(c_a), veh/h	150	0	272	162	304	254	285	0	683	290	684	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh	27.3	0.0	22.8	27.6	24.3	22.4	24.9	0.0	15.9	24.7	14.6	0.0
Incr Delay (d2), s/veh	6.7	0.0	1.4	4.2	8.7	0.5	10.4	0.0	5.1	9.8	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.6	0.8	3.2	0.7	3.0	0.0	5.2	3.0	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	0.0	24.2	31.8	33.0	23.0	35.2	0.0	21.0	34.5	17.3	0.0
LnGrp LOS	C	A	C	C	C	C	D	A	C	C	B	A
Approach Vol, veh/h		204			312			647			559	
Approach Delay, s/veh		27.7			31.0			25.2			23.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	26.1	7.3	13.8	12.4	26.5	8.0	13.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	18.0	5.1	9.4	9.1	18.4	5.0	9.5
Max Q Clear Time (g_c+I1), s	8.5	14.4	3.6	6.3	8.2	11.3	4.6	8.5
Green Ext Time (p_c), s	0.1	0.9	0.0	0.2	0.0	1.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	366	47	3	258	0	36	0	2	2	0	11
Future Vol, veh/h	12	366	47	3	258	0	36	0	2	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	13	389	50	3	274	0	38	0	2	2	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	274	0	0	439	0	0	726	720	414	721	745	274
Stage 1	-	-	-	-	-	-	440	440	-	280	280	-
Stage 2	-	-	-	-	-	-	286	280	-	441	465	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1289	-	-	1126	-	-	335	349	630	345	345	770
Stage 1	-	-	-	-	-	-	588	571	-	731	683	-
Stage 2	-	-	-	-	-	-	713	672	-	599	566	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1289	-	-	1126	-	-	326	343	630	339	339	770
Mov Cap-2 Maneuver	-	-	-	-	-	-	326	343	-	339	339	-
Stage 1	-	-	-	-	-	-	580	564	-	721	681	-
Stage 2	-	-	-	-	-	-	700	670	-	589	559	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	17.3	10.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	334	1289	-	-	1126	-	-	644
HCM Lane V/C Ratio	0.121	0.01	-	-	0.003	-	-	0.021
HCM Control Delay (s)	17.3	7.8	0	-	8.2	0	-	10.7
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	324	231	9	5	32
Future Vol, veh/h	50	324	231	9	5	32
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	60	386	275	11	6	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	286	0	-	0	787	282
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	506	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1276	-	-	-	363	762
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	610	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1276	-	-	-	341	761
Mov Cap-2 Maneuver	-	-	-	-	341	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	610	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1276	-	-	-	652
HCM Lane V/C Ratio	0.047	-	-	-	0.068
HCM Control Delay (s)	8	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	200	129	28	159	80	18
Future Vol, veh/h	200	129	28	159	80	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	238	154	33	189	95	21

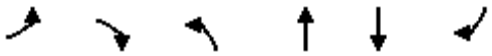
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	392	0	570	315
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	255	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1172	-	483	725
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1172	-	468	725
Mov Cap-2 Maneuver	-	-	-	-	468	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	764	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	501	-	-	1172	-
HCM Lane V/C Ratio	0.233	-	-	0.028	-
HCM Control Delay (s)	14.4	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	555	180	172	1584	2441	925
Future Volume (veh/h)	555	180	172	1584	2441	925
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	572	183	177	1633	2516	942
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	587	423	172	2713	2251	1252
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	572	183	177	1633	2516	942
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	19.8	12.0	11.6	24.1	76.0	36.5
Cycle Q Clear(g_c), s	19.8	12.0	11.6	24.1	76.0	36.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	587	423	172	2713	2251	1252
V/C Ratio(X)	0.97	0.43	1.03	0.60	1.12	0.75
Avail Cap(c_a), veh/h	587	423	172	2713	2251	1252
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.62	0.62	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.4	41.7	54.2	6.2	22.0	5.9
Incr Delay (d2), s/veh	23.5	2.0	76.1	0.4	59.8	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.1	11.4	8.6	6.0	43.9	20.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	79.9	43.7	130.3	6.6	81.8	8.5
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	755			1810	3458	
Approach Delay, s/veh	71.1			18.7	61.8	
Approach LOS	E			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.4	95.6	15.6	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.9	91.1	11.1	75.5
Max Q Clear Time (g_c+I1), s	21.8	26.1	13.6	78.0
Green Ext Time (p_c), s	0.0	17.5	0.0	0.0

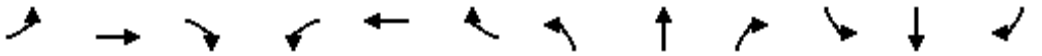
Intersection Summary	
HCM 6th Ctrl Delay	50.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	230	194	63	170	283	110	335	93	437	603	145
Future Volume (veh/h)	148	230	194	63	170	283	110	335	93	437	603	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	154	240	177	66	177	66	115	349	89	455	628	73
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	188	247	182	90	367	311	147	417	106	490	912	772
Arrive On Green	0.11	0.25	0.25	0.05	0.19	0.19	0.08	0.29	0.29	0.09	0.16	0.16
Sat Flow, veh/h	1781	989	730	1795	1885	1598	1767	1419	362	1795	1885	1598
Grp Volume(v), veh/h	154	0	417	66	177	66	115	0	438	455	628	73
Grp Sat Flow(s),veh/h/ln	1781	0	1719	1795	1885	1598	1767	0	1781	1795	1885	1598
Q Serve(g_s), s	10.2	0.0	28.8	4.4	10.0	4.2	7.7	0.0	27.6	30.2	37.7	4.7
Cycle Q Clear(g_c), s	10.2	0.0	28.8	4.4	10.0	4.2	7.7	0.0	27.6	30.2	37.7	4.7
Prop In Lane	1.00		0.42	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	188	0	430	90	367	311	147	0	523	490	912	772
V/C Ratio(X)	0.82	0.00	0.97	0.74	0.48	0.21	0.78	0.00	0.84	0.93	0.69	0.09
Avail Cap(c_a), veh/h	214	0	430	90	367	311	168	0	523	494	912	772
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.51	0.51	0.51
Uniform Delay (d), s/veh	52.6	0.0	44.7	56.2	43.0	40.6	53.9	0.0	39.7	53.4	41.9	28.0
Incr Delay (d2), s/veh	19.7	0.0	35.6	26.6	1.0	0.3	18.7	0.0	14.7	14.7	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	16.3	2.6	4.7	1.7	4.1	0.0	13.8	16.5	19.5	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.3	0.0	80.3	82.8	43.9	40.9	72.7	0.0	54.5	68.1	44.1	28.1
LnGrp LOS	E	A	F	F	D	D	E	A	D	E	D	C
Approach Vol, veh/h		571			309			553			1156	
Approach Delay, s/veh		78.2			51.6			58.3			52.5	
Approach LOS		E			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.8	39.2	10.0	34.0	14.0	62.0	16.7	27.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	32.5	34.5	5.5	29.5	10.9	56.1	13.9	21.1
Max Q Clear Time (g_c+I1), s	32.2	29.6	6.4	30.8	9.7	39.7	12.2	12.0
Green Ext Time (p_c), s	0.1	1.1	0.0	0.0	0.0	3.7	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	59.3
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	162	58	8	252	0	132	1	20	1	0	18
Future Vol, veh/h	5	162	58	8	252	0	132	1	20	1	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	182	65	9	283	0	148	1	22	1	0	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	283	0	0	247	0	0	540	528	217	541	560	285
Stage 1	-	-	-	-	-	-	227	227	-	301	301	-
Stage 2	-	-	-	-	-	-	313	301	-	240	259	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1262	-	-	1302	-	-	456	459	828	455	440	759
Stage 1	-	-	-	-	-	-	780	720	-	712	669	-
Stage 2	-	-	-	-	-	-	702	669	-	768	697	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1262	-	-	1302	-	-	438	453	826	436	434	758
Mov Cap-2 Maneuver	-	-	-	-	-	-	438	453	-	436	434	-
Stage 1	-	-	-	-	-	-	775	716	-	708	664	-
Stage 2	-	-	-	-	-	-	677	664	-	740	693	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	17.1	10.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	467	1262	-	-	1302	-	-	730
HCM Lane V/C Ratio	0.368	0.004	-	-	0.007	-	-	0.029
HCM Control Delay (s)	17.1	7.9	0	-	7.8	0	-	10.1
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.7	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	171	232	2	3	30
Future Vol, veh/h	15	171	232	2	3	30
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	19	216	294	3	4	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	299	0	-	0	554	298
Stage 1	-	-	-	-	298	-
Stage 2	-	-	-	-	256	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1234	-	-	-	497	746
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	791	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1232	-	-	-	486	745
Mov Cap-2 Maneuver	-	-	-	-	486	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	789	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1232	-	-	-	711
HCM Lane V/C Ratio	0.015	-	-	-	0.059
HCM Control Delay (s)	8	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	18	4	185	50	11
Future Vol, veh/h	156	18	4	185	50	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	197	23	5	234	63	14

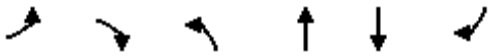
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	220	0	453	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	244	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1326	-	565	831
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1326	-	563	831
Mov Cap-2 Maneuver	-	-	-	-	563	-
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	794	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	598	-	-	1326	-
HCM Lane V/C Ratio	0.129	-	-	0.004	-
HCM Control Delay (s)	11.9	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	671	112	100	1923	1253	457
Future Volume (veh/h)	671	112	100	1923	1253	457
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	746	111	111	2137	1392	462
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	869	534	151	2213	1699	1146
Arrive On Green	0.26	0.26	0.09	0.64	0.50	0.50
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	746	111	111	2137	1392	462
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	15.7	3.8	4.7	43.6	25.9	8.1
Cycle Q Clear(g_c), s	15.7	3.8	4.7	43.6	25.9	8.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	869	534	151	2213	1699	1146
V/C Ratio(X)	0.86	0.21	0.73	0.97	0.82	0.40
Avail Cap(c_a), veh/h	869	534	176	2220	1699	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.71	0.71	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	17.5	33.4	12.8	16.0	3.3
Incr Delay (d2), s/veh	8.0	0.6	12.5	12.1	3.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	3.9	2.3	13.6	8.4	4.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.6	18.1	45.9	24.9	19.3	3.5
LnGrp LOS	C	B	D	C	B	A
Approach Vol, veh/h	857			2248	1854	
Approach Delay, s/veh	32.5			25.9	15.4	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.2	51.8	10.5	41.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	47.5	7.1	35.9
Max Q Clear Time (g_c+I1), s	17.7	45.6	6.7	27.9
Green Ext Time (p_c), s	0.3	1.8	0.0	5.7

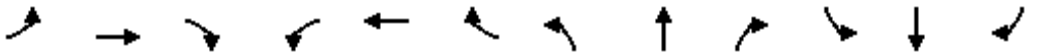
Intersection Summary	
HCM 6th Ctrl Delay	23.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	94	64	45	192	355	172	386	28	181	327	71
Future Volume (veh/h)	66	94	64	45	192	355	172	386	28	181	327	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	73	104	29	50	213	58	191	429	27	201	363	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	110	214	60	96	283	237	249	631	40	259	678	575
Arrive On Green	0.07	0.17	0.16	0.06	0.16	0.16	0.14	0.36	0.35	0.15	0.37	0.00
Sat Flow, veh/h	1640	1288	359	1739	1826	1527	1781	1741	110	1739	1826	1547
Grp Volume(v), veh/h	73	0	133	50	213	58	191	0	456	201	363	0
Grp Sat Flow(s),veh/h/ln	1640	0	1647	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.4	1.7	6.7	2.0	6.2	0.0	12.5	6.7	9.4	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.4	1.7	6.7	2.0	6.2	0.0	12.5	6.7	9.4	0.0
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	110	0	274	96	283	237	249	0	671	259	678	575
V/C Ratio(X)	0.66	0.00	0.48	0.52	0.75	0.25	0.77	0.00	0.68	0.78	0.54	0.00
Avail Cap(c_a), veh/h	150	0	274	162	304	254	285	0	671	293	678	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	27.3	0.0	22.7	27.6	24.2	22.3	24.9	0.0	16.2	24.6	14.8	0.0
Incr Delay (d2), s/veh	6.7	0.0	1.3	4.3	9.4	0.5	10.4	0.0	5.5	10.0	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.7	0.8	3.4	0.7	3.0	0.0	5.3	3.1	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	0.0	24.1	31.8	33.7	22.8	35.2	0.0	21.7	34.6	17.5	0.0
LnGrp LOS	C	A	C	C	C	C	D	A	C	C	B	A
Approach Vol, veh/h		206			321			647			564	
Approach Delay, s/veh		27.6			31.4			25.7			23.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	25.8	7.3	14.0	12.4	26.3	8.0	13.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.6	17.9	5.1	9.4	9.1	18.4	5.0	9.5
Max Q Clear Time (g_c+I1), s	8.7	14.5	3.7	6.4	8.2	11.4	4.6	8.7
Green Ext Time (p_c), s	0.1	0.8	0.0	0.2	0.0	1.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	26.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	12	293	145	24	213	0	98	0	15	2	0	11
Future Vol, veh/h	12	293	145	24	213	0	98	0	15	2	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	13	312	154	26	227	0	104	0	16	2	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	227	0	0	466	0	0	700	694	389	702	771	227
Stage 1	-	-	-	-	-	-	415	415	-	279	279	-
Stage 2	-	-	-	-	-	-	285	279	-	423	492	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1341	-	-	1101	-	-	349	361	651	355	333	817
Stage 1	-	-	-	-	-	-	607	586	-	732	683	-
Stage 2	-	-	-	-	-	-	714	673	-	613	551	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1341	-	-	1101	-	-	334	347	651	336	320	817
Mov Cap-2 Maneuver	-	-	-	-	-	-	334	347	-	336	320	-
Stage 1	-	-	-	-	-	-	599	578	-	722	665	-
Stage 2	-	-	-	-	-	-	685	655	-	590	544	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.8	20.1	10.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	357	1341	-	-	1101	-	-	670
HCM Lane V/C Ratio	0.337	0.01	-	-	0.023	-	-	0.021
HCM Control Delay (s)	20.1	7.7	0	-	8.3	0	-	10.5
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.5	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	264	207	9	5	32
Future Vol, veh/h	50	264	207	9	5	32
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	60	314	246	11	6	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	257	0	-	0	686	253
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	434	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1308	-	-	-	416	791
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	658	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1308	-	-	-	393	790
Mov Cap-2 Maneuver	-	-	-	-	393	-
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	658	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1308	-	-	-	695
HCM Lane V/C Ratio	0.046	-	-	-	0.063
HCM Control Delay (s)	7.9	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	213	56	12	180	35	7
Future Vol, veh/h	213	56	12	180	35	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	254	67	14	214	42	8

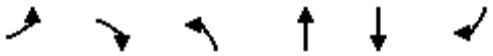
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	321	0	530	288
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	242	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1245	-	510	751
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1245	-	503	751
Mov Cap-2 Maneuver	-	-	-	-	503	-
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	788	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	532	-	-	1245	-
HCM Lane V/C Ratio	0.094	-	-	0.011	-
HCM Control Delay (s)	12.5	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	563	182	174	1584	2441	937
Future Volume (veh/h)	563	182	174	1584	2441	937
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	580	185	179	1633	2516	954
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	587	423	172	2713	2251	1252
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	580	185	179	1633	2516	954
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.1	12.1	11.6	24.1	76.0	37.7
Cycle Q Clear(g_c), s	20.1	12.1	11.6	24.1	76.0	37.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	587	423	172	2713	2251	1252
V/C Ratio(X)	0.99	0.44	1.04	0.60	1.12	0.76
Avail Cap(c_a), veh/h	587	423	172	2713	2251	1252
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.57	0.57	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	41.8	54.2	6.2	22.0	6.0
Incr Delay (d2), s/veh	25.1	1.9	79.4	0.4	59.8	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	11.5	8.8	6.0	43.9	21.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	81.6	43.6	133.6	6.6	81.8	8.8
LnGrp LOS	F	D	F	A	F	A
Approach Vol, veh/h	765			1812	3470	
Approach Delay, s/veh	72.5			19.1	61.7	
Approach LOS	E			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.4	95.6	15.6	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.9	91.1	11.1	75.5
Max Q Clear Time (g_c+I1), s	22.1	26.1	13.6	78.0
Green Ext Time (p_c), s	0.0	17.5	0.0	0.0

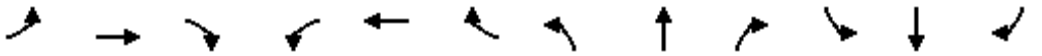
Intersection Summary	
HCM 6th Ctrl Delay	50.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	238	194	64	174	293	110	335	94	451	603	145
Future Volume (veh/h)	148	238	194	64	174	293	110	335	94	451	603	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	154	248	177	67	181	73	115	349	90	470	628	73
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	188	251	179	90	367	311	147	404	104	505	912	772
Arrive On Green	0.11	0.25	0.25	0.05	0.19	0.19	0.08	0.29	0.28	0.09	0.16	0.16
Sat Flow, veh/h	1781	1004	717	1795	1885	1598	1767	1415	365	1795	1885	1598
Grp Volume(v), veh/h	154	0	425	67	181	73	115	0	439	470	628	73
Grp Sat Flow(s),veh/h/ln	1781	0	1721	1795	1885	1598	1767	0	1780	1795	1885	1598
Q Serve(g_s), s	10.2	0.0	29.5	4.4	10.3	4.6	7.7	0.0	28.1	31.2	37.7	4.7
Cycle Q Clear(g_c), s	10.2	0.0	29.5	4.4	10.3	4.6	7.7	0.0	28.1	31.2	37.7	4.7
Prop In Lane	1.00		0.42	1.00		1.00	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	188	0	430	90	367	311	147	0	508	505	912	772
V/C Ratio(X)	0.82	0.00	0.99	0.75	0.49	0.23	0.78	0.00	0.86	0.93	0.69	0.09
Avail Cap(c_a), veh/h	214	0	430	90	367	311	168	0	508	509	912	772
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.49	0.49	0.49
Uniform Delay (d), s/veh	52.6	0.0	44.9	56.2	43.1	40.8	53.9	0.0	40.7	53.3	41.9	28.0
Incr Delay (d2), s/veh	19.7	0.0	40.0	28.4	1.0	0.4	18.7	0.0	17.5	14.2	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	17.1	2.7	4.9	1.8	4.1	0.0	14.3	17.0	19.5	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.3	0.0	84.9	84.7	44.1	41.2	72.7	0.0	58.2	67.5	44.0	28.1
LnGrp LOS	E	A	F	F	D	D	E	A	E	E	D	C
Approach Vol, veh/h		579			321			554			1171	
Approach Delay, s/veh		81.6			51.9			61.2			52.4	
Approach LOS		F			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	37.8	38.2	10.0	34.0	14.0	62.0	16.7	27.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	33.5	33.5	5.5	29.5	10.9	56.1	13.9	21.1
Max Q Clear Time (g_c+I1), s	33.2	30.1	6.4	31.5	9.7	39.7	12.2	12.3
Green Ext Time (p_c), s	0.1	0.8	0.0	0.0	0.0	3.7	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	60.6
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	167	59	8	260	0	134	1	20	1	0	19
Future Vol, veh/h	5	167	59	8	260	0	134	1	20	1	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	188	66	9	292	0	151	1	22	1	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	292	0	0	254	0	0	556	543	223	557	576	294
Stage 1	-	-	-	-	-	-	233	233	-	310	310	-
Stage 2	-	-	-	-	-	-	323	310	-	247	266	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1253	-	-	1294	-	-	445	450	822	444	431	750
Stage 1	-	-	-	-	-	-	775	716	-	705	663	-
Stage 2	-	-	-	-	-	-	693	663	-	761	692	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1253	-	-	1294	-	-	427	444	820	426	425	749
Mov Cap-2 Maneuver	-	-	-	-	-	-	427	444	-	426	425	-
Stage 1	-	-	-	-	-	-	770	712	-	701	658	-
Stage 2	-	-	-	-	-	-	667	658	-	733	688	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	17.7	10.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	455	1253	-	-	1294	-	-	722
HCM Lane V/C Ratio	0.383	0.004	-	-	0.007	-	-	0.031
HCM Control Delay (s)	17.7	7.9	0	-	7.8	0	-	10.1
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.8	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	176	239	2	3	31
Future Vol, veh/h	16	176	239	2	3	31
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	20	223	303	3	4	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	308	0	-	0	572	307
Stage 1	-	-	-	-	307	-
Stage 2	-	-	-	-	265	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1225	-	-	-	485	738
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1223	-	-	-	474	737
Mov Cap-2 Maneuver	-	-	-	-	474	-
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	782	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1223	-	-	-	703
HCM Lane V/C Ratio	0.017	-	-	-	0.061
HCM Control Delay (s)	8	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	161	18	4	192	50	11
Future Vol, veh/h	161	18	4	192	50	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	204	23	5	243	63	14

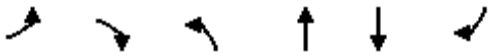
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	227	0	469	216
Stage 1	-	-	-	-	216	-
Stage 2	-	-	-	-	253	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1318	-	553	824
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	789	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1318	-	551	824
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	786	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	586	-	-	1318	-
HCM Lane V/C Ratio	0.132	-	-	0.004	-
HCM Control Delay (s)	12.1	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	675	112	100	1935	1260	460
Future Volume (veh/h)	675	112	100	1935	1260	460
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	750	111	111	2150	1400	465
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	866	533	151	2216	1701	1146
Arrive On Green	0.25	0.25	0.09	0.64	0.50	0.50
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	750	111	111	2150	1400	465
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	15.8	3.8	4.7	44.2	26.2	8.1
Cycle Q Clear(g_c), s	15.8	3.8	4.7	44.2	26.2	8.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	866	533	151	2216	1701	1146
V/C Ratio(X)	0.87	0.21	0.73	0.97	0.82	0.41
Avail Cap(c_a), veh/h	866	533	176	2220	1701	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	17.5	33.4	12.9	16.0	3.3
Incr Delay (d2), s/veh	8.2	0.6	12.5	12.9	3.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	3.9	2.3	13.9	8.5	4.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.9	18.1	45.9	25.7	19.4	3.5
LnGrp LOS	C	B	D	C	B	A
Approach Vol, veh/h	861			2261	1865	
Approach Delay, s/veh	32.7			26.7	15.4	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.1	51.9	10.5	41.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	47.5	7.1	35.9
Max Q Clear Time (g_c+I1), s	17.8	46.2	6.7	28.2
Green Ext Time (p_c), s	0.3	1.2	0.0	5.6

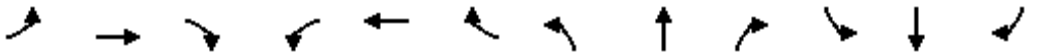
Intersection Summary	
HCM 6th Ctrl Delay	23.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	96	65	46	194	361	176	395	28	184	334	72
Future Volume (veh/h)	66	96	65	46	194	361	176	395	28	184	334	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	73	107	31	51	216	60	196	439	27	204	371	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	110	213	62	97	286	239	255	627	39	262	670	568
Arrive On Green	0.07	0.17	0.16	0.06	0.16	0.16	0.14	0.36	0.35	0.15	0.37	0.00
Sat Flow, veh/h	1640	1275	369	1739	1826	1527	1781	1744	107	1739	1826	1547
Grp Volume(v), veh/h	73	0	138	51	216	60	196	0	466	204	371	0
Grp Sat Flow(s),veh/h/ln	1640	0	1645	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.6	1.7	6.8	2.1	6.4	0.0	12.9	6.8	9.7	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.6	1.7	6.8	2.1	6.4	0.0	12.9	6.8	9.7	0.0
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	110	0	275	97	286	239	255	0	665	262	670	568
V/C Ratio(X)	0.66	0.00	0.50	0.52	0.76	0.25	0.77	0.00	0.70	0.78	0.55	0.00
Avail Cap(c_a), veh/h	150	0	275	162	304	254	291	0	665	296	670	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	27.3	0.0	22.8	27.5	24.2	22.2	24.8	0.0	16.5	24.5	15.1	0.0
Incr Delay (d2), s/veh	6.7	0.0	1.4	4.3	9.8	0.5	10.4	0.0	6.1	10.1	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.7	0.8	3.5	0.7	3.1	0.0	5.6	3.2	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	0.0	24.2	31.8	34.0	22.8	35.2	0.0	22.5	34.6	18.0	0.0
LnGrp LOS	C	A	C	C	C	C	D	A	C	C	B	A
Approach Vol, veh/h		211			327			662			575	
Approach Delay, s/veh		27.6			31.6			26.3			23.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	25.6	7.4	14.0	12.6	26.0	8.0	13.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.7	17.8	5.1	9.4	9.3	18.2	5.0	9.5
Max Q Clear Time (g_c+I1), s	8.8	14.9	3.7	6.6	8.4	11.7	4.6	8.8
Green Ext Time (p_c), s	0.1	0.7	0.0	0.2	0.0	1.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	13	302	147	25	220	0	99	0	15	2	0	12
Future Vol, veh/h	13	302	147	25	220	0	99	0	15	2	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	14	321	156	27	234	0	105	0	16	2	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	234	0	0	477	0	0	722	715	399	723	793	234
Stage 1	-	-	-	-	-	-	427	427	-	288	288	-
Stage 2	-	-	-	-	-	-	295	288	-	435	505	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1333	-	-	1090	-	-	337	351	642	344	323	810
Stage 1	-	-	-	-	-	-	598	578	-	724	677	-
Stage 2	-	-	-	-	-	-	705	666	-	604	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1333	-	-	1090	-	-	321	336	642	324	309	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	321	336	-	324	309	-
Stage 1	-	-	-	-	-	-	589	569	-	713	658	-
Stage 2	-	-	-	-	-	-	674	647	-	580	536	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.9	21.1	10.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	344	1333	-	-	1090	-	-	667
HCM Lane V/C Ratio	0.353	0.01	-	-	0.024	-	-	0.022
HCM Control Delay (s)	21.1	7.7	0	-	8.4	0	-	10.5
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.5	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	272	212	9	6	33
Future Vol, veh/h	52	272	212	9	6	33
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	62	324	252	11	7	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	263	0	-	0	706	259
Stage 1	-	-	-	-	258	-
Stage 2	-	-	-	-	448	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1301	-	-	-	405	785
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	648	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1301	-	-	-	382	784
Mov Cap-2 Maneuver	-	-	-	-	382	-
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1301	-	-	-	675
HCM Lane V/C Ratio	0.048	-	-	-	0.069
HCM Control Delay (s)	7.9	0	-	-	10.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	221	56	12	186	35	7
Future Vol, veh/h	221	56	12	186	35	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	263	67	14	221	42	8

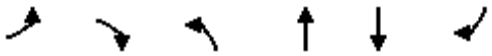
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	330	0	546	297
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	249	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1235	-	499	742
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	792	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1235	-	493	742
Mov Cap-2 Maneuver	-	-	-	-	493	-
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	782	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	522	-	-	1235	-
HCM Lane V/C Ratio	0.096	-	-	0.012	-
HCM Control Delay (s)	12.6	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	566	183	175	1593	2456	942
Future Volume (veh/h)	566	183	175	1593	2456	942
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	584	186	180	1642	2532	960
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	590	423	171	2710	2251	1253
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	584	186	180	1642	2532	960
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.3	12.2	11.5	24.5	76.0	38.1
Cycle Q Clear(g_c), s	20.3	12.2	11.5	24.5	76.0	38.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	590	423	171	2710	2251	1253
V/C Ratio(X)	0.99	0.44	1.05	0.61	1.13	0.77
Avail Cap(c_a), veh/h	590	423	171	2710	2251	1253
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.54	0.54	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	41.8	54.3	6.3	22.0	6.0
Incr Delay (d2), s/veh	24.8	1.8	84.0	0.4	62.7	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.4	11.6	8.9	6.1	44.8	21.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	81.3	43.6	138.3	6.7	84.7	8.9
LnGrp LOS	F	D	F	A	F	A
Approach Vol, veh/h	770			1822	3492	
Approach Delay, s/veh	72.2			19.7	63.9	
Approach LOS	E			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.5	95.5	15.5	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.0	91.0	11.0	75.5
Max Q Clear Time (g_c+I1), s	22.3	26.5	13.5	78.0
Green Ext Time (p_c), s	0.0	17.7	0.0	0.0

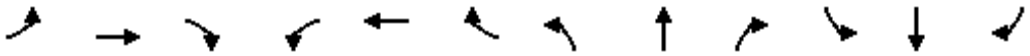
Intersection Summary	
HCM 6th Ctrl Delay	51.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	242	197	65	177	298	112	343	96	457	616	147
Future Volume (veh/h)	149	242	197	65	177	298	112	343	96	457	616	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	155	252	180	68	184	78	117	357	92	476	642	75
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	189	251	179	90	366	310	149	401	103	509	909	771
Arrive On Green	0.11	0.25	0.25	0.05	0.19	0.19	0.08	0.28	0.28	0.09	0.16	0.16
Sat Flow, veh/h	1781	1004	717	1795	1885	1598	1767	1416	365	1795	1885	1598
Grp Volume(v), veh/h	155	0	432	68	184	78	117	0	449	476	642	75
Grp Sat Flow(s),veh/h/ln	1781	0	1721	1795	1885	1598	1767	0	1780	1795	1885	1598
Q Serve(g_s), s	10.2	0.0	30.0	4.5	10.5	5.0	7.8	0.0	29.0	31.6	38.7	4.8
Cycle Q Clear(g_c), s	10.2	0.0	30.0	4.5	10.5	5.0	7.8	0.0	29.0	31.6	38.7	4.8
Prop In Lane	1.00		0.42	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	189	0	430	90	366	310	149	0	504	509	909	771
V/C Ratio(X)	0.82	0.00	1.00	0.76	0.50	0.25	0.78	0.00	0.89	0.94	0.71	0.10
Avail Cap(c_a), veh/h	214	0	430	90	366	310	171	0	504	509	909	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.48	0.48	0.48
Uniform Delay (d), s/veh	52.5	0.0	45.1	56.3	43.2	41.0	53.9	0.0	41.3	53.3	42.4	28.1
Incr Delay (d2), s/veh	20.0	0.0	44.4	30.4	1.1	0.4	18.7	0.0	20.4	14.7	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	17.9	2.8	5.0	2.0	4.1	0.0	15.1	17.2	20.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.5	0.0	89.5	86.6	44.3	41.4	72.6	0.0	61.7	68.0	44.6	28.3
LnGrp LOS	E	A	F	F	D	D	E	A	E	E	D	C
Approach Vol, veh/h		587			330			566			1193	
Approach Delay, s/veh		85.0			52.3			63.9			52.9	
Approach LOS		F			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	38.0	38.0	10.0	34.0	14.1	61.9	16.7	27.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	33.5	33.5	5.5	29.5	11.1	55.9	13.9	21.1
Max Q Clear Time (g_c+I1), s	33.6	31.0	6.5	32.0	9.8	40.7	12.2	12.5
Green Ext Time (p_c), s	0.0	0.6	0.0	0.0	0.0	3.7	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	62.2
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	167	66	10	260	0	154	1	24	1	0	19
Future Vol, veh/h	5	167	66	10	260	0	154	1	24	1	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	188	74	11	292	0	173	1	27	1	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	292	0	0	262	0	0	564	551	227	567	588	294
Stage 1	-	-	-	-	-	-	237	237	-	314	314	-
Stage 2	-	-	-	-	-	-	327	314	-	253	274	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1253	-	-	1285	-	-	439	445	817	437	424	750
Stage 1	-	-	-	-	-	-	771	713	-	701	660	-
Stage 2	-	-	-	-	-	-	690	660	-	756	687	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1253	-	-	1285	-	-	421	438	815	416	417	749
Mov Cap-2 Maneuver	-	-	-	-	-	-	421	438	-	416	417	-
Stage 1	-	-	-	-	-	-	766	709	-	697	653	-
Stage 2	-	-	-	-	-	-	662	653	-	724	683	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	19.3	10.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	450	1253	-	-	1285	-	-	720
HCM Lane V/C Ratio	0.447	0.004	-	-	0.009	-	-	0.031
HCM Control Delay (s)	19.3	7.9	0	-	7.8	0	-	10.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	180	241	2	3	31
Future Vol, veh/h	16	180	241	2	3	31
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	20	228	305	3	4	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	310	0	-	0	579	309
Stage 1	-	-	-	-	309	-
Stage 2	-	-	-	-	270	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1223	-	-	-	481	736
Stage 1	-	-	-	-	749	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1221	-	-	-	470	735
Mov Cap-2 Maneuver	-	-	-	-	470	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	778	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1221	-	-	-	700
HCM Lane V/C Ratio	0.017	-	-	-	0.061
HCM Control Delay (s)	8	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	165	18	4	194	50	11
Future Vol, veh/h	165	18	4	194	50	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	209	23	5	246	63	14

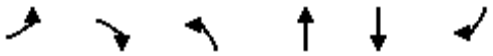
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	232	0	477	221
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	256	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1312	-	547	819
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1312	-	545	819
Mov Cap-2 Maneuver	-	-	-	-	545	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	784	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	580	-	-	1312	-
HCM Lane V/C Ratio	0.133	-	-	0.004	-
HCM Control Delay (s)	12.2	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	685	114	101	1935	1260	463
Future Volume (veh/h)	685	114	101	1935	1260	463
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	761	114	112	2150	1400	470
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	866	534	152	2216	1699	1145
Arrive On Green	0.25	0.25	0.09	0.64	0.50	0.50
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	761	114	112	2150	1400	470
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	16.1	3.9	4.7	44.2	26.2	8.3
Cycle Q Clear(g_c), s	16.1	3.9	4.7	44.2	26.2	8.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	866	534	152	2216	1699	1145
V/C Ratio(X)	0.88	0.21	0.74	0.97	0.82	0.41
Avail Cap(c_a), veh/h	866	534	176	2220	1699	1145
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.8	17.5	33.4	12.9	16.0	3.3
Incr Delay (d2), s/veh	8.8	0.6	12.7	12.9	3.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	4.0	2.3	13.9	8.5	4.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.7	18.1	46.1	25.7	19.5	3.6
LnGrp LOS	D	B	D	C	B	A
Approach Vol, veh/h	875			2262	1870	
Approach Delay, s/veh	33.4			26.7	15.5	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.1	51.9	10.6	41.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	47.5	7.1	35.9
Max Q Clear Time (g_c+I1), s	18.1	46.2	6.7	28.2
Green Ext Time (p_c), s	0.2	1.2	0.0	5.6

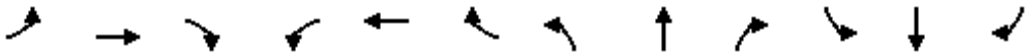
Intersection Summary	
HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	98	65	47	200	373	176	395	28	188	334	72
Future Volume (veh/h)	66	98	65	47	200	373	176	395	28	188	334	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	73	109	32	52	222	62	196	439	27	209	371	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	110	216	63	98	291	243	255	616	38	267	665	563
Arrive On Green	0.07	0.17	0.16	0.06	0.16	0.16	0.14	0.35	0.35	0.15	0.36	0.00
Sat Flow, veh/h	1640	1271	373	1739	1826	1527	1781	1744	107	1739	1826	1547
Grp Volume(v), veh/h	73	0	141	52	222	62	196	0	466	209	371	0
Grp Sat Flow(s),veh/h/ln	1640	0	1644	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.7	1.7	7.0	2.1	6.4	0.0	13.1	6.9	9.7	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.7	1.7	7.0	2.1	6.4	0.0	13.1	6.9	9.7	0.0
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	110	0	279	98	291	243	255	0	654	267	665	563
V/C Ratio(X)	0.66	0.00	0.51	0.53	0.76	0.26	0.77	0.00	0.71	0.78	0.56	0.00
Avail Cap(c_a), veh/h	150	0	279	162	304	254	291	0	654	301	665	563
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	27.3	0.0	22.7	27.5	24.1	22.1	24.8	0.0	16.8	24.4	15.2	0.0
Incr Delay (d2), s/veh	6.7	0.0	1.5	4.3	10.5	0.5	10.4	0.0	6.5	10.1	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.8	0.8	3.6	0.7	3.1	0.0	5.7	3.2	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	0.0	24.2	31.8	34.6	22.7	35.2	0.0	23.3	34.6	18.2	0.0
LnGrp LOS	C	A	C	C	C	C	D	A	C	C	B	A
Approach Vol, veh/h		214			336			662			580	
Approach Delay, s/veh		27.5			32.0			26.8			24.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	25.2	7.4	14.2	12.6	25.8	8.0	13.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	17.6	5.1	9.4	9.3	18.2	5.0	9.5
Max Q Clear Time (g_c+I1), s	8.9	15.1	3.7	6.7	8.4	11.7	4.6	9.0
Green Ext Time (p_c), s	0.1	0.7	0.0	0.2	0.0	1.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	13	302	172	30	220	0	113	0	18	2	0	12
Future Vol, veh/h	13	302	172	30	220	0	113	0	18	2	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	14	321	183	32	234	0	120	0	19	2	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	234	0	0	504	0	0	746	739	413	748	830	234
Stage 1	-	-	-	-	-	-	441	441	-	298	298	-
Stage 2	-	-	-	-	-	-	305	298	-	450	532	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1333	-	-	1066	-	-	325	340	631	331	308	810
Stage 1	-	-	-	-	-	-	587	570	-	715	671	-
Stage 2	-	-	-	-	-	-	696	660	-	592	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1333	-	-	1066	-	-	308	323	631	309	293	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	308	323	-	309	293	-
Stage 1	-	-	-	-	-	-	578	561	-	704	648	-
Stage 2	-	-	-	-	-	-	661	637	-	565	521	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	23.6	10.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	331	1333	-	-	1066	-	-	658
HCM Lane V/C Ratio	0.421	0.01	-	-	0.03	-	-	0.023
HCM Control Delay (s)	23.6	7.7	0	-	8.5	0	-	10.6
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	275	217	9	6	33
Future Vol, veh/h	52	275	217	9	6	33
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	62	327	258	11	7	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	269	0	-	0	715	265
Stage 1	-	-	-	-	264	-
Stage 2	-	-	-	-	451	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1295	-	-	-	400	779
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	646	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1295	-	-	-	376	778
Mov Cap-2 Maneuver	-	-	-	-	376	-
Stage 1	-	-	-	-	739	-
Stage 2	-	-	-	-	646	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1295	-	-	-	668
HCM Lane V/C Ratio	0.048	-	-	-	0.07
HCM Control Delay (s)	7.9	0	-	-	10.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Item #1.

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	224	56	12	191	35	7
Future Vol, veh/h	224	56	12	191	35	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	267	67	14	227	42	8

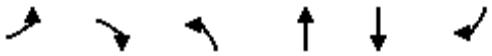
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	334	0	556	301
Stage 1	-	-	-	-	301	-
Stage 2	-	-	-	-	255	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1231	-	492	739
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1231	-	486	739
Mov Cap-2 Maneuver	-	-	-	-	486	-
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	778	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	515	-	-	1231	-
HCM Lane V/C Ratio	0.097	-	-	0.012	-
HCM Control Delay (s)	12.7	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	573	185	177	1593	2456	954
Future Volume (veh/h)	573	185	177	1593	2456	954
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	591	188	182	1642	2532	972
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	587	423	172	2713	2251	1252
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	591	188	182	1642	2532	972
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.4	12.4	11.6	24.4	76.0	39.6
Cycle Q Clear(g_c), s	20.4	12.4	11.6	24.4	76.0	39.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	587	423	172	2713	2251	1252
V/C Ratio(X)	1.01	0.44	1.06	0.61	1.13	0.78
Avail Cap(c_a), veh/h	587	423	172	2713	2251	1252
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.52	0.52	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.6	41.8	54.2	6.2	22.0	6.2
Incr Delay (d2), s/veh	28.2	1.8	84.5	0.4	62.7	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	11.7	9.0	6.1	44.8	22.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	84.9	43.6	138.7	6.6	84.7	9.4
LnGrp LOS	F	D	F	A	F	A
Approach Vol, veh/h	779			1824	3504	
Approach Delay, s/veh	74.9			19.8	63.8	
Approach LOS	E			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.4	95.6	15.6	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.9	91.1	11.1	75.5
Max Q Clear Time (g_c+I1), s	22.4	26.4	13.6	78.0
Green Ext Time (p_c), s	0.0	17.7	0.0	0.0

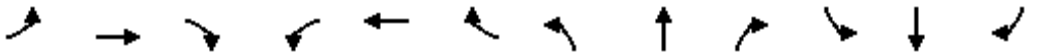
Intersection Summary	
HCM 6th Ctrl Delay	52.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	250	197	66	180	307	112	343	97	471	616	147
Future Volume (veh/h)	149	250	197	66	180	307	112	343	97	471	616	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	155	260	181	69	188	86	117	357	93	491	642	75
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	189	254	177	87	363	307	149	391	102	524	912	773
Arrive On Green	0.11	0.25	0.25	0.05	0.19	0.19	0.08	0.28	0.27	0.10	0.16	0.16
Sat Flow, veh/h	1781	1016	707	1795	1885	1598	1767	1412	368	1795	1885	1598
Grp Volume(v), veh/h	155	0	441	69	188	86	117	0	450	491	642	75
Grp Sat Flow(s),veh/h/ln	1781	0	1723	1795	1885	1598	1767	0	1780	1795	1885	1598
Q Serve(g_s), s	10.2	0.0	30.0	4.6	10.7	5.5	7.8	0.0	29.4	32.6	38.7	4.8
Cycle Q Clear(g_c), s	10.2	0.0	30.0	4.6	10.7	5.5	7.8	0.0	29.4	32.6	38.7	4.8
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	189	0	431	87	363	307	149	0	492	524	912	773
V/C Ratio(X)	0.82	0.00	1.02	0.80	0.52	0.28	0.78	0.00	0.91	0.94	0.70	0.10
Avail Cap(c_a), veh/h	214	0	431	87	363	307	171	0	492	524	912	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.46	0.46	0.46
Uniform Delay (d), s/veh	52.5	0.0	45.1	56.5	43.5	41.4	53.9	0.0	42.1	53.1	42.3	28.0
Incr Delay (d2), s/veh	20.0	0.0	49.5	38.5	1.3	0.5	18.7	0.0	24.0	14.2	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	18.5	3.0	5.1	2.2	4.1	0.0	15.6	17.7	20.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.5	0.0	94.6	95.0	44.8	41.9	72.6	0.0	66.0	67.4	44.4	28.2
LnGrp LOS	E	A	F	F	D	D	E	A	E	E	D	C
Approach Vol, veh/h		596			343			567			1208	
Approach Delay, s/veh		88.8			54.2			67.4			52.7	
Approach LOS		F			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	37.2	9.8	34.0	14.1	62.1	16.7	27.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	34.5	32.7	5.3	29.5	11.1	56.1	13.9	20.9
Max Q Clear Time (g_c+I1), s	34.6	31.4	6.6	32.0	9.8	40.7	12.2	12.7
Green Ext Time (p_c), s	0.0	0.4	0.0	0.0	0.0	3.7	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	63.9
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	169	66	10	264	0	155	1	24	1	0	19
Future Vol, veh/h	5	169	66	10	264	0	155	1	24	1	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	190	74	11	297	0	174	1	27	1	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	297	0	0	264	0	0	571	558	229	574	595	299
Stage 1	-	-	-	-	-	-	239	239	-	319	319	-
Stage 2	-	-	-	-	-	-	332	319	-	255	276	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1247	-	-	1283	-	-	435	441	815	433	420	745
Stage 1	-	-	-	-	-	-	769	711	-	697	657	-
Stage 2	-	-	-	-	-	-	686	657	-	754	685	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1247	-	-	1283	-	-	417	434	813	412	413	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	417	434	-	412	413	-
Stage 1	-	-	-	-	-	-	764	707	-	693	650	-
Stage 2	-	-	-	-	-	-	658	650	-	722	681	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	19.6	10.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	446	1247	-	-	1283	-	-	715
HCM Lane V/C Ratio	0.453	0.005	-	-	0.009	-	-	0.031
HCM Control Delay (s)	19.6	7.9	0	-	7.8	0	-	10.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	182	245	2	3	31
Future Vol, veh/h	16	182	245	2	3	31
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	20	230	310	3	4	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	315	0	-	0	586	314
Stage 1	-	-	-	-	314	-
Stage 2	-	-	-	-	272	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1217	-	-	-	476	731
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	778	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1215	-	-	-	465	730
Mov Cap-2 Maneuver	-	-	-	-	465	-
Stage 1	-	-	-	-	729	-
Stage 2	-	-	-	-	776	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1215	-	-	-	695
HCM Lane V/C Ratio	0.017	-	-	-	0.062
HCM Control Delay (s)	8	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	167	18	4	198	50	11
Future Vol, veh/h	167	18	4	198	50	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	211	23	5	251	63	14

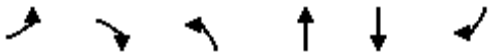
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	234	0	484	223
Stage 1	-	-	-	-	223	-
Stage 2	-	-	-	-	261	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1310	-	542	817
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	783	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1310	-	540	817
Mov Cap-2 Maneuver	-	-	-	-	540	-
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	780	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	575	-	-	1310	-
HCM Lane V/C Ratio	0.134	-	-	0.004	-
HCM Control Delay (s)	12.2	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	686	114	101	1940	1264	464
Future Volume (veh/h)	686	114	101	1940	1264	464
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	762	115	112	2156	1404	472
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	865	533	152	2217	1700	1145
Arrive On Green	0.25	0.25	0.09	0.64	0.50	0.50
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	762	115	112	2156	1404	472
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	16.1	3.9	4.7	44.4	26.3	8.3
Cycle Q Clear(g_c), s	16.1	3.9	4.7	44.4	26.3	8.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	865	533	152	2217	1700	1145
V/C Ratio(X)	0.88	0.22	0.74	0.97	0.83	0.41
Avail Cap(c_a), veh/h	865	533	176	2220	1700	1145
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	17.5	33.4	12.9	16.0	3.3
Incr Delay (d2), s/veh	9.0	0.6	12.7	13.2	3.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	4.1	2.3	14.1	8.5	4.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.9	18.2	46.1	26.1	19.5	3.6
LnGrp LOS	D	B	D	C	B	A
Approach Vol, veh/h	877			2268	1876	
Approach Delay, s/veh	33.5			27.1	15.5	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.1	51.9	10.6	41.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	47.5	7.1	35.9
Max Q Clear Time (g_c+I1), s	18.1	46.4	6.7	28.3
Green Ext Time (p_c), s	0.2	1.0	0.0	5.5

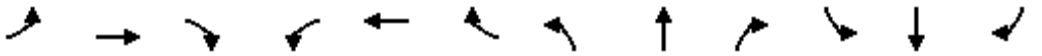
Intersection Summary	
HCM 6th Ctrl Delay	23.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	99	65	48	202	375	178	399	28	189	338	73
Future Volume (veh/h)	67	99	65	48	202	375	178	399	28	189	338	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	74	110	32	53	224	55	198	443	27	210	376	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	111	206	60	99	277	232	257	628	38	268	676	573
Arrive On Green	0.07	0.16	0.15	0.06	0.15	0.15	0.14	0.36	0.35	0.15	0.37	0.00
Sat Flow, veh/h	1640	1274	371	1739	1826	1527	1781	1745	106	1739	1826	1547
Grp Volume(v), veh/h	74	0	142	53	224	55	198	0	470	210	376	0
Grp Sat Flow(s),veh/h/ln	1640	0	1644	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.8	1.8	7.1	1.9	6.4	0.0	13.1	7.0	9.8	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.8	1.8	7.1	1.9	6.4	0.0	13.1	7.0	9.8	0.0
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	111	0	266	99	277	232	257	0	667	268	676	573
V/C Ratio(X)	0.67	0.00	0.53	0.53	0.81	0.24	0.77	0.00	0.71	0.78	0.56	0.00
Avail Cap(c_a), veh/h	150	0	266	162	277	232	291	0	667	301	676	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	27.3	0.0	23.1	27.5	24.6	22.4	24.7	0.0	16.5	24.4	15.0	0.0
Incr Delay (d2), s/veh	6.8	0.0	2.1	4.4	16.2	0.5	10.6	0.0	6.2	10.2	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.8	0.8	4.1	0.7	3.1	0.0	5.6	3.3	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	0.0	25.2	31.9	40.8	22.9	35.4	0.0	22.6	34.6	17.9	0.0
LnGrp LOS	C	A	C	C	D	C	D	A	C	C	B	A
Approach Vol, veh/h		216			332			668			586	
Approach Delay, s/veh		28.3			36.4			26.4			23.9	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	25.6	7.4	13.7	12.7	26.2	8.0	13.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	18.5	5.1	8.5	9.3	19.1	5.0	8.6
Max Q Clear Time (g_c+I1), s	9.0	15.1	3.8	6.8	8.4	11.8	4.6	9.1
Green Ext Time (p_c), s	0.1	0.9	0.0	0.1	0.0	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	27.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	13	307	173	30	223	0	114	0	18	2	0	12
Future Vol, veh/h	13	307	173	30	223	0	114	0	18	2	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	14	327	184	32	237	0	121	0	19	2	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	237	0	0	511	0	0	755	748	419	758	840	237
Stage 1	-	-	-	-	-	-	447	447	-	301	301	-
Stage 2	-	-	-	-	-	-	308	301	-	457	539	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1330	-	-	1059	-	-	320	336	626	326	304	807
Stage 1	-	-	-	-	-	-	583	567	-	712	669	-
Stage 2	-	-	-	-	-	-	694	658	-	587	525	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1330	-	-	1059	-	-	303	320	626	304	289	807
Mov Cap-2 Maneuver	-	-	-	-	-	-	303	320	-	304	289	-
Stage 1	-	-	-	-	-	-	574	558	-	701	646	-
Stage 2	-	-	-	-	-	-	659	635	-	561	517	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	24.1	10.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	326	1330	-	-	1059	-	-	653
HCM Lane V/C Ratio	0.431	0.01	-	-	0.03	-	-	0.023
HCM Control Delay (s)	24.1	7.7	0	-	8.5	0	-	10.6
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	279	220	9	6	33
Future Vol, veh/h	52	279	220	9	6	33
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	62	332	262	11	7	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	724	269
Stage 1	-	-	-	-	268	-
Stage 2	-	-	-	-	456	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1290	-	-	-	396	775
Stage 1	-	-	-	-	782	-
Stage 2	-	-	-	-	643	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1290	-	-	-	373	774
Mov Cap-2 Maneuver	-	-	-	-	373	-
Stage 1	-	-	-	-	736	-
Stage 2	-	-	-	-	643	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1290	-	-	-	664
HCM Lane V/C Ratio	0.048	-	-	-	0.07
HCM Control Delay (s)	7.9	0	-	-	10.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	228	56	12	194	35	7
Future Vol, veh/h	228	56	12	194	35	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	271	67	14	231	42	8

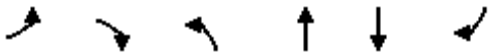
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	338	0	564	305
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	259	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1227	-	487	735
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1227	-	481	735
Mov Cap-2 Maneuver	-	-	-	-	481	-
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	774	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	510	-	-	1227	-
HCM Lane V/C Ratio	0.098	-	-	0.012	-
HCM Control Delay (s)	12.8	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	574	185	178	1598	2463	957
Future Volume (veh/h)	574	185	178	1598	2463	957
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	592	188	184	1647	2539	975
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	579	423	177	2722	2251	1248
Arrive On Green	0.06	0.06	0.10	0.77	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	592	188	184	1647	2539	975
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.1	12.3	11.9	24.3	76.0	40.4
Cycle Q Clear(g_c), s	20.1	12.3	11.9	24.3	76.0	40.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	579	423	177	2722	2251	1248
V/C Ratio(X)	1.02	0.44	1.04	0.61	1.13	0.78
Avail Cap(c_a), veh/h	579	423	177	2722	2251	1248
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.50	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.7	41.7	54.0	6.1	22.0	6.4
Incr Delay (d2), s/veh	32.4	1.7	79.1	0.4	64.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.9	11.7	9.0	6.0	45.2	22.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	89.0	43.4	133.2	6.5	86.0	9.7
LnGrp LOS	F	D	F	A	F	A
Approach Vol, veh/h	780			1831	3514	
Approach Delay, s/veh	78.0			19.2	64.8	
Approach LOS	E			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.1	95.9	15.9	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.6	91.4	11.4	75.5
Max Q Clear Time (g_c+I1), s	22.1	26.3	13.9	78.0
Green Ext Time (p_c), s	0.0	17.8	0.0	0.0

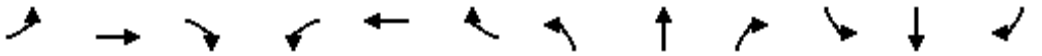
Intersection Summary	
HCM 6th Ctrl Delay	52.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	252	199	66	181	309	113	347	98	475	622	148
Future Volume (veh/h)	150	252	199	66	181	309	113	347	98	475	622	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	156	262	183	69	189	88	118	361	94	495	648	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	190	262	183	87	377	320	150	379	99	524	896	759
Arrive On Green	0.11	0.26	0.25	0.05	0.20	0.20	0.08	0.27	0.26	0.10	0.16	0.16
Sat Flow, veh/h	1781	1015	709	1795	1885	1598	1767	1412	368	1795	1885	1598
Grp Volume(v), veh/h	156	0	445	69	189	88	118	0	455	495	648	76
Grp Sat Flow(s),veh/h/ln	1781	0	1723	1795	1885	1598	1767	0	1780	1795	1885	1598
Q Serve(g_s), s	10.3	0.0	31.0	4.6	10.7	5.6	7.9	0.0	30.2	32.9	39.2	4.9
Cycle Q Clear(g_c), s	10.3	0.0	31.0	4.6	10.7	5.6	7.9	0.0	30.2	32.9	39.2	4.9
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	190	0	445	87	377	320	150	0	478	524	896	759
V/C Ratio(X)	0.82	0.00	1.00	0.80	0.50	0.28	0.79	0.00	0.95	0.95	0.72	0.10
Avail Cap(c_a), veh/h	214	0	445	87	377	320	171	0	478	524	896	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.46	0.46	0.46
Uniform Delay (d), s/veh	52.5	0.0	44.6	56.5	42.7	40.6	53.8	0.0	43.2	53.3	43.1	28.6
Incr Delay (d2), s/veh	20.2	0.0	42.6	38.5	1.0	0.5	19.0	0.0	30.9	15.4	2.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	18.2	3.0	5.1	2.2	4.2	0.0	16.8	18.0	20.3	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.7	0.0	87.2	95.0	43.7	41.1	72.8	0.0	74.1	68.6	45.5	28.7
LnGrp LOS	E	A	F	F	D	D	E	A	E	E	D	C
Approach Vol, veh/h		601			346			573			1219	
Approach Delay, s/veh		83.4			53.3			73.9			53.8	
Approach LOS		F			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	36.2	9.8	35.0	14.2	61.0	16.8	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	34.5	31.7	5.3	30.5	11.1	55.1	13.9	21.9
Max Q Clear Time (g_c+I1), s	34.9	32.2	6.6	33.0	9.9	41.2	12.3	12.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	3.6	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	64.4
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	169	70	11	264	0	167	1	27	1	0	19
Future Vol, veh/h	5	169	70	11	264	0	167	1	27	1	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	190	79	12	297	0	188	1	30	1	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	297	0	0	269	0	0	576	563	232	580	602	299
Stage 1	-	-	-	-	-	-	242	242	-	321	321	-
Stage 2	-	-	-	-	-	-	334	321	-	259	281	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1247	-	-	1277	-	-	431	438	812	429	416	745
Stage 1	-	-	-	-	-	-	766	709	-	695	655	-
Stage 2	-	-	-	-	-	-	684	655	-	750	682	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1247	-	-	1277	-	-	412	431	810	406	409	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	412	431	-	406	409	-
Stage 1	-	-	-	-	-	-	761	705	-	691	648	-
Stage 2	-	-	-	-	-	-	656	648	-	715	678	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	20.9	10.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	442	1247	-	-	1277	-	-	714
HCM Lane V/C Ratio	0.496	0.005	-	-	0.01	-	-	0.031
HCM Control Delay (s)	20.9	7.9	0	-	7.8	0	-	10.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.7	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	185	246	2	3	31
Future Vol, veh/h	16	185	246	2	3	31
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	20	234	311	3	4	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	316	0	-	0	591	315
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1216	-	-	-	473	730
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	775	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1214	-	-	-	462	729
Mov Cap-2 Maneuver	-	-	-	-	462	-
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	773	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1214	-	-	-	694
HCM Lane V/C Ratio	0.017	-	-	-	0.062
HCM Control Delay (s)	8	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	170	18	4	199	50	11
Future Vol, veh/h	170	18	4	199	50	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	215	23	5	252	63	14

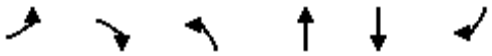
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	238	0	489	227
Stage 1	-	-	-	-	227	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1306	-	538	812
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1306	-	536	812
Mov Cap-2 Maneuver	-	-	-	-	536	-
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	779	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	571	-	-	1306	-
HCM Lane V/C Ratio	0.135	-	-	0.004	-
HCM Control Delay (s)	12.3	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	692	115	102	1940	1264	466
Future Volume (veh/h)	692	115	102	1940	1264	466
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	769	116	113	2156	1404	474
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	865	534	153	2217	1698	1144
Arrive On Green	0.25	0.25	0.09	0.64	0.50	0.50
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	769	116	113	2156	1404	474
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	16.3	4.0	4.8	44.4	26.3	8.4
Cycle Q Clear(g_c), s	16.3	4.0	4.8	44.4	26.3	8.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	865	534	153	2217	1698	1144
V/C Ratio(X)	0.89	0.22	0.74	0.97	0.83	0.41
Avail Cap(c_a), veh/h	865	534	179	2220	1698	1144
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	17.5	33.3	12.9	16.1	3.4
Incr Delay (d2), s/veh	9.5	0.6	12.6	13.2	3.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	4.1	2.3	14.1	8.5	4.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.5	18.1	45.9	26.1	19.6	3.6
LnGrp LOS	D	B	D	C	B	A
Approach Vol, veh/h	885			2269	1878	
Approach Delay, s/veh	34.1			27.1	15.6	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.1	51.9	10.6	41.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	47.5	7.2	35.8
Max Q Clear Time (g_c+I1), s	18.3	46.4	6.8	28.3
Green Ext Time (p_c), s	0.1	1.0	0.0	5.5

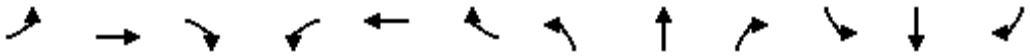
Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	100	65	48	206	382	178	399	28	192	338	73
Future Volume (veh/h)	67	100	65	48	206	382	178	399	28	192	338	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	74	111	32	53	229	55	198	443	27	213	376	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	111	205	59	99	274	229	257	629	38	271	679	575
Arrive On Green	0.07	0.16	0.15	0.06	0.15	0.15	0.14	0.36	0.35	0.16	0.37	0.00
Sat Flow, veh/h	1640	1277	368	1739	1826	1527	1781	1745	106	1739	1826	1547
Grp Volume(v), veh/h	74	0	143	53	229	55	198	0	470	213	376	0
Grp Sat Flow(s),veh/h/ln	1640	0	1645	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.8	1.8	7.3	1.9	6.4	0.0	13.1	7.1	9.8	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.8	1.8	7.3	1.9	6.4	0.0	13.1	7.1	9.8	0.0
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	111	0	263	99	274	229	257	0	667	271	679	575
V/C Ratio(X)	0.67	0.00	0.54	0.53	0.84	0.24	0.77	0.00	0.70	0.79	0.55	0.00
Avail Cap(c_a), veh/h	150	0	263	162	274	229	291	0	667	290	679	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	27.3	0.0	23.2	27.5	24.8	22.5	24.7	0.0	16.5	24.4	14.9	0.0
Incr Delay (d2), s/veh	6.8	0.0	2.3	4.4	19.7	0.5	10.6	0.0	6.2	11.4	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.9	0.8	4.4	0.7	3.1	0.0	5.6	3.4	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	0.0	25.5	31.9	44.5	23.0	35.4	0.0	22.6	35.8	17.8	0.0
LnGrp LOS	C	A	C	C	D	C	D	A	C	D	B	A
Approach Vol, veh/h		217			337			668			589	
Approach Delay, s/veh		28.4			39.0			26.4			24.3	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	25.6	7.4	13.6	12.7	26.3	8.0	13.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	19.0	5.1	8.4	9.3	19.2	5.0	8.5
Max Q Clear Time (g_c+I1), s	9.1	15.1	3.8	6.8	8.4	11.8	4.6	9.3
Green Ext Time (p_c), s	0.0	1.0	0.0	0.1	0.0	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	13	307	188	33	223	0	123	0	20	2	0	12
Future Vol, veh/h	13	307	188	33	223	0	123	0	20	2	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	14	327	200	35	237	0	131	0	21	2	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	237	0	0	527	0	0	769	762	427	773	862	237
Stage 1	-	-	-	-	-	-	455	455	-	307	307	-
Stage 2	-	-	-	-	-	-	314	307	-	466	555	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1330	-	-	1045	-	-	313	330	619	319	295	807
Stage 1	-	-	-	-	-	-	577	562	-	707	665	-
Stage 2	-	-	-	-	-	-	688	654	-	581	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1330	-	-	1045	-	-	295	313	619	295	279	807
Mov Cap-2 Maneuver	-	-	-	-	-	-	295	313	-	295	279	-
Stage 1	-	-	-	-	-	-	568	554	-	696	639	-
Stage 2	-	-	-	-	-	-	651	628	-	553	508	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.1	26.3	10.7
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	318	1330	-	-	1045	-	-	647
HCM Lane V/C Ratio	0.478	0.01	-	-	0.034	-	-	0.023
HCM Control Delay (s)	26.3	7.7	0	-	8.6	0	-	10.7
HCM Lane LOS	D	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.5	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	281	223	9	6	33
Future Vol, veh/h	52	281	223	9	6	33
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	62	335	265	11	7	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	276	0	-	0	730	272
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	459	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1287	-	-	-	392	772
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	641	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1287	-	-	-	369	771
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	641	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1287	-	-	-	660
HCM Lane V/C Ratio	0.048	-	-	-	0.07
HCM Control Delay (s)	7.9	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Item #1.

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	230	56	12	197	35	7
Future Vol, veh/h	230	56	12	197	35	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	274	67	14	235	42	8

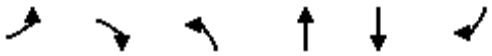
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	341	0	571	308
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	263	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1224	-	482	732
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	781	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1224	-	476	732
Mov Cap-2 Maneuver	-	-	-	-	476	-
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	771	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	505	-	-	1224	-
HCM Lane V/C Ratio	0.099	-	-	0.012	-
HCM Control Delay (s)	12.9	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	579	186	179	1598	2463	964
Future Volume (veh/h)	579	186	179	1598	2463	964
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	597	189	185	1647	2539	981
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	576	423	178	2724	2251	1247
Arrive On Green	0.06	0.06	0.10	0.77	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	597	189	185	1647	2539	981
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.0	12.4	12.0	24.2	76.0	41.3
Cycle Q Clear(g_c), s	20.0	12.4	12.0	24.2	76.0	41.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	576	423	178	2724	2251	1247
V/C Ratio(X)	1.04	0.45	1.04	0.60	1.13	0.79
Avail Cap(c_a), veh/h	576	423	178	2724	2251	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.49	0.49	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.7	41.7	54.0	6.1	22.0	6.5
Incr Delay (d2), s/veh	36.2	1.7	77.9	0.4	64.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	11.7	9.0	5.9	45.2	23.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	92.9	43.4	131.9	6.5	86.0	10.0
LnGrp LOS	F	D	F	A	F	A
Approach Vol, veh/h	786			1832	3520	
Approach Delay, s/veh	81.0			19.1	64.8	
Approach LOS	F			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.0	96.0	16.0	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	91.5	11.5	75.5
Max Q Clear Time (g_c+I1), s	22.0	26.2	14.0	78.0
Green Ext Time (p_c), s	0.0	17.8	0.0	0.0

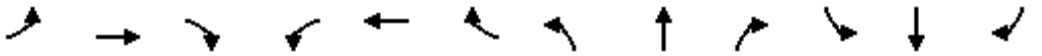
Intersection Summary	
HCM 6th Ctrl Delay	53.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	256	199	66	184	315	113	347	99	483	622	148
Future Volume (veh/h)	150	256	199	66	184	315	113	347	99	483	622	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	156	267	184	69	192	93	118	361	95	503	648	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	190	264	182	87	377	320	150	373	98	530	896	759
Arrive On Green	0.11	0.26	0.25	0.05	0.20	0.20	0.08	0.26	0.26	0.10	0.16	0.16
Sat Flow, veh/h	1781	1021	703	1795	1885	1598	1767	1409	371	1795	1885	1598
Grp Volume(v), veh/h	156	0	451	69	192	93	118	0	456	503	648	76
Grp Sat Flow(s),veh/h/ln	1781	0	1724	1795	1885	1598	1767	0	1779	1795	1885	1598
Q Serve(g_s), s	10.3	0.0	31.0	4.6	10.9	5.9	7.9	0.0	30.4	33.4	39.2	4.9
Cycle Q Clear(g_c), s	10.3	0.0	31.0	4.6	10.9	5.9	7.9	0.0	30.4	33.4	39.2	4.9
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	190	0	445	87	377	320	150	0	471	530	896	759
V/C Ratio(X)	0.82	0.00	1.01	0.80	0.51	0.29	0.79	0.00	0.97	0.95	0.72	0.10
Avail Cap(c_a), veh/h	214	0	445	87	377	320	171	0	471	530	896	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.45	0.45	0.45
Uniform Delay (d), s/veh	52.5	0.0	44.6	56.5	42.7	40.8	53.8	0.0	43.6	53.3	43.1	28.6
Incr Delay (d2), s/veh	20.2	0.0	45.8	38.5	1.1	0.5	19.0	0.0	34.0	15.7	2.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	18.7	3.0	5.2	2.4	4.2	0.0	17.3	18.3	20.3	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.7	0.0	90.4	95.0	43.9	41.3	72.8	0.0	77.7	69.0	45.4	28.7
LnGrp LOS	E	A	F	F	D	D	E	A	E	E	D	C
Approach Vol, veh/h		607			354			574			1227	
Approach Delay, s/veh		85.9			53.2			76.7			54.0	
Approach LOS		F			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.4	35.8	9.8	35.0	14.2	61.0	16.8	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	34.9	31.3	5.3	30.5	11.1	55.1	13.9	21.9
Max Q Clear Time (g_c+I1), s	35.4	32.4	6.6	33.0	9.9	41.2	12.3	12.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	3.6	0.1	0.9

Intersection Summary	
HCM 6th Ctrl Delay	65.6
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	171	70	11	268	0	167	1	27	1	0	19
Future Vol, veh/h	5	171	70	11	268	0	167	1	27	1	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	192	79	12	301	0	188	1	30	1	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	301	0	0	271	0	0	582	569	234	586	608	303
Stage 1	-	-	-	-	-	-	244	244	-	325	325	-
Stage 2	-	-	-	-	-	-	338	325	-	261	283	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1243	-	-	1275	-	-	427	435	810	425	413	741
Stage 1	-	-	-	-	-	-	764	708	-	692	653	-
Stage 2	-	-	-	-	-	-	681	653	-	748	681	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1243	-	-	1275	-	-	409	428	808	402	406	740
Mov Cap-2 Maneuver	-	-	-	-	-	-	409	428	-	402	406	-
Stage 1	-	-	-	-	-	-	759	704	-	688	646	-
Stage 2	-	-	-	-	-	-	653	646	-	713	677	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	21.1	10.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	439	1243	-	-	1275	-	-	710
HCM Lane V/C Ratio	0.499	0.005	-	-	0.01	-	-	0.032
HCM Control Delay (s)	21.1	7.9	0	-	7.9	0	-	10.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.7	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	187	250	2	3	31
Future Vol, veh/h	16	187	250	2	3	31
Conflicting Peds, #/hr	2	0	0	2	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	0	0
Mvmt Flow	20	237	316	3	4	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	321	0	-	0	599	320
Stage 1	-	-	-	-	320	-
Stage 2	-	-	-	-	279	-
Critical Hdwy	4.17	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1211	-	-	-	468	725
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1209	-	-	-	457	724
Mov Cap-2 Maneuver	-	-	-	-	457	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	771	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1209	-	-	-	689
HCM Lane V/C Ratio	0.017	-	-	-	0.062
HCM Control Delay (s)	8	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	170	20	4	199	54	12
Future Vol, veh/h	170	20	4	199	54	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	7	7	6	6	2	2
Mvmt Flow	215	25	5	252	68	15

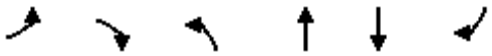
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	240	0	490	228
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	-	-	4.16	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1304	-	537	811
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1304	-	535	811
Mov Cap-2 Maneuver	-	-	-	-	535	-
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	779	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	570	-	-	1304	-
HCM Lane V/C Ratio	0.147	-	-	0.004	-
HCM Control Delay (s)	12.4	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	694	115	102	1940	1264	467
Future Volume (veh/h)	694	115	102	1940	1264	467
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	771	116	113	2156	1404	475
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	865	534	153	2217	1698	1144
Arrive On Green	0.25	0.25	0.09	0.64	0.50	0.50
Sat Flow, veh/h	3401	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	771	116	113	2156	1404	475
Grp Sat Flow(s),veh/h/ln	1700	1560	1739	1735	1706	1522
Q Serve(g_s), s	16.4	4.0	4.8	44.4	26.3	8.4
Cycle Q Clear(g_c), s	16.4	4.0	4.8	44.4	26.3	8.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	865	534	153	2217	1698	1144
V/C Ratio(X)	0.89	0.22	0.74	0.97	0.83	0.42
Avail Cap(c_a), veh/h	865	534	179	2220	1698	1144
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	17.5	33.3	12.9	16.1	3.4
Incr Delay (d2), s/veh	9.7	0.6	12.6	13.2	3.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	4.1	2.3	14.1	8.5	4.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.7	18.1	45.9	26.1	19.6	3.6
LnGrp LOS	D	B	D	C	B	A
Approach Vol, veh/h	887			2269	1879	
Approach Delay, s/veh	34.2			27.1	15.6	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.1	51.9	10.6	41.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	47.5	7.2	35.8
Max Q Clear Time (g_c+I1), s	18.4	46.4	6.8	28.3
Green Ext Time (p_c), s	0.0	1.0	0.0	5.5

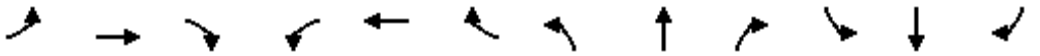
Intersection Summary	
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	101	65	48	207	384	178	399	28	193	338	73
Future Volume (veh/h)	67	101	65	48	207	384	178	399	28	193	338	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	74	112	33	53	230	56	198	443	27	214	376	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	111	203	60	99	274	229	257	628	38	272	679	575
Arrive On Green	0.07	0.16	0.15	0.06	0.15	0.15	0.14	0.36	0.35	0.16	0.37	0.00
Sat Flow, veh/h	1640	1270	374	1739	1826	1527	1781	1745	106	1739	1826	1547
Grp Volume(v), veh/h	74	0	145	53	230	56	198	0	470	214	376	0
Grp Sat Flow(s),veh/h/ln	1640	0	1644	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	0.0	4.9	1.8	7.4	1.9	6.4	0.0	13.1	7.1	9.8	0.0
Cycle Q Clear(g_c), s	2.6	0.0	4.9	1.8	7.4	1.9	6.4	0.0	13.1	7.1	9.8	0.0
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	111	0	263	99	274	229	257	0	666	272	679	575
V/C Ratio(X)	0.67	0.00	0.55	0.53	0.84	0.24	0.77	0.00	0.71	0.79	0.55	0.00
Avail Cap(c_a), veh/h	150	0	263	162	274	229	291	0	666	290	679	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	27.3	0.0	23.3	27.5	24.8	22.5	24.7	0.0	16.5	24.4	14.9	0.0
Incr Delay (d2), s/veh	6.8	0.0	2.4	4.4	20.2	0.5	10.6	0.0	6.2	11.5	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.9	0.8	4.4	0.7	3.1	0.0	5.6	3.4	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	0.0	25.7	31.9	45.0	23.0	35.4	0.0	22.7	35.9	17.8	0.0
LnGrp LOS	C	A	C	C	D	C	D	A	C	D	B	A
Approach Vol, veh/h		219			339			668			590	
Approach Delay, s/veh		28.6			39.3			26.4			24.4	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	25.6	7.4	13.6	12.7	26.3	8.0	13.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	19.0	5.1	8.4	9.3	19.2	5.0	8.5
Max Q Clear Time (g_c+I1), s	9.1	15.1	3.8	6.9	8.4	11.8	4.6	9.4
Green Ext Time (p_c), s	0.0	1.0	0.0	0.1	0.0	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	13	313	188	33	225	0	123	0	20	2	0	12
Future Vol, veh/h	13	313	188	33	225	0	123	0	20	2	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	14	333	200	35	239	0	131	0	21	2	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	239	0	0	533	0	0	777	770	433	781	870	239
Stage 1	-	-	-	-	-	-	461	461	-	309	309	-
Stage 2	-	-	-	-	-	-	316	309	-	472	561	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1328	-	-	1040	-	-	309	326	614	315	292	805
Stage 1	-	-	-	-	-	-	573	559	-	705	663	-
Stage 2	-	-	-	-	-	-	687	652	-	576	513	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1328	-	-	1040	-	-	292	309	614	292	277	805
Mov Cap-2 Maneuver	-	-	-	-	-	-	292	309	-	292	277	-
Stage 1	-	-	-	-	-	-	564	551	-	694	637	-
Stage 2	-	-	-	-	-	-	650	627	-	548	505	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.1	26.7	10.7
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	315	1328	-	-	1040	-	-	643
HCM Lane V/C Ratio	0.483	0.01	-	-	0.034	-	-	0.023
HCM Control Delay (s)	26.7	7.7	0	-	8.6	0	-	10.7
HCM Lane LOS	D	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.5	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	287	225	9	6	33
Future Vol, veh/h	52	287	225	9	6	33
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	62	342	268	11	7	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	279	0	-	0	740	275
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	466	-
Critical Hdwy	4.12	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1284	-	-	-	387	769
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	636	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1284	-	-	-	364	768
Mov Cap-2 Maneuver	-	-	-	-	364	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	636	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1284	-	-	-	656
HCM Lane V/C Ratio	0.048	-	-	-	0.071
HCM Control Delay (s)	7.9	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	230	62	13	197	37	8
Future Vol, veh/h	230	62	13	197	37	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	274	74	15	235	44	10

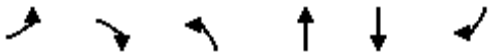
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	348	0	576	311
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	265	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1216	-	479	729
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	779	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1216	-	472	729
Mov Cap-2 Maneuver	-	-	-	-	472	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	768	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	-	-	1216	-
HCM Lane V/C Ratio	0.106	-	-	0.013	-
HCM Control Delay (s)	13	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	580	186	180	1598	2463	967
Future Volume (veh/h)	580	186	180	1598	2463	967
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	598	189	186	1647	2539	985
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	576	423	178	2724	2251	1247
Arrive On Green	0.06	0.06	0.10	0.77	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	598	189	186	1647	2539	985
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.0	12.4	12.0	24.2	76.0	41.7
Cycle Q Clear(g_c), s	20.0	12.4	12.0	24.2	76.0	41.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	576	423	178	2724	2251	1247
V/C Ratio(X)	1.04	0.45	1.04	0.60	1.13	0.79
Avail Cap(c_a), veh/h	576	423	178	2724	2251	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.7	41.7	54.0	6.1	22.0	6.6
Incr Delay (d2), s/veh	36.5	1.6	79.6	0.4	64.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.2	11.7	9.1	5.9	45.2	23.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	93.2	43.4	133.6	6.5	86.0	10.1
LnGrp LOS	F	D	F	A	F	B
Approach Vol, veh/h	787			1833	3524	
Approach Delay, s/veh	81.2			19.4	64.8	
Approach LOS	F			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.0	96.0	16.0	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	91.5	11.5	75.5
Max Q Clear Time (g_c+I1), s	22.0	26.2	14.0	78.0
Green Ext Time (p_c), s	0.0	17.8	0.0	0.0

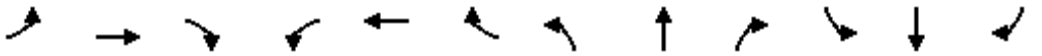
Intersection Summary	
HCM 6th Ctrl Delay	53.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/03/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	258	199	66	185	316	113	347	99	487	622	148
Future Volume (veh/h)	150	258	199	66	185	316	113	347	99	487	622	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	156	269	184	69	193	95	118	361	95	507	648	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	190	265	181	87	377	320	150	371	98	533	896	759
Arrive On Green	0.11	0.26	0.25	0.05	0.20	0.20	0.08	0.26	0.26	0.10	0.16	0.16
Sat Flow, veh/h	1781	1024	701	1795	1885	1598	1767	1409	371	1795	1885	1598
Grp Volume(v), veh/h	156	0	453	69	193	95	118	0	456	507	648	76
Grp Sat Flow(s),veh/h/ln	1781	0	1725	1795	1885	1598	1767	0	1779	1795	1885	1598
Q Serve(g_s), s	10.3	0.0	31.0	4.6	10.9	6.1	7.9	0.0	30.5	33.7	39.2	4.9
Cycle Q Clear(g_c), s	10.3	0.0	31.0	4.6	10.9	6.1	7.9	0.0	30.5	33.7	39.2	4.9
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	190	0	446	87	377	320	150	0	469	533	896	759
V/C Ratio(X)	0.82	0.00	1.02	0.80	0.51	0.30	0.79	0.00	0.97	0.95	0.72	0.10
Avail Cap(c_a), veh/h	214	0	446	87	377	320	171	0	469	533	896	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.45	0.45	0.45
Uniform Delay (d), s/veh	52.5	0.0	44.6	56.5	42.8	40.8	53.8	0.0	43.8	53.3	43.1	28.6
Incr Delay (d2), s/veh	20.2	0.0	46.9	38.5	1.2	0.5	19.0	0.0	35.4	16.0	2.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	18.8	3.0	5.2	2.4	4.2	0.0	17.5	18.5	20.3	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.7	0.0	91.5	95.0	43.9	41.3	72.8	0.0	79.3	69.3	45.4	28.7
LnGrp LOS	E	A	F	F	D	D	E	A	E	E	D	C
Approach Vol, veh/h		609			357			574			1231	
Approach Delay, s/veh		86.7			53.1			77.9			54.2	
Approach LOS		F			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.6	35.6	9.8	35.0	14.2	61.0	16.8	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	35.1	31.1	5.3	30.5	11.1	55.1	13.9	21.9
Max Q Clear Time (g_c+I1), s	35.7	32.5	6.6	33.0	9.9	41.2	12.3	12.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	3.6	0.1	0.9

Intersection Summary	
HCM 6th Ctrl Delay	66.1
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	207	37	0	363	0	75	1	5	1	0	19
Future Vol, veh/h	5	207	37	0	363	0	75	1	5	1	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	5	5	5	0	0	0	0	0	0
Mvmt Flow	6	233	42	0	408	0	84	1	6	1	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	408	0	0	275	0	0	687	674	256	680	695	410
Stage 1	-	-	-	-	-	-	266	266	-	408	408	-
Stage 2	-	-	-	-	-	-	421	408	-	272	287	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1135	-	-	1271	-	-	364	379	788	368	368	646
Stage 1	-	-	-	-	-	-	744	692	-	624	600	-
Stage 2	-	-	-	-	-	-	614	600	-	738	678	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1135	-	-	1271	-	-	350	377	786	362	366	645
Mov Cap-2 Maneuver	-	-	-	-	-	-	350	377	-	362	366	-
Stage 1	-	-	-	-	-	-	740	688	-	620	600	-
Stage 2	-	-	-	-	-	-	593	600	-	726	674	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	18.2	11
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	363	1135	-	-	1271	-	-	621
HCM Lane V/C Ratio	0.251	0.005	-	-	-	-	-	0.036
HCM Control Delay (s)	18.2	8.2	0	-	0	-	-	11
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	145	56	12	185	2	149	0	31	3	0	31
Future Vol, veh/h	16	145	56	12	185	2	149	0	31	3	0	31
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	7	7	7	6	6	6	0	0	0	0	0	0
Mvmt Flow	20	184	71	15	234	3	189	0	39	4	0	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	239	0	0	255	0	0	545	529	222	549	563	238
Stage 1	-	-	-	-	-	-	260	260	-	268	268	-
Stage 2	-	-	-	-	-	-	285	269	-	281	295	-
Critical Hdwy	4.17	-	-	4.16	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.263	-	-	2.254	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1299	-	-	1287	-	-	452	458	823	450	438	806
Stage 1	-	-	-	-	-	-	749	697	-	742	691	-
Stage 2	-	-	-	-	-	-	727	690	-	730	673	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1297	-	-	1287	-	-	420	443	821	417	424	804
Mov Cap-2 Maneuver	-	-	-	-	-	-	420	443	-	417	424	-
Stage 1	-	-	-	-	-	-	736	684	-	727	681	-
Stage 2	-	-	-	-	-	-	683	680	-	681	661	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	20.3	10.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	459	1297	-	-	1287	-	-	743
HCM Lane V/C Ratio	0.496	0.016	-	-	0.012	-	-	0.058
HCM Control Delay (s)	20.3	7.8	0	-	7.8	0	-	10.1
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.7	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	13	417	81	12	291	0	58	0	4	2	0	12
Future Vol, veh/h	13	417	81	12	291	0	58	0	4	2	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	1	1	1	6	6	6	0	0	0
Mvmt Flow	14	444	86	13	310	0	62	0	4	2	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	310	0	0	530	0	0	858	851	487	853	894	310
Stage 1	-	-	-	-	-	-	515	515	-	336	336	-
Stage 2	-	-	-	-	-	-	343	336	-	517	558	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1250	-	-	1042	-	-	273	293	572	281	283	735
Stage 1	-	-	-	-	-	-	535	528	-	682	645	-
Stage 2	-	-	-	-	-	-	664	635	-	545	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1250	-	-	1042	-	-	262	284	572	272	274	735
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	284	-	272	274	-
Stage 1	-	-	-	-	-	-	526	520	-	671	635	-
Stage 2	-	-	-	-	-	-	643	625	-	532	507	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	22.5	11.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	271	1250	-	-	1042	-	-	591
HCM Lane V/C Ratio	0.243	0.011	-	-	0.012	-	-	0.025
HCM Control Delay (s)	22.5	7.9	0	-	8.5	0	-	11.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.9	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	52	209	166	37	167	9	103	0	23	6	0	33
Future Vol, veh/h	52	209	166	37	167	9	103	0	23	6	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	62	249	198	44	199	11	123	0	27	7	0	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	210	0	0	447	0	0	785	770	348	779	864	206
Stage 1	-	-	-	-	-	-	472	472	-	293	293	-
Stage 2	-	-	-	-	-	-	313	298	-	486	571	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1361	-	-	1119	-	-	313	333	700	316	294	840
Stage 1	-	-	-	-	-	-	576	562	-	719	674	-
Stage 2	-	-	-	-	-	-	702	671	-	566	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1361	-	-	1119	-	-	274	298	700	279	263	839
Mov Cap-2 Maneuver	-	-	-	-	-	-	274	298	-	279	263	-
Stage 1	-	-	-	-	-	-	540	527	-	674	644	-
Stage 2	-	-	-	-	-	-	638	641	-	510	477	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1.5	27.3	11.1
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	308	1361	-	-	1119	-	-	641
HCM Lane V/C Ratio	0.487	0.045	-	-	0.039	-	-	0.072
HCM Control Delay (s)	27.3	7.8	0	-	8.3	0	-	11.1
HCM Lane LOS	D	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.5	0.1	-	-	0.1	-	-	0.2

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

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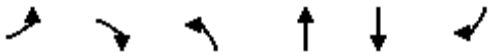

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	493	159	151	1506	2232	762
Future Volume (veh/h)	493	159	151	1506	2232	762
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	519	162	159	1585	2349	787
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	570	409	166	2730	2280	1257
Arrive On Green	0.05	0.05	0.09	0.77	0.64	0.64
Sat Flow, veh/h	3456	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	519	162	159	1585	2349	787
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1552
Q Serve(g_s), s	17.9	10.7	10.7	22.4	77.0	23.9
Cycle Q Clear(g_c), s	17.9	10.7	10.7	22.4	77.0	23.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	570	409	166	2730	2280	1257
V/C Ratio(X)	0.91	0.40	0.96	0.58	1.03	0.63
Avail Cap(c_a), veh/h	570	409	166	2730	2280	1257
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.8	41.9	54.2	5.8	21.5	4.6
Incr Delay (d2), s/veh	11.9	1.4	56.8	0.3	27.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	10.1	7.2	5.5	33.8	13.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	67.7	43.2	111.0	6.1	48.6	5.5
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	681			1744	3136	
Approach Delay, s/veh	61.9			15.7	37.8	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.8	96.2	15.2	81.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.3	91.7	10.7	76.5
Max Q Clear Time (g_c+I1), s	19.9	24.4	12.7	79.0
Green Ext Time (p_c), s	0.0	16.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	33.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

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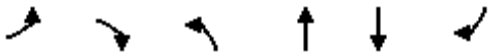

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	501	161	154	1506	2232	776
Future Volume (veh/h)	501	161	154	1506	2232	776
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	527	164	162	1585	2349	802
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	567	409	168	2733	2280	1256
Arrive On Green	0.05	0.05	0.09	0.77	0.64	0.64
Sat Flow, veh/h	3456	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	527	164	162	1585	2349	802
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1552
Q Serve(g_s), s	18.2	10.8	10.9	22.3	77.0	24.9
Cycle Q Clear(g_c), s	18.2	10.8	10.9	22.3	77.0	24.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	567	409	168	2733	2280	1256
V/C Ratio(X)	0.93	0.40	0.97	0.58	1.03	0.64
Avail Cap(c_a), veh/h	567	409	168	2733	2280	1256
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	41.9	54.2	5.8	21.5	4.7
Incr Delay (d2), s/veh	13.9	1.4	59.2	0.3	27.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	10.2	7.4	5.4	33.8	13.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	69.9	43.3	113.3	6.1	48.6	5.8
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	691			1747	3151	
Approach Delay, s/veh	63.6			16.0	37.7	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.7	96.3	15.3	81.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.2	91.8	10.8	76.5
Max Q Clear Time (g_c+I1), s	20.2	24.3	12.9	79.0
Green Ext Time (p_c), s	0.0	16.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	34.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
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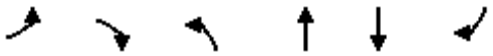
12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	505	162	155	1520	2252	783
Future Volume (veh/h)	505	162	155	1520	2252	783
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	532	166	163	1600	2371	809
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	593	423	169	2707	2251	1255
Arrive On Green	0.06	0.06	0.09	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	532	166	163	1600	2371	809
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	18.4	10.9	10.9	23.4	76.0	25.5
Cycle Q Clear(g_c), s	18.4	10.9	10.9	23.4	76.0	25.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	593	423	169	2707	2251	1255
V/C Ratio(X)	0.90	0.39	0.96	0.59	1.05	0.64
Avail Cap(c_a), veh/h	593	423	169	2707	2251	1255
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.5	41.3	54.1	6.2	22.0	4.8
Incr Delay (d2), s/veh	10.3	1.3	58.2	0.3	34.9	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	10.3	7.4	5.9	36.1	14.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	65.9	42.6	112.2	6.5	56.9	5.9
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	698			1763	3180	
Approach Delay, s/veh	60.4			16.3	43.9	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.6	95.4	15.4	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.1	90.9	10.9	75.5
Max Q Clear Time (g_c+I1), s	20.4	25.4	12.9	78.0
Green Ext Time (p_c), s	0.0	16.8	0.0	0.0

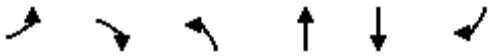
Intersection Summary	
HCM 6th Ctrl Delay	37.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	533	167	164	1520	2252	827
Future Volume (veh/h)	533	167	164	1520	2252	827
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	561	172	173	1600	2371	855
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	576	423	178	2724	2251	1247
Arrive On Green	0.06	0.06	0.10	0.77	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	561	172	173	1600	2371	855
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	19.5	11.2	11.6	22.9	76.0	29.5
Cycle Q Clear(g_c), s	19.5	11.2	11.6	22.9	76.0	29.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	576	423	178	2724	2251	1247
V/C Ratio(X)	0.97	0.41	0.97	0.59	1.05	0.69
Avail Cap(c_a), veh/h	576	423	178	2724	2251	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.4	41.3	53.8	5.9	22.0	5.3
Incr Delay (d2), s/veh	20.5	1.4	58.8	0.3	34.9	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.6	10.7	7.9	5.6	36.1	16.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	76.9	42.7	112.6	6.3	56.9	6.9
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	733			1773	3226	
Approach Delay, s/veh	68.9			16.6	43.7	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.0	96.0	16.0	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	91.5	11.5	75.5
Max Q Clear Time (g_c+I1), s	21.5	24.9	13.6	78.0
Green Ext Time (p_c), s	0.0	16.9	0.0	0.0

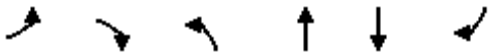
Intersection Summary	
HCM 6th Ctrl Delay	38.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	534	168	164	1525	2259	829
Future Volume (veh/h)	534	168	164	1525	2259	829
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	562	173	173	1605	2378	857
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	576	423	178	2724	2251	1247
Arrive On Green	0.06	0.06	0.10	0.77	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	562	173	173	1605	2378	857
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	19.5	11.3	11.6	23.1	76.0	29.6
Cycle Q Clear(g_c), s	19.5	11.3	11.6	23.1	76.0	29.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	576	423	178	2724	2251	1247
V/C Ratio(X)	0.98	0.41	0.97	0.59	1.06	0.69
Avail Cap(c_a), veh/h	576	423	178	2724	2251	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	41.3	53.8	6.0	22.0	5.4
Incr Delay (d2), s/veh	20.8	1.4	58.8	0.3	36.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.7	10.7	7.9	5.6	36.5	16.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	77.2	42.7	112.6	6.3	58.0	7.0
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	735			1778	3235	
Approach Delay, s/veh	69.1			16.6	44.5	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.0	96.0	16.0	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	91.5	11.5	75.5
Max Q Clear Time (g_c+I1), s	21.5	25.1	13.6	78.0
Green Ext Time (p_c), s	0.0	17.0	0.0	0.0

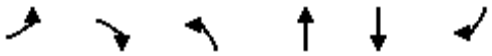
Intersection Summary	
HCM 6th Ctrl Delay	39.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	541	170	166	1525	2259	840
Future Volume (veh/h)	541	170	166	1525	2259	840
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	569	175	175	1605	2378	869
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	605	436	178	2695	2221	1247
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	569	175	175	1605	2378	869
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	19.7	11.4	11.8	23.9	75.0	30.6
Cycle Q Clear(g_c), s	19.7	11.4	11.8	23.9	75.0	30.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	605	436	178	2695	2221	1247
V/C Ratio(X)	0.94	0.40	0.98	0.60	1.07	0.70
Avail Cap(c_a), veh/h	605	436	178	2695	2221	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.9	40.7	53.9	6.4	22.5	5.5
Incr Delay (d2), s/veh	14.7	1.3	62.1	0.4	41.3	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	10.8	8.1	6.0	37.8	17.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	70.6	42.1	116.0	6.7	63.8	7.2
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	744			1780	3247	
Approach Delay, s/veh	63.9			17.5	48.6	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	25.0	95.0	16.0	79.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	90.5	11.5	74.5
Max Q Clear Time (g_c+I1), s	21.7	25.9	13.8	77.0
Green Ext Time (p_c), s	0.0	16.9	0.0	0.0

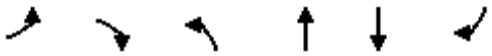
Intersection Summary	
HCM 6th Ctrl Delay	41.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	543	171	167	1534	2273	844
Future Volume (veh/h)	543	171	167	1534	2273	844
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	572	176	176	1615	2393	873
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	576	423	178	2724	2251	1247
Arrive On Green	0.06	0.06	0.10	0.77	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	572	176	176	1615	2393	873
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	19.9	11.5	11.8	23.3	76.0	30.9
Cycle Q Clear(g_c), s	19.9	11.5	11.8	23.3	76.0	30.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	576	423	178	2724	2251	1247
V/C Ratio(X)	0.99	0.42	0.99	0.59	1.06	0.70
Avail Cap(c_a), veh/h	576	423	178	2724	2251	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.6	41.4	53.9	6.0	22.0	5.5
Incr Delay (d2), s/veh	24.4	1.5	63.8	0.3	38.4	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.1	10.9	8.2	5.7	37.2	17.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	81.0	42.8	117.7	6.3	60.4	7.3
LnGrp LOS	F	D	F	A	F	A
Approach Vol, veh/h	748			1791	3266	
Approach Delay, s/veh	72.0			17.3	46.2	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	24.0	96.0	16.0	80.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	91.5	11.5	75.5
Max Q Clear Time (g_c+I1), s	21.9	25.3	13.8	78.0
Green Ext Time (p_c), s	0.0	17.2	0.0	0.0

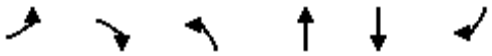
Intersection Summary	
HCM 6th Ctrl Delay	40.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	550	173	169	1534	2273	855
Future Volume (veh/h)	550	173	169	1534	2273	855
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	579	179	178	1615	2393	885
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	605	436	178	2695	2221	1247
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	579	179	178	1615	2393	885
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.1	11.7	12.0	24.2	75.0	31.9
Cycle Q Clear(g_c), s	20.1	11.7	12.0	24.2	75.0	31.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	605	436	178	2695	2221	1247
V/C Ratio(X)	0.96	0.41	1.00	0.60	1.08	0.71
Avail Cap(c_a), veh/h	605	436	178	2695	2221	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	40.8	54.0	6.4	22.5	5.6
Incr Delay (d2), s/veh	17.0	1.4	67.2	0.4	43.8	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.7	11.1	8.5	6.1	38.6	18.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	73.1	42.2	121.2	6.8	66.3	7.5
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	758			1793	3278	
Approach Delay, s/veh	65.8			18.2	50.4	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	25.0	95.0	16.0	79.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	90.5	11.5	74.5
Max Q Clear Time (g_c+I1), s	22.1	26.2	14.0	77.0
Green Ext Time (p_c), s	0.0	17.1	0.0	0.0

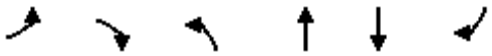
Intersection Summary	
HCM 6th Ctrl Delay	42.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	552	173	169	1539	2279	857
Future Volume (veh/h)	552	173	169	1539	2279	857
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	581	179	178	1620	2399	887
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	605	436	178	2695	2221	1247
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	581	179	178	1620	2399	887
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.1	11.7	12.0	24.3	75.0	32.0
Cycle Q Clear(g_c), s	20.1	11.7	12.0	24.3	75.0	32.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	605	436	178	2695	2221	1247
V/C Ratio(X)	0.96	0.41	1.00	0.60	1.08	0.71
Avail Cap(c_a), veh/h	605	436	178	2695	2221	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	40.8	54.0	6.4	22.5	5.6
Incr Delay (d2), s/veh	17.5	1.4	67.2	0.4	44.8	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	11.1	8.5	6.1	38.9	18.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	73.7	42.2	121.2	6.8	67.3	7.5
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	760			1798	3286	
Approach Delay, s/veh	66.3			18.1	51.2	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	25.0	95.0	16.0	79.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	90.5	11.5	74.5
Max Q Clear Time (g_c+I1), s	22.1	26.3	14.0	77.0
Green Ext Time (p_c), s	0.0	17.2	0.0	0.0

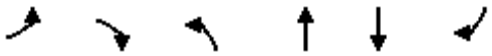
Intersection Summary	
HCM 6th Ctrl Delay	43.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	557	174	170	1539	2279	864
Future Volume (veh/h)	557	174	170	1539	2279	864
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	586	180	179	1620	2399	894
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	605	436	178	2695	2221	1247
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	586	180	179	1620	2399	894
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.3	11.7	12.0	24.3	75.0	32.6
Cycle Q Clear(g_c), s	20.3	11.7	12.0	24.3	75.0	32.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	605	436	178	2695	2221	1247
V/C Ratio(X)	0.97	0.41	1.00	0.60	1.08	0.72
Avail Cap(c_a), veh/h	605	436	178	2695	2221	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.2	40.9	54.0	6.4	22.5	5.7
Incr Delay (d2), s/veh	18.9	1.4	68.7	0.4	44.8	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	11.1	8.5	6.1	38.9	18.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	75.2	42.3	122.7	6.8	67.3	7.7
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	766			1799	3293	
Approach Delay, s/veh	67.4			18.3	51.1	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	25.0	95.0	16.0	79.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	90.5	11.5	74.5
Max Q Clear Time (g_c+I1), s	22.3	26.3	14.0	77.0
Green Ext Time (p_c), s	0.0	17.2	0.0	0.0

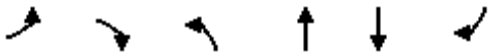
Intersection Summary	
HCM 6th Ctrl Delay	43.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/03/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	558	174	171	1539	2279	867
Future Volume (veh/h)	558	174	171	1539	2279	867
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	587	180	180	1620	2399	899
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	605	436	178	2695	2221	1247
Arrive On Green	0.06	0.06	0.10	0.76	0.63	0.63
Sat Flow, veh/h	3456	1585	1781	3647	3647	1551
Grp Volume(v), veh/h	587	180	180	1620	2399	899
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1777	1777	1551
Q Serve(g_s), s	20.3	11.7	12.0	24.3	75.0	33.1
Cycle Q Clear(g_c), s	20.3	11.7	12.0	24.3	75.0	33.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	605	436	178	2695	2221	1247
V/C Ratio(X)	0.97	0.41	1.01	0.60	1.08	0.72
Avail Cap(c_a), veh/h	605	436	178	2695	2221	1247
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.2	40.9	54.0	6.4	22.5	5.7
Incr Delay (d2), s/veh	19.2	1.4	70.2	0.4	44.8	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	11.1	8.6	6.1	38.9	18.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	75.5	42.3	124.2	6.8	67.3	7.8
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	767			1800	3298	
Approach Delay, s/veh	67.7			18.6	51.1	
Approach LOS	E			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	25.0	95.0	16.0	79.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	90.5	11.5	74.5
Max Q Clear Time (g_c+I1), s	22.3	26.3	14.0	77.0
Green Ext Time (p_c), s	0.0	17.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	43.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

S Redland Road at OR-213 (1st Hour)

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

AM Peak Hour												
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2021 Existing Conditions	33			293	43.3			10.7	75	19			42
2023 Background Conditions	27			271	41.7			11.3	75	15			41
2023 Buildout Conditions (Phase 1)	26			268	41.6			11.4	75	14			41
2026 Background Conditions (Phase 1)	26			268	41.6			11.4	75	14			41
2026 Buildout Conditions (Phase 1-2)	25			262	41.5			11.5	75	14			40
2027 Background Conditions (Phase 1-2)	25			258	41.5			11.5	75	14			40
2027 Buildout Conditions (Phase 1-3)	22			262	40.4			11.6	75	12			41
2029 Background Conditions (Phase 1-3)	22			262	40.4			11.6	75	12			41
2029 Buildout Conditions (Phase 1-4)	22			258	40.4			11.6	75	12			40
2030 Background Conditions (Phase 1-4)	21			258	40.4			11.6	75	11			40
2030 Buildout Conditions (Phase 1-5)	21			259	40.3			11.7	75	11			40
2030 Buildout Conditions (Phase 1-6)	21			259	40.3			11.7	75	11			40

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

AM Peak Hour													
		Adjust Flow		Saturated Flow			Adj/Sat Flows				C	L	Xc
	Critcial Movement	EBL	NBT	EBL	NBT	EBL	NBT	0	Sum				
2021 Existing Conditions		609	2087	3401	3561	0.179065	0.586071		0.765136		75	12	0.911
2023 Background Conditions		664	2111	3401	3561	0.195237	0.592811		0.788048		75	12	0.938
2023 Buildout Conditions (Phase 1)		679	2111	3401	3561	0.199647	0.592811		0.792458		75	12	0.943
2026 Background Conditions (Phase 1)		684	2130	3401	3561	0.201117	0.598147		0.799264		75	12	0.952
2026 Buildout Conditions (Phase 1-2)		732	2130	3401	3561	0.215231	0.598147		0.813377		75	12	0.968
2027 Background Conditions (Phase 1-2)	EBL NBT	734	2137	3401	3561	0.215819	0.600112		0.815931		75	12	0.971
2027 Buildout Conditions (Phase 1-3)		746	2137	3401	3561	0.219347	0.600112		0.81946		75	12	0.976
2029 Background Conditions (Phase 1-3)		750	2150	3401	3561	0.220523	0.603763		0.824286		75	12	0.981
2029 Buildout Conditions (Phase 1-4)		761	2150	3401	3561	0.223758	0.603763		0.827521		75	12	0.985
2030 Background Conditions (Phase 1-4)		762	2156	3401	3561	0.224052	0.605448		0.8295		75	12	0.987
2030 Buildout Conditions (Phase 1-5)		769	2156	3401	3561	0.22611	0.605448		0.831558		75	12	0.990
2030 Buildout Conditions (Phase 1-6)		771	2156	3401	3561	0.226698	0.605448		0.832146		75	12	0.991

S Redland Road at S Holcomb Boulevard/Abernethy Road

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

AM Peak Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2021 Existing Conditions	58	248	6	191	47.1	47	35.5	36.5	60	46	194	4	116
2023 Background Conditions	56	294	6	191	47.6	48	35	36	60	44	235	4	115
2023 Buildout Conditions (Phase 1)	54	312	6	191	47.6	48	35	36	60	43	250	4	115
2026 Background Conditions (Phase 1)	53	321	6	191	48	48	35.6	35.6	60	42	257	4	113
2026 Buildout Conditions (Phase 1-2)	49	379	6	191	46	46	37.6	37.2	60	38	291	4	118
2027 Background Conditions (Phase 1-2)	50	381	6	191	46.1	46	37.5	37.1	60	38	292	4	118
2027 Buildout Conditions (Phase 1-3)	49	394	6	191	46.1	46	37.6	37.1	60	38	302	4	118
2029 Background Conditions (Phase 1-3)	48	401	6	191	46.1	46	37.7	37.3	60	37	307	4	119
2029 Buildout Conditions (Phase 1-4)	47	414	6	191	46.1	46	37.9	37.3	60	36	317	4	119
2030 Background Conditions (Phase 1-4)	46	417	6	191	47	46.9	37	36.4	60	36	326	4	116
2030 Buildout Conditions (Phase 1-5)	46	424	6	191	47.1	47	36.5	36.3	60	36	332	4	116
2030 Buildout Conditions (Phase 1-6)	45	427	6	191	47.1	47	36.5	36.3	60	35	334	4	116

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

AM Peak Hour																	
	Critcial Movement				Adjust Flow				Saturated Flow				Adj/Sat Flows					C	L	Xc
					EBL	WBT	NBTR	SBL	EBL	WBT	NBTR	SBL	EBL	WBT	NBTR	SBL	Sum			
2021 Existing Conditions	EBL	WBT	NBTR	SBL	41	127	428	143	1640	1826	1853	1739	0.025	0.069551	0.230977	0.082231	0.407759	60	16	0.556
2023 Background Conditions					71	160	434	160	1640	1826	1852	1739	0.043293	0.087623	0.234341	0.092007	0.457264	60	16	0.624
2023 Buildout Conditions (Phase 1)					71	170	434	167	1640	1826	1852	1739	0.043293	0.0931	0.234341	0.096032	0.466766	60	16	0.636
2026 Background Conditions (Phase 1)					72	174	448	171	1640	1826	1852	1739	0.043902	0.09529	0.241901	0.098332	0.479426	60	16	0.654
2026 Buildout Conditions (Phase 1-2)					72	204	450	193	1640	1826	1851	1739	0.043902	0.11172	0.243112	0.110983	0.509717	60	16	0.695
2027 Background Conditions (Phase 1-2)					73	206	453	196	1640	1826	1851	1739	0.044512	0.112815	0.244733	0.112708	0.514768	60	16	0.702
2027 Buildout Conditions (Phase 1-3)					73	213	456	201	1640	1826	1851	1739	0.044512	0.116648	0.246353	0.115584	0.523098	60	16	0.713
2029 Background Conditions (Phase 1-3)					73	216	466	204	1640	1826	1851	1739	0.044512	0.118291	0.251756	0.117309	0.531868	60	16	0.725
2029 Buildout Conditions (Phase 1-4)					73	222	466	209	1640	1826	1851	1739	0.044512	0.121577	0.251756	0.120184	0.538029	60	16	0.734
2030 Background Conditions (Phase 1-4)					74	224	470	210	1640	1826	1851	1739	0.045122	0.122673	0.253917	0.120759	0.54247	60	16	0.740
2030 Buildout Conditions (Phase 1-5)					74	229	470	213	1640	1826	1851	1739	0.045122	0.125411	0.253917	0.122484	0.546934	60	16	0.746
2030 Buildout Conditions (Phase 1-6)					74	230	470	214	1640	1826	1851	1739	0.045122	0.125958	0.253917	0.123059	0.548056	60	16	0.747

S Redland Road at OR-213 (1st Hour)

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

PM Peak Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2021 Existing Conditions	7			118	85			13.5	120	5			13
2023 Background Conditions	5			103	82			15	120	3			13
2023 Buildout Conditions (Phase 1)	5			98	81			15	120	3			12
2026 Background Conditions (Phase 1)	5			102	81			15.2	120	3			13
2026 Buildout Conditions (Phase 1-2)	4			96	80			15.6	120	3			12
2027 Background Conditions (Phase 1-2)	4			96	80			15.6	120	3			12
2027 Buildout Conditions (Phase 1-3)	4			93	80			15.6	120	3			12
2029 Background Conditions (Phase 1-3)	4			89	80			15.5	120	3			11
2029 Buildout Conditions (Phase 1-4)	4			89	80			15.6	120	3			12
2030 Background Conditions (Phase 1-4)	4			92	80			15.9	120	3			12
2030 Buildout Conditions (Phase 1-5)	4			94	80			16	120	3			13
2030 Buildout Conditions (Phase 1-6)	4			92	80			16	120	3			12

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

PM Peak Hour															
	Critcial Movement			Adjust Flow			Saturated Flow			Adj/Sat Flows				C	L	Xc
				EBL	NBL	SBT	EBL	NBL	SBT	EBL	NBL	SBT	Sum			
2021 Existing Conditions	EBL	NBL	SBT	448	133	2451	3456	1781	3647	0.12963	0.074677	0.672059	0.876366	120	12	0.974
2023 Background Conditions				527	163	2487	3456	1781	3647	0.152488	0.091522	0.68193	0.92594	120	12	1.029
2023 Buildout Conditions (Phase 1)				536	166	2487	3456	1781	3647	0.155093	0.093206	0.68193	0.930229	120	12	1.034
2026 Background Conditions (Phase 1)				540	167	2509	3456	1781	3647	0.15625	0.093768	0.687963	0.93798	120	12	1.042
2026 Buildout Conditions (Phase 1-2)				571	177	2509	3456	1781	3647	0.16522	0.099382	0.687963	0.952565	120	12	1.058
2027 Background Conditions (Phase 1-2)				572	177	2516	3456	1781	3647	0.165509	0.099382	0.689882	0.954774	120	12	1.061
2027 Buildout Conditions (Phase 1-3)				580	179	2516	3456	1781	3647	0.167824	0.100505	0.689882	0.958212	120	12	1.065
2029 Background Conditions (Phase 1-3)				584	180	2532	3456	1781	3647	0.168981	0.101067	0.694269	0.964318	120	12	1.071
2029 Buildout Conditions (Phase 1-4)				591	182	2532	3456	1781	3647	0.171007	0.10219	0.694269	0.967466	120	12	1.075
2030 Background Conditions (Phase 1-4)				592	184	2539	3456	1781	3647	0.171296	0.103313	0.696189	0.970798	120	12	1.079
2030 Buildout Conditions (Phase 1-5)				597	185	2539	3456	1781	3647	0.172743	0.103874	0.696189	0.972806	120	12	1.081
2030 Buildout Conditions (Phase 1-6)				598	186	2539	3456	1781	3647	0.173032	0.104436	0.696189	0.973657	120	12	1.082

S Redland Road at S Holcomb Boulevard/Abernethy Road

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

PM Peak Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2021 Existing Conditions	43	215	11	95	88	90.8	76	58.9	120	32	163	7	47
2023 Background Conditions	40	236	11	148	87	98.4	79	60	120	29	194	7	74
2023 Buildout Conditions (Phase 1)	38	248	11	148	86	97.6	80.2	60.2	120	27	202	7	74
2026 Background Conditions (Phase 1)	39	255	11	148	85	96.6	81.2	61.6	120	28	205	7	76
2026 Buildout Conditions (Phase 1-2)	34	284	12	150	85	93.2	82	60.4	120	24	221	8	76
2027 Background Conditions (Phase 1-2)	34	280	12	151	86	94.4	81	59.4	120	24	220	8	75
2027 Buildout Conditions (Phase 1-3)	33	284	12	151	86	94.4	82	59.4	120	24	223	8	75
2029 Background Conditions (Phase 1-3)	33	284	12	151	86	94.4	82	59.6	120	24	223	8	75
2029 Buildout Conditions (Phase 1-4)	32	286	12	152	86	94.6	82.8	59.4	120	23	225	8	75
2030 Background Conditions (Phase 1-4)	32	289	12	149	85	93.6	83.8	60.4	120	23	225	8	75
2030 Buildout Conditions (Phase 1-5)	31	290	12	149	85	93.6	84.2	60.4	120	22	226	8	75
2030 Buildout Conditions (Phase 1-6)	31	289	12	149	85	93.6	84.4	60.4	120	22	225	8	75

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

PM Peak Hour																		
	Critcial Movement				Adjust Flow				Saturated Flow				Adj/Sat Flows					C	L	Xc
					EBTR	WBL	NBTR	SBL	EBTR	WBL	NBTR	SBL	EBTR	WBL	NBTR	SBL	Sum			
2021 Existing Conditions	EBTR	WBL	NBTR	SBL	300	55	414	310	1702	1795	1790	1795	0.176263	0.030641	0.231285	0.172702	0.610891	120	16	0.705
2023 Background Conditions					357	58	412	362	1707	1795	1785	1795	0.209139	0.032312	0.230812	0.201671	0.673934	120	16	0.778
2023 Buildout Conditions (Phase 1)					368	59	415	381	1710	1795	1783	1795	0.215205	0.032869	0.232754	0.212256	0.693084	120	16	0.800
2026 Background Conditions (Phase 1)					379	61	430	392	1710	1795	1783	1795	0.221637	0.033983	0.241167	0.218384	0.715172	120	16	0.825
2026 Buildout Conditions (Phase 1-2)					414	65	434	451	1720	1795	1781	1795	0.240698	0.036212	0.243683	0.251253	0.771846	120	16	0.891
2027 Background Conditions (Phase 1-2)					417	66	438	455	1719	1795	1781	1795	0.242583	0.036769	0.245929	0.253482	0.778763	120	16	0.899
2027 Buildout Conditions (Phase 1-3)					425	67	439	470	1721	1795	1780	1795	0.246949	0.037326	0.246629	0.261838	0.792743	120	16	0.915
2029 Background Conditions (Phase 1-3)					432	68	449	476	1721	1795	1781	1795	0.251017	0.037883	0.252106	0.265181	0.806186	120	16	0.930
2029 Buildout Conditions (Phase 1-4)					441	69	450	491	1723	1795	1780	1795	0.255949	0.03844	0.252809	0.273538	0.820736	120	16	0.947
2030 Background Conditions (Phase 1-4)					445	69	455	495	1724	1795	1780	1795	0.258121	0.03844	0.255618	0.275766	0.827945	120	16	0.955
2030 Buildout Conditions (Phase 1-5)					451	69	456	503	1724	1795	1780	1795	0.261601	0.03844	0.25618	0.280223	0.836444	120	16	0.965
2030 Buildout Conditions (Phase 1-6)					453	69	456	507	1725	1795	1780	1795	0.262609	0.03844	0.25618	0.282451	0.83968	120	16	0.969

S Redland Road at OR-213 (2nd Hour)

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

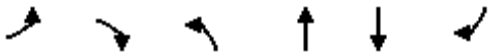
PM 2nd Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2021 Existing Conditions	-			-	-			-	120	#VALUE!			#VALUE!
2023 Background Conditions	7			114	81			15.2	120	5			14
2023 Buildout Conditions (Phase 1)	7			111	81			15.3	120	5			14
2026 Background Conditions (Phase 1)	6			113	80			15.4	120	5			14
2026 Buildout Conditions (Phase 1-2)	6			111	80			16	120	4			15
2027 Background Conditions (Phase 1-2)	6			111	80			16	120	4			15
2027 Buildout Conditions (Phase 1-3)	6			108	79			16	120	4			14
2029 Background Conditions (Phase 1-3)	6			106	80			16	120	4			14
2029 Buildout Conditions (Phase 1-4)	5			103	79			16	120	3			14
2030 Background Conditions (Phase 1-4)	5			103	79			16	120	3			14
2030 Buildout Conditions (Phase 1-5)	5			102	79			16	120	3			14
2030 Buildout Conditions (Phase 1-6)	5			100	79			16	120	3			13

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

PM 2nd Hour															
	Critcial Movement			Adjust Flow			Saturated Flow			Adj/Sat Flows				C	L	Xc
				EBL	NBL	SBT	EBL	NBL	SBT	EBL	NBL	SBT	Sum			
2021 Existing Conditions	EBL	NBL	SBT	-	-	-	-	-	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	120	12	#VALUE!
2023 Background Conditions				519	159	2349	3456	1781	3647	0.150174	0.089276	0.644091	0.88354	120	12	0.982
2023 Buildout Conditions (Phase 1)				527	162	2349	3456	1781	3647	0.152488	0.09096	0.644091	0.88754	120	12	0.986
2026 Background Conditions (Phase 1)				532	163	2371	3456	1781	3647	0.153935	0.091522	0.650123	0.89558	120	12	0.995
2026 Buildout Conditions (Phase 1-2)				561	173	2371	3456	1781	3647	0.162326	0.097136	0.650123	0.909586	120	12	1.011
2027 Background Conditions (Phase 1-2)				562	173	2378	3456	1781	3647	0.162616	0.097136	0.652043	0.911795	120	12	1.013
2027 Buildout Conditions (Phase 1-3)				569	175	2378	3456	1781	3647	0.164641	0.098259	0.652043	0.914943	120	12	1.017
2029 Background Conditions (Phase 1-3)				572	176	2393	3456	1781	3647	0.165509	0.098821	0.656156	0.920486	120	12	1.023
2029 Buildout Conditions (Phase 1-4)				579	178	2393	3456	1781	3647	0.167535	0.099944	0.656156	0.923634	120	12	1.026
2030 Background Conditions (Phase 1-4)				581	178	2399	3456	1781	3647	0.168113	0.099944	0.657801	0.925858	120	12	1.029
2030 Buildout Conditions (Phase 1-5)				586	179	2399	3456	1781	3647	0.16956	0.100505	0.657801	0.927866	120	12	1.031
2030 Buildout Conditions (Phase 1-6)				587	180	2399	3456	1781	3647	0.16985	0.101067	0.657801	0.928717	120	12	1.032

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/06/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	694	115	102	1940	1264	467
Future Volume (veh/h)	694	115	102	1940	1264	467
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1826	1826	1796	1796
Adj Flow Rate, veh/h	771	115	113	2156	1404	462
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	5	5	7	7
Cap, veh/h	1022	463	157	2290	1717	1080
Arrive On Green	0.07	0.07	0.09	0.66	0.50	0.50
Sat Flow, veh/h	4944	1560	1739	3561	3503	1522
Grp Volume(v), veh/h	771	115	113	2156	1404	462
Grp Sat Flow(s),veh/h/ln	1648	1560	1739	1735	1706	1522
Q Serve(g_s), s	9.2	3.7	3.8	33.5	20.8	7.6
Cycle Q Clear(g_c), s	9.2	3.7	3.8	33.5	20.8	7.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1022	463	157	2290	1717	1080
V/C Ratio(X)	0.75	0.25	0.72	0.94	0.82	0.43
Avail Cap(c_a), veh/h	1022	463	191	2313	1717	1080
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	19.0	26.6	9.2	12.6	3.6
Incr Delay (d2), s/veh	3.5	0.9	9.8	8.5	3.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	3.6	1.8	7.4	5.9	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.0	19.8	36.3	17.7	15.8	3.9
LnGrp LOS	C	B	D	B	B	A
Approach Vol, veh/h	886			2269	1866	
Approach Delay, s/veh	28.7			18.6	12.9	
Approach LOS	C			B	B	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	16.4	43.6	9.4	34.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.5	39.5	6.1	28.9
Max Q Clear Time (g_c+I1), s	11.2	35.5	5.8	22.8
Green Ext Time (p_c), s	0.1	3.6	0.0	4.6

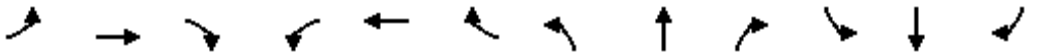
Intersection Summary	
HCM 6th Ctrl Delay	18.3
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	101	65	48	207	384	178	399	28	193	338	73
Future Volume (veh/h)	67	101	65	48	207	384	178	399	28	193	338	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1826	1826	1826	1870	1870	1870	1826	1826	1826
Adj Flow Rate, veh/h	74	112	5	53	230	290	198	443	27	214	376	27
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	12	12	12	5	5	5	2	2	2	5	5	5
Cap, veh/h	111	276	414	99	274	471	257	628	38	272	679	679
Arrive On Green	0.07	0.16	0.15	0.06	0.15	0.15	0.14	0.36	0.35	0.16	0.37	0.37
Sat Flow, veh/h	1640	1722	1423	1739	1826	1527	1781	1745	106	1739	1826	1547
Grp Volume(v), veh/h	74	112	5	53	230	290	198	0	470	214	376	27
Grp Sat Flow(s),veh/h/ln	1640	1722	1423	1739	1826	1527	1781	0	1851	1739	1826	1547
Q Serve(g_s), s	2.6	3.5	0.2	1.8	7.4	9.0	6.4	0.0	13.1	7.1	9.8	0.6
Cycle Q Clear(g_c), s	2.6	3.5	0.2	1.8	7.4	9.0	6.4	0.0	13.1	7.1	9.8	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	111	276	414	99	274	471	257	0	666	272	679	679
V/C Ratio(X)	0.67	0.41	0.01	0.53	0.84	0.62	0.77	0.00	0.71	0.79	0.55	0.04
Avail Cap(c_a), veh/h	150	276	414	162	274	471	291	0	666	290	679	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	27.3	22.6	15.3	27.5	24.8	17.8	24.7	0.0	16.5	24.4	14.9	9.6
Incr Delay (d2), s/veh	6.8	1.0	0.0	4.4	20.2	2.4	10.6	0.0	6.2	11.6	2.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.4	0.0	0.8	4.4	3.3	3.1	0.0	5.6	3.4	3.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	23.6	15.3	31.9	45.0	20.2	35.4	0.0	22.7	36.0	17.8	9.7
LnGrp LOS	C	C	B	C	D	C	D	A	C	D	B	A
Approach Vol, veh/h		191			573			668			617	
Approach Delay, s/veh		27.5			31.2			26.4			23.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	25.6	7.4	13.6	12.7	26.3	8.0	13.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	19.0	5.1	8.4	9.3	19.2	5.0	8.5
Max Q Clear Time (g_c+I1), s	9.1	15.1	3.8	5.5	8.4	11.8	4.6	11.0
Green Ext Time (p_c), s	0.0	1.0	0.0	0.1	0.0	1.2	0.0	0.0

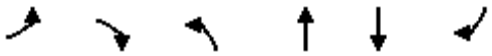
Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/06/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	580	186	180	1598	2463	967
Future Volume (veh/h)	580	186	180	1598	2463	967
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	598	189	186	1647	2539	985
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	795	409	178	2754	2280	1247
Arrive On Green	0.16	0.16	0.10	0.77	0.64	0.64
Sat Flow, veh/h	5023	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	598	189	186	1647	2539	985
Grp Sat Flow(s),veh/h/ln	1674	1585	1781	1777	1777	1552
Q Serve(g_s), s	13.6	12.0	12.0	23.3	77.0	41.7
Cycle Q Clear(g_c), s	13.6	12.0	12.0	23.3	77.0	41.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	795	409	178	2754	2280	1247
V/C Ratio(X)	0.75	0.46	1.04	0.60	1.11	0.79
Avail Cap(c_a), veh/h	795	409	178	2754	2280	1247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.65	0.65	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	37.5	54.0	5.7	21.5	6.6
Incr Delay (d2), s/veh	4.3	2.4	79.6	0.4	57.9	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	11.2	9.1	5.5	43.6	22.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	52.5	39.9	133.6	6.0	79.4	10.1
LnGrp LOS	D	D	F	A	F	B
Approach Vol, veh/h	787			1833	3524	
Approach Delay, s/veh	49.5			19.0	60.0	
Approach LOS	D			B	E	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	23.0	97.0	16.0	81.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	92.5	11.5	76.5
Max Q Clear Time (g_c+I1), s	15.6	25.3	14.0	79.0
Green Ext Time (p_c), s	0.9	17.9	0.0	0.0

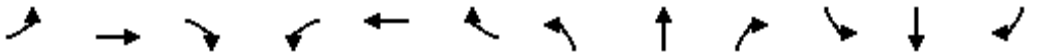
Intersection Summary	
HCM 6th Ctrl Delay	46.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
5: S Redland Road & S Holcomb Boulevard

12/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	258	199	66	185	316	113	347	99	487	622	148
Future Volume (veh/h)	150	258	199	66	185	316	113	347	99	487	622	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	156	269	91	69	193	244	118	361	94	507	648	113
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	1	1	1
Cap, veh/h	182	305	375	99	218	670	157	425	111	545	972	987
Arrive On Green	0.10	0.16	0.16	0.05	0.12	0.12	0.09	0.30	0.30	0.30	0.52	0.52
Sat Flow, veh/h	1781	1870	1546	1795	1885	1598	1767	1412	368	1795	1885	1598
Grp Volume(v), veh/h	156	269	91	69	193	244	118	0	455	507	648	113
Grp Sat Flow(s),veh/h/ln	1781	1870	1546	1795	1885	1598	1767	0	1780	1795	1885	1598
Q Serve(g_s), s	7.8	12.7	4.3	3.4	9.1	9.4	5.9	0.0	21.6	24.7	22.8	2.6
Cycle Q Clear(g_c), s	7.8	12.7	4.3	3.4	9.1	9.4	5.9	0.0	21.6	24.7	22.8	2.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	182	305	375	99	218	670	157	0	535	545	972	987
V/C Ratio(X)	0.86	0.88	0.24	0.70	0.89	0.36	0.75	0.00	0.85	0.93	0.67	0.11
Avail Cap(c_a), veh/h	182	305	375	112	218	670	181	0	535	559	972	987
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.45	0.45	0.45
Uniform Delay (d), s/veh	39.8	36.8	27.6	41.8	39.2	17.9	40.1	0.0	29.6	30.4	16.1	7.1
Incr Delay (d2), s/veh	31.0	24.7	0.3	15.4	32.3	0.3	14.2	0.0	15.5	12.1	1.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	7.7	1.6	1.9	6.0	3.3	3.1	0.0	10.8	11.6	8.9	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.7	61.6	27.9	57.2	71.6	18.2	54.3	0.0	45.1	42.5	17.7	7.2
LnGrp LOS	E	E	C	E	E	B	D	A	D	D	B	A
Approach Vol, veh/h		516			506			573			1268	
Approach Delay, s/veh		58.4			43.9			47.0			26.7	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.3	31.1	8.9	18.7	12.0	50.4	13.2	14.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	27.5	25.9	5.1	13.5	8.7	44.7	8.7	9.9
Max Q Clear Time (g_c+I1), s	26.7	23.6	5.4	14.7	7.9	24.8	9.8	11.4
Green Ext Time (p_c), s	0.2	0.6	0.0	0.0	0.0	4.2	0.0	0.0

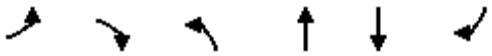
Intersection Summary	
HCM 6th Ctrl Delay	39.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: OR-213 & S Redland Road

12/06/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	558	174	171	1539	2279	867
Future Volume (veh/h)	558	174	171	1539	2279	867
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	587	178	180	1620	2399	897
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	737	396	184	2796	2310	1241
Arrive On Green	0.15	0.15	0.10	0.79	0.65	0.65
Sat Flow, veh/h	5023	1585	1781	3647	3647	1552
Grp Volume(v), veh/h	587	178	180	1620	2399	897
Grp Sat Flow(s),veh/h/ln	1674	1585	1781	1777	1777	1552
Q Serve(g_s), s	13.5	11.4	12.1	21.4	78.0	33.4
Cycle Q Clear(g_c), s	13.5	11.4	12.1	21.4	78.0	33.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	737	396	184	2796	2310	1241
V/C Ratio(X)	0.80	0.45	0.98	0.58	1.04	0.72
Avail Cap(c_a), veh/h	737	396	184	2796	2310	1241
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.5	38.0	53.7	5.0	21.0	5.9
Incr Delay (d2), s/veh	6.1	2.5	59.7	0.3	29.6	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	10.7	8.2	4.7	34.8	17.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	55.6	40.5	113.3	5.3	50.6	8.0
LnGrp LOS	E	D	F	A	F	A
Approach Vol, veh/h	765			1800	3296	
Approach Delay, s/veh	52.1			16.1	39.0	
Approach LOS	D			B	D	

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	21.6	98.4	16.4	82.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.1	93.9	11.9	77.5
Max Q Clear Time (g_c+I1), s	15.5	23.4	14.1	80.0
Green Ext Time (p_c), s	0.5	17.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

S Redland Road at OR-213 (1st Hour)

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

AM Peak Hour														
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2030 Mitigated Conditions (Phase 1-6)	22			287	33.4			10.6	60	12			51

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

AM Peak Hour														
		Adjust Flow		Saturated Flow		Adj/Sat Flows								
	Critcial Movement	EBL	NBT	EBL	NBT	EBL	NBT	0	Sum	C	L	Xc
2030 Mitigated Conditions (Phase 1-6)	EBL	NBT	771	2156	4944	3561	0.155947	0.605448		0.761395	60	12	0.952

S Redland Road at S Holcomb Boulevard/Abernethy Road

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

AM Peak Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2030 Mitigated Conditions (Phase 1-6)	109	224	6	109	33.3	33	36.5	26.8	60	60	123	4	49

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

AM Peak Hour																				
					Adjust Flow				Saturated Flow				Adj/Sat Flows					C	L	Xc
	Critcial Movement				EBL	WBT	NBTR	SBL	EBL	WBT	NBTR	SBL	EBL	WBT	NBTR	SBL	Sum			
2030 Mitigated Conditions (Phase 1-6)	EBL	WBT	NBTR	SBL	74	230	470	214	1640	1826	1851	1739	0.045122	0.125958	0.253917	0.123059	0.548056	60	16	0.747

S Redland Road at OR-213 (1st Hour)

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

PM Peak Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2030 Mitigated Conditions (Phase 1-6)	4			92	81			16	120	3			12

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

PM Peak Hour																		
				Adjust Flow			Saturated Flow			Adj/Sat Flows								
	Critcial Movement			EBL	NBL	SBT	EBL	NBL	SBT	EBL	NBL	SBT	Sum	C	L	Xc		
2030 Mitigated Conditions (Phase 1-6)	EBL	NBL	SBT	598	186	2539	5023	1781	3647	0.119052	0.104436	0.696189	0.919677	120	12	1.022		

S Redland Road at S Holcomb Boulevard/Abernethy Road

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

PM Peak Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2030 Mitigated Conditions (Phase 1-6)	207	206	16	154	58.8	43.6	59.6	27.6	110	111	82	9	39

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

PM Peak Hour																				
					Adjust Flow				Saturated Flow				Adj/Sat Flows					C	L	Xc
	Critcial Movement				EBT	WBL	NBTR	SBL	EBT	WBL	NBTR	SBL	EBT	WBL	NBTR	SBL	Sum			
2030 Mitigated Conditions (Phase 1-6)	EBT	WBL	NBTR	SBL	269	69	455	507	1870	1795	1780	1795	0.14385	0.03844	0.255618	0.282451	0.72036	110	16	0.843

S Redland Road at OR-213 (2nd Hour)

Right Turns on Red
APM Section 13.4.2: RTOR
Equation: vRTOR=sRTOR*(r/C)

PM 2nd Hour													
	sRTOR				r				C	vRTOR			
	EBR	WBR	NBR	SBR	EBR	WBR	NBR	SBR		EBR	WBR	NBR	SBR
2030 Mitigated Conditions (Phase 1-6)	7			107	82			16.4	120	5			15

Intersection v/c
APM Section 13.4.4: Critical Intersection v/c ratio
Method: Determine Critical Movements in HCM 2000 reports
HCM 6th reports, detemine adjusted and sat flow rates
Adjust Flow/Sat Flow
Sum up Crit Movement Flow Rates
Xc of intersection = sum(crit.move. Flow rates*(C/(C-L))

PM 2nd Hour																		
	Critcial Movement			Adjust Flow			Saturated Flow			Adj/Sat Flows				C	L	Xc
	EBL	NBL	SBT	EBL	NBL	SBT	EBL	NBL	SBT	EBL	NBL	SBT	Sum			
2030 Mitigated Conditions (Phase 1-6)	EBL	NBL	SBT	587	180	2399	5023	1781	3647	0.116862	0.101067	0.657801	0.87573	120	12	0.973

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	220	230	75	131	386	270	272	262	88
Average Queue (ft)	120	133	21	59	157	131	145	122	34
95th Queue (ft)	193	208	53	109	299	226	225	213	70
Link Distance (ft)	797	797	797	1308	1308	1308	1612	1612	1612
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	75	130	62	118	108	154	237	132	175	54
Average Queue (ft)	28	53	18	50	51	75	106	61	90	14
95th Queue (ft)	62	104	45	97	87	130	191	111	154	37
Link Distance (ft)	824	824	537	537	537	692	692	797	797	797
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	325	338	176	284	165	174	1559	1558	1448
Average Queue (ft)	191	205	73	147	91	70	1138	1151	664
95th Queue (ft)	304	317	144	264	145	134	1825	1848	1871
Link Distance (ft)	796	796	796	1349	1349	1349	1668	1668	1668
Upstream Blk Time (%)							7	13	9
Queuing Penalty (veh)							0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	122	360	98	150	101	146	390	375	416	66
Average Queue (ft)	47	192	37	64	47	67	207	203	245	19
95th Queue (ft)	95	324	83	124	82	126	340	321	375	52
Link Distance (ft)	846	846	536	536	536	719	719	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	252	254	92	180	449	342	273	261	103
Average Queue (ft)	132	147	24	68	194	160	159	137	41
95th Queue (ft)	209	217	64	138	396	297	239	227	83
Link Distance (ft)	797	797	797	1334	1334	1334	1556	1556	1556
Upstream Blk Time (%)					0				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	125	129	82	177	111	175	213	153	215	53
Average Queue (ft)	45	51	24	67	57	79	124	69	104	17
95th Queue (ft)	93	101	60	133	94	140	202	126	181	41
Link Distance (ft)	862	862	552	552	552	728	728	797	797	797
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	451	460	232	386	180	171	2253	2262	2254
Average Queue (ft)	279	293	86	217	100	79	1883	1899	1671
95th Queue (ft)	460	469	173	425	159	143	2726	2736	3024
Link Distance (ft)	796	796	796	1390	1390	1390	2216	2216	2216
Upstream Blk Time (%)							19	38	30
Queuing Penalty (veh)							0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	201	377	104	175	100	201	434	415	438	69
Average Queue (ft)	99	207	38	85	51	95	232	236	259	28
95th Queue (ft)	171	338	82	154	82	165	380	366	399	55
Link Distance (ft)	876	876	577	577	577	734	734	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Queuing and Blocking Report
2023 Ph.1 Buildout Conditions - AM Peak Hour

12/04/2021

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	258	256	84	129	332	333	273	260	104
Average Queue (ft)	137	151	25	62	177	154	152	138	41
95th Queue (ft)	221	233	62	113	288	270	225	224	82
Link Distance (ft)	796	796	796	1362	1362	1362	2066	2066	2066
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	118	135	71	141	118	148	238	177	199	53
Average Queue (ft)	43	56	23	64	60	79	126	77	105	18
95th Queue (ft)	90	105	55	117	95	131	212	140	180	40
Link Distance (ft)	872	872	544	544	544	735	735	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	363	384	178	394	169	163	2166	2177	2173
Average Queue (ft)	244	262	81	235	104	82	1945	1958	1776
95th Queue (ft)	384	402	155	438	157	146	2567	2571	2958
Link Distance (ft)	796	796	796	1363	1363	1363	2126	2126	2126
Upstream Blk Time (%)							22	48	39
Queuing Penalty (veh)							0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	213	431	93	204	107	198	415	406	428	80
Average Queue (ft)	102	235	36	95	53	94	244	240	244	32
95th Queue (ft)	183	408	78	180	89	175	385	369	376	63
Link Distance (ft)	880	880	514	514	514	726	726	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	244	270	79	136	342	329	270	250	100
Average Queue (ft)	136	151	25	64	173	153	152	136	44
95th Queue (ft)	212	230	63	117	288	272	235	224	86
Link Distance (ft)	796	796	796	1388	1388	1388	2006	2006	2006
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	120	156	72	171	122	170	241	167	204	60
Average Queue (ft)	45	64	23	74	61	85	129	78	103	19
95th Queue (ft)	91	127	55	140	102	148	216	136	173	45
Link Distance (ft)	906	906	499	499	499	738	738	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	413	439	174	388	189	173	2509	2517	2520
Average Queue (ft)	258	273	81	216	105	82	2102	2119	1919
95th Queue (ft)	427	446	154	405	165	147	3064	3079	3380
Link Distance (ft)	796	796	796	1373	1373	1373	2466	2466	2466
Upstream Blk Time (%)							21	48	44
Queuing Penalty (veh)							0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	218	444	130	203	111	195	470	401	454	84
Average Queue (ft)	102	251	46	100	56	97	246	237	265	34
95th Queue (ft)	185	415	99	179	92	174	410	355	410	67
Link Distance (ft)	867	867	559	559	559	724	724	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	285	287	85	140	458	362	273	253	101
Average Queue (ft)	159	173	29	63	182	153	154	136	45
95th Queue (ft)	252	258	68	123	352	283	229	221	83
Link Distance (ft)	796	796	796	1375	1375	1375	1996	1996	1996
Upstream Blk Time (%)					0				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	117	141	71	185	142	183	269	188	206	56
Average Queue (ft)	46	62	23	83	69	85	141	84	110	21
95th Queue (ft)	95	117	55	153	115	149	233	153	181	45
Link Distance (ft)	878	878	546	546	546	747	747	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	512	534	349	389	188	181	1946	1954	1958
Average Queue (ft)	347	363	117	231	111	87	1801	1810	1701
95th Queue (ft)	603	618	332	413	167	153	2269	2272	2582
Link Distance (ft)	796	796	796	1389	1389	1389	1902	1902	1902
Upstream Blk Time (%)	0	0	0				24	46	35
Queuing Penalty (veh)	0	0	0				0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	348	634	130	216	122	258	531	456	450	86
Average Queue (ft)	137	381	48	107	59	106	287	276	260	32
95th Queue (ft)	372	736	104	189	100	234	499	404	397	65
Link Distance (ft)	864	864	539	539	539	733	733	796	796	796
Upstream Blk Time (%)	0	1				0	1			
Queuing Penalty (veh)	0	0				0	0			
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	254	270	86	144	417	393	271	258	110
Average Queue (ft)	143	160	29	66	188	165	163	138	46
95th Queue (ft)	223	241	69	122	344	328	242	234	87
Link Distance (ft)	796	796	796	1344	1344	1344	1772	1772	1772
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	115	154	80	190	177	181	265	189	219	57
Average Queue (ft)	45	65	25	73	68	86	147	86	112	19
95th Queue (ft)	91	123	60	142	127	148	239	154	184	44
Link Distance (ft)	853	853	469	469	469	731	731	796	796	796
Upstream Blk Time (%)				0	0					
Queuing Penalty (veh)				0	0					
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	410	433	240	388	196	168	2533	2547	2540
Average Queue (ft)	274	291	98	230	111	84	2200	2212	2021
95th Queue (ft)	479	496	241	420	170	151	3038	3054	3368
Link Distance (ft)	796	796	796	1354	1354	1354	2490	2490	2490
Upstream Blk Time (%)							21	52	48
Queuing Penalty (veh)							0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	491	736	111	214	132	172	472	492	440	133
Average Queue (ft)	166	459	44	103	61	90	274	310	254	33
95th Queue (ft)	511	807	95	182	99	151	438	463	390	90
Link Distance (ft)	883	883	503	503	503	735	735	796	796	796
Upstream Blk Time (%)	2	4								
Queuing Penalty (veh)	0	0								
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	266	280	90	233	549	500	301	295	103
Average Queue (ft)	152	166	29	67	221	193	179	152	44
95th Queue (ft)	234	249	70	163	458	420	271	253	82
Link Distance (ft)	796	796	796	1341	1341	1341	1562	1562	1562
Upstream Blk Time (%)					0				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	126	151	78	179	147	176	296	177	190	67
Average Queue (ft)	47	65	24	83	71	83	148	88	105	19
95th Queue (ft)	99	124	59	151	121	146	242	151	167	46
Link Distance (ft)	868	868	515	515	515	715	715	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	517	531	316	393	184	168	1938	1937	1940
Average Queue (ft)	342	358	110	215	109	86	1834	1849	1782
95th Queue (ft)	585	599	303	401	167	152	2184	2179	2418
Link Distance (ft)	797	797	797	1386	1386	1386	1892	1892	1892
Upstream Blk Time (%)	0	0	0				25	48	38
Queuing Penalty (veh)	1	1	1				0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	444	769	133	210	115	337	610	518	471	88
Average Queue (ft)	137	470	51	116	62	109	341	316	250	33
95th Queue (ft)	373	827	110	201	100	239	584	490	397	69
Link Distance (ft)	874	874	540	540	540	746	746	797	797	797
Upstream Blk Time (%)	1	2				0	1			
Queuing Penalty (veh)	0	0				0	0			
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 2

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	282	277	100	172	463	442	306	293	119
Average Queue (ft)	155	171	31	72	218	199	166	152	45
95th Queue (ft)	242	253	73	142	392	377	260	251	86
Link Distance (ft)	796	796	796	1337	1337	1337	2012	2012	2012
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	105	151	78	179	161	170	301	183	209	57
Average Queue (ft)	46	66	24	82	74	88	160	86	111	19
95th Queue (ft)	90	125	56	149	129	152	270	159	185	44
Link Distance (ft)	845	845	522	522	522	707	707	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	574	589	359	451	190	202	2022	2031	2028
Average Queue (ft)	388	406	115	271	114	92	1860	1877	1768
95th Queue (ft)	619	634	298	513	172	164	2389	2395	2721
Link Distance (ft)	797	797	797	1349	1349	1349	1978	1978	1978
Upstream Blk Time (%)		0	0				23	49	37
Queuing Penalty (veh)		0	0				0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	495	756	125	235	147	284	594	486	449	82
Average Queue (ft)	213	481	48	115	66	105	331	296	257	35
95th Queue (ft)	641	857	104	201	114	207	547	447	396	68
Link Distance (ft)	860	860	499	499	499	712	712	797	797	797
Upstream Blk Time (%)	6	10					0			
Queuing Penalty (veh)	0	0					0			
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	285	298	81	207	604	568	300	282	114
Average Queue (ft)	161	177	29	68	238	215	175	144	45
95th Queue (ft)	252	270	66	157	488	462	262	239	84
Link Distance (ft)	796	796	796	1376	1376	1376	1520	1520	1520
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	123	152	74	192	156	189	318	176	235	53
Average Queue (ft)	49	69	26	83	74	86	163	85	115	19
95th Queue (ft)	104	128	59	152	127	149	271	145	193	42
Link Distance (ft)	886	886	507	507	507	726	726	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	569	579	453	364	204	189	1809	1816	1809
Average Queue (ft)	397	413	174	206	117	93	1733	1744	1690
95th Queue (ft)	744	754	535	363	179	163	1985	1984	2247
Link Distance (ft)	796	796	796	1341	1341	1341	1758	1758	1758
Upstream Blk Time (%)	1	1	1				25	48	35
Queuing Penalty (veh)	1	4	3				0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	651	806	130	240	161	428	607	506	506	101
Average Queue (ft)	288	551	52	122	70	162	372	319	260	34
95th Queue (ft)	804	945	112	210	124	462	648	495	422	74
Link Distance (ft)	856	856	530	530	530	718	718	796	796	796
Upstream Blk Time (%)	12	17				4	7			
Queuing Penalty (veh)	0	0				0	0			
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 8

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	259	273	78	134	611	611	290	281	101
Average Queue (ft)	149	164	27	63	258	239	169	152	44
95th Queue (ft)	228	243	64	111	524	509	258	255	83
Link Distance (ft)	796	796	796	1394	1394	1394	1870	1870	1870
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	107	166	75	225	197	224	274	200	205	59
Average Queue (ft)	48	76	25	92	74	98	148	89	111	22
95th Queue (ft)	92	141	56	171	129	184	242	158	180	48
Link Distance (ft)	875	875	546	546	546	738	738	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	632	639	580	388	311	186	2415	2427	2421
Average Queue (ft)	404	421	139	226	118	90	2202	2218	2119
95th Queue (ft)	703	710	412	419	256	161	2805	2806	3097
Link Distance (ft)	796	796	796	1377	1377	1377	2368	2368	2368
Upstream Blk Time (%)	0	0	0		0		24	58	51
Queuing Penalty (veh)	0	0	1		0		0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	540	829	127	218	154	277	646	566	499	163
Average Queue (ft)	234	568	56	111	65	103	400	340	264	37
95th Queue (ft)	706	956	118	190	116	220	643	547	431	121
Link Distance (ft)	872	872	504	504	504	732	732	796	796	796
Upstream Blk Time (%)	7	11					0		0	0
Queuing Penalty (veh)	0	0					0		0	0
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 1

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	319	324	84	169	552	436	291	287	132
Average Queue (ft)	168	182	29	76	222	200	171	154	51
95th Queue (ft)	286	297	67	146	413	359	259	250	100
Link Distance (ft)	797	797	797	1368	1368	1368	1814	1814	1814
Upstream Blk Time (%)					0				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	104	156	88	202	166	156	278	211	243	68
Average Queue (ft)	45	69	26	91	76	83	149	99	117	21
95th Queue (ft)	88	130	62	167	127	139	243	179	199	49
Link Distance (ft)	861	861	508	508	508	707	707	797	797	797
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	687	698	642	398	180	179	1937	1943	1937
Average Queue (ft)	470	484	213	236	110	86	1844	1855	1800
95th Queue (ft)	795	805	619	446	169	152	2140	2145	2383
Link Distance (ft)	796	796	796	1369	1369	1369	1888	1888	1888
Upstream Blk Time (%)	0	2	3				25	49	38
Queuing Penalty (veh)	1	5	7				0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	636	794	140	222	172	472	682	536	430	79
Average Queue (ft)	256	606	53	115	73	179	432	329	261	31
95th Queue (ft)	726	965	118	199	141	515	720	499	398	64
Link Distance (ft)	859	859	522	522	522	722	722	796	796	796
Upstream Blk Time (%)	5	11				5	10			
Queuing Penalty (veh)	0	0				0	0			
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 14

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	306	328	99	139	525	492	326	300	135
Average Queue (ft)	159	177	31	65	226	201	176	149	47
95th Queue (ft)	263	277	71	120	436	411	281	260	97
Link Distance (ft)	796	796	796	1369	1369	1369	1644	1644	1644
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	105	175	83	194	163	202	277	181	204	59
Average Queue (ft)	44	69	27	90	77	93	153	88	110	20
95th Queue (ft)	86	135	62	165	127	163	244	152	182	46
Link Distance (ft)	860	860	546	546	546	719	719	796	796	796
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 0

Queuing and Blocking Report
2030 Total Buildout Conditions - PM Peak Hour

12/04/2021

Intersection: 4: OR-213 & S Redland Road

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	704	703	570	491	195	173	1951	1956	1963
Average Queue (ft)	461	475	201	282	109	84	1809	1821	1715
95th Queue (ft)	792	796	590	557	168	148	2267	2267	2566
Link Distance (ft)	796	796	796	1354	1354	1354	1910	1910	1910
Upstream Blk Time (%)	0	1	1				21	45	34
Queuing Penalty (veh)	1	4	4				0	0	0
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: S Redland Road & S Holcomb Boulevard

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	579	776	139	215	158	470	668	555	509	88
Average Queue (ft)	273	533	56	113	74	187	452	349	265	34
95th Queue (ft)	778	934	114	186	133	553	761	548	444	71
Link Distance (ft)	852	852	554	554	554	734	734	796	796	796
Upstream Blk Time (%)	11	16				7	12	0	0	
Queuing Penalty (veh)	0	0				0	0	1	0	
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 9

Real-World Geotechnical Solutions
Investigation • Design • Construction Support

March 18, 2022
Project No. 20-5600

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SUBJECT: PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
PARK PLACE CROSSING GENERAL DEVELOPMENT PLAN / MASTER PLAN
TERMINUS OF SOUTH LIVESAY ROAD
OREGON CITY, OREGON

This report presents the results of a geotechnical engineering study conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our investigation was to evaluate subsurface conditions at the site and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-7453C, dated September 17, 2020, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*. The site is mapped by Oregon City as being within a designated Geologic Hazard Zone. This preliminary geotechnical engineering report is intended to address the current overall master plan. Further investigations and reports will likely be provided at the time of each respective detailed development plan, as necessary.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject site is located at the terminus of South Livesay Road in Oregon City, Clackamas County, Oregon (Figure 1). The site is located north of the portion of South Livesay Road which runs east-west and south of Holcomb Boulevard. The site consists of 13 tax lots that total approximately 92 acres in size. While GeoPacific has not yet performed geotechnical explorations on Tax Lots 200, 300, 301, 303, or 502, they are considered part of the master plan. Vegetation on the site is highly variable. Overall, vegetation in the western portion the site consists of grass, vegetation in the central portion of the site consists of grass, shrubs, and trees, and vegetation in the eastern portion of the site consists of small to large trees. The site is currently occupied by a number of residences and several outbuildings.

Overall, topography on the site slopes down to the west at grades of 25 percent or less. However, Oregon City Webmaps identifies several isolated areas in the middle of the site with steeper than 25 percent. There is a drainage in the northwest portion of the site which runs northeast to

southwest and the side slopes are inclined at average grades of about 50 percent (Figures 2 and 3). There are also drainages near the southwest corner of the site and in the southern-central portion of the site, with side slopes inclined at average grades of about 50 percent. Two landslides are mapped by the Oregon Department of Geology and Mineral Industries (DOGAMI) within the drainage in the northwest portion of the site (Figure 2). The large slide is classified as prehistoric (greater than 150 years old) and the small earthflow is considered historic with movement occurring in the last 150 years.

It is our understanding that the planned development will consist of approximately 477 lots for single family attached/detached homes, neighborhood commercial, new streets, stormwater management facilities, associated underground utilities, and open space. We anticipate maximum cuts will be on the order of about 24 feet and fills up to 30 feet. Utilities may be planned in areas with about 24 feet of cut, resulting in depths of about 30 feet below existing grade. Based on conversation with the project civil engineer, some utilities may be planned to depths of up to 30 feet below existing grades.

REGIONAL AND LOCAL GEOLOGIC SETTING

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins.

The southwestern portion of the subject site is underlain by the Quaternary age (last 1.6 million years) Willamette Formation, a catastrophic flood deposit associated with repeated glacial outburst flooding of the Willamette Valley (Yeats et al., 1996). The last of these outburst floods occurred about 10,000 years ago. These deposits typically consist of horizontally layered, micaceous, silt to coarse sand forming poorly-defined to distinct beds less than 3 feet thick.

Portions of the site above 360 feet elevation are underlain by the Boring Lava lithologic unit which consists of basaltic and basaltic andesite lava flows erupted from a series of local volcanic vents during Plio-Pleistocene time (about 600,000 thousand to 2.6 million years ago) (Schlicker and Finlayson, 1979; Madin, 2009). The total thickness of the Boring Lava unit ranges from greater than 600 feet near vents to less than 50 feet on the outer margins.

The Willamette Formation in the southwestern portion of the site and the Boring Lava Formation in the northeastern portion of the site are underlain by the Pliocene to Pleistocene aged (about 200,00 to 2 million years ago) Springwater Formation, which consists of fluvial conglomerate, volcaniclastic sandstone, siltstone and debris flows comprised by sediment derived from the Cascade Range deposited by the ancestral Clackamas River (Madin, 1994; Yeats et al., 1996; Madin, 2009). The Springwater Formation consists primarily of deeply weathered conglomerate including well-rounded pebbles to cobbles of basalt, andesite and dacite with a sand matrix composed of feldspathic and volcanic lithics. Siltstone units typically consist of quartzofeldspathic silt, volcanic ash and clay. The consistency of the Springwater Formation is generally hard where decomposed to clayey silt and medium-dense to very dense where highly weathered and can be 100 to 150 feet in thickness (Madin, 2009).

Underlying the Springwater Formation is the Miocene to Pliocene aged (2-65 million years ago) Troutdale formation - a partially cemented conglomerate, sandstone, and mudstone deposited by the ancestral Columbia River (Trimble, 1963; Madin, 2009). Regionally, the Troutdale Formation is

informally divided into an upper and a lower member (Phillips, 1987). Lithologies in the upper member include lenticular layers of volcaniclastic (vitric) sand, quartzite-bearing gravel, fine-grained sand, silt and clay, micaceous quartz-rich sand, and conglomerate with a cumulative average thickness of 100 to 150 feet. The lower member consists primarily of laminated silty clay and sand with reported thicknesses in water well logs of up to 880 feet and is the equivalent of the Sandy River Mudstone.

REGIONAL SEISMIC SETTING

At least four potential source zones capable of generating damaging earthquakes are thought to exist in the region. These include the Portland Hills Fault Zone, the Grant Butte and Damascus-Tickle Creek Fault Zones, the Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone, as discussed below.

Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that include the central Portland Hills Fault, the western Oatfield Fault, and the eastern East Bank Fault. These faults occur in a northwest-trending zone that varies in width between 3.5 and 5.0 miles. The combined three faults vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years) sediment (Madin, 1990). The Portland Hills Fault occurs along the Willamette River at the base of the Portland Hills and is approximately 1 mile northeast of the site. The East Bank Fault occurs along the eastern margin of the Willamette River, and is located approximately 10.8 miles north of the site. The Oatfield Fault occurs along the western side of the Portland Hills and is approximately 0.5 miles southwest of the site. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000). No historical seismicity is correlated with the mapped portion of the Portland Hills Fault Zone, but in 1991 a M3.5 earthquake occurred on a NW-trending shear plane located 1.3 miles east of the fault (Yelin, 1992). Although there is no definitive evidence of recent activity, the Portland Hills Fault Zone is assumed to be potentially active (Geomatrix Consultants, 1995).

Grant Butte and Damascus-Tickle Creek Fault Zones

The Grant Butte fault zone was mapped along the north side of Mt. Scott and Powell Butte by Madin (1990). It was also extended eastward to Grant Butte on the basis of mapping by CH2M Hill and others (1991) and informally named the Grant Butte fault (Cornforth and Geomatrix, 1992). The Damascus-Tickle Creek fault zone displaces Pliocene and possibly Pleistocene sediments in the vicinity of Boring, Oregon (Madin, 1992; Lite, 1992). Relatively short faults define a 17-km-long fault zone that is apparently linked to the Grant Butte fault on the basis of stratigraphic relationships showing middle and late Pleistocene activity. Geomatrix (1995) assigns a probability of 0.5 for activity on structures within these fault zones. The nearest portion of the Grant Butte and Damascus-Tickle Creek Fault Zone is approximately 2.3 miles east of the subject site.

Gales Creek-Newberg-Mt. Angel Structural Zone

The Gales Creek-Newberg-Mt. Angel Structural Zone is a 50-mile-long zone of discontinuous, NW-trending faults that lies approximately 19.9 miles southwest of the subject site. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment (Yeats et al., 1996; Werner et al., 1992). A geologic reconnaissance and photogeologic analysis study conducted for the Scoggins Dam site in the Tualatin Basin revealed no evidence of deformed geomorphic surfaces along the structural zone

(Unruh et al., 1994). No seismicity has been recorded on the Gales Creek Fault or Newberg Fault; however, these faults are considered to be potentially active because they may connect with the seismically active Mount Angel Fault and the rupture plane of the 1993 M5.6 Scotts Mills earthquake (Werner et al. 1992; Geomatrix Consultants, 1995).

Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year (Goldfinger et al., 1996). A growing body of geologic evidence suggests that prehistoric subduction zone earthquakes have occurred (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). This evidence includes: (1) buried tidal marshes recording episodic, sudden subsidence along the coast of northern California, Oregon, and Washington, (2) burial of subsided tidal marshes by tsunami wave deposits, (3) paleoliquefaction features, and (4) geodetic uplift patterns on the Oregon coast. Radiocarbon dates on buried tidal marshes indicate a recurrence interval for major subduction zone earthquakes of 250 to 650 years with the last event occurring 300 years ago (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). The inferred seismogenic portion of the plate interface lies approximately 50 miles west of the Portland Basin at depths of between 20 and 40 kilometers below the surface.

FIELD EXPLORATION

Our site-specific explorations for this report were conducted in October, 2020 and consisted of test pits and borings. On October 6, 7, 8, 2020, twenty four exploratory test pits were excavated with a medium or large sized trackhoe to depths of 15 to 29 feet at the approximate locations presented on Figure 3. Five exploratory borings were drilled to depths of 70.4 to 81.5 feet with an all-terrain drill rig at the approximate locations presented on Figure 3 on October 20, 21, and 22, 2020. It should be noted that exploration locations were located in the field by pacing or taping distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate.

The boreholes were drilled using a drill rig and mud rotary methods operated by Western States Soil Conservation, Inc. of Hubbard, Oregon. At each boring location, SPT (Standard Penetration Test) sampling was performed in general accordance with ASTM D1586 using a 2-inch outside diameter split-spoon sampler and a 140-pound pneumatic hammer. During the test, a sample is obtained by driving the sampler 18 inches into the soil with the hammer free-falling 30 inches. The number of blows for each 6 inches of penetration is recorded. The Standard Penetration Resistance ("N-value") of the soil is calculated as the number of blows required for the final 12 inches of penetration. If 50 or more blows are recorded within a single 6-inch interval, the test is terminated, and the blow count is recorded as 50 blows for the number of inches driven. This resistance, or N-value, provides a measure of the relative density of granular soils and the relative consistency of cohesive soils. At the completion of the borings, the holes were backfilled with bentonite.

A GeoPacific Engineering Geologist continuously monitored the field exploration program and logged the test pits. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System (USCS). Rock hardness was classified in accordance with Table 1, modified from the ODOT Rock Hardness Classification Chart. During exploration, our geologist also noted geotechnical conditions such as soil consistency, moisture and groundwater conditions. Logs of test pits are attached to this report. The following report sections are based on the exploration program and summarize subsurface conditions encountered at the site.

Table 1. Rock Hardness Classification Chart

ODOT Rock Hardness Rating	Field Criteria	Unconfined Compressive Strength	Typical Equipment Needed For Excavation
Extremely Soft (R0)	Indented by thumbnail	<100 psi	Small excavator
Very Soft (R1)	Scratched by thumbnail, crumbled by rock hammer	100-1,000 psi	Small excavator
Soft (R2)	Not scratched by thumbnail, indented by rock hammer	1,000-4,000 psi	Medium excavator (slow digging with small excavator)
Medium Hard (R3)	Scratched or fractured by rock hammer	4,000-8,000 psi	Medium to large excavator (slow to very slow digging), typically requires chipping with hydraulic hammer or mass excavation)
Hard (R4)	Scratched or fractured w/ difficulty	8,000-16,000 psi	Slow chipping with hydraulic hammer and/or blasting
Very Hard (R5)	Not scratched or fractured after many blows, hammer rebounds	>16,000 psi	Blasting

Undocumented Fill: Undocumented fill was not encountered in our explorations; however, it is likely that areas of undocumented fill may exist in the vicinity existing access driveways and structures.

Topsoil Horizon: The ground surface in test pits TP-1 through TP-24 and soil borings B-1 through B-5 was directly underlain by a topsoil horizon. The brown topsoil horizon consisted of silt (OL-ML), was loose, and contained trace fine roots throughout. The topsoil horizon typically had a low to high organic content and extended to a depth of 7 to 16 inches.

Landslide Debris: Landslide debris was encountered beneath the topsoil horizon in test pits TP-20 and TP-21. The landslide debris generally consisted of silt (ML) with clay or sand, silty clay (CL) with or without gravel, and zones of fat clay (CH). The landslide debris had a medium stiff to stiff consistency, was highly fractured, and extended to a depth of 24 feet in test pit TP-20 and to 20 feet in test pit TP-21.

> ***Fat Clay:*** Fat clay (CH) was encountered within the landslide debris in test pits TP-20 and TP-21. The fat clay was stiff to very stiff, gray in color, and extended to depths of 14 to 16 feet. This material was not sampled for laboratory testing; however, it is likely highly expansive.

Willamette Formation: Underlying the topsoil horizon in test pits TP-1 through TP-3, TP-16 through TP-19, TP-22, and TP-23 and soil borings B-1 through B-5 was material belonging to the Willamette Formation. In explorations, the Willamette Formation soils generally consisted of light brown, clayey silt (ML) characterized by a stiff to very stiff consistency, soft to stiff sandy silt, and

loose silty sand (SM). Willamette Formation materials tend to be highly moisture sensitive. Soils belonging to the Willamette Formation extended to depths of approximately 3 to 25 feet in test pits TP-1 through TP-3, TP-19, and TP-23 and soil borings B-1 through B-5 and beyond the maximum depth of exploration in test pits TP-16 through TP-18 and TP-22 (15 to 15.5 feet).

Residual Soil of Boring Lava Formation: Underlying the topsoil horizon in test pits TP-4 through TP-14 was residual soil derived from in place weathering of the underlying Boring Lava Formation. These soils generally consisted of light reddish brown to gray clayey silt (ML) to silty clay (CL) with basalt fragments typically exhibiting a stiff to very stiff consistency and silty gravel boulders (GM) that had a medium dense to dense relative density. The residual soil of the Boring Lava Formation extended to depths of 3 to 5 feet in test pits TP-4 through TP-14.

Boring Lava Formation: The residual soil of the Boring Lava in test pits TP-4 through TP-14 and the topsoil horizon in test pit TP24 was underlain by weathered basalt belonging to the Boring Lava Formation. In test pits TP-4 through TP-14 and TP-24, the gray to brown basalt contained trace silty clay to clayey silt matrix and was weathered to extremely soft (R0) to soft (R2) according to the ODOT Rock Hardness Chart (Table 1). Occasionally, less weathered boulders that were medium hard (R3) to hard (R4) were encountered. Excavation was generally achievable in Boring Lava material to depths of 15 to 25 feet; however, practical refusal was encountered with a large sized trackhoe on these boulders in test pits TP-7 and TP-14 at depths of 19 and 21 feet, respectively. Basalt belonging to the Boring Lava Formation extended to a depth of 2 feet in test pit TP-24 and beyond the maximum depth of exploration in test pits TP-4 through TP-14 (15 to 25 feet). The depth at which rock belonging to the Boring Lava Formation was first encountered and the depth at which practical refusal was achieved is presented in Table 2.

Table 2. Depth of Basalt Bedrock Encountered in Explorations

Test Pit	Depth Rock First Encountered (feet)	Depth of Practical Refusal on Medium Hard (R3) to Hard (R4) Basalt (feet)
TP-4	5	>25
TP-5	3.5	>15
TP-6	3.5	>15
TP-7	3.5	19 (R3 Boulder)
TP-8	4	>25
TP-9	3.5	>15
TP-10	3.5	>16.5
TP-11	3.5	>15
TP-12	3	>15
TP-13	3.5	>24
TP-14	4	21 (R3 to R4 Boulder)
TP-24	1	Springwater Formation materials encountered below 2’

Springwater Formation: Underlying the topsoil horizon in test pit TP-15; the landslide debris in test pits TP-20 and TP-21; the Willamette Formation in test pits TP-1 through TP-3, TP-19, and TP-23 and soil borings B-1 through B-5; and the Boring Lava Formation in test pit TP-24 was material belonging to the Springwater Formation. This material generally consisted of light brown to gray silty clay (CL), clayey silt (ML), fat clay (CH), silty sand (SM), silty gravel (GM), and gravel conglomerate (GP) with a medium dense relative density or medium stiff to very stiff consistency. The Springwater Formation extended to a depth of approximately 35 to 50 feet in soil borings B-3 through B-5 and beyond the maximum depth of exploration in test pits TP-1 through TP-3, TP-15, TP-19 through TP-21, TP-23, and TP-24 (15 to 29 feet) and soil borings B-1 and B-2 (51.5 feet).

> ***Fat Clay:*** Fat clay (CH) was encountered within and underlying the Springwater Formation in test pits TP-2, TP-23, and TP-24. The fat clay was stiff to very stiff, gray in color, and extended to depths of 12 to 15 feet in test pits TP-2 and TP-24 and beyond the depth of exploration in test pits TP-23 (18 feet). Laboratory testing of a sample of the fat clay from test pit TP-2 at a depth of 12 to 13 feet indicates the clay is very highly expansive with an expansion index of 132. Results of laboratory testing are attached at the end of this report.

Weathered Troutdale Formation: Weathered Troutdale Formation soils were encountered beneath the Springwater Formation in soil borings B-3 through B-5. These soils generally consisted of light reddish brown to dark gray, well graded sand (SW) and silty sand (SM). The Troutdale Formation materials were loose to medium dense to very dense with depth. In borings B-3 through B-5, soils belonging to the Troutdale Formation extended beyond the maximum depth of exploration (70.4 to 81.5 feet).

Soil Moisture and Groundwater

Soils encountered in test pits were moist to very moist on October 6, 7, 8, 2020. Perched groundwater seepage was encountered in test pit TP-1 at a depth of 12 feet. Discharge was visually estimated at approximately 1/4 gallon per minute. Mud rotary methods utilized during drilling inhibited the observation of groundwater conditions. Regional groundwater mapping indicates static groundwater is present at a depth of 120 to 280 feet below the existing ground surface (Snyder, 2008). Experience has shown that temporary perched storm-related groundwater conditions often occur within the surface soils over fine-grained native deposits such as those beneath the site, particularly during the wet season. It is anticipated that groundwater conditions will vary depending on the season, local subsurface conditions, changes in site utilization, and other factors.

INFILTRATION TESTING

Soil infiltration testing was performed using the open hole infiltration method in test pits TP-1, TP-3, TP-7, and TP-9 at depths of 15, 19, and 20 feet. The soil was pre-saturated for a period of over 3 hours. The water level was measured to the nearest tenth of an inch every fifteen minutes to half hour with reference to the ground surface. Table 3 presents the results of our falling head infiltration testing.

Table 3. Summary of Infiltration Test Results

Test Pit	Depth (feet)	Soil Type	Infiltration Rate (in/hr)	Hydraulic Head Range (inches)
TP-1	20	Sandy SILT (ML)	0	27-28
TP-3	20	Sandy SILT (ML), trace clay	0	28-29
TP-7	19	Weathered BASALT, trace silt to clay matrix	0	15
TP-9	15	Weathered BASALT, trace silt to clay matrix	0	9

Slope Stability

The subject site is designated as being within a Geohazard Zone by the City of Oregon City (OCWebMaps, 2022). Slopes exceeding 25% grade are mapped along the southwest facing central portion of the site and along the tributary drainages in the southern and western portions of the site. Landslide areas are mapped in the northwestern portion of the site.

For the purpose of evaluating slope stability, we reviewed 1:24,000 scale topographic mapping by the U.S. Geological Survey (Figure 1), Lidar based high resolution digital elevation maps (Figure 2), and 1:720 scale topographic mapping provided by AKS Engineering and Forestry, LLC. (Figure 3), reviewed published geologic mapping and the Oregon Department of Geology and Mineral Industries (DOGAMI) Landslide Database (Figure 2), performed a field reconnaissance, and explored subsurface conditions at the site with twenty four exploratory test pits and five exploratory borings, the locations of which are presented on Figure 3.

Landslide inventory mapping of the Oregon City Quadrangle and the statewide landslide database indicate three mapped landslides are present at the site (Madin and Burns, 2006; Burns and Madin, 2009; Madin, 2009; Burns and Mickelson, 2010; DOGAMI Slido, 2022). Two prehistoric (greater than 150 years old) landslides are mapped along a tributary drainage of Tour Creek in the western portion of the site, as presented on Figure 2 (Madin and Burns, 2006; Burns and Madin, 2009; Madin, 2009; Burns and Mickelson, 2010; DOGAMI Slido, 2022). This landslide complex is identified as Oregon_City_272 and 290 and are both classified as being earth slide rotational slides with an earth flow component, and having a failure depth of 25 and 35 feet (DOGAMI Slido, 2022). Another smaller earth flow type slide (identified as Oregon_City_274) that is considered to be historic in age (with movement in the last 150 years) is present along the Tour Creek tributary drainage to the southwest of the larger landslide (DOGAMI Slido, 2022). DOGAMI estimates the slide to be shallow with a failure depth of 7 feet; however, our explorations indicate a failure depth of 20 feet. We observed that the downslope portion of this landslide has experienced relatively recent reactivation, as evidenced by a scarp about 4 feet tall and approximately 40 feet across near the bottom of the east side of the drainage (Figure 3). Our observations indicate that erosion has been occurring at the toe of this landslide and that the landslide is marginally stable at best.

On the slopes of the northwest drainage, we observed many signs of slope creep and instability even outside of the areas of existing landslides. We observed many leaning and bowed trees. We also observed that several of the drainages leading down the western slopes to the bottom of the larger drainage were incised by erosion.

Our reconnaissance and review of Lidar based high resolution digital elevation maps (DOGAMI, 2022) indicate slopes on either side of the Tour Creek tributary drainage exhibit geomorphology indicative of prior, shallow instability and slope creep. We observed the presence of a previously unmapped landslide on the west side of the drainage. This landslide appears to extend all the way down to the bottom of the drainage. The approximate location of this previously unmapped landslide is shown on Figure 3. A small tributary drainage to Abernethy Creek is located in the southern portion of the site and some evidence of shallow slope creep was observed along the drainage. Elsewhere on the property, away from the drainages, topography is smooth and uniform. In these areas, away from the drainages, no evidence of recent movement (ground cracks, scarps, or hummocky topography) was observed during our reconnaissance.

Subsurface exploration indicates that the ground surface in the portions of the site above an elevation of 360 feet mean sea level is underlain by residual soil and basalt rock of the Boring Lava Formation. Topography in Boring Lava areas is flat to moderately sloping with grades up to 20 percent. Pocket penetrometer measurements of the residual soil of the Boring Lava Formation indicate an approximate unconfined compressive strength of 1.5 to 4.5 tons/ft^2 which correlates to a stiff to very stiff consistency. The residual soil of the Boring Lava was underlain by weathered, basalt bedrock in test pits TP-4 through TP-14 to the maximum depth of exploration (15 to 25 feet). Boring Lava Formation materials are considered to have moderate to high shear strength and a moderate to high resistance to slope instability along moderately steep slopes.

The moderately sloping, southwest facing slope in the central portion of the site is underlain by soils belonging to the Springwater Formation. Slope areas exceeding 25% grade are present in the central portion of the site (OCWebMaps, 2022). The fluvial depositional nature of this formation result in variable soil types consisting of silt, clay, gravel conglomerate, highly weathered volcanic rock, and sand. Fine grained soils encountered in explorations were medium stiff to very stiff with some soft to medium stiff soil zones encountered at depth. Granular materials were medium dense to dense. Two wetland areas were observed to the south of test pit TP-24 indicating the presence of perched groundwater conditions. The Springwater Formation is considered to have a moderate shear strength and moderate resistance to slope instability along moderate slopes.

The Troutdale Formation, which underlies the site at depth, includes a thick sequence of weak sedimentary strata that are prone to instability on moderate to steep slopes. Regionally, many large landslides are mapped within the Troutdale Formation primarily on the side slopes of drainages where stream erosion has deeply incised the formation and created oversteepened slopes (Schlicker and Finlayson, 1979; Madin, 1994; Madin and Burns, 2006). In areas where the Troutdale Formation is capped by Boring Lava, these landslides are known to propagate upslope by undermining large blocks of Boring Lava Formation. At the Park Place Subdivision, the Troutdale and Boring Lava Formations are separated by an intermediary Springwater Formation material; however the large landslide mass in the along the northwestern tributary drainage likely resulted from failure of steeply sloping exposures of the Troutdale Formation.

Surficial soils in the southwestern portion of the site are underlain by silt belonging to the Willamette Formation. These materials are moisture sensitive and become medium stiff as moisture levels increase and soft soils were encountered in several explorations adjacent to the tributary drainages (test pit TP-1 and soil borings B-1, B-3, and B-5). Willamette Formation soils are considered moderately resistant to slope instability on gentle slopes.

In our opinion, the slope instability hazard at the majority of the subject site, away from incised drainages, is low. Underlying geologic conditions are suitable for development providing our recommendations in this report are followed. Existing Boring Lava and Springwater Formation

materials underlying sloping areas are stiff to very stiff or medium dense to dense. Willamette Formation materials on gently sloping areas are medium stiff to very stiff. No evidence of recent landslide movement was observed outside drainage areas. It is our opinion that the potential instability from neighboring properties will have a low probability to negatively impact the proposed development.

CONCLUSIONS AND RECOMMENDATIONS

Our investigation indicates that the proposed development is geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. Noteworthy geotechnical issues associated with this site include:

1) It is our understanding that some relatively small, isolated areas with slopes steeper than 25 percent have been identified on OCWebmaps. One of these areas is located in the central portion of the site and the others are located in the southeast portion of the site. Soil conditions near the slope area in the central portion of the site will be investigated at a later date. Mass grading in these portions of the site will generally involve the construction of engineered fill slopes in these areas, although a few cut slopes are also proposed. Fill slopes will likely be constructed of native soils and will be graded no steeper than 2H:1V (Horizontal to Vertical). Cut slopes will be excavated into native soils and will be graded no steeper than 2H:1V. At these gradients, constructed of the appropriate materials, keyed, benched, and with proper drainage measures installed, cut and fill slopes should remain grossly and surficially stable. Based on our understanding of the proposed grading in the vicinities of the subject slope areas, which are currently steeper than 25 percent, it is our opinion that the proposed cuts and fills are generally practicable and adequate factors of safety will be maintained. We anticipate that stability of these areas of existing slopes will be adequate to support the proposed design/layout.

2) The presence of existing landslides and soft soils, and evidence of slope creep, in the drainage in the northwest portion of the site. We confirmed the presence of mapped landslide Oregon_City_272, 290, and 274 and landslide debris was encountered in test pits TP-20 and TP-21 to depths of 20 and 24 feet. Recent reactivation was observed at the toe of Oregon_City_274 and a previously unmapped landslide was observed on the west side of the drainage. Signs of soil creep and instability including leaning and bowed trees were observed along the northwest drainage outside previously mapped slide areas. Active erosion is occurring along the western slope of the drainage, which may be caused by soft soils underlying the slope. Very soft to soft soils were encountered in borings B-3 and B-5 located adjacent to the drainage.

   Our quantitative slope stability analysis indicates adequate factors of safety can be maintained with slope setbacks for residences and fill placement adjacent to the northwest drainage. As shown on Figure 3, the slope setback line for the northwest drainage can be shifted to accommodate the proposed design/layout, provided that a slope stabilization system is installed for the relevant lots. For preliminary planning purpose, the slope stabilization system is to include soldier pile walls with tiebacks.

   The planned design/layout appears to meet the slope setback requirements, provided that the slope stabilization system is installed along the relevant portion of the northwest drainage.

3) Slopes in the drainage in the southeast portion of the site are marginally stable in their existing condition. Unless remedial measures are implemented, setback distances for fill placement and for residences should be maintained. The planned design/layout appears to meet the slope setback requirements for the drainage in the southeast portion of the site.

4) The presence of soft soils near the drainage in the southeast portion of the site.

5) The presence of large boulders in the native Boring Lava Formation in the central and northeastern portions of the site. Weathered basalt bedrock was encountered throughout the site at elevations above 350 feet msl. Basalt was first encountered at depths of 3 to 5 feet and practical refusal was achieved with a large excavator on medium hard (R3) to hard (R4) basalt boulders at depths of 19 and 21 feet in test pits TP-7 and TP-14, respectively. Difficult excavating conditions should be expected at depth.

6) Low permeability soils. The results of our infiltration testing indicate on site soils exhibit low permeability with a high probability of silting up over time.

7) The potential to encounter highly expansive, fat clay soils. Fat clay soils were encountered in test pits TP-2, TP-20, TP-21, TP-23, and TP-24. Laboratory testing of the fat clay from test pit TP-2 indicates the soil has a very high expansion potential; however, areas of highly expansive soils may be encountered in other areas of the site. If encountered, the recommendations for fat clay soils determined to be highly expansive in structural areas are as follows: (1) remove the material and replace it with low to medium expansivity soil/engineered fill, (2) separate footings from the expansive soils by ensuring there is at least 5 feet of engineered fill and/or native, low to medium expansivity soil overlying the highly expansive clay, (3) chemically stabilize the soils with hydrated lime or alternate chemical additives such as Condor SS, or (4) blend with low expansivity soils. Expansive soils can remain beneath flexible pavement areas and backyards where expansion will have a minor impact on improvements.

While some areas of the site may require additional study to evaluate proposed grading, stormwater ponds, retaining walls, etc., it is our opinion that the proposed cuts and fills are generally practicable.

Slope Stability

A reconnaissance of the site was performed on October 6-8, 2020. The subject site generally slopes to the southwest, towards a tributary drainage to Tour Creek, which is located along the western property line (Figures 1 and 2). A tributary drainage to Abernethy Creek is located in the southern portion of the site. Slope geomorphology is characterized by gently to moderately sloping topography with grades of about 5 to 25 percent with short slopes up to approximately 50 percent grade adjacent to the drainages. A wetland area indicating the potential presence of a spring was observed in the central portion of the site to the south of test pit TP-24.

Three landslides are mapped by DOGAMI in the northwestern portion of the site (Figure 2). Subsurface explorations indicate that the landslides have failure depths of 20 to 24 feet where explored in test pits TP-20 and TP-21. Slope geomorphology observed in the tributary drainage included arcuate shaped scarps, subtle benches, and slightly hummocky topography indicative of prior slope movement that had not been previously mapped.

Explorations conducted in the northeastern portion of the site above an elevation of 360 feet msl encountered weathered basalt rock belonging to the Boring Lava Formation, which have a moderate to high resistance to slope instability (Figure 2). The moderately sloping central portion of the site is underlain by Springwater Formation material, which has a moderate resistance to slope instability along moderately sloping topography. The low lying western portion of the site is underlain by Willamette Formation soils that are moderately resistant to slope instability along gentle slopes. Visual reconnaissance and review of Lidar based high resolution digital elevation maps (Figure 2) of the areas of the site away from drainages indicate slopes are generally smooth and uniform (DOGAMI, 2022).

It is our opinion that areas mapped as slope hazard zones can safely be graded, provided that our recommendations are implemented. Our slope stability analysis indicates adequate factors of safety can be maintained around landslide areas by maintaining a setback for structures and fill placement.

Quantitative Slope Stability Modeling

Quantitative slope stability modeling and analyses were performed to evaluate slope stability on the sides of the drainages in the northwest and southwest portions of the site using the SLOPE/W computer program developed by Geo-Slope International of Calgary, Canada. This numerical analysis program utilizes a two-dimensional limiting equilibrium method to calculate the factor of safety of a potential slip surface and incorporates search routines to identify the most critical potential failure surfaces for the cases analyzed. Factors of safety were calculated using Morgenstern-Price method of analysis.

Slope topography, subsurface geometry, and other conditions modeled in the analyses are based on our subsurface explorations, geologic cross sections A-A', B-B', C-C', and D-D' and results of laboratory testing. Shear strength parameters used in the models were selected based on SPT N-value correlations, laboratory testing, and our local experience with similar soil and geologic conditions. The parameters assumed in the stability calculations including parameters for engineered fill are summarized in Table 4.

Table 4. Summary of Estimated Soil Strength Parameters

Geologic Unit	Unit Weight (pcf)	Friction Angle	Cohesion (psf)
Stiff Willamette Formation	120	28°	0
Willamette Formation	125	22°	0
Soft-Medium Stiff Springwater Formation	125	24°	0
Stiff Springwater Formation	125	36°	300
Loose Troutdale Formation	120	30°	150
Medium Dense – Very Dense Troutdale Formation	125	36°	200

Based on the results of our slopes stability analyses, our recommended setback distances for the existing conditions (without remediation) are summarized on Table 5 and shown on Figures 3 and 4.

Table 5. Recommended Setback Distances for Existing Conditions

Area of Site	Minimum Setback Distance for Residences and/or Fill Placement (ft)
Section B-B' Vicinity of Soil Boring B-3	100
Section C-C' Vicinity of Soil Boring B-4 and Landslide Oregon_City_274	80
Section D-D' Vicinity of Soil Boring B-5	60
Vicinity of Landslides Oregon_City_272 and _290	100

With the implementation of slope stabilizations measures, the setback distances can be decreased. It is our understanding that soldier pile retaining walls with tiebacks are proposed on the side of the northwest drainage in the vicinity of section B-B'. At this time, it is our understanding that no slope stabilization measures are proposed in the vicinities of sections A-A', C-C', or D-D'. The reduced setback distance for section B-B' after the implementation of slope stabilization measures is presented on Table 6 and is shown on Figure 3.

Table 6. Recommended Setback Distances for Existing Conditions

Area of Site	Minimum Setback Distance for Residences and/or Fill Placement after Implementation of Slope Stabilization Measures (ft)
Section B-B' Vicinity of Soil Boring B-3	40

Slope Stabilization Systems Lots Near B-3

Based on consultation with the project civil engineer, AKS Engineering & Forestry, it is our understanding that a trail and sewer utility line are proposed across the drainage in the northwest portion of the site in the same alignment, and will connect to an existing development to the east of the drainage.

Since the slopes of the drainage in the northwest portion of the site do not have adequate factors of safety for slope stability in their existing condition, slope stabilization systems are necessary to support the construction of the trail and the installation of the sewer utility line. Permanent soldier pile retaining walls are recommended to provide adequate factors of safety for the proposed sewer line.

The utilization of slope stabilization systems to support the construction of the trail and the installation of the sewer utility line would also sufficiently increase the factor of safety for slope stability on many lots in the vicinity of soil boring B-3. The adjusted slope setback line is shown on Figure 3.

Site Preparation

Areas of proposed buildings, streets, and areas to receive fill should be cleared of vegetation and any organic and inorganic debris. Encountered undocumented fills and any subsurface structures (dry wells, drainage tiles, old utility lines, septic leach fields, etc.) should be removed and the excavations backfilled with engineered fill. Undocumented fill was not encountered in our test pit explorations; however, areas of fill may be present outside our explorations, especially in the vicinity of the existing access driveways.

Organic-rich topsoil should then be stripped from native soil areas of the site. The estimated depth range necessary for removal of topsoil in cut and fill areas is approximately 6 to 9 inches, respectively. Greater stripping depths may be necessary in the southern portion of the site, which was formerly densely treed. The final depth of soil removal will be determined on the basis of a site inspection after the stripping/ excavation has been performed. Stripped topsoil should preferably be removed from the site due to the high density of the proposed development. Any remaining topsoil should be stockpiled only in designated areas and stripping operations should be observed and documented by the geotechnical engineer or his representative.

Once topsoil stripping and removal of organic and inorganic debris and undocumented fill soils are approved in a particular area, the area must be ripped or tilled to a depth of 12 inches, moisture conditioned, root-picked, and compacted in-place prior to the placement of engineered fill or crushed aggregate base for pavement. Exposed subgrade soils should be evaluated by the geotechnical engineer. For large areas, this evaluation is normally performed by proof-rolling the exposed subgrade with a fully loaded scraper or dump truck. For smaller areas where access is restricted, the subgrade should be evaluated by probing the soil with a steel probe. Soft/loose soils identified during subgrade preparation should be compacted to a firm and unyielding condition, over-excavated and replaced with engineered fill (as described below), or stabilized with rock prior to placement of engineered fill. The depth of overexcavation, if required, should be evaluated by the geotechnical engineer at the time of construction.

Engineered Fill

In general, we anticipate that soils from planned cuts and utility trench excavations will be suitable for use as engineered fill provided they are adequately moisture conditioned prior to compacting. All grading for the proposed construction should be performed as engineered grading in accordance with the applicable building code at time of construction with the exceptions and additions noted herein. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Imported fill material must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 95% of the maximum dry density determined by ASTM D698 (Standard Proctor) or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. All engineered fill should be observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd^3, whichever requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Site earthwork will be impacted by soil moisture and shallow groundwater conditions. Earthwork in wet weather would likely require extensive use of cement or lime treatment, or other special measures, at considerable additional cost compared to earthwork performed under dry-weather conditions.

Excavating Conditions and Utility Trenches

We anticipate that on-site soils can be excavated using conventional heavy equipment such as scrapers and trackhoes. The Boring Lava Formation is known for large, hard boulders that may hamper deep excavations such as utility trenching. Highly weathered basalt bedrock was encountered in test pits above an elevation of 360 feet msl at depths of 3 to 5 feet. The large excavator utilized for test pits TP-4 through TP-14 was able to achieve depths of 24 to 25 feet; however, practical refusal was encountered on medium hard (R3) to hard (R4) basalt boulders at depths of 19 and 21 feet in test pits TP-7 and TP-14, respectively. Difficult excavating conditions should be expected.

All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926) or be shored. The existing native, near surface soils are classified as Type B Soils and temporary excavation side slope inclinations as steep as 1.5H:1V may be assumed for planning purposes. This cut slope inclination is applicable to excavations above groundwater seepage zones only. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions.

Medium stiff, sandy silt that was very moist was encountered in Willamette Formation soils (test pits TP-1, TP-16 through TP-19, TP-22, and TP-23 and soil borings B-1 and B-5) and caving of the test pit walls was observed. Adequate shoring should be maintained. Soft, saturated soils and groundwater may be encountered in utility trenches, particularly during the wet season. We anticipate that dewatering systems consisting of ditches, sumps and pumps would be adequate for control of perched groundwater. Regardless of the dewatering system used, it should be installed and operated such that in-place soils are prevented from being removed along with the groundwater. Trench bottom stabilization, such as one to two feet of compacted crushed aggregate base, may be necessary in deeper trenches.

Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

PVC pipe should be installed in accordance with the procedures specified in ASTM D2321. We recommend that trench backfill be compacted to at least 95% of the maximum dry density determined by ASTM D1557 (Modified Proctor) or equivalent. Initial backfill lift thickness for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, one density test is taken for every 4 vertical feet of backfill on each 200-lineal-foot section of trench.

Erosion Control Considerations

During our field exploration program, we did not observe soil types that would be considered highly susceptible to erosion except in areas of moderately to steeply sloping topography. In our opinion, the primary concern regarding erosion potential will occur during construction, in areas that have been stripped of vegetation. Erosion at the site during construction can be minimized by implementing the project erosion control plan, which should include judicious use of straw wattles and silt fences. If used, these erosion control devices should be in place and remain in place throughout site preparation and construction.

Erosion and sedimentation of exposed soils can also be minimized by quickly re-vegetating exposed areas of soil, and by staging construction such that large areas of the project site are not denuded and exposed at the same time. Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture.

Wet Weather Earthwork

Soils underlying the site are likely to be moisture sensitive and may be difficult to handle or traverse with construction equipment during periods of wet weather. Earthwork is typically most economical when performed under dry weather conditions. Earthwork performed during the wet-weather season will probably require expensive measures such as cement treatment or imported granular material to compact fill to the recommended engineering specifications. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is difficult to control, the following recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soils should be followed promptly by the placement and compaction of clean engineered fill. The size and type of construction equipment used may have to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soils with a backhoe to minimize subgrade disturbance caused by equipment traffic;
- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water;
- Material used as engineered fill should consist of clean, granular soil containing less than 5 percent fines. The fines should be non-plastic. Alternatively, cement treatment of on-site soils may be performed to facilitate wet weather placement;
- The ground surface within the construction area should be sealed by a smooth drum vibratory roller, or equivalent, and under no circumstances should be left uncompacted and exposed to moisture. Soils which become too wet for compaction should be removed and replaced with clean granular materials;
- Excavation and placement of fill should be observed by the geotechnical engineer to verify that all unsuitable materials are removed and suitable compaction and site drainage is achieved; and

- Straw wattles and/or geotextile silt fences should be strategically located to control erosion.

If cement or lime treatment is used to facilitate wet weather construction, GeoPacific should be contacted to provide additional recommendations and field monitoring.

Spread Foundations

Slope setbacks of are necessary to maintain adequate factors of safety under static and pseudostatic conditions for home construction in the western portion of the site, as previously discussed. The proposed residential structures may likely be supported on shallow foundations bearing on competent undisturbed, native low expansivity soils and/or engineered fill, appropriately designed and constructed as recommended in this report. Very highly expansive soils were encountered at depths below 8 to 16 feet in test pits TP-2, TP-20, TP-21, TP-23 and TP-24. If encountered, the recommendations for fat clay soils determined to be highly expansive in structural areas are as follows: (1) remove the material and replace it with low to medium expansivity soil/engineered fill, (2) separate footings from the expansive soils by ensuring there is at least 5 feet of engineered fill and/or native, low to medium expansivity soil overlying the highly expansive clay, (3) chemically stabilize the soils with hydrated lime or alternate chemical additives such as Condor SS, or (4) blend with low expansivity soils. Expansive soils can remain beneath flexible pavement areas and backyards where expansion will have a minor impact on improvements.

Foundation design, construction, and setback requirements should conform to the applicable building code at the time of construction. For maximization of bearing strength and protection against frost heave, spread footings should be embedded at a minimum depth of 12 inches below exterior grade. The recommended minimum widths for continuous footings supporting wood-framed walls without masonry are 12 inches for single-story, 15 inches for two-story, and 18 inches for three-story structures. Minimum foundation reinforcement should consist of a No. 4 bar at the top of the stem walls, and a No. 4 bar at the bottom of the footings. Concrete slab-on-grade reinforcement should consist of No. 4 bars placed on 24-inch centers in a grid pattern.

The anticipated allowable soil bearing pressure is 1,500 lbs/ft^2 for footings bearing on competent, nonexpansive native soil and/or engineered fill. A maximum chimney and column load of 40 kips is recommended for the site. The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For heavier loads, the geotechnical engineer should be consulted. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.42, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. We anticipate that the majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any loose soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require overexcavation of footings and backfill with compacted, crushed aggregate.

Our recommendations are for house construction incorporating raised wood floors and conventional spread footing foundations. If living space of the structures will incorporate basements, a geotechnical engineer should be consulted to make additional recommendations for

retaining walls, water-proofing, underslab drainage and wall subdrains. After site development, a Final Soil Engineer's Report should either confirm or modify the above recommendations.

Concrete Slabs-on-Grade

Preparation of areas beneath concrete slab-on-grade floors should be performed as recommended in the *Site Preparation and Undocumented Fill Removal* section. Care should be taken during excavation for foundations and floor slabs, to avoid disturbing subgrade soils. If subgrade soils have been adversely impacted by wet weather or otherwise disturbed, the surficial soils should be scarified to a minimum depth of 8 inches, moisture conditioned to within about 3 percent of optimum moisture content, and compacted to engineered fill specifications. Alternatively, disturbed soils may be removed and the removal zone backfilled with additional crushed rock.

For evaluation of the concrete slab-on-grade floors using the beam on elastic foundation method, a modulus of subgrade reaction of 150 kcf (87 pci) should be assumed for the medium stiff native silt soils anticipated at subgrade depth. This value assumes the concrete slab system is designed and constructed as recommended herein, with a minimum thickness of crushed rock of 8 inches beneath the slab.

Interior slab-on-grade floors should be provided with an adequate moisture break. The capillary break material should consist of ODOT open graded aggregate per ODOT Standard Specifications 02630-2. The minimum recommended thickness of capillary break materials on re-compacted soil subgrade is 8 inches. The total thickness of crushed aggregate will be dependent on the subgrade conditions at the time of construction, and should be verified visually by proof-rolling. Under-slab aggregate should be compacted to at least 90% of its maximum dry density as determined by ASTM D1557 or equivalent.

In areas where moisture will be detrimental to floor coverings or equipment inside the proposed structure, appropriate vapor barrier and damp-proofing measures should be implemented. Appropriate design professionals should be consulted regarding vapor barrier and damp proofing systems, ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Permanent Below-Grade Walls

Lateral earth pressures against below-grade retaining walls will depend upon the inclination of any adjacent slopes, type of backfill, degree of wall restraint, method of backfill placement, degree of backfill compaction, drainage provisions, and magnitude and location of any adjacent surcharge loads. At-rest soil pressure is exerted on a retaining wall when it is restrained against rotation. In contrast, active soil pressure will be exerted on a wall if its top is allowed to rotate or yield a distance of roughly 0.001 times its height or greater.

If the subject retaining walls will be free to rotate at the top, they should be designed for an active earth pressure equivalent to that generated by a fluid weighing 35 pcf for level backfill against the wall. For restrained wall, an at-rest equivalent fluid pressure of 55 pcf should be used in design, again assuming level backfill against the wall. These values assume that drainage provisions are incorporated, free draining gravel backfill is used, and hydrostatic or expansive soil pressures are not allowed to develop against the wall.

During a seismic event, lateral earth pressures acting on below-grade structural walls will increase by an incremental amount that corresponds to the earthquake loading. Based on the Mononobe-Okabe equation and peak horizontal accelerations appropriate for the site location,

seismic loading should be modeled using the active or at-rest earth pressures recommended above, plus an incremental rectangular-shaped seismic load of magnitude 6.5H, where H is the total height of the wall.

We assume relatively level ground surface below the base of the walls. As such, we recommend passive earth pressure of 320 pcf for use in design, assuming wall footings are cast against competent native soils or engineered fill. If the ground surface slopes down and away from the base of any of the walls, a lower passive earth pressure should be used and GeoPacific should be contacted for additional recommendations.

A coefficient of friction of 0.42 may be assumed along the interface between the base of the wall footing and subgrade soils. The recommended coefficient of friction and passive earth pressure values do not include a safety factor, and an appropriate safety factor should be included in design. The upper 12 inches of soil should be neglected in passive pressure computations unless it is protected by pavement or slabs on grade.

The above recommendations for lateral earth pressures assume that the backfill behind the subsurface walls will consist of properly compacted structural fill, and no adjacent surcharge loading. If the walls will be subjected to the influence of surcharge loading within a horizontal distance equal to or less than the height of the wall, the walls should be designed for the additional horizontal pressure. For uniform surcharge pressures, a uniformly distributed lateral pressure of 0.3 times the surcharge pressure should be added. Traffic surcharges may be estimated using an additional vertical load of 250 psf (2 feet of additional fill), in accordance with local practice.

The recommended equivalent fluid densities assume a free-draining condition behind the walls so that hydrostatic pressures do not build-up. This can be accomplished by placing a 12 to 18-inch wide zone of sand and gravel containing less than 5 percent passing the No. 200 sieve against the walls. A 3-inch minimum diameter perforated, plastic drain pipe should be installed at the base of the walls and connected to a suitable discharge point to remove water in this zone of sand and gravel. The drain pipe should be wrapped in filter fabric (Mirafi 140N or other as approved by the geotechnical engineer) to minimize clogging.

Wall drains are recommended to prevent detrimental effects of surface water runoff on foundations – not to dewater groundwater. Drains should not be expected to eliminate all potential sources of water entering a basement or beneath a slab-on-grade. An adequate grade to a low point outlet drain in the crawlspace is required by code. Underslab drains are sometimes added beneath the slab when placed over soils of low permeability and shallow, perched groundwater.

Water collected from the wall drains should be directed into the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Down spouts and roof drains should not be connected to the wall drains in order to reduce the potential for clogging. The drains should include clean-outs to allow periodic maintenance and inspection. Grades around the proposed structure should be sloped such that surface water drains away from the building.

GeoPacific should be contacted during construction to verify subgrade strength in wall keyway excavations, to verify that backslope soils are in accordance with our assumptions, and to take density tests on the wall backfill materials.

Structures should be located a horizontal distance of at least 1.5H away from the back of the retaining wall, where H is the total height of the wall. GeoPacific should be contacted for additional foundation recommendations where structures are located closer than 1.5H to the top of any wall.

Pavement Design

For design purposes, we used an estimated resilient modulus of 7,500 for compacted native soil. Table 7 presents our recommended minimum dry-weather pavement section for light-duty public streets. For streets subjected to loading from traffic other than passenger cars and occasional emergency vehicles and delivery vehicles, GeoPacific should be consulted to provide additional recommendations.

Table 7. Recommended Minimum Dry-Weather Pavement Section for Light-Duty Streets

Material Layer	Section Thickness (in)	Compaction Standard
Asphaltic Concrete (AC)	3	92% of Rice Density AASHTO T-209
Crushed Aggregate Base ¾"-0 (leveling course)	2	95% of Modified Proctor AASHTO T-180
Crushed Aggregate Base 1½"-0	8	95% of Modified Proctor AASHTO T-180
Subgrade	12	95% of Standard Proctor AASHTO T-99 or equivalent

Any pockets of organic debris or loose fill encountered during ripping or tilling should be removed and replaced with engineered fill (see *Site Preparation* Section). In order to verify subgrade strength, we recommend proof-rolling directly on subgrade with a loaded dump truck during dry weather and on top of base course in wet weather. Soft areas that pump, rut, or weave should be stabilized prior to paving. If pavement areas are to be constructed during wet weather, the subgrade and construction plan should be reviewed by the project geotechnical engineer at the time of construction so that condition specific recommendations can be provided. The moisture sensitive subgrade soils make the site a difficult wet weather construction project.

During placement of pavement section materials, density testing should be performed to verify compliance with project specifications. Generally, one subgrade, one base course, and one asphalt compaction test is performed for every 100 to 200 linear feet of paving.

Seismic Design

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2022 Statewide GeoHazards Viewer indicates that the site is in an area where *very strong* ground shaking is anticipated during an earthquake. Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2018 International Building Code (IBC) with applicable Oregon Structural Specialty Code (OSSC) revisions (current 2019). We recommend Site Class D be used for design as defined in ASCE 7, Chapter 20, Table 20.3-1. Design values determined for the site using the ATC (Applied Technology Council) *ASCE7-16 Hazards by Location online Tool* website are summarized in Table 8.

Table 8. Recommended Earthquake Ground Motion Parameters (ATC 2022)

Parameter	Value
Location (Lat, Long), degrees	45.367, -122.563
Mapped Spectral Acceleration Values (MCE):	
Peak Ground Acceleration PGA_M	0.454 g
Short Period, S_s	0.821 g
1.0 Sec Period, S_1	0.367 g
Soil Factors for Site Class D:	
F_a	1.172
F_v	1.933*
$SD_s = 2/3 \times F_a \times S_s$	0.641 g
$SD_1 = 2/3 \times F_v \times S_1$	0.473 g*
Seismic Design Category	D

* The F_v value reported in the above table is a straight-line interpolation of mapped spectral response acceleration at 1-second period, S_1 per Table 1613.2.3(2) of OSSC 2019 with the assumption that Exception 2 of ASCE 7-16 Chapter 11.4.8 is met. SD_1 is based on the F_v value. The structural engineer should evaluate exception 2 and determine whether or not the exception is met. If Exception 2 is not met, and the long-period site coefficient (F_v) is required for design, GeoPacific Engineering can be consulted to provide a site-specific procedure as per ASCE 7-16, Chapter 21.

Soil Liquefaction

Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to earthquake shaking. Soil liquefaction is generally limited to loose, granular soils located below the water table. The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2022 Statewide GeoHazards Viewer indicates that the site is considered to not have a risk for soil liquefaction. Our explorations indicate that the soils underlying the site are not susceptible to liquefaction.

Other Potential Seismic Impacts

Other potential seismic impacts include fault rupture potential. However, based on our review of available geologic literature, we are not aware of any mapped active (demonstrating movement in the last 10,000 years) faults on the site. During our field investigation, we did not observe any evidence of surface rupture or recent faulting. Therefore, we conclude that the potential for fault rupture on site is very low.

Footing and Roof Drains

Construction should include typical measures for controlling subsurface water beneath the homes, including positive crawlspace drainage to an adequate low-point drain exiting the foundation, visqueen covering the expose ground in the crawlspace, and crawlspace ventilation (foundation vents). The homebuyers should be informed and educated that some slow flowing water in the crawlspaces is considered normal and not necessarily detrimental to the home given these other design elements incorporated into its construction. Appropriate design professionals should be

consulting regarding crawlspace ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Down spouts and roof drains should collect roof water in a system separate from the footing drains to reduce the potential for clogging. Roof drain water should be directed to an appropriate discharge point and storm system well away from structural foundations. Grades should be sloped downward and away from buildings to reduce the potential for ponded water near structures.

If the proposed structures will have a raised floor, and no concrete slab-on-grade floors in living spaces are used, perimeter footing drains would not be required based on soil conditions encountered at the site and experience with standard local construction practices. Where it is desired to reduce the potential for moist crawl spaces, footing drains may be installed. If concrete slab-on-grade floors are used, perimeter footing drains should be installed as recommended below.

Where necessary, perimeter footing drains should consist of 3 or 4-inch diameter, perforated plastic pipe embedded in a minimum of 1 ft^3 per lineal foot of clean, free-draining drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. In our opinion, footing drains may outlet at the curb, or on the back sides of lots where sufficient fall is not available to allow drainage to meet the street.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our 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, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.



Beth K. Rapp, C.E.G.
Senior Engineering Geologist



Benjamin G. Anderson, P.E.
Associate Engineer

Attachments: References
Figure 1 – Vicinity Map
Figure 2 – Lidar Based Vicinity Map – With Mapped Landslides
Figure 3 – Site Plan, Geologic Map, and Exploration Locations
Test Pit Logs (TP-1 through TP-24)
Boring Logs (B-1 through B-5)
Laboratory Test Results – Expansion Index of Soils
Slope Stability Analyses – Graphical Plots

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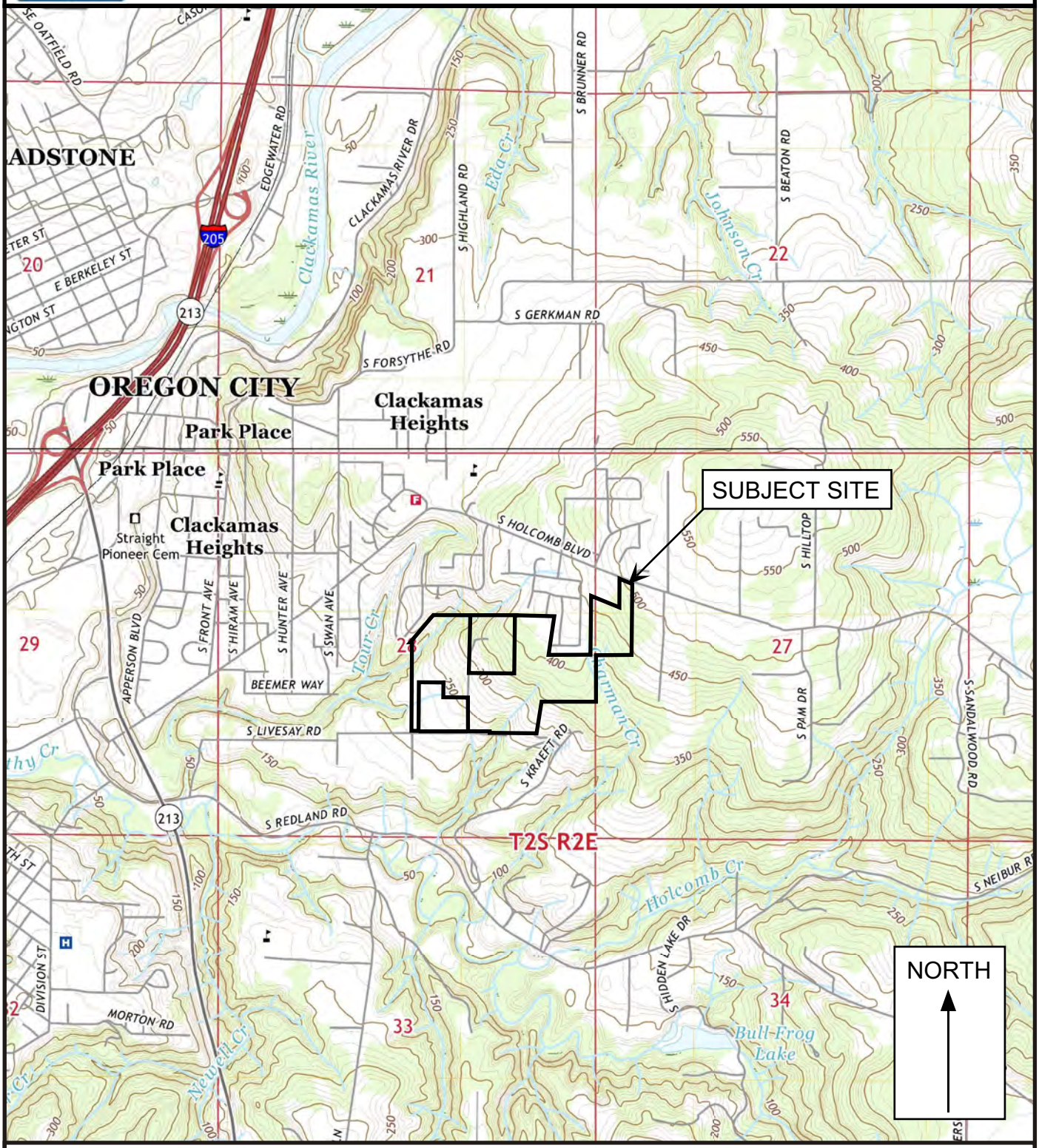
VICINITY MAP



Legend

Approximate Scale 1 in = 2,000 feet

Date: 02/24/22
Drawn by: EKR/BGA

Base map: U.S. Geological Survey 7.5 minute Topographic Map Series, Gladstone, Oregon Quadrangle, 2020 and Oregon City, Oregon Quadrangle, 2020.

Project: Park Place Crossing General Development Plan Oregon City, Oregon	Project No. 20-5600	FIGURE 1

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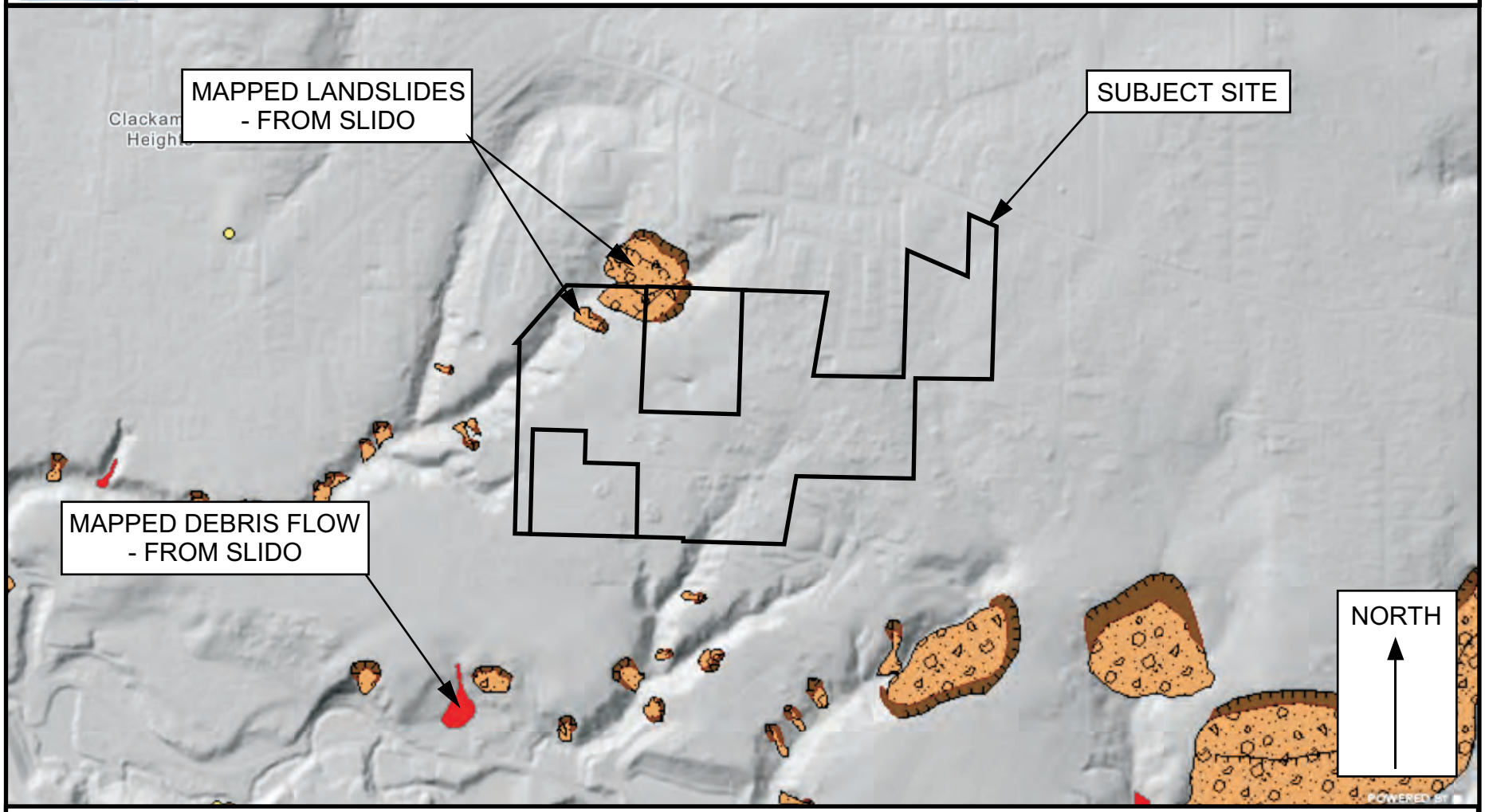
LIDAR BASED VICINITY MAP - WITH MAPPED LANDSLIDES



Legend

Approximate Scale 1 in = 1,000 ft

Date: 5/28/2021
Drawn by: EKR

Base map: Oregon Department of Geology and Mineral Industries, 2021, Statewide Landslide Information Database for Oregon (SLIDO): https://gis.dogami.oregon.gov/maps/slido/

Project: Park Place Crossing General Development Plan Oregon City, Oregon	Project No. 20-5600	FIGURE 2

Oregon_City_272 & 290
Oregon_City_274
Previously Unmapped Slide
Recent Scarp Observed
Probable Scarps
Soldier Pile Retaining Wall with Tiebacks Proposed to Increase Slope Stability
Slope Setback Line with Soldier Pile Retaining Wall Installed
Tour Creek Tributary Drainage
Abernethy Creek Tributary Drainage
SLOPE SETBACK LINES FOR EXISTING CONDITIONS
North
STREET A
STREET 1
STREET 2
STREET 3
STREET 4
STREET B
STREET C
STREET E
STREET F
STREET 6
CATTLE DRIVE
S HOLLY LANE
TP-1 23' >25'
TP-2
TP-3
TP-4 5' >25'
TP-5 3.5' >15'
TP-6 3.5' >15'
TP-7 3.5' 19'
TP-8 4' >25'
TP-9 3.5' >15'
TP-10 3.5' >16.5'
TP-11 3.5' >15'
TP-12 3' >15'
TP-13 3.5' >24'
TP-14 4' 21'
TP-15
TP-16
TP-17
TP-18
TP-19
TP-20
TP-21
TP-22
TP-23
TP-24
B-1
B-2
B-3
B-4
B-5

GEOLOGIC MAP KEY

- Landslide Debris
- Willamette Formation
- Boring Lava Formation
- Springwater Formation
- Troutdale Formation

SCALE
0 300 600 FEET
1 IN = 300 FT

Legend

- TP-1 — Test Pit Designation and Approximate Location
- B-1 — Boring Designation and Approximate Location
- Landslide Debris Encountered
- Soft Soils Encountered
- 3.5' = Depth at Which Rock is First Encountered
- 15.5' = Depth of Practical Refusal on Rock
- >25'= Depth is Beyond Maximum Exploration Depth
- 19' = Depth of Practical Refusal on Boulder

Note: Location of all geotechnical information is approximate.

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SITE PLAN, GEOLOGIC MAP, AND EXPLORATION LOCATIONS

Project: Park Place Crossing General Development Plan
Oregon City, Oregon

Project No. 20-5600

FIGURE 3

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-1**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Moderately organic, SILT (OL-ML), dark brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.0					Stiff to very stiff, clayey SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Willamette Formation)
3	4.0					
4	4.5					
5						Medium stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle orange and gray mottling, trace black staining, moist to very moist (Willamette Formation)
6						
7						
8						
9						
10						
11						
12						Moderate sidewall caving below 12 feet.
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						Blue gray below 22 feet.
23						Very soft (R1) to soft (R2), GRAVEL CONGLOMERATE, with siltstone and sandstone matrix, yellow brown, strong orange and gray mottling, cobbles up to 6 inches in diameter, trace black staining, moist (Springwater Formation)
24						
25						Test Pit Terminated at 25 Feet.
26						
27						Note: Perched groundwater seepage encountered at 12 feet. Discharge visually estimated at 1/4 gallon per minute.
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, damp (Topsoil Horizon)
2	3.0					
3	3.0					
4	4.5					
5						Medium stiff to very stiff, clayey SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Willamette Formation)
6						
7						
8						
9						
10						
11						
12						
13						Stiff, FAT CLAY (CH), light brown, sticky, strong orange mottling, trace black staining, damp to moist (Springwater Formation-Very Highly Expansive)
14						
15						
16						Test Pit Terminated at 15 Feet.
17						
18						Note: No seepage or groundwater encountered.
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-3**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Moderately organic, SILT (OL-ML), dark brown, trace roots throughout, loose, moist (Topsoil Horizon)
2–14						Medium stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle orange and gray mottling, trace black staining, moist to very moist (Willamette Formation)
15–17						Stiff, FAT CLAY (CH), light brown, sticky, strong orange mottling, trace black staining, with ash fragments, moist (Springwater Formation-Likely Very Highly Expansive)
18–21						Stiff to very stiff, sandy SILT (ML), trace clay, light brown, strong orange and gray mottling, sugary texture, massive, micaceous, moist (Highly Weathered Springwater Formation)
22–23						Extremely soft (R0) to very soft (R1), SILTSTONE, yellow brown, horizontal bedding planes preserved, black mineralization, moist (Springwater Formation)
24–28						Stiff, clayey SILT (ML), gray brown, subtle orange and gray mottling, massive, micaceous, moist (Springwater Formation)
29						Test Pit Terminated at 29 Feet. Note: No groundwater or seepage encountered.
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-4**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Moderately organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, damp to moist (Topsoil Horizon)
2	4.5					
3	4.5					Medium dense to dense, BOULDERS (GM), with light reddish brown silty clay to clayey silt matrix, gray to brown, trace black staining, boulders are soft (R2) to medium hard (R3) and up to 3 foot diameter, moist (Residual Soil)
4	4.5					
5						
6						
7						
8						Dense to very dense, very soft (R1) to soft (R2), BASALT, trace reddish brown silty clay to clayey silt matrix, gray brown to red, with medium hard (R3) boulders up to 5 feet diameter, difficult excavating conditions due to large boulders, trace black staining, moist (Boring Lava Formation)
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						Test Pit Terminated at 25 Feet.
26						
27						Note: No seepage or groundwater encountered.
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-5**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.5					Moderately organic, SILT (OL-ML), brown, roots throughout, loose, damp (Topsoil Horizon)
2	4.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	4.5					
4	4.5					
5						
6						
7						Stiff to very stiff, extremely soft (R0) to very soft (R1), BASALT, trace reddish brown silty clay to clayey silt matrix, gray to brown, with soft (R2) to medium hard (R3) boulders, trace black staining, moist (Boring Lava Formation)
8						
9						
10						
11						
12						
13						
14						
15						Test Pit Terminated at 15 Feet.
16						
17						Note: No seepage or groundwater encountered.
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-6**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					Moderately organic, SILT (OL-ML), brown, roots throughout, loose, damp (Topsoil Horizon)
2	3.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	4.5					
4	4.5					
5						
6						
7						Stiff to very stiff, extremely soft (R0) to very soft (R1), BASALT, trace reddish brown silty clay to clayey silt matrix, trace sand, gray to brown, trace black staining, moist (Boring Lava Formation)
8						
9						
10						
11						
12						
13						
14						
15						Test Pit Terminated at 15 Feet.
16						
17						Note: No seepage or groundwater encountered.
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place, Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-7**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Moderately to highly organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.0					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	1.5					
4	4.5					Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, trace reddish brown silty clay to clayey silt matrix, gray brown to red, trace black staining, moist (Boring Lava Formation)
5						
6						
7						
8						Dense to very dense, very soft (R1) to soft (R2), BASALT, trace reddish brown silty clay to clayey silt matrix, gray brown to red, with medium hard (R3) boulders up to 3 feet diameter, difficult excavating conditions due to large boulders, trace black staining, moist (Boring Lava Formation)
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						Practical Refusal on Medium Hard (R3) Boulder at 19 Feet.
20						Note: No seepage or groundwater encountered.
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-8**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Moderately organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	2.0					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	4.5					
4	4.5					
5						Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, trace reddish brown silty clay to clayey silt matrix, gray brown to red, trace black staining, moist (Boring Lava Formation)
6						
7						
8						
9						
10						With medium hard (R3) boulders up to 3 feet diameter below 10 feet.
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						Dense to very dense, very soft (R1) to soft (R2), BASALT, trace reddish brown silty clay to clayey silt matrix, gray brown to red, with medium hard (R3) boulders, moist (Boring Lava Formation)
25						
26						Test Pit Terminated at 25 Feet.
27						
28						Note: No seepage or groundwater encountered.
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-9**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.5					Moderately organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	2.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	4.5					
4–14						Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, with soft (R2) to medium hard (R3) boulders up to 2 feet diameter, trace reddish brown silty clay to clayey silt matrix, trace black staining, moist (Boring Lava Formation)
15						Test Pit Terminated at 15 Feet.
16–30						Note: No seepage or groundwater encountered.

LEGEND



Bag Sample | Bucket Sample | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-10**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Moderately to highly organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, moist (Residual Soil)
3	4.5					
4	4.5					
5						Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, with soft (R2) to medium hard (R3) boulders up to 2 feet diameter, trace reddish brown silty clay to clayey silt matrix, trace black staining, moist (Boring Lava Formation)
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						Test Pit Terminated at 16.5 Feet.
18						
19						Note: No seepage or groundwater encountered.
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place, Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-11**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.0					Moderately organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	2.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	4.0					
4–9						Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, with soft (R2) to medium hard (R3) boulders up to 1.5 feet diameter, trace reddish brown silty clay to clayey silt matrix, trace black staining, moist (Boring Lava Formation)
10–14						Very soft (R1) to soft (R2) below 10 feet.
15						Test Pit Terminated at 15 Feet.
16–30						Note: No seepage or groundwater encountered.

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-12**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Moderately organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	4.5					
4–14						Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, with soft (R2) boulders up to 1.5 feet diameter, trace reddish brown silty clay to clayey silt matrix, trace black staining, moist (Boring Lava Formation)
15						Test Pit Terminated at 15 Feet.
16–30						Note: No seepage or groundwater encountered.

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-13**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.0					Moderately organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel, light reddish brown, trace black staining, trace roots, moist (Residual Soil)
3	4.5					
4	4.5					
5–23						Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, with soft (R2) to medium hard (R3) boulders up to 3 feet diameter, trace reddish brown silty clay to clayey silt matrix, trace black staining, moist (Boring Lava Formation)
24						Test Pit Terminated at 24 Feet.
25–30						Note: No seepage or groundwater encountered.

LEGEND



Bag Sample | Bucket Sample | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-14**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Moderately organic, SILT (OL-ML), with gravel, brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gravel up to 2 feet, light reddish brown, trace black staining, damp to moist (Residual Soil)
3	4.5					
4	4.5					
5–20						Dense to very dense, extremely soft (R0) to very soft (R1), BASALT, with soft (R2) to medium hard (R3) boulders up to 4 feet diameter, trace reddish brown silty clay to clayey silt matrix, trace black staining, damp to moist (Boring Lava Formation)
21						Practical Refusal on Large Medium Hard (R3) to Hard (R4) Boulder at 21 Feet.
22–30						Note: No seepage or groundwater encountered.

LEGEND

Bag Sample (100 to 1,000 g) | Bucket Sample (5 Gal. Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place, Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-15**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					Low to moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, damp (Topsoil Horizon)
2	4.5					Stiff to very stiff, clayey SILT (ML), with gravel, light brown, subtle orange and gray mottling, moist (Springwater Formation)
3	4.5					
4	4.5					
5–13						Medium dense to dense, silty GRAVEL (GM), with silty clay to clayey silt matrix, with sand, yellow brown, gravel is subrounded and up to 6 inches in diameter, trace black staining, moist (Springwater Formation)
14–15						Stiff, clayey SILT (ML) to silty CLAY (CL), light brown to gray, bedding planes preserved, micaceous, soapy texture, moist (Springwater Formation)
16						Test Pit Terminated at 16 Feet.
17						Note: No seepage or groundwater encountered.
18–30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-16**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.0					Low to moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.5					Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), gray, micaceous, strong orange and gray mottling, trace black staining, moist (Willamette Formation)
3	4.5					
4	3.5					
5						
6						Stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle orange and gray mottling, trace black staining, moist (Willamette Formation)
7						
8						
9						
10						Medium stiff and very moist below 10 feet.
11						
12						
13						
14						
15						
16						Test Pit Terminated at 15.5 Feet.
17						
18						Note: No seepage or groundwater encountered.
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place, Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-17**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.5					Low to moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	3.0					Stiff to very stiff, clayey SILT (ML), light brown to gray, micaceous, strong orange and gray mottling, trace black staining, trace fine roots, damp to moist (Willamette Formation)
3	4.5					
4	4.5					
5						
6						Stiff, sandy SILT (ML), brown, micaceous, subtle orange and gray mottling, trace black staining, moist (Willamette Formation)
7						
8						
9						
10						Medium stiff and very moist below 10 feet.
11						
12						
13						
14						
15						
16						Test Pit Terminated at 15.5 Feet.
17						
18						Note: No seepage or groundwater encountered.
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-18**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.0					Moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.0					Stiff to very stiff, clayey SILT (ML), light brown to gray, micaceous, strong orange and gray mottling, trace black staining, moist (Willamette Formation)
3	4.5					
4	3.5					
5						
6						Stiff, sandy SILT (ML), brown, micaceous, subtle orange and gray mottling, trace black staining, moist (Willamette Formation)
7						
8						
9						
10						
11						
12						Medium stiff and very moist below 12 feet.
13						
14						
15						
16						Test Pit Terminated at 15 Feet.
17						
18						Note: No seepage or groundwater encountered.
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-19**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					Low to moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.5					Stiff to very stiff, clayey SILT (ML), gray, micaceous, strong orange and gray mottling, trace black staining, damp to moist (Willamette Formation)
3	4.5					
4	4.5					
5						
6						Stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Willamette Formation)
7						
8						
9						
10						
11						
12						
13						Stiff to very stiff, silty CLAY (CL), gray, micaceous, massive, with ash fragments, moist (Springwater Formation)
14						
15						
16						Test Pit Terminated at 15.5 Feet.
17						
18						Note: No seepage or groundwater encountered.
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-20**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	3.5					Medium stiff, clayey SILT (ML), light brown, fractured texture, moist (Landslide Debris)
3	4.5					Stiff, clayey SILT (ML), gray brown, strong mottling, moist (Landslide Debris)
4	4.0					Medium stiff to stiff, clayey SILT (ML), light brown, minor spalling of sidewall, micaceous, moist (Landslide Debris)
5						
6						
7						
8						
9						
10						
11						
12						Stiff, FAT CLAY (CH), light brown, sticky, strong orange mottling, trace black staining, moist (Landslide Debris-Likely Very Highly Expansive)
13						
14						
15						
16						Medium stiff, silty CLAY (CL), trace subrounded gravel, gray, highly fractured texture/crumbly, strong orange and gray mottling, moist (Landslide Debris)
17						
18						
19						
20						
21						
22						
23						
24						Stiff to very stiff, clayey SILT (ML), trace sand, light brown, micaceous, massive, moist (Springwater Formation)
25						Test Pit Terminated at 25 Feet. Note: No seepage or groundwater encountered.
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place, Oregon City, Oregon	Project No. 20-5600	Test Pit No. **TP-21**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Moderately organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	1.5					Medium stiff, clayey SILT (ML), light brown, fractured texture, strong orange and gray mottling, micaceous, moist (Landslide Debris)
3	4.5					
4	4.5					
5						Stiff, SILT (ML), trace sand, light brown, subtle orange and gray mottling, micaceous, moist (Landslide Debris)
6						
7						
8						
9						Stiff, sandy SILT (ML), with gravel, gray brown, strong red mottling, micaceous, moist (Landslide Debris)
10						
11						Stiff, FAT CLAY (CH), gray, sticky, strong orange mottling, with ash fragments, trace black staining, moist (Landslide Debris-Likely Very Highly Expansive)
12						
13						
14						
15						Medium stiff, silty CLAY (CL), gray, highly fractured texture/crumbly, strong orange and gray mottling, moist (Landslide Debris)
16						
17						
18						
19						
20						
21						Stiff to very stiff, silty CLAY (CL), gray, micaceous, massive, waxy texture, moist (Springwater Formation)
22						
23						Test Pit Terminated at 22 Feet.
24						
25						Note: No seepage or groundwater encountered.
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
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Portland, Oregon 97224
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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-22**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Low organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	4.0					Stiff to very stiff, clayey SILT (ML), light brown to gray, micaceous, strong orange and gray mottling, trace black staining, damp to moist (Willamette Formation)
3	4.5					
4	4.5					
5						
6						Stiff, sandy SILT (ML), brown, micaceous, subtle orange and gray mottling, trace black staining, moist (Willamette Formation)
7						
8						
9						
10						
11						Medium stiff and very moist below 11 feet.
12						
13						
14						
15						Test Pit Terminated at 15 Feet.
16						Note: No seepage or groundwater encountered.
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
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Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-23**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Low organic, SILT (OL-ML), brown, trace roots throughout, loose, moist (Topsoil Horizon)
2	2.0					Stiff to very stiff, clayey SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, trace fine roots, moist (Willamette Formation)
3	2.5					
4	3.5					
5						
6						Stiff, sandy SILT (ML), brown, micaceous, subtle orange and gray mottling, trace black staining, moist (Willamette Formation)
7						
8						
9						
10						
11						
12						Medium stiff and very moist below 12 feet.
13						
14						
15						
16						
17						Stiff, FAT CLAY (CH), gray, sticky, strong orange mottling, trace ash fragments, trace black staining, moist (Springwater Formation-Likely Very Highly Expansive)
18						
19						Test Pit Terminated at 18 Feet.
20						
21						Note: No seepage or groundwater encountered.
22						
23						
24						
25						
26						
27						
28						
29						
30						

LEGEND



Bag Sample | Bucket Sample | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

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TEST PIT LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Test Pit No. **TP-24**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Moderately organic, SILT (OL-ML), brown, with gravel, trace roots throughout, loose, damp (Topsoil Horizon)
2	4.5					Loose, silty GRAVEL (GM), gray, with roots, moist (Boring Lava Formation)
3	4.5					Very stiff, CLAY (CL), trace sand, gray, subtle orange and gray mottling, slight blocky texture to 3 feet, trace black staining, moist (Springwater Formation)
4	4.5					
5						
6						
7						
8						
9						Stiff, FAT CLAY (CH), light brown to gray, sticky, trace black staining, moist (Springwater Formation-Likely Very Highly Expansive)
10						
11						
12						
13						Very stiff, CLAY (CL), light brown to gray, massive, micaceous, soapy texture, damp (Springwater Formation)
14						
15						
16						FAT CLAY (CH) zone at 16 to 17 feet.
17						
18						
19						
20						
21						
22						
23						Very stiff, SILT (ML), trace sand, light brown, massive, micaceous, subtle orange and gray mottling, damp (Springwater Formation)
24						
25						
26						Test Pit Terminated at 26 Feet.
27						
28						Note: No seepage or groundwater encountered.
29						
30						

LEGEND



Bag Sample



Bucket Sample


Shelby Tube Sample


Seepage


Water Bearing Zone


Water Level at Abandonment

Date Excavated: 10/6-8/2020

Logged By: B. Rapp

Surface Elevation:

GEOPACIFIC
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BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-1**

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
						Moderately organic, SILT (ML), brown, with roots, moist (Topsoil Horizon)
		18				Stiff to very stiff, SILT (ML), trace fine grained sand, light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist to very moist (Willamette Formation)
5		10				
		4				
10		4				Soft to medium stiff, SILT (ML), trace fine grained sand, light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist to very moist (Willamette Formation)
		3				
15						
		11				
20		12				Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), with zones of fine grained sand, light brown to blue gray, strong to subtle orange and gray mottling, sugary texture, micaceous, damp to moist (Highly Weathered Springwater Formation)
25		10				
30		18				
35		19				
40		26				
						Very stiff, sandy SILT (ML) to very dense silty SAND (SM), gray, sand is fine grained, damp to moist (Highly Weathered Springwater Formation)

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table (10-20-99) | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

GEOPACIFIC
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BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-1**

Depth (ft)	Sample Type	N-Value	Well Con-struction	Moisture Content (%)	Water Bearing Zone	Material Description
45		47				Very stiff, sandy SILT (ML) to very dense silty SAND (SM), gray, sand is fine grained, sugary texture, damp to moist (Highly Weathered Springwater Formation)
50		50				
						Boring Terminated at 51.5 feet. Groundwater could not be determined due to mud rotary drilling methods.
55						
60						
65						
70						
75						
80						
85						

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table (10-20-99) | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

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BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-2**

Depth (ft)	Sample Type	N-Value	Well Con-struction	Moisture Content (%)	Water Bearing Zone	Material Description
						Moderately organic, SILT (ML), brown, with roots, moist (Topsoil Horizon)
		20				
5		17				Stiff to very stiff, SILT (ML), light brown, micaceous, subtle to strong orange and gray mottling, moist (Willamette Formation)
		9				
10		9				
		11				
15		20				Stiff to very stiff, clayey SILT (ML), trace sand, with zones of fine grained gravel, light gray brown, strong orange and gray mottling, sugary texture, trace mineralization, micaceous, moist (Highly Weathered Springwater Formation)
		8				
20		13				Stiff to very stiff, sandy SILT (ML) interbedded with loose to medium dense, silty SAND (SM), gray to brown, sand is fine to medium grained, moist to very moist (Highly Weathered Springwater Formation)
25		10				
30		12				Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light brown to blue gray, strong to subtle orange and gray mottling, subtle bedding planes preserved, micaceous, damp to moist (Highly Weathered Springwater Formation)
35		17				
40		20				

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table (10-20-99) | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

GEOPACIFIC
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BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-2**

Depth (ft)	Sample Type	N-Value	Well Con-struction	Moisture Content (%)	Water Bearing Zone	Material Description
45		19				Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light brown to blue gray, strong to subtle orange and gray mottling, subtle bedding planes preserved, micaceous, damp to moist (Highly Weathered Springwater Formation)
50		45				
						Boring Terminated at 51.5 feet. Groundwater could not be determined due to mud rotary drilling methods.
55						
60						
65						
70						
75						
80						
85						

LEGEND



Bag Sample


Split-Spoon


Shelby Tube Sample


Static Water Table at Drilling



Static Water Table


Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

BORING LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Boring No. **B-3**

Depth (ft)	Sample Type	N-Value	Well Con-struction	Moisture Content (%)	Water Bearing Zone	Material Description
						Moderately organic, SILT (ML), brown, with roots, moist (Topsoil Horizon)
		16				Very stiff, SILT (ML), trace fine grained sand, light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist to very moist (Willamette Formation)
5		14				
		5				Soft to medium stiff, SILT (ML), trace fine grained sand, light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist to very moist (Willamette Formation)
10		3				
		1				
15		(Shelby Tube empty)				Very soft to medium stiff, sandy SILT (ML) to very loose to loose, silty SAND (SM), light brown, micaceous, subtle mottling, moist to very moist (Willamette Formation)
		1				
20		5				
25		4				Soft to medium stiff, silty CLAY (CL), gray, subtle orange and gray mottling, trace black staining, moist (Highly Weathered Springwater Formation)
30		13				Medium dense, silty SAND (SM), trace clay, brown to red, highly decomposed volcanic rock, wet (Highly Weathered Springwater Formation)
35		9				Loose to dense, silty SAND (SM), brown, sand is fine to coarse grained, subtle cross bedding, weakly cemented zones, micaceous, damp to moist (Troutdale Formation)
40		34				

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table (10-20-99) | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-3**

Depth (ft)	Sample Type	N-Value	Well Con-struction	Moisture Content (%)	Water Bearing Zone	Material Description
45		85				
50		92				Very dense, silty SAND (SM), brown to dark gray, sand is fine to coarse grained, subtle cross bedding, micaceous, damp to moist (Troutdale Formation)
55		50 for 5"				
60		90				
65		84				
70		50 for 5"				
75		50 for 5.5"				Very dense, silty SAND (SM), trace gravel, brown to dark gray, sand is fine to coarse grained, subtle cross bedding, micaceous, damp to moist (Troutdale Formation)
80		68				
85						Boring Terminated at 81.5 feet. Groundwater could not be determined due to mud rotary drilling methods.

LEGEND



Bag Sample


Split-Spoon


Shelby Tube Sample


Static Water Table at Drilling



Static Water Table


Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

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Portland, Oregon 97224
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BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-4**

Depth (ft)	Sample Type	N-Value	Well Con-struction	Moisture Content (%)	Water Bearing Zone	Material Description
						Moderately organic, SILT (ML), brown, with roots, moist (Topsoil Horizon)
		16				Very stiff, SILT (ML), trace sand, light brown, micaceous, strong orange and gray mottling, trace black staining, moist to very moist (Willamette Formation)
5		8				
		6				
10		17				Medium stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), with highly weathered volcanic gravel, trace sand, brown to gray, trace red and black staining, ashy, micaceous, moist (Highly Weathered Springwater Formation)
		24				
15		29				
		28				
20		31				
25		11				Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), with sand, light brown to gray, trace red and black staining, ashy, micaceous, subtle orange mottling, damp to moist (Highly Weathered Springwater Formation)
30		26				
35		35				
40		29				
						Very stiff, clayey SILT (ML) to silty CLAY (CL), with highly weathered volcanic gravel, brown to gray, moist (Highly Weathered Springwater Formation)

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table (10-20-99) | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

GEOPACIFIC
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-4**

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
45		50 for 5"				Very stiff, clayey SILT (ML) to silty CLAY (CL), with highly weathered volcanic gravel, trace sand, brown to gray, damp to moist (Highly Weathered Springwater Formation)
50		50 for 5.5"				
55		73				Very dense, SAND (SW), yellow brown to dark gray, sand is fine to coarse grained, well graded, trace black staining, damp to moist (Troutdale Formation)
60		50 for 5"				
65		50 for 4"				
70		50 for 5"				Boring Terminated at 70.9 feet. Groundwater could not be determined due to mud rotary drilling methods.
75						
80						
85						

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table (10-20-99) | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

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BORING LOG

Project: Park Place
Oregon City, Oregon

Project No. 20-5600

Boring No. **B-5**

Depth (ft)	Sample Type	N-Value	Well Con-struction	Moisture Content (%)	Water Bearing Zone	Material Description
						Moderately organic, SILT (ML), brown, with roots, moist (Topsoil Horizon)
		11				Medium stiff to stiff, SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, damp to moist (Willamette Formation)
5		7				
		4				
10		2				Soft to medium stiff, clayey SILT (ML) to silty CLAY (CL), trace sand, brown to gray, trace black staining, ashy, micaceous, subtle orange and gray mottling, moist (Highly Weathered Springwater Formation)
15		8				
		8				
20		9				
25		50 for 5.5"				Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with sand, with zones of highly weathered volcanic rock, brown to gray, sugary texture, orange and gray mottling, moist (Highly Weathered Springwater Formation)
30		26				
35		33				
40		37				Medium dense to very dense, SAND (SW), trace silt, yellow brown to dark gray, sand is fine to very coarse grained, cross bedded, trace black staining, damp to moist (Troutdale Formation)

LEGEND



Bag Sample | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

GEOPACIFIC
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Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

BORING LOG

Project: Park Place Oregon City, Oregon	Project No. 20-5600	Boring No. **B-5**

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
45						
		30				
50		43				
55		88				Medium dense to very dense, SAND (SP), trace silt, yellow brown to dark gray, sand is fine to very coarse grained, cross bedded, trace black staining, damp to moist (Troutdale Formation)
60		77				
65		50 for 6"				
70		50 for 5"				Boring Terminated at 70.4 feet. Groundwater could not be determined due to mud rotary drilling methods.
75						
80						
85						

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table (10-20-99) | Water Bearing Zone

Date Drilled: 10/20-22/2020
Logged By: B. Rapp
Surface Elevation:

Project Name:	Park Place Subdivision				
Project #:	20-5600	Sample ID:	S20-249	Depth:	12'-13'
Material Type:	Fat Clay				
Material Source:	TP-2				

EXPANSION INDEX ASTM D4829

Initial Height (0.001 in.)	1.000
Initial Moisture Content (0.1%)	18.4
Initial Dry Unit Weight (0.1 lbf/cu.ft.)	82.7
Initial Degree of Saturation (50.0+/-2%)	48.0
Initial Dial Reading (0.001 in.)	0.2495
Final Dial Reading (0.001 in.)	0.1178
Final Moisture Content (0.1%)	40.8
Expansion Index	**132**

Sampled By:	EKR	Tested By:	SJC
Sample Date:	10/6/2020	Tested Date:	10/16/2020

Expansion Index, EI	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

Moisture Content from Trimmings

Pan #	12	Tare Wt. =	88.65	Moist Wt. + Tare=	136.77
Moisture=	18.4			Dry Wt. + Tare=	129.3

Expansion Ring

2 inch Radius x 1 inch Height= 5.08 cm Radius x 2.54 cm Height

Volume = 205.9 cm^3

Ring Wt. (g) =	368.6	**Moist Density** (g/cm^3) =	1.6
Ring + Sample (g) =	691.5	**Dry Density** (g/cm^3) =	1.3
		Dry Unit Wt. (lb/ft^3) =	82.7

Degree of Saturation = 48.0

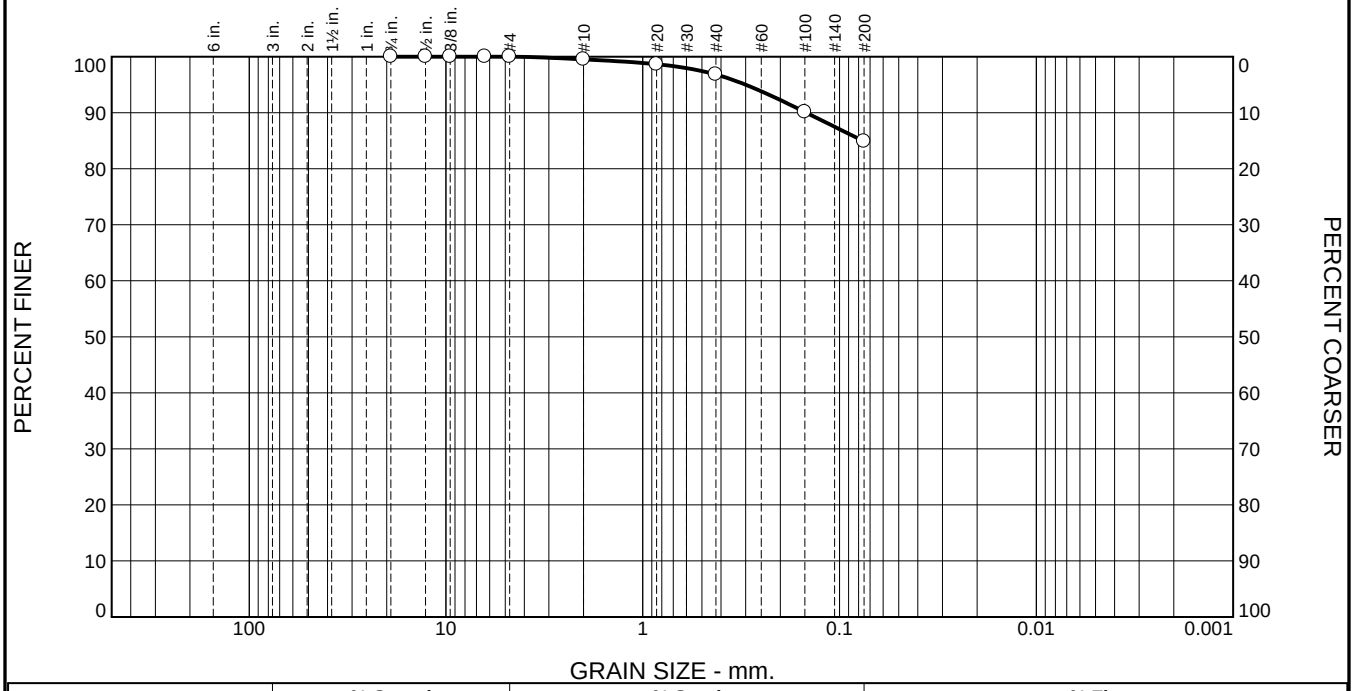
Final Moisture = 40.8

Ring + Sample after soaking (g) =	753.7
Sample after soaking (g)	385.1
Ring + Sample oven dry (g)=	642.2
Sample oven dry (g)	273.6

Expansion Index = 132

Initial Dial Reading (0.001 in.) =	0.2495
Final Dial Reading (0.001 in.) =	0.1178

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	2.7	11.9	84.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.5	100.0		
.375	100.0		
.25	100.0		
#4	100.0		
#10	99.5		
#20	98.6		
#40	96.8		
#100	90.1		
#200	84.9		

* (no specification provided)

Material Description

Silt with Sand

Atterberg Limits (ASTM D 4318)

PL= 23.6 **LL=** 29.5 **PI=** 5.9

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(5)

Coefficients

D_{90}= 0.1475 D_{85}= 0.0764 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Moisture 29.5%

Date Received: _____ **Date Tested:** 11/17/2020

Tested By: SJC

Checked By: _____

Title: _____

Location: B-1
Sample Number: S20-272 **Depth:** 15'

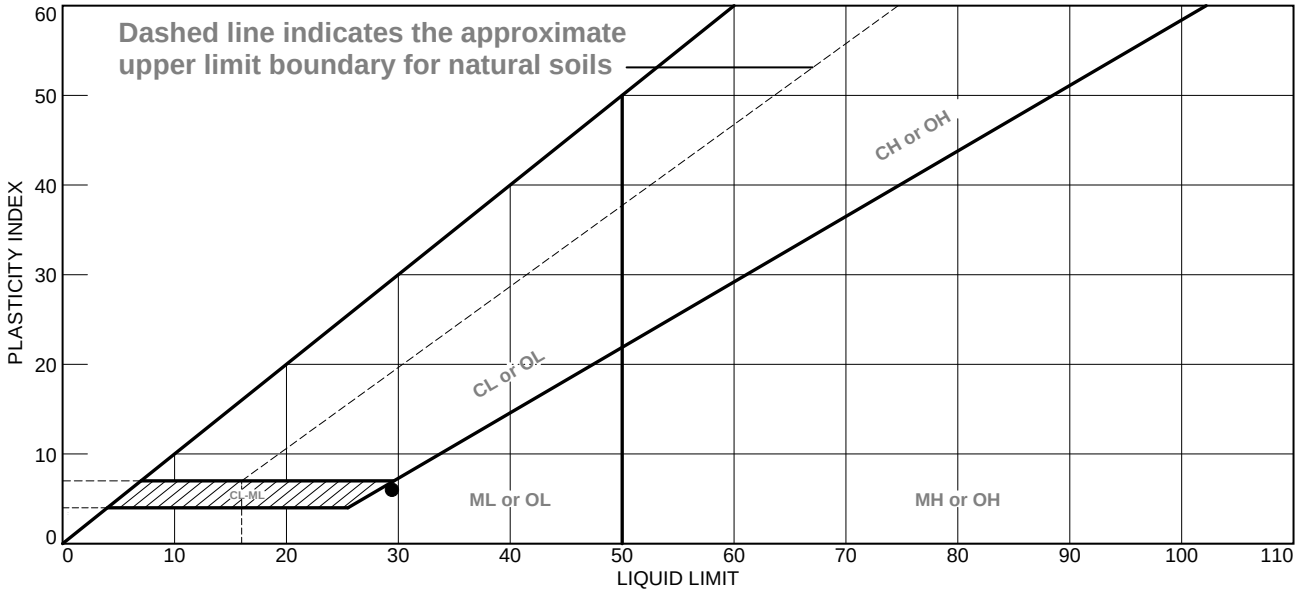
Date Sampled: 10/22/2020

GEOPACIFIC ENGINEERING, INC.

Client: Hidden Falls Development LLC
Project: Park Place Subdivision

Project No: 20-5600 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silt with Sand	29.5	23.6	5.9	96.8	84.9	ML

Project No. 20-5600 **Client:** Hidden Falls Development LLC

Project: Park Place Subdivision

Location: B-1
Sample Number: S20-272 **Depth:** 15'

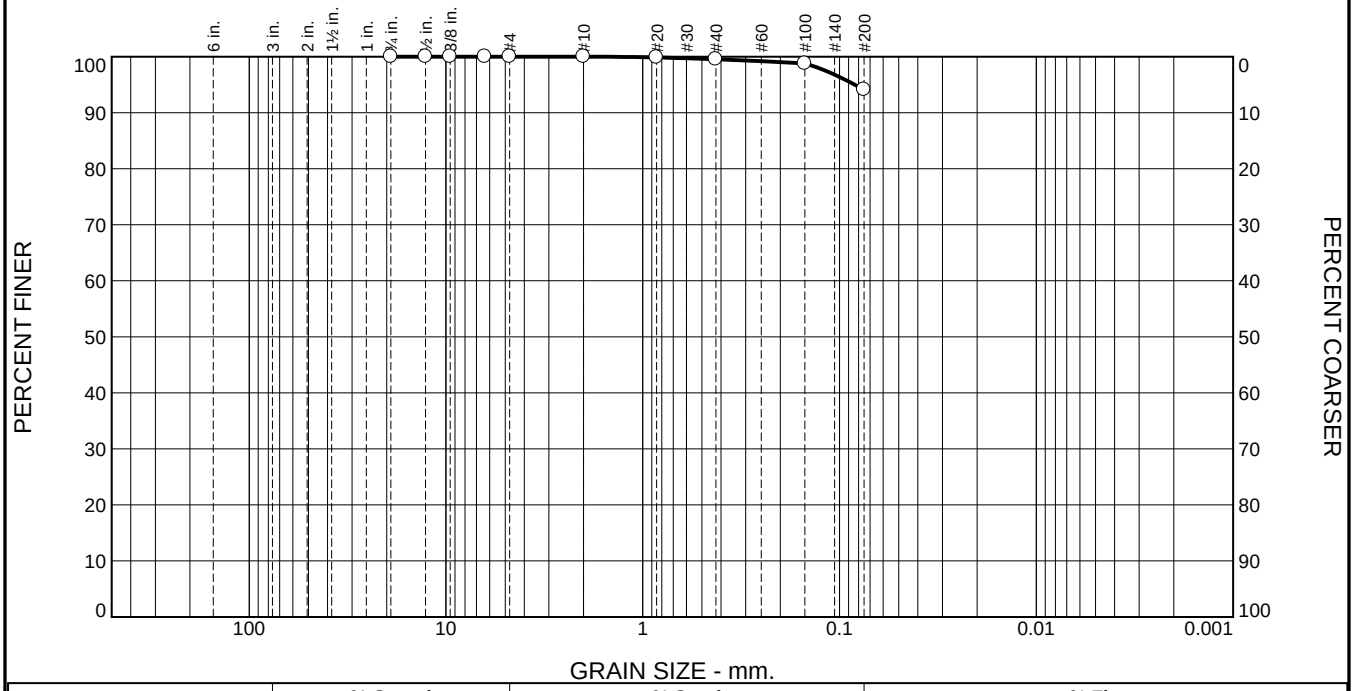
Remarks:

GEOPACIFIC ENGINEERING, INC.

Figure

Tested By: SJC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	5.4	94.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.5	100.0		
.375	100.0		
.25	100.0		
#4	100.0		
#10	100.0		
#20	99.9		
#40	99.5		
#100	98.8		
#200	94.1		

* (no specification provided)

Material Description

Silt

Atterberg Limits (ASTM D 4318)

PL= 29.2 **LL=** 33.5 **PI=** 4.3

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(6)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Moisture 33.4%

Date Received: _____ **Date Tested:** 11/17/2020

Tested By: SJC

Checked By: _____

Title: _____

Location: B-5
Sample Number: S20-273 **Depth:** 12.5'

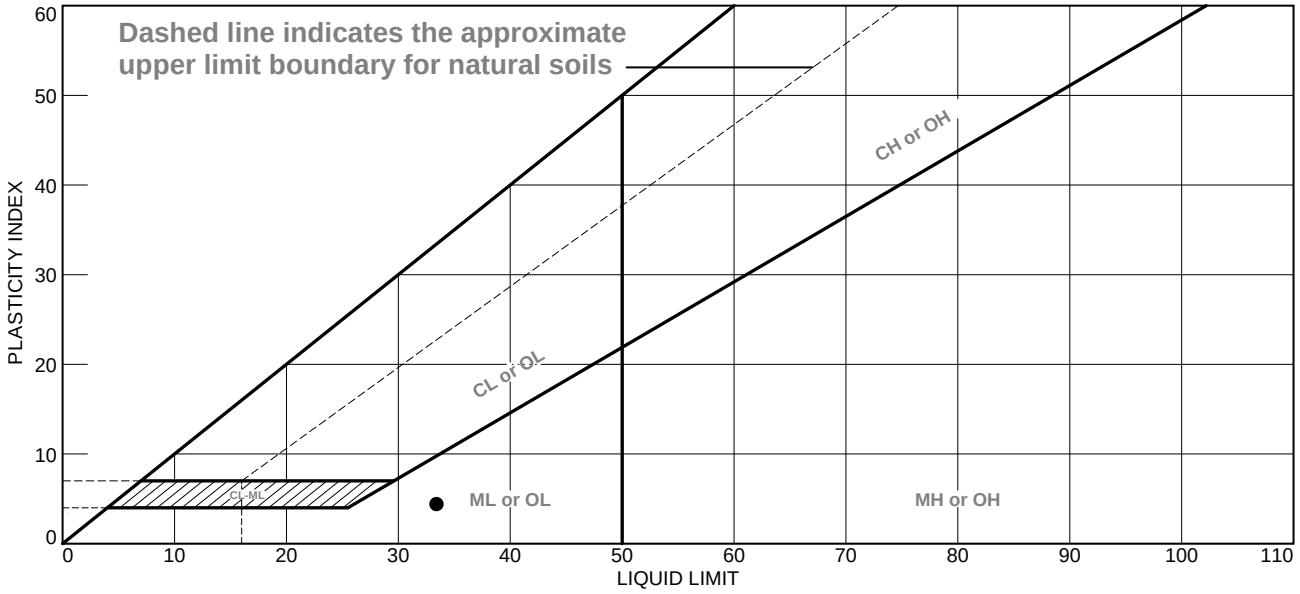
Date Sampled: 10/22/2020

GEOPACIFIC ENGINEERING, INC.

Client: Hidden Falls Development LLC
Project: Park Place Subdivision

Project No: 20-5600 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silt	33.5	29.2	4.3	99.5	94.1	ML

Project No. 20-5600 **Client:** Hidden Falls Development LLC

Project: Park Place Subdivision

Location: B-5
Sample Number: S20-273 **Depth:** 12.5'

Remarks:

GEOPACIFIC ENGINEERING, INC.

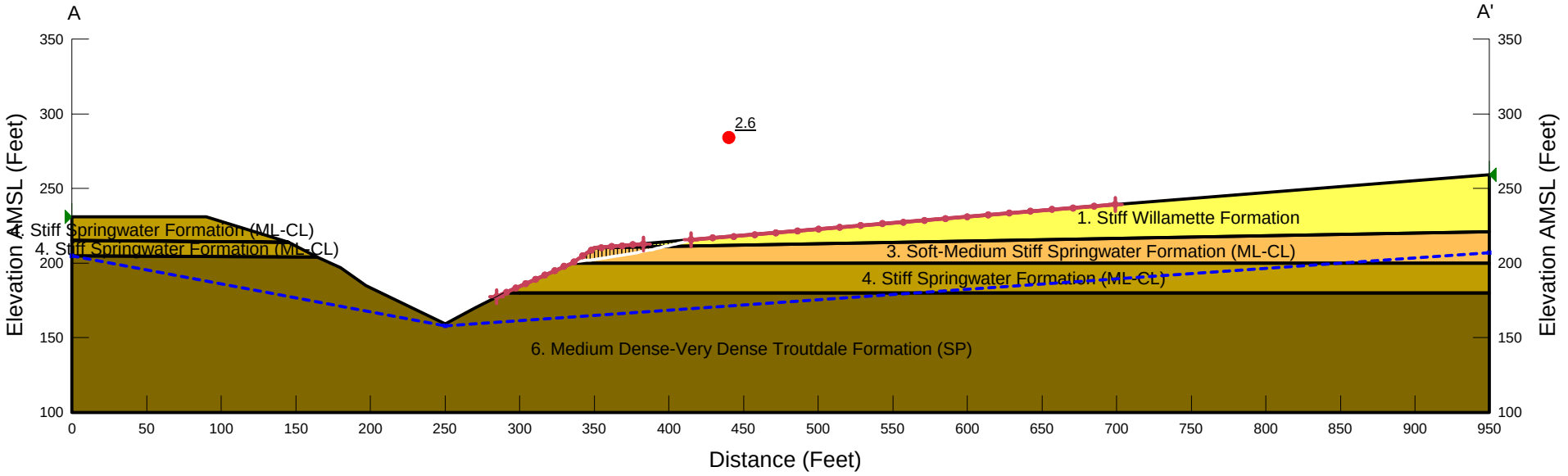
Figure

Tested By: SJC

20-5600 - Park Place Subdivision - Section A-A' - Static Slope Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	1. Stiff Willamette Formation	Mohr-Coulomb	120	0	28
	3. Soft-Medium Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	0	24
	4. Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	300	36
	6. Medium Dense-Very Dense Troutdale Formation (SP)	Mohr-Coulomb	125	200	36

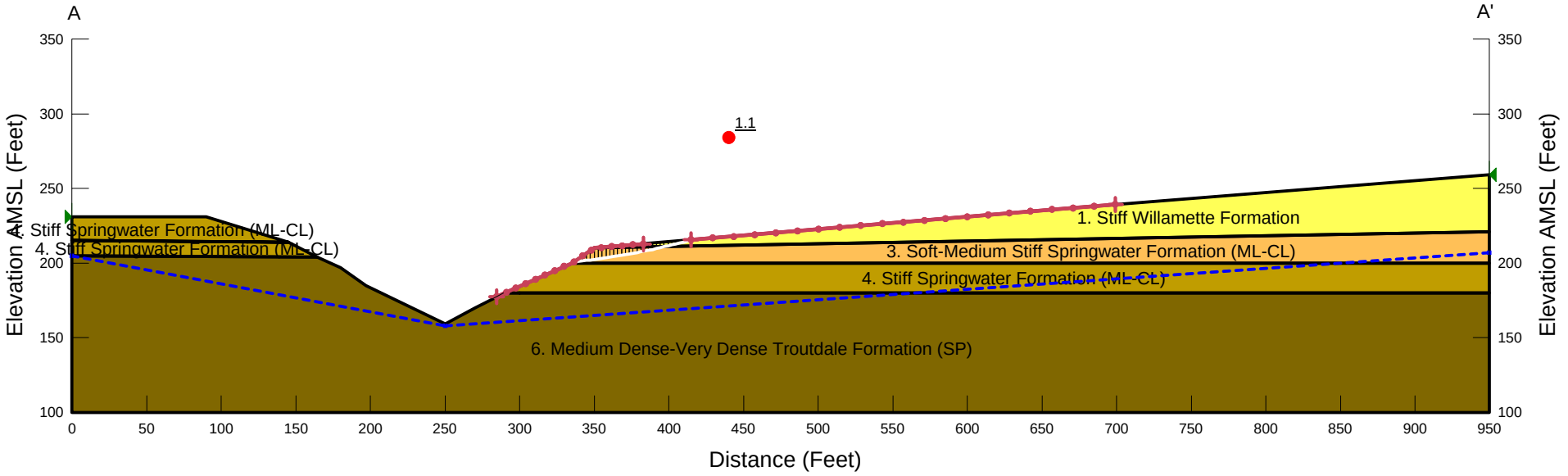
Static Factor of Safety: 2.6



20-5600 - Park Place Subdivision - Section A-A' - Seismic Slope Analysis 0.23g

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	1. Stiff Willamette Formation	Mohr-Coulomb	120	0	28
	3. Soft-Medium Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	0	24
	4. Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	300	36
	6. Medium Dense-Very Dense Troutdale Formation (SP)	Mohr-Coulomb	125	200	36

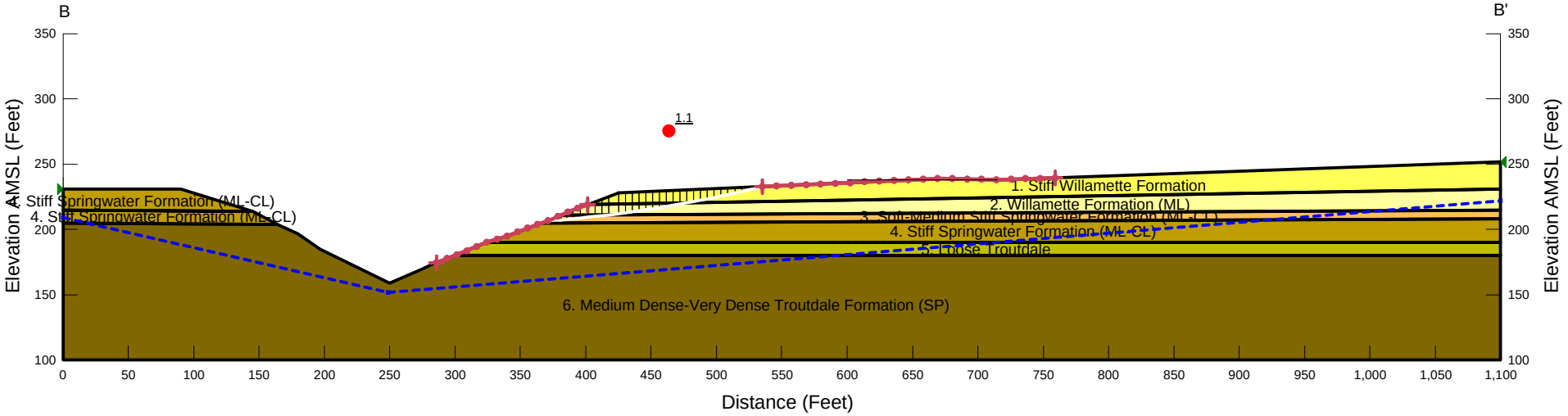
Pseudostatic Factor of Safety: 1.1



20-5600 - Park Place Subdivision - Section B-B' - Existing Conditions - Seismic Slope Analysis 0.23g

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	1. Stiff Willamette Formation	Mohr-Coulomb	120	0	28
	2. Willamette Formation (ML)	Mohr-Coulomb	125	0	22
	3. Soft-Medium Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	0	24
	4. Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	300	36
	5. Loose Troutdale	Mohr-Coulomb	120	150	30
	6. Medium Dense-Very Dense Troutdale Formation (SP)	Mohr-Coulomb	125	200	36

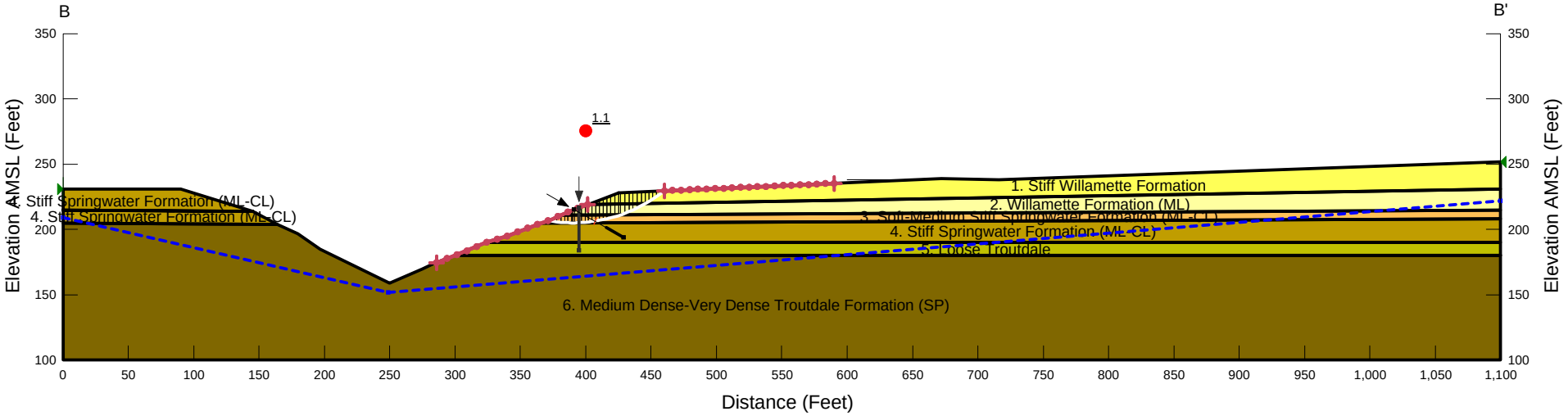
Pseudostatic Factor of Safety: 1.1



20-5600 - Park Place Subdivision - Section B-B' - Seismic Slope Analysis 0.236g

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	1. Stiff Willamette Formation	Mohr-Coulomb	120	0	28
	2. Willamette Formation (ML)	Mohr-Coulomb	125	0	22
	3. Soft-Medium Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	0	24
	4. Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	300	36
	5. Loose Troutdale	Mohr-Coulomb	120	150	30
	6. Medium Dense-Very Dense Troutdale Formation (SP)	Mohr-Coulomb	125	200	36

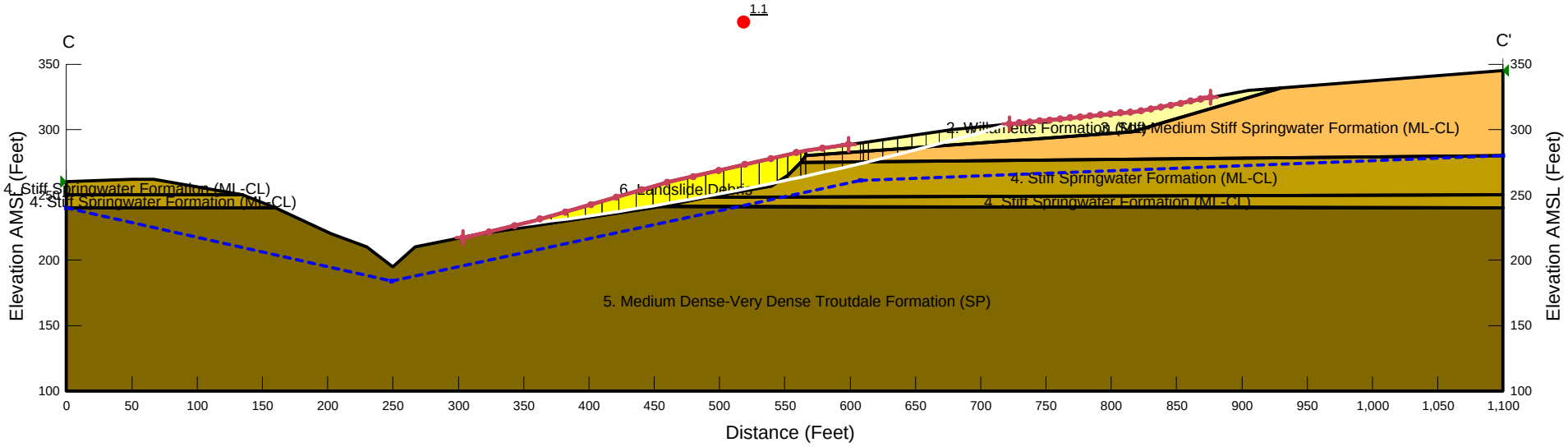
Pseudostatic Factor of Safety: 1.1



20-5600 - Park Place Subdivision - Section C-C' - Seismic Slope Analysis 0.23g

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	2. Willamette Formation (ML)	Mohr-Coulomb	125	50	26
	3. Soft-Medium Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	50	26
	4. Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	300	36
	5. Medium Dense-Very Dense Troutdale Formation (SP)	Mohr-Coulomb	125	200	36
	6. Landslide Debris	Mohr-Coulomb	110	150	10

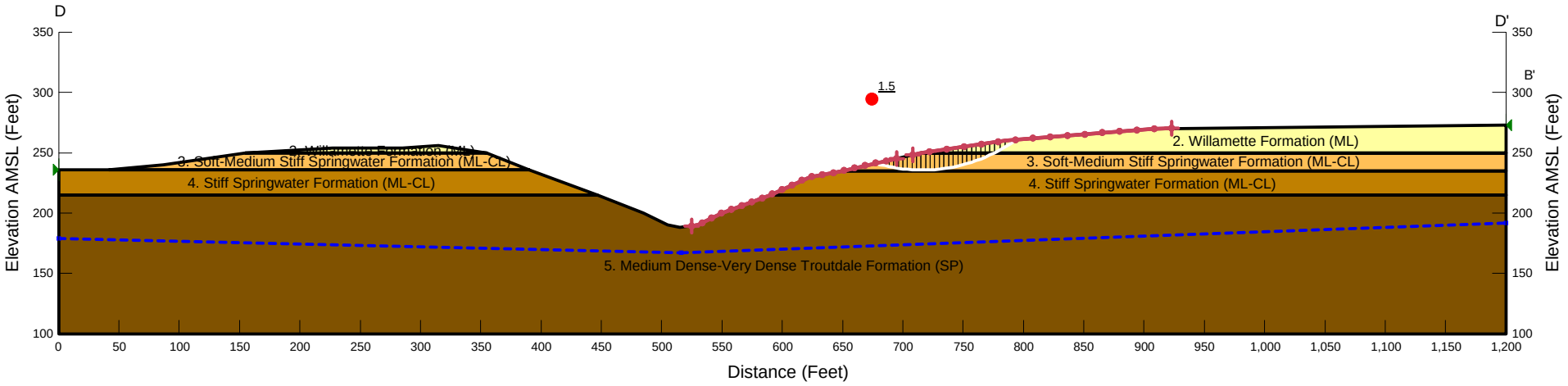
Pseudostatic Factor of Safety: 1.1



20-5600 - Park Place Subdivision - Existing Section D-D' - Seismic Slope Analysis 0.23g

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	2. Willamette Formation (ML)	Mohr-Coulomb	125	50	26
	3. Soft-Medium Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	250	20
	4. Stiff Springwater Formation (ML-CL)	Mohr-Coulomb	125	300	36
	5. Medium Dense-Very Dense Troutdale Formation (SP)	Mohr-Coulomb	125	200	36

Pseudostatic Factor of Safety: 1.5



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(503) 563-6151

VANCOUVER, WA
9600 NE 126th Avenue, Suite 2520
Vancouver, WA 98682
(360) 882-0419

www.aks-eng.com

Date: 3/18/2022
To: Oregon City Planning Division
From: Cody Street, EI and Monty Hurley, PE, PLS – AKS Engineering and Forestry, LLC
Project Name: Park Place Crossing General Development Plan/Master Plan
AKS Job No.: 7404
Project Site: Clackamas County Assessor's Map 2 2E 27BC, Tax Lots 1000, 2000; 2 2E 28D; Map 2 2E 28D, Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 500, 502, 3700, 3701

Subject: General Development Plan/Master Plan Geologic Hazard Overlay Zone Memorandum

---

Introduction

This memorandum summarizes aspects of the Park Place Crossing development and the alignment of S Holly Lane that relate to the Geologic Hazard Overlay Zone. This memorandum is intended to supplement the General Development Plan/Master Plan Application, which was originally submitted in July 2021 and has been resubmitted with this memo.

Park Place Crossing is located north and east of S Livesay Road and south of S Holcomb Road in Oregon City, Clackamas County, Oregon; Tax Lots 1000, 2000 of Clackamas County Assessor's Map 2 2E 27BC and Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 401, 500, 502, 3700, and 3701 of Clackamas County Assessor's Map 2 2E 28D.

Geohazard checklists and applications, as well as geotechnical reports and analyses are not required at the time of General Development Plan/Master Plan application. However, a geotechnical report is necessary for this project to demonstrate its feasibility and compliance with the Oregon City Municipal Code (OCMC) and Public Works Design Standards, as well as best practices for civil and geotechnical engineering. Attached to the Park Place Crossing General Development Plan/Master Plan Application are the Preliminary Geotechnical Report (Exhibit K) and Addendum on Slopes (Exhibit L) prepared by GeoPacific Engineering Inc. (GeoPacific). The intent of this memorandum is to:

1. Summarize the extensive research and investigation that has gone into the project.
2. Substantiate that the layout/design as proposed is feasible, safe, practical, and is the most reasonable layout and design to meet the intent of the Park Place Concept Plan while working within the constraints posed by existing development patterns, topography, natural resources, zoning, geological/geotechnical standards, and applicable jurisdictional requirements.
3. Demonstrate compliance with OCMC 17.44.060.L.
4. Leave the option open to provide additional detail with future Detailed Development Plan (DDP) Applications if necessary to ensure compliance.

Existing Site Conditions

Overall, topography on the site slopes down to the west at grades of 25 percent or less. However, small, isolated areas in the middle of the site and drainages in the northwest and south-central portion of the site exhibit slopes greater than 25 percent. These areas are designated as Geologic Hazards per OCMC 17.44 and are illustrated on the Preliminary Plans (Exhibit A, Sheet P-20) and overlayed on the existing

conditions aerial imagery in this memorandum's attached plan sheet EXH-15. Preliminary Existing Conditions Plans are included herein (EXH-1 through EXH-7) to illustrate the extents of field-verified survey information and include overall and zoomed in sector plan sheets for ease of viewing.

Proposed Site Conditions

The Preliminary Grading Plan (Exhibit A, Sheet P-06) illustrates the existing topographic extents of grading of the site across each of the project phases needed to construct infrastructure for the site, including public streets, functional underground utilities, and access to lots including alleys, buildable lots, etc. The Preliminary Grading plan is further broken down into zoomed-in sectors for ease of viewing in this memo as plan sheets EXH-8 through EXH-14, which also include the slope setbacks established by the Preliminary Geotechnical Report at the perimeter of the drainages in the northwest and south-central portion of the site.

Proposed grading adheres to the recommendations within the Preliminary Geotechnical Report and meets the intent and purpose of the City's Geologic Hazards ordinance (OCMC 17.44.010). Grading within the small, isolated areas located in the central portion of the site is unavoidable in order to comply with the Park Place Concept Plan, the City's Transportation System Plan (TSP), zoning requirements, and City Public Works Design Standards; to provide a safe and practical alignment for S Holly Lane through the site, safe access to buildable lots, and building envelopes for all types of housing; and to address slopes and topography throughout the site.

The Preliminary Geotechnical Report states that the grading can be accomplished safely and that cuts and fills are practicable and will not adversely affect and may improve slope stability. This information provides evidence of compliance with OCMC 17.44.060.L. Further detail will be provided with future DDP.

Geotechnical Results

The Preliminary Geotechnical Report and Slopes Addendum prepared by GeoPacific are included in this resubmittal. The Preliminary Geotechnical Report and Slopes Addendum demonstrate that grading can be accomplished safely and concludes that proposed cuts and fills are geotechnically practicable and will not adversely affect and may improve slope stability. The Preliminary Geotechnical Report includes field investigations and findings, including logs of subsurface conditions and laboratory testing results, as well as recommendations for development.

Alternative Alignment and Design Analysis for S Holly Lane

S Holly Lane serves a vital role in both the local and the regional context as the only continuous north/south travel corridor on the east side of Oregon Route 213 (OR 213). Within the context of the Park Place Concept Plan, S Holly Lane is planned to be one of the primary north-south connections between Redland Road and Holcomb Boulevard and to provide multimodal connectivity for this area of the City. This project includes over 2/3 of a mile of construction for this vital Collector, extending S Holly Lane roughly half the distance between S Holcomb Boulevard and Redland Road. Connectivity to Redland Road will be established with future annexation and development to the south of this project. S Holly Lane drops 240 feet in elevation within the Park Place Crossing Master Plan Area, which poses a significant challenge to the design and layout of the road, when combined with existing development patterns (i.e. established connections and subdivisions to the north), Public Works Design Standards (i.e. maximum

street grades, ADA crossings etc.), and compliance with the Park Place Concept Plan (i.e. alleys, connectivity, etc.)

EXH-16 in this memo shows the portion(s) of the proposed streets that will be at the maximum grades permitted by code per their respective classification (i.e. Collector or Local). EXH-17 and EXH-18 show the S Holly Lane's intersections meet Americans with Disabilities Act (ADA) requirements for grade change and connectivity through 'table topping,' and that they meet City block length standards, etc. The site grades also has impact cuts and fills along the development's other roadways and the blocks between them (including the small, isolated areas located in the central portion of site which S Holly Lane runs through and adjacent to).

Alternative alignments for S Holly Lane that avoid steep slope areas (slopes greater than 25 percent) were considered and analyzed, including routes between (EXH-23 through EXH-27) and north of (EXH-28 through EXH-32) the majority of the small, isolated steep slope areas. In certain locations, retaining walls may be able to limit grading; however, these retaining walls pose potential maintenance and safety concerns and create unnecessary challenges. The retaining walls would create view tunnels; streetscapes inconsistent with the Park Place Concept Plan; and walkability, aesthetic, and cost concerns, as demonstrated by the Preliminary Grading Plan and Preliminary Geotechnical Report. The geotechnical investigations demonstrate that grading can be accomplished safely and conclude that proposed cuts and fills are geotechnically practicable and can improve safety and slope stability within the small, isolated areas with slopes over 25 percent.

Conclusion

The proposed design is a feasible layout complying with the Park Place Concept Plan (Exhibit N). It follows the recommendations of the Preliminary Geotechnical Report has undergone rigorous alternative design analysis, and works within the constraints posed by existing development patterns, zoning, topography, natural resources, and all relevant jurisdictional requirements.

The project provides protection for the steep slopes and geologic hazard areas in and along the drainages to the northwest and south-central portions of the site. There are some small, isolated areas with slopes over 25 percent in the central portion of the site that will be developed in compliance with Section 17.44.060.L. As demonstrated by the Preliminary Geotechnical Report, these areas can be safely developed, and the planned improvements will improve safety.

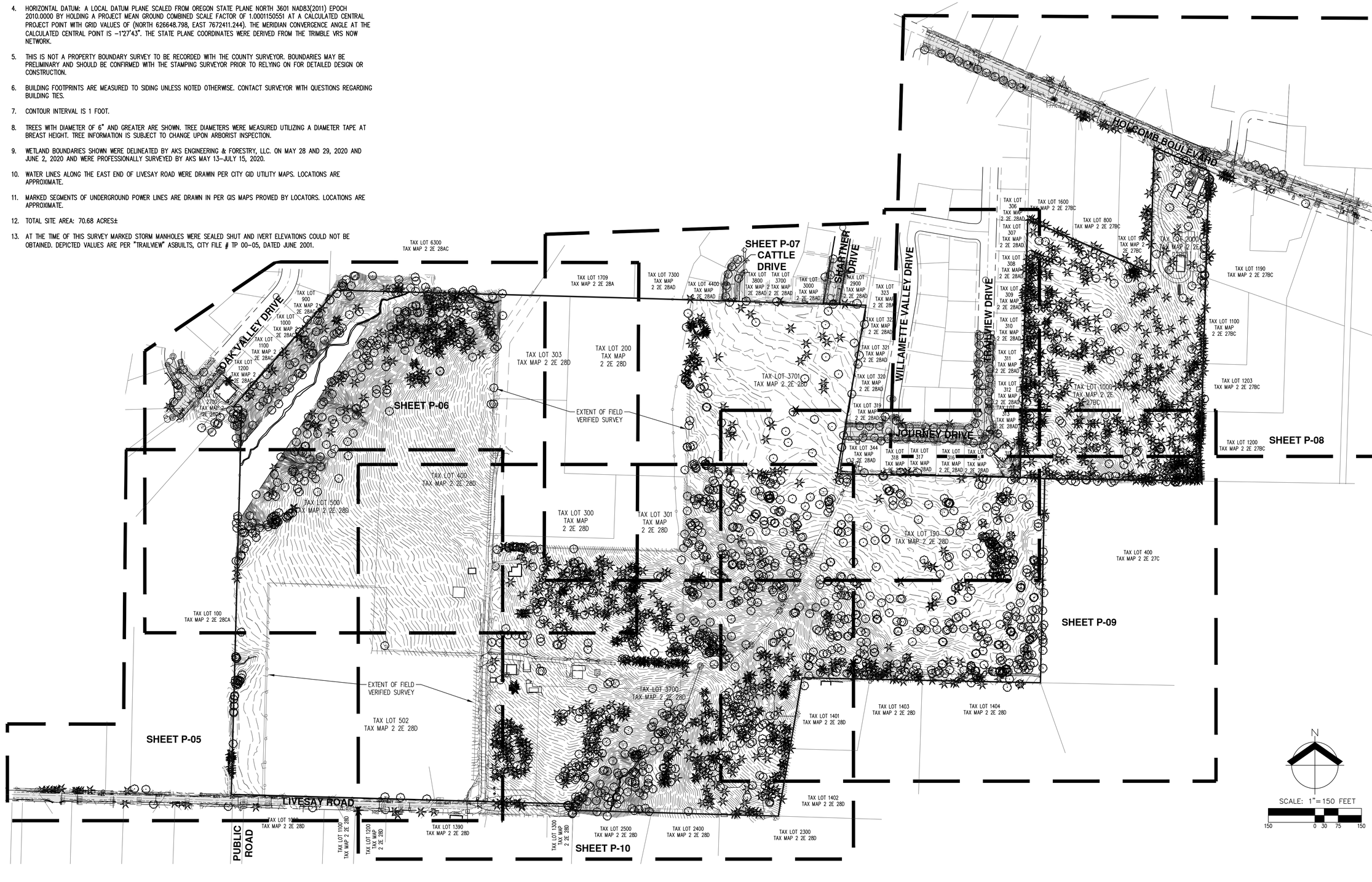
The Preliminary Geotechnical Report and this analysis excludes Tax Lots 200, 300, 301, 303, and 502, as these properties are not currently controlled by the applicant and therefore detailed geotechnical and slope analysis could not be performed on these properties; however, these properties are required by the Annexation Conditions of Approval to be included in this application. Further investigations and reports will be provided at the time of each respective Detailed Development Plan (DDP) application.

Attachments:

1. Compiled Geologic Hazard Overlay Zone Memorandum Exhibits

NOTES:

1. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 20134946, 20132787, 20132791, 20132798, 20132807, 20132485, 20134960, 20134962, 20132485, 20134972, 20176080, 20134975, 20176082, 20134984, 20134988, 20134992, & 20176027. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
2. FIELD WORK WAS CONDUCTED MAY 13–JULY 15, 2020.
3. VERTICAL DATUM: ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION V 723 (PID RD1497) LOCATED AT THE SE CORNER OF HWY 99E AND HWY I–205. ELEVATION = 62.48 FEET (NAVD 88).
4. HORIZONTAL DATUM: A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000 BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0001150551 AT A CALCULATED CENTRAL PROJECT POINT WITH GRID VALUES OF (NORTH 626648.798, EAST 7672411.244). THE MERIDIAN CONVERGENCE ANGLE AT THE CALCULATED CENTRAL POINT IS –1°27'43". THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
5. THIS IS NOT A PROPERTY BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY SURVEYOR. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.
6. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
7. CONTOUR INTERVAL IS 1 FOOT.
8. TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
9. WETLAND BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY, LLC. ON MAY 28 AND 29, 2020 AND JUNE 2, 2020 AND WERE PROFESSIONALLY SURVEYED BY AKS MAY 13–JULY 15, 2020.
10. WATER LINES ALONG THE EAST END OF LIVESAY ROAD WERE DRAWN PER CITY GID UTILITY MAPS. LOCATIONS ARE APPROXIMATE.
11. MARKED SEGMENTS OF UNDERGROUND POWER LINES ARE DRAWN IN PER GIS MAPS PROVIED BY LOCATORS. LOCATIONS ARE APPROXIMATE.
12. TOTAL SITE AREA: 70.68 ACRES±
13. AT THE TIME OF THIS SURVEY MARKED STORM MANHOLES WERE SEALED SHUT AND IVERT ELEVATIONS COULD NOT BE OBTAINED. DEPICTED VALUES ARE PER "TRAILVIEW" ASBUILTS, CITY FILE # TP 00–05, DATED JUNE 2001.



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ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

PRELIMINARY EXISTING CONDITIONS PLAN - OVERALL
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

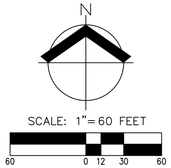
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
MARCH 14, 2017
BENJAMIN R HUFF
84738PLS
RENEWS: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	12/07/2021
DESIGNED BY:	
DRAWN BY:	MTB
CHECKED BY:	BRH

EXH-1

AKS DRAWING FILE: 7404 EXCOND.DWG | LAYOUT: P-04



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5. THIS IS NOT A PROPERTY BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY SURVEYOR. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.
6. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
7. CONTOUR INTERVAL IS 1 FOOT.
8. TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
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ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

Item #1.

PRELIMINARY EXISTING CONDITIONS PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
MARCH 14, 2017
BENJAMIN R HUFF
84738PLS
RENEWS: 6/30/23

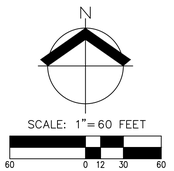
PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	12/07/2021
DESIGNED BY:	
DRAWN BY:	MTB
CHECKED BY:	BRH

EXH-2

AKS DRAWING FILE: 7404 EXCONDJDWG | LAYOUT: P-05





NOTES:

1. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 20134946, 20132787, 20132791, 20132798, 20132807, 20132485, 20134960, 20134962, 20132485, 20134972, 20176080, 20134975, 20176082, 20134984, 20134988, 20134992, & 20176027. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
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6. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
7. CONTOUR INTERVAL IS 1 FOOT.
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9. WETLAND BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY, LLC. ON MAY 28 AND 29, 2020 AND JUNE 2, 2020 AND WERE PROFESSIONALLY SURVEYED BY AKS MAY 13–JULY 15, 2020.
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12. TOTAL SITE AREA: 70.68 ACRES±
13. AT THE TIME OF THIS SURVEY MARKED STORM MANHOLES WERE SEALED SHUT AND IVERT ELEVATIONS COULD NOT BE OBTAINED. DEPICTED VALUES ARE PER "TRAILVIEW" ASBUILTS, CITY FILE # TP 00–05, DATED JUNE 2001.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151
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PRELIMINARY EXISTING CONDITIONS PLAN
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REGISTERED PROFESSIONAL LAND SURVEYOR
PRELIMINARY NOT FOR CONSTRUCTION
OREGON JANUARY 14, 2017 BENJAMIN R HUFF 84738PLS
RENEWS: 6/30/23

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DESIGNED BY:	
DRAWN BY:	MTB
CHECKED BY:	BRH

EXH-3

AKS DRAWING FILE: 7404 EXCOND.DWG | LAYOUT: P-06



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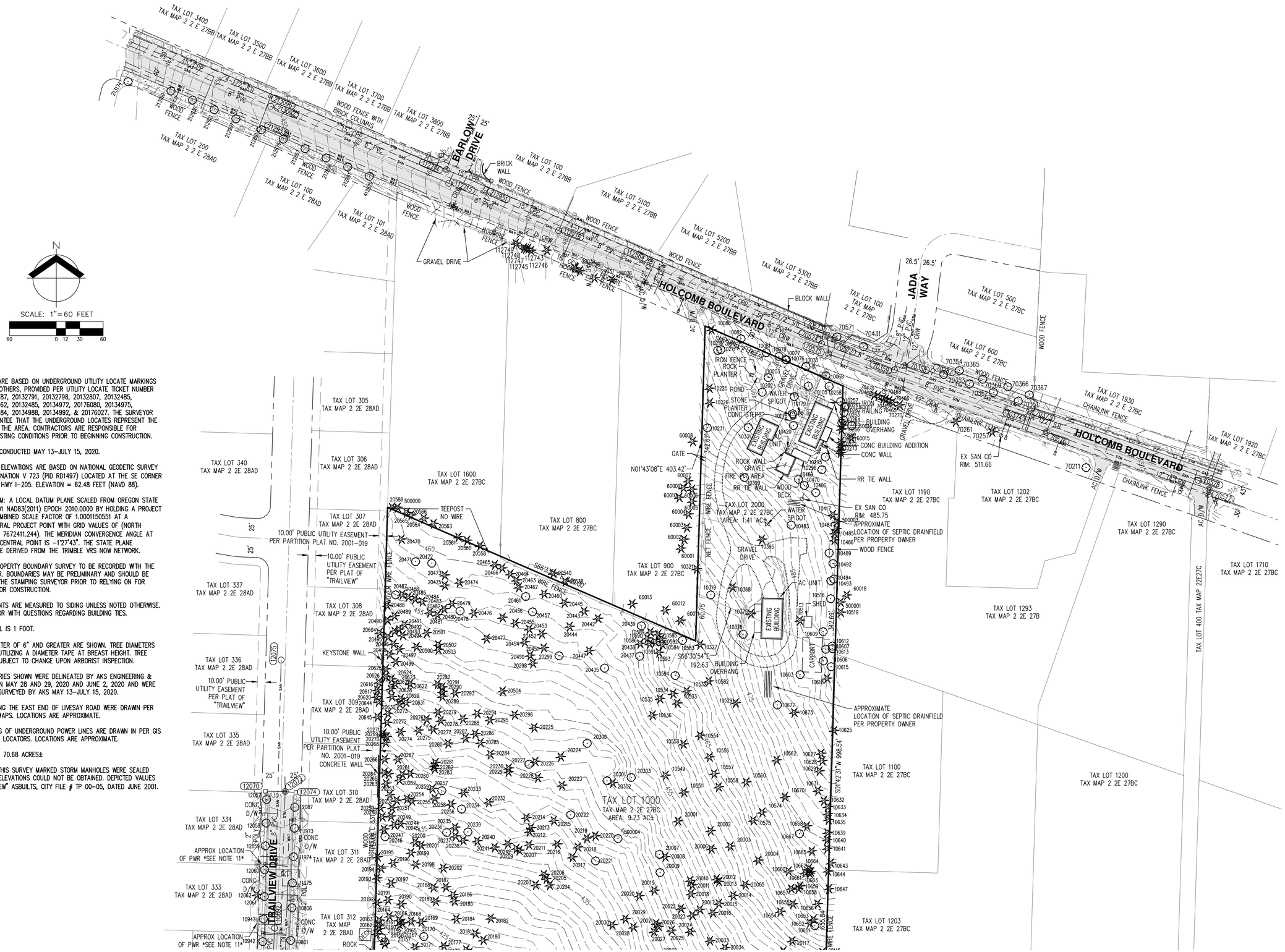
EXH-4

AKS DRAWING FILE: 7404 EXCOND.DWG | LAYOUT: P-07



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OREGON
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RENEWS: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	12/07/2021
DESIGNED BY:	
DRAWN BY:	MTB
CHECKED BY:	BRH

EXH-5

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PRELIMINARY EXISTING CONDITIONS PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

TAX LOT 319
TAX MAP 2 2E 28AD
CONC RETAINING WALL
ROCK RETAINING WALL
KEYSTONE RETAINING WALL
WOVEN WIRE FENCE
CHAIN LINK FENCE
GATE
10.00' PUBLIC UTILITY EASEMENT PER PARTITION PLAT NO. 2001-019
KEYSTONE RETAINING WALL
10.00' PUBLIC UTILITY EASEMENT PER PLAT OF "TRAILVIEW"
TAX LOT 330 TAX MAP 2 2E 28AD
TAX LOT 331 TAX MAP 2 2E 28AD
TAX LOT 332 TAX MAP 2 2E 28AD
TAX LOT 313 TAX MAP 2 2E 28AD
JOURNEY DRIVE
8" PVC
18" PVC
12" PVC
2" POLY
CONC D/W
WOOD FENCE
15.00' WATER LINE EASEMENT PER PLAT OF TRAILVIEW
EXISTING BUILDING
WOOD STEPS
CMU WALL
CMU RETAINING WALL
ROCK RETAINING WALL
KEYSTONE RETAINING WALL
WETLAND BOUNDARY SEE NOTE *9*
EX SAN. CO. MH RIM: 416.54 IE (E): 413±
AC UNIT
WOVEN WIRE FENCE
TAX LOT 1200
TAX MAP 2 2E 27BC
S89°41'37"E 481.97'
TAX LOT 344
TAX MAP 2 2E 28AD
TAX LOT 318 TAX MAP 2 2E 28AD
TAX LOT 317 TAX MAP 2 2E 28AD
TAX LOT 316 TAX MAP 2 2E 28AD
TAX LOT 315 TAX MAP 2 2E 28AD
APPROX LOCATION OF PWR *SEE NOTE 11*
CHAIN FENCE
ROCK RETAINING WALL
WOOD FENCE
GATE
SHED
ROD IRON FENCE
GRAVEL PATH
S88°48'58"E 589.01'
10.00' PUBLIC UTILITY EASEMENT PER PLAT OF "TRAILVIEW"
TAX LOT 314
TAX MAP 2 2E 28AD
S87°28'06"E 79.62'
N89°04'34"W 498.92'
TAX LOT 400
TAX MAP 2 2E 27C
TAX LOT 190
TAX MAP 2 2E 28D
AREA: 10.86 AC±
WETLAND BOUNDARY SEE NOTE *9*
15.00' STORM DRAINAGE EASEMENT PER DOC. NO. 2000-004471
SEE NOTE 13
TAX LOT 100
TAX MAP 2 2E 28D
AREA: 14.32 AC±
DRAINAGE EASEMENT PER DOC. NO. 2000-004471
ROCK WALL
EX 4" PVC CULVERT
IE: 331.32
SHED
EXISTING BUILDING
BARBWIRE FENCE
CHAIN FENCE
N88°47'22"W 767.55'
WIRE FENCE
BOULDERS
ABANDONED WELL
EDGE OF LANDSCAPE
S01°44'38"W 451.78'
S01°12'33"W 657.32'
20.00' PRIVATE RIGHT-OF-WAY PER BOOK 454, PAGE 192
TAX LOT 1401
TAX MAP 2 2E 28D
TAX LOT 1403
TAX MAP 2 2E 28D
TAX LOT 1404
TAX MAP 2 2E 28D
TAX LOT 1402
TAX MAP 2 2E 28D
TAX LOT 402
TAX MAP 2 2E 27C

N

SCALE: 1"=60 FEET
60 0 12 30 60

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REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
MARCH 12, 2017
BRAHIM R HUFF
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RENEWS: 6/30/23

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DRAWN BY:	MTB
CHECKED BY:	BRH

EXH-6



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OREGON
MARCH 17, 2017
DARWIN R HUFF
54738PLS
RENEWS: 6/30/23

JOB NUMBER:	7404
DATE:	12/07/2021
DESIGNED BY:	
DRAWN BY:	MTB
CHECKED BY:	BRH

EXH-7

AKS DRAWING FILE: 7404 EXCOND.DWG | LAYOUT: P–10

NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 5 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
3. TAXLOTS 200, 300, 301, 303, AND 502 HAVE NOT BEEN SURVEYED, NOR HAVE THEY BEEN EVALUATED FOR NROD AREAS.
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LEGEND

- EXISTING GROUND CONTOUR (5 FT)
- EXISTING GROUND CONTOUR (25 FT) — 350
- FINISHED GRADE CONTOUR (5 FT)
- FINISHED GRADE CONTOUR (25 FT) — 345

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY GRADING PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REVIEW COPY ONLY

JOB NUMBER:	7404
DATE:	03/15/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

EXH-8

AKS DRAWING FILE: 7404 ENLARGED GRADING.DWG | LAYOUT: 1



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5. HORIZONTAL DATUM: A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000 BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0001150551 AT A CALCULATED CENTRAL PROJECT POINT WITH GRID VALUES OF (NORTH 626648.798, EAST 7672411.244). THE MERIDIAN CONVERGENCE ANGLE AT THE CALCULATED CENTRAL POINT IS -1°27'43". THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.

LEGEND

EXISTING GROUND CONTOUR (5 FT)	
EXISTING GROUND CONTOUR (25 FT)	350
FINISHED GRADE CONTOUR (5 FT)	
FINISHED GRADE CONTOUR (25 FT)	345

N

SCALE: 1"=50 FEET

50 0 10 25 50

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY GRADING PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REVIEW COPY ONLY

JOB NUMBER:	7404
DATE:	03/15/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

EXH-9

AKS DRAWING FILE: 7404 ENLARGED GRADING.DWG | LAYOUT: 2



NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 5 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
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LEGEND

EXISTING GROUND CONTOUR (5 FT)	
EXISTING GROUND CONTOUR (25 FT)	350
FINISHED GRADE CONTOUR (5 FT)	
FINISHED GRADE CONTOUR (25 FT)	345

N

SCALE: 1"=50 FEET

50 0 10 25 50

ORIGINAL PAGE SIZE: 22" x 34"

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Item #1.

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CHECKED BY:	CMS

EXH-10

AKS DRAWING FILE: 7404 ENLARGED GRADING.DWG | LAYOUT: 3



NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
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LEGEND

EXISTING GROUND CONTOUR (5 FT)	
EXISTING GROUND CONTOUR (25 FT)	350
FINISHED GRADE CONTOUR (5 FT)	
FINISHED GRADE CONTOUR (25 FT)	345

N

SCALE: 1"=50 FEET

50 0 10 25 50

ORIGINAL PAGE SIZE: 22" x 34"

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DESIGNED BY:	CMS
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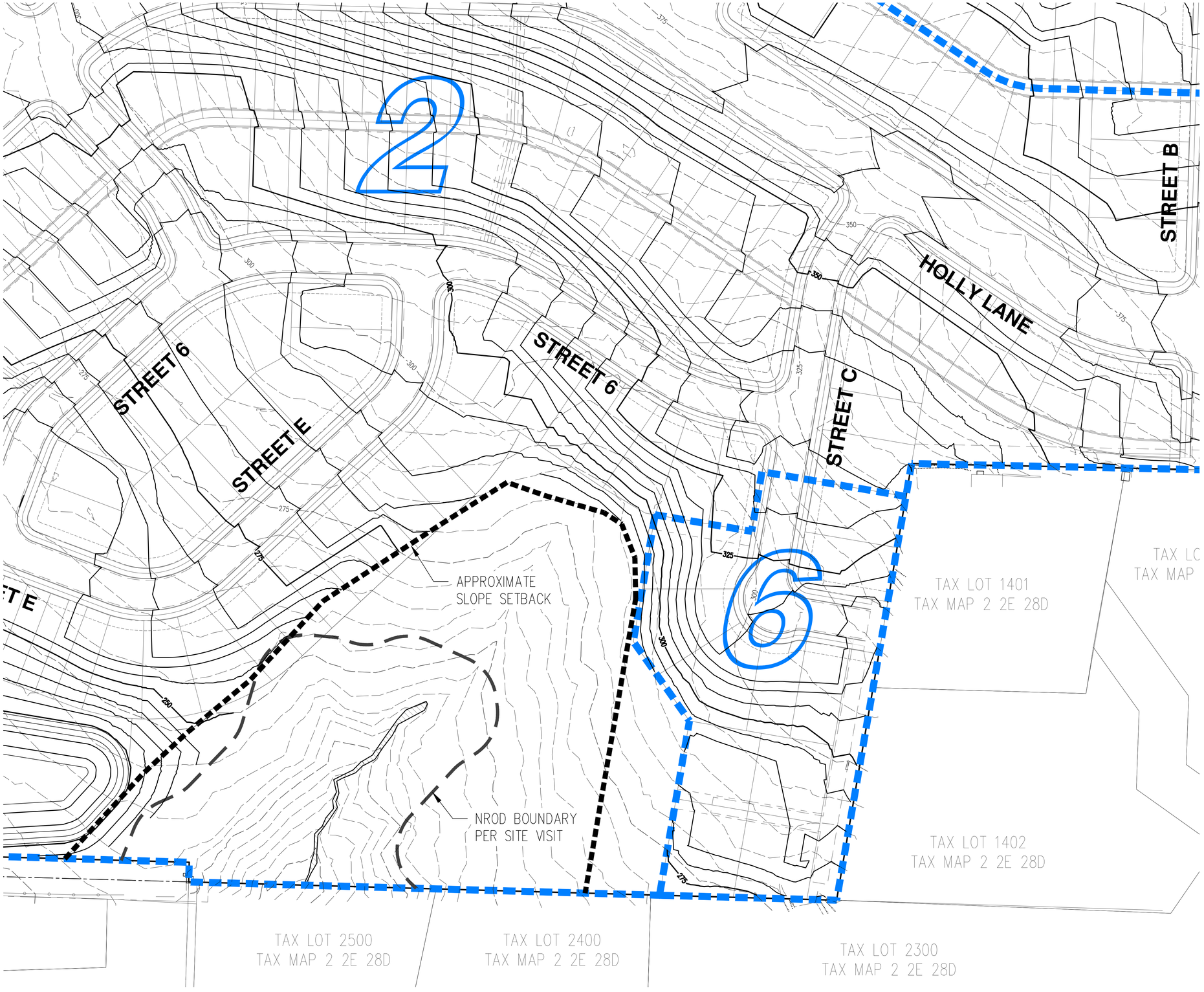
CHECKED BY:	CMS

EXH-11

AKS DRAWING FILE: 7404 ENLARGED GRADING.DWG | LAYOUT: 4



NOTES:

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LEGEND

- EXISTING GROUND CONTOUR (5 FT)
- EXISTING GROUND CONTOUR (25 FT) — 350
- FINISHED GRADE CONTOUR (5 FT)
- FINISHED GRADE CONTOUR (25 FT) — 345

N

SCALE: 1"= 50 FEET

50 0 10 25 50

ORIGINAL PAGE SIZE: 22" x 34"

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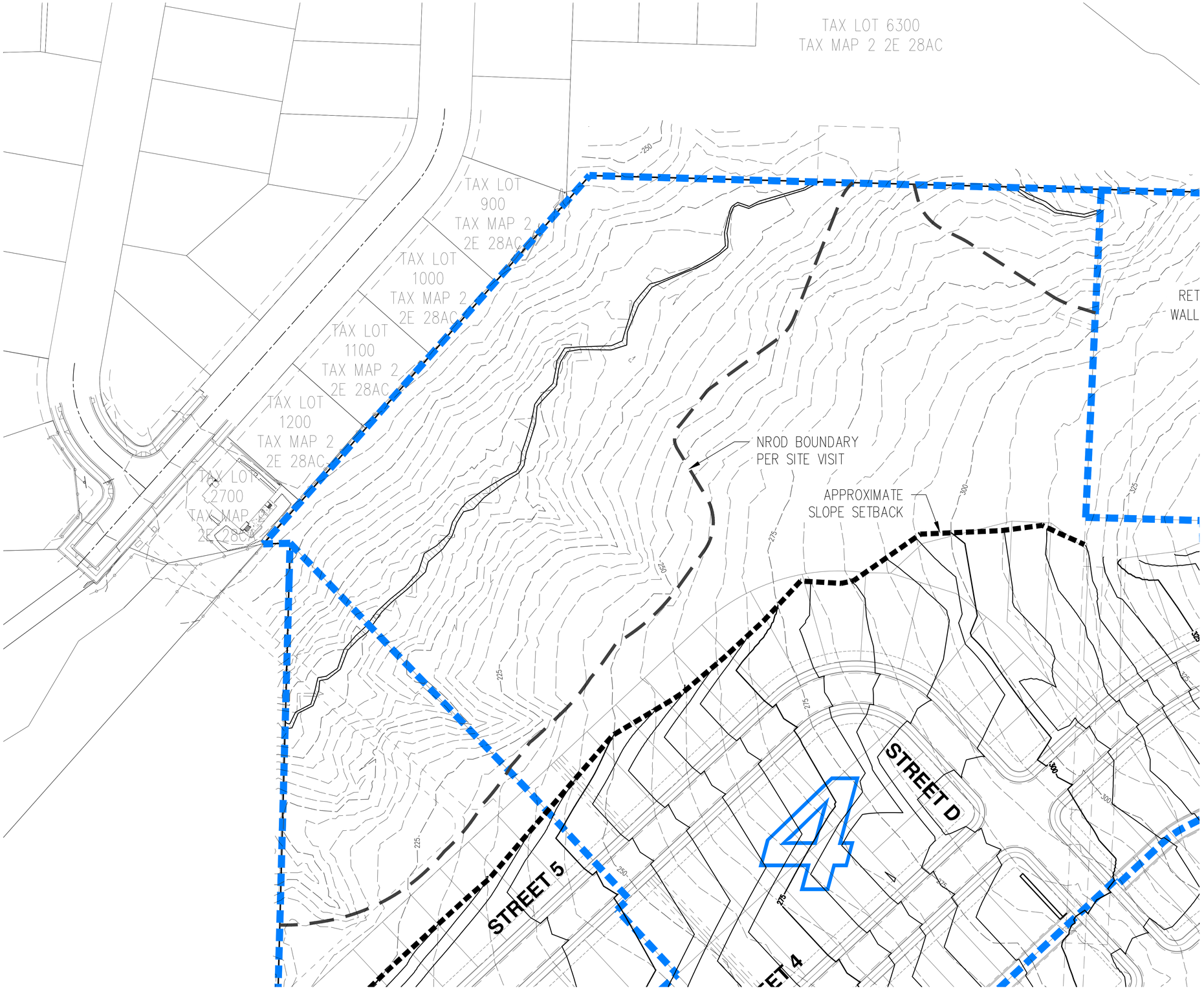
EXH-12

AKS DRAWING FILE: 7404 ENLARGED GRADING.DWG | LAYOUT: 5



NOTES:

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LEGEND

EXISTING GROUND CONTOUR (5 FT)	
EXISTING GROUND CONTOUR (25 FT)	350
FINISHED GRADE CONTOUR (5 FT)	
FINISHED GRADE CONTOUR (25 FT)	345

N

SCALE: 1"= 50 FEET

50 0 10 25 50

ORIGINAL PAGE SIZE: 22" x 34"

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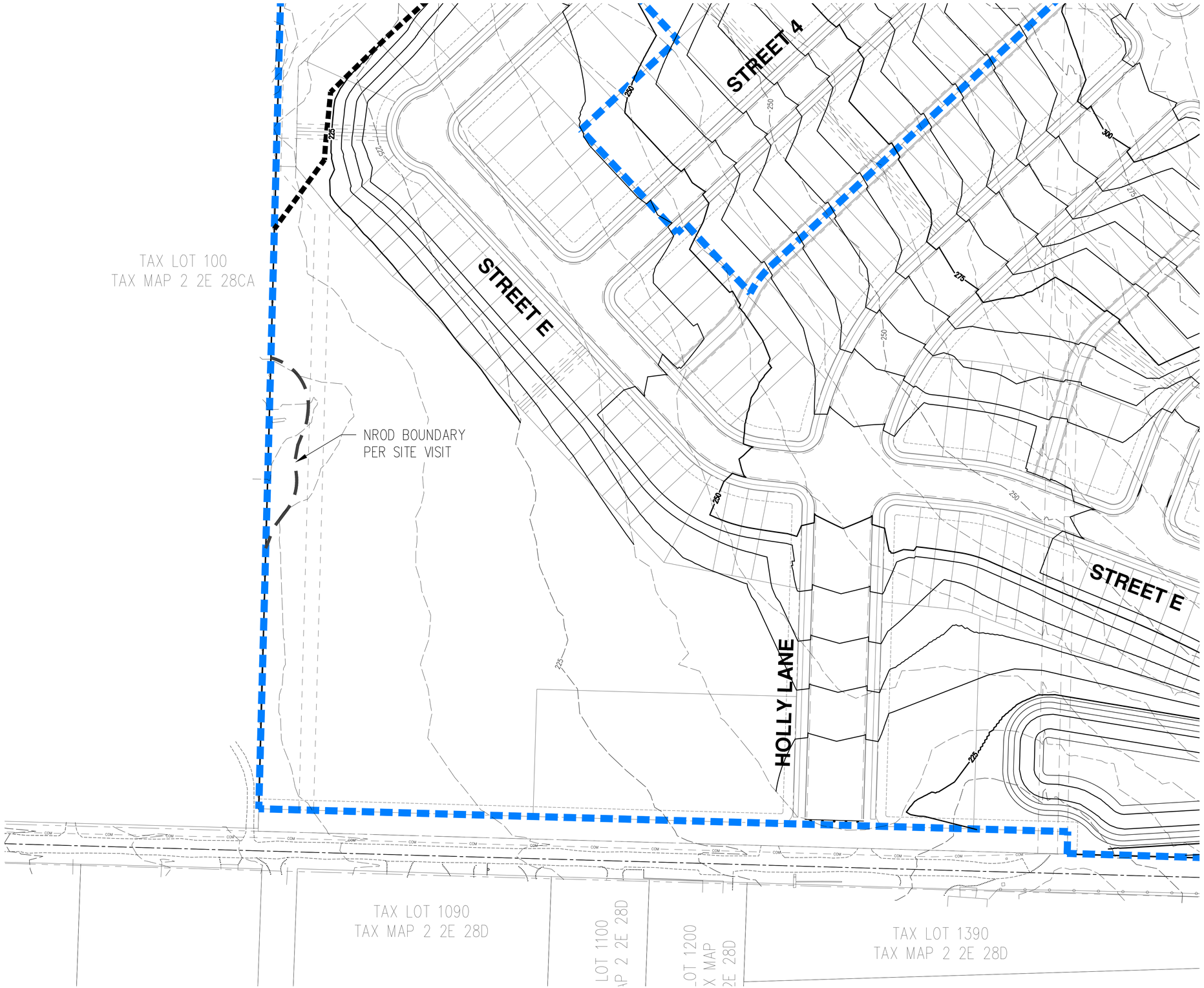
EXH-13

AKS DRAWING FILE: 7404 ENLARGED GRADING.DWG | LAYOUT: 6



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LEGEND

EXISTING GROUND CONTOUR (5 FT)	
EXISTING GROUND CONTOUR (25 FT)	350
FINISHED GRADE CONTOUR (5 FT)	
FINISHED GRADE CONTOUR (25 FT)	345

N

SCALE: 1"= 50 FEET

50 0 10 25 50

ORIGINAL PAGE SIZE: 22" x 34"

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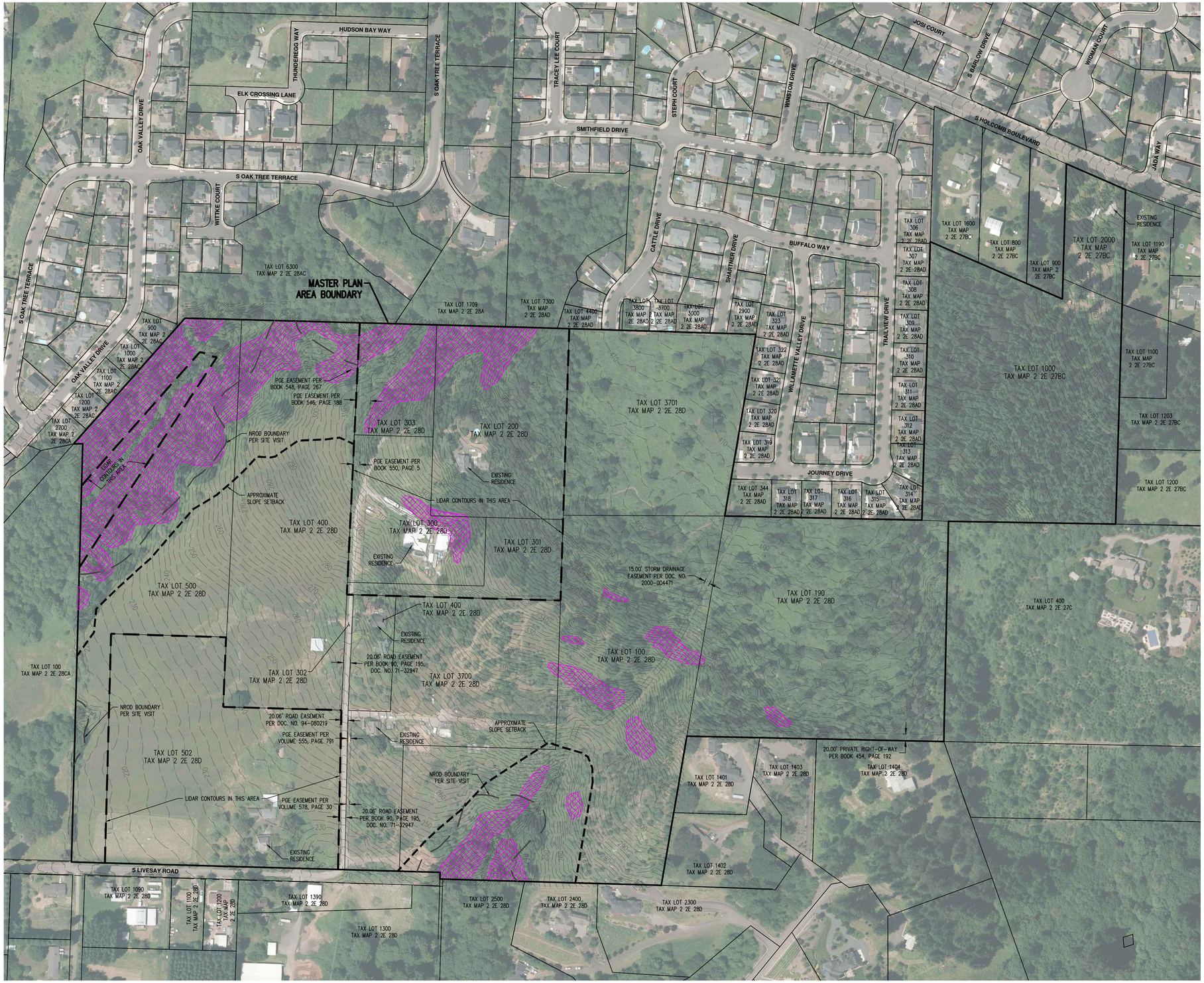
EXH-14

AKS DRAWING FILE: 7404 ENLARGED GRADING.DWG | LAYOUT: 7



LEGEND

GEOLOGIC HAZARD AREA (SLOPES GREATER THAN 25%) WITHIN MASTER PLAN AREA (PER OC WEBMAPS)

NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 2 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
3. TAXLOTS 200, 300, 301, 303, AND 502 HAVE NOT BEEN SURVEYED, NOR HAVE THEY BEEN EVALUATED FOR NROD AREAS.
4. FOR SLOPE ANALYSIS AND NATURAL RESOURCE OVERLAY INFORMATION PLEASE REFER TO SHEETS P-19 AND P-20.
5. VERTICAL DATUM: ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION V 723 (PID RD1497) LOCATED AT THE SE CORNER OF HWY 99E AND HWY I-205. ELEVATION = 62.48 FEET (NAVD 88).
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7. THIS IS NOT A PROPERTY BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY SURVEYOR. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.

EXISTING TAX LOT SUMMARY:

TAX LOT	# OF RESIDENCES	AREA (ACRE)
100:	NONE	14.3±
190:	NONE	10.8±
200:	1 RESIDENCE	5.2±
300:	1 RESIDENCE	3.1±
301:	NONE	1.4±
302:	NONE	0.4±
303:	NONE	1.8±
400:	1 RESIDENCE	10.4±
500:	NONE	10.3±
502:	1 RESIDENCE	9.4±
1000:	NONE	9.7±
2000:	1 RESIDENCE	1.5±
3700:	1 RESIDENCE	6.8±
3701:	NONE	6.6±
TOTAL:	6 RESIDENCES	91.7±

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY EXISTING CONDITIONS PLAN WITH AERIAL PHOTO
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

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JOB NUMBER:	7404
DATE:	03/04/2022
DESIGNED BY:	CMS
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EXH-15

AKS DRAWING FILE: 7404 EXISTING-PHOTO - SLOPE CATEGORIES.DWG | LAYOUT: P-04

LEGEND

LOCAL STREET SLOPES BETWEEN 12% AND 15%

COLLECTOR SLOPES AT 12%

LEGEND

EXISTING GROUND CONTOUR (5 FT)

EXISTING GROUND CONTOUR (25 FT) -350-

FINISHED GRADE CONTOUR (5 FT)

FINISHED GRADE CONTOUR (25 FT) 345

MAXIMUM SLOPES:

LOCAL STREET SLOPE:
15% IN RESIDENTIAL AREAS PER CLACKAMAS COUNTY STANDARD DRAWING C110

FIRE SPRINKLERS REQUIRED WHERE SLOPES OVER 12% ARE NECESSARY PER OREGON FIRE CODE 503.1.1 EXCEPTION (2)

COLLECTOR SLOPE:
12% IN RESIDENTIAL AREAS PER CLACKAMAS COUNTY STANDARD DRAWING C130

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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STREET SLOPE EXHIBIT
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

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DATE:	03/15/2022
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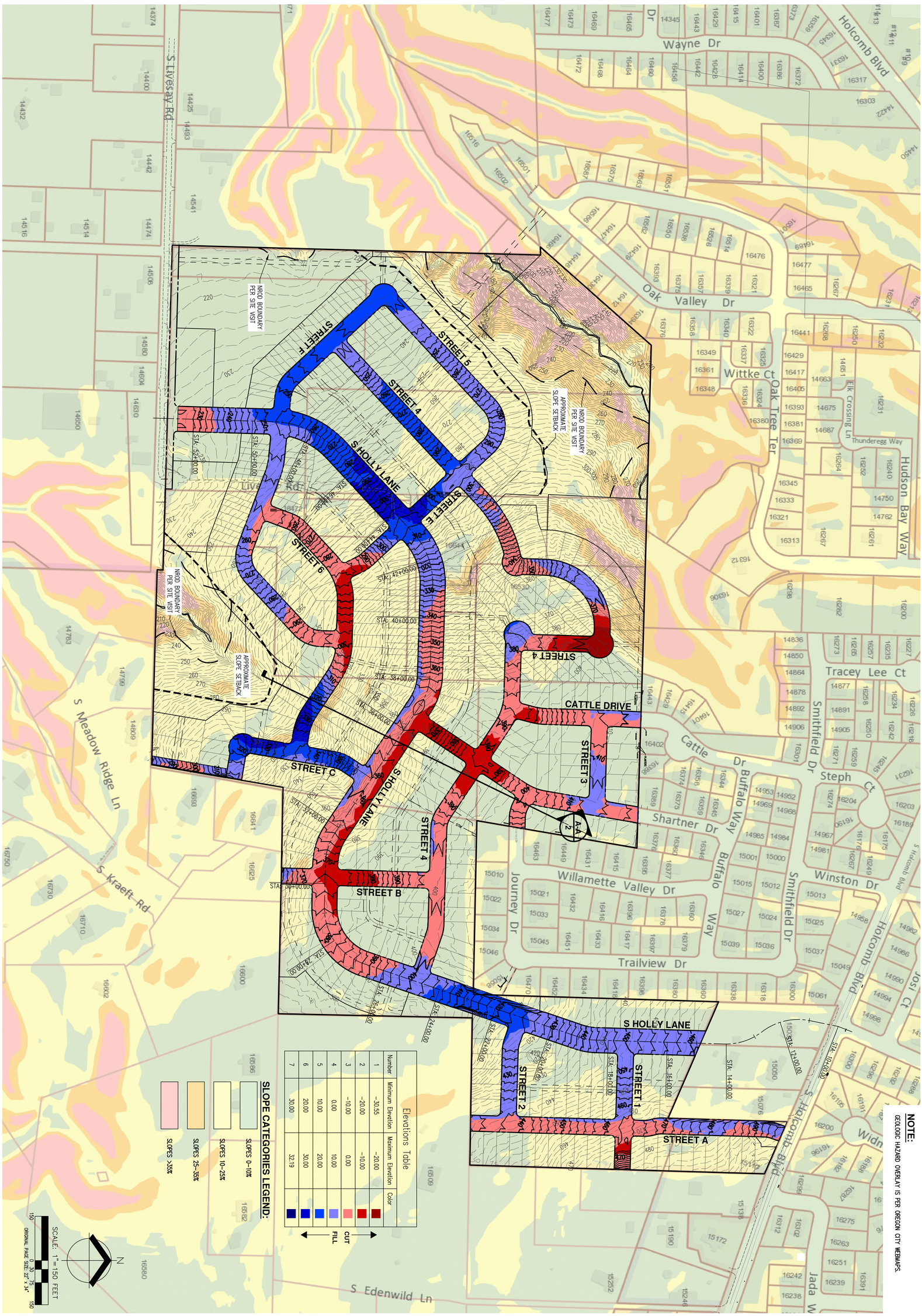
DRAWN BY:	NRA
CHECKED BY:	CMS

EXH-16

AKS DRAWING FILE: 7404 8 & 12 PERCENT ROADS.DWG | LAYOUT: 1

AKS DRAWING FILE: 7404 CUT-FILL ROW-ONLY.DWG | LAYOUT: COLOR CUT FILL



PRELIMINARY COLOR CUT-FILL MAP (ROW ONLY)
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

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JOB NUMBER: 7404
DATE: 03/15/2022
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DRAWN BY: NRA
CHECKED BY: CMS

EXH-17

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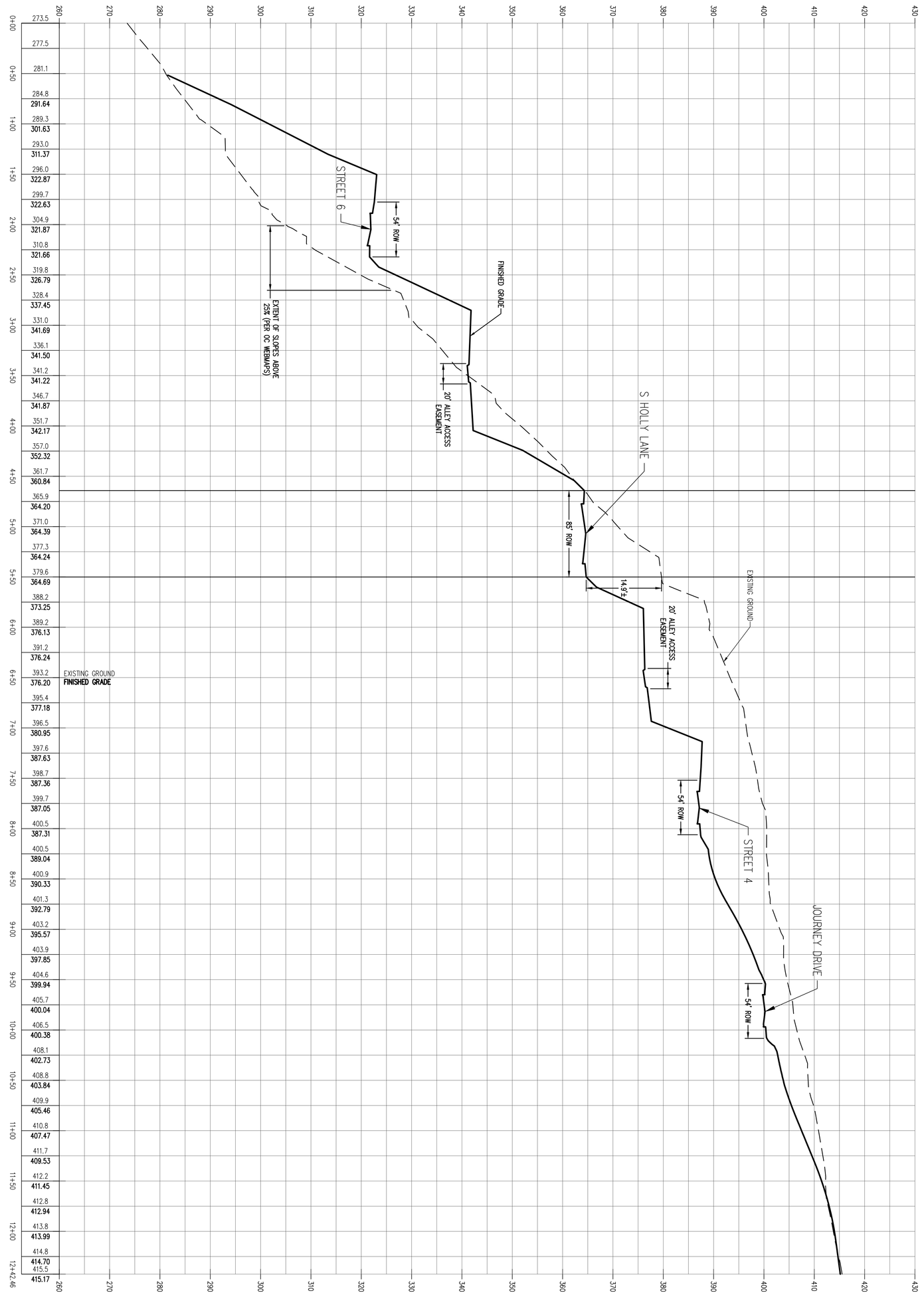
Item #1.

SECTION A-A
Hor. Scale: 1"= 50'
Vert. Scale: 1"= 10'



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SECTION A-A
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

EXH-18

JOB NUMBER: 7404
DATE: 03/15/2022
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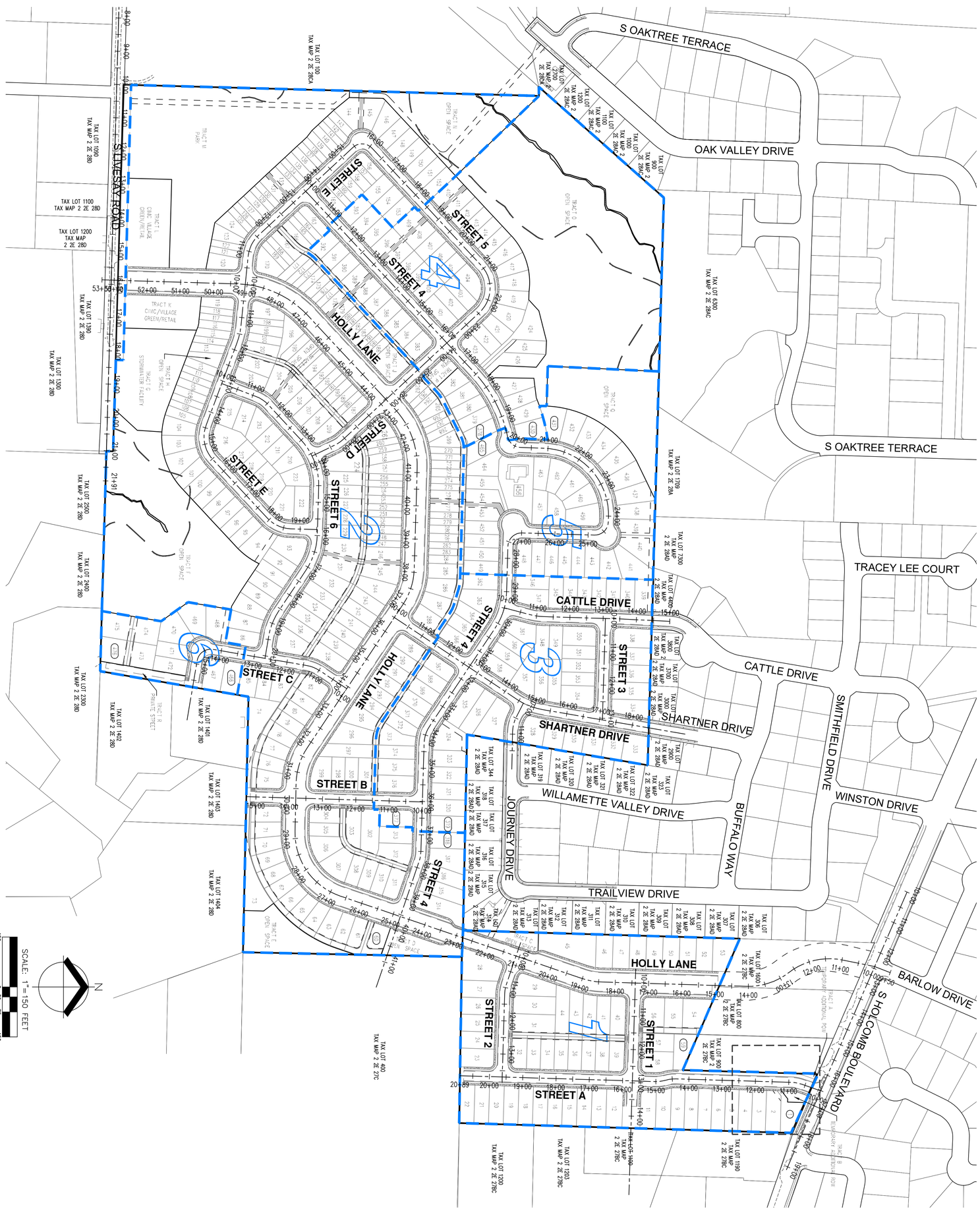
AKS DRAWING FILE: 7404 SITE-STREETS.DWG | LAYOUT: P-08



EXH-19

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JOB NUMBER:	7404
DATE:	03/15/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
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PRELIMINARY SITE PLAN WITH STREET STATIONING
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

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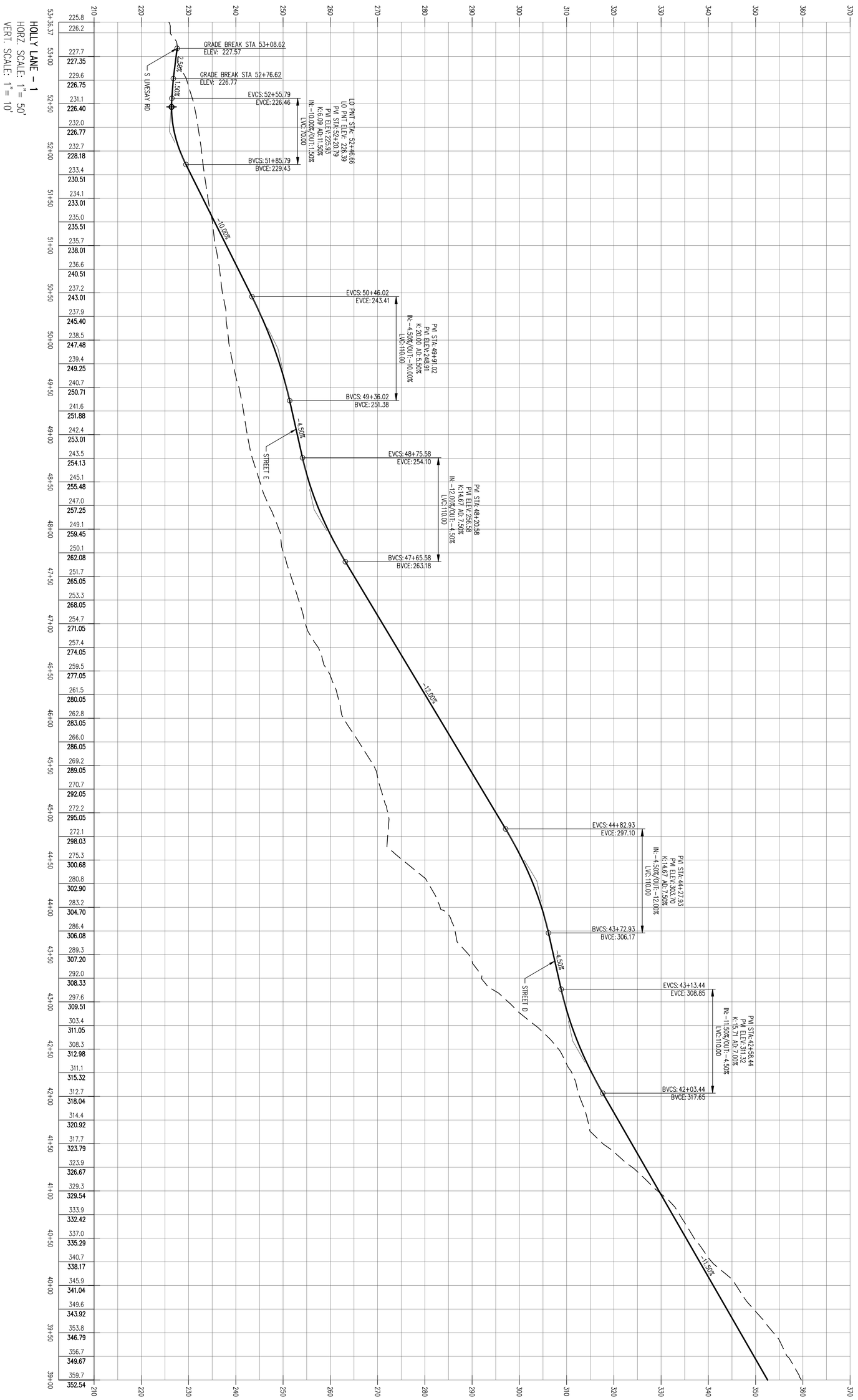
Item #1



EXH-20

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STREET PROFILES
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

JOB NUMBER:	7404
DATE:	03/07/2022
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CHECKED BY:	CMS

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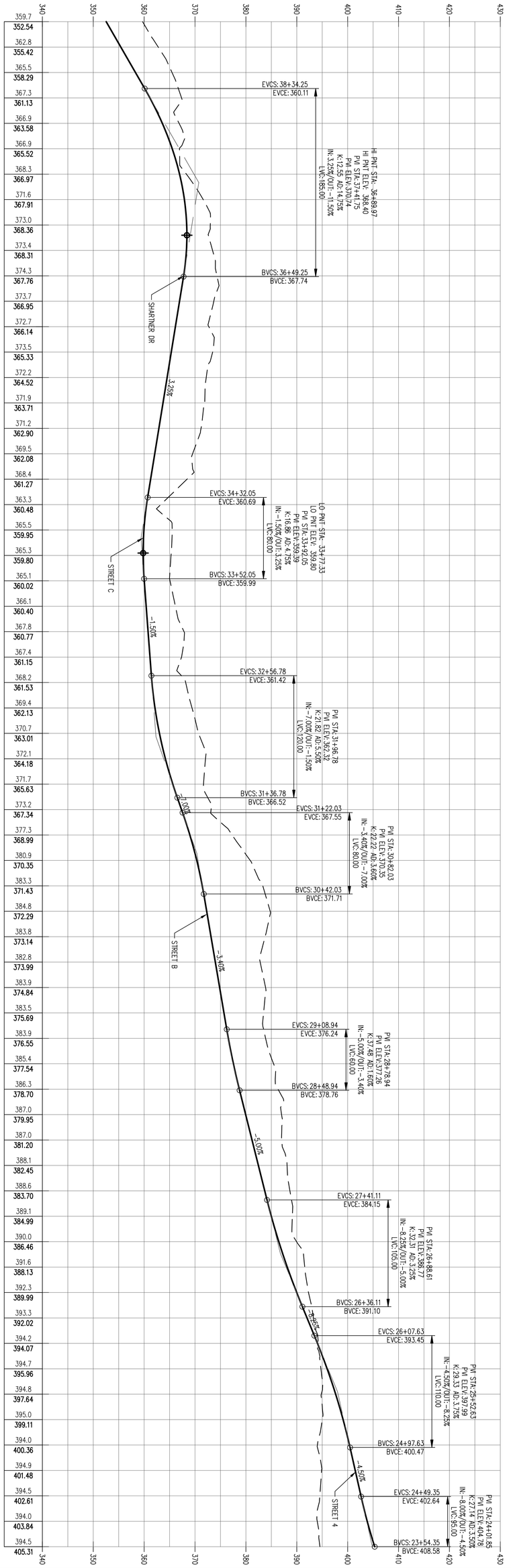
Item #1.

HOLLY LANE – 2
HORZ. SCALE: 1"= 50'
VERT. SCALE: 1"= 10'



STREET PROFILES
PARK PLACE CROSSING MASTER PLAN

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EXH-21

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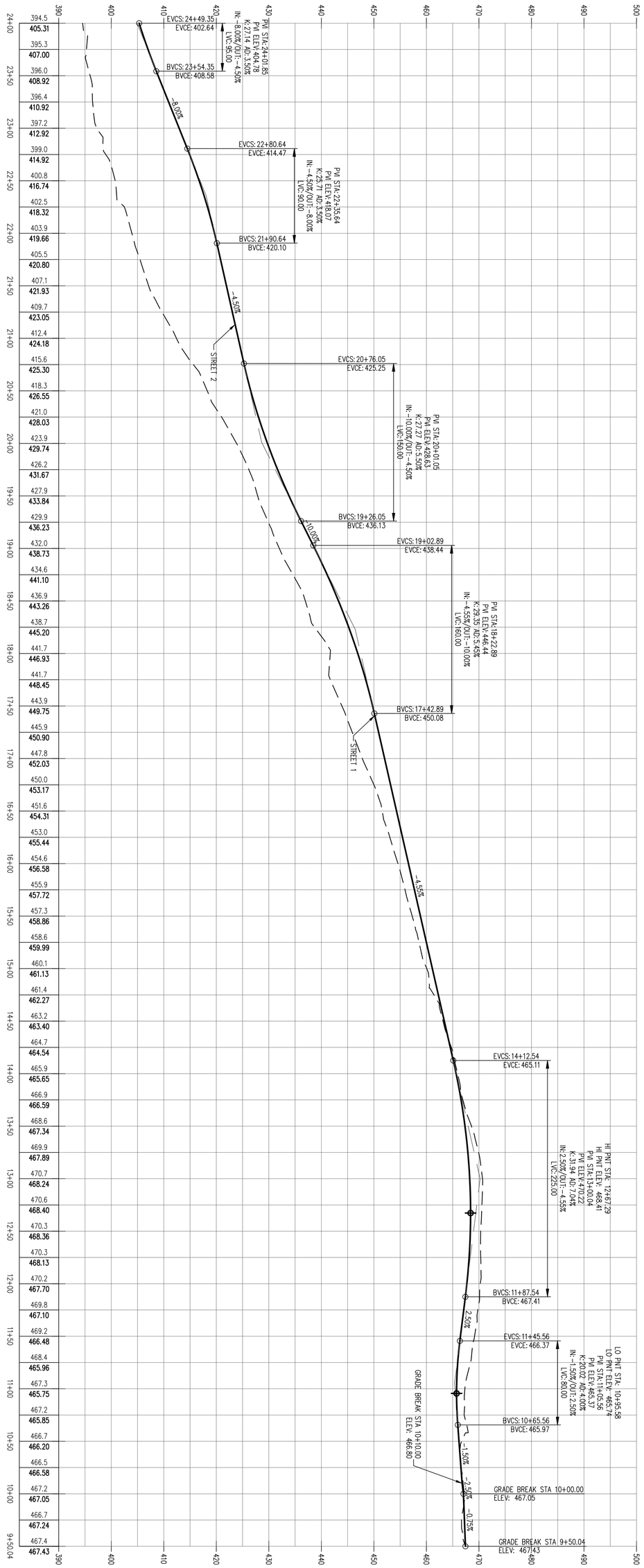
HOLLY LANE - 3
HORZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 10'



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STREET PROFILES
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

EXH-22

JOB NUMBER:	7404
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Item #1.

NOTE:

GEOLOGIC HAZARD OVERLAY IS PER OREGON CITY WEBMAPS.

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	−30.55	−20.00	
2	−20.00	−10.00	
3	−10.00	0.00	
4	0.00	10.00	
5	10.00	20.00	
6	20.00	30.00	
7	30.00	32.19	

CUT

FILL

SLOPE CATEGORIES LEGEND:

- SLOPES 0–10%
- SLOPES 10–25%
- SLOPES 25–35%
- SLOPES >35%

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY COLOR CUT-FILL MAP - S HOLLY LANE ALTERNATE 1
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

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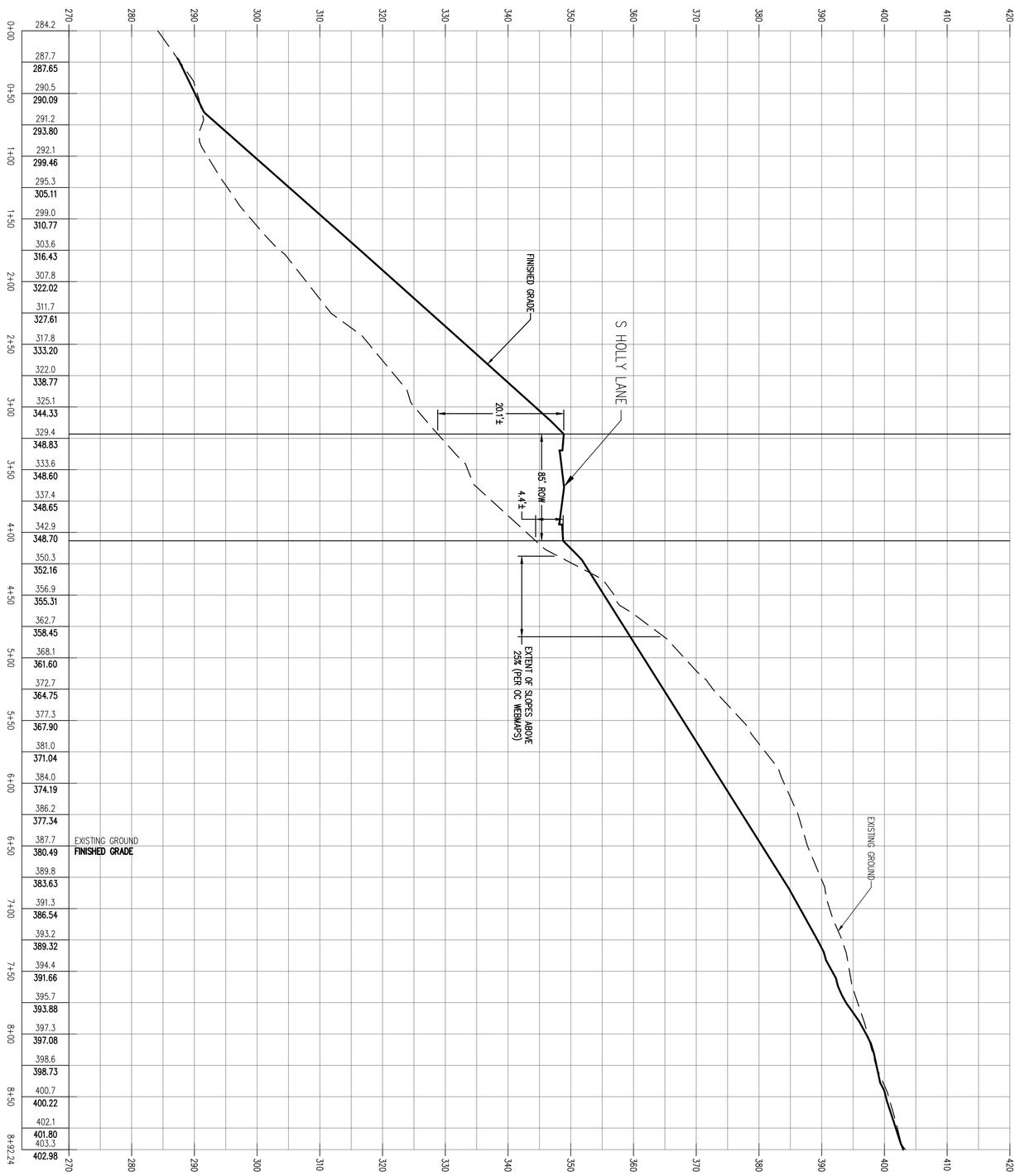
EXH-23

AKS DRAWING FILE: 7404 CUT-FILL HOLLY ALT-1.DWG | LAYOUT: COLOR CUT FILL

SECTION A-A
Hor. Scale: 1" = 50'
Vert. Scale: 1" = 10'



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S HOLLY LANE ALTERNATE 1 SECTION A-A
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

EXH-24

JOB NUMBER: 7404
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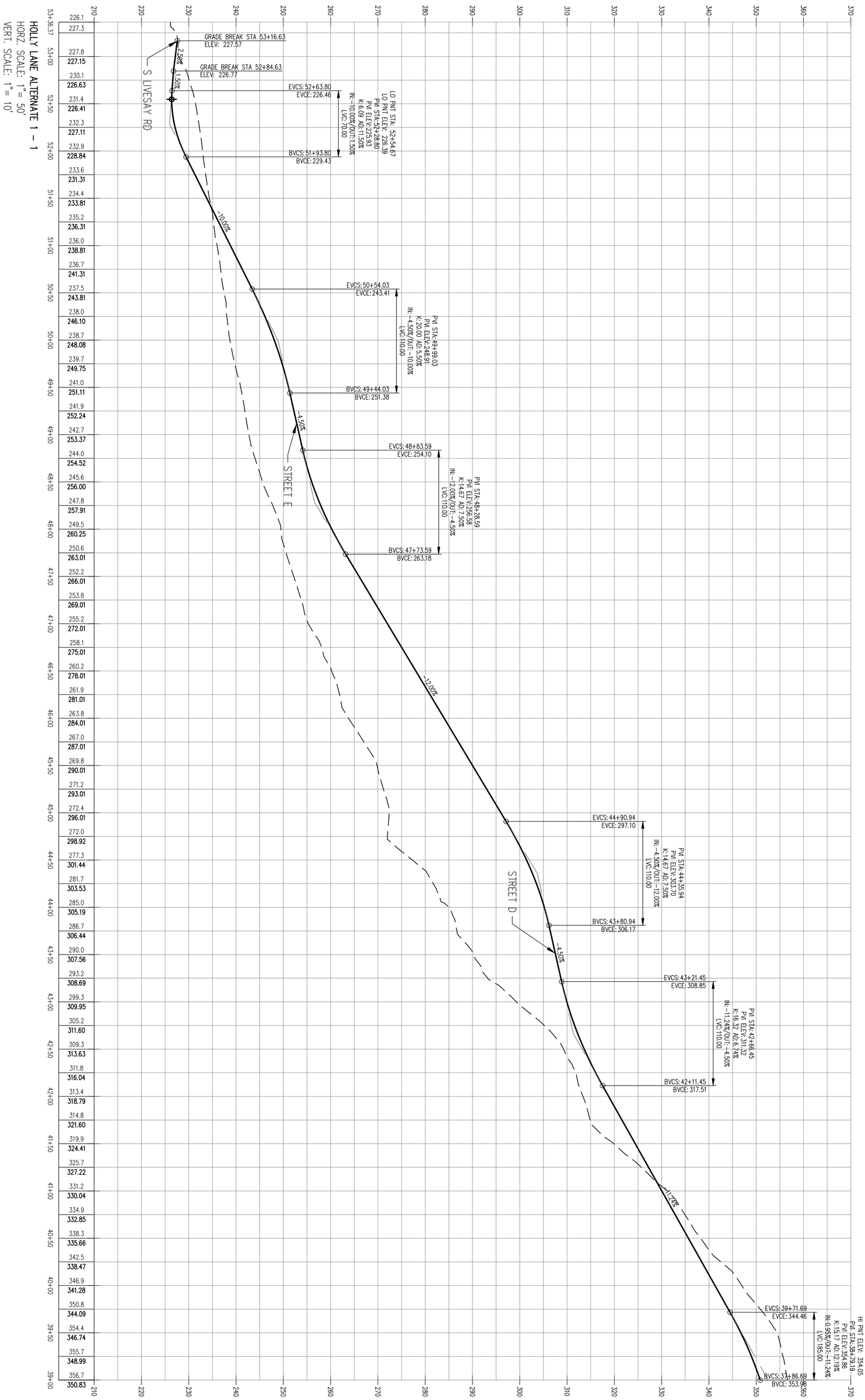

EXH-25

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STREET PROFILES
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

JOB NUMBER:	7404
DATE:	03/14/2022
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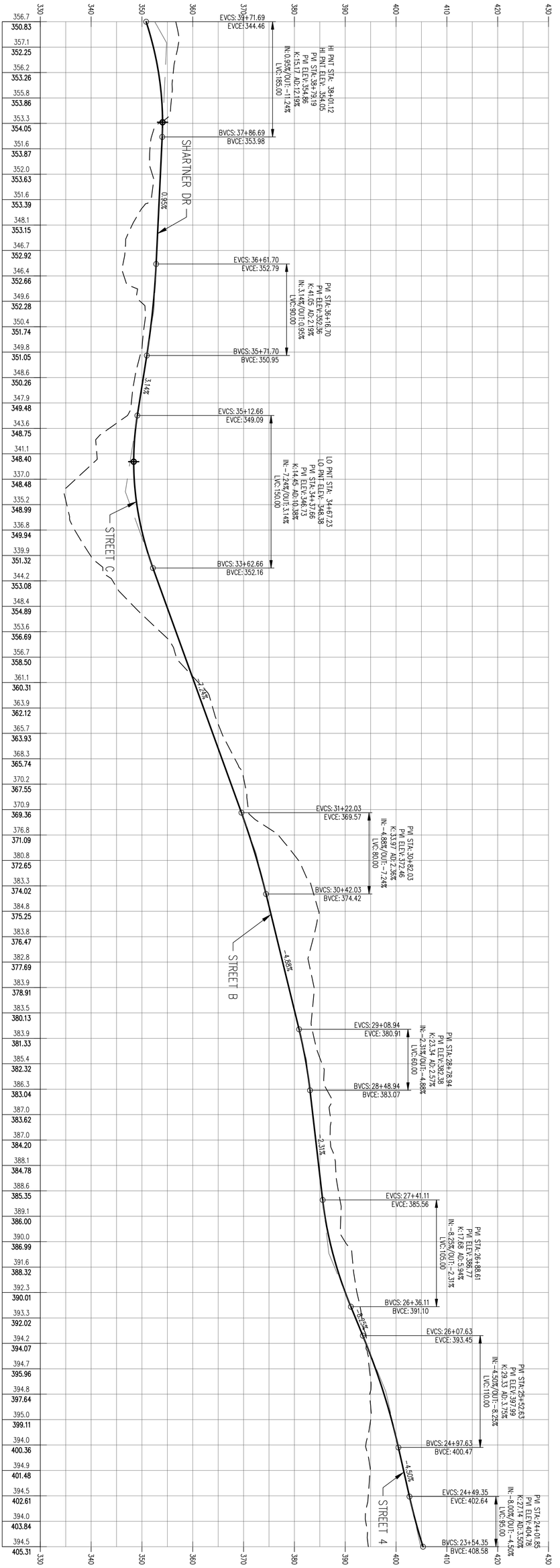
Item #1.

HOLLY LANE ALTERNATE 1 – 2
HORZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 10'



EXH-26

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STREET PROFILES
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

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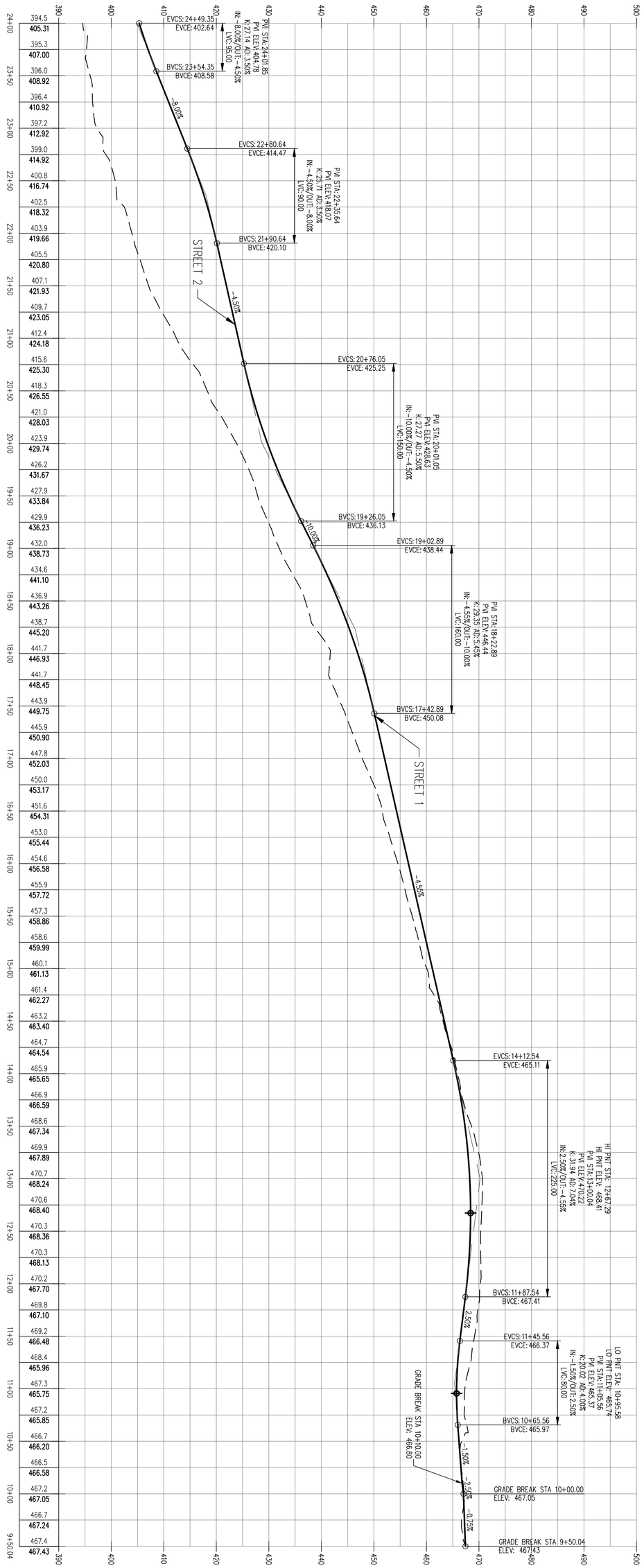
Item #1.

HOLLY LANE ALTERNATE 1 - 3
HORZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 10'



EXH-27

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STREET PROFILES
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

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Item #1

NOTE:

GEOLOGIC HAZARD OVERLAY IS PER OREGON CITY WEBMAPS.

NROD BOUNDARY PER SITE VISIT

APPROXIMATE SLOPE SETBACK

NROD BOUNDARY PER SITE VISIT

APPROXIMATE SLOPE SETBACK

NROD BOUNDARY PER SITE VISIT

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-30.55	-20.00	
2	-20.00	-10.00	
3	-10.00	0.00	
4	0.00	10.00	
5	10.00	20.00	
6	20.00	30.00	
7	30.00	32.19	

CUT

FILL

SLOPE CATEGORIES LEGEND:

- SLOPES 0-10%
- SLOPES 10-25%
- SLOPES 25-35%
- SLOPES >35%

SCALE: 1"=150 FEET

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY COLOR CUT-FILL MAP - S HOLLY LANE ALTERNATE 2
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

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JOB NUMBER:	7404
DATE:	03/15/2022
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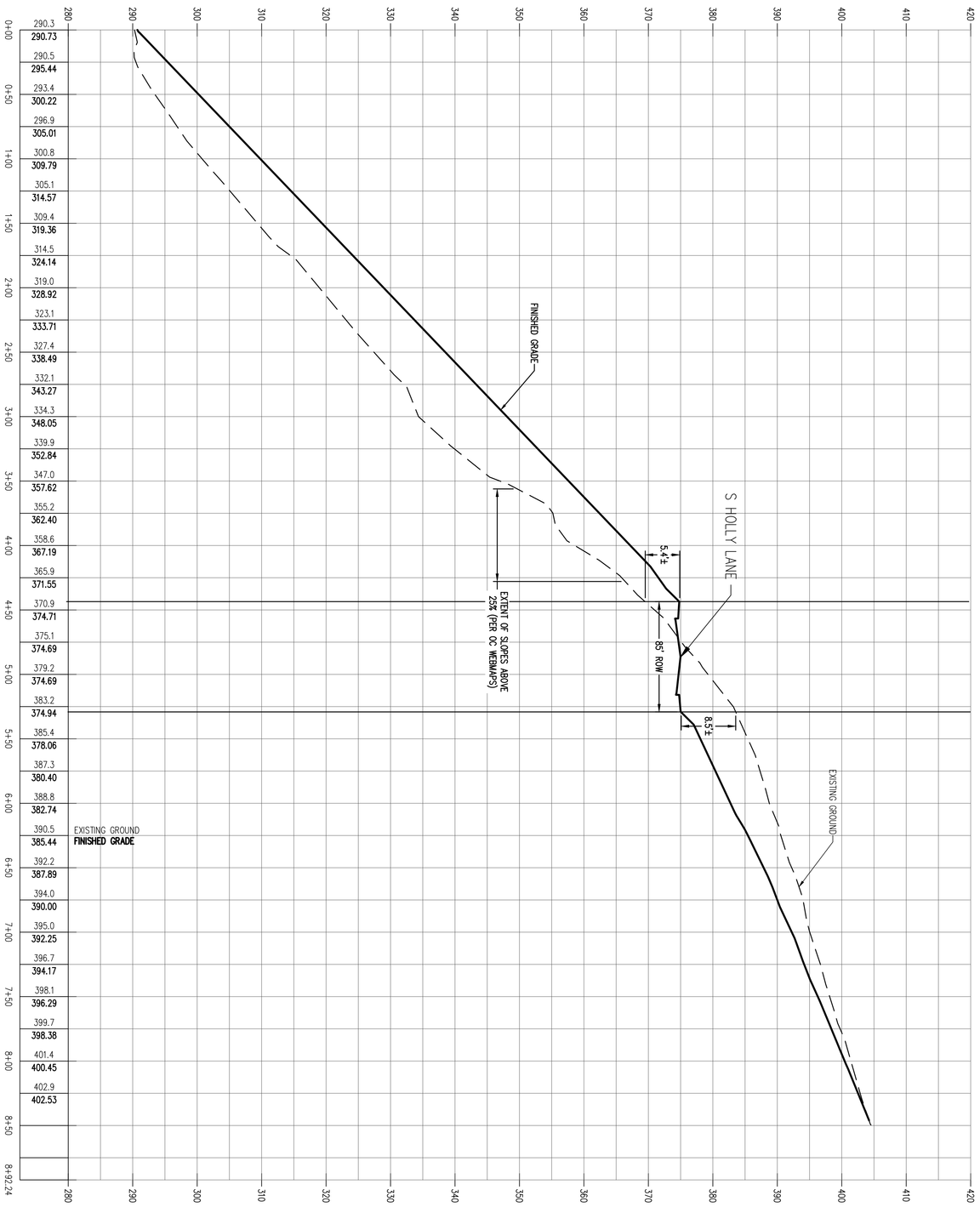
EXH-28

AKS DRAWING FILE: 7404 CUT-FILL HOLLY ALT-2.DWG | LAYOUT: COLOR CUT FILL

SECTION A-A
Hor. Scale: 1" = 50'
Vert. Scale: 1" = 10'



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S HOLLY LANE ALTERNATE 2 SECTION A-A
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OREGON CITY, OR

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EXH-29

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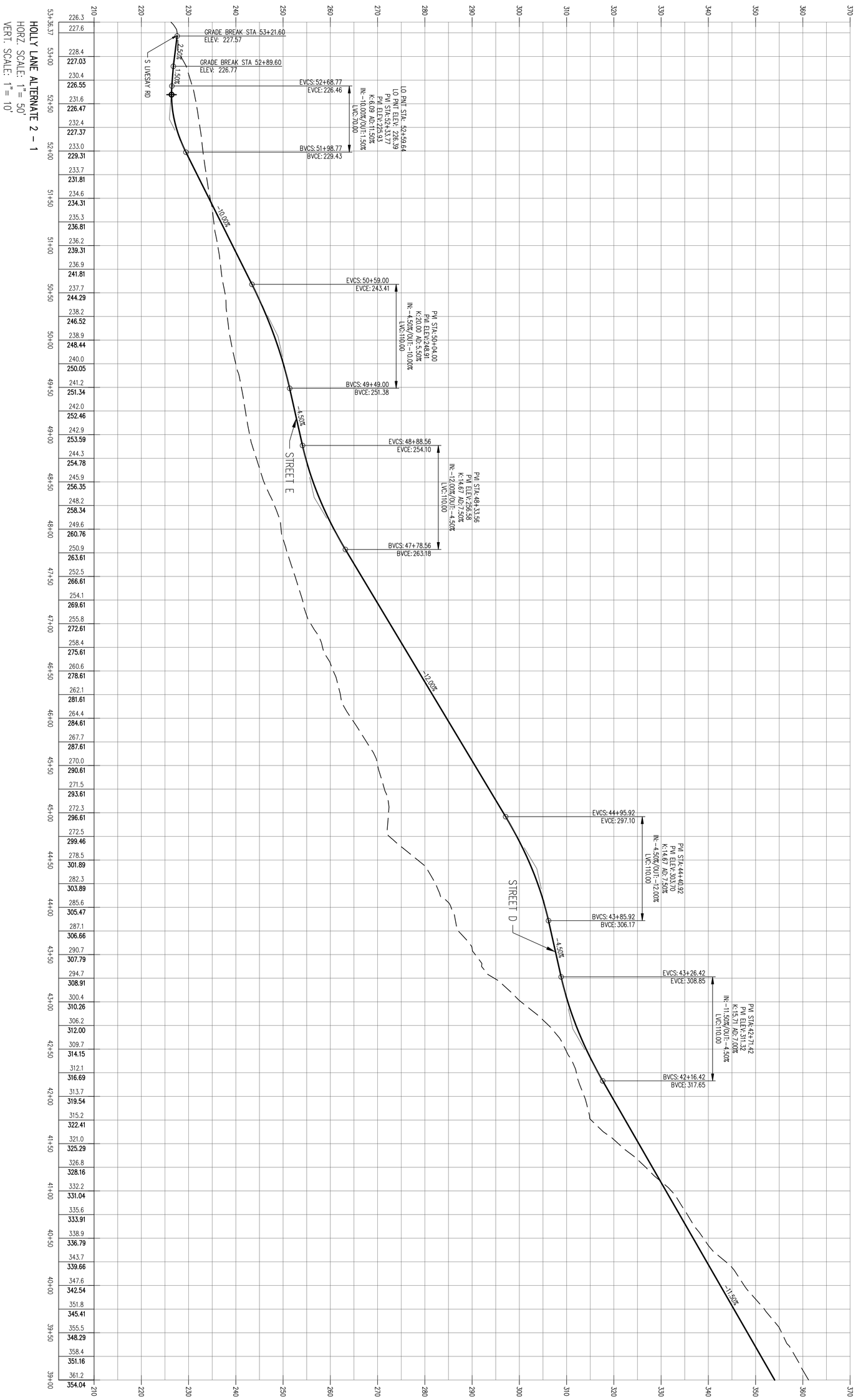

EXH-30

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PARK PLACE CROSSING MASTER PLAN

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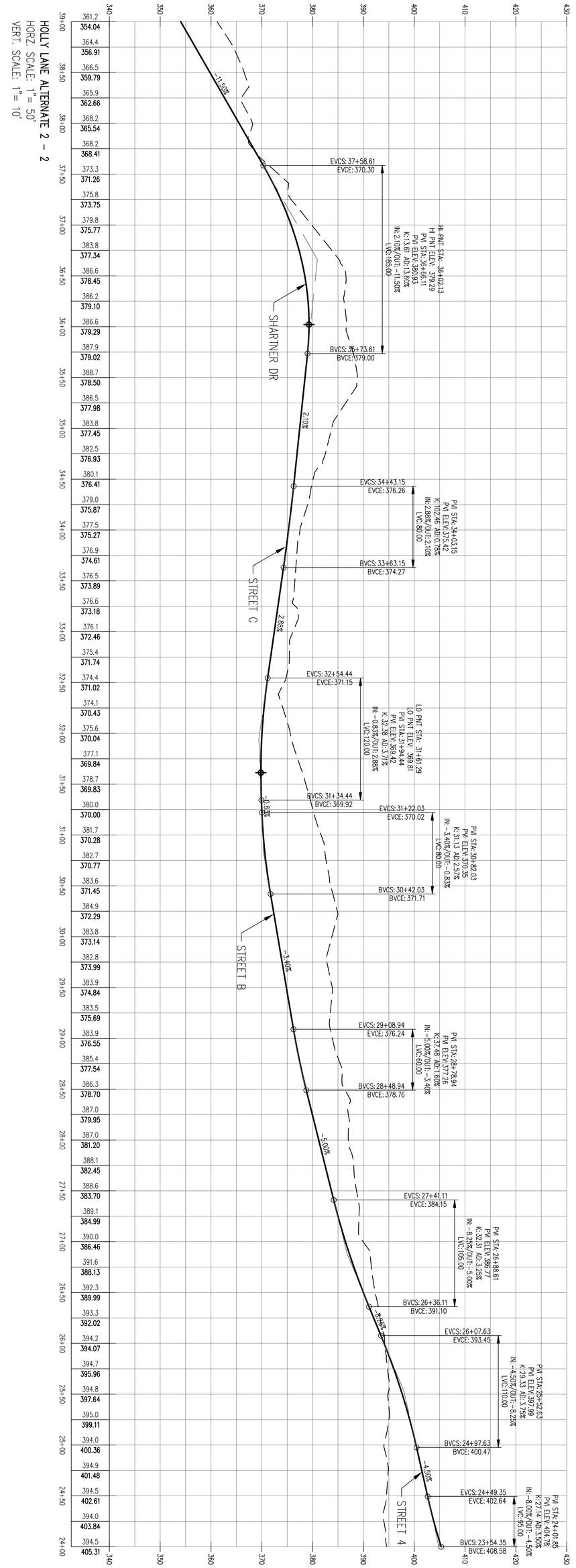
Item #1.

