



CITY OF OREGON CITY HISTORIC REVIEW BOARD AGENDA

Virtual Meeting
Tuesday, January 24, 2023 at 7:00 PM

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

CALL TO ORDER

OATH OF OFFICE

1. Mayor Denyse McGriff will administer the Oath of Office to Robert Green and Tim Powell as new Historic Review Board members.

ELECTIONS

PUBLIC COMMENT

Citizens are allowed up to 3 minutes to present information relevant to the City but not listed as an item on the agenda. To assist in tracking your time, refer to the timer at the dais. Prior to speaking, citizens shall complete a comment form and deliver it to the Staff Member. When the Chair calls your name, proceed to the speaker table and state your name and city of residence into the microphone. The Historic Review Board Officers do not generally engage in dialog with those making comments but may refer the issue to the City Manager.

PUBLIC HEARING

2. GLUA-22-00039 and HR 22-00013: Historic Review for solar panel installation of street-facing roof planes on a designated structure in the McLoughlin Conservation district, the William T. Whitlock House at 1216 Jackson Street.
3. GLUA 22-00031: HR-22-00011 Resubmission for a full ADA Ramp Modification of HR 20-00001 -1020 5th Street

COMMUNICATIONS

4. 2022 HRB Accomplishments

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: Historic Review Board **Agenda Date:** 1/24/2023
From: Christina Robertson-Gardiner, Senior Planner

SUBJECT:

GLUA-22-00039 and HR 22-00013: Historic Review for solar panel installation of street-facing roof planes on a designated structure in the McLoughlin Conservation district, the William T. Whitlock House at 1216 Jackson Street.

STAFF RECOMMENDATION:

Staff Recommends approval with conditions.

EXECUTIVE SUMMARY:

The William T. Whitlock House is a Vernacular-style structure with a medium pitch, side gable roofline. The roof on the William T. Whitlock House is a dark composition shingle. A total of 18 panels are proposed, 13 on the south-facing front gable (which can be seen from the street) and five on the rear-facing garage gable (which cannot be seen from the street)

The Board has approved panels facing the street and visible from the right of way in the past, as long as they were not distracting from or too prominently visible when viewing the primary façade or entryway of the structure. The panels proposed on the William T. Whitlock House will be visible from the right-of-way.

Unlike previous solar applications, The applicant has yet to submit an analysis showing that locating the panels on the rear roof plane where they would meet the HRB policies would not provide sufficient power generation. Staff will contact the applicant and request that they provide this information at the hearing. Though It is reasonable to infer this situation as 13 of the 18 panels are on the main southern-facing gable.

As energy prices rise and renewable technology becomes more affordable, more common, and more critical to society's response to climate change, the Board will have to balance these factors with the concerns of historic integrity. Because the panels are only placed on the roof and will not cover or destroy historical materials or features, and are designed to be removed in the future without causing irreparable damage to the structure, the Board may find that the panels will not affect the integrity of the structure. In fact, the investment may prolong the overall preservation of the home.

If the Board finds that these panels will impact the historic integrity of the home, the proposal's impacts may be mitigated by limiting the number of panels on the upper roof plane.

BACKGROUND:

See Staff Report and Recommendation document in the agenda item attachments.

OPTIONS:

1. Approve the proposal with conditions (staff recommendation)
2. Approve the proposal with modified conditions and provide revised findings
3. Deny the proposal and provide revised findings.
4. Continue the hearing and request more information



**Historic Review
Staff Report for a Solar Installation on a Designated Historic Site
in the McLoughlin Conservation District
January 16, 2023**

FILE NO.: GLUA-22-00039 and HR 22-00013: Historic Review

HEARING DATE: January 24, 2023
7:00 p.m. – Virtual Meeting over Zoom

APPLICANT: Hannah Nicholas
1403 N Research Way
Orem, Utah 84097

OWNER: Nicholas Kocher
1216 Jackson Street
Oregon City, OR 97045

LOCATION: 1216 Jackson Street
Oregon City, OR 97045

REQUEST: Historic Review for solar panel installation of street-facing roof planes on a designated structure in the McLoughlin Conservation district, the William T. Whitlock House

REVIEWER: Christina Robertson-Gardiner, Senior Planner, AICP

RECOMMENDATION: Approval with Conditions

CRITERIA: Administration and Procedures are set forth in Chapter 17.50, Historic Overlay District in Chapter 17.40, of the Oregon City Municipal Code. The City Code Book is available on-line at www.oregoncity.org.

Please be advised that any issue that is intended to provide a basis for appeal must be raised before the close of the hearing, in person or by letter, with sufficient specificity to afford the Historic Review Board and the parties an opportunity to respond to the issue. Failure to raise an issue with sufficient specificity will preclude any appeal on that issue. The decision of the Historic Review Board may be appealed to the City Commission by parties with standing within fourteen (14) calendar days of the notice of decision. Any appeal will be based on the record. The procedures that govern the hearing will be posted at the hearing and are found in OCMC Chapter 17.50 and ORS 197.763. A city-recognized neighborhood association requesting an appeal fee waiver pursuant to OCMC 17.50.290(C) must officially approve the request through a vote of its general membership or board at a duly announced meeting prior to the filing of an appeal.

Summary and Recommended Conditions of Approval

The William T. Whitlock House is a Vernacular-style structure with a medium pitch, side gable roofline. The roof on the William T. Whitlock House is a dark composition shingle. A total of 18 panels are proposed, 13 on the south-facing front gable (which can be seen from the street) and five on the rear-facing garage gable (which cannot be seen from the street)

The Board has approved panels facing the street and visible from the right of way in the past, as long as they were not distracting from or too prominently visible when viewing the primary façade or entryway of the structure. The panels proposed on the William T. Whitlock House will be visible from the right-of-way.

Unlike previous solar applications, The applicant has yet to submit an analysis showing that locating the panels on the rear roof plane where they would meet the HRB policies would not provide sufficient power generation. Staff will contact the applicant and request that they provide this information at the hearing. Though It is reasonable to infer this situation as 13 of the 18 panels are on the main southern-facing gable.

As energy prices rise and renewable technology becomes more affordable, more common, and more critical to society's response to climate change, the Board will have to balance these factors with the concerns of historic integrity. Because the panels are only placed on the roof and will not cover or destroy historical materials or features, and are designed to be removed in the future without causing irreparable damage to the structure, the Board may find that the panels will not affect the integrity of the structure. In fact, the investment may prolong the overall preservation of the home.

If the Board finds that these panels will impact the historic integrity of the home, the proposal's impacts may be mitigated by limiting the number of panels on the upper roof plane.

Prior to issuance of Building Permits:

1. The applicant shall submit documentation showing that the panels will be no more than 5" above the roof surface.
2. Ground- or wall-mounted equipment shall not obscure any architectural features and shall not be installed in a manner that destroys historic millwork or other historic materials. The applicant shall submit a sketch or mock-up of the equipment placement to staff to demonstrate compliance with this condition.
3. The panel frames shall be black, no unfinished/shiny metal frames or visible parts are permitted.
4. The applicant shall ensure that the ground-mounted equipment is blocked from pedestrian view by the use of fencing or landscaping.

I. BACKGROUND:

Site and Context

The subject property is the Arthur and Daisy Farr House, a 1923 Vernacular-style home on a corner lot in the McLoughlin Conservation District. The home is in good condition.



Vicinity Map and photograph

The Historic Inventory form for the home reads:

1216 Jackson Street - William T. Whitlock House



This two story vernacular house has a rectangular plan and sits on post and beam foundation with skirting. The gable roof is covered with composition shingles and is pierced by a chimney. The rafter tails are exposed, there are decorative eave brackets and rake board. The gable end of the front façade has a decorative sunburst. The house is covered with channel drop siding. The gable ends are clad in wood shingles of several shapes. The south façade has a square bay. Windows are

primarily 1/1 vinyl double-hung. The shed roof entry porch is supported by square columns and has a knee wall. The main entry door has been replaced. There is a hipped roof addition with porch and shingle siding to the rear. A concrete retaining wall extends across the front yard at the sidewalk level.

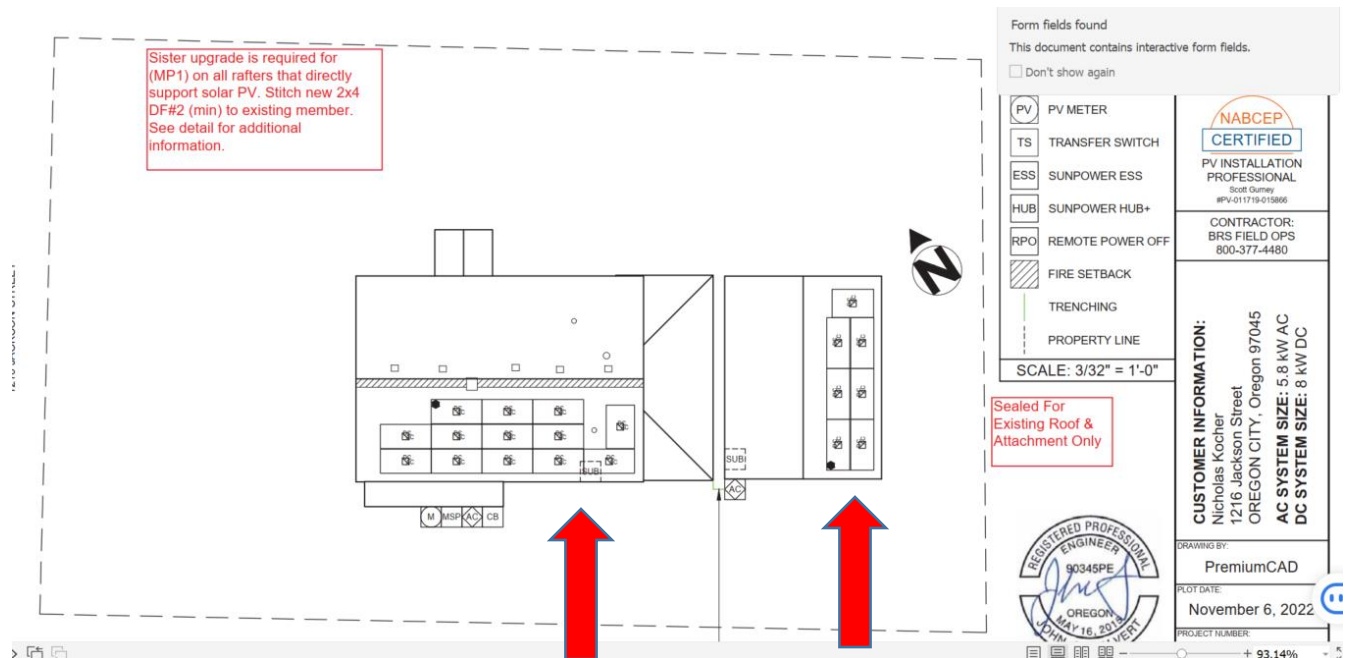
Statement of Significance: Edward R. Whitlock purchased the property in 1881. William Whitlock was the son of William Whitlock, Sr., who emigrated from England prior to 1860. Whitlock owned and operated a dry goods and general merchandise store in Oregon City in the late 1870s and early 1880s. On his death at the age of 54 in 1884, he left the store to his son

Edward. William, Jr. inherited the land the house is on in 1893 from his mother, Honor. He was Mayor of Oregon City from 1888 to 1889, County Recorder from 1877 through 1882, and City Councilman in 1883, 1887 and 1889. The property was sold several times over the next few decades. Verl Weldon was the last registered owner from 1959-81.

Existing Conditions

Project Description:

The applicant is proposing an 18-module solar photovoltaic array on the roof of the house. Panels are proposed on two different roof planes, and ground equipment is proposed on the south of the house, which is the side.





Proposed Roof plan

The applicant has proposed to place solar panels on the roof of the historic structure. In 2019, the City adopted an HRB Policy for solar technology on historic homes, which allowed solar panels without HRB review if the panels met the following standards:

- Sloped roof location: Solar panels are permitted on secondary facades of historic buildings and on accessory structures.
- Design: Panels on sloped roofs shall project five inches or less from the roof surface and be installed flat; they shall not alter the slope of the roof.
- Color: Panels and mounting systems shall be the same color as established roof materials.
- Mechanical equipment associated with the photovoltaic system shall be as unobtrusive as possible.

The panels proposed on this home are proposed on the rear side and front-facing roof slopes and placed such that they will be visible when viewing the primary façade of the house from the right of way. Thus, staff was unable to make a finding that the panels were on a secondary façade. Therefore, HRB review is required for this proposal.

The location of the panels is a key factor in determining whether they will impact the historic character of the home. The Secretary of Interior Standards has generally been applied to allow solar equipment that is minimally visible and/or on secondary portions of structures or sites (see Exhibit 5). The federal guidance provides some examples, including the “Vermont residence”, where panels are placed atop a

low-pitch gable roof on a 3-story building. “Though visible, these few panels have relatively little impact on the historic character of the property. However, if the roof had been a more prominent feature of the property, this installation may not have been appropriate.”



“Vermont residence” example

Zoning:

The property is zoned R-6 Dwelling District and Low-Density Residential in the Comprehensive Plan.

Notice and Public Comment:

Public notices were mailed to property owners within 300 feet of the subject site, posted on the subject site, and published in a newspaper of general circulation. Public comments that were received are summarized below and responded to within this staff report.

An email from Wendy Marshall, Land Use Chair of the Mcloughlin Conservation District, requesting more information on the reduction in production by not placing the panels on the front viewing elevation.

The building division indicated that the proposal does not conflict with their interests.

Full public comments are attached to this Staff report as Exhibit 3.

CODE RESPONSES:

17.40.060 - Exterior alteration and new construction.

- A. *Except as provided pursuant to subsection I of this section, no person shall alter any historic site in such a manner as to affect its exterior appearance, nor shall there be any new construction in an historic district, conservation district, historic corridor, or on a landmark site, unless a certificate of appropriateness has previously been issued by the historic review board. Any building addition that is thirty percent or more in area of the historic building (be it individual or cumulative) shall be considered new construction in a district. Further, no major*

public improvements shall be made in the district unless approved by the board and given a certificate of appropriateness.

Finding: Applicable: The proposal for exterior alteration in a historic district is being reviewed by the Historic Review Board.

B. Application for such a certificate shall be made to the planning staff and shall be referred to the historic review board. The application shall be in such form and detail as the board prescribes.

Finding: Complies as Proposed: The applicant submitted the required materials.

C. Archeological Monitoring Recommendation. For all projects that will involve ground disturbance, the applicant shall provide,

- 1. A letter or email from the Oregon State Historic Preservation Office Archaeological Division indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the Oregon State Historic Preservation Office and that the Oregon State Historic Preservation Office had not commented within forty-five days of notification by the applicant; and*
- 2. A letter or email from the applicable tribal cultural resource representative of the Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz, Confederated Tribes of the Umatilla, Confederated Tribes of the Warm Springs and the Confederated Tribes of the Yakama Nation indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the applicable tribal cultural resource representative and that the applicable tribal cultural resource representative had not commented within forty-five days of notification by the applicant.*

If, after forty-five days notice from the applicant, the Oregon State Historic Preservation Office or the applicable tribal cultural resource representative fails to provide comment, the city will not require the letter or email as part of the completeness review. For the purpose of this section, ground disturbance is defined as the movement of native soils.

Finding: Not Applicable. The project does not include disturbance of native soils.

D. [1.] The historic review board, after notice and public hearing held pursuant to Chapter 17.50, shall approve the issuance, approve the issuance with conditions or disapprove issuance of the certificate of appropriateness.

Applicable: The proposal is being reviewed by the Historic Review Board.

- 2. The following exterior alterations to historic sites may be subject to administrative approval:*
 - a. Work that conforms to the adopted Historic Review Board Policies.*

Not Applicable: The proposal is not subject to administrative approval.

E. For exterior alterations of historic sites in an historic district or conservation district or individual landmark, the criteria to be used by the board in reaching its decision on the certificate of appropriateness shall be:

- 1. The purpose of the historic conservation district as set forth in Section 17.40.010;*

Finding: Complies with Conditions.

The purpose of the district is to:

- A. Effect and accomplish the protection, enhancement and perpetuation of such improvements and of districts which represent or reflect elements of the city's cultural, social, economic, political and architectural history;*
- B. Safeguard the city's historic, aesthetic and cultural heritage as embodied and reflected in such improvements and districts;*
- C. Complement any National Register Historic districts designated in the city;*
- D. Stabilize and improve property values in such districts;*
- E. Foster civic pride in the beauty and noble accomplishments of the past;*

- F. Protect and enhance the city's attractions to tourists and visitors and the support and stimulus to business and industry thereby provided;
- G. Strengthen the economy of the city;
- H. Promote the use of historic districts and landmarks for the education, pleasure, energy conservation, housing and public welfare of the city; and
- I. Carry out the provisions of LCDC Goal 5.

The applicant has provided the following responses:

- A. *The addition of solar modules to the historic home will not alter the historic feature of the home. They will continue to enhance the home.*
- B. *The plan supports the preservation of the historic site. Circa 1900, most homes west of the Mississippi had independent renewable energy sources, primarily wind turbines and water wheels, which were mainly used to pump water. Electricity from the grid was very rare at that point. Thus, renewable energy sources and independently producing your own power are very period values and ideas.*
- C. *We plan to follow all rules, regulations and guidelines provided by the city*
- D. *Solar panels have been proven to improve property values. We can provide links to articles, as desired. We have also met with metro area real estate appraisers that have indicated to us that they add the invoice value of the system in the first 5 years and \$4/watt after that, which should always result in strong gains for the homeowner.*
- E. *Home owners with solar are usually very proud of their installation. Additionally, more and more neighborhoods, landlords and homeowners are telling us they want renewable energy coming straight in to their home.*
- F. *Our installations look very nice, as we have a strong focus on aesthetics, and will do a great job enhancing the neighborhood for residents and tourists alike.*
- G. *The local economy will be strengthened by continuing to increase the value of the home.*
- H. *Solar will help accomplish all of these, especially energy conservation*
- I. *Solar will comply with all the provisions of the LCDC's Goal 5. It will not alter, nor remove, the historic nature of the home in any way.*

Staff finds that the addition of solar panels on the property will improve property value and support the goals for energy conservation and economy. The location of the panels is the key factor determining whether they will impact the historic character of the home.

See findings in criterion #6 and #9 of this section.

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

- 2. *The provisions of the city comprehensive plan;*

Finding: Complies with Condition.

There are a few goals and policies in the Comprehensive Plan that pertain to this proposal:

Goal 5.3 Historic Resources

Policy 5.3.7:

Encourage property owners to preserve historic structures in a state as close to their original construction as possible while allowing the structure to be used in an economically viable manner.

Policy 5.3.8:

Preserve and accentuate historic resources as part of an urban environment that is being reshaped by new development projects.

Goal 13.1 Energy Sources

Policy 13.1.3:

Enable development to use alternative energy sources such as solar through appropriate design standards and incentives.

The applicant has proposed to place solar panels on the roof of the historic structure.

The Comprehensive Plan Goals and Policies are somewhat conflicting in this case; calling for the preservation of historic structures while also calling for alternative energy sources. The placement of solar panels on the prominent roof sections of the historic home may impact the historic character of the structure. See detailed findings in criterion #6 and #9 of this section.

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

3. *The economic use of the historic site and the reasonableness of the proposed alteration and their relationship to the public interest in the structure's or landmark's preservation or renovation;*

Finding: Complies with Condition: The site is used as a residence and the use is not proposed to change. The public interest in the structure's preservation is preserving the Vernacular architecture and historic character of the house, which is made up of its historic materials and design. See findings in criteria #6 and #9 of this section. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

4. *The value and significance of the historic site;*

Finding: Complies with Condition: The value and significance of the historic site is the architecture and age of the structure, an 1892 Vernacular in the McLoughlin District. See findings in criteria #6 and #9 of this section. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

5. *The physical condition of the historic site*

Finding: Complies as Proposed. The structure is in fair to good condition. The proposal for solar energy may prolong and support the continued use of the property.

6. *The general compatibility of exterior design, arrangement, proportion, detail, scale, color, texture and materials proposed to be used with the historic site;*

Finding: Complies with Condition:

The William T. Whitlock House is a Vernacular-style structure with a medium pitch gabled roof. The roof on the William T. Whitlock House is a dark composition shingle. A total of 18 panels are proposed, both of street-facing roof planes.

The Board has approved panels facing the street and visible from the right of way in the past, as long as they were not distracting from or too prominently visible when viewing the primary façade or entryway

of the structure. The panels proposed on the William T. Whitlock House will be visible from the right-of-way, albeit substantially higher than the typical pedestrian view. The applicant submitted an analysis showing that locating the panels on the rear roof plane where they would meet the HRB policies would provide less than half of the annual power generation.

The panels proposed on the main southern-facing gable roof will be visible from some angles but are high above the street, which makes them unobtrusive.

As energy prices rise and renewable technology becomes more affordable, more common, and more critical to society's response to climate change, the Board will have to balance these factors with the concerns of historic integrity. Because the panels are only placed on the roof and will not cover or destroy historical materials or features, and are designed to be removed in the future without causing irreparable damage to the structure, the Board may find that the panels will not affect the integrity of the structure. In fact, the investment may prolong the overall preservation of the home.

If the Board finds that these panels will impact this historic integrity of the home, these panels may be mitigated by limiting the number of panels on the upper roof plane.

- The applicant shall submit documentation showing that the panels will be no more than 5" above the roof surface.
- Ground- or wall-mounted equipment shall not obscure any architectural features and shall not be installed in a manner that destroys historic millwork or other historic materials. The applicant shall submit a sketch or mock-up of the equipment placement to staff to demonstrate compliance with this condition.
- The panel frames shall be black, no unfinished/shiny metal frames or visible parts are permitted.

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

7. Pertinent aesthetic factors as designated by the board;

Finding: Complies as Proposed. Staff does not suggest consideration of any aesthetic factors other than those already reflected in the code.

8. *Economic, social, environmental and energy consequences;*

Finding: Complies as Proposed. The home value may be increased, and CO2 emission will decrease. The consequences of the proposal are positive to the economy, environment, and energy conservation. Social impacts are inconsequential.

9. *Design guidelines adopted by the historic review board.*

Finding: Complies with Condition: The following design guidelines from the City's Design Guidelines for Alterations, which include the Secretary of Interior Standards, are applicable to this proposal:

Secretary of Interior Standard #2: The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

No distinctive materials will be removed. A moderate portion of the total roof area will be covered, but not altered.

Secretary of Interior Standard #9: New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

Staff finds that the alterations would not destroy historic materials, features, or spatial relationships.

Compatibility with massing is not applicable; the proposal will not alter the massing of the structure. Compatibility of the proposal with historic materials, features, size, scale and proportion is as follows:

Compatibility with Historic Materials: The smooth, black, shiny panel would be placed over the gray composition roof. The material is modern but is not necessarily incompatible. Composition shingles are not a historic feature but are typical of both historic and new roofs. Staff recommends conditions of approval to ensure the panels are low profile and no unfinished, shiny metal is used on the panel frames.

Compatibility with Historical Features: The panels would be placed on the medium-pitch roof on a house sited 8-10 feet above the sidewalk grade. The panels would not alter the pitch of the roof but would change the appearance of the roof and would be visible from the street. Generally, the Secretary of Interior Standards have been applied to find that roof-mounted solar panels may be compatible if they are on a rear-facing area, are minimally visible, or on a new addition to a historic building (see Exhibit 5).

Compatibility with Size/Scale/Proportion: The size and proportion of the panels appear to be uniformly rectangular. Staff recommends conditions of approval to ensure the panels are low profile and no unfinished, shiny metal is used on the panel frames.

Secretary of Interior Standard #10: New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The applicant did not provide a detailed response to this criterion. If approved, a condition of approval is recommended requiring that ground- or wall-mounted equipment not obscure any architectural features and shall not be installed in a manner that destroys historic millwork or other historic materials. The applicant should be required to submit a sketch or mock-up of the equipment placement to staff to demonstrate compliance with this condition, if approved.

Oregon City Guideline: Traditional landscape elements evident in the District (grass, trees, shrubs, picket fences, etc.) should be preserved, and are encouraged in site redevelopment. Inappropriate landscape treatments such as berms and extensive non- vegetative ground cover (e.g. mulch and bark dust) are discouraged.

The applicant has not proposed to remove any significant landscaping or trees on the site or in the district.

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

17.40.065 - Historic Preservation Incentives.

A. Purpose. Historic preservation incentives increase the potential for historically designated properties to be used, protected, renovated, and preserved. Incentives make preservation more attractive to owners of locally designated structures because they provide flexibility and economic opportunities.

B. Eligibility for Historic Preservation Incentives. All exterior alterations of designated structures and new construction in historic and conservation districts are eligible for historic preservation incentives if the exterior alteration or new construction has received a certificate of appropriateness from the Historic Review Board per OCMC 17.50.110(c).

C. Incentives Allowed. The dimensional standards of the underlying zone as well as for accessory buildings (OCMC 17.54.100) may be adjusted to allow for compatible development if the expansion or new construction is approved through historic design review.

D. Process. The applicant must request the incentive at the time of application to the Historic Review Board.

Finding: Not Applicable: No incentives are proposed.

II. PUBLIC NOTICE

A public notice was sent to neighbors with 300 feet of the subject property, posted online, emailed to various entities, and posted onsite.

III. CONCLUSIONS AND RECOMMENDATIONS

Based on the aforementioned findings, staff recommends that the Historic Review Board approve GLUA-22-00039 with conditions in this staff report for the property located at 1216 Jackson Street, Oregon City, Oregon 97045.

Exhibits

1. Applicant Submittal
2. Historic Inventory Form
3. Public Comments
4. [Secretary of Interior Guidance on Solar Panels](#) (link)



LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A)

- ☐ Compatibility Review
- ☐ Lot Line Adjustment
- ☐ Non-Conforming Use Review
- ☐ Natural Resource (NROD) Verification
- ☐ Site Plan and Design Review
- ☐ Extension of Approval

Type II (OCMC 17.50.030.B)

- ☐ Detailed Development Review
- ☐ Geotechnical Hazards
- ☐ Minor Partition (<4 lots)
- ☐ Minor Site Plan & Design Review
- ☐ Non-Conforming Use Review
- ☐ Site Plan and Design Review
- ☐ Subdivision (4+ lots)
- ☐ Minor Variance
- ☐ Natural Resource (NROD) Review

Type III / IV (OCMC 17.50.030.C)

- ☐ Annexation
- ☐ Code Interpretation / Similar Use
- ☐ Concept Development Plan
- ☐ Conditional Use
- ☐ Comprehensive Plan Amendment (Text/Map)
- ☐ Detailed Development Plan
- ☒ Historic Review
- ☐ Municipal Code Amendment
- ☐ Variance
- ☐ Zone Change

File Number(s): _____

Proposed Land Use or Activity: 8 kW PV Solar Panel Installation on Roof

Project Name: Nicholas Kocher Number of Lots Proposed (If Applicable): _____

Physical Address of Site: 1216 Jackson St. Oregon City, OR 97045

Clackamas County Map and Tax Lot Number(s): _____

Applicant(s):

Applicant(s) Signature: Hannah Nicholas Permitting Coordinator

Applicant(s) Name Printed: Hannah Nicholas Date: 11 / 11 / 2022

Mailing Address: 1403 N Research Way, Orem, Utah 84097

Phone: 385-482-0045 Fax: _____ Email: permitting.department@blueravensolar.com

Property Owner(s):

Property Owner(s) Signature: Nicholas Kocher 11 / 11 / 2022

Property Owner(s) Name Printed: Nicholas Kocher Date: 11 / 11 / 2022

Mailing Address: 1216 Jackson St. Oregon City, OR 97045

Phone: 513-259-0632 Fax: _____ Email: nicholas.w.kocher@gmail.com

Representative(s):

Representative(s) Signature: _____

Representative (s) Name Printed: _____ Date: _____

Mailing Address: _____

Phone: _____ Fax: _____ Email: _____

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.

Signature Certificate

Reference number: O9C6M-CZZZE-ILU9T-DWRHV

Signer	Timestamp	Signature
Nicholas Kocher Email: nicholas.w.kocher@gmail.com Sent: 11 Nov 2022 18:32:54 UTC Viewed: 11 Nov 2022 18:45:32 UTC Signed: 11 Nov 2022 18:45:51 UTC		
Recipient Verification: ✓ Email verified	11 Nov 2022 18:45:32 UTC	IP address: 98.246.16.140 Location: Oregon City, United States

Document completed by all parties on:
11 Nov 2022 18:45:51 UTC

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Nicholas Kocher

641584

1216 Jackson Street, Oregon city, OR 97045 OREGON CITY,
Oregon 97045

Site Survey Manager

1 - Customer Information

Site Surveyor Name	Jessica potash
Manager	Site Survey Manager
Customer Name	Nicholas Kocher
Project ID	641584
Customer Address	1216 Jackson Street, Oregon city, OR 97045 OREGON CITY, Oregon 97045
Assessment Date	10/21/2022
Year Home Built	1892
How many years has the customer lived in the home?	2
Year of Additions / Remodels (if applicable)	2015
What does the customer know about the roof?	Age Unknown

Does the proposal contain any outbuildings?	Yes
Year Outbuilding Built	2015
What does the customer know about the roof of the outbuilding?	Original
Is there any known history of roof leaks or structural damage? If yes, denote location and any repairs that have been made.	No
How many stories is the home?	2
Is the basement finished?	No basement
Are there any unpermitted structures on the property?	No
Are there any pets that may need to be locked up during the installation?	Yes
How many thermostats are in the home?	1

Account Notes

2 - Exterior



Jessica Potash
Loc: 45.3577, -122.5957



Jessica Potash
Loc: 45.3577, -122.5957



Jessica Potash
Loc: 45.3577, -122.5957



Jessica Potash
Loc: 45.3576, -122.5959



Jessica Potash
Loc: 45.3576, -122.5958



Jessica Potash
Loc: 45.3576, -122.5958



Jessica Potash
Loc: 45.3576, -122.5956



Jessica Potash
Loc: 45.3576, -122.5956



Jessica Potash
Loc: 45.3575, -122.5955



Jessica Potash
Loc: 45.3575, -122.5955



Jessica Potash
Loc: 45.3577, -122.5955



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Jessica Potash
Loc: 45.3577, -122.5955



Jessica Potash
Loc: 45.3577, -122.5955



Jessica Potash
Loc: 45.3577, -122.5955



Jessica Potash
Loc: 45.3578, -122.5956

2 - Exterior / Roof Shading Front - 8+ photos creating a 360° photo set. Photos should be taken from the ground with your phone. Be sure to capture the entire height of all surrounding trees relative to the height of the home.



Jessica Potash
Loc: 45.3577, -122.5957

2 - Exterior / Roof Shading Front - 8+ photos creating a 360° photo set. Photos should be taken from the ground with your phone. Be sure to capture the entire height of all surrounding trees relative to the height of the home.

Item #2.



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Item #2.



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Item #2.



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Jessica Potash
Loc: 45.3577, -122.5955

2 - Exterior / Exterior MSP - Location - 1.) 5+ photos showing entire wall (floor to ceiling, corner to corner) the panel is mounted to. 2.) 3+ photos showing the entire room the panel is located in. 3.) Select the main service panel location.

Item #2.



Jessica Potash
Loc: 45.3576, -122.5956

Page 42

2 - Exterior / Exterior MSP - Location - 1.) 5+ photos showing entire wall (floor to ceiling, corner to corner) the panel is mounted to. 2.) 3+ photos showing the entire room the panel is located in. 3.) Select the main service panel location.

Item #2.



Jessica Potash
Loc: 45.3576, -122.5956

Page 43

2 - Exterior / Exterior MSP - Location - 1.) 5+ photos showing entire wall (floor to ceiling, corner to corner) the panel is mounted to. 2.) 3+ photos showing the entire room the panel is located in. 3.) Select the main service panel location.

Item #2.



Jessica Potash
Loc: 45.3576, -122.5956

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November 7, 2022

To: Blue Raven Solar
1403 North Research Way, Building J
Orem, UT. 84097

Subject: Certification Letter
Kocher Residence
1216 Jackson St
Oregon City, OR. 97045

To Whom It May Concern,

A jobsite observation of the condition of the existing framing system was performed by an audit team of Blue Raven Solar as a request from Domus Structural Engineering. All review is based on these observations and the design criteria listed below and only deemed valid if provided information is true and accurate.

On the above referenced project, the roof structural framing has been reviewed for additional loading due to the installation of the solar PV addition to the roof. The structural review only applies to the section of the roof that is directly supporting the solar PV system and its supporting elements. The observed roof framing is described below. If field conditions differ, contractor to notify engineer prior to starting construction.

The roof structure of (MP1) consists of composition shingle on roof plywood and skip sheathing that is supported by 2x4 rafters @ 24" o.c. with ceiling joists acting as rafter ties. The rafters have a max projected horizontal span of 9'-3", with a slope of 31 degrees. The rafters are connected at the ridge to a ridge board and are supported at the eave by a load bearing wall.

The roof structure of (MP2) consists of composition shingle on roof plywood that is supported by nominal 2x6 rafters @ 16" o.c. with ceiling joists acting as rafter ties. The rafters have a max projected horizontal span of 8'-0", with a slope of 35 degrees. The rafters are connected at the ridge to a ridge board and are supported at the eave by a load bearing wall.

The existing roof framing system of (MP1) is judged to be inadequate to withstand the loading imposed by the installation of the solar panels. Structural reinforcement is required. Sister upgrade is required for (MP1) on all rafters that directly support solar PV. Stitch new 2x4 DF#2 (min) to existing member with Simpson SDW 22300 screws @ 16" o.c. or 10d nails @ 6" o.c.. Lap as needed with 4'-0" minimum lap per attached detail.

The existing roof framing system of (MP2) is judged to be adequate to withstand the loading imposed by the installation of the solar panels. No reinforcement is necessary.

The spacing of the solar standoffs should be kept at 48" o.c. for landscape and 48" o.c. for portrait orientation, with a staggered pattern to ensure proper distribution of loads. If mounting within 3 feet of any edge, ridge, or eave the spacing of the solar standoffs should be limited to 24" o.c. for landscape and 24" o.c. for portrait orientation.

The scope of this report is strictly limited to an evaluation of the fastener attachment, underlying framing and supporting structure only. The attachment's to the existing structure are required to be in a staggered pattern to ensure proper distribution of loading. All panels, racking and hardware shall be installed per manufacturer specifications and within specified design limitations. All waterproofing shall be provided by the manufacturer. Domus Structural Engineering assumes no responsibility for misuse or improper installation of the solar PV panels or racking.

Design Criteria:

- Applicable Codes = 2017 OSISC & 2019 ORSC, ASCE 7-16
- Roof Dead Load = 9 psf (MP1) -- 8 psf (MP2)
- Roof Live Load = 20 psf
- Wind Speed = 100 mph (Vult), Exposure C
- Ground Snow Load = 25 psf - Roof Snow Load = 20 psf
- Attachment: 1 - 5/16 dia. lag screw with 2.5 inch min. embedment depth, at spacing shown above.

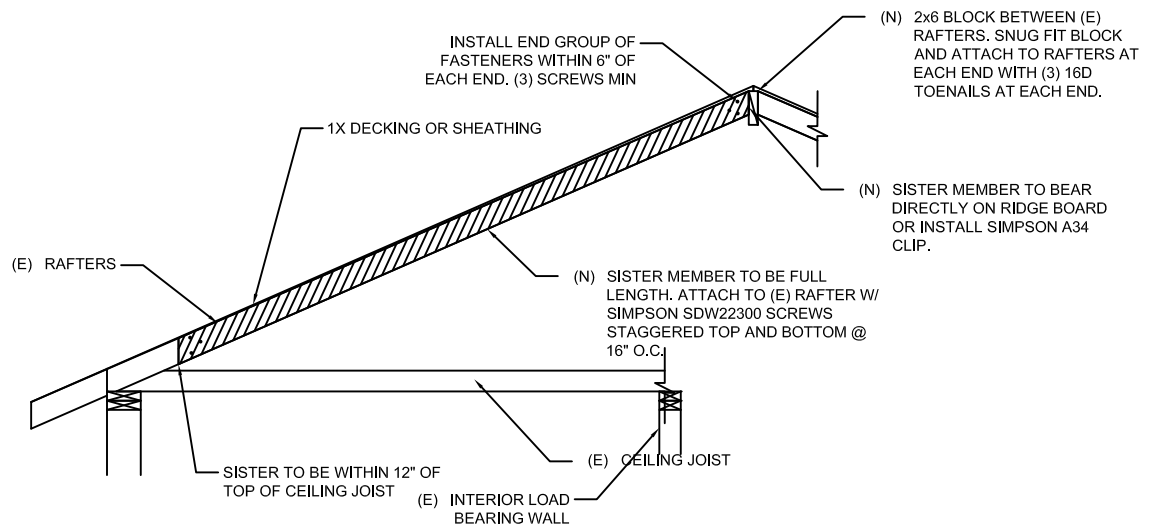
Please contact me with any further questions or concerns regarding this project.