HOLLY LANE ALTERNATE 2 - 2

HORZ. SCALE: 1" = 50'

VERT. SCALE: 1" = 10'



EXH-31

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PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

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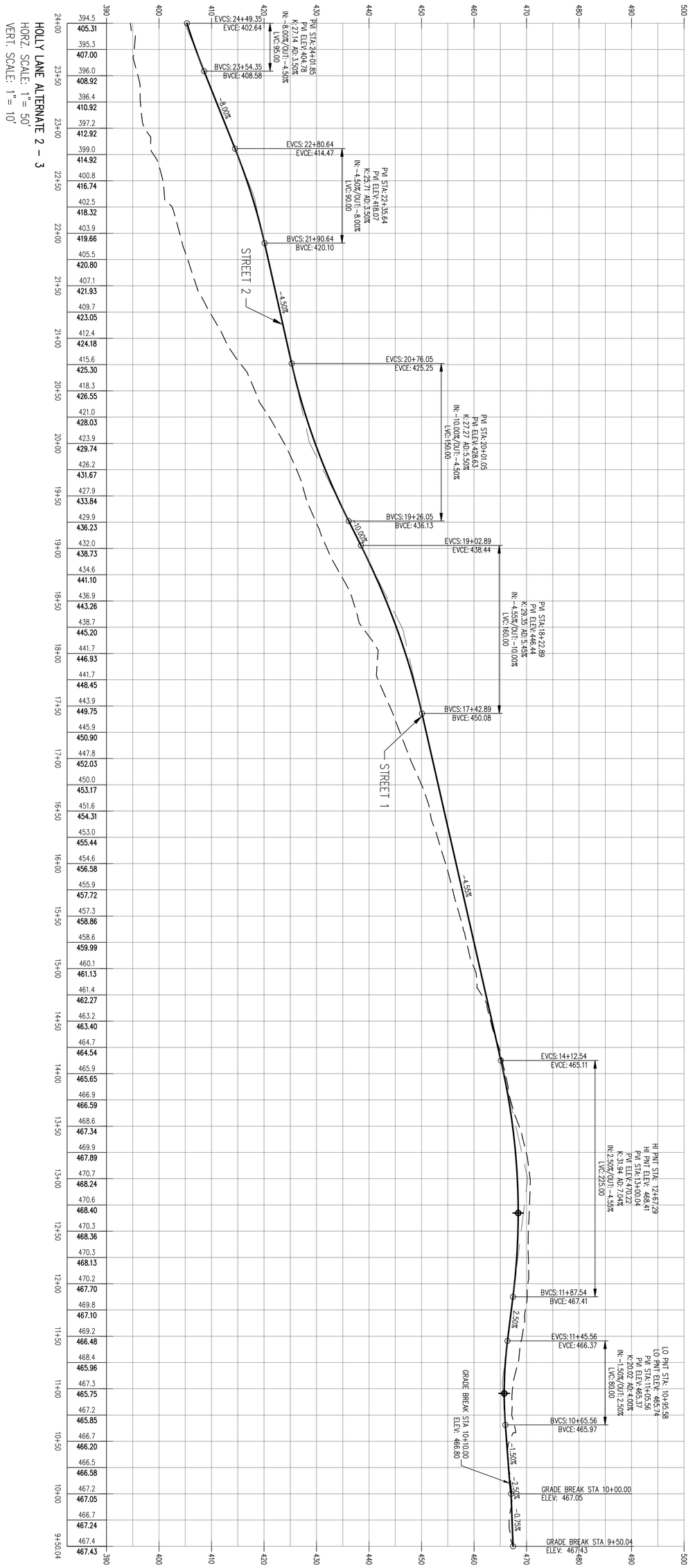
Item #1.



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STREET PROFILES
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

JOB NUMBER:	7404
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EXH-32

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Item #1

Real-World Geotechnical Solutions
Investigation • Design • Construction Support

March 18, 2022
Project No. 20-5600

Harlan Borow
Hidden Falls Development, LLC
1980 Willamette Falls Drive, Suite 260
West Linn, Oregon 97068
Via email: harlan@iconconstruction.net

SUBJECT: ADDENDUM ON SLOPES
PARK PLACE CROSSING GENERAL DEVELOPMENT PLAN / MASTER PLAN
TERMINUS OF SOUTH LIVESAY ROAD
OREGON CITY, OREGON

Reference: GeoPacific Engineering, Inc., Preliminary Geotechnical Engineering Report, Park Place Crossing General Development Plan / Master Plan, Terminus of South Livesay Road, Oregon City, Oregon, Dated March 18, 2022.

This letter presents an addendum on slopes for the proposed Park Place Crossing General Development Plan. It is our understanding that some relatively small, isolated areas with slopes steeper than 25 percent have been identified on OCWebmaps. This report addresses one sloped area in the central portion of the site, associated with the existing residence at 16644 South Livesay Road, and several sloped areas in the southeast portion of the site. The approximate locations of the subject areas with slopes steeper than 25 percent are shown on Figure 1. GeoPacific previously performed a geotechnical investigation of the site and provided preliminary recommendations for site development in the above-referenced report, dated March 16, 2022.

SLOPED AREA IN CENTRAL PORTION OF THE SITE

As shown on Figure 1, an area with a slope steeper than 25 percent has been identirfied on OC Webmaps in the central portion of the site, immediately northeast of the existing residence at 16644 South Livesay Road. In this area, OC Webmaps indicates that the slopes are generally between 25 to 35 percent, but that grades within a small portion of the sloped area are inclined at grades of over 35 percent. Based on our review of topographic mapping and our review of LiDAR imagery (Figure 2), we infer that the slope in this area was shaped artificially by grading associated with the existing single-family residence.

Landslide inventory mapping of the Oregon City and Gladstone Quadrangles and the statewide landslide database indicate no mapped landslides are present in the vicinity of the subject slope area (Schlicker and Finlayson, 1979; Madin, 1990; Madin and Burns, 2006; Burns and Madin, 2009; Madin, 2009; Burns and Mickelson, 2010; Burns et al., 2012; DOGAMI SLIDO, 2022).

Mass grading of the site will involve the construction of engineered fill slopes on the downslope side of this area and no significant addition or removal of fill material on the upslope side of this area. Current plans indicate that fills of up to 20 feet are planned on the downslope side of the existing slope area. The approximate magnitudes of cuts and fills in the vicinity of this slope area are shown on Figure 1.

Fill slopes will likely be constructed of native soils and will be graded no steeper than 2H:1V (Horizontal to Vertical). At these gradients, constructed of the appropriate materials, keyed, benched, and with proper drainage measures installed, fill slopes should remain grossly and surficially stable. Based on our understanding of the proposed grading in the vicinity of the subject slope area, which is currently steeper than 25 percent, it is our opinion that the proposed cuts and fills are generally practicable and adequate factors of safety can be maintained. We anticipate that stability of this existing slope area will be adequate to support the proposed design/layout. Soil conditions in this area are to be investigated at a later date.

SLOPED AREAS IN SOUTHEAST PORTION OF THE SITE

As shown on Figure 1, several relatively small, isolated areas with slopes steeper than 25 percent have been identified on OC Webmaps in the southeast portion of the site. LiDAR imagery of the subject portion of the site is shown on Figure 2. Landslide inventory mapping of the Oregon City and Gladstone Quadrangles and the statewide landslide database indicate no mapped landslides are present in the vicinity of the subject slope areas (Schlicker and Finlayson, 1979; Madin, 1990; Madin and Burns, 2006; Burns and Madin, 2009; Madin, 2009; Burns and Mickelson, 2010; Burns et al., 2012; DOGAMI SLIDO, 2022). During our reconnaissance, we did not observe evidence of recent movement (ground cracks, scarps, or hummocky topography) in the area of the subject slopes.

Our explorations indicate the areas with slopes exceeding 25% grade in the southeast portion of the site are underlain by soils belonging to the Springwater Formation. The fluvial depositional nature of this formation result in variable soil types consisting of silt, clay, gravel conglomerate, highly weathered volcanic rock, and sand. In our explorations in the vicinity of the subject area (test pits TP-2, TP-15, and TP-24), the Springwater Formations soils consisted of stiff to very stiff clay and silt and medium dense to dense gravel. The Springwater Formation is considered to have a moderate shear strength and moderate resistance to slope instability along moderate slopes.

In our opinion, the slope instability hazard in the subject area of the proposed development is low. Existing Springwater Formation soils in the vicinity of the subject slope areas are stiff to very stiff or medium dense to dense, and no evidence of recent landslide movement was observed in that area.

Mass grading of the site will generally involve the construction of engineered fill slopes in these areas. Current plans indicate that fills of up to 25 feet are planned on the downslope sides of the existing slope areas. The approximate magnitudes of cuts and fills in the vicinity of each of the subject slope areas are shown on Figure 1.

Fill slopes will likely be constructed of native soils and will be graded no steeper than 2H:1V (Horizontal to Vertical). Cut slopes will be excavated into native soils and will be graded no steeper than 2H:1V. At these gradients, constructed of the appropriate materials, keyed, benched, and with proper drainage measures installed, cut and fill slopes should remain grossly and surficially stable. Based on our understanding of the proposed grading in the vicinities of the subject slope areas, which are currently steeper than 25 percent, it is our opinion that the proposed

cuts and fills are generally practicable and adequate factors of safety will be maintained. Stability of these areas of existing slopes will be adequate to support the proposed design/layout.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our 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, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.



Benjamin G. Anderson, P.E.
Associate Engineer

Attachments: References
Figure 1 – Site Plan with OC Webmap Overlay
Figure 2 – Site Plan with LiDAR Imagery Overlay

REFERENCES

Burns, W.J. and Madin, I.P., 2009, Landslide Inventory Map of the Northwest Quarter of the Oregon City Quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, IMS-26, scale 1:8,000, 1 plate.

Burns, W.J. and Mickelson, K.A., 2010, Landslide Inventory Maps of the Oregon City Quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, IMS-30, scale 1:8,000, 4 plates.

Burns, W.J., Mickelson, K.A., Duplantis, S., and Madin, I.P., 2012, Landslide Inventory Maps of the Gladstone Quadrangle, Clackamas and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, IMS-48, 4 plates, 1:8,000 scale.

Madin, I.P., 1990, Earthquake hazard geology maps of the Portland metropolitan area, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report 0-90-2, scale 1:24,000, 22 p.

Madin, I.P., 2009, Geologic map of the Oregon City 7.5' Quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries GMS-119.

Madin, I.P. and Burns, W.J., 2006, Map of the landslide geomorphology of Oregon City, Oregon, and vicinity interpreted from lidar imagery and aerial photographs: Oregon Department of Geology and Mineral Industries Open File Report O-06-27.

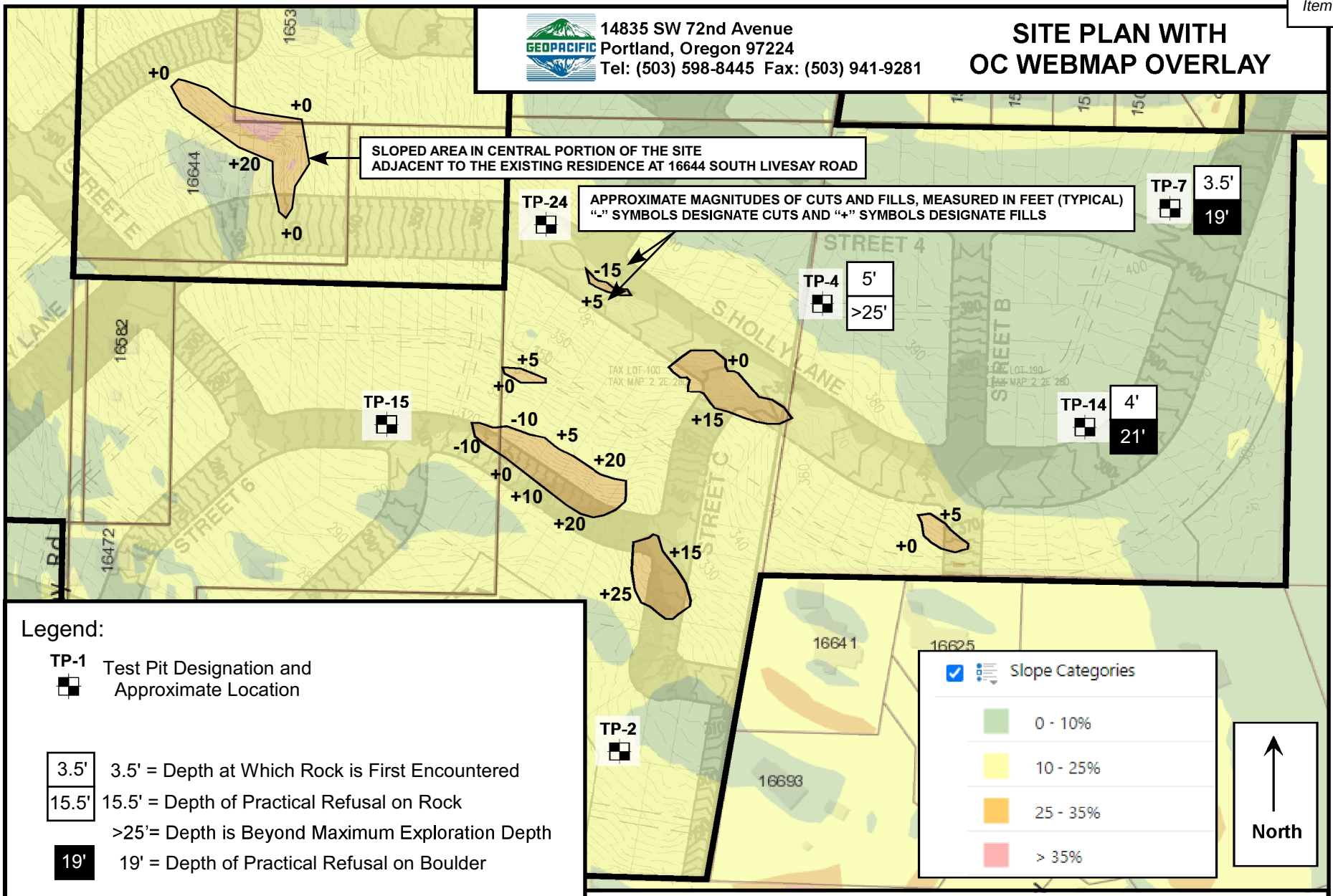
Oregon Department of Geology and Mineral Industries, 2022, DOGAMI Lidar Viewer: https://gis.dogami.oregon.gov/lidarviewer/.

Oregon Department of Geology and Mineral Industries, 2021, SLIDO: Statewide Landslide Information Database for Oregon: https://gis.dogami.oregon.gov/slido/

Schlicker, H.G. and Finlayson, C.T., 1979, Geology and Geologic Hazards of northwestern Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Bulletin No. 99, 79 p., scale 1:24,000.

14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

SITE PLAN WITH OC WEBMAP OVERLAY



Legend:

TP-1 Test Pit Designation and Approximate Location

3.5'	3.5' = Depth at Which Rock is First Encountered
15.5'	15.5' = Depth of Practical Refusal on Rock
	>25'= Depth is Beyond Maximum Exploration Depth
19'	19' = Depth of Practical Refusal on Boulder

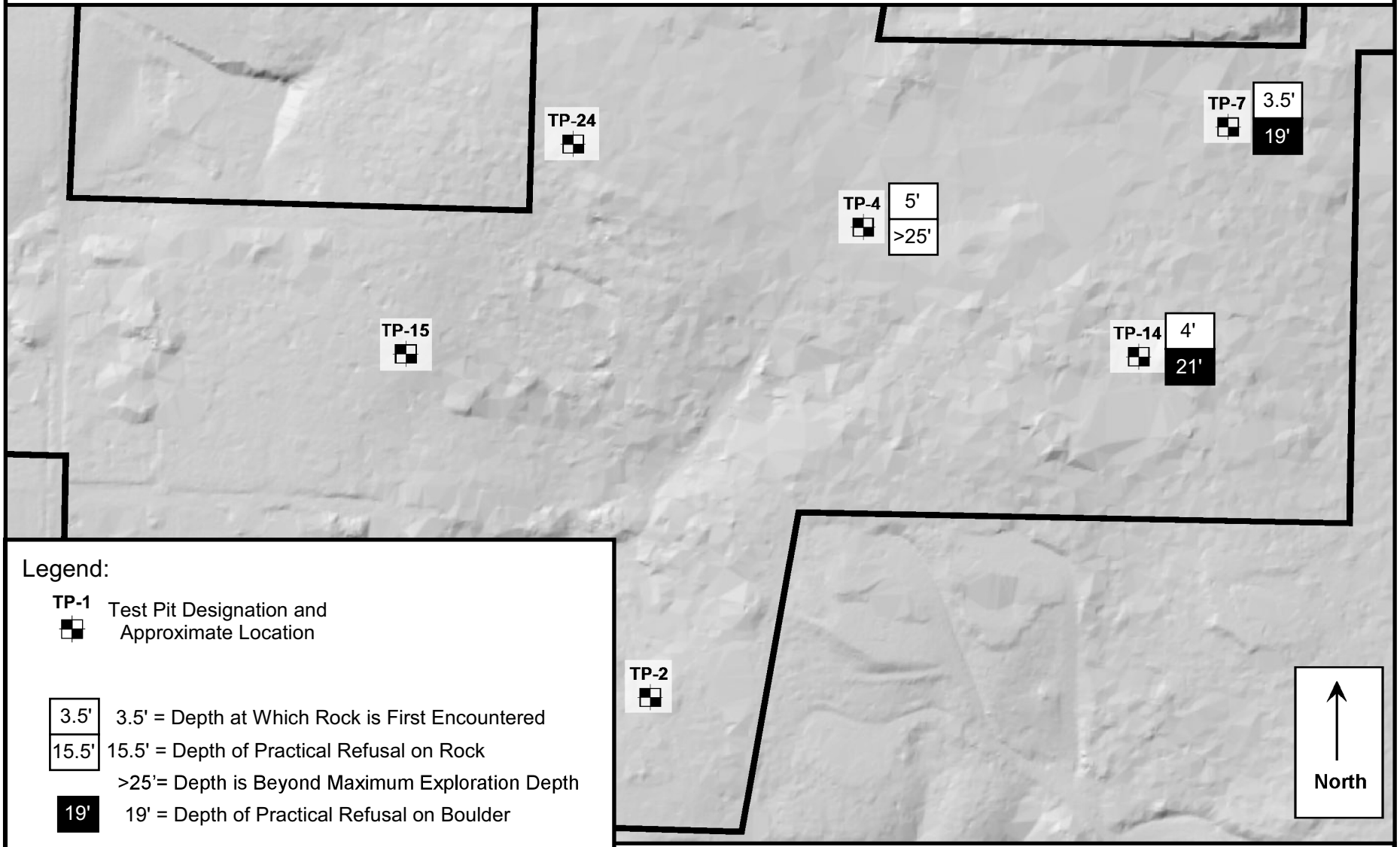
Note: Location of all geotechnical information is approximate.

Date: 03/19/21
Drawn by: BGA

Project: Park Place Crossing General Development Plan Oregon City, Oregon	Project No. 20-5600	FIGURE 1

14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

SITE PLAN WITH LIDAR IMAGERY OVERLAY



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15.5' 15.5' = Depth of Practical Refusal on Rock

>25'= Depth is Beyond Maximum Exploration Depth

19' 19' = Depth of Practical Refusal on Boulder

Note: Location of all geotechnical information is approximate.

0' 200'

APPROXIMATE SCALE 1"=200'

Date: 03/16/22
Drawn by: BGA

Project: Park Place Crossing General Development Plan
Oregon City, Oregon

Project No. 20-5600

FIGURE 2

January 14, 2022

Public Works – Engineering
City of Oregon City
625 Center Street
Oregon City, OR 97045

RE: Park Place Crossing Master Plan Sanitary Sewer Calculations Addendum

Dear Josh and John:

The purpose of this addendum letter is to provide updated calculations based on the revised layout of the Park Place Crossing Master Plan (attached updated Exhibit 10). The revised layout has approximately 476 lots accommodating both single-family attached and detached dwelling units. Based on the updated calculations, the Oak Valley Drive sanitary sewer main that drains into the Park Place Sanitary Sewer Basin can have 399 lots connected to it without any downstream deficiencies. With upsizing of certain pipe segments, all 476 lots can be accommodated.

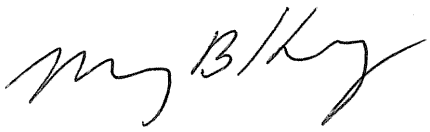
Park Place Crossing Master Plan (Connect to Park Place Sanitary Sewer Basin) (Exhibit 2)

The table shows the pipe segments that the sanitary sewer conveyance flows through from the connection at Oak Valley Drive to Redland Road. The pipe identification (ID), length, diameter, existing capacity, and buildout peak flows columns are based on data from the City of Oregon City *Sanitary Sewer Master Plan*, dated November 2014. The "Available Capacity After Future Buildout Condition" column was calculated by subtracting the "Buildout Peak Flows" column from the "Existing Pipe Capacity" column. This total available capacity was then used, in conjunction with the average flow per lot value from the updated Exhibit 1 (0.486 gallons per minute), to calculate the maximum number of lots that can flow through each pipe before surcharging. A peaking factor of 3 was used in the calculations, per the *Sanitary Sewer Master Plan*, so when the term "surcharging" is used, please note that there is a factor of safety of three for these values and the pipes are not likely flowing 100 percent full. The yellow highlighted columns show the maximum number of lots that can flow to each pipe (pipe ID 10742-10743 is the controlling pipe) with a maximum of 399 lots. This number of lots was used to show the actual maximum potential number of lots flowing to Oak Valley Drive without any downstream upgrades. If pipe segments of the pipe ID 10742-10473 are upsized, the Oak Valley Drive sanitary sewer main that drains into the Park Place Sanitary Sewer Basin can accept sewage from all 476 Park Place Crossing lots without any downstream deficiencies.

Please let us know if you have any questions on the above information or attachments.

Sincerely,

AKS ENGINEERING & FORESTRY, LLC



Monty Hurley, PE, Principal
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
503-563-6151 | Monty@aks-eng.com

Attachments

Updated Exhibit 1: Sanitary Sewer Flow Calculations for Park Place Concept Area

Updated Exhibit 2: Park Place Concept Area (Connect to Park Place Sanitary Sewer Basin)

Updated Exhibit 10: Park Place Concept Area Layout

AKS ENGINEERING & FORESTRY

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VANCOUVER, WA
9600 NE 126th Avenue, Suite
Vancouver, WA 98682
(360) 882-0419

EXHIBIT 1: SANITARY SEWER FLOW CALCULATIONS FOR PARK PLACE CROSSING MASTER PLAN

		Phase 1 & 2 (Connect to Holcomb Boulevard Sanitary Sewer Basin)	Overall (Including Phase 1 & 2) (Connect to Park Place Sanitary Sewer Basin)[d]
Gross area (acre):		12.11	91.69
Actual Net area[b] (acre):		7.82	47.70
Actual No. of lots:		78	476
Average Lot Size[e] (sf):	4,365		
Persons per lot[a]:	2.5		
Unit flow[a] (gpcd):	80		
Peaking Factor[a]:	3		
I/I[c] (gpad):	1000		
Domestic Flow (gpm):		32.50	198.33
I/I Flow (gpm):		5.43	33.13
Total Wastewater Flow (gpm):		**37.93**	**231.46**
Average flow per lot (gpm):		**0.486**	**0.486**

[a] Per Exhibit 9 - Section 3.5.1, Future Base Flows in the City of Oregon City Sanitary Sewer Master Plan, dated November 2014

[b] Per Exhibit 9 - Future Development Flow Method - Analysis Step 21 in the City of Oregon City Sanitary Sewer Master Plan, dated November 2014, actual net area utilized per the most current layout.

[c] Per Exhibit 9 - Section 3.5.2, Future Wet Weather Flows in the City of Oregon City Sanitary Sewer Master Plan, dated November 2014

[d] The Park Place Crossing Master Plan (Connect to Park Place Sanitary Sewer Basin) "Actual No. of Lots" is the maximum lots that can tie into the existing sanitary sewer line in Oak Valley Drive without surcharging the downstream pipes. The "Actual Net area" for this column is calculated based on the average lot size multiplied by the maximum number of lots.

[e] The average lot size is calculated from the most current Park Place layout (Exhibit 10).

Updated Exhibit 1

AKS ENGINEERING & FORESTRY

BEND, OR
2777 NW Lolo Drive, Suite 150
Bend, OR 97703
(541) 317-8429

KEIZER, OR
3700 River Road N, Suite 1
Keizer, OR 97303
(503) 400-6028

TUALATIN, OR
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

VANCOUVER, WA
9600 NE 126th Avenue, Suite 2520
Vancouver, WA 98682
(360) 882-0419

www.aks-eng.com

EXHIBIT 2: PARK PLACE CROSSING MASTER PLAN (Connect to Park Place Sanitary Sewer Basin)

Pipe ID[1]	Length[1]	Existing Pipe Diameter[1]	Existing Pipe Capacity[1] (GPM)	Existing Peak Flows[1] (GPM)	Buildout Peak Flows[1] (GPM)	Available Capacity After Future Buildout Condition (GPM)[2]	**No. of Future Lots (Park Place Concept Area - Overall) Can Connect With Available Capacity[3]**	As-built Pipe Diameter	Existing Pipe (As-built) Capacity (GPM)	Available Capacity After Future Buildout Condition (GPM)	**No. of Future Lots (Park Place Concept Area - Overall) Can Connect With Available Capacity**
10429_10430	322	8	371	92	105	266	547				
10430_10431	275	8	855	97	114	741	1524				
10431_10432	179	8	928	99	117	811	1668				
10432_10487	165	8	883	102	119	764	1571				
10487_10488	201	8	407	105	122	285	586				
10488_10422	33	8	389	106	130	259	533				
10422_10490	301	8	394	128	152	242	498				
10490_10489	12	8	3666	128	153	3513	7225				
10489_10288	315	8	1415	144	168	1247	2564				
10288_10491	28	8	1314	148	174	1140	2344				
10491_10492	309	8	1157	153	180	977	2009				
10492_10742	255	8	741	160	186	555	1141				
10742_10743	402	8	388	166	194	194	**399**				
10743_10744	335	8	936	190	222	714	1468				
10744_10745	196	8	1436	193	227	1209	2486				
10745_10746	127	8	595	195	230	365	751				
10746_10740[4]	316	8	309	201	236	73	150	10	530	294	605
10740_10747[4]	10	8	322	208	243	79	162	10	530	287	590
10747_10750	301	10	603	213	248	355	730				
10750_10748	50	10	883	213	219	664	1366				
10748_10770	191	10	627	252	288	339	697				
10770_10771	372	10	602	264	300	302	621				
10771_10772	358	10	604	269	307	297	611				
10772_10773	346	10	685	275	315	370	761				

[1] Value per City of Oregon City Sanitary Sewer Master Plan dated November 2014

[2] Calculated by subtracting buildout peak flows from existing pipe capacity.

[3] Calculated by dividing available capacity after future buildout condition by the average flow per lot.

[4] The Sanitary Sewer Master Plan shows a pipe size of 8" for both pipe segments 10746_10740 and 10740_10747. The Holcomb - Park Place Sanitary Sewer Collection System As-builts show these as 10" pipes (Exhibit 6).

Average flow per lot for Park Place Concept Area (gpm): 0.486

>>> 399 Lots of Park Place Concept Area Can Connect to Park Place Sanitary Sewer Basin Without Any Pipe Runs Being Surcharged

AKS ENGINEERING & FORESTRY, LLC
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CONCEPT AREA LAYOUT & SANITARY SEWER BASIN MAP
PARK PLACE CROSSING MASTER PLAN

OREGON CITY, OR

HOLCOMB BLVD
ANN DR
WAYNE DR
S OAKTREE TERRACE
OAK VALLEY DRIVE
TRACEY LEE COURT
SMITHFIELD DRIVE
WINSTON DRIVE
HOLCOMB BOULEVARD
BARLOW DRIVE
CATTLE DRIVE
SHARTNER DRIVE
BUFFALO WAY
WILLAMETTE VALLEY DRIVE
TRAILVIEW DRIVE
HOLLY LANE
JOURNEY DRIVE
LIVESAY ROAD
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET 6
STREET A
STREET B
STREET C
STREET E
STREET F

SEE CONCEPTUAL FUTURE STREET A ENLARGEMENT THIS SHEET

TAX LOT 617
TAX MAP 2 2E 28CA

TAX LOT 600
TAX MAP 2 2E 28CA

TAX LOT 100
TAX MAP 2 2E 28CA

TAX LOT 6300
TAX MAP 2 2E 28AC

TAX LOT 1709
TAX MAP 2 2E 28A

TAX LOT 7300
TAX MAP 2 2E 28AD

TAX LOT 400
TAX MAP 2 2E 27C

TAX LOT 1190
TAX MAP 2 2E 27BC

TAX LOT 1100
TAX MAP 2 2E 27BC

TAX LOT 1203
TAX MAP 2 2E 27BC

TAX LOT 1200
TAX MAP 2 2E 27BC

TAX LOT 1401
TAX MAP 2 2E 28D

TAX LOT 1403
TAX MAP 2 2E 28D

TAX LOT 1404
TAX MAP 2 2E 28D

TAX LOT 402
TAX MAP 2 2E 27C

TAX LOT 1402
TAX MAP 2 2E 28D

TAX LOT 1090
TAX MAP 2 2E 28D

TAX LOT 1390
TAX MAP 2 2E 28D

TAX LOT 1300
TAX MAP 2 2E 28D

TAX LOT 2500
TAX MAP 2 2E 28D

TAX LOT 2400
TAX MAP 2 2E 28D

TAX LOT 2300
TAX MAP 2 2E 28D

OVERALL PARK PLACE CONCEPT AREA SANITARY SEWER CONNECTION POINT (UP TO 399 LOTS)

PHASE 1 SANITARY SEWER CONNECTION POINT (56 LOTS)

OVERALL PARK PLACE CROSSING MASTER PLAN AREA ±91.7 AC

PHASE 1 ±12.11 AC

TRACT A OPEN SPACE
TRACT B OPEN SPACE
TRACT C NEIGHBORHOOD PARK
TRACT D OPEN SPACE
TRACT E OPEN SPACE
TRACT F OPEN SPACE
TRACT G STORMWATER FACILITY
TRACT H OPEN SPACE
TRACT Q PRIVATE STREET

OVERALL PARK PLACE CROSSING MASTER PLAN AREA BASIN

PHASE 1 OF PARK PLACE CROSSING MASTER PLAN AREA BASIN

N

SCALE: 1"=150 FEET
150 0 30 75 150
ORIGINAL PAGE SIZE: 22" x 34"

Updated Exhibit 10

PRELIMINARY NOT FOR CONSTRUCTION
REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 22, 2008
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	07/19/2021
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	

AKS DRAWING FILE: 20220107 SEWER EXHIBIT 1.DWG | LAYOUT: 1

Cody Street

From: Josh Wheeler <jwheeler@orcity.org>
Sent: Thursday, May 13, 2021 10:59 AM
To: Cody Street
Cc: Vu Nguyen; Cassondra Simic; Harlan Borow
Subject: RE: Additional Park Place Sanitary info

The City has reviewed your responses and are now confident that we can move forward. We have no further comments.

Josh Wheeler, PE
Assistant City Engineer
Public Works Department
City of Oregon City
625 Center Street
Oregon City, Oregon 97045
Email: jwheeler@orcity.org
971.322.9745 Cell

PLEASE NOTE THAT MY PHONE NUMBER HAS CHANGED TO A CELL PHONE WHILE WE ARE WORKING FROM HOME.

From: Cody Street <streetc@aks-eng.com>
Sent: Friday, April 30, 2021 3:43 PM
To: Josh Wheeler <jwheeler@orcity.org>
Cc: Vu Nguyen <VuN@aks-eng.com>; Cassondra Simic <simicc@aks-eng.com>; Harlan Borow <harlan@iconconstruction.net>
Subject: RE: Additional Park Place Sanitary info

Josh,

Preferred path forward would be to address all items now during this investigative phase.

Responses to Brown and Caldwell are provided below in orange.

Please let us know if there is any additional information you need at this time.

Thank you,

Cody Street, EI
AKS ENGINEERING & FORESTRY, LLC
P: 503.563.6151 Ext. 286 | www.aks-eng.com | StreetC@aks-eng.com

---

From: Josh Wheeler <jwheeler@orcity.org>
Sent: Thursday, February 25, 2021 8:11 AM
To: Cody Street <streetc@aks-eng.com>; Cassondra Simic <simicc@aks-eng.com>
Cc: Darren Gusdorf <darren@iconconstruction.net>
Subject: FW: Additional Park Place Sanitary info

Hello,

Please see the response by Brown and Caldwell. All of our question have not been addressed. Before we fully sign off on the concept, the below items will need addressed. We can do this through conditions of approval or during this investigative phase.

Thank you.

Josh Wheeler, PE
Assistant City Engineer
Public Works Department
City of Oregon City
625 Center Street
Oregon City, Oregon 97045
Email: jwheeler@orcity.org
971.322.9745 Cell

PLEASE NOTE THAT MY PHONE NUMBER HAS CHANGED TO A CELL PHONE WHILE WE ARE WORKING FROM HOME.

From: Ryan Retzlaff <rretzlaff@BrwnCald.com>
Sent: Wednesday, February 24, 2021 4:10 PM
To: Josh Wheeler <jwheeler@orcity.org>
Cc: Ryan Retzlaff <rretzlaff@BrwnCald.com>; Don Whitehead <dwhitehead@BrwnCald.com>
Subject: RE: Additional Park Place Sanitary info

Josh,

We are in agreement with the general assertion the existing sanitary system has capacity for the proposed developments of Park Place and Serres Property. A few elements should be considered that are identified in the email below.

The updated information provided by AKS in the email on February 2, 2021 did not appear to include any updated calculations or modifications to the design. Nor did the email address comments provided by BC on the email dated November 12, 2020 (Attached) AKS responses to B&C's November 12,2020 email are provided in the attached email. Based on this, the comments in the previous email stand as little clarity has been provided.

The attached Routing Options figure has been marked up to identify the developments and total units proposed per AKS. The aqua blue lines represent those that have been modeled for capacity in the SSMP and calculated for capacity by AKS. We are in agreement these have capacity but for the three pipe segments identified in figure 4-3 of the SSMP that surcharge. More information on these three pipes is included below.

The magenta lines in the attached figure have not been analyzed or has data been provided that would allow for any certainty that sufficient capacity exists. The following is provided as a rough estimate for the capacity of these lines which are mostly 8".

- 8" pipe with minimum slope of 0.004 ft/ft (per city design standards) has the capacity to move 347.58 gpm. If each unit contributes 0.504 gpm, as stated in exhibit 1 of the AKS letter, 690 units could theoretically be served by an 8" line at minimum slope. Assuming all pipe in the system is at or above the minimum design slope as the GIS does not have inverts for most of these pipes. Understood, no further action is needed.
- The theoretical capacity is determined based on these calculations with the assumptions stated in exhibit 1 of the AKS October letter. Correct, no further action is needed.

- The actual I/I is unknown. 1000 gpad is a theoretical number and should be verified or the pipes and manholes could be inspected to determine their relative condition and potential for I/I. The infrastructure in this area is roughly 20-30 years old based on city GIS and therefore should have relatively low I/I. As previous mention, these existing pipes probably have lower I/I than the theoretical (design) number, hence they should have more/extra capacity. No further action is needed.
- Based on the above the 8" lines (magenta) in the attached likely have capacity for the proposed developments. Agree. No further action is needed to determine the capacity of these lines.

Other considerations:

- The SSMP did not identify Holcomb Blvd for a CIP but the model extended only to node 10505 so no evaluation was completed of the section of pipe these developments will connect to. Understood, no further action is needed.
- Three pipes have been identified with possible surcharging between nodes 10505/12992 (CIP #6 in the SSMP0, 12992/10506 and 10444/10445. These are shown in figure 4-3 of the SSMP and identified by AKS ,10444/10445, in their October letter (refer highlighted text in red below). The analysis showing the surcharging is for future flows which is full build out. The addition of the Serres and Park Place development is close to the modeled scenario for buildout.

  The existing pipe from node 10505_12992 has extra capacity of 90 gpm and flow from future Park Place Phase 1 & 2 is 39 gpm. This section of pipe has capacity for future flow of Park Place Phase 1 & 2. No further action is needed.

  Future flow from Serres Properties Development will not drain to the existing 8-inch pipe from node 12992_10506, but the buildout peak flows in the SSMP has included its flow. The correct buildout peak flow should be approximately 454 gpm. The estimates buildout peak flow (with future flow from 78 Lots of Park Place Phase 1 & 2) is 39 gpm and the estimated available capacity for this section of pipe is 33 gpm. This section of pipe might be slightly surcharged with the flow from future Park Place Phase 1 & 2. No further action is needed.

  For the existing 12-inch pipe from node 10444_10445, we've surveyed and confirmed it has 0.34% slope which has capacity up to 2.08 cfs. The estimates buildout peak flow (with future flow from 116 Lots of Serres Properties Development and 78 Lots of Park Place Phase 1 & 2) is 931 gpm which is equivalent to approximately 2.07 cfs. This section of pipe has capacity for future flow. No further action is needed.

- It may be beneficial to inspect/CCTV the existing system at and near MH 10429, where the system crosses an unnamed stream/creek. This is a likely location where I/I could be significantly higher than theoretical values. These pipes were installed around 20 years ago, therefore they should have lower I/I than the theoretical (design) number. No further action is needed.

Please reach out with any questions or concerns.

Ryan Retzlaff
T 503.977.6628 | **C** 503.893.0410

From: Josh Wheeler <jwheeler@orcity.org>
Sent: Wednesday, February 03, 2021 12:57 PM
To: Ryan Retzlaff <rretzlaff@BrwnCald.com>
Subject: FW: Additional Park Place Sanitary info

I'm using Mimecast to share large files with you. Please see the attached instructions.

Hi Ryan,

Please review the attached and below information and let me know if there will be any downstream issues to the existing sanitary system without a need of upsizing the existing sewers.

My goal is for this to be a short exercise at low cost.

Please ensure it is billed separately from any other work so that I can bill the developer accordingly.

Josh Wheeler, PE
Assistant City Engineer
Public Works Department
City of Oregon City
625 Center Street
Oregon City, Oregon 97045
Email: jwheeler@orcity.org
971.322.9745 Cell

PLEASE NOTE THAT MY PHONE NUMBER HAS CHANGED TO A CELL PHONE WHILE WE ARE WORKING FROM HOME.

From: Cody Street <streetc@aks-eng.com>
Sent: Tuesday, February 2, 2021 5:42 PM
To: Josh Wheeler <jwheeler@orcity.org>
Cc: Cassondra Simic <simicc@aks-eng.com>
Subject: RE: Additional Park Place Sanitary info

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hey Josh,

Sorry for the delay. Attached is our most recent letter regarding the san. sewer calculations to save everyone time digging through past correspondence. Also attached is a PDF reference for the intended SSWR routing option.

Assumptions:

- The entire Park Place development is single family, one unit for each residential lot.
- Areas:
  - Park Place Phase 1 – Net area: 7.07 acres (56 Lots)
  - Park Place (including Phase 1) – Net area: 48.61 acres (385 Lots)
  - Serres Properties – Net area: 24.7 acres (106 Lots)
  - Abernethy – Net area: 22.5 acres (98 Lots)

Please let us know if there is any further info needed.

Cody Street, EI
AKS ENGINEERING & FORESTRY, LLC
P: 503.563.6151 Ext. 286 | www.aks-eng.com | StreetC@aks-eng.com

From: Josh Wheeler <jwheeler@orcity.org>
Sent: Tuesday, February 2, 2021 11:24 AM
To: Cassondra Simic <simicc@aks-eng.com>

Cc: Cody Street <streetc@aks-eng.com>
Subject: RE: Additional Park Place Sanitary info

No problem. Just making sure I understood what we came away with in our last meeting.

Josh Wheeler, PE
Assistant City Engineer
Public Works Department
City of Oregon City
625 Center Street
Oregon City, Oregon 97045
Email: jwheeler@orcity.org
971.322.9745 Cell

PLEASE NOTE THAT MY PHONE NUMBER HAS CHANGED TO A CELL PHONE WHILE WE ARE WORKING FROM HOME.

From: Cassondra Simic <simicc@aks-eng.com>
Sent: Tuesday, February 2, 2021 11:03 AM
To: Josh Wheeler <jwheeler@orcity.org>
Cc: Cody Street <streetc@aks-eng.com>
Subject: RE: Additional Park Place Sanitary info

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Josh,

Yes, Cody and I are working on organizing the information we have and will pass that all along as soon as possible. Sorry for the delay!

Thank you,

Cassie Simic, PE
AKS ENGINEERING & FORESTRY, LLC
P: 503.563.6151 Ext. 264 | F: 503.563.6152 | www.aks-eng.com | SimicC@aks-eng.com

From: Josh Wheeler <jwheeler@orcity.org>
Sent: Tuesday, February 2, 2021 11:01 AM
To: Cassondra Simic <simicc@aks-eng.com>
Subject: Additional Park Place Sanitary info

EXTERNAL EMAIL: This email originated from outside of AKS Engineering & Forestry. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Cassie,

Was AKS going to provide some inputs and assumptions that I can provide to Brown and Caldwell to verify the modeling so that the City can be comfortable with capacities or determine certain pipes need upsized?

Josh Wheeler, PE
Assistant City Engineer
Public Works Department
City of Oregon City
625 Center Street
Oregon City, Oregon 97045
Email: jwheeler@orcity.org
971.322.9745 Cell

PLEASE NOTE THAT MY PHONE NUMBER HAS CHANGED TO A CELL PHONE DURING THIS PHASED WORKING SCHEDULE. YOU MAY STILL USE 503-496-1548 BUT THERE MAY BE A DELAY IN REPLIES.

Website: www.orcity.org | webmaps.orcity.org | Follow us on: Facebook!|Twitter
Think **GREEN** *before you print.*

The City of Oregon City is open for business and continues to offer services and programs online and virtually. Some City facilities are open to the public, find current openings here, we encourage visitors to wear a mask, practice physical distancing, and reschedule in-person visits if you are feeling unwell.

The City has installed additional shielding and is providing hand sanitizer as well as occupancy limits to ensure our staff and visitors have a safe, no touch experience. Our goal is to be responsive to our community throughout this pandemic; we appreciate your understanding and cooperation.

Engineering Development Services Public Counter Hours at City Hall at 625 Center Street are 9:00 AM to 4:00 PM Monday through Thursday. We are available for in-person discussions on Friday by appointment only.

PUBLIC RECORDS LAW DISCLOSURE: This e-mail is subject to the State Retention Schedule and may be made available to the public.

October 1, 2020

Oregon City Engineering Department
City of Oregon City
625 Center Street
Oregon City, OR 97045

RE: Park Place Concept Area Sanitary Sewer Calculations

Dear Jeremy, Josh, and John:

The purpose of this letter is to walk you through the calculations performed by AKS in the attached exhibits. In our previous meeting, we stated that 200 lots could flow to the existing system in Oak Valley Drive without causing surcharge downstream. We have reevaluated the results from Brown and Caldwell. Based on additional review and calculations that reduce the assumed net area values, we now believe we can connect up to 385 lots to the Oak Valley Drive sanitary sewer main that drains into the Park Place Sanitary Sewer Basin without downstream deficiencies.

Sanitary Sewer Flow Calculations for Park Place Concept Area (Exhibit 1)

The attached calculations include the Park Place Phase 1 (first 56 lots) total wastewater flow, average flow per lot, and the overall Park Place area calculations for the maximum total lots before a sanitary sewer main surcharge condition occurs. The number of persons per lot, unit flow, peaking factor, and inflow/infiltration values are from the City of Oregon City Sanitary Sewer Master plan dated November 2014. The Sanitary Sewer Master Plan utilizes 20% of the gross area as the net area for calculations. This assumption is very conservative and is appropriate for a high-level analysis, but since we have a more detailed analysis of the site, we have utilized actual net area based on the preliminary development layout. The percentage of gross area that can be utilized for development is closer to 50-55%, rather than the 80% used in the Brown and Caldwell analysis. This reduction in net area is due to large open space, stormwater facility and street right-of-way areas. Based on this more detailed analysis, the total wastewater flow from the Park Place site is significantly lower than the number in the sanitary sewer master plan.

Park Place Concept Area (Connect to Park Place Sanitary Sewer Basin) (Exhibit 2)

The table shows the pipe segments that the sanitary sewer conveyance flows through from the connection at Oak Valley Drive to Redland Road. The pipe ID, length, diameter, existing capacity, and buildout peak flows columns are based on data from the City of Oregon City Sanitary Sewer Master Plan dated November 2014. The “Available Capacity After Future Buildout Condition” column was calculated using “Existing Pipe Capacity” column and subtracting the “Buildout Peak Flows” column. This total available capacity was then used, in conjunction with the average flow per lot value from the previous page (0.504 gpm), to calculate the maximum number of lots that could flow through each pipe before surcharging. A peaking factor of 3 was utilized in the calculations, per the Sanitary Sewer Master Plan, so when the term “surcharging” is used, please note that there is a factor of safety of 3 for these values, and the pipes are

not likely flowing 100% full. The yellow highlighted columns show the maximum number of lots that can flow to each pipe, pipe 10742-10743 ended up the controlling pipe, with 385 maximum lots. We used this number to show the actual maximum potential number of lots flowing to Oak Valley Drive.

The Holcomb – Park Place Sanitary Sewer Collection System as-builts show 10" pipes for segments 10746-10740 and 10740-10747 (numbered according to the Sanitary Sewer Master Plan), as opposed to the Sanitary Sewer Master Plan which shows 8" pipe segments. The additional columns on the right-hand side of Exhibit 2 show the recalculation of capacity for pipe segments 10746-10740 and 10740-10747, according to the as-built pipe size of 10". This provides an additional 287 gpm of capacity in these pipe segments.

Sanitary Sewer Flow Calculations for Abernethy Landing and the Serres Property (Exhibit 3)

As noted, the Sanitary Sewer Master Plan assumes a 20% reduction in gross site area for the net area, which is much more conservative than the actual net areas. Abernethy Landing is a developed, platted subdivision. A copy of the recorded plat is attached. It has 98 lots. The Sanitary Sewer Master Plan assumed 117 lots based on only a 20% reduction in gross site area for net area. The Serres Property is in preliminary design. A copy of the preliminary layout is attached. It has 106 lots. The Sanitary Sewer Master Plan assumed 140 lots based on only a 20% reduction in gross site area for net area. These calculations show side by side the Sanitary Sewer Master Plan calculations versus the actual net area and number of lots. The resulting difference in flow is 8.55 gpm for Abernethy Landing and 16.52 gpm for the Serres properties.

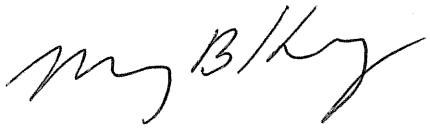
Park Place Concept Plan Area (Phase 1) and Serres Properties (Connection to Holcomb Boulevard Sanitary Sewer Basin) (Exhibit 4)

These calculations use the corrected flow for the Abernethy Landing and Serres Property projects to calculate the available downstream capacity. Pipe 10505-12992 is the first modeled pipe after Abernethy Landing flow is added, and the available capacity was increased by 8.55 gpm. Phase 1 of Park Place will flow to Holcomb Boulevard via Journey Drive and add an additional 28 gpm of flow (well within the 90 gpm available). The "Buildout Peak Flows" from the Sanitary Sewer Master Plan were based on undeveloped land in each sanitary sewer basin. For the Holcomb Boulevard Sanitary Sewer basin, Abernethy Landing and the Serres Property were the only large undeveloped properties remaining in the Holcomb Boulevard Sanitary Sewer Basin. Now, the Serres properties are the only large undeveloped properties remaining in the Holcomb Boulevard Sanitary Sewer Basin. Our calculations show an "Adjusted Buildout Peak Flows" column. This is calculated using the existing peak flows plus 118 gpm, from the corrected Abernethy Landing and Serres Property flows. Since Park Place was not planned to drain to the Holcomb Boulevard Sanitary Sewer Basin, it was not originally included in the peak buildout flow. An additional 28 gpm from Park Place Phase 1 is added to the buildout peak flows in the next calculation column, to account for the first 56 lots draining to the Holcomb Boulevard Sanitary Sewer Basin. This results in a possible slight surcharge in the 10444-10445 pipe.

Based on this more detailed analysis of actual development areas, the overall Park Place project site can be conveyed through the existing sanitary sewer system in the Park Place Sanitary Sewer Basin, and Park Place Phase 1 can drain to the existing sanitary sewer system in the Holcomb Boulevard Sanitary Sewer Basin without the need for upsizing any pipe segments. The calculations were adjusted to provide the actual net area for the Serres Property, Abernethy Landing, and the Park Place properties, which results in more available pipe capacity.

Please let us know if you have any questions on the above information or attachments.

Sincerely,
AKS ENGINEERING & FORESTRY, LLC



Monty Hurley, PE, Principal
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
503-563-6151 | Monty@aks-eng.com

Attachments

Attachment 1: Sanitary sewer Alignment Through the Drainage, and Sanitary Sewer Profile Through the Drainage (SAN 1 & 2)

Exhibit 1: Sanitary Sewer Flow Calculations for Park Place Concept Area

Exhibit 2: Park Place Concept Area (Connect to Park Place Sanitary Sewer Basin)

Exhibit 3: Sanitary Sewer Flow Calculations for Abernethy Landing and the Serres Property

Exhibit 4: Park Place Concept Plan Area (Phase 1) and Serres Properties (Connection to Holcomb Boulevard Sanitary Sewer Basin)

Exhibit 5: Sanitary Sewer Master Plan Map

Exhibit 6: Pages from Holcomb – Park Place Sanitary Sewer Collection System As-Builts

Exhibit 7: Abernethy Landing Recorded Plat

Exhibit 8: Serres Property Layout

Exhibit 9: Future Development Flow Method

Exhibit 10: Park Place Concept Area Layout

AKS DRAWING FILE: 7404 CPIPES – SSWR.DWG | LAYOUT: PLAN



Page 675	JOB NUMBER 7404	REVISIONS	DESIGNED BY: CLS DRAWN BY: CLS MANAGED BY: MRH CHECKED BY: VAN DATE: 9.30.2020	**OAK VALLEY DRIVE SANITARY SEWER CONNECTION ALIGNMENT MAP**	**PARK PLACE VILLAGE** **OREGON CITY OREGON**

AKS ENGINEERING & FORESTRY, LLC
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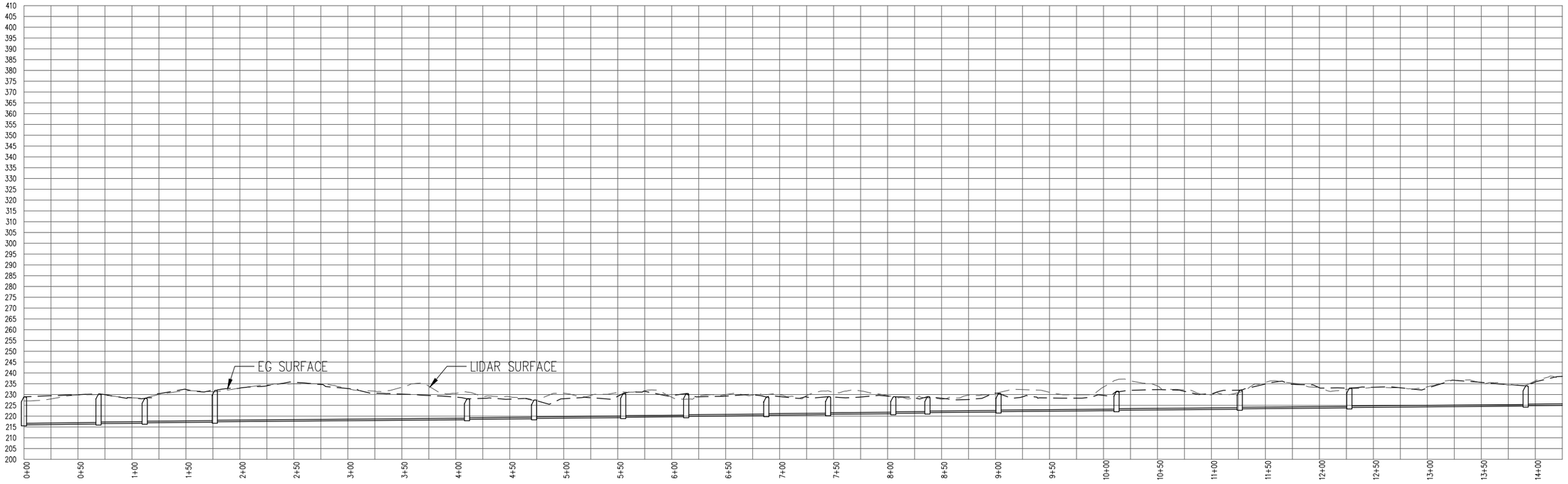
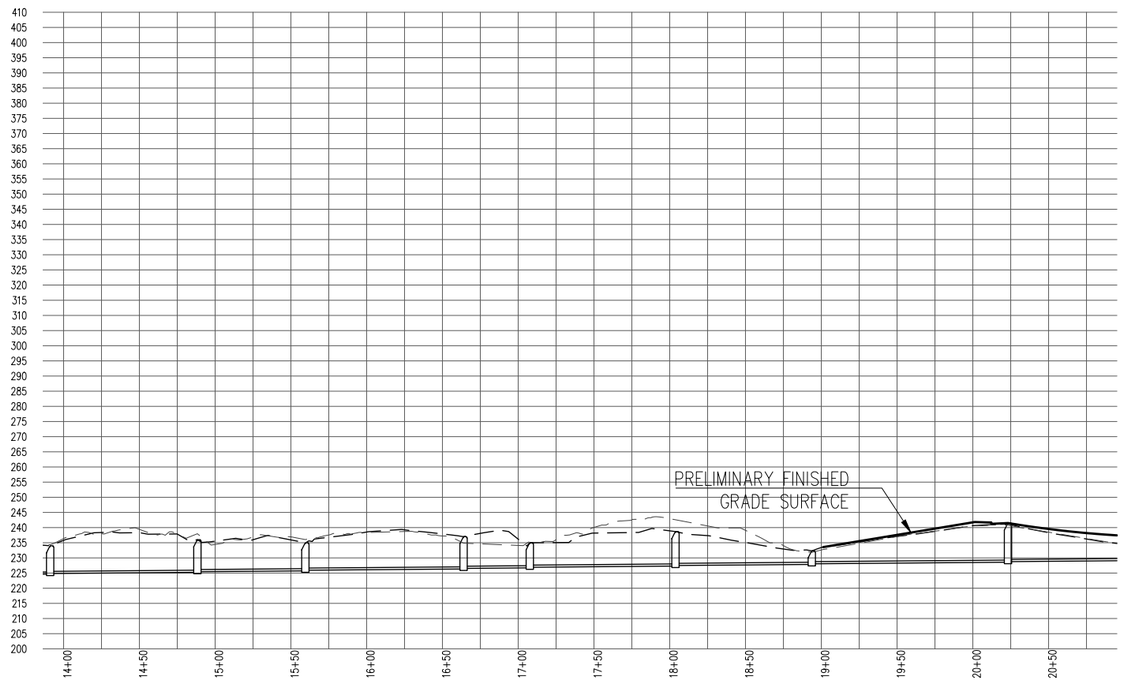
Item #1.



SAN A
HOR: 1"= 50'
VERT: 1"= 25'



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PARK PLACE VILLAGE

OREGON CITY OREGON

SANITARY SEWER PROFILE THROUGH DRAINAGE

DESIGNED BY:	CLS
DRAWN BY:	CLS
MANAGED BY:	MBH
CHECKED BY:	VHN
DATE:	9.30.2020

REVISIONS

JOB NUMBER
7404

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EXHIBIT 1: SANITARY SEWER FLOW CALCULATIONS FOR PARK PLACE CONCEPT AREA

		Park Place Concept Area - Phase 1 (Connect to Holcomb Boulevard Sanitary Sewer Basin)	Park Place Concept Area - Overall (Connect to Park Place Sanitary Sewer Basin)[d]
Gross area (acre):		12.11	91.69
Actual Net area[b] (acre):		7.07	48.61
Actual No. of lots:		56	385
Average Lot Size[e] (sf):	5,500		
Persons per lot[a]:	2.5		
Unit flow[a] (gpcd):	80		
Peaking Factor[a]:	3		
I/I[c] (gpad):	1000		
Domestic Flow (gpm):		23.33	160.42
I/I Flow (gpm):		4.91	33.76
Total Wastewater Flow (gpm):		**28.24**	**194.18**
Average flow per lot (gpm):		**0.504**	**0.504**

[a] Per Exhibit 9 - Section 3.5.1, Future Base Flows in the City of Oregon City Sanitary Sewer Master Plan dated November 2014

[b] Per Exhibit 9 - Future Development Flow Method - Analysis Step 21 in the City of Oregon City Sanitary Sewer Master Plan dated November 2014, actual net area utilized per the most current layout.

[c] Per Exhibit 9 - Section 3.5.2, Future Wet Weather Flows in the City of Oregon City Sanitary Sewer Master Plan, dated November 2014

[d] The Park Place Concept Area (Connect to Park Place Sanitary Sewer Basin) "Actual No. of Lots" is the maximum lots that can tie into the existing sanitary sewer line in Oak Valley Drive without surcharging the downstream pipes. The "Actual Net area" for this column is calculated based on the average lot size multiplied by the maximum number of lots.

[e] The average lot size is calculated from the most current Park Place layout (Exhibit 10).

Exhibit 1

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EXHIBIT 2: PARK PLACE CONCEPT AREA (Connect to Park Place Sanitary Sewer Basin)

Pipe ID[1]	Length[1]	Existing Pipe Diameter[1]	Existing Pipe Capacity[1] (GPM)	Existing Peak Flows[1] (GPM)	Buildout Peak Flows[1] (GPM)	Available Capacity After Future Buildout Condition (GPM)[2]	**No. of Future Lots (Park Place Concept Area - Overall) Can Connect With Available Capacity[3]**	As-built Pipe Diameter	Existing Pipe (As-built) Capacity (GPM)	Available Capacity After Future Buildout Condition (GPM)	**No. of Future Lots (Park Place Concept Area - Overall) Can Connect With Available Capacity**
10429_10430	322	8	371	92	105	266	527				
10430_10431	275	8	855	97	114	741	1469				
10431_10432	179	8	928	99	117	811	1608				
10432_10487	165	8	883	102	119	764	1515				
10487_10488	201	8	407	105	122	285	565				
10488_10422	33	8	389	106	130	259	514				
10422_10490	301	8	394	128	152	242	480				
10490_10489	12	8	3666	128	153	3513	6965				
10489_10288	315	8	1415	144	168	1247	2472				
10288_10491	28	8	1314	148	174	1140	2260				
10491_10492	309	8	1157	153	180	977	1937				
10492_10742	255	8	741	160	186	555	1100				
10742_10743	402	8	388	166	194	194	**385**				
10743_10744	335	8	936	190	222	714	1416				
10744_10745	196	8	1436	193	227	1209	2397				
10745_10746	127	8	595	195	230	365	724				
10746_10740[4]	316	8	309	201	236	73	145	10	530	294	583
10740_10747[4]	10	8	322	208	243	79	157	10	530	287	569
10747_10750	301	10	603	213	248	355	704				
10750_10748	50	10	883	213	219	664	1317				
10748_10770	191	10	627	252	288	339	672				
10770_10771	372	10	602	264	300	302	599				
10771_10772	358	10	604	269	307	297	589				
10772_10773	346	10	685	275	315	370	734				

[1] Value per City of Oregon City Sanitary Sewer Master Plan dated November 2014

[2] Calculated by subtracting buildout peak flows from existing pipe capacity.

[3] Calculated by dividing available capacity after future buildout condition by the average flow per lot.

[4] The Sanitary Sewer Master Plan shows a pipe size of 8" for both pipe segments 10746_10740 and 10740_10747. The Holcomb - Park Place Sanitary Sewer Collection System As-builts show these as 10" pipes (Exhibit 6).

>>> 385 Lots of Park Place Concept Area Can Connect to Park Place Sanitary Sewer Basin Without Any Pipe Runs Being Surcharged

Exhibit 2

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EXHIBIT 3: SANITARY SEWER FLOW CALCULATIONS FOR ABERNETHY LANDING AND THE SERRES PROPERTY

		Abernethy Landing[d] (Per Sanitary Sewer Master Plan)	Abernethy Landing[d] (Actual Built Scenario)	Serres Properties[e] (Per Sanitary Sewer Master Plan)	Serres Properties[e] (Actual Design Scenario)
Gross area (acre):		29.27		35.11	
Net area - 80% of Gross area[a] (acre):		23.42		28.09	
No. of lots[a] (5 lot per acre):		117		140	
Actual net area[b] (acre):			22.50		24.70
Actual No. of lots:			98		106
Persons per lot[a]:	2.5				
Unit flow[a] (gpcd):	80				
Peaking Factor[a]:	3				
I/I[c] (gpad):	1000				
Domestic Flow (gpm):		48.75	40.83	58.33	44.17
I/I Flow (gpm):		16.26	15.63	19.51	17.15
Total Wastewater Flow (gpm):		**65.01**	**56.46**	**77.84**	**61.32**

Difference in flow between the Master Plan and actual built calculation (gpm):	**8.55**	**16.52**

Total Serres and Abernethy Landing Flow (Master Plan) **143 gpm**

Total Serres and Abernethy Landing Flow (Actual) **118 gpm**

[a] Per Exhibit 9 - Section 3.5.1, Future Base Flows in the City of Oregon City Sanitary Sewer Master Plan dated November 2014
[b] Per Exhibit 9- Future Development Flow Method - Analysis Step 21 in the City of Oregon City Sanitary Sewer Master Plan dated November 2014, actual net area utilized
[c] Per Exhibit 9 - Section 3.5.2, Future Wet Weather Flows in the City of Oregon City Sanitary Sewer Master Plan dated November 2014
[d] Abernethy Landing recorded plat is Exhibit 7.
[e] The Serres Property layout is Exhibit 8.

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EXHIBIT 4: PARK PLACE CONCEPT PLAN AREA (Phase 1) AND SERRES PROPERTIES (Connect to Holcomb Boulevard Sanitary Sewer Basin

Pipe ID[1]	Length[1]	Existing Pipe Diameter[1]	Existing Pipe Capacity[1] (GPM)	Existing Peak Flows[1] (GPM)	Buildout Peak Flows[1] (GPM)	Difference in flow between the Master Plan and actual Abernethy Landing build out (GPM):	Available Capacity After Future Buildout Condition (GPM)	**Total Flow From Future Park Place Phase 1 (56 Lots) Concept Area (GPM)**		**Adjusted Buildout Peak Flows (GPM)[2]**	**Adjusted Buildout Peak Flows & Park Place Phase 1 (GPM)[3]**
10505_12992	161	8	540	328	459	8.55	90	**28**			
10444_10445	343	12	899	770	1017					**888**	**916**

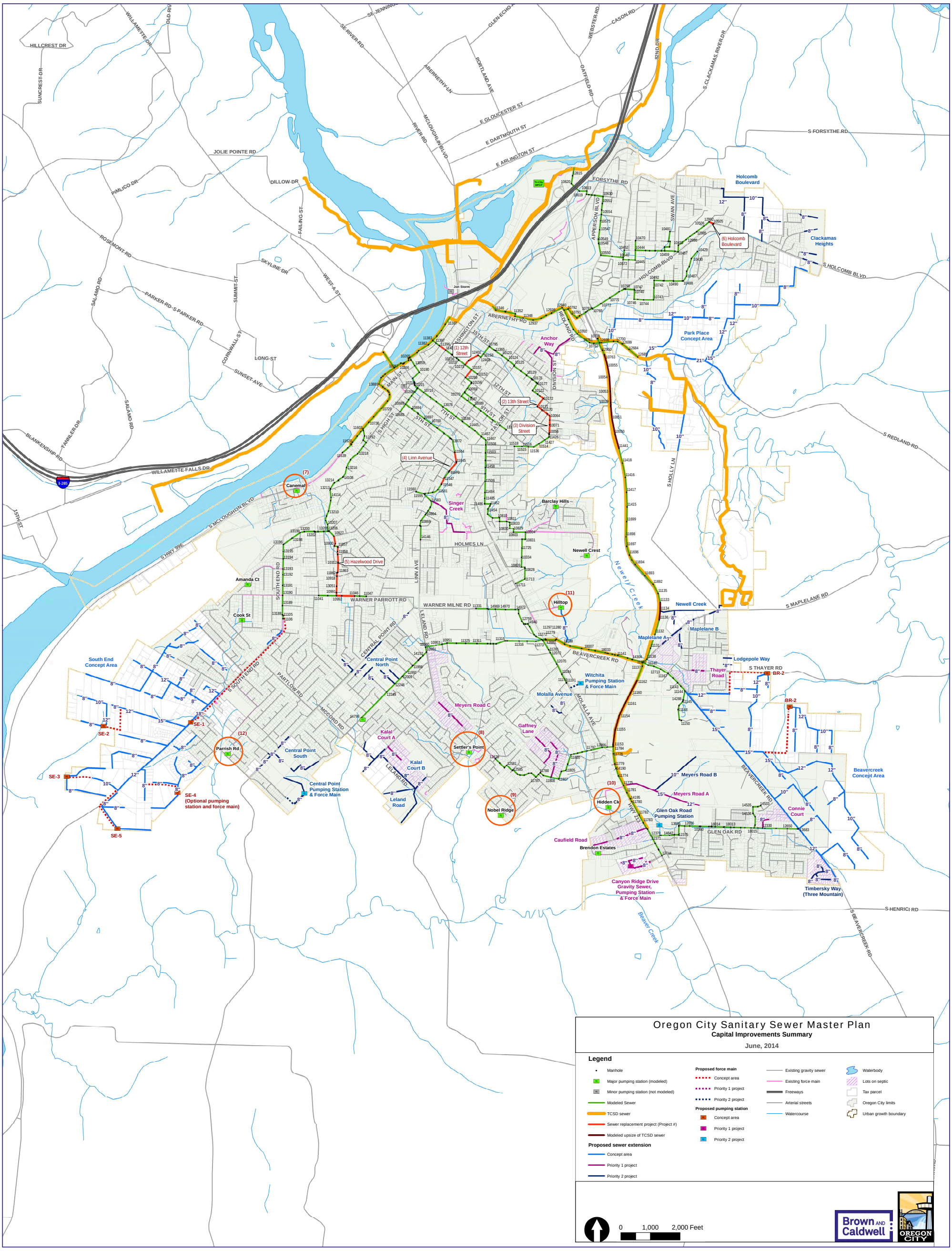
[1] Value per City of Oregon City Sanitary Sewer Master Plan dated November 2014

[2]Serres Properties and Abernethy Landing flows plus existing peak flows

[3]Adjusted buildout peak flows plus Park Place Phase 1 (56 lots) = 28 gpm.

>>> Existing Downstream Pipe Runs Will Not Be Impacted by Serres Properties Development, Pipe run 10444 to 10445 Will Be Slightly Surcharged with Future 56 Lots of Park Place Concept Area

Exhibit 4



Oregon City Sanitary Sewer Master Plan

Capital Improvements Summary

June, 2014

Legend

- Manhole
- Major pumping station (modeled)
- Minor pumping station (not modeled)
- Modeled Sewer
- TCSD sewer
- Sewer replacement project (Project #)
- Modeled upsize of TCSD sewer

Proposed sewer extension

- Concept area
- Priority 1 project
- Priority 2 project

Proposed force main

- Concept area
- Priority 1 project
- Priority 2 project

Proposed pumping station

- Concept area
- Priority 1 project
- Priority 2 project

- Existing gravity sewer
- Existing force main
- Freeways
- Arterial streets
- Watercourse
- Waterbody
- Lots on septic
- Tax parcel
- Oregon City limits
- Urban growth boundary

Brown AND Caldwell

OREGON CITY

DRAWING NUMBER 50027.00

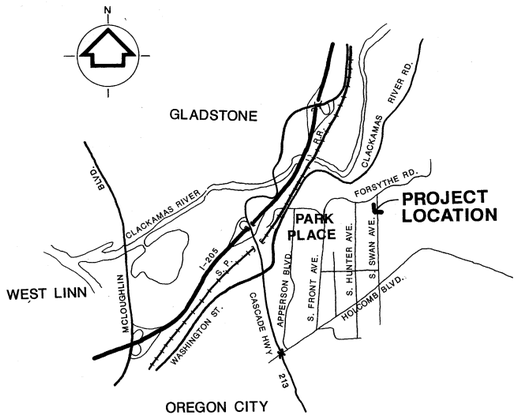
DRAWING NUMBER COVER SHEET

DRAWING NUMBER 1

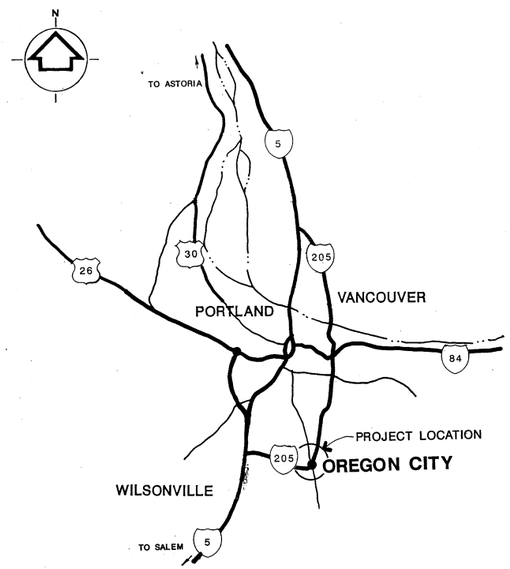
HOLCOMB-PARK PL. S/W

CITY OF OREGON CITY

HOLCOMB - PARK PLACE SANITARY SEWER COLLECTION SYSTEM



VICINITY MAP



LOCATION MAP

LEGEND

SYMBOL	DESCRIPTION (EXISTING)
+	GRID REGISTER
⊡	CATCH BASIN
☾	CULVERT
⊍	FIRE HYDRANT
⋈	GATE VALVE
Y	GUY POLE
△	H.V. CONTROL POINT
☼	LIGHT POLE
⊛	MANHOLE
○	PIPE
▫	POWER VAULT
—○—	POWER POLE
!	RAILROAD SWITCH
⊻	RAILROAD SIGN
⊛	SIGN

SYMBOL	DESCRIPTION (EXISTING)
○	SANITARY MANHOLE
♧	SINGLE TREE SMALL
✿	SINGLE TREE LARGE
135.0 ×	SPOT ELEVATION
□	TELEPHONE BOX
⊠	TRAFFIC POLE
◎	TELEPHONE MANHOLE
⊠	UTILITY BOX
	BUILDING

SYMBOL	DESCRIPTION (EXISTING)
X X X X X X	FENCE LINE
— —G— — —G— —	GAS LINE
——S—— ——S——	SEWER LINE
— —TV— — —TV— —	TELEVISION CABLE
— —W— — —W— —	WATER LINE
— —SD— — —SD— —	STORM DRAIN LINE
	CURB LINE
	EDGE OF PAVEMENT
	GRAVEL ROAD
	PAVED DRIVEWAY
	PAVED PARKING LOT
	PARKING LOT
	PROPERTY LINE/R.O.W. LINE
	UNPAVED DRIVEWAY
	RAILROAD TRACKS
	VEGETATION LINE
	CONSTRUCTION EASEMENT
120	CONTOUR LINE

SYMBOL	DESCRIPTION (PROPOSED)
	SANITARY SEWER
●	MANHOLE
3+00	SANITARY SEWER SERVICE LINE
	SANITARY SEWER WITH CASING
	TRANSITION COUPLING
•	CLEANOUT
BSM'T	BASEMENT ELEVATION

GENERAL NOTES

1. ADJUST GAS LINE AS REQUIRED.
2. ADJUST WATER LINE UP AS REQUIRED.
3. SERVICE LATERAL SHALL BE LAID AT THE MINIMUM SLOPE 0.02.
4. REMOVE AND REPLACE FENCE AS REQUIRED.
5. REMOVE AND REPLACE CULVERT AS REQUIRED.
6. REMOVE AND REPLACE CATCH BASIN AS REQUIRED.
7. REGRADE DRAINAGE DITCH TO ORIGINAL CONDITION.

The data on this map is the BEST INFORMATION AVAILABLE from the records of the City of Oregon City - errors and omissions may exist.

DRAWING REFERENCES

NOTE:
THE SYMBOLS LISTED ON THIS SHEET ARE TYPICAL SYMBOLS THAT MAY OR MAY NOT BE USED IN THIS SET OF PLANS. SPECIAL SYMBOLS WILL BE NOTED ON THE SHEETS THAT THEY APPLY TO.

1. DRAWINGS ARE CROSS REFERENCED IN THE FOLLOWING MANNER:
   (a) SECTION CUT ON DRAWING C08:
   1 / C09 — 1 = SECTION IDENTIFICATION; C09 = DRAWING ON WHICH SECTION APPEARS
   (b) ON DRAWING C09 THE SECTION IS IDENTIFIED AS:
   1 / C08 — 1 = SECTION IDENTIFICATION; C08 = DRAWING FROM WHICH THE SECTION WAS TAKEN
   (c) SECTION CUT AND SHOWN ON SAME DRAWING:
   1 / C09 — 1 = SECTION IDENTIFICATION; C09 = SAME DRAWING
2. PLANS, DETAILS AND ELEVATIONS ARE CROSS REFERENCED IN A SIMILIAR MANNER.
3. SECTION REFERENCED IN TEXT, "SEE [illegible]" OR DETAIL 5 ON DRAWING NUMBER [illegible]

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7080 S.W. Fir Loop
Portland, OR 97223

date	designed by	GM	
FEB. 1992	drawn by	GD	
scale	checked by	AS	
AS NOTED	approved by	JM	

REGISTERED PROFESSIONAL ENGINEER 14,162 OREGON — July 10, 1998
REGISTERED PROFESSIONAL ENGINEER 14,042 OREGON — July 10, 1998

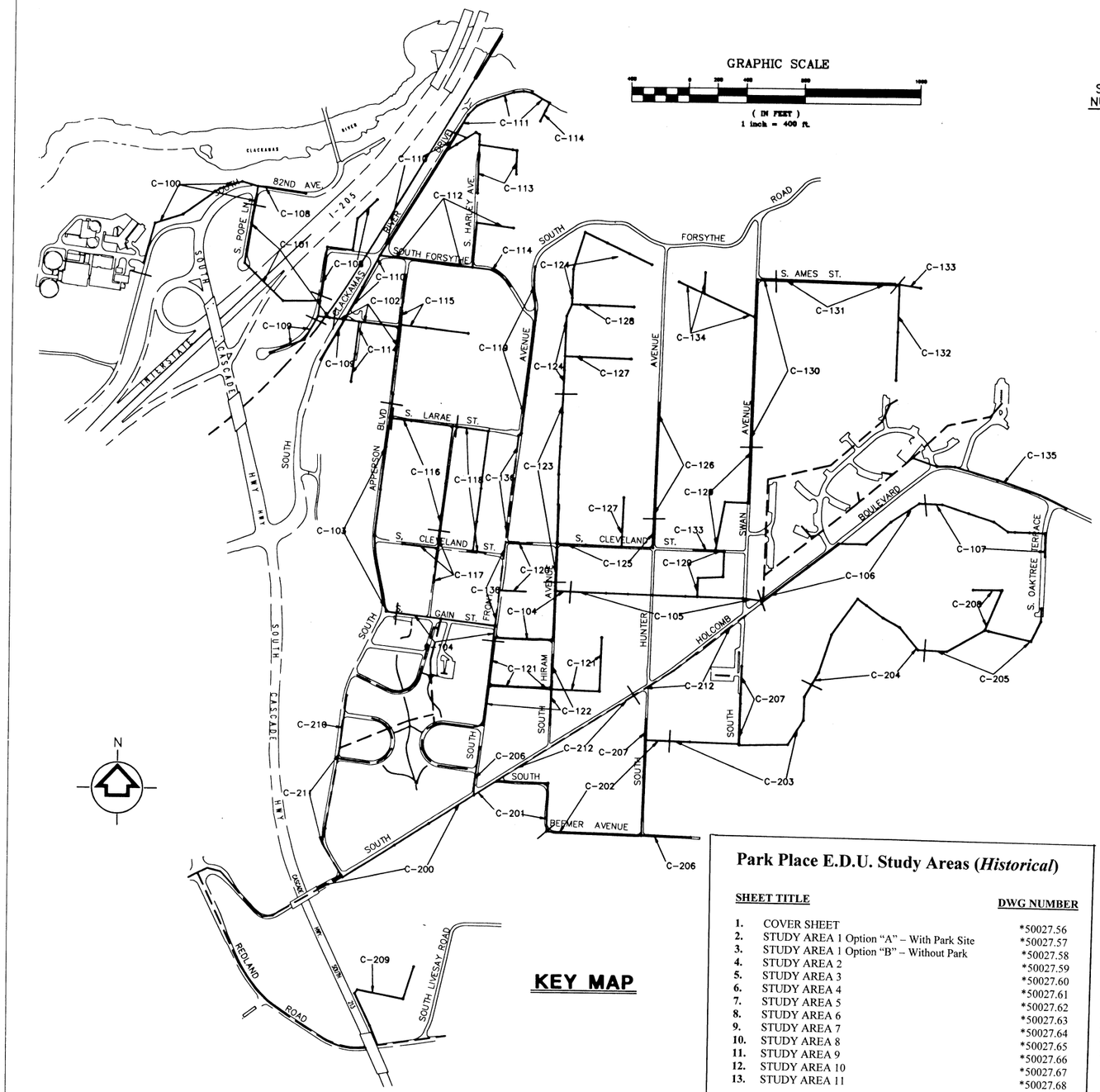
revisions
AS-BUILT 6/30/93

HOLCOMB - PARK PLACE
SANITARY SEWER COLLECTION SYSTEM
OREGON CITY, OREGON

COVER SHEET
VICINITY MAP / LOCATION MA
GENERAL NOTES / DRAWING R

Exhibit 6

Drawing is full size when 22"x 34" or is reduced to half size when 11"x17"



KEY MAP

INDEX TO DRAWINGS

SHEET NUMBER	DRAWING NUMBER	DRAWING TITLE
		GENERAL DRAWINGS
1	G-01	COVER SHEET/VICINITY MAP/DRAWING REFERENCE/LEGEND
2	G-02	INDEX TO DRAWINGS AND KEY MAP
3	G-03	SURVEY CONTROL AND MANHOLE COORDINATES
4	G-04	CIVIL DETAILS
5	G-05	CIVIL DETAILS
6	G-06	CIVIL DETAILS
		CIVIL – SCHEDULE A
7	C-100	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 0+00 TO 12+50
8	C-101	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 12+50 TO 24+50
9	C-102	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 24+50 TO 37+00
10	C-103	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 37+00 TO 51+00
11	C-104	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 51+00 TO 65+00
12	C-105	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 65+00 TO 79+00
13	C-106	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 79+00 TO 93+00
14	C-107	SCH A: K-INTERCEPTOR / PLAN AND PROFILE STA 93+00 TO END
15	C-108	SCH A: TRUNKS K-1 AND K-2 / PLAN AND PROFILE STA 0+00 TO END
16	C-109	SCH A: TRUNKS K-3 AND K-4 / PLAN AND PROFILE STA 0+00 TO END
17	C-110	SCH A: TRUNK 5-5 / PLAN AND PROFILE STA 0+00 TO 14+00
18	C-111	SCH A: TRUNK K-5 / PLAN AND PROFILE STA 14+00 TO END
19	C-112	SCH A: LATERAL K-5A / PLAN AND PROFILE STA 0+00 TO END
20	C-113	SCH A: LATERALS K-5B AND K-5B-1 / PLAN AND PROFILE STA 0+00 TO END
21	C-114	SCH A: TRUNK K-6/ PLAN AND PROFILE STA 0+00 TO END LATERALS K-5A-1 AND K-5C / PLAN AND PROFILE STA 0+00 TO END
22	C-115	SCH A: TRUNKS K-7 AND K-7A / PLAN AND PROFILE STA 0+00 TO END
23	C-116	SCH A: TRUNK K-8 / PLAN AND PROFILE STA 0+00 TO 11+50
24	C-117	SCH A: TRUNK K-8 / PLAN AND PROFILE STA 11+50 TO END TRUNK K-8B / PLAN AND PROFILE STA 0+00 TO END
25	C-118	SCH A: LATERALS K-8A AND K-8A-1 / PLAN AND PROFILE STA 0+00 TO END
26	C-119	SCH A: TRUNK K-9 / PLAN AND PROFILE STA 0+00 TO END
27	C-120	SCH A: LATERALS K-9A AND K-9B / PLAN AND PROFILE STA 0+00 TO END
28	C-121	SCH A: TRUNK K-10 / PLAN AND PROFILE STA 0+00 TO END
29	C-122	SCH A: LATERAL K-10A, K-10B, AND K-10C / PLAN AND PROFILE STA 0+00 TO END
30	C-123	SCH A: TRUNK K-11 / PLAN AND PROFILE STA 0+00 13+50
31	C-124	SCH A: TRUNK K-11 / PLAN AND PROFILE STA 13+50 TO END
32	C-125	SCH A: LATERAL K-11A / PLAN AND PROFILE STA 0+00 TO 9+00
33	C-126	SCH A: LATERAL K-11A / PLAN AND PROFILE STA 9+00 TO END
34	C-127	SCH A: LATERALS K-11A-1 AND K-11B / PLAN AND PROFILE STA 0+00 TO END
35	C-128	SCH A: LATERAL K-11C / PLAN AND PROFILE STA 0+00 TO END
36	C-129	SCH A: TRUNK K-12 / PLAN AND PROFILE STA 0+00 TO 14+00
37	C-130	SCH A: TRUNK K-12 / PLAN AND PROFILE STA 14+00 TO 28+00
38	C-131	SCH A: TRUNK K-12 / PLAN AND PROFILE STA 28+00 TO 37+50
39	C-132	SCH A: TRUNK K-12 / PLAN AND PROFILE STA 37+50 TO END
40	C-133	SCH A: LATERALS K-12A AND K-12C / PLAN AND PROFILE STA 0+00 TO END
41	C-134	SCH A: LATERALS K-12B AND K-12B-1 / PLAN AND PROFILE STA 0+00 TO END
42	C-135	SCH A: TRUNK K-13 / PLAN AND PROFILE STA 0+00 TO END
43	C-136	SCH A: TRUNK K-9 – NEW SEWER SERVICES ON EXISTING SEWER LINES STA 0+00 TO END
		CIVIL – SCHEDULE B
44	C-200	SCH B: H-INTERCEPTOR / PLAN AND PROFILE STA 0+00 TO END
45	C-201	SCH B: TRUNK H-3 / PLAN AND PROFILE STA 0+00 TO 9+50
46	C-202	SCH B: TRUNK H-3 / PLAN AND PROFILE STA 9+50 TO 23+00
47	C-203	SCH B: TRUNK H-3 / PLAN AND PROFILE STA 23+00 TO 34+50
48	C-204	SCH B: TRUNK H-3 / PLAN AND PROFILE STA 34+50 TO 48+00
49	C-205	SCH B: TRUNK H-3 / PLAN AND PROFILE STA 48+00 TO END
50	C-206	SCH B: LATERALS H-3A AND H-3B / PLAN AND PROFILE STA 0+00 TO END
51	C-207	SCH B: LATERALS H-3C AND H-3D / PLAN AND PROFILE STA 0+00 TO END
52	C-208	SCH B: LATERAL H-3E / PLAN AND PROFILE STA 0+00 TO END
53	C-209	SCH B: TRUNK H-1 / PLAN AND PROFILE STA 0+00 TO END
54	C-210	SCH B: LATERAL H-2A / PLAN AND PROFILE STA 0+00 TO END
55	C-211	SCH B: TRUNK H-2 – NEW SEWER SERVICES ON EXISTING SEWER LINES STA 0+00 TO END
56	C-212	SCH B: TRUNK H-4 – NEW SEWER SERVICES ON EXISTING SEWER LINES STA 0+00 TO END

AS-BUILT 6/30/93

Park Place E.D.U. Study Areas (*Historical*)

SHEET TITLE	DWG NUMBER
1. COVER SHEET	*50027.56
2. STUDY AREA 1 Option "A" – With Park Site	*50027.57
3. STUDY AREA 1 Option "B" – Without Park	*50027.58
4. STUDY AREA 2	*50027.59
5. STUDY AREA 3	*50027.60
6. STUDY AREA 4	*50027.61
7. STUDY AREA 5	*50027.62
8. STUDY AREA 6	*50027.63
9. STUDY AREA 7	*50027.64
10. STUDY AREA 8	*50027.65
11. STUDY AREA 9	*50027.66
12. STUDY AREA 10	*50027.67
13. STUDY AREA 11	*50027.68

* (See scanned)

50027.01

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date FEB. 1992	designed by	GM	
	drawn by	GD	
scale 1" = 400'	checked by	AS	
	approved by	JM	

REGISTERED PROFESSIONAL ENGINEER 14,162 OREGON JULY 26, 1978 STEPHEN C. WAGNER

REGISTERED PROFESSIONAL ENGINEER 14,043 OREGON JULY 26, 1978 GORDON A. MUNRO

revisions

HOLCOMB - PARK PLACE
SANITARY SEWER COLLECTION SYSTEM
OREGON CITY, OREGON

INDEX TO DRAWINGS
KEY MAP

This drawing is full size when 22"x 34" or is reduced to half size when 11"x17"

DRAWING NUMBER **50027.44**

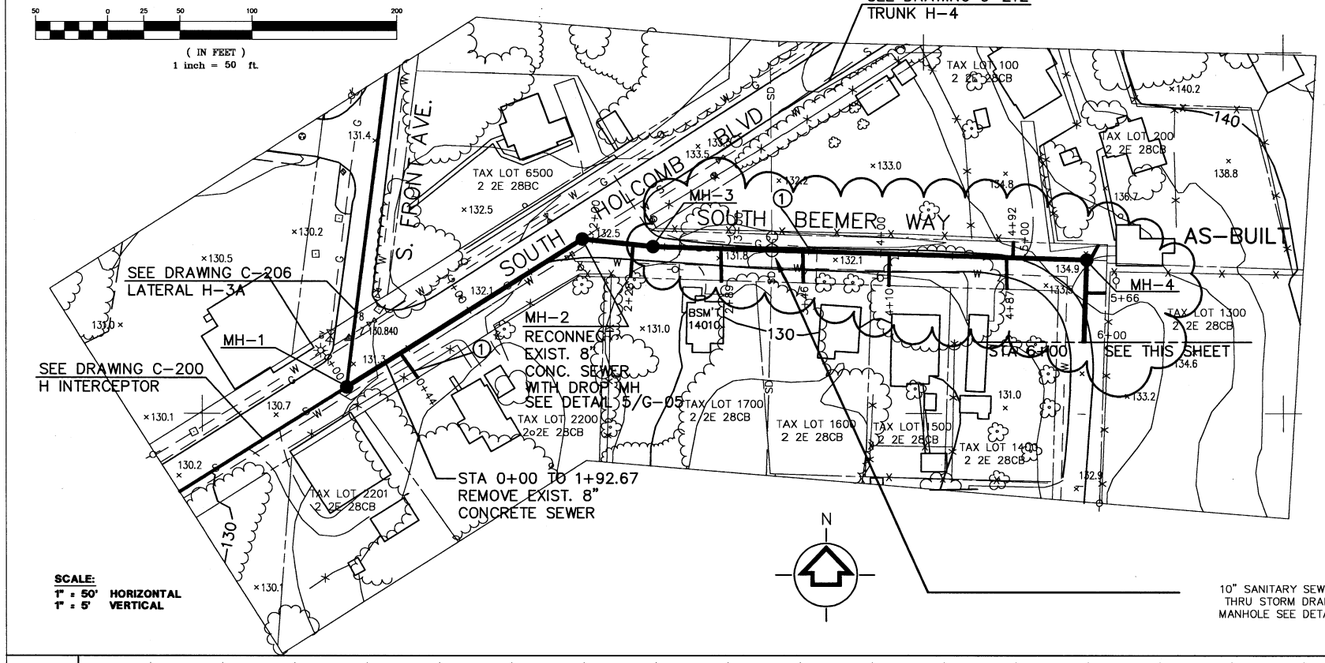
DRAWING NUMBER

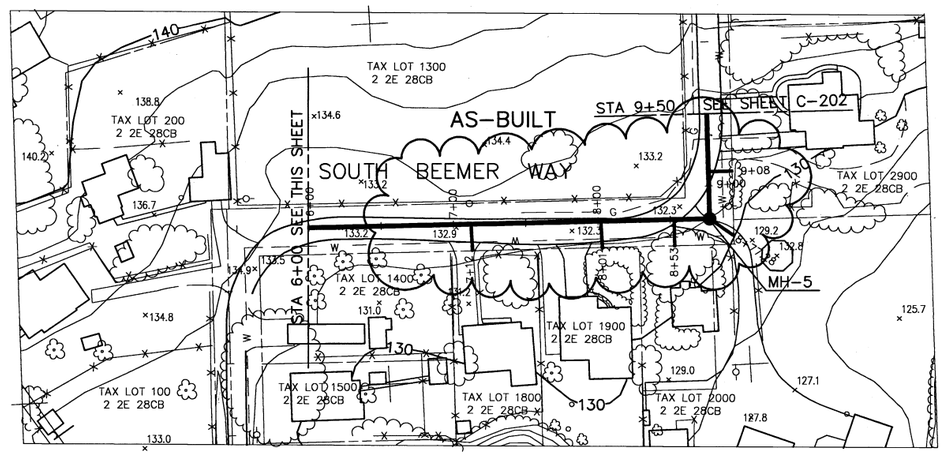
DRAWING NUMBER

GRAPHIC SCALE

50 0 25 50 100 200

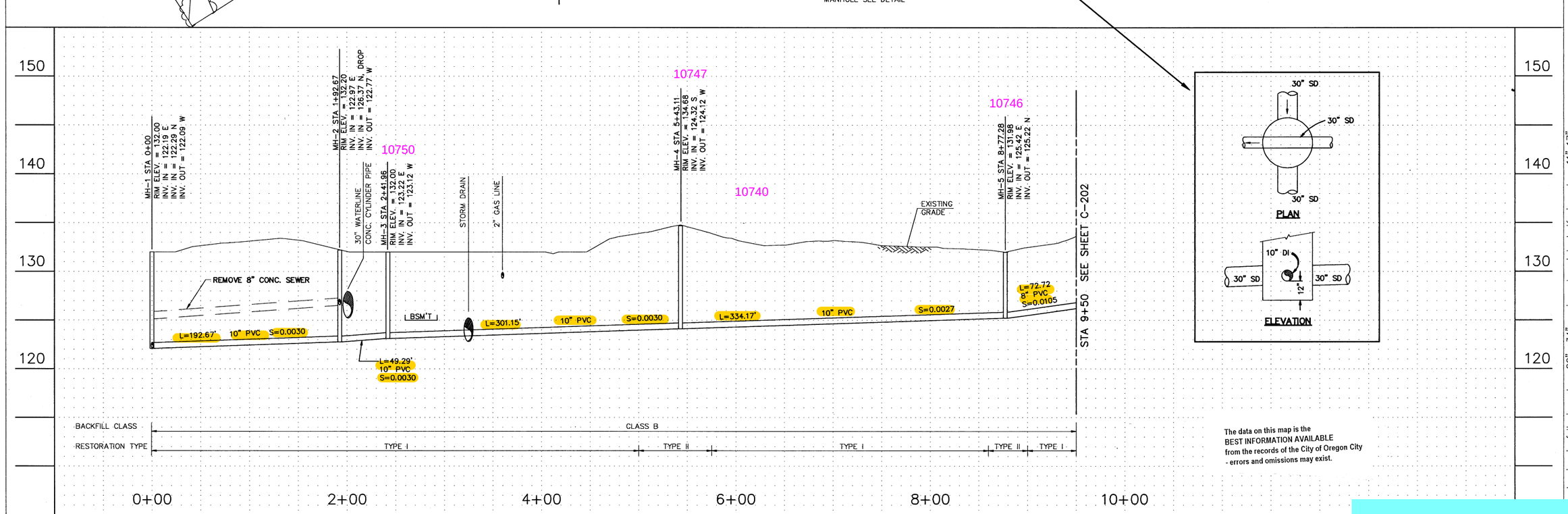
(IN FEET)
1 inch = 50 ft.





10" SANITARY SEWER THRU STORM DRAIN MANHOLE SEE DETAIL

SCALE:
1" = 50' HORIZONTAL
1" = 5' VERTICAL



The data on this map is the BEST INFORMATION AVAILABLE from the records of the City of Oregon City - errors and omissions may exist.

DRAWING NUMBER **C-201** sht. 45

KCM
Kramer, Chin, & Mayo, Inc.
7080 S.W. Fir Loop
Portland, OR 97223

date	FEB. 1992	designed by	GM
		drawn by	GD
scale	AS NOTED	checked by	AS
		approved by	JM

REGISTERED PROFESSIONAL ENGINEER 14,162 OREGON JULY 26, 1988 STEPHEN C. WAGNER
REGISTERED PROFESSIONAL ENGINEER 14,047 OREGON JULY 26, 1988 GORDON A. MUNRO

revisions
AS-BUILT 6/30/93

HOLCOMB - PARK PLACE
SANITARY SEWER COLLECTION SYSTEM
OREGON CITY, OREGON

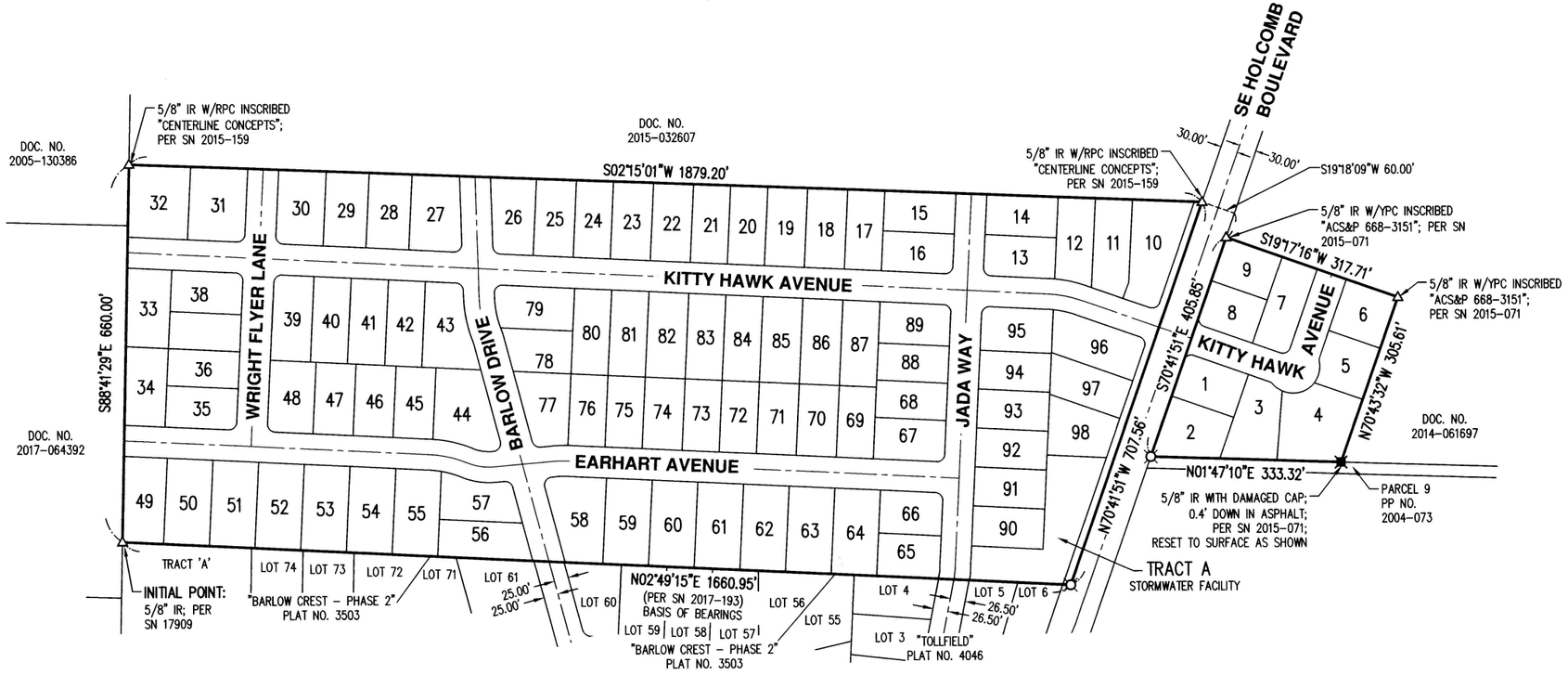
SCH. B - TRUNK H
PLAN & PROFILE
STA. 0+00 TO 9+

Exhibit 6

BOOK 149 PAGE 014
PLAT NO. 4543 SHEET 1 OF 8

ABERNETHY LANDING

LOCATED IN THE NORTHWEST 1/4 OF SECTION 27,
TOWNSHIP 2 SOUTH, RANGE 2 EAST, WILLAMETTE MERIDIAN,
CITY OF OREGON CITY, CLACKAMAS COUNTY, OREGON
OREGON CITY PLANNING FILE NO. TP 16-01
FEBRUARY 4, 2018



LEGEND

- ● 5/8" X 30" IRON ROD W/YPC INSCRIBED "AKS ENGR." SET DURING REMAINING MONUMENTATION ON: _____.
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- △ DENOTES FOUND MONUMENT AS NOTED; HELD UNLESS NOTED OTHERWISE
- DOC. NO. DOCUMENT NUMBER PER CLACKAMAS COUNTY DEED RECORDS

SHEET INDEX

SHEET 1 - OVERALL MAP, LEGEND
SHEET 2 - LOTS 27-33, 37-43, LEGEND, CURVE TABLE
SHEET 3 - LOTS 15-26, 78-89, LEGEND, CURVE TABLE
SHEET 4 - LOTS 5-14, LEGEND, CURVE TABLE
SHEET 5 - LOTS 1-4, 90-98, TRACT A, LEGEND, CURVE TABLE
SHEET 6 - LOTS 58-77, LEGEND, CURVE TABLE
SHEET 7 - LOTS 34-36, 44-57, LEGEND, CURVE TABLE
SHEET 8 - CITY OF OREGON CITY APPROVALS, CLACKAMAS COUNTY APPROVALS, DECLARATION, ACKNOWLEDGEMENT, NARRATIVE, PLAT NOTES, SURVEYOR'S CERTIFICATE

SCALE 1" = 150 FEET
150 0 60 90 120 150

Exhibit 7

PREPARED FOR

ABERNETHY LANDING, LLC
604 W EVERGREEN BLVD
VANCOUVER, WA 98660

4-19-18
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/19

JOB NAME:	HOLCOMB
JOB NUMBER:	5377
DRAWN BY:	BRH
CHECKED BY:	RDR
DRAWING NO.:	5377CROS

AKS ENGINEERING AND FORESTRY, LLC
12965 SW HERMAN RD
SUITE 100
TUALATIN, OR 97062
PHONE: 503.563.6151
FAX: 503.563.6152

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BOOK 149 PAGE 014
PLAT NO. 4543 SHEET 2 OF 8

ABERNETHY LANDING

LOCATED IN THE NORTHWEST 1/4 OF SECTION 27,
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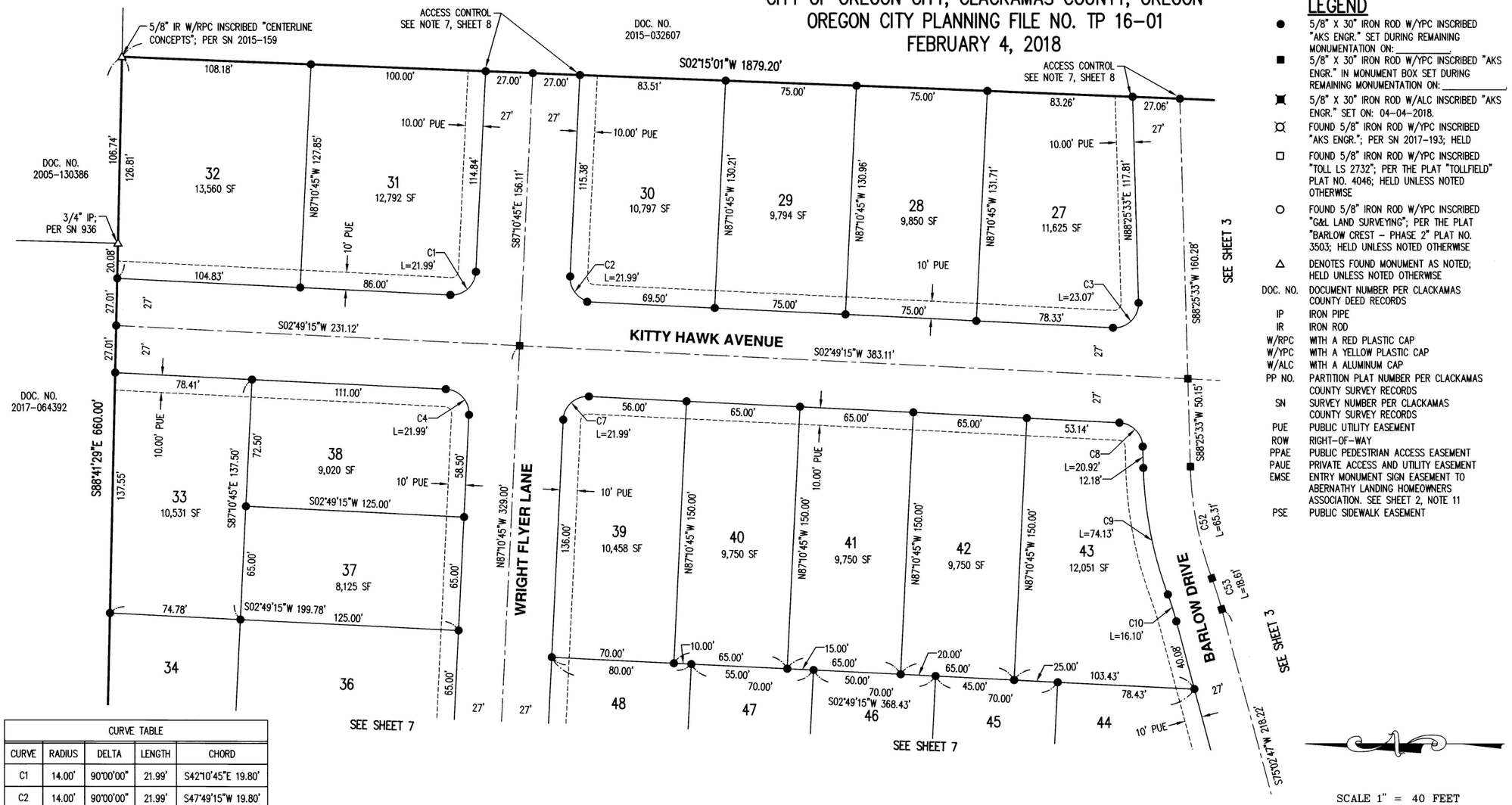

CURVE TABLE				
CURVE	RADIUS	DELTA	LENGTH	CHORD
C1	14.00'	90°00'00"	21.99'	S42°10'45"E 19.80'
C2	14.00'	90°00'00"	21.99'	S47°49'15"W 19.80'
C3	14.00'	94°23'42"	23.07'	S44°22'36"E 20.54'
C4	14.00'	90°00'00"	21.99'	N47°49'15"E 19.80'
C7	14.00'	90°00'00"	21.99'	N42°10'45"W 19.80'
C8	14.00'	85°36'18"	20.92'	N45°37'24"E 19.03'
C9	227.00'	18°42'40"	74.13'	S79°04'13"W 73.80'
C10	173.00'	5°19'53"	16.10'	N72°22'50"E 16.09'
C52	200.00'	18°42'40"	65.31'	N79°04'13"E 65.02'
C53	200.00'	5°19'53"	18.61'	N72°22'50"E 18.60'

LEGEND

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IR	IRON ROD
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W/YPC	WITH A YELLOW PLASTIC CAP
W/ALC	WITH A ALUMINUM CAP
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SN	SURVEY NUMBER PER CLACKAMAS COUNTY SURVEY RECORDS
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ROW	RIGHT-OF-WAY
PPAE	PUBLIC PEDESTRIAN ACCESS EASEMENT
PAUE	PRIVATE ACCESS AND UTILITY EASEMENT
EMSE	ENTRY MONUMENT SIGN EASEMENT TO ABERNATHY LANDING HOMEOWNERS ASSOCIATION. SEE SHEET 2, NOTE 11
PSE	PUBLIC SIDEWALK EASEMENT

SCALE 1" = 40 FEET
40 0 16 24 32 40

Exhibit 7

PREPARED FOR
ABERNETHY LANDING, LLC
604 W EVERGREEN BLVD
VANCOUVER, WA 98660

4-19-18
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/19

JOB NAME:	HOLCOMB
JOB NUMBER:	5377
DRAWN BY:	BRH
CHECKED BY:	RDR
DRAWING NO.:	5377CROS

AKS ENGINEERING AND FORESTRY, LLC
12965 SW HERMAN RD
SUITE 100
TUALATIN, OR 97062
PHONE: 503.563.6151
FAX: 503.563.6152
AKS
ENGINEERING · PLANNING · SURVEYING
FORESTRY · LANDSCAPE ARCHITECTURE

ABERNETHY LANDING

LOCATED IN THE NORTHWEST 1/4 OF SECTION 27,
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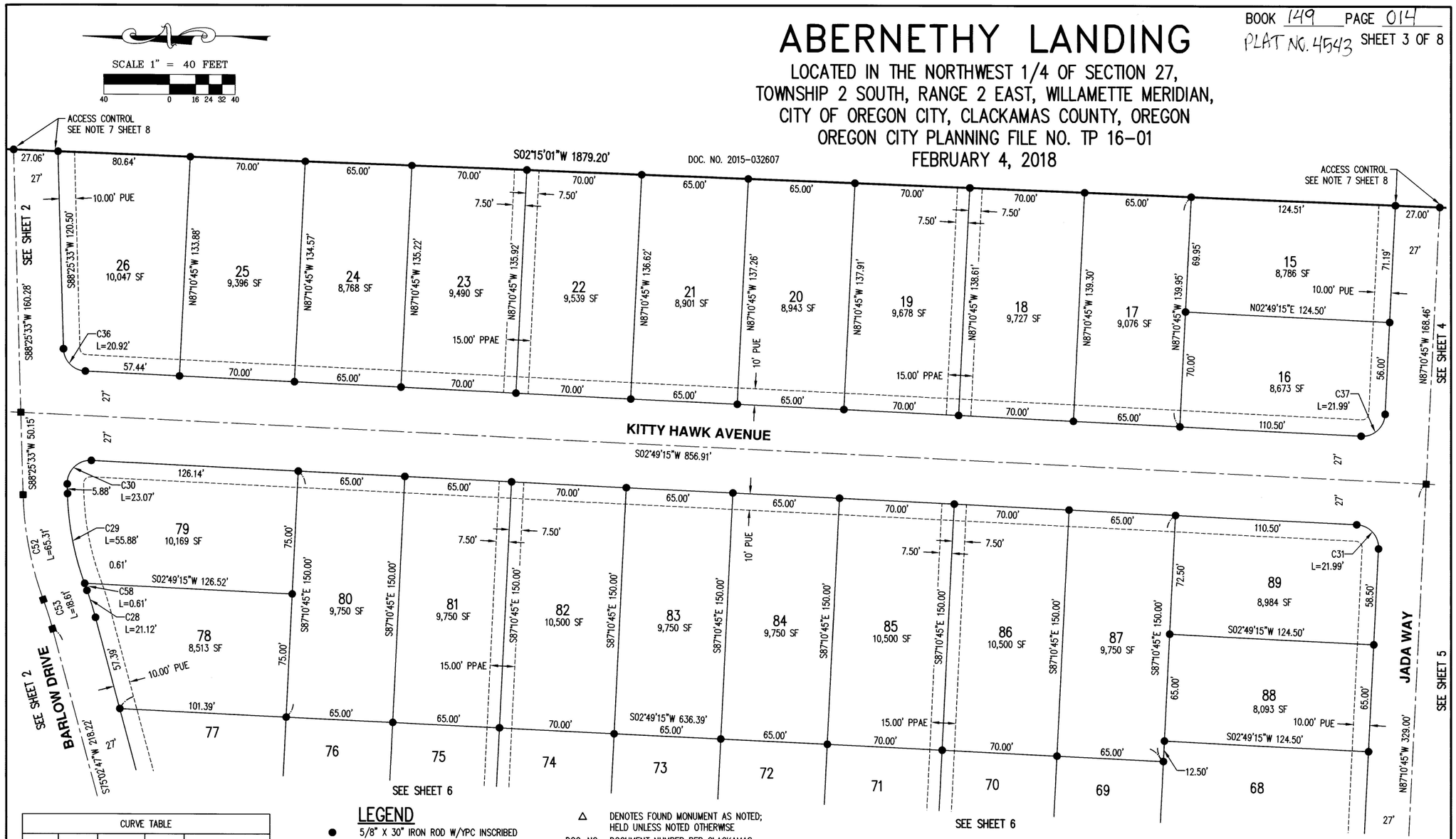
OREGON CITY PLANNING FILE NO. TP 16-01
FEBRUARY 4, 2018

BOOK 149 PAGE 014
PLAT NO. 4543 SHEET 3 OF 8

SCALE 1" = 40 FEET
40 0 16 24 32 40



CURVE TABLE				
CURVE	RADIUS	DELTA	LENGTH	CHORD
C28	227.00'	5°19'53"	21.12'	N72°22'50"E 21.12'
C29	173.00'	18°30'28"	55.88'	S79°10'19"W 55.64'
C30	14.00'	94°23'42"	23.07'	N44°22'36"W 20.54'
C31	14.00'	90°00'00"	21.99'	N47°49'15"E 19.80'
C36	14.00'	85°36'18"	20.92'	S45°37'24"W 19.03'
C37	14.00'	90°00'00"	21.99'	S42°10'45"E 19.80'
C52	200.00'	18°42'40"	65.31'	N79°04'13"E 65.02'
C53	200.00'	5°19'53"	18.61'	N72°22'50"E 18.60'
C58	173.00'	0°12'11"	0.61'	S69°48'59"W 0.61'

LEGEND

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PAUE	PRIVATE ACCESS AND UTILITY EASEMENT
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PSE	PUBLIC SIDEWALK EASEMENT

4-19-18
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/19

Exhibit 7

PREPARED FOR
ABERNETHY LANDING, LLC
604 W EVERGREEN BLVD
VANCOUVER, WA 98660

JOB NAME:	HOLCOMB
JOB NUMBER:	5377
DRAWN BY:	BRH
CHECKED BY:	RDR
DRAWING NO.:	5377CROS

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TUALATIN, OR 97062
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FAX: 503.563.6152
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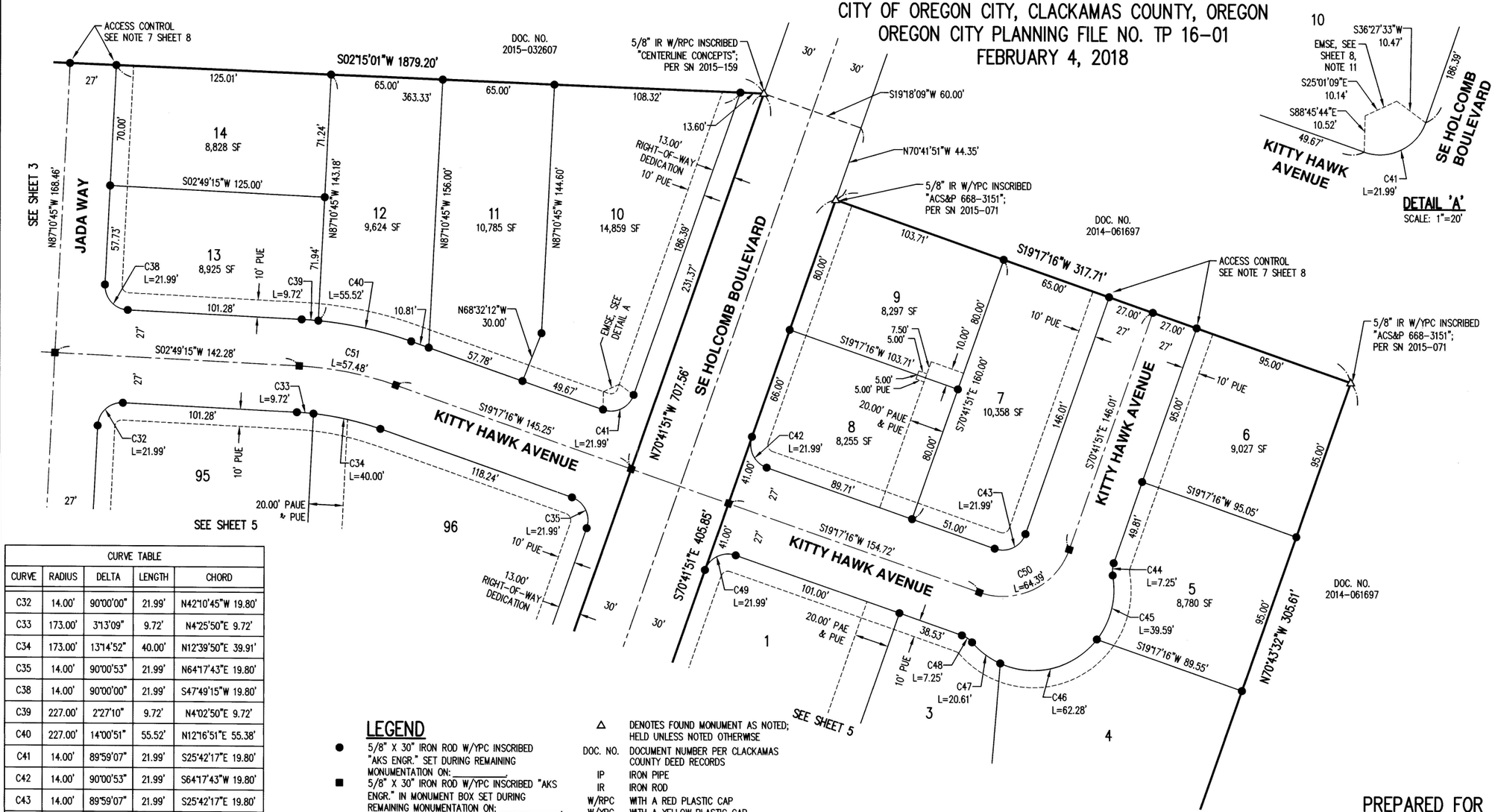
FORESTRY · LANDSCAPE ARCHITECTURE

ABERNETHY LANDING

BOOK 149 PAGE 014
PLAT NO. 4543 SHEET 4 OF 8

LOCATED IN THE NORTHWEST 1/4 OF SECTION 27,
TOWNSHIP 2 SOUTH, RANGE 2 EAST, WILLAMETTE MERIDIAN,
CITY OF OREGON CITY, CLACKAMAS COUNTY, OREGON
OREGON CITY PLANNING FILE NO. TP 16-01
FEBRUARY 4, 2018

SCALE 1" = 40 FEET



CURVE TABLE				
CURVE	RADIUS	DELTA	LENGTH	CHORD
C32	14.00'	90°00'00"	21.99'	N42°10'45"W 19.80'
C33	173.00'	3°13'09"	9.72'	N4°25'50"E 9.72'
C34	173.00'	13°14'52"	40.00'	N12°39'50"E 39.91'
C35	14.00'	90°00'53"	21.99'	N64°17'43"E 19.80'
C38	14.00'	90°00'00"	21.99'	S47°49'15"W 19.80'
C39	227.00'	2°27'10"	9.72'	N4°02'50"E 9.72'
C40	227.00'	14°00'51"	55.52'	N12°16'51"E 55.38'
C41	14.00'	89°59'07"	21.99'	S25°42'17"E 19.80'
C42	14.00'	90°00'53"	21.99'	S64°17'43"W 19.80'
C43	14.00'	89°59'07"	21.99'	S25°42'17"E 19.80'
C44	14.00'	29°39'54"	7.25'	N85°31'48"W 7.17'
C45	47.00'	48°16'04"	39.59'	S76°13'43"E 38.43'
C46	47.00'	75°55'15"	62.28'	S14°08'04"E 57.82'
C47	47.00'	25°07'41"	20.61'	S36°23'23"W 20.45'
C48	14.00'	29°39'57"	7.25'	N34°07'15"E 7.17'
C49	14.00'	89°59'07"	21.99'	N25°42'17"W 19.80'
C50	41.00'	89°59'07"	64.39'	S25°42'17"E 57.98'
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4-19-18
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON JULY 15, 2003 MONTGOMERY B. HURLEY 58542LS
RENEWS: 6/30/19

Exhibit 7

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604 W EVERGREEN BLVD
VANCOUVER, WA 98660

JOB NAME:	HOLCOMB
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BOOK 149 PAGE 0184
PLAT NO. 4543 SHEET 5 OF 8

ABERNETHY LANDING

LOCATED IN THE NORTHWEST 1/4 OF SECTION 27,
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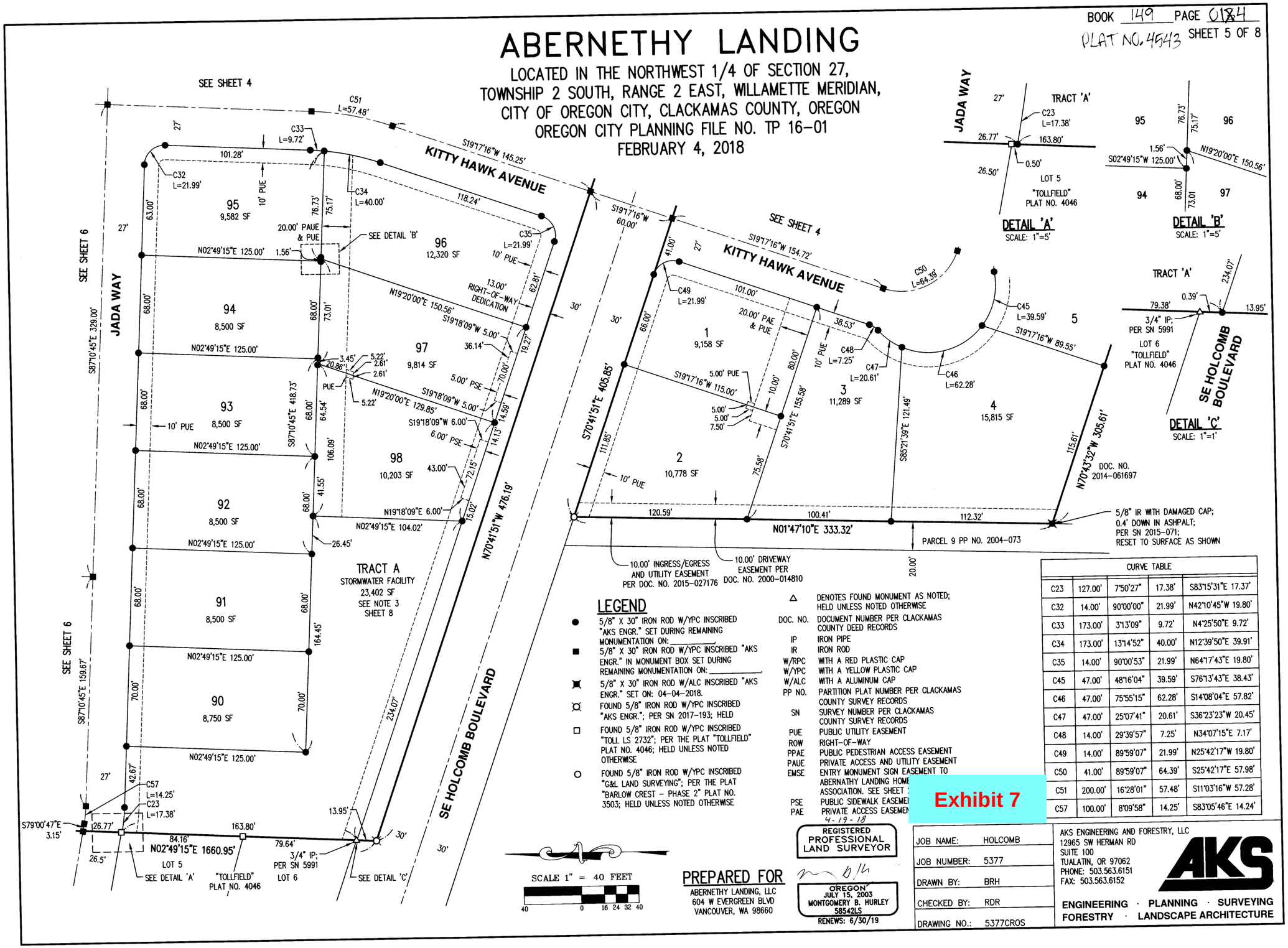

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C50	41.00'	89°59'07"	64.39'	S25°42'17"E 57.98'
C51	200.00'	16°28'01"	57.48'	S11°03'16"W 57.28'
C57	100.00'	8°09'58"	14.25'	S83°05'46"E 14.24'

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ABERNETHY LANDING, LLC
604 W EVERGREEN BLVD
VANCOUVER, WA 98660

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BOOK 149 PAGE 014
PLAT NO. 4543 SHEET 6 OF 8

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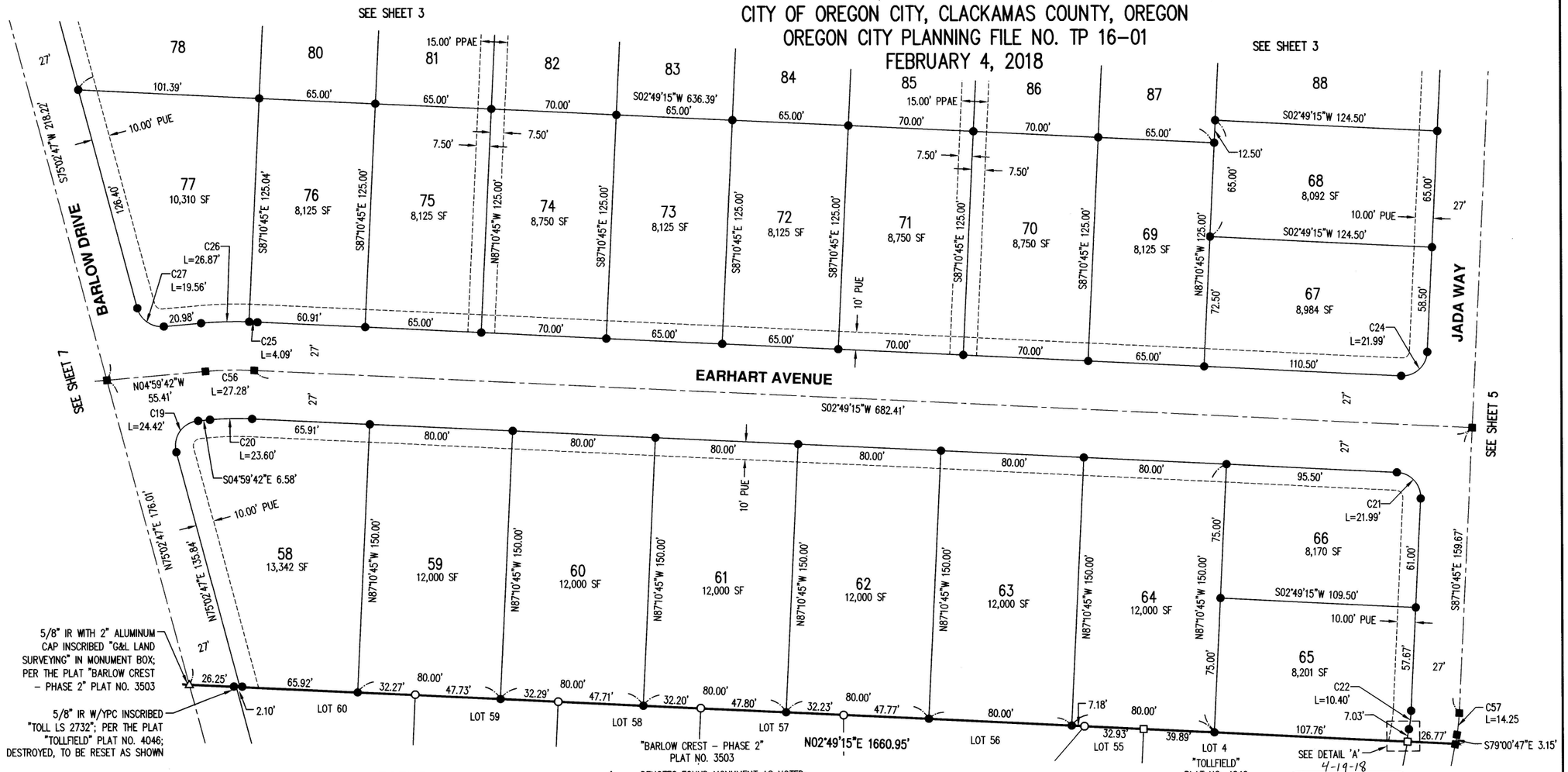
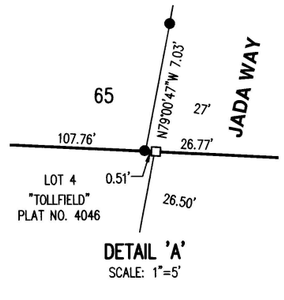
SCALE 1" = 40 FEET
40 0 16 24 32 40



CURVE TABLE				
C19	14.00'	99°57'31"	24.42'	N54°58'28"W 21.44'
C20	173.00'	7°48'57"	23.60'	N1°05'13"W 23.58'
C21	14.00'	90°00'00"	21.99'	N47°49'15"E 19.80'
C22	73.00'	8°09'58"	10.40'	S83°05'46"E 10.40'
C24	14.00'	90°00'00"	21.99'	S42°10'45"E 19.80'
C25	227.00'	1°01'58"	4.09'	N2°18'16"E 4.09'
C26	227.00'	6°46'59"	26.87'	N1°36'12"W 26.86'
C27	14.00'	80°02'29"	19.56'	S35°01'32"W 18.01'
C56	200.00'	7°48'57"	27.28'	N1°05'13"W 27.26'
C57	100.00'	8°09'58"	14.25'	S83°05'46"E 14.24'

LEGEND

- ● 5/8" X 30" IRON ROD W/YPC INSCRIBED "AKS ENGR." SET DURING REMAINING MONUMENTATION ON: _____.
- ■ 5/8" X 30" IRON ROD W/YPC INSCRIBED "AKS ENGR." IN MONUMENT BOX SET DURING REMAINING MONUMENTATION ON: _____.
- ⧓ 5/8" X 30" IRON ROD W/ALC INSCRIBED "AKS ENGR." SET ON: 04-04-2018.
- ⊗ FOUND 5/8" IRON ROD W/YPC INSCRIBED "AKS ENGR."; PER SN 2017-193; HELD
- □ FOUND 5/8" IRON ROD W/YPC INSCRIBED "TOLL LS 2732"; PER THE PLAT "TOLLFIELD" PLAT NO. 4046; HELD UNLESS NOTED OTHERWISE
- ○ FOUND 5/8" IRON ROD W/YPC INSCRIBED "G&L LAND SURVEYING"; PER THE PLAT "BARLOW CREST – PHASE 2" PLAT NO. 3503; HELD UNLESS NOTED OTHERWISE
- △ DENOTES FOUND MONUMENT AS NOTED; HELD UNLESS NOTED OTHERWISE
- DOC. NO. DOCUMENT NUMBER PER CLACKAMAS COUNTY DEED RECORDS
- IP IRON PIPE
- IR IRON ROD
- W/RPC WITH A RED PLASTIC CAP
- W/YPC WITH A YELLOW PLASTIC CAP
- W/ALC WITH A ALUMINUM CAP
- PP NO. PARTITION PLAT NUMBER PER CLACKAMAS COUNTY SURVEY RECORDS
- SN SURVEY NUMBER PER CLACKAMAS COUNTY SURVEY RECORDS
- PUE PUBLIC UTILITY EASEMENT
- ROW RIGHT-OF-WAY
- PPAE PUBLIC PEDESTRIAN ACCESS EASEMENT
- PAUE PRIVATE ACCESS AND UTILITY EASEMENT
- EMSE ENTRY MONUMENT SIGN EASEMENT TO ABERNATHY LANDING HOMEOWNERS ASSOCIATION. SEE SHEET 2, NOTE 11
- PSE PUBLIC SIDEWALK EASEMENT



DETAIL 'A'
SCALE: 1"=5'

4-19-18
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/19

Exhibit 7

PREPARED FOR
ABERNETHY LANDING, LLC
604 W EVERGREEN BLVD
VANCOUVER, WA 98660

JOB NAME:	HOLCOMB
JOB NUMBER:	5377
DRAWN BY:	BRH
CHECKED BY:	RDR
DRAWING NO.:	5377CROS

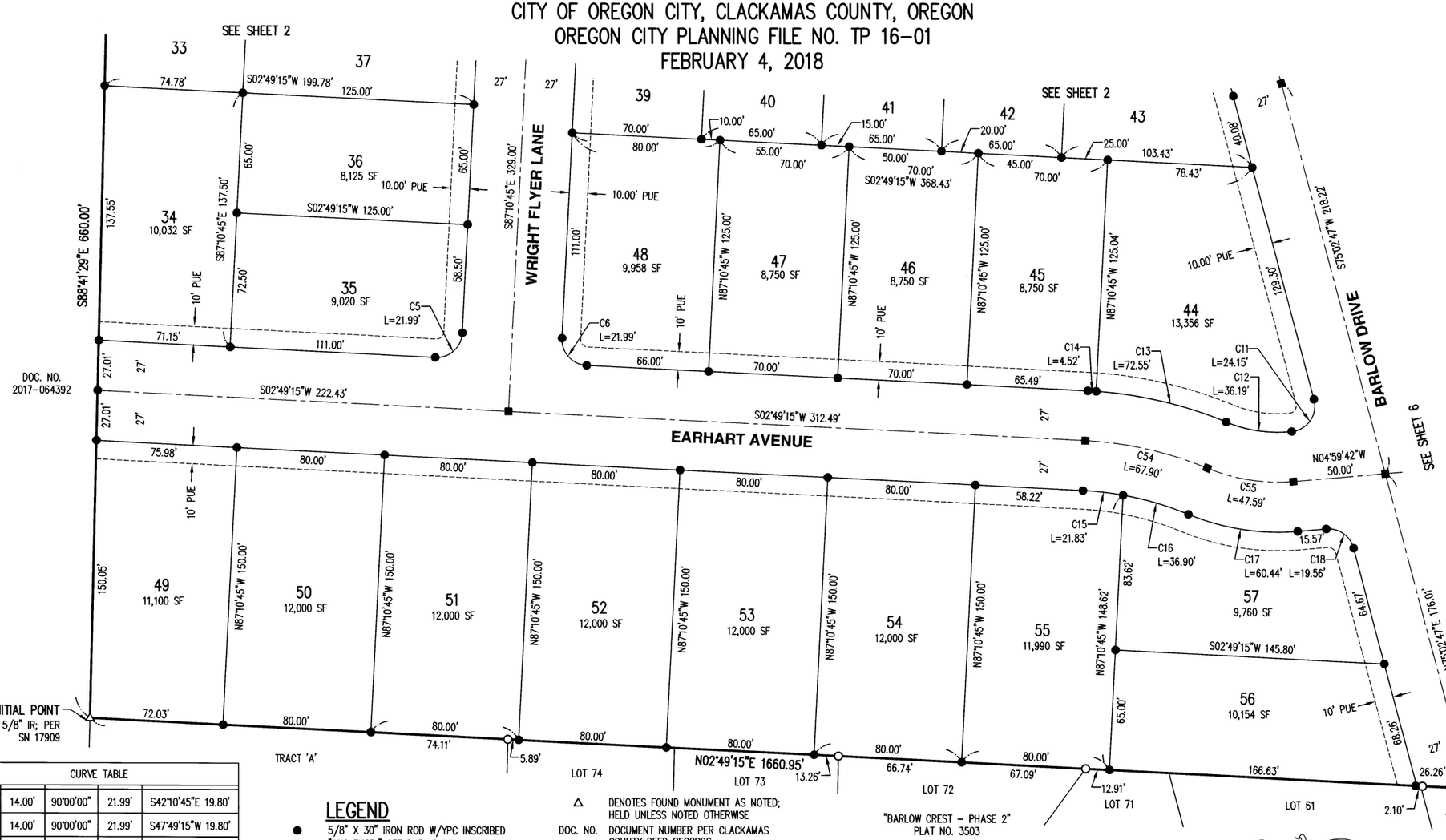
AKS ENGINEERING AND FORESTRY, LLC
12965 SW HERMAN RD
SUITE 100
TUALATIN, OR 97062
PHONE: 503.563.6151
FAX: 503.563.6152

AKS
ENGINEERING · PLANNING · SURVEYING
FORESTRY · LANDSCAPE ARCHITECTURE

ABERNETHY LANDING

BOOK 149 PAGE 014
PLAT NO. 4543 SHEET 7 OF 8

LOCATED IN THE NORTHWEST 1/4 OF SECTION 27,
TOWNSHIP 2 SOUTH, RANGE 2 EAST, WILLAMETTE MERIDIAN,
CITY OF OREGON CITY, CLACKAMAS COUNTY, OREGON
OREGON CITY PLANNING FILE NO. TP 16-01
FEBRUARY 4, 2018



CURVE TABLE				
C5	14.00'	90°00'00"	21.99'	S42°10'45"E 19.80'
C6	14.00'	90°00'00"	21.99'	S47°49'15"W 19.80'
C11	14.00'	98°49'15"	24.15'	S55°32'36"E 21.26'
C12	73.00'	28°24'16"	36.19'	S8°04'09"W 35.82'
C13	227.00'	18°18'40"	72.55'	N13°06'57"E 72.24'
C14	227.00'	1°08'23"	4.52'	N3°23'26"E 4.51'
C15	173.00'	7°13'52"	21.83'	N6°26'11"E 21.82'
C16	173.00'	12°13'10"	36.90'	N16°09'42"E 36.83'
C17	127.00'	27°15'59"	60.44'	S8°38'18"W 59.87'
C18	14.00'	80°02'29"	19.56'	N35°01'32"E 18.01'
C54	200.00'	19°27'02"	67.90'	N12°32'46"E 67.57'
C55	100.00'	27°15'59"	47.59'	N8°38'18"E 47.14'

LEGEND

- ● 5/8" X 30" IRON ROD W/YPC INSCRIBED "AKS ENGR." SET DURING REMAINING MONUMENTATION ON: _____.
- ■ 5/8" X 30" IRON ROD W/YPC INSCRIBED "AKS ENGR." IN MONUMENT BOX SET DURING REMAINING MONUMENTATION ON: _____.
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- ○ FOUND 5/8" IRON ROD W/YPC INSCRIBED "G&L LAND SURVEYING"; PER THE PLAT "BARLOW CREST - PHASE 2" PLAT NO. 3503; HELD UNLESS NOTED OTHERWISE
- △ DENOTES FOUND MONUMENT AS NOTED; HELD UNLESS NOTED OTHERWISE

DOC. NO.	DOCUMENT NUMBER PER CLACKAMAS COUNTY DEED RECORDS
IP	IRON PIPE
IR	IRON ROD
W/RPC	WITH A RED PLASTIC CAP
W/YPC	WITH A YELLOW PLASTIC CAP
W/ALC	WITH A ALUMINUM CAP
PP NO.	PARTITION PLAT NUMBER PER CLACKAMAS COUNTY SURVEY RECORDS
SN	SURVEY NUMBER PER CLACKAMAS COUNTY SURVEY RECORDS
PUE	PUBLIC UTILITY EASEMENT
ROW	RIGHT-OF-WAY
PPAE	PUBLIC PEDESTRIAN ACCESS EASEMENT
PAUE	PRIVATE ACCESS AND UTILITY EASEMENT
EMSE	ENTRY MONUMENT SIGN EASEMENT TO ABERNATHY LANDING HOMEOWNERS ASSOCIATION. SEE SHEET 2, NOTE 11
PSE	PUBLIC SIDEWALK EASEMENT

SCALE 1" = 40 FEET
40 0 16 24 32 40

PREPARED FOR
ABERNETHY LANDING, LLC
604 W EVERGREEN BLVD
VANCOUVER, WA 98660

Exhibit 7

4-19-18
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/19

JOB NAME:	HOLCOMB
JOB NUMBER:	5377
DRAWN BY:	BRH
CHECKED BY:	RDR
DRAWING NO.:	5377CROS

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AKS
ENGINEERING · PLANNING · SURVEYING
FORESTRY · LANDSCAPE ARCHITECTURE

ABERNETHY LANDING

LOCATED IN THE NORTHWEST 1/4 OF SECTION 27,
TOWNSHIP 2 SOUTH, RANGE 2 EAST, WILLAMETTE MERIDIAN,
CITY OF OREGON CITY, CLACKAMAS COUNTY, OREGON
OREGON CITY PLANNING FILE NO. TP 16-01
FEBRUARY 4, 2018

CITY OF OREGON CITY APPROVALS

APPROVED THIS 6th DAY OF July, 2018

BY: Alta Froman Goodrich, P.E.
OREGON CITY - CITY ENGINEER

****

APPROVED THIS 19 DAY OF June, 2018

BY: _____
OREGON CITY PLANNING MANAGER

CLACKAMAS COUNTY APPROVALS

APPROVED THIS 11th DAY OF July, 2018
CLACKAMAS COUNTY ROAD OFFICIAL

BY: _____
DEPUTY

****

APPROVED THIS 17th DAY OF July, 2018

_____
CLACKAMAS COUNTY SURVEYOR; AND CLACKAMAS COUNTY BOARD OF COMMISSIONERS DELEGATE PER COUNTY CODE CHAPTER 11.02

****

ALL TAXES, FEES, ASSESSMENTS, OR OTHER CHARGES AS PROVIDED BY O.R.S. 92.095 HAVE BEEN PAID THROUGH JUNE 30 2019
APPROVED THIS 12 DAY OF JULY, 2018

CLACKAMAS COUNTY ASSESSOR AND TAX COLLECTOR

BY: Craig Zuvers
DEPUTY

****

STATE OF OREGON)
COUNTY OF CLACKAMAS) SS

I DO HEREBY CERTIFY THAT THE ATTACHED PLAT WAS RECEIVED FOR RECORD ON THE 17TH DAY OF JULY, 2018
AT 3:17 O'CLOCK P M

AS PLAT NO. 4543

DOCUMENT NO. 2018-44361

SHERRY HALL,
CLACKAMAS COUNTY CLERK

BY: _____
DEPUTY

REMAINING CORNER MONUMENTATION

IN ACCORDANCE WITH O.R.S. 92.070, THE REMAINING CORNERS OF THIS SUBDIVISION HAVE BEEN CORRECTLY SET WITH THE PROPER MONUMENTS. AN AFFIDAVIT HAS BEEN PREPARED REGARDING THE SETTING OF SAID MONUMENTS AND IS RECORDED IN DOCUMENT NO. _____, CLACKAMAS COUNTY DEED RECORDS.

APPROVED THIS _____ DAY OF _____, 20___.

_____
CLACKAMAS COUNTY SURVEYOR

DECLARATION

KNOW ALL PEOPLE BY THESE PRESENTS THAT ABERNETHY LANDING, LLC, AN OREGON LIMITED LIABILITY COMPANY, OWNER OF THE LAND DEPICTED HEREON, DOES HEREBY MAKE, ESTABLISH, AND DECLARE THE ANNEXED PLAT OF "ABERNETHY LANDING" AS DESCRIBED IN THE ACCOMPANYING SURVEYOR'S CERTIFICATE TO BE A TRUE AND CORRECT MAP AND PLAT THEREOF, ALL LOTS AND TRACTS BEING OF THE DIMENSIONS SHOWN HEREON AND ALL STREETS OF THE WIDTHS THEREON SET FORTH, AND DOES HEREBY DEDICATE TO THE PUBLIC AS PUBLIC WAYS FOREVER, ALL STREETS, AND DOES HEREBY CREATE AND ESTABLISH PRIVATE EASEMENTS AS SHOWN, NOTED, OR STATED ON SAID MAP FOR THE USES INDICATED, AND DOES HEREBY GRANT ALL PUBLIC EASEMENTS AS SHOWN, NOTED, OR STATED ON SAID MAP, AND HEREBY CONVEYS TRACT A, STORMWATER FACILITY BY SEPARATE DEED DOCUMENT TO THE CITY OF OREGON CITY FOR THE USES INDICATED. THE DECLARANT DOES FURTHER STATE THAT THE PROPERTY PLATTED HEREIN IS SUBJECT TO PLAT RESTRICTIONS AS NOTED, ALL IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 92 OF THE OREGON REVISED STATUTES. THE DECLARANT MAKES NO CLAIM TO LAND BEYOND THE BOUNDARY AS MONUMENTED.

_____
GREG KUBICEK, MANAGER
ABERNETHY LANDING, LLC

ACKNOWLEDGMENT

STATE OF ~~OREGON~~ WASHINGTON)
COUNTY OF CLARK) SS

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON THIS 21 DAY OF MAY, 2018, BY GREG KUBICEK, MANAGER OF ABERNETHY LANDING, LLC, AN OREGON LIMITED LIABILITY COMPANY

NOTARY SIGNATURE Chantell A. Wilsey

NOTARY PUBLIC - ~~OREGON~~ WASHINGTON Chantell A. Wilsey

COMMISSION NUMBER 197731

MY COMMISSION EXPIRES 02/01/2022

PLAT NOTES

1. THIS PLAT IS SUBJECT TO CONDITIONS OF APPROVAL PER CITY OF OREGON CITY FILE NUMBER TP 16-01.
2. A 10-FOOT PUBLIC UTILITY EASEMENT SHALL EXIST ALONG THE FRONTAGE OF ALL LOTS ABUTTING A PUBLIC STREET FOR CONSTRUCTION AND MAINTENANCE OF NATURAL GAS, COMMUNICATIONS, ELECTRICAL SERVICES AND OTHER FRANCHISE UTILITIES THAT MAY BE PERMITTED BY THE CITY AND SHALL BE FOR EXCLUSIVE USE OF PERMITTED FRANCHISE UTILITIES. CITY OF OREGON CITY AND PERMITTED FRANCHISE UTILITIES SHALL RETAIN THE RIGHT OF ENTRY TO ENTER EASEMENT PROPERTY AT ANY TIME FOR PURPOSES OF THE EASEMENT.
3. TRACT A IS STORMWATER FACILITY TO BE MAINTAINED BY THE CITY OF OREGON CITY AND IS CONVEYED TO THE CITY OF OREGON CITY BY SEPARATE DEED DOCUMENT NUMBER 2018-044364, CLACKAMAS COUNTY DEED RECORDS.
4. THIS PLAT IS SUBJECT TO COVENANTS, CONDITIONS, AND RESTRICTIONS PER DOCUMENT NUMBER 2018-044365, CLACKAMAS COUNTY DEED RECORDS.
5. LOTS 1, 2, 8, 9 & 96-98 ARE SUBJECT TO A PRIVATE DRIVEWAY APPROACH MAINTENANCE AGREEMENT PER DOCUMENT NUMBER 2018-044363, CLACKAMAS COUNTY DEED RECORDS.
6. DOCUMENT NUMBER 2016-089045 SHALL EXPIRE UPON RECORDING OF THIS PLAT.
7. THE ACCESS CONTROL SHOWN AT THE END OF PUBLIC ROADS HEREON ARE CREATED IN FAVOR OF THE CITY OF OREGON CITY. THIS RESTRICTION SHALL RELINQUISH WHEN A PUBLIC ROAD WITHIN THE ADJACENT PROPERTY ADJOINS THE PLATTED ROAD.
8. ACCESS CONTROL GRANTED PER THE ADJOINING PLATS "BARLOW CREST-PHASE 2" AT THE END OF BARLOW DRIVE AND "TOLLFIELD" AT THE END OF JADA WAY ARE HEREBY TERMINATED UPON THE RECORDING OF THIS PLAT PER "BARLOW CREST-PHASE 2" PLAT NOTE 9 AND "TOLLFIELD" PLAT NOTE 3.
9. THIS PLAT IS SUBJECT TO AN ANNEXATION AGREEMENT AND CONDITIONS THEREOF RECORDED IN DOCUMENT NUMBER 2007-010426, CLACKAMAS COUNTY DEED RECORDS.
10. THIS PLAT IS SUBJECT TO AN AGREEMENT TO FACILITATE CLEANUP AND PRODUCTIVE REUSE OF PROPERTY RECORDED IN DOCUMENT NUMBER 2017-001366, CLACKAMAS COUNTY DEED RECORDS.
11. LOT 10 IS SUBJECT TO A SIGNAGE EASEMENT FOR AN ENTRY MONUMENT TO THE ABERNATHY LANDING HOMEOWNERS ASSOCIATION, AS SHOWN. THIS EASEMENT IS SUBJECT TO SECTION 1.2 COMMON AREA, 4.2 MAINTENANCE OBLIGATIONS, OF THE DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS PER NOTE 4.
12. THE OREGON TRAIL-BARLOW ROAD HISTORIC CORRIDOR EXISTS WITHIN THE RIGHT-OF-WAY OF SOUTH BARLOW DRIVE AS INDICATED IN CHAPTER 16.08.030.B.5 OF CITY OF OREGON CITY FILE NUMBER TP 16-01.
13. THIS PLAT IS SUBJECT TO A RESTRICTIVE COVENANT TO WAIVE REMONSTRANCE PER DOCUMENT NUMBER 2018-044362, CLACKAMAS COUNTY DEED RECORDS.
14. PERMANENT STRUCTURES INCLUDING FOUNDATIONS, OVERHANGS OR PROTRUSIONS SHALL BE PROHIBITED IN PUBLIC EASEMENTS.

SURVEYOR'S CERTIFICATE

I, MONTGOMERY B. HURLEY, PLS 58542LS, DO HEREBY CERTIFY THAT I HAVE CORRECTLY SURVEYED AND MARKED WITH PROPER MONUMENTS, THE LANDS SHOWN ON THE ACCOMPANYING MAP, DESCRIBED AS FOLLOWS:

TRACTS OF LAND LOCATED IN THE NORTHWEST 1/4 OF SECTION 27, TOWNSHIP 2 SOUTH, RANGE 2 EAST, WILLAMETTE MERIDIAN, CITY OF OREGON CITY, CLACKAMAS COUNTY, OREGON

TRACT 1:
BEGINNING AT THE INITIAL POINT, BEING A 5/8 INCH IRON ROD AT THE NORTHEAST CORNER OF TRACT A OF "BARLOW CREST-PHASE 2" PLAT NUMBER 3503; THENCE ALONG THE SOUTHERLY LINE OF THE TRACT PER DEED DOCUMENT NUMBER 2017-064392 SOUTH 88°41'29" EAST 660.00 FEET TO A 5/8 INCH IRON ROD WITH A RED PLASTIC CAP INSCRIBED "CENTERLINE CONCEPTS" AT THE NORTHWEST CORNER OF THE TRACT PER DEED DOCUMENT NUMBER 2015-032607; THENCE ALONG THE WESTERLY LINE OF SAID TRACT SOUTH 02°15'01" WEST 1879.20 FEET TO A 5/8 INCH IRON ROD WITH A RED PLASTIC CAP INSCRIBED "CENTERLINE CONCEPTS" ON THE NORTHEAST RIGHT-OF-WAY LINE OF SE HOLCOMB BOULEVARD (30.00 FEET FROM CENTERLINE); THENCE ALONG SAID NORTHEAST RIGHT-OF-WAY LINE NORTH 70°41'51" WEST 707.56 FEET TO A 5/8 INCH IRON ROD WITH A YELLOW PLASTIC CAP INSCRIBED "AKS ENGR." ON THE SOUTHERLY EXTENSION OF THE EASTERLY LINE OF THE PLAT "TOLLFIELD" PLAT NUMBER 4046; THENCE ALONG SAID SOUTHERLY EXTENSION AND THE EASTERLY LINES OF THE PLATS "TOLLFIELD" AND "BARLOW CREST-PHASE 2" NORTH 02°49'15" EAST 1660.95 FEET TO THE INITIAL POINT.

THE ABOVE DESCRIBED TRACT CONTAINS 27.17 ACRES, MORE OR LESS.

TRACT 2:
COMMENCING AT THE INITIAL POINT, BEING A 5/8 INCH IRON ROD AT THE NORTHEAST CORNER OF TRACT A OF "BARLOW CREST-PHASE 2" PLAT NUMBER 3503; THENCE ALONG THE SOUTHERLY LINE OF THE TRACT PER DEED DOCUMENT NUMBER 2017-064392 SOUTH 88°41'29" EAST 660.00 FEET TO A 5/8 INCH IRON ROD WITH A RED PLASTIC CAP INSCRIBED "CENTERLINE CONCEPTS" AT THE NORTHWEST CORNER OF THE TRACT PER DEED DOCUMENT NUMBER 2015-032607; THENCE ALONG THE WESTERLY LINE OF SAID TRACT SOUTH 02°15'01" WEST 1879.20 FEET TO A 5/8 INCH IRON ROD WITH A RED PLASTIC CAP INSCRIBED "CENTERLINE CONCEPTS" ON THE NORTHEAST RIGHT-OF-WAY LINE OF SE HOLCOMB BOULEVARD (30.00 FEET FROM CENTERLINE); THENCE SOUTH 19°18'09" WEST 60.00 FEET TO THE SOUTHWEST RIGHT-OF-WAY LINE OF SE HOLCOMB BOULEVARD (30.00 FEET FROM CENTERLINE); THENCE ALONG SAID SOUTHWEST RIGHT-OF-WAY LINE NORTH 70°41'51" WEST 44.35 FEET TO A 5/8 INCH IRON ROD WITH YELLOW PLASTIC CAP INSCRIBED "ACS&P 668-3151" AT THE MOST NORTHERLY CORNER OF THE TRACT PER DEED DOCUMENT NUMBER 2014-061697 AND THE POINT OF BEGINNING; THENCE ALONG THE NORTHERLY WEST LINE OF SAID TRACT SOUTH 19°17'16" WEST 317.71 FEET TO A 5/8 INCH IRON ROD WITH YELLOW PLASTIC CAP INSCRIBED "ACS&P 668-3151"; THENCE ALONG THE WESTERLY NORTH LINE OF SAID TRACT NORTH 70°43'32" WEST 305.61 FEET TO A 5/8 INCH IRON ROD WITH AN ALUMINUM CAP INSCRIBED "AKS-ENGR." ON THE EAST LINE OF PARCEL 9 PARTITION PLAT NUMBER 2004-073; THENCE ALONG THE EASTERLY LINE OF SAID PARCEL 9 NORTH 01°47'10" EAST 333.32 FEET TO A 5/8 INCH IRON ROD WITH A YELLOW PLASTIC CAP INSCRIBED "AKS ENGR." ON THE SOUTHWEST RIGHT-OF-WAY LINE OF SE HOLCOMB BOULEVARD (30.00 FEET FROM CENTERLINE); THENCE ALONG SAID SOUTHWEST RIGHT-OF-WAY LINE SOUTH 70°41'51" EAST 405.85 FEET TO THE POINT OF BEGINNING.

THE ABOVE DESCRIBED TRACT CONTAINS 2.60 ACRES, MORE OR LESS.

AS PER O.R.S. 92.070(2), I ALSO CERTIFY THAT THE MONUMENTATION OF THE REMAINING MONUMENTS IN THIS SUBDIVISION WILL BE ACCOMPLISHED WITHIN 90 CALENDAR DAYS FOLLOWING THE COMPLETION OF PAVING IMPROVEMENTS OR ONE YEAR FOLLOWING THE ORIGINAL PLAT RECORDATION, WHICHEVER COMES FIRST, IN ACCORDANCE WITH O.R.S. 92.060.

NARRATIVE

THE PURPOSE OF THIS PLAT IS TO SUBDIVIDE AND MONUMENT THE LANDS DESCRIBED IN DOCUMENT NUMBERS 2016-089044 AND 2016-088994, CLACKAMAS COUNTY DEED RECORDS. THE BASIS OF BEARINGS AND BOUNDARY DETERMINATION ARE PER SURVEY NUMBER 2017-193, CLACKAMAS COUNTY SURVEYOR'S OFFICE RECORDS.

CONSENT AFFIDAVIT

A SUBDIVISION PLAT CONSENT AFFIDAVIT BY SHAUGHNESSY CAPITAL LLC, A DELAWARE LIMITED LIABILITY COMPANY, BENEFICIARY UNDER DEED OF TRUST RECORDED IN 2017-069103, HAS BEEN EXECUTED AND RECORDED IN DOCUMENT NUMBER 2018-044360 OF THE CLACKAMAS COUNTY DEED RECORDS.

4-19-18
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/19

PREPARED FOR

ABERNETHY LANDING, LLC
604 W EVERGREEN BLVD
VANCOUVER, WA 98660

Exhibit 7

JOB NAME:	HOLCOMB
JOB NUMBER:	5377
DRAWN BY:	BRH
CHECKED BY:	RDR
DRAWING NO.:	5377CROS

AKS ENGINEERING AND FORESTRY, LLC
12965 SW HERMAN RD
SUITE 100
TUALATIN, OR 97062
PHONE: 503.563.6151
FAX: 503.563.6152

AKS

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FORESTRY · LANDSCAPE ARCHITECTURE

AMES STREET

PASTURE WAY

HOLCOMB SCHOOL ROAD

S HOLCOMB BOULEVARD

S ARMEL DRIVE

S WINSTON DRIVE

TRAIL DRIVE

S OYER DRIVE

S BARLOW DRIVE

TRACT A – STORMWATER FACILITY ±34,954 SF

TRACT B – OPEN SPACE ±33,220 SF

EXISTING 50' PGE EASEMENT

15' PED. ACCESS EASEMENT

APPROXIMATE NROD AREA (ASSUME THAT IT IS NOT JURISDICTIONAL)

N

SCALE: 1"=100 FEET

100 0 40 60 80 100

SCALE AT FULL SIZE: 1"=100 FEET
SCALE AT HALF SIZE: 1"=200 FEET

NOTES:

1. INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES, INCLUDING GEOGRAPHIC INFORMATION SYSTEMS (GIS), AERIAL PHOTOGRAPHS, AS-BUILT INFORMATION, AND TAX ASSESSOR MAP INFORMATION.
2. DIMENSIONS SHOWN ARE APPROXIMATE.
3. WETLAND AND NROD BOUNDARIES SHOWN ARE HAND-MAPPED BASED ON DESKTOP REVIEW AND ARE CONSIDERED APPROXIMATE ONLY. FULL WETLAND AND WATERS DELINEATION REQUIRED FOR DEVELOPMENT.

AKS ENGINEERING & FORESTRY, LLC
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aks-eng.com

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FORESTRY • PLANNING • LANDSCAPE ARCHITECTURE

S HOLCOMB BLVD SERRES

OREGON CITY OR

TAX LOTS 2100, 2200, 2300, & 500, 2200, 2300 CLACKAMAS CO. TAX MAPS 22E21D & 22E28A

R-10 PRELIMINARY SUBDIVISION LAYOUT

DESIGNED BY:	VN
DRAWN BY:	VN
CHECKED BY:	CG/MH
SCALE:	AS NOTED

DATE: 09/29/2020

PRELIMINARY

REVISIONS

JOB NUMBER 7332

AKS DRAWING FILE: 7332 PRE-LAYOUT 7.DWG | LAYOUT: DIM

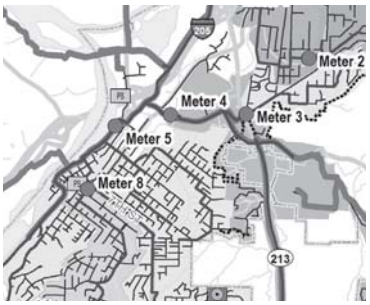
Exhibit 9

Prepared for
City of Oregon City

Sanitary Sewer Master Plan

November 2014









3.5 Future Flows

Base flows and RDII from future developments were estimated and routed through the model to estimate future capacity deficiencies in the trunk sewer system. Three types of future development areas were included in the analysis:

- Large future development areas at the boundaries of the City's urban growth area: South End Road, Park Place, and Beavercreek Road.
- Expected development areas within the city limits. This category includes all parcels identified by the City excluding those considered to be un-developable (e.g., existing parks) and lots considered not to have future development potential (e.g., small single residential lots with existing connections to the sewer system).
- Individual land parcels within the city limits with redevelopment potential. These consist of both vacant parcels and parcels where the existing land use is less dense than the parcel zoning. This category also includes individual parcels in unincorporated areas (within the urban growth area) with single family residential land use. It was assumed these parcels are currently serviced by onsite septic systems and will connect to the sanitary sewer system in the future.

3.5.1 Future Base Flows

Future average daily base flows were estimated from industry standard rates for each land use designation. For the large development areas, the proposed gross acreage for each land use designation was provided by the City. For parcels with areas greater than 1 acre, the net acreage was calculated assuming that 20 percent of the gross acreage would be used for local roads, easements, and other utilities. Table 3-2 lists the rates used to develop future base flows.

Table 3-2. Future Sewer Base Flow Unit Rates

Land use	Unit type	Unit flow
Residential[a,b]	Gallons per capita per day	80
Commercial[c]	Gallons per acre per day (gpad)	1,000
Industrial[c]	gpad	2,000

[a] *An average of 2.5 people per household was assumed.*

[b] *Development densities specified in the 2004 Oregon City Comprehensive Plan were used to determine the number of dwellings per acre. LDR = 5 dwellings per acre, MDR = 10 dwellings per acre, HDR = 22 dwellings per acre.*

[c] *Unit flow rates for commercial and industrial areas were based on industry standard.*

3.5.2 Future Wet Weather Flows

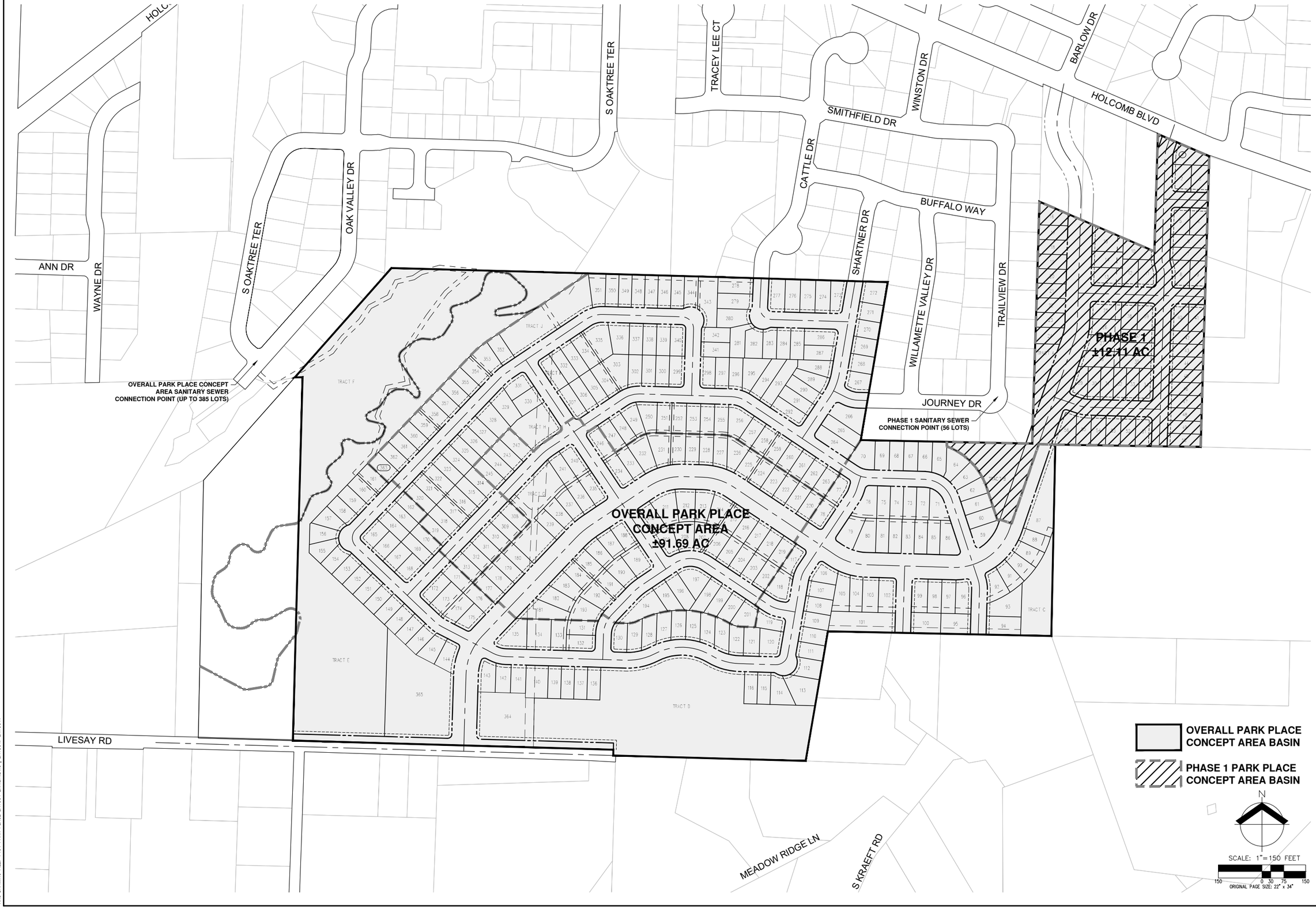
RDII from future areas was calculated by estimating the amount of future sewered areas and applying an infiltration/inflow (I/I) rate of 1,000 gpad. I/I was not applied to parcels within the city limits that are already developed, because it was assumed the I/I contribution from these parcels already would be accounted for in the existing conditions model.

16. ID those parcels located in concept plan areas
    a. Add field, type string, named “CONCEPT”
    b. Select by location parcels in “taxlot_model” with their centroid within any of the 3 concept plan polygons provided by the City.
    c. Field calculate “CONCEPT”=”YES”
17. Determine area of constrained land on each parcel
    a. Union “taxlot_model” and selection of “All_Constraints” that intersects “BASE_UGB_Fill”
        i. Resulting fc is named “taxlot_constrained_union”
        ii. Note: Set definition query on “All_Constraints” of "Building" = 'N'. This omits buildings from the constrained layer.
    b. Union “taxlot_constrained_union” and selection of “Vacant_Lands” that intersects “BASE_UGB_Fill”
        i. Resulting fc is named “taxlot_cnstrnd_vacant_union”
    c. Calculate vacant area slices
        i. Add field, type double, named “AREA_CONSTR”
        ii. Select features in “FID_All_Constraints” <> -1. This is all the constrained features.
        iii. Calculate geometry of “AREA_CONSTR” attribute, which represents “constrained land” area
        iv. Add field, type double, named “AREA_CONSTR_PRTL”
        v. Select features in “FID_All_Constraints” = -1 AND “FID_Vacant_Lands”<> ”-1”. This is vacant land that is also constrained (i.e. vacant and constrained land overlap).
        vi. Calculate geometry of “AREA_CONSTR_PRTL” attribute, which represents “constrained vacant land” area
    d. Dissolve “taxlot_cnstrnd_vacant_union” based on “TLID” attribute
        i. During dissolve, calculate sum of “AREA_CONSTR” and “AREA_CONSTR_PRTL” attributes.
        ii. Resulting fc is named “taxlot_cnstrnd_vcnt_union_dissolv”
    e. Transfer constrained land information to the “taxlot_model” fc
        i. Add field to “taxlot_model” fc named “CONSTR_AREA” – type Double.
        ii. Add field to “taxlot_model” fc named “CONSTR_VAC_AREA” – type Double.
        iii. Join “taxlot_constrained_union_Dissolv” fc to “taxlot_model” fc based on “TLID” attribute
        iv. Calculate “CONSTR_AREA” = “AREA_CONSTR”
            1. Select null values and set to 0
        v. Calculate “CONSTR_VAC_AREA” = “AREA_CONSTR_PRTL”
            1. Select null values and set to 0
18. Estimate net developable acres
    a. Add field to “taxlot_model”, type double, named “NET_DEV_ACRES”
    b. Select those parcels where only the vacant portion will be developed. Select features from “taxlot_model” where “DEV_MOD” = “YES_PARTIAL”
    c. Field calculate “NET_DEV_ACRES” = (“AREA”* “PRCNT_VACANT”- “CONSTR_VAC_AREA”) /43560
    d. Switch the selection
    e. Field calculate “NET_DEV_ACRES” = ([AREA]- [“CONSTR_AREA”])/43560
19. Identify Model Junction where development drains
    a. Add field to “taxlot_model”, type long, named “MANHOLE”
    b. Use “Tax_parcel_redevelopment_5” as a start – join this fc based on Tlid
20. Flow assumptions
    a. MFR is 5 units
21. Estimate ex and future flow

a. Add fields to “taxlot model”
    i. LU_UNIT_Q, type long
    ii. LU_UNIT_Q_TYPE, type text
    iii. EX_Q, type double
    iv. ZONE_UNIT_Q, type long
    v. ZONE_UNIT_Q_TYPE, type text
    vi. FUT_Q, type double
    vii. “AREA_RED”, type double
b. Create lookup tables
c. Join tables
d. Estimate flow by following logic
    i. Existing
        1. If gpd, then same
        2. if gpad, then unit q by area
    ii. Future
        1. Select features with “NET_DEV_ACRES” > 1
        2. Field calc “AREA_RED” = 0.8
        3. Switch selection
        4. Field calc “AREA_RED” = 1.0
        5. if gpd, then unit q x (“NET_DEV_ACRES” x “AREA_RED” x 43560) / “ZONE_MINLOTSF”
        6. if gpad, then unit q x (“NET_DEV_ACRES” x “AREA_RED”)
e. Identify areas where additional I/I could be expected (i.e. currently unsewered areas)
    i. Add field named “II_GPD”, type double
    ii. Select “SEPTIC” = “SEPTIC” and “VACANT_ID”=”VACANT” and “LANDUSE_COMPILE” = “RUR” and “LANDUSE_COMPILE” = “FOR” and “LANDUSE_COMPILE” = “AGR”
    iii. Field calc “II_GPD” = 1000 x “NET_DEV_ACRES”
        1. Assume 1,000 acre/day I/I
    iv. Switch selection, and calculate “II_GPD”= 0

22. Estimate additional flow
    a. Add field named “ADD_FLOW_GPD”, type double
        i. Select “SEPTIC” = “SEPTIC” and "DVLPMNT_MOD" = 'YES_PARTIAL'
        ii. Calc “ADD_FLOW_GPD” = “FUT_Q”
        iii. Select all features with no value for “ADD_FLOW_GPD”
        iv. Calc “ADD_FLOW_GPD” --

```
dim flow
if ([FUT_Q] + [II_GPD])  < [EX_FLOW] then
flow = 0
elseif ([FUT_Q]  - [EX_FLOW]) < 0 then
flow = 0
else
flow = [FUT_Q]  - [EX_FLOW]
end if
```



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PARK PLACE VILLAGE

OREGON CITY OREGON

PARK PLACE CONCEPT AREA LAYOUT AND SANITARY SEWER BASIN MAP

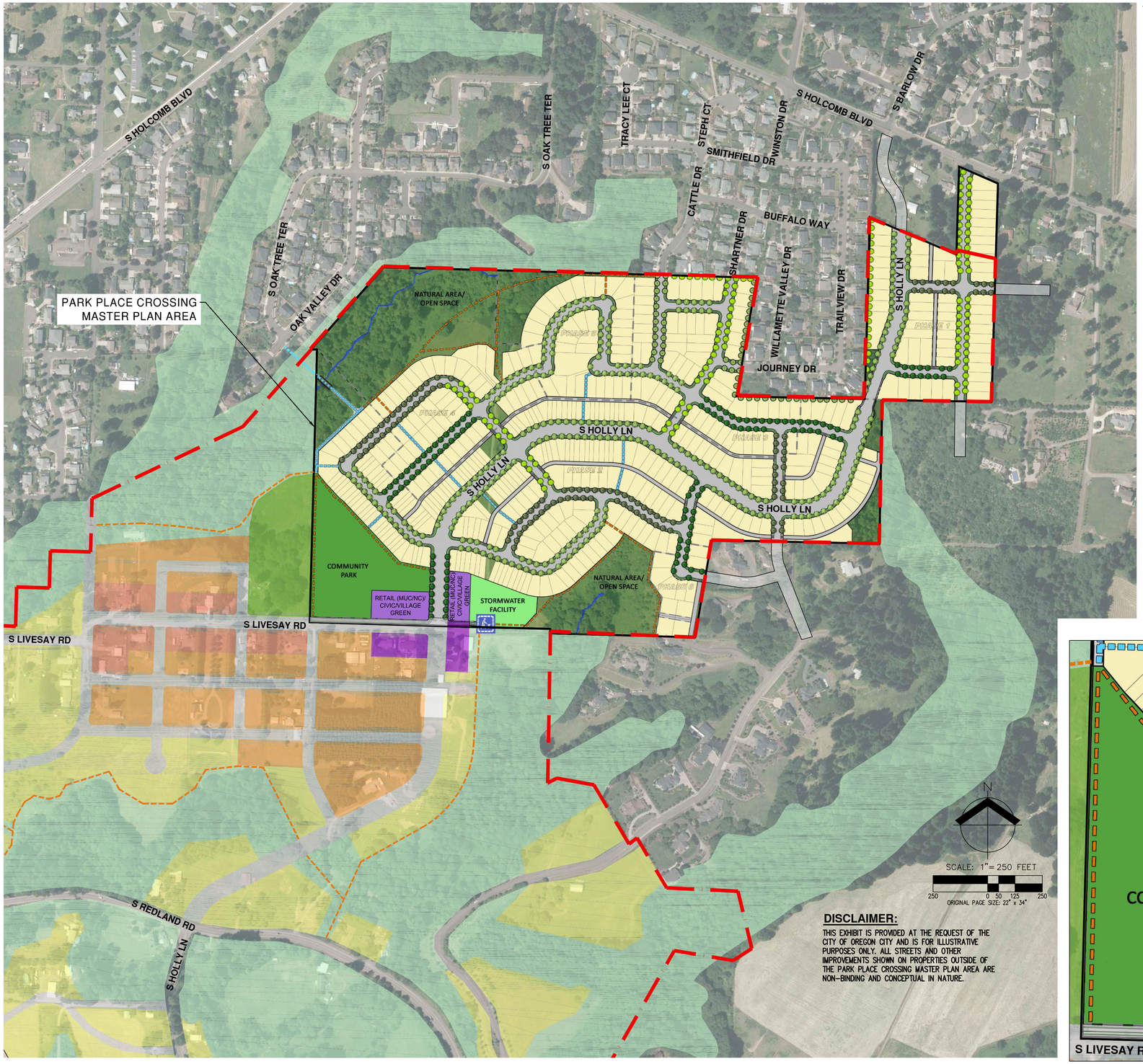
DESIGNED BY:	CLS
DRAWN BY:	CLS
MANAGED BY:	MBH
CHECKED BY:	VHN

DATE: 9.30.2020

REVISIONS

JOB NUMBER
7404

AKS DRAWING FILE: 7404 PARK PLACE LAYOUT EXHIBIT.DWG | LAYOUT: LAYOUT1



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SCALE: 1"= 250 FEET

250 0 50 125 250

ORIGINAL PAGE SIZE: 22" x 34"

DISCLAIMER:

THIS EXHIBIT IS PROVIDED AT THE REQUEST OF THE CITY OF OREGON CITY AND IS FOR ILLUSTRATIVE PURPOSES ONLY. ALL STREETS AND OTHER IMPROVEMENTS SHOWN ON PROPERTIES OUTSIDE OF THE PARK PLACE CROSSING MASTER PLAN AREA ARE NON-BINDING AND CONCEPTUAL IN NATURE.

PARK PLACE CROSSING MASTER PLAN OPEN SPACE LEGEND

- RESIDENTIAL LOTS
- RETAIL (MUC/NC)/ CIVIC/ VILLAGE GREEN
- COMMUNITY PARK
- NATURAL AREA/ OPEN SPACE
- SOFT SURFACE TRAIL
- PAVED PEDESTRIAN ACCESSWAY
- TRAILHEAD

OREGON CITY PARK PLACE CONCEPT PLAN LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- RETAIL (MUC/NC)/CIVIC/VILLAGE GREEN
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- MIXED-USE COMMERCIAL
- PARK PLACE CONCEPT PLAN LIMITS
- PARK PLACE CROSSING MASTER PLAN LIMITS
- SOFT SURFACE TRAIL
- PAVED PEDESTRIAN ACCESSWAY

ACHIEVED CONCEPTUAL PARK PLACE CROSSING MASTER PLAN AREA SUMMARY PER THIS PLAN:

	ONSITE:	OFFSITE:	TOTAL:
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3 AC	±1.2 AC	±2.5 AC
COMMUNITY PARK*:	±4.4 AC	±4.0 AC	±8.4 AC

MEASURED PARK PLACE CONCEPT PLAN LAND USE AREA SUMMARY PER OCWEBMAPS^:

	ONSITE:	OFFSITE:	TOTAL:
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3 AC	±1.2 AC	±2.5 AC
COMMUNITY PARK:	±5.6 AC	±1.6 AC	±7.2 AC

*PER DISCUSSIONS WITH CITY STAFF, THE PARK PLACE CROSSING MASTER PLAN IS EXPECTED TO PROVIDE A PROPORTIONATE PERCENTAGE OF PARK LAND FOR ITS RESIDENTS. APPROXIMATELY 51 PERCENT OF THE PLANNED DWELLING UNITS FOR THE PARK PLACE CONCEPT PLAN AREA NORTH VILLAGE ARE INCLUDED WITHIN THIS MASTER PLAN (±476 PLANNED PARK PLACE CROSSING UNITS/937 TOTAL NORTH VILLAGE UNITS). THE NEIGHBORHOOD PARK REPRESENTS 8.0± ACRES IN THE PARK PLACE CONCEPT PLAN; THEREFORE, PARK PLACE CROSSING WOULD BE EXPECTED TO CONTRIBUTE PROPORTIONALLY ±51 PERCENT OF THE NEEDED AREA, OR ±4.1 ACRES. THIS PLAN ANTICIPATES THAT ±4.4 ACRES WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA WILL BE DEDICATED FOR THE PARK LAND.

^AREAS SHOWN ARE BASED ON MEASURING THE EXTENTS OF VARIOUS LAND USES IN THE OREGON CITY PARK PLACE CONCEPT PLAN AS SHOWN ON OCWEBMAPS.



ONSITE NORTH VILLAGE CENTER ENLARGEMENT

SCALE: 1" = 100'

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CONCEPTUAL PARK PLACE NORTH VILLAGE PLAN W/ENLARGEMENT
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REVIEW COPY ONLY

JOB NUMBER:	7404
DATE:	03/18/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

EXH-1

AKS DRAWING FILE: 7404 COLOR OFFSITE MONITY.DWG | LAYOUT: EXH-2

March 18, 2022
Park Place Crossing & The Park Place Concept Plan



Park Place Concept Plan

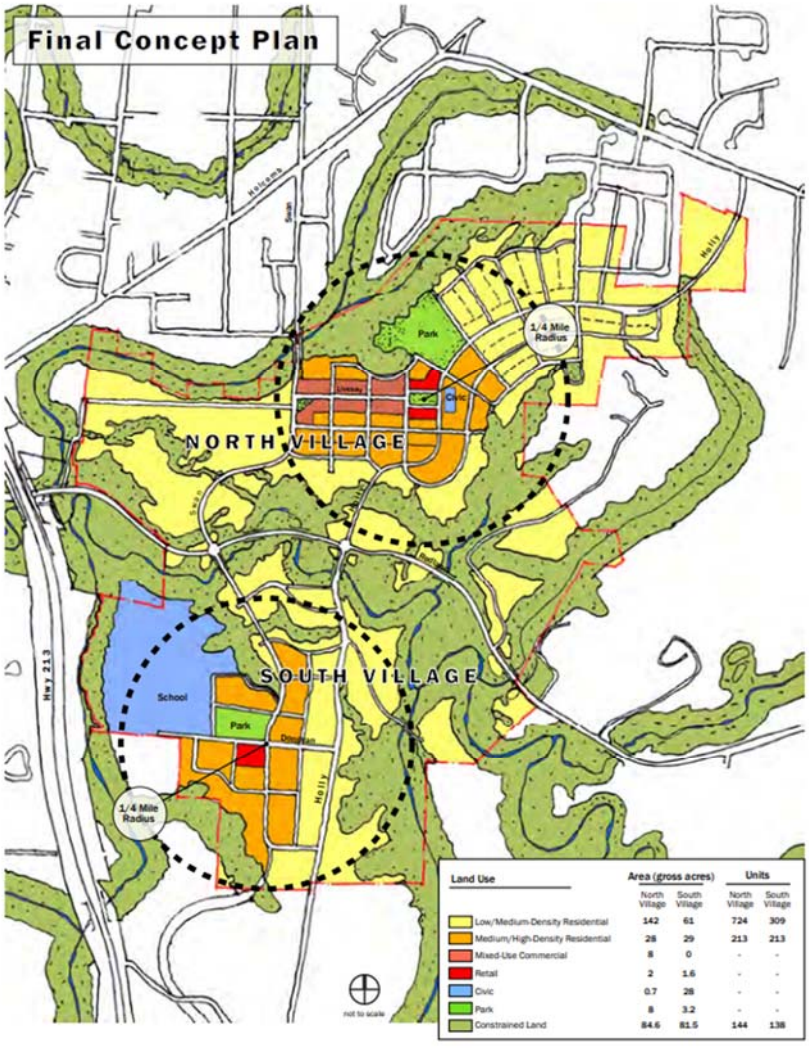


Figure 1-1. Park Place Concept Plan Urban Growth Diagram

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

As stated above, the Park Place Concept Plan is a high-level, aspirational document that is intended to be flexible and implemented through the City's planning processes based upon field verified information/data.

3. Park Place Concept Plan

1. Introduction

A series of growth alternatives for the Park Place study area were developed during a multi-day planning charrette the week of October 15, 2006 in Oregon City. The charrette (*summarized on page 22; see Appendix C for detailed descriptions and sketches*) consisted of interactive meetings, site tours, design sessions, and a series of public forums. Charrette participants included members of the project's Project Advisory and Technical Advisory Committees, local and regional service providers, Oregon City staff, property owners, developers, and citizens living in and around the Park Place study area. This intensive and transparent planning process resulted in a mutually agreed upon vision for the study area that became the foundation of the Park Place Concept Plan ("Concept Plan"). Following the charrette, the Park Place Concept Plan was refined to more accurately reflect the location of existing and proposed streets, natural resource areas, buildable lands, and to respond to remarks from the final public meeting.

The Concept Plan identifies the approximate location of land uses, public facilities and roads. Specific locations for these elements will be determined as part of more detailed future planning and development processes.

The Park Place Crossing Master Plan is the first planning process envisioned for this portion of the Park Place Concept Plan.

The Park Place Crossing Master Plan (PPCMP) represents ±91.7 acres of the ±500-acre expanse addressed by the Park Place Concept Plan (PPCP). It involves ±476 residential dwelling units, multi-modal connectivity, preservation of natural areas, park and trail amenities, and commercial, Civic, and "Village Green" gathering places. The Park Place Crossing Master Plan represents efficient growth which protects the natural resources within the Park Place Concept Plan area, provides effective connections for all transportation modes, and provides appropriate density and transition to the Livesay Main Street area. The Park Place Crossing Master Plan represents an attractive, functional, and efficient initial project within the Park Place Concept Plan area.

2. Concept Plan

The vision for the Park Place Concept Plan is to provide a framework for growth that respects and augments the area's context, history, and natural systems. The Park Place Concept Plan emphasizes good urban design, connectivity, opportunities for place-making and cultivating community, diversity, and, above all, a way to provide for future growth in a sustainable manner.

The key components of the Concept Plan (Figure 3-1) include:

- Two primary north-south connections between Holcomb Boulevard and Redland Road (Swan Avenue and Holly Lane)

Figure 1: PPCMP Holly Lane (Blue) /Swan Avenue (Green) Location

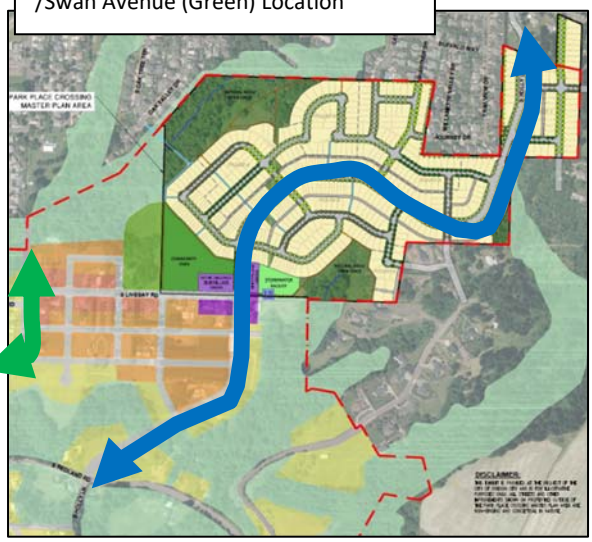
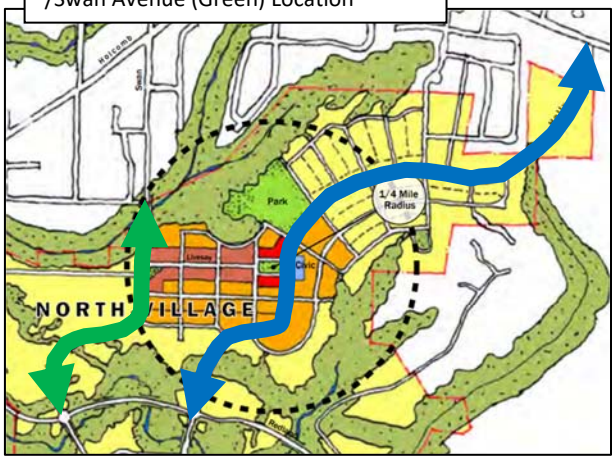


Figure 2: PPCP Holly Lane (Blue) /Swan Avenue (Green) Location



The primary north-south connection within the Park Place Crossing area is Holly Lane. As demonstrated by the above figures, the alignment of Holly Lane mimics the Concept Plan, but also considers topographic, natural resource, and design level information. The Park Place Crossing Master Plan is consistent with this key component of concept plan.

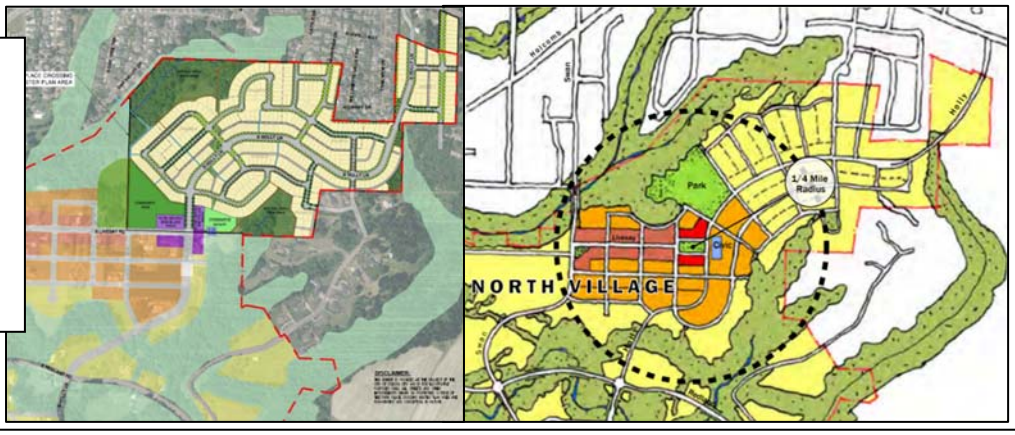
- Two distinct mixed-use neighborhoods (North Village and South Village) that accommodate 1,459 new dwelling units

Park Place Crossing is slated to provide ±476 new dwelling units, within the North Village area that support Mixed-Use and Neighborhood Commercial uses.

- Neighborhood-oriented commercial nodes that integrate commercial land uses, residential land uses, and public open space

As demonstrated within the Preliminary Plans, Park Place Crossing provides, at a location similar to those shown within the Park Place Concept Plan map, neighborhood commercial, residential land uses, and public open spaces in a way that create neighborhood centers that act as the heart of the North Village and provide a sense of place. The areas provided are similar as illustrated below.

Figure 3 (left): Planned PPCMP area with adjacent conceptual land uses
Figure 4 (right): PPCP Final Concept Plan



ACHIEVED CONCEPTUAL PARK PLACE CROSSING MASTER PLAN AREA SUMMARY PER THIS PLAN:

	ONSITE:	OFFSITE:	TOTAL:
RETAIL (NC/MUC):	0.81± AC	0.60± AC	1.41± AC
CIVIC:	0.26± AC	0.28± AC	0.54± AC
VILLAGE GREEN:	0.29± AC	0.36± AC	0.65± AC
COMMUNITY PARK*:	4.07± AC	4.03± AC	8.10± AC

MEASURED PARK PLACE CONCEPT PLAN LAND USE AREA SUMMARY PER OCWEBMAPS^:

	ONSITE:	OFFSITE:	TOTAL:
RETAIL (NC/MUC)	0.79± AC	0.58± AC	1.37± AC
CIVIC:	0.26± AC	0.28± AC	0.54± AC
VILLAGE GREEN:	0.24± AC	0.33± AC	0.57± AC
COMMUNITY PARK:	5.65± AC	1.55± AC	7.20± AC

Land Use	Area (gross acres)		Units	
	North Village	South Village	North Village	South Village
Low/Medium-Density Residential	142	61	724	309
Medium/High-Density Residential	28	29	213	213
Mixed-Use Commercial	8	0	-	-
Retail	2	1.6	-	-
Civic	0.7	28	-	-
Park	8	3.2	-	-
Constrained Land	84.6	81.5	144	138

Figure 5 (left): PPCMP/PPCP Final Concept Plan Area Comparison
Figure 6 (above): PPCP Final Concept Plan Legend

- An area for a new civic institution, such as a library or community center



Figure 7: Planned PPCMP area with conceptual civic and commercial areas in purple



Figure 8: PPCP Final Concept Plan map Civic and commercial areas at the southwest corner of the PPCMP project site

An area has been established for Civic purposes within the southern corner of Park Place Crossing. The area was considered for these purposes because of its proximity to Holly Lane and S Livesay Road, close vicinity to the Community Park, commercial areas, and higher density residential areas. This project is consistent with this PPCP key component.

- An 8-10 acre community park and a 3-5 acre neighborhood park

The Park Place North Village Community Park is planned near the southwest corner of Park Place Crossing as it is flat and close to higher intensity uses (e.g. commercial, denser housing, Livesay Road, etc.). This area is also adjacent to properties which also feature flat, cleared land.



Figure 9: Planned PPCMP area with conceptual park area



Figure 10: Conceptual PPCP park area

- A mix of housing types and ranges of affordability

Consistent with the PPCP, housing within the PPCMP is planned to consist of detached and attached housing on a diverse range of lot sizes that can accommodate a mix of home styles and sizes. Future commercial projects may be mixed-use, involving above-ground floor residential as permitted by the Oregon City Municipal Code. These housing options will appeal to a wide variety of residents.

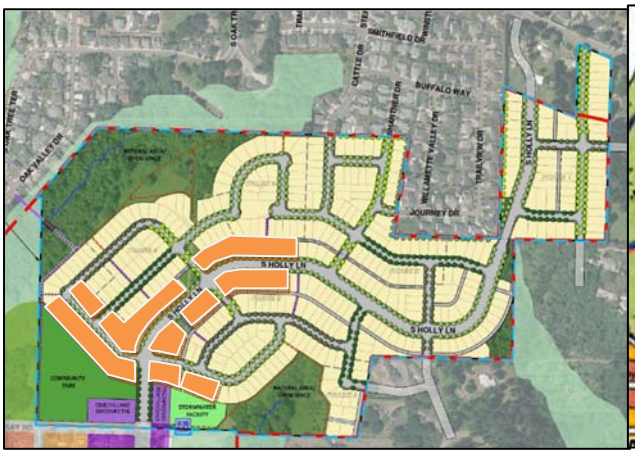


Figure 11: PPCMP planned attached homes (orange) & detached homes (yellow)

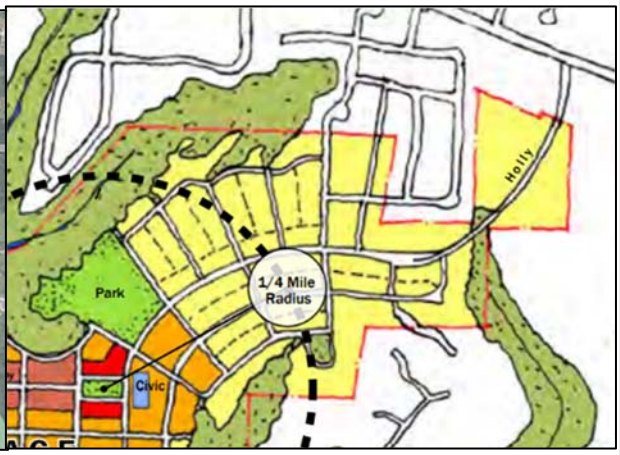


Figure 12: PPCP conceptual higher-density housing areas (orange) and lower-density housing (yellow)

- An extensive system of off-street and on-street trails and pedestrian/bicycle Connections

The Oregon City Trails Master Plan pictures several conceptual local trails and a trailhead located within the Park Place Crossing area. The Park Place Crossing Master Plan application demonstrates these connections and trails where feasible, including the trailhead location. The connections are provided through a variety of off-street and on-street trails and pedestrian/bicycle facilities, as demonstrated on the project's Preliminary Plans. The project is consistent with this key component.

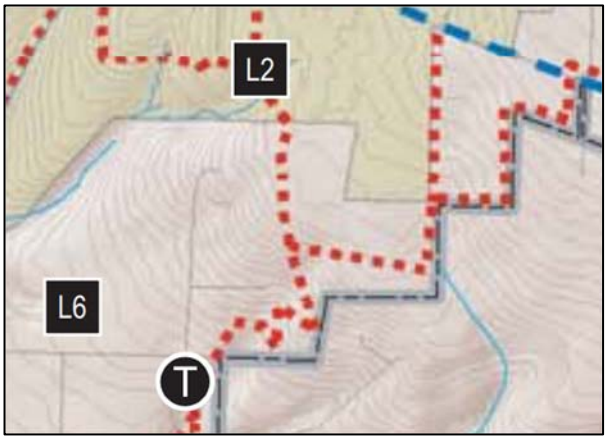


Figure 13: Excerpt from Oregon City Trails Master Plan showing conceptual trails through the area

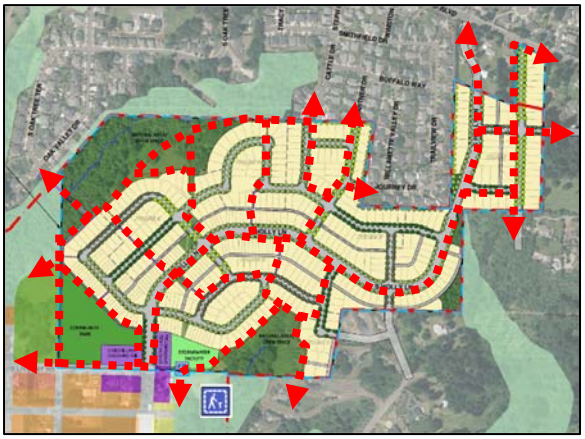


Figure 14: PPCMP trail connections through Park Place Crossing with planned trailhead

- Innovative, "green" on-site stormwater treatment methods

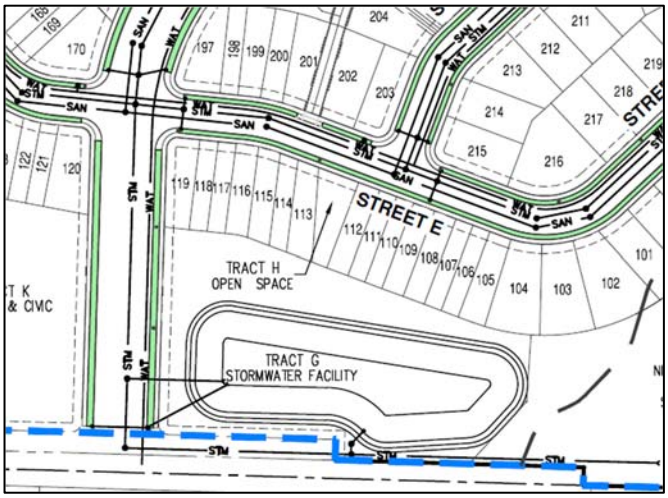


Figure 15: Conceptual locations for on-street stormwater planters and/or swales in the PPCMP

The Park Place Crossing Master Plan incorporates "green" streetside stormwater planters/swales where feasible and a LIDA vegetated stormwater management pond.

- Protected sensitive areas, including drainages and steep slopes

Park Place Crossing Master Plan sets aside ±15.7 acres of land to protect and preserve sensitive areas, such as drainages and steep slopes, from areas planned for residences, parks, streets, commercial areas, etc. The PPCP Final Concept Plan map assumed that ±11.4 acres will be retained as open spaces, shown as "green fingers" on the map, whereas the actual site conditions require that ±15.7 acres be retained as open space in the PPCMP.

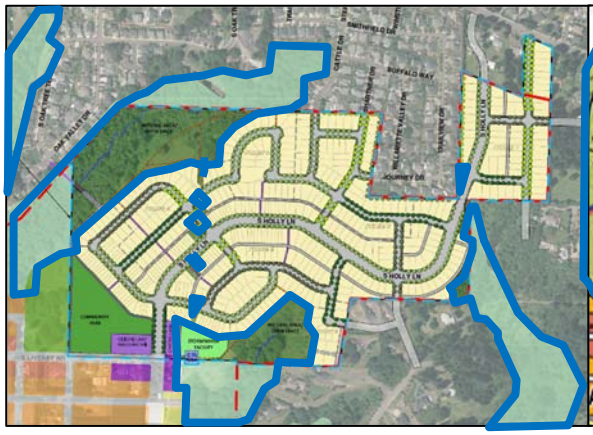


Figure 16: PPCMP sensitive areas (outlined in blue)- ±15.7 acres onsite



Figure 17: PPCP Final Concept Map sensitive areas (outlined in blue) - ±11.4 acres onsite

- Streets and buildings oriented for solar access

Streets have been designed and lots have been oriented to allow the maximum solar access practicable thus allowing for greater daylight exposure and ventilation, and providing opportunities for using renewable energy systems, and improved energy efficiency of buildings.

- The use of green edges to define neighborhoods and buffer developments

As shown above within Figures 18 and 19, Park Place Crossing is set within green edges created by existing NROD and sloped areas. These areas allow buffering from existing neighborhoods while also defining the Park Place Crossing neighborhood. The project is consistent with this key component.

- Integration of parks and open spaces into existing and future neighborhoods

Consistent with the PPCP, open spaces are planned along much of the perimeter of Park Place Crossing. These open space areas provide transition between existing and future neighborhoods as well as providing preserved areas for slopes and vegetation. The chosen location of the park permits its future expansion and its location provides for convenient access to existing and future nearby neighborhoods.

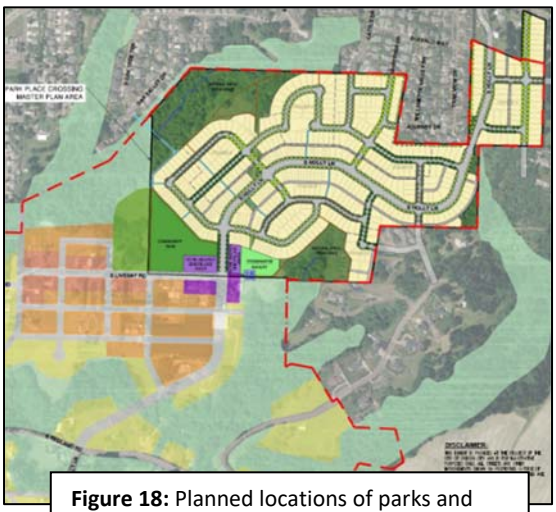


Figure 18: Planned locations of parks and open spaces within the PPCMP



Figure 19: Planned locations of parks and open spaces within the PPCP

3. Plan Elements

The following section describes the elements of the Park Place Concept Plan in detail and how the evaluation criteria and design principles are applied.

The Plan accommodates a minimum of 1,458 dwelling units with a variety of housing types. An additional ~280 units can be accommodated in the "green fingers" or constrained land. These figures were derived from the Buildable Lands Analysis, which is summarized in Chapter 2 and in its entirety in Appendix E.

A market analysis conducted in Fall 2006 determined that the study area can support approximately 40,000square feet of new commercial development: 30,000 square feet in the North Village and 10,000 square feet in the South Village.

Land Use: The Villages

The Park Place Concept Plan proposes a mix of residential, commercial, park and open space, and civic land uses. Redland Road serves as the logical division between two neighborhoods: North Village and South Village. Neighborhood-oriented nodes serve as the heart of these new neighborhoods and provide a variety of civic and commercial spaces. These nodes are centrally located in the neighborhoods along existing and future roadways and are surrounded by medium density residential land uses that transition to lower-density residential land uses. In response to the market analysis findings, the Concept Plan appropriates enough land for 30,000 square feet of commercial development in the North Village and 10,000 square feet of commercial development in the South Village.

The Park Place Crossing Master Plan provides for ±34,000 square feet of commercial lands within the ±1.3 acre commercial/Civic/Village Green area. The North Village requires, per the Park Place Concept Plan market analysis, ±30,000 square feet of commercial floor space and assumed a building coverage of each area of approximately 50 percent (PPCP "Commercial Development," page 65). Combined with the other Neighborhood Commercial area illustrated within the PPCP "Final Concept Plan" map (Figure 1-1), these commercial areas can be provided.

The Park Place Crossing Master Plan includes ±476 dwelling units. Rather than developing within the "green fingers," the PPCMP preserves the green fingers as open spaces. An appropriate quantity of commercial lands have been set aside to form the easternmost segment of the Livesay Main Street corridor.

North Village

The majority of new growth (approximately 936 units) is proposed to be accommodated in the North Village neighborhood, north of Redland Road (Figure 3-2). A new main street along Upper Livesay Road between the Holly Lane and Swan Avenue Extensions, called "Livesay Main Street," serves as the heart of the North Village. The Livesay Main Street is envisioned to have wide sidewalks, landscaped stormwater facilities (bioswales), pedestrian-scale lighting, street trees, and benches. The roadway terminates at the junction of the Holly Lane Extension with a Village Green and civic building (i.e., library, community center, environmental interpretative center, or post office). This mixed-use district is surrounded by medium-density housing (figures at right), which is within walking distance of the core area, and single-family housing that blends into the surrounding existing single-family residential neighborhoods. Small-scale commercial businesses, like a coffee shop, bookstore, dry cleaners, or café, are proposed to anchor the intersection of Holly Lane Extension and Livesay Main Street and surround the Village Green.

Park Place Crossing includes ±476 of the ±936 residential units anticipated within the North Village. It also includes ±35,000 square feet of North Commercial/Mixed-Use Commercial retail area, ±10,400 square feet of Village Green, and ±11,000 square feet of Civic area within a ±1.3 acre area. These areas are in keeping with the quantities envisioned within the Park Place "Final Concept Plan" map (Figure 1-1).

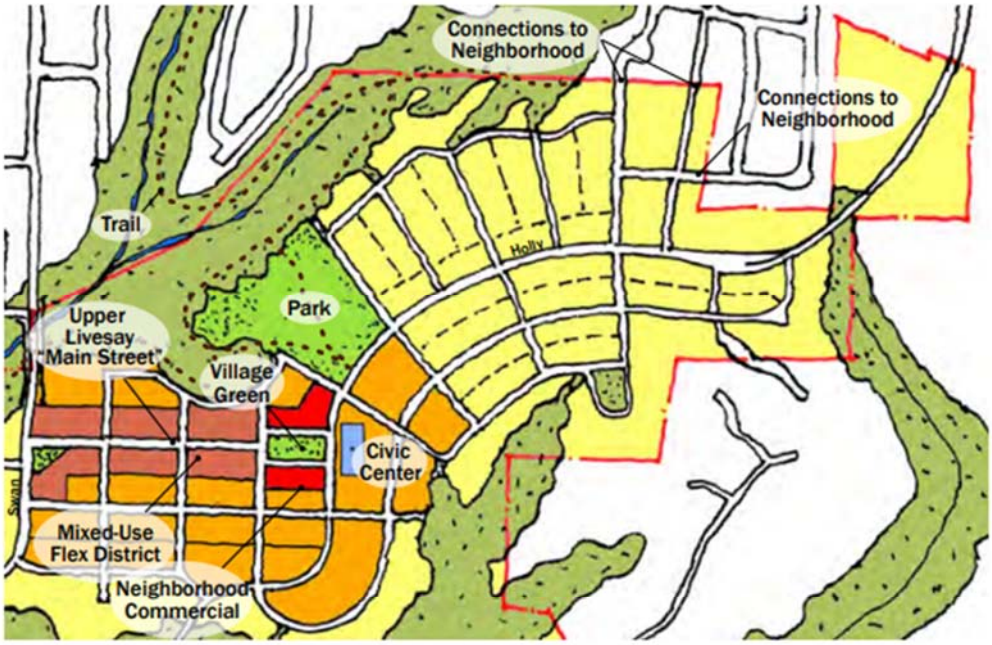
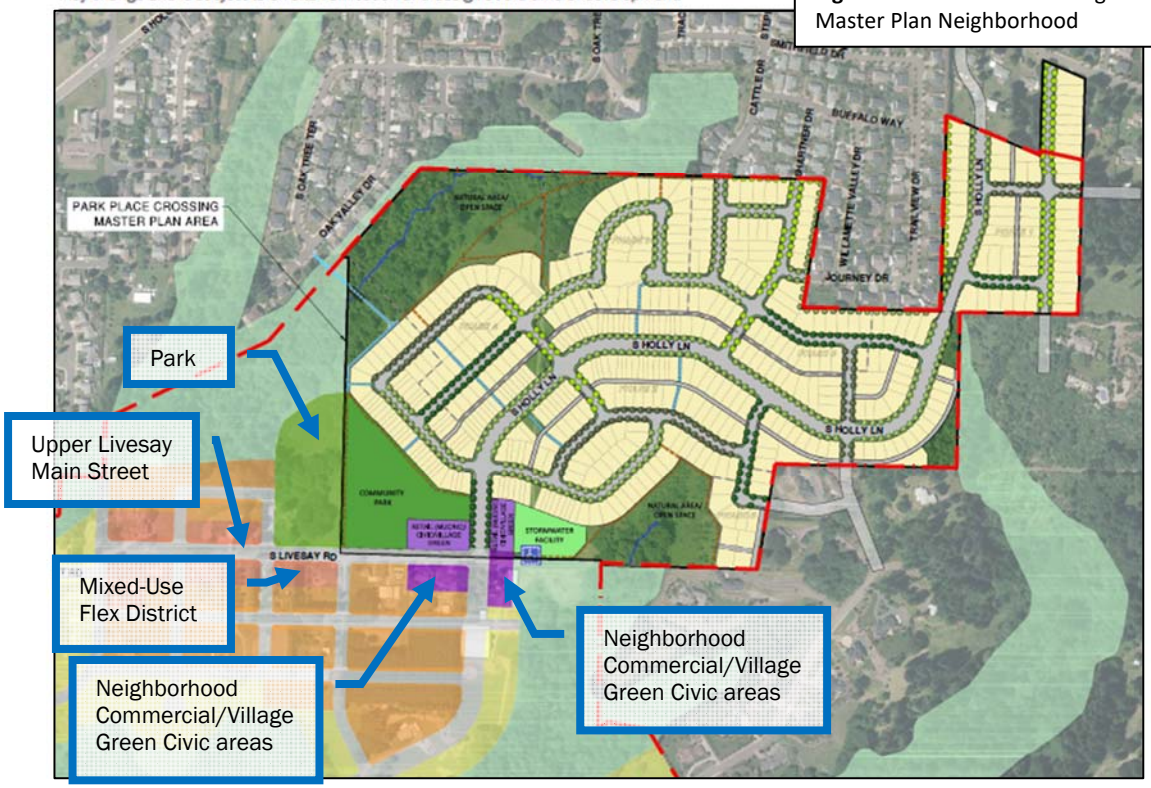


Figure 3-2. North Village Neighborhood

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

Figure 20: Park Place Crossing Master Plan Neighborhood



The land uses along Livesay Main Street are envisioned to be a mix of residential and commercial uses (e.g., ground-floor, neighborhood-oriented commercial with housing or offices above). The buildings should convey a rich palette of architectural elements that distinguish the Village from the existing auto-oriented commercial uses and a proposed regional shopping center in the area bounded by Washington Street, Abernethy, and Highway 213. The types of elements incorporated into the design of the street facing façade should include large storefront windows, recessed entry ways, awnings and canopies, building lighting, and a rhythm of columns and/or pilasters that break the façade into smaller, more intimate modules.



New mixed-use development and civic node in the North Village

Areas along the Livesay Main Street are planned to feature a mix of residential and commercial uses.

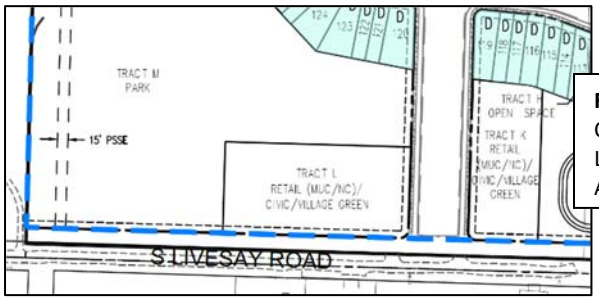


Figure 21: Park Place Crossing Master Plan Livesay Main Street Area



A variety of housing types and densities is proposed in both the North Village and the South Village

In order to ensure that architectural design elements are integrated into future development in the North Village, it is necessary to develop implementation measures that reflect these elements. As part of the implementation measures proposed for Park Place, the City's existing Neighborhood Commercial (NC) zone will be modified to include "main street" standards for use in creating vibrant neighborhood centers in the North and South Villages.

The Park Place Concept Plan includes a general street plan and street cross-sections as well as an overview of natural resource planning in Park Place, with recommended extension of density transfer provisions to all natural resource overlay zones occurring in the Park Place plan area. These implementation measures are described in more detail in Chapter 4 of this document and Appendix I.



Taller buildings and a mix of uses provide a desirable sense of enclosure around the civic space in the North Village

The Park Place Crossing Master Plan implements the general street plan and cross-sections required by OCMC and Public Works standards. The Master Plan provides greater quantities of open spaces than originally conceived within the PPCP for the protection of natural resource areas. These density transfer provisions are used to allow the number of housing units desired in the Park Place Concept Plan to be provided within the Park Place Crossing Master Plan.





Street trees, on-street parking, pedestrian-scale lighting, and street furniture create interesting places to meet in the community

Housing

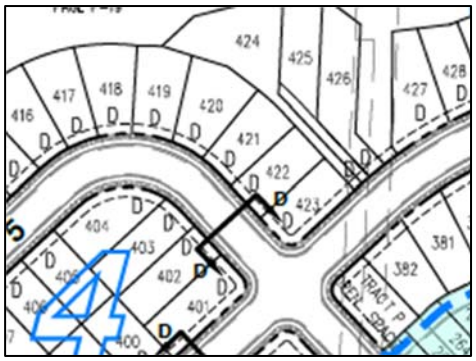
The primary land use proposed in the Park Place Concept Plan is residential. Of the approximately 408 net buildable acres in the study area, approximately 360 acres are proposed for residential use. Residential land will be provided in a range of very low-density (R-10) zones to neighborhood commercial (NC) zones. In order to provide attractive and affordable housing for a variety of incomes and household types. It is recommended that a new residential zone (R-5), modifications to existing zones, additional design standards forattached single-family housing (townhouses and rowhouses), and multi-family housing be instituted to implement the Park Place Concept Plan. Recommended residential types and zones include:

Low-Density Residential (R-10, maximum 4 units/acre)

- Single-family detached dwelling units (including manufactured homes)
- Accessory dwelling units (ADUs)

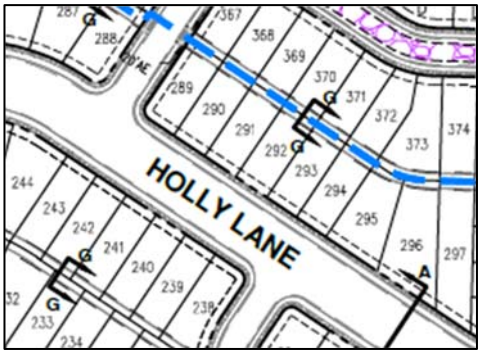
When annexed, a portion of the Park Place Crossing properties were zoned R-10. The maximum density of 4 dwelling units per acre required by this zoning is reflected in an overall reduction of density for the PPCMP.

Figure 22: Park Place Crossing Master Plan excerpt



Low/Medium-Density Residential (proposed R-5, minimum 6 units/acre)

- Single-family detached dwelling units (including manufactured homes)
- Accessory dwelling units (ADUs)
- Single-family attached dwelling units (townhouses/rowhouses)
- Two-family dwelling units (duplexes)



The majority of the site is located within the R-5 zoning district. As such, Park Place Crossing largely provides density within the range specified for the R-5 zoning district.

Figure 23: Park Place Crossing Master Plan residential excerpt

Medium/High-Density Residential (R-3.5, minimum 9 units/acre)

- Single-family detached dwelling units (including manufactured homes)
- Single-family attached dwelling units
- Two-family dwelling units (duplexes)
- Multi-family dwelling units (proposed)

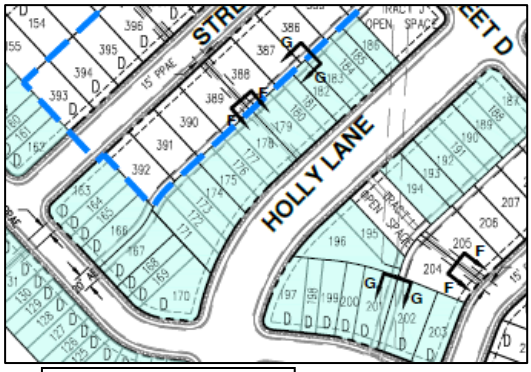


Figure 24: Park Place Crossing Master Plan residential excerpt

Following annexation of the property, the Park Place Crossing properties were not designated with areas of R-3.5 zoning; however, because the PPCP desired a Medium/High Density Residential designation that was not provided and because multiple residential types are required for General and Detailed Development Plan applications (none greater than 75% of the planned housing types), attached housing was included as part of the PPCMP. Those attached housing types included within Park Place Crossing are located near the Livesay Main Street area, as originally envisioned by the PPCP, and features desired densities matching those that would be provided through housing within an R-3.5 Medium/High Density Residential zoning district.

Neighborhood Commercial (NC)

- Dwelling units above ground floor (if in conjunction with a permitted or conditional use)

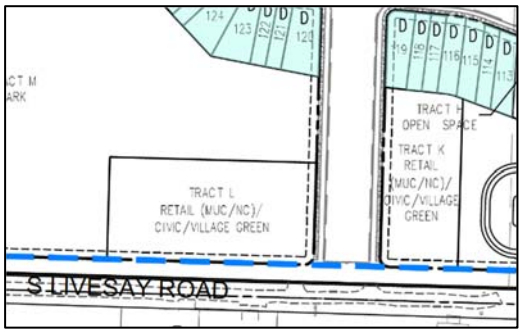


Figure 25: Park Place Crossing Master Plan commercial excerpt

Following annexation of the property, the Park Place Crossing properties were not designated with areas of R-3.5 zoning; however, because the PPCP desired a Medium/High Density Residential designation that was not provided and because multiple residential types are required for General and Detailed Development Plan applications (none greater than 75% of the planned housing types), attached housing was included as part of the PPCMP. Those attached housing types included within Park Place Crossing are located near the Livesay Main Street area, as originally envisioned by the PPCP, and features desired densities matching those that would be provided through housing district.

The needed mix of housing units is shown in Table 3-1. These figures mirror the ratio of existing housing types in Oregon City according to the 2000 Census. Additional information about the affordability of housing is provided in the following section.

Park Place Crossing Planned Housing	Number of Units
Single-Family Residential Detached	±350
Single-Family Residential Attached	±126
Accessory Dwelling Units	-
TOTAL	**±476**

Type of Housing	Number of Units Needed
Single-Family Residential Detached	950
Two-Family Residential Attached (Duplex)	87
Manufactured Home in Park	48
Single-Family Residential Attached	9
Multi-Family Residential	282
Accessory Dwelling Units	17
Group Quarters	65
TOTAL	**1,458**



The Park Place Crossing Master Plan includes ±476 dwelling units. Rather than developing within the "green fingers," the PPCMP preserves the green fingers as open spaces. An appropriate quantity of commercial lands have been set aside to form the easternmost segment of the Livesay Main Street corridor.

The City's lowest-density zoning is recommended for the "green fingers" of natural resource and environmentally sensitive lands in Park Place. These areas are appropriate for low-density development and will be protected, in part, by the City environmental overlay zones which restrict development altogether in certain areas or reduce the allowable density of residential development in other areas

Table 3-2 identifies the potential number of housing units of different types that could be developed within the concept planning area based on proposed zoning. The low/medium-density zone is more likely to be the site of manufactured homes and ADUs than the medium/high-density zone. The distribution of housing types in Table 3-2 however, represents only one scenario for accommodating needed housing within zones proposed for Park Place. **It is possible that housing types may develop in different ratios, including development of attached single-family housing in the low/medium-density residential zone.**

The Park Place Crossing Master Plan provides an appropriate mix of housing unit types. The percentages shown within the Park Place Concept Plan (2008) are outdated/superseded by the City's 2021 Housing Needs Analysis and/or code updates. The Park Place Crossing project is consistent with these current requirements by providing a mixture of housing types, approximately 26 percent single-family attached homes and approximately 74 percent single-family detached. Opportunities for residential units above ground-floor commercial is also possible within the future Livesay main street area.

Parks and Open Space

The Park Place Concept Plan incorporates a significant amount of open space, mostly attributed to environmentally-constrained natural areas within the planning area. This open space network takes the form of "green fingers." These "green fingers" consist of sensitive habitat and drainage areas that frame pockets of development while protecting the existing natural habitat. The proposed "green fingers" provide a buffer between resource areas, existing development, and new development. The "green fingers" also serve as a signature element for the burgeoning neighborhood, especially when they are combined with the Plan's proposed system of trails and pathways. This open space concept can be realized through local regulation, sensitive development practices,

and through public acquisition. The amount of open space proposed in the Plan exceeds Metro and City guidelines.

The area selected for the community park is the best location as it is a large, contiguous flat area that can accommodate play fields. Future expansion of the park to the west areas through contributions by adjacent properties and future projects is also possible.

The Community Park identified within the Park Place Crossing Master Plan boundary has been located south and west of the location pictured within the PPCP Final Concept Plan map as to allow expansion of the park through contribution by adjacent properties. The Park Place Crossing Master Plan area contributes approximately 51 percent of the North Village residential units and therefore contributes this same percentage of the conceptual park area. The park as planned achieves the 8 acre size envisioned by the PPCP.

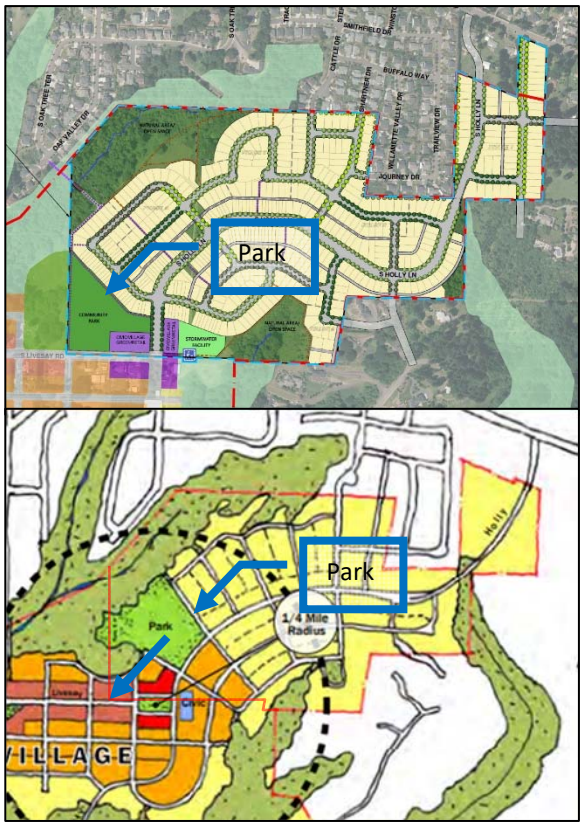


Figure 26 (Top): PPCMP Community Park area
Figure 27 (Bottom): PPCP conceptual park area

As discussed, the Park Place Concept Plan includes a neighborhood park in both the North Village and the South Village. These parks are shown in locations that optimize the following concept planning criteria:

- Locate parks adjacent to future village centers in order to maximize proximity and therefore walkability for the greatest number of residents;
- Locate parks adjacent to civic uses such as schools or other facilities in order to synergize with existing or planned public amenities;

- Locate parks on sites that are relatively flat in order to accommodate the need for play fields; and
- Locate parks adjacent to existing natural areas so as to integrate open spaces with parks. This may allow for reduced park areas by allowing passive recreation areas to occur in natural open space areas.

The park will be adjacent to planned civic, Village Green, retail, and open space areas with trails planned to lead between those areas and adjacent existing neighborhoods. Sidewalk and street connections are planned to adjacent Local and Collector streets. This location also places the park adjacent to the future village center in order to provide the maximum walkability for area residents.

There may be other locations within the proposed neighborhood fabric that meet these criteria and the locations indicated on the Urban Growth Diagram should not be taken as absolute. The parks were shown in these locations because they meet these criteria. It is essential that any alternative sites identified in the future meet the same or similar criteria.

The park location meets the above criteria for location and is therefore planned within an appropriate location. The park overlaps the location shown within the Final Concept Plan map and is better suited to the topography of the site and access to the adjacent main street areas.

The City's existing Park and Master Plan identifies the need for two developed parks in this area to meet its standard of having neighborhood or community parks within ½ mile of all residents. According to conversation with Jim Row, (former) Oregon City Park and Recreation Planner, The Oregon City Park and Recreation Master Plan, National Recreation and Park Association's park and recreation facility guidelines, and information compiled by Cogan Owens Cogan, a single park would not meet this standard. Such national and local guidelines typically indicate standards of between 1-3 acres of neighborhood parks per 1,000 residents, 2-4 acres of community parks per 1,000 residents and overall goals of six to 10 acres of developed park facilities per 1,000 residents. These standards indicate the need for 18-30 acres of developed parks, including neighborhood and community or other developed park facilities in the planning area, assuming a buildout population of about 3,000 residents. The proposed number of facilities and acres of developed parks is generally consistent with these targets.

The planned park and the shown conceptual expansion are able to meet these standards. Park Place Crossing will contribute ±4.1 acres of the required 8 acres, meeting the standard for the number of anticipated residents within the PPCP area.

The parks shown on the Urban Growth Diagram are located in their respective neighborhood centers and are surrounded by commercial, civic uses, and medium density housing. The parks are intended to provide basic recreational opportunities for residents and may include amenities such as play equipment, athletic fields, picnic tables or shelters, walking trails, and other features. The

neighborhood park in the North Village is approximately eight to ten acres and within walking distance of the Livesay Main Street. The South Village neighborhood park is approximately three to five acres and surrounded by medium/high-density residential. These two parks are consistent with the type of parks identified as needed in the City's *Parks and Recreation Master Plan* (2004) and with recommended national acreage guidelines and service areas.



Open Space – Natural Area



Neighborhood Park

The planned park and natural open space areas are consistent with the intent of the Park Place Concept Plan. The area is adjacent to commercial, Village Green, and civic areas, as well as higher density housing to provide greater access and walkability.

Transportation

The core values and guiding principles of the Park Place Concept Plan describe a multi-modal transportation system that is fully integrated with the land uses it serves. By design, the system is inherently sustainable, safe, and interconnected and serves the local and regional travel anticipated for the area.

Holly Lane and Swan Avenue Extensions

Holly Lane serves a vital role in both the local and the regional context as the only continuous north/south travel corridor on the east side of HWY 213. Holly Lane connects the northern area of Oregon City to many key destinations in the hilltop area of the city, such as Berryhill Shopping Center, Clackamas Community College, Oregon City High School, City Hall, and many other retail and employment locations. As a result, this corridor is expected to see travel demands increase by nearly 13,000 vehicles per day to a total of more than 16,000 vehicles per day. Were this to occur, Holly Lane would need to provide five lanes near its intersection with Redland Road and three lanes for the remainder of its length. In addition, Redland Road would need to provide six lanes (unless a smaller cross section is proven adequate) near its intersection with Holly Lane and five lanes for the remainder of its length to Abernethy Road.

The cost and feasibility of these improvements is questionable. Much of the Holly Lane corridor has a very narrow right-of-way with many single-family residences that take direct access from Holly Lane. Climbing sections of Holly Lane will be very costly to reconstruct and face several engineering challenges. The existing two-lane bridge across Abernethy Creek would need to be demolished and replaced with at least a five-lane bridge. Finally, much of Redland Road is significantly constrained by topography on the north side and the Abernethy Creek on the south side.

The primary north-south connection within the Park Place Crossing area is Holly Lane. As demonstrated below, the alignment of Holly Lane mimics the concept plan but also considers topographic, natural resource, and design level information. The Park Place Crossing Master Plan is consistent with the intent of the Park Place Concept Plan.

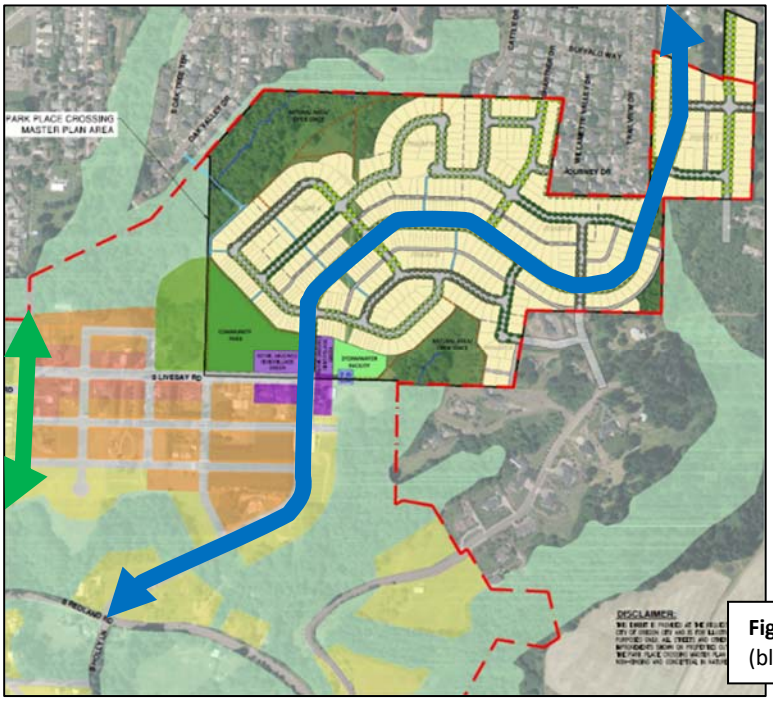


Figure 28: Planned alignment of Holly Lane (blue) and Swan Avenue (green) extensions

Sustainability

A sustainable transportation system is achieved through a number of specific components. The pattern of classified streets in the Plan naturally accommodates transit service to and through the area, creating a viable alternative to vehicular travel for most types of trips. The redundant and interconnected network of facilities distributes traffic, shortens trip lengths, and optimizes opportunities for non-auto travel.

These components work in combination to provide a sustainable transportation system and minimize the adverse impacts of impervious surface and vehicular travel.

The Park Place Crossing area will be designed for on-site storm water management facilities within street side swales (where feasible) and a regional facility. The transportation network of the PPCMP has been designed to allow viable transportation opportunities throughout the area by means other than motor vehicles throughout Park Place. These streets, sidewalks, bicycle lanes, accessways, hard-surface trails, and soft-surface trails allow shortened trip lengths, safe travel, and sustainable transportation options.

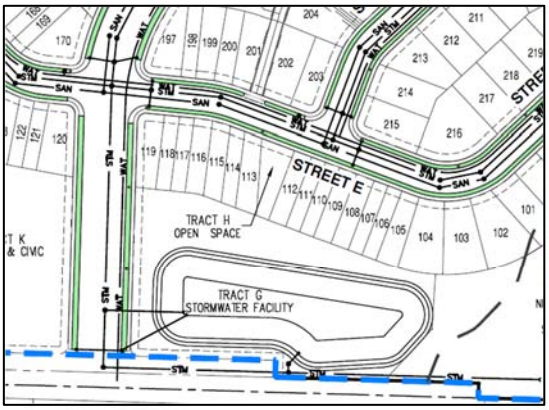


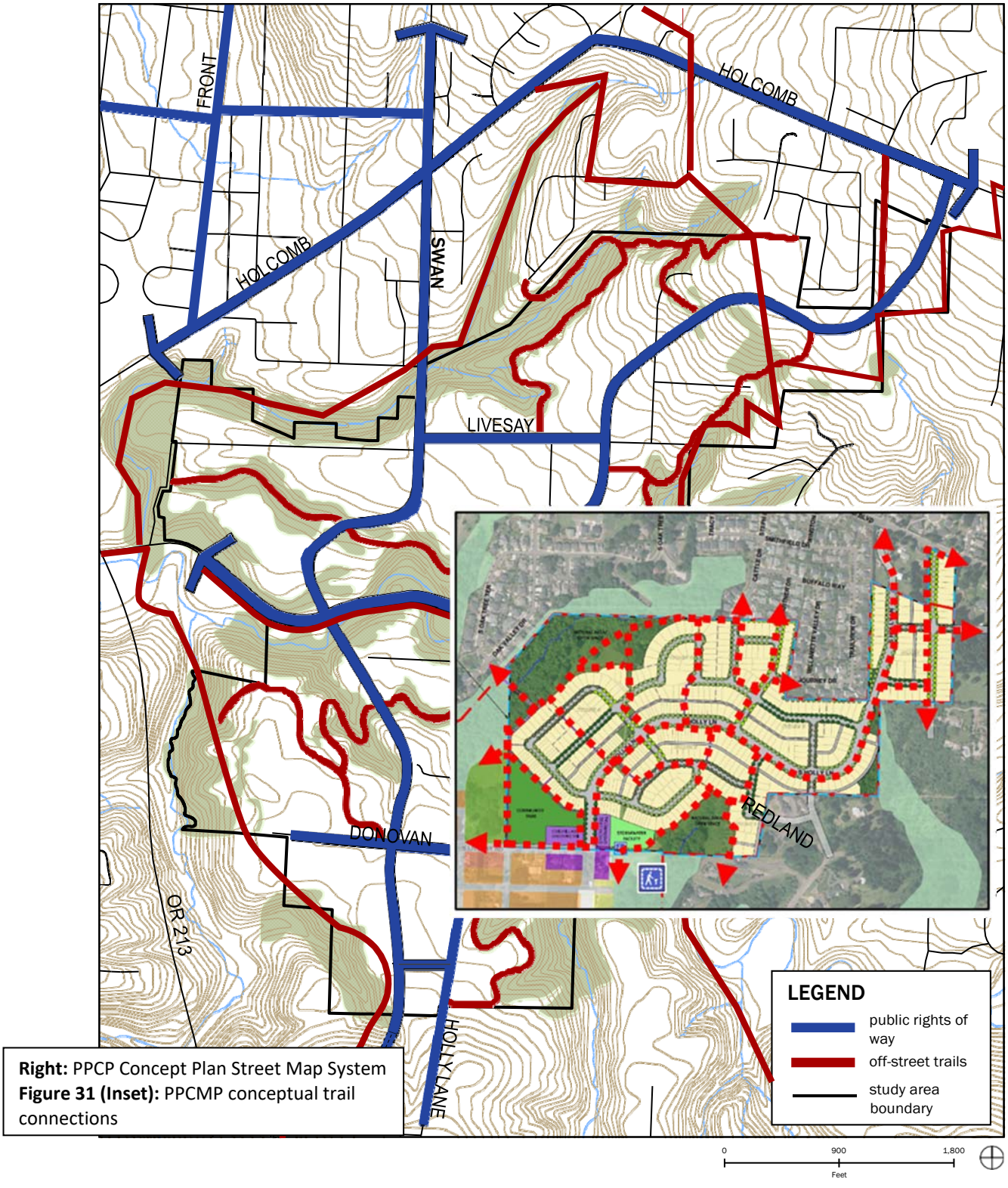


Figure 29 (Top): PPCMP conceptual stormwater facility locations
Figure 30 (Right): PPCMP conceptual trail connections

Nature and the Pedestrian/Bicycle System

The natural beauty of the Park Place area is a tremendous asset that justifies a high-quality pedestrian and bicycle system to access it. People are drawn to this beauty and desire to see it, as they travel, and spend time in it, as they recreate. The natural surroundings will be a stimulus for activity, which is best served by a pedestrian and bicycle system associated with public rights-of-way and on trails. Therefore, all public streets (any street owned by a public agency) will be equipped with sidewalks on both sides, sized appropriately to the adjacent land uses and expected pedestrian activity. On-street striped bike lanes will exist on most of the classified roadways (any roadway functionally classified as a collector or above by any public agency) to safely accommodate and delineate bike routes. **A system of hard- and soft-surface trails will intertwine with the public rights-of-way to provide direct access to nature for both modes.** The result is a natural environment, complemented by a robust pedestrian/bicycle network that is expected to stimulate a much higher level of pedestrian and bicycling activity than in many other areas of the region.

The Park Place Crossing Master Plan area has been designed with a system of hard and soft surface trails throughout. The PPCMP transportation system provides a variety of on and off-street facilities to connect residents with the planned commercial retail, civic, Village Green, extensive open spaces within the PPCP area, and the planned community park. These facilities will accommodate bicyclists and pedestrians and allow efficient and safe transportation within the Park Place Concept Plan area and adjacent future and existing neighborhoods.



Right: PPCP Concept Plan Street Map System
Figure 31 (Inset): PPCMP conceptual trail connections

Figure 3-4. Concept Plan Street System Map

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

The following sections provide a description of each mode of travel in Park Place and the recommended multi-modal system to support those modes.

Street System

A network of streets is necessary to satisfy the core values of the Plan and meet the needs of the traveling public. The Concept Plan Street System Map (Figure 3-4) and the Concept Plan Functional Classification Map (Figure 3-5), depict this system of streets and the way in which each is anticipated to function. Each street is carefully sized to carry the expected travel demand it is intended to serve, while minimizing the impact of unnecessary impervious surface. Described below are the functional classifications applied to roadways within the planning area. Other improvements (e.g., intersection improvements) will be evaluated and designed in more detail as development occurs. They could include a mix of traffic signals and/or roundabouts, as well as additional turn lanes.

Functional Classification

Roadways within the plan area are categorized into different groups. These groups are referred to as "functional classifications" and are defined in the City of Oregon City's Transportation System Plan (TSP). Roadway classifications applied within the Park Place neighborhood include Minor Arterial, Collector, Neighborhood Collector, and Local Street.

Minor Arterial streets are roadways that "connect principal traffic generators; carry local traffic between neighborhoods and to community and regional facilities within a city."

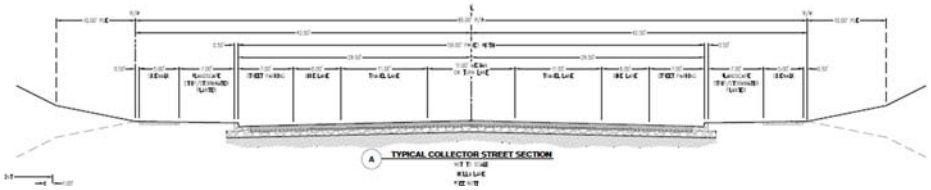
Collector

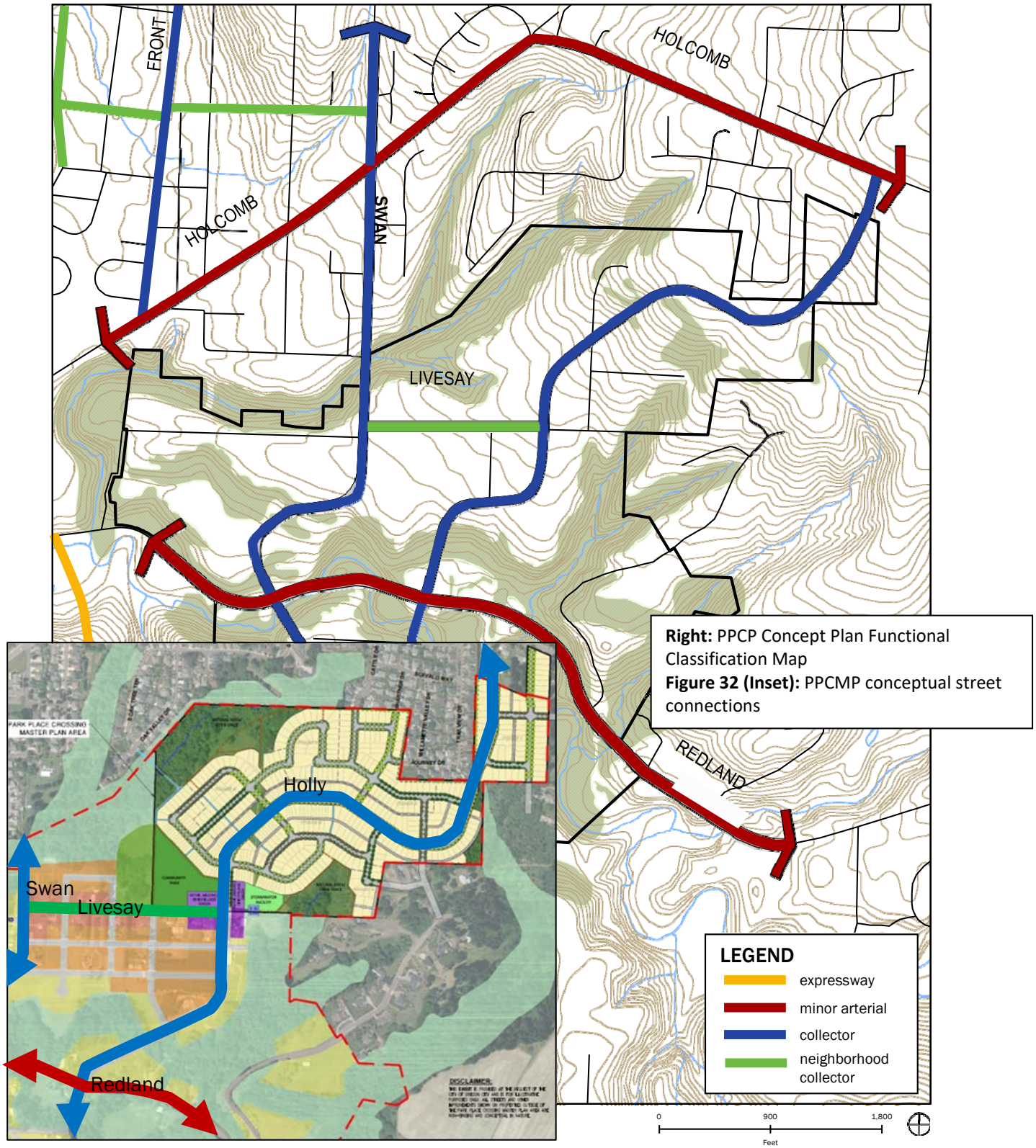
The existing Holly Lane is designated a Collector street, because it connects area residents to Redland Road and Maplelane Road, both of which are Minor Arterials. Other Collector streets in the vicinity include Forsythe Road, Front Avenue and Swan Avenue, north of Holcomb Boulevard. The extensions of Swan Avenue (from Holcomb Boulevard to south of Donovan) and Holly Lane (from Redland Road north to Holcomb Boulevard) are also designated as Collector facilities. This designation is chosen because of the anticipated function each extension will serve, connecting between Minor Arterial streets and linking neighborhoods to several areas of the city.

Collector streets are typically characterized by a 2 or 3-lane cross-section, low to moderate traffic volumes, trip lengths, and traffic speeds.

The primary function of Neighborhood Collectors is to provide local access and circulation. The roadway typically has low traffic volumes and speeds to ensure livability and safety.

The PPCMP features Holly Lane (pictured below) as the primary route through the project area. The design of Holly Lane within the PPCMP allows for the future connection of Holly Lane with Holcomb Boulevard and Redland Road.





Right: PPCP Concept Plan Functional Classification Map
Figure 32 (Inset): PPCMP conceptual street connections

Figure 3-5. Concept Plan Functional Classification Map

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

Neighborhood Collector

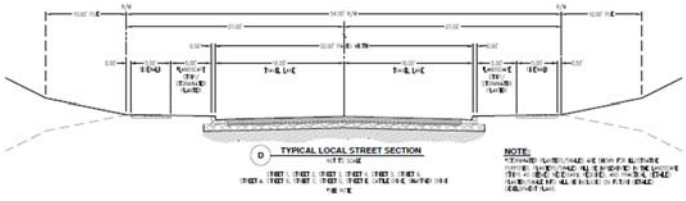
Livesay Road, between Swan Avenue and Holly Lane, and Donovan Road, from Holly Lane to Ogden Middle School, are designated as Neighborhood Collectors. Apperson Boulevard and Cleveland Street are other Neighborhood Collectors in the vicinity.

The Park Place Crossing Master Plan area is adjacent to Livesay Road. Future projects within the commercial retail/civic/Village Green areas will improve the adjacent Livesay Road facilities to the City's applicable Neighborhood Collector standards.

Local Street

A Local street is one that "provides direct access to adjacent properties and land uses within neighborhoods; lowest mobility function and highest accessibility function; low traffic volumes and speeds; through traffic discouraged; typically 2-lane sections; on-street parking encouraged; typically stop-sign control at intersections with collector and arterial streets; sidewalks and landscaping are required; and, bicycle lanes are optional." All roadways not depicted in Figure 3-5 will be constructed as local streets.

The Park Place Crossing Master Plan provides a network of interconnected local streets. These streets are anticipated to see low traffic volumes, little through traffic, and high accessibility. Local streets are anticipated to be provided according to the cross-section below.



Pedestrian and Bicycle

Area residents will be able to travel throughout the Park Place planning area by walking or biking on a system of trails and on-street facilities that are seamlessly interconnected with the local and regional trails system.

Trails

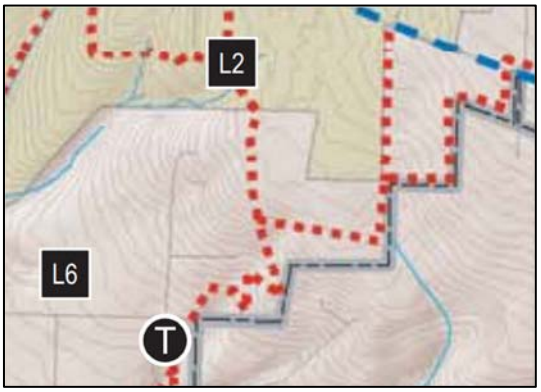
Figure 3-8 illustrates the trail system throughout the planning area. Local, community, and regional trails connect to the Park Place Concept Plan trails that link to parks, open space, and community destinations. Many of these trails could include a soft-surface to accommodate equestrian activity, while others would have an all-weather surface. (The Park Place Concept Plan is aspirational with respect to equestrian facilities. Equestrian facilities are likely to occur outside of public street rights-of-way.) These trails provide recreational opportunities in addition to providing safe routes of travel for bicyclists and pedestrians. The following trail types and standards are described in greater detail in the Oregon City Trails Master Plan.

Community Trails: These trails serve residents throughout the community and provide links both within and between different neighborhoods and community destinations within the city. They are designated as community trails in the Oregon City Trails Master Plan map. Community trails typically are wider than local trails and provide access to multiple types of users, similar to regional trails. Trails surfaces (paved or unpaved) and widths may vary depending on topography, other environmental conditions and level of use.

Local Trails: Local trails primarily serve residents within a single neighborhood or portion of the city. They provide links within neighborhoods to or between local destinations such as schools, parks or shopping areas, or within natural areas or parks. Trails surfaces (paved or unpaved) and widths may vary depending on topography, other environmental conditions and level of use. Due to the constrained Redland Road corridor, pedestrian and bicycle facilities will occur as a part of the typical cross section, or shall be separated and treated as a multi-use, accessible all-weather trail system.

The Park Place Crossing Master Plan (below, left) provides trail connections identified within the Oregon City Trails Master Plan map (below, right).





On-Street Bicycle and Pedestrian Facilities

Figure 3-9 depicts the on-street facilities for bicycles and pedestrians. **Sidewalks will be constructed on both sides of all new roads and will be added to both sides of all collector- and arterial-level roadways within the planning area, in order to accommodate pedestrians.** On-street bike lanes are

anticipated for Holly, Swan, and Donovan. Livesay will operate as a shared-use facility, equal in treatment to all Local streets. Due to the constrained Redland Road corridor, pedestrian and bicycle facilities may occur as a part of the typical cross section, or separated and treated more like an all-weather trail system.

These two systems of bicycle and pedestrian facilities will connect Park Place residents to parks, open spaces, centers of commercial activity, and the regional transportation system without requiring them to step into a car. The robustness of these systems is in response to the desires of the community and the quality of the natural environment.

Within this section of the Park Place Concept Plan area, Holly Lane is the primary north/south travel route. Bicycle and pedestrian travel routes are planned along the Collector and Local streets to connect to off-street trails that provide connectivity to adjacent existing neighborhoods. It is through these planned systems that pedestrians and bicyclists can avoid vehicle travel to reach the PPCMP Livesay Main Street or other neighboring areas. Pedestrians will be accommodated on sidewalks on both sides of each Local and Collector street. Bicycle lanes will be provided on Holly Lane. Accessways are planned through many of the PPCMP blocks to reduce block length and out of direction travel.

Water, Wastewater, Stormwater Improvements

The area is comprised of three drainage basins: Abernethy Creek, Newell Creek and Livesay Creek. As noted in the existing conditions, no major stormwater infrastructure exists within the Park Place Concept Plan area other than roadside ditches and natural drainage channels. It is recommended that a low-impact stormwater approach be developed with a goal of mimickingthe natural hydrological conditions of the three watersheds of the Park Place Concept Plan area. These three drainage basins should be used to delineate the stormwater approach for the Park Place Concept Plan.

Stormwater Management Approach

The general approach of the stormwater management system for the Park Place Concept Plan is to establish a system that mimics the natural hydrology of the site to the extent practicable. In pursuing this design goal, the Park Place Concept Plan area has been separated into three distinct systems based on the boundaries of the existing watersheds. The stormwater system within each drainage basin should utilize the combination of centralized and decentralized low-impact stormwater best management practices to manage stormwater generated from the Park Place Concept Plan area.

Central to the stormwater approach of the Concept Plan, is a stormwater hierarchy focused on managing stormwater in a naturalistic manner at three separate scales: site, street and neighborhood (vs. a one-size fits all approach).

Tier 2 – Green Streets Stormwater Management Facilities (Street)

In urban environments, much of the stormwater quantity and pollution issues are attributed to streets. An innovative, low-impact manner in which to address this reality is through the use of Green Streets. Green Streets are streets that integrate the management of stormwater into the street design itself to provide a stormwater management benefit as well as an urban design element and they may potentially reduce the need for downstream stormwater facilities such as large stormwater ponds.









Examples of Tier 1 and Tier 2 stormwater facilities

Green streets can serve as both stormwater management facilities and stormwater conveyance facilities. As a stormwater management facility, their objective is to minimize stormwater runoff generated from streets and reduce pollutants. As a stormwater conveyance facility, their objective is to convey stormwater from both private property and streets to regional stormwater management facilities. Green Streets typically take the form of vegetated swales located along the street with curb cuts to allow street runoff to enter them. In more urban areas, stormwater planter boxes mimicking the look of street tree wells may be used. Most Green Street stormwater facilities should be publicly owned and maintained.

Tier 3 – Regional Stormwater Management Facilities (Neighborhood)

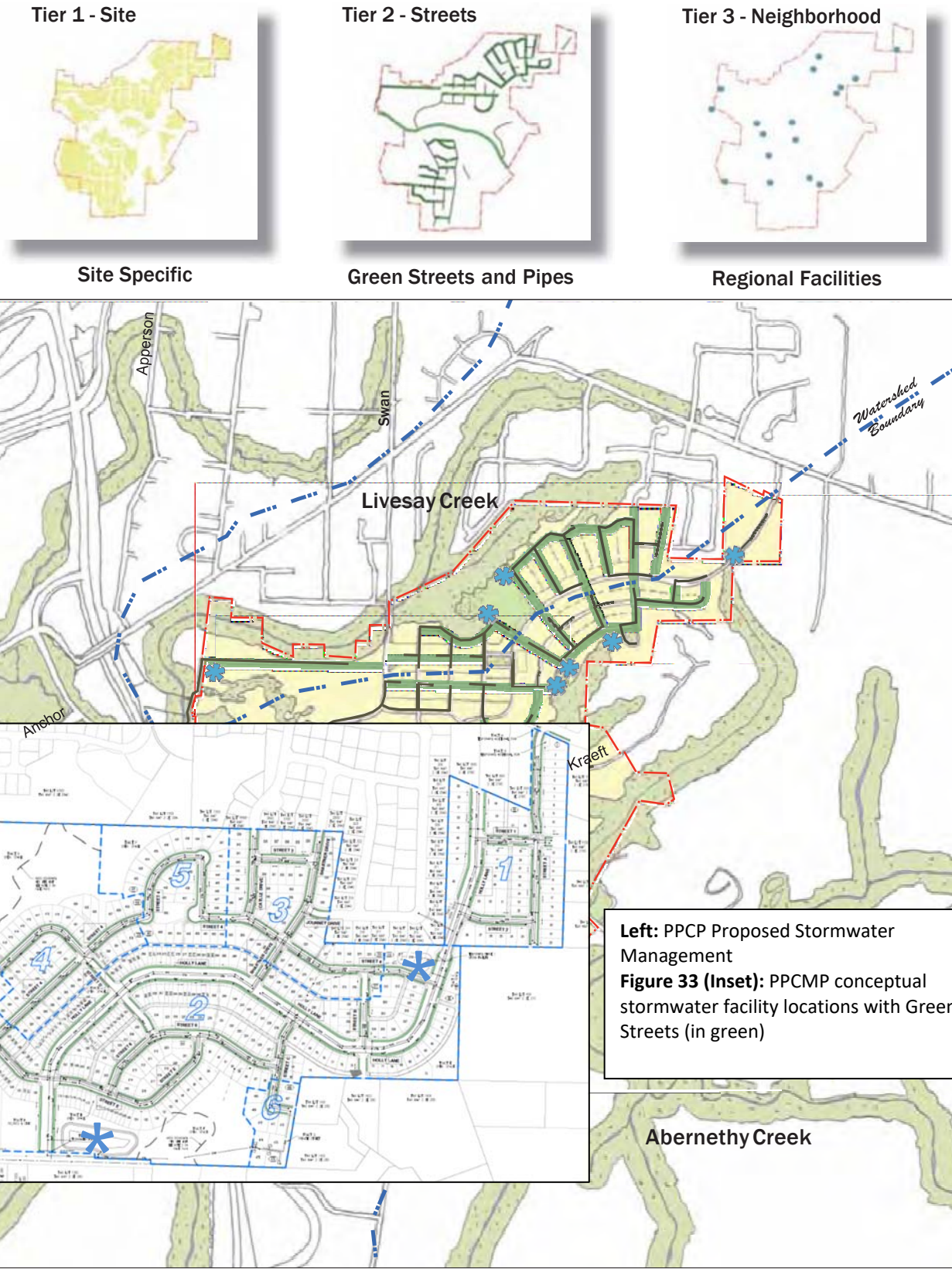
Regional stormwater management facilities are focused on managing large stormwater flows and volumes that may be passed through Tier 1 and Tier 2 facilities. Moreover, they provide additional water quality benefits prior to discharging stormwater to the existing creeks. These stormwater facilities are typically to be located adjacent to the existing streams and should take on a more naturalistic form such as a wetland pond. Most regional stormwater management facilities should be publicly owned and maintained.

The stormwater system concept plan (Figure 3-12) shows generally how this stormwater approach should be implemented for the Park Place Concept Plan area.

Stormwater Conveyance Approach

Surface conveyance, in the form of swales and ditches, should be provided as a means to convey stormwater via gravity from private property and streets to the existing creeks to the extent practicable. Piped conveyance will be required but should be kept to a minimum if possible.

Park Place Crossing features stormwater management facilities within street rights-of-way where required and feasible in order to minimize the need/size of downstream stormwater facilities. The Composite Utility Plans included within the Preliminary Plans include the possible locations for stormwater planters within street rights-of-way, a temporary facility to manage stormwater for Phase 1, and an ultimate regional facility to manage stormwater for much of Park Place Crossing's phases, where feasible.



Left: PPCP Proposed Stormwater Management
Figure 33 (Inset): PPCMP conceptual stormwater facility locations with Green Streets (in green)

Figure 3-12. Proposed Stormwater Management

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

4. Implementation

1. Compliance with Title 11

Land Use

Following are land use policies related to housing, commercial, and industrial developments. Other land uses (e.g., schools, parks, and public facilities) are addressed separately.

Housing

The following steps have been taken in the concept planning process to comply with Title 11 as it relates to housing.

- Zone adequate land to allow for a variety of housing types and densities as outlined in more detail in Chapter 3. The zoning mix allows the City to meet Metro targets for housing based on average densities required in the two different portions of the planning area.
- Create opportunities for mixed residential and commercial uses through amendments to and application of the city's mixed use zone.
- Locate denser housing types adjacent to commercial areas and civic uses.
- Zone land in a way that allows for housing types and densities typically more affordable to households with low and moderate incomes (see Chapter 3 for an assessment of this issue).

While the Park Place Concept Plan allows for opportunities to meet affordable housing needs without subsidy, the reality of the housing market in Oregon City and the Portland Metropolitan region is that some subsidy by public agencies and non-profit organizations will be required to achieve affordable housing goals for this area. The following goal, policies and implementation strategies can be used to meet affordable housing objectives, as well as more general housing goals.

Housing Goals, Policies, and Implementation Strategies

Goal

The concept planning area should incorporate Comprehensive Plan and zoning designations that allow for a wide range of housing types and densities that meet the needs of households with a range of incomes.

Policies

- Apply zoning designations that allow for achievement of the goal above.

Following annexation, the Park Place Crossing area was assigned with zoning district designations that would allow for the goal of providing a wide range of housing types and densities to meet the needs of households with a wide range of incomes. The project designates areas for both single-family attached and detached homes at densities that meet the intent of the Park Place Concept Plan.

- Create flexibility in development standards to allow for alternative housing types such as zero lot-line development, cluster housing, and accessory dwelling units.

The Park Place Crossing Master Plan has planned areas of attached housing. Code changes currently being undertaken by the City will allow for alternative housing types.

- Ensure connectivity of residential areas to commercial areas and parks and open space by creating regular street grid patterns where topography allows and providing a complete sidewalk network.

The PPCMP follows the general framework established by the Park Place Concept Plan to connect residential areas to commercial, park, and open space areas that will serve residents of the community. The Park Place Crossing layout creates street grid patters where feasible and provides a sidewalk and off-street trail network to allow for greater connectivity.

- Ensure that residential neighborhoods are bordered by parks and/or open space. Streets should be integrated with a network of bikeways, trails and/or pedestrian paths where possible.

Park Place Crossing is generally surrounded by open space. Trails and street networks connect residential areas to the planned community park. Off-street trails, pedestrian paths, and on-street facilities such as sidewalks and bicycle lanes are planned to provide non-vehicle transportation options for area residents where feasible due to topographic, natural resource, and block length constraints.

- Orient residential streets to maximize solar exposure for energy conservation where possible.

Housing density, street alignments, and lot orientation to maximize solar exposure have been considered when deciding on the residential layout for Park Place Crossing.

- Link the density of housing to the hierarchy of the street network.

Housing density within Park Place Crossing generally follows the street network hierarchy. Denser housing, such as the planned single-family attached residences, is intended to follow the Holly Lane Collector Street and be centered around the future commercial area at the intersection of Holly Lane and S Livesay Road.

- Provide a transition or buffer between existing and new residential

development.

Park Place Crossing provides wide natural open spaces and other buffers between many of the new residences and existing neighborhoods. These open spaces combined with larger residential lot sizes along the perimeter of the project allow for a transition to the higher density called for through the Park Place Concept Plan.

- Support architectural integrity and variety in residential and mixed-use neighborhoods.

The architectural composition of the residential and mixed-use portions of Park Place Crossing have not yet been determined but are expected to be in keeping with both the architectural provisions of the Park Place Concept Plan and the Oregon City Municipal Code.

Table 4-3. Proposed Area of Commercial Uses in Park Place

Type of Commercial Use	Proposed Zone	Land Area (SF)	Floor Area (SF)
Retail	Neighborhood Commercial (NC)	79,191	39,595

Commercial and Industrial Development

Commercial Development

The Neighborhood Commercial (NC) zone recommended in the North and South Villages will accommodate commercial development. The NC zone will be targeted for primarily retail use. Table 4-3 identifies the amount of land proposed for each of this zone and targeted uses.

Assuming an approximately 50% lot coverage, the NC zone yields about 0.91 acre (39,595 sq. ft.) of building area and the same for parking and landscaping. This falls within the range of retail building area that market consultant Johnson Gardner estimated that Park Place could support.

Economic and Commercial Development Goals, Policies, and Implementation Strategies

Goal

Establish opportunities to create neighborhood commercial and mixed use centers which provide area residents with opportunities to shop and work, consistent with the core values of this plan.

Policies

- Establish two neighborhood commercial/mixed use centers that allow for small scale, neighborhood oriented commercial development, as well as mixed residential/commercial development and public buildings and gathering places.

Park Place Crossing is located northwest of the North Village commercial/mixed-use center. The PPCMP plans to provide a retail area for small-scale at the sizes called for within the Park Place Concept Plan. The Master Plan also provides Civic and Village Green areas similar to those envisioned by the PPCP to serve as public and gathering places.

- Locate neighborhood commercial and mixed use centers in close proximity to denser residential development, as well as parks and community facilities.

Higher density attached single-family residences within Park Place Crossing are located close to the Livesay Main Street mixed-use area, community park, and other community amenities. These locations closely align with those envisioned by the Park Place Concept Plan.

- Ensure that roads, pathways and other transportation facilities are designed in a way that supports mixed use/commercial areas and provides adequate access to them by all modes of travel.

Transportation facilities within Park Place Crossing have been designed to provide access by many modes of travel. The vehicle network allows efficient and safe travel along the Holly Lane Collector Street. Streets allow safe and efficient travel by pedestrians and bicycles on both on- and off-street facilities. Trails allow additional connectivity to surrounding areas of existing and future neighborhoods

Natural Resources and Hazards

A key part of protecting existing natural resources is to use the best development practices available in these areas. For the Park Place Concept Plan development, Metro's Nature in Neighborhood design guidelines were followed. These guidelines, though voluntary, are very applicable to achieving the environmental protection goals of the Park Place Concept Plan. As the Park Place Concept Plan develops, the Table 4-4 provides a list of best development practices that should Implementation 68 Final Concept Plan be considered. The implementation measures described in Appendix I identify the City code sections which could incorporate these best development practices.

Natural Resources and Hazards Goals, Policies, and Implementation Strategies

Goal

- Manage and conserve natural resources and values within the planning area, including riparian areas, woodlands, wetlands and wildlife and plant habitat.

Creeks, including adjacent habitat areas are planned to be conserved within open space tracts. These tracts will allow woodlands, wetlands, flora, and fauna to remain as undisturbed as feasible within this area of the North Village.

- Minimize impacts to areas that pose hazards to personal property and the natural environment, including steep slopes, areas potentially susceptible to land slides and other such areas.

Many of the areas which pose hazards due to steep slopes and land slides are also within the above-described natural resource areas. These areas will also be preserved and will remain undeveloped as part of the Park Place Crossing Master Plan.

Policies

- Conserve and improve streamside, wetland, and floodplain habitat and their connections.

The Park Place Crossing Master Plan intends to conserve the nearby creek and Natural Resource Overlay District areas within open spaces tracts. These tracts will prevent disturbance related to the construction of homes and public improvements associated with future phases of the project. The

areas included are not currently connected, but it is anticipated that connections between the wooded areas would be maintained through the creation of preservation areas as shown within the PPCP Final Concept Plan map.

- Conserve large areas of contiguous habitat and avoid habitat fragmentation.

"Fingers" of preserved habitat areas will link to areas on adjacent properties to form contiguous habitat for wildlife.

Implementation Strategies

- Require applicants geotechnical engineer to field verify during construction to ensure that the subsurface conditions/assumptions made as part of their geotechnical evaluation/investigation are appropriate.
- Require the applicants geotechnical engineer to prepare a summary letter stating that the soils- and foundation-related project elements were accomplished in substantial conformance with their recommendations.

Geotechnical materials have been provided with this submittal and with each phase of Detailed Development Plan applications as well as when appropriate before, during, and after construction.

Public Facilities and Services

Conceptual public facility plans have be developed for the provision of wastewater, and storm drainage. These plans have been developed to comply with goals of the local community, City of Oregon City, Metro and the following documents:

- City of Oregon City Water Master Plan
- City of Oregon City Sanitary Sewer Master Plan
- City of Oregon City Drainage Master Plan
- City of Oregon City Draft Stormwater Management Plan
- City of Oregon City Stormwater and Grading Design Standards

The City of Oregon City Water Master Plan was referenced to determine anticipated water demands within the Park Place Concept Plan area. Average daily demand as well as peak demand and fire demand were evaluated at a preliminary level. In general, water demand from planned development within the Park Place Concept Plan area is consistent with demands anticipated in the Water Master Plan.

The City of Oregon City Sanitary Sewer Master Plan was referenced to determine anticipated wastewater generation within the Park Place Concept Plan area. In general, similar wastewater flows were developed. As a result, wastewater flows generated by development within the Park Place Concept Plan area are consistent with those found in the Sanitary Sewer Master Plan.
All three stormwater documents emphasize minimizing the amount of post-development stormwater runoff to pre-development conditions and reducing pollution loads. The Park Place Concept Plan stormwater approach was developed to meet these goals (Appendix J).

Public Facilities and Services Goals, Policies, and Implementation Strategies

Goal

- Plan for and provide adequate facilities for water, wastewater and stormwater service.

The Park Place Crossing Master Plan plans for adequate water, wastewater, and stormwater for both the project and as needed for adjacent future projects.

Policies

- Ensure that water, wastewater and stormwater facilities have adequate capacity to meet public facility and service needs within the planning area.

Park Place Crossing plans to provide adequate public facilities as outlined within the PPCP. Future Detailed Development Plan applications will verify the sizing needed for both the project and adjacent future projects.

- Plan and pay for needed improvements in an equitable manner with the costs of new growth borne by future developments

It is expected that the Park Place Crossing project will bear the costs of construction and provision of the needed utility improvements, except where additional capacity for adjacent future projects, or "upsizing" is required.

- Identify and implement best practices for on-site treatment of stormwater, water conservation and other practices to reduce service needs and impacts.

Stormwater management methods have been selected from proven best practices to fit the site as appropriate to its soils, infiltration rates, and other needs.

Implementation Strategies

- Identify areas within the Park Place Concept Plan planning area for slope stability hazards and infiltration areas to determine if stormwater should be allowed, limited, or restricted.

Stormwater from Park Place Crossing generally follows the natural drainage patterns for the area. Furthermore, stormwater will be detained and directed to a drainage area currently used by the Trailview Subdivision and appropriate for such continued use.

- Develop a stormwater management system that utilizes a combination of regional detention facilities, green streets and on-site stormwater detention and filtration to minimize runoff and impacts on local waterways.

Park Place Crossing integrates vegetated on-street and regional detention facilities to manage stormwater per best practices for "green streets" to minimize impacts to local waterways.

Parks

The Concept Plan includes two neighborhood parks, each located in a neighborhood center adjacent to commercial, civic, and medium and/or higher density residential land uses. The parks are intended to provide basic recreational opportunities for residents and may include amenities such as play equipment, athletic fields picnic table or shelters, walking trails and other features. The North Village neighborhood includes an 8-10 acre neighborhood park; the South Village park is about 3-5 acres.

Parks needs are consistent with those generally identified the City of Oregon City's existing Parks and

Open Spaces Master Plan. That plan identifies a community park and a neighborhood park service area within the Park Place Concept Plan study area. Local and national guidelines for these types of parks indicate a need for about 10 – 30 acres of developed park land in the planning Implementation City of Oregon City 73 Implementation area. The City is currently updating its Parks and Open Spaces Master Plan, which may provide more specific guidance on the size of future parks in the area and/or needed amenities within them.

The open spaces identified in environmentally constrained portions of the study area are also are expected to provide extensive opportunities for outdoor recreation including an extensive trail system.

Parks and Open Spaces Goals, Policies and Implementation Strategies

Goal



- **Provide parks, open space, and trails consistent with City or national standards, including trail or open space connections between centers.**

The planned park will be connected to Park Place Crossing through on and off-street pedestrian and bicycle facilities. Future connections to the envisioned South Village park area may be accomplished through future projects. The provided park will be ±4.1 acres, proportional with the number of homes provided by the project as a percentage of those imagined within the North Village.

Policies



- Plan for neighborhood parks that are intended for low-impact active and passive recreational activities.

It is anticipated that the provided park, in addition to neighboring property that could be used for an expansion of park areas, could be utilized for a number of different recreational activities. The area, dimensionally, could provide space for football, softball, volleyball, basketball, or any number of other sports fields and general play areas.



- Locate neighborhood parks within comfortable walking distance (e.g. one-half mile) of most residences and easily accessible to pedestrians and bicyclists.

The park would be located centrally within the North Village area, which would locate it within one-half mile of the majority of the Park Place Concept Area. Planned connections allow the park to serve surrounding existing neighborhoods as well without out-of-direction travel to or along Holcomb Boulevard.



- Develop and maintain a system of neighborhood trails to provide a variety of recreational opportunities, such as walking, bicycling and jogging.

On and off-street trail connections have been planned to accommodate recreational opportunities such as walking, bicycling, and jogging. These facilities, including a planned trailhead at the intersection of S Livesay Road and Holly Lane, will allow pedestrians easy access and navigation of the Park Place Crossing area and provide future connections to City trail networks.



- Design the trail system to connect parks and open spaces and provide connections to established neighborhoods where possible.

The planned location of the park and Park Place Crossing's open space areas allows for easy pathway connections between these areas and surrounding neighborhoods. The connections also allow for connections to established neighborhoods, such as S Livesay Road, Journey Drive, Cattle Drive, Shartner Drive, and across natural resource areas via a bridge connection to Oak Valley Drive.

- Promote the location of neighborhood parks adjacent to higher-density residential housing to provide outdoor recreational opportunities for residents of attached housing and to enhance the quality of the neighborhood.

The best location for the park has been determined to be at the southwest corner of the site to allow for expansion to adjacent properties, to benefit from generally flat topography, and the benefit from a more centralized location within the North Village area. This location also places the park adjacent to higher-density residential housing and a planned street intersection with frontage on two future streets. This proximity to planned attached housing and neighborhood commercial areas will allow for greater use and enjoyment of residents and visitors of the Park Place Concept Plan area.

- Allow for flexibility in the siting of future parks while ensuring that locations meet the criteria identified in the Park Place Concept Plan.

The park, as illustrated within the Final Concept Plan map, has been shifted south for the Park Place Crossing Master Plan in order to better locate the facility for the community. Flexibility in the siting of the park will allow for future expansion of the park area and easy access by residents of Park Place Crossing. Adjacent commercial and civic areas will attract foot traffic from those seeking recreation opportunities in the area and align better with future commercial areas west of the PPCMP area. Connecting trails and nearby trailhead facilities will allow easy access to other areas of Oregon City, existing neighborhoods, and additional park facilities. A strict interpretation of the park location within the PPCP Final Concept Plan map would not consider topographic issues, the size of the nearby natural resource area, and these essential connections to its surroundings.

- Support joint uses of community facilities such as schools and parks.

While schools have not been planned within the Park Place Crossing Master Plan area, it is anticipated that planned eventual street and trail extensions will allow easy access to the planned park from existing schools, such as Tumwata Middle School, and future schools that may be sited within the area.

- Conserve and protect natural areas, including environmentally constrained areas unsuitable for development.

Park Place Crossing provides for a greater quantity of open spaces than originally envisioned by the PPCP. This greater provision will allow for habitat areas to be preserved, greater buffers to be provided from existing neighborhoods, and a greater opportunity for recreational trails to be provided. Other areas of the open spaces not improved with soft-surface trails will be protected from encroachment by buildings and activities. These areas are likely to remain under the ownership of a Homeowner's Association and may be acquired by the City in the future.

Implementation Strategies



- Evaluate natural areas for capacity to support recreation uses, such as hiking or biking. Limit or protect human activity as appropriate.
- Coordinate with private property owners regarding development of the trail system.

The open spaces planned will allow for the preservation of habitat areas as well as light recreational uses such as hiking or biking within improved soft-surface trails. Human activity outside of these immediate areas is anticipated to be limited.

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Date: 4/15/2022
To: Kelly Reid, AICP – Oregon City Planning Division
From: Glen Southerland, AICP
Project Name: Park Place Crossing General Development Plan (GDP)
AKS Job No.: **7404**
Subject: **Supplemental Information & Alternative Density Calculations**

In response to staff requests for information, the Applicant's team provides the following information. These supplemental responses are relevant to Oregon City Municipal Code (OCMC) 17.65.050.C due to the to overlay district designations within the Park Place Crossing GDP boundaries.

GDP Supplemental Information

When the subject properties were brought into the Portland Metropolitan Urban Growth Boundary (UGB) in 2002, the City began working on a concept plan to address the needs of the area. The Park Place Concept Plan was adopted in 2008 to focus on these issues. The Park Place Crossing properties were annexed into the City in 2018 through Ordinance No. 18-1007. A condition of annexation approval required a General Development Plan/Master Plan be submitted for the properties – satisfied by this application. A General Development Plan does not authorize any physical alterations to the project site. Those alterations will occur following the submittal and approval of future reviews such as Detailed Development Plans (DDP), NROD Reviews, and Geologic Hazard Reviews for each future phase of the project.

While an application for General Development Plan/Master Plan is not subject to these reviews, reports and other items addressing NROD and Geologic Hazard areas have been included in the record (Exhibits G, K, L, and M) to address the relevant code criteria as they relate to the General Development Plan and demonstrate consistency with these overlay zones. As such, additional information regarding the applicable criteria of OCMC 17.65 is also included below.

> **17.65.050 - General development plan.**
>
> **C. Approval Criteria for a General Development Plan. The planning commission may approve an application for general development plan only upon finding that the following approval criteria are met:**
>
> **4. The proposed general development plan protects any inventoried Goal 5 natural, historic or cultural resources within the proposed development boundary consistent with the provisions of applicable overlay districts.**
>
> **7. The proposed general development plan is consistent with the underlying zoning district(s) and any applicable overlay zone or concept plans.**

Response: To further address this section of OCMC 17.65.050, the portions of OCMC 17.44 and OCMC 17.49 included below which are contextually relevant. Additional information to satisfy the above listed requirements have been included within Exhibits G, K, L, and M as part of this application for a General Development Plan. The General Development Plan does not authorize any physical alteration of the site. Future applications for Detailed

Development Plans will be accompanied by the appropriate applications for Geologic Hazard Review and/or NROD permit, as applicable. With the appropriate responses below, the criteria are adequately addressed and met.

Supplemental Overlay Information

Natural Resource Overlay District

NROD areas within the subject site consist of ravines located at the northwest and south-central portions of the site. The Park Place Crossing GDP is designed to largely avoid these areas and clearly includes them as open space. As discussed previously, approval of a GDP does not authorize physical alteration of the site. For the Park Place Crossing project to move forward, a Detailed Development Plan (DDP) is required. That application is required to be consistent with this GDP and provide a greater level of detail regarding natural resources on the site. At that time, a Natural Resource Overlay Permit will be necessary and ready for City review.

> **17.49.010 - Purpose.**
>
> The natural resource overlay district designation provides a framework for protection of Metro Titles 3 and 13 lands, and Statewide Planning Goal 5 resources within Oregon City. The natural resource overlay district (NROD) implements the Oregon City Comprehensive Plan Natural Resource Goals and Policies, as well as Federal Clean Water Act requirements for shading of streams and reduction of water temperatures, and the recommendations of the Metro ESEE Analysis. It is intended to resolve conflicts between development and conservation of habitat, stream corridors, wetlands, and floodplains identified in the city's maps. The NROD contributes to the following functional values:
>
> A. Protect and restore streams and riparian areas for their ecologic functions and as an open space amenity for the community.
> B. Protect floodplains and wetlands, and restore them for improved hydrology, flood protection, aquifer recharge, and habitat functions.
> C. Protect upland habitats, and enhance connections between upland and riparian habitat.
> D. Maintain and enhance water quality and control erosion and sedimentation through the revegetation of disturbed sites and by placing limits on construction, impervious surfaces, and pollutant discharges.
> E. Conserve scenic, recreational, and educational values of significant natural resources.
>
> The NROD ecological functions listed above are planned for integration with existing neighborhoods, new residential and commercial developments. The long-term goal of the NROD is to restore and enhance stream corridors, wetlands, and forests to more natural vegetated conditions, recognizing that existing homes and other existing uses will continue in the district. This chapter does not regulate the development within the identified water resource. Separate permits from the Division of State Lands and the Army Corp of Engineers may be required for work within a stream or wetland.

Response: This purpose statement is aspirational in nature and provides content for the standards and criteria that are relevant to the NROD. The Park Place Crossing General Development Plan preserves NROD areas through the designation of open space areas. The open space tracts will protect streams and riparian areas for their ecological functions and as amenities for the community. Trails, including some pictured within the City's Trails Master Plan, have been planned to allow the enjoyment of NROD areas by the community while protecting upland habitats that maintain and enhance water quality.

NROD areas (as mapped by the City) are shown on Sheet P-19 of Exhibit A. Some of these areas, such as those within Phase 5, are outside of the Applicant's current areas of control and, as such, may require some refinement of the site plan at the time of application for a Detailed Development Plan and NROD permit.

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.

Response: As described previously, an NROD permit will be submitted with future Detailed Development Plan applications which such activities are proposed. This application is for a General Development Plan, which does not provide authorization to divide property, alter the site, or construct anything on the property.

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.

Response: At such time that the uses regulated by OCMC 17.49.090 are proposed, an NROD permit application will be submitted. It is understood that such a permit will be processed as described above.

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.**

Response: These standards are understood and the listed activities are not relevant to this GDP application.

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 three thousand five hundred 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 subsection L shall be replaced with a new tree of at least one-half-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.

Response: Exempt activities necessary to prepare the GDP application such as boundary and topographic surveys, soil tests, borings, test pits, and other minor excavations necessary for geotechnical, geological or environmental investigation have or will be completed prior to the submittal of a Detailed Development Plan and/or NROD permit application.

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 stormwater 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.**

Response: This application involves a General Development Plan to guide future applications approving specific project improvements. Future DDP and NROD permits are anticipated to include some of these activities in the NROD (e.g., utility lines, trails, etc.). With those applications, necessary details demonstrating compliance with specific standards will be available and provided for review.

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-way (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):

Response: The following standards apply to the uses allowed within an NROD under prescribed conditions (listed above). As described above, this GDP application will not cause any of the above uses to be established on-site, including within the NROD areas.

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;

Response: Areas within Park Place Crossing that have been designated within the NROD are located such that they will be preserved within open space tracts. Existing tree locations have been provided as part of the Preliminary Plans (Exhibit A). These standards are understood and Park Place Crossing is expected to satisfy this standard. Structures and driveways will be located an appropriate distance from native trees unless deemed not wind-safe by a certified arborist.

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;

Response: These standards are not expected to apply to Park Place Crossing as the majority of mapped NROD areas are located within common open space tracts and within areas not subject to landscaping requirements. As appropriate, Park Place Crossing will comply with this standard.

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);

Response: If plantings within the project's NROD areas are deemed necessary, this standard will be met.

D. Grading is subject to installation of erosion control measures required by the city;

Response: Although this GDP application does not propose grading, this standard is understood and erosion control measures will be implemented through future DDP applications, as needed.

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;

Response: Although new home construction is not authorized with this GDP application, this standard is understood and future DDP and NROD applications may involve reduced front, street, or garage setbacks in order to minimize the disturbance of NROD portions of the lots; however, this action is not expected with this application for General Development Plan.

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;

Response: This GDP application does not involve construction of these items included by the standard. However, this standard is understood and future applications may demonstrate

a reduction in the required setbacks for commercial projects (if applicable); however, these reductions are not required at this time.

G. Fences in compliance with OCMC 17.49.080.N;

Response: This GDP application does not include fence construction. However, this standard is understood. If fencing is deemed to be necessary within an NROD area, it is expected to comply with these standards.

H. Exterior lighting shall be placed or shielded so that they do not shine directly into resource areas;

Response: This GDP application does not include approval that would allow lighting to be installed within or in proximity to an NROD area. However, this standard is understood and future lighting is expected to be placed and shielded as necessary.

I. If development will occur within the one hundred-year floodplain, the standards of OCMC 17.42 shall be met; and

Response: This standard does not apply to Park Place Crossing. The NROD area within the project boundary does not feature 100-year floodplain.

J. Mitigation of impacts to the regulated buffer is required, subject to OCMC 17.49.180 or 17.49.190.

Response: This standard is understood and is expected to be met with future applications.

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:

Response: As the GDP includes approximately 14.3 acres of mapped NROD land to be located within open spaces, a density transfer is planned to be utilized. NROD density transfers are regulated by OCMC 17.49.240. The standards included allow for a percentage of the NROD area to be considered towards the project's net developable area. This standard is provided separate to the density modifications permitted through the General Development Plan process (110% of the base zoning density).

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;

Response: This GDP application illustrates an NROD density transfer (as permitted herein) for the Park Place Crossing site, a series of contiguous properties with NROD-affected areas.

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.

Response: Sheet P-18 of Exhibit A (the General Development Plans) demonstrates that density transfer allows for an additional ±4.8 acres (±14.3 acres x ⅓) of NROD designated land to be considered as part of the net developable area of Park Place Crossing.

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 17.49.240.A—17.49.240.C.**

Response: As discussed above, this application for a GDP does not authorize any physical alterations to the project site. The NROD density transfer figures discussed are based on the estimated locations mapped by the City. As such, future refinement of the final figure may be needed during an application for DDP and NROD permit; however, using the prescribed methods outlined below result in a density both above the minimum required number and below the maximum allowed. Future applications for Detailed Development Permit and NROD permit will all for a specific calculation based on known site conditions.

The permitted modifications included within Tables 17.49.240.A through C have been applied as needed to some, but not all of the residential lots planned within Park Place Crossing. As Park Place Crossing involves a General Development Plan/Master Plan, standards are typically applied consistently throughout the Master Plan area rather than within isolated "splotches" of zoning. For example, density was calculated using a composite of the requirements for residential zones and uses included within the project boundaries ("Composite Maximum Residential Density" included on Sheet P-18 of the Preliminary Plans). Application of standards in such a manner promotes efficiency in land development within the project area through provision of a consistent neighborhood appearance, layout, and infrastructure rather than a disjointed arrangement of lot sizes, setbacks, and housing types corresponding to their base zoning.

From Table 17.49.240.A, lots with existing R-5 zoning have not received an allowed lot size reduction through an NROD density transfer. Such an adjustment, however, would permit through an NROD reduction and a GDP adjustment, a lot size minimum of 2,400 square feet. Lots within the existing R-10 zoning district have been proposed with a minimum lot size of 4,000 square feet, as determined through the allowed adjustment of up to 20% per OCMC 17.65.070.C.1 to the reduced standards shown within Table 17.49.240.A, below.

Reduced setbacks, such as those shown within Tables 17.49.240.B and C, have been planned to apply to the NROD-reduced lots as well. Instead of those specified within the Low Density Residential District dimensional standards of Table 17.08.040, those for lots between 4,000 and 5,999 square feet below would apply, bringing those lots into further conformity with surrounding lots within an R-5 zoning.

This criterion is met.

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.**

Response: Lot sizes for Park Place Crossing were determined through the processes outlined within this Chapter and explained above. This criterion is met.

E. The applicant may choose to make the adjustments over as many lots as required.

Response: This standard is understood.

Table 17.49.240.A
Lot Size Reductions Allowed for NROD Density Transfers

ZONE	Minimum Lot Size (%)	Minimum Lot Width	Minimum Lot Depth
R-10	5,000 square feet	50'	65'
R-5	3,000 square feet	30'	50'

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%

***Zero 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;

Response: This GDP does not illustrate that a density transfer is planned for properties within Park Place Crossing zoned other than the residentially-designated lands as described herein. This standard does not apply.

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.

Response: The GDP illustrates that NROD areas were not included towards determining compliance with minimum density requirements.

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.

Response: This standard is understood and such a covenant will be provided.

I. All other applicable development standards, including setbacks, building heights, and maximum lot coverage shall continue to apply when a density transfer occurs.

Response: This standard is understood.

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.

Response: Based upon the GDP application, it is anticipated that a Type I NROD verification will be included with an upcoming Detailed Development Plan application. Information provided with this application include an NROD Memorandum (Exhibit G), which gives a general overview of the site and mapped NROD areas.

Geologic Hazards

Portions of the project site contain slopes regulated by this Chapter of the municipal code. Generally, these areas are located within drainage areas at the northwest and south-central portions of the site; however, some isolated pockets of steeper topography are located within other portions of the site. Information regarding these areas is included in Exhibits K, L, and M of the Park Place Crossing application.

17.44.010 - Intent and purpose.

The intent and purpose of the provisions of this chapter are:

A. To ensure that activities in geologic hazard areas are designed based on detailed knowledge of site conditions in order to reduce the risk of private and public losses;

B. To establish standards and requirements for the use of lands within geologic hazard areas;

C. To provide safeguards to prevent undue hazards to property, the environment, and public health, welfare, and safety in connection with use of lands within geologic hazard areas;

D. To mitigate risk associated with geologic hazard areas, not to act as a guarantee that the hazard risk will be eliminated, nor as a guarantee that there is a higher hazard risk at any location. Unless otherwise provided, the geologic hazards regulations are in addition to generally applicable standards provided elsewhere in the Oregon City Municipal Code.

Response: As discussed previously, approval of a GDP does not authorize physical alteration of the site. For the Park Place Crossing project to move forward, a DDP is required. That application is required to be consistent with this GDP and provide a greater level of detail regarding Geologic Hazards on the site. At that time a Geologic Hazards Review will be necessary and ready for City review.

17.44.025 - When required; regulated activities; permit and approval requirements.

No person shall engage in any of the following regulated activities within the adopted Oregon City Geologic Hazards Overlay Zone as defined in section 17.04.515 of the

Oregon City Municipal Code without first obtaining permits or approvals as required by this chapter:

A. Installation or construction of an accessory structure greater than 500 square feet in area;

B. Development of land, construction, reconstruction, structural alteration, relocation or enlargement of any building or structure for which permission is required pursuant to the Oregon City Municipal Code;

C. Tree removal on slopes greater than 25 percent where canopy area removal exceeds 25 percent of the lot.

D. Excavation which exceeds two feet in depth, or which involves twenty-five or more cubic yards of volume;

The requirements of this chapter are in addition to other provisions of the Oregon City Municipal Code. Where the provisions of this chapter conflict with other provisions of the Oregon City Municipal Code, the provisions that are the more restrictive of regulated development activity shall govern.

Response: The Park Place Crossing General Development Plan does not involve, and City approval of the GDP does not authorize the activities listed above within areas regulated by this Chapter. When regulated activities such as those listed above are proposed in the Geologic Hazard Overlay Zone (e.g., part of a DDP application), a Geologic Hazard Overlay Zone permit will be submitted for review and approval by the City.

17.44.030 - Procedures.

No building or site development permit or other authorization for development shall be issued until the plans and other documents required by this chapter have been reviewed and found by the review authority to comply with the requirements of this chapter.

A. Where the development is part of a land use permit application, review shall occur in the manner established in Chapter 17.50 for review of land use decisions.

B. Where the development is part of a limited land use permit application, review shall occur in the manner established in Chapter 17.50 for review of limited land use decisions.

C. Where the development is solely part of a grading permit or building permit, the city engineer may allow review to occur in the manner established in Title 15, Chapters 15.04 and 15.48 if the application meets Section 17.44.060 development standards.

D. For any other proposed development not otherwise subject to review as a land use or limited land use permit application, review shall occur in the manner established in Chapter 17.50 for limited land use decisions.

Response: As this application involves a General Development Plan, building permits, site development permits, or other authorization for development (e.g., physical site alterations) are not relevant at this time. Future applications for Geologic Hazard Review are planned to be provided with future applications for Detailed Development Plan as that type of application may involve the types of permits/development desired above. At such time that an application is made, the procedures outlined above, as applicable, will apply.

17.44.035 - Exemptions.

The following activities, and persons engaging in same, are EXEMPT from the provisions of this chapter.

A. An excavation which is less than two feet in depth, or which involves less than twenty-five cubic yards of volume;

B. A fill which does not exceed two feet in depth or twenty-five cubic yards of volume;

C. Structural alteration of any structure of less than five hundred square feet that does not involve grading as defined in this chapter;

D. Installation, construction, reconstruction, or replacement of utility lines in city right-of-way, or public easement, not including electric substations;

E. The removal or control of noxious vegetation;

F. Emergency actions which must be undertaken immediately to prevent an imminent threat to public health or safety, or prevent imminent danger to public or private property. The person undertaking emergency action shall notify the building official on all regulated activities associated with any building permit or city engineer/public works director on all others within one working day following the commencement of the emergency activity. If the city engineer/public works director or building official determine that the action or part of the action taken is beyond the scope of allowed emergency action, enforcement action may be taken.

Response: The application involves a General Development Plan/Master Plan application. The activities listed above are exempt from the provisions of this Chapter and may be proposed at a future point in time. This may include things such as noxious vegetation removal, but is not certain at this point in time.

17.44.050 - Development—Application requirements and review procedures and approvals.

Except as provided by subsection B. of this section, the following requirements apply to all development proposals subject to this chapter:

A. A geological assessment and geotechnical report that specifically includes, but is not limited to:

1. Comprehensive information and data regarding the nature and distribution of underlying geology, the physical and chemical properties of existing soils and groundwater; an opinion of site geologic stability, and conclusions regarding the effect of geologic conditions on the proposed development. In addition to any field reconnaissance or subsurface investigation performed for the site, the following resources, as a minimum, shall be reviewed to obtain this information and data:

[…]

2. Information and recommendations regarding existing local drainage, proposed permit activity impacts on local drainage, and mitigation to address adverse impacts;

3. Comprehensive information about site topography;

4. Opinion as to the adequacy of the proposed development from an engineering standpoint;

5. Opinion as to the extent that instability on adjacent properties may adversely affect the project;

6. Description of the field investigation and findings, including logs of subsurface conditions and laboratory testing results;

7. Conclusions regarding the effect of geologic conditions on the proposed development, tree removal, or grading activity;

8. Specific requirements and recommendations for plan modification, corrective grading, and special techniques and systems to facilitate a safe and stable site;

9. Recommendations and types of considerations as appropriate for the type of proposed development:
   a. General earthwork considerations, including recommendations for temporary and permanent cut and fill slopes and placement of structural fill;
   b. Location of residence on lot;
   c. Building setbacks from slopes;
   d. Erosion control techniques applicable to the site;
   e. Surface drainage control to mitigate existing and potential geologic hazards;
   f. Subdrainage and/or management of groundwater seepage;
   g. Foundations;
   h. Embedded/retaining walls;
   i. Management of surface water and irrigation water; and
   j. Impact of the development on the slope stability of the lot and the adjacent properties.
10. Scaled drawings that describe topography and proposed site work, including:

    […]
11. For properties greater than one acre, a preliminary hydrology report, prepared by a suitably qualified and experienced hydrology expert, addressing the effect upon the watershed in which the proposed development is located; the effect upon the immediate area's stormwater drainage pattern of flow, the impact of the proposed development upon downstream areas and upon wetlands and water resources; and the effect upon the groundwater supply.

Response: Although the project involves a General Development Plan/Master Plan application, and not a Detailed Development Plan or Geologic Hazard Area Overlay Zone Permit, the materials include a Preliminary Geotechnical Report (Exhibit K), a memo regarding slopes on the site (Exhibit L), and an additional memo regarding the Geologic Hazard Overlay Zone. Information included therein was created using the information and data sources listed above and includes recommendations regarding the existing and planned local drainage, possible future activities, and the safety of such activities.

B. Review procedures and approvals require the following:
   1. Examination to ensure that:
      a. Required application requirements are completed;
      b. Geologic assessment and geotechnical report procedures and assumptions are generally accepted; and
      c. All conclusions and recommendations are supported and reasonable.
   2. Conclusions and recommendations stated in an approved assessment or report shall then be directly incorporated as permit conditions or provide the basis for conditions of approval for the regulated activity.
   3. All geologic assessments and geotechnical reports shall be reviewed by an engineer certified for expertise in geology or geologic engineering and geotechnical engineering, respectively, as determined by the city. The city will prepare a list of prequalified consultants for this purpose. The cost of review by independent review shall be paid by the applicant.

C. The city engineer may waive one or more requirements of subsections A and B of this section if the city engineer determines that site conditions, size or type or development of grading requirements do not warrant such detailed information. If one or more requirements are waived, the city engineer shall, in the staff report or decision, identify the waived provision(s), 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.

Response: Although it is understood that this GDP application does not involve the approval of site alterations/regulated activities, it is expected that a future application for Geologic Hazard Review will be reviewed according to the above requirements.

17.44.060 - Development standards.

Notwithstanding any contrary dimensional or density requirements of the underlying zone, the following standards shall apply to the review of any development proposal subject to this chapter. Requirements of this chapter are in addition to other provision of the Oregon City Municipal Code. Where provision of this chapter conflict with other provision of the Oregon City Municipal Code, the provisions that are more restrictive of regulated development activity shall govern.

A. All developments shall be designed to avoid unnecessary disturbance of natural topography, vegetation and soils. To the maximum extent practicable as determined by the review authority, tree and ground cover removal and fill and grading for residential development on individual lots shall be confined to building footprints and driveways, to areas required for utility easements and for slope easements for road construction, and to areas of geotechnical remediation.

Response: As this application involves a GDP, disturbances to natural topography, vegetation, and soils will not result because approval of a GDP application does not authorize physical site alterations. That said, the Park Place Crossing GDP has been designed to avoid unnecessary disturbance of the natural topography, vegetation, and soils to the greatest extent practicable. Site alterations are anticipated to be necessary to implement the GDP which has been required as part of the annexation application. Implementation of the roads, utilities, blocks, and development types envisioned in the Park Place Concept Plan require these site alterations. As it is appropriate, future applications for DDP and Geologic Hazard Review will provide details regarding these necessary site alterations. Please see Exhibits K, L, and M for further details.

B. All grading, drainage improvements, or other land disturbances shall only occur from May 1 to October 31. Erosion control measures shall be installed and functional prior to any disturbances. The city engineer may allow grading, drainage improvements or other land disturbances to begin before May 1 (but no earlier than March 16) and end after October 31 (but no later than November 30), based upon weather conditions and in consultation with the project geotechnical engineer. The modification of dates shall be the minimum necessary, based upon the evidence provided by the applicant, to accomplish the necessary project goals. Temporary protective fencing shall be established around all trees and vegetation designed for protection prior to the commencement of grading or other soil disturbance.

Response: These procedures are anticipated to be met when appropriate.

C. Designs shall minimize the number and size of cuts and fills.

Response: As shown on the GDP application plans, grading will be needed for roads, gravity utilities, etc. However, the design minimizes the number of cuts and fills and provides documentation that such activities can be done in a safe manner.

> D. Cut and fill slopes, such as those for a street, driveway accesses, or yard area, greater than seven feet in height (as measured vertically) shall be terraced. Faces on a terraced section shall not exceed five feet. Terrace widths shall be a minimum of three feet and shall be vegetated. Total cut and fill slopes shall not exceed a vertical height of fifteen feet. Except in connection with geotechnical remediation plans approved in accordance with the chapter, cuts shall not remove the toe of any slope that contains a known landslide or is greater than twenty-five percent slope. The top of cut or fill slopes not utilizing structural retaining walls shall be located a minimum of one-half the height of the cut slope from the nearest property line.

Response: This GDP application does not authorize physical site alterations but does include a preliminary grading plan that illustrates areas where earthwork is anticipated to occur. Future applications for a DDP and Geologic Hazard Review will include a detailed preliminary grading plan that illustrates necessary cuts and fills as well as required terracing, as applicable.

> E. Any structural fill shall be designed by a suitably qualified and experienced civil or geotechnical engineer licensed in Oregon in accordance with standard engineering practice. The applicant's engineer shall certify that the fill has been constructed as designed in accordance with the provisions of this chapter.

Response: This standard is understood. It is anticipated that during the appropriate process, structural fill designed by a qualified engineer will be provided.

> F. Retaining walls shall be constructed in accordance with the Oregon Structural Specialty Code adopted by the State of Oregon.

Response: This standard is understood.

> G. Roads shall be the minimum width necessary to provide safe vehicle and emergency access, minimize cut and fill and provide positive drainage control. The review authority may grant a variance from the city's required road standards upon findings that the variance would provide safe vehicle and emergency access and is necessary to comply with the purpose and policy of this chapter.

Response: The GDP application Park Place Crossing preliminary plans are being designed with the width necessary to provide safe vehicle and emergency access, provide appropriate drainage control, and minimize cuts and fills to the surrounding areas. A variance to this standard has not been sought.

> H. Density shall be determined as follows:
>
> 1. For those areas with slopes less than twenty-five percent between grade breaks, the allowed density shall be that permitted by the underlying zoning district;
> 2. For those areas with slopes of twenty-five to thirty-five percent between grade breaks, the density shall not exceed two dwelling units per acre except as otherwise provided in subsection I of this section;

3. For those areas with slopes over thirty-five percent between grade breaks, development shall be prohibited except as otherwise provided in subsection I.4. of this section.

Response: Exhibits K, L, and M demonstrate that the planned improvements can be feasibly and safely accomplished without adversely affecting slope stability. The small, isolated areas within the residential portions of the site require grading in order to provide public streets, underground utilities, home sites, and access to the residences. Density calculations for Park Place Crossing are included on Sheet P-18 of the Preliminary Plans (Exhibit A). Areas with slopes over 35 percent have not been considered for home placement and have been utilized where necessary only for roads, utilities, etc. that are permitted by OCMC 17.44.060.I.4 below. This standard is met.

I. For properties with slopes of twenty-five to thirty-five percent between grade breaks:

1. For those portions of the property with slopes of twenty-five to thirty-five percent, the maximum residential density shall be limited to two dwelling units per acre; provided, however, that where the entire site is less than one-half acre in size, a single dwelling shall be allowed on a lot or parcel existing as of January 1, 1994 and meeting the minimum lot size requirements of the underlying zone;
2. An individual lot or parcel with slopes between twenty-five and thirty-five percent shall have no more than fifty percent or four thousand square feet of the surface area, whichever is smaller, graded or stripped of vegetation or covered with structures or impermeable surfaces.
3. No cut into a slope of twenty-five to thirty-five percent for the placement of a housing unit shall exceed a maximum vertical height of fifteen feet for the individual lot or parcel.
4. For those portions of the property with slopes over thirty-five percent between grade breaks:
   a. Notwithstanding any other city land use regulation, development other than roads, utilities, public facilities and geotechnical remediation shall be prohibited; provided, however, that the review authority may allow development upon such portions of land upon demonstration by an applicant that failure to permit development would deprive the property owner of all economically beneficial use of the property. This determination shall be made considering the entire parcel in question and contiguous parcels in common ownership on or after January 1, 1994, not just the portion where development is otherwise prohibited by this chapter. Where this showing can be made on residentially zoned land, development shall be allowed and limited to one single-family residence. Any development approved under this chapter shall be subject to compliance with all other applicable city requirements as well as any applicable state, federal or other requirements;
   b. To the maximum extent practicable as determined by the review authority, the applicant shall avoid locating roads, utilities, and public facilities on or across slopes exceeding thirty-five percent.

Response: This standard is understood. Building envelopes have not yet been determined; however, further information will be provided with future applications for DDP and Geologic Hazard Review permits. Grading within areas with slopes over 35 percent have not been planned except for those intended for roads, utilities, public facilities, and geotechnical remediation. Further information will be provided with future applications for Geologic Hazard Review and DDP. Exhibits K, L, and M provide sufficient information to determine the safety of the overall site plans from a geotechnical engineer. The location of Holly Lane is prescribed by the Transportation Systems Plan, Park Place Concept Plan, roadway construction and curvature standards, and other factors such as the "chokepoint" at the southern edge of Phase 1. To the maximum extent practicable, roads, utilities, and public facilities were located as to avoid areas with slopes exceeding 35 percent.

J. The geotechnical engineer of record shall review final grading, drainage, and foundation plans and specifications and confirm in writing that they are in conformance with the recommendations provided in their report.

K. At the city's discretion, peer review shall be required for the geotechnical evaluation/investigation report submitted for the development and/or lot plans. The peer reviewer shall be selected by the city. The applicant's geotechnical engineer shall respond to written comments provided by the city's peer reviewer prior to issuance of building permit.

L. The review authority shall determine whether the proposed methods of rendering a known or potential hazard site safe for construction, including proposed geotechnical remediation methods, are feasible and adequate to prevent landslides or damage to property and safety. The review authority shall consult with the city's geotechnical engineer in making this determination. Costs for such consultation shall be paid by the applicant. The review authority may allow development in a known or potential hazard area as provided in this chapter if specific findings are made that the specific provisions in the design of the proposed development will prevent landslides or damage. The review authority may impose any conditions, including limits on type or intensity of land use, which it determines are necessary to assure that landslides or property damage will not occur.

Response: These standards are understood. Preliminary information to allow for the approval of a General Development Plan has been provided with further information to come as part of a Detailed Development Plan/Geologic Hazard Overlay Zone permit application.

17.44.070 - Access to property.

A. Shared private driveways may be required if the city engineer or principal planner determines that their use will result in safer location of the driveway and lesser amounts of land coverage than would result if separate private driveways are used.

Response: This provision is understood. Details such as driveway locations have been considered preliminarily and will be further refined with future applications for Detailed Development Plans and Geologic Hazard Overlay Zone permits.

B. Innovations in driveway design and road construction shall be permitted in order to keep grading and cuts or fills to a minimum and to achieve the purpose and policy of this chapter.

Response: This requirement is understood. Details such as grading, cuts, and fills will be considered in relation to driveway placement and road construction with future applications for Detailed Development Plans and Geologic Hazard permits.

> **C. Points of access to arterials and collectors shall be minimized.**

Response: Points of access to roads of higher classification have been minimized, with only one access to Holcomb Boulevard planned for Park Place Crossing until the future construction and extension of Holly Lane can take place. At such time, the closure of the Phase 1 connection to Holcomb Boulevard is possible.

> **D. The city engineer or principal planner shall verify that adequate emergency services can be provided to the site.**

Response: Through consultation with City and Clackamas Fire District #1 staff, the project was designed with adequate emergency services in mind. Temporary emergency access from Shartner Drive is planned for Phase 1 with further emergency access to the site provided from S Livesay Road as part of Phase 2.

17.44.080 - Utilities.

> **All new service utilities, both on-site and off-site, shall be placed underground and under roadbeds where practicable. Every effort shall be made to minimize the impact of utility construction. Underground utilities require the geologic hazards permitting and review prescribed herein.**

Response: Utilities have been shown within Exhibit A – Preliminary Plans to be planned for installation underground and under roadbeds as practicable. With General Development Plan applications, only general locations of utilities are provided as the final design may not be known. As such, future applications for Detailed Development Plans will be accompanied by a required Geologic Hazard Permit application that addresses the placement of utilities.

17.44.090 - Stormwater drainage.

> **The applicant shall submit a permanent and complete stormwater control plan. The program shall include, but not be limited to the following items as appropriate: curbs, gutters, inlets, catch basins, detention facilities and stabilized outfalls. Detention facilities shall be designed to city standards as set out in the city's drainage master plan and design standards. The review authority may impose conditions to ensure that waters are drained from the development so as to limit degradation of water quality consistent with Oregon City's Title III section of the Oregon City Municipal Code Chapter 17.49 and the Oregon City Public Works Stormwater Management Design Manual and Standards Plan or other adopted standards subsequently adopted by the city commission. Drainage design shall be approved by the city engineer before construction, including grading or other soil disturbance, has begun.**

Response: A Preliminary Stormwater Report has been provided as Exhibit F that demonstrates that the GDP application does not create a drainage issue that degrades water quality or excess erosion than occurs presently.

17.44.100 - Construction standards.

> **[…]**

17.44.110 - Approval of development.

> **The city engineer shall review the application and verify, based on the applicant's materials and the land use record, whether the proposed development constitutes a**

> **hazard to life, property, natural resources or public facilities. If, in the city engineer's opinion, a particular development poses such a hazard, the city engineer shall recommend to the review authority permit conditions designed to reduce or eliminate the hazard. These conditions may include, but are not limited to, prohibitions on construction activities between November 1st and March 31st.**
>
> **[…]**

Response: The construction standards will be addressed with future applications for Geologic Hazard Overlay Zone Review and will be adhered to as appropriate during future construction. Similarly, because the application involves a General Development Plan and is subject to future review of Detailed Development Plans and Geologic Hazard permits prior to commencement of work on the site that could pose a hazard to life, property, natural resources, or public facilities. These issues will be addressed at that time, but materials are provided to demonstrate that these areas are generally safe, as determined by a geotechnical engineer.

Thank you for your assistance. Please let us know if you have any questions.

July 16, 2021

Re: Neighborhood Meeting Summary
Park Place Crossing – Park Place Neighborhood Association Meeting
City of Oregon City File No. PA 21-00015

Meeting Date: May 17, 2021
Time: 6:30 p.m.
Location: Virtual Meeting was held via Zoom Webinar

The Applicant participated in a scheduled Park Place Neighborhood Association neighborhood meeting in accordance with applicable City regulations to discuss an application for a General Development Plan for Park Place Crossing. This meeting was held via a Zoom Webinar. The meeting was attended by Harlan Borow and Darren Gusdorf of ICON Construction and Development, LLC; Todd Mobley of Lancaster Mobley; Chris Goodell, Cody Street, and Glen Southerland from AKS Engineering & Forestry, LLC, as well as approximately 24 other interested neighbors/other attendees. The meeting began with a brief presentation which included an overview of the project and details about the planned project. The planned land use application and a general process of the land use application process was described.

Following the introduction of the project, neighbors asked questions and/or provided general comments about the project. Additionally, prior to the meeting, there were some questions asked by neighbors. Below is a summary of the questions asked and responses provided:

Item	Question Summary	Response Summary
1	Several questions involved the location of the S Holcomb Blvd./Holly Lane intersection and why it was relocated from Jada Way per the Park Place Concept Plan.	Following coordination with the City and a memo issued by Lancaster Mobley on July 24, 2020, the conceptual location of the S Holcomb Blvd./Holly Lane intersection was relocated from opposite Jada Way to opposite S. Barlow Drive because of safety and alignment reasons.
2	Several questions and comments related to the timing of the Holly Lane connection to S Holcomb Blvd.	The project site does not include the properties immediately adjacent to where the intersection would be located. It is likely that City involvement would be needed in order to complete the connection to S Holcomb Blvd.
3	Several neighborhood residents were concerned about the zoning of the property and the number of homes that would be located adjacent to existing homes near Trail View/Journey Drive.	Homes are being placed per OCMC requirements, though there was some discussion about the possibility of adding vegetated screening of some sort to screen new homes from those existing.
4	A number of comments were received from residents of the adjacent subdivision accessing S Holcomb Blvd via Winston Drive. They recounted their experiences of trying to leave the neighborhood	The project would initially access S Holcomb Blvd via "Street A"/Holly Lane. The initial phases would provide emergency access to and from the site via a gravel fire access from Shartner Drive to Holly Lane. Later phases would complete Holly Lane and connections to existing streets, allowing access in

	in vehicles following an evacuation notice for wildfires last summer.	both directions and possibly alleviating congestion at Winston Drive. Emergency access after Phase 2 would be provided by S Livesay Road. Eventual completion of other portions of the Livesay Road Main Street and other properties would allow for full access to S Livesay Road and eventual connection to Redland Road and the existing Holly Lane leading south.
5	The possibility of construction traffic was mentioned as a concern.	Construction traffic will be dealt with by the City and addressed when Detailed Development Plans and construction plans are submitted and approved.
6	Several community members were concerned by the number of dwelling units the project would eventually provide.	The number of units is based on the zoning of the site and the constraints created by the natural resources and geologic hazard areas. The project meets the density requirements put in place by the City through OCMC and the Park Place Concept Plan.
7	Several community members were concerned about off-site traffic impacts.	Todd Mobley, PE, of Lancaster Mobley spoke to the off-site traffic impacts, the mitigation required by the annexation application and the reviews that would take place at submittal of the GDP and future DDP applications. Off-site intersections and transportation projects would receive funding based on proportionate share.

The applicant portion of the meeting concluded at approximately 8:45 p.m.

Sincerely,
AKS ENGINEERING & FORESTRY, LLC



Chris Goodell, AICP, LEED AP
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
503-563-6151 | ChrisG@aks-eng.com

Glen Southerland

From: Glen Southerland
Sent: Tuesday, May 4, 2021 11:30 AM
To: gpstone72@yahoo.com; steve@vanhaverbeke.org
Cc: PPNA Bob La Salle; Chris Goodell; Cody Street; Janelle Guiao
Subject: Park Place Neighborhood Meeting Inquiry
Attachments: 7404 2021504 Park Place Village Plans.pdf

Categories: Filed by Newforma

Good Morning All,

We are preparing an application for a residential subdivision and would like to request an opportunity to present our project to the Park Place Neighborhood Association. Do you believe you will have any time available at your May 17, 2021 Steering Committee meeting?

The application is for a Master Plan for a planned ±408 lot subdivision of single-family homes. The applications will also include Detailed Development Plans for two phases (±84 lots) of the project. The project is on approximately 91.4 acres located at 15110 S Holcomb Blvd. and 16472, 16582, 16644, 16530, and 14361 S Livesay Road. The properties are zoned R-10 – Low Density Residential (±9.5 acres), R-5 – Medium Density Residential (±77.4 acres), and Neighborhood Commercial (±4.5 acres).

I've attached plans for your reference. Please let me know if you have time available to discuss this project.

Best Regards,

Glen Southerland, AICP
AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100 | Tualatin, OR 97062
P: 503.563.6151 Ext. 166 | www.aks-eng.com | SutherlandG@aks-eng.com
Offices in: Bend, OR | Keizer, OR | Tualatin, OR | Vancouver, WA

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Glen Southerland

From: Glen Southerland
Sent: Monday, May 10, 2021 4:58 PM
To: Linda Smith; Chris Goodell; Cody Street; Janelle Guiao
Cc: Stone, Greg; Steve VanHaverbeke; Bob LaSalle
Subject: RE: Park Place Neighborhood Association Meeting May 17th

Categories: Filed by Newforma

Thank you, Linda!

We look forward to speaking with the Neighborhood Association.

Best Regards,
Glen Southerland, AICP
AKS ENGINEERING & FORESTRY, LLC
P: 503.563.6151 Ext. 166 | www.aks-eng.com | southerlandg@aks-eng.com

---

From: Linda Smith <ocgal5700@gmail.com>
Sent: Monday, May 10, 2021 4:55 PM
To: Glen Southerland <southerlandg@aks-eng.com>; Chris Goodell <chrisg@aks-eng.com>; Cody Street <streetc@aks-eng.com>; Janelle Guiao <guiaoj@aks-eng.com>
Cc: Stone, Greg <gpstone72@yahoo.com>; Steve VanHaverbeke <steve@vanhaverbeke.org>; Bob LaSalle <jeanbob06@comcast.net>
Subject: Park Place Neighborhood Association Meeting May 17th

EXTERNAL EMAIL: This email originated from outside of AKS Engineering & Forestry. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Mr. Southerland,

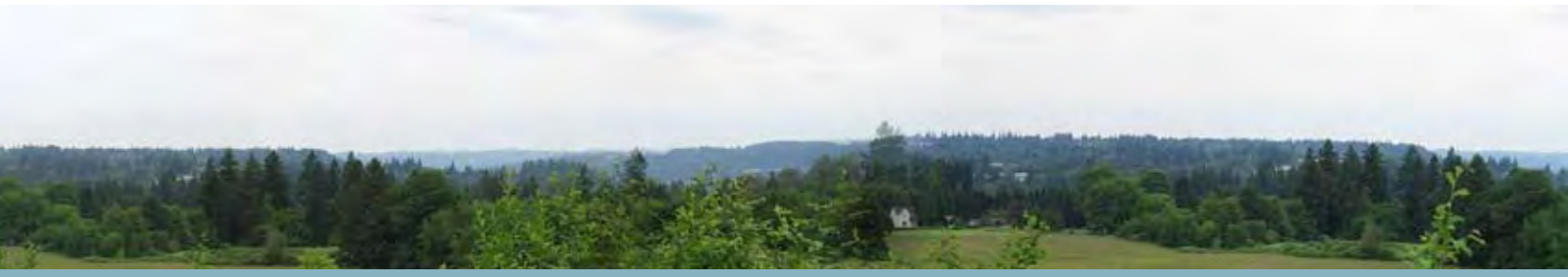
We have added you to the PPNA agenda for our upcoming steering committee meeting on Monday May 17th at 6:30PM. Zoom link will be sent in a followup email.

Best,
Linda Smith, PPNA Secretary

Park Place Neighborhood Association Steering Committee Meeting

Attendee List **May 17, 2021 6:30 p.m.**

Steve Van Haverbeke	Park Place NA Vice Chair
Ray Renken	Park Place NA Treasurer
Linda Smith	Park Place NA Secretary
Bob LaSalle	CIC Alternate Representative
Chris Goodell	AKS Engineering & Forestry, LLC
Cody Street	AKS Engineering & Forestry, LLC
Glen Southerland	AKS Engineering & Forestry, LLC
Todd Mobley	Lancaster Mobley
Harlan Borow	ICON Construction & Development, LLC
Darren Gusdorf	ICON Construction & Development, LLC
Ryan Richards	
Nick Rierkman	
Elira Solaita	
Barbara Renken	
Troy Lavoie	
Jennifer Reitshtein	
Lecia	
Sara Sutton	
Steve Sagi	
Kirk Tolstrup	
Tee	
Janice Vandomelan	
Brian Sutton	
John Anderson	
Heidi	
Jennifer Harvey	
Marian Hedberg-Stan	
Gus Miller	
Geneava/Gene Butterfield	
Paulette Merrill	
Jean LaSalle	
Tom Geil	
Armando Barbora	
Laura P.	
Lisa Brown	
Jackie Hammonds	



Park Place Concept Plan

March 12, 2008
Version 1.4

Park Place Concept Plan Project Advisory Committee (PAC)

Jerry Herrmann – Oregon City Natural Resource Committee
Joe Marek – Clackamas County Transportation
Nancy Walters – Oregon City Historic Review Board
Tim Powell – Oregon City Planning Commission
Mike Riseling – Oregon City School District
Melanie Paulo - Oregon City Transportation Advisory Committee
Gary DiCenzo – Housing Authority of Clackamas County
Ted Schumaker – Oregon City Park and Recreation Advisory Committee
Linda Royer – Livesay Road
Karen Kelly – South of Holcomb Boulevard
Carter Stein – North of Holcomb Boulevard
Michael Kehoe – Holly Lane
Rod Moxley – Holly Lane
Ralph Kiefer – Park Place Neighborhood Association
Charlie Bottita – South of Holcomb Boulevard
Jackie Hammond-Williams – Livesay Road
Doug Neeley – Oregon City Transportation Advisory Committee
Ron Stewart - Oregon City School District
Don Sligar - Oregon City Natural Resource Committee
Steve VanHaverbeke – Park Place Neighborhood Association
Roger Rada - Oregon City School District
Kent Ziegler – Development Interest
Nancy Yuill - Clackamas Community Land Trust
Gene Stringham - Holcomb Outlook CPO
Kami Kehoe – Holcomb Outlook CPO
Steve Morrow – Small Business Owner
Ray Valone - Metro
Ben Baldwin – Tri-Met
Lorraine Gonzales – Clackamas County Planning
Gail Curtis - ODOT
Andrew Johnson - ODOT
Stacy Humphrey – Department of Land Conservation and Development
Ron Weinman – Clackamas County Transportation
Karen Buehrig – Clackamas County Planning

Park Place Concept Plan

March 12, 2008

City of Oregon City

Christina Robertson-Gardiner
Pete Walter
Dan Drentlaw
Nancy Kraushaar

Metro

Raymond Valone

SERA

Tim Smith
Matt Arnold
David Berniker
Allison Wildman
Eric Ridenour
Michelle Marx
Robin Moodie

Johnson Gardner

Jerry Johnson

David Evans & Associates

Tom Puttman
Jennifer Hoglund
Kelly Rodgers
Josh Cerra

Angelo Planning Group

Frank Angelo
Shayna Rehberg

Kittelson & Associates

Phill Worth
Andrew Cibor
Nick Foster

Cogan Owens Cogan

Matt Hastie
Ellie Fiore

EFA

Ray Bartlett

GRI

Tova Peltz

Acronyms

ADA	Americans with Disabilities Act
ADU	Accessory Dwelling Unit
CEG	Certified Engineering Geologist
CIP	Capital Improvement Plan
CRW	Clackamas River Water
EDU	Equivalent Dwelling Unit
EIS	Environmental Impact Statement
GIS	Geographic Information System
HCA	Habitat Conservation Area
HUD	U.S. Dept. of Housing and Urban Development
LF	Linear Foot
LID	Local Improvement District
LIDAR	Light Detection and Ranging
MDD	Maximum Daily Demand
MHI	Median Household Income
MSTIP	Major Streets Improvement Program
DOGAMI	Oregon Department of Geology and Mineral Industries
OCSD	Oregon City School District
ODOT	Oregon Department of transportation
ORS	Oregon Revised Statutes
PAC	Project Advisory Committee
PE	Public Engineer
SAFTEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SDC	System Development Charge
SFWB	South Fork Water Board
TSP	Transportation System Plan
TCSD	Tri-City Sewer District
UGB	Urban Growth Boundary
WWTP	Wastewater Treatment Plant

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1. Executive Summary

In 2002, nearly 500 acres of rural land located just east of Oregon City was brought into the Portland Metropolitan Urban Growth Boundary (UGB) to accommodate future growth. The Park Place Concept Plan was developed to help the City of Oregon City prepare for this growth by working with local citizens, area stakeholders, and local and regional jurisdictions to develop a common vision for the area. This vision provides a framework for growth that respects and augments the area's context, history, and natural systems. The Park Place Concept Plan emphasizes good urban design, multi-modal connectivity, opportunities for place-making and cultivating community, diversity, and, above all, a way to provide for future growth in a sustainable manner. Ultimately, the Park Place Concept Plan will ensure that the land brought in is planned in an efficient and sustainable manner that will maximize the use of the available lands while protecting the natural resources in the study area.

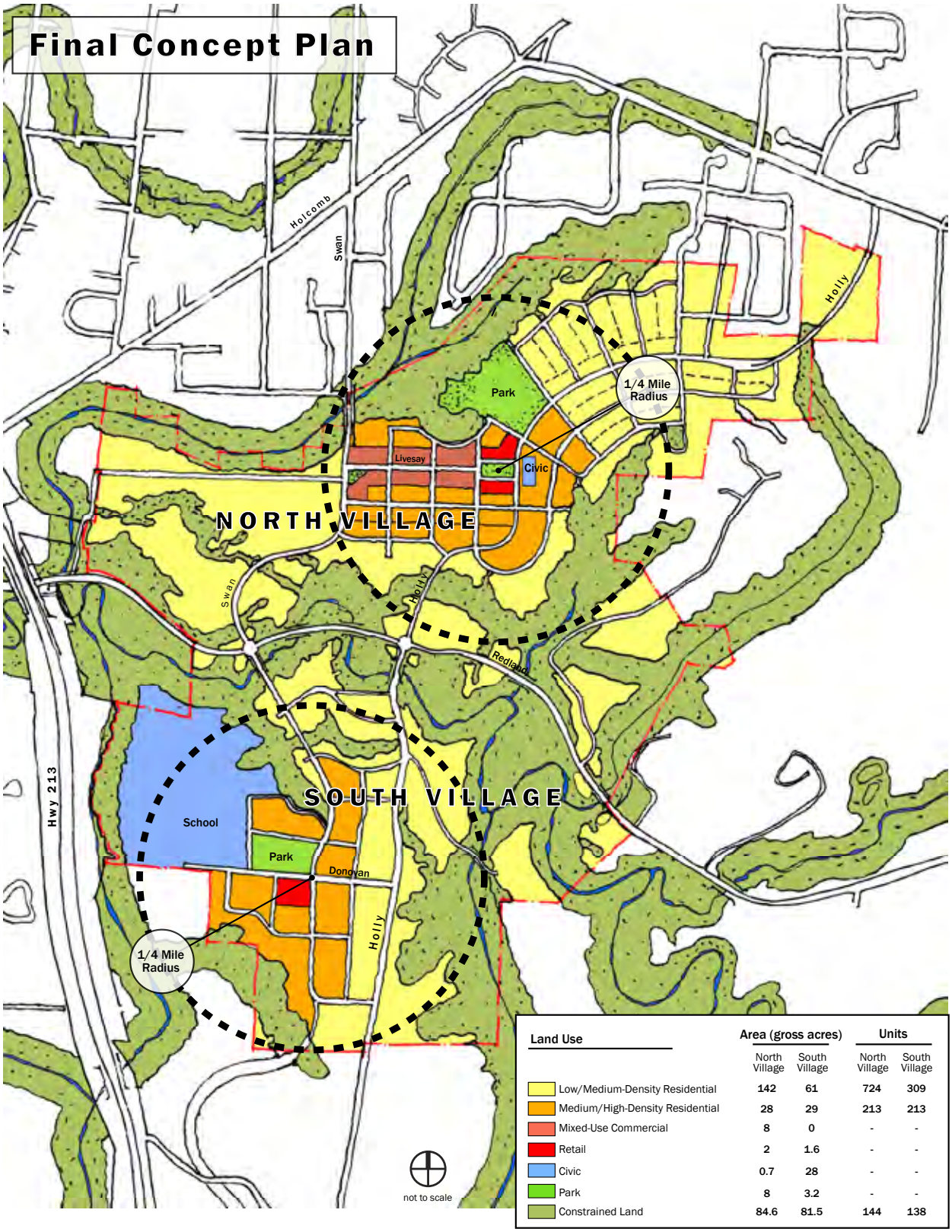
Key components of the Park Place Concept Plan include:

- Two primary north-south connections between Holcomb Boulevard and Redland Road (Swan Avenue and Holly Lane)
- Two distinct mixed-use neighborhoods (North Village and South Village) that accommodate 1,459 new dwelling units
- Neighborhood-oriented commercial nodes that integrate commercial land uses, residential land uses, and public open space
- An area for a new civic institution, like a library or community center
- An 8-10 acre community park and a 3-5 acre neighborhood park
- A mix of housing types and ranges of affordability
- An extensive system of off-street and on-street trails and pedestrian/bicycle connections
- Innovative, green on-site stormwater treatment methods
- Protected sensitive areas, including drainages and steep slopes
- Streets and buildings oriented for solar access
- The use of green edges to define neighborhoods and buffer developments
- Integration of parks and open spaces into existing and future neighborhoods

The following list describes these components and how elements of the Park Place Concept Plan comply with the established evaluation criteria (see page 71 in Appendix). These planning principles are based on the core values developed during the planning process and applicable local and regional community development standards and practices.

Community Design

Identifiable centers and green edges: The preferred alternative includes two discrete mixed-use/commercial centers, one on Livesay Road and another in the southern portion of the study area near Donovan Road supported by the enhanced transportation system. Each center provides for a mix of civic and commercial uses and spaces to serve the planning area. Edges around and between residential areas and existing



Land Use	Area (gross acres)		Units	
	North Village	South Village	North Village	South Village
Low/Medium-Density Residential	142	61	724	309
Medium/High-Density Residential	28	29	213	213
Mixed-Use Commercial	8	0	-	-
Retail	2	1.6	-	-
Civic	0.7	28	-	-
Park	8	3.2	-	-
Constrained Land	84.6	81.5	144	138

Figure 1-1. Park Place Concept Plan Urban Growth Diagram

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

neighborhoods are defined by open spaced (primarily corresponding to natural areas) and larger rear setbacks for new lots that border existing neighborhoods.

Existing low-density clusters: Properties along Lower Livesay Road and Holly Lane are expected to remain as low-density clusters in the foreseeable future. They will have the potential to transition to medium-density residential uses over time. However, in the near term they are expected to retain the lowest densities within the planning area.

Mix of housing types and densities: The Park Place Concept Plan recommends and provides for a mix of different Comprehensive Plan and zoning designations that allow and/or require different densities and housing types, including low, medium and high densities, single-family homes on a range of lot sizes, townhouses, duplexes, multi-family units and mixed commercial/residential uses. Section 4 describes recommended residential densities and housing types in more detail.

Housing affordable to range of incomes: As noted above, the Plan provides or allows for a range of housing types and densities, including those that are most likely to be affordable to households or families with lower incomes, including single-family homes on small lots, townhouses, duplexes and multi-family units. The Plan also identifies potential zoning or development code strategies for distributing less expensive housing units among different areas rather than concentrating them all in one place. Finally, the Plan also incorporates policies aimed at working with other local housing agencies and non-profit organizations to achieve housing goals.

Greenway, street lighting, street furnishings: The Park Place Concept Plan includes recommendations for street and other standards, including those for neighborhood commercial or mixed-use areas, and provisions for street lighting, furnishings, trees and other amenities, as well as public gathering places.

One or more mixed use centers: The Plan includes two mixed-use centers. One is located along upper Livesay Road in the approximate center of the northern portion of the planning area, and is surrounded by medium and higher density housing. The second center is located to the west of the Holly Lane area near Donovan Road and Swan Avenue. This center is proposed to be located near high density residential uses, across the road from a park and in conjunction with some type of civic use. Twin north/south street corridors link these centers to one another and the surrounding Plan area, increasing their attractiveness and viability.

Central public space: Public gathering spaces are recommended and illustrated within or directly adjacent to both of the mixed-use centers described above.

Future school sites: Metro's Title 11 requirements stipulate that school sites should be identified, if needed. A preliminary projection of school age children

in the planning area, in conjunction with a review of Oregon City School District enrollment data, indicates that there will not be a need for an entire elementary, middle or high school, and that in the short to medium term, existing surrounding schools will be able to accommodate school needs. This issue should continue to be monitored by the City and school district as the area continues to be developed.

Natural Resources

Parks and open space per guidelines: The Park Place Concept Plan incorporates a significant amount of open space, located in conjunction with environmentally constrained and natural areas within the planning area. The amount of open space exceeds Metro and City guidelines. Two developed neighborhood and/or community parks are proposed within the planning area, consistent with recommended local and national acreage guidelines and service areas.

Trail and open space connections: The Park Place Concept Plan identifies a substantial, interconnected network of trails corresponding to the open space system, and in some cases parallel to road corridors. Proposed trail locations are consistent with the City's adopted Trails Master Plan and other local and regional plans, help connect activity centers, and provide alternatives to travel by automobile.

Protect natural resources: As noted above, the Park Place Concept Plan identifies a significant open space network and natural resource protection areas. They will be protected by a range of local regulations, as well as public ownership or easements, where feasible, that will prohibit or limit development and related adverse effects.

Avoid development in stability hazard areas: The City's existing development regulations will be applied and enhanced to direct development away from or mitigate the impacts of development within slope stability hazard areas.

Water, Wastewater, and Stormwater Infrastructure

Mimic existing hydrology: The Park Place Concept Plan has been developed in a manner that minimizes impacts to the existing hydrological conditions of the study area. Moreover, the stormwater concept plan and recommendations seek to utilize existing natural drainage features and low-impact development best practices to most mimic existing hydrologic functions.

Consistent with capacity of infrastructure: Preliminary review of local public facility master plans indicates that sufficient wastewater and water capacity exists to accommodate projected levels of development within the study area. The Park Place Concept Plan identifies potential improvements to existing or future facilities to ensure that water, wastewater treatment and stormwater management needs can be met.

Optimize existing infrastructure: The water and stormwater infrastructure improvements of the Park Place Concept Plan have been developed to utilize existing infrastructure to the extent possible. Due to the nature and intensity of development forecasted within the Park Place Concept Plan area, water and stormwater infrastructure systems will need to be upgraded and upsized. Stormwater infrastructure improvements will seek to mimic existing drainage patterns minimizing the need for significant stormwater facility development.

Transportation

Streets sized to handle future growth: A network of local, collector, and arterial streets provide the area with sufficient capacity and connectivity to meet anticipated travel demands, well into the future. Access to HWY 213 and I-205 will be provided by an improved 5-lane Redland Road corridor, (unless a smaller cross section is proven adequate) designated as a Minor Arterial. Holcomb Boulevard will serve the area as a 2- to 3-lane Minor Arterial. Holly Lane and Swan Avenue, designated as Collectors, will both be extended and improved to provide pedestrian, bicycle, and auto/transit facilities from Holcomb Boulevard to south of Donovan Road. Donovan Road and the eastern half of Livesay Road are designated as Neighborhood Collectors with a 2-lane cross section and amenities to meet the needs of the adjacent land uses. Local streets will be sized appropriately to meet traffic needs while contributing to traffic safety and promoting use of alternative modes of travel.

Provide safe environment for all modes of travel: Safe travel by each mode of travel is inherent in the design and layout of the Plan's transportation system. Conflict points between autos and pedestrians/bicycles are minimized and treated appropriately, wherever they occur. Uses that generate large numbers of pedestrians and bicyclists are directly linked to neighborhoods with appropriately sized and designed facilities to safely meet the travel needs.

Opportunities for all modes of travel: The Park Place Concept Plan identifies facilities that provide for a full range of travel modes, including an adequate road system for automobiles, bicycle lanes, sidewalks and trails that provide multiple opportunities for bicycle and pedestrian travel, and a looped transit system that will enhance public transit travel opportunities. The network of streets is designed to easily disperse vehicular traffic, readily accommodate transit, and fully integrate pedestrian and bicycle travel.

Connectivity within and outside study area: The Park Place Concept Plan incorporates a well-connected transportation system with two primary north/ south travel routes (Holly and Swan corridors) providing connectivity both within and outside of the planning area. Similarly, Redland Road serves the same purpose for east/west travel through the area, complemented by Holcomb Boulevard. Local streets in a grid pattern will provide strong connectivity within individual sub-areas of neighborhoods.

Minimize increases in impervious surfaces: Transportation network redundancy, interconnected streets, and an emphasis on pedestrian, bicycle, and transit

amenities work together to manage the need for impervious surface. Stormwater management techniques that store and treat transportation system run-off within the public right-of-way minimizes the adverse impact of impervious surfaces.

Minimize adverse impacts on existing properties: To the greatest extent possible, the Park Place Concept Plan minimizes impacts to existing properties. Strategies to do so include:

- Providing a parallel collector route to Holly to reduce impacts on properties along that street.
- Designing streets and intersections in the context of the land uses they serve.
- Considering development parameters, such as parcel size and access locations, while laying out the transportation network.
- Providing design flexibility in roadway alignments, while diligently preserving safety and capacity for all travel modes.

Financing and Other Criteria

Funding sources pay for facilities and services: The financing of public improvements needed for Park Place's urban development is projected for transportation, water, wastewater, stormwater, and parks. Once the Park Place Concept Plan is adopted, Oregon City and the regional agencies that fund or own elements of the services will have to amend their master plans and systems development charges.

Transportation improvements: ODOT, Metro, Clackamas County, and Oregon City own various elements of the transportation network. Many of the roadways that ODOT and Metro are responsible for, will have to be constructed regardless of Park Place developing. Areas adjacent to Park Place also are developing and creating the need for many of the roadway improvements that are also needed by Park Place development.

Water: The regional service provider already has capacity for water treatment, storage and delivery to Park Place. Development of a water distribution system in Park Place will largely be paid for by properties that develop.

Wastewater: The regional service provider already has wastewater treatment and transmission lines near Park Place. Developing a wastewater collection system in Park Place will largely be paid for by properties that develop.

Stormwater: Natural storm drainages exist in Park Place, so that as development occurs on-site, roadway improvements will include installation of stormwater management improvements. Developing properties in Park Place will be responsible for constructing these improvements.

Parks: The two parks identified in the Concept Plan have to be integrated into Oregon City's parks master plan and at that time decide how to fund the proposed parks. It may be funded entirely from system development charges or as an integral part of the master plan's financing strategies.

2. Background

1. Introduction

Concept plans describe how an area is expected to develop over time. In general, they identify the general location and intensity of land uses, including a variety of housing types (affordable and market-rate), commercial and industrial land uses, parks, open spaces, and schools. They describe how basic services, such as transportation facilities (streets, sidewalks, transit routes, etc.), utilities, and stormwater facilities, are provided. Additionally, they demonstrate how environmental resources and sensitive habitats will be protected. Finally, concept plans establish implementation, phasing, and financial strategies to help guide future growth.

The concept planning process is established by State legislation, specifically Senate Bill 100, which requires that all regional growth agencies (in this case Metro) review their existing urban growth boundary (UGB) every five years and adjust it accordingly to accommodate the latest 20-year growth projections. Metro brought the Park Place study area into the Portland UGB in 2002 after an extensive technical analysis of the region. As such, Oregon City was required to initiate a concept planning process for the UGB expansion areas to adequately plan for future growth. The outcome of this planning process is the Park Place Concept Plan ("Concept Plan").

The Park Place Concept Plan is organized as follows:

- The **Background** chapter summarizes the Plan's guiding core values, existing conditions, and opportunities and constraints.
- The **Concept Plan** chapter presents the vision and design principles for the area, and provides detailed descriptions of the Plan elements.
- The **Implementation** chapter recommends implementation strategies and regulatory amendments based on feedback from service providers and members of the consultant team.
- The **Finance and Funding** chapter summarizes the costs associated with new growth and proposes a variety of ways to pay for it.

The Park Place Concept Plan is supplemented with a Technical Appendix, which provides comprehensive descriptions and details of the Plan elements.

2. Core Values

Early in the concept planning process, the project team worked with community members to develop a set of "core values," or aspects of the community they think are important. Preliminary core values were drawn from *Envision Park Place* (2005) and then refined through an iterative process involving members of the Project Advisory Committee (PAC) and participants in the first two Community Forums.

Planning Process

Summer 2006

- *Public Outreach*
- *Background information collection and existing conditions analysis*
- *Core Values development*
- *Community Information Night*
- *Community Forums 1 and 2*

October 2006

Design Charrette

- *Day 1: Site Tour*
- *Day 2: Sketch Diagram Concepts*
- *Day 3: Refined Alternatives*
- *Day 4: Refine Preferred Alternative*
- *Day 5: Presentation of Preferred Alternative*

Winter - Spring 2006-07

- *Concept Refinement*
- *Develop Implementation Strategies*
- *Community Forum #4*
- *Planning Commission Hearing*
- *City Council Hearing / Adoption*

2007 and Beyond

- *Annexation*

Evaluation criteria were derived from the core values, which were then used to evaluate plan alternatives and the preferred plan. (Evaluation criteria can be found in Appendix D.) The core values are organized into three categories: Environment, Community Design, and Transportation/Traffic. A fourth category ("Other Core Values") captures core values that do not readily fit within the other categories. The Park Place Core Values are as follows:



Livesay Creek

Environment

- We value natural resources in our neighborhood, including streams, aquifers, wetlands, woods, mature trees, viewsheds, hillsides and wildlife habitat, including migratory corridors for wildlife. Such features should be incorporated in the design of neighborhoods and specific developments.
- We value distinguishing between developed and natural areas with buffers.
- We value an interconnected system of neighborhood and community parks, recreation areas, open spaces and pathways that provide recreational opportunities and allow residents to feel connected to the natural environment.
- We value connections among community-oriented facilities and other destinations.
- We value a sustainable approach to planning and development that minimizes negative impacts on the natural environment and property owners, including impacts associated with runoff, flooding, landslides, steep slopes, geologic hazards, erosion, street lighting, traffic and other factors.



Public Involvement

Community Design

- We value the rural character of the Park Place Concept Plan area and a planning approach that will allow us to maintain this rural feeling as the area develops and grows.
- We value a choice of housing types, densities and price ranges, including housing that is affordable to existing and future residents of all ages and incomes, and that complements existing landscapes, environments and architectural styles.
- We value our history and seek to preserve and incorporate historical and artistic elements in the design and development of our community.
- We value high quality design that makes efficient use of land, provides transitions between urban and rural areas and incorporates sustainable/"green" design principles and practices.
- We value having the civic and retail services that provide for the community's basic day-to-day needs located within the community.

Transportation/Traffic

- We value a safe, interconnected system of roads and other transportation facilities that allows people to move freely within the neighborhood and connects them to other parts of the city and region.
- We value a system of roads, trails and pathways that allow people to travel by a full range of transportation modes - bicycle, horse, walking, automobile and transit.
- We value a transportation system that safely connects residents to shopping, parks and other community facilities within the Park Place neighborhood.
- We value a transportation system that limits congestion without overbuilding roads and provides adequate facilities to address traffic conditions (intersection improvements, adequate road capacity, etc.).
- We value the use of traffic calming tools such as traffic islands, roundabouts, curvilinear streets, curb extensions and other methods.



Holcomb Boulevard

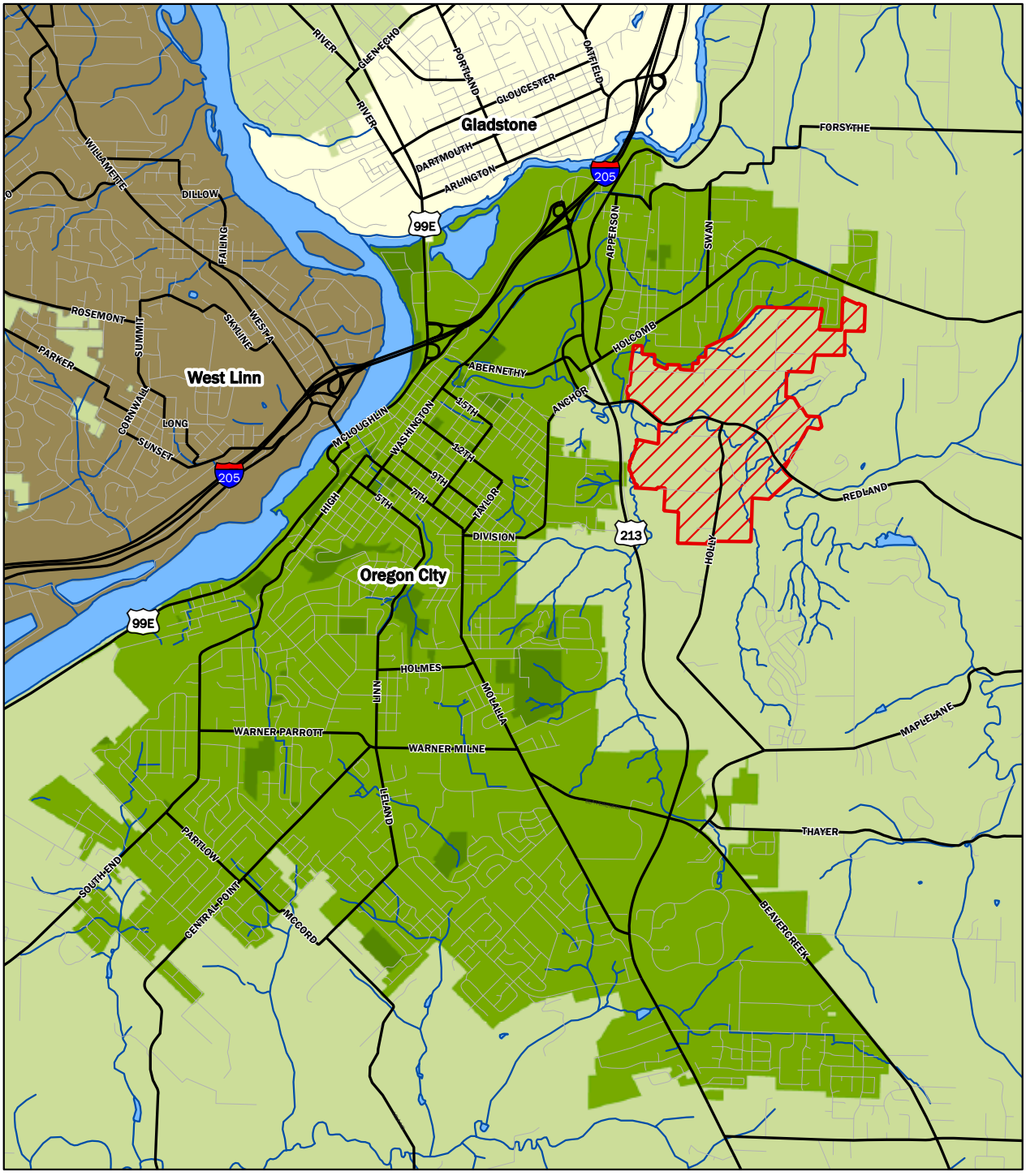
Other Core Values

- We value local shops (e.g., Steve's Market) and other employment opportunities.
- We value, clear, complete, timely and open communication, and meaningful opportunities for involvement in the planning process.
- We value protection of property owners' rights.
- We value security and safety.
- We value phased development that provides adequate public services and infrastructure such as police, fire protection and schools in place before, or as development is allowed to occur.
- We value adequate schools, teachers and other resources needed to educate our children.
- We value the use of innovative funding methods to pay for enhanced levels of public service.

3. Existing Conditions

The full Existing Conditions analysis for each of the Plan elements is provided in Appendix B of this document. A summary of the document follows.

The Park Place study area is adjacent to Oregon City's Park Place neighborhood on the eastern edge of the City (Figure 2-1). The total land area is approximately 480 acres, of which 180 acres are located immediately adjacent to Oregon City limits in the vicinity of Livesay Road. These 180 acres were brought into the UGB in the 1980's, but were not annexed into the City of Oregon City. The remaining approximate 300 acres were brought into the UGB in 2002.



Park Place Concept Plan

Area Context

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

Figure 2-1. Park Place Study Area

The study area is comprised of 138 individual property owners. To date, the largest amount of acreage under single ownership is approximately 48 acres. Thirty-eight acres are in public ownership, the majority of which comprise Ogden Middle School (Oregon City School District). Nearly half of the parcels in the study area are one acre or less. Consequently, any large-scale development based on a comprehensive vision for the area may take many years to be realized unless a significant number of people are compelled to sell property to a single entity.

Land Use

The primary existing land uses in the study area are rural farms, low-density residential housing, and civic uses (i.e., schools and churches). There are no commercial, office, or industrial land uses within the study area; the closest commercial nodes are located on Holcomb Boulevard near Front Avenue, and at the intersection of Redland Road and Holcomb Boulevard. A regional shopping center may be developed a half-mile from the western edge of the study area, which will influence the type and subsequent success of future land uses and traffic patterns in the study area.

The majority of the housing in the study area is located along Livesay Road and Holly Lane. These areas are generally characterized by low to moderately angled slopes and minimal wildlife habitat. Houses in the study area were constructed as early as 1900 and as recently as 2005; the majority of the housing was constructed between 1960 and 1980. Modest cottages, farm houses, and ranch style houses comprise the architectural styles in the study area. The study area is surrounded by pockets of higher-density, single-family residential subdivisions: Barlow Crest, Trailview Estates, Meadowridge Estates, and Holcomb Ridge.

Buildable Land

The term "buildable land" is defined by Metro as land that is suitable for development or redevelopment (after considering issues like steep topography, wetlands and waterways, habitat areas, easements, and land for public services, like roads, schools, and parks), and is used to calculate future land use densities. This calculation is required by Title 11 of Metro's *Urban Growth Functional Plan,* which states that new urban area plans must provide "for average residential densities of at least 10 dwelling units (du) per acre of net vacant buildable land." The average residential density is only applicable to areas added to the UGB in 2002; the area added to the UGB in the 1980s was calculated at the lower density of four dwelling units per acre.

The Park Place buildable lands methodology aggregates all of the vacant and developable land (as determined by Metro and real estate market experts) in the area and removes land that have slopes greater than 25%, a "high" or "moderate" Habitat Conservation Area rating (includes designated wetlands and essential riparian habitat), established easements, or a registered historic building. Twenty-four percent of the total is subtracted to account for new

Land Use

General Findings

- *Existing land uses are primarily rural farm, low-density residential and civic*
- *Majority of existing housing is located along Livesay Road and Holly Lane*
- *Most of the housing was built between 1960 and 1980*
- *Study area consists of varied topography with limited access points*
- *The study area must accommodate a minimum of 1,458 new dwelling units*

Table 2-1. Buildable Land Summary

2002 UGB Expansion Area	
Vacant + Developable Land	246.9 acres
Constrained Land	-103.4 acres
New Roads and Utilities	-34.4 acres
Net Buildable Land	109.1 acres
Units (10 du/acre)	*1,091 units*
1980 UGB Expansion Area (Livesay Area)	
Vacant + Developable Land	171.6 acres
Constrained Land	-48.7 acres
New Roads and Utilities	-31.2 acres
Net Buildable Land	93.4 acres
Units (4 du/acre)	*367 units*
Park Place Study Area Total	**1,458 units**

roads, stormwater facilities, and future civic uses, like schools and libraries. This final number is then multiplied by the required minimum densities for the area: 10 dwelling units for the area added to the UGB in 2002 and 4 dwelling units for the area added to the UGB in the 1980s.

The result of this analysis is that a minimum of **1,458 dwelling units** (Table 2-1) are required in the Park Place Concept Plan study area at build-out. For a more detailed description of the buildable lands methodology and analysis, please refer to Appendix E.

Regulatory Conditions

Development of a Concept Plan fulfills regional planning requirements as established in the Metro 2040 Plan and Urban Growth Management Functional Plan. These regional plans as well as local comprehensive plans and codes are responsible for complying with and implementing Statewide Planning Goals.

Regulatory Conditions

General Findings

- *Primary elements of the Concept Plan include: Governance, Housing, Transportation and protection of Natural Resources*
- *Elements of the plan are illustrated in an Urban Growth Diagram*
- *Majority of the study area is to consist of single family housing*
- *Upon adoption of the Concept Plan, the City will determine Comprehensive Plan designations and an annexation strategy*

The Concept Plan must include the following elements: governance, housing plans (including minimum density, diversity, and affordability), commercial and industrial land uses as needed, a conceptual transportation plan, natural resources and protection plan, a public facilities plan, and a plan for public schools. Conceptual plans for these elements must reflect and account for policies and projects established in the City's Comprehensive Plan, Transportation System Plan, Trails Master Plan, and Parks and Recreation Master Plan. Ultimately these element plans will be presented as a report and illustrated in an Urban Growth Diagram.

Following adoption of the Park Place Concept Plan and any necessary plan amendments by City Council, the next step in the process is for the City to determine the appropriate Comprehensive Plan designations based on the Preferred Concept Diagram, and to develop an Annexation Strategy. As part of annexation, the City will adopt zoning for the Park Place plan area according to the Comprehensive Plan designations. It is anticipated that most of the buildable land in the plan area will be designated for medium- and medium/low-density housing (e.g., single-family homes on medium-sized lots), which is compatible with existing uses and development patterns.



Livesay Road

However, Title 11 requirements from Metro's Functional Plan require a minimum density of 10 units per net buildable acre in new urban areas. Given an exception for land in Park Place that is not considered new urban area, buildable land in Park Place will need to accommodate 1,458 housing units. As a result, implementation measures in the study area will need to allow for mixed-use designations and more medium- and high-density housing. Creation of a new residential zone, modification of existing zones and regulations, including master planning requirements, and establishment of clear and strong policies in the Park Place Concept Plan are designed to meet housing targets and to implement the type and intensity of development that is envisioned in the Final Concept Plan.

Transportation

The study area is served by a multi-modal transportation system that includes roadway, transit, bicycle, and pedestrian facilities and services. Isolated locations on the roadway system experience congestion and delays. However, applicable agency standards are met at all study area intersections and road segments.

The Highway 213 corridor is approaching capacity, particularly on the segment between Redland Road and the I-205 interchange. Federal appropriations have been obtained through the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFTEA-LU) for the planning of improvements, including funding for an Environmental Impact Statement (EIS) and preliminary engineering for the I-205/OR 213 interchange.

The public transit system provides limited service to this low-density, suburban location. Additionally, the bicycle and pedestrian systems are incomplete, but plans exist to make incremental improvements. Until pedestrian, bicycle, and transit improvements are made, current conditions will make travel by these modes undesirable and will promote greater vehicular trip-making.

Transportation

General Findings:

- *Very limited transit service*
- *Incomplete pedestrian system*
- *Limited system does not promote walking*
- *Incomplete bicycle system*

Water, Wastewater, and Stormwater Infrastructure

Limited water service exists within the study area except for a small portion of Livesay Road, which is served by the Oregon City water distribution system. Capacity exists within the Oregon City system to be expanded within the study area. Transmission mains, owned by Clackamas River Water, run through the study area to serve communities outside the study area.

Limited wastewater collection exists within the study area. Many properties are on septic systems. Two-trunk interceptor lines, owned by the Tri-City Sewer District, pass through the study area and convey wastewater flows from Country Village and Ogden Middle School. These two interceptors connect within the study area and their flows are conveyed by the Highway 213/ Newell interceptor to the wastewater treatment plant. These interceptors and the treatment plant have capacity to serve future development within the study area.

Stormwater is presently managed in the study area with roadside ditches and natural drainage channels. No major stormwater infrastructure facilities exist beyond these surface facilities. All stormwater within the study area is conveyed to Abernethy Creek, Newell Creek, and Livesay Creek. Abernethy Creek and Newell Creek are subject to occasional flooding; however, no significant flood damage is known to have occurred in the study area since the 1996 flood.

Water Infrastructure

General Findings:

- *Limited water distribution*
- *Capacity exists in the water system to serve the study area*
- *Limited wastewater collection*
- *Wastewater Treatment Plant and interceptors have capacity to serve the study area*
- *A natural stormwater drainage system exists*

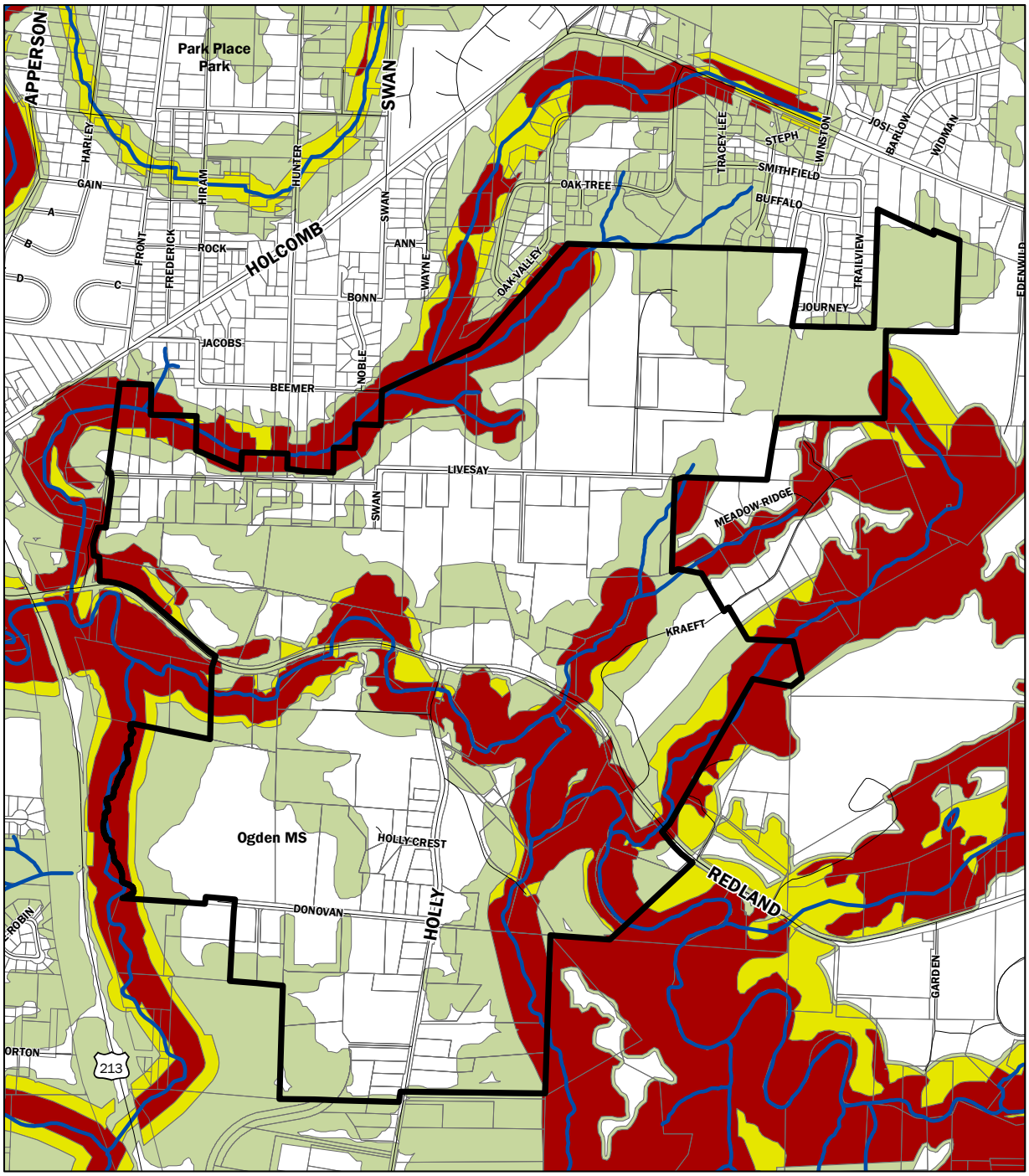


Figure 2-2. Habitat Conservation Areas

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

Natural Resources

Through evaluation and mapping efforts performed by Metro, Habitat Conservation Areas (HCA) in the study area have been established. Metro created an inventory map showing areas of greatest significance, called "regionally significant habitat," which includes riparian areas, wildlife habitat, and parks and open spaces. From this map, Metro established a Habitat Conservation Area Map (Figure 2-2) which identifies the highest value streamside habitat that will be subject to regulatory performance standards and best management practices. The Habitat Conservation Area Map also helped inform the buildable lands analysis.

Geologic Conditions

The study area is located in the Abernethy Creek drainage of the Willamette Valley. The Abernethy Creek drainage consists of a narrow meandering creek fed by Newell and Holcomb Creeks and flows directly into the Willamette River, immediately northwest of the study area. The drainage is characterized by steep canyons that are subject to ongoing slope processes (Figure 2-3). The local geology is dominated by the fine-grained facies of the Missoula Flood deposits (Madin, in press) primarily comprised of silt, sand, and gravel of late Pleistocene age. These deposits generally form terraces at the lower extent of the local creeks and mantle slopes up to about elevation 200 to 250 ft. In the low-lying areas within the floodplain of Abernethy Creek is alluvium and Pleistocene-age Willamette Silt, which consists of fine-grained sands, silt and clay with scattered lenses of fine- to medium-grained sand. At the north edge of the study area (along Holcomb Boulevard, at the south end along Holly Lane and at the southwest edge, adjacent to Newell Creek Canyon), mudstone, claystone, and sandstone of the Troutdale Formation are present, typically in steep canyons and ridges. Geomorphic and geologic evidence indicates these tributary canyons of Abernethy Creek have been modified by ongoing, large-scale landslides (Figure 2-4). The Oregon Department of Geology and Mineral Industries' (DOGAMI) preliminary geologic map of the area indicates an inferred trace of the Oatfield Fault may extend into the northwest portion of the study area; however there is no direct evidence that the fault exists in this area (Madin, in press).

Due to the topographic and geologic conditions in the study area, there is a history of landslides within the Abernethy Creek drainage that have damaged property and infrastructure (Burns, 1993, 1998). In addition, recent mapping of landslide geomorphology in Oregon City using LIDAR imagery and aerial photographs indicates the tributary canyons of Abernethy Creek have been modified by ongoing large-scale landslides (Madin and Burns, 2006). A full discussion of the consultant's technical analysis and recommendations are in the Appendix K.

Natural Resources

General Findings:

- *Regionally Significant Habitats areas have been inventoried*
- *Habitat Conservation Areas have been identified including three major riparian corridors: Livesay Creek, Abernethy Creek, and Newell Creek*
- *Development best management practices have been established*

Geotechnical

General Findings:

- *Study area is characterized by steep canyons*
- *Study area is dominated by weathered siltstone and mudstone*
- *Canyon and hillsides are subject to ongoing slope processes*

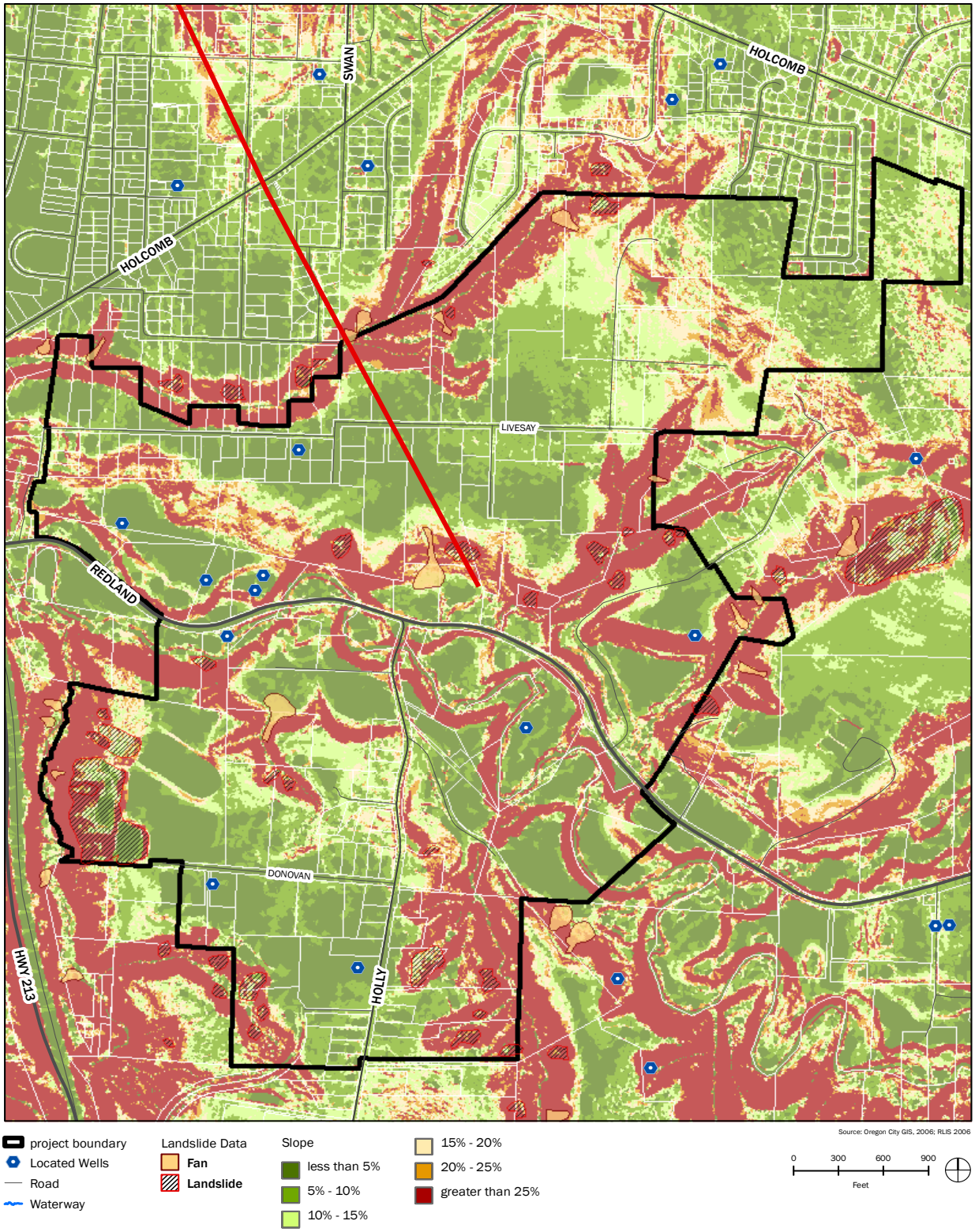


Figure 2-3. Steep Slopes and Landslide Geomorphology

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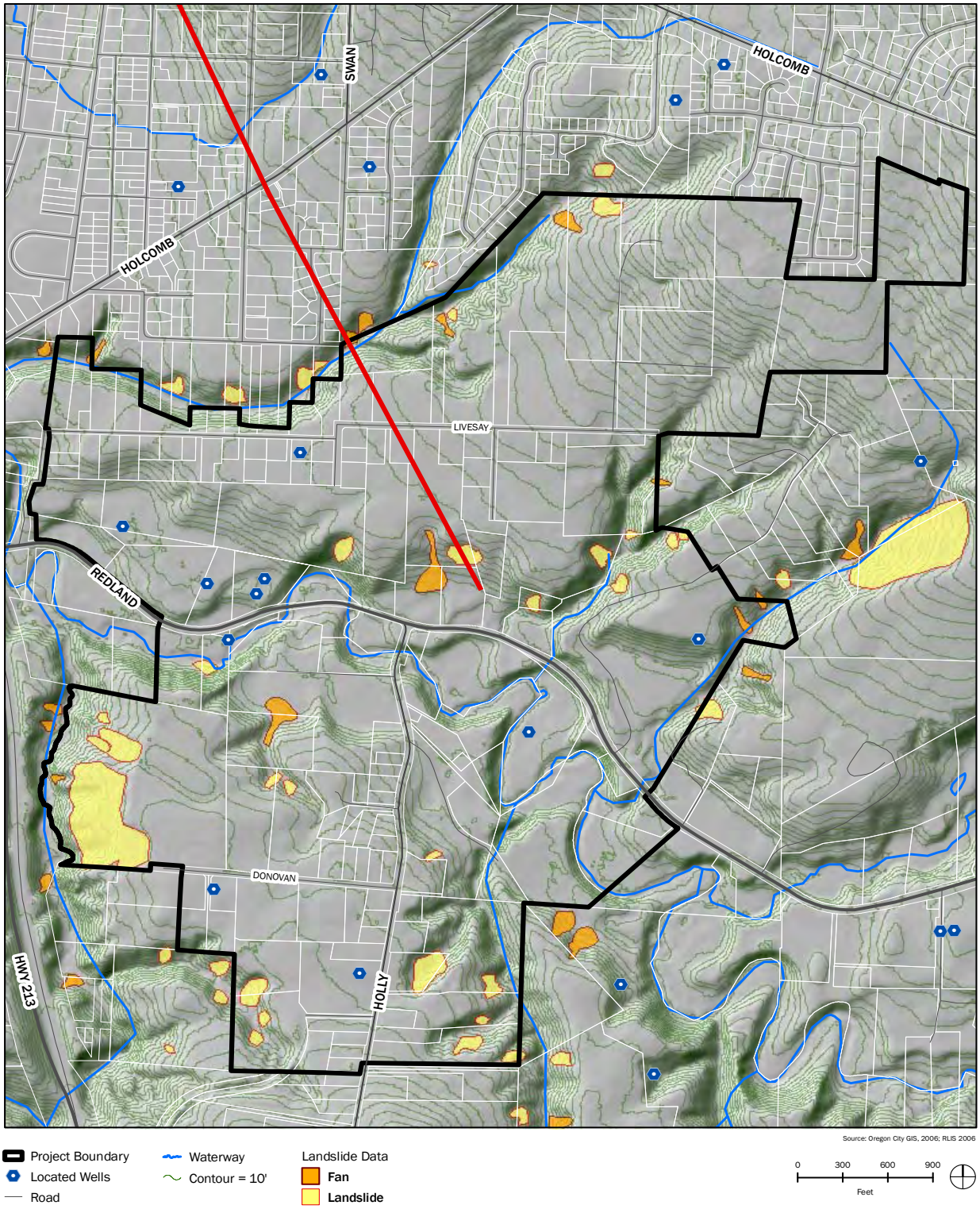

Figure 2-4. Landslide Geomorphology

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

Market Assessment

The study area is characterized by varied topography, with limited access points and visibility. As a result, the predominant land uses in the area are expected to be residential. However, a moderate level of commercial (retail and office) development can be supported in the study area, which would serve the Park Place neighborhood and surrounding environs, as well as assist in organizing the Plan. The Portland metropolitan area economy has been enjoying a period of substantial employment growth. Trends in the commercial and industrial markets also indicate better than reported rates of growth and greater optimism for future space needs. Population growth held steady during the recent economic decline in the area, and the recent employment growth indicates that the level of growth can be sustained.

The retail market is currently sound in the Oregon City area, although there is a notable lack of regional-draw retail space. Retail is an area of obvious opportunity in the Oregon City area as population and associated levels of local buying power increase. The pending development of a major regional retail center in the immediate area will address this need for the broader community. Because of this development (and other physical circumstances of the study area), retail development in the study area will be limited to neighborhood supported uses.

The study area is expected to support between 20,000 and 40,000 square feet of retail space when fully developed. The area has limited access points, making it an unlikely candidate for more regional-serving retail services. From a market perspective, a commercial center that can capitalize on through traffic from existing arterials will increase the viability of retail space, particularly during the study area's build-out period.

Market Conditions

General Findings:

- *Predominant land use is residential*
- *Oregon City is growing - primarily residential growth*
- *Current shortage of regional retail*
- *Retail suffers from lack of exposure, and being located on the edge of an urban area*
- *Future retail limited to neighborhood uses*
- *20,000 - 40,000 square feet of retail could be supported in the study area*
- *Local office including medical office, insurance brokerages, realty companies, title companies and other professional office uses are often willing to utilize ground floor commercial space in order to attract foot traffic.*

Office space demand within the study area will respond to community needs, supported by the area's population base and industrial activity. Likely tenant types would include medical office, insurance brokerages, realty companies, title companies, and other professional office users. These types of office tenants will often utilize ground floor commercial space, as they have a significant amount of customer traffic, but could be located in more traditional office configurations.

Commercial development in the planning area is not seen as necessary for the success of the area, which is expected to be developed largely as residential. The commercial needs of the planning area can be met outside of the concept planning area by existing and planned developments. However, commercial development can serve to organize the Park Place Concept Plan by providing a "center" to the community. In addition, commercial development can meet some of the needs of the community, providing a marketable amenity for residential development while reducing trips out of the neighborhood.

4. Opportunities and Constraints

The opportunities and constraints diagram (Figure 2-5) synthesizes findings from the existing conditions analysis and integrates input from the public meetings. The diagram was refined at the second community forum and updated for the design charrette in October 2006.

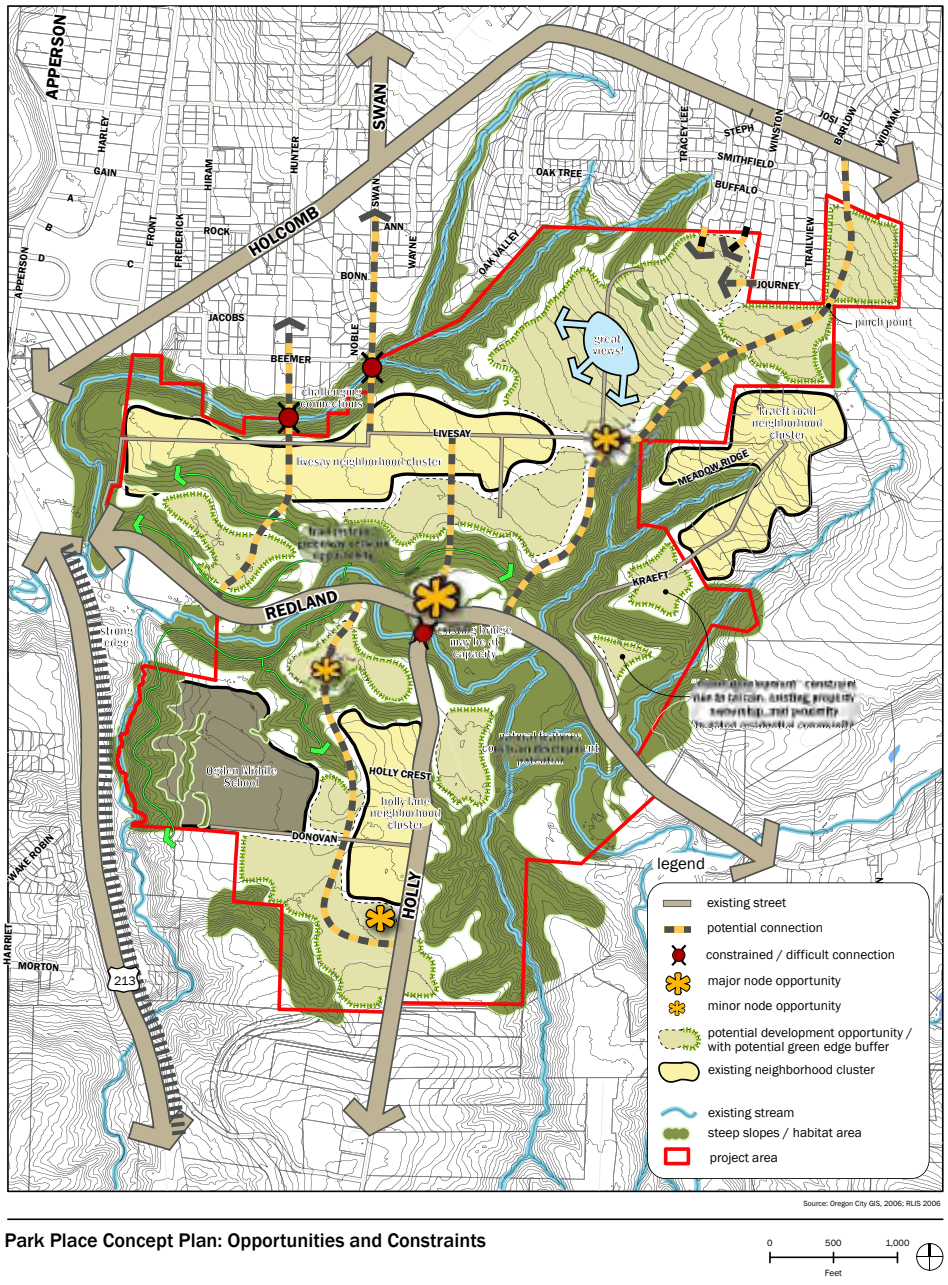

Figure 2-5. Opportunities and Constraints

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Opportunities & Constraints

Key elements of the opportunities and constraints diagram include:

- *The study area currently consists of two neighborhood clusters: Holly Lane neighborhood cluster and the Livesay neighborhood cluster.*
- *The majority of the study area's buildable land (development opportunity sites) are located north of Redland Road.*
- *Opportunity to surround new and existing development with green buffers.*
- *The northeast portion of the area has great views to the south and west. Development layout lends itself to a (east-west) solar orientation.*
- *Sensitive areas (waterways, floodplains, wetlands, habitat conservation areas, and areas with slopes in excess of 25%) are treated as limited development zones.*
- *Opportunity to establish an extensive off-street trail network*
- *The study area has limited opportunities for north-south roadway connections due to steep slopes and sensitive habitat areas.*
- *The existing Holly Lane bridge is approaching capacity.*
- *Livesay Creek is both an opportunity (resource, habitat, aesthetic) and a constraint (difficult to connect across).*
- *Opportunities exist for major and minor nodes at the confluence of major roadways and on flat lands.*
- *Lower Livesay is a challenging area to redevelop due to limited access, steep slopes, and numerous small lots.*

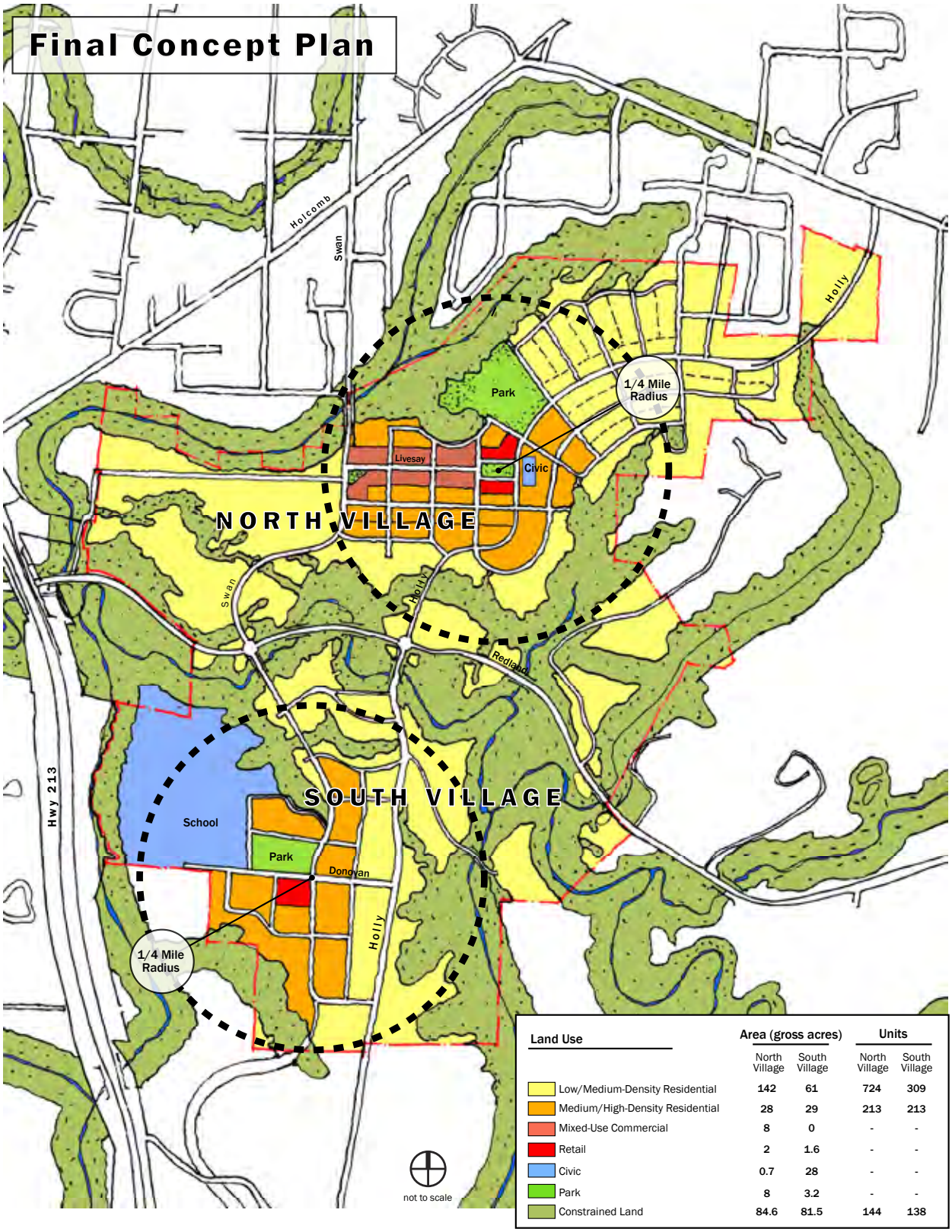


Figure 3-1. Park Place Concept Plan Urban Growth Diagram

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

3. Park Place Concept Plan

1. Introduction

A series of growth alternatives for the Park Place study area were developed during a multi-day planning charrette the week of October 15, 2006 in Oregon City. The charrette (*summarized on page 22; see Appendix C for detailed descriptions and sketches*) consisted of interactive meetings, site tours, design sessions, and a series of public forums. Charrette participants included members of the project's Project Advisory and Technical Advisory Committees, local and regional service providers, Oregon City staff, property owners, developers, and citizens living in and around the Park Place study area. This intensive and transparent planning process resulted in a mutually agreed upon vision for the study area that became the foundation of the Park Place Concept Plan ("Concept Plan"). Following the charrette, the Park Place Concept Plan was refined to more accurately reflect the location of existing and proposed streets, natural resource areas, buildable lands, and to respond to remarks from the final public meeting.

The Concept Plan identifies the approximate location of land uses, public facilities and roads. Specific locations for these elements will be determined as part of more detailed future planning and development processes.

2. Concept Plan

The vision for the Park Place Concept Plan is to provide a framework for growth that respects and augments the area's context, history, and natural systems. The Park Place Concept Plan emphasizes good urban design, connectivity, opportunities for place-making and cultivating community, diversity, and, above all, a way to provide for future growth in a sustainable manner.

The key components of the Concept Plan (Figure 3-1) include:

- Two primary north-south connections between Holcomb Boulevard and Redland Road (Swan Avenue and Holly Lane)
- Two distinct mixed-use neighborhoods (North Village and South Village) that accommodate 1459 new dwelling units
- Neighborhood-oriented commercial nodes that integrate commercial land uses, residential land uses, and public open space
- An area for a new civic institution, such as a library or community center
- A mix of housing types and ranges of affordability
- An extensive system of off-street and on-street trails and pedestrian/bicycle connections
- Innovative, "green" on-site stormwater treatment methods
- Protected sensitive areas, including drainages and steep slopes
- Streets and buildings oriented for solar access
- The use of green edges to define neighborhoods and buffer developments
- Integration of parks and open spaces into existing and future neighborhoods

Park Place Concept Plan Charrette Summary









photos from top: charrette participants on a tour of the study area; members of the project team working on various growth alternatives; fielding questions and concerns at the first public forum; community member evaluating one of the growth concepts

Day 1 (Sunday, October 15)

- Reviewed Core Values and Evaluation Criteria (see Appendix B1) with stakeholders.
- Reviewed the opportunities and constraints diagram with stakeholders.
- Conducted a site tour of selected locations in the study area.

Day 2 (Monday, October 16)

- Held a stakeholder meeting to identify potential opportunities and constraints to creating the Park Place Concept Plan.
- Developed five preliminary planning alternatives (afternoon).
- Held Public Open House to review and comment on preliminary alternatives (evening).

Day 3 (Tuesday, October 17)

- Met with public agency representatives and others who were unable to attend Day 2 stakeholder meetings and/or decided to return for additional individual meetings.
- Narrowed five preliminary planning alternatives to two refined alternatives.
- Evaluated refined alternatives using evaluation criteria/core values (afternoon). Held second Public Open House to review and comment on two refined alternatives (evening).

Day 4 (Wednesday, October 18)

- Held stakeholder group meetings with public agency representatives, property owners, neighborhood group representatives and others, including PAC members to review refined alternatives and recommend a Preferred Alternative (morning).
- Refined the Preferred Alternative based on feedback from morning stakeholder group meetings (afternoon).

Day 5 (Thursday, October 19)

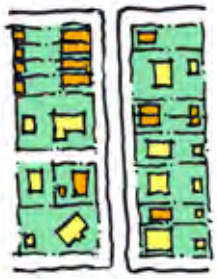
- Continued to refine the Preferred Alternative (morning and afternoon).
- Held final public meeting (Clackamas Community College) to present the Preferred Alternative (evening).

Design Principles

The following design principles were developed during the planning charrette. Both the core values and the design principles helped shape the various elements of the Final Concept Plan.

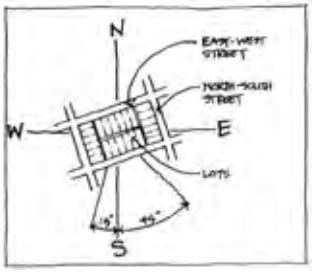


Create neighborhood centers in the heart of the community. All great neighborhoods have a center that acts as the heart of the community and provides a sense of place.





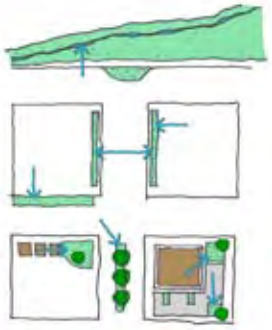
Create a mix of housing types that include ranges of affordability. One way to provide neighborhood diversity is to enable the development of a variety of housing types and sizes. This also allows people to stay in the neighborhood for long periods of time as they transition through the various stages of life.



Design for solar access. Maximizing solar access provides better daylight and ventilation, opportunities for using renewable energy systems (i.e., solar power) and improves the energy-efficiency of buildings.



Integrate existing open spaces and parks into existing and future neighborhoods. Linking new parks with existing natural areas, provides a greater range of open space options for residents and encourages better neighborhood connectivity.



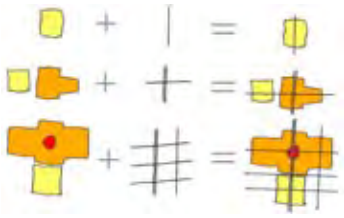
Integrate stormwater management. By treating or detaining stormwater on site, there is less need for costly infrastructure. On site treatment also improves overall water quality.



Integrate a network of streets and trails into neighborhoods. People are more likely to walk to destinations and for recreation if a safe and convenient system is in place.



Utilize existing green edges to define neighborhoods. Providing "green edges" or buffers between development provides opportunities for better neighborhood connectivity, wildlife habitat preservation, a more rural, park-like environment, and greater privacy.



Link land use and transportation. As communities develop, it is important to provide transportation connections that are commensurate with the intensity of adjacent land uses. It is important to provide transportation options for all residents and visitors, including children, the elderly, and those with disabilities.

3. Plan Elements

The following section describes the elements of the Park Place Concept Plan in detail and how the evaluation criteria and design principles are applied.

The Plan accommodates a minimum of 1,458 dwelling units with a variety of housing types. An additional ~280 units can be accommodated in the "green fingers" or constrained land. These figures were derived from the Buildable Lands Analysis, which is summarized in Chapter 2 and in its entirety in Appendix E.

A market analysis conducted in Fall 2006 determined that the study area can support approximately 40,000 square feet of new commercial development: 30,000 square feet in the North Village and 10,000 square feet in the South Village.

Land Use: The Villages

The Park Place Concept Plan proposes a mix of residential, commercial, park and open space, and civic land uses. Redland Road serves as the logical division between two neighborhoods: North Village and South Village. Neighborhood-oriented nodes serve as the heart of these new neighborhoods and provide a variety of civic and commercial spaces. These nodes are centrally located in the neighborhoods along existing and future roadways and are surrounded by medium density residential land uses that transition to lower-density residential land uses. In response to the market analysis findings, the Concept Plan appropriates enough land for 30,000 square feet of commercial development in the North Village and 10,000 square feet of commercial development in the South Village.

North Village

The majority of new growth (approximately 936 units) is proposed to be accommodated in the North Village neighborhood, north of Redland Road (Figure 3-2). A new main street along Upper Livesay Road between the Holly Lane and Swan Avenue Extensions, called "Livesay Main Street," serves as

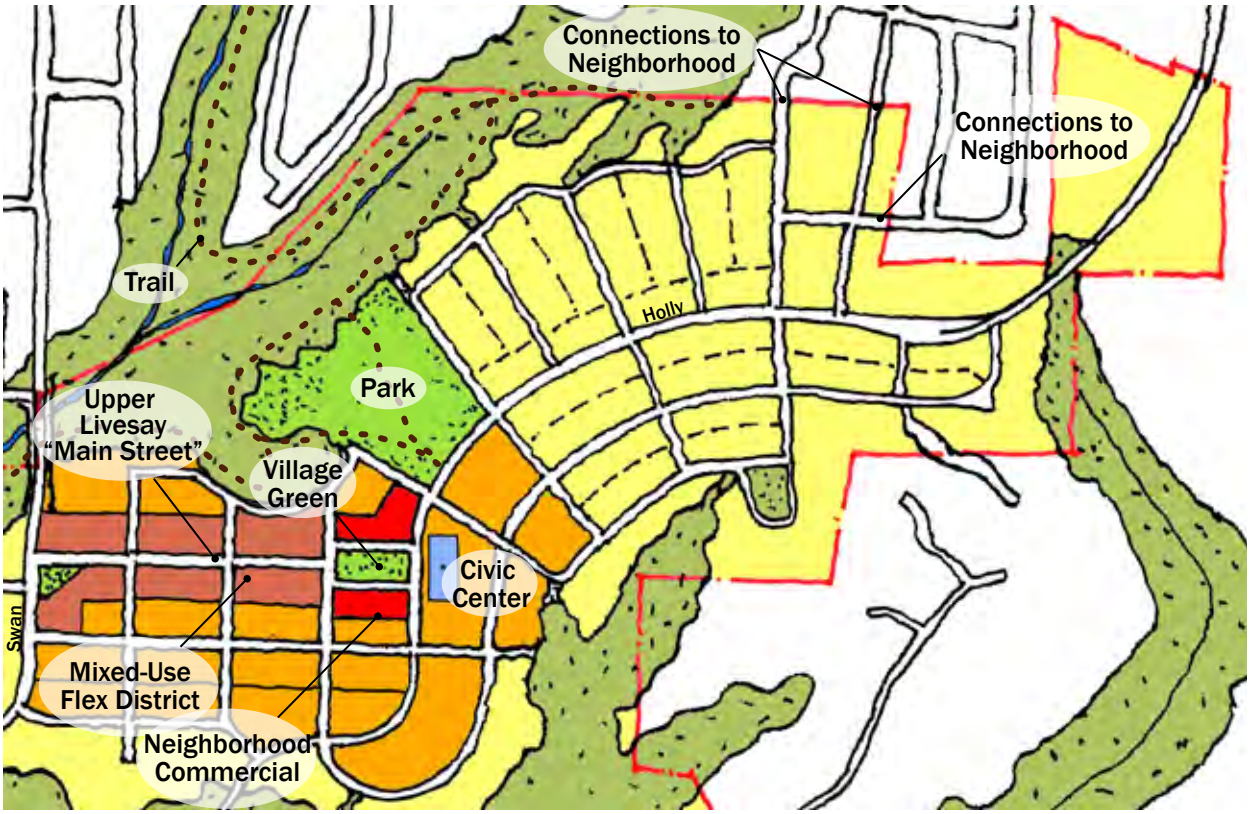


Figure 3-2. North Village Neighborhood

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

the heart of the North Village. The Livesay Main Street is envisioned to have wide sidewalks, landscaped stormwater facilities (bioswales), pedestrian-scale lighting, street trees, and benches. The roadway terminates at the junction of the Holly Lane Extension with a Village Green and civic building (i.e., library, community center, environmental interpretative center, or post office). This mixed-use district is surrounded by medium-density housing (figures at right), which is within walking distance of the core area, and single-family housing that blends into the surrounding existing single-family residential neighborhoods. Small-scale commercial businesses, like a coffee shop, bookstore, dry cleaners, or café, are proposed to anchor the intersection of Holly Lane Extension and Livesay Main Street and surround the Village Green.



New mixed-use development and civic node in the North Village

The land uses along Livesay Main Street are envisioned to be a mix of residential and commercial uses (e.g., ground-floor, neighborhood-oriented commercial with housing or offices above). The buildings should convey a rich palette of architectural elements that distinguish the Village from the existing auto-oriented commercial uses and a proposed regional shopping center in the area bounded by Washington Street, Abernethy, and Highway 213. The types of elements incorporated into the design of the street facing façade should include large storefront windows, recessed entry ways, awnings and canopies, building lighting, and a rhythm of columns and/or pilasters that break the façade into smaller, more intimate modules.



A variety of housing types and densities is proposed in both the North Village and the South Village

In order to ensure that architectural design elements are integrated into future development in the North Village, it is necessary to develop implementation measures that reflect these elements. As part of the implementation measures proposed for Park Place, the City's existing Neighborhood Commercial (NC) zone will be modified to include "main street" standards for use in creating vibrant neighborhood centers in the North and South Villages.

The Park Place Concept Plan includes a general street plan and street cross-sections as well as an overview of natural resource planning in Park Place, with recommended extension of density transfer provisions to all natural resource overlay zones occurring in the Park Place plan area. These implementation measures are described in more detail in Chapter 4 of this document and Appendix I.



Taller buildings and a mix of uses provide a desirable sense of enclosure around the civic space in the North Village

South Village

The South Village is located at the intersection of Swan Avenue and Donovan (Figure 3-3). The South Village proposes a small neighborhood commercial node with a 3 - 5 acre park (figures at left) surrounded by a significant amount of medium-density housing; however, it will probably be some time before the existing single-family residential neighborhoods experience sufficient pressure to redevelop. Civic landmarks in the South Village include the existing Ogden Middle School and a new park. Similar to the North Village, these uses are surrounded by medium- and low-density housing.

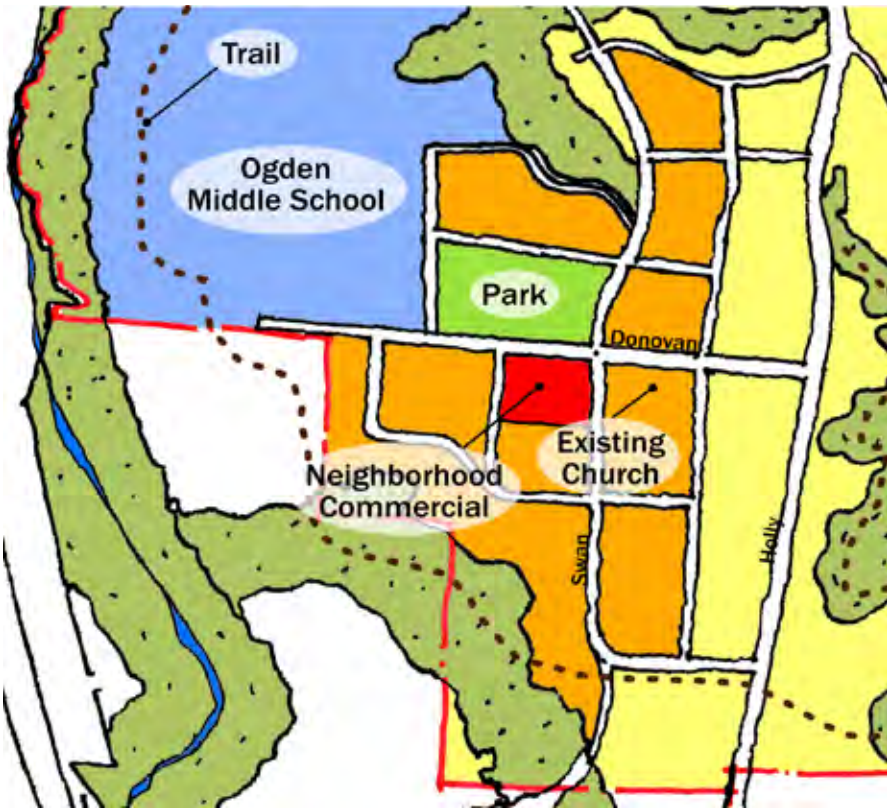


Figure 3-3. South Village Neighborhood

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.





Street trees, on-street parking, pedestrian-scale lighting, and street furniture create interesting places to meet in the community

Housing

The primary land use proposed in the Park Place Concept Plan is residential. Of the approximately 408 net buildable acres in the study area, approximately 360 acres are proposed for residential use. Residential land will be provided in a range of very low-density (R-10) zones to neighborhood commercial (NC) zones. In order to provide attractive and affordable housing for a variety of incomes and household types. It is recommended that a new residential zone (R-5), modifications to existing zones, additional design standards for attached single-family housing (townhouses and rowhouses), and multi-family housing be instituted to implement the Park Place Concept Plan. Recommended residential types and zones include:

Low-Density Residential (R-10, maximum 4 units/acre)

- Single-family detached dwelling units (including manufactured homes)
- Accessory dwelling units (ADUs)

Low/Medium-Density Residential (proposed R-5, minimum 6 units/acre)

- Single-family detached dwelling units (including manufactured homes)
- Accessory dwelling units (ADUs)
- Single-family attached dwelling units (townhouses/rowhouses)
- Two-family dwelling units (duplexes)

Park Place Concept Plan Housing Development Types

Houses don't always have to be large to provide a quality living space. A variety of housing sizes and types attract a mixture of ages, incomes, family structures and lifestyles to help create a richer, more diverse community.



Single-Family Housing

Part of the challenge of meeting the housing needs of a growing and thriving region is to offer housing types that address the values that drive demand for detached, single family housing, but with smaller spaces and smaller price tags.

Single-family houses can be a range of sizes, styles, and colors. Above all, they should be community-oriented with architectural elements that encourage "eyes on the street" and neighbor interaction.



Multi-Family Housing

Multi-family housing clustered around common open spaces (instead of parking lots) help foster a sense of community that usually isn't found in conventional apartment complexes. Vehicle access is provided in the rear and with alleys.

There are a variety of ways to provide quality, community-oriented apartments. In some cases, apartment complexes can be designed to look like single-family residences and contain six or seven apartments. This provides density without dramatically changing the character of the neighborhood.

Medium/High-Density Residential (R-3.5, minimum 9 units/acre)

- Single-family detached dwelling units (including manufactured homes)
- Single-family attached dwelling units
- Two-family dwelling units (duplexes)
- Multi-family dwelling units (proposed)

Neighborhood Commercial (NC)

- Dwelling units above ground floor (if in conjunction with a permitted or conditional use)



One example of a "Green Finger" - development buffer and greenway

The needed mix of housing units is shown in Table 3-1. These figures mirror the ratio of existing housing types in Oregon City according to the 2000 Census. Additional information about the affordability of housing is provided in the following section.

Type of Housing	Number of Units Needed
Single-Family Residential Detached	950
Two-Family Residential Attached (Duplex)	87
Manufactured Home in Park	48
Single-Family Residential Attached	9
Multi-Family Residential	282
Accessory Dwelling Units	17
Group Quarters	65
TOTAL	**1,458**

Table 3-1. Type and Amount of Housing Needed

The City's lowest-density zoning is recommended for the "green fingers" of natural resource and environmentally sensitive lands in Park Place. These areas are appropriate for low-density development and will be protected, in part, by the City environmental overlay zones which restrict development altogether in certain areas or reduce the allowable density of residential development in other areas.

Table 3-2 identifies the potential number of housing units of different types that could be developed within the concept planning area based on proposed zoning. The low/medium-density zone is more likely to be the site of manufactured homes and ADUs than the medium/high-density zone. The distribution of housing types in Table 3-2 however, represents only one scenario for accommodating needed housing within zones proposed for Park Place. It is possible that housing types may develop in different ratios, including development of attached single-family housing in the low/medium-density residential zone.

Schools

No new school sites are identified in the Park Place Concept Plan. The two existing elementary schools near the study area, Park Place Elementary and Holcomb Elementary, currently have capacity for an additional 300 students.

Moreover, future enrollment for these elementary schools is projected to remain relatively flat, as new households in their service area are projected to include fewer young children. Ogden Middle School is currently at its preferred capacity. Although enrollment figures are expected to increase slightly with the addition of new households to Park Place, this growth is expected to be gradual and not significant enough to trigger the need for a new middle school.

Based on enrollment projection assumptions used by the Oregon City School District, which vary for different types of housing units, development in the study area is expected to result in the following approximate number of additional students when the area is completely developed:

Table 3-2. Type and Amount of Housing By Land Use Designation

Residential Land Use Designation/Zone	Number of Units Needed	Housing Type
Low/medium-density residential (yellow) – minimum 6 units/acre	907	Single-Family Residential Detached (including Manufactured Homes)
	17	Accessory Dwelling Units (ADUs) sited with Single-Family Residential
Sub-total	924	
Medium/high-density residential (orange) - minimum 9 units/acre	117	Single-Family Residential (Detached and Attached)
	369	Two-Family Residential Attached (Duplex) and Multi-Family Residential
	65	Group Quarters
Sub-total	551	
Total	**1,475**	

- 350 elementary school students
- 150 middle school students
- 150 high school students

These increases in enrollment are expected to occur gradually over the next five to twenty years, depending on the pace of annexation and development in the planning area. Given the additional capacity of existing schools, these additional students would not create the need for a new elementary school which averages about 500 students in the Oregon City School District. Similarly, the increase in enrollment would not result in the need for an entire new middle school, which averages about 700 students in the District. Therefore, no additional school site is recommended in the Park Place Concept Plan.

Parks and Open Space

The Park Place Concept Plan incorporates a significant amount of open space, mostly attributed to environmentally-constrained natural areas within the planning area. This open space network takes the form of “green fingers.” These

"green fingers" consist of sensitive habitat and drainage areas that frame pockets of development while protecting the existing natural habitat. The proposed "green fingers" provide a buffer between resource areas, existing development, and new development. The "green fingers" also serve as a signature element for the burgeoning neighborhood, especially when they are combined with the Plan's proposed system of trails and pathways. This open space concept can be realized through local regulation, sensitive development practices, and through public acquisition. The amount of open space proposed in the Plan exceeds Metro and City guidelines.

As discussed, the Park Place Concept Plan includes a neighborhood park in both the North Village and the South Village. These parks are shown in locations that optimize the following concept planning criteria:

- Locate parks adjacent to future village centers in order to maximize proximity and therefore walkability for the greatest number of residents;
- Locate parks adjacent to civic uses such as schools or other facilities in order to synergize with existing or planned public amenities;
- Locate parks on sites that are relatively flat in order to accommodate the need for play fields; and
- Locate parks adjacent to existing natural areas so as to integrate open spaces with parks. This may allow for reduced park areas by allowing passive recreation areas to occur in natural open space areas.

There may be other locations within the proposed neighborhood fabric that meet these criteria and the locations indicated on the Urban Growth Diagram should not be taken as absolute. The parks were shown in these locations because they meet these criteria. It is essential that any alternative sites identified in the future meet the same or similar criteria.

The City's existing Park and Master Plan identifies the need for two developed parks in this area to meet its standard of having neighborhood or community parks within ½ mile of all residents. According to conversation with Jim Row, (former) Oregon City Park and Recreation Planner, The Oregon City Park and Recreation Master Plan, National Recreation and Park Association's park and recreation facility guidelines, and information compiled by Cogan Owens Cogan, a single park would not meet this standard. Such national and local guidelines typically indicate standards of between 1-3 acres of neighborhood parks per 1,000 residents, 2-4 acres of community parks per 1,000 residents and overall goals of six to 10 acres of developed park facilities per 1,000 residents. These standards indicate the need for 18-30 acres of developed parks, including neighborhood and community or other developed park facilities in the planning area, assuming a buildout population of about 3,000 residents. The proposed number of facilities and acres of developed parks is generally consistent with these targets.

The parks shown on the Urban Growth Diagram are located in their respective neighborhood centers and are surrounded by commercial, civic uses, and medium density housing. The parks are intended to provide basic recreational opportunities for residents and may include amenities such as play equipment, athletic fields, picnic tables or shelters, walking trails, and other features. The neighborhood park in the North Village is approximately eight to ten acres and within walking distance of the Livesay Main Street. The South Village neighborhood park is approximately three to five acres and surrounded by medium/high-density residential. These two parks are consistent with the type of parks identified as needed in the City's *Parks and Recreation Master Plan* (2004) and with recommended national acreage guidelines and service areas.



Open Space - Natural Area



Neighborhood Park

Transportation

The core values and guiding principles of the Park Place Concept Plan describe a multi-modal transportation system that is fully integrated with the land uses it serves. By design, the system is inherently sustainable, safe, and interconnected and serves the local and regional travel anticipated for the area.

Regional Growth Impacts

Substantial growth in local and regional travel is anticipated over the next 25 years. The Highway 213 corridor will be hardest hit, with travel demands growing by nearly 50 percent to almost 60,000 vehicle-trips a day. Improvements to this corridor would be very costly and face many difficult challenges to overcome. City and regional planners agree that this vital facility must be protected by enhancing the City's transportation system to better serve local travel.

Redland Road, Holcomb Boulevard, and Holly Lane are also forecast to experience significant increases in travel demands. Each corridor is constrained by narrow rights-of-way, physical features, and/or difficult topography that make improvements difficult. Nonetheless, it is imperative that the local transportation system be improved and expanded to better serve the Oregon City area and protect the regional resources of HWY 213 and I-205. Therefore, the Park Place Concept Plan provides for a transportation system that addresses these constraints while minimizing the adverse impact of local and regional growth.

Holly Lane and Swan Avenue Extensions

Holly Lane serves a vital role in both the local and the regional context as the only continuous north/south travel corridor on the east side of HWY 213. Holly Lane connects the northern area of Oregon City to many key destinations in the hilltop area of the city, such as Berryhill Shopping Center, Clackamas Community College, Oregon City High School, City Hall, and many other retail and employment locations. As a result, this corridor is expected to see travel demands increase by nearly 13,000 vehicles per day to a total of more than 16,000 vehicles per day. Were this to occur, Holly Lane would need to provide five lanes near its intersection with Redland Road and three lanes for the remainder of its length. In addition, Redland Road would need to provide six lanes (unless a smaller cross section is proven adequate) near its intersection with Holly Lane and five lanes for the remainder of its length to Abernethy Road.

The cost and feasibility of these improvements is questionable. Much of the Holly Lane corridor has a very narrow right-of-way with many single-family residences that take direct access from Holly Lane. Climbing sections of Holly Lane will be very costly to reconstruct and face several engineering challenges. The existing two-lane bridge across Abernethy Creek would need to be demolished and replaced with at least a five-lane bridge. Finally, much of Redland Road is significantly constrained by topography on the north side and the Abernethy Creek on the south side.

The Park Place Concept Plan provides for a parallel, collector-level corridor to Holly Lane, referred to as the Swan Avenue extension, as a solution to the issues described above. Establishing this corridor from Forsythe Road to points well south of Donovan Road ensures that the existing Holly Lane can remain a two-lane, collector-level facility, south of Redland Road. The Swan Avenue extension will include bridges across the Livesay Creek canyon and Abernethy Creek, creating much needed connections between adjacent neighborhoods and providing adequate capacity and system redundancy critically needed during times of emergency. In addition, Holly Lane would be extended north from Redland Road to connect with Holcomb Boulevard, providing good access, connectivity, and system redundancy to the area.

The Swan Avenue extension provides the opportunity for a continuous, north/south, collector-level facility that is fully equipped to serve all travel modes. The facility will include sidewalks and on-street striped bike lanes on both sides and accommodate future transit service. Equipped as such, Swan Avenue is anticipated to attract 10,000 to 12,000 vehicles a day, while Holly Lane is only required to serve 4,000 to 6,000 vehicles per day. This allows the existing Holly Lane to remain a two-lane road with improvements to address safety concerns and manage travel speeds.

There are many other benefits derived from the Swan Avenue extension, such as:

- the Livesay Creek Canyon is finally overcome as a barrier of access to schools, parks, retail uses, and neighborhoods, which reduces demands on Redland and Holcomb and reduces out-of-direction travel;
- the new Swan Avenue-Abernethy Creek bridge provides a critical connection that is out of the flood plain, redundant to the Holly Lane-Abernethy Creek bridge crossing, and improves system connectivity and local access;
- areas north and south of Redland Road are more accessible and achieve higher levels of development as a result;
- the Swan Avenue connection from Livesay Road to Redland Road alleviates the need for the existing Livesay Road intersection with Redland Road and dramatically reduces the likelihood of cut-through traffic using lower Livesay Road;
- improvement requirements for Redland Road are appreciably reduced, lowering costs and environmental impacts; and,
- a more complete, robust, and redundant multi-modal transportation system can be developed that is cost-effective and environmentally sound.

The Swan Avenue-Livesay Creek Canyon bridge and the Swan Avenue-Abernethy Creek bridge are vital links in the local and regional transportation system and critical components to the viability of the land use concept. These allow

a continuous collector-level corridor to be created. This alleviates the need to widen and significantly improve the Holly Lane corridor, which minimizes adverse impacts to existing properties along Holly Lane. The connections provide for more direct routes between key destinations in and around the study area. This reduces out-of-direction travel, particularly travel on Holcomb Boulevard and Redland Road. Finally, these connections provide convenient access to a large enough population base to fully support the north and south mixed-use village areas.

Sustainability

A sustainable transportation system is achieved through a number of specific components. Many of the new public rights-of-way will be equipped with on-site storm water and water quality management techniques that minimize or eliminate the need to carry run-off to treatment facilities. All rights-of-way will be equipped to serve pedestrian and bicyclists (with the possible exception of Holly Lane south of Redland Road), which will reduce the need for vehicular travel. The pattern of classified streets in the Plan naturally accommodates transit service to and through the area, creating a viable alternative to vehicular travel for most types of trips. The redundant and interconnected network of facilities distributes traffic, shortens trip lengths, and optimizes opportunities for non-auto travel. These components work in combination to provide a sustainable transportation system and minimize the adverse impacts of impervious surface and vehicular travel.

Land Use and Transit

The Land Use component of the Park Place Concept Plan achieves a level of residential density that is considered transit-supportive. As such, there is a much greater likelihood that transit service will be extended to this area. The potential exists for services to connect the Park Place area to the Oregon City Transit Center (which connects Oregon City the greater Portland region) and the Clackamas Community College Transit Center (which connects multiple areas of Oregon City). Said services are likely to greatly improve the number of transit riders in the planning area.

Nature and the Pedestrian/Bicycle System

The natural beauty of the Park Place area is a tremendous asset that justifies a high-quality pedestrian and bicycle system to access it. People are drawn to this beauty and desire to see it, as they travel, and spend time in it, as they recreate. The natural surroundings will be a stimulus for activity, which is best served by a pedestrian and bicycle system associated with public rights-of-way and on trails. Therefore, all public streets (any street owned by a public agency) will be equipped with sidewalks on both sides, sized appropriately to the adjacent land uses and expected pedestrian activity. On-street striped bike lanes will exist on most of the classified roadways (any roadway functionally classified as a collector or above by any public agency) to safely accommodate and delineate bike routes. A system of hard- and soft-surface trails will intertwine with the public rights-of-way to provide direct access to nature for both modes. The result is a natural

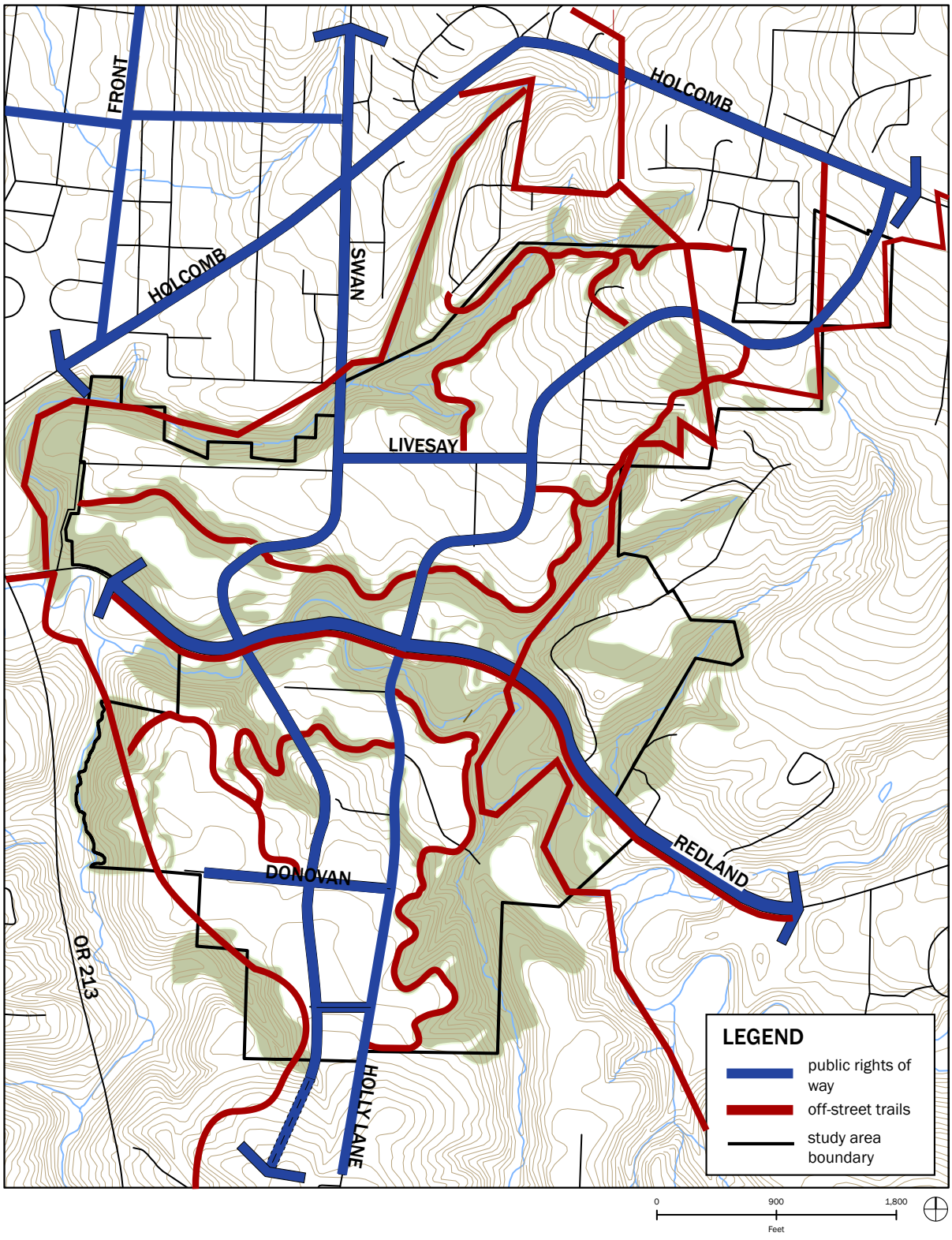


Figure 3-4. Concept Plan Street System Map

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

environment, complemented by a robust pedestrian/bicycle network that is expected to stimulate a much higher level of pedestrian and bicycling activity than in many other areas of the region.

The following sections provide a description of each mode of travel in Park Place and the recommended multi-modal system to support those modes.

Street System

A network of streets is necessary to satisfy the core values of the Plan and meet the needs of the traveling public. The Concept Plan Street System Map (Figure 3-4) and the Concept Plan Functional Classification Map (Figure 3-5), depict this system of streets and the way in which each is anticipated to function. Each street is carefully sized to carry the expected travel demand it is intended to serve, while minimizing the impact of unnecessary impervious surface. Described below are the functional classifications applied to roadways within the planning area. Other improvements (e.g., intersection improvements) will be evaluated and designed in more detail as development occurs. They could include a mix of traffic signals and/or roundabouts, as well as additional turn lanes.

Functional Classification

Roadways within the plan area are categorized into different groups. These groups are referred to as "functional classifications" and are defined in the City of Oregon City's Transportation System Plan (TSP). Roadway classifications applied within the Park Place neighborhood include Minor Arterial, Collector, Neighborhood Collector, and Local Street.

Minor Arterial streets are roadways that "connect principal traffic generators; carry local traffic between neighborhoods and to community and regional facilities within a city."

Minor Arterial

Redland Road is the only street classified as a Minor Arterial within the Park Place Concept Plan area, since it connects area residents to the Highway 213 corridor (Expressway classification) and to downtown Oregon City via Abernethy Road, another Minor Arterial. Other streets with the same designation in the Park Place vicinity include Anchor Way, Abernethy Road, Clackamas River Drive, Holcomb Boulevard, and Washington Street.

Collector streets are typically characterized by a 2 or 3-lane cross-section, low to moderate traffic volumes, trip lengths, and traffic speeds.

Collector

The existing Holly Lane is designated a Collector street, because it connects area residents to Redland Road and Maplelane Road, both of which are Minor Arterials. Other Collector streets in the vicinity include Forsythe Road, Front Avenue and Swan Avenue, north of Holcomb Boulevard. The extensions of Swan Avenue (from Holcomb Boulevard to south of Donovan) and Holly Lane (from Redland Road north to Holcomb Boulevard) are also designated as Collector facilities. This designation is chosen because of the anticipated function each extension will serve, connecting between Minor Arterial streets and linking neighborhoods to several areas of the city.

The primary function of Neighborhood Collectors is to provide local access and circulation. The roadway typically has low traffic volumes and speeds to ensure livability and safety.

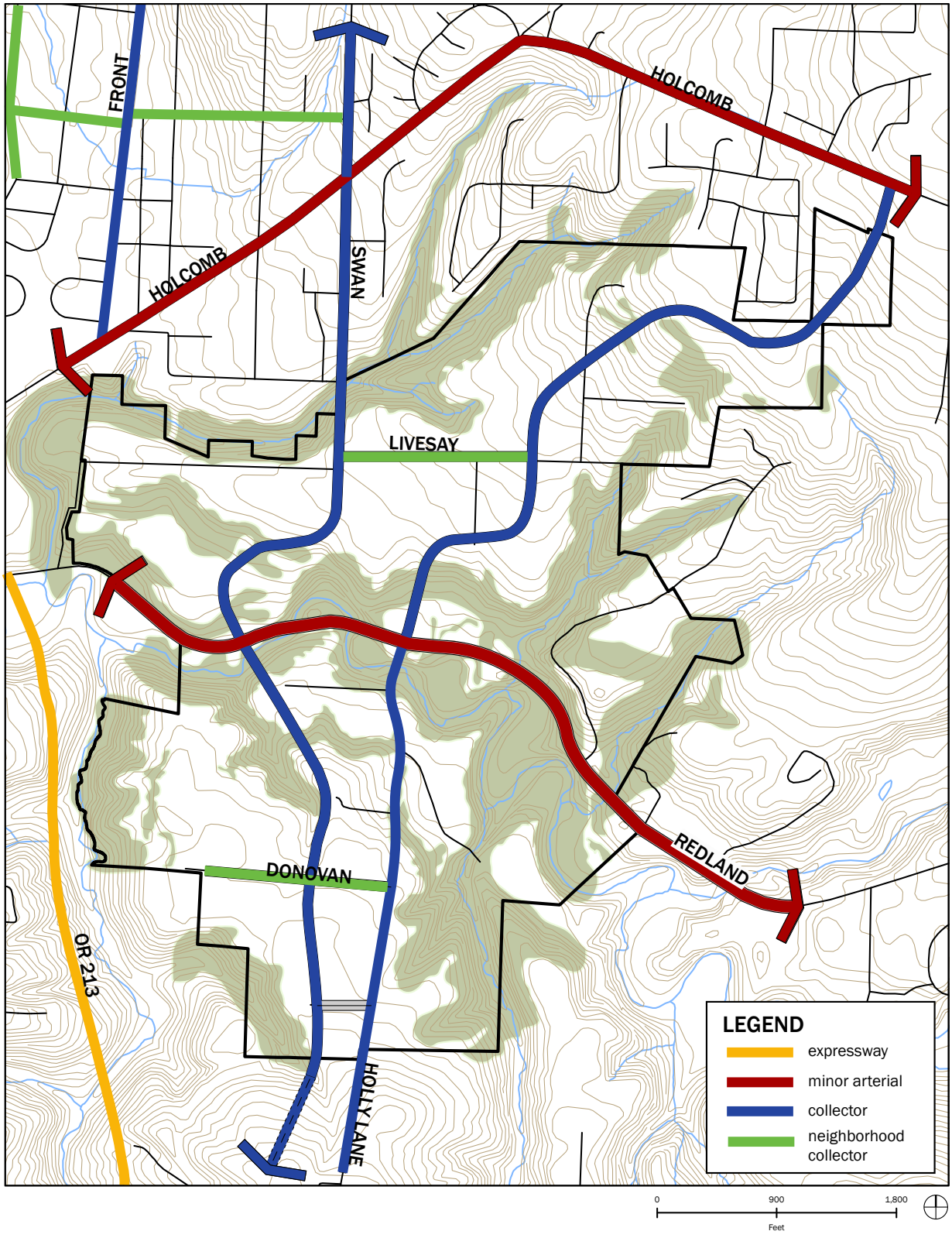


Figure 3-5. Concept Plan Functional Classification Map

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

Neighborhood Collector

Livesay Road, between Swan Avenue and Holly Lane, and Donovan Road, from Holly Lane to Ogden Middle School, are designated as Neighborhood Collectors. Apperson Boulevard and Cleveland Street are other Neighborhood Collectors in the vicinity.

Local Street

A Local street is one that "provides direct access to adjacent properties and land uses within neighborhoods; lowest mobility function and highest accessibility function; low traffic volumes and speeds; through traffic discouraged; typically 2-lane sections; on-street parking encouraged; typically stop-sign control at intersections with collector and arterial streets; sidewalks and landscaping are required; and, bicycle lanes are optional." All roadways not depicted in Figure 3-5 will be constructed as local streets.

Sizing

The Concept Plan Functional Classification Map (Figure 3-5) illustrates the basic street sizes expected as a part of implementing the Park Place Concept Plan. As shown, only the segment of Redland Road between Swan Avenue and Highway 213 is expected to require four travel lanes of capacity (unless a smaller cross section is proven adequate). All other roadways only require two travels lanes, one in each direction.

Tables 3-1 and 3-2 summarize proposed functional classification of each roadway in the Park Place Concept Plan and list features and the range of right-of-way to

Table 3-3. Functional Classification of Park Place Roadways

Roadway	Functional Classification
Redland Road	Minor Arterial
Holly Lane: South of Redland Road	Collector
Holly Lane: North of Redland Road	Collector
Swan Avenue: South of Holcomb Boulevard	Collector
Livesay Road: Holly Lane to Swan Avenue	Neighborhood Collector
Donovan Road: Holly Lane to Ogden Middle School	Neighborhood Collector

Functional Classification	Total ROW (Feet)	Standard Widths of Features (Feet)					
		Each Side				Other	
		Travel Lanes	Bike Lanes	Sidewalks	Planter Strips	Median	Parking
Minor Arterial	64-114	12-24	6	7	0-10	0-12	0-8
Collector	60-86	11	6	6	0-10	0-12	0-16
Neighborhood Collector	52-81	11	0 or 5	5	10	0-11	8-16
Local Street	42-54	8	0	5	5	0	0-8

Table 3-4. Right-of-Way Required for Each Functional Class

accommodate the street. The City's typical cross section requirements have flexibility, with many features being optional. The City has final authority over determining the appropriate cross section features and right-of-way width to require for all roadways constructed within the city limits.

Typical Cross Sections

Figures 3-A through 3-J correspond with the recommended cross sections for key facilities within the Park Place Concept Plan area. These figures correspond to the Concept Sizing Map (Figure 3-6) and illustrate the desired features for different street segments within the plan area. (It should be noted that Figure 3-B is not located on Figure 3-6 due to the streets being located outside of the study area.) Planter strips and medians are anticipated to work as water quality mitigation features where they are depicted. A brief description of each is provided below.

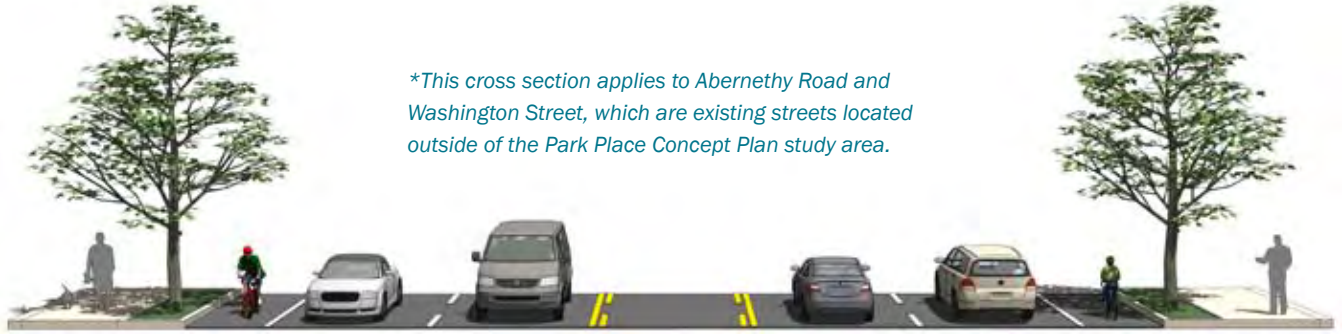
Minor Arterial

Figure 3-A, Redland Road 5-Lane Cross Section, illustrates an example cross section for Redland Road. The combination of regional and Concept Plan growth results in travel demands on Redland Road potentially requiring a typical five-lane cross section from the Abernethy-Holcomb intersection to Swan Avenue. Redland Road follows the Abernethy Creek corridor and is constrained by gentle to moderate slopes of adjacent hills. As such, widening of this corridor will be difficult. However, there is an opportunity to accommodate bicyclists and pedestrians on a shared use trail that parallels Abernethy Creek, in lieu of being in the Redland Road right-of-way. All reasonable efforts to minimize the typical cross section, while providing a safe and multi-modal facility, are encouraged.

While it is reasonable to pursue sufficient right-of-way to accommodate a 5-lane cross section, a Redland Road Corridor study to evaluate the impacts of widening the existing roadway should be completed prior to construction of any major improvements in this area



Figure 3-A: Redland Road 5-Lane Cross Section



**This cross section applies to Abernethy Road and Washington Street, which are existing streets located outside of the Park Place Concept Plan study area.*

Figure 3-B. Minor Arterial 5-Lane Cross Section*

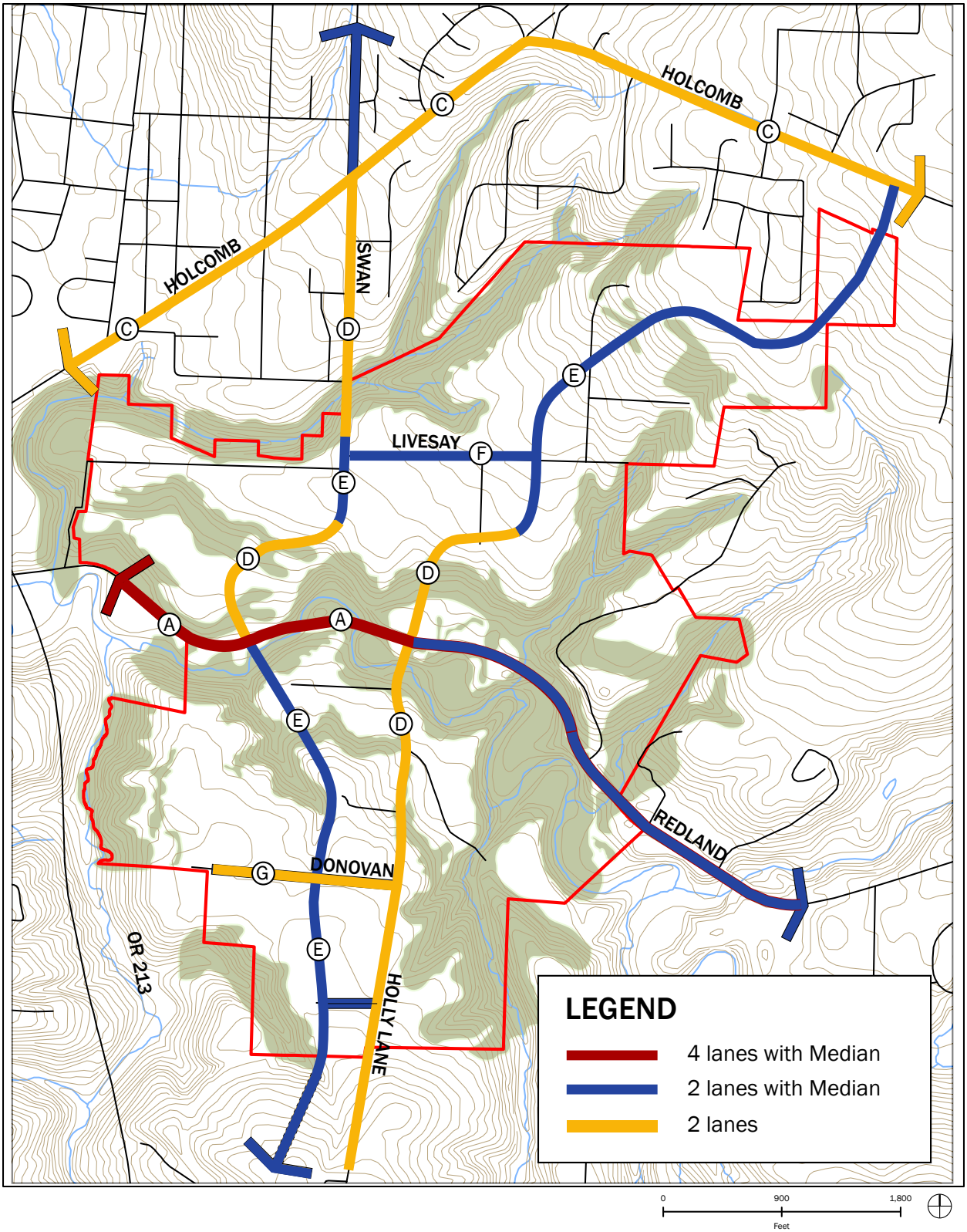


Figure 3-6. Concept Plan Street Sizing Map with Proposed Cross Section Designations

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

due to the sensitivity of the Abernethy Creek and Newell Creek Watersheds. Further widening should be phased only as capacity needs are confirmed through future analyses.

Figure 3-B, Minor Arterial 5-Lane Cross Section, represents the type of cross section anticipated for Abernethy Road and Washington Street. Each is expected to be a five-lane roadway, with on-street bike lanes and sidewalks on both sides.

Figure 3-C, Minor Arterial 2-Lane Cross Section, illustrates a cross section that would be appropriate for Holcomb Boulevard and Anchor Way. The rights-of-way for both facilities are narrow and each must overcome grades, therefore, it is appropriate to keep the cross section as narrow as possible, without compromising safety or functionality.

Collector

Several sample cross sections illustrate the range of options considered for this area. Figure 3-D, Collector Narrow 2-Lane Cross Section, provides a very narrow cross section; devoid of planter strips, medians, and on-street parking; for use in areas with steep grades and/or in a bridge section. This cross section may be appropriate for the climbing segments of Swan Avenue from Redland toward Livesay and of Holly Lane from Redland toward Donovan and Redland toward Livesay.



Figures 3-C and 3-D. Narrow Minor Arterial 2-Lane Cross Section and Collector 2-Lane Cross Section

The major differences between a narrow 2-lane Minor Arterial and a 2-lane Collector are its functional classification, the width of the bicycle lanes and the width of the sidewalks.

Collector segments occurring on flat to gentle grades afford the opportunity to provide several cross section amenities. Figure 3-E, Collector 3-Lane Cross



Figure 3-E. Collector 3-Lane Cross Section

Section, includes the planter strip and median and represents a cross section desired for Swan Avenue south of Redland and for Holly Lane north of Redland. The planter strip and median better integrate the street with adjacent land uses and provide for the necessary storm water management features.

Neighborhood Collector

Sections of Livesay and Donovan are designated as Neighborhood Collector and Figures 3-F and 3-G represent cross sections desired for these streets. The designated section of Livesay is anticipated to function like a main street in the mixed-use commercial node, as shown in Figure 3-F, Neighborhood Collector as Main Street. As such, on-street parking and wide sidewalks with plantings and other pedestrian amenities are desirable. Traffic speeds and vehicle volumes would be low enough that bikes can safely share the road with vehicles.

Figure 3-G, Neighborhood Collector with Bike Lanes, illustrates a potential treatment that may be appropriate for Donovan. Because Donovan connects to Ogden Middle School, there is a greater need for a delineated bicycle facility. Therefore, this cross section provides on-street bike lanes and only one lane of on-street parking.

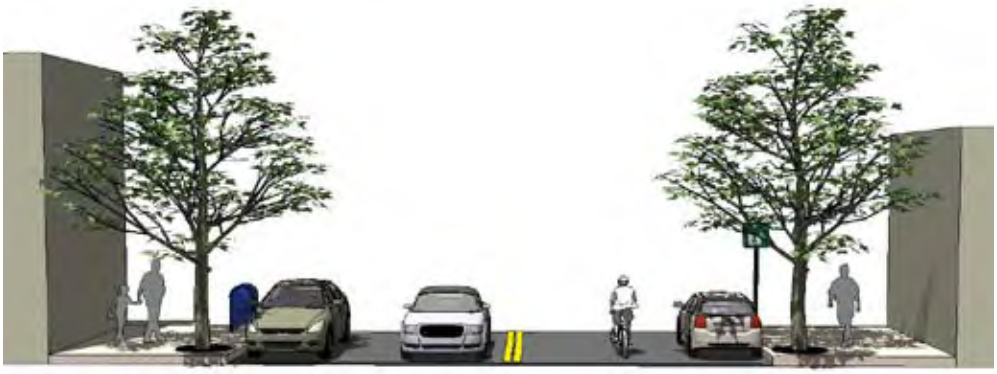


Figure 3-F. Neighborhood Collector as Main Street



Figure 3-G. Neighborhood Collector with Bike Lanes

Local

Many local streets are anticipated in the Park Place Concept Plan. A variety of cross sections is available and should be used to fit the character of the development, creating the strongest integration of land use and transportation. Figures 3-H through 3-J represent different ways in which the Local street integrates with the neighborhood it serves and accommodates pedestrian, bicycle, and motor vehicle travel. The local street system provides an excellent opportunity to comprehensively integrate innovative stormwater facilities and systems. These systems are discussed in greater detail in the next section.

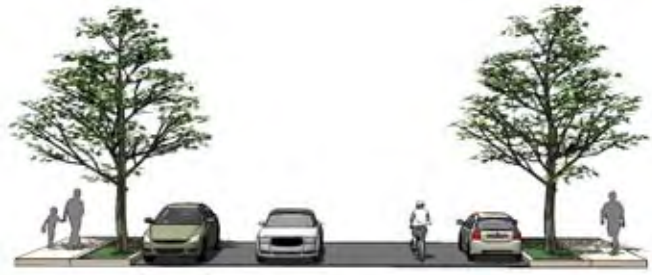


Figure 3-H. Local Street with On-Street Parking



Figure 3-I. Hillside Local Street With Stormwater Swale

Transit



Figure 3-J. Local Street with No On-Street Parking

TriMet is the transit agency responsible for providing public transportation services to the Park Place planning area. Figure 3-7 shows proposed transit routes within the planning area. The routes provide bus service to the following locations:

- along Holcomb Boulevard between its intersection with Redland Road and the Holly Lane extension;
- along Holly Lane from Holcomb Boulevard to Maplelane Road;
- along Swan Avenue from Holcomb Boulevard to Donovan Road, and
- along Redland Road west of Holly Lane.

Ideally, buses would travel along these routes at 15-minute headways during the peak hours and at lesser frequencies during the rest of the day, depending on demand. This plan would provide Park Place residents with a viable alternative to driving their own cars to reach destinations that are too far for bicycling or walking.

Achieving this level of transit service is dependent on the amount of transit demand generated by the planning area. Transit service to the area can be expected to evolve over time, as growth occurs and is accommodated in transit-supportive development densities. The evolution would likely start with increased service on the existing route to better serve the commuter peaks and provide a longer span of service. As the transportation network is expanded and population densities increase, improvements could include extensions of existing routes and increased service frequencies. Finally, transit demands reach the point where new routes are justified for better coverage to this newly developed area, as illustrated in Figure 3-7.

Pedestrian and Bicycle

Area residents will be able to travel throughout the Park Place planning area by walking or biking on a system of trails and on-street facilities that are seamlessly interconnected with the local and regional trails system.

Trails

Figure 3-8 illustrates the trail system throughout the planning area. Local, community, and regional trails connect to the Park Place Concept Plan trails that link to parks, open space, and community destinations. Many of these trails could include a soft-surface to accommodate equestrian activity, while others would have an all-weather surface. (ThePark Place Concept Plan is aspirational with respect to equestrian facilities. Equestrian facilities are likely to occur outside of public street rights-of-way.) These trails provide recreational opportunities in addition to providing safe routes of travel for bicyclists and pedestrians. The following trail types and standards are described in greater detail in the Oregon City Trails Master Plan.

Regional Trails: These trails are part of a larger trail system and may be identified in the Metro Regional Trails map. They provide access to areas within and outside the City of Oregon City. Regional trails typically are paved and wider than community or local trails, providing access to multiple types of users, including people walking, bicycling, jogging or roller-blading.

Community Trails: These trails serve residents throughout the community and provide links both within and between different neighborhoods and community destinations within the city. They are designated as community trails in the Oregon City Trails Master Plan map. Community trails typically are wider than local trails and provide access to multiple types of users, similar to regional trails. Trails surfaces (paved or unpaved) and widths may vary depending on topography, other environmental conditions and level of use.

Local Trails: Local trails primarily serve residents within a single neighborhood or portion of the city. They provide links within neighborhoods to or between local destinations such as schools, parks or shopping areas, or within natural areas or parks. Trails surfaces (paved or unpaved) and widths may vary depending on topography, other environmental conditions and level of use. Due to the constrained Redland Road corridor, pedestrian and bicycle facilities will occur as a part of the typical cross section, or shall be separated and treated as a multi-use, accessible all-weather trail system.

On-Street Bicycle and Pedestrian Facilities

Figure 3-9 depicts the on-street facilities for bicycles and pedestrians. Sidewalks will be constructed on both sides of all new roads and will be added to both sides of all collector- and arterial-level roadways within the planning area, in order to accommodate pedestrians. On-street bike lanes are anticipated for Holly, Swan, and Donovan. Livesay will operate as a shared-use facility, equal in treatment to all Local streets. Due to the constrained Redland Road corridor, pedestrian and bicycle facilities may occur as a part of the typical cross section, or separated and treated more like an all-weather trail system.

These two systems of bicycle and pedestrian facilities will connect Park Place residents to parks, open spaces, centers of commercial activity, and the regional transportation system without requiring them to step into a car. The robustness of these systems is in response to the desires of the community and the quality of the natural environment.

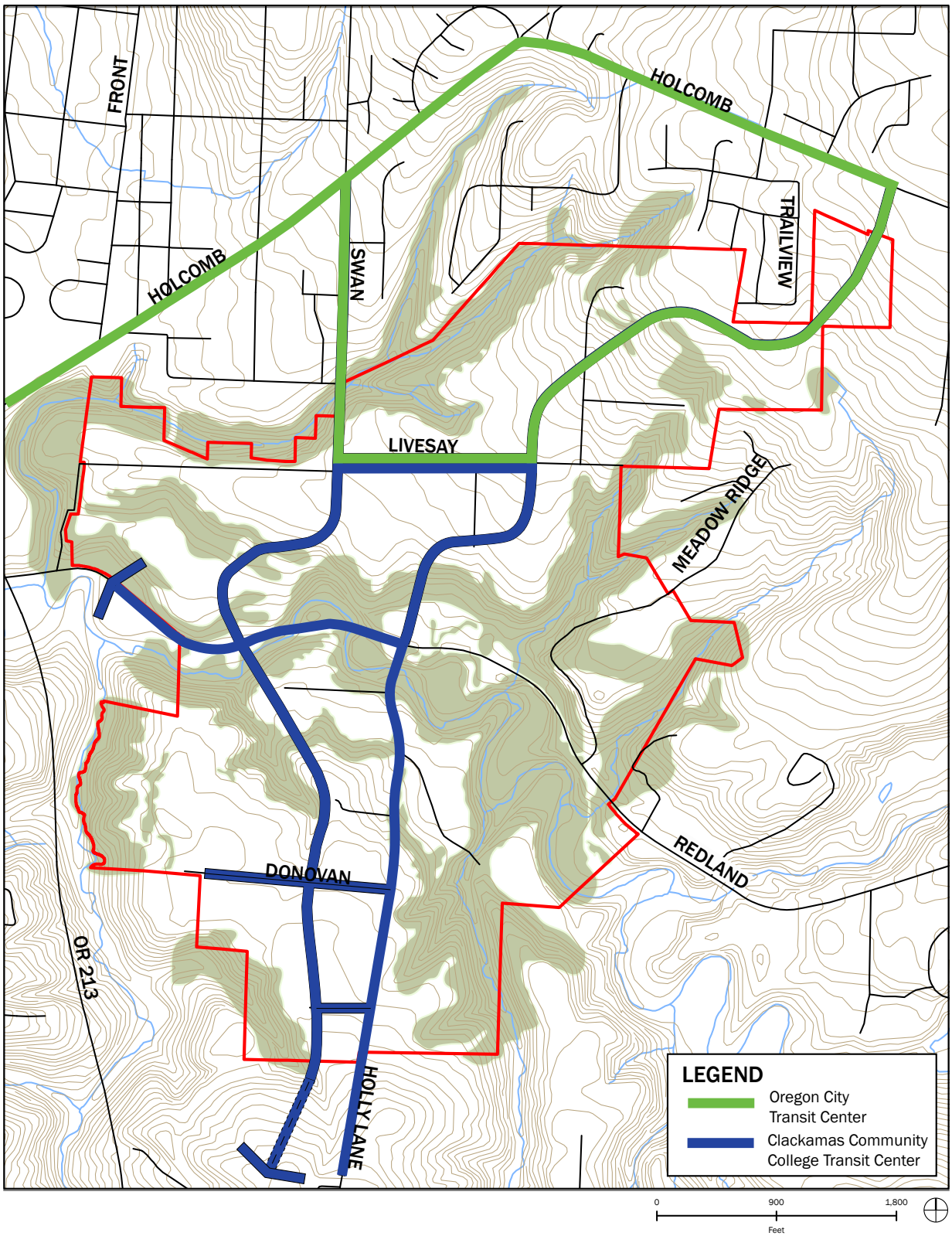


Figure 3-7. Proposed Transit Routes

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

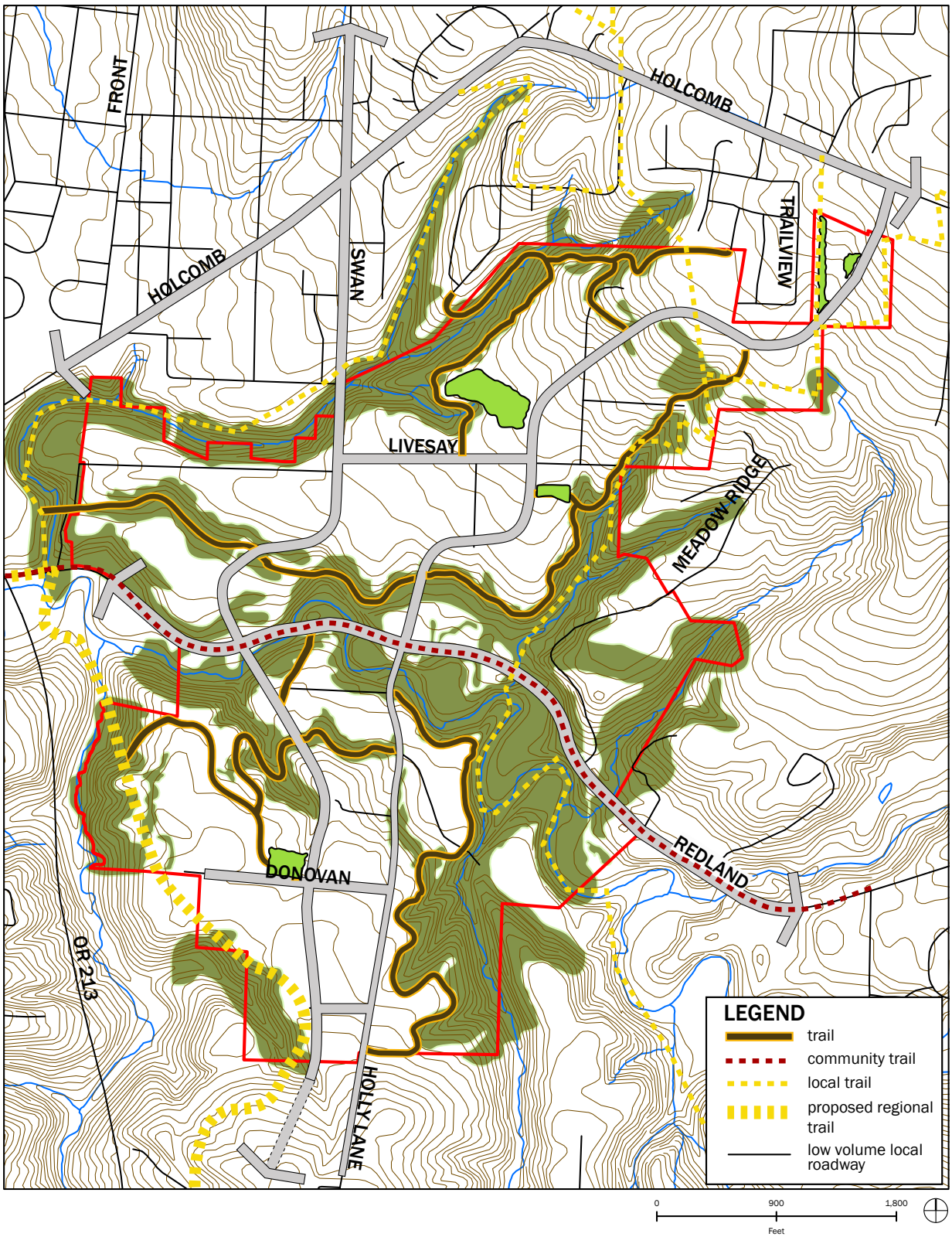


Figure 3-8. Proposed Trail System

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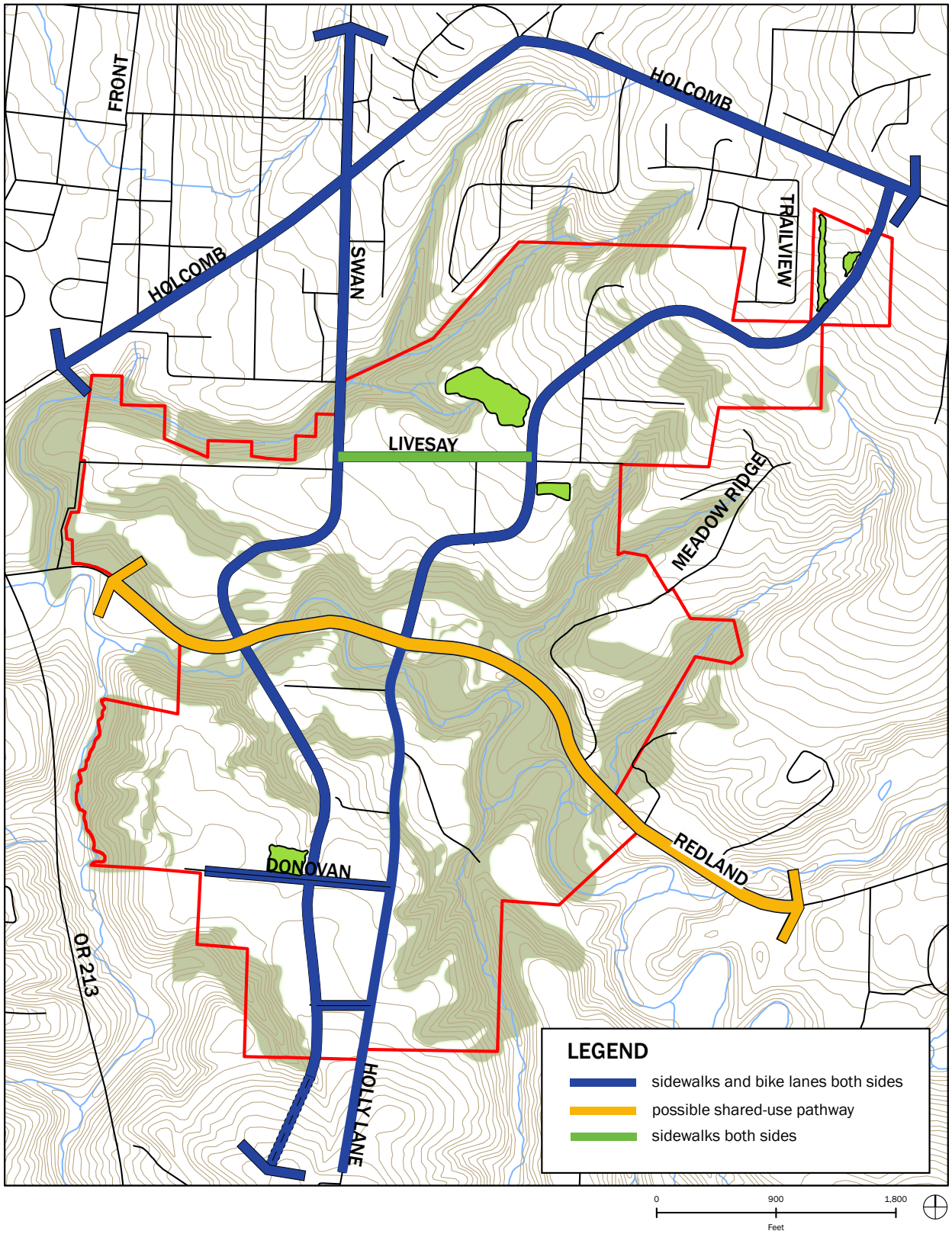

Figure 3-9. Proposed Bicycle and Pedestrian System

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

Water, Wastewater, Stormwater Improvements

As described in the existing conditions chapter, water infrastructure is limited within the concept plan area. Of the water infrastructure that does exist, there are two systems. The existing water system located in the area of the future North Village is owned and operated by the City of Oregon City. The existing water system located in the area of the future South Village is owned and operated by Clackamas River Water (CRW). The CRW system should be preserved to continue to provide water transmission to areas outside of the concept plan area.

Based on these existing conditions, it is recommended that the existing City of Oregon City water system be expanded to serve the entire Park Place Concept Plan area. This system should be constructed, owned and operated by the City of Oregon City. The existing CRW system should be preserved to continue to provide water transmission to the customer areas outside the UGB. A future study is needed to analyze CRW/OC systems to assure maximum efficiency.

Water Supply Improvements

Based on the existing conditions review, there is limited capacity in the existing water system to serve the Park Place Concept Plan area.

According to the Oregon City Water Master Plan the current water demand in the Park Place Lower Zone is split between Barlow Crest Reservoir and Mountainview Reservoir. While Mountainview has ample storage capacity (10.5 million gallons) to satisfy both existing and future demand, Barlow Crest reservoir (1.75 million gallons) will ultimately require expansion. According to the master plan, complete buildout of the whole area will require 3.23 million gallons of capacity at Barlow Crest. Expansion is needed to include additional storage capacity within the Park Place Lower Zone. As development may occur outside the concept plan area, additional reservoir capacity may be needed. A potential location for this reservoir has been shown on the water system concept plan; however, it is for reference only and has not been included in design and cost estimate activities. The location of this reservoir is consistent with the City's Water Master Plan. The location and size of this future reservoir should be established based on future concept plan refinement.

Distribution Improvements

The proposed water system improvements are based on future system improvements assumed in the City of Oregon City Water Master Plan and modified to fit the Park Place Concept Plan. The Water Master Plan shows the future system as an expansion of the City water system that currently exists to the north of the concept plan area.

The proposed water main system improvements are shown in Figure 3-10. Water main improvements consist of new water mains ranging from 8-inches to 16-inches. Four connections are recommended to the existing water system to

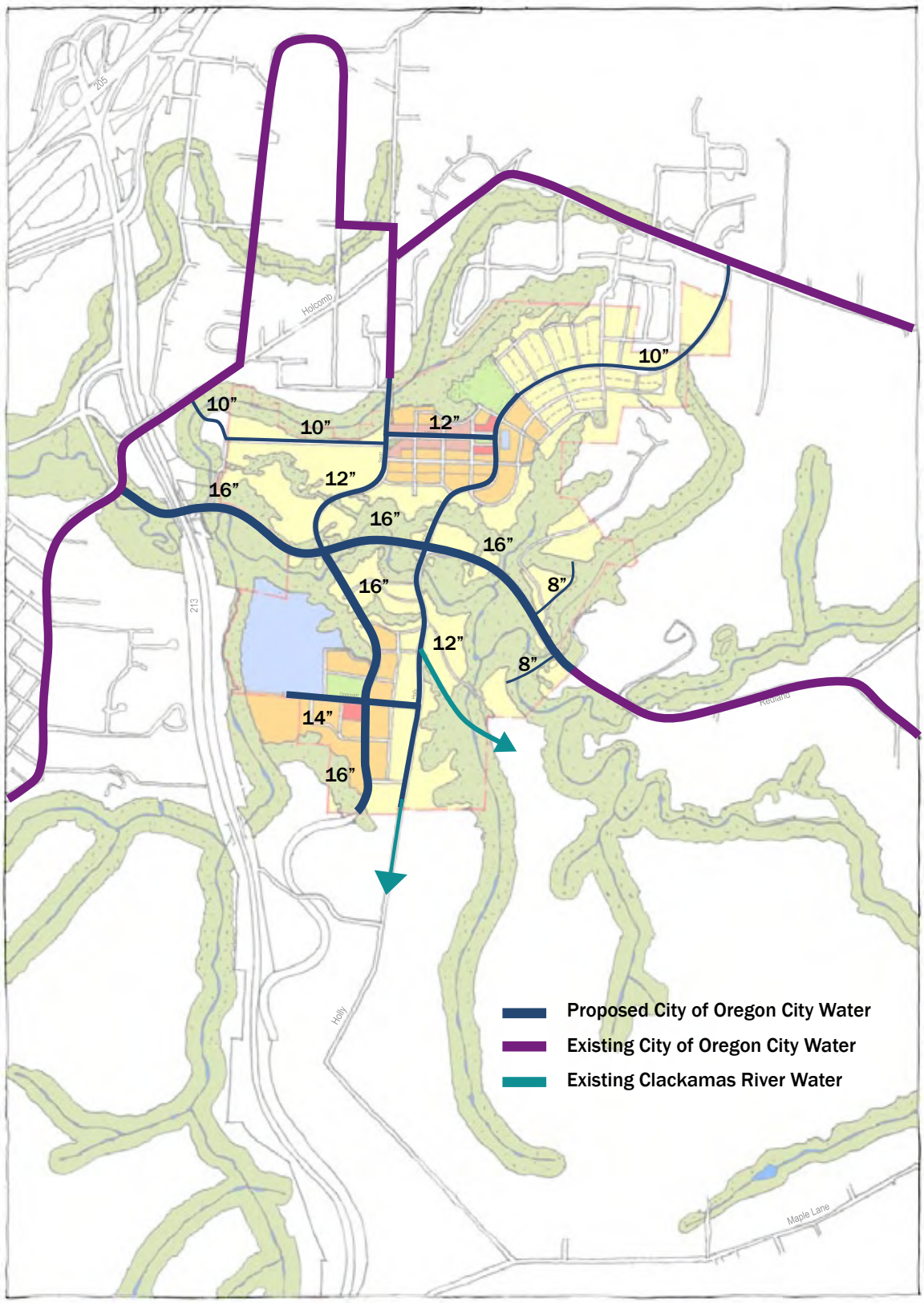

Figure 3-10. Proposed Water System Improvements

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provide sufficient system looping and redundancy. A new 16-inch water main should be provided along Redland Road. A new water main, with pipe sizes varying from 10-16-inches, should be provided along Holly Lane and the Holly Lane Extension. A new 16-inch water main should be provided along the new Swan Road. A new water main, with pipe sizes ranging from 10- to 12-inches, should be provided along Livesay Road. Smaller water mains will be needed to serve development within each Village. These pipes are generally anticipated to be a minimum of 8-inches, as established by City of Oregon City standards, however larger sizes may be required to meet fire flow requirements.

Preliminary pipe size estimates were developed based on fire flow requirements and demand flows. The fire flows used were 3,000 gpm for 3 hours applied to both new and existing buildings. The existing school was assumed to require the new school fire flow rate of 5,000 gpm for 4 hours. In most cases pipe sizes are controlled by the sum of Maximum Daily Demand (MDD) and fire flow. MDD was determined based on housing densities shown on the "Preferred Alternative" dated 10/19/06 showing the Swan Avenue Extension. All pipe size estimates are preliminary and should be revised with detailed flow modeling. Size calculations assume that flow velocities should be kept at or below 10 ft per second.

The grid network created by this new system should alleviate existing system pressure issues. As such, the existing pump station located along Livesay Road should be able to be removed. The existing CRW water transmission mains, located along Holly Lane and Redland Road, should remain as the concept plan area develops in order to provide continued water service to CRW customers.

Wastewater Infrastructure System Improvements

Existing public wastewater services within the concept plan area is limited. As such, new wastewater infrastructure will need to be developed to service future development within the concept plan area. A new 36-inch interceptor should be constructed along Redland Road to service the entire concept plan area. This interceptor should serve both the concept plan area and existing service areas. An additional wastewater collection system will need to be constructed to serve future development within the North and South Villages.

Ownership of the new 36-inch interceptor should remain with TCSD as it conveys wastewater from both the Park Place Concept Plan area and areas outside the Park Place Concept Plan area. The existing TCSD wastewater system should remain and continue to provide wastewater conveyance to areas outside of the Park Place Concept Plan area. For areas inside the Park Place Concept Plan area boundary, these areas should transition to the new City of Oregon City wastewater system.

Wastewater Treatment Improvements

Improvements to the existing TCSD treatment plant are not expected to be required as the capacity of the existing plant is adequate to meet additional

flows generated by future development within the concept plan area. In addition, adequate capacity exists in the TCSD conveyance system to convey wastewater from the concept plan area to the treatment plan.

Wastewater Collection System Improvements

The proposed wastewater system improvements are shown in Figure 3-11. Due to the topography of the concept plan area, the future areas of the North Village and South Village should be easily conveyed to Redland Road. The existing 12-inch wastewater system, currently owned and operated by TCSD, should be upgraded to a 36-inch interceptor. This upgrade should occur from the existing point of connection at Redland and Highway 213 and continue to the eastern edge of the Park Place Concept Plan area. The upgraded interceptor should serve both the Park Place Concept Plan area and the existing areas currently managed by the existing 12-inch pipe.

The North Village should be served with three wastewater trunks. A new 10-inch wastewater line should be provided along Livesay Road and connect to the new 36-inch Redland Road wastewater at the intersection of Redland Road and Livesay Road. A new 12-inch wastewater line should be provided from the North Village main street down the Swan Avenue extension to the new 36-inch Redland Road wastewater system. A new wastewater system, ranging from 10- to 12-inches, should be provided along the Holly Lane extension to convey wastewater from the upper reaches of the North Village.

The South Village should be served with two wastewater trunks. A new 12-inch wastewater system should be provided from the South Village down the Swan Avenue extension to the new 36-inch Redland Road wastewater interceptor. The existing Holly Lane wastewater line should be upgraded to a 10- to 12-inch system to convey wastewater from the South Village.

Stormwater Infrastructure System Improvements

The area is comprised of three drainage basins: Abernethy Creek, Newell Creek and Livesay Creek. As noted in the existing conditions, no major stormwater infrastructure exists within the Park Place Concept Plan area other than roadside ditches and natural drainage channels. It is recommended that a low-impact stormwater approach be developed with a goal of mimicking the natural hydrological conditions of the three watersheds of the Park Place Concept Plan area. These three drainage basins should be used to delineate the stormwater approach for the Park Place Concept Plan.

Stormwater Management Approach

The general approach of the stormwater management system for the Park Place Concept Plan is to establish a system that mimics the natural hydrology of the site to the extent practicable. In pursuing this design goal, the Park Place Concept Plan area has been separated into three distinct systems based on the boundaries of the existing watersheds. The stormwater system within each drainage basin should utilize the combination of centralized and

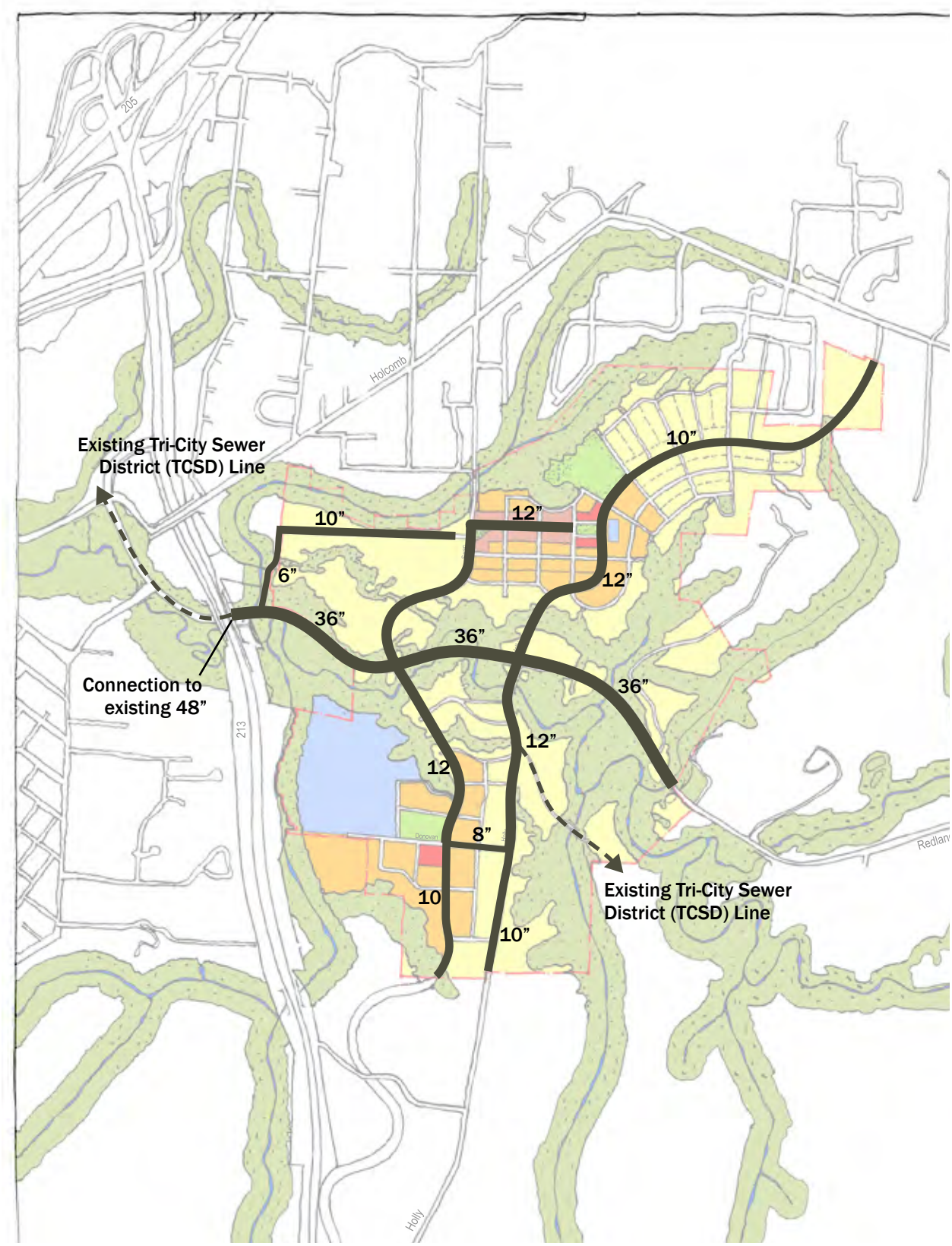

Figure 3-11. Proposed Wastewater System Improvements

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decentralized low-impact stormwater best management practices to manage stormwater generated from the Park Place Concept Plan area.

Central to the stormwater approach of the Concept Plan, is a stormwater hierarchy focused on managing stormwater in a naturalistic manner at three separate scales: **site**, **street** and **neighborhood** (vs. a one-size fits all approach).

Tier 1 – Site Specific Stormwater Management Facilities (Site)

All private property within the study area should utilize site specific (or on-site) low-impact stormwater facilities to manage stormwater on-site to the extent practicable. The objective of these facilities is to reduce the quantity (flow and volume) through detention and retention/infiltration of stormwater generated from private property as well as improve the water quality of stormwater.

These facilities are comprised of three types: impervious area reduction facilities, stormwater management facilities, and infiltration only facilities.



Capturing stormwater run-off from buildings in landscaped swales

Impervious area reduction facilities are focused on preventing the generation of stormwater in the first place and include porous pavement and ecoroofs.

Stormwater management facilities are focused on managing the stormwater in stormwater planters, stormwater swales, and vegetated infiltration basins.

These facilities may be used for single-family residential, multi-family residential, commercial, and open space. Most site specific facilities should be privately owned and maintained except facilities located within public open space.

Tier 2 – Green Streets Stormwater Management Facilities (Street)

In urban environments, much of the stormwater quantity and pollution issues are attributed to streets. An innovative, low-impact manner in which to address this reality is through the use of Green Streets. Green Streets are streets that integrate the management of stormwater into the street design itself to provide a stormwater management benefit as well as an urban design element and they may potentially reduce the need for downstream stormwater facilities such as large stormwater ponds.



Ecoroof









Examples of Tier 1 and Tier 2 stormwater facilities



Example of a Tier 3 stormwater facility

Green streets can serve as both stormwater management facilities and stormwater conveyance facilities. As a stormwater management facility, their objective is to minimize stormwater runoff generated from streets and reduce pollutants. As a stormwater conveyance facility, their objective is to convey stormwater from both private property and streets to regional stormwater management facilities. Green Streets typically take the form of vegetated swales located along the street with curb cuts to allow street runoff to enter them. In more urban areas, stormwater planter boxes mimicking the look of street tree wells may be used. Most Green Street stormwater facilities should be publicly owned and maintained.

Tier 3 – Regional Stormwater Management Facilities (Neighborhood)

Regional stormwater management facilities are focused on managing large stormwater flows and volumes that may be passed through Tier 1 and Tier 2 facilities. Moreover, they provide additional water quality benefits prior to discharging stormwater to the existing creeks. These stormwater facilities are typically to be located adjacent to the existing streams and should take on a more naturalistic form such as a wetland pond. Most regional stormwater management facilities should be publicly owned and maintained.

The stormwater system concept plan (Figure 3-12) shows generally how this stormwater approach should be implemented for the Park Place Concept Plan area.

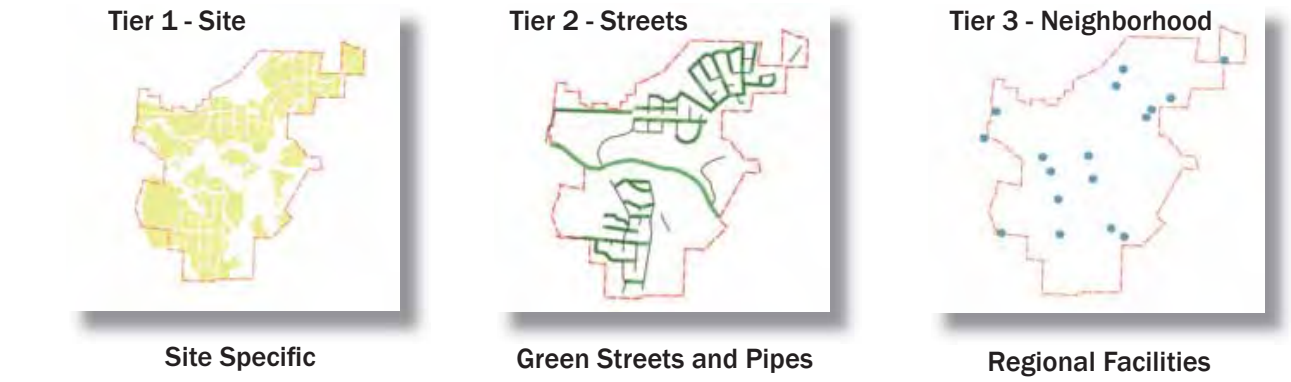
Stormwater Conveyance Approach

Surface conveyance, in the form of swales and ditches, should be provided as a means to convey stormwater via gravity from private property and streets to the existing creeks to the extent practicable. Piped conveyance will be required but should be kept to a minimum if possible.

Natural Resources and Hazards

Significant natural resources exist within the Park Place Concept Plan area and are generally located adjacent or near Abernethy Creek, Livesay Creek and Newell Creek. In order to protect these natural resources, an inventory map, which delineates natural resource areas of greatest significance (including riparian areas, wildlife habitat, and parks and open spaces) and a habitat conservation area map, which identifies the highest value riparian areas, were utilized to help determine where to build, where to build with restrictions, and where not to build within the Park Place Concept Plan area (Figure 3-13).

The Park Place Concept Plan was significantly shaped by the existing natural resources of the concept plan area. The vast majority of development within the Park Place Concept Plan area is targeted outside all habitat conservation areas (HCA) except for infrastructure improvements such as roads and very low-density housing. As such, regulations and restrictions associated with development within HCAs may be avoided. Voluntary best management



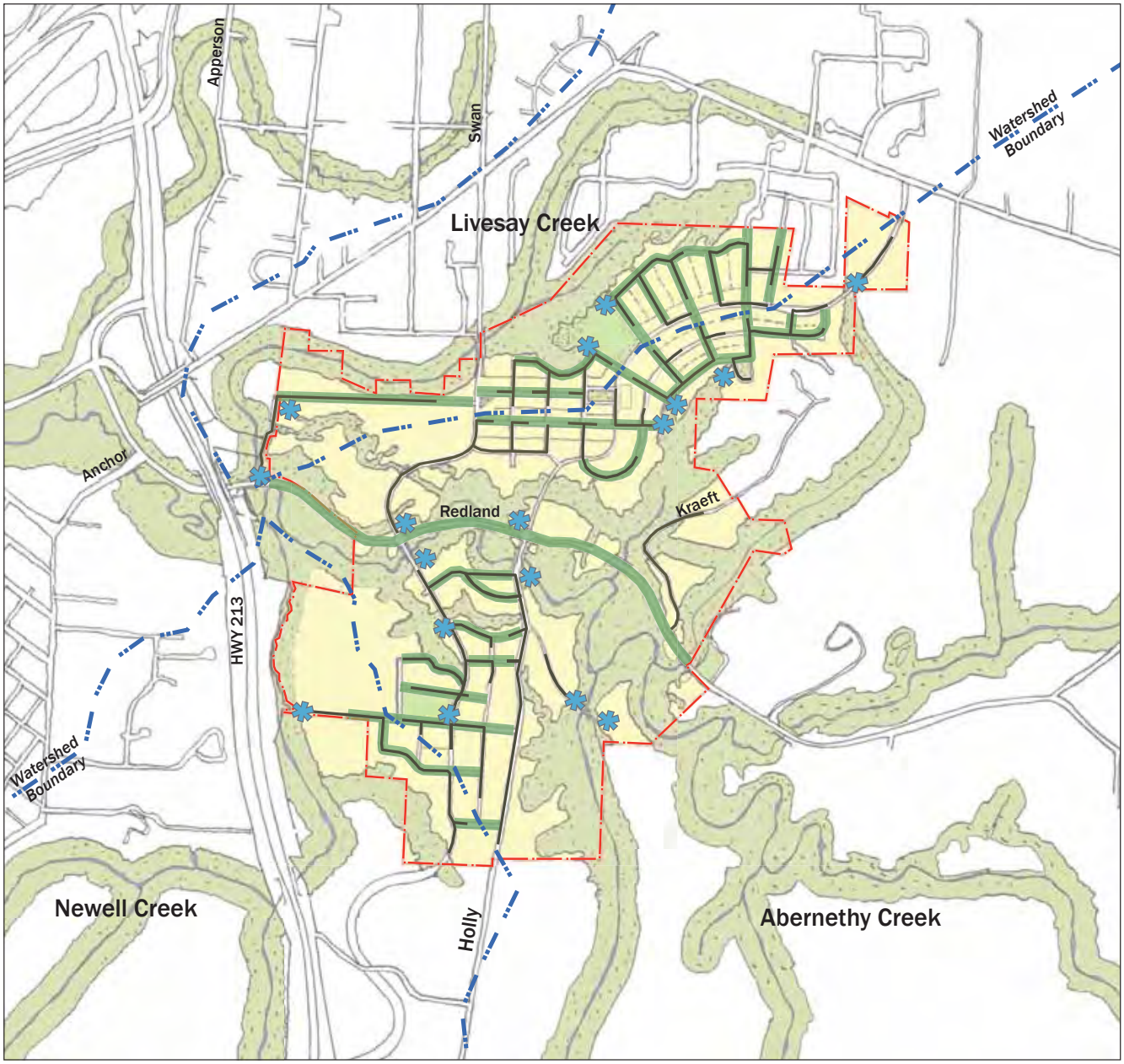


Figure 3-12. Proposed Stormwater Management

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The Nature in Neighborhoods program is an effort to protect clean water and health natural areas for fish, wildlife and people. Much of the Concept Plan has been developed to meet Nature in Neighborhood design goals including:

- *Conserving and improving streamside, wetland and floodplain habitat and their connections*
- *Conserving large areas of contiguous habitat and avoid habitat fragmentation*
- *Conserving and improving connections between riparian corridors and upland habitat*
- *Conserving and improving unique and at-risk habitats*
- *Promoting habitat-friendly development practices*

practices (Chapter 4) have been identified however to help guide development in a manner that further protects existing natural resources within the study area.

Metro has inventoried and classified much of the study area. They will only regulate the "high" and "medium" quality habitat. This habitat is generally riparian in nature. As such, upland areas, which are considered a low quality habitat area, are generally not regulated as HCA's. Regarding what to do with the "No HCA" areas, it is recommended that the City of Oregon City continues to try to apply voluntary standards - Nature in Neighborhoods - where applicable. These regulations will not mandate that we protect the "No HAC" areas. However, it is our hope that they supply sufficient guidance.

In general, it is recommended that the City incorporate Best Management Practices including reducing paved, impermeable surfaces, using permeable pavement, providing fish and wildlife crossings of roadways, and landscaping adjacent to Habitat Conservation Areas (HCAs) into its code and criteria for all development in Park Place. The code sections that could potentially be updated to incorporate these practices are included with the implementation measures in Appendix J.

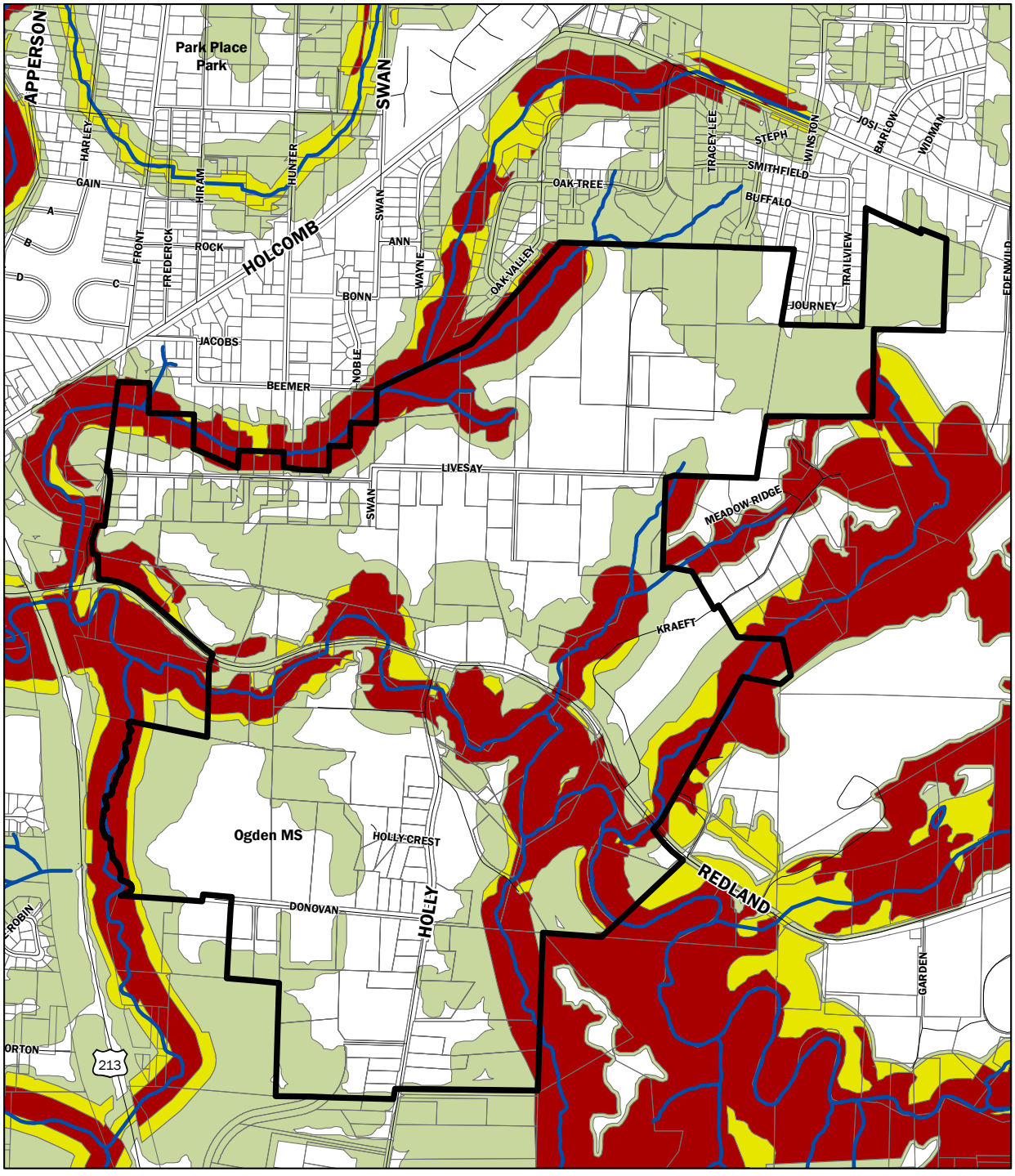
The City currently has three environmental overlay zones that would apply to areas in Park Place: the Flood Management Overlay Zone, the Geologic Hazards (Steep Slopes) Overlay Zone, and the Water Resource Overlay Zone. It is anticipated that these areas will be primarily zoned with the City's lowest density residential plan designation and zoning (R-10 zone). Density transfers are already allowed in the City's Water Resources Overlay Zone. Measures recommended for implementing the Park Place Concept Plan include extending density transfer provisions to the other two overlay zones, as well as encouraging the use of conservation easements and other incentives to protect natural areas and trail corridors. (See Appendix I.) Further, a composite environmental overlay zone is being proposed to comprehensively manage natural resources in Park Place.

Slope Instability

Landslides have occurred within the study area and in adjacent areas with similar topography, geology, and groundwater conditions. With regard to slope instability, most of the known slope instability has occurred on the steeper slopes on ravines along streams and drainages. The Park Place Concept Plan identifies areas with slopes of 25% or more as open space that will remain undeveloped. Limiting development in these areas is an appropriate measure to limit the risk of slope instability and landslides impacting future development. In addition, for the purpose of this Concept Plan, it is recommended that further site-specific study be conducted for future developments, in accordance with the City's municipal code Chapter 17.44, for managing geologic hazards and in accordance with the following recommendations.

Additionally, the City should expand the definitions included in the City of Oregon City Municipal Code, Chapter 17.44.020, to include the Portland State University

Figure 3-13. Habitat Conservation Areas



Source: Oregon City GIS, 2006; RLIS 2006

High
Low
Moderate
Non-Regulated Goal 5 Resources - (No HCA designation)

Park Place Concept Plan

Habitat Conservation Area (HCA) Values

0 500 1,000
Feet

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.

study, “Landslides in the Portland, Oregon, Metropolitan Area Resulting from the Storm of February 1996: Inventory Map, Database and Evaluation” (Burns and others, 1998); the DOGAMI Open File Report O-06-27, “Map of Landslide Geomorphology of Oregon City, Oregon, and Vicinity Interpreted from LIDAR Imagery and Aerial Photographs” (Madin and Burns, 2006); and the upcoming “Preliminary Geologic Map of the Oregon City Quadrangle, Clackamas County, Oregon” (Madin, in press), as references for identifying mapped landslides and landslide materials, “landslide areas,” “unstable slopes,” “unstable soils,” and debris fans.

It is also recommended that the City require a geotechnical evaluation/investigation as part of any future development in areas with slopes of 25% or steeper and within a 200-ft setback of the crest and toe of these slopes, and in areas previously mapped as landslides. This would include all new construction, including additions to existing homes such as swimming pools and retaining walls, installation of underground utilities, new access driveways and/or roadways, and similar types of projects that require significant earthwork. The geotechnical evaluation/investigation should address the slope hazards in the development and specifically address how the proposed development will limit the risk of future slope instability, prior to issuing a building permit. The geotechnical evaluation/investigation should also address setbacks from existing slopes and recommendations for cut and fill and on-site stormwater management, as described in more detail below. In addition, the City should require special inspection by the geotechnical engineer during construction of soil- and foundation-related elements and a summary letter of compliance upon completion of the work.

The actual scope of the geotechnical evaluation/investigation will depend somewhat on the location within the study area and the proposed development. For example, for development in areas that will likely require little if any earthwork, a reconnaissance-level site evaluation may be adequate prior to issuing a building permit. However, if the new development requires cuts deeper than about 5 ft into the existing hillsides, the geotechnical engineer may need to consider performing subsurface explorations, such as test pit excavations and/or shallow borings, as part of their evaluation/investigation. For any development within or adjacent to mapped landslide areas or debris fans, or any development that requires excavations deeper than about 10 ft into the existing hillside, it would be prudent to perform a more-detailed, comprehensive geotechnical investigation prior to issuing a building permit. An engineering geologist should provide site-specific geologic input for any development with proposed cuts deeper than about 10-feet and all evaluations within the limits of mapped landslide areas and debris fans. Implementation strategies for these recommendations follow in Chapter 4.

4. Implementation

1. Compliance with Title 11

Concept Plans are regulated by Title 11 in Metro's Urban Growth Management Functional Plan. Title 11 and the Park Place Concept Plan are intended to lay a foundation for urbanization of areas added to the region's Urban Growth Boundary (UGB) in a way that reasonably provides public facilities and services, offers transportation and housing choices, supports economic development, and protects natural resources.

Concept Plans must address the following elements:

- Annexation
- Housing (density, diversity, and affordability)
- Commercial and industrial land
- Transportation
- Natural resources
- Public facilities
- Public schools
- Funding and Finance Sources

The Park Place Concept Plan strives to provide the Park Place plan area with development flexibility, housing choices, transportation choices, natural resource protection, access to open space and recreation, educational opportunities, and economic activity. To support these goals, it is recommended that the set of policies addressing housing, parks, schools, economic development, natural resources, transportation, and other public facilities included in the Park Place Concept Plan be adopted by reference into the City's Comprehensive Plan. The following sections provide overviews of these elements and their associated goals, policies, and implementation strategies. For more detailed descriptions of these elements and their compliance with Title 11, please refer to the Appendices.

Annexation

Chapter 14 of the City's existing code establishes regulations for annexation. These regulations require an application process, hearings, and review by the Planning Commission and City Commission before the annexation is decided by Oregon City voters.

In addition to a legal description of the proposed annexation area, written consent of property owners, site plans, and an application fee, an annexation

proposal must provide statements addressing the following:

- availability, capacity and status of existing water, wastewater, drainage, transportation, park and school facilities;
- increased demand for such facilities to be generated by the proposed development, if any, at this time;
- additional facilities, if any, required to meet the increased demand and any proposed phasing of such facilities in accordance with projected demand;
- method and source of financing required to provide additional facilities, if any;
- overall development concept and methods by which the physical and related social environment of the site, surrounding area and community will be enhanced;
- potential physical, aesthetic, and related social effects of the proposed, or potential development on the community as a whole and on the small subcommunity or neighborhood of which it will become a part; and proposed actions to mitigate such negative effects, if any; and
- the type and nature of any comprehensive plan text or map amendments, or zoning text or map amendments that may be required to complete the proposed development.

The Planning Commission's recommendation to the City Commission and the City Commission's decision as to whether to advance the proposal to the voters for a decision depend on whether adequate access and public facilities and services can be provided; impacts to Goal 5 resources, natural hazard areas, and the overall economic, social, and physical community are avoided or are minimal; and the proposal complies with goals and policies in the City's Comprehensive Plan.

Annexation of Park Place should be guided by the ability to serve subareas with public facilities such as roads, water, wastewater, and storm water. For these reasons, subareas of Park Place that are adjacent to existing city boundaries, facilities, and services are likely to be annexed first. The northern portion of Park Place was brought into the City's Urban Growth Boundary (UGB) in the 1980s, long before the rest of Park Place was in 2002, and is particularly primed for annexation, due to existing development and property owners' interest in developing.

Annexation Goals, Policies, and Implementation Strategies

Goal

Ensure that annexation of land within the planning area is consistent with other goals, policies and strategies in this Plan and meets overall city and regional requirements for annexation.

Policies

- Ensure that public facilities and services can be provided to serve

proposed development prior to annexation of any portion of the Park Place Concept Plan area, consistent with existing City and regional requirements.

- Provide residents within and adjacent to areas proposed for annexation with opportunities to review and comment on annexation proposals.

Implementation Strategies

- Adhere to existing city regulations and procedures in accepting, reviewing and approving proposed future annexations of the planning area or portions of it.
- Review annexations proposals for adherence to the goals, policies and core values identified in the Park Place Concept Plan.
- Provide adequate notice of and opportunities for comment on proposed annexations pursuant to existing City notice requirements.

Land Use

Following are land use policies related to housing, commercial, and industrial developments. Other land uses (e.g., schools, parks, and public facilities) are addressed separately.

Housing

The following steps have been taken in the concept planning process to comply with Title 11 as it relates to housing.

- Zone adequate land to allow for a variety of housing types and densities as outlined in more detail in Chapter 3. The zoning mix allows the City to meet Metro targets for housing based on average densities required in the two different portions of the planning area.
- Create opportunities for mixed residential and commercial uses through amendments to and application of the city's mixed use zone.
- Locate denser housing types adjacent to commercial areas and civic uses.
- Zone land in a way that allows for housing types and densities typically more affordable to households with low and moderate incomes (see Chapter 3 for an assessment of this issue).

While the Park Place Concept Plan allows for opportunities to meet affordable housing needs without subsidy, the reality of the housing market in Oregon City and the Portland Metropolitan region is that some subsidy by public agencies and non-profit organizations will be required to achieve affordable housing goals for this area. The following goal, policies and implementation strategies can be used to meet affordable housing objectives, as well as more general housing goals.

Housing Goals, Policies, and Implementation Strategies

Goal

The concept planning area should incorporate Comprehensive Plan and zoning designations that allow for a wide range of housing types and densities that meet the needs of households with a range of incomes.

Policies

- Apply zoning designations that allow for achievement of the goal above.
- Create flexibility in development standards to allow for alternative housing types such as zero lot-line development, cluster housing, and accessory dwelling units.
- Ensure connectivity of residential areas to commercial areas and parks and open space by creating regular street grid patterns where topography allows and providing a complete sidewalk network.
- Ensure that residential neighborhoods are bordered by parks and/or open space. Streets should be integrated with a network of bikeways, trails and/or pedestrian paths where possible.
- Orient residential streets to maximize solar exposure for energy conservation where possible.
- Link the density of housing to the hierarchy of the street network.
- Work with other public agencies, non-profit organizations and developers to encourage production of affordable housing that meets the needs of residents with low and moderate incomes.
- Provide a transition or buffer between existing and new residential development.
- Support architectural integrity and variety in residential and mixed-use neighborhoods.

Implementation Strategies

- Work with local groups to develop affordable housing strategies for Park Place, including incentives for developers to build affordable housing and for moderate-income home ownership.
- Update city and county zoning ordinances and development codes as needed to allow for innovative development and zoning mechanisms that will add to the affordable housing stock, including establishing minimum densities, allowing for density bonuses, reducing minimum lot sizes, and establishing other provisions in the zoning code to reduce housing costs associated with the price of land while protecting community character.
- Create design standards for Park Place in order to ensure diverse, compact, attractive, and community-oriented residential development and compatibility with existing and surrounding neighborhood character and scale.
- Allow for a variety of lot sizes within a subdivision by permitting average density calculations for subdivisions over 25 units.

Table 4-1. Affordable Housing in Oregon City

Percentage of MHI	Percentage of Households	Percentage Difference	Affordable Rent/ Mortgage
0-30% MHI	11%	-	$341
0-50% MHI	20%	9%	$569
0-80% MHI	38%	18%	$911

- Consider density bonuses for developers who provide affordable housing units.
- Provide a gradual transition in zoning and allowed densities between existing residential development and new or future residential development and/or require larger setbacks between existing and new residential development.
- Consider adopting additional architectural design standards for residential development and consider developing and adopting architectural variety requirements for subdivision development.
- Create flexibility in development standards to allow for alternative housing types such as zero lot-line development, cluster housing and accessory dwelling units.
- update the City's zoning ordinances to allow for master planning of developments of 10 acres or more in Park Place.

Affordability

Affordable housing is typically defined as housing which does not cost more than 30% of a household's income. For rental units, housing costs include rent and utilities, while housing costs for homeowners includes mortgage payments, taxes and insurance.

Extremely low income households are typically defined as those earning less than 30% of median household income; very low income households as those earning less than 50% of median household income; and low income households are those making between 50% and 80% of median income. These income ranges have been used to estimate the cost of housing that would be considered

Household size	Area Median Income	Affordable monthly housing costs (100%)	Household Income (80%)	Affordable Monthly Housing Costs (80%)	Household Income (50%)	Affordable Monthly Housing Costs (50%)	Household Income (30%)	Affordable Monthly Housing Costs (30%)
1	47,500	1,188	38,000	950	23,750	594	14,250	356
2	54,313	1,358	43,450	1,086	27,150	679	16,300	408
3	61,125	1,528	48,900	1,223	30,550	764	18,350	459
4	67,875	1,697	54,300	1,358	33,950	849	20,350	509
5	73,313	1,833	58,650	1,466	36,650	916	22,000	550
6	78,750	1,969	63,000	1,575	39,400	985	23,650	591
7	84,188	2,105	67,350	1,684	42,100	1,053	25,250	631
8	89,625	2,241	71,700	1,793	44,800	1,120	26,900	673

Table 4-2. Affordability by Income, Portland Metro Area (HUD), 2007

affordable to households with very low, low, and moderate incomes. Table 4-1 shows the results of this analysis for Oregon City.

According to the 2000 Census, the median household income (MHI) for Oregon City is $45,531. Table 4-2 shows the area median income (AMI) by household size, and corresponding affordable housing costs. Census data for the Park Place Concept Plan area is not available since its boundaries do not correspond to census block boundaries.

Title 11 requires that the planning area allow for development of affordable housing without public subsidy. The zoning proposed for the planning area theoretically provides opportunities to develop housing that would be affordable to residents with a full range of incomes, assuming a similar mix of income levels to the city as a whole. As a result, the concept plan meets the requirements of Title 11 and ORS related to housing. However, some form of public subsidy is expected to be necessary to meet the affordable housing goals of the Park Place Concept Plan. Its goals call for a range of housing types to meet the needs of renters at all income levels and to provide opportunities for home ownership for moderate-income households. Without some subsidy and/or actions by local governments or non-profit organizations, it is unlikely that the desired range of housing products will be developed. Given the rate of housing price increases in the area, many of the multi-family units, attached and detached single-family homes will be built for market rate home ownership.

Proposed land use designations for the Park Place plan area allow for a range of housing types (described in Chapter 3). Typically, the types of housing most affordable to people with low and moderate incomes are single-family homes on small lots, attached single family homes, duplexes and multi-family housing, as accessory dwelling units, and single-family rental homes. Extremely low and very low income households typically reside in multi-family housing. These types of housing are expected to account for a significant portion of all housing units in the plan area – 370-500 units (25%-35%), depending on the proportion of higher density detached single-family homes that fall into affordable price ranges. This range is consistent with the percentage of lower income households that could be expected to need housing units in the area, if they are representative of the City as a whole.

In order to meet the affordable housing goals, it is anticipated that the City will work with other public agencies, non-profit groups and developers to identify funding opportunities to further increase the supply of affordable housing in the area. Potential partners include Clackamas Community Land Trust, Northwest Housing Alternatives, Housing Authority of Clackamas County and Clackamas County Social Services.

Table 4-3. Proposed Area of Commercial Uses in Park Place

Type of Commercial Use	Proposed Zone	Land Area (SF)	Floor Area (SF)
Retail	Neighborhood Commercial (NC)	79,191	39,595

Commercial and Industrial Development

Commercial Development

The Neighborhood Commercial (NC) zone recommended in the North and South Villages will accommodate commercial development. The NC zone will be targeted for primarily retail use. Table 4-3 identifies the amount of land proposed for each of this zone and targeted uses.

Assuming an approximately 50% lot coverage, the NC zone yields about 0.91 acre (39,595 sq. ft.) of building area and the same for parking and landscaping. This falls within the range of retail building area that market consultant Johnson Gardner estimated that Park Place could support.

Industrial Development

Potential industrial uses in the area would be constrained by limited access and suitable buildable land (large sites with little or no slope). Land zoned industrial to the north of Park Place focused around an I-205 interchange and land with existing and planned industrial zoning (as part of a concept plan) for the Beavercreek area directly south of Park Place provide suitable and adequate industrial land for the City. No industrially zoned land is recommended or planned for Park Place.

Economic and Commercial Development Goals, Policies, and Implementation Strategies

Goal

Establish opportunities to create neighborhood commercial and mixed use centers which provide area residents with opportunities to shop and work, consistent with the core values of this plan.

Policies

- Establish two neighborhood commercial/mixed use centers that allow for small scale, neighborhood oriented commercial development, as well as mixed residential/commercial development and public buildings and gathering places.
- Locate neighborhood commercial and mixed use centers in close proximity to denser residential development, as well as parks and community facilities.

- Ensure that roads, pathways and other transportation facilities are designed in a way that supports mixed use/commercial areas and provides adequate access to them by all modes of travel.

Implementation Strategies

- Implement and update design standards for neighborhood commercial and mixed use areas, including storefront windows, street-level entrances, streetscape elements such as weather protection and street trees, and restrictions of mid-block driveways, to ensure they are developed in an attractive, walkable and efficient manner and promote.
- Work with existing and future neighborhood residents, as well as community business groups to identify and attract an appropriate mix of businesses to commercial and mixed use centers in the planning area.
- Identify small-scale food production as an allowed use in commercial and possibly residential zones.

Transportation

The Park Place Concept Plan includes a multi-modal transportation system that complies with city, regional, and statewide transportation plans and ensures a safe and adequate multi-modal transportation system to meet the forecast travel needs of the planning area. The Conceptual Transportation Plan comprises street, transit, bicycle, and pedestrian facilities and services that make each mode viable to meet certain travel needs, while minimizing the need to travel in single-occupant motor vehicles. Plan components include the following:

1. A functionally classified set of streets that provide appropriate connections within and across the planning area and adequately serve local and longer-distance vehicular travel (Figure 3-4). An emphasis of the Plan is to expand the City's functionally classified network such that it protects the Highway 213 corridor as a regional facility of critical importance.
2. A network of local and higher-order streets that provides redundancy for emergency access, appropriate ventilation to neighborhoods and commercial nodes of activity, and efficient connections to minimize travel distances (Figure 3-5).
3. A variety of street cross sections that reflect the needs of adjacent land uses and respond to the constraints of topography, limited rights-of-way, and the costs of construction (Figures 3-A through 3-J).
4. A network of on-street and off-street pedestrian and bicycle facilities that meet the needs of commuters, recreationalists, residents, and employees (Figures 3-8 and 3-9). These facilities are planned to provide safe routes to schools and other key pedestrian/bicycle generators in the planning area. In addition, they provide seamless connections to anticipated transit service in the area. Finally, the comprehensive nature of this network promotes these modes as viable options for a variety of trip purposes.
5. A conceptual routing of future transit service that connects the planning area to major transit centers in the Oregon City area, as well as key destinations within Oregon City (Figure 3-7).

Construction cost estimates for the planned transportation improvements have been prepared and a conceptual financing plan has been developed. These estimates are located in the following chapter: Funding and Finance.

Transportation Goals, Policies, and Implementation Strategies

Goal

Plan for and implement a safe, interconnected system of roads and other transportation facilities that allows people to move freely within the neighborhood and connects them to other parts of the city and region.

Policies

- Support and encourage Metro and ODOT to construct improvements to regional and state facilities (e.g., I-205, Highway 213 and the Sunrise Corridor) to accommodate proposed growth inside and surrounding the planning area.
- Develop and apply basic road standards based on transportation analysis and land use goals adequate to serve area residents and businesses.
- Require that needed improvements to transportation facilities necessitated by new development be made or funded as part of the development process; condition development approval on construction of or financial commitments for improvements.

Implementation Strategies

- Identify updates to City, County and regional transportation plans to incorporate proposed improvements to major facilities.
- Include proposed transportation improvements in the city's Capital Improvement Plan (CIP).
- Apply appropriate road standards as development occurs and facilities are designed and constructed.
- Coordinate with Clackamas County in planning for improvements to existing county facilities (e.g., Holly Lane and Redland Road).
- Update the city's System Development Charge for transportation, consistent with the need and cost for future improvements in the planning area.
- Evaluate and minimize or mitigate environmental impacts of future transportation improvements.
- Update City standards for green streets as needed to implement the Park Place Concept Plan.

Natural Resources and Hazards

A key part of protecting existing natural resources is to use the best development practices available in these areas. For the Park Place Concept Plan development, Metro's *Nature in Neighborhood* design guidelines were followed. These guidelines, though voluntary, are very applicable to achieving the environmental protection goals of the Park Place Concept Plan. As the Park Place Concept Plan develops, the Table 4-4 provides a list of best development practices that should

be considered. The implementation measures described in Appendix I identify the City code sections which could incorporate these best development practices.

Natural Resources and Hazards Goals, Policies, and Implementation Strategies

Goals

Manage and conserve natural resources and values within the planning area, including riparian areas, woodlands, wetlands and wildlife and plant habitat.

Minimize impacts to areas that pose hazards to personal property and the natural environment, including steep slopes, areas potentially susceptible to land slides and other such areas.

Policies

- Distinguish between areas where development will not be allowed and where development can occur but with lower densities or other limitations as documented on concept area maps and refined during more detailed mapping that may occur as part of the development process.
- Apply existing city regulations related to stream buffers, trees preservation, restrictions on steep slope development and other issues.
- Reference most recently available geological maps in Oregon City zoning ordinance provisions.
- Require geotechnical evaluation for new construction and future development in areas with slopes of 25% or greater and within 200 feet of the crest and toe of such slopes.
- Require geotechnical evaluation for new construction and future development in areas mapped as landslides or landslide materials
- Require development-specific investigation related to slope stability be conducted by a qualified professional engineer (PE) and certified engineer geologist (CEG).
- Manage and protect archeological and historic resources within the planning area, consistent with the City and state requirements and policies.
- Conserve and improve streamside, wetland, and floodplain habitat and their connections.
- Conserve large areas of contiguous habitat and avoid habitat fragmentation.
- Conserve and improve connections between riparian corridors and upland habitat.
- Conserve and improve unique and at-risk habitats.
- Promote habitat-friendly development practices.
- Apply implementation code particularly relating to geologic hazard and tree protection, and significant fish and wildlife habitat, shall be approved prior to development of property located in the concept plan area. Tree protection should include provisions to protect trees in area within the city's UGB but not yet annexed. Protection of fish and wildlife habitat should address riparian and upland areas. Methods to protect these

Table 4-4. Best Management Practices for Non-Habitat Conservation Areas[1]

Part (a): Design and Construction Practices to Minimize Hydrologic Impacts
1. Amend disturbed soils to original or higher level of porosity to regain infiltration and stormwater storage capacity.
2. Use pervious paving materials for residential driveways, parking lots, walkways, and within centers of cul-de-sacs.
3. Incorporate stormwater management in road right-of-ways.
4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.
5. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
6. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.
7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.
8. Use multi-functional open drainage systems in lieu of more conventional curb-and-gutter systems.
9. Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.
10. Apply a treatment train approach to provide multiple opportunities for storm water treatment and reduce the possibility of system failure.
11. Reduce sidewalk width and grade them such that they drain to the front yard of a residential lot or retention area.
12. Reduce impervious impacts of residential driveways by narrowing widths and moving access to the rear of the site.
13. Use shared driveways.
14. Reduce width of residential streets, depending on traffic and parking needs.
15. Reduce street length, primarily in residential areas, by encouraging clustering and using curvilinear designs.
16. Reduce cul-de-sac radii and use pervious vegetated islands in center to minimize impervious effects, and allow them to be utilized for truck maneuvering/loading to reduce need for wide loading areas on site.
17. Eliminate redundant non-ADA sidewalks within a site (i.e., sidewalk to all entryways and/or to truck loading areas may be unnecessary for industrial developments).
18. Minimize car spaces and stall dimensions, reduce parking ratios, and use shared parking facilities and structured parking.
19. Minimize the number of stream crossings and place crossing perpendicular to stream channel if possible.
20. Allow narrow street right-of-ways through stream corridors whenever possible to reduce adverse impacts of transportation corridors.
Part (b): Design and Construction Practices to Minimize Impacts on Wildlife Corridors and Fish Passage
1. Carefully integrate fencing into the landscape to guide animals toward animal crossings under, over, or around transportation corridors.
2. Use bridge crossings rather than culverts wherever possible.
3. If culverts are utilized, install slab, arch or box type culverts, preferably using bottomless designs that more closely mimic stream bottom habitat.
4. Design stream crossings for fish passage with shelves and other design features to facilitate terrestrial wildlife passage.
5. Extend vegetative cover through the wildlife crossing in the migratory route, along with sheltering areas.
Part (c): Miscellaneous Other Habitat-Friendly Design and Construction Practices
1. Use native plants throughout the development (not just in HCA).
2. Locate landscaping (required by other sections of the code) adjacent to HCA.
3. Reduce light-spill off into HCAs from development.
4. Preserve and maintain existing trees and tree canopy coverage, and plant trees, where appropriate, to maximize future tree canopy coverage.

[1]Table 3.07-13c in Exhibit C or Ordinance No. 05-1077C, Title 13 (Nature in Neighborhoods) of the Urban Growth Management Functional Plan (Metro Code Chapter 3.07)

areas should include an evaluation of conservation easements and density reductions.

Implementation Strategies

- Identify and explore the use of incentives such as conservation easements to protect natural resources.
- Extend existing density transfer provisions from the Water Resource Overlay Zone to the Flood Management and Geologic Hazards Overlay Zones.
- Identify potential new ordinance requirements related to protection of environmental resources.
- Identify and encourage use of best management practices related to erosion control, wildlife management, landscaping, tree preservation, etc. (e.g. Metro's Nature in Neighborhoods guidelines).
- Update the city's zoning ordinance to incorporate the policies related to slope stability above.
- Work with the Oregon Department of Geology and Mineral Industries (DOGAMI) to complete and incorporate a landslide susceptibility map for Oregon City.
- Review geotechnical reports as well as final grading, drainage and foundation plans by a geotechnical engineer.
- Require peer review of geotechnical report by peer reviewers selected by the City of Oregon City.
- Conduct special inspections in areas with steep slopes or mapped as landslide susceptibility areas with a geotechnical engineer during construction processes.
- Require applicants geotechnical engineer to field verify during construction to ensure that the subsurface conditions/assumptions made as part of their geotechnical evaluation/investigation are appropriate.
- Require the applicants geotechnical engineer to prepare a summary letter stating that the soils- and foundation-related project elements were accomplished in substantial conformance with their recommendations.
- Conduct specific environmental studies and apply environmental standards as required during planning and construction of public improvements (e.g., roads and bridges) as the Park Place Concept Plan is implemented.
- Update the City's zoning ordinance to establish "night sky" protection provisions. Incorporate associated lighting standards in the City's requirements.
- Refine Buildable Areas Map - perform a GIS evaluation of the City of Oregon City water quality overlay zone with existing topography.
- Field verify existing natural resources to ensure that important natural resources have not been overlooked.
- Identify regulations and/or restrictions associated with infrastrcture impacts on Habitat Conservation Areas (HCAs).

Public Facilities and Services

Conceptual public facility plans have be developed for the provision of wastewater, and storm drainage. These plans have been developed to comply with goals of the local community, City of Oregon City, Metro and the following documents:

- City of Oregon City Water Master Plan
- City of Oregon City Sanitary Sewer Master Plan
- City of Oregon City Drainage Master Plan
- City of Oregon City Draft Stormwater Management Plan
- City of Oregon City Stormwater and Grading Design Standards

The City of Oregon City Water Master Plan was referenced to determine anticipated water demands within the Park Place Concept Plan area. Average daily demand as well as peak demand and fire demand were evaluated at a preliminary level. In general, water demand from planned development within the Park Place Concept Plan area is consistent with demands anticipated in the Water Master Plan.

The City of Oregon City Sanitary Sewer Master Plan was referenced to determine anticipated wastewater generation within the Park Place Concept Plan area. In general, similar wastewater flows were developed. As a result, wastewater flows generated by development within the Park Place Concept Plan area are consistent with those found in the Sanitary Sewer Master Plan.

All three stormwater documents emphasize minimizing the amount of post-development stormwater runoff to pre-development conditions and reducing pollution loads. The Park Place Concept Plan stormwater approach was developed to meet these goals (Appendix J).

Public Facilities and Services Goals, Policies, and Implementation Strategies

Goal

Plan for and provide adequate facilities for water, wastewater and stormwater service.

Policies

- Ensure that water, wastewater and stormwater facilities have adequate capacity to meet public facility and service needs within the planning area.
- Plan and pay for needed improvements in an equitable manner with the costs of new growth borne by future developments
- Identify and implement best practices for on-site treatment of stormwater, water conservation and other practices to reduce service needs and impacts.

Implementation Strategies

- Prepare stormwater, water system, and wastewater master plans to further refine the systems and approaches outlined in the Park Place Concept Plan. (The existing Oregon City stormwater standards should be evaluated and refined to improve performance of the stormwater master plan).
- Perform further water evaluation to ensure that the Clackamas River Water District and the City of Oregon City maximize efficiency - City of Oregon City should provide water service to all urban customers within the UGB.
- Identify areas within the Park Place Concept Plan planning area for slope stability hazards and infiltration areas to determine if stormwater should be allowed, limited, or restricted.
- Incorporate estimate water, wastewater and stormwater needs in capital facility master plans and capital improvement plans.
- Expand city wastewater mains and other collection facilities within and adjacent to the planning area to ensure adequate wastewater collection capacity; preserve TCSD trunk lines.
- Expand city water mains and other distribution facilities within and adjacent to the planning area to ensure adequate water distribution capacity; preserve the existing Clackamas River Water transmission system.
- Establish a stormwater management system that mimics the natural hydrology of the planning area.
- Develop a stormwater management system that utilizes a combination of regional detention facilities, green streets and on-site stormwater detention and filtration to minimize runoff and impacts on local waterways.
- Coordinate with other service providers to plan for and provide fire protection, law enforcement, school, library and other public services as specific developments are planned and implemented.

Parks

The Concept Plan includes two neighborhood parks, each located in a neighborhood center adjacent to commercial, civic, and medium and/or higher density residential land uses. The parks are intended to provide basic recreational opportunities for residents and may include amenities such as play equipment, athletic fields picnic table or shelters, walking trails and other features. The North Village neighborhood includes an 8-10 acre neighborhood park; the South Village park is about 3-5 acres.

Parks needs are consistent with those generally identified the City of Oregon City's existing Parks and Open Spaces Master Plan. That plan identifies a community park and a neighborhood park service area within the Park Place Concept Plan study area. Local and national guidelines for these types of parks indicate a need for about 10 – 30 acres of developed park land in the planning

area. The City is currently updating its Parks and Open Spaces Master Plan, which may provide more specific guidance on the size of future parks in the area and/or needed amenities within them.

The open spaces identified in environmentally constrained portions of the study area are also are expected to provide extensive opportunities for outdoor recreation including an extensive trail system.

Parks and Open Spaces Goals, Policies and Implementation Strategies

Goal

Provide parks, open space, and trails consistent with City or national standards, including trail or open space connections between centers.

Policies

- Plan for neighborhood parks that are intended for low-impact active and passive recreational activities.
- Locate neighborhood parks within comfortable walking distance (e.g. one-half mile) of most residences and easily accessible to pedestrians and bicyclists.
- Develop and maintain a system of neighborhood trails to provide a variety of recreational opportunities, such as walking, bicycling and jogging.
- Design the trail system to connect parks and open spaces and provide connections to established neighborhoods where possible.
- Promote the location of neighborhood parks adjacent to higher-density residential housing to provide outdoor recreational opportunities for residents of attached housing and to enhance the quality of the neighborhood.
- Allow for flexibility in the siting of future parks while ensuring that locations meet the criteria identified in the Park Place Concept Plan.
- Support joint uses of community facilities such as schools and parks.
- Conserve and protect natural areas, including environmentally constrained areas unsuitable for development.

Implementation Strategies

- Amend parks and recreation, open space and trails master plans as necessary to be consistent with the goals and policies of the Park Place Concept Plan.
- Coordinate with the Parks and Recreation Master Planning process to identify appropriate amenities for new neighborhood parks.
- Communicate with the school district to determine if school facilities in such areas have the capacity for greater community use.
- Explore the feasibility of joint use of Ogden Middle School land and facilities for community-based recreational needs.

- Evaluate natural areas for capacity to support recreation uses, such as hiking or biking. Limit or protect human activity as appropriate.
- Coordinate with private property owners regarding development of the trail system.
- Establish and implement an equitable approach to funding acquisition of park lands and development of park and recreational facilities through a mix of system development fees, user fees and other available revenue sources. Ensure that property owners or developers pay their share of these costs in an equitable manner.

Public Schools

No new school sites are identified for Park Place. There are two existing elementary schools near the study area — Park Place Elementary and Holcomb Elementary. They have a combined capacity for an additional 300 students. Future enrollment projections for these elementary schools are relatively flat, as new households in their service areas are projected to be less likely to include young children than they have in the past. However, it is critical that all families in the Park Place neighborhood can safely access existing school sites and other educational facilities.

Public Schools Goals, Policies, and Implementation

Goal

Ensure that residents of the planning area have access to school facilities, consistent with school enrollment projections, and efficient provision of school facilities and educational services.

Policies

- Ensure that children and families can safely access their area schools.
- Identify and encourage additional educational opportunities for area residents.
- Encourage creation of physical and educational linkages between elementary, middle and high school students through programs like tutoring and mentoring.
- Promote connections between schools and the surrounding community, particularly community members without school-age children.

Implementation Strategies:

- Continue to coordinate with the Oregon City School District to identify school needs for area residents and ensure that the District meets them.
- Identify needed safe routes for walking and biking to school for area residents and children and incorporate them into planning and construction of transportation facilities in the area.
- Work with the School District to ensure that school bus routes provide for a high level of safety.
- Participate in efforts by the school district and residents to identify strategies for achieving educational linkages among schools in the

area and between schools and the community. Examples could include tutoring, mentorship programs and other educational programs, especially between neighboring schools.

- Explore the potential to locate an environmental educational facility in the planning area, preferably co-located with parks, open space or trails facilities in the area.
- Continue to coordinate with the Oregon City School District to identify school needs for area residents and ensure that the District meets them. If enrollment and development projections and trends differ from those identified in this Plan, work with the School District to identify appropriate locations) for school(s) within the planning area, if warranted.
- Encourage the Oregon City School District to continue to work with local families and other residents to develop and implement educational plans that meet the educational needs of children and families within the planning area.
- Organize programs like community gardens and school parades for strengthening the connection between schools and the surrounding community.

Financing

Metro's Title 11 requires concept plans to identify approximate costs of public infrastructure and potential sources of funding to pay for its development as the area is developed. Costs and funding sources are described in Chapter 5. The following goal policies and strategies will be sued to ensure equitable and cost-efficient use of funding as the plan is implemented.

Goal

Provide funding and financing in a manner that each development pays it proportional share of the overall cost with Park Place.

Policies

Ensure that residents and businesses within Park Place will be treated equitably with respect to the City as a whole

Implementation Strategies

- Identify existing funding sources and their ability to pay for the cost of future facilities and services.
- Identify and recommend additional, innovative methods for paying for facilities and services.
- Use a combination of system development charges, density bonuses, land dedication, fees-in-lieu and public acquisition to pay for park land and facilities.
- Use a combination of user fees, system development charges, land dedication and public acquisition for right-of-way and other local, regional and state funding sources to fund transportation improvements.
- Use a combination of system development charges, user fees, general fund tax revenues and other funding sources to pay for water, wastewater and stormwater facilities and services.

2. Next Steps

As described by Metro, concept planning is an interim set of measures meant to prepare an area for comprehensive planning. The outline below provides the general process and process elements that follow adoption of a concept plan.

1. Development and adoption of comprehensive plan designations, comprehensive plan amendments, and development code amendments, based on the Park Place Concept Plan (legislative procedure)
    a. Transportation System Plan (TSP) amendments
    b. Amendments to other public facilities plans
    c. Goal 5 inventory and implementation measures
    d. Amendments to other comprehensive plan goals and policies (see Implementation section below)
    e. Comprehensive plan designation mapping
    f. Code amendments, including potential land division, zoning, and system development charge (SDC) regulations (see Implementation section below)
2. Applications for annexation (Type III/IV procedure)
3. Adoption of zoning designations upon annexation (Type I or Type IV procedure)
4. Development review

In the case that updates to the Park Place Concept Plan itself needed to be made, those amendments would be subject to the same legislative procedures as when the plan was originally adopted. See Oregon City Municipal Code, Chapter 17.50, Administration and Procedures, for descriptions of the different decision types.

5. Funding and Finance

Introduction

The available public infrastructure currently in Park Place is insufficient to serve development proposed in the Park Place Concept Plan. Though Park Place does not have existing infrastructure, it is adjacent to existing service providers. The key public services that need to be developed are: transportation, drinking water, wastewater, stormwater, and parks.

1. Infrastructure Requirements

Transportation

To handle the traffic generated by future development in Park Place and in the surrounding urbanizing area, roadways will have to be improved inside and outside of Park Place. The construction costs for transportation improvements needed to indirectly or directly serve the area amounts to approximately $137-187 million in 2007 dollars. Table 5-1 indicates that approximately $52 million of roadway and intersection improvements are likely needed as a result of the Concept Plan.

Table 5-1 also summarizes the cost of improvements by type of roadway: Expressway, Minor Arterial, and Collector. These types of roadways imply different jurisdictional ownership and funding responsibilities.

Table 5-2 shows a preliminary distribution of ownership and funding responsibilities. ODOT owns the express roadways and is primarily responsible for their construction and maintenance. ODOT and the regional, county, and city governments share in the cost of improvements to ODOT's roadways based on regionally negotiated percentages approximately: ODOT, 60%; Metro 20%; County, 15%; and City, 5%. In Table 5-2, these percentages are applied to the construction costs to allocate the funding responsibilities to each government.

The minor arterials are Clackamas County roadways that will eventually revert to City ownership after annexation and as agreed upon between the City and County. Generally, County roadways are brought up to "standard" before the transfer occurs. For this analysis, the County is assumed to fund 60% of the construction costs, and the City 40%. These roadways - Redland Road and Holly Lane - primarily benefit a larger county-wide population than will live in Park Place.

The new collector roadways to be built in Park Place, and as Park Place develops, are 100% the responsibility of the City. These roadways primarily benefit local traffic.

Those improvements or parts of improvements allocated to Oregon City are identified as No-Build and Build improvements. Regardless of the development of Park Place, the No-Build improvements will have to be constructed as the City grows outside of Park Place. Metro is listed as a possible funding source but no allocation of project costs is shown for it. Metro may participate in some of the regional roadway projects, but at this time none of the projects is in Metro's Regional Transportation Funding Plan.

Table 5-1: Summary of Estimated Needs for Transportation Improvements (for concept planning purposes only)

Roadway	No Build	Build	Total
HWY 213 Corridor Improvements (I-205 to Oregon City UGB)	75-125,000,000	0	75-125,000,000
Redland Road: Abernethy/Holcomb to Swan Ave		11,500,000	11,500,000
Holly Lane: Redland to Maplelane Road	3,000,000	0	3,000,000
Livesay Road: Swan Ext to Holly Ext		1,800,000	1,800,000
Donovan Road: Holly Lane to Ogden Middle School		1,200,000	1,200,000
Swan Ave Extension: Existing Swan Ave south to Holcomb Blvd		1,100,000	1,100,000
Swan Ave Extension: Livesay canyon to Redland Road		9,300,000	9,300,000
Swan Ave Extension: Redland Rd to Holly Ln		9,300,000	9,300,000
Holly Lane: Redland to Holcomb Blvd		17,400,000	17,400,000
Total	78-128,000,000	51,600,000	130-180,000,000

Intersections	No Build	Build	Total
Anchor Way/Redland	2,900,000		2,900,000
Holly Ln/Redland Rd	2,000,000		2,000,000
Holly Ln/Maplelane Rd	1,600,000		1,600,000
Swan Ave/Holcomb Blvd		300,000	300,000
Total Intersection Improvements	6,500,000	300,000	6,800,000
Grand Totals	85-135,000,000	51,900,000	137-187,000,000

Table 5-2: Facility Ownership and Estimated Construction Costs (for concept planning purposes only)

Roadway	ODOT	Clackamas	City of Oregon City		Totals
			No Build	Build	
Highway 213 Corridor Improvements (I-205 to Oregon City UGB)	75-125,000,000			0	75-125,000,000
Redland Road: Abernethy/ Holcomb to Swan Ave.		6,900,000	0	4,600,000	11,500,000
Holly Lane: Redland to Maplelane			3,000,000	0	3,000,000
Livsey Road: Swan Ext to Holly Ext			0	1,800,000	1,800,000
Donovan Road: Holly Lane to Ogden Middle School			0	1,200,000	1,200,000
Swan Ave Extension: Existing Swan Ave south to Holcomb Blvd			0	1,100,000	1,100,000
Swan Ave Extension: Livesay canyon to Redland Road			0	9,300,000	9,300,000
Swan Ave Extension: Redland Rd to Holly Ln			0	9,300,000	9,300,000
Holly Lane: Redland to Holcomb Blvd		10,400,000	0	7,000,000	17,400,000
Total Roadway	75-125,000,000	17,300,000	3,000,000	34,300,000	130-180,000,000

Intersections	ODOT	Clackamas	No Build	Build	Totals
Anchor Way/Redland		1,700,000		1,200,000	2,900,000
Holly Ln/Redland Rd		1,200,000		800,000	2,000,000
Holly Ln/Maplelane Rd		1,000,000		600,000	1,600,000
Swan Ave/Holcomb Blvd		200,000		100,000	300,000
Total Intersection		4,100,000	0	2,700,000	6,800,000
Grand Totals	75-125,000,000	21,400,000	3,000,000	37,000,000	137-187,000,000

Source: Kittelson& Associates

To summarize, Oregon City will have to fund approximately $40 million of the identified $137-187 million of needs. Approximately $3 million will be funded city-wide, regardless of the Park Place Concept Plan. The Park Place area will be responsible for approximately $37 million.

The funding mechanisms for these improvements cannot be predicted with great accuracy, but the mechanisms can be identified and used to plan the improvements. As a part of the process to adopt the Park Place Concept Plan, the City and County will have to amend their Transportation System Plans to include all of the improvements identified above. The updated TSP also addresses funding by source of revenues. Once that is amended, the City and

County would update their transportation System Development Charges (SDCs) to include some portion of each capital improvement for eventual SDC funding. The projects in Park Place will then be ranked and scheduled for construction along with all of the other transportation projects in the City. These updates may or may not increase the amount of the current transportation SDC.

Outside of the Federal, State, County, and City funding sources for transportation improvements, the City and County may look to other financing mechanisms. The City may require developers to pay for or construct some of the improvements. The City may also accept applications to fund some projects as local improvement districts (LIDs) or advance financing arrangements with developers.

Water

Park Place will be served by the South Fork Water Board, which is a regional water utility owned by the Cities of Oregon City and West Linn. The Park Place area will be served by the SFWB's ample supply of water, treatment, reservoirs, and transmission lines to Park Place. The planned capital improvements build an internal distribution system at an approximate cost of $3.8 million in 2007 dollars for approximately 26,306 lineal feet of water pipes and associated appurtenances.

Once the Park Place Concept Plan is accepted, the City's water master plan will have to be amended to include these projects. The water SDC will have to be amended to include these projects and perhaps to increase the City-wide water SDC (currently $4,445 for a ¾ x ⅝ inch water meter, varying by meter size). The update of the City's SDC would include the new projects and account for new users, and may or may not increase the amount of the SDC. It would make some parts of the water improvements in Park Place eligible for SDC funding. These costs will be absorbed by developers either through SDCs or construction of water system improvements as a condition of development approval.

Wastewater

The Tri-City Sewer District (TCSD), which includes Oregon City, West Linn, Gladstone provides the wastewater treatment plant (WWTP) and interceptor wastewater lines from Park Place to the WWTP. The planned capital improvements provide the collection system within Park Place. Only the 36-inch wastewater lines along Redland Road will provide service to areas outside of Park Place. The total cost of these improvements is approximately $5.52 million in 2007 dollars. The cost per EDU is approximately $2,483.

After adopting the Park Place Concept Plan, the City and TCSD will amend their SDCs to include these projects and perhaps increase the wastewater SDC, which is currently $3,716 (sum of City and TCSD) per single-family residence on a ⅝ x ¾ inch water meter.

Table 5-3. Summary of Water System Improvements

Water System Improvement	Size	Length (ft)	Cost/ft	Total Cost
North Village:				
Livesay Rd - E of Swan	12"	1,500	$106	$159,000
Swan Ave - Livesay Rd to Redland Rd.	12"	1,969	106	208,714
Livesay Rd W of Swan	10"	1,888	90	169,920
Livesay Rd W. to Holcomb Rd.	10"	784	90	70,560
North Village to Redland Rd.	16"	1,981	126	249,606
North Village to Holcomb Rd.	10"	3,576	90	321,840
Subtotals		**11,698**		**1,179,640**
Redland Road:				
SFWB connection to Swan Ave	16"	2,805	$126	$353,430
Swan Ave to Holly Lane	16"	1,245	126	156,870
Holly Lane to UGB Boundary	16"	2,448	126	308,448
Subtotals		**6,498**		**$818,748**
South Village:				
Swan Ave - Redland Rd to Donovan Lane	16"	1,962	$126	$247,212
Swan Ave - Donovan Lane to UGB Bndry	10"	1,353	90	121,770
Holly Lane - Redland Rd to Donovan Lane	12"	1,906	106	202,036
Holly Lane - Donovan Lane to UGB Bndry	10"	1,244	90	111,960
Donovan Lane - Swan Ave to Holly Lane	16"	610	126	76,860
Donovan Lane - Swan Ave to School	16"	1,035	126	130,410
Subtotals		**8,110**		**$759,838**
	10"	8,845		
	12"	5,375		
	16"	12,086		
Total Lineal Feet of Water Lines		**26,306**		
Construction Cost				**$2,758,226**
Design Costs (20% of construction cost)				**551,645**
Construction + Design Cost				**3,309,871**
Contingency (15%)				**496,481**
Total Cost				**$3,806,352**

Source: David Evans & Associates

Funding of these improvements may be borne directly by developers either through payment of SDCs or construction of wastewater system improvements as a condition of development approval. The City also may pay for part of these improvements through its own investments by issuing debt and paying debt service from user fees or SDCs. Updating the City's wastewater SDC to include the Park Place projects and the numbers of new users may result in both new revenues to the City and qualify some of the Park Place wastewater improvements for SDC funding or credits. The updated SDC may or may not be greater than it is currently. Formation of LIDs or advance financing agreements also may be used to pay for some of the improvements.

Wastewater System Improvement	Size	Number	Length (ft)	Cost/ft	Total Cost
North Village:					
Livesay Rd - E of Swan	12”		1,500	$100	$150,000
Manholes	4’	5		$4,000	$19,000
Swan Ave - Livesay Rd to Redland Rd.	12”		1,947	$100	$194,700
Manholes	4’	6		$4,000	$23,470
Livesay Rd - W of Swan	10”		1,894	$95	$179,930
Manholes	4’	6		$4,000	$22,940
Livesay Rd - W to Redland Rd.	8”		839	$90	$75,510
Manholes	4’	3		$4,000	$12,390
North Village to Redland Rd	12”		1,964	$100	$196,400
Manholes	4’	6		$4,000	$23,640
North Village to Hilltop	10”		3,568	$95	$338,960
Manholes	4’	10		$4,000	$39,680
Subtotals		**25**	**11,712**		**$1,276,620**
Redland Road: *					
48” connection to Swan Ave	36”		1,891	$335	$633,485
Manholes	6’	6		$7,200	$41,238
Swan Ave to Holly Lane	36”		1,245	$335	$417,075
Manholes	6’	4		$7,200	$29,610
Holly Lane to UGB Boundary	36”		2,448	$335	$820,080
Manholes	6’	7		$7,200	$51,264
Subtotals		**17**	**5,584**		**$1,992,752**
South Village:					
Swan Ave - Redland Rd to Donovan Lane	12”		1,995	$100	$199,500
Manholes	4’	6		$4,000	$23,950
Swan Ave - Donovan Lane to UGB Bndry	10”		1,353	$95	$128,535
Manholes	4’	4		$4,000	$17,530
Holly Lane - Redland Rd to Donovan Lane	12”		1,910	$100	$191,000
Manholes	4’	6		$4,000	$23,100
Holly Lane - Donovan Lane to UGB Bndry	10”		1,244	$95	$118,180
Manholes	4’	4		$4,000	$16,440
Donovan Lane - Swan Ave to Holly Lane	8”		610	$90	Use Extg
Manholes	4’	3		$4,000	$10,100
Subtotals		**23**	**7,112**		**$728,335**
	8”		1,449		
	10”		8,059		
	12”		9,316		
	36”		5,584		
Total Lineal Feet of Wastewater Lines			**24,408**		
Construction Cost					**$3,997,707**
Design Costs (20% of construction cost)					**$799,541**
Construction + Design Cost					**$4,797,248**
Contingency (15%)					**$719,587**
Total Cost					**$5,516,836**

Table 5-4. Summary of Wastewater System Improvements

Source: David Evans & Associates

Stormwater

The stormwater system will in part be constructed as an element of the transportation system and in part from those improvements listed in Table 5-5. These improvements would not be constructed as part of a roadway. These non-roadway stormwater improvements will cost approximately $765,845 in 2007 dollars.

Once the Park Place Concept Plan is adopted, the stormwater master plan and SDC would be amended to include these improvements. These improvements will likely be constructed by developers as a condition of development approval. Updating the stormwater SDC will have the same possible effects as updating the wastewater and water SDCs.5.

Parks

The Park Place Concept Plan identifies two parks: an 8- to 10-acre community park and a 3- to 5-acre neighborhood park. The development cost is estimated at $1.82 million in 2007 dollars. The current price of vacant residentially-zoned land in Park Place ranges from a low of approximately $30,000 per acre for undeveloped un-served to $125,000/acre for land adjacent to services. For this analysis, an average price for land with services is used that ranges from $100,000 per acre to $125,000 per acre. The community park in the North Village would serve a larger area than Park Place, while the neighborhood park in the South Village would serve only Park Place.

Once the Park Place Concept Plan is adopted, the City will have to update its Parks and Open Space Master Plan to include these projects, and revise its

Stormwater System Improvement	Quantity	Units	Cost/ft	Total Cost
Livesay Creek Basin				
Ponds - Assumes approx 10,000 cu ft	5	EACH	$15,000	$75,000
Pipe - Assumes 12”	1,200	LF	$68	$81,600
Subtotals				$156,600
Holcomb Creek Basin				
Ponds - Assumes approx 10,000 cu ft	1	EACH	$15,000	$15,000
Pipe - Assumes 12”	260	LF	$68	$17,680
Subtotals				**$32,680**
Abernethy Creek Basin				
Ponds - Assumes approx 10,000 cu ft	13	EACH	$15,000	$195,000
Pipe - Assumes 12”	2,510	LF	$68	$170,680
Subtotals				**$365,680**
Total Ponds	19			
Total Pipe	3,970			
Construction Cost				$554,960
Design Costs (20% of construction cost)				$110,992
Construction + Design Cost				$665,952
Contingency (15%)				$99,893
Total Cost				**$765,845**

Table 5-5. Summary of Stormwater System Improvements

Source: David Evans

Table 5-6. Summary of Park Improvements

Park Type	Acres		Acquisition		Development		Total
	Range	Assumed	$/Acre*	$'s	$/Acre	$'s	
Community	8 to 10	9	$100,000	$900,000	$140,000	$1,260,000	$2,160,000
Neighborhood	3 to 5	4	125,000	500,000	140,000	560,000	1,060,000
Total Cost				**$1,400,000**		**$1,820,000**	**$3,220,000**

*The Clackamas County Office of Assessment and Taxation reports current market values for vacant unimproved land without services ranges as low as $33,000/acre. We assume a developable acre of land with services will be purchased for parks.

park SDC, currently $3,056 per residential unit. This amount may or may not increase with the inclusion of the proposed parks in Park Place.

2. Development and Timing

Park Place is composed of about 109.1 acres of net buildable land and 368.5 acres in un-developable wetlands, steep slopes, or other physically constrained land. It provides upwards of 1,458 housing units and approximately 8 acres of land zoned for a mix of retail and office uses. The land area is divided into 138 parcels of private ownership that range from less than 1 acre in size to more than 30 acres. It also requires the investment of $50.3 million for public improvements. Assuming that planned housing and commercial development occurs, the development will provide 1,458 dwelling units (single and multiple housing developments) and commercial development that equates to about 162 equivalent dwelling units (EDU). Using the EDUs of 1,620, and assuming the park development costs are only to be paid by residential development, the cost per average EDU is approximately $31,300.

The public infrastructure improvements illustrated in Table 5-7 will not be built all at one time; however, development of any one parcel will require roadway, wastewater, water, and stormwater improvements to be installed at the time of development. This proposition creates a need to invent financing arrangements that accommodate both the particular requirements of any one development, and the public's ability to build or cause to have built the necessary public improvements.

Vacant land in an urbanizing area such as Park Place is converted to urban uses on a nearly random basis. Urban vacant land conversion studies show the

Table 5-7. Improvements Summary

Service	Cost	Number of EDUs*	Cost per EDU
Transportation	36,980,000	1,620	$22,827
Water	3,806,352	1,620	2,350
Wastewater	5,516,836	1,620	2,405
Stormwater	765,845	1,620	473
Parks	3,220,000	1,458	2,209
Total Cost	$50,289, 032		$31,263

* An EDU for retail and office is assumed to equal about 10 percent of total trips, water usage, and wastewater production.

reason a land owner either develops the land himself or sells to a developer has more to do with the owner's personal circumstances than with the rational expansion of urban development. Lifestyle changes (e.g., change in career, retirement, the onset of disease, bankruptcy, divorce) often trigger the sale of vacant land at the urban fringe. The likelihood of land adjacent to parcels with a full range of infrastructure is very small. The cost of building public improvements is minimized when they are built only when needed, and only as much as a proposed development would require. These circumstances rarely coalesce. Since the public lacks the authority and so many parcels exist in Park Place, neither the public nor a single private owner can orchestrate its sequential and timely development. Each development proposal will have to be evaluated for private and public feasibility, and any excess capacity in the public improvements likely will have to be financed by the private developer or the public.

Development in Park Place, as in all other similar areas, is more likely to include some vacant parcels. This development process gives rise to the need to extend linear public services like roadways, wastewater and water lines, and storm drainage facilities through vacant parcels. Financing of improvements would be easier if the leapfrogged property owners were willing to pay their share of the cost. Typically, the leapfrogged property owner does not want to pay his or her share of improvement costs until development of the property, when service becomes necessary.

3. Land Owner and Developer Financing Tools

If the developer has only to pay for public improvements directly related to their own property with no excess capacity built into the improvements, then the developer would likely build the improvements and pay systems development charges. This circumstance rarely occurs in fringe urban areas where transportation, water and wastewater improvements are needed.

In areas like Park Place, the developer will typically have to build roadways, wastewater and water lines, storm drainage and perhaps park improvements that have capacity in excess of the development's own use. Generally, the developer cannot recover the cost of the excess capacity from the final development it sells (finished lots or finished lots and houses or commercial buildings). The developer, as a rule, has to finance this excess capacity in hopes that other development will occur to use the excess capacity and to purchase the excess capacity from the original developer.

Size also matters. The larger the development, the more property sales the developer needs to spread the cost of the excess capacity. The original developer has two possible tools to finance the excess capacity—a local improvement district (LID) or an advance financing agreement.

Local Improvement District

A developer may organize a LID for those properties that will eventually benefit from the excess capacity. Once formed by concurrence or vote of a majority of the property owners within the specified district, the City assesses each property for its proportionate share of the cost of constructing the public improvements, including administration and financing costs. For those properties that do not pay their assessments in full and immediately, the City can issue a Bancroft bond to raise the rest of the cash needed to construct the improvements and pay the associated expenses. The City then assesses a tax each year on those properties that owe their assessments, plus interest and expenses, until the assessment is fully repaid. This form of borrowing—instigated by the developer and managed by the city—gives the developer a risk-free method of financing the excess capacity. It does, however, take agreement by a majority of the property owners in the LID to approve of the arrangement, and concurrence by the City to participate in the LID financing. If the property owners fail to make payment, the City has to foreclose on the non-paying properties and resell the property to recover the lost revenues. The City, in effect provides the security for the loan and takes the risks of default.

Advance Financing (Reimbursement) Agreement

The other tool is an advance financing agreement (also commonly referred to as a reimbursement agreement). This arrangement works similar to a LID except that the developer takes all of the financial risks of default. Cities in Oregon have adopted several variations on this type of agreement. But generally, the affected property owners do not have a direct vote in the formation of the agreement, and the city computes an assessment for each property or each type of development (e.g., a single family house, per square foot of commercial space). The assessment is not paid until the property owner chooses to develop the land and connect to the public improvements financed by the original developer. At that time, the assessment is due. Some cities insist on full payment at the time of assessment, while others may accept financing of the assessment. The city collects the assessed amount from the next developer, keeps a small amount for administration, and pays the rest to the original developer. The city's financial risk is limited to administrative costs. In the event the developer does not collect all of the assessments within the time frame set in the agreement (typically 10 to 20 years), the agreement is rendered null and void and the developer suffers the financial consequences.

4. Public Financing Tools

Size makes a difference to a developer's ability to absorb risk. When properties in an area are small and proposed developments are small, such as a series of small subdivisions for residential development or small commercial centers, the city may be the only financier available to absorb the financial risk of constructing the necessary public improvements. The city's risk is its ability

to collect systems development charges, charge user fees and, if authorized by voters, to assess specific property taxes to repay general obligation bonds. Generally the city has three possible sources of capital to build excess capacity into public improvements—cash reserves, revenue bonds or state loans where available, and general obligation bonds.

Cash Reserves

If the City has cash reserves from past collections of systems development charges or from the net operating revenues of user-fee based services (wastewater and water), then it can act as the financier in either a LID or advance financing agreement. It can also expect repayment from future payment of systems development charges. But the City must use its own cash to pay for construction of the improvements. No third-party lender would accept a promise of future SDC revenues to repay a debt because this stream of revenue is so unpredictable.

Revenue Bonds or Loans

Where the City charges monthly (or bimonthly) user fees for services, it has the ability to set those charges at a level that will pay all operating costs and pay the principal and interest (debt service) on a bond or loan. User fees provide a reliable stream of income that can be pledged to repay debts. Revenue collected for systems development charges can in part be applied to repay these debts. Specific laws guide the use of SDC revenues for this purpose. The City cannot levy a property tax to repay this debt.

General Obligation Bonds

Cities in Oregon can issue general obligation bonds only with the specific approval of voters at a general election and for a maximum specified amount and purpose. Revenue to repay this debt is primarily derived from a special property tax levy, though net income from user fees and SDC revenues may also be used to repay these debts.



Park Place Concept Plan

Appendix

Park Place Concept Plan

May 30, 2007

City of Oregon City

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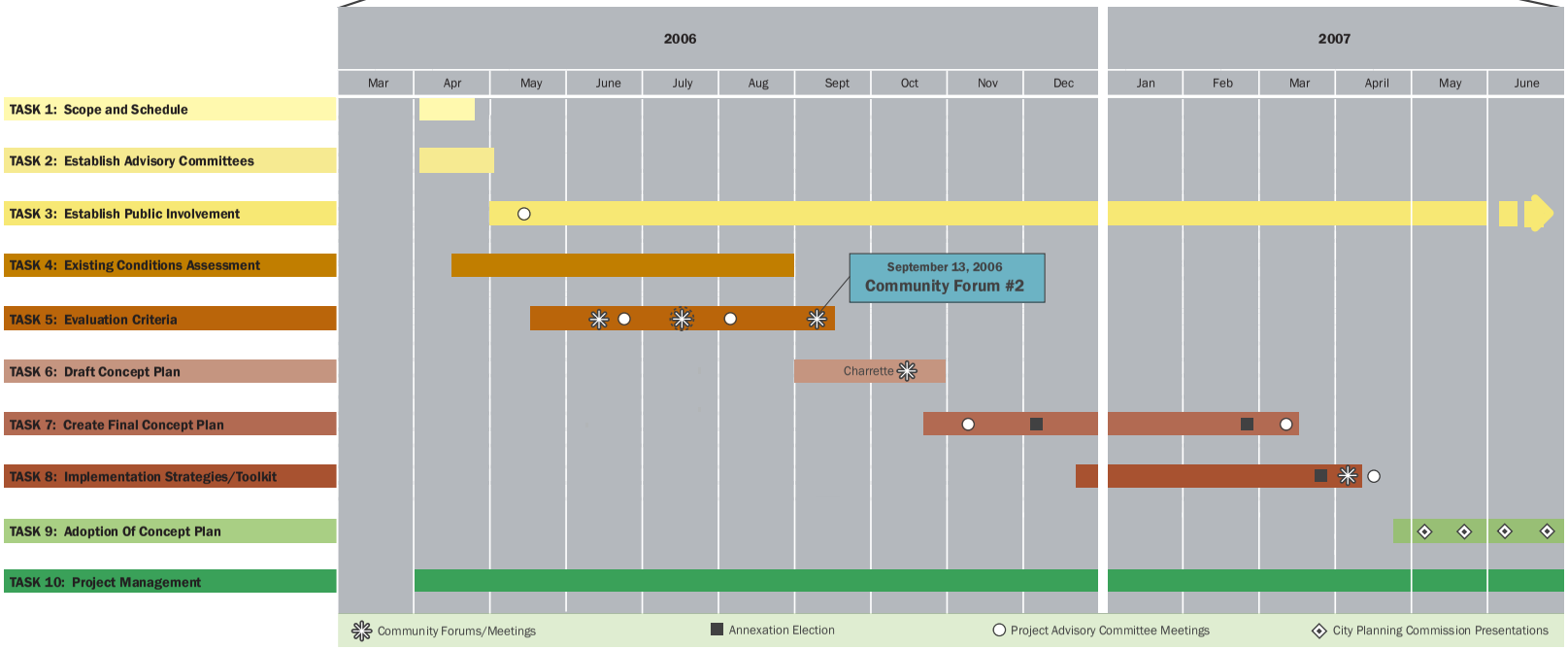
A. Park Place Timeline

Park Place
CONCEPT PLAN

Concept Planning Timeline: 1980s - 2007

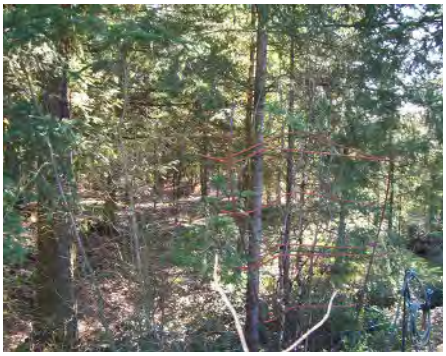
early 1980s	2002	2006	2006 - 2007	2007	beyond 2007
Livesay portion of Park Place area added to Metro UGB	Additional Park Place area added to Metro UGB	Oregon City initiates process to prepare Concept Plan	**City, consultant team and citizens engage in concept planning process**	Property owners initiate annexation requests; adopt new Plan and zoning designations	Area develops over 10 to 20 years



A. Park Place Ti

B. Existing Conditions Report

Land Use







The Park Place study area is located east of Highway 213 and south of Redland and Holcomb Roads. The land area of the study area is approximately 470 acres of which 180 acres are located immediately adjacent to Oregon City limits in the vicinity of Livesay Road. These 180 acres were brought into the urban growth boundary (UGB) in the 1980s, but have not been annexed as part of the City of Oregon City. The remaining approximately 300 acres were brought into the UGB in 2002 and consist of portions of Alternative areas 24, 25 and 26, which were study areas determined by Metro during its regional growth assessment in 2000.

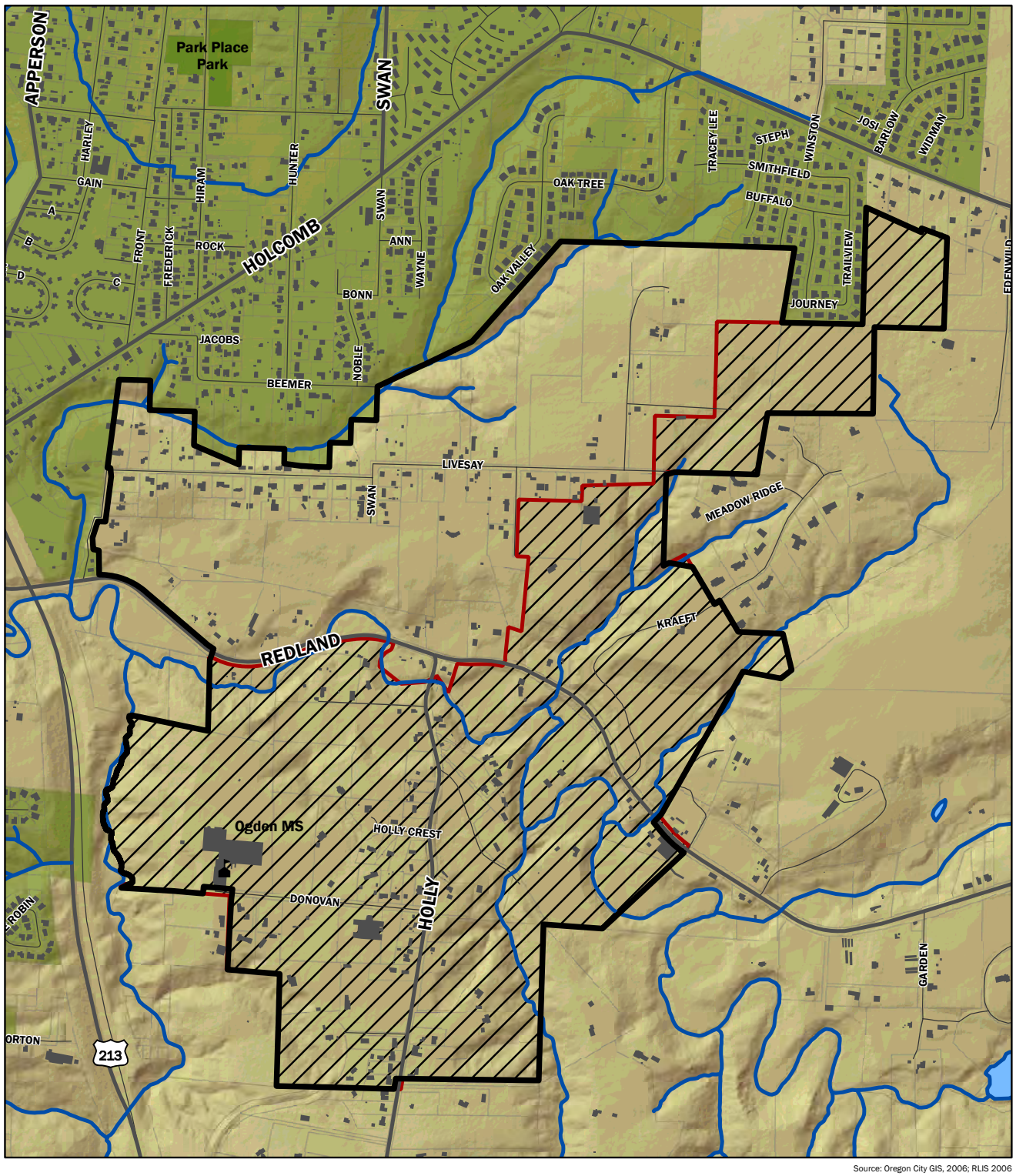
The study area is comprised of 138 individual property owners. To date, the largest amount of acreage under one ownership is approximately 48 acres. Thirty-eight acres are in public ownership, the majority of which comprise the Ogden Middle School (Oregon City School District). More importantly, nearly half of the parcels in the study area are one acre or less. This fact illustrates that any large-scale development will likely take many years to be fully realized unless a significant number of people are compelled to sell property to a single entity. New development patterns will likely be fragmented and uncoordinated, stressing the importance of a cohesive vision and growth strategies for the area.

The primary land uses in the study area are rural farms, low density residential housing and civic uses, like schools and churches. There are no commercial, office or industrial land uses within the study area; the closest commercial nodes are located on Holcomb Road near Front Street (Steve's Market) and at the intersection of Redland and Holcomb Roads. A regional power center is being developed a half-mile from the westernmost edge of the study area, which will influence the type and subsequent success of future land uses and traffic patterns in the study area.

The majority of the housing in the study area is located along Livesay Road and Holly Road near Donovan Street, which is the primary connection to Ogden Middle School. These areas are generally characterized by low to moderately angled slopes and minimal wildlife habitat. Houses in the study area were constructed as early as 1900 and as recently as 2005; the majority of the housing was constructed between 1960 and 1980. Architectural styles in the study area primarily consist of modest sized cottages, farm houses, and ranch style houses. The study area is surrounded by pockets of higher density, high-end single-family residential subdivisions including Barlow Crest, Trailview Estates, Meadowridge Estates, and Holcomb Ridge.

Conclusion

Creating a truly mixed use neighborhood in the Park Place study area will be challenging due to the study area's natural topographic constraints, lack of connectivity, adjacent land uses and regional objectives, and existing land use patterns. The study area's existing low density, coupled with the relatively large number of individual property owners and the limited amount of property under single ownership, will further inhibit a mix of uses at higher density.



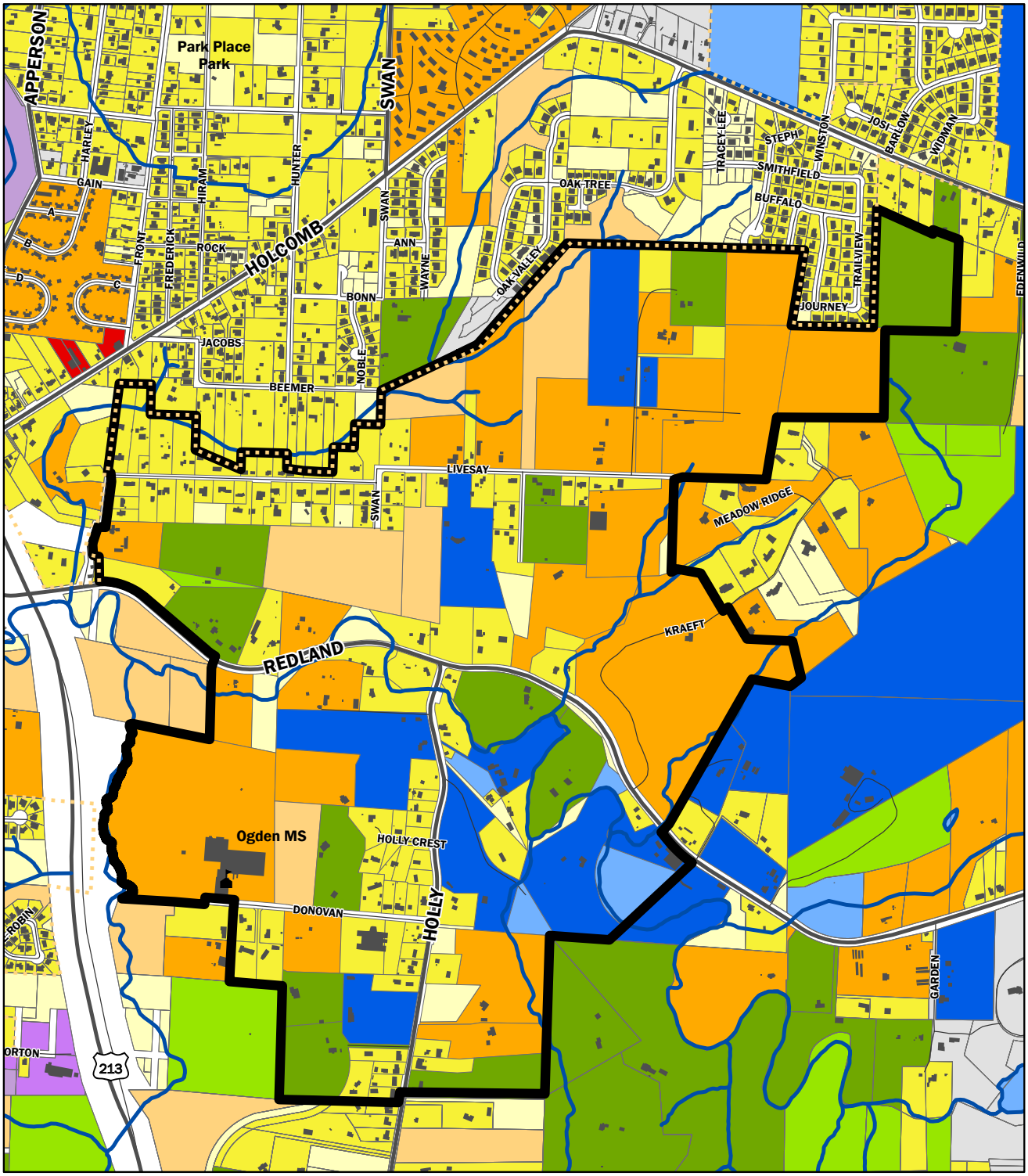
Source: Oregon City GIS, 2006; RLIS 2006

project boundary
Oregon City limits
Major roadways
Minor roadways
buildings
taxlots
streams
waterbodies
UGB Expansion Area

Park Place Concept Plan

Project Area

0 500 1,000
Feet



Source: Oregon City GIS, 2006; RLIS 2006

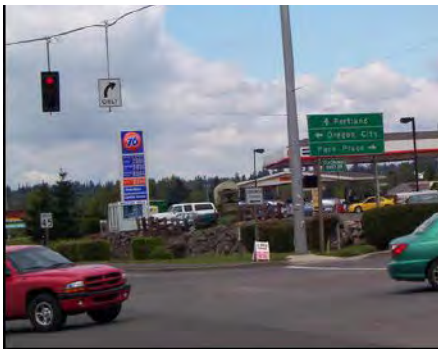
- no data
- Residential land - vacant
- Residential land - improved
- Commercial land - vacant
- Commercial land - improved
- Misc. Operating assessed
- Industrial land - vacant
- Industrial land - improved
- Tract land - vacant
- Tract land - improved
- Non-EFU farmland - vacant
- Non-EFU farmland - improved
- EFU farmland vacant
- Designated forestland and.or SWO - vacant
- Designated forestland and/or SWO - improved
- Manufactured structure park

Park Place Concept Plan

Land Use: Existing land use

0 500 1,000
Feet

Transportation Existing Conditions







Project Description

The City of Oregon City is seeking to develop a concept plan for an area encompassing nearly 500 acres located east of Highway 213 and south of Holcomb Road, which will be adopted into the City's Comprehensive Plan. The Park Place Concept Plan will integrate a multi-modal transportation system with a mixed-use development pattern to achieve a highly efficient and sustainable design. The Concept Plan will identify a network of internal and external pedestrian, bicycle, transit, and street connections that serve the study area and connect it to the surrounding community and the broader region.

The Concept Plan will ensure that the land brought in is planned in an efficient and sustainable manner that will maximize the use of the available lands while protecting the natural resources in the study area. This project will identify compatible land uses, which may include industrial, commercial, and residential uses, thereby reducing the need for vehicle trips, maximizing the efficiency of public transportation, offering multi-modal transportation options, and reducing the need to expand the Urban Growth Boundary (UGB).

Contents of the Memorandum

This memorandum focuses on the following transportation issues related to the Park Place Concept Plan:

- Study Area
- Existing Roadway Facilities
- Existing Transit Facilities
- Existing Pedestrian Facilities
- Existing Bicycle Facilities
- Existing Traffic Conditions
- Planned Improvements

Study Area

The overall study area and study intersections were selected based on direction provided by Oregon City staff. As illustrated in Figure 1, the study area encompasses the vicinity around Highway 213 bounded by the I-205/Highway 213 interchange to the north and Beavercreek Road to the south. Kittelson & Associates visited and observed the study area in August 2006.

Existing Roadway Facilities

As illustrated in Figure 1, Highway 213, Redland Road, Holcomb Road, and Holly Lane are the major roadway corridors within the study area.

Highway 213

Highway 213 is a major connection to the regional transportation system for residents of Oregon City. Traffic on Highway 213 is highly directional in nature, as it is heavily used by commuters in the a.m. and p.m. peak hours each weekday, with congestion occurring during both peak periods. Highway 213 is a four-/five-lane expressway from the I-205 interchange to the Molalla Avenue intersection. Traffic flow



in this segment is only interrupted by signalized intersections at Washington Street, Redland Road, and Beavercreek Road. As defined in the Oregon City Transportation Plan (TSP), an expressway primarily serves motorized vehicle traffic and is expected to provide a high level of mobility and access control for those vehicles. The expressway has shoulder bike lanes, but offers no sidewalks.

Redland Road

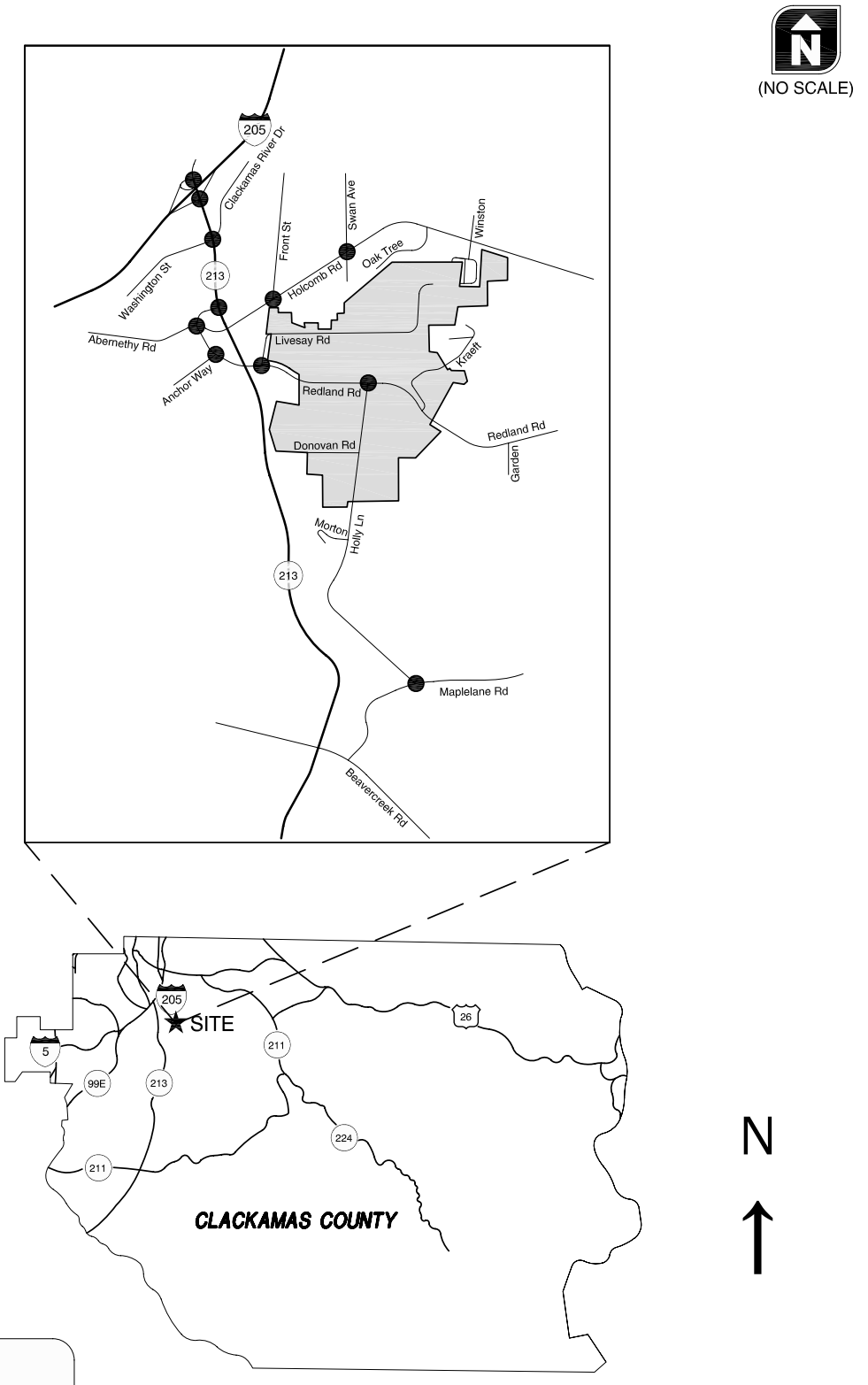
Redland Road is a minor arterial providing Oregon City residents with access to and from the area east of Highway 213. Redland Road is a two-lane minor arterial facility that serves as a link between Highway 213 and several residential areas to the east. Vehicles traveling through on Redland Road do not have to stop or yield at any intersections in the study area beyond the signalized intersections at Highway 213 and Holcomb Boulevard-Abernethy Road. As defined in the Oregon City TSP, a minor arterial is expected to carry local traffic between neighborhoods and community and regional facilities within a city. Minor arterials have limited parking and possible public transit; however, they require sidewalk and bicycle facilities. The current cross section is rural in design, with open ditches, shoulder bike lanes and no curb, gutter or sidewalks on either side.

Holcomb Boulevard

Holcomb Boulevard is a minor arterial providing Oregon City residents with access to and from the area east of Highway 213. Holcomb Boulevard is a two-lane minor arterial facility that transitions into Abernethy Road at the Redland Road intersection. Vehicles traveling through on Holcomb Road do not have to stop or yield at any intersections in the study area beyond the signalized intersection at Redland Road. As defined in the Oregon City TSP, a minor arterial is expected to carry local traffic between neighborhoods and community and regional facilities within a city. Minor arterials have limited parking and possible public transit; however, they require sidewalk and bicycle facilities. The rural cross section of today, with narrow shoulders

Table 1: Existing Transportation Facilities and Roadway Designations

Roadway	Classification	Cross Section	Speed Limit (mph)	Sidewalks	Bicycle Lanes	On-Street Parking
I-205	Freeway	6-lane	55	No	No	No
Highway 213	Expressway	4/5-lane	55	No	Yes	No
Washington Street	Minor Arterial	2/3-lane	35/45	Partial	Yes	No
Redland Road	Minor Arterial	2-lane	45	No	Yes	No
Holcomb Boulevard	Minor Arterial	2-lane	35	Partial	No	Partial
Maplelane Road	Minor Arterial	2-lane	45	No	No	No
Anchor Way	Minor Arterial	2-lane	25	Partial	No	No
Front Street	Collector	2-lane	25	Partial	No	Partial
Swan Avenue	Collector	2-lane	25	Partial	No	Partial
Holly Lane	Local Street	2-lane	40/45	No	No	No
Livesay Road	Local Street	2-lane	25	No	No	No



SITE VICINITY MAP
OREGON CITY, OREGON

FIGURE 1

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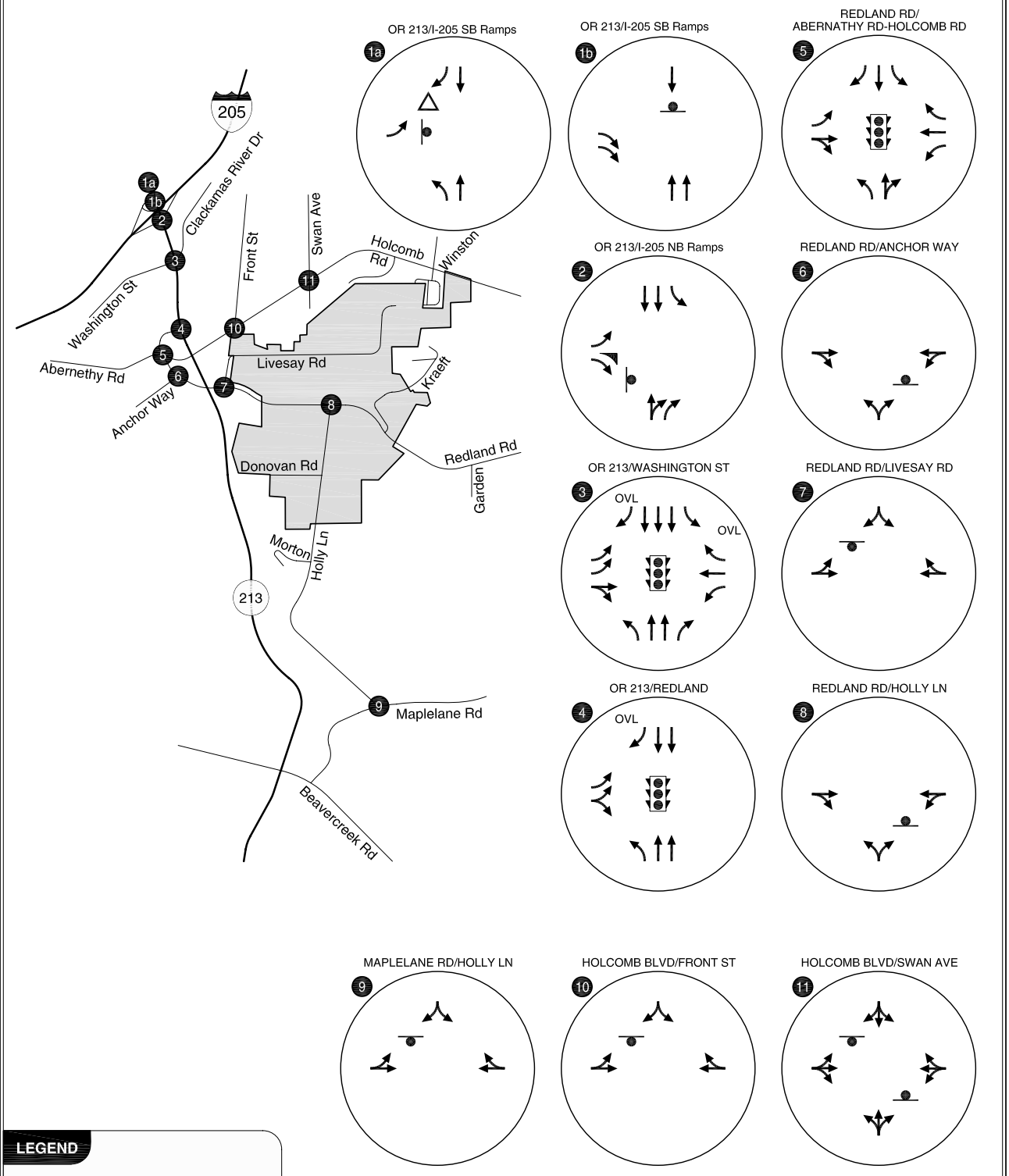
Park Place Concept Plan *August 2006*



LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES
OREGON CITY, OREGON

FIGURE **2**

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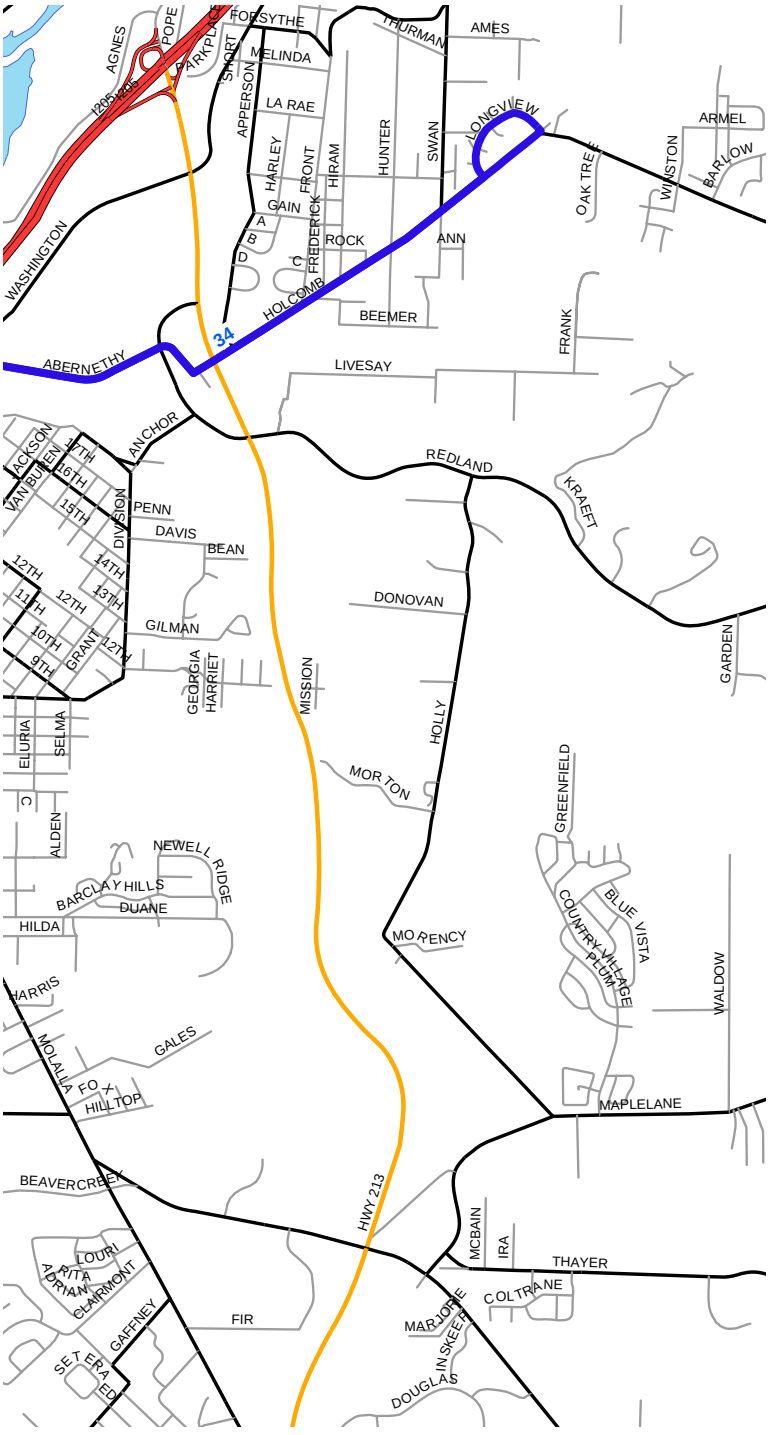

LEGEND

Bus Line

34

EXISTING TRI-MET BUS ROUTES
OREGON CITY, OREGON

FIGURE 3

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and no curbing, gutters or sidewalks, is transitioning to a typical urban cross section (curb, gutter, sidewalks and bike lanes) as infill and redevelopment occur.

Holly Lane

Holly Lane is a local street that runs between Redland Road and Maplelane Road providing service to several residential properties and Ogden Middle School via South Donovan Road. Holly Lane is a free flowing two-lane facility except at its two terminating locations where it has stop control. Holly Lane has several horizontal and vertical curves, steep grades and narrow shoulders. As defined in the Oregon City TSP, a local street is expected to provide direct access to adjacent properties and land uses within neighborhoods; as a result, they have the lowest mobility function and the highest accessibility function. Sidewalks and landscaping are required along local streets; however, bicycle lanes are optional. Holly Lane is built to a rural county standards, with open ditches, narrow to nonexistent shoulders and no curb, gutter, sidewalks or bike lanes.

As illustrated in Figure 1, there are several other roadways within the study area that will be included in this projects analysis. Table 1 provides a summary of the roadway facilities included in this analysis.

Intersection Configurations

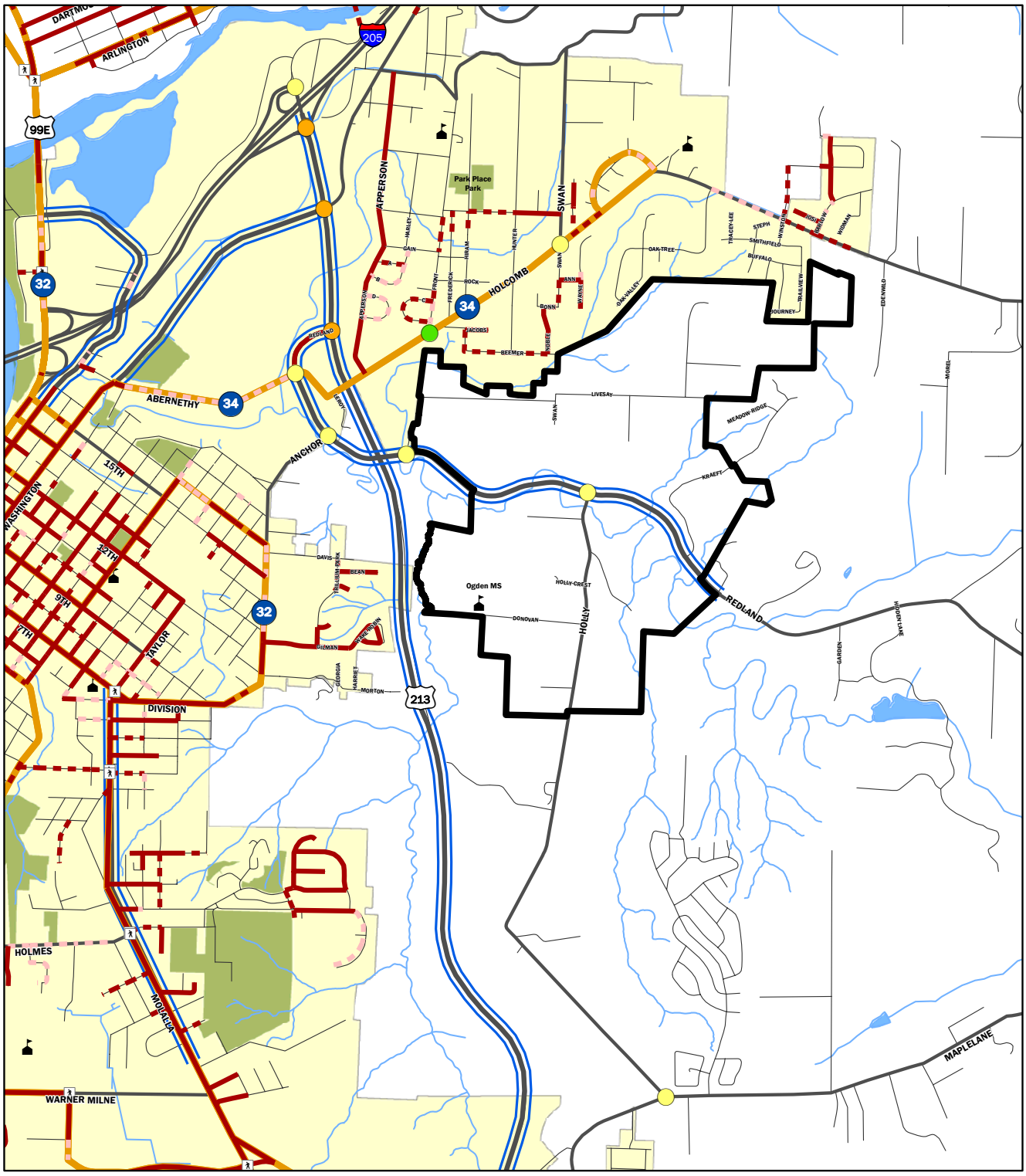
Lane configurations and traffic control devices were inventoried during the August 2006 field visit at the following 11 study intersections and are summarized in Figure 2:

- Highway 213/I-205 Southbound Ramps
- Highway 213/I-205 Northbound Ramps
- Highway 213/Washington Street
- Highway 213/Redland Road
- Redland Road/Abernethy Road-Holcomb Boulevard
- Redland Road/Anchor Way
- Redland Road/Livesay Road
- Redland Road/Holly Lane
- Maplelane Road/Holly Lane
- Holcomb Boulevard/Front Street
- Holcomb Boulevard/Swan Avenue

The Highway 213/I-205 Southbound interchange terminal comprises two intersections because the northbound left-turn movement must yield to the uncontrolled southbound through movement in the northern portion of the intersection (intersection 1a) while the southbound through movement is stop-controlled just south of there (intersection 1b) to give way to an uncontrolled eastbound right-turn movement. Therefore, intersection 1a is the northernmost intersection where traffic exiting the freeway is turning left and traffic from Highway 213 is turning onto the freeway on-ramp. Intersection 1b is where traffic exiting the freeway is turning right onto southbound Highway 213 and southbound through traffic on Highway 213 is stop-controlled.

Transit Facilities

Figure 3 summarizes the existing transit service in the study area. The figure is generated from Metro's RLIS database, Reference 1. As illustrated in Figure 3, transit service in the study area is very limited, with only the following Tri-Met bus route



Source: Oregon City GIS, 2006; RLIS 2006

Existing bicycle lane

Bus Route

Sidewalk on left side only

Sidewalk on right side only

Sidewalk on both sides

Intersection Operation

good

fair

poor

Oregon City limits

project boundary

Park Place Concept Plan

Transportation: Existing Facilities: Bike, Pedestrian and Transit

0 0.2 0.4 0.6

Miles



discussed below providing service within the general site vicinity. The bus route and schedule information was collected from Tri-Met's website, Reference 2.

Route 34: River Road, which provides service between Clackamas Heights and the Milwaukie Transit Center, travels along Holcomb Boulevard, Longview, and Abernethy Road in the study area with scheduled stops at the Oregon City Transit Center and Clackamas Heights (Holcomb Boulevard/Longview Way intersection). Service is provided from 5:45 a.m. to 6:30 p.m. at approximately one-hour headways, except during the peak periods, at the Oregon City Transit Center. However, service is provided to Clackamas Heights twice during each weekday peak period and once in the mid-day. Service is not provided on the weekend.

Existing Pedestrian Facilities

Existing pedestrian facilities are illustrated in Figure 4. The pedestrian facility figure was created from Metro's pedestrian inventory map on their FTP website, Reference 3. Notable generators of pedestrian activity in the immediate study area include Ogden Middle School, the Steve's Market area, Holcomb School and the area around the Plaid Pantry near the Holcomb Boulevard/Redland Road intersection. As illustrated in Figure 4 and summarized in Table 1, the pedestrian system is incomplete, with sidewalk facilities in the study area being very limited. In addition, several of the roadways within the study area that do not have sidewalks have narrow or nonexistent shoulders and create an unsafe and undesirable environment for pedestrians. Improvements to the existing pedestrian transportation system are planned and listed in the planned improvement section of this memo.

Existing Bicycle Facilities

Existing bicycle facilities are illustrated in Figure 5. The bicycle facilities figure was created from Metro's RLIS database, Reference 1. As illustrated in Figure 4 and summarized in Table 1, the bicycle system is incomplete, with only Highway 213, Washington Street and Redland Road having striped bike lanes. Holcomb Boulevard is considered a high traffic through street, making it a potentially dangerous route for bicyclists so long as there are not striped bike lanes on the road. Anchor Way, Holly Lane, and Maplelane Road are considered caution areas for cyclists due to, among other factors, high speeds, narrow or nonexistent shoulders and ditches below pavement grade. Improvements to the existing bicycle transportation system are planned and listed in the planned improvement section of this memo.

Existing Traffic Conditions

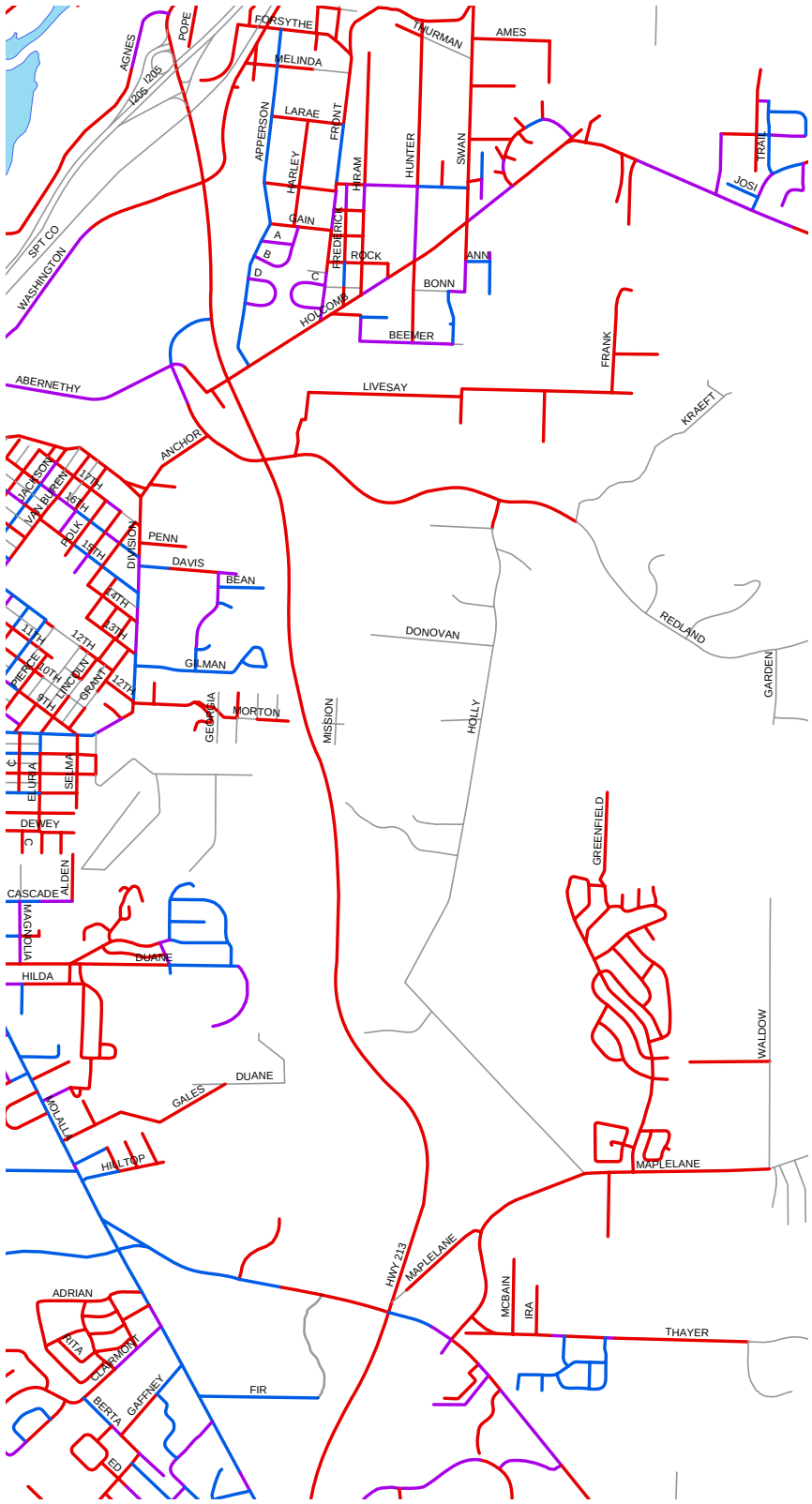
Manual turning movement counts for the study intersections were obtained from past projects in the area and newly ordered counts. These counts were conducted during the weekday evening peak hour. All counts were taken between July 2005 and June 2006. Older counts were balanced with new counts to obtain existing year traffic volumes. Heavy vehicle percentages were entered by approach. The turning movement counts from the weekday p.m. peak hour are summarized and rounded to the nearest five vehicles per hour as shown in Figure 6. Appendix C1 contains the traffic count sheets used in this study.

Current Levels of Service

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the 2000 Highway Capacity Manual, Reference 4. A description of level of service and the criteria by which it is determined is presented in Appendix "C2." Appendix "C2" also indicates how level of service is measured and what is generally considered the acceptable range of level of service.

Park Place Concept Plan

August 2006



EXISTING PEDESTRIAN FACILITIES
OREGON CITY, OREGON

FIGURE 4

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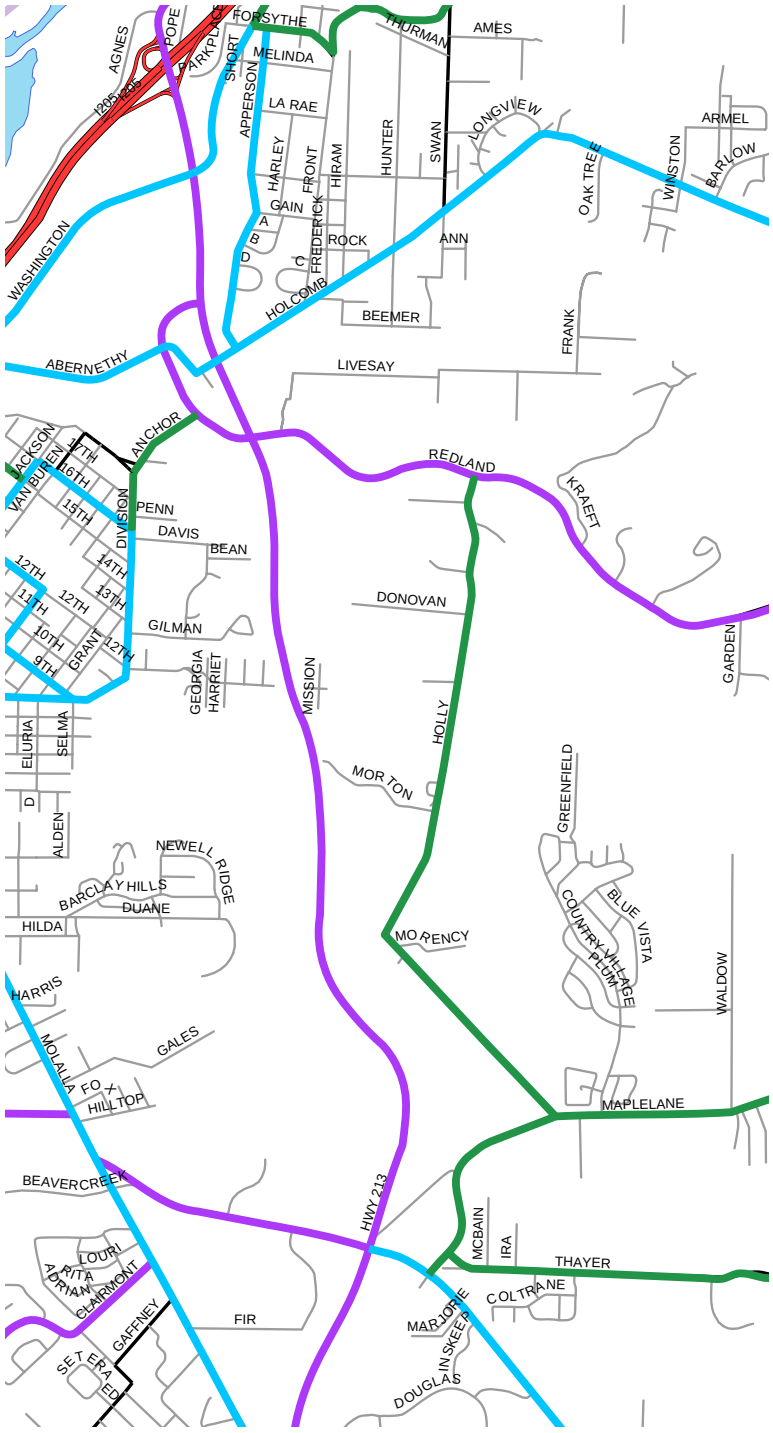
Park Place Concept Plan

August 2006



LEGEND

Bike Route

- Bike lane
- Caution area
- High traffic through street
- Low traffic through street
- Planned bike lane
- Regional multi-use path

EXISTING BIKE ROUTES
OREGON CITY, OREGON

FIGURE 5

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The peak 15-minute flow rates during the weekday peak hours were used in the evaluation of all intersection levels of service to ensure that this analysis was based on a reasonable worst-case scenario. For this reason, the analyses reflect conditions that are only likely to occur for 15 minutes out of each average peak hour. Traffic conditions during all other weekday time periods will likely operate under conditions better than those described in this report.

Level of Service (LOS) analyses conducted for signalized intersections in this report are based on the average control delay per vehicle entering the intersection. Level of Service (LOS) is a measure used by transportation engineers to determine the quality of the transportation system in an area. In general, LOS is linked to transporttion time (the shorter, the better) and speed. For unsignalized intersections, LOS is based on the intersection's capacity to accommodate the worst, or critical, movement.

Volume-to-capacity (v/c) ratios and levels of service were calculated for the three signalized and the eight unsignalized study intersections using the weekday p.m. peak hour traffic volumes, as shown in Figure 6. Appendix "C3" includes the year 2006 existing conditions level-of-service worksheets.

Highway 213 Corridor

The Oregon Department of Transportation (ODOT) does not have any standards regarding level of service. Instead, the Department uses volume-to-capacity ratio standards to assess the study intersections along the Highway 213 corridor. ODOT standards require that the v/c ratios on all intersections of Highway 213 included within the Urban Growth Boundary (UGB) not exceed 0.99, except for the I-205 interchange ramp intersections. ODOT has special standards for freeway interchange ramp intersections. The freeway interchange ramp intersections are required to maintain a v/c ratio at or below 0.85. It should be noted that the signalized intersections along the Highway 213 corridor were analyzed using Synchro files provided by ODOT.

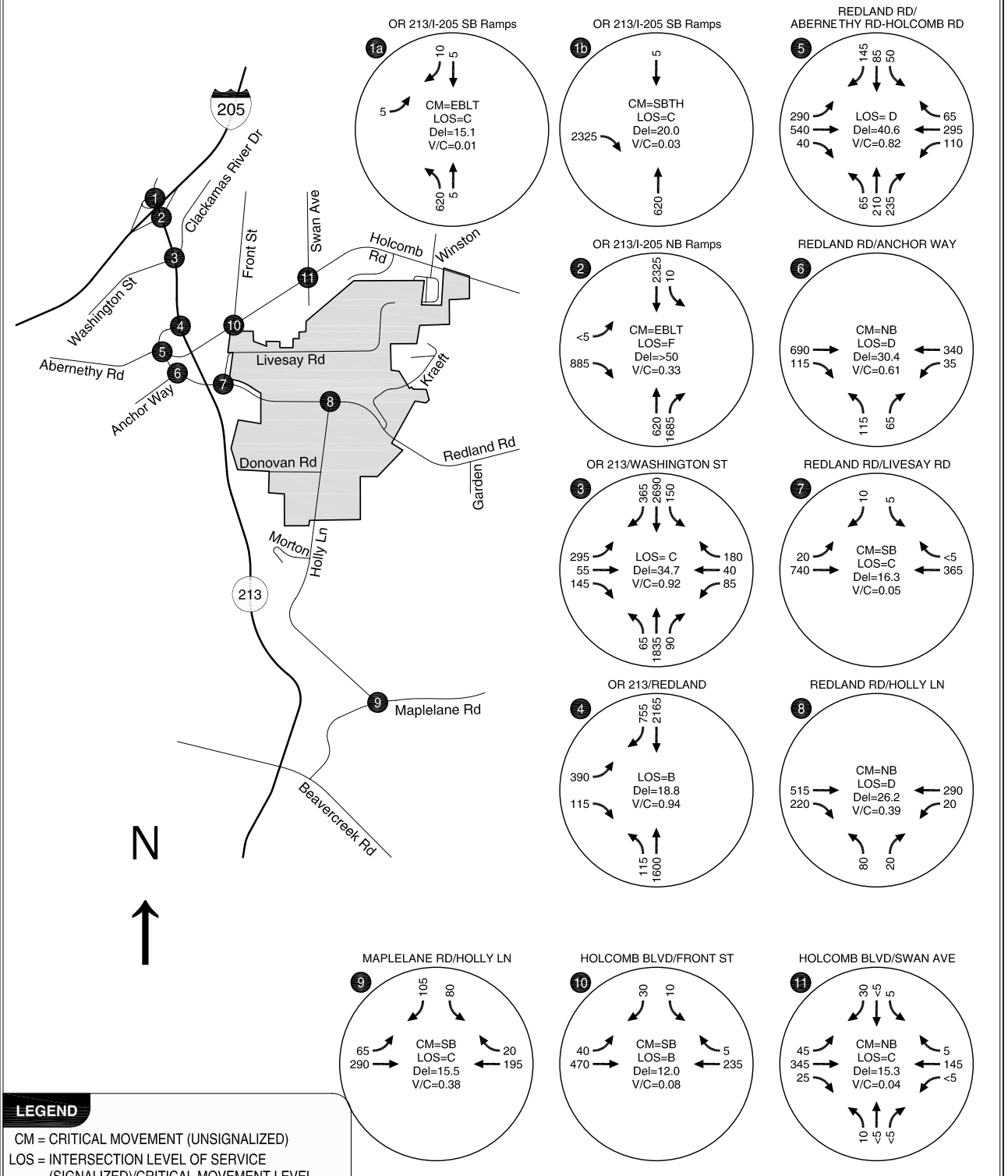
As Figure 6 illustrates, all study intersections along the Highway 213 corridor are operating at acceptable volume-to-capacity levels. Weekday p.m. peak hour field observations revealed that significant queuing occurs at the Washington Street and Redland Road intersections. Southbound queues from the Washington Street intersection spilled back to the I-205 overcrossing. Despite the long queues, all stopped vehicles were able to clear the Washington Street intersection and the Redland Road intersection during each signal cycle. No approach or movement failures were observed at either intersection during the weekday p.m. peak hour.

In addition to analyzing the intersection operations along the Highway 213 corridor, a road segment analysis was performed on Highway 213 between I-205 and Beavercreek Road, assuming a free flow speed of 55 miles per hour. Table 2 summarizes the results of the road segment analysis.

As summarized in Table 2, all of the road segments along the Highway 213 corridor are expected to operate at acceptable levels.

Redland Road/Holcomb Boulevard/Holly Lane Corridors

For analysis of intersections along the Redland Road, Holcomb Boulevard, and Holly Lane corridors, Oregon City and Clackamas County level-of-service standards are applied. The City of Oregon City and Clackamas County require that LOS "D" or better be maintained for all signalized intersections and LOS "E" or better be maintained for all unsignalized intersections. The City of Oregon City and Clackamas County do not have any standards regarding volume-to-capacity ratios.



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YEAR 2006 EXISTING TRAFFIC TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE **6**

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Transportation Engineering / Planning

As Figure 6 illustrates, all study intersections within the Redland Road, Holcomb Boulevard, and Holly Lane corridors are operating at acceptable levels.

Planned Improvements

Three planned and funded transportation improvement projects were identified in the study area through discussions with ODOT, Clackamas County, and City of Oregon City staff. Table 3 provides a summary of these improvement projects.

Several additional planned transportation improvement projects were identified through a review of the Metro 2004 Regional Transportation Plan (RTP), Reference 6, the ODOT 2008-2011 Draft Statewide Transportation Improvement Program (STIP), Reference 7, and the City of Oregon City Transportation System Plan (TSP), Reference 8; however, these projects are not yet funded. Table 4 provides a summary of the planned and unfunded transportation improvement projects in the project study area.

Conclusion

The study area is served by a multi-modal transportation system that includes roadway, transit, bicycle and pedestrian facilities and services. Isolated locations on the roadway system experience congestion and delays; however, applicable agency standards are met at all study intersections and road segments.

The Highway 213 corridor is approaching capacity, particularly on the segment between Redland Road and the I-205 interchange. Federal appropriations have been obtained through the Safe, Accountable, Flexible, EfficientTransportation Equity Act: A Legacy for Users (SAFTEA-LU) for the planning of Highway 213 improvements,

Table 2: Highway 213 Road Segment Analysis

Segment		Direction	LOS[1]	Density (pc/mi/ln)[2]
From	To			
I-205 SB Ramps	I-205 NB Ramps	Northbound	A	6.3
		Southbound	C	23.3
I-205 NB Ramps	Washington	Northbound	C	23.4
		Southbound	C	21.4
Washington Street	Redland Road	Northbound	C	20.2
		Southbound	C	19.7
Redland Road	Beavercreek Road	Northbound	B	16.4
		Southbound	C	23.1

Table 3: Planned and Funded Transportation Improvement Projects

Location	Project	Description
Hwy 213/I-205 NB	I-205 Northbound Ramp Meter	ODOT
Washington St. Hwy 213 - 5th St. (partially complete)	Striped 5-6 foot bike lanes in both directions	City of Oregon City
Hwy 213/I-205	Funds appropriated for an IAMP and EA for improvements to Hwy 213/I-205 interchange	Federal

Table 4: Planned and Unfunded Transportation Improvement Projects			
Location	**Project Description**	**Estimated Cost**	**Document Source**
Highway 213/Beavercreek Rd	Provide dual northbound left-turn lanes.	-	City of Oregon City TSP
Anchor Way: 18th St –Redland Rd	Provide curb, gutter, and sidewalks along both sides.	$350,000	City of Oregon City TSP
Holcomb Road: Redland Rd – UGB	Provide curb, gutter, and sidewalks along both sides.	$1,510,000	City of Oregon City TSP
Redland Road: Anchor Way – UGB	Provide curb, gutter, and sidewalks along both sides.	$296,000	City of Oregon City TSP
Swan Avenue: Holcomb Rd – Forsythe Rd	Provide curb, gutter, and sidewalks along both sides.	$528,000	City of Oregon City TSP
Washington St/Clackamas River: Abernethy Rd - UGB	Provide curb, gutter, and sidewalks along both sides.	$1,670,000	City of Oregon City TSP
Holcomb Rd/Front St.-Beemer Jacobs Way	Realign offset intersection	$500,000	City of Oregon City TSP
Highway 213: I-205-Redland Rd	Phase 1A improvement from HWY 213 Urban Corridor Design Study	$10,000,000	City of Oregon City TSP
Highway 213/Beavercreek Rd	Single Point Diamond grade separated interchange improvement as described in the Highway 213 Corridor Study.	$20 Million	City of Oregon City TSP
Redland Rd/Anchor Way	Signalization (could be development driven)	$582,000	City of Oregon City TSP
Redland Road extension between Abernethy Rd and Washington St	Frontage connection complementing the Highway 213 Corridor Phase 1A improvements – Minor Arterial.	-	City of Oregon City TSP
Abernethy-Holcomb Blvd: Washington St-Winston Dr	Provide sidewalk along north side.	$450,000	City of Oregon City TSP
Abernethy-Holcomb Blvd: Redland Rd-Winston Dr	Provide sidewalk along south side.	$307,500	City of Oregon City TSP
Clackamas River Drive: Highway 213 - UGB	Provide sidewalk along both sides.	$450,000	City of Oregon City TSP
Front Avenue: Forsythe Rd-Holcomb Blvd	Fill in gaps without sidewalks.	$500,000	City of Oregon City TSP
Redland Road: Highway 213 – Abernethy Rd	Provide sidewalk along both sides.	$69,100	City of Oregon City TSP
Redland Road: Abernethy Rd – UGB	Provide sidewalk along both sides.	$685,400	City of Oregon City TSP
Swan Avenue: Forsythe Rd – Holcomb Blvd	Provide sidewalk along both sides.	$216,000	City of Oregon City TSP
Washington Street: Abernethy Rd – Highway 213	Provide sidewalk along one side.	$325,000	City of Oregon City TSP
Highway 213: I-205 – Molalla Ave	Redesign bike/ped intersections and enhance bike use between Redland Rd and the old 82nd Ave bridge.	$4,500	City of Oregon City TSP
Anchor Way: Redland Rd – Division St	Resurface and widen to accommodate 4-6-foot bike lanes in both directions.	$50,000	City of Oregon City TSP
Front Avenue: Forsythe Rd – Holcomb Rd	Provide striped bike lanes.	$4,000	City of Oregon City TSP
Holcomb Boulevard: Abernethy Rd – UGB	Provide striped bike lanes.	$15,000	City of Oregon City TSP
Swan Avenue: Forsythe Rd – Holcomb Blvd	Sign as a bike route.	$3,000	City of Oregon City TSP
Clackamas River Drive: Hwy 213 to UGB	Provide striped bike lanes.	$10,000	City of Oregon City TSP
Abernethy Road: Washington St – Redland Rd	Provide striped bike lanes.	$5,000	City of Oregon City TSP
Oregon City Transit Center – Clackamas Community College	Increase frequency of the existing service (Clackamas Community College to Oregon City Transit Center) from 30-minute headways to 10 or 15-minute headways on an existing bus route.	-	Tri-Met

Location	Project Description	Estimated Cost	Document Source
I-205: 99E – Highway 213	General purpose, express, HOV or peak period pricing capacity improvements to be determined based on I-205 South Corridor Study	$86,625,000	Metro 2004 RTP
Highway 213/Washington St	Grade separate southbound Highway 213 at Washington Street and add a northbound lane to Highway 213 from just south of Washington	$10,395,000	Metro 2004 RTP
Highway 213/Abernethy	Intersection improvements.	$3,465,000	Metro 2004 RTP
Highway 213/Beavercreek Rd	Grade separate existing intersection	$20,790,000	Metro 2004 RTP
I-205/Highway 213	Reconstruct southbound off-ramp to Highway 213 to provide more storage and enhance freeway operations and safety.	$1,155,000	Metro 2004 RTP
Highway 213 south of I-205	Corridor analysis to study long-term transit and road improvements	$577,500	Metro 2004 RTP
Abernethy Road: Highway 213 – Main St	Widen Abernethy from Highway 213 to Main Street.	$3,580,500	Metro 2004 RTP
Washington/Abernethy	Construct new two lane minor arterial with sidewalks and bike lanes.	$4,000,000	Metro 2004 RTP
Washington Street: Abernethy – 5th St	Complete boulevard design improvements.	$1,022,175	Metro 2004 RTP
Washington Street: Abernethy – Highway 213	Complete boulevard design improvements.	$1,524,600	Metro 2004 RTP
McLoughlin, Main, Washington, 7th, 5th, and neighborhood streets	Improve sidewalks, lighting, crossings, bus shelters and benches.	$1,155,000	Metro 2004 RTP
Oregon City Regional Center	Implement a transportation management association program with employers.	$200,000	Metro 2004 RTP

including funding for an Environmental Impact Statement (EIS) and preliminary engineering.for the I-205/OR 213 interchange.

The public transit system provides limited service to this low-density, suburban location. Additionally, the bicycle and pedestrian systems are incomplete, but plans exist to make incremental improvements. Until pedestrian, bicycle, and transit improvements are made, current conditions will make travel by these modes undesirable and will promote greater vehicular trip-making.

REFERENCES

1. Metro. RLIS Database. Accessed July 2006.
2. Tri-Met. July 27, 2006. http://www.trimet.org/schedules/buslines.htm.
3. Metro. 2001 Sidewalk Inventory. 2001
4. Transportation Research Board. Highway Capacity Manual. 2000.
5. Oregon Department of Transportation. 1999 Oregon Highway Plan. 1999.
6. Metro. 2004 Regional Transportation Plan. 2004.
7. ODOT. 2008-11 Draft Transportation Improvement Program. 2006.
8. Oregon City. Transportation System Plan. 2001.

Existing Conditions: Regulatory Framework

In December 2002, the Portland metropolitan regional government Metro approved an Urban Growth Boundary (UGB) expansion on the eastern edge of Oregon City, in the Park Place neighborhood. The approximate 300 acre site, combined with 180 acres that were brought into the UGB in the 1980s, forms the project area for the Park Place Concept Plan. Concept planning is a regional requirement that outlines the vision and strategies for establishing public facilities, transportation, land use, and urban form in UGB expansion areas designated for future urbanization.



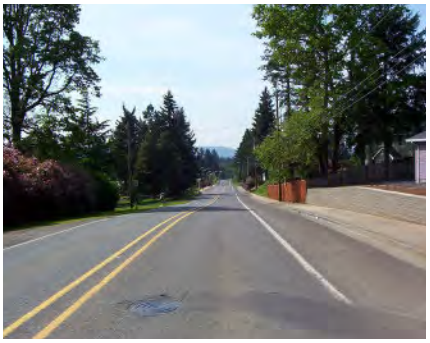
This section assesses the policies and regulations that the Park Place Concept Plan must comply with and implement. (A complete analysis of applicable goals, policies, and land use procedures is described in Appendix A.)

Metro Urban Growth Management Functional Plan

The whole foundation for concept planning is based on requirements established in Title 11 of Metro's Urban Growth Management Functional Plan ("Functional Plan"). Title 11 requires the following urbanization elements to be addressed. (See Appendix B for a detailed description of Concept Planning Requirements.)



- Annexation and urban services
- Minimum residential densities
- Affordable housing and needed housing types
- Commercial and industrial land needs
- Conceptual transportation planning
- Conceptual public facilities and services planning for sewer, water, storm water, parks, police, and fire protection
- Conceptual school facilities planning
- Natural resource protection/conservation planning



As a result, the concept plan should include a diagram that shows the locations of the following features.

- Constrained lands
- Protected/conservation lands
- Public facilities including transportation
- Single- and multi-family housing
- Commercial and industrial lands
- Mixed use areas
- Neighborhood centers
- Parks and open spaces

Urban Growth Management Agreement

The existing Urban Growth Management Agreement (UGMA) between Clackamas County and the City of Oregon City was adopted October 25, 1990. The UGMA guides coordination between Oregon City and Clackamas County for managing land inside the Oregon City UGB that is not yet incorporated into the city. This land is



bounded by the Urban Growth Management Boundary (UGMB). The Park Place project area is entirely UGMB land that is subject to the terms of this agreement.

Park Place Buildable Land Inventory Methodology

Title 11 of Metro's Urban Growth Functional Plan states that new urban area plans require a "provision for average residential densities of at least 10 dwelling units (du) per acre of net vacant buildable land in zones…" This average residential density is only applicable to areas recently added to the urban growth area. This section established the number of units required in the larger study area and defines the term "buildable lands" for the Park Place Concept Plan. This includes outlining a strategy for determining which lands within the project area qualify as "buildable lands."

Based upon the Buildable Lands Analysis, described in Table 1, for the Livesay area and the aforementioned UGB expansion area, 1465 housing units need to be considered as part of this concept plan. Per the direction of Metro, these units can be distributed throughout the study area. Implementation of this residential density, within the study area, is dependent upon the comprehensive plan designations and zoning that is developed as part of this planning process.

For this study, buildable land is defined as land that is suitable for development or redevelopment. Briefly, the methodology for determining suitable lands in the Park Place project area is as follows:

Vacant Land + Redevelopable Land - Constrained Land - Other Land = Gross Buildable Land

Definitions

Vacant Land is sourced through Metro's Regional Land Inventory System (RLIS). This process, outlined in detail in Chapter 4 of the *2002-2022 Urban Growth Report: A Residential Land Need Analysis*, defines vacant land as tax parcels with no improvement value or buildings, and partially-vacant land as parcels with an undeveloped portion of a lot that is larger than one-half acre. In this context, vacant land is simply that. It does not indicate whether the parcel is buildable or marketable.

Redevelopable Land is defined as non-vacant land that meets redevelopment thresholds established by the market professional. The primary assumption is that all properties with a square foot value (SFV) of $10/sf or less is a candidate for redevelopment. This is based upon recent land transactions which indicate a value in excess of $10/sf. for commercial (retail and office) land and approaching $10/sf for residential property. The SFV is derived by dividing the total market value of the property by the total area of the site (market value/area = $/sf).

Constrained Land is land that is considered environmentally-sensitive and/or has limited or no redevelopment potential. Constrained lands considered unbuildable for inclusion in the buildable lands inventory are:

- Class I and II Riparian Habitat areas [recognized as "High" and "Moderate" Habitat Conservation Areas (HCA) by Metro]
- Steep slopes – Slopes greater than 25%
- Major easements
- Other Land is defined as land that has cultural and/or historic value. The category is also open to land that may be omitted from the buildable inventory for reasons not currently apparent.

Buildable Land Summary - Livesay Area

		acres	
+	Vacant land (1)	129.5	
+	Redevelopable Land (2)	42.1	171.6
	Development Base aggregate	*171.6*	
-	25% > slopes (3)	37.2	
-	Habitat Conservation Areas (4)	11.5	48.7
-	Right-of-way needs (5)	22.1	122.9
-	Stormwater facilities (6)	3.1	
-	Civic uses (7)	4.3	
-	School area	n/a	
-	Historic properties - listed landmark (8)	1.66	
-	Easements		
	Total buildable land	91.7	
	at R-10 zoning density (4 du/acre)	367	units

Notes:

(1) RLIS database inventory (2006) clipped to Livesay area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

(6) 2.5% of "buildable" land as determined by Clackamas County (ibid)

(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"

Net Buildable Lands Summary - UGB Expansion Area

		acres	
+	Vacant land (1)	208.36	
+	Redevelopable Land (2)	38.54	246.9
	Development Base aggregate	*246.9*	
-	25% > slopes (3)	70.1	
-	Habitat Conservation Areas (4)	33.3	103.4
-	Right-of-way needs (5)	25.8	143.5
-	Stormwater facilities (6)	3.6	
-	Civic uses (7)	5.0	
-	School area	n/a	
-	Historic properties - listed landmark (8)	0	
-	Easements		
	Total buildable land	109.1	
	Required minimum density (10 du/acre)	1091	units

Notes:

(1) RLIS database inventory (2006) clipped to expansion area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

(6) 2.5% of "buildable" land as determined by Clackamas County (ibid)

(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"



Table 1.



Gross Buildable Area and Net Buildable Area

Since the residential density is based on "net buildable land," it is necessary to convert gross buildable land to net buildable land to account for land needs for new roadways, sewer infrastructure, other public facilities, and civic institutions (i.e., churches, fraternal organizations, etc.) This planning process proposed using a methodology similar to that used for the Damascus-Boring Concept Plan, which allocates percentages of the gross buildable land for these services based on past performance, professional judgement, and community input. We proposed the following percentages to accommodate land needs for new infrastructure:

- New Local Streets – 18%
- Storm Drainage – 2.5%
- Police, fire, and civic institutions – 3%

The total percentage of land deducted from the gross buildable area is 23,5%. Therefore, the equation for net buildable land is:

- Gross Buildable Land – (23.5% of Gross Buildable Land) = Net Buildable Land

Oregon City Comprehensive Plan

Concept Planning for Park Place must comply with Oregon City's Comprehensive Plan policies if the area is to be approved for annexation to the city. The policies of the following goals generally apply to the Park Place Concept Plan and project area. Brief commentary is offered for some of the goals below.

- Goal 1, Citizen Involvement

The Park Place Concept Plan involves forming a citizen advisory committee, which is scheduled to meet six times between May and December 2006. Three community forums addressing the evaluation criteria are scheduled between June and October 2006. A design charrette for the Draft Concept Plan will be held in October 2006. Another community forum is scheduled for in November 2006 in order to discuss implementation strategies. Finally, a series of six Planning Commission presentations are scheduled from December 2006 to April 2006. The Park Place Concept Plan hosts its own website, which is accessible through the City's Planning Department web page.

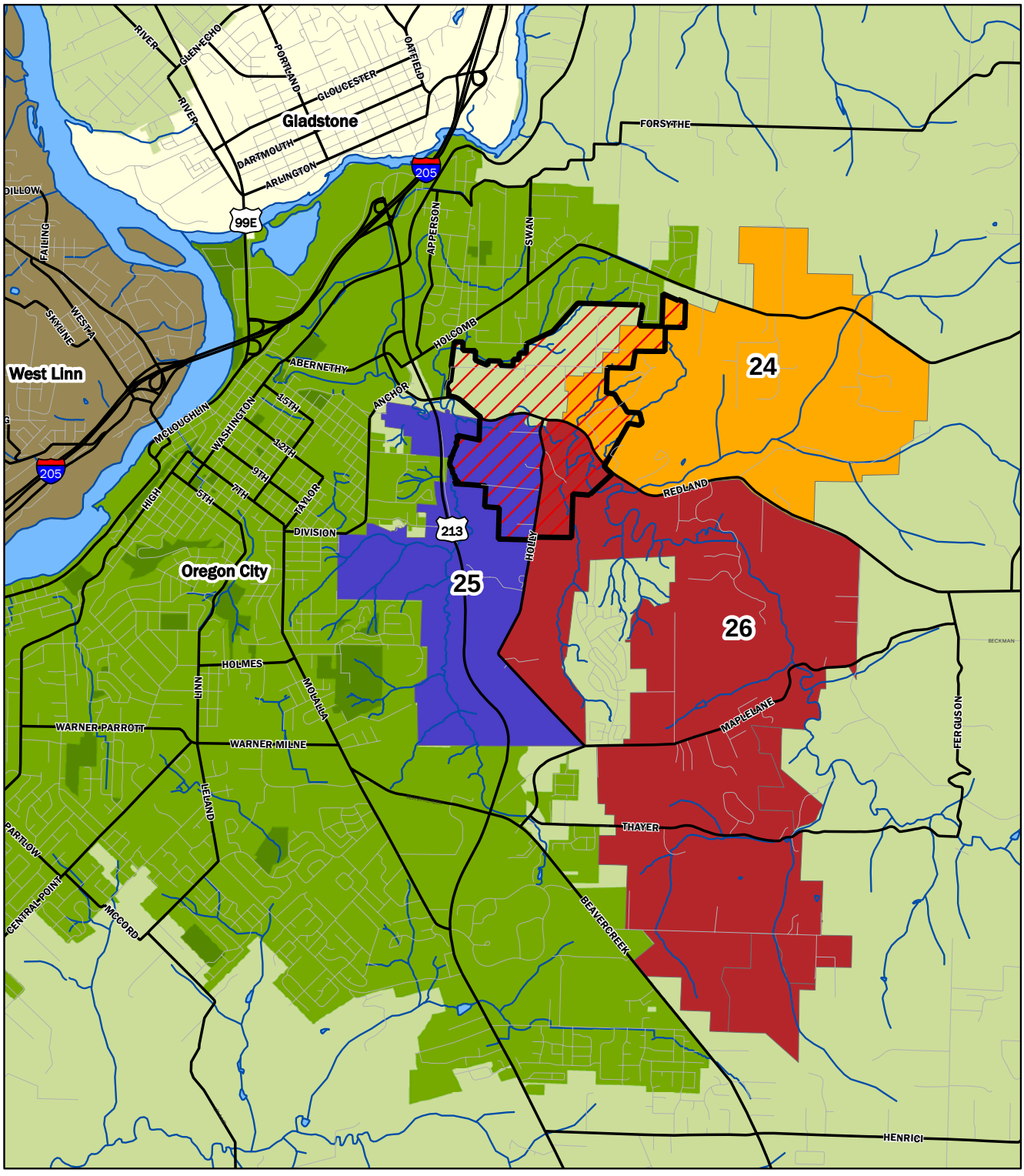
The Park Place Neighborhood Association provides a means of public participation specifically for the Park Place project area.

- Goal 2, Land Use

Presently, the Park Place project area is part of unincorporated Clackamas County, and is designated for Low Density Residential, Forest, and Rural uses according to the County's Comprehensive Plan. The City's Comprehensive Plan designates the project area as Low Density Residential (LR) and Future Urban (FUH). Existing Comprehensive Plan designations in parts of the city adjacent to the project area include Low Density Residential (LR), Medium Density Residential (MR), and a small area of Mixed Use Corridor (MUC).

Zoning classifications for Park Place may both draw from existing classifications and modify existing classifications to create new zones.

- Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources



Source: Oregon City GIS, 2006; RLIS 2006

Oregon City
Gladstone
West Linn
Clackamas Co.
project boundary
Alternative 24
Alternative 25
Alternative 26

Park Place Concept Plan

Context: Area Zoning

0 0.4 0.8 1.2
Miles



Concept planning requires that an inventory and protection strategies be prepared for Goal 5 natural and cultural resources in the Park Place project area. The Comprehensive Plan indicates that Park Place is one of a few areas in Oregon City that has older homes and structures that need to be examined for historic identification, preservation, and renovation before they deteriorate and are torn down. The Park Place project area contains parts of Abernethy Creek, Tour Creek, and Newell Creek. Metro's 2002 Alternatives Analysis for Study Areas 24, 25, and 26 identified the area around these creeks and other land as potential Goal 5 natural resources in need of some level of protection.

- Goal 6, Quality of Air, Water, and Land Resources
- Goal 7, Natural Hazards
- Goal 8, Parks and Recreation

Oregon City prepared a Park and Recreation Master Plan in 1999, which is reviewed later in this report. The master plan may be updated to reflect park and recreation facilities that Park Place will need.

- Goal 9, Economic Development

Concept planning requires that sufficient commercial and industrial opportunities be provided in the project area, given the area's 2040 Growth Concept design types. The Economic Development Technical Report prepared for the City's 2004 Comprehensive Plan found that the City as a whole had the capacity to accommodate 8,370 employees, which was 75% of the 11,172 employment target.

The report recommended adding one- to two-acre neighborhood commercial areas (generating roughly 10-15 employees each) to serve under served residential areas and to help increase the employment capacity within the city. The Park Place project area is not a likely candidate for industrial development due to the constrained nature of the land and the planning of the Beavercreek Road area, southeast of the City for industrial development.

- Goal 10, Housing

Concept planning will need to demonstrate how Park Place will provide housing that is affordable to households with incomes at or below the area median income, without the use of public subsidy.

The City's Comprehensive Plan Housing Resource Document (October 2002) found that the City's existing land supply was deficient by 1,444 units in order to accommodate the demand for 6,075 new units by 2017. These needed units are split between 10 single-family units and 1,434 multi-family units.

- Goal 11, Public Facilities

The Park Place Concept Plan will be required to provide conceptual facilities and service plans for sewer, water, storm water, transportation, parks, police, and fire/emergency services. Preliminary cost estimates and implementation strategies must be a part of the conceptual plans.

The Park Place project area consists of portions of Study Areas 24, 25, and 26, and Metro's 2002 Alternatives Analysis evaluated these study areas to assess for how easy it would be to provide them with water, sewer, and stormwater services.

Stormwater services in all the study areas were judged to be easy to serve from the perspective of service provider Clackamas County Water Environment Services because the facilities would be provided by developers on a per-project basis. Area 24 was determined to be moderately difficult to serve with both water and sewer. Sewer service in Area 25 was also deemed to be moderately difficult to provide, while water service would be easy to provide. Area 26 was also deemed to be easy to serve with water, but difficult to serve with sewer.



- Goal 12, Transportation
- Goal 13, Energy Conservation
- Goal 14, Urbanization

The goals and policies of Goal 14 in the Oregon City Comprehensive Plan directly address concept planning requirements including Goal 14.3 – Orderly Provision of Services to Growth Areas and Goal 14.4 Annexation of Lands to the City.

Oregon City Municipal Code

Municipal code sections addressing zoning, design standards, master plans, subdivisions, and legislative procedures can be viewed online at: http://www.orcity.org/community-develop/planning/New_Code/New_Code.htm. Zoning and other pertinent regulations are described in Appendix A.

Zoning

Once incorporated into the City, the Park Place project area will receive a full set of City zoning designations. Existing City zoning and Comprehensive Plan designations of city land adjacent to the project area are primarily residential (Low Density Residential, R-10, R-8, and R-6, to Medium/High Density Residential, R-3.5) with a small area of mixed use (Mixed Use Corridor, MUC-1). A range of residential zones will need to be employed in Park Place in order to achieve the target of an average of 10 dwelling units per net buildable acre in the new UGB expansion portion of the Park Place project area. Commercial or mixed use zoning will be necessary to site businesses that can serve housing in the project area.

Lot Standards and Use Standards

Lot standards and use standards for all the residential zones (R-10, R-8, R-6, R-3.5, and R-2), commercial and neighborhood commercial zones (C and NC), and mixed use commercial zones (MUC-1 and MUC-2) that may be used in the Park Place project area are provided in the Land Use and Development Standards Tables located in Appendix B.

In considering commercial zoning for the Park Place project area, it is to be noted that mixed use commercial (MUC-1 and MUC-2) zoning is more permissive of different types of housing than is the neighborhood commercial (NC) zone. The MUC-1 zone, for instance, allows existing single-family detached units, single- and two-family attached units, and multi-family units whereas the NC zone only allows dwelling units as limited uses above permitted and conditional uses.

Other Regulations and Standards

The City's Code regulates the following aspects of development that may apply to the Park Place project area at different points in its planning and development process.

- Design standards (Section 17.20.030)
- Development application review (Chapter 17.50)



- Site plan and design review (Chapter 17.72)
- Master planning (Chapter 17.65)
- Subdivision (Chapters 16.08 and 16.12)
- Legislative hearing process (for Comprehensive Plan amendments) (Section 17.50.170)
- Annexations (Section 14.04.050)

Oregon City Transportation System Plan

The Park Place Concept Plan will be required to provide conceptual transportation and street plans that are consistent with the local Transportation System Plan (TSP), the Regional Transportation Plan (RTP) and the Oregon Transportation Planning Rule (TPR). Preliminary cost estimates and implementation strategies must be a part of the conceptual plans.

The conceptual transportation plan should be guided by the goals that the City's TSP establishes for multi-modal travel options, safety, capacity, and implementation.

Transportation Standards

The conceptual transportation plan must be compatible and consistent with different standards and guidelines instituted by the TSP, including functional classifications, design standards, and access management. Parking space requirements are determined according to land use, and those are presented in Table 5-14 of the TSP. Functional Classifications

- Highway 213 is classified as an expressway in City's TSP and as a freeway/ expressway in the County's TSP.
- Holcomb Road is classified as a minor arterial in the City's TSP and as part minor arterial and part collector in the County's TSP.
- Redland Road is classified as a minor arterial in the City's TSP and as a major arterial in the County's TSP.
- Holly Lane is classified as a minor arterial in the County's TSP.
- All other roads in the project area are classified as local roads.

Metro's 2004 Regional Transportation Plan (RTP) also assigns its own sets of classifications to Highway 213 and Redland Road, with the exception of a public transportation designation.

General street design standards by functional classification are provided in Figures 5-2A and 5-2B of the City's TSP (see Appendix A). The TSP reports that design and access standards required by the RTP will be incorporated into the Oregon City Street Design Standards Manual, which is adopted separately from the TSP.

Access Management

Tables 6 and 7, included in Appendix A, provide standards for intersection and access/driveway spacing in the city. (See Appendix A.)

Planned Roadway, Pedestrian, Bicycle, and Transit Projects

Conceptual plans for streets and transportation in the Park Place project area should also be compatible with improvements planned for the vicinity. Table 8, included in Appendix A, presents roadway, pedestrian, bike, and transit projects planned for the vicinity around the Park Place project area. (See Appendix A.)

Clackamas County's Capital Improvement Program 2006/07-2010/11 includes one

project in the Park Place project area vicinity.



- Project 707 – Holcomb Boulevard Pedestrian Enhancement Program; Highway 213 to the UGB; Proposed Phase 1: Design pedestrian Improvements to fill in gaps in sidewalks; City of Oregon City and Clackamas County 50/50 partnership; Project Development 2006/07-2007/08.

Oregon City Trails Master Plan

Parks and transportation plans for the Park Place Concept Plan must incorporate the goals and projects established in the 2004 Oregon City Trails Master Plan. Contracting for an update of the plan is currently underway. Existing master plan goals address trail development and regional connections, access, transit synergy, community linkages, amenities, maintenance, emergency access, and preservation of rights-of-way, scenic views, and natural areas.

The master plan is linked through the City's Planning Department web page, including a map of proposed trails. The map depicts three levels of trails proposed for the Park Place project area and vicinity.

- Regional trails are proposed on the western edge of the project area, east of Highway 213, associated with Newell Creek. The trail forks at Ogden Middle School, where one fork continues south and the other heads east on Donovan to Holly and then south.
- A community trail is proposed trail along Abernethy Creek and Redland Road through the middle of the project area.
- Several local trails are proposed associated with streams in the project area.

Table 12 in the master plan presents the design standards established for the three types of trails. (See Appendix A)

Oregon City Park and Recreation Master Plan

The City of Oregon City is currently updating its Park and Recreation Plan. Currently, the 1999 Oregon City Park and Recreation Master Plan addresses the following types of parks and recreation spaces being planned for the city.

- Mini-parks
- Neighborhood parks
- Community parks
- Regional parks
- Linear parks
- Special use areas
- Natural open space areas
- Undeveloped lands
- Pathways and trails
- Specialized recreational facilities
- Indoor recreation facilities
- Sports field facilities

The master plan includes a needs assessment, standards, and guidelines for each



type of park in Oregon City. The plan provides both conceptual maps of neighborhood and community park service areas and a map of specific proposed park and recreation facilities. Per Table 13, new facilities and facility improvements planned for the Park Place project area and vicinity include the following (see Appendix A):

- Neighborhood Parks – N-3 Holcomb School/Park (proposed), N-5 Park Place Park (existing), N-8 Livesay Park (proposed);
- Community Parks – Holcomb Road Park (proposed); and
- Natural Open Space Areas – Redland Road (proposed), Abernethy Creek (proposed), Newell Creek Canyon (existing).

Regional Facilities

Existing natural park and open space in the project area vicinity that is managed by Metro is located in Newell Creek Canyon. Metro is also sponsoring a bond measure for the November 2006 election that proposes to acquire or assist in acquiring three areas in the Park Place project area. The bond measure includes funding for acquisition of land along Abernethy Creek and Holcomb Creek as well as and further acquisition along Newell Creek.

Conclusion

Development of a Concept Plan fulfills regional planning requirements as established in the Metro 2040 Plan and Urban Growth Management Functional Plan. These regional plans as well as local comprehensive plans and codes are responsible for complying with and implementing Statewide Planning Goals.

The Concept Plan must include the following elements: governance, housing plans (including minimum density, diversity, and affordability), commercial and industrial land uses as needed, a conceptual transportation plan, a natural resources and protection plan, a public facilities plan, and a plan for public schools. Conceptual plans for these elements must reflect and account for policies and projects established in the City's Comprehensive Plan, Transportation System Plan, Trails Master Plan, and Parks and Recreation Master Plan. Ultimately these element plans will be presented as a report and illustrated in an Urban Growth Diagram.

Following adoption of the Concept Plan and any necessary plan amendments by City Council, the next step in the process is for the City to determine the appropriate Comprehensive Plan designations based on the Preferred Concept Diagram and to develop an Annexation Strategy. Once areas of the Park Place study area are annexed, the City will then adopt zoning according to the Comprehensive Plan Designations. It is anticipated that the majority of the study will remain low density, which is compatible with existing uses and development patterns. In order to meet the growth target of 1,465 housing units as established in the Buildable Land Summary, zoning in the study area will need to include higher density residential designations (e.g. R-3.5 and R-2) and mixed-use designations (e.g. MUC-1 and MUC-2). In addition, new high density, mixed-use, or overlay zones may need to be developed or existing zones may need to be modified in order to meet growth targets and implement the type and intensity of development that is envisioned in the Preferred Alternative. The Preferred Alternative will be developed at the public charrette, in October.

Resources

1. Metro Urban Growth Management Functional Plan - Title 11
2. Urban Growth Management Agreement
3. Oregon City Comprehensive Plan - Policies from Goals 1, 2, and 5-12
4. Oregon Municipal Code – Zoning, design standards, master plans, subdivisions, administration and procedures (comprehensive plan amendments), and annexations
5. Oregon City Transportation System Plan
6. Oregon City Trails Master Plan
7. Oregon City Park and Recreation Master Plan
8. Housing Resource Document for the City of Orgogn City Comprehensive Plan.
9. Oregon City School District future needs assessment (pending)

Water Infrastructure







The purpose of this memo is to provide existing condition information for water, sanitary and stormwater infrastructure as well as Goal 5 resources for the Park Place UGB Concept Plan area. The memo has been organized into the following sections:

A. Study Area Overview
B. Summary of Documents Reviewed
C. Water Infrastructure Existing Conditions
D. Sanitary Sewer Infrastructure Existing Conditions
E. Stormwater Infrastructure Existing Conditions
F. Goal 5 Resource Existing Conditions

A. STUDY AREA OVERVIEW

The project study area is roughly bounded on the west by Newell Creek and on the northwest by Livesay Creek. Both are tributaries of Abernethy Creek. The south and west sides are irregularly bounded as shown on the attached maps. The area is generally sparsely developed with the greatest existing development in about ½ acre to 3 acre lots along Livesay road and on the west side of Holly Lane. The character of the terrain is variable with slopes exceeding 25% near the major streams and a few smaller drainages. In addition large areas exist with slopes of less than 10%.

B. WATER INFRASTRUCTURE EXISTING CONDITIONS

Water Supply

Overview of Water Supply System

Wholesale water is currently supplied to the Park Place Concept Plan area by South Fork Water Board (SFWB) which is jointly owned by the cities of Oregon City and West Linn. SFWB treats the water in a plant at Hunter Avenue and Thurman Street, and has rights to withdraw 42.6 MGD at the existing intake, with an estimated maximum withdrawal rate of 52 MGD. The cities of Oregon City and West Linn purchase water from SFWB for distribution and storage within each municipal utility.

Capacity of Water Supply System

According to the Oregon City Water Master Plan, adequate water supply capacity exists to serve the study area under current development conditions. Regarding future development conditions, adequate water supply capacity appears to exist as well based on the development assumptions of the Water Master Plan. Future concept planning efforts in the Park Place area should coincide with the development assumptions of the Oregon City Water Master Plan.

Water Distribution

Distribution System Overview

The Livesay portion of the Concept Plan area is served by the Oregon City water distribution system. Much of the Concept Plan area has no current water service – either from private wells or from public distribution systems or districts. The Oregon City Water Master Plan includes recommended improvements to provide retail water service to the Concept Plan area.

The Clackamas River Water District (CRW) purchases water from the SFWB and distributes it to areas primarily south and east of the Concept Plan area. Oregon City's



water system currently serves the Livesay Road area from the Livesay Road Pump Station with 6-inch diameter pipes. Clackamas River Water currently serves the unincorporated portion of the study area south of Abernethy Creek.

The Water Master Plan does not provide detailed information about the existing pipe system, but it does show pipes in Redland Road, Donovan Road, and in Holly Lane. One pipe system passes in a southeasterly direction across the area and provides water to an unincorporated area that includes the Canyon and Country Village Pressure Zones to the southeast – outside of the study area.

The area of this concept plan encompasses 4 different pressure zones (as shown in Figure 2-8 from the master plan). Most of the Park Place Concept Plan area is in the Park Place Lower Zone. In addition, the northeast portion of the study area includes the following pressure zones: The entire Livesay Road Pressure .Zone, a portion of Park Place Intermediate Zone, and a portion of Park Place Upper Zone.

The master plan identifies the Park Place Lower Zone as including an already developed area to the north plus the majority of the area for this study on its south end. As can be seen on Figure 2-8 from the master plan, the recent UGB expansion area constitutes about 1/3 of the future Park Place Lower Zone. Future development (including full buildout of the Livesay Road area) will more than double the developed area in Park Place Lower Zone.

Currently water demand in Park Place Lower Zone is split between Barlow Crest Reservoir and Mountainview Reservoir. While Mountainview has ample storage capacity (10.5 million gallons) for both existing and future demand, Barlow Crest reservoir (1.75 mg) will ultimately require expansion. According to the master plan, complete buildout will require 3.23 million gallons of capacity at Barlow Crest.

The main pump station that will serve the area is the Hunter Avenue Station. It has a pumping capacity of 2,700 gpm in 3 pumps. Its primary purpose is to fill the Barlow Crest Reservoir which serves a large area of existing development as well as the proposed development area. The only other pump station in the area is the one at Livesay Road which serves only a small and sparsely developed area. It has a pumping capacity of 30 gpm.

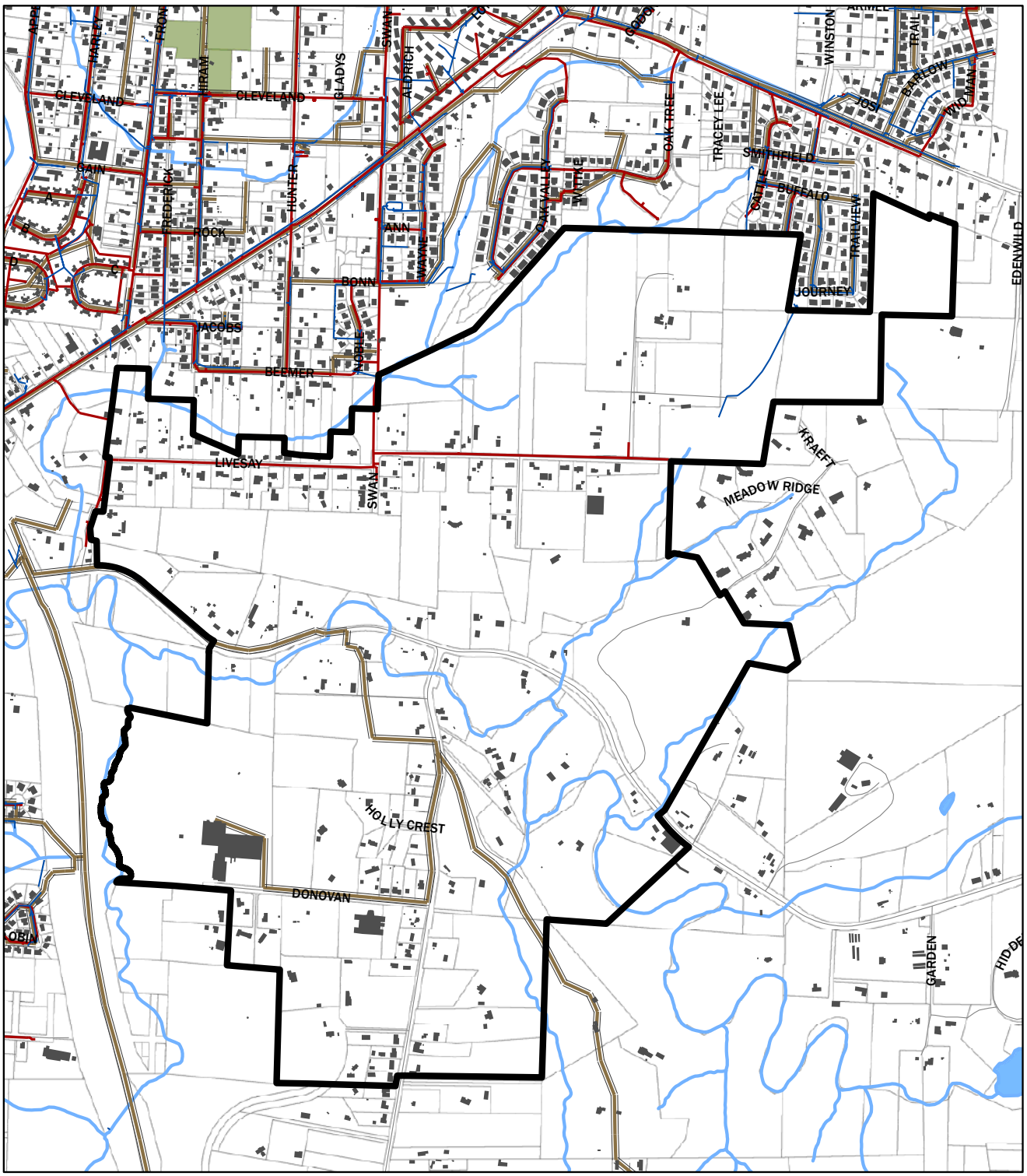
Capacity of Water Distribution System

As noted before, limited water service is provided within the Concept Plan area. The current distribution system is adequate to serve existing development. Moreover, it is assumed that the CRW transmission mains are adequate to serve existing and future development outside the Concept Plan area.

Storage

The Oregon City Water Master Plan states that Oregon City's existing system contains a storage capacity of 16.25 million gallons for treated water. This is adequate for current levels of demand. It also states that existing treated water storage capacity will be adequate during much of the build-out period. However, ultimately expansion of the Barlow Crest Reservoir will be necessary.

Fire flow capacities in the Park Place Lower Zone will eventually will need to be enhanced in the higher elevation areas. The Water Master Plan suggests construction of a new reservoir south of the UGB expansion area on Holly Lane to address this need.



Source: Oregon City GIS, 2006

sewer line water line stormwater line buildings

Park Place Concept Plan
Infrastructure: Existing Utilities

0 0.1 0.2 0.3
Miles



Pumps

There is currently a pump station at Livesay Road that the Oregon City Water Master Plan recommends be decommissioned. According to Oregon City, this pump station is small and experiences frequent operations and maintenance issues and lacks fire flow capacity. A future distribution system extension will incorporate the Livesay Road Pressure Zone into the Park Place Intermediate Zone.

Distribution

The Oregon City Water Master Plan indicates that the Oregon City water pipes (6-inch) currently serving the Livesay Road area from the Livesay Road Pump Station will be replaced. In addition, the Oregon City Water Master Plan notes that it is likely that upgrading much of the Clackamas River Water system pipes will be required.

C. SANITARY SEWER INFRASTRUCTURE EXISTING CONDITIONS

Sanitary Sewer Treatment System

Capacity of Sanitary Sewer Treatment System

Tri-Cities Sewer District (TCSD) provides sanitary sewer interceptor service and treatment for the most developed areas south of Redland Road and for a portion of the Livesay Road area. TCSD owns and operates the existing pipe system which consists of an interceptor line and a small collection system. Oregon City provides sanitary collection service within City limits. According to Oregon City, the small collection system owned by TCSD is remnant from disorderly annexation. Their interceptor system provides essential infrastructure to convey sanitary sewerage to the treatment plan. The interceptor line runs generally south to north down highway 213 as far as Redland Road. The collection system includes a pipe in Donovan Road, connecting to a pipe in Holly Lane and Redland Road. One branch passing through the study area connects incorporated areas located to the southeast.

The Oregon City Sanitary Sewer Master Plan does not include information on the capacity of the existing Tri-Cities Treatment Plant. However, according to TCSD the treatment plant has capacity to service the Concept Plan area.

Sanitary Sewer Collection System

Capacity of Sanitary Sewer Collection System

The Oregon City Sanitary Sewer Master Plan indicates that there are no existing collection pipes in the Concept Plan area. As such, a sanitary collection system will need to be constructed as the area develops. The Oregon City Sanitary Master Plan does include a projection of future flow at build-out (3.48 cfs). The master plan also identified Area E-5, which is essentially the same as the 2003 UGB expansion area, will be served entirely by the existing TCSD interceptor.

No specific recommendations were made for future sanitary infrastructure within area E-5, as the Master Plan only dealt with then existing Oregon City infrastructure. However, its clear that additional collection and trunk lines will be required to serve new development in the Concept Plan area. According to the Oregon City Sanitary Sewer Master Plan, the following future development assumptions were made:

- Full “buildout” will occur in 2024 based on a 3% annual growth rate.
- An average of 2.3 residents per dwelling unit was assumed for residential areas.
- 25% of the land area is used for infrastructure and parking. The remaining land was assumed to be developed as follows: 10% commercial, 10% industrial, 30% residential (RA-2), and 50% residential (R10).

D. STORMWATER INFRASTRUCTURE EXISTING CONDITIONS



There appears to be no major surface water infrastructure in the study area other than roadside ditches and natural drainage channels. However, one storm outfall line passes through the area to drain a development just outside of the study area's northeast corner.

The area is drained by Abernethy Creek flowing generally east to west through the middle of the area and two of its tributaries, Newell Creek on the west, Livesay Creek on the northwest. Wetlands have been identified along several areas near Abernethy Creek. Abernethy Creek and Newell Creek are subject to occasional flooding; however, no significant flood damage is known to have occurred in the study area. The 1996 flood was the most severe in recent history. Within the study area, the 1996 event primarily impacted undeveloped areas along Abernethy Creek causing little if any property damage.

City of Oregon City – Drainage Master Plan, January 1988

Only one small portion of the study area is included in this master plan. This is the Livesay Creek drainage basin that partially overlaps into the study area. One drainage issue was identified for this basin: The master plan recommended replacement of the Livesay Creek culvert under Redland Road. It is not stated that any damage has been caused by this apparently under-sized culvert. The culvert itself is outside of the study area boundaries. It is not clear whether any backwater effects from the under-sized culvert affect properties in the study area.

City of Oregon City – Draft Stormwater Managemet Plan, 2006

This document was created primarily to address water quality issues to meet the requirements for the NPDES MS4 permit. This document provides a general outline of how the city will apply best management practices (BMPs) to address stormwater pollution issues. The BMPs discussed include various street and storm system maintenance measures; water quality educational programs; prevention of illicit discharges; and pollutant monitoring. It is relevant to the current study in that these same BMPs will need to be applied to the study area as it develops.

City of Oregon City – Stormwater Grading and Design Standards, December 1999

This document spells out the City's requirements for site grading and for design of stormwater quality and quantity control (detention and infiltration) systems. These requirements are intended to mitigate the hydrologic and water quality impacts of creating new impervious surfaces. Upgrades These same requirements will also apply to new development in the study area after it is annexed into the city.

E. GOAL 5 NATURAL RESOURCES EXISTING CONDITIONS

In September 2005, the Portland metropolitan regional government Metro approved the Nature in Neighborhoods ordinance that is designed to help local communities meet the requirements of Statewide Planning Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources. By approving the ordinance, Metro adopted a new title (Title 13, "Nature in Neighborhoods") to the Urban Growth Management Functional Plan, amended the Regional Framework Plan, and adopted a model ordinance for use by cities and counties. The ordinance relies on voluntary, incentive-based approaches for development in upland areas and will use regulation to protect the region's highest value streamside habitat, which has been designated as "habitat conservation areas."

This section addresses these habitat conservation areas in the Park Place Concept Plan project area through a discussion of the maps that form the basis of Metro's



fish and wildlife habitat protection program. The maps include the Regionally Significant Fish and Wildlife Habitat Inventory map (the "Inventory Map") and the Habitat Conservation Area ("HCA") map.

Regionally Significant Habitat Inventory Map
("Goal 5: Environmental Resources")

The Goal 5 inventory process began in 1999 as part of the draft Streamside CPR (Conservation, Protection, and Restoration) Report. The Water Quality and Flood Management map, adopted as part of Metro's Urban Growth Management Function Plan (Title 3) served as the starting point, or base map, for the Regionally Significant Habitat Inventory Map. A habitat is an area that provides food and shelter for fish and wildlife. The Inventory Map identifies those areas that Metro has determined are of greatest significance, called "regionally significant habitat," and includes riparian areas (i.e., the land and vegetation adjacent to waterbodies such as streams, river, wetlands and lakes), wildlife habitat, and parks and open spaces.

Metro took an ecological functions approach to define the riparian corridor and identify upland wildlife habitat. An extensive review of the scientific literature, mapping and field work served to develop two sets of criteria to identify the location and health of fish and wildlife habitat, one for riparian habitat and one for drier upland wildlife habitat.

Riparian corridor ecological functions and criteria for GIS model scoring:

- Microclimate and shade
- Streamflow moderation and water storage
- Bank stabilization, sediment, and pollution control
- Large wood and channel dynamics
- Organic matter input

Wildlife habitat characteristics and criteria for GIS model scoring:

- Habitat patch size
- Habitat interior
- Connectivity and proximity to water resources
- Connectivity and proximity to other patches
- Habitats of concern and habitats for unique and sensitive species (sites known to be critical for sensitive species or to be scarce and declining in the Metro region)

In 2001, Metro began the effort to map the specific landscape features associated with these criteria, such as stands of trees, woody vegetation, meadows, wetlands, stream centerlines, steep slopes, and flood areas. The methodology assigned values to fish and wildlife habitat features that allowed comparison of their cumulative health and importance. Areas that received a score of one to 30 were identified as regionally significant resources. Metro differentiated its inventory of regionally significant fish and wildlife habitat by type (riparian/wildlife and upland wildlife) and quality (high-, medium-, and low-value), creating six habitat categories (Riparian Class I, II and III, and Upland Wildlife Class A, B and C). Each category covers a geographically discrete portion of the inventory, and may include riparian and/or wildlife functions and also may be a "habitat of concern." The Inventory Map also identifies "impact areas" that define where allowed land uses or activities could harm the fish and wildlife habitat, which focuses primarily on two aspects of the Goal 5 natural resource inventories: primary functional criteria for streams and waterbodies, and tree root-zone protection. This map was updated in September 2004.

Habitat Conservation Areas Map



The Habitat Conservation Area Map ("HCA Map") is the graphic representation of the culmination of Metro's Goal 5 process and identifies the highest value streamside habitat that will be subject to regulatory performance standards and best management practices.

The Goal 5 process generally follows three steps. The first is to identify regionally significant fish and wildlife habitat, which Metro completed in 2002 with the Inventory Map. The economic, social, environment and energy (ESEE) analysis is the second step. This step applies the tradeoffs associated with allowing, limiting, or prohibiting conflicting uses, such as a land use or activity that could adversely affect a significant Goal 5 resource, with the need to protect significant natural resources. The third step is development of a program to protect significant fish and wildlife habitat.

Metro's approach for conducting a region-wide ESEE consequences analysis focused on achieving the goals of the 2040 Growth Concept. Metro's ESEE Analysis consisted of four steps that included: (1) identification of conflicting uses from a regional perspective (using seven generalized regional zones) and considering Metro's 2040 design type hierarchy, (2) identifying the "impact area" surrounding the significant resources, described above, (3) analyzing the ESEE consequences, and (4) determining whether to allow, limit, or prohibit conflicting uses for significant resource sites.

Metro weighed and considered the many factors for and against allowing, limiting, or prohibiting conflicting uses within the most significant resources to make a balanced "Allow, Limit, Prohibit" (ALP) Decision that seeks to conserve and preserve the highest value and most critical habitat (Class I and II riparian habitat), ensure that the Metro region's economy continues to thrive, protects and improves the region's water quality and prevents water pollution, and respects property rights. Metro found that none of the significant resources are of such importance relative to conflicting uses to support a decision to prohibit such conflicting uses, and is not limiting development in wildlife habitat because the economic and social impacts of such a decision, as well as the impact on meeting the region's housing and employment needs, would be too significant compared with the value of such protections. Instead, Metro is developing aggressive non-regulatory programs to conserve and preserve such habitat.

The resultant HCA Map therefore illustrates the areas in the region that are subject to the performance standards and best management practices described in Section 4 of Title 13 "Nature in Neighborhoods." Highly ranked riparian habitat areas within the current urban growth boundary were identified as "habitat conservation areas" and will be subject to high, moderate, and low levels of conservation based on habitat value or quality and urban development value per the results of the ESEE consequences of protecting or not protecting the habitat, public input, technical review, and Metro's decision to balance conflicting uses in habitat areas.

The Habitat Conservation Areas (HCA) disturbance area limitations are identified in Section 6 of the Title 13 ordinance. These include:

- Single-family residential – Maximum disturbance area (MDA) allowed within HCAs is determined by subtracting the area of the lot or parcel outside of the HCAs from the total disturbance area (TDA) calculated below [TDA – Area outside the HCA = MDA]



HCA Total Disturbance Area Limitations for SFR	
HCA Type	**Total Disturbance Area**
High	50 percent of the lot area, up to a max of 5,000 sq. ft.
Moderate/Low	65 percent of the lot area, up to a max of 6,000 sq. ft.

- All other zones – Maximum disturbance area (MDA) allowed by right within Low, Moderate and High HCAs in these zones are noted; this MDA is subject to mitigation requirements iterated below.

HCA Disturbance Area Limitations for all zones other than SFR	
HCA Type	**Total Disturbance Area**
High	10 percent of HCA on site
Moderate	15 percent of HCA on site
Low	50 percent of HCA on site

- Mitigation requirements for disturbance in HCAs – Tree replacement and vegetation planting are required when development intrudes into an HCA, except for wetlands and waterway mitigation requirements imposed by state and federal law.

  Trees, shrubs and ground cover must be native plants selected from the Metro Native Plant List. Must meet Mitigation Option 1 or 2, whichever results in more tree plantings; except that where the disturbance area is one acre or more, Mitigation Option 2 must be used.

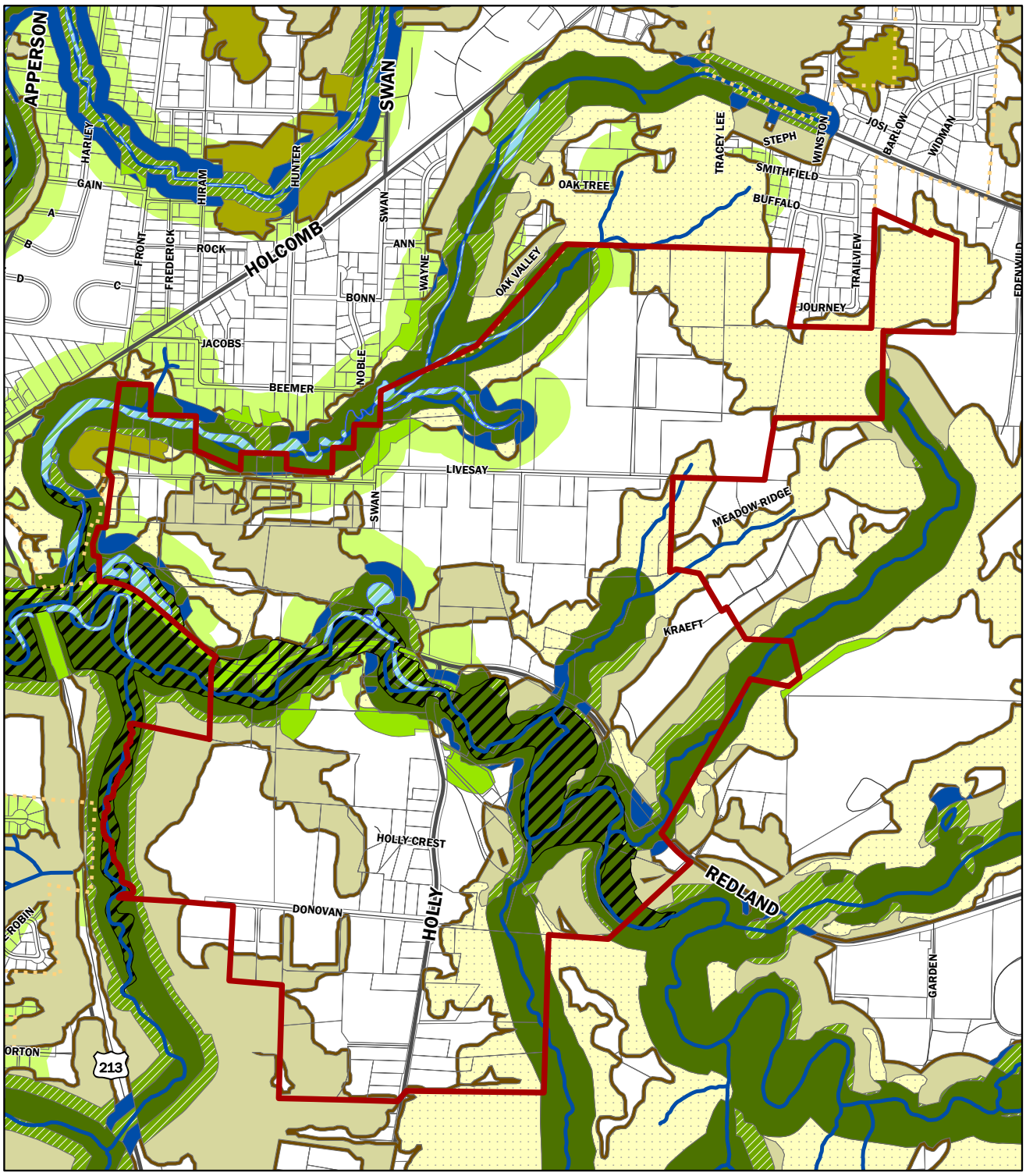
  Mitigation Option 1: Mitigation requirement is based on number and size of trees removed from site. Trees must be replaced per the following table. Bare ground must be planted or seeded with native grasses or herbs.

Mitigation Option 1: Tree Replacement	
Size of tree to be removed (inches in diameter)	**Number of trees and shrubs to be planted**
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

  Mitigation Option 2: Mitigation requirement is based on the size of the disturbance area within a HCA. Trees and shrubs must be planted at a rate of 5 trees and 25 shrubs every 500 square feet of disturbance area.

  Plant spacing and location – Trees will be planted between 8 and 12 feet on-center and shrubs will be planted between 4 and 5 feet on center, or clustered in single species groups of no more than 4 plants, with each cluster planted between 8 feet and 10 feet on center.

  All vegetation must be planted on the applicant's site within the HCA or in an area contiguous to the HCA, provided that if the vegetation is planted outside of the HCA then the applicant shall preserve the contiguous area by executing a deed restriction.



Source: Oregon City GIS, 2006; Metro 2005

project boundary
streams
wetlands
Riparian Corridor Class I
Riparian Corridor Class II
Riparian Corridor Class III
Upland Wildlife Habitat Class A
Upland Wildlife Habitat Class B
Upland Wildlife Habitat Class C
Aquatic Impact Areas
Upland Impact Areas
1996 flood zone
WQR area

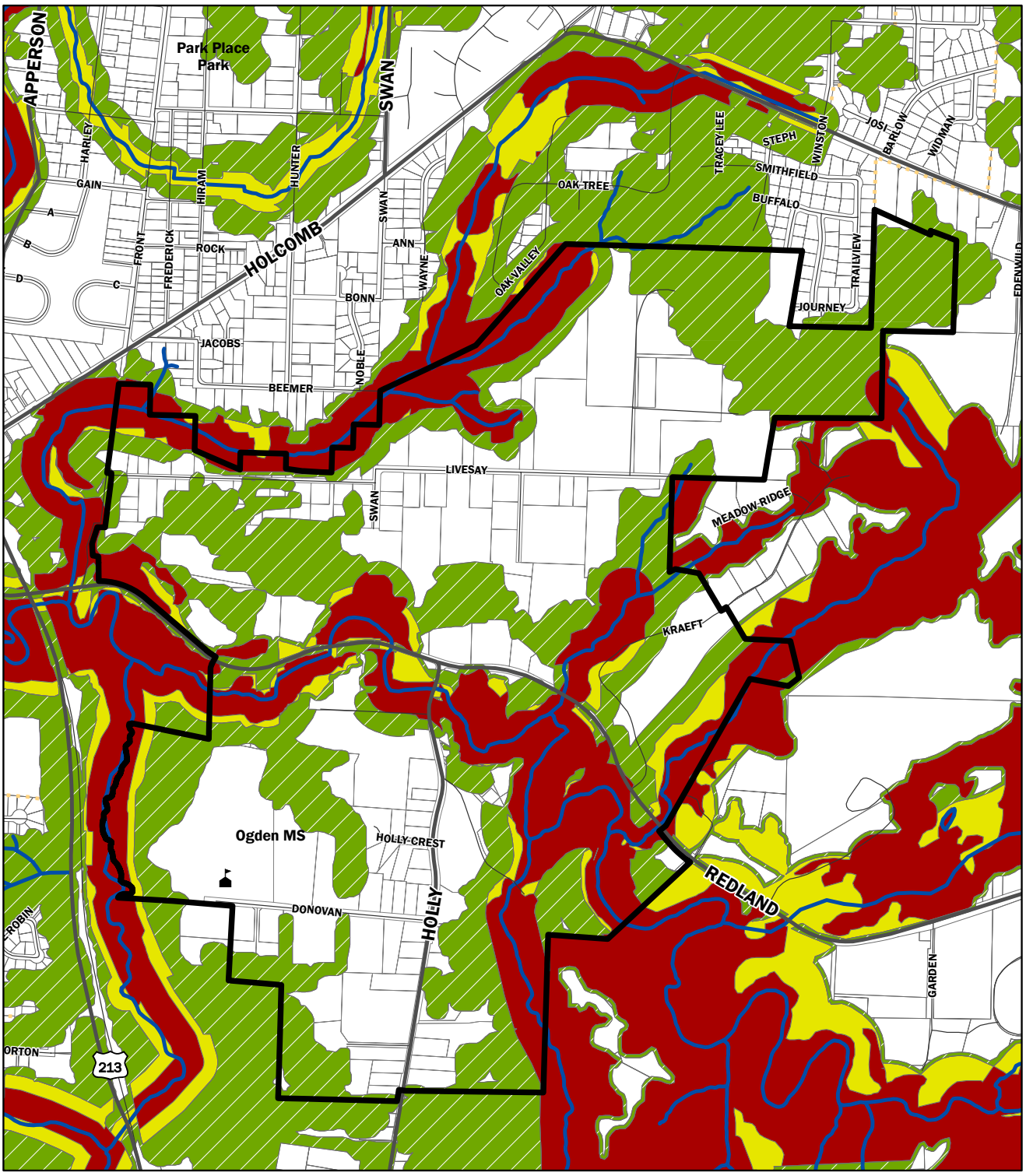
Water Quality Resource Area (WQRA) data is from the City of Oregon City

Park Place Concept Plan

Environmental: Goal 5

Note: Title 3 analysis for the area within the new urban growth boundary has not been completed by the City of Oregon City as of July 2006.

0 500 1,000
Feet



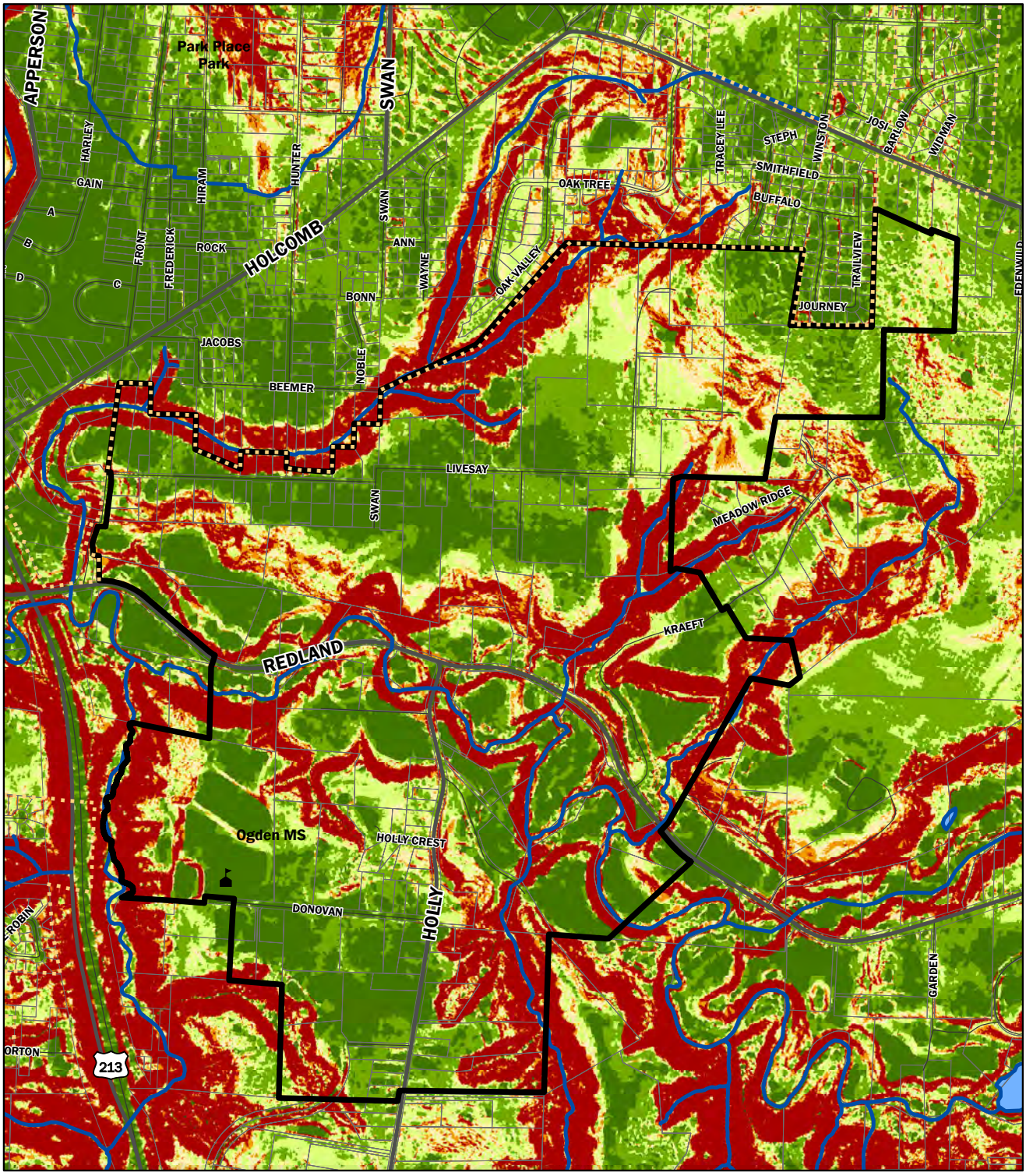
Source: Oregon City GIS, 2006; RLIS 2006

HIGH
MODERATE
LOW
NO HCA

Park Place Concept Plan

Habitat Conservation Area Values

0 500 1,000
Feet



Source: Oregon City GIS, 2006; RLIS 2006

- less than 5%
- 5% - 10%
- 10% - 15%
- 15% - 20%
- 20% - 25%
- greater than 25%

Park Place Concept Plan

Environmental: Slope Analysis

0 500 1,000
Feet

Park Place Goal 5 Resources

The accompanying Metro Inventory Map and HCA Map of the Park Place study area clearly identify three major riparian corridors. These include Livesay Creek, Abernethy Creek, and Newell Creek.

Livesay Creek

Livesay Creek lies along but largely outside the northwest border of the study area, yet some of its associated features, including the following significant natural resources, are included in the study area:

- Waterways – two tributaries of Livesay Creek
- Wetlands – identified largely as linear features associated with the tributaries
- Riparian Corridor Class I – lies adjacent to the tributaries at varying widths
- Riparian Corridor Class II – several very narrow small areas lie near the study area's western border and northern border
- Riparian Corridor Class III – two small areas of this resource are identified
- Upland Wildlife Area Habitat Class A – several small areas including a linear feature lie parallel to the waterways just beyond the riparian habitat, and a large area is represented in the northeast corner of the study area
- Upland Wildlife Area Habitat Class C – one small area of this resource is located just north of the confluence with Abernethy Creek.

Abernethy Creek

Abernethy Creek is the largest of the waterways within the Park Place study area and generally runs east to west near the center of the study area. The following significant resources are associated with or are located near Abernethy Creek:

- 1996 Flood Zone – the majority of the main stem of Abernethy Creek is mapped as flood zone
- Waterways – Abernethy Creek along with several tributaries that lie along the southeastern boundary of the study area
- Wetlands – three are identified, one near the confluence with Livesay Creek, a linear feature associated with Abernethy Creek, and a pond-like feature just north of the creek near the center of the study area
- Riparian Corridor Class I – lies adjacent to the main stem and its tributaries at varying widths
- Riparian Corridor Class II – several small narrow areas lie adjacent to the Class I resources near the main stem and tributaries with a wider width resource associated with the northern tributary along the southwest boundary
- Riparian Corridor Class III – several areas of this resource are located north and south of the main stem near the center of the study area
- Upland Wildlife Area Habitat Class A – the majority of the resource is associated with the tributaries and lies just beyond the riparian corridors or immediately adjacent to the waterway
- Upland Wildlife Area Habitat Class B – there are several large irregular areas of this resource located near the interior of the study area north and south of Abernethy Creek and along the southern border of the study area, and several linear features associated with the tributaries

Newell Creek

A portion of Newell Creek lies along but largely outside the southwest border of the Park Place study area, yet some of its features, including the following significant natural resources, are included in the study area:

- 1996 Flood Zone – all of Newell Creek within the study area is identified as flood zone
- Waterways – Newell Creek
- Riparian Corridor Class I – a narrow band lies adjacent to the creek
- Riparian Corridor Class II – a very narrow ban lies adjacent to the Class I resource
- Upland Wildlife Area Habitat Class B – a relatively large irregular area of this resource is located immediately east of the riparian habitat.

F. SUMMARY OF FINDINGS

Water Infrastructure (water, sanitary and stormwater)

Limited water service exists within the study area except for a small portion of Livesay Road which is served by the Oregon City water distribution system. Capacity exists within the Oregon City system to be expanded within the study area. Transmission mains, owned by Clackamas River Water, run through the study area to serve communities outside the study area and should be maintained.

Limited sanitary sewer collection exists within the study area. Many properties are on septic systems. A number of interceptor lines, owned by the Tri-City Sewer District, pass through the study area conveying sanitary flows from communities outside the study area and Ogden Middle School to the wastewater treatment plant. These interceptors and the treatment plant have capacity to serve future development within the study area.

Stormwater is presently managed in the study area with roadside ditches and natural drainage channels. No major stormwater infrastructure facilities exist beyond these surface facilities. All stormwater within the study area is conveyed to Abernethy Creek, Newell Creek, and Livesay Creek. Abernethy Creek and Newell Creek are subject to occasional flooding; however, no significant flood damage is known to have occurred in the study area since the 1996 flood.

Water, Sanitary and Stormwater General Findings:

- Limited water distribution exists
- Capacity exists in the water system to serve the study area
- Limited sanitary sewer collection exists
- Wastewater Treatment Plant and interceptors have capacity to serve the study area
- A natural stormwater drainage system exists

Natural Resources (goal 5 resources)

Natural Resources: Through evaluation and mapping efforts performed by Metro, habitat conservation areas in the Park Place Concept Plan project area have been established. Metro created an Inventory Map showing areas of greatest significance, called “regionally significant habitat,” which includes riparian areas, wildlife habitat, and parks and open spaces. From this map, Metro established a Habitat Conservation Area Map which identifies the highest value streamside habitat that will be subject to regulatory performance standards and best management practices. The Habitat Conservation Area Map will be utilized to establish buildable lands (ie, where to build, where to build with restrictions, and where not to build) within the Concept Plan area.

Natural Resources General Findings:

- Regionally Significant Habitats areas have been inventoried
- Habitat Conservation Areas have been identified including three major riparian corridors: Livesay Creek, Abernethy Creek, and Newell Creek.
- Development best management practices have been established

G. DOCUMENTS REVIEWED

Water Infrastructure:

- Water Master Plan, City of Oregon City (Yost West and Associates, October 2004)
- Water Master Plan, Clackamas River Water (MWH, May 25, 2005)

Sanitary Sewer Infrastructure:

- Sanitary Master Plan, City of Oregon City (TetraTech/KCM, December 2003)

Stormwater Infrastructure:

- Drainage Master Plan, City of Oregon City (January 1988)
- Draft Stormwater Management Plan, City of Oregon City (2006)
- Stormwater and Grading Design Standards, City of Oregon City (December 1999)

Goal 5 Resources:

- Metro's Nature in Neighborhoods Regionally Significant Fish and Wildlife Habitat Inventory Map (the "Inventory Map")
- Metro's Nature in Neighborhoods Habitat Conservation Area Map

Market Assessment







Market Assessment for the Park Place Concept Plan

The focus of this section is on outlining current and anticipated market conditions impacting viable development forms in the study area. The market for a range of prospective product types will substantively impact concept planning efforts in the area, informing the process in terms of development forms and scale of supportable uses.

Macroeconomic Overview

National Trends

National economic performance has been outstanding for an extended period of time, but there is concern that we are nearing the end of the current business cycle. The national economy expanded at a 5.3% rate in the first three months of 2006, the strongest performance since the Summer of 2003. Private spending on automobiles, computers and equipment, a surge in exports due to the weak dollar, and significant spending on post-Hurricane Katrina rebuilding by the federal government spurred the economy in the first quarter.

Given the failure of fuel price spikes to immediately slow economic growth, the housing market has emerged over the past three months as perhaps the most-watched economic variable. Consensus has emerged that the national market indeed peaked in August of 2005, declining thereafter with gradual increases in long-term interest rates. Nationwide, measures of the housing market are decidedly mixed and contributing to some ambiguity for Federal Reserve policy.

Caution is the order of the day, both from larger home builders and from the Federal Reserve. Economic strength in the face of higher fuel prices has Fed policy still biased towards rate escalation, but rate hikes have clearly put the brakes on the market via higher cost of short-term construction lending, higher cost of credit for consumers, and a hit to the lending sector. Johnson Gardner fully expects the Federal Reserve to continue to push short-term rates upward, at least once more before September.

Johnson Gardner is still bullish about the national economy, despite a cooling housing market nationwide. Fuel cost increases have appeared to not significantly affect economic strength as has been anticipated. While the recent jump in economic activity of 5.3% was impressive, it will not be sustained and activity is anticipated to return to 3.1%-3.3% annual growth for the remainder of 2006 provided households continue to react rationally and mildly to rising rates.

Portland-Vancouver Metropolitan Area

The City of Oregon City is considered part of the Portland metropolitan area, which is defined as for statistical purposes as Clackamas, Clark, Columbia, Multnomah, Skamania, Washington and Yamhill counties. The local economy continued to realize substantial employment growth throughout the first quarter, averaging around 39,000 more jobs in the quarter, and finishing March with employment levels exceeding 2004 levels by approximately 38,000. Trends in the commercial and industrial markets also indicate better than reported rates of growth or greater optimism for future space needs.

Employment gains during the last year were widespread, with all major industrial sectors reporting growth. In terms of the magnitude of growth, Manufacturing (4,900

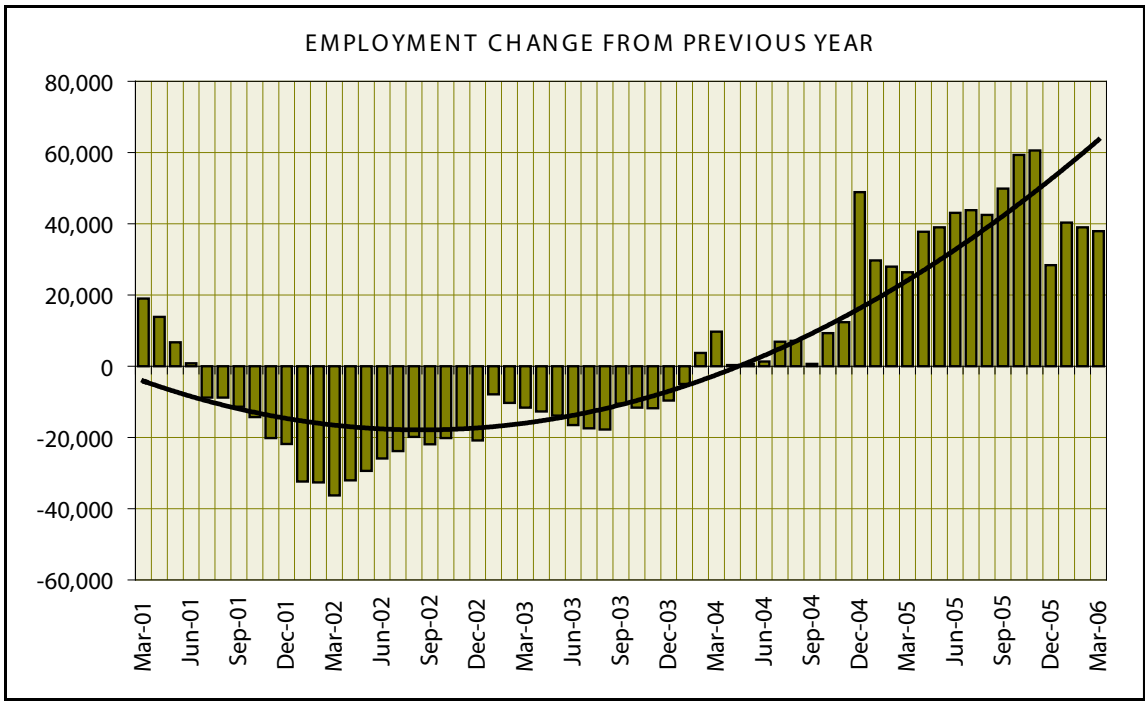
jobs), Professional and Business Services (4,700 jobs), Education/Health Services (4,100 jobs), and Trade Transportation Warehousing and Utilities (3,600 jobs) led the way. In terms of rate of growth, Manufacturing (9.0%), High Tech (4.3%) and Professional and Business Services (3.8%) grew the fastest.

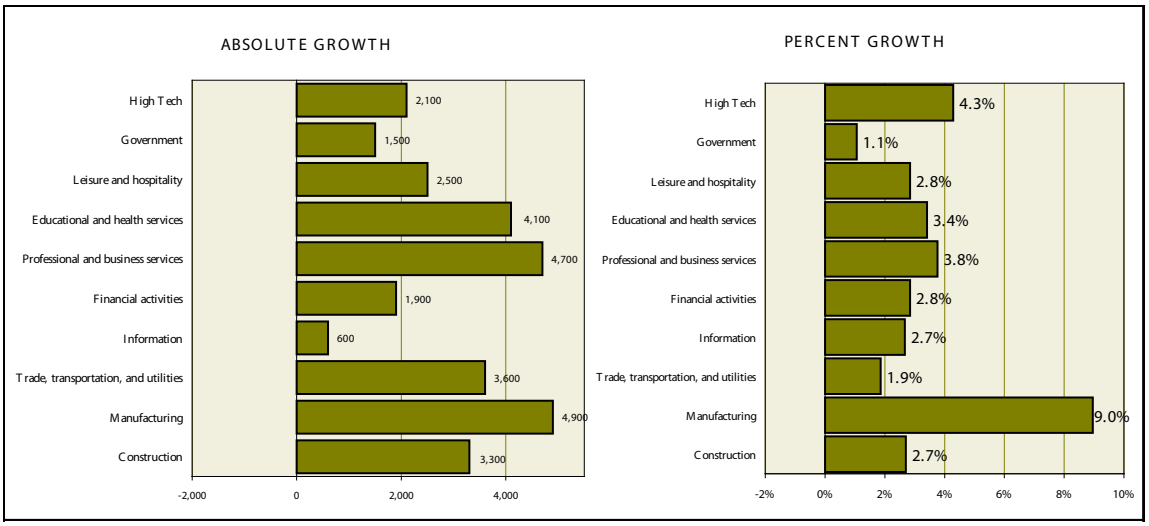
Population & Residential Permitting

While a positive rate of population growth was maintained during the recent economic decline in the Portland metropolitan area, the strong positive employment growth is a welcome sign that the level of growth can be sustained. Population growth has ranged from 1.0% to 2.6% for the last decade, a pace we expect to continue. Employment growth is expected to be around 4.0% during the next couple years, followed by growth under 2.0%, allowing the locally high unemployment rate to continue to drop to a more sustainable level.

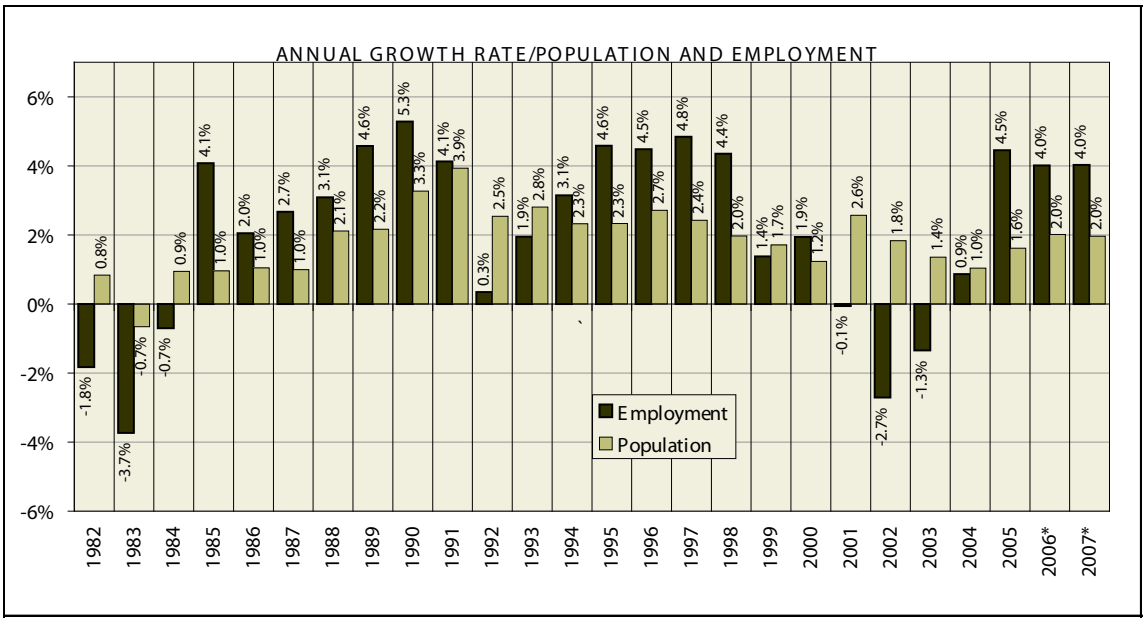
Population growth in the Portland metropolitan area has been shifting away from Multnomah County and towards the more suburban areas. Clackamas County has lagged behind both Washington and Clark Counties in terms of population growth rate over the last decade, but increasing land scarcity in Washington County is expected to drive a greater share of metropolitan area demand to Clackamas County over the next decade.

Continued population growth allowed for a continued strong level of residential construction activity.



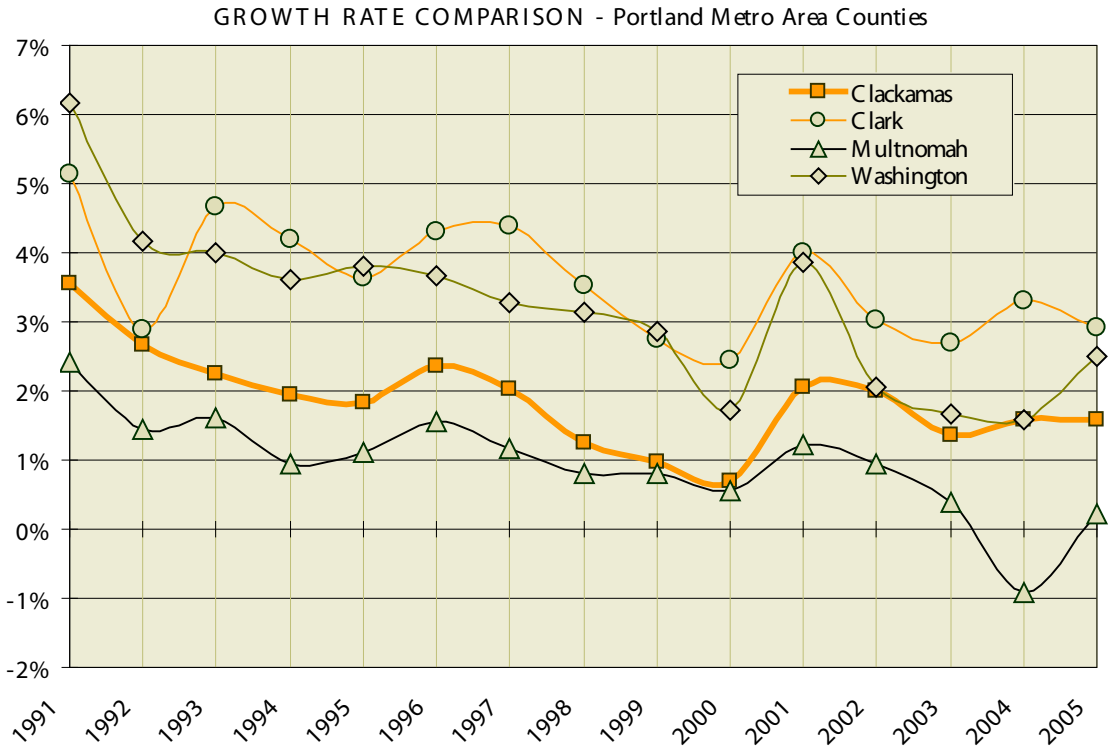


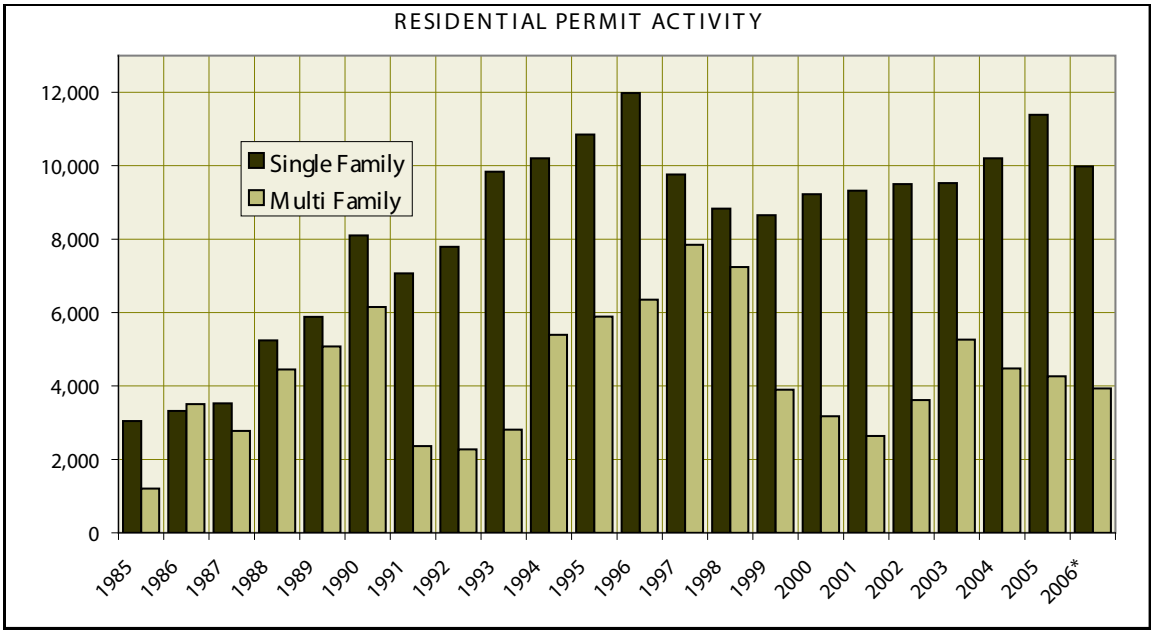
1/ Trade, Transportation, Warehousing & Utilities



*Reflects 2000 Census; updated historical data not yet available.

SOURCE: Center for Population Research and Census, State of Washington Office of Finance, and Johnson Gardner





* 2006 permit activity annualized based on activity through March
SOURCE: Bureau of the Census and Johnson Gardner

	July 1 Population Estimates						Census Population	
	2000	2001	2002	2003	2004	2005	4/1/2000	4/1/1990
CLACKAMAS	340,000	345,150	350,850	353,450	356,250	361,300	338,391	278,850
Barlow	140	140	140	140	140	140	140	118
Canby	12,910	12,790	13,440	13,910	14,110	14,385	12,790	8,990
Damascus						9,670		
Estacada	2,380	2,460	2,440	2,440	2,450	2,480	2,371	2,016
Gladstone	11,470	11,450	11,620	11,790	12,140	12,170	11,438	10,152
Happy Valley	4,650	4,930	5,810	6,370	6,640	7,275	4,519	1,519
Johnson City	635	630	630	630	630	630	634	586
Lake Oswego (part)*	33,115	33,270	33,428	33,530	33,595	33,740	32,989	28,317
Milwaukie	20,540	20,550	20,550	20,580	20,590	20,655	20,490	18,670
Molalla	5,710	5,690	5,780	5,800	5,930	6,395	5,647	3,637
Oregon City	26,200	26,680	27,270	28,100	28,370	28,965	25,754	14,698
Portland (part)*	750	760	759	770	780	785	747	707
Rivergrove (part)*	290	290	290	290	310	315	287	267
Sandy	5,425	5,380	5,780	6,200	6,360	6,680	5,385	4,154
Tualatin (part)*	2,695	2,725	2,740	2,820	2,895	3,065	2,664	1,406
West Linn	22,440	23,090	23,430	23,820	23,970	24,075	22,261	16,389
Wilsonville (part)*	14,360	14,165	15,585	14,225	14,595	14,855	13,987	7,096
Unincorporated	176,290	180,150	181,157	182,035	182,745	175,020	176,288	160,128

Oregon City Area Trends

Population

The City of Oregon City experienced rapid population growth during the 1990s, with the pace of growth decreasing in the last several years.

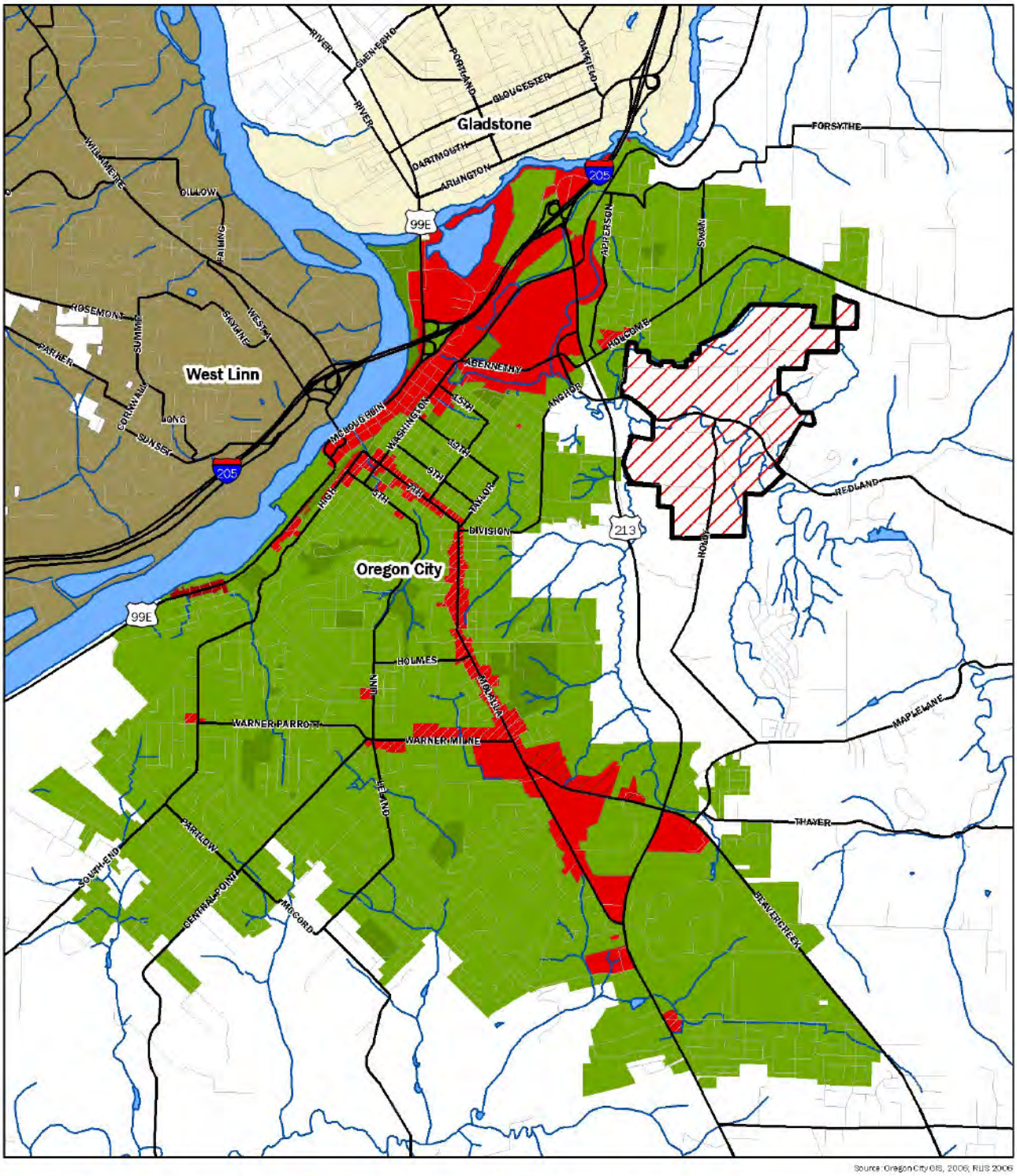
The City of Oregon City's population base grew at an average annual rate of 5.8% from 1990 through 2000, almost three times the rate of growth for Clackamas County during the same period (2.0%). The rate of growth since 2000 has ranged from 1.0% to 3.0%, as the supply of developable land has diminished.

Oregon City has accounted for a greater share of recent population growth in Clackamas County than any other jurisdiction. The population base grew at an average of over 1,100 persons from 1990 through 2000, with annual growth in the last five years ranging from an estimated 270 to 830 persons. Increasing price pressure in the Portland metropolitan area has led to a shift to markets such as Oregon City that offer a greater housing value. The level of population growth in Oregon City is increasingly constrained by land supply, which the concept planning areas such as Park Place will address for a period of time.

Residential permit trends mirror this trend, with annual permit levels exceeding 200 units per year for all but one year over the last decade.

Retail Market Trends

The retail market is currently an area of opportunity for Oregon City, as population levels and local buying power increase. The area of greatest apparent need is for regional serving retail uses, as typically found in centers such as Clackamas Town Center, Bridgeport Village and Washington Square.



Oregon City
Gladstone
West Linn
Clackamas Co.
project boundary
General Commercial
Mixed Use Downtown
Historic Commercial
Mixed Use Corridor 1
Mixed Use Corridor 2

Park Place Concept Plan

Context: Oregon City Commercial Zoning - Relationship to Study Area

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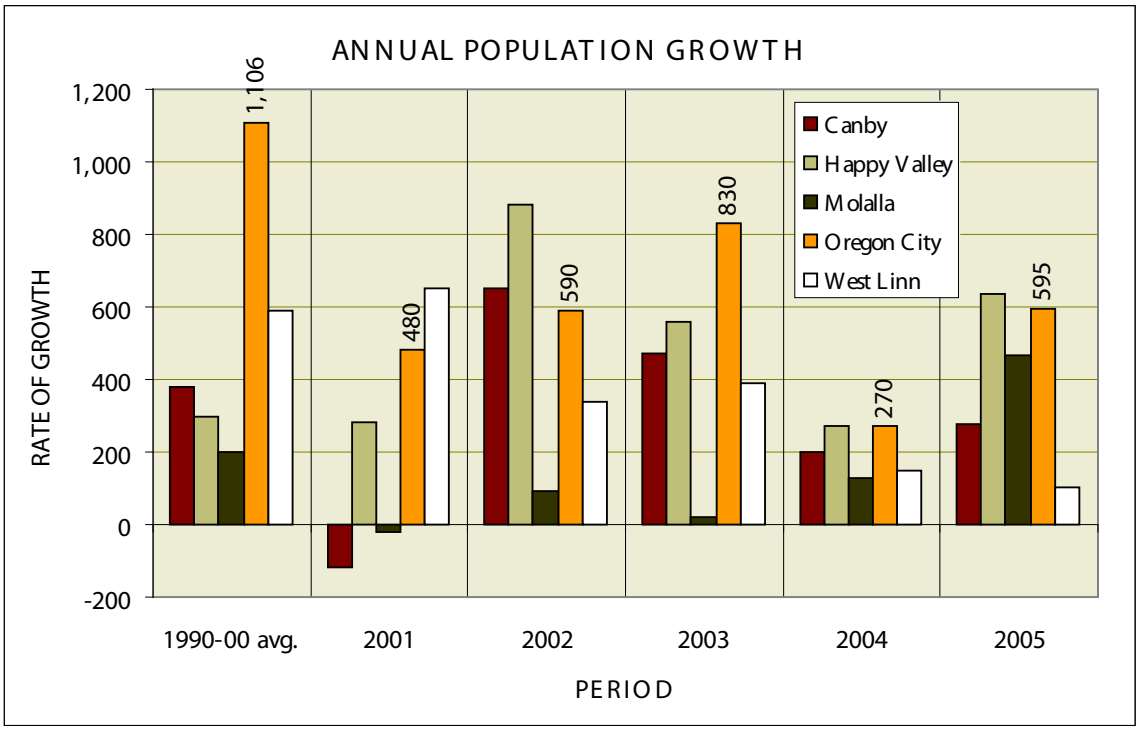
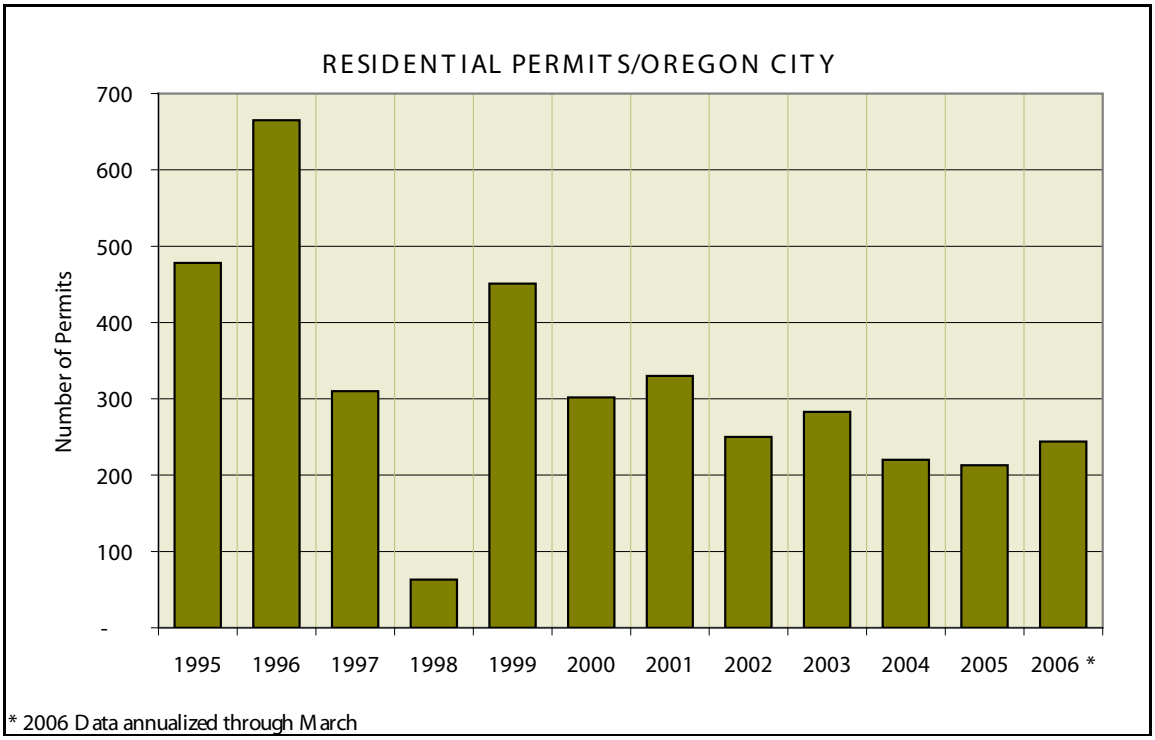
Miles





* 2006 Data annualized through March

Portland Metropolitan Area Trends

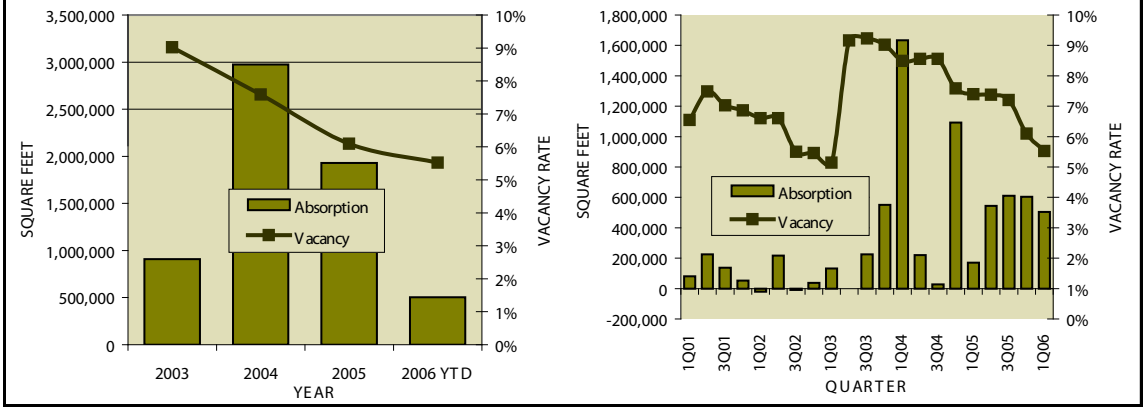
The Portland metropolitan area's retail market vacancy rate continues its ten-quarter gradual decline from a high of 9.2%. In the first quarter, the market absorbed 504,000 square feet while adding 163,000 square feet of new space. Vacancy in tracked space on Co-Star dropped from the last quarter to 5.5%. In regional and power centers , vacancy remained minimal, while community/neighborhood centers continued their positive trend, with vacancy dropping to only 4.2%. Mixed-use (9.9%) and strip/specialty/urban centers (8.8%) again had the highest vacancy rates, though occupancy was up substantially for both compared to the previous quarter.

Mixed-use retail space typically reports vacancy levels well above average, as this type of space does not include typical anchor stores (such as a grocery or department store), and the tenants tend to turn over on a more regular basis.

The most significant recent retail development in the Region, Bridgeport Village in Tualatin, sold last year for a price of $366 per square foot. The 465,000 square-foot lifestyle center has been well received and several new retail projects are scheduled

	Speculative Inventory	New Construction	Inventory Adjustments	Net Absorption	Vacancy S.F.	Vacancy Rate
BREAKOUT BY CLASS						
Strip/Specialty/Urban	19,908,766	86,388	1,120,835	345,245	1,752,208	8.8%
Community/Neighborhood	24,740,783	0	-2,716,765	218,441	1,030,945	4.2%
Mixed Use	1,729,813	76,488	35,205	114,919	170,874	9.9%
Power/Regional	11,402,999	0	-2,497,855	-174,479	235,322	2.1%
Total	57,782,361	162,876	-4,058,580	504,126	3,189,349	5.5%

NET ABSORPTION AND VACANCY RATE TRENDS



for construction in the area along I-5. Major upcoming additions to Portland area retail include the 280,000 square-foot IKEA megastore, which is set to begin construction later this year at Cascade Station, and Kohl's, which will be building three stores and converting a fourth.

A total of 1.30 million square feet of new space is projected to enter the market over the next twelve months, while demand is estimated at 1.16 million square feet. While the Portland market has successfully absorbed recent surges in construction, this will be tested with the large amounts of new supply scheduled to enter the market in the next two years. Our demand model predicts market vacancy will edge up slightly to 5.6% by the first quarter of 2007, and continue upwards to 6.4% by the first quarter of 2008.

The City of Oregon City is included as part of the broader Oregon City/McLoughlin Corridor subregion. This market is among the healthiest in the Portland metropolitan area, with an overall vacancy rate of just over 5%. To-date, the area has been missing a regional retail center, but the proposed development by CenterCal in Oregon City will address that deficiency. Current plans for that center appear to indicate a "lifestyle center" concept, which mirrors a traditional downtown environment. The proximity of this development to the study area will have a profound influence on viable retail forms in the planning area.

The retail market appears to be quite healthy, despite what is probably considerable leakage of regional retail expenditures outside of the area. The recent and anticipated level of residential growth in the area should allow for an expansion of retail opportunities locally, while new development addresses the regional retail needs of the community. Marginal rent levels appear to be adequate to support new construction.

The study area suffers somewhat as a retail location, with limited exposure and a location on the periphery of the urbanized area of Oregon City. There is some opportunity to capture sales from traffic passing through from more rural areas to the east and north, but this will be limited. The existing and projected population base in the study area will likely support only a limited scale of retail development, which will be neighborhood oriented. The largest anticipated tenant would be a grocer, but this is seen as unlikely unless support is anticipated from a broader trade area.

Office Market Trends

Portland Metropolitan Area

On a metropolitan area level, the office market has been recovering from an extended over-build period. While the overall market was soft, most of the vacancy was felt

	Speculative Inventory	Vacancy S.F.	Vacancy Rate
BREAKOUT BY CLASS			
Strip/Specialty/Urban	551,236	19,334	3.51%
Community/Neighborhood	1,822,545	108,597	5.96%
Mixed Use	54,500	2,850	5.23%
Power/Regional	0	0	N/A
Total	2,428,281	130,781	5.39%
BREAKOUT BY SUBMARKET			
Damascus/Sandy	202,838	72,058	35.52%
SE Outlying	406,611	3,970	0.98%
Oregon City	1,377,904	52,457	3.81%
Canby	440,928	2,296	0.52%
Total	2,428,281	130,781	5.39%

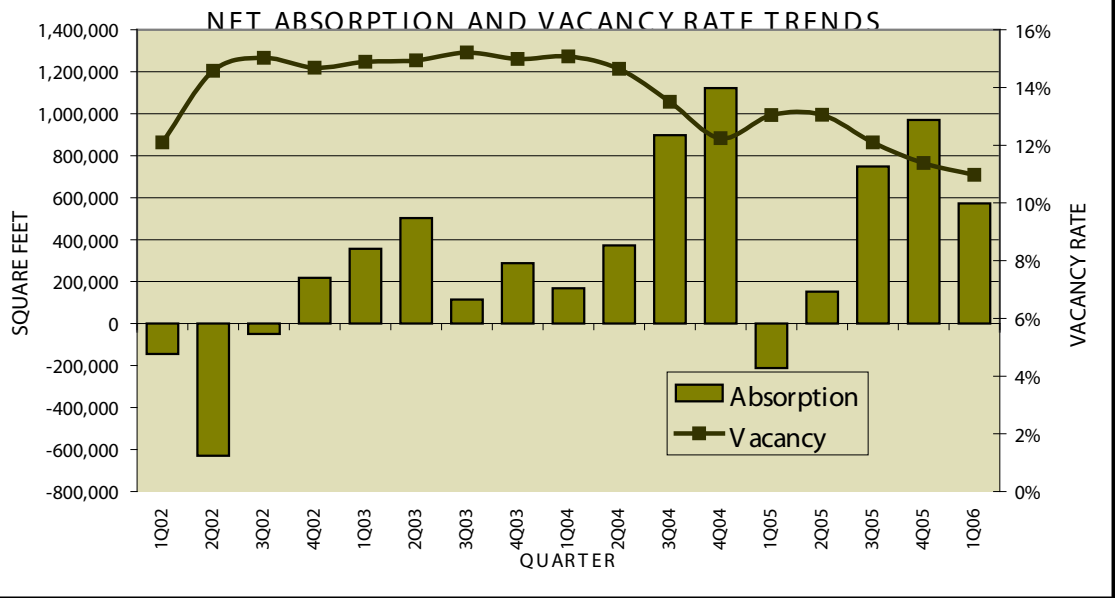
NET ABSORPTION AND VACANCY RATE TRENDS

in the tech-heavy Sunset Corridor and downtown Portland submarkets. The suburban markets remained relatively healthy, as population growth continued bringing an associated demand for uses such as medical office.

The Portland metropolitan area's speculative office market reported an increase in overall occupied office space during the first quarter of 2006 of over 570,000 square feet, the fifth-largest quarterly gain in the past five years despite significant new construction. The strong absorption and general tightening of the market suggest a continued positive future outlook. The direct vacancy rate and total vacancy including sublease space dropped to 11.0% and 11.5%, respectively. Office space is typically underwritten with an assumed 10% vacancy rate, which is considered a structural rate of vacancy consistent with a balanced market. Using this baseline, the market overall is still somewhat over-supplied, but moving towards stabilization.

The direct vacancy rate for Class-A space is estimated at 7.6%, or 8.3% with sublease space included, a drop that is consistent with the overall market. Direct vacancy is estimated at 13.4% and 12.4% for Class-B and Class-C space, reflecting a continued move to quality in this buyer's market. An estimated 7.3 million square

	Speculative Inventory	Net Absorption	Vacancy Direct	Vacancy Sublease	Vacancy Direct	Vacancy Total
BREAKOUT BY CLASS						
Class A	25,707,577	134,623	1,962,987	165,588	7.64%	8.28%
Class B	26,550,035	352,473	3,566,105	131,488	13.43%	13.93%
Class C	14,021,915	85,959	1,742,335	43,857	12.43%	12.74%
Total	66,279,527	573,055	7,271,427	340,933	10.97%	11.49%



feet of tracked space is directly vacant, with 341,000 square feet of space identified for sublease. The amount of sublease space has now declined consistently over the past nine quarters, and both direct and total vacancies have been generally trending downward over the past three years.

We are seeing vacancy rates below 10% in the I-5 South Corridor, the Sunset Cor-

ridor/Hillsboro, and the East Multnomah County subregions. The first two markets, along with Kruse Way/ Washington Square, serve major executive housing concentrations and have performed far better than the Portland CBD over the last decade. The strongest submarkets in terms of occupancy are Close-In Northeast Portland (3.8%), the I-205 corridor in East Multnomah County (5.6%), and Kruse Way in Lake Oswego (6.2%).

Soft market conditions and low net lease rates are expected to limit new supply over the next year to just over 1.0 million square feet, while demand is forecasted to exceed 2.3 million square feet. Our demand forecasts for office space are employment driven, and as a result do not factor in the marginal impact of soft market conditions and reduced effective lease rates. During periods of relatively high vacancy, aggressive leasing tactics have the ability to generate demand through reducing the effective cost of space to tenants. While this can lead to an increase in net absorption, it is important to recognize that the impact is temporary, and does not change the underlying demand for space if priced appropriately. Our projected demand increase reflects predictions for improved economic performance in the region.

Oregon City Area

Oregon City is included within the broader Oregon City/Gladstone/Milwaukie submarket in terms of tracked office space. This market reported a 13.9% vacancy rate at the end of the first quarter of 2006, and is heavily weighted towards lower quality Class B and Class C space. The vacancy rate has improved significantly over the last few years.

The Oregon City market has only a limited amount of Class A office space, which is typically found in more regional-serving office concentrations with outstanding regional access. Due to the limited visibility and access in the study area, any office space demand will likely be based on community needs, supported by the area's population base. Likely tenant types would include medical office, insurance brokerages, real estate brokerages, title companies, and other professional office users. These types of office tenants will often utilize ground floor commercial space, as they have a significant amount of customer traffic, but can be located in more traditional office configurations.

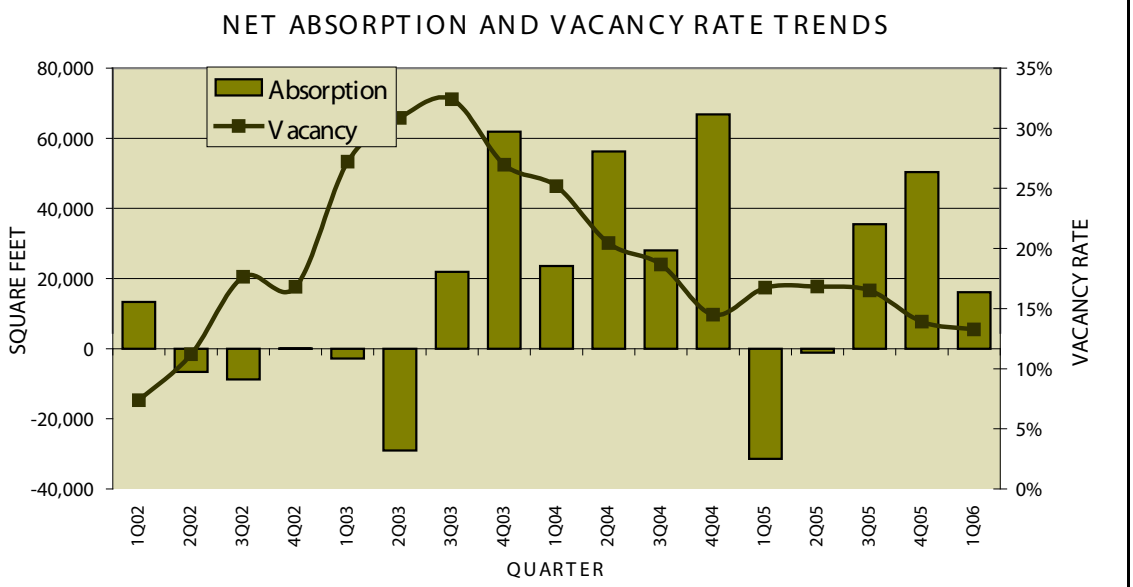
Conclusion

The study area is characterized by varied topography, with limited access points and visibility. As a result, the predominant land uses in the area is expected to be residential. We would expect that a level of commercial (retail and office) development will be supportable in the area, which will assist in organizing the concept planning while being limited in scale. The metropolitan area economy has been enjoying a period of substantial employment growth. Trends in the commercial and industrial markets also indicate better than reported rates of growth or greater optimism for future space needs. Population growth held steady during the recent economic decline in the Portland metropolitan area, and the recent employment growth indicates that the level of growth can be sustained.

The retail market is currently sound in the Oregon City area, although there is a notable lack of regional-draw retail space. Retail is an area of obvious opportunity in the Oregon City area, as population levels arise and associated levels of local buying power increase. The pending development of a major regional retail center in the immediate area will address the need for the broader community, with retail development in the study area limited to neighborhood supported uses.

The study area is expected to support between 20,000 and 40,000 square feet of retail space when fully developed. The area has limited access points, making it an

	Speculative Inventory	Net Absorption	Vacancy Direct	Vacancy Sublease	Vacancy Direct	Vacancy Total
BREAKOUT BY CLASS						
Class A	171,710	9,412	56,595	0	32.96%	32.96%
Class B	941,960	-13,052	130,565	0	13.86%	13.86%
Class C	855,749	19,757	73,893	0	8.63%	8.63%
Total	1,969,419	16,117	261,053	0	13.26%	13.26%



unlikely candidate for more regional serving retail services. From a market perspective, a commercial center that can capitalize on through traffic from existing arterials will increase the viability of retail space, particularly during the study area's build-out period.

Office space demand within the study area will respond to community needs, supported by the area's population base and industrial activity. Likely tenant types would include medical office, insurance brokerages, realty companies, title companies, and other professional office users. These types of office tenants will often utilize ground floor commercial space, as they have a significant amount of customer traffic, but could be located in more traditional office configurations.

Commercial development in the planning area is not seen as necessary for the success of the area, which is expected to be developed largely as residential. The commercial needs of the planning area could be met outside of the concept planning area by existing and planned developments. Commercial development can serve in the role of organizing the concept plan, providing a community center. In addition, commercial development can meet some of the needs of the community, providing a marketable amenity for the residential development while reducing trips out of the neighborhood.

References

1. Goal 9 data from the City of Oregon City.

C. Charrette Process

Concept Plan

The Preferred Concept for the Park Place study area was developed during a multi-day planning charrette which was held on October 15-October 19, 2006. Following the five-day charrette, the consultant team updated the Preferred Alternative to more accurately reflect the location of existing and proposed streets, neighborhoods and resource areas as well as buildable and non-buildable lands [reference buildable lands table]. Per this process, the revised Preferred Concept Plan became the Final Concept Plan [reference to final plan diagram].Following is is a brief summary of the agenda used at the charrette.



I. Overview of Charette



- Day 1 (Sunday, October 15)

  Reviewed with stakeholders the core values and evaluation criteria.

  Reviewed with stakeholders the opportunities and constraints diagram.

  Conducted site tour with stakeholders of selected locations in the study area.



- Day 2 (Monday, October 16)

  Held stakeholder meetings with public agency representatives, property owners, neighborhood group representatives and others, including PAC members (morning).

  Consultant team developed five preliminary planning alternatives (afternoon).

  Held Public Open House to review and comment on preliminary alternatives (evening).



- Day 3 (Tuesday, October 17)

  Met with public agency representatives and others who were unable to attend Day 2 stakeholder meetings and/or decided to return for additional individual meetings.

  Consultant team narrowed five preliminary planning alternatives to two refined alternatives; evaluated refined alternatives using evaluation criteria/core values (afternoon).

  Held Second Public Open House to review and comment on two refined alternatives using criteria/core values (evening).

- Day 4 (Wednesday, October 18)

  Held stakeholder group meetings with public agency representatives, property owners, neighborhood group representatives and others, including PAC members to review refined alternatives and recommend

preferred alternative (morning).

Consultant team refined preferred alternative based on feedback from morning stakeholder group meetings (afternoon).

- Day 5 (Thursday, October 19)

  Consultant team continued to refine preferred alternative (morning and afternoon).

  Held public meeting (Clackamas County Community College) to present preferred alternative (evening).

II. First Public Open House: Five Alternatives

As described above, Day 2 (Monday, October 16) of the charrette consisted of the team developing five land use and transportation alternatives which were presented to the public in an open house that evening, In general, the Holly Lane Extension, the Front-Holly Extension, the Holly-Swan Extension and the Holly Lane Extension-Variation with Redland Highway were well received by stakeholders. Stakeholders identified the following advantages to these four schemes:

- Direct connections to Holcomb and Redland Roads;
- Protection of riparian areas, floodways, steep slopes and other sensitive environmental or habitat areas;
- Development of mixed-use centers north and south of Redland, with a preferred center at the intersection of Livesay Road and the proposed Holly Lane Extension;
- Protection of the lower Livesay neighborhood cluster; and
- Development of a higher density residential cluster at Holly and Redland.

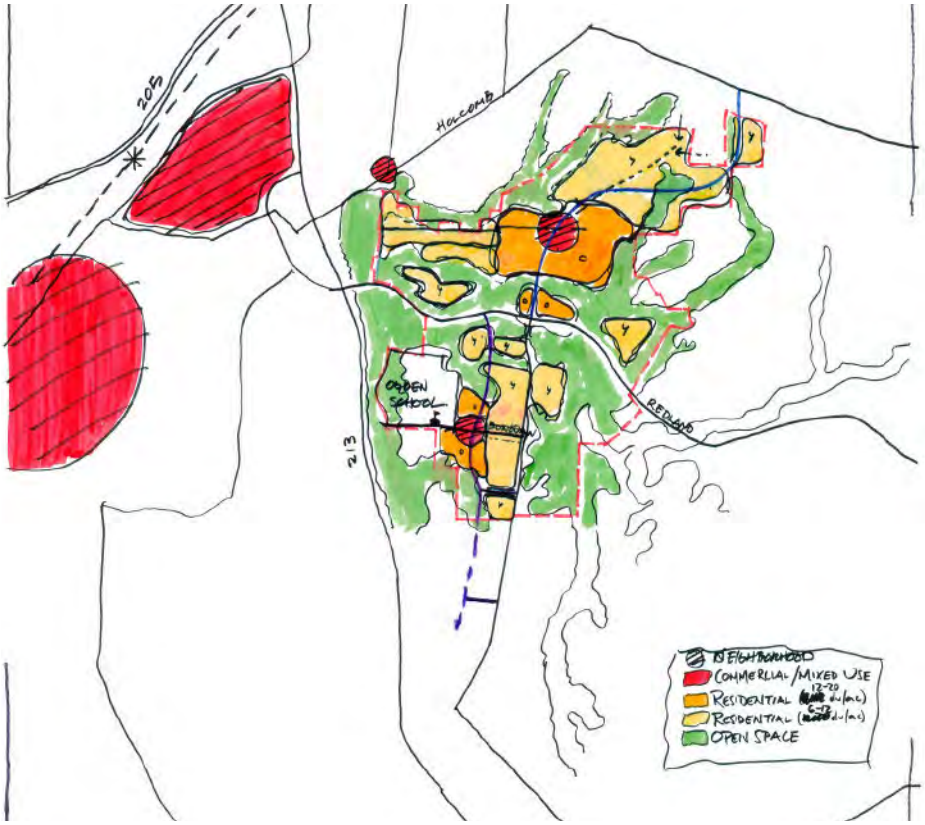
III. Second Public Open House: Two Refined Alternatives

Day three of the charrette (Tuesday, October 13), narrowed the five preliminary planning alternatives to two refined alternatives – the Holly Lane Extension and the Swan Avenue Extension. Successful common elements of the two schemes include:

- Direct connections to Holcomb and Redland Roads;
- Protection of riparian areas, floodways, steep slopes and other sensitive environmental or habitat areas;
- Development of mixed-use centers north and south of Redland, with a preferred center at the intersection of Livesay Road and the proposed Holly Lane Extension;
- Protection of the lower Livesay neighborhood cluster;
- Development of a higher density residential cluster at Holly and Redland.
- Use of the existing topography to incorporate a new road between Redland

and Holcomb (thereby limiting expensive infrastructure costs);

- Incorporation of a small loop road parallel to Holly and south of Redland;
- The provision of trail corridors along streams and between activity centers and neighborhoods;
- Bicycle and pedestrian connections to adjacent neighborhoods and schools;



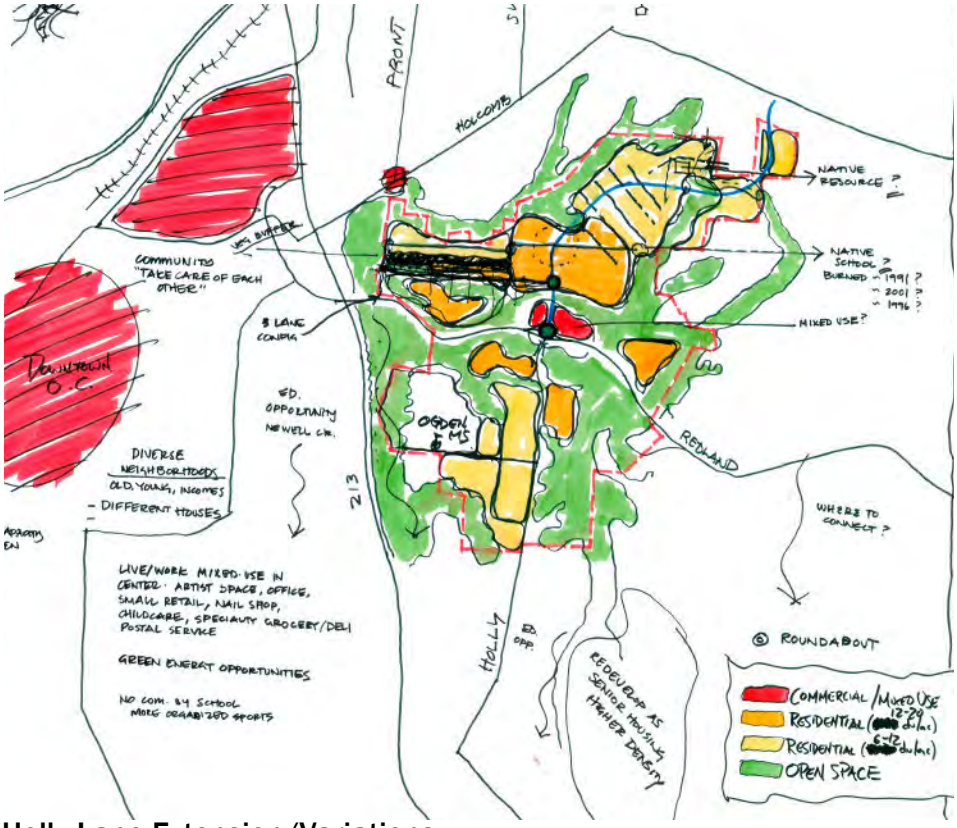
Holly Lane Extension

Unique features of the Holly Lane Extension include

- *A new road parallel to the existing Holly Lane that terminates at Redland*
- *The extension of Holly Lane north of Redland through the pinch point located east of the Trailview Estates neighborhood to the intersection of roughly Holcomb and Barlow*

Unique features of the Holly Lane Extension-Variations with Redland Highway include:

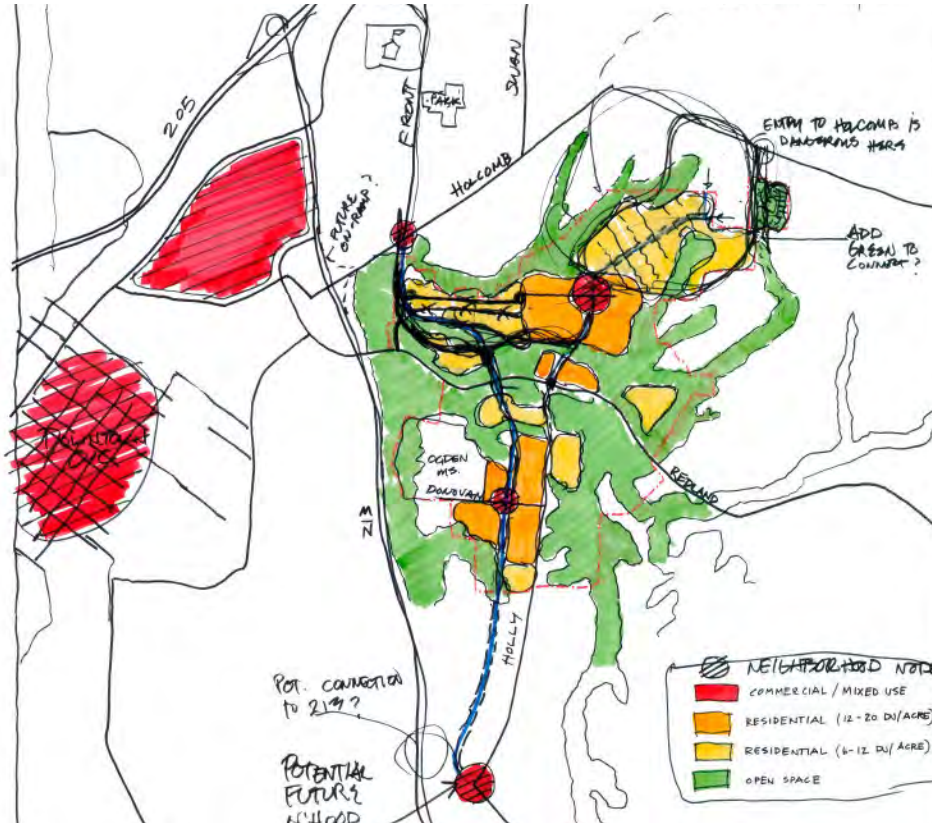
- *A smaller loop road parallel to the existing Holly Lane that starts and ends at Holly Lane*
- *The extension of Holly Lane north of Redland through the pinch point located east of the Trailview Estates neighborhood to the intersection of roughly Holcomb and Barlow*



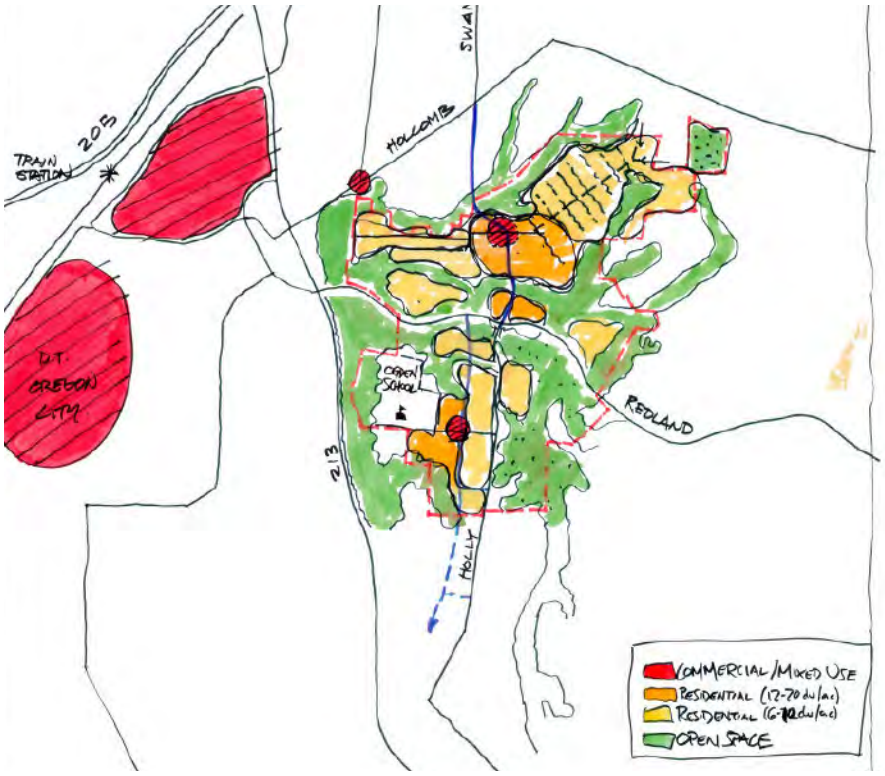
Holly Lane Extension/Variations

Unique features of the Front-Holly Extension include:

- *A new road parallel to the existing Holly Lane that crosses Redland and connects to Front Street, west of lower Livesay Road*
- *A new mixed-use commercial center at the intersection of Holcomb and Fronts Street*
- *The extension of Holly Lane north to the existing street network within the Trailview Estates Neighborhood.*



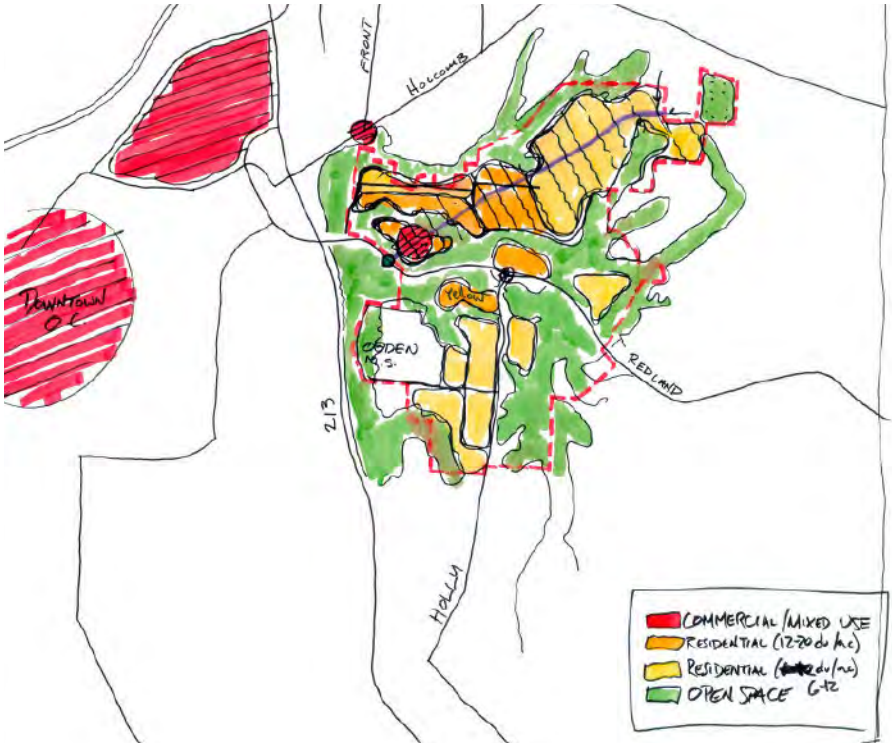
Front/Holly Extension



Holly/Swan Extension

Unique features of the Holly-Swan Extension include:

- *A new road parallel to the existing Holly Lane that terminates at Redland*
- *An extension of Holly Lane to Swan Avenue*
- *An extension of Upper Livesay Road to the existing street network within the Trailview Estates Neighborhood*



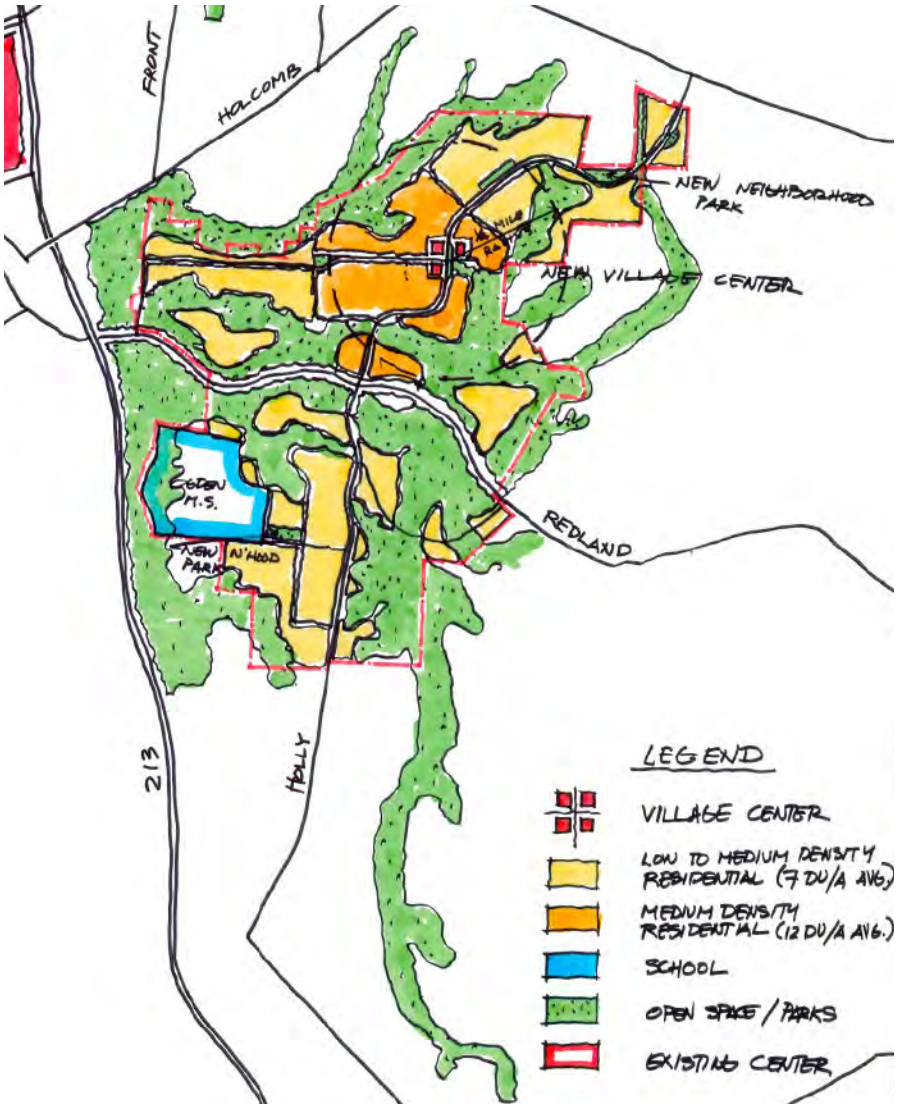
No Extention

The No Extension Alternative garnered limited support from stakeholders. Disadvantages of this scheme include:

- *No direct connections between Holcomb and Redland*
- *Lack of north-south connections through the larger study area*
- *The location of a large node west of Holly near the Highway 213 / Redland Interchange which does not serve the heart of the future community*

Unique features of the Holly Lane Extension include:

- *Extension of Holly Lane north of Redland to Holcomb Avenue, east of Trailview*
- *Retention of the existing single-family residential pattern, south of Redland*
- *Incorporation of medium density housing and neighborhood commercial-oriented land uses around a node at Upper Livesay and Holly Lane.*

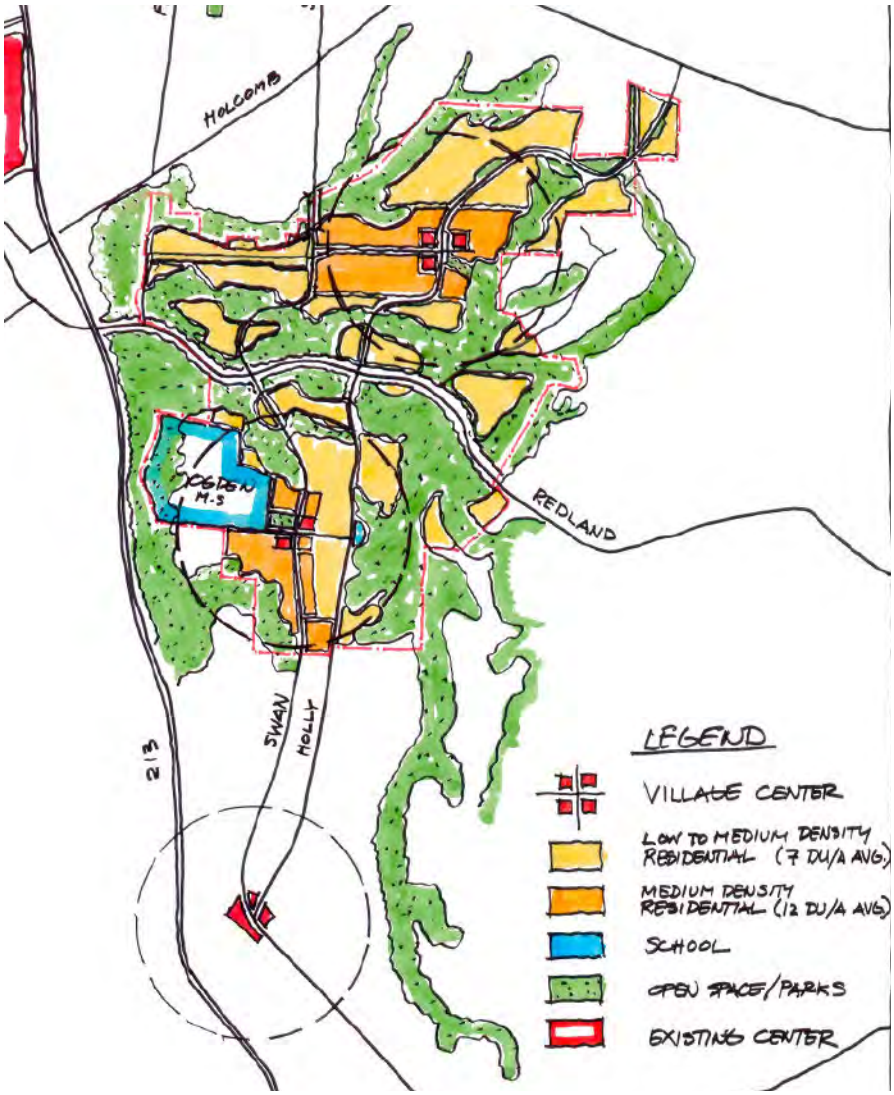


Holly Lane Extension

- Development of a mix of medium density (1 unit per 6,000 square feet) and higher density (1 unit per 3,500 square feet) housing.