Sincerely,

John Calvert, P.E.
Project Engineer

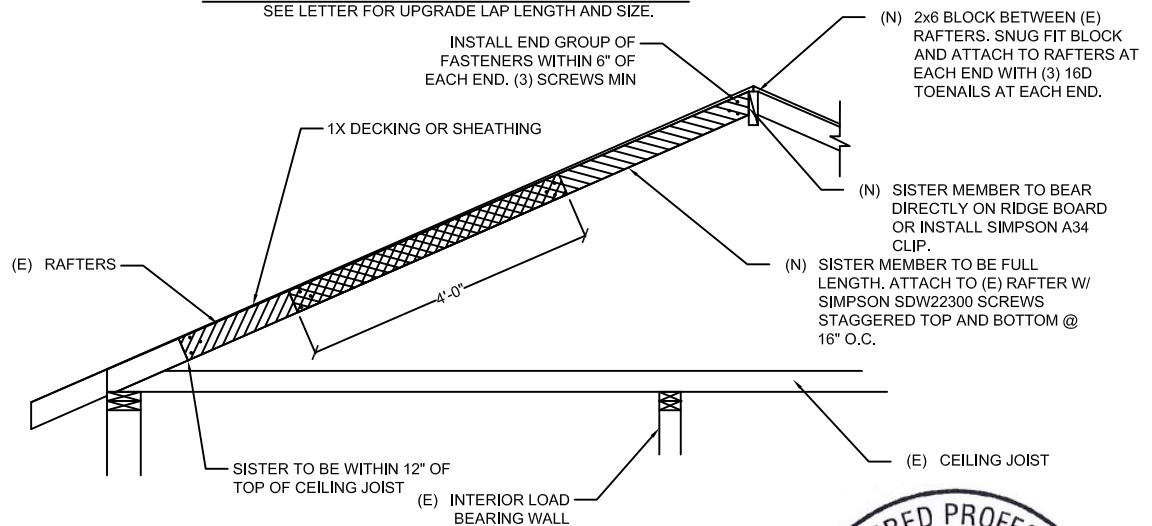


Exp: 12/31/23



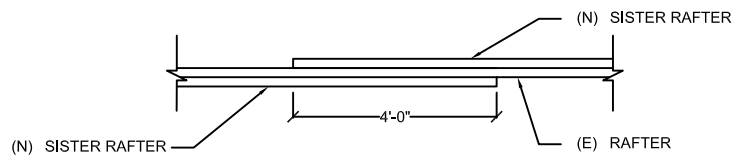
OPTION 1 - FULL LENGTH SISTER

SEE LETTER FOR UPGRADE LAP LENGTH AND SIZE.



OPTION 2 - OVERLAPPED SISTER

SEE LETTER FOR UPGRADE LAP LENGTH AND SIZE.



SECTION A-A



Exp: 12/31/23

S1

SISTER UPGRADE OPTIONS

ALTERNATIVE FASTENER SCHEDULE: 10d NAILS STAGGERED TOP AND BOTTOM AT 6" O.C.

PROJECT NAME: Alternate install of upgrade.

Scale: N.T.S.

Domus Structural Engineering, LLC.

Date: 2/4/2020

Project Number: Solar PV

Drawn By: JAC

Drawing Name:

Revisions:

A

B

F-SI

Page 47

P.O. BOX 6986
Broomfield, CO 80021
(530) 864-7055
Domusstructural@gmail.com

Project Description: Alt. Sister upgrade detail and specifications.

Gravity Loading

Roof Snow Load Calculations		
p_g = Ground Snow Load =	25 psf	
$p_f = 0.7 C_e C_t I p_g$		(ASCE7 - Eq 7-1)
C_e = Exposure Factor =	1	(ASCE7 - Table 7-2)
C_t = Thermal Factor =	1	(ASCE7 - Table 7-3)
I = Importance Factor =	1	
p_f = Flat Roof Snow Load =	20.0 psf	
$p_s = C_s p_f$		(ASCE7 - Eq 7-2)
C_s = Slope Factor =	1	
p_s = Sloped Roof Snow Load =	20.0 psf	

PV Dead Load = 3 psf (Per Blue Raven Solar)	
DL Adjusted to 31 Degree Slope	3.50 psf
PV System Weight	
Weight of PV System (Per Blue Raven Solar)	3.0 psf
X Standoff Spacing =	4.00 ft
Y Standoff Spacing =	6.08 ft
Standoff Tributary Area =	24.33 sft
Point Loads of Standoffs	73 lb
Note: PV standoffs are staggered to ensure proper distribution of loading	

Roof Live Load = 20 psf	
Note: Roof live load is removed in area's covered by PV array.	

Roof Dead Load (MP1)		
Composition Shingle	4.00	
Roof Plywood and Skip Sheathing	3.50	
Double 2x4 Rafters @ 24"o.c.	1.46	
Vaulted Ceiling	0.00	(Ceiling Not Vaulted)
Miscellaneous	0.04	
Total Roof DL (MP1)	9.0 psf	
DL Adjusted to 31 Degree Slope	10.5 psf	

Roof Dead Load (MP2)		
Composition Shingle	4.00	
Roof Plywood	2.00	
2x6 Rafters @ 16"o.c.	1.72	
Vaulted Ceiling	0.00	(Ceiling Not Vaulted)
Miscellaneous	0.28	
Total Roof DL (MP2)	8.0 psf	
DL Adjusted to 35 Degree Slope	9.77	

Wind Calculations
Per ASCE 7-16 Components and Cladding

Input Variables	
Wind Speed	100 mph
Exposure Category	C
Roof Shape	Gable Roof
Roof Slope	31 degrees
Mean Roof Height	20 ft
Effective Wind Area	21.3 ft
Ground Elevation	0 ft

Design Wind Pressure Calculations	
$q_h = 0.00256 * K_z * K_{zt} * K_d * K_e * V^2$	(Eq. 26.10-1)
K_z (Exposure Coefficient) = 0.90	(Table 30.3-1)
K_{zt} (topographic factor) = 1.00	(Fig. 26.8-1)
K_d (Wind Directionality Factor) = 0.85	(Table 26.6-1)
K_e (Ground Elevation Factor) = 1.00	
V (Design Wind Speed) = 100 mph	(Fig. 26.5-1A)
Risk Category = II	(Table 1.5-1)
$q_h = 19.63$	

Standoff Uplift Calculations-Portrait				
	Zone 1	Zone 2	Zone 3	Positive
$y_a =$	0.67	0.77	0.80	0.67
$GC_p =$	-1.41	-1.93	-2.59	0.75
Uplift Pressure =	-18.6 psf	-29.3 psf	-40.6 psf	9.8 psf
ASD Uplift Pressure =	-11.2 psf	-17.6 psf	-24.4 psf	9.6 psf
X Standoff Spacing =	4.00	4.00	2.67	
Y Standoff Spacing =	6.08	3.04166667	3.04166667	
Tributary Area =	24.33	12.17	8.11	
Dead Load on attachment =	73 lb	37 lb	24 lb	
Footing Uplift (0.6D+0.6W) =	-228 lb	-192 lb	-183 lb	

Standoff Uplift Calculations-Landscape				
	Zone 1	Zone 2	Zone 3	Positive
$y_a =$	0.75	0.80	0.80	0.75
$GC_p =$	-1.65	-2.00	-2.83	0.84
Uplift Pressure =	-24.4 psf	-31.4 psf	-44.4 psf	12.4 psf
ASD Uplift Pressure (0.6W)=	-14.6 psf	-18.8 psf	-26.6 psf	9.6 psf
X Standoff Spacing =	4.00	4.00	2.67	
Y Standoff Spacing =	3.50	1.75	1.75	
Tributary Area =	14.00	7.00	4.67	
Dead Load on attachment =	42.00	21.00	14.00	
Footing Uplift (0.6D+0.6W) =	-180 lb	-119 lb	-116 lb	

Standoff Uplift Check
Maximum Design Uplift = -228 lb
Standoff Uplift Capacity = 450 lb
450 lb capacity > 228 lb demand Therefore, OK

Fastener Capacity Check
Fastener = 1 - 5/16" dia. lag
Number of Fasteners = 1
Embedment Depth = 2.5
Pullout Capacity Per Inch = 250 lb
Fastener Capacity = 625 lb
w/ F.S. of 1.5 & DOL of 1.6= 667 lb
667.2 lb capacity > 228 lb demand Therefore, OK

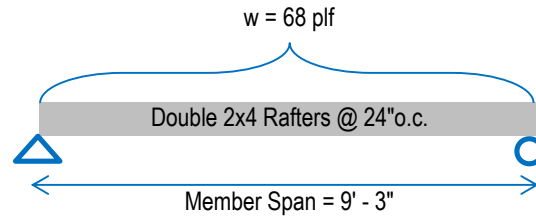
Framing Check

(MP1)

PASS - With Framing Upgrades

Dead Load 10.5 psf
PV Load 3.5 psf
Snow Load 20.0 psf

Governing Load Combo = DL + SL
Total Load 34.0 psf



Member Properties - Based on Upgraded Section

Member Size	S (in ³)	I (in ⁴)	Lumber Sp/Gr	Member Spacing
Double 2x4	6.13	10.72	DF#2	@ 24"o.c.

Check Bending Stress

Fb (psi) =	f _b	x	C _d	x	C _f	x	C _r	(NDS Table 4.3.1)
	900	x	1.15	x	1.5	x	1.15	

Allowed Bending Stress = 1785.3 psi

Maximum Moment = $(wL^2) / 8$
= 727.2727 ft#
= 8727.273 in#

Actual Bending Stress = (Maximum Moment) / S
= 1424.9 psi

Allowed > Actual -- 79.9% Stressed -- Therefore, OK

Check Deflection

Allowed Deflection (Total Load) = $L/120$ (E = 1600000 psi Per NDS)
= 0.925 in

Deflection Criteria Based on = $Simple Span$
Actual Deflection (Total Load) = $(5 * w * L^4) / (384 * E * I)$
= 0.654 in
= $L/170 > L/120$ **Therefore OK**

Allowed Deflection (Live Load) = $L/180$
= 0.616 in
Actual Deflection (Live Load) = $(5 * w * L^4) / (384 * E * I)$
= 0.385 in
= $L/289 > L/180$ **Therefore OK**

Check Shear

Member Area = 10.5 in² F_v (psi) = 180 psi (NDS Table 4A)
Allowed Shear = F_v * A = 1890 lb Max Shear (V) = w * L / 2 = 314 lb

Allowed > Actual -- 16.7% Stressed -- Therefore, OK

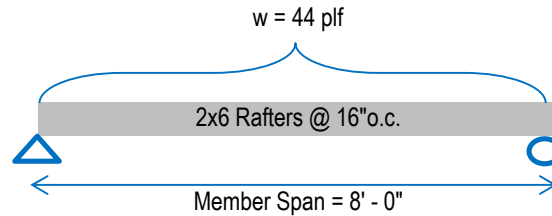
Framing Check

(MP2)

PASS

Dead Load 9.8 psf
PV Load 3.5 psf
Snow Load 20.0 psf

Governing Load Combo = DL + SL
Total Load 33.3 psf



Member Properties				
Member Size	S (in ³)	I (in ⁴)	Lumber Sp/Gr	Member Spacing
2x6	7.56	20.80	DF#2	@ 16" o.c.

Check Bending Stress							
Fb (psi) =	fb	x	Cd	x	Cf	x	Cr
	900	x	1.15	x	1.3	x	1.15

(NDS Table 4.3.1)

Allowed Bending Stress = 1547.3 psi

Maximum Moment = $(wL^2) / 8$
= 354.8384 ft#
= 4258.06 in#

Actual Bending Stress = (Maximum Moment) / S
= 563.1 psi

Allowed > Actual - 36.4% Stressed -- Therefore, OK

Check Deflection	
Allowed Deflection (Total Load) =	$L/180$ (E = 1600000 psi Per NDS)
	= 0.533 in
Deflection Criteria Based on =	Simple Span
Actual Deflection (Total Load) =	$(5 * w * L^4) / (384 * E * I)$
	= 0.123 in
	= L/781 > L/180 Therefore OK

Allowed Deflection (Live Load) =	$L/240$
	0.4 in
Actual Deflection (Live Load) =	$(5 * w * L^4) / (384 * E * I)$
	0.074 in
	L/1298 > L/240 Therefore OK

Check Shear	
Member Area =	8.3 in ²
Allowed Shear = $F_v * A$	1485 lb
Fv (psi) =	180 psi (NDS Table 4A)
Max Shear (V) = $w * L / 2$	177 lb

Allowed > Actual -- 12% Stressed -- Therefore, OK

Lateral Check

Existing Weight of Effected Building			
Level	Area	Weight (psf)	Weight (lb)
Roof	1917 sf	10.5 psf	20128 lb
Ceiling	1917 sf	6.0 psf	11502 lb
Wood Siding	100 ft	5.0 psf	2000 lb
Int. Walls	100 ft	6.4 psf	2560 lb
Existing Weight of Effected Building			36190 lb

(8'-0" Wall Height)

Proposed Weight of PV System	
Weight of PV System (Per Blue Raven Solar)	3.0 psf
Approx. Area of Proposed PV System	277 sf
Approximate Total Weight of PV System	831 lb

10% Comparison	
10% of Existing Building Weight (Allowed)	3619 lb
Approximate Weight of PV System (Actual)	831 lb
Percent Increase	2.3%
3619 lb > 831 lb, Therefore OK	

Lateral Check

Existing Weight of Effected Building			
Level	Area	Weight (psf)	Weight (lb)
Roof	500 sf	10.5 psf	5250 lb
Ceiling	500 sf	6.0 psf	3000 lb
Wood Siding	90 ft	5.0 psf	1800 lb
Int. Walls	0 ft	6.4 psf	0 lb
Existing Weight of Effected Building			10050 lb

(8'-0" Wall Height)

Proposed Weight of PV System	
Weight of PV System (Per Blue Raven Solar)	3.0 psf
Approx. Area of Proposed PV System	150 sf
Approximate Total Weight of PV System	450 lb

10% Comparison	
10% of Existing Building Weight (Allowed)	1005 lb
Approximate Weight of PV System (Actual)	450 lb
Percent Increase	4.5%
1005 lb > 450 lb, Therefore OK	

GENERAL NOTES

CODE AND STANDARDS

1. ALL WORK SHALL COMPLY WITH 2017 OREGON ELECTRIC SPECIALTY CODE (OESC), 2019 OREGON STRUCTURAL SPECIALTY CODE, 2017 OREGON RESIDENTIAL SPECIALTY CODE, AND ALL STATE AND LOCAL BUILDING AND ELECTRICAL CODES.
2. DRAWINGS HAVE BEEN DETAILED ACCORDING TO UL LISTING REQUIREMENTS.

SITE NOTES / OSHA REGULATION

1. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM.
3. THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
4. ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SHALL SERVE TO PROTECT THE BUILDING OR STRUCTURE.

SOLAR CONTRACTOR

1. MODULE CERTIFICATIONS WILL INCLUDE UL1703, IEC61646, IEC61730.
2. IF APPLICABLE, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE MARKED GROUNDING LUG HOLES PER THE MANUFACTURER'S INSTALLATION REQUIREMENTS.
3. AS INDICATED BY DESIGN, OTHER NRTL LISTED MODULE GROUNDING DEVICES MAY BE USED IN PLACE OF STANDARD GROUNDING LUGS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ.
4. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.
5. CONDUIT POINT OF PENETRATION FROM EXTERIOR TO INTERIOR TO BE INSTALLED AND SEALED WITH A SUITABLE SEALING COMPOUND.
6. DC WIRING LIMITED TO MODULE FOOTPRINT W/ ENPHASE AC SYSTEM.
7. ENPHASE WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY W/ SUITABLE WIRING CLIPS.
8. MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC UNLESS NOT AVAILABLE.
9. ALL INVERTERS, MOTOR GENERATORS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AC PHOTOVOLTAIC MODULES, DC COMBINERS, DC-TO-DC CONVERTERS,SOURCE CIRCUIT COMBINERS, AND CHARGE CONTROLLERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER NEC 690.4(B).
10. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE.
11. TERMINALS AND LUGS WILL BE TIGHTENED TO MANUFACTURER TORQUE SPECIFICATIONS (WHEN PROVIDED) IN ACCORDANCE WITH NEC CODE 110.14(D) ON ALL ELECTRICAL CONNECTIONS.

EQUIPMENT LOCATIONS

1. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.
2. EQUIPMENT INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31(A) AND NEC TABLE 310.15(B).
3. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
4. ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

PROJECT INFORMATION:

NUMBER OF STORIES: 2
CONDUIT RUN: Interior
ECOBEE QTY: 1
LIGHT BULB QTY: 18
PV METER: Not Required

ROOF TYPE (1) INFORMATION:

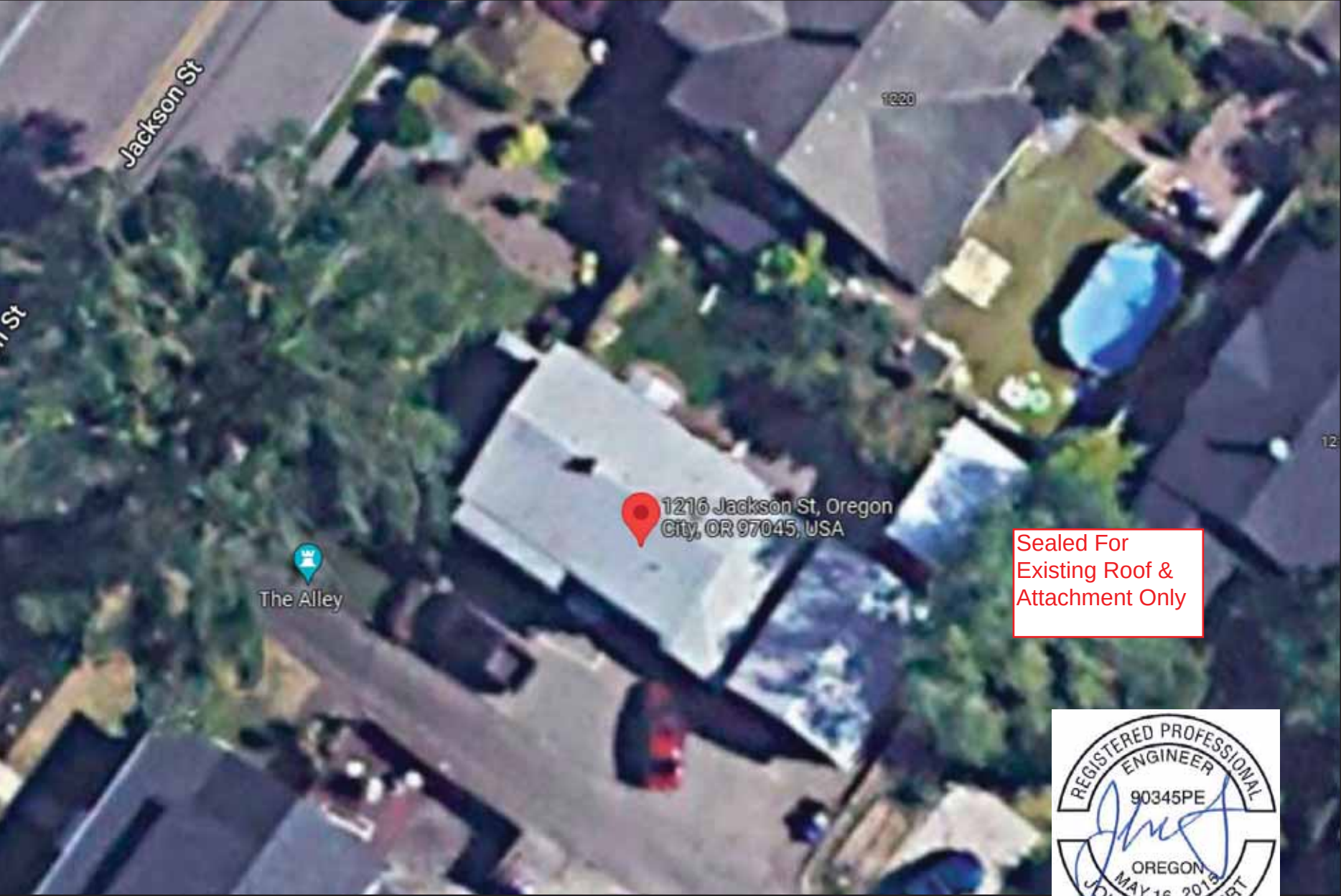
ROOF TYPE: Comp Shingle
FRAMING TYPE: Rafter
SHEATHING TYPE: OSB
ATTACHMENT: SFM Infinity Flashkit
RACKING: Unirac SFM Infinity @ 48" OC Portrait / 48" OC Landscape
NUMBER OF ATTACHMENTS: 53

ROOF TYPE (2) INFORMATION (IF APPLICABLE):
*SEE PV4.2

SYSTEM TO BE INSTALLED INFORMATION:

DC SYSTEM SIZE: 8 kW DC
AC SYSTEM SIZE: 5.8 kW AC
MODULE TYPE: (20) QCells Q.PEAK DUO BLK ML-G10+ 400
INVERTER TYPE: Enphase IQ8PLUS-72-2-US
MONITORING: Enphase IQ Combiner 4 X-IQ-AM1-240-4

AERIAL VIEW



DESIGN CRITERIA

WIND SPEED: 100 mph
GROUND SNOW LOAD: 25 lb/ft²
WIND EXPOSURE FACTOR: C
SEISMIC DESIGN CATEGORY: D

SITE SPECIFICATIONS

CONSTRUCTION - V-B
ZONING: RESIDENTIAL

SCOPE OF WORK

INSTALLATION OF UTILITY INTERACTIVE PHOTOVOLTAIC SOLAR SYSTEM AND ANY NECESSARY ADDITIONAL WORK NEEDED FOR INSTALLATION.

SHEET INDEX

PV1 - COVER SHEET
PV2 - SITE PLAN
PV3 - ROOF PLAN
PV4 - STRUCTURAL
PV5 - ELECTRICAL 3-LINE DIAGRAM
PV6 - ELECTRICAL CALCULATIONS
PV7 - WARNING LABELS AND LOCATIONS
(ALL OTHER SHEETS AS REQUIRED)
SS - PRODUCT SPEC. SHEETS
Digitally signed by John A. Calvert
Date: 2022.11.09 08:31:25 -07'00'

UTILITY COMPANY:

Portland General Electric (PGE)

PERMIT ISSUER:

Oregon City



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NABCEP
CERTIFIED
PV INSTALLATION
PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
800-377-4480

CUSTOMER INFORMATION:
Nicholas Kocher
1216 Jackson Street
OREGON CITY, Oregon 97045
AC SYSTEM SIZE: 5.8 kW AC
DC SYSTEM SIZE: 8 kW DC

DRAWING BY:
PremiumCAD

PLOT DATE:
November 6, 2022

PROJECT NUMBER:
641584

SHEET NAME:
COVER SHEET

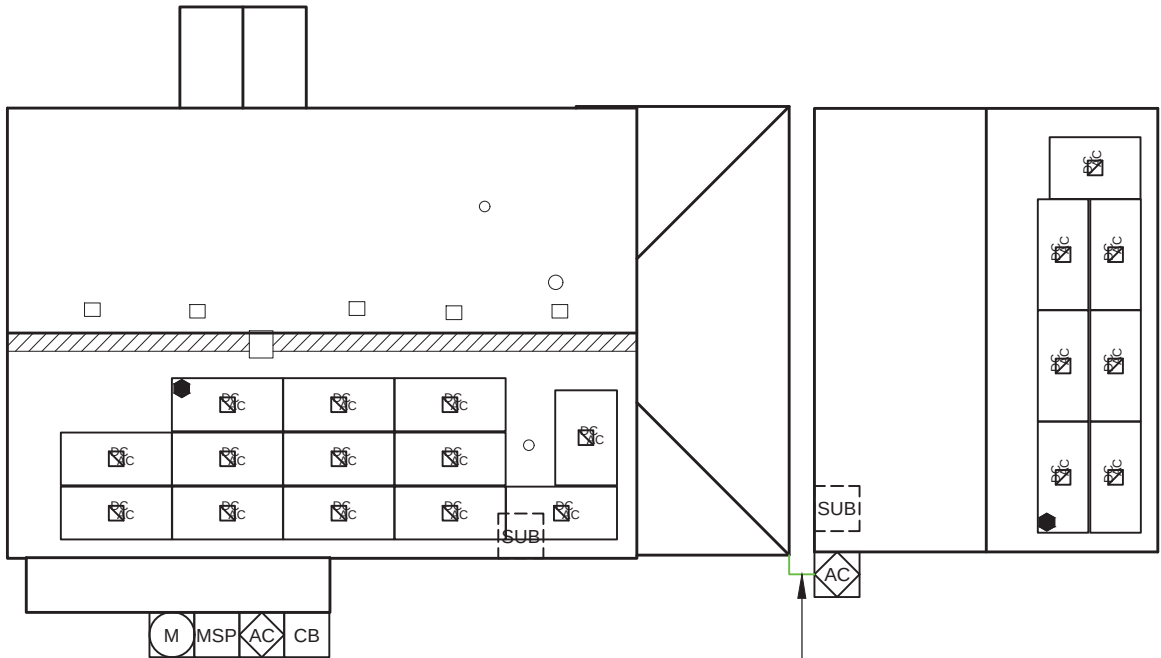
REVISION: 0
PAGE NUMBER: Page 54

PV SYSTEM SPECIFICATIONS
TOTAL NUMBER OF MODULES: 20
MODULE MAKE AND MODEL: QCells Q.PEAK DUO BLK ML-G10+ 400
MODULE WATTAGE: 400W DC

INVERTER MAKE AND MODEL: Enphase IQ8PLUS-72-2-US
INVERTER TYPE: Microinverter (1 Inverter per PV Module)
INVERTER CURRENT OUTPUT: 1.21A AC
INVERTER NOMINAL VOLTAGE: 240V
INVERTER WATTAGE: 290W AC

Sister upgrade is required for (MP1) on all rafters that directly support solar PV. Stitch new 2x4 DF#2 (min) to existing member. See detail for additional information.

FRONT OF HOME
1216 JACKSON STREET



LEGEND

- JUNCTION BOX
- UTILITY METER
- MAIN SERVICE PANEL
- AC DISCONNECT
- COMBINER BOX
- LOAD CENTER
- SUBPANEL
- PV METER
- TRANSFER SWITCH
- SUNPOWER ESS
- SUNPOWER HUB+
- REMOTE POWER OFF
- FIRE SETBACK
- TRENCHING
- PROPERTY LINE

SCALE: 3/32" = 1'-0"

Sealed For
Existing Roof &
Attachment Only



1. AC DISCONNECT TO BE LOCATED WITHIN 10 FT. OF METER
2. ROOF ATTACHMENTS SHALL BE SPACED NO GREATER THAN 24 IN. OC IN ANY DIRECTION WHERE LOCATED WITHIN 3 FT. OF A ROOF EDGE, HIP, EAVE, OR RIDGE (OSISC 305.4.3)

TRENCHING
5 FT THROUGH DIRT
SCHEDULE 80 PVC CONDUIT
20" DEEP

11/9/2022
Exp: 12/31/23



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PV INSTALLATION
PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
800-377-4480

CUSTOMER INFORMATION:
Nicholas Kocher
1216 Jackson Street
OREGON CITY, Oregon 97045
AC SYSTEM SIZE: 5.8 kW AC
DC SYSTEM SIZE: 8 kW DC

DRAWING BY:
PremiumCAD

PLOT DATE:
November 6, 2022

PROJECT NUMBER:
641584

SHEET NAME:
SITE PLAN

REVISION:
0

PAGE NUMBER:
Page 55

PV SYSTEM SPECIFICATIONS
TOTAL NUMBER OF MODULES: 20
MODULE MAKE AND MODEL: QCells Q.PEAK DUO BLK ML-G10+ 400
MODULE WATTAGE: 400W DC

INVERTER MAKE AND MODEL: Enphase IQ8PLUS-72-2-US
INVERTER TYPE: Microinverter (1 Inverter per PV Module)
INVERTER CURRENT OUTPUT: 1.21A AC
INVERTER NOMINAL VOLTAGE: 240V
INVERTER WATTAGE: 290W AC

Sister upgrade is required for (MP1) on all rafters that directly support solar PV. Stitch new 2x4 DF#2 (min) to existing member. See detail for additional information.



LEGEND

JUNCTION BOX

M

UTILITY METER

MSP

MAIN SERVICE PANEL

AC

AC DISCONNECT

CB

COMBINER BOX

LC

LOAD CENTER

SUB

SUBPANEL

PV

PV METER

TS

TRANSFER SWITCH

ESS

SUNPOWER ESS

HUB

SUNPOWER HUB+

RPO

REMOTE POWER OFF

FIRE SETBACK

TRENCHING

PROPERTY LINE

SCALE: 1/8" = 1'-0"

Item #2.

BLUE RAVEN

SOLAR

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NABCEP

CERTIFIED

PV INSTALLATION PROFESSIONAL

Scott Gurney

#PV-011719-015866

CONTRACTOR:

BRS FIELD OPS

800-377-4480

CUSTOMER INFORMATION:

Nicholas Kocher

1216 Jackson Street

OREGON CITY, Oregon 97045

AC SYSTEM SIZE: 5.8 kW AC

DC SYSTEM SIZE: 8 kW DC

MP2
OF MODULES: 7
AZIMUTH: 124
PITCH: 35
TSRF: 87%
AREA: 287 ft.²

Sealed For
Existing Roof &
Attachment Only

TRENCHING
5 FT THROUGH DIRT
SCHEDULE 80 PVC CONDUIT
20" DEEP

11/9/2022
Exp: 12/31/23

1. AC DISCONNECT TO BE LOCATED WITHIN 10 FT. OF METER
2. ROOF ATTACHMENTS SHALL BE SPACED NO GREATER THAN 24 IN. OC IN ANY DIRECTION WHERE LOCATED WITHIN 3 FT. OF A ROOF EDGE, HIP, EAVE, OR RIDGE (OSISC 305.4.3)

DRAWING BY:
PremiumCAD

PLOT DATE:
November 6, 2022

PROJECT NUMBER:
641584

SHEET NAME:
ROOF PLAN

REVISION:
0

PAGE NUMBER:
Page 56

STRUCTURAL INFORMATION:

ROOF TYPE (1):

ROOF TYPE: Comp Shingle

SHEATHING TYPE: OSB

FRAMING TYPE: Rafter

FRAMING SIZE: 2x4 @ 24" OC

CEILING JOIST SIZE: 2x6 @ 16" OC

ATTACHMENT: SFM Infinity Flashkit

RACKING: Unirac SFM Infinity

@ 48" OC Portrait / 48" OC Landscape

NUMBER OF ATTACHMENTS: 53

PV MODULE COUNT: 20 Modules

TOTAL ARRAY AREA: 408.0 ft² (20.4ft²/panel)

TOTAL ROOF AREA: 1917.22 ft²

ARRAY/ROOF AREA: 21.3%

ARRAY WEIGHT: 1,000 lbs (50 lbs/panel)

DISTRIBUTED LOAD: 2.45 lbs/ft²

POINT LOAD: 18.87 lbs/attachment

STRUCTURAL NOTES:

1. AC DISCONNECT TO BE LOCATED WITHIN 10 FT. OF METER

2. ROOF ATTACHMENTS SHALL BE SPACED NO GREATER THAN 24 IN. OC IN ANY DIRECTION WHERE LOCATED WITHIN 3 FT. OF A ROOF EDGE, HIP, EAVE, OR RIDGE (OSISC 305.4.3)

None

*NOTE: LISTED NUMBER OF ATTACHMENT POINTS ARE AN ESTIMATE ONLY AND MAY VARY BASED ON FIELD CONDITIONS. MAXIMUM ATTACHMENT SPACING TO BE FOLLOWED PER ENGINEER OF RECORD SPECIFICATIONS.

PV MODULE

UNIRAC SFM 2" MICRORAIL

UNIRAC SFM 6.5" SPLICE

23" MAX.

48" MAX.

LANDSCAPE

PV MODULE

UNIRAC SFM 2" MICRORAIL

UNIRAC SFM 6.5" SPLICE

23" MAX.

48" MAX.

PORTRAIT

C

ATTACHMENT SPACING- FRONT VIEW

SCALE: 3/4" = 1'-0"

-RACKING ATTACHMENTS TO BE STAGGERED BY SHIFTING EACH SUBSEQUENT ROW OF ATTACHMENTS OVER ONE RAFTER.

QCELLS Q.PEAK DUO BLK ML-G10+ 400 PV MODULE

UNIRAC SFM MICRORAIL/ SPLICE

UNIRAC SFM SLIDER

FLASHING

(1) 5/16" STAINLESS STEEL LAG BOLT WITH 2-1/2" MIN. EMBEDMENT AND FLAT WASHER

2 1/2" MIN. EMBED.

(E) ROOF SHEATHING

(E) BUILDING STRUCTURE

A

MIDDLE/TOP STANDOFF DETAIL

SCALE: 3" = 1'-0"

PV MODULE

UNIRAC SFM 2" MICRORAIL

UNIRAC SFM 6.5" SPLICE

23" MAX.

48" MAX.

LANDSCAPE

PV MODULE

UNIRAC SFM 2" MICRORAIL

UNIRAC SFM 6.5" SPLICE

23" MAX.

48" MAX.

PORTRAIT

D

ATTACHMENT SPACING- SIDE VIEW

SCALE: 1/2" = 1'-0"

31°

QCELLS Q.PEAK DUO BLK ML-G10+ 400 PV MODULE

UNIRAC SFM TRIMRAIL

UNIRAC SFM SLIDER AND TRIMRAIL ROOF ATTACHMENT

FLASHING

(1) 5/16" STAINLESS STEEL LAG BOLT WITH 2-1/2" MIN. EMBEDMENT AND FLAT WASHER

2 1/2" MIN. EMBED.

(E) ROOF SHEATHING

(E) BUILDING STRUCTURE

B

BOTTOM STANDOFF DETAIL

SCALE: 3" = 1'-0"

Sister upgrade is required for (MP1) on all rafters that directly support solar PV. Stitch new 2x4 DF#2 (min) to existing member. See detail for additional information.