The primary difference between the two refined alternatives is how the north-south connection through the site is treated. The Holly Lane Extension treats Holly Lane as the sole north-south connection. The new roadway builds off the existing roadway, which currently terminates at the intersection of Holly Lane and Redland Road. The new, extended roadway crosses Redland where it intersects with upper Livesay, creating the opportunity for a neighborhood-oriented commercial node, before connecting to Holcomb Road, east of Trailview.

By putting all the emphasis on Holly Lane, it is expected that the existing roadway and proposed street extension, as well as the existing bridge will need to be significantly enlarged to handle the traffic associated with the proposed new development north of Redland Road, as well as the increasing number of sub-divisions in the area. As part of the Holly Lane Extension proposal, the existing single-family residential development pattern south of Redland Road would



Swan Avenue Extension

Unique features of the Swan Avenue Extension include:

- *Extension of Holly Lane north of Redland to Holcomb Avenue, east of Trialview.*
- *Extension of Swan Avenue, which is identified in the City of Oregon City's Transportation System Plan as a collector, across Redland Road through Donovan Road.*
- *Development of a mixed-use "Main Street" along Upper Livesay.*
- *Incorporation of medium density housing and neighborhood commercial-oriented land uses at Donovan and Swan.*
- *Development of a Main Street along Livesay between Holly and Swan.*
- *Development of a node (gateway) at the intersection of Lower Livesay and Swan Avenue.*

be retained, with lands identified as buildable in the Buildable Lands Analysis developing over time with low and medium density single-family housing.

The Swan Avenue Extension proposal increases connectivity through the study area by adding a new north-south connection to Swan Avenue, in addition to the Holly Lane Extension. Both Holly Lane and Swan Avenue are designated as a City Collector in the City of Oregon City's Transportation System Plan. In this scheme, Swan Avenue is extended southward across the ____ravine through the intersection of Upper and Lower Livesay Road, across Redland Road through Donovan Road, before connecting with Holly Lane. Development of this secondary collector parallel to Holly Lane will provide additional opportunities for north-south connections through the study area, and is expected to help minimize the cross section width of both Swan Avenue and Holly Lane. In the short term, until traffic volumes increase with new development in the region, Holly Lane, including the bridge over Abernathy Creek would function using the existing right of way.

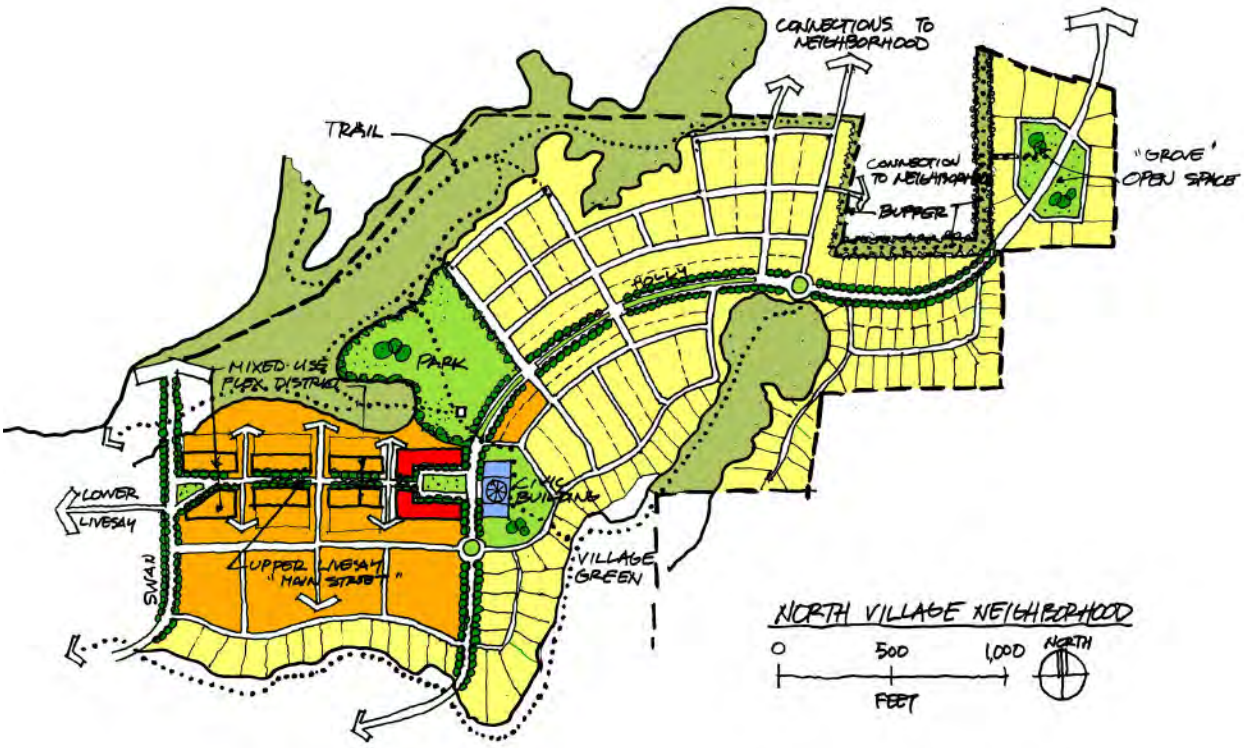
In addition to increased connectivity, the Swan Avenue Extension incorporates a commercial node both north and south of Redland Road. The Alternative North

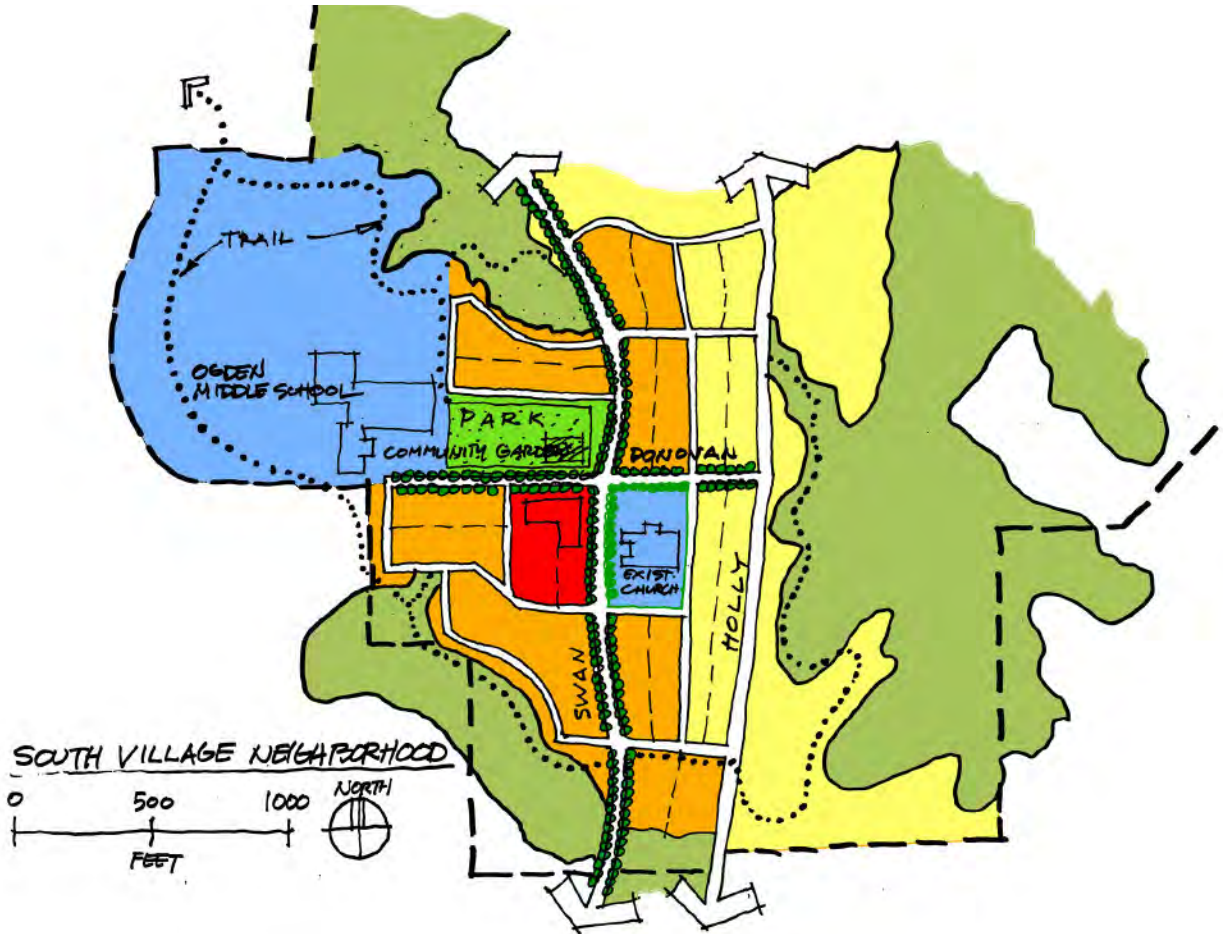
Village Neighborhood envisions a Mixed-Use “Main Street” along upper Livesay between Holly Lane and the proposed Swan Avenue Extension. A smaller village is proposed to the south at the intersection of Swan Avenue and Donovan Road.

Evaluation of the Two Refined Alternatives

On Tuesday evening, about 50 people attended a community open house. Participants reviewed and commented on the two Refined Alternatives. Earlier in the afternoon, the team performed an evaluation of the two alternatives using the evaluation criteria developed for the project. The team asked for comment, and conducted discussions with participants about the alternatives and the evaluation.

Y= Yes H= High Medium N=No L=Low		
--- = Not enough information to evaluate. To be assessed during subsequent phase.		
Criteria	Alt. 1: Holly Ln.	Alt. 2: Swan Ave.
Community Design		
Identifiable centers and green edges	Y	Y
Existing low density clusters	Y	Y
Mix of housing types and densities	M	H
Housing affordable to range of incomes	M	M
Greenway, street lighting, street furnishings	---	---
One or more mixed use centers	M	H
Central public space	Y	Y
Future school sites	N	N
Natural Resources		
Parks and open space per guidelines	Y	Y
Trail and open space connections	Y	Y
Protect natural resources	H	H
Avoid development in stability hazard areas	Y	Y
Water Infrastructure		
Mimic existing hydrology	---	---
Consistent with capacity of infrastructure	---	---
Optimize existing infrastructure	---	---
Transportation		
Street sized to handle future growth	Y	Y
Provide safe environment for all modes of travel	M	H
Opportunities for all modes of travel	M	H
Connectivity within and outside study area	M	H
Minimize increases in impervious surfaces	H	M
Minimize adverse impacts on existing properties	M	M
Financing and Other Criteria		
Funding sources pay for facilities and services	---	---
Uses fund costs of added services	---	---
Open and transparent process	---	---
Y= Yes H= High Medium N=No L=Low		


CONNECTIONS TO NEIGHBORHOOD
TRAIL
"GROVE" OPEN SPACE
BUFFER
HOLLY
PARK
MIXED USE FLEX DISTRICT
CIVIC BUILDING
LOWER LIVESAY
UPPER LIVESAY "MAIN STREET"
SWAN
VILLAGE GREEN
NORTH VILLAGE NEIGHBORHOOD
0
500
1,000
FEET
NORTH


TRAIL
OGDEN MIDDLE SCHOOL
PARK
COMMUNITY GARDEN
DONOVAN
EXIST. CHURCH
SWAN
HOLLY
SOUTH VILLAGE NEIGHBORHOOD
0
500
1000
FEET
NORTH

D. Evaluation Criteria

Park Place CONCEPT PLAN

Draft Evaluation Criteria

These criteria are intended to be both qualifiable and where appropriate quantifiable. These criteria build off applicable local and regional community development standards and practices. Criteria that involve quantitative or qualitative comparisons will use a consistent scale (low/ medium/high or 1/2/3 for comparison purposes).

- ☐ Do alternatives have easily identifiable centers and green edges that serve as a buffer between developed and natural areas? (yes/no criterion)
- ☐ Does the alternative maintain existing clusters of low density residential development and meet community / study area goals? (yes/no criterion)
- ☐ Is the potential mix of different types and densities of housing, in the alternative, compatible with existing community-wide conditions or goals? (yes/no; quantitative measure and comparison of alternatives)
- ☐ Does the alternative include housing types that are affordable to households with lower incomes (e.g., multi-family, single-family attached and single family homes on small lots)? (quantitative measure and comparison of alternatives)
- ☐ Does the alternative include potential designated gateways, street lighting, street furnishings or historical / artistic elements that add to the legibility of the neighborhood? (yes/no criterion)
- ☐ Does the alternative include one or more neighborhood commercially oriented uses or centers? (yes/no criterion)

Park Place
CONCEPT PLAN

- ☐ Is the heart of the commercial node oriented to a central public space or center? (yes/no criterion)
- ☐ Do the alternatives identify the location of future schools (and other civic uses) based on projected population estimates? (yes/no criterion)

NATURAL RESOURCES: PARKS, OPEN SPACE, NATURAL AND SENSITIVE ENVIRONMENTAL AREAS

- ☐ Does the alternative provide for parks and/or open space, consistent with city or national goals or standards? (quantitative comparison to existing or proposed standards)
- ☐ Does each alternative identify trail or open space connections between centers (yes/no for part 1 and low/medium/high for part 2)
- ☐ Does the alternative preserve and enhance existing natural resources (i.e., floodways, riparian areas, wetlands and wildlife habitat) and avoid development in inappropriate sites? (qualitative assessment and/or quantitative measure of the amount of constrained land devoted to open space and/or resource protection)
- ☐ Does the alternative avoid development in areas with slope stability hazard potential based on available slope stability information and assessment of degree of risk by consulting team? (yes/no criterion)

Park Place CONCEPT PLAN

WATER INFRASTRUCTURE: STORMWATER, WATER AND SANITARY SEWER FACILITIES

- ☐ Do alternatives mimic natural hydrology (to the extent practicable) through the use of site-specific and regional stormwater management best management practices? (Assess existing watershed characteristics and relative impacts of each alternative)
- ☐ Are projected levels of development consistent with the capacities of existing or potential planned future infrastructure systems? (yes/no criterion)
- ☐ Do alternatives optimize the use of the existing infrastructure systems and improved infrastructure systems? (yes/no for part 1 and low/medium/high for part 2)

TRANSPORTATION INFRASTRUCTURE

- ☐ Are existing and proposed streets appropriately sized to accommodate projected growth in the planning area? (yes/no criterion)
- ☐ Will proposed transportation improvements provide a safe environment to travel by each mode? (qualitative: low/medium/high criterion)

Park Place
CONCEPT PLAN

TRANSPORTATION INFRASTRUCTURE, continued.

- ☐ Are there appropriate opportunities to travel by multiple modes of transportation (walking, bicycling, driving, and transit) and are residents likely to use such facilities? (yes/no for part 1 and low/medium/high for part 2)
- ☐ Are there appropriate levels of connectivity by multiple modes within the area and to other areas of the community? (qualitative: low/medium/high criterion)
- ☐ Do proposed transportation improvements minimize increases in impervious surface and related environmental impacts? (qualitative: low/medium/high criterion)

FINANCING AND OTHER CRITERIA

- ☐ Do probable funding needs and prospective funding methods pay for enhanced levels of public service? (yes/no criterion)
- ☐ Do the alternatives optimize the use of existing public services and facilities? (yes/no criterion)

Park Place
CONCEPT PLAN

FINANCING AND OTHER CRITERIA, continued.

- ☐ Do the alternatives provide for a land use mix with fiscal characteristics adequate to fund the marginal cost of law enforcement, fire and other emergency services? (yes/no criterion)

- ☐ Was the Park Place Concept Plan an open and transparent process that is characterized by a clear, complete, timely and open communication and meaningful opportunities for involvement in the planning process? (yes/no criterion; approach: qualitative assessment by PAC members and community forum participants through evaluation questionnaire)

- ☐ Do the alternatives identify the location of future schools (and other civic uses) based on projected population estimates? (yes/no criterion)

E. Buildable Lands Methodology

Park Place Buildable Land Inventory Methodology

Title 11 of Metro's Urban Growth Functional Plan states that new urban area plans require a "provision for average residential densities of at least 10 dwelling units (du) per acre of net vacant buildable land in zones…" This average residential density is only applicable to areas recently added to the urban growth area. This section define the term "buildable lands" for Park Place Concept Plan study and outline a strategy for determining which lands within the project area qualify as "buildable lands." The purpose of this exercise is to determine the density of development required as part of Title 11.

For this study, buildable land is defined as land that is suitable for development or redevelopment. Briefly, the methodology for determining suitable lands in the Park Place project area is as follows:

Vacant Land + Redevelopable Land - Constrained Land - Other Land = Gross Buildable Land

Definitions

Vacant Land is sourced through Metro's Regional Land Inventory System (RLIS). This process, outlined in detail in Chapter 4 of the 2002-2022 Urban Growth Report: A Residential Land Need Analysis, defines vacant land as tax parcels with no improvement value or buildings, and partially-vacant land as parcels with an undeveloped portion of a lot that is larger than one-half acre. In this context, vacant land is simply that. It does not indicate whether the parcel is buildable or marketable.

Redevelopable Land is defined as non-vacant land that meets redevelopment thresholds established by market professionals and community members during the planning process. The primary assumption is that all properties with a square foot value (SFV) of $10/sf or less is a candidate for redevelopment. The SFV is derived by dividing the total market value of the property by the total area (market value/area = $/sf).

Constrained Land is land that is considered environmentally-sensitive and/or has limited or no redevelopment potential. Constrained lands considered unbuildable for inclusion in the buildable lands inventory are:

Class I and II Riparian Habitat areas (recognized as “High” and “Moderate” Habitat Conservation Areas (HCA) by Metro)
Steep slopes – Slopes greater than 25%
Major easements
Other Land is defined as land that has cultural and/or historic value. The category is also open to land that may be omitted from the buildable inventory for reasons not currently apparent.

Gross Buildable Area and Net Buildable Area

Since the residential density is based on “net buildable land,” it is necessary to convert gross buildable land to net buildable land to account for land needs for new roadways, sewer infrastructure, other public facilities, and civic institutions (i.e., churches, fraternal organizations, etc.) This planning process proposed using a methodology similar to that used for the Damascus-Boring Concept Plan, which allocates percentages of the gross buildable land for these services based on past performance, professional judgement, and community input. We proposed the following percentages to accommodate land needs for new infrastructure:

New Local Streets – 18%
Storm Drainage – 2.5%
Police, fire, and civic institutions – 3.5%

The total percentage of land deducted from the gross buildable area is 24%. Therefore, the equation for net buildable land is:

Gross Buildable Land – (24% of Gross Buildable Land) = Net Buildable Land

Net Buildable Lands Summary - UGB Expansion Area		
		acres
+	Vacant land (1)	208.36
+	Redevelopable Land (2)	38.54
	Development Base aggregate	*246.9*
-	25% > slopes (3)	70.1
-	Habitat Conservation Areas (4)	33.3
-	Right-of-way needs (5)	25.8
-	Stormwater facilities (6)	3.6
-	Civic uses (7)	5.0
-	School area	n/a
-	Historic properties - listed landmark (8)	0
-	Easements	
	Total buildable land	109.1
	Required minimum density (10 du/acre)	1091

Notes:

(1) RLIS database inventory (2006) clipped to expansion area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

(6) 2.5% of "buildable" land as determined by Clackamas County (ibid)

(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"

Buildable Land Summary - Livesay Area		
		acres
+	Vacant land (1)	129.5
+	Redevelopable Land (2)	42.1
	Development Base aggregate	*171.6*
-	25% > slopes (3)	37.2
-	Habitat Conservation Areas (4)	11.5
-	Right-of-way needs (5)	22.1
-	Stormwater facilities (6)	3.1
-	Civic uses (7)	4.3
-	School area	n/a
-	Historic properties - listed landmark (8)	1.66
-	Easements	
	Total buildable land	91.7
	at R-10 zoning density (4 du/acre)	367

Notes:

(1) RLIS database inventory (2006) clipped to Livesay area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

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(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"

F. Typology

PARK PLACE: COMMERCIAL TYPOLOGIES

VILLAGE COMMERCIAL

Mixing residential and commercial activities contributes to “eyes on the street” and focuses human activity in core areas at all times of the day. Commercial can be retail, office or civic uses, depending on demand.















F. Typology

PARK PLACE: PARKS AND OPEN SPACE TYPOLOGIES

UNDEVELOPED NATURAL AREAS

Undeveloped natural areas are unprogrammed open areas typically consisting of steep slopes, wetlands, and other sensitive natural areas.



preserving creek corridors as open space provides benefits for both habitat and humans



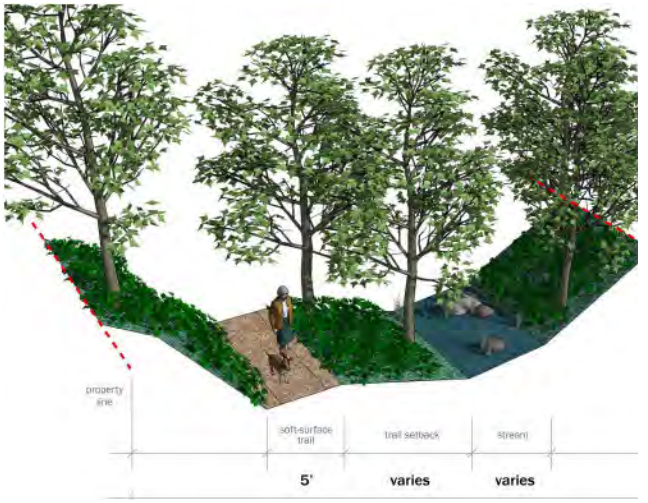
preserved wetlands can provide a natural buffer and transition area between development and natural areas



clusters and significant stands of trees should be preserved for habitat, shade, and windbreak



a greenway is a more formal way to preserve mature trees and open space and improve connectivity through the community





PARK PLACE: PARKS AND OPEN SPACE TYPOLOGIES

DEVELOPED OPEN SPACE: PARKS

This type of open space is intended to provide public gathering and recreation space for community residents. A neighborhood park should be within 1/2 mile of each home in the community so that residents can easily walk or bicycle to them. Ideally, the parks should be connected with a trail system.





















PARK PLACE: PARKS AND OPEN SPACE TYPOLOGIES

DEVELOPED OPEN SPACE: VILLAGE CENTER COMMONS



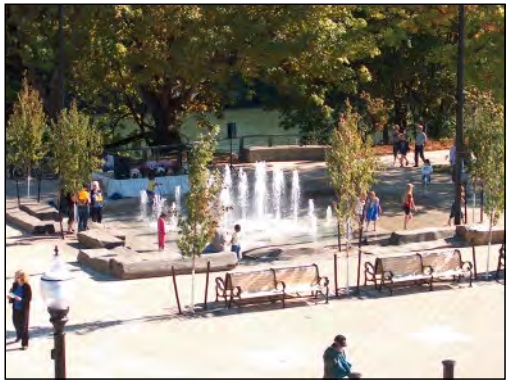




A Village Center Plaza or Commons provides a mix of soft and hardscapes for a variety of community uses, like farmers' markets, bazaars, concerts, and festivals. The urban design of the space creates a sense of enclosure but also permeability, with access from multiple points.







PARK PLACE: RESIDENTIAL TYPOLOGIES

SINGLE-FAMILY RESIDENTIAL



Single-family houses can be a range of sizes, styles, and colors. Above all, they should be community-oriented with architectural elements that encourage "eyes on the street" and neighbor interaction.









Rural roots. Variety. Community oriented. Green. Quality. Classic.









SINGLE-FAMILY RESIDENTIAL: affordable alternatives

Part of the challenge of meeting the housing needs of a growing and thriving region is to offer housing types that address the values that drive demand for detached, single family housing, but with smaller spaces and smaller price tags.





Housing Variety

Houses don't always have to have to maximize their size to provide a quality living space. A variety of housing sizes and types attract a mixture of ages, incomes, family structures and lifestyles to help create a richer, more diverse community.



Cottage Clusters

Cottage housing provides an option that preserves the privacy and personal space of a detached house in a smaller and less costly unit. Cottages provide a way to trade **quantity** of space **for quality** of space.

PARK PLACE: RESIDENTIAL TYPOLOGIES

MULTI-FAMILY HOUSING







There are a variety of ways to provide quality, community-oriented apartments. In some cases, apartment complexes can be designed to look like single-family residences and contain six or seven apartments. This provides density without dramatically changing the character of the neighborhood.

Highland's Garden (Denver, CO)





Multi-family housing clustered around common open spaces (instead of parking lots) help foster a sense of community that usually isn't found in conventional apartment complexes. Vehicle access is provided in the rear and with alleys.

MULTI-FAMILY HOUSING: alternatives



An ADU over a garage.

An auxillary dwelling unit (ADU) or "granny flat" is a second self-contained dwelling unit created on a lot with a house, attached house or manufactured home. These dwellings are typically small (no larger than 800 sf) and are intended to provide housing options for a variety of single occupant tenants. Units can be joined to/over garages or stand alone on the property.



The Rose House is a net-zero energy ADU in Portland. Net-zero energy means that the house produces as much energy as it uses.

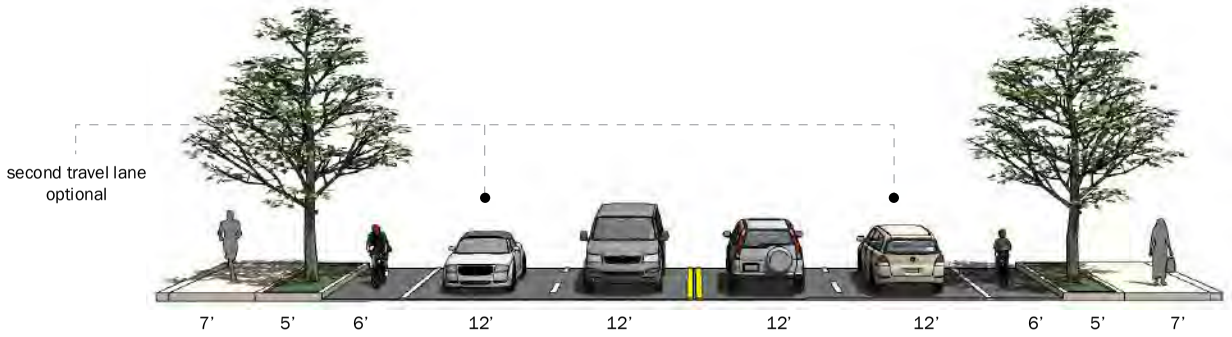
PARK PLACE: ROADWAY TYPOLOGIES

ARTERIAL ROADS

MINOR ARTERIAL 1

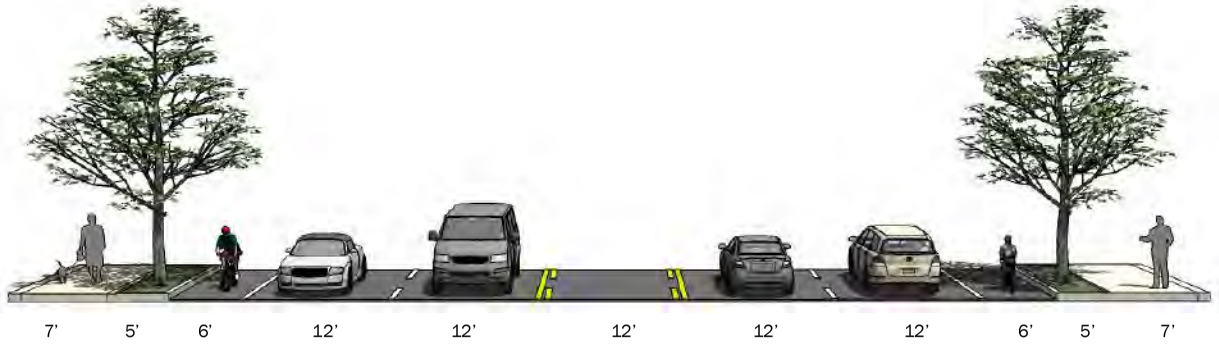
TOTAL ROW = 86'

TOTAL ROW WITHOUT SECOND TRAVEL LANE = 62'



MINOR ARTERIAL 2

TOTAL ROW = 98'



MINOR ARTERIAL 3

TOTAL ROW = 98'



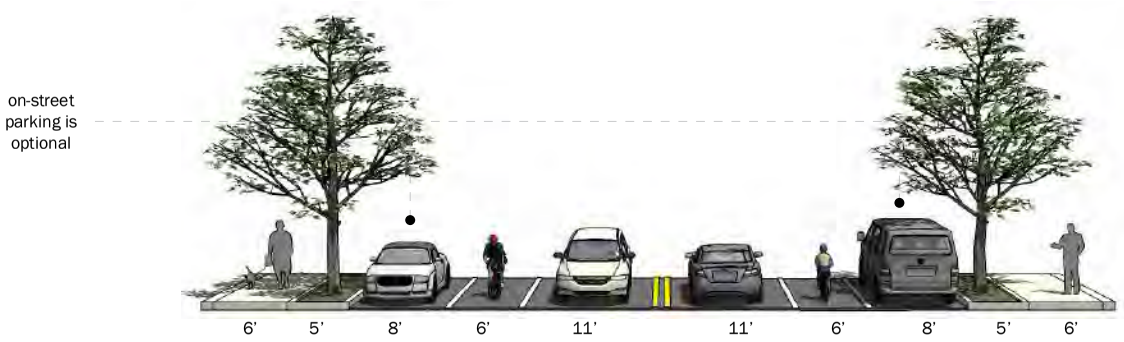
PARK PLACE: ROADWAY TYPOLOGIES

COLLECTOR ROADS

COLLECTOR 1

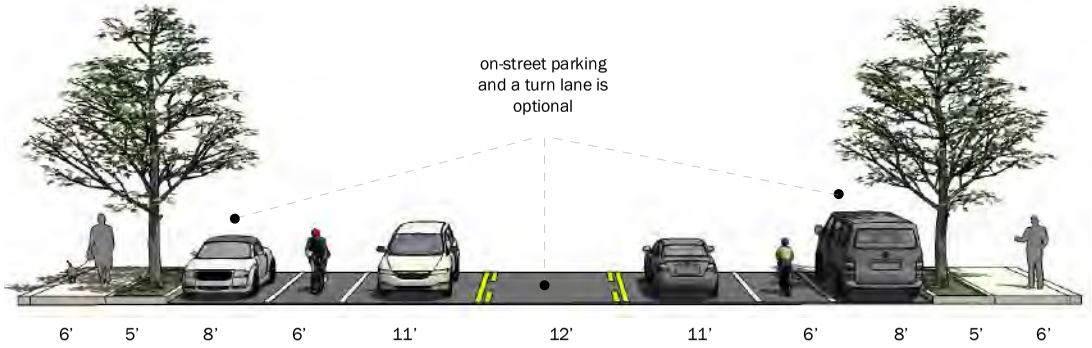
TOTAL ROW = 74'

TOTAL ROW WITHOUT PARKING= 58'



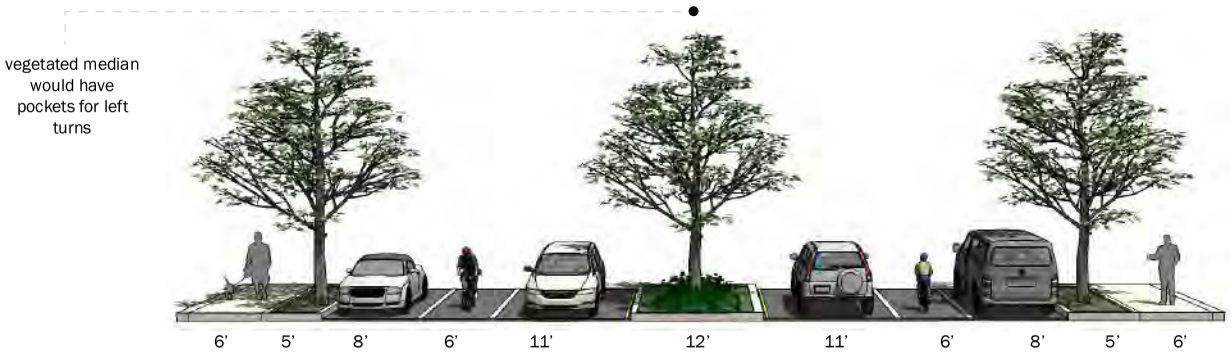
COLLECTOR 2

TOTAL ROW = 86'



COLLECTOR 3

TOTAL ROW = 86'

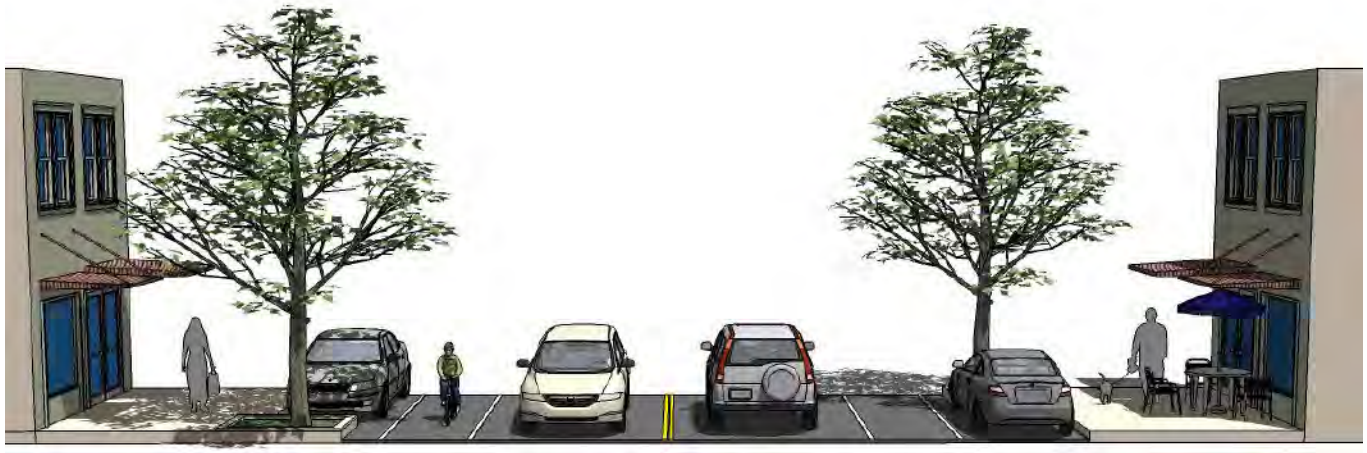


PARK PLACE: ROADWAY TYPOLOGIES

COLLECTOR ROADS

NEIGHBORHOOD COLLECTOR 1

TOTAL ROW = 68' - 72'



10' - 12' | 8' | 5' | 11' | 11' | 5' | 8' | 10' - 12'

NEIGHBORHOOD COLLECTOR 2

TOTAL ROW = 81'

TOTAL ROW WITHOUT PARKING= 58'

vegetated median would have pockets for left turns



5' | 5' | 8' | 5' | 11' | 11' | 11' | 5' | 8' | 5' | 5'

PARK PLACE: ROADWAY TYPOLOGIES LOCAL ROADS

LOCAL ROAD 1

TOTAL ROW = 58’



5’ 5’ 10’ 16’ shared lane 10’ 5’ 5’

LOCAL ROAD 2

TOTAL ROW = 36’



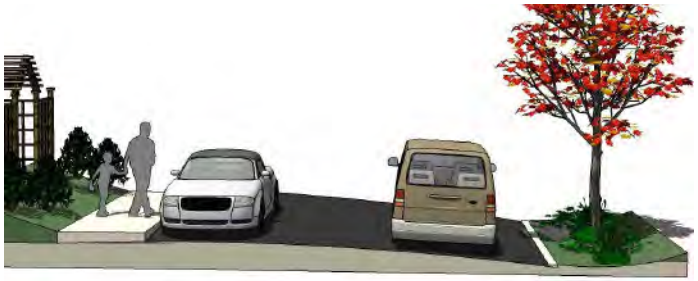
5’ 5’ 16’ shared lane 5’ 5’

HILLSIDE ROAD*

TOTAL ROW = 86’

A Hillside Road would be appropriate for roads that traverse steeper slopes and have limited or no development on one side (typically the downhill side). The road is graded such that surface stormwater is directed to a large bio-swale on the downhill side of the slope. The bio-swale pretreats and absorbs some of the stormwater before it enters the local waterways.

* This roadway treatment is not an accepted standard for the City of Oregon City.



5’ 8’ 16’ shared lane 10’ - 12’ swale

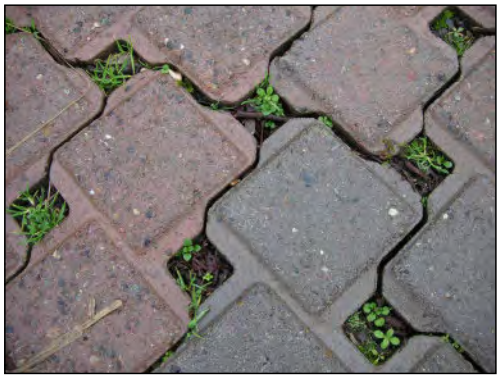
PARK PLACE: ROADWAY TYPOLOGIES

INNOVATIVE ROAD AND EDGE TREATMENTS










permeable pavers for parking strips and full road treatments







bio-swales collect and pre-treat stormwater runoff

PARK PLACE: ROADWAY TYPOLOGIES

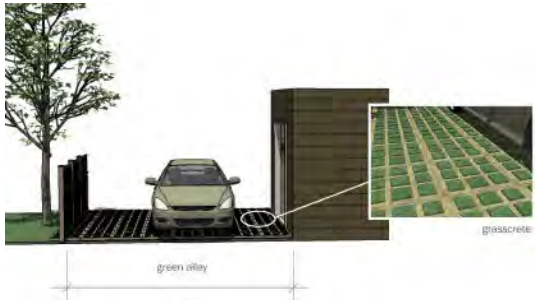
INNOVATIVE ROAD AND EDGE TREATMENTS



a green alley incorporates "green" features like permeable pavement, pavers, and/ or a small vegetated filter strip to reduce stormwater runoff



woonerf is the dutch term for a "living street"



G. Title 11

Introduction

This memo provides the findings for compliance with the following land use elements of Metro's Title 11 regulations governing concept planning within Metro's jurisdiction.

- Annexation
- Housing density
- Variety of housing types
- Housing affordability
- Commercial/Industrial development
- Transportation
- Mapping
- Public Facilities and Services
- Schools
- Urban Growth Diagram
- Plan Amendments

The following sections provide overviews of these elements and how they comply with Title 11 concept planning requirements.

Annexation

Chapter 14 of the City's existing code establishes regulations for annexation. These regulations require an application process, hearings, and review by the Planning Commission and City Commission before the annexation is decided by Oregon City voters.

In addition to a legal description of the proposed annexation area, written consent of property owners, site plans, and an application fee, an annexation proposal must provide statements addressing the following:

- availability, capacity and status of existing water, sewer, drainage, transportation, park and school facilities;
- increased demand for such facilities to be generated by the proposed development, if any, at this time;
- additional facilities, if any, required to meet the increased demand and any proposed phasing of such facilities in accordance with projected demand;
- method and source of financing required to provide additional facilities, if any;
- overall development concept and methods by which the physical and related social environment of the site, surrounding area and community will be enhanced;
- potential physical, aesthetic, and related social effects of the proposed, or potential development on the community as a whole and on the small sub community or neighborhood of which it will become a part; and proposed actions to mitigate such negative effects, if any; and
- the type and nature of any comprehensive plan text or map amendments, or zoning text or map amendments that may be required to complete the proposed development.

The Planning Commission's recommendation to the City Commission and the City Commission's decision as to whether to advance the proposal to the voters for a decision depend on whether adequate access and public facilities and services can be provided; impacts to Goal 5 resources, natural hazard areas, and the overall economic, social, and physical community are avoided or are minimal; and the proposal complies with goals and policies in the City's Comprehensive Plan.

Annexation of Park Place should be guided by the ability to serve subareas with public facilities such as roads, water, sewer, and storm water. For these reasons, subareas of Park Place that are adjacent to existing city boundaries, facilities, and services are likely to be annexed first. The northern portion of Park Place was brought into the City's Urban Growth Boundary (UGB) in the 1980s, long before the

rest of Park Place was in 2002, and is particularly primed for annexation, due to existing development and property owners' interest in developing.

More detailed explanations of serving subareas of Park Place with public facilities are provided in Appendix J.

Housing Density

B. Provision for average residential densities of at least 10 dwelling units per acre of net vacant buildable land in zones in which residences are allowed, or such other densities that the Council specifies pursuant to Section 3.01.040 of the Urban Growth Boundary Functional Plan.

The Park Place Concept Plan must provide for an overall average residential density of at least 10 dwelling units per residential acre within the southern portion of Park Place added to the UGB in 2002. The remaining northern portion of Park Place that was added to the UGB in the 1980s is only required to meet the density of the existing base zone (4 dwelling units maximum in the R-10 zone). The total number of housing units that the buildable land in these two subareas of Park Place can provide, given their respective densities, is the target amount of housing that proposed land use designations and zoning in the overall Park Place Concept Plan area must accommodate. The amount of net buildable land in the northern and southern subareas of Park Place and the total number of units each subarea can provide, based on their respective density requirements, is presented in Table 1.

Table 1: Buildable Land and Target Number of Housing Units

2002 UGB Expansion Area	
Vacant + Developable Land	246.9 acres
Constrained Land	-103.4 acres
New Roads and Utilities	-34.4 acres
Net Buildable Land	109.1 acres
Units (10 du/acre)	*1,091 units*
1980 UGB Expansion Area (Livesay Area)	
Vacant + Developable Land	171.6 acres
Constrained Land	-48.7 acres
New Roads and Utilities	-31.2 acres
Net Buildable Land	93.4 acres
Units (4 du/acre)	*367 units*
Park Place Study Area Total	**1,458 units**

The proposed land use designations for the Park Place Concept Plan are shown in the Urban Growth Diagram in Figure 1-1 of the Park Place Area Concept Plan. Land designated for residential use is a mixture of low/medium- and medium/high-density. The low/medium-density is planned for a minimum of 6 units/acre and the medium/high-density for a minimum of 9 units/acre. These densities roughly correspond to the maximum densities allowed in the City's existing R-6 and R-3.5. However, only the minimum densities for these zones – 5 units/acre in the R-6 zone and 9 units/acre in the R-3.5 zone – can be guaranteed to be developed based on the current zoning code.[1] Therefore, strictly applying the existing R-6 zone will not achieve the required minimum density necessary to reach the overall housing target of 1,458 units. To achieve this minimum density and create a more conventional minimum lot size, code revisions (e.g. new base zones) that ensure development at a minimum of 6 units/acre in a low/medium-density residential zone are recommended. These code provisions will help implement the Concept Plan and demonstrate compliance with Title 11.

Conclusions and Recommendations

In order to provide the amount of housing required by Title 11, it is recommended a new residential zone be developed for use in Park Place and citywide: low/medium-density residential (R-5) zone with a minimum density of 6 units/acre. Using an existing medium/high-density residential zone (R-3.5 zone), with some modifications which would apply only in Park Place, is also recommended.

The low/medium-density and medium/high-density zones are proposed for the areas shaded orange and yellow, respectively, in the Urban Growth Diagram (see Figure 1-1 of the Park Place Area Concept Plan). The location and size of these zones were determined through a rigorous multi-day charrette process described in Appendix C.

The areas shaded green include environmentally constrained lands and, as a result, are recommended to be zoned with the lowest-density residential district available in the City, the R-10 zone. Density requirements and other standards for these zones are discussed further in the implementation section (see Appendix I).

The mixed-use designation (MUC-1) proposed along the main street in Park Place's largest neighborhood center, North Village, will allow for stand-alone high-density residential uses and a combination of residential and commercial uses. This area is represented in pink in the Concept Plan Urban Growth Diagram (see Figure 1-1 of the Park Area Concept Plan). Standards proposed in the implementation appendix of this report, however, are intended to provide flexibility for ground floor development that would support a combination of residential and commercial uses.

As presented in Table 3 in the following section on housing variety, the land proposed for low/medium-density residential and medium/high-density residential zoning provides for the housing target of 1,458 units. The low-density R-10 zone shaded green in Park Place will also provide housing, but the amount of housing is uncertain and will likely be limited due to environmental constraints in these areas.. As is shown in the spreadsheet of land use areas (see Appendix I), the single-family or low/medium-density zone is represented in the Urban Growth Diagram includes approximately 203 gross acres and the multi-family or medium/high-density zone includes approximately 57 gross acres.

[1] Subdivision regulations in Oregon City Code Section 16.12.232 establish minimum density as 80% of the maximum density. Minimum density is not required for partitions of one to three lots. However, more than three lots must be created if there is enough land for more than three lots given minimum lot size requirements. In this case, the land division would then be subject to subdivision regulations.

Variety of Housing Types

C. Demonstrable measures that will provide a diversity of housing stock that will fulfill needed housing requirements as defined by ORS 197.303. Measures may include, but are not limited to, implementation of recommendations in Title 7 of the Urban Growth Management Functional Plan.

The Concept Plan must provide for a diversity of housing stock to meet projected housing needs. Based upon the "Best Practices" images (see Appendix F), the plan will identify housing types that can meet desired densities, contribute to community character, and accommodate future area residents. It is recommended that the types of housing include accessory dwelling units (ADUs), detached or attached single-family residences (townhouses), and duplexes or other small multiplexes.

A range of housing types would be allowed within the zones recommended for use in Park Place.

- Low-Density Residential (R-10, maximum 4 units/acre)
  - Single-family detached dwelling units (including manufactured homes)
  - Accessory dwelling units (ADUs) [2]
- Low/Medium-Density Residential (proposed R-5, minimum 6 units/acre)
  - Single-family detached dwelling units (including manufactured homes)
  - Accessory dwelling units (ADUs)
  - Single-family attached dwelling units (townhouses/rowhouses)
  - Two-family dwelling units (duplexes)
- Medium/High-Density Residential (R-3.5, minimum 9 units/acre)
  - Single-family detached dwelling units (including manufactured homes)
  - Single-family attached dwelling units
  - Two-family dwelling units (duplexes)
  - Multi-family dwelling units (proposed)
- Medium-Density Mixed Use Corridor (MUC-1)
  - Pre-existing single-family detached dwelling units
  - Single-family and two-family attached dwelling units (duplexes)
  - Multi-family dwelling units
- Neighborhood Commercial (NC)
  - Dwelling units above ground floor (if in conjunction with a permitted or conditional use)

Cogan Owens Cogan determined the number of needed housing units according to housing type, which is presented in Table 2. These figures are based on the number of units required by Title 11 to be provided in Park Place and the ratio of existing housing types in Oregon City according to the 2000 Census.

Table 2: Type and Amount of Needed Housing

Type of Housing	Number of Units Needed
Single-Family Residential Detached	950
Two-Family Residential Attached (Duplex)	87
Manufactured Home in Park	48

[2] According to the supplemental standards in OCMC Section 17.54.090, accessory dwelling units (ADUs) are allowed in all single-family residential zones, subject to special development and occupancy standards. However, ADUs are not explicitly listed as allowed uses in the R-10 and R-6 zones, and for clarity it is recommended that they be listed.

Type of Housing	Number of Units Needed
Single-Family Residential Attached	9
Multi-Family Residential	282
Accessory Dwelling Units	17
Group Quarters	65
TOTAL	***1,458***

Manufactured homes on their own are permitted in any zone where single-family detached housing units are permitted, which includes the low-density, low/medium-density, and medium/high-density zones. They also will be permitted in the new R-5 zone proposed for use in Park Place and citywide, as described in the implementation technical memorandum (See Appendix I). The R-10, R-5, and R-3.5 zones are the primary residential zoning proposed for use in Park Place.

Group quarters including boarding and lodging houses, correctional facilities, and nursing homes are all permitted as conditional uses in Oregon City residential zones according Oregon City Municipal Code (OCMC) Section 17.56.030 (See Appendix I) of the City's existing code. Definitions of group quarters in Oregon Revised Statutes (ORS) 197.660 differentiate between residential homes and residential facilities as uses serving up to five residents versus six to 15 residents, respectively. Given this definition, residential homes are permitted/permitted conditionally in Oregon City single-family residential zones (R-10, R-8, R-6, R-3.5, and the proposed R-5) and residential facilities in two-family and multi-family residential zones (R-3.5 and R-2).

Conclusions and Recommendations

Most of the housing planned for Park Place is proposed to be accommodated in a new proposed low/medium-density R-5 zone and the City's existing medium/high-density R-3.5 zone with proposed allowances for multi-family housing in Park Place. Table 3 provides a summary of what acreage is needed in each zone in order to accommodate the needed number and variety of housing units.

Table 3: Type and Amount of Housing by Land Use Designation

Residential Land Use Designation/Zone	Number of Units Needed	Housing Type
Low/medium-density residential (yellow) – minimum 6 units/acre	907	Single-Family Residential Detached (including Manufactured Homes)
	17	Accessory Dwelling Units (ADUs) sited with Single-Family Residential
Sub-total	924	
Medium/high-density residential (orange) - minimum 9 units/acre	117	Single-Family Residential (Detached and Attached)
	369	Two-Family Residential Attached (Duplex) and Multi-Family Residential
	65	Group Quarters
Sub-total	551	
Total	**1,475**	

The low/medium-density zone is more likely to be the site of manufactured homes and ADUs than the medium/high-density zone. The distribution of housing types in Table 3, however, represents only one scenario for accommodating needed housing within zones proposed for Park Place. It is possible that housing types may develop in different ratios, including development of attached single-family housing in the low/medium-density residential zone.

Housing Affordability

D. Demonstration of how residential developments will include, without public subsidy, housing affordable to households with incomes at or below area median incomes for home ownership and at or below 80 percent of area median incomes for rental as defined by U.S. Department of Housing and Urban Development for the adjacent urban jurisdiction. Public subsidies shall not be interpreted to mean the following: density bonuses, streamlined permitting processes, extensions to the time at which systems development charges (SDCs) and other fees are collected, and other exercises of the regulatory and zoning powers.

Title 11 requires that the planning area allow for inclusion of and adequate supply of affordable housing without public subsidy. According to the 2000 Census, the median household income (MHI) in Oregon City is $45,531. Affordable housing is typically defined as housing which does not cost more than 30% of a household's income. In addition, very low income households are typically defined as those earning less than 30% of median household income; low-income households as those earning less than 50% of median household income; and moderate income households are those making between 50% and 80% of median income. These income ranges have been used to estimate the cost of housing that would be considered affordable to households with very low, low, and moderate incomes. Table 4 shows the results of this analysis for Oregon City.

Table 4: Affordable Housing in Oregon City

Percentage of MHI	Percentage of Households	Percentage Difference	Affordable Rent/Mortgage
0-30% MHI	11%	-	$341
0-50% MHI	20%	9%	$569
0-80% MHI	38%	18%	$911

Typically, the types of housing most affordable to people with low and moderate incomes are single-family homes on small lots, attached single family homes, duplexes and multi-family housing, as well as accessory dwelling units. These types of housing are expected to account for a significant portion of all housing units in the plan area – 370-500 units (25%-35%), depending on the proportion of higher density detached single-family homes that fall into affordable price ranges. This range is consistent with the percentage of lower income households that could be expected to need housing units in the area, if they are representative of the City as a whole.

Conclusions and Recommendations

While Title 11 requires that the planning area allow for development of affordable housing without public subsidy, it is anticipated that the City will work with other public agencies, non-profit groups and developers to identify funding opportunities to further increase the supply of affordable housing in the area. The other housing elements of Title 11 compliance describe how a range of housing types, and a corresponding potential range of affordable housing, can be accommodated within the Park Place plan area and its proposed land use designations. Affordable housing goals, policies, and strategies are presented in the Plan Elements section of Chapter 3 of the Concept Plan.

Commercial and Industrial Development

E. Provision for sufficient commercial and industrial development for the needs of the area to be developed consistent with 2040 Growth Concept design types. Commercial and industrial designations

in nearby areas inside the Urban Growth Boundary shall be considered in comprehensive plans to maintain design type consistency.

The plan must provide for sufficient commercial and industrial development to meet the needs of the area, if a demand for such land and associated services or employment exists. The planning process will determine whether there is land suitable for this type of development within the Park Place area, whether it is consistent with the community goals and vision for the area, and if so how much of it and where it should be located to best meet the needs of residents.

Commercial Development

Johnson Gardener, the consulting firm providing market analysis for this project, estimates that the Park Place Concept Plan area can support about 20,000 to 40,000 square feet of retail services. The plan area is not a likely candidate for regional retail services because of limited access and regional commercial centers that are already present or are planned nearby. Johnson Gardener recommends that if neighborhood-scale commercial uses are planned for the Park Place Concept Plan area, they be located so as to maximize exposure and business from through traffic.

The need for office employment space will be more loosely based on community needs. Office uses in the area that are considered to be the most viable and likely to develop include medical, insurance, real estate, and other professional services.

Conclusions and Recommendations

Both the Neighborhood Commercial (NC) and Medium-Density Mixed Use (MUC-1) zones will accommodate commercial development and are recommended for use in Park Place; the MUC-1 zone is proposed for limited use along the main street (Livesay) in the proposed North Village.[3] Either zone could accommodate the retail and employment uses envisioned for the area. However, the NC zone will be targeted for primarily retail use and the MUC-1 zone for office/employment and housing. Table 5 identifies the amount of floor area proposed for each of these commercial uses.

The amount of land that will accommodate retail development includes land for parking and landscaping. Given approximately 79,000 square feet of total land area and assuming approximately 50% lot coverage, the NC zone yields about 0.91 acre (39,595 square feet) of building area and the same area for parking and landscaping. This closely approximates the upper end of retail building area that consultant Johnson Gardner estimated that Park Place could support.

There is roughly 274,500 square feet of total land area in the MUC-1 zone, although if the MUC-1 zone were to be developed with office uses on the ground floor, only a portion of the land area (e.g. 50%) would likely develop in order to allow for parking and landscaping. Therefore, the roughly 137,000 acres reported in Table 5 represents the capacity that the MUC zone has for commercial/office development. The market will determine how much of this floor area capacity is ultimately developed in the MUC-1 zone. Similarly, if the ground floor initially develops as residential, “live/work” development standards that are proposed incorporation into the MUC-1 zone in Park Place will allow commercial uses to eventually develop on the ground floor if there is demand for those uses. Live/work standards would allow up to 50% of the ground floor to be used for commercial purposes. As assumed above, if the building covers half of the lot, 50% of the ground floor area in the MUC zone yields 68,607 square feet that could be developed as live/work commercial space depending on the market.

[3] The NC zone is shaded as red in the Urban Growth Diagram and the MUC-1 zone as pink. (See Figure 1-1 of the Park Place Area Concept Plan)

Table 5: Proposed Area of Commercial Uses in Park Place

Type of Commercial Use	Proposed Zone	Land Area (sq. ft.)	Floor Area (sq. ft.)
Retail	Neighborhood Commercial (NC)	79,191	39,595
Office	Medium Density Mixed-Use Corridor (MUC-1)	274,428	137,214
TOTAL		***353,619***	***176,809***

There are numerous development standards in the City's existing code that will promote an urban atmosphere, a pedestrian friendly environment, and energy and natural resource conservation for commercial development in these zones. The implementation section of this report recommends additions or revisions of these standards (see Appendix I).

Industrial Development

Potential industrial uses in the area would be constrained by limited access and suitable buildable land (large sites with little or no slope). Land zoned industrial to the north of Park Place focused around an I-205 interchange and land with existing and planned industrial zoning (as part of a concept plan) for the Beavercreek area directly south of Park Place provide suitable and adequate industrial land for the City.

Conclusions and Recommendations

No industrially zoned land is recommended or planned for Park Place.

Transportation

F. A conceptual transportation plan consistent with the applicable provision of the Regional Transportation Plan, Title 6 of the Urban Growth Management Functional Plan, and that is also consistent with the protection of natural resources either identified in acknowledged comprehensive plan inventories or as required by Title 3 of the Urban Growth Management Functional Plan. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

The Park Place Concept Plan includes a multi-modal transportation system that complies with city, regional, and statewide transportation plans and ensures a safe and adequate multi-modal transportation system to meet the forecast travel needs of the planning area. The Conceptual Transportation Plan comprises street, transit, bicycle, and pedestrian facilities and services that make each mode viable to meet certain travel needs, while minimizing the need to travel in single-occupant motor vehicles. Plan components include the following:

1. A functionally classified set of streets that provide appropriate connections within and across the planning area and adequately serve local and longer-distance vehicular travel (see Figure 3-5 of the Park Place Concept plan). An emphasis of the Plan is to expand the City's functionally classified network such that it protects the HWY 213 corridor as a regional facility of critical importance.
2. A network of local and higher-order streets that provides redundancy for emergency access, appropriate ventilation to neighborhoods and commercial nodes of activity, and efficient connections to minimize travel distances (see Figure 3-4 of the Park Place Concept Plan).
3. A variety of street cross sections that reflect the needs of adjacent land uses and respond to the constraints of topography, limited rights-of-way, and the costs of construction (see Figures 3A-3J of the Park Place Concept Plan).
4. A network of on-street and off-street pedestrian and bicycle facilities that meet the needs of commuters, recreationists, residents, and employees (see Figures 3-8 and 3-10 of the Park Place Concept Plan). These facilities are planned to provide safe routes to schools and other

key pedestrian/bicycle generators in the planning area. In addition, they provide seamless connections to anticipated transit service in the area. Finally, the comprehensive nature of this network promotes these modes as viable options for a variety of trip purposes.

5. A conceptual routing of future transit service that connects the planning area to major transit centers in the Oregon City area, as well as key destinations within Oregon City (see Figures 3-7 of the Park Place Concept Plan).

Construction cost estimates for the planned transportation improvements have been prepared and a conceptual financing plan has been developed

Mapping

G. Identification and mapping of areas to be protected from development due to fish and wildlife habitat protection, water quality enhancement and mitigation, and natural hazards mitigation, including, without limitation, all Habitat Conservation Areas, Water Quality Resource Areas, and Flood Management Areas. A natural resource protection plan to protect fish and wildlife habitat, water quality enhancement areas, and natural hazard areas shall be completed as part of the comprehensive plan and zoning for lands added to the Urban Growth Boundary prior to urban development. The plan shall include zoning strategies to avoid and minimize the conflicts between planned future development and the protection of Habitat Conservation Areas, Water Quality Resource Areas, Flood Management Areas, and other natural hazard areas. The plan shall also include a preliminary cost estimate and funding strategy, including likely financing approaches, for options such as mitigation, site acquisition, restoration, enhancement, and easement dedication to ensure that all significant natural resources are protected.

Required mapping and preliminary costs are included in the Concept Plan and in Appendix L.

Public Facilities and Services

H. Provide a conceptual public facilities and services plan for the provision of sanitary sewer, water and storm drainage. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

Conceptual public facility plans have be developed for the provision of sanitary sewer, water and storm drainage. These plans have been developed to comply with goals of the local community, City of Oregon City, Metro and the following documents:

- City of Oregon City Water Master Plan
- City of Oregon City Sanitary Sewer Master Plan
- City of Oregon City Drainage Master Plan
- City of Oregon City Draft Stormwater Management Plan
- City of Oregon City Stormwater and Grading Design Standards

The City of Oregon City Water Master Plan was referenced to determined anticipated water demands within the concept plan area. Average daily demand as well as peak demand and fire demand were evaluated at a preliminary level. In general, water demand from planned development within the concept plan area is consistent with demands anticipated in the Water Master Plan.

The City of Oregon City Sanitary Sewer Master Plan was referenced to determined anticipated sanitary sewer generation within the concept plan area. In general, similar sanitary flows were developed. As a result, sanitary flows generated by development within the concept plan area are consistent with those found in the Sanitary Sewer Master Plan.

All three stormwater documents emphasize minimizing the amount of post-development stormwater runoff to pre-development conditions and reducing pollution loads. The Concept Plan stormwater approach was developed to meet these goals.

Law Enforcement. The Clackamas County Sheriff's Department currently provides law enforcement services. As the area is annexed, the City of Oregon Police Department will assume service responsibilities for the area.

Fire protection. Fire protection services currently are provided by Clackamas Fire District #1 (CFD) which serves the City of Oregon City as well as four other cities in Clackamas County. CFD is expected to continue to serve the area as it is annexed.

Libraries. Currently, the Clackamas County Libraries District has the responsibility for serving unincorporated portions of Clackamas County, including the planning area. As the area is annexed, the City will work with the County to determine the most efficient approach for providing library services to the Park Place area.

Parks. The Concept Plan includes two neighborhood parks, each located in a neighborhood center adjacent to commercial and civic uses as well as medium and/or higher density housing. The parks are intended to provide basic recreational opportunities for residents and may include amenities such as play equipment, athletic fields picnic table or shelters, walking trails and other features. The north village neighborhood includes an 8-10 acre neighborhood park, while the south village park is about 3-5 acres.

Parks needs are consistent with those generally identified the City of Oregon City's existing Parks Master Plan. That plan identifies a community park and a neighborhood park service area within the Concept Plan study area. Local and national guidelines for these types of parks indicate a need for about 10 – 30 acres of developed park land in the planning area. The City is currently updating its Parks Master Plan which may provide more refined guidance on the size of future parks in the area and/or needed amenities within them

The open spaces identified in environmentally constrained portions of the study area are also are expected to provide extensive opportunities for outdoor recreation including an extensive trail system.

New land and facilities to meet parks and recreation needs are expected to be paid for by assessing systems development charges on new development and/or collecting fees or land donations in lieu of SDCs. Other potential mechanisms for acquiring land and/or paying for park or recreation facilities could include voluntary donations from private landowners or other citizens, partnerships with community groups or organizations, and/or joint development or use agreements with the Oregon City School District. Ongoing operation and maintenance of park facilities is expected to be funded through a combination of general fund money, user fees, cooperative efforts with community groups, and possibly joint use and maintenance agreements with the school district if joint facilities are developed in the vicinity of Ogden Middle School. The City updated Parks System Master Plan may identify additional possible funding mechanisms."

Schools

I. A conceptual school plan that provides for the amount of land and improvements needed, if any, for school facilities on new or existing sites that will serve the territory added to the UGB. The estimate of need shall be coordinated with affected local governments and special districts.

No new school sites are identified for Park Place. There are two existing elementary schools near the study area — Park Place Elementary and Holcomb Elementary. They have a combined capacity for an additional 300 students. Future enrollment projections for these elementary schools are relatively flat, as new households in their service areas are projected to be less likely to include young children than they have in the past.

Ogden Middle School is in the study area and has additional capacity, although it is at its preferred capacity. Middle school enrollment also is projected to decline overall in the surrounding area served by Ogden, exclusive of potential additional development within the Park Place study area.

Based on enrollment projection assumptions used by the Oregon City School District, which vary for different type of housing units, development in the study area is expected to result in the following approximate number of additional students when the area is completely developed:

- 350 elementary school students
- 150 middle school students
- 150 high school students

These increases in enrollment are expected to occur gradually over the next five to twenty years, depending on the pace of annexation and development in the planning area. Given the additional capacity of existing schools, these additional students would not create the need for a new elementary school which averages about 500 students in the Oregon City School District. Similarly, the increase in enrollment would not result in the need for an entire new middle school, which averages about 700 students in the District. Therefore, no additional school site is recommended in the concept plan.

Urban Growth Diagram

J. An urban growth diagram for the designated planning area showing, at least, the following, when applicable:

1. General locations of arterial, collector and essential local streets and connections and necessary public facilities such as sanitary sewer, storm sewer and water to demonstrate that the area can be served;
2. Location of steep slopes and unbuildable lands including but not limited to wetlands, floodplains and riparian areas;
3. Location of Habitat Conservation Areas;
4. General locations for mixed use areas, commercial and industrial lands;
5. General locations for single and multi-family housing;
6. General locations for public open space, plazas and neighborhood centers; and
7. General locations or alternative locations for any needed school, park or fire hall sites.

See Final Concept Plan / Figure 1-1 of the Park Place Concept Plan.

Plan Amendments

K. The plan amendments shall be coordinated among the city, county, school district and other service districts. (Ordinance No. 98-772B, Sec. 2. Amended by Ordinance No. 99-818A, Sec. 3; Ordinance No. 01-929A, Sec. 8; Ordinance No. 02-964, Sec. 5; Ordinance No. 05-1077C, Sec. 6.) to the UGB. The estimate of need shall be coordinated with affected local governments and special districts.

See Final Concept Plan.

H. Transportation

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TRANSPORTATION MEMORANDUM

Date: May 21, 2007 **Project #**: 7938.0

To: Tim Smith, SERA Architects

From: Phill Worth, Andrew Cibor, and Nick Foster

Project: Park Place Concept Plan

Subject: Future Conditions Analysis

PROJECT DESCRIPTION

The City of Oregon City is preparing a concept plan for an area encompassing nearly 500 acres located east of Highway 213 and south of Holcomb road, which will be adopted into the City's Comprehensive Plan. The Park Place Concept Plan will integrate a multi-modal transportation system with a mixed-use development pattern to achieve a highly efficient and sustainable design. The Concept Plan will identify a network of internal and external pedestrian, bicycle, transit, and street connections that serve the study area and connect it to the surrounding community and the broader region.

The Concept Plan will ensure that this area is developed in an efficient and sustainable manner, optimizing the use of the available lands while protecting the natural resources of the area. This project will identify compatible land uses, which will include a mix of commercial and residential uses, thereby reducing the need for vehicle trips, optimizing the efficiency of public transportation, offering multi-modal transportation options, and reducing the need to expand the Urban Growth Boundary (UGB).

CONTENTS OF THE MEMORANDUM

This memorandum focuses on the following transportation issues related to the Park Place Concept Plan:

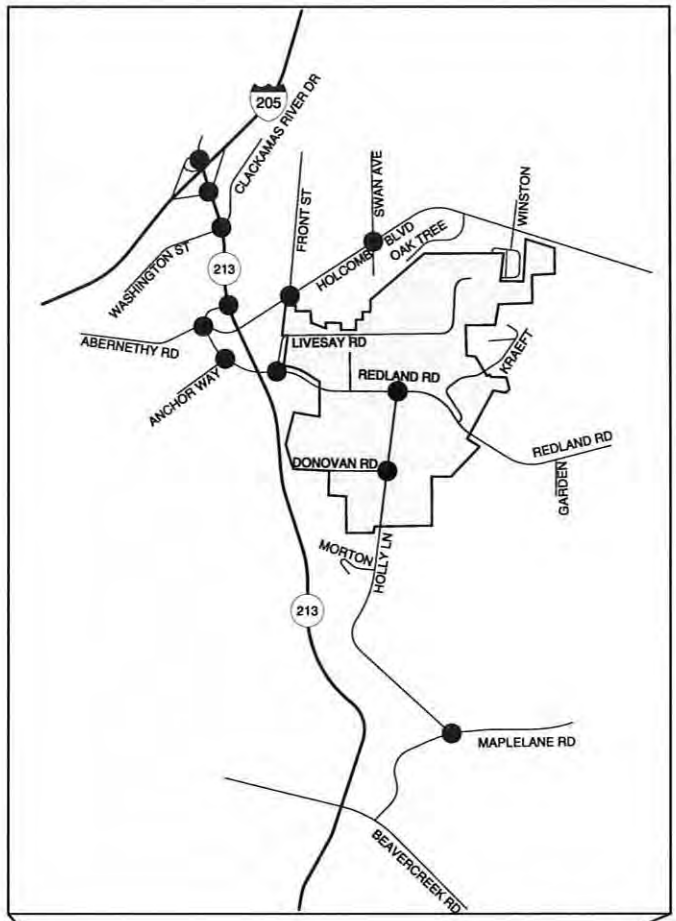
- Study Area
- Regional and Local Growth
- Future Year 2027 Forecast No-Build Traffic Conditions
- Future Year 2027 Forecast Build Traffic Conditions
- Recommended Improvements & Costs

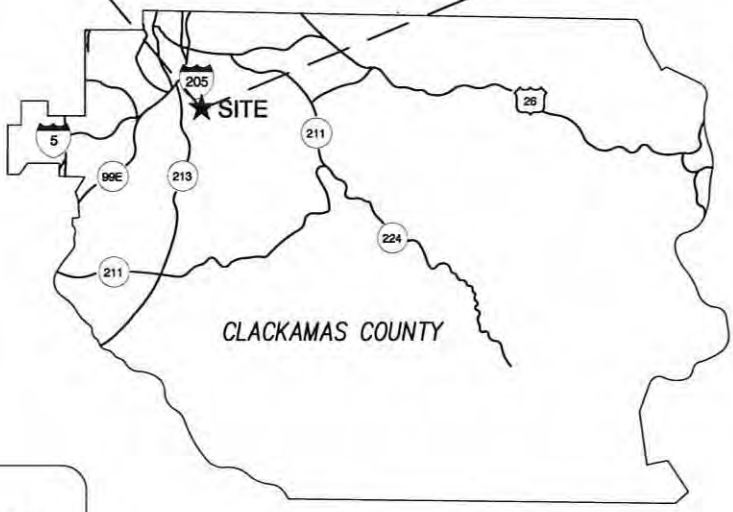
STUDY AREA

The study area and study intersections were selected based on direction provided by Oregon City staff. As illustrated in Figure 1, the study area encompasses the vicinity around HWY 213 bounded by the I-205/HWY 213 interchange to the north and Beavercreek Road to the south.

Park Place Concept Plan

May 2007





(NO SCALE)

LEGEND

● - STUDY INTERSECTION

□ - PROJECT AREA

SITE VICINITY MAP
OREGON CITY, OREGON

FIGURE **1**

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H:\proj\file\7938 - Park Place Concept Plan\dwgs\figs\Future2\FromPDX\FutureFigs1.dwg May 17, 2007 - 8:31am - nfoster Layout Tab: FIG 01

REGIONAL & LOCAL GROWTH

Increases in regional and local travel demand are most closely associated with growth in population and employment; therefore, it is important to understand the context of the year 2027 No-Build Scenario.

Projected Regional Population & Employment Growth

The Portland metropolitan regional population is projected to exceed 2 million by the year 2030. The region is expected to add nearly 367,000 new households over the next 25 years, to a total of more than 1.1 million households; an increase of nearly 50 percent. More than 900,000 new jobs are expected to be added in the region by year 2030, for a total of more than 2.2 million jobs; an increase of approximately 70 percent.

Projected Oregon City Population & Employment Growth

The Oregon City area is expected to share in this regional growth. Households are expected to grow from approximately 13,500 to nearly 23,750 by 2030; an increase of more than 75 percent. Employment is estimated to grow from just over 18,500 in 2005 to nearly 36,000 by 2030; an increase of more than 90 percent. Figure 2 provides an illustration of the Oregon City area, indicating the city limits (shaded yellow), urban growth boundary (gold boundary line), and the geographic area (black boundary line) that contains the households and jobs associated with Oregon City.

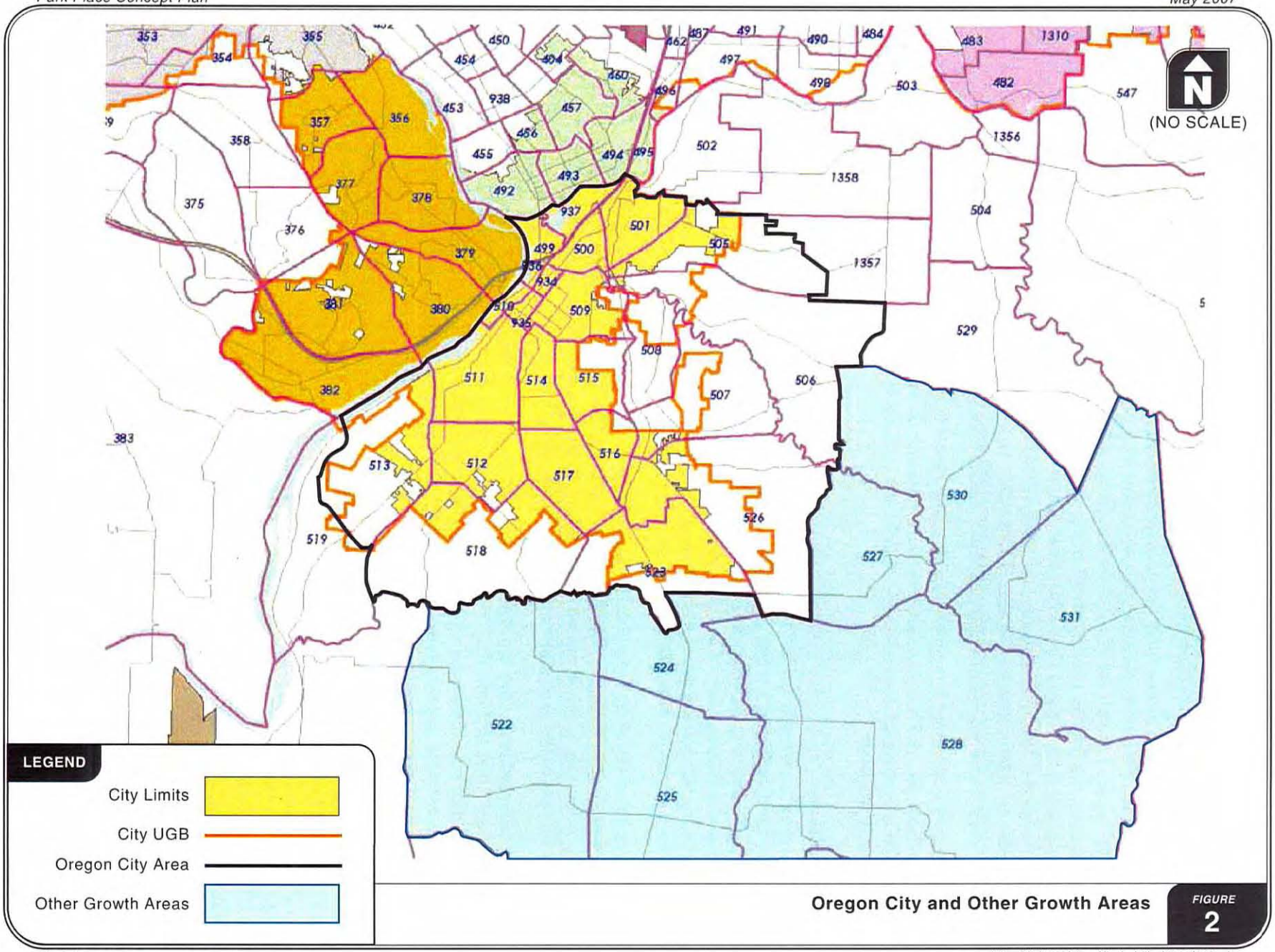
Oregon City Jobs-Housing Balance

The jobs-housing ratio of a city, county, or region can have a significant effect on the quantity of travel that occurs on the transportation system. Cities that serve as "bedroom communities" to regional employment centers often experience higher levels of commuter congestion than do cities of comparable size with a higher jobs-housing ratio. In addition, those commuters are frequently traveling longer-than-average distances; thus, increasing the regional vehicle-miles-traveled per capita. The outcome of this jobs-housing imbalance is a degradation of the quality of life at both the local and the regional level.

The jobs-housing ratio for Oregon City in 2005 was approximately 1.38 compared to 1.69 for the region as a whole. This understanding has led the City of Oregon City to pursue a more balanced jobs-housing ratio as a long-term transportation strategy to improve quality of life, reduce vehicle-miles-traveled per capita, and improve the efficiency of the transportation system. The City is projected to achieve a jobs-housing ratio of 1.52 by 2030, if it is able to successfully attract the number of new jobs and households listed above.

Projected Population & Employment Growth Surrounding Oregon City

Available data from METRO indicates that areas east and south of Oregon City (highlighted in blue in Figure 2) are projected to experience appreciable growth. Households will increase from approximately 2,600 in 2005 to nearly 6,300 by 2030 (an increase of over 140 percent). Employment is forecast to increase from approximately 1,400 jobs in 2005 to almost 2,000 by 2030 (an increase of over 40 percent). This growth will contribute to increased travel demand on such corridors as HWY 213, Redland Road, Holcomb Boulevard, and Holly Lane.



Oregon City and Other Growth Areas

FIGURE 2

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YEAR 2027 NO-BUILD TRAVEL DEMAND FORECAST

The regional travel demand model, built and maintained by METRO, is the forecasting tool used for this project. METRO and its partnering agencies develop versions of the model for various reasons and the version chosen for this project is referred to as the Sunrise Model, which was prepared to support the Sunrise Corridor study being completed in northern Clackamas County. During consultations with Oregon City, Clackamas County, and ODOT staff, this version of the model was selected and key improvements (such as a new Clackamas River crossing connecting the I-205/Gladstone interchange to Clackamas River Drive) were removed to provide a better representation of the existing transportation system in the Oregon City area.

Caution is advised when using a regional travel demand model to conduct a subarea study, in as much as the land use and transportation network structure is very coarse. The result is a generalized forecast of travel demand that is suitable at a regional level, but must be interpreted for use at the subarea level.

Forecast Volumes

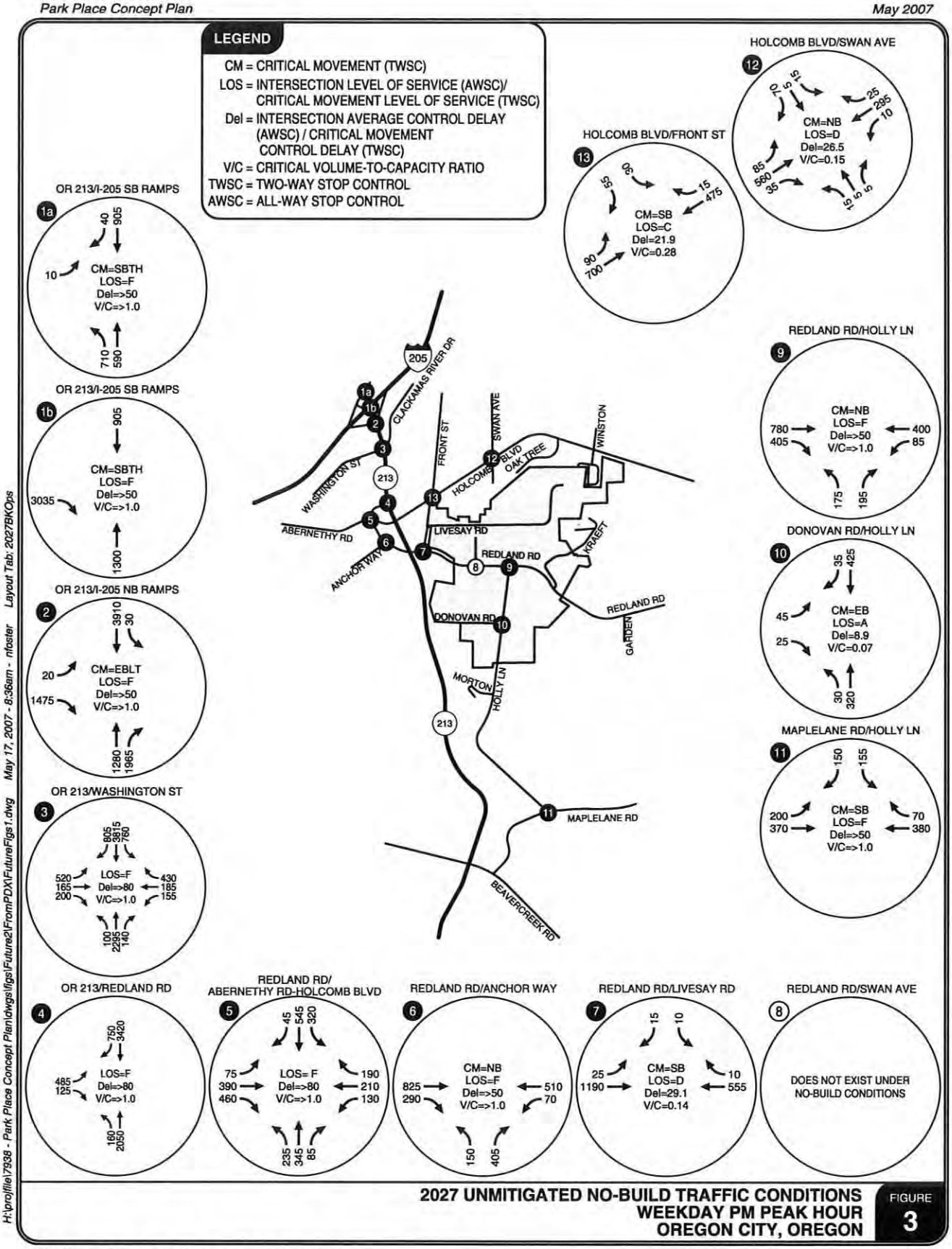
Year 2027 No-Build forecast traffic volumes for the weekday PM peak hour are modified volumes from the Clackamas County 2030 Sunrise model projections. The Sunrise model is chosen because it contains the latest land use assumptions approved of by the City of Oregon City and Clackamas County, as well as model refinements that produce a more suitable forecast for this area than the standard regional model is capable of. Nonetheless, the model forecast must be post-processed to provide reasonable volumes upon which to conduct planning analysis.

National Cooperative Highway Research Program Report 255 describes acceptable approaches for post-processing model forecasts. Various approaches were applied to the 2030 Sunrise model projections to determine which approach produced the most reasonable results. The approach that consistently yielded the most reasonable results is described below.

A model forecast produced from the 2005 "base year" model was subtracted from the 2030 Sunrise model and then multiplied by 80% to produce an estimate of the traffic growth that would occur on each link of the transportation system over the next 20 years. This 20-year traffic growth was then added to existing volumes to produce an estimate of the year 2027 background traffic volumes in the study area.

Final adjustments were then made on a link-by-link basis to better represent how local traffic accesses the transportation system. For example, movements that are not included in the model, or that are otherwise deemed by professional judgment to not be modeled correctly (i.e. extremely large growth due to a zone loading all its traffic at one intersection), must be modified. Traffic is either added to or subtracted from these movements until an amount of growth is obtained that appears reasonable, based on professional judgment, surrounding constraints to or opportunities for growth, and growth at other movements at the same intersection. Future volumes are also modified to ensure that volumes between intersections balance, where appropriate. In these instances, the higher volumes are typically assumed to be correct, in order to provide a conservative forecast. These final Year 2027 future turning movement volumes are shown in Figure 3. *Appendix "A" contains worksheets illustrating the base and modified future Sunrise model output volumes.*

Park Place Concept Plan May 2007



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2027 UNMITIGATED NO-BUILD TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE 3

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Growth in Travel Demand

Substantial growth in local and regional travel is anticipated over the next 25 years. The HWY 213 corridor will be hardest hit, with travel demands growing by nearly 50 percent to almost 60,000 vehicle-trips a day. Improvements to this corridor would be very costly and face many difficult challenges to overcome. City and regional planners agree that this vital facility must be protected by enhancing the city's transportation system to better serve local travel.

Redland Road, Holcomb Boulevard, and Holly Lane are also forecast to experience significant increases in travel demands. Each corridor is constrained by narrow rights-of-way, physical features, and/or difficult topography that make improvements difficult. Nonetheless, it is imperative that the local transportation system be improved and expanded to better serve the Oregon City area and protect the regional resources of HWY 213 and I-205.

A comparison of 2027 No-Build forecast traffic volumes to those measured under existing conditions reveals significant growth in demand will occur on several key corridors in the Oregon City area. Table 1 provides examples of existing and forecast volumes on several roadway segments and the percentage of growth that is estimated to occur.

TABLE 1
GROWTH IN TRAVEL DEMAND ON KEY CORRIDORS

Roadway	Existing PM Peak Hour Volumes	2027 No-Build PM Peak Hour Volumes	Percent Increase
HWY 213: North of Washington St.	5,500	8,600	56%
HWY 213: Washington St. to Redland Rd.	4,900	6,700	37%
HWY 213: Redland Rd. to Beavercreek Rd.	4,000	5,800	45%
Redland Rd.: HWY 213 to Abernethy Rd-Holcomb Blvd	900	1,500	67%
Redland Rd.: Abernethy Rd.-Holcomb Blvd. to Anchor Way	1,300	1,800	38%
Redland Rd.: Anchor Way to Livesay Rd.	1,100	1,800	64%
Redland Rd.: Livesay Rd to Holly Ln.	1,100	1,800	64%
Holly Ln..: Redland Rd. to Donovan Rd.	300	900	200%
Holly Ln.: Donovan Rd. to Maplelane Rd.	300	800	167%
Holcomb Blvd.: Redland Rd. to Front St.	800	1,300	63%
Holcomb Blvd.: Front St. to Swan Ave.	600	1,100	83%

The projected growth in travel demand on these corridors ranges between 300 vehicles per hour (on Holly Lane) to 3,100 vehicles per hour (on the northernmost segment of HWY 213). The percent increase ranges from 38 percent to 200 percent. These increases are so significant that demands on several roadways will exceed their existing capacity. The next section presents a summary of how well the existing transportation system can accommodate these 2027 No-Build travel demands and what mitigations are likely necessary to meet agency performance standards.

2027 NO-BUILD TRANSPORTATION DEMAND ANALYSIS

Level-of-Service Analysis

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the 2000 Highway Capacity Manual (Reference 1). *A description of level of service and the criteria by which it is determined is presented in Appendix "B." Appendix "B" also indicates how level of service is measured and what is generally considered the acceptable range of level of service.*

Level of service (LOS) analyses conducted for signalized intersections in this report are based on the average control delay per vehicle entering the intersection. For unsignalized intersections, LOS is based on the intersection's capacity to accommodate the worst, or critical, movement. Volume-to-capacity ratios are the controlling factors for all ODOT facilities and an appropriate general guide for planning studies that recommend long-term improvements to the multimodal transportation system.

Volume-to-capacity (v/c) ratios and levels of service were calculated for the 12 study area intersections using the weekday PM peak hour traffic volumes shown in Figure 3. The existing lane configurations and traffic control devices, summarized in Figure 4, were assumed in the analysis of the year 2027 no-build traffic conditions. *Appendix "C" includes the year 2027 No-Build Traffic Conditions level-of-service worksheets.*

Highway 213 Corridor

The Oregon Department of Transportation (ODOT) does not have any standards regarding level of service. Instead, the Department uses volume-to-capacity ratio standards to assess the study intersections along the HWY 213 corridor. ODOT standards require that the v/c ratios on all intersections of HWY 213 included within the Urban Growth Boundary (UGB) not exceed 0.99, except for the I-205 interchange ramp intersections. ODOT has special standards for freeway interchange ramp intersections. The freeway interchange ramp intersections are required to maintain a v/c ratio at or below 0.85. It should be noted that the signalized intersections along the HWY 213 corridor were analyzed using Synchro files provided by ODOT.

Figure 3 illustrates that all of the intersections along the HWY 213 corridor will be operating above capacity (v/c > 1.0) under year 2027 No-Build conditions, if all intersections retain the existing configurations shown in Figure 4. Improvements at each of the HWY 213 intersections would be required to meet applicable ODOT standards.

Redland Road/Holcomb Boulevard/Holly Lane Corridors

Oregon City and Clackamas County level-of-service standards are applied to the analysis of intersections along the Redland Road, Holcomb Boulevard, and Holly Lane corridors. The City of Oregon City and Clackamas County require that LOS "D" or better be maintained for all signalized intersections and LOS "E" or better be maintained for all unsignalized intersections. The City of Oregon City and Clackamas County do not have any standards regarding volume-to-capacity ratios.

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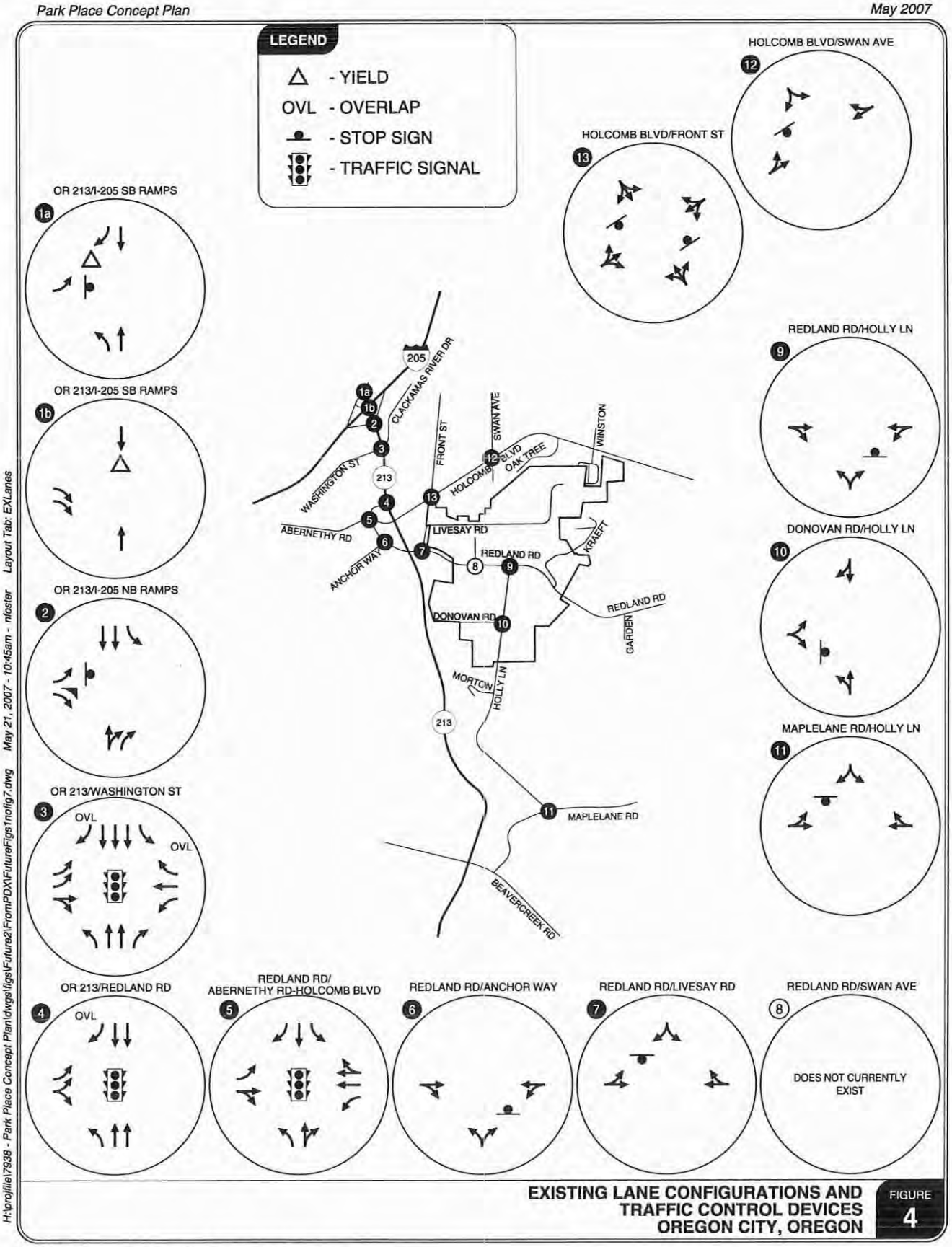

EXISTING LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES OREGON CITY, OREGON FIGURE 4

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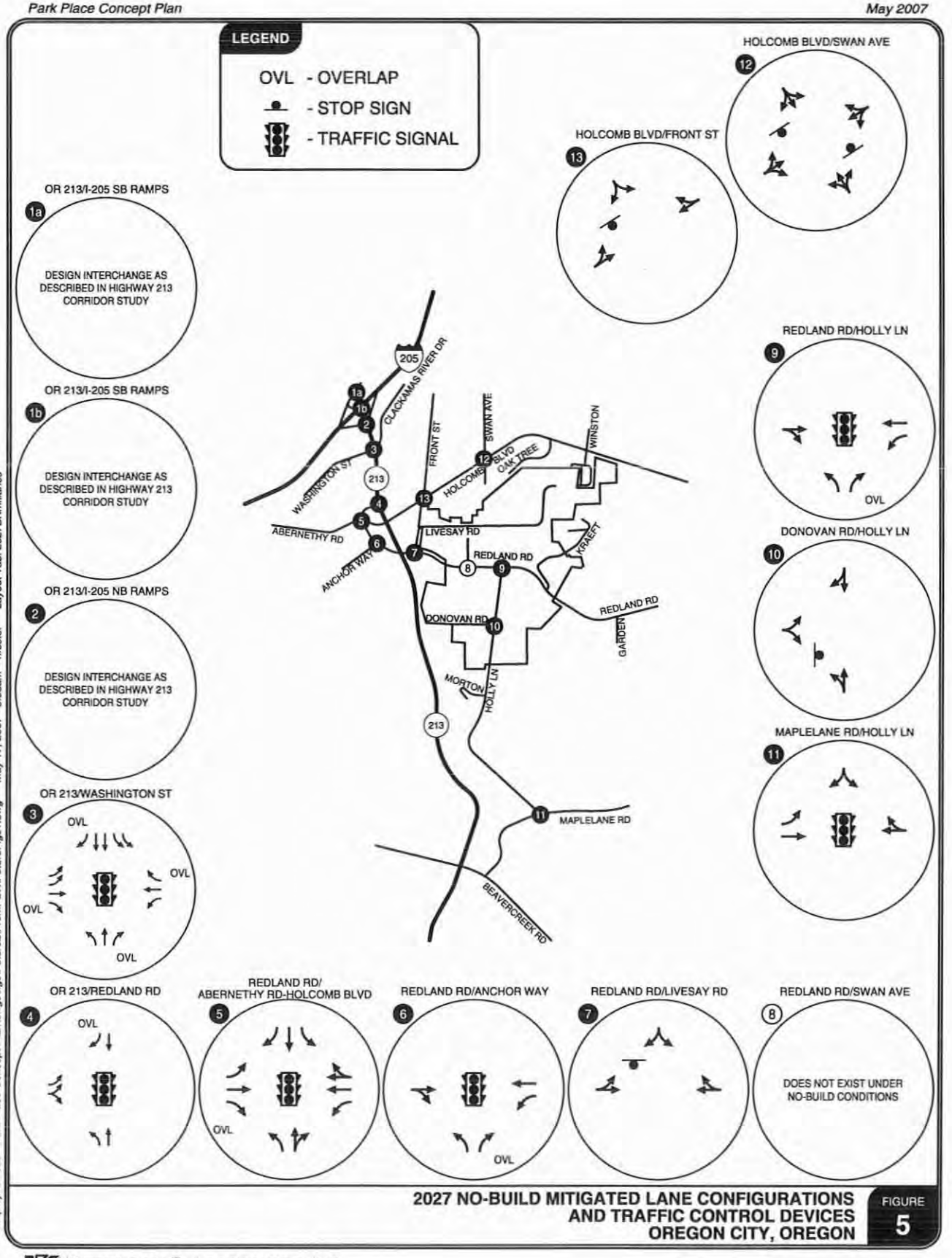
Figure 3 illustrates that several intersections along the Redland Road and Holly Lane corridors are forecast to fall below applicable standards during the PM peak hour in the year 2027. More specifically, the Redland Road/Abernethy Road-Holcomb Boulevard, Redland Road/Anchor Way, Redland Road/Holly Lane, and MapleLane Road/Holly Lane intersections are all expected to operate at LOS "F" without future improvements. Therefore, these intersections will need to be improved regardless of what happens in the Park Place planning area. All other non-highway intersections are expected to operate acceptably.

Needed Improvements

Table 2 describes the type of improvements that are necessary for each study intersection to meet its applicable standard. These new lane configurations and traffic control devices are shown in Figure 5 and the results of the operations analysis with these improvements in place are shown in Figure 6. *Appendix "D" contains the year 2027 No-Build Mitigated Traffic Conditions worksheets.*

TABLE 2
NEEDED IMPROVEMENTS UNDER 2027 NO-BUILD CONDITIONS

Intersection	2027 No-Build Conditions		Needed Improvement	2027 Mitigated No-Build Conditions	
HWY 213 Corridor					
	V/C			**V/C**	
HWY 213/I-205 SB Ramps	>1.0		- Construct Alternative 3 of the *HWY 213 Urban Corridor Design Study* (See Figure 7)	No conflicting movements	
HWY 213/I-205 NB Ramps	>1.0				
HWY 213/Washington Street	>1.0		- Construct Alternative 3 of the *HWY 213 Urban Corridor Design Study* (See Figure 7) - Configure intersection as shown in Figure 5	0.99	
HWY 213/Redland Road	>1.0		- Construct Alternative 3 of the *HWY 213 Urban Corridor Design Study* (See Figure 7) - Configure intersection as shown in Figure 5	0.68	
Redland Road/Holcomb Boulevard/Holly Lane Corridors					
	Delay (s)	**LOS**		**Delay (s)**	**LOS**
Redland Road/Abernethy Road-Holcomb Boulevard	>80.0	F	- Construct an EB RT lane - Modify signal	43.1	D
Redland Road/Anchor Way	>50.0	F	- Signalize intersection - Construct a NB LT lane - Construct a WB LT lane	38.1	D
Redland Road/Holly Lane	>50.0	F	- Signalize intersection - Construct a NB LT lane - Construct a WB LT lane	26.4	C
Maplelane Road/Holly Lane	>50.0	F	- Signalize intersection - Construct an EB LT lane	21.1	C



2027 NO-BUILD MITIGATED LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES OREGON CITY, OREGON

FIGURE 5

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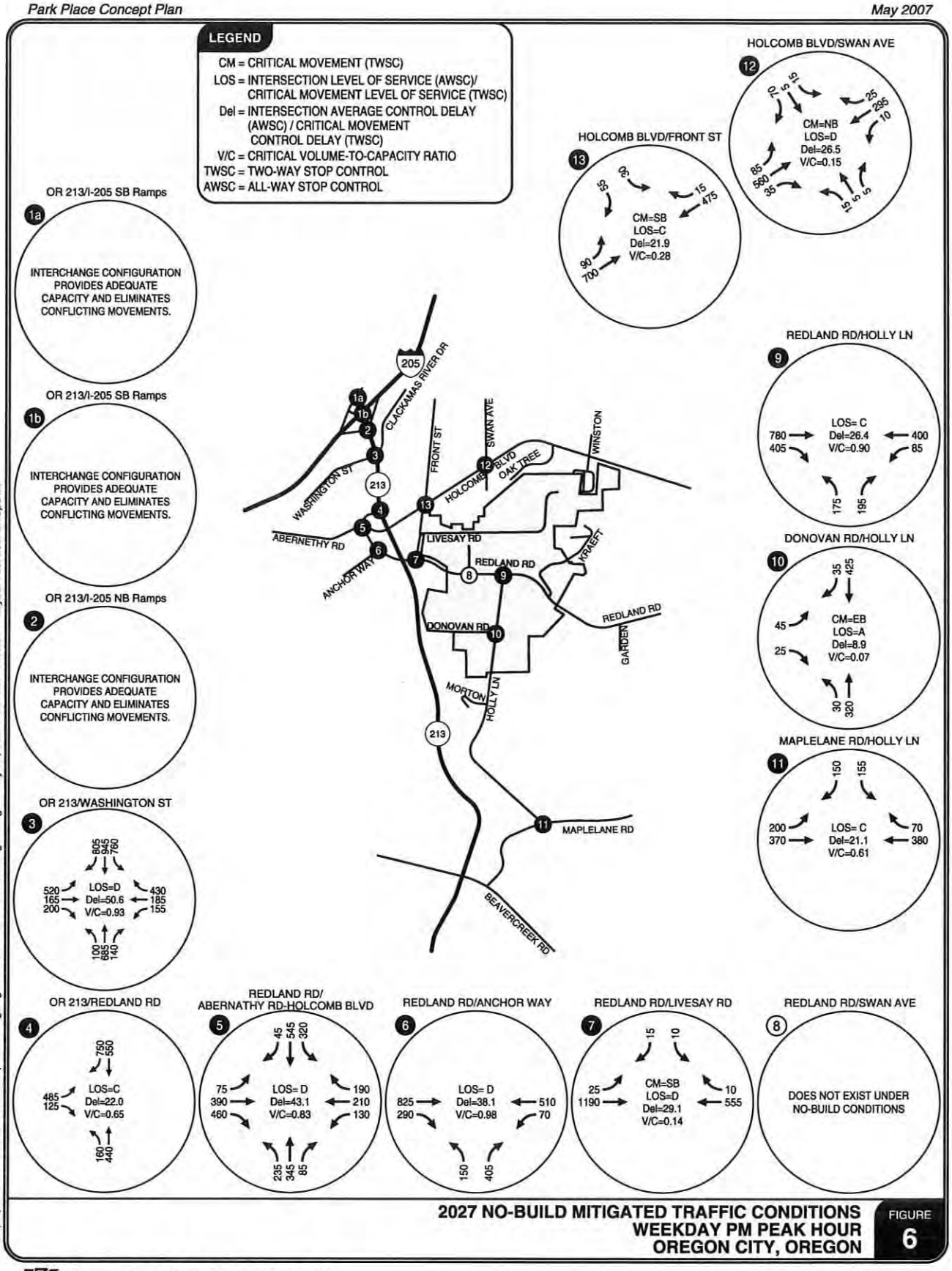

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2027 NO-BUILD MITIGATED TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE 6

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Figure 6 and Table 2 both show that with these improvements in place, the operations at all study intersections will meet applicable agency standards.

Highway 213 Corridor Improvement

Figure 7 is an illustration from the *Highway 213 Urban Corridor Design Study*, prepared in June of 2000 (Reference 2). The preferred long-term improvement for the northern-most segment of the corridor is represented in Figure 7 and involves two major components. First, the I-205/HWY 213 interchange would be reconstructed as a "systems interchanging", meaning that all movements between I-205 and HWY 213 would occur without conflict (no ramp terminals or at-grade intersections). Second, traffic bound for either Washington Street or Redland Road would be served by reconfiguring the existing at-grade intersections, while traffic that is to/from HWY 213 further south of Redland Road and going to/coming from I-205 would pass by Washington Street and Redland Road via grade-separated overcrossings.

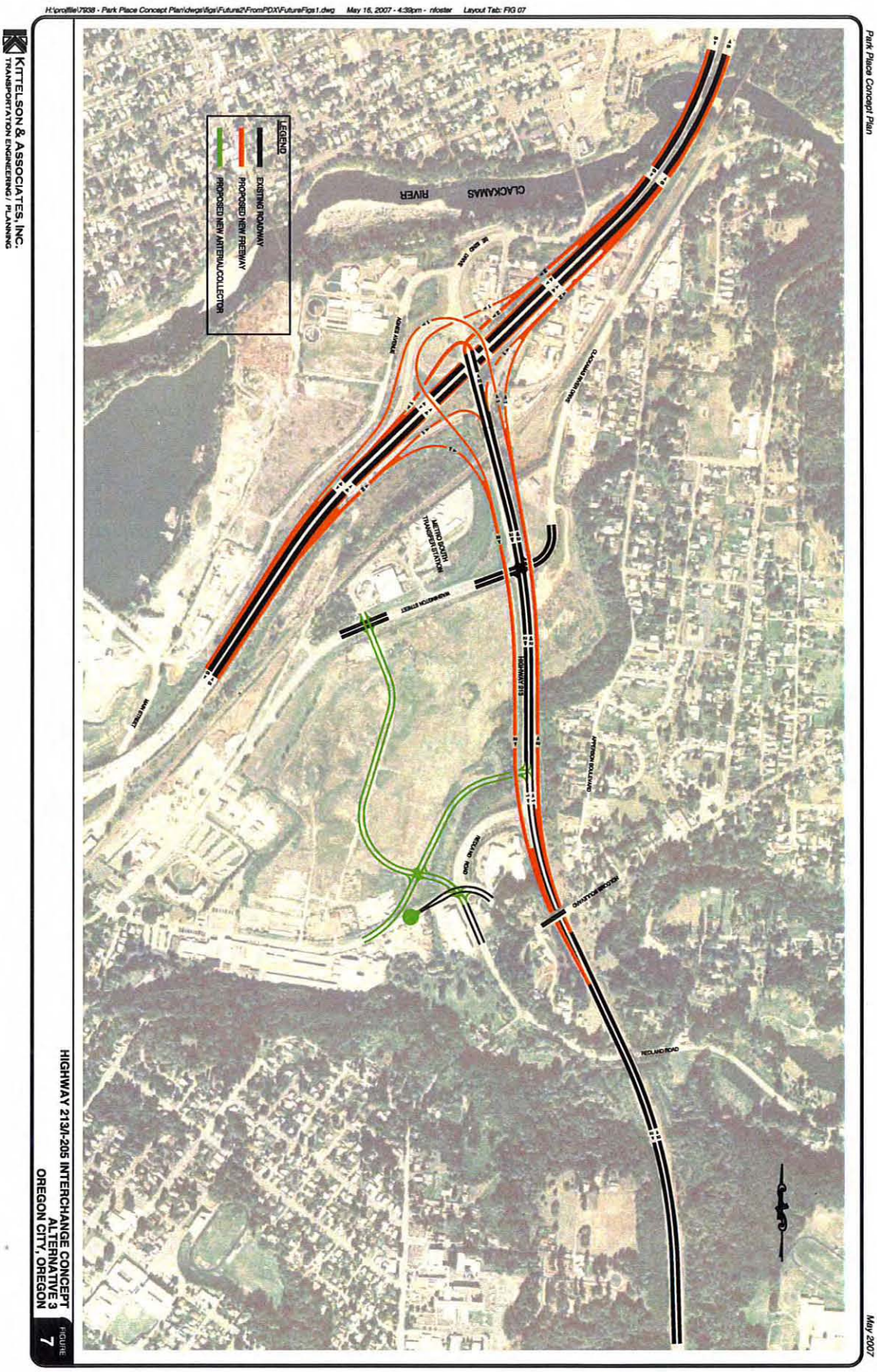
An alternative was developed that assumed a full interchange would not be constructed by the year 2027. Maintaining at-grade interactions at Washington Street and Redland Road, to serve both local traffic and highway through traffic, would require HWY 213 to be widened to four through lanes in each direction, plus turn lanes at the intersections to accommodate all movements. The highway would be twelve lanes wide at the Washington Street intersection, in order to accommodate all movements and achieve an acceptable v/c ratio. These improvements would extend north across the existing railroad overcrossing, as well as the I-205 overcrossing. They would extend south to a point near or beyond the Holcomb Boulevard overcrossing of HWY 213. This would be an interim solution with marginal benefit toward the longer-term solution described in the *Highway 213 Urban Corridor Design Study*. This is not considered a viable alternative.

Redland Road/Holcomb Boulevard/Holly Lane Improvements

Only intersection improvements are required to these three corridors under the No-Build scenario, as is shown in Table 2. It is worth noting that making these improvements will only address intersection capacity issues at key intersections. Redland Road may need to be constructed as a three-lane cross-section from the Abernethy Road-Holcomb Boulevard intersection to its intersection with Holly Lane in order to address capacity and safety issues that may arise in the vicinity of other intersections and private driveways.

PROPOSED LAND USE CONCEPT PLAN

The City of Oregon City, through a series of community meetings and charrettes, has identified a preferred alternative for the development of the Park Place area. The preferred alternative contains a mixture of land uses including residential, retail, mixed-use, park/open space, and civic areas. The mixed-use, retail, and high- and medium-density residential uses are clustered together in two different nodes to encourage area residents to travel by bicycling or walking to access the retail and commercial locations. Table 3 provides a comprehensive list of the land uses identified in the preferred alternative.



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HIGHWAY 213/I-205 INTERCHANGE CONCEPT
ALTERNATIVE 3
OREGON CITY, OREGON

FIGURE 7

TABLE 3
CONCEPT PLAN LAND USES

Land Use	Number of Units	Size (Sq. Ft.)
Single-Family Residential	1,106	N/A
Multi-Family Residential	470	N/A
Condo/Townhouses	134	N/A
Retail	N/A	122,750
Office	N/A	274,430

TRIP GENERATION

Estimates of daily and weekday PM peak hour vehicle trip ends for the preferred alternative are calculated using data for similar land uses summarized in the industry standard reference manual, *Trip Generation, 7th Edition*, published by the Institute of Transportation Engineers (ITE) (Reference 3). This approach to estimating trip generation was required because the METRO travel demand forecasting model was not available.

Not all of the trips will be to or from locations outside of the planning area. Several trips remain "internal trips" and are estimated using the methodology outlined in *Trip Generation Handbook, 2nd Edition*, published by the Institute of Transportation Engineers (Reference 4). Finally, the proposed layout of the Park Place area will encourage residents to travel to other locations within the site via bicycling or walking more than a traditional suburban environment does. Therefore a mode-split reduction is also taken to account for these non-vehicular trips. A brief description of these reductions follows.

Internal Trips

Internal trips are those trips that are made from one facility to another within the planning area and, never reach facilities outside of the planning area like HWY 213. This tends to occur when uses are too far away to walk or bicycle, but still closer than similar uses outside the planning area. Based on the type, location, and size of mixed-use development proposed and the methodology presented in the *ITE Trip Generation Handbook* for mixed-use developments, an internal trip rate of five percent was applied (Reference 4).

Mode Split Reduction

The vision of the Park Place Concept Plan is to decrease the use of single-occupancy vehicles and encourage local travel within the planning area via bicycling or walking, more than a traditional suburban environment does. This will be achieved by designing the area as a bicycle- and pedestrian-friendly area. By including parks and mix of land uses, it is expected that the planning area will function more as a neighborhood community than a typical subdivision used by ITE in their trip generation calculations. In addition, it is anticipated that the area will have and make use of regular transit service. Therefore, a mode-split reduction is also taken to account for the anticipated benefits. The reduction factor took into account such factors as proximity to major roadway facilities, the mix of land uses, and the proposed infrastructure. An overall mode-split reduction factor of 5 percent was applied to the planning area.

Table 4 summarizes the estimated site trip generation during a typical weekday, as well as during the weekday PM peak hour (all trip ends shown in Table 4 are rounded to the nearest five trips).

TABLE 4
PARK PLACE CONCEPT PLAN ESTIMATED TRIP GENERATION

Land Use	ITE Land Use Code	Size	Weekday Daily Trips	Weekday PM Peak Hour Trips		
			Total	Total	In	Out
Single Family Residential	110	1,106 HH	10,585	1,120	705	415
Apartments	220	470 HH	3,160	290	190	100
Condo/Townhouse	230	134 HH	785	70	45	25
Specialty Retail	814	122,750 SF	5,440	330	145	185
General Office	710	274,430 SF	3,020	410	70	340
Total New Trips			22,990	2,220	1,155	1,065
Internal Trips (5%)			*1,150*	*110*	*55*	*55*
Mode Split (5%)			*1,150*	*110*	*60*	*50*
Total Net New Trips			20,690	2,000	1,040	960

Table 4 shows that the site is expected to generate approximately 22,990 new weekday daily trips; of which 2,220 will be during the weekday PM peak hour. Approximately 110 of the PM peak hour trips will be internal to the site, while another 110 trips will be made by modes other than a single-occupancy vehicle. This means that the site will generate approximately 2,000 net new trips on the surrounding roadway system during the weekday PM peak hour; of which, approximately 1,040 will be into the site and 960 will be leaving the site.

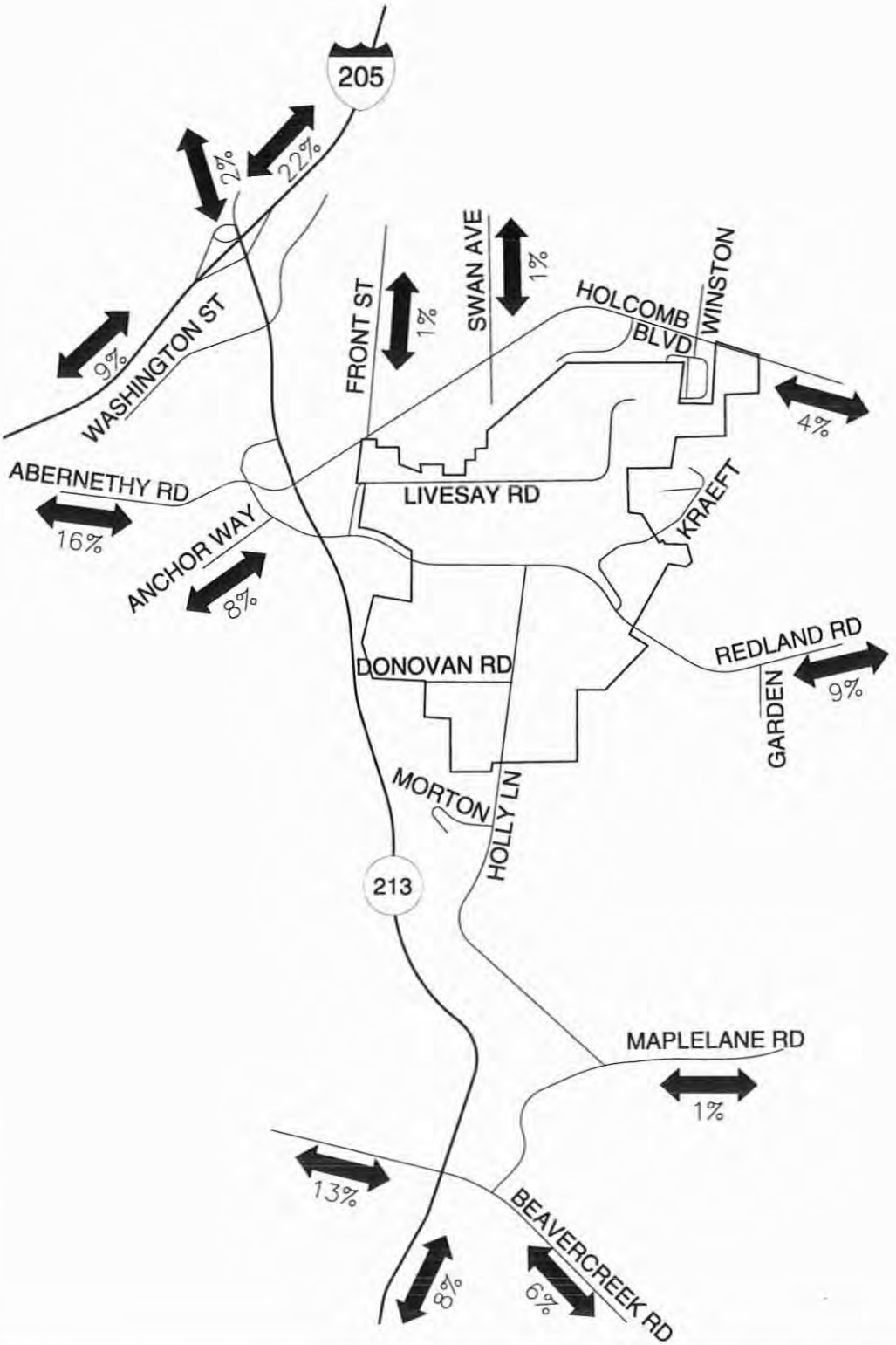
It should be noted that the 2027 No-Build forecast includes growth in households and jobs in TAZs 505, 506, 507, and 508. Because only a fraction of the planning area is in each zone, it is difficult to determine whether some or all of that growth is anticipated within the Park Place concept planning area. No reduction in travel demand was made to try and account for any "overlap" in assumed development. Therefore, it is safe to say the forecasts used in this analysis represent a reasonable worst-case scenario and likely represent greater levels of development than may actually occur. *Appendix "E" contains the land use estimates assumed in the Sunrise model for TAZs located within the planning area.*

Trip Distribution and Assignment

Trip Distribution

Distribution of the net new site-generated trips onto the study area roadway system is estimated based on a review of select zone analyses produced by the METRO Sunrise model, as well as existing traffic patterns, local knowledge of the area, and professional judgment. Figure 8, displays the estimated trip distribution pattern for the net new trips associated with the Park Place Concept Plan. *Appendix "F" contains the select zone analyses results.*

Figure 8 shows that approximately one third of all trips are to/from the I-205 corridor, one third are to/from the west, more than one quarter to/from the south, and 13 percent to/from the east.



ESTIMATED TRIP DISTRIBUTION PATTERN
OREGON CITY, OREGON

FIGURE 8

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Trip Assignment

The site-generated trips shown in Table 4 are assigned to the roadway network using the estimated trip distribution pattern shown in Figure 8. In order to accomplish this assignment, the Park Place area is divided up into twelve different zones where trips will originate from or travel to. This is necessary to accurately assign trips, given the size of the Park Place area and the varying access options available to travel to and from the area. Table 5 identifies the area each zone encompasses and the number of net new PM Peak hour trips each zone generates.

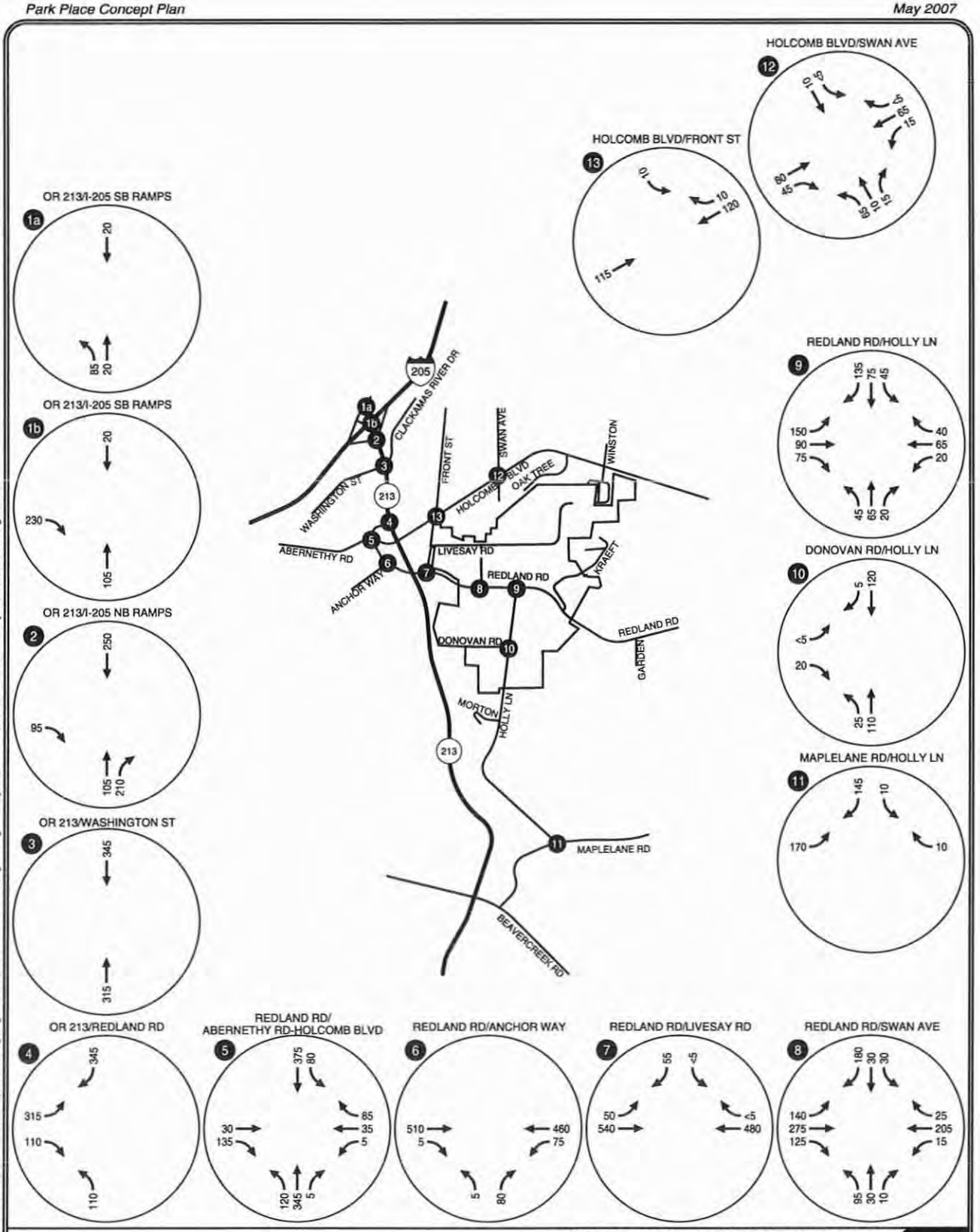
TABLE 5
PARK PLACE CONCEPT PLAN TRIP GENERATION BY ZONE

Zone No.	Description	Net New Weekday PM Peak Hour Trips
1	North of Livesay Road, west of Swan Avenue extension	30
2	Between Redland Road and Livesay Road, west of Swan Avenue extension	165
3	Between Redland Road and Donovan Road, west of Swan Avenue extension	30
4	South of Donovan Road, west of Swan Avenue extension	200
5	South of Donovan Road, between Swan Avenue extension and Holly Lane	70
6	Between Redland Rd and Donovan Rd, Swan Ave Ext., and Holly Ln	120
7	Between Redland Rd and Livesay Rd, Swan Ave Ext., and Holly Ln. Ext	430
8	North of Livesay Road, between Swan Avenue extension and Holly Lane Ext	310
9	East of Holly Lane extension, north of Livesay Road	305
10	East of Holly Lane extension, between Redland Road and Livesay Road	180
11	East of Holly Lane, between Redland Road and Donovan Road	115
12	East of Holly Lane, south of Donovan Road	45

Table 5 shows that zones 7 – 9 generate the most trips during the weekday PM peak hour. This is because each of these areas contains a significant number of multi-family residential units, as well as retail and office space. Meanwhile, zones 1, 3, 5, and 12 primarily contain a small number of single family residential units. Figure 9 illustrates the result of assigning the Concept Plan trips to the roadway system.

PROPOSED TRANSPORTATION CONCEPT PLAN

The Concept Plan calls for a network of transportation facilities to support local and regional travel. Miles of new residential streets are anticipated, in association with the future housing supply. A segment of Livesay Road is recommended to be classified as a Neighborhood Collector and serve as a "Main Street" for the northern commercial node of the planning area. Donovan Road is also recommended for classification as a Neighborhood Collector, to serve the same purpose in the southern commercial node and provide safe connections to the Ogden Middle School. Holly Lane is planned to be extended from Redland Road to Holcomb Boulevard and designated as a Collector facility from Maplelane Road to Holcomb Boulevard. Finally, an extension of Swan Avenue is recommended from its current terminus south of Holcomb Boulevard to an intersection with Holly Lane south of Donovan Road. *Appendix "G" contains the preferred alternative concept plan.*



ESTIMATED SITE-GENERATED TRIPS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE 9

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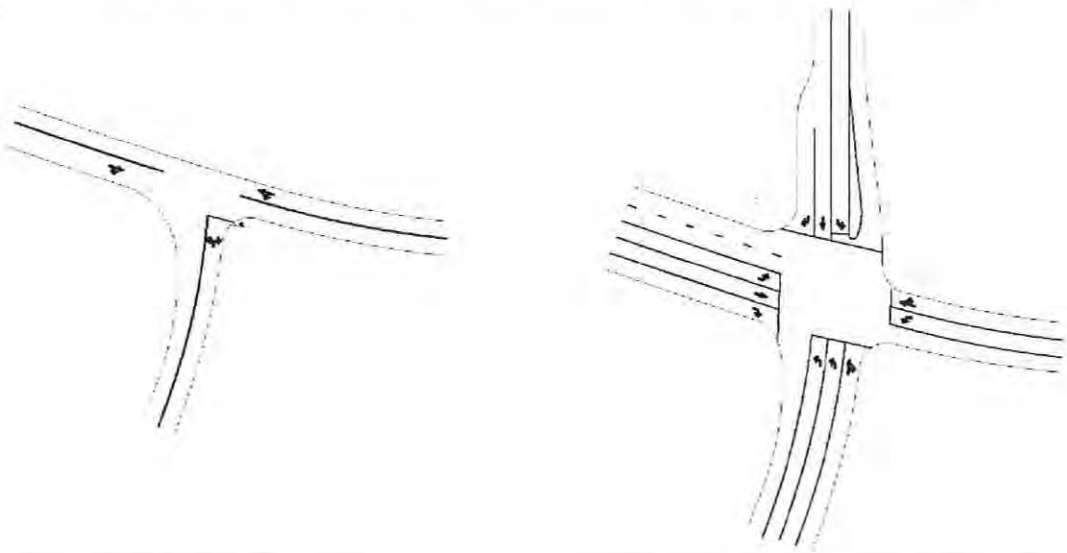
Holly Lane and Swan Avenue Extensions

Holly Lane serves a vital role in both the local and the regional context as the only continuous north/south travel corridor on the east side of HWY 213. Holly Lane connects the northern area of Oregon City to many key destinations in the southern area of the City, such as Berryhill Shopping Center, Clackamas Community College, Oregon City High School, City Hall, and many other retail and employment locations. As a result, this corridor is expected to see travel demands increase by nearly 13,000 vehicles per day to a total of more than 16,000 vehicles per day. Were this to occur, Holly Lane would need to provide five lanes near its intersection with Redland Road and three lanes for the remainder of its length. In addition, Redland Road would need to provide six lanes near its intersection with Holly Lane and five lanes for the remainder of its length to Abernethy Road.

The cost of these improvements is significant (>$15 million) and the feasibility is questionable. Much of the Redland Road corridor is significantly constrained by topography on the north side and by Abernethy Creek on the south side. Much of the Holly Lane corridor has a very narrow right-of-way and improved width, with many single-family residences taking direct access from Holly Lane. Climbing sections of Holly Lane will be very costly to reconstruct and face several engineering challenges. Finally, the existing Holly Lane bridge across Abernethy Creek would need to be demolished and replaced with at least a five-lane bridge. Diagram 1 illustrates the existing lane configurations at the Redland Road/Holly Lane intersection and how the intersection would look, if the Park Place Concept Plan were completed without the Swan Avenue extension. *Appendix "H" contains the Redland Road/Holly Lane intersection level-of-service worksheets without the Swan Avenue extension.*

DIAGRAM #1: REDLAND ROAD/HOLLY LANE INTERSECTION



EXISTING LANE CONFIGURATIONS

2027 BUILD WITHOUT SWAN AVENUE EXTENSION

Park Place Concept Plan provides for a parallel, collector-level corridor to Holly Lane, ·ed to as the Swan Avenue extension, as a solution to the issues described above. ·lishing this corridor from Forsythe Road to points well south of Donovan Road ensures that xisting Holly Lane can remain a two-lane, collector-level facility south of Redland Road. Swan Avenue extension will include bridges across the Livesay Creek canyon and nethy Creek, creating much needed connections between adjacent neighborhoods and ding adequate capacity and system redundancy critically needed during times of gency.

dition, Holly Lane would be extended north from Redland Road to connect with Holcomb :vard, providing good access, connectivity, and system redundancy to the area.

Swan Avenue extension provides the opportunity for a continuous, north/south, collector- facility that is fully equipped to serve all travel modes. The facility will include sidewalks ·n-street striped bike lanes on both sides and accommodate future transit service. Equipped :h, Swan Avenue is anticipated to attract 8,000 to 11,000 vehicles a day, while Holly Lane .y required to serve 4,000 to 6,000 vehicles per day. This allows the existing Holly Lane to in a two-lane road with improvements to address safety concerns and manage travel speeds.

: are many other benefits derived from the Swan Avenue extension, such as:

- the Livesay Creek Canyon is finally overcome as a barrier of access to schools, parks, retail uses, and neighborhoods, which reduces demands on Redland and Holcomb and reduces out-of-direction travel;
- the new Swan Avenue-Abernethy Creek bridge provides a critical connection that is out of the flood plain, redundant to the Holly Lane-Abernethy Creek bridge crossing, and improves system connectivity and local access;
- areas north and south of Redland Road are more accessible and achieve higher levels of development as a result;
- the Swan Avenue connection from Livesay Road to Redland Road alleviates the need for the existing Livesay Road intersection with Redland Road and dramatically reduces the likelihood of cut-through traffic using lower Livesay Road;
- improvement requirements for Redland Road are appreciably reduced, lowering costs and environmental impacts; and,
- a more complete, robust, and redundant multi-modal transportation system can be developed that is cost-effective and environmentally sound.

Swan Avenue-Livesay Creek Canyon bridge and the Swan Avenue-Abernethy Creek bridge ital links in the local and regional transportation system and critical components to the lity of the land use concept. These allow a continuous collector-level corridor to be created. alleviates the need to widen and significantly improve the Holly Lane corridor, which nizes adverse impacts to existing properties along Holly Lane. The connections provide for direct routes between key destinations in and around the study area. This reduces out-of- tion travel, particularly travel on Holcomb Boulevard and Redland Road. Finally, these :ctions provide convenient access to a large enough population base to fully support the and south mixed-use village areas.

YEAR 2027 BUILD CONDITIONS

The build analysis evaluates how the study area's transportation system will operate in the future forecast year, 2027, assuming full development of the Park Place area, as it is outlined in the preferred alternative. The 2027 no-build traffic volumes for the weekday PM peak hour shown in Figure 6 are added to the site-generated traffic shown in Figure 9 to arrive at the total traffic volumes shown in Figure 10.

Level-of-Service Analysis

Figure 10 also provides a summary of the forecast total traffic levels of service and volume/capacity analyses associated with full build-out of the Park Place area. This analysis assumes that the improvements recommended under the no-build traffic conditions and the lane configurations shown in Figure 5 are in place. *Appendix "I" contains the 2027 Unmitigated Build Conditions worksheets.*

Highway 213 Corridor

Figure 10 illustrates that all of the intersections along the HWY 213 corridor will meet ODOT operating standards except for the intersection of HWY 213 and Washington Street. The HWY 213/Washington Street intersection is expected to operate over capacity during the weekday PM peak hour under year 2027 build traffic conditions. Improvements at the HWY 213 intersections would be required to meet applicable ODOT standards.

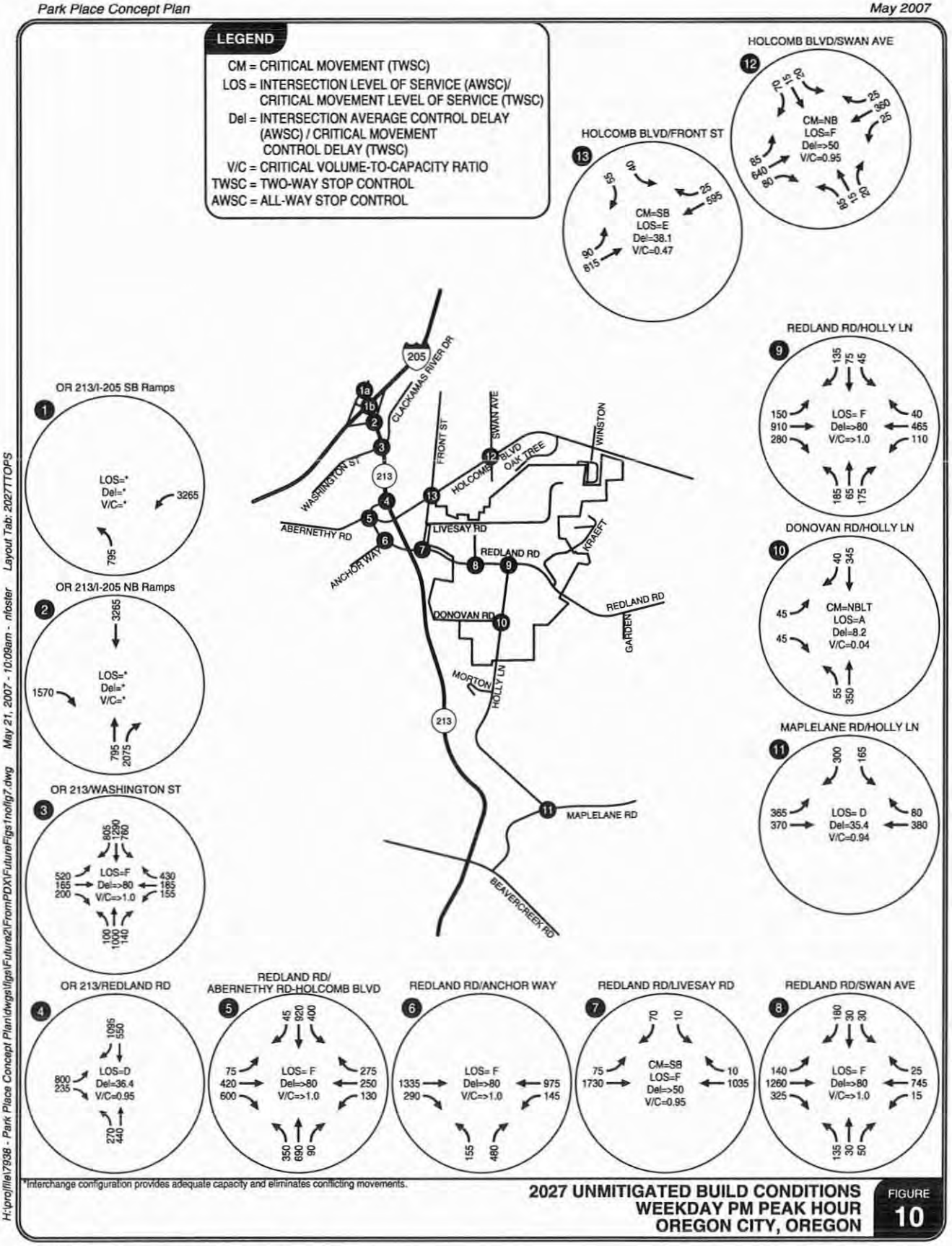
Redland Road/Holcomb Boulevard/Holly Lane Corridors

Oregon City and Clackamas County level-of-service standards are applied to the analysis of intersections along the Redland Road, Holcomb Boulevard, and Holly Lane corridors. The City of Oregon City and Clackamas County require that LOS "D" or better be maintained for all signalized intersections and LOS "E" or better be maintained for all unsignalized intersections. The City of Oregon City and Clackamas County do not have any standards regarding volume-to-capacity ratios.

Figure 10 illustrates that several intersections along the Redland Road and Holly Lane corridors are forecast to fall below applicable standards during the PM peak hour under year 2027 build traffic conditions. More specifically, the Redland Road/Abernethy Road-Holcomb Boulevard, Redland Road/Anchor Way, Redland Road/Livesay Road, Redland Road/Swan Avenue, Redland Road/Holly Lane, and Holcomb Boulevard/Swan Avenue intersections are all expected to operate at LOS "F" without additional future improvements. Therefore, these intersections will need to be improved with build-out of the Park Place planning area. All other non-highway intersections are expected to operate acceptably.

Needed Improvements

Table 6 summarizes the mitigations triggered by the concept plan that are in addition to those made under the 2027 Mitigated No-Build Conditions. In addition, Figure 11 illustrates the 2027 Mitigated Build lane configurations and traffic control devices needed to achieve acceptable performance standards. Figure 12 summarizes the resulting year 2027 Mitigated Build traffic conditions for all study area intersections. *Appendix "J" contains the 2027 Mitigated Build Conditions worksheets.*



*Interchange configuration provides adequate capacity and eliminates conflicting movements.

2027 UNMITIGATED BUILD CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE 10

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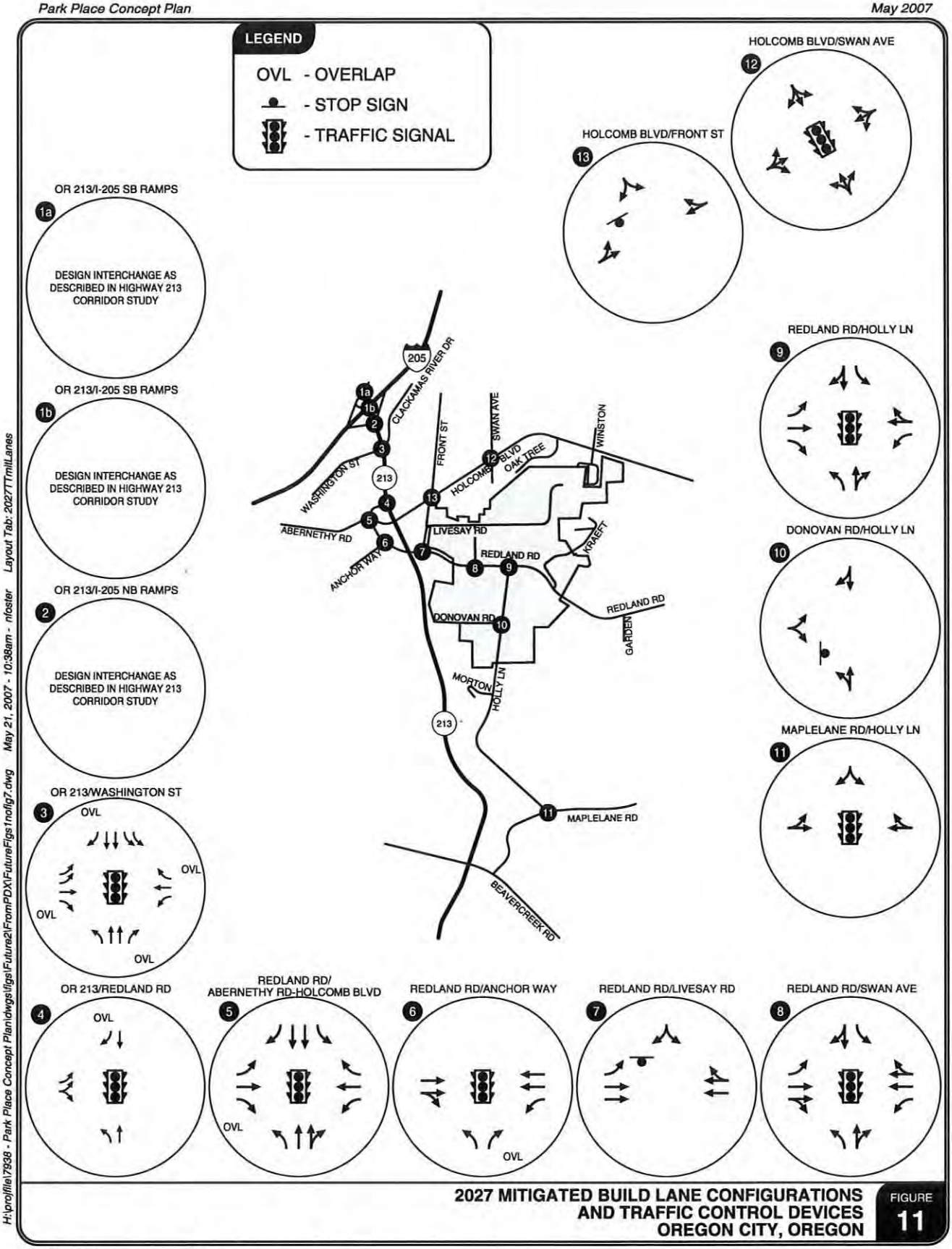

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2027 MITIGATED BUILD LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES OREGON CITY, OREGON

FIGURE 11

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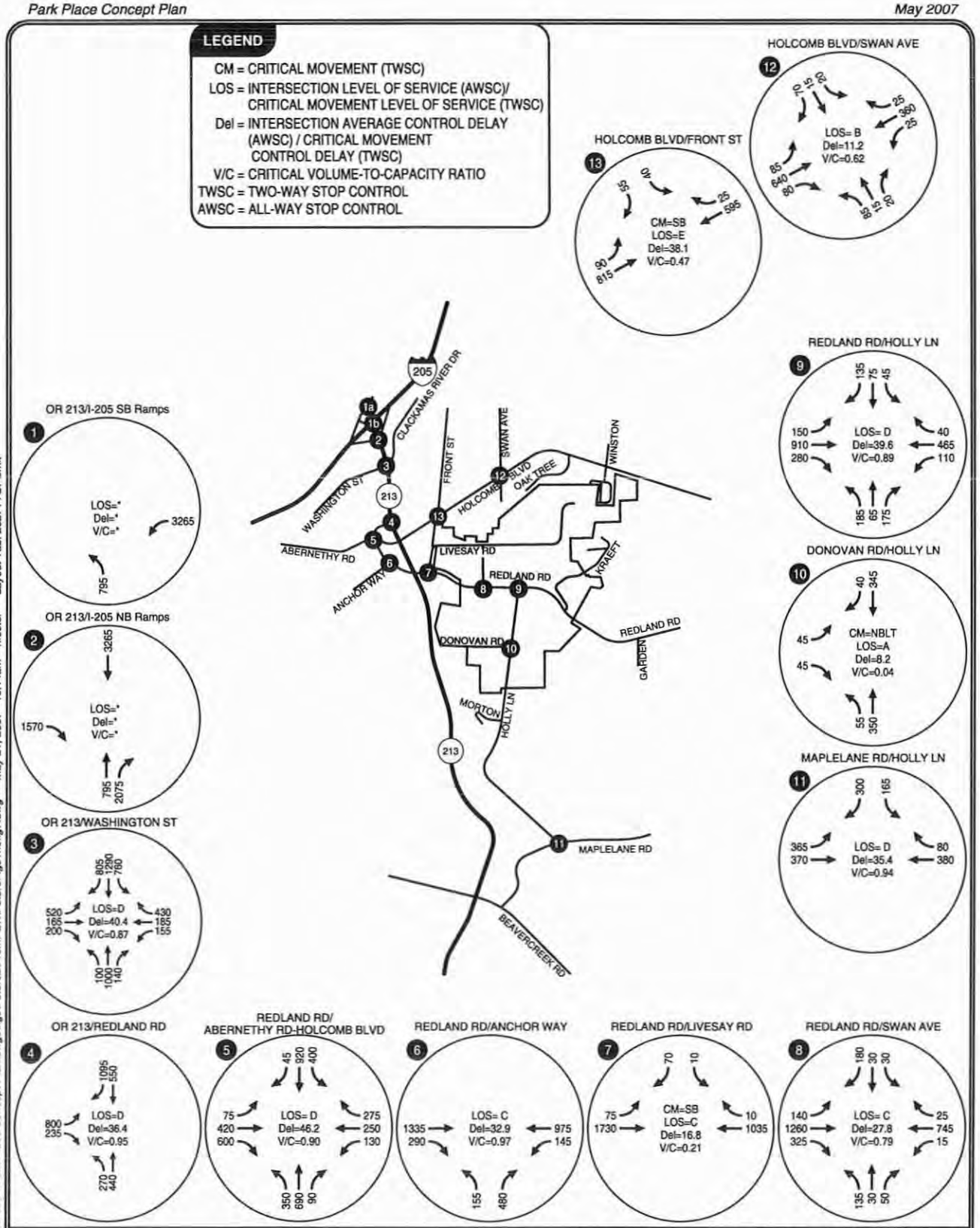

2027 MITIGATED BUILD CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE 12

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Table 6 and Figure 12 both show that with these improvements in place, the operations at all study intersections will meet applicable agency standards.

TABLE 6
NEEDED IMPROVEMENTS UNDER 2027 BUILD CONDITIONS

Intersection	2027 No-Build Conditions		Needed Improvement	2027 Mitigated No-Build Conditions	
HWY 213 Corridor					
	V/C			**V/C**	
HWY 213/Washington Street	>1.0		- Construct 2nd NB thru lane	0.87	
Redland Road/Holcomb Boulevard/Holly Lane Corridors					
	Delay (s)	**LOS**		**Delay (s)**	**LOS**
Redland Road (NB-SB)/ Abernethy Road-Holcomb Boulevard (EB-WB)	>80.0	F	- Construct 2nd NB thru lane - Construct 2nd SB thru lane	46.2	D
Redland Road (EB-WB)/ Anchor Way (NB-SB)	>80.0	F	- Construct 2nd EB thru lane - Construct 2nd WB thru lane	32.9	C
Redland Road (EB-WB)/ Livesay Road (NB-SB)	>50.0	F	- Construct 2nd EB thru lane - Construct 2nd WB thru lane	16.8	C
Redland Road (EB-WB)/ Swan Avenue (NB-SB)	N/A	N/A	- Construct north and south approaches with separate LT and shared thru/right lanes - Signalize intersection - Construct 2nd EB thru lane - Construct 2nd WB thru lane	27.8	C
Redland Road (EB-WB)/ Holly Lane (NB-SB)	>80.0	F	- Construct north approach with separate LT and shared thru/right lanes - Construct an EB RT lane - Construct EB and WB LT lanes	39.6	D
Holcomb Boulevard (EB-WB)/ Swan Avenue (NB-SB)	>50.0	F	- Signalize intersection	11.2	B

Highway 213 Corridor

The only intersection along the HWY 213 corridor that needs to be improved is the HWY 213/Washington Street intersection. Widening HWY 213 to include a second northbound through lane through this intersection is all that is necessary to achieve acceptable operations along this corridor.

Redland Road/Holcomb Boulevard/Holly Lane Corridors

Redland Road will need to be widened to five lanes between Abernethy Road-Holcomb Boulevard and Swan Avenue, with the additional eastbound lane becoming a right-turn only drop-lane between Swan Avenue and Holly Lane. Redland Road will most likely need to be a three-lane cross-section east of Holly Lane. No other corridor widening appears to be necessary, though many intersection improvements will also need to be made due to new approaches being added and additional traffic being generated by the planning area.

COST ESTIMATES OF NEEDED IMPROVEMENTS

A planning level cost estimate analysis was conducted in order to approximate the amount of funding that will be needed to construct the needed improvements to the local roadway system, with and without build-out of the planning area. Table 7 (on the following page) lists these improvements and their estimated costs. These generalized cost estimates include assumptions for right-of-way, design, and construction. Table 7 includes all of the intersection improvements listed in Tables 1 and 6, as well as corridor improvements.

CONCLUSION

The Oregon City area is expected to see significant growth over the next twenty-three years. Current forecasts predict increases in travel demand of approximately 50% on the Highway 213 corridor and approximately 60% on the Redland Road corridor. These increases will exceed the capacity of the current transportation system and will likely necessitate phased capacity improvements similar to those recommended in Alternative 3 of the *Highway 213 Urban Corridor Design Study*. The Redland Road corridor is likely to require widening to a three-lane cross-section within the planning area, as a result of the growth in regional travel demand.

It is estimated that the housing and commercial development anticipated in the proposed Park Place Concept Plan will add approximately 20,700 new trips to the surrounding roadway network, with approximately 2,000 of these occurring in the PM peak hour. Additional improvements to Redland Road intersections, beyond what was described above, will be needed to meet future demands resulting from both regional and Concept Plan growth. The extension of Swan Avenue, as proposed in the Park Place Concept Plan, will eliminate the need to further widen any other corridors (i.e. Holly Lane), in addition to providing enhanced connectivity within the planning area. The greater connectivity provided by the Swan Avenue extension will help support the two mixed-use villages proposed in the Concept Plan by increasing their accessibility, as well as facilitate improved travel throughout the planning area.

TABLE 7
ESTIMATED COST OF MAJOR TRANSPORTATION IMPROVEMENTS

Roadway Improvements	Improvement	Scenario		Total
		No Build	Build	
HWY 213: I-205 Over crossing	Construct new over crossing with 3 SB and 3 NB lanes	$12,000,000		$12,000,000
HWY 213: I-205 Interchange to Washington Street	Widen NB off-ramp and add 2 SB and one NB lanes on HWY 213	$13,000,000		$13,000,000
HWY 213: Washington to Redland	Add one lane in each direction	$4,200,000		$4,200,000
HWY 213: Redland to Beavercreek	Add one lane in each direction	$ 25,000,000		$25,000,000
Redland Road: Abernethy/Holcomb to Swan Ave	Construct five-lane cross section to City standards		$11,500,000	$11,500,000
Holly Lane: Redland to Maplelane	Limited safety improvements	$3,000,000		$3,000,000
Livesay Road: Swan Ext to Holly Ext	Upgrade to neighborhood collector standards		$1,800,000	$1,800,000
Donovan Road: Holly Lane to Ogden Middle School	Upgrade to neighborhood collector standards		$1,200,000	$1,200,000
Swan Ave. Extension: Existing Swan Ave. south of Holcomb Blvd	Upgrade to collector standards		$1,100,000	$1,100,000
Swan Ave. Extension: Livesay canyon to Redland Road	Construct new roadway and bridge across canyon		$9,300,000	$9,300,000
Swan Extension: Redland Rd to Holly Ln	Construct new roadway		$9,300,000	$9,300,000
Holly Lane: Redland to Holcomb Blvd	Construct new roadway		$17,400,000	$17,400,000
Total Roadway Improvements		$57,200,000	$51,600,000	$108,800,000
Intersection Only Improvements	**Improvement**	**No Build**	**Build**	**Total**
Anchor Way/Redland Rd		$2,900,000		$2,900,000
Holly Ln/Redland Rd		$2,000,000		$2,000,000
Holly Ln/Maplelane Rd		$1,600,000		$1,600,000
Swan Ave/Holcomb Blvd			$300,000	$300,000
Total Intersection Improvements		$6,500,000	$300,000	$6,800,000
Grand Totals		$63,700,000	$51,900,000	$115,600,000

References

1. Transportation Research Board. *Highway Capacity Manual.* 2000.
2. Kittelson & Associates, Inc. *Highway 213 Urban Corridor Design Study*. 2000
3. Institute of Transportation Engineers. *7th Edition, Trip Generation Manual.* 2003.
4. Institute of Transportation Engineers. *2nd Edition, Trip Generation Handbook*. June 2004.

Appendix A

Model Base & Future Volumes

INTERSECTION: #1	I-205 Southbound Ramps/OR 213											
1	NB			SB			EB			WB		
Nodes 13842 and 13843	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	618	4			7	8	5		2,325			
METRO EX Model	711	57	0	0	748	55	17	0	3,599	0	0	0
METRO Future Model	1,585	880	0	0	1,443	45	73	0	7,889	0	0	0
Sunrise EX Model	661	54	0	0	56	21	21	0	3,280	0	0	0
Sunrise Future Model	876	1,477	0	0	2,175	96	88	0	5,253	0	0	0
Metro 1 Hr EX Model	377	20	0	0	78	8	9	0	2,116	0	0	0
Metro 1 Hr future Model	999	466	0	0	765	24	39	0	4,181	0	0	0
Sunrise 1 Hr EX Model	345	50	0	0	30	11	38	0	1,901	0	0	0
Sunrise 1 Hr Future Model	464	783	0	0	1,153	51	46	0	2,785	0	0	0
Metro Future Delta (25 Year)	*1,240*	*457*	*0*	*0*	*690*	*24*	*29*	*0*	*4,390*	*0*	*0*	*0*
Metro Future % (25 Year)	*1,538*	*93*	*0*	*0*	*86*	*24*	*27*	*0*	*4,554*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*1,426*	*273*	*0*	*0*	*381*	*24*	*28*	*0*	*4,422*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*807*	*269*	*0*	*0*	*374*	*16*	*23*	*0*	*2,157*	*0*	*0*	*0*
Metro Future Delta (20 Year)	1,116	361	0	0	556	21	29	0	3,977	0	0	0
Metro Future % (20 Year)	1,434	77	0	0	56	21	18	0	4,140	0	0	0
Metro Future Obs (20 Year)	1,275	219	0	0	306	21	23	0	4,058	0	0	0
Metro Net Increase (20 Year)	657	215	0	0	299	13	18	0	1,733	0	0	0
Sun Future Delta (25 Year)	*737*	*737*	*0*	*0*	*1,130*	*48*	*13*	*0*	*3,210*	*0*	*0*	*0*
Sun Future % (25 Year)	*832*	*83*	*0*	*0*	*272*	*37*	*8*	*0*	*3,407*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*784*	*400*	*0*	*0*	*701*	*42*	*10*	*0*	*3,308*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*166*	*396*	*0*	*0*	*694*	*34*	*5*	*0*	*983*	*0*	*0*	*0*
Sun Future Delta (20 Year)	713	590	0	0	905	40	11	0	3,033	0	0	0
Sun Future % (20 Year)	789	51	0	0	219	31	6	0	3,191	0	0	0
Sun Future Obs (20 Year)	751	321	0	0	562	35	9	0	3,112	0	0	0
Sun Net Increase (20 Year)	133	317	0	0	555	27	4	0	787	0	0	0

EX Observed	618	4	0	0	7	8	5	0	2,325	0	0	0
Sunrise EX Model (1 hr.)	345	50			30	11	38		1901			
Sunrise Future Model (1 hr.)	464	783			1153	51	46		2785			
Model Growth	119	[illegible]			[illegible]	40	8		885			
80% of Model Growth	95	586			898	32	6		708			
EX Observed + 80% Growth	713	[illegible]			[illegible]	40	11		3033			

INTERSECTION: #2	I-205 Northbound Ramps/OR 213											
2	NB			SB			EB			WB		
Node 13844	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed		621	1,667	9	2,323		1		883			
METRO EX Model	0	719	2,026	133	3,946	0	12	0	1,318	0	0	0
METRO Future Model	0	2,645	3,534	58	9,274	0	47	0	3,645	0	0	0
EX Model	0	951	2,863	40	3,582	0	14	0	1,350	0	0	0
Future Model	0	2,214	2,898	88	7,341	0	54	0	2,444	0	0	0
Metro 1 Hr EX Model	0	381	1,551	70	2,092	0	6	0	699	0	0	0
Metro 1 Hr future Model	0	1,402	1,868	31	4,915	0	25	0	1,932	0	0	0
Sunrise 1 Hr EX Model	0	350	1,411	21	1,909	0	7	0	558	0	0	0
Sunrise 1 Hr Future Model	0	1,173	1,638	47	3,891	0	29	0	1,295	0	0	0
Metro Future Delta (25 Year)	*0*	*1,642*	*2,004*	*-31*	*5,146*	*0*	*20*	*0*	*2,116*	*0*	*0*	*0*
Metro Future % (25 Year)	*0*	*2,289*	*2,332*	*4*	*5,457*	*0*	*8*	*0*	*2,446*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*0*	*1,962*	*2,078*	*-10*	*5,301*	*0*	*12*	*0*	*2,278*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*0*	*1,340*	*701*	*-22*	*2,978*	*0*	*11*	*0*	*1,796*	*0*	*0*	*0*
Metro Future Delta (20 Year)	0	1,438	1,941	-23	4,581	0	16	0	1,870	0	0	0
Metro Future % (20 Year)	0	1,952	1,963	5	4,830	0	3	0	2,130	0	0	0
Metro Future Obs (20 Year)	0	1,695	1,952	-9	4,706	0	10	0	2,000	0	0	0
Metro Net Increase (20 Year)	0	1,074	285	-18	2,383	0	9	0	1,117	0	0	0
Sun Future Delta (25 Year)	*0*	*1,444*	*1,913*	*35*	*4,305*	*0*	*22*	*0*	*1,620*	*0*	*0*	*0*
Sun Future % (25 Year)	*0*	*2,080*	*1,958*	*20*	*4,734*	*0*	*4*	*0*	*2,049*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*0*	*1,762*	*1,935*	*27*	*4,520*	*0*	*13*	*0*	*1,835*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*0*	*1,141*	*248*	*18*	*2,197*	*0*	*12*	*0*	*952*	*0*	*0*	*0*
Sun Future Delta (20 Year)	0	1,279	1,868	30	3,906	0	18	0	1,473	0	0	0
Sun Future % (20 Year)	0	1,788	1,903	18	4,252	0	3	0	1,816	0	0	0
Sun Future Obs (20 Year)	0	1,534	1,886	24	4,080	0	11	0	1,644	0	0	0
Sun Net Increase (20 Year)	0	913	199	15	1,757	0	10	0	761	0	0	0

EX Observed	0	621	1,667	9	2,323	0	1	0	883	0	0	0
Sunrise EX Model (1 hr.)	0	350	1411	21	1909	0	7	0	558	0	0	0
Sunrise Future Model (1 hr.)	0	1173	1638	47	3891	0	29	0	1295	0	0	0
Model Growth	0	823	229	26	1982	0	21	0	737	0	0	0
80% of Model Growth	0	658	181	21	1585	0	17	0	590	0	0	0
EX Observed + 80% Growth	0	1279	1868	30	3908	0	18	0	1473	0	0	0

INTERSECTION: #3	OR 213/Washington Street											
3	NB			SB			EB			WB		
Node 13710	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	65	1,821	85	160	2,657	389	304	55	135	80	410	183
METRO EX Model	1	2,757	24	1,375	3,867	74	172	181	1	29	135	714
METRO Future Model	5	4,206	72	4,194	7,757	968	969	212	1	19	166	1,794
Sunrise EX Model	1	2,372	14	1,139	3,331	135	136	134	1	1	134	747
Sunrise Future Model	1	3,454	21	2,554	5,101	1,139	696	201	1	2	518	1,154
Metro 1 Hr EX Model	1	1,461	13	702	2,050	39	92	96	1	15	72	378
Metro 1 Hr future Model	3	2,229	38	2,223	4,111	513	90	112	1	10	88	951
Sunrise 1 Hr EX Model	1	1,363	7	603	1,783	81	99	71	1	4	92	301
Sunrise 1 Hr Future Model	1	1,831	11	1,354	3,234	599	369	207	1	4	275	612
Metro Future Delta (25 Year)	*4*	*2,589*	*110*	*1,641*	*4,719*	*963*	*302*	*77*	*133*	*73*	*54*	*1,020*
Metro Future % (25 Year)	*325*	*2,779*	*245*	*506*	*5,330*	*3,085*	*297*	*84*	*135*	*52*	*49*	*449*
Metro Future Obs (25 Year)	*190*	*2,684*	*177*	*1,094*	*5,024*	*2,024*	*299*	*80*	*134*	*64*	*52*	*735*
Metro Net Increase (25 Year)	*131*	*863*	*92*	*934*	*2,967*	*2,587*	*207*	*25*	*134*	*-16*	*-18*	*425*
Metro Future Delta (20 Year)	67	2,435	105	1,376	4,306	782	302	68	135	76	53	641
Metro Future % (20 Year)	273	2,587	213	437	4,795	4,149	298	63	135	58	47	404
Metro Future Obs (20 Year)	170	2,511	159	907	4,551	2,458	300	65	135	67	50	523
Metro Net Increase (20 Year)	105	690	74	747	1,894	2,069	-4	10	0	-13	10	340
Sun Future Delta (25 Year)	*65*	*2,268*	*89*	*916*	*4,107*	*907*	*574*	*191*	*135*	*80*	*222*	*494*
Sun Future % (25 Year)	*65*	*2,445*	*128*	*359*	*4,817*	*2,892*	*1,139*	*160*	*135*	*80*	*119*	*372*
Sun Future Obs (25 Year)	*65*	*2,367*	*108*	*638*	*4,462*	*1,900*	*856*	*176*	*135*	*80*	*171*	*433*
Sun Net Increase (25 Year)	*0*	*546*	*23*	*475*	*1,805*	*1,511*	*552*	*121*	*0*	*0*	*131*	*250*
Sun Future Delta (20 Year)	65	2,195	88	760	3,817	804	520	164	135	80	186	432
Sun Future % (20 Year)	65	2,321	119	319	4,385	2,391	971	139	135	80	103	335
Sun Future Obs (20 Year)	65	2,258	103	540	4,101	1,597	746	152	135	80	145	383
Sun Net Increase (20 Year)	0	437	18	380	1,444	1,208	442	97	0	0	105	200

EX Observed	65	1,821	85	160	2,657	389	304	55	135	80	410	183
Sunrise EX Model (1 hr.)	1	1363	7	603	1783	81	99	71	1	4	92	301
Sunrise Future Model (1 hr.)	1	1831	11	1354	3234	599	369	207	1	4	275	612
Model Growth	[illegible]	467	[illegible]	750	1450	518	270	136	[illegible]	[illegible]	182	311
80% of Model Growth	0	374	3	600	1160	415	216	109	[illegible]	0	146	249
EX Observed + 80% Growth	[illegible]	2195	[illegible]	760	3817	804	520	164	[illegible]	[illegible]	186	432

INTERSECTION: #4	OR 213/Redland Road											
4	NB			SB			EB			WB		
Node 13711	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	100	1,632			2,215	657	339		100			
METRO EX Model	230	2,344	0	0	3,819	577	436	0	169			
METRO Future Model	271	2,854	0	0	4,457	3,380	1,429	0	269			
Sunrise EX Model	256	2,175	0	0	3,240	1,590	413	0	463	0	0	0
Sunrise Future Model	397	2,856	0	0	5,100	990	518	0	463	0	0	0
Metro 1 Hr EX Model	175	1,242	0	0	1,600	465	232	0	100	0	0	0
Metro 1 Hr future Model	144	1,513	0	0	2,383	1,738	757	0	143	0	0	0
Sunrise 1 Hr EX Model	157	1,153	0	0	1,210	578	219	0	255	0	0	0
Sunrise 1 Hr Future Model	210	1,567	0	0	2,703	477	275	0	245	0	0	0
Metro Future Delta (25 Year)	*69*	*1,902*	*0*	*0*	*2,968*	*1,827*	*894*	*0*	*142*	*0*	*0*	*0*
Metro Future % (25 Year)	*80*	*1,997*	*0*	*0*	*3,799*	*2,437*	*1,106*	*0*	*142*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*75*	*1,949*	*0*	*0*	*3,383*	*2,194*	*983*	*0*	*142*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*-25*	*717*	*0*	*0*	*859*	*1,537*	*646*	*0*	*47*	*0*	*0*	*0*
Metro Future Delta (20 Year)	75	1,848	0	0	2,842	1,676	779	0	134	0	0	0
Metro Future % (20 Year)	88	1,916	0	0	3,063	2,097	953	0	134	0	0	0
Metro Future Obs (20 Year)	80	1,882	0	0	2,952	1,887	866	0	134	0	0	0
Metro Net Increase (20 Year)	-20	250	0	0	747	1,230	517	0	34	0	0	0
Sun Future Delta (25 Year)	*154*	*2,046*	*0*	*0*	*3,708*	*556*	*395*	*0*	*90*	*0*	*0*	*0*
Sun Future % (25 Year)	*134*	*2,218*	*0*	*0*	*4,948*	*542*	*429*	*0*	*96*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*144*	*2,132*	*0*	*0*	*4,328*	*549*	*411*	*0*	*93*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*44*	*500*	*0*	*0*	*2,113*	*-108*	*72*	*0*	*-7*	*0*	*0*	*0*
Sun Future Delta (20 Year)	143	1,963	0	0	3,409	576	384	0	92	0	0	0
Sun Future % (20 Year)	127	2,101	0	0	4,401	565	409	0	97	0	0	0
Sun Future Obs (20 Year)	135	2,032	0	0	3,905	571	396	0	94	0	0	0
Sun Net Increase (20 Year)	35	400	0	0	1,690	-86	57	0	-6	0	0	0

EX Observed	100	1,632	0	0	2,215	657	339	0	100	0	0	0
Sunrise EX Model (1 hr.)	157	1153	0	0	1210	578	219	0	255	0	0	0
Sunrise Future Model (1 hr.)	210	1567	0	0	2703	477	275	0	245	0	0	0
Model Growth	54	414	0	0	1493	[illegible]	56	0	[illegible]	0	0	0
80% of Model Growth	43	331	0	0	1194	[illegible]	45	0	[illegible]	0	0	0
EX Observed + 80% Growth	143	1963	0	0	3409	[illegible]	384	0	[illegible]	0	0	0

INTERSECTION: #5	OR 213/Beavercreek Road											
5	NB			SB			EB			WB		
Node Ndoe 10372	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	35	769	125	728	1,163	424	493	520	30	130	370	470
METRO EX Model	1	1,219	91	1,436	1,438	534	424	614	1	36	537	1,101
METRO Future Model	6	1,525	106	2,009	2,165	592	439	2,072	6	40	877	1,160
Sunrise EX Model	1	1,228	91	965	1,243	537	703	993	1	25	278	449
Sunrise Future Model	1	1,251	107	1,744	3,065	854	1,013	1,303	1	142	848	1,078
Metro 1 Hr EX Model	1	646	43	761	762	177	225	325	1	20	285	546
Metro 1 Hr future Model	3	808	56	1,065	1,147	314	233	1,098	3	21	465	615
Sunrise 1 Hr EX Model	1	704	16	522	659	285	372	314	1	13	147	233
Sunrise 1 Hr Future Model	1	663	57	924	1,624	453	537	691	1	75	449	571
Metro Future Delta (25 Year)	*36*	*931*	*130*	*1,022*	*1,548*	*561*	*501*	*1,293*	*33*	*131*	*560*	*536*
Metro Future % (25 Year)	*210*	*962*	*164*	*1,016*	*1,751*	*752*	*510*	*1,755*	*180*	*137*	*604*	*529*
Metro Future Obs (25 Year)	*124*	*847*	*151*	*1,025*	*1,650*	*656*	*506*	*1,524*	*106*	*134*	*577*	*534*
Metro Net Increase (25 Year)	*89*	*176*	*26*	*297*	*487*	*232*	*13*	*1,004*	*76*	*4*	*207*	*64*
Metro Future Delta (20 Year)	37	889	136	971	1,471	533	499	1,138	32	131	514	525
Metro Future % (20 Year)	178	923	156	960	1,633	666	507	1,506	150	126	587	517
Metro Future Obs (20 Year)	106	911	146	966	1,552	610	503	1,320	91	133	536	521
Metro Net Increase (20 Year)	71	142	21	238	389	186	10	803	61	3	166	51
Sun Future Delta (25 Year)	*35*	*728*	*165*	*1,130*	*2,129*	*592*	*658*	*896*	*30*	*192*	*672*	*806*
Sun Future % (25 Year)	*35*	*724*	*431*	*1,289*	*2,868*	*674*	*711*	*1,143*	*30*	*736*	*1,129*	*1,152*
Sun Future Obs (25 Year)	*35*	*726*	*298*	*1,210*	*2,498*	*633*	*685*	*1,019*	*30*	*465*	*900*	*980*
Sun Net Increase (25 Year)	*0*	*-43*	*173*	*482*	*1,335*	*209*	*192*	*499*	*0*	*335*	*530*	*510*
Sun Future Delta (20 Year)	35	736	157	1,050	1,936	558	625	821	30	180	612	741
Sun Future % (20 Year)	35	733	370	1,177	2,527	624	668	1,018	30	617	977	1,015
Sun Future Obs (20 Year)	35	735	264	1,113	2,231	591	646	920	30	398	794	878
Sun Net Increase (20 Year)	0	-34	139	385	1,068	167	153	400	0	268	424	408

EX Observed	35	769	125	728	1,163	424	493	520	30	130	370	470
Sunrise EX Model (1 hr.)	1	704	16	522	659	285	372	314	1	13	147	233
Sunrise Future Model (1 hr.)	1	663	57	924	1624	453	537	691	1	75	449	571
Model Growth			40	402	966	168	165	376		62	302	338
80% of Model Growth	0		32	322	773	134	132	301	0	50	242	271
EX Observed + 80% Growth			157	1050	1936	558	625	821		180	612	741

INTERSECTION: #6	OR 213/Molalla Avenue											
6	NB			SB			EB			WB		
Node 14337	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	250	603	60	92	1,101	130	149	85	445	95	115	177
METRO EX Model	1,001	1,132	1	1	1,444	32	168	1	1,134	1	1	1
METRO Future Model	1,479	1,625	1	1	2,202	10	12	1	2,164	1	1	1
Sunrise EX Model	396	861	119	21	1,248	1	1	499	442	214	632	436
Sunrise Future Model	748	1,146	365	289	2,818	1	1	879	1,454	1,266	1,658	214
Metro 1 Hr EX Model	531	600	1	1	755	17	89	1	601	1	1	1
Metro 1 Hr future Model	784	861	1	1	1,167	5	6	1	1,158	1	1	1
Sunrise 1 Hr EX Model	210	457	63	11	661	1	1	264	234	113	293	263
Sunrise 1 Hr Future Model	396	607	193	153	1,547	1	1	466	771	639	561	113
Metro Future Delta (25 Year)	*550*	*864*	*60*	*92*	*1,503*	*118*	*66*	*85*	*1,002*	*99*	*115*	*177*
Metro Future % (25 Year)	*369*	*886*	*60*	*92*	*1,479*	*41*	*11*	*85*	*847*	*95*	*115*	*177*
Metro Future Obs (25 Year)	*436*	*868*	*60*	*92*	*1,591*	*79*	*38*	*85*	*928*	*95*	*115*	*177*
Metro Net Increase (25 Year)	*186*	*262*	*0*	*0*	*490*	*-51*	*111*	*0*	*494*	*0*	*0*	*0*
Metro Future Delta (20 Year)	453	813	60	92	1,422	121	83	85	890	95	115	177
Metro Future % (20 Year)	346	813	60	92	1,563	59	38	85	778	95	115	177
Metro Future Obs (20 Year)	399	813	60	92	1,493	90	61	85	832	95	115	177
Metro Net Increase (20 Year)	149	210	0	0	392	-40	-88	0	387	0	0	0
Sun Future Delta (25 Year)	*437*	*753*	*190*	*234*	*1,986*	*130*	*149*	*286*	*981*	*621*	*383*	*26*
Sun Future % (25 Year)	*472*	*801*	*184*	*1,266*	*2,574*	*130*	*149*	*150*	*1,464*	*535*	*220*	*76*
Sun Future Obs (25 Year)	*454*	*777*	*187*	*750*	*2,280*	*130*	*149*	*218*	*1,223*	*578*	*302*	*52*
Sun Net Increase (25 Year)	*204*	*174*	*127*	*658*	*1,179*	*0*	*0*	*133*	*778*	*483*	*187*	*-125*
Sun Future Delta (20 Year)	399	723	164	206	1,809	130	149	246	874	516	330	57
Sun Future % (20 Year)	428	761	159	1,031	2,280	130	149	137	1,260	447	199	96
Sun Future Obs (20 Year)	414	742	162	618	2,044	130	149	191	1,067	481	264	77
Sun Net Increase (20 Year)	164	139	102	526	943	0	0	106	622	386	149	-100

EX Observed	250	603	60	92	1,101	130	149	85	445	95	115	177
Sunrise EX Model (1 hr.)	210	457	63	11	661	1	1	264	234	113	293	263
Sunrise Future Model (1 hr.)	396	607	193	153	1547	1	1	466	771	639	561	113
Model Growth	187	150	130	142	885			201	536	526	268	
80% of Model Growth	149	120	104	114	708	0	0	161	429	421	215	
EX Observed + 80% Growth	399	723	164	206	1809			246	674	516	330	

INTERSECTION: #7	OR 213/Glen Oak Road											
7	NB			SB			EB			WB		
Node 27736	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	1	675	12	149	1,365	18	26	2	1	11	1	113
METRO EX Model												
METRO Future Model												
Sunrise EX Model	1	1,128	52	340	1,961	1	1	1	3	63	1	233
Sunrise Future Model	1	1,412	115	1,816	3,428	1	1	1	1	149	1	741
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	1	597	26	180	1,039	1	1	1	1	28	1	150
Sunrise 1 Hr Future Model	1	748	61	962	1,817	1	1	1	1	79	1	393
Metro Future Delta (25 Year)	*1*	*675*	*12*	*149*	*1,365*	*18*	*26*	*2*	*1*	*11*	*1*	*113*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*1*	*338*	*6*	*75*	*683*	*9*	*13*	*1*	*1*	*6*	*1*	*57*
Metro Net Increase (25 Year)	*0*	*-337*	*-6*	*-74*	*-682*	*-9*	*-13*	*-1*	*0*	*-5*	*0*	*-56*
Metro Future Delta (20 Year)	1	675	12	149	1,365	18	26	2	1	11	1	113
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*1*	*827*	*45*	*931*	*2,143*	*18*	*26*	*2*	*1*	*62*	*1*	*356*
Sun Future % (25 Year)	*1*	*846*	*27*	*796*	*2,386*	*18*	*26*	*2*	*1*	*31*	*1*	*296*
Sun Future Obs (25 Year)	*1*	*837*	*36*	*864*	*2,264*	*18*	*26*	*2*	*1*	*46*	*1*	*326*
Sun Net Increase (25 Year)	*0*	*162*	*24*	*715*	*899*	*0*	*0*	*0*	*0*	*35*	*0*	*213*
Sun Future Delta (20 Year)	1	796	39	775	1,987	18	26	2	1	52	1	307
Sun Future % (20 Year)	1	812	24	666	2,182	18	26	2	1	27	1	259
Sun Future Obs (20 Year)	1	804	31	721	2,084	18	26	2	1	39	1	283
Sun Net Increase (20 Year)	0	129	19	572	719	0	0	0	0	28	0	170

EX Observed	1	675	12	149	1,365	18	26	2	1	11	1	113
Sunrise EX Model (1 hr.)	1	597	26	180	1039	1	1	1	1	28	1	150
Sunrise Future Model (1 hr.)	1	748	61	962	1817	1	1	1	1	79	1	393
Model Growth		152	33	782	778					51		243
80% of Model Growth		121	27	626	622					41		194
EX Observed + 80% Growth		796	39	775	1987					52		307

INTERSECTION: #8	OR 213/Henrici Road											
8	NB			SB			EB			WB		
Node 14198	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed		565	17	95	1,117					11		67
METRO EX Model	0	1,884	131	98	2,079	0	0	0	0	42	0	116
METRO Future Model	0	1,877	327	425	2,261	0	0	0	0	42	0	187
Sunrise EX Model	0	1,172	148	98	2,611	0	0	0	0	264	0	31
Sunrise Future Model	0	1,594	253	122	3,444	0	0	0	0	413	0	23
Metro 1 Hr EX Model	0	893	69	52	1,102	0	0	0	0	22	0	61
Metro 1 Hr future Model	0	995	173	225	1,198	0	0	0	0	22	0	99
Sunrise 1 Hr EX Model	0	622	77	50	1,067	0	0	0	0	140	0	3
Sunrise 1 Hr Future Model	0	797	150	70	1,825	0	0	0	0	219	0	12
Metro Future Delta (25 Year)	*0*	*667*	*121*	*268*	*1,213*	*0*	*0*	*0*	*0*	*11*	*0*	*105*
Metro Future % (25 Year)	*0*	*630*	*42*	*412*	*1,315*	*0*	*0*	*0*	*0*	*11*	*0*	*106*
Metro Future Obs (25 Year)	*0*	*649*	*82*	*340*	*1,214*	*0*	*0*	*0*	*0*	*11*	*0*	*106*
Metro Net Increase (25 Year)	*0*	*84*	*65*	*246*	*97*	*0*	*0*	*0*	*0*	*0*	*0*	*39*
Metro Future Delta (20 Year)	0	647	100	234	1,196	0	0	0	0	11	0	97
Metro Future % (20 Year)	0	617	37	349	1,195	0	0	0	0	11	0	100
Metro Future Obs (20 Year)	0	632	69	291	1,195	0	0	0	0	11	0	98
Metro Net Increase (20 Year)	0	67	53	196	78	0	0	0	0	0	0	31
Sun Future Delta (25 Year)	*0*	*740*	*90*	*115*	*1,875*	*0*	*0*	*0*	*0*	*90*	*0*	*77*
Sun Future % (25 Year)	*0*	*724*	*33*	*133*	*1,910*	*0*	*0*	*0*	*0*	*17*	*0*	*308*
Sun Future Obs (25 Year)	*0*	*732*	*61*	*123*	*1,893*	*0*	*0*	*0*	*0*	*54*	*0*	*193*
Sun Net Increase (25 Year)	*0*	*167*	*44*	*28*	*776*	*0*	*0*	*0*	*0*	*43*	*0*	*125*
Sun Future Delta (20 Year)	0	705	75	111	1,723	0	0	0	0	74	0	75
Sun Future % (20 Year)	0	693	30	125	1,751	0	0	0	0	16	0	260
Sun Future Obs (20 Year)	0	699	52	118	1,737	0	0	0	0	45	0	167
Sun Net Increase (20 Year)	0	134	35	23	620	0	0	0	0	34	0	100

EX Observed	0	565	17	95	1,117	0	0	0	0	11	0	67
Sunrise EX Model (1 hr.)	0	622	77	50	1067	0	0	0	0	140	0	3
Sunrise Future Model (1 hr.)	0	797	150	70	1825	0	0	0	0	219	0	12
Model Growth	0	175	73	20	758	0	0	0	0	79	0	10
80% of Model Growth	0	140	58	16	606	0	0	0	0	63	0	8

EX Observed + 80% Growth	0	705	75	111	1723	0	0	0	0	74	0	75

INTERSECTION: #9	Thayer Road / Mapletane Road											
9	NB			SB			EB			WB		
Node 10373	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed		363	79	10	280					51		3
METRO EX Model												
METRO Future Model												
Sunrise EX Model		483	1	1	240					1	0	1
Sunrise Future Model		952	1	1	782					1		1
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	0	245	1	1	127	0	0	0	0	1	0	1
Sunrise 1 Hr Future Model	0	507	1	1	414	0	0	0	0	1	0	1
Metro Future Delta (25 Year)	*0*	*363*	*79*	*10*	*280*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*0*	*182*	*40*	*5*	*140*	*0*	*0*	*0*	*0*	*26*	*0*	*2*
Metro Net Increase (25 Year)	*0*	*121*	*-39*	*-5*	*-140*	*0*	*0*	*0*	*0*	*-25*	*0*	*-1*
Metro Future Delta (20 Year)	0	363	79	10	280	0	0	0	0	51	0	3
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*0*	*625*	*79*	*10*	*567*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Sun Future % (25 Year)	*0*	*750*	*79*	*10*	*912*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Sun Future Obs (25 Year)	*0*	*688*	*79*	*10*	*740*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Sun Net Increase (25 Year)	*0*	*325*	*0*	*0*	*460*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Sun Future Delta (20 Year)	0	572	79	10	510	0	0	0	0	51	0	3
Sun Future % (20 Year)	0	673	79	10	786	0	0	0	0	51	0	3
Sun Future Obs (20 Year)	0	623	79	10	648	0	0	0	0	51	0	3
Sun Net Increase (20 Year)	0	260	0	0	368	0	0	0	0	0	0	0

EX Observed	0	363	79	10	280	0	0	0	0	51	0	3
Sunrise EX Model (1 hr.)	0	245	1	1	127	0	0	0	0	1	0	1
Sunrise Future Model (1 hr.)	0	507	1	1	414	0	0	0	0	1	0	1
Model Growth	0	262			287	0	0	0	0		0	
80% of Model Growth	0	209			230	0	0	0	0		0	
EX Observed + 80% Growth	0	572			510	0	0	0	0		0	

INTERSECTION: #10	Beavercreek Road/Mapletane Road (See Left Comment)											
10	NB			SB			EB			WB		
Node 17122	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	186	79	46	89	45	217	303	731	115	13	473	60
METRO EX Model	1	1	1	277	1	196	302	1,829	1	1	1,448	146
METRO Future Model	1	1	1	277	1	559	2,027	1,739	1	1	1,519	382
Sunrise EX Model	1	1	1	24	1	215	437	1,182	1	1	538	35
Sunrise Future Model	1	1	1	65	1	694	826	2,328	1	1	1,374	133
Metro 1 Hr EX Model	1	1	1	147	1	105	160	969	1	1	746	79
Metro 1 Hr future Model	1	1	1	147	1	296	1,074	922	1	1	805	192
Sunrise 1 Hr EX Model	1	1	1	13	1	114	226	626	1	1	280	19
Sunrise 1 Hr Future Model	1	1	1	47	1	368	438	1,234	1	1	728	70
Metro Future Delta (25 Year)	*186*	*79*	*46*	*89*	*45*	*408*	*1,217*	*682*	*115*	*13*	*532*	*173*
Metro Future % (25 Year)	*186*	*79*	*46*	*89*	*45*	*510*	*2,534*	*695*	*115*	*13*	*810*	*146*
Metro Future Obs (25 Year)	*186*	*79*	*46*	*89*	*45*	*509*	*1,525*	*689*	*115*	*13*	*621*	*158*
Metro Net Increase (25 Year)	*0*	*0*	*0*	*0*	*0*	*292*	*1,322*	*-42*	*0*	*0*	*48*	*99*
Metro Future Delta (20 Year)	186	79	46	89	45	370	1,034	693	115	13	520	150
Metro Future % (20 Year)	186	79	46	89	45	531	1,688	702	115	13	503	179
Metro Future Obs (20 Year)	186	79	46	89	45	450	1,361	698	115	13	511	139
Metro Net Increase (20 Year)	0	0	0	0	0	233	1,058	-33	0	0	38	79
Sun Future Delta (25 Year)	*186*	*79*	*46*	*103*	*45*	*471*	*514*	*1,338*	*115*	*13*	*921*	*112*
Sun Future % (25 Year)	*186*	*79*	*46*	*253*	*45*	*700*	*586*	*1,440*	*115*	*13*	*1,231*	*228*
Sun Future Obs (25 Year)	*186*	*79*	*46*	*178*	*45*	*586*	*550*	*1,389*	*115*	*13*	*1,076*	*170*
Sun Net Increase (25 Year)	*0*	*0*	*0*	*109*	*0*	*369*	*247*	*658*	*0*	*0*	*603*	*110*
Sun Future Delta (20 Year)	186	79	46	95	45	420	472	1,217	115	13	832	102
Sun Future % (20 Year)	186	79	46	216	45	604	530	1,296	115	13	1,079	194
Sun Future Obs (20 Year)	186	79	46	156	45	512	501	1,257	115	13	956	146
Sun Net Increase (20 Year)	0	0	0	87	0	295	198	526	0	0	483	88

EX Observed	186	79	46	89	45	217	303	731	115	13	473	60
Sunrise EX Model (1 hr.)	1	1	1	13	1	114	226	626	1	1	280	19
Sunrise Future Model (1 hr.)	1	1	1	47	1	368	438	1234	1	1	728	70
Model Growth				34		254	211	607			448	52
80% of Model Growth				27		203	169	486			359	42
EX Observed + 80% Growth				96		420	472	1217			832	102

INTERSECTION: #11	Beavercreek Road / Clairemont Drive (East Community College Driveway)											
11	NB			SB			EB			WB		
Node 16013	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	26	442			817	158	84		38			
METRO EX Model												
METRO Future Model												
Sunrise EX Model	111	221			826	479	308		219	0	0	0
Sunrise Future Model	283	726			1,794	623	771		257	0	0	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	59	138	0	0	438	201	163	0	145	0	0	0
Sunrise 1 Hr Future Model	161	390	0	0	951	330	409	0	136	0	0	0
Metro Future Delta (25 Year)	*26*	*442*	*0*	*0*	*817*	*158*	*84*	*0*	*38*	*0*	*0*	*0*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*11*	*221*	*0*	*0*	*409*	*79*	*42*	*0*	*19*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*-52*	*-221*	*0*	*0*	*-426*	*-79*	*-42*	*0*	*-19*	*0*	*0*	*0*
Metro Future Delta (20 Year)	26	442	0	0	817	158	84	0	38	0	0	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*128*	*884*	*0*	*0*	*1,330*	*287*	*329*	*0*	*30*	*0*	*0*	*0*
Sun Future % (25 Year)	*71*	*1,246*	*0*	*0*	*1,774*	*250*	*210*	*0*	*38*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*99*	*970*	*0*	*0*	*1,552*	*274*	*270*	*0*	*33*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*73*	*528*	*0*	*0*	*735*	*116*	*186*	*0*	*-5*	*0*	*0*	*0*
Sun Future Delta (20 Year)	107	643	0	0	1,227	261	280	0	31	0	0	0
Sun Future % (20 Year)	62	1,086	0	0	1,563	239	185	0	36	0	0	0
Sun Future Obs (20 Year)	85	864	0	0	1,405	250	233	0	34	0	0	0
Sun Net Increase (20 Year)	59	422	0	0	588	92	149	0	-4	0	0	0

EX Observed	26	442	0	0	817	158	84	0	38	0	0	0
Sunrise EX Model (1 hr.)	59	138	0	0	438	201	163	0	145	0	0	0
Sunrise Future Model (1 hr.)	161	390	0	0	951	330	409	0	136	0	0	0
Model Growth	102	252	0	0	513	129	245	0		0	0	0
80% of Model Growth	81	201	0	0	410	103	196	0		0	0	0
EX Observed + 80% Growth	107	643	0	0	1227	261	280	0		0	0	0

INTERSECTION: #12	Beavercreek Road / Loder Road

This intersection could not be modeled because the TAZs in this area are too large and require dis-aggregation.

INTERSECTION: #13	Beavercreek Road / Meyers Road (High School)

This intersection could not be modeled because the TAZs in this area are too large and require dis-aggregation.

INTERSECTION: #14	Beavercreek Road / Glen Oak											
14	NB			SB			EB			WB		
Node 87100	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	17	369			665	117	64		19			
METRO EX Model												
METRO Future Model												
Sunrise EX Model	49	281			753	384	81		46	0	0	0
Sunrise Future Model	169	731			1,996	49	286		143	0	0	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	24	149	0	0	378	204	48	0	21	0	0	0
Sunrise 1 Hr Future Model	90	398	0	0	1,058	26	153	0	76	0	0	0
Metro Future Delta (25 Year)	*12*	*369*	*0*	*0*	*665*	*117*	*64*	*0*	*19*	*0*	*0*	*0*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*6*	*185*	*0*	*0*	*333*	*59*	*32*	*0*	*10*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*-5*	*-184*	*0*	*0*	*-332*	*-58*	*-32*	*0*	*-9*	*0*	*0*	*0*
Metro Future Delta (20 Year)	12	369	0	0	665	117	64	0	19	0	0	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*77*	*618*	*0*	*0*	*1,345*	*-61*	*166*	*0*	*74*	*0*	*0*	*0*
Sun Future % (25 Year)	*44*	*986*	*0*	*0*	*1,862*	*15*	*203*	*0*	*68*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*61*	*802*	*0*	*0*	*1,603*	*-23*	*185*	*0*	*71*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*49*	*433*	*0*	*0*	*938*	*-140*	*121*	*0*	*52*	*0*	*0*	*0*
Sun Future Delta (20 Year)	64	568	0	0	1,209	-25	148	0	63	0	0	0

Sun Future % (20 Year)	38	863	0	0	1,622	35	175	0	58	0	0	0
Sun Future Obs (20 Year)	51	716	0	0	1,416	5	161	0	60	0	0	0
Sun Net Increase (20 Year)	39	347	0	0	751	-112	97	0	41	0	0	0

EX Observed	12	369	0	0	665	117	64	0	19	0	0	0
Sunrise EX Model (1 hr.)	24	149	0	0	378	204	48	0	21	0	0	0
Sunrise Future Model (1 hr.)	90	398	0	0	1058	29	153	0	76	0	0	0
Model Growth	65	249	0	0	680	87	104	0	55	0	0	0
80% of Model Growth	52	199	0	0	544	70	84	0	44	0	0	0
EX Observed + 80% Growth	64	568	0	0	1209	187	148	0	63	0	0	0

INTERSECTION: #15	Beavercreek Road/Henrici Road											
15	NB			SB			EB			WB		
Node # 14197	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	15	234	3	175	460	25	27	52	49	14	22	84
METRO EX Model	38	220	38	344	1,059	2	1	175	54	227	101	184
METRO Future Model	95	249	77	1,586	671	9	1	622	129	131	125	212
Sunrise EX Model	1	196	20	331	417	84	1	146	47	218	183	131
Sunrise Future Model	1	506	72	661	1,478	84	1	337	78	243	435	414
Metro 1 Hr EX Model	30	117	21	182	561	1	1	93	29	120	54	98
Metro 1 Hr future Model	50	132	41	841	356	5	1	330	68	69	66	112
Sunrise 1 Hr EX Model	1	104	16	133	221	45	1	77	26	20	98	69
Sunrise 1 Hr Future Model	1	268	38	350	783	45	1	179	42	129	231	219
Metro Future Delta (25 Year)	36	249	23	800	254	20	27	289	89	-37	35	90
Metro Future % (25 Year)	25	265	8	927	281	111	27	185	117	8	27	97
Metro Future Obs (25 Year)	31	287	15	820	273	71	27	237	103	14	31	90
Metro Net Increase (25 Year)	16	23	12	645	187	46	0	185	54	-25	9	54
Metro Future Delta (20 Year)	33	246	19	700	296	26	27	242	81	-27	33	96
Metro Future % (20 Year)	23	258	5	680	325	95	27	154	103	9	26	92
Metro Future Obs (20 Year)	27	282	12	691	310	61	27	200	92	-9	29	95
Metro Net Increase (20 Year)	12	18	9	516	-150	36	0	148	43	-23	7	11
Sun Future Delta (25 Year)	15	398	25	392	1,022	25	27	153	65	123	158	234
Sun Future % (25 Year)	15	604	7	461	1,630	25	27	120	79	90	52	265
Sun Future Obs (25 Year)	15	501	16	427	1,326	25	27	137	72	106	103	250
Sun Net Increase (25 Year)	0	267	13	252	866	0	0	85	23	92	81	166
Sun Future Delta (20 Year)	15	365	21	349	910	25	27	133	62	101	128	204
Sun Future % (20 Year)	15	530	6	404	1,396	25	27	106	73	74	46	229
Sun Future Obs (20 Year)	15	448	14	376	1,153	25	27	120	67	88	87	217
Sun Net Increase (20 Year)	0	214	11	201	693	0	0	68	18	74	65	133

EX Observed	15	234	3	175	460	25	27	52	49	14	22	84
Sunrise EX Model (1 hr.)	1	104	16	133	221	45	1	77	26	20	98	69
Sunrise Future Model (1 hr.)	1	268	38	350	783	45	1	179	42	129	231	219
Model Growth	0	164	22	217	562	0	0	101	16	109	133	150
80% of Model Growth	0	131	18	174	450	0	0	81	13	87	106	120
EX Observed + 80% Growth	15	365	21	349	910	25	27	133	62	101	128	204

INTERSECTION: #A	Redland Road/Abernethy Road-Holcomb Road											
A	NB			SB			EB			WB		
Node # 15182	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	112	295	63	290	538	42	64	211	233	49	84	145
METRO EX Model												
METRO Future Model												
Sunrise EX Model	261	465	165	313	936	224	432	591	465	135	153	39
Sunrise Future Model	548	407	209	278	859	161	306	819	1,004	312	449	270
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	138	213	86	112	504	119	229	207	246	66	103	31
Sunrise 1 Hr Future Model	290	216	111	147	455	85	162	434	532	165	238	143
Metro Future Delta (25 Year)	112	295	63	290	538	42	64	211	233	49	84	145
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	56	148	32	145	269	21	32	106	117	25	42	73
Metro Net Increase (25 Year)	56	147	31	145	269	21	32	105	116	24	42	72
Metro Future Delta (20 Year)	112	295	63	290	538	42	64	211	233	49	84	145
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	264	298	88	325	490	9	-3	438	519	148	219	257
Sun Future % (25 Year)	235	299	81	380	486	30	45	442	503	122	193	664
Sun Future Obs (25 Year)	250	298	85	353	488	19	21	440	511	135	206	460
Sun Net Increase (25 Year)	138	3	22	53	-50	-23	-43	229	278	86	122	315
Sun Future Delta (20 Year)	234	297	83	318	499	15	11	392	462	128	192	234
Sun Future % (20 Year)	211	298	78	362	497	33	49	396	449	108	172	560
Sun Future Obs (20 Year)	222	298	80	340	498	24	30	394	455	118	182	397
Sun Net Increase (20 Year)	110	3	17	50	-40	-18	-34	183	222	69	98	252

	WB Redland			EB Redland			NB Abernathy			SB Holcomb		
EX Observed	112	295	63	290	538	42	64	211	233	49	84	145
Sunrise EX Model (1 hr.)	138	213	86	112	504	119	229	207	246	66	103	31
Sunrise Future Model (1 hr.)	290	216	111	147	455	85	162	434	532	165	238	143
Model Growth	152	0	23	35	-49	34	-67	227	286	99	135	112
80% of Model Growth	122	0	20	28	-39	27	-53	181	229	79	108	89
EX Observed + 80% Growth	234	295	83	318	499	69	11	392	462	128	192	234

INTERSECTION: #B	Redland Road/Anchor Way											
B	NB			SB			EB			WB		
EX Observed	115	0	65	0	0	0	0	692	113	36	340	0
METRO EX Model												
METRO Future Model												
Sunrise EX Model	161	0	39	0	0	0	0	1,435	497	45	278	0
Sunrise Future Model	233	0	892	0	0	0	0	1,664	510	419	931	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	77	0	51	0	0	0	0	763	51	23	360	0
Sunrise 1 Hr Future Model	123	0	473	0	0	0	0	882	270	222	493	0
Metro Future Delta (25 Year)	115	0	65	0	0	0	0	692	113	36	340	0
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	56	0	32	0	0	0	0	346	67	18	170	0
Metro Net Increase (25 Year)	57	0	32	0	0	0	0	346	56	18	170	0
Metro Future Delta (20 Year)	115	0	65	0	0	0	0	692	113	36	340	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	161	0	487	0	0	0	0	811	332	235	474	0
Sun Future % (25 Year)	134	0	604	0	0	0	0	800	594	351	466	0
Sun Future Obs (25 Year)	172	0	545	0	0	0	0	806	463	293	470	0
Sun Net Increase (25 Year)	57	0	480	0	0	0	0	114	350	257	130	0
Sun Future Delta (20 Year)	152	0	403	0	0	0	0	787	288	195	447	0
Sun Future % (20 Year)	170	0	496	0	0	0	0	779	498	288	441	0
Sun Future Obs (20 Year)	161	0	449	0	0	0	0	783	393	242	444	0
Sun Net Increase (20 Year)	46	0	384	0	0	0	0	91	280	206	104	0

EX Observed	115	0	65	0	0	0	0	692	113	36	340	0
Sunrise EX Model (1 hr.)	77	0	51	0	0	0	0	763	51	23	360	0
Sunrise Future Model (1 hr.)	123	0	473	0	0	0	0	882	270	222	493	0
Model Growth	46	0	422	0	0	0	0	119	219	199	134	0
80% of Model Growth	37	0	338	0	0	0	0	95	175	159	107	0
EX Observed + 80% Growth	152	0	403	0	0	0	0	787	288	195	447	0

INTERSECTION: #C	Redland Road/Livesay Road (refer to cell comment)

This intersection could not be modeled because the TAZs in this area are too large and require dis-aggregation.

INTERSECTION: #D	Redland Road/Holly Lane											
D	NB			SB			EB			WB		
Node # 15268	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	79	0	19	0	0	0	0	514	221	22	291	0
METRO EX Model												
METRO Future Model												
Sunrise EX Model	181	0	22	0	0	0	0	1,174	368	28	542	0
Sunrise Future Model	413	0	482	0	0	0	0	1,757	799	189	937	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	96	0	38	0	0	0	0	622	191	21	287	0
Sunrise 1 Hr Future Model	219	0	255	0	0	0	0	931	423	100	497	0
Metro Future Delta (25 Year)	79	0	19	0	0	0	0	514	221	22	291	0
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	40	0	10	0	0	0	0	257	111	11	146	0
Metro Net Increase (25 Year)	-39	0	-9	0	0	0	0	-257	-110	-11	-145	0
Metro Future Delta (20 Year)	79	0	19	0	0	0	0	514	221	22	291	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	202	0	236	0	0	0	0	823	454	102	500	0
Sun Future % (25 Year)	180	0	127	0	0	0	0	769	490	107	503	0

Sun Future Obs (25 Year)	191	0	182	0	0	0	0	796	472	104	502	0
Sun Net Increase (25 Year)	112	0	153	0	0	0	0	282	251	82	211	0
Sun Future Delta (20 Year)	177	0	193	0	0	0	0	761	407	86	458	0
Sun Future % (20 Year)	160	0	106	0	0	0	0	718	437	90	461	0
Sun Future Obs (20 Year)	169	0	149	0	0	0	0	740	422	88	460	0
Sun Net Increase (20 Year)	90	0	130	0	0	0	0	226	201	66	169	0

EX Observed	79	0	19	0	0	0	0	514	221	22	291	0
Sunrise EX Model (1 hr.)	96	0	38	0	0	0	0	622	191	21	287	0
Sunrise Future Model (1 hr.)	219	0	255	0	0	0	0	931	423	100	497	0
Model Growth	123	0	217	0	0	0	0	309	233	80	209	0
80% of Model Growth	98	0	174	0	0	0	0	247	186	64	167	0
EX Observed + 80% Growth	177	0	193	0	0	0	0	761	407	86	458	0

INTERSECTION: #E	Maplelane Road/Holly Lane											
E	NB			SB			EB			WB		
Node # 14073	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	0	0	0	79	0	106	65	290	0	0	194	21
METRO EX Model												
METRO Future Model												
Sunrise EX Model	0	0	0	1	0	53	91	373	0	0	187	1
Sunrise Future Model				1		162	404	555			620	1
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	0	0	0	1	0	28	48	197	0	0	99	1
Sunrise 1 Hr Future Model	0	0	0	1	0	86	214	294	0	0	329	1
Metro Future Delta (25 Year)	0	0	0	79	0	106	65	290	0	0	194	21
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	0	0	0	46	0	53	39	145	0	0	97	11
Metro Net Increase (25 Year)	0	0	0	-39	0	-53	-32	-145	0	0	-97	-10
Metro Future Delta (20 Year)	0	0	0	79	0	106	65	290	0	0	194	21
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	0	0	0	79	0	164	231	388	0	0	423	21
Sun Future % (25 Year)	0	0	0	79	0	324	289	434	0	0	643	21
Sun Future Obs (25 Year)	0	0	0	79	0	244	260	411	0	0	533	21
Sun Net Increase (25 Year)	0	0	0	0	0	138	195	121	0	0	339	0
Sun Future Delta (20 Year)	0	0	0	79	0	152	198	368	0	0	378	21
Sun Future % (20 Year)	0	0	0	79	0	280	244	405	0	0	553	21
Sun Future Obs (20 Year)	0	0	0	79	0	216	221	387	0	0	465	21
Sun Net Increase (20 Year)	0	0	0	0	0	110	156	97	0	0	271	0

EX Observed	0	0	0	79	0	106	65	290	0	0	194	21
Sunrise EX Model (1 hr.)	0	0	0	1	0	28	48	197	0	0	99	1
Sunrise Future Model (1 hr.)	0	0	0	1	0	86	214	294	0	0	329	1
Model Growth	0	0	0	0	0	58	166	98	0	0	229	0
80% of Model Growth	0	0	0	0	0	46	133	78	0	0	184	0
EX Observed + 80% Growth	0	0	0	0	0	152	198	368	0	0	378	21

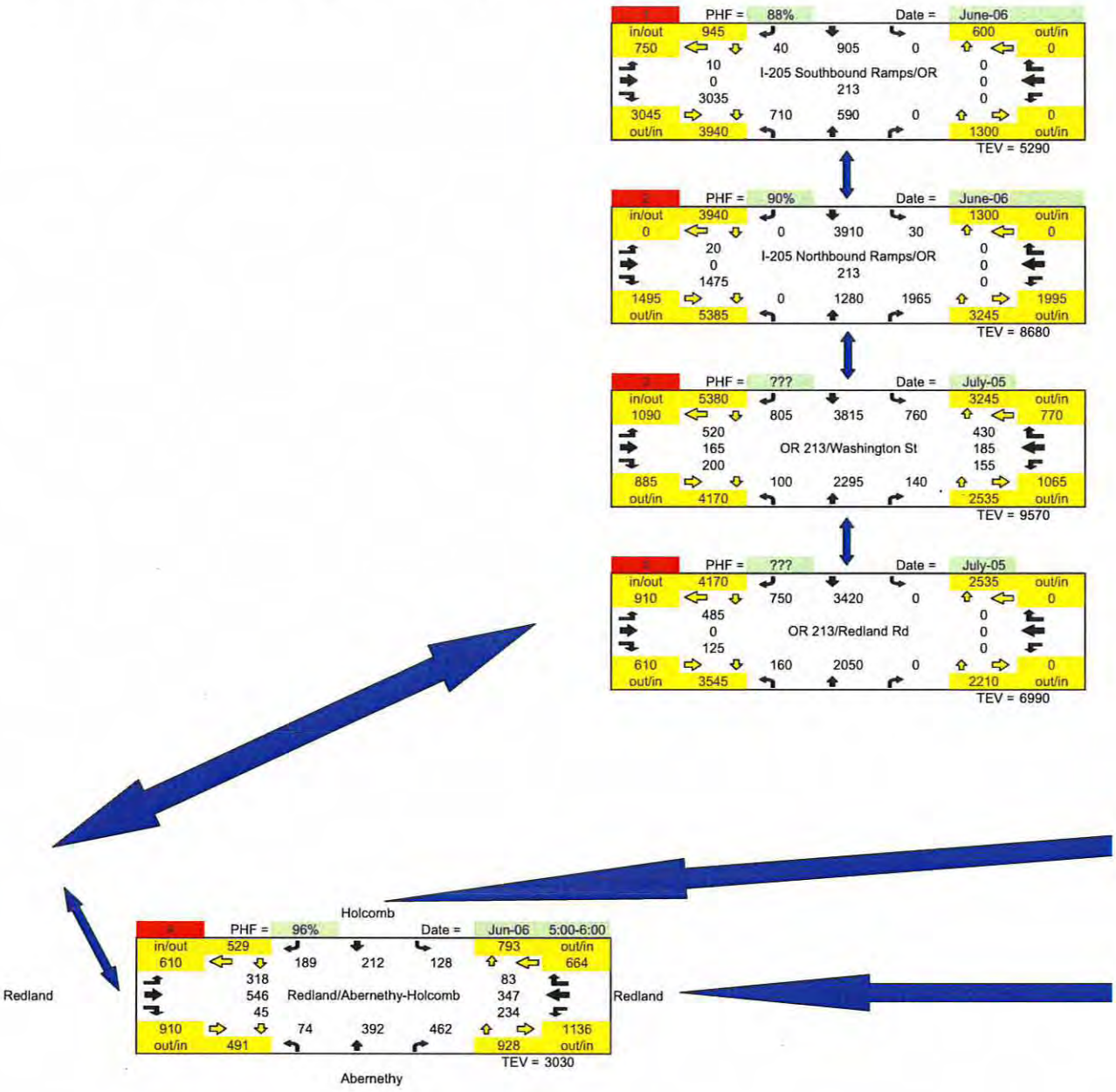
INTERSECTION: #F	Holcomb Boulevard/Front Street											
F	NB			SB			EB			WB		
Node # 14327	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	0	0	0	11	0	29	41	470	0	0	236	5
METRO EX Model												
METRO Future Model												
Sunrise EX Model	0	0	0	173	0	59	1	769	0	0	379	15
Sunrise Future Model				222		88	1	1,307			941	8
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	0	0	0	95	0	15	1	407	0	0	201	8
Sunrise 1 Hr Future Model	0	0	0	118	0	47	1	693	0	0	499	8
Metro Future Delta (25 Year)	0	0	0	11	0	29	41	470	0	0	236	5
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	0	0	0	6	0	15	21	235	0	0	118	3
Metro Net Increase (25 Year)	0	0	0	-5	0	-14	-20	-235	0	0	-118	-2
Metro Future Delta (20 Year)	0	0	0	11	0	29	41	470	0	0	236	5
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	0	0	0	34	0	60	41	758	0	0	534	5
Sun Future % (25 Year)	0	0	0	14	0	88	41	800	0	0	586	5
Sun Future Obs (25 Year)	0	0	0	24	0	74	41	778	0	0	560	5
Sun Net Increase (25 Year)	0	0	0	13	0	45	0	308	0	0	324	0
Sun Future Delta (20 Year)	0	0	0	29	0	54	41	699	0	0	474	5
Sun Future % (20 Year)	0	0	0	13	0	76	41	734	0	0	516	5
Sun Future Obs (20 Year)	0	0	0	21	0	65	41	716	0	0	495	5
Sun Net Increase (20 Year)	0	0	0	10	0	36	0	246	0	0	259	0

EX Observed	0	0	0	11	0	29	41	470	0	0	236	5
Sunrise EX Model (1 hr.)	0	0	0	95	0	15	1	407	0	0	201	8
Sunrise Future Model (1 hr.)	0	0	0	118	0	47	1	693	0	0	499	8
Model Growth	0	0	0	23	0	31	0	286	0	0	298	3
80% of Model Growth	0	0	0	18	0	25	0	229	0	0	238	2
EX Observed + 80% Growth	0	0	0	29	0	54	41	699	0	0	474	5

INTERSECTION: #G	Holcomb Boulevard/Swan Avenue											
G	NB			SB			EB			WB		
Node # 14082	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	11	1	2	3	2	28	43	345	23	1	143	3
METRO EX Model												
METRO Future Model												
Sunrise EX Model	1	1	1	374	1	23	35	737	1	1	221	221
Sunrise Future Model	1	1	1	406	1	128	136	1,241	1	1	575	275
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	1	1	1	198	1	14	19	388	1	1	117	117
Sunrise 1 Hr Future Model	1	1	1	215	1	68	72	658	1	1	305	146
Metro Future Delta (25 Year)	11	1	2	3	2	28	43	345	23	1	143	3
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	6	1	1	2	1	14	22	173	12	1	72	2
Metro Net Increase (25 Year)	-5	0	-1	-1	-1	-14	-21	-172	-11	0	-71	-1
Metro Future Delta (20 Year)	11	1	2	3	2	28	43	345	23	1	143	3
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	11	1	2	20	2	82	97	615	23	1	331	32
Sun Future % (25 Year)	11	1	2	3	2	133	167	585	23	1	372	4
Sun Future Obs (25 Year)	11	1	2	12	2	107	132	600	23	1	351	18
Sun Net Increase (25 Year)	0	0	0	9	0	79	89	255	0	0	208	15
Sun Future Delta (20 Year)	11	1	2	17	2	71	86	561	23	1	293	26
Sun Future % (20 Year)	11	1	2	3	2	112	142	537	23	-1	326	4
Sun Future Obs (20 Year)	11	1	2	10	2	91	114	549	23	1	310	15
Sun Net Increase (20 Year)	0	0	0	7	0	63	71	204	0	0	167	12

EX Observed	11	1	2	3	2	28	43	345	23	1	143	3
Sunrise EX Model (1 hr.)	1	1	1	198	1	14	19	388	1	1	117	117
Sunrise Future Model (1 hr.)	1	1	1	215	1	68	72	658	1	1	305	146
Model Growth	0	0	0	17	0	54	54	270	0	0	188	29
80% of Model Growth	0	0	0	14	0	43	43	216	0	0	150	23
EX Observed + 80% Growth	0	0	0	17	0	71	86	561	0	0	293	26

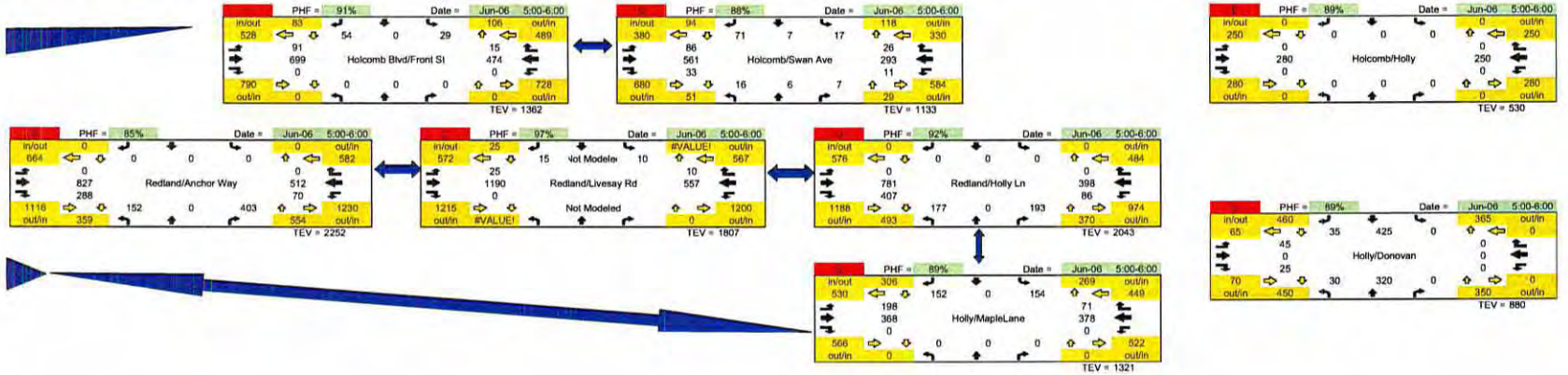
Kittelson and Associates, Inc Intersection Volume Summary 5/16/2007
7938 - Park Place Concept Plan 2027 Volumes



Kittelson and Associates, Inc
7938 - Park Place Concept Plan

Intersection Volume Summary
2027 Volumes

5/16/2007



Appendix B

Description of Level-of-Service Methods & Criteria

Appendix B

LEVEL OF SERVICE CONCEPT

Level of service (level of service) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from A to F.[1]

SIGNALIZED INTERSECTIONS

The six level of service grades are described qualitatively for signalized intersections in Table B1. Additionally, Table B2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, level of service D is generally considered to represent the minimum acceptable design standard.

Table B1
Level of Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

1 Most of the material in this appendix is adapted from the Transportation Research Board, *Highway Capacity Manual*, 2000.

Table B2
Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two way stop controlled (TWSC) and all way stop controlled (AWSC) intersections. The 2000 Highway Capacity Manual provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table B3. A quantitative definition of level of service for unsignalized intersections is presented in Table B4. Using this definition, level of service E is generally considered to represent the minimum acceptable design standard.

Table B3
Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	• Many times there is more than one vehicle in queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. • There is almost always more than one vehicle in queue. • Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table B4
Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and #15.0
C	>15.0 and #25.0
D	>25.0 and #35.0
E	>35.0 and #50.0
F	>50.0

It should be noted that the level of service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level-of-service is only calculated for each minor street lane.

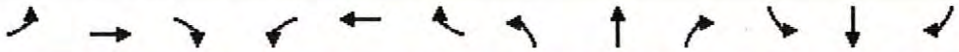
In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOE's) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

Appendix C

2027 No-Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis
100: Washington Street & Cascade Hwy South

2027 Background Conditions
5/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1677		1736	1827	1553	1736	3471	1553	1736	4988	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	1677		1736	1827	1553	1736	3471	1553	1736	4988	1553
Volume (vph)	520	165	200	155	185	430	100	2295	140	760	3815	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	2416	147	800	4016	847
Lane Group Flow (vph)	520	365	0	155	185	430	105	2416	147	800	4016	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Split			Split		pt+ov	Prot		Perm	Prot		pm+ov
Protected Phases	8	8		7	7	7 5	1	6		5	2	8
Permitted Phases									6			2
Actuated Green, G (s)	19.0	19.0		25.2	25.2	55.2	5.0	56.8	56.8	30.0	81.8	100.8
Effective Green, g (s)	21.0	21.0		26.2	26.2	57.2	6.0	59.8	59.8	31.0	84.8	105.8
Actuated g/C Ratio	0.14	0.14		0.17	0.17	0.38	0.04	0.40	0.40	0.21	0.57	0.71
Clearance Time (s)	5.0	5.0		4.0	4.0		4.0	6.0	6.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	471	235		303	319	592	69	1384	619	359	2820	1126
v/s Ratio Prot	0.15	c0.22		0.09	0.10	c0.28	0.06	c0.70		c0.46	0.81	0.11
v/s Ratio Perm									0.09			0.44
v/c Ratio	1.10	1.55		0.51	0.58	0.73	1.52	1.75	0.24	2.23	1.42	0.75
Uniform Delay, d1	64.5	64.5		56.1	56.8	39.7	72.0	45.1	30.0	59.5	32.6	13.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.97	0.96	0.85	1.00	1.00	1.00
Incremental Delay, d2	72.9	268.8		1.5	2.6	4.4	269.3	337.1	0.5	561.7	193.0	2.9
Delay (s)	137.4	333.3		57.6	59.4	44.1	339.4	380.5	25.8	621.2	225.6	16.8
Level of Service	F	F		E	E	D	F	F	C	F	F	B
Approach Delay (s)		218.2			50.5			359.3			250.2	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM Average Control Delay	261.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	154.0%	ICU Level of Service	H

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
200: Redland Road & Cascade Hwy South

2027 Background Conditions
5/18/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	0.95	0.95	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3369		1736	3471	3471	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3369		1736	3471	3471	1553
Volume (vph)	485	125	160	2050	3420	750
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	485	125	168	2158	3600	789
Lane Group Flow (vph)	610	0	168	2158	3600	789
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	21.0		10.0	121.0	107.0	128.0
Effective Green, g (s)	22.0		11.0	122.0	108.0	130.0
Actuated g/C Ratio	0.15		0.07	0.81	0.72	0.87
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	494		127	2823	2499	1377
v/s Ratio Prot	c0.18		c0.10	0.62	c1.04	0.08
v/s Ratio Perm						0.42
v/c Ratio	1.23		1.32	0.76	1.44	0.57
Uniform Delay, d1	64.0		69.5	6.9	21.0	2.6
Progression Factor	1.00		1.00	1.00	0.69	0.13
Incremental Delay, d2	122.2		189.7	2.0	198.5	0.1
Delay (s)	186.2		259.2	8.9	212.9	0.4
Level of Service	F		F	A	F	A
Approach Delay (s)	186.2			27.0	174.7	
Approach LOS	F			C	F	

Intersection Summary			
HCM Average Control Delay	128.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	136.6%	ICU Level of Service	H

c Critical Lane Group

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 205 SB Ramps/213 (North Part)	F	OVRFL	0.000	F	OVRFL	0.000	+ 0.000 D/V
# 2 205 NB Ramps/213	F	OVRFL	0.000	F	OVRFL	0.000	+ 0.000 D/V
# 23 205 SB Ramps/213 (South Part)	F	OVRFL	0.000	F	OVRFL	0.000	+ 0.000 D/V
#101 Redland Rd/Abernathy Rd-Holcom	F	122.2	1.173	F	122.2	1.173	+ 0.000 D/V
#102 Redland Rd/Anchor Way	F	782.3	0.000	F	782.3	0.000	+ 0.000 D/V
#103 Redland Rd/Livesay Rd	D	29.1	0.000	D	29.1	0.000	+ 0.000 D/V
#104 Redland Rd/Holly Ln	F	619.0	0.000	F	619.0	0.000	+ 0.000 D/V
#105 Holly Lane/Donovan Road	A	8.9	0.000	A	8.9	0.000	+ 0.000 D/V
#106 Holly Ln/Maplelane Rd	F	127.2	0.000	F	127.2	0.000	+ 0.000 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	C	21.9	0.000	+ 0.000 D/V
#108 Holcomb Blvd/Swan Ave	D	26.5	0.000	D	26.5	0.000	+ 0.000 D/V

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 205 SB Ramps/213 (North Part)

Average Delay (sec/veh): OVERFLOW Worst Case Level Of Service: F[xxxxx]

Street Name:	213						205 SB					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	1 0 1	0	0	0 0 1	0	0	0 0 1	0	0	1 0 1	0	1
Volume Module: 4:30-5:30												
Base Vol:	0	710	0	0	0	0	0	905	0	10	0	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	710	0	0	0	0	0	905	0	10	0	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	710	0	0	0	0	0	905	0	10	0	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	710	0	0	0	0	0	905	0	10	0	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	710	0	0	0	0	0	905	0	10	0	40
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	6.5	xxxxx	7.1	6.5	6.2
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.0	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	710	xxxxx	1163	710	710
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	357	xxxxx	171	357	432
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	357	xxxxx	0	357	432
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	2.53	xxxx	xxxx	0.00	0.09
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	73.1	xxxxx	xxxx	xxxx	0.3
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	721	xxxxx	xxxxx	xxxx	14.2
LOS by Move:	*	*	*	*	*	*	*	F	*	*	*	B
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			720.9			xxxxxx		
ApproachLOS:	*			*			F			F		

Note: Queue reported is the number of cars per lane.

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 205 NB Ramps/213

Average Delay (sec/veh): 139.7 Worst Case Level Of Service: F[36590.6]

Street Name:	213						205 NB					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Ignore			Include			Ignore			Include		
Lanes:	0 0 0	1	1	1 0 2	0	0	1 0 0	0	1	0 0 0	0	0
Volume Module: 4:30-5:30 PM												
Base Vol:	0	1280	1965	30	3910	0	20	0	1475	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1280	1965	30	3910	0	20	0	1475	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1280	1965	30	3910	0	20	0	1475	0	0	0
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	0	1280	0	30	3910	0	20	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1280	0	30	3910	0	20	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	6.4	xxxx	6.3	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1280	xxxx	xxxxx	5250	xxxx	1955	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	539	xxxx	xxxxx	0	xxxx	78	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	539	xxxx	xxxxx	0	xxxx	78	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.06	xxxx	xxxx	48.12	xxxx	0.00	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	4.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	12.1	xxxx	xxxxx	36591	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	B	*	*	F	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			F			*		

Note: Queue reported is the number of cars per lane.

City of Oregon City
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Item #1.

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------------------------------------------------------------------------------
                    Kittelson & Associates, Inc. #7938
                  Park Place Concept Plan - Oregon City, OR
              2027 Background Traffic Conditions, Weekday PM Peak Hour
------------------------------------------------------------------------------
                      Level Of Service Computation Report
              2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #23 205 SB Ramps/213 (South Part)
******************************************************************************
Average Delay (sec/veh):    474.0       Worst Case Level Of Service: F[1869.6]
******************************************************************************
Street Name:                213                          205 ramps
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:       0  0  1  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0 1300    0      0 1365    0      0    0  905      0    0    0
Growth Adj:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:     0 1300    0      0 1365    0      0    0  905      0    0    0
Added Vol:       0    0    0      0    0    0      0    0    0      0    0    0
PasserByVol:     0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:     0 1300    0      0 1365    0      0    0  905      0    0    0
User Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Volume:      0 1300    0      0 1365    0      0    0  905      0    0    0
Reduct Vol:      0    0    0      0    0    0      0    0    0      0    0    0
Final Vol.:      0 1300    0      0 1365    0      0    0  905      0    0    0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx  1365  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   179  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   179  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  5.04  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx  94.3  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx  1870 xxxxx xxxx xxxxx
LOS by Move:   *    *    *     *    *    *     *    *     F     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:    xxxxxx            xxxxxx          1869.6           xxxxxx
ApproachLOS:       *                 *               F               *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************

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                    Kittelson & Associates, Inc. #7938
                  Park Place Concept Plan - Oregon City, OR
              2027 Background Traffic Conditions, Weekday PM Peak Hour
------------------------------------------------------------------------------
                      Level Of Service Computation Report
              2000 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd
******************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):          1.173
Loss Time (sec):       16 (Y+R=4.0 sec) Average Delay (sec/veh):        122.2
Optimal Cycle:        180              Level Of Service:                   F
******************************************************************************
Street Name:          Abernathy-Holcomb                Redland Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Protected        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0      0    0    0      0    0    0      0    0    0
Lanes:       1  0  0  1  0    1  0  1  0  1    1  0  0' 0  1  0    1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module: 5:00-6:00
Base Vol:      234  347   83    318  546   45     74  392  462    128  212  189
Growth Adj:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:   234  347   83    318  546   45     74  392  462    128  212  189
Added Vol:       0    0    0      0    0    0      0    0    0      0    0    0
PasserByVol:     0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:   234  347   83    318  546   45     74  392  462    128  212  189
User Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Volume:    234  347   83    318  546   45     74  392  462    128  212  189
Reduct Vol:      0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:   234  347   83    318  546   45     74  392  462    128  212  189
PCE Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:    234  347   83    318  546   45     74  392  462    128  212  189
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     1900 1900 1900   1900 1900 1900   1900 1900 1900   1900 1900 1900
Adjustment:   0.94 0.96 0.96   0.94 0.99 0.84   0.93 0.90 0.90   0.92 0.97 0.83
Lanes:        1.00 0.81 0.19   1.00 1.00 1.00   1.00 0.46 0.54   1.00 1.00 1.00
Final Sat.:   1787 1474  353   1787 1881 1599   1769  785  926   1753 1845 1568
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.13 0.24 0.24   0.18 0.29 0.03   0.04 0.50 0.50   0.07 0.11 0.12
Crit Moves:       ****             ****             ****             ****
Green/Cycle:  0.11 0.20 0.20   0.15 0.24 0.24   0.13 0.43 0.43   0.06 0.36 0.36
Volume/Cap:   1.20 1.17 1.17   1.17 1.20 0.12   0.33 1.17 1.17   1.17 0.32 0.33
Delay/Veh:   171.4  143 143.1 152.3  146 29.6   40.8  121 120.8 187.0 23.3 23.5
User DelAdj: 1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:  171.4  143 143.1 152.3  146 29.6   40.8  121 120.8 187.0 23.3 23.5
LOS by Move:   F    F    F     F    F    C     D    F    F     F    C    C
HCM2kAvgQ:    15   24   24    19   31    1     2   45   45     9    5    4
******************************************************************************
Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Average Delay (sec/veh): 193.1 Worst Case Level Of Service: F[782.3]

Street Name:	Anchor Way						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0	0	0	0	0	0	1 0	0	1	0 0
Volume Module: 5:00-6:00 PM												
Base Vol:	152	0	403	0	0	0	0	827	288	70	512	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	152	0	403	0	0	0	0	827	288	70	512	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	152	0	403	0	0	0	0	827	288	70	512	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	152	0	403	0	0	0	0	827	288	70	512	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	152	0	403	0	0	0	0	827	288	70	512	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1623	1623	971	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1115	xxxx	xxxxx
Potent Cap.:	114	104	309	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	623	xxxx	xxxxx
Move Cap.:	104	92	309	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	623	xxxx	xxxxx
Volume/Cap:	1.46	0.00	1.30	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.11	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.5	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	211	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	47.4	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.4	xxxx	xxxxx
Shrd ConDel:	xxxxx	782	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.5	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	B	*	*
ApproachDel:	782.3			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: D[29.1]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	0 0	0	0	1! 0	0	1	0 0	0	0	0 1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	15	25	1190	0	0	557	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	10	0	15	25	1190	0	0	557	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	10	0	15	25	1190	0	0	557	10
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1802	1802	562	567	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	89	80	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	87	78	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.12	0.00	0.03	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	174	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.5	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	29.1	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	D	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			29.1			xxxxxx			xxxxxx		
ApproachLOS:	*			D			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Average Delay (sec/veh): 112.7 Worst Case Level Of Service: F[619.0]

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	177	0	193	0	0	0	0	781	407	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	177	0	193	0	0	0	0	781	407	86	398	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	177	0	193	0	0	0	0	781	407	86	398	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	177	0	193	0	0	0	0	781	407	86	398	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	177	0	193	0	0	0	0	781	407	86	398	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1555	1555	985	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1188	xxxx	xxxxx
Potent Cap.:	126	114	304	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	577	xxxx	xxxxx
Move Cap.:	111	96	304	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	577	xxxx	xxxxx
Volume/Cap:	1.60	0.00	0.64	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.15	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.5	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	12.3	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	166	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	30.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.5	xxxx	xxxxx
Shrd ConDel:	xxxxx	619	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	12.3	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	B	*	*
ApproachDel:	619.0			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: A[8.9]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1 0 0 0			0 0 0 1 0			0 0 1! 0 0			0 0 0 0 0		
Volume Module:												
Base Vol:	30	320	0	0	425	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	320	0	0	425	35	45	0	25	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	30	320	0	0	425	35	45	0	25	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	30	320	0	0	425	35	45	0	25	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	30	320	0	0	425	35	45	0	25	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	460	xxxx	xxxxx	xxxx	xxxx	xxxxx	823	823	443	xxxx	xxxx	xxxxx
Potent Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	343	309	615	xxxx	xxxx	xxxxx
Move Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	336	300	615	xxxx	xxxx	xxxxx
Volume/Cap:	0.03	xxxx	xxxx	xxxx	xxxx	xxxx	0.13	0.00	0.04	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	990	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.9	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.9			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Average Delay (sec/veh): 30.8 Worst Case Level Of Service: F[127.2]

Street Name:	Holly Ln									Maplelane Rd								
Approach:	North Bound				South Bound					East Bound					West Bound			
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	0	0	1!	0	0	0	1	0	0	0	0	0	0	1	0
Volume Module: 5:00-6:00 PM																				
Base Vol:	0	0	0			154	0	152			198	368	0			0	378	71		
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	0	0	0			154	0	152			198	368	0			0	378	71		
Added Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
PasserByVol:	0	0	0			0	0	0			0	0	0			0	0	0		
Initial Fut:	0	0	0			154	0	152			198	368	0			0	378	71		
User Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Volume:	0	0	0			154	0	152			198	368	0			0	378	71		
Reduct Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
Final Vol.:	0	0	0			154	0	152			198	368	0			0	378	71		
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx			6.4	6.5	6.2			4.1	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
FollowUpTim:	xxxxx	xxxx	xxxxx			3.5	4.0	3.3			2.2	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx			1178	1178	414			449	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Potent Cap.:	xxxx	xxxx	xxxxx			209	189	634			1117	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Move Cap.:	xxxx	xxxx	xxxxx			177	152	634			1117	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Volume/Cap:	xxxx	xxxx	xxxx			0.87	0.00	0.24			0.18	xxxx	xxxx			xxxx	xxxx	xxxx		
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			0.6	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Control Del:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			8.9	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
LOS by Move:	*	*	*			*	*	*			A	*	*			*	*	*		
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	276	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx			xxxxx	12.8	xxxxx			0.6	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx			xxxxx	127	xxxxx			8.9	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shared LOS:	*	*	*			*	F	*			A	*	*			*	*	*		
ApproachDel:	xxxxxx					127.2					xxxxxx					xxxxxx				
ApproachLOS:	*					F					*					*				

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 1.9 Worst Case Level Of Service: C[21.9]

Street Name:	Front St									Holcomb Blvd								
Approach:	North Bound				South Bound					East Bound					West Bound			
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	0	0	1!	0	0	0	1	0	0	0	0	0	0	1	0
Volume Module: 5:00-6:00 PM																				
Base Vol:	0	0	0			29	0	54			91	699	0			0	474	15		
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	0	0	0			29	0	54			91	699	0			0	474	15		
Added Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
PasserByVol:	0	0	0			0	0	0			0	0	0			0	0	0		
Initial Fut:	0	0	0			29	0	54			91	699	0			0	474	15		
User Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Volume:	0	0	0			29	0	54			91	699	0			0	474	15		
Reduct Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
Final Vol.:	0	0	0			29	0	54			91	699	0			0	474	15		
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx			6.4	6.5	6.2			4.1	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
FollowUpTim:	xxxxx	xxxx	xxxxx			3.5	4.0	3.3			2.2	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx			1363	1363	482			489	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Potent Cap.:	xxxx	xxxx	xxxxx			165	149	589			1079	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Move Cap.:	xxxx	xxxx	xxxxx			153	136	589			1079	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Volume/Cap:	xxxx	xxxx	xxxx			0.19	0.00	0.09			0.08	xxxx	xxxx			xxxx	xxxx	xxxx		
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			0.3	xxxx	xxxxx			xxxx	xxxx	xxxxx		
Control Del:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			8.6	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
LOS by Move:	*	*	*			*	*	*			A	*	*			*	*	*		
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	296	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx			xxxxx	1.1	xxxxx			0.3	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx			xxxxx	21.9	xxxxx			8.6	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shared LOS:	*	*	*			*	C	*			A	*	*			*	*	*		
ApproachDel:	xxxxxx					21.9					xxxxxx					xxxxxx				
ApproachLOS:	*					C					*					*				

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #108 Holcomb Blvd/Swan Ave

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: D[26.5]

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	16	6	7	17	7	71	86	561	33	11	293	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	6	7	17	7	71	86	561	33	11	293	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	16	6	7	17	7	71	86	561	33	11	293	26
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1117	1091	578	1084	1094	306	319	xxxx	xxxxx	594	xxxx	xxxxx
Potent Cap.:	186	217	520	196	216	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Move Cap.:	154	199	520	177	198	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Volume/Cap:	0.10	0.03	0.01	0.10	0.04	0.10	0.07	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	196	xxxxx	xxxx	418	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.5	xxxxx	xxxxx	0.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	26.5	xxxxx	xxxxx	16.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	D	*	*	C	*	*	*	*	*	*	*
ApproachDel:		26.5			16.1			xxxxxx			xxxxxx	
ApproachLOS:		D			C			*			*	

Note: Queue reported is the number of cars per lane.

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Appendix D

2027 Mitigated No-Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis 2027 Mitigated Background Traffic Conditions
150: Washington Street & Cascade Hwy South 5/18/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1827	1553	1736	1827	1553	1736	1827	1553	3367	3471	1553
Flt Permitted	0.29	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1025	1827	1553	889	1827	1553	1736	1827	1553	3367	3471	1553
Volume (vph)	520	165	200	155	185	430	100	685	140	760	945	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	721	147	800	995	847
Lane Group Flow (vph)	520	165	200	155	185	430	105	721	147	800	995	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	pm+pt		pm+ov	pm+pt		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)	33.4	18.4	31.4	30.4	16.9	38.9	13.0	47.1	60.6	22.0	56.1	71.1
Effective Green, g (s)	37.4	20.4	34.4	32.4	17.9	40.9	14.0	50.1	64.6	23.0	59.1	76.1
Actuated g/C Ratio	0.31	0.17	0.29	0.27	0.15	0.34	0.12	0.42	0.54	0.19	0.49	0.63
Clearance Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	651	311	445	342	273	568	203	763	875	645	1709	985
v/s Ratio Prot	c0.11	0.09	0.05	0.05	0.10	0.15	0.06	c0.39	0.02	c0.24	0.29	c0.12
v/s Ratio Perm	c0.14		0.08	0.07		0.13			0.07			0.42
v/c Ratio	0.80	0.53	0.45	0.45	0.68	0.76	0.52	0.94	0.17	1.24	0.58	0.86
Uniform Delay, d1	34.3	45.4	35.0	35.2	48.3	35.1	49.8	33.6	14.1	48.5	21.7	17.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	1.31	3.31	1.00	1.00	1.00
Incremental Delay, d2	6.8	1.7	0.7	1.0	6.5	5.7	2.0	20.2	0.1	121.0	1.5	7.6
Delay (s)	41.1	47.2	35.8	36.2	54.8	40.9	61.2	64.1	46.7	169.5	23.1	25.3
Level of Service	D	D	D	D	D	D	E	E	D	F	C	C
Approach Delay (s)		41.0			43.3			61.2			68.1	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	58.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	E

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 2027 Mitigated Background Traffic Conditions
250: Redland Road & Cascade Hwy South 5/18/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3369		1736	1827	1827	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3369		1736	1827	1827	1553
Volume (vph)	485	125	160	440	550	750
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	485	125	168	463	579	789
Lane Group Flow (vph)	610	0	168	463	579	789
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	25.7		16.0	86.3	66.3	92.0
Effective Green, g (s)	26.7		17.0	87.3	67.3	94.0
Actuated g/C Ratio	0.22		0.14	0.73	0.56	0.78
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	750		246	1329	1025	1255
v/s Ratio Prot	c0.18		c0.10	0.25	0.32	c0.14
v/s Ratio Perm						0.37
v/c Ratio	0.81		0.68	0.35	0.56	0.63
Uniform Delay, d1	44.3		48.9	6.0	16.9	5.5
Progression Factor	1.00		1.00	1.00	0.46	1.68
Incremental Delay, d2	6.7		7.6	0.7	2.0	0.9
Delay (s)	51.0		56.5	6.7	9.8	10.2
Level of Service	D		E	A	A	B
Approach Delay (s)	51.0			20.0	10.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	B

c Critical Lane Group

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#101 Redland Rd/Abernathy Rd-Holcom	D	43.1	0.830	D	43.1	0.830	+ 0.000 D/V
#102 Redland Rd/Anchor Way	D	38.1	0.982	D	38.1	0.982	+ 0.000 D/V
#103 Redland Rd/Livesay Rd	D	29.1	0.000	D	29.1	0.000	+ 0.000 D/V
#104 Redland Rd/Holly Ln	C	26.4	0.900	C	26.4	0.900	+ 0.000 D/V
#105 Holly Lane/Donovan Road	A	8.9	0.000	A	8.9	0.000	+ 0.000 D/V
#106 Holly Ln/Maplelane Rd	C	21.1	0.612	C	21.1	0.612	+ 0.000 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	C	21.9	0.000	+ 0.000 D/V
#108 Holcomb Blvd/Swan Ave	D	26.5	0.000	D	26.5	0.000	+ 0.000 D/V

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.830
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	43.1
Optimal Cycle:	94	Level Of Service:	D

Street Name:	Abernathy-Holcomb									Redland Rd								
Approach:	North Bound				South Bound				East Bound				West Bound					
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Include					Include					Ovl					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	1	0	0	1	0	1	0	1	0	1	1	0	1	0	1	1	0	1	0	1
Volume Module: 5:00-6:00																				
Base Vol:	234	347		83		318	546		45		74	392		462		128	212		189	
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
Initial Bse:	234	347		83		318	546		45		74	392		462		128	212		189	
Added Vol:	0	0		0		0	0		0		0	0		0		0	0		0	
PasserByVol:	0	0		0		0	0		0		0	0		0		0	0		0	
Initial Fut:	234	347		83		318	546		45		74	392		462		128	212		189	
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
PHF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
PHF Volume:	234	347		83		318	546		45		74	392		462		128	212		189	
Reduct Vol:	0	0		0		0	0		0		0	0		0		0	0		0	
Reduced Vol:	234	347		83		318	546		45		74	392		462		128	212		189	
PCE Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
MLF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
Final Vol.:	234	347		83		318	546		45		74	392		462		128	212		189	
Saturation Flow Module:																				
Sat/Lane:	1900	1900		1900		1900	1900		1900		1900	1900		1900		1900	1900		1900	
Adjustment:	0.94	0.96		0.96		0.94	0.99		0.84		0.93	0.98		0.83		0.92	0.97		0.83	
Lanes:	1.00	0.81		0.19		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
Final Sat.:	1787	1474		353		1787	1881		1599		1769	1862		1583		1753	1845		1568	
Capacity Analysis Module:																				
Vol/Sat:	0.13	0.24		0.24		0.18	0.29		0.03		0.04	0.21		0.29		0.07	0.11		0.12	
Crit Moves:		****				****						****				****				
Green/Cycle:	0.15	0.28		0.28		0.21	0.34		0.34		0.09	0.25		0.41		0.09	0.25		0.25	
Volume/Cap:	0.85	0.83		0.83		0.83	0.85		0.08		0.48	0.83		0.71		0.83	0.45		0.48	
Delay/Veh:	61.7	44.3		44.3		51.6	40.4		22.2		45.7	47.0		28.5		74.6	32.2		32.6	
User DelAdj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
AdjDel/Veh:	61.7	44.3		44.3		51.6	40.4		22.2		45.7	47.0		28.5		74.6	32.2		32.6	
LOS by Move:	E	D		D		D	D		C		D	D		C		E	C		C	
HCM2kAvgQ:	10	15		15		12	18		1		3	14		13		6	6		5	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Cycle (sec):	100	Critical Vol./Cap.(X):	0.982
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	38.1
Optimal Cycle:	167	Level Of Service:	D

Street Name:	Anchor Way									Redland Rd								
Approach:	North Bound				South Bound				East Bound				West Bound					
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Split Phase					Split Phase					Permitted					Prot+Permit				
Rights:	Ovl					Include					Include					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0
Volume Module: 5:00-6:00 PM																				
Base Vol:	152	0		403		0	0		0		0	827		288		70	512		0	
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
Initial Bse:	152	0		403		0	0		0		0	827		288		70	512		0	
Added Vol:	0	0		0		0	0		0		0	0		0		0	0		0	
PasserByVol:	0	0		0		0	0		0		0	0		0		0	0		0	
Initial Fut:	152	0		403		0	0		0		0	827		288		70	512		0	
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
PHF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
PHF Volume:	152	0		403		0	0		0		0	827		288		70	512		0	
Reduct Vol:	0	0		0		0	0		0		0	0		0		0	0		0	
Reduced Vol:	152	0		403		0	0		0		0	827		288		70	512		0	
PCE Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
MLF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
Final Vol.:	152	0		403		0	0		0		0	827		288		70	512		0	
Saturation Flow Module:																				
Sat/Lane:	1900	1900		1900		1900	1900		1900		1900	1900		1900		1900	1900		1900	
Adjustment:	0.95	1.00		0.85		1.00	1.00		1.00		1.00	0.96		0.96		0.92	0.97		1.00	
Lanes:	1.00	0.00		1.00		0.00	0.00		0.00		0.00	0.74		0.26		1.00	1.00		0.00	
Final Sat.:	1805	0		1615		0	0		0		0	1346		469		1753	1845		0	
Capacity Analysis Module:																				
Vol/Sat:	0.08	0.00		0.25		0.00	0.00		0.00		0.00	0.61		0.61		0.04	0.28		0.00	
Crit Moves:				****								****				****				
Green/Cycle:	0.21	0.00		0.25		0.00	0.00		0.00		0.00	0.63		0.63		0.67	0.67		0.00	
Volume/Cap:	0.39	0.00		0.98		0.00	0.00		0.00		0.00	0.98		0.98		0.10	0.42		0.00	
Delay/Veh:	34.4	0.0		76.5		0.0	0.0		0.0		0.0	40.4		40.4		8.8	7.9		0.0	
User DelAdj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00	
AdjDel/Veh:	34.4	0.0		76.5		0.0	0.0		0.0		0.0	40.4		40.4		8.8	7.9		0.0	
LOS by Move:	C	A		E		A	A		A		A	D		D		A	A		A	
HCM2kAvgQ:	4	0		18		0	0		0		0	41		41		1	7		0	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: D[29.1]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0	0	1! 0 0	0	1 0	0 0	0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	15	25	1190	0	0	557	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	10	0	15	25	1190	0	0	557	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	10	0	15	25	1190	0	0	557	10
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1802	1802	562	567	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	89	80	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	87	78	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.12	0.00	0.03	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	174	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.5	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	29.1	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	D	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			29.1			xxxxxx			xxxxxx		
ApproachLOS:	*			D			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec): 120 Critical Vol./Cap.(X): 0.900
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 26.4
Optimal Cycle: 120 Level Of Service: C

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Prot+Permit		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	0 1	0	0	0 0	0	0	1 0	1	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	177	0	193	0	0	0	0	781	407	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	177	0	193	0	0	0	0	781	407	86	398	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	177	0	193	0	0	0	0	781	407	86	398	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	177	0	193	0	0	0	0	781	407	86	398	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	177	0	193	0	0	0	0	781	407	86	398	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	177	0	193	0	0	0	0	781	407	86	398	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	0.94	0.94	0.90	0.95	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.66	0.34	1.00	1.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	1180	615	1718	1809	0
Capacity Analysis Module:												
Vol/Sat:	0.10	0.00	0.12	0.00	0.00	0.00	0.00	0.66	0.66	0.05	0.22	0.00
Crit Moves:	****							****		****		
Green/Cycle:	0.11	0.00	0.16	0.00	0.00	0.00	0.00	0.74	0.74	0.79	0.79	0.00
Volume/Cap:	0.90	0.00	0.73	0.00	0.00	0.00	0.00	0.90	0.90	0.13	0.28	0.00
Delay/Veh:	90.5	0.0	57.2	0.0	0.0	0.0	0.0	21.1	21.1	4.7	3.5	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	90.5	0.0	57.2	0.0	0.0	0.0	0.0	21.1	21.1	4.7	3.5	0.0
LOS by Move:	F	A	E	A	A	A	A	C	C	A	A	A
HCM2kAvgQ:	9	0	8	0	0	0	0	37	37	1	4	0

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: A[8.9]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0	0 0	1 0	0	0 1!	0 0	0	0 0	0 0
Volume Module:												
Base Vol:	30	320	0	0	425	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	320	0	0	425	35	45	0	25	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	30	320	0	0	425	35	45	0	25	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	30	320	0	0	425	35	45	0	25	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	30	320	0	0	425	35	45	0	25	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	460	xxxx	xxxxx	xxxx	xxxx	xxxxx	823	823	443	xxxx	xxxx	xxxxx
Potent Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	343	309	615	xxxx	xxxx	xxxxx
Move Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	336	300	615	xxxx	xxxx	xxxxx
Volume/Cap:	0.03	xxxx	xxxx	xxxx	xxxx	xxxx	0.13	0.00	0.04	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	990	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.9	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.9			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.612
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	21.1
Optimal Cycle:	49	Level Of Service:	C

Street Name:	Holly Ln						Maplelane Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0	0 1!	0 0	1	0 1	0 0	0	0 0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	154	0	152	198	368	0	0	378	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	154	0	152	198	368	0	0	378	71
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	154	0	152	198	368	0	0	378	71
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	154	0	152	198	368	0	0	378	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	154	0	152	198	368	0	0	378	71
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	154	0	152	198	368	0	0	378	71
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.88	1.00	0.88	0.94	0.99	1.00	1.00	0.97	0.97
Lanes:	0.00	0.00	0.00	0.50	0.00	0.50	1.00	1.00	0.00	0.00	0.84	0.16
Final Sat.:	0	0	0	837	0	826	1787	1881	0	0	1550	291
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.18	0.00	0.18	0.11	0.20	0.00	0.00	0.24	0.24
Crit Moves:						****	****				****	
Green/Cycle:	0.00	0.00	0.00	0.30	0.00	0.30	0.58	0.58	0.00	0.00	0.40	0.40
Volume/Cap:	0.00	0.00	0.00	0.61	0.00	0.61	0.22	0.34	0.00	0.00	0.61	0.61
Delay/Veh:	0.0	0.0	0.0	32.2	0.0	32.2	12.2	11.2	0.0	0.0	25.5	25.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	32.2	0.0	32.2	12.2	11.2	0.0	0.0	25.5	25.5
LOS by Move:	A	A	A	C	A	C	B	B	A	A	C	C
HCM2kAvgQ:	0	0	0	9	0	9	3	6	0	0	11	11

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 1.9 Worst Case Level Of Service: C[21.9]

Street Name:	Front St						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0	0	0 0	1! 0	0	0 1	0	0 0	0 0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	29	0	54	91	699	0	0	474	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	54	91	699	0	0	474	15
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	29	0	54	91	699	0	0	474	15
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	29	0	54	91	699	0	0	474	15
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	29	0	54	91	699	0	0	474	15
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1363	1363	482	489	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	165	149	589	1079	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	153	136	589	1079	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.19	0.00	0.09	0.08	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	296	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	1.1	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	21.9	xxxxx	8.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			21.9			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
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2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #108 Holcomb Blvd/Swan Ave

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: D[26.5]

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	16	6	7	17	7	71	86	561	33	11	293	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	6	7	17	7	71	86	561	33	11	293	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	16	6	7	17	7	71	86	561	33	11	293	26
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1117	1091	578	1084	1094	306	319	xxxx	xxxxx	594	xxxx	xxxxx
Potent Cap.:	186	217	520	196	216	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Move Cap.:	154	199	520	177	198	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Volume/Cap:	0.10	0.03	0.01	0.10	0.04	0.10	0.07	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	196	xxxxx	xxxx	418	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.5	xxxxx	xxxxx	0.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	26.5	xxxxx	xxxxx	16.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	D	*	*	C	*	*	*	*	*	*	*
ApproachDel:	26.5			16.1			xxxxxx			xxxxxx		
ApproachLOS:	D			C			*			*		

Note: Queue reported is the number of cars per lane.

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Appendix E

2030 Sunrise Model TAZ Land Use Estimates for Park Place Planning Area

TAZ1358	H1I1A1	H1I1A2	H1I1A3	H1I1A4	H1I2A1	H1I2A2	H1I2A3	H1I2A4	H1I3A1	H1I3A2	H1I3A3	H1I3A4	H1I4A1	H1I4A2	H1I4A3	H1I4A4	H2I1A1	H2I1A2	H2I1A3	H2I1A4	H2I2A1	H2I2A2	H2I2A3	H2I2A4	H2I3A1	H2I3A2	H2I3A3	H2I3A4	H2I4A1	H2I4A2
505	49.96881	42.25767		24.65094	230.74896	5.49781	40.75423	14.51878	69.91433	6.16041	78.98986	20.41003	43.26026	0.83754	38.62288	17.24696	27.51909	13.49336	24.40874	8.48837	19.98896	9.82381	25.05910	8.79728	35.09638	21.37333	74.67487	41.19387	93.27718	5.72075	150.19310
506	32.71182	27.66376		16.13761	151.05861	3.59911	26.67954	9.50464	45.76905	4.03288	51.71030	13.36132	28.32011	0.54829	25.28427	11.29063	18.01523	8.83336	15.97906	5.55687	13.08567	6.43110	16.40481	5.75909	22.97566	13.99194	48.88552	26.96735	61.06342	3.74506	98.32313
507	18.08371	15.29305		8.92117	83.50804	1.98966	14.74895	5.25434	25.30199	2.22945	28.58642	7.38639	15.65589	0.30311	13.97762	6.24167	9.95916	4.88325	8.83352	3.07194	7.23401	3.55524	9.06889	3.18374	12.70138	7.73501	27.02483	14.90806	33.75701	2.07034	54.35487
508	7.88166	6.66537		3.88823	36.39640	0.86718	6.42823	2.29007	11.02770	0.97169	12.45920	3.21931	6.82351	0.13211	6.09205	2.72039	4.34063	2.12833	3.85033	1.33888	3.15289	1.54952	3.95261	1.38761	5.53581	3.37125	11.77859	6.49757	14.71276	0.90234	23.69020

Y2030 BEA Employment TAZ 1260 -- Jurisdiction Reviewed, Corrected BEA Conversion

38831	1	2	7	9	3	6	8	4	5	
TAZ1358	Agriculture,timber 0 - 14	Construction 15 - 17	Finance, insurance, real estate 60-67	GOV	MFG	Retail trade 52-59	SER	TPU	Wholesale trade 50,51	Total
505	0.246324111	146.489753	26.08851456	43.723905	27.72759	8.414874	44.75745	7.808273	10.82867023	316.0854
506	0.338536612	53.2762109	23.12760629	38.761474	28.99391	18.918029	58.31566	6.922075	5.968068914	234.6216
507	0.663784187	133.387578	89.65204722	117.8254	78.98471	138.60353	229.6447	21.04142	29.18065975	838.9839
508	0.253342311	50.909193	12.57350838	44.969675	30.14559	2.1567467	44.25868	8.030744	11.13719779	204.4347

H2I4A3	H2I4A4	H3I1A1	H3I1A2	H3I1A3	H3I1A4	H3I2A1	H3I2A2	H3I2A3	H3I2A4	H3I3A1	H3I3A2	H3I3A3	H3I3A4	H3I4A1	H3I4A2	H3I4A3	H3I4A4	H4I1A1	H4I1A2	H4I1A3	H4I1A4	H4I2A1	H4I2A2	H4I2A3	H4I2A4	H4I3A1	H4I3A2	H4I3A3	H4I3A4	H4I4A1	H4I4A2	H4I4A3	H4I4A4	Total
98.38593	107.10431	10.94727	22.96094	1.39600	2.43483	13.93051	30.84273	2.89964	3.97407	13.33788	78.93549	13.51307	12.69738	6.20154	176.06358	45.60814	21.21397	4.42227	30.76273	1.27284	1.38513	12.82888	47.16184	2.34084	1.50506	7.23819	155.72569	8.57339	5.55342	2.40997	333.05072	33.24104	11.37758	2564
64.40784	70.11528	7.16657	15.03126	0.91389	1.59395	9.11954	20.19103	1.89824	2.60160	8.73157	51.67471	8.84626	8.31228	4.05981	115.25911	29.85713	13.88762	2.89502	20.13866	0.83326	0.90677	8.39836	30.87425	1.53242	0.98528	4.73845	101.94501	5.61253	3.63552	1.57768	218.02993	21.76108	7.44827	1679
35.60586	38.76104	3.96182	8.30956	0.50521	0.88117	5.04145	11.16198	1.04938	1.43822	4.82698	28.56675	4.89038	4.59518	2.24434	63.71740	16.50558	7.67733	1.60042	11.13303	0.46064	0.50128	4.64277	17.06787	0.84715	0.54468	2.61950	56.35712	3.10271	2.00978	0.87217	120.53104	12.02993	4.11754	928
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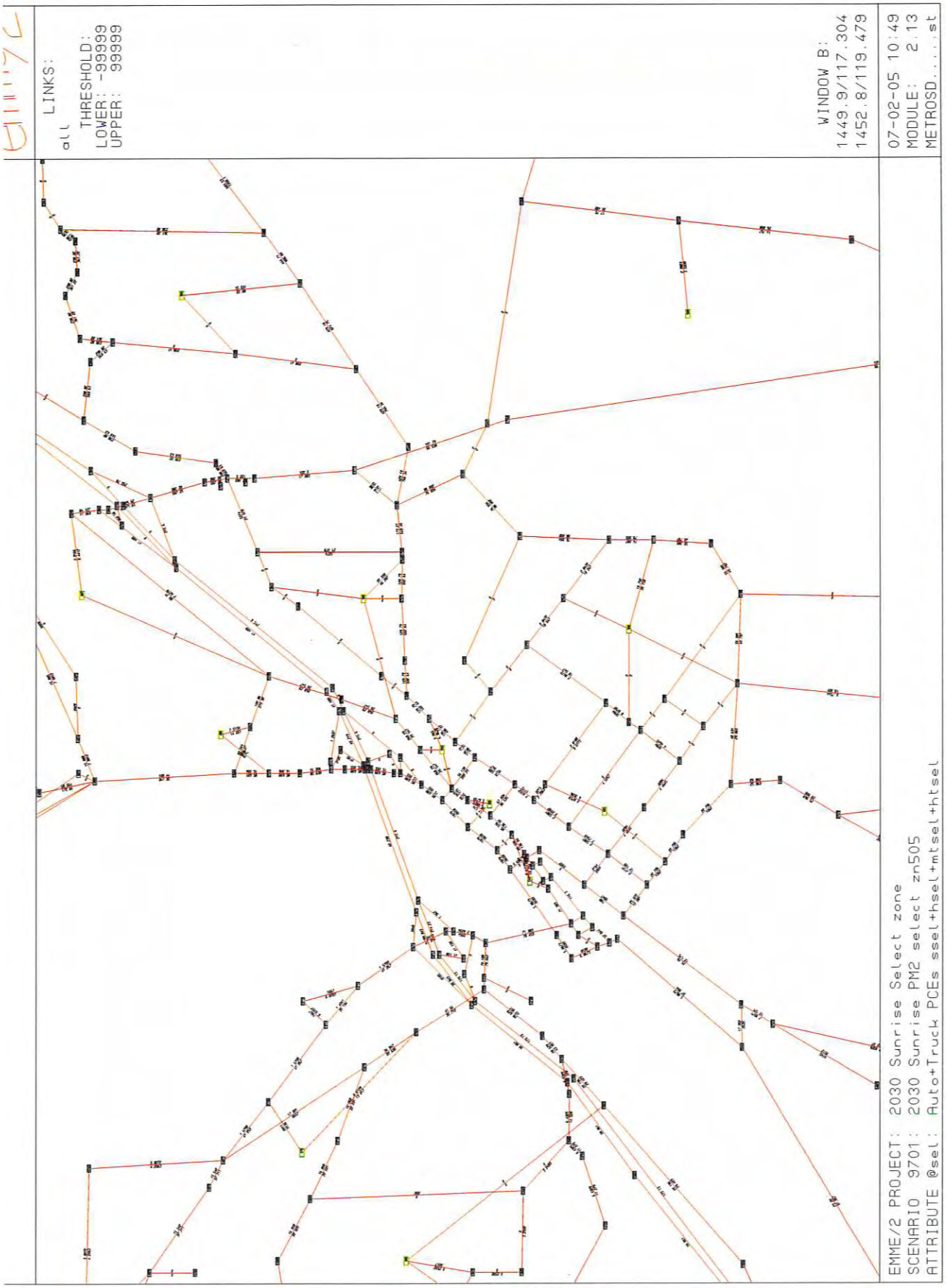
Appendix F

2030 Sunrise Model Select Zone Analyses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METROSD.....st
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SCENARIO 9701: 2030 Sunrise PM2 select zn505
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel


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1452.8/117.304
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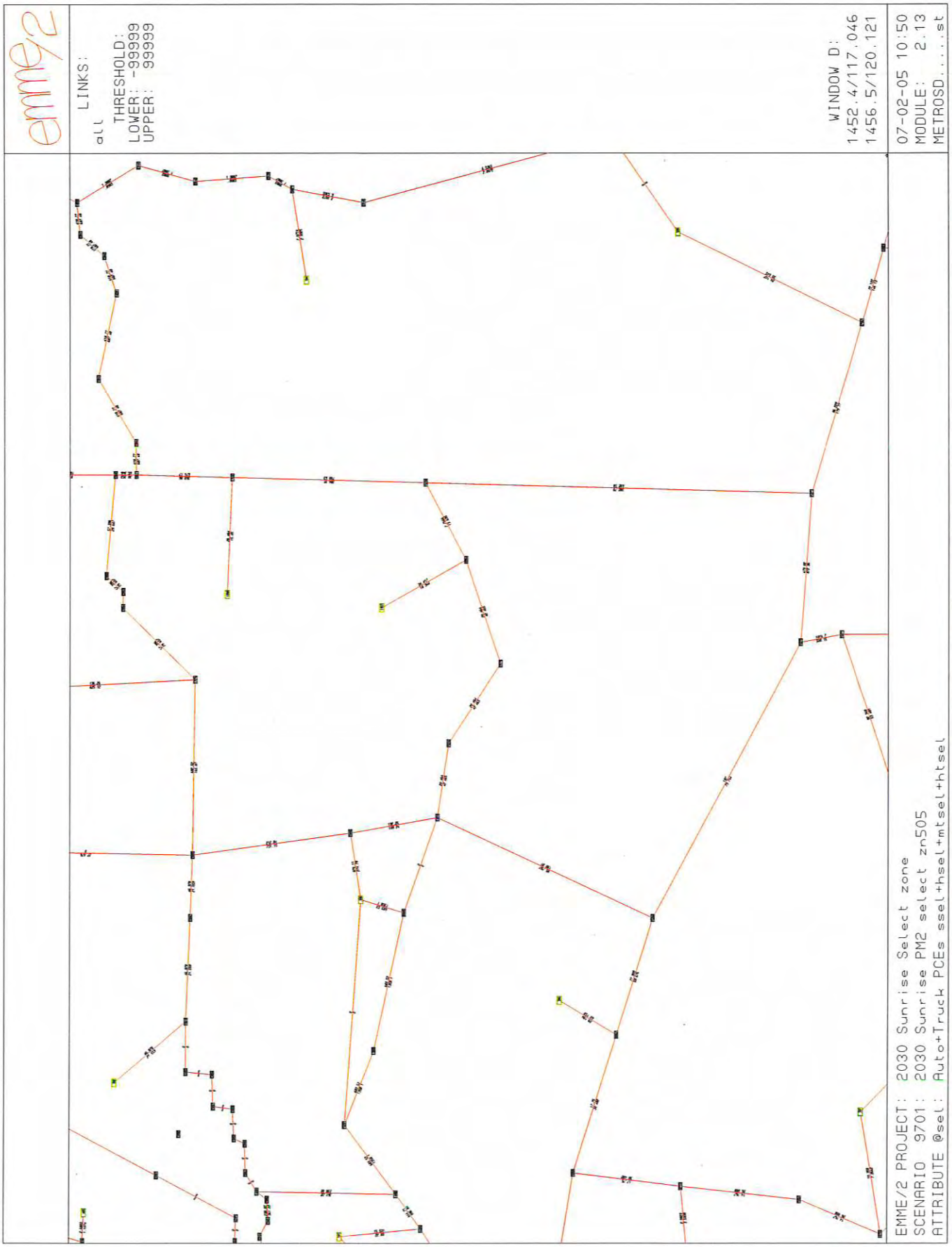
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METROSD.....st
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SCENARIO 9701: 2030 Sunrise PM2 select zn505
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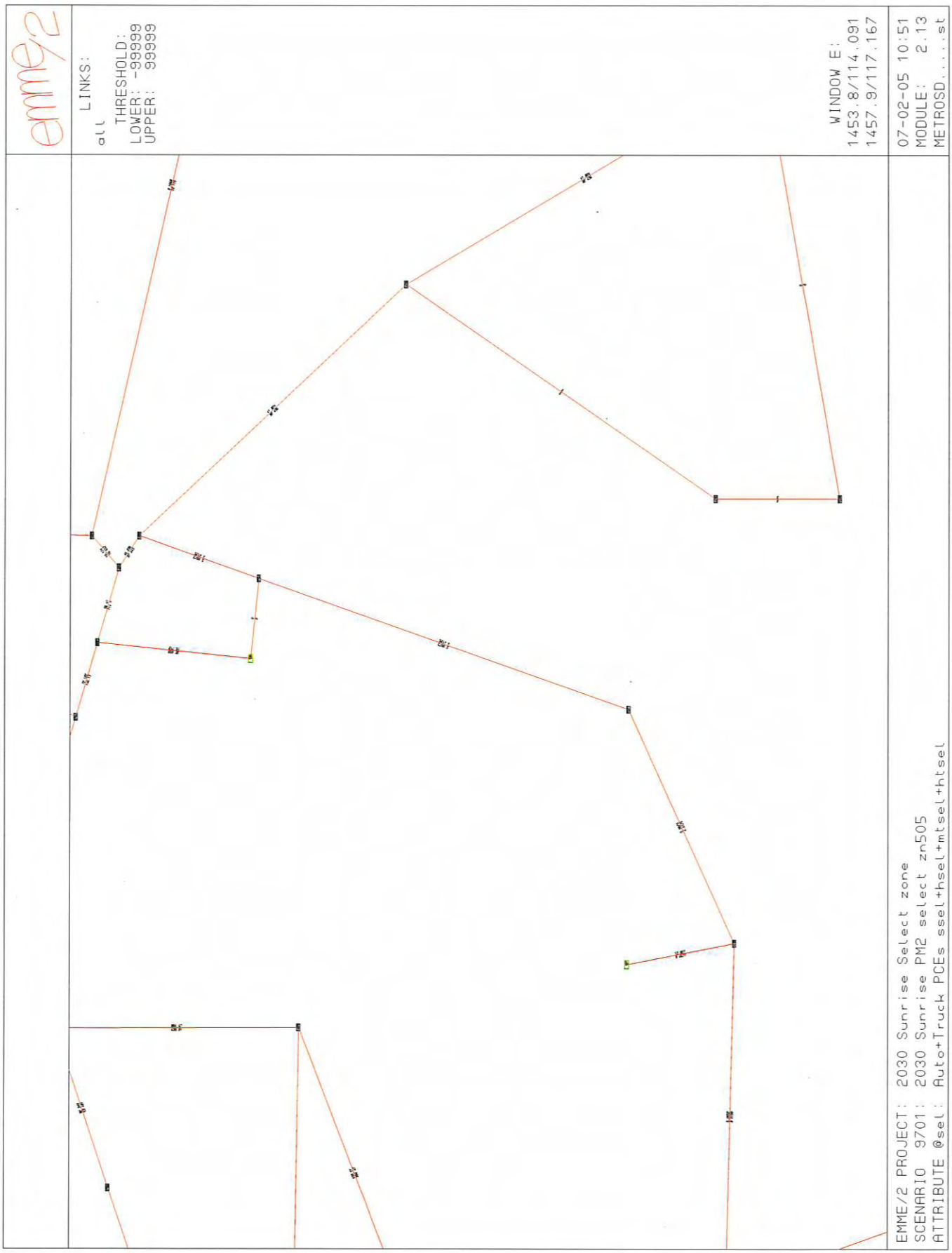
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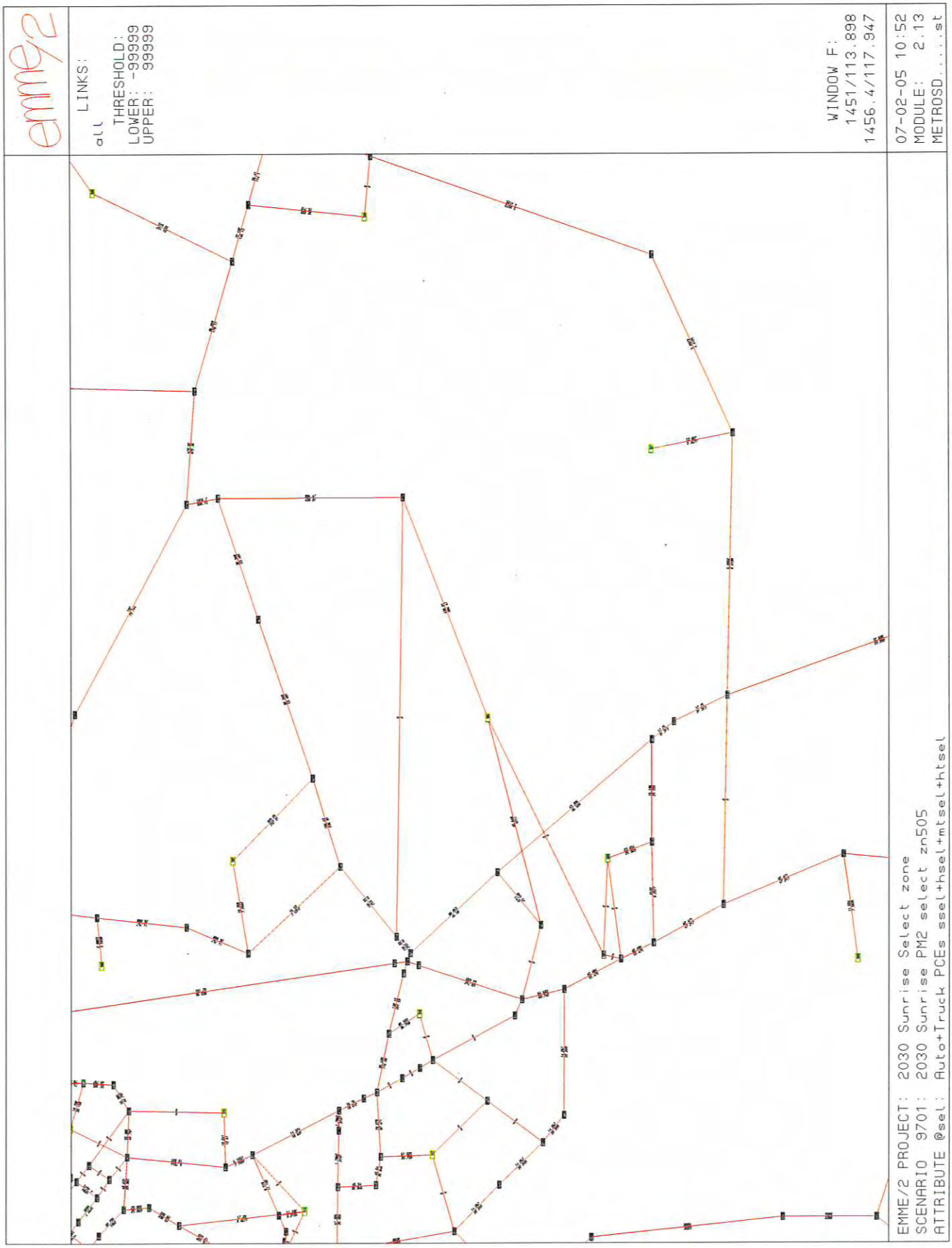
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1456.4/117.947
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METROSD.....st
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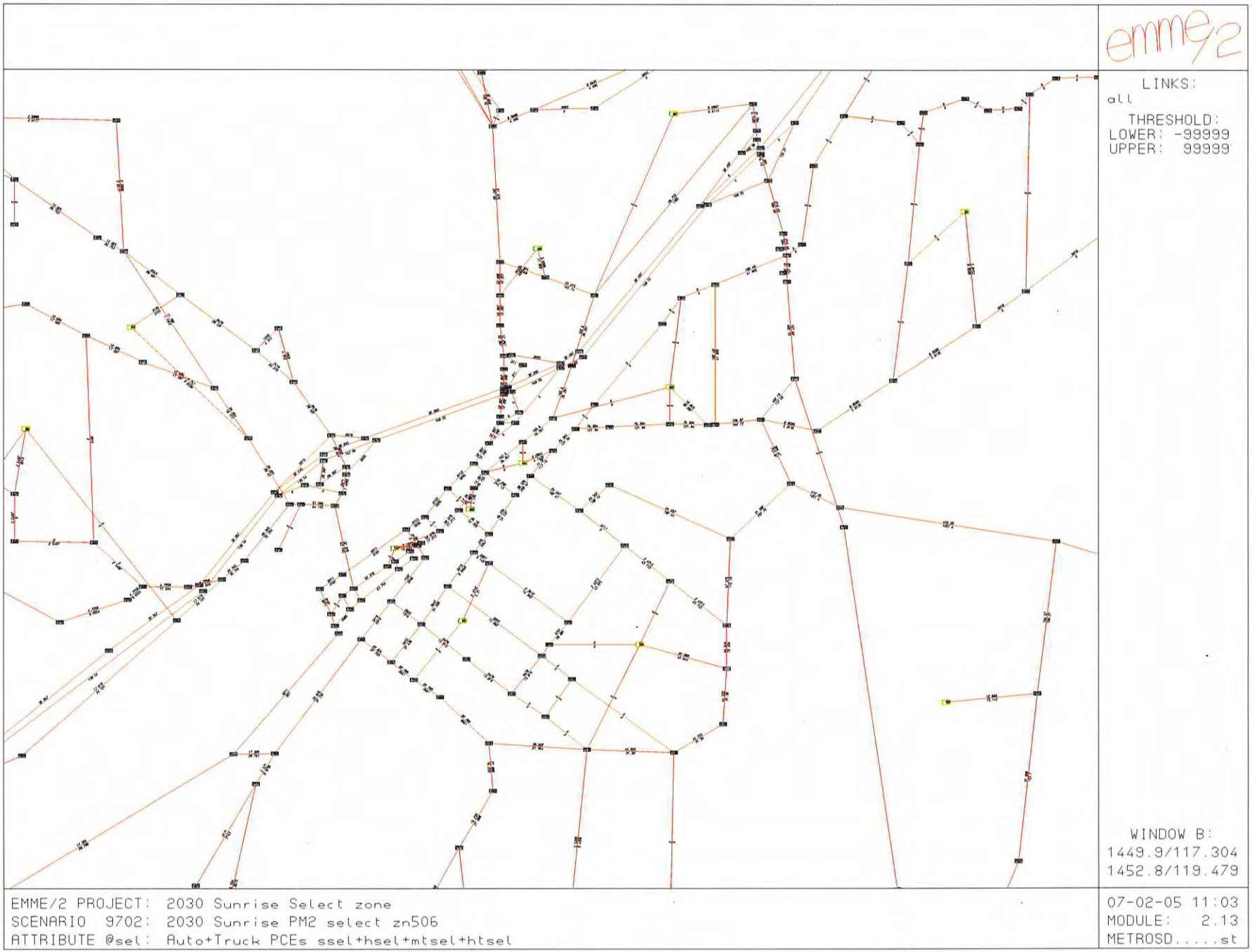
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1452.8/119.479
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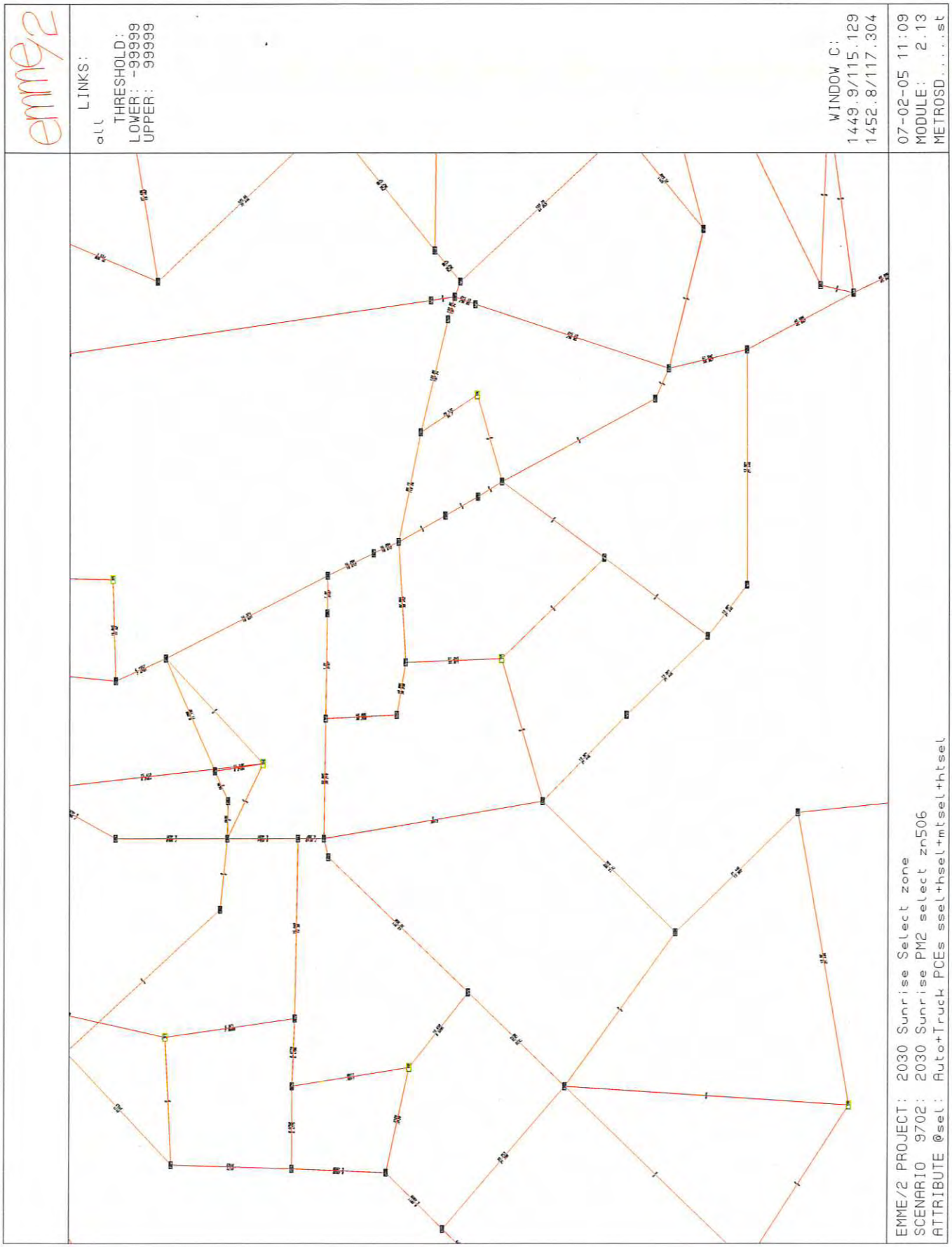
METROSD.....st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1452.8/117.304
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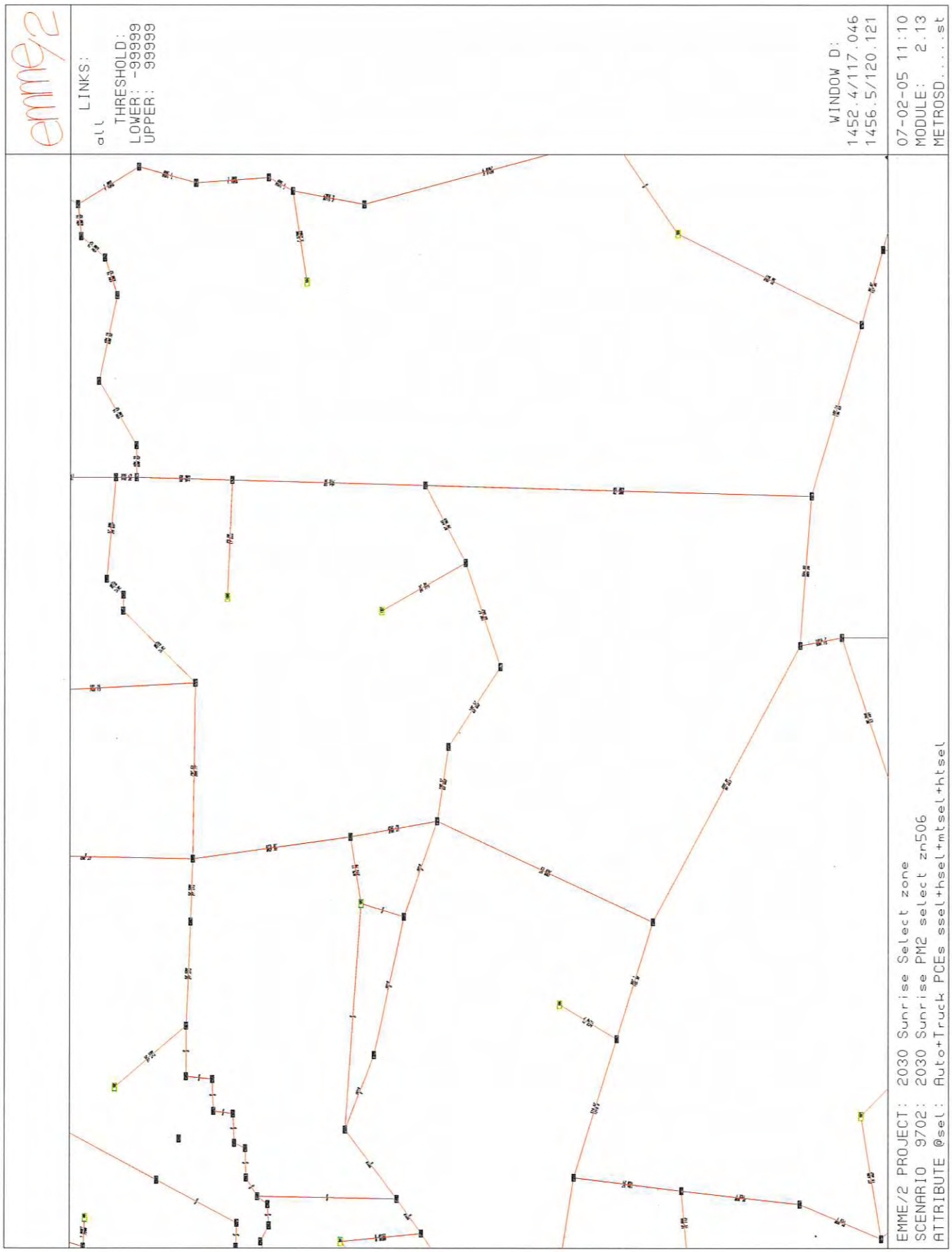
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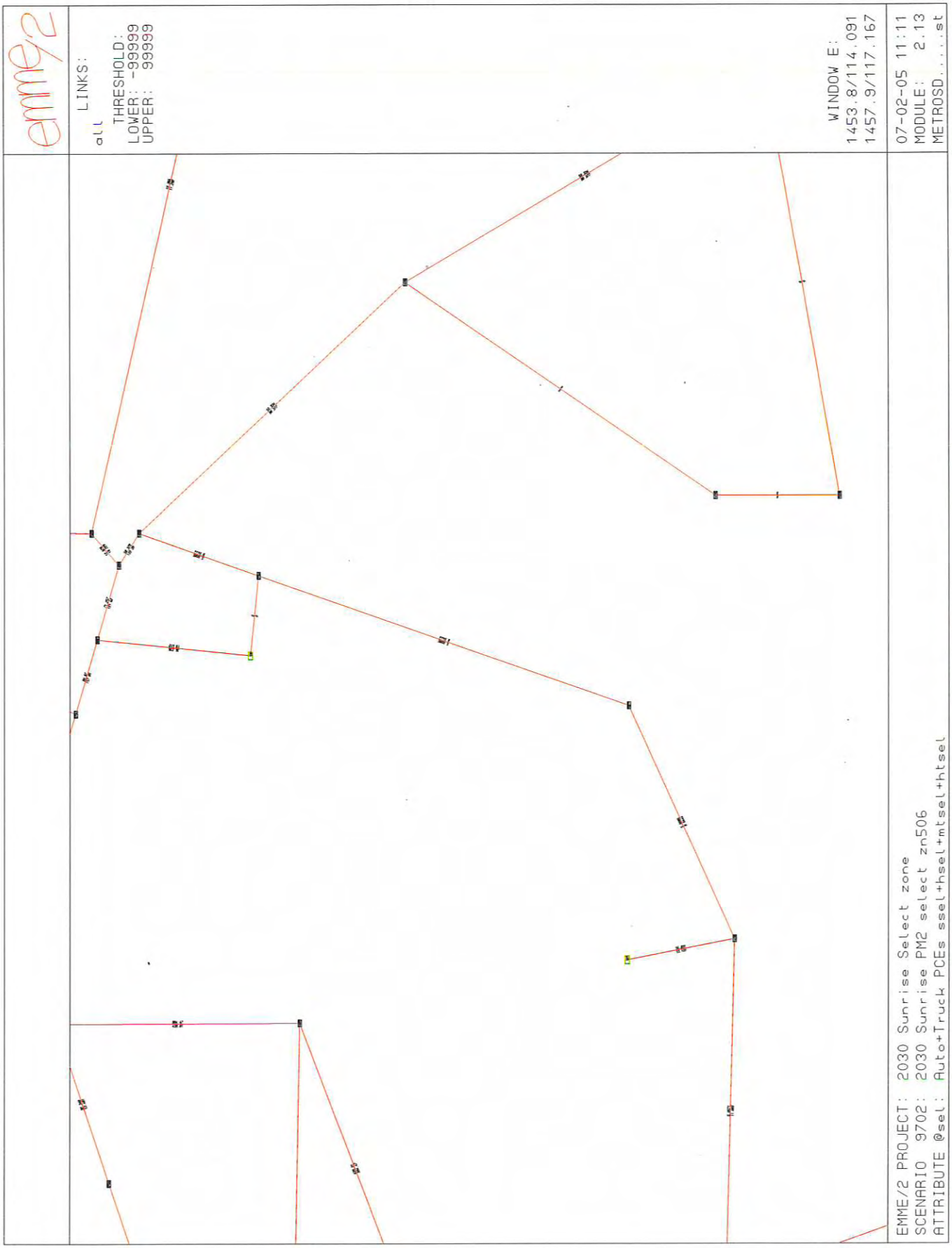
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WINDOW E:
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1457.9/117.167
07-02-05 11:11
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METROSD.....st
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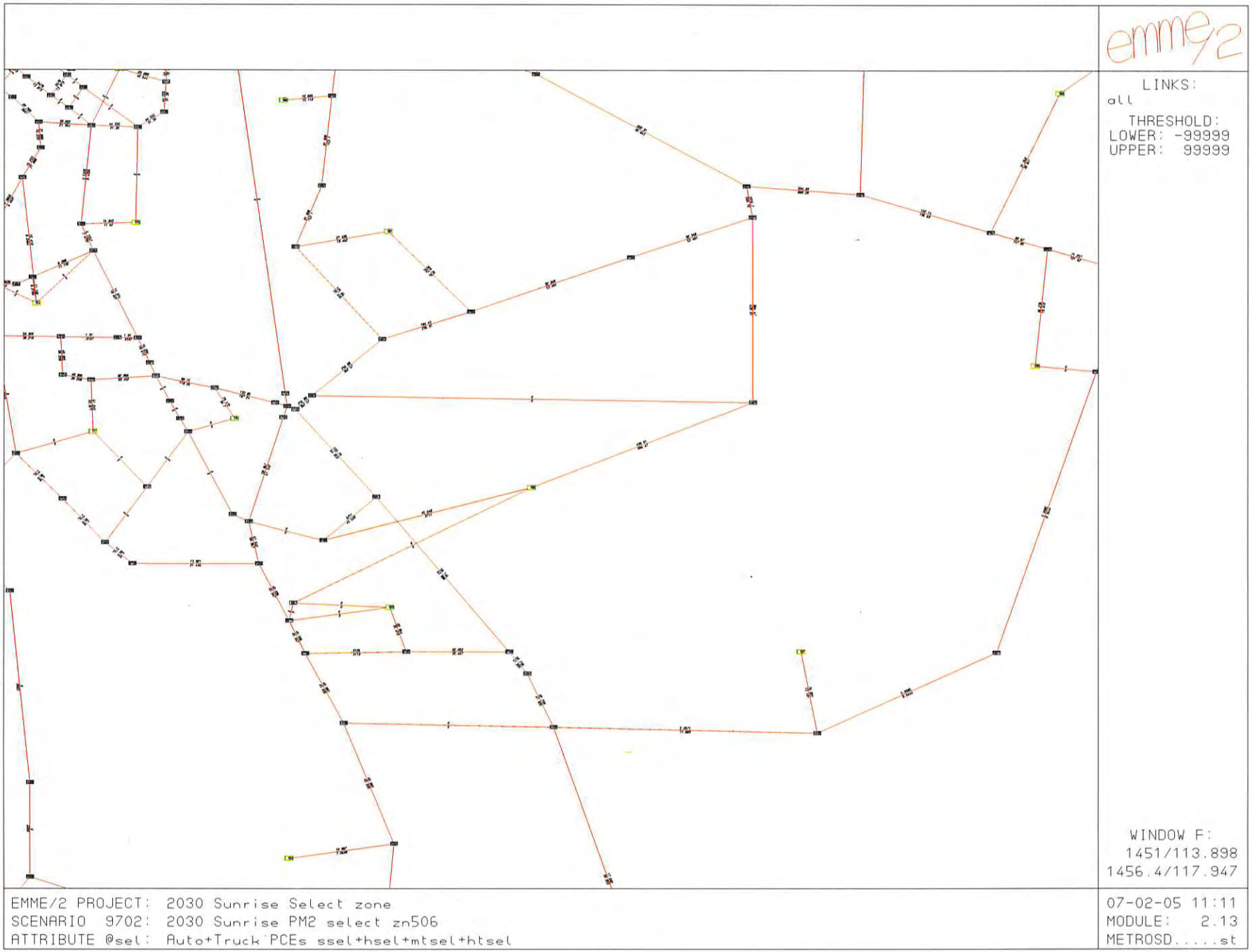
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1456.4/117.947
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SCENARIO 9702: 2030 Sunrise PM2 select zn506
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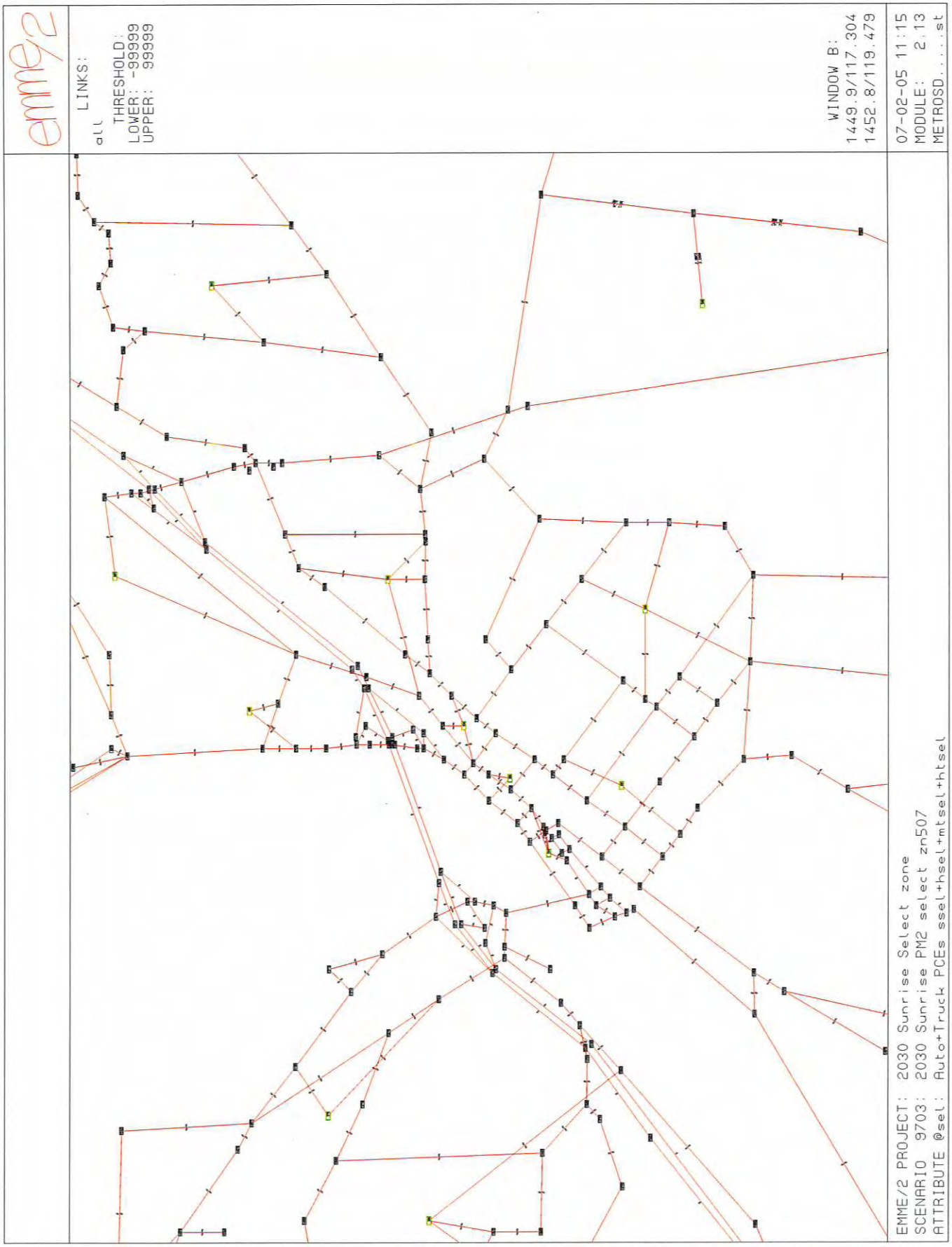
07-02-05 11:11
MODULE: 2.13
METROSD.....st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1452.8/119.479
07-02-05 11:15
MODULE: 2.13
METROSD.....st
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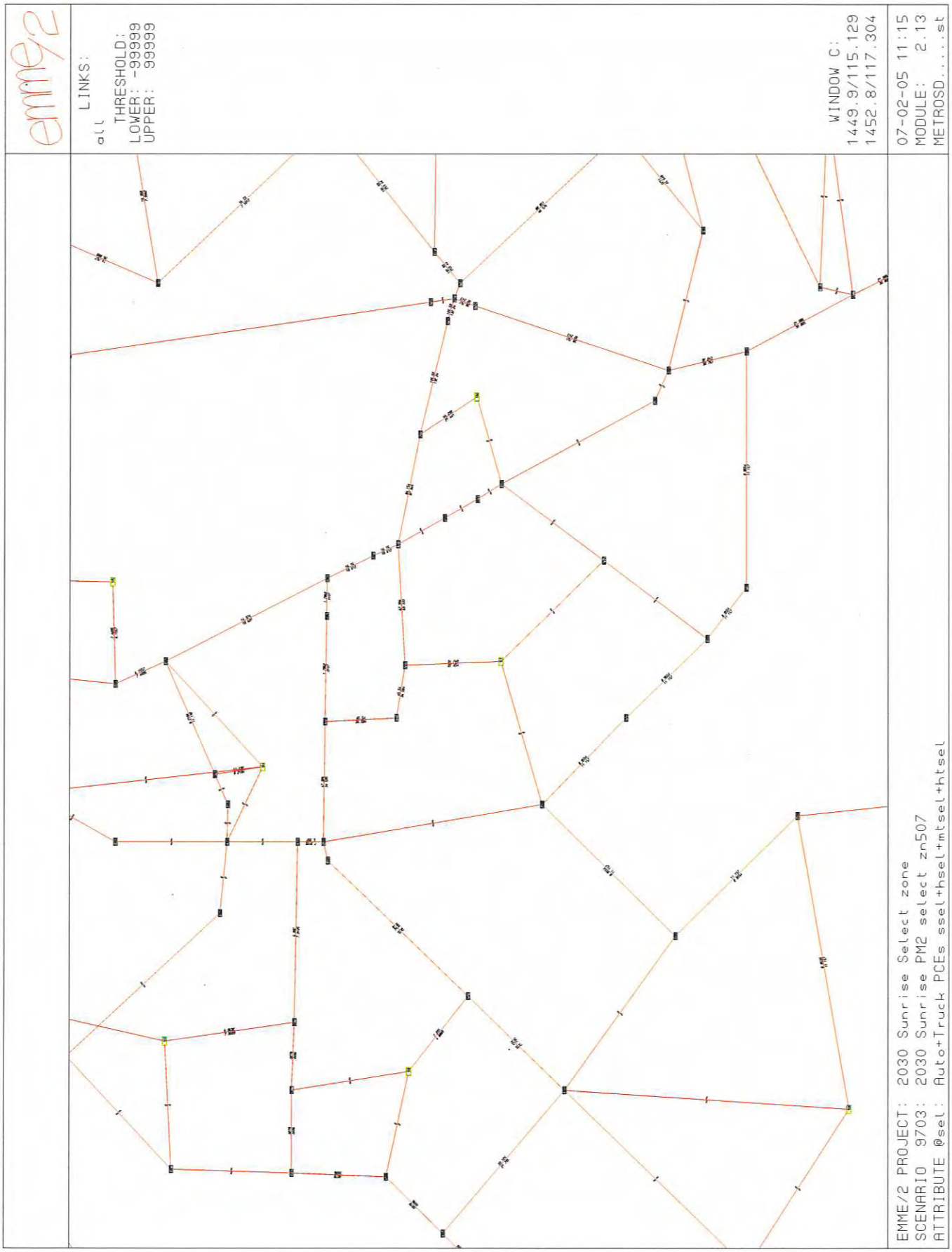
SCENARIO 9703: 2030 Sunrise PM2 select zn507
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel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1452.8/117.304
07-02-05 11:15
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METROSD.....st
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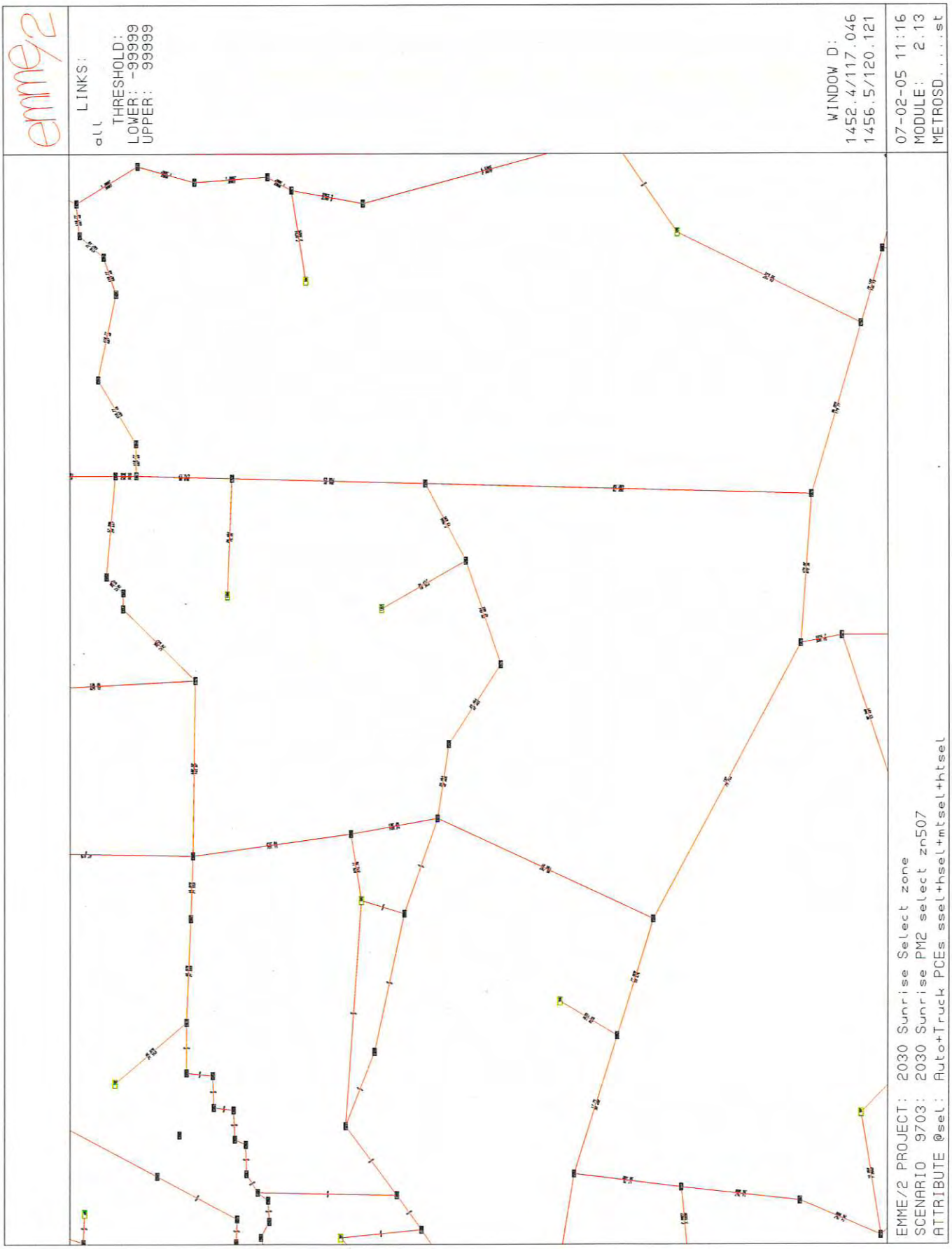
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1456.5/120.121
07-02-05 11:16
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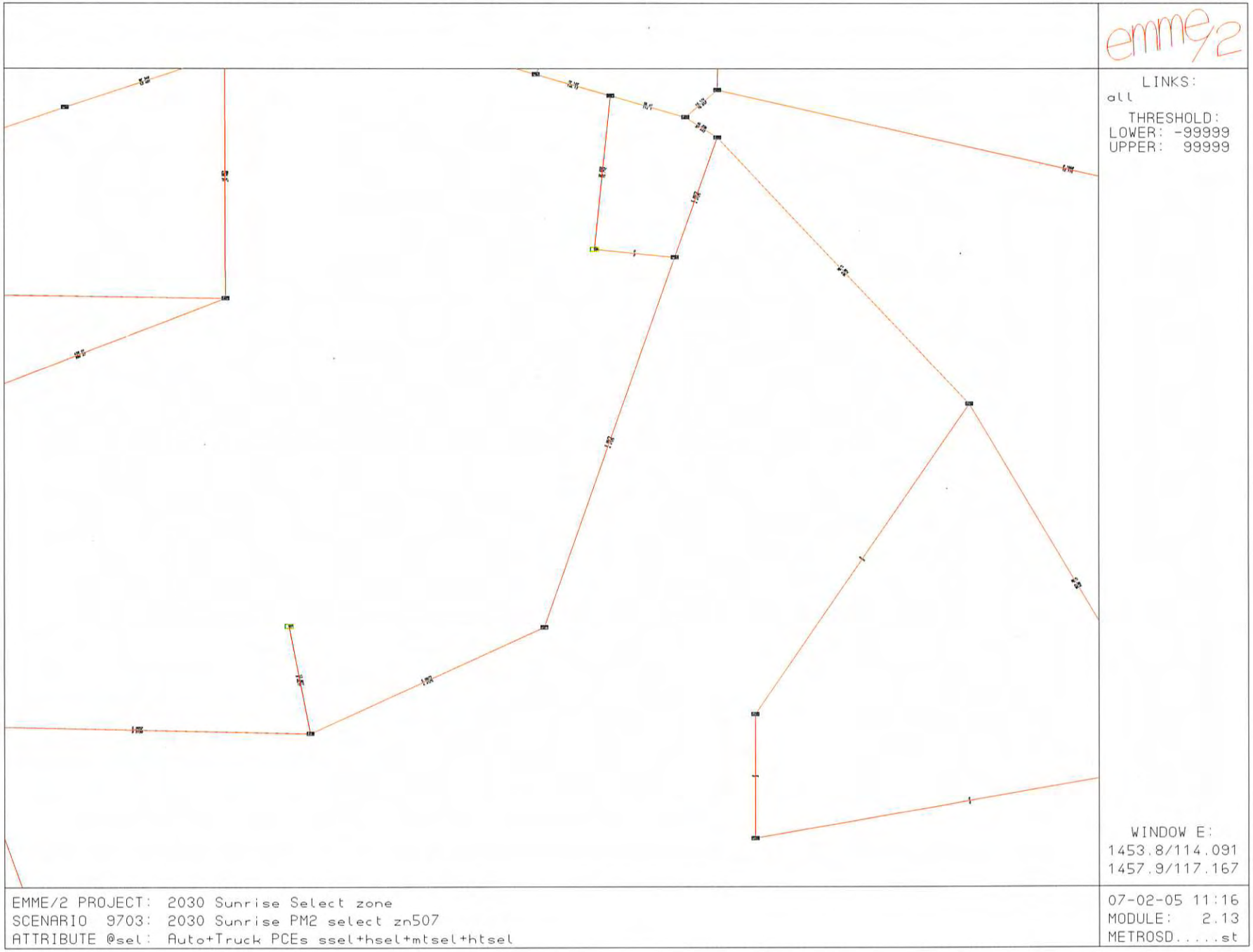
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1457.9/117.167
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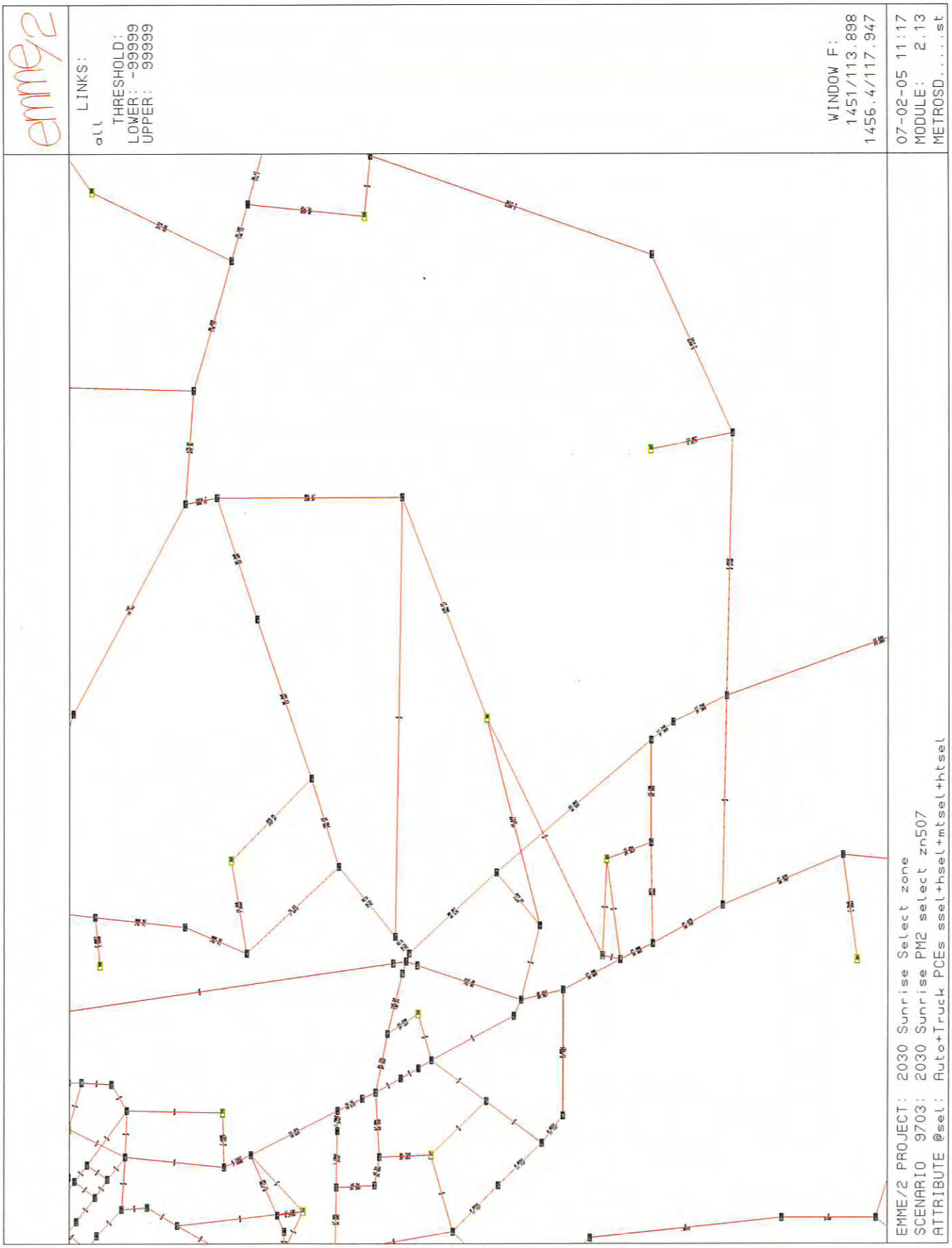
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07-02-05 11:20
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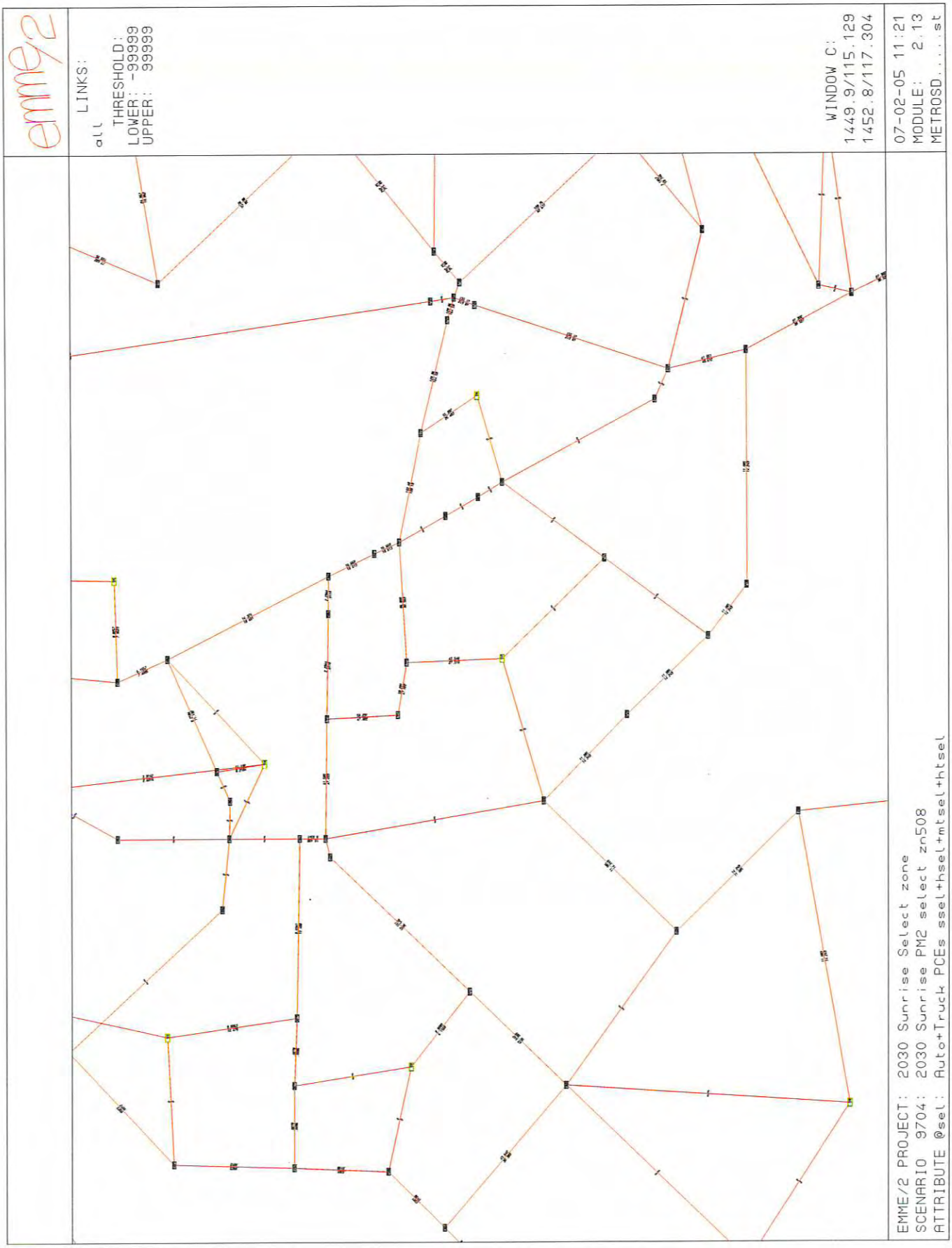
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07-02-05 11:21
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SCENARIO 9704: 2030 Sunrise PM2 select zn508
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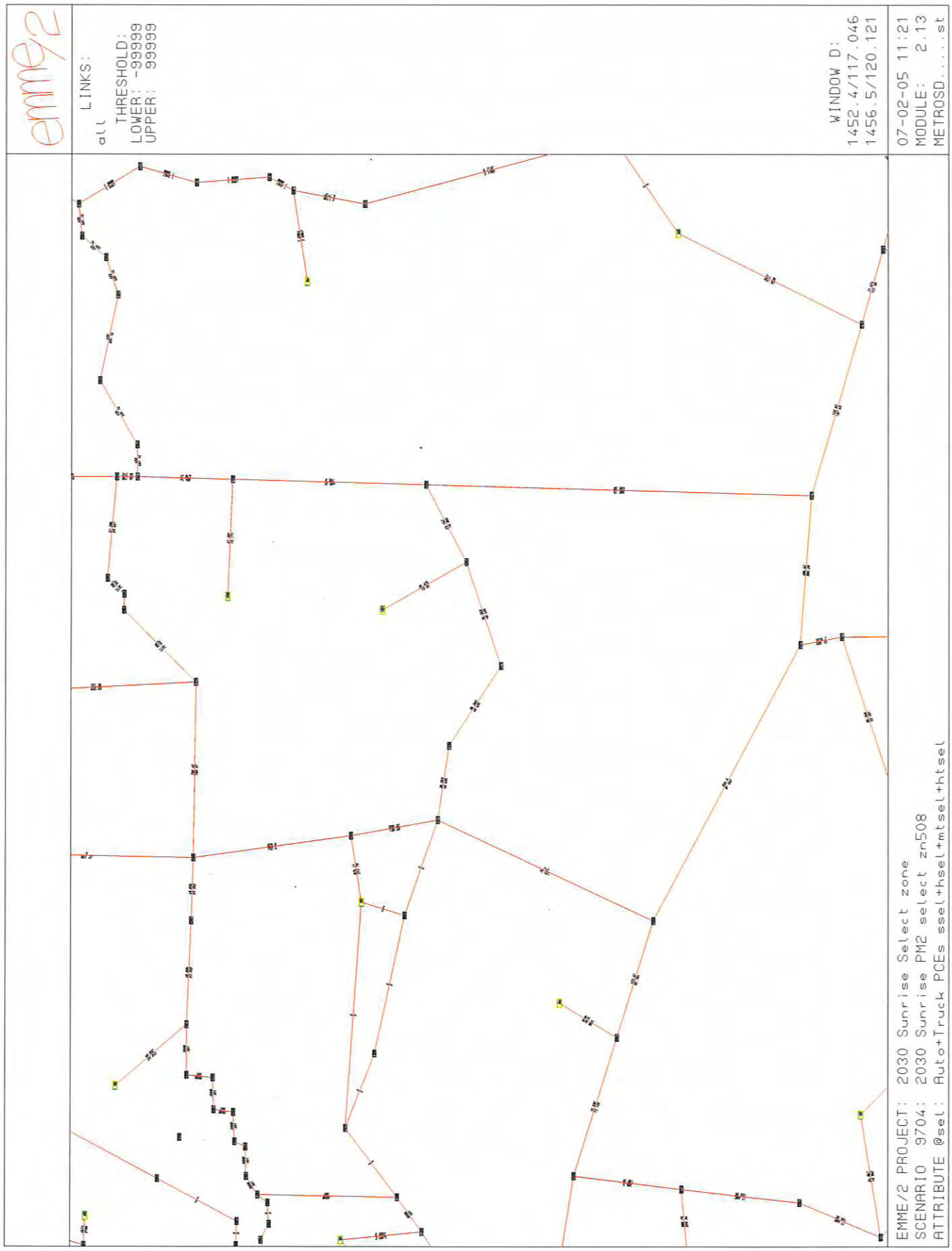
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1456.5/120.121
07-02-05 11:21
MODULE: 2.13
METROSD.....st
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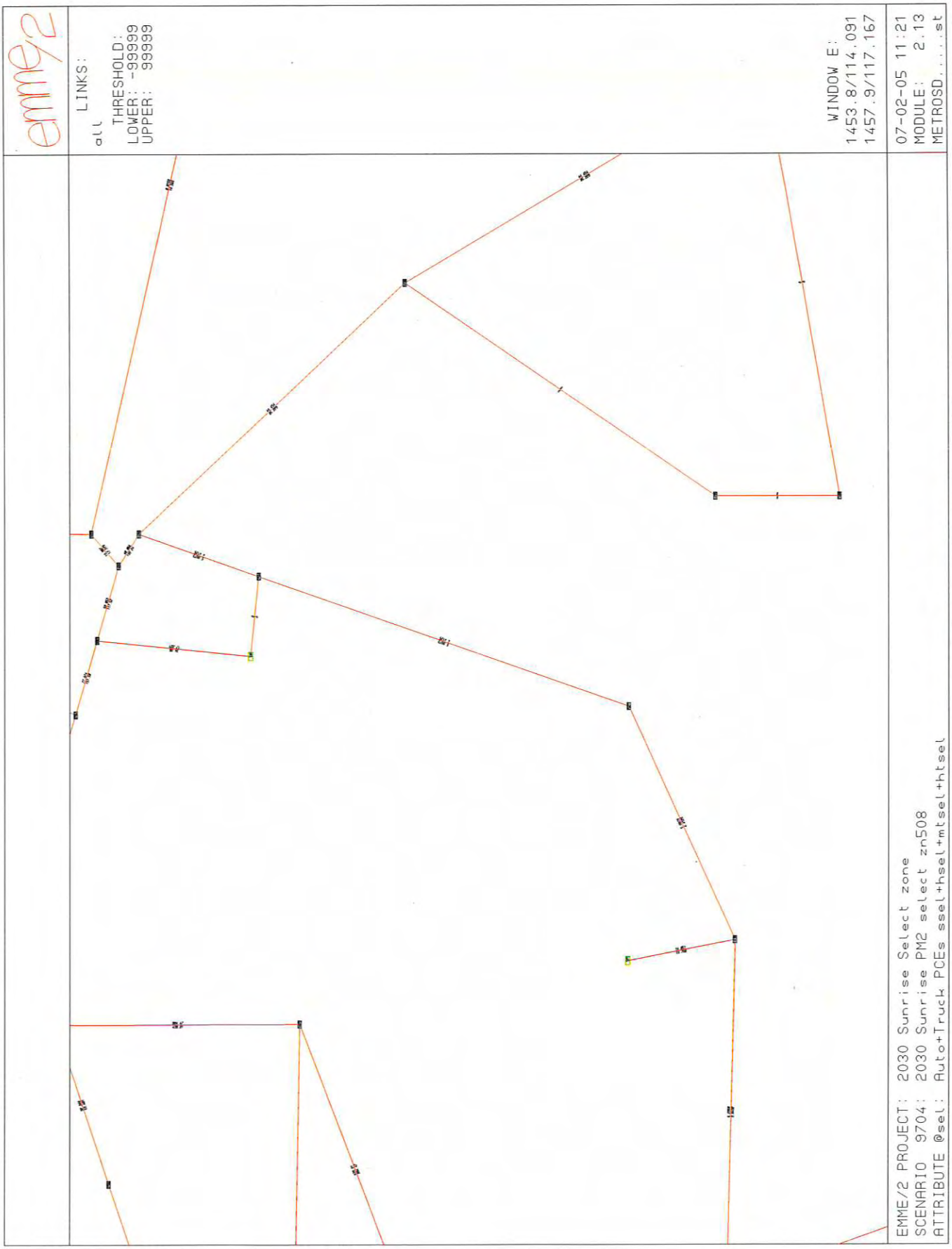
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel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1457.9/117.167
07-02-05 11:21
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Appendix G

Preferred Alternative Concept Plan

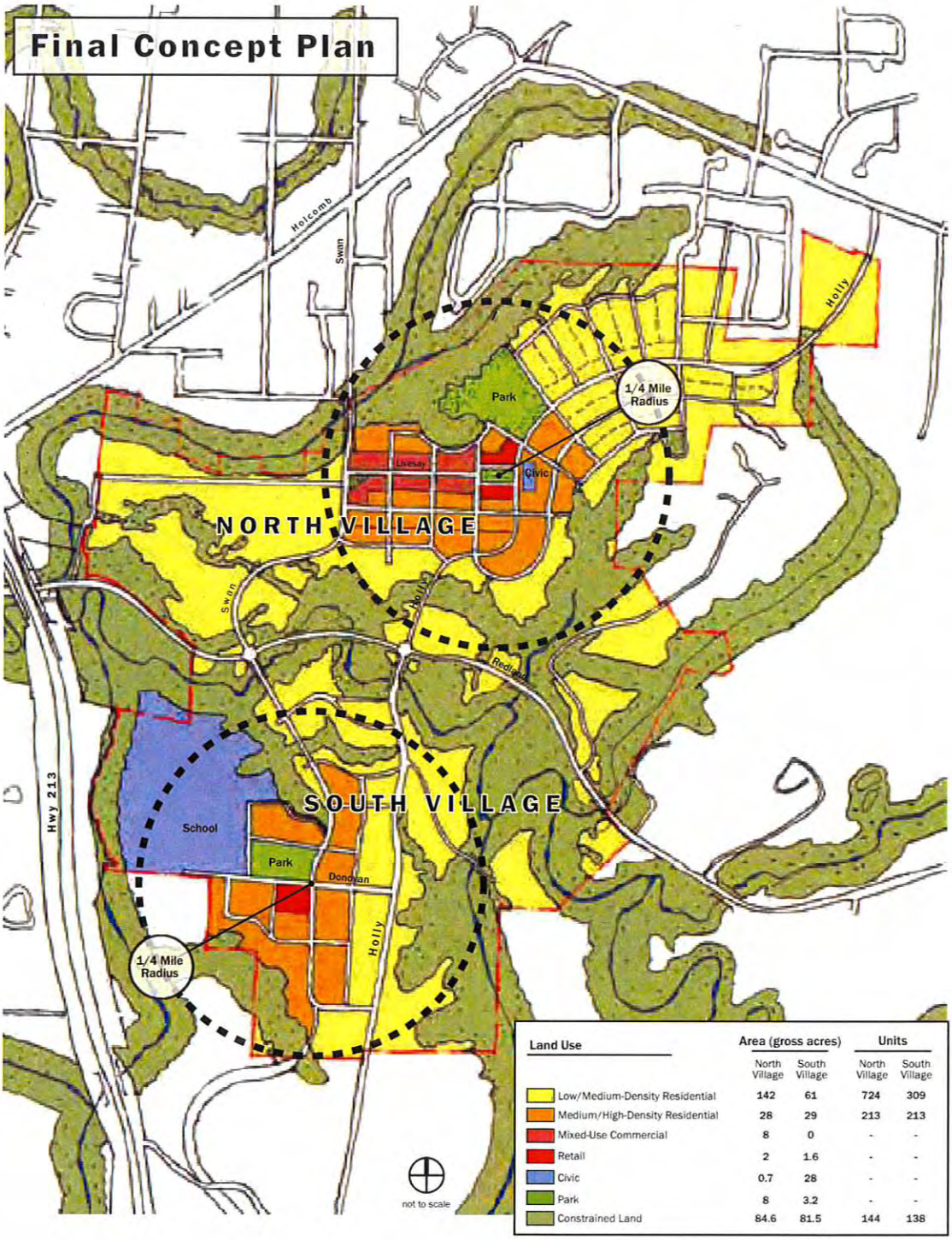

Figure 1-1. Park Place Concept Plan Urban Growth Diagram

Appendix H

Redland Rd./Holly Ln. Intersection
2027 Build Conditions
Level-of-Service Worksheets
without
Swan Avenue Extension

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions (no Swan Ave Ext), Weekday PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions (no Swan Ave Ext), Weekday PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#104 Redland Rd/Holly Ln	D	37.5	0.858	D	37.5	0.858	+ 0.000 D/V

PM Wed Apr 4, 2007 15:01:57 Page 3-1

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions (no Swan Ave Ext), Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec):	120	Critical Vol./Cap.(X):	0.858
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	37.5
Optimal Cycle:	111	Level Of Service:	D

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Prot+Permit		
Rights:	Include			Ovl			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2	0	0 1	0	1	0 1	1	0	1 0 1	1	0	0 1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	320	95	225	75	105	315	290	830	605	125	450	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	320	95	225	75	105	315	290	830	605	125	450	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	320	95	225	75	105	315	290	830	605	125	450	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	320	95	225	75	105	315	290	830	605	125	450	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	320	95	225	75	105	315	290	830	605	125	450	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	320	95	225	75	105	315	290	830	605	125	450	40
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	0.90	0.90	0.95	1.00	0.85	0.94	0.99	0.84	0.90	0.94	0.94
Lanes:	2.00	0.30	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.08
Final Sat.:	3502	505	1196	1805	1900	1615	1787	1881	1599	1718	1641	146
Capacity Analysis Module:												
Vol/Sat:	0.09	0.19	0.19	0.04	0.06	0.20	0.16	0.44	0.38	0.07	0.27	0.27
Crit Moves:		****		****				****		****		
Green/Cycle:	0.17	0.22	0.22	0.05	0.10	0.32	0.22	0.51	0.68	0.38	0.38	0.38
Volume/Cap:	0.55	0.86	0.86	0.86	0.55	0.60	0.73	0.86	0.56	0.61	0.73	0.73
Delay/Veh:	46.9	62.7	62.7	109.4	54.7	36.1	50.0	33.1	10.5	30.3	36.2	36.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	46.9	62.7	62.7	109.4	54.7	36.1	50.0	33.1	10.5	30.3	36.2	36.2
LOS by Move:	D	E	E	F	D	D	D	C	B	C	D	D
HCM2kAvgQ:	6	14	14	5	4	10	11	29	12	5	16	16

Note: Queue reported is the number of cars per lane.

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Appendix I

2027 Unmitigated Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis
150: Washington Street & Cascade Hwy South

2027 Total Traffic Conditions
5/21/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1827	1553	1736	1827	1553	1736	1827	1553	3367	3471	1553
Flt Permitted	0.29	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1025	1827	1553	889	1827	1553	1736	1827	1553	3367	3471	1553
Volume (vph)	520	165	200	155	185	430	100	1001	140	760	1288	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Lane Group Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	pm+pt		pm+ov	pm+pt		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)	33.4	18.4	27.4	30.4	16.9	31.9	9.0	54.1	67.6	15.0	60.1	75.1
Effective Green, g (s)	37.4	20.4	30.4	32.4	17.9	33.9	10.0	57.1	71.6	16.0	63.1	80.1
Actuated g/C Ratio	0.31	0.17	0.25	0.27	0.15	0.28	0.08	0.48	0.60	0.13	0.53	0.67
Clearance Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	651	311	393	342	273	478	145	869	965	449	1825	1037
v/s Ratio Prot	c0.11	0.09	0.04	0.05	0.10	c0.12	0.06	c0.58	0.02	c0.24	0.39	c0.12
v/s Ratio Perm	0.14		0.09	0.07		0.16			0.08			0.43
v/c Ratio	0.80	0.53	0.51	0.45	0.68	0.90	0.72	1.21	0.15	1.78	0.74	0.82
Uniform Delay, d1	34.3	45.4	38.4	35.2	48.3	41.4	53.7	31.4	10.7	52.0	22.1	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.15	3.14	1.00	1.00	1.00
Incremental Delay, d2	6.8	1.7	1.0	1.0	6.5	19.4	13.0	104.2	0.1	360.7	2.8	5.1
Delay (s)	41.1	47.2	39.4	36.2	54.8	60.8	70.2	140.4	33.8	412.7	24.9	19.7
Level of Service	D	D	D	D	D	E	E	F	C	F	C	B
Approach Delay (s)		41.9			54.4			122.7			126.7	
Approach LOS		D			D			F			F	

Intersection Summary			
HCM Average Control Delay	103.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	G

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
250: Redland Road & Cascade Hwy South

2027 Total Traffic Conditions
5/21/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3360		1736	1827	1827	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3360		1736	1827	1827	1553
Volume (vph)	801	237	271	440	550	1093
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	801	237	285	463	579	1151
Lane Group Flow (vph)	1038	0	285	463	579	1151
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	43.3		20.0	68.7	44.7	88.0
Effective Green, g (s)	44.3		21.0	69.7	45.7	90.0
Actuated g/C Ratio	0.37		0.18	0.58	0.38	0.75
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1240		304	1061	696	1204
v/s Ratio Prot	0.31		c0.16	0.25	0.32	c0.35
v/s Ratio Perm						0.39
v/c Ratio	0.84		0.94	0.44	0.83	0.96
Uniform Delay, d1	34.6		48.9	14.1	33.7	13.3
Progression Factor	1.00		1.00	1.00	0.61	1.54
Incremental Delay, d2	5.1		35.1	1.3	8.6	13.3
Delay (s)	39.6		83.9	15.4	29.0	33.8
Level of Service	D		F	B	C	C
Approach Delay (s)	39.6			41.5	32.2	
Approach LOS	D			D	C	

Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	E

c Critical Lane Group

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#101 Redland Rd/Abernathy Rd-Holcom	D	43.1	0.830	F	107.3	1.174	+64.216 D/V
#102 Redland Rd/Anchor Way	D	38.1	0.982	F	121.5	1.323	+83.433 D/V
#103 Redland Rd/Livesay Rd	D	29.1	0.000	F	170.9	0.000	+141.789 D/V
#104 Redland Rd/Holly Ln	E	72.5	1.011	F	211.8	1.399	+139.319 D/V
#105 Holly Lane/Donovan Road	A	7.8	0.000	A	8.2	0.000	+ 0.377 D/V
#106 Holly Ln/Maplelane Rd	B	16.6	0.642	D	35.4	0.938	+18.883 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	E	38.1	0.000	+16.234 D/V
#108 Holcomb Blvd/Swan Ave	D	26.5	0.000	F	134.3	0.000	+107.843 D/V
#300 Holcomb Blvd/Holly Ln	A	0.0	0.000	B	14.3	0.000	+14.296 D/V
#301 Livesay Rd/Swan Ave		0.0	0.000	B	11.9	0.000	+11.936 D/V
#302 Livesay Rd/Holly Ln		0.0	0.000	A	9.3	0.000	+ 9.345 D/V
#303 Redland Rd/Swan Ave	F	112.6	1.135	F	401.1	1.816	+288.487 D/V
#304 Swan Ave/Donovan Rd	B	11.2	0.000	C	15.1	0.000	+ 3.939 D/V

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	1.174
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	107.3
Optimal Cycle:	180	Level Of Service:	F

Street Name:	Abernathy-Holcomb									Redland Rd		
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1	0	1	0 1	1	0	1 0 1	1	0	1 0 1
Volume Module: 5:00-6:00												
Base Vol:	234	347	83	318	546	45	74	392	462	128	212	189
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	347	83	318	546	45	74	392	462	128	212	189
Added Vol:	118	344	5	81	373	0	0	29	137	3	36	84
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	352	691	88	399	919	45	74	421	599	131	248	273
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	352	691	88	399	919	45	74	421	599	131	248	273
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	352	691	88	399	919	45	74	421	599	131	248	273
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	352	691	88	399	919	45	74	421	599	131	248	273
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.94	0.97	0.97	0.94	0.99	0.84	0.93	0.98	0.83	0.92	0.97	0.83
Lanes:	1.00	0.89	0.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1787	1640	209	1787	1881	1599	1769	1862	1583	1753	1845	1568
Capacity Analysis Module:												
Vol/Sat:	0.20	0.42	0.42	0.22	0.49	0.03	0.04	0.23	0.38	0.07	0.13	0.17
Crit Moves:	****				****			****		****		
Green/Cycle:	0.17	0.38	0.38	0.20	0.42	0.42	0.05	0.19	0.36	0.06	0.21	0.21
Volume/Cap:	1.17	1.10	1.10	1.10	1.17	0.07	0.84	1.17	1.05	1.17	0.65	0.84
Delay/Veh:	149.5	97.0	97.0	118.3	121	17.6	95.8	144	83.6	186.4	40.3	55.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	149.5	97.0	97.0	118.3	121	17.6	95.8	144	83.6	186.4	40.3	55.9
LOS by Move:	F	F	F	F	F	B	F	F	F	F	D	E
HCM2kAvgQ:	20	37	37	21	48	1	4	24	27	9	8	11

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Cycle (sec):	100	Critical Vol./Cap.(X):	1.323
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	121.5
Optimal Cycle:	180	Level Of Service:	F

Street Name:	Anchor Way									Redland Rd		
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Prot+Permit		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 0 1	0	0	0 0 0	0	0	0 1 0	1	0	1 0 0
Volume Module: 5:00-6:00 PM												
Base Vol:	152	0	403	0	0	0	0	827	288	70	512	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	152	0	403	0	0	0	0	827	288	70	512	0
Added Vol:	5	0	79	0	0	0	0	510	3	74	462	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	157	0	482	0	0	0	0	1337	291	144	974	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	157	0	482	0	0	0	0	1337	291	144	974	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	157	0	482	0	0	0	0	1337	291	144	974	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	157	0	482	0	0	0	0	1337	291	144	974	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	0.97	0.97	0.77	0.97	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.82	0.18	1.00	1.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	1508	328	1457	1845	0
Capacity Analysis Module:												
Vol/Sat:	0.09	0.00	0.30	0.00	0.00	0.00	0.00	0.89	0.89	0.10	0.53	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.16	0.00	0.22	0.00	0.00	0.00	0.00	0.66	0.66	0.72	0.72	0.00
Volume/Cap:	0.54	0.00	1.35	0.00	0.00	0.00	0.00	1.35	1.35	0.19	0.73	0.00
Delay/Veh:	40.7	0.0	212.6	0.0	0.0	0.0	0.0	179	178.7	9.0	10.5	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	40.7	0.0	212.6	0.0	0.0	0.0	0.0	179	178.7	9.0	10.5	0.0
LOS by Move:	D	A	F	A	A	A	A	F	F	A	B	A
HCM2kAvgQ:	5	0	32	0	0	0	0	101	101	2	19	0

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 5.1 Worst Case Level Of Service: F[170.9]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	1	0	56	49	540	0	0	480	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	11	0	71	74	1730	0	0	1037	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	11	0	71	74	1730	0	0	1037	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	11	0	71	74	1730	0	0	1037	12
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2921	2921	1043	1049	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	17	16	281	660	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	16	14	281	660	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.70	0.00	0.25	0.11	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	86	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	5.3	xxxxx	0.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	171	xxxxx	11.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	B	*	*	*	*	*
ApproachDel:	xxxxxx			170.9			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec): 120 Critical Vol./Cap.(X): 1.399
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 211.8
Optimal Cycle: 180 Level Of Service: F

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1 0	0	1 0	0 0	1!	0 0	1 0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	137	0	153	0	0	0	0	821	207	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	137	0	153	0	0	0	0	821	207	86	398	0
Added Vol:	46	67	21	46	73	133	149	91	74	22	67	42
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	183	67	174	46	73	133	149	912	281	108	465	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	183	67	174	46	73	133	149	912	281	108	465	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	183	67	174	46	73	133	149	912	281	108	465	42
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	183	67	174	46	73	133	149	912	281	108	465	42
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.56	0.89	0.89	0.86	0.90	0.90	0.96	0.96	0.96	0.90	0.94	0.94
Lanes:	1.00	0.28	0.72	1.00	0.35	0.65	0.11	0.68	0.21	1.00	0.92	0.08
Final Sat.:	1057	471	1224	1626	608	1108	202	1235	381	1718	1639	148
Capacity Analysis Module:												
Vol/Sat:	0.17	0.14	0.14	0.03	0.12	0.12	0.74	0.74	0.74	0.06	0.28	0.28
Crit Moves:	****				****		****					****
Green/Cycle:	0.19	0.13	0.13	0.11	0.08	0.08	0.51	0.51	0.51	0.20	0.20	0.20
Volume/Cap:	0.96	1.09	1.09	0.44	1.43	1.43	1.43	1.43	1.43	0.32	1.43	1.43
Delay/Veh:	94.8	138	137.5	52.1	286	285.8	231.0	231	231.0	41.8	259	259.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	94.8	138	137.5	52.1	286	285.8	231.0	231	231.0	41.8	259	259.4
LOS by Move:	F	F	F	D	F	F	F	F	F	D	F	F
HCM2kAvgQ:	10	15	15	2	17	17	99	99	99	4	39	39

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: A[8.2]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0	0 0	1 0	0	0 1!	0 0	0	0 0	0 0
Volume Module:												
Base Vol:	30	240	0	0	225	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	240	0	0	225	35	45	0	25	0	0	0
Added Vol:	23	112	0	0	118	4	2	0	20	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	53	352	0	0	343	39	47	0	45	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	53	352	0	0	343	39	47	0	45	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	53	352	0	0	343	39	47	0	45	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	382	xxxx	xxxxx	xxxx	xxxx	xxxxx	821	821	363	xxxx	xxxx	xxxxx
Potent Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	344	310	682	xxxx	xxxx	xxxxx
Move Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	332	295	682	xxxx	xxxx	xxxxx
Volume/Cap:	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	0.14	0.00	0.07	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1228	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.2	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx				8.2			xxxxxx	
ApproachLOS:	*			*				A			*	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Cycle (sec): 100 Critical Vol./Cap.(X): 0.938
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 35.4
Optimal Cycle: 125 Level Of Service: D

Street Name:	Holly Ln						Maplelane Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0	0 1!	0 0	0	1	0 0	0	0 1	0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	154	0	152	198	368	0	0	378	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	154	0	152	198	368	0	0	378	71
Added Vol:	0	0	0	10	0	147	169	0	0	0	0	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	164	0	299	367	368	0	0	378	81
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	164	0	299	367	368	0	0	378	81
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	164	0	299	367	368	0	0	378	81
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	164	0	299	367	368	0	0	378	81
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.86	1.00	0.86	0.67	0.67	1.00	1.00	0.97	0.97
Lanes:	0.00	0.00	0.00	0.35	0.00	0.65	0.50	0.50	0.00	0.00	0.82	0.18
Final Sat.:	0	0	0	581	0	1059	632	634	0	0	1512	324
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.28	0.00	0.28	0.58	0.58	0.00	0.00	0.25	0.25
Crit Moves:				****				****				
Green/Cycle:	0.00	0.00	0.00	0.30	0.00	0.30	0.62	0.62	0.00	0.00	0.62	0.62
Volume/Cap:	0.00	0.00	0.00	0.94	0.00	0.94	0.94	0.94	0.00	0.00	0.40	0.40
Delay/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9
LOS by Move:	A	A	A	E	A	E	D	D	A	A	A	A
HCM2kAvgQ:	0	0	0	18	0	18	26	26	0	0	7	7

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: E[38.1]

Street Name:	Front St						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0	0	0 0	1! 0	0	0 1	0	0 0	0 0	0 1	0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	29	0	54	91	699	0	0	474	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	54	91	699	0	0	474	15
Added Vol:	0	0	0	10	0	0	0	114	0	0	122	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	39	0	54	91	813	0	0	596	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	39	0	54	91	813	0	0	596	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	39	0	54	91	813	0	0	596	25
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1604	1604	609	621	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	117	107	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	108	96	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.36	0.00	0.11	0.09	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	199	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	2.3	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	38.1	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	E	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			38.1			xxxxxx			xxxxxx		
ApproachLOS:	*			E			*			*		

Note: Queue reported is the number of cars per lane.

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Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #108 Holcomb Blvd/Swan Ave

Average Delay (sec/veh): 13.5 Worst Case Level Of Service: F[134.3]

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	67	9	13	1	9	0	0	79	46	13	65	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	83	15	20	18	16	71	86	640	79	24	358	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	83	15	20	18	16	71	86	640	79	24	358	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	83	15	20	18	16	71	86	640	79	24	358	27
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1315	1285	680	1289	1311	372	385	xxxx	xxxxx	719	xxxx	xxxxx
Potent Cap.:	136	166	455	142	160	679	1179	xxxx	xxxxx	882	xxxx	xxxxx
Move Cap.:	103	149	455	116	144	679	1179	xxxx	xxxxx	882	xxxx	xxxxx
Volume/Cap:	0.80	0.10	0.04	0.16	0.11	0.10	0.07	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.3	xxxx	xxxxx	9.2	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	124	xxxxx	xxxx	283	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	6.3	xxxxx	xxxxx	1.6	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	134	xxxxx	xxxxx	25.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	*	D	*	*	*	*	*	*	*
ApproachDel:	134.3			25.1			xxxxxx			xxxxxx		
ApproachLOS:	F			D			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #300 Holcomb Blvd/Holly Ln

Average Delay (sec/veh): 2.0 Worst Case Level Of Service: B[14.3]

Street Name:	Holly Ln						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	280	0	0	250	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	280	0	0	250	0
Added Vol:	66	0	26	0	0	0	0	13	80	28	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	66	0	26	0	0	0	0	293	80	28	263	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	66	0	26	0	0	0	0	293	80	28	263	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	66	0	26	0	0	0	0	293	80	28	263	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	652	652	333	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	373	xxxx	xxxxx
Potent Cap.:	433	387	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Move Cap.:	425	378	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Volume/Cap:	0.16	0.00	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	479	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.7	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd ConDel:	xxxxx	14.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	A	*	*
ApproachDel:		14.3			xxxxxx			xxxxxx			xxxxxx	
ApproachLOS:		B			*			*			*	

Note: Queue reported is the number of cars per lane.

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #301 Livesay Rd/Swan Ave

Average Delay (sec/veh): 7.4 Worst Case Level Of Service: B[11.9]

Street Name:	Swan Ave						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	40	27	55	24	40	11	7	28	23	95	43	37
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	27	55	24	40	11	7	28	23	95	43	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	27	55	24	40	11	7	28	23	95	43	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	40	27	55	24	40	11	7	28	23	95	43	37
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	51	xxxx	xxxxx	82	xxxx	xxxxx	268	256	46	254	234	55
Potent Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	685	648	1024	700	667	1012
Move Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	606	621	1024	639	639	1012
Volume/Cap:	0.03	xxxx	xxxx	0.02	xxxx	xxxx	0.01	0.05	0.02	0.15	0.07	0.04
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.4	xxxx	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	733	xxxxx	xxxx	693	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	1.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.3	xxxxx	xxxxx	11.9	xxxxx
Shared LOS:	*	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:		xxxxxx			xxxxxx			10.3			11.9	
ApproachLOS:		*			*			B			B	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #302 Livesay Rd/Holly Ln

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[9.3]

Street Name:	Holly Ln						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0	0	0 1 0	0	0	1! 0 0	0	0	1! 0 0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	37	133	0	0	98	6	10	0	65	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	133	0	0	98	6	10	0	65	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	37	133	0	0	98	6	10	0	65	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	37	133	0	0	98	6	10	0	65	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	104	xxxx	xxxxx	xxxx	xxxx	xxxxx	308	308	101	341	311	133
Potent Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	684	606	954	613	604	916
Move Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	671	591	954	561	588	916
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	0.00	0.07	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	903	xxxxx	xxxx	0	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.3	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			9.3			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #303 Redland Rd/Swan Ave

Cycle (sec): 120 Critical Vol./Cap.(X): 1.816
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 401.1
Optimal Cycle: 180 Level Of Service: F

Street Name:	Swan Ave						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1	0	0 1 0	0	0	1! 0 0	0	0	1! 0 0
Volume Module:												
Base Vol:	40	0	40	0	0	0	0	988	200	0	536	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	0	40	0	0	0	0	988	200	0	536	0
Added Vol:	97	30	11	29	30	178	142	273	126	13	207	25
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	137	30	51	29	30	178	142	1261	326	13	743	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	137	30	51	29	30	178	142	1261	326	13	743	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	137	30	51	29	30	178	142	1261	326	13	743	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	137	30	51	29	30	178	142	1261	326	13	743	25
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.49	0.89	0.89	0.93	0.85	0.85	0.94	0.94	0.94	0.94	0.94	0.94
Lanes:	1.00	0.37	0.63	1.00	0.14	0.86	0.08	0.73	0.19	0.02	0.95	0.03
Final Sat.:	939	625	1062	1769	234	1389	147	1305	337	30	1696	57
Capacity Analysis Module:												
Vol/Sat:	0.15	0.05	0.05	0.02	0.13	0.13	0.97	0.97	0.97	0.44	0.44	0.44
Crit Moves:	****				****				****	****		
Green/Cycle:	0.14	0.08	0.08	0.10	0.07	0.07	0.52	0.52	0.52	0.24	0.24	0.24
Volume/Cap:	1.01	0.58	0.58	0.21	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Delay/Veh:	119.0	59.2	59.2	50.5	474	473.8	418.7	419	418.7	440.7	441	440.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	119.0	59.2	59.2	50.5	474	473.8	418.7	419	418.7	440.7	441	440.7
LOS by Move:	F	E	E	D	F	F	F	F	F	F	F	F
HCM2kAvgQ:	9	4	4	1	21	21	160	160	160	73	73	73

Note: Queue reported is the number of cars per lane.

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------------------------------------------------------------------------------
                    Kittelson & Associates, Inc. #7938
                  Park Place Concept Plan - Oregon City, OR
                 2027 Total Traffic Conditions, PM Peak Hour
------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #304 Swan Ave/Donovan Rd
******************************************************************************
Average Delay (sec/veh):     10.6       Worst Case Level Of Service: C[ 15.1]
******************************************************************************
Street Name:             Swan Ave                    Donovan Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   80    0     0  200    0     0   60    0     0   50    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    0   80    0     0  200    0     0   60    0     0   50    0
Added Vol:      0   75    0    20   72   35    35   15    0     0   15   13
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    0  155    0    20  272   35    35   75    0     0   65   13
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     0  155    0    20  272   35    35   75    0     0   65   13
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:     0  155    0    20  272   35    35   75    0     0   65   13
Critical Gap Module:
Critical Gp:xxxxx  6.5 xxxxx   7.1  6.5  6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx  4.0 xxxxx   3.5  4.0  3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx  223 xxxxx   294  217   72    78 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx  676 xxxxx   658  681  991  1520 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx  660 xxxxx   530  665  991  1520 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx 0.23  xxxx  0.04 0.41 0.04  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx  0.9 xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx 12.1 xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    B     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  679 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  2.6 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 15.1 xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     *    C     *     A    *     *     *    *     *
ApproachDel:       12.1             15.1           xxxxxx           xxxxxx
ApproachLOS:        B                C               *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************


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Appendix J

2027 Mitigated Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis
150: Washington Street & Cascade Hwy South

2027 Mitigated Total Traffic Conditions
5/18/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1827	1553	1736	1827	1553	1736	3471	1553	3367	3471	1553
Flt Permitted	0.29	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1025	1827	1553	889	1827	1553	1736	3471	1553	3367	3471	1553
Volume (vph)	520	165	200	155	185	430	100	1001	140	760	1288	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Lane Group Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	pm+pt		pm+ov	pm+pt		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)	33.4	18.4	27.4	30.4	16.9	43.9	9.0	42.1	55.6	27.0	60.1	75.1
Effective Green, g (s)	37.4	20.4	30.4	32.4	17.9	45.9	10.0	45.1	59.6	28.0	63.1	80.1
Actuated g/C Ratio	0.31	0.17	0.25	0.27	0.15	0.38	0.08	0.38	0.50	0.23	0.53	0.67
Clearance Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	651	311	393	342	273	633	145	1305	810	786	1825	1037
v/s Ratio Prot	c0.11	0.09	0.04	0.05	0.10	0.16	0.06	c0.30	0.02	c0.24	0.39	c0.12
v/s Ratio Perm	c0.14		0.09	0.07		0.12			0.07			0.43
v/c Ratio	0.80	0.53	0.51	0.45	0.68	0.68	0.72	0.81	0.18	1.02	0.74	0.82
Uniform Delay, d1	34.3	45.4	38.4	35.2	48.3	30.9	53.7	33.6	16.7	46.0	22.1	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.11	2.28	1.00	1.00	1.00
Incremental Delay, d2	6.8	1.7	1.0	1.0	6.5	2.9	13.0	4.3	0.1	36.6	2.8	5.1
Delay (s)	41.1	47.2	39.4	36.2	54.8	33.8	70.2	41.6	38.2	82.6	24.9	19.7
Level of Service	D	D	D	D	D	C	E	D	D	F	C	B
Approach Delay (s)		41.9			39.3			43.5			38.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 2027 Mitigated Total Traffic Conditions
250: Redland Road & Cascade Hwy South 5/18/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3360		1736	1827	1827	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3360		1736	1827	1827	1553
Volume (vph)	801	237	271	440	550	1093
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	801	237	285	463	579	1151
Lane Group Flow (vph)	1038	0	285	463	579	1151
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	43.3		20.0	68.7	44.7	88.0
Effective Green, g (s)	44.3		21.0	69.7	45.7	90.0
Actuated g/C Ratio	0.37		0.18	0.58	0.38	0.75
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1240		304	1061	696	1204
v/s Ratio Prot	0.31		c0.16	0.25	0.32	c0.35
v/s Ratio Perm						0.39
v/c Ratio	0.84		0.94	0.44	0.83	0.96
Uniform Delay, d1	34.6		48.9	14.1	33.7	13.3
Progression Factor	1.00		1.00	1.00	0.61	1.54
Incremental Delay, d2	5.1		35.1	1.3	8.6	13.3
Delay (s)	39.6		83.9	15.4	29.0	33.8
Level of Service	D		F	B	C	C
Approach Delay (s)	39.6			41.5	32.2	
Approach LOS	D			D	C	

Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	E

c Critical Lane Group

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#101 Redland Rd/Abernathy Rd-Holcom	C	34.6	0.697	D	46.2	0.899	+11.593 D/V
#102 Redland Rd/Anchor Way	C	22.2	0.698	C	32.9	0.965	+10.742 D/V
#103 Redland Rd/Livesay Rd	B	13.1	0.000	C	16.8	0.000	+ 3.787 D/V
#104 Redland Rd/Holly Ln	C	20.4	0.671	D	39.6	0.887	+19.171 D/V
#105 Holly Lane/Donovan Road	A	7.8	0.000	A	8.2	0.000	+ 0.377 D/V
#106 Holly Ln/Maplelane Rd	B	16.6	0.642	D	35.4	0.938	+18.883 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	E	38.1	0.000	+16.234 D/V
#108 Holcomb Blvd/Swan Ave	A	7.5	0.498	B	11.2	0.623	+ 3.700 D/V
#300 Holcomb Blvd/Holly Ln	A	0.0	0.000	B	14.3	0.000	+14.296 D/V
#301 Livesay Rd/Swan Ave		0.0	0.000	B	11.9	0.000	+11.936 D/V
#302 Livesay Rd/Holly Ln		0.0	0.000	A	9.3	0.000	+ 9.345 D/V
#303 Redland Rd/Swan Ave	A	5.6	0.430	C	27.8	0.785	+22.226 D/V
#304 Swan Ave/Donovan Rd	B	11.2	0.000	C	15.1	0.000	+ 3.939 D/V

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.899
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	46.2
Optimal Cycle:	116	Level Of Service:	D

Street Name:	Abernathy-Holcomb						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1	1 0	1 0	2	0 1	1 0	1	0 1	1 0	1	0 1
Volume Module: 5:00-6:00												
Base Vol:	234	347	83	318	546	45	74	392	462	128	212	189
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	347	83	318	546	45	74	392	462	128	212	189
Added Vol:	118	344	5	81	373	0	0	29	137	3	36	84
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	352	691	88	399	919	45	74	421	599	131	248	273
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	352	691	88	399	919	45	74	421	599	131	248	273
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	352	691	88	399	919	45	74	421	599	131	248	273
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	352	691	88	399	919	45	74	421	599	131	248	273
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.94	0.92	0.92	0.94	0.94	0.84	0.93	0.98	0.83	0.92	0.97	0.83
Lanes:	1.00	1.77	0.23	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1787	3116	397	1787	3574	1599	1769	1862	1583	1753	1845	1568
Capacity Analysis Module:												
Vol/Sat:	0.20	0.22	0.22	0.22	0.26	0.03	0.04	0.23	0.38	0.07	0.13	0.17
Crit Moves:	****				****			****		****		
Green/Cycle:	0.22	0.25	0.25	0.25	0.29	0.29	0.06	0.25	0.47	0.08	0.27	0.27
Volume/Cap:	0.90	0.88	0.88	0.88	0.90	0.10	0.65	0.90	0.80	0.90	0.50	0.65
Delay/Veh:	60.8	46.2	46.2	53.7	44.9	26.3	57.6	56.1	28.9	91.2	31.6	35.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	60.8	46.2	46.2	53.7	44.9	26.3	57.6	56.1	28.9	91.2	31.6	35.7
LOS by Move:	E	D	D	D	D	C	E	E	C	F	C	D
HCM2kAvgQ:	14	15	15	15	18	1	3	16	18	7	7	8

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Cycle (sec):	100	Critical Vol./Cap.(X):	0.965
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	32.9
Optimal Cycle:	151	Level Of Service:	C

Street Name:	Anchor Way						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Permitted			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	0 1	0	0	0 0	0	1	1 0	1	2	0 0
Volume Module: 5:00-6:00 PM												
Base Vol:	152	0	403	0	0	0	0	827	288	70	512	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	152	0	403	0	0	0	0	827	288	70	512	0
Added Vol:	5	0	79	0	0	0	0	510	3	74	462	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	157	0	482	0	0	0	0	1337	291	144	974	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	157	0	482	0	0	0	0	1337	291	144	974	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	157	0	482	0	0	0	0	1337	291	144	974	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	157	0	482	0	0	0	0	1337	291	144	974	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	0.92	0.92	0.92	0.92	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.64	0.36	1.00	2.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	2856	622	1753	3505	0
Capacity Analysis Module:												
Vol/Sat:	0.09	0.00	0.30	0.00	0.00	0.00	0.00	0.47	0.47	0.08	0.28	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.31	0.00	0.39	0.00	0.00	0.00	0.00	0.49	0.49	0.09	0.57	0.00
Volume/Cap:	0.28	0.00	0.76	0.00	0.00	0.00	0.00	0.96	0.96	0.96	0.49	0.00
Delay/Veh:	26.4	0.0	31.3	0.0	0.0	0.0	0.0	39.3	39.3	108.3	13.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.4	0.0	31.3	0.0	0.0	0.0	0.0	39.3	39.3	108.3	13.0	0.0
LOS by Move:	C	A	C	A	A	A	A	D	D	F	B	A
HCM2kAvgQ:	4	0	14	0	0	0	0	32	32	8	9	0

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 0.8 Worst Case Level Of Service: C[16.8]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			1 0 2 0 0			0 0 1 1 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	1	0	56	49	540	0	0	480	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	11	0	71	74	1730	0	0	1037	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	11	0	71	74	1730	0	0	1037	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	11	0	71	74	1730	0	0	1037	12
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2056	2921	525	1049	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	49	16	503	653	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	45	14	503	653	xxxx	xxxxx	xxxx	xxxx	xxxxx
Total Cap:	55	73	xxxxx	154	78	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.07	0.00	0.14	0.11	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	385	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	16.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			16.8			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec): 120 Critical Vol./Cap.(X): 0.887
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 39.6
Optimal Cycle: 123 Level Of Service: D

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1 0	0	1 0	1	0	1 0	1	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	137	0	153	0	0	0	0	821	207	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	137	0	153	0	0	0	0	821	207	86	398	0
Added Vol:	46	67	21	46	73	133	149	91	74	22	67	42
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	183	67	174	46	73	133	149	912	281	108	465	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	183	67	174	46	73	133	149	912	281	108	465	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	183	67	174	46	73	133	149	912	281	108	465	42
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	183	67	174	46	73	133	149	912	281	108	465	42
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.89	0.89	0.95	0.90	0.90	0.94	0.99	0.84	0.90	0.94	0.94
Lanes:	1.00	0.28	0.72	1.00	0.35	0.65	1.00	1.00	1.00	1.00	0.92	0.08
Final Sat.:	1805	471	1224	1805	608	1108	1787	1881	1599	1718	1639	148
Capacity Analysis Module:												
Vol/Sat:	0.10	0.14	0.14	0.03	0.12	0.12	0.08	0.48	0.18	0.06	0.28	0.28
Crit Moves:	****				****			****			****	
Green/Cycle:	0.28	0.21	0.21	0.17	0.14	0.14	0.14	0.55	0.55	0.07	0.48	0.48
Volume/Cap:	0.67	0.67	0.67	0.22	0.89	0.89	0.59	0.89	0.32	0.89	0.59	0.59
Delay/Veh:	41.5	48.4	48.4	42.6	82.1	82.1	52.2	33.5	15.2	104.0	24.1	24.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	41.5	48.4	48.4	42.6	82.1	82.1	52.2	33.5	15.2	104.0	24.1	24.1
LOS by Move:	D	D	D	D	F	F	D	C	B	F	C	C
HCM2kAvgQ:	7	9	9	2	10	10	6	32	6	6	14	14

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: A[8.2]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0	0 0	0	1 0	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	30	240	0	0	225	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	240	0	0	225	35	45	0	25	0	0	0
Added Vol:	23	112	0	0	118	4	2	0	20	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	53	352	0	0	343	39	47	0	45	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	53	352	0	0	343	39	47	0	45	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	53	352	0	0	343	39	47	0	45	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	382	xxxx	xxxxx	xxxx	xxxx	xxxxx	821	821	363	xxxx	xxxx	xxxxx
Potent Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	344	310	682	xxxx	xxxx	xxxxx
Move Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	332	295	682	xxxx	xxxx	xxxxx
Volume/Cap:	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	0.14	0.00	0.07	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1228	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.2	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.2			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Cycle (sec): 100 Critical Vol./Cap.(X): 0.938
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 35.4
Optimal Cycle: 125 Level Of Service: D

Street Name:	Holly Ln									Maplelane Rd					
Approach:	North Bound			South Bound			East Bound			West Bound					
Movement:	L	- T	- R	L	- T	- R	L	- T	- R	L	- T	- R			
Control:	Split Phase			Split Phase			Permitted			Permitted					
Rights:	Include			Include			Include			Include					
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0	0	0	0 0	1	0
Volume Module: 5:00-6:00 PM															
Base Vol:	0	0	0	154	0	152	198	368	0	0	378	71			
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Initial Bse:	0	0	0	154	0	152	198	368	0	0	378	71			
Added Vol:	0	0	0	10	0	147	169	0	0	0	0	10			
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0			
Initial Fut:	0	0	0	164	0	299	367	368	0	0	378	81			
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
PHF Volume:	0	0	0	164	0	299	367	368	0	0	378	81			
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0			
Reduced Vol:	0	0	0	164	0	299	367	368	0	0	378	81			
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Final Vol.:	0	0	0	164	0	299	367	368	0	0	378	81			
Saturation Flow Module:															
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Adjustment:	1.00	1.00	1.00	0.86	1.00	0.86	0.67	0.67	1.00	1.00	0.97	0.97			
Lanes:	0.00	0.00	0.00	0.35	0.00	0.65	0.50	0.50	0.00	0.00	0.82	0.18			
Final Sat.:	0	0	0	581	0	1059	632	634	0	0	1512	324			
Capacity Analysis Module:															
Vol/Sat:	0.00	0.00	0.00	0.28	0.00	0.28	0.58	0.58	0.00	0.00	0.25	0.25			
Crit Moves:				****				****							
Green/Cycle:	0.00	0.00	0.00	0.30	0.00	0.30	0.62	0.62	0.00	0.00	0.62	0.62			
Volume/Cap:	0.00	0.00	0.00	0.94	0.00	0.94	0.94	0.94	0.00	0.00	0.40	0.40			
Delay/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9			
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
AdjDel/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9			
LOS by Move:	A	A	A	E	A	E	D	D	A	A	A	A			
HCM2kAvgQ:	0	0	0	18	0	18	26	26	0	0	7	7			

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: E[38.1]

Street Name:	Front St						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	29	0	54	91	699	0	0	474	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	54	91	699	0	0	474	15
Added Vol:	0	0	0	10	0	0	0	114	0	0	122	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	39	0	54	91	813	0	0	596	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	39	0	54	91	813	0	0	596	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	39	0	54	91	813	0	0	596	25
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1604	1604	609	621	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	117	107	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	108	96	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.36	0.00	0.11	0.09	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	199	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	2.3	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	38.1	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	E	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			38.1			xxxxxx			xxxxxx		
ApproachLOS:	*			E			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #108 Holcomb Blvd/Swan Ave

Cycle (sec): 100 Critical Vol./Cap.(X): 0.623
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 11.2
Optimal Cycle: 40 Level Of Service: B

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	67	9	13	1	9	0	0	79	46	13	65	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	83	15	20	18	16	71	86	640	79	24	358	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	83	15	20	18	16	71	86	640	79	24	358	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	83	15	20	18	16	71	86	640	79	24	358	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	83	15	20	18	16	71	86	640	79	24	358	27
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.64	0.64	0.64	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Lanes:	0.70	0.13	0.17	0.17	0.15	0.68	0.11	0.79	0.10	0.06	0.87	0.07
Final Sat.:	851	154	205	280	249	1105	181	1346	166	102	1518	115
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.10	0.06	0.06	0.06	0.48	0.48	0.48	0.24	0.24	0.24
Crit Moves:		****						****				
Green/Cycle:	0.16	0.16	0.16	0.16	0.16	0.16	0.76	0.76	0.76	0.76	0.76	0.76
Volume/Cap:	0.62	0.62	0.62	0.41	0.41	0.41	0.62	0.62	0.62	0.31	0.31	0.31
Delay/Veh:	45.7	45.7	45.7	39.1	39.1	39.1	6.3	6.3	6.3	3.8	3.8	3.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.7	45.7	45.7	39.1	39.1	39.1	6.3	6.3	6.3	3.8	3.8	3.8
LOS by Move:	D	D	D	D	D	D	A	A	A	A	A	A
HCM2kAvgQ:	4	4	4	3	3	3	12	12	12	4	4	4

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #300 Holcomb Blvd/Holly Ln

Average Delay (sec/veh): 2.0 Worst Case Level Of Service: B[14.3]

Street Name:	Holly Ln						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	280	0	0	250	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	280	0	0	250	0
Added Vol:	66	0	26	0	0	0	0	13	80	28	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	66	0	26	0	0	0	0	293	80	28	263	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	66	0	26	0	0	0	0	293	80	28	263	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	66	0	26	0	0	0	0	293	80	28	263	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	652	652	333	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	373	xxxx	xxxxx
Potent Cap.:	433	387	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Move Cap.:	425	378	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Volume/Cap:	0.16	0.00	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	479	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.7	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd ConDel:	xxxxx	14.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	A	*	*
ApproachDel:		14.3		xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:		B		*			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #301 Livesay Rd/Swan Ave

Average Delay (sec/veh): 7.4 Worst Case Level Of Service: B[11.9]

Street Name:	Swan Ave						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	40	27	55	24	40	11	7	28	23	95	43	37
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	27	55	24	40	11	7	28	23	95	43	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	27	55	24	40	11	7	28	23	95	43	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	40	27	55	24	40	11	7	28	23	95	43	37
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	51	xxxx	xxxxx	82	xxxx	xxxxx	268	256	46	254	234	55
Potent Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	685	648	1024	700	667	1012
Move Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	606	621	1024	639	639	1012
Volume/Cap:	0.03	xxxx	xxxx	0.02	xxxx	xxxx	0.01	0.05	0.02	0.15	0.07	0.04
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.4	xxxx	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	733	xxxxx	xxxx	693	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	1.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.3	xxxxx	xxxxx	11.9	xxxxx
Shared LOS:	*	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:		xxxxxx			xxxxxx			10.3			11.9	
ApproachLOS:		*			*			B			B	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #302 Livesay Rd/Holly Ln

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[9.3]

Street Name:	Holly Ln						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0	0 1	0	0	0 1!	0 0	0	0 1!	0 0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	37	133	0	0	98	6	10	0	65	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	133	0	0	98	6	10	0	65	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	37	133	0	0	98	6	10	0	65	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	37	133	0	0	98	6	10	0	65	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	104	xxxx	xxxxx	xxxx	xxxx	xxxxx	308	308	101	341	311	133
Potent Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	684	606	954	613	604	916
Move Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	671	591	954	561	588	916
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	0.00	0.07	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	903	xxxxx	xxxx	0	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.3	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			9.3			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #303 Redland Rd/Swan Ave

Cycle (sec): 120 Critical Vol./Cap.(X): 0.785
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 27.8
Optimal Cycle: 89 Level Of Service: C

Street Name:	Swan Ave						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1	0	1 0	0	1	0	1 0	1	1 0
Volume Module:												
Base Vol:	40	0	40	0	0	0	0	988	200	0	536	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	0	40	0	0	0	0	988	200	0	536	0
Added Vol:	97	30	11	29	30	178	142	273	126	13	207	25
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	137	30	51	29	30	178	142	1261	326	13	743	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	137	30	51	29	30	178	142	1261	326	13	743	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	137	30	51	29	30	178	142	1261	326	13	743	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	137	30	51	29	30	178	142	1261	326	13	743	25
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.89	0.89	0.93	0.85	0.85	0.92	0.89	0.89	0.90	0.89	0.89
Lanes:	1.00	0.37	0.63	1.00	0.14	0.86	1.00	1.59	0.41	1.00	1.93	0.07
Final Sat.:	1769	625	1062	1769	234	1389	1753	2699	698	1702	3277	110
Capacity Analysis Module:												
Vol/Sat:	0.08	0.05	0.05	0.02	0.13	0.13	0.08	0.47	0.47	0.01	0.23	0.23
Crit Moves:	****				****			****			****	
Green/Cycle:	0.30	0.20	0.20	0.23	0.16	0.16	0.16	0.60	0.60	0.01	0.45	0.45
Volume/Cap:	0.50	0.25	0.25	0.09	0.79	0.79	0.51	0.79	0.79	0.79	0.51	0.51
Delay/Veh:	34.5	41.2	41.2	36.3	62.4	62.4	47.7	20.6	20.6	177.2	24.1	24.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.5	41.2	41.2	36.3	62.4	62.4	47.7	20.6	20.6	177.2	24.1	24.1
LOS by Move:	C	D	D	D	E	E	D	C	C	F	C	C
HCM2kAvgQ:	5	3	3	1	9	9	5	24	24	2	11	11

Note: Queue reported is the number of cars per lane.

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PM                          Thu Mar 29, 2007 09:04:41                Page 15-1
-------------------------------------------------------------------------------
                     Kittelson & Associates, Inc. #7938
                  Park Place Concept Plan - Oregon City, OR
             2027 Mitigated Total Traffic Conditions, PM Peak Hour
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #304 Swan Ave/Donovan Rd
*******************************************************************************
Average Delay (sec/veh):      10.6       Worst Case Level Of Service: C[ 15.1]
*******************************************************************************
Street Name:              Swan Ave                          Donovan Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:            Include          Include          Include          Include
Lanes:         0  0  1  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0   80     0     0  200     0     0   60     0     0   50     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0   80     0     0  200     0     0   60     0     0   50     0
Added Vol:       0   75     0    20   72    35    35   15     0     0   15    13
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  155     0    20  272    35    35   75     0     0   65    13
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  155     0    20  272    35    35   75     0     0   65    13
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  155     0    20  272    35    35   75     0     0   65    13
Critical Gap Module:
Critical Gp:xxxxx  6.5 xxxxx   7.1  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx  4.0 xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx  223 xxxxx   294  217    72    78 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx  676 xxxxx   658  681   991  1520 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx  660 xxxxx   530  665   991  1520 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx 0.23  xxxx  0.04 0.41  0.04  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx  0.9 xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx 12.1 xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    B     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  679 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  2.6 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 15.1 xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     *    C     *     A    *     *     *    *     *
ApproachDel:      12.1             15.1           xxxxxx           xxxxxx
ApproachLOS:        B                C                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
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I. Land Use: Implementation

Angelo planning group

LAND USE PLANNING • TRANSPORTATION PLANNING • PROJECT MANAGEMENT

Memorandum

Date:	May 25, 2007
To:	David Berniker, LEED AP, Project Manager, SERA Architects
From:	Shayna Rehberg, AICP, Planner, Angelo Planning Group
cc:	Frank Angelo, Principal, Angelo Planning Group
Re:	Implementation of the Park Place Concept Plan – Development Code Amendments (**DRAFT**)

Introduction

The Park Place Concept Plan ("Concept Plan") will be implemented by updating, supplementing, and being referenced in City comprehensive planning documents and by amending associated implementing documents. Changes to comprehensive planning documents such as City public facility master plans are recommended in sets of policies and implementation strategies included in Chapter 4 (Implementation) of the Concept Plan. These sets of goals, policies, and strategies serve to supplement goals, policies, and strategies established in the City's existing Comprehensive Plan. Given the comprehensive planning document updates and supplements provided elsewhere in the Concept Plan, this memorandum focuses on the types of amendments that are recommended for the City's development code, the primary implementing document for land use in the City.

Development Code Amendments

The Park Place Concept Plan envisions vibrant, mixed-use neighborhoods and neighborhood centers that also respect existing neighborhoods and environmentally sensitive lands and meet minimum regional housing requirements. In order to address these objectives in a way that will be reasonable for an applicant to use and the City to administer, it is recommended that following types of revisions be made to the base zones, standards, and procedures found in the City's development code. Some of these revisions would apply citywide while others will apply only to Park Place.

I. Residential District Code Amendments

- A. New R-5 zone
- B. Modifications to R-3.5 zone
- C. New standards for attached single-family dwellings
- D. Additional standards for multi-family dwellings
- E. New land division requirements and architectural standards for residential development
- F. Modified master planning requirements

620 SW Main Street, Suite 201, Portland, OR 97205-3026 • tel 503.224.6974 • fax 503.227.3679 • www.angeloplanning.com

II. Commercial/Mixed-Use District Code Amendments

A. Modified standards for Neighborhood Commercial (NC) zone

B. Modified standards for Medium-Density Mixed Use Corridor (MUC-1) zone

C. New "main street" standards for NC and MUC-1 zones

D. New definitions and standards for live/work units

III. Transportation-Related Code Amendments

A. Modified parking standards

B. New requirements in R-3.5, NC, and MUC-1 zones

IV. Natural Resource Code Amendments

A. Integration of regional Nature in Neighborhoods Best Management Practices into development code

B. New density transfer provisions in Floodplain/Flood Management Overlay Zone and Geologic Hazards Overlay Zone

The following sections address each element of the outline in greater detail. These code amendments and other implementation measures are also presented in the implementation matrix at the end of Chapter 4 (Implementation) of the Concept Plan.

I. Residential District Code Amendments

Residential zones depicted in the Park Place Concept Plan diagram were created assuming an average of 7 units/acre for low/medium-density housing and 12 units/acre for medium/high-density housing. These densities correspond to the yellow and orange shading on the Concept Plan diagram, respectively (Appendix A). These densities are critical in providing a vibrant, more urban environment in Park Place while satisfying Title 11 minimum density requirements.

Existing residential base zones in Oregon City come close to these density requirements, but do not necessarily provide sufficient density or housing variety to fulfill Title 11 housing requirements. It is recommended that a new residential zone be adopted citywide and modifications to an existing residential zone be adopted for Park Place. These new and modified zones are intended not only to achieve target housing densities, but to conform to more historical platting patterns and to include standards that foster a more vibrant pedestrian environment and seek compatibility with existing development. This new residential zone (the R-5 zone) and modified existing residential zone (R-3.5 zone) are intended to implement the low/medium-density and medium/high-density housing (yellow and orange shading) depicted in the Concept Plan diagram (Appendix A).

Further, there are new standards recommended for attached single-family dwelling units and modified standards for multi-family dwelling units that will support development flexibility as well as compatibility with the surrounding neighborhood. At the City's request, potential modifications to existing land division standards, residential design standards, and master planning requirements are also discussed.

The full set of existing lot and use standards that apply to the zones referenced in the following sections are included in this report as Appendix E.

A. Low/Medium-Density Residential Zone (R-5)

The proposed new R-5 zone is based largely on the City's existing R-6 zone, but reflects historical platting patterns present elsewhere in the city. It is recommended that if the R-5 zone is adopted, the City consider phasing out the R-6 zone over time and replacing it with the R-5 zone.

The following is a summary of how proposed standards for the new R-5 zone vary from standards in the existing R-6 zone.

- Decrease minimum lot size
- Increase minimum and maximum density[1]
- Increase maximum lot coverage
- Add more housing types as permitted uses

All the other standards established in the R-6 zone would apply to the new R-5 zone. (See Appendix E for standards in the R-6 zone.) The proposed standards differ in order to meet housing targets, make more efficient use of land, concentrate housing outside of environmentally sensitive areas, create more housing choices and affordability, and encourage compatibility with existing development. The specific proposed standards are presented in Table 1.

Table 1: Lot Standards and Use Standards in Low/Medium-Density Single-Family Residential (R-5) Zone

Proposed R-5 Zone	Proposed Standard
Minimum Lot Size	5,000 sq. ft. (*note: 6,000 sq. ft. in R-6 zone)*
Maximum Building Lot Coverage	50% (*note: 40% in R-6 zone*)
Minimum Density	7 units/acre
Maximum Density	8 units/acre
Minimum setbacks (subject to solar standards, OCMC Section 17.54.070)	Rear yard adjacent to existing development – 40 ft. (*note: 20ft. in R-6 zone)*
Permitted Uses	Add attached single-family units, duplexes, and accessory

[1] It is a City standard to calculate the minimum density as 80% of the maximum density. Maximum density can be derived from minimum lot size. For example, a minimum lot size of 10,000 square feet corresponds to 4 units/acre. Conversely, the maximum density may be calculated as 120% of the minimum density.

Chapter 16.12 (Minimum Improvements and Design Requirements for Land Divisions), Section -235, allows for lot sizes up to 10% less than the minimum lot size specified for the underlying base zone, given that the average lot size for the entire subdivision meets the minimum lot size requirement. ADUs and non-dwelling tracts (e.g. storm water, natural resources, open space, or access) are not included in lot size averaging calculations.

The City's Site Plan and Design Review standards reinforce these exceptions and methods for determining minimum density: *For a residential development, site layout shall achieve at least 80% of the maximum density of the base zone for the net developable area. Net developable area excludes all areas for required right-of-way dedication, land protected from development through water resource and steep slopes, and required open space or park dedication.* (OCMC Section 17.62.050)

[2] According to the supplemental standards in OCMC Section 17.54.090, accessory dwelling units (ADUs) are allowed in all single-family residential zones, subject to special development and occupancy standards.

Proposed R-5 Zone	Proposed Standard
	dwelling units (ADUs)[2] to list of explicitly permitted uses *(note: attached single-family units and duplexes are not allowed uses in the R-6 zone)*

B. Medium/High-Density Residential Zone (R-3.5)

Modifications to the existing medium/high-density residential base zone (R-3.5 zone) are recommended to be made within the base zone code section, with language specifying that these modifications would apply only to the zone as it is used in Park Place. The modifications presented in Table 2 are intended to foster a more pedestrian-oriented environment and assist in achieving the mix of housing types needed in Park Place.

Table 2: Design Standards and Use Standards in Medium/High-Density Residential (R-3.5) Zone

Modified R-3.5 Zone	Proposed Standard
Design Standards	Add alley requirement
Permitted Uses	Add multi-family residential uses (subject to existing and amended design standards)

C. Attached Single-Family Housing Standards

Allowing attached single-family housing and establishing standards for this type of housing supports the following objectives.

- Greater variety of housing types
- Housing that can be developed more densely and make more efficient use of the land
- Design that is compatible with surrounding development and with the Concept Plan diagram

It is recommended that the City adopt specific standards for attached single-family housing (townhouses and rowhouses) that could be applied in Park Place and citywide by incorporating them into the City's Site Plan and Design Review regulations (OCMC Section 17.62).

Attached single-family housing standards address building orientation, garages, alleys, and common areas. These standards can be added to site plan and design review regulations to apply to townhouse and rowhouse development in Park Place or citywide. An example of these standards is provided in Appendix F – Attached Single-Family Housing Standards.

D. Multi-Family Housing Standards

The City already has development standards for multi-family housing addressing building design, parking, and open space. The City may choose to augment its existing standards with those recommended by the State's Model Code to improve the quality of multi-family housing Park Place. Similar to the proposed attached single-family housing standards, these standards can be added to site plan and design review requirements to apply to townhouse and rowhouse development either in Park Place only or citywide. The elements addressed in the Model Code and that are not currently in the City's code include:

- Building mass;
- Type of open space;
- Open space dimensions; and
- Trash receptacles.

However, ADUs are not explicitly listed as allowed uses in the R-6 zone, and for clarity it is recommended that they be listed.

The template language from the Model Code is excerpted below.

Multi-family Housing Development Standards

Where multi-family housing is allowed, it shall conform to all of the following standards, which are intended to promote livability for residents and compatibility with nearby uses. Figure 2.2.200.H provides a conceptual illustration of the requirements listed below.

1. Building mass. The maximum width or length of a multiple family building shall not exceed [80-160] feet from end-wall to end-wall, not including outdoor living areas (e.g., porches, balconies, patios, and similar unenclosed spaces).

2. Common open space. A minimum of [10] percent of the site area shall be designated and permanently reserved as common open space in [all multiple family developments / multiple family developments with more than [20] dwellings], in accordance with all of the following criteria:

a. The site area is defined as the lot or parcel on which the development to be located, after subtracting any required dedication of street right-of-way and other land for public purposes (e.g., public park or school grounds, etc.);

b. In meeting the common open space standard, the multiple family development shall contain one or more of the following: outdoor recreation area, protection of sensitive lands (e.g., trees preserved), play fields, outdoor playgrounds, outdoor sports courts, swim pools, walking fitness courses, pedestrian amenities, or similar open space amenities for residents.

c. Historic buildings or landmarks that are open to the public may count toward meeting the common open space requirements when approved by the [planning commission/historic resource commission];

d. To receive credit under Section 2.2.200.H, a common open space area shall have an average width that is not less than 20 feet and an average length that is not less than 20 feet;

e. Projects in the Residential-Commercial District that provide pedestrian amenities between primary building entrance(s) and adjoining street(s) are required to provide a minimum of [5] percent of the site in common open space;

f. The approval body may waive the common open space requirement for the first [20-50] dwelling units in a multiple family project that is located within one-quarter mile (measured walking distance) of a public park, and there is a direct, accessible (i.e., Americans With Disabilities Act-compliant), lighted pedestrian walkway or multi-use pathway connecting the site to the park. If the park is not developed, or only partially developed, the approval body may require the multiple family housing developer to improve park land in an amount comparable to that which he or she would otherwise be required to provide in his or her development.

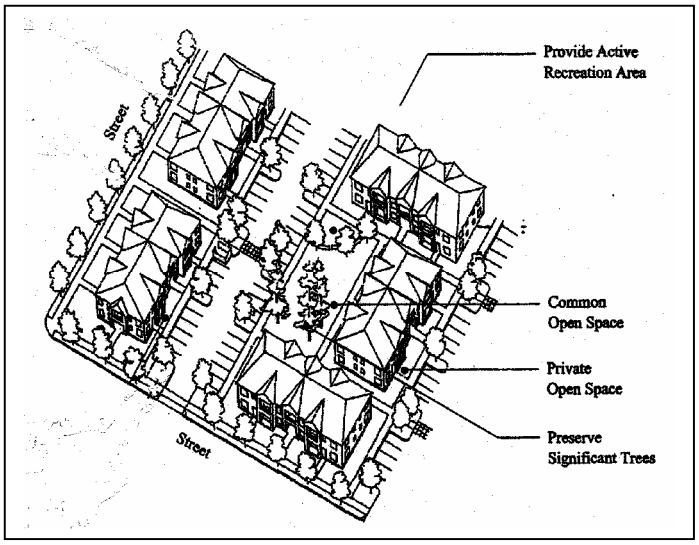
3. Private open space. Private open space areas shall be required for ground-floor and upper-floor housing units based on all of the following criteria:

a. [A minimum of [40-60] percent of all] ground-floor housing units shall have front or rear patios or decks measuring at least [48] square feet. Ground-floor housing means the housing unit entrance (front or rear) is within 5 feet of the finished ground elevation (i.e., after grading and landscaping);

b. [A minimum of [40-60] percent of all] upper-floor housing units shall have balconies or porches measuring at least [48]] square feet. Upper-floor housing means housing units that are more than 5 feet above the finished grade; and

c. In the Residential-Commercial District, multiple family dwellings are exempt from the private open space standard where the development contains pedestrian amenities located between primary building entrance(s) and adjoining streets

Figure 2.2.200H – Examples of Multiple Family Open Space



4. Trash receptacles. Trash receptacles shall be oriented away from building entrances, setback at least ten (10) feet from any public right-of-way and adjacent residences and shall be screened with an evergreen hedge or solid fence or wall of not less than 6 feet in height. Receptacles must be accessible to trash pick-up trucks.

E. Land Division and Residential Design Standards

The City has expressed interest in allowing for development flexibility, given certain performance standards, and more architectural variety in residential development in the city and Park Place. The following are code concepts the City may wish to pursue in implementing the Park Place Concept Plan.

Lot size averaging and open space

The City's existing code already allows for lot size averaging in residential subdivisions.[3] However, for even greater flexibility in lot size averaging, the City may wish to consider increasing the percentage that a lot can be less than the minimum lot size for that district. Currently, the City's code would allow a lot to be up to 10% less than the minimum lot size, and it is recommended that this allowance be increased to 20%. While the City's existing lot size averaging allow for tracts to be created for open space and natural resource protection, it is recommended that these provisions be amended to ***require*** open space tracts within residential subdivisions.

Planned unit development, cluster development, and cottage development

Planned unit development (PUDs), cluster development, and cottage development are code concepts that allow flexibility in residential development on different scales, while assuring density, open space, and other performance standards are met. The City of Redmond provides an example of planned unit, cluster, and

[3] Chapter 16.12 addresses minimum improvements and design standards for land divisions and OCMC Section 16.12.235 (Calculations of Lot Area) specifically addresses lot size averaging. According to the code, ADUs and tracts created for non-dwelling unit purposes such as open space, natural resources and hazards, storm water tracts, or access ways are not included in these calculations.

cottage development regulations in its zoning code, Redmond Development Code (RDC) Sections 8.0275-8.0287.[4]

Architectural integrity and variety

For architectural integrity and variety, the City may consider increasing the number of residential design elements currently required of single-family dwellings and two-family dwelling (duplexes). Similarly, the City could revise the standards to require certain elements for all applicable development, and then leave other elements to be selected from a menu-style method already used by the City.

As an example, the State Transportation Growth Management (TGM) Program's Model Development Code for Small Cities, 2nd Edition, ("Model Code") regulates the building length, articulation, and presence of building entries, windows, porches, and balconies for all residential development. The applicant must choose a minimum number of design details from amongst a list. The following is an excerpt of the architectural elements regulated for all development.

1. Building Length. The continuous horizontal distance, as measured from end-wall to end-wall, of individual buildings shall not exceed [80-160] feet.

2. Articulation. All buildings shall incorporate design features such as varying roof lines, offsets, balconies, projections (e.g., overhangs, porches, or similar features), recessed or covered entrances, window reveals, or similar elements to break up large expanses of uninterrupted building surfaces (blank walls). Along the vertical face of a structure, and on all building stories, such elements shall occur at a minimum interval of [30-40] feet, and each floor shall contain at least two elements, as generally shown in Figure 2.2.190C(2):

a. Recess (e.g., deck, patio, courtyard, entrance or similar feature) that has a minimum depth of [4-6] feet;

b. Extension (e.g., floor area, deck, patio, entrance, overhang, or similar feature) that projects a minimum of 2 feet and runs horizontally for a minimum length of 4 feet; and/or

c. Offsets or breaks in roof elevation of 2 feet or greater in height;

3. Eyes on the Street. All building elevations visible from a street right of way shall provide prominent defined entrances, and a combination of windows, porches, and/or balconies. A minimum of [40-60] percent of front (i.e., street-facing) elevations [(30% for manufactured homes that also conform to Section 2.2.200.D)], and a minimum of [30] percent of side and rear building elevations shall meet this standard, as generally shown in Figure 2.2.190C(2), above. "Percent of elevation" is measured as the horizontal plane (lineal feet) containing doors, porches, balconies, terraces and/or windows. The standard applies to each full and partial building story.

Appendix D presents an excerpt of the architectural variety standards required by the City of Battle Ground, Washington. For a thorough assessment and update of the City's code, it is recommended that the City pursue a code assistance grant administered by the State's Transportation Growth Management (TGM) program.

Solar Orientation

Supplemental zoning regulations in the City's existing code (OCMC Section 17.54.070) already establish solar access standards (maximum shade point heights and maximum shade height on solar features) for single-family residential development. In order to maximize passive solar heating of homes proposed as part of a PUD or subdivision and to reinforce the street layout proposed for Park Place, it is recommended that solar orientation standards be added to this existing set of solar regulations. The following is sample solar orientation regulation language from the Oregon Department of Energy and Boulder, Colorado.

[4] The City of Redmond's zoning code can be viewed at: http://doc.ci.redmond.or.us/Community_Development/Development_Code/Zoning_Updated_101006.pdf.

3. Siting Requirements: All planned unit developments and subdivisions shall be designed and constructed in compliance with the following solar siting requirements:

A. All new residential units shall have a roof surface that meets all of the following criteria:

i. Is oriented within 30 degrees of a true east-west direction;

ii. Is flat or not sloped towards true north; 100 square feet of un-shaded solar collectors for each individual dwelling unit in the building; and

iv. Has unimpeded solar access consistent with the requirements of Section 8.0370.2 or through easements, covenants, or other private agreements among affected landowners that the city manager finds are adequate to protect continued solar access for such roof surface.

4. Street Orientation Requirement:

A. New residential streets in planned unit developments and subdivisions, shall be predominantly oriented within thirty degrees of true east-west in order to maximize the number of homes with the major walls and windows facing south.

F. Modified Master Planning Requirements

The City has expressed interest in modifying its master planning requirements to accommodate more residential development. In doing so, the City would need to set a threshold acreage above which master planning would be required. Thresholds in the two to ten acre range should be considered. These modifications may be made in the City's development code (OCMC 17.65) to apply citywide or specifically to Park Place. It is critical that clear and explicit reference be made to the Park Place Concept Plan in modifying master planning requirements so that principles and policies included in the plan are implemented in master planned development.

II. Commercial/Mixed-Use District Code Amendments

The neighborhood centers – North Village and South Village – in Park Place are key components of the Park Place Concept Plan. These centers combine commercial uses, civic uses, higher-density residential uses, and public open spaces for residents to live, recreate, gather, and access everyday services. These uses are reflected in the mix of land use designations proposed in the Village Center. (See Appendix A.)

Figure 1: Examples of Neighborhood Commercial and Mixed-Use Development



Source: SERA Architects

The following sections address recommended standards for the commercial and mixed-use districts proposed in Park Place. In particular, modifications to the City's existing Neighborhood Commercial (NC) and Medium-Density Mixed-Used Corridor (MUC-1) are proposed, including "main street" standards, , in addition to provisions for live/work uses. Figure 1 presents examples of the kind of neighborhood-scale commercial and mixed uses that could be allowed in the proposed North and South Village NC and MUC-1 zones.

A. Neighborhood Commercial (NC) Zone Standards

The City's existing Neighborhood Commercial (NC) base zone includes many of the use and development standards that will enable the type of development envisioned in the Park Place Concept Plan.

Existing standards in the NC zone already prescribe a maximum front setback of 5 feet that creates a more active, pedestrian-oriented environment, with provisions for more of a setback if public space and pedestrian amenities are proposed in the setback. Minimum building height and landscaping also contribute to the pedestrian orientation of the environment. Similarly, a higher maximum building height provides opportunities for more density and mixed uses and creates a unique identity for the Village Centers. A wider range of allowed uses will support the provision of everyday services to residents so that the do not need to travel outside of Park Place to meet these needs. Therefore, it is recommended that the following provisions be amended in the Neighborhood Commercial (NC) base zone with specifications that they apply to Park Place.

- Provide incentives for minimum building height
- Increase maximum building height
- Add minimum landscaping requirement
- Add permitted uses

The specific standards recommended for addition to or modification of the existing NC zone are presented in Table 3.

Table 3: Lot Standards and Use Standards in the Neighborhood Commercial (NC) District in the Park Place Overlay Zone

	Existing Standards	Proposed Standards
Minimum Building Height	-	▪ *Note: A minimum height requirement is not generally recommended because it can be too restrictive and discouraging to development. However, to encourage mixed uses and a sense of enclosure that multi-story buildings can provide, it is suggested that the City discuss provisions that would offer public investments in streetscape amenities or parking in exchange for construction of multi-story buildings*
Maximum Building Height	35 ft.	▪ 45 ft.
Minimum Landscaping	-	▪ 20% including parking lot landscaping (*note: same as required in MUC-1 zone*)
Permitted Uses	Antique Shops; Apparel shop; Art gallery, store, supplies; Bakery, retail; Banks without a drive-through; Barbershop; Beauty parlor; Bicycle sales, service, rental; Bookstore; Candy store; Coffee shop without a drive-through; Computer or audio equipment sales Craft store; Custom dressmaking and tailoring; Dry cleaners; Dry cleaners, self-service; Dry cleaning agencies; Delicatessen store; Drug stores; Dry good stores; Florist shops; Gift shops; Grocery, fruit or vegetable store; Hardware store; Ice-cream store; Interior decoration, including drapery and upholstery;	▪ Add professional services (e.g. insurance, real estate, medical/dental) to permitted uses.

	Existing Standards	Proposed Standards
	Jewelry store; Laundromat, self-service; Laundry agencies; Locksmith; Music store; Plant or garden shop; Printing and copy service (no audible sounds beyond the premises); Restaurants without a drive-through; Seasonal sales, subject to the provisions of OCMC Section 17.54.060; Shoe sales, repair; Stationery store; Studio for art, dance, music, photo; and Watch and clock repair shop.	
Conditional Uses	Any permitted use more than 10,000 square feet in floor area	▪ Allow vehicle fuel sales in NC zone conditionally (*note: currently allowed conditionally in MUC zones and prohibited in NC zone*)

B. Medium-Density Mixed-Use Corridor (MUC-1) Zone Standards

Similar to modifications proposed for the NC zone, it is recommended that the following provisions for the MUC-1 zone be made in the base zone and specified for use in Park Place in order to support housing targets and foster a pedestrian-oriented urban environment in the Park Place North Village.

- Minimum building height for live/work units
- Allow additional mixed uses
- Prohibit auto-oriented uses

Currently, attached single- and two-family housing and multi-family housing is allowed in the MUC-1 zone (see Table 4). It is recommended that flexible "live/work units" also be allowed in the MUC-1 zone within the Park Place. Live/work units are those in which up to 50% of the ground floor can be in commercial use, while the remaining building area is in residential use. "Main street" development standards, such as requiring entrances to be at sidewalk level, will allow the conversion of ground floor uses from residential to commercial use as needed. Standards for live/work units and main streets are addressed in more detail in following sections of this memorandum.

Unlike the NC zone where development is expected to be largely commercial with limited secondary residential uses, development in the MUC-1 zone in Park Place is expected to be primarily residential, for which multi-story building requirements are generally less prohibitive. In particular, a minimum building height requirement is recommended for live/work units. To further encourage density, multi-story building, and a pedestrian environment, it is recommended that a minimum lot coverage requirement be added the MUC-1 zone for Park Place. These and other recommended standards are presented in Table 4.

Table 4: Lot Standards and Use Standards in the Medium-Density Mixed Use Corridor (MUC-1) District in the Park Place Overlay Zone

	Existing Standards	**Proposed Standards**
Minimum Height (subject to solar standards, OCMC Section 17.54.070)	-	▪ Require minimum of 2-story buildings for live/work units (*note: definition and standards for live/work units provided in following section*)
Minimum Lot Coverage	-	▪ 50% (*note: there is currently no minimum requirement, but the existing maximum lot coverage standard in the MUC-1 zone is 80%)*
Permitted Uses	A. Banquet, conference facilities and meeting rooms; B. Bed and breakfast and other lodging facilities for up to ten guests per night; C. Child care facilities; D. Health and fitness clubs; E. Medical and dental clinics, outpatient; infirmary services; F. Museums, libraries and cultural facilities; G. Offices, including finance, insurance, real estate and government; H. 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; I. Postal services; J. Publicly-owned parks, playgrounds, play fields and community or neighborhood centers; K. Repair shops, for radio and television, office equipment, bicycles, electronic equipment, shoes and small appliances and equipment; L. Residential units, single-family detached residential existing prior to adoption of this chapter; M. Residential units, single-family and two-family attached; N. Residential units, multi-family; O. Restaurants, eating and drinking establishments without a drive through; P. Retail services, including personal, professional, educational and financial services; laundry and dry-cleaning; Q. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use	▪ Allow live/work townhomes (attached single-family units) and apartments (multi-family units) (*note: see the definitions and standards in the following section on live/work units*)

	Existing Standards	Proposed Standards
	permitted in the neighborhood commercial, historic commercial or limited commercial districts, provided the maximum footprint for a stand alone building with a single store does not exceed 60,000 sq. ft.; R. Senior housing, including congregate care, residential care and assisted living facilities; nursing homes and other types of group homes; 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.	
Conditional Uses	A. Clubs/lodges; B. Car washes; C. Drive-in or drive-through facilities for a permitted or conditional use; D. Emergency and ambulance services; E. Motor vehicle service, parts sales, repair, or equipment rental; F. Museums and cultural facilities; G. Outdoor markets that do not meet the criteria of OCMC Section 17.29.020(H); H. Public utilities and services such as pump stations and sub stations; I. Religious institutions; J. Retail trade, including gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the neighborhood, historic or limited commercial districts that have a footprint for a stand alone building with a single store in excess of 60,000 sq. ft. in the MUC-1 or MUC-2 zone; K. Schools, including trade schools and technical institutes; and L. Vehicle fuel sales.	Allow conditionally: ▪ retail trade over 30,000 sq. ft. in floor area (*note: lowers the threshold for conditional review from 60,000 sq. ft. established in subsection J*). Prohibit: ▪ car washes (*note: currently conditionally allowed by subsection B)*; ▪ drive-in or drive-through facilities (*note: currently allowed by subsection C*); ▪ motor vehicle service, parts sales and equipment rental (*note: currently allowed by subsection E*); ▪ vehicle fuel sales (*note: currently allowed by subsection L and proposed to be allowed conditionally in NC zone in Park Place Overlay Zone*)

C. "Main Street" Standards

There are Site Plan and Design Review standards[5] that currently apply to commercial development in Oregon City that should be expanded to apply to mixed-use and live/work development in Park Place. In particular, these standards will encourage an active and pedestrian-oriented environment in the Village Centers. It is recommended that these standards be added to the MUC-1 zone with specifications that they apply to the MUC-1 zone in Park Place.[6] These existing design review standards include the following:

Maximum front yard setbacks of 5 feet, with exceptions for cases in which the applicant provides additional public space and pedestrian amenities within the setback.

- Primary building entrances oriented to the main street, accessed by a public sidewalk, and featuring some sort of weather protection.
- Parking areas located below, to the sides, or behind the building.
- Façade transparency for at least 60% of the ground floor facing the street and for at least 30% of the side elevations.

The City's existing Site Plan and Design Review standards for commercial development also address roof treatments, entryways, lighting, and building massing. It is recommended that all of these design review standards be added to the MUC-1 zone in Park Place as well.

In order to further support the pedestrian orientation of the Village Center and the quality of development in the centers, it is recommended that the following code concepts be developed for adoption as main street standards

1. Building entrances

In addition to requiring a primary entrance along the main street adjacent to the building and providing weather protection, additional standards regarding the level of the entrance and the entrances of buildings at the corners of intersections are recommended. These standards will support the conversion between residential and commercial uses in live/work units in the mixed-use zone and will create a stronger pedestrian orientation and visual interest at intersections.

It is recommended that building entrances be required to be at sidewalk level and that stairs and stoops to the entrance be prohibited.

For buildings located at the corner of intersections, it is recommended that one of the three treatments be required. This sample language is based on design standards proposed for downtown Redmond, Oregon.

> *1. Locate the primary entry to the building at the corner of the building or within 25 feet of the corner of the building.*
>
> *2. Incorporate prominent architectural elements, such as increased building height or massing, a cupola, a turret, or a pitched roof, at the corner of the building or within 25 feet of the corner of the building.*

[5] OCMC Chapter 17.62, Sections –050 and –055

[6] The City may wish to further specify that these standards apply to the first 50 feet of depth of property in these zones. This specification avoids applying the standards to flaglots or lots that do no otherwise have a building frontage and presence on the main streets.

3. Chamfer the corner of the building (i.e. cut the corner at a 45-degree angle and a minimum of 10 feet from the corner) and incorporate include extended weather protection (arcade or awning), special paving materials, street furnishings, or plantings in the cut.

2. Architectural standards

While the City currently requires some façade and entryway treatments as part of its existing Site Plan and Design Review standards, it is recommended that the City consider requiring that development along the Village Center main streets in Park Place incorporate two of the following standards. These standards are intended to create more transparency and visual interest of buildings, particularly for pedestrians at the street level. These examples are taken from standards proposed for downtown Redmond, Oregon.

• Canopies or overhangs (5'-0" minimum, measured from either the face of the column or the street-facing elevation) for the width of the building

• Transom window

• Storefront frieze, horizontal sign band, or a belt course above the transom window or mezzanine level

• Window plant box (minimum of one per window)

• Projected window sill (12" to 24" above grade)

3. Materials

Related to additional architectural standards, the City may wish to consider regulating building materials in order to achieve a higher quality of development in Park Place, especially along the main streets in the NC and MUC-1 zones in Park Place. The City may choose either to require certain exterior building materials, to limit and prohibit other kinds of building materials, or to combine these methods. Below is sample language from the City of Milwaukie, which chose to prohibit certain building materials in its downtown zones.

b. The following wall materials are prohibited at the street level of the building:

i. EIFS or other synthetic stucco panels;

ii. Split-face or other masonry block.

c. The following wall materials are prohibited at all levels of the building in all downtown zones:

i. Plywood paneling;

ii. Brick with dimensions larger than four by eight by two inches;

iii. Spandrel glazing/curtain wall;

iv. Vinyl or metal cladding;

v. Composite wood fiberboard or composite cement-based siding, except as permitted in the downtown residential zone in subsection (C)(2)(d)(iii);

4. Streetscape

While the previous sets of development and design standards applied mainly to the building architecture along Park Place main streets, the following sets of standards related to street trees, lighting, seating, signs, and awnings can be classified as "streetscape" standards. These standards affect the quality of the space between the building and the street.

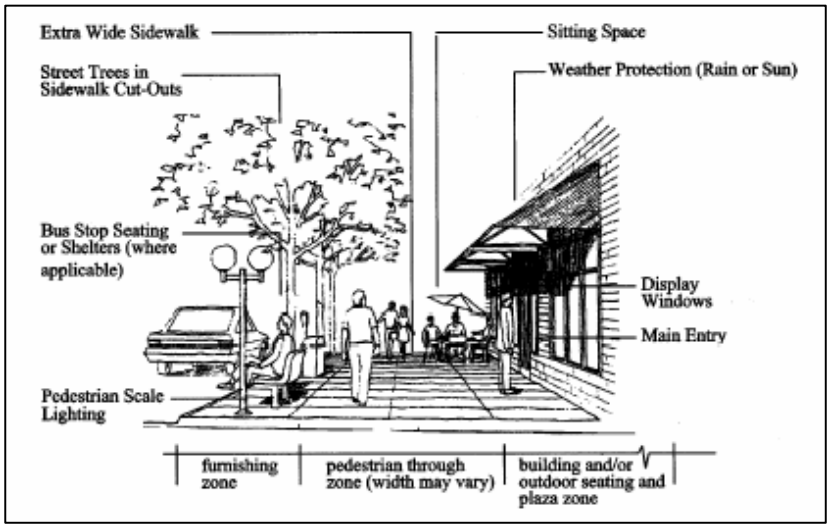
The State's Model Code recommends code language addressing the streetscape and offers the diagram in Figure 2 to illustrate elements of an active and pedestrian-oriented streetscape, which is recommended for main streets in Park Place.

5. Street Trees

As shown in Figure 2, street trees are a crucial streetscape element. They are depicted as part of urban design drawings of the Livesay Main Street in the North Village in the Park Place Concept Plan (Figure 3-2 in the Concept Plan). The City's existing Site Plan and Design Review standards address landscaping standards, minimum percentage of landscaping, protection of existing trees and vegetation, and replacement requirements. Landscaping is also specifically required for off-street parking, and interior landscaping for parking cannot be counted as part of the required minimum landscaping for the site.

Planting street trees in the "furnishing zone" or planting strip are an additional recommended standard for the main streets in Park Place. The City is responsible for maintaining a list of appropriate trees for landscaping, and street trees should be selected from this list.

Figure 2: Examples of Pedestrian and Transit Amenities



5. Lighting

In addition to basic existing lighting requirements, it is recommended that the City require pedestrian-scale and certain types of lighting along Village Center main streets in Park Place. The following is sample lighting regulation language proposed in a code update for the City of Oakridge, Oregon.

> *Lighting shall be provided at all building entrances, pathways and other pedestrian areas, and be lit to two-foot candles with pedestrian-scale lighting (e.g., wall mounted, sidewalk*

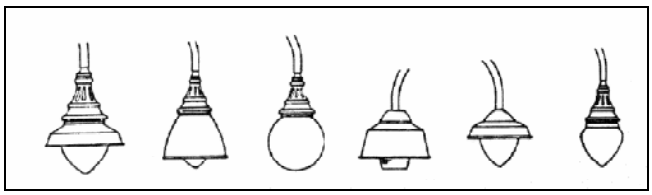
lamps, bollards, landscape up lighting, etc.). Alternative lighting to meet the intent of the design guidelines may be approved through site design review.

As another example, the following language is part of design guidelines for the Gateway Overlay District in Astoria, Oregon.

1. *Exterior lighting shall consist of at least one of the following lighting types.*

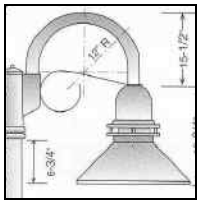
   a. *Decorative lighting integrated with architecture.*
   b. *Metal halide or incandescent.*
   c. *Pedestrian and traffic signals combined with street lamps.*
   d. *Light fixtures that direct light downward and eliminate glare.*

Figure N.1.c



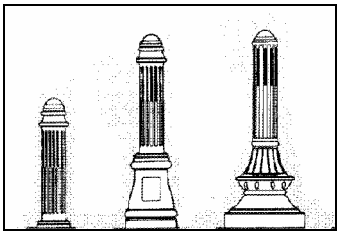
   e. *Historic street lamps along walks and parking lots.*
   f. *Industrial pan light with goose neck.*

Figure N.2.a



   g. *Low bollard lighting.*

Figure N.2.b



2. *The following types of exterior lighting are prohibited.*

   a. *Sodium vapor (amber).*

b. *Fluorescent tube.*
c. *Cobra head street lamps or other contemporary fixtures.*
d. *Fixtures with undiffused, undirected light that do not focus the light to the ground.*

6. Seating

The following sample language is provided by the State's Model Code, which recommends that various streetscape elements be required for commercial development. In order to encourage residents to gather and customers to relax and linger, it is suggested that the City consider requiring one of the seating elements below.

1. A plaza, courtyard, square or extra-wide sidewalk next to the building entrance (minimum width of [6] feet);
2. Sitting space (i.e., dining area, benches, garden wall or ledges between the building entrance and sidewalk) with a minimum of 16 inches in height and 30 inches in width;
3. Building canopy, awning, pergola, or similar weather protection (minimum projection of 4 feet over a sidewalk or other pedestrian space);
4. Public art that incorporates seating (e.g., fountain, sculpture).
5. Transit amenity, such as bus shelter, per the standards of the [name of transit district.

7. Signs and Awnings

In order to establish the main streets as special places within Park Place, the City should consider additional sign standards for businesses along the Village Center main streets. Further, while weather protection may already be required for commercial development in the City, it may be helpful to specify and illustrate the kind of weather protection permitted, particularly in regards to awnings.

The sample language below addresses sign and awning standards in a special plan district in Astoria, Oregon.

1. *Signs shall incorporate at least one of the following elements.*
   a. *Hanging blade signs. (See Figure L.1.a.)*
   b. *Signs painted on building facade.*
   c. *Signs applied to building facade.*
   d. *Front lit.*
   e. *Graphics historic in character.*
   f. *Exterior neon. (See Figure L.2.)*

Figure L.1.a. Blade Sign



Source: City of Astoria

Figure L.2. Neon Sign



Source: City of Astoria

2. The following types of signs are prohibited.

a. Pole mounted freestanding signs.
b. Plastic or internal and back lit plastic.

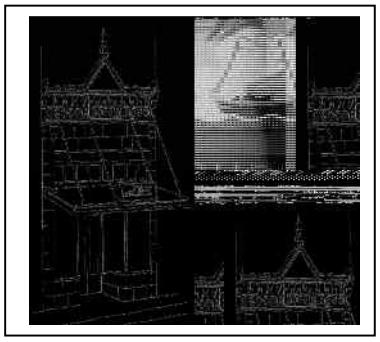
1. The following type of awning shall be used for commercial buildings.

a. Canvas awnings or fixed canopies for rain protection. (See Figure 14.090.E.1.)
b. Vinyl awnings.

2. The following type of awning is prohibited.

a. Back lit awnings.

Figure 14.090.E.1. Commercial Awning



Source: City of Astoria

8. Driveways and Alleys

As a final consideration for the streetscape environment on Village Center main streets, it is recommended that the City consider restricting driveways and access onto the main streets themselves in the NC and MUC-1 zones in Park Place, requiring instead access from a side street or alley. If it is deemed too excessive to restrict this access on all parts of Swan, Donovan, and Livesay in the North and South Villages, it is recommended that

the City consider restricting driveways at least in the mixed-use zone (MUC-1) along Livesay in the North Village.

C. Live/work Units

Allowing live/work units in the mixed-use zone proposed in the Park Place Village Centers is important for the flexibility it provides in combining residential and commercial uses and allowing for commercial uses on the ground floor when the market is ready to support them.

The following definitions of live/work units and standards governing them are examples from the City of Bend's NorthWest Crossing Overlay Zone.[7]

E. Live/work Dwelling. A dwelling in which a business may be operated on the ground floor. The ground floor commercial or office space has visibility, signage and access from the primary street.

To preserve the pedestrian orientation of the commercial or office space, alley access is required to provide trash service and residential parking. A live/work dwelling is allowed instead of, or in addition to, home occupation as defined by this Code. The location of lots where live/work dwellings may be sited shall be specified on the subdivision plat. The permitted live/work housing types are defined below:

a. Live/work House: A single-family detached house with no more than 50 percent of the round floor of the building available as commercial or office space.

b. Live/work Townhome: A residential, fee simple townhome unit in which a business may be operated. The commercial or office portion of the building shall be limited to the ground floor and may not exceed 50 percent of the square footage of the entire building, excluding the garage.

c. Live/work Apartment: A primarily residential multi-story, multi-unit building with a maximum of 50 percent of the building ground floor square footage used as commercial or office space. Residential units may be for rent or for sale in condominium or cooperative ownership.

G. Primary Street Frontage. The location along a street in the Residential Mixed-use District where live/work housing or community commercial uses may be located. Table 2.7.320 of this Chapter identifies areas and limits the maximum lot frontage along the Primary Street Frontage that may be used for live/work housing or community commercial uses in each area. The primary entrance to the office or commercial portion of live/work housing or a community commercial building must be located on the Primary Street Frontage.

9. Platting Lots for Live/work Housing and Community Commercial Uses.

a. The final plat for a subdivision in the Residential Mixed-use Overlay District shall specify the lots where live/work housing or community commercial uses will be permitted.

b. A deed restriction shall be recorded with each lot identified on the final plat as a live/work housing or community commercial.

[7] Section 2.7.300 of Chapter 2.7, Special Planned Districts, in the City of Bend's Development Code

c. The number of lots in the Residential Mixed-use Overlay District shall be limited to a maximum amount of linear primary street frontage.

10. Sign Standards.

a. Each live/work house or live/work townhome may have non-illuminated sign(s) not exceeding a combined maximum area of 16 square feet. Signs shall be attached to the building.

b. Each live/work apartment or community commercial building may have one non-illuminated monument sign and/or one building mounted sign not exceeding a combined maximum area of 32 square feet.

c. Individual businesses in live/work apartment buildings may have additional non-illuminated sign(s) mounted on the building not exceeding a combined maximum of 8 square feet in size.

11. Off-street Parking Standards.

a. Each live/work house or live/work townhome may have no more than two off-street spaces in addition to the two spaces required by Chapter 3.3, Vehicle Parking, Loading and Bicycle Parking of this code.

b. The off-street parking standards in Chapter 3.3, Vehicle Parking, Loading and Bicycle Parking shall apply to a work use in a live/work apartment building.

12. Special Standards For Live/work Townhomes and Live/work Houses.

a. The area dedicated to the work use in the live/work unit shall not exceed the size requirement in the applicable definition of live/work house or live/work townhome in Section 2.7.310.

b. The work use shall not generate noise exceeding 55-decibel level as measured at the lot line of the lot containing the live/work house or live/work townhome.

c. No outside storage of materials or goods related to the work occupation or business shall be permitted.

d. No dust or noxious odor shall be evident off the premises.

e. Employees of the work occupation or business may not occupy more than 2 on-street parking spaces at any time.

f. If the business is open to the public, public access must be through the front door and the business may not be open to clients or the public before 7:00 a.m. or after 7:00 p.m.

III. Transportation-Related Code Amendments

A generalized street plan and updates to the City's Transportation System Plan, including proposed new street cross-sections and projects, are included in Chapter 3 (Plan Elements) and Appendix H of the Park Place Concept Plan. Further, "green street" standards for natural stormwater management in roadway right-of-way are addressed as part of the Stormwater Infrastructure System Improvements in Chapter 3 and Appendix J of

the Concept Plan. In addition to these transportation elements of the Concept Plan, there are a few minor transportation-related code amendments that are recommended that are described below.

A. Parking Standards

In order to make efficient use of land and foster a more urban environment, it is recommended that parking standards be reviewed. However, the City has essentially adopted Metro parking standards, and these standards are both more prescriptive in instituting parking maximums and less regulatory in not requiring minimums for many land uses as compared to other standards around the region and the state.

The City may wish to adopt on-street parking credits to reduce the need for off-street parking and make more efficient use of land. These credits typically occur at a one-to-one ratio, for each space of on-street parking along the street frontage of the proposed building. These standards can be adopted as part of the parking standards for application either citywide or just in Park Place. The following is sample language from the State's Model Code regulating on-street parking credits.

> ***C. On-Street Parking.*** *On-street parking shall conform to the following standards:*
>
> *1. Dimensions. The following constitutes one on-street parking space:*
>
> *a. Parallel parking, each [22] feet of uninterrupted curb;*
>
> *b. [45/60] degree diagonal, each with [12] feet of curb;*
>
> *c. 90 degree (perpendicular) parking, each with [12] feet of curb.*
>
> *2. Location. Parking may be counted toward the minimum standards in Table 3.3.300A when it is on the block face abutting the subject land use. An on-street parking space must not obstruct a required clear vision area and its must not violate any law or street standard.*
>
> *3. 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.*

B. Driveways and Alleys

As addressed in previous sections of this memo, it is recommended that the City consider regulations related to driveways and alleys to support the pedestrian orientation of neighborhoods in Park Place. In particular, the City should consider prohibiting curb cuts and driveways in the NC and MUC-1 zones (which include frontage on the Livesay, Donovan, and Swan main streets) in Park Place. At the very least, some form of restriction of driveways should be considered for the MUC-1 zone in Park Place. Related to these driveway and access provisions, alleys should be required in the NC and MUC-1 zones in Park Place. In addition, alleys should be provided for medium/high-density housing in the R-3.5 zone in Park Place.

IV. Natural Resources Code Amendments

The City currently has the following overlay zones to help protect environmentally sensitive and constrained areas, which can be applied in Park Place.

- Water resource overlay zone
- Flood management overlay zone
- Geologic hazards (steep slopes) overlay zone.

The City has been developing a composite environmental overlay zone based on the existing environmental overlay zones, with updated information and requirements regarding steep slopes and potential landslide hazards that have been developed as part of the Park Place Concept Plan. (See Appendix K – Preliminary Geologic and Geotechnical Evaluation.)

A. Nature in Neighborhoods Best Management Practices

According to mapping of Goal 5 resources and Habitat Conservation Areas (HCAs) included in the Park Place Existing Conditions Report (Figure 2-2 in the Concept Plan), there are areas of Class A and B upland wildlife habitat in Park Place that are not classified as HCAs or subject to Metro HCA regulations.

Instead of recommending that a new environmental overlay zone be created to regulate this upland habitat, David Evans and Associates is recommending that best management practices (BMPs) developed for the regulation of non-Habitat Conservation Areas (HCAs) be applied to development throughout the Park Place. These BMPs are included in ordinances adopted by Metro as part of their Nature in Neighborhoods program, implemented by Title 13 of their Urban Growth Management Functional Plan. A table of the BMPs included in Title 13, and the sections of Oregon City code (OCMC) or other planning and engineering documents into which they could potentially be incorporated, are presented below in Table 5.

Table 5: Best Management Practices for Habitat Conservation Areas[8]

Part (a): Design and Construction Practices to Minimize Hydrologic Impacts Potential amendments to: Building Construction Standards (OCMC 15.04 Building Code and OCMC 15.12 Housing Code), Transportation System Plan and Street Design Manual, OCMC 16.12 Minimum Improvements and Design Standards for Land Divisions, OCMC 17.62 Site Plan and Design Review, OCMC 17.52 Off-Street Parking and Loading
1. Amend disturbed soils to original or higher level of porosity to regain infiltration and stormwater storage capacity.
2. Use pervious paving materials for residential driveways, parking lots, walkways, and within centers of cul-de-sacs.
3. Incorporate stormwater management in road right-of-ways.
4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.
5. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
6. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.
7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.
8. Use multi-functional open drainage systems in lieu of more conventional curb-and-gutter systems.
9. Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.
10. Apply a treatment train approach to provide multiple opportunities for storm water treatment and reduce the

[8] Table 3.07-13c in Exhibit C of Ordinance No. 05-1077C, Title 13 (Nature in Neighborhoods) of the Urban Growth Management Functional Plan (Metro Code Chapter 3.07)

possibility of system failure.

11. Reduce sidewalk width and grade them such that they drain to the front yard of a residential lot or retention area.

12. Reduce impervious impacts of residential driveways by narrowing widths and moving access to the rear of the site.

13. Use shared driveways.

14. Reduce width of residential streets, depending on traffic and parking needs.

15. Reduce street length, primarily in residential areas, by encouraging clustering and using curvilinear designs.

16. Reduce cul-de-sac radii and use pervious vegetated islands in center to minimize impervious effects, and allow them to be utilized for truck maneuvering/loading to reduce need for wide loading areas on site.

17. Eliminate redundant non-ADA sidewalks within a site (i.e., sidewalk to all entryways and/or to truck loading areas may be unnecessary for industrial developments).

18. Minimize car spaces and stall dimensions, reduce parking ratios, and use shared parking facilities and structured parking.

19. Minimize the number of stream crossings and place crossing perpendicular to stream channel if possible.

20. Allow narrow street right-of-ways through stream corridors whenever possible to reduce adverse impacts of transportation corridors.

Part (b): Design and Construction Practices to Minimize Impacts on Wildlife Corridors and Fish Passage

Potential amendments to: Transportation System Plan and Street Design Manual, OCMC 16.12 Minimum Improvements and Design Standards for Land Divisions, OCMC 17.62 Site Plan and Design Review

1. Carefully integrate fencing into the landscape to guide animals toward animal crossings under, over, or around transportation corridors.

2. Use bridge crossings rather than culverts wherever possible.

3. If culverts are utilized, install slab, arch or box type culverts, preferably using bottomless designs that more closely mimic stream bottom habitat.

4. Design stream crossings for fish passage with shelves and other design features to facilitate terrestrial wildlife passage.

5. Extend vegetative cover through the wildlife crossing in the migratory route, along with sheltering areas.

Part (c): Miscellaneous Other Habitat-Friendly Design and Construction Practices Potential amendments to: OCMC 16.12 Minimum Improvements and Design Standards for Land Divisions and OCMC 17.62 Site Plan and Design Review
1. Use native plants throughout the development (not just in HCA). 2. Locate landscaping (required by other sections of the code) adjacent to HCA. 3. Reduce light-spill off into HCAs from development. 4. Preserve and maintain existing trees and tree canopy coverage, and plant trees, where appropriate, to maximize future tree canopy coverage.

Excerpts of Title 13 that address implementing ordinances required for Cities and Counties are included as Appendix G. Metro also developed a model ordinance for implementation of Title 13. The model ordinance was developed to apply to all HCAs and to provide application criteria, development standards, and measures for development flexibility and mitigation within HCAs. The complete Title 13 Model Ordinance can be viewed online at: http://www.metro-region.org/article.cfm?ArticleID=15311.

B. Density Transfers

Most of the "green fingers" associated with stream corridors and steep slopes in Park Place – and generally designated as open space in the Concept Plan diagram (Appendix A) – will be zoned with the City's lowest-density residential (R-10) district. The R-10 zone has an established 10,000 square foot minimum lot size or, in essence, a maximum density of 4 units/acre.

Natural resource and natural hazard areas in Park Place, zoned primarily R-10, will be overlaid with a combination of existing City environmental overlay zones or a composite of these zones. Excerpts of existing code addressing applicability and standards for environmentally sensitive areas of the City are included at the end of this memorandum as Appendix H. Parts of these zones preclude development or would limit housing density to 2 units/acre.

Existing City Code allows density transfers in association with the City's water resource overlay zone. In order to protect other natural resources in Park Place and allow for needed housing, it is recommended that these density transfer provisions be extended to flood management and geologic hazards (steep slope) overlay zones and any other new composite environmental zones that are developed. The following is a template for density transfer provisions based on existing language in the City's water resource overlay zoning code.

Density transfers.

A. The purpose of this section is to allow density accruing to portions of a property within the R-10 zone to be transferred outside the R-10 zone to other areas of the Park Place Overlay District.

B. Development applications for partitions that request a density transfer shall:

1. Provide a map showing the net buildable area to which the density will be transferred;

2. Provide calculations justifying the requested density increase;

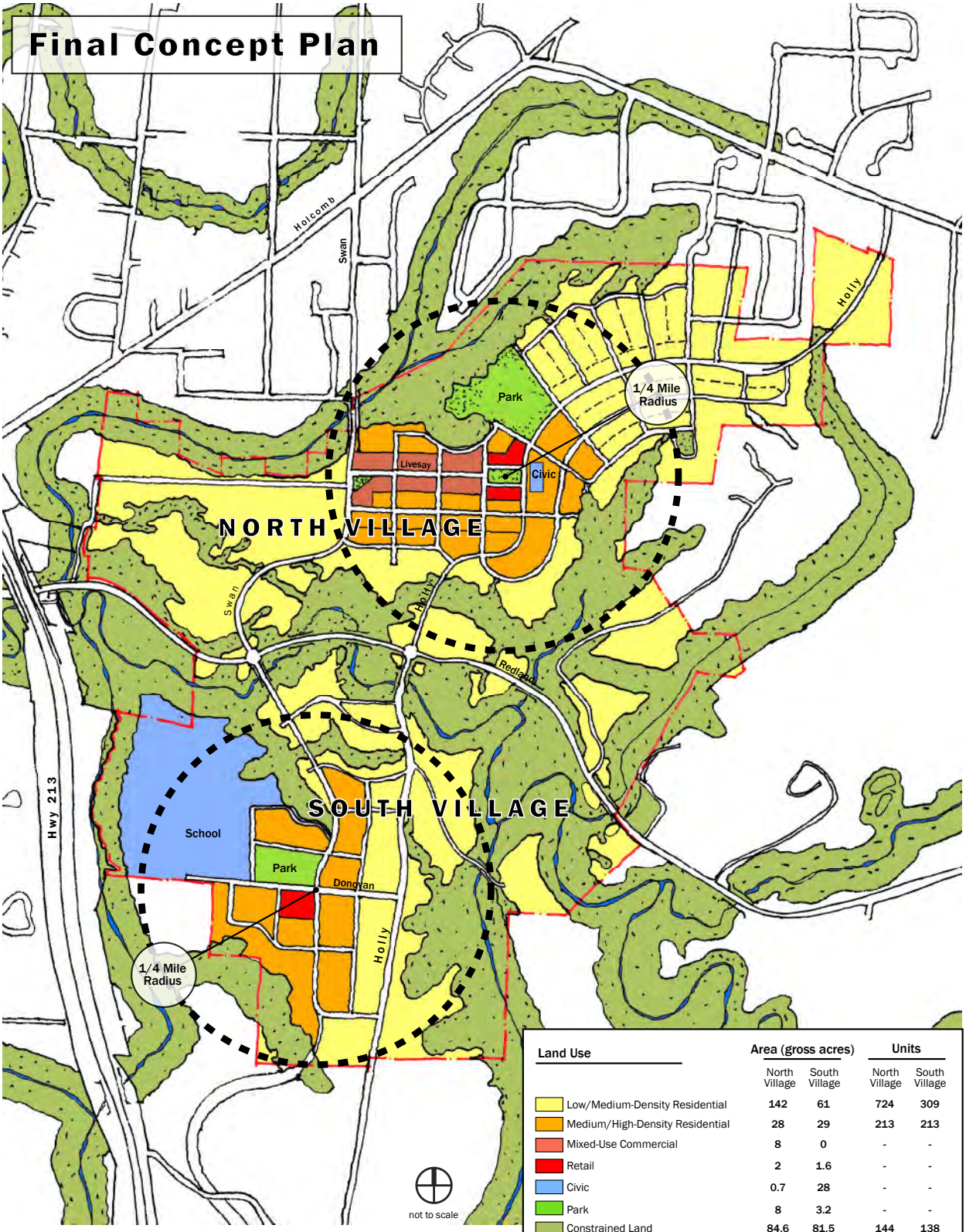
3. Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the [water quality resource area tract] created pursuant to Section 17.49.060, and that no residential lot created is less than ten thousand square feet;

4. Demonstrate that, with the exception of the [water quality resource area parcel] created pursuant to Section 17.49.060, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;

5. Meet all other standards of the base zone.

C. The area of land contained in a [water quality resource area] may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code. (Ord. 99-1013 §10(part), 1999)

Final Concept Plan



Land Use	Area (gross acres)		Units	
	North Village	South Village	North Village	South Village
Low/Medium-Density Residential	142	61	724	309
Medium/High-Density Residential	28	29	213	213
Mixed-Use Commercial	8	0	-	-
Retail	2	1.6	-	-
Civic	0.7	28	-	-
Park	8	3.2	-	-
Constrained Land	84.6	81.5	144	138

Appendix B: Land Use Areas

Land Use	Area (gross acres)		Units	
	North Village	South Village	North Village	South Village
Low/Medium-Density Residential	142	61	724	309
Medium/High-Density Residential	28	29	213	213
Mixed-Use Commercial	8	0	-	-
Retail	2	1.6	-	-
Civic	0.7	28	-	-
Park	8	3.2	-	-
Constrained Land	84.6	81.5	144	138

Appendix C: Conditional Uses in Existing Oregon City Code

The following uses are permitted conditionally in zones throughout the City except as otherwise specified.

Conditional Uses

17.56.030 Uses requiring conditional use permit.
Uses requiring conditional use permit are:
A. Ambulance services in C and GI districts;
B. Boarding, lodging houses and bed and breakfast inns;
C. Boat repair, for boats not exceeding twenty-five feet in length, in the C district;
D. Cemeteries, crematories, mausoleums and columbariums;
E. Child care centers and nursery schools;
F. Churches;
G. Colleges and universities, excluding residential districts;
H. Correctional facilities, in the GI district;
I. Emergency service facilities (police and fire), excluding correctional facilities;
J. Government and public service buildings;
K. Helipad in conjunction with a permitted use, excluding residential districts;
L. Hospitals, excluding residential districts;
M. Houseboats;
N. Hydroelectric generating facilities in GI district only;
O. Motor vehicle towing and temporary storage in the GI district; recreational vehicle storage in C and GI districts;
P. Museums;
Q. Nursing homes;
R. Parking lots not in conjunction with a primary use;
S. Private and public schools;
T. Private clubs and lodges, excluding residential districts;
U. Public utilities, including sub-stations (such as buildings, plants and other structures);
V. Sales and service establishments of manufactured homes and recreational vehicles in C and GI districts;
W. Stadiums, arenas and auditoriums, excluding residential districts; and
X. Welfare institutions and social service organizations, excluding residential districts. (Ord. 03-1014, Att. B3 (part), 2003: Ord. 98-1004 §§1, 2, 1998; Ord. 91-1025 §2, 1991)

Appendix D: Architectural Variety Standards from the City of Battle Ground, Washington Development Code

The following design standards, referred to as the City of Battle Ground's "legacy standards", were adopted by the City in 1999 and apply to all new residential development in the city.

17.106.040 Neighborhood design standards.
A. Applicability. The provisions of this section shall apply to all new residential development projects within the city of Battle Ground.
B. Development Compatibility and Continuity. Development within residential districts shall be designed to the following standards to assure compatibility and continuity between and within developments:
The provisions of this subsection shall apply only to developments with a density equivalent to that of an R3 zone or greater. Directly abutting residential uses, either within a single proposal or between a proposed and existing or preliminarily approved development, shall be designed to assure that there is a maximum twenty-five percent density differential to transition between housing types or densities. When separated by a street, facing housing types shall be of the same type and densities of facing residential uses shall be within ten percent of each other. The director or examiner may modify the provisions of this section upon finding that physical site constraints require development to be designed with a separation of more than three hundred feet between building envelopes or to accommodate unique designs that address compatibility between housing types and densities. Where adjacent properties are undeveloped or developed at densities substantially less than what is permitted by the zone, the minimum average lot size allowed in the zone shall be used to determine what the density of the abutting property is for the purposes of compliance with this section.
C. Architectural Variety. To assure variety in architecture and to reduce the dominance of garages on the streetscape, the following provisions shall apply to new residential development:
1. In single-family detached or duplex residential developments, no five or fewer linearly contiguous lots shall have repetitious facades. Facades shall be substantially different beyond simple mirrored plans, garage or window relocation, and shall include combinations of architectural variety such as: front porches, dormers, gables, bay windows, hipped or pitched roofs or other such architectural features that substantially differentiate house facades.
2. Garages with entry doors facing the street in single-family or duplex residential development shall be set back from the front face of the residential structure, including covered porches, by at least four feet. To qualify as a porch under this subsection, the porch must extend the full length of the street fronting building facade that is not devoted to the garage. Garage doors may be located forward of the front face of the residential structure and located in the front yard setback, if placed so their entrance doors are perpendicular to the right-of-way; and provided, that they have windows, doors or other architectural treatments covering at least thirty percent of the wall facing the street.
3. Where houses are served by alleys, all garages and on-site parking shall be accessible from the alley and the facade of the house facing the public street shall be designed as the front of the house including, but not limited to, a primary building entrance consisting of inward swinging door(s), porches, windows and pathways to the public sidewalks.
4. Applicants for building permits shall demonstrate compliance with the provisions of this section.
5. All single-family residences shall be constructed with a roof of nominal 6:12 pitch or steeper for the main portion of the roof and containing eaves of a minimum of six inches. Roofs with a lower pitch are acceptable if they contain multiple roof lines, gables, dormers or other features that serve to reduce the visual impact of the lesser pitched roof. Hipped,

gambrel, saltbox and shed roofs are also permitted. Roofs not meeting these specific standards may be approved by the planning director if they are found to be consistent with the overall intent of this section.
6. Each single-family residence shall contain a porch or covered entry area for the primary entrance facing or accessible from the public or private street serving the residence.
7. Each single-family residence shall contain at least three of the following features:
a. An attached or detached garage;
b. Bay window(s) facing the street;
c. Cross gable roof;
d. Roof dormers;
e. Trim a minimum of two inches wide around the windows facing a public street;
f. Varied roof line with at least one intersecting plane. (Ord. 05-014 § 3, 2005: Ord. 04-024 § 16 (part), 2004: Ord. 01-006 § 1, 2001: Ord. 99-004 § 4 (part), 1999)

Appendix E: Existing Use and Development Standards in Oregon City Zones

Tables A-1 through A-5 present existing lot, use, and some development standards for development in R-10, R-6, R-3.5, NC, and MUC-1 zones proposed for use in Park Place.

Table A-1: Existing Lot Standards and Use Standards in Single-Family Residential (R-10) District

Minimum Lot Size	10,000 sq. ft.
Minimum Lot Width	65 ft.
Minimum Lot Depth	80 ft.
Maximum Height	2.5 stories (35 ft.)
Maximum Building Lot Coverage	40%
Minimum Density	3 units/acre
Maximum Density	4 units/acre
Minimum Setbacks	Front yard – 20 ft. Rear yard – 20 ft. Interior side yard – 10 ft. one side, 8 ft. other side Corner side yard – 15 ft. Attached garage – 20 ft. (plus residential design standards)
Design Standards	(OCMC Section 17.20; addresses façade and garage options, and architectural elements including dormers, porches, window coverage, door orientation and entry, building face offsets; applies to all new single-family and two-family (duplex) dwelling units)
Permitted Uses	A. Single-family detached residential units; B. Publicly-owned parks, playgrounds, playfields and community or neighborhood centers; C. Home occupations; D. Farms, commercial or truck gardening and horticultural nurseries on a lot not less than 20,000 sq. ft. in area (retail sales of materials grown on site is permitted); E. Temporary real estate offices in model homes located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed; F. Accessory uses, buildings and dwellings; G. Family day care provider, subject to the provisions of OCMC Section 17.54.050.
Conditional Uses	A. Golf courses, except miniature golf courses, driving ranges or similar commercial enterprises; B. Uses listed in OCMC Section 17.56.030 (Appendix C).

Table A-2: Existing Lot Standards and Use Standards in Single-Family Residential (R-6) District

Minimum Lot Size	6,000 sq. ft.
Minimum Lot Width	50 ft.

Minimum Lot Depth	70 ft.
Maximum Height	2.5 stories (35 ft.)
Maximum Building Lot Coverage	40%
Minimum Density	5 units/acre
Maximum Density	7 units/acre
Minimum Setbacks	Front yard – 10 ft. Rear yard – 20 ft. Interior side yard – 9 ft. one side, 5 ft. other side Corner side yard – 15 ft. Attached garage – 20 ft. (plus residential design standards)
Design Standards	(OCMC Section 17.20; addresses façade and garage options, and architectural elements including dormers, porches, window coverage, door orientation and entry, building face offsets; applies to all new single-family and two-family (duplex) dwelling units)
Permitted Uses	A. Single-family detached residential units; B. Publicly-owned parks, playgrounds, playfields and community or neighborhood centers; C. Home occupations; D. Farms, commercial or truck gardening and horticultural nurseries on a lot not less than 20,000 sq. ft. in area (retail sales of materials grown on site is permitted); E. Temporary real estate offices in model homes located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed; F. Accessory uses, buildings and dwellings; G. Family day care provider, subject to the provisions of OCMC Section 17.54.050.
Conditional Uses	A. Golf courses, except miniature golf courses, driving ranges or similar commercial enterprises; B. Uses listed in OCMC Section 17.56.030 (Appendix C).

Table A-3: Lot Standards and Use Standards in the Medium and High-Density Residential (R-3.5 and R-2) Districts

Minimum Lot Size	3,500 sq. ft.
Minimum Lot Width	25 ft. in R-3.5 20 ft. in R-2
Minimum Lot Depth	70 ft.
Maximum Height (subject to solar standards, OCMC Section 17.54.070)	2.5 stories (35 ft.) in R-3.5 4 stories (55 ft.) in R-2
Maximum Building	NA

Lot Coverage	
Minimum Density	9 units/acre in R-3.5 16 units/acre in R-2
Maximum Density	12 units/acre 21 units/acre in R-2
Minimum setbacks (subject to solar standards, OCMC Section 17.54.070)	Front yard – 5 ft. Rear yard – 15 ft. Interior side yard, detached unit – 5 ft. Interior side yard, attached unit (not common property line) – 7 ft. Garage – 20 ft.
Design Standards	(OCMC Section 17.20; addresses façade and garage options, and architectural elements including dormers, porches, window coverage, door orientation and entry, building face offsets; applies to all new single-family and two-family (duplex) dwelling units)
Permitted Uses	A. Two-family dwellings (duplexes); B. Single-family detached residential units; C. Single-family attached residential units (Row houses with no more than 6 dwelling units may be attached in a row in R-3.5); D. Publicly owned parks, playgrounds, playfields and community or neighborhood centers; E. Home occupations; F. Temporary real estate offices in model homes located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed; G. Accessory uses, buildings, and dwellings; H. Family day care provider, subject to the provisions of OCMC Section 17.54.050.
Conditional Uses	A. Golf courses, except miniature golf courses, driving ranges or similar commercial enterprises; B. Uses listed in OCMC Section 17.56.030 (Appendix C).

Table A-4: Existing Lot Standards and Use Standards in the Neighborhood Commercial (NC) District

Maximum Height (subject to solar standards, OCMC Section 17.54.070)	2.5 stories (35 ft.)
Maximum Lot Coverage	Building footprint – 10,000 sq. ft.
Minimum setbacks (subject to solar standards, OCMC Section 17.54.070)	Interior side and rear yard (if abutting residential zone) – 10 ft. None if not abutting a residential zone
Minimum Landscaping	None (note: versus MUC-1 zone: 20% including parking lot landscaping)
Maximum Setbacks	Front yard – 5 ft. (exceptions through Site Plan and Design Review, OCMC Section 17.62.055)

	Rear yard – none Interior side yard – none Corner side yard – 30 ft. (given Site Plan and Design Review requirements met)
Permitted Uses	Antique Shops; Apparel shop; Art gallery, store, supplies; Bakery, retail; Banks without a drive thru; Barbershop; Beauty parlor; Bicycle sales, service, rental; Bookstore; Candy store; Coffee shop without a drive thru; Computer or audio equipment sales Craft store; Custom dressmaking and tailoring; Dry cleaners; Dry cleaners, self-service; Dry cleaning agencies; Delicatessen store; Drug stores; Dry good stores; Florist shops; Gift shops; Grocery, fruit or vegetable store; Hardware store; Ice-cream store; Interior decoration, including drapery and upholstery; Jewelry store; Laundromat, self-service; Laundry agencies; Locksmith; Music store; Plant or garden shop; Printing and copy service (no audible sounds beyond the premises); Restaurants without a drive thru; Seasonal sales, subject to the provisions of OCMC Section 17.54.060; Shoe sales, repair; Stationery store; Studio for art, dance, music, photo; and Watch and clock repair shop.
Conditional Uses	A. Any use permitted in the Neighborhood Commercial District that has a building footprint in excess of 10,000 square feet.
Limited Uses	Dwelling units are permitted above the ground floor if in conjunction with a permitted use as identified in OCMC Section 17.24.020 or conditional use as identified in OCMC Section 17.24.025. [two sections above]

Table A-5: Existing Lot Standards and Use Standards in the Medium-Density Mixed Use Corridor (MUC-1) and High-Density Mixed Use Corridor (MUC-2) Districts

Minimum Lot Area	None
Maximum Height	3 stories (45 ft.) in MUC-1 60 ft. in MUC-2 (Minimum Height: 2 stories/25 ft.)
Maximum Lot Coverage	Building and parking lot – 80% in MUC-1 Building and parking lot – 90% in MUC-2
Minimum Setbacks (MUC-1)	Rear and interior side yard (if abutting a residential zone) – 20 ft. plus 1 ft. for every foot of building height over 35 ft. None if not abutting residential zone
Maximum Setbacks (MUC-1)	Front yard – 5 ft. (exceptions through Site Plan and Design Review, OCMC Section 17.62.055) Rear yard – none Interior side yard – none Corner side yard – 30 ft. (given Site Plan and Design Review requirements met)
Minimum Landscaping	20% (including parking lot landscaping)
Permitted Uses	A. Banquet, conference facilities and meeting rooms; B. Bed and breakfast and other lodging facilities for up to ten guests per night; C. Child care facilities; D. Health and fitness clubs; E. Medical and dental clinics, outpatient; infirmary services; F. Museums, libraries and cultural facilities; G. Offices, including finance, insurance, real estate and government; H. 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; I. Postal services; J. Publicly-owned parks, playgrounds, play fields and community or neighborhood centers; K. Repair shops, for radio and television, office equipment, bicycles, electronic equipment, shoes and small appliances and equipment; L. Residential units, single-family detached residential existing prior to adoption of this chapter; M. Residential units, single-family and two-family attached; N. Residential units, multi-family; O. Restaurants, eating and drinking establishments without a drive through; P. Retail services, including personal, professional, educational and financial services; laundry and dry-cleaning; Q. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the neighborhood commercial, historic commercial or limited commercial districts, provided the maximum footprint for a stand alone building with a single store does not exceed 60,000 sq. ft.; R. Senior housing, including congregate care, residential care and assisted living facilities; nursing homes and other types of group homes;

	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. Those uses allowed in 17.29.020 with the following exception: Retail Trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the Neighborhood, Historic or Limited Commercial Districts, provided the maximum footprint for a stand alone building with a single store does not exceed 60,000 square feet in MUC-2.
Conditional Uses	A. Clubs/lodges; B. Car washes; C. Drive-in or drive-through facilities for a permitted or conditional use; D. Emergency and ambulance services; E. Motor vehicle service, parts sales, repair, or equipment rental; F. Museums and cultural facilities; G. Outdoor markets that do not meet the criteria of OCMC Section 17.29.020(H); H. Public utilities and services such as pump stations and sub stations; I. Religious institutions; J. Retail trade, including gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the neighborhood, historic or limited commercial districts that have a footprint for a stand alone building with a single store in excess of 60,000 sq. ft. in the MUC-1 or MUC-2 zone; K. Schools, including trade schools and technical institutes; and L. Vehicle fuel sales.
Prohibited Uses	A. Bulk retail or wholesale uses B. Commercial or industrial laundry C. Contractor's equipment yard D. Foundry casting lightweight nonferrous metals E. Frozen food lockers F. Heavy equipment service, repair, sales, storage or rental. G. Hotels and motels, commercial lodging H. Hospitals I. Ice or cold storage plant J. Kennels K. Motor vehicle sales or storage L. Outdoor sales or storage (except secured areas for overnight parking or temporary parking of vehicles used in the business) M. Retail feed, fuel or lumber yard N. Self-service storage facilities

1 Except secured areas for overnight parking or temporary parking of vehicles used in the business

2 Heavy equipment includes but is not limited to construction equipment and machinery and farming equipment



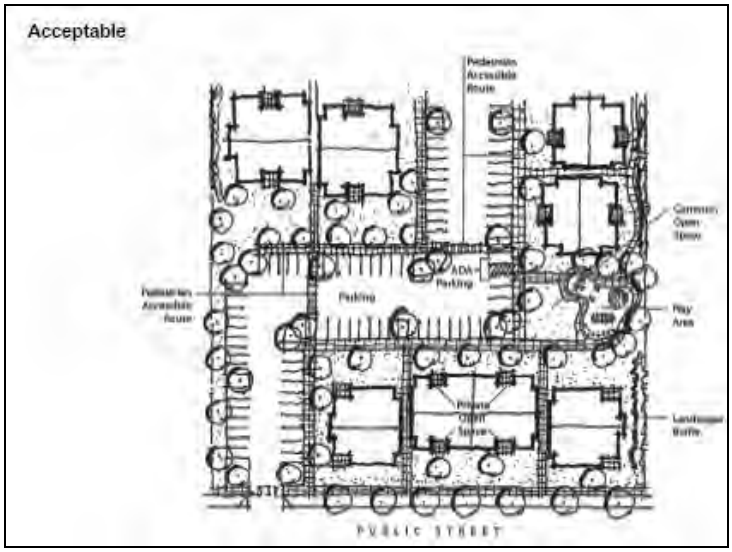
Appendix F: Proposed Attached Single-Family Housing Standards

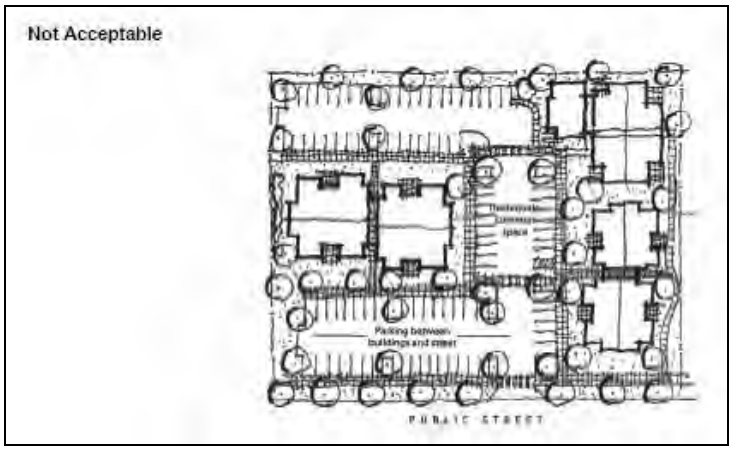
The following template language for attached single-family housing (townhouse and rowhouse) standards is provided by the Oregon Transportation and Growth Management (TGM) Model Development Code and User's Guide for Small Cities, 2nd Edition. An example of vehicle access and circulation standards is also included in this appendix because they are referenced in the housing standards.

Orientation

b. Attached single family housing developments (townhomes) with street-facing garages may have one driveway access located between the street and the primary building entrance for every two dwelling units, provided they meet the following criteria, as generally shown in Figure 2.2.180C(2):
1) Where two abutting townhomes have street-facing garages, they shall share one driveway access that does not exceed 16 feet in width where it crosses the sidewalk and intersects the street;
2) All primary building entrances shall be connected to a driveway (and sidewalk) via a pedestrian walkway that is not less than three (3) feet wide;
3) The maximum number consecutively attached townhomes with garages facing the same street is four (4) (two driveways); and
4) Street-facing garages shall be setback at least 20 feet from the street; where a building is placed less than 20 feet from the street, the 20-foot garage setback may be accomplished recessing the garage behind the front building elevation.

Figure 2.2.180.C(1) – Townhome Building Orientation





Special Use Standards

B. Attached Single Family (Townhouses and Rowhouses) and Duplexes. *Single-family attached housing with three or more dwellings (lots), and attached duplex housing (two or more consecutively attached duplexes), shall comply with the standards in sections 1-2, below, which are intended to control development scale; avoid or minimize impacts associated with traffic, parking, and design compatibility; and ensure management and maintenance of common areas.*

1. Alley Access Required for Subdivisions Principally Containing Townhomes or Duplexes. Subdivisions, or phases of subdivisions, proposed to contain three (3) or more consecutively attached single family dwellings, and developments with two (2) or more attached duplexes (4+ dwelling units), shall provide vehicle access to all such lots and units from an alley or parking court, as described in Chapter 3.1.2. Alley(s) and parking court(s) shall be created at the time of subdivision approval, and may be contained in private tracts or, if approved by the City, in public right-of-way, in accordance with Chapter 3.4.1, Transportation Standards, and Chapter 4.3, Land Divisions.

2. Common Areas. Any common areas (e.g., landscaping, private tracts, common driveways, private alleys, building exteriors, and/or similar common areas) shall be owned and maintained by a homeowners association or other legal entity. A copy of any applicable covenants, restrictions and conditions shall be recorded and provided to the city prior to building permit approval.

Appendix G: Excerpts of Metro Urban Growth Management Functional Plan, Title 13 (Metro Ordinance No. 05-1077C)

Section 3. Implementation Alternatives for Cities and Counties

B. Each city and county in the region shall either:

1. Amend its comprehensive plan and implementing ordinances to adopt the Title 13 Model Ordinance and the Metro Habitat Conservation Areas Map, and demonstrate compliance with the provisions of (a) subsection 4(A)(5) of this title, related to enhanced fish and wildlife protection and management of publicly-owned parks and open spaces that have been designated as natural areas and are not intended for future urban development, and (b) subsection 4(A)(8) of this title, related to the restoration of Habitat Conservation Areas when developed property is undergoing significant redevelopment; or

2. Demonstrate that its existing or amended comprehensive plan and existing, amended, or new implementing ordinances substantially comply with the performance standards and best management practices described in Section 4, and that maps that it has adopted and uses substantially comply with the Metro Habitat Conservation Areas Map; or

3. Demonstrate that it has implemented a program based on alternative approaches that will achieve protection and enhancement of Class I and II riparian habitat areas, and of Class A and B upland wildlife habitat areas in territory added to the Metro UGB after the effective date of Ordinance No. 05-1077, substantially comparable with the protection and restoration that would result from the application of a program that complied with subsections 3(B)(1) or 3(B)(2) of this title. [program criteria]

C. The comprehensive plan and implementing ordinances relied upon by a city or county to comply with this title shall contain clear and objective standards. A standard shall be considered clear and objective if it meets any one of the following criteria:

1. It is a fixed numerical standard, such as fixed distance (e.g. "50 feet") or land area (e.g. "1 acre");

2. It is a nondiscretionary requirement, such as a requirement that grading not occur beneath the dripline of a protected tree; or

3. It is a performance standard that describes the outcome to be achieved, specifies the objective criteria to be used in evaluating outcome or performance, and provides a process for application of the performance standard, such as a conditional use or design review process.

D. In addition to complying with subsection 3(C) of this section, the comprehensive plan and implementing ordinances that a city or county relies upon to satisfy the requirements of this title may include an alternative, discretionary approval process that is not clear and objective provided that the comprehensive plan and implementing ordinance provisions of such a process:

1. Specify that property owners have the choice of proceeding under either the clear and objective approval process, which each city or county must have pursuant to subsection 3(D) of this section, or under the alternative, discretionary approval process; and

2. Require a level of protection for, or enhancement of, the fish and wildlife habitat that meets or exceeds the level of protection or enhancement that would be achieved by following the clear and objective standards described in Section 3(D) of this title.

Section 4. Performance Standards and Best Management Practices for Habitat Conservation Areas

B. City and county comprehensive plans and implementing ordinances shall contain review standards applicable to development in all Habitat Conservation Areas that include:

1. Clear and objective development approval standards consistent with subsection 3(C) of this title that protect Habitat Conservation Areas but which allow limited development within High Habitat Conservation Areas, slightly more development in Moderate Habitat Conservation Areas, and even more development in Low Habitat Conservation Areas…. Standards that meet the requirements of this subsection and subsection 3(C) of this title are provided in Section 7 of the Metro Title 13 Model Ordinance; and

2. Discretionary development approval standards consistent with subsection 3(D) of this title that comply with subsections (a), (b), and (c) of this subsection. Standards that meet the requirements of this subsection and subsection 3(D) of this title are provided in Section 8 of the Metro Title 13 Model Ordinance.

a. Avoid Habitat Conservation Areas.

i. Development may occur within a Habitat Conservation Area only if a property owner demonstrates that no practicable alternatives to the requested development exist which will not disturb the Habitat Conservation Area;

ii. When implementing this requirement to determine whether a practicable alternative exists, cities and counties shall include consideration of the type of Habitat Conservation Area that will be affected by the proposed development. For example, High Habitat Conservation Areas have been so designated because they are areas that have been identified as having lower urban development value and higher-valued habitat, while Low Habitat Conservation Areas have been so designated because they are areas that have been identified as having higher urban development value and lower-valued habitat; and

iii. Cities and counties shall allow flexibility in the application of local code requirements that may limit a property owner's ability to avoid development in Habitat Conservation Areas, such as setback and landscaping requirements or limits on clustering and the transfer of development rights on-site. Property owners shall also consider reduced building footprints and use of minimal excavation foundation systems (e.g., pier, post or piling foundation). The use of the techniques described in this paragraph shall be part of the alternatives analysis to determine whether any alternative to development within the Habitat Conservation Area is practicable; and

b. Minimize Impacts on Habitat Conservation Areas and Water Quality.

i. If there is no practicable alternative, limit the development to minimize, to the extent practicable, the detrimental impacts on Habitat Conservation Areas associated with the proposed development;

ii. When implementing this requirement to determine whether development has been minimized to the extent practicable, cities and counties shall include consideration of the type of Habitat Conservation Area that will be affected by the proposed development. For example, High Habitat Conservation Areas have been so designated because they are areas that have been identified as having lower urban development value and higher-valued habitat, while Low Habitat Conservation Areas have been so designated because they are areas that have been identified as having higher urban development value and lower-valued habitat; and

iii. The techniques described in subsection 4(B)(2)(a)(iii) shall be used to demonstrate that development within a Habitat Conservation Area has been minimized. In addition, the magnitude of the impact of development within

Habitat Conservation Areas also shall be minimized, such as by use of the habitat-friendly development practices described in Table 3.07-13c, unless the use of such practices is prohibited by an applicable and required State or Federal permit issued to a unit of local government having jurisdiction in the area, such as a permit required under the Clean Water Act, 33 U.S.C. §§1251 et seq., or the Safe Drinking Water Act, 42 U.S.C. §§300f et seq., and including conditions or plans required by such permit; and

c. Mitigate Impacts on Habitat Conservation Areas and Water Quality.

When development occurs, require mitigation to restore the ecological functions that were lost or damaged as a result of the development, after taking into consideration the property owner's efforts to minimize the magnitude of the detrimental impacts through the use of the techniques described in Table 3.07-13c and through any additional or innovative techniques.

C. City and county comprehensive plans and implementing ordinances shall include procedures to consider claims of hardship and to grant hardship variances for any property demonstrated to be converted to an unbuildable lot by application of any provisions implemented to comply with the requirements of this title.

Appendix H: Excerpts from Natural Resource Overlay Zones in Existing Oregon City Code

The following three natural resource overlay zones apply to areas of Park Place.

Water Resource Overlay
Flood Management Overlay
Geologic Hazards (Steep Slopes) Overlay

The excerpts of existing code sections for these zones address how they may affect residential density and development in Park Place.

In Water Resource Overlay Zone:

E. Provisional Uses. The following uses are allowed in the water quality resource area subject to compliance with the application requirements and development standards of subsections G and H of this section:

1. Any use allowed in the base zone, other than those listed in subsection C and D of this section [stream and wetland uses, maintenance and repair or minor alterations of existing structures]*;*

17.49.060 Subdivisions and partitions.

C. Prior to preliminary plat approval, the water quality resource 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 unit.

D. Prior to final plat approval, ownership of the water quality resource area 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 homeowners 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. At the owners option, 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 city manager. (Ord. 99-1013 §10(part), 1999)

17.49.070 Density transfers.

A. The purpose of this section is to allow density accruing to portions of a property within the water quality resource area to be transferred outside the water quality resource area.

B. Development applications for partitions that request a density transfer shall:

1. Provide a map showing the net buildable area to which the density will be transferred;

2. Provide calculations justifying the requested density increase;

3. Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the water quality resource area tract created pursuant to Section 17.49.060, and that no residential lot created is less than five thousand square feet;

4. Demonstrate that, with the exception of the water quality resource area parcel created pursuant to Section 17.49.060, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;

5. Meet all other standards of the base zone.

C. The area of land contained in a water quality resource area may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code. (Ord. 99-1013 §10(part), 1999)

In Geologic Hazards Overlay Zone:

17.44.030 Applicability and procedures.

The provisions of this chapter shall apply to all applications for new development and for the expansion of existing development on landslide areas, hillsides or unstable slopes.

17.44.020 Definitions.

"Hillside" refers to any area with a slope of twenty-five percent or more.

"Landslide areas" means those areas identified as known or potential landslide or mass movement geological hazard areas:

1. By the State of Oregon Department of Geology and Mineral Industries (DOGAMI) in Bulletin 99, Geology and Geological Hazards of North Clackamas County, Oregon (1979), or in any subsequent DOGAMI mapping for the Oregon City area; or

2. By Portland State University in a study entitled "Environmental Assessment of Newell Creek Canyon, Oregon City, Oregon" (1992).

"Unstable slopes" or "unstable soils" includes:

1. Any area identified on the city's Steep Slope map;

2. Any other area that is identified on official city, county or federal or state agency maps as being subject to soil instability, slumping or earth flow, high ground water level, landslide or erosion, seismic activity or for which field investigation, performed by a suitably qualified geotechnical engineer or engineering geologist who is licensed in Oregon and derives his or her livelihood principally from that profession, confirm the existence of or potential for a severe hazard. (Ord. 94-1001 §2(part), 1994)

17.44.060 Development standards.

H. Density shall be determined as follows:

1. For those areas with slopes less than twenty-five percent between grade breaks, the allowed density shall be that permitted by the underlying zoning district;

2. For those areas with slopes of twenty-five to thirty-five percent between grade breaks, the density shall not exceed two dwelling units per acre except as otherwise provided in subsection I of this section;

3. For those areas with slopes over thirty-five percent between grade breaks, development shall be prohibited except as otherwise provided in subsection J of this section.

In the Flood Management Overlay Zone:

17.42.020 Definitions.

"Flood management areas" means all lands contained within the one-hundred-year floodplain, flood area and floodway as shown on the Federal Emergency Management Agency flood insurance rate maps, floodway maps and the area of inundation for the February 1996 flood.

"Floodplain" means the land area identified and designated by the United States Army Corps of Engineers, the Oregon Division of State Lands, FEMA, or city of Oregon City that has been or may be covered temporarily by water as a result of a storm event of identified frequency. It is usually the flat area of land adjacent to a stream or river formed by floods.

17.42.170 Flood management area standards.

A. 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 17.42.200 (Floodways).

B. Provisional Uses. 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.

D. Site Development Standards.

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. Fully 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 wails by allowing for the entry and exit of floodwaters.

17.42.190 Subdivision standards.

B. The purpose of this section is to allow density accruing to portions of a property within the flood management overlay district to be transferred outside the overlay district.

1. Development applications shall comply with the submittal requirements of Chapter 17.64, Planned Unit Development, if the applicant wishes to transfer density.



2. Density transfers shall be allowed if the applicant demonstrates compliance with the following standards:

a. The density transfer is proposed as part of a planned unit development and meets the requirements of Section 17.64.050.

b. Minimum density standards will not increase due to the density transfers.

c. The area of land contained in a flood management area may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code.

J. Water Infrastructure and Natural Resources

DAVID EVANS AND ASSOCIATES INC.

MEMORANDUM

DATE: February 13, 2007
TO: David Berniker
FROM: Tom Puttman, PE, AICP, LEED AP
SUBJECT: **90% Concept Plan Sections - Water Infrastructure and Natural Resources (preliminary)**
PROJECT: City of Oregon City Park Place UGB Concept Plan
PROJECT NO: SSER0000-0011
COPIES:

A. Water Infrastructure System Improvements

General Findings and Recommendations:

As described in the existing conditions report, water infrastructure is limited within the concept plan area. Of the water infrastructure that does exist, there are two systems. The water system located in the area of the future North Village is owned and operated by the City of Oregon City. The water system located in the area of the future South Village is owned and operated by Clackamas River Water (CRW). The CRW system primarily provides water transmission to areas outside of the concept plan area.

Based on these existing conditions, it is recommended that the existing City of Oregon City water system be expanded to serve the entire concept plan area. This system should be constructed, owned and operated by the City of Oregon City. The existing CRW system should be preserved to continue to provide water transmission.

Concept Plan Water System Summary:

Water Supply Improvements

Based on the existing conditions review, adequate supply capacity exists in the current City of Oregon City water system to serve the development anticipated for the concept plan area.

According to the Oregon City Water Master plan the current water demand in the Park Place Lower Zone is split between Barlow Crest Reservoir and Mountainview Reservoir. While Mountainview has ample storage capacity (10.5 million gallons) to satisfy both existing and future demand, Barlow Crest reservoir (1.75 mg) will ultimately require expansion. According to the master plan, complete buildout of the whole area will require 3.23 million gallons of capacity at Barlow Crest. As development may occur outside the concept plan area, additional reservoir capacity may be needed. A potential location for this reservoir has been shown on the water system concept plan; however, it is for reference only and has not been included in design and cost estimate activities. The location of this reservoir is consisted with the City's Water Master Plan.

Distribution Improvements

2100 SW River Parkway Portland Oregon 97201 Phone: 503.223.6663 Facsimile: 503.223.2701

The proposed water system improvements are based on future system improvements assumed in the City of Oregon City Water Master Plan and modified to fit the concept plan. The Water Master Plan shows the future system as an expansion of the City water system the currently exists to the north of the concept plan area.

The proposed water main system improvements are shown ____ (*see water system map*). Water main improvements consist of new water mains ranging from 8-inches to 16-inches. Four connections are recommended to the existing water system to provide sufficient system looping and redundancy. A new 16-inch water main should be provided along Redland Road. A new water main, with pipe sizes varying from 10-16-inches, should be provided along Holly Lane and the Holly Lane Extension. A new 16-inch water main should be provided along the new Swan Road. A new water main, with pipe sizes ranging from 10- to 12-inches, should be provided along Livesay Road. Smaller water mains will be needed to serve development within each Village. These pipes are generally anticipated to be a minimum of 8-inches, as established by City of Oregon City standards, however larger sizes may be required to meet fire flow requirements.

Preliminary pipe size estimates were developed based on fire flow requirements and demand flows. The fire flows used were 3,000 gpm for 3 hours applied to both new and existing buildings. The existing school was assumed to require the new school fire flow rate of 5,000 gpm for 4 hours. In most cases pipe sizes are controlled by the sum of Maximum Daily Demand (MDD) and fire flow. MDD was determined based on housing densities shown on the "Preferred Alternative" dated 10/19/06 showing the Swan Avenue Extension. All pipe size estimates below are preliminary and should be revised with detailed flow modeling. Size calculations assume that flow velocities should be kept at or below 10 ft per second. *These sizes are to be verified by West Yost and Associates (DEA to coordinate).*

A summary of water demand information has been provided at the end of this memo.

The grid network created by this new system should alleviate existing system pressure issues. As such, the existing pump station located along Livesay Road should be able to be removed. The existing CRW water transmission mains, located along Holly Lane and Redland Road, should remain as the concept plan area develops in order to provide continued water service to CRW customers.

Recommended Next Steps:

The following next steps are recommended for the development of the water system:

- ***Water Master Plan –*** Once the concept plan is adopted, prepare a water master plan. The objective of this master plan is to further refine the sanitary sewer system outlined in the Concept Plan. The objective of this master plan is to further refine the water system outlined in the Concept Plan.

B. Sanitary Sewer Infrastructure System Improvements

General Findings and Recommendations:

Existing public sanitary sewer services within the concept plan area is very limited. As such, a new sanitary sewer system will need to be developed to service future development within the concept plan area. A new 36-inch sanitary sewer should be constructed along Redland Road to service the entire concept plan area. This sewer shall serve both the concept plan area and the existing areas currently managed by the existing TCSD system.

Additional sanitary sewers will need to be constructed to serve future development within the North and South Villages.

Ownership of the new 36-inch pipe should remain with TCSD as it conveys sanitary sewerage from both the concept plan area and areas outside the concept plan area. The existing TCSD sanitary system should remain and continue to provide sanitary conveyance to areas outside of the concept plan area. For areas inside the concept plan area boundary, these areas should be transitioned to the new City of Oregon City sanitary sewer system.

Concept Plan Sanitary Sewer System Summary:

Sanitary Treatment Improvements

Improvements to the existing TCSD treatment plant shall not be required as the capacity of the existing plant is adequate to meet additional flows generated by future development within the concept plan area. In addition, adequate capacity exists in the TCSD conveyance system to convey sanitary sewerage from the concept plan area to the treatment plan.

Sanitary Sewer Improvements

The proposed sanitary sewer system improvements are shown ____ (*see sanitary system map*). Due to the topography of the concept plan area, the future areas of the North Village and South Village should be easily conveyed to Redland Road. The existing 12-inch sanitary sewer, currently owned and operated by the Tri-City Sewer District (TCSD), should be upgraded to a 36-inch pipe. This upgrade should occur from the existing point of connection at Redland and Highway 213 and continue to the eastern edge of the concept plan area. The upgraded pipe shall serve both the concept plan area and the existing areas currently managed by the existing 12-inch pipe.

The North Village shall be served with three sanitary sewer mains. A new 10-inch sewer shall be provided along Livesay Road and connect to the new 36-inch Redland Road sanitary sewer at the intersection of Redland Road and Livesay Road. A new 12-inch sewer shall be provided from the North Village main street down the Swan Avenue extension to the new 36-inch Redland Road sanitary sewer. A new sewer, ranging from 10- to 12-inches, should be provided along the Holly Lane extension to convey sanitary sewerage from the upper reaches of the North Village.

The South Village shall be served with two sanitary sewer mains. A new 12-inch sewer shall be provided from the South Village down the Swan Avenue extension to the new 36-inch Redland Road sanitary sewer. The existing Holly Lane sewer should be upgraded to a 10- to 12-inch sewer to convey sanitary sewerage from the South Village.

A summary of sanitary flows information has been provided at the end of this memo.

Recommended Next Steps:

The following next steps are recommended for the development of the sanitary sewer system:

- ***Sanitary Sewer Master Plan –*** Once the concept plan is adopted, prepare a sanitary sewer master plan. The objective of this master plan is to further refine the sanitary sewer system outlined in the Concept Plan.

C. Stormwater Infrastructure System Improvements

General Findings and Recommendations:

The area is comprised three watersheds: Abernethy Creek, Newell Creek and Livesay Creek. As noted in the existing conditions, no major stormwater infrastructure exists within the concept plan area other than roadside ditches and natural drainage channels.

It is recommended that a low-impact stormwater approach to developed with a goal of mimicing the natural hydrological conditions of the three watersheds of the concept plan area. These three watersheds shall be used to delineate the stormwater approach for the concept plan.

Concept Plan Stormwater System Summary:

Stormwater Management Approach

The general approach of the stormwater management system for the concept plan is to establish a system that mimics the natural hydrology of the site to the extent practicable. In pursuing this design goal, the concept plan area has been separated into three distinct systems based on the boundaries of the existing watersheds. The stormwater system within each watershed shall utilize the combination of centralized and decentralized low-impact stormwater best management practices to manage stormwater generated from the concept plan area.

Central to stormwater approach of the Concept Plan, is a stormwater hierarchy focused on managing stormwater in a naturalistic manner at three separate scales: site, street and neighborhood (vs. a one-size fits all approach). This hierarchy is described as follows:

- ***Tier 1 – Site Specific Stormwater Management Facilities (Site)*** – All private property within the study area shall utilize site specific (or on-site) low-impact stormwater facilities to manage stormwater on-site to the extent practicable. The objective of these facilities is to reduce the quantity (flow and volume) through detention and retention/infiltration of stormwater generated from private property as well as improve the water quality of stormwater.

  These facilities are comprised of three types: impervious area reduction facilities, stormwater management facilities, and infiltration only facilities. Impervious area reduction facilities are focused on preventing the generation of stormwater in the first place and include porous pavement and ecoroofs. Stormwater management facilities are focused on managing the stormwater in a manner to , stormwater planters, stormwater swales, and vegetated infiltration basins. See Appendix ___ for images of these facilities. These facilities may be used for single-family residential, multi-family residential, commercial, and open space. Most site specific facilities shall be privately owned and maintained except facilities located within public open space.

- ***Tier 2 – Greenstreets Stormwater Management Facilities (Street)*** – In urban environments, much of the stormwater quantity and pollution issues are attributed to streets. An innovative, low-impact

manner in which to address this reality is through the use of greenstreets. Greenstreets are streets that integrate the management of stormwater into the street design itself to provide a stormwater management benefit as well as an urban design element and they may potentially reduce the need for downstream stormwater facilities such as large stormwater ponds.

They can serve as both stormwater management facilities and stormwater conveyance facilities. As a stormwater management facility, their objective is to manage stormwater runoff generated from streets. As a stormwater conveyance facility, their objective is to convey stormwater from both private property and streets to regional stormwater management facilities. Greenstreets typically take the form of vegetated swales located along the street with curb cuts to allow street runoff to enter them. In more urban areas, stormwater planter boxes mimicing the look of street tree wells may be used. Most greenstreet stormwater facilities shall be publicly owned and maintained.

- ***Tier 3 – Regional Stormwater Management Facilities (Neighborhood)*** – Regional stormwater management facilities are facilities focused on managing large stormwater flows and volumes that may be pasted through Tier 1 and Tier 2 facilities. Moreover, they are to provide additional water quality benefits prior to discharging stormwater to the existing creeks. These stormwater facilities are typically to be located adjacent to the existing streams and should take on a more naturalistic form such as a wetland pond. Most greenstreet stormwater facilities shall be publicly owned and maintained.

The stormwater system concept plan, see _____ , shows generally how this stormwater approach should be implemented for the concept plan area.

Stormwater Conveyance Approach

Surface conveyance, in the form of swales and ditches, should be provided as a means to conveying stormwater via gravity from private property and streets to the existing creeks to the extent practicable. Piped conveyance will be required but should be kept to a minimum if possible.

Recommended Next Steps:

The following next steps are recommended for the development of the sanitary sewer system:

- ***Stormwater Master Plan –*** Once the concept plan is adopted, prepare a stormwater master plan. The objective of this master plan is to further refine the stormwater approach outlined in the Concept Plan.
- ***Infiltration and Slope Stability Hazards –*** Further study should be performed to identify areas with the concept plan boundaries in which infiltration of stormwater should be allowed, limited or restricted.

D. Natural Resources

General Findings and Recommendations:

Significant natural resources exist within the concept plan area and generally located adjacent or near Abernethy Creek, Livesay Creek and Newell Creek. In order to protect these natural resources, an inventory map, which delineates natural resource areas of greatest significance (including riparian areas, wildlife habitat, and parks and open spaces) and a habitat conservation area map, which identifies the highest value riparian areas, were utilized

to help determine where to build, where to build with restrictions, and where not to build within the Concept Plan area.

The Concept Plan was significantly shaped by the existing natural resources of the concept plan area. Development within the concept plan area is targeted outside all habitat conservation areas (HCA) except for infrastructure improvements such as roads. As such, regulations and restrictions associated with development within HCAs may be avoided. Voluntary best management practices have been identified however to help guide development in a manner that further protects existing natural resources within the study area.

Concept Plan Summary:

As noted before, the Concept Plan was significantly shaped by the existing natural resources. Approximately __% (__-acres) of the Concept Plan area has been preserved to protect existing natural resources. For all Concept Plan development, Metro's Nature in Neighborhood design guidelines were followed. These guidelines, though voluntary, are very applicable to achieving the environmental protection goals of the Concept Plan.

The Nature in Neighborhoods program is an effort to protect clean water and health natural areas for fish, wildlife and people. Much of the Concept Plan has been developed to meet Nature in Neighborhood design goals including:

- Conserving and improving streamside, wetland and floodplain habitat and their connections
- Conserve large areas of contiguous habitat and avoid habitat fragmentation
- Conserve and improve connections between riparian corridors and upland habitat
- Conserve and improve unique and at-risk habitats
- Promote habitat-friendly development practices

As the Concept Plan developments, the table below provides a list of best development practices that should be considered:

Table 10: Best Management Practices for Habitat Conservation Areas[1]

Part (a): Design and Construction Practices to Minimize Hydrologic Impacts
1. Amend disturbed soils to original or higher level of porosity to regain infiltration and stormwater storage capacity.
2. Use pervious paving materials for residential driveways, parking lots, walkways, and within centers of cul-de-sacs.
3. Incorporate stormwater management in road right-of-ways.
4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.

[1] Table 3.07-13c in Exhibit C of Ordinance No. 05-1077C, Title 13 (Nature in Neighborhoods) of the Urban Growth Management Functional Plan (Metro Code Chapter 3.07)

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5. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
6. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.
7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.
8. Use multi-functional open drainage systems in lieu of more conventional curb-and-gutter systems.
9. Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.
10. Apply a treatment train approach to provide multiple opportunities for storm water treatment and reduce the possibility of system failure.
11. Reduce sidewalk width and grade them such that they drain to the front yard of a residential lot or retention area.
12. Reduce impervious impacts of residential driveways by narrowing widths and moving access to the rear of the site.
13. Use shared driveways.
14. Reduce width of residential streets, depending on traffic and parking needs.
15. Reduce street length, primarily in residential areas, by encouraging clustering and using curvilinear designs.
16. Reduce cul-de-sac radii and use pervious vegetated islands in center to minimize impervious effects, and allow them to be utilized for truck maneuvering/loading to reduce need for wide loading areas on site.
17. Eliminate redundant non-ADA sidewalks within a site (i.e., sidewalk to all entryways and/or to truck loading areas may be unnecessary for industrial developments).
18. Minimize car spaces and stall dimensions, reduce parking ratios, and use shared parking facilities and structured parking.
19. Minimize the number of stream crossings and place crossing perpendicular to stream channel if possible.
20. Allow narrow street right-of-ways through stream corridors whenever possible to reduce adverse impacts of transportation corridors.
Part (b): Design and Construction Practices to Minimize Impacts on Wildlife Corridors and Fish Passage
1. Carefully integrate fencing into the landscape to guide animals toward animal crossings under, over, or around transportation corridors.
2. Use bridge crossings rather than culverts wherever possible.
3. If culverts are utilized, install slab, arch or box type culverts, preferably using bottomless designs that more closely mimic stream bottom habitat.

4. Design stream crossings for fish passage with shelves and other design features to facilitate terrestrial wildlife passage. 5. Extend vegetative cover through the wildlife crossing in the migratory route, along with sheltering areas.
Part (c): Miscellaneous Other Habitat-Friendly Design and Construction Practices
1. Use native plants throughout the development (not just in HCA). 2. Locate landscaping (required by other sections of the code) adjacent to HCA. 3. Reduce light-spill off into HCAs from development. 4. Preserve and maintain existing trees and tree canopy coverage, and plant trees, where appropriate, to maximize future tree canopy coverage.

Although Concept Plan development is currently not targeted within existing HCAs, development is not precluded from these areas. Development could occur within existing HCAs but it will be subject to regulatory performance standards and best management practices. See existing conditions memo.

Recommended Next Steps:

The following next steps are recommended related to natural resources within the concept plan area:

- ***Refine Buildable Areas Map –*** Perform a GIS evaluation of the City of Oregon City water quality overlay zone with existing topography. The result of this evaluation may necessitate the modification of no-build areas which could increase or decrease buildable lands within the concept plan area.
- ***Field Verify Existing Natural Resouces(?) –*** Field verifying existing natural resources would aid in further refinement of the buildable areas map which could increase or decrease buildable lands within the concept plan area.
- ***Identify Regulations and/or Restrictions Associated with Infrastructure Impacts on HCAs***

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D. Regulatory Compliance (Title 11)

Title 11 Standard:

Provide a conceptual public facilities and services plan for the provision of sanitary sewer, water and storm drainage. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

Title 11 Response:

Conceptual public facility plans have be developed for the provision of sanitary sewer, water and storm drainage. These plans have been developed to comply with goals of the local community, City of Oregon City, Metro and the following documents:

- City of Oregon City Water Master Plan
- City of Oregon City Sanitary Sewer Master Plan
- City of Oregon City Drainage Master Plan
- City of Oregon City Draft Stormwater Management Plan
- City of Oregon City Stormwater and Grading Design Standards

The City of Oregon City Water Master Plan was referenced to determined anticipated water demands within the concept plan area. Average daily demand as well as peak demand and fire demand were evaluated at a preliminary level. *Insert Yost West findings…* In general, water demand from planned development within the concept plan area is consistent with demands anticipated in the Water Master Plan.

The City of Oregon City Sanitary Sewer Master Plan was referenced to determined anticipated sanitary sewer generation within the concept plan area. In general, similar sanitary flows were developed. As a result, sanitary flows generated by development within the concept plan area are consistent with those found in the Sanitary Sewer Master Plan.

All three stormwater documents emphasize minimizing the amount of post-development stormwater runoff to pre-development conditions and reducing pollution loads. The Concept Plan stormwater approach was developed to meet these goals.

Attachments: Concept cost estimates
Stormwater Photographs
Sanitary and Water Design Flow Assumptions

Initials: TJP
File Name: P:\S\SSER00000011\0800REC\0830Deliverables\Concept Plan - Draft\90% Concept Plan - DEA sections 02-01-07.doc
Project Number: SSER0000-0011

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Park Place Concept Plan - Water Line Cost Estimate

	Size	Length (Ft)	Cost/ft	Total Cost
North Village:				
Livesay Rd - E of Swan	12"	1,500	$106	$159,000
Swan Ave - Livesay Rd to Redland Rd.	12"	1,969	$106	$208,714
Livesay Rd W of Swan	10"	1,888	$90	$169,920
Livesay Rd W. to Holcomb Rd.	10"	784	$90	$70,560
North Village to Redland Rd.	16"	1,981	$126	$249,606
North Village to Holcomb Rd.	10"	3,576	$90	$321,840
subtotals		11,698		$1,179,640
Redland Road:				
SFWB connection to Swan Ave	16"	2,805	$126	$353,430
Swan Ave to Holly Lane	16"	1,245	$126	$156,870
Holly Lane to UGB Boundary	16"	2,448	$126	$308,448
subtotals				$818,748
South Village:				
Swan Ave - Redland Rd to Donovan Lane	16"	1,962	$126	$247,212
Swan Ave - Donovan Lane to UGB Bndry	10"	1,353	$90	$121,770
Holly Lane - Redland Rd to Donovan Lane	12"	1,906	$106	$202,036
Holly Lane - Donovan Lane to UGB Bndry	10"	1,244	$90	$111,960
Donovan Lane - Swan Ave to Holly Lane	16"	610	$126	$76,860
Donovan Lane - Swan Ave to School	16"	1,035	$126	$130,410
subtotals				$759,838

Construction Cost	**2,758,226**
Design Costs (20% of construction cost)	**551,645**
Construction + Design Cost	**3,309,871**
Contingency (15%)	**496,481**
Total Cost	**3,806,352**

Costs are based roughly on the 2004 Oregon City Water Master Plan inflated at 3% over 3 years

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Park Place Concept Plan - Sanitary Cost Estimate

	Size	Number	Length (Ft)	Cost/ft	Total Cost
North Village:					
Livesay Rd - E of Swan	12"		1,500	$100	$150,000
Manholes	4'	5		$4,000	$19,000
Swan Ave - Livesay Rd to Redland Rd.	12"		1,947	$100	$194,700
Manholes	4'	6		$4,000	$23,470
Livesay Rd - W of Swan	10"		1,894	$95	$179,930
Manholes	4'	6		$4,000	$22,940
Livesay Rd - W to Redland Rd.	8"		839	$90	$75,510
Manholes	4'	3		$4,000	$12,390
North Village to Redland Rd	12"		1,964	$100	$196,400
Manholes	4'	6		$4,000	$23,640
North Village to Hilltop	10"		3,568	$95	$338,960
Manholes	4'	10		$4,000	$39,680
subtotals		25	11,712		$1,236,940
Redland Road: *					
48" connection to Swan Ave	36" DI		1891	$335	$633,485
Manholes	6'	6		$7,200	$41,238
Swan Ave to Holly Lane	36" DI		1245	$335	$417,075
Manholes	6'	4		$7,200	$29,610
Holly Lane to UGB Boundary	36" DI		2448	$335	$820,080
Manholes	6'	7		$7,200	$51,264
subtotal					$1,941,488
South Village:					
Swan Ave - Redland Rd to Donovan Lane	12"		1995	$100	$199,500
Manholes	4'	6		$4,000	$23,950
Swan Ave - Donovan Lane to UGB Bndry	10"		1353	$95	$128,535
Manholes	4'	4		$4,000	$17,530
Holly Lane - Redland Rd to Donovan Lane	12"		1910	$100	$191,000
Manholes	4'	6		$4,000	$23,100
Holly Lane - Donovan Lane to UGB Bndry	10"		1244	$95	$118,180
Manholes	4'	4		$4,000	$16,440
Donovan Lane - Swan Ave to Holly Lane	8"		610	$90	Use Extg
Manholes	4'	3		$4,000	$10,100
subtotal					$718,235

Construction Cost **$3,896,663**

Design Costs (20% of construction cost)	**$779,333**
Construction + Design Cost	**$4,675,996**
Contingency (15%)	**$701,399**
Total Cost	**$5,377,395**

* Unit costs for 36-inch pipe in Redland Road are based partly on numbers provided by Tri-Cities Sewer District for recent 30-inch sewer pipe; increased assuming 36-inch ductile iron.

All othe unit coses are based on numbers from recent ODOT projects.

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Park Place Concept Plan - Storm System Cost Estimate

	Quantity	Units	Cost/ft	Total Cost
Livesay Creek Basin				
Ponds - Assumed approx 10,000 cu ft	5	EACH	$15,000	$75,000
Pipe - Assumed 12"	1,200	LF	$68	$81,600
subtotals				$156,600
Holcomb Creek Basin				
Ponds - Assumed approx 10,000 cu ft	1	EACH	$15,000	$15,000
Pipe - Assumed 12"	260	LF	$68	$17,680
subtotals				$32,680
Abernethy Creek Basin				
Ponds - Assumed approx 10,000 cu ft	13	EACH	$15,000	$195,000
Pipe - Assumed 12"	2,510	LF	$68	$170,680
subtotals				$365,680
Total Ponds	19			
Total Pipe	3,970			
Construction Cost				**$554,960**
Design Costs (20% of construction cost)				**110,992**
Construction + Design Cost				**665,952**
Contingency (15%)				**99,893**
Total Cost				**765,845**

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Summary of Flows:

Sanitary

South Village Flow Estimate: 1.3 cfs

North Village Flow Estimate: 2.3 cfs

Population	2.3 people/lot	Oregon City Sanitary Master Plan
Industrial Flow:	3,000 gpad	Oregon City Sanitary Master Plan
School Flow:	1,200 gpad	Web Search
Infiltration & Inflow	3,300 gpad	Oregon City Sanitary Master Plan
Per Capita Flow	80 gpcd	Oregon City Sanitary Master Plan
Peaking Factor	3	Oregon City Sanitary Master Plan

Water

South Village Flow Estimate: 1.8 cfs

North Village Flow Estimate: 3.9 cfs

Population	2.3 people/lot	From Oregon City Sanitary Master Plan
Industrial Flow:	2,500 gpad	Estimated Based on number for sanitary.
School Flow:	1,000 gpad	Estimated Based on number for sanitary.
Per Capita Flow	144 gpcd	From Oregon City Water Master Plan
Peaking Factor	4	From Oregon City Water Master Plan
Fire Flow - Res.	3,000 gpm/3hrs	From Oregon City Water Master Plan
Fire Flow - School	5,000 gpm/4hrs	From Oregon City Water Master Plan

K. Preliminary Geologic and Geotechnical Evaluations

GRI Geotechnical & Environmental Consultants
9725 SW Beaverton Hillsdale Hwy, Ste 140
Portland, Oregon 97005-3364
PHONE 503/641/3478 FAX 503/644/8034

February 7, 2007

4584 PRELIM GEOTECH EVALUATION
(ISSUED 3-28-07)

SERA Architects
338 NW 5th Avenue
Portland, OR 97209

Attention: David Berniker

SUBJECT: Preliminary Geologic and Geotechnical Evaluation
Park Place Concept Plan
Oregon City, Oregon

At your request, GRI has completed a preliminary geologic and geotechnical evaluation for the proposed Park Place Concept Plan project in Oregon City, Oregon. This evaluation addressed the Park Place study area, which is shown on the Vicinity Map, Figure 1. The Park Place Concept Plan is being developed to identify the preferred long-term land use of the study area. The Concept Plan was developed by the design team and local community during a design charrette and series of community meetings.

The purpose of the evaluation was to identify, on a preliminary basis, the potential geologic hazards within the study area and provide geotechnical considerations for future development, to be included in the Concept Plan document for the City of Oregon City (City). This includes recommendations for site-specific geotechnical evaluations prior to development and general slope hazard management. The conclusions and recommendations provided in this report are based on a review of the previous work completed in the study area by others and other sources of information described herein.

The evaluation consisted of limited field reconnaissance; review of published geologic reports and maps, readily available geotechnical reports and subsurface information, and water well records on file with the Oregon Water Resources Department (OWRD); and examination of aerial photographs. The intent of this document is to serve as a practical guide to assist the City in their understanding and management of the short- and long-term geologic risks associated with future development in the Park Place Concept Plan study area.

PROJECT DESCRIPTION

The study area is located in Clackamas County, Oregon, east of Highway 213 and south of Redland and Holcomb roads. The total study area is approximately 470 acres; 180 acres of the study area are located immediately adjacent to Oregon City limits in the vicinity of Livesay Road, but have not been annexed as part of the City, and 300 acres were brought into the Urban Growth Boundary in 2002. The study area is composed of 138 individual property owners. The largest property under one ownership is approximately 48 acres, and nearly half the parcels in the study area are 1 acre or less.

The Park Place Concept Plan was developed to identify the preferred long-term land use of the study area. The Concept Plan identifies the general areas of different housing densities, commercial and industrial land uses, parks, open spaces, and schools.

The study area includes existing residential developments and a public middle school, but is generally rural and distinguished by steep slopes, several creeks, marsh areas, and wooded areas. The general topography of the study area is shown on the Slope Map, Figure 2, and the Landslide Geomorphology Map, Figure 3. The long-term development outlined in the proposed Concept Plan includes new mixed-use and residential development, new roads between Holly Lane and Highway 213 and Redland and Holcomb roads, and improvements to existing roadways. We understand the proposed Concept Plan has identified open space areas located in conjunction with environmentally constrained and natural areas, which will serve as undeveloped parks and natural resource areas for the study area. These open spaces include all areas with slopes of 25% or steeper within the Concept Plan study area.

GEOLOGIC SETTING

The study area is located in the Abernathy Creek drainage of the Willamette Valley. The Abernathy Creek drainage consists of a narrow meandering creek, fed by Newell and Holcomb creeks, which flows directly into the Willamette River immediately northwest of the study area. The drainage is characterized by steep canyons subject to ongoing slope processes. The local geology is dominated by the fine-grained facies of the Missoula Flood deposits (Madin, in press) primarily comprised of silt, sand, and gravel of late Pleistocene age, as shown on the Geologic Map, Figure 4. These deposits generally form terraces at the lower extent of the local creeks and mantle slopes up to about elevation 200 to 250 ft. In the low-lying areas within the floodplain of Abernathy Creek is alluvium and Pleistocene-age Willamette Silt, which consists of fine-grained sands, silt and clay with scattered lenses of fine- to medium-grained sand. At the north edge of the study area (along Holcomb Road, at the south end along Holly Lane and at the southwest edge, adjacent to Newell Creek Canyon), mudstone, claystone, and sandstone of the Troutdale Formation are present, typically in steep canyons and ridges. Geomorphic and geologic evidence indicates these tributary canyons of Abernathy Creek have been modified by ongoing, large-scale landslides. The Oregon Department of Geology and Mineral Industries' (DOGAMI) preliminary geologic map of the area indicates an inferred trace of the Oatfield Fault may extend into the northwest portion of the study area; however there is no direct evidence that the fault exists in this area (Madin, in press).

PREVIOUS WORK

Due to the presence of landslides in the Oregon City area, a number of geologic maps and geotechnical studies have been completed in the vicinity of the Concept Plan study area. DOGAMI Bulletin 99, "Geology and Geologic Hazards of Northwestern Clackamas County, Oregon," documents the initial study focusing on the geology and geologic hazards of the area (Schlicker & Finlayson, 1979). This report identified slopes of 10 to more than 50% within the study area. The report also identified hazards associated with flooding along Abernathy Creek and the potential for a high water table near Ogden Middle School, west of Holly Lane. Bulletin 99 did not identify landslide-specific hazards within the Concept Plan study area, but identified landslide topography, local slumping, earthflow, mudflow, and debris flow in Newell Creek Canyon, immediately west of the study area, and in canyons on both sides of Holly Lane, south and east of the study area.

Subsequent to Bulletin 99, Portland State University (PSU) evaluated geologic constraints for future development of Newell Creek Canyon (Burns and others, 1993). The study area included in this report is immediately adjacent to the Concept Plan study area, to the west. The report included evaluation of geologic, soil, and groundwater conditions within the canyon and included a landslide susceptibility map for the canyon, which identified existing landslides as high risk, and exposures of Troutdale Formation with slopes of 14% (8°) or more as having a moderate risk of landslides. The report identified over 50 existing landslides in Newell Creek Canyon and noted that 73% of the project area was at moderate risk for landslides. Several other site-specific geologic and geotechnical investigations have been conducted within Newell Creek Canyon to assess landslide hazards associated with residential development. In addition, two studies have been published following storm-induced landslides in 1996 and 1997, documenting landslides immediately adjacent to the study area (Burns and others, 1998; Hofmeister, 2000).

In 2006, DOGAMI developed a map identifying landslide geomorphology in the vicinity of Oregon City, including the Concept Plan study area, using light detection and ranging (LIDAR) surveys and air photos (Madin and Burns, 2006). This map identifies over 35 existing landslides and debris fans within the Concept Plan study area, as shown in Figure 3. DOGAMI is currently completing a geologic map of the Oregon City vicinity (Madin, in press). A draft version of this map is shown on Figure 4. At this time, the 2006 map is the most up-to-date source of information concerning landslides in the study area.

SITE RECONNAISSANCE

Methodology

A certified engineering geologist (CEG) and registered geologist (RG) from GRI conducted a general reconnaissance of the study area on November 29, 2006. The ground-level reconnaissance consisted of viewing the majority of the study area from roadway rights-of-way. Visual reconnaissance was limited to areas and facilities that were readily observable from streets or other public areas.

Study Area Observations

The study area lies on both sides of Redland Road, extending north toward Holcomb Road and south toward Maple Lane, primarily along adjacent creek canyons. Redland Road bisects the study area from east to west, and Holly Lane extends from Redland to the south end of the study area. There are no north-south connecting roads from Redland Road to Holcomb Boulevard. Between Redland Road and Holcomb Boulevard there are a number of separate residential developments with discontinuous streets. Significant portions of the study area include steep, wooded creek canyons and generally rural property.

Redland Road is a two-lane, minor arterial linking Highway 213 to residential areas to the east of Oregon City. Redland Road transects the Abernathy Creek valley and crosses Abernathy Creek four times within the study area. As shown on Figure 2, the slopes at creek crossings are typically steeper than 25%. We observed localized slumping and raveling along these stream banks. In addition, slopes greater than 25% were observed along much of Redland Road, as road cuts on the north side of the road and sloping toward the creek on the south side of the road. Several small roads intersect Redland Road and extend northward into residential developments. These residential developments are generally low density and established on slopes of 5 to 15%. Readily apparent and obvious indications of recent large-scale, deep seated slope instability were not observed in these developments.

Holly Lane is a local street that runs south from Redland Road to Maplelane Road and has steep grades and very narrow shoulders. There is a steep canyon to the east of Holly Lane and steep slopes (greater than 25%) along Holly Lane between Redland Road and Donovan Lane. Based on personal communication with property owners, GRI understands that localized slope failures have occurred at residential properties on the south east side of Holly Lane, just outside the Concept Plan study area (Moxley, personal communication, 2006).

There are no connecting roads between Redland Road and Holcomb Boulevard in the north portion of the study area. Development in this area is composed of isolated residential developments that have been constructed over the past 50 years. Swan Avenue and Livesay Road are residential streets that extend east-west through this portion of the study area. These residential developments occur on the relatively flat plateau above Redland Road. We did not observe any development adjacent to the canyon at the north edge of the study area; however, development has occurred immediately outside the study area, in the Oak Valley area. Evidence of soil creep observed during the reconnaissance includes tilted and bowed trees around the perimeter slopes of the development.

SUBSURFACE CONDITIONS

To provide a preliminary characterization of subsurface materials and conditions within the study area, GRI reviewed water well logs available through OWRD and available boring logs for sites adjacent to the project area. There are limited well logs available for the study area, as shown on Figures 2 through 4. Review of well logs indicates the study area is generally mantled with silt, which is underlain by weathered sedimentary rocks. This characterization is consistent with the conditions described in boring logs included in the study by PSU (1993) and in the preliminary mapping by Madin (in press).

Groundwater

It is anticipated that the groundwater level in low-lying areas of the study area, in the Abernathy Creek drainage, will fluctuate according to seasonal rainfall and may occur near the ground surface during wet, winter and spring months and during periods of prolonged or intense rainfall, and within several feet of the ground surface during drier months.

It is anticipated the regional water table occurs at depth in areas of higher elevation; however, shallow perched water can occur in and over the weathered sedimentary rock and fine-grained soil, particularly following intense and/or prolonged precipitation.

CONCLUSIONS AND RECOMMENDATIONS

Landslides have occurred within the study area and in adjacent areas with similar topography, geology, and groundwater conditions. With regard to slope instability, most of the known slope instability has occurred on the steeper slopes on ravines along streams and drainages. We understand the recommended Concept Plan developed by the design team identifies areas with slopes of 25% or more as open space that will remain undeveloped. Limiting development in these areas is an appropriate measure to limit the risk of slope instability and landslides impacting future development. In addition, for the purpose of this Concept Plan, GRI recommends further site-specific study be conducted for future developments, in accordance with the City's municipal code Chapter 17.44, for managing geologic hazards and in accordance with following recommendations.

It would be prudent for the City to expand the definitions included in the City of Oregon City Municipal Code, Chapter 17.44.020, to include the Portland State University study, "Landslides in the Portland, Oregon, Metropolitan Area Resulting from the Storm of February 1996: Inventory Map, Database and Evaluation" (Burns and others, 1998); the DOGAMI Open File Report O-06-27, "Map of Landslide Geomorphology of Oregon City, Oregon, and Vicinity Interpreted from LIDAR Imagery and Aerial Photographs" (Madin and Burns, 2006); and the upcoming "Preliminary Geologic Map of the Oregon City Quadrangle, Clackamas County, Oregon" (Madin, in press), as references for identifying mapped landslides and landslide materials, "landslide areas," "unstable slopes," "unstable soils," and debris fans. We also recommend that the City require a geotechnical evaluation/investigation as part of any future development in areas with slopes of 25% or steeper and within a 200-ft setback of the crest and toe of these slopes, and in areas previously mapped as landslides. This would include all new construction, including additions to existing homes such as swimming pools and retaining walls, installation of underground utilities, new access driveways and/or roadways, and similar types of projects that require significant earthwork. The geotechnical evaluation/investigation should address the slope hazards in the development and specifically address how the proposed development will limit the risk of future slope instability, prior to issuing a building permit. The geotechnical evaluation/investigation should also address setbacks from existing slopes and recommendations for cut and fill and on-site stormwater management, as described in more detail below. In addition, the City should require special inspection by the geotechnical engineer during construction of soil- and foundation-related elements and a summary letter of compliance upon completion of the work.

The actual scope of the geotechnical evaluation/investigation will depend somewhat on the location within the study area and the proposed development. For example, for development in areas that will likely require little if any earthwork, a reconnaissance-level site evaluation may be adequate prior to issuing a building permit. However, if the new development requires cuts deeper than about 5 ft into the existing hillsides, the geotechnical engineer may need to consider performing subsurface explorations, such as test pit excavations and/or shallow borings, as part of their evaluation/investigation. For any development within or adjacent to mapped landslide areas or debris fans, or any development that requires excavations deeper than about 10 ft into the existing hillside, it would be prudent to perform a more-detailed, comprehensive geotechnical investigation prior to issuing a building permit. An engineering geologist should provide site-specific geologic input for any development with proposed cuts deeper than about 10 ft and all evaluations within the limits of mapped landslide areas and debris fans.

To assist the City, GRI has prepared the following geotechnical-related considerations for future development in the Park Place Concept Plan area.

1) Require a development- and/or lot-specific evaluation/investigation and report by a Professional Engineer, registered in the State of Oregon, who by training, education, and experience is qualified in the practice of geotechnical engineering. The engineer should be assisted in the evaluation of mapped landslide areas and debris fans by a Certified Engineering Geologist (CEG) certified in the State of Oregon. The evaluation/investigation and report should include, but not be limited to, the following type of considerations, as appropriate for the type of proposed development:

General earthwork considerations, including recommendations for temporary and permanent cut and fill slopes and placement of structural fill,

Location of residence on lot,

Building setbacks from slopes,

Subdrainage and/or management of groundwater seepage,

Foundations,

Embedded/retaining walls,

Management of surface water and irrigation water, and

Impact of the development on the slope stability of the lot and the adjacent properties

2) The geotechnical engineer of record should review final grading, drainage, and foundation plans and specifications and confirm in writing that they are in conformance with the recommendations provided in their report.

3) For large complex developments on sites with challenging conditions, at the City's discretion, it may be appropriate to obtain a peer review of the geotechnical evaluation/investigation report for the development and/or lot plans. The peer reviewer should be selected by the City. tThe applicant's geotechnical engineer will need to respond to written comments provided by the City's peer review prior to issuance of building permit.

4 The applicant's geotechnical engineer should provide special inspection during construction to confirm that the subsurface conditions/assumptions made as part of their geotechnical evaluation/investigation are appropriate. This will allow for timely design changes if site conditions are encountered that are different from those anticipated. In addition, prior to issuing an occupancy permit, the City should require the geotechnical engineer to prepare a summary letter stating that the soils- and foundation-related project elements were accomplished in substantial conformance with their recommendations.

Concluding Remarks and Limitations

This report has been prepared to identify geologic hazards and geotechnical considerations associated with future development in the Park Place Concept Plan study area.

The opinions and recommendations stated in this report are based on a review of the previous work completed in the study area by others and other sources of information described herein. With respect to the work performed by others, GRI did not participate in the implementation of the work and did not independently verify the accuracy or completeness of the information provided. GRI makes no representations or warranty regarding instruments of service completed by others. The information presented in this report was developed by GRI in a manner consistent with that level of care and skill

ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty, expressed or implied, is made.

It is important to note that GRI's work evaluated the study area as a whole and did not address individual properties. For this reason, property owners/developers should retain qualified engineers and geologists to assist in the evaluation of specific properties and to prepare associated development plans and designs.

This evaluation has been prepared to aid SERA Architects and the City in the completion of the Park Place Concept Plan. The scope is limited by the fact that the actual plans for the study area are indefinite; hence, only preliminary opinions are presented.

Submitted for GRI,



Dwight J. Hardin, PE
Principal



George A. Freitag, RG, CEG
Associate



Tova R. Peltz, PE, RG
Project Engineer/Geologist

References

Burns, S., 1993, Environmental assessment of Newell Creek Canyon, Oregon City, Oregon presented to City of Oregon City, Clackamas County: Portland State University.

Burns, S., Growney, L., Brodersen, B., Yeats, R., and Popowski, T., 1998, Map showing faults, bedrock geology and sediment thickness of west half of Oregon City 1:100,000 quadrangle, Washington, Multnomah, Clackamas, and Marion Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map Series IMS-4.

Burns, S., Burns, W., James, D., and Hinkle, J., 1998, Landslides in the Portland, Oregon metropolitan area resulting from the storm of February 1996: inventory map, database and evaluation: Portland State University, report prepared as fulfillment of METRO contract 905828.

Hofmeister, R., 2000, Slope failures in Oregon, GIS inventory for three 1996/97 storm events: Oregon Department of Geology and Mineral Industries Special Paper 34.

Hofmeister, R., Hasenberg, C., Madin, I., and Wang, Y., 2003, Earthquake and landslide hazard maps in Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-03-09.

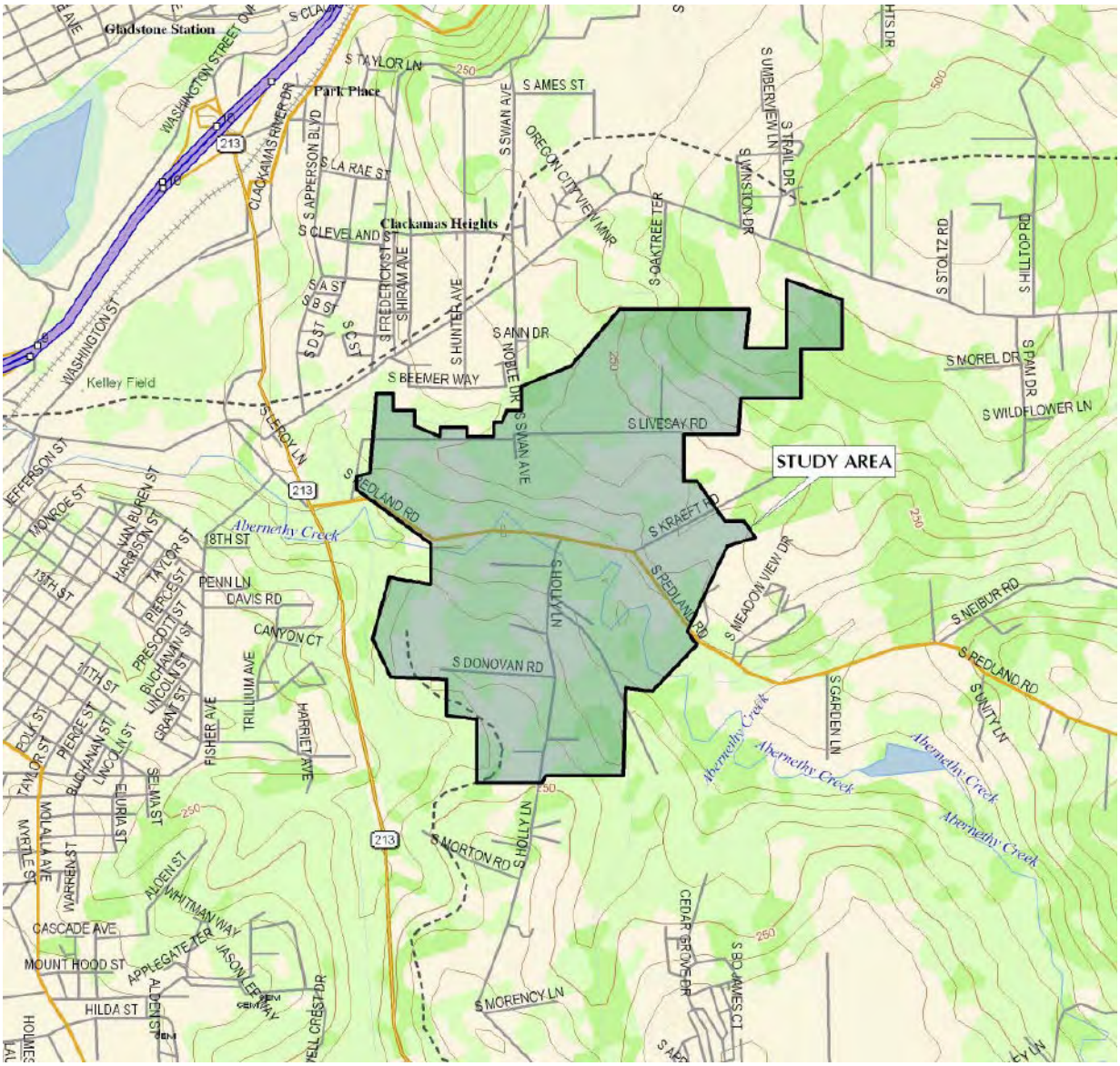
Madin, I., and Burns, W., 2006, Map of landslide geomorphology of Oregon City, Oregon, and vicinity interpreted from LIDAR imagery and aerial photographs: Oregon Department of Geology and Mineral Industries Open-File Report O-06-27.

Madin, I., in press, Preliminary geologic map of the Oregon City quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries.

Moxley, R., personal communication, 2006.

Oregon City Municipal Code, 2006.

Schlicker, H., and Finlayson, C., 1979, Geology and geologic hazards of Northwestern Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 99.



DELORME 3-D TOPOQUADS, OREGON
OREGON CITY, OREG. (1bb, 2aa, & 2ad) 2004

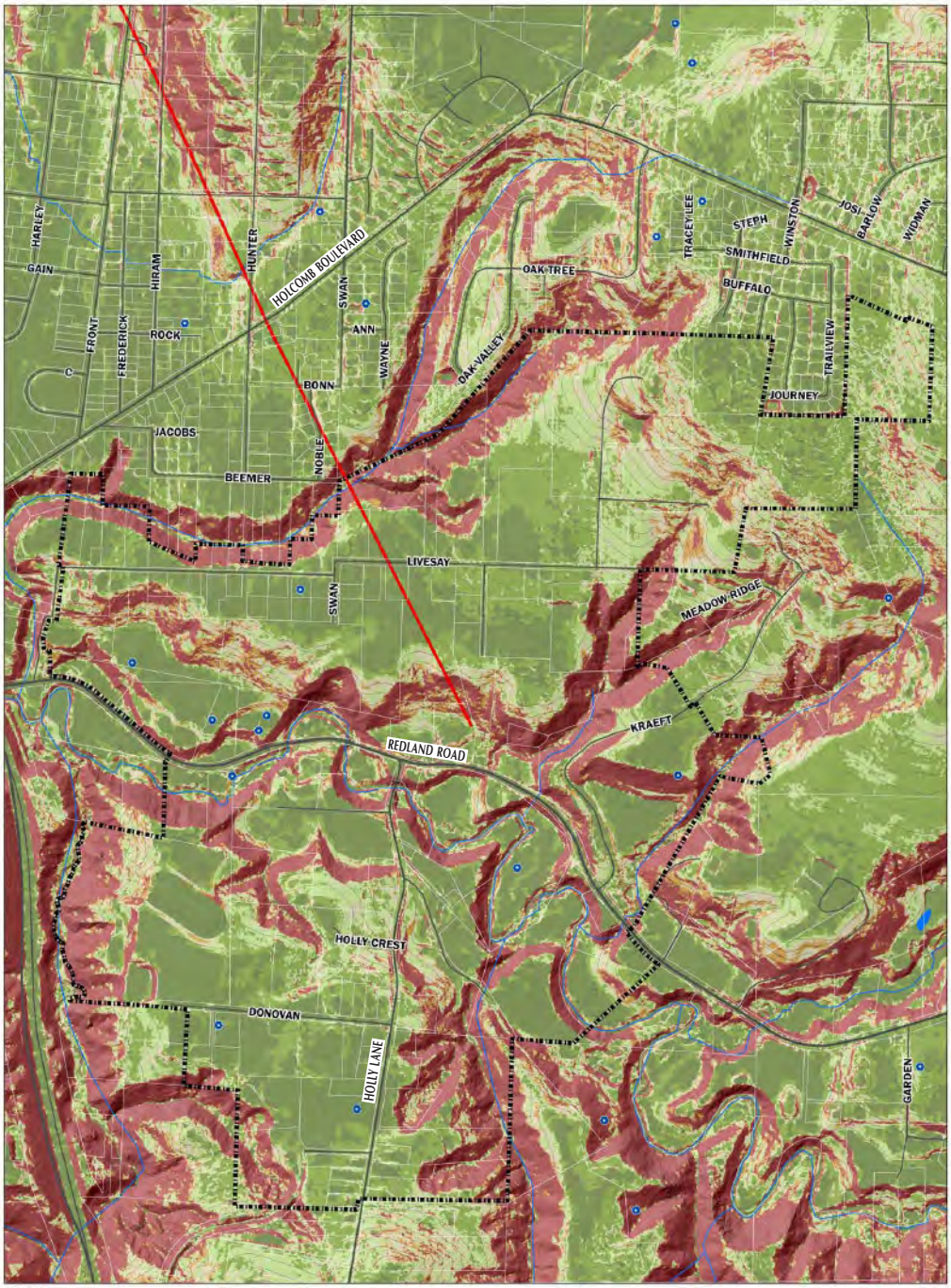
North

0 1/2 1 MILE

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

VICINITY MAP

FEB. 2007 JOB NO. 4584 FIG. 1



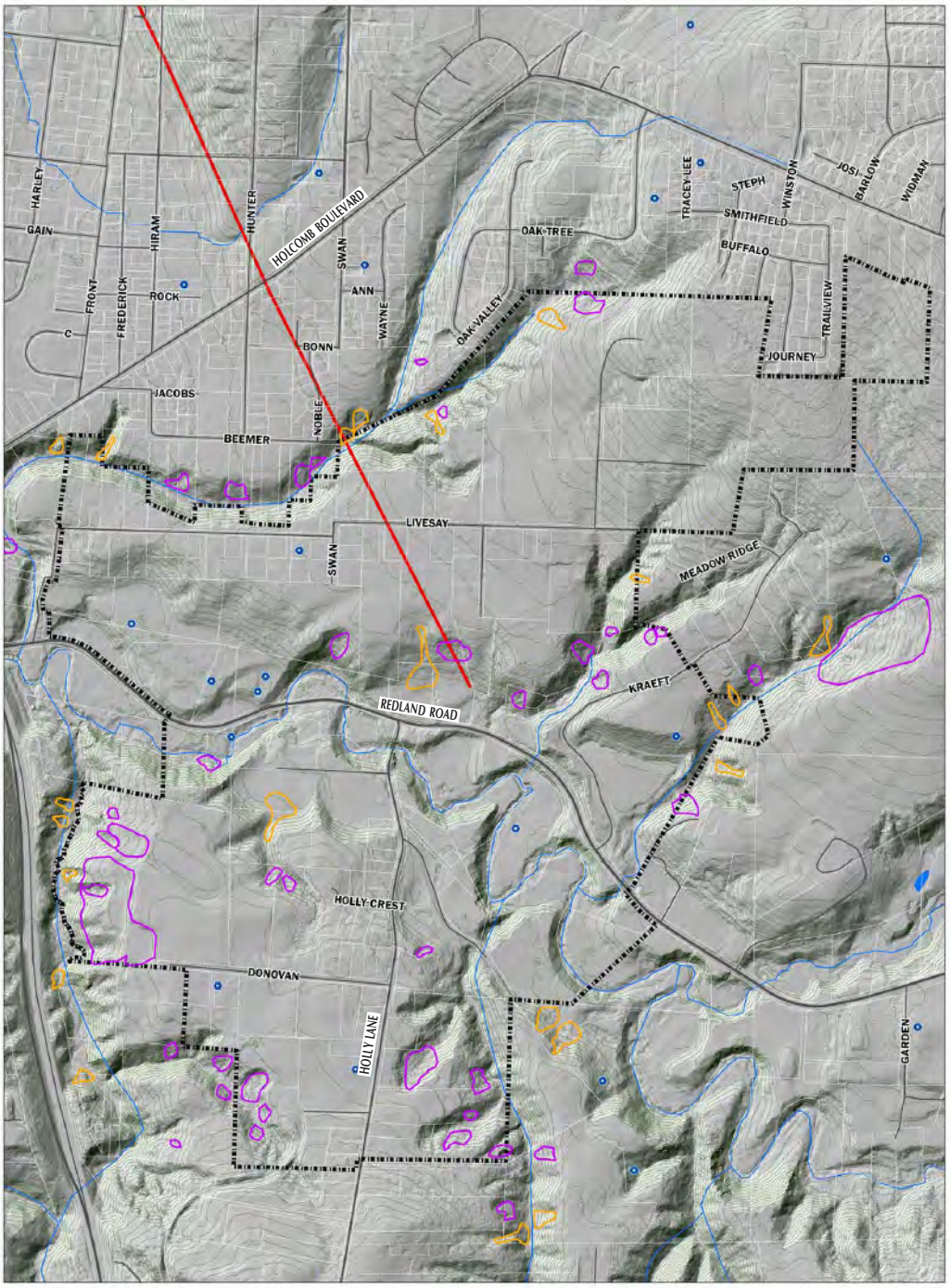
Park Place Concept Plan

Slope

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

SLOPE MAP

FEB. 2007 JOB NO. 4584 FIG. 2

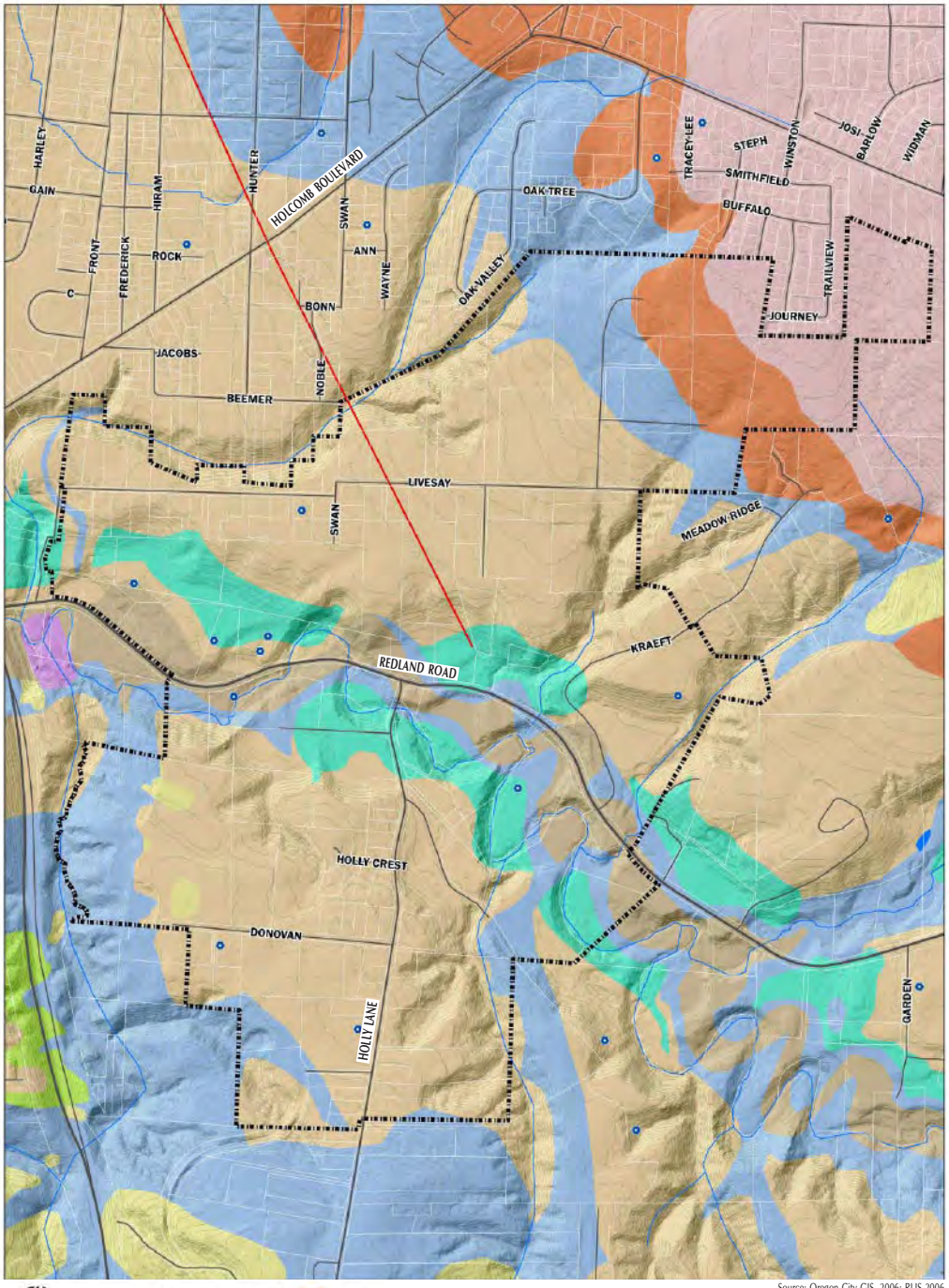


Park Place Concept Plan
Landslide Geomorphology

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

LANDSLIDE GEOMORPHOLOGY

FEB. 2007 JOB NO. 4584 FIG. 3



Source: Oregon City GIS, 2006; RLIS 2006 (Based on Madin, in press)

Study Area
Located Wells
Road
Fault Line
Waterway
Contour = 10'

Geologic Map Unit

af
Tt
Qt
Qls
Qff
Qbo
Qbc
Qal
QTs

af	Artificial Fill (Recent)
Qal	Alluvium (Late Pleistocene-Holocene)
Qt	Terrace Deposits (Late Pleistocene-Holocene)
Qff	Fine-grained Facies of Missoula Flood deposits (Latest Pleistocene)
Qls	Quaternary Landslides (Pleistocene-Recent)
Qbc	Boring Volcanic Field-Basalt of Canemah (Pleistocene)
Qbo	Boring Volcanic Field-Basalt andesite of Outlook (Pleistocene)
QTs	Springwater Formation (Pliocene to Pleistocene)
Tt	Troutdale Formation (Miocene to Pliocene)

Park Place Concept Plan
Geology

North
0 700 1,400 FT

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

GEOLOGY MAP

FEB. 2007 JOB NO. 4584 FIG. 4

L. Preliminary Costs

* See Section 5 (Funding and Finance) of Park Place Concept Plan Draft: May 30, 2007 - Version 1.2 Redline.

CITY OF OREGON CITY

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

To: Planning Commission **Agenda Date:** 07/11/2022

SUBJECT:

Public Comments for GLUA-21-00045 / MAS-21-00006 / VAR-22-00001
Park Place Crossing General Development Plan

Below is a list of all public comments received for this land use application prior to June 30, 2022. The document is split into four separate PDFs due to the large number of comments and information provided.

Each item is included in this document in the order listed below.

Each item on the list below is a clickable link to navigate to the specific comment within the document.

PART 1

1. Jed Pedersen emails dated March 31, 2022, April 2, April 3, and April 10, 2022
2. Sharon and Neish emails dated April 3, 2022
3. Sharon and Ken Neish emails dated April 4, 2022
4. Jackie-Hammond Williams letter received April 11, 2022
5. Janice Troxler letter dated April 7, 2022
6. Barbara Renken letter dated April 8, 2022
7. Christine Kosinski letter dated April 11, 2022
8. Park Place Neighborhood Association letter dated April 11, 2022
9. Hamlet of Beavercreek letter received April 11, 2022
10. Clackamas County Engineering Division letter dated April 15, 2022
11. Metro emails dated March 31, 2022
12. Kendall Reid, Oregon City Parks and Recreations Director email dated April 15, 2022
13. Clackamas River Water comment form dated March 31, 2022
14. Oregon City Building Division comment form dated April 5, 2022
15. James Graham, Oregon City Economic Development Manager letter dated April 18, 2022

PART 2

16. Kirk Tolstrup email dated May 2, 2022
17. John Widmer email dated May 6, 2022
18. Janice Troxler email dated May 5, 2022
19. Karla Laws letter dated May 8, 2022
20. Christine Kosinski email dated May 9, 2022
21. Jane Varley, Michael Mueller, Dan and Shannon Keller, and Shirley Humprey letter received May 9, 2022
22. Darin Shoup email dated May 9, 2022

23. Mikhail Krughkov email dated May 9, 2022
24. Adella and Mark Bell slides dated May 9, 2022
25. Rivers of Life Center letter dated May 9, 2022
26. Oregon City School District letter dated May 9, 2022
27. Melissa Warner email dated May 9, 2022
28. Jed Pedersen slides dated May 9, 2022
29. Brent and Jamie Gross email dated May 9, 2022
30. Jaimee Melilli email dated May 9, 2022

PART 3

31. Enoch Huang and Roya Mansouri slides dated May 9, 2022
32. Enoch Huang and Roya Mansouri letter dated May 9, 2022
33. Emily Lisborg email dated May 10, 2022
34. Ken Iverson emailed dated May 9, 2022
35. Barb Seekins letter received May 9, 2022
36. Trailview Heights HOA letter received May 9, 2022
37. Sutton map received May 9, 2022
38. Tom Geil slides received May 9, 2022
39. Stephen Ford letter received May 9, 2022
40. Jackie-Hammond Williams letter received May 9, 2022
41. Tara McElhannon letter received May 9, 2022
42. Sharon Neish emailed dated May 10, 2022
43. Carolyn Lu email dated May 11, 2022
44. Anonymous website submission dated May 11, 2022
45. Lynette Basiou email dated May 12, 2022
46. Photos from Planning Commission Chair's site visit dated May 9, 2022
47. Clackamas County Disaster Management public records request email dated May 11, 2022
48. Tom Geil and Dirk Schlagenhaufer facebook posts dated May 12, 2022
49. Jackie Dalseme emailed dated May 12, 2022
50. Tom Geil Oregon City News opinion piece dated May 12, 2022
51. Department of Land Conservation and Development (DLCD) email dated May 13, 2022
52. Jane Nitschke email dated May 15, 2022
53. Suzanne Hammond emailed dated May 14, 2022
54. James Nicita email and attachments dated May 13, 2022
55. UGB map received May 17, 2022

PART 4

56. Christine Kosinski/Scott Burns letter dated May 23, 2022
57. Christine Kosinski letter dated May 23rd, 2022
58. Tara McElhannon email dated May 23rd, 2022
59. Maryann Lee email dated May 22, 2022
60. James Nicita email and attachments dated May 22, 2022
61. James Nicita email #2 and attachments dated May 22, 2022
62. Emily Lisborg email dated May 18, 2022
63. James Nicita email dated May 24, 2022
64. Jed Peterson email dated May 21, 2022
65. Sharon Neish Oregon City News opinion piece dated May 23, 2022

66. Roya Mansouri email dated May 23, 2022
67. Roya Mansouri letter received May 23, 2022
68. Roya Mansouri email #2 dated May 23, 2022
69. Scott Coleman letter received May 23, 2022
70. Sharon Neish email dated May 24, 2022

From: Jed Peterson
To: Planning
Subject: Notice of Planning GLUA-20-00045
Date: Thursday, March 31, 2022 5:47:47 PM

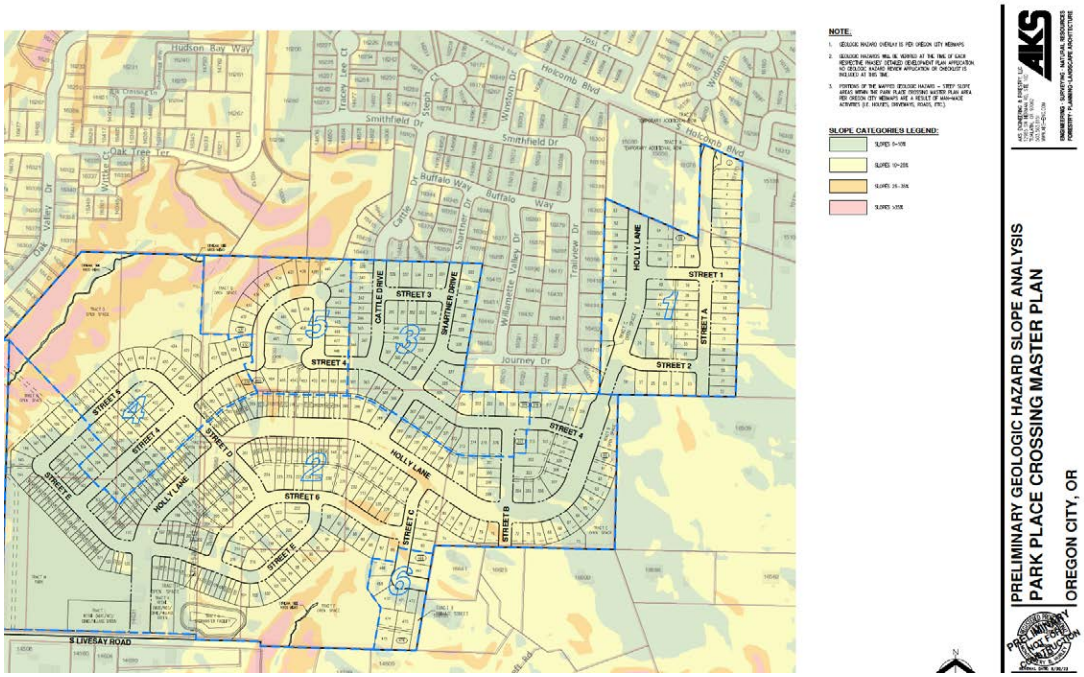
CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am very concerned regarding the proposal. The maps are clearly out of date and therefore inaccurate. My property at 16586 S Edenwild Ln, Oregon City, OR 97045 is at risk with these changes due to significant storm water redirection that will negatively impact me. On one map it shows my house and my neighbors house as not existing and our properties are "Constrained Land - Open space." Clearly that inaccuracy will affect all of the projections. There needs to be a major revision on these plans to take into account changes that have occurred over the past several years. When the plans are based on this level of inaccurate information, I question the whole process.

Sincerely,
Jed Peterson
home (503) 974-9203

From: Jed Peterson
To: Kelly Reid
Subject: Topography map
Date: Saturday, April 2, 2022 6:37:59 PM
Attachments: Screen Shot 2022-04-02 at 6.31.57 PM.png

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.



This map appears to show that a tremendous amount of runoff will be affecting my property and my immediate neighbors' property. The sparse "Tract E Open Space" will clearly not be sufficient. There needs to be major changes to the plan as submitted. I believe that Street 4, Street B and Holly Lane will need to be reworked to account for the water.

Thanks,
Jed Peterson

From: Jed Peterson
To: Kelly Reid
Subject: Re: Notice of Planning GLUA-20-00045
Date: Sunday, April 3, 2022 10:31:20 PM

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This is becoming more and more troubling as I investigate this development.

https://pamplinmedia.com/pt/9-news/516813-412689-assisted-by-planners-oregon-city-developers-skirt-new-code?wallit_nosession=1

There is huge concern regarding safety, traffic, fire truck availability with limited roads. Clearly, the impacts of this development are being minimized by the developers but the real world impacts will be potentially life threatening. Inadequate planning and poor execution will be beyond costly. This mistake must not be allowed to occur.

Sincerely,
Jed Peterson

On Fri, Apr 1, 2022 at 14:38 Jed Peterson <jed.peterson.md@gmail.com> wrote:

> The Park Place Crossing Master Plan map is years out of date. The City of Oregon City Park Place Concept Plan Overlay Map is years out of date. The Existing Conditions Plan Park Place Crossing map and the Post-Developed Basin Map are not reflective of other properties that will be impacted. I am downhill from Phase 1 and potentially downhill from part of Phase 2 and see this as a tremendous potential problem. These concerns regarding stormwater are just a fraction of my concerns regarding these plans. This high density development is going to permanently change the topography of this area with the tremendous loss of trees and other wildlife. I can look at an up to date map on Google Maps and see that there will be a disruption of a long stretch of forested land. That is really disappointing. Light pollution and transportation impacts will also be quite noticeable and potentially unacceptable.
>
> Sincerely,
> Jed Peterson
>
> On Fri, Apr 1, 2022 at 12:57 PM Kelly Reid <kreid@orcity.org> wrote:
>
> > Hi Jed,
> >
> > Thank you for the email, I will add it to the record for this land use review. Are there specific maps or page numbers that you are referring to?
> >
> > Thanks,

Kelly Reid

She/her/hers

Planner

Community Development Department, City of Oregon City

695 Warner Parrott Rd, Oregon City, OR 97045

kreid@orcity.org

(503) 496-1540 Direct

(503) 722-3789 Main

Website

Interactive Maps and Apps

On-Line Submittal of Land Use Applications

The City of Oregon City continues to offer services and programs in-person and online - find facility hours of operation here.

Website: www.orcity.org
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State Retention Schedule and may be made available to the public.

From: Jed Peterson <jed.peterson.md@gmail.com>
Sent: Thursday, March 31, 2022 8:30 PM
To: Kelly Reid <kreid@orcity.org>
Subject: Fwd: Notice of Planning GLUA-20-00045

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Re: GLUA-20-00045, MAS-21-00006, VAR-22-00001

I am very concerned regarding the proposal. The maps are clearly out of date and therefore inaccurate. My property at 16586 S Edenwild Ln, Oregon City, OR 97045 is at risk with these changes due to significant storm water redirection that will negatively impact me. On one map it shows my house and my neighbors house as not existing and our properties are "Constrained Land - Open space." Clearly that inaccuracy will affect all of the projections. There needs to be a major revision on these plans to take into account changes that have occurred over the past several years. When the plans are based on this level of inaccurate information, I question the whole process.

Sincerely,

Jed Peterson

home (503) 974-9203

--
Sent from Gmail Mobile

From: Jed Peterson
To: Kelly Reid
Subject: GLUA-21-00045 / MAS-21-00006 / VAR-22-00001
Date: Sunday, April 10, 2022 1:45:35 PM

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The transportation impact study is misleading.

The data is shown to be achieved with inaccurate information. "Due to the ongoing COVID-19 viral pandemic, traffic volumes around Oregon have been depressed relative to normal conditions. A review of available traffic count data yielded 24-hour traffic counts along S Holcomb Boulevard east of S Barlow Drive from November 2, 2017, and year 2019 annual average daily traffic (AADT) along OR-213, just south of Redland Road from ODOT's Transportation Volume Tables. Given these available counts, the following methodology for data collection and volume adjustment was utilized..." A repeat detailed analysis should be performed as the collection dates were in the peak of COVID-19 when traffic was artificially low. Even analysis performed now is likely to be depressed compared with the future given that return to onsite work has been delayed for many businesses. The massaging of data throughout the report is flawed and cannot achieve the accuracy required for a project of this scope.

The executive summary notes: "that the site is projected to generate a net additional 290 morning peak hour trips, 390 evening peak hour trips, and 4,064 average weekday trips." However, the average household in the US generates approximately 9.5 trips per weekday by all modes. Being that the potential homes are in a location not ideally situated for biking or walking, the vast majority of those trips will be via car. The average US household has almost 2 cars and again given the potential location of these homes, it can be easily assumed that most of these homes will have 2 cars. Therefore, the impact on transportation appears to be deeply flawed just from basic statistical analysis.

It is also concerning that: "For the intersection of Redland Road at OR-213, the intersection is projected to operate in excess of acceptable per jurisdictional standards during the 2nd evening peak hour under 2026 buildout conditions (Phase 1) and for all succeeding analysis scenarios through year 2030. Additionally, extended queuing beyond available lane storage is expected to occur at some of the turn lanes of the two Redland Road study intersections. Although no specific mitigation is planned at either intersection..." As such, I cannot imagine a scenario where all of the phases get approved. Only phase 1 could possibly be approved as other phases would adversely affect not only existing residents but potential residents residing in phase 1 housing.

The transportation impact study also notes: "The historical traffic counts from 2019 along OR-213 were grown to reflect 2021 existing conditions by applying a 0.0118 percent per year linear growth rate over a two-year period, calculated in accordance with ODOT's Future Volumes Table." However, this does not take into account the many planned developments that will be adding to that growth. That project growth rate does not take into account the many developments that are in process or will be in process over the next several years.

The second hour analysis at the intersection of Redland Road at OR-213 is unacceptably compiled. Not even a full hour of data was collected for the analysis,"approximately 25 minutes worth of counts were collected." The complete lack of effort by the impact study to obtain accurate data is astounding. As such, more data massaging was completed that isn't based on reality but on arguably false assumptions.

Their conclusion conveniently brushes off the "2nd evening peak hour" and the fact that it will be problematic, requiring major infrastructure changes. This conclusion is clearly deceptive. How could a project of this scope proceed without those changes occuring? That should have been at the top of the conclusion. That is what we call a "rate limiting step" to the build out and should have been the initial conclusion. A more accurate conclusion would have started as, "the findings may support this project if major infrastructure changes are made at the intersection of Redland and OR-213. Without these changes, the traffic flow will fail with this development."

Thank you,
Jed Peterson

From: Sharon Neish
To: Kelly Reid
Subject: Re: GLUA-20–00045
Date: Sunday, April 3, 2022 9:46:50 PM

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Really Kelly please address this at your meeting proof that there is no egress any idiot can see through this plan of yours!

https://pamplinmedia.com/pt/9-news/516813-412689-assisted-by-planners-oregon-city-developers-skirt-new-code

> On Apr 3, 2022, at 9:24 PM, Sharon Neish <sharonaneish@gmail.com> wrote:
>
> Kelli, Then I look at the crappy ugly retail plan with pictures of crappy ugly retail plazas! Really dry cleaners??? Where is urban planning??? Why dump l the section 8 in one area?? This burns me up. Why not design it like the area of Sunriver where we own another house or at least Murray Hill in Beaverton? Who came up with this plan the old fools sitting in a meeting in 2007??? That was along time ago???
> Sharon
>
> > On Apr 3, 2022, at 8:37 PM, Sharon Neish <sharonaneish@gmail.com> wrote:
> >
> > How many section 8 houses and what is the standard size lot in the Oregon city area? What is the size lot variance the icon construction is trying to obtain? Why the secrecy and why the shoddy AKS environmental plan??? I want explanations for all of this? My mother grew up in HUD housing on the east coast and I used to live near it when I was younger. It is not a pleasant experience.
> > Sharon
> >
> > > On Apr 3, 2022, at 8:24 PM, Sharon Neish <sharonaneish@gmail.com> wrote:
> > >
> > > Will HUD be inspecting this high density neighborhood?
> > > No sex offenders is usually one of the rules. Why

would metro dump 500 plus units of section 8? How much money does Oregon City gain to have higher police protection? I took a look at the icon homes behind park view manor they look like hell on earth with a high fence protecting them from what?? What are the community regulations going to be??? How would you like this mess in your neighborhood Kelly??? Why wasn't this disclosed when we bought the land????
Sharon

> On Apr 3, 2022, at 6:52 PM, Sharon Neish <sharonaneish@gmail.com> wrote:
>
> Sorry, I am blind sided since we moved into Oregon city recently and now have to deal with the tweakers and the crime rate increasing like park view manor type housing and around the Plaid pantry. Sorry I am a psych nurse and deal with it on a daily basis the huge drug crisis and homelessness. I don't trust your plan pushing the crisis into peaceful neighborhoods. Please provide facts to all new neighbors on police protection. Why are they segregating this neighborhood and offering grants???? I have little faith in being able to have security and safety with the current police force. Please provide data.
> Thanks,
> Sharon
>
> > On Apr 3, 2022, at 6:08 PM, Sharon Neish <sharonaneish@gmail.com> wrote:
> >
> > Hi Kelly,
> > I am thinking about obtaining a lawyer to review this awful plan from all perspectives. My other question is this section 8 housing low income? Why such short notice to obtain questions no one one in our

immediate neighborhood or adjoins neighborhoods knew about this shoddy cheaply built housing project. We are all up in arms about everything from water runoff, schools, traffic patterns, fire department that this will affect we realize it is lots of money involved for Oregon City in permits. Are they going to put sprinkler systems in these houses? Is the road big enough to handle emergency traffic??? The numbers of cars projected onto Holcomb look extremely low and yes you probably will have to do eminent domain to get a major artery onto Holcomb. Will you be expanding the Holcomb road for capacity for both this section 8 type housing project and the one on Serres farm???? Please explain sewer plans the 4 inch pipe does not look like it will be enough. I realize this west linn Icon builder could give a crap about this area and is out to make a buck.
Thanks,
Sharon Neish
16580 S Edenwild Lane

Begin forwarded message:

From: Sharon Neish <sharonaneish@gmail.com>

Date: April 2, 2022 at 2:42:47 AM PDT
To: kreid@orcity.or
Cc: Ken Neish <kenneish@gmail.com>

Subject: GLUA-20–00045

Hi Kelly,
I am in total disagreement with your metro urban pack them in master plan. I agree with affordable housing but using some builder named ICON (see other subdivisions they have produced) with cookie cutter hardiplank sided houses and 4 plexes packed in like sardines is not a solution. It looks like some crazy kind of ugly section 8 housing project from the seventies near where I grew up on the East coast and a C plus rating from the better business bureau can't be good for the people that actually buy these so called affordable homes. Please look at the reviews of this company of what the consumers have been through. The plan itself looks like hell on earth. Plus not mention all the traffic onto Holcomb that will be coming from the numerous Park Place type

‘projects’ that are in the works or under consideration. I agree with capitalism and making a buck but at what cost to the consumer for corners cut? What is this mess going to look like in 10-20 years?? No wonder why they have to put up hedges to block it from the existing neighbors, I would ask for at least a 6 foot brick/stone wall to block the view. By the way, I have never written about any other so called building project in my lifetime.
Thanks for your consideration,
Sharon Neish BSN, MS RN
16580 S Edenwild Ln.
Oregon City, OR

From: Sharon Neish
To: Kelly Reid
Cc: Ken Neish
Subject: Answer this question
Date: Tuesday, April 5, 2022 8:03:16 PM

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How dishonest can you be? Commissioners' concerns about city-planning staff allegedly favoring developers over citizens recently led to an internal investigation that found city employees had not been biased. However, Terway and City Planner Kelly Reid faced disciplinary action for their failure to consult the city attorney prior to the June 2 City Commission meeting regarding when a land-use notice should be sent. Although, supposedly not biased Laura Terway tipped off Icon Construction before new building code for landslides. Mmm, have there not been other apartments buildings that developers have tried to build on landslide areas. Meanwhile, Laura has left for an area that will suit her well Happy Valley. I got to admit that suits her better her urban planning which make Levittown look good and her architectural stylings. Meanwhile old growth trees etc will be cut down by this Icon Construction for their homes devoid of any architectural value not to mention shoddy construction. See near Holcomb school.
Sharon

From: Kelly Reid
To: Kelly Reid
Subject: FW: GLUA-20–00045 comment
Date: Monday, April 4, 2022 4:15:23 PM

-----Original Message-----
From: Sharon Neish <sharonaneish@gmail.com>
Sent: Monday, April 4, 2022 1:03 PM
To: Kenneth Neish <kenneish@gmail.com>
Cc: Kelly Reid <kreid@orcity.org>
Subject: Re: GLUA-20–00045

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One more thing for your docket. This does correlate with park place concept master plan or doesn't it? See the section about affordable housing grants. Question for icon are they receiving these grants??? Does this correlate with purposed removal of park view manor section 8 housing dates 2017 and that Oregon city has to come up with a plan to move the tenants that is acceptable to HUD so that land can also be developed. Is Icon Construction part of this solution? I know they will try to bob and weave and I understand the tax brought to the area but at what cost to all of us affected by this rash decision made in 2005 16 years ago by people who probably don't reside in the area anymore, got to admit it is one of the ugliest plans in the annuals of metro area even with the small playground and the trails.
Sharon

> On Apr 4, 2022, at 10:27 AM, Kenneth Neish <kenneish@gmail.com> wrote:
>
> Absolutely I would like all my concerns entered on the docket for a public concern.
> I see if they have proposed this project many times in the past and it has been declined because of soil instability and access issues.
> The plan also shows a number of access roads leading into private property that is not available and outside the growth boundary why?
> Going back to a year and a half ago when the chance of fire presented itself, the danger having only two access roads to this concentrated body of homes would've been detrimental and unsafe for 500 families trying to clear out in an emergency situation.
> I am also concerned that the with the development of all the new homes proposed, Holcomb grade school has no capacity to take on the additional students. Your plan also shows an abundance of subsidize homes for low income families…currently Holcomb school has a 53% need of subsidize lunches for their existing student body. Does this plan put an additional strain on the school and its resources for more subsidizing of students?
> A number of my neighbors are concerned with water runoff because they're at the base of this thing…both have wells for their water source and overflow could in turn spoil those wells.
> Your plan calls for the highest density sections other development to touch properties that are outside of the growth boundary and considered rural…why?
>
> Sincerely, Ken
>

Jackie Hammond-Williams
16303, Wayne Dr
Oregon City
OR 97045

Response to GLUA-20-00045
General Land-use Application/MAS-21-00006-Master Plan/VAR-22-00001

Dear Commissioners,
I am a 30+ year resident of Park Place. 15 years ago I was selected for the Park Place Concept Plan Committee and attended every meeting. I am deeply troubled by this proposed development.
The vision drafted for the Park Place Concept Plan was for it 'to provide a framework for growth that respects and augments the area's context, history, and natural systems. The Concept Plan emphasizes good urban design, connectivity, opportunities for place-making and cultivating community, diversity, and, above all, a way to provide for future growth in a sustainable manner'.
In fact the first key component of the Park Place Concept Plan was "the two primary north-south connections between Holcomb Boulevard and Redland Road " (Swan Avenue and Holly Lane) yet both these connectors have been removed from the current land use proposal.
During the multiple Concept Plan meetings it was stated clearly many times that the Holly Lane extension (in particular) was deemed of the utmost importance to the City of Oregon City who recognized back then the pressure of having just the single two lane Holcomb Blvd providing the main access into the neighborhood, with a narrow sharp bend at the bottom, (to this day the bend is so narrow there is not enough room for sidewalks).
15 years ago having one access road into the neighborhood was deemed a hazard for evacuation and access during an emergency, since then multiple other developments have been and continue to be built, with no new connector roads.
The Concept Plan for the biggest development yet (then referred to as the Park Place Village) provided the much needed connector roads which have now been eliminated. This leaves ALL the heavy duty development traffic, plus the future residential traffic to be carried solely by Holcomb Blvd. During the 2020 wildfire level 2 evacuation it took our family one hour to travel one mile down Holcomb Blvd.
It has been noted that the Park Place Village is now referred to as Park Place Crossing, possibly because the original concept was to create a neighborhood center in the heart of the community, with live/work development, along with retail, office, civic space and good connectivity to the rest of the city all of which has mostly been abandoned. To reduce vehicle trips on Holcomb (and Redland Rd, given the Holly Lane extension would be built) the concept of a village was planned, with enough amenities provided in place to residents to reduce trips out of the neighborhood.
I would urge you to thoroughly read through the original Concept Plan as devised with input from multiple residents of the neighborhood over many months and to drive the area noting the constraints on egress posed by Holcomb Blvd for such an enormous development.
In the interest of public safety and to maintain some kind of livability in Park Place this development should be shelved unless and until additional connector roads are built providing the already desperately needed safe connectivity to the rest of the city.

April 7, 2024

City of Oregon City Planning Commission

Re: Master Plan and Variance – Park Place Crossing Development

I have read thru the various files and see that the proposed park and trails look awesome.

Issues for me:

1. Traffic with 427 homes and a park area for games. Yes, some will go out onto Redland Rd and some out Holcomb Blvd. Holcomb Blvd already has issues with traffic from the old neighborhoods and the Kitty Hawk area. Then, the old Serres farm will soon have more homes. At least 2 cars per home for all of the proposed land use!! Both Redland and Holcomb are 2-lane roads. Once all of this traffic gets to the intersection of Abernathy, Holcomb, and Redland Rd they will also encounter traffic. Plus more in the future from the proposed land use at the “old dump” site.

   The beautiful and historic Oregon City is going away!!

2. New schools will need to be built – the residence will be paying for these!!

Please consider there will be too many homes, too many people, too much traffic. During the fires a couple of years ago when we had to evacuate it took us 2-1/2 hours to drive 5 miles to safety.

Thank you,

Janice (Jan) Troxler

Comment #6

OREGON CITY
Community Development – Planning
695 Warner Parrott Road | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION TRANSMITTAL – RESPONSE FORM

Date: 4/11/2022

Land Use Application File Number: GLUA-20-00045

NAME: ~~Stephen VanHaverbeke~~ Barbara Renken

AGENCY: Park Place Neighborhood Association

EMAIL ADDRESS: ~~steve@vanhaverbeke.org~~ mmflower@comcast.net

The land use application material is referred to you for your information, study and official comments. Your recommendations and suggestions will be used to guide the Planning staff when reviewing this proposal. If you wish to have your comments considered and incorporated into the staff report, please return a copy of this form to facilitate the processing of this application and to ensure prompt consideration of your recommendations.

Please check the appropriate spaces below.

	The proposal does not conflict with our interests.
X	The proposal conflicts with our interests for the reasons attached. (Please attach additional information)
	The proposal would not conflict our interests if the changes noted below or attached are addressed.

Please add any specific comments below or attach a separate document with more information.

See attachment.

CONTACT THE PLANNING DIVISION IF YOU HAVE ANY QUESTIONS ABOUT THIS APPLICATION

Comment #6

Response to GLUA-20-00045 General Land Use Application/MAS-21-00006-Master Plan/VAR-12-00001

April 8, 2022

We previously submitted a written comment on March 6, 2019 to the Oregon City Planning Commission, after studying and discussing the revisions proposed at that time, resulting from the January 2019 PPNA presentation at our meeting by Pres. Greg Stone. These comments were the result of many Park Place Neighborhood Organization Meetings, attended by the Park Place Neighborhood Committee as well as meetings with many residents in the Park Place area, who were greatly concerned about several issues with the revisions. The neighborhood residents live in several subdivisions some of which are relatively new and some which have existed for decades. There was a basic LACK OF UNDERSTANDING IN THE HUNDREDS OF PAGES IN THE NEW CODE ADOPTION DOCUMENT REQUESTS FROM THE DEVELOPERS. Attendees requested the City Staff explain it in citizen language.

Kelly Reid spoke at our February 25 General Meeting . There were many questions she was unable to answer, not because she wasn't prepared, but because NO ONE KNOWS THE OUTCOME OF THE LANDSLIDE ISSUES , INFRASTRUCTURE, FURTHER ANNEXATIONS REQUIRING ACCESS WILL RESULT IN. At that time residents were aware of a proposed **700** homes proposed or in progress in our neighborhood, all accessed by one road, **HOLCOMB BLVD**.

Other concerns are where is a second High School in this area?? A Park in 'Park Place'??? Sidewalks to be able to walk nto town??

We have lived here for 18 years and been active residents in our community and in the city. As a member of the CIC for several years, I've come to know many of you and worked with you on many projects. I had higher expectations. Some of you listen and hear the residents while some of you only hear the developers.

That is not what this is about. This is about:

RESIDENTIAL SAFETY, ACCESS TO A LOCAL PARK, TRAFFIC CONGESTION especially in a time of crisis such as fire, which we recently had the experience to live through, not easily because of lack of ability to leave the area. Some residents returned to their homes, hoping to make it safely through the events.

We feel there should be NO DEVELOPMENT OF MAJOR PROJECTS UNTIL A SECOND ACCESS TO THE AREA IS ESTABLISHED. WITHOUT A SECOND ACCESS THERE IS NO WAY TO INSURE SAFETY FOR RESIDENTS IN A TIME OF ANY FORM OF CRISIS, not to mention normal traffic times of day with only ONE EXIT.

Repectfully submitted,

Barbara Renken 15090 Oyer Drive, Oregon City 97045 **PARK PLACE NEIGHBORHOOD**

Comment #7

Oregon City Planning Commission
Meeting of April 25, 2022

Today's date: April 11, 2022
Time sent to City: 2:00pm

Testimony of: Christine Kosinski, Unincorported Clackamas County, Holly Ln

Agenda File #: GLUA-21-00045/MAS-21-00006/VAR22-00001 Master Plan and Variance for Park Place Crossing Development

I ask the City to cancel the upcoming April 25th Planning Commission meeting because

1. The City has purposely not sent notice of the meeting to the homeowners on Holly Ln, outside the UGB.
2. The City is non-compliant with Statewide Land Use Goal 1 as stated below.
3. I ask the City to invite and meet with ALL homeowners on Holly Ln, whether in or out of UGB
4. I ask the City to invite DLCD to this meeting for non-compliance with Land Use Goal 1
5. I ask the City to invite LCDC to this meeting because you are non-compliant in your Comprehensive Plan.
6. I ask the City to invite Metro and ODOT because they approved dense development which goes against Land Use Goal 7 , developing in a hazardous area, and because ODOT said it was O.K. to use Holly Ln rather than to construct the Grade Separated Intersection at Hwy 213/Beavercreek, placing hundreds of people in harm's way, which also goes against Goal 7 as well as the OC NHMP with FEMA.
7. I ask the City to invite DOGAMI to see the dense development in a hazardous area with zoning codes that should not be allowed here.
8. I ask the City to invite Clackamas County as a representative to the people of Holly Ln, since Holly Ln is still a County Road. As well, the OC Natural Hazards Mitigation Plan is an Addendum to the Clackamas County NHMP.
9. I ask the City to invite FEMA to this meeting with Holly Ln homeowners regarding the City's NHMP agreement with FEMA. The people of Holly Ln have already lost a boat load of money in previous landslides, they need reassurance FEMA will continue to support them in future landslide losses.
10. I am not crazy in asking you to do this, please remember, a City united will stand, but a City divided will surely fall. Which way would you rather have it?

Because of the many complications and issues that remain **unresolved** for this Park Place Crossing Plan, **I REQUEST THAT THE CITY KEEP THE RECORDS OPEN (until completely resolved) for this land use application.** Following is information on each outstanding and unresolved issue for this land use application.

STATEWIDE LAND USE GOAL 1- Goal 1 calls for "the opportunity for **all** citizens to be involved in **all phases** of the Planning Process". It requires each City and County to have a Citizen Involvement Program that addresses.....

1. Opportunities for widespread public involvement
2. Effective two-way communication with the public
3. The ability for the public to be involved in all phases of the Planning Process
4. Making technical information easy to understand
5. Feedback mechanisms for policymakers to respond to public input, and
6. Adequate financial support for public involvement efforts

Comment #7

Goal 1 also calls for local governments to have a committee for Citizen Involvement (CCI) to monitor and encourage public participation planning.

Resolution is required from The Oregon City Planning Commission for discrepancies and for not meeting the State's Terms and Conditions of Goal 1. The people of Holly Ln ask you to resolve the question of why has the City never invited, mailed a notice to, or contacted any of the people of Holly Ln regarding involvement in, the Planning Process making technical information easy to understand, giving people of Holly Ln any understanding of feedback mechanisms for policymakers to respond to public input, and for taking away any and all opportunity for the people of Holly Ln to be included in widespread public involvement. **Additionally**, why were the people of Holly Ln completely left out of all phases of the Planning Process in 2013 when the City, decided on it's own, to add Holly Ln to their TSP against the will of the people. Additionally, why were the people of Holly Ln completely left out of any and all land use developments, involving Holly Ln and transportation, **even though the people of Holly Ln have been very vocal in the past, requesting the opportunity to be involved and to speak to both the Planning and City Commissions about their concerns for very heavy traffic being proposed for their street.** THE PEOPLE OF HOLLY LN HAVE BEEN DENIED ALL DUE PROCESS OF THE LAW BY THE CITY OF OREGON CITY., therefore, all development affecting Holly Ln all the way back to 2004 shall be negated, shouldn't it? The City has completely wiped the people of Holly Ln off any and all invitation lists, these people have been notified of nothing, isn't that true? DLCD and LCDC need to rule on this as the City has committed a horrible crime to these homeowners who the City has completely ignored because they knew if the people were aware of the plans they had made for Holly Ln, there would have been a huge citizen uprising

Please also note that in the Applicant Narrative, the developer has met with the Park Place Neighborhood Association, but the developer never met with the people of Holly Ln regarding the transportation plan, nor the use of Holly Ln and the proposal to build a Holly Ln extension to connect to Holcomb Road.

So, Oregon City, how many ADT's per day do you now propose for Holly Ln? In 2007, just for the Park Place Plan, you gave us a figure of at least 20,000 per day. Now add traffic from the Beavercreek Road Concept Plan, in 2007 it was about 40,000-50,000 ADT's per day. The City has more than 100 streets in the City pointed directly at Holly Ln, which you know and we know is totally unsustainable, extremely unsafe and unlivable for the people currently living here. Yes, I have brought this to the attention of the City and NOTHING has been done. The City intends to literally ignore the people of Holly Ln, while they continue to development irresponsibly in building the necessary infrastructure needed to support their lofty plans.

STATEWIDE LAND USE GOAL 7 – Areas Subject to Natural Hazards
Goal 7 is written to "protect people and property from natural hazards". Local governments shall adopt comprehensive plans to reduce risk to people and property from natural hazards. Holly Ln is subject to landslides. In 1996-97 alone, two homes were complete losses and four other homes suffered serious damage. Holly Ln sits in a highly susceptible landslide area for landslides to occur in the future. The homeowners here also are unable to obtain Insurance for losses due to Landslides, in fact, there is NO insurance for losses due to landslides in the world. No insurance company in the U.S. will write coverage for landslides, so bids go out into the world, and Lloyd's of London, may in some cases, write coverage, however they **will not insure any property within ONE MILE of a previous landslide,** which means No homeowners on Holly Ln and No homeowners in Park Place can be insured due to the plethora of landslides here.

OREGON CITY'S COMPREHENSIVE PLAN – LANDSLIDES, It is stated in the Comprehensive Plan that Landslides can be triggered by heavy rains, ground shaking from earthquakes and heavy traffic, as well as development, such as cuts in road construction, and undercutting the lower edge of a slope, which can be caused by erosion along stream banks. The landslides on Holly Ln in 1996-97 occurred during a prolonged period of very heavy rains and flooding, which resulted in two homes being completely destroyed and four homes which suffered disastrous destruction. Oregon City is going against it's own Comprehensive Plan because of the many highly susceptible landslides on Holly Ln which can fail due to either heavy, vibrating traffic (as the City proposes more than 40,000 ADT's per day) or to development, such as cuts in road construction which will occur. Again, none of the homeowners on Holly Ln can obtain insurance for losses due to landslides because Lloyd's of London (the only carrier) will deny coverage if your property is within ONE MILE of a previous landslide. If Oregon City approves this amount, and more, of traffic per day down Holly Ln, then the City will be responsible for all losses due to landslides, as we have warned the City on many occasions that the homeowners on Holly Ln. will not be able to obtain landslide insurance. A similar situation arises on Trailview Dr where the City proposes to build a Holly Ln Extension(within 20-30 feet of these homes) to connect to Holcomb Rd. The homeowners here, where heavy traffic will be vibrating and shaking their homes, will suffer damages to their homes from this vibration and from development and road construction. These homeowners as well cannot obtain landslide insurance, another huge liability for the City. Again, we asked the City to work on the landslide isue more than 12 years ago.

OREGON CITY'S ADDENDUM TO THE CLACKAMAS COUNTY MULTI-JURISDICTIONAL NATURAL HAZARD MITIGATION PLAN (NHMP)

This is an agreement Oregon City signed in September of 2019 with FEMA. The plan must be renewed every five years, therefore will renew in 2024. Once the agreement is signed, the City is allowed to collect payments from FEMA for Hazard losses. The problem is that the City has failed to abide by some of the terms of this agreement, such as the following, for example see Pg. 46 of this agreement. Under heading 2018 Status/Rationale for Proposed Action Item, it is stated “The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community. Incorporating natural hazards plans into comprehensive plans, local ordinances, and land-use regulations will ensure that communities implement the proper mitigation measures for their community. Please note, that to date, the City has not integrated the natural hazard plan into it's comprehensive plan nor it's local ordinances, even though I have previously testified to the City regarding this matter and I suggested the City needed to add this plan (NHMP) to both it's Comprehensive Plan as well as being added to the Upgraded Hazard Regulations. Lastly, on this page, FEMA suggests the City use Zoning Codes to regulate development in hazard-prone areas, the City has failed to do this. Instead of applying Zoning for R8 and R10 homes, here in a landslide area, the City has gone as low as R-2. This makes the City non-compliant to it's agreement with FEMA putting the City into jeopardy of renewing the hazard plan in 2024. This would place huge liability upon the City & the people.

Now, I ask that you turn to Pg. 53 of this NHMP document that was drafted to Protect Life and Property. Please read under the heading of “ideas for implementation”, where FEMA suggests the City makes certain “there are no adverse impacts on other properties” and “limit construction in known landslide areas”. Again, Oregon City fails to meet this criteria. The Park Place Crossing application does NOT limit construction in known landslide areas, and yes there will be plenty of adverse impacts on other properties. Both Holly Ln and the proposed Park Place area for development are heavily affected by landslides. There have already been Adverse impacts on Oak Tree Terrace where a home

has suffered drastic de-valuation of their property and NO mitigation will stop this landslide in the future. As well, the many landslides on Holly Ln, sit in a High Susceptibility area where landslides have a high chance of re-occurring and the people have NO insurance. Another example where the City has been non-compliant to this agreement.

I could go on and on giving you many more examples, but the bottom line is that the City has signed an agreement with FEMA in exchange for Hazard funds, but the City has failed to live up to it's part of the plan.

ADDITIONAL ISSUES , THAT NEED RESOLUTION FROM THE PLANNING COMMISSIONS

1. Holly Ln is a FIRE TRAP. The heavy proposed traffic makes it impossible for the homeowners to get in and out of their properties and raises huge safety issues. We are trapped by both Redland Rd and Maplelane roads.
2. The people of Holly Ln demand to know, from the City, how they will access Holly Ln
3. The people of Holly Ln demand to meet with both the City and Developer. You met with the Park Place Neighborhood, but shut out all the people on Holly. Violation of Goal 1
4. We want the name of "Holly Ln extension" changed. Leave our street alone and give the extension it's own name. We are NOT the City's FREEWAY!
5. The people of Holly Lane (in it's entirety) demand to be invited to all future meetings at the City where Holly Ln is involved in any way. A requirement of Goal 1
6. The people of Holly Ln ask to meet with the City regarding the TSP and inclusion of Holly Ln
7. Street Trees – All Sidewalks **must have rebar in them**. The City is not using Rebar thus the tree roots come up under the cement and the poor homeowners are bearing the losses. Please do this right.
8. Holly Ln has previously testified to the City regarding the fact there is NO Landslide Insurance available to homeowners living in hazardous areas, we requested the City go to the State and work on a plan where the homeowners will not bear the heavy losses of damages due to landslides. We ask the City to do this NOW, and if you don't then the City becomes liable if it cannot be responsible to live up to it's NHMP agreement with FEMA.
9. Lastly, the Alternative Mobility Targets – Why did the City do this? You are putting more and more people at risk for injury and/or fatality. During the City meetings regarding the alternative mobility targets, your consultant came straight out and stated that rear end crashes continue to rise near the intersection of Hwy 213/Beavercreek. The consultant went on to state, that unfortunately, authorizing the addition of the mobility target will **increase rear end collisions.** I am having a hard time believing the City approved this! To know that you are approving **more rear end crashes, what about the poor people**, many could be maimed for life or possibly lose their life, all because the City had to have an alternative mobility target in order to continue developing! Is this the cost of development, people's lives? I think this is shameful and I know there is a better way. Please spare the people in your decisions in the future and please approve only development that meets and/or exceeds the 19 Statewide Land Use Goals, development that is safe and livable for the people.

OREGON CITY
Community Development – Planning
695 Warner Parrott Road | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION TRANSMITTAL – RESPONSE FORM

Date: 4/11/2022

Land Use Application File Number: GLUA-20-00045

NAME: Stephen VanHaverbeke

AGENCY: Park Place Neighborhood Association

EMAIL ADDRESS: steve@vanhaverbeke.org

The land use application material is referred to you for your information, study and official comments. Your recommendations and suggestions will be used to guide the Planning staff when reviewing this proposal. If you wish to have your comments considered and incorporated into the staff report, please return a copy of this form to facilitate the processing of this application and to ensure prompt consideration of your recommendations.

Please check the appropriate spaces below.

	The proposal does not conflict with our interests.
X	The proposal conflicts with our interests for the reasons attached. (Please attach additional information)
	The proposal would not conflict our interests if the changes noted below or attached are addressed.

Please add any specific comments below or attach a separate document with more information.

See attachment

CONTACT THE PLANNING DIVISION IF YOU HAVE ANY QUESTIONS ABOUT THIS APPLICATION

Comment #8

Park Place Neighborhood Association, Oregon City, Oregon

The Neighborhood at the End of the Oregon Trail

Response to GLUA-20-00045 General Land Use Application / MAS-21-00006 – Master Plan / VAR-22-00001

The new development represented by this application will have serious impact on the livability of the Park Place area. Primarily in the subdivisions off Winston Dr, but also any homes that depend on Holcomb Blvd for driving to or from home. There are currently 1400 addresses in our neighborhood, most of which are dependent on Holcomb for getting in and out. This new development will add another 470 units (or more) all of which will connect only to Holcomb. This will seriously impact those of us who must make a left turn onto Holcomb, especially in the event of an emergency, such as the fires of September 2020. During that event, it required over an hour to drive the one mile from Winston to Redland. Any additional load on the street will make it even more problematic.

The other issue we have is that all the construction traffic will be driving on Winston to access the site. The plans call for multiple phases extending for 8 years. Again, the original development called for access from Redland Rd, but that area was not part of this annexation.

After the completion of the development, there will be another issue. All the traffic in and out of the new neighborhood and the existing subdivisions off Winston will have to drive out to Holcomb on Winston, or possibly Holly. This area will be a serious bottleneck. Again, this could have been alleviated by connecting using Holly Lane through Redland. There is an existing connection possible – Livesay Rd – but current plans indicate that it will be blocked and only accessible for emergency vehicles. I can understand that the people who live off Livesay would not be happy to have the additional traffic driving through their unincorporated area. At the time of the annexation, it was stated that 70% of the traffic from the new development would use Livesay to Redland, and that there would be required modifications to Livesay Road to allow this use.

This development purports to follow the requirements set forth in the Park Place Concept Plan – a village atmosphere with shopping, dining, coffee shops, and playgrounds. As this application only covers a quarter of the area, it does not provide for any of this. As residents of Park Place, we would want to make sure that these amenities are covered in any development being considered.

Comment #9

The Hamlet of
BEAVERCREEK
PO Box 587 • Beavercreek • Oregon • 97004
Serving the Communities of Beavercreek, Carus, Echo Dell & Fishers Corner

To Kelly Reid, Planner
City of Oregon City

RE: Land Use Transmittal for Park Place Crossing Master Plan: GLUA-20-00045 / MAS-21-00006 / VAR-22-00001

The Board of The Hamlet of Beavercreek has received and reviewed the above listed land use transmittal. We have two topics we'd like to bring forward:

- Landslides – please see the two attached DOGAMI SLIDO maps. The first, a map of historic landslides in the development area. The second, a map of landslide susceptibility. There are historic landslides in this proposed development area and a VERY high susceptibility of future landslides. These facts are denied in the application and coupled with the fact that you CANNOT purchase landslide insurance for your home, should give the City, the Applicant, the Representative and the citizens of the City pause before irresponsible development.
  The City of Oregon City signed a contract with FEMA in 2019 committing to the Natural Hazards Mitigation Plan. This contract requires the restriction of development in areas of know hazards.

- Transportation – Redland Road, Holcomb Boulevard, the intersection of both of these roads and the intersection of Redland Road and Highway 213 are all at a "failing" level; meaning unacceptable congestion. Please see page 5 of 48 item number 11 of your Lancaster Mobley Park Place Crossing Master Plan Transportation Impact Study. Two of these roads are NOT the responsibility of Oregon City, but the County of Clackamas and the State of Oregon. Adding this type of development without the planning and funding of adequate improvement is irresponsible development.

Please understand that The Hamlet of Beavercreek is not against development, only **irresponsible development** that seriously impacts the safety and quality of our citizens' lives and has no regard for "what happens after my home slides down the hill?"

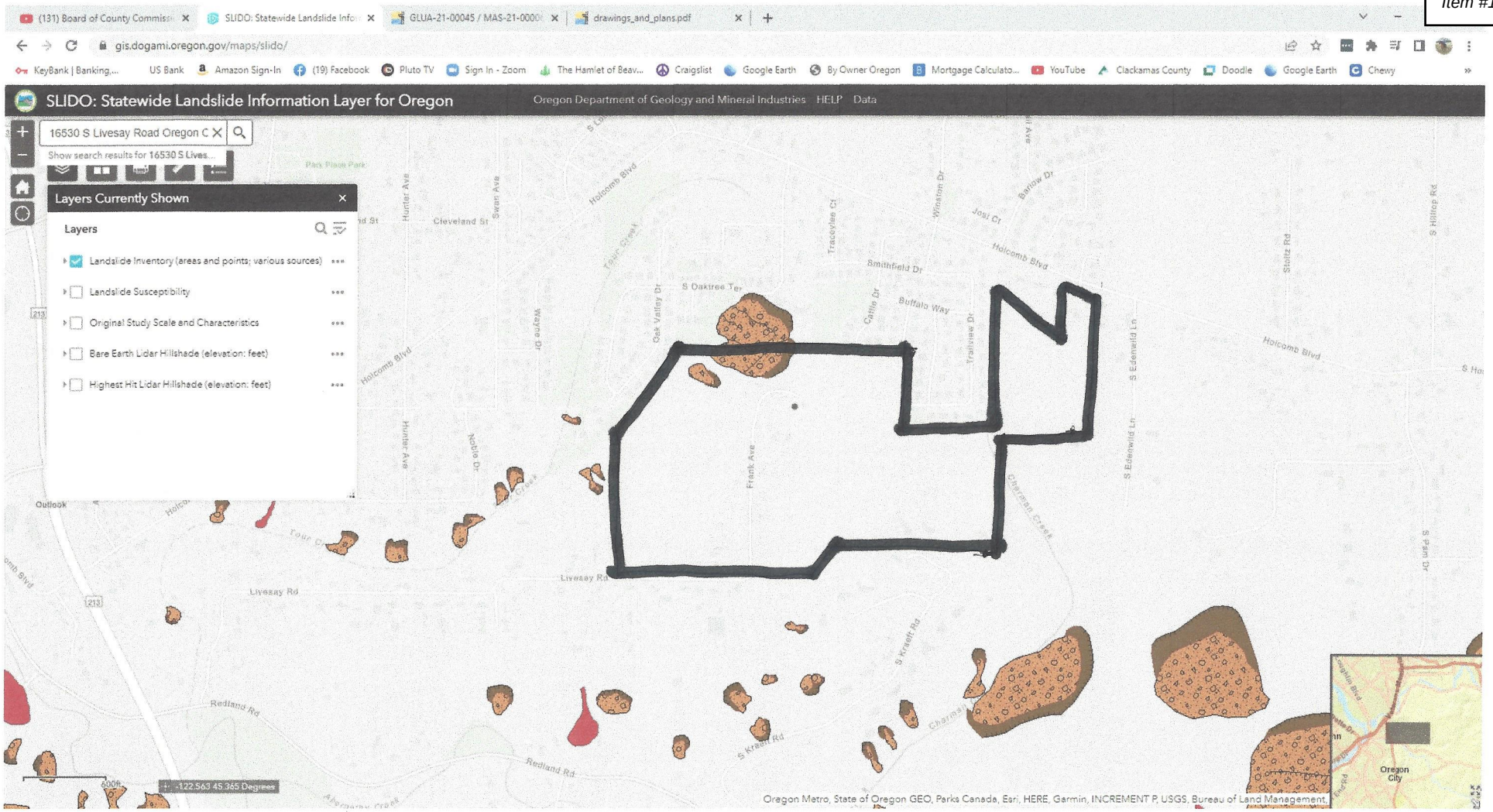
We are certainly happy to provide additional information or answer questions. Thank you for this opportunity to provide input to your land use process.

Sincerely,

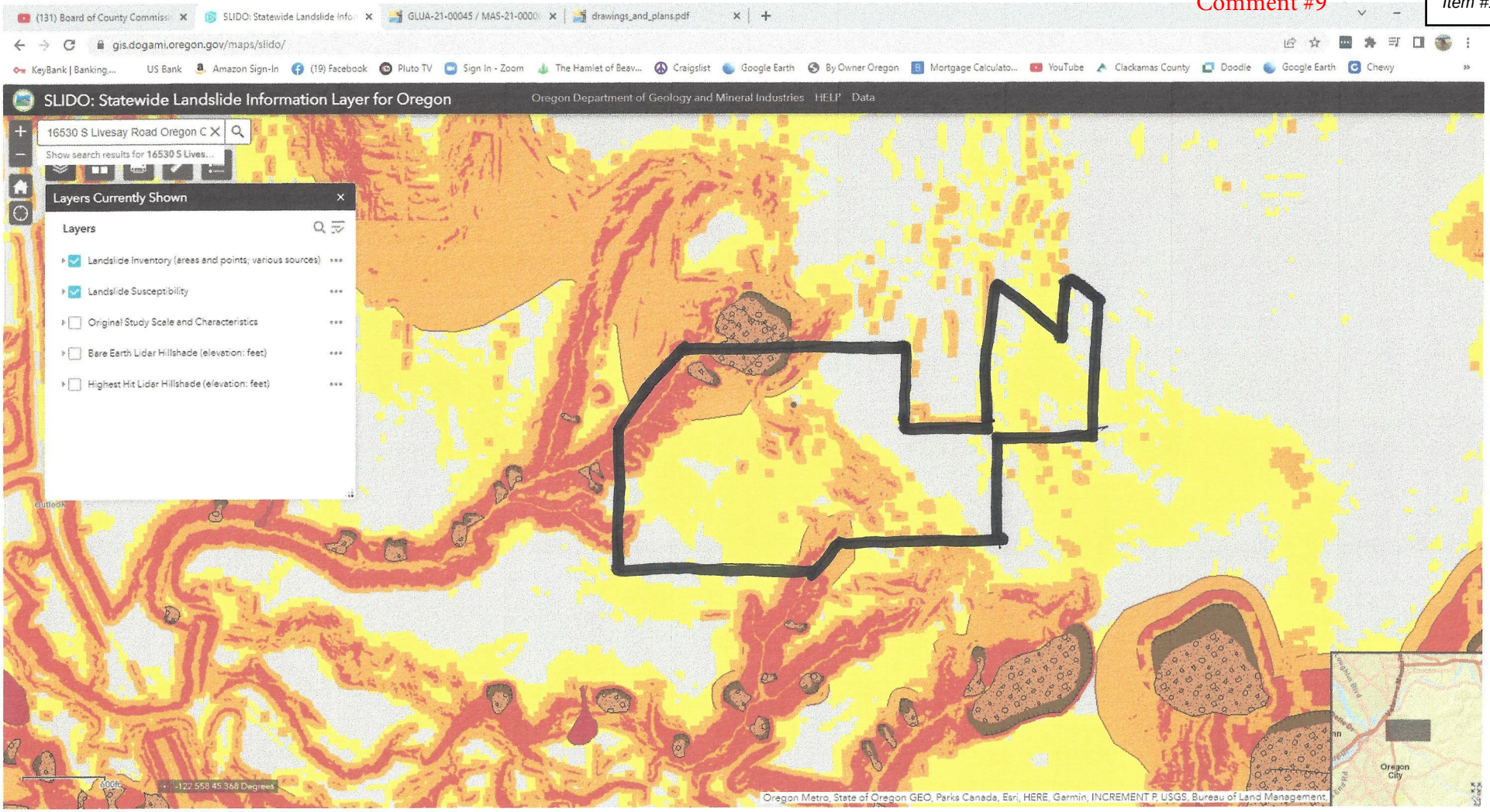
Tammy Stevens, Chair
The Hamlet of Beavercreek
503.939.3552

Enclosures

Comment #9


SLIDO: Statewide Landslide Information Layer for Oregon
Oregon Department of Geology and Mineral Industries HELP Data
16530 S Livesay Road Oregon C
Show search results for 16530 S Lives...
Layers Currently Shown
Layers
Landslide Inventory (areas and points; various sources)
Landslide Susceptibility
Original Study Scale and Characteristics
Bare Earth Lidar Hillshade (elevation: feet)
Highest Hit Lidar Hillshade (elevation: feet)
Holcomb Blvd
Livesay Rd
Redland Rd
Cleveland St
Smithfield Dr
Buffalo Way
Frank Ave
S Oaktree Ter
Outlook
Oregon City
-122.563 45.365 Degrees
Oregon Metro, State of Oregon GEO, Parks Canada, Esri, HERE, Garmin, INCREMENT P, USGS, Bureau of Land Management,

Comment #9


SLIDO: Statewide Landslide Information Layer for Oregon
Oregon Department of Geology and Mineral Industries HELP Data
16530 S Livesay Road Oregon C
Show search results for 16530 S Lives...
Layers Currently Shown
Layers
Landslide Inventory (areas and points; various sources)
Landslide Susceptibility
Original Study Scale and Characteristics
Bare Earth Lidar Hillshade (elevation: feet)
Highest Hit Lidar Hillshade (elevation: feet)
Oregon Metro, State of Oregon GEO, Parks Canada, Esri, HERE, Garmin, INCREMENT P, USGS, Bureau of Land Management,
Oregon City

Comment #10

CLACKAMAS COUNTY

DAN JOHNSON
DIRECTOR

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
DEVELOPMENT SERVICES BUILDING
150 BEAVERCREEK ROAD OREGON CITY, OR 97045

MEMORANDUM

TO: City of Oregon City, Planning Division
FROM: Kenneth Kent, Clackamas County Engineering, Senior Planner
DATE: April 15, 2022
RE: Park Place Crossing Master Plan: GLUA-20-00045 / MAS-21-00006 / VAR-22-00001

This office has the following comments pertaining to this proposal:

1. The proposed master plan provides for 477 lots, developed in six phases and is part of the larger Park Place Concept Plan. As indicated in the public notice, detailed development plans will be reviewed and approved for each phase through subsequent land use.

2. The proposed Park Place Crossing Master Plan includes frontage on S Livesay Road, which is a county collector roadway. The project site has approximately 1,095 feet of frontage on north side of the S Livesay Road right-of-way. This portion of the site include development of a future commercial uses, a community park and a water quality facility. The proposed master plan indicates that access to S Livesay from the extension of Holly Lane will be gated.

3. The Park Place Concept Plan identifies new roadways ultimately providing connectivity between S Redland Road and S Holcomb Boulevard, including a south extension of S Holly Lane. As noted in this master plan, access will be provided from S Holcomb, with gated emergency access provided to S Livesay Road at Phase 2.

4. Although, the current proposal does not include a through connection to S Livesay Road, the County has concerns about the impact to Livesay Road and its intersection with Redland Road, if full access is proposed in the future, especially if a through connection has not been completed via S Holly Lane to S Redland Road. The County has a capital improvement (CIP) project at the existing S Holly Lane/Redland Road intersection for a signal or roundabout, but appears to be based on the current configuration.

5. Even if Holly Lane is extended to S Redland, the Park Place Concept Plan does not address the S Livesay Road/S Redland Road intersection. Before access is provided to S

Comment #10

Livesay Road from the proposed master plan, additional analysis of traffic impacts to the off-site roadway and the S Livesay Road/S Redland Road intersection will require evaluation through a transportation impact study, including the possible need for a left turn lane and adequate intersection sight distance.

The adequacy of the existing width of S Livesay Road and adequacy to support traffic from the development will need to be evaluated. The current paved width of S Livesay Road is less than 20 feet, varying from 17.5 to 19 feet. The minimum width considered adequate for two-way travel is 20 feet. If access to S Livesay Road is proposed, at a minimum off-site improvements to widen the existing paved width to at least 20 feet will be required from the project site to S Redland Road. Additional improvements will be determined based on the traffic analysis.

6. Based on the scale of the proposed development, at the time of Phase 2, frontage improvements along S Livesay Road will be required. As a collector roadway, a three-lane section is recommended, with a minimum one half right-of-way width of 35 feet.

7. Prior to commencement of site work, a Development Permit will be required and must be obtained from Clackamas County Engineering for all work performed in the S Livesay Road right-of-way.

CONCLUSION

Although the County does not have land use jurisdiction over the proposed subdivision, the County does have jurisdiction over improvements along S Livesay Road. However, the following recommended conditions reflect the County's minimum standards. Where Oregon City's standards are greater, and do not otherwise conflict with the County's storm drainage standards and maintenance practices, the City's cross section may be acceptable.

If the City of Oregon City approves the request, the following conditions of approval are recommended. If the applicant is advised to or chooses to modify the proposal in terms of access location and/or design following the preparation of these comments, this office requests an opportunity to review and comment on such changes prior to a decision being made.

1. All frontage improvements in, or adjacent to Clackamas County right-of-way, shall be in compliance with *Clackamas County Roadway Standards*.
2. The applicant shall dedicate an additional approximately 15 feet of right-of-way along the entire site frontage of S Livesay Road and shall verify by survey that a 35-foot wide, one-half right-of-way width exists, or shall dedicate additional right-of-way as necessary to provide it.
3. At the time of development of Phase 2, the applicant shall dedicate an additional approximately 9 feet of right-of-way on S Leland Road and shall verify by survey that a 39-foot wide, one-half right-of-way width exists along the entire site frontage, or shall dedicate additional right-of-way as necessary to provide it.

Comment #10

4. The following improvements will be required along the entire site frontage of S Livesay Road at the time of development of Phase 2, in accordance with Clackamas County Roadway Standards:

    a. A 25-foot wide half-street improvement is required, constructed from centerline of the right-of-way. The structural section for S Livesay Road improvements shall be constructed per Clackamas County Roadway Standards Standard Drawing C100 for a collector roadway. Where widening is required, saw-cut and grind and inlay may be needed based on road condition, per Roadway Standards Section 225.5.

    b. Standard curb, or curb and gutter if curbline slope is less than one percent, and pavement with the face of the new curb located 25 feet from the centerline of the right-of-way. Centerline of the right-of-way shall be established by a registered survey.

    c. A minimum 7-foot wide unobstructed setback sidewalk shall be constructed along the frontage of the commercial sites on Tracts L and K. The remainder of the frontage a minimum 5-foot wide sidewalk shall be constructed.

    d. A 5-foot wide landscape strip, including street trees shall be constructed along the entire site frontage.

    e. Drainage facilities in conformance Tri-City regulations and Clackamas Roadway Standards, Chapter 4.

    f. For the proposed public street intersection with S Livesay Road, construct dual curb ramps, per Oregon Standard Drawings.

    g. The intersection of Holly Lane with S Livesay Road shall be limited to gated emergency vehicle access only, with the gate approve by the Clackamas Fire District.

5. If full access to S Livesay Road from the Master Plan site is proposed at any one of the proposed phases, a supplemental TIS will be required evaluating the adequacy of the off-site portion of S Livesay Road and the intersection with S Redland Road. At a minimum, a paved road width of 20 feet will be required from the project site to Redland Road, and the roadway is deemed adequate, or made adequate through improvements to support traffic from the masterplan site. Approval of a Development Permit from Clackamas County Engineering will be required for access to S Livesay Road.

Comment #11

From: Tim O"Brien
To: Kelly Reid
Subject: RE: GLUA-20-00045/MAS-21-00006
Date: Thursday, March 31, 2022 1:32:15 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Kelly
Annexation to the Metro District Boundary is separate from annexation to a city boundary. Only the Metro Council can approve an annexation to the Metro District Boundary and a city annexation does not automatically include the area into the Metro Boundary if it is not already within the boundary. All of the other subject parcels were included in the original Metro District Boundary dating back to 1979, however this one parcel was not included at that time.

Tim

Tim O'Brien, AICP
Principal Regional Planner
Planning, Development & Research

Metro I oregonmetro.gov
600 NE Grand Avenue
Portland, OR 97232-2736
Please note I am working remotely
Schedule: Monday – Thursday, 8am to 5pm

From: Kelly Reid [mailto:kreid@orcity.org]
Sent: Thursday, March 31, 2022 12:10 PM
To: Tim O'Brien <Tim.O'Brien@oregonmetro.gov>
Subject: [External sender]RE: GLUA-20-00045/MAS-21-00006

CAUTION: This email originated from an **External source**. Do not open links or attachments unless you know the content is safe.

Hi Tim,

Hmm, that does not match our records – we have that parcel included in the 2018 approved annexation. I have attached documents from the final packet sent to Metro following our annexation approval. I wonder why this parcel wouldn't have been included in the Metro boundary but it was included in the city's boundary… I did not work on this project until just last year so I am not clear on the history. Let me know if I should give you a call to discuss.

Thanks,

Comment #11

Kelly Reid
She/her/hers
Planner
Community Development Department, City of Oregon City
695 Warner Parrott Rd, Oregon City, OR 97045
kreid@orcity.org
(503) 496-1540 Direct
(503) 722-3789 Main
Website
Interactive Maps and Apps
On-Line Submittal of Land Use Applications

The City of Oregon City continues to offer services and programs in-person and online - find facility hours of operation here.

Website: www.orcity.org
Visit us on Facebook! and Twitter
PUBLIC RECORDS LAW DISCLOSURE: This e-mail is subject to the State Retention Schedule and may be made available to the public.

From: Tim O'Brien <Tim.O'Brien@oregonmetro.gov>
Sent: Thursday, March 31, 2022 11:23 AM
To: Kelly Reid <kreid@orcity.org>
Subject: GLUA-20-00045/MAS-21-00006

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

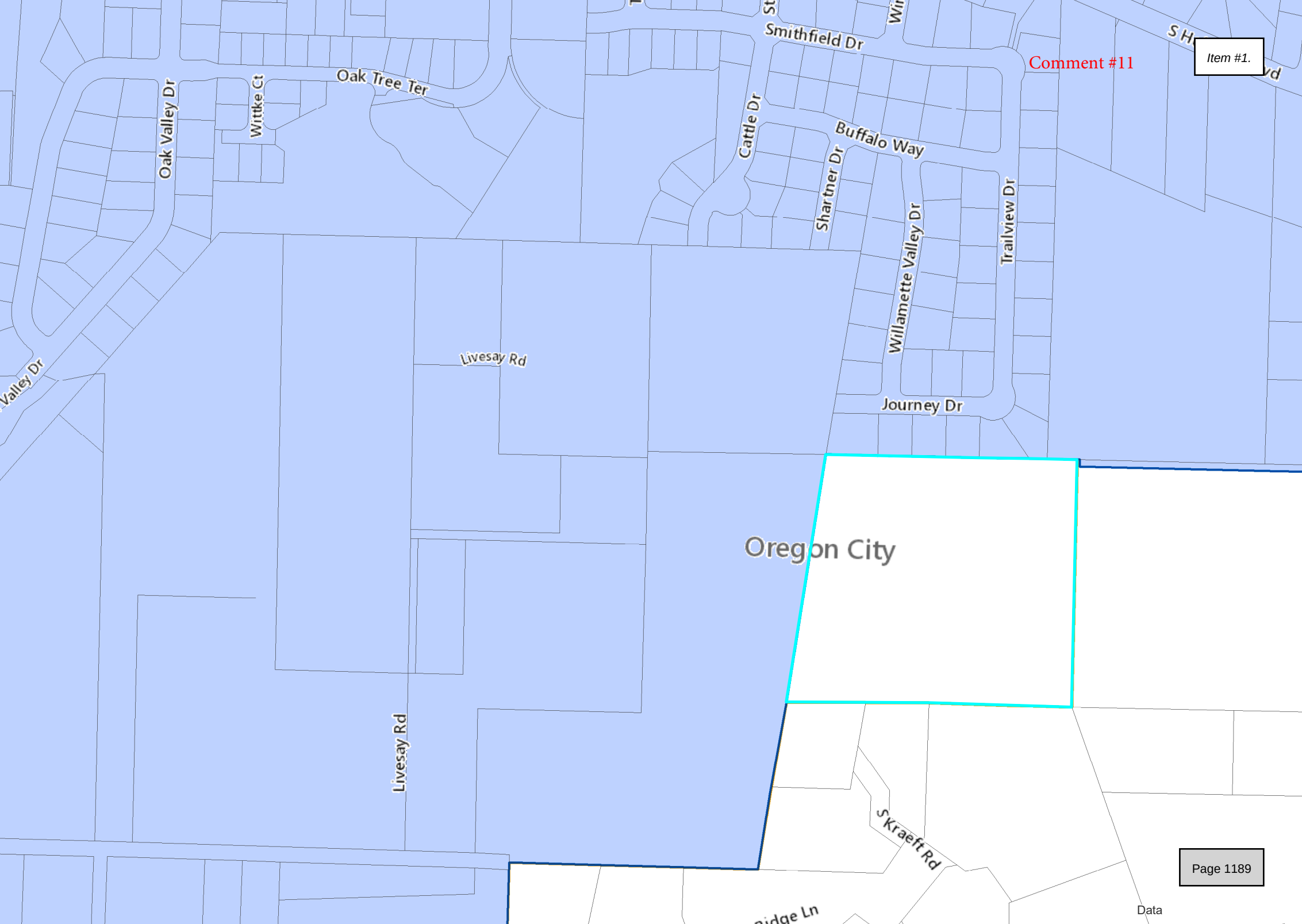
Hi Kelly
In reviewing the materials you sent for the Park Place Crossing Master Plan I realized that one of the subject parcels is not within the Metro District Boundary – see attached map with highlighted parcel. Please forward the attached annexation packet to the applicant's representative. AKS has submitted a number of Metro Boundary annexation applications and they are familiar with the process – although they can contact me with any questions.

Thanks, Tim

Tim O'Brien, AICP
Principal Regional Planner
Planning, Development & Research

Comment #11

Metro I oregonmetro.gov
600 NE Grand Avenue
Portland, OR 97232-2736
Please note I am working remotely
Schedule: Monday – Thursday, 8am to 5pm


Smithfield Dr
Comment #11
Item #1.
Oak Tree Ter
Oak Valley Dr
Wittke Ct
Cattle Dr
Buffalo Way
Shartner Dr
Willamette Valley Dr
Trailview Dr
Livesay Rd
Journey Dr
Oregon City
Livesay Rd
S Kraeft Rd
Page 1189
Data

Comment #12

From: Kelly Reid
To: Kelly Reid
Subject: FW: Parks comment on Park Place Crossing
Date: Friday, April 15, 2022 10:40:12 AM

From: Kendall Reid <kendallreid@orcity.org>
Sent: Friday, April 15, 2022 10:34 AM
To: Kelly Reid <kreid@orcity.org>
Cc: Aquilla Hurd-Ravich <ahurdravich@orcity.org>
Subject: RE: Parks comment on Park Place Crossing

Kelly,

Sure, here you go!

The Park Place neighborhood needs additional public park space, as determined by the adopted Parks Master Plan. The proposed 4.4-acre dedication of public park land appears to be proportional to the number of residential units in the proposal. The location of the 4.4 acres is a relatively flat part of the site that will be suitable for a park. The Parks Department would accept dedication of this land and would develop a Master Plan for the park at a future date. We would request that streets and utilities be extended to the park frontage, but we would not request that the applicant build any improvements within the park itself; the City will also utilize its own funding for the development of the park with recreational amenities. The dedication of the land should occur at Phase 1 to give the public certainty that park land will be provided within the project area if the full 92-acre development is not implemented in a timely manner.

The Parks Department would also accept a larger dedicated park space, especially given that the Park Place Concept Plan calls for an 8–10-acre park in this location. While the shadow plat map shows how additional land could be incorporated into the park in the future to create a larger park, the additional land shown is constrained by steep slopes and a stream, which would limit usable park space and would preclude various recreational uses such as athletic fields and playgrounds. It is not clear how 8 to 10 acres of open, relatively flat public park land would be fully accommodated under this plan.

Thanks,

Kendall Reid

OREGON CITY

Kendall Reid
kendallreid@orcity.org
Parks and Recreation Director
City of Oregon City
625 Center St.
Oregon City, Oregon 97045
503-496-1546 Direct phone
503-657-0891 City phone

OREGON CITY

Community Development – Planning

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

LAND USE APPLICATION TRANSMITTAL – RESPONSE FORM

Date: 3-31-22

Land Use Application File Number: GLUA-21-00045

NAME: Betty Johnson

AGENCY: Clackamas River Water

EMAIL ADDRESS: bjohnson@crwater.com

The land use application material is referred to you for your information, study and official comments. Your recommendations and suggestions will be used to guide the Planning staff when reviewing this proposal. If you wish to have your comments considered and incorporated into the staff report, please return a copy of this form to facilitate the processing of this application and to ensure prompt consideration of your recommendations.

Please check the appropriate spaces below.

☑	The proposal does not conflict with our interests.
☐	The proposal conflicts with our interests for the reasons attached. (Please attach additional information)
☐	The proposal would not conflict our interests if the changes noted below or attached are addressed.

Please add any specific comments below or attach a separate document with more information.

CRW will be the water purveyor to those areas where the City cannot provide adequate water service per the HOPP Agreement.

CONTACT THE PLANNING DIVISION IF YOU HAVE ANY QUESTIONS ABOUT THIS APPLICATION

OREGON CITY
Community Development – Planning
695 Warner Parrott Road | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION TRANSMITTAL – RESPONSE FORM

Date: 4/5/2022

Land Use Application File Number: GLUA-20-00045/MAS-21-00006/VAR-22-00001

NAME: Chris Long

AGENCY: Oregon City

EMAIL ADDRESS: clong@orcity.org

The land use application material is referred to you for your information, study and official comments. Your recommendations and suggestions will be used to guide the Planning staff when reviewing this proposal. If you wish to have your comments considered and incorporated into the staff report, please return a copy of this form to facilitate the processing of this application and to ensure prompt consideration of your recommendations.

Please check the appropriate spaces below.

X	The proposal does not conflict with our interests.
	The proposal conflicts with our interests for the reasons attached. (Please attach additional information)
	The proposal would not conflict our interests if the changes noted below or attached are addressed.

Please add any specific comments below or attach a separate document with more information.

CONTACT THE PLANNING DIVISION IF YOU HAVE ANY QUESTIONS ABOUT THIS APPLICATION

OREGON CITY

Economic Development Department

625 Center Street | Oregon City OR 97045
Ph (503) 657-0891 | Fax (503) 657-7026

April 18, 2022

To The Oregon City Planning Commission

RE: Park Place Crossing Development

After reviewing the Park Place Crossing Master Plan, it is our understanding ICON Construction & Development, LLC intend on developing primarily a residential community that includes a community park, open space, regional stormwater management facility, retail/civic component, and trail amenities.

As you are aware, it is important to be mindful of the need to establish a balance between residential development and business tax base producing investment in the community. In the long run, it is necessary to avoid a situation where the cost of providing public services to residents overcomes the tax revenue generation capacity of for-profit enterprise. Such an imbalance can be problematic. While we recognize that homeowners pay property taxes, the tax revenue generated by private for-profit enterprise is greater and the public services required of businesses is generally less.

Hence, it is preferable that there be a for-profit business investment component realized in this planned community. In its 2022- 2027 Economic Development Strategic Plan, the Economic Development Department of Oregon City cites the need for "spec" commercial buildings within the city. The department receives calls almost monthly from business investors seeking a space that they can custom design to meet for their needs. For instance, the need to have available facilities especially designed for childcare has become more acute over the years.

The Park Place Crossing Master Plan calls for the project to be developed in six phases. In that ICON Construction & Development, LLC is not known for the development of commercial/business structures or sites, there is a concern that the proposed retail/civic portion of the development may, in actuality, not be developed by ICON. Therefore, to ensure that the planned retail/civic component becomes a reality as cited in the Parks Place Concept Plan, we support certain stipulations:

- when the residential component reaches 60% completion, the developer be required to install all necessary infrastructure to make the sites reserved for retail/civic development shovel ready for this particular purpose, and
- require ICON to offer for purchase the sites reserved for retail/civic development to the City of Oregon City on a right-of-first refusal basis for up to 12 months, permitting the purchase price to be set by appraisals of the sites ordered by the City of Oregon City.

We look forward to monitoring the development of the site as stipulated in the Parks Place Concept Plan.

Yours truly,

James N. Graham, CEcD
Economic Development Manager

CITY OF OREGON CITY

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

To: Planning Commission **Agenda Date:** 07/11/2022

SUBJECT:

Public Comments for GLUA-21-00045 / MAS-21-00006 / VAR-22-00001
Park Place Crossing General Development Plan

Below is a list of all public comments received for this land use application prior to June 30, 2022. The document is split into four separate PDFs due to the large number of comments and information provided.

Each item is included in this document in the order listed below.

Each item on the list below is a clickable link to navigate to the specific comment within the document.

PART 1 - SEE SEPARATE DOCUMENT

1. Jed Pedersen emails dated March 31, 2022, April 2, April 3, and April 10, 2022
2. Sharon and Neish emails dated April 3, 2022
3. Sharon and Ken Neish emails dated April 4, 2022
4. Jackie-Hammond Williams letter received April 11, 2022
5. Janice Troxler letter dated April 7, 2022
6. Barbara Renken letter dated April 8, 2022
7. Christine Kosinski letter dated April 11, 2022
8. Park Place Neighborhood Association letter dated April 11, 2022
9. Hamlet of Beavercreek letter received April 11, 2022
10. Clackamas County Engineering Division letter dated April 15, 2022
11. Metro emails dated March 31, 2022
12. Kendall Reid, Oregon City Parks and Recreations Director email dated April 15, 2022
13. Clackamas River Water comment form dated March 31, 2022
14. Oregon City Building Division comment form dated April 5, 2022
15. James Graham, Oregon City Economic Development Manager letter dated April 18, 2022

PART 2 - CLICK EACH LINE BELOW TO NAVIGATE DIRECTLY TO COMMENT

16. Kirk Tolstrup email dated May 2, 2022
17. John Widmer email dated May 6, 2022
18. Janice Troxler email dated May 5, 2022
19. Karla Laws letter dated May 8, 2022
20. Christine Kosinski email dated May 9, 2022
21. Jane Varley, Michael Mueller, Dan and Shannon Keller, and Shirley Humprey letter received May 9, 2022
22. Darin Shoup email dated May 9, 2022

23. Mikhail Krughkov email dated May 9, 2022
24. Adella and Mark Bell slides dated May 9, 2022
25. Rivers of Life Center letter dated May 9, 2022
26. Oregon City School District letter dated May 9, 2022
27. Melissa Warner email dated May 9, 2022
28. Jed Pedersen slides dated May 9, 2022
29. Brent and Jamie Gross email dated May 9, 2022
30. Jaimee Melilli email dated May 9, 2022

PART 3

31. Enoch Huang and Roya Mansouri slides dated May 9, 2022
32. Enoch Huang and Roya Mansouri letter dated May 9, 2022
33. Emily Lisborg email dated May 10, 2022
34. Ken Iverson emailed dated May 9, 2022
35. Barb Seekins letter received May 9, 2022
36. Trailview Heights HOA letter received May 9, 2022
37. Sutton map received May 9, 2022
38. Tom Geil slides received May 9, 2022
39. Stephen Ford letter received May 9, 2022
40. Jackie-Hammond Williams letter received May 9, 2022
41. Tara McElhannon letter received May 9, 2022
42. Sharon Neish emailed dated May 10, 2022
43. Carolyn Lu email dated May 11, 2022
44. Anonymous website submission dated May 11, 2022
45. Lynette Basiou email dated May 12, 2022
46. Photos from Planning Commission Chair's site visit dated May 9, 2022
47. Clackamas County Disaster Management public records request email dated May 11, 2022
48. Tom Geil and Dirk Schlagenhaufer facebook posts dated May 12, 2022
49. Jackie Dalseme emailed dated May 12, 2022
50. Tom Geil Oregon City News opinion piece dated May 12, 2022
51. Department of Land Conservation and Development (DLCD) email dated May 13, 2022
52. Jane Nitschke email dated May 15, 2022
53. Suzanne Hammond emailed dated May 14, 2022
54. James Nicita email and attachments dated May 13, 2022
55. UGB map received May 17, 2022

PART 4

56. Christine Kosinski/Scott Burns letter dated May 23, 2022
57. Christine Kosinski letter dated May 23rd, 2022
58. Tara McElhannon email dated May 23rd, 2022
59. Maryann Lee email dated May 22, 2022
60. James Nicita email and attachments dated May 22, 2022
61. James Nicita email #2 and attachments dated May 22, 2022
62. Emily Lisborg email dated May 18, 2022
63. James Nicita email dated May 24, 2022
64. Jed Peterson email dated May 21, 2022
65. Sharon Neish Oregon City News opinion piece dated May 23, 2022

66. Roya Mansouri email dated May 23, 2022
67. Roya Mansouri letter received May 23, 2022
68. Roya Mansouri email #2 dated May 23, 2022
69. Scott Coleman letter received May 23, 2022
70. Sharon Neish email dated May 24, 2022

From: Kirk Tolstrup
To: Kelly Reid
Subject: GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Master Plan and Variance for Park Place Crossing Development
Date: Monday, May 2, 2022 1:31:38 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Kelly,

I don't know if this has any bearing on the hearings for the Park Place Crossing plan but at the first hearing when you were laying out the background and history of the subject site you mentioned that the site was added to the UGB in the 2002 UGB expansion.

This section of the Park Place Concept Plan area is peculiar in that the majority of it wasn't part of that expansion. If my research is correct, only tax lots 100, 190 and 1000 (35 acres) of the subject site were added to the UGB in 2002. The balance and majority (57 acres) of the tax lots in this application were included in the original UGB at its inception.

Thank you,
Kirk

16530 S Livesay Rd, Oregon City, OR 97045

From: John Widmer
To: Planning
Subject: parkland crossing
Date: Friday, May 6, 2022 8:46:25 AM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am a resident of Oregon City who was recently informed about Parkland Crossings as a potential site for future housing development. My one question is, if we have a SQ Ft Lot minimum in Oregon City, why in the world would we grant an exception for this project. My big opposition has to do with ignoring the local rules to make an exception for a project of this nature. Make no mistake that we do not want housing density unless we maintain the current rules and the builder respects the current nature of Holcomb Blvd and its current "neighborhood" feel. This is a developer focusing on profits over their concern for our current residents. Move this project to an appropriate area.

thanks
John Widmer

From: janice troxler
To: Planning
Subject: Park Place Crossing Proposed Development
Date: Thursday, May 5, 2022 2:20:10 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please consider the following:

1. Traffic with 475+ homes and a park area for games. Yes, some traffic will go onto Redland but most will go out onto Holcomb. Blvd. Holcomb Blvd. already has issues with traffic from old neighborhoods and the new Kitty Hawk housing area.

We are also looking at two other developments: A portion of Serres farm with homes. The other development would be the End of the Oregon Trail / "old dump" site.

2. New schools will need to be built - who is paying for them?

3. During the fire evacuation we had to drive approximately 5 miles to safety -- which took 2.5 hours.

Please consider the traffic on the two-lane roads (Holcomb and Redland). Of these new developments (Park Place Crossing and Serres Farm, there will be approximately 2 cars per home (about 1800 added cars).

So much will be taken away from our historic Oregon City.

Thank you for taking the above into consideration.

Janice (Jan) Troxler

May 8, 2022

419 Roosevelt St
Oregon City, OR 97045

Oregon City Planning Commission
615 Center St.
Oregon City, OR 97045

Subject: GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan

Dear Planning Commissioners:

I am extremely concerned about this development, especially concerning geographical concerns, congestion, traffic, safety, the infrastructure of stormwater/wastewater, and parking minimally. Holcomb is a bottleneck and there is no way to help improve traffic, especially in a natural disaster. Traffic issues/safety is an issue for my neighborhood as well, being the Elyville Chair, about traffic safety from families from our neighborhood traveling to Park Place Park and to Holcomb Elementary School.

My biggest concern here, like in my neighborhood as the Chair of Elyville NA, is the administrative process. We are getting results from the OC 2040 that many residents are concerned about wetlands, geological overlay, and trees. This development seems to not honor overall the feedback city staff is getting from the residents, us who pay taxes and city staff salaries. What is the point of implementing the OC 2040 if the staff are not already concerned with what we the residents want, the people who live here and not just work here? The original “Park Place Concept Plan” has been altered dramatically. A process and commitment were made with Park Place NA, city staff is the gatekeeper to the plan. The city staff is responsible for following through with the neighborhood. How can this neighborhood or any neighborhood trust that our city will care for residents' needs, their feedback, or their best interests? Paperwork is posted inconsistently and at the last minute, similar to Elyville NA concerning Holmes Condominiums. We the residents are not professional lawyers or land use attorneys. Current conduct is not helpful or supportive of Oregon City residents. Overall, this new concept and land use application are not good for Oregon City.

I appreciate your time and thank you for listening!

Sincerely,

Karla Laws
Volunteer, Elyville NA
Volunteer, Citizen Involvement Committee
Volunteer, OC 2040

Oregon City Planning Commission Meeting of May 9th, 2022 e-mailed on 5/9/22

RE: Testimony of Christine Kosinski, Unincorporated Clackamas County
Agenda Item 1 – GLUA 21-00045/MAS-21-00006/VAR 22-00001 Park Place Crossing

I request that the City keep the records open for the above Land Use Application because of the many unresolved problems that plague the Park Place/Holcomb/Redland Rd/Holly Ln area. Two of the problems are so serious, they will stop this development. You have NO roads, Holly Ln is incapable of the large traffic loads (read below) and until the City provides Landslide Insurance, they risk future litigation since new property owners are not being told this is a landslide zone and there is NO Landslide Insurance available anywhere to pay for losses due to landslides. The people need answers from the City and Traffic Engineer before this proposal can go forward as currently designed. There are at least four other additional demanding issues that must be resolved, and to date, these additional issues have not been addressed by the Planning Commission, and must be answered prior to any consideration for approval or disapproval. These issues are as follows.....

1) **HOLLY LANE – Is it really safe to use? -** I am providing you with information about Holly Ln, I transcribed from the tape of two City Commission meetings, where strong concerns were brought forward by City Commissioners regarding any use, by the City, of Holly Ln, and whether it should be considered for removal of the Oregon City TSP. Here is what was said,

First Meeting transcribed =Oregon City Planning Commission, meeting of January 25th, 2016

(Bottom of Pg 6) **Commissioner McGriff** – "Pete, I appreciate this, but I do not see how in any universe that we could ever get this on Holly Lane – EVER! - Its just not – this could never happen on Holly Lane. I have to say that for the record".

(Pg 7, 3rd paragraph) **Commissioner McGriff –** States to Pete Walter, "I wish there was a way we could recommend that the TSP be amended to take substantial portions of Holly Ln out, because I think it's a (fool's errand) to think we're going to do anything. I mean, I don't see it ever happening, and why, we've got geologic hazards, we've got, there are just so many impediments to Holly Lane tht is not funny, I would never buy property on Holly Ln."

(Pg 7, 3rd paragraph) **Pete Walter, city planner** – States "Well, there are No other South/North alignments except for I-205 and Molalla Avenue identified in any of our TSP's. There's nothing further East plus our UGB doesn't go that far, so in terms of North/South connectors and what we have to work with within regulatory boundaries."

(Pg 8, lines 7-14) (Mabee) Yes, we recognize **Holly Ln is an impossible dream**, um, (Espe) it needs a little more help than that, (Kidwell) I think what we're suggesting is that the status of Holly Ln in the TSP be reconsidered based on the reality of (Mahoney/McGriff/Kidwell) unrealistic limitations and in fact the City of Oregon City has no jurisdiction over that road, nor do we want jurisdiction unless it gets, (Mahoney) yet for some reason we've adopted tht responsibility. (McGriff) Guys, we brought this up when we were reviewing the TSP about Holly Ln, we said "what's the likelihood", and the City Staff person said the likelihood that that's ever going to happen is "slim to slim".

(Pg 9, last para.) – Denyse McGriff stated "go ahead Damon Mabee and say it, the impossible dream.

Second Meeting transcribed = Oregon City, City Commission meeting, of March 02, 2016

(Pg 3, lines 6-15) The biggest issue that I think we heard about all of this, with regard to traffic and transportation was Holly Lane, and I know many of you have been on Holly Lane, but maybe not lately, but we are very concerned about Holly Lane, it is severely constrained and it is very unlikely that in any near future of our lifetimes that the County's going to have any money or that we would have sufficient money to make it a Minor Arterial. We would like to see, at the very least, that we look at putting either amending the TSP to remove a portion of Holly Lane or at least putting an Asterisk so that we know it is a constrained facility and that it is going to take a lot more than what we currently have right now to try to deal with that situation. We kind of feel that, we cannot in good conscious, recommend that we add more trips to that in its current configuration and construction".

GOAL 1 - A **program that insures the opportunity for citizens to be involved in all phases of the planning process**. The staff of the City of Oregon City, have purposefully and neglectfully, not sent notices to any of the homeowners living on Holly Ln, outside of the UGB, even though, since the inception of the Park Place Concept Plan, I have requested the City to send notices to these homeowners since the City decided in 2013, against the will of these people, to put Holly Ln into the Oregon City Transportation System Plan. I am assuming city staff does not notice Holly Ln, outside the UGB, because staff thinks they are more than 300 feet from the boundaries of the Park Place Concept Plan. Because the City has openly planned, since 2013, to place all of Holly Ln, including the part outside the UGB, into their plan for The Park Place Concept Plan, the homeowners living on Holly Ln, outside the UGB, are within 20-30 feet of the street. In other words, the City is making a decision, on their own, to grab Holly Ln for itself. Therefore, since the people are only 20 feet away from Holly Ln, a major street planned for the Park Place Crossing development, this puts these citizens in the center of the Park Place Crossing plan, and by law, they should be noticed. Actually, the peoples of Holly Ln could ask Oregon City to begin hearings all over again on both the Park Place Concept Plan as well as the Beavercreek Concept Plan, they could ask the City to begin at 2004, since the City has unlawfully kept them out of all of the planning process for both of these large developments. Oregon City has been neglectful in leaving these people out of the planning process and must now go back to as far as 2004, if that's what it takes, to help these homeowners understand the disastrous effects the Park Place Crossing, the Park Place Concept Plan, and the Beavercreek Concept Plan, will have upon their properties, the property valuations, the huge amount of safety being lost for these homeowners, as well as the fact they live in a Landslide Zone and cannot obtain insurance for losses due to landslides. So what will it be Oregon City? For the last time, when are you going to notice the people on Holly Ln, outside the UGB, of the bulldozer coming their way. If you fail to notice the people, you will be non-compliant with GOAL 1. We are through requesting, as we have done at least 5 times in the past, to be included in these hearings, we will not request again without taking further action

.

LANDSLIDE INSURANCE – Where is it?.....There is NO Landslide Insurance available. Since the disastrous floods of 1996-97, insurance companies in the United States all took such catastrophic losses they could no longer offer insurance that would cover losses due to landslides. As I have testified many times to the City, the buyer's of new homes are not being told they are moving into property in a landslide zone and that there is no insurance to cover losses due to landslides. It is criminal for these citizens to purchase very expensive homes and then not be told the truth about the property they are buying, even though proof is now available through Lidar imagery. It is unconscionable that Oregon City is allowing this to happen, it is the most illegal transaction I have seen a government do. **I have testified to Oregon City hundreds of times regarding the fact that Landslide Insurance does not exist.** The City
may feel they are innocent, since they have the developer sign a waiver that is somehow to hold the City harmless. It is time for the City to end this practice, especially now, since they want to acquire Holly Ln which is filled on both sides with landslides, many are active. Oregon City proposes at least 40,000-50,000 ADT's per day down Holly Ln from the Beavercreek Concept Plan, and the City must acknowledge these numbers to the people of Park Place, as they must realize when traveling down the Holly Ln Extension, from Holcomb down to Redland Rd, they will be facing this huge amount of traffic trying to take a left turn onto Redland Rd. In essence, there will be about 40,000 ADT's per day from the Park Place Plans and 40,000 from Holly Ln. Let's be honest, SHEER GRIDLOCK! And to make matters worse **NO LANDSLIDE INSURANCE!**

2) **CITY OF OREGON CITY TO PAY FOR LANDSLIDE INSURANCE** – This is correct, the people of Holly Ln have literally begged the City to acknowledge the fact that landslide insurance does not exist, that the City should not be heavily developing in these hazardous lands. If you are going to continue to allow buyers to purchase property in landslide areas and withhold this valuable information from them, as well as not notifying them that Landslide Insurance does not exist, then the City should be liable. After all, the City is breaking it's own Comprehensive Plan, it's agreement with FEMA, the DLCD Landslide Guidelines, as well as all requirements of State land use Goal 7, each time they allow this important information to be withheld from the buyer. They also want to heavily use Holly Ln, a street that just a few years ago suffered six landslides, a street where landslides remain active. The heavy traffic you propose, the widening of Holly Ln to three lanes, bike lanes and etc, any of these could easily reactivate these slides and these homeowners have **no landslide insurance**. If the City takes over the street, then they take over ALL LIABILITY, not only for Holly Ln, but for Holly Ln east and west extensions, as well as the new homes in Park Place, because you, the City are withholding information from these people that could financially ruin them for life. If the City does not want to pay for the landslide insurance, then they should get themselves down to the State Capital and hammer out a plan with the administration that would cover all homeowners in the State of Oregon. Again, something I have asked the City to do on numerous occasions.

If the City wants Holly Ln, **they pay for it**, because when they take over, it will be assumed all future landslides are caused by actions of the City.

3) **STATE LAND USE GOALS I, 5, 6, 7, 12 –** The City is non-compliant with these land use goals for the Park Place Crossing Plan.

4) **THE TRAFFIC ENGINEER'S REPORT FOR PARK PLACE CROSSING –** Report is incorrect in many ways and must be corrected. In 2008, the ITE Manual called for 10 trips per day, per car, for every single family home. I don't think the ITE manual has changed that much since 2008, for the Traffic Engineer to give such dramatically low ADT's per day from the 476 homes in Park Place Crossing. The actual figure for 476 homes, with two cars for each home, would be 9,520 added trips per day. The ADT's per day must be corrected, and also, a corrected TSP must be addressed by the Traffic Engineer and the City. **THE KITTLESON REPORT FROM 2007 shows the Park Place Concept Plan to generate 22,990 new weekday daily trips, they additionally state "Redland Road, Holcomb Blvd, and Holly Lane are also forecast to experience significant increases in travel demands. Each corridor is constrained by narrow rights-of-way and difficult topography.** All of this being proposed down roads that can barely handle to amount of trips per day they currently are experiencing. Holly Ln, Holcomb, Redland, Maplelane, Thayer.....all of these roads are in no condition to take on this type of heavy traffic. A new traffic plan must be addressed, one that connects Park Place directly into the I-205.

5) The Planning Commission should not consider approval at this time until the difficult transportation issues can be resolved, there are NO roads in this area to support this type of large development. The fact there is NO Landslide Insurance for any of these homeowners must be addressed. The density being proposed is way too dense for a hazardous landslide area where the Bolton, Oatfield and part of the Portland earthquake faults lie. The City must meet with the State regarding a program for homeowners living in these hazardous areas. Yes, FEMA will pay somewhat, however they pay poorly for landslide damages which are usually very high and catastrophic. If we get a bad earthquake in the Holly Ln/Park Place area, some of these homes will come down like dominoes. This is nothing to take lightly, the DLCD and DOGAMI Guidelines must be part of the Park Place Crossing Plan and all future plans for both Park Place and Holly Ln. The homeowners must know they are moving into a landslide area and that there is no insurance available to pay for losses due to landslides. With the huge amount of large development Oregon City has been undertaking in the hazardous and challenging landslide areas, they could be placing themselves in a high liability situation and this must be considered.

Oregon City - City Commission meeting of March 02, 1016

Mayor, Dan Holladay Commissioner Brian Shaw Commissioner Rocky Smith

Commissioner Carol Pauli Commissioner Renate Mengelberg

Agenda Item 6C: PC 16-037 Re-adoption of the Beavercreek Road Concept Plan

RE: Transcription of Video Tape showing strong concerns from the Planning Commission, to the City Commission, that either part of Holly Lane be taken out of the Oregon City TSP or that the street be labeled as "Constrained." This was in a Memo delivered from the Planning Commission to the City Commission, which included these three additional strong concerns, a specific response from Tri-Met, Mobility Standards, and clarification for Cottage manufacturing. The Planning Commission stated in their meeting of January 25th, 2016 that they would pass along these very large concerns to the City Commission as they felt strongly these needed further deliberation and action at the City Commission level.

At 2:49:00 the Video Tape, the hearing begins with the Mayor opening the hearing.

At 2:58:00 on the Video Tape Mayor Holladay begins by speaking to both Planning Commissioner Chair Charles Kidwell, and Vice-Chair Denyse McGriff. Mayor Holladay states "Before you guys start talking, I want to say that we couldn't do this job without you guys doing your job" and that while Ms. McGriff and I have been on opposite sides of many issues, I have a great amount of respect for the amount of time you have spent inside the planning community both here in Oregon City and in the City of Portland and now that you know the stuff inside out and upside down and backwards and so I'm confident that any challenges that might come up to this, I think you guys have probably already visited, so thanks again for both of your service." Chair Kidwell responds by stating "Thank you for the compliment although as a professional land use planner, we always have things to learn and I appreciate working with our staff because we work with each other, but we were going to have some T-

shirts printed up for you that said " We do the heavy lifting so you don't have to", but we decided not to wear those tonight."

Charles Kidwell, Chair of the Planning Commission and Denyse McGriff, Vice-Chair Planning Commission, thank you for hearing us this evening. Mayor Holladay, City Commissioners, thank you for the kind words and we were elected by consensus of the Planning Commission to come and share just a few thoughts with you, this was a particular issue that as a Commission we didn't feel like we just wanted to pass it on to you without a little bit of commentary, so with the assistance of Mr. Walters (city planner) we have prepared a memorandum which you have in your packet and I wanted to take a few moments just to read a few of the more, what I would consider, important points and Denyse and I are going to do a little "tag team" effort, we're not talking about mud wrestling, we're talking about giving you the information. There were a few areas that we both had specific concerns about that we wanted to share with you. There was a lengthy detailed process that the Planning Commission went through in reviewing this reconsideration of the Concept Plan and the re-adoption of that and through that there was quite a bit of public testimony and we believe that the Beavercreek Road Concept Plan re-adoption strikes a balance between achieving the communities vision for complete and sustainable community with opportunities for Oregon City residents to live and work and _____ fully endorse the adoption of this plan, but we have several points that we wanted to bring to your attention that we believe warrant special on-going consideration, and one of those is the **Transportation issues** especially those related to **Alternative Mobility Targets and Tri-Met service and Holly Lane.** We heard testimony from ODOT officials in support of the planning process for the Beavercreek Road Concept Plan and urged the City Commission to follow through with the adoption of the Alternative Mobility Standards as soon as staff is able to prepare them and these targets must be adopted prior to any re-zoning of lands within the concept area. You saw the meetings, we spent quite a bit of time on this, we're really concerned basically that there is a large amount of congestion in this area, particularly

at the intersection of Hwy 213 and Beavercreek Road, we also know that a lot of that traffic is not generated from within Oregon City, it comes in Oregon City and out Oregon City and goes to parts unknown, but we still feel really responsible about making sure we have good land use planning with regard to Oregon City's Comp Plan and the Metro Functional Regional Plan. It's really imperative that we work, whether we have to drag them kicking and screaming, with Clackamas County to get some of this work done, Clackamas County, the State and Metro. **The biggest issue that I think we heard about all of this, with regard to traffic and transportation was Holly Lane,** and I know many of you have been on Holly Lane, but maybe not lately, but we are very concerned about Holly Lane, it is severely constrained and it is very unlikely that in any near future of our lifetimes that the County's going to have any money or that we would have sufficient money to make it a Minor Arterial. We would like to see, at the very least, that we look at putting either amending the TSP to remove a portion of Holly Lane or at least putting an Asterisk so that we know it is a constrained facility and that it is going to take a lot more than what we currently have right now to try to deal with that situation. We kind of feel that, we cannot in good conscience, recommend that we add more trips to that in its current configuration and construction. Both of the Commissioners have, what I thought, almost a humerous overall, although I'm not sure it was intended to be a humerous suggestion that we institute a Toll Gate at the entrance to Oregon City at both ends to deal with the notion that Commissioner McGriff has raised that a significant portion of traffic that we are dealing with at these key intersections come from outside Oregon City. From a serious point of view I think it just emphasizes the need to expand our conversation beyond the boundaries of Oregon City, its really, we talk about Holly Lane, but its beyond Holly Lane to get the County involved in this conversation because our TSP needs to dove-tail with their TSP, beyond that the Alternative Mobility Standards are the key component that is the Tri-Met component of mass transit, and without an adequate bus system there is not a realistic alternative for mobility, very few people will be able to walk from where they live to work and bicycle riding in Oregon City is not realistic for most people so the bus is really the best and most realistic option. We

had a meeting and a presentation on February 22nd where a Tri-Met representative came and we had a conversation with them and explained our concerns, what we're suggesting is that the City strongly is encouraged to pursue tangible set of surface improvements with Tri-Met and we're recommending some sort of partnership with Tri-Met be considered and possibly implemented . We recommended to Tri-Met that they consider smaller shuttle buses within the boundaries of Oregon City to help bridge the gap between people getting from home to the main transit lines. So I think that's an important component of the alternative mobility so the Planning Commission is strongly recommending two parts, to implement the alternative mobility standards let us work with the County, and the second is to work with Tri-Met and then together I believe we will help to address the transportation considerations in this Concept Plan.

At 3:08:00 on the Video Tape, Mayor Holladay addressed Goal 5 issues as a last point.

When the Mayor was done, Chair Kidwell came in and stated . The Planning Commission is in full agreement that there are some considerations that need to be addressed, primarily with the Transportation issues and some of the environmental concerns need to be looked at, but the overall view is that we feel confident that this re-adoption of the Beavercreek Plan should be considered and approved by the City Commission. We recommend that.

At 3:09:00 on the Video Tape – a short summary was given

At 3:10:00 on the Video Tape – Jon Makler from ODOT spoke. Talks about Trip Cap, congestion at 213/Beavercreek, alternate mobility standards, shows non-support of grade separated interchange.

At 3:17:30 on the Video Tape - Elizabeth Graser-Lindsey spoke about family wage jobs, about transportation plan being 10 year old studies – spoke of Goal 2. Water & Sewer being 10 year old reports and fact that there is no money for roads.

At 3:21:40 on the Video Tape – Paul Edgar spoke about all the State goals, fact that BRCP transportation plan is 10 years old and the need for a new updated TSP.

The hearing was closed here and the City Commission went into deliberations.

Commissioner Pauli talked about transportation, that all the needs will work out over time. She stated how the Planning Commission has been trying to get in touch with Tri-Met. She stated that until there is a demand for more capacity on the roads, nothing will change. She said, how can we work smarter and not more costly. Its a plan, as we work through it, everything will be worked out.

Commissioner Mengelberg stated, we've had a decade, lets move forward

Commissioner Shaw talked about the two most important projects, the Willamette Falls Legacy and the BRCP. He talked about the Meyers Rd Extension and how it will help, he says let's go.

Rocky did not deliberate

The Mayor spoke last, then Commissioner Pauli made the motion to approve, the Vote was 5 Yes 0 No.

Note: The Planning Commission had 4 very long, in depth, hearings on the re-adoption of the Beavercreek Road Concept Plan. They submitted a Memo to the City Commission regarding four large concerns they are passing along to the City Commission for action. Those concerns are, specific response from Tri-Met, mobility standards, clarification for cottage manufacturing, and the status of Holly Lane. The City Commission deliberated only **Eight Minutes** at this first hearing for the re-adoption of the Beavercreek Concept Plan, they only slightly mentioned transportation, but for the most part, all four large concerns passed along to them, from the Planning Commission, were not addressed!

Oregon City Planning Commission - Meeting of January 25th, 2016

Commissioner Charles Kidwell, Chair Commissioner Paul Espe Commissioner Tom Geil

Commissioner Denyse McGriff Commissioner Bob Mahoney

Commissioner Damon Mabee Commissioner Zachary Henkin

Video Tape starts at 1:40

Agenda Item: Re-adoption of the Beavercreek Road Concept Plan – PC 16-017

RE: Transcription of Video Tape showing, **(1)** strong concerns from the Planning Commission that either part of Holly Lane be taken out of the Oregon City TSP or that the street be labeled as "Constrained." Planning Commission emphasizes here the importance of a "Memo" that the Planning Commission will both send to, and verbally give to, the City Commission regarding four major concerns that they want to bring to the attention of the City Commission for action. Those concerns are **(a)** specific response from Tri-Met with respect to the Southeast corridor and its requiring improved service **(b)** Mobility Standards **(c)** clarification for Cottage Manufacturing being part of the employment land (d) status of Holly Lane for areas outside the UGB in terms of it being reconsidered in the TSP as well as its functional classification.

Also transcribing the section of Video Tape (especially between **1:06:02 and 1:23:00)** showing **(2)**, how the Planning Commission struggled with the Alternative Mobility Studies, how information was not in the file that the Commission needed, ie, the letter from Vanessa at Tri-Met and what that letter stated. Many of the Commissioners had strong concerns that Tri-Met has been absent in and not sensitive to the needs of our community.

At 1:05:00 on the Video Tape – Pete Walter, City Planner, stated to the Planning Commission that Staff is recommending that the Planning Commission find for approval of the BRCP and its appendices. We have provided Findings, how it meets the Statewide Land Use Goals, Metro Title I, Metro Title 4, as well as applicable concept plan criteria based upon the record and the findings. As you know the record for this re-adoption is very large and it includes multiple sets of public comments, reports, memoranda and staff responses.

At 1:06:02 on the Video Tape – Pete Walter goes on to state to the Planning Commission "It, the plan, will be reviewed in its entirety at the City Commission level again. The Memorandum is intended to raise just the final issues raised in the Planning Commission meeting of January 11th, 2016. Let's summarize some of those concerns just as the Planning Commission deliberates, so the Memorandum I put before you addresses Tri-Met, Holly Lane, the Alternative Mobility Targets, Open Space and the issue of Cottage manufacturing industry employment and Home occupations. First, with respect to Tri-Met, I included a letter from John Lewis, our Public Works Director, which was addressed to Tri-Met official and it talks about the Southeast Enhancement Program that Tri-Met has put out there. So, John's letter is addressing the southeast enhancement plan and it includes recommendation to request further planning for the following areas, Meyers Road with service to Clackamas Community College and the BRCP concept area. This would be to increase safety and efficiency by routing Tri-Met buses through the community, the college and out Meyers Rd Extension and to spur development of industrial sites in order to foster family wage jobs and support economic growth. It also mentions Clackamette Cove as an area needing transit service in addition and also turns South Oregon City community and jobs connector shuttle. John Lewis also wanted to state that we need to coordinate our communication with Tri-Met through Public Works since they have a department that works with the Transportation Advisory Committee and he has been doing a lot of work with Tri-Met ever since this issue came up.

If you recall, it came up with the South End Concept Plan as well, That being said, this is certainly something we will carry forward to the City Commission. **Commissioner McGriff** asked Pete Walter, "Where the other half of this letter is – from Vanessa at Tri-Met. Commissioner McGriff stated that the Planning Commissioners do not have this letter.

Chair Kidwell stated "in echoing Commissioner McGriff's concerns, I would like to see some tangible evidence that Tri-Met is being responsible to the concerns we have, maybe we can suggest that they give us a "Plan of Action", something that is what they are intending to do and not just give us some platitudes. **Commissioner Henkin** then stated, "and just to reiterate, so your expectation is that with the approval we have before us tonight, that we would expect an up to date response from Tri-Met in time for the City Commission meeting. Well, through the public process of, at the City Commission level, we want to see something entered into the record as a response to the plan and to the Planning Commissioners and the City Commission.

Commissioner McGriff – stated, "I'd sure feel a lot more comfortable if I knew that now." Pete Walter answered – Well, I understand that, but this is a Concept Plan and we know through experience that Tri-Met has commented on applications for development when they come in, and so I feel that at this level of planning its, the timing is right. The majority of these properties have not been developed and won't be developed until there is a zone change approved and the zone change won't be approved until the Alternative Mobility Targets and subsequent site planning are done, so its definitely not our last time to get a bite of the apple.

Commissioner Espe – stated, "when we get down the road to a project, we're going to do X,Y &Z at such and such a time and I guess that all depends on how you want to have your concept plan, but there needs to be something, some kind of acknowledgment, I can't make a decision on this tonight until I see Tri-Met do something. It doesn't have to be exactly how many bus stops, or how many bus trips they're going to do, but I think there really does have to be some kind of give and take and between the City and Tri-Met on how all of this is going to work. If we're going to do the TSP with Alternative

Modes, this is kind of a big piece of that alternative pie."

Commissioner Mahoney – stated, "he feels there is a struggle between the cities and Tri-Met that right now is the **big elephant in the room** because they have the power and until the City Commission just says, **We Demand – and I use the word Demand**, we want some responses on what your plans are for Oregon City because we've addressed it, but you haven't addressed Routes, Manpower and Stops, we can't do that, but the City Commission has got to require that Tri-Met respond to this communities concerns about service and we haven't done that."

Commissioner McGriff – stated, "we are trying to approve a plan that relies heavily on Alternative Mobility, she goes on to say that she thinks the Planning Commission has the power to request answers to these concerns.

Commissioner Mahoney – states, "This has to come from Tri-Met, but how are we gonna get them to respond if they won't.

At 1:16:47 on the Video Tape

Commissioner Mabee – I have an idea that might get Tri-Met to respond and that's that we add to this "that if Tri-Met is unable to meet the needs of the community, we withdraw from Tri-Met and an alternative means be established to meet the needs of the community, maybe we contract with City of Canby, contract with the school to run little yellow buses, maybe we should put into this Concept Plan that Tri-Met not be a part of it."

Commissioner Mahoney – I agree and support what the Planning Commission is trying to do, but I think we should advise the City Commission that we are unable to proceed and complete the BRCP without the input from Tri-Met.

Commissioner McGriff – We don't kick the can to them

Commissioner Mahoney – That's right, we don't have the authority at this level to do that, if Tri-Met gets the message from our City Commission, based on our recommendation, then something's going to be done, but we're not going to write a Memo.

Chair Kidwell – What if we include something like Commissioner Mabee has suggested as leverage.

Chair McGriff – If I think I heard what you're saying, I'm not ready to move this forward unless we get a response from Tri-Met.

Laura Terway, City Planner – Can I chime in, one thing is that we don't know what the Alternative Mobility Standards will be. We don't know if they call for increased Tri-Met or if they just say – maybe we'll allow more congestion. We just don't know til the study is done.

Chair Kidwell – That is exactly the point, there are six Commissioners here that don't want to see more congestion, O.K., that's not going to be an acceptable alternative.

Carrie Richter, City Attorney – No development pursuant to this plan can happen until the Alternative Mobility Standards are adopted and for them to be adopted, there will be a process that will come before you and will come before the City Commission as an Amendment to the City TSP. So I know you would prefer to do the Alternative Mobility Studies first and that would be my preference to, but there have not been that many Alternative Mobility determinations done in the metro area, so we are sort of a guinea pig as Jon Makler, ODOT, pointed out at the last hearing.

Chair Kidwell – I don't think we're asking for that plan, I think we are asking for a commitment from Tri-Met to improve service in this area, we're not asking for the mobility plan, we're asking for a response to this letter from John Lewis saying they are committed to increasing the service.

Commissioner McGriff – This isn't a response Chair Kidwell, John Lewis wrote this letter in response to something that came from Tri-Met, that was my question, where is the letter that came from Tri-Met? We are requesting specific contact with Tri-Met saying, we are holding this up because we need to hear from you please.

At 1:23:00 on the Video Tape

Pete Walter, City Planner – The second item here is Holly Lane. Holly Lane was addressed in the TSP. It is a Minor Arterial in our TSP. One portion of Holly Lane, which is outside the UGB, between the Park Place Concept Plan and Maplelane Road, is a Rural Minor Arterial in the TSP for Clackamas County. That is the cross section I put on your desk. All projects within the City's TSP, whether they are in a geologic hazard overlay district or not include detailed surveys conducted to identify hydrologic, topographic, or other geologic constraints and all street extensions included in this plan are shown with conceptual alignments so that planning will have an illustration for street connectivity. Final street connectivity will be identified after those surveys are completed so when the TSP was adopted, we already made a finding that, based on our development standards and review processes defined in our code, that the TSP update is consistent with Statewide Planning Goal 7 Hazards.

Commissioner Mabee – Asks Pete Walter, are you saying that this is the cross section for how Holly Lane should be?

Pete Walter, city planner – That is the Functional Classification for Holly Lane as it should be, but that is subject to topographic environmental constraints, so that is the typical cross section anywhere in a Rural Arterial section, its like any TSP, a typical cross section subject to final engineering. And that closely resembles what we adopted in the Park Place Concept Plan.

Commissioner McGriff – Pete, I appreciate this, but I do not see how in any universe that we could ever get this on Holly Lane – **EVER! - its just not –** this could never happen on Holly Lane. **I HAVE TO SAY THAT FOR THE RECORD.**

Pete Walter, city planner – That's just what's on the books today, every other section of Holly Lane is either in a Concept Plan area or is within our City limit already.

Commissioner McGriff – Questioned Pete Walter, "is there a portion of Holly Lane that is in the City limits currently?" Pete Walter stopped and thought for a minute, then answered NO, but it is within the Park Place Concept Plan area. Commissioner McGriff continued, going on to state "in the best of all possible worlds, my – let's just say- Clackamas County is never going to improve Holly Lane because they don't have the money and its not their priority.

Pete Walter, city planner – Yes, and they've stated as much, until this area is brought into the UGB.

Commissioner McGriff – I'm just saying, in the best of all possible world's, we don't have enough money to do anything to Holly Lane that would work because of its instability. To be hones with you, **I wish there was a way we could recommend that the TSP be amended to take substantial portions of Holly Lane out,** because I think its a "fool's errand" to think we're going to do anything, I mean, I don't see it ever happening, and why, we've got geologic hazards, we've got, there are just so many impediments to Holly Lane that is not funny, I would never buy property on Holly Lane.

Pete Walter, city planner – Well, there are **No other South/North alignments** except for I-205 and Molalla Avenue identified in any of our TSP's. There's nothing further East plus our UGB doesn't go that far, so in terms of North/South connectors and what we have to work with within regulatory boundaries.

At 1:55:00 on the Video Tape - Planning Commissioner, Denyse McGriff states she would like the Planning Commission to put into the Memo something about the impossible dream of Holly Lane, not that we're recommending it come out of the TSP, (Mabee/McGriff) but that we recognize that this is going to be insurmountable odds to try to do this work there and we really need to have some recognition that, that particular property needs some consideration which could include taking parts of

it out of the TSP or whatever, (Espe) do you think the road classification should change? yes, or just the cross-section, (Mabee) we could specifically say that existing cross-section will never look like this theoretically or we could use it until the road the road meets its cross sectional requirements, the City will take no responsibility for Holly Ln in any sections, way or shape, (McGriff) I like that, (Mabee) that way the Counties on the stick and they maybe could throw some money at us to do a feasibility study, but until we know, its not going to happen. (Kidwell) So we have four items on the list, (Pete Walter) I'm a little unclear on the Holly Ln thing, is there consensus on the Commission , (Mabee) Yes, we recognize Holly Ln is an impossible dream, um, (Espe) it needs a little more help than that, (Kidwell) I think what we're suggesting is that the status of Holly Ln in the TSP be reconsidered based on the reality of (Mahoney/McGriff/Kidwell) unrealistic limitations and in fact the City of Oregon City has no jurisdiction over that road, nor do we want the jurisdiction unless it gets, (Mahoney) yet for some reason we've adopted that responsibility. (McGriff) Guys, we brought this up when we were reviewing the TSP about Holly Ln, we said "what's the likelihood", and the City Staff person said the likelihood that that's ever going to happen is "slim and slim." (Kidwell) So, Pete, you have 4 items on your Memo list, specific response from Tri-Met with respect to the Southeast corridor and its requiring improved service, Mobility Standards, clarificaton for Cottage manufacturing being part of the employment land and the status of Holly Lane for the areas outside the UGB in terms of it being reconsidered in the TSP as well as its functional classification.

(McGriff) You can say something like "we cannot strongly emphasize enough that this Mobility Standard MUST, SHALL, whatever hard word we want, be done, we cannot move this community forward unless we are able to complete that work, it has got to happen, (Mahoney/Kidwell) it has to be in cooperation with Tri-Met, (McGriff) and ODOT and the County. So can we entertain a motion of this BRCP.

(McGriff) I would so move that "we recommend approval of the Beavercreek Road Concept Plan as we have modified the documents specifically related to Goal 5 resources and the four items we have listed previously and that the Memo be brought back to us in two weeks and in the meantime please make an attempt to contact Tri-Met.

Planner, Laura Terway, of Oregon City stated they were thinking of cancelling the next meeting on February 8th and actually having the February 22nd meeting because I actually scheduled a Metro representative to come and chat with me, so if we could change the February 8th date to February 22nd, that will give us sufficient time to write the letter and do all as well. Chair Kidwell went back to the motion that was made and asked if we have a second, and yes they do. Vote was taken, the BRCP was approved unanimously by all Planning Commissioners.

At 2:00:00 on the Video Tape

Chair Kidwell asked the Commission if they want to plan to personally go to the City Commission meeting, Denyse McGriff then stated go ahead Damon Mabee and say it, the impossible dream.

There was a break here in by the City due to taping problems.

Chair Kidwell, we've approved the BRCP as amended in the findings and we're going to get a Memorandum back. I guess my question is are we going to go to the City Council meeting where its going to be presented , Commissioner McGriff stated, Yes we can go. Chair Kidwell asked Pete Walter if they could get a draft of the Memo ahead of time and then when we get here that night, its not like that's the first time we've seen it. Pete agreed.

Discussion for plan ended at 2:06:12 on the Video Tape

To OC planning commission,
Attn: Kelly Reid; kreid@orcity.org
Re: GLUA-20-00045 General Land Use Application / MAS-21-00006-Master Plan/VAR-22-0001;
Staff Recommendation Revised 5/3/22

We have been aware and involved with the Park Place concept plan since it was first mentioned to us in the late 90's. Now that it is inching closer to reality, we are writing to OC Planning to express our concerns for the residents of Livesay Rd, as well as the surrounding areas. This has been a long, expensive process for all concerned, and in the home stretch we would like Oregon City to get it right.

First of all, we appreciate the efforts on the part of the Planning Commission Staff over the nearly 2 decades of work this project has created. Their level of professionalism is commendable, especially under pressure. We are also appreciative of the public's involvement in the development process, to ensure that all aspects of the development have been reviewed to address the concerns and requirements of local residents as well as compliance to a higher standard for any large Oregon City development.

We reviewed the Planning Commission Staff Recommendations posted after May 3 and prior to the forthcoming public hearing on Monday May 9th. The document is complex and somewhat confusing to the public. It appears to have been updated several times over the past few days. Our concerns below are based on the document as of May 5th. We tried to map our comments to the numbering on the planning document, but some of the numbers that we've referenced seem to have changed.

We are most concerned about the integrity and preservation of livability for the current Livesay Rd residents and owners on properties NOT currently included in the 92-acre development under review. With specific respect to the four properties directly across from Phase 2 of the development (14630, 14604, 14580 & 14508 S Livesay Rd), in the Staff recommendation Clackamas County mentions the need to widen Livesay Rd to 50' in front of the southernmost border (14631 S. Livesay) (See item 45 A, B & C a - g) of the 92 Acre Development.

Livesay Road is approximately 15-20' wide between the south and north sides of the paved road adjacent to these four properties and the planned development at 14631 S Livesay Rd. These four residences are directly across from the bulk of the development currently happening in Phase 2 of the 6 phases. If Clackamas County uses its standard method of widening the road to two lanes of 25 feet from the center of the road, these four residences stand to lose a significant portion of their already small front yards. We would have to make significant changes at considerable expense to preserve or upgrade the privacy, safety and curb appeal of our properties.

On the north side of Livesay, the existing house at 14631 S Livesay is not included on the current plan for Phase 2. We believe there is a public park, or a stormwater retention facility where that house now sits. Assuming it will be removed prior to development, and even if it isn't, we respectfully request that Clackamas County alter their standard road widening practice to take ALL the necessary land for making this section of Livesay wider from the North side of Livesay Rd (at 14631) and leave the four properties on the south side as they currently are with minimal frontage changes. Of course, we would need

Oregon City Planning to make this a requirement of the Development. It's enough pressure that these four properties have to endure the bulk of the chaos of most of the 476 lots being developed in Phase 2 directly across from their homes. Currently we watch horses playing and grazing out across from our houses. Although we recognize the need for housing in the greater Portland area, the noise pollution, dust and impact on livability will be intense, especially to our four properties. It will be quite an adjustment. If this request is possible, it would have minimal impact to the Developer's plan.

Reading the Staff report it is difficult to determine what exactly is planned to happen to that section of Livesay Rd in Phase 2. (See item 39 A, B & C (a thru g.) and Sec 16.12.095 A, B, C (a thru g). Clarification would be greatly appreciated.

If at some point, (see 45D, also 16.12.095 B, C) as a Clackamas County Planning Staff member recently verbalized, it becomes necessary to upgrade and widen Livesay Road for additional traffic and emergency evacuation, many additional residents will also lose large portions of their lot frontage, especially in the middle stretch of Livesay where homes are built on a narrow ridge adjacent to the road on the front side and a steep canyon on the back side. The current paved road at this part of Livesay is also only @ 15-20' wide. Years ago, the residents of Livesay Road thought we had a verbal guarantee that this option was not possible for the development to utilize, but apparently this possibility still exists. Please clarify this portion of the Staff recommendations document for us.

We respect and applaud the process for addressing all these concerns, especially those concerning traffic and livability for current Livesay Rd and Park Place residents. This development along with the additional Serres development adjacent to Holcomb and the development underway across from Oregon City High School will greatly impact the Livesay, Holcomb, Redland, Abernethy, Hwy 213 & Hwy 205 travel and intersection traffic. It is difficult to believe that the Traffic studies report otherwise.

Several years ago in the process of annexing this 92-acre development the OC Planning and City Commissions verbalized their opinions that they would not allow the builder to go forward until ingress and egress between Holcomb and Redland Roads had been established. We agree and request that this requirement be reinstated as a condition prior to this project being approved. It seems counter-intuitive that the builder would go forward with Phase 1, only to be halted in or at the start of Phase 2 after failing an additional traffic study. 2000 added trips may be the required threshold, but that's an enormous number of added vehicles on the adjacent roads. We request the Developer at least do a feasibility study for the connector road from Livesay to Redland prior to this project being approved. Yes, there are slopes. Figure this out before the problem is intensified. This would address many Holcomb, Livesay, Redland and Holly Rd. residents' concerns about traffic and emergency routes out of the area, not to mention the effect added development will have on Hwy 213 and 205.

We additionally request that OC Planning reconsider their decision to allow this all to happen before they address these traffic issues. Let's not put this off.

Finally, if at all possible, we request a further continuance so the local residents may continue to review and absorb the 173-page OC Planning Staff Recommendations document as well as re-familiarize themselves with the Master plan prior to the Planning Commission making a decision on this project,

especially in light of this being a Type 3 decision that does not require an approval by the City Commission. Yes, this project has been around for a long time, but new information presented from the Developer and a long list of recommendations being posted recently just prior to the next meeting on Monday, May 9th, presents a huge amount of information for all the public concerned to understand fully.

This is one of the largest developments that Oregon City has undertaken. Please get this right and address the need for quality housing without negatively impacting the lives of the residents who already live there.

Sincerely,

Jane E. Varley and Michael H. Mueller
14630 S. Livesay Rd. OC OR

Dan and Shannon Keller
14604 S. Livesay Rd. OC OR

Shirley Humphrey
14580 S. Livesay Rd. OC OR

From: Darin Shoup
To: Kelly Reid
Subject: New Park Place Development
Date: Monday, May 9, 2022 10:27:57 AM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi,

My name is Darin Shoup and I live at 14836 Smithfield Drive, Oregon City OR 97045-8237.
I welcome affordable housing and appropriate use. I do not approve and would like to speak out on the probability of increased flooding, the probability of inadequate infrastructure, and the increased traffic. I work in healthcare and take call for the hospital. When an emergency Radiology or Cardiac (such as a heart attack) patient comes to the hospital I must be able to respond. With the increased traffic and no infrastructure improvements I believe this can impact my ability to appropriately respond for my job. Thank you for hearing my concerns.

With regards,

Darin Shoup
479-283-9574

From: mikhail krughkov
To: Planning
Subject: Park Place Crossing -concerns with extremely small lots
Date: Monday, May 9, 2022 1:05:46 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

my name is Mikhail Krughkov, we live at the Park Place address:

16463 Willamette Valley Dr
Oregon City OR 97045

The original development plans we received two years ago stated the small lots will be 5,000sq. Now the plans say the lots will be 1,800sq. This is an extraordinary density and it brings extra traffic, noise, and wildlife issues, including our drinking water. If there is a chance to vote, I vote against small lots.

Thank you.

Mikhail.

Comments for GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Master Plan and Variance for Park Place Crossing Development

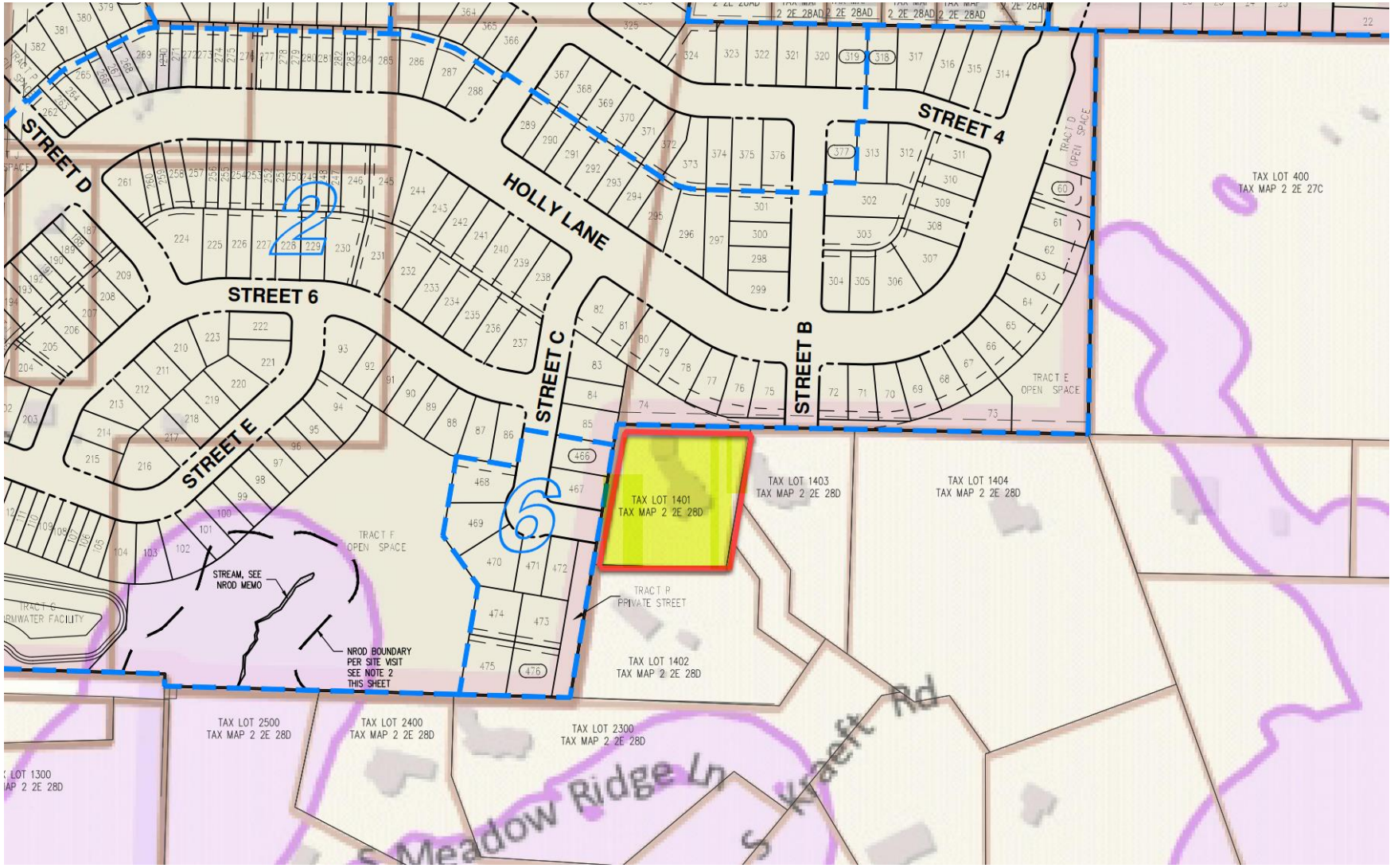
Project ID: GLUA-21-00045

Adella Bell and Mark Bell

Property

16641 S Kraeft Rd
Oregon City, Or 97045

Tax Lot 1401
Tax Map 2 2E 28D



HWY 213 & REDLAND RD INTERSECTION

Staff Report Page 22: The applicant has proposed to provide additional traffic studies at the time of Detailed Development Plan application for each Phase. The traffic study submitted for this General Development Plan Review identifies where the transportation system is expected to have adequate capacity and where improvements will be needed to provide adequate capacity for the new development. **The study identified that the intersection of HWY 213 and Redland Rd, an intersection providing connectivity for this development, is a key intersection will be over capacity at some point between proposed Phase 1 and Phase 2. This means that the applicant will likely not be able to demonstrate compliance with transportation mobility standards for Phase 2, as proposed, and beyond.**

If and when the applicant or the City is able to fund and construct an improvement to this intersection to add the requisite capacity necessary to serve subsequent development phases, additional development may occur. The City's planned improvement for the intersection of HWY 213 and Redland Road is known as the Jughandle Phase II project, which has been designed but is not currently scheduled for construction due to a lack of funding.

Questions:

- If this intersection will be at capacity between proposed Phase 1 and Phase 2, and as improvements are not currently funded and planned, will completion of improvements to solve capacity constraints for this intersection need to have been completed prior to Phase 2 being approved?

GEOLOGICAL HAZARD AREAS

Staff Report Page 23: The City notes that the proposed preliminary layout has streets (Holly Lane, Street C, Street 6 and Street 4) running through geologic hazard areas within the site (steep slopes). Per the City's code (OCMC 17.44) these geological hazard areas are to be avoided. **The applicant has provided preliminary alternatives for shifting the alignment of Holly Lane away from the geohazard areas,** but they state that these alternatives would create view tunnels, streetscapes inconsistent with the Park Place Master Plan, walkability, aesthetic, and cost concerns.

Questions:

- When will the preliminary alternatives be available to impacted neighbors?

DENSITY AND LOT SIZE

Staff Report Page 53: The applicant has proposed a density of 9.1 units per net developable acre, resulting in 476 total units. Development proposals within the Concept Plan area must show that the density envisioned in the plan is achieved. **The Park Place Concept Plan includes 1,459 total residential units, with 937 in the North Village area.** The Park Place Crossing Master Plan area encompasses approximately 50% of the acreage of the North Village area. **It is the applicant's responsibility to show that the number of units proposed will be consistent with the Park Place Concept Plan density assumptions** as well as within the **minimum and maximum densities of the zone**. The applicant has proposed 476 units, which is 50.8% of the total number of units planned in the North Village. **Based on zoning alone, applying the minimum density standard would result in 318 units in the project area. This would only provide 34% of the total 937 units required in the North Village, and would put a burden on the remaining properties in the North Village to develop at densities that may be infeasible and/or inconsistent with the Concept Plan itself. 1.**

Questions:

- Where did the proposed density from the Park Place Concept Plan originate from?
- Why is it that the Park Place Crossing Master Plan decided that there should he such a high density?

DENSITY AND LOT SIZE

Staff Report Page 53: The overall density is not necessarily limited by the Concept Plan; **the 1,459 total units in the Park Place Concept Plan area is a floor, and the ceiling is only limited by infrastructure capacity, development standards, and maximum density standards**. Thus, if the applicant can demonstrate infrastructure capacity for additional units, and meet all other applicable standards, the properties within the Concept Plan may be developed at higher densities up to the maximum density allowed by code.

Questions:

- If the 1,459 total units is only a floor, what is the ceiling based on maximum density allowed by code, and assuming no approved variances that would allow developer to deviate from said code?
- If the developer is allowed to request lot size variances, what is to prevent the number of units from growing exponentially?
- Why allow density to increase if the area cannot support it?

Thank You!

Adella Bell
adellabell82@gmail.com

Mark Bell
Mark.bell@orecity.k12.or.us

Comments from Rivers of Life Center Regarding former Park Place Village Project now Proposed by Icon Development

File number:

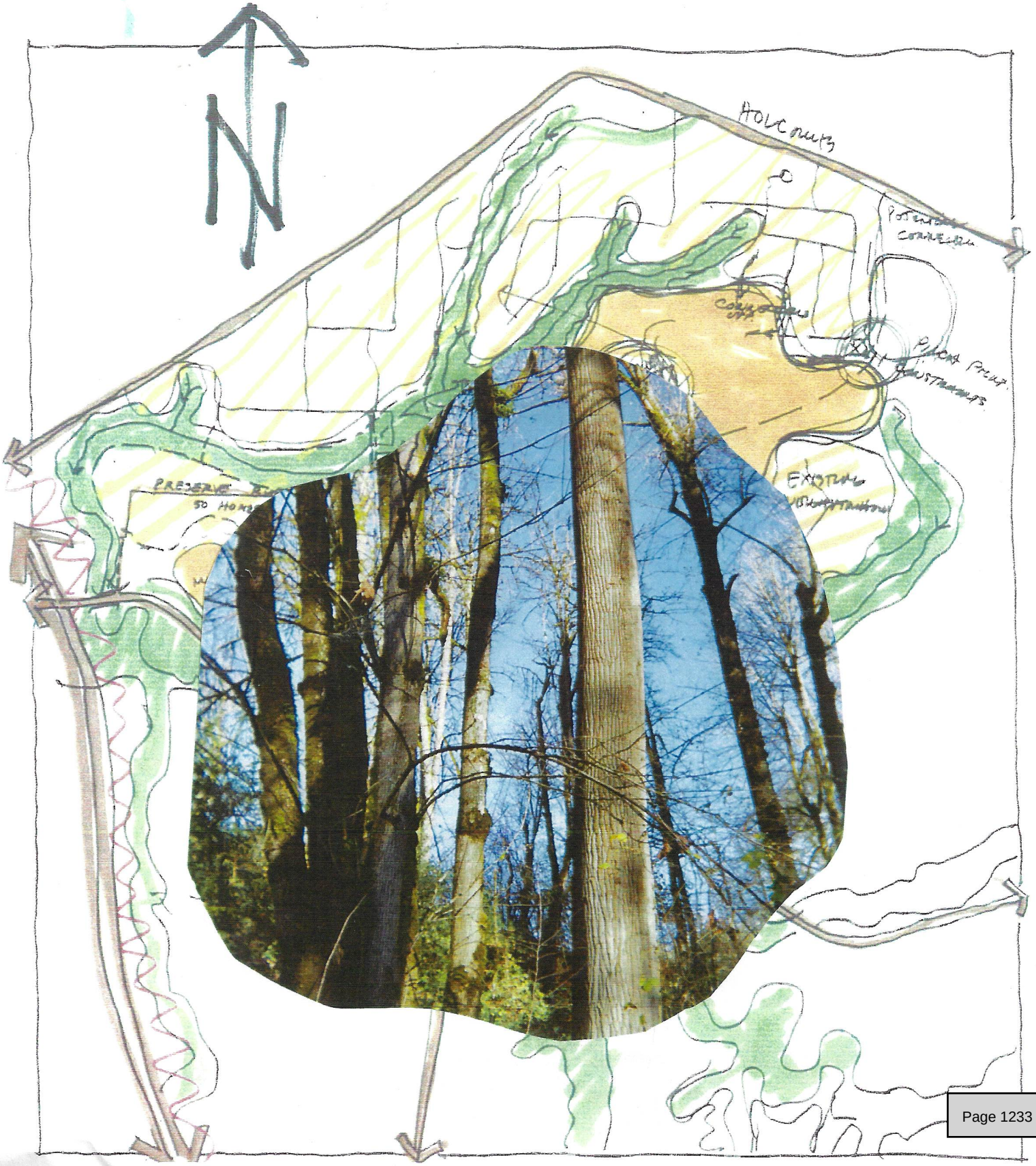
GLUA-21-0045/MAS-21-00006/UAR-22-00001

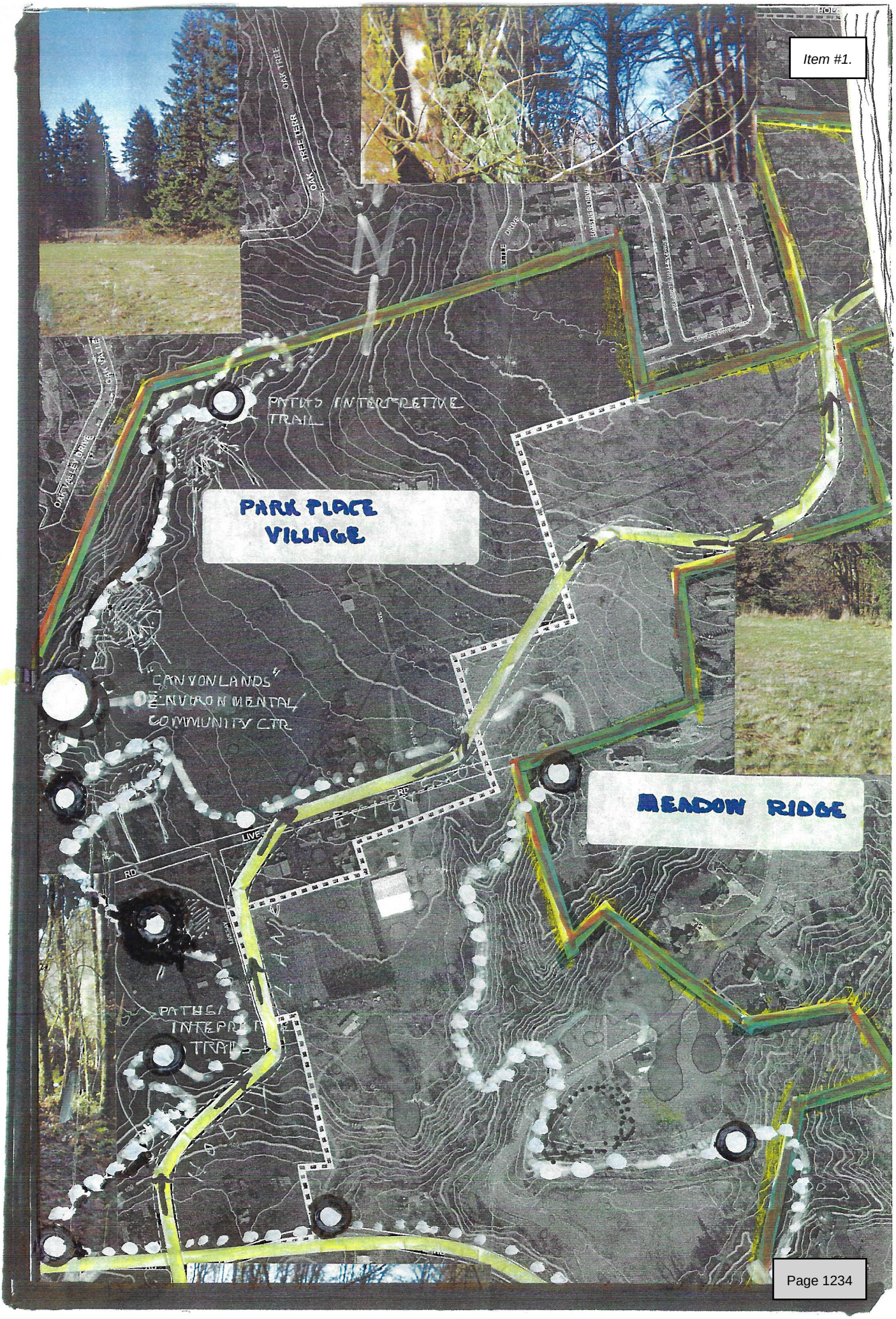
Comments:

1. This project now undertaken by Icon Development needs to reflect the attitudes that were accepted by the community in the concept planning process nearly a decade ago
2. The community was adamant about trying to reduce impacts to adjoining watersheds, Urban Forests and connectivity that would need to be addressed to link the project from top at Holcomb Blvd to bottom at Redland Rd and Holly Lane.
3. Elements of Oregon City's adopted Natural Resource Overlay district ordinance 17.49 et. al. and concerns of city guidelines in 17.21 need to be given further refinement, review and acceptance through the Planning Commission and City staff processes.
4. Specifically, 2 watersheds with coho salmon and winter steelhead function need to be protected well beyond the NROD requirements because they are listed Significant Wildlife and Fishery Areas by the Oregon Department of Fish and Wildlife.
5. Livesay Creek to the north and Holcomb creek to the south have received a good deal of community involvement to protect and enhance cool water conditions that are sustaining fisheries at this time. Holcomb creek in particular was equipped with a new "fish passable culvert" a decade ago with the City of Oregon City participating in that joint agency project.

6. The entire 300+ acre area drains to both those two urban streams and the city's present desire to treat all stormwater through a highly maintained stormwater detention facility is wrong.
7. The project's road systems were originally designed to be "coved" that is multiple curves introduced with infiltration and bioswales throughout the entire network. Major stormwater impacts were to be handled from top to bottom in a series of small ponds and detention areas and not at the final bottom, where remediation would be greatly reduced.
8. The city's present 140+ bioswales and detention facilities do not represent good stewardship when it comes to maintaining installed native vegetation and we have significant concern that that would be the result of a major water quality feature instead of multiple interventions as was originally proposed in the concept plan of a decade ago.
9. Finally, a series of trails were initially established in Livesay Creek Corridor and in the Holcomb creek corridor that should be major components of any trail network in this development area. They were installed to give future residents and visitors the opportunity to see these beautiful canyon lands, experience them and importantly become participants in stewarding and enhancing these urban streams as a part of living in this project area. Attached are seven pages of graphics and designs that were integrated to the concept plan and reflect the attitudes of city ordinance areas 17.49 et. al. and 17.21 et. al. **We hope you will consider these matters from the recent past as guiding factors for what can be a major development in a fisheries and wildlife sensitive area of Oregon.**

ENVIROTEK
AT
PARK PLACE VILLAGE




OAK TREE
OAK TREE TERR
OAK VALLEY DRIVE
PATHS/ INTERPRETIVE TRAIL
PARK PLACE VILLAGE
CANYONLANDS' ENVIRONMENTAL COMMUNITY CTR
MEADOW RIDGE
PATHS/ INTERPRETIVE TRAILS

A Journey Thru Nature Time and Beauty

(1) Moss Jr Hi
Watershed begins

(2) Clackamas Community College site of
Historic Beaver Marshes and Wetlands

(3) John Inskeep ELC
Wildlife & Technologies Museum
Habitat development and education

(4) Thayer-Beavercreek Rd
Neighborhood Assoc
Wildlife & fish protection

(5) Denil Fish Ladder
Fish passage project

(6) Newell Creek
Canyonlands Trailhead

(7) Wolf Tree Wildlife Snags
Hawk & Owl nesting habitat

(8) State & Federal Fish passage culverts

(9) Canyon Lands Geology
Active springs & landslides

(10) Abernethy Creek Corridor
Salmon & Beaver migration

(11) Nesting Sanctuaries
Heron in flood plains

(12) Abernethy Green
Historic wetlands
End of Oregon Trail

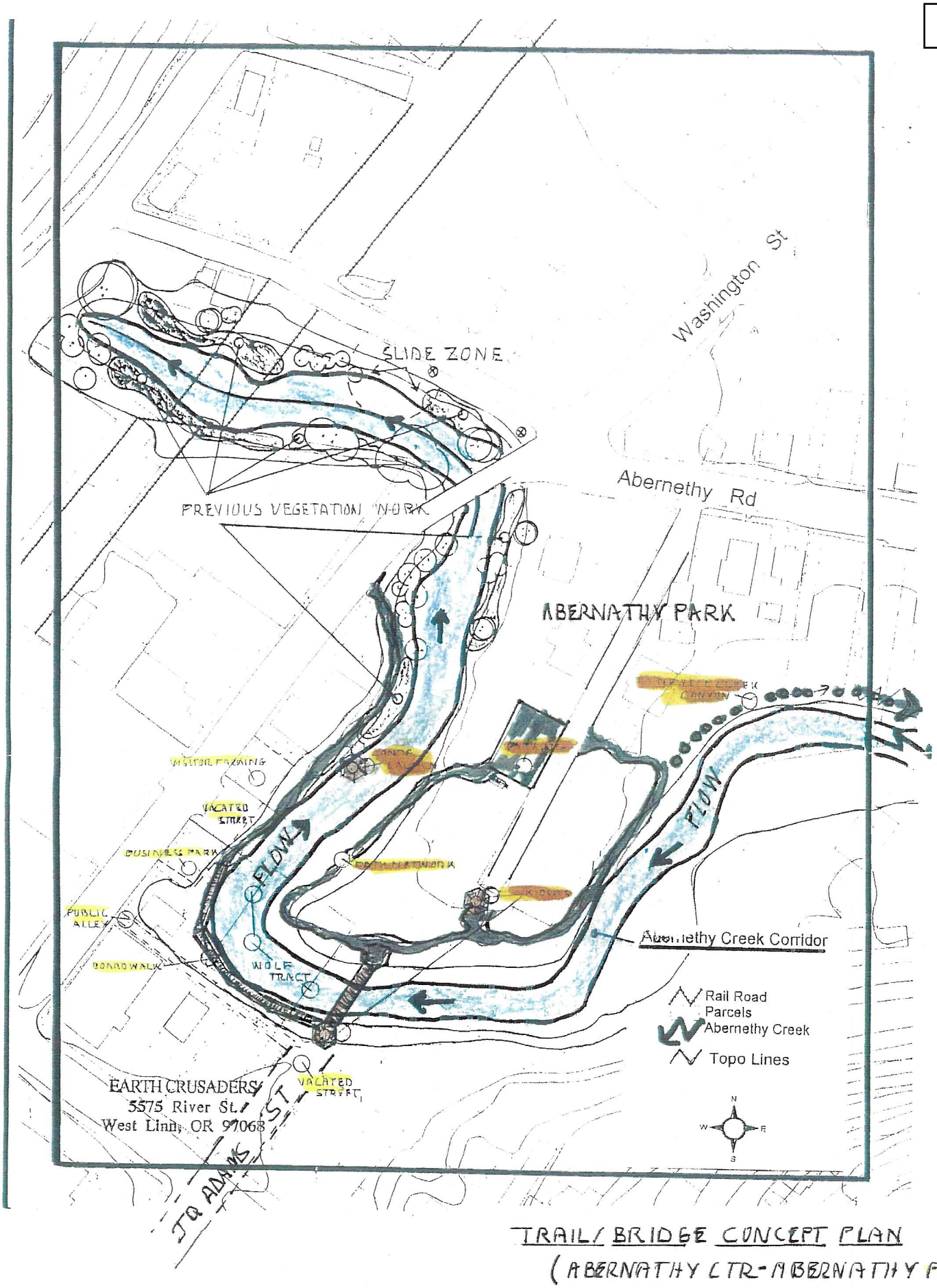
(13) Metro Center Wetlands
Enhancement project

(14) Willamette River
"River of Life"

A WATERSHED WORTH PROTECTING...



NEWELL CREEK & ABERNETHY CREEK BASINS



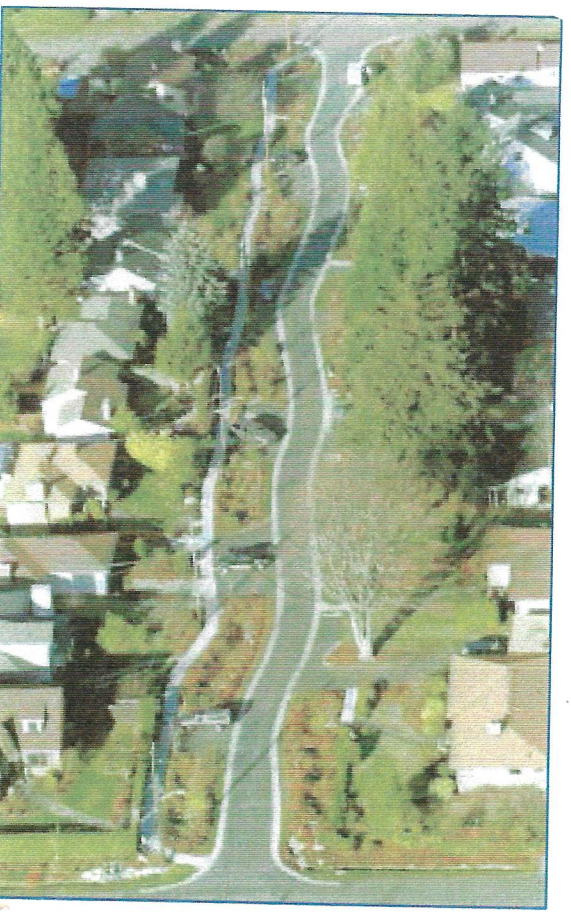
TRAIL/BRIDGE CONCEPT PLAN
(ABERNATHY CTR-ABERNATHY PARK)
(VACATED J.Q. ADAMS CONSIDERED)

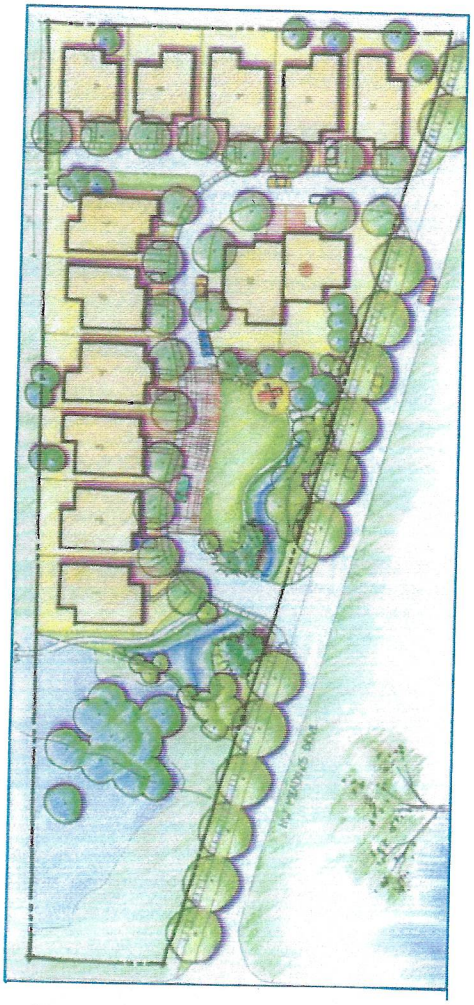
* **Coving:** A method of planning which utilizes a unique meandering road pattern combined with



BayHomes courtesy of Homescape Design Group

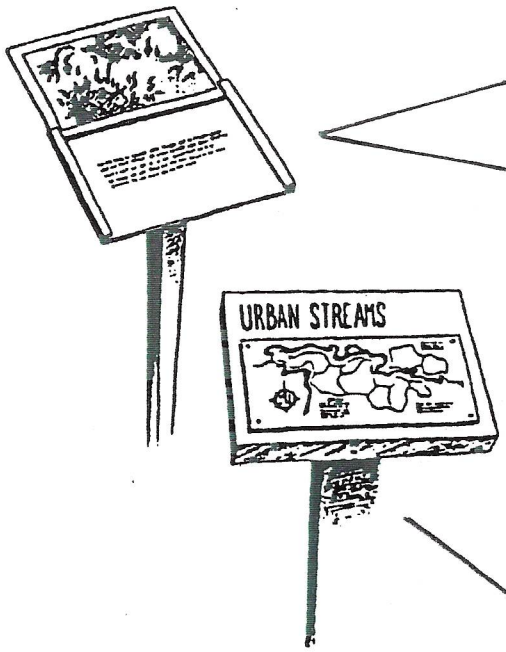






"Coving" - Nesting Roads

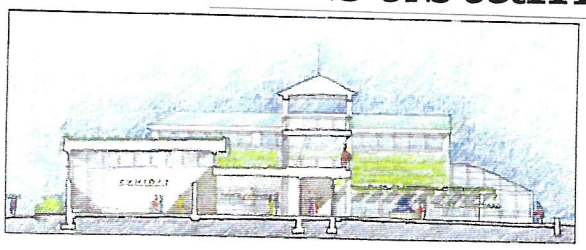
SIGNAGE MODULES for projects, programs and directional uses. Various sizes are available for use in providing information in public settings, school, and commercial usage...



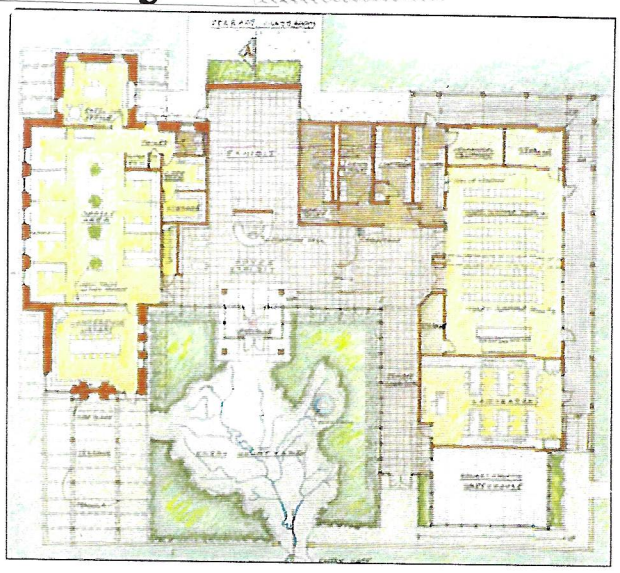




Regional Center For Sustainability

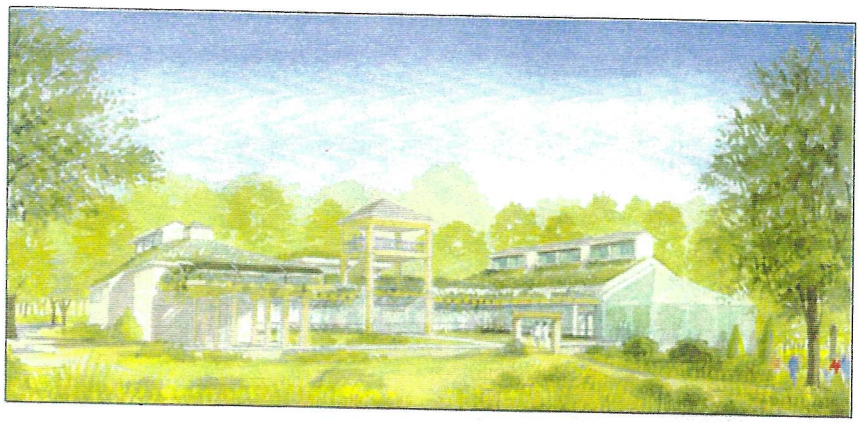


Limerick Elevation Drawing

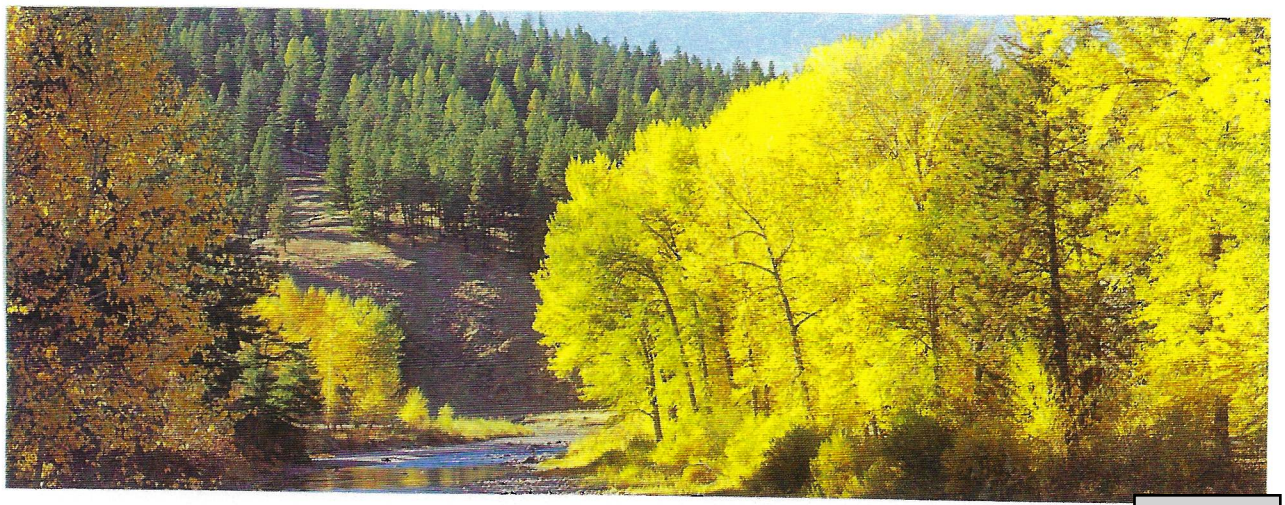


Reference:
Tad Radzinski, PE,
President,
Sustainable Solutions, Inc.
(610) 287-4152

Construction Cost: n/a
Square Feet: 12,000







Oregon City School District No. 62

Learning to be our Best

PO Box 2110 (1417 12th St.), Oregon City, Oregon 97045-5010
Michael Sweeten, Director of Operations
Telephone: (503) 785-8000 ● FAX: (503) 657-2492

May 9, 2022

Planning Commission
City of Oregon City
698 Warner Parrott Rd.
Oregon City, OR 97045

RE: GLUA-21-00045 / MAS-21-00006 / VAR-22-00001
Park Place Crossing General Development Plan

Regarding the Park Place Crossing General Development Plan that guides the build out over next 20 years. The plan is located south of Holcomb Blvd. and north of Redland Rd.. Impacted school enrollment areas are Holcomb and Redland Elementary Schools, Tumwata Middle School and Oregon City High School.

In the fall of 2021 the Oregon City School District experienced a dramatic decrease in student enrollment after returning from the pandemic. Currently in spring of 2022 we have seen a slight return of students. However even with this slight increase the District has the capacity available at both Redland and Holcomb Elementary Schools, capacity available at Tumwata Middle School and Oregon City High School. Our most current PSU student projection shows a slow return of students over the next eight to ten years.

Additionally, past developments in the area by Holcomb Elementary School have yielded significantly less than one student per household. The District also passed a capital bond measure in November of 2018 that included refurbishing the then Ogden now Tumwata Middle School and acquiring additional property for a future school site. The former middle school site could then be repurposed into an elementary school when elementary enrollment in the area requires a new school. We believe this plan will be adequate to meet the long-term enrollment generated by this proposed development plan.

Sincerely,

Michael Sweeten
Director of Operations
503-785-8000, michael.sweeten@orecity.k12.or.us

From: MW
To: Planning
Subject: Concerned Citizen - Public Hearing May 9th 7pm
Date: Monday, May 9, 2022 2:06:45 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To Whom It May Concern,

This is in regard to GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.

During the wildfires in 2020 we were told to evacuate. As Holcomb only has one lane each way, it backed up quickly and it took over 2 hours to get out of the neighborhood only to continue to be stuck on Redland Road. Safety is a huge concern with the existing population in this neighborhood as it exists today. We need new roads with other outlets to disburse the congestion in an emergency for the safety of all existing residents, prior to considering adding more. Please do not allow more homes to be built without new roads/outlets coming first.

Thank You,
Melissa Warner
16239 Jada Way
Oregon City, OR 97045

CONTINUANCE OF GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing

General Development Plan

[ADVENTISTHEALTH:INTERNAL]

Issues raised:

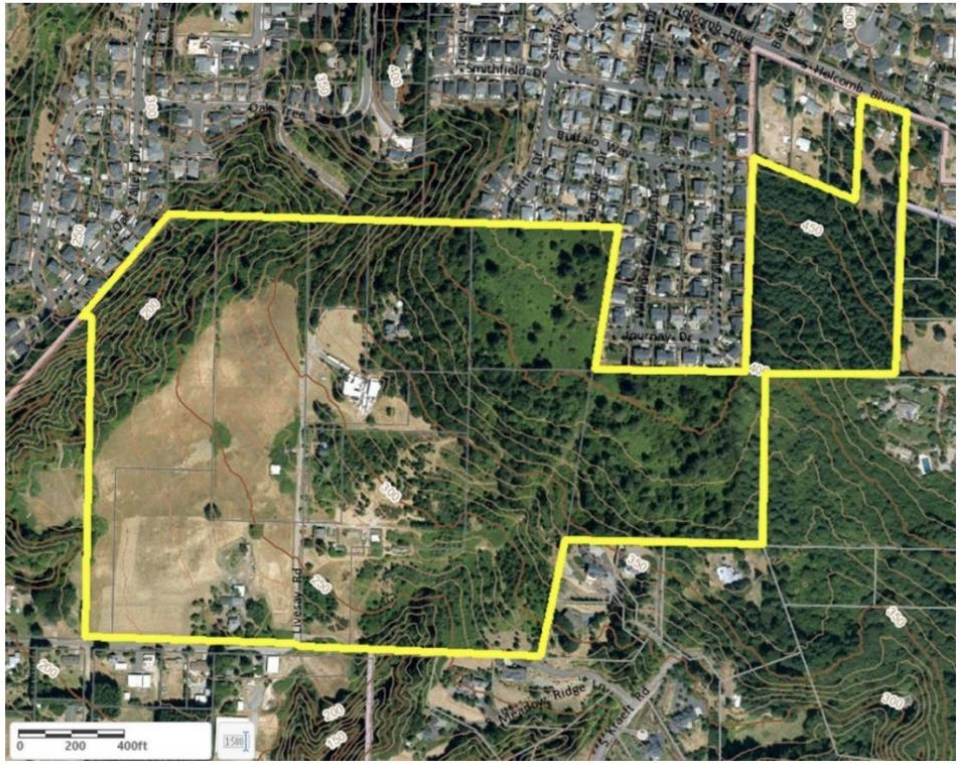
- Inaccuracies and factual omissions
- Conflicts with the Oregon Land Use Goals (1-19)
  - Goal 1 – Citizen Involvement
  - Goal 2 – Land Use Planning
  - Goal 7 – Areas Subject to Natural Disasters and Hazards
  - Goal 12 – Transportation
- Foundational failures

[ADVENTISTHEALTH:INTERNAL]

Inaccuracies: Illustrative issue from the proposal

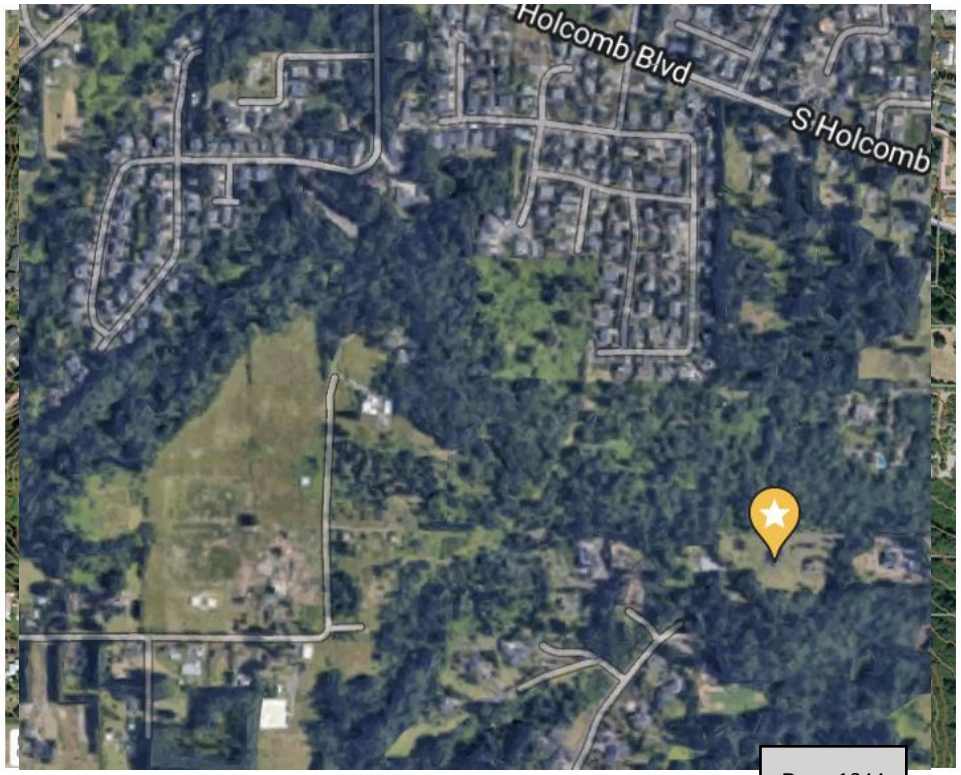
Their slide below:

Existing Conditions



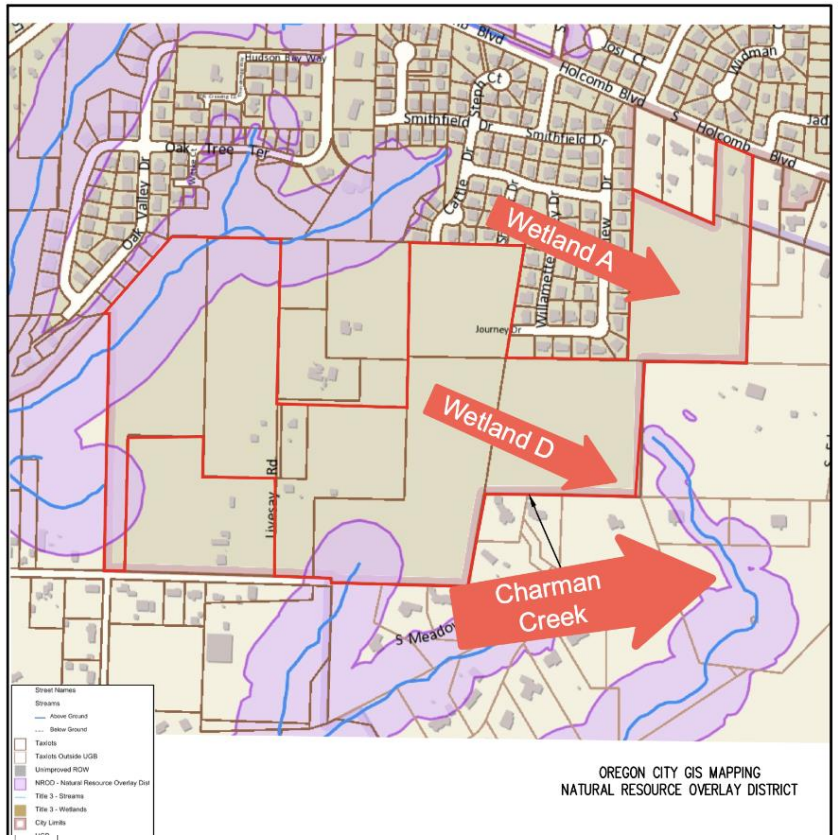
Reality below:

Existing Conditions



[ADVENTISTHEALTH:INTERNAL]

Wetlands



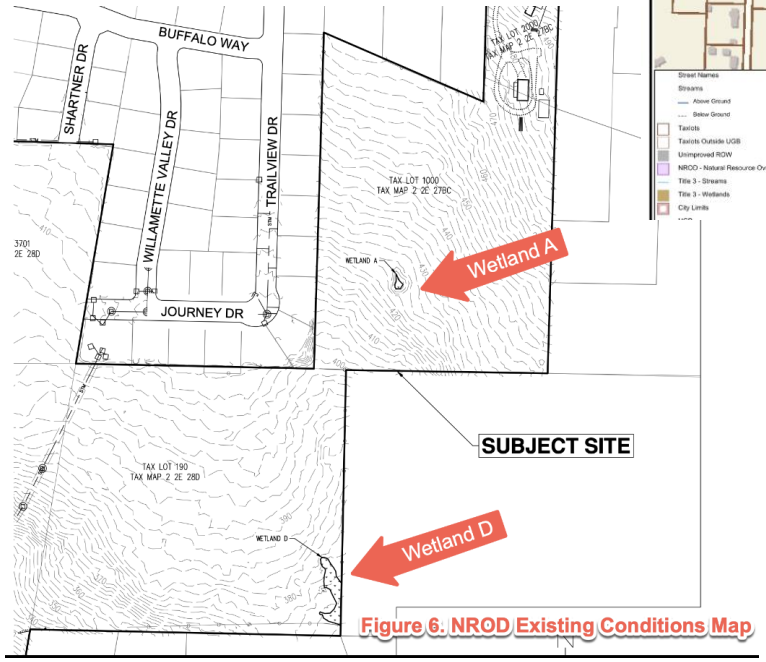
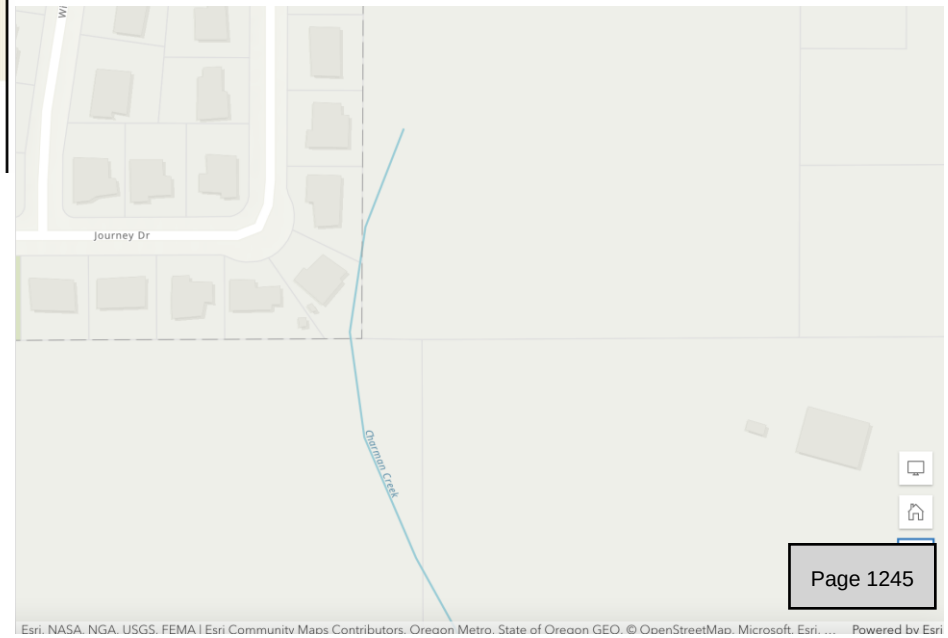
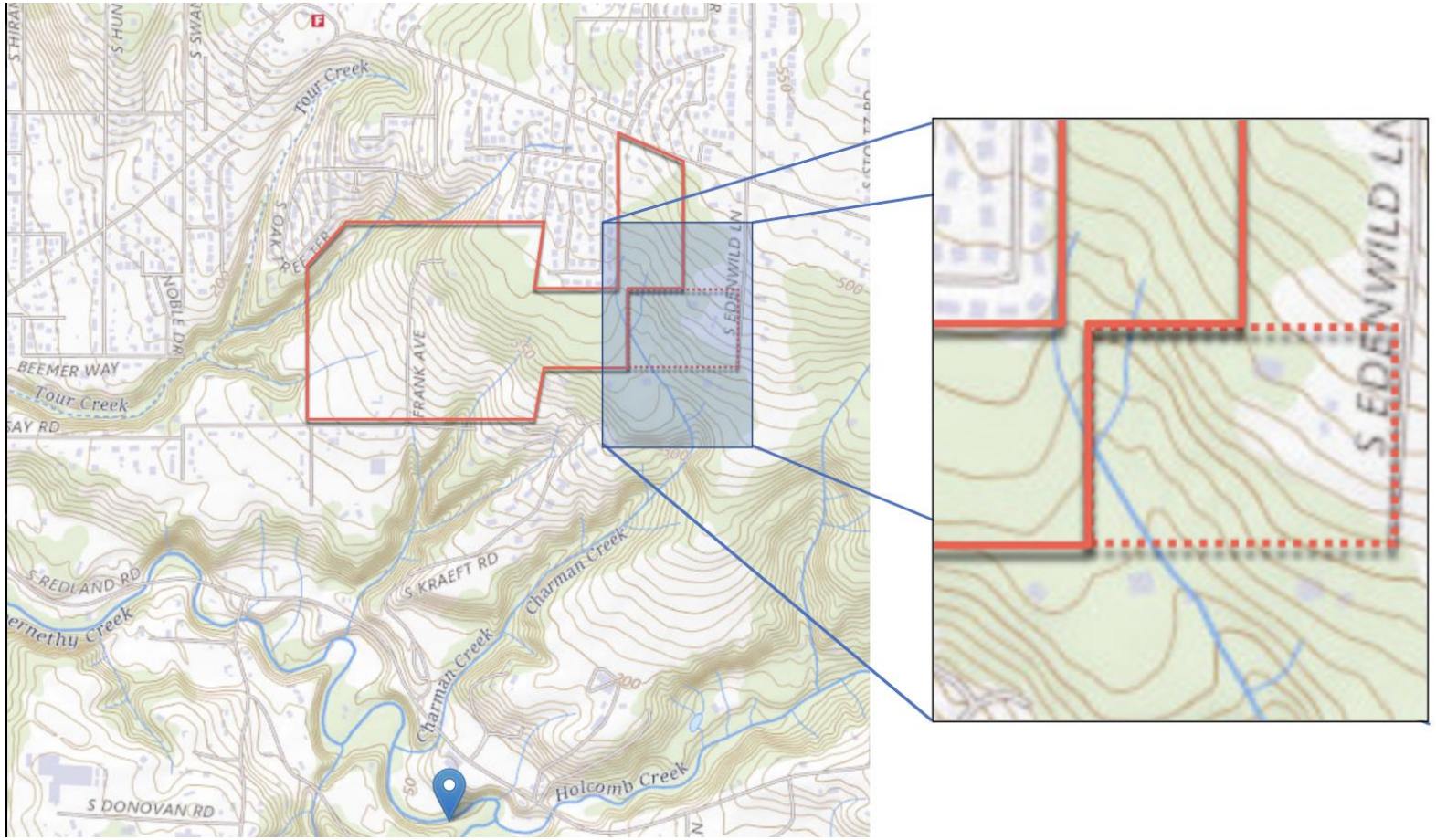


Figure 6. NROD Existing Conditions Map



[ADVENTISTHEALTH:INTERNAL]

Charman Creek



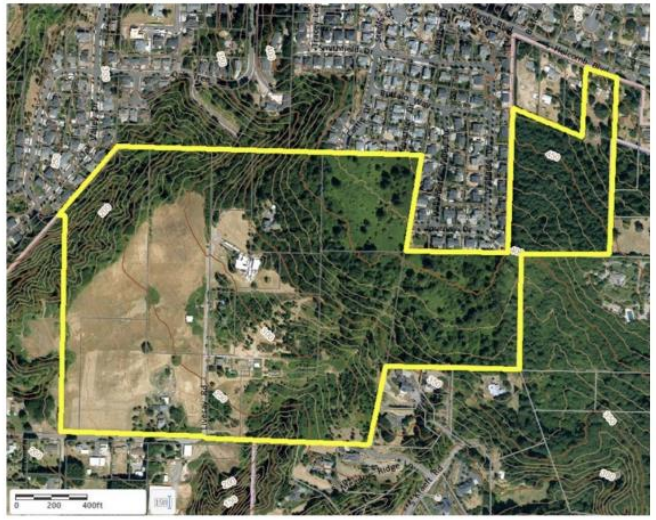
[ADVENTISTHEALTH:INTERNAL]

Purposeful and willful deceit or poor execution

- Maps are inaccurate and conflicting
  - “Existing Conditions” map is at least 5 years old
  - Provided NROD data are inconsistent with USGS Wetlands maps
  - Charman Creek tributaries are missing from the Provided NROD map

Their slide below:

Existing Conditions



Reality below:

Existing Conditions



[ADVENTISTHEALTH:INTERNAL]

Oregon Land use - Goal 1 Citizen Involvement

- ”The opportunity for citizens to be involved in all phases of the planning process.”
  - Only homes within a very short distance from the proposed development received notice – not in the spirit of the goal
  - “The citizen involvement program shall involve a cross-section of **affected** citizens in all phases of the planning process.“
  - Park Place Concept Plan Annexation – was voted down 3 times by the citizens – can it be any more clear what the citizens’ opinion regarding this annexation is?

[ADVENTISTHEALTH:INTERNAL]

Oregon Land use - Goal 2
Land Use Planning

- “Cities and counties must build their comprehensive plans on a **factual base** and follow their plan when making decisions on appropriate zoning. ”
- Discrepancies with the maps are already shown to not be factual

[ADVENTISTHEALTH:INTERNAL]

Oregon Land use - Goal 7
Areas Subject to Natural Disasters and Hazards

- “Local governments shall adopt comprehensive plans (inventories, policies and implementing measures) to **reduce risk to people and property from natural hazards**. “
- “Natural hazards for purposes of this goal are: **floods** (coastal and riverine), **landslides**, earthquakes and related hazards, tsunamis, coastal erosion, and **wildfires**. Local governments may identify and plan for other natural hazards.”
- Evaluate the risk to people and property based on the new inventory information and an assessment of:
  - a. the frequency, severity and location of the hazard;
  - b. the effects of the hazard on existing and future development;
  - c. the potential for development in the hazard area to increase the frequency and severity of the hazard; and
  - d. the types and intensities of land uses to be allowed in the hazard area.
- Allow an opportunity for citizen review and comment on the new inventory information and the results of the evaluation and incorporate such information into the comprehensive plan, as necessary.
- Adopt or amend, as necessary, based on the evaluation of risk, plan policies and implementing measures consistent with the following principles:
  - a. avoiding development in hazard areas where the risk to people and property cannot be mitigated; and
  - b. prohibiting the siting of essential facilities, major structures, hazardous facilities and special occupancy structures, as defined in the state building code (ORS 455.447(1) (a)(b)(c) and (e)), in identified hazard areas, where the risk to public safety cannot be mitigated, unless an essential facility is needed within a hazard area in order to provide essential emergency response services in a timely manner.

[ADVENTISTHEALTH:INTERNAL]

Natural Hazards include:

Figure 2-160. Inventory of Landslide Deposits from Lidar Imagery of the Portland Metro region, Oregon and Washington

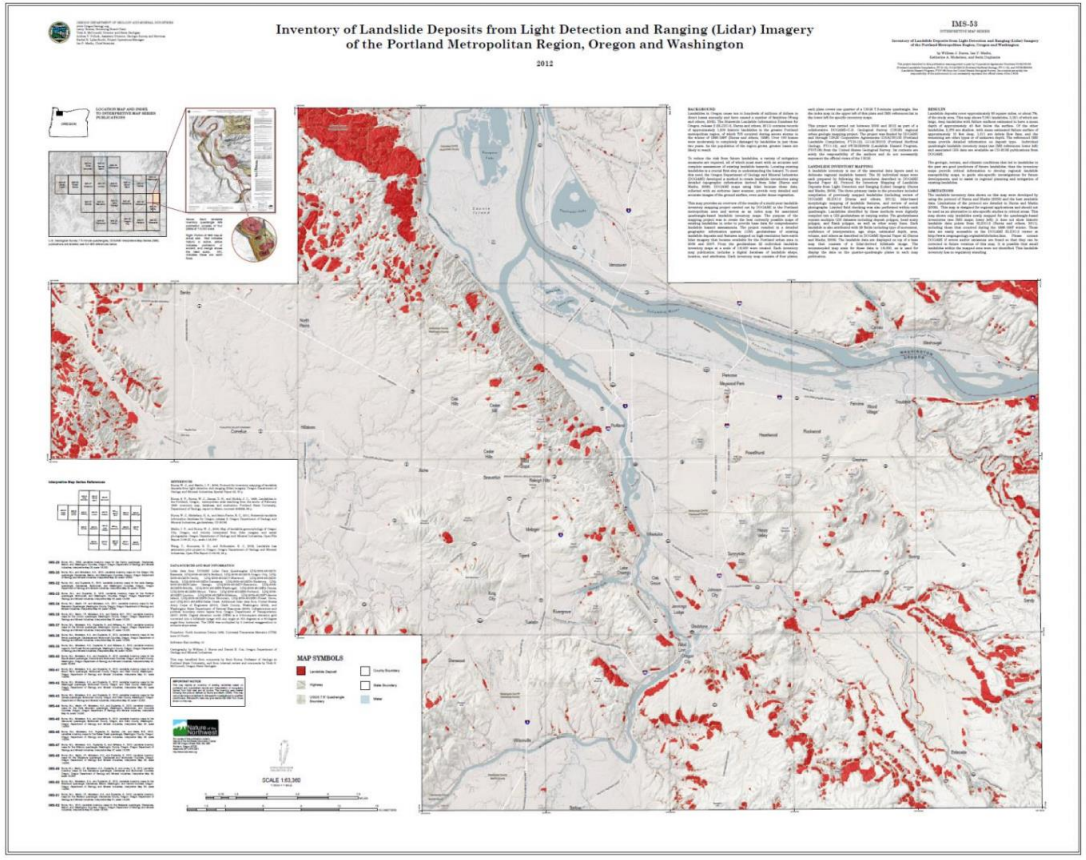
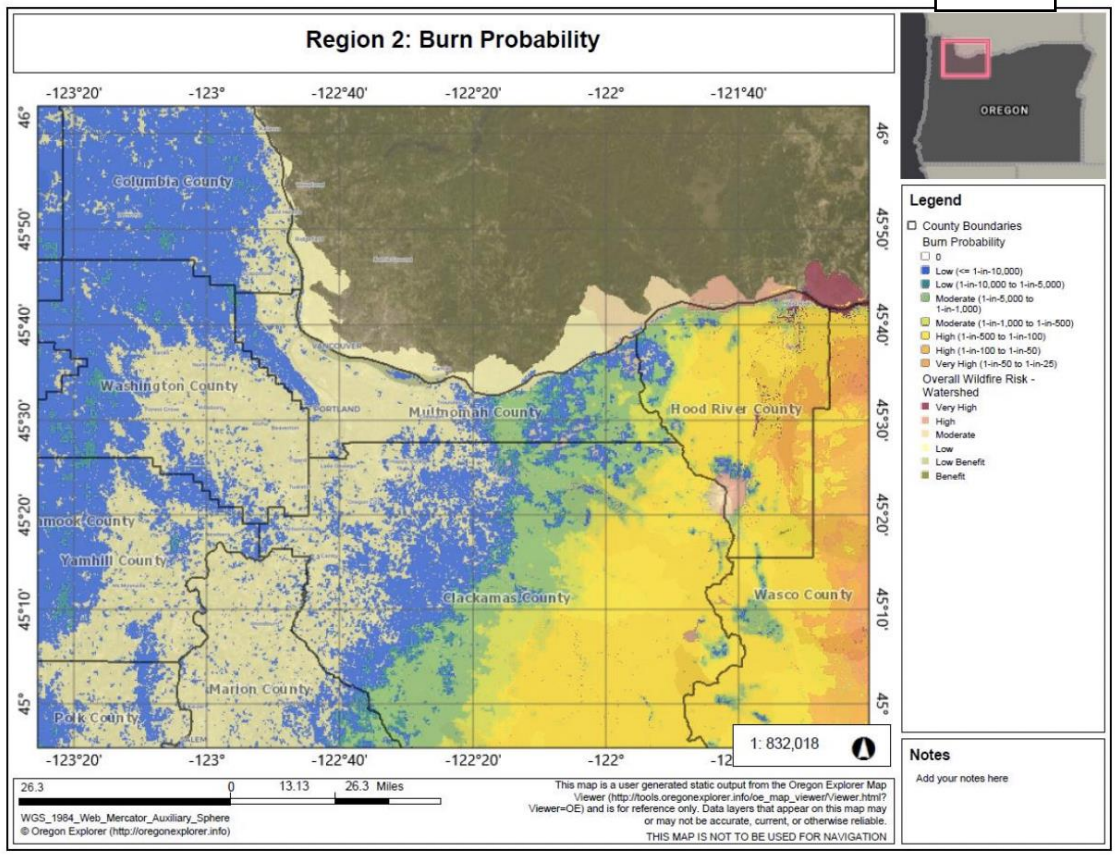
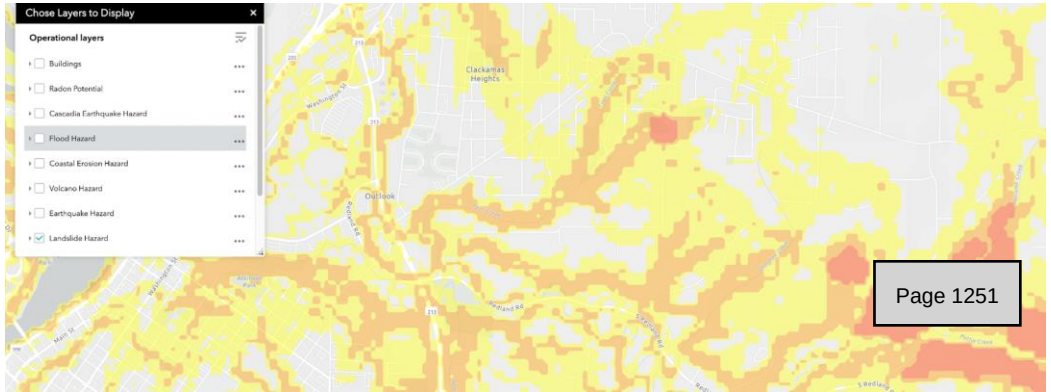


Figure 2-163. Burn Probability



Source: Oregon Wildfire Risk Explorer, March 2020

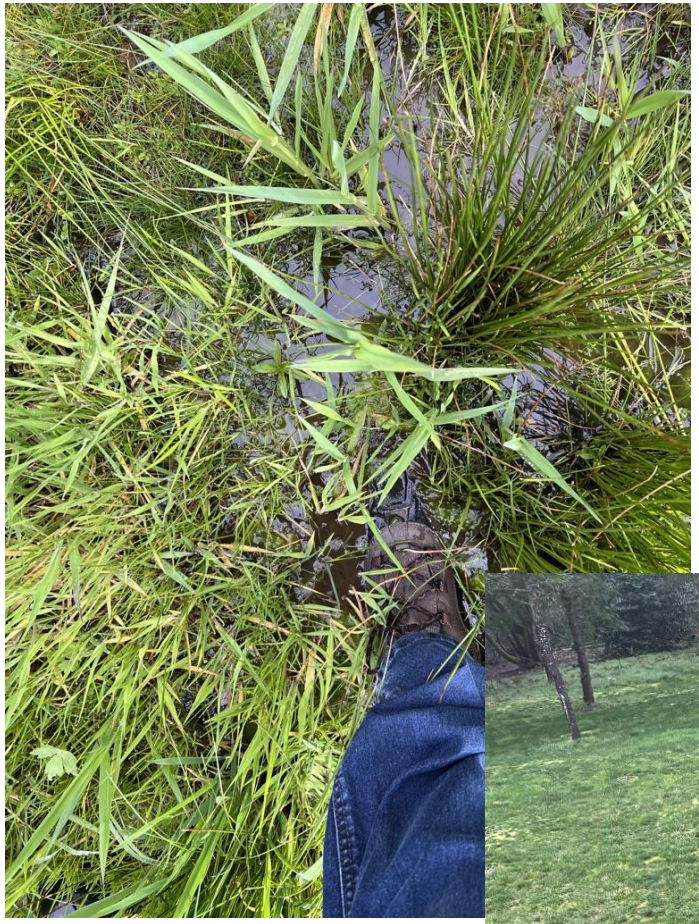


[ADVENTISTHEALTH:INTERNAL]

Oregon Land use - Goal 7
Areas Subject to Natural Disasters and Hazards - Implementation

- "Local governments should give special attention to **emergency access** when considering development in identified hazard areas."
- "Local governments should consider programs to manage stormwater runoff as a means to help address flood and landslide hazards."
  - Stormwater plan is inadequate – the stormwater facility will fail
- "When reviewing development requests in high hazard areas, **local governments should require site-specific reports**, appropriate for the level and type of hazard (e.g., hydrologic reports, geotechnical reports or other scientific or engineering reports) prepared by a licensed professional. Such reports **should evaluate the risk to the site as well as the risk the proposed development may pose to other properties**."

[ADVENTISTHEALTH:INTERNAL]











[ADVENTISTHEALTH:INTERNAL]

Oregon Land use - Goal 12 Transportation

- "To provide and encourage a safe, convenient and economic transportation system."
- **660-012-0000**
  - "In meeting the purposes described in section (1), coordinated land use and transportation plans should **ensure** that the **planned transportation system supports a pattern of travel and land use in urban areas that will avoid the air pollution, traffic and livability problems faced by other large urban areas** of the country through measures designed to increase transportation choices and make more efficient use of the existing transportation system."
- The Traffic Impact Study was deeply flawed
  - Data Analysis at the height of COVID-19
  - Data obtained on a few select days
  - For unsignaled intersections - all movements serving more than 20 vehicles shall be maintained LOS E or better. How is this going to guaranteed? What provisions are being taken? Is LOS E truly adequate or are we going to be like Beaverton?
  - Mitigation to traffic issues not only must be planned but implemented to alleviate issues shown to be problematic prior to this development. As noted in the Traffic Impact Study the current info structure cannot handle even existing projected growth by 2025. New developments are only g to exacerbate the issues and accelerate the degradation of traffic flow.

[ADVENTISTHEALTH:INTERNAL]

Redland at OR-213



[ADVENTISTHEALTH:INTERNAL]

Conclusion

- Although the submitted documentation is plentiful, the documentation is fraught with danger and inaccuracies
- It is truly inexcusable that the submitted documents that were proven to be inaccurate have not been revised
- Oregon Land Use Goals are not being adhered to with regard to this proposal
- This development puts **more lives at risk** – this is a KEY FACT and is not refuted in any of the submitted documentation
- This process is costing all of us valuable time and money
  - Why are we as citizens having to “fact-check” the application?
  - Why approve a project that cannot be supported with existing infrastructure and then ”kick the can down the road” for all of us to have to resolve in the future?

[ADVENTISTHEALTH:INTERNAL]

Solution

- **Deny** the application outright
- Many of the proposed solutions are based on ”Magical Thinking”
  - Such as 3 left hand turn lanes from Redland to OR-213 – despite OR-213 being TWO lanes at this intersection
  - Even if OR-213 is expanded to 3 lanes in this location – 3 Left hand turns would be dangerous
- The process **requires** submission of **factual information** – adhere to this requirement – failure to do so invalidates the process and makes a mockery of all of us

[ADVENTISTHEALTH:INTERNAL]

From: Brent
To: Oregon City Planning
Subject: Park Place Crossing Development
Date: Thursday, May 5, 2022 5:56:15 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern,

I am sending this email to notify that my wife and I are not supportive of the development plan. We are highly concerned about the tax this will put on our infrastructure not limited to water, fire/police, schools, etc.

Placing so many homes in such a small space will create horrible congestion and traffic. During the fires last year we were unable to evacuate due to traffic on Holcomb.

In addition, the destruction of green space and the wildlife would be devastating to the environment.

I hope the city will take the views of their existing citizens into consideration before moving forward.

Sincerely
Brent and Jaime Gross
16380 Oaktree Terrace
Oregon City, OR 97045

Sent from Yahoo Mail for iPhone

From: Jaimee Melilli
To: Planning
Subject: Testimony for Park Place Crossing Development meeting on Monday, May 9
Date: Monday, May 9, 2022 4:43:27 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am writing to submit testimony for the Park Place Development meeting on Monday, May 9 in regards to GLUA-21-00045/MAS-21-00006/VAR-22-00001 Master Plan and Variance for Park Place Crossing Development.

This development will put increased strain on the community. There is only one narrow access road into the current development that already has a lot of daily traffic with many drivers already going over the speed limit in a residential area where kids play and families walk dogs. More access roads into the development need to be put in prior to any new homes to reduce heavy traffic into this residential area and to allow for sufficient access and exit in case of emergency situations that require evacuations, such as fires.

New schools need to be built to accommodate the large influx of families and children into a very tight area. This needs to be considered and planned for prior to acceptance of any plan for new housing.

With the increase of fires in the area it seems ill-advised to remove even more natural green space without consideration for the environmental impact.

Overall, more time needs to be allowed so the proper research can be done as to the impact on the families, community, and natural spaces before this project is put up for approval.

Jaimee Melilli
jaimeemelilli@gmail.com
714-469-7288
Oregon City resident

CITY OF OREGON CITY

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

To: Planning Commission **Agenda Date:** 07/11/2022

SUBJECT:

Public Comments for GLUA-21-00045 / MAS-21-00006 / VAR-22-00001
Park Place Crossing General Development Plan

Below is a list of all public comments received for this land use application prior to June 30, 2022. The document is split into four separate PDFs due to the large number of comments and information provided.

Each item is included in this document in the order listed below.

Each item on the list below is a clickable link to navigate to the specific comment within the document.

PART 1 - SEE SEPARATE DOCUMENT

1. Jed Pedersen emails dated March 31, 2022, April 2, April 3, and April 10, 2022
2. Sharon and Neish emails dated April 3, 2022
3. Sharon and Ken Neish emails dated April 4, 2022
4. Jackie-Hammond Williams letter received April 11, 2022
5. Janice Troxler letter dated April 7, 2022
6. Barbara Renken letter dated April 8, 2022
7. Christine Kosinski letter dated April 11, 2022
8. Park Place Neighborhood Association letter dated April 11, 2022
9. Hamlet of Beavercreek letter received April 11, 2022
10. Clackamas County Engineering Division letter dated April 15, 2022
11. Metro emails dated March 31, 2022
12. Kendall Reid, Oregon City Parks and Recreations Director email dated April 15, 2022
13. Clackamas River Water comment form dated March 31, 2022
14. Oregon City Building Division comment form dated April 5, 2022
15. James Graham, Oregon City Economic Development Manager letter dated April 18, 2022

PART 2 - SEE SEPARATE DOCUMENT

16. Kirk Tolstrup email dated May 2, 2022
17. John Widmer email dated May 6, 2022
18. Janice Troxler email dated May 5, 2022
19. Karla Laws letter dated May 8, 2022
20. Christine Kosinski email dated May 9, 2022
21. Jane Varley, Michael Mueller, Dan and Shannon Keller, and Shirley Humprey letter received May 9, 2022
22. Darin Shoup email dated May 9, 2022

23. Mikhail Krughkov email dated May 9, 2022
24. Adella and Mark Bell slides dated May 9, 2022
25. Rivers of Life Center letter dated May 9, 2022
26. Oregon City School District letter dated May 9, 2022
27. Melissa Warner email dated May 9, 2022
28. Jed Pedersen slides dated May 9, 2022
29. Brent and Jamie Gross email dated May 9, 2022
30. Jaimee Melilli email dated May 9, 2022

PART 3 - CLICK EACH LINE TO NAVIGATE DIRECTLY TO COMMENT

31. Enoch Huang and Roya Mansouri slides dated May 9, 2022
32. Enoch Huang and Roya Mansouri letter dated May 9, 2022
33. Emily Lisborg email dated May 10, 2022
34. Ken Iverson emailed dated May 9, 2022
35. Barb Seekins letter received May 9, 2022
36. Trailview Heights HOA letter received May 9, 2022
37. Sutton map received May 9, 2022
38. Tom Geil slides received May 9, 2022
39. Stephen Ford letter received May 9, 2022
40. Jackie-Hammond Williams letter received May 9, 2022
41. Tara McElhannon letter received May 9, 2022
42. Sharon Neish emailed dated May 10, 2022
43. Carolyn Lu email dated May 11, 2022
44. Anonymous website submission dated May 11, 2022
45. Lynette Basiou email dated May 12, 2022
46. Photos from Planning Commission Chair's site visit dated May 9, 2022
47. Clackamas County Disaster Management public records request email dated May 11, 2022
48. Tom Geil and Dirk Schlagenhaufer facebook posts dated May 12, 2022
49. Jackie Dalseme emailed dated May 12, 2022
50. Tom Geil Oregon City News opinion piece dated May 12, 2022
51. Department of Land Conservation and Development (DLCD) email dated May 13, 2022
52. Jane Nitschke email dated May 15, 2022
53. Suzanne Hammond emailed dated May 14, 2022
54. James Nicita email and attachments dated May 13, 2022
55. UGB map received May 17, 2022

PART 4

56. Christine Kosinski/Scott Burns letter dated May 23, 2022
57. Christine Kosinski letter dated May 23rd, 2022
58. Tara McElhannon email dated May 23rd, 2022
59. Maryann Lee email dated May 22, 2022
60. James Nicita email and attachments dated May 22, 2022
61. James Nicita email #2 and attachments dated May 22, 2022
62. Emily Lisborg email dated May 18, 2022
63. James Nicita email dated May 24, 2022
64. Jed Peterson email dated May 21, 2022
65. Sharon Neish Oregon City News opinion piece dated May 23, 2022

66. Roya Mansouri email dated May 23, 2022
67. Roya Mansouri letter received May 23, 2022
68. Roya Mansouri email #2 dated May 23, 2022
69. Scott Coleman letter received May 23, 2022
70. Sharon Neish email dated May 24, 2022

GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan

CHAPTER 17.49 Natural Resource Overlay District (NROD) Boundary Map Analysis

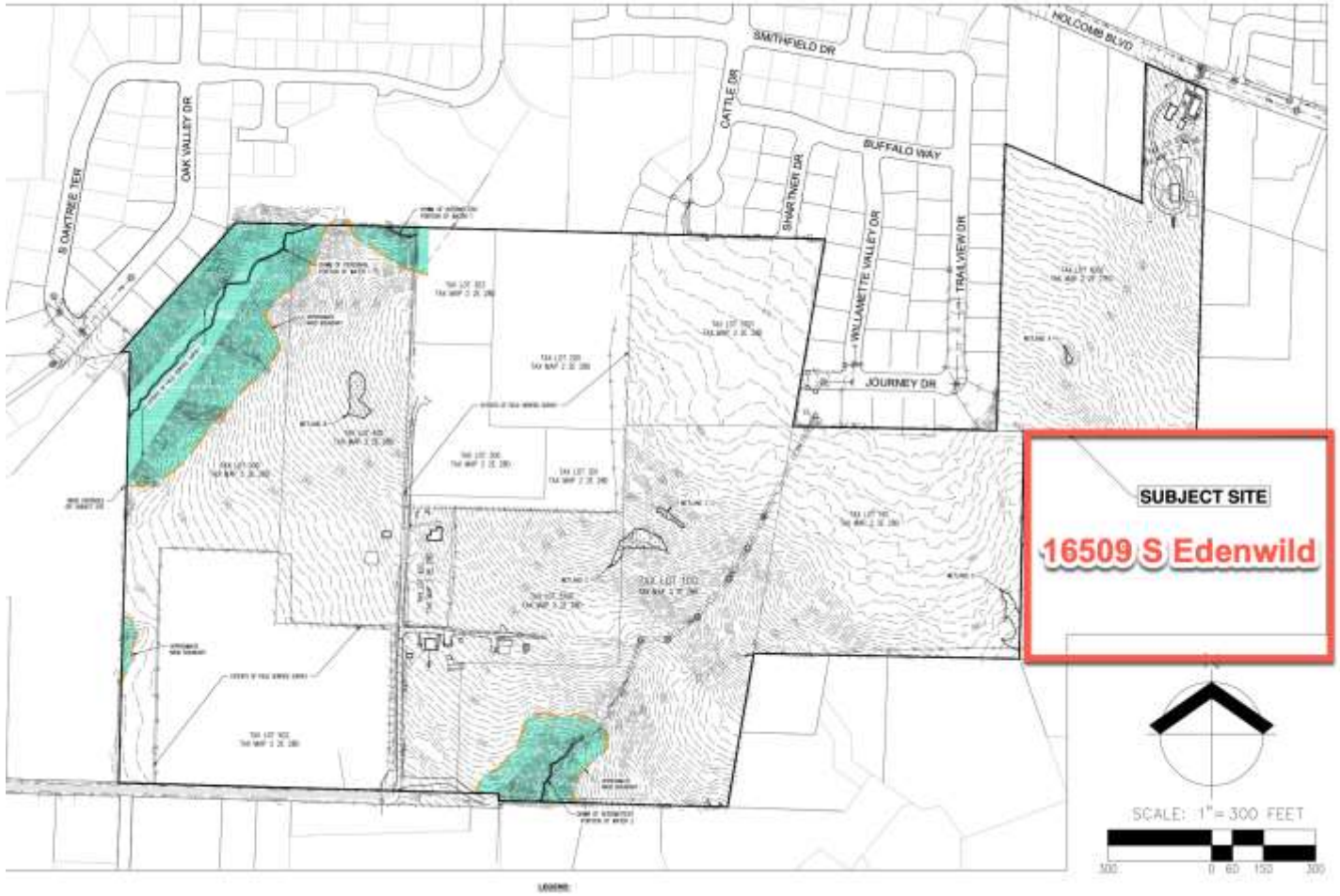
Public Comments by:

Enoch Huang

16509 S Edenwild Lane

Oregon City, OR 97045

Relation to the proposed development



- 16509 S Edenwild Lane has the greatest shared border with the development
  - ~500 feet on northern border
  - ~625 feet on western border

What does the NROD regulate?