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11/9/2022
Exp: 12/31/23

REGISTERED PROFESSIONAL ENGINEER
90345PE
JOHN A. CALVERT
MAY 16, 2018
OREGON

CUSTOMER INFORMATION:

Nicholas Kocher

1216 Jackson Street

OREGON CITY, Oregon 97045

AC SYSTEM SIZE: 5.8 kW AC

DC SYSTEM SIZE: 8 kW DC

DRAWING BY:

PremiumCAD

PLOT DATE:

November 6, 2022

PROJECT NUMBER:

641584

SHEET NAME:

STRUCTURAL

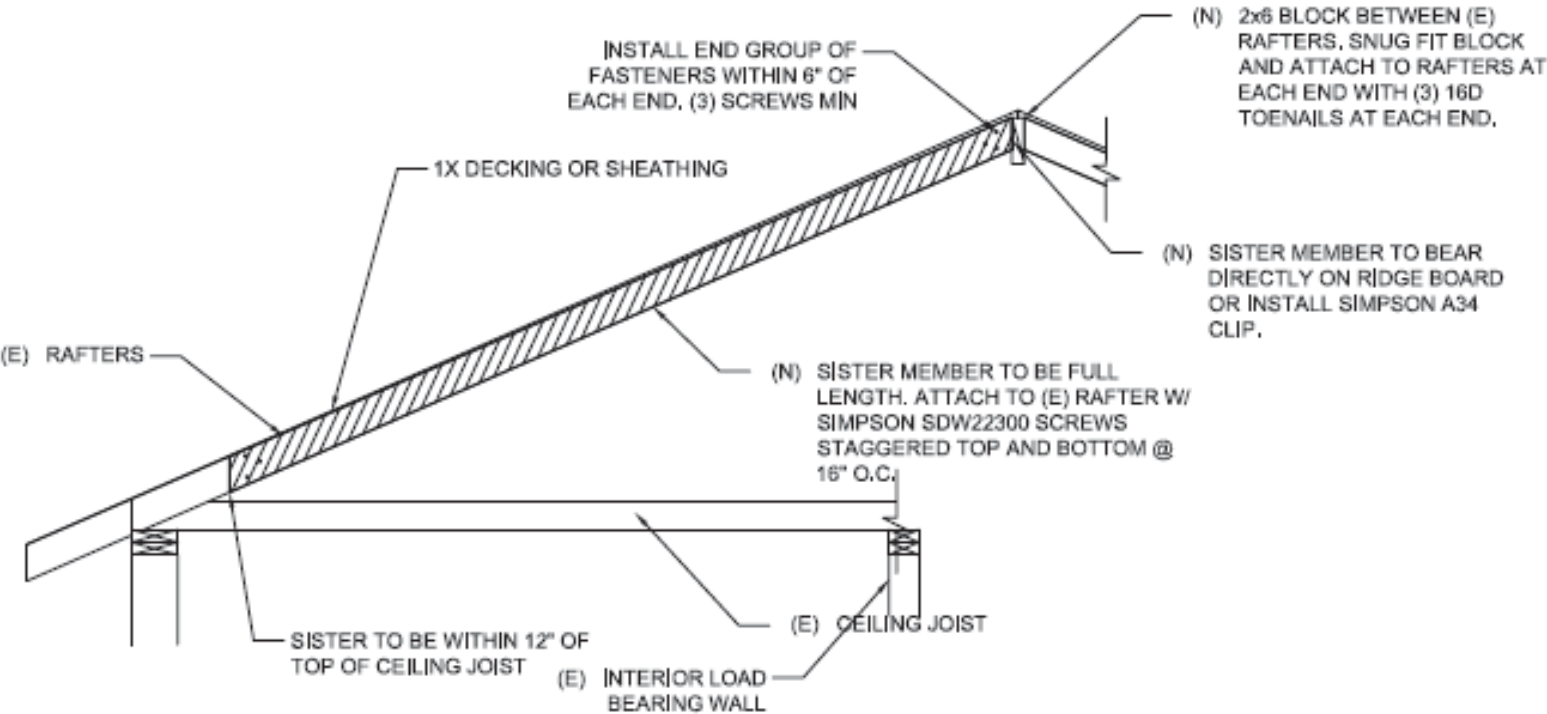
REVISION:

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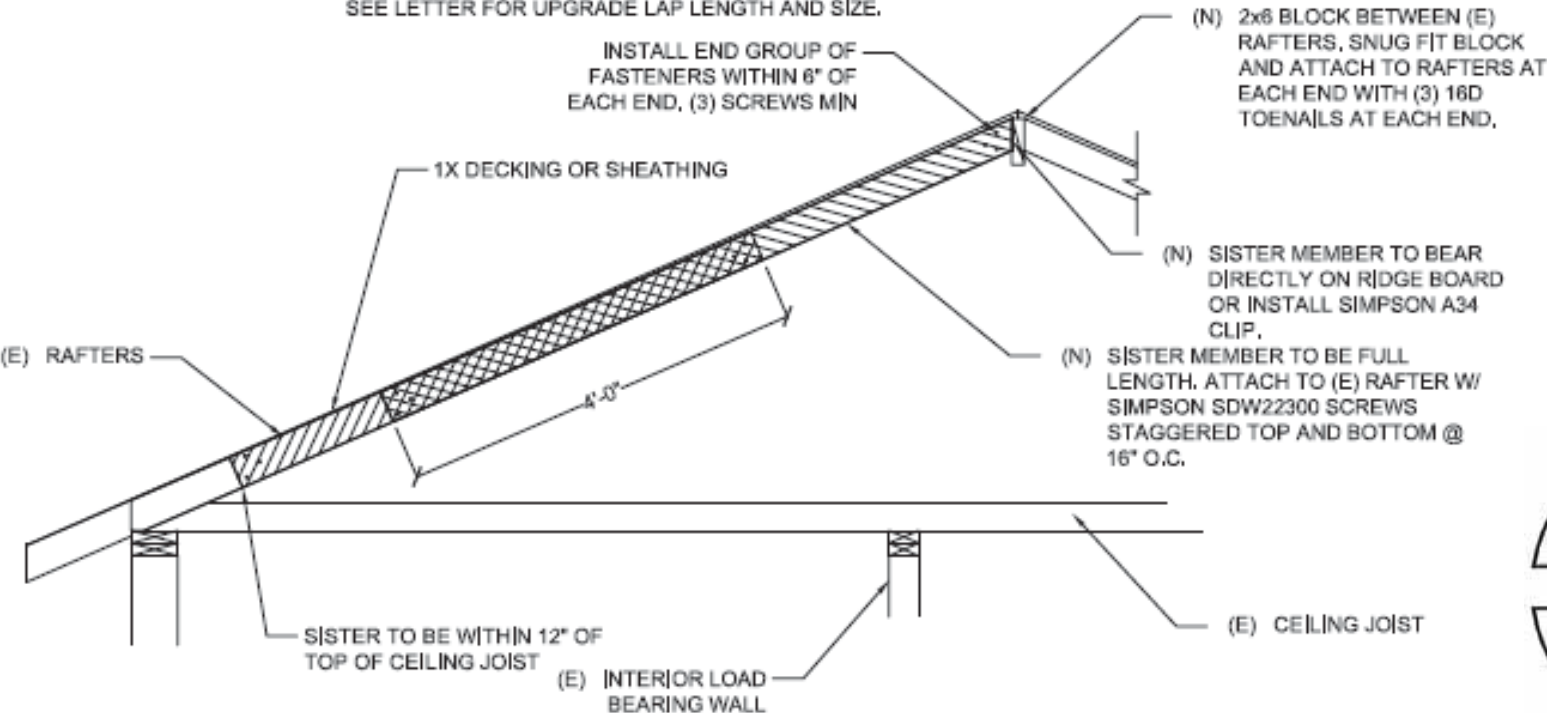
PAGE NUMBER:

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Sister upgrade is required for (MP1) on all rafters that directly support solar PV. Stitch new 2x4 DF#2 (min) to existing member. See detail for additional information.



OPTION 1 - FULL LENGTH SISTER
SEE LETTER FOR UPGRADE LAP LENGTH AND SIZE.



OPTION 2 - OVERLAPPED SISTER
SEE LETTER FOR UPGRADE LAP LENGTH AND SIZE.



11/9/2022
Exp: 12/31/23

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PV INSTALLATION
PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
800-377-4480

CUSTOMER INFORMATION:
Nicholas Kocher
1216 Jackson Street
OREGON CITY, Oregon 97045
AC SYSTEM SIZE: 5.8 kW AC
DC SYSTEM SIZE: 8 kW DC

DRAWING BY: PremiumCAD	
PLOT DATE: November 6, 2022	
PROJECT NUMBER: 641584	
SHEET NAME: STRUCTURAL	
REVISION: 0	PAGE NUMBER: Page 58

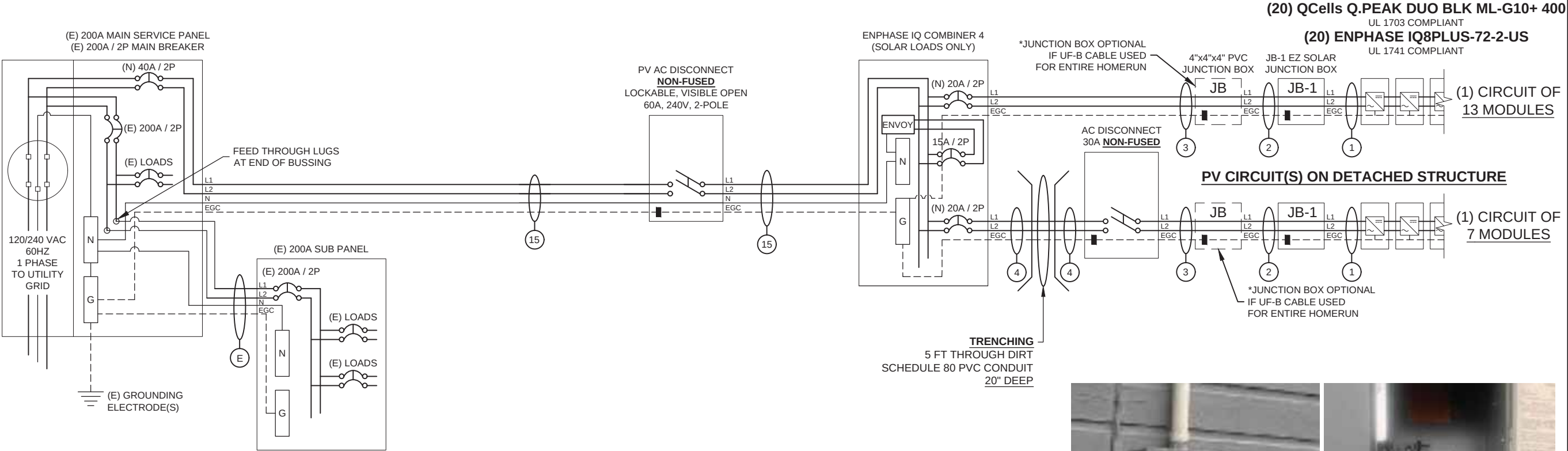
15	(1) 6 AWG THHN/THWN-2, CU., BLACK (L1)	24.2 A AC	3	(1) 10 AWG THHN/THWN-2, CU., BLACK (L1)	MAX 15.7 A AC	2	(1) 10 - 2 UF-B (or NM) W/G, THHN/THWN-2, SO	MAX 15.7 A AC	1	(1) 12-2 TC-ER, THHN/THWN-2, CU.	MAX 15.7 A AC
	(1) 6 AWG THHN/THWN-2, CU., RED (L2)	240 V AC		(1) 10 AWG THHN/THWN-2, CU., RED (L 2)	240 V AC			240 V AC		(1) 6 AWG BARE, CU (EGC)	240 V AC
	(1) 6 AWG THHN/THWN-2, CU., WHITE (N)			(1) 10 AWG THHN/THWN-2, CU., GREEN (EGC)							
	(1) 10 AWG THHN/THWN-2, CU., GREEN (EGC)										
4	(1) 3/4 INCH EMT	EXTERIOR		(1) 3/4 INCH EMT	EXTERIOR			INTERIOR			EXTERIOR
	(1) 10 AWG THHN/THWN-2, CU., BLACK (L1)	8.5 A AC									
	(1) 10 AWG THHN/THWN-2, CU., RED (L2)	240 V AC									
	(1) 10 AWG THHN/THWN-2, CU., GREEN (EGC)										
	(1) 1 INCH SCH 80 PVC	EXTERIOR									

DESIGNER NOTES:

SUPPLY SIDE BREAKER IN MSP EXTERIOR POI. PLACE PV BREAKER IN SOLAR READY SLOT.

ELECTRICAL NOTES:

ALL CONDUIT TO BE RAN AT LEAST 7/8 IN. ABOVE ROOF SURFACE WHERE EXPOSED TO SUNLIGHT.



INTERCONNECTION NOTES

705.11 AN ELECTRIC POWER PRODUCTION SOURCE, WHERE CONNECTED TO THE SUPPLY SIDE OF THE SERVICE DISCONNECTING MEANS AS PERMITTED IN 230.82(6), SHALL COMPLY WITH 705.11 (A) THROUGH (E).

UTILITY COMPANY: Portland General Electric (PGE) PERMIT ISSUER: Oregon City



Item #2.

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PV INSTALLATION PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
800-377-4480

CUSTOMER INFORMATION:
Nicholas Kocher
1216 Jackson Street
OREGON CITY, Oregon 97045
AC SYSTEM SIZE: 5.8 kW AC
DC SYSTEM SIZE: 8 kW DC

DRAWING BY:
PremiumCAD

PLOT DATE:
November 6, 2022

PROJECT NUMBER:
641584

SHEET NAME:
ELECTRICAL

REVISION:
0

PAGE NUMBER:
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MODULE SPECIFICATIONS	QCells Q.PEAK DUO BLK ML-G10+ 400
RATED POWER (STC)	400 W
MODULE VOC	45.3 V DC
MODULE VMP	37.1 V DC
MODULE IMP	10.8 A DC
MODULE ISC	11.1 A DC
VOC CORRECTION	-0.27 %/°C
VMP CORRECTION	-0.34 %/°C
SERIES FUSE RATING	20 A DC
ADJ. MODULE VOC @ ASHRAE LOW TEMP	49.1 V DC
ADJ. MODULE VMP @ ASHRAE 2% AVG. HIGH TEMP	32.2 V DC

MICROINVERTER SPECIFICATIONS	Enphase IQ8+ Microinverters
POWER POINT TRACKING (MPPT) MIN/MAX	30 - 58 V DC
MAXIMUM INPUT VOLTAGE	60 V DC
MAXIMUM DC SHORT CIRCUIT CURRENT	15 A DC
MAXIMUM USABLE DC INPUT POWER	440 W
MAXIMUM OUTPUT CURRENT	1.21 A AC
AC OVERCURRENT PROTECTION	20 A
MAXIMUM OUTPUT POWER	290 W
CEC WEIGHTED EFFICIENCY	97 %

AC PHOTOVOLATIC MODULE MARKING (NEC 690.52)	
NOMINAL OPERATING AC VOLTAGE	240 V AC
NOMINAL OPERATING AC FREQUENCY	47 - 68 HZ AC
MAXIMUM AC POWER	240 VA AC
MAXIMUM AC CURRENT	1.0 A AC
MAXIMUM OCPD RATING FOR AC MODULE	20 A AC

DESIGN LOCATION AND TEMPERATURES	
TEMPERATURE DATA SOURCE	ASHRAE 2% AVG. HIGH TEMP
STATE	Oregon
CITY	OREGON CITY
WEATHER STATION	PORTLAND INTERNATIONAL AP
ASHRAE EXTREME LOW TEMP (°C)	-6
ASHRAE 2% AVG. HIGH TEMP (°C)	32

SYSTEM ELECTRICAL SPECIFICATIONS	CIR 1	CIR 2	CIR 3	CIR 4	CIR 5	CIR 6
NUMBER OF MODULES PER MPPT	13	7				
DC POWER RATING PER CIRCUIT (STC)	5200	2800				
TOTAL MODULE NUMBER	20 MODULES					
STC RATING OF ARRAY	8000W DC					
AC CURRENT @ MAX POWER POINT (IMP)	15.7	8.5				
MAX. CURRENT (IMP X 1.25)	19.6625	10.5875				
OCPD CURRENT RATING PER CIRCUIT	20	20				
MAX. COMB. ARRAY AC CURRENT (IMP)	24.2					
MAX. ARRAY AC POWER	5800W AC					

AC VOLTAGE RISE CALCULATIONS	DIST (FT)	COND.	√RISE(V)	VEND(V, %VRISE
VRISE SEC. 1 (MICRO TO JBOX)	46.8	12 Cu.	2.46	242.46 1.02%
VRISE SEC. 2 (JBOX TO COMBINER BOX)	35	10 Cu.	1.40	241.40 0.58%
VRISE SEC. 3 (COMBINER BOX TO POI)	5	6 Cu.	0.12	240.12 0.05%
TOTAL VRISE			3.98	243.98

PHOTOVOLTAIC AC DISCONNECT OUTPUT LABEL (NEC 690.54)	
AC OUTPUT CURRENT	24.2 A AC
NOMINAL AC VOLTAGE	240 V AC

CONDUCTOR SIZE CALCULATIONS	
MICROINVERTER TO JUNCTION BOX (1)	MAX. SHORT CIRCUIT CURRRENT (ISC) = 15.7 A AC MAX. CURRENT (ISC X1.25) = 19.7 A AC CONDUCTOR (TC-ER, COPPER (90°C)) = 12 AWG CONDUCTOR RATING = 30 A AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 28.8 > 19.7
JUNCTION BOX TO JUNCTION BOX (2)	MAX. SHORT CIRCUIT CURRRENT (ISC) = 15.7 A AC MAX. CURRENT (ISC X1.25) = 19.7 A AC CONDUCTOR (UF-B, COPPER (60°C)) = 10 AWG CONDUCTOR RATING = 30 A CONDUIT FILL DERATE = 1 AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 28.8 > 19.7
JUNCTION BOX TO COMBINER BOX (3)	MAX. SHORT CIRCUIT CURRRENT (ISC) = 15.7 A AC MAX. CURRENT (ISC X1.25) = 19.7 A AC CONDUCTOR (UF-B, COPPER (60°C)) = 10 AWG CONDUCTOR RATING = 30 A CONDUIT FILL DERATE = 0.8 AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 23.04 > 19.7
COMBINER BOX TO MAIN PV OCPD (15)	INVERTER RATED AMPS = 24.2 A AC MAX. CURRENT (RATED AMPS X1.25) = 30.25 A AC CONDUCTOR (THWN-2, COPPER (75°C TERM.)) = 6 AWG CONDUCTOR RATING = 65 A CONDUIT FILL DERATE = 1 AMB. TEMP. AMP. CORRECTION = 0.96 ADJUSTED AMP. = 62.4 > 30.3

GROUNDING NOTES

1. A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH [NEC 690.47] AND [NEC 250.50-60] SHALL BE PROVIDED. PER [NEC 690.47], THE GROUNDING ELECTRODE SYSTEM OF AN EXISTING BUILDING MAY BE USED AND BE BONDED AT THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, OR IS ONLY METALLIC WATER PIPING, A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT GROUND ROD WITH ACORN CLAMP.
2. THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 AWG COPPER WIRE PER [NEC 250.64(B)]. THE GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT PER [NEC 250.64(C)].
3. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN 8 AWG AND NO GREATER THAN 6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
4. PV SYSTEM SHALL BE GROUNDED IN ACCORDANCE TO [NEC 250.21], [NEC TABLE 250.122], AND ALL METAL PARTS OR MODULE FRAMES ACCORDING TO [NEC 690.46].
5. MODULE SOURCE CIRCUITS SHALL BE GROUNDED IN ACCORDANCE TO [NEC 690.42].
6. THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDED CONDUCTOR TO ANOTHER MODULE.
7. EACH MODULE WILL BE GROUNDED USING THE SUPPLIED CONNECTION POINTS IDENTIFIED IN THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
8. ENCLOSURES SHALL BE PROPERLY PREPARED WITH REMOVAL OF PAINT/FINISH AS APPROPRIATE WHEN GROUNDING EQUIPMENT WITH TERMINATION GROUNDING LUGS.
9. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR DIRECT BURIAL.
10. GROUNDING AND BONDING CONDUCTORS SHALL BE COPPER, SOLID OR STRANDED, AND BARE WHEN EXPOSED.
11. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO [NEC 690.45] AND BE A MINIMUM OF 10 AWG WHEN NOT EXPOSED TO DAMAGE (6 AWG SHALL BE USED WHEN EXPOSED TO DAMAGE).
12. GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN (OR MARKED GREEN IF 4 AWG OR LARGER).
13. ALL CONDUIT BETWEEN THE UTILITY AC DISCONNECT AND THE POINT OF CONNECTION SHALL HAVE GROUNDED BUSHINGS AT BOTH ENDS.
14. SYSTEM GEC SIZED ACCORDING TO [NEC 690.47], [NEC TABLE 250.66], DC SYSTEM GEC SIZED ACCORDING TO [NEC 250.166], MINIMUM 8 AWG WHEN INSULATED, 6 AWG WHEN EXPOSED TO DAMAGE.
15. EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENTS, AND CONDUCTOR ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH [NEC 250.134] OR [NEC 250.136(A)] REGARDLESS OF VOLTAGE.

WIRING & CONDUIT NOTES

1. ALL CONDUIT SIZES AND TYPES, SHALL BE LISTED FOR ITS PURPOSE AND APPROVED FOR THE SITE APPLICATIONS.
2. BOLTED CONNECTION REQUIRED IN DC DISCONNECTS ON THE WHITE GROUNDED CONDUCTOR (USE POLARIS BLOCK OR NEUTRAL BAR).
3. ANY CONNECTION ABOVE LIVE PARTS MUST BE WATERTIGHT. REDUCING WASHERS DISALLOWED ABOVE LIVE PARTS, MEYERS HUBS RECOMMENDED
4. UV RESISTANT CABLE TIES (NOT ZIP TIES) USED FOR PERMANENT WIRE MANAGEMENT OFF THE ROOF SURFACE IN ACCORDANCE WITH [NEC 110.2,110.3(A-B)].
5. SOLADECK JUNCTION BOXES MOUNTED FLUSH WITH ROOF SURFACE TO BE USED FOR WIRE MANAGEMENT AND AS FLASHED ROOF PENETRATIONS FOR INTERIOR CONDUIT RUNS.
6. ALL PV CABLES AND HOMERUN WIRES BE TYPE USE-2, AND SINGLE-CONDUCTOR CABLE LISTED AND IDENTIFIED AS PV WIRE, TYPE TC-ER, OR EQUIVALENT; ROUTED TO SOURCE CIRCUIT COMBINER BOXES AS REQUIRED.
7. ALL CONDUCTORS AND OCPD SIZES AND TYPES SPECIFIED ACCORDING TO [NEC 690.8] FOR MULTIPLE CONDUCTORS.
8. ALL PV DC CONDUCTORS IN CONDUIT EXPOSED TO SUNLIGHT SHALL BE INSTALLED AT LEAST 7/8" ABOVE THE ROOF SURFACE AND DERATED ACCORDING TO [NEC TABLE 310.15 (B)(2)(A)], [NEC TABLE 310.15(B)(3)(A)],& [NEC 310.15(B)(3)(C)].
9. EXPOSED ROOF PV DC CONDUCTORS SHALL BE USE-2, 90°C RATED, WET AND UV RESISTANT, AND UL LISTED RATED FOR 600V, UV RATED SPIRAL WRAP SHALL BE USED TO PROTECT WIRE FROM SHARP EDGES.
10. PHASE AND NEUTRAL CONDUCTORS SHALL BE DUAL RATED THHN/THWN-2 INSULATED, 90°C RATED, WET AND UV RESISTANT, RATED FOR 600V
11. 4-WIRE DELTA CONNECTED SYSTEMS HAVE THE PHASE WITH THE HIGHER VOLTAGE TO GROUND MARKED ORANGE OR IDENTIFIED BY OTHER EFFECTIVE MEANS.
12. ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION
13. VOLTAGE DROP LIMITED TO 2% FOR DC CIRCUITS AND 3% FOR AC CIRCUITS
14. NEGATIVE GROUNDED SYSTEMS DC CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS: DC POSITIVE- RED (OR MARKED RED), DC NEGATIVE- GREY (OR MARKED GREY)
15. POSITIVE GROUNDED SYSTEMS DC CONDUCTORS COLOR CODED: DC POSITIVE- GREY (OR MARKED GREY), DC NEGATIVE- BLACK (OR MARKED BLACK)
16. AC CONDUCTORS >4AWG COLOR CODED OR MARKED: PHASE A OR L1- BLACK, PHASE B OR L2- RED, PHASE C OR L3- BLUE, NEUTRAL- WHITE/GRAY
* USE-2 IS NOT INDOOR RATED BUT PV CABLE IS RATED THWN/THWN-2 AND MAY BE USED INSIDE
** USE-2 IS AVAILABLE AS UV WHITE
17. RIGID CONDUIT, IF INSTALLED, (AND/OR NIPPLES) MUST HAVE A PULL BUSHING TO PROTECT WIRES.
18. IF CONDUIT DETERMINED TO BE RAN THROUGH ATTIC IN FIELD THEN CONDUIT WILL BE EITHER EMT, FMC, OR MC CABLE IF DC CURRENT COMPLYING WITH [NEC 690.31], [NEC 250.118(10)]. DISCONNECTING MEANS SHALL COMPLY WITH [NEC 690.13] AND [NEC 690.15].
19. CONDUIT RAN THROUGH ATTIC WILL BE AT LEAST 18" BELOW ROOF SURFACE COMPLYING WITH [NEC 230.6(4)] AND SECURED NO GREATER THAN 6' APART PER [NEC 330.30(B)].



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PV INSTALLATION
PROFESSIONAL
Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
800-377-4480

CUSTOMER INFORMATION:

Nicholas Kocher
1216 Jackson Street
OREGON CITY, Oregon 97045

AC SYSTEM SIZE: 5.8 kW AC
DC SYSTEM SIZE: 8 kW DC

DRAWING BY:

PremiumCAD

PLOT DATE:

November 6, 2022

PROJECT NUMBER:

641584

SHEET NAME:

ELEC CALCS

REVISION:

0

PAGE NUMBER:

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STANDARD LABELS

⚠️

WARNING

ELECTRIC SHOCK HAZARD

TERMINALS ON THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

PHOTOVOLTAIC SYSTEM

⚠️

AC DISCONNECT

⚠️

RATED AC OUTPUT CURRENT 24.2 A
NOMINAL OPERATING AC VOLTAGE 240 V

⚠️

WARNING

DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

⚠️

WARNING

POWER SOURCE OUTPUT CONNECTION

DO NOT RELOCATE
THIS OVERCURRENT
DEVICE

⚠️

WARNING

THIS EQUIPMENT FED BY MULTIPLE
SOURCES. TOTAL RATING OF ALL
OVERCURRENT DEVICES, EXCLUDING
MAIN SUPPLY OVERCURRENT
DEVICE, SHALL NOT EXCEED
AMPACITY OF BUSBAR.

SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN
SWITCH TO THE
"OFF" POSITION TO
SHUT DOWN PV SYSTEM
AND REDUCE
SHOCK HAZARD
IN THE ARRAY

RAPID SHUTDOWN
SWITCH FOR
SOLAR PV SYSTEM

LABELING NOTES

1) LABELS CALLED OUT ACCORDING TO ALL COMMON CONFIGURATIONS. ELECTRICIAN TO DETERMINE EXACT REQUIREMENTS IN THE FIELD PER CURRENT NEC AND LOCAL CODES AND MAKE APPROPRIATE ADJUSTMENTS.

2) LABELING REQUIREMENTS BASED ON THE 2017 & 2020 NEC CODE, OSHA STANDARD 19010.145, ANSIZ535.

3) MATERIAL BASED ON THE REQUIREMENTS OF THE AHJ.

4) LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED AND SHALL NOT BE HANDWRITTEN [NEC 110.21]

LABEL 1

FOR PV SYSTEM DISCONNECTING MEANS WHERE THE LINE AND LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN POSITION.

[2017 NEC 690.13(B)]
[2020 NEC 690.13(B)]

LABEL 2

SHALL BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS AS A POWER SOURCE AND WITH THE RATED AC OUTPUT CURRENT AND THE NOMINAL OPERATING AC VOLTAGE.

[2017 NEC 690.54]
[2020 NEC 690.54]

LABEL 3

IF INTERCONNECTING LOAD SIDE, INSTALL THIS LABEL ANYWHERE THAT IS POWERED BY BOTH THE UTILITY AND THE SOLAR PV SYSTEM, IE. MAIN SERVICE PANEL AND SUBPANELS.

[2017 NEC 705.12(B)(3)]
[2020 NEC 705.12(B)(3)]

LABEL 4

APPLY TO THE DISTRIBUTION EQUIPMENT ADJACENT TO THE BACK-FED BREAKER FROM THE POWER SOURCE.

[2017 NEC 705.12(B)(2)(3)(b)]
[2020 NEC 705.12(B)(3)(2)]

LABEL 5

APPLY TO THE PV COMBINER BOX

[2017 NEC 705.12(B)(2)(3)(c)]
[2020 NEC 705.12(B)(3)(3)]

LABEL 6

BUILDINGS WITH PV SYSTEMS SHALL HAVE A PERMANENT LABEL LOCATED AT EACH SERVICE EQUIPMENT LOCATION TO WHICH THE PV SYSTEMS ARE CONNECTED OR AT AN APPROVED READILY VISIBLE LOCATION AND SHALL INDICATE THE LOCATION OF RAPID SHUTDOWN INITIATION DEVICES.

[2017 NEC 690.56(C)(1)(a)]
[2020 NEC 690.56(C)]

LABEL 7

SIGN LOCATED AT RAPID SHUT DOWN DISCONNECT SWITCH

[2017 NEC 690.56(C)(3)]
[2020 NEC 690.56(C)(2)]

⚠️

WARNING

MAIN DISTRIBUTION UTILITY DISCONNECT(S)

POWER TO THIS BUILDING IS ALSO SUPPLIED
FROM A ROOF MOUNTED SOLAR ARRAY WITH
A RAPID SHUTDOWN DISCONNECTING MEANS
GROUPED AND LABELED WITHIN LINE OF SITE
AND 10 FT OF THIS LOCATION

⚠️

WARNING

POWER TO THIS BUILDING IS ALSO
SUPPLIED FROM MAIN DISTRIBUTION
UTILITY DISCONNECT LOCATED

⚠️

WARNING

POWER TO THIS BUILDING IS ALSO SUPPLIED
FROM A ROOF MOUNTED SOLAR ARRAY. SOLAR
ARRAY RAPID SHUTDOWN DISCONNECT IS
LOCATED OUTSIDE NEXT TO THE UTILITY METER.

⚠️

WARNING

PHOTOVOLTAIC SYSTEM
COMBINER PANEL

DO NOT ADD LOADS

LABEL 8

PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ELECTRIC POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED.

[2017 NEC 705.10]
[2020 NEC 705.10]

LABEL 9

PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ELECTRIC POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED.

[2017 NEC 705.10]
[2020 NEC 705.10]

LABEL 10

PERMANENT PLAQUE OR DIRECTORY TO BE LOCATED AT MAIN SERVICE EQUIPMENT DENOTING THE LOCATION OF THE RAPID SHUTDOWN SYSTEM DISCONNECTING MEANS IE SOLAR ARRAY RAPID SHUTDOWN DISCONNECTING SWITCH IS NOT GROUPED AND WITHIN LINE OF SITE OF MAIN SERVICE DISCONNECTING MEANS.

[2017 NEC 705.10 AND 690.56(C)(1)(a)]
[2020 NEC 705.10 AND 690.56(C)]

LABEL 11

PERMANENT PLAQUE OR DIRECTORY TO BE LOCATED AT AC COMBINER PANEL.

[2017 NEC 110.21(B)]
[2020 NEC 110.21(B)]

ADDITIONAL LABELS

⚠️

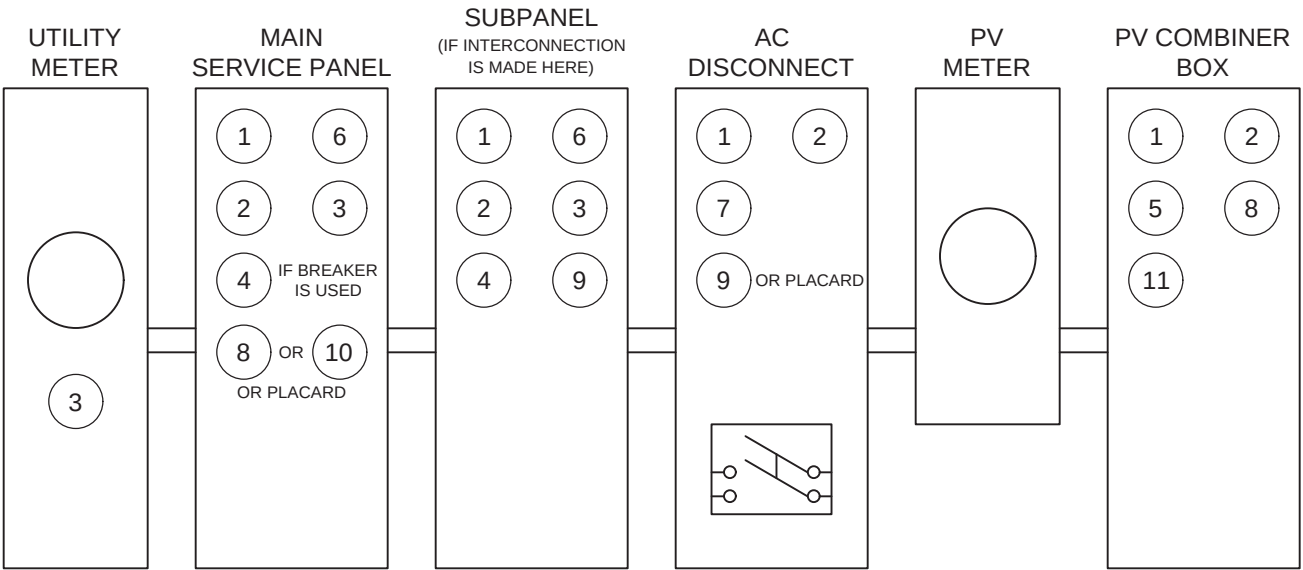
WARNING

DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

LABEL 3

IF INTERCONNECTING LOAD SIDE, INSTALL THIS LABEL ANYWHERE THAT IS POWERED BY BOTH THE UTILITY AND THE SOLAR PV SYSTEM, IE. MAIN SERVICE PANEL AND SUBPANELS. [NEC 705.12(B)(3)]



*ELECTRICAL DIAGRAM SHOWN ABOVE IS FOR LABELING PURPOSES ONLY. NOT AN ACTUAL REPRESENTATION OF EQUIPMENT AND CONNECTIONS TO BE INSTALLED. LABEL LOCATIONS PRESENTED MAY VARY DEPENDING ON TYPE OF INTERCONNECTION METHOD AND LOCATION PRESENTED ON 3 LINE DIAGRAM. 3 LINE DIAGRAM ON PV5 TO REFLECT ACTUAL REPRESENTATION OF PROPOSED SCOPE OF WORK.



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NABCEP

CERTIFIED

PV INSTALLATION
PROFESSIONAL

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CONTRACTOR:
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DC SYSTEM SIZE: 8 kW DC

DRAWING BY:
PremiumCAD

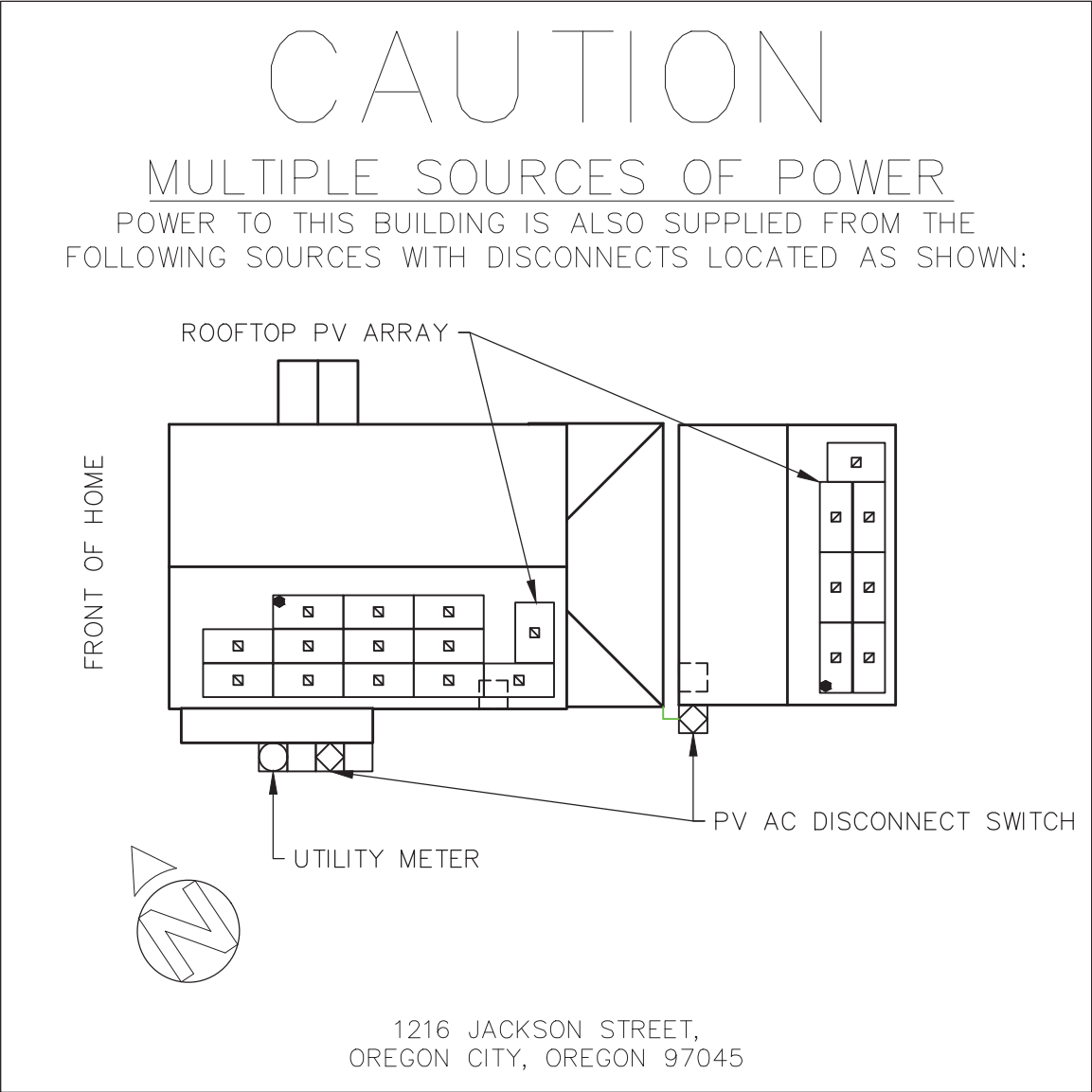
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DIRECTORY PLACARD NOTES

[NEC 705.10] A PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ELECTRIC POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED. THE MARKING SHALL COMPLY WITH [110.21(B)].