- *17.49.070 - Prohibited uses*
- *17.49.080 - Uses allowed outright (exempted)*
- *17.49.090 - Uses allowed under prescribed conditions*
- *17.49.100 - General development standards*
- *17.49.110 - Width of vegetated corridor*

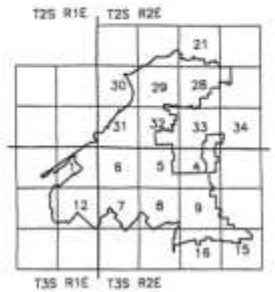
CHAPTER 17.49 Natural Resource Overlay District (NROD)

- *17.49.020 NROD identifying documents*
  - *The 1999 Oregon City Local Wetland Inventory.*
  - *The Oregon City Water Quality Resource Area Map (Ord. No. 99-1013).*
  - *2004 Oregon City slope data and mapping (LIDAR).*
  - *Metro Regionally Significant Habitat Map (Aerial Photos taken 2002).*
  - *National Wetland Inventory (published 1992).*
  - *Beavercreek Road Concept Plan (adopted September 2008).*
  - *Park Place Concept Plan (adopted April 2008).*
  - *South End Concept Plan (adopted April 2014).*
- *The NROD provisions apply only to properties within the NROD as shown on the NROD Map, as amended.*

APPROVED WETLANDS INVENTORY
Oregon Division of State Lands
Meets LWI standards
Date 9/99 Approved by J. Morlan

CITY OF OREGON CITY
LOCAL
WETLAND INVENTORY

ATTACHMENT
SECTION MAPS

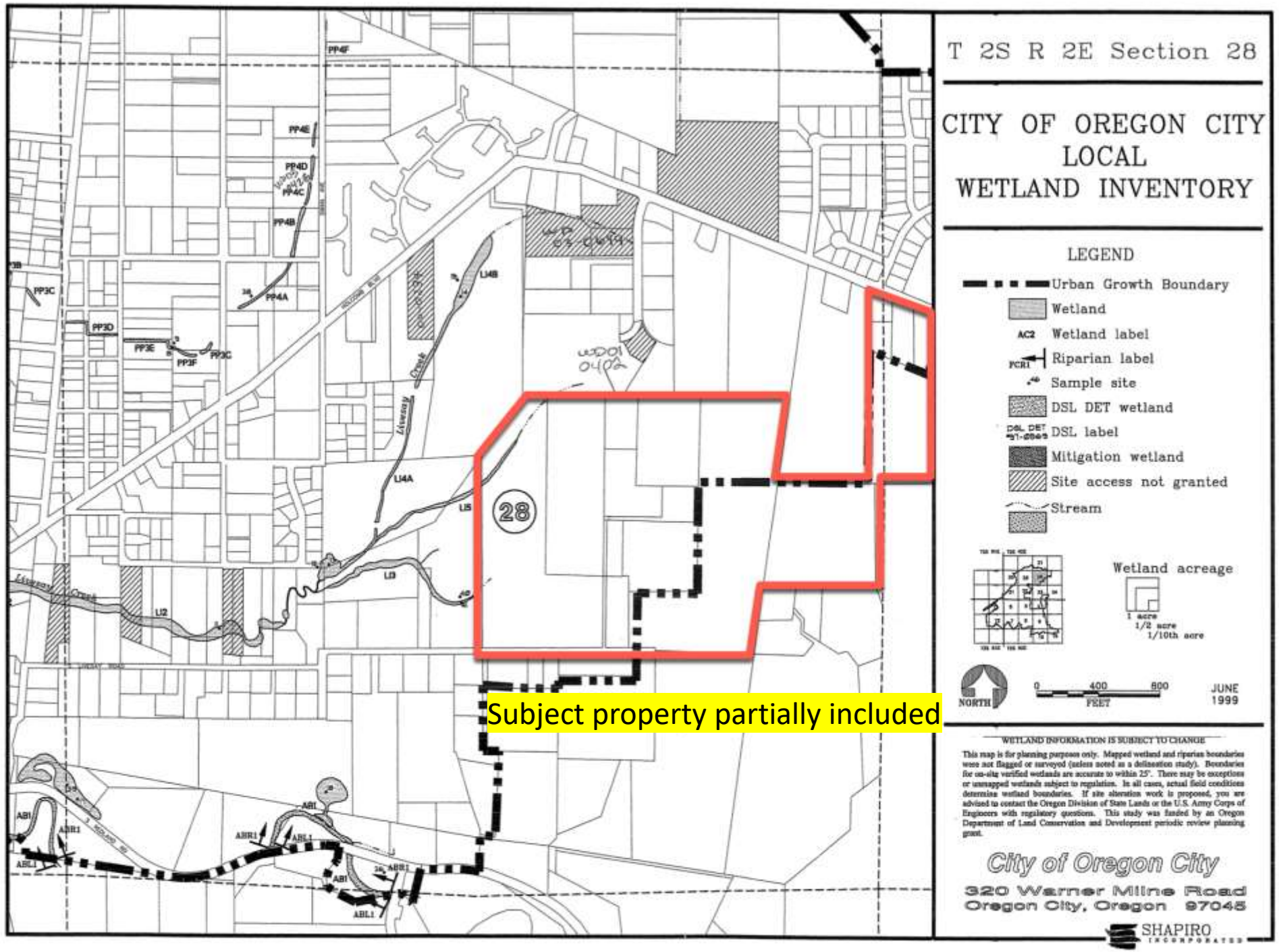


JUNE
1999

City of Oregon City
320 Warner Milne Road
Oregon City, Oregon 97045

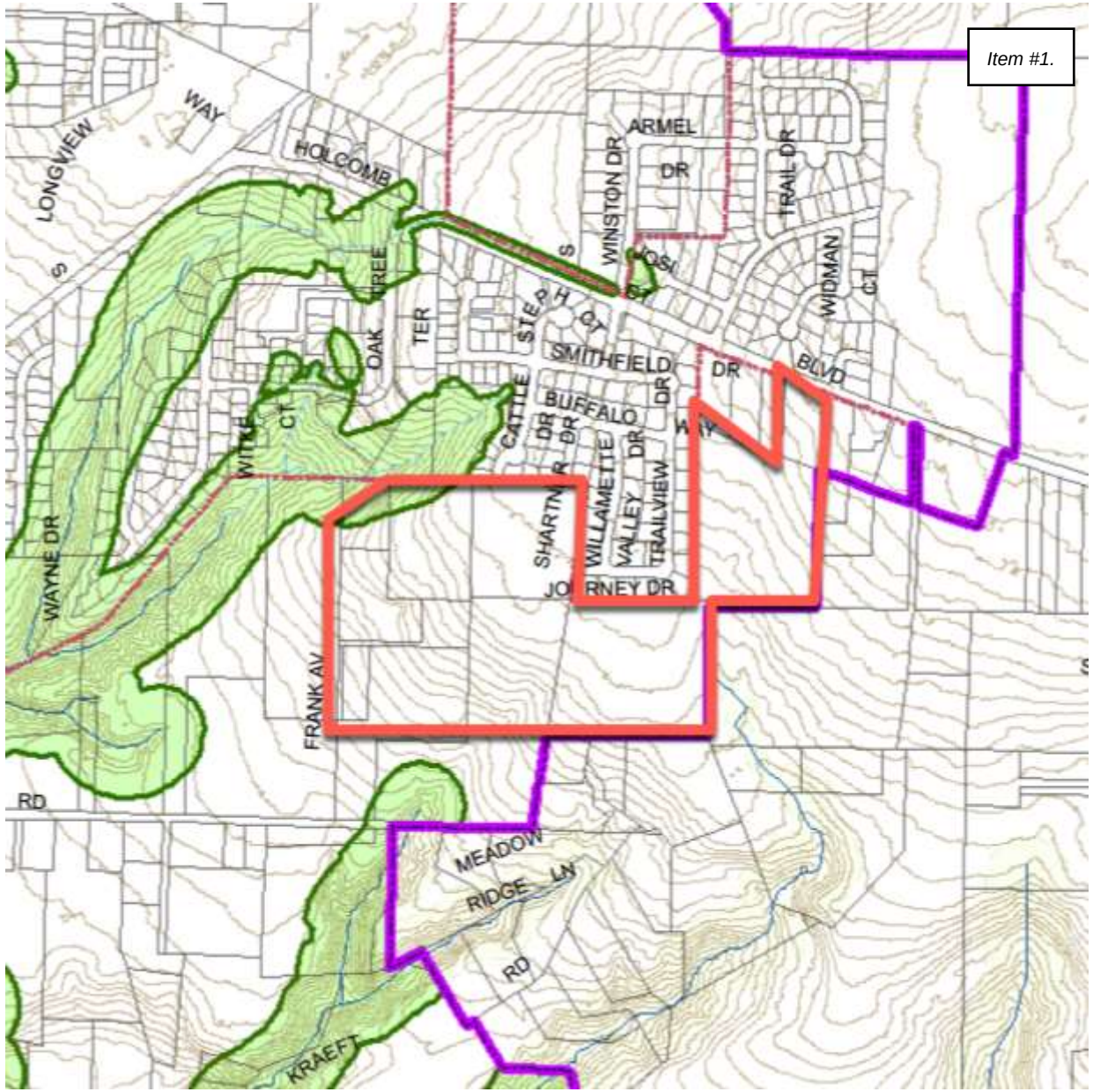
PROJECT #7971165

SHAPIRO INCORPORATED


T 2S R 2E Section 28
CITY OF OREGON CITY
LOCAL
WETLAND INVENTORY
LEGEND
Urban Growth Boundary
Wetland
AC2 Wetland label
Riparian label
Sample site
DSL DET wetland
DSL label
Mitigation wetland
Site access not granted
Stream
Wetland acreage
1 acre
1/2 acre
1/10th acre
NORTH
0 400 800
FEET
JUNE
1999
28
Subject property partially included
WETLAND INFORMATION IS SUBJECT TO CHANGE
This map is for planning purposes only. Mapped wetland and riparian boundaries were not flagged or surveyed (unless noted as a delineation study). Boundaries for on-site verified wetlands are accurate to within 25'. There may be exceptions or unmapped wetlands subject to regulation. In all cases, actual field conditions determine wetland boundaries. If site alteration work is proposed, you are advised to contact the Oregon Division of State Lands or the U.S. Army Corps of Engineers with regulatory questions. This study was funded by an Oregon Department of Land Conservation and Development periodic review planning grant.
City of Oregon City
320 Warner Milne Road
Oregon City, Oregon 97045
SHAPIRO
INCORPORATED

Official OC NROD Map

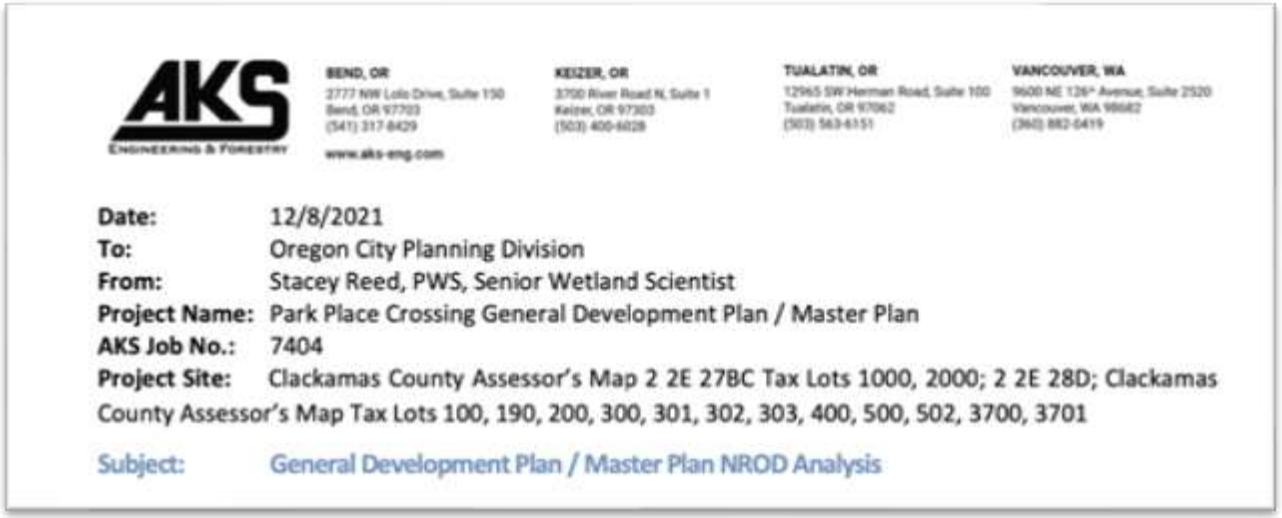
- Map boundaries end at UGB



https://www.orcity.org/maps/natural-resource-overlay-district-nrod-map

Delineation Site Visit Results

- AKS Senior Wetland Scientist Stacey Reed, PWS and Natural Resource Specialist Sonya Templeton conducted site visits on May 28, June 2, and August 5, 2020 to delineate Protected Water Features (wetlands and/or waters) within the project site and assess whether Protected Water Features were present immediately off-site to determine if a vegetated corridor buffer should extend onto the project site.



AKS ENGINEERING & FORESTRY

BEND, OR
2777 NW Lolo Drive, Suite 150
Bend, OR 97703
(541) 317-8429

KEIZER, OR
3700 River Road N, Suite 1
Keizer, OR 97303
(503) 400-6028

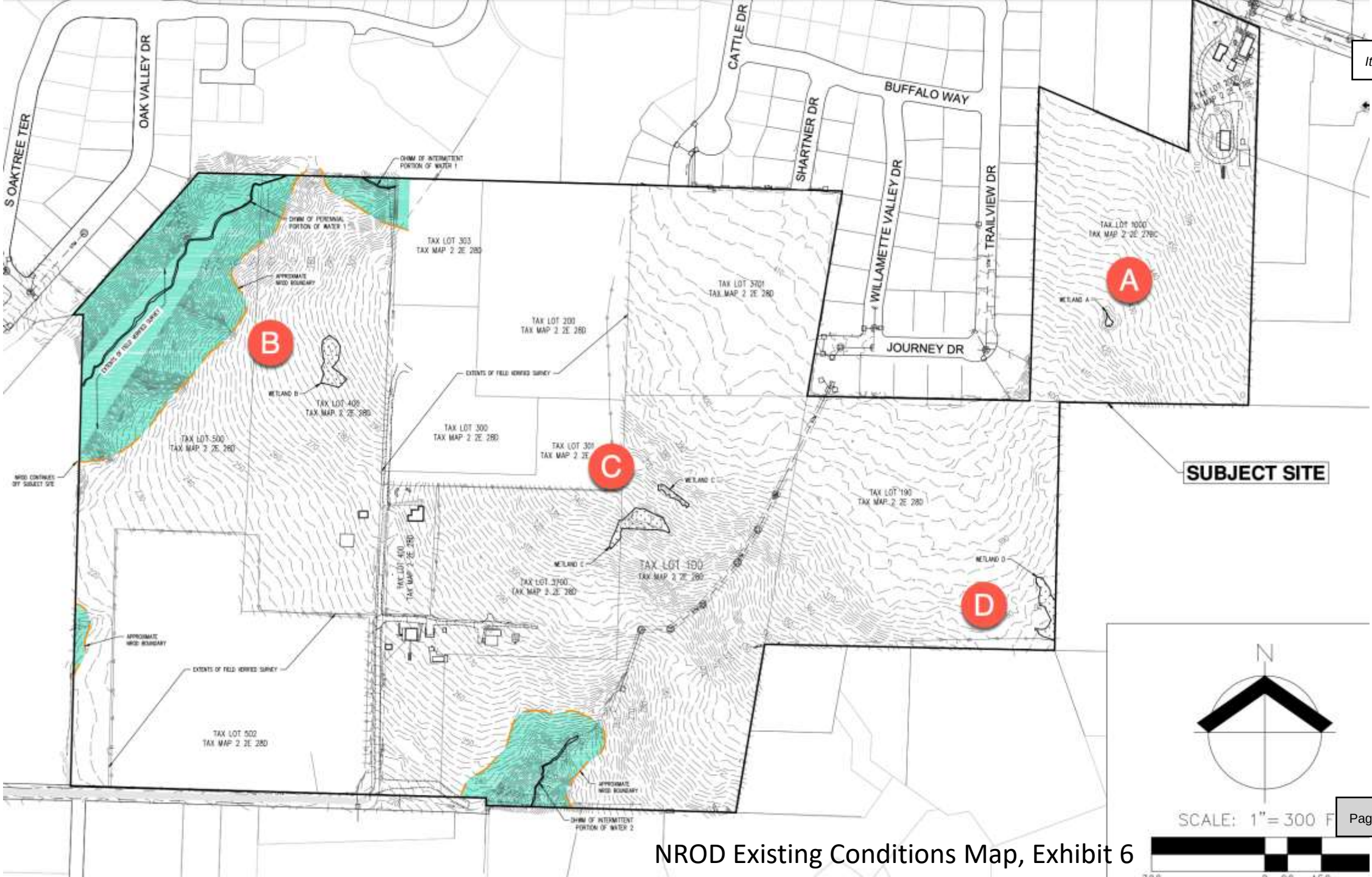
TUALATIN, OR
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

VANCOUVER, WA
9600 NE 126th Avenue, Suite 2520
Vancouver, WA 98682
(360) 882-0419

www.aks-eng.com

Date: 12/8/2021
To: Oregon City Planning Division
From: Stacey Reed, PWS, Senior Wetland Scientist
Project Name: Park Place Crossing General Development Plan / Master Plan
AKS Job No.: 7404
Project Site: Clackamas County Assessor's Map 2 2E 27BC Tax Lots 1000, 2000; 2 2E 28D; Clackamas County Assessor's Map Tax Lots 100, 190, 200, 300, 301, 302, 303, 400, 500, 502, 3700, 3701

Subject: General Development Plan / Master Plan NROD Analysis



NROD Existing Conditions Map, Exhibit 6

NROD Analysis

- Three isolated wetlands (referred to as Wetlands A-C) and Wetland D (which extends off-site to the southeast) were delineated on the project site. None of the wetlands delineated on the project site are mapped within an NROD boundary; therefore, according to Chapter 17.49.035 of Oregon City Municipal Code (OCMC), Chapter 17.49 NROD review does not apply to these wetlands. Wetlands A-D are likely to be regulated by the Oregon Department of State Lands (DSL) requiring state authorization for impact.

NROD Analysis

- Wetland D is a palustrine emergent (PEM) wetland situated on a subtle slope in the southeastern portion of the site. Wetland D appears to be fed by a natural spring. Wetland conditions extend off-site to the southeast.
- A wetland and waters delineation report in accordance with OAR 141-090-0030 and OAR-141-090-0035 (1-17) was prepared by AKS to describe the results of a wetland and waters delineation. The delineation report was submitted to DSL and is currently under review per DSL File WD 2021-0311.

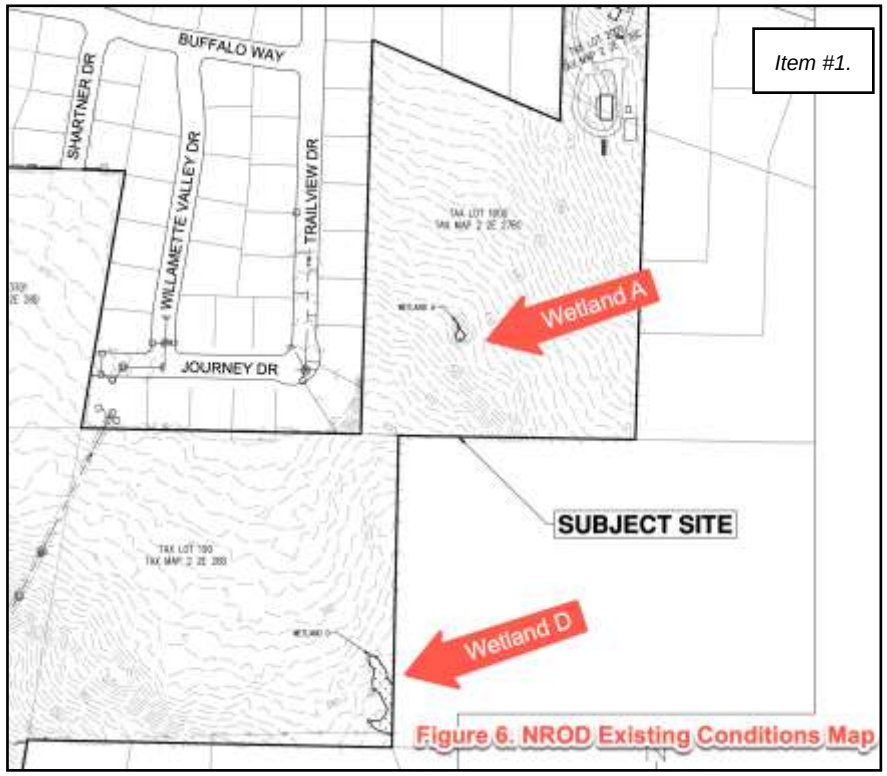
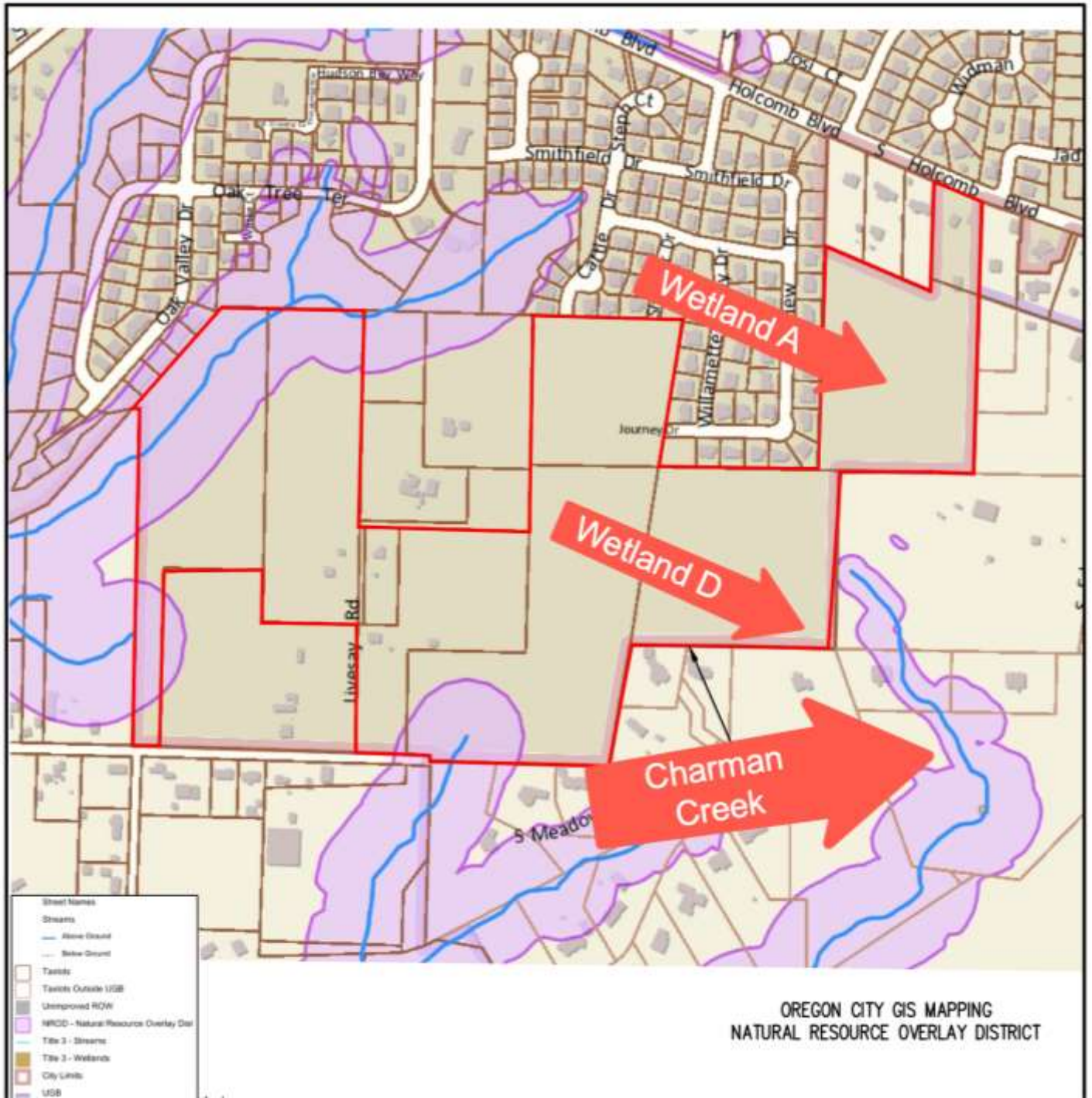


Figure 6. NROD Existing Conditions Map

Request: Please make DSL File WD 2021-0311 public



Map submitted by AKS NROD Report Figure 5

None of the wetlands delineated on the project site are mapped within an NROD boundary; therefore, according to Chapter 17.49.035 of Oregon City Municipal Code (OCMC), Chapter 17.49 NROD review does not apply to these wetlands.

AKS NROD Report

Any Natural Resources Overlay District areas impacted by development will be reviewed for compliance with this section either before or at the time of first DDP application. *Since Phase 1 area does not contain any mapped resources, an NROD review is not required for the proposed Phase 1 area.*

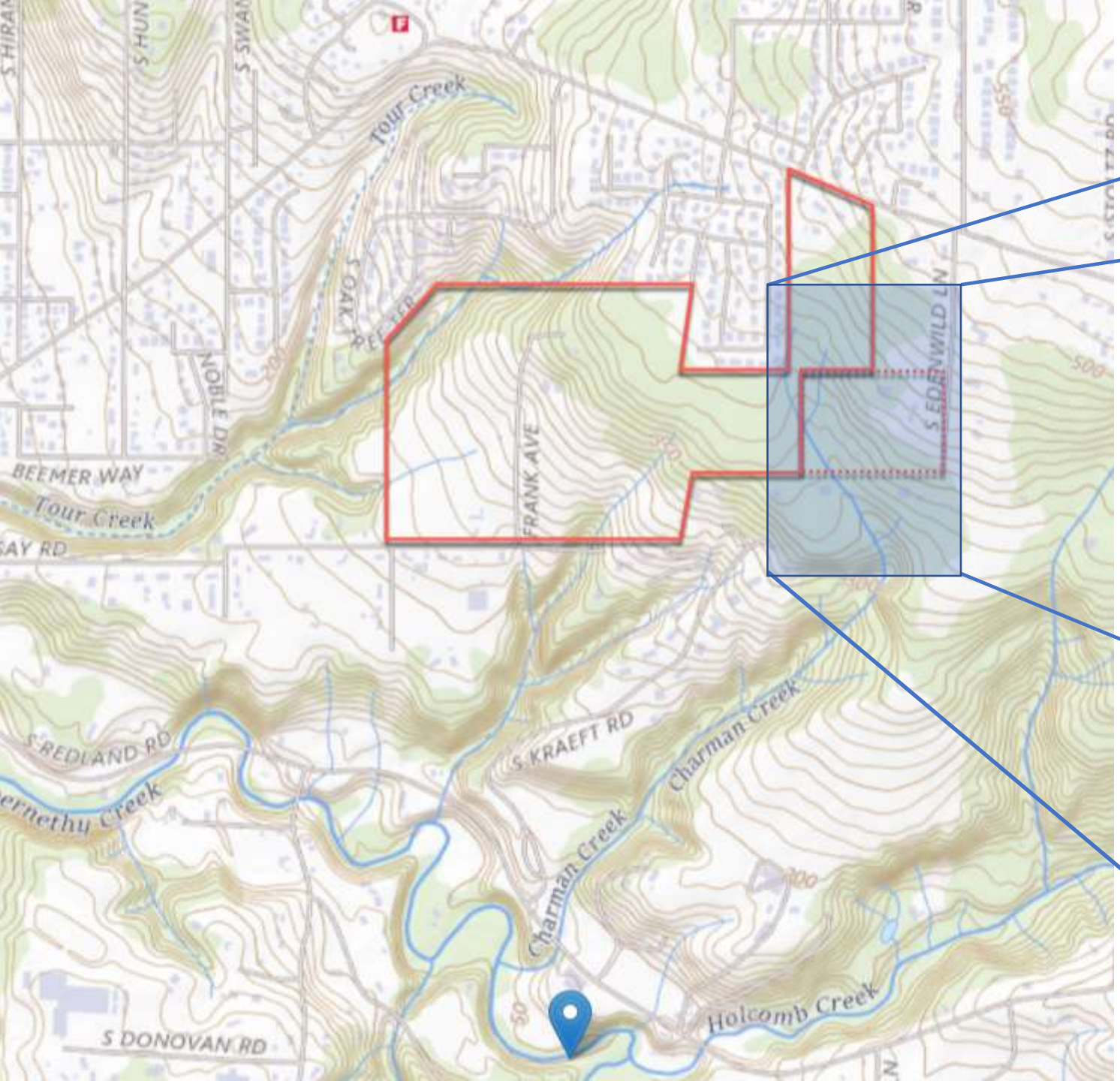
-Staff Report, p. Page 1274

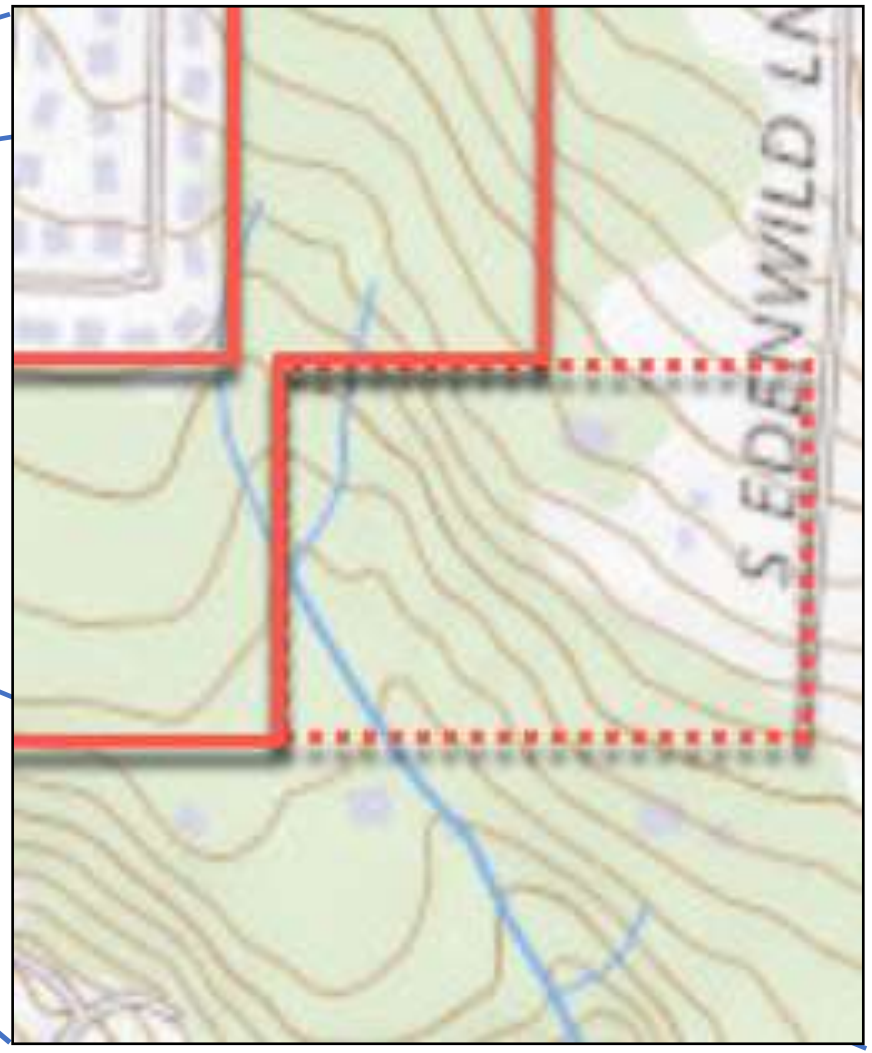
Staff Report: NROD Analysis and Goal 5

- The wetlands are outside of the inventoried resources and thus are not subject to NROD review. However, they are subject to protection under Comprehensive Plan Policies in Goal 5; see findings in OCMC 17.65.050.C.6.
- **Staff has determined that it is possible, likely and reasonable that the applicant shall meet this standard through the Conditions of Approval.**

Staff Report, p. 49

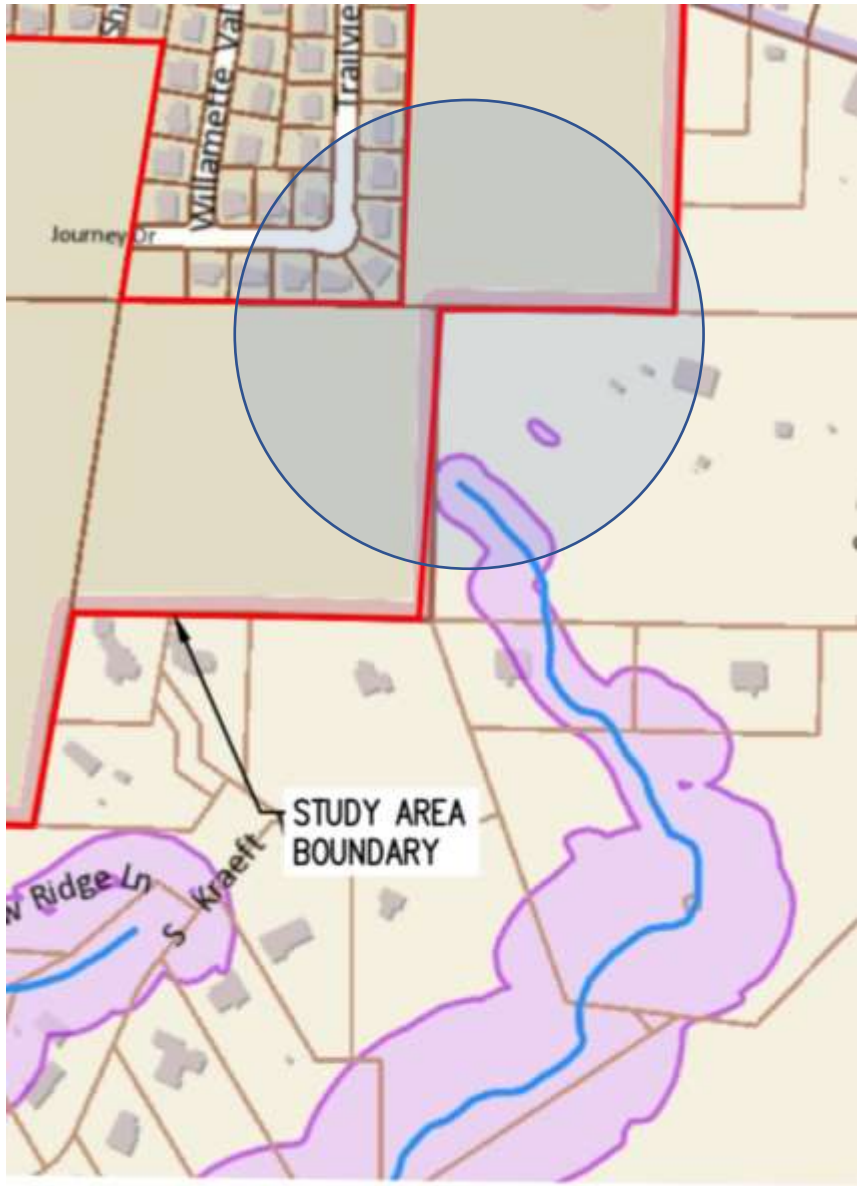
However…





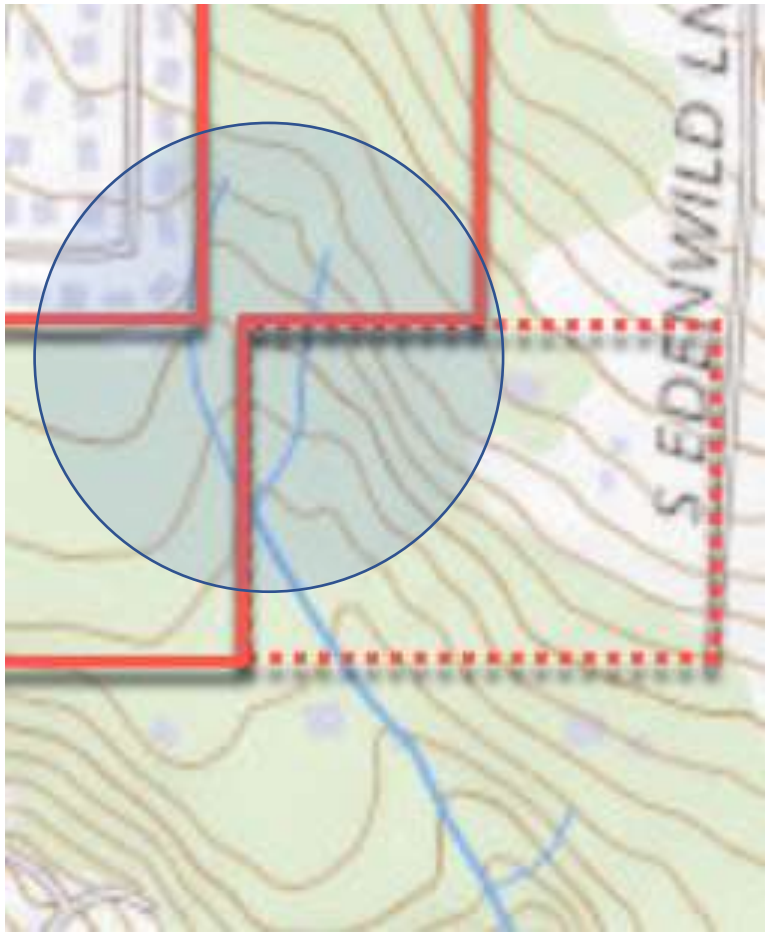
USGS Map Quadrangle Oregon City

Map provided by AKS/ICON



OREGON CITY GIS MAPPING
NATURAL RESOURCE OVERLAY DISTRICT

USGS Map Quadrangle Oregon City 2020



"None of the wetlands delineated on the project site are mapped within an NROD boundary"

Two tributaries of Charman Creek are missing from the NR

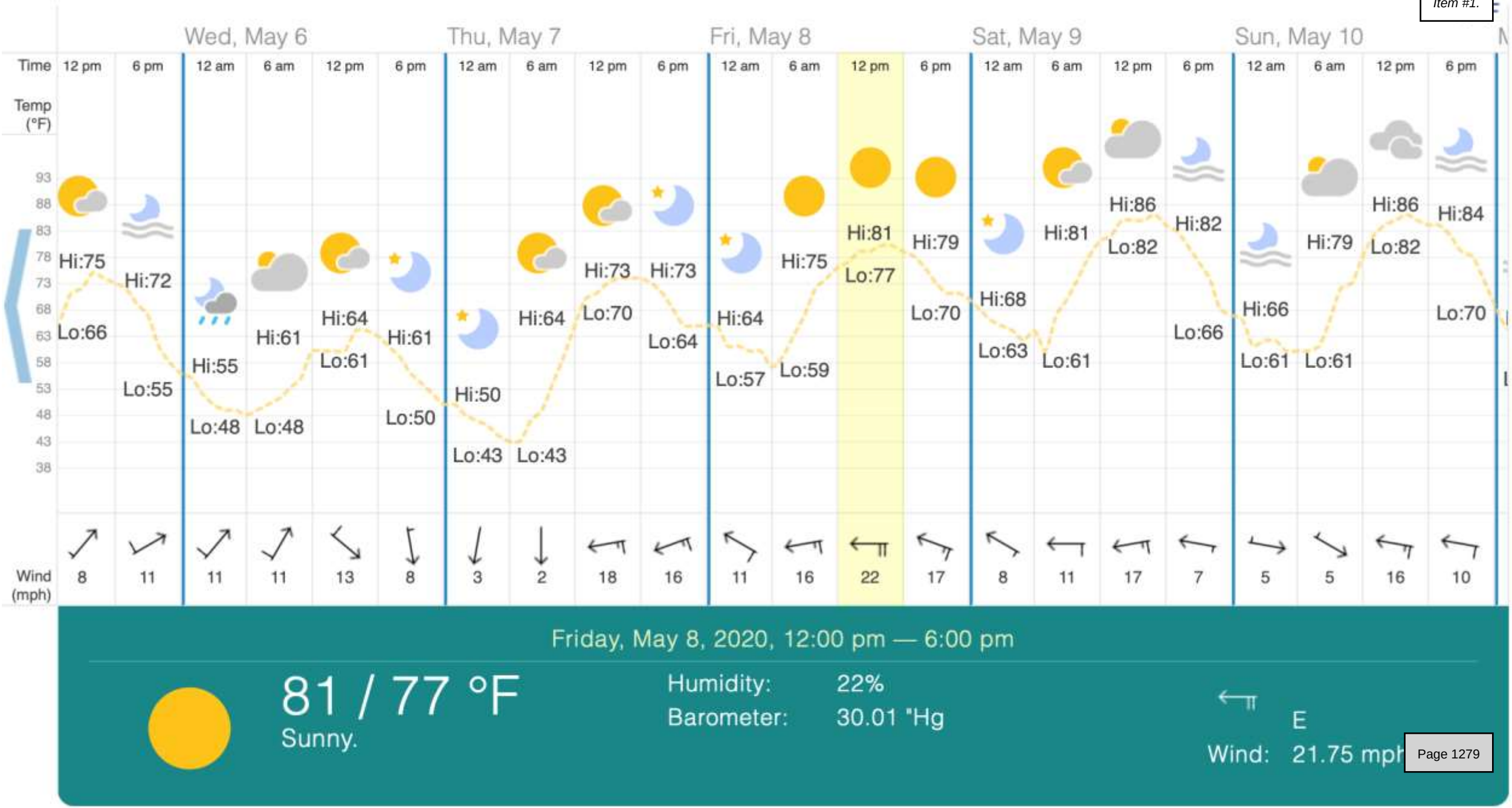
17.04.1205 - Stream

- "Stream" means areas where surface water produces a defined channel or bed, including bedrock channels, gravel beds, sand and silt beds, and defined-channel swales. The channel or bed does not have to contain water year-round.
- Streams are categorized into two classes: Perennial streams and intermittent streams. Perennial stream means a stream that flows year-round during years of normal precipitation. Intermittent stream means a stream that flows only part of the year, or seasonally, during years of normal precipitation.

Site visits were on May 28, June 2, and August 5, 2020

(Ord. No. 18-1009, § 1(Exh. A), 7-3-2019)

May 2020 Weather in Oregon City — Graph



Friday, May 8, 2020, 12:00 pm — 6:00 pm

81 / 77 °F

Sunny.

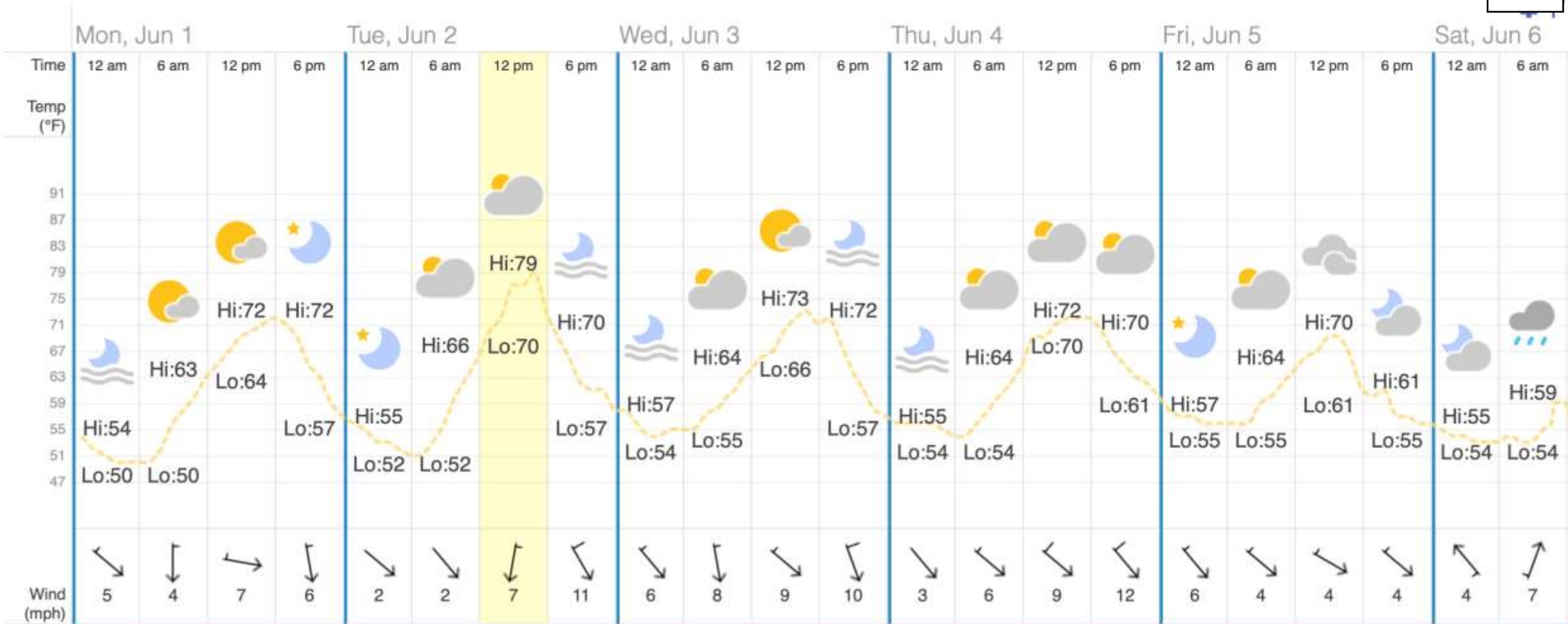
Humidity: 22%

Barometer: 30.01 "Hg

E

Wind: 21.75 mph

June 2020 Weather in Oregon City — Graph



Tuesday, June 2, 2020, 12:00 pm — 6:00 pm

79 / 70 °F

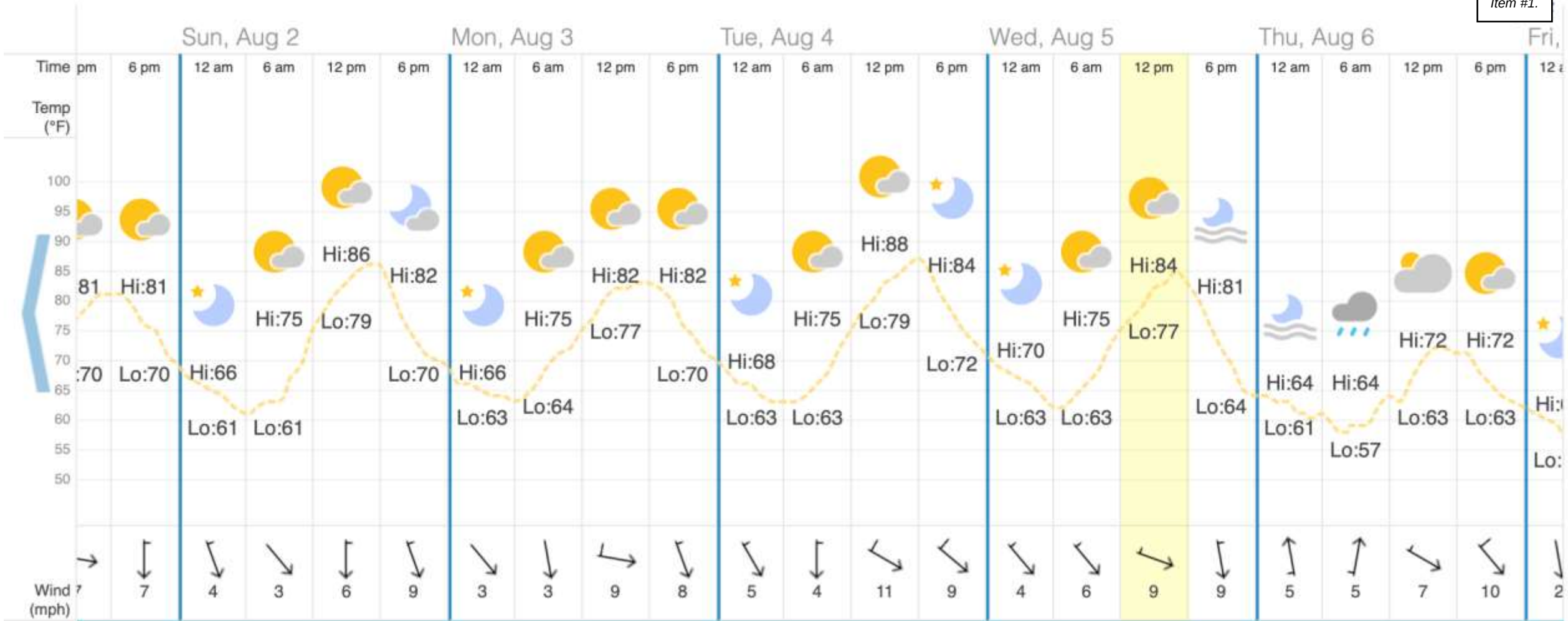
Partly sunny.

Humidity: 30%

Barometer: 30.15 "Hg

Wind: N 6.836 mph

August 2020 Weather in Oregon City — Graph



Wednesday, August 5, 2020, 12:00 pm — 6:00 pm

84 / 77 °F

Passing clouds.

Humidity: 38%

Barometer: 29.88 "Hg

WNW

Wind: 8.7 mph

17.49.030 - Map as reference

1. This chapter applies to all development within the Natural Resources Overlay District as shown on the NROD Map, which is a regulatory boundary mapped ten feet beyond the required vegetated corridor width specified in OCMC 17.49.110. The mapped NROD boundary is based on a GIS-supported application of the adopted documents, plans and maps listed in OCMC 17.49.020A.1.—17.19.020A.8., however the adopted map may not indicate the true location of protected features.

2. Notwithstanding changing field conditions or updated mapping approved by the City (and processed as a Type I Verification per OCMC 17.49.255), the applicant may choose to either accept the adopted NROD boundary or provide a verifiable delineation of the true location of the natural resource feature pursuant to the Type I or Type II procedure in accordance with this chapter.

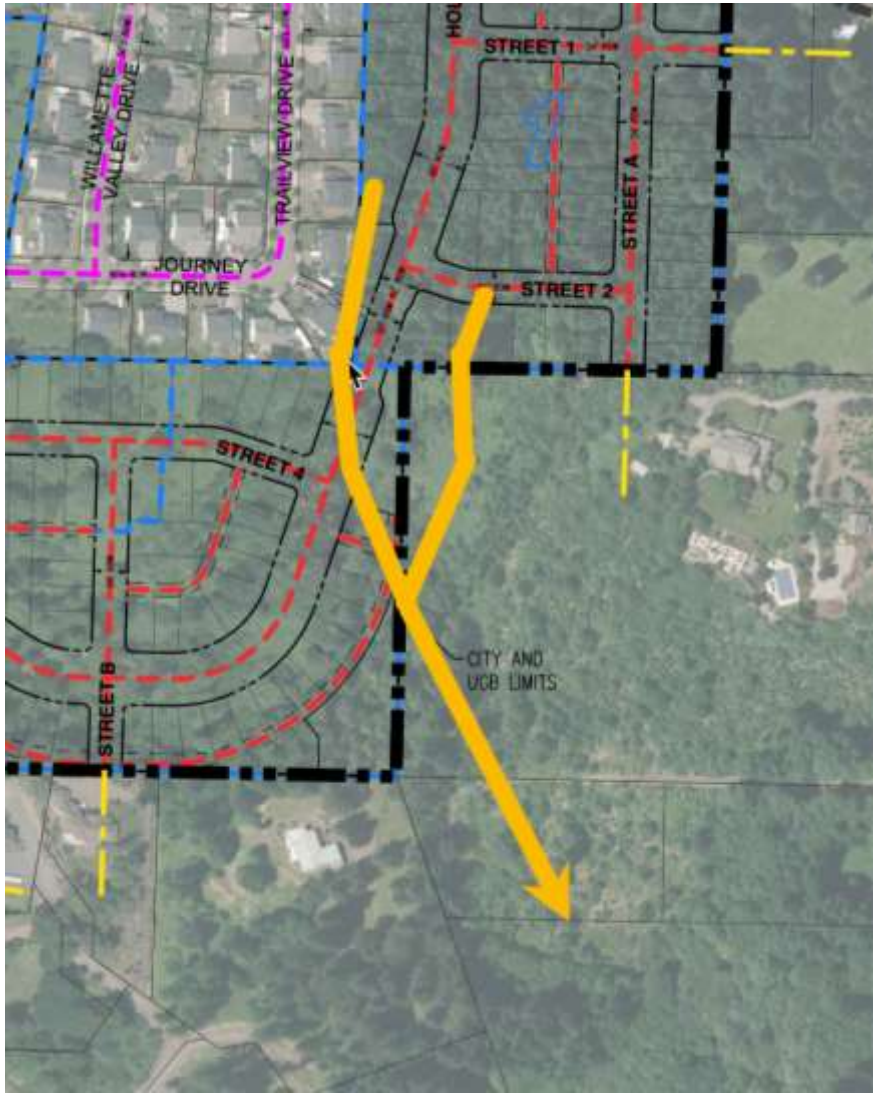
3. The NROD boundary shall be shown on all development permit applications

4. The official NROD map can only be amended by the City Commission.

5. Verification of the map shall be processed pursuant to OCMC 17.49.250.

Impact of missing streams

- Potentially affects
  - Holly Lane
  - Street 2
  - Lots 26-28
  - Lots 60-62
  - Lot 314
- Regulated by OCMC
  - 17.49.070
  - 17.49.080
  - 17.49.090
  - 17.49.100
  - 17.49.110



Policy 5.4.5 – Staff Report (p 65)

- *Ensure that riparian corridors along streams and rivers are conserved and restored to provide maximum ecological value to aquatic and terrestrial species. This could include an aggressive tree and vegetation planting program to stabilize slopes, reduce erosion, and mitigate against invasive species and stream impacts where appropriate.*
- **Finding: Complies as Proposed.** Portions of the site are within the Natural Resources Overlay District, which serves to protect the resources through regulation of development within the vicinity of streams and wetlands. The proposal demonstrates that riparian corridors are protected and conserved, although no verification of the NROD boundary is proposed at this time. The applicant has provided a preliminary NROD report and will be required to comply with overlay district standards for future DDP applications, including verification of the NROD boundary.

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.

Oregon Department of State Lands: Rule 141-086-0350 : Locally Significant Wetland Criteria

- Mandatory LSW Criteria. A local government shall identify a wetland as locally significant if it meets one or more of the following criteria:
- **(a)** The wetland performs any of the following functions at the levels indicated below using the Oregon Freshwater Wetland Assessment Methodology:

  (A) "Diverse" wildlife habitat; or

  (B) "Intact" fish habitat; or

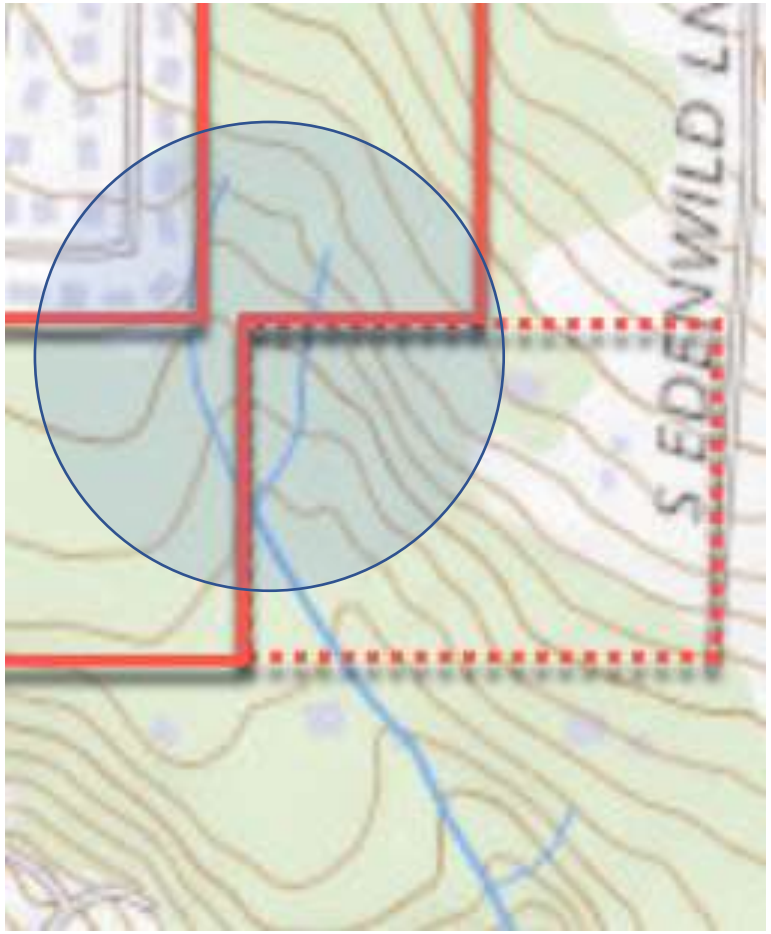
  (C) "Intact" water quality function; or

  (D) "Intact" hydrologic control function.

Multiple standards in Rule 141-086-0350 need to be investigated

Summary

- The NROD Boundary Map shows that Charman Creek is part of the NROD boundary (purple shaded area)
  - Does the NROD boundary extend to the full extent of the creek (on lots 190 and 1000)?
- Wetland D may be an extension of the Charman Creek headwater (as it is fed by a natural spring)
- Wetland D/Charman Creek are potentially Locally Significant Wetlands and should be within the existing NROD boundary map
- The Oregon City Local Wetland Inventory was last completed in September 1999, does not include the subject property, and is out of date.



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.

Summary

- The city must clarify whether all tributaries of a creek are included in the NROD boundary
  - If so, the NROD boundary map must be updated according to OCMC 17.49.035
- An *independent* wetland specialist must perform a delineation study of Lots 1000 and 190 Wetland D to determine if they are LSWs.
  - If so, the NROD boundary map must be updated according to OCMC 17.49.035
- The Local Wetland Inventory needs to be updated
- The development of Lots 1000 and 190 must comply with OCMC 17.49.070, 17.49.080, 17.49.090, and 17.49.110

17.49.060.B.2 Compliance with Federal and State Requirements. Timing is important!

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.*

Summary

- There are unanswered questions as to whether there are Locally Significant Wetlands on or around the subject property (Lots 1000 and 190)
- There are unanswered questions as to whether the NROD boundary map and the Local Wetland Inventory are accurate
- The city commissioners have the ability and responsibility to verify NROD boundaries
- Request for continuance until all of these questions are resolved
- Do not let the developers ask for forgiveness rather than for permission

Oregon City Planning Commission
c/o Planner Kelly Reid
625 Center Street
Oregon City, OR 97045
kreid@orcity.org

RE: Park Place Crossing General Development Plan
GLUA-21-00045 / MAS-21-00006 / VAR-22-00001

May 9, 2020

Dear Chair Schlagenhaufer and Commissioners:

Thank you for the opportunity to address further our concerns about the Park Place Crossing General Development Plan (PPC GDP). We believe that there were some errors and omissions in the documents submitted with the GDP and in the conclusions drawn by the developer and the OC Planning Commission (OCPC) staff – specifically with respect to the Natural Resource Overlay District (NROD) as regulated by Chapter 17.49 of the Oregon City Municipal Code (OCMC).

Background

Chapter 17.49 of the OCMC is intended to resolve conflicts between development and conservation of habitat, stream corridors, wetlands, and floodplains identified in the city's maps. Specific chapters of OCMC 17.49 describe:

- *17.49.070 - Prohibited uses*
- *17.49.080 - Uses allowed outright (exempted)*
- *17.49.090 - Uses allowed under prescribed conditions*
- *17.49.100 - General development standards*
- *17.49.110 - Width of vegetated corridor*

OCMC 17.49.020 lists the 1999 Oregon City Local Wetland Inventory (LWI) as one of the identifying documents for the NROD. It further states that the NROD provisions apply only to properties within the NROD as shown on the NROD Map.

Unfortunately, the 1999 OC LWI [Figure 1] is out of date and does not include all of the subject property (outlined) in the PPC GDP. Furthermore, the official OC NROD Boundary Map [Figure 2] similarly excludes part of the subject property (outlined). Note that the vegetative corridor markings terminate abruptly at the urban growth boundary (UGB), even though the streams and waterways obviously extend past the UGB.

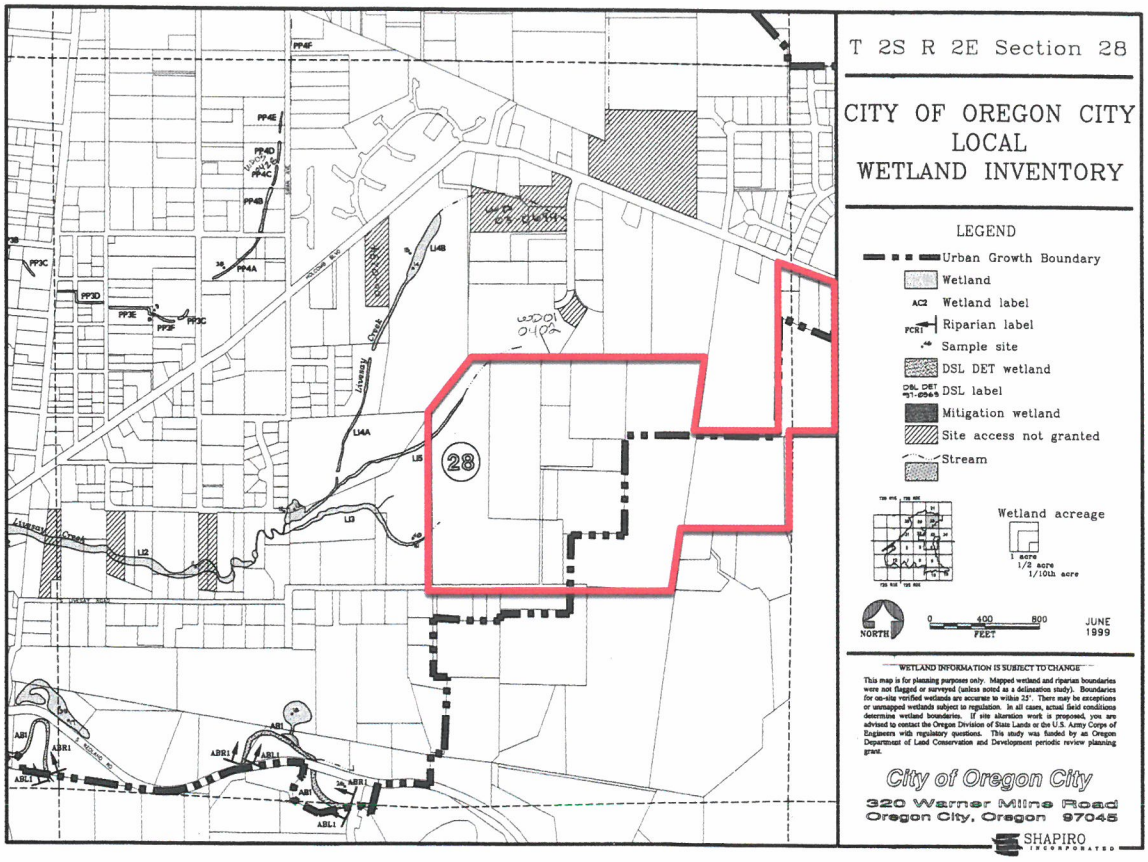


Figure 1. Oregon City Local Wetland Inventory

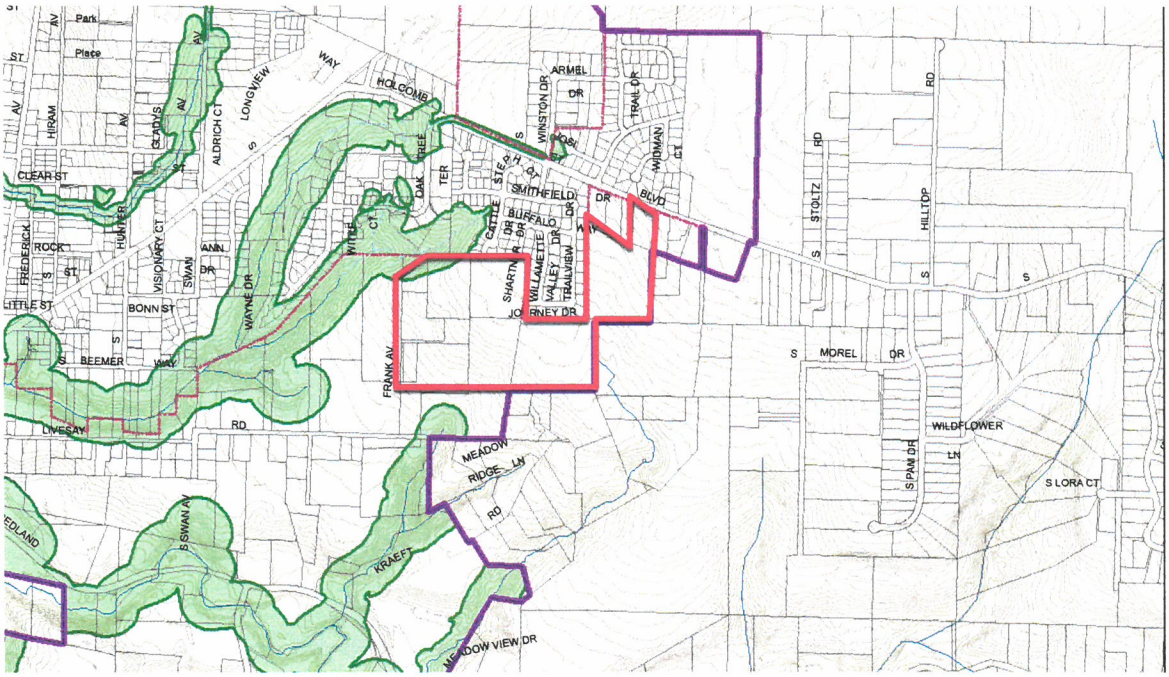


Figure 2. Oregon City Natural Resource Overlay District Map

Developer's Application

AKS Engineering and Forestry/Icon Construction submitted an NROD analysis that reported that:

- AKS Senior Wetland Scientist Stacey Reed, PWS and Natural Resource Specialist Sonya Templeton conducted site visits on May 28, June 2, and August 5, 2020 to delineate Protected Water Features (wetlands and/or waters) within the project site and assess whether Protected Water Features were present immediately off-site to determine if a vegetated corridor buffer should extend onto the project site.
- Three isolated wetlands (referred to as Wetlands A-C) and Wetland D (which extends off-site to the southeast) were delineated on the project site. None of the wetlands delineated on the project site are mapped within an NROD boundary; therefore, according to Chapter 17.49.035 of Oregon City Municipal Code (OCMC), Chapter 17.49 NROD review does not apply to these wetlands. Wetlands A-D are likely to be regulated by the Oregon Department of State Lands (DSL) requiring state authorization for impact.
- Wetland D is a palustrine emergent (PEM) wetland situated on a subtle slope in the southeastern portion of the site. Wetland D appears to be fed by a natural spring. Wetland conditions extend off-site to the southeast.
- A wetland and waters delineation report in accordance with OAR 141-090-0030 and OAR-141-090-0035 (1-17) was prepared by AKS to describe the results of a wetland and waters delineation. The delineation report was submitted to DSL and is currently under review per DSL File WD 2021-0311.

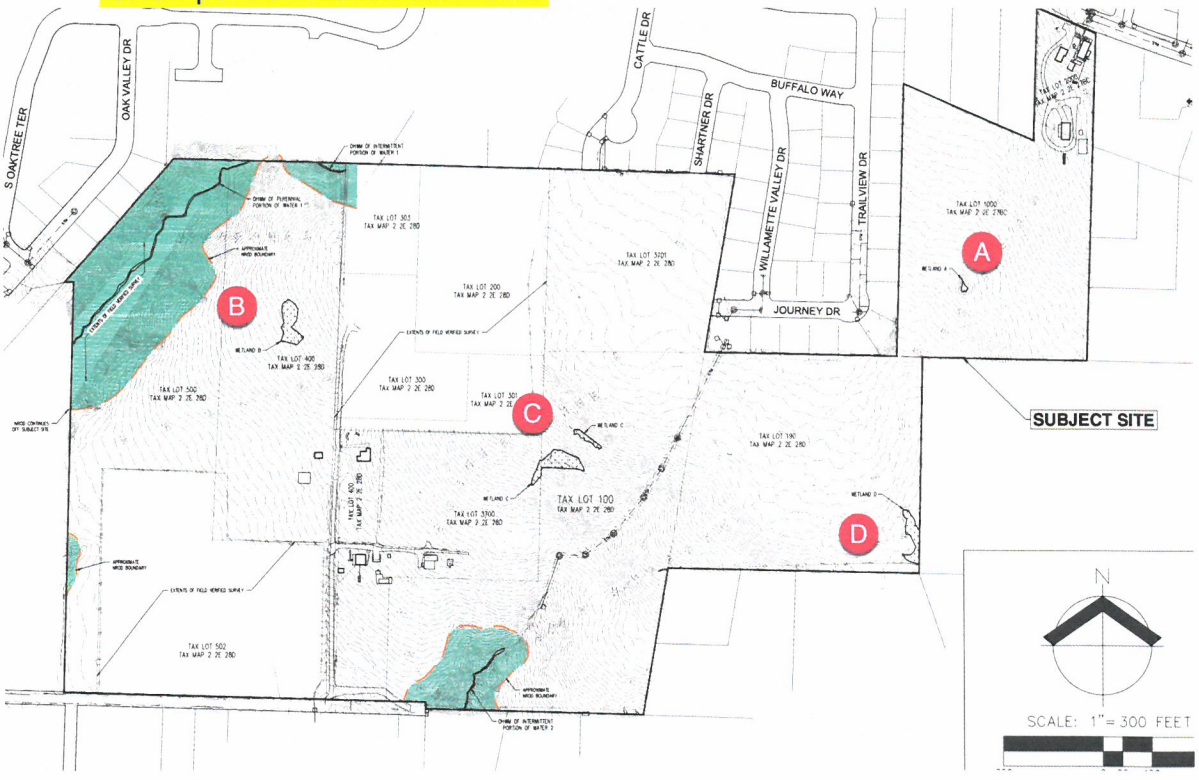


Figure 3. NROD Existing Conditions Map, Exhibit 6

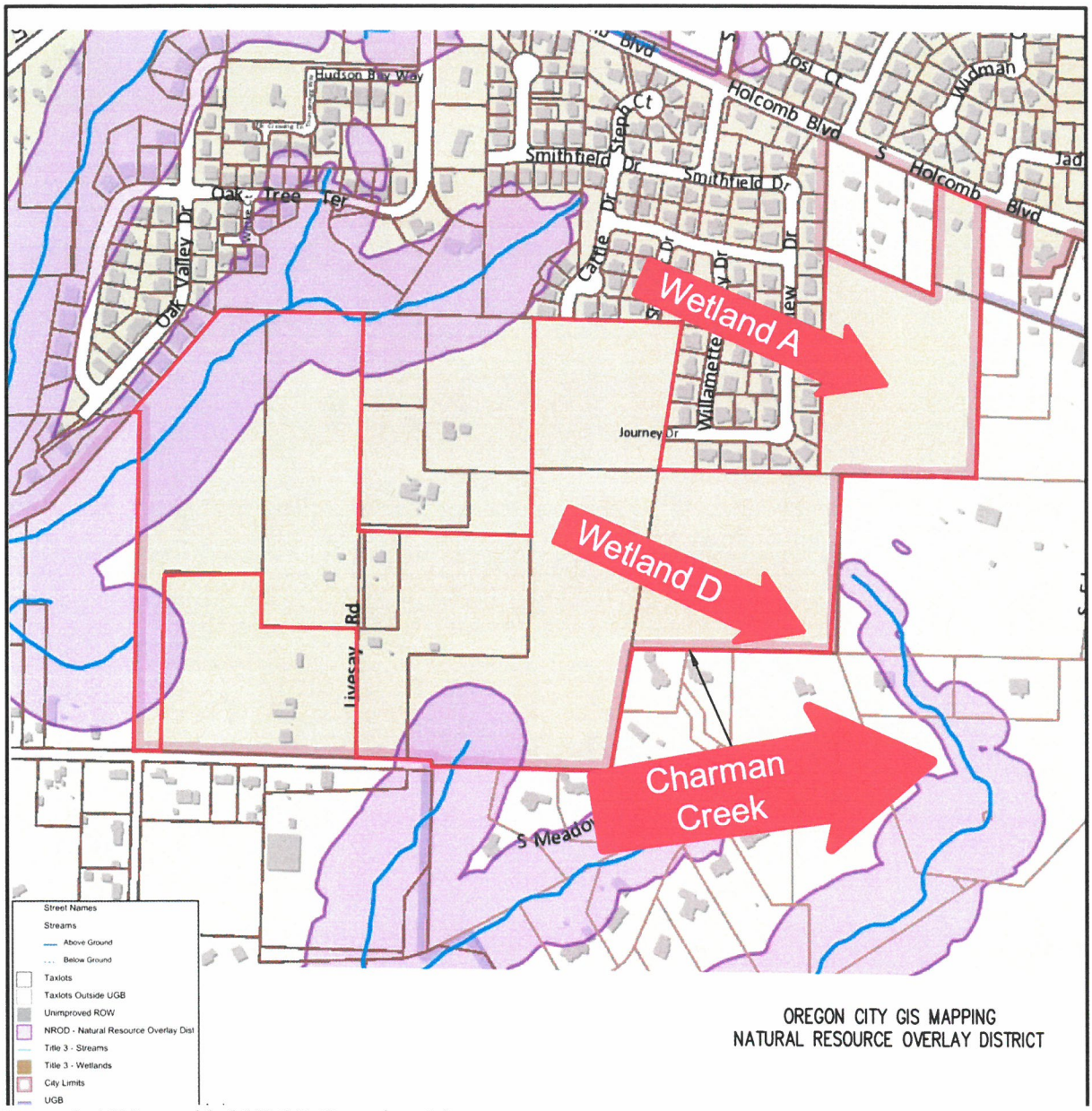


Figure 4. AKS provided NROD Boundary Map

The OCPC Staff Report concurred with the AKS NROD Analysis that:

1. Page 47: See findings in OCMC 17.49. Any Natural Resources Overlay District areas impacted by development will be reviewed for compliance with this section either before or at the time of first DDP application. Since Phase 1 area does not contain any mapped resources, an NROD review is not required for the proposed Phase 1 area.
2. Page 49: The wetlands are outside of the inventoried resources and thus are not subject to NROD review. However, they are subject to protection under Comprehensive Plan Policies in Goal 5; see findings in OCMC 17.65.050.C.6.

Error in AKS NROD Boundary Map

The AKS NROD Analysis also includes a topographical map of the Oregon City Quadrangle [Figure 5]. It clearly shows the presence of Charman Creek – a tributary feeding into Holcomb Creek. The most upland portion of Charman Creek extends onto Tax Lots 1000 and 109, which represent Phase 1 and Phase 2 of the PPC GDP. These waterways are absent on the AKS NROD Boundary Map [Figure 6].

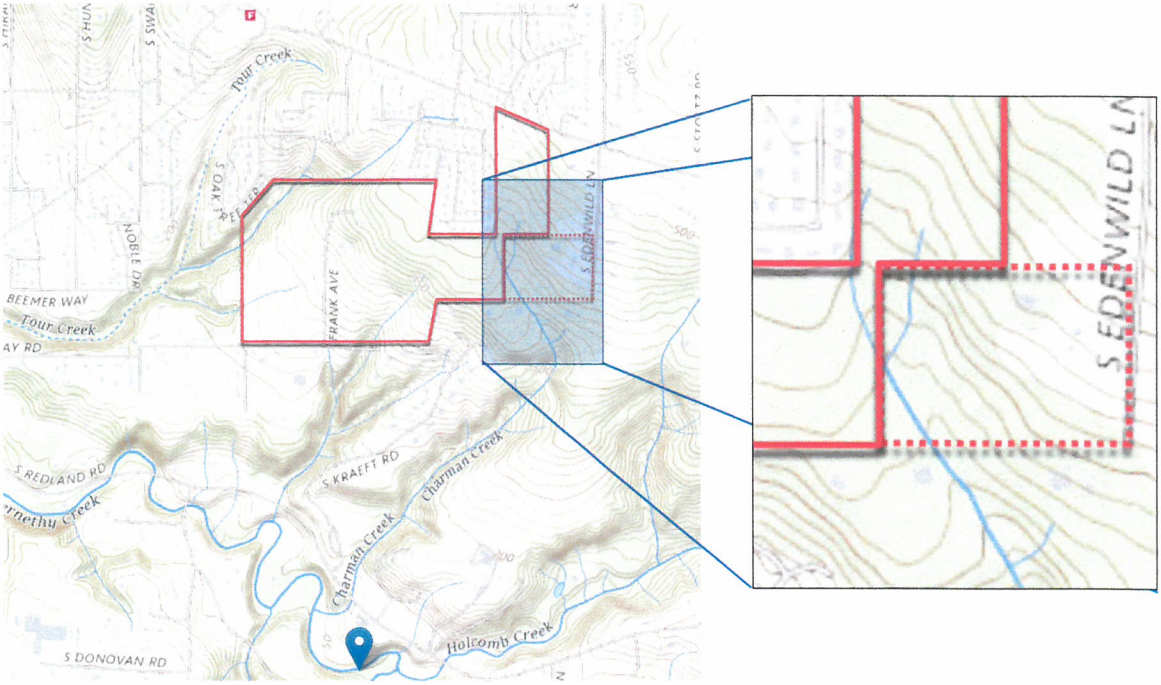


Figure 5. USGS Map - Oregon City Quadrangle 2020

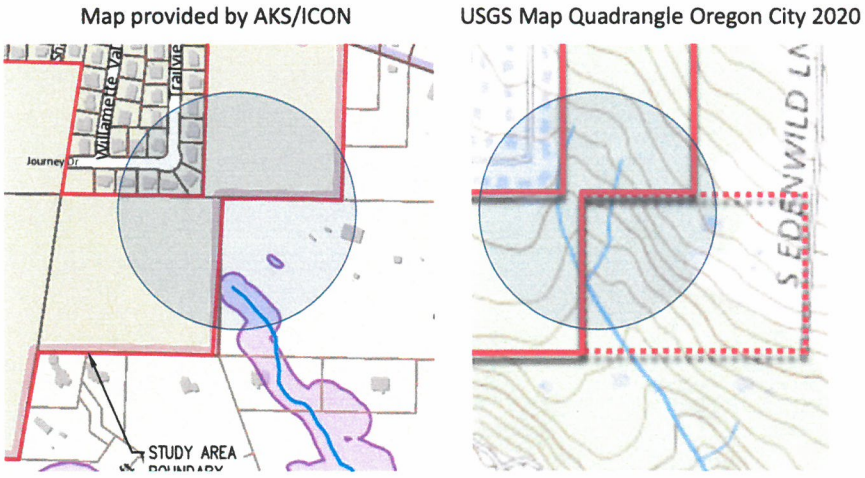


Figure 6. A side-by-side comparison shows the absence of any waterway on the subject property.

This evidence directly contradicts the conclusions of the AKS NROD Analysis and the staff report.

Reconciling the Differing Maps

The AKS Survey team went to subject property on three separate occasions, but the weather on those days was dry and warm with no precipitation that day or the days before [Figure 7]. It is possible that the team did not appreciate the presence of these intermittent streams.



Figure 7. Weather in Oregon City on dates of AKS Wetland Survey **a)** May 8, 2020 **b)** June 2, 2020, and **c)** August 5, 2020

It is likely that the dry weather resulted in conditions that hid the location of these streams. The OCMC 17.04.1205 defines a Stream:

- "Stream" means areas where surface water produces a defined channel or bed, including bedrock channels, gravel beds, sand and silt beds, and defined-channel swales. The channel or bed does not have to contain water year-round.
- Streams are categorized into two classes: Perennial streams and intermittent streams. Perennial stream means a stream that flows year-round during years of normal precipitation. Intermittent stream means a stream that flows only part of the year, or seasonally, during years of normal precipitation.

The presence of these streams [Figure 8] within an NROD boundary directly impacts Phase 1 and Phase 2 of the development, as these streams affect

- Holly Lane
- Street 2
- Lots 26-28, 60-62, and 314

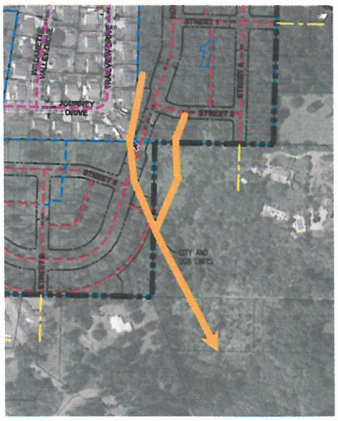


Figure 8. Missing Streams

OCMC 17.49.030 states that

1. This chapter applies to all development within the Natural Resources Overlay District as shown on the NROD Map, which is a regulatory boundary mapped ten feet beyond the required vegetated corridor width specified in OCMC 17.49.110. The mapped NROD boundary is based on a GIS-supported application of the adopted documents, plans and maps listed in OCMC 17.49.020A.1.—17.19.020A.8., however the adopted map may not indicate the true location of protected features.
2. Notwithstanding changing field conditions or updated mapping approved by the City (and processed as a Type I Verification per OCMC 17.49.255), the applicant may choose to either accept the adopted NROD boundary or provide a verifiable delineation of the true location of the natural resource feature pursuant to the Type I or Type II procedure in accordance with this chapter.
3. The NROD boundary shall be shown on all development permit applications
4. The official NROD map can only be amended by the City Commission.
5. Verification of the map shall be processed pursuant to OCMC 17.49.250.

What can be done at this point?

At this time, the applicants have chosen to accept the NROD boundary rather than provide verifiable delineation of the true location of the natural resource features on the property. But, the City Commission is empowered to amend the NROD map *before* approving the PPC GDP.

OCMC 17.49.030.4 grants the City Commission the power to amend the official NROD map.

The NROD boundary can be verified according to OCMC 17.49.250

- *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.*

The NROD boundary can be expanded according to OCMC 17.49.035, which regulates the addition of wetlands to map following adoption and states

- 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.

- Oregon Department of State Lands: Rule 141-086-0350 defines Locally Significant Wetland (LSW) Criteria
    - Mandatory LSW Criteria. A local government shall identify a wetland as locally significant if it meets one or more of the following criteria:
      (a) The wetland performs any of the following functions at the levels indicated below using the Oregon Freshwater Wetland Assessment Methodology:
        (A) "Diverse" wildlife habitat; or
        (B) "Intact" fish habitat; or
        (C) "Intact" water quality function; or
        (D) "Intact" hydrologic control function.

Why does this have to happen before approval of the PPC GDP?

Timing of the NROD boundary map question should be done *before* approval of the PPC GDP as 17.49.060.B.2 Compliance with Federal and State Requirements states:

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.*

This may mean that developers would get a free pass if there are environmentally significant waterways or wetlands on their property and are in an NROD zone if it is discovered AFTER approval of the GDP.

Do not allow ICON to ask for forgiveness, but require that they ask for permission based on accurate, up-to-date maps and data.

Based on the above information, we request a continuance to allow further investigation into the precise location of the NROD boundary map and the location of LSW on the subject and neighboring properties.

Sincerely,

Enoch Huang and Roya Mansouri
16509 S Edenwild Lane
Oregon City, OR 97045

From: Aquilla Hurd-Ravich
To: Kelly Reid
Subject: FW: statement for Park Place
Date: Tuesday, May 10, 2022 9:58:27 AM

From: Emily <emilylisborg@gmail.com>
Sent: Sunday, May 8, 2022 9:18 PM
To: recorderteam <recorderteam@orcity.org>
Subject: statement for Park Place

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Virtual statement from Emily Lisborg, OC resident

Requesting that the original design plan that incorporated community spaces, including natural areas and park space, be the one that is implemented. There needs to be another access road for safe evacuation in case of wildfires or other immediate hazards. The people who will be moving to Park Place deserve community spaces. The wildlife that lives there now deserves access to habitats that will be managed with their needs in mind, including clean water, air, and soil. I urge the planning commission to leave native habitat where it remains and improve any green spaces with invasives and non-natives with appropriate native plants.

From: Ken Iverson
To: Planning
Subject: Park Place Crossing
Date: Monday, May 9, 2022 7:22:07 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am firmly against this development as I believe the areas roads cannot safely handle the increase in traffic that would result from so many additional housing units. During the wildfire evacuation a drive from our house, located at 16100 S. Redland Rd., to safety in Milwaukie took 2 hours and 40 minutes, the drive usually takes only 12 minutes.
We were evacuating before our house went into the forced evacuation statues, traffic got worse after we got out.

There is no reason other than greed that any developer wants to add 475+/- homes to this area. Please do not lower the current zoning footage requirement.
Thank you,
Ken Iverson
O.C. Resident

My name is Barb Seekins. I live on Holcomb Blvd at the top where the hill levels off.
Residence; 15190 Holcomb Blvd. seekinsb@gmail.com

I appreciate having this opportunity to speak to you. I hope that you seriously consider these comments.

Our neighborhood has already had a substantial amount of development. The latest was 100 homes built directly across the street (on the old airstrip). We've observed the effects. I want to go on record as sharing many of the concerns of our neighbors;

- Continued loss of wildlife habitat (ex; no longer see deer, coyotes)
- Increase in noise levels (power tools, barking dogs, lawn mowers, etc.)
- New security issues
- Less protection of remaining trees from winds
- Increased traffic causing congestion and safety issues

Our property lies just to the east of the northeastern edge of this development. The maps of the PPCMP show 4 small lots that would abutt my property with another 18 small lots just one narrow lot away from my home. This project would mean a huge drop in our quality of life.

- **Inconsistencies with PPCCP**;
  - PPCMP shows 8 lots to be built in the northeastern corner all the way up to Holcomb. The area where these lots are shown is <u>not</u> part of the development area in the final PPCP. They are an addition.
  - Variances requested to make lot sizes (20%) smaller and to make street width narrower vary from the PPCCP. These variances should not be granted. These lots would change the nature of the neighborhood.

- **Maps in the plan show numerous potential roads on private property**. Assumptions are being made that these properties would be sold to developers. I object to these **assumptions being made and being used to market development plans**. Oregon City's Core Values state that they "value protection of property owners' rights".

- The city has a "**standard of having a neighborhood or community park within ½ mile of all residents.**" **Currently, this standard is not being met nor would the proposed project meet it**. The nearest park is Park Place Park on Front St. which is 1.8 miles away down a long hill from my home and others on Holcomb hill. Due to the slope of the hill and distance it's not walkable. The development of 100 homes just finished did not add any park or open space other than a very small fenced bioswale. This standard of a "parks within a ½ mile of all residents" is referenced in the PPCP-PPCMP Comparison Final document. The first phase of the project in the northeast corner would add 59 residences yet only 0.14 acres of open space/ street connections. The Master Plan shows a park and open space located in the south, southwestern corner, and western parts of their project areas. These are also all located downhill and are approximately 2 miles from our area on the top elevations of the Holcomb hill and the lots planned in the northeastern section of the project. **Regardless of their claims, the standard would not be met.**

VIALFOTHERINGHAM LLP

MICHAEL D. MONTAG
503.684.4111
MDM@VF-LAW.COM
Admitted to practice in:
Oregon
Washington

May 5, 2022

5671-001

City of Oregon City
Planning Commission

Re: *Proposed Park Place Crossing Development: Trailview Heights Homeowners' Association Objections*

To Whom it May Concern:

This office represents the Trailview Heights Homeowners' Association, Inc. ("Association"). The Association is the homeowner association responsible for the Trailview subdivision in Oregon City. ICON Construction and Development, LLC's proposed Park Place Crossing development is adjacent to, and in some locations directly abuts, Trailview. In addition, ICON owns Trailview Lot 14 (15058 Journey Drive).

The purpose of this letter is to address ICON's potential use of Lot 14 and express the Association's objection. Last year, ICON presented their development proposal to the Park Place Neighborhood Association. At that meeting, ICON representatives suggested that Lot 14 could be used to provide either temporary construction access or permanent access to the proposed development, and presented a plan that depicted a road over part of Lot 14.

Put simply: current restrictions prohibit ICON's proposed use of Lot 14, and the Association will not approve any alteration or variance that would accommodate such use.

The current restrictions are clear. Trailview and the Association are governed by the Declaration of Covenants, Conditions and Restrictions for Trailview Heights Subdivision (the "Declaration") recorded January 16, 2003 as Document No. 2003-006569 in the records of Clackamas County. First, Section 9.5 of the Declaration prohibits subdivision of Lot 14. Thus, it cannot be subdivided in order to accommodate access to the proposed Park Place Crossing development.

Second, any alteration of Lot 14 would require the Association's prior approval. Article VI of the Declaration establishes the Association's broad architectural control authority, and Section 6.3 spells it out unambiguously:

> No building, fence, wall, patio, deck, outbuilding, landscaping, pool, athletic facility or other structure or improvement shall be erected, altered, added onto or repaired

> upon any portion of the Property without the prior written consent of the ACC [Architectural Control Committee]…

In short, any change to Lot 14 requires Association consent. That means that the existing home cannot be altered, and no roadway can be constructed across the lot, even temporarily, without the Association's consent. That would remain true if ICON were to grant an easement across Lot 14 to a third party.

To be clear, the Association and its ACC will not approve any alteration to Lot 14 to facilitate using the lot to access ICON's proposed development site. More specifically, the Association and its ACC will reject any proposal to alter the existing home on Lot 14 to permit access to Park Place Crossing, and will likewise reject any proposal to alter the land itself for that purpose. Approving any such proposal would be detrimental to the Trailview Community, inconsistent with the existing development, and contrary to the requirement in Sections 8.1 and 8.2 of the Declaration that all lots in Trailview be limited to single-family residential use.

In addition, the above-referenced ICON representatives suggested the existing waterline easement over Lot 14 could be used for access to the proposed new development. This is not true. The easement is for the benefit of the Clackamas River Water District, and is for a waterline. ICON is not the beneficiary of the easement and, in any event, it cannot reasonably be interpreted as permitting general access across the lot.

Again, the Association will not approve any alteration of Lot 14 to accommodate access to the proposed Park Place Crossing development. If you have any questions or concerns, please feel free to contact me directly.

Sincerely,

VIAL FOTHERINGHAM LLP

s/ *Michael D. Montag*

Michael D. Montag

MDM/ajn

The area in yellow is governed by the Covenants, Conditions, and Restrictions for Trailview Heights Subdivision recorded January 16, 2003 as Document No. 2003-006569 in the records of Clackamas County. When Icon purchased Lot 14 in 2020, they agreed to abide by these CC&R's. These will not allow Lot 14 of Trailview to be used for any construction related to Park Place Crossing, including the new sidewalk that crosses Lot 14 on Icon's drawings. Nor will we approve any alterations or allow variances to the property itself.

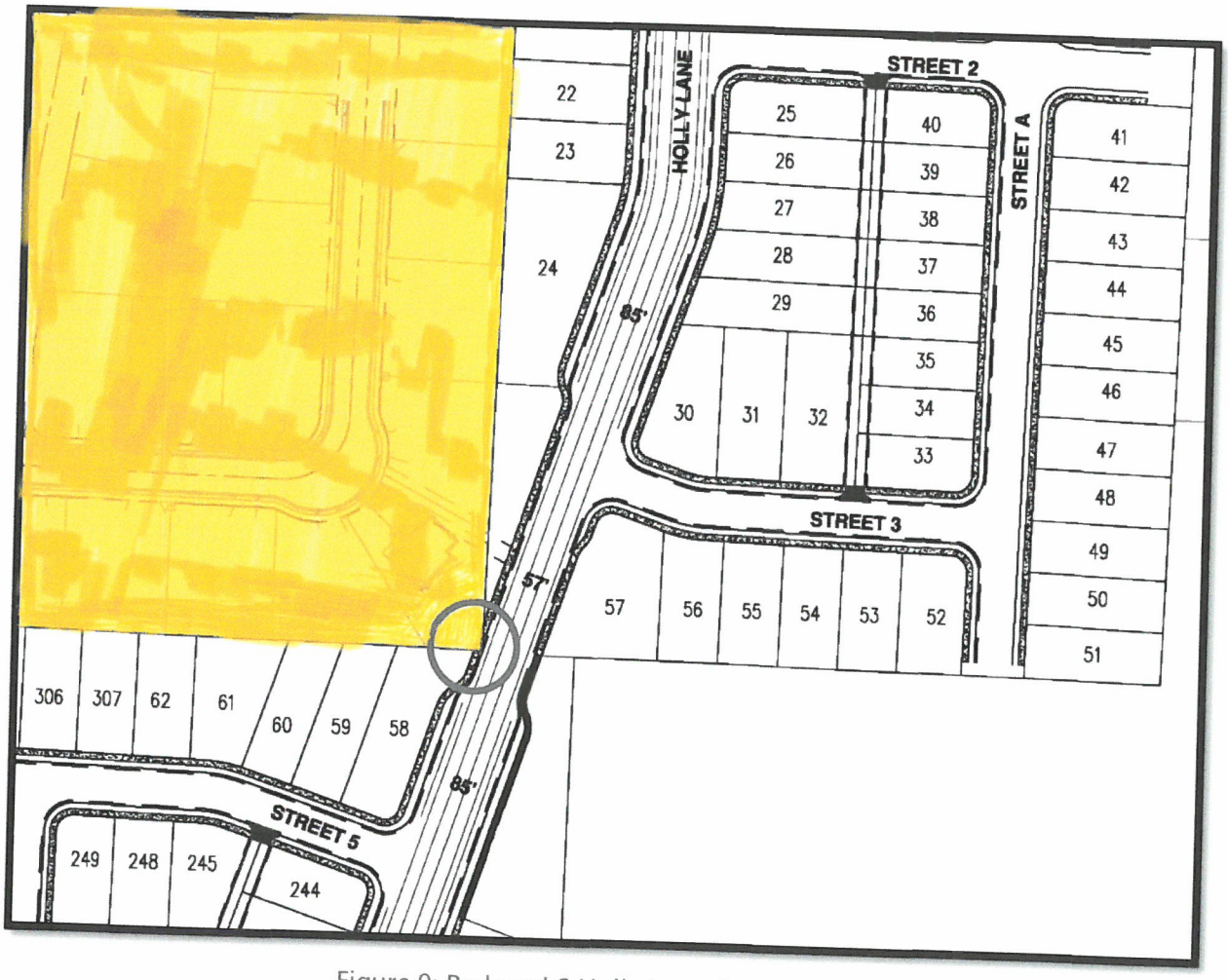
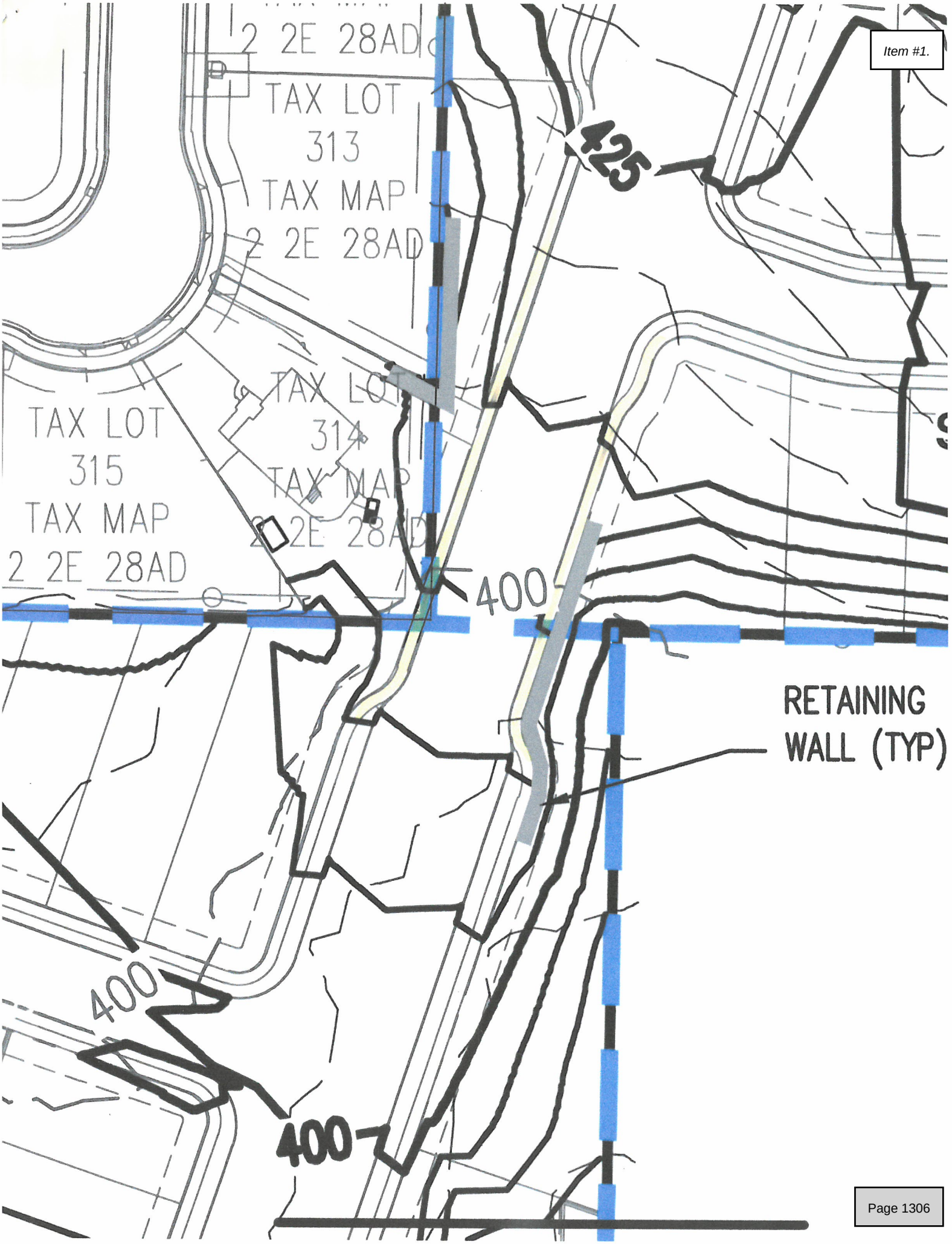


Figure 9: Reduced S Holly Lane Cross-Section

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	Residential	126'	94'	0.5'	5'	10.5'	6'	8'	(5) 12' Lanes	6'
Minor Arterial	Residential	100'	68'	0.5'	5'	10.5'	6'	7'	(3) 12' Lanes	6'
Collector	Residential	85'	59'	0.5'	5'	7.5'	6'	7'	(3) 11' Lanes	N/A
Holly Lane Variance	Residential	57'	45'	0.5'	5'	0.5'	6'	0'	(3) 11' Lanes	N/A
Local	Residential	54'	32'	0.5'	5'	7.5'	(2) 16' Shared Space			N/A
Holly Lane Variance without using Trailview Lot #14 (Tax Lot 2-2E-28D-00190) ????????										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WALL (TYP)

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Park Place Crossing Concerns

Monday May 9th, 2022

Oregon City Planning Commission


S OAK TREE TER
TRACY LEE CT
STEPH CT
WINSTON DR
S HOLCOMB BLVD
SMITHFIELD DR
CATTLE DR
BUFFALO WAY
SHARTNER DR
STREET 1
STREET A
S OAK TREE TER
OAK VALLEY DR
FUTURE PHASE
STREET 2
STREET 4
STREET D
CATTLE DR
WILLAMETTE VALLEY DR
TRAIL VIEW DR
STREET 5
JOURNEY DR
STREET 3
SHARTNER DR
STREET 6
STREET E
STREET 5
HOLLY LN
STREET 5
HOLLY LN
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STREET B
STREET F
STREET E
STREET C
STREET F
HOLLY LN
1
2
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5

The Criteria of Livability

- The Original Park Place Concept Plan called for a road to connect Holcomb Blvd to Redland to reduce traffic on an already constrained, narrow road.
- Instead there is currently **no planned road to connect to Redland**
- Their plan dead ends at an emergency locked gate down near Livesay Rd.
- Instead there is a connector road UP to Holcomb, with openings of stub roads through an existing neighborhood, for the 476 homes.
- Opening these stub roads will entice new residents to cut through a small neighborhood, leading to a half road entrance called Winston Drive.

An Independent Traffic Engineer's thoughts

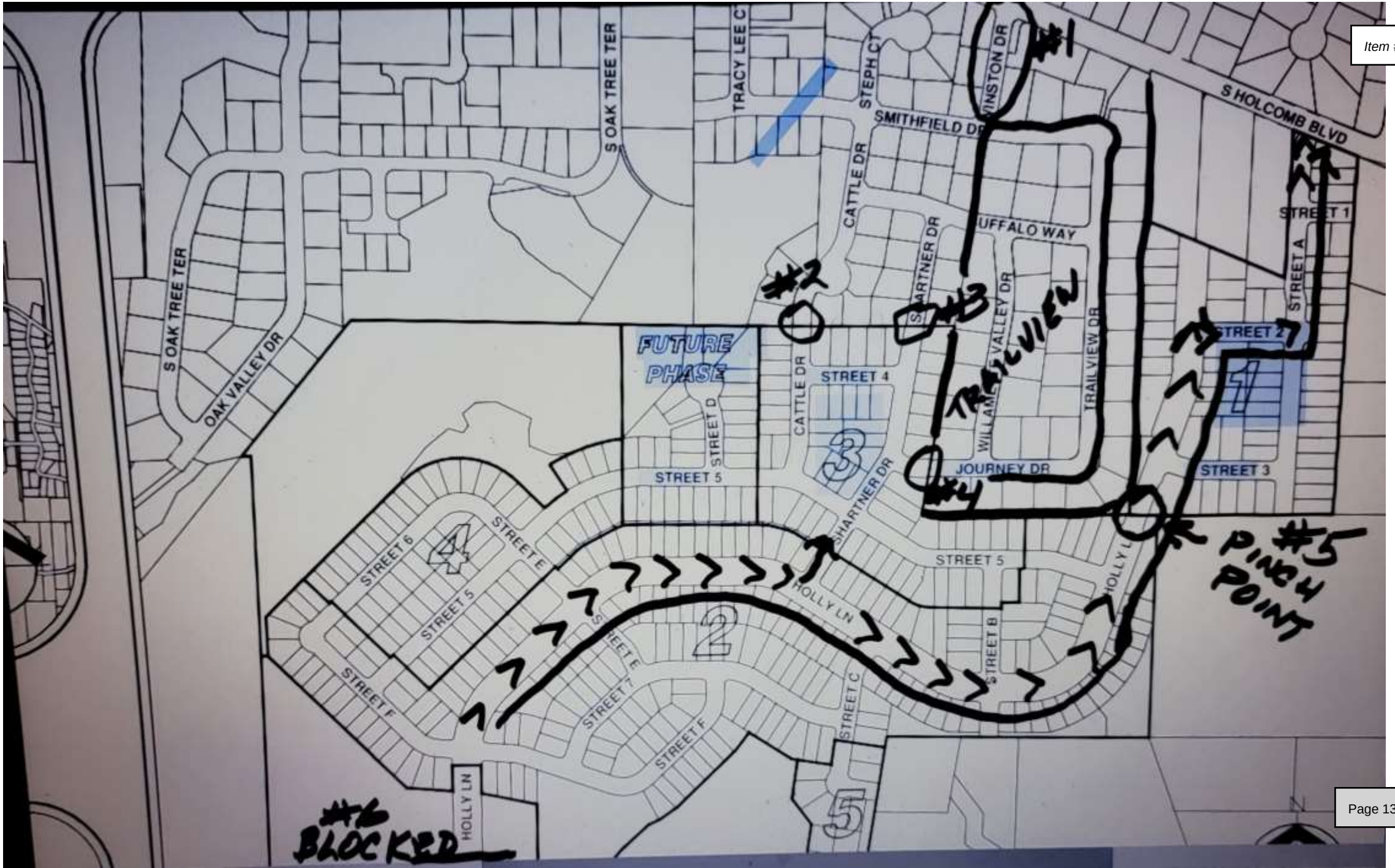
- An independent traffic engineer (who could not testify because he has worked for this traffic engineer company before) stated that
- "**vehicular traffic is much like water. It will find the path of least resistance, which in this case is through existing neighborhoods."**

- **He estimated that traffic at Winston could exceed 3,000 vehicles before any changes could be made.**

- The neighborhoods off Holcomb, off Winston Drive have only one way in and one way out on a half a block Winston Dr.

- During the Fire evacuations, it took our residents an hour and more to exit out of our neighborhood just to get onto Holcomb, and then another hour to get down Holcomb, due to the traffic coming from outer Clackamas County.

- What if another evacuation be necessary, how could another 476 homes be able to escape.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CATTLE DR
BUFFALO WAY
SHARTNER DR
WILLAMETTE VALLEY DR
TRAILVIEW DR
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STREET D
STREET 6
STREET E
STREET F
STREET 7
STREET B
STREET C
OAK VALLEY DR
FUTURE PHASE
JOURNEY DR
HOLLY LN
#1
#2
#3
#4
#5 PINCH POINT
#6 BLOCKED
TRAILVIEW

- Page 52 of the Staff Report has a section about
- **“the trigger to complete the road to Redland”**

- b. The applicant shall measure average daily trip volume on Winston Drive, Cattle Drive and Shartner Drive at the time of each DDP application that would route trips on these streets.
- **If trips (total existing plus new) will exceed 2,000 per day on any of these streets, the applicant shall ensure a secondary street connection is provided to the south connecting to Redland Road, so that drivers have multiple route choices.**

In Summary

- By the time daily trips reach 2,000 or more, it will be too late for residents of these neighborhoods…because, AGAIN, there is only one half block to enter or exit this existing neighborhood.
- If the developer or city would then consider alternative routes
- **WHERE?** **There are no feasible outlets**.
- **WHY NOT COMPLETE THOSE NOW!**
- I ask for a continuance to provide more detail information that we cannot get in within our limited 3 minutes.

- **AGAIN, I encourage our Planning Commissioners to do a site visit to understand the constraints of this area.**

- We request that this development **NOT BE APPROVED** until better roads are planned to allow **safe travel routes** for existing and NEW residents of restricted area off Holcomb Blvd..

CITY OF OREGON CITY, OR

PLANNING COMMISSION MAY 9, 2022 MEETING

REMARKS REGARDING PARK PLACE CONCEPT PLAN

I TAKE THIS OPPORTUNITY TO COMMEND THE OREGON CITY COMMISSIONERS AND THE OC PLANNING COMMISION FOR THEIR IMPRESSIVE OUTSTANDING DEPTH AND DETERMINATION TO PROVIDE INCLUSIVE AND COLLABORATIVE CITIZEN OPPORTUNITIES FOR THE FUTURE OF OREGON CITY.

MY NAME IS CAPTAIN STEPHEN F. FORD AND A TWENTY-ONE YEAR RESIDENT OF CLACKAMAS COUNTY AT THE TOP OF HOLCOMB BLVD

I HAVE A MASTER'S DEGREE WITH HONORS IN GEOGRAPHIC INFORMATION SYSTEMS (GIS). I AM QUITE FAMILIAR WITH HOW MAPS HAVE MANY MANIPULATIVE VAGARITIES AND THAT THEY REQUIRE THE MOST CAUTIOUS OF ANALYSES, PARTICULARLY WITH RESPECT TO HAVING SYNCRONOUS TIME AND DATUM CONTINUITY.

GIS IS THE ART AND THE SKILL OF CONVERTING "**DATA**" INTO TABULAR AND VISUAL "**INFORMATION**" SUITABLE FOR ADVANCED DECISION-MAKING FOR OVER-SIGHT MANAGEMENT.

I FURTHER STRESS THE BENEFITS OF INTEGRATED, INTERACTIVE 3D MAPS FOR MANAGEMENT'S IMPROVED COMMUNICATION WITH STAKEHOLDERS AND MORE INFORMED DECISION-MAKING ABILITIES.

THE 15-YEARS-IN-THE-MAKING, PROPOSED PLAN IS RIFE WITH OUT OF DATE, NON-INTEGRATED, PIECEMEAL "**DATA**", NUMBERS AND ECONOMICS. THE CURRENT DOCUMENT DOES NOT PROVIDE A STAKEHOLDER THE TIMELY, INTEGRATED "APPLES-TO-APPLES" INFORMATION SUITABLE TO MAKE INFORMED DECISIONS

AS IS, THE PLAN IS NOT CONVEYING TO STAKEHOLDERS ACCURATE, REAL-TIME, APPLES-TO-APPLES, INFO/DATA/MAPS FOR THE PARK PLACE CONCEPT PLAN. MY CONCERNS INCLUDE, BUT ARE NOT LIMITED TO:

1. TRANSPORTATION
2. STORM WATER MANAGEMENT
3. STREET SYSTEM
    a. NOTE: THE 2019 HOLCOMB BLVD. CORRIDOR ANALYSIS IS IN PART BASED ON AN OREGON CITY SUBDIVISION MAP MORE THAN 5 TO 10 YEARS OUT OF DATE

b. AS PER THE SEPT. 11, 2019 OC TRANSPORTATION ADVISORY COMMITTEE MEMO NOTATION, THE HOLCOMB BLVD. IS CLASSIFIED AS A MINOR ARTERIAL STREET
    - FOR PUBLIC SAFETY, BOTH ENDS OF HOLCOMB BLVD. WILL REQUIRE SIGNIFIGANT TRAFFIC IMPROVEMENTS OF STOPLIGHTS, CROSSWALKS, SIGNAGE, ETC.
    - SUCH TRAFFIC SAFETY IMPROVEMENTS SHOULD BE GIVEN PRIORITY #1 BEFORE ANY GROUND BREAKINGS OCCUR. NOTE THAT COSTS ARE NOT INCLUDED IN CURRENT PROPOSED "PARK PLAN".

4. FOR THE RECORD, I RESERVE MY POSITION AND THAT OF ALL STAKEHOLDERS TO COMMENT ON THESE AND OTHER APPROPRIATE FUTURE CITY CODE AND PLANNING TOPIC CHANGES AND DEVELOPMENTS.

THE OREGON CITY PLANNING COMMISSION IS CAUTIONED IN PROVIDING THE OREGON CITY COMMISSIONERS WITH TIMELY, UP-TO-DATE MAPS AND ECONOMICS THAT WILL PERMIT THE COMMISSIONERS TO MAKE THEIR MOST INFORMED DECISION ON THIS PLAN,

THE COMMISSIONERS ARE FURTHER DIRECTED TO THE OREGON CITY CIRCULAR LOGIC THAT "OREGON CITY GIS MAPS" DISCLAIM & AVOID RESPONSIBILITY AND ASSUME NO RESPONSIBILITY FOR THEIR USE.

I OPINE:

ON THESE BASIS, UNTIL THE ORIGINATORS/INSTIGATORS/STAKEHOLDERS AND CITY CODES, Etc. "GET IT TOGETHER" ON ONE TIME-FRAME, ONE ECONOMIC FOUNDATION, ONE CODE, ONE CITY, ONE UNIFYING AUTHORITY, Etc., IS ACHIEVED AND THAT THE RESPONSIBLE PARTIES FOR THE PLAN'S OUTCOME ARE DETERMINED.

I RECOMMEND: THE OC PLANNING COMMISSION **Continue the hearing to a date certain. This option may be used if the Planning Commission requires more information or more time to reach a decision.**

S/S: STEPHEN F. FORD

5/9/2022

REFERENCES ATTACHED:

REFERENCES:

https://www.orcity.org/sites/default/files/fileattachments/public_works/page/26931/holcomb_blvd_corridor_memo_-_tac_sept_2019.pdf

OREGON CITY

Public Works

625 Center Street | Oregon City OR 97045
Ph (503) 657-0891 | Fax (503) 657-7892

MEMORANDUM

TO: Transportation Advisory Committee
FROM: John M. Lewis, P.E., Public Works Director
Dayna Webb, P.E., City Engineer
DATE: September 11, 2019
SUBJECT: Holcomb Boulevard Corridor Analysis

Background

The City has received feedback from residents related to the speed and safety along the Holcomb Boulevard corridor.

Holcomb Boulevard is classified as a Minor Arterial. The posted speed limit on Holcomb Boulevard between Redland Road and Bradley is 40 mph. This is based on a speed zone order #2982 issued March 15, 1978 by the Oregon Department of Transportation. This order rescinded Res No. 1971, dated July 21, 1971.

The Oregon City Transportation System Plan states Minor Arterial Roadways are intended to serve local traffic traveling to and from major arterial roadways. These roadways provide greater accessibility to neighborhoods, often connecting to major activity generators and provide efficient through movement for local traffic. Posted speeds on minor arterial roadways typically range between 25 and 45 miles per hour.

Holcomb Elementary School is located north of Holcomb Boulevard and is accessed via Holcomb School Road.

Holcomb Boulevard has a TriMet bus route that runs from Redland Road up to Longview Way and then back to Redland Road.

Holcomb Boulevard Volume Counts, Speed Studies, and Classification Studies

https://www.orcity.org/publicworks/holcomb-blvd-volume-counts-speed-studies-and-classification-studies

OREGON CITY MAPS DISCLAIMS & AVOIDS RESPONSIBILITY

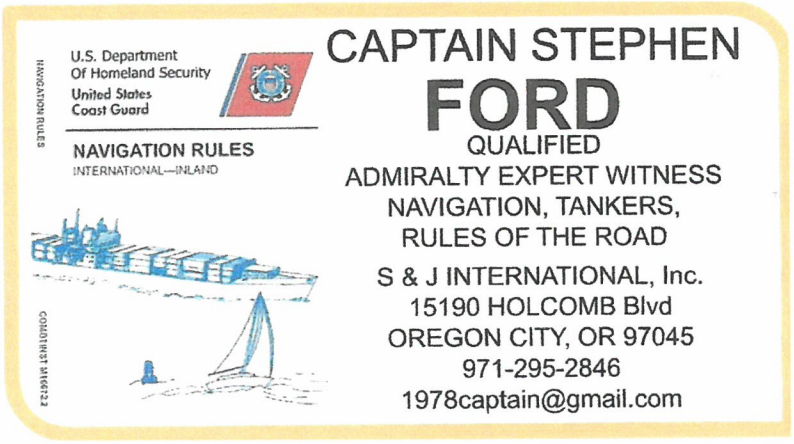
SEE: https://www.orcity.org/maps/ocwebmaps

The City of Oregon City makes no representations, express or implied, as to the accuracy, completeness and timeliness of the information, maps, and data contained herein. This data is for informational purposes only and should not be used for legal, engineering, or surveying purposes. This data is provided with the understanding that it is not guaranteed to be correct or complete, and conclusions drawn, or decisions made from such information are the responsibility of the user. The City of Oregon City assumes ***no responsibility*** *for its use.*

- **OREGON CITY MAPS TRAFFIC**

https://maps.orcity.org/Html5Viewer_4_14_2/index.html?viewer=TrafficCounts2021.TrafficCounts2021

- **ONE OF MANY DANGEROUS, LOOSE PLAN SPECULATION EXAMPLES**
  - **THE PARK PLACE CROSSING MASTER PLAN HAS PLANNED AREAS OF ATTACHED HOUSING. CODE CHANGES CURRENTLY BEING UNDERTAKEN BY CITY WILL ALLOW FOR ALTERNATIVE HOUSING TYPES**
  - **THERE SHOULD BE NO ACTION TAKEN ON PLANNING COMMISSION PLANS UNTIL THE DETAILS OF THE CITY'S CODE DECISIONS ARE ON RECORD AND AVAILABLE TO ALL SHAREHOLDERS.**



May 9th 2022

Dear Commissioners,
I was a member of the Park Place Concept Plan (PPCP) committee and am very familiar with the intent of the original concept plan.
This proposed Master Plan submitted to you falls short of that intent.

The first mentioned "**Key Component**" of the PPCP is the two primary north/south connections between Holcomb and Redland, namely the Swan Ave connection and the Holly Lane extension. However in this Master Plan there is no mention of the Swan Ave Connection and Holly Lane does not connect Holcomb to Redland as mandated in the PPCP, indeed it does not connect to either street.

16.12.095 Public Facilities and Services
A. Transportation System
"Applicants are responsible for designing and providing adequate vehicular, bicycle and pedestrian access to their developments "
In the Master Plan only Street A is designated as access off Holcomb and no additional direct access is provided.

On page 47 of the **Transportation Impact Study** submitted by the applicant it states:
Prior Annexation & Future Connectivity
The annexation TIS assumed the S Holly Lane connection between S Holcomb Boulevard and S Redland Road would have been constructed prior to or concurrent with full buildout of the Park Place Crossing Master Plan project. Because this application precedes the construction of the S Holly Lane connection, this TIS assumes all site generated traffic uses S Holcomb Boulevard and the intersections of Redland Road at OR-213 and Redland Road at Holcomb Boulevard/Abernethy Road.

Page 95 of applicants Master Plan
Ordinance no. 18-1007-AN-17-0004
Appendix A: Conditions of approval.
#4

The general development plan and all phases of development authorized by it ***must implement the Park Place Concept Plan*** *and Oregon City's adopted Public Facilities Plans* ***with regard to*** *the provision of open space, parks and trails, sewer, water, stormwater and* ***transportation improvements.***

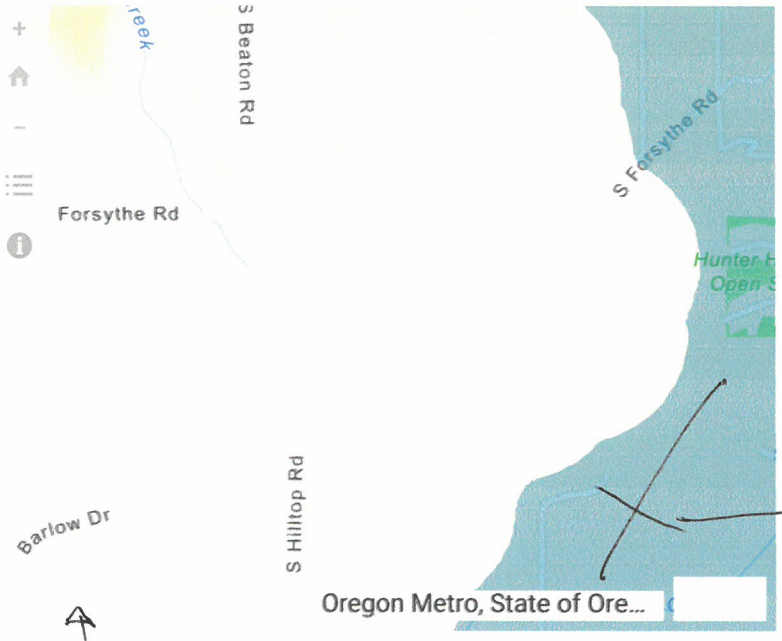
The north Park Place Village (now Park Place Crossing) was always designed to mitigate the build up of traffic on Holcomb by providing north/south connections through to Redland with the construction of the Holly Lane Extension and the Swan Ave connection (now removed.) These extensions were designed to provide additional access into and out of our neighborhood, which currently is served just by the two lane Holcomb Blvd. The additional connections were designed not only to relieve traffic on Holcomb but also to provide additional access in case of emergencies.

A map recently released by PGE earlier this month has identified 10 areas of Critical Fire Danger, one of which is less than a mile due east from this proposed development. Good access and evacuation routes WILL be needed in the future in this development and in the whole neighborhood.

I am asking that you attach a Condition of Approval to this Master Plan mandating that the key component of the Park Place Concept Plan namely a north/south direct connection be built between Holcomb and Redland before any development occurs.

Jackie Hammond-Williams
16303, Wayne Dr

Oregon City
503 753-5321



Critical Fire Danger Area.

Holcomb + PPC

Please refer to PGE's Web site Map this did not print Correctly!

0 0.2 0.4mi

My name is Tara McElhannon and I am an Oregon City resident. According to Planning Commission guidelines, the Planning Commission may approve an application for general development plan **only** upon finding that the following approval criteria are met with respect to Section C Public service areas: schools and transportation, specifically evacuation safety.

The applicant has not met the Public Services condition to demonstrate that the Oregon City School District is capable of serving the proposed development now or by the time each phase of the development is completed.

The applicant and the city planner reference a 2017 quote from Wes Rogers, representative from OCSD. The quote itself is from the Serres property annexation, which tangentially references the annexation of 92 acres for the Park Place Concept Plan. Not only is this quote over 5 years old, it does not include Holcomb Elementary serving residents of Park Place Crossing current tax lots 1000 and 3701, Phase 1 and Phase 3.

Wes Rogers states that additional elementary and middle school capacity would need to be constructed. That did not happen in the 2018 Bond measure the city planner references in their approval recommendation. According to the Bond 18 plan, middle school capacity increase occurred in Gardiner Middle School, which does not serve Park Place Crossing or have any impact on this application.

The applicant references "several other methods of providing or shifting capacity" the school district can employ, which they are inaccurately basing off of Wes' 'additional tools available' statement which was made in the context of dealing with capacity concerns while waiting for voter approval and development of the 2018 school construction bond and not in support of the Park Place Concept Plan.

The district has no documented plans to redraw attendance boundaries or set up semi-permanent buildings for this development. Any reference to this 2017 quote or the 2018 Bond are irrelevant and out of date do not justify the meeting of this approval criteria.

The city planner's recommendation for approval states that they coordinate with the district during the review process and that the Planning decision follows standard procedure of actively participating at pre-planning conferences in anticipation of development. There is no data to show this has occurred.

The city planner's recommendation for approval also states that quote "The city has not received comments from the Oregon City School District at this time."

Did the city inquire of the school district and the district refused to participate? I sent an email to Wes on May 5th and he responded within one hour.

According to Portland State Population Research Center a 2020 study shows that 45 students on average are generated from every 100 new homes. Is the School District ready to serve 225

new students? None of us know, because the Oregon City School district has not participated in this application.

Regarding the impact to evacuation concerns: The Staff memo from Kelly Reid states the intent is to provide the Planning Commission with additional information regarding emergency evacuation concerns in Park Place. The recommendation to move forward with approval without conditions regarding emergency evacuation concerns is egregious. Kelly quotes Daniel Nibouar regarding Clackamas County's upcoming efforts to address emergency evacuation plans. I reached out to the Disaster Management office staff, to find out when the county evacuation planning efforts started or when they will be completed. It is May, well past early 2022 and there is no data. The county has not produced a schedule for evacuation planning. Kelly's recommendation only provides the hope and potential plans for evacuation planning. The Disaster Management office committed to respond to my request for data with respect to 7 focus areas included in my document packet and email.

In summary, the City Planning Commission does not have the data necessary from the Oregon City School District or the Clackamas County Disaster Management office to find that this approval criteria is met for Public Services. I recommend the Committee deny the application on a basis of false information or continue the hearing to a date certain, so the applicant and city planner can work with the school district and Disaster Management of Clack Co to provide the City Planning commission accurate and relevant data.

Planning Commission Public Hearing re: Park Place Development Plan

Section C: Approval Criteria for a General Development Plan. The Planning Commission may approve an application for general development plan **only** upon finding that the following approval criteria are met.

3. Public services....are capable of serving the proposed development, or will be made capable by the time each phase of the development is completed.

Public Services- noncompliance with conditions

1. Oregon City School District Impact and accuracy of Application

2. Impact to existing Disaster Management and evacuation capacity

Comments by: Tara McElhannon May 9, 2022

The Applicant has not demonstrated Oregon City School District has current capacity by the time each phase of development has been completed

Applicants statement, p.71 of Land Use Application, updated March 2022:

> *"...the School District voiced no major concerns regarding school capacity or serving the new homes as build-out of the project aligned with the School District's stated timeline to provide additional school capacity and several other methods of providing or shifting capacity are available."*

2017 Comments from Wes Rogers, annexation in AN-17-04 stated:

> *"...the District has always known that as the Park Place Concept Plan was significantly developed, additional elementary and middle school capacity would have to be constructed."*
>
> *"...although well maintained, District facilities do not support current educational practice and all District facilities are in need of serious renovation or replacement and in some cases minor expansion."*
>
> *"The subject property is served by Oregon City Public Schools. The schools serving this site are Redland Elementary School, Ogden Middle School, and Oregon City High School.*

Facts:

- ✓ Holcomb Elementary was not factored into the 2017 statements by Wes Rogers and there is no data on enrollment impact as part of this application. Kitty Hawk and Serres Farm developments must be factored into capacity.
- ✓ No additional elementary school capacity was included in the 2018 Bond and none is documented by the School District as of this writing on 5/9/22.
- ✓ There is no documented plan to redraw attendance boundaries or install semi-permanent buildings for this development. Wes Rogers' statement from 2017 was in the context of waiting for voter approval of the 2018 school construction bond and not in support of the Park Place Concept Plan.

2017 School District Comments do not reference Holcomb Elementary Impact

Tax Lots 1000 (Phase 1) and 3701 (Phase 3 (*partial*) are in **Holcomb Elementary Boundary**, not Redland Elementary



Serres Farm approved Land Use Application brings 123 homes in the Holcomb Elementary Boundary in 2022-23

The City Planner has not completed due diligence with the Oregon City School District, is not following standard procedures and is not holding the applicant accountable

Two statements have been made by the City Planner in their recommendation for approval dated 5/3/22:

1. Staff coordinates with the Oregon City School District **during the development review process** in accordance with adopted Comprehensive Plan Goals and Policies.
2. Standard procedures for the Planning Division includes notice of all land use actions, both long range and current proposals, to the School District, the School District **actively** participates at **pre-application conferences** in anticipation of development.

In email conversation with Wes Rogers last week he did not indicate he has been a part of any development review process. Wes did not indicate he is actively participating in any pre-application conferences for the Park Place Crossing application. The last documented contact with Wes was in 2017 for the annexation of property, and no evidence suggests he has been contacted since 2017 with respect to the Park Place Crossing Land Use application.

Statement from City Planner: Finding: Complies as Proposed. The City has not received comments from the Oregon City School District at this time.

Did the City even attempt to get comments from Wes Rogers at the Oregon City School District in preparation for this application, or are they relying on inaccurate data that is 5 years old? Wes Rogers responded to my email within one hour.

The City Planner has not completed due diligence with the Oregon City School District, is not following standard procedures and is not holding the applicant accountable

Statement from City Planner in staff report and recommendation: *Since the time of the annexation, voters approved a bond measure for the Oregon City School District to fund capacity increases for two middle schools, including Ogden Middle School.*

Facts:

- ✓ Ogden Middle school capacity was not increased as part of the 2018 Bond, it only received improvements. Capacity was increased at Gardiner Middle School.
- ✓ Increased capacity at Gardiner Middle School does not positively impact the Park Place Crossing development. It is not within this school boundary.



Gardiner Middle School Replacement

Replace a 1954 school to reduce overcrowding, enhance learning spaces, improve safety and security and increase energy efficiency.

Begin Design November 2018

End Design October 2019

Begin Construction April 2020

Building Opens September 2021



Ogden Middle School Renovation

Renovate Ogden Middle School to add common areas, improve safety and security, and improve learning conditions.

Begin Design November 2018

End Design October 2019

Begin Construction May 2020

End Construction August 2021

Building Opens September 2021

The City Planner has not done due diligence with the Clackamas County Disaster Management office for evacuation planning and I have requested the following information, which they have agreed to provide.

1. Names of consultants and contractors who were hired on a project in early 2022 to perform evacuation zone planning and create a mapping system and current status on their recommendations or plans.

2. Clackamas County Disaster Management office documentation of work in flight with municipalities, ODOT, and law enforcement to create evacuation zones for different types of disasters.

3. Clackamas County Disaster Management office documentation of work in flight with municipalities to figure out how to maximize traffic flow during an incident.

4. Progress to date on a more strategic evacuation procedure (the example provided mentions levels of evacuation in a sequential, organized manner). The quote from you mentions this is only a hope at this time. Have any actions on this materialized past a hope?

5. An update on the Clackamas County interactive map system that provides real time traffic information (the quote links to Medford as an example).

6. Data on the formation of the Emergency Preparedness Council, its members, how often they meet, how you can join, etc.

7. Overall project planning timeline with milestones and delivery dates.

Securi... TLS Learn more

---------- Forwarded message ---------
From: **Rogers, Wes** <wes.rogers@orecity.k12.or.us>
Date: Thu, May 5, 2022 at 3:23 PM
Subject: Re: New Housing Developments impact on Holcomb Elementary
To: Tara McElhannon <tara.e.mcelhannon@gmail.com>

These BIG projects generate hundreds of pages of information. Hang in there.
.wes rogers

On Thu, May 5, 2022 at 2:46 PM Tara McElhannon <tara.e.mcelhannon@gmail.com> wrote:
Thank you! Extensive and multi-faceted and technical is absolutely accurate. It's really overwhelming for a lay person.

On Thu, May 5, 2022 at 2:45 PM Rogers, Wes <wes.rogers@orecity.k12.or.us> wrote:
I cc'd Michael separately. Yes land use application requirements are quite extensive and multi-faceted not to mention very technical at times.
..wes

On Thu, May 5, 2022 at 2:42 PM Tara McElhannon <tara.e.mcelhannon@gmail.com> wrote:
Also... I did not see Michael cc'd on your email, unless he was Bcc'd. :)

On Thu, May 5, 2022 at 2:40 PM Tara McElhannon <tara.e.mcelhannon@gmail.com> wrote:
Wes, thanks so much for your quick response and hello Michael! You're correct, the May 9th 2022 Planning Commission meeting. Agenda for that meeting is here. There is A LOT of material to weed through.

Thank you,
Tara

On Thu, May 5, 2022 at 2:37 PM Rogers, Wes <wes.rogers@orecity.k12.or.us> wrote:
Tara, I am working with the current Director of Operations Michael Sweeten to respond to your comments/questions. Hopefully we'll have something to you tomorrow. Mr. Sweeten is the current District representative for land use applications involving OCSD. I've copied him with this e-mail. I'm assuming you are referencing the May 9th 2022 Planning Commission meeting?
..wes rogers

On Thu, May 5, 2022 at 1:31 PM Tara McElhannon <tara.e.mcelhannon@gmail.com> wrote:
Hello Wes-

You are quoted in two applications for new housing developments.

The first is for Serres Farm (123 single family homes). The application references your statement that you have no school capacity concerns for Serres Farm, with the phase 1 development for ~60 homes in the summer of 2022 and the phase 2 the summer after for the other ~60 with respect to Holcomb Elementary.

You are referenced as such:

Based upon the size of the project and the price range of the homes, he estimated tha development would only generate 10 to 20 elementary school students.

However, a study conducted by Portland Stated in 2020 (attached, p 8) states as follows: *For detached single family homes in OCSD about 10 years old or newer, the average number of OCSD K-12 students per home was 0.45, or 45 students in every 100 homes.*

The study further breaks this data down by K-5, with 0.23, or 23 students in every 100 homes (table 12 on pg 25). By my math the projection should be an average of 28 enrollments expected. **Can you help me understand how you arrived at your estimation of 10 to 20 given the data provided by the study?** The price range of the homes do not seem to impact enrollment numbers at all due to the study given these are all single family dwellings with the same average price point.

The second application is for Park Place Crossing, which is a 476 mixed single/detached and row homes initiative. It is a part of the overall Park Place Concept plan which has been around since the early 00's. The Oregon City Planner states that although they have reached out to OCSD they have not received a response, so they are basing their recommendation on a 2017 note from you. This application incorrectly reflects the elementary school impacted as Redland Road Elementary. Based on the current Clackamas tax map, the phase 1 for the Park Place Crossing plan is Holcomb Elementary, not in the boundary of Redland Road Elementary.

An excerpt from your quote states: ....*additional elementary and middle school capacity would have to be constructed. Currently the elementary school of attendance for this area would be Redland Elementary.*

Can you tell me if the district has constructed additional elementary and middle school capacity to handle this development?

Lastly, there is this quote:
In the meantime the District has several other tools to help with over capacities by installing semi-permanent buildings and/or redrawing attendance boundaries."

Can you help me understand what the applicant of this development needs to do or what steps they need to follow to work with the school district in order to enact these tools mentioned? The application states that it is the responsibility of the applicant, not Oregon City Planners.

I apologize for the fire drill request on this email, but the City Planners just released a recommendation on 4/2, which leaves little time for the community to gather data by the 4/9 planning meeting. I'd respectfully ask that you be willing to review the current application and respond to the questions the City Planners have, in response to the modified application. I am not comfortable with the Planning Commission approving an application based on half-a-decade old data, which is what the City Planner is currently recommending.

Thank you,
Tara,

Oregon City Resident and Parent with 2 children in OCSD

--

Wes Rogers, Director of Capital Projects
503-785-8531 desk
503 732-6528 cell
wes.rogers@orecity.k12.or.us
Oregon City School District

PO Box 2110
Oregon City, OR 97045

--

Wes Rogers, Director of Capital Projects
503-785-8531 desk
503 732-6528 cell
wes.rogers@orecity.k12.or.us
Oregon City School District
PO Box 2110
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wes.rogers@orecity.k12.or.us
Oregon City School District
PO Box 2110
Oregon City, OR 97045

Re: Request for Data & Documentation on CC Evacuation Zone and creation of Mappir System

Securi... TLS Learn more

From: **Tara McElhannon** <tara.e.mcelhannon@gmail.com>
Date: Thu, May 5, 2022 at 10:58 AM
Subject: Re: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System
To: Poole, Jamie <JPoole@clackamas.us>
Cc: Nibouar, Daniel <DNibouar@clackamas.us>, Hanto, Aryka <AHanto@clackamas.us>

Hello Jamie,

Thank you so much for getting back to me. I sincerely appreciate it. Do you foresee a response back by the end of the week (tomorrow)? The next City Planning meeting is Monday 4/9. If a response back is not possible by EOD tomorrow I will request the Planning Commission to continue to a date certain at the meeting, so we can include this data in order to provide them the information they need to reach an informed decision. Apologies for this rush ask- the recommendations and memo on this subject were not made available to the community until 4/2, which leaves little time for community members to respond accordingly by 4/9.

Thanks,
Tara

On Thu, May 5, 2022 at 9:55 AM Poole, Jamie <JPoole@clackamas.us> wrote:

> Ms. McElhannon,
>
> Your request for information and documentation was received May 4, 2022. We will do a review of your request and follow up after we have had time to review our files.
>
> Thank you,
>
> Jamie Poole, Interim Deputy Disaster Manager
>
> Pronouns: she/her
>
> Clackamas County Disaster Management
>
> 1710 Red Soils Ct., Suite 225, Oregon City, OR 97045
>
> 503-655-8838 (office) | 503-278-9150 (cell)
>
> www.clackamas.us/dm

From: Tara McElhannon <tara.e.mcelhannon@gmail.com>
Sent: Tuesday, May 3, 2022 10:29 PM
To: Nibouar, Daniel <DNibouar@clackamas.us>; Hanto, Aryka <AHanto@clackamas.us>; Poole, Jamie <JPoole@clackamas.us>
Subject: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System

Warning: External email. Be cautious opening attachments and links.

Hi Daniel-

I hope this email finds you well. You were recently cited in a memo (attached) stating Clackamas County is underway on planning efforts to better manage the logistics of evacuation efforts. The information shared in this memo on your behalf resulted in the City Planner's recommendation to the Planning Commission to move past any emergency evacuation concerns from our community, in order to approve a new housing development.

In short, the memo suggests that 1) Clackamas County has an established plan to ensure what happened with the wildfire evacuations in September 2020 does not happen again on Holcomb Blvd, Redland Rd, or 213, and 2) the development of roughly 500 new homes directly off Holcomb Blvd is not a concern relative to evacuation safety, given your office's planning efforts coming in time for before phase 1 of the new development.

Can you please kindly provide documentation and data on the following:

1. Names of consultants and contractors who were hired on a project in early 2022 to perform evacuation zone planning and create a mapping system and current status on their recommendations or plans.

2. Clackamas County Disaster Management office documentation of work in flight with municipalities, ODOT, and law enforcement to create evacuation zones for different types of disasters.

3. Clackamas County Disaster Management office documentation of work in flight with municipalities to figure out how to maximize traffic flow during an incident.

4. Progress to date on a more strategic evacuation procedure (the example provided mentions levels of evacuation in a sequential, organized manner). The quote from you mentions this is only a hope at this time. Have any actions on this materialized past a hope?

5. An update on the Clackamas County interactive map system that provides real time traffic information (the quote links to Medford as an example).

6. Data on the formation of the Emergency Preparedness Council, its members, how often they meet, how you can join, etc.

7. Overall project planning timeline with milestones and delivery dates.

Thank you,
Tara McElhannon, Oregon City resident

From: Sharon Neish
To: Kelly Reid
Subject: Park place Crossing
Date: Tuesday, May 10, 2022 3:00:19 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Kelly,
Two questions I have are as follows:
1. Does Kate Brown's HB 2001 effective in July negate the need for a variance given that they are asking give that there is bonus incentives if the cram more houses in? Also, do they have to stay at a certain price point for possible funding or lot size variances? Is this going to be considered middle housing? Are they forced to build these small lots based on metro?
2. How are the current increasing interest rates effect this housing project? Are they going to be able to finish it without tax payer funding? Of course, I hope they end up with 10 percent rates and a 2008 recession to bankrupt this particular better business bureau C plus rated Icon Development company that appeared so disorganized at the meeting. Also, what is a contract to purchase meaning they don't actually own all the land???
3. Clackamas County voted this project down that effects all of us in the area. Why is Oregon City pushing it forward?
Sincerely,
Sharon

From: Carolyn Lu
To: Kelly Reid
Subject: Re: Park Place Crossing Development
Date: Wednesday, May 11, 2022 10:14:42 AM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Planning Commission,
I would like to give my testimony as a neighbor to the proposed Park Place Crossing Development.

I am excited to see our area developed, but have concerns about the flow of traffic onto HWY 213 and on Holcomb Blvd.

If over 500 living units are being planned for the Park Place Crossing, then we need to seriously look at how to support the potential 1000 daily commuters that will be added to the following areas:
1. Holcomb Road,
2. Holcomb and Redland
3. Redland/213 HWY interchange
The planning commission needs to require the developer to augment the existing infrastructure or contribute money for the city/county to do this before the completion of the housing.

I would also like to request that the shopping needs of this community be addressed. Currently, in order to buy groceries, one has to go all the way up hwy 213 to the hilltop area to find a Fred Meyers, Safeway etc, or get on the freeway (I-205) to get to a Costco, 82nd drive Fred Meyers, etc. The only other grocery shopping options are convenience-store type options, which is not suitable for family grocery shopping. Without addressing this need for additional grocery shopping options, cars will need to access HWY 213 and I-205 even more frequently, only placing a higher demand on the roadways.

In addition, walkable trails, sidewalks and pathways would make this a more liveable area. I would strongly encourage the planning commission to require this kind of infrastructure as a part of the plan. I would prefer to see mixed use trails (bike & Walking trails) to bike lanes on the roadway. Our need in this hilly area is always going to be for more lanes for cars, so the addition of bike lanes only cuts into the street space for cars. I drive these roads every day, and rarely do I see them used by bicycles. It seems that this area is most well suited for walking/leisure-use trails that could accommodate bikes should anyone want to use them for that.

Sincerely,
Carolyn Lu
16192 Widman Court
Oregon City, OR 97045

On Wed, May 11, 2022 at 9:58 AM Kelly Reid <kreid@orcity.org> wrote:

Hi Carolyn,

Yes, the meeting was continued to May 23rd and you may submit additional testimony by emailing it to me, dropping it off at our office, or testifying at the hearing on the 23rd.

Thanks,

Kelly Reid

She/her/hers

Planner

Community Development Department, City of Oregon City

695 Warner Parrott Rd, Oregon City, OR 97045

kreid@orcity.org

(503) 496-1540 Direct

(503) 722-3789 Main

Website

Interactive Maps and Apps

On-Line Submittal of Land Use Applications

The City of Oregon City continues to offer services and programs in-person and online - find facility hours of operation here.

Website: www.orcity.org
Visit us on Facebook! and Twitter
PUBLIC RECORDS LAW DISCLOSURE: This e-mail is subject to the

State Retention Schedule and may be made available to the public.

From: Carolyn Lu <mscarolynlu@gmail.com>
Sent: Tuesday, May 10, 2022 4:31 PM
To: Planning <planning@orcity.org>
Subject: Park Place Crossing Development

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi,

I heard that I can write a testimony for the May 9th OCPC meeting? Do I just send it to this email address to be included?

--

Carolyn Lu, LPC, CMS, CADCI, NCC

Goal-Execution Coaching
www.carolynlu.net
clu@carolynlu.net

From: Kelly Reid
To: Kelly Reid
Subject: FW: Form submission from: Contact Us
Date: Wednesday, May 11, 2022 10:58:33 AM

First Name x
Last Name x
Email xxx@yahoo.com
Question/Comment

RE: PARK PLACE CROSSING DEVLOPMENT
As required by any / all federal, state & local rules, regulations and laws:

• Did any / all involved entities make publicly available and transparent the:

o land purchases or transfer, costs incurred by public agencies / to the public to-date as well as the estimated future costs to the public?
o all meetings and gatherings?
o proposals and recommendations?

• Did any / all involved parties get vetted for:

o connection to / potential (or perceived) conflict of interest with any / all involved agencies & other entities including neighborhood associations?
o safe work practices / safety records?
o quality of work, business ratings and records?

• Did any / all transportation concerns get adequately reviewed including:

o current amount of traffic on Holcomb, Redland and any / all other nearby roads?
o safety concerns, issues, accidents on the above mentioned roads, recent speed reductions, crosswalks & signage added for safety / liability get reviewed?
o terrain issues such as; hills, curves, curves up and down hills, bridges…all of which can be especially slippery when wet, frost, ice, snow get reviewed?

• Did any / all historical / cultural and environmental / Wildlife concerns, issues, matters including, but, not limited to the following get reviewed:

o Migratory Bird Treaty Act
o Native plants & trees get inventoried including ones that are food for wildlife in the area i.e. Oregon Grape? Did old growth trees get cataloged?
o Potential for historical, cultural artifacts, archeological items on the land get reviewed? Did the historical significance of the land get addressed?
o Did the Oregon City Charter get applied?
o Did the potential impacts to displacing wildlife get reviewed, including, wildlife being displaced onto residential areas & preying on pets more frequently?

o Did the endangered, threatened status of wildlife in the area or that may use the area at times i.e. eagles get reviewed and considered?

The results of this submission may be viewed at:

https://www.orcity.org/node/7/submission/31728

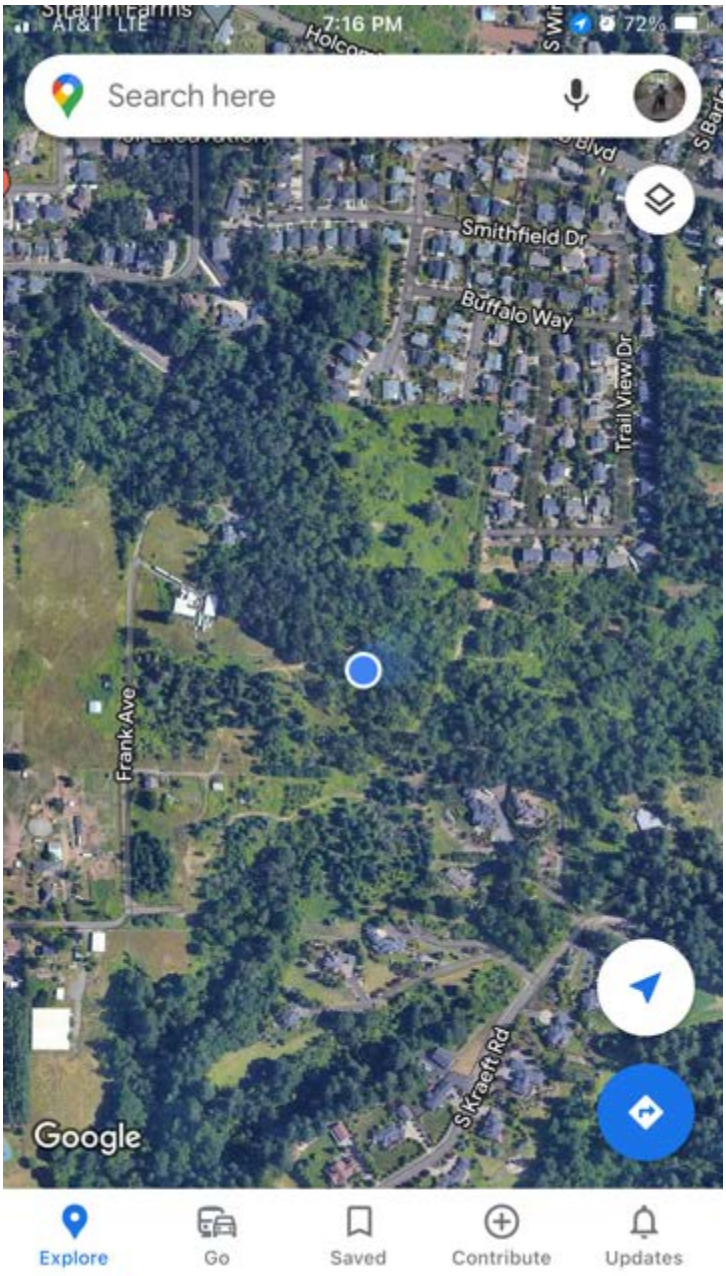
From: Lynnette Basiou
To: Kelly Reid
Subject: May 23 Park Place zoom meeting
Date: Thursday, May 12, 2022 11:12:43 AM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am the last house on Cattle Drive. We respectfully ask for you to select a more suitable exit street to Holcomb.. Cattle Drive is a very narrow street east/west of our home and also a culdasac and does not make sense to open this up to 2000 cars a day. Why did this change from the previous plan? What happened to Swan being the go thru for traffic? And with no parks where are all these kids going to play? Right now in Trailsview kids play in the streets and with more traffic I see a recipe for disaster someone is going to get hurt. Thank you for addressing this. We have lived here for over 15 years and continue to vote no for this plan but no one is listening.
Sent from my iPhone

From: Kelly Reid
To: Kelly Reid
Subject: FW: Hard copy plans for Planning Commissioners
Date: Monday, May 9, 2022 2:57:41 PM
Attachments: image1.png
image5.png

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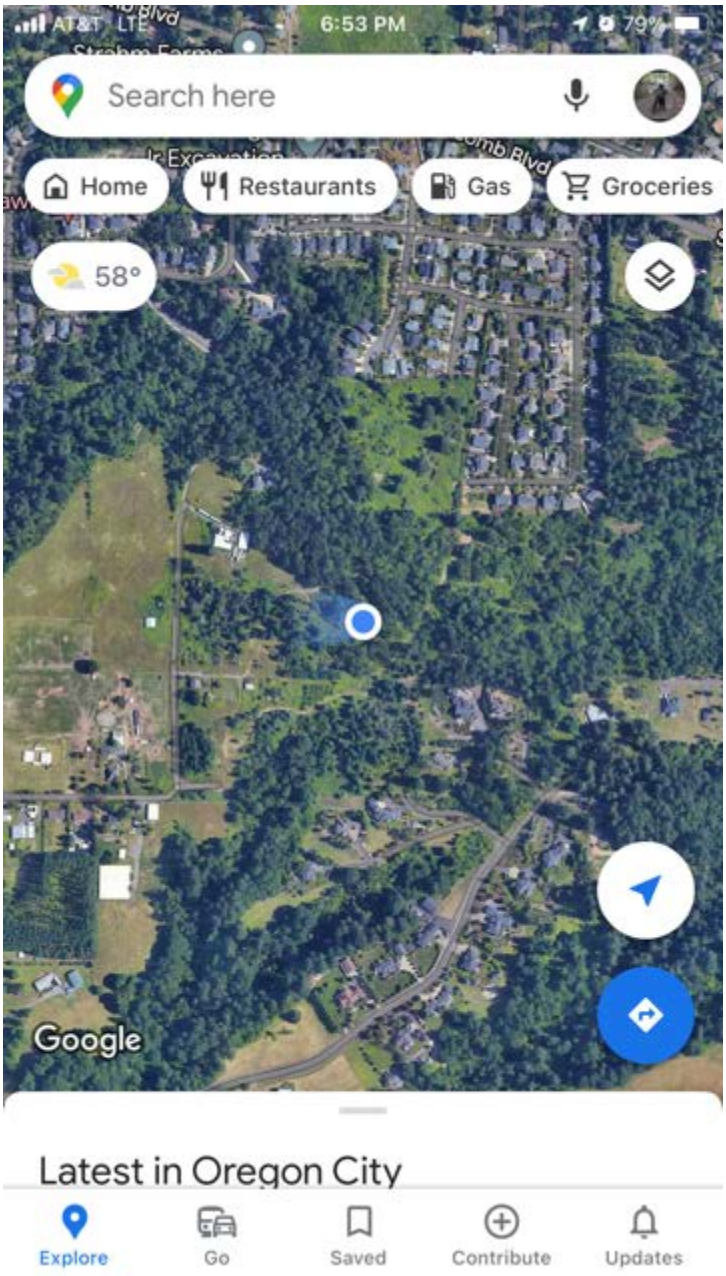
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Sent from my iPhone

From: Kelly Reid
To: Kelly Reid
Subject: FW: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System
Date: Wednesday, May 11, 2022 9:54:01 AM

From: Poole, Jamie <JPoole@clackamas.us>
Sent: Tuesday, May 10, 2022 2:31 PM
To: Kelly Reid <kreid@orcity.org>
Cc: Nibouar, Daniel <DNibouar@clackamas.us>
Subject: FW: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System

Hi Kelly,
Below is just an FYI.
Thank you,
Jamie

From: Poole, Jamie
Sent: Tuesday, May 10, 2022 2:32 PM
To: 'Tara McElhannon' <tara.e.mcelhannon@gmail.com>
Cc: Nibouar, Daniel <DNibouar@clackamas.us>; Hanto, Aryka <AHanto@clackamas.us>
Subject: RE: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System

Ms. McElhannon,

After a review with departmental staff I have determined the following:

1. Names of consultants and contractors who were hired on a project in early 2022 to perform evacuation zone planning and create a mapping system and current status on their recommendations or plans.
Response: Due to delayed recruitments and current staff being out on extended leave this project has been delayed. A consultant/contractor has not been hired to complete this project.

2. Clackamas County Disaster Management office documentation of work in flight with municipalities, ODOT, and law enforcement to create evacuation zones for different types of disasters.
Response: This work has not commenced, therefore there is no documentation to provide regarding creation of evacuation zones.

3. Clackamas County Disaster Management office documentation of work in flight with municipalities to figure out how to maximize traffic flow during an incident.
Response: This work has not commenced, therefore there is no documentation to provide regarding maximizing traffic flow during an incident.

4. Progress to date on a more strategic evacuation procedure (the example provided mentions levels of evacuation in a sequential, organized manner). The quote from you mentions this is only a hope at this time. Have any actions on this materialized past a hope?
Response: In person discussions have occurred with Clackamas County Sheriff's Office, Department of Transportation and Development, and various Fire District staff in regards to sequential evacuations and need for planning, however there is no formal documentation or plans created.

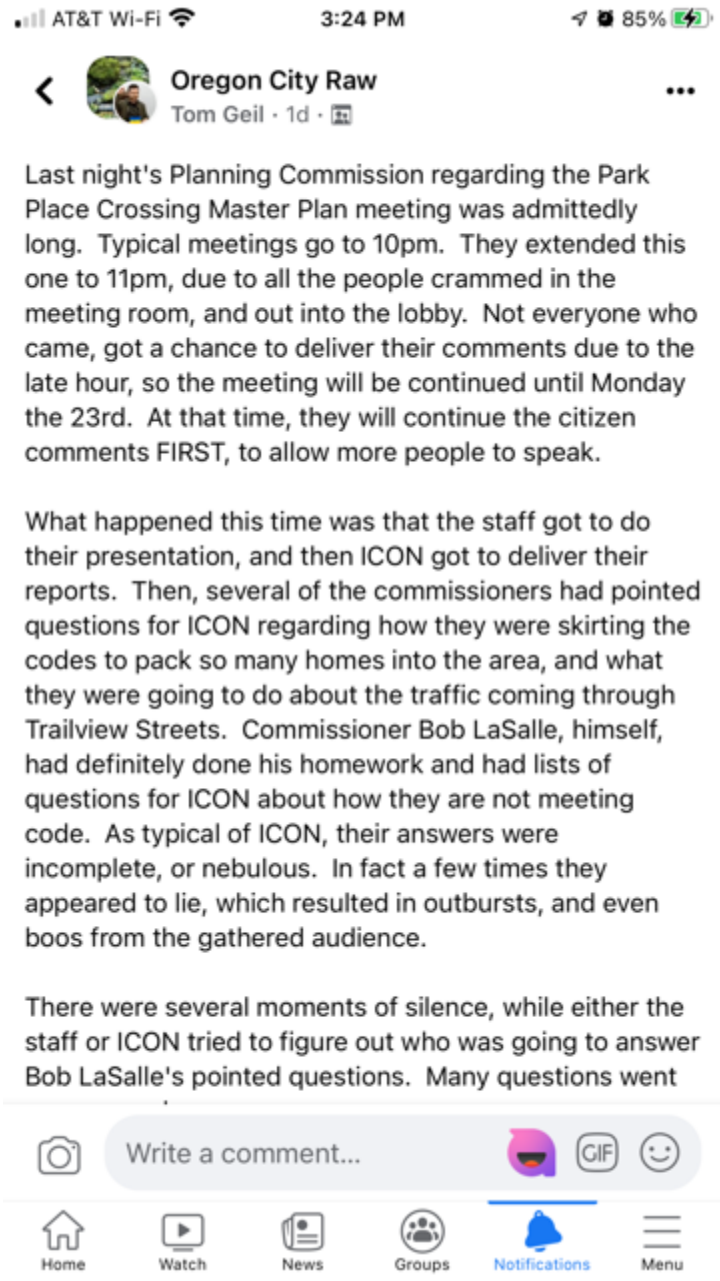
5. An update on the Clackamas County interactive map system that provides real time traffic information (the quote links to Medford as an example).
Response: This work has not commenced.

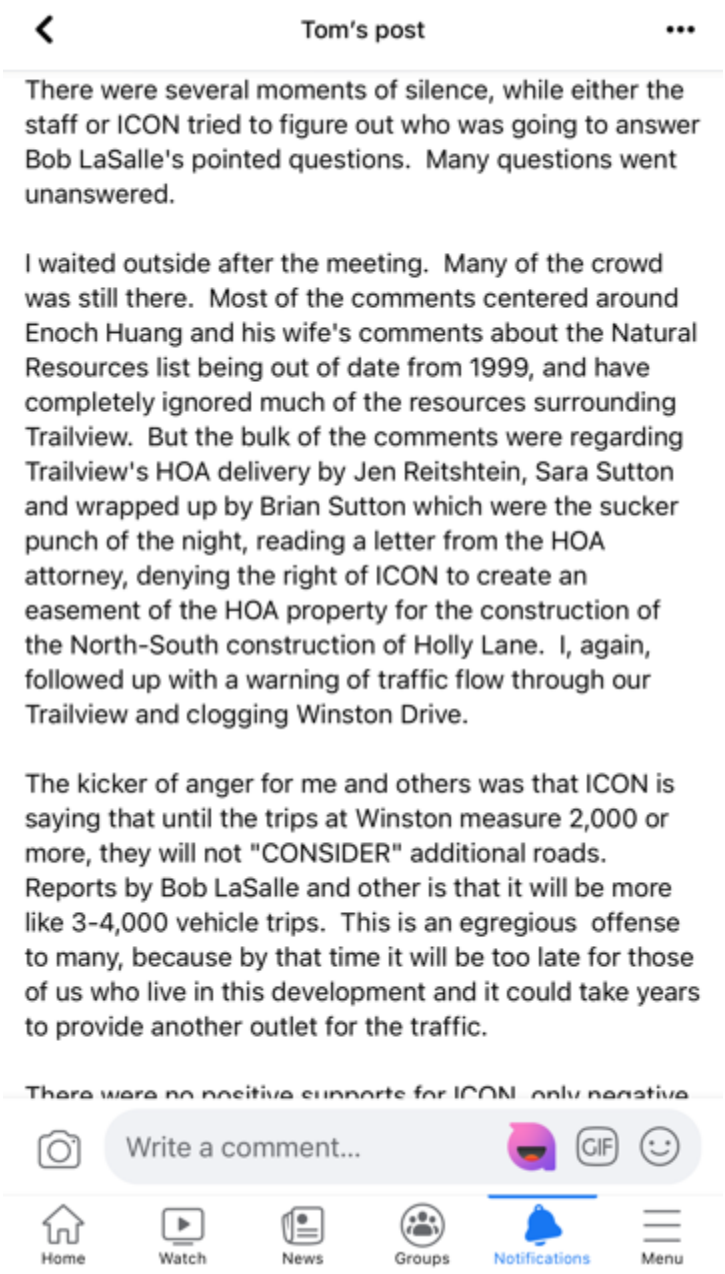
6. Data on the formation of the Emergency Preparedness Council, its members, how often they meet, how you can join, etc.
Response: The Emergency Preparedness Council first met in February. Its 15 voting members were recruited from the community at the end of last year. The Council is still working out its schedule, but is planning to meet quarterly. The next application period for open positions will be in Spring 2023, but meetings are open to the public. When the next meeting is scheduled it can be found at https://web3.clackamas.us/abc/abc.jsp#E.

7. Overall project planning timeline with milestones and delivery dates.
Response: The intent is still to commence the project in this calendar dependent on staffing levels.

Thank you,
Jamie Poole, Interim Deputy Disaster Manager
Pronouns: she/her
Clackamas County Disaster Management
1710 Red Soils Ct., Suite 225, Oregon City, OR 97045
503-655-8838 (office) | 503-278-9150 (cell)
www.clackamas.us/dm

From: Kelly Reid
To: Kelly Reid
Subject: FW: Facebook post to enter into record
Date: Thursday, May 12, 2022 12:48:31 PM
Attachments: image0.png
image1.png
image2.png
image3.png
image4.png
image5.png




Tom's post
There were several moments of silence, while either the staff or ICON tried to figure out who was going to answer Bob LaSalle's pointed questions. Many questions went unanswered.
I waited outside after the meeting. Many of the crowd was still there. Most of the comments centered around Enoch Huang and his wife's comments about the Natural Resources list being out of date from 1999, and have completely ignored much of the resources surrounding Trailview. But the bulk of the comments were regarding Trailview's HOA delivery by Jen Reitshtein, Sara Sutton and wrapped up by Brian Sutton which were the sucker punch of the night, reading a letter from the HOA attorney, denying the right of ICON to create an easement of the HOA property for the construction of the North-South construction of Holly Lane. I, again, followed up with a warning of traffic flow through our Trailview and clogging Winston Drive.
The kicker of anger for me and others was that ICON is saying that until the trips at Winston measure 2,000 or more, they will not "CONSIDER" additional roads. Reports by Bob LaSalle and other is that it will be more like 3-4,000 vehicle trips. This is an egregious offense to many, because by that time it will be too late for those of us who live in this development and it could take years to provide another outlet for the traffic.
There were no positive supports for ICON, only negative
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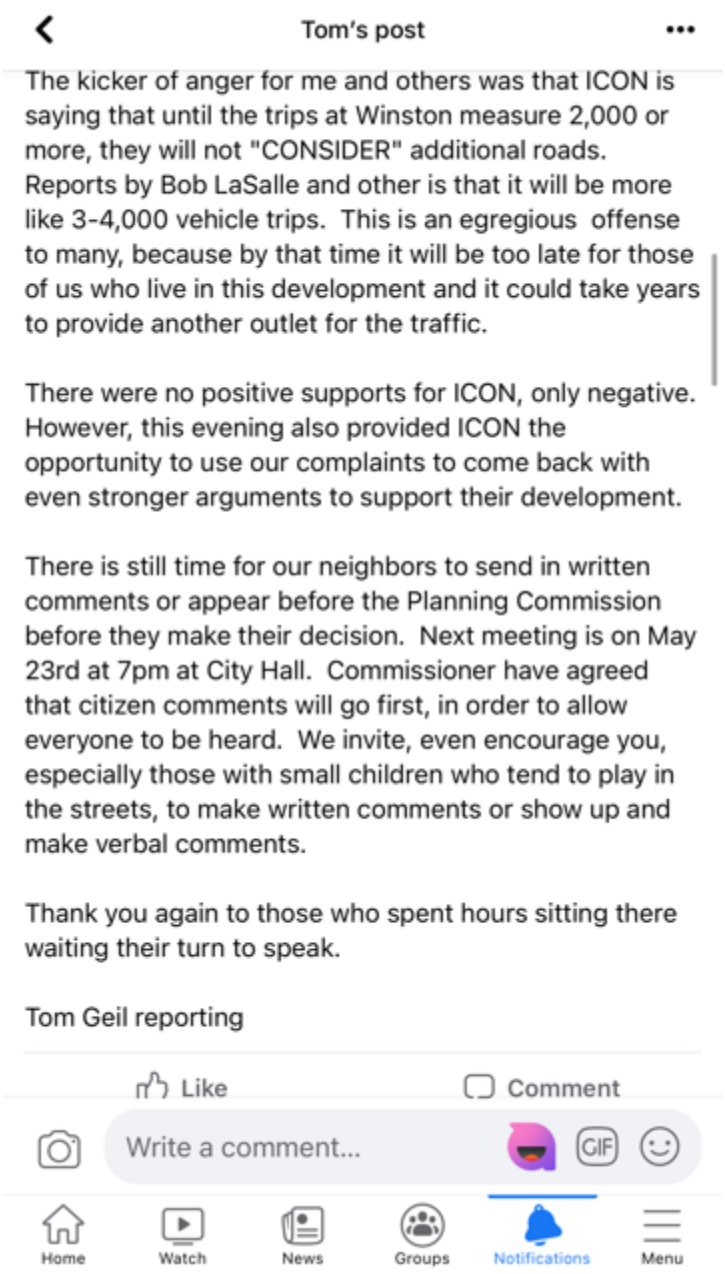
Tom's post
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There were no positive supports for ICON, only negative. However, this evening also provided ICON the opportunity to use our complaints to come back with even stronger arguments to support their development.
There is still time for our neighbors to send in written comments or appear before the Planning Commission before they make their decision. Next meeting is on May 23rd at 7pm at City Hall. Commissioner have agreed that citizen comments will go first, in order to allow everyone to be heard. We invite, even encourage you, especially those with small children who tend to play in the streets, to make written comments or show up and make verbal comments.
Thank you again to those who spent hours sitting there waiting their turn to speak.
Tom Geil reporting
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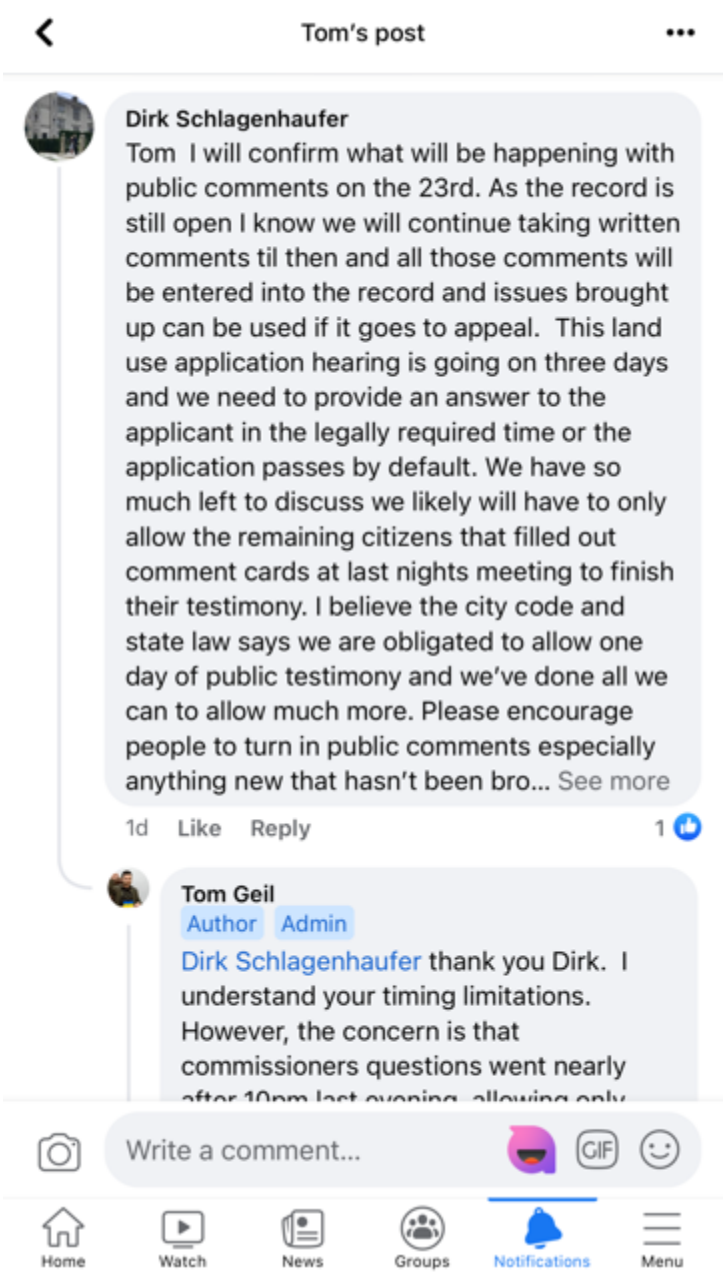
Tom's post
Dirk Schlagenhaufer
Tom I will confirm what will be happening with public comments on the 23rd. As the record is still open I know we will continue taking written comments til then and all those comments will be entered into the record and issues brought up can be used if it goes to appeal. This land use application hearing is going on three days and we need to provide an answer to the applicant in the legally required time or the application passes by default. We have so much left to discuss we likely will have to only allow the remaining citizens that filled out comment cards at last nights meeting to finish their testimony. I believe the city code and state law says we are obligated to allow one day of public testimony and we've done all we can to allow much more. Please encourage people to turn in public comments especially anything new that hasn't been bro... See more
1d Like Reply 1
Tom Geil
Author Admin
Dirk Schlagenhaufer thank you Dirk. I understand your timing limitations. However, the concern is that commissioners questions went nearly
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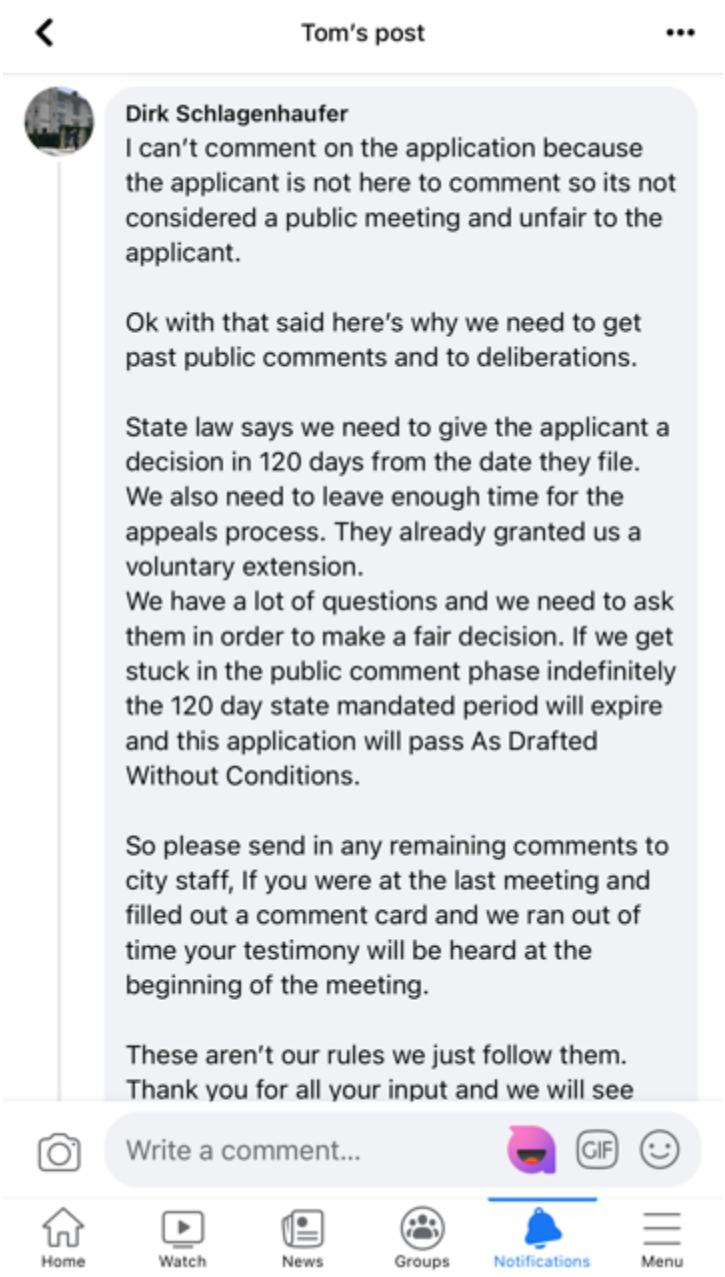
Tom's post
Dirk Schlagenhaufer
I can't comment on the application because the applicant is not here to comment so its not considered a public meeting and unfair to the applicant.
Ok with that said here's why we need to get past public comments and to deliberations.
State law says we need to give the applicant a decision in 120 days from the date they file. We also need to leave enough time for the appeals process. They already granted us a voluntary extension.
We have a lot of questions and we need to ask them in order to make a fair decision. If we get stuck in the public comment phase indefinitely the 120 day state mandated period will expire and this application will pass As Drafted Without Conditions.
So please send in any remaining comments to city staff, If you were at the last meeting and filled out a comment card and we ran out of time your testimony will be heard at the beginning of the meeting.
These aren't our rules we just follow them.
Thank you for all your input and we will see
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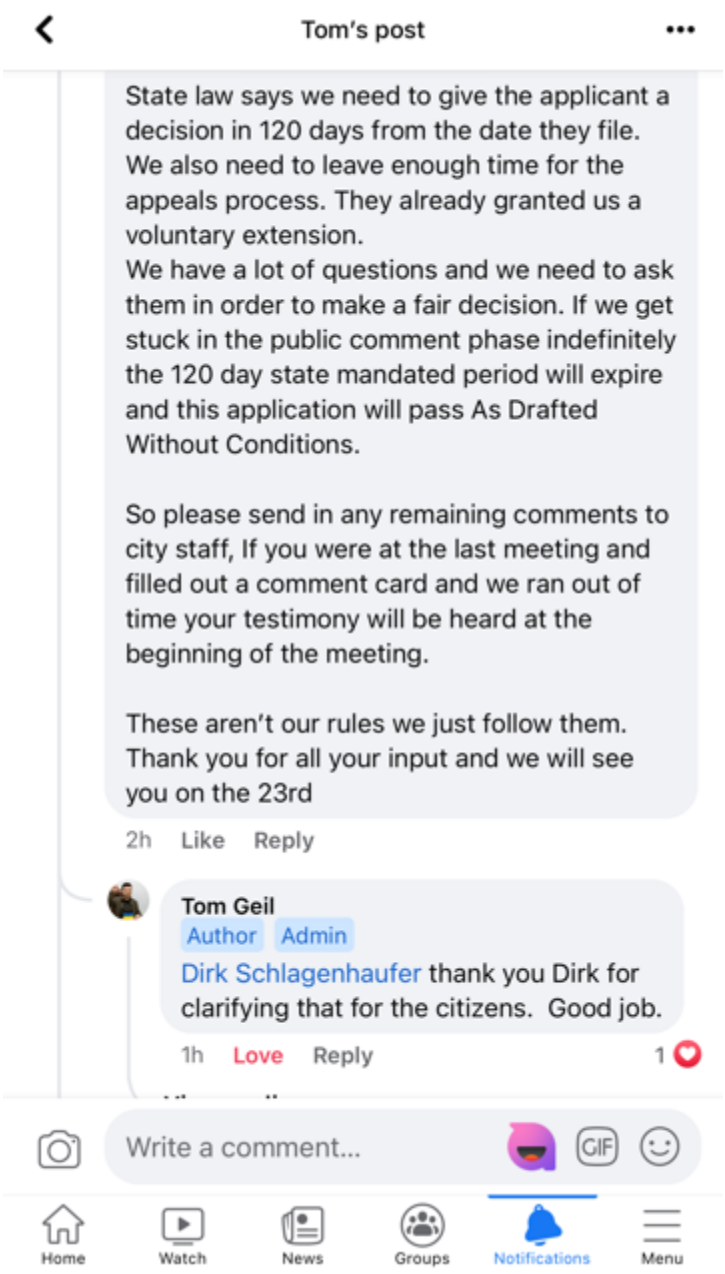


Sent from my iPhone

From: Jackie Dalseme
To: Kelly Reid; Planning
Subject: Park Place Crossing General Development Plan - Meeting May 23
Date: Thursday, May 12, 2022 7:06:20 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Oregon City Planning Commissioners,

The Park Place Crossing Concept Plan is quite an impressive and well-planned project and I believe it would be a tremendous improvement to Oregon City. HOWEVER, to allow the developer to:

- Cut corners to save money
- Reduce minimum lot sizes to increase revenue
- Side-swipe new public safety codes based on "inside" information
- Change the aesthetics of the original concept vision
- Not have a solid plan to extend BOTH Holly and Swan streets
- Use outdated geological maps for a hazardous landslide area
- Delay the building of crucial evacuation streets, especially after what happened during the 2020 wildfires

IS DEAD WRONG!

I encourage the City Planning Commission to show that they are able to hold a neutral position, despite the existing conflicts of interest of a few of the Commissioners and the Community Development Director, by denying the proposed Master Project Plan and demand the developer fix the deviations from the original Park Place Concept Plan.

Thank you.

Jackie Dalseme
16369 Kitty Hawk Ave
Oregon City, OR 97045
760-690-7550

Opinion: Icon Construction developers master art of tragic play

Tom Geil May 12 2022

Tom Geil: Oregon City Planning Commission holds its second play/meeting regarding the Park Place Crossing Master Plan

On Monday evening, May 9, a theatrical performance the likes of which Oregon City has never seen took place at City Hall.

It was a standing-room-only performance, with an audience that extended out into the foyer. This tragedy play was brought to you by Icon Construction and their development team. It included moments of laughter, booing, complete silence as actors and audience were stunned by an Icon actor's loss of words in responding to Planning Commission's questions. The play lasted until 11 p.m., longer than most Planning Commission plays that end at 10 p.m. But this play was such a hit that it is being extended over to Monday, May 23.

Get your free tickets early, as it may be a standing-room-only affair again. Seating is limited. Join in the fun as Icon actors stumble and trip over their nearly well-rehearsed lines. The moments of silence will cause you to be as speechless as Icon's actors, lawyers and technical geologists.

On May 9, Oregon City's Planning Commission held its second play/meeting regarding the Park Place Crossing Master Plan. Planning commissioners extended the length of the meeting, due to all the people crammed in the meeting room and out into the lobby, but not everyone who came got a chance to deliver their comments due to the late hour.

Oregon City staff presented first and then Icon got to deliver their reports, which took over an hour. Then, several of the commissioners, led by Chair Dirk Shlagenhaufer, had pointed questions for Icon regarding how they were skirting the codes to pack so many homes into the area, and what they were going to do about the traffic coming through opened stub roads.

Commissioners had definitely done their homework, and some had even done site visits. Planning Commissioner Bob La Salle had lists of questions for Icon about how the developers were not meeting code. As typical of Icon, their answers were incomplete or nebulous. In fact, a few times they "appeared to lie," which resulted in outbursts and even boos from the gathered audience.

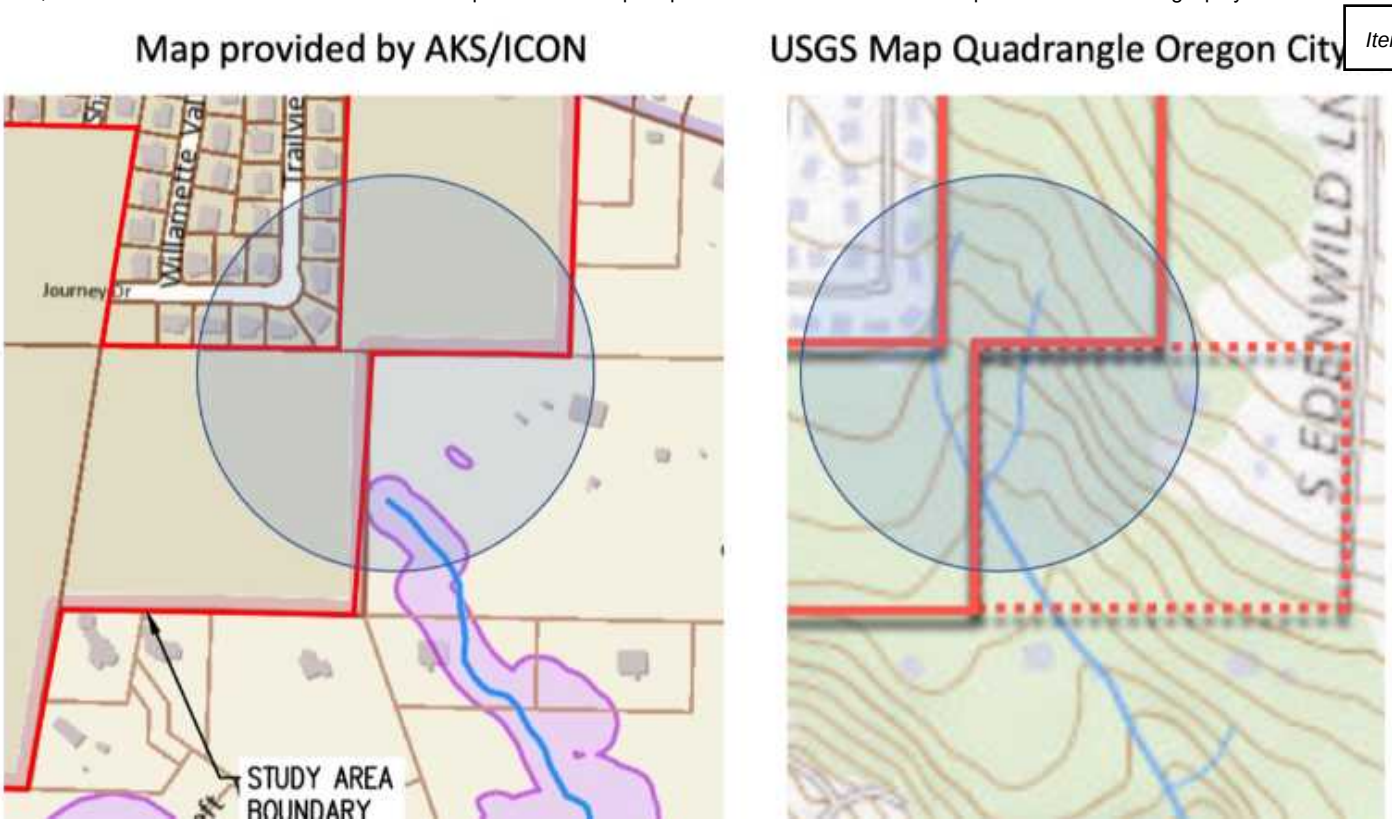
There were several moments of silence, while either the city staff or Icon tried to figure out who was going to answer La Salle's questions. Many questions went unanswered. La Salle spent over an hour delving into great detail of how the code and their plans were in conflict. La Salle referenced each code by number and oftentimes left Icon and city staff at a loss of words.

A D V E R T I S I N G | Continue reading below



(https://reach.adspmg.com/cl.php?bannerid=10273&zoneid=739&sig=31f584ed8e85ca8a6a0e7dcc506b092f94255245727880938ba0562028508852&oadest=http%3A%2F%2Fwww.savinglocalnews.com)

The residents down Edenwild Lane just east of the project area raised multiple objections highlighting incomplete and inaccurate information in the Oregon City Planning Commission staff report. They pointed out that the Oregon City Local Wetland Inventory has not been updated since 1999 and does not include the eastern half of the proposed Park Place Crossing development. Finding that the developer's map for stream locations didn't match the U.S. Geological Survey topographical map, they requested a full inventory of streams, creeks and ponds that could ultimately impact project areas. (https://pamplinmedia.com/images/artimg/00003735142898-0600.jpg)



COURTESY MAPS: TOM GEIL - Developers provided a Natural Resource Overlay District (NROD) map that leaves out the location of two branches of Charman Creek that begin behind the Trail View subdivision and run through the proposed development. These branches are shown in the U.S. Geological Survey topographical map and should be protected by the NROD regulations.

The evening ended with a powerful delivery by Trail View's HOA President Brian Sutton, along with his wife, Sara, and HOA Vice President Jen Reitshtein. A real sucker punch of the night came when they read a letter from the Trail View HOA attorney, denying the right of Icon to create an easement of HOA property for the construction of the north-south construction of Holly Lane.

A "trigger" point of increased anger for others was Icon saying that until the trips at Winston measure 2,000 or more, they will not "consider" additional roads. Reports by La Salle and others is that it will be more like 3,000-4,000 vehicle trips on the short, half-block Winston Drive. This is an egregious offense to many, because by that time it will be too late for those who live in this development, and it could take years to provide another outlet for the traffic. During the fire evacuations of September 2020, it took residents of this 108-home area over an hour to exit off Winston onto Holcomb, and another hour to get down Holcomb. Imagine the addition of 477 more homes using Winston.

There were no citizens who supported Icon, only negative comments. However, this evening also provides Icon the opportunity to use citizen complaints to come back with even stronger arguments to support their development.

There is still time for our residents to send in written comments or appear before the Planning Commission before they make their decision. Next meeting is at 7 p.m. on May 23 at City Hall. Commissioners have agreed that citizen comments will go first, to allow everyone to be heard.

Tom Geil is an Oregon City resident who formerly volunteered for the city as a planning commissioner.

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From: KELLY Laura * DLCD
To: Kelly Reid
Subject: RE: Concept Plan implementation notice - Oregon City
Date: Friday, May 13, 2022 2:17:37 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Kelly,
Thank you for reaching out with these questions.

As you know, comprehensive plans must follow the guidelines and rules of the statewide planning goals. DLCD reviews the plans, and any revisions or updates to the plans, to make sure they align with the Statewide Planning Goals. A plan is said to be "acknowledged" when LCDC approves it. The plan then becomes the controlling document for land use in the area it covers.

The "comp plan," as it's informally called, has three main elements:

- Inventory of local lands uses and resources;
- Goal and policy statements that indicate local objectives over a specific period and guidance on how to achieve them; and
- Detailed map that shows desired uses for each property throughout the entire locale.

State law requires local governments to notify the public when a comp plan or land use regulation is under review or when changes are proposed or adopted. Part of the process includes notice to DLCD regarding any change to a comp plan or land use regulation. This process is referred to as a Post Acknowledgment Plan Amendment (PAPA). The information you provided indicates the applicant is not proposing any changes to the comp plan or land use regulations; thus, it does not meet the threshold for a PAPA. Accordingly,the city is not required to notify DLCD of this proposal and DLCD will not be involved in its review.
Please let me know if you have any further questions on this matter.
Sincerely,
Laura

Laura Kelly
Metro, Clackamas and Multnomah County &
Interim Washington County and City of Portland Regional Representative
Oregon Department of Land Conservation and Development
Cell: 503-798-7587 | Main: 503-373-0050
laura.kelly@dlcd.oregon.gov | www.oregon.gov/LCD

From: Kelly Reid <kreid@orcity.org>
Sent: Thursday, May 12, 2022 12:41 PM
To: KELLY Laura * DLCD <Laura.KELLY@dlcd.oregon.gov>
Subject: Concept Plan implementation notice - Oregon City

Hi Laura,

I just left you a voicemail as well and here is the same question in writing:

Our Planning Commission is reviewing an application for a large development within one of our Concept Plan areas – this is the first proposal for development in the Park Place Concept Plan area since adoption of the Concept Plan in 2008. We have a lot of questions from community members and calls for all agencies including DLCD to be involved. Now, our understanding is that DLCD would not be involved in this review since no changes to the Concept Plan or Comprehensive Plan are proposed. The City's review of the development includes a detailed review for consistency with the adopted Concept Plan.

Nonetheless, would you be willing to provide a response indicating the role of DLCD in this process? And of course if there is anything that we need to talk to DLCD about, please let me know! The notice we sent out a couple of months ago is attached.

Our next hearing is May 23rd so if it is possible to get a response before then, we'd really appreciate it.

Thank you,

Kelly Reid
She/her/hers
Planner
Community Development Department, City of Oregon City
695 Warner Parrott Rd, Oregon City, OR 97045
kreid@orcity.org
(503) 496-1540 Direct
(503) 722-3789 Main
Website
Interactive Maps and Apps
On-Line Submittal of Land Use Applications

The City of Oregon City continues to offer services and programs in-person and online - find facility hours of operation here.

Website: www.orcity.org
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PUBLIC RECORDS LAW DISCLOSURE: This e-mail is subject to the State Retention Schedule and may be made available to the public.

From: Jane Nitschke
To: Kelly Reid
Subject: Park place crossing planning commission meeting 5/23/22
Date: Sunday, May 15, 2022 12:11:03 PM

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Thank you for this opportunity to share my concerns about the proposed Park Place housing project.

(1) Adding two+ cars per household in Park Place project and the proposed Serres neighborhood on Holcomb will cause traffic issues because there are no plans for left turn lanes, traffic circles, or lights included in the planning. Many people on the lower half of Holcomb have no space for widening the road which means they could lose their homes.

(2) Holcomb is the only egress for both housing developments (Park Place and Serres property - 150 proposed houses). When we had the wildfires and tried to evacuate to a safer place, it took over an hour to get to the bottom of the hill from Abernathy Landing (about two miles). There need to be at least two exits for Park Place - one on a road that does not include Holcomb.

(3) There is a sharp, blind curve on Holcomb by the elementary school. Adding that many cars onto Holcomb without widening the road, adding turn lanes, and putting in sidewalks, crosswalks, or lights creates hazardous conditions for students walking or biking to school as well as cars and busses trying to turn into the school from both directions.

(4) Finally, the intersection at Holcomb and Redlands Road needs to be improved to increase traffic flow if that many additional cars are being added to the road. The blind curve at the bottom is dangerous and during rush traffic already backs up the hill as cars wait three or more lights to get through. When making the turn from Holcomb or straight off Redlands Road to get to 205, both left turn lanes are backed up all the way to the intersection. Even with a second egress in Park Place project that empties onto Redlands Road, that intersection will only get worse causing more delays in all direction.

Thank you.

Jane Nitschke
Abernathy Landing

From: Suze Hammond
To: Oregon City Planning
Subject: Park Place Crossing North
Date: Saturday, May 14, 2022 11:08:58 PM

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Hi, I wish to send the following comments to the Planning Commission. Having attended a meeting and seeing the rather cavalier way ICON is treating this, I feel the need to speak up.

Dear Planning Commission, living downstream of this proposal worries me. I seem to identify things they may have overlooked.

"What will stop this runaway freight train?" a friend asks.

Maybe hearty doses of reality? They have Livesay rd as a major contributor to the traffic flow, despite it being currently about 1.5 lanes wide with a strong uphill entrance, an ice hazard. Given the rather obvious terrain, "improving" Livesay this much, increasing its load, may very well result in considerable subsidence and concommitant loss of both roadbed and private property. The developers have extending Holly Lane across Redland Road as the other. This looks better, but also will have "issues". Much of the proposed area looks landslide-prone to me, but what do I know? Like my friend said, if it was buildable, there'd already be something on it. Take lots of pictures? Yes, Livesay has a wider easement than currently used, but I wonder how many residents would like 10 feet or more taken off what they've always considered their front yard? In my experience this never goes down well, even though legal.

Why am I interested? Tour Creek crosses my land just two blocks downstream of the northern part of the proposal, it has attracted at least one Beaver, and my yard, though flat, is slowly slipping into its pond. I have already lost a large cedar tree to it, and am tearing down my sauna because it is next. The ground has cracked within ten feet of that. Construction may also pollute the Beaver's pond. Has the Oregon State Game Commission been informed?

This is on Beemer Way, and across Tour Creek gulch from Livesay Road, only two blocks from the northern part of the proposal. I very much do not trust the geological survey, with all its disclaimers. "We did this great survey, got paid, and stand by none of it".

Is the Planning Commission aware Swan Avenue does not cross the creek, I suspect for good reason?

Do they recall the necessary tearing down of an entire apartment building on very similar land? Slides in 1996 and 2005 seem to belie the geo survey.

This is going to make big headaches for everybody...

Suzanne Hammond, 14080 Beemer Way, Park Place.

To: Aquilla Hurd-Ravich; Kelly Reid
Subject: FW: GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan
Date: Friday, May 13, 2022 11:36:21 AM
Attachments: 20220509_225915_055020_Chapter_17.24___NC_NEIGHBORHOOD_COMMERCIAL_DISTRICT.docx
November 7, 2007 City Commission Agenda Packet Excerpt Attachment C.pdf
PPCP Ordinance 07-1007 .pdf
Main Street Standards.pdf
Oops.png

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-

From: james nicita <jim_nicita@hotmail.com>
Sent: Monday, May 9, 2022 4:29 PM
To: dschlagenhaufer@orcity.org; mmitchell@orcity.org; pgage@orcity.org; gstoll@orcity.org; dwuest@orcity.org; blasalle@orcity.org; cstaggs@orcity.org
Cc: ocplanning@orcity.org; Carrie Richter <crichter@batemanseidel.com>
Subject: GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan

You don't often get email from jim_nicita@hotmail.com. Learn why this is important

Hi Planning Commissioners,

Looking at this file I noticed that some things are not in the record that I thought should be. So as a courtesy I thought I would send them along for your consideration and addition to the record.

First, the Park Place Concept Plan was adopted via Ordinance No. 07-1007. I noticed that the version of the Concept Plan uploaded to the online record does not include the Ordinance.

The Ordinance is attached. I don't know what the significance is of its being recorded with the County.

Note that on p. 2, in Section 1 it notes that not only the Concept Plan but also its Appendix was adopted by Ordinance 07-1007. That Appendix is too big to attach to this file, but here is the link:

https://www.orcity.org/publicworks/park-place-concept-plan

Then, in Section 2, the Ordinance indicates that it also adopts

"The Ancillary Documents to Oregon City Comprehensive Plan, as amended, included as Attachment C of Item 6a on November 7, 2007."

That Attachment C is attached this email as well. On the last page I have placed an asterisk next to the section that applies to Parks.

Also, I noticed on p. 25 of the Concept Plan this statement:

In order to ensure that architectural design elements are integrated into future development in the North Village, it is necessary to develop implementation measures that reflect these elements. As part of the implementation measures proposed for Park Place, the City's existing Neighborhood Commercial (NC) zone will be modified to include "main street" standards for use in creating vibrant neighborhood centers in the North and South Villages.

Have these "main street" standards have ever been adopted for the NC zone? The NC zone code at OCMC 17.24 has in fact been amended to take into account some features of the Beavercreek Road Concept Plan (Thimble Creek). Likewise OCMC 17.62.058 and .059 have been added to address Thimble Creek

But neither 17.24 nor 17.21 appear to have been amended to implement the "main street" standards for the Park Place neighborhood centers.

On the other hand, OCMC 17.21 includes design standards for the single family residential areas of the Park Place Concept Plan, but by its terms this chapter clearly does not apply to the NC zone as applied to Park Place.

I hope there will be a discussion this evening about why the NC zone "main street" standards for Park Place have not yet been adopted.

Thank you for considering these comments.

James Nicita
Oregon City

PS: Today the link to this hearing's agenda packet has not worked. An "Oops message is generated (see attached). Perhaps this might warrant a continuance.

3

AFTER RECORDING RETURN TO:

City Recorder (Nancy Ide)
P.O. Box 3040
Oregon City, OR 97045-0304

Clackamas County Official Records
Sherry Hall, County Clerk

2008-07048

Item #1.

01254847200800704850030033

$41.00

10/10/2008 12:21:38 PM

D-ORD Cnt=1 Stn=9 DIANNAW
$15.00 $16.00 $10.00

ORDINANCE NO. 07-1007

AN ORDINANCE ADOPTING THE PARK PLACE CONCEPT PLAN; ADOPTING AMENDMENTS TO OREGON CITY COMPREHENSIVE PLAN AND ITS ANCILLARY DOCUMENTS (L 07-01)

WHEREAS, the City has worked with Oregon City residents and public advisory groups to develop the overall vision, policies and goals for the future growth and development of the Park Place Concept Plan area; and

WHEREAS, the Park Place Concept Plan is intended to guide the growth and management of the Park Place Concept Plan Area, to support natural, recreational, and economic benefits for the community of Oregon City, and to provide a framework for implementation of identified goals and policies; and

WHEREAS, the Park Place Concept Plan complies and is consistent with Statewide Planning Goals, Metro Ordinance No. 02-969B, and the Metro Regional Framework Plan, specifically Title 11; and

WHEREAS, the City will continue to work with Clackamas County to recommend long-term urban and rural reserves during the upcoming 2-year Metro reserves project for future expansion of the Urban Growth Boundary or designation of urban reserves pursuant to 660 Oregon Administrative Rules Division 21; and

WHEREAS, notice was mailed to all Oregon City property owners in conformance with Measure 56 requirements and notice was published in the local newspaper. Public meetings and workshops were held where the objectives and concepts of the Park Place Concept Plan were presented and discussed; and

WHEREAS, the Planning Commission and the City Commission both held publicly noticed work sessions on the proposed Concept Plan; and

WHEREAS, the Planning Commission held three public hearings on the proposed amendments; and

WHEREAS, the Planning Commission, based on the oral and written testimony they received at the public hearings, adopted minor revisions to the amendments and unanimously recommended it be adopted; and

WHEREAS, in a project of this size and scope, additional editing and refinement will inevitably be necessary after adoption; and

WHEREAS, further amendments to the Oregon City Comprehensive Plan and Map and Zoning Code and Map will be necessary in order to implement the Park Place Concept Plan, and these Amendments will be considered and reviewed in a duly noticed Public Hearing which

will be mailed to all Oregon City residents and interested parties in compliance with Measure 56e; and

WHEREAS, adopting the Park Place Concept Plan, and Amendments to the Comprehensive Plan and its ancillary documents is in the best interest of Oregon City to ensure that the goals and policies of the City can be realized,

NOW, THEREFORE, OREGON CITY ORDAINS AS FOLLOWS:

Section 1. The Park Place Concept Plan and Appendix, included as Attachment B of Item 6a on November 7, 2007, is hereby adopted as an Ancillary Document to the Oregon City Comprehensive Plan based on the findings contained in the Staff Report and Record for Planning File L 07-01.

Section 2. The Ancillary Documents to Oregon City Comprehensive Plan, as amended, included as Attachment C of Item 6a on November 7, 2007, are hereby adopted based on the findings contained in the Staff Report and Record for Planning File L 07-01.

Read for the first time at a regular meeting of the City Commission held on the 19th day of March 2008, and the foregoing ordinance was finally enacted by the Commission on this 2nd day of April 2008.

ALICE NORRIS, Mayor

ATTESTED to this 2nd day of April 2008

Nancy Ide
City Recorder

AGENDA
WEDNESDAY, NOVEMBER 7, 2007

REGULAR MEETING OF THE CITY COMMISSION OF OREGON CITY
City Hall – City Commission Chambers
7:00 p.m.

***City Commission*:**
Alice Norris, Mayor
Trent Tidwell, Commission President
Damon Mabee
Doug Neeley
Daphne Wuest

City Hall:
320 Warner Milne Rd.
Oregon City, OR 97045
503-657-0891

Agenda available on Oregon City's Web site at www.orcity.org

6:30 p.m. **EXECUTIVE SESSION – CITY COMMISSION**

a. Executive Session pursuant to ORS 192.660(2)(h): To consult with counsel concerning the legal rights and duties of a public body with regard to current litigation or litigation likely to be filed.

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1. **CONVENE REGULAR MEETING OF NOVEMBER 7, 2007, AND ROLL CALL**

2. **FLAG SALUTE**

3. **CEREMONIES, PROCLAMATIONS, PRESENTATIONS**

   a. Oregon City Law Enforcement Trends – Chief Gordon Huiras, Police Chief and Public Safety Director

4. **CITIZEN COMMENTS**
   This section of the agenda allows citizens up to 3 minutes to present information or raise issues relevant to the city, regarding items not on the agenda. As a general practice, the City Commission will not engage in discussion with those making comments. Prior to speaking, citizens should fill out a form (available in the foyer) and hand it to the Mayor or City Recorder.

5. **ADOPTION OF THE AGENDA**

6. **PUBLIC HEARINGS**

   a. **LEGISLATIVE:** Public Hearing and Adoption of the Park Place Concept Plan as an Amendment to the Oregon City Comprehensive Plan and its Ancillary Documents
   Commission Report Park Place Concept Plan
   Staff: Dan Drentlaw, Community Development Director

   b. Public Hearing and Ordinance No. 07-1019, Development Agreement between Modena Homes and the City of Oregon City
   Staff: Dan Drentlaw, Community Development Director

Item 6c continued to the December 5, 2007 City Commission meeting at the applicant's request.

c. Resolution for Proposed Annexation of 114 Acres Located East of Beavercreek Road and North of Old Acres Lane *(Continued from the August 1, 2007 City Commission meeting)*
Staff: Dan Drentlaw, Community Development Director

7. **GENERAL BUSINESS**

a. Clearwire US LLC; Wireless Telecommunications Site Lease at Boynton Water Reservoir
Staff: Nancy Kraushaar, City Engineer and Public Works Director

b. Personal Services Agreement, Supplement No. 2, Cook Street Pump Station Final Design and Construction Services, Wallis Engineering
Staff: Nancy Kraushaar, City Engineer and Public Works Director

8. **CONSENT AGENDA**
(This section allows the City Commission to consider routine items that require no discussion and can be approved in one comprehensive motion. An item may only be discussed if it is pulled from the consent agenda.)

a. Minutes of the August 15, 2007 Regular Meeting *(all present)*
Staff: Nancy Ide, City Recorder

b. Minutes of the August 15, 2007 Work Session *(all present)*
Staff: Nancy Ide, City Recorder

c. OLCC: Liquor License Application – Greater Privilege Liquor License for Full On-Premises Sales for a Commercial Establishment, Applying as an Individual, DBA Panaderia Mitzil, Located at 212 Molalla Avenue, Oregon City
Staff: Gordon Huiras, Police Chief and Public Safety Director

d. Restrictive Non-Remonstrance Agreement for the McCarver Landing Subdivision Project, Located at 554 Warner Parrot (TP06-06)
Staff: Nancy Kraushaar, City Engineer and Public Works Director

e. Public Water Easement for the Park Place Wood Products Property, Located at 13665 Holcomb Boulevard (Misc 07-01)
Staff: Nancy Kraushaar, City Engineer and Public Works Director

f. Public Water Easement for Summit Woodworking, Inc. Coyle Property, Located at 13663 Holcomb Blvd. (Misc07-01)
Staff: Nancy Kraushaar, City Engineer and Public Works Director

g. Annexation Agreement and Measure 37 Waiver for 14450 Thayer Road (AN 06-05)
Staff: Dan Drentlaw, Community Development Director

COMMISSION REPORT: CITY OF OREGON CITY

TO THE HONORABLE MAYOR AND COMMISSIONERS

320 Warner Milne Road, Oregon City, Oregon 503.657.0891

INCORPORATED 1844	**Agenda Item No.:** 6a	**Topic:** Adoption of the Park Place Concept Plan as an Amendment to the Oregon City Comprehensive Plan and its Ancillary Documents, and amendments to the Oregon City Zoning Code. (Planning File L 07-01).
	Agenda Type: PUBLIC HEARING	
	Meeting Date: November 7, 2007	**Attachments:** ☒ Yes ☐ No
Prepared By: P. Walter	**Reviewed By:** D. Drentlaw	**Approved By:** L. Patterson

RECOMMENDATION:
The Planning Commission recommends that the City Commission approve the Park Place Concept Plan and Appendix as an amendment to the Oregon City Comprehensive Plan and its Ancillary Documents, along with amendments to the Zoning Ordinance. Planning Commission's motion also included a recommendation to begin updating the City's System Development Charges and to form an ad-hoc committee to review and make recommendations for green building standards and requirements. This is a legislative action.

REASON FOR RECOMMENDATION:
Based on the oral and written testimony provided at public hearings and the work sessions with Oregon City residents and interested parties, the Planning Commission unanimously recommended approval on October 8, 2007 of the Park Place Concept Plan and the proposed amendments to the Comprehensive Plan, Ancillary Documents and Zoning Code. *Metro* will make a final determination as to whether the plan meets Title 11 requirements, however the planning commission have determined that the plan appears to meet all of the necessary requirements for adoption by the City, including Metro Title 11.

BACKGROUND:
As required by Metro *Title 11: Planning for New Urban Areas* of the *Urban Growth Management Functional Plan*, the Park Place Concept Plan is intended to lay a foundation for urbanization of the Park Place area brought in the City's Urban Growth Boundary (UGB). The Park Place Concept Plan addresses annexation, urban services, residential density and design, housing, commercial and employment uses, transportation, natural resources, public facilities and services, schools, roads, and developable and unbuildable lands. The plan is based on core values developed by the Project Advisory Committee to address these issues. The plan's regulatory compliance section documents in detail how the plan meets the requirements of Title 11.

The proposed Park Place Concept Plan, dated October 31, 2007, was developed through an extensive interactive public process and was guided by a Project Advisory Committee comprised of neighbors, stakeholders, business owners and City residents from February 2006 to present, to draft a framework for sustainable development of the Park Place area.

ATTACHMENTS

	A.	Staff Memo to Planning Commission of 10/8/07 detailing Motion for Recommendation.
	B.	Park Place Concept Plan and Appendix: Draft: June 20, 2007– Version 1.3 (Appendix On-File)
*	C.	Amendments to Ancillary Documents to Oregon City Comprehensive Plan (CIP Estimates).
	D.	Oregon City Zoning Code Amendments: OCMC 17.40, 17.44 and 17.65 (CC only)
	E.	Planning File L 07-01 – Review: Matrix of the Record from July 9, 2007 to October 8, 2007
	F.	Draft Minutes from 7/9/07 Planning Commission Public Hearing
	G.	Draft Minutes from 8/13/07 Planning Commission Public Hearing
	H.	Draft Minutes from 9/24/07 Planning Commission Public Hearing
	I.	Draft Minutes from 10/8/07 Planning Commission Meeting

ATTACHMENT C

PARK PLACE CONCEPT PLAN
Amendment to Comprehensive Plan Ancillary Documents

Ancillary Document:	**Transportation System Plan**
Date of Adoption:	April 2001

The Transportation System Plan shall be amended to reference the following needed capital improvements in the Park Place Concept Plan:

Table 5-1. Summary of Estimated Needs for Transportation Improvements.

Table 5-1: Summary of Estimated Needs for Transportation Improvements (for concept planning purposes only)

Roadway	No Build	Build	Total
HWY 213 Corridor Improvements (I-205 to Oregon City UGB)	75-125,000,000	0	75-125,000,000
Redland Road: Abernethy/Holcomb to Swan Ave.		11,500,000	11,500,000
Holly Lane: Redland to Maplelane	3,000,000	0	3,000,000
Livsey Road: Swan Ext to Holly Ext		1,800,000	1,800,000
Donovan Road: Holly Lane to Ogden Middle School		1,200,000	1,200,000
Swan Ave Extension: Existing Swan Ave south to Holcomb Blvd		1,100,000	1,100,000
Swan Ave Extension: Livesay canyon to Redland Road		9,300,000	9,300,000
Swan Ave Extension: Redland Rd to Holly Ln		9,300,000	9,300,000
Holly Lane: Redland to Holcomb Blvd		17,400,000	17,400,000
Total	78-128,000,000	51,600,000	130-180,000,000

Intersections			
Anchor Way/Redland	2,900,000		2,900,000
Holly Ln/Redland Rd	2,000,000		2,000,000
Holly Ln/Maplelane Rd	1,600,000		1,600,000
Swan Ave/Holcomb Blvd		300,000	300,000
Total Intersection Improvements	6,500,000	300,000	6,800,000
Grand Totals	85-135,000,000	51,900,000	137-187,000,000

ATTACHMENT C

Table 5-2: Facility Ownership and Estimated Construction Costs

Table 5-2: Facility Ownership and Estimated Construction Costs (for concept planning purposes only)

Roadway	ODOT	Clackamas	No Build	Build	Totals
Highway 213 Corridor Improvements (I-205 to Oregon City UGB)	75-125,000,000			0	75-125,000,000
Redland Road: Abernethy/ Holcomb to Swan Ave.		6,900,000	0	4,600,000	11,500,000
Holly Lane: Redland to Maplelane			3,000,000	0	3,000,000
Livsey Road: Swan Ext to Holly Ext			0	1,800,000	1,800,000
Donovan Road: Holly Lane to Ogden Middle School			0	1,200,000	1,200,000
Swan Ave Extension: Existing Swan Ave south to Holcomb Blvd			0	1,100,000	1,100,000
Swan Ave Extension: Livesay canyon to Redland Road			0	9,300,000	9,300,000
Swan Ave Extension: Redland Rd to Holly Ln			0	9,300,000	9,300,000
Holly Lane: Redland to Holcomb Blvd		10,400,000	0	7,000,000	17,400,000
Total Roadway	75-125,000,000	17,300,000	3,000,000	34,300,000	130-180,000,000

Intersections					
Anchor Way/Redland		1,700,000		1,200,000	2,900,000
Holly Ln/Redland Rd		1,200,000		800,000	2,000,000
Holly Ln/Maplelane Rd		1,000,000		600,000	1,600,000
Swan Ave/Holcomb Blvd		200,000		100,000	300,000
Total Intersection		4,100,000	0	2,700,000	6,800,000
Grand Totals	75-125,000,000	21,400,000	3,000,000	37,000,000	137-187,000,000

Source: Kittelson& Associates

PARK PLACE CONCEPT PLAN
Amendment to Comprehensive Plan Ancillary Documents

Ancillary Document:	**Sanitary Sewer Master Plan**

The Sanitary Sewer Master Plan shall be amended to reference the following needed capital improvements in the Park Place Concept Plan:

Table 5-4. Summary of Sewer System Improvements

Sewer System Improvement	Size	Number	Length (ft)	Cost/ft	Total Cost
North Village:					
Livesay Rd - E of Swan	12"		1,500	$100	$150,000
Manholes	4'	5		$4,000	$19,000
Swan Ave - Livesay Rd to Redland Rd.	12"		1,947	$100	$194,700
Manholes	4'	6		$4,000	$23,470
Livesay Rd - W of Swan	10"		1,894	$95	$179,930
Manholes	4'	6		$4,000	$22,940
Livesay Rd - W to Redland Rd.	8"		839	$90	$75,510
Manholes	4'	3		$4,000	$12,390
North Village to Redland Rd	12"		1,964	$100	$196,400
Manholes	4'	6		$4,000	$23,640
North Village to Hilltop	10"		3,568	$95	$338,960
Manholes	4'	10		$4,000	$39,680
Subtotals		**25**	**11,712**		**$1,276,620**
Redland Road: *					
48" connection to Swan Ave	36"		1,891	$335	$633,485
Manholes	6'	6		$7,200	$41,238
Swan Ave to Holly Lane	36"		1,245	$335	$417,075
Manholes	6'	4		$7,200	$29,610
Holly Lane to UGB Boundary	36"		2,448	$335	$820,080
Manholes	6'	7		$7,200	$51,264
Subtotals		**17**	**5,584**		**$1,992,752**
South Village:					
Swan Ave - Redland Rd to Donovan Lane	12"		1,995	$100	$199,500
Manholes	4'	6		$4,000	$23,950
Swan Ave - Donovan Lane to UGB Bndry	10"		1,353	$95	$128,535
Manholes	4'	4		$4,000	$17,530
Holly Lane - Redland Rd to Donovan Lane	12"		1,910	$100	$191,000
Manholes	4'	6		$4,000	$23,100
Holly Lane - Donovan Lane to UGB Bndry	10"		1,244	$95	$118,180
Manholes	4'	4		$4,000	$16,440
Donovan Lane - Swan Ave to Holly Lane	8"		610	$90	Use Extg
Manholes	4'	3		$4,000	$10,100
Subtotals		**23**	**7,112**		**$728,335**
	8"		1,449		
	10"		8,059		
	12"		9,316		
	36"		5,584		
Total Lineal Feet of Sewer Lines			**24,408**		
Construction Cost					**$3,997,707**
Design Costs (20% of construction cost)					**$799,541**
Construction + Design Cost					**$4,797,248**
Contingency (15%)					**$719,587**
Total Cost					**$5,516,836**

Table 5-4. Summary of Sewer System Improvements

Source: David Evans & Associates

Table 5-5. Summary of Stormwater System Improvements

Storm Water System Improvement	Quantity	Units	Cost/ft	Total Cost
Livesay Creek Basin				
Ponds - Assumes approx 10,000 cu ft	5	EACH	$15,000	$75,000
Pipe - Assumes 12"	1,200	LF	$68	$81,600
Subtotals				$156,600
Holcomb Creek Basin				
Ponds - Assumes approx 10,000 cu ft	1	EACH	$15,000	$15,000
Pipe - Assumes 12"	260	LF	$68	$17,680
Subtotals				$32,680
Abernethy Creek Basin				
Ponds - Assumes approx 10,000 cu ft	13	EACH	$15,000	$195,000
Pipe - Assumes 12"	2,510	LF	$68	$170,680
Subtotals				$365,680
Total Ponds	19			
Total Pipe	3,970			
Construction Cost				$554,960
Design Costs (20% of construction cost)				110,992
Construction + Design Cost				665,952
Contingency (15%)				99,893
Total Cost				$765,845

Table 5-5. Summary of Storm Water System Improvements

Source: David Evans & Associate

PARK PLACE CONCEPT PLAN
Amendment to Comprehensive Plan Ancillary Documents

Ancillary Document:	**Water Master Plan**
Date of Adoption:	October 2004

The Water Master Plan shall be amended to reference the following needed capital improvements in the Park Place Concept Plan:

Pp. 82-83, and Table 5-3. Summary of Water System Improvements:

Water System Improvement	Size	Length (ft)	Cost/ft	Total Cost
North Village:				
Livesay Rd - E of Swan	12"	1,500	$106	$159,000
Swan Ave - Livesay Rd to Redland Rd.	12"	1,969	106	208,714
Livesay Rd W of Swan	10"	1,888	90	169,920
Livesay Rd W. to Holcomb Rd.	10"	784	90	70,560
North Village to Redland Rd.	16"	1,981	126	249,606
North Village to Holcomb Rd.	10"	3,576	90	321,840
Subtotals		11,698		1,179,640
Redland Road:				
SFWB connection to Swan Ave	16"	2,805	$126	$353,430
Swan Ave to Holly Lane	16"	1,245	126	156,870
Holly Lane to UGB Boundary	16"	2,448	126	308,448
Subtotals		6,498		$818,748
South Village:				
Swan Ave - Redland Rd to Donovan Lane	16"	1,962	$126	$247,212
Swan Ave - Donovan Lane to UGB Bndry	10"	1,353	90	121,770
Holly Lane - Redland Rd to Donovan Lane	12"	1,906	106	202,036
Holly Lane - Donovan Lane to UGB Bndry	10"	1,244	90	111,960
Donovan Lane - Swan Ave to Holly Lane	16"	610	126	76,860
Donovan Lane - Swan Ave to School	16"	1,035	126	130,410
Subtotals		8,110		$759,838
	10"	8,845		
	12"	5,375		
	16"	12,086		
Total Lineal Feet of Water Lines		26,306		
Construction Cost				$2,758,226
Design Costs (20% of construction cost)				551,645
Construction + Design Cost				3,309,871
Contingency (15%)				496,481
Total Cost				$3,806,352

Source: David Evans & Associates

PARK PLACE CONCEPT PLAN
Amendment to Comprehensive Plan Ancillary Documents

Ancillary Document:	**Parks and Recreation Master Plan**
Date of Adoption:	July 1999 (pending update 2007)

The Parks and Recreation Master Plan shall be amended to reference the following needed capital improvements in the Park Place Concept Plan:

Table 5-6. Summary of Park Improvements

Table 5-6. Summary of Park Improvements

Park Type	Acres		Acquisition		Development		Total
	Range	Assumed	$/Acre*	$'s	$/Acre	$'s	
Community	8 to 10	9	$100,000	$900,000	$140,000	$1,260,000	$2,160,000
Neighborhood	3 to 5	4	125,000	500,000	140,000	560,000	1,060,000
Total Cost				$1,400,000		$1,820,000	$3,220,000

*The Clackamas County Office of Assessment and Taxation reports current market values for vacant unimproved land without services ranges as low as $33,000/acre. We assume a developable acre of land with services will be purchased for parks

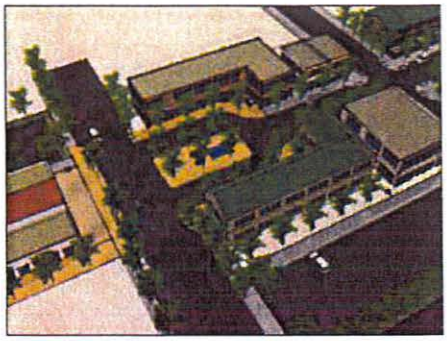
Table 5-7. Improvements Summary

Table 5-7. Improvements Summary

Service	Cost	Number of EDUs*	Cost per EDU
Transportation	36,980,000	1,620	$22,827
Water	3,806,352	1,620	2,350
Sanitary Sewer	5,516,836	1,620	2,405
Storm Water	765,845	1,620	473
Parks	3,220,000	1,458	2,209
Total Cost	$50,289, 032		$31,263

An EDU for retail and office is assumed to equal about 10 percent of total trips, water usage, and sewage production

the heart of the North Village. The Livesay Main Street is envisioned to have wide sidewalks, landscaped stormwater facilities (bioswales), pedestrian-scale lighting, street trees, and benches. The roadway terminates at the junction of the Holly Lane Extension with a Village Green and civic building (i.e., library, community center, environmental interpretative center, or post office). This mixed-use district is surrounded by medium-density housing (figures at right), which is within walking distance of the core area, and single-family housing that blends into the surrounding existing single-family residential neighborhoods. Small-scale commercial businesses, like a coffee shop, bookstore, dry cleaners, or café, are proposed to anchor the intersection of Holly Lane Extension and Livesay Main Street and surround the Village Green.



New mixed-use development and civic node in the North Village

The land uses along Livesay Main Street are envisioned to be a mix of residential and commercial uses (e.g., ground-floor, neighborhood-oriented commercial with housing or offices above). The buildings should convey a rich palette of architectural elements that distinguish the Village from the existing auto-oriented commercial uses and a proposed regional shopping center in the area bounded by Washington Street, Abernethy, and Highway 213. The types of elements incorporated into the design of the street facing façade should include large storefront windows, recessed entry ways, awnings and canopies, building lighting, and a rhythm of columns and/or pilasters that break the façade into smaller, more intimate modules.



A variety of housing types and densities is proposed in both the North Village and the South Village

In order to ensure that architectural design elements are integrated into future development in the North Village, it is necessary to develop implementation measures that reflect these elements. As part of the implementation measures proposed for Park Place, the City's existing Neighborhood Commercial (NC) zone will be modified to include "main street" standards for use in creating vibrant neighborhood centers in the North and South Villages.

The Park Place Concept Plan includes a general street plan and street cross-sections as well as an overview of natural resource planning in Park Place, with recommended extension of density transfer provisions to all natural resource overlay zones occurring in the Park Place plan area. These implementation measures are described in more detail in Chapter 4 of this document and Appendix I.



Taller buildings and a mix of uses provide a desirable sense of enclosure around the civic space in the North Village

South Village

The South Village is located at the intersection of Swan Avenue and Donovan (Figure 3-3). The South Village proposes a small neighborhood commercial node with a 3 - 5 acre park (figures at left) surrounded by a significant amount of medium-density housing; however, it will probably be some time before the existing single-family residential neighborhoods experience sufficient pressure to redevelop. Civic landmarks in the South Village include the existing Ogden Middle School and a new park. Similar to the North Village, these uses are surrounded by medium- and low-density housing.

Chapter 17.24 NC NEIGHBORHOOD COMMERCIAL DISTRICT[1]

17.24.010 Designated.

The neighborhood commercial district is designed for small-scale commercial and mixed-uses designed to serve a convenience need for residents in the surrounding low-density neighborhood. Land uses consist of small and moderate sized retail, service, office, multi-family residential uses or similar. This district may be applied where it is appropriate to reduce reliance on the automobile for the provision of routine retail and service amenities, and to promote walking and bicycling within comfortable distances of adjacent residential infill neighborhoods, such as within the Park Place and South End Concept Plan areas. Approval of a site plan and design review application pursuant to OCMC 17.62 is required.

(Ord. No. 08-1014, §§ 1—3(Exhs. 1—3), 7-1-2009; Ord. No. 13-1017, § 1(Exh. 1), 4-16-2014; Ord. No. 18-1009, § 1(Exh. A), 7-3-2019; Ord. No. 19-1008, § 1(Exh. A), 12-18-2019)

17.24.020 Permitted uses—NC.

The following uses are permitted within the neighborhood commercial district:

A. Any use permitted in the mixed-use corridor, provided the maximum footprint for a stand-alone building with a single store or multiple buildings with the same business does not exceed ten thousand square feet, unless otherwise restricted in this chapter;

B. Grocery stores, provided the maximum footprint for a stand-alone building with a single store or multiple buildings with the same business does not exceed forty thousand square feet;

C. Live/work dwellings;

D. Outdoor sales that are ancillary to a permitted use on the same or abutting property under the same ownership.

(Ord. No. 08-1014, §§ 1—3(Exhs. 1—3), 7-1-2009; Ord. No. 13-1017, § 1(Exh. 1), 4-16-2014; Ord. No. 18-1009, § 1(Exh. A), 7-3-2019; Ord. No. 19-1008, § 1(Exh. A), 12-18-2019)

17.24.025 Conditional uses.

The following conditional uses may be permitted when approved in accordance with the process and standards contained in OCMC 17.56:

A. Any use permitted in the neighborhood commercial district that has a building footprint in excess of ten thousand square feet;

B. Emergency and ambulance services;

[1]Editor's note(s)—Ord. No. 08-1014, adopted July 1, 2009, repealed Chapter 17.24 in its entirety and enacted new provisions to read as herein set out and subsequently amended. Prior to amendment, Chapter 17.24 pertained to similar subject matter. See Ordinance Disposition List for derivation.

C. Drive-through facilities;

D. Outdoor markets that are operated before six p.m. on weekdays;

E. Public utilities and services such as pump stations and sub-stations;

F. Religious institutions;

G. Public and or private educational or training facilities;

H. Gas stations;

I. Hotels and motels, commercial lodging;

J. Veterinary clinic or pet hospital.

(Ord. No. 08-1014, §§ 1—3(Exhs. 1—3), 7-1-2009; Ord. No. 13-1017, § 1(Exh. 1), 4-16-2014; Ord. No. 18-1009, § 1(Exh. A), 7-3-2019; Ord. No. 19-1008, § 1(Exh. A), 12-18-2019)

17.24.035 Prohibited uses.

The following uses are prohibited in the NC District:

A. Distributing, wholesaling and warehousing;

B. Outdoor storage;

C. Outdoor sales that are not ancillary to a permitted use on the same or abutting property under the same ownership;

D. Hospitals;

E. Kennels;

F. Motor vehicle sales and incidental service;

G. Motor vehicle repair and service;

H. Self-service storage facilities;

I. Heavy equipment service, repair, sales, storage or rental (including but not limited to construction equipment and machinery and farming equipment);

J. Marijuana production, processing, wholesaling, research, testing, and laboratories;

K. Mobile food units or vendors, except with a special event permit;

L. Residential use that exceeds fifty percent of the total building square footage on-site.

(Ord. No. 08-1014, §§ 1—3(Exhs. 1—3), 7-1-2009; Ord. No. 13-1017, § 1(Exh. 1), 4-16-2014; Ord. No. 16-1008, § 1(Exh. A), 10-19-2016, ballot 11-8-2016; Ord. No. 18-1009, § 1(Exh. A), 7-3-2019; Ord. No. 19-1008, § 1(Exh. A), 12-18-2019)

17.24.040 Dimensional standards.

Dimensional standards in the NC district are:

A. Maximum building height: Forty feet or three stories, whichever is less.

B. Maximum building footprint: Ten thousand square feet.

C. Minimum required setbacks if not abutting a residential zone: None.

D. Minimum required interior and rear yard setbacks if abutting a residential zone: Ten feet plus one-foot additional yard setback for every one foot of building height over thirty-five feet.

E. Maximum Allowed Setback.

1. Front yard setback: Five feet.

2. Interior yard setback: None.

3. Corner side yard setback abutting a street: Thirty feet.

4. Rear yard setback: None.

Public utility easements may supersede the minimum setback. Maximum setback may be increased per OCMC 17.62.055.D.

F. Standards for residential uses: Residential uses shall meet the minimum net density standards for the R-3.5 district, except that no minimum net density shall apply to residential uses proposed above nonresidential uses in a mixed-use configuration or to live/work dwellings. Any new lots proposed for exclusive residential use shall meet the minimum lot size and setbacks for the R-3.5 zone for the proposed residential use type.

G. Minimum required landscaping (including landscaping within a parking lot): Fifteen percent.

(Ord. No. 08-1014, §§ 1—3(Exhs. 1—3), 7-1-2009; Ord. No. 18-1009, § 1(Exh. A), 7-3-2019; Ord. No. 19-1008, § 1(Exh. A), 12-18-2019; Ord. No. 21-1007, § 1(Exh. A), 4-21-2021)

17.24.050 Additional standards for Thimble Creek Concept Plan Area.

A. Applicability. This section applies to all development in the NC district within the Thimble Creek Concept Plan Area.

B. Relationship of Standards. These standards apply in addition to and supersede the standards of the NC zone within the Thimble Creek Concept Plan Area. In the event of a conflict, the standards of this section control.

C. Uses.

1. All uses permitted per OCMC 17.24.020.A and B, are limited to a maximum footprint for a stand-alone building with a single store or multiple buildings with the same business not to exceed ten thousand square feet, unless otherwise restricted in this chapter.

2. Residential uses, excluding live/work, that do not exceed fifty percent of the total building square footage within the Thimble Creek Concept Plan Neighborhood Commercial Zoning District.

3. Artisan and specialty goods production is permitted, constituting small-scale businesses that manufacture artisan goods or specialty foods and makes them available for purchase and/or consumption on-site, with an emphasis on direct sales rather than the wholesale market. Examples include: Candy, fruit and vegetable preserving and specialty foods, bakeries and tortilla manufacturing; artisan leather, glass, cutlery, hand tools, wood, paper, ceramic, textile and yarn products; microbreweries, microdistilleries, and wineries. All uses shall provide either:

a. A public viewing area that includes windows or glass doors covering at least twenty-five percent of the front of the building face abutting the street or indoor wall, allowing direct views of manufacturing; or

b. A customer service space that includes a showroom, tasting room, restaurant, or retail space.

4. Drive-throughs are prohibited.

5. Gas stations are prohibited.

D. Dimensional Standards.

1. Maximum building height shall be sixty feet or five stories, whichever is less.

2. Minimum building height shall be twenty-five feet or two stories, whichever is less, except for accessory structures or buildings under one thousand square feet.

3. Maximum corner side yard setback abutting a street shall be five feet.

4. Minimum floor area ratio (FAR) shall be 0.5.

a. Required minimum FARs shall be calculated on a project-by-project basis and may include multiple contiguous blocks. In mixed-use developments, residential floor space will be included in the calculations of floor area ratio to determine conformance with minimum FAR.

b. An individual phase of a project shall be permitted to develop below the required minimum FAR provided the applicant demonstrates, through covenants applied to the remainder of the site or project or through other binding legal mechanism that the required FAR for the project will be achieved at project build-out.

5. Minimum required landscaping: Ten percent. Required landscaping areas may include:

a. Landscaping within a parking lot.

b. Planter boxes.

c. Eco roofs.

d. Paved courtyard or plaza with at least twenty-five percent of the area used for landscaping, planter boxes, and/or water features including shade trees planted at the ratio of one tree for every five hundred square feet of urban plaza area.

E. Residential Uses. Residential uses, excluding live/work dwellings, shall be subject to the following additional standards:

1. All ground-floor residential uses, with the exception of entrances for upper-story residential uses, shall be set back a minimum of one hundred fifty feet from the property line along Glen Oak Road.

2. Ground-floor residential building square footage shall not exceed fifty percent of the ground-floor nonresidential building square footage on-site.

3. Ground-floor residential uses shall achieve a minimum net density of 17.4 units per acre, with no maximum net density.

4. Any new lots proposed for exclusive residential use shall meet the minimum lot size and setbacks for the R-2 zone for the proposed residential use type.

5. Upper-story residential uses are permitted with no limitations.

F. Site Design Standards.

1. In lieu of complying with OCMC 17.62.050.B.1, parking areas shall be located behind the building façade that is closest to the street or below buildings and shall not be located on the sides of buildings or between the street and the building façade that is closest to the street.

(Ord. No. 21-1006, § 1(Exh. A), 7-1-2020)



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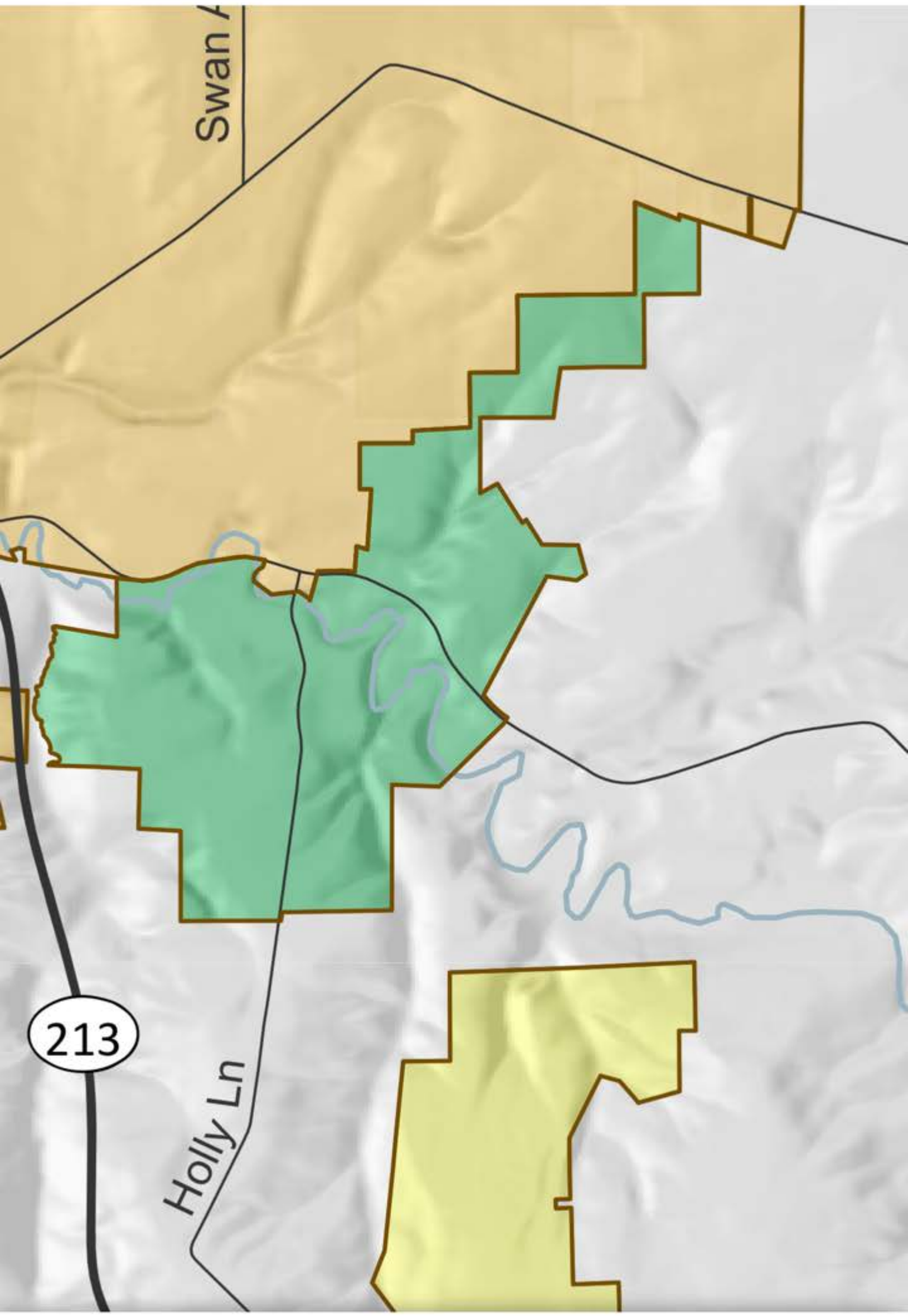
Swan
213
Holly Ln

CITY OF OREGON CITY

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

To: Planning Commission **Agenda Date:** 07/11/2022

SUBJECT:

Public Comments for GLUA-21-00045 / MAS-21-00006 / VAR-22-00001
Park Place Crossing General Development Plan

Below is a list of all public comments received for this land use application prior to June 30, 2022. The document is split into four separate PDFs due to the large number of comments and information provided.

Each item is included in this document in the order listed below.

Each item on the list below is a clickable link to navigate to the specific comment within the document.

PART 1 - SEE SEPARATE DOCUMENT

1. Jed Pedersen emails dated March 31, 2022, April 2, April 3, and April 10, 2022
2. Sharon and Neish emails dated April 3, 2022
3. Sharon and Ken Neish emails dated April 4, 2022
4. Jackie-Hammond Williams letter received April 11, 2022
5. Janice Troxler letter dated April 7, 2022
6. Barbara Renken letter dated April 8, 2022
7. Christine Kosinski letter dated April 11, 2022
8. Park Place Neighborhood Association letter dated April 11, 2022
9. Hamlet of Beavercreek letter received April 11, 2022
10. Clackamas County Engineering Division letter dated April 15, 2022
11. Metro emails dated March 31, 2022
12. Kendall Reid, Oregon City Parks and Recreations Director email dated April 15, 2022
13. Clackamas River Water comment form dated March 31, 2022
14. Oregon City Building Division comment form dated April 5, 2022
15. James Graham, Oregon City Economic Development Manager letter dated April 18, 2022

PART 2 - SEE SEPARATE DOCUMENT

16. Kirk Tolstrup email dated May 2, 2022
17. John Widmer email dated May 6, 2022
18. Janice Troxler email dated May 5, 2022
19. Karla Laws letter dated May 8, 2022
20. Christine Kosinski email dated May 9, 2022
21. Jane Varley, Michael Mueller, Dan and Shannon Keller, and Shirley Humprey letter received May 9, 2022
22. Darin Shoup email dated May 9, 2022

23. Mikhail Krughkov email dated May 9, 2022
24. Adella and Mark Bell slides dated May 9, 2022
25. Rivers of Life Center letter dated May 9, 2022
26. Oregon City School District letter dated May 9, 2022
27. Melissa Warner email dated May 9, 2022
28. Jed Pedersen slides dated May 9, 2022
29. Brent and Jamie Gross email dated May 9, 2022
30. Jaimee Melilli email dated May 9, 2022

PART 3 - SEE SEPARATE DOCUMENT

31. Enoch Huang and Roya Mansouri slides dated May 9, 2022
32. Enoch Huang and Roya Mansouri letter dated May 9, 2022
33. Emily Lisborg email dated May 10, 2022
34. Ken Iverson emailed dated May 9, 2022
35. Barb Seekins letter received May 9, 2022
36. Trailview Heights HOA letter received May 9, 2022
37. Sutton map received May 9, 2022
38. Tom Geil slides received May 9, 2022
39. Stephen Ford letter received May 9, 2022
40. Jackie-Hammond Williams letter received May 9, 2022
41. Tara McElhannon letter received May 9, 2022
42. Sharon Neish emailed dated May 10, 2022
43. Carolyn Lu email dated May 11, 2022
44. Anonymous website submission dated May 11, 2022
45. Lynette Basiou email dated May 12, 2022
46. Photos from Planning Commission Chair's site visit dated May 9, 2022
47. Clackamas County Disaster Management public records request email dated May 11, 2022
48. Tom Geil and Dirk Schlagenhaufer facebook posts dated May 12, 2022
49. Jackie Dalseme emailed dated May 12, 2022
50. Tom Geil Oregon City News opinion piece dated May 12, 2022
51. Department of Land Conservation and Development (DLCD) email dated May 13, 2022
52. Jane Nitschke email dated May 15, 2022
53. Suzanne Hammond emailed dated May 14, 2022
54. James Nicita email and attachments dated May 13, 2022
55. UGB map received May 17, 2022

PART 4 - CLICK LINE BELOW TO NAVIGATE DIRECTLY TO COMMENT

56. Christine Kosinski/Scott Burns letter dated May 23, 2022
57. Christine Kosinski letter dated May 23rd, 2022
58. Tara McElhannon email dated May 23rd, 2022
59. Maryann Lee email dated May 22, 2022
60. James Nicita email and attachments dated May 22, 2022
61. James Nicita email #2 and attachments dated May 22, 2022
62. Emily Lisborg email dated May 18, 2022
63. James Nicita email dated May 24, 2022
64. Jed Peterson email dated May 21, 2022
65. Sharon Neish Oregon City News opinion piece dated May 23, 2022

66. Roya Mansouri email dated May 23, 2022
67. Roya Mansouri letter received May 23, 2022
68. Roya Mansouri email #2 dated May 23, 2022
69. Scott Coleman letter received May 23, 2022
70. Sharon Neish email dated May 24, 2022

From: Aquilla Hurd-Ravich
To: Kelly Reid
Subject: FW: Testimony for 5/23 Planning Commission meeting
Date: Monday, May 23, 2022 2:58:53 PM
Attachments: Newell Ck Cnyn Stability Report_PSU 1999 (13).pdf
TestimonyOCPlanCommParkPlaceCrossingMay232022.odt
TestimonyOCPlanCommScottBurnsMsgMay232022.odt

For tonight…

From: britenshin@aol.com <britenshin@aol.com>
Sent: Monday, May 23, 2022 12:34 PM
To: Aquilla Hurd-Ravich <ahurdravich@orcity.org>; recorderteam <recorderteam@orcity.org>
Cc: britenshin@aol.com
Subject: Testimony for 5/23 Planning Commission meeting

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Attached is my testimony for the Planning Commission meeting for tonight, 5/23. Also attaching the Thesis of Professor Bill Burns and a message from Professor Scott Burns.

Thank you for your assistance
Christine Kosinski

Oregon City Planning Commission Meeting of May 23rd, 2022

Testimony of: Christine Kosinski, Unincorporated Clackamas County

Agenda Item: GLUA-21-00045/MAS-21-00006/VAR22-00001
Park Place Crossing Development Plan

I am attaching the following document to my testimony, as well as a message from Scott Burns, Professor of Geology, PSU.

The Thesis of Professor Bill Burns of DOGAMI
dated 1999, PSU
Master of Science

Subject of Thesis
Engineering geology and Relative Stability of the
Southern half of Newell Creek Canyon, Oregon City, Oregon

The Thesis by Bill Burns covers the Morton Road Landslide as well as the Newell Creek Landslide. In some of my previous testimonies, I have brought the difficult topography on both Morton Rd and Holly Ln to the attention of both the Planning Commission and the City Commission of Oregon City. In my testimonies, I suggested the City read this important information since I am concerned about the proposed plan to build a road to connect to Morton Rd and then to Holly Ln. I draw your attention particularly to Pg. 62 of this thesis. Last Paragraph, Deep-Seated Landslide Conclusions, on line 5, "Extreme caution should be exercised before any construction takes place on or near one of these deep-seated slides, including a complete surface/subsurface investigation and a slope stability analysis including earthquake loads by an engineering geologist and a geotechnical engineer."

Pages 42 and the top of Pg 43 speak to slopes with safety factors less than 1.3 to 1.5. Because these safety factors are very low, the slopes are considered potentially unstable. With this information in mind, I direct you to Page 61, Paragraph 1, lines 2-4, "The stability analysis confirms the current conditions of this deep-seated movement with a **factor of safety of 1.2** for the current conditions. This is an extremely low, and worrisome, safety factor for the Morton Rd landslide.

Pages 81-82, highlight the dangers of the plethora of deep seated landslides in the Holly Ln, Morton Rd, Newell Creek areas. It is important to remember, none of these homeowners can obtain Landslide Insurance for any losses due to landslides or land movement of any kind. Homeowners must be informed if they are moving into a landslide area and that insurance is not available anywhere.

In 2007, Oregon City agreed to have GRI, Geotechnical and Environmental Consultants, perform a Preliminary geotechnical review of the Park Place Concept Plan boundaries. At this time, the City did not have the money to have full in-depth studies done, but the City stated before any development took place within the Park Place Concept Plan in the future, that the complete in-depth studies would be completed. Additionally, in 2007, I sent e-mail to GRI and asked if they would also be studying the proposed new roads, ie, the Swan Rd and Holly Ln extensions. Tova Peltz of GRI stated that the work they were authorized to do in 2007 was just preliminary and did not include any site-specific studies.

Therefore, now that the City and developer are proposing 476 new homes in the Park Place Crossing development, wouldn't this be the time to have the in-depth geotechnical studies performed? This was a promise made by the City to the people.

It is imperative that these important studies, promised by the City prior to any development, be done at this time, prior to any approval of the Park Place Crossing development. Until the City and the State act to insure financial stability to the homeowners purchasing homes in landslides areas, no future developments in these hazardous zones should be allowed. Oregon City has already built thousands of homes where the people are not told they are moving into a landslide area and that NO landslide insurance is available anywhere to pay for losses to landslides and land movement. How many more homes does Oregon City plan to develop in hazardous areas where density, and a lack of truth to the homebuyer, exists.

Again, I request Oregon City to meet with the State Legislature over this serious problem. It will only take a large earthquake or a flood, to once again, bring untold damages and financial losses to thousands of homeowners in Oregon. As for the Park Place Crossing development, Statewide Land Use Goal 7, DLCD landslide guidelines as well as FEMA guidelines do not allow the heavy densities which ICON is proposing. Unfortunately, this heavy density will only lead to financial devastation for the people. I do not support the Park Place Crossing development, and will not support it, until the City and/or State begin to be honest with prospective homebuyers.

Oregon City Planning Commission Meeting of May 23rd, 2022

RE: GLUA-21-00045/MAS-21-00006/VAR 22-00001 Park Place Crossing Development

Message from Scott Burns, Professor of Geology, PSU, to the Planning Commissioners, as given to Christine Kosinski

My Testimony (Christine Kosinski) being submitted today to the Planning Commissioners for tonight's meeting, addresses concerns for building a Swan Rd Extension that would parallel Holly Ln and connect to Morton Road. I attached, to my testimony, the Thesis written by Bill Burns of DOGAMI in 1999, which directly speaks to his concerns for any construction in the area of Morton Rd. His Thesis highlights the building of Hwy 213 at the Morton Rd Landslide and the dangerous landslide conditions which exist here. While I was reading the Thesis, I became very concerned over the magnitude of this landslide and whether the soils here were capable, and stable enough, to adequately transport traffic that is being proposed by the City for this development. I therefore called Professor Scott Burns to get a better understanding of the Morton Rd area and to discuss my concerns.

Here is the Message Professor Scott Burns asked me to deliver to the Planning Commissioners at tonight's meeting where the proposed Park Place Development will be discussed.

“Mrs. Kosinski called me on Saturday, May 21st, 2022 regarding Oregon City's proposal to build a Swan Road extension connecting into Morton Rd, near Holly Ln. After discussing her concerns, I asked Mrs. Kosinski to give the Planning Commission my following message, “Oregon City should call Professor Bill Burns of DOGAMI and discuss the proposed plans for construction of the Swan Road extension which will connect into Morton Road. The City should go by recommendations made by Professor Bill Burns. Then, Professor Scott Burns added, that all recommended work performed at the Morton Road connection, be done only by Certified Geotechnical Engineers.” End of Message

cc: Professor Scott Burns
Professor Bill Burns

THESIS APPROVAL

The abstract and thesis of William J. Burns for the Master of Science in Geology presented January 7, 1999, and accepted by the thesis committee and the department.

COMMITTEE APPROVALS:

_____
Kenneth Cruikshank, Chair

_____
Scott Burns

_____
Marvin Beeson

_____
Trevor Smith
Representative of the Office of Graduate Studies

DEPARTMENTAL APPROVAL:

_____
Ansel Johnson
Department of Geology

ABSTRACT

An abstract of the thesis of William J. Burns for the Master of Science in Geology presented January 7, 1999.

Title: Engineering Geology and Relative Stability of the Southern Half of Newell Creek Canyon, Oregon City, Oregon.

This study investigates the engineering geology and relative slope stability of the southern half of Newell Creek Canyon, Oregon City, Oregon, located partially inside the urban growth boundary of Portland where there is increasing pressure for development in areas of geologically hazardous terrain.

Within the study area, features associated with landslides were mapped and categorized according to their relative age (active, inactive-young, and inactive-mature) and the depth to the failure plane (deep or shallow-seated). These features were then examined and 79 landslides were identified. Sixty-five of the slides were classified as shallow-seated or having a failure plane ≤ 4.5 meters below the ground surface. Most of the 14 deep-seated landslides in the study area were classified as inactive-young and inactive-mature and generally had a much greater area (1,600m^2 to 256,000m^2) than the shallow-seated slides (40m^2 to 6,100m^2).

One deep-seated landslide, representative of most of the deep-seated slides, was examined in detail and a stability analysis confirmed the current, relatively stability and the potential for reactivation. The Spady Landslide, a typical shallow-seated landslide, was examined in detail by mapping the slide after its initial failure in 1996 and then again after it grew in size from 2,200 m^3 to 14,600 m^3 in order to examine how these types of slides grow and the resulting stability of the area immediately adjacent to these slides. Finally, a stability analysis was performed on all of the residual soils to evaluate potential shallow-seated landsliding.

From the record of landslide features and geologic conditions, the Engineering Geologic Map was constructed. This map, along with the stability analysis on existing landslides and areas with no existing features resulted in the construction of the interpretive Relative Stability Map. This Relative Stability Map was divided into three zones with the following percents of the study area: moving ground (5%), potentially unstable ground (56%), and stable ground (38%). The two maps resulting from this study along with the text serve as an engineering geologic report for use by engineers and planners in making educated decisions for future development.

ENGINEERING GEOLOGY AND RELATIVE STABILITY OF THE SOUTHERN HALF OF NEWELL CREEK CANYON, OREGON CITY, OREGON

by

WILLIAM J. BURNS

A thesis submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

GEOLOGY

Portland State University

1999

Acknowledgments

I am very grateful for all the assistance given to me, without which this study would have been very difficult to complete. Dr. Kenneth Cruikshank suggested the research topic and methods for analyzing the problems. His insight on field mapping, landslide mechanisms, and stability analysis have proven to be very helpful. Dr. Scott Burns proved very helpful by suggesting the study area and providing an excellent background on slope stability in this area. Dr. Marvin Beeson helped me with delineating the highly irregular stratigraphy within the Troutdale Formation and the rest of the geologic units within the study area.

Many fellow students here at Portland State University have helped to complete some of the detailed mapping needed for this study. David James and Tom Braibish mapped the Spady Landslide with me in 1996 and did some of the soil analysis and drafting of the detailed map. Stuart Cowburn, Glenn Gettemy, Robert Schlichting, and Sean Wilson mapped the Spady Landslide after the second failure in 1997. Their help proved essential for the completion of this study.

I am indebted to the city of Oregon City, especially Jessica Schriever, who provided the digital data for the creation of the base map used throughout this study. Bob Pinotti spent many hours helping create this base map and setting the stage for the creation of the paper and digital output maps. I am also indebted to Sha Spady for letting me run around her property mapping and taking soil samples for several months. Ron

Jennison, at the Oregon Department of Transportation, graciously gave me bore hole logs and aerial photographs taken during the construction of Highway 213.

Last but certainly not least, I wish to thank my family. My wife, Amy, helped me with field work and spent many hours proofreading. She has lent moral support throughout my studies here. My sister, Tonia, also helped me with field work and continues to lend her moral support. My uncle, Gary Quinn, is an excellent mentor who sparked my interest in slope stability studies. I'd also like to thank my brother and sister in law, Greg and Audrey Brown-Spitz, for their final editing. Finally, I'd like to thank my parents, Joe and Kay, who gave me tremendous moral support and financial help, without which this would have been infinitely more difficult, if not impossible.

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Chapter 1: Introduction

Landsliding in the United States causes an average of 25 to 50 deaths and $1 to $2 billion in economic losses annually (Schuster and Fleming, 1986). In Oregon, a minimum estimated $4 million in damage occurs annually (Wold and Jochim, 1995). This estimate for landslide damage in Oregon was calculated from 1973-1983 data and is growing due to the ever-increasing pressure for development in areas of geologically hazardous terrain inside urban growth boundaries (Wold and Jochim, 1995). During 1996 and 1997, heavier than normal rains caused over 700 landslides in the Portland Metropolitan area which totaled over $40 million for mitigation (Burns et al., 1998).

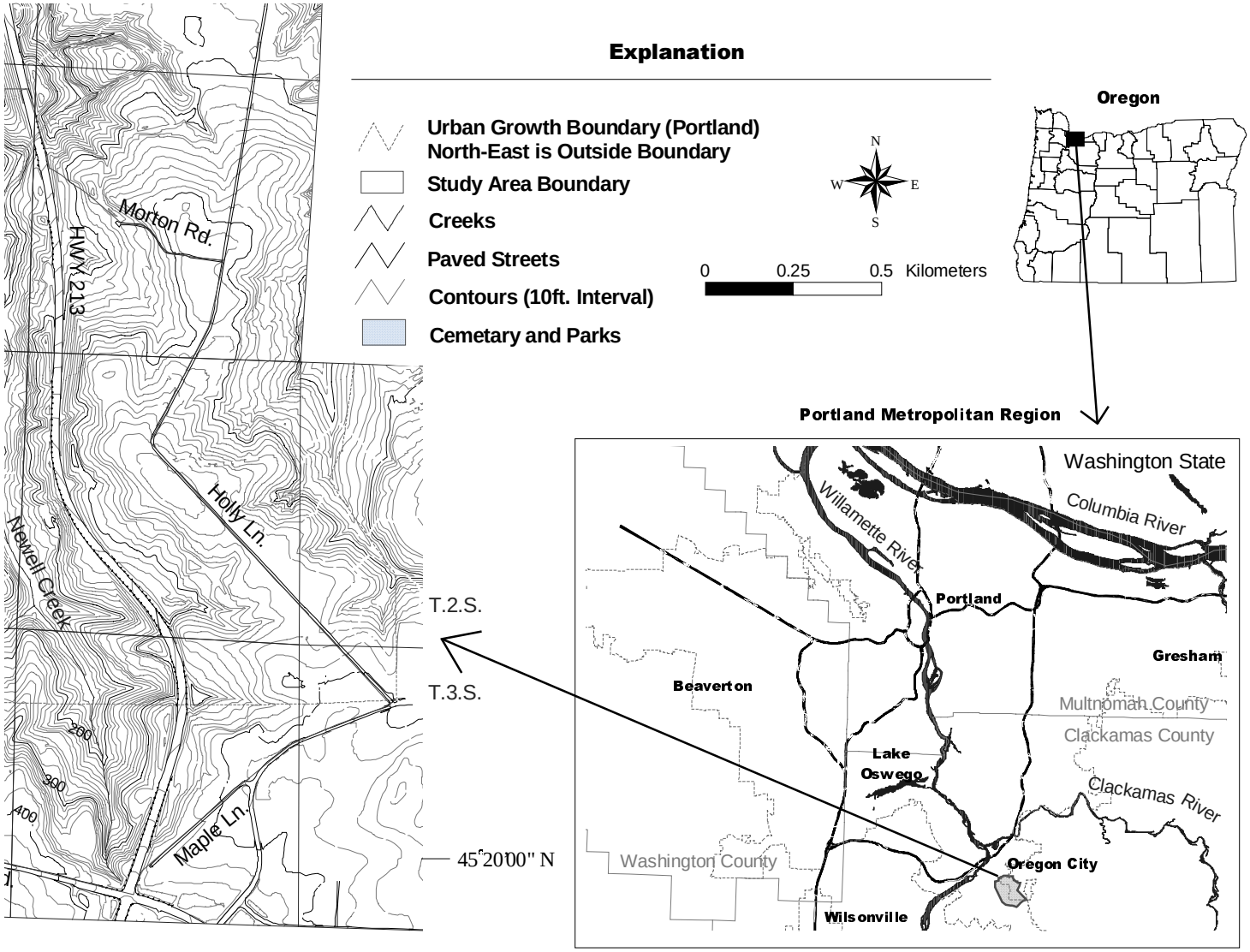
The purpose of this study is to investigate the engineering geology and relative slope stability of the southern half of Newell Creek Canyon, Oregon City, Oregon and to create a relative stability map of this area. The study area is located in Oregon City along the southeastern border of the Portland Metropolitan Region in northwestern Oregon. This particular study area was chosen for it's extensive landslides and the opportunity to improve on earlier slope stability studies. Since part of the study area is within Portland's urban growth boundary, I believe this thesis will help the community in making educated future development decisions.

CHAPTER 2: DESCRIPTION OF STUDY AREA

The study area is located on the southeastern edge of the city of Oregon City and is composed of a 3.1 km^2 plot bounded by Holly Lane to the east, Beaver Creek Road to the south, Molalla Avenue and some smaller side streets to the west, and Morton Road to the north (Figure 1). About half of the area is located within the Portland Urban Growth Boundary, making it likely to be developed soon. The study area is predominantly open green space and rural farm land, but most of the area is bordered by relatively high density residential single-family and multiple-family dwellings (three to eight houses per city block). Developmental pressures continue for land in the canyon. Most of the current development is taking place along the western and southern fringes of the canyon and has happened within the last five years.

The study area is characterized by moderate (5°) to steep (60°+) slopes with a maximum relief of about 107 meters. Newell Creek runs south to north bisecting the study area. There are several smaller tributaries along Newell Creek that generally trend east-west with the exception of the two located in the northwest section that trend north-east.

Highway 213 parallels the eastern side of Newell Creek and marks a stretch of land that has been extensively regraded and filled. Where Newell Creek crosses


Explanation
Urban Growth Boundary (Portland)
North-East is Outside Boundary
Study Area Boundary
Creeks
Paved Streets
Contours (10ft. Interval)
Cemetary and Parks
N
W
E
S
0
0.25
0.5 Kilometers
Oregon
Portland Metropolitan Region
Morton Rd.
HWY 213
Holly Ln.
Newell Creek
Maple Ln.
200
300
400
T.2.S.
T.3.S.
45°20'00" N
Washington State
Columbia River
Willamette River
Portland
Gresham
Beaverton
Multnomah County
Clackamas County
Lake Oswego
Clackamas River
Washington County
Oregon City
Wilsonville

Highway 213, at the northern boundary of the study area, a 2.5 m diameter culvert was placed to reduce blockage and divert the creek under the highway. There are several other spots along Highway 213 where culverts are needed to replace surface flow. Culvert outlets are also located all along the southern and western boundaries where the current, high density development ends. These culverts flow heavily during the winter months because they channel a lot of the runoff from the urbanized areas surrounding the canyon.

Oregon is considered a moist Mediterranean climate with a xeric moisture regime. This type of climate results in an average temperature between 5°C to 17°C and a total average precipitation of 153 cm per year with the majority occurring during the winter months (Gerig, 1985).

Geology

The stratigraphy of the Oregon City area consists of generally flat-lying Miocene to Pleistocene basalts and fluvial sediments. Bedrock in the area for engineering purposes includes the Columbia River Basalt Group (Grande Ronde and Wanapam Basalt) which is overlain by the Sandy River Mudstone interbedded within the Troutdale Formation which is topped in some places by the Boring Lavas or the Willamette Silts (Figure 2, Figure 3). The Sandy River Mudstone/Troutdale Formation, the Boring Lavas, and the Willamette Silts are topped by a residual soil derived from the

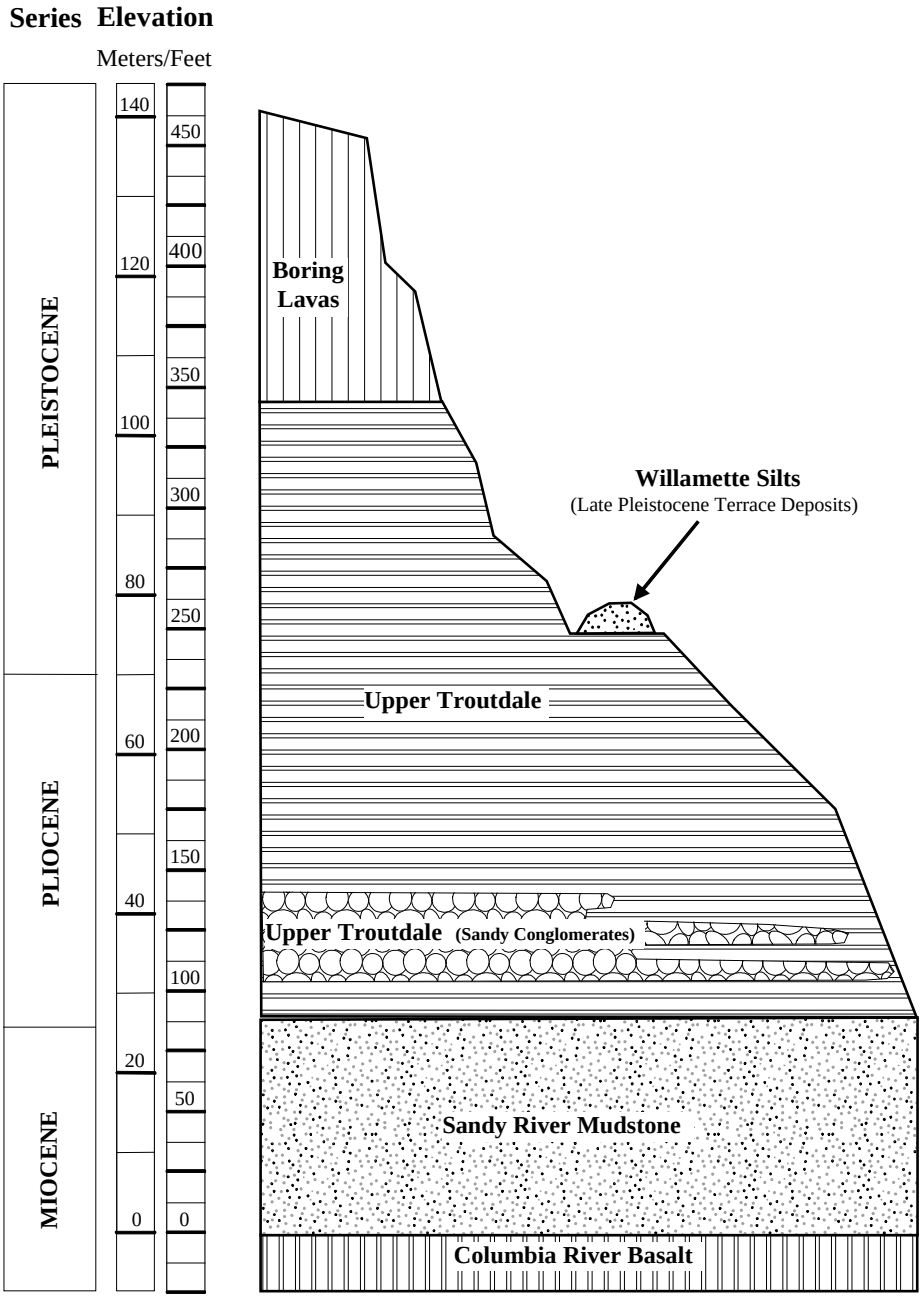


Figure 2: Miocene to Pleistocene stratigraphy of Newell Creek Canyon (after Schlicker and Finlayson, 1979; Tolan and Beeson, 1984).

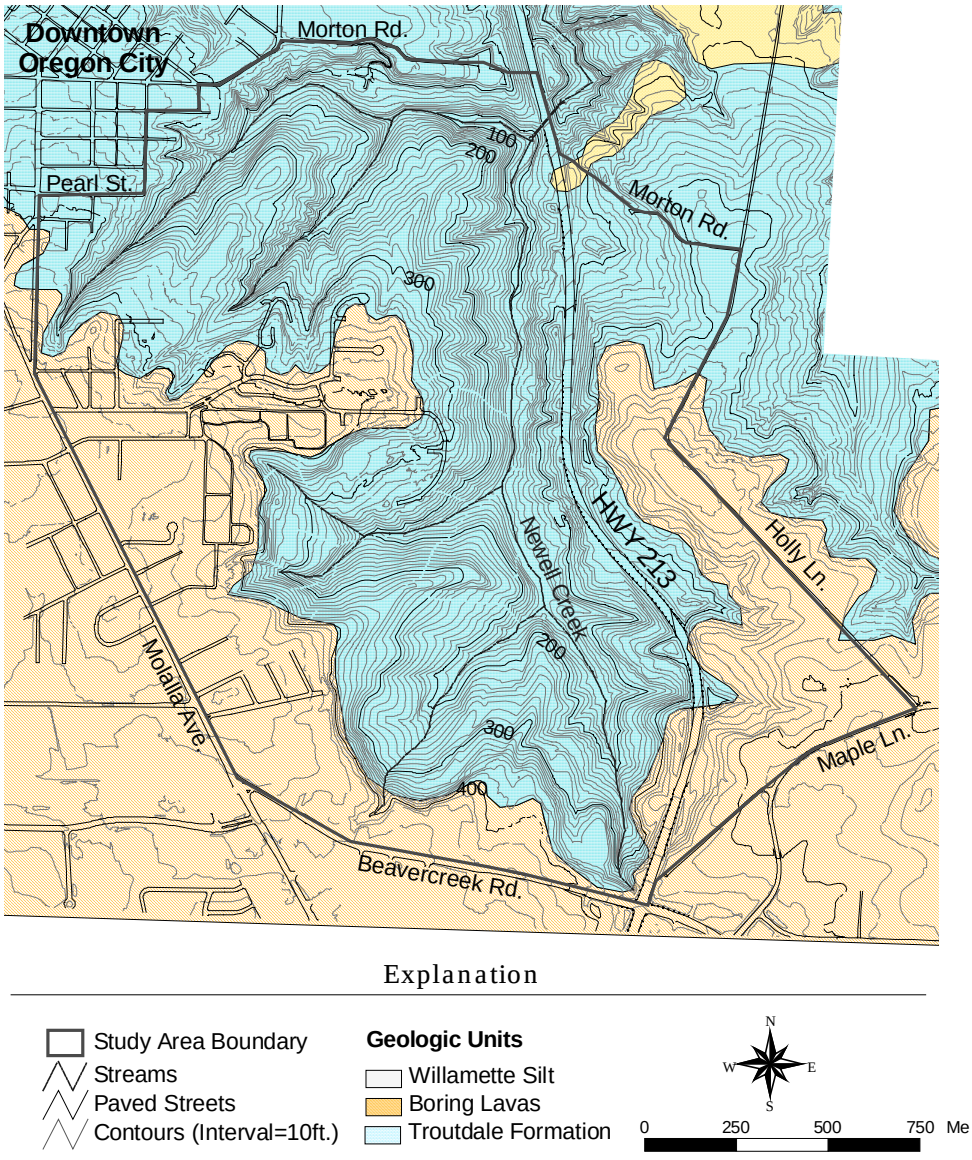


Figure 3: Geologic map of the study area displaying the contact between the Sandy River Mudstone/Troutdale Formation and the Boring Lavas where many of the landslides are located (after Schlicker and Finlayson, 1979; Oregon City, 1997; METRO, 1997).

parent material. The following description of the lithologies and residual soils is a composite of my field notes, well driller logs, bore hole logs, and information from Swanson (1986), Schlicker and Finlayson (1979), and Tolan and Beeson (1984) (appendix 1).

The Columbia River Basalt Group

Within the study area the Miocene-age Columbia River basalt group does not crop out at the surface. The Columbia River basalt is a series of lava flows or flood basalts ranging in thickness from 5 to 45 meters, with a total thickness of about 300 meters (Schlicker and Finlayson, 1979; Tolan and Beeson, 1984). Thin, baked soil zones often separate the individual flows. Prior to the deposition of younger formations on top of the Columbia River basalt, the Columbia River Basalt Group was gently folded and faulted resulting in topographic highs and lows (Schlicker and Finlayson, 1979). In some of these topographic lows, such as Newell Creek Canyon, thick sedimentary units have been deposited on top of the Columbia River basalt, filling in the depression (Marvin Beeson, PSU Geology Department, Personal Communication, 1998).

Sandy River Mudstone and the Troutdale Formation

The Sandy River Mudstone and the Troutdale Formation unconformably overlie the Columbia River Basalt Group and are overlain by the Boring Lavas and in some places by the Willamette Silts. These formations crop out in approximately 80% of the

study area (Figure 3) and because they weather easily, they may form moderate (15°) to steep (60°+) slopes. These two formations are the result of a complex fluvial system resulting in the interbedding of the two formations (Figure 2) (Schlicker and Finlayson, 1979; Tolan and Beeson, 1984).

The Miocene-Pliocene age Sandy River Mudstone consists of mudstone, siltstone, and fine to medium grained sand with some gravel lenses ranging in thickness of individual beds from 0.6 to 4.5 meters (Tolan and Beeson, 1984). This formation is currently thought to be the same as the lower Troutdale Formation and represents the fine-grained, overbank facies of the ancestral Columbia River. The fine grained facies tends to be an impermeable barrier to groundwater causing local high water tables and springs if they intercept the surface (Schlicker and Finlayson, 1979). Moisture-sensitive clays, present in certain parts of the Sandy River Mudstone, expand with increasing moisture, decreasing its shear strength, and contract when drying (Schlicker and Finlayson, 1979).

The Miocene-Pliocene age Troutdale Formation is a fluvial deposit that is currently divided into two distinct lithologies: the upper and lower members (Swanson, 1986). The lower member consists of paleo-Columbia River gravels and sands composed mainly of basaltic pebbles and cobbles and minor amounts of intrusive granite and metamorphic rock types of which quartzite is usually noted (Swanson, 1986). These gravels will stand vertically for several tens of meters and are highly permeable (Schlicker and Finlayson, 1979). In addition to some gravels, the upper member largely

consists of finer grained sands, silts, and clays that are generally locally derived volcanic debris, altered to a clay, agglomerates and highly weathered basaltic gravels (Swanson, 1986). The upper member, like the Sandy River Mudstone, also contains impermeable clay layers that are moisture sensitive (Schlicker and Finlayson, 1979).

The Boring Lavas

The Boring Lavas are basaltic lavas that overlie the Sandy River Mudstone and Troutdale Formation (Figure 2). These Lavas are Pliocene-Pleistocene age basalts that are light gray in color and vary in thickness from 8 to over 150 meters. They occur as blocky intracanyon flows, volcanic cones, and shield volcanoes, which result in deposits ranging from tuff breccias and agglomerates to lavas (Schlicker and Finlayson, 1979). Where the flows are thin they are sometimes weathered to a red clay with scattered residual boulders (Schlicker and Finlayson, 1979). In the study area, the Boring Lavas form the upper terrace with a relatively flat surface (0°-15° slopes) that covers the southwest, southern, and southeast boundaries. Weathering of the Boring Lavas produces a 0.3 to 3 meter thick impermeable clay-rich soil over the bedrock which saturates quickly and forms ponds or heavy runoff though rivulets (Schlicker and Finlayson, 1979).

Willamette Silt

The Willamette Silts overlie the Sandy River Mudstone/Troutdale Formation in a small northern section of the study area. They are late Pleistocene terrace deposits made of unconsolidated beds with lenses of fine sands, silts, and clays (Schlicker and Finlayson, 1979). These beds are commonly 10 to 15 cm beds of fine-grained material, but can be massive, without distinct stratification. These sediments were deposited as a product of the Missoula Floods, occurring about 12,700 to 15,300 years B.P. (Waitt, 1985).

Residual Soils

Most of the bedrock in Newell Creek Canyon is covered by a residual soil. These soils are derived from the bedrock or parent material and external sources, such as glacial flooding. Their properties are controlled by climate, topography, organisms, geology, and time (Birkeland, 1984). The resulting soils are generally tan, silty clays when developed on the Sandy River Mudstone/Troutdale Formation and red, stiff clays with scattered basalt boulders when developed on the Boring Lavas. The bedrock-soil contact is transitional and defined by a zone of weathered bedrock (Birkeland, 1984). This contact is of great importance because it marks a change in strength of materials and as a result, many of the failure planes occur at this contact. Thickness of these residual soils varies depending on topographic relief and changes from 0.2 meters thick on steep slopes to three meters thick on gentle to level slopes.

These residual soils are further divided into five soil series: Bornstedt (8), Helvetia (37), Jory (45), Woodburn (91), and Xerochrepts and Haploxerolls (92), which are subdivided into eight soil phases (Figure 4) (Gerig, 1985). The soil series are based on similar profile characteristics while the phases differentiate slope steepness, thickness of soil profile, amount of erosion, and texture (Birkeland, 1984).

Table 1 displays some of the important properties of the residual soils found in the study area, such as the soil texture and permeability. Table 2 displays some of the important engineering properties of the residual soils, such as the percent of clay, liquid limit, plasticity index, and other comments like soil strength.

In most of the steeper portions of the study area, the residual soils are colluvial, meaning they have been transported downslope from the place of origin. These colluvial soils are a mixture of the Boring Lavas residual soils and Sandy River Mudstone/Troutdale Formation residual soils and are generally thinner than the alluvial soils but sometimes appear as 1000 m^3 blocks indicating mass movement.

Man-Made Fill

Some of the study area has been developed or is being developed and therefore has been or is being regraded and mantled with man-made fill (Figure 5). Current development is taking place along the canyon wall where the important contacts between geologic bedrock and changes in soil series are located. The properties and thickness of this man-made fill vary widely and are site specific. Fill materials within

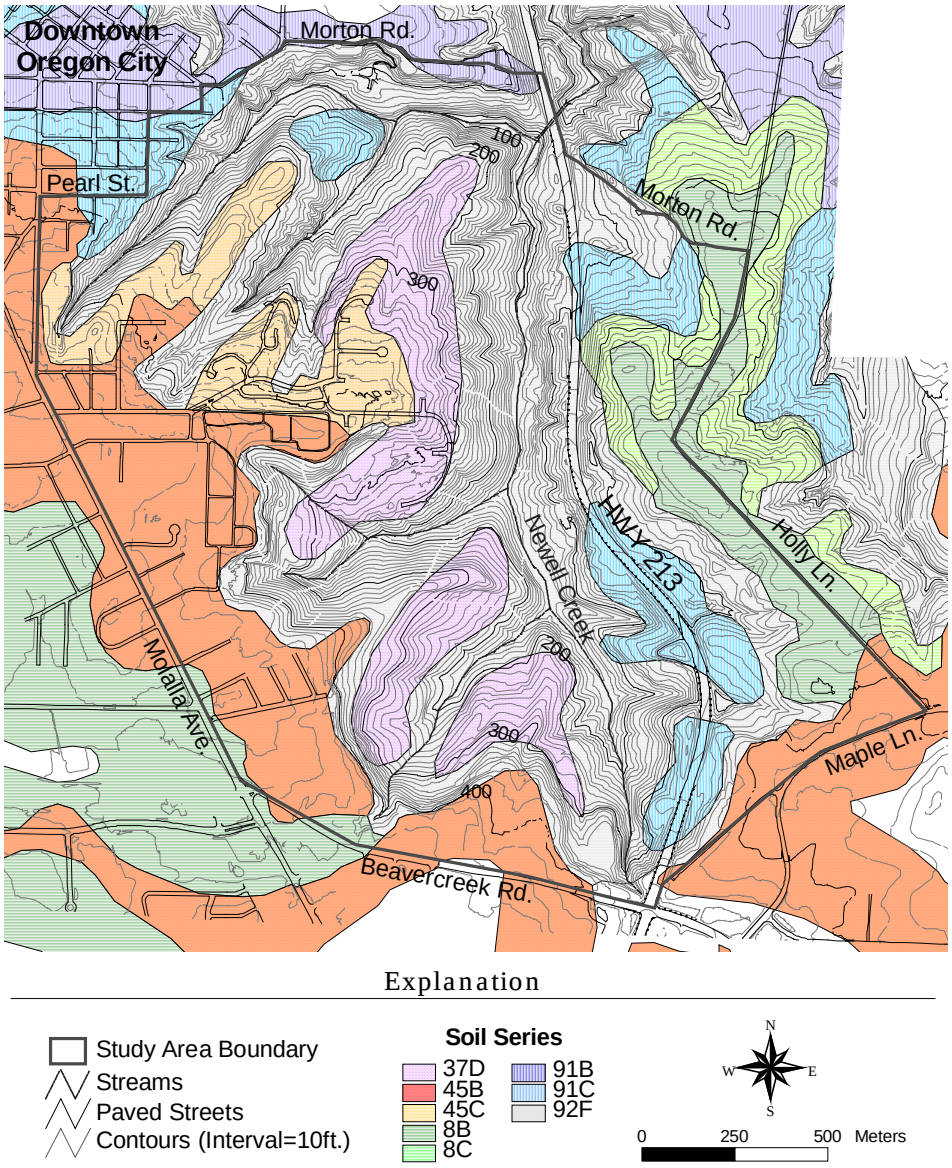


Figure 4: Soil series map of the study area displaying the distribution between the Xerochrepts and Haploxerolls (92F) and Helvetia (37D) Series containing steeper slopes with thinner soils and the Bornstedt (8B, 8C), Jory (45B, 45C), and Woodburn (91B, 91C) Series with low to moderate slopes and thicker soils (after Gerig, 1985; after Oregon City, 1997; METRO, 1997).

Table 1: Residual soil properties examined through the soil series in the study area (after Gerig, 1985) (* Indicates no data available).

Soil Name and Map Symbol	Soil Texture (USDA)	Slope (deg)	Derivation	Depth (meters)	Permeability	Permeability (cm/hr.)
Bornstedt-8B	Silt Loam	0-5	Alluvium	≥1.5	Slow	0.15-0.58
Bornstedt-8C	Silt Loam	5-10	Alluvium	≥1.5	Slow	0.15-0.58
Helvetia-37D	Silt Loam	5-15	Alluvium	<1.5	Moderate-Slow	0.15-5.08
Jory-45B	Silty Clay Loam	0-5	Colluvium	≥1.5	Moderate-Slow	0.15-5.08
Jory-45C	Silty Clay Loam	5-10	Colluvium	≥1.5	Moderate-Slow	1.5-5.08
Woodburn-91B	Silt Loam	0-5	Glacio-lacustrine	≥1.5	Moderate	1.53-5.08
Woodburn-91C	Silt Loam	5-10	Glacio-lacustrine	≥1.5	Moderate	1.53-5.08
Xerochrepts and Haploxerolls-92F	Gravelly Clay Loam	10-35	Colluvium	<1.5	Moderate-Moderate Slow	*

Table 2: Residual soils engineering properties examined through the soil series in the study area (after Gerig, 1985) (* Indicates no data available).

Soil Name and Map Symbol	Depth (cm)	Soil Class (Unified)	Clay (%)	Liquid Limit (LL) (%)	Plasticity Index (PI)	Moist Bulk Density (g/cm^3)	Other Comments
Bornstedt-8B, 8C	0-20	ML	20-27	30-35	5-10	1.3-1.5	Excessive Runoff
	20-84	ML, CL	27-35	35-40	10-15	1.4-1.6	
	84-153	ML	40-50	45-50	15-20	1.3-1.5	
Helvetia-37D	0-36	ML	15-25	25-35	NP-5	1.1-1.3	Shink/Swell, Low Soil Strength
	36-53	ML	27-35	35-40	5-10	1.1-1.3	
	53-102	ML, CH, CL, CH	35-50	40-55	15-25	1.2-1.4	
	102-153	ML, CL	25-35	35-40	10-15	1.2-1.4	
Jory-45B, 45C	0-33	ML	27-40	40-50	10-15	1.2-1.3	Shink/Swell, Low Soil Strength
	33-152	CL	45-60	40-50	15-25	1.3-1.5	
Woodburn-91B, 91C	0-41	ML	10-20	25-30	NP-5	1.2-1.4	Low Soil Strength
	41-97	CL	20-35	35-40	10-20	1.2-1.4	
	97-152	ML, CL-ML	15-30	25-35	5-10	1.3-1.5	
Xerochrepts and Haploxerolls-92F	*	*	*	*	*	*	Severe Water Erosion, Steep Slopes, Unstable Soils

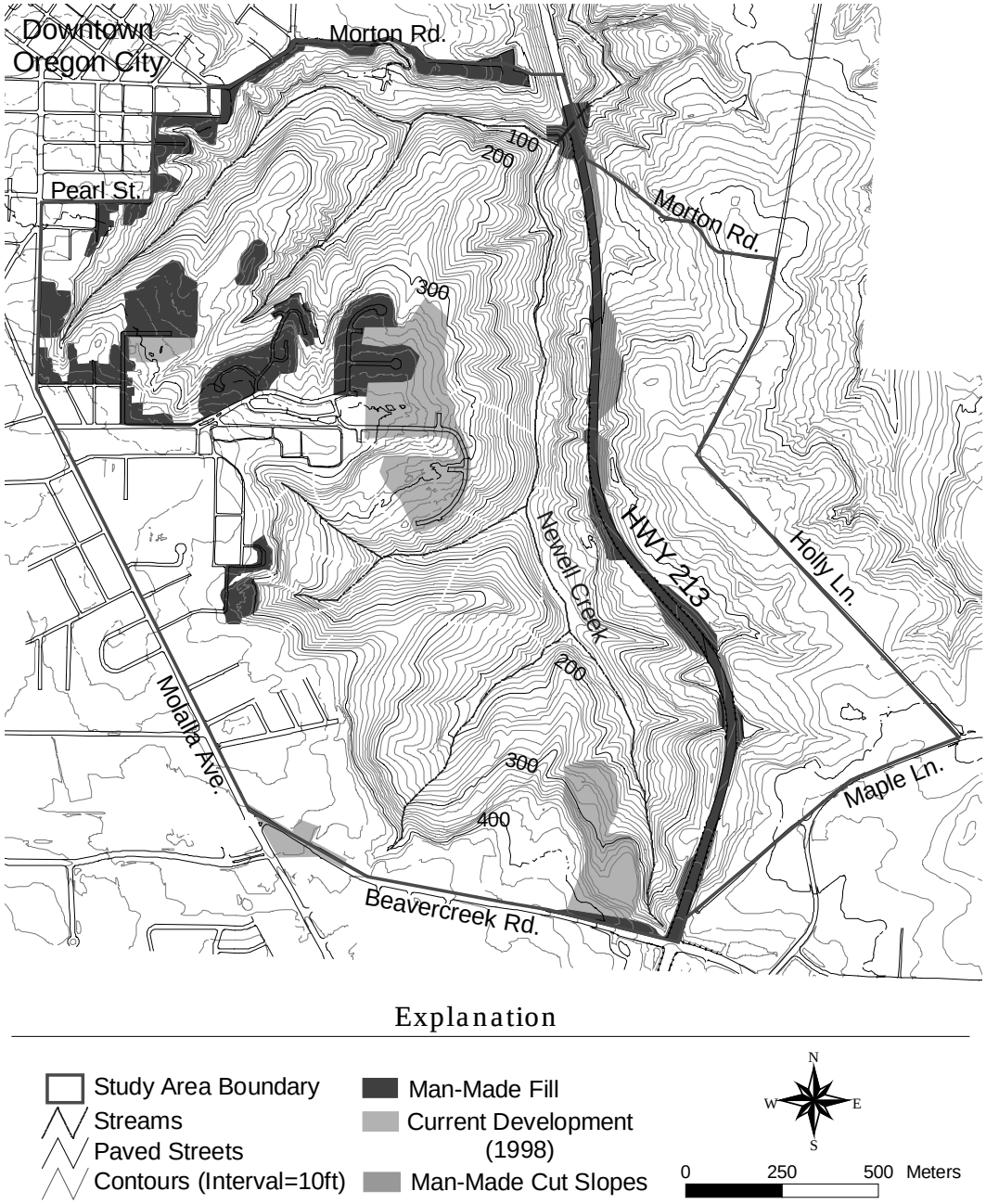


Figure 5: Location map of man-made fill, large cut-slopes, and current development within the study area (after Oregon City, 1997; METRO, 1997).

the study area are generally composed of the local residual soil, basalt gravels and cobbles. Also present in some of the fill used in the study area are bricks, organic debris, wood, concrete, and garbage. The two main sites without much residual soil fill are the R & B Leasing Agency, located on Morton Road (west side of Highway 213), and the landfill on the Mountain View Cemetery, both of which were apparently not engineered, and as a result, settlement and landsliding have occurred at both sites.

CHAPTER 3: METHODS

Literature Review

This study was initiated with an extensive review of the literature pertaining to any aspect of landslides in the Oregon City area. *Environmental Assessment of Newell Creek Canyon, Oregon City, Oregon* and *Geology and Geologic Hazards of Northern Clackamas County, Oregon*, both provided a historical perspective on landsliding in the study area (Burns, 1993; Schlicker and Finlayson, 1979).

The geological literature was consulted and several reports provided excellent Tertiary to Quaternary geologic history of the complex stratigraphy located in the study area (Schlicker and Finlayson, 1979; Tolan and Beeson, 1984). This geologic history literature was coupled with reviewing any well-water log reports, boring logs, and soil pit data the author could acquire to examine the local stratigraphy within the formations. Many of these well log reports were collected from the Water Resources Department in Salem, Oregon (appendix 1). Soil properties were derived from Oregon Department of Transportation boring logs, the Soil Survey of Clackamas County, field evaluation of materials, and laboratory tests performed by fellow students during the evaluation of the Spady Landslide (Oregon Department of Transportation, 1998; Gerig, 1985; James, Burns, and Braibish, 1996).

To prepare a plan for the investigation, several techniques for evaluating and constructing engineering geology and relative slope stability maps were consulted

including: Wieczorek (1984), Richards (1982), McCalpin (1974), and Soeters and Van Westen (1996). These reports helped build an excellent framework for which the rest of this study was built upon.

Base Map Acquisition and Creation

After the initial literature review was complete, the acquisition of digital data from the City of Oregon City helped immensely for creation of the base maps to record field data. The City of Oregon City provided digital data of contours at ten feet and two feet intervals, streets, structures, fences and walls, and many more layers in the form of CAD drawings, projected in State Plane, Oregon North Zone. These drawings were imported into the geographical information system program, *Arc View GIS*, and then converted to shape files (ESRI, 1997). I then created a detailed base map at a scale of 1:250 with a ten to two foot in places contour interval. This base map proved excellent for this type of study.

Field Mapping

The initial field mapping began in April 1996 and lasted until November 1996. This mapping consisted of completing the following tasks:

1) walking or viewing every square meter of the study area,
2) recording all features indicating instability onto the base map,
3) filling out a landslide inventory worksheet,
4) recording vegetation change and response,
5) measuring or calculating (from topography) amount of vertical and horizontal displacement,

6) noting any hydrologic features (springs, ponds),
7) estimating relative age of landslide features, and
8) taking photographs.

Also recorded were broader things like changes in slope from linear to hummocky topography and changes in soils and geologic formations. This field mapping also included a set of detailed maps of the Spady Landslide, representative of many of the slides in the area, at two different stages in its development. Final field work was performed during December 1997 and consisted of taking soil samples from the Spady Landslide and walking into areas that were once covered in vegetation too heavy to cover during the summer months.

Detailed Mapping of the Spady Landslide

Other field work performed consisted of mapping the Spady Landslide. This landslide is considered a typical slide in the study area and was mapped in detail at a scale between 1:100 to 1:200 at two different stages in its development, first in May 1996 and then in May 1997.

The first mapping of the Spady Landslide (1996) was performed with a plane table at a scale of 1:120, while the second mapping (1997) was done with a Sokkia electronic total station at a scale of 1:100.

Laboratory Work and Stability Analysis

The grain size distribution for soil samples collected at the Spady Landslide were determined by sieve and hydrometer analysis. Atterberg limits and unconfined compressive strength tests were also performed on samples from the 1996 failure surface (James, Burns, Braibish, 1996; Al-Khafaji and Andersland, 1992). These data proved helpful for a stability analysis on this slide. The stability analysis was performed using *Janbu's Method* calculated with a Visual Basic subroutine (Janbu, 1973). Stability analysis also included using the *Infinite Slope Equation* and *XSTABL* analysis on the residual soils and on some of the larger deep-seated landslides, located elsewhere in the study area to see how stable they are and what conditions are needed to reactivate these landslides (Sharma, 1994).

Creation of Digital Data Maps

The data collected in the field were digitized from the paper copy to a digital copy using Arc View GIS (ESRI, 1997). Several different themes or layers were digitized including scarps, shear zones, toes, sag ponds and local depressions, areas of development and man-made fill, creeks, and geology. This digitizing was performed at a scale ranging from 1:200 to 1:1000 depending on the size and detail of features. To accompany these polylines and polygons, a database, linked to the shapes, was created which includes data such as relative age, vertical and horizontal displacements, and mitigation of the landslide features.

Creation of Interpretive Maps

The final phase of the investigation consisted of preparing an Engineering Geology Map and a Relative Stability Map. *The Engineering Geologic Map* (Plate 1) includes information collected on the base map and on field notebooks/worksheets, including landslide features and bedrock geology. From the information on *The Engineering Geology Map*, an interpretive *Relative Stability Map* (Plate 2) was created (Hoexter et al., 1978; Richards, 1982). This *Relative Stability Map* consists of a map of the study area with zones of relative stability marked on it, including active, inactive-young, inactive-mature, and deep-seated and shallow-seated landslides. Accompanying these zones of relative stability are suggestions for further study needed before any further development or other changes to the land take place (Hoexter et al., 1978; McCalpin, 1974; Richards, 1982; Weickzorek, 1984). These two maps represent the results of this study of the Engineering Geology and Relative Stability of the Southern Half of Newell Creek Canyon, Oregon City, Oregon.

Chapter 4: Landslide Features and Their Relative Ages

This chapter describes measurable characteristics associated with landslides, morphological changes these components exhibit with time, and the landslide features found in the study area. These definitions and descriptions are used to distinguish relative ages of landslide features in the study area and thus identify the areas that are prone to future landslides.

Landslide Features

Features associated with landslides usually include scarps, tension cracks, shear zones, and toes (Figure 6). In many instances only a few of these features are present, but by mapping the distribution of these features, large landslides can often be delineated and the driving and resisting parts of these landslides can be identified which aid in developing a stability analysis for active and dormant slides (Baum and Fleming, 1991).

Extensional Features

Tension cracks and scarps are extensional features. Tension cracks can be found throughout a landslide and many landslide features initiate as tension cracks.

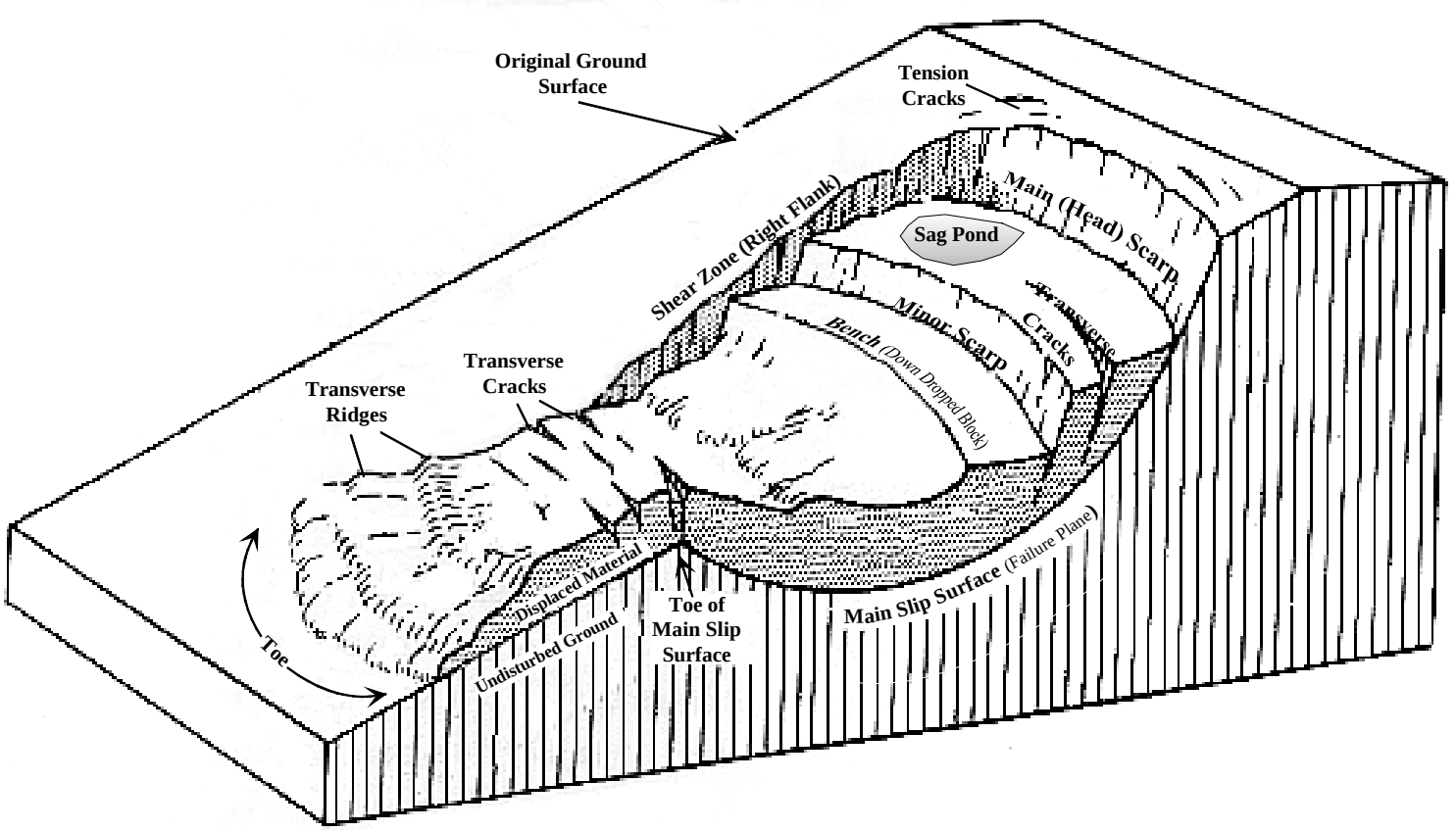


Figure 6: Block diagram of typical landslide, illustrating landslide features and their spatial relationships (after Cruden and Varnes, 1996).

Scarps are generally found near the top of a landslide, in the zone of extension and generally begin at the surface first as tension cracks, which develop into scarps. Early shear zones, located along the flanks of a landslide commonly appear at the surface first as en-echelon zones of tension cracks, and later develop into strike-slip faults. Toes can also have tension cracks on them, referred to as transverse cracks. Tension cracks are not only a precursor for future landslide features, but the pattern of tension cracks can also be used to define the local deformation and be used in a stability analysis for the surrounding area.

Tension cracks are open fractures in the ground that have rough and irregular surfaces (Fleming and Johnson, 1989). Movement is initially normal to the fracture, but lateral movement can occur later. These features are generally found above the head scarp and can be the first signs of movement (Figure 6) (Richards, 1982). Tension cracks can also be found along the flanks, outside the main landslide zone. Traverse cracks are located within the moving mass at the toe of the main slip surface (Cruden and Varnes, 1996).

In the study area, tension cracks, when present, were mostly found above scarp-like features and along the upper portions of the flanks of active landslides (Plate 3). Tension cracks found in the study area had openings from 5 to 30 centimeters wide (Figure 7). As observed by Sha Spady during the February 1996 failure of the Spady Landslide, a tension crack ranging in width from 5 to 30 centimeters appeared on the



Figure 7: Fresh tension crack located above head scarp of the Hilltop Avenue landslide, located at the dead end of Hilltop Avenue in the southwest section of the study area (8½ × 11 inch field notebook for scale).



Figure 8: Transverse cracks formed as a fill failure flows over the lesser disturbed natural stratigraphy. View looking down at west R & B Leasing landslide.

slope 24 hours prior to the first catastrophic failure of this landslide (Sha Spady, Property Owner, Newell Creek Canyon, Personal Communication, 1996).

Transverse cracks, although seldom found, were always located within the moving masses. On the R & B Leasing property, located on Morton Road (near Highway 213), one of the slides occurring in man-made fill had a series of transverse cracks where the fill flowed over a bench (Figure 8).

Scarps are steep exposures of the upper edge of slip surfaces marked by a sudden increase in slope angle, sometimes nearing vertical (Figure 6) (Cruden and Varnes, 1996). They generally first appear as tension cracks parallel to the slope contours and then develop into a scarp, concave downslope in map view. The head scarp is the upper edge of the main slip surface and is the uppermost scarp. Minor scarps are generally located within the moving mass and usually mark the beginning or end of a down dropped block or bench (Figure 6). These minor scarps appear morphologically similar to head scarps but are always located within the landslide and below the head scarp (Cruden and Varnes, 1996). Scarps are common within the extending portion of the landslide mass.

Among the features found in the study area resembling scarps, many of them associated with active landslides displayed a continuous, steep, bare soil escarpment, with a concave downslope shape in map view (Figure 9) (Plate 3). Other scarp-like



Figure 9: View looking up at head scarp of the Spady Landslide after the February 1996 failure displaying a continuous escarpment of bare soil with a concave downslope shape. This is typical of a fresh head scarp on an active landslide (plane table survey rod = 15 ft).

features only displayed the steep, concave downslope escarpment, which remained vegetated with plants like water-loving vegetation and displaced trees. At the extreme, some scarp-like features only displayed a moderately steep escarpment that may or may not be continuous.

The measured vertical offset of scarps ranged from 0.2 to 18 meters throughout the study area. Between many of these scarp-like features and minor scarps, a down dropped bench could be found. Sag ponds commonly formed on top of these benches and when dry, they appear as local depressions.

Shear Features

The most prominent features associated with landslides are the shear zones forming the flanks of the landslide. These zones separate the moving mass from the surrounding stationary slope (Figure 6). Shear zones are also present within a landslide. Flank shear zone surfaces may show slickensides on the bare surfaces, indicating horizontal shearing (Fleming and Johnson, 1989). As the landslide is beginning to move, the shear zones usually first show up as en-echelon tension cracks which develop into a shear zone (Fleming and Johnson, 1989).

In the study area, the shear zones were easily identified on active slides by the change from a predominantly vegetated area off of the slide to a predominantly non-vegetated area. When vegetation was present everywhere, a dramatic change in the



Figure 10: Change in vegetation size, from large (older) trees in the foreground (left side of picture) to smaller (younger) trees in the background (on landslide), divided by a shear zone marked by a small gully. This slide is located in the northern portion between Newell Creek and Highway 213.

size or age of the vegetation helped to distinguish shear zones (Figure 10). Other shear zones sometimes appeared as erosional gullies in the direction of the slope.

Shortening Features

Shortening features of landslides are toes, transverse ridges, and snouts. The snout is the furthest downslope extent of the slide, however toe-like features may also be found within a slide mass referred to as transverse ridges (Figure 6). These shorting features consist of a linear to concave upslope ridge of disturbed soil/debris that is sometimes thrust over undisturbed ground (Cruden and Varnes, 1996).

Landslide toes in the study area generally exhibited an oversteepened slope, with a concave upslope shape in map view. These toes are composed of displaced material. Many of the larger landslide toes have smaller failures located on them. Many of these toes structures parallel a creek, and in some cases, the creeks formed a new path around the toe. For example, the toe of the Waitkowicz landslide, at the corner of Eluria Street and Pearl Street, and the toe of the inactive-mature slide (Highway 213-Morton Road landslide) on the western side of Morton Road, both have diverted streams, forming a new path around their toes.

Transverse ridges, like toes, are thrusts of soil/debris located within the landslide mass. These ridges appear as linear to concave upslope features in map view (Cruden and Varnes, 1996).

Transverse ridges were found at many landslides in the study area. These ridges, paralleling the slope contours, located within the moving mass appeared as thrusts of displaced material (Figure 6). Many times a local depression, sometimes filled with water, was located directly behind these ridges. The Mountain View landslide has five of these local depressions, located behind transverse ridges, and three of them are filled with water all year and are called sag ponds (Easterbrook, 1993).

Associated Features

In areas of instability, environmental changes associated with landslides are sometimes easier to identify than landslide morphological features. These non-morphological features appear as a direct result of the formation of landslide features and therefore can be indirect indicators of past movement. Three of these non-morphological features are vegetation which has responded to ground movement, specific hydrological conditions, and channels filled with debris flow deposits.

Vegetation's response to landsliding is a widely documented subject and is important in that it can help identify instability and hydrologic conditions of a slope (Richards, 1982; Wieczorek, 1984; McCalpin, 1974). In the Pacific Northwest, the presence of large conifers such as Douglas firs and cedars generally indicates stable conditions; many of these trees are hundreds of years old. The presence of young deciduous trees, such as alders, oaks, and maples, on the other hand, can indicate unstable conditions because these types of trees are generally the first to reinhabit areas

with removed vegetation (Scott Burns, PSU Geology Department, personal communication, 1996). The presence of trees of the same size may also indicate instability. In cases when landslides fail catastrophically, causing the complete loss of all vegetation, the revegetation of these landslide surfaces occurs fairly uniformly. This generally results in the growth of similar-aged trees and, hence, size (McCalpin, 1974). Vegetation that may indicate the hydrological conditions on a slope, such as the presence of a spring or seep, includes small water-loving plants such as Horse Tails and Skunk Cabbage.

Unstable soils can also be identified by the presence of vegetation which has been disturbed in some manner (Richards, 1982). Disturbed trees, for example, are usually leaning in an upslope or downslope direction (sometimes referred to as a drunken forest) or can be lying on the ground.

Specific hydrologic conditions associated with landslides, such as water seeps, springs, and sag ponds are also associated features that can indicate instability. When these associated features are related to landslides, seeps and springs are generally located at the bottom of the head scarp, below minor scarps, and below the toe and usually mark where there is a vertical change in conductivity (Richards, 1982). Sag ponds are usually located on top of a down-dropped bench or just below the head scarp, and, when dry, appear as a local depression. As mentioned above, water-loving vegetation present can be an excellent indicator of these hydrologic conditions.

Debris flows are rapid flows of saturated earth/debris mixed with water. They have the consistency of wet concrete and can flow with a plastic behavior forming steep fronts and marginal levees (Easterbrook, 1993).

In the study area, these debris flow deposits appeared as creek channels filled with soil and debris with marginal levees of displaced material (Figure 11). These debris flows also have steep thrusts (toe compressional features) where the material flowed around a corner or where the material came to a stop (snouts). In one case (March, 1997 failure of the Spady Landslide, located at the end of Alden Street), a debris flow traveled the length of the creek (approximately 60 m) and into the merging creek, where it blocked the merging creek, damming it and ponding water up the merging creeks valley to an estimated depth of two meters (Figure 12 and Plate 3).

Morphological Changes of Landslide Features with Time

It quickly became obvious that the geomorphic features being recorded during the field mapping portion of this study were not all the same age. Hence, these features were divided into three categories, using the descriptions from McCalpin (1974): active, inactive-young, and inactive-mature (Figure 13 and Table 3).

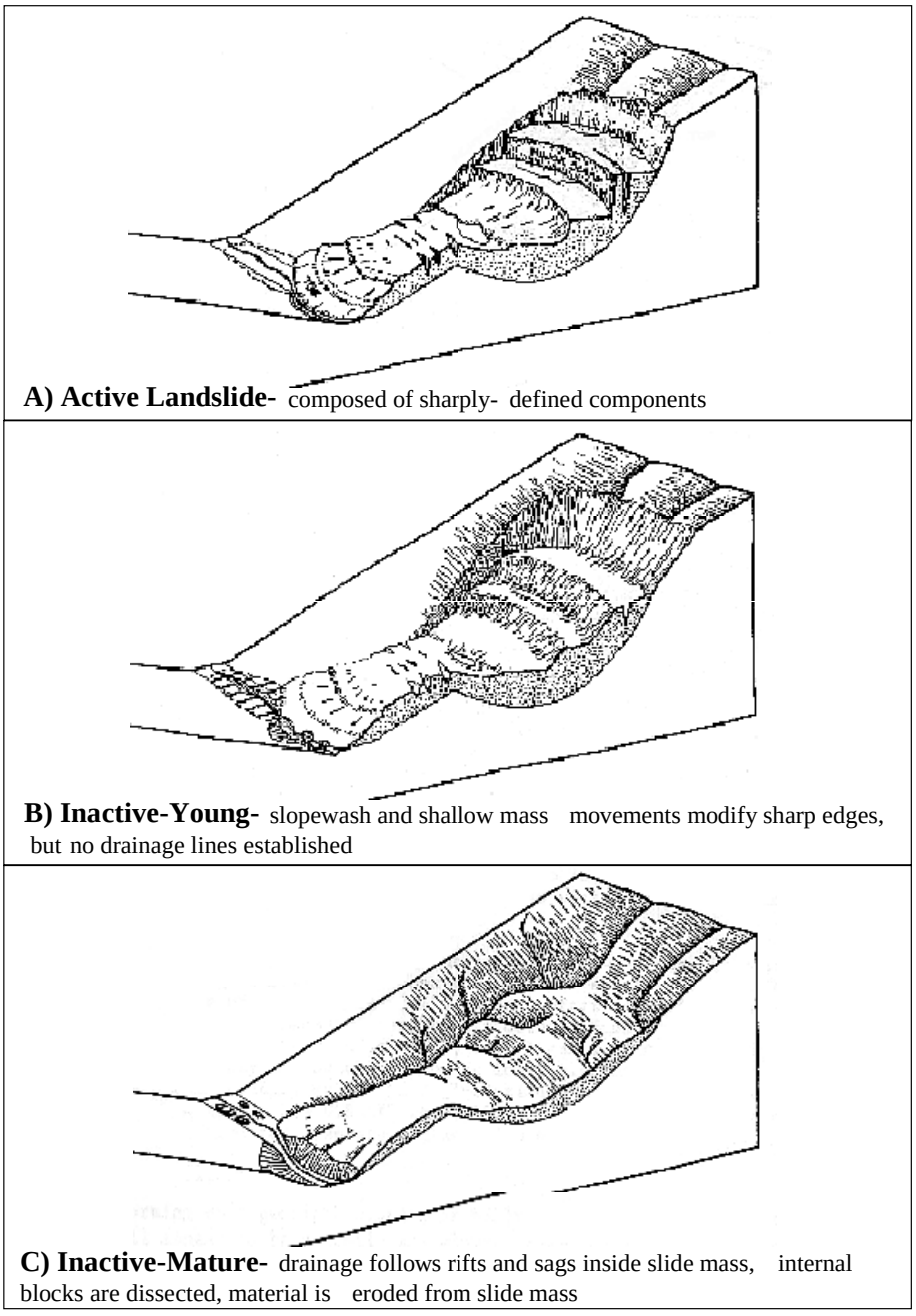
In the study area, it is common for large inactive-mature landslides to have smaller active or inactive-young slides located on the steep head scarps or toes due to undercutting of the toe by a stream. In order to define morphological changes with time, one must start with a description of these changes (Table 3) (McCalpin, 1974).



Figure 11: View down the debris flow filled channel below the Spady Landslide after the first failure (February 1996), displaying marginal levees and creek channel filled with soil/debris. It is approximately 15 meters wide and extends for approximately 60 meters beyond the large, downed tree in foreground.



Figure 12: Ponded channel caused by debris flow from the second failure (March 1997) of the Spady Landslide.



A) Active Landslide- composed of sharply- defined components

B) Inactive-Young- slopewash and shallow mass movements modify sharp edges, but no drainage lines established

C) Inactive-Mature- drainage follows rifts and sags inside slide mass, internal blocks are dissected, material is eroded from slide mass

Figure 13: Block diagram of idealized landslide features displaying morphological changes with time: A) Active, B) Inactive-Young, and C) Inactive-Mature Features (after McCalpin, 1974).

Table 3: Description of morphological feature changes with time (after McCalpin, 1974).

Age Class	Head Scarp	Internal Morphology and Drainage	Vegetation	Toe	Estimated Absolute Age
Active	Sharp, Unvegetated	Undrained Depressions, Lakes, Hummocky Topography, Angular Internal Blocks Separated by Unvegetated Cracks	Absent or Sparse on Scarps and Internal Scarps, Tilted "jack-strawed" Trees Common	Forces Axial Drainage to Opposite Side of Valley, Dams Drainage, Covers Modern Flood Plain, Not Modified by Streams	Activity Within Historic Time, Less Than 100 years old
Inactive-Young	Sharp to Smooth, Partly Vegetated	Undrained and Drained Depressions, Ponds and Marshes, Internal Cracks Vegetated	Younger than Adjacent Terrain or Different Type or Density	Same as Above, But May be Modified by Modern Channel	100 - 5000 years old
Inactive-Mature	Smooth, Dissected, Vegetated	No Drainage Depressions, But Smooth Rolling Topography, Shear Zones Become Drainage	Same Age as Adjacent Terrain, But May be Different Density	Cut by Modern Flood Plain, Stream Not Constricted	5000 - 10,000 years old

Active Features

For planning purposes, any landslide that has undergone historic (about 100 years for the western U.S.) movement is considered active or as having the potential for renewed movement (McCalpin, 1974). This category also includes landslides which are currently moving. Landslides in this active category typically possess fresh, unmodified morphologic features (Figure 13A). The head scarp is fresh, often jagged, steep (approaching 90°), unvegetated, and shows the original irregularities of the break. Closed depressions or sag ponds, often containing water are common on the down-dropped blocks. Pre-slide drainages are truncated and development of internal, marginal drainage channels have not begun. The slide toe may interfere with the modern valley, forming ponds upstream of the slide-toe dam (McCalpin, 1974).

Active features found in the study area contained the most pronounced morphological changes to the slope. These are best represented on a map and include the following (Plate 3, detailed map of the Spady Landslide):

1) sharp unvegetated, continuous scarps (Figure 9),

2) sharp unvegetated, shear zones, most with cracks extending outward and parallel to the main shear and some with slickensided surfaces,

3) sharp, open tension cracks above the main head scarp (Figure 7),

4) unmodified toes of debris, some with ponds upstream (Figure 12). Some toes entered the valley and became debris flows displaying marginal levees (Figure 11), and

5) internal down-dropped blocks, separated by minor scarps, with active springs and sag ponds on the scarps and blocks, and lobes of saturated flow material.

Inactive-Young Features

Landslides that have not moved within historic time will have more subdued features than active landslides (McCalpin, 1974). Figure 13B shows the morphological change of original sharp features to softened features of an inactive-young landslide. Scarps become smoother (decrease in slope angle) due to erosion and begin to be vegetated. Internal depressions begin to fill with locally derived sediments and may appear as soggy areas. Marginal gullies begin to develop along the newly developed topographic boundaries. The slide toe is trimmed back from stream bank erosion, which may trigger smaller debris slides and slumps along the margin of the toe (McCalpin, 1974).

Inactive-young features found in the study area were slightly harder to identify than active features. The inactive-young features found in the study area include the following:

1) slightly rounded, partly revegetated scarps,

2) shear zones partly revegetated, no visible fresh cracks extending outward and parallel to shear, shear zone becoming or is a gully,

3) internal vegetation is younger, different type, or different density than surrounding areas (Figure 10),

4) toes are revegetated and some have active landslides occurring on the oversteepened slope due to stream bank erosion, and

5) internal down-dropped blocks are rounded, but sag ponds and springs are still prevalent, with some of the sag ponds being dry or moist depressions.

Inactive-Mature Features

The mature landslide is a transition from a mass-movement dominated landform to a fluvial-dominated landform (Figure 13C) (McCalpin, 1974). The scarps appear as moderate changes in slope angle and are rounded and thickly revegetated. Many times, smaller landslides occur on these modified scarps. Tributaries of the marginal drainages extend themselves into the slide mass. The toes appear as oversteepened ridges paralleling the slope contours. The stream may make a gentle but unmistakable swing to the opposite side of the valley from the toe (McCalpin, 1974).

Inactive-mature features were the most difficult to identify in the study area. These features are subdued and poorly defined, but an accurate topographic base map aided in their identification. The following includes the inactive-mature features found in the study area:

1) smooth, non-continuous, completely revegetated scarps (some of these scarps had smaller, more recent landslides occurring on them),

2) shear zones appeared as small gullies and tributary creeks,

3) toes being revegetated and commonly having smaller more recent landslides occurring on them, and

4) rolling topography (hummocky), some sag ponds still present, but mostly dry or moist depressions.

These landslide features, as defined and illustrated above, change with time and form the basis for developing a model for the causes of landslides and the factors they relate to possible reactivation.

Chapter 5: Causes of Landslides in the Study Area

A slope's stability is a function of the material properties and geometry of the slope. Pore water pressure has been included in the material properties section of this chapter. The effect of material properties can be investigated using the equations for the stability of an infinite slope, while the role of geometry can be looked at through a simple method of slices analysis. The mechanics of slope stability can be divided into two forces: the driving forces and the resisting forces. These two forces oppose each other and the state of stability existing in a slope can be thought of as their ratio:

$$\frac{\textbf{Resisting Forces}}{\textbf{Driving Forces}}$$

When the material properties and geometry of a slope are examined, this simplified ratio becomes an equation called the factor of safety (F_s) against landsliding and is defined as (Al-Khafaji and Andersland, 1992):

$$\textbf{Factor of Safety } (F_s) = \frac{\textbf{Available Shear Strength}}{\textbf{Required Shear Stress for Equilibrium}} \qquad \textbf{Equation 1}$$

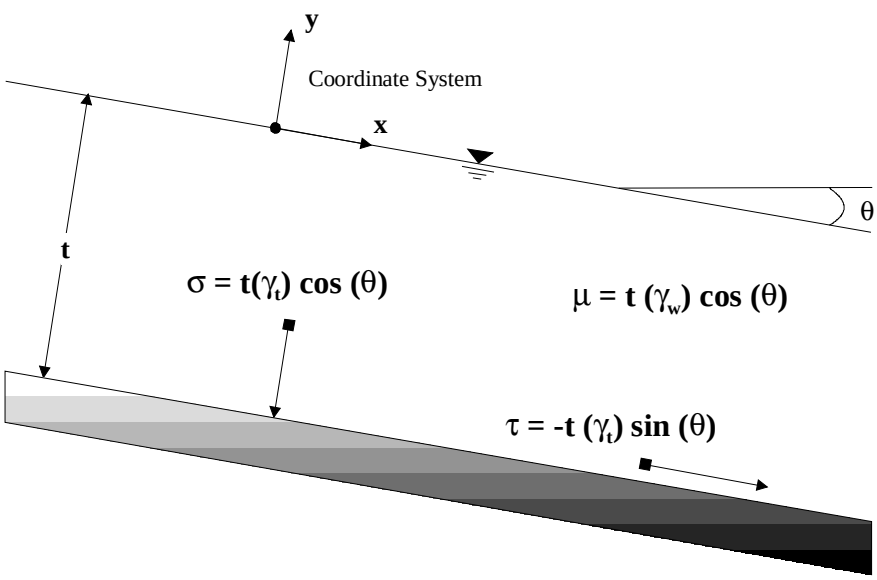
A $F_s > 1$ would theoretically be a stable slope because the shear strength (resisting forces) would be greater than the actual shear stress. A $F_s < 1$ would theoretically be an unstable slope because the actual shear stress (driving forces) would be greater than the shear strength. A critically stable slope would have a $F_s = 1$. Because of the inability to know all the conditions present within a slope, Senneset (1996) recommends that slopes

with a factor of safety less than 1.3-1.5 be considered potentially unstable. Since most of the failures examined in the study area failed very quickly and the general material is composed of semiconsolidated clays and silts, undrained conditions were assumed in all stability analysis, unless otherwise mentioned. When the forces acting on a slope are examined in detail, the parameters and geometry that contribute to a stable, unstable, or critically stable slope become apparent.

Material Properties

The resistance of a material to sliding along a slip surface is its shear strength (Easterbrook, 1993). Shear strength of materials varies considerably depending on their physical properties. A simple model for a slopes stability, the limit equilibrium equation, is derived using the Mohr-Coulomb Law, is illustrated in equation 2 (Figure 14)(Lambe and Whitman, 1969). Using the infinite slope equation, derived from equation 2 (equation 3), which is a good approximation for landslides that are about ten times longer than they are thick and have generally uniform soil conditions, the factor of safety is defined as (Figure 14)(Lambe and Whitman, 1969):

$$F_s = \frac{c' + (\sigma - \mu)\tan(\phi')}{|\tau|} \quad \textbf{Equation 2}$$



$$F_s = \frac{c + (\sigma - \mu) \tan(\phi)}{|\tau|}$$

Equation 2
(Mohr-Coulomb Limit Equilibrium Equation)

$$F_s = \frac{c + \tau (\gamma_t - \gamma_w) \cos(\theta) \tan(\phi)}{\tau \gamma_t \sin(\theta)}$$

Equation 3
(Infinite Slope)

$$t_{critical} (F_s=1) = \frac{c / (\gamma_t - \gamma_w)}{\cos(\theta) (\tan(\theta) - \tan(\phi))}$$

Equation 4
(Critical Thickness)

Where:

τ = shear stress	θ = slope angle
σ = normal stress	c = cohesion
γ_t = total unit weight of soil	ϕ = angle of internal friction
γ_w = unit weight of water	t = thickness
μ = pore water pressure	

Figure 14: Infinite slope diagram illustrating parameters and equations for the factor of safety and the critical slope thickness for a slope with seepage parallel to the slope.

$$F_s = \frac{c' + t(\gamma_t - \gamma_w)\cos(\theta)\tan(\phi')}{t\gamma_t \sin(\theta)} \quad \textbf{Equation 3*}$$

**Note - for saturated slopes with seepage parallel to the slope. See Figure 14 for deviation of equation 3, from equation 2, including definition of variables.*

Examining equations 2 and 3 and Figure 14, one can see that the parameters which influence material properties are cohesion, angle of internal friction, slope angle, pore-water pressure, and thickness. From these equations, one can see that a decrease in cohesion (c) and/or the angle of internal friction (ϕ) and/or an increase in slope angle (θ) will decrease the factor of safety, potentially causing failure (Easterbrook, 1993). These parameters are for conditions on the failure plane. Many slopes are colluvial slopes, which are natural slopes formed by movement of soil from its original place by landsliding and creep (Al-Khafaji and Andersland, 1992). For natural slopes, the residual strength should be used (Skempton, 1985). The residual strength occurs when the strength drops off because of the formation of a shear plane by continued shear deformation (Spangler and Handy, 1982). Slip surfaces usually occur at the bedrock-soil interface, where colluvial slip surfaces generally form (Richards, 1980).

A useful form of the infinite slope equation is to solve for the critical thickness (Figure 14, Equation 4). This is the thickness required to give a factor of safety of one and is calculated as:

$$t_{critical} = \frac{c'/(\gamma_t - \gamma_w)}{\cos(\theta)(\tan(\theta) - \tan(\phi'))}; F_s = 1 \quad \textbf{Equation 4}$$

From equations 1 through 3, it is clear that anything that either decreases the shear strength or increases the shear stress will move the slope closer to failure. There are two conditions that can cause a reduction of shear strength (Skempton, 1985):

1) a temporary reduction in shear strength, usually caused by an increase in water content, which will eventually dissipate, or

2) a permanent reduction in shear strength, decreasing the strength to the residual value, usually due to shearing deformation.

Shear Strength Reduction

It is a common observation that much of the shallow landsliding in the Portland area occurs during the winter rainy seasons. This increased precipitation results in higher groundwater tables, saturation of soils, and consequent pore pressure increases and temporary shear strength reduction (Spangler and Handy, 1982). Through equations 2 it is clear that an increase in water content or saturation of a slope increases the pore water pressure, in turn decreasing the frictional resistance through the angle of internal friction (Spangler and Handy, 1982). Once even several centimeters of movement have taken place, no more than the residual strength can be developed along a surface, resulting in permanent strength reduction (Skempton, 1985). This observation is confirmed by the approximately 700 landslides that occurred in the Portland metropolitan area during the greater than normal rainy seasons of 1996 and 1997 (Burns et al., 1998).

The relationship between time of year and landslide movement is not as clear for very large or deep-seated landslides (defined in Chapter 6), but it is expected that deep-seated landslides would potentially be most active during the winter (Richards, 1982). Furthermore, it may take prolonged periods of rainfall to activate or reactivate deep-seated landslides (Baum et al., 1993).

In developed areas, local slope saturation may be a result of concentrated runoff from man-made structures. This higher than normal concentration of runoff from buildings and paved surfaces can raise the water table on slopes that might not normally have such a high water table, even during the rainy seasons. Trees can act as pumps to reduce the water table and consequent pore water pressure.

Another human related cause of shear strength reduction is the removal of vegetation from a slope. Trees act as water pumps, reducing the pore water in the soil. Woody vegetation also increases the resisting force through tree root strength on shallow colluvial slopes (Riestenberg and Sovonick-Dunford, 1983). The tree roots play the same role as cohesion in equation 2-4. Their role in increasing shear strength can be seen through equation 5:

$$\boldsymbol{F_s} = \frac{c' + \frac{1}{A}\sum F + t(\gamma_t - \gamma_w)\cos(\theta)\tan(\phi')}{t\gamma_t \sin(\theta)} \qquad \textbf{Equation 5}$$

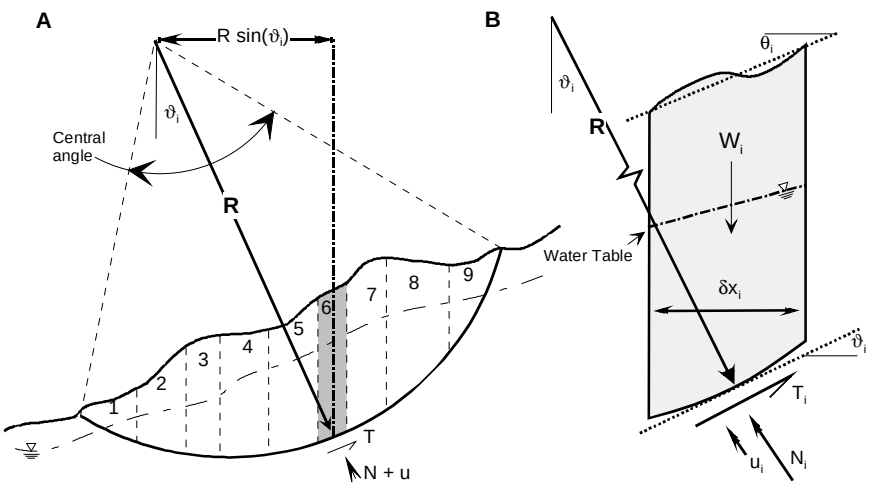
Where: A=area of slip surface penetrated by roots
F=normal force required to break each root

Geometry-Effect of the Shape in a Landslide

The simplest stability model illustrating the role of geometry is the Bishop method (Figure 15)(Bishop, 1955). This type of analysis displays the role of different portions of a landslide. Other methods of slices, like Janbu, are similar, however they allow for a more complex geometry (Janbu, 1973).

In the modified Bishop analysis, a circular slip surface is assumed and the area above this slip surface is divided into slices of various widths that can be examined individually (Figure 15B) or together (Figure 15A) to calculate the factor of safety (Bishop, 1955).

The factor of safety in this type of analysis is the resisting moments divided by the driving moments, where moments are about the circular center (Figure 15). With this analysis in mind, the addition of weight (or surcharge), generally to the higher numbered slices (right of center) will increase the driving moments about the center. In



$$F_s = \frac{RT_i}{R\Sigma W_i \sin(\vartheta_i)} = \frac{\Sigma[\frac{b\,\delta x_i}{\cos(\vartheta_i)}(c - u_i\tan(\phi)) + N_i\tan(\phi)]}{\Sigma W \sin(\vartheta_i)} \qquad \textbf{Equation 6}$$

Where:

R = radius of circle
T = shear force
W = sum of the unit weights
c = cohesion
ϕ = angle of internal friction
u = pore water pressure
δx = width of the slice
= width (in and out of paper)
slope angle (θ)
=normal force

Figure 15: Method of slices (modified Bishop Method) parameters and equation for calculating the factor of safety: (A) general diagram displaying circular slip surface and slices and (B) detail of forces acting on a single slice. Side forces not included in Bishop Model, added in Janbu (Bishop, 1955).

the study area, this addition of weight can be caused by human or natural agencies such as the following:

1) loads imposed by fill and buildings or construction at the top of slopes and

2) weight of water from heavy rains and concentrated man-made structure runoff.

The removal of weight from the lower numbered slices (left of center) will decrease the resisting moments. The following are the three main ways that these resisting moments are being reduced in the study area:

1) bank erosion by creeks and streams, which removes support from the base of slopes and from toes of preexisting landslides,

2) human excavation and cuts of slopes for constructing roads and building lots, and

3) landslides on the lower portion of the slope, decreasing the stability of the upper part of the slope.

The stability of a slope is governed by these two factors: material properties and the slope geometry. It should now be easy to see that a change in either of these properties by human and natural agencies can affect the factor of safety of the slope or an existing landslide on that slope.

Chapter 6: Types of Landslides Identified in the Study Area

Landslides identified in the study area were grouped into two classes, shallow-seated and deep-seated. Then the two classes of slides were further divided into three categories related to their state of stability: active, inactive-young, and inactive-mature. For the purpose of this study, the division between deep- and shallow-seated landslides is defined as slides with a failure plane greater or less than 4.5 meters below the ground surface. This depth separation is based on a frequency versus exposed scarp histogram, the thickness of residual soils on the slopes, bore hole logs, and field observations (Figure 16**,** Table 1 and appendix 1). According to most, if not all of the geotechnical community landslides are divided into two classes related to the depth to the failure plane typically called a toe circle (shallow) failure and a base circle (deep) failure (Al-Khafaji and Andersland, 1992). These geotechnical definitions were not used in this study, because most, if not all of the failures were “toe circle” type failures. There was a distinction found between this type of failure (toe circle) related to the depth to the failure plane as previously mentioned and hence the two classes, deep- and shallow-seated landslides, was defined for this study (Figure 16).

There are currently 79 identified landslides within the study area (Plate 1). The predominate class of landslides are shallow-seated, totaling 65 slides. However, there are at least 14 deep-seated landslide complexes which are potentially the most

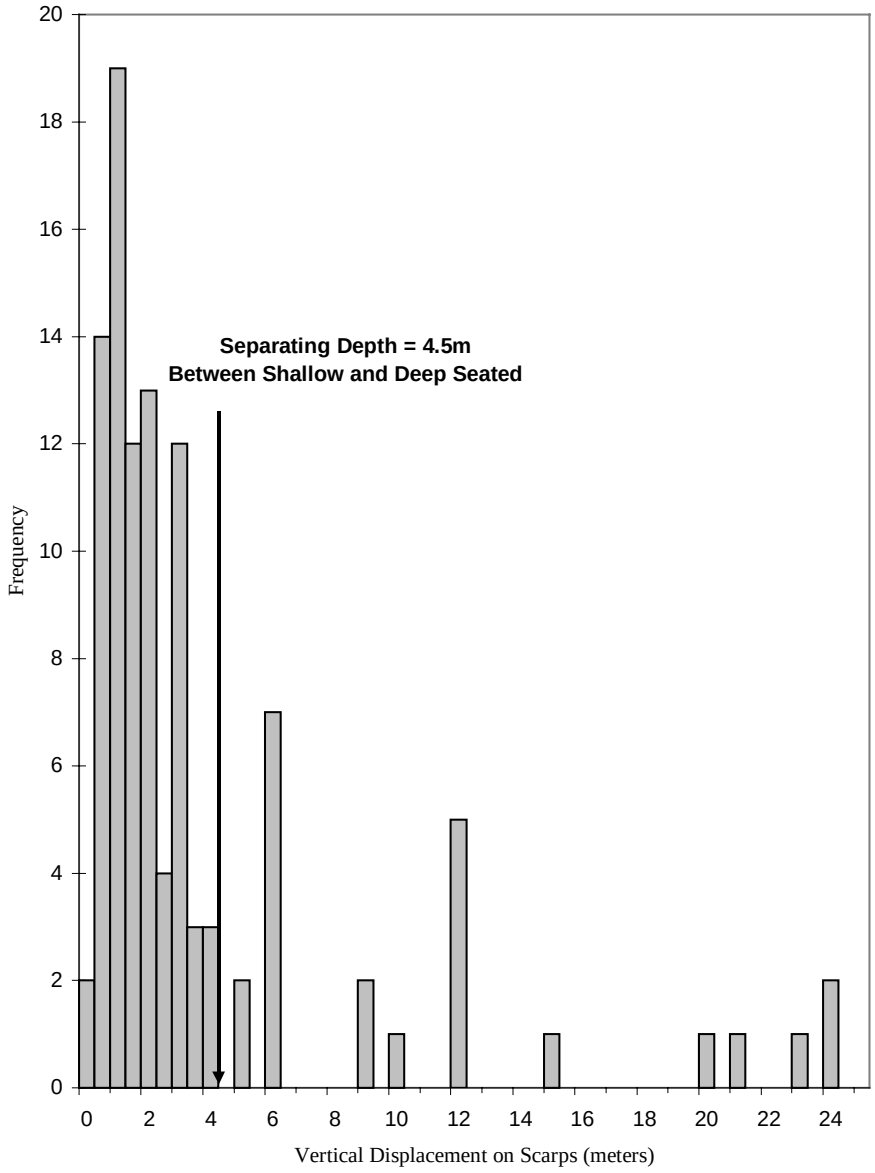


Figure 16: Histogram of Frequency versus exposed scarp for all the landslides in the study area. Note the dividing depth between shallow-seated and deep-seated at 4.5 meters.

destructive and hardest to mitigate. All of these landslides were also classified geomorphologically, totaling 65 earthflows, 3 earthflow/debrisflows, 9 slumps, and 2 slump/earthflows (Easterbrook, 1993). The following is a brief overview of the location of landslides found in the study area.

Landslide scarps in the southern portion of the study area, especially the deep-seated landslides, are located along the contact between the Troutdale/Sandy River Mudstone Formation and the Boring Lavas (Plate 1). In this portion, most of the shallow-seated landslides occur along the locally steeper slopes of creek banks, in man-made fills, and on inactive-young and inactive-mature landslides scarps and toes.

In the northern portion of the study area, the deep-seated landslides are generally located along the perimeter of the canyon where the slopes change from relatively flat to steep (Plate 1). Most of the active, shallow-seated slides are located in this northern portion. Similar to the southern portion, the shallow-seated slides in the northern portion are generally associated with locally oversteepened creek banks, man-made fills, and to a lesser extent with inactive-young and mature landslide features.

Deep-Seated Landslides

Most of the deep-seated landslides in the study area are classified as inactive-young and inactive-mature, with the exception of the 1997 failure of the Spady Landslide and the Dewey Street-Warren Street Landslide, which are active (McCalpin, 1974). The exposed scarps for deep-seated slides range from 5 to 24 meters, with most of the

exposed scarps occurring at an average of 12 meters (±6.6 meters) (Figure 16). The area of these deep-seated slide complexes is generally much larger than that of the shallow-seated slides and range from 1,622 m^2 to 256,436 m^2 or 0.05% to 7.41% of the study area. Almost all of these deep-seated landslides have smaller, inactive-young and active, shallow-seated slides within their boundaries. Out of the two active deep-seated landslides in the study area, one of these landslides had a complete evacuation of material, while the other landslide seemed to have relatively smaller horizontal and vertical movements, probably constrained by the depth to the failure plane. These relatively smaller horizontal and vertical movements are most likely indicating drained conditions.

Out of the 14 deep seated landslides, the Highway 213-Morton Road landslide and the Highway 213-Mile Post 2.1 landslide were examined in detail. Both of these landslides seemed to be representative of most of the deep-seated slides in the study area based on size and morphology.

The Highway 213-Morton Road Landslide

The Highway 213-Morton Road deep-seated landslide was mapped by Schlicker and Finlayson in 1979 as a "large area of bedrock (Troutdale Formation) failure characterized by irregular topography, disrupted stratigraphy, overall anomalous moderate to shallow slope, and disrupted drainage pattern" (Figure 17 and Figure 18). This large inactive-mature slide has an estimated area of 208,925 m^2 and contains

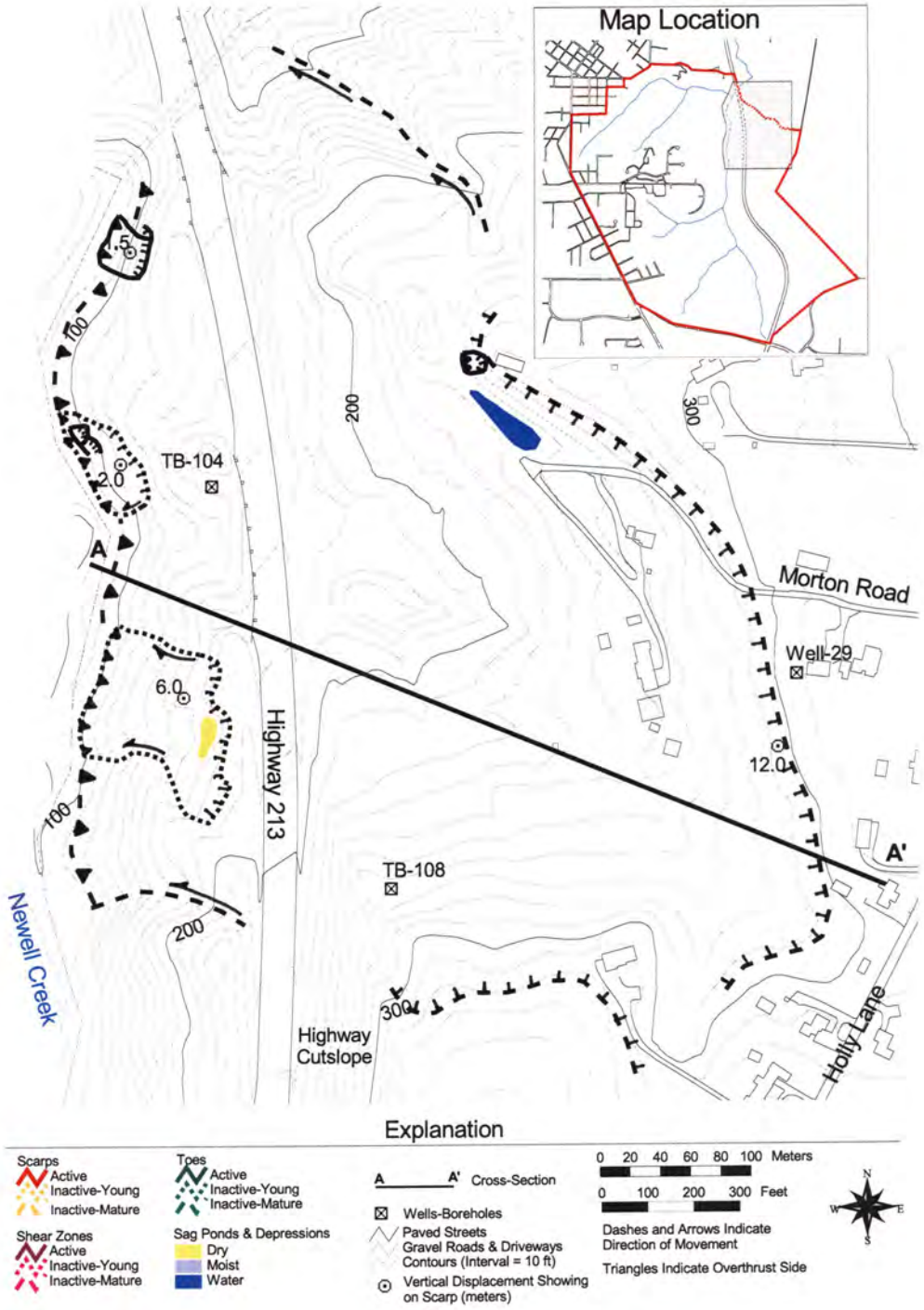


Figure 17: Plan view of surficial features identified for The Highway 213-Morton Road Landslide, a deep-seated landslide.

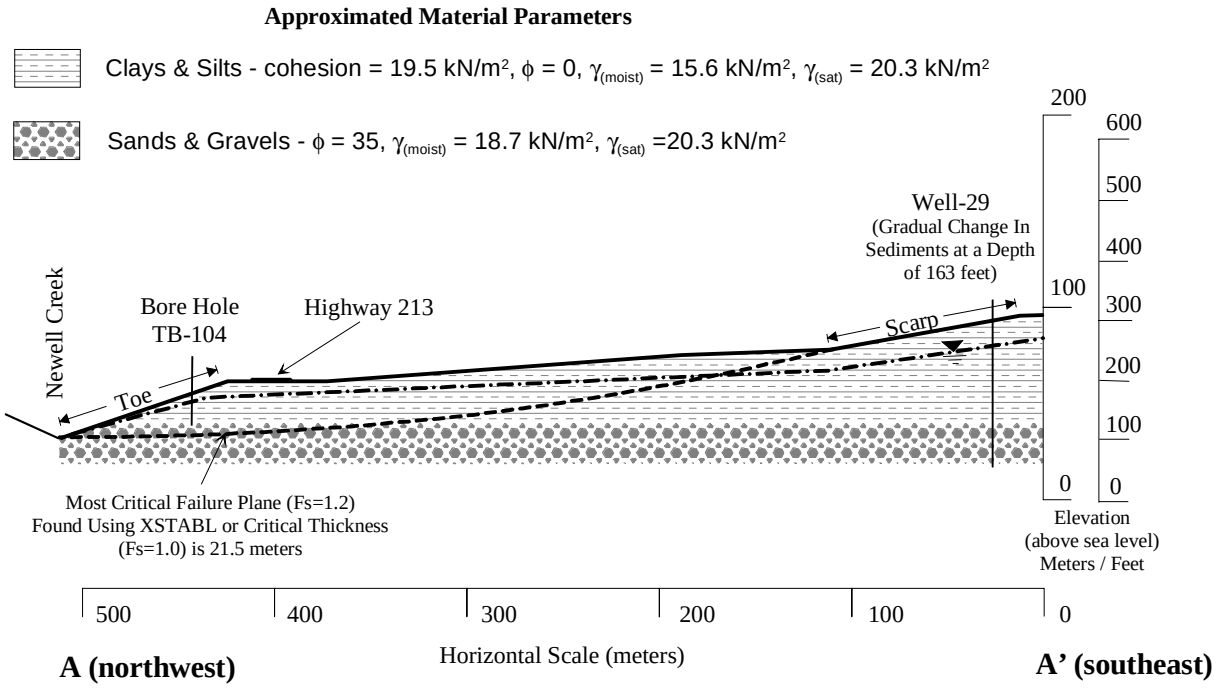


Figure 18: Cross-section A-A' through the Highway 213-Morton Road, deep-seated Landslide displaying the Bishop stability analysis calculated failure plane for the current conditions and the generalized stratigraphy and approximate material parameters from bore-hole and well logs.

landslide features characteristic of inactive-mature landslides. It is approximately 500 meters long and 400 meters wide. The topography near the head scarp varies from very steep (40°+) to moderately steep (20°). The topography within the landslide mass is rolling and considerably flatter than that of the head scarp or toe. Highway 213 cuts across this flatter area (trending north/south) and construction of the highway through this area resulted in a large area of fill (northern extent of slide mass) with a large scale diameter (2.5 meter) culvert diverting Newell Creek under the highway. At the southern end of Highway 213 (southern extent of slide mass) a high (35 meter) cutslope was constructed. Most of the area is forested with Douglas fir and deciduous trees with the exception of a couple of small pastures.

The zone of extension is characterized by a large head scarp approximately 500 meters long, with a maximum 12 meters of vertical displacement showing on the surface. This head scarp is rounded, non-continuous, and revegetated with a smaller (40 m^2) active slide occurring on it on the northern side. It is dissected by a small creek at the southern end and does not appear to have any tension cracks above the head scarp. There is one sag pond on top of a down-dropped block located just south of the smaller active slide. Just south of the sag pond is a flat area (top of a down-dropped block) where several structures and houses are located.

The shear zones appear as small gullies and creeks that are non-continuous, partially due to the construction of the large cutslope at the southern end of the slide.

Below Highway 213 is the toe, which is steep to very steep (70°-80°) in places and which has two smaller active slides and two inactive-young slides located on it (Figure 17). The three northernmost younger slides are shallow-seated (depth to failure plane<4.5 m). The southern younger slide is a deep-seated landslide.

Some of the bore-hole and well logs drilled during the construction of Highway 213 in 1979 and later, show gradual increases in sediment grain size with depth, from clays and silts to sands and gravels and other suspicious stratigraphic units. One well-water drillers log (29), located just above the head scarp near Morton Road, shows a gradual but consistent increase in the grain size with depth from clay rich to a predominately sandy soil at a depth of approximately 50 m (Figure 18 and appendix 1). Bore-hole log TB-104, located just north of the cross-section, displays the phreatic water surface at approximately two meters below the ground surface (Figure 18 and appendix 1). Bore-hole log TB-108, located just below the southern head scarp, has an organic layer at a depth of 16.8 m (appendix 1). This organic layer may represent a paleosol (old land surface) that is now restricting water movement below it causing an increased local water table.

To locate an approximate failure plane and a factor of safety for this deep-seated landslide, the program XSTABL was used with the Bishop analysis for circular failure planes (

Table 4)(Sharma, 1994). The current conditions used in the initial stability analysis were derived from the surficial landslide features (Figure 17), the generalized

Table 4: Highway 213-Morton Road Landslide Stability Analysis Results, assuming undrained conditions.

Trial	Effective Cohesion (Clays & Silts) kN/m^2 (psf)	Effective Angle of Internal Friction (Clays & Silts) degrees	Angle of Internal Friction (Sands & Gravels) degrees	Earthquake load (horizontal coefficient)	Factor of Safety
1	38.3(800)	15	35	none	2.8
1a	38.3(800)	15	35	major (0.1)	1.5
1b	38.3(800)	15	35	great (0.15)	1.3
2	28.7(600)	0	35	none	1.6
2a	28.7(600)	0	35	major (0.1)	0.8
2b	28.7(600)	0	35	great (0.15)	0.6
3	19.5(400)	0	32	none	1.2
3a	19.5(400)	0	32	major (0.1)	0.6
3b	19.5(400)	0	32	great (0.15)	0.5

subsurface soil properties from bore holes TB-104 and TB-108 and phreatic water surfaces found in well log 29 and bore hole TB-104 (appendix 2, Figure 18). This analysis consisted of three trials, starting with estimated material properties (cohesion and angle of internal friction) from the subsurface data, then lowering the values until a reasonable factor of safety was found (

Table 4, appendix 2). The material properties displayed in Figure 18 are most likely very close to the residual strength. The most critical failure plane (F_s=1.2) occurs at a maximum depth of 25 meters, approximately twice the exposed scarp (12 meters), and is depicted on the cross-section (Figure 18). To confirm this approximate depth to the failure plane, the critical thickness was calculated, resulting with a thickness of 21.5 meters, a value slightly less than that calculated by XSTABL, but within a close range of approximation considering the lack of subsurface information (appendix 2). Further stability analysis of this landslide included the addition of a horizontal earthquake load through a coefficient (k). Recommended values from the California Department of Conservation (1997) included k=0.10 for a 6.5 magnitude earthquake (major) and k=0.15 for a 8.25 magnitude earthquake (great). This analysis resulted in a factor of safety ranging from 1.5 to 0.6 for a major earthquake and 1.3 to 0.5 for a great earthquake (appendix 2).

Although major development, including cutslopes and fills, occurred during the building of Highway 213, which passes across the toe of this landslide, this slide does not appear to have any deep-seated movements since this construction. But, examination

of the toe and the scarp indicate active and inactive-young slides have been modifying this deep-seated landslide continuously. The stability analysis confirms the current conditions of this deep-seated movement with a factor of safety of 1.2 for the current conditions. It was also discovered that a even major earthquake (magnitude=6.5) could cause a decrease in the factor of safety below one, indicating reactivation of this landslide (California Department of Conservation, 1997). These predicted factors of safety show that there is a chance of reactivation for this inactive-mature, deep-seated landslide and others like it.

The Highway 213, Mile Post 2.1 Deep-Seated Landslide

In 1979 the Oregon Department of Transportation began investigation for the construction of Highway 213. Included in this investigation was a series of bore holes. Some of these bore holes were very helpful in more accurately assessing the depth to the failure plane of some of the deep-seated landslides. The Highway 213, mile post 2.1 landslide (Plate 1), located crossing Highway 213 in the central portion of the study area is a deep-seated, inactive-mature landslide very similar to the Highway 213-Morton Road landslide described in the last section. This slide has a double bowl shape in plan view and is approximately 300 meters wide and 300 meters long with an exposed maximum scarp of approximately nine meters. The scarp and toe parallel Highway 213, Holly Lane and Newell Creek. Within this landslide's boundaries are two smaller, shallow-seated, active slides, both of which appear to have their scarps in the road prism

of Highway 213. During the building of Highway 213, the Oregon Department of Transportation recognized this deep-seated slide through surficial mapping and subsurface exploration and mitigated it with a rock buttress located upslope from the highway (ODOT, 1998).

One of the bore holes, TB-109, drilled during construction of the highway, notes the presence of slickensides at a depth of approximately 13.5 meters (ODOT, 1998) (appendix 1). The depth of the slickensides in this bore hole (TB-109), located in the middle the Highway 213, mile post 2.1 deep seated landslide, is interpreted to display the approximate depth to the failure plane. Although this interpreted depth to failure plane (13.5 meters) does not match the estimated depth from the exposed scarp (nine meters), their comparison confirms that this slide is deep-seated.

Deep-Seated Landslide Conclusions

Since most of these deep-seated slides are prehistoric, human caused induction can be ruled out. The most probable initiating causes of these slides are a wetter prehistoric climate, inundation and quick lake level drop following the 40+ Missoula Floods (12,700 to 15,300 years B.P.), and earthquake shaking (CDC, 1997; Waitt, 1985). Although most of these slides are considered inactive-mature (dormant), extreme caution should be exercised before any construction takes place on or near one of these deep-seated slides, including a complete surface/subsurface investigation and a slope stability analysis including earthquake loads by an engineering geologist and a geotechnical

engineer. This recommendation is further supported by the fact that the Dewey-Warren Street landslide reactivated in response to above average rainfall in 1996 (Figure 19). This deep-seated slide, located in the northwest section of the study area, had a horizontal displacement of only 0.3 meters and a vertical displacement of 0.5 meters in 1996 (Figure 19). This minor amount of movement was enough to damage the foundation of a new house to the point where repair was not economically feasible.

Shallow-Seated Landslides

There are about 65 shallow-seated landslides in the study area. The scarps range from 0.2 to 4 meters with an average vertical displacement of two meters (± 1.0 meters)(Figure 16). This average vertical displacement measured on the scarps of two meters was used to approximate the depth to the failure plane which corresponds to the general location of the contact between the residual soils and bedrock (Table 1)(Gerig, 1985). These shallow-seated slides generally have a much smaller area than the deep-seated slides, ranging from 36 to 6,141 m^2 or 0.001% to 0.2% of the study area, in size. This smaller size is probably due to the constraint of the depth to the failure plane. Most of the shallow-seated slides resulted in a complete evacuation of the material, sometimes exposing all of the failure surface, unlike the deep-seated landslides.



Figure 19: Reactivation of the Dewey-Warren Street, deep-seated landslide with destroyed (red tagged) house in the background. An 8 ½ inch by 11 inch size field notebook is on the scarp for scale. Displacement measured on the scarp only totaled 0.3 meters of horizontal and 0.5 meters of vertical.

Many of these shallow-seated slides are active and hence younger than the deep-seated slides. Furthermore, many of these younger shallow-seated slides have been active within the last ten to twenty years. For example the Highway 213, mile post 2.1 shallow-seated landslide, discussed earlier, occurred during construction of the highway in 1984 (Figure 20). Some of the active, shallow-seated landslides occur in cutslopes and fills.

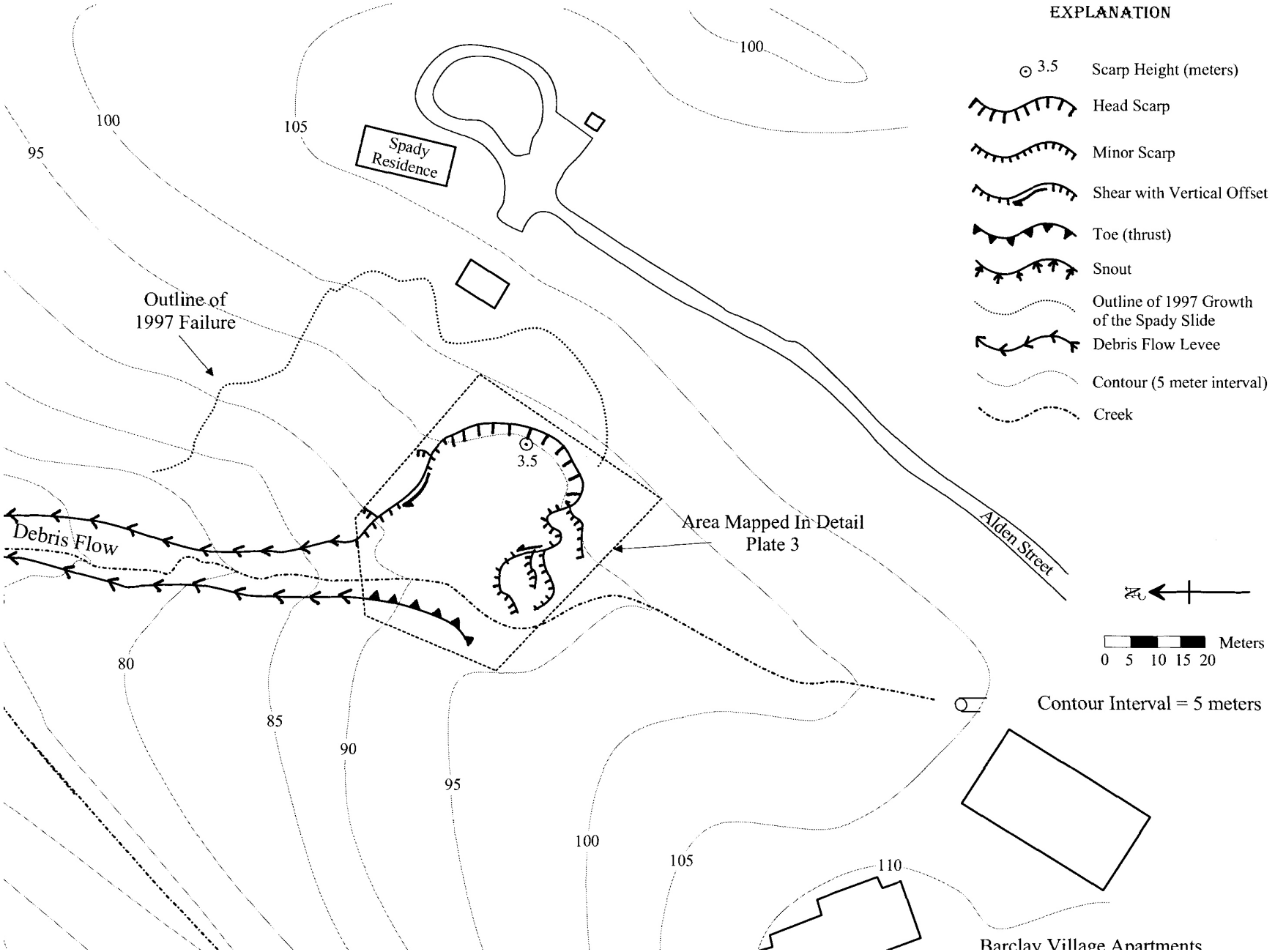
Realizing that this form of mass wasting predominates in Newell Creek Canyon, I decided to make a detailed study and map of a typical shallow-seated landslide, with a depth to failure plane of approximately 3.5 meters, (shallow-seated) located on Sha Spady's property in the northwest section of the study area (Plate 3). This particular detailed section of this study was performed in the spring of 1996. In the spring of 1997, the Spady Landslide failed again, this time to a depth of approximately 5.5 to 6 meters (deep-seated). This slide was mapped again at a scale of 1:100 following the second period of sliding (Plate 3). The 1996 landslide on the Spady property is representative of shallow-seated landslides in the study area, and the following is a description of this landslide and its growth.

The Spady Landslide

The Spady property is located at the end of Alden Street in the northwest corner of the study area (Figure 21). The property consists of a ridge trending north-northeast with slopes on either side ranging from 10°-35° (Figure 21). The residual soils on



Figure 20: Oblique arial photograph of the active, shallow-seated Highway 213-mile post 2.1 landslide on the toe of the larger deep-seated slide. This slide occurred during construction of the highway in the summer of 1984 and is indicated by arrows. Also noted is the rock buttress located in the cutslope above the slide (after ODOT, 1998).


EXPLANATION
3.5 Scarp Height (meters)
Head Scarp
Minor Scarp
Shear with Vertical Offset
Toe (thrust)
Snout
Outline of 1997 Growth of the Spady Slide
Debris Flow Levee
Contour (5 meter interval)
Creek
Spady Residence
Outline of 1997 Failure
Debris Flow
Area Mapped In Detail Plate 3
Alden Street
Meters
0 5 10 15 20
Contour Interval = 5 meters
Barclay Village Apartments
100
105
95
80
85
90
110

these slopes are part of the Jory Series (45C) (Figure 4, Table 1, and Table 2) and are classified as a silty clay loam, which can contain up to 40% clay. They are colluvial soils with a depth to the upper Troutdale Formation greater than 1.5 meters. The vegetation on these slopes is mainly Douglas fir (up to 75 years old), maple trees, and other vegetation composed of shrubs and blackberry bushes. At the bottom of the western slope is a creek trending northwest. This creek begins about 140 meters south of the Spady residence as a culvert outage that funnels the runoff from the Barclay Hills apartment complex located just south of the Spady property.

During 1996 and 1997 this area had greater than normal precipitation, which resulted in a "100 year flood" event in February 1996 and another episode of flooding in January 1997 (Figure 22).

The 1996 Failure of the Spady Landslide

On March 6, 1996, Sha Spady, the property owner, observed three large cracks in the ground very close to where the scarp was located after the initial failure. These cracks had an approximate one half to two meter spacing parallel to the slope and were approximately six to nine meters long with up to 30 centimeters of opening on each crack.

On March 7, Spady watched as the upper section of the slide failed with velocities ranging from 0.5 to 2 meters/second. The slide stopped when it reached the small creek running northwest, located 100 meters west of her house, creating a small earth

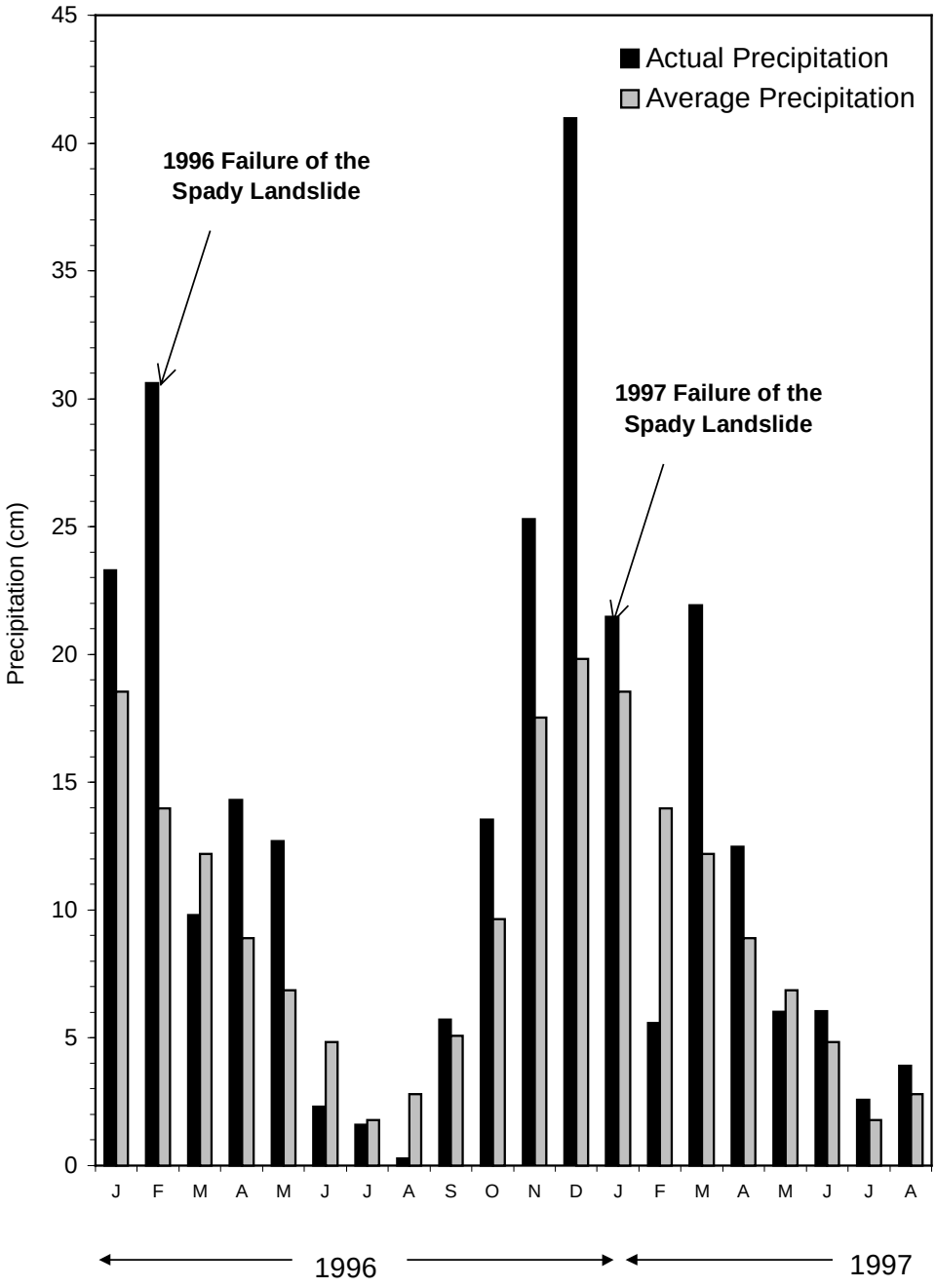


Figure 22: Histogram of monthly precipitation for Oregon City from 1996 to 1997 (August) (after National Weather Service, 1998).

dam. Over the next 4-5 days, a pond formed behind the landslide debris dam. Finally, on March 12, Spady watched as the dam broke and a slurry of viscous soil and water flowed down the stream valley and stopped just before reaching the junction of the next creek about 120 meters down slope (Sha Spady, property owner in Newell Creek Canyon, personal communication, 1996).

Description of the 1996 Failure of the Spady Landslide

Features of the landslide and debris flow were mapped by plane table mapping during April and May of 1996 at a scale of 1:150 (Figure 21 and Plate 3). Soil samples were taken at two locations and several lab tests were performed including grain size analysis (sieve and hydrometer), Atterberg limits, dilatancy, toughness, dry strength, and unconfined compressive strength (Table 5- units 1 and 4 and appendix 3, sample locations are on Plate 3). A Janbu stability analysis was performed to evaluate the conditions before failure as a benchmark for use elsewhere in the study area (appendix 3).

The 1996 evacuated area consists of an oblong-shaped bowl with an approximate volume of 2200 m^3. This area is located approximately 80 meters southwest of the Spady home (Figure 21). Below the evacuated zone, filling the creek running northwest on the western side of the Spady property is the debris flow deposit. This debris flow is 80 meters long and, on average, 10 meters wide. This debris flow ends

Table 5: Material properties for residual soils and bedrock units (beds) within the extent of the Spady Landslide.

	Soil Unit 1	Bedrock Unit 1	Bedrock Unit 2	Bedrock Unit 3	Bedrock Unit 4
Sample	Sample 1 (1996)	Sample 1 (1997)	Sample 2 (1997)	Sample 3 (1997)	Sample 4 (96 &97)
Color (dry)	Brown (Tan)	Gray (Light Gray)	Red/Brown (Brown)	Gray (Light Gray)	Blue/Gray (Gray)
Relative Density	Soft-Firm	Firm	Very Firm	Firm	Stiff
Oversized % (largest)	0	0	1 (1cm)	6 (2cm)	0
Sand %	3	0	3	7	10
Silt %	91	61	50	50	54
Clay %	6	39	46	37	36
Organics	Minor Amount	Trace	None	None	None
Dry Strength	Slight to Medium	Medium	Medium	Medium	High
Dilatancy	Slow	Medium	Slow	Slow	Slow
Plasticity	BPL	BPL	BPL	BPL	NearPL
Liquid Limit %	38.6	-	-	-	45.2
Plastic Limit %	26.9	-	-	-	24.6
Unit Weight (kg/m^3)	18.29	-	-	-	18.43
Unconfined Compressive Strength (kPa)	23.22	-	-	-	53.14
USCA (Unified)	Silt (ML)	Silty Clay Loam (ML-CL)	Silty Clay (CL)	Silty Clay Loam (ML)	Silty Clay Loam (ML-MH)

where the small creek enters another creek trending northeast. The following section is a description of the four zones into which the 1996 failure of the Spady Landslide was divided for classification purposes: zone of extension, shear zones, zone of saturated flow, and the debris flow.

ZONE OF EXTENSION - The head scarp was a concave downslope break, with a maximum vertical displacement of approximately 3.5 meters (Figure 9 and Plate 3). This part of the landslide was approximately 21 meters wide, with no vegetation left standing.

There were a few small (1-2 cm opening) tension cracks located above the head scarp. The interception of the flanks and the head scarp had many tension cracks extending out from the main body as far as 15 meters, characteristics of a zone of extension (Fleming and Johnson, 1989). There was one main spring line that parallels the head scarp and was located at the base of the scarp.

SHEAR ZONES - Both flanks were littered with tension cracks, some of which were in an en-echelon style. These tension cracks were usually left-stepping along the right flank and right-stepping along the left flank. They were orientated between approximately parallel along the main shear zones and closer to perpendicular where the shear zones were interrupted by a minor scarp, usually extending out from the main shear zone. Some of the tension cracks had openings as wide as 30 centimeters. Slickensides were located on the lower right flank where the slide entered the channel and became a debris flow.

ZONE OF SATURATED FLOW - The main body of the slide was marked by the saturated soil flows (Plate 3). Below the head scarp, several spring lines mark the beginning of this saturated flow zone, which extended to the small creek running northwest (Plate 3). This zone contained features that formed after the debris dam failed on March 12, as a result of smaller sloughing off the head scarp and flanks, as they were still intact after March of 1996. These saturated flow features were generally at least twice as long as they were wide and were composed of non-blocky saturated residual soil that resemble lobes.

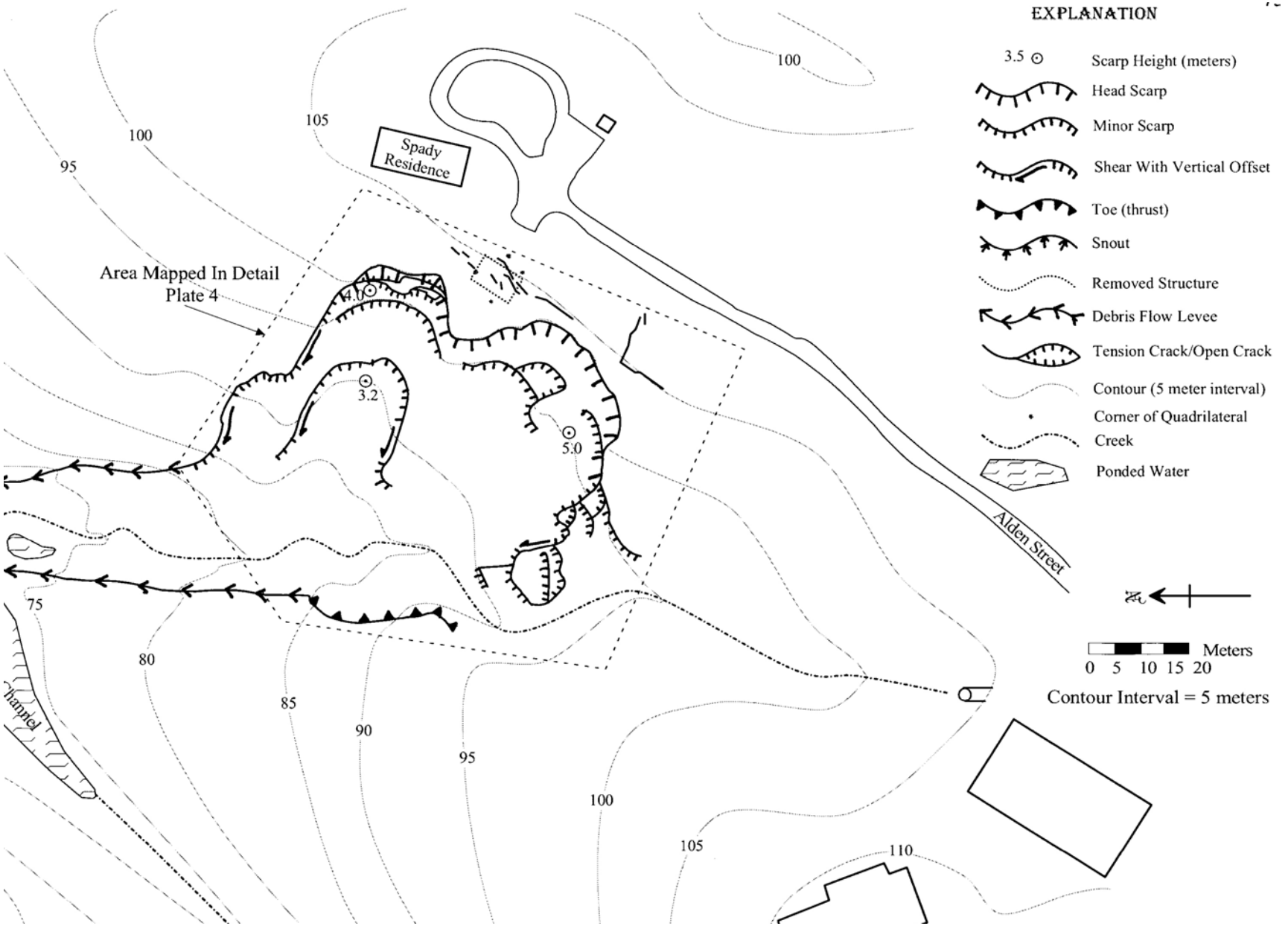
The point where the slide becomes a debris flow (bottom of cross section A-A' on Plate 3 was the only place where the Upper Troutdale Formation was exposed. The rest of the slide occurred in the residual soils that covers the parent material on the slope.

DEBRIS FLOW - The channelized section of the slide, from elevation 73 to 90 meters, was 80 meters long and has debris levees on both flanks of the main body (Figure 11). These levees mark the highest elevation the saturated soil and debris reached during flow down the channel. They were located along most of the debris flow and range from 0.3 to 1.2 meters in height and 3 to 28 meters in length. The tops and sides of some of these debris levees had scour marks resembling slickensides and trended parallel to the general direction of flow. This section of the 1996 failure of the Spady Landslide also exhibited saturated flow lobe features, like the zone of saturated flow, that contained toe-like thrusts of blocky debris at the ends of each lobe. When this debris flow reached the intersection of the next creek, it formed a snout with a vertical thrust of about 1.5 meters.

PRE-FAILURE STABILITY ANALYSIS - A pre-failure stability analysis was performed along the slope where the 1996 failure took place (appendix 3). This analysis was performed using Janbu's method of slices, which calculates the factor of safety of a known failure plane. The cross section line A-A' was used as the line of analysis. The analysis variables were derived from Table 5 and a water table was assumed to be at a depth of 0.5 meters below the ground surface. The material properties were lowered until a factor of safety at one (F_s=1.0) was reached for the higher than normal precipitation year of 1996 (Figure 22 and appendix 3).

Growth of the Spady Landslide: The 1997 Failure

The second failure occurred early in January 1997 (Figure 23), following the heavy rains of December 1996. The first and most obvious difference was the change in shape and increase in size of the evacuated area from one to two oblong shaped bowls with a volume increase from 2,200 m^3 to 14,600 m^3 (Figure 21 and Figure 23). The direction along the slope where this increase took place was not upslope, as seen in the 1996 failure, but along the slope (north, and next to the 1996 failure). The debris flow section of this second landslide also increased to about twice the length it was after the 1996 failure and has ponded the next channel at the intersection of the two creeks (Figure 12).


EXPLANATION
3.5 Scarp Height (meters)
Head Scarp
Minor Scarp
Shear With Vertical Offset
Toe (thrust)
Snout
Removed Structure
Debris Flow Levee
Tension Crack/Open Crack
Contour (5 meter interval)
Corner of Quadrilateral
Creek
Ponded Water
Spady Residence
Area Mapped In Detail
Plate 4
Alden Street
4.0
3.2
5.0
100
105
95
75
80
85
90
110
Meters
0 5 10 15 20
Contour Interval = 5 meters

Another change with the 1997 failure of this landslide is the noticeable increase in depth to the failure plane. This increased depth, up to 2.5 meters in places, is marked by the outcrop of upper Troutdale Formation beds in the zone of stretching and the minor scarps and down-dropped blocks located below the head scarp, neither of which were seen after the 1996 failure. The four layers outcropping within the zone of stretching are presumed to be horizontal beds of the upper Troutdale formation and vary in texture from a silty clay to a silty clay loam (Plate 3-cross section B-B' and Table 5).

Description of the 1997 Failure of the Spady Landslide

Deformation on the surface of the 1997 failure of the Spady Landslide was documented with a Sokkia, five second Total Station, during May of 1997. Soil samples were taken at four locations and several lab tests were performed, including grain size analysis (sieve and hydrometer), relative density, plasticity, and moisture content (Table 5-units 2, 3, and 4 appendix 3, sample locations are on Plate 3). A post-failure (1997) stability analysis was performed to analyze the area above the new head scarp (appendix 3). The following is a description of the four zones which the 1997 failure of the Spady Landslide was divided into for classification purposes: zone of extension, shear zones, zone of saturated flow, and the debris flow.

ZONE OF EXTENSION - This section of the landslide is marked by two bowl-shaped structures, with a ridge running between them. It is approximately 65 meters wide and

45 meters long. The head scarp has approximately five to six meters of vertical displacement (Plate 3).

There are numerous tension cracks located above the head scarp, with most of them occurring above the right bowl, where the small structure was located before it was moved in January 1997 (Figure 23). Most of these tension cracks parallel the head scarp and range in opening from 2 to 20 centimeters. One of these tension cracks pulled apart a surface tree root, producing 11 centimeters of displacement. During May 1997 a quadrilateral was placed in this area of critical stability, but measurements on this quadrilateral did not display any major (>0.5 cm) movements (Keaton and DeGraff, 1996). Above the left bowl, a tension crack with 5 to 30 centimeters of vertical and 10 to 20 centimeters of horizontal displacement marks the upper extent of the zone of extension. This tension crack split a dead tree.

The zone of extension also has numerous minor scarps with down dropped blocks located between them. Most of these minor scarps are located in the right bowl where the cross section is located, and none of the minor scarps appear to transect the ridge between the two bowls. These minor scarps and down dropped blocks seem to be associated with the contacts between bedrock stratigraphy, as there is one of each with three of the four changes in stratigraphy (Plate 3-cross-section B-B').

SHEAR ZONE - The left flank remained almost the same as it was after the 1996 failure with the exception of some small sloughing. The left flank is divided into two shear sections that are right stepping en-echelon. This new shear zone (right flank) did

not have many tension cracks extending out from it, like the right flank of the 1996 failure.

ZONE OF SATURATED FLOW - Like the 1996 failure, the main body of the 1997 slide has several saturated flow lobes (Plate 3). Below the head scarp and minor scarps several spring lines mark contacts between layers and the beginning of saturated flow lobes. These flow lobes are divided into saturated and blocky flow lobes. The blocky lobes seem to be made of 5 to 25 centimeter in diameter blocks of bedrock, mostly from the upper two layers and the residual soils, while the saturated flow lobes are a slurry of material, non-blocky in nature. These lobes also seem to have occurred just after the main failure as a result of head scarp, minor scarp, and flank sloughing.

DEBRIS FLOW - The channelized section of the 1997 Spady Landslide is approximately 150 meters long and like the 1996 failure, it too has debris levees on both flanks. The current deposit (1997) flowed over the top of the 1996 deposit and into the next creek channel forming a dam at the convergence of the valleys. A pond is currently located up valley from this dam with a water depth of approximately 0.5 to 1.5 meters. Below this valley dam and pond the debris flow becomes thinner until it reaches the snout marked by a three meter drop off to undisturbed ground (Figure 23).

POST-FAILURE (1997) ANALYSIS - Stability analysis was performed on the head scarp of the right-bowl and the area above it that contains many tension cracks. This analysis was performed with the program XSTABL with the Bishop analysis for circular

failure planes (Sharma, 1994). The results were ten likely failure planes with factors of safety ranging from 1.1 to 1.3, values critically close to one (appendix 3).

Discussion of the Spady Landslide

The first and most obvious change in growth of this landslide is the increase in depth to the failure plane from 3.5 to 5-6 meters and the addition of a second bowl-shaped evacuation area (Plate 1 and Plate 2).

The most probable cause of initial failure of the Spady Landslide in 1996 was a combination of stream bank erosion and a higher than normal perched water table in the residual soils on the slope. This theory is supported by the pre-failure stability analysis (appendix 3). The raised water table is very probable, considering this failure occurred in early March 1996, right after the February 100-year flood in the Pacific Northwest (Figure 22)(National Weather Service, 1998). This raised water table, in combination with the removal of soil (lateral support) from the stream bank through increased runoff in the creek added the increase in driving forces needed to initiate movement.

The 1996 failure occurred along the boundary between the weaker residual soils and the bedrock units of the upper Troutdale (Table 5 and Plate 1: cross-section A-A'). These bedrock units, besides having greater strength, have a slow to no dilatancy inferring low permeability (Al-Khafaji and Andersland, 1992). Although this unit was classified as a silt loam, it has properties very similar to a clay and is assumed to act like a clay. This also infers that the lower units probably slowed or stopped movement of

water, causing the formation of a perched water table in the residual soils. The 1996 initial failure led to the damming of the creek, creation of a small pond, and breeching of the dam resulting in a channelized flow of soil and debris down the valley (Figure 21).

Reviewing the description and interpretation of the 1996 failure combined with the description of the 1997 failure results in some interpretation of the probable causes of the growth of the Spady Landslide in 1997. The most probable reason for the growth of the Spady Landslide is a combination of two causes: a much increased shear stress along the head scarp and right flank of the 1996 slide combined with a higher than normal perched water table on top of the unweathered Troutdale Formation from the heavy rainfall in December 1996 and January 1997.

During the second failure it appears that the right bowl formed first through a catastrophic failure with enough force to shear some of the bedrock units, which have a greater strength than the residual soil. After this initial failure, some smaller sloughing took place along the head scarp and left flank of the left bowl creating the saturated flow lobes. The main excavation of the right bowl, similar to the first failure, caused a debris flow. This debris flow traveled over the top of the 1996 deposit and created a dam at the intersection of the next creek valley.

A post-failure stability analysis reveals that the potential for growth of this landslide is highly probable (appendix 3). In order for growth to occur, the stability analysis confirms that a higher than normal water table, similar to the surface reached during the above average precipitation years of 1996 and 1997 would be needed. Also,

the observations and mapping of the growth of this landslide tend to confirm that the head scarp (right-bowl) and upper right flank are the areas most susceptible to further growth.

Conclusions for Deep and Shallow-Seated Landslides

The main hazards associated with deep and shallow-seated landslides in the study area are very different. The shallow-seated slides generally fail very rapidly, sometimes spawning a potentially life-threatening debris flow in the valley below. Although these shallow-seated landslides are dangerous and can cause considerable damage when they occur, it is relatively easy and economically feasible to mitigate these landslides. Another hazard associated with the shallow-seated slides is the potential for growth if mitigation is not implemented immediately, as shown with the Spady Landslide.

The deep-seated slides in the study area are generally not as dangerous (life-threatening), because their movements, at one time, are generally less and much slower than shallow-seated slides. But these landslides can be extremely costly to mitigate if movement does occur, as shown with the Dewey-Warren Street landslide. Another concern is the potential for earthquake induced movement, as studied with the Highway 213-Morton Road landslide. If a major or great earthquake did occur, the potential for movement of these deep-seated slides greatly increases.

This concern of reactivation of deep-seated landslides is (1998) becoming a reality in some other areas, such as the Aldercrest Landslide in Kelso, Washington, and several

landslides within kilometers of Newell Creek Canyon, such as the Holly Lane Landslide and the Mathew Court Landslide. All of these active, deep-seated landslides are located in the Upper Troutdale Formation.

Chapter 7: Delineating Potentially Unstable Areas

This chapter explains two major goals and products of this study: an accurate record of all landslide features and geologic units displayed on The Engineering Geologic Map and based on this map and the stability analysis, the interpreted relative stability displayed on The Relative Stability Map. The basic methods of preparing the Engineering Geologic Map (Plate 1) and the Relative Stability Map (Plate 2) included in this thesis was presented by Hoexter et al. (1978), Richards (1982), and Wieczorek (1984).

The Engineering Geologic Map

The Engineering Geologic Map is a record of all the landslide features, residual soils, geologic formations, and hydrogeologic features encountered during the field investigation portion of this study. The landslide features are represented by differing line types corresponding to the type (deep and shallow-seated) and relative age (active, inactive-young, and inactive-mature) of the feature. The residual soils and bedrock geologic formational contacts are represented by solid and dashed lines. Hydrologic features are displayed as shaded areas (sag ponds and depressions) and points (springs and seeps). This map also includes the locations of the bore holes and well logs examined throughout this study. All of this explanatory information is located on the Engineering Geologic Map (Plate 1).

Although some slopes on the map of the study area do not depict slide features, these areas are not to be considered as totally stable (Richards, 1982). This map is only a static representation of a dynamic system, as the Spady Landslide has proved. However, slopes with landslide features can be expected to be either moving or critically stable (factor of safety at or close to one), and development should be planned with this in mind (Richards, 1982). This Engineering Geologic Map is not a substitute for more detailed site-specific work. It is intended as a tool for the geotechnical engineer and presents all the relevant information which may affect stability in the study area.

The Relative Stability Map

The Relative Stability Map is an interpretation of the stability of the study area based on all the information recorded within this thesis and the Engineering Geologic Map (Plate 2). It is intended for land use planners, architects, and others involved in development. This map delineates stable areas, potentially unstable areas, and moving ground with the following percents of the study area: moving ground (5%), potentially unstable ground (56%), stable ground (38%). These categories are further differentiated into deep- and shallow-seated landsliding and areas of man-made fill and cutslopes of questionable stability. This further subdivision is performed because of the potentially extreme difference in difficulty and cost of mitigation of shallow-seated landslides versus deep-seated landslides. Since about half of the study area is located within Portland's Urban Growth Boundary, it can be expected to be developed at some point in

the future. These categories also represent a recommendation for further investigation required prior to development. To back up these interpreted delineated zones a stability analysis was performed on all of the residual soils. The following is a brief description of each of the map categories delineated on the map and their associated recommendations and the residual soils stability analysis.

Stable Ground

These areas exhibit no current or past history of instability. However, a geotechnical engineer should be consulted prior to development. On steeper slopes, within the stable ground category, an engineer should design all slope and drainage modifications to insure that these modifications do not lead to instability (Richards, 1980). A simple rule is that the only construction on a slope should be one that increases the stability of the slope, even if the slope could be considered stable in its current state.

Potentially Unstable Ground

Slopes which exhibit inactive-young and inactive-mature landslide features, hummocky topography, or other characteristics of past movement are categorized as potentially unstable. Areas immediately adjacent to slide masses and areas having similar soil, hydrologic, and slope conditions are also included in this category. These areas probably have a factor of safety above, but close to, one and can be considered

critically stable. These conditions are extremely susceptible to minor slope modifications which may initiate instability or renewed instability.

An example of this is the Highway 213, mile post 2.1 shallow-seated landslide, in which construction of the Highway through excavations (cutslope) and minor amounts of fill initiated movement. Since the time construction was finished (early 1980s) and a large rock buttress and a caged/rock retaining structure were emplaced to stop movement, there does not appear to have been significant movement. If this area had been initially recognized as potentially unstable, the design and construction plan could have taken this into account and possibly avoided these problems (Richards, 1980; Hoexter et al., 1978).

Before any development in areas delineated as potentially unstable ground, a geotechnical engineer and an engineering geologist should be consulted to investigate the site and surrounding area in order to make design recommendations. In areas with potential for deep-seated landsliding, extreme caution should be used when planning for development. Development in these areas should plan to increase the stability of the slope, the cost of which would most likely be far less than the cost of repairing damage and stabilizing a renewed deep-seated landslide (Richards, 1982).

Moving Ground

Areas delineated as moving ground are locations of active landsliding. These areas should be stabilized prior to any development and extreme caution should be used prior to and during development of these areas.

Residual Soils Stability Analysis

A generalized stability analysis was performed on all of the residual soils in the study area to evaluate areas of potential instability and to confirm conditions in areas that contained mapped landslides. This analysis was performed with the infinite slope equation (seepage parallel to slope, equation 3) to calculate the factor of safety. After the factor of safety for all the residual soils was calculated, the program Arc View GIS was used to relate the data spatially (ESRI, 1997).

The eight soil series found in the study area were divided into three categories with relatively equal thickness, general slope angles, and soil properties (Table 6, Table 1 and Table 2)(Gerig, 1985).

Table 6: Generalized material properties for the three catagories of residual soils

Soil Series	Thickness (meters)	Slope Angle (degrees)	Soil Texture (USDA)	Cohesion (KPa)	Friction Angle (degrees)
92F	1.5	10-35	Gravelly Clay Loam	9.55	25
37D	1.5	5-15	Silt Loam	9.55	15
8B&C, 45B&C, 91B&C	4.5	0-10	Silt-Silty Clay Loam	9.55	15

The soil properties for these three categories were derived from the pre-failure stability analysis of the 1996 Spady Landslide, the Soil Survey of Clackamas County, and Taylor's Stability Chart for soils with a friction angle (Gerig, 1985; Abramson et al, 1996). With these three categories, the factors of safety were calculated for the generalized slope angles from Gerig (1985) and the slope angles needed to reach a factor of safety < 1.5 (projected) or a slope considered to be unsafe (Senneset, 1996). Figure 24 is a graph of the values calculated for the three categories. Next, Arc View GIS was used to calculate the actual slope angles in the study area from the 10 foot contours. This was done with the spatial analysis tool package in the program with a grid spacing of 15 meters (Figure 25). Finally, a map query was performed between the soil series layer and the slope angles layer. This query consisted of the spatial location of any slopes in any of the three categories that had a factor of safety below 1.5 (Figure 26). Examining this map, one can see that the locations calculated (zoned) with slopes with a F_s<1.5 coincide relatively strongly with the mapped, shallow-seated landslides. A few mapped slides are not touching these zone areas, but I noticed that nine out of these ten slides occurred on creek cut banks with a local slope angle higher than depicted by the slope angles.

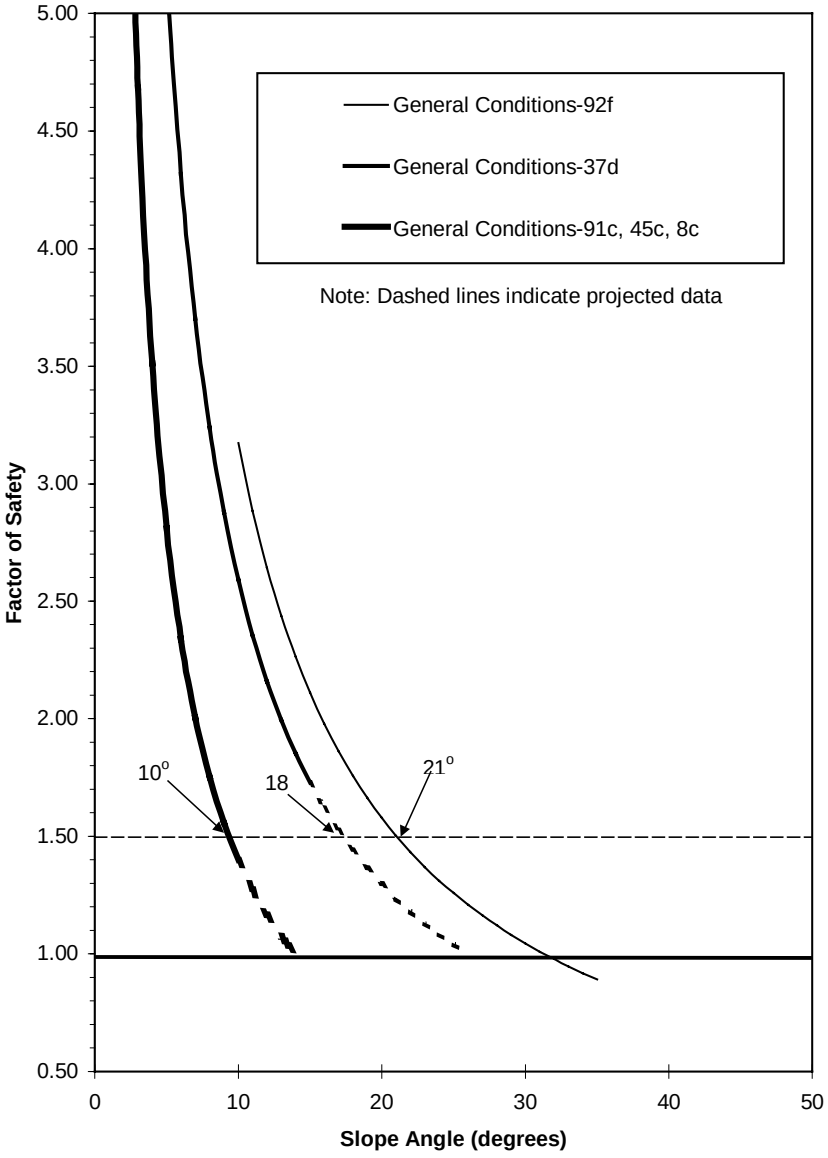


Figure 24: Graph of the factor of safety versus slope angles for the residual soils in the study area with a constant water table at a depth of 0.5 m. Note the critical slope angles for each category, above which the factor of safety falls below 1.5.

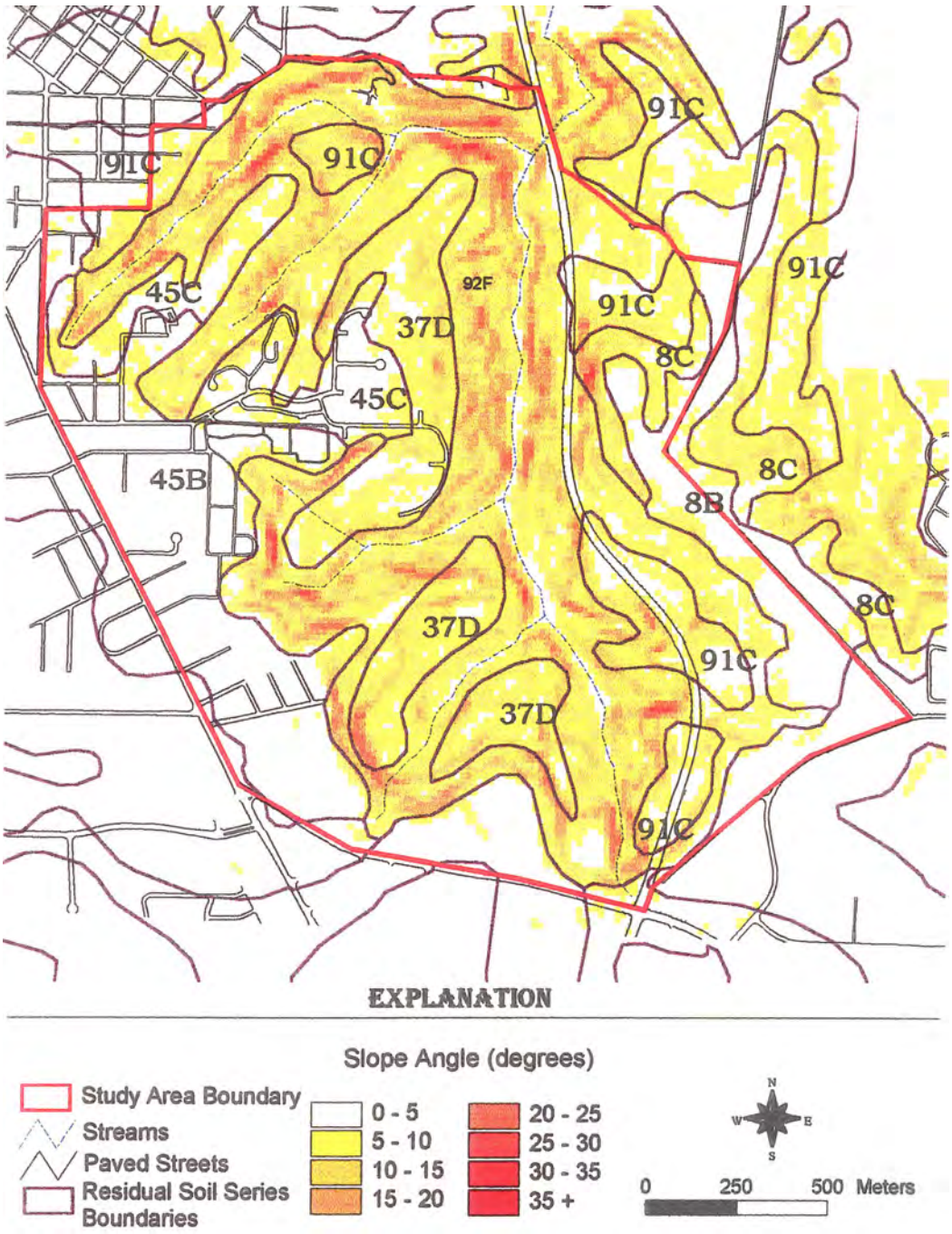


Figure 25: Map of actual slope angles within the study area and the relation to the residual soils.

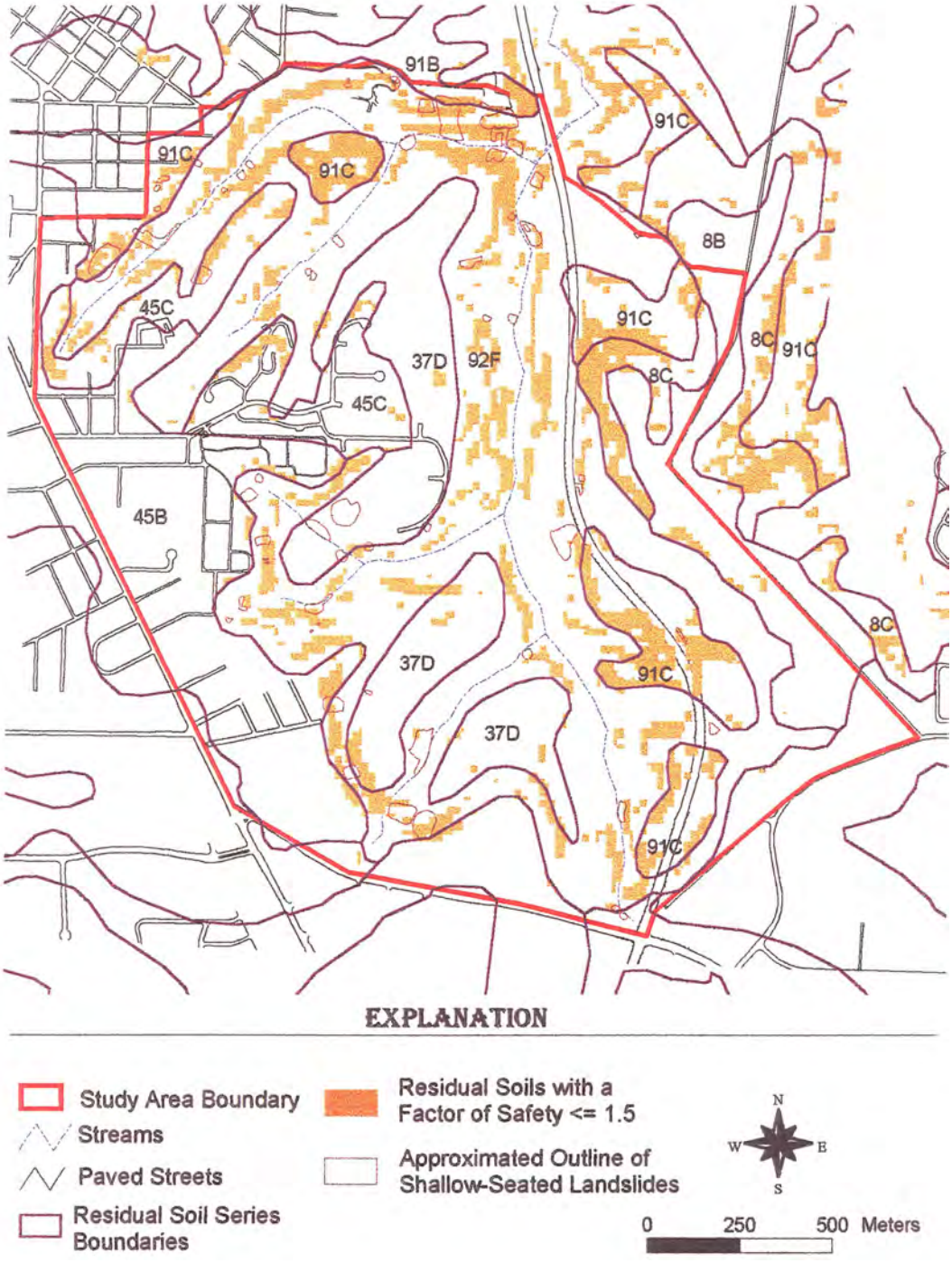


Figure 26: Map of residual soil series with factors of safety less than 1.5 and the approximated outlines of mapped shallow-seated landslides.

CHAPTER 8: CONCLUSIONS

This engineering geologic investigation and interpretation of the relative stability of the southern half of Newell Creek Canyon covered an area roughly 3.1 km^2. The results of this study are a set of detailed maps displaying areas of active and formerly active landslides, geologic bedrock and soil distribution, and a set of recommendations concerning future development and the possible stability conditions that may be encountered.

The mapping of morphological landslide features and associated features resulted in the identification of 79 landslides in the southern half of Newell Creek Canyon (Plate 1). These landslides were divided into two classes related to the depth to the failure plane resulting with 65 shallow-seated and 14 deep-seated landslides. All of these landslides were also classified geomorphologically, totaling 65 earthflows, 3 earthflow/debrisflows, 9 slumps, and 2 slump/earthflows (Easterbrook, 1993). From the Engineering Geology Map combined with a stability analysis, the Relative Stability Map was created resulting in three zones of relative stability with the following percents of the study area: moving ground (5%), potentially unstable ground (56%), stable ground (38%).

Suggested Engineering Geologic and Geotechnical Investigation

Engineering geologic investigations and interpretation of the relative slope stability serve as an essential first step in the evaluation of landslide hazards for regional and community land-use planning, decision making, and development. After this decision making has taken place, an experienced engineering geologist should complete a similar site-specific investigation including an engineering geologic map, relative stability map, and a report of observations and suggestions concerning development. This investigation should, in turn, be followed by a geotechnical study including a subsurface investigation such as drilling or trenching with insitu testing and sampling, testing of soil and bedrock samples, and stability computations.

The annual estimated $4 million cost of landslide damage in Oregon reveals the severity of the problem. In 1997, along with one of my professors, Scott Burns, and two other graduate students completed a landslide inventory of the entire Portland Metropolitan Region (Burns et al., 1998). This study focused only on landslides occurring in the past two years (1996-1997), yet 705 landslides were mapped, and a total of over $40 million for mitigation was estimated! However, I suggest that this study on Newell Creek Canyon and studies similar to it, followed by the recommended site-specific studies can reduce these costs immensely.

Suggested Land Use Planning

The purpose of the engineering geologic investigation is not to prevent development, but to promote educated decision making and wise development. Any area can be developed if the potential for instability is determined and the cost of stabilization and development meets the developer's budget. Yet, some of these areas may be worth more to the community, socially and economically, if other land uses are implemented, such as parks.

Suggested Further Study

As Portland continues to expand its suburbs due to continued population increases and as there is continued pressure to develop in geologically hazardous terrain, the need for the development of relative stability maps for educated decision making is increased. In a recent study by Burns et al. (1998), five zones of high risk for landsliding were delineated for the Portland Metropolitan Region. One of these zones is the fine grained facies of The Troutdale Formation, which covers hundreds of square kilometers in the southeast section of Portland. Newell Creek Canyon is located within this zone and most of the rest of this zone contains slides similar in type and density to these in Newell Creek Canyon.

Another concern within the Portland Metropolitan Region is the potential for earthquake induced and reactivation of currently identified landslides. Portland is in seismic risk zone 3, meaning the area can experience earthquakes of magnitudes up to

VIII (Schlicker and Finlayson, 1979). The effects of an earthquake can be added to the simplified factor of safety equation through a second pseudostatic driving force component or earthquake thrust (Abel, 1997).

I suggest that before the area zoned as a high potential for landslides in the 1998 study by Burns, et al. becomes urbanized, a study similar to this one should be performed on this zone. Included with this study should be the evaluation for reactivation of earthquake induced landslides.

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APPENDIX A

Well Drillers and Bore Hole Logs

Well Drillers Log Number 29

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

CLAC 4426

RECEIVED
NOV 21 1984
WATER RESOURCES DEPT.
SALEM, OREGON

04428 2S/2E-33

PLEASE TYPE OR PRINT USING INK. (for official use only)

(1) OWNER:
Name CAROL SCHRING
Address 14072 S. MORTON RD
City ORE CITY State OR

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL: Rotary Air ☑ Driven ☐ Rotary Mud ☐ Dug ☐ Cable ☐ Bored ☐

(4) PROPOSED USE (check): Domestic ☑ Industrial ☐ Municipal ☐ Irrigation ☐ Thermal: ☐ Withdrawal ☐ Reinjection ☐ Other: Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED: Steel Threaded ☑ Plastic Welded ☐
6" Diam. from +2 ft. to 282 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED: Steel Threaded ☐ Plastic Welded ☐
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS: Perforated? ☐ Yes ☑ No
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☑ Yes ☐ No
Manufacturer's Name Johnson
Type STAINLESS STEEL Model No.
Diam. 5½ Slot Size .20 Set from 286 ft. to 291 ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
gal./min. with ft. drawdown after hrs.
Air test 30+ gal./min. with drill stem at 260 ft. 2 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION: Special standards: Yes ☐ No ☑
Well seal—Material used CEMENT
Well sealed from land surface to 21 ft.
Diameter of well bore to bottom of seal 10+ in.
Diameter of well bore below seal 6 in.
Amount of sealing material 8 sacks ☑ pounds ☐
How was cement grout placed? PUMP

Was pump installed? NO Type HP Depth ft.
Was a drive shoe used? ☑ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☑ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:
County CLACKAMAS ¼ ¼ of Section 33 of
Township 2S. (Township is North or South) Range 2E (Range is East or West) WM.
Tax Lot 0500 Lot Block Subdivision
MAILING ADDRESS OF WELL (or nearest address) 14072 S. MORTON RD ORE CITY, OR 97045

(11) WATER LEVEL of COMPLETED WELL:
Depth at which water was first found 285 ft.
Static level 205 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 6
Depth drilled 304 ft. Depth of completed well 296 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
TOP SOIL	0	1	
BROWN CLAY	1	21	
GRAY CLAY	21	42	
GRAY CLAYSTONE	42	163	
CEMENTED GRAVEL & SAND	163	187	
GRAY CLAYSTONE	187	232	
BROWN CLAYSTONE SANDY	232	285	
SAND W/SOME SM. GRAVEL	285	295	205
GRAY CLAY & GRAVEL	295	304	

NOTE: 4½ FEET of 5 INCH CASING ABOVE AND BELOW SCREEN.

Date work started 9/24/84 /completed 10/6/84
Date well drilling machine moved off of well 10/6 19 84

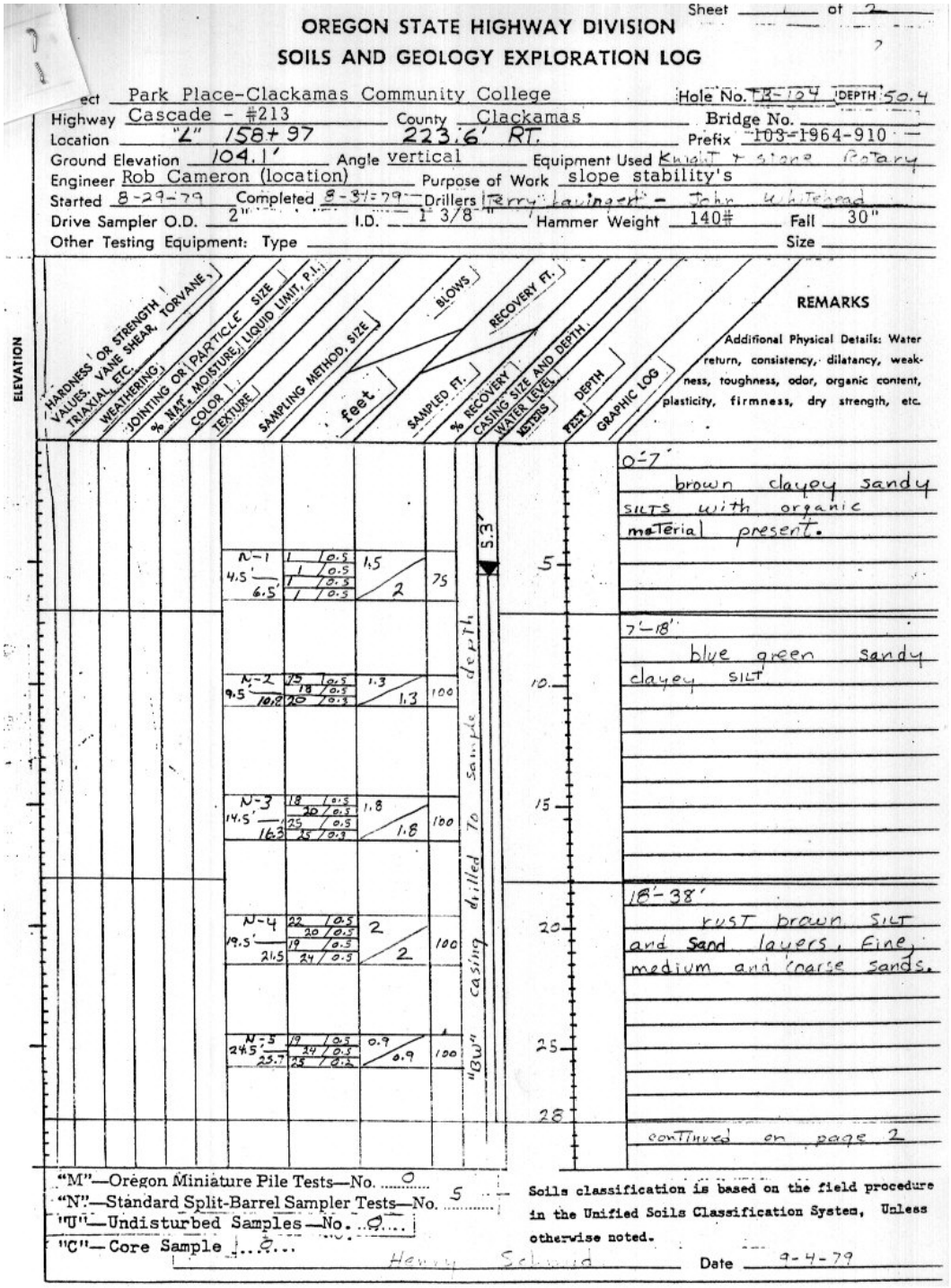
(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Date , 19

(bonded) Water Well Constructor Certification:
Bond (number) Issued by: (Surety Company Name)
On behalf of DANIEL V. WILAND (type or print name of Water Well Constructor)
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
(Signed) Daniel V. Wiland (Water Well Constructor)
(Dated) 10/20/84

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*46866-890

Bore Hole Number B-104



OREGON STATE HIGHWAY DIVISION
SOILS AND GEOLOGY EXPLORATION LOG

Sheet 1 of 2

Project Park Place-Clackamas Community College — Hole No. B-104 — DEPTH 50.4
Highway Cascade - #213 — County Clackamas — Bridge No.
Location "L" 158+97 223.6' RT. — Prefix 103-1964-910 —
Ground Elevation 104.1' — Angle vertical — Equipment Used Knight + Stone Rotary
Engineer Rob Cameron (location) — Purpose of Work slope stability's
Started 8-29-79 — Completed 8-31-79 — Drillers Terry Lavinder - John Whitehead
Drive Sampler O.D. 2" — I.D. 1 3/8" — Hammer Weight 140# — Fall 30"
Other Testing Equipment: Type — Size

ELEVATION	HARDNESS OR STRENGTH / VALUES, TRIAXIAL, VANE SHEAR, TORVANE, ETC. / WEATHERING / JOINTING OR PARTICLE SIZE / % NAT. MOISTURE / LIQUID LIMIT, P.I. / COLOR / TEXTURE	SAMPLING METHOD, SIZE	feet	BLOWS	SAMPLED FT.	RECOVERY FT. / % RECOVERY	CASING SIZE AND DEPTH / WATER LEVEL / NOTES	DEPTH	GRAPHIC LOG	REMARKS: Additional Physical Details: Water return, consistency, dilatancy, weakness, toughness, odor, organic content, plasticity, firmness, dry strength, etc.
		N-1	4.5 / 6.5	1 0.5 / 1 0.5 / 1 0.5 / 1 0.5	1.5	2	75	5.3'	5	0-7' brown clayey sandy SILTS with organic material present.
		N-2	9.5 / 10.8	15 0.5 / 18 0.5 / 20 0.3	1.3	1.3	100		10	7-18' blue green sandy clayey SILT
		N-3	14.5 / 16.3	18 0.5 / 20 0.5 / 25 0.5 / 25 0.3	1.8	1.8	100		15	
		N-4	19.5 / 21.5	22 0.5 / 20 0.5 / 19 0.5 / 24 0.5	2	2	100		20	18-38' rust brown SILT and Sand layers, Fine, medium and coarse sands.
		N-5	24.5 / 25.7	19 0.5 / 24 0.3 / 25 0.2	0.9	0.9	100		25	
									28	continued on page 2

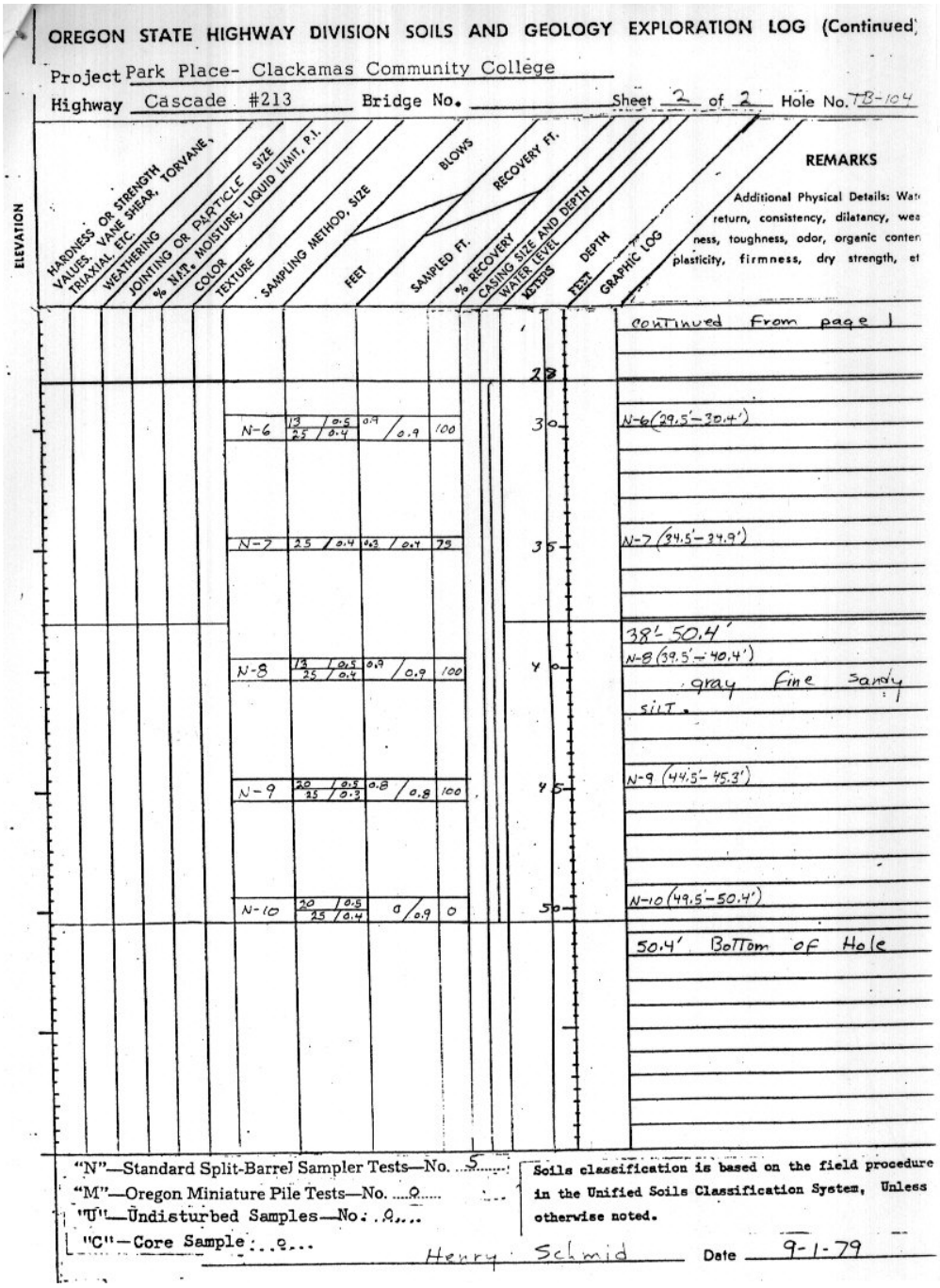
"8w" casing drilled to sample depth

"M"—Oregon Miniature Pile Tests—No. 0
"N"—Standard Split-Barrel Sampler Tests—No. 5
"U"—Undisturbed Samples—No. 0
"C"—Core Sample ...0...

Soils classification is based on the field procedure in the Unified Soils Classification System, Unless otherwise noted.

Henry Schmid — Date 9-4-79

Bore Hole Number B-104 (continued)



OREGON STATE HIGHWAY DIVISION SOILS AND GEOLOGY EXPLORATION LOG (Continued)

Project Park Place- Clackamas Community College

Highway Cascade #213 Bridge No. _____ Sheet 2 of 2 Hole No. B-104

ELEVATION	HARDNESS OR STRENGTH VALUES, VANE SHEAR, TORVANE, TRIAXIAL, ETC.	WEATHERING	JOINTING OR PARTICLE SIZE	% NAT. MOISTURE, LIQUID LIMIT, P.I.	COLOR	TEXTURE	SAMPLING METHOD, SIZE	FEET	BLOWS / SAMPLED FT.	RECOVERY FT. / % RECOVERY	CASING SIZE AND DEPTH / WATER LEVEL	METERS	FEET	GRAPHIC LOG	REMARKS
															continued From page 1
													28		
							N-6	13 / 25	0.5 / 0.4	0.9 / 0.9	100	30			N-6 (29.5'-30.4')
							N-7	25	0.4	0.9	0.9	75	35		N-7 (34.5'-34.9')
															38' 50.4'
							N-8	13 / 25	0.5 / 0.4	0.9 / 0.9	100	40			N-8 (39.5'-40.4') gray Fine Sandy silT.
							N-9	20 / 25	0.5 / 0.3	0.8 / 0.8	100	45			N-9 (44.5'-45.3')
							N-10	20 / 25	0.5 / 0.4	0 / 0.9	0	50			N-10 (49.5'-50.4')
															50.4' Bottom of Hole

"N"—Standard Split-Barrel Sampler Tests—No. 5

"M"—Oregon Miniature Pile Tests—No. 0

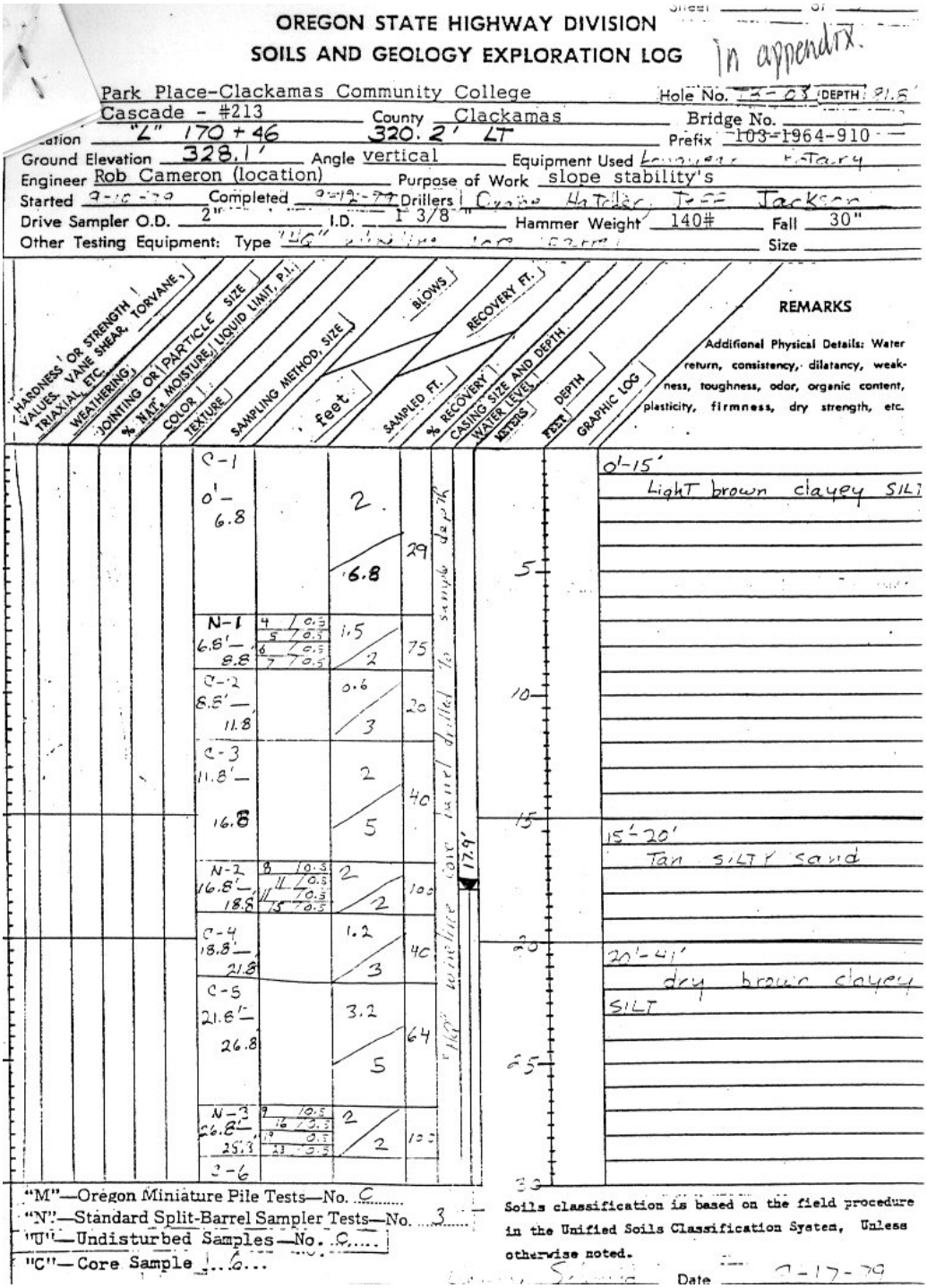
"U"—Undisturbed Samples—No. 0

"C"—Core Sample 0

Soils classification is based on the field procedure in the Unified Soils Classification System, Unless otherwise noted.

Henry Schmid Date 9-1-79

Bore Hole Number TB-108



OREGON STATE HIGHWAY DIVISION
SOILS AND GEOLOGY EXPLORATION LOG

In appendix.

Park Place-Clackamas Community College — Hole No. TB-08 (DEPTH 21.6')
Cascade - #213 — County Clackamas — Bridge No.
Location "L" 170+46 320.2' LT — Prefix 103-1964-910
Ground Elevation 328.1' — Angle vertical — Equipment Used [illegible] 4-Tarp
Engineer Rob Cameron (location) — Purpose of Work slope stability's
Started 9-16-79 — Completed 9-19-79 — Drillers Crane Hatler, Tess Jackson
Drive Sampler O.D. 2" — I.D. 1 3/8" — Hammer Weight 140# — Fall 30"
Other Testing Equipment: Type "U" [illegible] — Size

Sample	Blows	Recovery Ft.	Sampled Ft.	% Recovery	Feet	Graphic Log	Remarks
C-1 0'-6.8'	2 / 6.8	29			0		0'-15' Light brown clayey SILT
N-1 6.8'-8.8'	4 / 0.5, 5 / 0.5, 6 / 0.5, 7 / 0.5	1.5 / 2	75		5		
C-2 8.8'-11.8'	0.6 / 3	20			10		
C-3 11.8'-16.8'	2 / 5	40			15		15'-20' Tan SILTY sand
N-2 16.8'-18.8'	8 / 10.5, 11 / 0.5, 15 / 0.5	2 / 2	100		20		
C-4 18.8'-21.8'	1.2 / 3	40					20'-41' dry brown clayey SILT
C-5 21.6'-26.8'	3.2 / 5	64			25		
N-3 26.8'-28.3'	9 / 10.5, 16 / 0.5, 19 / 0.5, 23 / 0.5	2 / 2	100		30		
C-6							

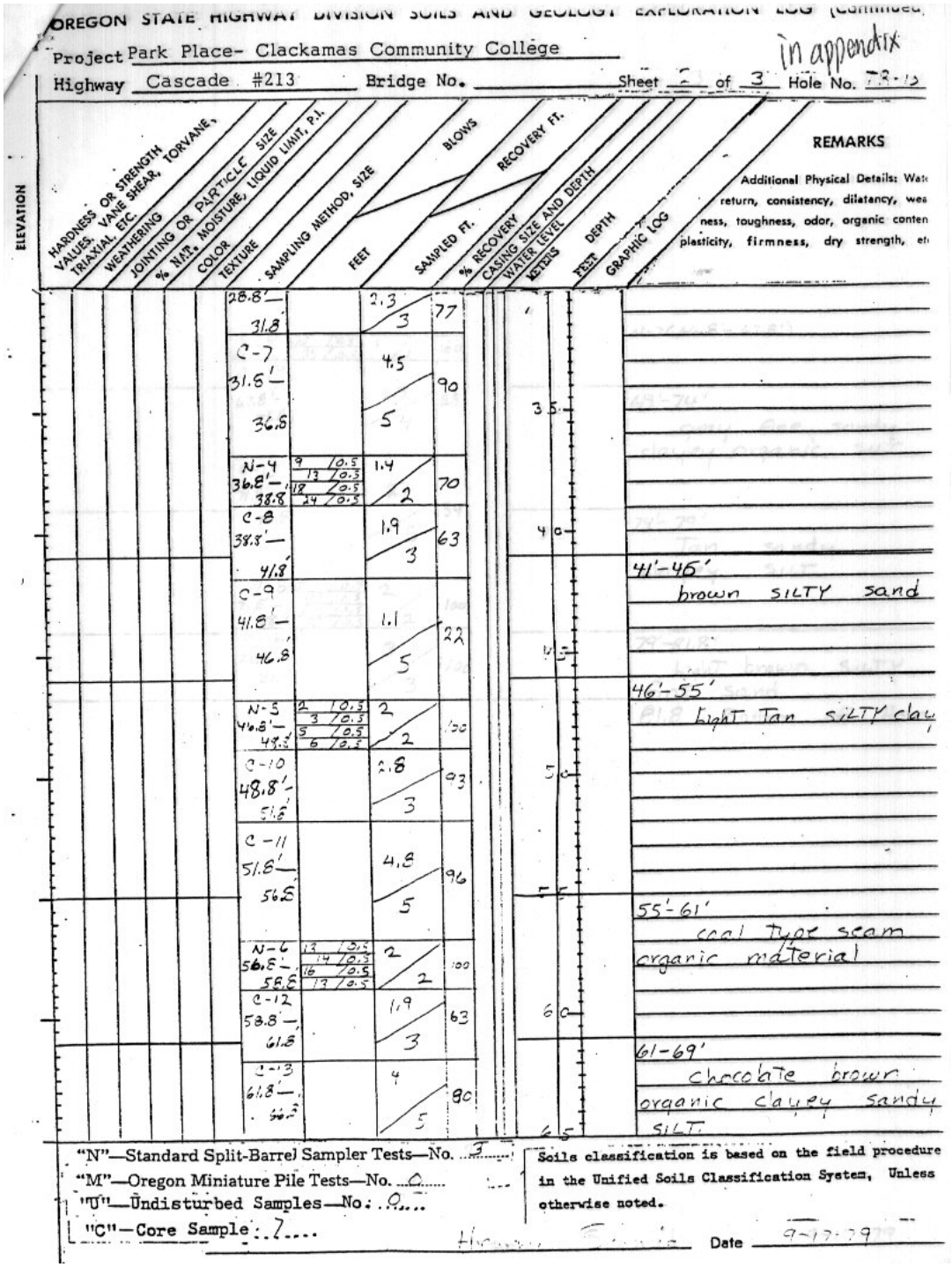
Water level 17.9' during drilling
5" HQ corrective core barrel drilled to sample depth

"M"—Oregon Miniature Pile Tests—No. 6
"N"—Standard Split-Barrel Sampler Tests—No. 3
"U"—Undisturbed Samples—No. 6
"C"—Core Sample 16

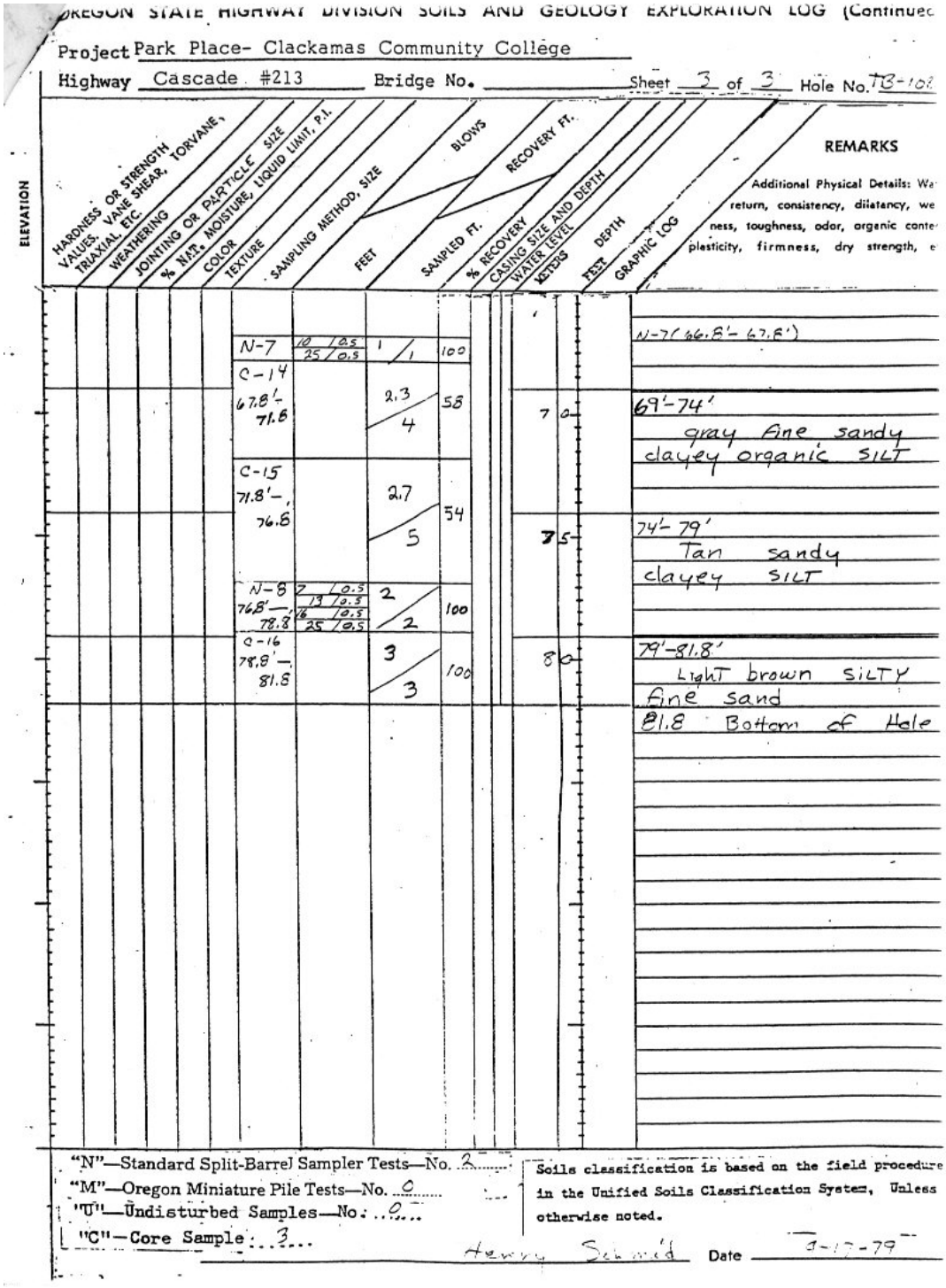
Soils classification is based on the field procedure in the Unified Soils Classification System, Unless otherwise noted.

Signature [illegible] Date 9-17-79

Bore Hole Number TB-108 (continued)



Bore Hole Number TB-108 (continued)



OREGON STATE HIGHWAY DIVISION SOILS AND GEOLOGY EXPLORATION LOG (Continued)

Project Park Place- Clackamas Community College

Highway Cascade #213 Bridge No. _____ Sheet 3 of 3 Hole No. TB-108

ELEVATION	HARDNESS OR STRENGTH VALUES, TRIAXIAL, VANE SHEAR, TORVANE, ETC.	WEATHERING	JOINTING OR PARTICLE SIZE	% NAT. MOISTURE, LIQUID LIMIT, P.I.	COLOR	TEXTURE	SAMPLING METHOD, SIZE	FEET	BLOWS / SAMPLED FT.	RECOVERY FT. / % RECOVERY	CASING SIZE AND DEPTH / WATER LEVEL METERS	DEPTH FEET	GRAPHIC LOG	REMARKS
							N-7	10 / 0.5 25 / 0.5	1 / 1	100				N-7 (66.8'-67.8')
							C-14 67.8'- 71.8		2.3 / 4	58		70		69'-74' gray fine sandy clayey organic SILT
							C-15 71.8'- 76.8		2.7 / 5	54		75		74'-79' Tan sandy clayey SILT
							N-8 76.8'- 78.8	7 / 0.5 13 / 0.5 16 / 0.5 25 / 0.5	2 / 2	100				
							C-16 78.8'- 81.8		3 / 3	100		80		79'-81.8' Light brown SILTY fine sand 81.8 Bottom of Hole

"N"—Standard Split-Barrel Sampler Tests—No. 2

"M"—Oregon Miniature Pile Tests—No. 0

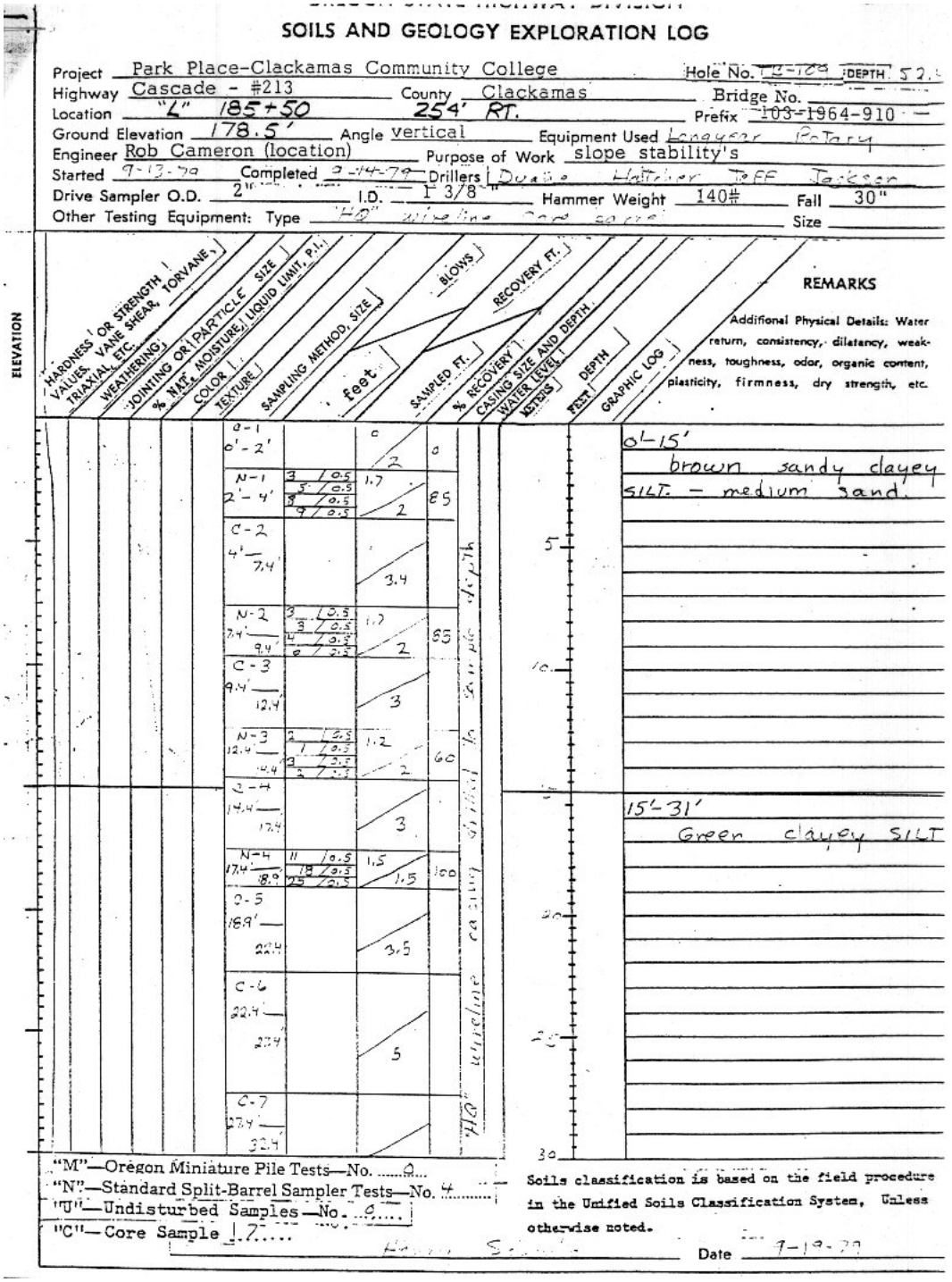
"U"—Undisturbed Samples—No: 0

"C"—Core Sample: 3

Soils classification is based on the field procedure in the Unified Soils Classification System, Unless otherwise noted.

Henry Schmidt Date 7-17-79

Bore Hole Number TB-109



SOILS AND GEOLOGY EXPLORATION LOG

Project Park Place-Clackamas Community College Hole No. TB-109 DEPTH 52.[illegible]
Highway Cascade - #213 County Clackamas Bridge No.
Location "L" 185+50 254' RT. Prefix 103-1964-910
Ground Elevation 178.5' Angle vertical Equipment Used Longyear Rotary
Engineer Rob Cameron (location) Purpose of Work slope stability's
Started 9-13-79 Completed 9-14-79 Drillers Duane Hatcher Jeff Jackson
Drive Sampler O.D. 2" I.D. 1 3/8" Hammer Weight 140# Fall 30"
Other Testing Equipment: Type "HQ" wireline core barrel Size

ELEVATION	HARDNESS OR STRENGTH / VALUES, VANE SHEAR, TORVANE / TRIAXIAL, ETC. / WEATHERING / JOINTING OR PARTICLE SIZE / % NAT. MOISTURE, LIQUID LIMIT, P.I. / COLOR / TEXTURE	SAMPLING METHOD, SIZE	BLOWS / feet	RECOVERY FT. / SAMPLED FT.	% RECOVERY	CASING SIZE AND DEPTH / WATER LEVEL / METERS	DEPTH / FEET	GRAPHIC LOG	REMARKS (Additional Physical Details: Water return, consistency, dilatancy, weakness, toughness, odor, organic content, plasticity, firmness, dry strength, etc.)
		C-1 0'-2'		0 / 2	0				0'-15' brown sandy clayey SILT - medium sand.
		N-1 2'-4'	3 / 0.5; 5 / 0.5; 8 / 0.5; 9 / 0.5	1.7 / 2	85				
		C-2 4'-7.4'		3.4			5		
		N-2 7.4'-9.4'	3 / 0.5; 3 / 0.5; 4 / 0.5; 6 / 0.5	1.7 / 2	85				
		C-3 9.4'-12.4'		3			10		
		N-3 12.4'-14.4'	2 / 0.5; 1 / 0.5; 3 / 0.5; 2 / 0.5	1.2 / 2	60				
		C-4 14.4'-17.4'		3					15'-31' Green clayey SILT
		N-4 17.4'-18.9'	11 / 0.5; 18 / 0.5; 25 / 0.5	1.5 / 1.5	100				
		C-5 18.9'-22.4'		3.5			20		
		C-6 22.4'-27.4'		5			25		
		C-7 27.4'-32.4'					30		

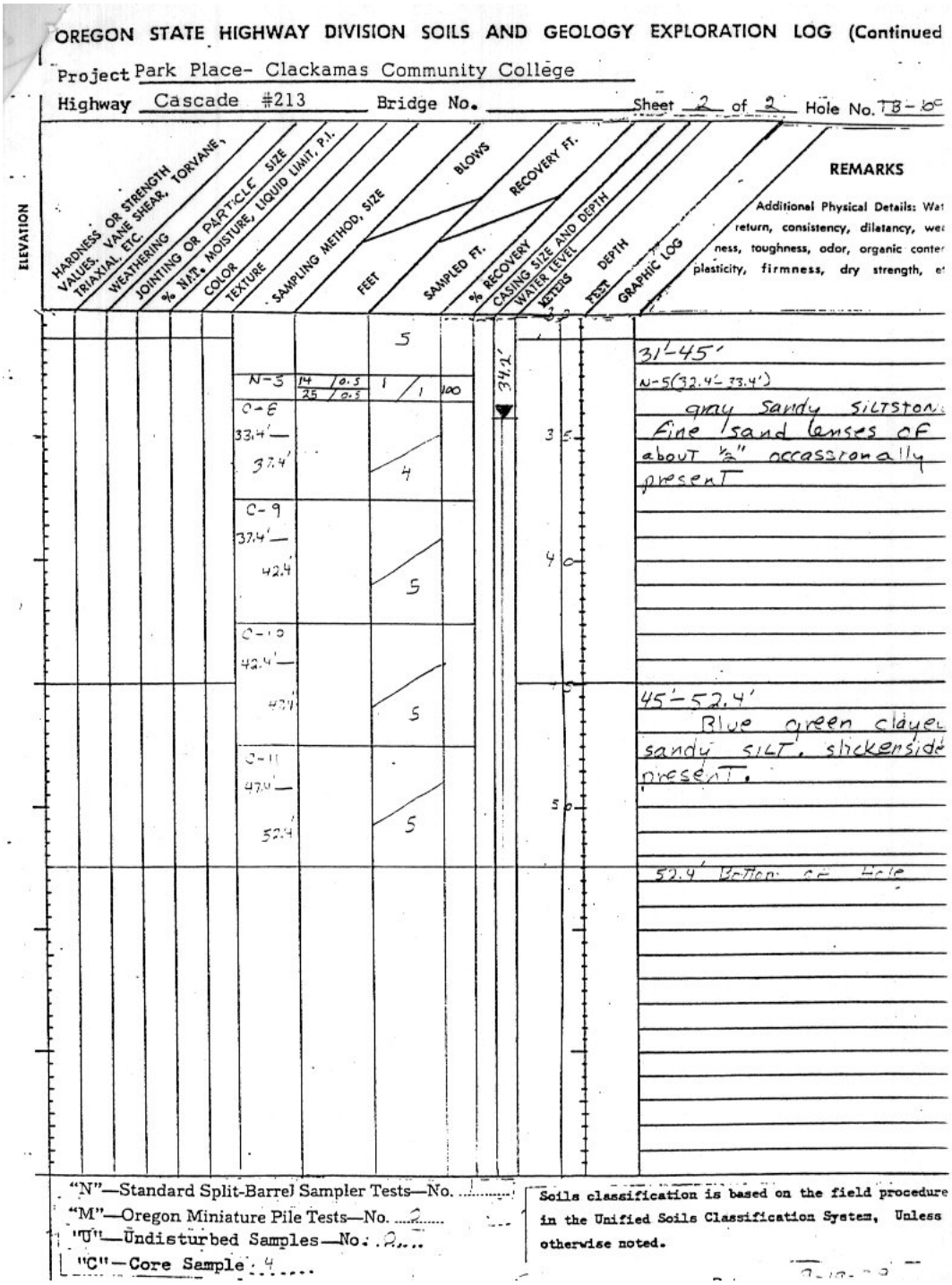
"HQ" wireline casing drilled to sample depth

"M"—Oregon Miniature Pile Tests—No. 0
"N"—Standard Split-Barrel Sampler Tests—No. 4
"U"—Undisturbed Samples—No. 0
"C"—Core Sample 17

Soils classification is based on the field procedure in the Unified Soils Classification System, Unless otherwise noted.

[illegible] Date 9-19-79

Bore Hole Number TB-109 (continued)



OREGON STATE HIGHWAY DIVISION SOILS AND GEOLOGY EXPLORATION LOG (Continued

Project Park Place- Clackamas Community College

Highway Cascade #213 Bridge No. _____ Sheet 2 of 2 Hole No. TB-109

ELEVATION	HARDNESS OR STRENGTH VALUES, VANE SHEAR, TORVANE, TRIAXIAL, ETC.	WEATHERING	JOINTING OR PARTICLE SIZE	% NAT. MOISTURE, LIQUID LIMIT, P.I.	COLOR	TEXTURE	SAMPLING METHOD, SIZE	FEET	BLOWS / SAMPLED FT.	RECOVERY FT. / % RECOVERY	CASING SIZE AND DEPTH	WATER LEVEL	METERS	DEPTH FEET	GRAPHIC LOG	REMARKS
									5							31'-45'
							N-5	14 / 0.5 25 / 0.5	1 / 1	100		34.2'				N-5(32.4'-33.4')
							C-8 33.4'— 37.4'		4				35			gray sandy siltstone fine sand lenses of about ½" occassionally present
							C-9 37.4'— 42.4'		5				40			
							C-10 42.4'— 47.4'		5				45			45'-52.4' Blue green clayey sandy silt, slickenside present.
							C-11 47.4'— 52.4'		5				50			
																52.4' Bottom of Hole

"N"—Standard Split-Barrel Sampler Tests—No. 1

"M"—Oregon Miniature Pile Tests—No. 2

"U"—Undisturbed Samples—No. 2

"C"—Core Sample 4

Soils classification is based on the field procedure in the Unified Soils Classification System, Unless otherwise noted.

APPENDIX B

The Highway 213-Morton Road Landslide: Slices (XSTABL) and Infinite Slope (Critical Thickness) Stability Analysis

XSTABL File: MORT3 2-09-99 18:39

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*          X S T A B L                    *
*                                         *
*       Slope Stability Analysis          *
*            using the                    *
*         Method of Slices                *
*                                         *
*       Copyright (C) 1992 Ä 96           *
*  Interactive Software Designs, Inc.     *
*       Moscow, ID 83843, U.S.A.          *
*                                         *
*        All Rights Reserved              *
*                                         *
* Ver. 5.200              96 Ä 1265       *
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Problem Description : HWY213-Morton Rd. Landslide(current)

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	.0	300.0	100.0	2
2	300.0	100.0	1100.0	150.0	1
3	1100.0	150.0	1400.0	200.0	1
4	1400.0	200.0	1500.0	200.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	100.0	35.0	1500.0	35.0	2

ISOTROPIC Soil Parameters
---

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	100.0	130.0	400.0	.00	.000	.0	1
2	120.0	130.0	.0	32.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	.00
2	300.00	90.00
3	1100.00	130.00
4	1400.00	180.00
5	1500.00	180.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced
along the ground surface between x = .0 ft
and x = 150.0 ft

Each surface terminates between x = 1000.0 ft
and x = 1250.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

18.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 53 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	116.67	38.89
2	134.65	38.21
3	152.64	37.64
4	170.64	37.18
5	188.64	36.83

6	206.63	36.59
7	224.63	36.46
8	242.63	36.43
9	260.63	36.52
10	278.63	36.71
11	296.63	37.01
12	314.63	37.42
13	332.62	37.94
14	350.61	38.57
15	368.59	39.30
16	386.57	40.15
17	404.55	41.10
18	422.52	42.16
19	440.48	43.33
20	458.43	44.61
21	476.38	46.00
22	494.32	47.49
23	512.24	49.09
24	530.16	50.81
25	548.07	52.63
26	565.97	54.55
27	583.85	56.59
28	601.72	58.73
29	619.58	60.99
30	637.43	63.35
31	655.26	65.81
32	673.07	68.39
33	690.87	71.07
34	708.65	73.86
35	726.42	76.76
36	744.17	79.76
37	761.89	82.87
38	779.60	86.09
39	797.29	89.42
40	814.96	92.85
41	832.61	96.39
42	850.24	100.04
43	867.84	103.79
44	885.43	107.65
45	902.98	111.61
46	920.52	115.68

47	938.03	119.86
48	955.51	124.14
49	972.97	128.53
50	990.40	133.02
51	1007.80	137.62
52	1025.18	142.32
53	1039.18	146.20

**** Simplified BISHOP FOS = 1.238 ****

The following is a summary of the TEN most critical surfaces

Problem Description : HWY213-Morton Rd. Landslide(current)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.238	237.76	3017.09	2980.66	116.67	1039.18	1.808E+09
2.	1.250	342.54	2884.51	2841.04	150.00	1131.71	1.617E+09
3.	1.281	199.77	3933.38	3895.38	116.67	1179.73	2.535E+09
4.	1.286	195.27	4162.74	4124.60	116.67	1247.08	2.792E+09
5.	1.298	-368.47	7098.01	7093.69	50.00	1044.98	4.984E+09
6.	1.314	-1148.10	12772.31	12819.78	16.67	1089.68	1.000E+10
7.	1.315	-274.47	7006.97	6993.08	66.67	1097.79	4.832E+09
8.	1.320	160.43	3450.92	3412.31	116.67	1001.21	1.940E+09
9.	1.326	-787.02	9590.53	9614.48	33.33	1001.29	6.680E+09
10.	1.337	-1795.92	17615.50	17702.98	16.67	1090.42	1.335E+10

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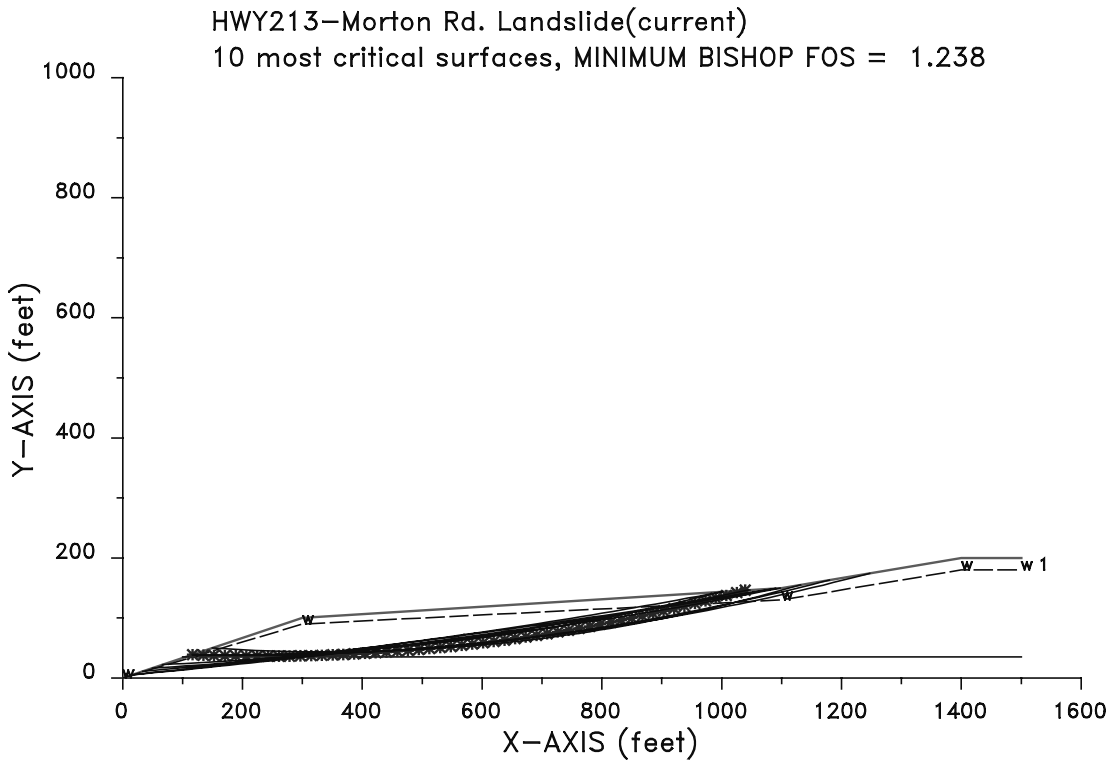

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*            using the                    *
*         Method of Slices                *
*                                         *
*       Copyright (C) 1992 Ä 96           *
*  Interactive Software Designs, Inc.     *
*       Moscow, ID 83843, U.S.A.          *
*                                         *
*        All Rights Reserved              *
*                                         *
* Ver. 5.200              96 Ä 1265       *
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```

Problem Description : HWY213-Morton Rd. Landslide(.10)

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	.0	300.0	100.0	2
2	300.0	100.0	1100.0	150.0	1
3	1100.0	150.0	1400.0	200.0	1
4	1400.0	200.0	1500.0	200.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	100.0	35.0	1500.0	35.0	2

ISOTROPIC Soil Parameters
---

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	100.0	130.0	400.0	.00	.000	.0	1
2	120.0	130.0	.0	32.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	.00
2	300.00	90.00
3	1100.00	130.00
4	1400.00	180.00
5	1500.00	180.00

A horizontal earthquake loading coefficient
of .100 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random
technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced
along the ground surface between x = .0 ft
and x = 150.0 ft

Each surface terminates between x = 1000.0 ft
and x = 1250.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

18.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 57 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	150.00	50.00

2	167.96	48.84
3	185.93	47.79
4	203.91	46.85
5	221.89	46.03
6	239.87	45.32
7	257.87	44.73
8	275.86	44.25
9	293.85	43.89
10	311.85	43.63
11	329.85	43.50
12	347.85	43.47
13	365.85	43.56
14	383.85	43.77
15	401.85	44.09
16	419.84	44.52
17	437.83	45.07
18	455.82	45.73
19	473.81	46.50
20	491.78	47.39
21	509.76	48.39
22	527.72	49.51
23	545.68	50.74
24	563.63	52.08
25	581.57	53.54
26	599.50	55.11
27	617.42	56.80
28	635.33	58.60
29	653.23	60.51
30	671.12	62.53
31	688.99	64.67
32	706.85	66.92
33	724.69	69.29
34	742.52	71.77
35	760.33	74.36
36	778.13	77.06
37	795.91	79.88
38	813.67	82.81
39	831.41	85.85
40	849.13	89.00
41	866.83	92.27
42	884.51	95.64

43	902.17	99.13
44	919.81	102.74
45	937.42	106.45
46	955.01	110.27
47	972.57	114.21
48	990.11	118.26
49	1007.62	122.42
50	1025.11	126.69
51	1042.57	131.07
52	1060.00	135.56
53	1077.40	140.16
54	1094.77	144.87
55	1112.12	149.69
56	1129.43	154.62
57	1131.71	155.28

**** Simplified BISHOP FOS = .585 ****

The following is a summary of the TEN most critical surfaces

Problem Description : HWY213-Morton Rd. Landslide(.10)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	.585	342.54	2884.51	2841.04	150.00	1131.71	1.630E+09
2.	.618	237.76	3017.09	2980.66	116.67	1039.18	1.809E+09
3.	.625	199.77	3933.38	3895.38	116.67	1179.73	2.529E+09
4.	.627	195.27	4162.74	4124.60	116.67	1247.08	2.786E+09
5.	.636	272.26	3502.55	3454.71	150.00	1118.42	1.885E+09
6.	.653	205.28	4211.03	4167.20	133.33	1228.64	2.589E+09
7.	.657	184.03	4004.56	3960.44	133.33	1091.33	2.221E+09
8.	.667	160.43	3450.92	3412.31	116.67	1001.21	1.931E+09
9.	.678	99.33	4964.18	4925.33	116.67	1247.74	3.230E+09
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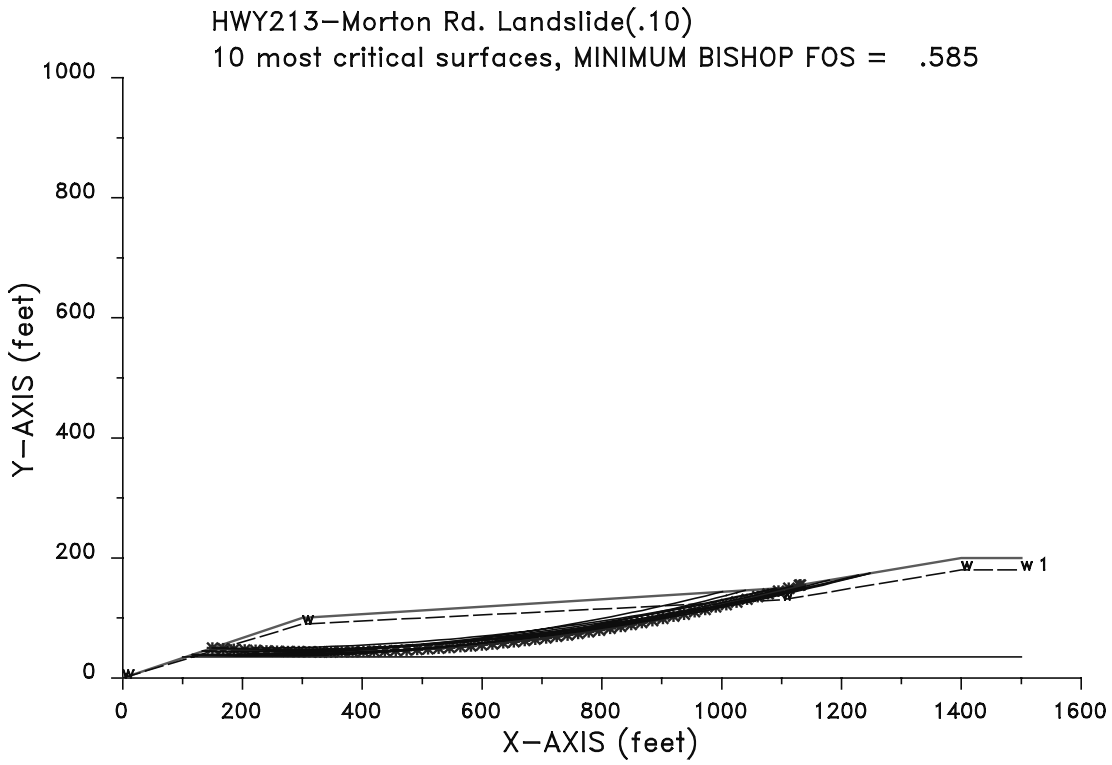

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*          X S T A B L                    *
*                                         *
*       Slope Stability Analysis          *
*            using the                    *
*         Method of Slices                *
*                                         *
*       Copyright (C) 1992 Ä 96           *
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*                                         *
* Ver. 5.200              96 Ä 1265       *
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Problem Description : HWY213-Morton Rd. Landslide(.15)

SEGMENT BOUNDARY COORDINATES

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4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	.0	300.0	100.0	2
2	300.0	100.0	1100.0	150.0	1
3	1100.0	150.0	1400.0	200.0	1
4	1400.0	200.0	1500.0	200.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	100.0	35.0	1500.0	35.0	2

ISOTROPIC Soil Parameters
---

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Surface Constant (psf)	Water Surface No.
1	100.0	130.0	400.0	.00	.000	.0	1
2	120.0	130.0	.0	32.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	.00
2	300.00	90.00
3	1100.00	130.00
4	1400.00	180.00
5	1500.00	180.00

A horizontal earthquake loading coefficient
of .150 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random
technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced
along the ground surface between x = .0 ft
and x = 150.0 ft

Each surface terminates between x = 1000.0 ft
and x = 1250.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * **

18.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 57 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	150.00	50.00
2	167.96	48.84

3	185.93	47.79
4	203.91	46.85
5	221.89	46.03
6	239.87	45.32
7	257.87	44.73
8	275.86	44.25
9	293.85	43.89
10	311.85	43.63
11	329.85	43.50
12	347.85	43.47
13	365.85	43.56
14	383.85	43.77
15	401.85	44.09
16	419.84	44.52
17	437.83	45.07
18	455.82	45.73
19	473.81	46.50
20	491.78	47.39
21	509.76	48.39
22	527.72	49.51
23	545.68	50.74
24	563.63	52.08
25	581.57	53.54
26	599.50	55.11
27	617.42	56.80
28	635.33	58.60
29	653.23	60.51
30	671.12	62.53
31	688.99	64.67
32	706.85	66.92
33	724.69	69.29
34	742.52	71.77
35	760.33	74.36
36	778.13	77.06
37	795.91	79.88
38	813.67	82.81
39	831.41	85.85
40	849.13	89.00
41	866.83	92.27
42	884.51	95.64
43	902.17	99.13

44	919.81	102.74
45	937.42	106.45
46	955.01	110.27
47	972.57	114.21
48	990.11	118.26
49	1007.62	122.42
50	1025.11	126.69
51	1042.57	131.07
52	1060.00	135.56
53	1077.40	140.16
54	1094.77	144.87
55	1112.12	149.69
56	1129.43	154.62
57	1131.71	155.28

**** Simplified BISHOP FOS = .463 ****

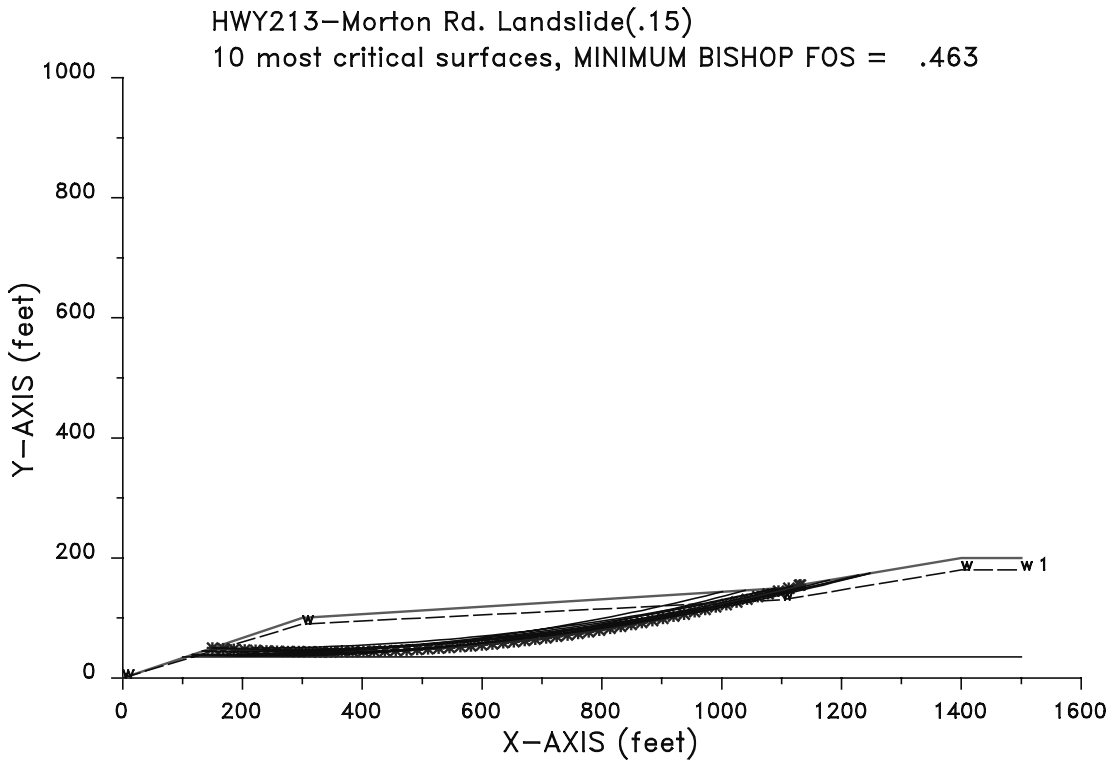
The following is a summary of the TEN most critical surfaces

Problem Description : HWY213-Morton Rd. Landslide(.15)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	.463	342.54	2884.51	2841.04	150.00	1131.71	1.637E+09
2.	.494	237.76	3017.09	2980.66	116.67	1039.18	1.809E+09
3.	.498	199.77	3933.38	3895.38	116.67	1179.73	2.527E+09
4.	.499	195.27	4162.74	4124.60	116.67	1247.08	2.783E+09
5.	.503	272.26	3502.55	3454.71	150.00	1118.42	1.886E+09
6.	.518	205.28	4211.03	4167.20	133.33	1228.64	2.586E+09
7.	.521	184.03	4004.56	3960.44	133.33	1091.33	2.217E+09
8.	.534	160.43	3450.92	3412.31	116.67	1001.21	1.926E+09
9.	.539	99.33	4964.18	4925.33	116.67	1247.74	3.221E+09
10.	.541	198.40	4077.99	4028.28	150.00	1088.47	2.086E+09

* * END OF FILE * * *

MORT32 2-09-99 18:40



Critical Thickness

HWY 213-Morton Road Landslide

Parameters	English	Metric
c	450 psf	21.5 kN/m^2
γ_t	100 pcf	20.88 kN/m^3
γ_w	62.4 pcf	9.81 kN/m^3
θ	20 deg	20 deg
ϕ	15 deg	15 deg

t_c= 30.7 feet

tc= 21.5 meters

$$t_{critical} = \frac{c / (\gamma_t - \gamma_w)}{\cos(\theta)(\tan(\theta) - \tan(\phi))}; F_s = 1$$

APPENDIX C

The Spady Landslide: Soil Analysis, Pre- and Post-Slope Failure Analysis

SOIL ANALYSIS

Sample # 1
Name William J. Burns
Project Spady Landslide
Date 5/27/96
Sample Description upper layer, tan silt (residual soil)

Weight: Wet Sample & Container	
Weight: Dry Sample & Container	
Weight: Container	
Insitu Moisture Content (ω) (%)	**28.00**
Weight: Container	
Weight: Dry Sample & Container	
Weight: Dry Sample (WS)	**130.60**

Sieve Mesh #	Openings (mm)	Φ $-Log_2$(mm)	Weight W	Weight % W / WS(100)	Weight Passing	% Passing	Grain Size
10	2.000	-1.00	0.00	0.00	130.60	100.00	Gravel
35	0.500	1.00	0.20	0.15	130.40	99.85	Coarse Sand
60	0.250	2.00	0.30	0.23	130.10	99.62	Medium Sand
120	0.125	3.00	2.80	2.14	127.30	97.47	Fine Sand
230	0.063	3.99	16.50	12.63	110.80	84.84	Silt & Clay

Weight: Total Larger Than 230 Sieve	**15.16**
Weight: Dry Sample (hydrometer analysis)	**117.97**

Time (Actual)	Elapsed Time (Minutes)	Hydrometer Reading (R)	Corrected R (Rc)	L Value (cm)	Diameter (mm)	% Finer	Grain Size
2:37 (5/23)	0.5	67	65	53	0.141	49.77	
2.38	1.0	65	63	57	0.103	48.24	
2.39	2.0	64	62	60	0.075	47.47	
2.43	6.0	54	52	78	0.049	39.82	Coarse Silt
2.57	20.0	41	39	99	0.030	29.86	Medium Silt
4.00	122.0	31	29	115	0.013	22.21	
7.15	318.0	22	20	130	0.009	15.31	Fine Silt
10.30 (5/24)	480.0	15	13	142	0.007	9.95	
2.30	1440.0	15	13	142	0.004	9.95	
11.40 (5/27)	6300.0	10	8	150	0.002	6.13	Clay

Zero Correction Value 2
Hydrometer # 28625
Graduated Cylinder # 40

Texture Classification(USDA): **Silt**
Texture Classification(Unified): **CL-ML**

Unit Weight:	lb/ft^3	kg/m^3
(moist)γ_m	**116.50**	**18.29**
(dry)γ_d	**91.00**	**14.3**

Atterberg Limits:
Liquid Limit (%) **38.6**
Plastic Limit (%) **26.9**
Plasticity Index **11.7**

Unconfined Compressive Strength:	lb/ft^2	kN/m^2
	485.0	**23.23**

PARTICLE SIZE ANALYSIS

Sample # 1 (sp-6)
Name William Burns
Project Thesis-Spady Landslide
Date 12/17/97
Sample Description top layer - tan silty clay

Weight: Wet Sample & Container	71.00
Weight: Dry Sample & Container	64.75
Weight: Container	45.55
Insitu Moisture Content (ω) (%)	**75.44**

Weight: Container	183.70
Weight: Dry Sample & Container	278.70
Weight: Dry Sample (WS)	**95.00**

Sieve Mesh #	Openings (mm)	Φ $-Log_2$(mm)	Weight W	Weight % W / WS(100)	Weight Passing	% Passing	Grain Size
10	2.000	-1.00	0.00	0.00	95.00	100.00	Gravel
18	1.000	0.00	0.00	0.00	95.00	100.00	Very Coarse Sand
35	0.500	1.00	0.00	0.00	95.00	100.00	Coarse Sand
60	0.250	2.00	0.00	0.00	95.00	100.00	Medium Sand
120	0.125	3.00	0.00	0.00	95.00	100.00	Fine Sand
230	0.063	3.99	0.05	0.05	94.95	99.95	Very Fine Sand

Weight: Total Larger Than 230 Sieve	**0.05**
Weight: Dry Sample (hydrometer analysis)	**94.95**

Time (Actual)	Elapsed Time (Minutes)	Hydrometer Reading (R)	Corrected R (Rc)	L Value (cm)	Diameter (mm)	% Finer	Grain Size
4:15pm (12/18)	0.5	62	60	6.5	0.0492	63.19	
4:16pm	1.0	60	58	6.8	0.0356	61.08	Coarse Silt
4:17pm	2.0	59	57	7.0	0.0255	60.03	
4:21pm	6.0	57	55	7.3	0.0151	57.93	Medium Silt
4:35pm	20.0	52	50	8.1	0.0087	52.66	
5:15pm	60.0	45	43	9.2	0.0053	45.29	Fine Silt
6:35pm	140.0	39	37	10.2	0.0037	38.97	Clay
9:30am (12/19)	1035.0	25	23	12.5	0.0015	24.22	
2:30pm	1335.0	23	21	12.9	0.0013	22.12	
9:15am (12/22)	5340.0	18	16	13.3	0.0007	16.85	

Zero Correction Value 2
Hydrometer # 28557
Graduated Cylinder # 0

Texture Classification: **Silty Clay Loam**

PARTICLE SIZE ANALYSIS

Sample # 2 (sp-2)
Name William Burns
Project Thesis-Spady Landslide
Date 12/17/97
Sample Description second layer, red/brown clayey silt

Weight: Wet Sample & Container	79.00
Weight: Dry Sample & Container	70.40
Weight: Container	41.30
Insitu Moisture Content (ω) (%)	**77.19**

Weight: Container	186.60
Weight: Dry Sample & Container	294.50
Weight: Dry Sample (WS)	**107.90**

Sieve Mesh #	Openings (mm)	Φ $-Log_2$(mm)	Weight W	Weight % W / WS(100)	Weight Passing	% Passing	Grain Size
10	2.000	-1.00	0.70	0.65	107.20	99.35	Gravel
18	1.000	0.00	0.40	0.37	106.80	98.98	Very Coarse Sand
35	0.500	1.00	0.40	0.37	106.40	98.61	Coarse Sand
60	0.250	2.00	0.40	0.37	106.00	98.24	Medium Sand
120	0.125	3.00	0.80	0.74	105.20	97.50	Fine Sand
230	0.063	3.99	2.50	2.32	103.50	95.92	Very Fine Sand

Weight: Total Larger Than 230 Sieve	**5.20**
Weight: Dry Sample (hydrometer analysis)	**102.70**

Time (Actual)	Elapsed Time (Minutes)	Hydrometer Reading (R)	Corrected R (Rc)	L Value (cm)	Diameter (mm)	% Finer	Grain Size
4:15pm (12/18)	0.5	68	66	5.5	0.0453	64.26	
4:16pm	1.0	67	65	5.6	0.0323	63.29	Coarse Silt
4:17pm	2.0	65	63	6.0	0.0236	61.34	
4:21pm	6.0	64	62	6.1	0.0138	60.37	Medium Silt
4:35pm	20.0	60	58	6.8	0.0080	56.48	
5:15pm	60.0	54	52	7.8	0.0049	50.63	Fine Silt
6:35pm	140.0	49	47	8.6	0.0034	45.76	Clay
9:30am (12/19)	1035.0	41	39	9.9	0.0013	37.97	
2:30pm	1335.0	40	38	10.1	0.0012	37.00	
9:15am (12/22)	5340.0	37	35	12.0	0.0006	34.08	

Zero Correction Value 2
Hydrometer # 28557
Graduated Cylinder # 40

Texture Classification: **Silty Clay**

PARTICLE SIZE ANALYSIS

Sample # 3 (sp-3)
Name William Burns
Project Thesis-Spady Landslide
Date 12/17/97
Sample Description third layer, gray silty clay

Weight: Wet Sample & Container	82.70
Weight: Dry Sample & Container	68.90
Weight: Container	42.30
Insitu Moisture Content (ω) (%)	**65.84**

Weight: Container	180.0
Weight: Dry Sample & Container	276.40
Weight: Dry Sample (WS)	**96.40**

Sieve Mesh #	Openings (mm)	Φ -Log_2(mm)	Weight W	Weight % W / WS(100)	Weight Passing	% Passing	Grain Size
10	2.000	-1.00	5.20	5.39	91.20	94.61	Gravel
18	1.000	0.00	3.80	3.94	87.40	90.66	Very Coarse Sand
35	0.500	1.00	1.60	1.66	85.80	89.00	Coarse Sand
60	0.250	2.00	0.70	0.73	85.10	88.28	Medium Sand
120	0.125	3.00	0.50	0.52	84.60	87.76	Fine Sand
230	0.063	3.99	0.90	0.93	84.20	87.34	Very Fine Sand

Weight: Total Larger Than 230 Sieve	**12.70**
Weight: Dry Sample (hydrometer analysis)	**83.70**

Time (Actual)	Elapsed Time (Minutes)	Hydrometer Reading (R)	Corrected R (Rc)	L Value (cm)	Diameter (mm)	% Finer	Grain Size
4:15pm (12/18)	0.5	56	54	7.4	0.0525	64.52	
4:16pm	1.0	54	52	7.8	0.0381	62.13	Coarse Silt
4:17pm	2.0	53	51	7.9	0.0271	60.93	
4:21pm	6.0	51	49	8.3	0.0161	58.54	Medium Silt
4:35pm	20.0	46	44	9.1	0.0092	52.57	
5:15pm	60.0	38	36	10.4	0.0057	43.01	Fine Silt
6:35pm	140.0	33	31	11.2	0.0039	37.04	Clay
9:30am (12/19)	1035.0	23	21	12.9	0.0015	25.09	
2:30pm	1335.0	22	20	13.0	0.0013	23.89	
9:15am (12/22)	5340.0	11	9	14.2	0.0007	10.75	

Zero Correction Value 2
Hydrometer # 28557
Graduated Cylinder # 39

Texture Classification: **Silty Clay Loam**

PARTICLE SIZE ANALYSIS

Sample # 4 (sp-4)
Name William Burns
Project Thesis-Spady Landslide
Date 12/17/97
Sample Description lowest layer, blue clay

Weight: Wet Sample & Container	79.80
Weight: Dry Sample & Container	69.00
Weight: Container	42.50
Insitu Moisture Content (ω) (%)	**71.05**

Weight: Container	114.9
Weight: Dry Sample & Container	216.30
Weight: Dry Sample (WS)	**101.40**

Sieve Mesh #	Openings (mm)	Φ $-Log_2$(mm)	Weight W	Weight % W / WS(100)	Weight Passing	% Passing	Grain Size
10	2.000	-1.00	4.50	4.44	96.90	95.56	Gravel
18	1.000	0.00	1.40	1.38	95.50	94.18	Very Coarse Sand
35	0.500	1.00	0.50	0.49	95.00	93.69	Coarse Sand
60	0.250	2.00	0.30	0.30	94.70	93.39	Medium Sand
120	0.125	3.00	0.70	0.69	94.00	92.70	Fine Sand
230	0.063	3.99	1.50	1.48	93.20	91.91	Very Fine Sand

Weight: Total Larger Than 230 Sieve	**8.90**
Weight: Dry Sample (hydrometer analysis)	**92.50**

Time (Actual)	Elapsed Time (Minutes)	Hydrometer Reading (R)	Corrected R (Rc)	L Value (cm)	Diameter (mm)	% Finer	Grain Size
4:15pm (12/18)	0.5	62	60	6.5	0.0492	64.86	
4:16pm	1.0	60	58	6.8	0.0356	62.70	Coarse Silt
4:17pm	2.0	57	55	7.3	0.0261	59.46	
4:21pm	6.0	55	53	7.6	0.0154	57.30	Medium Silt
4:35pm	20.0	48	46	8.8	0.0091	49.73	
5:15pm	60.0	42	40	9.7	0.0055	43.24	Fine Silt
6:35pm	140.0	36	34	10.7	0.0038	36.76	Clay
9:30am (12/19)	1035.0	26	24	12.4	0.0015	25.95	
2:30pm	1335.0	25	23	12.5	0.0013	24.86	
9:15am (12/22)	5340.0	21	19	15.0	0.0007	20.54	

Zero Correction Value 2
Hydrometer # 28557
Graduated Cylinder # 3

Texture Classification: **Silty Clay Loam**

SOIL ANALYSIS

Sample # 2
Name William J. Burns
Project Spady Landslide
Date 5/27/96
Sample Description bottom layer, blue to gray color, very slick, clayey silt

Weight: Wet Sample & Container	
Weight: Dry Sample & Container	
Weight: Container	
Insitu Moisture Content (ω) (%)	**34.10**
Weight: Container	
Weight: Dry Sample & Container	
Weight: Dry Sample (WS)	**106.00**

Sieve Mesh #	Openings (mm)	Φ $-Log_2$(mm)	Weight W	Weight % W / WS(100)	Weight Passing	% Passing	Grain Size
10	2.000	-1.00	0.00	0.00	106.00	100.00	Gravel
35	0.500	1.00	0.10	0.09	105.90	99.91	Coarse Sand
60	0.250	2.00	0.10	0.09	105.80	99.81	Medium Sand
120	0.125	3.00	0.30	0.28	105.50	99.53	Fine Sand
230	0.063	3.99	3.20	3.02	102.30	96.51	Silt & Clay

Weight: Total Larger Than 230 Sieve	**3.49**
Weight: Dry Sample (hydrometer analysis)	**102.98**

Time (Actual)	Elapsed Time (Minutes)	Hydrometer Reading (R)	Corrected R (Rc)	L Value (cm)	Diameter (mm)	% Finer	Grain Size
2:37 (5/23)	0.5	69	67	53	0.141	63.21	
2.38	1.0	68	66	57	0.103	62.26	
2.39	2.0	68	66	60	0.075	62.26	
2.43	6.0	65	63	78	0.049	59.43	Coarse Silt
2.57	20.0	53	51	99	0.030	48.11	Medium Silt
4.00	122.0	40	38	115	0.013	35.85	
7.15	318.0	30	28	130	0.009	26.42	Fine Silt
10.30 (5/24)	480.0	21	19	142	0.007	17.92	
2.30	1440.0	21	19	142	0.004	17.92	
11.40 (5/27)	6300.0	14	12	150	0.002	11.32	Clay

Zero Correction Value 2
Hydrometer # 28625
Graduated Cylinder # 45

Texture Classification(USDA): **Silt**
Texture Classification(Unified): **CH-MH**

Unit Weight:	lb/ft^3	kg/m^3
(moist)γ_m	**117.40**	**18.43**
(dry)γ_d	**87.55**	**13.7**

Atterberg Limits:
Liquid Limit (%) **45.2**
Plastic Limit (%) **24.6**
Plasticity Index **20.6**

Unconfined Compressive Strength:	lb/ft^2	kN/m^2
	1111.0	**53.21**

Janbu Slope Stability Analysis – Pre-Slope Failure of 1996 Spady Landslide

Version 0.1 (May 1996)

General Input Parameters

n	Number of slices	6
E_a	Lateral force at toe (kN)	0.00
E_b	Lateral force at head (kN)	0.00
γ_w	Unit weight of water (kN/m^3)	9.81

Slice Input Parameters

		Bottom Cut:	0		1		2		3		4		5		6	
	Parameters	Slice:		1		2		3		4		5		6		7
x	Horizontal distance (m)		2.00		4.00		6.00		15.50		25.00		35.00		43.00	
z	Ground surface (m)		19.00		16.00		15.00		11.00		7.00		3.75		2.00	
d	Water table (m)		19.00		16.50		15.50		11.50		7.50		4.25		2.50	
y	Slip surface (m)		19.00		18.25		17.50		14.25		11.00		8.00		5.50	
η	nu (dimensionless)		0.33		0.33		0.33		0.33		0.33		0.33		0.33	
γ	Total unit weight of soil (kN/m^3)			18.29		18.29		18.29		18.29		18.29		18.29		18.29
ϕ	Angle of internal friction (°)			10.00		10.00		10.00		10.00		10.00		10.00		10.00
C	Cohesion (kN/m^2 or kPa)			13.40		13.40		13.40		13.40		13.40		13.40		13.40
Q	Surcharge (kN)			0.00		0.00		0.00		0.00		0.00		0.00		0.00
u	Pore water pressure (kPa, 0 if unknown)			0.00		0.00		0.00		0.00		0.00		0.00		0.00

Janbu Slope Stability – Results

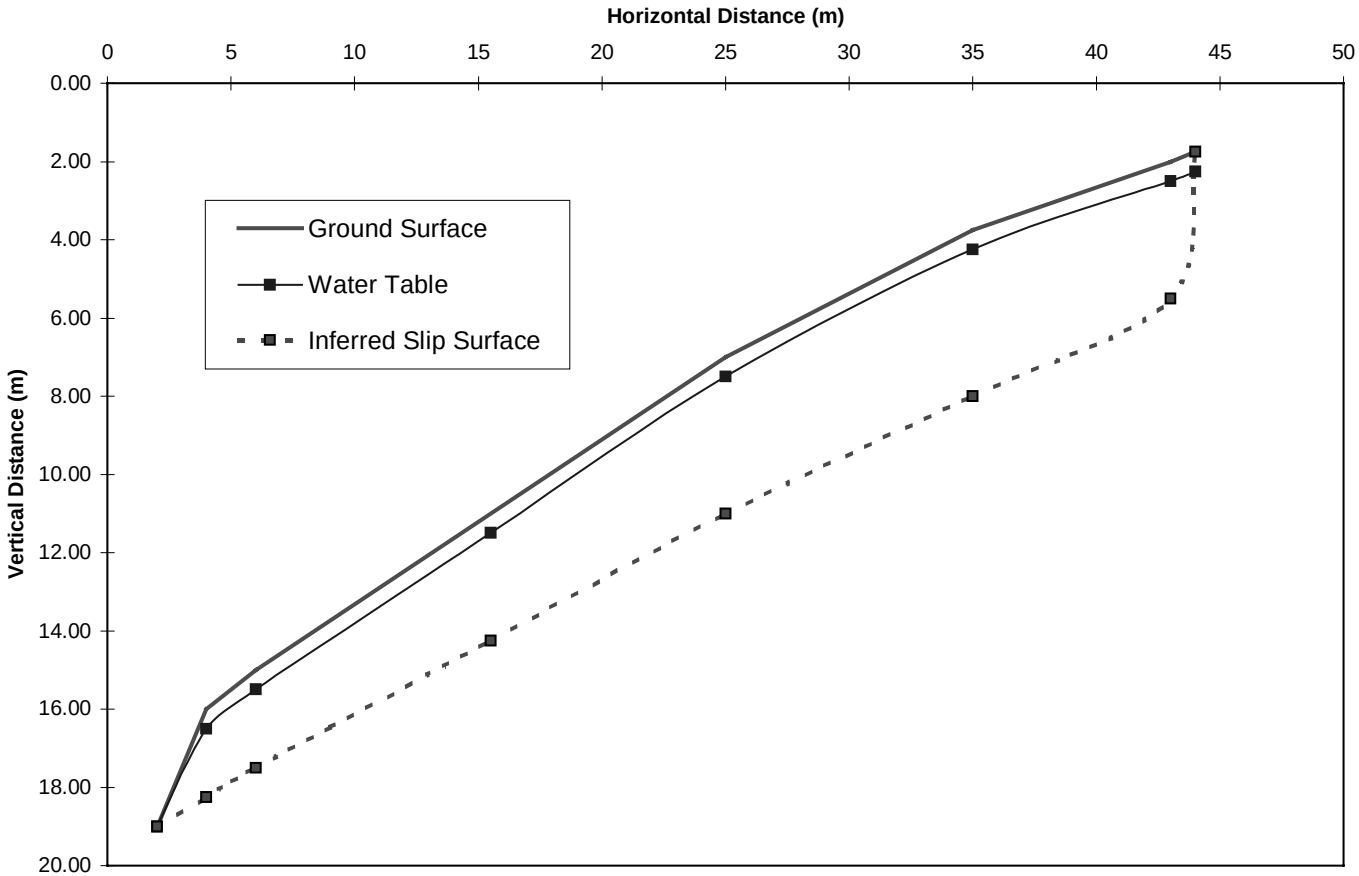
Version 0.1 (May 1996)

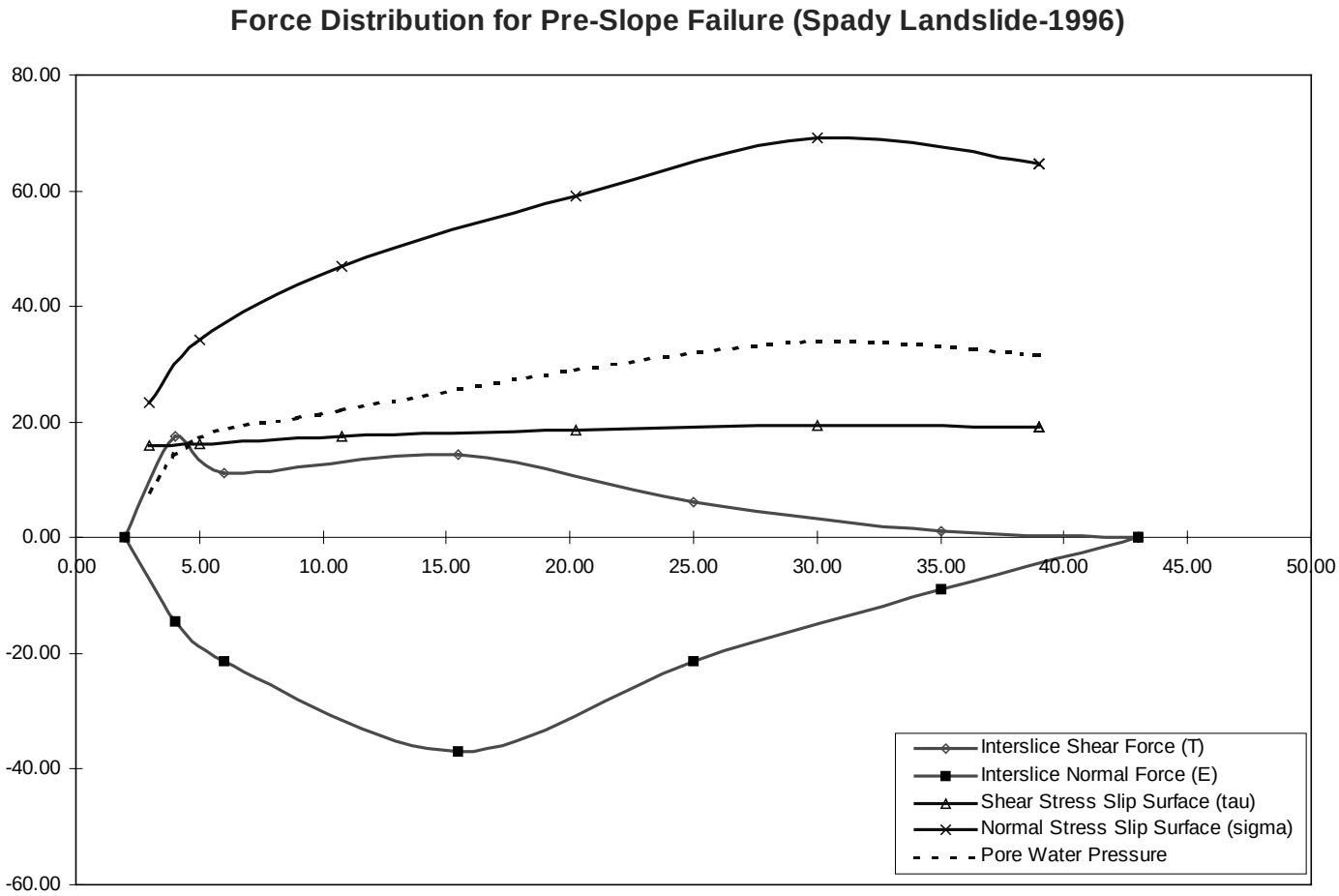
F	**Average Factor of Saftey**	**1.00**
	Number of iterations	1

		0		1		2		3		4		5		6	
	Parameters		1		2		3		4		5		6		7
X	X-coordinate	2.00	3.00	4.00	5.00	6.00	10.75	15.50	20.25	25.00	30.00	35.00	39.00	43.00	39.00
T_i	Interslice shear force	0.00		17.60		11.32		14.43		6.24		1.05		0.00	
E_i	Interslice normal force	0.00		-14.47		-21.40		-36.92		-21.49		-8.84		0.00	
τ_i	Shear stress on slip surface		16.00		16.29		17.67		18.59		19.46		19.13		19.11
σ_i	Normal stress on slip surface		23.38		34.19		46.87		59.08		69.09		64.76		64.77
u	Pore water pressure		8.04		17.22		22.04		29.01		34.06		31.60		31.60

136

Generalized Cross Section for The Pre-Slope Failure of 1996 Spady Landslide (water table at 0.5m)




Force Distribution for Pre-Slope Failure (Spady Landslide-1996)
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
Interslice Shear Force (T)
Interslice Normal Force (E)
Shear Stress Slip Surface (tau)
Normal Stress Slip Surface (sigma)
Pore Water Pressure

XSTABL File: SPADY2 2-10-99 20:24

```
*****************************************
*          X S T A B L                  *
*                                       *
*       Slope Stability Analysis        *
*            using the                  *
*         Method of Slices              *
*                                       *
*       Copyright (C) 1992 Ä 96         *
*   Interactive Software Designs, Inc.  *
*       Moscow, ID 83843, U.S.A.        *
*                                       *
*        All Rights Reserved            *
*                                       *
*  Ver. 5.200             96 Ä 1265     *
*****************************************
```

Problem Description : post 1997 stability analysis

SEGMENT BOUNDARY COORDINATES
---

10 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	.0	40.0	10.0	2
2	40.0	10.0	70.0	30.0	2
3	70.0	30.0	72.5	32.0	2
4	72.5	32.0	79.0	41.0	1
5	79.0	41.0	83.5	41.0	1
6	83.5	41.0	84.0	39.0	1
7	84.0	39.0	88.0	39.0	1
8	88.0	39.0	88.5	42.0	1
9	88.5	42.0	115.0	48.0	1
10	115.0	48.0	135.0	53.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	72.5	32.0	135.0	32.0	2

ISOTROPIC Soil Parameters
---

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	116.0	120.0	242.0	10.00	.000	.0	1
2	117.0	120.0	555.0	10.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 3 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	70.00	30.00
2	80.00	34.00
3	135.00	40.00

A critical failure surface searching method, using a random

technique for generating CIRCULAR surfaces has been specified.

20 trial surfaces will be generated and analyzed.

2 Surfaces initiate from each of 10 points equally spaced
along the ground surface between x = 30.0 ft
and x = 50.0 ft

Each surface terminates between x = 90.0 ft
and x = 120.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

5.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 20 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	36.67	9.17
2	41.58	8.23
3	46.54	7.64

4	51.54	7.42
5	56.54	7.56
6	61.51	8.06
7	66.44	8.91
8	71.29	10.12
9	76.04	11.68
10	80.67	13.57
11	85.15	15.80
12	89.45	18.34
13	93.56	21.18
14	97.46	24.32
15	101.12	27.72
16	104.52	31.39
17	107.65	35.29
18	110.49	39.40
19	113.03	43.71
20	115.18	48.04

**** Simplified BISHOP FOS = 1.131 ****

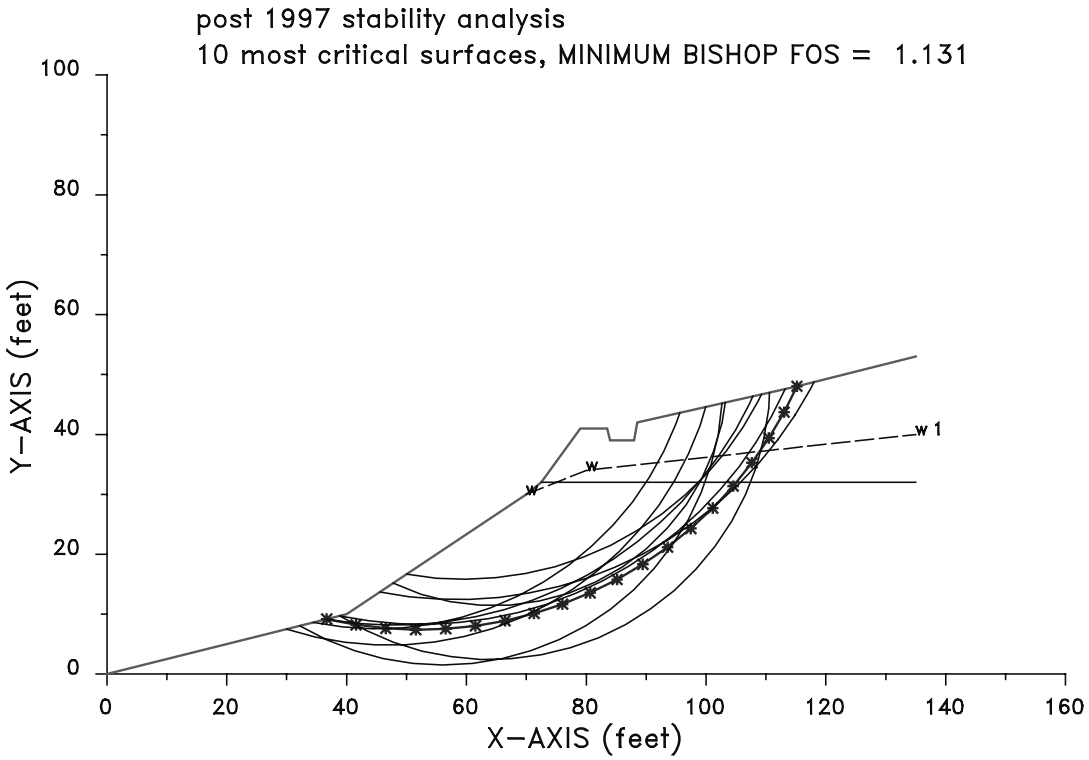
The following is a summary of the TEN most critical surfaces

Problem Description : post 1997 stability analysis

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.131	52.13	76.66	69.24	36.67	115.18	4.463E+06
2.	1.141	52.55	74.75	66.45	38.89	113.19	4.024E+06
3.	1.174	63.95	49.19	46.75	38.89	110.58	3.396E+06
4.	1.174	56.05	48.23	46.71	32.22	102.65	3.234E+06
5.	1.183	48.05	74.07	65.90	36.67	107.80	3.730E+06
6.	1.215	58.50	79.40	66.96	45.56	117.99	3.784E+06
7.	1.216	47.01	60.04	55.22	30.00	99.97	3.297E+06
8.	1.307	45.02	61.17	53.61	34.44	95.61	2.639E+06
9.	1.310	64.50	50.57	39.13	47.78	103.21	1.917E+06
10.	1.336	59.61	71.28	55.45	50.00	109.27	2.449E+06

* * END OF FILE * * *

SPADY2 2-10-99 20:24



From: Tara McElhannon
To: Kelly Reid; Oregon City Planning
Subject: Fwd: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System
Date: Monday, May 23, 2022 12:10:11 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To the Oregon City Planning Commission and Oregon City Planning Department-

This email is concerning the application for Park Place Crossing and I am directly forwarding the response from the Clackamas County Disaster Management office. At the last committee planning meeting I presented documentation from the Clackamas County Disaster Management office in response to the City Planner recommendation of approving the General Development plan in part due to evacuation preparation the Disaster Management office had eluded to. This recommendation of approval was provided on 5/09. A quote from Daniel Nibouar was provided by the City Planner stating that due to the efforts of the county described below, and the fact that the timing of the county project to improve evacuation preparedness aligned with the timing of Phase 1, the GDP should be approved with conditions, and Phase 1 specifically should be allowed to move forward **without** any conditions on evacuation planning adjustments by the applicant, the city or the county.

However, as documented below from the Disaster Management office of Clackamas County, literally nothing has been done on the plan the City Planner referenced as justification for approval. The county is short staffed, the budget has not been approved for any of the implementation plans and if and only if the budget is approved the intent is to commence the planning project. At best, this is a hope and good intentions at this time from the county. Hope is not a strategy when it comes to ensuring residents can safely evacuate their homes. While the obvious response to this concern is likely that it is the county's problem, or other developments such as Serres farm have been approved without this action from the county, or an event necessitating evacuation is unlikely, I implore the planning commission to take into account the reason each of you are in your roles as commissioners: Section C of the approval criteria for a GDP states: *The Planning Commission may approve an application for general development plan **only** upon finding that the following approval criteria are met.*
3. Public services….are capable of serving the proposed development, or will be made capable by the time each phase of the development is completed.

County and Oregon City public services related to transportation **are not currently capable** of servicing the proposed development and **will not be made capable** by the time phase1 or any other phase of the development 2-6. I recommend the Planning Commission continue this hearing to a date certain or at a very minimum, add a condition to approval for the GDP and phase 1 that the applicant must work with the County/City to get the intersections to an acceptable state that is currently recommended for future Phase 2+ conditions.

City Planner states in the most recent recommendation to the planning committee: ``It is *important to note that proposed Phase 1 of 59 units in the northeast corner of the subject site*

appears to be able to meet transportation standards." **This is not an accurate statement based on fact.** It is curious the City Planner chose to use the phrase 'appears to be able to.' The Planning Commission would do well to inquire as to why the City Planner chose to say the applicant 'appears to be able to' rather than 'the applicant is able to.' Decisions of this nature need to be based on fact, not on appearance.

123 homes are approved for development in the summer of 2022 and 2023 on Serres Farm. The Planning Commission approval today would add another 59 units for Park Place Crossing. The existing transportation infrastructure cannot handle the current traffic load on Holcomb/Redland roads due to the inadequate intersections on 213 and Redland and Redland/Holcomb and Abernethy streets, in an emergency evacuation let alone with the addition of these homes. The continued recommendations for approval by the Oregon City planning office for piecemeal development projects amounts to negligence, with everyone knowing full well this puts lives at risk during an emergency. The burden of keeping current and future residents of Oregon City safe falls to the Planning Commission. The impact of these continued approvals are all rolling down hill. Do not let this roll down hill to residents of Oregon City. If it is not the responsibility of the City Planning office, or the City Planning commission's responsibility, then who is responsible for ensuring the County and Oregon City's current infrastructure is capable of serving the proposed development? Who is responsible for ensuring the proposed development does not tax the current infrastructure so severely that further lives are at risk? It seems it is yours, Planning Commissioners.

Here is the response from the Disaster Management office:

Ms. McElhannon,

After a review with departmental staff I have determined the following:

1. Names of consultants and contractors who were hired on a project in early 2022 to perform evacuation zone planning and create a mapping system and current status on their recommendations or plans.

Response: Due to delayed recruitments and current staff being out on extended leave this project has been delayed. A consultant/contractor has not been hired to complete this project.

2. Clackamas County Disaster Management office documentation of work in flight with municipalities, ODOT, and law enforcement to create evacuation zones for different types of disasters.

Response: This work has not commenced, therefore there is no documentation to provide regarding creation of evacuation zones.

3. Clackamas County Disaster Management office documentation of work in flight with municipalities to figure out how to maximize traffic flow during an incident.

Response: This work has not commenced, therefore there is no documentation to provide regarding maximizing traffic flow during an incident.

4. Progress to date on a more strategic evacuation procedure (the example provided mentions levels of evacuation in a sequential, organized manner). The quote from you mentions this is only a hope at this time. Have any actions on this materialized past a hope?

Response: In person discussions have occurred with Clackamas County Sheriff's Office, Department of Transportation and Development, and various Fire District staff in regards to sequential evacuations and need for planning, however there is no formal documentation or plans created.

5. An update on the Clackamas County interactive map system that provides real time traffic information (the quote links to Medford as an example).

Response: This work has not commenced.

6. Data on the formation of the Emergency Preparedness Council, its members, how often they meet, how you can join, etc.

Response: The Emergency Preparedness Council first met in February. Its 15 voting members were recruited from the community at the end of last year. The Council is still working out its schedule, but is planning to meet quarterly. The next application period for open positions will be in Spring 2023, but meetings are open to the public. When the next meeting is scheduled it can be found at https://web3.clackamas.us/abc/abc.jsp#E.

7. Overall project planning timeline with milestones and delivery dates.

Response: The intent is still to commence the project in this calendar dependent on staffing levels.

---------- Forwarded message ---------
From: **Poole, Jamie** <JPoole@clackamas.us>

Date: Tue, May 17, 2022 at 12:16 PM
Subject: RE: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System
To: Tara McElhannon <tara.e.mcelhannon@gmail.com>
Cc: Nibouar, Daniel <DNibouar@clackamas.us>, Hanto, Aryka <AHanto@clackamas.us>

Good afternoon,

It is our intent to commence the planning project in the calendar year 2022, however it is dependent on approval of our budget for Fiscal Year 2023 (July 1, 2022 - June 30, 2023). The scope of the project is rather large, therefore it will take time to develop a timeline with a consultant once the project is awarded (if our budget is approved).

Thank you,

Jamie

From: Tara McElhannon <tara.e.mcelhannon@gmail.com>
Sent: Friday, May 13, 2022 5:33 PM
To: Poole, Jamie <JPoole@clackamas.us>
Cc: Nibouar, Daniel <DNibouar@clackamas.us>; Hanto, Aryka <AHanto@clackamas.us>
Subject: Re: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System

Warning: External email. Be cautious opening attachments and links.

Jamie,

Thank you for providing this detailed information. Just one clarifying question. On the last comment in number 7, do you mean the intent is still to commence the project in this calendar **year,** meaning 2022? If yes, do you have a date you are working backward from for

completion on any of these initiatives?

Thanks again,
Tara

On Tue, May 10, 2022 at 2:29 PM Poole, Jamie <JPoole@clackamas.us> wrote:

> Ms. McElhannon,
>
> After a review with departmental staff I have determined the following:
>
> 1. Names of consultants and contractors who were hired on a project in early 2022 to perform evacuation zone planning and create a mapping system and current status on their recommendations or plans.
>
> **Response: Due to delayed recruitments and current staff being out on extended leave this project has been delayed. A consultant/contractor has not been hired to complete this project.**
>
> 2. Clackamas County Disaster Management office documentation of work in flight with municipalities, ODOT, and law enforcement to create evacuation zones for different types of disasters.
>
> **Response: This work has not commenced, therefore there is no documentation to provide regarding creation of evacuation zones.**
>
> 3. Clackamas County Disaster Management office documentation of work in flight with municipalities to figure out how to maximize traffic flow during an incident.
>
> **Response: This work has not commenced, therefore there is no documentation to provide regarding maximizing traffic flow during an incident.**
>
> 4. Progress to date on a more strategic evacuation procedure (the example provided mentions levels of evacuation in a sequential, organized manner). The quote from you mentions this is only a hope at this time. Have any actions on this materialized past a hope?
>
> **Response: In person discussions have occurred with Clackamas County Sheriff's Office,**

Department of Transportation and Development, and various Fire District staff in regards to sequential evacuations and need for planning, however there is no formal documentation or plans created.

5. An update on the Clackamas County interactive map system that provides real time traffic information (the quote links to Medford as an example).

Response: This work has not commenced.

6. Data on the formation of the Emergency Preparedness Council, its members, how often they meet, how you can join, etc.

Response: The Emergency Preparedness Council first met in February. Its 15 voting members were recruited from the community at the end of last year. The Council is still working out its schedule, but is planning to meet quarterly. The next application period for open positions will be in Spring 2023, but meetings are open to the public. When the next meeting is scheduled it can be found at https://web3.clackamas.us/abc/abc.jsp#E.

7. Overall project planning timeline with milestones and delivery dates.

Response: The intent is still to commence the project in this calendar dependent on staffing levels.

Thank you,

Jamie Poole, Interim Deputy Disaster Manager

Pronouns: she/her

Clackamas County Disaster Management

1710 Red Soils Ct., Suite 225, Oregon City, OR 97045

503-655-8838 (office) | 503-278-9150 (cell)

www.clackamas.us/dm

From: Tara McElhannon <tara.e.mcelhannon@gmail.com>

Sent: Tuesday, May 10, 2022 10:25 AM
To: Poole, Jamie <JPoole@clackamas.us>
Cc: Nibouar, Daniel <DNibouar@clackamas.us>; Hanto, Aryka <AHanto@clackamas.us>
Subject: Re: Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System

Warning: External email. Be cautious opening attachments and links.

Hello Jamie-

As I await a response from the Disaster Management office on my 7 areas above in my initial email, I wanted to let you know that the Oregon City Planning Commission voted to continue last night's hearing to May 23rd, so more data can be presented on the application. Do you believe it is possible for the Disaster Management office to respond directly to me with the data I have requested in time for that meeting?

Thank you,
Tara

On Thu, May 5, 2022 at 10:58 AM Tara McElhannon <tara.e.mcelhannon@gmail.com> wrote:

> Hello Jamie,
>
> Thank you so much for getting back to me. I sincerely appreciate it. Do you foresee a response back by the end of the week (tomorrow)? The next City Planning meeting is Monday 4/9. If a response back is not possible by EOD tomorrow I will request the Planning Commission to continue to a date certain at the meeting, so we can include this data in order to provide them the information they need to reach an informed decision. Apologies for this rush ask- the recommendations and memo on this subject were not made available to the community until 4/2, which leaves little time for community members to respond accordingly by 4/9.

Thanks,
Tara

On Thu, May 5, 2022 at 9:55 AM Poole, Jamie <JPoole@clackamas.us> wrote:

> Ms. McElhannon,
>
> Your request for information and documentation was received May 4, 2022. We will do a review of your request and follow up after we have had time to review our files.
>
> Thank you,
>
> Jamie Poole, Interim Deputy Disaster Manager
>
> Pronouns: she/her
>
> Clackamas County Disaster Management
>
> 1710 Red Soils Ct., Suite 225, Oregon City, OR 97045
>
> 503-655-8838 (office) | 503-278-9150 (cell)
>
> www.clackamas.us/dm
>
> **From:** Tara McElhannon <tara.e.mcelhannon@gmail.com>
> **Sent:** Tuesday, May 3, 2022 10:29 PM
> **To:** Nibouar, Daniel <DNibouar@clackamas.us>; Hanto, Aryka <AHanto@clackamas.us>; Poole, Jamie <JPoole@clackamas.us>
> **Subject:** Request for Data & Documentation on CC Evacuation Zone and creation of Mapping System
>
> **Warning: External email. Be cautious opening attachments and links.**

Hi Daniel-

I hope this email finds you well. You were recently cited in a memo (attached) stating Clackamas County is underway on planning efforts to better manage the logistics of evacuation efforts. The information shared in this memo on your behalf resulted in the City Planner's recommendation to the Planning Commission to move past any emergency evacuation concerns from our community, in order to approve a new housing development.

In short, the memo suggests that 1) Clackamas County has an established plan to ensure what happened with the wildfire evacuations in September 2020 does not happen again on Holcomb Blvd, Redland Rd, or 213, and 2) the development of roughly 500 new homes directly off Holcomb Blvd is not a concern relative to evacuation safety, given your office's planning efforts coming in time for before phase 1 of the new development.

Can you please kindly provide documentation and data on the following:

1. Names of consultants and contractors who were hired on a project in early 2022 to perform evacuation zone planning and create a mapping system and current status on their recommendations or plans.

2. Clackamas County Disaster Management office documentation of work in flight with municipalities, ODOT, and law enforcement to create evacuation zones for different types of disasters.

3. Clackamas County Disaster Management office documentation of work in flight with municipalities to figure out how to maximize traffic flow during an incident.

4. Progress to date on a more strategic evacuation procedure (the example provided mentions levels of evacuation in a sequential, organized manner). The quote from you mentions this is only a hope at this time. Have any actions on this materialized past a hope?

5. An update on the Clackamas County interactive map system that provides real time

traffic information (the quote links to Medford as an example).

6. Data on the formation of the Emergency Preparedness Council, its members, how often they meet, how you can join, etc.

7. Overall project planning timeline with milestones and delivery dates.

Thank you,
Tara McElhannon, Oregon City resident

From: Maryann Lee
To: Planning
Subject: Comments regarding GLUA-20-00045 Land Use Application / MAS-21-0006-Master Plan
Date: Sunday, May 22, 2022 4:39:31 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Madame or Sir,
We are Edward and Maryann Lee, 16219 Jada Way, Oregon City.
Maryann watched and listened to the May 9 meeting via YouTube, and we concur with the concerns expressed about the impact that the 476-home Park Crossing plan will have on the already problematic evacuation situation for people living off Holcomb Blvd.

We have lived in Abernathy Landing for almost two years. During the 2020 wildfire level 2 evacuation, it took us almost two hours to get out of Oregon City. The main bottleneck was Holcomb Blvd. The addition of 476 homes (which also will depend on Holcomb for getting in and out of the area) will make an evacuation scenario even more problematic.

If additional connector roads are not built, during a wildfire evacuation some residents may not be able to get out of the area, with the tragic consequence of people dying in their cars.

Please do not approve the Park Place Crossing project until a plan for an additional connection to Highway 213 is developed and funded.

Thank for your time and attention.
Sincerely,
Maryann Lee

Maryann Ott Lee
MOL Consulting LLC
510-579-2930

From: James Nicita
To: Planning
Cc: Dirk Schlagenhaufer; Mike Mitchell
Subject: Fwd: Public Comment: "Baker Conflict" in GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.
Date: Sunday, May 22, 2022 11:36:23 PM
Attachments: Baker Conflicts.pdf
NC Zone Findings.pdf

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Greetings,

Regarding the above-referenced file, I note a distinction between the "ocplanning@orcity.org" email address I have been using for this proceeding, and the shorter "planning@orcity.org" address that Ms. Reid included in her letter regarding public comment on this file last week.

I am resending my comment below to the "planning@orcity.org" address, with the request that it be placed in the record of the above-referenced proceeding.

I hope also that during the May 23rd public hearing, there might be some clarification and assurance that comments sent to "ocplanning@orcity.org" address are being included in the file of the proceeding to the same extent and in the same manner as those sent to the "planning@orcity.org" address.

Thanks very much,

James Nicita
Oregon City

---------- Forwarded message ---------
From: **James Nicita** <james.nicita@gmail.com>
Date: Sat, May 21, 2022 at 4:59 PM
Subject: Public Comment: "Baker Conflict" in GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.
To: <dschlagenhaufer@orcity.org>, <mmitchell@orcity.org>, <gstoll@orcity.org>, <pgage@orcity.org>, Daphne Wuest <dwuest@orcity.org>, <blasalle@orcity.org>, <cstaggs@orcity.org>
Cc: Oregon City Planning <ocplanning@orcity.org>

Planning Commissioners,

I hope you are all out in the nice weather and not reading this email until after sunset. It seems spring has finally sprung, and I hope I am not jinxing things by saying so.

I respectfully request that these comments be entered into the record of the above-referenced proceeding.

I would like the Planning Commission to consider whether there is a "Baker conflict" in the application for the above-referenced land use applications.

Attached is an excerpt from a citizens' guide to land use issues published by 1000 Friends of Oregon about a decade ago.

A "Baker conflict" is when a zoning ordinance allows or permits a use, activity, development, etc. that would be prohibited or unauthorized under the land use plan itself. Under the Oregon Supreme Court's case Baker v. City of Milwaukie, when such a conflict or contradiction occurs, the plan controls over the zoning ordinance.

I think there is a "Baker conflict" between the application under review, regarding its proposal for certain uses authorized by the Neighborhood Commercial (NC), zone and the Park Place Concept Plan (which for the purposes of these comments includes the Technical Appendix).

This conflict pertains to the concept plan's creation of a North Village downtown area along Livesay Road. That area is supposed to be something akin to the historic Willamette District in West Linn.

The NC zone designation is specifically located on either side of Livesay Road in order to create the North Village downtown required by the Park Place Concept Plan.

The second attachment to this email is an excerpt from the staff report with findings that the application is consistent with the NC zone.

The staff report indicates that the NC zone allows the following as proposed by the applicant: 1) parkand; 2) a small-scale retail store; and 3) a stormwater treatment facility. As to #2, the land use application seems to call for small-scale retail comparable to Steve's Market on Holcomb Road.

I fully agree that the NC zone allows these three uses. However, the Park Place Concept Plan does not. The concept plan's section regarding the North Village downtown area is very specific in its textual description of a specific urban design element: a solid, uninterrupted "building wall" of two- to three- story mixed-use buildings, with retail on the ground floor and residential dwellings on the upper floors.

Thus the "Baker conflict." Under the Baker case, the concept plan controls, and the three uses are not allowed, notwithstanding the fact that they are permitted uses in the area zoned NC.

Allowing the proposed uses in the NC zone as recommended by the staff report would seriously undermine, if not destroy outright, the central concept plan element of the North Village downtown.

I would suggest another "Baker conflict" as well regarding the stormwater facility; even that portion that is not located within the NC zone. The Park Place concept plan is very advanced and visionary in a lot of ways, one being how it treats stormwater management. The concept plan prescribes stormwater management not via an end-of-pipe stormwater treatment pond, but rather via on-site management and swales through the interstices of the entire development. There is no need for the stormwater pond in the system prescribed by the concept plan, and the stormwater facility described in the application is not permitted by the

concept plan.

Thank you again for your consideration of these comments.

James Nicita
Oregon City

In some cases an applicable law may be unclear and it becomes necessary to consider the legislative history to discern the law's intent. If a local decision-maker interprets a law to mean something other than its intended meaning, a Petitioner can challenge this interpretation by looking at the legislative history of the law. Be sure to first look at any interpretive guides included in the ordinance or statute that may clarify ambiguous language. *If the legislative history reveals that the local decision-maker misinterpreted a law's intended meaning, the relevant history should be included in the record if possible, and be addressed in the Petition for Review.*

Statewide statutes and administrative rules may directly govern some or all of your case or apply in conjunction with local laws. You must identify the general type of decision involved (e.g., a conditional use permit for a golf course in an EFU zone), and check ORS (Oregon Revised Statutes) Chapters 197, 215, and 227 and OAR (Oregon Administrative Rules) Chapters 660 and 661 for laws applying to your case. The applicable ORS (under "State Statutes") and OAR (under "Administrative Rules") chapters can be found on DLCD's website.

Be aware that provisions of different laws may conflict with each other. For example, a development allowed by a local ordinance may be prohibited by the local comprehensive plan. In such cases (known as "Baker conflicts"), the comprehensive plan, and not the ordinance implementing that plan, controls.[364] Likewise, in all but the most extraordinary circumstances, a city or county cannot amend its plan based on the authority of a zoning ordinance; rather, the plan amendment will be governed by the statewide planning goals or statutes. Case law will further help you decide how to resolve conflicts between applicable laws.

> **NOTE**: Remember that language in a comprehensive plan may appear to require something when it really only describes what the city or county hopes will happen. Such "aspirational" language (e.g. "conflict between agricultural and non-agricultural uses should be avoided . . . ") probably won't be binding on the local government in a given case since it is too vague.

Determine How the Law Applies to Your Case

Closely related to determining what law applies to your case is determining *how* that law applies. This determination is made through research of cases decided by LUBA and the appellate courts on the same or related issues. How to find cases relevant to your issue is detailed in Section IV, below.

Remember that your task is to explain why the law requires, or at least strongly favors, an outcome in your favor. Hopefully, you will find a case dealing with the same issue in a similar factual situation which decided the issue in your favor. Then you simply have to state the issue presented in your case, its treatment in the earlier case, how the facts from the cases are similar, and the conclusion LUBA should reach as a result. (See the example under "Formulating Arguments" below.)

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[364] Baker v. City of Milwaukie, 271 Or 500, 533 P.2d 772 (1975); Fasano v. Washington County Commission, 264 Or 574, 507 P.2d 23 (1973).

T. Studios and galleries, including dance, art, photography, music and other arts.
U. 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.
V. Veterinary clinics or pet hospitals, pet day care.
W. Home occupations.
X. Research and development activities.
Y. 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.
Z. Transportation facilities.
AA. Live/work dwellings.
BB. After-hours public parking.

B. Grocery stores, provided the maximum footprint for a stand alone building with a single store or multiple buildings with the same business does not exceed forty thousand square feet;
C. Live/work dwellings;
D. Outdoor sales that are ancillary to a permitted use on the same or abutting property under the same ownership.

Baker Conflict

Finding: Complies with Condition. The applicant proposed the following uses within the NC zone: a public park permitted under letter K, a stormwater facility, which is considered a basic facility under letter U, and two sites for future retail, allowed under letter Q. Future detailed development plans may include any permitted uses in the NC zone, subject to review under OCMC 17.62 Site Plan and Design Review. The applicant shall ensure that future detailed development plans maintain the residential lots outside of the NC-zoned area, unless the residential use is considered permitted within the NC zone.



NC area of the property shown in green.

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

17.24.025 - Conditional uses.
The following conditional uses may be permitted when approved in accordance with the process and standards contained in OCMC 17.56:

From: James Nicita
To: Planning; Oregon City Planning; Jakob Wiley; recorderteam
Subject: Fwd: Public Comment: "Baker Conflict" in GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.
Date: Sunday, May 22, 2022 11:26:13 PM
Attachments: CitizensGuideToLUBAFinal.pdf

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Greetings:

I sent in comments regarding the above-referenced file which included a one-page excerpt of the attached "CItizens Guide to LUBA".

For authentication purposes, I respectfully request that the full attached document be placed in the record as well.

In addition, I am requesting that the Park Place Concept Plan Technical Appendix be placed in the record of the above-referenced proceeding.

It is too large a file to attach to an email, so I will be momentarily be forwarding that document via a Dropbox invitation.

Thank you for your consideration of these requests.

James Nicita
Oregon City

The Citizen's Guide

to

Land Use Appeals

1000 Friends of Oregon

December 2009

NOTE: This edition of the Citizen's Guide to Land Use Appeals was revised in December 2009, and is based upon state law, administrative rules and the written decisions of LUBA and the courts effective at that time. All are subject to change.

The Citizen's Guide to Land Use Appeals

1000 Friends of Oregon

December 2009

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Introduction

Land use decisions made by local governments in Oregon may be appealed to the state Land Use Board of Appeals (LUBA).[1] LUBA was created solely for the purpose of reviewing these decisions when there are no more opportunities to challenge them at the local level.[2] Rulings by LUBA may be appealed to the Oregon Court of Appeals.[3]

Though its legal rulings are binding, LUBA is not a traditional court. It is composed of three attorneys — known as board members[4] — appointed by the governor and confirmed by the Oregon Senate.[5] Individuals, appearing before LUBA on their own behalf, need not be represented by attorneys.[6] However, corporations, organizations, and individuals who do not wish to represent themselves are required to be represented by attorneys (members of the Oregon State Bar) before LUBA.[7]

Remember that you cannot win a land use appeal just because you are unhappy with the decision made by the local government.[8] Because of the broad latitude afforded to local governments under Oregon law, many of their decisions can be challenged successfully only through the political — not the legal — process. *LUBA is only allowed to review land use decisions for certain specific errors and is not intended as a substitute forum for good land use planning*.

> **NOTE**: The great majority of LUBA appeals involve decisions made by local governments. Therefore, the balance of the text will often refer to local governments as examples. Keep in mind, however, that some special district and state agency decisions can also be appealed to LUBA.

A LUBA appeal proceeds along a schedule (summarized below) that is designed to resolve land use appeals in roughly four months, barring any objections to the local government's record of the case or other extraordinary extensions of the appeal schedule. This four month period required for a LUBA decision may seem intimidating, but it is actually a much faster means of resolving land use disputes than occurs in California and Washington, where challenges to permit applications often drag on for two to four *years*.

Here is a quick overview of the LUBA process:

- A party[9] bringing an appeal is called the “Petitioner” and the local government is the “Respondent.” Anyone else who is allowed to participate is called an “Intervenor.”

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[1] ORS 197.820(1); ORS 197.825(1).
[2] ORS 197.805
[3] ORS 197.850(1) and (3).
[4] Currently LUBA attorneys are known as “Board Members;“ in the past they have been known as “Referees. For statutory reference, see ORS 197.810 and OAR 661-010-0010(2).
[5] ORS 197.810(1).
[6] OAR 661-010-0075(6).
[7] OAR 661-010-0075(6). A party can also choose not to appear before LUBA even though they are named on the appeal. Activists will often pool their resources for the appeal fees, collaborate on the written filings, and then have a single spokesperson before LUBA that technically only represents themselves.
[8] See e.g., Reed v. Benton County, 23 Or LUBA 486 (1992).
[9] OAR 661-010-0010(11).

- The Petitioner files with LUBA a Notice of Intent to Appeal (NITA), along with two copies, a filing fee and a deposit for costs, (see section 2, fees) in most cases within 21 days after the land use decision becomes final.[10]
- A "Motion to Intervene" is filed within 21 days after the NITA is filed[11] by any other eligible party who appeared before the local government and wishes to participate.[12]
- The Respondent (city or county) delivers the record of the local proceeding to LUBA and the Petitioner within 21 days after the NITA is filed.[13]
- A party may file "Objections to the Record" within 14 days of the date appearing on the Notice of Record Transmittal sent to the parties by the Board.[14]
- Within 14 days after receiving a record objection, an opposing party may file an answer to the objection.[15]
- The Petitioner submits a "Petition for Review" ("petition" or "brief"), along with four copies, within 21 days after LUBA receives the record or amended record[16] or 21 days after any objections to the record have been settled.[17] (An intervenor on the side of the Petitioner must also submit a brief by this time.[18])
- The Respondent (and any intervenor on the Respondent's side) submit their briefs (called "response briefs"), along with four copies, within 42 days after the record is received[19] or any objections to the record are settled.[20]
- LUBA schedules a date for and hears oral argument.[21]
- LUBA renders a decision within 77 days after receiving[22] or settling the record.[23]

Each step in the appeal process is described in more detail in Part II. However, you should carefully review Part I, which discusses factors that could greatly influence prospects for a successful appeal, before assuming that a LUBA appeal is justified and worthwhile.

> **NOTE:** State law and state administrative rules mandate the process by which LUBA makes its decisions. Anyone participating in a LUBA appeal should become familiar with the rules governing LUBA decisions (see Oregon Administrative Rules (OAR) Chapter 661, Division 10, available in most public libraries or from LUBA and at the LUBA Homepage: http://luba.state.or.us).

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[10] ORS 197.830(3), (4), (8), (9); OAR 661-10-0015(1).
[11] ORS 197.830(7)(a), (b); OAR 661-010-0050(2).
[12] OAR 661-010-0050(1).
[13] ORS 197.830(10)(a); OAR 661-010-0025(2)-(4).
[14] OAR 661-010-0026(2).
[15] OAR 661-010-0026(4).
[16] ORS 197.830(12), (13); OAR 661-010-0030(1).
[17] OAR 661-010-0026(6).
[18] OAR 661-010-0050(3)(a).
[19] OAR 661-010-0035(1); OAR 661-010-0050(3)(b).
[20] OAR 661-010-0026(6).
[21] OAR 661-010-0040(3).
[22] ORS 197.830(14).
[23] OAR 661-010-0026(6).

Part One

DECIDING WHETHER TO APPEAL A LOCAL DECISION

I. Am I Eligible?

Individual Standing

Normally, to qualify to bring an appeal before LUBA (to have "standing"), a Petitioner must: 1) submit a Notice of Intent to Appeal by the deadline for appealing (discussed in Part II), and 2) have "appeared" before the local government.[24]

A person "appears" by testifying orally at a hearing or submitting written testimony to the decision-making body.[25] It is not sufficient to have only attended a hearing.[26] Sending a letter of testimony to the decision-making body may be sufficient to have "appeared" in writing.[27] The letter must clearly indicate that it concerns the land use decision and it must be mailed during the time period allowed for public comment.[28] You should confirm that the letter was entered into the "record" of the proceedings or specifically request in your letter that it be entered into the record.[29]

Remember that because decisions often pass through a number of stages before different decision-making bodies, you have to be sure that: (1) you actually appeared *orally or in writing* before the *final* local government decision-maker, or (2) your comments from an earlier proceeding were made a part of the *final* proceeding's record.

> **EXAMPLE:** If you testified on a decision before the planning commission but not again before the city council, you will not be able to appeal the city council's decision unless your earlier comments were made a part of the city council's final record of decision. Likewise, if you submitted opposition to a proposed development before an application had actually been filed, you will have to state your opposition again during proceedings on the formal application.

Individuals may appear on behalf of other individuals or artificial entities in local land use proceedings provided they adequately identify the person they are appearing for.[30] If an attorney appears before the local governing body on behalf of individuals, she must indicate whom she is representing in order for those persons to later have standing on their own before LUBA.[31]

> **NOTE:** In very rare circumstances, a person who did not appear before the governing body may still have standing to appeal the decision if he or she is adversely affected

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[24] ORS 197.830(2).
[25] See gen., ORS 197.830(2)(b).
[26] See e.g., Cecil v. City of Jacksonville, 19 Or LUBA 446, 448-49 (1990).
[27] Cecil v. City of Jacksonville, 19 Or LUBA at 453; Wolverton v. Crook County, 34 Or LUBA 515 (1998).
[28] Wolverton v. Crook County, 34 Or LUBA at 518-19.
[29] Cf., Cecil v. City of Jacksonville, 19 Or LUBA 446, n.8.
[30] Neighbors for Responsible Growth v. City of Veneta, 50 Or LUBA 745 (2005).
[31] Dowrie v. Benton County, 37 Or LUBA 998 (1999).

by it.[32] The appearance requirement will be excused in two instances. The first is if the local government makes a land use decision without holding a hearing.[33] The second is if the government's notice fails to describe the matter to be decided in a reasonable way.[34] For example, the notice may not have given adequate warning that the decision at issue was going to be discussed, and thus concerned parties didn't think they needed to attend. In that case, to have standing to appeal, an opponent need not have appeared, but must be adversely affected by the decision[35] -- e.g. own property likely to be affected.[36]

NOTE: Persons (other than the applicant) may "intervene" in an appeal before LUBA *only* if they appeared before the local government.[37] Being adversely affected may provide standing to bring an appeal but never provides standing to intervene in an existing one. If a local government refuses to allow a person to testify, that person has "appeared" and has standing to intervene, at least for the purpose of challenging the decision to refuse testimony.[38]

Organizational Standing

An organization may have standing to bring a LUBA appeal in its own interest just like any individual.[39] For an organization to have standing:

- its members must have standing in their own right;
- neither the claim asserted nor the relief sought requires the participation of individual members; and
- the interests the organization seeks to protect are germane to the organization's purpose.[40]

An organization must appear at local hearings to have standing to appeal or intervene before LUBA on its own behalf.[41] For an organization to appear, persons testifying on behalf of an organization should clearly indicate to the governing body that they are doing so.[42] Anyone representing an organization should also indicate that she is also testifying on her own behalf.[43] If you state to the local government that you are appearing for yourself *and* on behalf of an

---

[32] ORS 197.830(3), (4).

[33] Flowers v. Klamath County, 98 Or App 384, 389, 780 P.2d 227, rev. den. 308 Or 592 (1989)(decided under former ORS 197.830(3) standard of "aggrieved" rather than "adversely affected").

[34] ORS 197.830(3)

[35] ORS 197.830(3).

[36] See Kamppi v. City of Salem, 21 Or LUBA 498, 501 (1991); Schatz v. City of Jacksonville, 21 Or LUBA 149 (1991); Goddard v. Jackson County, 34 Or LUBA 402, 408-09 (1998).

[37] ORS 197.830(7); OAR 661-010-050(1).

[38] Sorte v. City of Newport, 25 Or LUBA 828 (1993); McKenzie v. Multnomah County, 26 Or LUBA 619 (1993).

[39] Tuality Lands Coalition v. Washington County, 21 Or LUBA 611, 618 (1991); citing 1000 Friends of Oregon v. Multnomah County, 39 Or App 917, 924, 593 P.2d 1171 (1979).

[40] Tuality Lands Coalition v. Washington County, 21 Or LUBA at 618.

[41] ORS 197.830(2); See e.g., Faye Wright Neighborhood Planning Council v. City of Salem, 3 Or LUBA 17, 18-19 (1981).

[42] See East McAndrews Neighborhood Assoc. v. City of Medford, 19 Or LUBA 390, aff'd 104 Or App 280, 800 P.2d 308 (1990), rev. den. 311 Or 150 (1991); Friends of Douglas County v. Douglas County, 39 Or LUBA 156 (2000).

[43] But see Terra v. City of Newport, 24 Or LUBA 579 (1992) (member of organization with interests identical to organization afforded standing as individual despite not clearly indicating she was testifying on her own behalf, rather than the organization's).

organization, *both* you and the organization will have standing in a LUBA appeal.[44] For the same reason, you should sign written testimony twice -- once as a representative of the organization and once in your individual capacity.

> **EXAMPLE**: Here is how to sign testimony in both representative and individual capacities:
>
> Respectfully submitted,
>
> (Signature)
>
> D.O. Right
>
> and
>
> Friends of Land Use
>
> By (signature)
>
> D.O. Right, Vice-President

Remember also that when an organization such as a neighborhood association or a citizen participation organization wants to support or oppose a land use decision, it must be very careful to follow its own procedural requirements before it can speak on behalf of its members. Otherwise, any member of the organization can seek to invalidate the organization's actions.

> **EXAMPLE:** A formal vote conducted during a neighborhood meeting and recorded in the minutes may be required before the organization can act in an appeal.[45] The organization's bylaws usually set forth its procedural requirements.

II. How Much Will it Cost?

Filing Fees

The initial cost of an appeal (as of 2009)[46] is $350 for *each* Notice of Intent to Appeal filed with LUBA.[47] This amount includes a $200 filing fee and a $150 deposit for costs.[48] (See Part II (Fees) for details on filing.) If the appeal results in a reversal or remand, the Petitioner should file a cost bill requesting award of the $200 filing fee and return of the $150 deposit for costs, and serve a copy on all parties to the appeal.[49] The cost bill must be filed within 14 days of the date of LUBA's final order in the appeal.[50]

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[44] See e.g., Dames v. City of Medford, 9 Or LUBA 433, 436-37 (1983).
[45] But See, Clark v. Dagg, 38 Or. App. 71, 82-83, 588 P.2d 1298 (1979).
[46] As of late 2009, LUBA has proposed increasing the deposit for costs to $200. Before filing a NITA with LUBA verify that the filing fee and deposit for costs have not changed.
[47] OAR 661-010-0015(4).
[48] Id.
[49] OAR 661-010-0075(1).
[50] Id.

If LUBA upholds the local government's decision or dismisses the appeal, the $200 filing fee is forfeited.[51] Additionally, the local government may file a cost bill to cover its expenses in preparing the record.[52] These expenses are paid from the deposit for costs, and cannot exceed the amount of the deposit.[53] Any excess is returned to the Petitioner.[54] A party who intervenes in a case must pay a $100 filing fee,[55] and along with the Respondent, may be assessed the cost of the filing fee awarded to a prevailing Petitioner.[56].

Attorney's Fees

If a Petitioner brings an appeal before LUBA without a valid reason for doing so, LUBA may charge him or her with the opposing party's attorney's fees.[57] Although such an award has rarely been made, reasonable attorney's fees are provided for if the appeal was brought "without probable cause to believe the position was well-founded in law or on factually supported information" by LUBA.[58]

Attorney fees will *not* be awarded just because a party presented a losing argument.[59] Even poorly-founded arguments will not be penalized unless LUBA believes an improper motive was involved.[60] Moreover, attorney fees are recoverable only if the presentation of the non-prevailing party from whom they are sought is devoid of merit in its entirety.[61] LUBA would be most likely to grant attorney fees if an appeal were brought only to harass the other party or to stall progress on a proposal that had been approved.

Attorney's fees are also authorized when LUBA grants a ”stay” (discussed in Part II), which prevents a land use decision from going forward during the appeal.[62] For example, a party who requested a stay of an applicant's building permit will be liable for the applicant's attorney's fees if LUBA ultimately affirms the permit approval.[63]

Other Costs

Petitioners will also incur other costs when appealing a land use decision to LUBA. For example, notice must be served on the entire list of interested persons for the land use decision. This list can be long and a Petitioner can incur significant photocopying and mailing costs serving the notice list. The Petitioner can request the notice list from the government body prior to deciding whether to appeal if these costs are a concern.

---

[51] OAR 661-010-0075(1)(c); See e.g., Remarkable Properties v. Deschutes County, LUBA No. 99-096 (1999).
[52] OAR 661-010-0075(1)(b)(B).
[53] OAR 661-010-0075(1)(b)(C).
[54] OAR 661-010-0075(1)(d).
[55] OAR 661-010-0050(4)
[56] See e.g., Gray v. Clatsop County, LUBA No. 93-010 (1994); Mazeski v. Wasco County, LUBA No. 93-206 (1994).
[57] ORS 197.830(15)(b).
[58] ORS 197.830(15)(b); OAR 661-010-0075(1)(e).
[59] Fechtig v. City of Albany, 150 Or App. 10, 946 P.2d 280 (1997).
[60] Bradbury v. City of Independence, 23 Or LUBA 670, 671 (1992); See also McKay Creek Valley Assoc. v. Washington County, 20 Or LUBA 494, 497n6 (1990).
[61] Fechtig v. City of Albany, 150 Or. App. 10, 946 P.2d 280 (1997).
[62] OAR 661-010-0075(1)(e)(C).
[63] Walton v. Clackamas County, 34 Or LUBA 829 (1998).

III. Is My Case Eligible?

Is it a Land Use Decision?

The first question to consider before bringing an appeal before LUBA is whether the decision involved is a “land use decision” or “limited land use decision.”[64] These are the only types of decisions LUBA has statutory authority to consider.[65] LUBA has authority to review *permitting-type* decisions, such as re-zonings of specific parcels, land divisions, variances, conditional use approvals or site plan approvals.[66] These are decisions by which the local government applies criteria or standards from the comprehensive plan or land use regulations to a development application.[67] LUBA's statutory authority also includes most *legislative* actions, such as adopting generally applicable zoning ordinances and amending comprehensive plans.

An action by a local government that does *not* fit the statutory definition of a land use decision would still be appealable to LUBA if it would "create an actual, qualitatively or quantitatively significant impact on present or future land uses."[68] For example, a routine road improvement could be authorized by a city and not fall under the statutory definition of a "land use decision," even though the authorization will help lead to more development along the road. A party could appeal the authorization to LUBA because it will significantly impact future land uses.

An important exception to LUBA's jurisdiction involves “ministerial decisions".[69] These are decisions that "do not require the interpretation or exercise of policy or legal judgment."[70] An example of a purely ministerial act is when a planning official looks at a zoning map to decide which zone classification applies to a given parcel.[71] Likewise, when a building permit is approved or denied under clear and objective standards,[72] such as upon receipt of septic, electrical, and plumbing documentation, the action is only ministerial. The point is to avoid needless appeals of land use actions which are essentially automatic.

Although an action may seem quite simple, it might not be considered "ministerial."[73] Deciding whether previous or current zoning criteria apply to a given application, for example, is not ministerial.[74] Likewise, whether a proposed use falls within the same class as listed permitted uses[75] (e.g. whether a proposed methadone clinic is a "medical clinic" under the city code[76]) is not a ministerial decision, and LUBA will have authority to review it.[77]

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64 ORS 197.015(10) and (12).
65 ORS 197.825(1).
66 See gen., ORS 197.828; ORS 197.015(12).
67 See gen., ORS 197.825; ORS 197.015(10)(a).
68 Hashem v. City of Portland, 34 Or LUBA 629 (1998).
69 ORS 197.825(3)(a).
70 ORS 197.015(10)(b)(A).
71 Bradbury v. City of Independence, 18 Or LUBA 883 (1989).
72 ORS 197.015(10)(b)(B).
73 Breivogel v. Washington County, 114 Or App 55, 834 P.2d 473 (1992).
74 Tuality Lands Coalition v. Washington County, 22 Or LUBA 319, 327 (1991).
75 Citizens Concerned v. City of Sherwood, 21 Or LUBA 515, 522 (1991).
76 Hollywood Neighborhood Assoc. v. City of Portland, 22 Or LUBA 789 (1991).
77 ORS 197.825.

More About LUBA's Jurisdiction . . .

A few other exceptions to LUBA's jurisdiction are provided by statute.[78] For example, when a local government makes decisions about updating its local comprehensive plan -- a process known as "periodic review" -- those decisions are reviewed by the Department of Land Conservation and Development (DLCD) and not LUBA.[79] Other examples are decisions involving the Forest Management Practices Act[80] or the Columbia River Gorge Natural Scenic Area Act.[81] It should be clear from the local proceedings if any of these exceptions are involved.

Additionally, conventional lawsuits may be brought in circuit court to enforce land use orders rendered by LUBA[82] or the provisions of a comprehensive plan or zoning ordinance.[83] LUBA has no authority over these types of enforcement cases, and they are appealed to the Oregon Court of Appeals.[84] However, LUBA does have authority to review land use decisions to determine whether they comply with an LCDC enforcement order.[85]

Is the Decision Final?

The land use decision to be appealed must be a "final" decision of the local government.[86] Normally, a decision is final when it is written in its final form and signed by the members of the governing body.[87]

Decisions often pass though a number of stages before they become final. A development proposal, for instance, may start at the local planning department, be reviewed by a planning commission, and finally progress to city hall for ultimate approval. Decisions are final only when ultimately acted on by the final decision-making body.[88] If the final decision maker sends a proposal back to an earlier stage for further consideration, the action is not a final decision if it will come back to the final decision maker again for final approval.[89]

Occasionally, a local ordinance will provide that a decision becomes final at some point in time after it is in final written form and signed.[90] For example, an ordinance may provide that a decision becomes final after a certain number of days if no one requests a hearing during that time.[91] However, a city charter provision which delays the *effective date* of a decision does not

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[78] See gen., ORS 197.825; ORS 197.828.
[79] ORS 197.825(2)(c).
[80] ORS 197.825(2)(e).
[81] ORS 197.825(2)(f).
[82]ORS 197.825(3)(b).
[83] ORS 197.825(3)(a).
[84] ORS 197.335(2).
[85] Schatz v. City of Jacksonville, 23 Or LUBA 40, 47, aff'd 113 Or. App. 675, 835 P.2d 923 (1992).
[86] ORS 197.015(10)(a)(A); ORS 197.830(2); OAR 661-010-015(1).
[87] OAR 661-010-0010(3).
[88] OAR 661-010-0010(3).
[89] Tylka v. Clackamas County, 20 Or LUBA 296 (1990).
[90] OAR 661-010-0010(3).
[91] OAR 661-010-010(3).

postpone the date on which that decision is considered *final*.[92] Likewise, a land use decision may be final for purposes of appeal even if approval is conditioned on the completion of further studies.[93] Local rules can change the time at which decisions are considered "final" if they do not violate statewide procedural requirements.[94]

Tentative decisions and decisions that are only recommendations are not final decisions appealable to LUBA.[95] Decisions in which the local government is only answering inquiries or giving opinions on land use matters (often called "advisory opinions" or "interpretations") normally do not count as final decisions because the local government will not later be bound to follow them.[96] But some rulings *are* issued pursuant to formal proceedings for binding declaratory rulings and may affect future land use decisions.[97] They are therefore final land use decisions, which are appealable to LUBA.[98]

Have All Other Options Been Exhausted?

Opponents of a land use decision must make sure they have used every means available at the local level to change the decision before appealing it to LUBA.[99] This rule is intended to encourage resolution of land use issues at the local level whenever possible.[100] A land use proposal may often be appealed to one or more local bodies before the highest responsible authority approves it.[101] Each step in the process may be an opportunity to challenge the proposal. Only when there are no more avenues to challenge a local decision are local remedies considered "exhausted" so that LUBA will accept the appeal.[102] Fear that an appeal on the local level will be futile does not excuse a party's failure to exhaust their local appeals.[103]

> **NOTE**: If you have lost your chance to oppose a decision at the local level because you failed to apply for any available *local* appeal, LUBA will not hear the case.[104] LUBA will enforce the requirement that local remedies first be exhausted even if a local planning staff member mistakenly tells you there are no opportunities to do so.[105]

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92 Club Wholesale v. City of Salem, 19 Or LUBA 576, 578 (1990); Friends of Clean Living v. Polk County, 36 Or LUBA 544 (1999).

93 Citizens for Responsible Growth v. City of Seaside, 23 Or LUBA 100, 104 (1992) (ODOT traffic study required by conditional use zoning ordinance.).

94 Columbia River Television v. Multnomah County, 299 Or 325, 702 P.2d 1246 (1985).

95 Goose Hollow Foothills League Assoc. v. City of Portland, 21 Or LUBA 358 (1991).

96 See General Growth v. City of Salem, 16 Or LUBA 447 (1988); But see Weeks v. City of Tillamook, 113 Or App 285, 289 (1992).

97 Hollywood Neighborhood Association v. City of Portland, 21 Or LUBA 381, 384 (1991).

98 Id.

99 ORS 197.825(2)(a).

100 See Shaffer v. City of Salem, 29 Or LUBA 479 (1995).

101 See e.g., Clackamas County Zoning Development Ordinance § 1305.02.

102 Lyke v. Lane County, 70 Or. App. 82, 688 P.2d 411 (1984).

103 Shaffer v. City of Salem, 29 Or LUBA 479 (1995).

104 See e.g., Southeast Neighbors v. City of Eugene, 43 Or LUBA 268, 288-89 (2002).

105 Kamppi v. City of Salem, 21 Or LUBA 498, 505-06 (1991); Lyke v. Lane County, 70 Or App. 82, 688 P.2d 41.

Is the Decision Moot?

Finally, a land use decision cannot be appealed if it has become "moot."[106] An appeal is considered moot if a decision in the appeal would be without practical effect.[107] If a decision was repealed by the local government or cannot go forward for some other reason, LUBA will not rule on it.[108]

IV. What Are My Chances for Success?

If you have standing and a land use case that seems eligible for LUBA review, you can go ahead with an appeal. Your chances of success at LUBA, however, depend on certain limitations and standards LUBA follows in reviewing cases.

Grounds for Reversal or Remand

When deciding a case, LUBA affirms (approves) the local decision, reverses (overturns) it, or remands (sends back) the decision to the local government for further consideration.[109] In some cases, a remand can be as effective as a reversal in defeating a proposal because flaws identified by LUBA can be very hard to remedy by the local government.

To receive a favorable ruling from LUBA, a Petitioner should cite certain grounds for either reversal or remand that fall within LUBA's scope of authority.[110] The grounds for reversal or remand explained below provide the basis for challenging a land use decision before LUBA.

Reversal

LUBA may reverse a decision when the decision of local government exceeds its jurisdiction, is unconstitutional, or violates a provision of applicable law.[111]

A decision that is found to violate a provision of applicable law, must also be "prohibited as a matter of law"[112] in order to be reversed. This means the decision is illegal and there is *no* way for the local government to cure the illegality by modifying the decision or supporting it with additional information.

LUBA may, for example, reverse a decision that violates a local comprehensive plan provision or an applicable land use regulation.[113] (Quite often, however, there is a possibility that a decision could be made legal after some modifications by the local government. Thus, it is much more common for LUBA to "remand" (discussed below) a decision than to reverse it.) LUBA

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[106] Davis v. City of Bandon, 19 Or LUBA 526, 527 (1990)(and cases cited therein).
[107] Id.
[108] Kuzmanich v. Washington County, 9 Or LUBA 179 (1983)(case is moot where decision challenged is supplanted by controlling legislation); 1000 Friends of Oregon v. DEQ, 7 Or LUBA 84 (1982)(issuance of new permit authorizing structures renders appeal of prior permit for such structures moot).
[109] ORS 197.835(1).
[110] See gen., ORS 197.835(5) – (10); OAR 661-010-0071; OAR 661-010-0073.
[111] OAR 661-010-0071(1)
[112] OAR 661-010-0071(1)(c); OAR 661-010-0073(1)(c); see also ORS 197.835(5),(6),(7); ORS 197.828(2)(b).
[113] ORS 197.835(5) – (7).

may also reverse decisions that violate statewide law,[114] including statutes, land use goals, administrative agency rules,[115] or Oregon's constitution.[116]

LUBA will also reverse a decision in which the local government exceeded its scope of authority (jurisdiction) in making the decision.[117] A local government may exceed its jurisdiction, for example, by passing a regulation affecting land outside its geographic boundaries or impose restrictions which are the sole responsibility of the state or federal government. Additionally, LUBA will reverse a decision in which the local government acted "outside its range of discretion" in denying an application.[118] This would occur if the local government considered factors it was not supposed to take into account when deciding to deny an application.

When a local government creates a new land use regulation or amends an existing one, that decision may be reversed if it is not in compliance with the local comprehensive plan,[119] or if the local plan or the state-wide planning goals provide no basis for creating the regulation or amendment in the first place.[120] Amendments to the comprehensive plans themselves must comply with the state-wide planning goals[121] and state statutes.[122] State agency and special district land use decisions are also reviewed for goal compliance.[123]

Remand

LUBA will remand a decision that improperly construes applicable law.[124] Many decisions are remanded under this standard. Also, many local decisions are defective in only one or two respects, which are correctible, but comply with the law otherwise.[125] This fact accounts for many remands.

LUBA will remand a decision that is not "supported by substantial evidence in the whole record."[126] This means that LUBA will send a decision back to the local government if (1) there was virtually no evidence to support the decision, or (2) the supporting evidence was so undermined by other evidence that it was unreasonable for the local government to decide as it did.[127]

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[114] OAR 661-010-0071(1)(c); OAR 661-010-0073(1)(c); see also ORS 197.835(5), (7).
[115] Id.
[116] OAR 661-010-0071(1)(b); OAR 661-010-0073(1)(b); see also ORS 197.835(9)(a)(E); ORS 197.828(2)(c)(B).
[117] OAR 661-010-0071(1)(a); OAR 661-010-0073(1)(a); see also ORS 197.835(9)(a)(A); ORS 197.828(2)(c)(A).
[118] ORS 197.835(10)(a)(A).
[119] ORS 197.835(7)(a).
[120] ORS 197.835(7)(b).
[121] ORS 197.835(6).
[122] See Alliance for Responsible Land Use in Deschutes County v. Deschutes County, 115 Or App 621, 839 P.2d 746 (1992).
[123]ORS 197.835(9)(b).
[124] OAR 661-010-0071(2)(d); OAR 661-010-0073(2)(d); see also ORS 197.835(9)(a)(D).
[125] See e.g., Alliance for Responsible Land Use Planning v. Deschutes County, 23 Or LUBA 476, aff'd 115 Or App 621, 839 P.2d 746 (1992).
[126] OAR 661-010-071(2)(b); OAR 661-010-073(2)(b). See also ORS 197.835(9)(a)(C); ORS 197.828(2)(a).
[127] See e.g., Younger v. City of Portland, 305 Or 346, 752 P.2d 262 (1988); Dodd v. Hood River County, 317 Or 172, 855 P.2d 608 (1993).

> **NOTE:** Land use decisions often involve valid evidence both for and against a given proposal. It is up to the local government, and not LUBA, to decide which evidence deserves more weight in these cases.[128] Likewise, evidence may be subject to more than one legitimate interpretation, in which case a reasonable interpretation by the local government controls.[129]

The local government is required to adopt written "findings" that explain the criteria which apply to its decision and say how those criteria have been satisfied.[130] *This is a very important requirement which local governments often fail to meet*. LUBA will remand when there are inadequate findings to allow review of the decision.[131]

LUBA will also remand a decision if the local government fails to follow proper procedures to such an extent that the failure "prejudiced the substantial rights of the Petitioner."[132] Land use participants commonly feel they have been treated unfairly, but LUBA remands very few decisions under this standard. Only when serious procedural errors were made is a remand likely.[133] Procedural problems, which can range from minor flaws in the notice procedure to a hostile planning staff or decision maker, but which have no provable effect on the outcome of the case, do not provide a basis for remand.[134]

> **NOTE:** In practice, a significant number of LUBA decisions are remands, rather than reversals, which are comparatively rare. If remanded, a case will return to the local government for further consideration, and the applicant seeking a permit (or the governing body proposing an ordinance or plan amendment) does not have to begin the approval process from scratch. It is up to the local government to decide whether new individuals or organizations -- or only the parties to the LUBA appeal -- can participate at this stage of the decision-making process. Based on its reconsideration, the local government may then approve or deny the application or ordinance. (If disagreement still exists, this decision of the local government on remand can be appealed to LUBA by parties with standing.)
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> In short, some (but by no means all) cases heard by LUBA do *not* result in a final resolution in four months. Be prepared for a longer haul (e.g., two years or more) if there is ongoing disagreement between the parties involved.

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[128] Stefan v. Yamhill County, 18 Or LUBA 820,838 (1990); See Boumon v. Jackson County, 23 Or LUBA 628, 641 (1992); Harwood .v Lane County, 23 Or LUBA 191 (1992).

[129] Dority v. Clackamas County, 23 Or LUBA 384, 388, aff'd 115 Or. App. 449, 838 P.2d 1103 (1992), rev. den. 315 Or 311 (1993); McInnis v. City of Portland, 25 Or LUBA 376 (1993).

[130] See, e.g., ORS 215.416(9); ORS 227.173(2)(land use permit); Sunnyside Neighborhood v. Clackamas Co. Comm., 280 Or 3, 19-23, 569 P.2d 1063 (1977)(quasi-judicial plan amendment); Von Lubken v. Hood River County, 22 Or LUBA 307, 313 (1991)(for legislative plan amendment, explanation may be made in either the findings or the record); Latta v. City of Joseph, 36 Or LUBA 708 (1999) (where the staff report identifies an approval criterion and the final decision fails to demonstrate compliance with the criterion or take the position that the criterion does not apply, the decision will be remanded).

[131] OAR 661-010-071(2)(a); OAR 661-010-073(2)(a).

[132] OAR 661-010-071(2)(c); OAR 661-010-073(2)(c); see also ORS 197.835(9)(a)(B); ORS 197.828(2)(d).

[133] See gen., ORS 197.835(9)(a)(B).

[134] West Amazon Basin Landowners Association, Inc. v. Lane County, 24 Or LUBA 508, 512 (1992) (notice of hearing made available nine days rather than ten prior to hearing did not prejudice substantial rights of the parties); See also Mazeski v. Wasco County, 26 Or LUBA 226 (1993).

Deference to Local Decisions

LUBA's authority in reviewing decisions applying *local* law is limited, and this will affect your prospects for success. If the local rule or ordinance is subject to more than one valid interpretation, LUBA cannot reject a decision just because its interpretation of the local comprehensive plan or land use regulation might be different from the local government's.[135] The following rules govern LUBA's authority in these cases:

- if a local government's interpretation of its comprehensive plan or land use regulation is consistent with the express language, purpose, or underlying policy of the plan or regulation as a whole, LUBA must uphold the interpretation;
- if a local interpretation of a local provision or regulation clearly goes against the actual language, purpose, or policy, LUBA need not uphold the interpretation; and
- if the local provision being interpreted implements a state statute, administrative rule or statewide planning goal, LUBA can reverse an interpretation that is contrary to the statewide requirement. [136]

Raise It or Waive It

The subjects you may address at LUBA depend on what subjects were addressed during local proceedings. State law dictates that when the local government has made a "quasi-judicial" land use decision (e.g., a permit approval), *a party can only appeal issues to LUBA that were raised during the local government hearings*.[137] For example, if testimony during a permit hearing talked about nothing but the *traffic impact* of a proposed development, a party probably won't be able to raise the issue of *height restrictions* in an appeal to LUBA.

This requirement to "raise it or waive it" is designed to make sure parties give the local government an opportunity to respond to issues before LUBA reviews them.[138] An issue must have been raised by *any* party (you do not have to be the person who raised it)[139] before the local government in order to challenge the local government on that issue before LUBA.[140]

Additionally, the requirement to “raise it or waive it” refers to the requirement that issues, rather than arguments, must have been raised during the local government proceedings if they are to be reviewed by LUBA.[141] There is no statutory requirement that particular arguments be raised in local proceedings in order to address those arguments on appeal.[142] Thus, the statutory

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[135] DLCD v. Crook County, 25 Or LUBA 625, 633 (1993).
[136] ORS 197.829.
[137] ORS 197.763(1); ORS 197.835(3).
[138] See Boldt v. Clackamas County, 21 Or LUBA 40, 46 (1991) ("Petitioners may not fail to raise issues locally and then surprise the local government by raising those issues for the first time at LUBA."); Larson v. Multnomah County, 25 Or LUBA 18, 21-22 (1993)(takings claim waived if not raised below, because denial of application is reasonably foreseeable).
[139]ORS 197.835(3).
[140] Spiering v. Yamhill County, 25 Or LUBA 695 (1993).
[141] ORS 197.763(1).
[142] DLCD v. Tillamook County, 34 Or LUBA 586, 591-92, aff’d 157 Or. App. 11, 967 P.2d 898 (1998).

restrictions to raising “issues” on appeal before LUBA do not apply to new “arguments” regarding issues that were raised at the local level.[143]

> **NOTE:** The requirement to "raise it or waive it" does not apply to "legislative" land use decisions.[144] In a legislative decision, the local government adopts or amends provisions to its comprehensive plan or zoning ordinance that are generally applicable to everyone. It is not just deciding an individual permit or addressing an individual property.

In quasi-judicial cases (i.e., "permitting-type," see Glossary), issues brought before LUBA don't have to be *identical* to those raised at the local level,[145] but close enough so that the local government could have addressed them during the hearing. If the local government's written decision interprets a local ordinance differently than the Petitioner could have reasonably anticipated during the local hearing, however, the Petitioner may raise that interpretation as an issue before LUBA even if it was not raised locally.[146]

Because parties appealing quasi-judicial decisions to LUBA are limited to issues raised locally, the local government is required to give complete notice of the issues to be discussed at the local hearing so parties may come prepared to raise them.[147] Thus (in quasi-judicial local hearings) if the local government fails to send notice to interested persons, fails to explain the proposal and list all the criteria applicable to it, or fails to make the necessary information available to parties before the hearing, parties may raise new issues before LUBA.[148] If the local government does not follow those requirements, or if the final decision turns out to be significantly different from what was proposed in the notice,[149] parties may raise new issues before LUBA.[150]

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[143] Id.
[144] DLCD v. Columbia County, 24 Or LUBA 32, 36, aff’d 117 Or. App. 207, 843 P.2d 996 (1992).
[145] Boldt v. Clackamas County, 21 Or LUBA 40, aff’d 107 Or. App. 619, 813 P.2d 1078 (1991).
[146] Washington County Farm Bureau v. Washington County, 21 Or LUBA 51, 57 (1991).
[147] See ORS 197.763(3); DLCD v. Columbia County, 24 Or LUBA 32, aff’d 117 Or. App. 207, 843 P.2d 996 (1992).
[148] ORS 197.830(5)(a); ORS 197.835(4)(a).
[149] ORS 197.830(10)(b) and ORS 197.835(2)(B) permit new issues to be raised if "the local government made a decisions which is different from the proposal described in the notice to such a degree that the notice of the proposed action did not reasonably describe the local government's final action."
[150] See also Wuester v. Clackamas County, 25 Or LUBA 425, 429 (1993) (local government's failure to list all applicable criteria allows parties to raise any new issues before LUBA).

Part Two

THE APPEAL PROCESS

You must strictly follow LUBA rules and state law to have a successful appeal at LUBA. This section summarizes some of LUBA's rules. Be sure to check the current rules at http://www.oregon.gov/LUBA/Rules.shtml to verify that nothing has changed. Follow all the rules applicable to your particular appeal. While some mistakes are correctable (e.g. failing to notify someone on the notice list who is not a party to the case and does not wish to intervene) others are not (e.g. failing to file with LUBA on time) and will result in dismissal of your case.

I. Notice of Intent to Appeal

Deadlines

Once the requirements listed in Part I are satisfied, an appeal is commenced by submitting to LUBA a "Notice of Intent to Appeal" (NITA).[151] *A "Notice of Intent to Appeal" is commonly known as a "NITA" but may also be referred to as a "NOITA" or a "NOIA".* (A sample NITA is provided in Appendix A.)

The NITA, along with a filing fee and deposit, must be received at, or mailed to, LUBA's Salem office within 21 days after the decision appealed becomes "final."[152] The date of filing a NITA is the date the NITA is received by LUBA, or the date the NITA is mailed, provided it is mailed by registered or certified mail and the party filing the NITA has proof from the post office of the mailing date.[153] If the date of mailing is relied upon as the date of filing, acceptable proof from the post office consists of a receipt stamped by the United States Postal Service showing the date mailed and the certified or registered number.[154]

Normally, a decision becomes "final" when it has been written in its final form and signed by the members of the governing body rendering the decision.[155] Thus, if a decision is signed on June 1, June 2 is counted as the first day and June 22 is counted as the 21st day after the decision became final. However, a local rule or ordinance may specify that a decision becomes final on a date later than when it is signed.[156] *As discussed above, if the NITA is not received at, or mailed*

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[151] ORS 197.830(1).

[152] OAR 661-010-0015(1); Pilling v. Crook County, 23 Or LUBA 51 (1992) (fees and deposit received by the 21st day, but NITA filed after untimely filing).

[153] OAR 661-010-0015(1)(b).

[154] Id.

[155] OAR 661-010-0010(3). Final legislative type decisions are often described as "entered" or "adopted" by the local government; quasi-judicial decisions are often described as "transmitted" once they become final.

[156] Id.

to, LUBA's office by 5:00 p.m. on the 21st day, the case will automatically be thrown out and the opportunity to appeal will be lost.[157]

> **NOTE:** The rules about when a decision becomes final and when the NITA is due are applied differently in different situations. The rule stated above is a general guideline. How it applies in a given case may vary. For example, when a local government adopts a new comprehensive plan provision or land use regulation (or amends an existing one), the 21-day deadline to file your NITA starts counting when notice of the decision is mailed to the various people entitled to receive them.[158] If the 21st day falls on a weekend or holiday, the NITA must be filed by the end of the next business day.[159] If you are not sure when you must file your NITA, it is best to file it early.

> **NOTE:** Occasionally, a separate local rule or ordinance may provide that the land use decision to be appealed does not become "final" until some later date after the decision has been written and signed.[160] For instance, a local ordinance may provide that a decision becomes final if no one requests a hearing on it within a certain number of days. In such cases, the 21-day time limit does not begin running until the later date.[161]

Because local governments do not always hold public hearings for land use decisions, concerned persons may not learn of the decision until well after it became final. In such cases, persons adversely affected (discussed in Part I, Section I) by the decision have 21 days from the time they knew or should have known of the decision to file a NITA.[162]

The same rule applies when the local government was supposed to provide notice of the hearing and failed to do so, or notice was provided, but it did not adequately describe the matter that was going to be considered.[163] In these situations, interested persons may not have thought of attending, so they are also given 21 days until after they learn of the decision to file a NITA.[164]

> **NOTE:** It is important to follow up on any information you receive about the land use decision as soon as you learn it. If activity on the property, conversations with others, news reports, etc. give you reason to think a decision has taken place, contact the local planning office immediately and confirm. LUBA may think you had enough reason to know a land use decision took place and count the 21-day time limit from that time.

An additional copy of the NITA must be filed along with the original.[165] Filing may be by first class mail, by hand, or by messenger, but not by fax.[166] If you file by mail, the NITA must be

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[157] Oak Lodge Water District v. Clackamas County, 18 Or LUBA 643 (1990) (NITA mailed prior to, but received after, the 21 day deadline is not timely filed); See also J.C. Reeves Corporation v. Washington County, 32 Or LUBA 263 (1996), aff'd without opinion 147 Or. App. 241, 932 P.2d 1217 (1997).
[158] ORS 197.830(8); OAR 661-10-015(1); Sparrows v. Clackamas County, 24 Or LUBA 318, 324-25 (1992).
[159] OAR 661-010-0075(8).
[160] OAR 661-010-0010(3).
[161] OAR 661-010-0010(3).
[162] ORS 197.830(3)(b); Clearwaters v. Josephine County, 50 Or LUBA 300 (2005); Rogers v. City of Eagle Point, 42 Or LUBA 607 (2002).
[163] ORS 197.830(3), (6)(b).
[164] ORS 197.830(4).
[165] OAR 661-010-0015(1)(a).
[166] OAR 661-010-0015(2); See also, OAR 661-010-0075(2).

mailed by certified or registered mail before the expiration of the 21-day time limit.[167] Call LUBA on or before the 20th day to confirm that the notice has been filed.

> **NOTE:** an attorney must sign a NITA filed on behalf of an organization, corporation or individual other than the Petitioner.[168]
>
> **NOTE:** If there are related land use decisions to be appealed (such as a comprehensive plan amendment and a corresponding zone change), both decisions can usually be addressed in a single NITA, but will require an additional filing fee and deposit for costs on each decision being appealed.[169] Generally, as long as the related decisions are contained in a single written order (such as an ordinance), they may be combined in a single NITA.[170] Separate NITAs are required for separate land use decisions contained in separate written orders.[171]

Contents of the Notice of Intent to Appeal

Each NITA must contain[172]:

- a caption identifying the person(s) filing the NITA, identified as "Petitioner(s)"[173] (if there is more than one petitioner, one must be identified as the "Lead Petitioner"[174], who may receive subsequent documents, such as the Respondent's Brief, on behalf of the other Petitioners);
- a caption identifying the governing body, identified as "Respondent";[175]
- the heading "Notice of Intent to Appeal" below the caption;[176]
- the title of the decision being appealed as it appears on the final decision issued by the local government, special district, or state agency;[177]
- the date the decision became final;[178] and
- a concise description of the decision being appealed.[179]

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[167] OAR 661-010-0015(1)(b).
[168] OAR 661-010-0015(3)(h); 661-010-0075(6); Gray v. Clatsop County, 21 Or LUBA 600 (1991); Homebuilders Association v. City of Portland, 37 Or LUBA 991 (1999).
[169] See e.g., McKenzie v. Multnomah County, 30 Or LUBA 459, 460 (1996).
[170] See e.g., Reusser v. Washington County, 24 Or LUBA 652, n.2 (1993) ; But see, Woodward v. City of Cottage Grove, 56 Or LUBA 206 (2008).
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[171] Osbourne v. Lane County, 4 Or LUBA 368, 370 (1981); Seneca Sawmill Company v. Lane County, 6 Or LUBA 454, 454-55 (1983).
[172] OAR 661-010-0015(3).
[173] OAR 661-010-0015(3)(a).
[174] OAR 660-010-0010(8); OAR 661-010-0015(3)(f)(A).
[175] OAR 661-010-0015(3)(a).
[176] OAR 661-010-0015(3)(b).
[177] OAR 661-010-0015(3)(c).
[178] OAR 661-010-0015(3)(d).
[179] OAR 661-010-0015(3)(e).

The NITA must also include the name(s), address(s), and phone number(s) of: [180]

- the Petitioner(s) (unless an attorney represents them, in which case you give the attorney's name, etc.),
- the governing body and the governing body's legal counsel,
- the applicant for the decision being appealed (if there is an applicant or the applicant is not the Petitioner) or the applicant's attorney, and
- any person who received written notice of the decision as indicated in the governing body's records. (The telephone numbers of these persons are not required.)

The NITA must also include a statement advising the applicant and those who received notice of the decision that they must file a "Motion to Intervene" (explained below) if they wish to participate in the appeal.[181] It also needs to have a statement that the Petitioner served copies of the NITA to all persons listed above at the time the notice was filed with LUBA (See Certificates of Filing and Service).[182] The NITA must also contain the signature of each Petitioner or the attorney representing the Petitioner on the last page.[183]

(A sample NITA is included in the Appendix)

Fees

A filing fee of $200 plus a $150 deposit to cover the costs of preparing the record must accompany the NITA.[184] (These are the costs as of 2009 and may be subject to later changes). Parties who win their appeal can have these amounts refunded.[185] The deposit and filing fee may be paid by a single $350 check, money order, or State of Oregon purchase order made payable to the Land Use Board of Appeals.[186]

LUBA will not accept a NITA for filing until it receives the required filing fee and deposit.[187] A filing fee and deposit are required for each separate NITA being filed.[188]

Service: NITA and Other Documents

In addition to filing a Notice of Intent to Appeal (plus one copy) with LUBA, exact copies of the notice must be mailed or hand delivered to the local governing body, the governing body's legal counsel, the applicant (or the applicant's attorney), all persons identified in the NITA, and any other person to whom written notice of the *final* decision was mailed.[189] You are not required to

[180] OAR 661-010-0015(3)(f).
[181] OAR 661-010-0015(3)(g).
[182] OAR 661-010-0015(3)(i).
[183] OAR 660-010-0015(3)(h).
[184] ORS 193.830(9); OAR 661-010-0015(4).
[185] OAR 661-010-0075(1)(b)(A) (filing fee); Tice v. Josephine County, 21 Or LUBA 596 (1991).
[186] OAR 661-010-0015(4).
[187] OAR 661-010-0015(1).
[188] OAR 661-010-0015(1)(c).
[189] ORS 197.830(9); OAR 661-010-0015(2) and (3)(f)(C) and (D).

send NITA copies to everyone who received notice of the local public *hearings*, only those who received written notice of the *final decision*.[190]

> **NOTE:** The records of the decision (kept on file at the local planning department) will list everyone who received written notice of the final decision and who is therefore entitled to receive a copy of the NITA.[191] The planning director or a clerk may be able to provide the names by phone, mail, email, or fax. You may also inspect the records personally at the planning office.

While LUBA requires the NITA to be *received* at, or *mailed* by registered or certified mail to, its office within 21 days after the decision became final, it is sufficient if copies of the NITA are *mailed* to those entitled to receive them on the day the original notice is filed with LUBA.[192] Copies of the notice may be sent by first class mail[193] and should be sent by certified mail, return receipt requested to prove the notice was served.[194] Copies of the notice may also be hand delivered,[195] in which case the person receiving it should sign a receipt indicating the delivery date.

> **NOTE:** Filing any document (other than the NITA) with LUBA may be accomplished by personal delivery or by first class mail on the date the document is due.[196] The NITA must be received, or mailed by registered or certified mail, by the due date.[197] Any document may be served on other parties by mailing a copy of the document on the same date the original is filed with LUBA.[198] Failure to serve notice to the required parties by the due date can result in dismissal of the appeal if that party establishes substantial prejudice from the delay in service.[199]

Certificates of Service and Filing

All documents filed with LUBA, including the NITA, must be accompanied by a "Certificate of Service" which includes a statement that the Petitioner served a "true copy" (exact copy) of the document on each person entitled to receive one.[200]

Likewise, copies of all documents filed with LUBA (including the NITA) sent to other participants must contain a "Certificate of Filing" indicating the date on which the original notice was filed with LUBA.[201]

(Sample Certificates of Service and Filing provided by LUBA are included in Appendix B.)

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[190] Heritage Enterprises v. City of Corvallis, 12 Or LUBA 402, aff'd 71 Or App 581, 693 P.2d 651 (1984); aff'd 300 Or 168, 708 P.2d 601 (1985)..

[191] See gen., OAR 661-010-0015(3)(f)(D).

[192] OAR 661-010-0015(1)(b), (2); OAR 661-010-0075(2)(b)(A) and (B); Davenport v. City of Tigard, 23 Or LUBA 679 (1992); Petersen v. Columbia County, 39 Or LUBA 799 (2001).

[193] OAR 661-010-0015(2).

[194] See OAR 661-010-0015(1)(b).

[195] OAR 661-010-0015(2); OAR 661-010-0075(2)(b)(B).

[196] OAR 661-010-0075(2)(a).

[197] OAR 661-010-0015(1)(b).

[198] OAR 661-010-0075(2)(b)(A) and (B).

[199] Winner v. Multnomah County, 30 Or LUBA 420 (1996).

[200] OAR 661-010-0015(3)(I); OAR 661-010-0075(2)(b)(D).

[201] OAR 661-010-0075(2)(b)(A), (C).

II. Motions to Intervene

As stated in the section on Standing, any person who appeared before the local government while the land use proposal in question was being considered may be entitled to participate in the appeal.[202] Anyone wishing to participate, including the original applicant, must file a "motion to intervene", plus one additional copy[203] with LUBA within 21 days after the Notice of Intent to Appeal is filed.[204] A filing fee of $100 must also be included.[205] (An example of a Motion to Intervene is provided in Appendix C.)

> **NOTE:** LUBA appeals typically involve challenges to development applications, which were approved by the local government and appealed by opponents. But if the applicant's request was *denied*, the applicant also has the right to appeal. In that event, a person who wishes to participate in seeing the local decision upheld must file a motion to intervene on the side of the *Respondent* (the local government) within 21 days after the NITA is filed.[206]

The motion to intervene must state whether the party is intervening on the side of the Petitioner or the Respondent, and it must indicate why the person filing the motion is eligible to participate in the appeal.[207] (Parties may submit a sworn affidavit or simply refer in their motions to pages of the record which show their participation in the local hearing.) True copies of the motion to intervene, along with Certificates of Filing, must be delivered to the Petitioner, the local government's attorney, and any other parties to the appeal.[208]

A party who files a motion to intervene becomes an "intervenor,"[209] who is entitled to receive copies of any document filed with LUBA by any participant during the appeal.[210] (LUBA may later deny intervenor status to that party.[211])

> **NOTE:** Persons who received written notice of the final decision (and were thus entitled to receive copies of the NITA) will not be entitled to receive future documents relating to the appeal unless they also become intervenors.

> **NOTE:** If you intervene on the side of the Petitioner and the Petitioner is later disqualified, you will also be eliminated as a party.[212] Thus, anyone wishing to challenge a local government decision should file a Notice of Intent to Appeal rather than intervene on the side of another petitioner.[213]

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[202] ORS 197.830(2); OAR 661-010-0050(1).
[203] OAR 661-010-0075(3).
[204] ORS 197.830(7); OAR 661-010-0050(2).
[205] OAR 661-010-0050(4)
[206] OAR 661-010-0050(3)(b).
[207] OAR 661-010-0050(2)(a) and (b) and (c).
[208] OAR 661-010-0050(3).
[209] Ramsey v. City of Portland, 22 Or LUBA 295, 303 (1991).
[210] OAR 661-010-0075(2)(b)(A).
[211] OAR 661-010-0050(1).
[212] See e.g., Gross v. Washington County, 17 Or LUBA 640, 646 (1989).
[213] See National Advertising Co. v. City of Portland, 20 Or LUBA 79 (1990).

III. The Record

What Information Will LUBA Consider?

Appeals before LUBA are based solely on information gathered during the local proceedings which led to the land use decision.[214] With few exceptions, no new information about the land use decision can be brought up for the first time before LUBA.[215] Furthermore, the record only includes information gathered by the *final* decision-making body.[216] Information gathered during an earlier proceeding will be part of the record only if the final decision-maker adopts that information in its record.[217]

> NOTE: This also means that it is important to raise all of you issues with the final decision-making body even if your arguments have been rejected by the lower level decision-makers. This ensures that your issues are preserved for review at LUBA.

When analyzing a local land use decision, LUBA will look at information gathered in local proceedings to determine if the decision-making body properly applied an applicable land use statute. In some cases, these statutes may be unclear or ambiguous. A party may therefore include in the record any legislative history that clarifies the legislative intent of an applicable statute.[218] If, for example, an applicable statute refers to the "preservation of land for wildlife," and it is unclear from the text what the legislature meant by "wildlife," a party may introduce legislative history that determines or clarifies what the legislators meant when they included this word in the statute. However, LUBA may conclude that an applicable statute is clear and unambiguous, in which case it does not have to give weight to this legislative history.[219] Furthermore, LUBA is not obligated to conduct independent research of legislative history,[220] and therefore parties wishing to challenge a land use decision based on alleged misinterpretation of legislative intent should include in the record any applicable legislative history.

It is very important that all parties review the record carefully as soon as it is received. You should make sure the record contains all the information which supports your case that was presented at the local proceeding -- even if it was presented by someone else or as part of a staff report. The record will have to contain all the facts needed to support your arguments (see Legal Research), and the record in most cases has to show that issues being appealed were raised at least once before the local government (see Part I).

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[214] ORS 197.835(3); See also, OAR 660-010-0025(1).

[215] See e.g., Von Lubken v. Hood River County, 19 Or LUBA 548 (1990) (where identity or authenticity of excluded document is not disputed, document may be admitted as part of LUBA's record for limited purpose of review for error in excluding the document from the local government's record); Friends of Clean Living v. Polk County, 36 Or LUBA 544 (1999) (LUBA will grant a motion to strike documents attached to the Petition for Review, where those documents are neither part of the record submitted to LUBA nor documents of which LUBA may take official notice).

[216] OAR 661-010-0025(1).

[217] OAR 661-010-0025(1)(b).

[218] State v. Gaines, 346 Or. 160 (2009).

[219] Id.

[220] Id.

The governing body is required to send the original or a certified copy of the record (except for large maps and other items which are difficult to duplicate[221]) to LUBA within 21 days after the governing body was served its copy of the Notice of Intent to Appeal.[222] The governing body must also send a copy of the record to the Petitioner.[223] Intervenors and other interested parties may obtain copies of the record as long as the local government is reimbursed for duplication costs.[224]

> **NOTE:** If you are entitled to a copy of the record and do not receive it within 21 days after sending the NITA to the governing body, call the governing body's legal counsel and find out the reasons for the delay. If the record is not on the way, call LUBA and ask for a conference call so that you, LUBA, and the governing body can resolve the problem.

Contents of the Record

When you receive a copy of the record, review it immediately for accuracy and completeness. Local governments sometimes fail to include all the letters or other evidence you may need to support your case. The record sent to LUBA may be inaccurate or incomplete, or include materials that were never even placed before the governing body. A common scenario is when a planning staff member reports the results of a study to the decision-making body, thus causing the *results*, but not the entire *study*, to become part of the record. Neither side can bring up other information from the study to help its case unless that information was also submitted during the local proceedings.[225]

The record that LUBA can consider on appeal is very broad, including all spoken and written information actually offered before, and not specifically rejected by, the decision-making body during its hearing process.[226] The record must at least include:

- the final decision itself, including the findings and conclusions of the decision-making body,
- all written exhibits, maps, documents, transcripts and other written material submitted to the decision-making body,
- minutes of the proceedings summarizing oral testimony to the decision-making body and the decision-making body's responses, or verbatim transcriptions, if any were prepared, of some or all of the oral testimony and responses,

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[221] OAR 661-010-0025(2). However, maps and documents must be individually identified in the record's table of contents if they are part of the record. OAR 661-10-025(4)(a)(B); see Eckis v. Linn County, 20 Or LUBA 589 (1991) (large bulky documents, such as maps, may be listed in the contents of the record and withheld until oral argument).

[222] ORS 197.830(10); OAR 661-010-0025(2).

[223] OAR 661-010-0025(3).

[224] Id.

[225] Eckis .v Linn County, 20 Or LUBA 589 (1991); See McKay Creek Valley Association v. Washington County, 19 Or LUBA 500 (1990); Hoffman v. City of Lake Oswego, 19 Or LUBA 607 (1990); Homebuilders Association v. Metro, 41 Or LUBA 616 (2002).

[226] OAR 661-10-025(1); Silani v. Klamath County, 22 Or LUBA 823 (1991); Wilson Park Neighborhood Assoc. v. City of Portland, 23 Or LUBA 688 (1992).

- notices of proposed action, public hearing, and adoption of final decision, published, printed, posted or mailed during the course of the land use hearing.[227]

The following points are useful when verifying the contents of the record:

- Check whether the record includes all information accepted by the decision-making body, whether it was actually reviewed by them or not.[228]
- Normally, all information from a series of meetings before a single decision-making body is part of the record of the decision issued by that body.[229] However, when a proposal passes through a number of hearings before different level decision-making bodies, the record before LUBA will only include information from the lower level proceedings if that information was re-introduced before the final decision maker and not rejected.[230] A local ordinance may require that the record from a lower level proceeding automatically be placed before the final decision maker.[231]
- The decision-making body must be clear that it is rejecting evidence, or LUBA will consider it part of the record.[232] But if the decision maker receives information, considers it, and then expressly rejects it, that information does not become part of the record, even if the decision maker retains it throughout the proceeding.[233] Further, written submissions to the decision maker after the final due date are rejected from the record.[234]
- Local rules may require certain information (such as planning commission documents) to be submitted every time a certain type of land use proceeding is conducted. Even if staff members neglected to actually place such information before the decision maker in your case, it will be included in the record before LUBA.[235]
- The local comprehensive plan and any ordinances applicable to the land use decision may always be referred to as if they were part of the record.[236] LUBA may consider criteria contained in these documents even if they are not cited by the parties or included in the record.[237] LUBA is also free to consider official agency publications

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[227] OAR 661-010-0025(1).

[228] Hummel v. City of Brookings, 15 Or LUBA 634 (1987).

[229] Davis v. City of Bandon, 19 Or LUBA 493 (1990) (successive investigation, reporting, and adoption meetings for a moratorium are part of the final of decision adopting a moratorium); McKay Creek Valley Assoc. v. Washington County, 19 Or LUBA 500 (1990) (citizen involvement phase of proceedings leading to adoption of challenged ordinances part of final decision record).

[230] Leonard v. Union County, 23 Or LUBA 664, 667 (1992); Hubenthal v. City of Woodburn, 38 Or LUBA 916 (2000).

[231] Union Gospel Ministries v. City of Portland, 21 Or LUBA 557, 559, 560 (1990); League of Women Voters v. Coos County, 13 Or LUBA 311, 312, aff'd 76 Or. App. 705, 712 P.2d 111 (1985), rev. den. 301 Or 76 (1986).

[232] Central Klamath County CAT v. Klamath County, 41 Or LUBA 579 (2002).

[233] Id. at 580.

[234] Kane v. City of Beaverton, 49 Or LUBA 712 (2005).

[235] Union Gospel Ministries v. City of Portland, 21 Or LUBA 557, 559, 560 (1991); Hubenthal v. City of Woodburn, 38 Or LUBA 916 (2000).

[236] Sunburst II Homeowners Assoc. v. City of West Linn, 18 Or LUBA 695, 698, aff'd 101 Or. App. 458, 790 P.2d 1213, rev. den. 310 Or 243 (1990).

[237] Hoffman v. City of Lake Oswego, 19 Or LUBA 607, 611 (1990) (official notice of transportation planning study incorporated by reference into comprehensive plan); Sunburst II Homeowners Assoc. v. City of West Linn, 18 Or LUBA 695, 698, aff'd 101 Or. App. 458, 790 P.2d 1213, rev. den. 310 Or 243; Downtown Community Assoc. v. City of Portland, 31 Or LUBA 574 (1996); Jackman v. City of Tillamook, 27 Or LUBA 704 (1994).

and the history behind any general state laws which might apply to your case.[238] However, LUBA is not free to consider pertinent history, which led to a *local* law, unless that history is included in the record.[239] Because LUBA has no obligation to consider the legislative history that leads to an applicable law or ordinance,[240] a petitioning party should seek to have such relevant information included in the record.

More About the Record . . .

Because LUBA's concern is with what information was actually before the decision-making body -- and not what should have been before it -- the following points are also important:

- Occasionally, the decision-making body will receive new information after it has completed its hearings but before it has issued a final decision.[241] Unless the decision maker specifically rejects that information, it will usually be included as part of the record, even though the governing body had announced that it would not accept additional evidence after the close of hearings.[242] Minutes of deliberations by the decision-making body during public hearings, but after parties are no longer allowed to submit evidence or arguments, are also part of the record.[243] However, "resolutions" subsequently adopted by the governing body to clarify its actions during the proceedings are not part of the record.[244]
- A land use decision may have been appealed to LUBA before and "remanded" (sent back) to the local decision maker for additional proceedings. The record for a subsequent appeal to LUBA includes the record from the original proceedings as well as from the proceedings on remand unless a new application was filed in place of the old one.[245]
- Inaccurate information placed before the decision maker will be included to provide a "complete" record for LUBA to review.[246] (Inaccuracies may be able to be addressed during an "evidentiary hearing" discussed below.[247])
- A party cannot have information removed from the record just because she never knew it was put in the record during the local proceedings.[248]

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[238] Foland v. Jackson County, 18 Or LUBA 731, 738, aff'd 101 Or. App. 632, 792 P.2d 1228 (1990), aff'd 311 Or. 167, 807 P.2d 801 (1991); Adkins v. Heceta Head Water Dist., 23 Or LUBA 207, 211 (1992).

[239] 19th Street Project v. City of The Dalles, 20 Or LUBA 440, 447, 448 (1991); Adkins v. Heceta Head Water Dist., 23 Or LUBA 207, 211 (1992).

[240] State v. Gaines, 346 Or. 160 (2009).

[241] See e.g., Von Lubken v. Hood River County, 19 Or LUBA 548, 552 (1990) (minutes of deliberations after hearing closed are part of the record).

[242] Schatz v. City of Jacksonville, 22 Or LUBA 799 (1990); But see Kane v. City of Beaverton, 49 Or LUBA 712 (2005).

[243] Von Lubken v. Hood River County, 19 Or LUBA 548, 552 (1990).

[244] Perkins v. City of Rajneeshpuram, 10 Or LUBA 426, aff'd 68 Or. App. 726, 686 P.2d 369 (1984), aff'd 300 Or. 1, 706 P.2d 949 (1985).

[245] Rutigliano v. Jackson County, 47 Or Luba 628, (2004); Fisher v. City of Gresham, 10 Or LUBA 409, aff'd 69 Or. App. 411, 685 P.2d 486 (1984).

[246] Gray v. Clatsop County, 21 Or LUBA 574, 578 (1991).

[247] OAR 661-010-0045(1).

[248] Chauncey v. Multnomah County, 23 Or LUBA 685, 686-67 (1992).

- If, during a hearing, you informally requested a staff member to include documents in the record and they are accidentally left out, LUBA will not include them in the record.[249]
- Written submissions must be to the members of the body rendering the decision or their designated custodian of records (as designated in the governing body's charter.) Do not, for example, submit written testimony to a member of the planning staff when the hearings are being held before the city council. Your testimony will not be counted as placed before the city council.[250]
- Letters, documentation, and the like submitted before an actual application was filed are not part of the record of the subsequent hearing unless they were reintroduced at that hearing.[251]

Objections to the Record

If you discover errors or omissions in the record, you must first contact the local government's attorney and attempt to resolve any differences.[252] If you are unsuccessful, you must file an "Objection to the Record" within 14 days of the date appearing on the notice of record transmittal.[253] (A sample Objection to the Record is provided in Appendix D.) It is sufficient if the objection is sent by first class mail by the 14th day.[254] Retain a postmarked receipt from the post office to show that the objection was mailed on time.

> **NOTE:** Unless the local government actually corrects the error or omission in the record (and doesn't just agree to) within the 14-day period, file an objection with LUBA.[255]

The objection must state exactly how the record is inaccurate.[256] For example, the record does not include all materials included as part of the record during the proceedings before the final decision maker, the record contains material not included as part of the record during the proceedings before the final decision maker, the minutes or transcripts of meetings or hearings are incomplete or do not accurately reflect the proceedings.[257] It is important to be specific. The objection should state, for example, how your arguments will be incomplete without information that should be in the record, or why LUBA won't be able to reach the correct decision unless certain inaccuracies in the minutes or transcripts are corrected.[258]

> **NOTE:** If a party demonstrates that alleged defects in the minutes are material, LUBA will require the local government to submit more complete or amended transcripts of audiotape recordings.[259] Parties are also routinely allowed to submit partial transcripts

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[249] Eckis v. Linn County, 18 Or LUBA 889, 890 (1989).
[250] Blatt v. City of Portland, 20 Or LUBA 572 (1991).
[251] Forest Highlands Neighborhood Assoc. v. City of Lake Oswego, 23 Or LUBA 723 (1992).
[252] OAR 661-010-0026(1).
[253] OAR 661-010-0026(2).
[254] OAR 661-010-0026(2); OAR 661-010-0075(2)(a)(B).
[255] OAR 661-010-0026(2).
[256] OAR 661-010-0026(2).
[257] Id.
[258] See e.g., Schmaltz v. City of Hood River, 21 Or LUBA 563, 566 (1991).
[259] OAR 661-010-0026(3).

of official tapes from the local proceedings. [260] Transcripts are *prepared at the parties' own expense* and are included with their briefs.[261]

Remember that the objection requires a certificate of service indicating that a true copy of the objection was served on all parties and each copy sent to the parties requires a certificate of filing. [262]

IV. The Petition for Review

The Petition for Review is the heart of an appeal. It presents the legal arguments as to why the local decision should be overturned.[263] These arguments must be as thorough and convincing as possible. Refer to the section on legal research for help when preparing your legal arguments. A Sample Petition for Review can be found in Appendix F.

The Petition for Review must be filed with LUBA within 21 days after LUBA receives the complete record.[264] At the same time, copies of the Petition must be served on the local government and any parties who have filed a motion to intervene.[265] If you file or serve the Petition even one day late, your case will be dismissed and your fee will be forfeited.[266]

> **NOTE:** The 21 day time limit for filing the Petition for Review begins to run *even if LUBA receives the record and you do not.*[267] If you do not receive the record, file an objection with LUBA. Only an objection to the record or a motion for an evidentiary hearing stops the 21-day clock for filing the Petition for Review.[268]
>
> **NOTE:** Remember that if there are objections to the record, the time limits for future documents (the Petition for Review, Respondent's Brief, etc) are measured from the date the record objection is *settled*, not when the record was first *received*.[269]

Format of the Petition for Review

The Petition for Review must:

- Contain a table of contents at the beginning;
- Be no more than 50 pages, excluding appendices, except with permission from LUBA;
- Contain a blue cover page with the caption of the proceeding and the names, addresses, and phone numbers of all parties. If an attorney(s) represents a party, only list the attorney(s). A plain sheet of the same blue paper is used as the back cover.

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[260] Hammack and Associates v. Washington County, 16 Or LUBA 75, n.2, aff'd 89 Or App 40, 747 P.2d 373 (1987).
[261] Id.; OAR 661-010-0025(3).
[262] OAR 661-010-0075(2)(b)(A).
[263] OAR 661-010-0030(4)(b).
[264] OAR 660-010-0030(1).
[265] OAR 661-010-0030(1).
[266] OAR 661-010-0030(1).
[267] OAR 661-010-0025(5); OAR 661-010-0030(1).
[268] OAR 661-010-0026(6); OAR 661-010-0045(9).
[269] OAR 661-010-0026(6).

These blue pages must be of heavier quality than typing paper (at least 65 pound weight);

- Be typewritten, with lines double-spaced except for the footnotes. The font size should be no smaller than 12 point for text and 10 point for footnotes. The printed area should not exceed 6 ¼ inches by 9 ½ inches (inside margins of 1 ¼ inch, outside margins of 1 inch, and top and bottom margins of ¾ inch), exclusive of page numbers;
- Be on unglazed white paper (8 1/2 x 11 inches), with surface suitable for both pen and pencil notations (not onionskin). Text should be printed on one side unless the paper is sufficiently opaque to prevent material from showing through, and the papers bound along the left-hand margin so that the pages lie flat when open;
- On the last page should be the name of the author of the Petition for Review, the author's signature, and the name of the law firm(s), if any, representing the Petitioner;
- If a single Petition is submitted by multiple unrepresented parties (petitioners or petitioner-intervenors) each shall sign.[270]

> **NOTE:** The LUBA Rules of Procedure require the original Petition for Review be submitted to LUBA with *four copies.*[271] In addition, one copy of the Petition must be served on the attorney for the governing body and on each party.[272] Also, each copy, like the original, must have the cover page on 65-pound weight blue paper and have a plain sheet of the same blue paper as a back cover.[273] If the Board determines that the Petition fails to conform to the formatting rules, it will notify the author and allow three day to resubmit a corrected petition.[274]

Contents of the Petition for Review

The Petition for review must contain the following seven components:

1. Basis for Standing

A statement describing the Petitioner's basis for standing to appeal the local decision.[275] *Review the requirements for standing explained in Part I, Section I.* If you participated in the land use decision before the local government, either in writing or orally, standing can usually be explained in one or two sentences.

> **NOTE:** On rare occasions, a party will challenge the Petitioner's standing by alleging that the facts in his statement are not true. LUBA may hold an "evidentiary hearing" (see Section X) to decide the issue.[276] This is one occasion when new facts (facts not preserved in the record of the local proceeding) can be presented to LUBA.[277] If your statement of standing is challenged, you will need to gather witnesses or other proof to support your claim.

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[270] OAR 661-010-0030(2).
[271] OAR 661-010-0030(1).
[272] Id.
[273] OAR 661-010-0030(2)(c).
[274] OAR 661-010-0030(3).
[275] OAR 661-010-0030(4)(a).
[276] OAR 661-010-0045(4).
[277] OAR 661-010-0045(1).

2. Statement of the Case

The next section of the Petition, the "Statement of the Case," includes several subsections:

- The "*Nature of the Land Use Decision and the Relief Sought"* by the Petitioners;
- A succinct and clear "*Summary of the Arguments"* contained in your Petition; and
- A complete and concise "*Summary of the Facts"*.[278]

Under "Nature of the Land Use Decision and Relief Sought,"[279] identify the land use decision you are challenging by its title and number, and explain what that land use decision would do. Then ask that LUBA "reverse" (overturn) or "remand" (send back to the local government) the decision.

Under "Summary of Arguments,"[280] summarize each "assignment of error" (discussed below) set out in your Petition for Review. This section should be fairly short, not a complete restatement of the arguments in the assignments of error. A good rule of thumb is to write only one paragraph per assignment of error.

Next, under "Summary of the Facts," list the relevant facts of the proceeding *with citations to the pages in the local government record where those facts are found*.[281] Be sure to only summarize the *facts, and not opinions or arguments*.

> **NOTE:** It is appropriate to emphasize the facts that are helpful to your side, but the fact summary must give a complete picture of the local proceeding.

3. LUBA's Jurisdiction

State why the decision being appealed is a land use decision or a limited land use decision (see Part I, Section III)[282]. Also, state why LUBA has jurisdiction to hear the appeal.[283]

4. Assignments of Error and Arguments

The "assignment of error" specifically identifies each violation of the law that you are alleging. There should be a separate assignment of error for each violation alleged.[284] Each assignment of error should state why LUBA should reverse or remand the local decision. Each assignment of error begins with a succinct one or two sentence statement of how and why the local decision is unlawful. Each assignment of error is followed by an "argument." The argument explains in detail how the decision violates the legal requirement identified in the assignment of error. *The argument is the legal analysis; it is the heart of the petition.*

In preparing your arguments, it is helpful to outline your thoughts for each assignment of error in the following order:

- What does the law require?

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[278] OAR 661-010-0030(4)(b).
[279] OAR 661-010-0030(4)(b)(A).
[280] OAR 661-010-0030(4)(b)(B).
[281] OAR 661-010-0030(4)(b)(C).
[282] OAR 661-010-0030(4)(c); See also ORS 197.825(1); ORS 197.015(10), (12).
[283] Id.
[284] OAR 661-010-0030(4)(d).

- What are the facts? (Remember, only facts in the record may be relied upon.)
- What did the decision-making body conclude from the facts? Do the facts support the conclusions reached? Are there sufficient facts in the record for the decision-making body to reach the conclusions it did?
- How are those conclusions inconsistent with the law?

It is important that each assignment of error be addressed separately so as to provide clarity to LUBA. Arguments should be clear and concise so that LUBA can properly address the issues being raised. The section on legal research discusses in detail how to develop arguments and present them in the most convincing manner possible.

5. Conclusion

At the end of the argument prepare a one-paragraph conclusion summarizing the case and sign your name below the last paragraph.

6. Attachments

You are required to attach a copy of the local government's decision that you are challenging, including all findings adopted in support of the decision and any comprehensive plan provision or ordinance cited in your petition.[285]

> **NOTE:** The authors asked LUBA the most common mistakes made by petitioners. The Board Chair stated that not attaching the decision was a common mistake and materially affected the Board's ability to review petitions and reach proper conclusions. It is extremely important that you attach a copy of the decision.

7. Certificate of Filing and Service

Finally, at the back of the Petition for Review, just inside the back cover page, attach a "Certificate of Filing and Service." (Sample Certificates of Service and Filing are provided in Appendix B.)

Filing the Petition for Review

Make four copies of the entire Petition for LUBA, one copy for each party, a couple for you, and mail them first-class.[286] Be sure that the postmark indicates that the petitions were mailed no more than 21 days after LUBA received the record.

> **NOTE:** If you discover after the Petition is filed that it did not significantly comply with LUBA's rules, you may request permission from LUBA to amend the petition.[287] *However, permission to amend the Petition is within LUBA's discretion.*[288] It may or may not be approved. If a serious problem is spotted after filing, a motion to amend should be made as soon as possible.

[285] OAR 661-010-0030(4)(e) and (f).
[286] OAR 661-010-0030(1).
[287] OAR 661-010-0030(6).
[288] OAR 661-010-0030(3), (6).

V. Respondent's Brief

The Respondent's Brief must be filed with LUBA within 42 days after LUBA receives the record[289] or 42 days after any objections to the record are settled.[290] Copies of the brief must be served on all other parties and intervenors within the same time limit.[291]

The Respondent's Brief takes the same form and meets the same requirements as a Petition for Review, except the Respondent's Brief has red front and back covers.[292] If there is more than one Respondent, the cover of the brief must indicate which Respondent is filing that particular brief.[293]

The Respondent's Brief replies to the legal arguments in the Petition for Review. First, it either accepts the Petitioner's statement of the case (see Contents of the Petition for Review) or challenges it as inaccurate or incomplete.[294] The Respondent's statement of the case may, for example, highlight different facts in the record. Or it may provide additional detail or context to the Petitioner's description of the land use decision.

Second, the Respondent's statement of the case accepts or rejects the Petitioner's standing (see "Standing") and LUBA's jurisdiction (see "Requirements Prior to a LUBA Appeal") and sets out its summary of the arguments.

If you are the Petitioner (or intervening on the side of the Petitioner), you must scrutinize the Respondent's Brief carefully to prepare for oral argument or to prepare a reply brief prior to oral argument. Check any information cited to in the record to confirm that it is accurate.

> **NOTE:** Like the Petitioner, the Respondent may rely only on facts in the record.[295] If the Respondent states facts outside the record, file a motion to strike (discussed below).

Confirm that the cited cases contain the legal propositions the Respondent claims they do. Can the cases be distinguished from your case because they involve different fact patterns? Have any of the cases been overturned or limited since they were written? Finally, consider carefully if there are any logical gaps between the conclusions reached by the local government and the facts and law cited to support those conclusions.

> **NOTE:** Refer again to the section on legal research to help you challenge the Respondent's arguments. You must be ready to respond to those arguments by the time of oral argument. Focus on your opponent's best arguments and your weakest arguments first when preparing for oral argument. LUBAis likely to ask you questions about these issues and ask the other party about issues that weaken their case.

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[289] OAR 661-010-0035(1).
[290] OAR 661-010-0026(6).
[291] OAR 661-010-0035(1).
[292] OAR 661-010-0035(2); OAR 661-10-035(3)(a).
[293] OAR 661-010-0035(2).
[294] OAR 661-010-0035(3)(a).
[295] See gen., OAR 661-010-0035(3)(a).

VI. Intervenor's Brief

If intervening as a Petitioner, the Brief must be written in the same format and filed within the same time limit as for Petition for Review.[296] Likewise, an Intervenor's Brief on the side of the Respondent must comply with the requirements and time limits of the Respondent's Brief.[297]

VII. The Reply Brief

On rare occasions, a petitioner will need to file a Reply Brief after receiving the Respondent's Brief and before oral argument. *A Reply Brief is only filed to respond to new issues raised by the respondent.*[298] It cannot be filed simply to reiterate or embellish arguments already contained in the Petition for Review, [299] or to raise assignments of error for the first time.[300] The Reply Brief has a grey cover.[301]

You must obtain permission from LUBA before filing a Reply Brief.[302] A "Motion for Permission to File a Reply Brief" (discussed below) must be filed with LUBA along with four copies of the proposed Reply Brief.[303] Copies must also be served on all parties.[304] You must explain in the motion why a reply is necessary; namely, what new issues have been raised and how they will affect the outcome of the case.[305] For example, if the Respondent's Brief asserts that the petitioner failed to exhaust all local administrative remedies, and neither party (in a previous motion) had addressed this, the Petitioner may be allowed to address the matter in a Reply Brief. *A Reply Brief will not be permitted after oral argument*.[306]

> **NOTE:** The chance of having the motion approved may be enhanced if you offer to file it quickly (for example, within 7 days). A Reply Brief may not exceed five pages, exclusive of appendices, unless the Board gives permission for a longer reply brief.[307] A request for an overlength reply brief should be made, if applicable, when the "Motion for Permission to File a Reply Brief" is made.

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[296] OAR 660-010-0050(3)(a).
[297] OAR 661-010-0050(3)(b).
[298] OAR 661-010-0039.
[299] Bohnenkamp v. Clackamas County, 56 Or LUBA 17 (2008); Wissusik v. Yamhill County, 20 Or LUBA 246 (1990).
[300] Porter v. Marion County, 56 Or LUBA 635 (2008).
[301] OAR 661-010-0039.
[302] Id.
[303] Id.
[304] OAR 661-010-0075(2)(b)(A)
[305] Kellogg Lake Friends v. Clackamas County, 17 Or LUBA 277, 279-80 (1988), aff'd 96 Or. App. 536, 773 P.2d 23, *rev. den*. 308 Or. 197 (1989) (LUBA requires that petitioners demonstrate a need for reply brief).
[306] East McAndrews Neighborhood Assoc. v. City of Medford, 19 Or LUBA 604, aff'd 104 Or. App. 280, 800 P.2d 308 (1990), rev. den. 311 Or 150, 806 P.2d 128 (1991).
[307] Id.

NOTE: Remember to send copies of each motion to all parties and attach a certificate of service (see Certificates of Service and Filing).[308]

VIII. Oral Argument

Only parties who submitted briefs are given the opportunity to present their cases orally before LUBA.[309] Generally, oral argument is held in the hearing room at LUBA's Salem office at a date and time set by LUBA (usually two or three weeks after the Respondent's Brief is due).[310] If you live a great distance from Salem (e.g., Pendleton, Klamath Falls, or Ontario), LUBA may arrange for oral argument by conference call.[311] Ask LUBA's secretary about this possibility.

You may waive your right to oral argument,[312] but 1000 Friends strongly discourages this. Oral argument serves two important functions. First, it allows the Petitioner to respond to arguments raised in the Respondent's Brief.[313] Second, it provides LUBA with an opportunity to ask questions of both sides.[314] Both parties may stipulate to waive oral argument,[315] but you should object if your opponent suggests this.

Remember that unlike local land use hearings, you are appearing before LUBA to argue the *law that applies to the facts of your case -- not the facts themselves.* The facts of the case were established at the local proceeding. You will bring them up to give background, to emphasize important aspects of your case, and to distinguish the facts in your case from those in the cases raised by your opponent. (See the chapter on legal research.) But you cannot dispute the accuracy of any facts except in the rare case of a "special evidentiary hearing" (discussed below).

The best way to prepare for oral argument is to study your brief and your opponent's. You must also know the contents of the record as thoroughly as possible.

Unless LUBA says otherwise, each side is allowed up to 30 minutes for argument.[316] The Petitioner will speak first.[317] (If there is more than one Petitioner, the time will be split among all of the Petitioners for oral argument. The same is true with Respondents.)[318] Outline your most important points for emphasis. Remember that LUBA has read your Petition, so it is not necessary to repeat all of its contents. The Petitioner may also reserve some of their 30 minutes for rebuttal after the Respondents present their side. It is common for Petitioners to reserve 10 minutes for rebuttal. If you wish to do this tell LUBA how much time you wish to reserve at the beginning of your argument.

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[308] OAR 661-010-0075(2)(b)(A).
[309] OAR 661-010-0040(1).
[310] OAR 661-010-0040(3).
[311] OAR 661-010-0040(6).
[312] OAR 661-010-0040(2).
[313] See gen., http://www.oregon.gov/LUBA/FAQ.shtml.
[314] Id.
[315] OAR 661-010-0040(2).
[316] OAR 661-010-0040(3).
[317] OAR 661-010-0040(3).
[318] Id.

In general, at oral argument you should:

- Briefly highlight what the case is about (or point to any *important* aspects of the case your opponent is ignoring);
- Present your most persuasive arguments; and
- Respond to your opponent's arguments.

For the Petitioner, the third point can be the most critical since this may be the only opportunity to respond to the arguments raised in the opponent's brief.[319]

> **NOTE:** The 30 minutes provided to the Petitioner may be divided between the initial presentation and rebuttal to the Respondent's argument. [320] Petitioners usually ask LUBA to reserve ten of their 30 minutes for rebuttal after the Respondent has finished.

Expect LUBA to ask questions. The questions are intended to improve LUBA's understanding of the case and are not intended to intimidate or harass. *Be aware that questions by LUBA may consume a large portion of your argument time.* Begin with your strongest arguments to be sure they are heard before your time is up. Then, if you finish early, you may want to repeat your strongest points as a conclusion, but don't talk simply to fill the time. If you feel your points have been made and you have rebutted the Respondents arguments, tell LUBA you have completed your argument and ask them if they have any further questions.

Also, do not read from a prepared text when presenting your oral argument. Speak calmly but with conviction. (It's natural to be nervous.) Always remain polite. Address the LUBA board members as Mr./Ms.___ – LUBA places a placard with the board members name on it in front of each board member. Address your opponent as "Respondent," "Petitioner," or Mr./Mrs./Miss/Ms. ____. Above all, try not to worry. LUBA is not there to embarrass you.

IX. Final Opinion and Order

Usually about two weeks after all sides have submitted their briefs and argued their cases, LUBA will issue its decision (called "Final Opinion and Order"). LUBA will mail a copy to each of the parties. LUBA is required to issue a final opinion and order 77 days after it receives the record.[321] LUBA commonly asks the parties at oral argument if it is OK to extend the final order deadline – usually by a week. Parties customarily agree to allow LUBA the extra time to complete the case.

As explained in Part I, Section IV, LUBA's Final Opinion and Order will either "affirm" (approve), "reverse" (disapprove-overturn) or "remand" (overturn but allow further consideration by the local government) the decision of the local government.[322]

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[319] OAR 661-010-0040(3).
[320] See gen., OAR 661-010-0040(3).
[321] ORS 197.830(14).
[322] OAR 661-010-0070(1).

If LUBA remands the decision, the matter will again go before the local government. You will again need to participate before the local government, and you may need to file another appeal with LUBA after the local government issues a new decision. Be sure you get notice from your local government of any new hearings on the matter so that you can participate fully. Also, be sure the local government provides a copy of its new decision.

If LUBA affirms a decision adverse to you, your next option may be to pursue an appeal with the Court of Appeals.[323] The date of LUBA's final order is important for purposes of an appeal to the Court of Appeals.[324] Any appeal of a LUBA final order must be filed in the Court of Appeals within 21 days after the date of the decision, or the decision becomes irreversible.[325]

Judicial review (appeal) of a LUBA decision is not covered by this guide. *If you wish to appeal LUBA's decision, or if you prevail and the other side appeals, contact your attorney or 1000 Friends immediately.*

> **NOTE:** An order must actually be labeled "Final Opinion and Order" to be appealed.[326]

Filing A Cost Bill

LUBA's rules authorize the winning party to file a "cost bill" within 14 days of the date of the final order so that LUBA may award "costs."[327] "Costs" include only the following:

> (1) If the Petitioner wins, recovery of the filing fee;[328].
>
> (2) If the Respondent wins, costs incurred preparing the record (not to exceed the deposit).[329]

Recoverable costs do not include the cost of preparing and delivering the Petition for Review or the cost of travel to appear at the oral argument.[330] If the Petitioner is the prevailing party, the Petitioner may be awarded the cost of the filing fee.[331] Also, if the Petitioner wins, the deposit will be returned to the Petitioner automatically, without the filing of a cost bill.[332] A copy of a cost bill is attached as Appendix E.

> **NOTE**: If you win but do not file a cost bill within 14 days, you cannot recover the filing fee.[333]

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[323] ORS 197.850(3).
[324] See gen., ORS 197.850(3)(a).
[325] ORS 197.850(3)(a).
[326] ORS 197.850(1).
[327] OAR 661-010-0075(1)(a).
[328] OAR 661-010-0075(1)(b)(A).
[329] OAR 661-010-0075(1)(b)(B), (C); OAR 661-010-0075(1)(c).
[330] OAR 661-0100075(1)(b).
[331] OAR 661-010-0075(1)(b)(A).
[332] Id.
[333] OAR 661-010-0075(1)(a).

Any objections to the cost bill by any party must be filed with LUBA within 10 days after the date the cost bill was filed with LUBA.[334] Costs awarded against more than one party are generally divided equally among all such parties unless LUBA directs otherwise.

X. Miscellaneous Provisions

Motions

A "motion" is a written request for an "order" (resolution of an issue) from LUBA. Typical motions include:

- **Motion to Dismiss:** This is a request to throw out the appeal, usually on the ground that the Petitioner does not have standing or LUBA lacks jurisdiction to hear the case (see Part I, Section I).
- **Motion to Strike:** This is a request to remove a portion of a brief, usually on the ground that the portion relies on evidence not in the record.
- **Motion to Intervene** (see Section II).[335]
- **Motion to File a Reply Brief** (see Section VII).[336]
- **Motion for Evidentiary Hearing** (discussed below).[337]

A sample Motion to Intervene is provided in Appendix C. Motions must be served on all parties and proof of service (see Certificates of Filing and Service) must be filed with LUBA.[338] Where the motion challenges a party's failure to satisfy any statutory requirements or LUBA's rules (for example, the requirement in Oregon Administrative Rule 660-10-030(1) to file the Petition for Review within 21 days after the record is complete), then the motion must be filed *within 10 days* of when the party filing the motion learned of the violation.[339]

The motion should be on white, unglazed paper, with the case caption set out at the top of the first page. Motions should be accompanied by a short memorandum stating the reasons, and citing the case law and/or statutes, why the motion should be granted (see Arguments and Legal Research). The other side may file an opposing memorandum within 14 days.[340] Ultimately, LUBA will issue an "order" resolving the motion one way or the other.[341]

> **NOTE:** If a motion is filed against you, you have 14 days to respond.[342] While parties are not required to respond to motions, 1000 Friends strongly recommends that you do so.

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[334] See http://www.oregon.gov/LUBA/FAQ.shtml (cost bill).
[335] OAR 661-010-0050(2).
[336] OAR 661-010-0039.
[337] OAR 661-010-0045.
[338] OAR 661-010-0065(1).
[339] OAR 661-010-0065(2).
[340] Id.
[341] See e.g., Citizens for Florence v. City of Florence, 33 OR LUBA 255, 258-260 (1998).
[342] OAR 661-010-0065(2).

Extensions of Time for Filing Documents

A party may, by filing a motion with LUBA, request a motion to extend the time limit for filing documents *other than the Notice of Intent to Appeal and the Petition for Review*.[343] The motion must state reasons for granting the extension and must be filed with LUBA before the date the document would have been due.[344]

On rare occasions, it may be possible to obtain an extension of time for filing the Petition for Review.[345] The motion requesting the extension must be accompanied by a written "stipulation" (agreement) signed by each party to the appeal.[346] Such stipulations are rarely obtained.

Special Evidentiary Hearings

In very special circumstances, LUBA will hold special evidentiary hearings to resolve *factual* disputes, such as whether particular evidence was actually placed before the decision maker in the local government proceeding.[347] Special evidentiary hearings are also used when a party's standing has been challenged on factual grounds or issues concerning the constitutionality of the decision are raised.[348] Filing a motion for an evidentiary hearing suspends all other time limits in the appeal.[349]

> **NOTE:** Most attacks on "standing" do not challenge the facts (rather, they claim that the facts, *even if true*, do not give the Petitioner standing). Such challenges *are not grounds* for an evidentiary hearing. Hearings are appropriate only when the truth of the facts is at issue. If this occurs, we recommend you call an attorney or 1000 Friends for advice.

LUBA also holds special evidentiary hearings when it appears that such a hearing is necessary to reveal procedural irregularities not shown in the record and which, if proven, would warrant reversal or remand of the decision.[350] "Procedural irregularities" usually refer to evidence of (1) illegal *ex parte* contacts (private communications) between a party and the decision maker at the local level (presumably influencing the decision maker and preventing a fair hearing); and (2) conflicts of interest or bias by a local decision maker.[351]

It is extremely rare that a challenge will succeed based on claims of ex parte contacts, bias, or conflict of interest. If you intend to challenge a decision on such grounds, you should consult a lawyer or 1000 Friends.

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[343] OAR 661-010-0067(1)-(3).
[344] OAR 661-010-0067(4).
[345] OAR 661-010-0067(2).
[346] Id.
[347] OAR 661-010-0045(1); Dickas v. City of Beaverton, 17 Or LUBA 1076 (1989).
[348] Id.; Johnson v. Jefferson County, 56 Or LUBA 72 (2008); See also, Berg v. Linn County, 21 Or LUBA 622 (1991) (Under OAR 661-10-045(1), allegations of unconstitutionality only provide grounds for an evidentiary hearing if the facts presented are not in the local record).
[349] OAR 661-010-0045(9).
[350] OAR 661-010-0045(1); see e.g., Halvorson Mason Corp. v. City of Depoe Bay, 39 Or LUBA 702 (2001). (LUBA will accept evidence not included in the record where that evidence is necessary to support a claim of bias in a "clear and unmistakable manner" so as to warrant reversal or remand of the local government's decision pursuant to ORS 197.835(9)(a)(B)).
[351] Id.; Space Age Fuels Inc. v. City of Sherwood, 40 Or LUBA 577 (2001).

Stays

In some instances, a successful applicant may begin development pursuant to a local land use decision which you are appealing to LUBA. Under these circumstances LUBA has the authority to "stay" the activity (stop the activity until the resolution of the appeal) if the Petitioner demonstrates:

(1) A colorable claim of error in the land use decision under review; and
(2) That the Petitioner would suffer irreparable injury if the stay is not granted.[352]

To establish a "colorable claim of error," the Petitioner must allege error which, if sustained, would be sufficient to reverse or remand the local land use decision.[353] For example, the Petitioner might honestly assert that the local government's decision is based on inadequate findings. Since the decision would be remanded if the assertion were true (and as long as the claim is not devoid of legal merit[354]) the Petitioner has established a "colorable claim of error."

To establish "irreparable injury" the Petitioner must meet the following requirements:

- the injury must be adequately specified;
- the injury cannot be adequately compensated for by the payment of money;
- the injury must be substantial and unreasonable;
- the conduct sought to be barred must be probable; and,
- the resulting injury must be probable.[355]

For example, if an applicant has obtained a conditional use permit to conduct forestry practices in an exclusive farm use zone, the harvesting may constitute an irreparable injury by disrupting wildlife habitat or the natural drainage of an intermittent stream. These losses are not like lost business profits, for example, which can be replaced with a payment of money (irreparable injury requirement No. 2). The other requirements for irreparable injury also appear to be met, so a stay would be appropriate in this situation.

> **NOTE:** Attach affidavits, preferably from experts, specifically describing the adverse affect of the activities at issue. Your motion arguments must be precise and specific. Your injuries must be definitely stated.[356] Do not allege likely or speculative injuries.

A "stay" will *not* be granted simply to ease fears or apprehensions.[357]

> **NOTE:** If LUBA grants the "stay" and the decision being appealed is a quasi-judicial one, you will be required to post a $5,000 "undertaking" or surety bond.[358] The undertaking is in addition to the LUBA appeal filing fee and deposit.[359] If you lose on

[352] ORS 197.845(1).
[353] Dames v. City of Medford, 9 Or LUBA 433, 438 (1983), aff'd 69 Or. App. 675, 687 P.2d 1111 (1984).
[354] Save Amazon Coalition v. City of Eugene, 29 Or LUBA 565 (1995); Thurston Hills Neighborhood Assoc. v. City of Springfield, 19 Or LUBA 591 (1990).
[355] City of Oregon City v. Clackamas County, 17 Or LUBA 1032 (1988).
[356] OAR 661-010-0068(1)(c).
[357] McGreer v. Rajneeshpuram, 7 Or LUBA 406 (1983).
[358] ORS 197.845(2); OAR 661-010-0068(4).
[359] ORS 197.845(2).

appeal, LUBA must award to your opponent reasonable attorney's fees and actual damages resulting from the stay.[360] This amount cannot exceed the undertaking.[361]

A motion for a stay requires statements of jurisdiction and standing, as required in a Petition for Review.[362]

[360] ORS 197.845(3).
[361] Id.
[362] OAR 661-010-0068(1).

Part Three

HOW TO DO LEGAL RESEARCH

I. Introduction—The Role of Legal Research

Legal Research for a successful LUBA appeal is different from and more extensive than the research required for local land use proceedings. To a greater extent than in local proceedings, the courts and the law stated in past decisions of LUBA play a vital role in a LUBA appeal. Also, as part of its job reviewing local land use decisions, LUBA may focus on whether all the necessary procedures were followed by the local government (procedural issues) in addition to whether the law was understood and applied correctly (substantive issues).

Legal research tells you what the law requires in your case and how that law has been applied in similar situations in the past. It also helps you understand the issues that matter most to LUBA and how to present them in a thorough and convincing manner.

A LUBA appeal does not decide what the facts are in your case; the facts of the case were established in the local proceedings. Rather, LUBA decides if the law, when applied to the facts of your case, upholds the local decision. As explained in this chapter, participants attempt to persuade LUBA to decide in their favor by making legal "arguments" and supporting those arguments with legal "authorities." Facts are only used in legal arguments to explain the situation or context of the case and to compare or contrast the case with prior cases dealing with the same issue.

> **NOTE**: Remember that only the facts, which are contained in the record of the local proceeding, may be used to support your legal arguments before LUBA. Except for the rare case of an evidentiary hearing (see Chapter II, Sec. X), LUBA does not settle disagreements about the facts of the case, such as whether a given parcel is 49 acres or 51 acres or whether the applicant submitted documentation before or after a certain date.

A legal argument is a statement or explanation why, under the facts of your case, the law requires an outcome in your favor. An argument may take anywhere from a few paragraphs to many pages to explain fully. Legal authorities include "codified law" (the local and statewide ordinances, rules and statues governing Oregon's land use system) and "case law" (the written opinions of LUBA and appellate courts interpreting the codified law in individual cases).

II. Steps to Researching an Issue

Determine Which Law(s) Apply

The first step in arguing to challenge or uphold a land use decision is to ascertain which law or laws govern the decision. Often, the easiest place to start is with the decision itself or the staff reports or findings prepared for the decision. These documents often list some or all of the applicable criteria (e.g. comprehensive plan or zoning ordinance provision) and explain how they

were applied to the case. Additional documents describing the applicable law may be available through the planning office or in the record of the local proceeding.

> **NOTE**: As explained in Section IV below, the governing law for different types of decisions comes from different sources. For example, a building permit application will normally be governed by a local ordinance. A decision approving or denying a farm dwelling will be governed, at least in part, directly by ORS chapter 215 and OAR Chapter 660, Div. 33. A zone change will be governed by the local comprehensive plan, and an amendment to a local comprehensive plan will be governed by the Statewide Planning Goals and statutes.

> **NOTE**: There is no single best way to research a given issue. Unfortunately, trial and error will usually be part of your method. It is important not to become discouraged; research becomes easier quickly with a little practice.

An alternative approach is to study the various land use laws generally and then narrow your focus to the specific state and local provisions governing your issue. The advantage of this "top-down" approach is a better rounded understanding of the land use program, which may be very useful when building your arguments. The disadvantage is potential confusion faced by beginners and experienced researchers alike, resulting from Oregon's sometimes overwhelming land use laws.

An excellent place to start with this approach is to the Oregon State Bar Continuing Legal Education Handbook on Land Use or the handbooks on Oregon land use law published by the Oregon Law Institute. The "Headnotes" on LUBA's homepage, covered in Section V below, are also an excellent place to start.[363] These resources are available through the sponsoring organizations or in some law libraries. They provide thorough introductions to many specific areas of land use law.

Be Thorough

Once you have identified the main body of law controlling the decision, confirm that the local government has not overlooked any of the other laws discussed in Section IV of this chapter which may apply in your particular case. Review carefully all cross-references to other sections of the same law or other laws. For example, a typical cross-reference in the applicable zoning code might read "Except as provided in § 21(a) . . ." You must then look up § 21(a), where you may discover that other provisions control because, for example, a planned unit development rather than a conventional subdivision is proposed.

You should also review the table of contents of the ordinance or statute to ascertain if other provisions might apply. *Be sure to check any section that seems like it could apply to your case.* Also be sure to check interpretive guides (especially the "Definitions" section of the ordinance or statute), which help you determine if a law applies to your case.

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[363] Headnotes are brief synopses of the law. LUBA produces its own headnotes for each case it decides as a legal research aid and provides them on its webpage categorized in a Table of Contents style presentation.

In some cases an applicable law may be unclear and it becomes necessary to consider the legislative history to discern the law's intent. If a local decision-maker interprets a law to mean something other than its intended meaning, a Petitioner can challenge this interpretation by looking at the legislative history of the law. Be sure to first look at any interpretive guides included in the ordinance or statute that may clarify ambiguous language. *If the legislative history reveals that the local decision-maker misinterpreted a law's intended meaning, the relevant history should be included in the record if possible, and be addressed in the Petition for Review.*

Statewide statutes and administrative rules may directly govern some or all of your case or apply in conjunction with local laws. You must identify the general type of decision involved (e.g., a conditional use permit for a golf course in an EFU zone), and check ORS (Oregon Revised Statutes) Chapters 197, 215, and 227 and OAR (Oregon Administrative Rules) Chapters 660 and 661 for laws applying to your case. The applicable ORS (under "State Statutes") and OAR (under "Administrative Rules") chapters can be found on DLCD's website.

Be aware that provisions of different laws may conflict with each other. For example, a development allowed by a local ordinance may be prohibited by the local comprehensive plan. In such cases (known as "Baker conflicts"), the comprehensive plan, and not the ordinance implementing that plan, controls.[364] Likewise, in all but the most extraordinary circumstances, a city or county cannot amend its plan based on the authority of a zoning ordinance; rather, the plan amendment will be governed by the statewide planning goals or statutes. Case law will further help you decide how to resolve conflicts between applicable laws.

> **NOTE**: Remember that language in a comprehensive plan may appear to require something when it really only describes what the city or county hopes will happen. Such "aspirational" language (e.g. "conflict between agricultural and non-agricultural uses should be avoided . . . ") probably won't be binding on the local government in a given case since it is too vague.

Determine How the Law Applies to Your Case

Closely related to determining what law applies to your case is determining *how* that law applies. This determination is made through research of cases decided by LUBA and the appellate courts on the same or related issues. How to find cases relevant to your issue is detailed in Section IV, below.

Remember that your task is to explain why the law requires, or at least strongly favors, an outcome in your favor. Hopefully, you will find a case dealing with the same issue in a similar factual situation which decided the issue in your favor. Then you simply have to state the issue presented in your case, its treatment in the earlier case, how the facts from the cases are similar, and the conclusion LUBA should reach as a result. (See the example under "Formulating Arguments" below.)

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[364] Baker v. City of Milwaukie, 271 Or 500, 533 P.2d 772 (1975); Fasano v. Washington County Commission, 264 Or 574, 507 P.2d 23 (1973).

More often, however, you will find cases that only deal with issues analogous to the ones in your case or deal with your issues under different factual situations. Your argument will then have to describe how the law applies in closely related situations and why it should apply favorably in your case. For example, if a number of cases uphold the denial of a certain type of permit, then you need to explain why the permit in your case is comparable, and therefore should also be denied (or why it is different, and therefore should be approved).

Think carefully about the facts involved in the cases and how they relate to your case. You may be able to argue that the facts of your case justify a different outcome. Remember to focus only on relevant facts. If the local government relied on engineering studies to justify approval of a development proposal, neighbors' testimony against increased property taxes are probably not relevant to support an argument in favor of a denial. Rather, you must focus on the adequacy of the studies, whether they were misinterpreted, or some other aspect of the decision maker's reliance on the studies that undermines the approval.

You should strive to build your case based upon the application of facts to the law, with the decisions of previous LUBA cases to bolster your argument. At times, there simply may not be any cases dealing with the issue presented by your case. You should then explain why, in addition to the law being on your side, it would be good policy to decide in your favor. An outcome in your favor may, for instance, send a signal to local governments that they must consider potential water shortages more carefully when they plan rural subdivisions. Or an outcome in your favor may represent a victory for greater citizen involvement. It is important to be creative while bearing in mind the objectives of Oregon's land use program when making policy arguments.

III. Developing Arguments

Organizing Assignments of Error

Arguments to LUBA are organized according to "assignments of error." As explained in Part II, Section IV of this Citizens' Guide, an assignment of error states how the decision maker made an unlawful decision by describing the decision and referring to the legal arguments governing the decision. Review the assignments of error in the Sample Petition for Review in Appendix F and consider the first example, which begins by noting the county's legal obligations under OAR 660-004-0020(2)(a) to provide justification for exceptions to statewide planning policies. The first assignment of error states that "the County's market analysis fails to provide reasons that justify why state policy embodied in Goal 3 should not apply to the subject property." An assignment of error begins with statements like this because it addresses the legal requirements (justification of exceptions to state policy) which LUBA has authority to review under ORS 197.835.

The example continues: "The first sentence of OAR 660-004-0022(2) prohibits a reasons exception for rural residential development based on market demand for housing, assumed continuation of past urban and rural population distributions, and on housing types and cost characteristics...." This statement further incorporates applicable legal criteria while identifying the decision and the criteria's applicability to the decision.

Refer to Part I of this Citizens' Guide for a summary of LUBA's authority in reviewing land use decisions. Refer to Appendix F for additional examples of assignments of error presented in a Petition for Review.

> **NOTE**: Remember that since LUBA has authority to reverse or remand a decision when the local government "Improperly construed the applicable law,"[365] parties may raise violations of any applicable local or statewide law in their assignments of error, and not just the ones listed in ORS 197.835. Every decision will therefore have its own set of relevant legal criteria for which LUBA may take action.

To formulate assignments of error, first dissect the land use decision into its components. A decision may, for example, include a comprehensive plan amendment, a zone change, and a development permit. Separate assignments of error should address each component of the decision.

Next, organize the applicable legal criteria and state how it was or was not applied to each component of the decision. For example, lack of substantial evidence and inadequate findings supporting the plan amendment should probably be listed together in an assignment of error, but inadequate findings in support of the plan amendment and inadequate evidence supporting the development application should be addressed in separate assignments of error. Observe in the Sample Petition for Review how a series of arguments is broken down into separate assignments of error. Each assignment of error is further broken down into sub-arguments that address each specific requirement that the County is alleged to have failed to have addressed.

Formulating Arguments

Points raised in each assignment of error are then discussed in detail in the arguments presented under the assignment. If the same arguments and discussion apply to several assignments of error, present a single argument beneath the related assignments, which are simply listed one after the other before the combined argument.[366]

It is often best to present your argument (discussion) under each assignment according to the following formula: 1) what was required, 2) what was decided, 3) why the decision did or did not satisfy what was required. (The elements of your argument don't necessarily have to be presented in this order.) The following is a shorthand example of the argument based on the authority of the local comprehensive plan:

The city erred in granting a permit for the hazardous waste incinerator in the R-2 Residential zone, because Policy 6-A of the Comprehensive Plan states: "No use which threatens public health or safety shall be authorized in any residential zone." There is no dispute that hazardous waste incinerators are authorized in the R-2 zone by the zoning ordinance. However, land use regulations are subordinate to the comprehensive plan; to

[365] ORS 197.835(9)(a)(D).
[366] OAR 661-010-0030(4)(d).

the extent they authorize more intensive uses than are permitted in the plan, they are invalid. Baker v. City of Milwaukie, 271 Or 500, 533 P2d 772 (1975).

Another formula for presenting legal arguments in a clear and concise manner is to use the "IRAC" methodology. IRAC stands for Issue, Rule, Analysis, and Conclusion. First, begin by stating the *issue* or question at hand, making sure to address exactly what the question of law is before including any application of rules or legal analysis. Second, introduce the *rule(s)* that apply to the issue stated. Rather than stating all the applicable laws verbatim, you should summarize them and condense them into a clear rule. Third, make a legal *analysis* of how the rule applies or does not apply to the specific set of facts in your case. Finally, make a *conclusion* that directly answers your stated issue, while making sure not to introduce any new facts or analysis.

The number of arguments that may be possible in a given case depends on how many separate issues were decided by the local government and the different legal criteria which may have been violated. To help yourself come up with arguments, consider any place where there are logical gaps between the information cited and the conclusions reached by the decision maker. Remember that if vital information is missing, that omission itself or other flaws, which are implicated by the omission, may form the basis of an argument.

You will also need to consider the arguments which are or will be offered by your opponent. There is no more effective way to strengthen your arguments than by playing "devil's advocate" with yourself or with someone reviewing your brief. Try as hard as you can to argue your opponent's side, and then fill in any holes in your argument revealed in the process. Try to anticipate challenges to your argument and address them ahead of time.

Finally, there is no formula for what constitutes the most persuasive style of argument. Above all, try to proof read your brief from the standpoint of the person reading it. Remember that LUBA sees a very large number of briefs a year, so "brief" as briefly as possible.

> **NOTE**: Copies of briefs submitted in prior LUBA cases can be obtained through LUBA's office. These briefs can not only give you a head start in legal research and help you formulate your arguments; they can also help you assess your own writing style.

IV. Sources of Legal Authority

There are a number of sources of codified law and case law that may be needed in your legal research. These sources may be accessed through a law library, your local courthouse, or one of the law school libraries (see section V). Local planning departments, general libraries, or legal aid offices may also be able to provide you with access to legal reference material.

Laws governing land use are written in and available from the following sources:

Codified Laws

- Local zoning ordinances, subdivision controls, and other local land use regulations.

  Local land use regulations are contained in city or county ordinances (often called codes, zoning ordinances, etc.). These regulations provide the most specific legal requirements including restrictions and approval criteria, applicable to a given type of land use decision. They are often published in loose-leaf binders since they are frequently revised.

- Comprehensive plans.

  Oregon's cities and counties are required to adopt comprehensive land use plans. Generally, these plans are implemented through local land use regulations described above which control each land use decision. But sometimes the local comprehensive plan itself will contain requirements directly applicable to a decision. Also, if the regulation which is supposed to implement a plan provision is inconsistent with the provision, the plan provision controls over the inconsistent regulation (See "Baker Conflicts," discussed above.)

  Comprehensive plans also contain supporting information such as inventories and statistical data which can be directly incorporated into legal arguments supporting or opposing a local government's decision.

- Statewide Planning Goals

  Oregon's Statewide Planning Goals (the Goals) are adopted and periodically revised by the Land Conservation and Development Commission (LCDC). There are currently nineteen goals. These goals can be found on the Department of Land Conservation and Development (DLCD) website at: http://www.oregon.gov/LCD/goals.shtml. You may also obtain a paper copy of the goals directly from the DLCD or you may make copies from libraries of the local planning department.

  The goals themselves sometimes apply directly to land use decisions. For example, state law provides that the goals generally apply to local comprehensive plan amendments. The goals also apply if a decision was made pursuant to a plan or ordinance amendment and that amendment has not been "acknowledged." The goals may also apply because the local plan or ordinance incorporates a goal in its decision criteria (in other words, because the local plan or ordinance says a goal applies). The goals apply in other circumstances as well.

- Oregon Revised Statutes

  Chapters 197, 215, and 227 of the Oregon Revised Statutes encompass most of the state laws on land use. Local plans, regulations, and procedures must comply with the

requirements in these statewide laws. The state laws also set forth specific requirements which apply directly to many land use decisions.

The statewide land use statutes may be revised at least once every two years during general and special legislative sessions. The Oregon Revised Statutes are available in law libraries and many general libraries. Copies of important ORS chapters on land use can be found on the DLCD website at http://www.oregon.gov/LUBA/Rules.shtml.

- Oregon Administrative Rules

  LCDC disseminates specific rules to implement the general laws contained in the Oregon Revised Statutes and the Statewide Planning Goals. These rules often simply restate the law contained in the statutes and goals. But they also usually provide additional and more detailed legal requirements. The requirements in LCDC's administrative rules may either apply to local regulations or directly to land use decisions. The Oregon Administrative Rules applying to land use appeals can also be found on the DLCD website at: http://www.oregon.gov/LUBA/Rules.shtml.

- Constitutions

  The Oregon and United States Constitutions govern all actions of government. The constitutional principles of fairness and "due process" in particular are applicable to all land use decisions, but it is very unusual to have a local decision overturned because it is unconstitutional. The constitutional prohibition against the taking of private property for public purposes without just compensation (takings) may also be, but very rarely is, implicated.

Case Law

Land use decisions are also governed by case law contained in the written opinions of LUBA, the Oregon Court of Appeals, and the Oregon Supreme Court. These opinions interpret the codified law by deciding exactly what that law requires when applied to specific controversies. In some instances, case law establishes new rules not contained in any statutes or regulations.

Like any appellate tribunal, LUBA attempts to decide each case consistently with its past decisions. For this reason, past LUBA decisions are "authorities" that can be used to support arguments in a new case before LUBA. LUBA should decide an issue the same way it has in previous cases unless the factual situation in the current case differs significantly from past one or the statutes or rules have been changed.

> **NOTE**: Your research of prior LUBA and court opinions should focus on (1) the law that was applied on the case and whether that law has been repealed or amended, (2) the circumstances of the case which lead LUBA to decide the way it did, and (3) how the legal and factual circumstances of your case compare to those of the prior cases.

Case law from the Oregon Court of Appeals of the Oregon Supreme Court is "binding authority" on LUBA. In other words, LUBA must adhere to the decisions of these courts when deciding

cases. Also an appellate court decision can "overrule" a rule established by older LUBA decisions by resolving an issue differently than the older LUBA decisions have. Likewise, Court of Appeals decisions may be overruled by subsequent decisions of the Oregon Supreme Court, the highest court in the state.

> **NOTE**: Make sure you do not cite to cased law that has been overruled by a higher authority. It is not uncommon for LUBA to be overruled by the Oregon Court of Appeals so do not base your argument on a LUBA decision that is no longer valid.

> **NOTE**: The Oregon Supreme Court can only be overruled by itself or the United States Supreme Court. (LUBA and the Court of Appeals may also, on rare occasions, overrule principles they established in their own earlier decisions.) However, the Oregon Supreme Court, the Court of Appeals, and LUBA are frequently "overruled," so to speak, when the Legislature passes new statutes dealing directly with issues decided in cases.

V. Locating and Citing the Law

Codified laws and court cases are referred to by uniform citation formats to make legal research easier. (Statutes, administrative rules, and cases are referenced in their proper citation forms in footnotes throughout this Citizens' Guide.) As you will see during your legal research, every time you state what the law is (what a statute, regulation, or case decision provides), you must cite the authority (the law or case) that contains that legal rule.

Codified Law

Citations to codified law consist of abbreviated references to the set of laws from which the particular law is drawn and a specific section or paragraph reference. An example is "ORS 197.763(2)(a)(A)," which refers to paragraph A of subsection (2)(a) of section 197.763 (the statewide law governing the conduct of local quasi-judicial land use hearing notice requirements and procedures) of Chapter 197 of the Oregon Revised Statutes. Thus, an example of a proposition in a legal argument using this statutory citation may appear as follows:

> Property owners within 100 feet of the proposed development were to have received notice of the hearing. ORS 197.763(2)(a)(A).

LCDC's administrative rules follow a simple citation formula. For example, section 045 of Oregon Administrative Rules Chapter 660, Division 12 (Transportation Planning) is cited as OAR 660-12-045.

Citations to local ordinance or regulations often refer to their common names—often abbreviated—rather than their exact technical citations. For example, a citation to section 501.01 of the Yamhill County Zoning Ordinance can be cited as YCZO § 501.01. ("YCZO" is commonly understood to refer to "Yamhill County Zoning Ordinance.") The "§" symbol, "section, or "sec." may be used to identify the section number.

NOTE: An Oregon statute recently passed by the legislature but not yet published in an updated volume of the Oregon Revised Statutes is cited by its "session law" citation. A session law citation reads as follows: "1993 Or Laws Ch. 792, §2(1)(b)." The Sessions Laws are published in two or three volumes following the close of every legislative session and are cited for several months until a new version of the Oregon Revised Statutes is published. They can be found in law libraries and occasionally in general libraries.

Case Law

Case decisions are published in a "reporter" (bound volumes and paperback updates) available in law libraries. Each case has its own citation, which tells you the volume and page number where the case if found.

An example of a LUBA case citation is:

Von Lubken v. Hood River County, 24 Or LUBA 271 (1992).

"Von Lubken v. Hood River County" (underlined or italicized) is the name of the case, signifying "[the name (or last name if an individual) of the Petitioner or lead Petitioner] versus [the name of the Respondent or lead Respondent]." Following the case name is a comma, and then the location of the written opinion, indicating the following:

"24"	"Or LUBA"	"271"	"(1992)"
Volume	Reporter	first page where case is found	year of opinion

Thus, to find this Von Lubken case, you would look in volume 24 of the LUBA reports ("Or LUBA") at page 271.

Citations to decisions of the Court of Appeals or Supreme Court follow the same format. An example is:

1000 Friends of Oregon v. Jackson County, 79 Or App 93, 718 P.2d 753 (1986).

This case is found in volume 79 of the Oregon Appellate Court Reporter ("Or App"), beginning on page 93. The second citation is to a "parallel" reporting of the case in the Pacific Reporter (2nd series).

NOTE: The Pacific Reporter, published by the West Publishing Company, contains appellate court (Court of Appeals and Supreme Court) decisions from many states. A regional reporter such as the Pacific Reporter enables attorneys from other states, who may not have a set of official Oregon reports, to look up an Oregon case.

The Pacific Reporter is also published much more quickly than the official reporter. Thus, formal citations to Oregon Court of Appeals or Supreme Court cases should always contain a parallel citation to the Pacific Reporter. The bound volumes of the Oregon case reporters provide the Pacific Reporter cite at the beginning of each case, and vice versa.

An example of an Oregon Supreme Court citation is:

> Anderson v. Peden, 284 Or 313, 587 P.2d 59 (1978).

The official Oregon Supreme Court Reporter (a set of volumes separate from the Court of Appeals reporter) is abbreviated "Or," but the parallel citation is to the same regional reporter ("P.2d") that contains opinions from the Oregon Court of Appeals.

Citations in a brief or in legal opinions appear in the text of the brief following the sentence that states the legal proposition. (Since this Citizens' Guide is not a legal brief, legal authorities have instead been cited in footnotes.) Just as with a codified law citation, a citation to case law in a brief is given just after a legal proposition, for example, as follows:

> Conversion of rural resource land to one-acre residential use requires compliance with Goal 14. DLCD v. Klamath County, 16 Or LUBA 23 (1987).

A Note on Late-Breaking Case Law

Court opinions written since publication of the latest bound volumes of the Oregon Appellate Court Reporters are compiled in "Advance Sheets," which are temporary paperback supplements to the reporter and written in the same format. The Advance Sheets provide the correct citation to the case as it will appear in the next bound volume.

LUBA opinions written since the last LUBA reporter was published are issued as "Slip Opinions" which are compiled in loose-leaf notebooks or folders and are usually available with the bound volumes in a law library. *It is very important to check late-breaking cases in the Advance Sheets or Slip Opinions to make sure any authorities cited in your brief have not been overruled.*

A table entitled "Appellate Court Decisions on LUBA Cases," printed at the beginning of each LUBA reporter, indicates which of the recent LUBA cases have been appealed to the appellate courts and whether the LUBA holding was upheld or overturned. Check the tables contained in the next couple of volumes after a decision was published to see whether the decision was ever appealed. If you discover that one of your authorities has been overruled, you may have to adjust your argument to reflect the change in the law. More on this point is discussed below.

VI. Additional Notes on Case Citations

When reading decisions you will sometimes run into other types of citations.

"Subsequent History" of a Case

Often you will read citations which indicate the journey a case made through the court system—its so-called "subsequent history." An example is:

City of Pendleton v. Kerns, 56 Or App 818, 643 P.2d 658, aff'd, 294 Or 126, 653 P.2d 992 (1982).

This citation shows that the case was first appealed to the Court of Appeals ("Or App"), and then to the Supreme Court ("Or"), where the Court of Appeal's ruling was affirmed ("aff'd").

Similarly, an example of a LUBA case which was appealed to the Court of Appeals and then to the Supreme Court is:

Citizens for Responsible Growth v. City of Seaside, 23 Or LUBA 100, rev'd and remanded, 116 Or App 275, 840 P.2d 1370 (1992), rev den, 315 Or 643, 849 P.2d 524 (1993).

This citation tells you that LUBA's decision was reversed and remanded (overturned and sent back to the local government) by the Court of Appeals, and the Supreme Court denied a petition to review ("rev den") the Court of Appeals decision to reverse and remand LUBA's decision. (Note that since LUBA's and the Court of Appeals' decisions were in the same year, the date only needs to be written after the Court of Appeals cite; a different date must be indicated for the Supreme Court's decision since it was not in the same year as the earlier decisions.)

Two especially important actions by a reviewing court are signified in citations by reversed ("rev'd") and modified. As noted under "Late-Breaking Case Law" section above, if a holding has been reversed or modified on appeal, the holding of the original opinion is no longer legal authority, at least as applied to the facts of that case.

"Pinpoint" and Explanatory Citations

Sometimes a citation refers to the exact page within an opinion where a rule is stated for the convenience of the reader (sometimes known as "pinpoint citation" or a "pin cite"). For example, a writer referring to a specific legal proposition stated on page 316 of the Anderson case cited above would cite the case in its normal format but add an additional page number reference (316) as follows:

Anderson v. Peden, 284 Or 313, 316, 487 P.2d 59 (1978).

Note that the exact page number of the proposition is cited for the official reporter, but not for the regional reporter.

You can also expect to encounter various explanatory introductions to citations during your research, including: see, e.g. (which essentially means "for an example of the legal proposition I'm describing, see the following case . . ."), accord (acc'd) (which means "the following case involved a similar situation or came to a similar legal conclusion . . ."), and compare (cf) (which means "the following case involved a different situation or came to a different conclusion").

Cross References

Finally, Latin reference indicators used frequently in legal writing (including in this Citizens' Guide) include "infra" (meaning "cited or discussed below (later) in this text") and "supra" (meaning "discussed above (earlier) in this text"). For example, a brief might read:

> "As noted, some cases have used a different legal standard. See Anderson, supra, 284 Or App at 319."

You will note that some writers simply type "id." rather than re-typing an entire citation when they are repeating a citation made just a few sentences earlier. The better alternative is to give a "short form" citation like the Anderson citation at the end of the previous paragraph. Similarly, to direct the reader's attention to a different page of the same case, some writers cite as follows:

> "See id. at 321."

VII. Reference Tools to Help You Locate Cases

As you read opinions by LUBA and the courts, you will see citations to other cases, which you should also read. These cases will lead you to still other cases and authorities, and so on. The following tools (some more readily available than others) will make it easier to sort out the cases or find additional cases dealing with a particular issue.

Headnotes

Headnotes for LUBA cases are available on the LUBA website at:

> http://www.oregon.gov/LUBA/Headnote-Index.shtml

Headnotes provide a quick reference to the holdings of LUBA cases. Each holding is organized by topic and each topic is assigned a number (e.g. 36.2; Nonconforming Uses—Definition). Once you find the topic you are searching for, you can browse the LUBA headnotes for holdings related to your case. While headnotes provide a convenient reference, they should not be the full extent of legal research as they are not considered part of the LUBA's opinions and cannot be cited as legal authority. Once you have found headnotes that relate to your argument, you should read the case carefully to see if it's holding can be applied to your case.

In additions to the headnotes available on the LUBA website, the LUBA Reporter has a section at the beginning of each volume that provides the headnotes pertaining to the cases of that volume. Find the number of the topic you are researching in the "Headnote Index" and turn to the "Headnote Digest" section in the reporter, and locate any headnotes under that number. Each headnote cites the case in that volume which discusses the topic. Turn back to the Index of Opinions (or Index of Orders) to find the page number for the case.

Unfortunately, headnotes are not available for the Slip Opinions published prior to new volumes of LUBA opinions. You must skim the Slip Opinions themselves to find the most recent discussions of your issues.

LUBA Citator

The LUBA Citator serves the same function for LUBA decisions as a Shepard's Citator does for appellate court decisions. Each LUBA opinion is listed by its citation, and subsequent LUBA opinions citing the earlier opinion are listed directly below it. The LUBA Citator also lists citations to individual Court of Appeals and Supreme Court opinions, individual Oregon statutes, and individual Oregon Administrative Rules, providing with each, a list of citations to LUBA cases which discuss (or at least mention) them somewhere in their opinions.

Where to Find Legal Resources

The LUBA website (http://www.oregon.gov/LUBA) posts the Oregon Administrative Rules and the Oregon Revised Statutes that pertain to land use appeals. Additionally, the website posts the headnotes of cases that have come before LUBA. However, these headnotes should merely serve as a guide to help you find cases related to your argument. LUBA cases can be found in the Oregon LUBA Reports, available through a legal search engine such as Westlaw and Lexis Nexis or in printed volumes. If you do not have access to an online legal search engine, it may be best to find case law in a law library. There are several public law libraries and law school libraries accessible throughout the State of Oregon:

State of Oregon Law Library
1163 State Street
Supreme Court Building
Salem, Oregon 97301
503-986-5640

Lane County Law Library
Lane County Public Service Building
125 East 8th Avenue
Eugene, OR 97401
(541) 682-4337

Washington County Law Library
111 NE Lincoln Street
Suite: 250-L
Hillsboro, OR 97124-3036
Phone: (503) 846-8880

Deschutes County Law Library
1340 NW Wall Street
Bend, OR 97701
Phone: (541)388-6690

Marion County Law Library
The Marion County Courthouse
100 High St. NE Room 5110
Salem, Oregon 97301-3640
Phone: 503.588.5090

Clackamas County Law Library
821 Main Street
Room 101
Oregon City, Oregon 97045
Phone: (503)655-8248

Boley Law Library
Lewis & Clark Law School
10015 S.W. Terwilliger Blvd.
Portland, Oregon 97219
(503) 768-6676

John E Jaqua Law Library
1221 University of Oregon
Eugene, OR 97403-1221
Phone: (541) 346-3088

J.W. Long Law Library
Willamette University
245 Winter Street SE
Salem, OR 97301
Phone: 503-370-6282

BEFORE THE LAND USE BOARD OF APPEALS

OF THE STATE OF OREGON

JANE SMITH,	)	
	)	
Petitioner,	)	
	)	LUBA No. _____
vs.	)	
	)	
WILLAMETTE COUNTY,	)	
	)	
Respondent.	)	

NOTICE OF INTENT TO APPEAL

I.

Notice is hereby given that petitioner intends to appeal that land use decision or limited land use decision of respondent entitled [INDICATE TITLE OF LAND USE DECISION OR LIMITED LAND USE DECISION], which became final on [INDICATE DATE] and which involves [SET FORTH A BRIEF STATEMENT OF THE NATURE OF THE DECISION].

II.

Petitioner, Jane Smith, is represented by: [INDICATE NAME, ADDRESS, AND TELEPHONE NUMBER OF ATTORNEY OR PETITIONER(S) IF UNREPRESENTED BY AN ATTORNEY].

Respondent, Willamette County, has as its mailing address and telephone number: [INDICATE MAILING ADDRESS AND TELEPHONE NUMBER] and has, as its legal counsel: [INDICATE NAME, ADDRESS AND TELEPHONE NUMBER].

III.

Applicant, John Developer, was represented in the proceeding below by: [INDICATE NAME, ADDRESS AND TELEPHONE NUMBER OF ATTORNEY].

IV.

Other persons mailed written notice of the land use decision or limited land use decision by Willamette County, as indicated by its records in this matter, include: [INDICATE NAMES, ADDRESSES AND TELEPHONE NUMBERS OF ALL PERSONS WHOM THE GOVERNING BODY'S RECORDS INDICATE WERE MAILED WRITTEN NOTICE OF THE LAND USE DECISION OR LIMITED LAND USE DECISION. THE TELEPHONE NUMBERS OF SUCH PERSONS MAY BE OMITTED].

NOTICE:

Anyone designated in paragraph III of this Notice who desires to participate as a party in this case before the Land Use Board of Appeals must file with the Board a Motion to Intervene in this proceeding as required by OAR 661-10-050.

Dated this _____ day of _____, _____
Day Month Year

_____
Petitioner (each petitioner must sign)

or

_____
Attorney for Petitioner(s)

(Editor's Note: Be sure and include Certificates of Filing and Service along with your NITA -- see Appendix B.)

CERTIFICATE OF SERVICE

I hereby certify that on [INDICATE DATE], I served a true and correct copy of this **Notice of Intent to Appeal** on all persons listed in paragraphs II and III of this Notice pursuant to OAR 661-10-015(2) by (a) first class mail or (b) personal delivery. [INDICATE WHICH]

Dated this _____ day of _____, _____
Day Month Year

_____
Petitioner (each petitioner must sign)

or

_____
Attorney for Petitioner(s)

CERTIFICATE OF FILING AND SERVICE

I hereby certify that on (Month Day, Year), I filed the original of this **Petition for Review**, together with four (4) copies with the Land Use Board of Appeals, 550 Capitol Street NE, Suite 235, Salem, Oregon 97301-2552, by first class mail.

I also certify that on (Month Day, Year), I served a true and correct copy of this Petition for Review, by first class mail, on the persons listed below.

John Q. Attorney
Willamette County Courthouse, Room 100
123 Valley Street
Urbania, Oregon 97123
Willamette County Counsel

Jane C. Lawyer
Jacoby & Smith
National Bank Office Tower, Ste. 1200
500 S.W. Ninth Avenue
Portland, Oregon 97223
Counsel for Intervenors

DATED: (Month Day, Year)

_____
Oliver Wendell Holmes

BEFORE THE LAND USE BOARD OF APPEALS

OF THE STATE OF OREGON

JANE SMITH,	)	
	)	
Petitioner,	)	
	)	LUBA No. _____
vs.	)	
	)	
WILLAMETTE COUNTY,	)	
	)	
Respondent.	)	

MOTION TO INTERVENE

I.

John Davis moves to intervene on the side of (a) Petitioner or (b) Respondent [INDICATE WHICH] in the above-captioned appeal. Mr. Davis' (or his attorney's) address and phone number are as follows: [INDICATE ADDRESS AND PHONE NUMBER].

II.

The facts establishing movant's right to intervene are as follows: [SET FORTH STATEMENT OF FACTS].

III. [OPTIONAL]

In support of this motion, John Davis relies on the attached affidavit, Memorandum of Law or both.

Dated this _____ day of _____, _____
Day Month Year

_____
Petitioner (each petitioner must sign)

or

_____
Attorney for Petitioner(s)

[Editor's Note: Add Certificates of Filing and Service -- see Appendix B.]

CERTIFICATE OF FILING

[For Document Other Than
Notice of Intent to Appeal]

I hereby certify that on [INDICATE DATE], I filed the original of this [IDENTIFY DOCUMENT], together with [INDICATE NUMBER OF COPIES] copies, with the Land Use Board of Appeals, 550 Capitol Street NE, Suite 235, Salem, Oregon 97301-2552, by (a) first class mail or (b) personal delivery [INDICATE WHICH]

I also certify that on [INDICATE DATE], I served a true and correct copy of this [IDENTIFY DOCUMENT] by (a) first class mail or (b) personal delivery [INDICATE WHICH] on the following persons: [LIST NAME AND ADDRESS OF EACH PARTY OR THE PARTY'S ATTORNEY].

Dated: _____

_____
Signature

BEFORE THE LAND USE BOARD OF APPEALS
OF THE STATE OF OREGON

JANE SMITH,	)	
	)	
Petitioner,	)	
	)	LUBA No. _____
vs.	)	
	)	
WILLAMETTE COUNTY,	)	
	)	
Respondent.	)	

OBJECTION TO THE RECORD

I.

Pursuant to OAR 661-10-026(2), the petitioner objects to the record filed in the above-captioned appeal as follows:

A. The record does not include all the materials on which the respondent based the decision appealed in this matter. Specifically, the record does not include: [SET FORTH OMITTED ITEM(S)] that was (or were) submitted to and accepted by the respondent for inclusion in the record in the proceedings leading to the challenged decision.

B. The record contains material that was not included as part of the record during the proceedings before the governing body. Specifically, the following document(s) was (or were) not submitted to or accepted by the respondent in the proceedings leading to challenged decision: [SPECIFY DOCUMENTS]

II.

Pursuant to 661-10-026(1), counsel for the petitioner attempted to resolve the matter with counsel for the respondent.

_____ _____
Date Jane Smith, Petitioner
or
_____
Tom Dum, Attorney for Petitioner

[Editor's Note: Add Certificates of Filing and Service -- See appendix B.]

BEFORE THE LAND USE BOARD OF APPEALS
OF THE STATE OF OREGON

JANE SMITH,	)	
	)	
Petitioner,	)	
	)	LUBA No. _____
vs.	)	
	)	
WILLAMETTE COUNTY,	)	
	)	
Respondent.	)	

_____

COST BILL

_____

Pursuant to OAR 661-10-075(1), the petitioners in the above captioned case respectfully request the reimbursement of the filing fee ($50) and the deposit for costs ($150). Checks should be made payable to Jane Smith.

Respectfully submitted this _____ day of _____, 200__

_____
Keith A. Bartholomew, OSB 87377
300 Willamette Building
534 SW Third Avenue
Portland, Oregon 97204
503/497-1000
Of attorneys for the petitioners

(Editor's Note: Be sure and add Certificates of Filing and Service as shown in Appendix B.)

BEFORE THE LAND USE BOARD OF APPEALS

FOR THE STATE OF OREGON

JANE SMITH,	)	
	)	
Petitioner,	)	
	)	
v.	)	**LUBA No. _____**
	)	
YAMHILL COUNTY,	)	
	)	
Respondent,	)	
	)	
and	)	
	)	
JOHN DAVIS,	)	
	)	
Intervener-Respondent.	)	
	)	

PETITION FOR REVIEW

Jane Smith,
1234 SE Easy St.
Portland, OR 97214
Phone: (503) 555-1234

Petitioner

John Q. Attorney, OSB #_____
Assist. Yamhill County Counsel
Courthouse
321 N.E. Yamhill St.
McMinnville, OR 97128
Phone: (503) 555-5678

Attorney for Respondent

Jane Q. Lawyer, OSB #_____
Attorney at Law
1234 S.W. Baker Rd.
Sherwood, OR 97140
Phone: (503) 555-9876

Attorney for Intervener–Respondent

APPENDIX F – Sample Petition for Review

TABLE OF CONTENTS

(Omitted)

I. STANDING OF PETITIONER

ORS 197.830(2) contains two requirements for a petitioner to have standing to appeal a land use decision. The petitioner must have:

> "(a) Filed a notice of intent to appeal as provided in subsection (1) of [ORS 197.830]; and (b) Appeared before the local government . . . orally or in writing."

Petitioner, Jane Smith, has met both aspects of the standing test established by ORS 197.830(2). A notice of intent to appeal, as provided in ORS 197.830(1), was filed on June 3rd, 2004. In addition, petitioner appeared before the Yamhill County Board of Commissioners on March 18th, 2004. Rec. 24

II. STATEMENT OF THE CASE

(A) Nature of the Land Use Decision and Relief Sought

Petitioner challenges Yamhill County's adoption of Ordinance No. 737, "In the Matter of Approving a Zone Change from Agriculture/Forestry Large Holding to Agriculture/Forestry Small, a Zone Change from EF-20 Exclusive Farm Use to AF-10 Agriculture Forestry Small Holding and Taking an Exception to Goal 3 for a 38.71 Acre Parcel Located on the north side of Chehalem Drive, Yamhill County, Tax Lots Nos. 3301-100, -101 and -102, applicants Matthew and Renee Powell, Docket PAZ-02-03, and Declaring an Emergency", by which Yamhill County adopted a Comprehensive Plan map amendment, a Comprehensive Plan text amendment, a zone change and an exception to Statewide Planning Goal 3, which became final on May 13, 2004. This action by the county amended the county's comprehensive plan to redesignate land from

Agriculture Forestry large Holding to Agriculture Forestry Small Holding, changed the zoning designation from EF-20 Exclusive Farm Use to AF-10 Agriculture Forestry Small Holding, and approved an exception to Goal 3. Rec. 1.

Petitioner requests that the Land Use Board of Appeals (LUBA) reverse or remand the county's decision approving the request for a Comprehensive plan map amendment, zone change and exception.

(B) Summary of Arguments

ASSIGNMENT OF ERROR: Reasons exception

1. The County's Market Analysis Fails to Provide Reasons that Justify Why State Policy Embodied in Goal 3 Should Not Apply to the Subject Property.

2. The County's Alternative Sites Analysis Fails to Provide Reasons that Justify Why State Policy Embodied in Goal 3 Should Not Apply to the Subject Property.

3. The County's Findings that the Subject Property is Not Well Suited as Resource Land Fails to Provide Reasons that Justify Why State Policy Embodied in Goal 3 Should Not Apply.

4. The County Cannot Grant an Exception to Goal 3 for a Proposed Use which is Already Permitted under the Goal.

(C) Summary of Material Facts

Intervenor-Respondent John Davis submitted applications for a Comprehensive Plan map amendment, a Zone Change and exception to Statewide Planning Goal 3 (agricultural lands). The applicant proposed to amend the Yamhill County Comprehensive Plan Map designation on three tax lots totaling 38.71 acres from Agriculture/Forestry Large Holding to Agriculture/Forestry Small Holding and amend the Zoning Map designation on the 38.71 acres from EF-20 Exclusive Farm Use to AF-10 Agriculture Forestry Small Holding. The subject property is comprised of

three tax lots: Tax Lot 100 is 21.27 acres, Tax Lot 101 is 16.86 acres and Tax Lot 102 is 0.58 acres. Rec. 2.

Tax Lot 100 contains one existing residence. It is owned and occupied by John Doe. The applicant, John Davis, is the prospective purchaser of the western portion of Tax lot 100, in the event that their application is upheld. Tax Lot 101 is owned by the Chehalem Park and Recreation District, a political subdivision of the state. The small Tax Lot 102, which is surrounded by Tax Lot 101, contains one existing residential structure, is owned by the Chehalem Park and Recreation District, and Mary Jones, the latter owning a life estate in the lot. Rec. 229-230.

Taken as a whole, the property slopes down to the south and is predominantly forested on the steeper slopes of the northeast. The applicant indicates that the flatter pastureland of Tax Lot 101 has been grazed, but the steeper original pasture/orchard area located on Tax Lot 100 has not been farmed at least since the 1970s or otherwise for many years. R. 2.

According to the soils maps and text of the Soil Survey and Table 2 in the application, the subject property is predominantly High Value Farmland, pursuant to the definition of the High Value Farmland contained in ORS 215.710, with 60.9% of the soils being listed as high value and 39.1% not listed. Rec. 232.

Tax Lot 100 has 20.27 of its 21.27 acres on farm tax deferral. Tax lot 101 has 16.45 of its 16.86 acres on farm tax deferral. Rec. 3.

The subject property is located about one mile north of the City of Newberg. Rec. 228. The area in which the subject property lies includes variously zoned properties, including AF-10, EF-20, EF-80, and EF-40. Rec. 326. The immediate neighboring properties to the east, south and west are zoned AF-10, and are predominantly used for rural residential hobby farms. Rec. 228.

The properties to the north are zoned EF-20, and are used for commercial tree farms, small and large natural woodlots, rural residential small scale hobby farms, and small pasture areas.

* * *

III. LUBA'S JURISDICTION

LUBA's jurisdiction is governed by ORS 197.825(1), which provides that "[LUBA] shall have exclusive jurisdiction to review any land use decision or limited land use decision of a local government." The county is a "local government" as defined in ORS 197.015(13). Therefore, if the county's decision was a "land use decision," LUBA has jurisdiction over this appeal.

ORS 197.015(10) defines "land use decision" to mean "a final decision or determination made by a local government … that concerns the … application of (i) the goals." Because the county's decision specifically applies the Goal 2 exception process and considers aspects of Goal 3, this is a land use decision and LUBA has jurisdiction over it.

* * *

IV. ASSIGNMENTS OF ERROR: REASONS EXCEPTION

OAR 660-004-0020(2)(a) states that the county must provide "[r]easons [that] justify why the state policy embodied in the applicable goals should not apply. The exception shall set forth the facts and assumptions used as the basis for determining that a state policy embodied in a goal should not apply to specific properties or situations including the amount of land for the use being planned and why the use requires a location on resource land."

1. The County's Market Analysis Fails to Provide Reasons that Justify Why State Policy Embodied in Goal 3 Should Not Apply to the Subject Property.

The first sentence of OAR 660-004-0022(2) prohibits a reasons exception for rural residential development based on market demand for housing, assumed continuation of past urban and rural population distributions, and on housing types and cost characteristics. The second sentence of that section describes what a reasons exception for rural residential housing must contain: findings based on the economic analysis in the comprehensive plan demonstrating reasons why the type and density of housing planned require this particular location on resource lands. The third sentence provides an exception to the prohibition, in the first sentence, on justifications based on market demand for housing, where the county identifies existing or planned rural industrial, commercial, or other economic activity in the area that generates a market demand for rural housing. *DLCD v. Umatilla County*, 39 Or LUBA 715, 729 (2001).

The county's findings state that "[r]egarding OAR 660-004-0022(2), the applicants have submitted significant and substantial documentation and information regarding the growth in Yamhill County … The Economic Development section of the County's Comprehensive Plan addresses this fact and states that the attraction of new industries in recent years has helped the local economy significantly, and the County's Overall Economic Development Plan has served as a 'guide to the fulfillment of the county's economic development goals and policies.' … [T]he County's own Exception Land analysis … demonstrates the impact of this economic growth on rural residential lands by finding in 1996 that at least 78.5% of all rural residential properties were then currently developed. Within the Newberg area, the percentage of developed rural residential properties in 1996 actually increased to at least 84%. This increased market demand in the Newberg area is supported by and results from the continued commercial and industrial development within the Newberg urban growth boundary and city limits, as well as from the continued demand for all residential land, including rural residential properties, given Newberg's close proximity to the Portland Metro Area."

The county continues by stating in its findings that "[a]nother indicator of rural economic development is the increase traffic counts on rural County roads." The county found that it "should provide sufficient rural residential lands in appropriate ways and locations under the law for as diverse an income level of its citizens as possible, so that such lands are not only available to the wealthy, or to those citizens who either owned the property for a significant period or inherited it." The county concludes its analysis by stating that "based on the evidence in the record, the application complies with the requirements of OAR 660-004-0022(2) because the applicants have demonstrated that the subject property is not resource land; that even though the County has not established a specific percentage threshold for developed land, the existing County AF-10 zoned land within the Study Area has been developed to at least 89.1%; and that there is a need for more AF-10 zoned land within the Study Area to satisfy the market demand for housing and park land generated by existing and planned rural and urban industrial, commercial, and other economic activity in the area."

The county's findings under OAR 660-004-0022(2) fail to satisfy the requirements of the second sentence of OAR 660-004-0022(2), stated above, which states that findings must be "based on the economic analysis in the comprehensive plan … " The county's findings fail to adequately address why the type and density of housing planned (one additional 10 acre parcel on the subject property available for rural residential development) require this particular location on resource land.

The county's findings also fail to satisfy the requirements of the third sentence of OAR 660-004-0022(2), which "provides an exception to the prohibition, in the first sentence, on justifications based on market demand for housing, where the county identifies existing or planned rural industrial, commercial, or other economic activity in the area that generates a market demand for rural housing." The county fails to provide any data or other empirical

analysis for why the proposed type and density of this action, a 10-acre rural residential parcel, is needed to satisfy the alleged housing demands generated by its generalized statements concerning increased economic activity in the area. The county fails to explain how any of these economic activities generate a market demand for rural residential housing.

The county fails to identify any specific growth of "existing or planned rural industrial, commercial, or other economic activity in the area that generates a market demand for rural housing." Instead, the county makes generalized statements about population growth and higher traffic counts. Indeed, the county stated in its finding that the reason for granting an exception to Goal 3 for this particular parcel is that "even though other exception lands are available in other areas of the County, those exception lands are located in areas that would require a significant investment in time and money for the applicants to transport themselves to their established community and their son to the Newberg school system … " Rec. 6. While the applicants' desires are understandable, they are not appropriate to grant a reasons exception to Goal 3.

No reason is presented by the county to compel the "amount of land for the use being planned" OAR 660-004-0020(2)(a) at the subject property's particular location, much less on resource land. OAR 660-004-0020(2). The county fails to provide this or any other empirical data to substantiate its speculation regarding a market need for the subject property. The county does indicate that this particular sized lot is being asked for because it is a size and in an area that is affordable to the applicants. The county fails to show any evidence for why the applicants cannot find adequate housing elsewhere in the area. Such cost considerations for a specific applicant are simply not relevant to the analysis needed in this case.

The county also fails to address the rest of the requirements in OAR 660-004-0020(2)(a). The county fails to "set forth the facts and assumptions used as the basis for determining" why a 10-acre rural residential parcel is necessary to satisfy the alleged housing demands generated by

increased economic activity in the area. The county provides no data or other factual basis showing the alleged increased housing needs of people in the area, and whether or not these needs are currently being met. Indeed, it is clear from the county's findings that there is no increased demand generated by increased economic activity in the area, but rather a demand by a specific family for an affordable 10 acre rural parcel, that lacks a current house, because they would like to build a new house. This is not an appropriate justification for a reasons exception to Goal 3. If such a justification were found appropriate, there would be no end to the exceptions allowed, and Goal 3 would soon be rendered meaningless.

The county also fails to "set forth the facts and assumptions used as the basis for determining" why the use, housing for the applicants, requires a location on resource land, rather than on non-resource land. There is no examination of the current housing market within the Newberg UGB, whether there is a housing shortage within Newberg, or outside its UGB. There is no explanation why this resource land in particular is needed to satisfy this alleged need. The county fails to address any of these issues in its findings.

2. The County's Alternative Sites Analysis Fails to Provide Reasons that Justify Why State Policy Embodied in Goal 3 Should Not Apply to the Subject Property.

The county's alternative sites analysis, which is required by ORS 197.732(1)(c)(B), Goal 2, Part II(c)(2), and OAR 660-004-0020(2)(b), fails to demonstrate that "areas which do not require a new exception cannot reasonably accommodate the proposed use." OAR 660-004-0020(2)(b)(B).

The county states in its findings that "the applicant has appropriately indicated on a map of the county exception lands in the Newberg Dundee areas, and otherwise described, the

location of possible alternative areas considered for the proposed use, which alternative sites are predominantly AF-10 exception lands and adjacent UGB and resource lands which do not require a new exception. The Board also accepts the applicants' Study Area, and finds that the area for which the exception is taken has been adequately identified." Rec. 13.

The county continues: "One of the questions listed in OAR 660-004-0020(2)(b)(B) is whether the proposed use could reasonably be accommodated in other areas that do not require an exception. Economic factors can be considered along with other relevant factors. One of the items to be considered is whether a dwelling location could be established on property within the urban Growth Boundary, on committed resource land or on nonresource property. The applicants submitted general information … stating that rural residential lands with the UGB were eliminated due to lack of availability and that such lands are significantly less affordable." Rec. 13.

The staff report reviewing the application in this case found that "it appears that much of the reason for choosing this parcel is that it will simply be less expensive to develop. While the costs of other lots may be considered, it is not a determinative factor that can be used to eliminate other rural residential lots from consideration. Because of this, the applicant has not adequately explained why there is a need for additional AF-10 zoned property. In addition the applicant has not addressed why undeveloped lots surrounding Newberg would not be able to accommodate the proposed use." Rec. 217.

Indeed, the applicants state in their application that "[a]ssuming the necessary partition approval is obtained from the County, the subject property can be purchased and developed more easily and less expensively by the applicants than other nonresource lands that are more expensive to purchase at the outset because of the nonresource location, developed status and existing improvements, if nonresource land were even available, which the above findings state

they are not." Rec. 217. As stated in the county planning bureau's staff report for this application, which recommended denial, "[f]rom this statement, it appears that much of the reason for choosing this parcel is that it will simply be less expensive to develop." Rec. 217. The staff report found, and petitioner concurs, that although the costs of other lots may be considered, it is not a determinative factor that can be used to eliminate other rural residential lots from consideration. Rec. 217.

The rationale the county states for the proposed use, a 10-acre rural residential parcel, is that this is needed for the applicants due to their particular circumstances. But the county fails to explain why these other sites are inadequate to provide that same use, or even why a 10-acre parcel is specifically needed to satisfy the applicants' needs. The county's findings include Table 5, which clearly documents that there are 64 available AF-10 lots within the area examined by the applicants. Rec. 7.

(assignments of error 3, 4 omitted)

V. CONCLUSION

For all of the above reasons, the county's decision in this matter should be reversed or remanded.

Respectfully submitted this 8th day of July 2004.

_____
Jane Smith
Petitioner

(Be sure to attach a copy of the local government's decision as well as the "Certificate of Filing and Service" (see Part II, Sec. III))

GLOSSARY OF TERMS

Assignment of error- a specification of alleged errors made by the local decision maker that the petitioner relies on to seek reversal or remand before LUBA. *(see Part II, Sec. IV; Part III Sec. III)*

Colorable claim of error- a claim of error that appears to be true, valid, or right. *(see Part II, Sec. X)*

Declaratory ruling- a legally binding judgment of the duties, rights obligations and status of the parties. *(see Part I, Sec. III)*

Fact Pattern- a set or series of facts that lead to a legal conclusion

Evidentiary hearing- a hearing where evidence as opposed to a hearing where only legal argument is presented. *(see Part II, Sec. X)*

Ex parte contacts- private contact between a party and a decision maker (may be illegal if contact results in undue influence or prevention of fair hearing). *(see Part II, Sec, X)*

Injunction (stay)- An equitable remedy wherein a party is required to refrain from doing certain acts. If a local land use decision is found to cause an *irreparable injury*, LUBA may grant an injunction that halts development while the appeal is being settled. *(see Part II, Sec, X)*

Intervenor- One who voluntarily enters a LUBA appeal, either on behalf of the Petitioner or Respondent, due to a personal stake in the outcome. *(see Introduction, Part II, Sec. II)*

Irreparable injury- An injury that cannot be adequately measured or compensated for with money. If irreparable injury can be shown, an injunction or stay may be granted. *(see Part II, Sec. X)*

Ministerial decision- decisions that do not require the interpretation or exercise of policy or legal judgment. *(see Part I, Sec. III)*

Moot, mootness- An issue or controversy that has no practical significance. *(see Part II, Sec. III)*

Periodic review- a process by which a local government makes decisions about updating its local comprehensive plan. *(see Part II, Sec. IV)*

Petitioner- the party that seeks to challenge a local land use decision before LUBA. *(see Introduction)*

Procedural Issue- A procedural issue involves whether or not a required procedure is followed. Procedural issues (such as whether a local decision maker provided adequate opportunity for public comment) are distinct from substantive issues (such as whether a local decision maker property applied the law). *(see Part III, Sec. I)*

Quasi-judicial decision- An adjudicative decision made by an executive or administrative official. Local land use decisions, such as permitting type, are considered quasi-judicial as they can be carried out by an administrative body. *(see Part I, Sec. IV)*

Raise it or waive it- The requirement that issues challenged before LUBA must have been raised at the local level. *(see Part I, Sec. IV)*

Remand- to send a case or claim back to the local decision-maker for clarification or modification based on LUBA's holding. *(see Part I, Sec. IV)*

Respondent- the party against whom the appeal is taken. In LUBA appeals, the respondent is generally the local government body whose decision is being appealed. *(see Introduction)*

Reversal- The overturning of a local land use decision. *(see Part I, Sec. IV)*

Standing- The ability of a party to demonstrate to a court sufficient connection to an issue or decision in order to warrant the party's participation in that case. To have standing before LUBA, petitioners must: 1) submit a Notice of Intent to Appeal by the deadline for appealing, and 2) have "appeared" before the local government. *(see Part I, Sec. I)*

Stay- (see injunction)

Substantive Issues- A substantive issue involves the proper application of established law. Substantive issues (such as whether a local decision maker property applied the law) are distinct from procedural issues (such as whether a local decision maker provided adequate opportunity for public comment). *(see Part III, Sec. I)*

From: Emily
To: recorderteam
Subject: Park Place Electronic Testimony
Date: Wednesday, May 18, 2022 11:18:35 AM

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Hi,

I would like to be added to the list of citizens to offer verbal testimony at the next Park Place meeting on the 23rd. And here is my electronic testimony,

"I want to echo the sentiments expressed by residents, emphasizing the importance of maintaining significant wetlands as required by NROD. the proposed plan to 'fill the wetland' was mentioned only briefly in the applicant's presentation and skimmed over. a small park or open space maintained as turf lawn is in no way a replacement for any wildlife habitat that still remains. the original park place plan called for two parks, which would account for 11-15 acres of the original **500 acres** purchased by the portland metropolitan urban growth boundary. it promised a mix of house types, protected sensitive areas including drainages, and integration of parks and open spaces into existing and future neighborhoods. the plan has changed in ways that detract from these important features.

icon development has a 2-3.2 star rating out of over 30 online reviews, almost all of which are from people who own an icon home. primary complaints include poor workmanship, hidden fees, and low long-term durability. If Oregon city is going to approve a large housing development it should be with companies who can maintain community trust and who have a high degree of workmanship and commitment to not only future home buyers but to existing residents as well."

Thank you,
Emily

From:	James Nicita
To:	Dirk Schlagenhaufer; Mike Mitchell; Gregory Stoll; Patti Gage; Daphne Wuest; Bob La Salle; cstaggs@orcity.org
Cc:	Oregon City Planning
Subject:	(Brief) Public Comment: Building a road outside of city limits GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.
Date:	Tuesday, May 24, 2022 11:14:51 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Planning Commissioners:

Thank you for your patience with my extended presentation regarding the Main Street village component of the Park Place concept plan during Monday night's hearing.

I actually had more to say, so I am following up by email with this brief additional comment for inclusion into the record of the above-referenced file.

I had only intended to inquire whether there has been a discussion of a law that allows Oregon City to build a road that would be partly outside the city limits.

That law is ORS 223.930, which is below, with my emphasis in bold. It appears relevant to whether Oregon City can build the Holly Connector down to Redland Road, even though the land necessary for the road is in Clackamas County.

Thank you,

James Nicita
Oregon City

223.930 Streets along city boundaries or partly within and without city. (1) Any city may construct, improve, maintain and repair any street the roadway of which, as defined in the Oregon Vehicle Code, is along or along and partly without, or **partly within and partly without the boundaries of the city** and may acquire, **within and without the boundaries of such city,** such rights of way as may be required for such street by donation or purchase or by condemnation in the same manner as provided in ORS 223.005 to 223.105, except as provided in subsection (2) of this section.

(2) In any condemnation proceeding pursuant to subsection (1) of this section, a city shall not have any right of occupancy or possession until the condemnation judgment is paid. [1955 c.551 §1; 1985 c.16 §453]

From: Jed Peterson
To: Kelly Reid
Subject: Re: FW: Park Place Crossing - Planning Commission hearing May 23rd
Date: Saturday, May 21, 2022 8:59:48 AM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Kelly,
It is troubling that on one hand we are told that this general plan is a 10000 foot view and not to worry about the details. But, then the developer is requesting very specific variances and accommodations that are contrary to the Park Place plan. For instance, there is no clear resolution on a connector road, which is vital to the project and yet they are pushing for variances to decrease lot sizes to "accommodate the number of houses originally planned for in the Park Place concept." The original concept included connector roads and that is being conveniently dropped by the developer. By, picking and choosing the ideas from the original concept and dropping others, the proposed plan looks nothing like the original concept. The so called, 10000 foot view, is looking more and more like we are stuck on a plane at 10k and air traffic control is saying "don't worry that there isn't a runway, we will build it eventually" knowing that by the time we need it, it will be far too late. Please, do not recommend this plan. People's lives are at risk.

Thanks,
Jed Peterson

On Wed, May 18, 2022 at 1:30 PM Kelly Reid <kreid@orcity.org> wrote:

> Good Afternoon,
>
> This email is being sent to everyone who has commented or signed up to comment on GLUA-21-00045 for Park Place Crossing General Development Plan. The City does not typically send emails to those who have participated in a hearing until the final decision is made on the matter, but due to the large volume of comments and interest in this particular project, we are attempting to provide clarity about the process for the upcoming hearing.
>
> At the May 23rd hearing, testimony will be taken as follows:
>
> 1. Testimony from people who filled out comment sheets for May 9th but were unable to comment
> 2. Testimony from new individuals and organizations who have not already testified.

3. The applicant will then be allotted 20 minutes for rebuttal before Planning Commission closes the record to deliberate.

Note that written testimony is still being accepted.

The Planning Commission regular meeting packet with all application materials, staff reports, and public testimony submitted to date can be found here: https://www.orcity.org/bc-pc/planning-commission-31. The agenda packet links are also pasted below:

- GLUA-21-00045 / MAS-21-00006 / VAR-22-00001 Park Place Crossing General Development Plan.
  - REVISED Commission Report.pdf (0.05 MB)
  - REVISED Public Comment Summary Table.pdf (0.21 MB)
  - NEW Staff Memo re revised conditions of approval with Exhibits.pdf (3.49 MB)
  - Revised Recommended Conditions of Approval.pdf (0.25 MB)
  - New Items and Comments since May 6 - PART 1 with navigation.pdf (24.69 MB)
  - New Items and Comments since May 6 - PART 2 with navigation.pdf (49.55 MB)
  - NEW Staff Presentation Slides from 5.9.22 Hearing.pdf (2.40 MB)
  - May 9th agenda packet links.pdf (0.14 MB)

Please note that all of the items already in the record as of May 6th, including the application materials and staff report, are included in the "May 9th agenda packet links" document.

If you wish to testify at the hearing, please fill out the attached testimony form and send to planning@orcity.org or fill out a form at the meeting.

Zoom link for meeting:

- Topic: Planning Commission May 23, 2022
- Time: May 23, 2022 07:00 PM Pacific Time (US and Canada)
- Join Zoom Meeting https://us02web.zoom.us/j/83171863438?pwd=cTYBqJ4_vg3Wv2U5rjsV5X_YFWy2fj.1

Thank you,

Kelly Reid

She/her/hers

Planner

Community Development Department, City of Oregon City

695 Warner Parrott Rd, Oregon City, OR 97045

kreid@orcity.org

(503) 496-1540 Direct

(503) 722-3789 Main

Website

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MORE STORIES

Item #1.

Opinion: Developer seeks to steal Oregon City neighbors' access

Sharon Neish May 23 2022

Sharon Neish: The version of the Park Place concept being proposed has no acquired southern exit, no permanent northern exit.

Icon Construction's proposed Oregon City Crossing housing project is confusing at best, and at worse, fails to answer critical 10,000-foot-level questions.



COURTESY GRAPHIC - This map shows the area near Holcomb Boulevard in Oregon City where a large housing development is proposed.

(https://pamplinmedia.com/images/artimg/00003736145785-0600.jpg)

Attempting to understand their version of the Park Place Concept Plan, I have been attending Icon Construction and AKS Engineering's planning meetings, where they have repeatedly avoided serious issues with the proposed project.

So, I called the Clackamas County Planning Department for advice on how to fight this project. My husband and I live on Edenwild Lane and love being away from urban blight.

I asked the county why the Holly Lane collector would be in Clackamas County and parts of the project appear to be outside the urban growth boundary, per the developer's map. Wouldn't Clackamas County be involved?

The nice person I talked with, Clackamas County Long Range Planning Manager Karen Buehrig, told me that t county voted against this abhorrent housing project, stating, "It is my understanding that the Park Place development that is currently under discussion is within the city of Oregon City. Clackamas County does not have a role in the approval process for applications within Oregon City. "With respect to the extension of Holly Lane to connect Redland to the Park Place development, that extension currently traverses across unincorporated Clackamas County. At this point, I do not think that the developer is being required to construct that connection. At the time the connection is built, it is possible that it could also be required to be within the limits of Oregon City. Clackamas County would have a role in the review of the connection with Redland Road." Ms. Buehrig said to let her know if I had additional questions, which of course I did, since part of the initial project connecting to Holcomb appears to also be in Clackamas County. Icon and AKS stated they will have "to get Oregon City involved" to get Holly Lane connected to Holcomb or else use Street A, which appears to connect near Jada Way. According to the developer's own traffic study, Jada Way is "dangerous."

In this regard Ms. Buehrig emailed me the following: "From reading the information that you have sent, my understanding is that the 'long-term solution' appears to be the connection of Holly Lane to Holcomb near Barlow. The proposed interim solution is to provide access through the property that they own, and is within the city, which has the road access closer to Jada. "You are correct that there are three properties that are still in unincorporated Clackamas County (not in the city). Eventually, Holly Lane would extend through these properties, but that is not proposed at this time (from what I can tell in both the slideshow that you sent and the memo)."

So, the version of the Park Place Concept being proposed has no acquired southern exit, no permanent northern exit and has to steal from a neighboring subdivision in order to make the proposed Holly Lane usable with a nonapproved variance.

Sharon Neish is a resident of unincorporated Clackamas County just outside of the city limits of Oregon City.

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From: Roya Mansouri
To: Kelly Reid
Subject: Continuance
Date: Monday, May 23, 2022 9:10:55 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Kelly,

Could you explain to me why they are being granted a continuance? They have been the ones pushing for this and had the luxury of time to be prepared. They are now not prepared and wish to ask for a 6 week continuance. When the public received a continuance, it is 2 weeks. In addition, they have the luxury of providing us with the new information only 7 days prior to meeting. They complain about only having 2 weeks since the last meeting to create a rebuttal, but why are we given then only 7 days? This appears to be significantly unfair to the citizens of Oregon City, who will be the ones who have to live next to this development. As stated, none of the lawyers, developers, engineers, etc., live or plan to live in this development or this community.

Thank you.

Sincerely,
Roya Mansouri

Dear Kelly and Members of the Oregon City Planning Commission:

I offer a rebuttal of comments noted from Mr. Garrett Stephenson, attorney representing the developer, from Schwabe, Williamson, and Wyatt in his letter dated 4/6/22 regarding the Park Place Crossing Development Plan.

1) Per Conditions of Approval - Condition 10: The developer reports that it is not feasible or logical to dedicate the parkland during Phase I as the developer needs to have flexibility in the Phase 2 planning phase due to unknown factors that could come up. However, if the park is in a flat region that is appropriate and preferred for the park to be so it can be usable, it is not necessary to be flexible with that region. Rather, flexibility can remain around the design of that park itself. It raises concerns that the park will be changed for the worse, in terms of location, slope, and therefore, functionality. Their response does not rise to a level of necessity.

2) Per Condition 18.c: Additional Local Street Connection east of Holly Lane and South of Street E. The condition here is that there has to be a street connector. However, the applicant would like to change the condition to being allowed to "evaluate possible additional local street connections". They claim that it is not feasible for the road to be belt east of the region secondary to the stormwater detention facility as well as concerns for grading. However, they do not have the same concerns for building houses on lots that are also on steep slopes, etc. Also, stormwater detention facilities can be moved or alternatives to one major stormwater detention facility can be considered. Therefore, the argument that this is not feasible is not accurate. The developer should be held to a higher standard and not be allowed to request that they will 'try real hard' to fulfill their obligations, knowing that they do have a way out, which likely they would avail themselves of, given likely cost increases. This is not preferable for the citizens of the community. Therefore, this adjustment to this condition should not be granted.

3) Applicant's Response to Public Testimony:

   They request that all public comments are rejected as they do not rise to the level of being arguable against the General Development Plan. They also discuss that Statewide Planning Goals are not approval criteria. However, these planning goals do factor in significantly to the Park Place Concept Plan which is referenced frequently by the applicant to support their reasons for setting up the development as they have. Therefore, if the development is designed to support the Park Place Concept Plan, then by association, the developer should support the Statewide Planning Goals. Oregon City is known as the city of trees, and choosing not to discuss Key Concepts of the Park Plan that include limited tree removal and loss of habitat that affects soil erosion, landslides, water runoff secondary to impervious sources, and disconnection of contiguous forested corridors that allow for wildlife migration, then it is reasonable and expected for the developer to address these concerns at this GDP level and not at a more granular level. These are 10,000 feet questions to be answered at the 10,000 foot level.

   With regards to the concerns by the public regarding transportation concerns, there is reasonable and significant concern regarding the main collector street of Holly Lane, and that it currently is not able to be connected fully to Holcomb except through a side street (Street A), nor does it connect to Livesay or Redland. In addition, the Park Place Concept Plan did discuss other street connections, such as through Swan Road, but these are conspicuously omitted from this application. In addition, the concern for safety during an evacuation is a true existential threat. To ignore the seriousness of this concern is like going on a run without an epi-pen when one is severely and deathly allergic to bees. It has

to be addressed before approval of the GDP. There needs to absolutely be an appropriate evacuation plan prior to the addition of any further people.

With regards to **e. The Application is consistent with the Park Place Concept Plan.:** The applicant uses this Concept Plan inconsistently. In certain situation that benefit the applicant, the Park Place Concept Plan is cited as being consistent with the developer's plan. In other instances, the Park Place Concept Plan is referenced only as a 'concept'. I have reviewed the entire Park Place Concept Plan and many of the Key Concepts as well as sub-concepts are not present in the developer's application. Many of these concepts, such as the different option of traffic routes (e.g. Swan Road, etc.), importance of greenery, wildlife corridors, use of water-runoff mitigation strategies (use of permeable sidewalks, rain gardens, green roofs, etc.), use of solar panels, livability.

For example - from the Park Place Concept Plan:

"To Minimize Hydrologic Impact
1. Amend disturbed soils to original or higher level of porosity to regain infiltration and stormwater storage capacity. 2. Use pervious paving materials for residential driveways, parking lots, walkways, and within centers of cul-de-sacs. 3. Incorporate stormwater management in road right-of-ways.
4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.
5. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
6. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.
7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.
8. Use multi-functional open drainage systems in lieu of more conventional curb-and-gutter systems.
9. Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.

Miscellaneous Other Habitat-Friendly Design and Construction Practices
4. Preserve and maintain existing trees and tree canopy coverage, and plant trees, where appropriate, to maximize future tree canopy coverage."(FCP, pg. 69)

In addition, providing greenery barriers to minimize impact of development on other neighborhoods.

Unfortunately, these concepts are not addressed in the applicant's GDP. Therefore, it is difficult to agree with the applicant that the application is indeed consistent with the Park Place Concept Plan.

Below are representative examples of housing developments that appear to fit the criteria of the developer in terms of density, lot size, and building height. There are no trees (or only very young, short ones), and no shading, minimal privacy between lots, significant hardscaping and minimal grass, and no sense of 'community'. They do not create the village-like idea that fueled the Park Place Concept Plan. Instead, they look like densely packed, soulless, identical

houses, straight out of “A Wrinkle in Time”s Planet Camazotz where everything is the same and all do the same things:





Not so different from below!













Respectfully submitted,

Roya Mansouri/Enoch Huang

From: Roya Mansouri
To: Kelly Reid
Subject: Question regarding the Unit Number for Park Place Crossing Development.
Date: Monday, May 23, 2022 6:31:39 PM

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Dear Kelly and the Oregon City Planning Commission:

I had an important question that came up at the last meeting that I wanted to ask. It is in regards to the number of units that must be built in the Park Place Crossing Development. As per the Park Place Concept Development Plan: Two distinct mixed-use neighborhoods (North Village and South Village) that accommodate 1,459 new dwelling units would be build. In addition, the North Village would require about 937 units. As the Park Place Crossing Development has about 50% gross acreage, the argument that recurs is that since the development has roughly 50% of the acreage, then it requires that roughly 50%, or 460+ units, be built. However, nowhere can I find the **buildable** acreage that is available in the Park Place Crossing Development compared to that of the **rest of** the North Village. Indeed, when one looks at the topographical maps, it appears the southern portion of the North Village has much more buildable acreage than what makes up the development under discussion today.

Therefore, I would like clarification as to how much **buildable** acreage exists in the Park Place Crossing Development, whose GDP is currently being discussed, as compared to the rest of the North Village property. If there is more buildable acreage in the residual portion of the North Village property, then it makes sense that the PPCD does not require such density in units as being proposed.

I look forward to your response. Thank you.

Sincerely,
Roya Mansouri

Scott Coleman
18552 S Holly Lane
Oregon City, OR 97045

RE: Diverting Oregon City Traffic to Roads Outside The UGB
May 23rd 2022

To Whom it May Concern,

I am a homeowner on S Holly lane who is opposed to Oregon City's plans to route city traffic from developments within the city to roads that are outside the urban growth boundary.

Holly Lane struggles to handle the current traffic load and is certainly not designed to safely handle the increased use from developments already under construction. This additional new development causing Holly Ln. to link two portions of Oregon City would be an abdication of the city planners responsibility to ensure safe transportation.

In the last 5 years foot traffic has increased along Holly Ln where there are no sidewalks. Pedestrians are already at risk along this road, increasing traffic will put them at greater risk. There is not a non-vehicle safe route to Tumwata Middle School. This should be in place before allowing any development that will increase traffic in the area.

I am in favor of appropriately planned developments that include the infrastructure that enables these new neighbors to live out their lives in a way that does not endanger the safety of others. Intentionally or unintentionally, traffic will be added to Holly Lane if the current proposal is allowed. I ask that the city require the developers to add infrastructure within the city limits or Urban Growth Boundary that will handle the traffic. Otherwise for the safety and general wellbeing of families, the city should deny the current development plans.

Thank you,

Scott Coleman

From: Sharon Neish
To: Kelly Reid; Ken Neish
Subject: Street entrances/exits for safety
Date: Tuesday, May 24, 2022 10:13:54 AM

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Kelly,
Oregon City Concept Plan is proposing 1459 homes over 500 acres of rural land. I don't know how closely you are following the original plan. There are existing well planned communities that you should take a few ideas from when you meet with Icon or whoever. They all have multiple exits and entrances. One is Murrayhill in Beaverton. It has the same number of homes as park place concept and has withstood architecturally the test of time and remains a desirable place to live. You can see on the map more than one exit entrance into 1,456 home sites over 379 acres. It has trails parks, swimming pools, community center and a town center. On a larger scale a subdivision that where I own a home is Sunriver near Bend. This is an example of 4500 homes of all varying sizes and price ranges. Admittedly, there have been traffic issues in the summer with the two entrances and exits because they do not have many full time residents. Sunriver just built another traffic circle near the village which my neighbor says is a big help with the flow of traffic. Another one to look at is probably Forest Heights. It has 1126 homes on 602 acres. However, the traffic backs up at the main entrance/exit light. The city of Portland required a shuttle service to which they continue to maintain to downtown Portland and the other part is in Washington county. Also, please address why Oregon City planners are not planning on building a more striking architecturally designed subdivision than what is being proposed at your next meeting that blends in with the topography rather than sticking out like a sore thumb. The one gentlemen with the glasses at the meeting yesterday had some very good ideas. You can't blame that on HB 2001 or making middle housing affordable plan that would cause a haphazardly thrown bunch of houses together without taking in a good eye for design even on low price point homes. Please include this in your record and make sure it is addressed.
Thanks,
Sharon Neish
16580 S Edenwild Ln
Oregon City OR

REPLINGER & ASSOCIATES LLC
TRANSPORTATION ENGINEERING

April 15, 2022

Ms. Kelly Reid
City of Oregon City
PO Box 3040
Oregon City, OR 97045

SUBJECT: REVIEW OF TRAFFIC IMPACT STUDY – PARK PLACE MASTER PLAN – GLUA21-45

Dear Ms. Reid:

In response to your request, I have reviewed the materials submitted in support of the proposed general development plan (GDP) for the Park Place development. The relevant materials consisted of the Traffic Impact Study (TIS) dated January 13, 2022. The TIS was prepared under the direction of Daniel Stumpf, PE of Lancaster Mobley.

The proposal consists of a plan to develop 477 single-family dwellings on parcels currently occupied by six single-family dwellings. The GDP provides for the dwellings to be constructed in six phases with implementation to be completed by 2030.

Additional materials relevant to this land use action were transportation analyses conducted in support of the annexation and rezoning (AN17-04 and ZC17-05) that relate to the same parcels. These analyses were a TIS, dated August 2, 2017; the TIS Addendum #1, dated March 27, 2018; and TIS Addendum #2, dated April 9, 2017. The TIS was prepared under the direction of Michael T. Ard, PE of Lancaster Engineering. The TIS Addendum #1 and TIS Addendum #2 were prepared under the direction of Todd Mobley, PE of Lancaster Engineering.

There are important differences between the original analyses conducted in 2017-8 and the current analysis. Key differences are explained below.

The original TIA and addenda provided a comprehensive analysis of the regional impacts associated with the annexation and rezoning and considered full development of the site with a combination of residential and commercial uses. The transportation analysis included analysis of traffic operations on a large scale. It addressed, for example, the operations at major intersections such as Highway 213 and Redland Road. The analysis also illustrated how the transportation system would function with completion of Holly Lane from Holcomb Boulevard to Redland Road. This project is

specifically included in the Transportation System Plan (TSP). It is important to recognize that only a portion of Holly Lane is included in the project area associated with AN17-04 and ZC17-05 and with the current land use action (GLUA21-45). The analysis year for the annexation and rezoning was 2035, the horizon year of the TSP.

In contrast, the current land use proposal considers the impact of building only the residential portion of the original development proposal. Furthermore, the 2022 TIS focuses on the impact of traffic on key intersections on Holcomb Boulevard that were not analyzed in the 2017-8 analysis. This was not an oversight with the original analysis, but a deliberate decision to provide additional information when key features of the residential subdivision was known with more specificity. It is also important to recognize that only a portion of Holly Lane will be constructed in connection with the proposed land use action. The connection of the residential portion of the property to Redland Road is not a feature of the transportation system analyzed in the current TIS. The 2022 TIS assumes all traffic from the residential development proposed access the major street network by connecting to Holcomb Boulevard.

In summary, the 2017-8 analysis was for residential and commercial development; it assessed the regional transportation impact for 2035; and it assumed the TSP's Holly Lane connection to both Holcomb Boulevard and Redland Road would be constructed. The current analysis is for residential development only; focusses on localized impacts for key intersections on Holcomb Boulevard that provide direct or indirect access to the site; and the analysis is for years 2023 through 2030 (corresponding with individual phases of the residential development). It does not provide for the TSP's planned connection of Holly Lane to Redland Road.

1. ***Study Area.*** The study addresses the appropriate intersections. The engineer evaluated traffic patterns and traffic volumes and evaluated five locations. The key intersections were:

    1. Holcomb Boulevard and Winston Drive
    2. Holcomb Boulevard and Barlow Drive(existing)/Holly Lane (future)
    3. Holcomb Boulevard and Street A
    4. Oregon Highway 213 and Redland Road
    5. Redland Road and Abernethy Road/S Holcomb Boulevard

    These intersections were identified for the study in consultation with city staff and supplement the more extensive intersection analysis performed in 2017-8 for the annexation and rezoning. The focus on the Holcomb Boulevard intersections

addresses Planning Commission issues about impact on adjacent neighborhoods raised in the prior land use action. The study area is appropriate.

2. ***Traffic Counts.*** The engineer used a variety of sources to develop base year traffic counts for the analysis. The TIS included extensive discussions about the traffic volumes that included adjustments to account for the COVID-19 pandemic. The engineer used traffic counts conducted in 2017 on Holcomb Boulevard near the site; 2019 counts from Highway 213; and new counts from April 2021. The engineer also used mid-week traffic volumes on Highway 213 for each July from 2017 through 2021 to assess the impact of the pandemic on traffic volumes. The engineer used appropriate methods and documented his conclusions. The adjustments appear adequate to account for base year 2021 conditions at the intersections in #1, above. Traffic volume information was prepared for both the AM and PM peak periods. The base year traffic volumes appear reasonable.

3. ***Trip Generation.*** The TIS presents information on trip generation for the entire 477 lot development and included trip generation estimates for each of the six phases. The TIS uses trip generation information from the Institute of Transportation Engineers' *Trip Generation Manual.* Most units are single-family detached dwellings; some are proposed to be single-family attached dwelling.

   The TIS presents the trip generation for each phase for the AM peak hour, the PM peak hour and for weekdays. The TIS provides trip generation for each phase individually and cumulatively with the prior phases. Furthermore, both entering and exiting traffic volumes during both AM and PM peak hours is provided. The table below provides the basic information on trip generation summarized from the TIS.

Phase	Units	AM Trips	PM Trips	Weekday
1	59	46	61	622
2	259	149	194	2128
3	55	35	49	480
4	53	33	47	454
5	34	20	29	288
6	11	7	10	92
Total	477	290	390	4064

   It is also important to recognize that the trip generation for the residential development proposed under this GDP is less than the total trip generation presented in the TIS for the annexation and rezoning approved in the prior land use

action. The trip cap established with the annexation and rezoning was 538 AM peak hour trips; 679 PM peak hour trips; and 7,406 total weekday trips. The number of trips generated by the proposed residential development is comfortably below the adopted trip cap and leaves substantial trips available for commercial development on the remaining portions of the property subject to the annexation and rezoning.

4. ***Trip Distribution.*** The engineer's trip distribution shows traffic using a variety of routes and distribution to major regional facilities as follows:

- Approximately 25 percent of site trips will travel to/from the northeast along I-205;
- Approximately 18 percent of site trips will travel to/from the east on Holcomb Boulevard;
- Approximately 15 percent of site trips will travel to/from the southwest along I-205;
- Approximately 13 percent of site trips will travel to/from the southwest along Washington Street;
- Approximately 8 percent of site trips will travel to/from the north along OR-99E;
- Approximately 4 percent of site trips will travel to/from the south along OR-213;
- Approximately 3 percent of site trips will travel to/from the southwest along Main Street;
- Approximately 3 percent of site trips will travel to/from the southwest along S Anchor Way;
- Approximately 3 percent of site trips will travel to/from the west along Beavercreek Road;
- Approximately 1 percent of site trips will travel to/from the southwest along OR-99E;
- Approximately 1 percent of site trips will travel to/from the south along Holly Lane;
- Approximately 1 percent of site trips will travel to/from the east along Beavercreek Road; and
- Approximately 5 percent of site trips will travel to/from locales within the immediate vicinity, including surrounding residential areas and Holcomb Elementary School.

As explained in the introduction, this GDP assumes there will not be a connection of Holly Lane to Redland Road (a project identified in the TSP) for traffic from this residential development. For the purposes of this residential development all traffic connects with Holcomb Boulevard utilizing either new or existing streets.

The TIS presents the following information about how the site trips are expected to be distributed between the Street A connection and S Winston Drive:

- Phase 1: All site trips will utilize Street A.
- Phase 2: All site trips will utilize Street A.
- Phase 3: All site trips will utilize S Winston Drive. Additionally, approximately 75 percent of site trips generated by Phase 2 will reroute from Street A to S Winston Drive.
- Phase 4: All site trips will utilize S Winston Drive.
- Phase 5: All site trips will utilize S Winston Drive.
- Phase 6: All site trips will utilize Street A.

Provided the S Holly Lane connection to S Holcomb Boulevard is constructed following full buildout of the Master Plan and development of tax lots 800 and 1600, the interim Street A connection will be closed, and a majority of trips projected to utilize S Winston Drive are expected to reroute to S Holly Lane. Trips are expected to be redistributed as follows:

- Phase 1: All site trips will utilize S Holly Lane.
- Phase 2: All site trips will utilize S Holly Lane.
- Phase 3: Approximately 50 percent of site trips will utilize S Holly Lane and the other 50 percent will utilize S Winston Drive.
- Phase 4: Approximately 50 percent of site trips will utilize S Holly Lane and the other 50 percent will utilize S Winston Drive.
- Phase 5: Approximately 50 percent of site trips will utilize S Holly Lane and the other 50 percent will utilize S Winston Drive.
- Phase 6: All site trips will utilize S Holly Lane.

Note that in either scenario, with or without the S Holly Lane connection to S Holcomb Boulevard, access to S Livesay Road will be restricted to emergency vehicle access only whereby nominal trip impacts will occur along S Livesay Road until such a time that this connection is fully developed.

The trip distribution of traffic to the regional street network and for the access to Holcomb Boulevard seem reasonable.

5. ***Traffic Growth.*** The engineer calculated growth at the study area intersections for each year applicable to the six development phases. For intersections on Holcomb Boulevard near the site, the engineer applied a two percent annual growth rate. For the intersection of OR-213/Redland Road, the engineer applied a 0.31 percent growth rate that had been developed and approved for other studies, including the North End Development. For the intersection of Redland/Abernethy/Holcomb, the engineer applied a 1.15 percent annual growth rate, which is also that used in previous studies. In addition, the engineer also accounted for growth from approved, in-process developments, namely, the North End Development and Serres Farm Subdivision.

   The background traffic growth from regional development and traffic from approved, in-process developments was developed using appropriate methods and assumptions and is reasonable.

6. ***Analysis.*** The TIS includes an analysis of each of the five study area intersections identified in #1 above for each phase of the development. In addition, the engineer provided the background traffic for the applicable years. The following scenarios were analyzed in the TIS:

   - Year 2021 existing conditions
   - Year 2023 background conditions
   - Year 2023 buildout conditions (Phase 1)
   - Year 2026 background conditions (Phase 1)
   - Year 2026 buildout conditions (Phase 1 & 2)
   - Year 2027 background conditions (Phase 1 & 2)
   - Year 2027 buildout conditions (Phases 1 through 3)
   - Year 2029 background conditions (Phases 1 through 3)
   - Year 2029 buildout conditions (Phases 1 through 4)
   - Year 2030 background conditions (Phases 1 through 4)
   - Year 2030 buildout conditions (Phases 1 through 5)
   - Year 2030 buildout conditions (Phases 1 through 6)

   The TIS provides detailed tables indicating the calculated level-of-service (LOS), delay, and volume-to-capacity ratio (v/c) for each of the intersections for both the

AM and PM peak hours for the study area intersections for each of the scenarios listed above.

The intersections of Holcomb Boulevard with Winston Drive, Barlow Drive and Street A (the new intersection serving the development) are calculated to have similar operational performance. All three intersections operate very well with minimal delay under existing or near-term conditions. The operational performance of the intersections is predicted to degrade with background traffic growth and with the addition of traffic from the development. All three intersections are calculated to meet operational performance standards under all development scenarios, including 2030 conditions with regional traffic growth and with full buildout of the residential development proposed in this land use action.

The poorest performance predicted at the intersection of Holcomb Boulevard with Winston Drive is in 2030 when the final phase is planned to be completed. During the AM peak hour, the predicted performance is LOS C with a v/c of 0.50. During the PM peak hour, the predicted performance is LOS D with a v/c of 0.48. This meets the city's adopted performance standards. The TIS also indicates that this intersection's performance will improve if the connection of Holly Lane to Holcomb Boulevard is completed.

The existing intersection of Holcomb Boulevard with Barlow Drive is a T-intersection. Ultimately, the TSP's planned extension of Holly Lane would become the fourth (south) leg of the intersection. Until such time as Holly Lane connects, the predicted performance of the intersection is very good. Without the Holly Lane connection, the poorest performance predicted at the intersection of Holcomb Boulevard with Barlow Drive is LOS B with a v/c of 0.06 (AM peak hour) or 0.07 (PM peak hour). With the connection of Holly Lane to this intersection, the predicted 2030 performance in the AM peak hour is LOS C with a v/c of 0.50; in the PM peak hour it is LOS D with a v/c of 0.49. For the intersection of Holcomb Boulevard and Barlow Drive, all scenarios are predicted to meet the city's adopted performance standards.

The intersection of Holcomb Boulevard and Street A is a new intersection to serve the development. As discussed in #4, above, Street A will provide the only site access for Phases 1 and 2. With the new street connections introduced with Phase 3, traffic patterns will be somewhat altered and traffic volumes on Street A will be lower and the intersection performance of Holcomb Boulevard and Street A will improve. The poorest performance predicted at the intersection of Holcomb

Boulevard with Street A will be in 2026 before local street connections to other streets including Winston Drive are established. During the AM peak hour in 2026, the predicted performance is LOS B with a v/c of 0.30. During the PM peak hour, the predicted performance is LOS B with a v/c of 0.23. This easily meets the city's adopted performance standards.

The TIS also provides an analysis of the intersection of Redland Road/Abernethy Road/Holcomb Boulevard for the AM and PM peak hours for all the development scenarios. As with most transportation analyses, the performance is predicted to degrade with the addition of background traffic growth, in-process developments, and with site traffic. The poorest performance predicted at the intersection of Redland Road/Abernethy Road/Holcomb Boulevard is in 2030. During the AM peak hour, the predicted performance is LOS C with a v/c of 0.747. During the PM peak hour, the predicted performance is LOS E with a v/c of 0.969. This meets the city's adopted performance standards for this intersection with the Regional Center.

The intersection of OR-213 and Redland Road falls within the Regional Center. For this intersection, there is a performance standard for two hours in each peak period. For the highest hour the maximum permissible v/c is 1.10 and in the second highest hour of the peak period, the standard is a v/c of 0.99. According to the TIS, the intersection is calculated to meet applicable standards during the AM peak hour with a maximum v/c of 0.991. This is predicted to occur in 2030 with background traffic growth, in-process development, plus site traffic. During the PM peak hour, the intersection's performance is calculated to degrade from a v/c of 0.974 under existing conditions to 1.082 in 2030. This meets applicable performance standards. During second highest hour of the PM peak, the calculated v/c is predicted to degrade from 0.982 under existing conditions to 1.032 in 2030 with the development.

The engineer concludes in the TIS: "Based on the results of the operational analysis, the intersection of Redland Road at OR-213 is projected to operate in excess of acceptable per jurisdictional standards during the 2nd evening peak hour under 2026 buildout conditions (Phase 1) and for all succeeding analysis scenarios through year 2030."

In addition to the anticipated failure to achieve mobility standards at OR-213 and Redland Road, both that intersection and the intersection of Redland Road/Abernethy Road/Holcomb Boulevard are predicted to suffer from queues that exceed the available storage length.

For the OR-213 and Redland Road intersection, queue storage is predicted to be an issue for northbound left turns and eastbound left turns. For the intersection of Redland Road/Abernethy Road/Holcomb Boulevard, queue storage is predicted to be an issue for westbound right turns, northbound left turns, eastbound left turns and southbound left turns.

As potential mitigation, the TIS evaluated the changes at both key intersections. For Redland Road at OR-213, the TIS evaluated an additional eastbound left-turn lane for a total of three left-turn lanes. This also includes restriping the north intersection leg to include three receiving lanes. For the intersection of Redland Road/Abernethy Road/Holcomb Boulevard, the mitigation concept consisted of revising the west intersection leg to include one receiving westbound travel lane, one eastbound left-turn lane, one eastbound through lane, and one eastbound right-turn lane.

According to the analysis in the TIS, these potential mitigation measures improve the performance of both intersections such that the v/c standard is achieved. Some issues related to queue storage capacity are still predicted.

The TIS includes the following disclaimer and conclusion: "Note that these analyzed mitigation scenarios are only conducted for demonstrative purposes whereby alternative mitigation may be considered or found preferential to those detailed above. Once appropriate mitigation have been determined for both intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan."

7. ***Crash Information.*** The TIS provides crash information for the five-year period from 2015 through 2019. No crashes were reported at the intersections of Holcomb Road with Winston Drive and with Barlow Drive.

   Crash history for a broader area was conducted in connection with the property's annexation and rezoning. No safety mitigation measures were recommended at that time.

8. ***Sight Distance.*** Sight distance was measured by the engineer at the interim Street A intersection along Holcomb Boulevard as well as the future Holly Lane connection along Holcomb Boulevard (opposite of S Barlow Drive). Based on the posted speed of 35 mph along Holcomb Boulevard, the minimum recommended intersection sight distance is 390 feet at each intersection. With the removal of obstructing

vegetation near the access locations (along the south side of Holcomb Boulevard), sight distances at the Barlow Drive intersection were measured to be in excess of 500 feet to the east and west, while at the Street A intersection sight distances were measured to be in excess of 500 feet to the west and approximately 294 feet to the east, limited by a crest vertical curve along Holcomb Boulevard. Although the sight distance to the east is less than recommended intersection sight distance, it exceeds stopping sight distances for the 35-mph posted speed. The engineer concludes "there is sufficient stopping sight distance to accommodate westbound approaching vehicles." I concur.

9. ***Turn Lanes.*** The engineer evaluated the need for left-turn lanes on Holcomb Boulevard at all study area intersections. He concluded that left-turn lanes were not warranted based on 2030 traffic volumes. While his analysis follows common practice, I disagree with his conclusion. The 2030 traffic volumes, which are associated with the buildout year of the subdivision, are fairly close to meeting warrants for a left-turn lane at Holcomb Road/Barlow Drive/future Holly Lane. I think it is appropriate to plan for the intersection of Holcomb Road/Barlow Drive/future Holly Lane to have left-turn lanes on the east, west, and south approaches given that Holcomb Boulevard is designated minor arterial street and Holly Lane is a collector street in the TSP.

10. ***Traffic Signal Warrants.*** The engineer analyzed the unsignalized intersections along Holcomb Boulevard to assess whether they met preliminary traffic signal warrants. Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at the study intersections under any of the analysis scenarios.

11. ***Holly Lane Intersection Location Selection.*** The TIS also contains a brief discussion on the process used to select the location for the northern terminus of Holly Lane. Following the annexation and rezoning action approved in 2018, the city and the applicant entered into discussions about the appropriate connection of Holly Lane with Holcomb Boulevard. A safety and operation review for Holly Lane connection along Holcomb Boulevard was undertaken to assess two potential locations for the connection were considered: opposite of S Barlow Drive and opposite of S Jada Way. This analysis is detailed in a technical memorandum from Lancaster Mobley, dated July 24, 2020. Based on the analysis findings and correspondence with Oregon City staff, the location of S Holly Lane opposite of Barlow Drive was determined as the preferred location by City staff. That concept has been carried forward in the current application.

12. ***Intersection Spacing.*** As described in the introduction and previous sections, a new access, known as Street A, is proposed to intersect with Holcomb Boulevard to serve the subdivision. Ultimately, a second access, an extension of Holly Lane will intersect Holcomb Boulevard opposite Barlow Drive. The Street A access will be spaced approximately 220 feet from Jada Way to the east and 400 feet from Barlow Drive to the west. The future planned Holly Lane connection to Holcomb Boulevard, opposite of Barlow Drive, will be spaced approximately 620 feet from Jada Way to the east and 500 feet from Winston Drive to the west. The proposed intersection spacing appears appropriate.

13. ***Holly Lane Cross-section.*** The TIS also provides a discussion of the planned cross-section of Holly Lane. As specified in Oregon City Municipal Code Table 16.12.016 a collector right-of-way width is 85 feet, however within the project site where S Holly Lane crosses between tax lots 2-2E-28D-00190 and 2-2E-27BC-01000 there is not adequate room to accommodate this. The engineer concludes that due to this restriction, a reduced section is necessary to allow room for roadway construction and grading (retaining walls, daylight slopes etc.).

14. ***Proportional Share for System Impacts.*** Consistent with the conditions associated with the annexation and rezoning action, the engineer provided calculations of the traffic generated by the development that would impact key transportation facilities for which a proportional share is being collected.

    Proportional share calculations for projects use the following inputs: the project cost as listed in the most recent Transportation System Development Charge project list; the predicted 2035 intersection traffic volumes from the TSP or a TIA showing 2035 traffic volumes; and the calculated intersection volumes using the subject intersections from the proposed development. The per trip cost is derived by dividing the project cost by the total 2035 PM peak hour intersection volumes.

    The following table lists the estimated proportional share attributable to the Phase 1 of the Park Place Crossing development based on the TIS.

    The proportional share calculation estimates are based on the latest available information. The cost may be adjusted based on a change in the scope of the project or other information.

Project	Project Cost ($000)	Total PM Peak Entering Volume (2035)	$/trip	Phase 1 Trips	Phase 1 Share $
Redland/Holly D36	1,040	688	545	1	545
Holcomb/Holly D43	1,040	1899	1512	61	92,232
I-205 SB Ramps/ OR 99E D75	2,990	5690	525	5	2,625
I-205 NB Ramps/ OR 99E D76	1,970	6155	320	5	1,600
Hwy213/Redland D97	10,105	6540	1545	22	33,990
Redland/ Holcomb/ Abernethy	na	2273	na	35	na
Hwy213/Beavercreek D94	2,800	6935	404	5	2,020
Holcomb Blvd Sidewalk Infill W11, W12, W13	3,035	1135*	2674	50	133,700
Holcomb Blvd Bike Lanes B12	560	1135*	493	50	24,650
Holcomb Blvd Pedestrian Crossings C3, C4, C5, C6	140	1135*	123	50	6,150
'* Two-way PM peak volume on Holcomb Boulevard east of Redland Road/Holcomb Blvd/Abernethy Road intersection					

15. Conclusions and Recommendations. The engineer's conclusions as stated in the TIS are as follows:

No significant trends or crash patterns were identified at any of the study intersections that were indicative of safety concerns.

Provided any obstructing foliage near the access locations and along the south side of S Holcomb Boulevard are removed or properly maintained, adequate sight distances can be made available to ensure safe operation of the temporary Street A intersection, while adequate sight distances can be made available at the S Barlow Drive intersection to allow safe and efficient operation of the future S Holly Lane approach. No other sight distance related mitigation is necessary or recommended.

Left-turn lane warrants are not projected to be met at any of the study intersections under any analysis scenario.

Due to insufficient main and side street traffic volumes, traffic signal warrants are not projected to be met at the access study intersections under any of the analysis scenarios.

All access study intersections are currently operating acceptably per Oregon City standards and are projected to continue operating acceptably through the 2030 site buildout year, regardless of whether the S Holly Lane connection to S Holcomb Boulevard is constructed.

The intersections of Redland Road at OR-213 and Redland Road at Holcomb Boulevard/Abernethy Road are projected to operate acceptably per jurisdictional standards for all analysis scenarios during the peak hour (1st hour) through year 2030.

The following mitigation measures were reviewed for demonstrative purposes only to show the study intersections can operate acceptably per City and ODOT standards. Applicable agencies may consider alternative mitigation as preferential to those described below. If any mitigation is required for either or both of the intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan.

For the intersection of Redland Road at OR-213, the intersection is projected to operate in excess of acceptable per jurisdictional standards during the 2nd evening peak hour under 2026 buildout conditions (Phase 1) and for all succeeding analysis scenarios through year 2030. Additionally, extended queuing beyond available lane storage is expected to occur at some of the turn lanes of the two Redland Road study intersections. Although no specific mitigation is planned at either intersection, the following may potentially be implemented to address these capacity and potential queuing issues:

Redland Road at OR-213

- Add an additional eastbound left-turn lane for a total of three left-turn lanes.
- Restripe the north intersection leg to include three receiving lanes.
- Extend the northbound left-turn storage lane to accommodate 95th percentile queues.

Redland Road at Holcomb Boulevard/Abernethy Road

- Revise the west intersection leg to include one receiving travel lane, one left-turn lane, one through lane, and one right-turn lane.
- Extend the eastbound left-turn storage into the center two-way left-turn turn to accommodate
95th percentile queues.

Note the aforementioned mitigation were reviewed for demonstrative purposes to show the study intersections could operate acceptably per City and ODOT standards. Applicable agencies may consider alternative mitigation as preferential to those detailed above. Once appropriate mitigation have been determined for both intersections, a methodology for determining proportionate share fee contributions towards mitigation should be issued to the applicant of the Park Place Crossing Master Plan.

Conditions of Approval from the annexation detailed proportional share contributions are to be collected for several transportation facilities requiring mitigation which could be impacted by the Park Place Crossing Master Plan. Oregon City staff have indicated that proportional share contributions were subsequently modified in the Pre-Application notes. In addition, the current trip generation are lower than those anticipated at the time of the annexation, which may further decrease the proportional share amounts associated with the Park Place Crossing Master Plan. As part of each future Detailed Development Plan, proportional share fees will be contributed to the following facilities:

a. 14th Street and 15th Street, between OR-99E and John Adams Street (TSP Project D7 and D8)
b. S Redland Road at S Holly Lane (TSP Project D36)
c. S Holcomb Boulevard at S Holly Lane (TSP Project D43)
d. I-205 SB Ramps at OR-99E (TSP Project D75)
e. I-205 NB Ramps at OR-99E (TSP Project D76)
f. OR-213, near the S Redland Road Undercrossing (TSP Project D79)
g. S Holcomb Boulevard at S Redland Road
h. OR-213 at Beavercreek Road

The analysis in this Master Plan study does not consider the S Holly Lane connection to S Redland Road as was previously assumed for the Park Place Annexation project. Therefore, some of the proportionate share fees, and particularly additional mitigation at the two Redland Road study intersections, may be reduced or possibly become unnecessary. To address this uncertainty, it is recommended that a trip accounting letter, and if necessary, an updated traffic analysis, be prepared as each phase of the project is constructed. This will enable accurate tracking of projected impacts to the two Redland Road intersections and other transportation projects.

Recommendations

I conclude that the applicant's analysis is sufficient for the purposes of defining the impacts associated with the GDP proposed for the subject property.

The TIS addresses many key issues that were subject of the conditions of approval associated with the annexation and rezoning of this property. Among other things, the TIS clearly illustrates that the trip generation for the residential development described in this development proposal is below the limits of the trip cap established in the prior land use action. The TIS also addresses issues associated with access to Holcomb Boulevard, including the proposal for Street A and the eventual connection of Holly Lane to Holcomb Boulevard opposite Barlow Drive.

The TIS demonstrates that the intersection of Holcomb Boulevard with Barlow Drive and the intersection of Holcomb Boulevard with Winston Drive, through which traffic

in some phases will gain access to Holcomb Boulevard, will operate acceptably (i.e. they will meet the city's adopted performance standards) through 2030 with full development of the planned residences. The analysis performed for this TIS assumed the Holly Lane would not be extended to Redland Road, but that all traffic generated by the residential development would go north to Holcomb Boulevard.

The TIS also demonstrates that the intersection of Holcomb Boulevard with Street A will meet the city's operational standards and accommodate traffic from Phases 1 and 2, even if the northern section of Holly Lane to Holcomb Boulevard is not connected.

The TIS provides sufficient information and documentation to satisfy the requirements of OCMC 17.65.050 C 3 with respect to adequacy of the transportation system for Phase 1 of the proposed development. For Phase 1, all intersections operate acceptably. However, the TIS indicates that the intersection of OR-213 and Redland Road fails to meet the applicable v/c standard for the second hour of the PM peak hour. In addition, queues that exceed available storage distance are predicted at the intersection of OR-213 and Redland Road and at the intersection of Redland Road/Abernethy Road/Holcomb Boulevard.

A detailed development plan for Phase 1 will not need additional transportation analysis beyond that provided in this TIS.

Detailed development plans for any phase beyond Phase 1 will require additional analysis and implementation of mitigation measures that demonstrate that the transportation system is "capable of serving the proposed development, or will be made capable by the time each phase of the development is completed" in accordance with OCMC 17.65.050 C 3. Specifically, the applicant will need to implement improvements at the intersection of OR-213 and Redland Road and at the intersection of Redland Road/Abernethy Road/Holcomb Boulevard such that v/c standards are met and adequate queue storage is provided. The burden is on the applicant to coordinate with and meet the requirements of the agencies with jurisdiction over the subject intersections and roadways (i.e. the Oregon Department of Transportation, Clackamas County and the City of Oregon City).

The applicant should also comply with the conditions of approval for the prior annexation and rezoning (AN17-05 and ZC17-05).

The prior approval included conditions for the developer to participate in funding of key intersections in proportion to their impact. The proportionate share is based on the

development's portion of the total entering volume of each intersection and the project cost specified in the TSP or the city's systems development charge project list. I recommend that the conditions of approval include paying a proportional share for intersections impacted by his development as follows:

Project	Project Cost ($000)	Total PM Peak Entering Volume (2035)	$/trip	Phase 1 Trips	Phase 1 Share $
Redland/Holly D36	1,040	688	545	1	545
Holcomb/Holly D43	1,040	1899	1512	61	92,232
I-205 SB Ramps/ OR 99E D75	2,990	5690	525	5	2,625
I-205 NB Ramps/ OR 99E D76	1,970	6155	320	5	1,600
Hwy213/Redland D97	10,105	6540	1545	22	33,990
Redland/ Holcomb/ Abernethy	na	2273	na	35	na
Hwy213/Beavercreek D94	2,800	6935	404	5	2,020
Holcomb Blvd Sidewalk Infill W11, W12, W13	3,035	1135*	2674	50	133,700
Holcomb Blvd Bike Lanes B12	560	1135*	493	50	24,650
Holcomb Blvd Pedestrian Crossings C3, C4, C5, C6	140	1135*	123	50	6,150
'* Two-way PM peak volume on Holcomb Boulevard east of Redland Road/Holcomb Blvd/Abernethy Road intersection					

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\2021\GLUA21-45TIA3

OREGON INVENTORY OF HISTORIC PROPERTIES

HISTORIC RESOURCE SURVEY FORM

County: Clackamas

PAGE 1

Historic Name: Waldron, George W. and Amanda House	Original Use: Single family residence
Common Name: Gabriel Residence	Current Use: Single family residence
Street Address: 14508 South Livesay Road	Condition (Circle One): (Good) Fair Poor Moved
City: Oregon City	Date of Construction: c1900
Owner: Gabriel, Peter L. and Dolores A. Circle One: (P) L S F M	Theme: 20th Century Architecture
Circle One: (Building) Structure District Site Object	Style: Vernacular
Location, Circle One: (Rural) Town Urban	Architect: Unknown
Number of Associated Features: 1 List: Garage	Builder: Unknown
Map #: 28CD Tax Lot: 01000	Quadrangle: Oregon City Twnshp/Range/Section: T2S R2E S28
Block: NA Lot: NA	UTM or GPS Latitude: Longitude:
Addition Name: NA	Local Ranking:

Plan Type/Shape: Square	Number of Stories: Two
Foundation Material: Concrete and brick	Basement? (Y/N) No
Roof Form & Materials: Cross gable Wood shakes	Porch? (Y/N) Yes
Structural Framing: Wood, balloon frame	
Primary Window Type: 1/1 double hung , replacement window on first level, small hipped dormer	
Exterior Surfacing Materials: Primary: Wide shiplap with corner boards Decorative:	
Decorative Features: Wide frieze board, interior corbelled brick chimney	
Integrity (Circle One): Good Fair (Poor)	
Exterior Alterations/Additions: Replacement window	Date:
Noteworthy Landscape Features: Minimal landscaping with native shrubs, three large cedar trees to the west	
Known Archaeological Features:	
Setting: House faces north on Livesay Road, a fairly busy country road, semi-rural with houses of various ages; dead end road.	
Other:	

Recorded By: Marianne Kadas	Date: July 1997
Local Inventory Number: 1076	SHPO Inventory Number:

OREGON INVENTORY OF HISTORIC PROPERTIES
HISTORIC RESOURCE SURVEY FORM
PAGE 2

County: Clackamas

Statement of Significance: (Use additional sheets if necessary)

House is located on part of the George Abernethy Donation Land Claim. Livesay Road is named for members of the Livesay who owned property in the vicinity as early as the 1870s.

No information regarding the early history of the house is available at this time.

Historic Name: Waldron, Geroge W. and Amanda House	Map #: 28CD Tax Lot #: 01000
Address: 14508 South Livesay Road	Quadrangle: Oregon City Twnshp/Range/Section: T2S R2E S28
UTM or Latitude: GPS Longitude:	SHPO Inventory Number:

OREGON INVENTORY OF HISTORIC PROPERTIES
HISTORIC RESOURCE SURVEY FORM
PAGE 3

County: Clackamas

Roll & Negative Number: Roll C, # 13	Photographer: Marianne Kadas
Roll & Slide Number: Roll 1, #13	Date: June 1997



Historic Name: Waldron, George and Amanda House	Map #: 29CD Tax Lot #:01000
Address: 14508 South Livesay Road	Quadrangle: Oregon City Twnshp/Range/Section: T2S R2E S28
UTM or Latitude: GPS Longitude:	SHPO Inventory Number:

Cultural Resource Survey Form:

CLACKAMAS COUNTY

I.D. NUMBER _____

PHOTO INFORMATION:
ROLL: LXXXVII
FRAME: 13

STUDY AREA: OC/B
LEGAL: T. 2S R. 2E SEC. 28D
TAX (LOTS): 1000
ZONE _____ SIZE _____

IDENTIFICATION:

COMMON/HISTORICAL NAME: KRAEFT RESIDENCE
ADDRESS: 14508 S. Livesay Road
AREA: Clackamas Heights
CURRENT OWNER: PETER L. GABRIEL
USE: Residence
OWNER'S ADDRESS: Same Oregon City 97045
ORIGINAL OWNER: KRAEFT
USE: Residence
AREA OF SIGNIFICANCE: TOWN: _____ COUNTY: X CITY: _____ NATION: _____

HISTORIC INTEREST:

THEME: Architecture - 20th Century
DATE: 1903
DESCRIPTION:

ARCHITECTURAL INTEREST:

STYLE: Vernacular
STORIES: 2½
DATE: 1903 CONDITION: Good ARCHITECT:
SIDING: Wide shiplap with rake and cornerboards.
ROOF: Cross gable.
DOORS: Vertical panels.
WINDOWS: 1/1 double-hung sash. Front window replaced in 1940's.

MAIN ENTRANCE: Altered. Gable roof extends over front porch with no support.

NOTES:



BIBLIOGRAPHY:

DATE: Sept 4
RECORDER: Al en

1076

Oregon Historic Site Record

LOCATION AND PROPERTY NAME

address:	15138 S Holcomb Blvd Oregon City, Clackamas County	**historic name:**	
		current/other names:	
assoc addresses:		**block/lot/tax lot:**	
location descr:		**twnshp/rng/sect/qtr sect:**	

PROPERTY CHARACTERISTICS

resource type:	Building	**height (stories):**	1.0	**total elig resources:**	**total inelig resources:**
elig evaluation:	eligible/contributing			**NR Status:**	
prim constr date:	1940	**second date:**		**date indiv listed:**	

primary orig use:		**orig use comments:**	
second orig use:			
primary style:	Ranch (Type)	**prim style comments:**	
secondary style:		**sec style comments:**	
primary siding:	Wood Sheet	**siding comments:**	
secondary siding:			
plan type:		**architect:**	
		builder:	

comments/notes:

GROUPINGS / ASSOCIATIONS

Survey/Grouping Included In:	Type of Grouping	Date Listed	Date Compiled
Oregon City RLS 2011	Survey & Inventory Project		2011

SHPO INFORMATION FOR THIS PROPERTY

NR date listed:	N/A	**106 Project(s):**	None
ILS survey date:		**Special Assess Project(s):**	None
RLS survey date:	03/12/2011	**Federal Tax Project(s):**	None

ARCHITECTURAL / PROPERTY DESCRIPTION

(Includes expanded description of the building/property, setting, significant landscape features, outbuildings and alterations)

Refer to scanned documents links.