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DATA SHEET



IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry’s first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer’s instructions.

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IQ8SP-DS-0002-01-EN-US-2022-03-17

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current ² [module Isc]	A	15	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range ³	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit ⁴		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01	
Certifications		This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility>
(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17



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PV INSTALLATION
PROFESSIONAL

Scott Gurney
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CONTRACTOR:
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385-498-6700

DRAWING BY:

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SHEET NAME:

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Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



To learn more about Enphase offerings, visit enphase.com

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed



Enphase IQ Combiner 4/4C

MODEL NUMBER

IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
--------------------------------	---

IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
----------------------------------	--

ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)

Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.

ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

MECHANICAL DATA

Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"), Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)

COMPLIANCE

Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

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powered by
Q.ANTUM DUO Z



Q.PEAK DUO BLK ML-G10+ 385-405

ENDURING HIGH
PERFORMANCE



Quality
Controlled PV

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BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty².

¹ APT test conditions according to IEC / TS 62804-1:2015, method A (~1500 V, 96h)

² See data sheet on rear for further information.



6 BUSBAR
CELL TECHNOLOGY

12 BUSBAR
CELL TECHNOLOGY

THE IDEAL SOLUTION FOR:



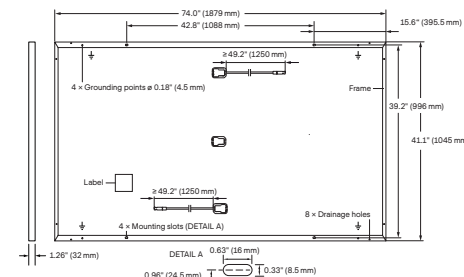
Rooftop arrays on
residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68



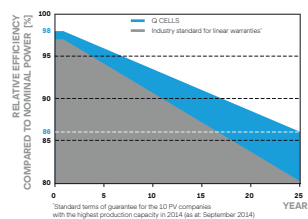
ELECTRICAL CHARACTERISTICS

POWER CLASS	385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)					
Power at MPP ¹	P _{MPP} [W]	385	390	395	405
Short Circuit Current ¹	I _{SC} [A]	11.04	11.07	11.10	11.17
Open Circuit Voltage ¹	V _{OC} [V]	45.19	45.23	45.27	45.34
Current at MPP	I _{MPP} [A]	10.59	10.65	10.71	10.83
Voltage at MPP	V _{MPP} [V]	36.36	36.62	36.88	37.13
Efficiency ¹	η [%]	≥ 19.6	≥ 19.9	≥ 20.1	≥ 20.4
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²					
Power at MPP	P _{MPP} [W]	288.8	292.6	296.3	300.1
Short Circuit Current	I _{SC} [A]	8.90	8.92	8.95	8.97
Open Circuit Voltage	V _{OC} [V]	42.62	42.65	42.69	42.72
Current at MPP	I _{MPP} [A]	8.35	8.41	8.46	8.51
Voltage at MPP	V _{MPP} [V]	34.59	34.81	35.03	35.25

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • 800 W/m², NMOT, spectrum AM 1.5

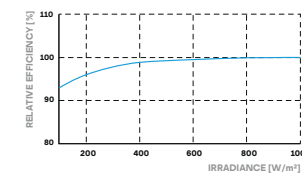
Q CELLS PERFORMANCE WARRANTY

PERFORMANCE AT LOW IRRADIANCE



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I _{SC}	α	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1000 (IEC) / 1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 2
Max. Design Load, Push / Pull ³	[lbs/ft ²]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push / Pull ³	[lbs/ft ²]	113 (5400 Pa) / 84 (4000 Pa)		

³ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
Quality Controlled PV - TÜV Rheinland,
IEC 61215:2016, IEC 61730:2016,
U.S. Patent No. 9,893,215 (solar cells),



Horizontal packaging	76.4 in 1940 mm	43.3 in 1100 mm	48.0 in 1220 mm	1656 lbs 751 kg	24 pallets	24 pallets	32 modules
----------------------	--------------------	--------------------	--------------------	--------------------	---------------	---------------	---------------

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

Specifications subject to technical changes © Q CELLS Q.PEAK DUO BLK ML-G10+ 385-405 DA_2022-02_Rev.01_NA



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PV INSTALLATION
PROFESSIONAL

Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
385-498-6700

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Product data sheet
Characteristics

DU222RB
Safety switch, general duty, non fusible, 60A,
2 poles, 10 hp, 240 VAC, NEMA 3R, bolt-on
provision

Product availability : Stock - Normally stocked in distribution facility



Price* : 353.00 USD



Main

Product	Single Throw Safety Switch
Current Rating	60 A
Certifications	UL listed file E2875
Enclosure Rating	NEMA 3R
Disconnect Type	Non-fusible disconnect switch
Factory Installed Neutral	None
Mounting Type	Surface
Number of Poles	2
Electrical Connection	Lugs
Duty Rating	General duty
Voltage Rating	240 V AC
Wire Size	AWG 12...AWG 3 aluminium AWG 14...AWG 3 copper

Complementary

Short-circuit withstand	200 kA
Maximum Horse Power Rating	10 hp 240 V AC 60 Hz 1 phase NEC 430.52
Tightening torque	35 lbf.in (3.95 N.m) 0.00...0.01 in² (2.08...5.26 mm²) AWG 14...AWG 10) 35 lbf.in (3.95 N.m) AWG 14...AWG 10) 45 lbf.in (5.08 N.m) 0.01 in² (8.37 mm²) AWG 8) 45 lbf.in (5.08 N.m) 0.02...0.03 in² (12.3...21.12 mm²) AWG 6...AWG 4) 50 lbf.in (5.65 N.m) 0.04 in² (26.67 mm²) AWG 3)
Height	9.63 in (244.60 mm)
Width	7.75 in (196.85 mm)
Depth	3.75 in (95.25 mm)

* Price is "List Price" and may be subject to a trade discount - check with your local distributor or retailer for actual price.

Apr 21, 2021



1

Ordering and shipping details

Category	00106 - D & DU SW,NEMA3R, 30-200A
Discount Schedule	DE1A
GTIN	00785901491491
Nbr. of units in pkg.	1
Package weight(Lbs)	4.65 lb(US) (2.11 kg)
Returnability	Yes
Country of origin	MX

Packing Units

Unit Type of Package 1	PCE
Package 1 Height	5.30 in (13.462 cm)
Package 1 width	7.20 in (18.288 cm)
Package 1 Length	10.00 in (25.4 cm)
Unit Type of Package 2	CAR
Number of Units in Package 2	5
Package 2 Weight	24.60 lb(US) (11.158 kg)
Package 2 Height	10.70 in (27.178 cm)
Package 2 width	10.20 in (25.908 cm)
Package 2 Length	23.50 in (59.69 cm)
Unit Type of Package 3	PAL
Number of Units in Package 3	120
Package 3 Weight	610.00 lb(US) (276.691 kg)
Package 3 Height	36.50 in (92.71 cm)
Package 3 width	40.00 in (101.6 cm)
Package 3 Length	48.00 in (121.92 cm)

Offer Sustainability

Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
REACH Regulation	REACH Declaration
REACH free of SVHC	Yes
EU RoHS Directive	Compliant EU RoHS Declaration
Toxic heavy metal free	Yes
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Pro-active China RoHS declaration (out of China RoHS legal scope)
Environmental Disclosure	Product Environmental Profile
PVC free	Yes

Contractual warranty

Warranty	18 months
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SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included



SolaDeck Model SD 0783



SolaDeck UL50 Type 3R Enclosures

Available Models:

Model SD 0783 - (3" fixed Din Rail)

Model SD 0786 - (6" slotted Din Rail)



SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

**Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 1- Power Distribution Block 600VDC 175AMP
- 1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

**Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 4- Din Rail Mounted Terminal Blocks
- Bus Bars with UL lug

**Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.



Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.



Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.



Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

RSTC Enterprises, Inc • 2219 Heimstead Road • Eau Claire, WI 54703
For product information call 1(866) 367-7782



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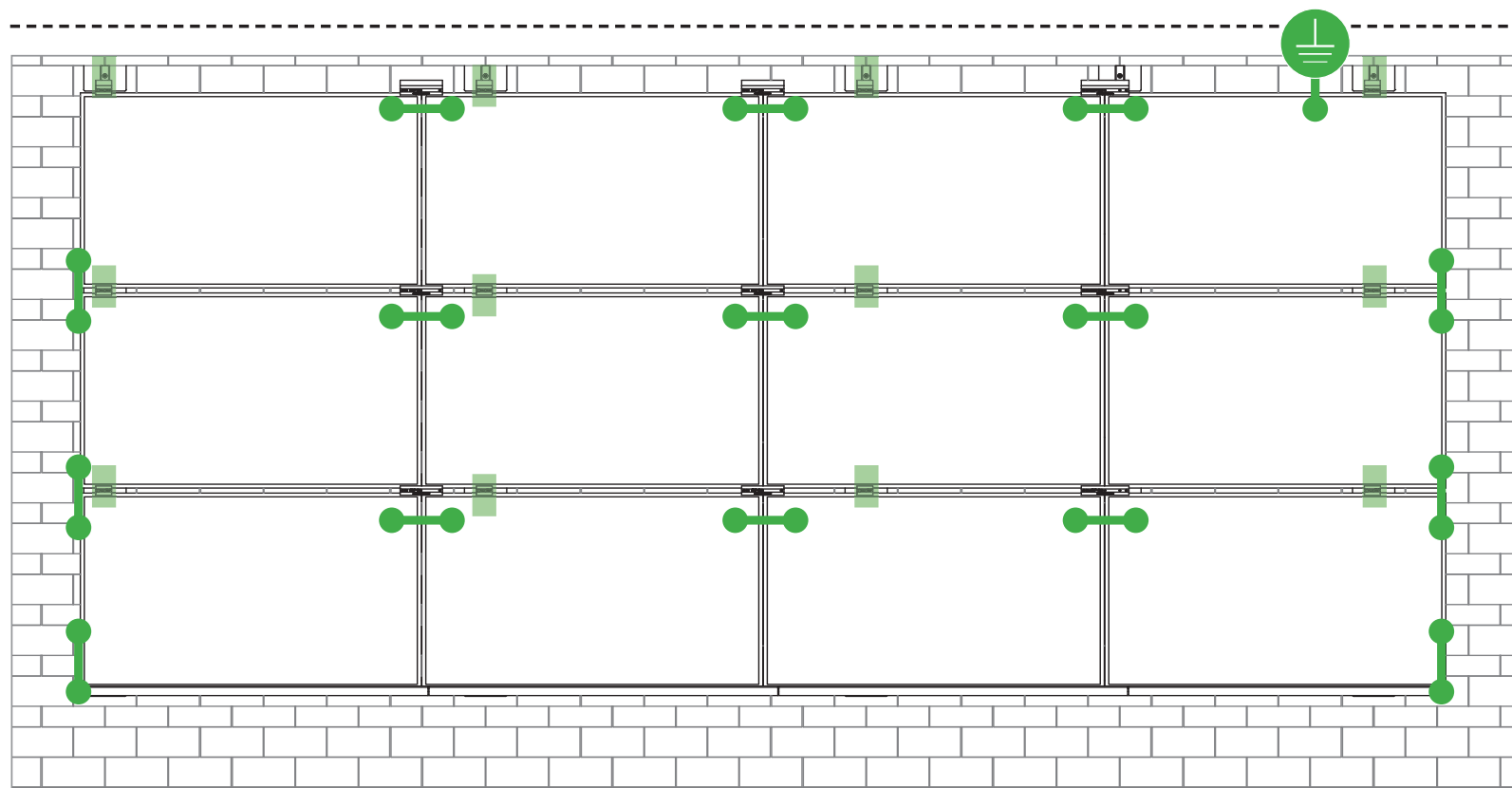


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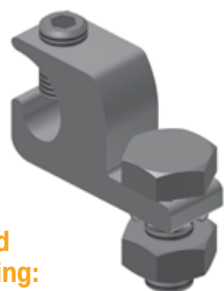
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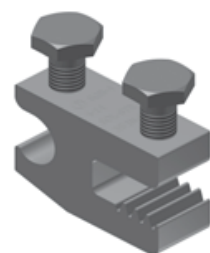


Star Washer is
Single Use Only

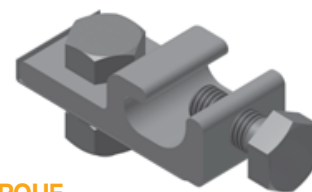


TERMINAL TORQUE,
Install Conductor and
torque to the following:
4-6 AWG: 35in-lbs
8 AWG: 25 in-lbs
10-14 AWG: 20 in-lbs

TERMINAL TORQUE,
Install Conductor and
torque to the following:
4-14 AWG: 35in-lbs



WEEBLUG
Single Use Only



TERMINAL TORQUE,
Install Conductor and
torque to the following:
6-14 AWG: 7ft-lbs

LUG DETAIL & TORQUE INFO Ilco Lay-In Lug (GBL-4DBT)

- 10-32 mounting hardware
- Torque = 5 ft-lb
- AWG 4-14- Solid or Stranded

LUG DETAIL & TORQUE INFO Ilco Flange Lug(SGB-4)

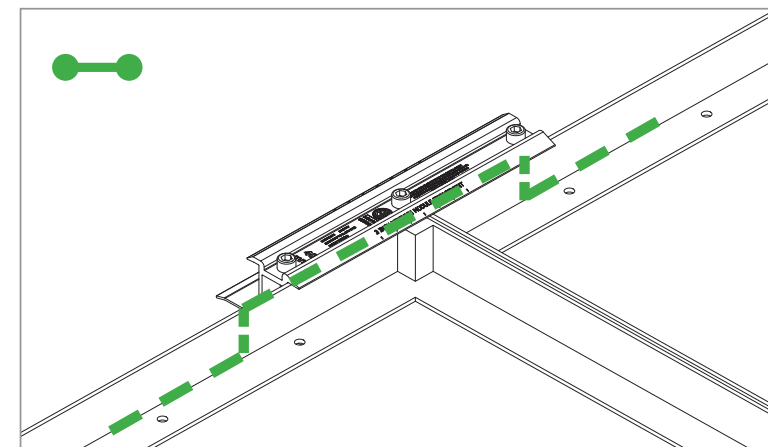
- 1/4" mounting hardware
- Torque = 75 in-lb
- AWG 4-14- Solid or Stranded

LUG DETAIL & TORQUE INFO Wiley WEEBLug (6.7)

- 1/4" mounting hardware
- Torque = 10 ft-lb
- AWG 6-14- Solid or Stranded

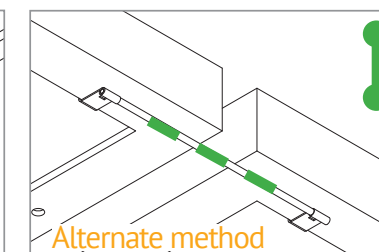
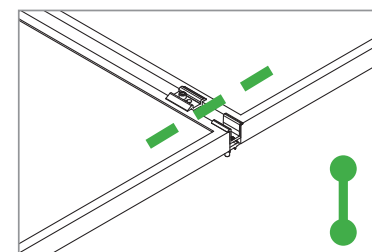
NOTE: ISOLATE COPPER FROM ALUMINUM CONTACT TO PREVENT CORROSION

System bonding is accomplished through modules. System grounding accomplished by attaching a ground lug to any module at a location on the module specified by the module manufacturer.



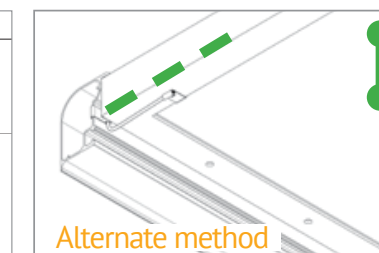
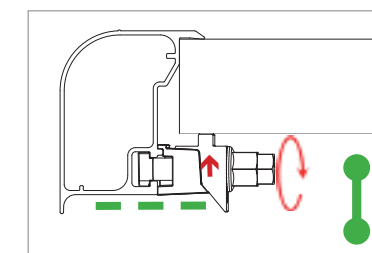
E-W BONDING PATH:

E-W module to module bonding is accomplished with 2 pre-installed bonding pins which engage on the secure side of the Microrail™ and splice.



N-S BONDING PATH:

N-S module to module bonding is accomplished with bonding clamp with 2 integral bonding pins. **(refer also to alternate method)**



TRIMRAIL BONDING PATH:

Trimrail to module bonding is accomplished with bonding clamp with integral bonding pin and bonding T-bolt. **(refer also to alternate method)**

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PV INSTALLATION
PROFESSIONAL

Scott Gurney
#PV-011719-015866

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385-498-6700

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UL CODE COMPLIANCE NOTES

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INSTALLATION GUIDE

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SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the SUNFRAME MICRORAIL (SFM) Installation Guide. SFM has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into the UL 2703 product certification. SFM has achieved Class A, B & C system level performance for low slope & steep sloped roofs when used in conjunction with type 1 and type 2 modules. Class A, B & C system level fire

performance is inherent in the SFM design, and no additional mitigation measures are required. The fire classification rating is valid for any roof pitch. There is no required minimum or maximum height limitation above the roof deck to maintain the Class A, B & C fire rating for SFM. SUNFRAME MICRORAIL™ components shall be mounted over a fire resistant roof covering rated for the application.

Module Type	Roof Slope	System Level Fire Rating	Microrail Direction	Module Orientation	Mitigation Required
Type 1 and Type 2	Steep Slope & Low Slope	Class A, B & C	East-West	Landscape OR Portrait	None Required

UL2703 TEST MODULES

See pages V and W for a list of modules that were electrically and mechanically tested or qualified with the SUNFRAME MICRORAIL (SFM) components outlined within this Installation Guide.

- Maximum Area of Module = 27.76 sqft
- UL2703 Design Load Ratings:
 - a) Downward Pressure – 113 PSF / 5400 Pa
 - b) Upward Pressure – 50 PSF / 2400 Pa
 - c) Down-Slope Load – 21.6 PSF / 1034 Pa
- Tested Loads:
 - a) Downward Pressure – 170 PSF / 8000 Pa
 - b) Upward Pressure – 75 PSF / 3500 Pa
 - c) Down-Slope Load – 32.4 PSF / 1550 Pa
- Maximum Span = 6ft
- Use with a maximum over current protection device OCPD of 30A
- System conforms to UL Std 2703, certified to LTR AE-001-2012
- Rated for a design load of 2400 Pa / 5400 Pa with 24 inch span
- PV modules may have a reduced load rating, independent of the SFM load rating. Please consult the PV module manufacturer's installation guide for more information
- Down-Slope design load rating of 30 PSF/ 1400 Pa for module areas of 22.3 sq ft or less



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TESTED / CERTIFIED MODULE LIST

V

INSTALLATION GUIDE : PAGE

Manufacture	Module Model / Series
Aleo	P-Series
Astronergy	CHSM6612P, CHSM6612P/HV, CHSM6612M, CHSM6612M/HV, CHSM6610M (BL)(BF)/(HF), CHSM72M-HC
Auxin	AXN6M610T, AXN6P610T, AXN6M612T & AXN6P612T
Axitec	AXIblackpremium 60 (35mm), AXIpower 60 (35mm), AXIpower 72 (40mm), AXIpremium 60 (35mm), AXIpremium 72 (40mm).
Aptos	DNA-120-(BF/MF)26 DNA-144-(BF/MF)26
Boviet	BVM6610, BVM6612
BYD	P6K & MHK-36 Series
Canadian Solar	CS1(H/K/U/Y)-MS CS3(K/L/U), CS3K-MB-AG, CS3K-(MS/P) CS3N-MS, CS3U-MB-AG, CS3U-(MS/P), CS3W CS5A-M, CS6(K/U), CS6K-(M/P), CS6K-MS CS6P-(M/P), CS6U-(M/P), CS6V-M, CS6X-P
Centrosolar America	C-Series & E-Series
CertainTeed	CT2xxMxx-01, CT2xxPxx-01, CTxxxMxx-02, CTxxxM-03, CTxxxMxx-04, CTxxxHC11-04
Dehui	DH-60M

Manufacture	Module Model / Series
Eco Solargy	Orion 1000 & Apollo 1000
ET Solar	ET-M672BHxxxTW
FreeVolt	Mono PERC
GCL	GCL-P6 & GCL-M6 Series
Hansol	TD-AN3, TD-AN4, UB-AN1, UD-AN1
Heliene	36M, 60M, 60P, 72M & 72P Series
HT Solar	HT60-156(M) (NDV) (-F), HT 72-156(M/P)
Hyundai	KG, MG, TG, RI, RG, TI, MI, HI & KI Series HiA-SxxxHG
ITEK	iT, iT-HE & iT-SE Series
Japan Solar	JPS-60 & JPS-72 Series
JA Solar	JAP6 60-xxx, JAM6-60-xxx/SI, JAM6(K)-60/ xxx, JAP6(k)-72-xxx/4BB, JAP72SYY-xxx/ZZ, JAP6(k)-60-xxx/4BB, JAP60SYY-xxx/ZZ, JAM6(k)-72-xxx/ZZ, JAM72SYY-xxx/ZZ, JAM6(k)-60-xxx/ZZ, JAM60SYY-xxx/ZZ. i. YY: 01, 02, 03, 09, 10 ii. ZZ: SC, PR, BP, HiT, IB, MW, MR
Jinko	JKM & JKMS Series Eagle JKMxxxM JKMxxxM-72HL-V
Kyocera	KU Series

Manufacture	Module Model / Series
LG Electronics	LGxxxN2T-A4 LGxxx(A1C/E1C/E1K/N1C/N1K/N2T/N2W/ Q1C/Q1K/S1C/S2W)-A5 LGxxxN2T-B5 LGxxxN1K-B6 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/ QAC/QAK)-A6 LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxx(N1C/N1K/N2W/S1C/S2W)-G4 LGxxxN2T-J5 LGxxx(N1K/N1W/N2T/N2W)-L5 LGxxx(N1C/Q1C/Q1K)-N5 LGxxx (N1C/N1K/N2W/Q1C/Q1K)-V5
	LR4-60(HIB/HIH/HPB/HPH)-xxxM LR4-72(HIH/HPH)-xxxM LR6-60(BP/HBD/HIBD)-xxxM (30mm) LR6-60(BK)(PE)(HPB)(HPH)-xxxM (35mm) LR6-60(BK)(PE)(PB)(PH)-xxxM (40mm) LR6-72(BP)(HBD)(HIBD)-xxxM (30mm) LR6-72(HV)(BK)(PE)(PH)(PB)(HPH)-xxxM (35mm) LR6-72(BK)(HV)(PE)(PB)(PH)-xxxM (40mm)
Mission Solar Energy	MSE Series
Mitsubishi	MJE & MLE Series
Neo Solar Power Co.	D6M & D6P Series

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- Please see the SFM UL2703Construction Data Report at Unirac.com to ensure the exact solar module selected is approved for use with SFM
- SFM Infinity is not compatible with module frame height of less than 30mm and more than 40mm. See Module Mounting section, page L for further information



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TESTED / CERTIFIED MODULE LIST

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INSTALLATION GUIDE

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Manufacture	Module Model / Series
Panasonic	VBHNxxxSA15 & SA16, VBHNxxxSA17 & SA18, VBHNxxxSA17(E/G) & SA18E, VBHNxxxKA01 & KA03 & KA04, VBHNxxxZA01, VBHNxxxZA02, VBHNxxxZA03, VBHNxxxZA04
Peimar	SGxxxM (FB/BF)
Phono Solar	PS-60, PS-72
Prism Solar	P72 Series
Q.Cells	Plus, Pro, Peak, G3, G4, G5, G6(+), G7, G8(+) Pro, Peak L-G2, L-G4, L-G5, L-G6, L-G7 Q.PEAK DUO BLK-G6+ Q.PEAK DUO BLK-G6+/TS Q.PEAK DUO (BLK)-G8(+) Q.PEAK DUO L-G8.3/BFF Q.PEAK DUO (BLK) ML-G9(+) Q.PEAK DUO XL-G9/G9.2/G9.3 Q.PEAK DUO (BLK) ML-G10(+) Q.PEAK DUO XL-G(10/10.2/10.3/10.c/10.d)
REC	Alpha (72) (Black) (Pure) N-Peak (Black) N-Peak 2 (Black) PEAK Energy Series PEAK Energy BLK2 Series PEAK Energy 72 Series

Manufacture	Module Model / Series
REC (cont.)	TwinPeak Series TwinPeak 2 Series TwinPeak 2 BLK2 Series TwinPeak 2S(M)72(XV) TwinPeak 3 Series (38mm) TP4 (Black)
Renesola	Vitrus2 Series & 156 Series
Risen	RSM72-6 (MDG) (M), RSM60-6
S-Energy	SN72 & SN60 Series (40mm)
Seraphim	SEG-6 & SRP-6 Series
Sharp	NU-SA & NU-SC Series
Silfab	SLA, SLG, BC Series & SILxxx(BL/NL/NT/HL/ ML/BK/NX/NU/HC)
Solaria	PowerXT-xxxR-(AC/PD/BD) PowerXT-xxxC-PD PowerXT-xxxR-PM (AC)
SolarWorld	Sunmodule Protect, Sunmodule Plus
Sonali	SS 230 - 265
Suntech	STP
Suniva	MV Series & Optimus Series
Sun Edison/Flextronics	F-Series, R-Series & FLEX FXS Series
SunPower	X-Series, E-Series & P-Series
Talesun	TP572, TP596, TP654, TP660, TP672, Hipor M, Smart

Manufacture	Module Model / Series
Tesla	SC, SC B, SC B1, SC B2 TxxxS
Trina	PA05, PD05, DD05, DE06, DD06, PE06, PD14, PE14, DD14, DE09.05, DE14, DE15, PE15H
Upsolar	UP-MxxxP(-B), UP-MxxxM(-B)
URE	D7MxxxH7A, D7(M/K)xxxH8A FAKxxx(C8G/E8G), FAMxxxE7G-BB FAMxxxE8G(-BB)
Vikram	Eldora, Solivo, Somera
Waaree	AC & Adiya Series
Winaico	WST & WSP Series
Yingli	YGE & YLM Series
ZN Shine	ZXM6-72

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- Please see the SFM UL2703Construction Data Report at Unirac.com to ensure the exact solar module selected is approved for use with SFM
- SFM Infinity is not compatible with module frame height of less than 30mm and more than 40mm. See Module Mounting section, page L for further information



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PROFESSIONAL

Scott Gurney
#PV-011719-015866

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385-498-6700

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Applicant:Unirac, Inc

Address:1411 Broadway Blvd NE
Albuquerque, NM 87102

Country:USA

Party Authorized To Apply Mark:Same as Manufacturer

Report Issuing Office:Intertek Testing Services NA, Inc., Lake Forest, CA

Control Number:5019851

Manufacturer:

Address:

Country:

Authorized by:

ETL

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Intertek

for L. Matthew Snyder, Certification Manager



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Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

Standard(s):	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels [UL 2703:2015 Ed.1+R:29May2019]
	PV Module and Panel Racking Mounting System and Accessories [CSA TIL No. A-40:2020]
Product:	Photovoltaic Mounting System, Sun Frame Microrail Installation Guide, PUB2021NOV29
Brand Name:	Unirac
Models:	Unirac SFM



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Party Authorized To Apply Mark:Same as Manufacturer

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Control Number:5021866

Manufacturer:

Address:

Country:

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for L. Matthew Snyder, Certification Manager



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545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

Standard(s):	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels [UL 2703:2015 Ed.1+R:29May2019]
	PV Module and Panel Racking Mounting System and Accessories [CSA TIL No. A-40:2020]
Product:	Photovoltaic Mounting System, Sun Frame Microrail Installation Guide, PUB2021NOV29
Brand Name:	Unirac
Models:	Unirac SFM



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Listing Constructional Data Report (CDR)

1.0 Reference and Address		
Report Number	102393982LAX-002	Original 11-Apr-2016 Revised: 2-Jan-2022
Standard(s)	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels [UL 2703:2015 Ed.1+R:29May2019] PV Module and Panel Racking Mounting System and Accessories [CSA TIL No. A-40:2020]	
Applicant	Unirac, Inc	Manufacturer 2
Address	1411 Broadway Blvd NE Albuquerque, NM 87102	Address
Country	USA	Country
Contact	Klaus Nicolaedis Todd Ganshaw	Contact
Phone	505-462-2190 505-843-1418	Phone
FAX	NA	FAX
Email	klaus.nicolaedis@unirac.com toddg@unirac.com	Email
Manufacturer 3		Manufacturer 4
Address		Address
Country		Country
Contact		Contact
Phone		Phone
FAX		FAX
Email		Email
Manufacturer 5		
Address		
Country		
Contact		
Phone		
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Listing Constructional Data Report (CDR)

1.0 Reference and Address			
Report Number	102393982LAX-002	Original 11-Apr-2016	Revised: 2-Jan-2022
Email			

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 PV INSTALLATION PROFESSIONAL Scott Gurney #PV-011719-015866
CONTRACTOR: BRS FIELD OPS 385-498-6700

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2.0 Product Description	
Product	Photovoltaic Mounting System, Sun Frame Microrail Installation Guide, PUB2021NOV29
Brand name	Unirac
Description	The product covered by this report is the Sun Frame Micro Rail roof mounted Photovoltaic Rack Mounting System. This system is designed to provide bonding and grounding to photovoltaic modules. The mounting system employs anodized or mill finish aluminum brackets that are roof mounted using the slider, outlined in section 4 of this report. There are no rails within this product, whereas the 3" Micro Rail, Floating Splice, and 9" Attached Splice electrically bond the modules together forming the path to ground.
	The Micro Rails are installed onto the module frame by using a stainless steel bolt anodized with black oxide with a stainless type 300 bonding pin, torqued to 20 ft-lbs, retaining the modules to the bracket. The bonding pin of the Micro Rail when bolted and torqued, penetrate the anodized coating of the photovoltaic module frame (at bottom flange) to contact the metal, creating a bonded connection from module to module.
	The grounding of the entire system is intended to be in accordance with the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems or the Canadian Electrical Code, CSA C22.1 Part 1 in accordance to the revision in effect in the jurisdiction in which the project resides. Any local electrical codes must be adhered in addition to the national electrical codes. The Grounding Lug is secured to the photovoltaic module, torqued in accordance with the installation manual provided in this document.
	Other optional grounding includes the use of the Enphase UL2703 certified grounding system, which requires a minimum of 2 micro-inverters mounted to the same rail, and using the same engage cable.

2.0 Product Description	
Models	Unirac SFM
Model Similarity	NA
Ratings	Fuse Rating: 30A Module Orientation: Portrait or Landscape Maximum Module Size: 17.98 ft² UL2703 Design Load Rating: 33 PSF Downward, 33 PSF Upward, 10 PSF Down-Slope Tested Loads - 50 psf/2400Pa Downward, 50psf/2400Pa Uplift, 15psf/720Pa Down Slope Trina TSM-255PD05.08 and Sunpower SPR-E20-327 used for Mechanical Loading Increased size ML test: Maximum Module Size: 22.3 ft² UL2703 Design Load Rating: 113 PSF Downward, 50 PSF Upward, 30 PSF Down-Slope LG355S2W-A5 used for Mechanical Loading test. Mounting configuration: Four mountings on each long side of panel with the longest span of 24" UL2703 Design Load Rating: 46.9 PSF Downward, 40 PSF Upward, 10 PSF Down-Slope LG395N2W-A5, LG360S2W-A5 and LG355S2W-A5 used for used for Mechanical Loading test. Mounting configuration: Six mountings for two modules used with the maximum span of 74.5" IEC 61646 Test Loads - 112.78 psf/5400Pa Downward, 50psf/2400Pa Uplift
	Mechanical Load test to add FlashLoc Slider and Trim Assemblies to UL2703 and IEC 61646 Certifications, & Increase SFM System UL2703 Module Size: Maximum Module Size: 27.76 ft² UL2703 Design Load Rating: 113 PSF Downward, 50 PSF Upward, 21.6 PSF Down-Slope Jinko Eagle 72HM G5 used for Mechanical Loading test. Mounting configuration: Four mountings on each long side of panel with the longest span of 24" Maximum module size: 21.86 ft² IEC 61646 Test Loads - 112.78 psf/5400Pa Downward, 75psf/3600Pa Uplift SunPower model SPR-A430-COM-MLSD used for Mechanical Loading
	Fire Class Resistance Rating: - Class A for Steep Slope Applications when using Type 1 Modules. Can be installed at any interstitial gap. Installations must include Trim Rail. - Class A for Steep Slope Applications when using Type 2 Modules. Can be installed at any interstitial gap. Installations must include Trim Rail. - Class A Fire Rated for Low Slope applications with Type 1 or 2 listed photovoltaic modules. This system was evaluated with a 5" gap between the bottom of the module and the roof's surface
	See section 7.0 illustrations # 1, 1a, 1b, and 1c for a complete list of PV modules evaluated with these racking systems
Other Ratings	NA



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7.0 Illustrations

Illustration 1 - Approved PV Modules

Manufacture	Module Model / Series	Manufacture	Module Model / Series
Aleo	P-Series	Eco Solargy	Orion 1000 & Apollo 1000
Astronergy	CH5M6612P, CH5M6612P/HV, CH5M6612M, CH5M6612M/HV, CH5M6610M (BL)(BF)/(HF), CH5M72M-HC	ET Solar	ET-M672BHxxxTW
Auxin	AXN6M610T, AXN6P610T, AXN6M612T & AXN6P612T	FreeVolt	Mono PERC
Axitec	AXIblackpremium 60 (35mm), AXIpower 60 (35mm), AXIpower 72 (40mm), AXIpremium 60 (35mm), AXIpremium 72 (40mm).	GCL	GCL-P6 & GCL-M6 Series
Aptos	DNA-120-(BF/MF)26 DNA-144-(BF/MF)26	Hansol	TD-AN3, TD-AN4, UB-AN1, UD-AN1
Boviet	BVM6610, BVM6612	Heliene	36M, 60M, 60P, 72M & 72P Series
BYD	P6K & MHK-36 Series	HT Solar	HT60-156(M) (NDV) (-F), HT 72-156(M/P)
Canadian Solar	CS1(H/K/U/Y)-MS CS3(K/L/U), CS3K-MB-AG, CS3K-(MS/P) CS3N-MS, CS3U-MB-AG, CS3U-(MS/P), CS3W CS5A-M, CS6(K/U), CS6K-(M/P), CS6K-MS CS6P-(M/P), CS6U-(M/P), CS6V-M, CS6X-P	Hyundai	KG, MG, TG, RI, RG, TI, MI, HI & KI Series HiA-SxxxHG
Centrosolar America	C-Series & E-Series	ITEK	IT, IT-HE & IT-SE Series
CertainTeed	CT2xxxMxx-01, CT2xxxPxx-01, CTxxxMxx-02, CTxxxM-03, CTxxxMxx-04, CTxxxHC11-04	Japan Solar	JPS-60 & JPS-72 Series
Dehui	DH-60M	JA Solar	JAP6 60-xxx, JAM6-60-xxx/SI, JAM6(K)-60/xxx, JAP6(k)-72-xxx/4BB, JAP72SYY-xxx/ZZ, JAP6(k)-60-xxx/4BB, JAP60SYY-xxx/ZZ, JAM6(k)-72-xxx/ZZ, JAM72SYY-xxx/ZZ, JAM6(k)-60-xxx/ZZ, JAM60SYY-xxx/ZZ. i. YY: 01, 02, 03, 09, 10 ii. ZZ: SC, PR, BP, HIT, IB, MW, MR
		Jinko	JKM & JKMS Series Eagle JKMxxxM JKMxxxM-72HL-V
		Kyocera	KU Series

7.0 Illustrations

Illustration 1a - Approved PV Modules Continue

Manufacture	Module Model / Series	Manufacture	Module Model / Series	
LG Electronics	LGxxxN2T-A4 LGxxx(A1C/E1C/E1K/N1C/N1K/N2T/N2W/ Q1C/Q1K/S1C/S2W)-A5 LGxxxN2T-B5 LGxxxN1K-B6 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/ QAC/QAK)-A6 LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxx(N1C/N1K/N2W/S1C/S2W)-G4 LGxxxN2T-J5 LGxxx(N1K/N1W/N2T/N2W)-L5 LGxxx(N1C/Q1C/Q1K)-N5 LGxxx (N1C/N1K/N2W/Q1C/Q1K)-V5	Panasonic	VBHNxxxSA15 & SA16, VBHNxxxSA17 & SA18, VBHNxxxSA17(E/G) & SA18E, VBHNxxxKA01 & KA03 & KA04, VBHNxxxZA01,VBHNxxxZA02, VBHNxxxZA03,VBHNxxxZA04	
		Peimar	SGxxxM (FB/BF)	
		Phono Solar	P5-60, P5-72	
		Prism Solar	P72 Series	
		Q.Cells	Plus, Pro, Peak, G3, G4, G5, G6(+), G7, G8(+) Pro, Peak L-G2, L-G4, L-G5, L-G6, L-G7 Q.PEAK DUO BLK-G6+ Q.PEAK DUO BLK-G6+/T5 Q.PEAK DUO (BLK)-G8(+) Q.PEAK DUO L-G8.3/BFF Q.PEAK DUO (BLK) ML-G9(+) Q.PEAK DUO XL-G9/G9.2/G9.3 Q.PEAK DUO (BLK) ML-G10(+) Q.PEAK DUO XL-G(10/10.2/10.3/10.c/10.d)	
			REC	Alpha (72) (Black) (Pure) N-Peak (Black) N-Peak 2 (Black) PEAK Energy Series PEAK Energy BLK2 Series PEAK Energy 72 Series
LONGI	LR4-60(HIB/HIH/HPB/HPH)-xxxM LR4-72(HIH/HPH)-xxxM LR6-60(BP/HBD/HIBD)-xxxM (30mm) LR6-60(BK)(PE)(HPB)(HPH)-xxxM (35mm) LR6-60(BK)(PE)(PB)(PH)-xxxM (40mm) LR6-72(BP)(HBD)(HIBD)-xxxM (30mm) LR6-72(HV)(BK)(PE)(PH)(PB)(HPH)-xxxM (35mm) LR6-72(BK)(HV)(PE)(PB)(PH)-xxxM (40mm)			
	Mission Solar Energy	MSE Series		
	Mitsubishi	MJE & MLE Series		
	Neo Solar Power Co.	D6M & D6P Series		



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7.0 Illustrations

Illustration 1b - Approved PV Modules Continue

Manufacture	Module Model / Series	Manufacture	Module Model / Series
REC (cont.)	TwinPeak Series	Tesla	SC, SC B, SC B1, SC B2
	TwinPeak 2 Series		TxxxS
	TwinPeak 2 BLK2 Series	Trina	PA05, PD05, DD05, DE06, DD06, PE06,
	TwinPeak 2S(M)72(XV)		PD14, PE14, DD14, DE09.05, DE14, DE15,
	TwinPeak 3 Series (38mm)		PE15H
	TP4 (Black)	Upsolar	UP-MxxxP(-B),
Renesola	Vitrus2 Series & 156 Series		UP-MxxxM(-B)
Risen	RSM72-6 (MDG) (M), RSM60-6	URE	D7MxxxH7A, D7(M/K)xxxH8A
S-Energy	SN72 & SN60 Series (40mm)		FAKxxx(C8G/E8G), FAMxxxE7G-BB
Seraphim	SEG-6 & SRP-6 Series		FAMxxxE8G(-BB)
Sharp	NU-SA & NU-SC Series	Vikram	Eldora,
Silfab	SLA, SLG, BC Series & SILxxx(BL/NL/NT/HL/		Solivo,
	ML/BK/NX/NU/HC)		Somera
	PowerXT-xxxR-(AC/PD/BD)	Waaree	AC & Adiya Series
Solaria	PowerXT-xxxC-PD	Winaico	WST & WSP Series
	PowerXT-xxxR-PM (AC)	Yingli	YGE & YLM Series
SolarWorld	Sunmodule Protect,	ZN Shine	ZXM6-72
	Sunmodule Plus		
Sonali	SS 230 - 265		
Suntech	STP		
Suniva	MV Series & Optimus Series		
Sun Edison/Flextronics	F-Series, R-Series & FLEX FXS Series		
SunPower	X-Series, E-Series & P-Series		
Talesun	TP572, TP596, TP654, TP660,		
	TP672, Hipor M, Smart		



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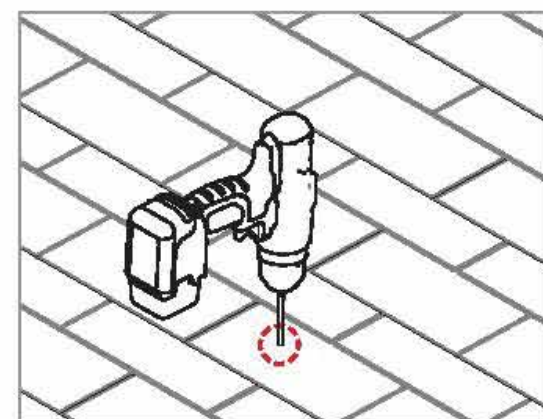
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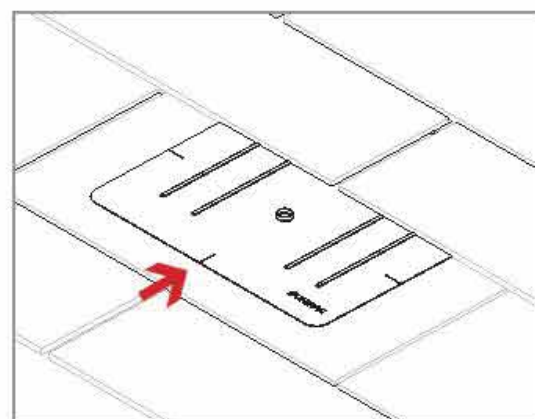
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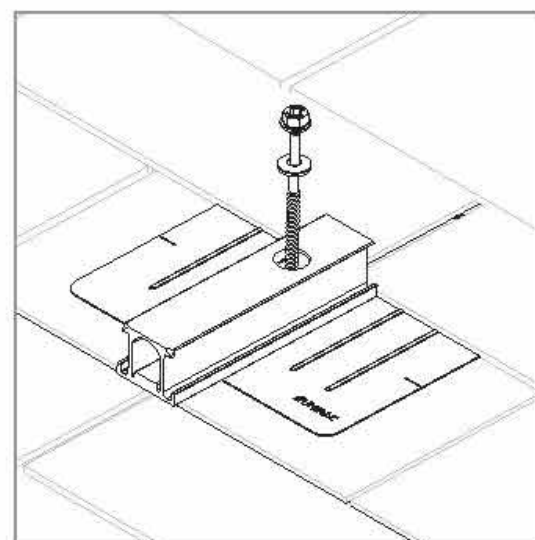
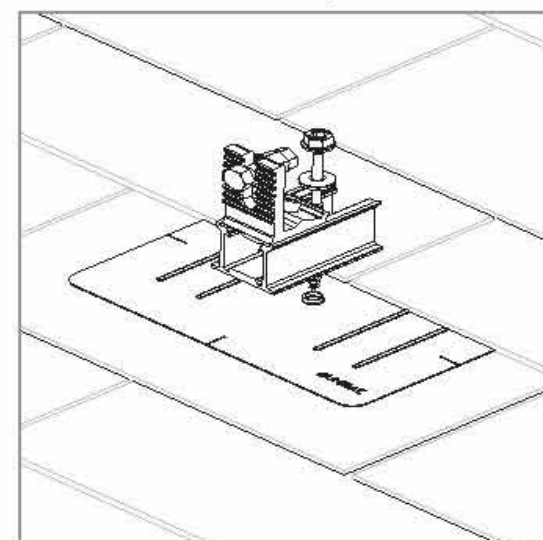
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PILOT HOLES:
Drill pilot holes for lag screws or structural screws (as necessary) at marked attachment points

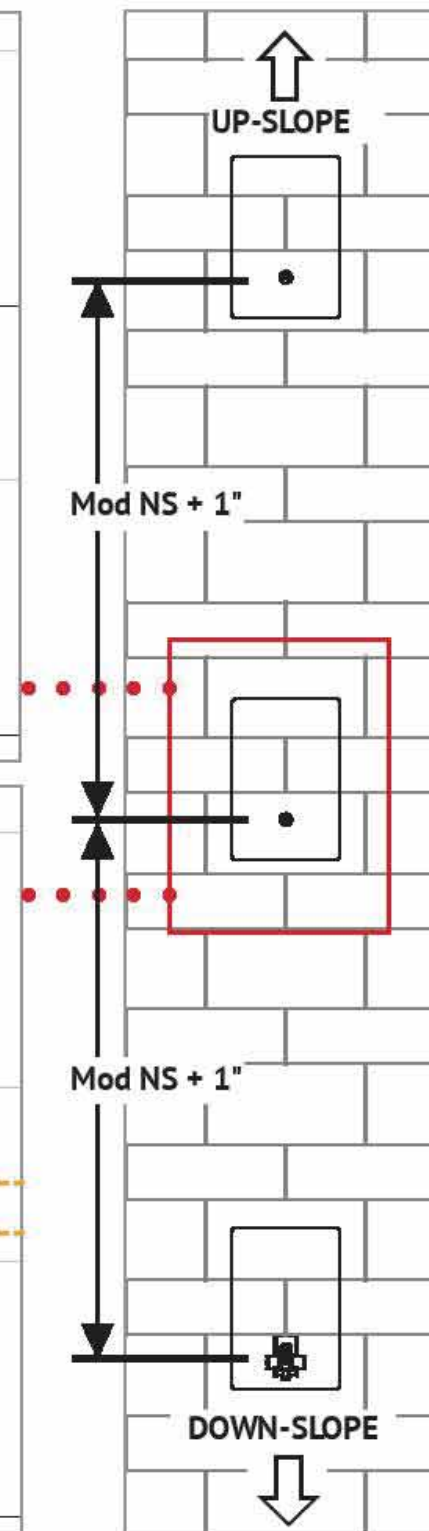
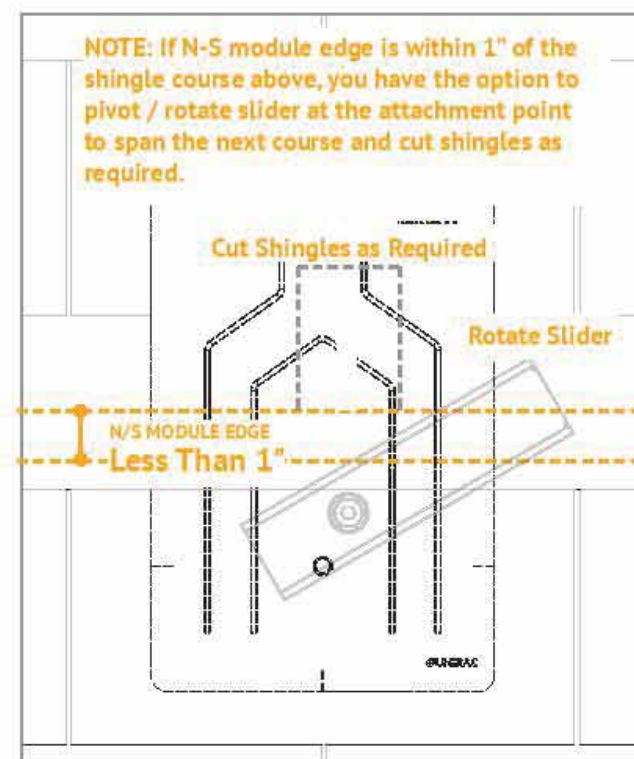
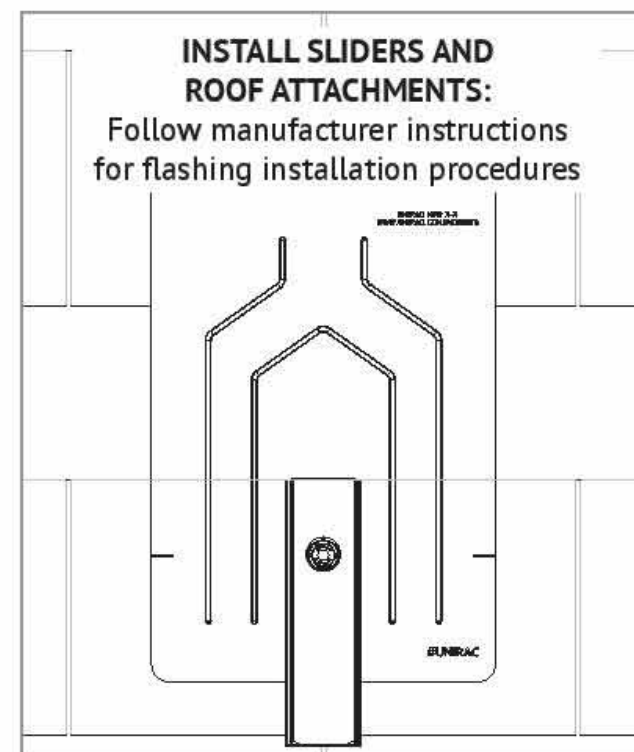


FLASHINGS:
Place flashings



INSTALL SLIDERS AND TRIMRAIL ROOF ATTACHMENTS:

- Insert flashings per manufacturer instructions
- NOTE: Use Lag screw or structural fastener with a maximum diameter of 5/16"**
- Attach sliders to rafters
- Verify proper row to row spacing for module size (Mod NS + 1")
- Ensure that Trimrail™ roof attachments in each row have sufficient engagement with slider dovetails for proper attachment.





DATA SHEET



IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry’s first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer’s instructions.

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IQ8SP-DS-0002-01-EN-US-2022-03-17

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings ¹	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current ² [module Isc]	A	15	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range ³	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit ⁴		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01	
Certifications		This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility>
(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17



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PV INSTALLATION
PROFESSIONAL

Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
385-498-6700

DRAWING BY:

PLOT DATE:

PROJECT NUMBER:

SHEET NAME:

SPEC SHEET

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Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



To learn more about Enphase offerings, visit enphase.com



The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

Enphase IQ Combiner 4/4C

MODEL NUMBER

IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
--------------------------------	---

IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
----------------------------------	--

ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)

Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.

ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

MECHANICAL DATA

Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"), Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)

COMPLIANCE

Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit enphase.com

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PV INSTALLATION
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Scott Gurney
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powered by
Q.ANTUM DUO Z



Q.PEAK DUO BLK ML-G10+ 385-405

ENDURING HIGH
PERFORMANCE



Quality
Controlled PV

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ID 1111232615



BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty².

¹ APT test conditions according to IEC / TS 62804-1:2015, method A (~1500 V, 96h)

² See data sheet on rear for further information.



6 BUSBAR
CELL TECHNOLOGY

12 BUSBAR
CELL TECHNOLOGY

THE IDEAL SOLUTION FOR:



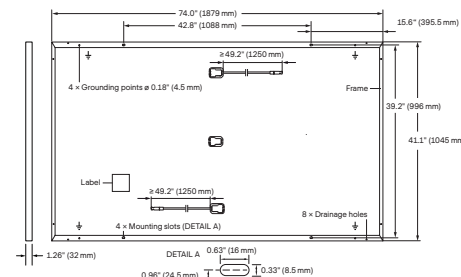
Rooftop arrays on
residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68



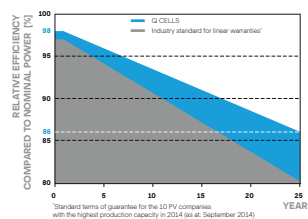
ELECTRICAL CHARACTERISTICS

POWER CLASS			385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)							
Minimum	Power at MPP ¹	P _{MPP} [W]	385	390	395	400	405
	Short Circuit Current ¹	I _{SC} [A]	11.04	11.07	11.10	11.14	11.17
	Open Circuit Voltage ¹	V _{OC} [V]	45.19	45.23	45.27	45.30	45.34
	Current at MPP	I _{MPP} [A]	10.59	10.65	10.71	10.77	10.83
	Voltage at MPP	V _{MPP} [V]	36.36	36.62	36.88	37.13	37.39
	Efficiency ¹	η [%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²							
Minimum	Power at MPP	P _{MPP} [W]	288.8	292.6	296.3	300.1	303.8
	Short Circuit Current	I _{SC} [A]	8.90	8.92	8.95	8.97	9.00
	Open Circuit Voltage	V _{OC} [V]	42.62	42.65	42.69	42.72	42.76
	Current at MPP	I _{MPP} [A]	8.35	8.41	8.46	8.51	8.57
	Voltage at MPP	V _{MPP} [V]	34.59	34.81	35.03	35.25	35.46

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • 800 W/m², NMOT, spectrum AM 1.5

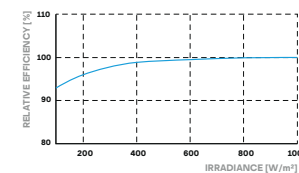
Q CELLS PERFORMANCE WARRANTY

PERFORMANCE AT LOW IRRADIANCE



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I _{SC}	α	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1000 (IEC) / 1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 2
Max. Design Load, Push / Pull ³	[lbs/ft ²]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push / Pull ³	[lbs/ft ²]	113 (5400 Pa) / 84 (4000 Pa)		

³ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
Quality Controlled PV - TÜV Rheinland,
IEC 61215:2016, IEC 61730:2016,
U.S. Patent No. 9,893,215 (solar cells),



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ID 1111232077

Horizontal packaging	76.4 in 1940 mm	43.3 in 1100 mm	48.0 in 1220 mm	1656 lbs 751 kg	24 pallets	24 pallets	32 modules
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Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

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Specifications subject to technical changes © Q CELLS Q.PEAK DUO BLK ML-G10+ 385-405 DA_2022-02_Rev.01_NA



PV INSTALLATION
PROFESSIONAL

Scott Gurney
#PV-011719-015866

CONTRACTOR:
BRS FIELD OPS
385-498-6700

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PLOT DATE:

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Product data sheet
Characteristics

DU222RB
Safety switch, general duty, non fusible, 60A,
2 poles, 10 hp, 240 VAC, NEMA 3R, bolt-on
provision

Product availability : Stock - Normally stocked in distribution facility



Price* : 353.00 USD



Main

Product	Single Throw Safety Switch
Current Rating	60 A
Certifications	UL listed file E2875
Enclosure Rating	NEMA 3R
Disconnect Type	Non-fusible disconnect switch
Factory Installed Neutral	None
Mounting Type	Surface
Number of Poles	2
Electrical Connection	Lugs
Duty Rating	General duty
Voltage Rating	240 V AC
Wire Size	AWG 12...AWG 3 aluminium AWG 14...AWG 3 copper

Complementary

Short-circuit withstand	200 kA
Maximum Horse Power Rating	10 hp 240 V AC 60 Hz 1 phase NEC 430.52
Tightening torque	35 lbf.in (3.95 N.m) 0.00...0.01 in² (2.08...5.26 mm²) AWG 14...AWG 10) 35 lbf.in (3.95 N.m) AWG 14...AWG 10) 45 lbf.in (5.08 N.m) 0.01 in² (8.37 mm²) AWG 8) 45 lbf.in (5.08 N.m) 0.02...0.03 in² (12.3...21.12 mm²) AWG 6...AWG 4) 50 lbf.in (5.65 N.m) 0.04 in² (26.67 mm²) AWG 3)
Height	9.63 in (244.60 mm)
Width	7.75 in (196.85 mm)
Depth	3.75 in (95.25 mm)

* Price is "List Price" and may be subject to a trade discount - check with your local distributor or retailer for actual price.

Apr 21, 2021



1

Ordering and shipping details

Category	00106 - D & DU SW,NEMA3R, 30-200A
Discount Schedule	DE1A
GTIN	00785901491491
Nbr. of units in pkg.	1
Package weight(Lbs)	4.65 lb(US) (2.11 kg)
Returnability	Yes
Country of origin	MX

Packing Units

Unit Type of Package 1	PCE
Package 1 Height	5.30 in (13.462 cm)
Package 1 width	7.20 in (18.288 cm)
Package 1 Length	10.00 in (25.4 cm)
Unit Type of Package 2	CAR
Number of Units in Package 2	5
Package 2 Weight	24.60 lb(US) (11.158 kg)
Package 2 Height	10.70 in (27.178 cm)
Package 2 width	10.20 in (25.908 cm)
Package 2 Length	23.50 in (59.69 cm)
Unit Type of Package 3	PAL
Number of Units in Package 3	120
Package 3 Weight	610.00 lb(US) (276.691 kg)
Package 3 Height	36.50 in (92.71 cm)
Package 3 width	40.00 in (101.6 cm)
Package 3 Length	48.00 in (121.92 cm)

Offer Sustainability

Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
REACH Regulation	REACH Declaration
REACH free of SVHC	Yes
EU RoHS Directive	Compliant EU RoHS Declaration
Toxic heavy metal free	Yes
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Pro-active China RoHS declaration (out of China RoHS legal scope)
Environmental Disclosure	Product Environmental Profile
PVC free	Yes

Contractual warranty

Warranty	18 months
----------	-----------



2



Item #2.

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SOLAR

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SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included



SolaDeck Model SD 0783



SolaDeck UL50 Type 3R Enclosures

Available Models:

Model SD 0783 - (3" fixed Din Rail)

Model SD 0786 - (6" slotted Din Rail)



SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

**Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 1- Power Distribution Block 600VDC 175AMP
- 1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

**Typical System Configuration

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 4- Din Rail Mounted Terminal Blocks
- Bus Bars with UL lug

**Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.



Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.



Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.



Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

RSTC Enterprises, Inc • 2219 Heimstead Road • Eau Claire, WI 54703
For product information call 1(866) 367-7782



Item #2.

1403 N RESEARCH WAY, BUILDING J
OREM, UT 84097

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CONTRACTOR:
BRS FIELD OPS
385.498.6700

SHEET NAME

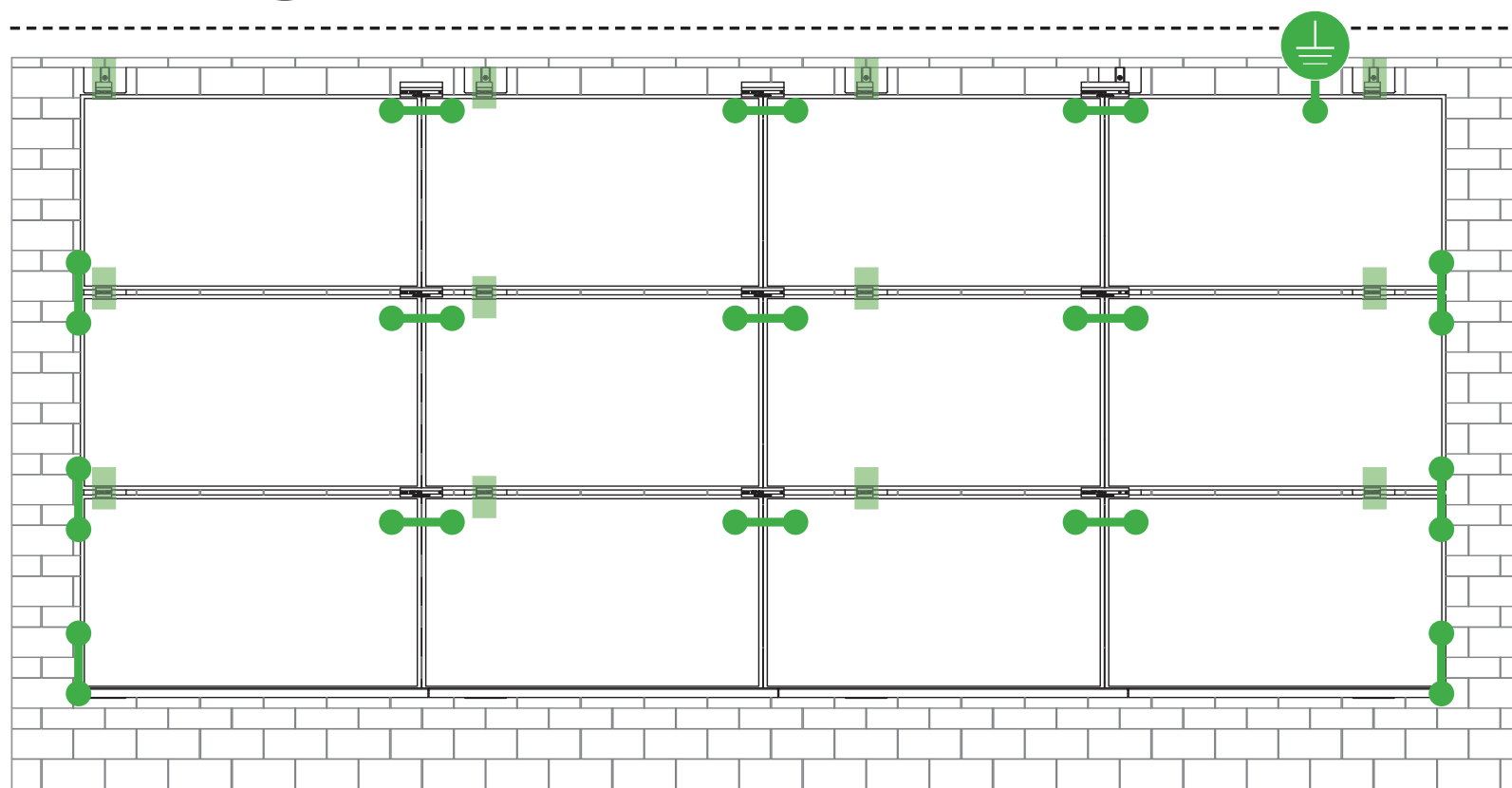
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PAGE NUMBER

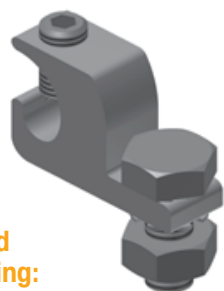
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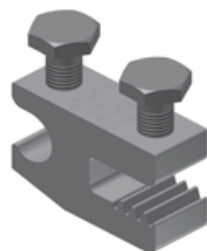


Star Washer is
Single Use Only

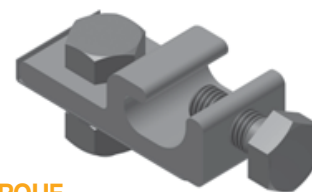


TERMINAL TORQUE,
Install Conductor and
torque to the following:
4-6 AWG: 35in-lbs
8 AWG: 25 in-lbs
10-14 AWG: 20 in-lbs

TERMINAL TORQUE,
Install Conductor and
torque to the following:
4-14 AWG: 35in-lbs



WEEBLUG
Single Use Only



TERMINAL TORQUE,
Install Conductor and
torque to the following:
6-14 AWG: 7ft-lbs

LUG DETAIL & TORQUE INFO Ilco Lay-In Lug (GBL-4DBT)

- 10-32 mounting hardware
- Torque = 5 ft-lb
- AWG 4-14- Solid or Stranded

LUG DETAIL & TORQUE INFO Ilco Flange Lug(SGB-4)

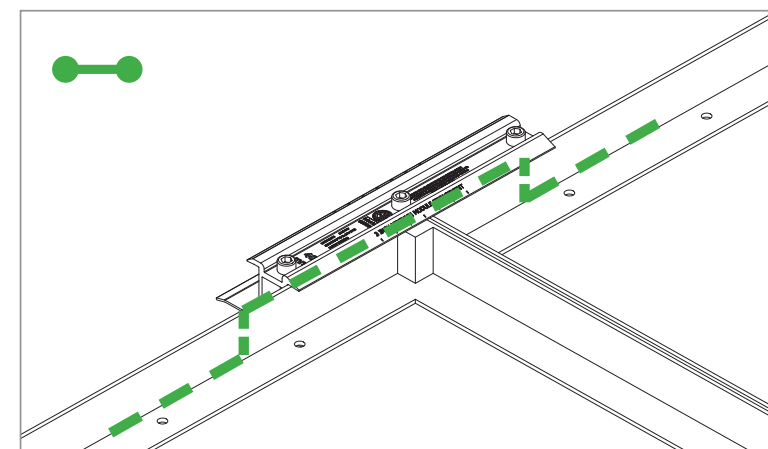
- 1/4" mounting hardware
- Torque = 75 in-lb
- AWG 4-14- Solid or Stranded

LUG DETAIL & TORQUE INFO Wiley WEEBLug (6.7)

- 1/4" mounting hardware
- Torque = 10 ft-lb
- AWG 6-14- Solid or Stranded

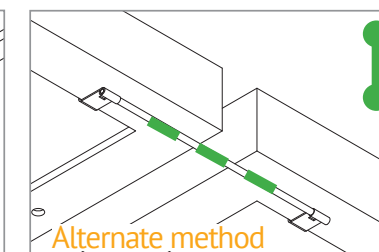
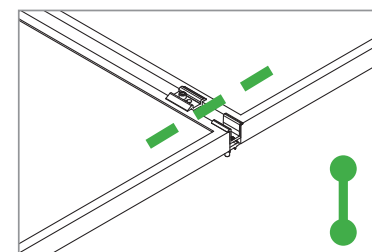
NOTE: ISOLATE COPPER FROM ALUMINUM CONTACT TO PREVENT CORROSION

System bonding is accomplished through modules. System grounding accomplished by attaching a ground lug to any module at a location on the module specified by the module manufacturer.



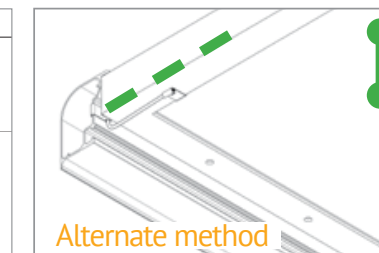
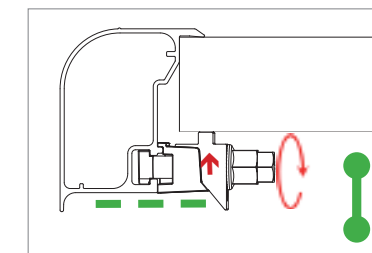
E-W BONDING PATH:

E-W module to module bonding is accomplished with 2 pre-installed bonding pins which engage on the secure side of the Microrail™ and splice.



N-S BONDING PATH:

N-S module to module bonding is accomplished with bonding clamp with 2 integral bonding pins. **(refer also to alternate method)**



TRIMRAIL BONDING PATH:

Trimrail to module bonding is accomplished with bonding clamp with integral bonding pin and bonding T-bolt. **(refer also to alternate method)**

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UL CODE COMPLIANCE NOTES

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INSTALLATION GUIDE

PAGE

SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the SUNFRAME MICRORAIL (SFM) Installation Guide. SFM has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into the UL 2703 product certification. SFM has achieved Class A, B & C system level performance for low slope & steep sloped roofs when used in conjunction with type 1 and type 2 modules. Class A, B & C system level fire

performance is inherent in the SFM design, and no additional mitigation measures are required. The fire classification rating is valid for any roof pitch. There is no required minimum or maximum height limitation above the roof deck to maintain the Class A, B & C fire rating for SFM. SUNFRAME MICRORAIL™ components shall be mounted over a fire resistant roof covering rated for the application.

Module Type	Roof Slope	System Level Fire Rating	Microrail Direction	Module Orientation	Mitigation Required
Type 1 and Type 2	Steep Slope & Low Slope	Class A, B & C	East-West	Landscape OR Portrait	None Required

UL2703 TEST MODULES

See pages V and W for a list of modules that were electrically and mechanically tested or qualified with the SUNFRAME MICRORAIL (SFM) components outlined within this Installation Guide.