HISTORY

(Chronological, descriptive history of the property from its construction through at least the historic period - preferably to the present)

Refer to scanned documents links.

RESEARCH INFORMATION

Title Records	Census Records	Property Tax Records	Local Histories
Sanborn Maps	Biographical Sources	SHPO Files	Interviews
Obituaries	Newspapers	State Archives	Historic Photographs
City Directories	Building Permits	State Library	

Local Library:		**University Library:**	
Historical Society:		**Other Respository:**	

Bibliography:

Oregon Historic Site Record

LOCATION AND PROPERTY NAME

address:	15172 S Holcomb Blvd Oregon City, Clackamas County	**historic name:**	
		current/other names:	
assoc addresses:		**block/lot/tax lot:**	
location descr:		**twnshp/rng/sect/qtr sect:**	

PROPERTY CHARACTERISTICS

resource type:	Building	**height (stories):**	1.0	**total elig resources:**	**total inelig resources:**
elig evaluation:	eligible/contributing			**NR Status:**	
prim constr date:	1935	**second date:**		**date indiv listed:**	

primary orig use:		**orig use comments:**	
second orig use:			
primary style:	Minimal Traditional	**prim style comments:**	
secondary style:		**sec style comments:**	
primary siding:	Synthetic Wood Siding	**siding comments:**	
secondary siding:			
plan type:		**architect:**	
		builder:	

comments/notes:

Siding replacement

GROUPINGS / ASSOCIATIONS

Survey/Grouping Included In:	Type of Grouping	Date Listed	Date Compiled
Oregon City RLS 2011	Survey & Inventory Project		2011

SHPO INFORMATION FOR THIS PROPERTY

NR date listed:	N/A	**106 Project(s):**	None
ILS survey date:		**Special Assess Project(s):**	None
RLS survey date:	03/12/2011	**Federal Tax Project(s):**	None

ARCHITECTURAL / PROPERTY DESCRIPTION

(Includes expanded description of the building/property, setting, significant landscape features, outbuildings and alterations)

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Obituaries	Newspapers	State Archives	Historic Photographs
City Directories	Building Permits	State Library	

Local Library:		**University Library:**	
Historical Society:		**Other Respository:**	

Bibliography:

Wetland Land Use Notice Response

Response Page

Department of State Lands (DSL) WN# *

WN2022-0457

Responsible Jurisdiction

Staff Contact
Kelly Reid

Jurisdiction Type
City

Municipality
Oregon City

Local case file #
GLUA-21-00045

County
Clackamas

Activity Location

Township	Range	Section	QQ section	Tax Lot(s)
02S	02E	28	D	100,190,302,400,500,3700,3701,502,300

Street Address

Address Line 2

City
Oregon City

State / Province / Region

Postal / Zip Code

Country
Clackamas

Latitude
45.366754

Longitude
-122.566261

Wetland/Waterway/Other Water Features

- [x] There are/may be wetlands, waterways or other water features on the property that are subject to the State Removal-Fill Law based upon a review of wetland maps, the county soil survey and other available information.

- [x] The National Wetlands Inventory shows wetland, waterway or other water features on the property

Your Activity

- [x] It appears that the proposed project **will** impact wetlands and **requires** a State Permit.

☑ An onsite inspection by a qualified wetland consultant is recommended prior to site development to determine if the site has wetlands or other waters that may be regulated. The determination or delineation report should be submitted to DSL for review and approval. Approved maps will have a DSL stamp with approval date and expiration date.

Applicable Oregon Removal-Fill Permit Requirement(s)

☑ A state permit is required for 50 cubic yards or more of fill removal or other ground alteration in wetlands, below ordinary high water of waterways, within other waters of the state, or below highest measured tide.

Closing Information

Additional Comments

A wetland delineation has been conducted for a majority of the identified tax lots (WD2021-0311). Based on this delineation, and the submitted site plan, the proposed subdivision impacts onsite wetlands and waters and a permit will be needed for the proposed development.

Please note that this delineation did not cover TLs 502 and 300. Additional wetlands and waters may be present on these tax lots. If work is being proposed on these tax lots, a new delineation is recommended for these areas.

To date, a permit application has not been received for this project.

This is a preliminary jurisdictional determination and is advisory only.

This report is for the State Removal-Fill law only. City or County permits may be required for the proposed activity.

☑ A Federal permit may be required by The Army Corps of Engineers: (503)808-4373

Contact Information

- For information on permitting, use of a state-owned water, wetland determination or delineation report requirements please contact the respective DSL Aquatic Resource, Proprietary or Jurisdiction Coordinator for the site county. The current list is found at: http://www.oregon.gov/dsl/ww/pages/wwstaff.aspx
- The current Removal-Fill permit and/or Wetland Delineation report fee schedule is found at: https://www.oregon.gov/dsl/WW/Documents/Removal-FillFees.pdf

Response Date

5/16/2022

Response by:

Chris Stevenson

Response Phone:

503-986-5246

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

Shemia Fagan
Secretary of State

Tobias Read
State Treasurer

August 26, 2021

Icon Construction & Development, LLC
Attn: Mark Handris
1969 Willamette Falls Drive, Suite 260
West Linn, OR 97068

Re: WD # 2021-0311 **Approved**
Wetland Delineation Report for Park Place Crossing
Clackamas County; T2S R2E S27BC TLs 1000 and 2000;
S28D TLs 100, 190, 302, 400, 500, 3700 and 3701

Dear Mark Handris:

The Department of State Lands has reviewed the wetland delineation report prepared by AKS Engineering & Forestry, LLC for the site referenced above. Based upon the information presented in the report, we concur with the wetland and waterway boundaries as mapped in Figure 6, 6A, 6B and 6C of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study area, 4 wetlands (Wetland A, B, C and D, totaling approximately 0.41 acres) and 5 waterways (Perennial Water 1, Intermittent Water 2, and Ephemeral Drainage 1, 2 and 3) were identified. The wetlands and 2 of the waterways (Perennial Water 1 and Intermittent Water 2) 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 (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). The remaining 3 waterways (Ephemeral Drainage 1, 2 and 3) are exempt per OAR 141-085-0510(49); therefore, they are not subject to these state permit requirements.

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

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.

Thank you for having the site evaluated. If you have any questions, please contact the Jurisdiction Coordinator for Clackamas County, Chris Stevenson, PWS, at (503) 986-5246.

Sincerely,

Peter Ryan, SPWS
Aquatic Resource Specialist

Enclosures

ec: Stacey Reed, PWS, AKS Engineering & Forestry, LLC
Clackamas County Planning Department
Trey Fraley, Corps of Engineers
Michael De Blasi, DSL

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:
ICON Construction & Development, LLC
1969 Willamette Falls Dr, Suite 260, West Linn Or 97068

Business phone # (503) 657-0406
Mobile phone # (optional)
E-mail: Harlan@IconConstruction.net

☐ 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: Mark Handris **Signature:**
Date: 6/10/21 Special instructions regarding site access: ____

Project and Site Information

Project Name: Park Place Crossing

Latitude: 45.36760653 Longitude: -122.56610041
decimal degree - centroid of site or start & end points of linear project

Proposed Use:
Residential Subdivision

Tax Map # 2 2E 27BC
Tax Lot(s) 1000, 2000

Tax Map # 2 2E 28D
Tax Lot(s) 100, 190, 302, 400, 500, 3700, 3701

Project Street Address (or other descriptive location):
South of Holcomb Boulevard

Township 2S Range 2E Section 27, 28 QQ
Use separate sheet for additional tax and location information

City: Oregon City County: Clackamas

Waterway: N/A River Mile: N/A

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Stacey Reed, PWS
AKS Engineering & Forestry, LLC
12965 SW Herman Road, Suite 100
Tualatin, OR 9062

Phone # (503) 563-6151
Mobile phone # (if applicable)
E-mail: staceyr@aks-eng.com

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: Stacey Reed Date: 06/10/2021

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No Study Area size: 68.74 Total Wetland Acreage: 0.4100

Check Applicable Boxes Below

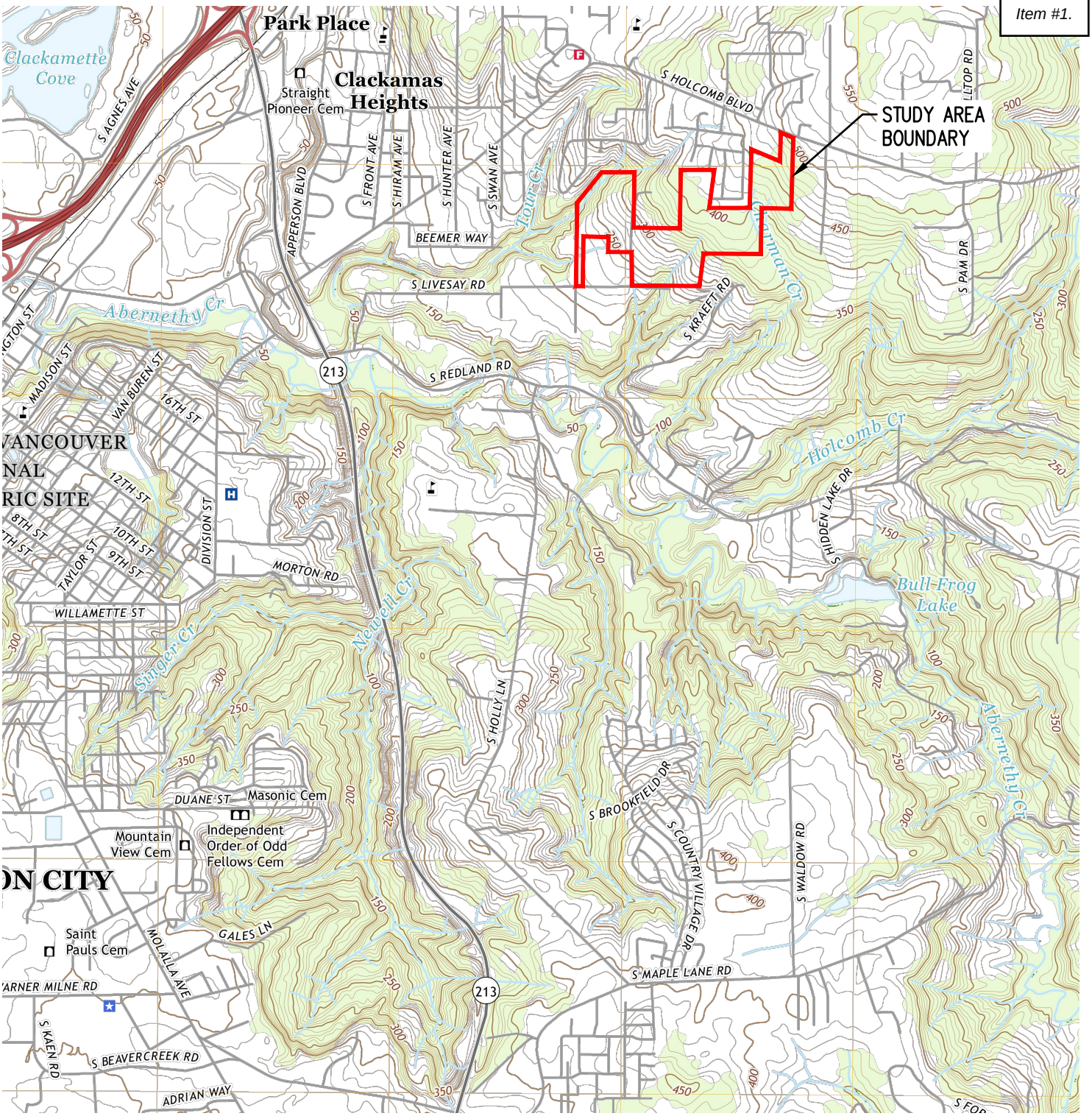
☐ R-F permit application submitted
☐ Mitigation bank site
☐ Industrial Land Certification Program Site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Previous delineation/application on parcel
If known, previous DSL # ____

☐ 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: CS Fee Paid Date: ____/____/____ DSL WD # 2021-0311

Date Delineation Received: 06/11/2021 Scanned: ☐ Electronic: ☒ DSL App.# ____



N

USGS 7.5' TOPOGRAPHIC SERIES
QUADRANGLE: OREGON CITY, OR (2020)

SCALE: 1"= 2000 FEET

2000 0 400 1000 2000

ORIGINAL PAGE SIZE: 8.5" x 11"

DATE: 05/26/2021

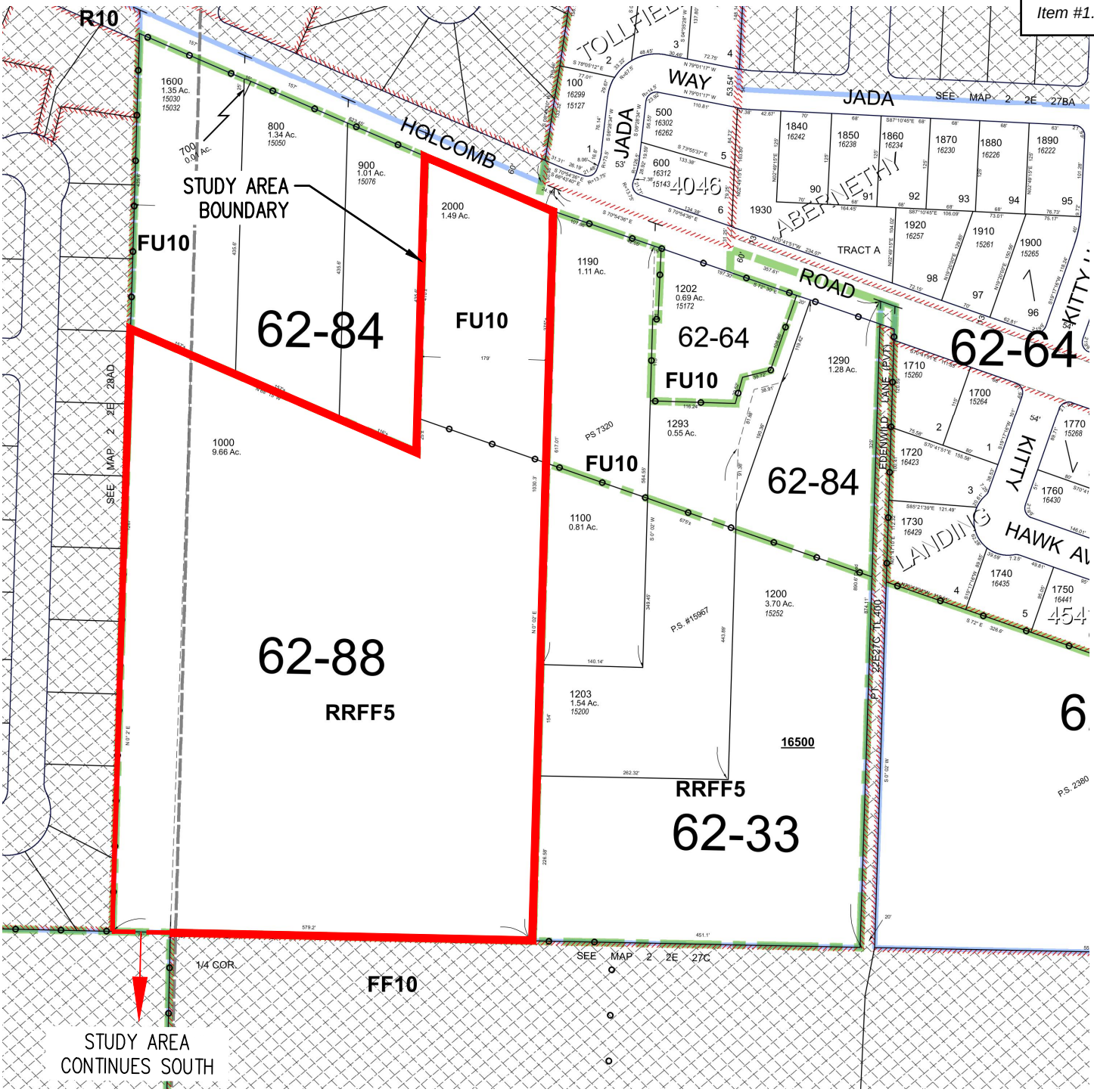
USGS VICINITY MAP
PARK PLACE VILLAGE WETLAND AND WATERS DELINEATION REPORT

FIGURE 1

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: SKT
CHKD: SAR

DWG: 7404 BACKGROUND FIGURES | FIGURE 1



CLACKAMAS COUNTY
TAX LOTS 1000 AND 2000
TAX MAP 2 2E 27BC

N

SCALE: 1"= 200 FEET

200 0 40 100 200

ORIGINAL PAGE SIZE: 8.5" x 11"

DATE: 05/26/2021

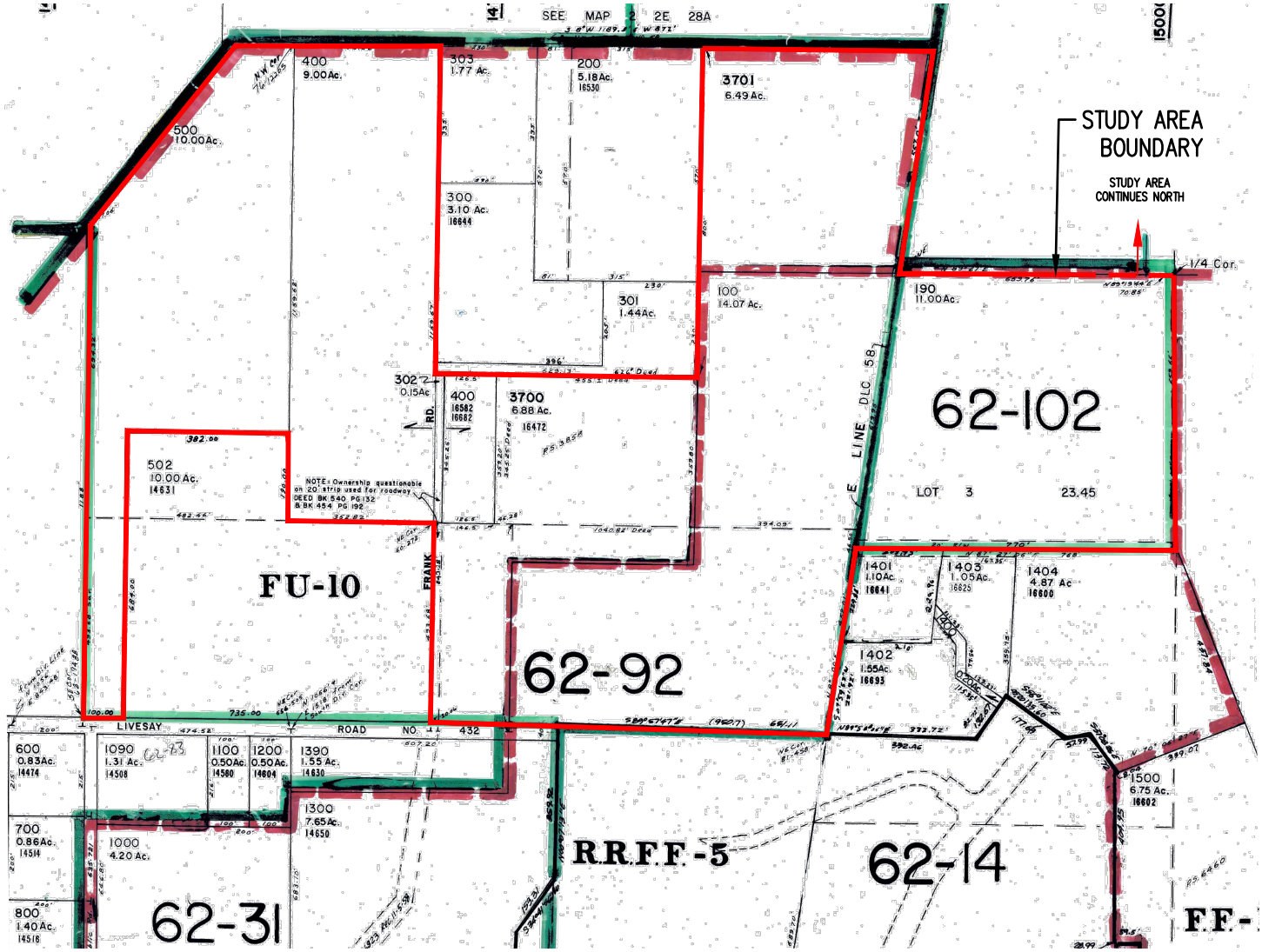
TAX MAP (MAP 2 2E 27BC)
PARK PLACE VILLAGE WETLAND AND WATERS DELINEATION REPORT

FIGURE **2A**

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: SKT
CHKD: SAR

DWG: 7404 BACKGROUND FIGURES | FIGURE 2A



CLACKAMAS COUNTY
TAX LOTS 100, 190, 302,
400, 500, 3700, 3701
TAX MAP 2 2E 28D

N

SCALE: 1"= 400 FEET

400 0 80 200 400

ORIGINAL PAGE SIZE: 8.5" x 11"

DATE: 05/26/2021

TAX MAP (MAP 2 2E 28D) **PARK PLACE VILLAGE WETLAND AND WATERS DELINEATION REPORT**	FIGURE **2B**
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: SKT CHKD: SAR

DSL WD # 2021-0311
Approval Issued 8/26/2021
Approval Expires 8/26/2026

LEGEND:

TOTAL WETLAND AREA ON-SITE: 17,716 SF± (0.41 ACRES±)

WETLAND A: 362 SF± (0.01 ACRES±)
WETLAND B: 5,560 SF± (0.13 ACRES±)
WETLAND C: 7,345 SF± (0.17 ACRES±)
WETLAND D: 4,449 SF± (0.10 ACRES±)

TOTAL ON-SITE WATERS: 4,481 SF± / 1,434 LF± (0.10 ACRES±)

WATER 1: 3,493 SF± / 960 LF± (0.08 ACRES±)
WATER 2: 988 SF± / 474 LF± (0.02 ACRES±)

EPHEMERAL DRAINAGE 1: 73 LF±
EPHEMERAL DRAINAGE 2: 229 LF±

HOLCOMB BOULEVARD
SEE FIGURE 6A
SEE FIGURE 6C
SEE FIGURE 6B
OAK VALLEY DRIVE
OHWM OF INTERMITTENT PORTION OF WATER 1
OHWM OF PERENNIAL PORTION OF WATER 1
STUDY AREA BOUNDARY
EPHEMERAL DRAINAGE 2
EPHEMERAL DRAINAGE 1
CENTERLINE OF EPHEMERAL PORTION OF WATER 2
OHWM OF INTERMITTENT PORTION OF WATER 2
WETLAND A
WETLAND B
WETLAND C
WETLAND D
SWM
TAX LOT 1709 TAX MAP 2 2E 28A
TAX LOT 303 TAX MAP 2 2E 28D
TAX LOT 200 TAX MAP 2 2E 28D
TAX LOT 3701 TAX MAP 2 2E 28D
TAX LOT 300 TAX MAP 2 2E 28D
TAX LOT 301 TAX MAP 2 2E 28D
TAX LOT 500 TAX MAP 2 2E 28D
TAX LOT 400 TAX MAP 2 2E 28D
TAX LOT 100 TAX MAP 2 2E 28CA
TAX LOT 502 TAX MAP 2 2E 28D
TAX LOT 400 TAX MAP 2 2E 28D
TAX LOT 3700 TAX MAP 2 2E 28D
TAX LOT 502 TAX MAP 2 2E 28D
TAX LOT 100 TAX MAP 2 2E 28D
TAX LOT 190 TAX MAP 2 2E 28D
TAX LOT 1000 TAX MAP 2 2E 27BC
TAX LOT 2000 TAX MAP 2 2E 27BC

N

SCALE: 1"= 250 FEET

250 0 50 125 250
ORIGINAL PAGE SIZE: 11" x 17"

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28 & 29, JUNE 2, AND AUGUST 5 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29-JUNE 15, 2020.

DATE: 05/26/2021

WETLAND AND WATER DELINEATION MAP OVERVIEW

FIGURE 6

PARK PLACE VILLAGE - OREGON CITY

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
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DRWN: JRI
CHKD: SAR

DWG: 7404 WDR EXCOND | FIGURE 6

DSL WD # 2021-0311
Approval Issued 8/26/2021
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TAX LOT 3100
TAX MAP 2 2E 28AC

TAX LOT 800
TAX MAP 2 2E 28AC

TAX LOT 6300
TAX MAP 2 2E 28AC

WATER 1 EXTENDS OFF-SITE

WETLAND MITIGATION AREA TO BE PROTECTED PER DOCUMENT NUMBER 2003-160022

OAK VALLEY DRIVE

TAX LOT 3200
TAX MAP 2 2E 28AC

TAX LOT 900
TAX MAP 2 2E 28AC

EX 4" PVC CULVERT

OHWM OF INTERMITTENT PORTION OF WATER 1

WATER 1 EXTENDS OFF-SITE

TAX LOT 1000
TAX MAP 2 2E 28AC

TAX LOT 3300
TAX MAP 2 2E 28AC
10.00' PUBLIC UTILITY EASEMENT PER PLAT OF "HOLCOMB RIDGE"

TAX LOT 1100
TAX MAP 2 2E 28AC
10.00' PUBLIC UTILITY EASEMENT PER PLAT OF "HOLCOMB RIDGE"

TAX LOT 303
TAX MAP 2 2E 28D

PGE EASEMENT PER BOOK 548, PAGE 267

PGE EASEMENT PER BOOK 546, PAGE 188

TAX LOT 3400
TAX MAP 2 2E 28CA

TAX LOT 1200
TAX MAP 2 2E 28AC

(NO TOPO SURVEY)

EXISTING BUILDING

WOOD STEPS

EX SAN CO

TAX LOT 2700
TAX MAP 2 2E 28CA

GRAVEL

OHWM OF PERENNIAL PORTION OF WATER 1

PLOT 7

PLOT 9

PGE EASEMENT PER BOOK 550, PAGE 5

PLOT 8

WETLAND B BOUNDARY

PLOT 10

PLOT 11

TAX LOT 400
TAX MAP 2 2E 28D
AREA: 9.37 AC±

WATER EXTENDS OFF-SITE

CENTERLINE OF EPHEMERAL DRAINAGE 2

TAX LOT 500
TAX MAP 2 2E 28D
AREA: 10.28 AC±

GRAVEL DRIVE

COMM LINES NOT LOCATED

TAX LOT 100
TAX MAP 2 2E 28CA

PLOT 4

20.06' ROAD EASEMENT PER BOOK 90, PAGE 195; DOC. NO. 71-32947

ABONDONED DECK

TEEPOST FENCE PARTIALLY DOWN

PLOT 5

EXISTING BUILDING

EXISTING BUILDING

STUDY AREA BOUNDARY

TAX LOT 302
TAX MAP 2 2E 28D
AREA: 0.38 AC±

AC DRIVE

TAX LOT 400
TAX MAP 2 2E 28D

N

SCALE: 1"=100 FEET

100 0 20 50 100

ORIGINAL PAGE SIZE: 11" x 17"

LEGEND:

TOTAL WETLAND AREA ON-SITE: 17,716 SF± (0.41 ACRES±)

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EPHEMERAL DRAINAGE 1: 73 LF±
EPHEMERAL DRAINAGE 2: 229 LF±

A PHOTO LOCATION & ORIENTATION

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28 & 29, JUNE 2, AND AUGUST 5 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29-JUNE 15, 2020.

1-FOOT INTERVAL GROUND CONTOURS DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING CONDITIONS AND STUDY AREA BOUNDARY DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING TREE LOCATIONS WERE NOT SURVEYED.

DATE: 05/26/2021

WETLAND AND WATER DELINEATION MAP

PARK PLACE VILLAGE - OREGON CITY

FIGURE 6A

AKS ENGINEERING & FORESTRY, LLC
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TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: JRI
CHKD: SAR

DWG: 7404 WDR EXCOND | FIGURE 6A

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28 & 29, JUNE 2, AND [illegible] 5 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29–JUNE 15, 2020.

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SCALE: 1"=100 FEET

100 0 20 50 100

ORIGINAL PAGE SIZE: 11" x 17"

TAX LOT 301
TAX MAP 2 2E 28D

TAX LOT 190
TAX MAP 2 2E 28D
AREA: 10.86 AC±

TAX LOT 3700
TAX MAP 2 2E 28D
AREA: 6.76 AC±

TAX LOT 100
TAX MAP 2 2E 28D
AREA: 14.32 AC±

WETLAND C BOUNDARY

PLOT 12
PLOT 13
PLOT 14
PLOT 15
PLOT 16

15.00' STORM DRAINAGE EASEMENT PER DOC. NO. 2000-004471

WETLAND D BOUNDARY

PLOT 17
PLOT 18
PLOT 19
PLOT 20

ABANDONED WELL

WETLAND EXTENDS OFF-SITE

EX 8" CONC CULVERT
EX 12" CMP CULVERT
EX 12" CMP CULVERT
STEM WALL CONC FOUNDATION
ATTACHED OVERHANG

EX 4" PVC CULVERT
ROCK WALL
SHED
ROCK WALL
SHED
BARBWIRE FENCE

20.00' PRIVATE RIGHT-OF-WAY PER BOOK 454, PAGE 192

EDGE OF LANDSCAPE

TAX LOT 1401
TAX MAP 2 2E 28D

TAX LOT 1403
TAX MAP 2 2E 28D

TAX LOT 1404
TAX MAP 2 2E 28D

DSL WD # 2021-0311
Approval Issued 8/26/2021
Approval Expires 8/26/2026

Centerline of Ephemeral Drainage 3

STUDY AREA BOUNDARY

OHWM OF INTERMITTENT PORTION OF WATER 2

TAX LOT 1402
TAX MAP 2 2E 28D

EDGE OF LANDSCAPE

AC DRIVE

SHED

WATER 2 EXTENDS OFF-SITE

20X20 WATER EASEMENT PER BOOK 647 PAGE 792

TAX LOT 2500
TAX MAP 2 2E 28D

TAX LOT 2400
TAX MAP 2 2E 28D

TAX LOT 2300
TAX MAP 2 2E 28D

N

LEGEND:

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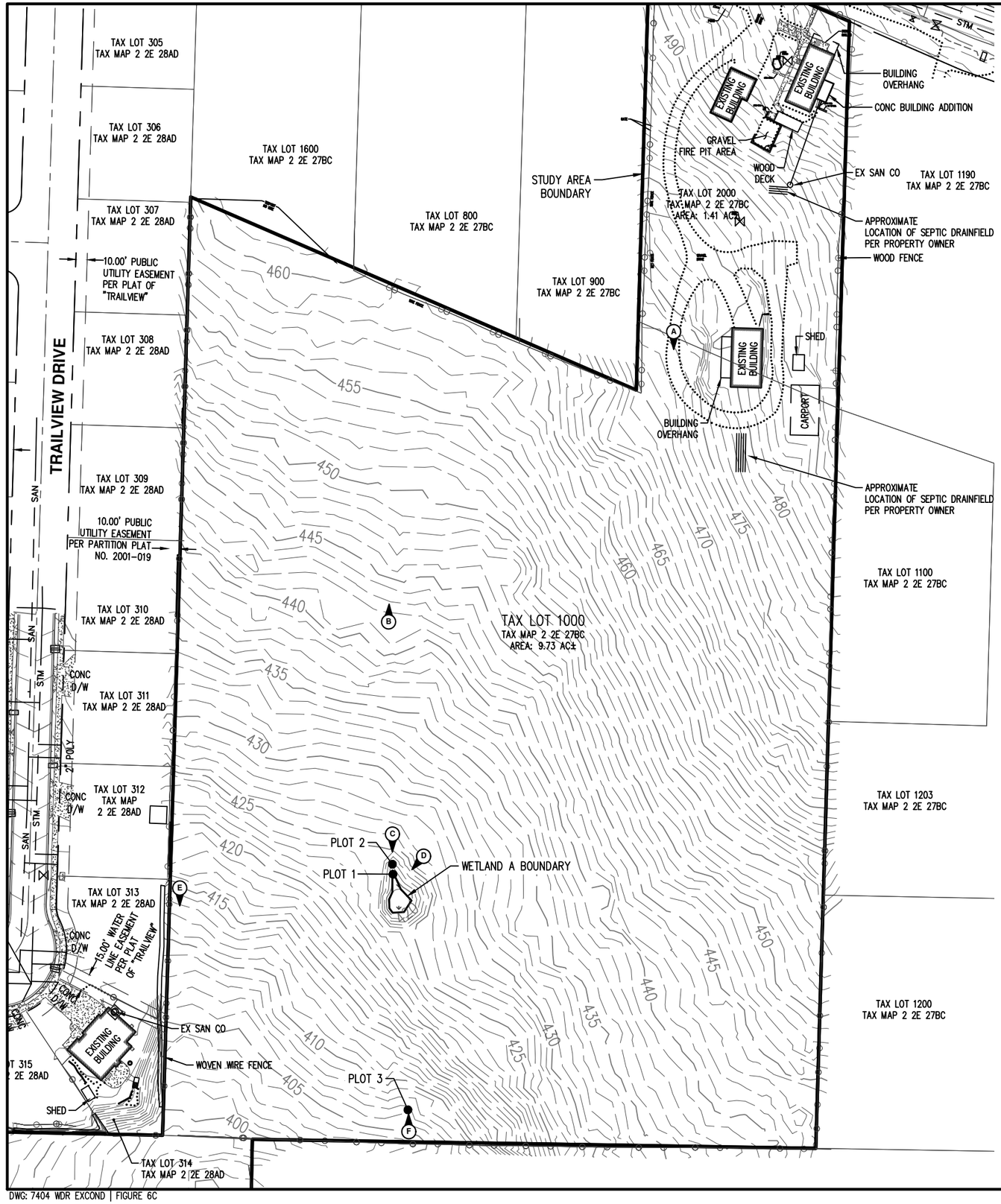
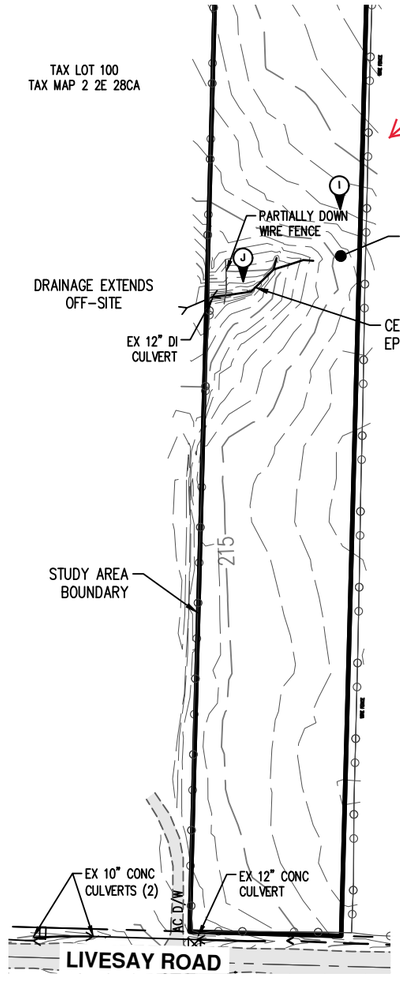
PHOTO LOCATION & ORIENTATION

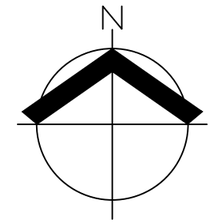
DATE: 05/26/2021

WETLAND AND WATER DELINEATION MAP	FIGURE 6B
PARK PLACE VILLAGE- OREGON CITY	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: JRI CHKD: SAR

DWG: 7404 WDR EXCOND | FIGURE 6B







SCALE: 1"=100 FEET

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ORIGINAL PAGE SIZE: 11" x 17"

DSL WD # 2021-0311
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DATE: 05/26/2021

WETLAND AND WATER DELINEATION MAP

PARK PLACE VILLAGE - OREGON CITY

FIGURE 6C

AKS ENGINEERING & FORESTRY, LLC
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TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: JRI
CHKD: SAR

DWG: 7404 WDR EXCOND | FIGURE 6C

Schwabe
WILLIAMSON & WYATT®

May 6, 2022

Garrett H. Stephenson
Admitted in Oregon
T: 503-796-2893
gstephenson@schwabe.com

VIA EMAIL

Oregon City Planning Commission
c/o Planner Kelly Reid
625 Center Street
Oregon City, OR 97045
kreid@orcity.org

RE: Park Place Crossing General Development Plan
GLUA-21-00045 / MAS-21-00006 / VAR-22-00001

Dear Chair Schlagenhaufer and Commissioners:

This firm represents ICON Construction & Development, LLC, the Applicant in the above-referenced file. Park Place Crossing has been in the development and planning stages since at least 2017 and we greatly appreciate City staff's hard work on its review of the Application. This letter addresses the proposed conditions of approval and responds to public testimony received thus far.

1. Conditions of Approval

The Staff Report proposed over 50 conditions of approval; the Applicant accepts and supports almost all of these in their current form. However, the Applicant respectfully requests changes to two conditions, explained below.

a. Condition 10 – Parkland Dedication Requirement

Condition 10 would require the Applicant to dedicate 4.4 acres of parkland when recording the final plat for Phase 1 of the Project. Phase 1 consists of approximately 11 acres and 59 homes. As originally proposed, this phase would provide 0.14 acres of open space, while Phase 2 (the largest phase) would provide 6.52 acres of open space. The community park is proposed to be located at the SW corner of the General Development Plan area and would be part of the open space dedicated during Phase 2.

While the Applicant can (and intends to) dedicate the community park as part of the final plat in Phase 2, there are number of practical problems with dedication of the community park as part of Phase 1. These are summarized below:

- The parkland is not contiguous with Phase 1 and it is not within a parcel or tract that is proposed to be created during Phase 1. Thus, it would need to be created as an island outside of the Phase 1 Detailed Development Plan area.

- As the Application is for a General Development Plan (and not a Detailed Development Plan), it is likely that the precise location of the community park will need to be adjusted and refined as the project goes through its future Detailed Development Plan phases. In particular, creation of the precise boundaries of the community park during Phase 1 eliminates much of the flexibility available to refine Phase 2 and respond to any issues that arise during the Phase 2 review process.

- The Applicant is under contract to purchase, but does not yet own much of the Phase 2 parcel area, including much of the proposed parkland. The Applicant plans to close on most of the community park property after Phase 1 is approved and before Phase 2 is started.

- While the proposed General Development Plan shows a parkland of roughly 4.4 acres, this is more than what is required in "rough proportionality" to the impacts of the Park Place Crossing development. As explained in the Application:

  > "Per discussions with the City, the Park Place Crossing project is expected to provide a proportional percentage of park land envisioned in the Concept Plan for its residents. Approximately 51 percent of the planned dwelling units for the Park Place Concept Area North Village are included in this master plan (±476 planned PPC units/937 total North Village units). The Community Park represents ±8 acres; therefore, Park Place Crossing would be expected to contribute ±51 percent of the needed area or ±4.0 acres."

  As noted above, the Applicant is obligated to provide 51% of 8 acres of parkland, or 4.08 acres of parkland. Therefore, while the GDP proposed 4.4 acres for a community park, there is no basis upon which the Applicant is *obligated* to provide more than 4.08 acres of parkland. Fixing the final size of the community park now to the tenth of an acre also reduces the ability of the applicant to make minor adjustments to the plat in Phase 2, as allowed through the Detailed Development Plan process.

- Requiring the dedication of 4.4 acres of parkland during Phase 1 would be far out of proportion to the impact of the 59 units proposed for that phase. As such, Condition 10 (as currently drafted) is likely an unconstitutional condition under the 5th Amendment of the U.S. Constitution. Specifically, such a requirement lacks the "rough proportionality" between the impact of Phase 1 and the amount of parkland required to be dedicated during that phase. *Dolan v. City of Tigard*, 512 US 374 (1994). It also likely lacks an "essential nexus" to the impacts of Phase 1 because there is no evidence that a park intended to accommodate the entire Park Place Crossing project is needed to accommodate Phase 1. *Nollan* v. *California Coastal Comm'n*, 483 U. S. 825 (1987)

For the above reasons, the Applicant requests that Condition 10 be revised as follows:

> "The applicant shall dedicate a minimum of **4.1** acres of public park space in the location identified on the GDP exhibit at the time of final plat recording of **Phase 2** of the project."

b. Condition 18.c – Additional Local Street connection east of Holly Lane and South of Street E.

As currently proposed, Condition 18.c requires the Applicant to "provide an additional local street connection to the east of Holly Lane and South of Street E." This condition is infeasible for two reasons. First, it would require a street connection through the Applicant's proposed stormwater detention facility, which must be located at the bottom of nearby slopes to ensure adequate stormwater capture. Second, even if the stormwater facility did not need to be located in this area, the required connection would have to be constructed through extremely steep slopes that would require cut, fill, grading, and retaining walls far beyond what is reasonable or desirable for such a connection.

However, the Applicant is not opposed to providing an additional local street connection in this vicinity. For the above reasons, the Applicant respectfully requests that Condition 18.c be revised as follows:

> "The Applicant shall, as part of Phase 2 Detailed Development Plan, evaluate possible additional local street connections to Livesay Road."

With the proposed revisions to the two conditions discussed above, the Applicant fully supports and accepts the conclusions and proposed conditions in the Staff Report.

2. Applicant's Response to Public Testimony

This letter also provides the Applicant's response to the written public comments included in the record, as well as the public comments raised at the April 25, 2022, public hearing on the application. The 92-acre site was annexed in 2018 through AN-17-04 and ZC 17-05, which required, among other things, that the Applicant apply for a General Development Plan in order to redevelop the subject property. Per Oregon City Municipal Code ("OCMC") 17.65.010:

> [T]he master plan process is structured to allow an applicant to address larger development issues, *such as adequacy of infrastructure and transportation capacity*, and reserve capacity of the infrastructure and transportation system before expenditure of final design costs.

Emphasis added. Ultimate development of the subject property will be accomplished through the second step in the two-step process, the Detailed Development Plan, because the General Development Plan process does not authorize physical alterations of the subject property. OCMC 17.65.040. Many of the concerns raised regarding the Application are that it lacks certain items that are required as part of a Detailed Development Plan but not as part of this Application.

Below is a summary of the public comments followed by the Applicant's responses. For the reasons below, the Planning Commission can reject public comments in opposition to the Application and find that the Application has satisfied all applicable criteria.

a. Public notice of the Application satisfied all applicable notice requirements in the OCMC.

A number of public comments raised concerns regarding inadequate public notice. Pursuant to OCMC 17.65.040.B, General Development Plans are processed through a Type III procedure. As a result, compliance with the notice requirements of OCMC 17.50.090.B. is required. Specifically, at least twenty days prior to the hearing, the city must prepare and send, by first class mail, notice of the hearing to all record owners of property *within three hundred feet of the subject property* and to any city-recognized neighborhood association whose territory includes the subject property. OCMC 17.50.090.B. The Applicant is responsible for providing an accurate and complete set of mailing labels for these property owners and for posting the subject property with the city-prepared notice in accordance with OCMC 17.50.100. *Id.* The Applicant provided the requisite mailing labels and posted the subject property and the City mailed notice on March 29th, twenty-eight days before the hearing, in accordance with its requirements. As a result, the Applicant and the City have complied with the statutory notice requirements.

b. The Statewide Planning Goals are not approval criteria.

The public comments raised concerns regarding compliance and consistency with the Statewide Planning Goals 1, 5, 6, 7, and 12. The Statewide Planning Goals do not apply directly as approval criteria for permit applications governed by acknowledged comprehensive plans and land use regulations. *Gottman v. Clackamas County*, 64 Or LUBA 358 (2011). The City has an acknowledged Comprehensive Plan dated June 2004. The OCMC implements this acknowledged Comprehensive Plan and thus the Statewide Planning Goals themselves are not approval criteria for the General Development Plan application.

While concerns were raised about deforestation and loss of habitat, the City's Goal 5 Inventory has specifically been acknowledged by the Department of Land Conservation and Development as being consistent with Goal 5 including protection of riparian corridors through the subject property. While the project will result in the loss of some trees, the City annexed the subject property in order to provide for additional housing while maintaining Goal 5 protections. The Applicant will submit detailed tree removal and mitigation plans during the Detailed Development Plan process for each phase.

c. The Applicant's Transportation Impact Statement demonstrates that transportation impacts from the project can and will be adequately mitigated.

Public comments raised a number of issues regarding the transportation related impacts of the project.

First, concerns were raised about Holly Lane being used as the main thoroughfare through the subject property. Holly Lane is a planned Collector Street, the extension of which was originally envisioned in the Park Place Concept Plan ("PPCP"). Although there is no code

Figure 1: PPCMP Holly Lane (Blue) /Swan Avenue (Green) Location

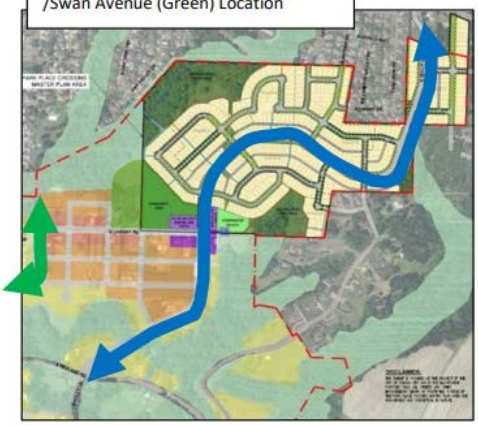
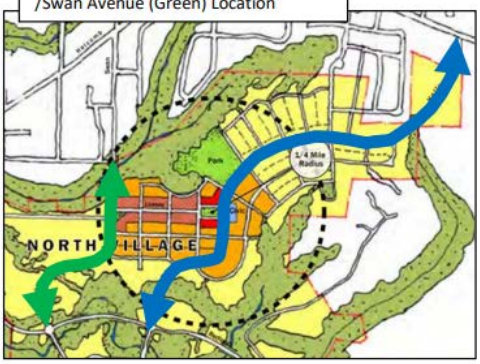


Figure 2: PPCP Holly Lane (Blue) /Swan Avenue (Green) Location



requirement that the road alignment in the PPCP be exactly duplicated in the Application, the Applicant provided a Park Place Concept Plan Analysis (the "PPCP Analysis") prepared by AKS Engineering & Forestry, dated March 18, 2022, which explained how Holly Lane is substantially consistent with the configuration of Holly Lane in the PPCP, especially in terms of connectivity and access to the surrounding street network. As shown in the excerpts from the PPCP below, Holly Lane is envisioned as the primary north-south connection between Redland Road and S Holcomb Boulevard. Swan Lane is outside the boundaries of this master plan application, as is the connection of Holly Lane to Redland Road. While concerns were raised regarding the lack of an extension of Holly Lane to Redland Road in the event of wildfires, this additional extension of Holly Lane is outside the boundaries of this master plan application.

For the above reasons, the Commission can find that the Application is consistent with the street grid concepts originally established in the PPCP.

Second, concerns were raised that the existing and planned roadway infrastructure cannot accommodate existing or proposed development. The Applicant submitted a Transportation Impact Study (the "Traffic Study"), prepared by Lancaster Mobley, dated January 13, 2022, which concludes that, with the recommended mitigation measures (which are additional to the proportional share payment required as part of the annexation), the existing and proposed street network is capable of serving the proposed development, including the planned density of 476 units, as required by OCMC 17.65.050.C.3. Some concerns were raised that the trip generation in the Traffic Study may be inaccurate; however, as stated in the Traffic Study, trip generation for the existing and proposed uses were based on the Institute of Transportation Engineers (ITE), trip Generation Manual, 11th Edition, 2021. There is no other traffic analysis in the record which disputes the Applicant's Traffic Study.

Third, the public raised concerns about the modification of the street width standards to a small portion of Holly Lane. Per OCMC Table 16.12.016, the required paved width for a

collector street is 59 feet. The Applicant is unable to provide this width for a small portion of Holly Lane between tax lots 2-2E-28D-00190 and 2-2E-27BC-01000 based on the existing topography of the Subject Site, which does not allow room for roadway construction at this width. Instead a paved roadway width of 49 feet is proposed. As stated above, the PPCP envisioned Holly Lane as a planned collector street and the main thoroughfare through the subject property; however, this designation of Holly Lane did not take into account the existing steep slopes and topography of the subject site. Thus, the proposed modification to the street width standards allows for a project that is consistent with the PPCP and will fulfill the function of Holly Lane anticipated in that plan. As stated in the Traffic Study, Holly Lane can accommodate the anticipated traffic volumes of the project even with the requested adjustment. On-street parking along this small segment of Holly Lane will be prohibited along both sides of the roadway and thus the roadway will operate similarly to if a 59-foot paved roadway was provided. Importantly, Holly Lane as proposed will include the standard number of travel lanes, the requisite travel lane width, lane width, bicycle lanes, and sidewalks.

d. Flooding, landslides, stormwater, and other natural hazards were evaluated as part of the Application and will be further addressed during future Detailed Development Plan phases.

Comments were received regarding potential impacts of landslides, flooding, and other natural hazards. While the subject property is located within the Natural Resource Overlay District ("NROD") and Geologic Hazard Overlay zone, the project avoids known natural hazards to the extent possible and home sites have been located to avoid existing steep slopes and landslide hazards where possible.

With its initial submission, the Applicant submitted a memorandum addressing compliance with the Natural Resource Overly District requirements and Geologic Hazard Overlay Zone requirements. *See*, Exhibits G and M. In addition, the Applicant submitted a Preliminary Stormwater Report (Exhibit F), a Preliminary Geotechnical Report (Exhibit K), and Addendum on Slopes (Exhibit L). Subsequently, the Applicant submitted a Supplemental Memorandum, prepared AKS Engineering & Forestry, dated April 15, 2022, which addresses the concerns regarding landslides, flooding, and other natural hazards.

As noted above, the Applicant is requesting approval of the General Development Plan and not approval of a Detailed Development Plan or subdivision. The project will require a Detailed Development Plan review, NROD reviews, and Geological Hazard reviews for each phase and prior to construction on the subject property. As stated in the Application, the project will comply with all requirements; therefore the Planning Commission can find that the criteria of OCMC 17.65.050.C.7 is satisfied.

Additional comments raised concerns regarding an increase in impervious surface as a result of the project. As stated in the Applicant's Preliminary Stormwater Report (Exhibit F), all stormwater will be accommodated on the subject property through planters and detention ponds. Detailed stormwater plans for each phase of construction will be provided through each subsequent Detail Development Plan application.

Concerns were raised about contamination of wells on adjacent properties. These concerns do not appear related to an approval criterion and are not supported by evidence, but even if they were, the Applicant will be required to submit geotechnical and stormwater analyses for each phase during the Detailed Development Plan review to determine the amount of potential infiltration into the groundwater in the area.

e. The Application is consistent with the Park Place Concept Plan.

The Park Place Neighborhood Association raised concerns that the Application differs in some respects to the concept maps in the PPCP. This assertion is incorrect for two reasons. First, OCMC 17.65.050.C.7 states that the proposed general development plan must be consistent with any concept plan, not that it must be *identical* to the concept plan.

Second, as stated above, the Applicant submitted the PPCP Analysis which outlines the project's consistency with the PPCP. The PPCP itself acknowledges that it is a high level document intended to be flexible based on the actual situations encountered. *See,* PPCP at pg. 2.

Importantly, the project is consistent with numerous key components of the PPCP including: (i) utilizing Holly Lane as the primary north-south connection; (ii) the creation of two distinct mixed-use neighborhoods with 1,459 new dwelling units[1]; and (iii) protecting sensitive areas, including drainages and steep slopes. As demonstrated on Page 18 of the PPCP Analysis, the alignment of Holly Lane is largely consistent with the general location of Holly Plan in the PPCP, but also takes into account topographic and natural resource conditions on the subject property. While the project does not include an extension of Holly Lane to Redland Road, this additional extension of Holly Lane is outside the boundaries of this master plan application. As result, while the proposed location of Holly Lane is not identical to that of the PPCP, the Planning Commission can find that the project is consistent with the PPCP as required by OCMC 17.65.050.C.7.

f. Variances and Adjustments

In addition to the modification of the street width standards, the application includes the following adjustments:

- OCMC 17.08.040 and 17.10.040 Dimensional Standards, including up to 20% reduction of lot sizes, widths, depths, and setbacks
- OCMC 17.21.090.A for garage placement and design
- OCMC 17.08.050 and 17.10.050 Density Standards to exceed maximum density by approximately 4%.

[1] The "North Village" is envisioned to included approximately 936 units and the project includes approximately 476 or the anticipated 936 units envisioned in the PPCP.

The application also requests a variance to reduce the minimum lot size for attached single family lots to 1800 square feet. Effectively, the requested variances and adjustments allow for development at a scale and density as called for in the PPCP and the previous annexation application. At a density of 9.1 units per net acre, the proposed density is consistent with the underlying zoning, PPCP, and the transfer of density as permitted in the NROD. The purpose of general development plan review is to allow for flexibility in development and adjustments to certain development standards are explicitly allowed per OCMC 17.65.070 provided the criteria of subsection E are met. As stated in the Applicant's submission materials and as further stated herein, the project is consistent with the overall purposes of the zone and the PPCP. Moreover, the adverse traffic and environmental impacts can be sufficiently mitigated, as explained in the Application. As a result, the Planning Commission can find that the approval criteria of OCMC 17.65.070(E) are satisfied.

With respect to the requested variance, OCMC 17.65.050.C.9 requires a mix of residential uses with no single use exceeding 75% of the total. As a result, attached units are required to meet the requirements of the OCMC. Specifically, the requested variance will allow the Applicant to construct attached units which would not be possible on lots that are 2,800 square feet since this would result in unreasonably deep lots (i.e. 140 feet long by 20 feet wide). Attached homes need no interior side setbacks due to their construction and thus requiring larger lot widths and lot areas is not practical given the type of construction proposed. For an 1800 square foot lot, the lot dimensions would be 20 feet wide by 90 feet long, which provides ample open space in the front and rear yards for attached dwelling. The project also includes substantial public open space, including a public park. The additional density in some portions of the subject property allows the planned density to be realized while allowing some flexibility for accommodating topography and natural features, as well as planned open space—as stated above, the proposed density is consistent with the underlying medium density residential zoning and the PPCP while also allowing for a mixture of housing types as required by the OCMC.

City staff have also explained that reduced lot sizes for attached dwellings are necessary as evidenced by the proposed amendments to the OCMC in response to House Bill 2001, which would permit a minimum lot size for attached dwellings of 1,500 square feet. As a result, the Planning Commission can find that the variance criteria of OCMC 17.60.030 are met.

g. Planned Roads on Adjacent Properties

Public comments raised concerns about roads that were shown on adjacent properties not owned or controlled by the Applicant. These roads are outside the area of the proposed master plan and per OCMC 17.65.020, the plan shall have no effect for land not currently controlled by the Applicant. Details about the future design of street will be further refined during the Detailed Development plan application review. The Preliminary Master Plan drawings illustrate future streets extending to the boundaries of the subject property in order to permit access by future adjoining projects. Notification of future street extensions will be posted at the end of the stub street. Turnarounds are not required for these length of street stubs. These street extensions are shown for the purpose of demonstrating the feasibility of the proposed development pattern to

facilitate connections into neighboring properties that may eventually be annexed into City limits.

h. The project will not have an adverse impact on Oregon City's schools or existing infrastructure.

Per OCMC 17.65.050.C.3, public services for transportation, water supply, police, fire, sanitary waste disposal, storm-water disposal, and any other needed public services and facilities including schools and parks for proposed residential uses, are capable of serving the proposed development, or will be made capable by the time each phase of the development is completed. A detailed discussion of the proposed developments impacts on other public services is included at pages 66 through 68 of the Applicant's initial submission.

With respect to schools, the Oregon City School District provided comments during the annexation proceeding an indicated no major concerns regarding school capacity. In addition, Police service will be provided by the Oregon City Police Department ("OCPD"), which previously submitted a comments during the annexation proceeding that indicated that the resources to serve this area were available. While the Clackamas Fire District #1, provided pre-application conference comments on the project, the Applicant has responded to all comments received from the Fire District. Emergency Medical Services for the area are provided by Clackamas Fire District #1 and American Medical Response ("AMR") through a contract with Clackamas County. Emergency services to the planned project are satisfactory and consistent with applicable requirements.

Temporary emergency access will be available to Phase 1 from Shartner Drive, as depicted on Sheet P-08 of the plans submitted with the Applicant's initial submission. With Phase 2, additional temporary emergency access to project will be available via the Holly Lane and S Livesay Road connection. At each of these locations, removable barriers will allow emergency traffic to travel to and through the project. Further details about emergency access will be submitted during the Detailed Development Plan applications process.

3. Conclusion.

While the Applicant understands and respects the public's concerns, for the reasons above the Planning Commission can find that the Application adequately addresses these concerns. The Applicant respectfully requests that the Planning Commission approve the Application with reasonable conditions of approval.

Best regards,



Garrett H. Stephenson

GST:jog/jmhi

cc: Mr. Harlan Borow (*via email*)
Mr. Chris Goodell (*via email*)
Mr. Mark Handris (*via email*)
Mr. Darren Gusdorf (*via email*)
Mr. Joseph O. Gaon (*via email*)
Ms. Carrie Richter *(via email)*

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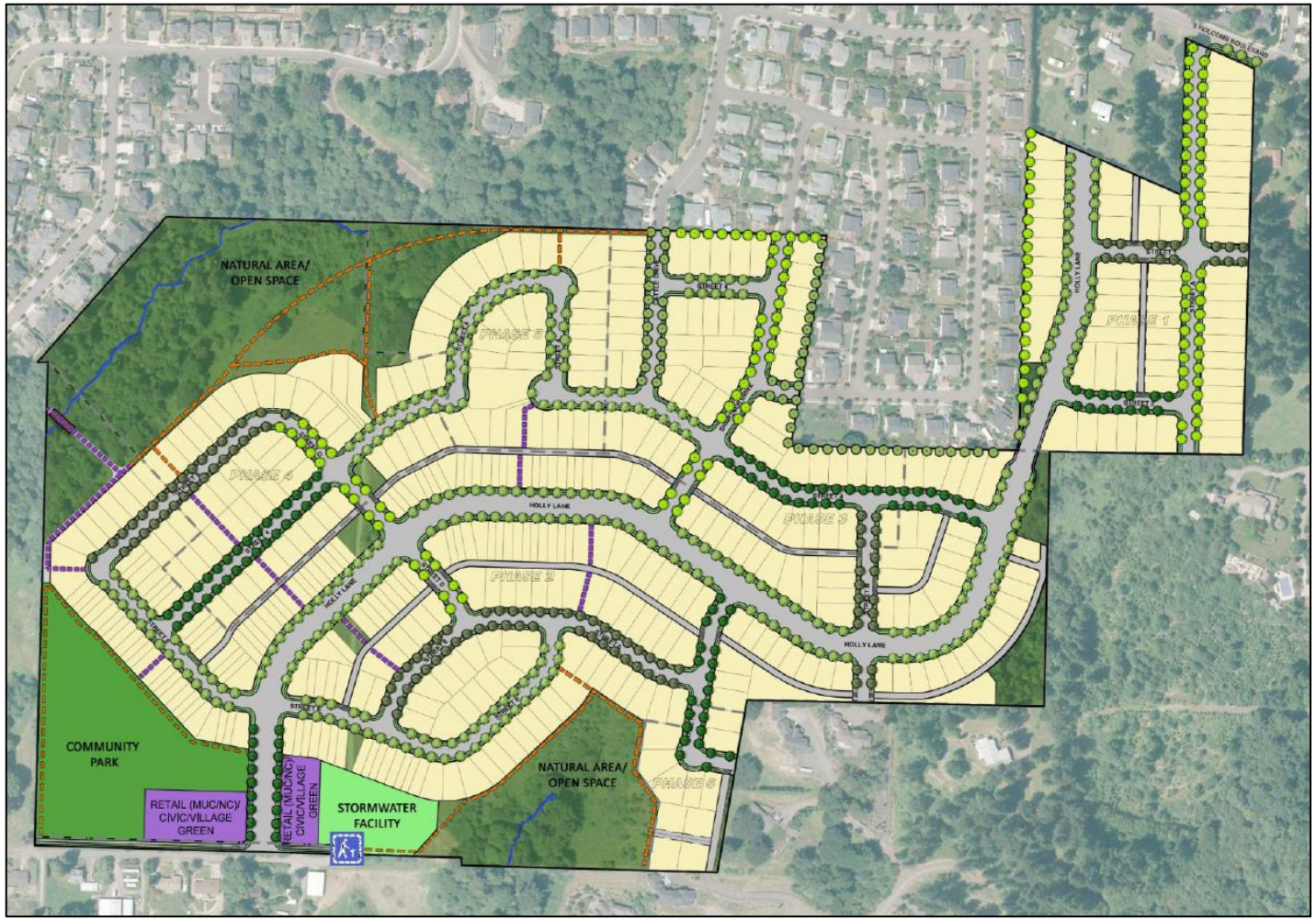
Park Place Crossing
General Development Plan/Master Plan



City of Oregon City Planning Commission
May 9, 2022

City of Oregon City Case File Nos.:
GLUA-21-00045 / MAS 21-00006 / VAR-22-00001

AKS ENGINEERING &

Project Team

Applicant

- ICON Construction & Development, LLC
  - Harlan Borow

Legal Counsel

- Schwabe Williamson & Wyatt
  - Garrett Stephenson

Traffic Engineer

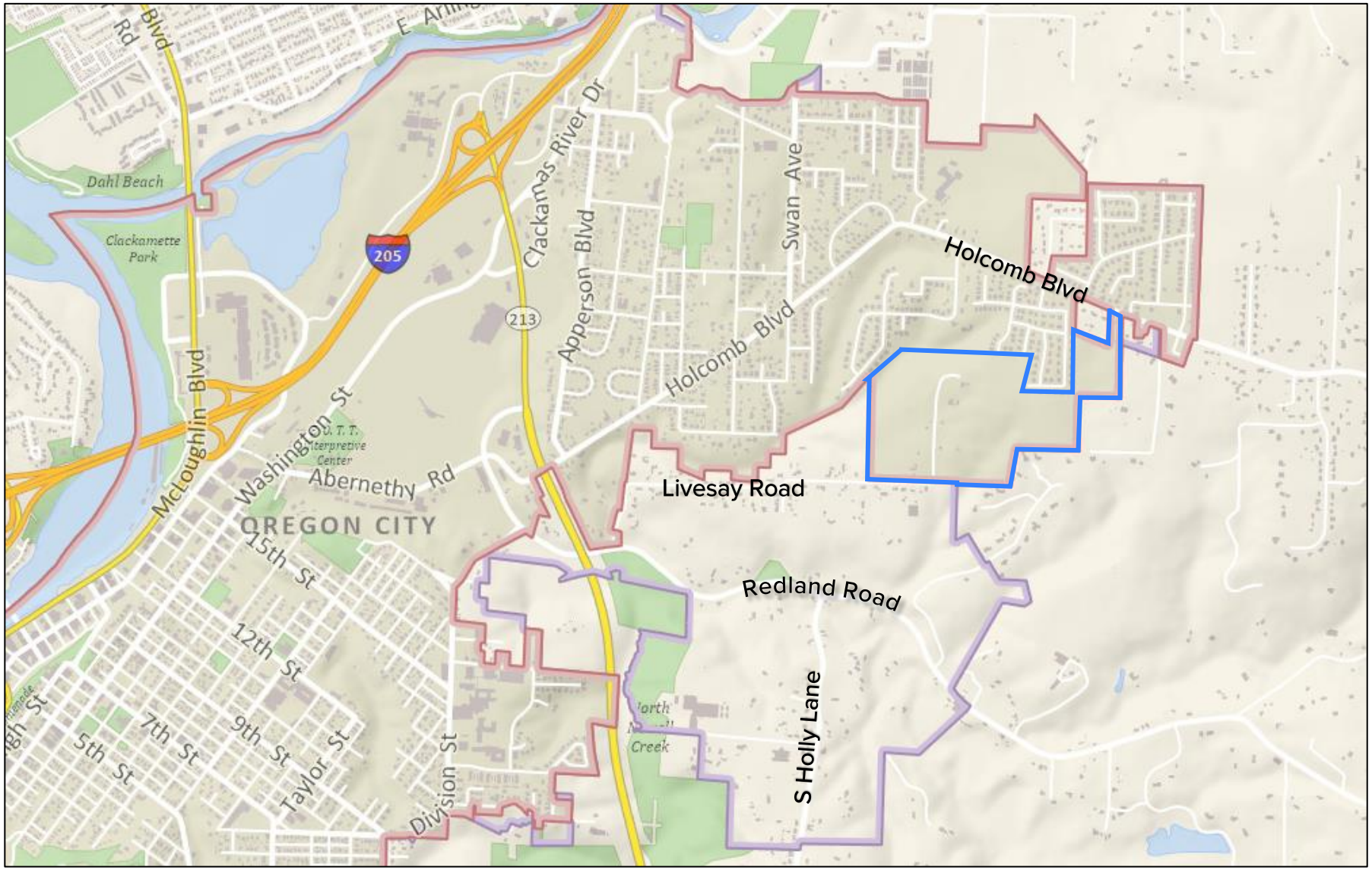
- Lancaster Mobley
  - Todd Mobley, PE, Principal

Land Use Planning and Civil Engineering

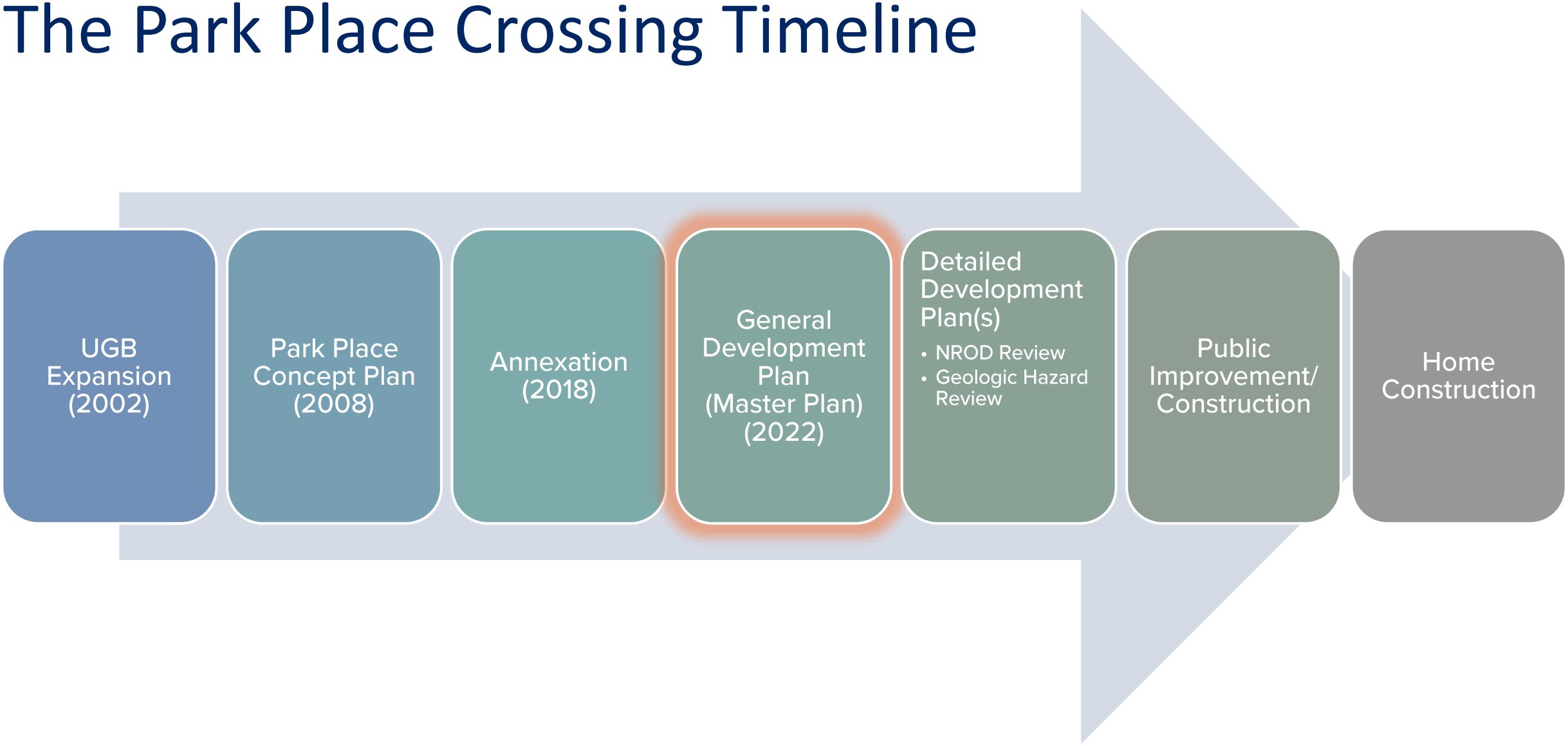
- AKS Engineering & Forestry, LLC
  - Chris Goodell, AICP, LEED AP
  - Cody Street, EI
  - Monty Hurley, PE, PLS, Principal
  - Glen Southerland, AICP

Site Location

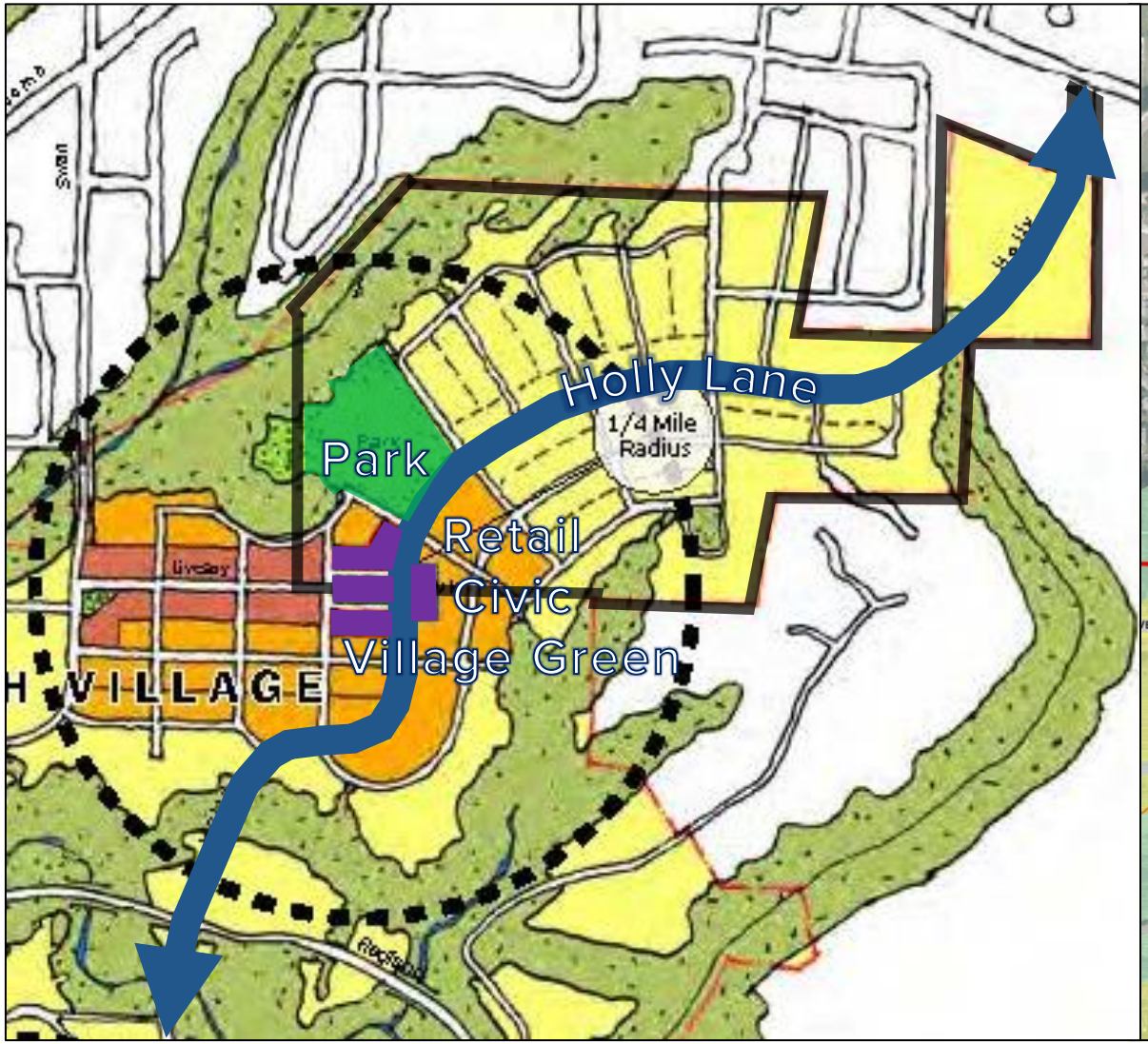
- Park Place Crossing
  - ±91.7-acre site
  - South of PPNA
  - South of Holcomb/ North of Livesay



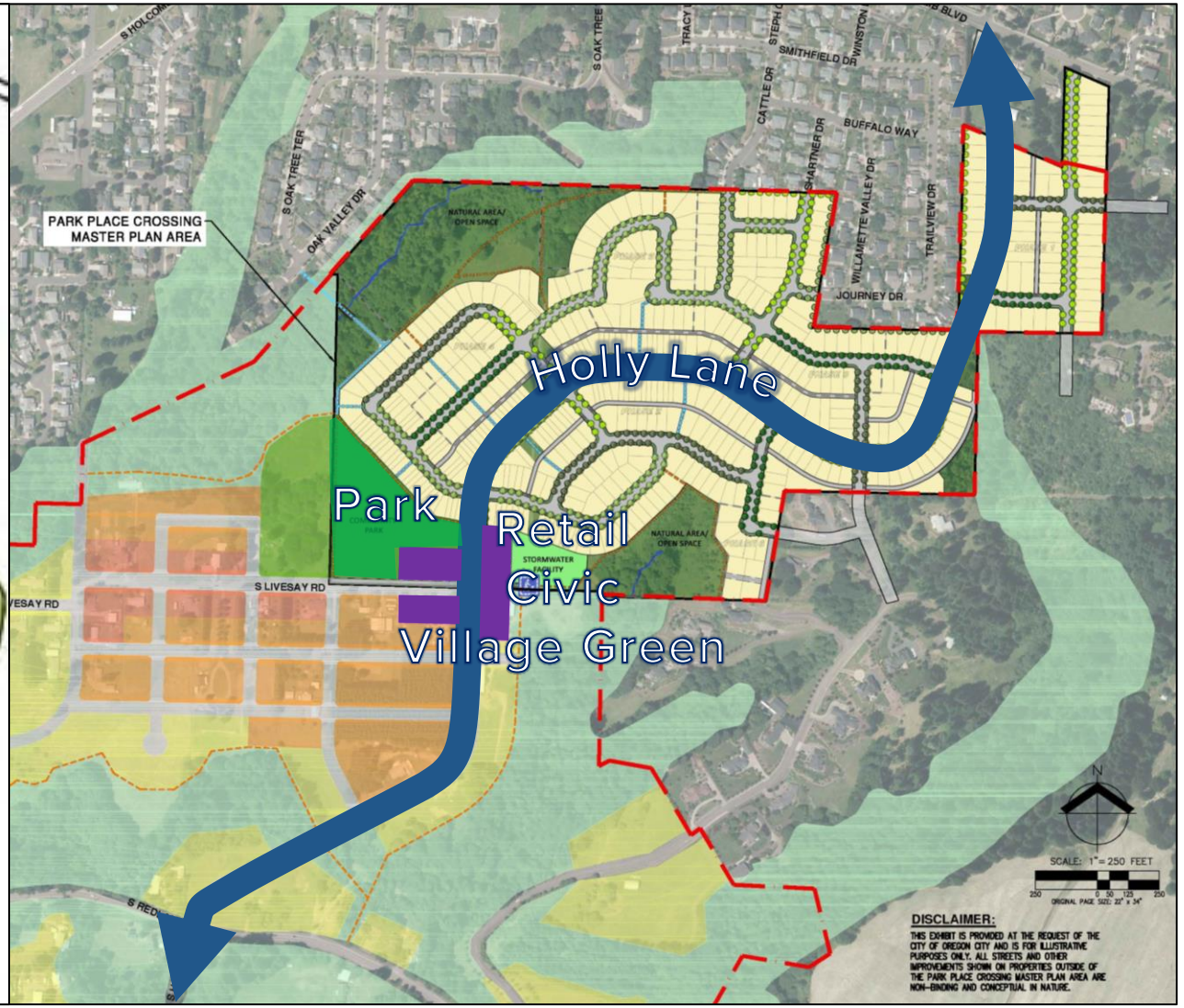
The Park Place Crossing Timeline



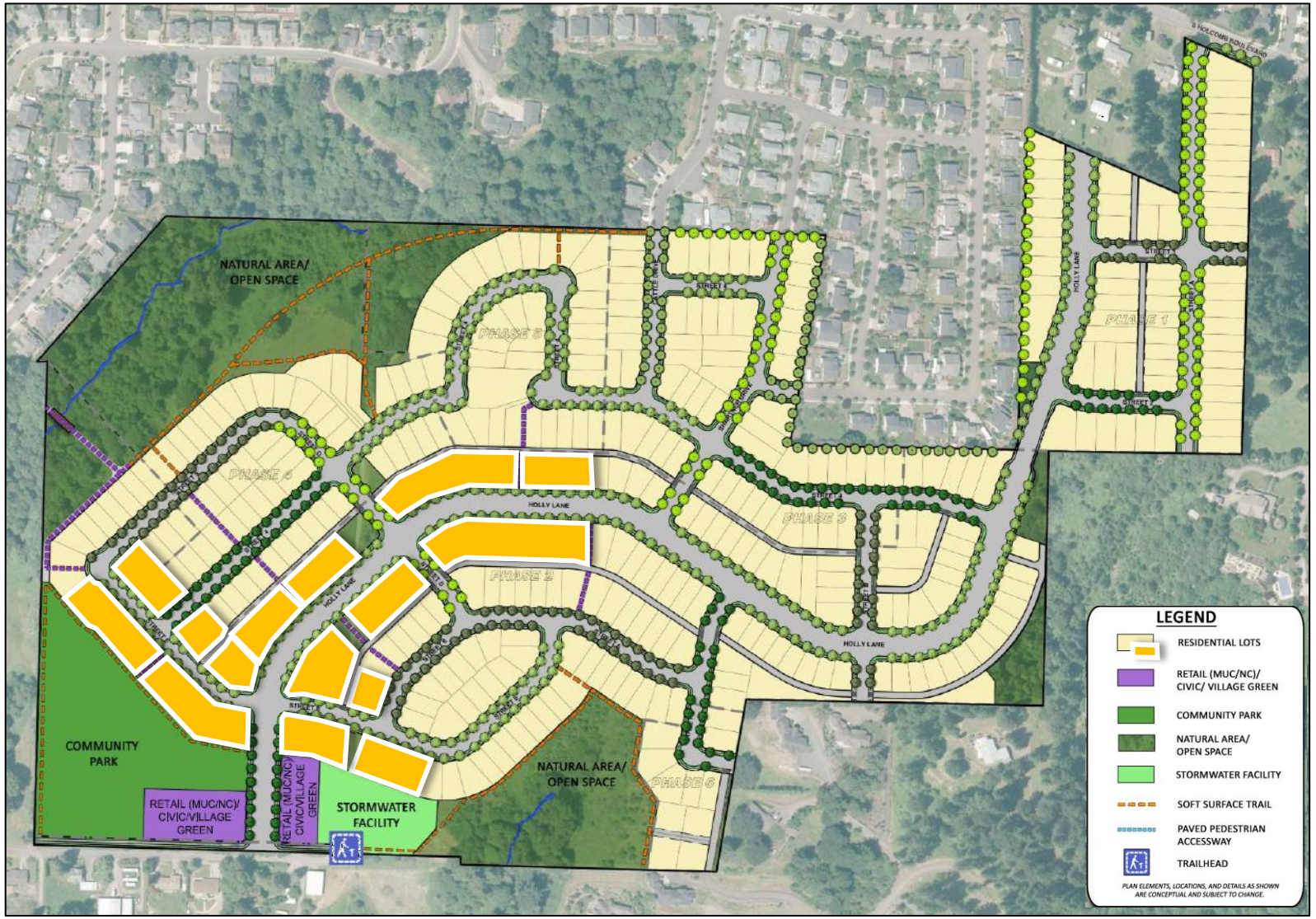
Park Place Concept Plan



Park Place Crossing GDP



Park Place Crossing Overview



- General Development Plan (Master Plan)
  - Six phases
    - Detached homes
    - Attached homes
  - Community Park
  - Open Space
    - Preservation of slopes
    - Preservation of natural resource areas
  - Retail/Civic/Village Green
- Consistent with PPCP

Park Place Crossing Housing







Transportation System Improvements

Construction of Holly Lane (from Holcomb Blvd to Livesay Road)

Park Place Crossing will contribute financially to upgrades to intersections off-site:

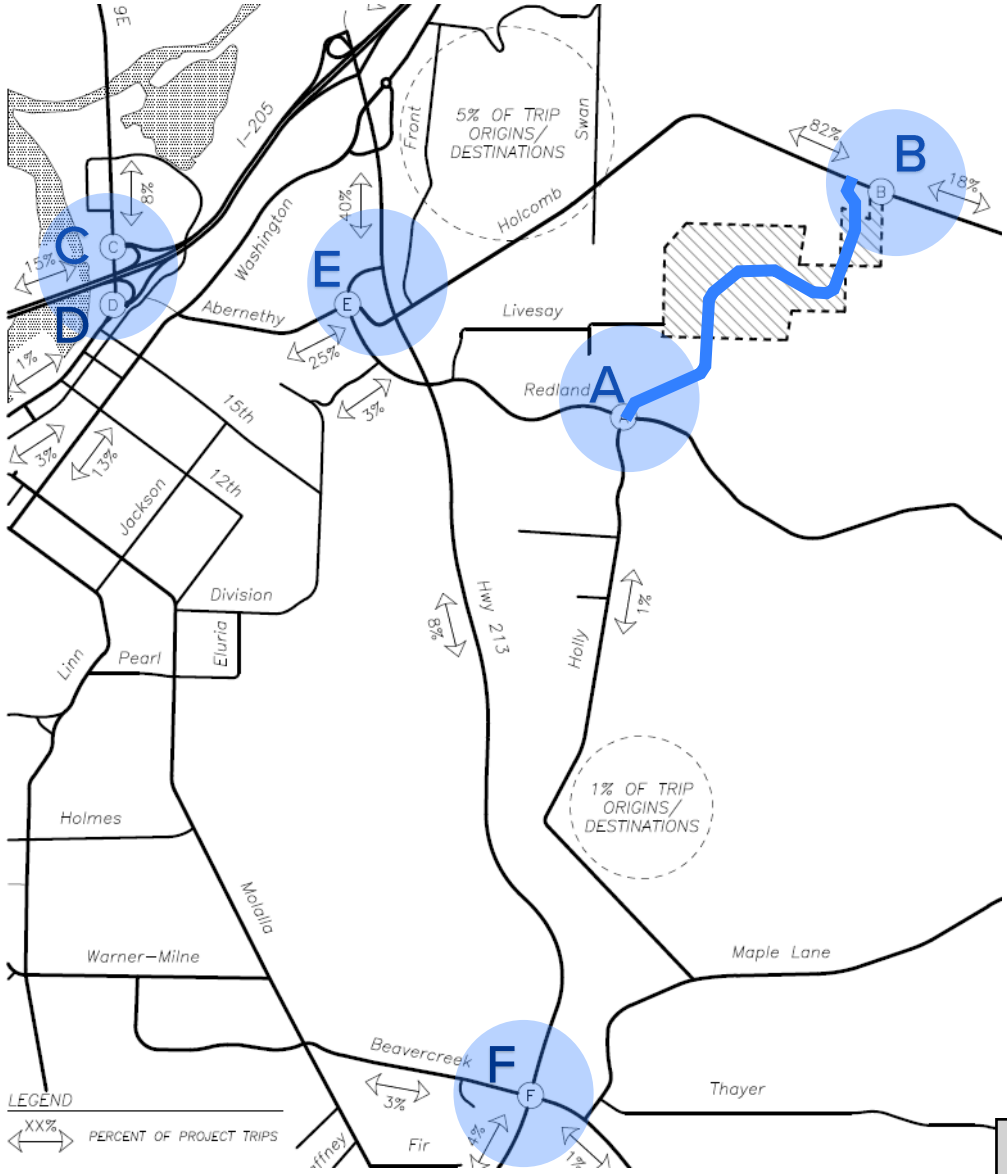
A. Redland/Holly
B. Holcomb/Holly
C. I-205/OR 99 NB
D. I-205/OR-99 SB
E. Hwy 213/Redland
F. Hwy 213/Beavercreek

And specific improvements to Holcomb Blvd:

- Sidewalks
- Bike lanes
- Ped crossings

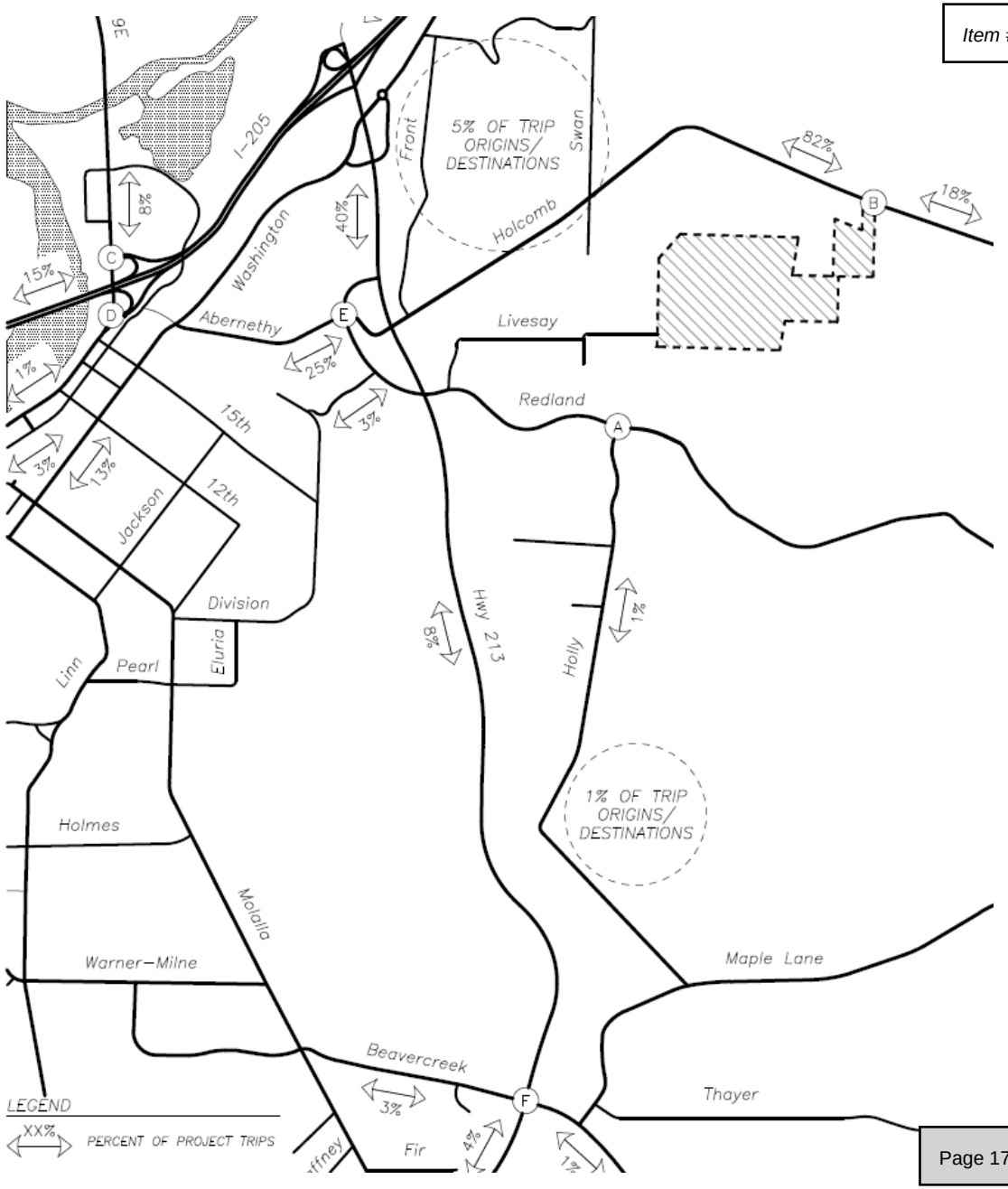
Livesay Road improvements per Clackamas County:

- Half street improvements along Livesay
  - Sidewalks, curb, gutter, landscape strip, etc.

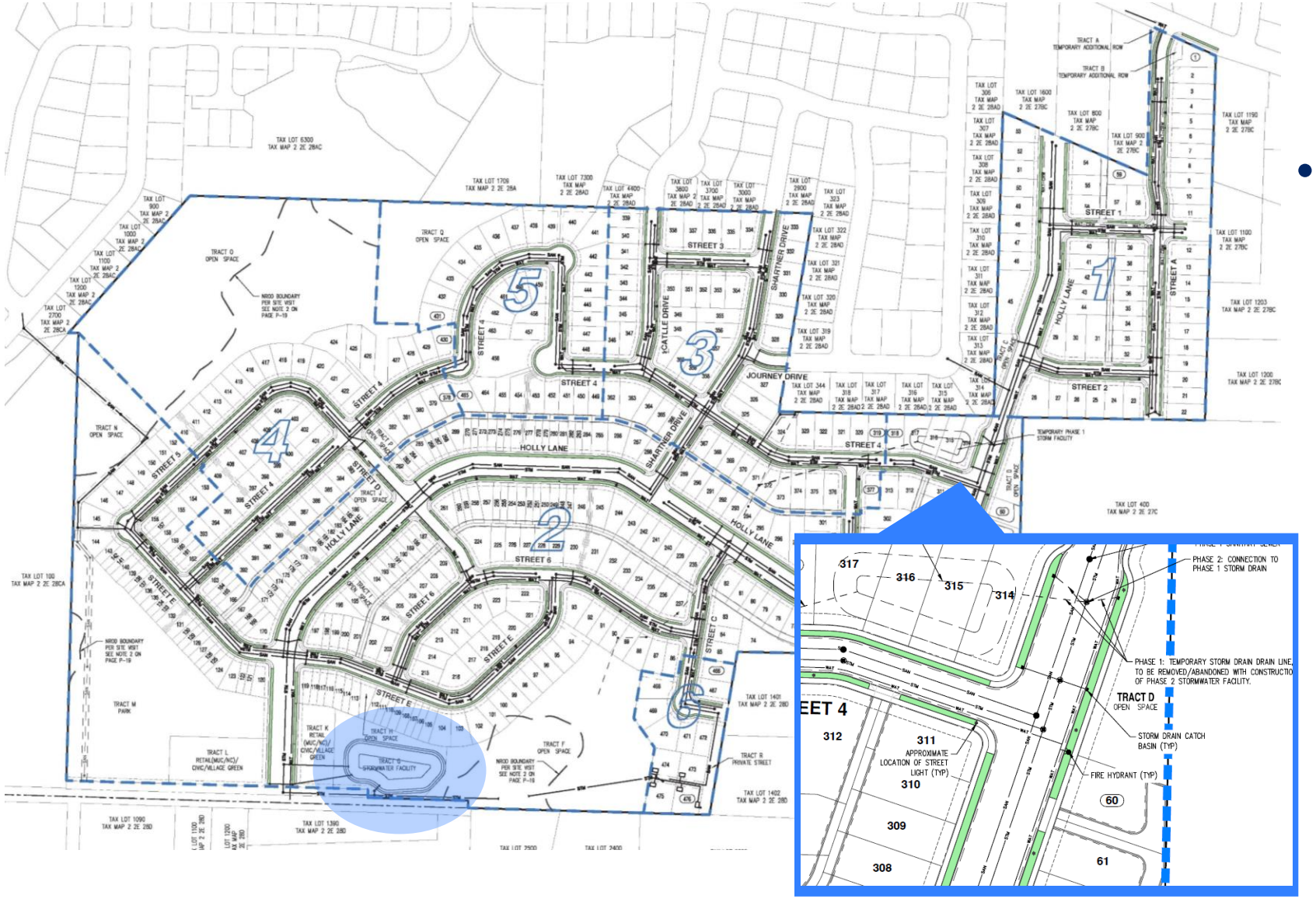


Transportation System Financial Contributions

- Annexation/Conditions of Approval require financial contributions:
  - Est. Phases 1-6 (TBD at time of DDP): **±$982k to ±$1.8M**
  - Phase 1 (CoA 5): **$297,512**
- TSDC (current rate) payments (at building permit):
  - Est. Phases 1-6 (126 SFA/350 SFD units): **$5,249,146**
  - Phase 1 (59 SFD units): **$741,571**



Stormwater Management



- Stormwater management facilities
  - Opportunity for “Green street” planters and swales
  - Regional facility at site low point
  - Meets City requirements

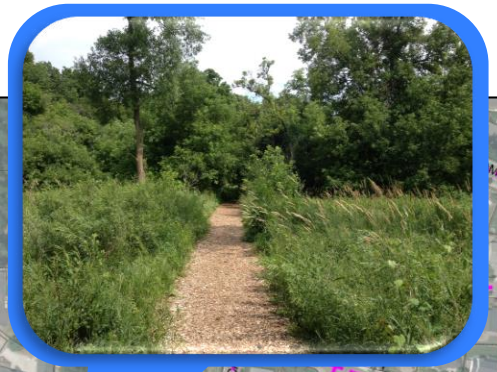
Pedestrian Connectivity/Trails



Pedestrian Bridge



Off-street pathways



Soft-surface trails

Parks and Open Space

- Slope preservation
- Natural resource preservation
- Community Park
- Pocket open spaces

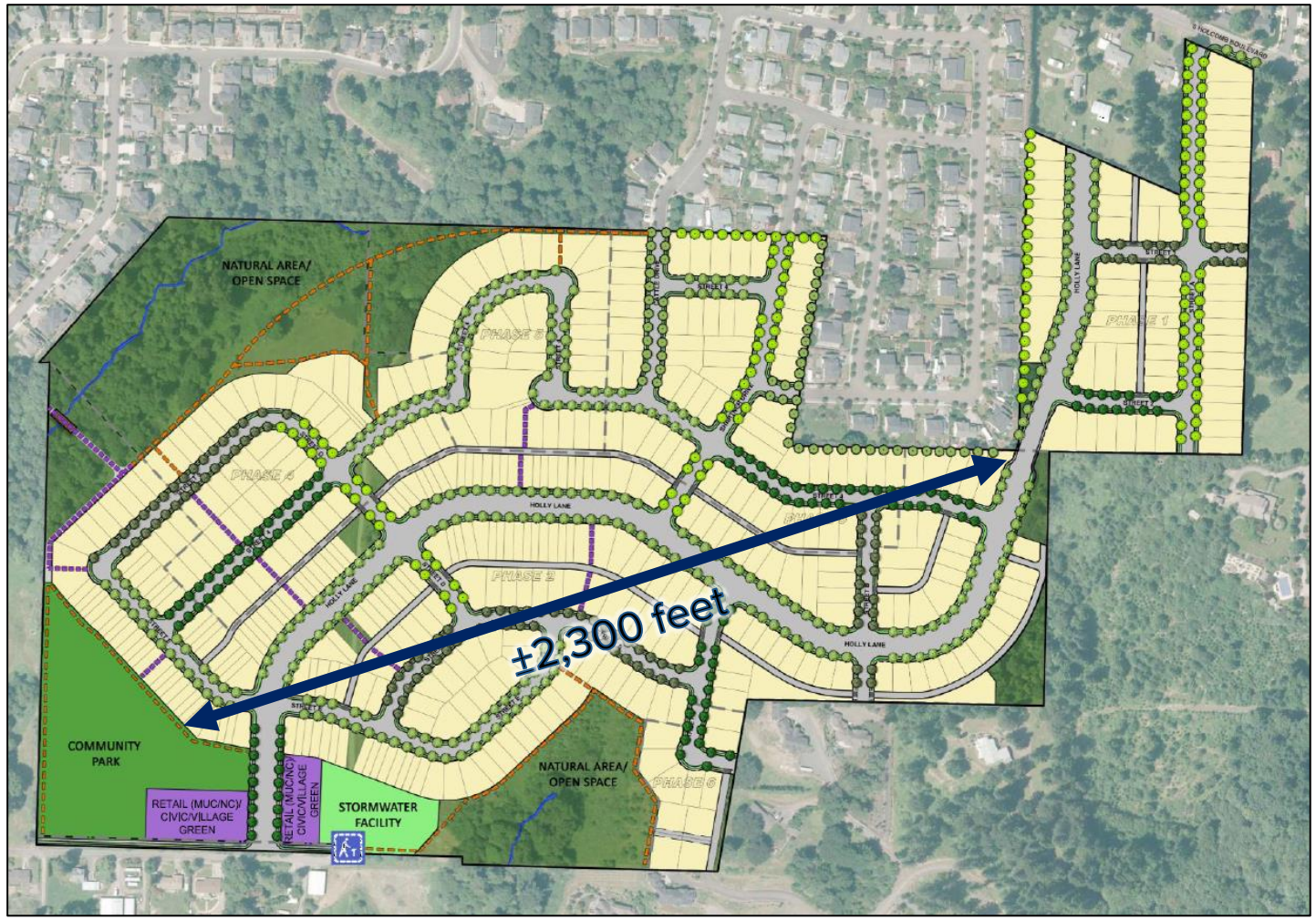


Parks and Open Space

- ±20.1 acres or 22% of the site dedicated to parks and open spaces
  - ±15.7 acres of open space
  - Greater than envisioned with Park Place Concept Plan
  - ±4.4-acre community park
  - Preserved natural areas with off-street trail connectivity

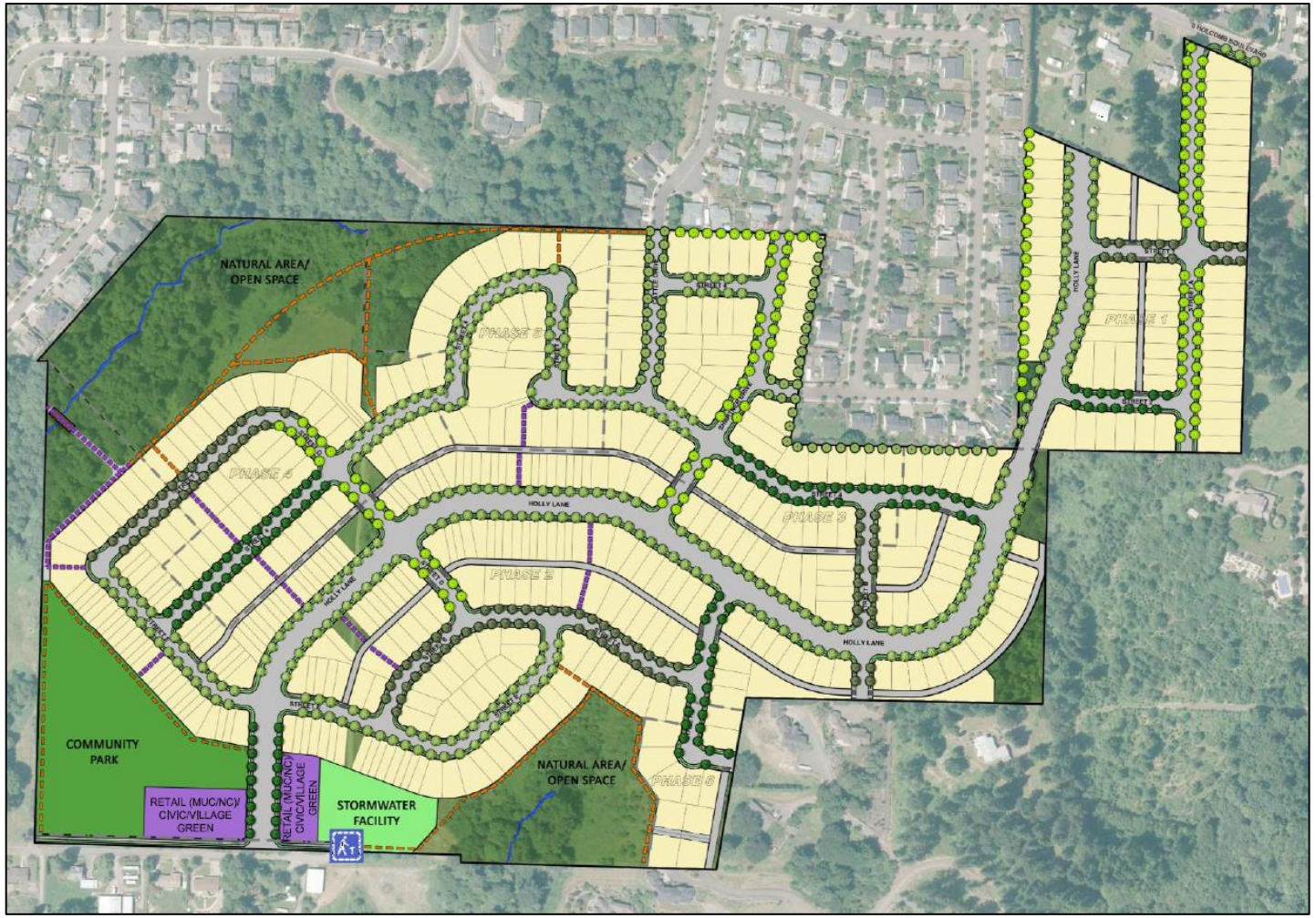


Condition 10 – Parkland Dedication



- Park not contiguous with Phase 1
- Further refinement subject to future DDPs
- Rough proportionality of Phase 1 park dedication
- Property not under control of Applicant until after Phase 1 approved and built

Condition 10 – Parkland Dedication



Condition 10 as written:
"The applicant shall dedicate a minimum of **4.4** acres of public park space in the location identified on the GDP exhibit at the time of final plat recording of **Phase 1** of the project"

Condition 10 as requested:
"The applicant shall dedicate a minimum of **4.1** acres of public park space in the location identified on the GDP exhibit at the time of final plat recording of **Phase 2** of the project"

Condition 18c - Additional Local Street

- Not opposed to providing additional connection
- Street connection would be required through planned stormwater facility
- Challenging grading

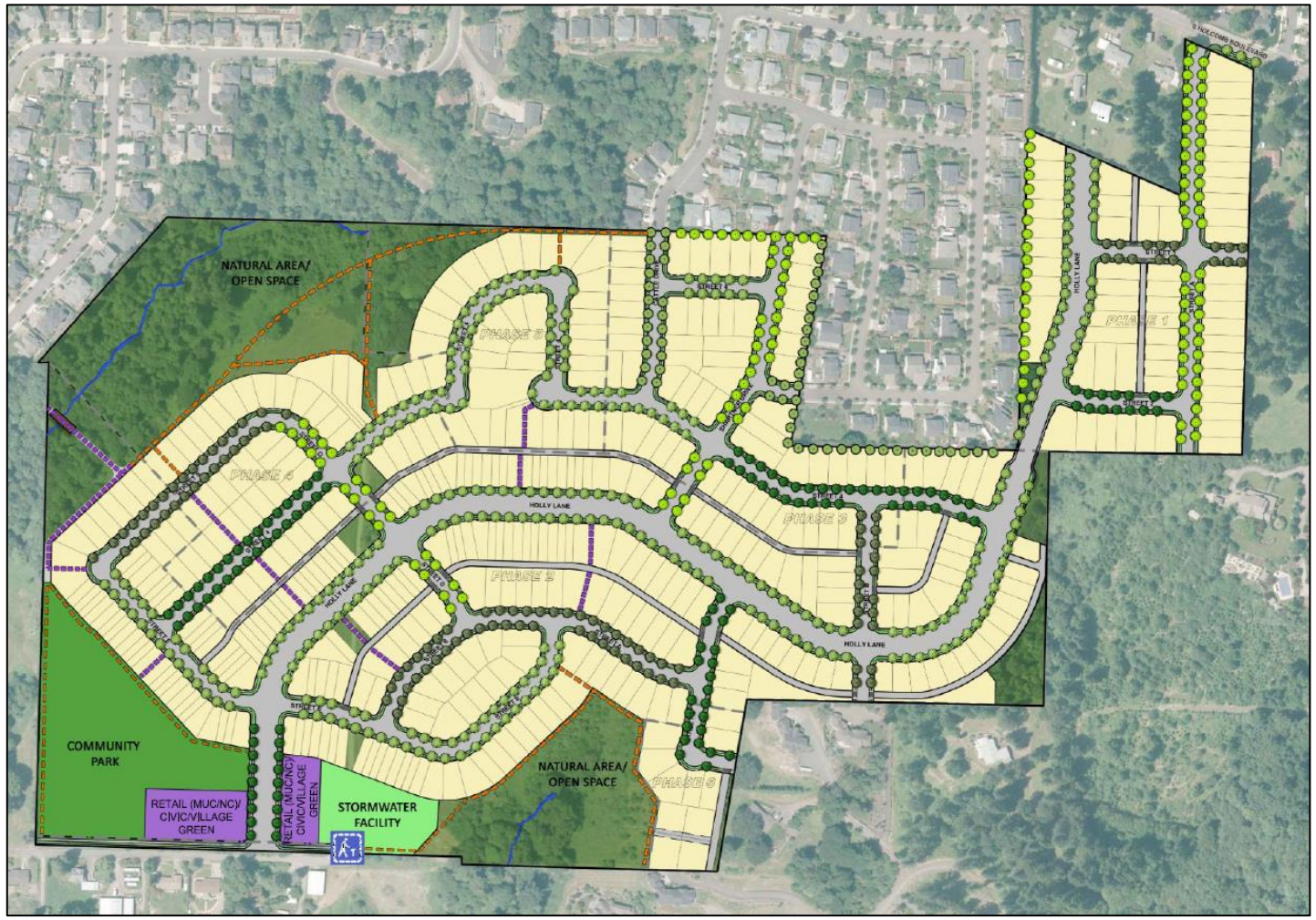


Condition 23c - Additional Local Street

Condition 23c as written:
“Provide an additional local street connection to the east of Holly Lane and South of Street E.”

Condition 23c as requested:
“The Applicant shall, as part of Phase 2 Detailed Development Plan, evaluate possible local street connections to Livesay Road.”

Questions?



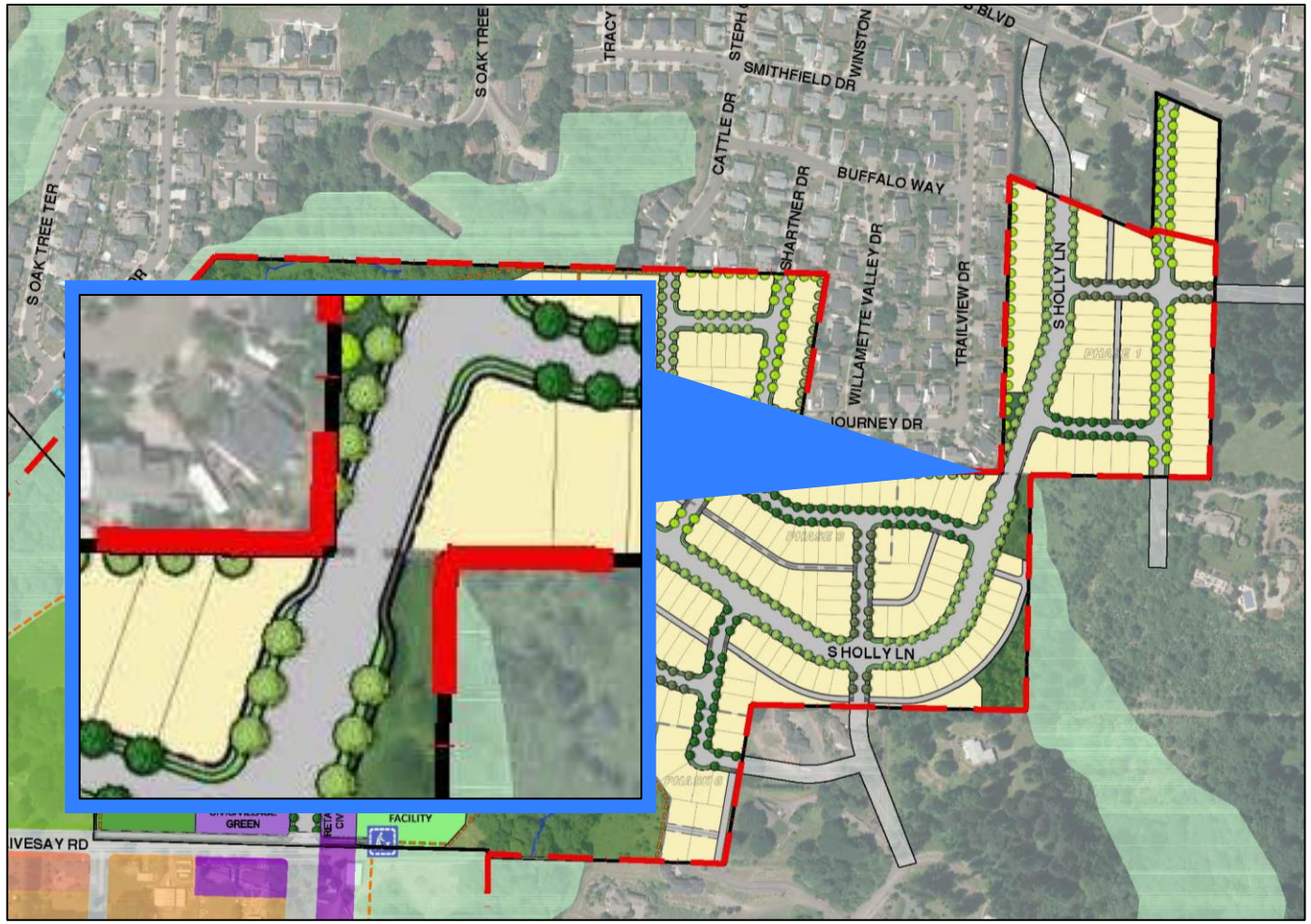
Chris Goodell, AICP, LEED AP
AKS Engineering & Forestry, LLC

Holly Lane Reduced Width Section

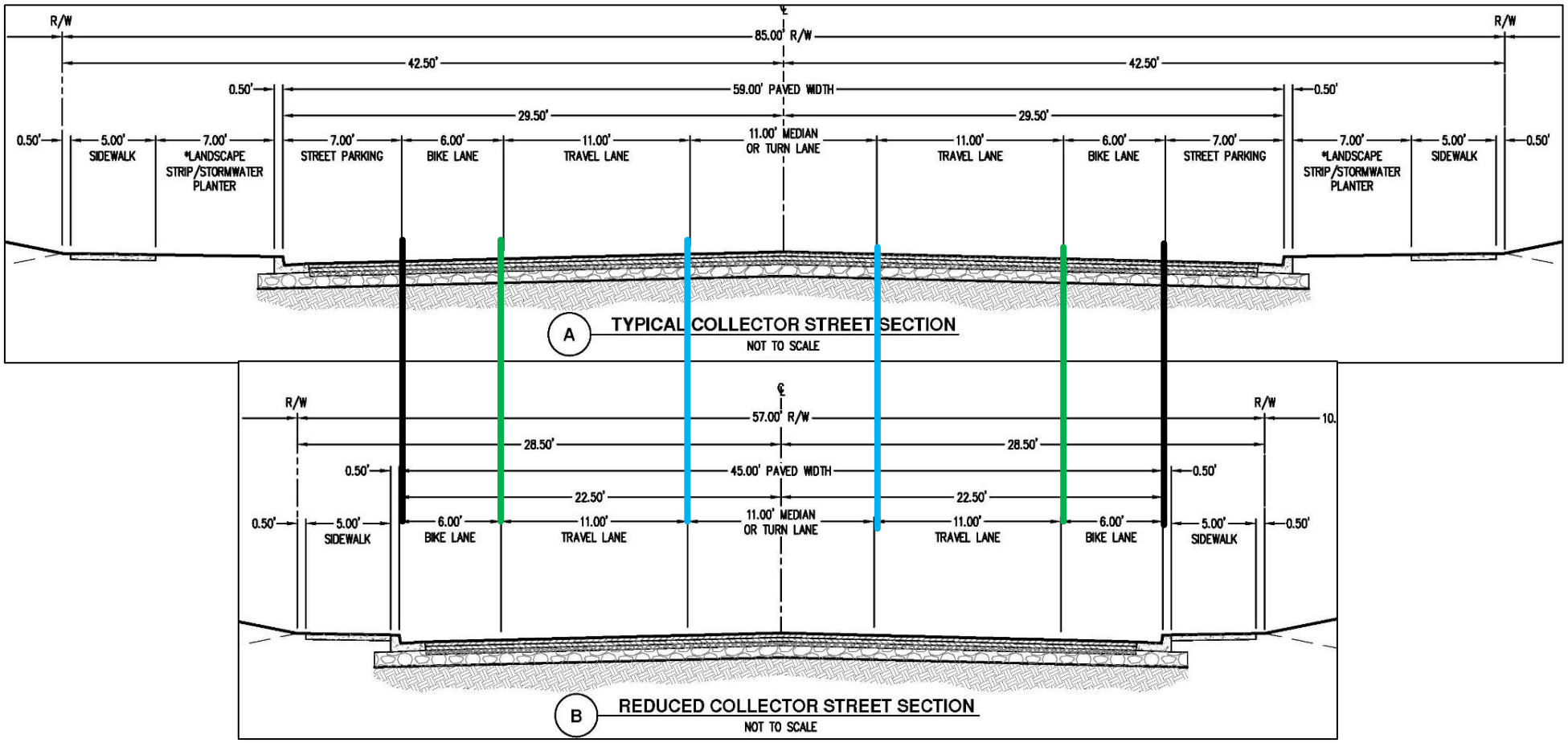
- Existing subdivision to west
- UGB to east
- Between Phase 1/Phase 2

±80 feet available – typical
Collector width is 85 feet

Reduced section removes on-street parking and planter strips only

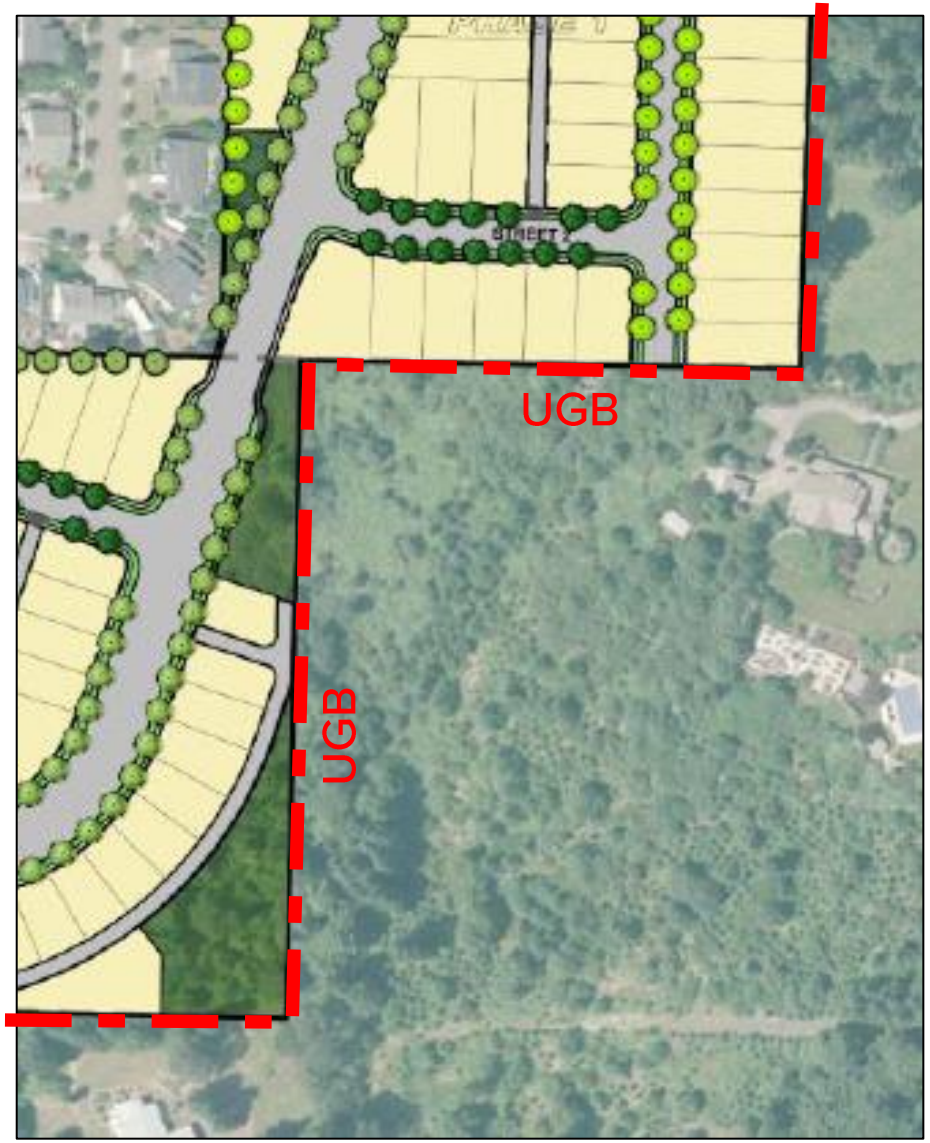


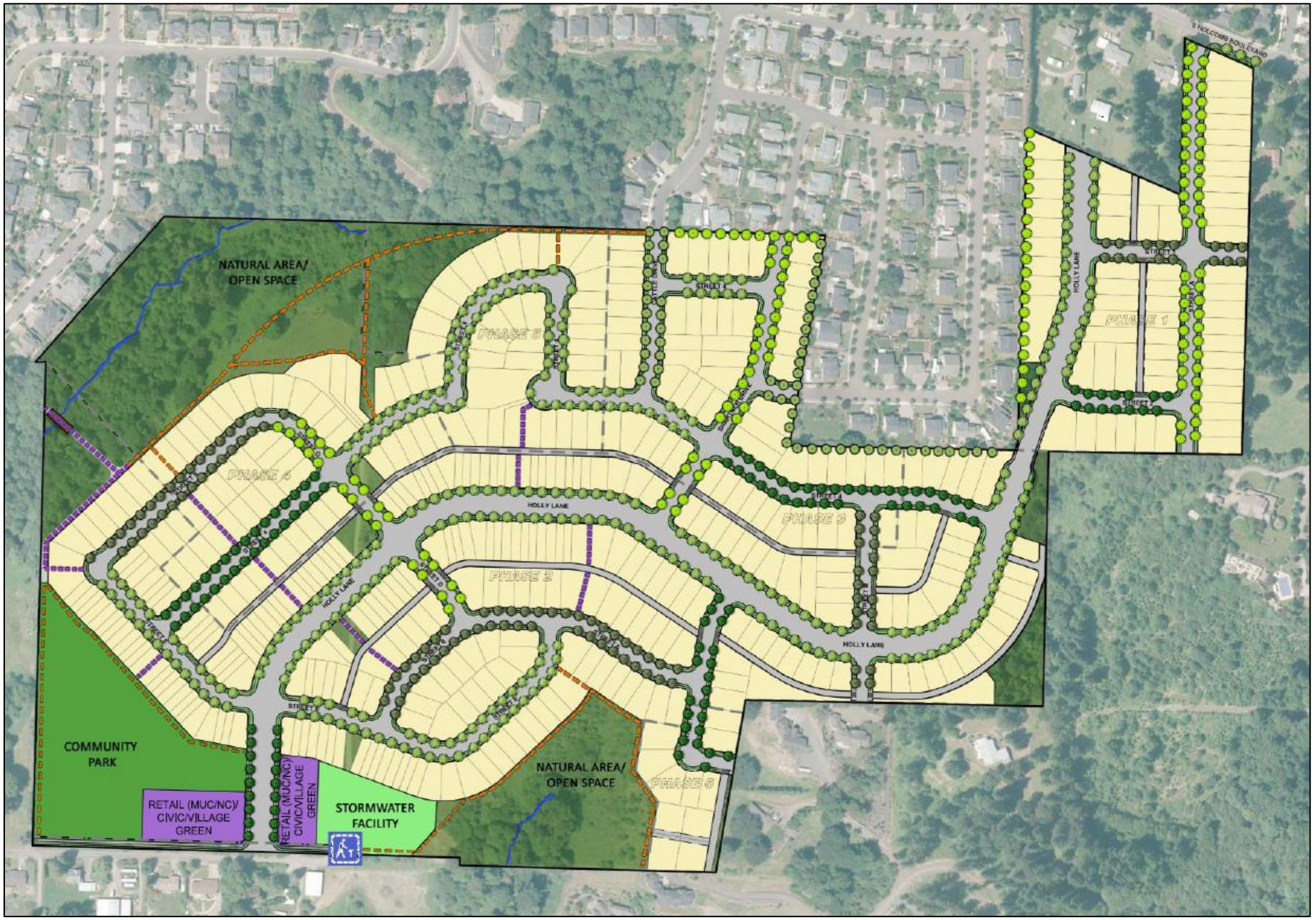
Holly Lane Reduced Width Section



Open Space Areas – SE Corner

- Phase 1/Phase 2
  - Open spaces, alley or street along majority boundaries
  - Seven lots between ±100 to ±500 feet away from neighboring home
- UGB follows project boundary




NATURAL AREA/
OPEN SPACE
PHASE 5
PHASE 1
PHASE 4
HOLLY LANE
PHASE 3
PHASE 2
COMMUNITY
PARK
RETAIL (MUC/NC)/
CIVIC/VILLAGE
GREEN
STORMWATER
FACILITY
NATURAL AREA/
OPEN SPACE
PHASE 6

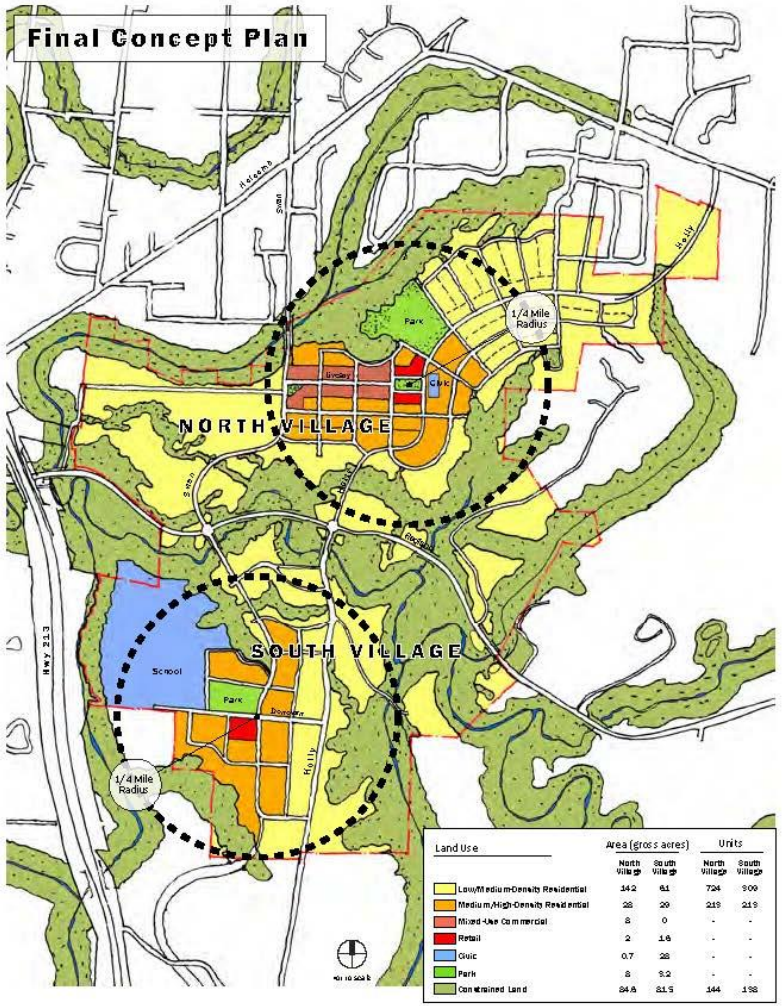
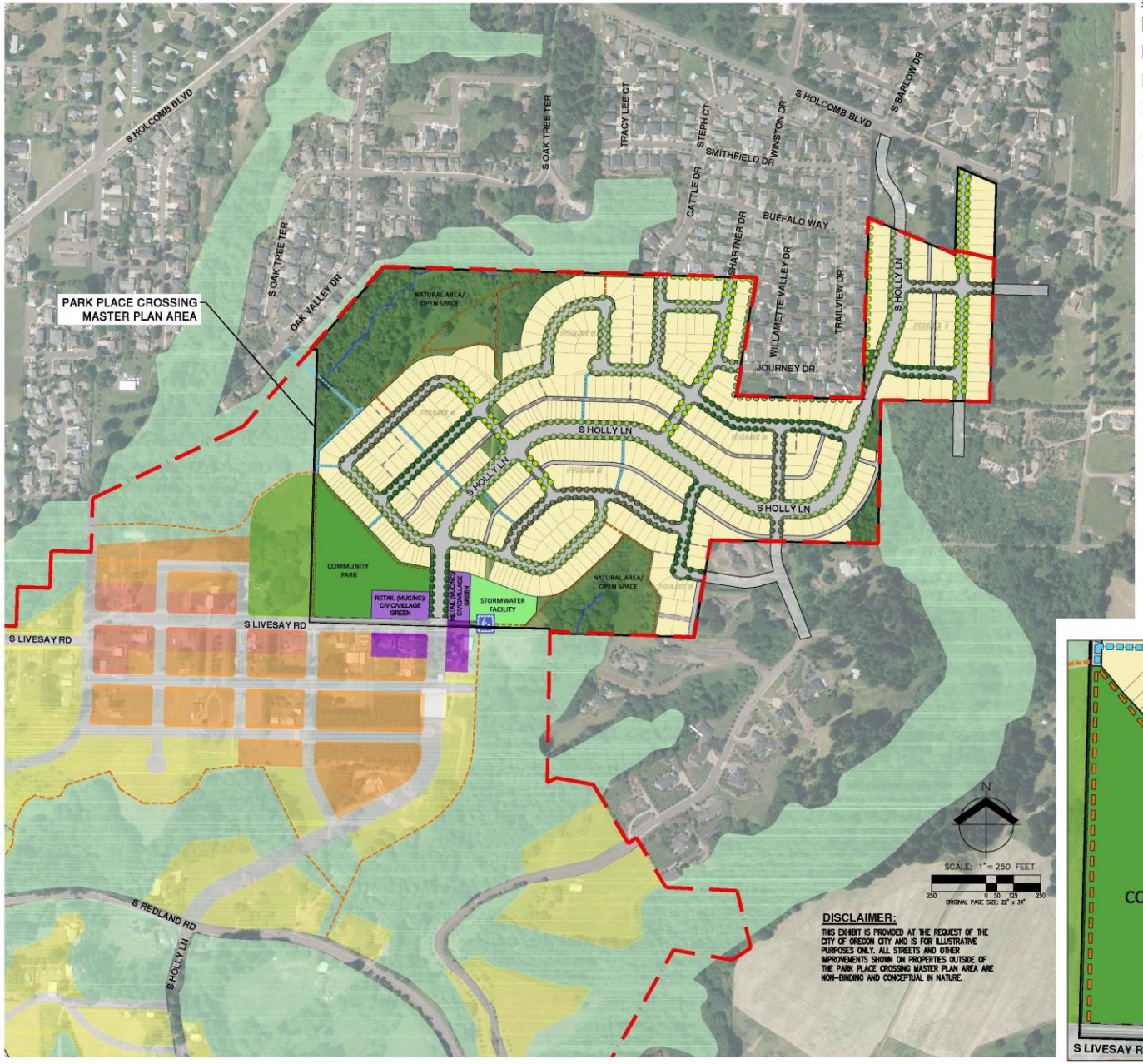


Figure 1-1. Park Place Concept Plan Urban Growth Diagram

This map is for concept planning purposes only. The specific locations of natural resource boundaries, open space, parks, land uses, roads, trails, infrastructure and related improvements may change and is subject to on-site verification and design at the time of development.



DISCLAIMER:

THIS EXHIBIT IS PROVIDED AT THE REQUEST OF THE CITY OF OREGON CITY AND IS FOR ILLUSTRATIVE PURPOSES ONLY. ALL STREETS AND OTHER IMPROVEMENTS SHOWN ON PROPERTIES OUTSIDE OF THE PARK PLACE CROSSING MASTER PLAN AREA ARE NON-BINDING AND CONCEPTUAL IN NATURE.

PARK PLACE CROSSING MASTER PLAN OPEN SPACE LEGEND

- RESIDENTIAL LOTS
- RETAIL (MUC/NC)/ CIVIC/ VILLAGE GREEN
- COMMUNITY PARK
- NATURAL AREA/ OPEN SPACE
- SOFT SURFACE TRAIL
- PAVED PEDESTRIAN ACCESSWAY
- TRAILHEAD

OREGON CITY PARK PLACE CONCEPT PLAN LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- RETAIL (MUC/NC)/CIVIC/VILLAGE GREEN
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- MIXED-USE COMMERCIAL
- PARK PLACE CONCEPT PLAN LIMITS
- PARK PLACE CROSSING MASTER PLAN LIMITS
- SOFT SURFACE TRAIL
- PAVED PEDESTRIAN ACCESSWAY

ACHIEVED CONCEPTUAL PARK PLACE CROSSING MASTER PLAN AREA SUMMARY PER THIS PLAN:

	ONSITE:	OFFSITE:	TOTAL:
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3 AC	±1.2 AC	±2.5 AC
COMMUNITY PARK*:	±4.4 AC	±4.0 AC	±8.4 AC

MEASURED PARK PLACE CONCEPT PLAN LAND USE AREA SUMMARY PER OCWEBMAPS^:

	ONSITE:	OFFSITE:	TOTAL:
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3 AC	±1.2 AC	±2.5 AC
COMMUNITY PARK:	±5.6 AC	±1.6 AC	±7.2 AC

*PER DISCUSSIONS WITH CITY STAFF, THE PARK PLACE CROSSING MASTER PLAN IS EXPECTED TO PROVIDE A PROPORTIONATE PERCENTAGE OF PARK LAND FOR ITS RESIDENTS. APPROXIMATELY 51 PERCENT OF THE PLANNED DWELLING UNITS FOR THE PARK PLACE CONCEPT PLAN AREA NORTH VILLAGE ARE INCLUDED WITHIN THIS MASTER PLAN (±476 PLANNED PARK PLACE CROSSING UNITS/937 TOTAL NORTH VILLAGE UNITS). THE NEIGHBORHOOD PARK REPRESENTS 8.0± ACRES IN THE PARK PLACE CONCEPT PLAN; THEREFORE, PARK PLACE CROSSING WOULD BE EXPECTED TO CONTRIBUTE PROPORTIONALLY ±51 PERCENT OF THE NEEDED AREA, OR ±4.1 ACRES. THIS PLAN ANTICIPATES THAT ±4.4 ACRES WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA WILL BE DEDICATED FOR THE PARK LAND.

^AREAS SHOWN ARE BASED ON MEASURING THE EXTENTS OF VARIOUS LAND USES IN THE OREGON CITY PARK PLACE CONCEPT PLAN AS SHOWN ON OCWEBMAPS.



ONSITE NORTH VILLAGE CENTER ENLARGEMENT

SCALE: 1" = 100'

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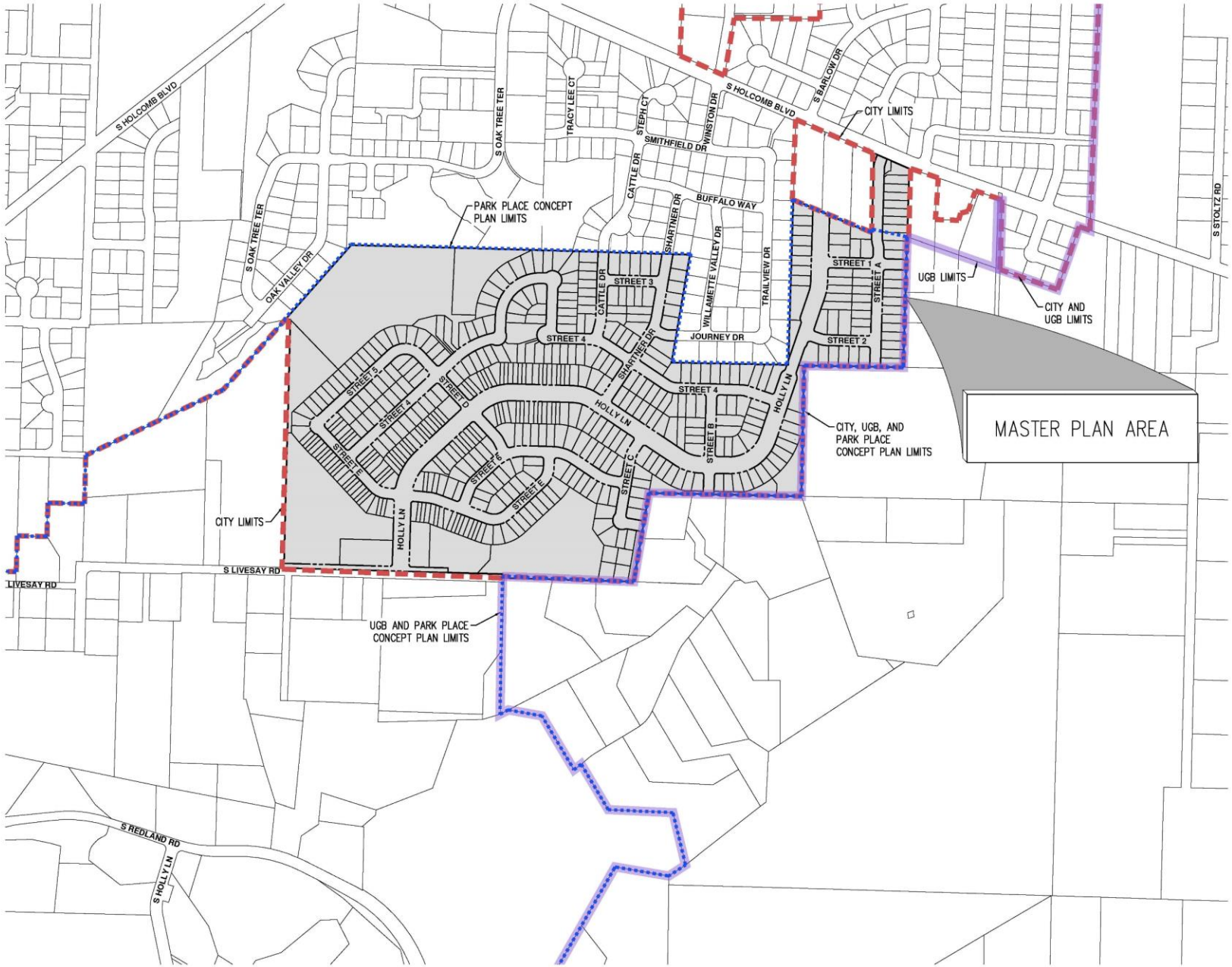
CONCEPTUAL PARK PLACE NORTH VILLAGE PLAN W/ENLARGEMENT
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REVIEW COPY ONLY

JOB NUMBER:	7404
DATE:	03/18/2022
DESIGNED BY:	CI
DRAWN BY:	NE
CHECKED BY:	CI

EXH-1

AKS DRAWING FILE: 7404 COLOR OFFSITE MOVITY.DWG | LAYOUT: EXH-2



LEGEND:

- CITY LIMITS
- UGB LIMITS
- PARK PLACE CONCEPT PLAN LIMITS
- AREA SUBJECT TO MASTER PLAN

N

SCALE: 1" = 250 FEET

250 0 50 125 250

ORIGINAL PAGE SIZE: 22" x 34"

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VICINITY MAP
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 25, 2006
MONTGOMERY B. HORLICK

PRELIMINARY NOT FOR CONSTRUCTION

RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CJ
DRAWN BY:	NB
CHECKED BY:	CJ

P-02

AKS DRAWING FILE: 7404 VICINITY.DWG | LAYOUT: P-02

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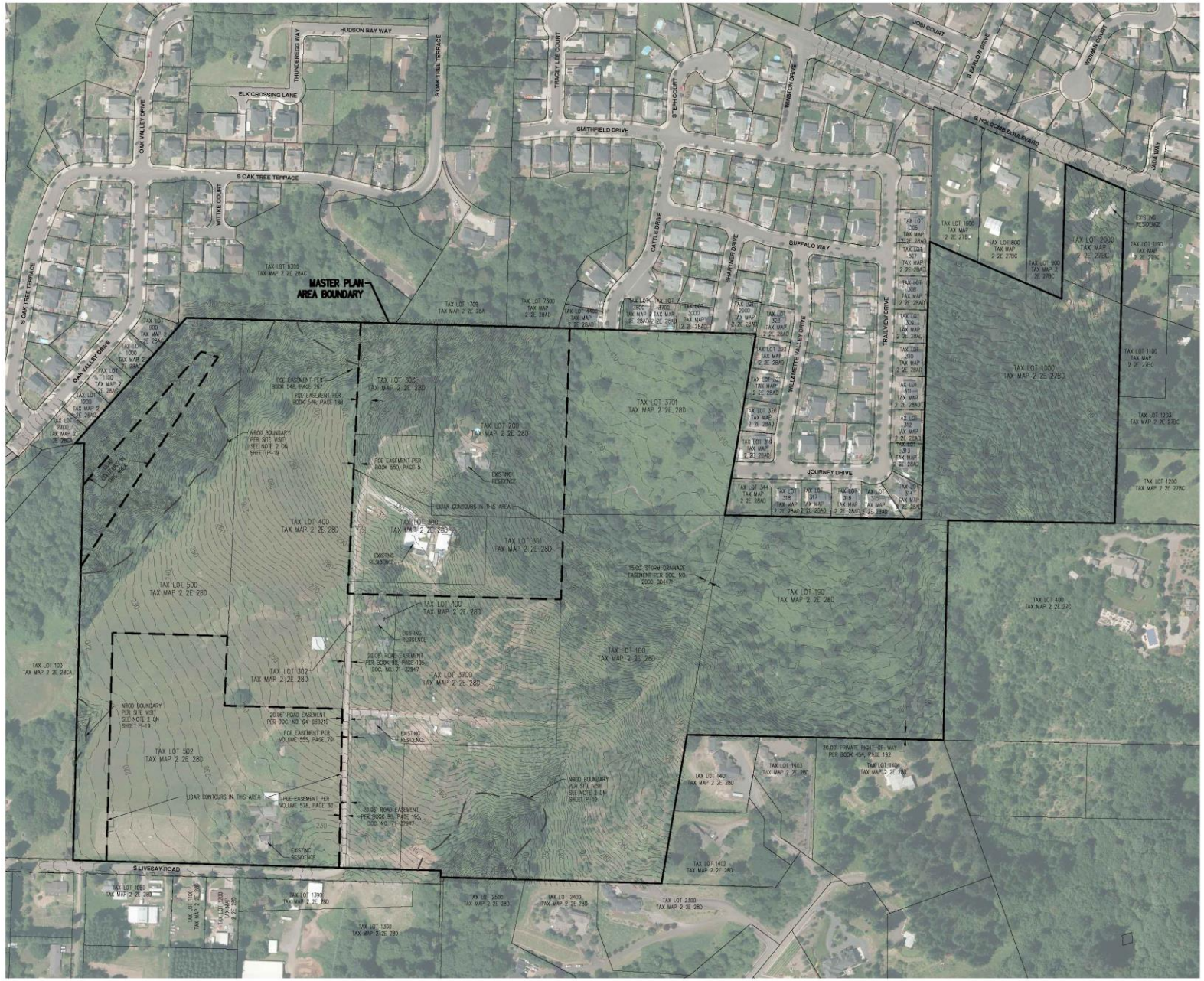
PRELIMINARY CONCEPT AND OPEN SPACE PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED LANDSCAPE ARCHITECT
PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER: 7404
DATE: 03/18/2022
DESIGNED BY:
DRAWN BY:
CHECKED BY:

P-03



NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 2 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
3. TAXLOTS 200, 300, 301, 303, AND 502 HAVE NOT BEEN SURVEYED, NOR HAVE THEY BEEN EVALUATED FOR NROD AREAS.
4. FOR SLOPE ANALYSIS AND NATURAL RESOURCE OVERLAY INFORMATION PLEASE REFER TO SHEETS P-19 AND P-20.
5. VERTICAL DATUM: ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION V 723 (PID RD1467) LOCATED AT THE SE CORNER OF HWY 99E AND HWY I-205. ELEVATION = 62.48 FEET (NAVD 88).
6. HORIZONTAL DATUM: A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.00000 BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.00011505561 AT A CALCULATED CENTRAL PROJECT POINT WITH GRID VALUES OF (NORTH 626648.798, EAST 7672411.244). THE MERIDIAN CONVERGENCE ANGLE AT THE CALCULATED CENTRAL POINT IS -1°27'43". THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
7. THIS IS NOT A PROPERTY BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY SURVEYOR. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.

EXISTING TAX LOT SUMMARY:

TAX LOT	# OF RESIDENCES	AREA (ACRE)
100:	NONE	14.3±
190:	NONE	10.8±
200:	1 RESIDENCE	5.2±
300:	1 RESIDENCE	3.1±
301:	NONE	1.4±
302:	NONE	0.4±
303:	NONE	1.8±
400:	1 RESIDENCE	10.4±
500:	NONE	10.3±
502:	1 RESIDENCE	9.4±
1000:	NONE	9.7±
2000:	1 RESIDENCE	1.5±
3700:	1 RESIDENCE	6.8±
3701:	NONE	6.6±
TOTAL:	6 RESIDENCES	91.7±

N

SCALE: 1" = 150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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PRELIMINARY EXISTING CONDITIONS PLAN WITH AERIAL PHOTO
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 13, 2004
MONTGOMERY B. HORNER
RENEWAL DATE: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CJ
DRAWN BY:	NB
CHECKED BY:	CJ

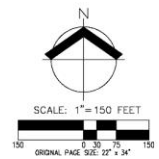
P-04

AKS DRAWING FILE: 7404 EXISTING-PHOTOLINE | LAYOUT: P-04



NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 2 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
3. TAXLOTS 200, 300, 301, 303, AND 502 HAVE NOT BEEN SURVEYED, NOR HAVE THEY BEEN EVALUATED FOR NROD AREAS.
4. FOR SLOPE ANALYSIS AND NATURAL RESOURCE OVERLAY INFORMATION PLEASE REFER TO SHEETS P-19 AND P-20.
5. VERTICAL DATUM: ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION V 723 (PID RD1497) LOCATED AT THE SE CORNER OF HWY 99E AND HWY I-205. ELEVATION = 62.48 FEET (NAVD 88).
6. HORIZONTAL DATUM: A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000 BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0001150551 AT A CALCULATED CENTRAL PROJECT POINT WITH GRID VALUES OF (NORTH 626648.798, EAST 7672411.244). THE MERIDIAN CONVERGENCE ANGLE AT THE CALCULATED CENTRAL POINT IS -1°27'43". THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
7. THIS IS NOT A PROPERTY BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY SURVEYOR. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.
8. TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.



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PRELIMINARY EXISTING CONDITIONS PLAN WITH TREES
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL LANDSCAPE ARCHITECT
OREGON
MONTGOMERY B. HORNICK
RENEWAL DATE: 6/30/23
PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
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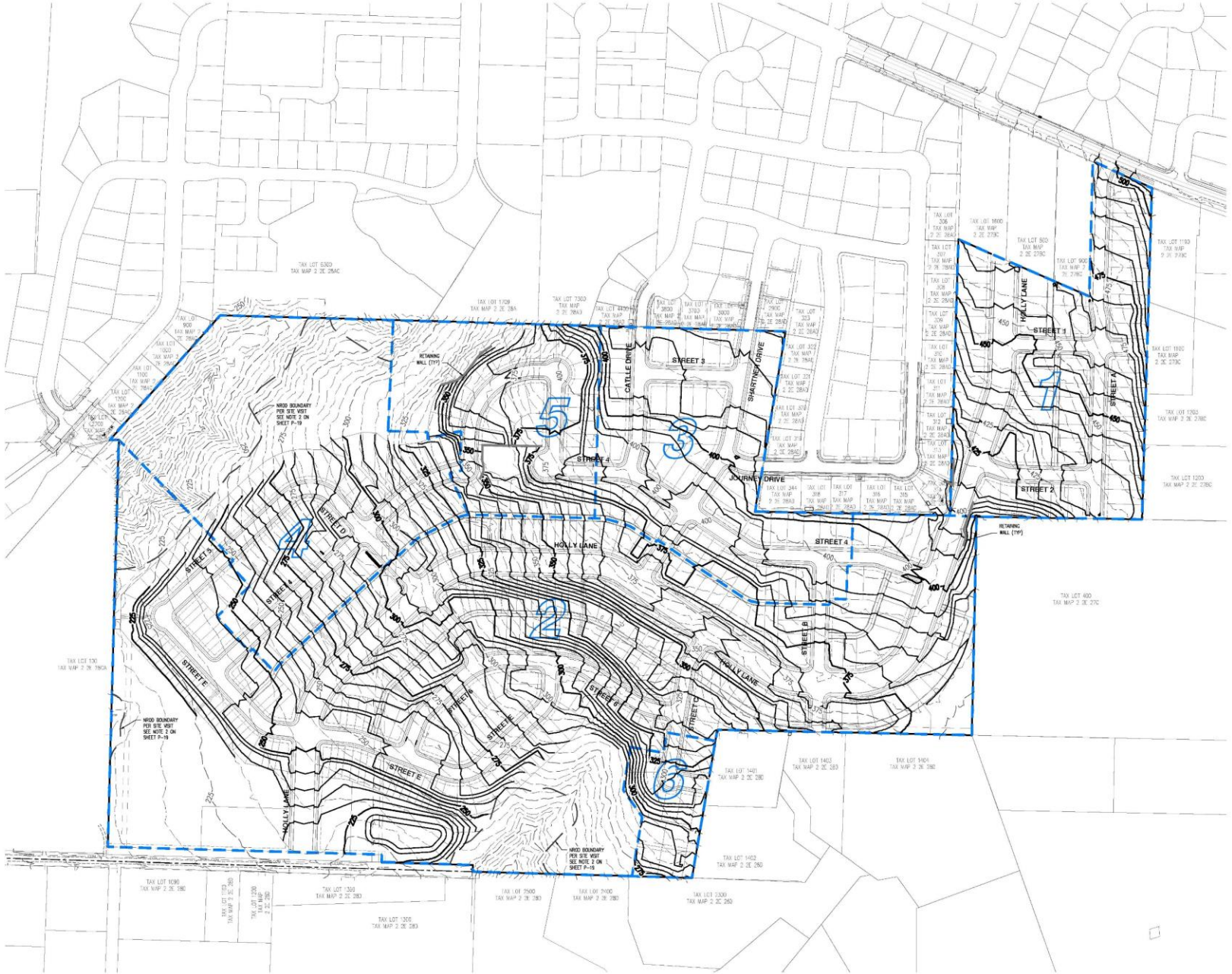
DRAWN BY:	NB
CHECKED BY:	OF

P-05

AKS DRAWING FILE: 7404 EXISTING TREE DWG | LAYOUT: P-05



NOTES:

1. EXISTING CONDITION INFORMATION SHOWN IS BASED ON A VARIETY OF SOURCES INCLUDING: TOPOGRAPHIC AND UTILITY SURVEYING, BOUNDARY SURVEYING, GEOGRAPHIC INFORMATION SYSTEM (GIS), AERIAL PHOTOGRAPH AND TAX ASSESSOR MAP INFORMATION. ALL DIMENSIONS AND AREAS SHOWN ARE PRELIMINARY AND APPROXIMATE.
2. CONTOUR INTERVAL IS 5 FEET. CONTOURS SHOWN ARE PER A MIX OF SURVEYED ELEVATIONS AND LIDAR DATA AND SHOULD BE CONSIDERED APPROXIMATE.
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LEGEND

EXISTING GROUND CONTOUR (5 FT)	
EXISTING GROUND CONTOUR (25 FT)	350
FINISHED GRADE CONTOUR (5 FT)	
FINISHED GRADE CONTOUR (25 FT)	325

N

SCALE: 1"=150 FEET

150 0 30 75 150

ORIGINAL PAGE SIZE: 22" x 34"

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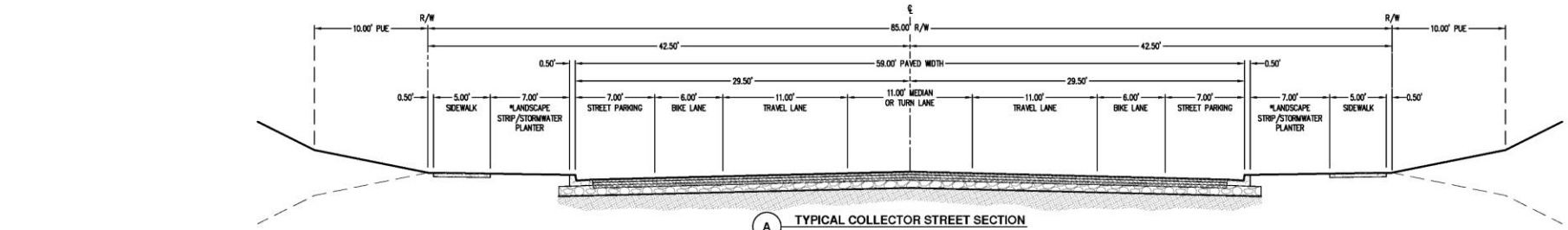
PRELIMINARY GRADING PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY NOT FOR CONSTRUCTION
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

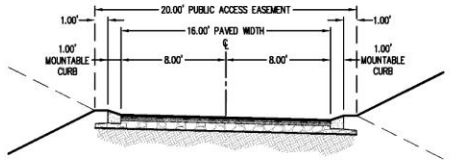
JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	C
DRAWN BY:	N
CHECKED BY:	C

P-06

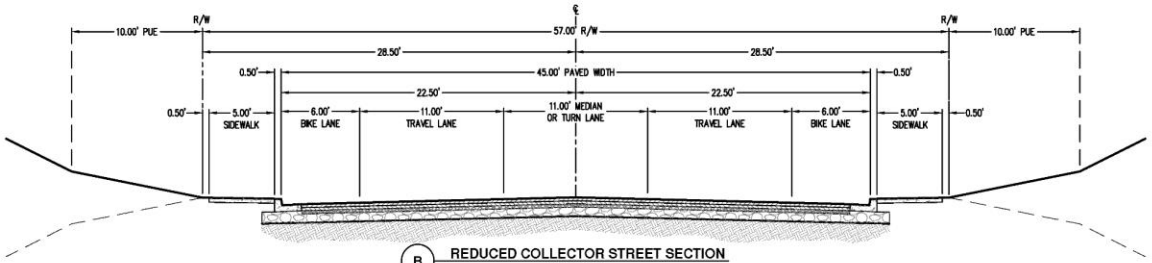
AKS DRAWING FILE: 7404 GRADING.DWG | LAYOUT: P-06



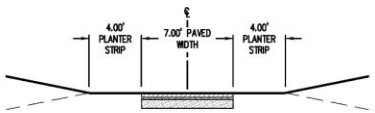
A TYPICAL COLLECTOR STREET SECTION
NOT TO SCALE
HOLLY LANE
*SEE NOTE



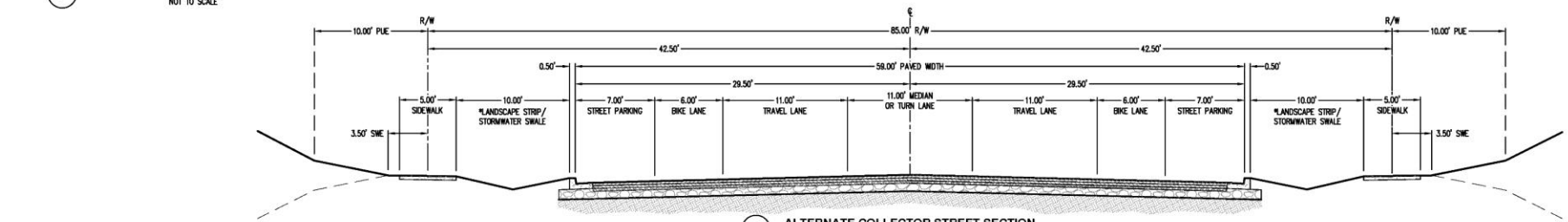
G ALLEY SECTION
NOT TO SCALE



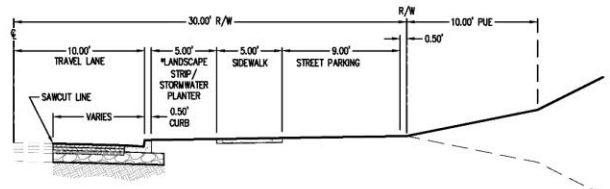
B REDUCED COLLECTOR STREET SECTION
NOT TO SCALE
REDUCED HOLLY LANE (BETWEEN TAX LOT 314 TAX MAP 2 2E 28AD AND TAX LOT 400 TAX MAP 2 2E 27C.)



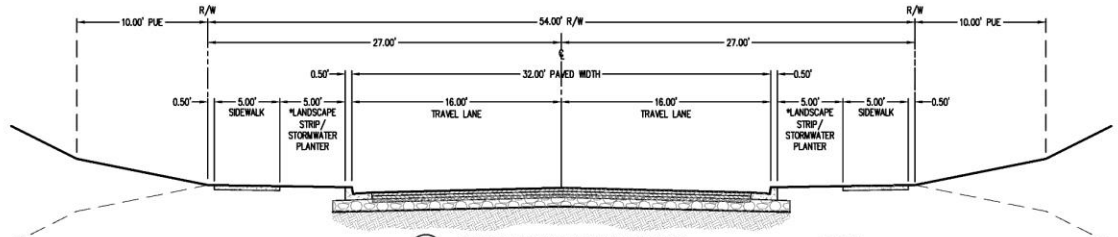
F PEDESTRIAN ACCESSWAY SECTION
NOT TO SCALE



C ALTERNATE COLLECTOR STREET SECTION
NOT TO SCALE
HOLLY LANE
*SEE NOTE



E S HOLCOMB BOULEVARD HALF STREET SECTION
NOT TO SCALE



D TYPICAL LOCAL STREET SECTION
NOT TO SCALE
STREET 1, STREET 2, STREET 3, STREET 4, STREET 5, STREET 6, STREET A, STREET B, STREET C, STREET D, STREET E, CATTLE DRIVE, SHARTNER DRIVE
*SEE NOTE

NOTE:
*STORMWATER PLANTERS/SWALES ARE SHOWN FOR ILLUSTRATIVE PURPOSES. PLANTERS/SWALES WILL BE IMPLEMENTED IN THE LANDSCAPE STRIPS AS DEEMED NECESSARY, REQUIRED, AND PRACTICAL. DETAILED PLANTER/SWALE INFO WILL BE INCLUDED ON FUTURE DETAILED DEVELOPMENT PLANS.

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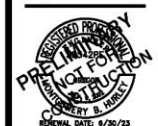
PRELIMINARY STREET CROSS-SECTIONS
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR



JOB NUMBER:	7404
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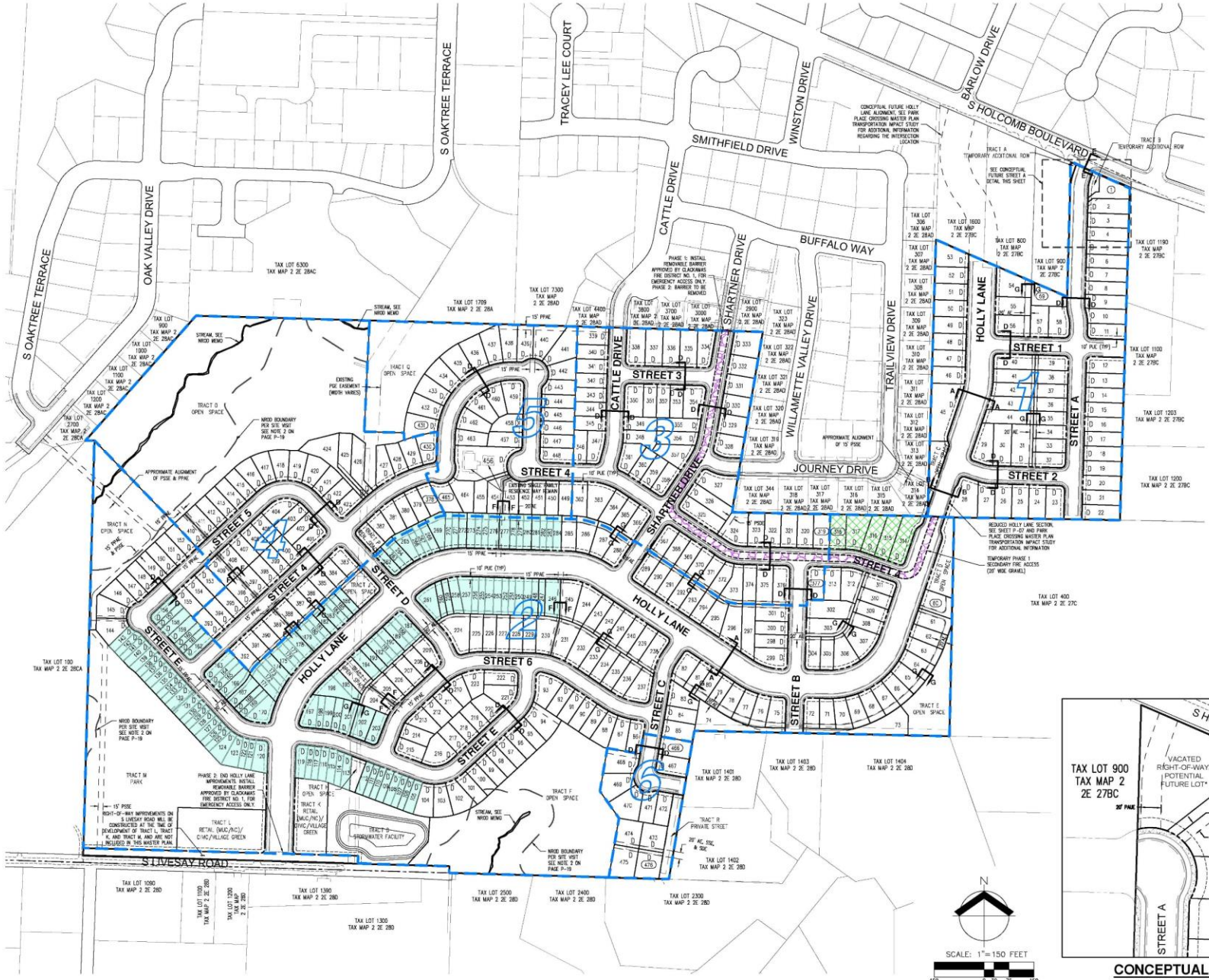
DESIGNED BY:	CI
DRAWN BY:	NB
CHECKED BY:	CI

P-07

AKS DRAWING FILE: 7404 STREET SECTIONS.DWG | LAYOUT: P-07



CONCEPTUAL FUTURE STREET A DETAIL

SCALE: 1" = 50'

NOTE:

*STREET A CONNECTION TO S HOLCOMB BOULEVARD IS AN INTERIM ACCESS THAT WILL NO LONGER BE NECESSARY UPON THE CONNECTION OF HOLLY LANE TO HOLCOMB BOULEVARD. WHEN THE INTERSECTION OF HOLLY LANE AND HOLCOMB BOULEVARD IS ESTABLISHED, THE NORTH END OF STREET A WILL BE ABANDONED, VACATED, AND OWNERSHIP RETURNED TO THE DECLARANT WITH APPROPRIATE EASEMENTS REMAINING IN PLACE.

EASEMENT LEGEND:

AE	PRIVATE ACCESS EASEMENT (ALLEY)
PAUE	PUBLIC ACCESS AND UTILITY EASEMENT
PSDE	PUBLIC STORM DRAINAGE EASEMENT
PSSE	PUBLIC SANITARY SEWER EASEMENT
PPAE	PUBLIC PEDESTRIAN ACCESS EASEMENT
PUE	PUBLIC UTILITY EASEMENT
SDE	PRIVATE STORM DRAINAGE EASEMENT
SSE	PRIVATE SANITARY SEWER EASEMENT

LEGEND:

- TEMPORARY PHASE 1 STORM FACILITY SEE COMPOSITE UTILITY PLAN FOR ADDITIONAL INFORMATION
- TEMPORARY PHASE 1 SECONDARY FIRE ACCESS TO BE REMOVED DURING PHASE 2
- D — APPROXIMATE DRIVEWAY LOCATION. LOTS WITHOUT A 'D' DESIGNATION EITHER SHARE ACCESS WITH AN ADJACENT LOT OR ARE ALLEY ACCESS
- ATTACHED SINGLE-FAMILY LOT

PARK PLACE CROSSING MASTER PLAN DEVELOPMENT STANDARDS:

LOT DIMENSIONS
- MIN. LOT SIZE:
  - ** SINGLE-FAMILY DETACHED – 4,000 SF
  - ** SINGLE-FAMILY ATTACHED – 1,800 SF
- MIN. LOT WIDTH AT BUILDING LINE
  - ** SINGLE-FAMILY DETACHED – 35'
  - ** SINGLE-FAMILY ATTACHED – 20'
- MIN. LOT DEPTH AT BUILDING LINE – 70'
- MIN. STREET FRONTAGE – 20' UNLESS FLAG LOT

MIN. SETBACKS:
- FRONT – 10', 5' PORCH
- REAR – 20', 15' PORCH, 10' ADU
- GARAGE – 20' FROM ROW, 5' FROM ALLEY
- SIDE – 5' INTERIOR, 7' CORNER

REFER TO THE MASTER PLAN NARRATIVE FOR INFORMATION REGARDING BASE ZONES, DIMENSIONAL STANDARDS, APPLIED ADJUSTMENTS, VARIANCE, AND EXCEPTIONS.

UNIT TYPE AND OPEN SPACE SUMMARY:

PHASE 1:
- SINGLE FAMILY DETACHED: 59
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 0.1± ACRE

PHASE 2:
- SINGLE FAMILY DETACHED: 133
- SINGLE FAMILY ATTACHED: 126
- OPEN SPACE: 6.5± ACRE

PHASE 3:
- SINGLE FAMILY DETACHED: 59
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 0.0± ACRE

PHASE 4:
- SINGLE FAMILY DETACHED: 53
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 7.8± ACRE

PHASE 5:
- SINGLE FAMILY DETACHED: 35
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 1.5± ACRE

PHASE 6:
- SINGLE FAMILY DETACHED: 11
- SINGLE FAMILY ATTACHED: 0
- OPEN SPACE: 0.0± ACRE

TOTAL:
- SINGLE FAMILY DETACHED: 350 (74%)
- SINGLE FAMILY ATTACHED: 126 (26%)
- OPEN SPACE: 15.7± ACRE

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PRELIMINARY SITE AND PHASING PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 27, 2010
CHERYL B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CJ
DRAWN BY:	NB
CHECKED BY:	CJ

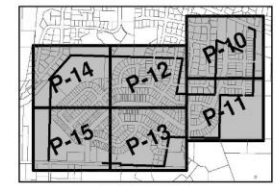
P-08

AKS DRAWING FILE: 7404 PHASINGCOMB | LAYOUT: P-08



UTILITY LEGEND

	EXISTING	PROPOSED
STORM DRAIN DRAIN LINE	STM	STM
STORM DRAIN DRAIN CLEAN OUT		
STORM DRAIN DRAIN CATCH BASIN		
STORM DRAIN DRAIN AREA DRAIN		
STORM DRAIN DRAIN MANHOLE		
SANITARY SEWER LINE	SAN	SAN
SANITARY SEWER CLEAN OUT		
SANITARY SEWER MANHOLE		
WATER LINE	WAT	WAT
FIRE HYDRANT		
WATER BLOWOFF		
WATER METER		
WATER VALVE		



KEY MAP
SCALE: 1" = 1000'

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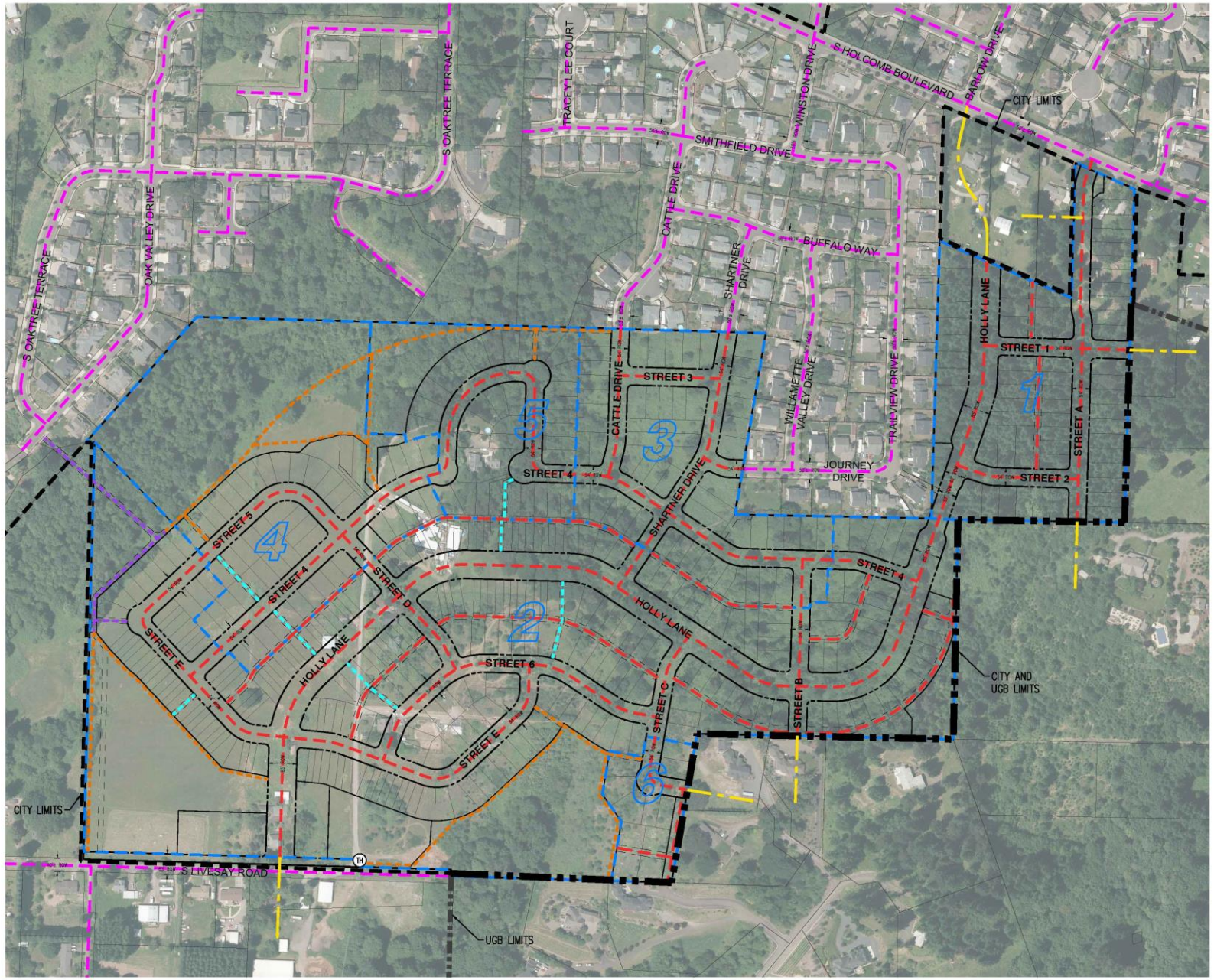
PRELIMINARY COMPOSITE UTILITY PLAN - OVERALL
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	

P-09

AKS DRAWING FILE: 7404 COMPOSITE UTILITY.DWG | LAYOUT: P-09



LEGEND:

- VEHICULAR, PEDESTRIAN, AND BICYCLE ACCESS STREETS, PRIVATE STREETS, AND ALLEYS
- PAVED PEDESTRIAN ACCESSWAY
- SOFT SURFACE TRAIL
- PAVED TRAIL
- EXISTING OFF-SITE STREETS
- FUTURE OFF-SITE STREETS
- TH TRAILHEAD, SEE SHEET P-11

NOTES:

1. POTENTIAL OFF-SITE FUTURE STREETS ARE FOR ILLUSTRATIVE PURPOSES ONLY. THESE AREAS ARE NOT INCLUDED IN THIS GENERAL DEVELOPMENT PLAN AND DEVELOPMENT OF THESE OFF-SITE PROPERTIES IS NOT INCLUDED WITH THIS PROJECT.
2. STREETS AS SHOWN ARE NOT BINDING ON OFF-SITE PROPERTIES.
3. TRAIL AND PEDESTRIAN BRIDGE ALIGNMENTS ARE PRELIMINARY AND MAY BE ADJUSTED WITH FUTURE DETAILED DEVELOPMENT PLANS.

N

SCALE: 1"=150 FEET

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ORIGINAL PAGE SIZE: 22" x 34"

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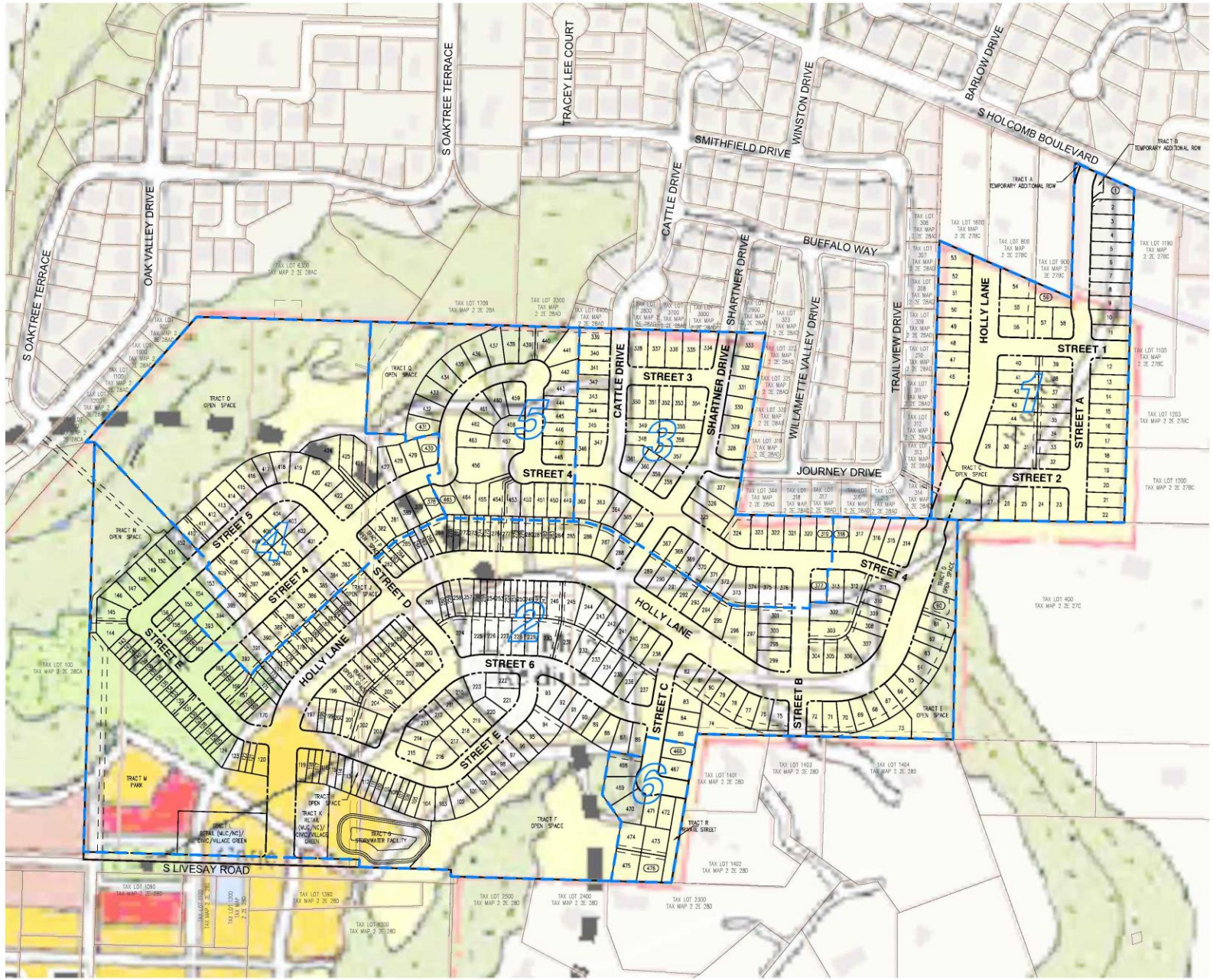
PRELIMINARY NEIGHBORHOOD CIRCULATION PLAN
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY NOT FOR CONSTRUCTION
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	C
DRAWN BY:	N
CHECKED BY:	C

P-16

AKS DRAWING FILE: 7404 CIRCULATION.DWG | LAYOUT: P-16



NOTE:

CONCEPT PLAN OVERLAY IS PER OREGON CITY WEBMAPS.

OREGON CITY PARK PLACE CONCEPT PLAN OVERLAY LEGEND:

- LOW/MEDIUM DENSITY RESIDENTIAL
- MEDIUM/HIGH DENSITY RESIDENTIAL
- COMMUNITY PARK
- CONSTRAINED LAND (OPEN SPACE)
- RETAIL (MUC/NC)
- CIVIC

PARK PLACE CROSSING MASTER PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±15.7
STORM FACILITY:	±1.2
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3
COMMUNITY PARK:	±4.4*
REMAINING AREA:	±69.1

OREGON CITY PARK PLACE CONCEPT PLAN AREA BREAKDOWN (ACRES):

TOTAL SITE AREA:	±91.7
OPEN SPACE:	±11.4
RETAIL (MUC/NC)/ CIVIC/VILLAGE GREEN:	±1.3
COMMUNITY PARK:	±4.1*
REMAINING AREA:	±74.9

NOTE:

*PER DISCUSSIONS WITH CITY STAFF, THE PARK PLACE CROSSING MASTER PLAN IS EXPECTED TO PROVIDE A PROPORTIONATE PERCENTAGE OF PARK LAND FOR ITS RESIDENTS. APPROXIMATELY 51 PERCENT OF THE PLANNED DWELLING UNITS FOR THE PARK PLACE CONCEPT PLAN AREA NORTH VILLAGE ARE INCLUDED WITHIN THIS MASTER PLAN (±476 PLANNED PARK PLACE CROSSING UNITS/937 TOTAL NORTH VILLAGE UNITS). THE NEIGHBORHOOD PARK REPRESENTS ±8.0 ACRES ON THE PARK PLACE CONCEPT PLAN; THEREFORE, PARK PLACE CROSSING WOULD BE EXPECTED TO CONTRIBUTE PROPORTIONALLY ±51 PERCENT OF THE NEEDED AREA, OR ±4.1 ACRES. THIS APPLICATION ANTICIPATES THAT ±4.4 ACRES WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA WILL BE DEDICATED FOR THE PARK LAND. TECHNICAL DETAILS FOR HOW THE PARK LAND WILL BE REQUIRED/TRANSFERRED ARE BEING COORDINATED WITH THE CITY OF OREGON CITY PARKS DEPARTMENT.

LAYOUT SUMMARY:

SINGLE-FAMILY ATTACHED DWELLING UNITS: 126
SINGLE-FAMILY DETACHED DWELLING UNITS: 350
TOTAL DWELLING UNITS: 476

PROPORTIONAL SHARE = 476/937^ = 0.51 = 51%

^937 IS THE ANTICIPATED TOTAL DWELLING UNITS IN THE NORTH VILLAGE PER THE PARK PLACE CONCEPT PLAN

N

SCALE: 1"=150 FEET

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CITY OF OREGON CITY PARK PLACE CONCEPT PLAN OVERLAY MAP
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

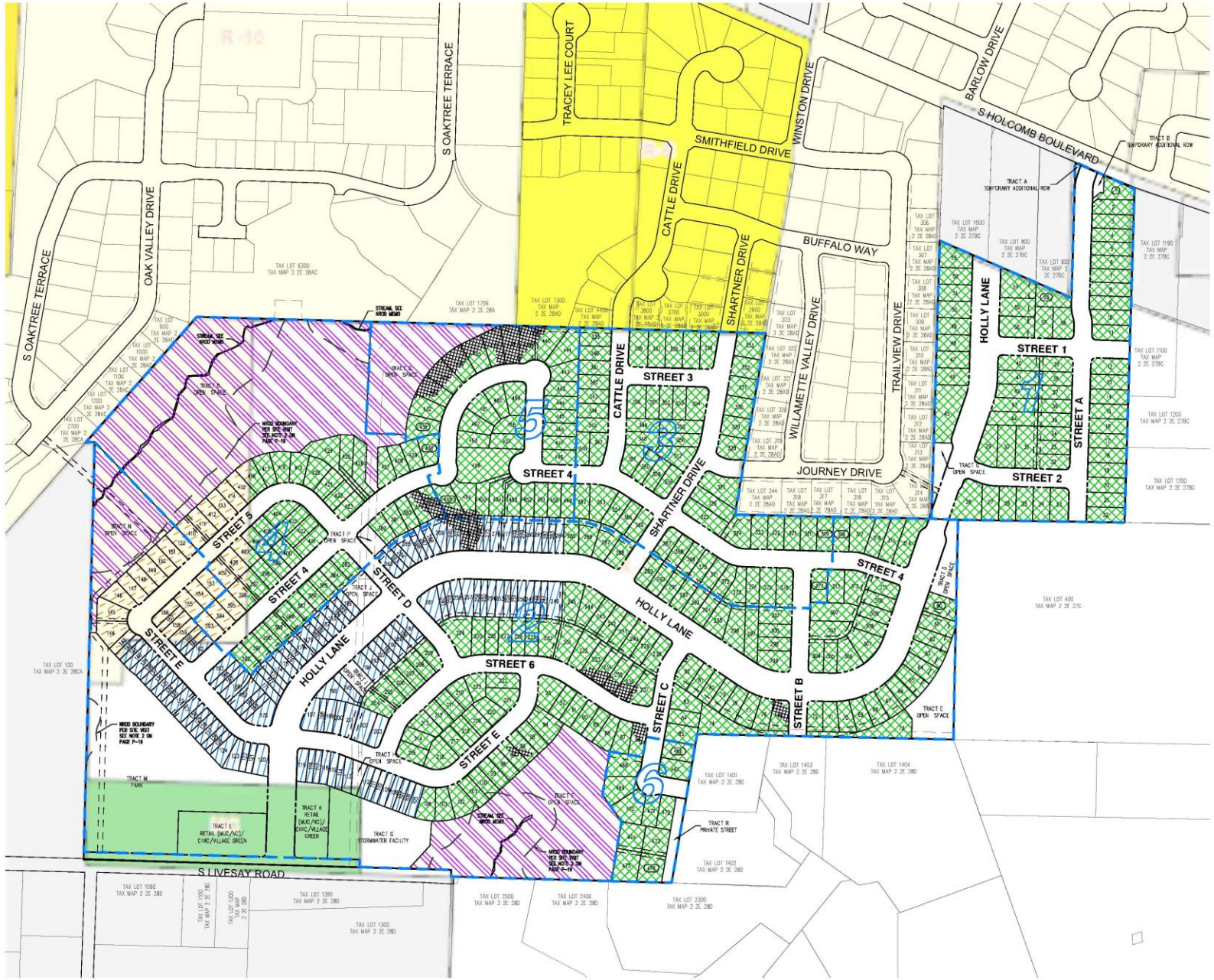
REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	C
DRAWN BY:	N
CHECKED BY:	C

P-17

AKS DRAWING FILE: 7404 CONCEPT.DWG | LAYOUT: P-17



NOTE:

1. ZONING OVERLAY AND GEOLOGIC HAZARD AREAS ARE PER OREGON CITY WEBMAPS.
2. PORTIONS OF THE MAPPED GEOLOGIC HAZARD – STEEP SLOPE AREAS WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA PER OREGON CITY WEBMAPS ARE A RESULT OF MAN-MADE ACTIVITIES (I.E. HOUSES, DRIVEWAYS, ROADS, ETC.).

ZONING OVERLAY LEGEND:

- R-5
- R-6
- R-10
- NC

DENSITY STANDARDS:

R-5
- MINIMUM NET DENSITY – 7.0 DU/ACRE
- MAXIMUM NET DENSITY – 8.7 DU/ACRE (DETACHED)
- MAXIMUM NET DENSITY – 12.4 DU/ACRE (ATTACHED)

R-10
- MINIMUM NET DENSITY – 3.5 DU/ACRE
- MAXIMUM NET DENSITY – 4.4 DU/ACRE

CITY GEOLOGIC HAZARD OVERLAY AREA (SLOPES GREATER THAN 25%)
- MAXIMUM NET DENSITY – 2 DU/ACRE

DENSITY AREA SUMMARY:

R-5 ZONE DETACHED HOME AREA:	36.7± ACRE
R-5 ZONE ATTACHED HOME AREA:	6.9± ACRE
R-10 ZONE AREA:	2.8± ACRE
NROD CONSERVATION TRACT AREA:	14.3± ACRE
GEOLOGIC HAZARD AREA WITHIN DEVELOPABLE AREA: (SLOPES GREATER THAN 25%)	1.3± ACRE
RIGHT OF WAY:	21.1± ACRE

DENSITY CALCULATIONS

NET DEVELOPABLE AREA:
36.7 + 6.9 + 2.8 + 1.3 = 47.7 ACRE

COMPOSITE MAXIMUM RESIDENTIAL DENSITY:
((36.7/47.7)*8.7) + ((6.9/47.7)*12.4) +
((2.8/47.7)*4.4) + ((1.3/47.7)*2.0) = 8.8 DU/ACRE

17.65.070.C.4 – INCREASE IN ALLOWED MAXIMUM RESIDENTIAL DENSITY OF UP TO TEN PERCENT:
8.8*110% = 9.7 DU/ACRE

17.49.240 – DENSITY TRANSFER:
14.3*(1/3) = 4.8 ACRE
47.7 + 4.8 = 52.5 ACRE

MAXIMUM DWELLING UNITS:
9.7*52.5 = 509 DU

COMPOSITE MINIMUM RESIDENTIAL DENSITY:
((36.7/47.7)*7.0) + ((6.9/47.7)*7.0) +
((2.8/47.7)*3.5) + ((1.3/47.7)*2.0) = 6.7 DU/ACRE

MINIMUM DWELLING UNITS:
6.7*47.7 = 320 DU

ACHIEVED DENSITY:
476/52.5 = 9.1 DU/ACRE

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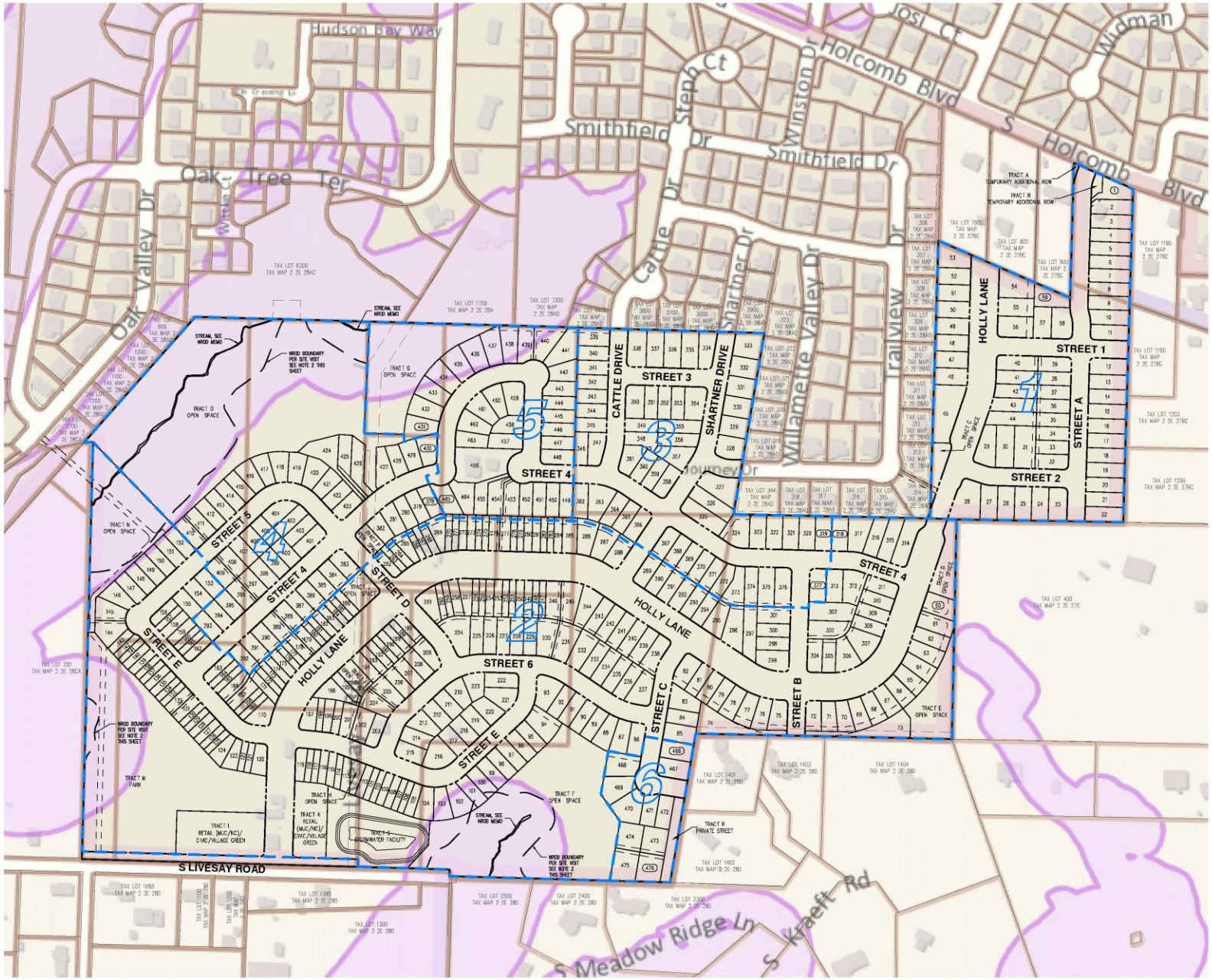
CITY OF OREGON CITY ZONING OVERLAY MAP AND DENSITY ANALYSIS
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CM
DRAWN BY:	NR
CHECKED BY:	CM

P-18

AKS DRAWING FILE: 7404 DENSITY-ZONING.DWG | LAYOUT: P-18



NOTES:

1. NROD OVERLAY IS PER OREGON CITY WEBMAPS
2. NROD BOUNDARY PER SITE VISIT WILL BE VERIFIED AT THE TIME OF EACH RESPECTIVE PHASES' DETAILED DEVELOPMENT APPLICATIONS. SEE ADDITIONAL INFO IN APPENDIX G OF THIS SUBMITTAL, NATURAL RESOURCES OVERLAY DISTRICT MEMORANDUM.

NROD OVERLAY LEGEND:

NROD – NATURAL RESOURCE OVERLAY DISTRICT

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CITY OF OREGON CITY NATURAL RESOURCE OVERLAY DISTRICT MAP
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

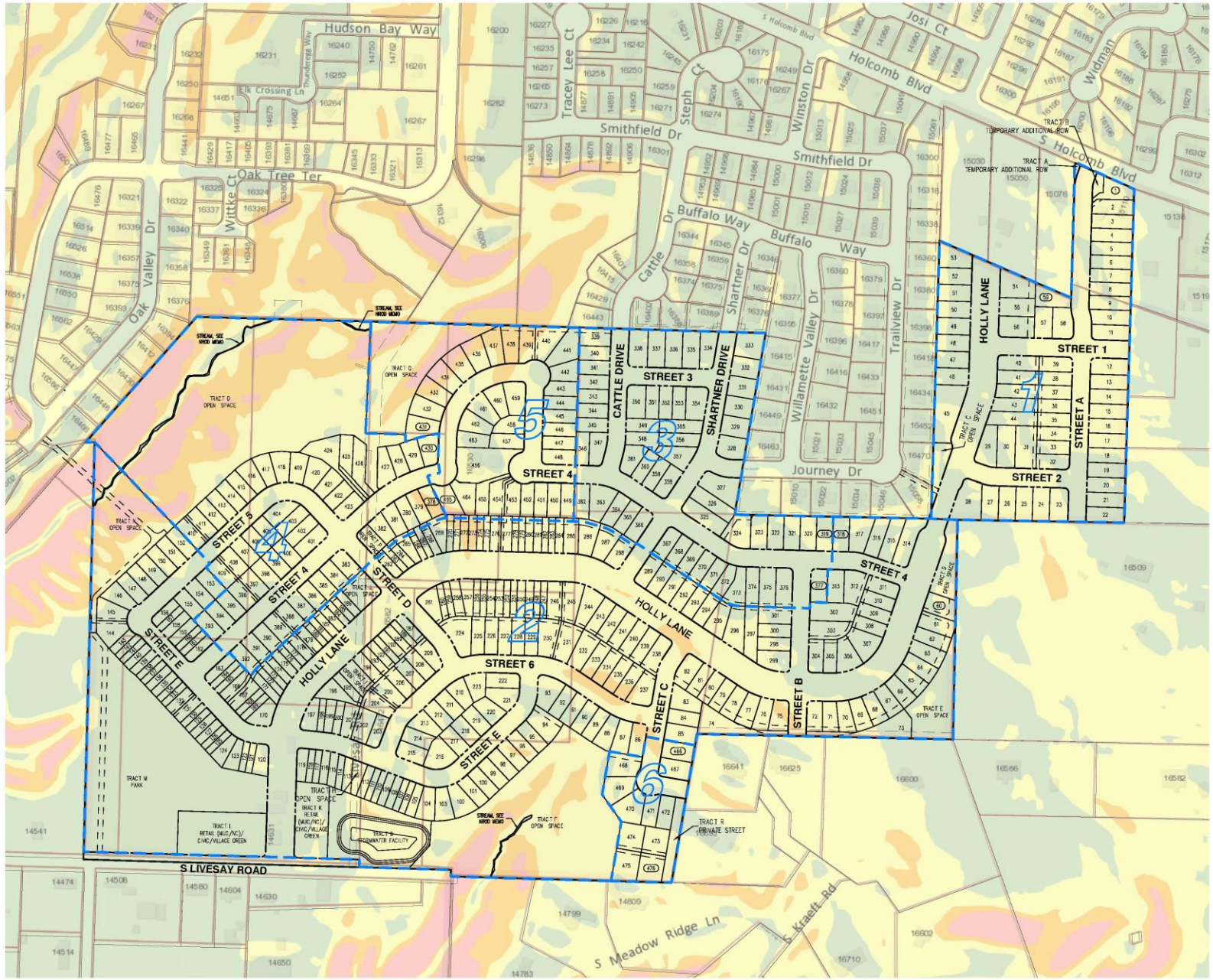
REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/23

PRELIMINARY NOT FOR CONSTRUCTION

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	C
DRAWN BY:	N
CHECKED BY:	C

P-19

AKS DRAWING FILE: 7404 NROD.DWG | LAYOUT: P-19



NOTE:

1. GEOLOGIC HAZARD OVERLAY IS PER OREGON CITY WEBMAPS
2. GEOLOGIC HAZARDS WILL BE VERIFIED AT THE TIME OF EACH RESPECTIVE PHASES' DETAILED DEVELOPMENT PLAN APPLICATION. NO GEOLOGIC HAZARD REVIEW APPLICATION OR CHECKLIST IS INCLUDED AT THIS TIME.
3. PORTIONS OF THE MAPPED GEOLOGIC HAZARD – STEEP SLOPE AREAS WITHIN THE PARK PLACE CROSSING MASTER PLAN AREA PER OREGON CITY WEBMAPS ARE A RESULT OF MAN-MADE ACTIVITIES (I.E. HOUSES, DRIVEWAYS, ROADS, ETC.).

SLOPE CATEGORIES LEGEND:

- SLOPES 0-10%
- SLOPES 10-25%
- SLOPES 25-35%
- SLOPES >35%

N

SCALE: 1" = 150 FEET

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ORIGINAL PAGE SIZE: 22" x 34"

PRELIMINARY GEOLOGIC HAZARD SLOPE ANALYSIS
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR

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REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 9, 2007
MONTGOMERY B. HORLICK

PRELIMINARY NOT FOR CONSTRUCTION

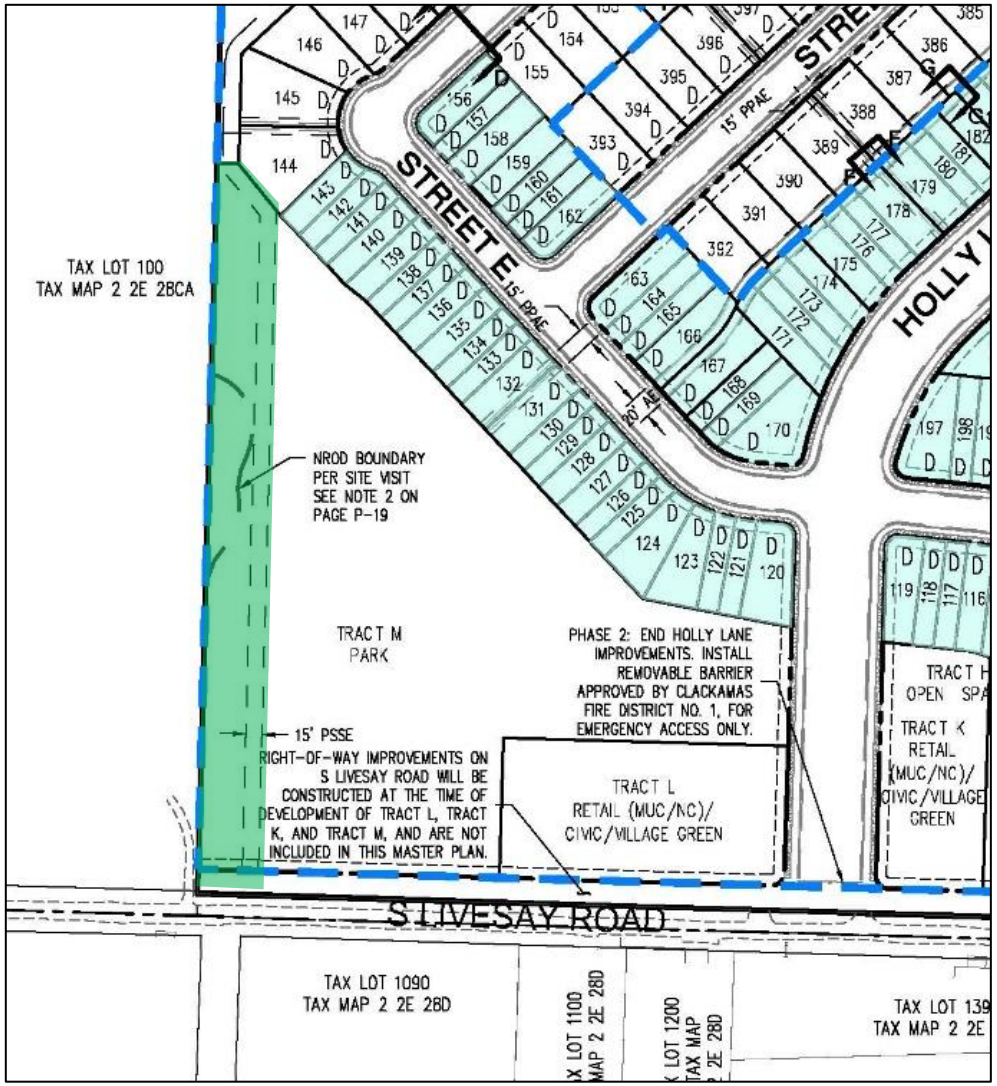
RENEWAL DATE: 6/30/23

JOB NUMBER:	7404
DATE:	03/17/2022
DESIGNED BY:	CI
DRAWN BY:	NB
CHECKED BY:	CI

P-20

AKS DRAWING FILE: 7404 SLOPES.DWG | LAYOUT: P-20

Phase 1 Park Reservation



- Park Dedication planned with Phase 2
  - **±4.1 acres** required proportionally per PPCP planned units
    ±476 PPC / 937 North Village units = ±50.8% of planned ±8.0-acre park = ±4.06 acres
  - **±4.4 acres** of park planned

- Phase 1 units – 59
  - Using same methodology:
    ±0.50 acres required proportionally per PPCP planned units
  - **±0.83 acres shown at left**

Schwabe
WILLIAMSON & WYATT®

May 23, 2022

Garrett H. Stephenson
Admitted in Oregon
T: 503-796-2893
gstephenson@schwabe.com

VIA EMAIL

Oregon City Planning Commission
c/o Planner Kelly Reid
625 Center Street
Oregon City, OR 97045
kreid@orcity.org

RE: Park Place Crossing General Development Plan
GLUA-21-00045 / MAS-21-00006 / VAR-22-00001

Dear Chair Schlagenhaufer and Planning Commissioners:

This firm represents ICON Construction & Development, LLC, the Applicant in the above-referenced file. We greatly appreciate City staff's and the Commission's hard work and continued review of this Application. This letter addresses some of the proposed conditions of approval and the additional public comments received thus far. For the reasons below and in the staff report, the Planning Commission can and should find that the Application meets all applicable criteria.

1. Conditions of Approval

The updated Staff Report proposes 55 conditions of approval; the Applicant accepts and supports almost all of these in their current form. However, at this time the Applicant respectfully requests changes to two conditions, explained below.

a. Condition 10 – Proposed condition requiring a financial surety for park dedication and construction.

Condition 10 would require the Applicant to post a financial guarantee for the proposed park dedication. The amount of the fee-in-lieu is calculated based on $4,783.80 per unit per park land cost **plus** $3,664 per unit for park improvement cost. As an initial matter, the Applicant is not solely responsible for the costs of park improvement; rather, these improvements are to be paid for by the City's system development charges, which the Applicant or its successor must pay when development occurs. Second, providing a fee-in-lieu in the form of a surety is impractical for the Applicant as a financial matter.

As an alternative, the Applicant proposes to provide a permanent easement for 0.5 acres of park land in Phase 1, which addresses the park demand created by the 59 units proposed in Phase 1. This easement would ultimately merge with the City's property interest when the park is dedicated during Phase 2. For the above reasons, the Applicant requests that Condition 10 be revised as follows:

> "The Applicant shall dedicate a total of 4.4 acres of park land to the City at the time of final plat recording of Phase 2, in the approximate location identified in the GDP exhibit. At the time of final plat recording of Phase 1, the Applicant shall grant a public easement for park use on 0.5 acres of property currently owned by the Applicant that is within with the 4.4 acres of park land proposed to be dedicated prior to the final plat recording of Phase 2."

The proposed easement area is shown on **Exhibit 1**.

a. Condition 23.c – Additional Local Street connection east of Holly Lane and South of Street E.

As currently proposed, Condition 23.c requires the Applicant to "[p]rovide an additional local street connection to the east of Holly Lane and South of Street E." As previously stated, this condition is infeasible for two reasons. First, it would require a street connection through the Applicant's proposed stormwater detention facility, which must be located at the bottom of nearby slopes to ensure adequate stormwater capture. Second, even if the stormwater facility did not need to be located in this area, the required connection would have to be constructed through extremely steep slopes that would require cut, fill, grading, and retaining walls far beyond what is reasonable or desirable for such a connection.

As previously stated the Applicant is not opposed to providing an additional local street connection in this vicinity. For the above reasons, the Applicant respectfully requests that Condition 23.c be revised as follows:

"Provide an additional local street connection to Livesay Rd."

2. Applicant's Response to Public Comments

A number of written and oral comments were made to the Planning Commission both during and shortly after the May 9th hearing. The Applicant appreciates and understands many of the concerns raised in those comments. However, for the reasons below, the Planning Commission can and should reject arguments that the Application should be denied. In particular, the Application includes a number of benchmarks and mitigation measures, enforced through conditions of approval that will ensure traffic impacts from the project will by adequately mitigated and will not become a burden on surrounding development.

a. The Applicant's Transportation Impact Statement demonstrates that transportation impacts from the project can and will be adequately mitigated.

A number of individuals argued that the existing and planned roadway infrastructure cannot accommodate existing or proposed development. This is not accurate. The Applicant submitted a Transportation Impact Study (the "Traffic Study"), prepared by Lancaster Mobley, dated January 13, 2022, which concludes that, with the recommended mitigation measures (which are additional to the proportional share payment required as part of the annexation), the existing

and proposed street network is capable of serving the proposed development, as required by OCMC 17.65.050.C.3.

In its memorandum to the City dated April 15, 2022, Replinger & Associates LLC (the "Replinger Memo"), the City's independent transportation consultant concluded that the Applicant's Traffic Study "clearly illustrates that the trip generation for the residential development described in this development proposal is below the limits of the trip cap established in the prior land use action." Replinger Memo at pg. 14. Moreover, "[t]he [Traffic Study] also demonstrates that the intersection of Holcomb Boulevard with Street A will meet the city's operational standards and accommodate traffic from Phases 1 and 2, even if the northern section of Holly Lane to Holcomb Boulevard is not connected."

As stated above, the Applicant is committed to mitigating transportation impacts, and such mitigation measures will grow with the construction of future phases. With respect to Phase 1, both Lancaster Mobley and Mr. Replinger agree that all intersections will operate acceptably without additional mitigation. Robust conditions of approval require mitigation of potential traffic impacts for all future phases. In particular, staff's proposed conditions require updated transportation studies for each Detailed Development Plan application after Phase 1 and that, for each phase, the applicant must "show that improvements have been made to OR-213 and Redland Road and at the intersection of Redland Road/Abernethy Road/Holcomb Boulevard such that v/c standards are met and adequate queue storage is provide before development can occur." Specific traffic calming measures are also required for street connections to Cattle Drive, Shartner Drive, Journey Drive, Smithfield Drive, and Winston Drive. And, a secondary street connection to Redland Road must be constructed when existing plus proposed trips exceed 2,000 trips per day before any additional residential units can be approved.

Coupled with the proportional share payment required as part of the annexation and conditions of approval, the Planning Commission can find that the transportation system will be capable of serving each phase of development before that phase is occupied.

The Applicant understands concerns raised regarding wildfire evacuation. However, construction of Park Place Crossing will improve, not diminish, potential evacuation routes by ultimately improving north-south flow of traffic between Holcomb Boulevard and Livesay Road, thereby increasing the availability of emergency access to Highway 213. Initially, temporary emergency access will be available to Phase 1 from Shartner Drive, as depicted on Sheet P-08 of the plans submitted with the Applicant's initial submission. With Phase 2, additional temporary emergency access will be available via the Holly Lane and S Livesay Road connection. Clackamas County submitted a comment on the Application which supports the proposed gated access at Holly Lane and Livesay Road, with the gate being approved by the Clackamas Fire District. Until complete street connectivity is constructed, this gate could be easily opened by the Fire District in the event of an evacuation.

The additional roads proposed as part of this Application will also provide additional connections throughout the subject property that will aid in evacuation in the event of an emergency. In a memorandum from Kelly Reid dated May 2, 2022, City staff further addressed

the wildfire concerns raised by the public. As stated in the memorandum, "Clackamas County emergency management officials are working on plans to better manage the logistics of the evacuation efforts to avoid a similar evacuation traffic problem in the future" and these efforts will begin in 2022. However, at this point, the County has no clear evacuation plans with which the Applicant must or can conform. Moreover, evacuation route planning is not embodied in the approval criteria or applicable standards.

b. The Proposed Development's density is consistent with the underlying zoning and the Park Place Concept Plan.

Concerns were raised about the overall density of the proposed development.

The proposed development will achieve a density of 9.1 units per acre consistent with the underlying zoning of the subject property and the Park Place Concept Plan (the "Concept Plan"). Specifically, the Applicant has proposed 476 units, which is approximately 50% of the total number of units planned for the North Village Area of the Concept Plan (937 units). Similarly, the proposed development encompasses approximately 50% of the North Village Area and thus the proposed unit count is consistent with the density called for the Concept Plan. Restricting development to the minimum density allowed in each zone would result in approximately 320 units on the subject property and the remainder of the North Village Area would be required to include increased densities per acre in order to make up for the shortfall of units, as called for in the Concept Plan.

The Concept Plan does not require a portion of the Property to be set aside for density levels not exceeding 4 units/acre. The housing portion of the Concept Plan explains as follows:

> "Residential land will be provided in a range of low-density (R-10) zones to neighborhood commercial (NC) zones. In order to provide attractive and affordable housing for a variety of incomes and household types [,] it is recommended that a new residential zone (R-5), modifications to existing zones, additional design standards for attached single-family housing be instituted to implement the Park Place Concept Plan."

The Plan goes on to recommend a mix of zones including R-10, R-5, R-3.5, and Neighborhood Commercial. At no point does this recommendation include a requirement for a proportion of Park Place to be limited to only 4 units/acre. Rather, the Plan's density goals are set forth in Table 3-1 and 3-2, and the density limits for the combination of "low/medium density residential" is a *minimum* of six units/acre, not a maximum of four units/acre. As explained in the updated staff report, the Application satisfies this requirement.

c. The Applicant correctly relies on the Natural Resource Overlay District Boundaries and its wetland delineation.

Comments were received from Enoch Huang and Roya Mansouri regarding potential errors and omissions in the Applicant's Natural Resource Overlay District ("NROD") Analysis. Mr. Huang's and Ms. Mansouri's comments generally argue that the NROD inventory excludes certain

resources, but these arguments must be rejected for three reasons, summarized here and explained in more detail below. First, a revision to the NROD boundary is not proposed in the Application. Second, none of wetland identified in the Applicant's wetland delineation abut the NROD boundary. Finally, substantial evidence in the record supports a conclusion that all wetlands and streams were correctly identified in the Applicant's wetland delineation, which has received concurrence by the Oregon Department of State Lands ("DSL").

First, Mr. Huang and Ms. Mansouri argued that the 1999 Oregon City Local Wetland Inventory is out of date and the NROD does not include all the subject property. As an initial matter, this Application is a limited land use application; therefore, only those maps identified in OCMC 17.49.020, including the 1999 Local Wetland Inventory, are applicable to Application. *See* ORS 197.195. Moreover, the NROD only applies to areas on the adopted NROD map unless a delineated wetland is found partially within the mapped boundary or the applicant seeks to adjust those boundaries. OCMC 17.49.035. The Applicant submitted a wetland delineation to DSL that received concurrence from DSL; none and of the identified wetlands are within or adjacent to the NROD boundary, and the Applicant does not propose to adjust the boundaries of the NROD.

Second, Mr. Huang and Ms. Mansouri argued that Charmin Creek extends onto Tax Lots 1000 and 109 and these Tax Lots are not included within the NROD Boundary. In order to support this assertion, they rely on the United States Geological Survey ("USGS) Quadrangle Maps. However, the USGS Quadrangle Maps have not been adopted by the City and are not the basis for the NROD boundaries, as outlined in OCMC 17.49.020. Moreover, per OCMC 17.49.030.4, the official NROD map and its boundaries can only be amended by the City Commission. There is no evidence in the record that the USGS Quadrangle Map is based on identified hydrology and the record is clear that the City's adopted wetland inventories do not show these streams on Tax Lots 1000 and 109. Moreover, there is no evidence in the record that these streams have been identified by any ground-level delineation or reconnaissance and are anything more than presumed extensions of the watershed, based on USGS topography. Thus, any conflict between the USGS Quadrangle Maps and the Applicant's wetland delineation must be resolved in favor of the delineation because the delineation is the only site-specific data regarding wetlands and streams on the subject property.

Third, Mr. Huang and Ms. Mansouri raise issues regarding the timing of the Applicant's surveying of the subject property. Specifically, the comments contend that the weather was warm and there was no precipitation on the preceding days and that may be the reason these streams were not identified. However, AKS Engineering complied with all required methodologies regarding its site survey for the wetland delineation. These methodologies do not require standing water to identify wetlands or streams. Rather, they look at hydric soils, wetland hydrology, and wetland vegetation, one or more of which would have been present in a seasonal stream bed even during dry conditions. *See* **Exhibit 2**, Supplemental NROD Memorandum from Stacey Reed, dated May 20, 2022.

As a result, the City is neither required nor permitted to change the NROD boundary as it relates to the Application. The Application is subject to the "Fixed Goal-Post Rules" in ORS 227.178(3), which precludes amendment of the NROD map as applicable to the Application. And,

under OCMC 17.49.030.2, the Applicant has the discretion whether or not to request a change in the NROD map boundary in a quasi-judicial review.

d. The project will not have an adverse impact on Oregon City's schools.

Pursuant to OCMC 17.65.050.C.3, public services for transportation, water supply, police, fire, sanitary waste disposal, storm-water disposal, and any other needed public services and facilities including schools and parks for proposed residential uses, must be capable of serving the proposed development, or can be made capable by the time each phase of the development is completed. With respect to schools, the Oregon City School District provided an additional comment letter dated May 9, 2022, which confirms that the City's school have adequate capacity to serve the proposed development. **Exhibit 3**.

e. Lot 14 adjacent to the subject property is not required to construct the roadway improvements for the project, as proposed.

Representatives of the Trailview Heights Homeowners' Association, Inc. (the "Association") argued that no construction or alteration of Lot 14 is permitted under the Declaration of Covenants, Conditions and Restrictions for Trailview Heights Subdivision (the Declaration).[1] The Applicant confirms that it does not intend to utilize Lot 14 as means of access to the project so long as the reduced width of Holly Lane is approved. Moreover, enforcement of a private covenant is not a "land use decision" and outside of the City's purview. *See Rasmussen v. City of Lake Oswego*, 56 Or LUBA 628 (2008); *Jewett v. City of Bend*, 48 Or LUBA 631 (2004).

f. A majority of the lots in the proposed development are alley-loaded.

The OCMC require that residential areas be constructed with alleys in the medium and high density zones unless "other permanent provisions for private access to off-street parking and loading facilities are approved by the decision maker." *See* OCMC 16.12.026. Consistent with the Concept Plan and the OCMC, the Applicant has proposed alleys for a majority the proposed lots, except for those lots that are located along the perimeter of the subject property where it is impractical to have alley-loaded lots.

At the May 9, 2022 public hearing, Tom Geil testified that in 2019 the City Commission denied the Applicant's request to modify certain provisions of the OCMC, including those that pertain to the requirement for alley loaded lots. In 2019, when the City Commission was adopting amendments to OCMC, the Applicant submitted three comment letters to the City Commission regarding certain aspects of the OCMC that did not align with the goals and objectives outlined within the Concept Plan, most specifically relating to the requirement written into the OCMC restricting front loading garages. The City Commission did not deny the Applicant's request to modify these provisions of the OCMC. Instead, some of the Commissioners, staff, and the City attorney agreed that it was not the appropriate time to request code modifications and insisted that code modifications could be addressed in future land use applications.

[1] Recorded January 16, 2003 as Clackamas County Document No. 2003-006569.

As is evident in the Application, most blocks within the interior of Park Place Crossing include alleys. To require all lots be accessible via alleys would require effectively a ring of exterior alleys around the project, which would be not only redundant in terms of access, it would substantially increase the maintenance requirements for community assets and make the density goals of the Concept Plan more difficult to achieve. As the Planning Commission noted in 2019, the correct setting in which to consider the strictness of the alley-access requirement *is* the General Development Plan process, which is now before the Planning Commission.

3. Conclusion.

The Applicant understands and respects the public's concerns, and, for the reasons above, the Planning Commission can find that the Application adequately addresses these concerns. The Applicant respectfully requests that the Planning Commission approve the Application with the conditions of approval recommended by staff with the modest changes requested by the Applicant.

Best regards,



Garrett H. Stephenson

GST:jog/jmhi

cc: Mr. Harlan Borow (*via email*)
Mr. Chris Goodell (*via email*)
Mr. Mark Handris (*via email*)
Mr. Darren Gusdorf (*via email*)
Mr. Joseph O. Gaon (*via email*)
Ms. Carrie Richter *(via email)*

PDX\132873\238782\JOG\33759751.1

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151
WWW.AKS-ENG.COM

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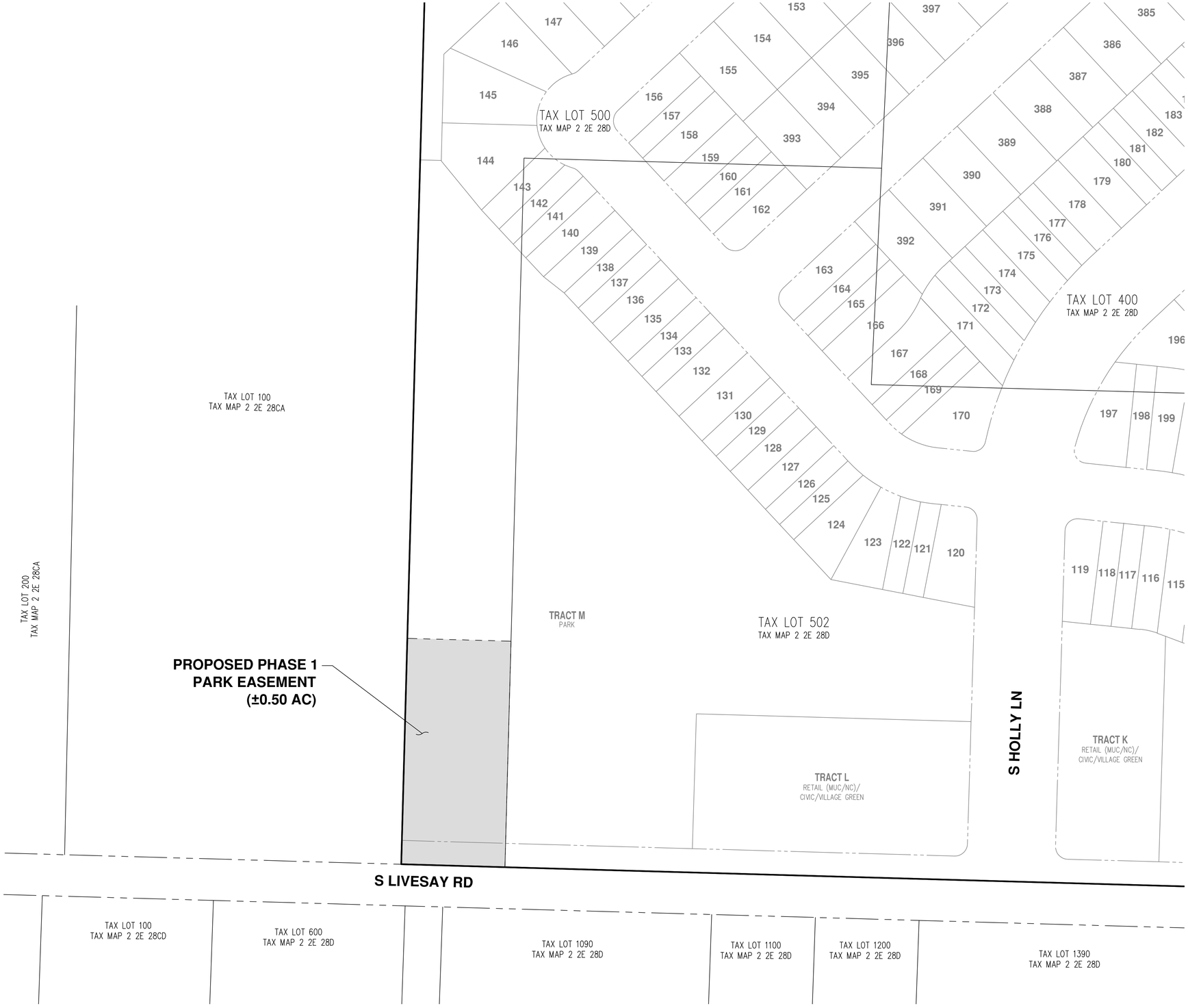
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

PHASE 1 PARK EASEMENT EXHIBIT
PARK PLACE CROSSING MASTER PLAN
OREGON CITY, OR



REVIEW COPY ONLY

JOB NUMBER:	7404
DATE:	05/23/2022
DESIGNED BY:	CMS
DRAWN BY:	NRA
CHECKED BY:	CMS

EXH-1

AKS DRAWING FILE: 7404 PARK EASEMENT EXHIBIT.DWG | LAYOUT: EXH-2

AKS ENGINEERING & FORESTRY

BEND, OR
2777 NW Lolo Drive, Suite 150
Bend, OR 97703
(541) 317-8429

KEIZER, OR
3700 River Road N, Suite 1
Keizer, OR 97303
(503) 400-6028

TUALATIN, OR
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

VANCOUVER, WA
9600 NE 126th Avenue, Suite 2520
Vancouver, WA 98682
(360) 882-0419

www.aks-eng.com

Date: 5/23/2022
To: Oregon City Planning Commission
c/o Kelly Reid, AICP – Oregon City Planning Division
From: Stacey Reed, PWS, Senior Wetland Scientist
Project Name: Park Place Crossing General Development Plan (GDP)
AKS Job No.: **7404**
Subject: **Supplemental NROD Information**

Dear Chair Schlagenhaufer and Planning Commissioners,

This letter serves as a response to public comments received on the Park Place Crossing, General Development Plan (City of Oregon City Files GLUA-21-00045, MAS-21-00006, and VAR-22-0001). For the reasons below and in the staff report, the Planning Commission can and should find that the Application meets all applicable criteria.

1. *Public Comment: Wetlands A-D should be protection under Comprehensive Plan Policies – 17.65.050.C.6*

Response: Per Section 17.49.035 of City of Oregon City (City) Municipal Code (OCMC), identified wetlands that are not currently mapped on the City's Natural Resource Overlay District (NROD) map are regulated by the City if located within or partially within the mapped NROD boundary *and* meet the State of Oregon's (State's) definition for a "locally significant wetland." If identified wetlands meet both criteria, then a vegetated corridor buffer is required adjacent to the wetland.

None of the wetlands delineated for the project are located within the mapped NROD boundary. Additionally, even if the delineated wetlands were located within the mapped NROD boundary, under the Oregon Freshwater Wetland Assessment Methodology (OFWAM), Wetlands A through D do not likely meet the State's definition for a "locally significant wetland." According to Oregon Administrative Rule (OAR) 141-086-0350, a wetland is considered potentially locally significant if it provides one or more of the following criteria using OFWAM: diverse wildlife habitat, intact fish habitat, intact water quality function, or intact hydrologic control function.

Wetlands A through C are functionally isolated features, lacking a surface water connection to nearby water features. None of the wetlands delineated provide habitat for known sensitive, threatened, or endangered plant, animal, or fish species. Wetlands A through D are dominated by herbaceous and non-native grasses, lacking woody vegetation. Therefore, under preliminary assessment, Wetlands A through D may not meet State criteria for local significance.

The wetland and water boundaries within portions of the project area controlled by the applicant were approved by the Oregon Department of State Lands (DSL) under DSL

concurrence letter WD2021-0311, dated August 26, 2021 (see Attachment A). DSL determined that Wetlands A through D, Water 1 (Tour Creek), and Intermittent Water 2 (Holcomb Creek tributary) are regulated under Oregon's removal-fill law, requiring a State permit for impacts, in accordance with OAR Chapter 141.

2. *Public Comment: Charman Creek tributaries missing from delineation figure.*

Response: According to Figure 1, US Geological Survey (USGS) included in the AKS December 8, 2021, Master Plan NROD Analysis Memorandum, Charman Creek and side-fork headwater tributaries are mapped originating in the northeastern portion of the project site.

AKS conducted several site visits and determined no defined bed and bank (i.e. stream) exists on site in the vicinity of the USGS mapped streams. Wetland A was delineated in the vicinity of the USGS mapped Charman Creek. Wetland A is a small pond that may have been created by the historic stream. Per observations from our site investigation and confirmed through professional land surveyed contours (see Figure 6 included in the AKS December 8, 2021, Master Plan NROD Analysis Memorandum), there is currently no evidence of a defined bed and bank (criteria for a regulated stream) within the vicinity of the USGS mapped streams. Charman Creek is not currently present on the project site.

3. *Public Comment: NROD Map verification is required.*

Response: The Park Place Crossing land use application addresses only the criteria of OCMC Chapter 17.65, Master Plans and Planned Unit Developments. The AKS Master Plan NROD Analysis serves as a preliminary NROD assessment. The applicant has provided due diligence wetland and water delineation studies to determine the extent of potential state and federal jurisdictional resources within portions of the project site controlled by the applicant. Additional site visits are necessary to evaluate portions of the Master Development project area not controlled or assessed by the applicant. Future detailed development plans will require an NROD boundary verification, documenting project compliance with Chapter 17.49 of OCMC. Future development may require an updated DSL wetland delineation concurrence. DSL wetland delineation concurrences are valid for a 5-year period.

4. *Public Comment: Timing of AKS delineation site visits.*

Response: The wetland and water delineation site visits were conducted in accordance with both state and federal delineation requirements, which provide approved guidance on methodology for conducting delineations during all times of the year, including below normal rainfall periods.

According to these standards, AKS' May, June, and August 2020 site visits were conducted within a normal rainfall period for that time of year. Normal precipitation conditions are defined by comparing observed rainfall received year-to-date, two weeks prior to each site visit, and three months prior to the site visit, to average precipitation data collected

over the past 30 years by the National Oceanic and Atmospheric Administration (NOAA). AKS used applicable dry-weather conditions methods and did not determine lack of wetland or waters solely based on lack of surface ponding or saturation. DSL reviewed and approved the wetland determination data submitted for our delineation (see Attachment A).

The flow regime for streams delineated on the site were analyzed using US Environmental Protection Agency (EPA) and DSL approved Streamflow Duration Assessment Method for Oregon (SDAM). The methodology criteria for this assessment does not require flow to be present during the time of the site visit to determine intermittent or ephemeral flow regime.

The project as preliminarily planned avoids encroachment into Tour Creek and the headwater tributary to Holcomb Creek. The riparian community adjacent to these features is currently dominated by invasive Himalayan blackberry, with portions lacking a closed native tree canopy. Future development of the project site provides opportunity for enhancement of these riparian areas (e.g. removing invasive species and planting native woody vegetation), which will provide a net functional benefit to native fish in downstream receiving waters (Abernethy Creek).

Thank you for your continued review of this Application. Please let us know if you have any questions.

Sincerely,

AKS ENGINEERING & FORESTRY, LLC

Stacey Reed

Stacey Reed, PWS, Senior Wetland Scientist
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
503-563-6151 | staceyr@aks-eng.com

Attachments:
Attachment A: DSL Concurrence Letter (File WD2021-0311)

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

Shemia Fagan
Secretary of State

Tobias Read
State Treasurer

August 26, 2021

Icon Construction & Development, LLC
Attn: Mark Handris
1969 Willamette Falls Drive, Suite 260
West Linn, OR 97068

Re: WD # 2021-0311 **Approved**
Wetland Delineation Report for Park Place Crossing
Clackamas County; T2S R2E S27BC TLs 1000 and 2000;
S28D TLs 100, 190, 302, 400, 500, 3700 and 3701

Dear Mark Handris:

The Department of State Lands has reviewed the wetland delineation report prepared by AKS Engineering & Forestry, LLC for the site referenced above. Based upon the information presented in the report, we concur with the wetland and waterway boundaries as mapped in Figure 6, 6A, 6B and 6C of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study area, 4 wetlands (Wetland A, B, C and D, totaling approximately 0.41 acres) and 5 waterways (Perennial Water 1, Intermittent Water 2, and Ephemeral Drainage 1, 2 and 3) were identified. The wetlands and 2 of the waterways (Perennial Water 1 and Intermittent Water 2) 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 (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). The remaining 3 waterways (Ephemeral Drainage 1, 2 and 3) are exempt per OAR 141-085-0510(49); therefore, they are not subject to these state permit requirements.

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

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.

Thank you for having the site evaluated. If you have any questions, please contact the Jurisdiction Coordinator for Clackamas County, Chris Stevenson, PWS, at (503) 986-5246.

Sincerely,



Peter Ryan, SPWS
Aquatic Resource Specialist

Enclosures

ec: Stacey Reed, PWS, AKS Engineering & Forestry, LLC
Clackamas County Planning Department
Trey Fraley, Corps of Engineers
Michael De Blasi, DSL

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:
ICON Construction & Development, LLC
1969 Willamette Falls Dr, Suite 260, West Linn Or 97068

Business phone # (503) 657-0406
Mobile phone # (optional)
E-mail: Harlan@IconConstruction.net

☐ 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: Mark Handris **Signature:**
Date: 6/10/21 Special instructions regarding site access: ____

Project and Site Information

Project Name: Park Place Crossing

Latitude: 45.36760653 Longitude: -122.56610041
decimal degree - centroid of site or start & end points of linear project

Proposed Use:
Residential Subdivision

Tax Map # 2 2E 27BC
Tax Lot(s) 1000, 2000

Tax Map # 2 2E 28D
Tax Lot(s) 100, 190, 302, 400, 500, 3700, 3701

Project Street Address (or other descriptive location):
South of Holcomb Boulevard

Township 2S Range 2E Section 27, 28 QQ
Use separate sheet for additional tax and location information

City: Oregon City County: Clackamas

Waterway: N/A River Mile: N/A

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Stacey Reed, PWS
AKS Engineering & Forestry, LLC
12965 SW Herman Road, Suite 100
Tualatin, OR 9062

Phone # (503) 563-6151
Mobile phone # (if applicable)
E-mail: staceyr@aks-eng.com

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.

Consultant Signature: Stacey Reed Date: 06/10/2021

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No Study Area size: 68.74 Total Wetland Acreage: 0.4100

Check Applicable Boxes Below

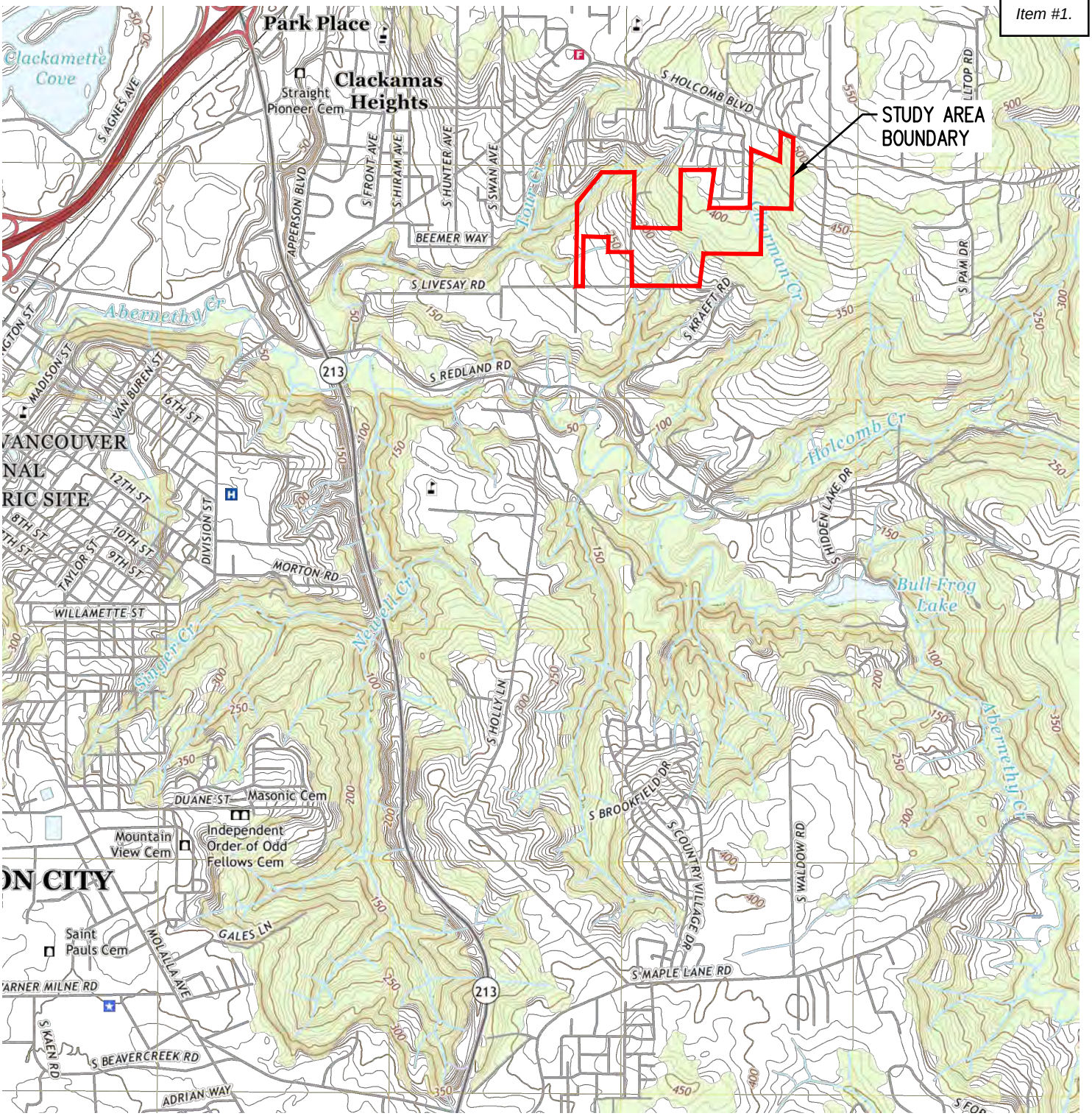
☐ R-F permit application submitted
☐ Mitigation bank site
☐ Industrial Land Certification Program Site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Previous delineation/application on parcel
If known, previous DSL # ____

☐ 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: CS Fee Paid Date: ____/____/____ DSL WD # 2021-0311

Date Delineation Received: 06/11/2021 Scanned: ☐ Electronic: ☒ DSL App.# ____



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USGS 7.5' TOPOGRAPHIC SERIES
QUADRANGLE: OREGON CITY, OR (2020)

DATE: 05/26/2021

SCALE: 1"= 2000 FEET

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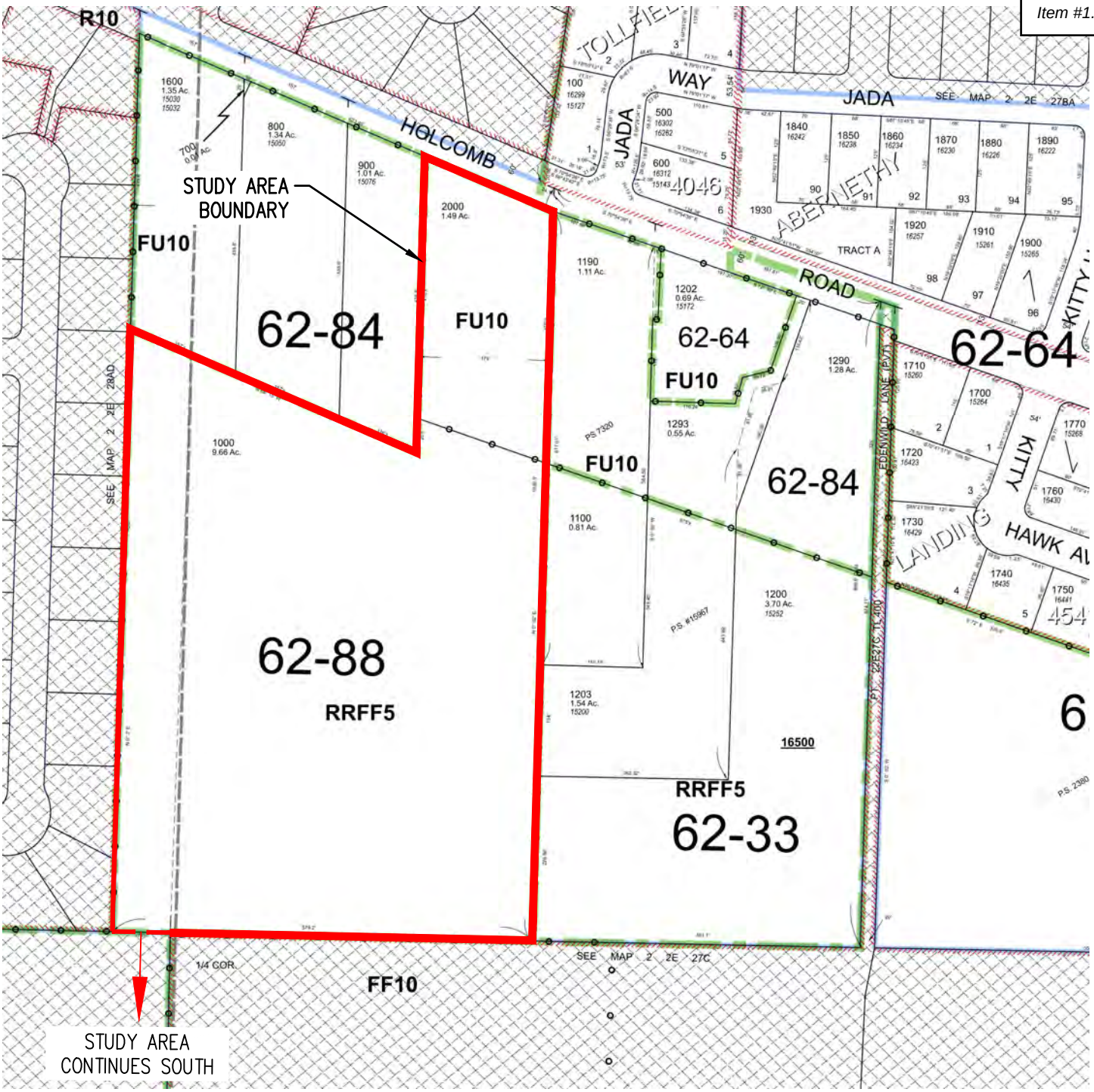
ORIGINAL PAGE SIZE: 8.5" x 11"

USGS VICINITY MAP
PARK PLACE VILLAGE WETLAND AND WATERS DELINEATION REPORT

FIGURE 1

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: SKT
CHKD: SAR



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SCALE: 1"= 200 FEET

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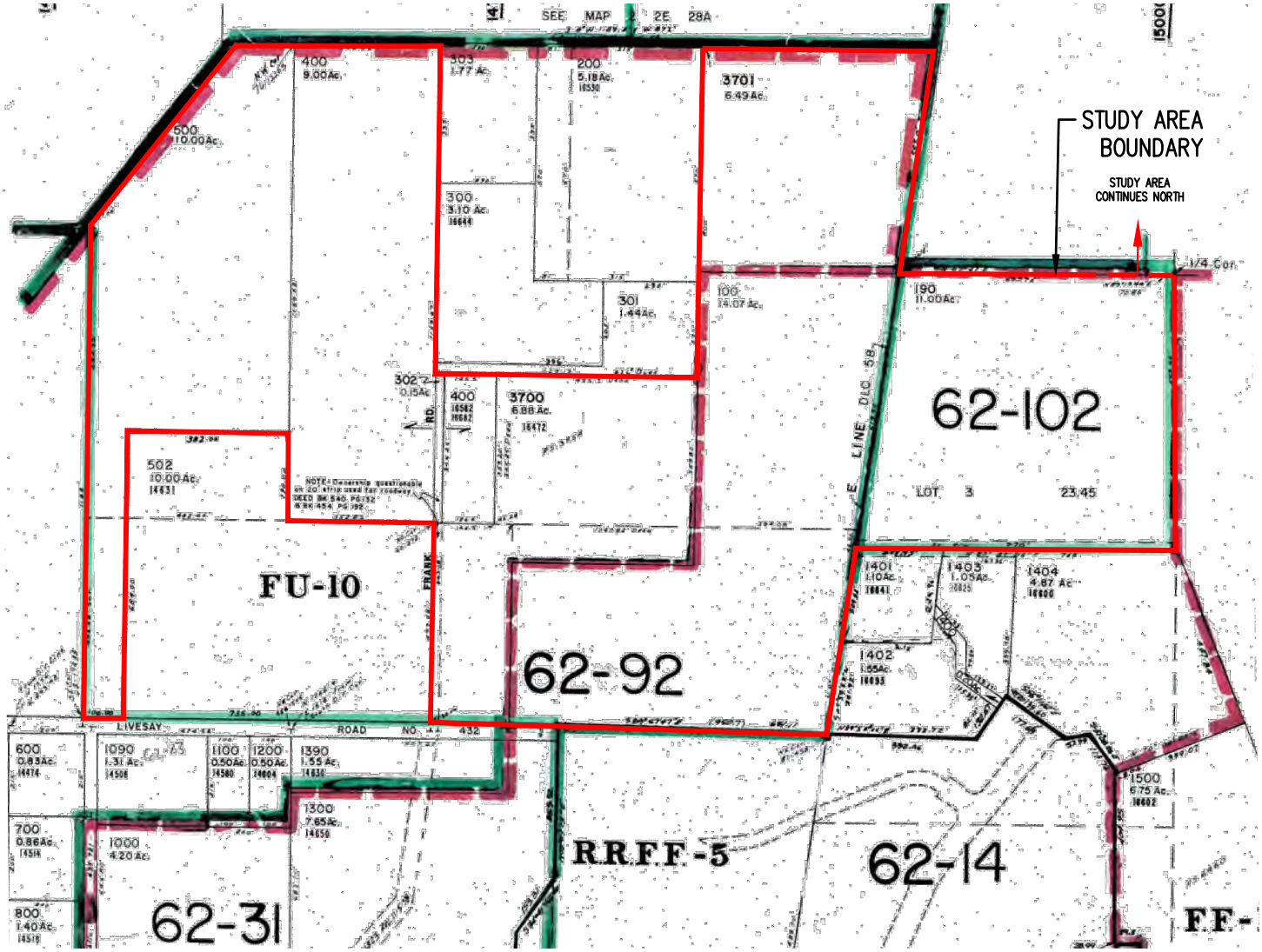
ORIGINAL PAGE SIZE: 8.5" x 11"

CLACKAMAS COUNTY
TAX LOTS 1000 AND 2000
TAX MAP 2 2E 27BC

DATE: 05/26/2021

TAX MAP (MAP 2 2E 27BC) PARK PLACE VILLAGE WETLAND AND WATERS DELINEATION REPORT	FIGURE 2A
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: SKT CHKD: SAR



CLACKAMAS COUNTY
TAX LOTS 100, 190, 302,
400, 500, 3700, 3701
TAX MAP 2 2E 28D

N

SCALE: 1"= 400 FEET

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ORIGINAL PAGE SIZE: 8.5" x 11"

DATE: 05/26/2021

TAX MAP (MAP 2 2E 28D) **PARK PLACE VILLAGE WETLAND AND WATERS DELINEATION REPORT**	FIGURE **2B**
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: SKT CHKD: SAR 7404

DWG: 7404 BACKGROUND FIGURES | FIGURE 2B

DSL WD # 2021-0311
Approval Issued 8/26/2021
Approval Expires 8/26/2026

LEGEND:

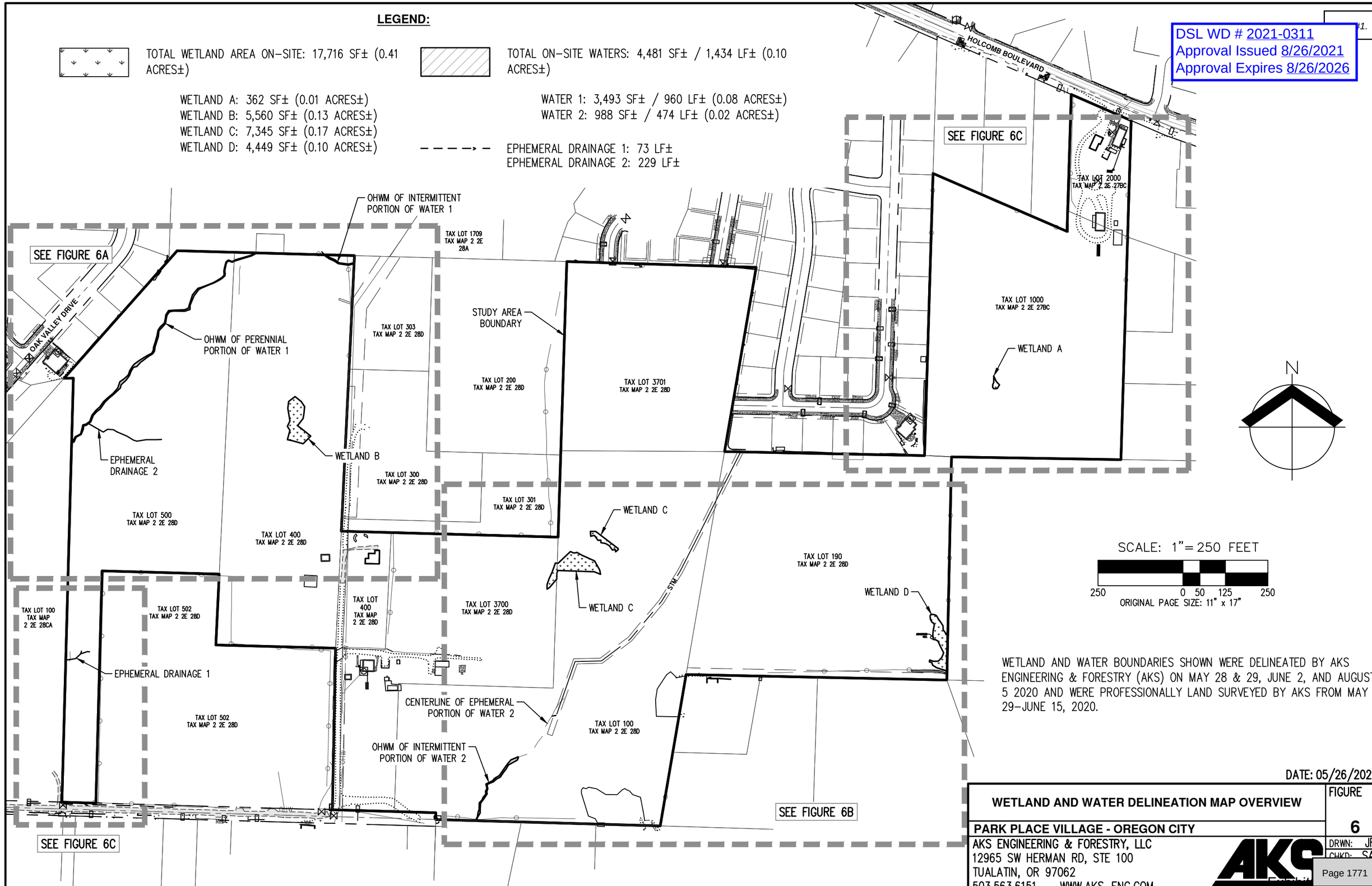
TOTAL WETLAND AREA ON-SITE: 17,716 SF± (0.41 ACRES±)

WETLAND A: 362 SF± (0.01 ACRES±)
WETLAND B: 5,560 SF± (0.13 ACRES±)
WETLAND C: 7,345 SF± (0.17 ACRES±)
WETLAND D: 4,449 SF± (0.10 ACRES±)

TOTAL ON-SITE WATERS: 4,481 SF± / 1,434 LF± (0.10 ACRES±)

WATER 1: 3,493 SF± / 960 LF± (0.08 ACRES±)
WATER 2: 988 SF± / 474 LF± (0.02 ACRES±)

EPHEMERAL DRAINAGE 1: 73 LF±
EPHEMERAL DRAINAGE 2: 229 LF±



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ORIGINAL PAGE SIZE: 11" x 17"

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28 & 29, JUNE 2, AND AUGUST 5 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29-JUNE 15, 2020.

DATE: 05/26/2021

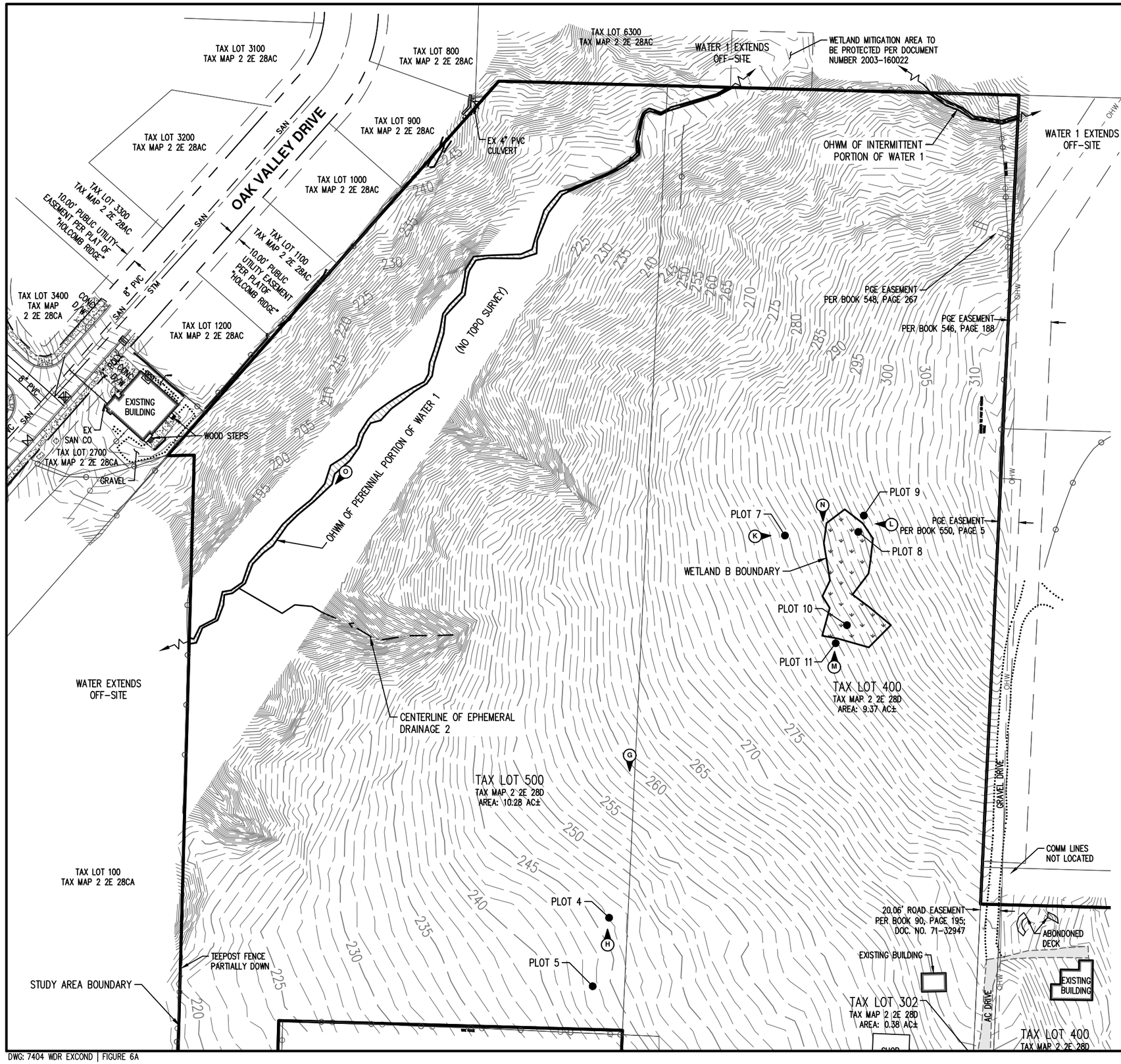
WETLAND AND WATER DELINEATION MAP OVERVIEW	FIGURE 6
PARK PLACE VILLAGE - OREGON CITY	

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM

DRWN: JRI
CHKD: SAR
7404

DWG: 7404 WDR EXCOND | FIGURE 6

DSL WD # 2021-0311
Approval Issued 8/26/2021
Approval Expires 8/26/2026



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SCALE: 1"=100 FEET

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ORIGINAL PAGE SIZE: 11" x 17"

LEGEND:

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PHOTO LOCATION & ORIENTATION

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28 & 29, JUNE 2, AND AUGUST 5 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29-JUNE 15, 2020.

1-FOOT INTERVAL GROUND CONTOURS DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING CONDITIONS AND STUDY AREA BOUNDARY DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING TREE LOCATIONS WERE NOT SURVEYED.

DATE: 05/26/2021

WETLAND AND WATER DELINEATION MAP	FIGURE 6A
PARK PLACE VILLAGE - OREGON CITY	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: JRI CHKD: SAR 7404

DWG: 7404 WDR EXCOND | FIGURE 6A

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28 & 29, JUNE 2, AND AUGUST 5 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29–JUNE 15, 2020.

1–FOOT INTERVAL GROUND CONTOURS DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING CONDITIONS AND STUDY AREA BOUNDARY DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING TREE LOCATIONS WERE NOT SURVEYED.

SCALE: 1"=100 FEET

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ORIGINAL PAGE SIZE: 11" x 17"

TAX LOT 301
TAX MAP 2 2E 28D

TAX LOT 190
TAX MAP 2 2E 28D
AREA: 10.86 AC±

TAX LOT 3700
TAX MAP 2 2E 28D
AREA: 6.76 AC±

TAX LOT 100
TAX MAP 2 2E 28D
AREA: 14.32 AC±

WETLAND C BOUNDARY

WETLAND D BOUNDARY

PLOT 12
PLOT 13
PLOT 14
PLOT 15
PLOT 16
PLOT 17
PLOT 18
PLOT 19
PLOT 20

15.00' STORM DRAINAGE EASEMENT PER DOC. NO. 2000-004471

15.00' STORM DRAINAGE EASEMENT PER DOC. NO. 2000-004471

STM

EX 8" CONC CULVERT

EX 12" CMP CULVERT

EX 12" CMP CULVERT

STEM WALL CONC FOUNDATION

ATTACHED OVERHANG

EX 4" PVC CULVERT

ROCK WALL

SHED

ROCK WALL

SHED

BARBWIRE FENCE

ABANDONED WELL

WETLAND EXTENDS OFF–SITE

20.00' PRIVATE RIGHT–OF–WAY PER BOOK 454, PAGE 192

EDGE OF LANDSCAPE

Centerline of Ephemeral Drainage 3

OHWM OF INTERMITTENT PORTION OF WATER 2

STUDY AREA BOUNDARY

EDGE OF LANDSCAPE

SHED

AC DRIVE

WATER 2 EXTENDS OFF–SITE

20X20 WATER EASEMENT PER BOOK 647 PAGE 792

TAX LOT 1401
TAX MAP 2 2E 28D

TAX LOT 1402
TAX MAP 2 2E 28D

TAX LOT 1403
TAX MAP 2 2E 28D

TAX LOT 1404
TAX MAP 2 2E 28D

TAX LOT 2500
TAX MAP 2 2E 28D

TAX LOT 2400
TAX MAP 2 2E 28D

TAX LOT 2300
TAX MAP 2 2E 28D

N

DSL WD # 2021-0311
Approval Issued 8/26/2021
Approval Expires 8/26/2026

LEGEND:

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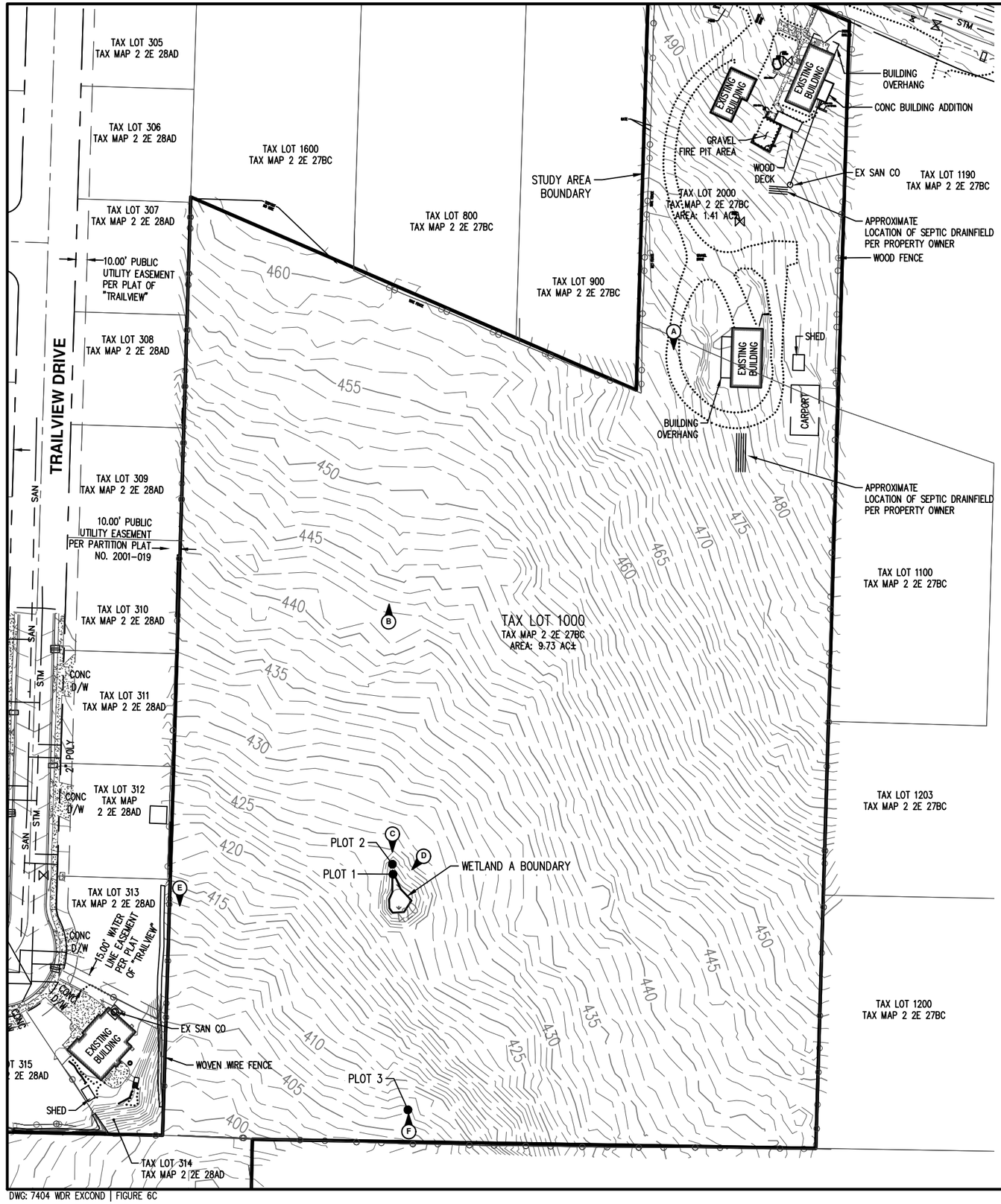
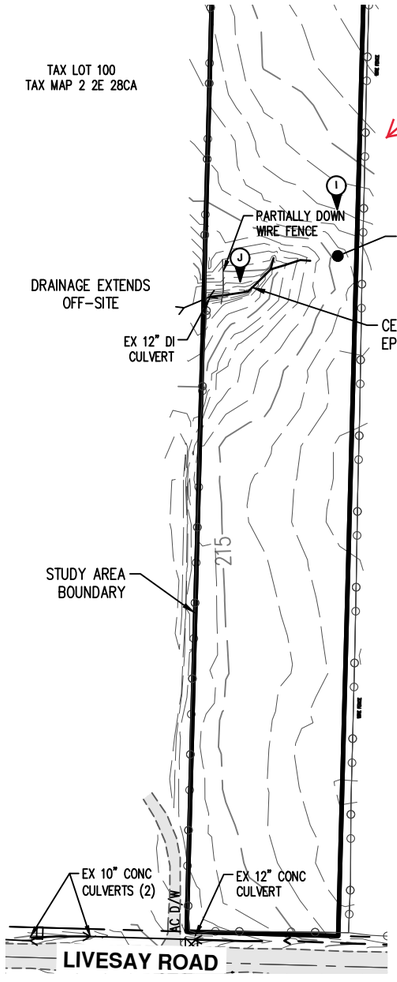
PHOTO LOCATION & ORIENTATION

DATE: 05/26/2021

WETLAND AND WATER DELINEATION MAP	FIGURE 6B
PARK PLACE VILLAGE- OREGON CITY	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS–ENG.COM	DRWN: JRI CHKD: SAR 7404

DWG: 7404 WDR EXCOND | FIGURE 6B





DSL WD # 2021-0311
Approval Issued 8/26/2021
Approval Expires 8/26/2026

N

SCALE: 1"=100 FEET

100 0 20 50 100

ORIGINAL PAGE SIZE: 11" x 17"

LEGEND:

TOTAL WETLAND AREA ON-SITE: 17,716 SF± (0.41 ACRES±)

WETLAND A: 362 SF± (0.01 ACRES±)
WETLAND B: 5,560 SF± (0.13 ACRES±)
WETLAND C: 7,345 SF± (0.17 ACRES±)
WETLAND D: 4,449 SF± (0.10 ACRES±)

TOTAL ON-SITE WATERS: 4,481 SF± / 1,434 LF± (0.10 ACRES±)

WATER 1: 3,493 SF± / 960 LF± (0.08 ACRES±)
WATER 2: 988 SF± / 474 LF± (0.02 ACRES±)

EPHEMERAL DRAINAGE 1: 73 LF±
EPHEMERAL DRAINAGE 2: 229 LF±

PHOTO LOCATION & ORIENTATION

WETLAND AND WATER BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY (AKS) ON MAY 28 & 29, JUNE 2, AND AUGUST 5 2020 AND WERE PROFESSIONALLY LAND SURVEYED BY AKS FROM MAY 29-JUNE 15, 2020.

1-FOOT INTERVAL GROUND CONTOURS DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING CONDITIONS AND STUDY AREA BOUNDARY DERIVED FROM AKS PROFESSIONAL LAND SURVEY. EXISTING TREE LOCATIONS WERE NOT SURVEYED.

DATE: 05/26/2021

WETLAND AND WATER DELINEATION MAP	FIGURE 6C
PARK PLACE VILLAGE - OREGON CITY	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM	DRWN: JRI CHKD: SAR

DWG: 7404 WDR EXCOND | FIGURE 6C

Oregon City School District No. 62

Learning to be our Best

PO Box 2110 (1417 12th St.), Oregon City, Oregon 97045-5010
Michael Sweeten, Director of Operations
Telephone: (503) 785-8000 ● FAX: (503) 657-2492

May 9, 2022

Planning Commission
City of Oregon City
698 Warner Parrott Rd.
Oregon City, OR 97045

RE: GLUA-21-00045 / MAS-21-00006 / VAR-22-00001
Park Place Crossing General Development Plan

Regarding the Park Place Crossing General Development Plan that guides the build out over next 20 years. The plan is located south of Holcomb Blvd. and north of Redland Rd.. Impacted school enrollment areas are Holcomb and Redland Elementary Schools, Tumwata Middle School and Oregon City High School.

In the fall of 2021 the Oregon City School District experienced a dramatic decrease in student enrollment after returning from the pandemic. Currently in spring of 2022 we have seen a slight return of students. However even with this slight increase the District has the capacity available at both Redland and Holcomb Elementary Schools, capacity available at Tumwata Middle School and Oregon City High School. Our most current PSU student projection shows a slow return of students over the next eight to ten years.

Additionally, past developments in the area by Holcomb Elementary School have yielded significantly less than one student per household. The District also passed a capital bond measure in November of 2018 that included refurbishing the then Ogden now Tumwata Middle School and acquiring additional property for a future school site. The former middle school site could then be repurposed into an elementary school when elementary enrollment in the area requires a new school. We believe this plan will be adequate to meet the long-term enrollment generated by this proposed development plan.

Sincerely,

Michael Sweeten
Director of Operations
503-785-8000, michael.sweeten@orecity.k12.or.us

From: Stephenson, Garrett H.
To: Kelly Reid
Cc: Gaon, Joseph O.; "Carrie Richter"
Subject: ICON/Park Place - Request for Continuance
Date: Monday, May 23, 2022 3:31:38 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Kelly,

We have just submitted a short letter into the record responding to the public comments and staff's proposed conditions of approval. Recognizing that we had limited time to consider the comments and conditions and that the Planning Commission will have even less time to review our responses, ICON respectfully requests a continuance of the May 23 Planning Commission hearing to the Planning Commission's next scheduled hearing date, which I understand to be June 13. The Applicant is carefully considering the comments it received from the Planning Commission and from the public on May 9, and is working on some limited but significant design alternatives that should address many of those concerns. The time it takes to reconsider these elements means that we are not able to give the PC much time to review these changes before the hearing. Second, we are working on design solutions to address Staff's additional conditions of approval announced on Monday night, which add another layer of considerations that our team is working to accommodate. In summary, we want to provide as comprehensive and thoughtful of a response to the testimony and staff recommendations as we can, while also giving staff and the Planning Commission a reasonable amount of time to consider and respond to our proposals.

The goal with the continued hearing would be to allow ICON to prepare exhibits and explanations of how the project could address these concerns, and submit them to the Planning Commission with enough time for the Planning Commission to review them before meeting. As we discussed, I have authorization to extend the 120-day deadline to get us to the June 23rd hearing plus time to continue deliberations to the next hearing, if necessary. If the Planning Commission approves this request, we will grant the additional 120-day extension (which we assume will be roughly 30 days).

We assume the Planning Commission will still take public testimony on May 23rd and are fine with that, but would like to reserve our responsive presentation until June 13. We understand that the public may want to comment on the proposed changes, but I assume they will have the right to do so regardless of whether we go forward with our presentation on May 23rd or June 16; as noted above, we will provide adequate time in terms of the 120-day deadline to ensure that the City is able to provide the public with adequate opportunities to respond to any new evidence.

We think this is best for all parties and would really appreciate staff and the Planning Commission support for this request.

Thanks much,

Garrett

Garrett H. Stephenson
Shareholder
Direct: 503-796-2893
Mobile: 503-320-3715
gstephenson@schwabe.com

Schwabe Williamson & Wyatt
Please visit our COVID-19 Resource page



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OREGON CITY

Community Development – Planning

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

May 2, 2022

To: Oregon City Planning Commission
From: Kelly Reid, AICP, Planner
Re: Emergency Evacuation in Park Place

Purpose

The purpose of this memo is to provide the Planning Commission with additional information regarding emergency evacuation concerns in Park Place, as it relates to the land use File No. GLUA-21-00045, Park Place Crossing.

Background

A number of public comments have raised concerns about what occurred in Park Place during the 2020 Wildfire evacuation. Holcomb Boulevard was used by many people at once to attempt to evacuate, and traffic was at a standstill for hours due to the amount and timing of people leaving their homes. Everyone headed to HWY 213 – including areas to the south and east of Oregon City. This was not necessarily expected, and the effect was that streets leading to HWY 213, like Holcomb, Redland, and Forsythe, were backed up for many hours.



HWY 213 Northbound during the 2020 wildfire evacuation. Source: https://www.cnbc.com/2020/09/14/in-photos-oregon-wildfires-devastate-communities-as-fires-rage-on.html

Holcomb Blvd is a two-lane street, which connects to Redland Rd, which leads to HWY 213 and I-205 (see map showing Holcomb connect to Redland and HWY 213 below). During the wildfires, some people were heading to I-205 to get to other urban locations. Others were heading from Holcomb Blvd into Oregon City to emergency shelter evacuation sites such as Clackamette Park.



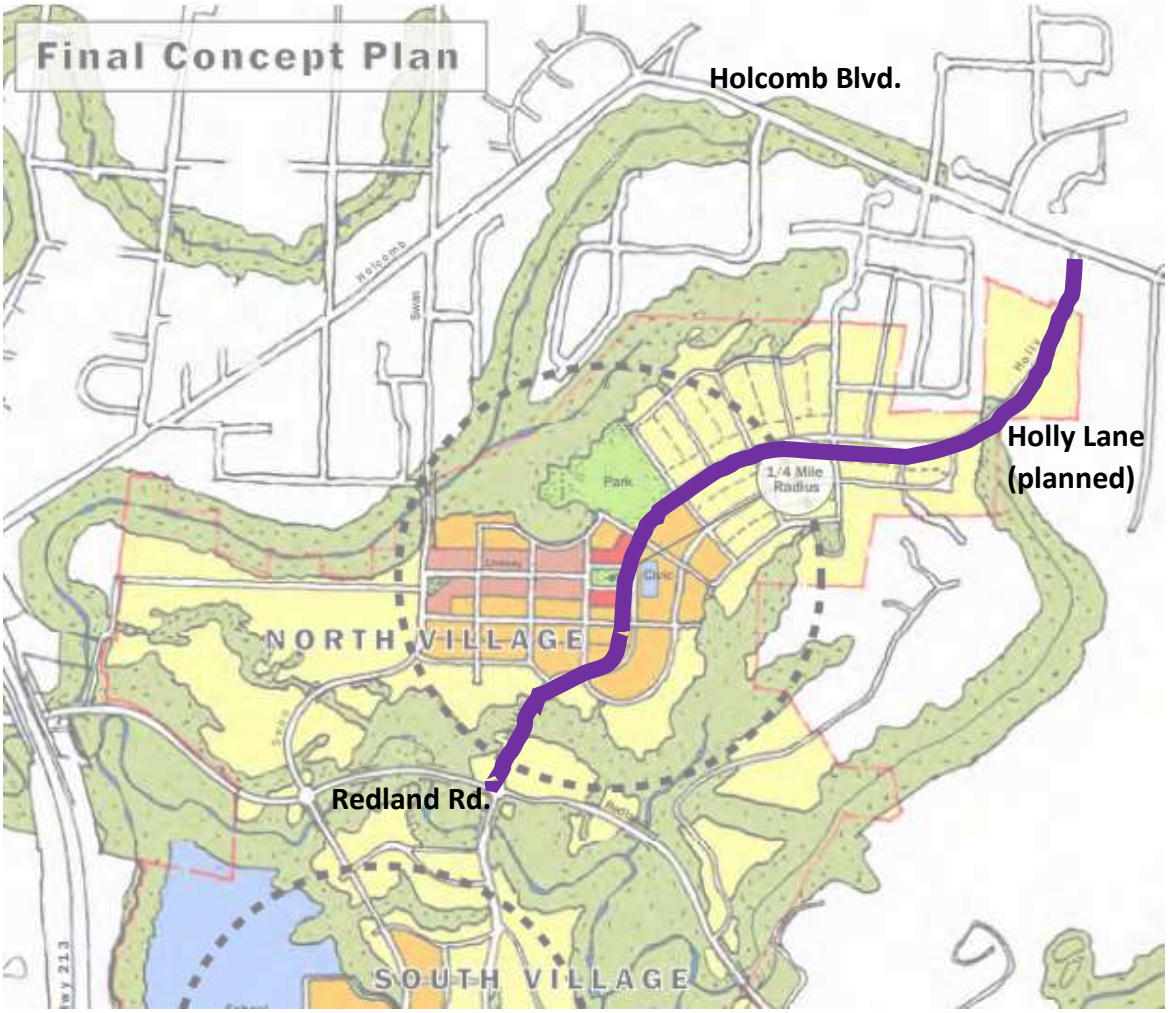
Most common route taken during 2020 Wildfire evacuations – Holcomb to Redland to HWY 213

Constraints of the Street Network

While the fact that Holcomb Blvd only has two lanes has been brought up as a concern for future evacuations, the actual constraint is the capacity of HWY 213, Redland Rd, and the intersections leading to them, including the HWY 213/ Redland intersection and the Abernethy/Holcomb/Redland intersection. The backups on HWY 213 were the reason why the Holcomb traffic was not moving. Widening Holcomb Blvd would make the line of traffic shorter and wider, rather than narrow and long, but would not make it move any faster, due to the backups on HWY 213.

Park Place is in a unique geographic setting, with streams and canyons to the South (Livesay creek) limiting street connectivity. One of the means to reducing congestion, as well as provide a secondary emergency ingress and egress point, on Holcomb is planned for in the Transportation System Plan - the Holly Lane extension to Redland Road. The connection will be constructed as development occurs within the Park Place Concept Plan area. This connection has been identified as necessary for a full-build-out scenario, to provide alternate routes for the significant additional development planned in the Park Place Concept Plan area. When the Holly Lane connection is constructed, an emergency evacuation-related backup may be somewhat alleviated, although, if the ultimate destination is Highway 213, a similar issue to the 2020 wildfires may still occur. In response to OCMC 17.65.050 of this staff report there is a recommended condition of approval requiring a street connection to Redland Road when local traffic volumes reach a specific level on some of the local streets in the area, so it is possible that the applicant may construct the street connection during the life of the 20-year Master Plan.

The applicant's traffic study indicates that the current street system has the necessary capacity for the project to meet mobility standards in OCMC 16.12.033 until about 2026, when background traffic levels will cause the intersection of HWY 213 and Redland Rd to exceed capacity at the 2nd peak hour. At that time, the applicant will be limited by the intersection capacity and will have to wait a capital improvement project is completed that expands intersection capacity, work with the City to finance construction of the intersection project, or otherwise demonstrate that mobility standards can be met at the intersection which will contribute to alleviating this concern.



Park Place Concept Plan Map showing the Holly Lane Extension from Holcomb to Redland, in purple

Disaster Management Efforts

Clackamas County emergency management officials are working on plans to better manage the logistics of the evacuation efforts to avoid a similar evacuation traffic problem in the future. Below are notes from Daniel Nibouar about the County's upcoming efforts to address emergency evacuation plans:

> *The County is seeking consultants and contractors to begin work on a project in early 2022 to perform evacuation zone planning and create a mapping system.*
>
> *Clackamas County is currently split into disaster zones. The plan would further divide those into evacuation zones. The County plans to work with municipalities, ODOT, and law enforcement to create evacuation zones for different types of disasters. The zones will take into account the available infrastructure and roads, will consider how long it will take to evacuate the areas, as well as what special needs are in each area (farm animals, medical facilities, etc). Primary and secondary evacuation routes will also be determined for each zone.*
>
> *The County will also work with municipalities to figure out how to maximize traffic flow during an incident. The new plan will emphasize other routes, so people east of Oregon City will be directed to go north or south in many cases, instead of all heading towards Oregon City via HWY 213. The County hopes to also implement a more strategic*

evacuation procedure that would adjust timing, to ensure Level 3 areas are mostly cleared before issuing level 2 orders, for example. The map system will include a publicly accessible map that includes real time emergency information as well as real-time traffic data so that people can plan their routes. One example is the City of Medford's map found here:
https://medford.maps.arcgis.com/apps/instant/lookup/index.html?appid=2fd35c4b17d14ff1bbfb12d620ff907d&findSource=1&find=MD-21

Clackamas County is also setting up an Emergency Preparedness Council that will advise the County and take on disaster planning and public education projects. Once the evacuation planning is finished, the County plans to provide information to community members by sending a flyer to each household about their evacuation zone and routes. More public education and information about what the evacuation levels 1 through 3 mean is also planned. In general, the County encourages everyone to sign up for emergency alerts at publicalters.org.

The County's efforts will begin in 2022 and are expected to be in place around the same time as development of Phase 1 of Park Place Crossing. Given the fact that the County has a schedule for evacuation planning, and that the City's mobility standards are based on the daily peak hour and not the fairly rare event of an evacuation, staff does not recommend additional conditions related to the emergency evacuation concerns.

OREGON CITY

Community Development – Planning

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

May 9, 2022

MEMORANDUM

To: Oregon City Planning Commission
From: Planning Division
Re: Park dedication for GLUA-21-00045 Park Place Crossing - response to letter from applicant dated 5.6.22

Regarding Land Use file GLUA-21-00045 for Park Place Crossing General Development Plan: The applicant has objected to Condition 10 related to the provision of park land, arguing that it is more land than is necessary to serve the development and that the rough proportionality obligations imposed under the 5th Amendment of the Us Constitution prohibits the City from requiring dedication of all 4.4 acres as part of the Phase I development when this is the amount of land needed to serve all 6 Phases of development.

First, it is important to point out that it was the applicant who identified 4.4 acres as the appropriate amount of park land for dedication. As noted in the staff report, the Park Place Concept Plan calls for a community park to serve the North Village that is 8-10 acres in size. The applicant proposes to build 51% of the proposed North Village residences and commercial village area, creating a demand for approximately half of the park land necessary to serve this area. Half of the park land acreage would require parkland sized at between 4-5 acres. A 4.4 acre dedication is roughly proportional to the impacts from constructing roughly half of the North Village area as set forth in the Concept Plan.

As for the timing for improvement, allowing for deferred dedication of 4.4 acres as the applicant proposes would not acknowledge the park demand created by the Phase I development or the 59 single-family homes. If the applicant seeks to defer the provision of necessary park improvements, it must be required to pay a fee-in-lieu, in the form of a surety, to ensure that Phase 2 park development will occur and if not, the City has funds in reserve necessary to provide park land for Phase I. Therefore, in order to calculate the appropriate fee, the City offers the following:

Land Value Calculation:

Comparables

Location	Sale Date	Acreage	Sale Price	Price per acre
16433 Front Ave	4/22/2020	0.41	$ 195,000	$ 475,610
13930 Forsythe	for sale	0.94	$ 529,000	$ 562,766
16175 Apperson	10/31/2021	0.74	$ 420,000	$ 567,568
16294 Hunter	10/30/2020	0.29	$ 137,000	$ 472,414
				$ 519,589 AVG

Based on the forgoing average price per acre of recently sold undeveloped properties in the Park Place neighborhood, the City assumes that the price per acre for land in this area is $519,589 or $11.90 per square foot. The 4.4 acres of parkland necessary to serve 476 housing units can be converted into 402 square feet per dwelling unit. Multiplied by $11.90 per square foot results in an overall park land cost of $4,783.80 per unit. Phase I development is estimated to include 59 units triggering a land cost of $282,244.20 in today's dollars.

As for the cost of improving park land, the City has recently incurred development costs for the 3.5 acre Hazelnut Grove Park in the amount of $1.35 million. This means that parkland development cost per acre is $397,059 or $9.12 per square foot. Again, assuming 4.4 acres of land to serve 476 housing units would be converted into 402 square feet per dwelling unit multiplied by $9.12 per square foot of improvement cost results in an overall improvement cost of $3,664 per dwelling unit. Phase I development estimates to include 59 units will trigger improvement costs in the amount of $216,194. The Mortenson Construction Cost Index for the Portland area reflects an annual construction cost increase in the amount of 18% per year which should be added to these costs depending on when the Phase I development occurs.

Again, assuming that the Phase I development includes 59 units as currently proposed, the total deposit amount would be $498,439 plus an additional 18% per annum in the overall construction cost.

Therefore, based on the foregoing rough proportionality analysis, staff recommends replacement of Condition of Approval #10 with the following:

> "The applicant shall contribute a fee-in-lieu for parks to be calculated based on $4,783.80 per unit for park land cost plus $3,664 per unit for park improvement costs increased at 18% per annum, to be paid at the time of final plat recording of Phase I of the project. This amount shall be held by the City in the form of a surety until at least 4.4 acres of parkland in the location identified in the GDP exhibit is dedicated to the City. The 4.4 acres of park land shall be dedicated to the City at the time of final plat recording of Phase 2."

GLUA-21-00045: Park Place Crossing General Development Plan:

MAS-21-00006 – General Development Plan (GDP)
VAR-22-00001 – Variance

Type III Quasi-judicial review

Kelly Reid, Planner

Planning Commission

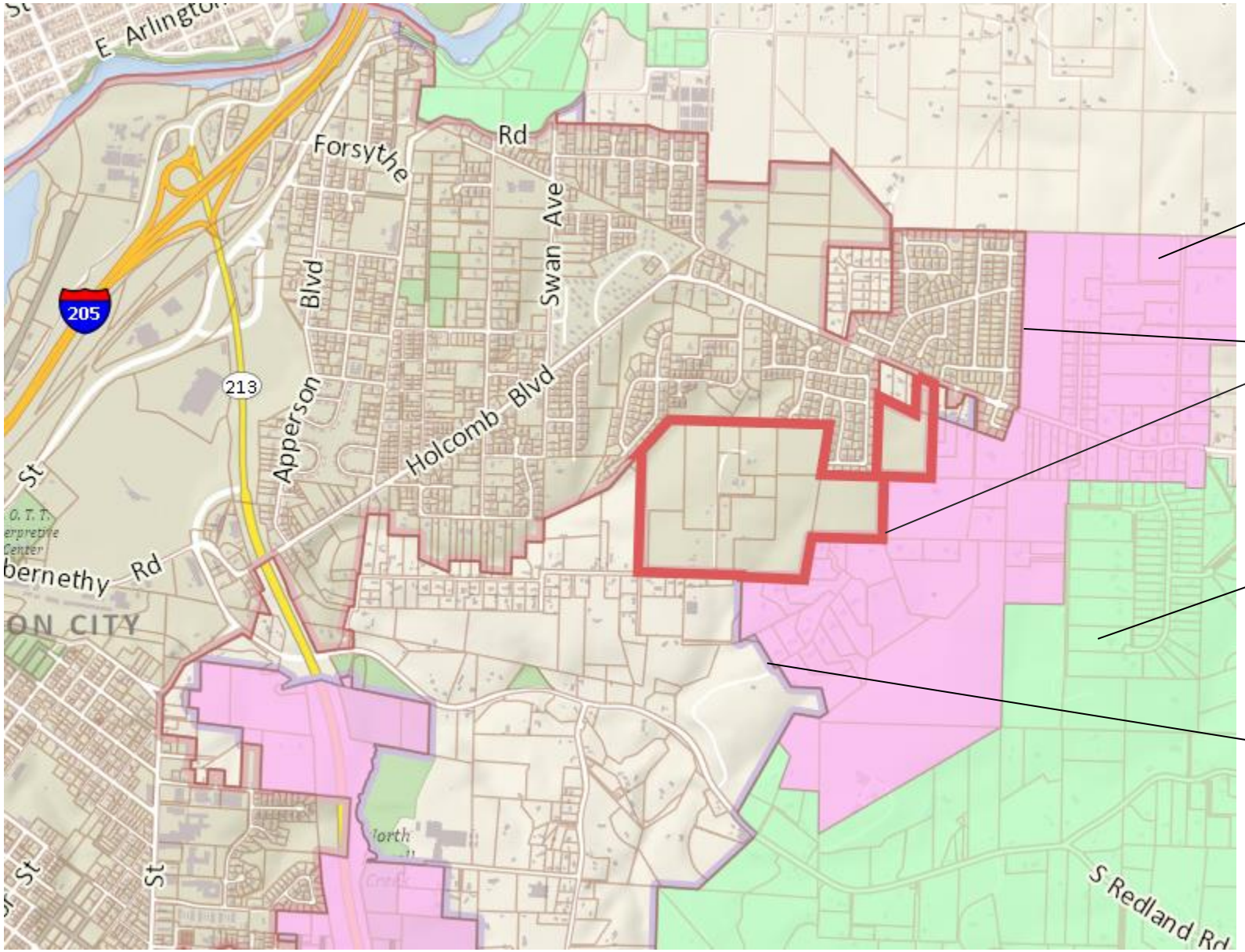
April 25, 2022

Tonight's Hearing

Continuance needed to incorporate new information into the staff report

1. Brief summary from staff
2. Public Testimony
3. Keep record open and continue hearing

Subject Site



Urban Reserve

City Limit/UGB

Rural Reserve

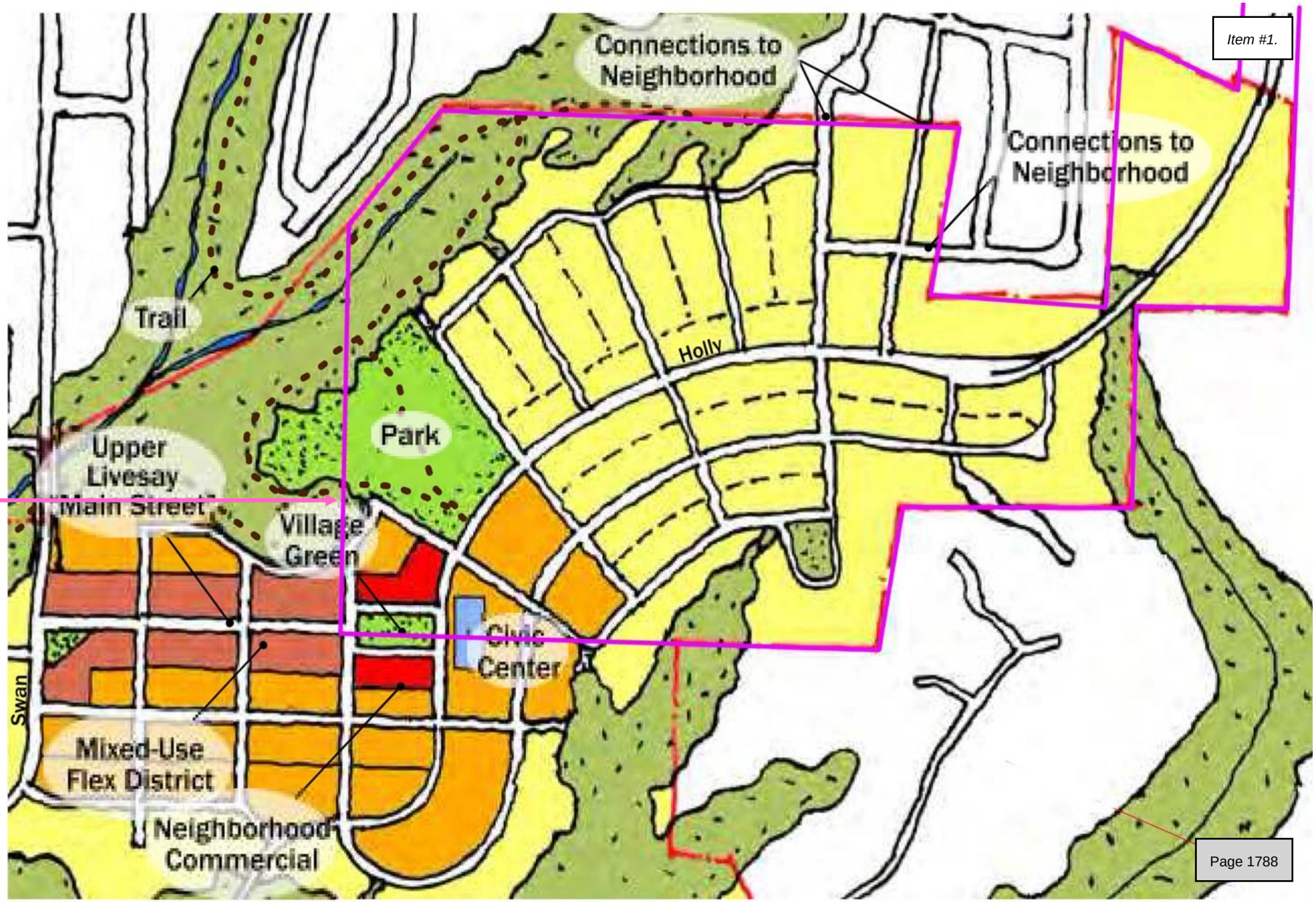
UGB

History

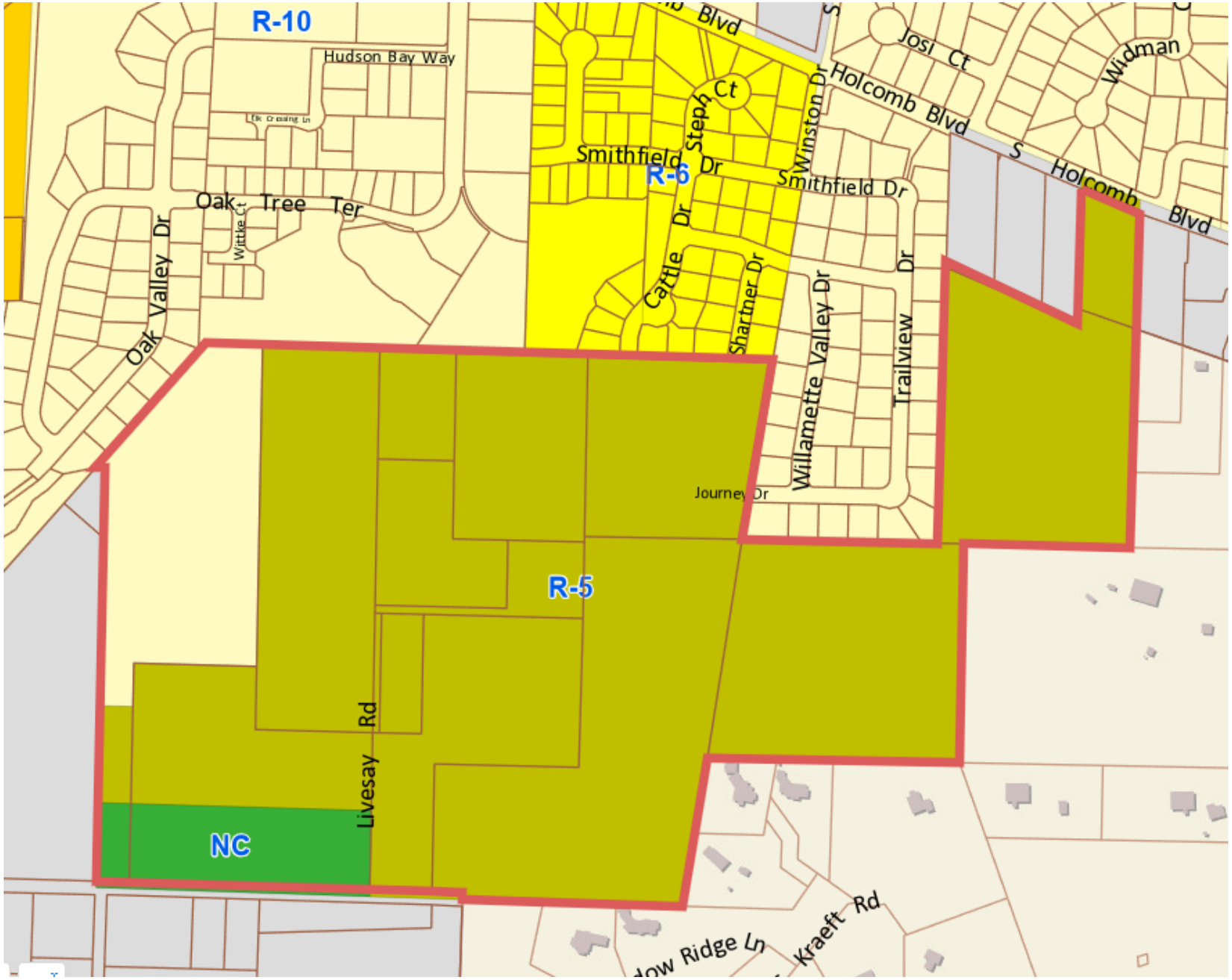
- Park Place Concept Plan (2008) following addition of land into UGB
- AN-17-04: Approved annexation of 92 acres of land within the Urban Growth Boundary
- ZC-17-05: Approved zone change from Clackamas County Future Urbanizable-10 (FU-10) and RRF5 (Rural Farm and Forest 5-Acre) to:
  - R-10 Low Density Residential District
  - R-5 Medium Density Residential District
  - NC Neighborhood Commercial District

Park Place Concept Plan

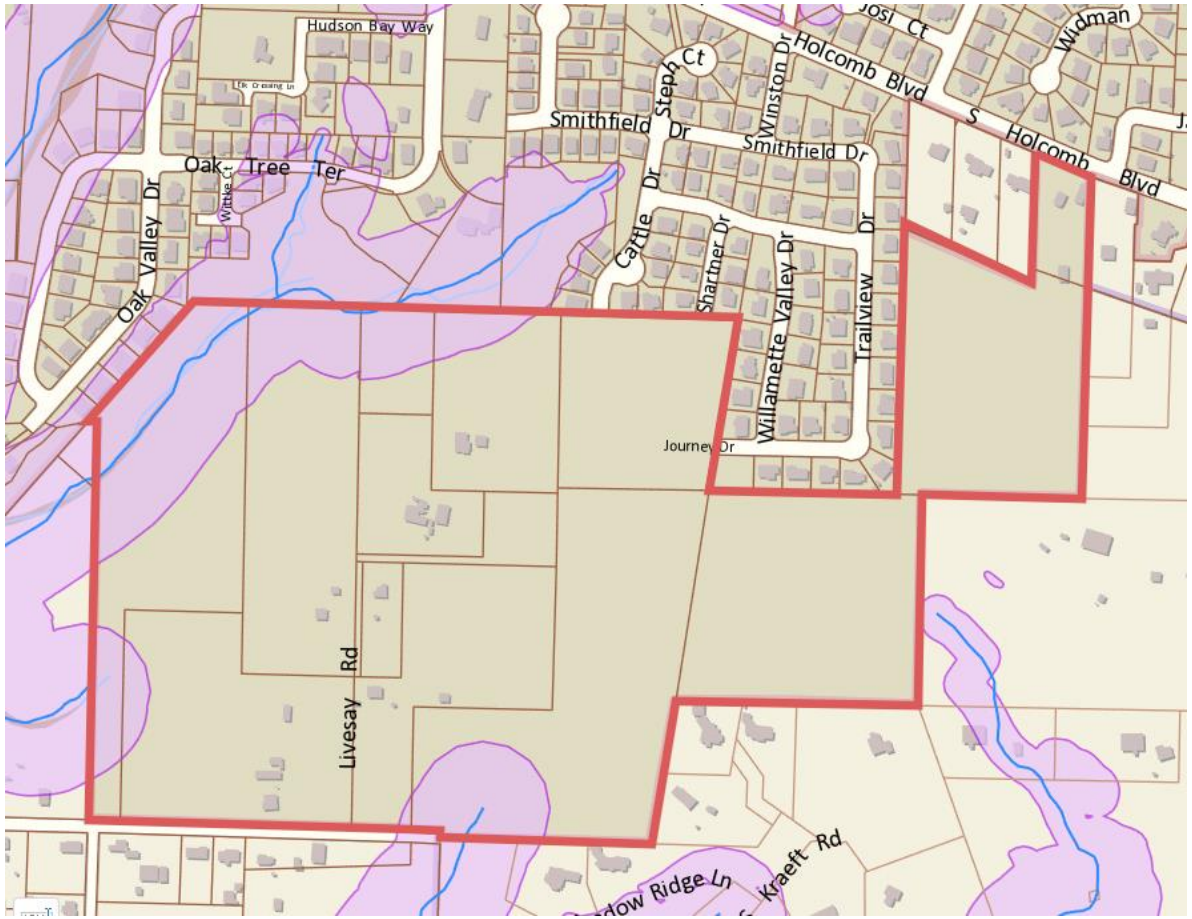
Subject property



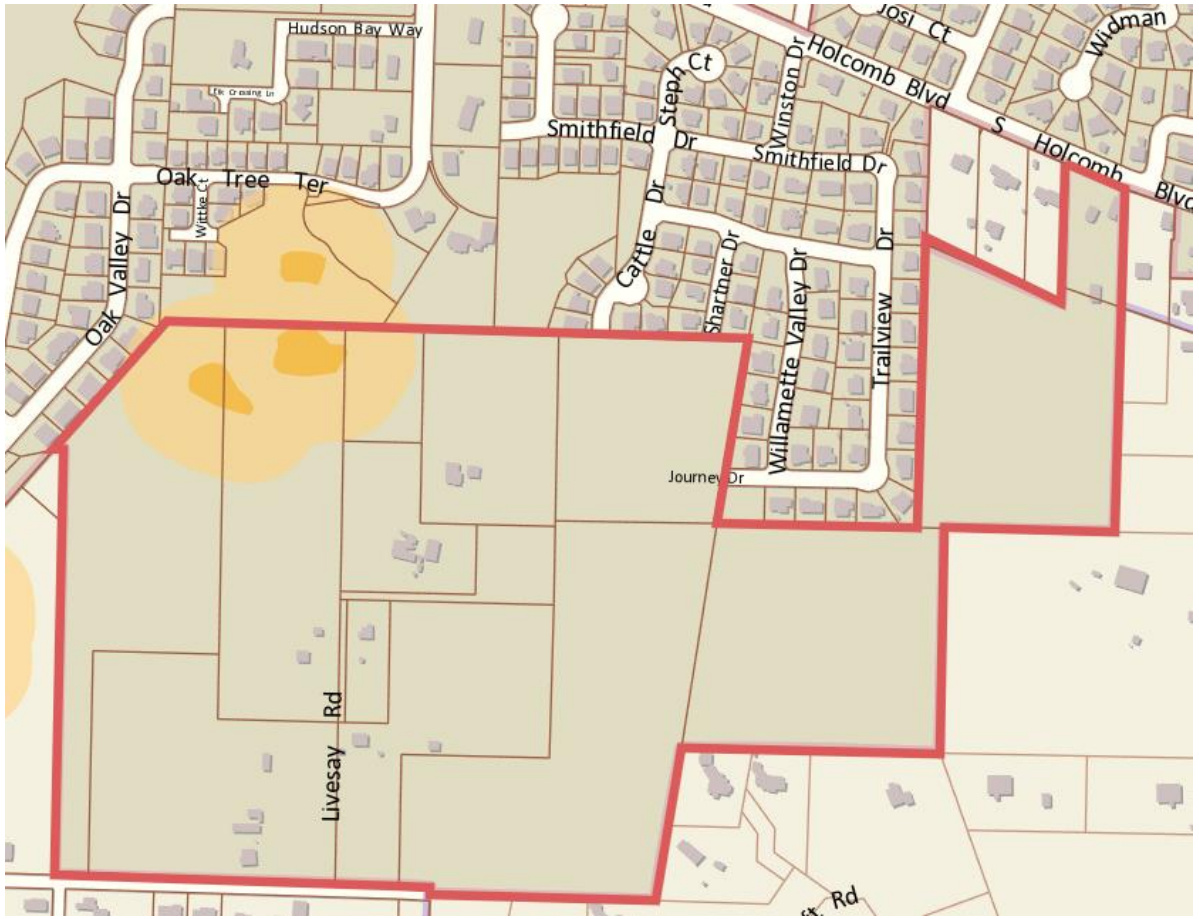
Zoning


R-10
Hudson Bay Way
Elk Crossing Ln
Oak Tree Ter
Wittke Ct
Oak Valley Dr
Smithfield Dr
Steph Ct
R-6
Winston Dr
Holcomb Blvd
Josi Ct
Widman
S Holcomb Blvd
Cattle Dr
Shartner Dr
Willamette Valley Dr
Trailview Dr
Journey Dr
R-5
Livesay Rd
NC
Kraeft Rd
Ridge Ln

Overlay Zones

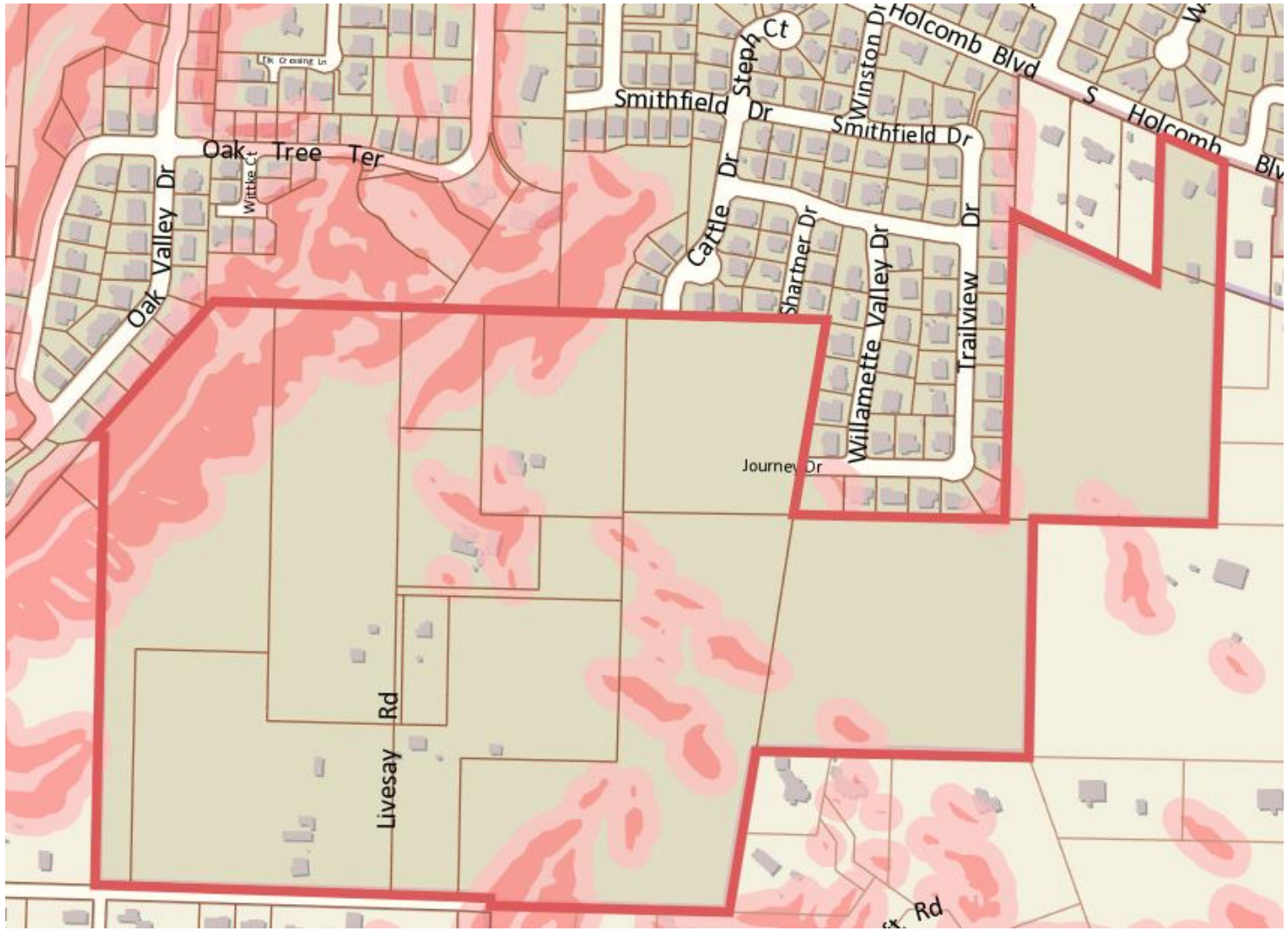


Natural Resource Overlay (NROD)



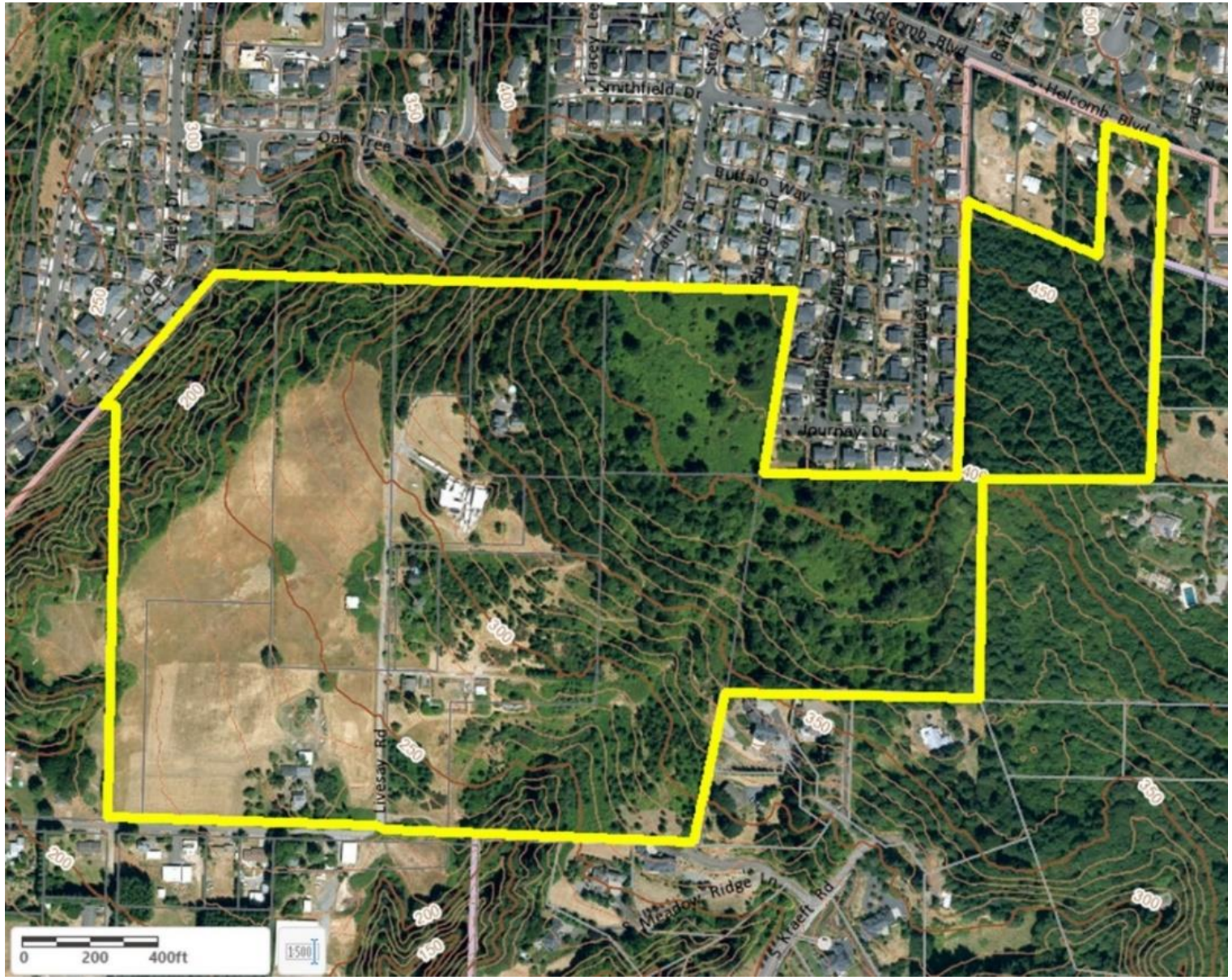
Landslides (Geologic Hazard Overlay)

Overlay Zones



Steep Slopes (Geologic Hazard Overlay)

Existing Conditions



Project Summary

- **General Development Plan (GDP)**: The overall long-term approach to development through 2030 for up to 476 residential lots, including supporting parks, trails, and neighborhood commercial and civic spaces. Included in the request for GDP approval is:
  - A modification to street width standards for a limited segment of Holly Lane
  - Adjustments to the following development standards:
    - OCMC 17.08.040 and 17.10.040 Dimensional Standards, including up to 20% reduction of lot sizes, widths, depths, and setbacks
    - OCMC 17.21.090.A for garage placement and design
    - OCMC 17.08.050 and 17.10.050 Density Standards to exceed maximum density by approximately 4%

- **Variance:** Request to reduce the minimum lot size for attached single family lots to 1800 square feet.

General Development Plan



- 476 total housing units, including 126 attached dwellings and 350 detached dwellings
- Construction of a segment of Holly Lane, a planned collector street
- A future public park site of 4.4 acres
- Approximately 1.3 acres of commercial/civic space provided in two parcels
- An off-street trail system within protected natural areas

General Development Plan Process

1. General Development Plan review (Type III)

2. Detailed Development Plan (DDP) review for each development phase (Type II)

   - DDPs must be consistent with approved General Development Plan

3. Construction Plans and Permits

Next Hearing

- Full staff report and recommendation
- Applicant’s Presentation
- Additional testimony and rebuttal

Planning Commission Options

1. Open the hearing, take public testimony, and continue the hearing to a date certain of May 9, 2022
2. Open the hearing, take public testimony, and continue to hearing to another date certain

GLUA-21-00045: Park Place Crossing General Development Plan:

MAS-21-00006 – General Development Plan (GDP)
VAR-22-00001 – Variance

Type III Quasi-judicial review

Kelly Reid, Planner

Planning Commission

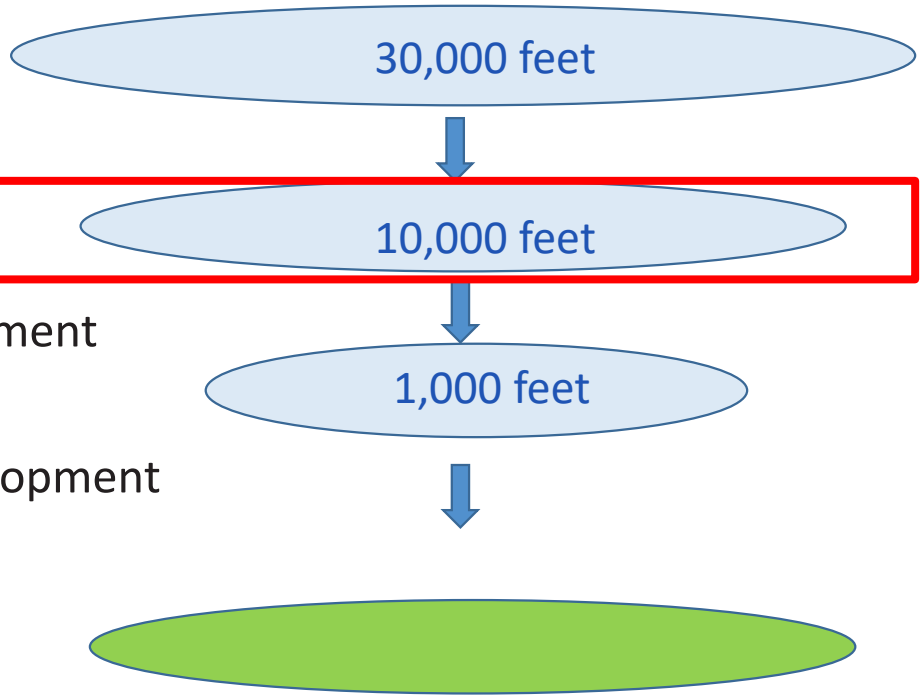
May 9th, 2022

Tonight’s Hearing

1. Staff report
2. Applicant’s Presentation
3. Public Testimony
4. Applicant's rebuttal
5. Planning Commission Deliberation

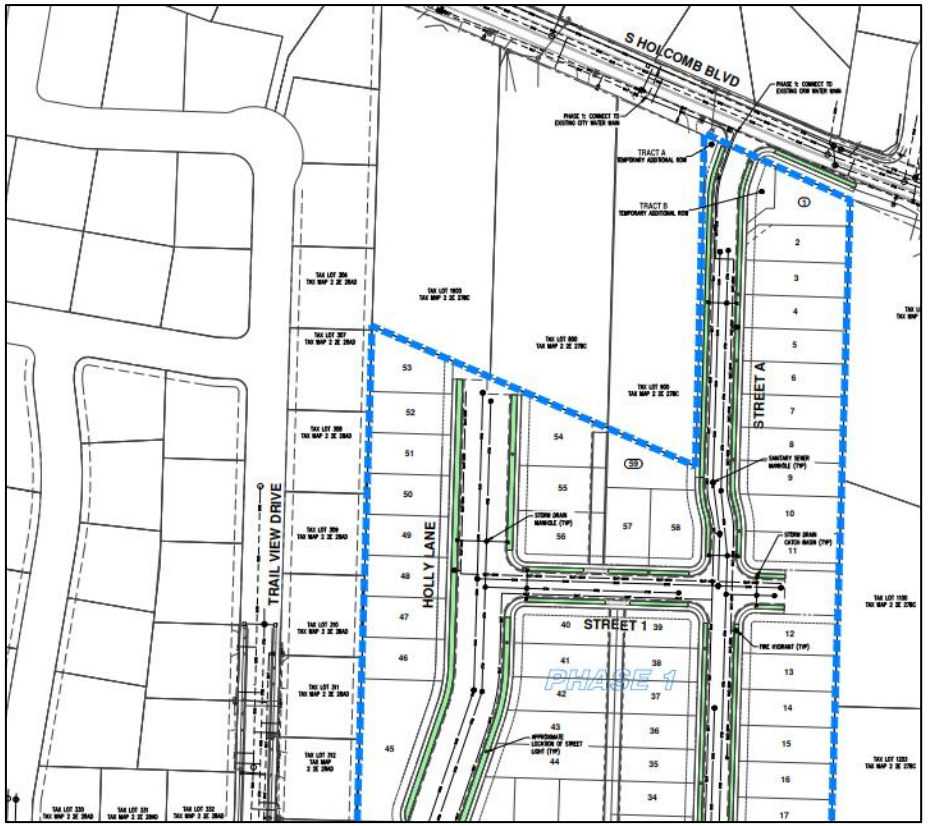
Project History and GDP Process

- Concept Plan Adoption (Type IV)
- Annexation and Zone Change (Type IV)
- General Development Plan review (Type III)
- Detailed Development Plan (DDP) review for each development phase (Type II)
    - DDPs must be consistent with approved General Development Plan
- Construction Plans and Permits (Type I)



Items that will be reviewed at time of DDP

- Tree removal and mitigation
- Geologic Hazard compliance
- NROD compliance
- Stormwater designs
- Block lengths
- Final lot sizes and layout
- Further transportation analysis



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Park Place Concept Plan

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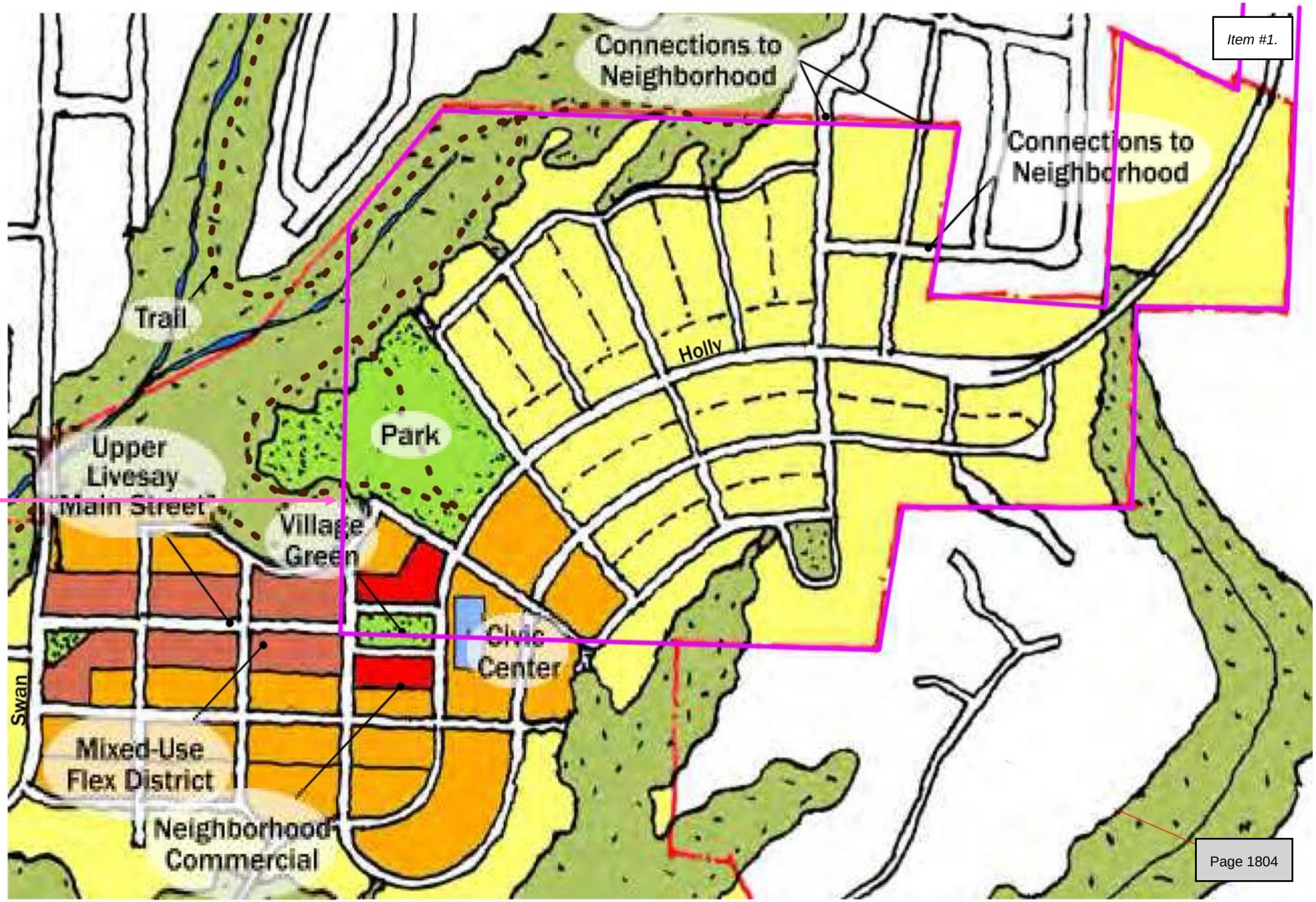
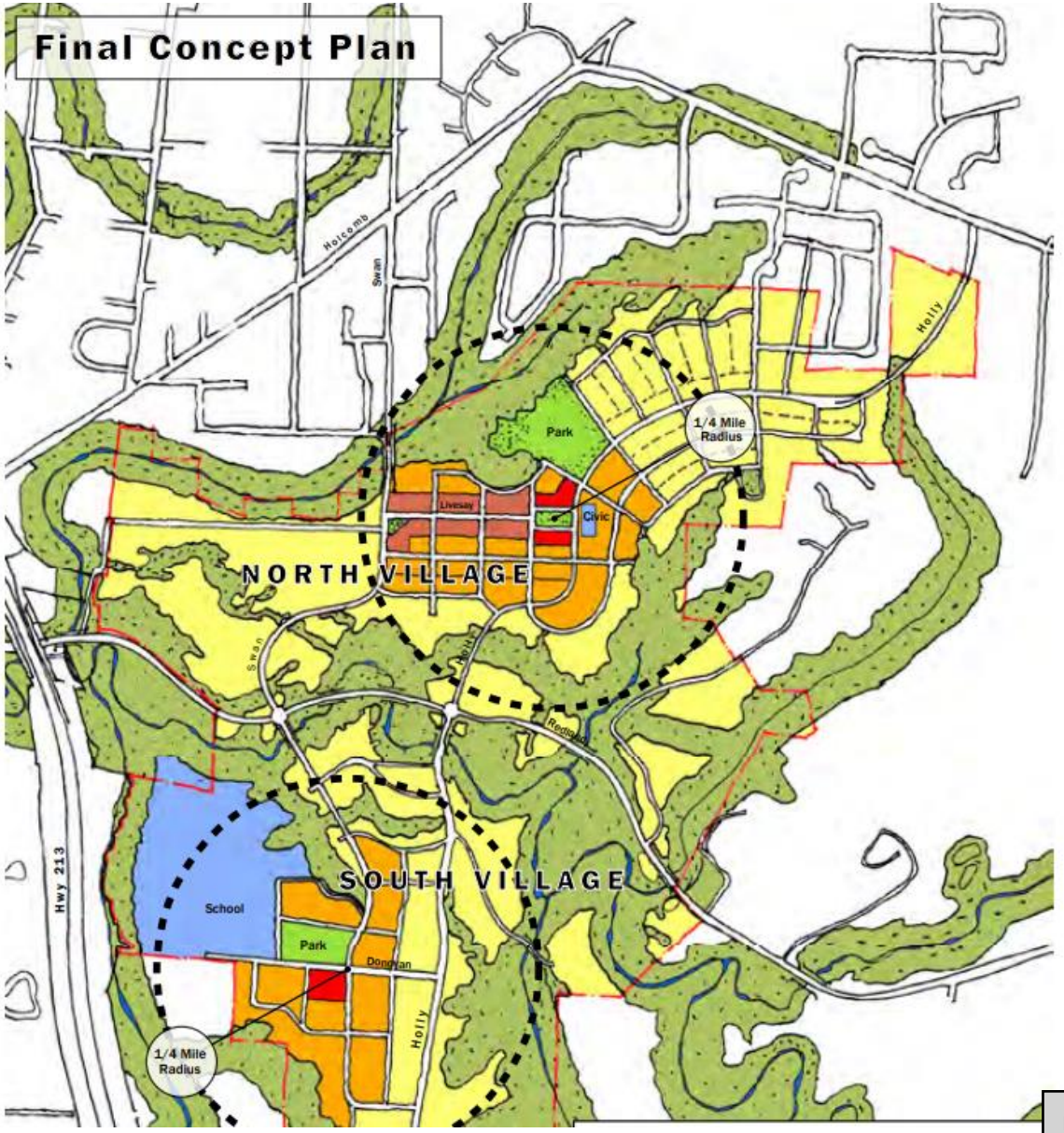


Density and Lot Size

2002 UGB Expansion Area	
Vacant + Developable Land	246.9 acres
Constrained Land	-103.4 acres
New Roads and Utilities	-34.4 acres
Net Buildable Land	109.1 acres
Units (10 du/acre)	*1,091 units*
1980 UGB Expansion Area (Livesay Area)	
Vacant + Developable Land	171.6 acres
Constrained Land	-48.7 acres
New Roads and Utilities	-31.2 acres
Net Buildable Land	93.4 acres
Units (4 du/acre)	*367 units*
Park Place Study Area Total	**1,458 units**



Density and Lot Size

Land Use	Area (gross acres)		Units	
	North Village	South Village	North Village	South Village
Low/Medium-Density Residential	142	61	724	309
Medium/High-Density Residential	28	29	213	213
Mixed-Use Commercial	8	0	-	-
Retail	2	1.6	-	-
Civic	0.7	28	-	-
Park	8	3.2	-	-
Constrained Land	84.6	81.5	144	138
TOTAL			937	

- The subject site represents about 50% of the North Village land area.
- Consequently, about 50% of the residential units should be provided to achieve minimum plan density
- 50% of 937 units is 469 units.

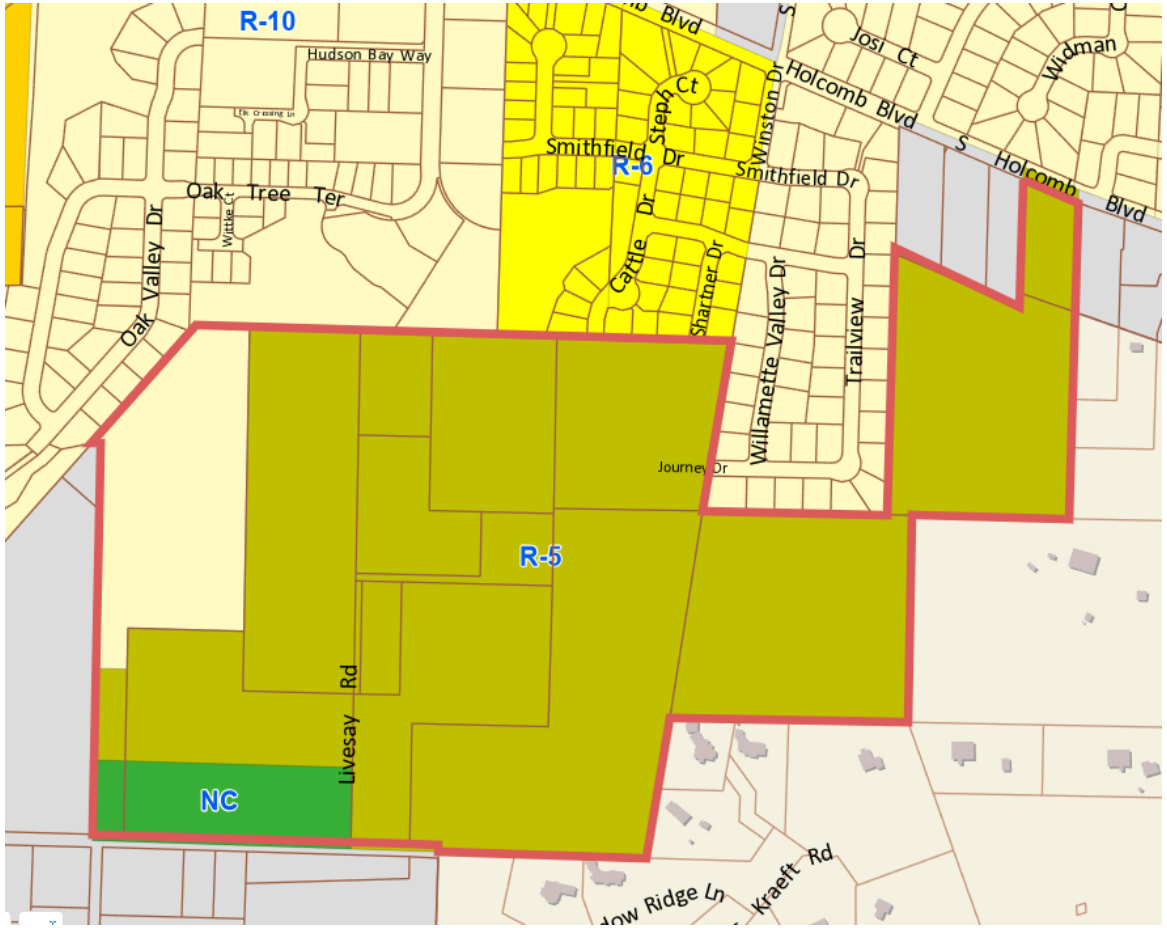
Density and Lot Size

Required: 469 units
Proposed: 477 units

Density Adjustment: up to 10%
Lot Size adjustment: up to 20%
Variance: 1800 sf lots for attached units

- Example: 20x90 foot lot
  (typical house footprint: 20x45)

Mitigation: Open space acreage is provided over and above what was anticipated in Park Place Concept Plan



<u>Staff recommendation: approve</u>

Implications of HB 2001/Middle Housing Code Amendments

- Future DDPs could propose lots sized to accommodate middle housing*
  - E.g. 1500 sf townhome lots or 7,000 sf quadplex lots
- Individual building permit applications for middle housing
  - E.g. Duplex
- Traffic studies still apply

*Future DDP applications can use code in place at time of GDP submittal (July 20, 2021) or the code version in place at time of DDP submittal

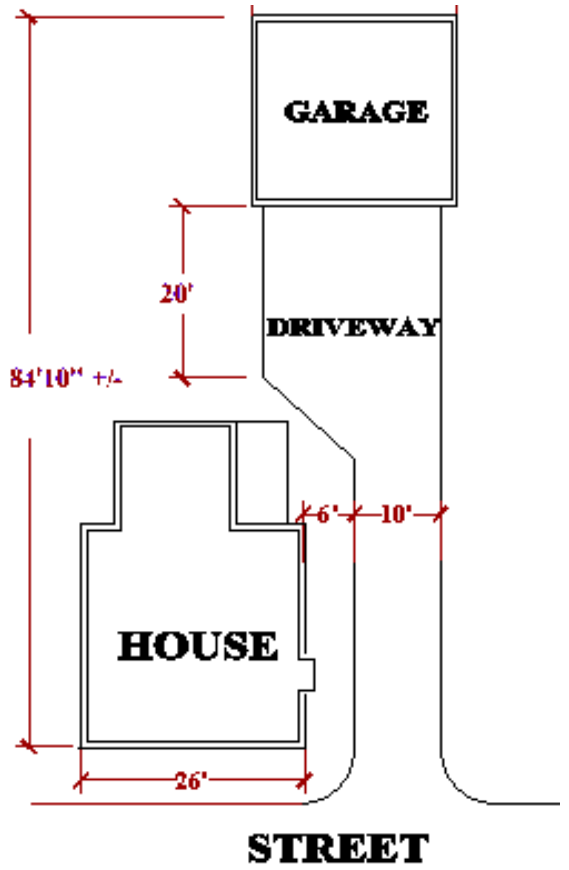
Garage Design Standard Adjustment

Requested adjustment: Allow front-loaded garages

Current standard: “Garages must be detached, side entry or rear entry. For side entry garages: The garage area shall not be located in front of the living area.”

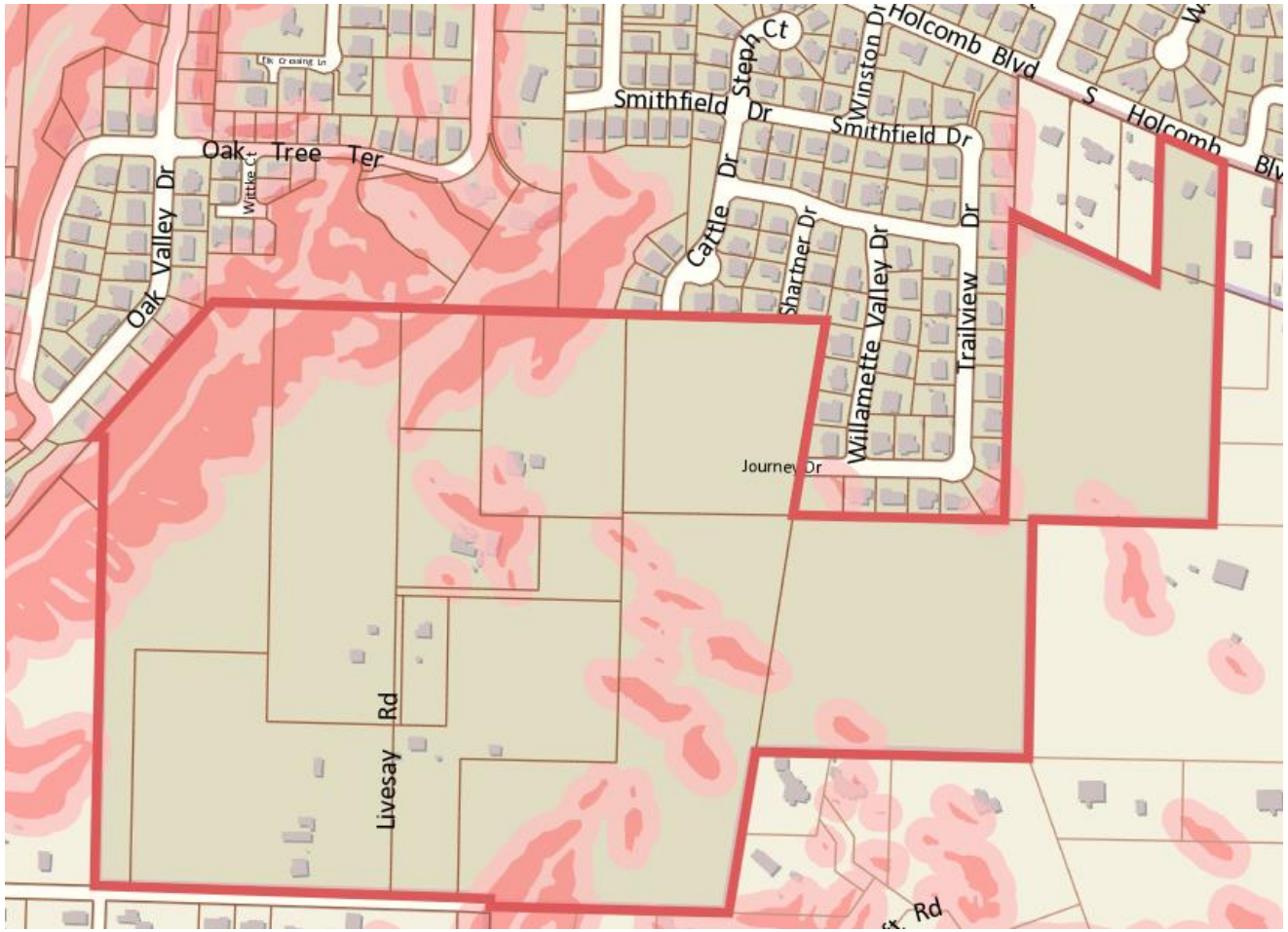
Current exemption opportunity: “An exemption may be granted….**<u>if the applicant proposes a design that mitigates the impact a front entry attached garage has on the pedestrian environment</u>.** Any alternative attached garage design shall not project farther than the living area and shall be limited to **<u>garage door widths of ten feet or less</u>**.”

<u>Staff recommendation: Deny</u>



Geologic Hazards

- Recommended conditions of approval to avoid construction on steep slopes where necessary
- May result in re-alignment of streets, revision to lot layout/sizes
- Future geologic hazard reviews with DDP applications



Steep Slopes (Geologic Hazard Overlay)

Parks and Open Space

- Proposed 4.4 acre land dedication to City for future public park
- Recommended condition of approval for timing of dedication
- Recommended condition of approval for park infrastructure and frontage improvements
- Additional acreage of natural open spaces and trails – privately owned and maintained



Parks and Open Space

Condition of Approval #10

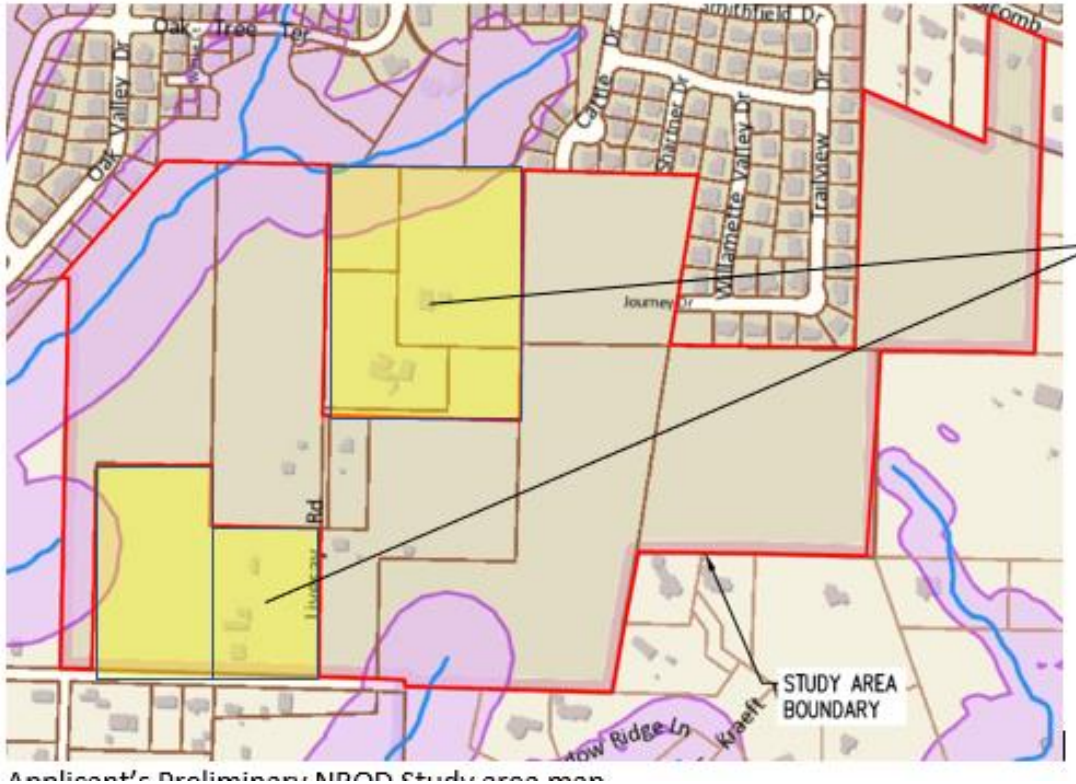
Proposed revision:

"The applicant shall contribute a fee-in-lieu for parks to be calculated based on $4,783.80 per unit for park land cost plus $3,664 per unit for park improvement costs increased at 18% per annum, to be paid at the time of final plat recording of Phase I of the project. This amount shall be held by the City in the form of a surety until at least 4.4 acres of parkland in the location identified in the GDP exhibit is dedicated to the City. The 4.4 acres of park land shall be dedicated to the City at the time of final plat recording of Phase 2."



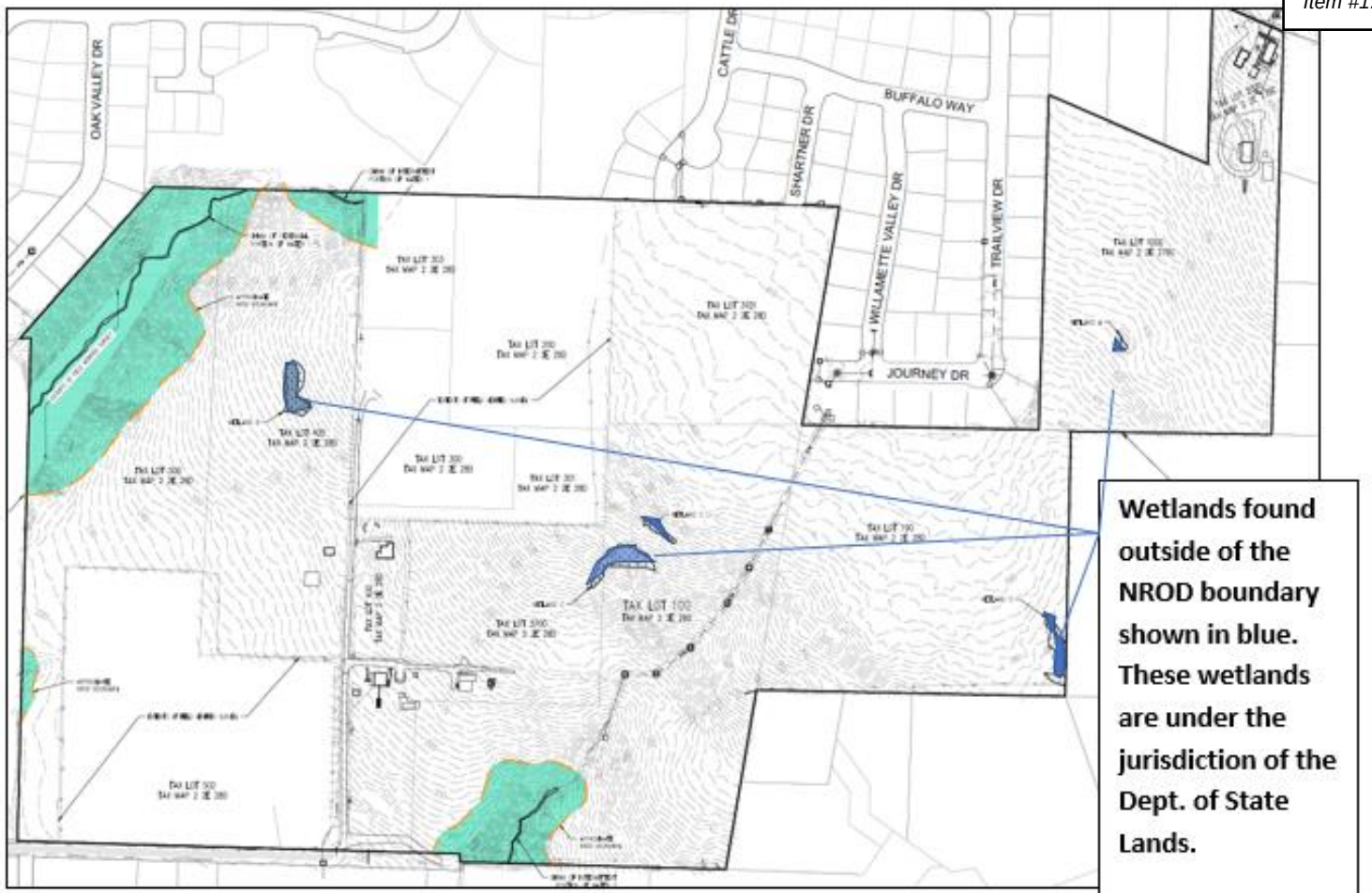
Natural Resources Overlay District

- Preliminary NROD study submitted with application
- Future NROD verifications needed with DDP applications
- NROD Density Transfer proposed



NROD Study

- Wetlands on property outside of NROD boundaries
- Wetlands regulated by State (DSL) and Federal (Army Corps of Engineers) agencies
- City's NROD only applies when wetland is found within or partially within mapped NROD



Applicant's NROD Study Results

Transportation

Applicant's traffic study:

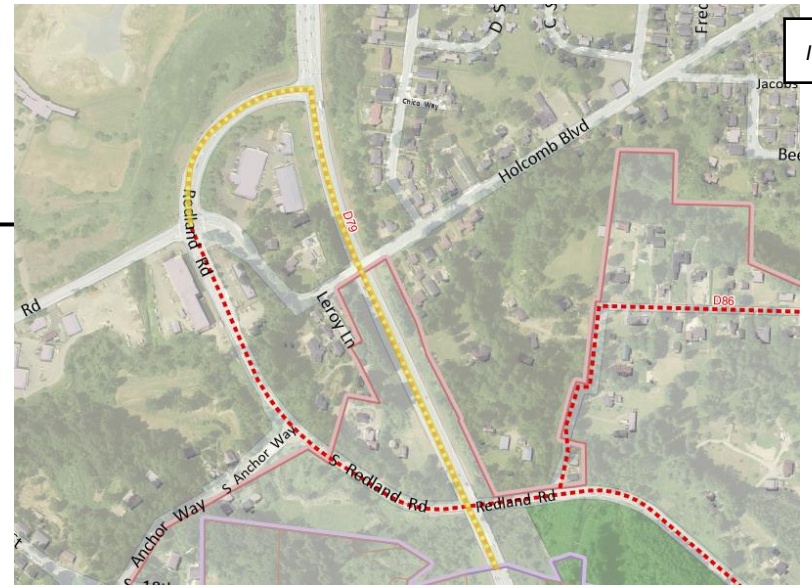
- Accounts for background traffic growth
- Accounts for planned developments (Serres Farms, North End)
- Accounts for pandemic-related traffic fluctuations

Future studies needed for each DDP (except Phase 1)

Proportional share financial contributions for TSP projects required for all phases (calculations provided for Phase 1)

HWY 213 and Redland Rd

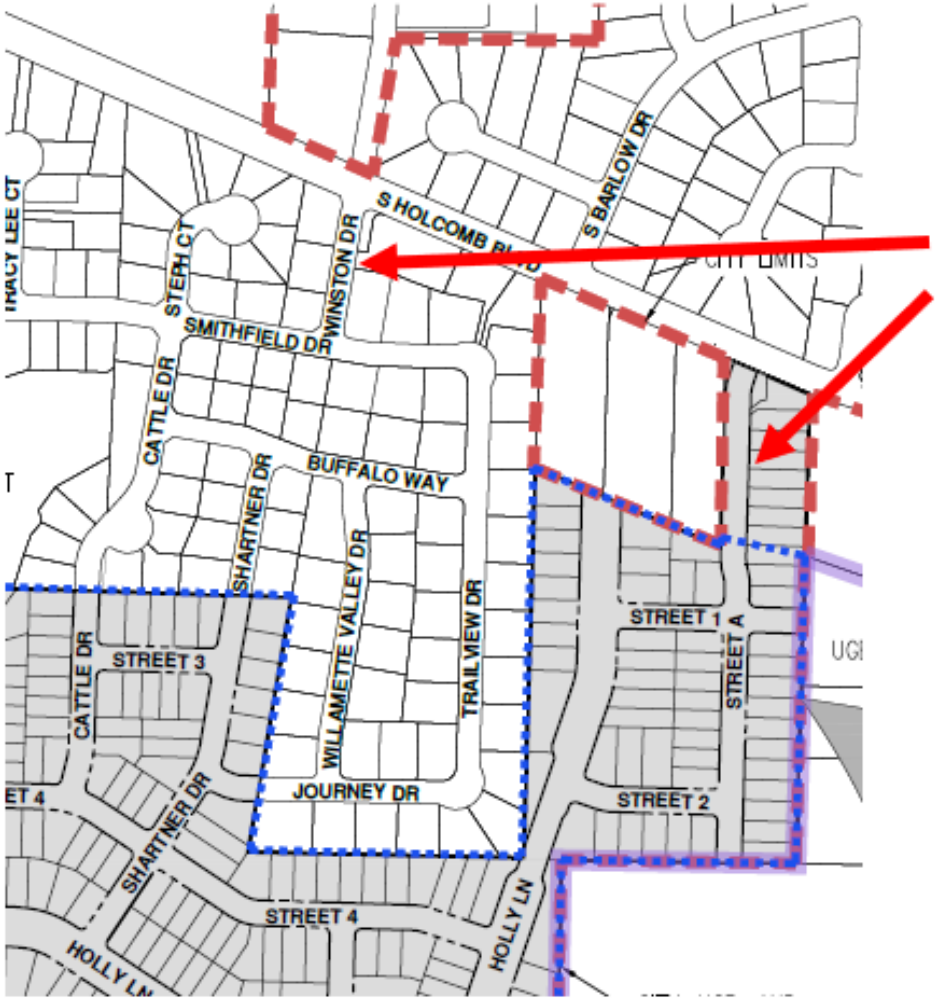
- At Phase 2, intersection will be over capacity.
- GDP must show transportation system will be “made capable”
- Recommended condition of approval that capacity must be <u>available</u>, not just planned
- TSP Project D79 – “Jughandle Phase II”





Traffic Impacts

Connections to existing subdivisions combined with lack of extension to Redland Road will result in high volumes of traffic on local streets

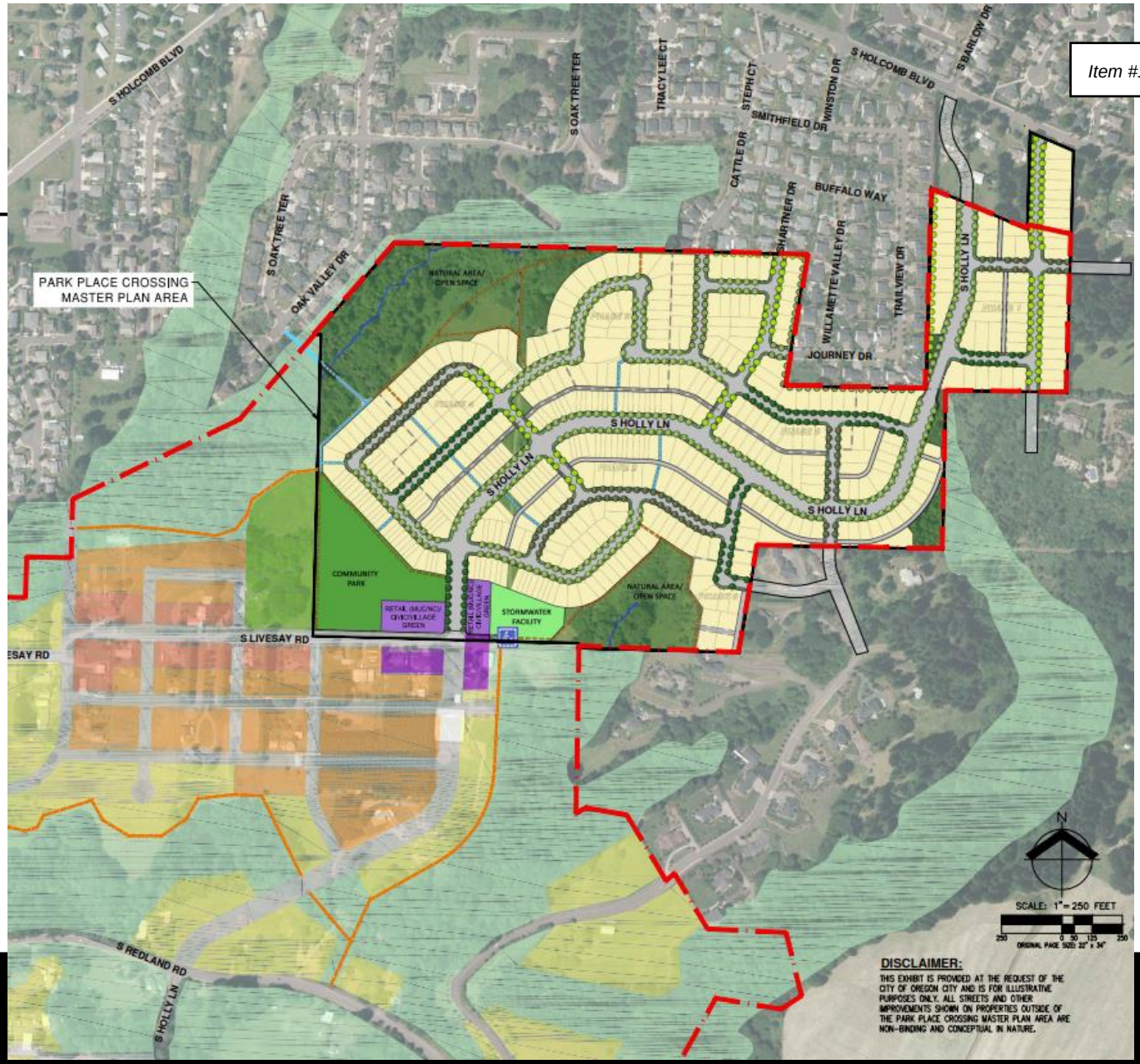


As proposed, two local street access points will be used to access the development by vehicle. One, Street A, is a new street in the development. The other, Winston Drive, is an existing street that currently provides a single vehicular access for 108 residential lots.

Holly Lane would be expected to be connected to Holcomb Blvd eventually, but this connection is not proposed by the applicant due to lack of property control.

Traffic Impacts

Recommended condition of approval for traffic counts, traffic calming elements, and construction of a connection to Redland Rd if vehicular volumes on local streets will exceed 2000 per day.



Street Connectivity

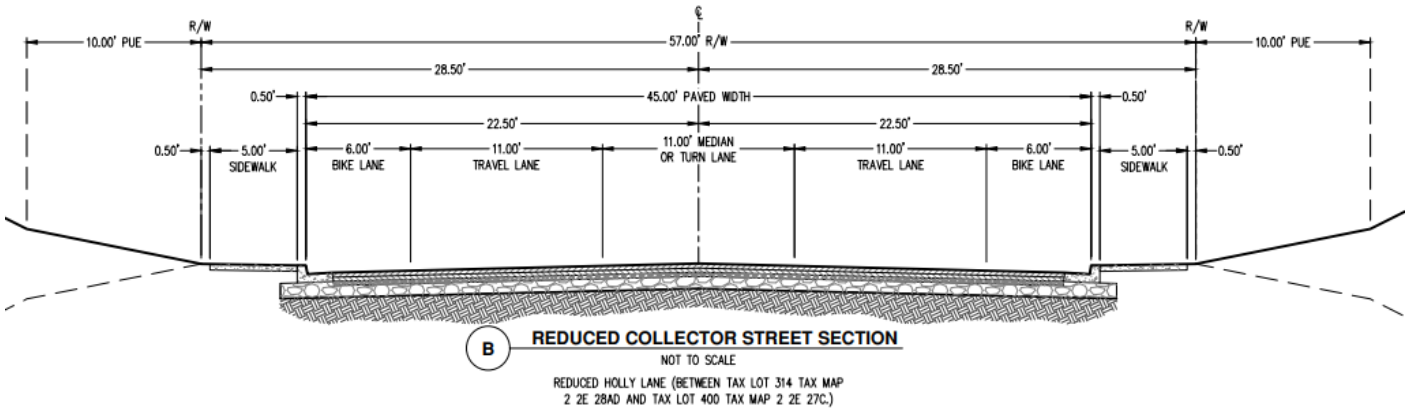


Concept Plan (left) which has local streets running in a north-south direction to the east and west of Holly Lane, and applicant's plan (right) which does not include such local street connections.

Holly Lane modification request

For segment of Holly Lane, reduce right-of-way width to 57 feet

Eliminates on-street parking spaces and planter strips



Staff recommendation: approve

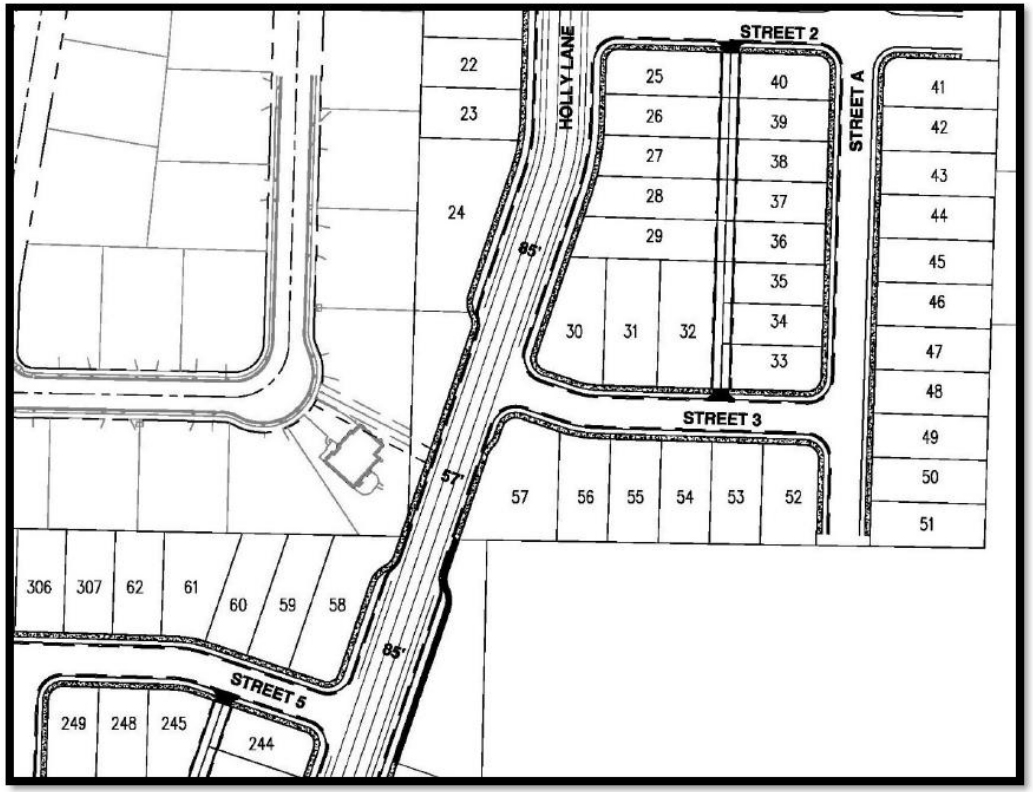
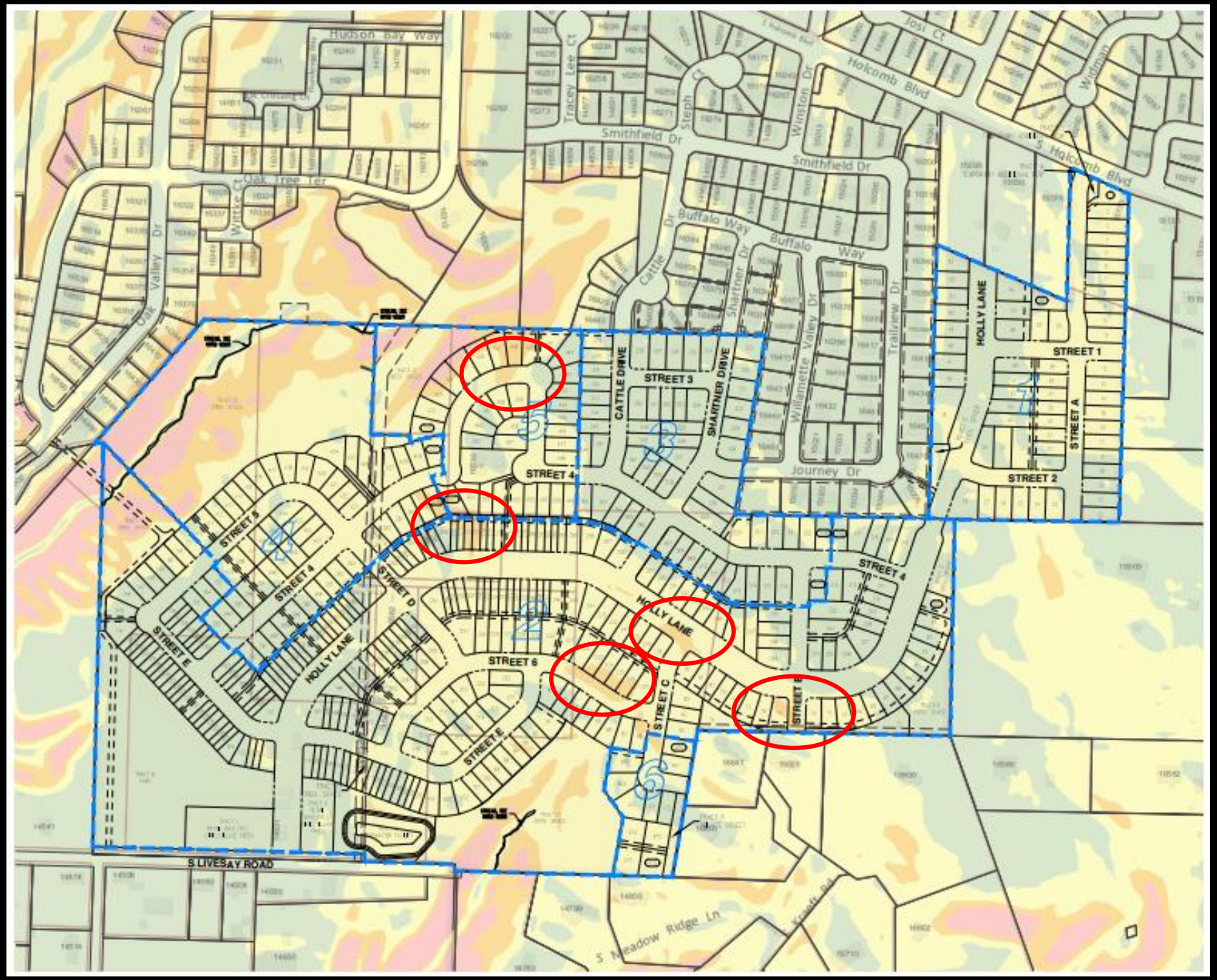


Figure 9: Reduced S Holly Lane Cross-Section

Planning Commission Options

1. Approve the application with the recommended conditions of approval.
2. Approve the application with revised conditions. Close the public hearing, schedule a special meeting in order to adopt revised findings and conditions.
3. Deny the application. Another hearing may be needed in order to adopt revised findings, but the record would be closed.
4. Continue the hearing to a date certain. This option may be used if the Planning Commission requires more information or more time to reach a decision.


Hudson Bay Way
Oak Tree Ter
Oak Valley Dr
Smithfield Dr
Tracey Lee Ct
Steph Ct
Winston Dr
Holcomb Blvd
Josi Ct
Widman
S Holcomb Blvd
Cattle Dr
Buffalo Way
Shartner Dr
Wilamette Valley Dr
Trailview Dr
Journey Dr
HOLLY LANE
STREET 1
STREET A
STREET 2
CATTLE DRIVE
STREET 3
SHARTNER DRIVE
STREET 4
STREET 5
STREET 4
STREET D
HOLLY LANE
STREET E
HOLLY LANE
STREET 6
STREET E
STREET C
STREET E
STREET 4
S LIVESAY ROAD
S Meadow Ridge Ln


LEGEND
RESIDENTIAL LOTS
RETAIL (MUC/NC)/ CIVIC/ VILLAGE GREEN
COMMUNITY PARK
NATURAL AREA/ OPEN SPACE
STORMWATER FACILITY
SOFT SURFACE TRAIL
PAVED PEDESTRIAN ACCESSWAY
TRAILHEAD
PLAN ELEMENTS, LOCATIONS, AND DETAILS AS SHOWN ARE CONCEPTUAL AND SUBJECT TO CHANGE.
PEDESTRIAN BRIDGE
NATURAL AREA/OPEN SPACE
PEDESTRIAN ACCESSWAY
SOFT SURFACE TRAIL
HOLCOMB BOULEVARD
BUJADA WAY
BUFFALO WAY
CATTLE DRIVE
SHARTNER DRIVE
WILLAMETTE VALLEY DRIVE
TRAIL VIEW DRIVE
JOURNEY DRIVE
OAK TREE TERRACE
OAK VALLEY DRIVE
NATURAL AREA/ OPEN SPACE
COMMUNITY PARK
STORMWATER FACILITY
NATURAL AREA/ OPEN SPACE
RETAIL (MUC/NC)/ CIVIC/ VILLAGE GREEN
TRAILHEAD
NEIGHBORHOOD/MIXED USE COMMERCIAL AND CIVIC SPACE
STORMWATER FACILITY
PARK