- Maximum Area of Module = 27.76 sqft
- UL2703 Design Load Ratings:
 - a) Downward Pressure – 113 PSF / 5400 Pa
 - b) Upward Pressure – 50 PSF / 2400 Pa
 - c) Down-Slope Load – 21.6 PSF / 1034 Pa
- Tested Loads:
 - a) Downward Pressure – 170 PSF / 8000 Pa
 - b) Upward Pressure – 75 PSF / 3500 Pa
 - c) Down-Slope Load – 32.4 PSF / 1550 Pa
- Maximum Span = 6ft
- Use with a maximum over current protection device OCPD of 30A
- System conforms to UL Std 2703, certified to LTR AE-001-2012
- Rated for a design load of 2400 Pa / 5400 Pa with 24 inch span
- PV modules may have a reduced load rating, independent of the SFM load rating. Please consult the PV module manufacturer's installation guide for more information
- Down-Slope design load rating of 30 PSF/ 1400 Pa for module areas of 22.3 sq ft or less



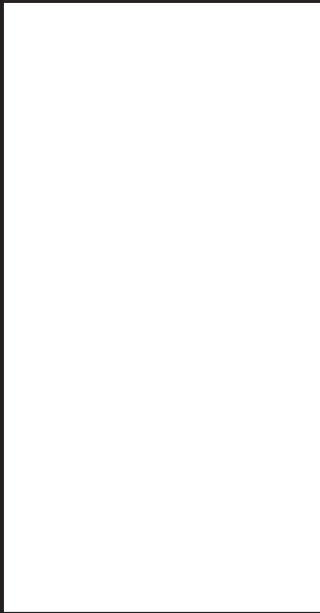
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Page 85



TESTED / CERTIFIED MODULE LIST

V

INSTALLATION GUIDE : PAGE

Manufacture	Module Model / Series
Aleo	P-Series
Astronergy	CHSM6612P, CHSM6612P/HV, CHSM6612M, CHSM6612M/HV, CHSM6610M (BL)(BF)/(HF), CHSM72M-HC
Auxin	AXN6M610T, AXN6P610T, AXN6M612T & AXN6P612T
Axitec	AXIblackpremium 60 (35mm), AXIpower 60 (35mm), AXIpower 72 (40mm), AXIpremium 60 (35mm), AXIpremium 72 (40mm).
Aptos	DNA-120-(BF/MF)26 DNA-144-(BF/MF)26
Boviet	BVM6610, BVM6612
BYD	P6K & MHK-36 Series
Canadian Solar	CS1(H/K/U/Y)-MS CS3(K/L/U), CS3K-MB-AG, CS3K-(MS/P) CS3N-MS, CS3U-MB-AG, CS3U-(MS/P), CS3W CS5A-M, CS6(K/U), CS6K-(M/P), CS6K-MS CS6P-(M/P), CS6U-(M/P), CS6V-M, CS6X-P
Centrosolar America	C-Series & E-Series
CertainTeed	CT2xxMxx-01, CT2xxPxx-01, CTxxxMxx-02, CTxxxM-03, CTxxxMxx-04, CTxxxHC11-04
Dehui	DH-60M

Manufacture	Module Model / Series
Eco Solargy	Orion 1000 & Apollo 1000
ET Solar	ET-M672BHxxxTW
FreeVolt	Mono PERC
GCL	GCL-P6 & GCL-M6 Series
Hansol	TD-AN3, TD-AN4, UB-AN1, UD-AN1
Heliene	36M, 60M, 60P, 72M & 72P Series
HT Solar	HT60-156(M) (NDV) (-F), HT 72-156(M/P)
Hyundai	KG, MG, TG, RI, RG, TI, MI, HI & KI Series HiA-SxxxHG
ITEK	iT, iT-HE & iT-SE Series
Japan Solar	JPS-60 & JPS-72 Series
JA Solar	JAP6 60-xxx, JAM6-60-xxx/SI, JAM6(K)-60/ xxx, JAP6(k)-72-xxx/4BB, JAP72SYY-xxx/ZZ, JAP6(k)-60-xxx/4BB, JAP60SYY-xxx/ZZ, JAM6(k)-72-xxx/ZZ, JAM72SYY-xxx/ZZ, JAM6(k)-60-xxx/ZZ, JAM60SYY-xxx/ZZ. i. YY: 01, 02, 03, 09, 10 ii. ZZ: SC, PR, BP, HiT, IB, MW, MR
Jinko	JKM & JKMS Series Eagle JKMxxxM JKMxxxM-72HL-V
Kyocera	KU Series

Manufacture	Module Model / Series
LG Electronics	LGxxxN2T-A4 LGxxx(A1C/E1C/E1K/N1C/N1K/N2T/N2W/ Q1C/Q1K/S1C/S2W)-A5 LGxxxN2T-B5 LGxxxN1K-B6 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/ QAC/QAK)-A6 LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxx(N1C/N1K/N2W/S1C/S2W)-G4 LGxxxN2T-J5 LGxxx(N1K/N1W/N2T/N2W)-L5 LGxxx(N1C/Q1C/Q1K)-N5 LGxxx (N1C/N1K/N2W/Q1C/Q1K)-V5
	LR4-60(HIB/HIH/HPB/HPH)-xxxM LR4-72(HIH/HPH)-xxxM LR6-60(BP/HBD/HIBD)-xxxM (30mm) LR6-60(BK)(PE)(HPB)(HPH)-xxxM (35mm) LR6-60(BK)(PE)(PB)(PH)-xxxM (40mm) LR6-72(BP)(HBD)(HIBD)-xxxM (30mm) LR6-72(HV)(BK)(PE)(PH)(PB)(HPH)-xxxM (35mm) LR6-72(BK)(HV)(PE)(PB)(PH)-xxxM (40mm)
Mission Solar Energy	MSE Series
Mitsubishi	MJE & MLE Series
Neo Solar Power Co.	D6M & D6P Series

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- Please see the SFM UL2703Construction Data Report at Unirac.com to ensure the exact solar module selected is approved for use with SFM
- SFM Infinity is not compatible with module frame height of less than 30mm and more than 40mm. See Module Mounting section, page L for further information



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TESTED / CERTIFIED MODULE LIST

W

INSTALLATION GUIDE

PAGE

Manufacture	Module Model / Series
Panasonic	VBHNxxxSA15 & SA16, VBHNxxxSA17 & SA18, VBHNxxxSA17(E/G) & SA18E, VBHNxxxKA01 & KA03 & KA04, VBHNxxxZA01, VBHNxxxZA02, VBHNxxxZA03, VBHNxxxZA04
Peimar	SGxxxM (FB/BF)
Phono Solar	PS-60, PS-72
Prism Solar	P72 Series
Q.Cells	Plus, Pro, Peak, G3, G4, G5, G6(+), G7, G8(+) Pro, Peak L-G2, L-G4, L-G5, L-G6, L-G7 Q.PEAK DUO BLK-G6+ Q.PEAK DUO BLK-G6+/TS Q.PEAK DUO (BLK)-G8(+) Q.PEAK DUO L-G8.3/BFF Q.PEAK DUO (BLK) ML-G9(+) Q.PEAK DUO XL-G9/G9.2/G9.3 Q.PEAK DUO (BLK) ML-G10(+) Q.PEAK DUO XL-G(10/10.2/10.3/10.c/10.d)
REC	Alpha (72) (Black) (Pure) N-Peak (Black) N-Peak 2 (Black) PEAK Energy Series PEAK Energy BLK2 Series PEAK Energy 72 Series

Manufacture	Module Model / Series
REC (cont.)	TwinPeak Series TwinPeak 2 Series TwinPeak 2 BLK2 Series TwinPeak 2S(M)72(XV) TwinPeak 3 Series (38mm) TP4 (Black)
Renesola	Vitrus2 Series & 156 Series
Risen	RSM72-6 (MDG) (M), RSM60-6
S-Energy	SN72 & SN60 Series (40mm)
Seraphim	SEG-6 & SRP-6 Series
Sharp	NU-SA & NU-SC Series
Silfab	SLA, SLG, BC Series & SILxxx(BL/NL/NT/HL/ ML/BK/NX/NU/HC)
Solaria	PowerXT-xxxR-(AC/PD/BD) PowerXT-xxxC-PD PowerXT-xxxR-PM (AC)
SolarWorld	Sunmodule Protect, Sunmodule Plus
Sonali	SS 230 - 265
Suntech	STP
Suniva	MV Series & Optimus Series
Sun Edison/Flextronics	F-Series, R-Series & FLEX FXS Series
SunPower	X-Series, E-Series & P-Series
Talesun	TP572, TP596, TP654, TP660, TP672, Hipor M, Smart

Manufacture	Module Model / Series
Tesla	SC, SC B, SC B1, SC B2 TxxxS
Trina	PA05, PD05, DD05, DE06, DD06, PE06, PD14, PE14, DD14, DE09.05, DE14, DE15, PE15H
Upsolar	UP-MxxxP(-B), UP-MxxxM(-B)
URE	D7MxxxH7A, D7(M/K)xxxH8A FAKxxx(C8G/E8G), FAMxxxE7G-BB FAMxxxE8G(-BB)
Vikram	Eldora, Solivo, Somera
Waaree	AC & Adiya Series
Winaico	WST & WSP Series
Yingli	YGE & YLM Series
ZN Shine	ZXM6-72

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
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This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

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Unirac, Inc

Manufacturer:

Address:

1411 Broadway Blvd NE
Albuquerque, NM 87102

Address:

Country:

USA

Country:

Party Authorized To Apply Mark:

Same as Manufacturer

Report Issuing Office:

Intertek Testing Services NA, Inc., Lake Forest, CA

Control Number:

5003705

Authorized by:

for L. Matthew Snyder, Certification Manager



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545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

Standard(s):	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels [UL 2703:2015 Ed.1+R:29May2019]
	PV Module and Panel Racking Mounting System and Accessories [CSA TIL No. A-40:2020]
Product:	Photovoltaic Mounting System, Sun Frame Microrail Installation Guide, PUB2021NOV29
Brand Name:	Unirac
Models:	Unirac SFM



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	PV Module and Panel Racking Mounting System and Accessories [CSA TIL No. A-40:2020]
Product:	Photovoltaic Mounting System, Sun Frame Microrail Installation Guide, PUB2021NOV29
Brand Name:	Unirac
Models:	Unirac SFM



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Listing Constructional Data Report (CDR)

1.0 Reference and Address		
Report Number	102393982LAX-002	Original 11-Apr-2016 Revised: 2-Jan-2022
Standard(s)	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels [UL 2703:2015 Ed.1+R:29May2019] PV Module and Panel Racking Mounting System and Accessories [CSA TIL No. A-40:2020]	
Applicant	Unirac, Inc	Manufacturer 2
Address	1411 Broadway Blvd NE Albuquerque, NM 87102	Address
Country	USA	Country
Contact	Klaus Nicolaedis Todd Ganshaw	Contact
Phone	505-462-2190 505-843-1418	Phone
FAX	NA	FAX
Email	klaus.nicolaedis@unirac.com toddg@unirac.com	Email
Manufacturer 3		Manufacturer 4
Address		Address
Country		Country
Contact		Contact
Phone		Phone
FAX		FAX
Email		Email
Manufacturer 5		
Address		
Country		
Contact		
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FAX		

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Listing Constructional Data Report (CDR)

1.0 Reference and Address			
Report Number	102393982LAX-002	Original 11-Apr-2016	Revised: 2-Jan-2022
Email			

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 PV INSTALLATION PROFESSIONAL Scott Gurney #PV-011719-015866
CONTRACTOR: BRS FIELD OPS 385-498-6700

DRAWING BY:	
PLOT DATE:	
PROJECT NUMBER:	
SHEET NAME: SPEC SHEET	
REVISION: ----	PAGE NUMBER: Page 90

2.0 Product Description	
Product	Photovoltaic Mounting System, Sun Frame Microrail Installation Guide, PUB2021NOV29
Brand name	Unirac
Description	The product covered by this report is the Sun Frame Micro Rail roof mounted Photovoltaic Rack Mounting System. This system is designed to provide bonding and grounding to photovoltaic modules. The mounting system employs anodized or mill finish aluminum brackets that are roof mounted using the slider, outlined in section 4 of this report. There are no rails within this product, whereas the 3" Micro Rail, Floating Splice, and 9" Attached Splice electrically bond the modules together forming the path to ground.
	The Micro Rails are installed onto the module frame by using a stainless steel bolt anodized with black oxide with a stainless type 300 bonding pin, torqued to 20 ft-lbs, retaining the modules to the bracket. The bonding pin of the Micro Rail when bolted and torqued, penetrate the anodized coating of the photovoltaic module frame (at bottom flange) to contact the metal, creating a bonded connection from module to module.
	The grounding of the entire system is intended to be in accordance with the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems or the Canadian Electrical Code, CSA C22.1 Part 1 in accordance to the revision in effect in the jurisdiction in which the project resides. Any local electrical codes must be adhered in addition to the national electrical codes. The Grounding Lug is secured to the photovoltaic module, torqued in accordance with the installation manual provided in this document.
	Other optional grounding includes the use of the Enphase UL2703 certified grounding system, which requires a minimum of 2 micro-inverters mounted to the same rail, and using the same engage cable.

2.0 Product Description	
Models	Unirac SFM
Model Similarity	NA
Ratings	Fuse Rating: 30A Module Orientation: Portrait or Landscape Maximum Module Size: 17.98 ft² UL2703 Design Load Rating: 33 PSF Downward, 33 PSF Upward, 10 PSF Down-Slope Tested Loads - 50 psf/2400Pa Downward, 50psf/2400Pa Uplift, 15psf/720Pa Down Slope Trina TSM-255PD05.08 and Sunpower SPR-E20-327 used for Mechanical Loading Increased size ML test: Maximum Module Size: 22.3 ft² UL2703 Design Load Rating: 113 PSF Downward, 50 PSF Upward, 30 PSF Down-Slope LG355S2W-A5 used for Mechanical Loading test. Mounting configuration: Four mountings on each long side of panel with the longest span of 24" UL2703 Design Load Rating: 46.9 PSF Downward, 40 PSF Upward, 10 PSF Down-Slope LG395N2W-A5, LG360S2W-A5 and LG355S2W-A5 used for used for Mechanical Loading test. Mounting configuration: Six mountings for two modules used with the maximum span of 74.5" IEC 61646 Test Loads - 112.78 psf/5400Pa Downward, 50psf/2400Pa Uplift
	Mechanical Load test to add FlashLoc Slider and Trim Assemblies to UL2703 and IEC 61646 Certifications, & Increase SFM System UL2703 Module Size: Maximum Module Size: 27.76 ft² UL2703 Design Load Rating: 113 PSF Downward, 50 PSF Upward, 21.6 PSF Down-Slope Jinko Eagle 72HM G5 used for Mechanical Loading test. Mounting configuration: Four mountings on each long side of panel with the longest span of 24" Maximum module size: 21.86 ft² IEC 61646 Test Loads - 112.78 psf/5400Pa Downward, 75psf/3600Pa Uplift SunPower model SPR-A430-COM-MLSD used for Mechanical Loading
	Fire Class Resistance Rating: - Class A for Steep Slope Applications when using Type 1 Modules. Can be installed at any interstitial gap. Installations must include Trim Rail. - Class A for Steep Slope Applications when using Type 2 Modules. Can be installed at any interstitial gap. Installations must include Trim Rail. - Class A Fire Rated for Low Slope applications with Type 1 or 2 listed photovoltaic modules. This system was evaluated with a 5" gap between the bottom of the module and the roof's surface
	See section 7.0 illustrations # 1, 1a, 1b, and 1c for a complete list of PV modules evaluated with these racking systems
Other Ratings	NA



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PAGE NUMBER:
Page 91

7.0 Illustrations

Illustration 1 - Approved PV Modules

Manufacture	Module Model / Series	Manufacture	Module Model / Series
Aleo	P-Series	Eco Solargy	Orion 1000 & Apollo 1000
Astronergy	CH5M6612P, CH5M6612P/HV, CH5M6612M, CH5M6612M/HV, CH5M6610M (BL)(BF)/(HF), CH5M72M-HC	ET Solar	ET-M672BHxxxTW
Auxin	AXN6M610T, AXN6P610T, AXN6M612T & AXN6P612T	FreeVolt	Mono PERC
Axitec	AXIblackpremium 60 (35mm), AXIpower 60 (35mm), AXIpower 72 (40mm), AXIpremium 60 (35mm), AXIpremium 72 (40mm).	GCL	GCL-P6 & GCL-M6 Series
Aptos	DNA-120-(BF/MF)26 DNA-144-(BF/MF)26	Hansol	TD-AN3, TD-AN4, UB-AN1, UD-AN1
Boviet	BVM6610, BVM6612	Heliene	36M, 60M, 60P, 72M & 72P Series
BYD	P6K & MHK-36 Series	HT Solar	HT60-156(M) (NDV) (-F), HT 72-156(M/P)
Canadian Solar	CS1(H/K/U/Y)-MS CS3(K/L/U), CS3K-MB-AG, CS3K-(MS/P) CS3N-MS, CS3U-MB-AG, CS3U-(MS/P), CS3W CS5A-M, CS6(K/U), CS6K-(M/P), CS6K-MS CS6P-(M/P), CS6U-(M/P), CS6V-M, CS6X-P	Hyundai	KG, MG, TG, RI, RG, TI, MI, HI & KI Series HiA-SxxxHG
Centrosolar America	C-Series & E-Series	ITEK	IT, IT-HE & IT-SE Series
CertainTeed	CT2xxxMxx-01, CT2xxxPxx-01, CTxxxMxx-02, CTxxxM-03, CTxxxMxx-04, CTxxxHC11-04	Japan Solar	JPS-60 & JPS-72 Series
Dehui	DH-60M	JA Solar	JAP6 60-xxx, JAM6-60-xxx/Sl, JAM6(K)-60/xxx, JAP6(k)-72-xxx/4BB, JAP725YY-xxx/ZZ, JAP6(k)-60-xxx/4BB, JAP605YY-xxx/ZZ, JAM6(k)-72-xxx/ZZ, JAM725YY-xxx/ZZ, JAM6(k)-60-xxx/ZZ, JAM605YY-xxx/ZZ. i. YY: 01, 02, 03, 09, 10 ii. ZZ: SC, PR, BP, HIT, IB, MW, MR
		Jinko	JKM & JKMS Series Eagle JKMxxxM JKMxxxM-72HL-V
		Kyocera	KU Series

7.0 Illustrations

Illustration 1a - Approved PV Modules Continue

Manufacture	Module Model / Series	Manufacture	Module Model / Series
LG Electronics	LGxxxN2T-A4 LGxxx(A1C/E1C/E1K/N1C/N1K/N2T/N2W/Q1C/Q1K/S1C/S2W)-A5 LGxxxN2T-B5 LGxxxN1K-B6 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/QAC/QAK)-A6 LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxx(N1C/N1K/N2W/S1C/S2W)-G4 LGxxxN2T-J5 LGxxx(N1K/N1W/N2T/N2W)-L5 LGxxx(N1C/Q1C/Q1K)-N5 LGxxx (N1C/N1K/N2W/Q1C/Q1K)-V5	Panasonic	VBHNxxxSA15 & SA16, VBHNxxxSA17 & SA18, VBHNxxxSA17(E/G) & SA18E, VBHNxxxKA01 & KA03 & KA04, VBHNxxxZA01, VBHNxxxZA02, VBHNxxxZA03, VBHNxxxZA04
	LONGi	Peimar	SGxxxM (FB/BF)
		Phono Solar	P5-60, P5-72
		Prism Solar	P72 Series
		Q.Cells	Plus, Pro, Peak, G3, G4, G5, G6(+), G7, G8(+) Pro, Peak L-G2, L-G4, L-G5, L-G6, L-G7 Q.PEAK DUO BLK-G6+ Q.PEAK DUO BLK-G6+/T5 Q.PEAK DUO (BLK)-G8(+) Q.PEAK DUO L-G8.3/BFF Q.PEAK DUO (BLK) ML-G9(+) Q.PEAK DUO XL-G9/G9.2/G9.3 Q.PEAK DUO (BLK) ML-G10(+) Q.PEAK DUO XL-G(10/10.2/10.3/10.c/10.d)
			Alpha (72) (Black) (Pure) N-Peak (Black) N-Peak 2 (Black) PEAK Energy Series PEAK Energy BLK2 Series PEAK Energy 72 Series
		REC	
Mission Solar Energy	MSE Series		
Mitsubishi	MJE & MLE Series		
Neo Solar Power Co.	D6M & D6P Series		



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REVISION:	PAGE NUMBER:
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7.0 Illustrations

Illustration 1b - Approved PV Modules Continue

Manufacture	Module Model / Series	Manufacture	Module Model / Series
REC (cont.)	TwinPeak Series	Tesla	SC, SC B, SC B1, SC B2
	TwinPeak 2 Series		TxxxS
	TwinPeak 2 BLK2 Series	Trina	PA05, PD05, DD05, DE06, DD06, PE06,
	TwinPeak 2S(M)72(XV)		PD14, PE14, DD14, DE09.05, DE14, DE15,
	TwinPeak 3 Series (38mm)		PE15H
	TP4 (Black)	Upsolar	UP-MxxxP(-B), UP-MxxxM(-B)
Renesola	Vitrus2 Series & 156 Series	URE	D7MxxxH7A, D7(M/K)xxxH8A
Risen	RSM72-6 (MDG) (M), RSM60-6		FAKxxx(C8G/E8G), FAMxxxE7G-BB
S-Energy	SN72 & SN60 Series (40mm)		FAMxxxE8G(-BB)
Seraphim	SEG-6 & SRP-6 Series	Vikram	Eldora,
Sharp	NU-SA & NU-SC Series		Solivo,
Silfab	SLA, SLG, BC Series & SILxxx(BL/NL/NT/HL/ ML/BK/NX/NU/HC)		Somera
Solaria	PowerXT-xxxR-(AC/PD/BD)	Waaree	AC & Adiya Series
	PowerXT-xxxC-PD	Winaico	WST & WSP Series
	PowerXT-xxxR-PM (AC)	Yingli	YGE & YLM Series
SolarWorld	Sunmodule Protect, Sunmodule Plus	ZN Shine	ZXM6-72
Sonali	SS 230 - 265		
Suntech	STP		
Suniva	MV Series & Optimus Series		
Sun Edison/Flextronics	F-Series, R-Series & FLEX FXS Series		
SunPower	X-Series, E-Series & P-Series		
Talesun	TP572, TP596, TP654, TP660,		
	TP672, Hipor M, Smart		



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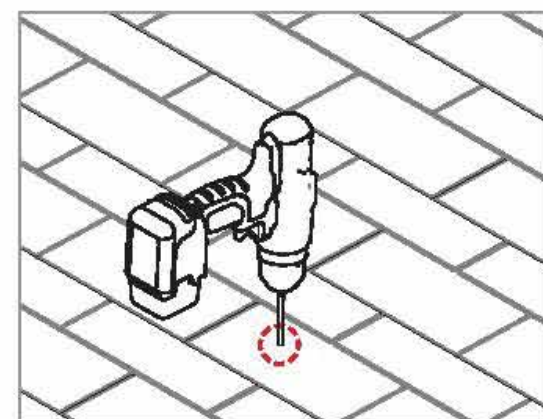
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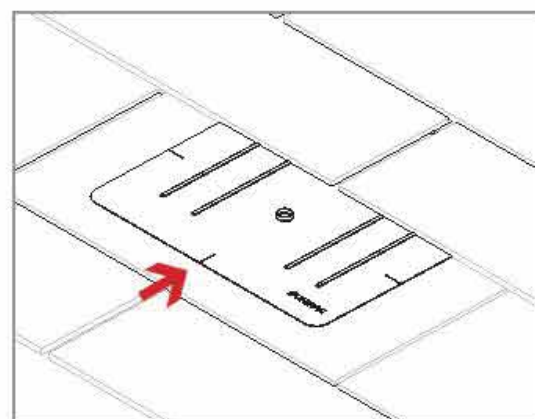
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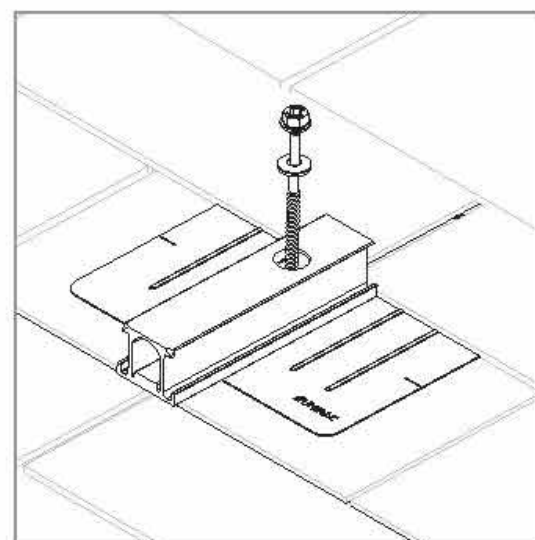
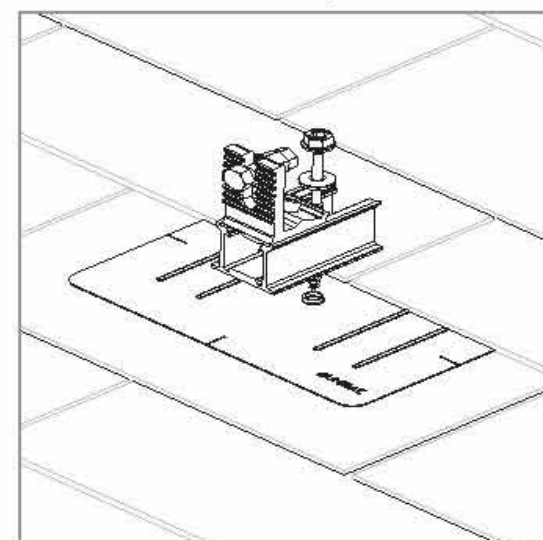
Page 93



PILOT HOLES:
Drill pilot holes for lag screws or structural screws (as necessary) at marked attachment points

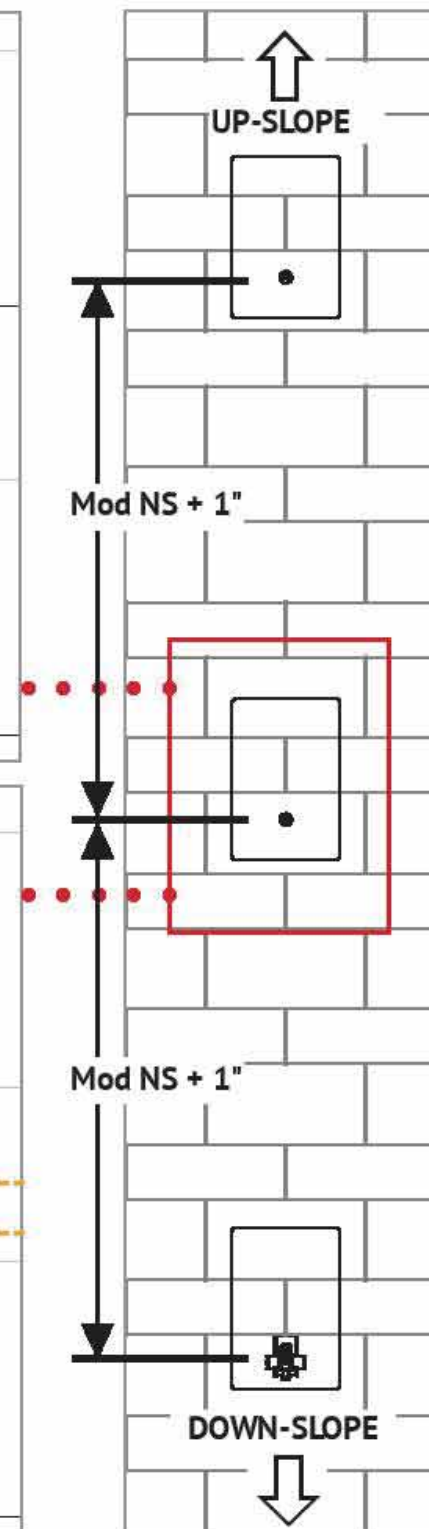
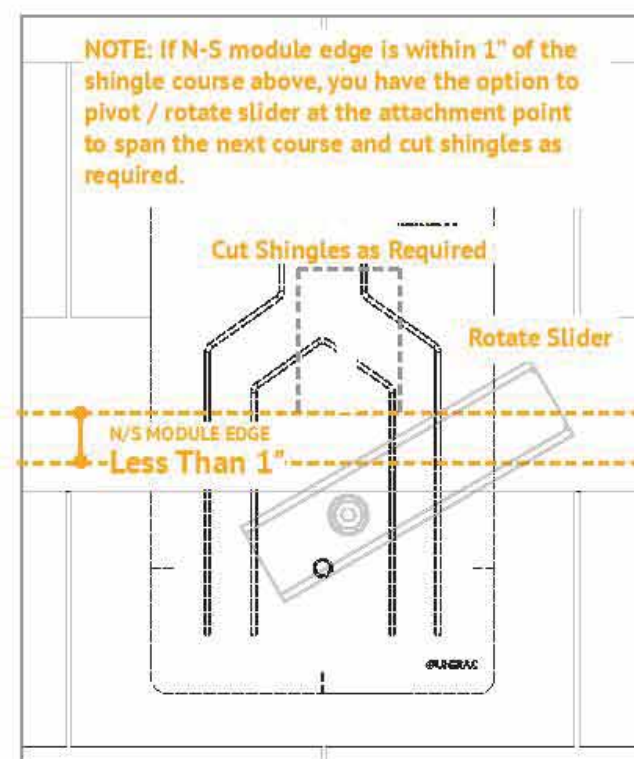
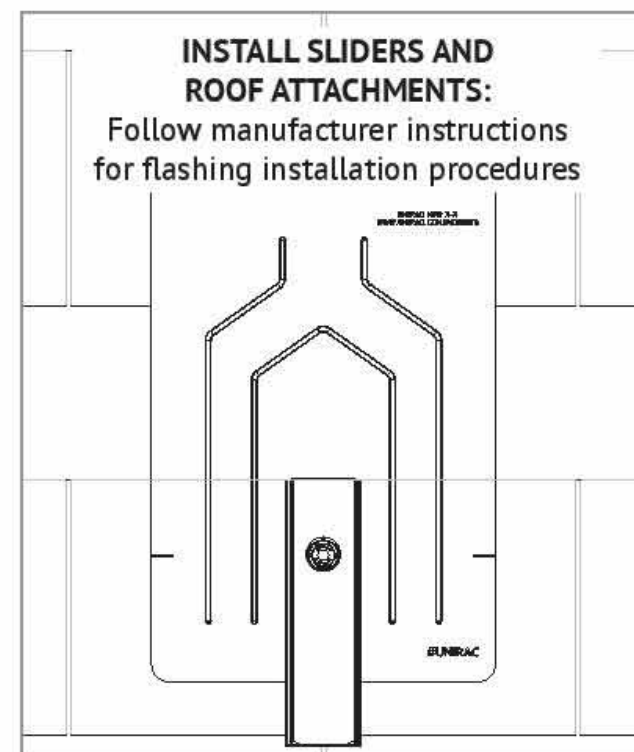


FLASHINGS:
Place flashings



INSTALL SLIDERS AND TRIMRAIL ROOF ATTACHMENTS:

- Insert flashings per manufacturer instructions
- NOTE: Use Lag screw or structural fastener with a maximum diameter of 5/16"**
- Attach sliders to rafters
- Verify proper row to row spacing for module size (Mod NS + 1")
- Ensure that Trimrail™ roof attachments in each row have sufficient engagement with slider dovetails for proper attachment.



OREGON CITY HISTORIC RESOURCE SURVEY FORM

Street Address: 1216 JACKSON ST				City: OREGON CITY			
USGS Quad Name: Oregon City			GPS Latitude: 45 21 28 N		Longitude: 122 35 44 W		
Township: 02S	Range: 02E	Section: 32	Block: 170	Lot: 7	Map #: 22E32BB	Tax Lot #: 6300	
Date of Construction: c. 1892		Historic Name: Whitlock, William T., House			Historic Use or Function: Domestic - single dwelling		
Grouping or Cluster Name: NA		*Current Name or Use: Domestic - single dwelling			Associated Archaeological Site: Unknown		
Architectural Classification(s): Vernacular			Plan Type/Shape: Rectangle		Number of Stories: 2.0		
Foundation Material: Post and beam			Structural Framing: Unknown		Moved? No		
Roof Type/Material: Gable / Composition shingle			Window Type/Material: 1/1 vinyl double-hung				
Exterior Surface Materials Primary: Drop			Secondary: Wood shingle		Decorative:		
Exterior Alterations or Additions/Approximate Date:			Porch with exposed rafters and battered columns added, c.1920; full window replacement, c.1990; front door.				
Number and Type of Associated Resources: Carport (1)							
Integrity: Fair		Condition: Good		Local Ranking: Designated Historic Site		National Register Listed? No	
Potentially Eligible: ☐ Individually or ☐ As a contributing resource in a district Not Eligible: ☐ Intact but lacks distinction ☒ Altered (choose one): ☒ Reversible/Potentially eligible individually or in district ☐ Reversible/Ineligible as it lacks distinction ☐ Irretrievable loss of integrity ☐ Not 50 years old							
Description of Physical and Landscape Features:							
This two story vernacular house has a rectangular plan and sits on post and beam foundation with skirting. The gable roof is covered with composition shingles and is pierced by a chimney. The rafter tails are exposed, there are decorative eave brackets and rake board. The gable end of the front façade has a decorative sunburst. The house is covered with channel drop siding. The gable ends are clad in wood shingles of several shapes. The south façade has a square bay. Windows are primarily 1/1 vinyl double-hung. The shed roof entry porch is supported by square columns and has a knee wall. The main entry door has been replaced. There is a hipped roof addition with porch and shingle siding to the rear. A concrete retaining wall extends across the front yard at the sidewalk level.							
Statement of Significance:							
Edward R. Whitlock purchased the property in 1881. William Whitlock was the son of William Whitlock, Sr., who emigrated from England prior to 1860. Whitlock owned and operated a dry goods and general merchandise store in Oregon City in the late 1870s and early 1880s. On his death at the age of 54 in 1884, he left the store to his son Edward. William, Jr. inherited the land the house is on in 1893 from his mother, Honor. He was Mayor of Oregon City from 1888 to 1889, County Recorder from 1877 through 1882, and City Councilman in 1883, 1887 and 1889. The property was sold several times over the next few decades. Verl Weldon was the last registered owner from 1959-81.							

Researcher/Organization: Heather Goodson / HPNW			Date Recorded: 4/12/2002	
Survey Form Page 1	Address: 1216 JACKSON ST	Local Designation #	SHPO #	



LAND USE APPLICATION TRANSMITTAL – RESPONSE FORM

Date: 01/03/23

Land Use Application File Number: GLUA-22-00039

NAME: James W Sayers

AGENCY: OC Building Division

EMAIL ADDRESS: jsayers@orccity.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.



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.
Any solar panel installation must first be permitted through the Building Division for structural and electrical installations.

CONTACT THE PLANNING DIVISION IF YOU HAVE ANY QUESTIONS ABOUT THIS APPLICATION

Christina Robertson-Gardiner

From: Wendy Marshall <wendypaddles@gmail.com>
Sent: Tuesday, January 3, 2023 9:25 PM
To: Christina Robertson-Gardiner
Subject: RE: Land Use Application Transmittal- Historic Review Board Application(1216 Jackson)

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 Christina –

Hope your holidays were nice; flew by too quickly. In Response A.2 on p. 3 of the narrative, the applicant refers to the electrical efficiency letter, which justifies why the panels need to be placed on the street (alley) facing side. I could not find it in the submittal. Can you forward the letter?

Thanks,
 Wendy

From: [Christina Robertson-Gardiner](#)
Sent: Tuesday, January 3, 2023 12:36 PM
Subject: Land Use Application Transmittal- Historic Review Board Application(1216 Jackson)

Good afternoon,

The Planning Division has received an application for a Type III land use decision.

Written comments on these Type III Land Use Applications must be received by the Oregon City Planning Division crobertson@orcify.org, no later than **January 16, 2023** to be included in the Staff Report. Comments received after this date will be provided to the Historic Review Board at the hearing. The public record will remain open until the Historic Review Board closes the public hearing



Oregon City Planning Division
ocplanning@orcify.org
 Planning Division - 503.722.3789
 Fax 503.722.3880

[Interactive Maps and Apps](#)

[Printable Maps](#)

[Online 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](#).

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OREGON CITY HISTORIC RESOURCE SURVEY FORM

Street Address: 1216 JACKSON ST				City: OREGON CITY			
USGS Quad Name: Oregon City			GPS Latitude: 45 21 28 N		Longitude: 122 35 44 W		
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Date of Construction: c. 1892		Historic Name: Whitlock, William T., House			Historic Use or Function: Domestic - single dwelling		
Grouping or Cluster Name: NA		*Current Name or Use: Domestic - single dwelling			Associated Archaeological Site: Unknown		
Architectural Classification(s): Vernacular				Plan Type/Shape: Rectangle		Number of Stories: 2.0	
Foundation Material: Post and beam				Structural Framing: Unknown		Moved? No	
Roof Type/Material: Gable / Composition shingle				Window Type/Material: 1/1 vinyl double-hung			
Exterior Surface Materials Primary: Drop				Secondary: Wood shingle		Decorative:	
Exterior Alterations or Additions/Approximate Date: Porch with exposed rafters and battered columns added, c.1920; full window replacement, c.1990; front door.							
Number and Type of Associated Resources: Carport (1)							
Integrity: Fair		Condition: Good		Local Ranking: Designated Historic Site		National Register Listed? No	
Potentially Eligible: ☐ Individually or ☐ As a contributing resource in a district Not Eligible: ☐ Intact but lacks distinction ☒ Altered (choose one): ☒ Reversible/Potentially eligible individually or in district ☐ Reversible/Ineligible as it lacks distinction ☐ Irretrievable loss of integrity ☐ Not 50 years old							
Description of Physical and Landscape Features:							
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Researcher/Organization: Heather Goodson / HPNW				Date Recorded: 4/12/2002	
Survey Form Page 1	Address: 1216 JACKSON ST		Local Designation #		SHPO #



**Historic Review
Staff Report and Recommendation
Revised
January 17, 2023**

A preliminary analysis of the applicable approval criteria is enclosed within the following staff report. All applicable criteria shall be met or met with conditions in order to be approved. The Historic Review Board may choose to adopt the findings as recommended by Staff or alter any finding as determined appropriate.

FILE NO.: GLUA 22-00031: HR-22-00011 resubmission for a full ADA ramp modification of HR 20-00001

1st HEARING DATE: September 27, 2022 Historic Review Board Hearing
Virtual

APPLICANT: Bogdan Smolinets
NW Custom Homes Inc.
15730 SE Bybee Rd

OWNER: Portland, OR 97236
Teresa Yip
5835 SW Hamilton St
Portland, OR 97221

LOCATION: 1020 5th Street
Oregon City, OR 97045
Clackamas County Map 2-2E-31DA-10900

REQUEST: Exterior modifications to HR 20-01 resubmission for a full ADA ramp with modifications (Revised Metal Design)

REVIEWER: Christina Robertson-Gardiner, AICP crobertson@orccity.org

RECOMMENDATION: This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the needed evidence to show that the proposal provides the best option to balance the needs of the applicant and the impact on the historic district. Staff recommends Denial of GLUA 22-00031: HR 22-0011 1020 5th Steet as the proposal does not demonstrate a concerted effort to protect historic resources and meets the needs of the Applicant under the Americans with Disabilities Act.

CRITERIA: Administration and Procedures are set forth in Chapter 17.50, Chapter 17.40, Historic Overlay District in Chapter 17.40, and "MUC" Mixed-Use Corridor

District in Chapter 17.29 of the Oregon City Municipal Code. The City Code Book is available online at www.orcity.org.

Please be advised that any issue that is intended to provide a basis for appeal must be raised before the close of the hearing, in person or by letter, with sufficient specificity to afford the Historic Review Board and the parties an opportunity to respond to the issue. Failure to raise an issue with sufficient specificity will preclude any appeal on that issue. The decision of the Historic Review Board may be appealed to the City Commission by parties with standing within fourteen (14) calendar days of the notice of the decision. Any appeal will be based on the record. The procedures that govern the hearing will be posted at the hearing and are found in OCMC Chapter 17.50 and ORS 197.763. A city-recognized neighborhood association requesting an appeal fee waiver pursuant to OCMC 17.50.290(C) must officially approve the request through a vote of its general membership or Board at a duly announced meeting prior to the filing of an appeal.

STAFF RECOMMENDATION: DENIAL

At the [November 22, 2022, Historic Review Board meeting](#), the Board reviewed the submittal and found that there was a lack of evidence in the record to support the revised ADA ramp design that transitioned from the wood railings (side door entrances) to metal railings (rear door entrance), they provided a list of additional materials needed for the record. Without this critical evidence, the HRB found that they could not approve the application with conditions.

They provided a list of submittals that would be needed to demonstrate a concerted effort to protect historic resources and meets the needs of the Applicant under the Americans with Disabilities Act. They are listed below, along with an outline of what they are needed for Conditional Approval. As of January 17, 2023 and the release of this staff report, no additional information has been submitted to staff.

HRB Comment	Submittal item	Purpose
Alternative Analysis The Board found that the existing alternative analysis does not adequately describe the ADA options available to the applicant, their cost, and their effect on the Foursquare design of the building/McLoughlin Conservation District. The Board requested that the applicant Include partial interior demolition cost as part of any options that may require a revised interior design and requested the applicant identify why the approach does or does not meet the needs of the applicant and how the approach would affect the compatibility of	Alternative Analysis Revise alternative analysis with approximate cost estimates for all options, even ones that would require selected interior demolition to install, a matrix approach was recommended.	Alternative Analysis This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the needed evidence to show that the proposal provides the best option that balances the needs of the applicant and the impact on the historic district. 3

the design and its effect on the Mcloughlin Conservation District.		
HRB Comment	Submittal item	Purpose
Consistent Revised Plans In order to further differentiate the ramp and the house and reduce its massing on the District, the Applicant shall return at a date certain future meeting with updated elevation drawings that remove horizontal siding from all portions of the ramp structure. Exposed poured-in-place concrete and exposure of the metal structure underneath is encouraged to the extent practicable to allow it to be seen as a lighter, airier structure. The Applicant shall remove the rounded columns from the side door entry as rounded columns are not appropriate on a secondary entry. The side porch posts shall be simple and wood-wrapped. The Applicant shall remove the highly decorative pendant lighting along the side (right) elevation and rear (if installed) and replace with simple downlighting painted to match the siding color of the house	Consistent Revised Plans Left and rear elevations showing: a. Removed decorative pendants or provide an alternative side lighting plan b. Removed columns from the side porch c. Transition of materials from side entry ADA ramp (wood) to rear remap (metal) Revised spec sheet- listing all materials	Consistent Revised Plans As the applicant has provided multiple versions of plans and elevation over the course of this application, some of which were not constructed as proposed, the Board requested a final design that incorporated their direction on various elements discussed over the course of many months to ensure they can be constructed as proposed. This information is required for the Board to determine if the revised metal railing ADA design satisfies the standards, particularly the obligation to ensure that new construction does not introduce a new building style that “dilutes and distracts from the historic context of the district?”
HRB Comment	Submittal item	Purpose
Landscape Plan The landscape plan appears to show 3 feet and 6 feet planter beds along the side elevation. Whereas the revised site plan shows 2 feet 6 inches and 5 feet 6 inches, respectively. The landscape plan appears not to include the newly approved small concrete retaining wall depicted in the revised site plan. With space at such a premium, it is very important to ensure that both plans are accurate and that the	Landscape Plan An email from the registered landscape architect confirming that the planting choices will be successful, notwithstanding a potential 6-inch reduction in the planting area.	Landscape Plan There was a discrepancy in the site plan and landscape plan, which removed 6 inches from a very tight mitigation planting area between the ADA ramp and the property line. As mitigation planting is a component of the ADA ramp redesign approach (wood& metal) to reduce the massing of the ADA ramp, the Board requested confirmation from the landscape architect that the plant materials proposal

registered landscape architect can confirm in writing that the planting choices will be successful, notwithstanding a potential 6-inch reduction in the planting area.		plant materials could thrive in the reduced planting area.
--	--	--

As found in AP 21-0006, the massing and design of the proposed rear ramp resulted in a structure that would no longer read as a Foursquare-inspired design when viewed from the side, which was highly visible from 5th Ave, lacked appropriate mitigation and that the applicant failed to show that less impactful alternatives were fully considered and proved infeasible.

Although ADA requirements do apply to structures that are subject to historic resource protections, the ADA does not exempt owners from complying with historic resource requirements to the extent possible. The crux of the Historic Review analysis of this proposal, as previously explained, is that the burden is on the Applicant to show the evidence necessary to conclude that a full exterior ramp is an architecturally compatible means of allowing residents to access the second floor of the house on a sloped lot.

This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the needed evidence to show that the proposal that balances the needs of the applicant and does not detract from the character of the historic district. As the items listed above were not submitted, staff recommended the denial of this application. Without this critical evidence, the Board cannot evaluate the potential (wood + metal) design to determine compliance with the applicable criteria including the Guidelines for New Construction.

PROJECT DESCRIPTION

The site has numerous files associated with its construction. The Applicant has submitted an additional revision (metal railings replace wood along with a detailed landscape plan). A timeline of files and project modifications is below.

HR 20-0001 (Initial Approval of Live/Work Building)

Proposal: New Construction with the McLoughlin Conservation District of a live/work building that contains a commercial space on the ground level front and a large, 10-bedroom dwelling in the remaining portions of the structure. No exterior ADA ramps were included with this package.

Approval: The Application that was approved under HR 20-01 was the construction of a live/work building designed in the American foursquare style that contains a commercial space on the ground level front and a large, 10-bedroom dwelling in the remaining portions of the structure. The main entry for the commercial space is located in the center of the ground floor porch accessed from 5th Street. The residential entry is on the south elevation at grade, with internal stairs leading to the main residential floor, located on the 2nd floor above the Street. The project is a live/work dwelling. The City's definition of live/work is as follows:

17.04.645 - Live/work dwelling.

"Live/work dwelling" a dwelling in which a business is designed to be operated on the ground floor. The ground floor commercial, personal service, or office space has visibility, signage, and access from the primary Street.

HR 21-00020 and AP 22-0006 (1st proposal of full ADA ramp)

Proposal: Revision to an approved plan for a full ADA Ramp to the rear of the site along with modification of the foundation height and modification of some window locations.

Approval: Historic Review Board and City Commission approved a partial exterior ADA ramp to the side door of the house and denied the full ADA ramp proposal.

After the initial Historic Review Board approval in HR 20-0001, the proposal was additionally reviewed for compliance with the Geohazard Overlay District through GLUA 20-0024: GEO 20-0002 SP 20-0052. The site is crossed sloped with elevation dropping from the rear and top front of the site. The low point of the slope is at the NW elevation. At the front lower corner of the lot was the location of the proposed ADA ramp. The geohazard review and Conditions of Approval directed the application to minimize cuts and fills, which resulted in an exposed foundation approximately 4 feet taller at the side door entrance at the finished grade on the downhill side elevation than reflected in the approved HR plans.

The Applicant originally planned to access the side elevation door with an at-grade side entrance and retaining wall to the rear. With the revised elevation level, the Applicant proposes to utilize an ADA ramp to access the side and rear entrances. The ADA ramp is designed with lap siding to match the house with railings attached on the inside to minimize the massing of the ramp and reduce the visual appearance of the ramp as a separate building element.

The Historic Review Board and City Commission (upon appeal) found that a smaller ADA ramp to the side porch was reasonable as it provided ADA access to the interior of the building. Its impact was minimized by the design and size and conditionally could meet the Guidelines for New Construction and OCMC 17.40.060(G) *construction of new structures in an historic or conservation district*. They both found that the additional building length of the full ADA ramp would be highly visible from the side elevation, elongated the building, and further eroded the building's foursquare design, and concluded that the record did not provide sufficient evidence to indicate that screening in the form of additional landscaping could be accommodated taking into account the width the ramp and retaining wall.

October 25, 2022 HRB Hearing

HR 22-0011 (1st proposal -full ADA ramp with wood construction)

Proposal: Review an alternate design of a full ADA ramp to the rear of the site that provides the same general design and material approach HR 21-00020 and AP 22-0006 but with a reduction in the number of ramp switchbacks (from 5 to 3), no reduction in overall length, but the inclusion of new planter areas.

The 1st proposal (HR 22-00010) requested a review of an alternate design of a full ADA ramp to the rear of the site that provides the same general design and material approach HR 21-00020 and AP 22-0006 but with a reduction in the number of ramp switchbacks (from 5 to 3), the inclusion of one planter island between the switchbacks and one small planter between the building and the ADA ramp on the side elevation, and the addition of a hipped roof to the side door entry.

The overall length of the full wood ADA design (Option 2) indicates the same length (97 feet total 18 feet beyond the rear of the house). The Applicant did not submit a revised landscape plan indicating how the newly proposed planter areas will screen the massing of the ramp when viewed from 5th Street.

The Applicant submitted the following information in their request to approve a modified full ADA wood ramp to access the rear of the building.

1. A short narrative email describing the proposal

2. Revised Site Plan showing an option 1 and 2
3. Revised elevations showing an option 1 and 2
4. Profile study of uphill side elevation demonstrating inability to provide ADA access from the upper elevation or south side of the structure.
5. One photo of the rear of the building (current condition)

The difference between the full wood proposal and the previously denied full ADA ramp (option 1) appears to be the redesign of the ramps to reduce the number of switchbacks from 5 to 3 with no reduction in the overall depth (97 feet total 18 feet beyond the rear of the house).

The Applicant did not submit a revised landscape plan indicating how the newly proposed planter areas will screen the massing of the ramp when viewed from 5th Street. The location of the proposed planter areas (between the house and the ramp and within the rear switchbacks) does not appear to be able to provide landscaping that could shield or soften the view from 5th Street.

As part of the review for HR 21-00020 and AP 22-0006, the Historic Review Board found that the addition of an 18 feet 4-inch deep switchback ramp to the rear of a building that was at its limit of being considered a foursquare design was not compatible with the intent of the architectural style. The proposed full ramp design, with no measurable change in depth, with the same materials as the house, continues to be too large of mass for the style of the foursquare style and dilutes the historic context of the District.

The lack of a detailed narrative, revised landscape plan, and renderings showing how new planter areas will mitigate the massing of the ramp when viewing it from 5th Street, did not give Staff or the Historic Review Board an accurate understanding of how this approach mitigates massing that was one of the primary reasons for denial of the full ADA ramp in the previous application.

The Applicant was encouraged to secure counsel from an expert qualified architect or designer in historic preservation and accessibility options, which could help to inform the effort and alternative analysis response prior to the October 25, 2022 Historic Review Board meeting. At the October 25, 2022 Historic Review Board meeting, the Historic Review Board concurred with Staff's assessment and continued the hearing to November 22, 2022. The Applicant additionally provided a 30-day extension of the 120-day deadline. The new deadline is March 1, 2022.

November 22, 2022 HRB Hearing

HR 22-0011 (2nd proposal -full ADA ramp with metal railing)

Proposal: Review a revised design for a full exterior ADA ramp made of black powder-coated metal along with additional alternative analysis findings provided by Heritage Consulting Group.

In response to the HRB request for additional information, the Applicant submitted the following information:

1. Alternative analysis memo, Erin Ward, Heritage Consulting Group
2. Elevation and renderings (revised)
3. Site Plan (revised)
4. Landscape Plan (revised) *

**note the landscape plan scale of 1 in= 20 feet does not appear to match the revised site plan. The landscape plan appears to show 3 feet and 6 feet planter beds along the side elevation. Whereas the revised site plan shows 2 feet 6 inches and 5 feet 6 inches accordingly. With space at such a premium, it is very important to ensure that both plans utilize the same scales and that the*

registered landscape architect can confirm that the planting choices will be successful notwithstanding a potential 6-inch reduction in the planting area.

The Historic Review Board was tasked to answer the following questions as part of the analysis for the revised metal railing ADA ramp design:

1. Does the revised metal railing ADA design satisfy the standards, particularly the obligation to ensure that new construction does not introduce a new building style that “dilutes and distracts from the historic context of the district?” Guidelines p 7.
2. If not, short of eliminating the rear exterior ramp, are there other design changes or improvements that would further mitigate those impacts?
 - a. The HRB’s previous denial was based on a finding that the overall length of the building when viewed from the side, without mitigation, failed to reinforce the context of the conservation district with respect to the Foursquare style. Are there additional design/landscaping changes that might further restore the Foursquare style?
3. If the Design Guidelines cannot be satisfied, has the Applicant provided sufficient evidence in the record to reject the other design alternatives as either inconsistent with the Applicant’s identified therapeutic objectives or financially infeasible?

With respect to financial feasibility, it is important to keep in mind that the construction of this building is very nearly complete. Whether or not this Applicant could have made different design decisions to provide an interior to the accessibility as part of the original building design cannot be considered to any greater degree than the HRB would require the same from a retrofit request to make an existing home accessible. In other words, questions of timing for pursuing this request should not be used to penalize this Applicant with respect to its current accessibility needs. If the Board finds that the new metal ADA design meets the standards, then the answer to question #3 does not need to be answered.

Analysis Overview- (full ADA ramp with metal railing construction)

Allowing the larger ADA ramp as currently proposed is not out of the range of discretion of the HRB and would allow greater access to the building for elderly residents and visitors, and would fit the character of a more commercial building in a Commercial District, particularly when it is new construction. The Secretary of the Interior provides [guidance](#) on how to design compatible ADA ramps for historic structures, recognizing that access is an important component to both private and public spaces. While this proposal is new construction of a live/work building, reviewing how ADA ramps can be made to fit historic resources can provide background to the best approach for this project. As there are no specific Design Guidelines for ADA access, the Historic Review Board should review the proposal and see if the design and mitigation measures as outlined in the Conditions of Approval can be found to be compatible with the District and provide the best option to allow access for visitors and residents.

The Applicant has indicated that there will be future elderly residents that will want access to the second floor through a ramp system beyond the existing internal stairwell. They also indicate that they are not comfortable relying on mechanical ADA access that could not be operable during a power failure. There is no city requirement for ADA access for a single-family residence. There is direct ADA access to the commercial office unit at the front of the building.

The crux of the Historic Review analysis of this proposal, as previously explained, is that the burden is on the Applicant to show the evidence necessary to conclude that a full exterior ramp is an architecturally compatible means of allowing residents to access the second floor of the house on a sloped lot.

The Historic Review Board deliberated over multiple meetings in the Spring of 2020 to address massing concerns on the proposed live-work design based on a Foursquare architectural design. The Historic Review Board allowed an attached garage, with conditions, understanding that the need to reduce cuts and fills on the site was reasonable. At no time during this analysis was the need for a ADA access brought up as part of the design discussion. The Historic Review Board spent the majority of their deliberations discussing the large massing of the building; this included dropping the wall height, removing ornamentation, and requiring a visual separation of the garage from the main volume of the housing.

If ADA access was proposed during the initial HR 20-01 review. Staff would have recommended the Applicant look at access from the upper sloped side of the lot (JQ Adams), or pursue an internal ramping or chair lift design. Staff provided the following findings in HR 20-01 *"The Applicant has proposed the foursquare style. The hallmarks of the style include a basically square, boxy design, two-and-one-half stories high, usually with four large, boxy rooms to a floor, a center dormer, and a large front porch with wide stairs. The proposed structure is boxy with a hip roof, large eaves, and symmetrical arrangement, which resembles a foursquare. "* The Applicant has not provided sufficient findings for how the larger switchback ramp will retain the boxy foursquare feeling of the approved design. HR 20-01 allowed a somewhat longer footprint than a class square with a 70' 3" length of the building to 47' width w/o garage)

Use of Metal in a Historic District.

The Historic Review Board has approved metal elements in both historic districts and on Landmarks. Often they were related to more commercial projects, though one in Canemah was related to the design of a 1970s house and its accessory building. The Board has previously found that metal is an appropriate material for infill development, especially when used to further differentiate new from old or when completely open to the elements. Below are some selected examples

Metal railings were approved as part of this application in 2020 (HR 20-0001) for the flat roof balcony above the garage.



May 26, 2020 HRB Meeting Submittal (HR 20-00001)



619 6th Street Ermatinger House ADA ramp (2014)



603 6th Street. Stevens Crawford House metal hand railings (2009)

BACKGROUND

Site and Context

The site is located in the McLoughlin Conservation District in the Mixed-Use Corridor Zone. The property is approximately 9500 square feet and has 77 feet of frontage on 5th Avenue. It also borders unimproved JQ Adams Street, which is heavily forested and includes a pedestrian walkway up to the Barclay Hills and Rivercrest neighborhoods. The site is crossed slope upward from 5th and to the back of the lot (see figure 2)

The property is on the edge of the McLoughlin Conservation District.



Figure 1 Vicinity Map (Conservation district shown in purple)



Figure 2-Aerial photo and topography- arrow showing cross-slope



Figure 3 Zoning Map



Figure 4 Existing condition of side elevation showing unpermitted CMU wall. - September 20, 2022 . CMU wall has been removed as of November 15, 2022



Figure 4 Existing condition of front and side elevations.- September 20, 2022



Figure 6 Neighboring building at 1010 5th Street; a modern commercial building with a low shed roof, roughly U-shaped. The offices are sited in the eastern portion of the building, with a small courtyard framed by the low roof on the west side. The building is primarily clad with stone veneer, but some portions have vertical groove plywood siding. The windows are fixed aluminum sash and are located

primarily on the east and west sides of the building. It is not a designated structure in the McLoughlin Conservation District. (Google Maps- taken prior to construction)



Figure 7-Stevens Crawford House, 603 6th Street. An example of a larger Foursquare/bungalow design with a foundation height of 3 ½ to 4 feet.



Figure 8 -909 Washington Street- Charles Caufield House. An example of a side porch and stair with a 3 ½ to 4-foot foundation height on a sloping site.

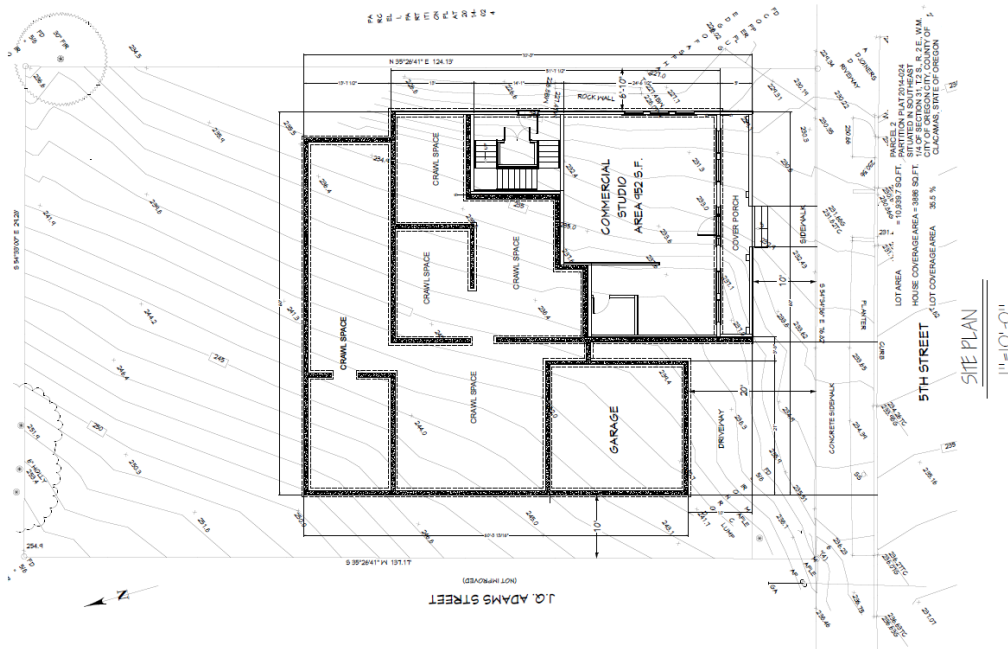


Figure 9 Approved HR 20-01 Site Plan (original proposal)

PLANT LIST:				
SYMBOL	QTY.	LATIN NAME/ Common Name	SIZE	SPACING
STREET TREES				
	2	SYRINGA RETICULATA Japanese Tree Lilac	2" cal.	As Shown
MITIGATION TREES				
	3	CORNUS NUTTALLII Pacific Dogwood	2" cal.	As Shown
	3	TSUGA HETEROPHYLLA Western Hemlock	6" ht.	As Shown
	1	ACER JAPONICUM 'ACONITIFOLIUM' Full Moon Maple	6" ht.	As Shown
SHRUBS				
	29	NANDINA DOMESTICA 'HARBOR BELLE' Harbor Belle Nandina	2 gal.	2' o.c.
	10	PIERIS JAPONICA 'LITTLE HEATH' Little Heath Pieris	5 gal.	3' o.c.
	1	TAXUS MEDIA 'STONEHEDGE' Stonehedge Yew	5 gal.	3' o.c.
	6	CORNUS ALBA 'BAILHALO' Ivory Halo Dogwood	2 gal.	5' o.c.
	12	VACCINIUM OVATUM Evergreen Huckleberry	5 gal.	4' o.c.
	32	LEUCOTHOE FONTANESIANA 'NANA' Dwarf Leucothoe	2 gal.	3' o.c.
	13	AUCUBA JAPONICA 'MR. GOLDSTRIKE' Mr. Goldstrike Aucuba	5 gal.	4' o.c.
	35	MAHONIA REPENS Creeping Mahonia	1 gal.	3' o.c.
	6	CAMELLIA 'FAIRY BLUSH' Fairy Blush Camellia	2 gal.	3' o.c.
	8	CEPHALOTAXUS HARRINGTONIA 'FASTIGIATA' Upright Japanese Plum Yew	5 gal.	2' o.c.
	7	SARCOCOCCA RUSCIFOLIA Sweet Box	1 gal.	3' o.c.
GROUND COVER				
	14	ARCTOSTAPHYLOS U.U. 'WOOD'S DWARF' Wood's Dwarf Kinnikinnick	1 gal.	3' o.c.
	63	EPIMEDIUM PERRALCHICUM 'FROHNLEITEN' Frohnleiten Bishop's Hat	1 gal.	2' o.c.
	44	LIRIOPE MUSCARI 'BIG BLUE' Big Blue Lily Turf	1 gal.	2' o.c.

GENERAL NOTES:

1. Contractor is to verify all plant quantities.
2. Adjust plantings in the field as necessary.
3. Project is to be irrigated by an automatic, underground system, which will provide full coverage for all plant material. System is to be design/ build by Landscape Contractor. Guarantee system for a minimum one year. Show drip systems as alternate bid only.
4. All plants are to be fully foliated, well branched and true to form.
5. Contractor is to notify Landscape Architect or Owner's Representative of any site changes or unforeseen conditions that may be detrimental to plant health, or cause future problems to any structural elements of the project.
6. Invasive plant species shall be removed from all landscape areas prior to approval of final occupancy permit.

Figure 10 -2021 SARCOLD Landscape Plan Details

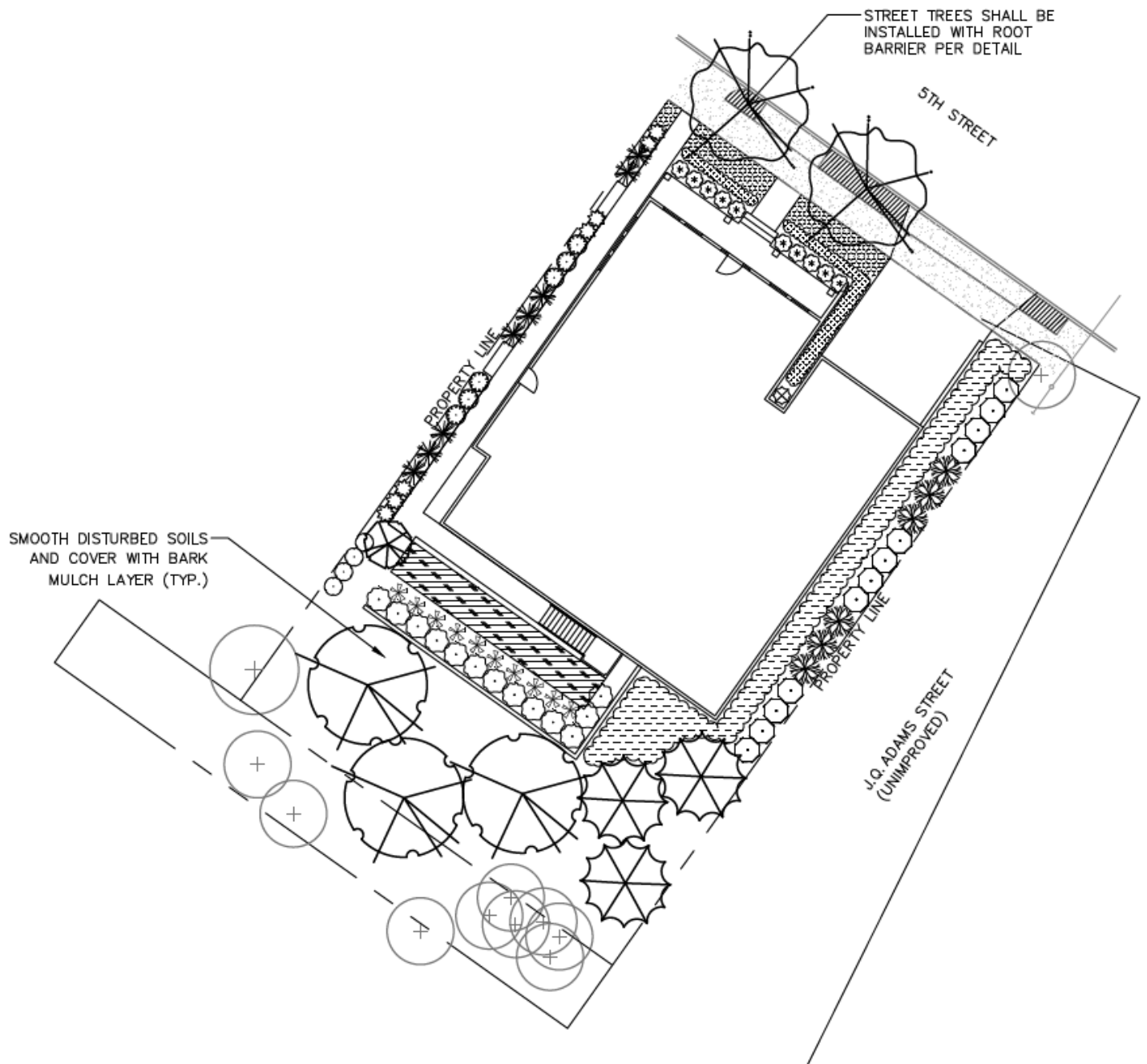


Figure 11- 2021 Proposal Landscape Plan showing ADA ramp location and side yard mitigation plants (Japanese yew, sweetbox, and fairy bush camellia). ADA setbacks to the property line look to 2 1/2 to 3 feet. **Please note the Applicant has not revised the landscape plan based on the revised rear ramp design.**



Figure 12- Approved Front Elevation- HR 20-1

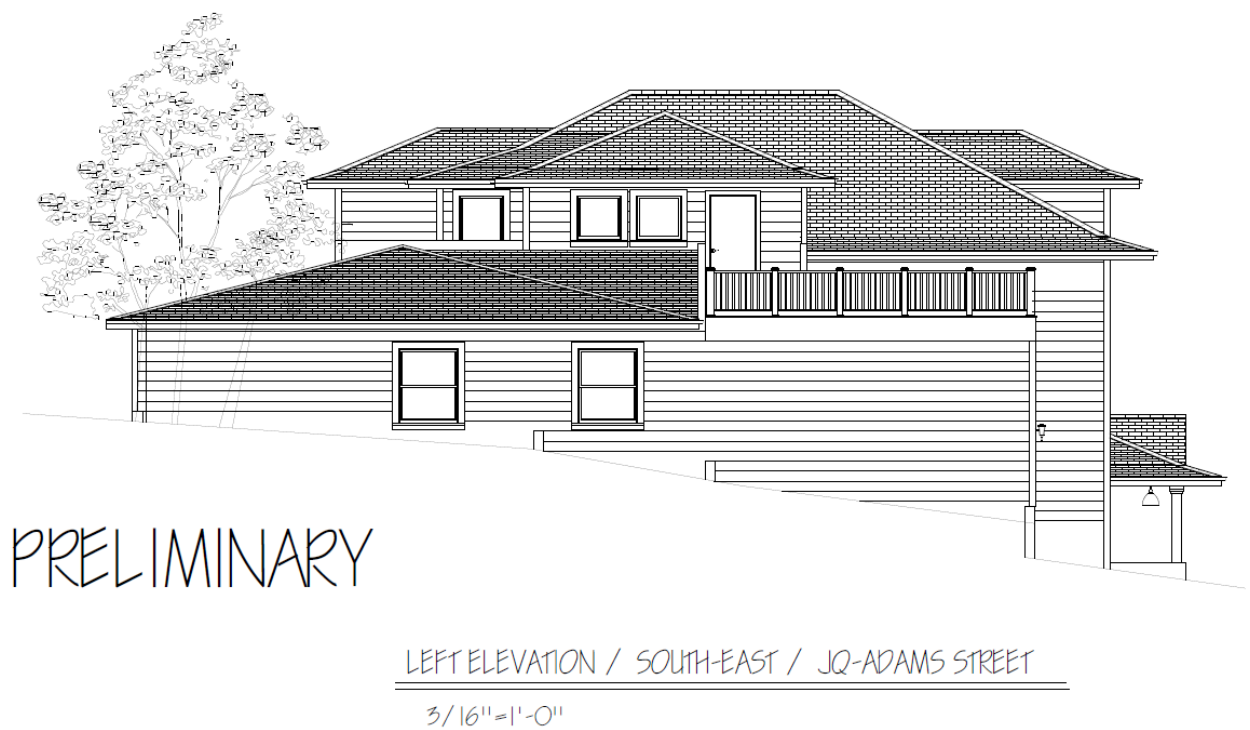


Figure 13-Approved HR 20-01 Left elevation (uphill side)



Figure 14-Approved HR 20-01 Right elevation (downhill side)

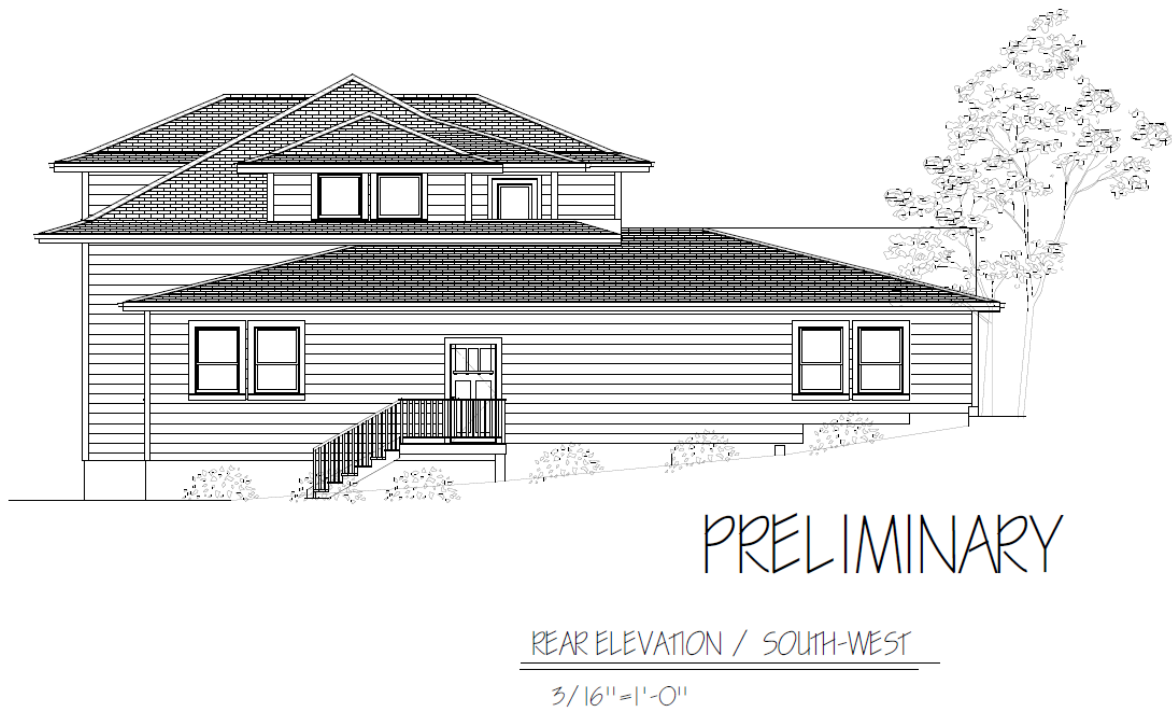


Figure 15-Approved HR 20-01 rear elevation

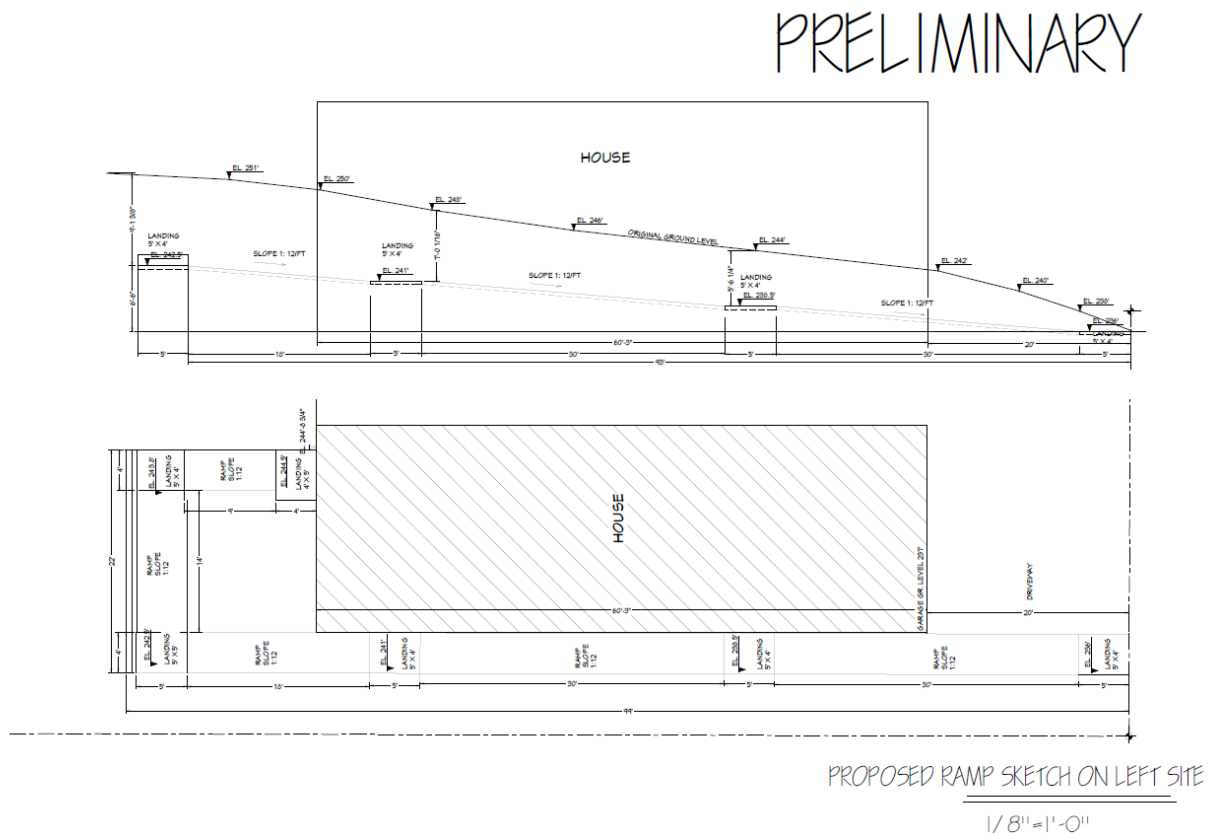


Figure 16 -Proposed uphill side ramp approach study (HR 22-0011)

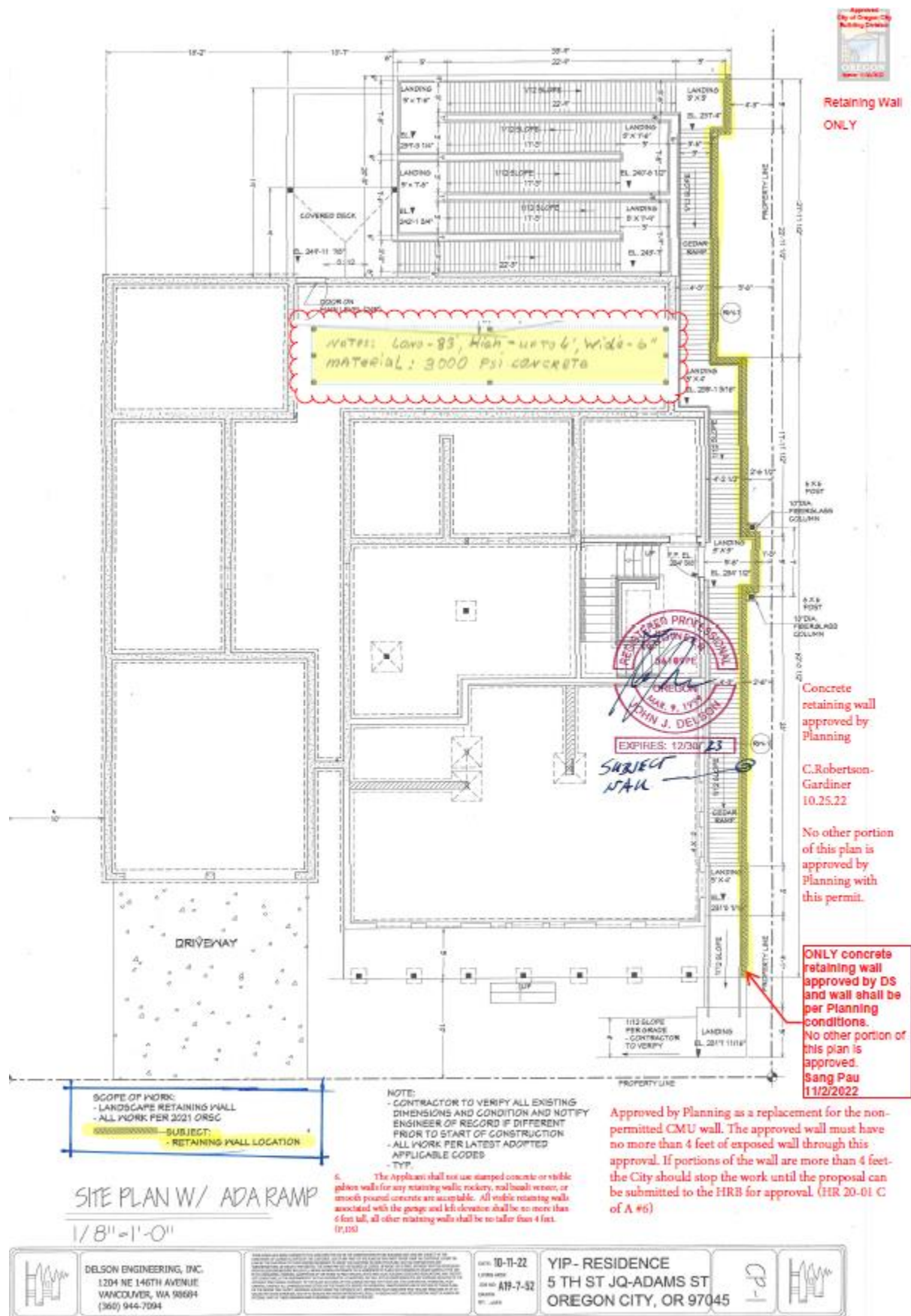
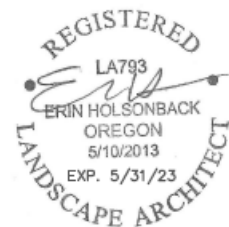


Figure 16 -Revised Site Plan.

A new 4-foot or less concrete retaining wall was approved to replace the non-permitted CMU wall.

PLANT LIST:

SYMBOL	QTY.	LATIN NAME/ Common Name	SIZE	SPACING
STREET TREES				
	2	SYRINGA RETICULATA Japanese Tree Lilac	2" cal.	As Shown
MITIGATION TREES				
	3	CORNUS NUTTALLII Pacific Dogwood	2" cal.	As Shown
	3	TSUGA HETEROPHYLLA Western Hemlock	6' ht.	As Shown
SHRUBS				
	32	NANDINA DOMESTICA 'HARBOR BELLE' Harbor Belle Nandina	2 gal.	2' o.c.
	10	PIERIS JAPONICA 'LITTLE HEATH' Little Heath Pieris	5 gal.	3' o.c.
	4	TAXUS MEDIA 'STONEHEDGE' Stonehedge Yew	5 gal.	3' o.c.
	6	CORNUS ALBA 'BAILHALO' Ivory Halo Dogwood	2 gal.	5' o.c.
	7	HYDRANGEA PANICULATA 'LITTLE LIME' Little Lime Hydrangea	2 gal.	3' o.c.
	12	VACCINIUM OVATUM Evergreen Huckleberry	5 gal.	4' o.c.
	24	BUXUS SEMPERVIRENS 'GREEN MOUNTAIN' Green Mountain Boxwood	2 gal.	3' o.c.
	12	CAMELLIA JAPONICA 'NUCCIO'S GEM' Nuccio's Gem Camellia	5 gal.	6' o.c.
	35	MAHONIA REPENS Creeping Mahonia	1 gal.	3' o.c.
GROUND COVER				
	14	ARCTOSTAPHYLOS U.U. 'WOOD'S DWARF' Wood's Dwarf Kinnikinnick	1 gal.	3' o.c.
	63	EPIMEDIUM PERRALCHICUM 'FROHNLEITEN' Frohnleiten Bishop's Hat	1 gal.	2' o.c.
	44	LIRIOPE MUSCARI 'BIG BLUE' Big Blue Lily Turf	1 gal.	2' o.c.



OTTEN + ASSOCIATES LANDSCAPE ARCHITECTURE

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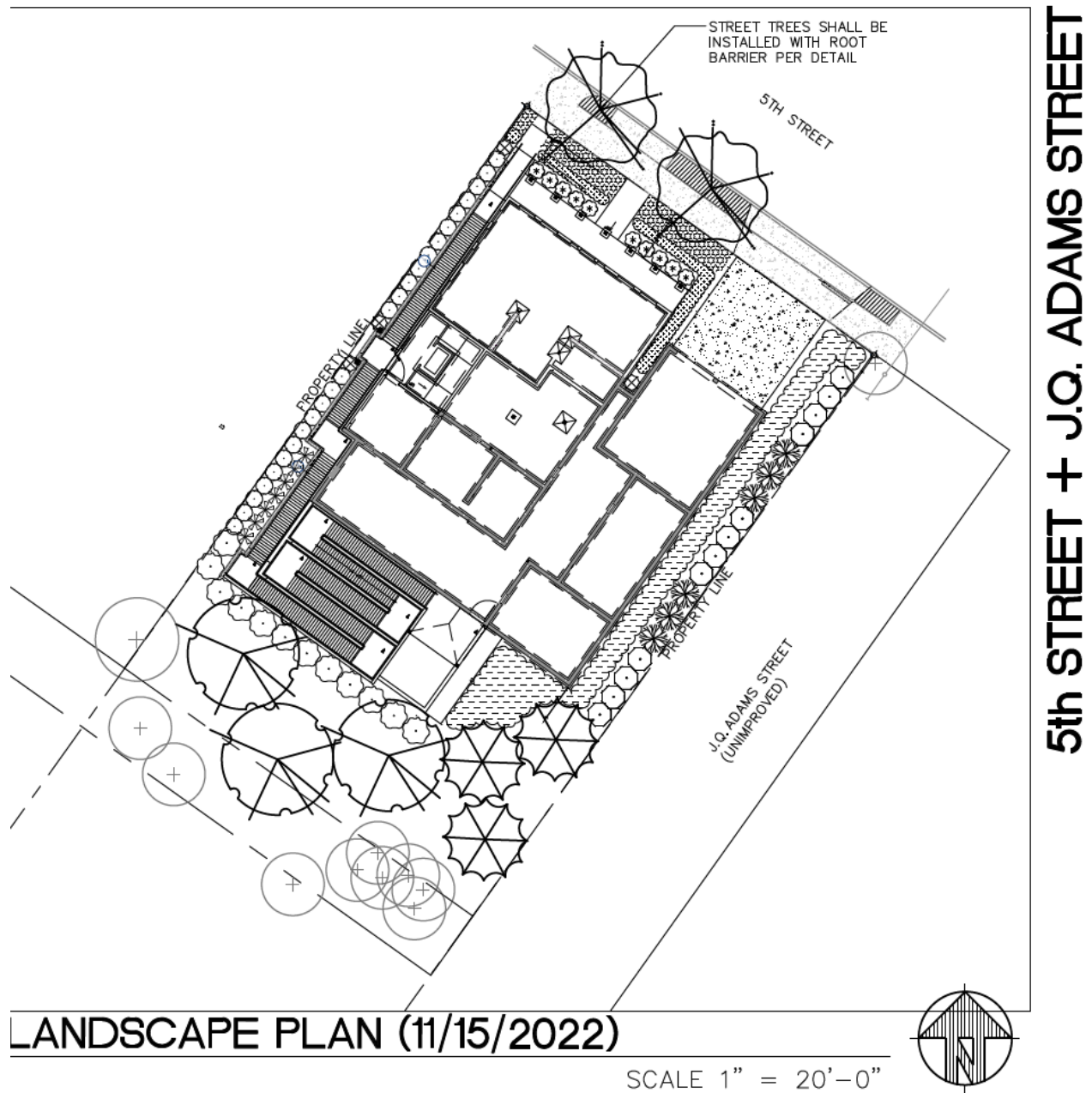


Figure 16 a/b -Landscaping Plan.

PUBLIC NOTICE AND COMMENT

A public notice was sent to neighbors within 300 feet of the subject property, posted on the City's website, emailed to a variety of stakeholders, a sign was posted onsite. No public comments have been received prior to publishing the staff report.

REVIEW CRITERIA

17.40.060 - Exterior alteration and new construction.

- A. *Except as provided pursuant to subsection I of this section, no person shall alter any historic site in such a manner as to affect its exterior appearance, nor shall there be any new construction in an historic district, conservation district, historic corridor, or on a landmark site, unless a certificate of appropriateness has previously been issued by the historic review board. Any building addition that is thirty percent or more in area of the historic building (be it individual or cumulative) shall be considered new construction in a district. Further, no major public improvements shall be made in the District unless approved by the Board and given a certificate of appropriateness.*

Applicable: This is a proposed modification to an approved New Construction in the McLoughlin Conservation District (HR 20-0001)

- B. *Application for such a certificate shall be made to the planning staff and shall be referred to the historic review board. The application shall be in such form and detail as the Board prescribes.*

Complies as Proposed: The City processed the application pursuant to Chapter 17.50 of the municipal code. The Applicant provided elevation drawings, a landscape plan, floor plan, and a narrative to address the specific revisions requested. Staff is processing the application based on what the Applicant has submitted but will also ask the Historic Review Board if the Applicant needs to provide additional findings or plans to comply with the Design Guidelines.

- C. *Archeological Monitoring Recommendation. For all projects that will involve ground disturbance, the Applicant shall provide,*
1. *A letter or email from the Oregon State Historic Preservation Office Archaeological Division indicating the level of recommended archeological monitoring on-site, or demonstrate that the Applicant had notified the Oregon State Historic Preservation Office and that the Oregon State Historic Preservation Office had not commented within forty-five days of notification by the Applicant; and*
 2. *A letter or email from the applicable tribal cultural resource representative of the Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz, Confederated Tribes of the Umatilla, Confederated Tribes of the Warm Springs and the Confederated Tribes of the Yakama Nation indicating the level of recommended archeological monitoring on-site, or demonstrate that the Applicant had notified the applicable tribal cultural resource representative and that the applicable tribal cultural resource representative had not commented within forty-five days of notification by the Applicant.*

If, after forty-five days notice from the Applicant, the Oregon State Historic Preservation Office or the applicable tribal cultural resource representative fails to provide comment, the City will not require the letter or email as part of the completeness review. For the purpose of this section, ground disturbance is defined as the movement of native soils.

Complies as Proposed. Oregon SHPO and the Native American tribes listed above were notified of the proposed ground disturbance in 2019. A response was received from SHPO and is in the City's files for HR 20-00001. The letter indicates the level of recommended archaeological monitoring on the site. No major change in grading is being proposed for the side ADA ramp beyond the original notice.

- D. *[1.] The historic review board, after notice and public hearing held pursuant to Chapter 17.50, shall approve the issuance, approve the issuance with conditions or disapprove issuance of the certificate of appropriateness.*

Applicable: The proposal is being reviewed by the Historic Review Board.

F. For construction of new structures in an historic or conservation district, or on an historic site, the criteria to be used by the Board in reaching its decision on the certificate of appropriateness shall include the following:

1. The purpose of the historic conservation district as set forth in Section 17.40.010;

The purpose of the District is:

- A. Effect and accomplish the protection, enhancement and perpetuation of such improvements and of districts which represent or reflect elements of the City's cultural, social, economic, political and architectural history;
- B. Safeguard the City's historic, aesthetic and cultural heritage as embodied and reflected in such improvements and districts;
- C. Complement any National Register Historic districts designated in the City;
- D. Stabilize and improve property values in such districts;
- E. Foster civic pride in the beauty and noble accomplishments of the past;
- F. Protect and enhance the City's attractions to tourists and visitors and the support and stimulus to business and industry thereby provided;
- G. Strengthen the economy of the City;
- H. Promote the use of historic districts and landmarks for the education, pleasure, energy conservation, housing and public welfare of the City; and
- I. Carry out the provisions of LCDC Goal 5.

Finding: Denial

As the applicant has provided multiple versions of plans and elevation over the course of this application, some of which were not constructed as proposed, the Board requested the submittal of revised elevation drawings that incorporated their direction on various elements discussed over the course of many months, to ensure they can be constructed as proposed achieving compliance with the applicable standards.

The Board found that the existing alternative analysis does not adequately describe the ADA options available to the applicant, their cost, and their effect on the foursquare design of the building/McLoughlin Conservation District with sufficient detail for Board evaluation.

The existing alternative analysis does not provide a cost estimate for all of the options. At the November 22, 2022 Hearing, the Board requested that the applicant Include partial interior demolition cost as part of any options that may require a revised interior design. Identify why the approach does or does not meet the needs of the applicant t and how the approach would affect the capability of the design and affect on the McLoughlin Conservation District.

As found in AP 21-0006, the massing and design of the proposed rear ramp resulted in a structure that would no longer read as a Foursquare-inspired design when viewed from the side, which was highly visible from 5th Ave, lacked appropriate mitigation and that the applicant failed to show that less impactful alternatives were fully considered and proved infeasible. Although ADA requirements do apply to structures that are subject to historic resource protections, the ADA does not exempt owners from complying with historic resource requirements to the extent possible. This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the needed evidence to show that the proposal provides the best option that balance the needs of the applicant and the impact on the historic district,

As part of HR 21-00020 and AP 22-0006, the Historic Review Board and City Commission provided a list of alternative approaches that the Applicant should review before the Board could look at the full ADA ramp

as a potential approval option. Staff has reviewed the Applicant's current findings and submittal against this list.

1. An interior ADA access from the ground floor through the garage, interior stairway, or other means.

HR 22-00011 Applicant's Response: The Applicant has indicated that as the project is almost completed in the interior of the building, an interior ADA access is not feasible at this time. *At this time, the construction of the building is largely complete. As construction is nearly complete, undertaking a change to the interior design to accommodate an interior means of ADA access would be cost-prohibitive on the part of the owner and is not feasible. The industry standard cost for a chair lift is approximately \$5,000. The industry standard cost for a residential elevator is approximately \$30,000. These prices do not include the cost of undertaking a change to the interior programming of the building. In addition, it is our understanding that the zoning of this area requires that the property be mixed-use (commercial and residential). As the building proposes a commercial use at the first floor and a residential use at the second floor, two separate points of entry are needed to ensure resident and building safety. Creating a shared interior lobby space would remove needed square footage from the commercial space and would not provide the residential space with a separate entrance. As there will be individual entrances to each floor, the currently proposed exterior ramp provides full ADA access to both floors.*

Staff's Findings: Staff agrees that it is likely that internal improvements are nearly complete, and any such retrofit is likely infeasible.

2. A noncommercial interior chair lift or residential elevator.

HR 22-00011 Applicant's Response: The Applicant has provided the following information. *As explained in item 1, the construction of the building is nearly complete and therefore the addition of an interior chair lift or residential scaled elevator would require major modifications to the home and would be cost-prohibitive on the part of the owner. In looking into these alternatives, the home owner expressed concern about the necessary upkeep and maintenance of an interior chair lift and residential-scaled elevator for providing ADA access as both options would be rendered unusable during power outages or inclement weather*

Staff's Findings: The \$5,000 cost of an interior chairlift to the existing stairwell is not an unreasonable constraint and appears to be less than the cost of the exterior ADA ramp. The Applicant has previously mentioned that they were not interested in mechanical means of ADA access that could be impacted by a loss of power or the need for multiple people to leave the residence in an emergency. The Historic Review Board will need to determine if this is sufficient to show that this option is not viable for the Applicant

3. A chair lift accommodation along exterior stairs that hugs the building.

HR 22-00011 Applicant's Response: *In exploring the option of installing a chair lift at the exterior stairs, it was determined that the addition of the exterior stair, chair lift, and associated mechanical equipment would add a great deal more visible massing to the building and would have a larger visual impact to the surrounding district than the proposed ramp solution. As currently designed, the proposed exterior ramp is minimally intrusive to the surrounding district with much of it located at the rear of the property. In addition, there is concern that an exterior chair lift would be rendered unusable during power outages or inclement weather and would thus not provide full ADA access to the*

building. Finally, the installation of an exterior chair lift would be cost-prohibitive and would require many changes to the already constructed property, rendering it not feasible.

Staff's Findings: The Applicant has previously mentioned that they were not interested in mechanical means of ADA access that could be impacted by a loss of power or the need for multiple people to leave the residence in an emergency. The Historic Review Board will need to determine if this is sufficient to show that this option is not viable for the Applicant or determine if an exterior ADA lift would create massing in a more prominent view corridor.

4. An ADA-complaint design relying on the existing uphill topography on the left or southeast side elevation.

HR 22-00011 Applicant's Response: The Applicant provided a one-page slope analysis (figure 19) but did not provide narrative findings as to why this approach is not feasible, cost information, ramp size, and potential impact on the house or McLoughlin Conservation District. Erin Ward, Heritage Consulting Group, provided the following information: *The Applicant explored the potential of constructing the exterior ramp at several different locations around the building. The southeast side of the building cannot be used as the grade of the topography does not meet the code requirements for rise of the ramp. Additionally, the proposed ramp provides ADA access to the first floor office space as well as the second floor residential space and the first floor entrance is located on the opposite side of the building. As such the current proposed design provides full ADA access to the interior in a location that is facing the rear of the building and is the least visually intrusive to the surrounding district.*

Staff's Findings: At the October 25, 2022 HRB meeting, Johns Delson provided background about the rise over run calculations and indicated that even the upslope side of the building would not meet ADA-approved grade without further excavation towards the front and new retaining walls. The rise-over-run slope calculations would also require a ramp in the rear to get to the backdoor. As this site is located within the Geologic Hazard Overlay District, any additional upslope excavation would require a new Type II GeoHazard Review. With this information, it is reasonable to find that the upslope ADA ramp is not feasible at this time and could require substantial retaining walls to create a lower-sloped flatter area towards the front of the lot.

5. The use of materials and design that create a lighter, airier appearance, such as painted metal.

HR 22-00011 Applicant's Response: *In response to the comments received, the design of the ramp has been revised to utilize a painted metal railing rather than wood. The use of metal will allow for a lighter, airier railing and will match what is already installed along the garage roofline. The simple Alumarail by Precision Rail railing design (as shown in the photograph below) is compatible with the conservation district and the Craftsman design of the subject building. Additionally, this type of railing was previously approved for the subject building and therefore will provide a consistent appearance and aesthetic.*



Staff's Findings: A wood ramp with horizontal siding may be appropriate for the smaller side entry design, but as it is extended to the rear, which was once compatible, seems to create the large mass that caused the Historic Board and the City Commission to deny the full ADA ramp. The US Department of the Interior National Park Service, Cultural Resources Division has promulgated a Preservation Brief dealing specifically with accessibility, which is attached here and may provide a suitable reference for how the City might interpret its historic standards with respect to the ADA. The brief provides examples of metal designs that are lighter and airier than the wood option. These simpler design look to hide the ramp rather than integrate it into the design of the building.

Although the Historic Board believes that a lighter / airier design might restore the building to a foursquare design along the side elevation, the Board asked the applicant to provide elevation drawing to show that such an approach is feasible and likely to occur.

6. Consider whether the removal or reduction in the length of the rear porch would reduce the massing of the ADA ramp.

HR 22-00011 Applicant's Response: The Applicant has provided a revised drawing that reduces the number of switchbacks from 5 to 3, does not reduce the overall length of the building and provides an opportunity for planter beds between the house and the ramp and between the switchbacks. The rear covered porch proposed and not approved in HR 21-00020 is not part of this application. *In response to the comments received, the Applicant has revised the design of the rear porch to be smaller in scale and to serve merely as a covered landing at the second floor entrance. Additionally, the massing of the rear ramp has been significantly reduced, limiting the number of switchbacks to the minimum required to meet code. The proponent will add planters facing the rear to further minimize the visibility of the ramp to the surrounding district and adjacent neighbors.*

Staff's Findings: The Applicant's revised drawing addressed this. The rear porch has been reduced to a small rear door entry cover.

7. Utilizing a taller retaining wall (assuming that it is made of appropriate materials) toward the rear along the side to provide some level of initial screening that can be further mitigated with plantings.

HR 22-00011 Applicant's Response: The Applicant provided updated side elevations of the revised ramp and no detailed narrative response. *In response to comments received, the Applicant has explored the option of a taller retaining wall at the rear of the ramp. While a*

taller wall would provide additional screening, the construction of a taller retaining wall would be more visually intrusive to the surrounding district. In contrast, the metal railing of the ramp, as proposed, is minimally intrusive to the surrounding district and is low in height. This solution allows more of the previously approved building to remain exposed and does not create a large,

Staff's Findings: The updated landscape plan shows the tight geometry/topography of the back corner of the side elevation. It is unclear if a higher retaining wall is even possible or would even mitigate the ramp massing.

8. Provide a revised landscape plan that incorporates the proposed replacement retaining wall and mitigation planting to ensure that the selected plant types are appropriate for the location.

HR 22-00011 Applicant's Response: *The Applicant has discussed the proposed landscape plan with Staff and understands that the landscaping will need to be compatible with the conservation district. It is our understanding that the plantings will either need to be native to the area or historically compatible and of the English garden variety and will further follow up with Staff regarding proposed plantings to ensure they are compatible with the district.*

Staff's Findings: A revised landscaping plan was provided with this staff report (Exhibit 1b). For the purposes of this meeting, Staff is concentrating on the portions of the landscape plan that are associated with the ADA ramp. Other portions of the Landscape plan are not consistent with the existing conditions and will need to be revised through the Type I Site Plan and Design Review Process.

A row of 2-gallon Greenmountain boxwood (mature height 3-5 feet) is shown between the ADA ramp and the property line on the side elevation (approx. 3 feet). A row of little lime hydrangeas (mature height 6-8 feet tall) is planned to be planted behind the boxwoods towards the rear of the property line as the ADA ramp setback. This creates an approx. 6-foot planter area for the final 1/3 of the ramp abutting the property line. Nuccio's Gem Camellias (mature height 15 feet) are planned to wrap around the rear portion of the ramp. These proposed plants do seem to provide adequate long-term screening to mitigate the massing of the ramp.

2. *The provisions of the city comprehensive plan;*

Goal 5.3 Historic Resources

Policy 5.3.1

Encourage architectural design of new structures in local Historic Districts, and the central Downtown area to be compatible with the historic character of the surrounding area.

Policy 5.3.8

Preserve and accentuate historic resources as part of an urban environment that is being reshaped by new development projects.

Finding: Not Satisfied. A new live/work dwelling is proposed on vacant commercial land within the McLoughlin Conservation District. The Historic Review Board is tasked with identifying an ADA ramp option that preserves the character of the historic district, to the extent feasible. Without the benefit of additional submittals, the Board lacks the necessary evidence to determine if the proposed design, as conditioned, will satisfy the standards. If the necessary evidence was submitted, the Board could find that the new metal ADA design meets the design standards or is

the least impactful exterior option, then Staff recommends approval of the application as the proposal demonstrates a concerted effort to protect historic resources and meets the needs of the Applicant under the Americans with Disabilities Act.

3. *The economic effect of the new proposed structure on the historic value of the District or historic site;*

Finding: Complies as proposed. Approving this development will add additional housing stock and commercial space in an area with currently low housing stock and increasing the housing options for people within Oregon City or looking to move to Oregon City.

4. *The effect of the proposed new structure on the historic value of the District or historic site;*

Finding: Not Satisfied. The Historic Review Board is tasked with identifying an ADA ramp option that preserves the character of the historic district, to the extent feasible. Without the benefit of additional submittals, the Board lacks the necessary evidence to determine if the proposed design, as conditioned, will satisfy the standards. If the necessary evidence was submitted, the Board could find that the new metal ADA design meets the design standards is the least impactful exterior option, then Staff recommends approval of the application as the proposal demonstrates a concerted effort to protect historic resources and meets the needs of the Applicant under the Americans with Disabilities Act.

5. *The general compatibility of the exterior design, arrangement, proportion, detail, scale, color, texture and materials proposed to be used in the construction of the new building or structure;*

Finding: Not Satisfied The Secretary of Interior often recommends using contrasting materials with a lighter, simpler design to reduce impact on historic buildings, and in this case, the resource is the McLoughlin Conservation District. Yet, the applicant has not provided the necessary elevation drawings or renderings for the HRB review and evaluation. If the necessary drawings were submitted, it may be possible for the HRP to find this criterion is satisfied.

A black powder-coated metal ramp with simple railings spaced at the minimum needed to meet building code allows for the least amount of visual impact. As stated above in the staff report, metal ADA ramp railings were used in the historic Ermatinger House. They were also approved in the initial HR 20-0001 approval on the uncovered garage balcony, where wood railings would have a very short lifespan. The use of metal railings to reduce massing or address uncovered areas should be differentiated from the use of railings within traditional house architecture, such as a porch or stair railings, which the design guidelines do not recommend.

6. *Economic, social, environmental and energy consequences;*

Finding: Complies as Proposed. The addition of housing stock and commercial space in an existing neighborhood provides more needed housing and is located in an already-developed area in close proximity to goods and services.

7. *Design guidelines adopted by the historic review board.*

Design Guidelines for New Construction – McLoughlin Commercial

1. STYLE

Determining the appropriate style for a new infill project is an important initial step in the design process. Each historic District has different styles that were prevalent during the historic period of significance. These styles are

what create the historic context. New construction shall complement one of these styles to support the historic context. Use of other styles dilutes and distracts from the historic context of the District. While there may be several styles dominant within the District, the specific choice of a style shall be compatible with adjacent properties, the block, and the neighborhood. It also must be fitting for the particular function of the building and its size.

Outside of the Seventh Street Commercial Corridor, commercial uses shall employ a residential style architecture to better integrate into the neighborhood fabric. The larger residential styles, such as Queen Anne, Vernacular [single buildings or grouped], and Foursquare, are appropriate. They create a suitable transition to adjacent residential areas and can be built relatively close together to achieve appropriate density. These styles could be utilized for any uses: retail, office or multifamily residential. The carriage building on High Street is an existing residential style structure used for commercial purposes.

Finding: Denial The Historic Review Board is tasked with finding the least impactful full ADA ramp option. The Secretary of Interior often recommends using contrasting materials with a lighter, simpler design to reduce the impact on historic buildings. In this case, the resource is the Mcloughlin Conservation District.

A black powder-coated metal ramp with simple railings spaced at the minimum needed to meet building code allows for the least amount of visual impact. Additionally, the use of a contrasting material will help further to reduce the massing of the ramp on the building; this differentiation addresses the Historic Review Board's concerns that the previous wood ramp was adversely impacting the foursquare design of the building as the ramp appeared to be an extension the building.

As the applicant has provided multiple versions of plans and elevation over the course of this application, some of which were not constructed as proposed, the Board requested a final design that incorporated their direction on various elements discussed over the course of many months to ensure they can be constructed as proposed.

Per AP 21-0006, the massing and design of the proposed rear ramp resulted in a structure that would no longer read as a Foursquare-inspired design when viewed from the side, which was highly visible from 5th Ave, lacked appropriate mitigation and that the applicant failed to show that less impactful alternatives were fully considered and proved infeasible. Although ADA requirements do apply to structures that are subject to historic resource protections, the ADA does not exempt owners from complying with historic resource requirements to the extent possible. This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the needed evidence to show that the proposal provides the best option that balance the needs of the applicant and the impact on the historic district.

SITE

Siting principles involve both how the site is used and how the building(s) is placed within the site. The specific lot location and its topography can dictate many requirements.

Commercial buildings are to face the Street squarely with their primary face and display areas in full view, to engage the pedestrian, and to be set back only slightly, if at all from the front and side lot lines. Small courtyard area may be appropriate for multifamily and certain commercial uses. Vehicle access to be on the less visible sides or rear.

SITE CHARACTERISTICS OF MCLOUGHLIN COMMERCIAL BUILDINGS

- *Rectangular footprint that largely fills the width of the lot.*
- *Oriented to Street for access, and display. No or small setback from the sidewalk along Street; may not extend all way to rear lot line.*
- *Small front or side setback is appropriate for residential uses.*
- *Central or individual ground floor customer-tenant entries. Grouped residential entry to lobby or foyer. Separate service entries.*

- *Vehicle access and storage at side or rear; may be hidden under the building.*
- *Landscape: small plantings if there are setbacks; otherwise street trees. Upper story gardens visible from the sidewalk were not used in the historic period, and are discouraged.*

I: SITE *continued*

USE OF SITE	How the site is planned to be used.	
ASPECT	PRINCIPLE — GOOD EXAMPLE	NOT ALLOWED
Topography Use	Site houses according to neighboring or contextual practice. At sloping sites, houses were sited at most the easily built portions of the lot and close to grade. At upsloping sites the main level was raised. At downslope sites the main level was lowered. Cross-slope sites utilized the easiest access. Residential garages may extend to front property line at up or down sloping sites. Commercial buildings requiring a larger footprint utilized level lots in close proximity to the street. Buildings may be set back to better integrate with houses where adjacent, and to facilitate grade changes.	Extensive regrading of lot to raise or lower the main level of a house. Tall walls to alter the natural topography for building siting or yard leveling purposes. Commercial buildings without the main level close in height to the public way Foundations, piers or piling more than 1 story in height above natural grade

Finding: Complies with Conditions. The Guidelines direct development on cross slopes to utilize the easiest access and not allow foundations more than 1-story. The Guidelines also allow for a small side yard setback for commercial buildings in the Mcloughlin Conservation District. While Live/work is a bit of a hybrid of commercial and residential, Staff finds that this setback direction still applies and provides direction for smaller, more commercial-scale setbacks for uses that go beyond single-family residential. The setback for the MUC-1 District is 0 feet. The Applicant has proposed a setback that appears to be between 2-3 feet. Staff finds that either ramp option meets this standard.

2. BUILDING FORM

Address the overall size, shape and bulk of the building. The architectural style used for the building defines many aspects of its appropriate form and proportions. Excessive variation in the size, shape, or configuration creates an inappropriate solution that is stylistically incorrect and not complementary to the District. The building form needs to relate to the buildings in the immediate neighborhood, and to take into account both similarities and changes on the block. The new building form shall reference the principles, proportions and scale of an historically appropriate style. Existing commercial historic buildings are now less numerous in the districts. Acceptable styles will produce new infill form based on historic character qualities of the original buildings and those found in other similar districts. This new development will then successfully relate to adjacent residential neighborhoods. The appropriate style and form of the new buildings depends upon the site and neighboring, or transitioning context.

BUILDING FORM CHARACTERISTICS OF MCLOUGHLIN COMMERCIAL BUILDINGS

- *Building form and foot print primarily rectangular, possible rectangular additions or wings; possible interior light court, courtyard or areaway.*
- *Massing: A simple rectangular primary form encompassing the primary and visible facades. a parapet or false front that provides the height boundary of the building and hides the view of the roof. Single story with retail or service use; Two or three story with single or mixed use. Basement option*
- *Ground floor typically has high ceilings; retail use with office or residential use above.*

- *Height: Main level close to grade. Single story buildings: minimum 16 foot high parapet. First to Second floor height to be at least 12 feet unless for multifamily use, then may be 10 feet. Upper floor to floor heights at least 10 feet. Maximum Height: Per City code*
- *Height for Commercial Buildings using a Residential Style: First to Second floor height to be at least 10 feet. Main Floor Level Height Above Grade: 2½ feet minimum. Eave Height: 28 feet maximum. Ridge Height maximum: 40 feet.*
- *Residential styles, including Queen Anne, or Foursquare, are encouraged on Seventh above John Q Adams and on Center and High, and where facing or adjoining residential zoning. Alternatively, the use(s) may be embodied in a grouping of smaller buildings.*
- *Full width one or two story porches at front (accessed by interior stair), or rear are appropriate for residential.*
- *Grade level or depressed parking if accessed from rear or rear end of side and generally concealed from sidewalk by building wall, provided commercial or residential use is located along primary Street.*

Finding: Complies with Conditions. The addition of an ADA ramp as conditioned does not contradict any of the Guideline elements above.

3. DESIGN COMPOSITION

Include a range of more detailed design issues that address groups of elements, individual elements, their design and how they relate to the overall composition and finish. The principles place a traditional emphasis on the design's composition as seen from the exterior, rather than as a result of interior functional planning requirements. They also outwardly convey a sense of quality craftsmanship. The design composition principles, being more detailed, and stylistically dependent, are typically developed after the previous principles are resolved. These principles also reflect historically appropriate materials, respective finishes, and unobtrusive integration of new technology.

DESIGN COMPOSITION CHARACTERISTICS OF MCLOUGHLIN COMMERCIAL BUILDINGS

- *Mostly single or double store design to 100 feet in width. Wider than 100 feet requires style change.*
- *False front: covering front gable roof or just an extended wall; may have a parapet on each side (possibly not rear) hiding a low sloped roof.*
- *Streetcar Commercial: wood or masonry construction and finish; generous ground floor retail display with individual or grouped upper level double hung windows in an otherwise solid wall.*
- *Large ground floor storefront windows with short bulkhead wall below and very often with transom windows above; wood frames or appropriate metal. Trim at window/transom frame edges.*
- *Often recessed store entries; side entries typically not recessed. Separate entries for individual stores.*
- *Streetcar Multifamily: wood or masonry construction and finish. Less emphasis on retail display, but location of public and lobby areas adjoining the public way. Possible upper level window bays within the width and height of the primary or side façades. Possible entry projection.*
- *Upper Level Entry: typically a single shared entry with small lobby.*
- *Upper story wood framed windows designed as 'punched' openings in the otherwise solid wall, regularly spaced; individual, paired double hung design or triple units with fixed center and double hung side lights. Possible transom windows. Possible flat arch windows in masonry walls.*
- *Façade with modest, but defining cornice, possible belt cornice. Wood exteriors can support more detailing; masonry or plaster finished buildings with less detail and ornamentation; typically, no significant form projections or recesses except window bays or entries.*
- *Materials/Finish: cement plaster (stucco), brick, concrete with plaster over, horizontal board siding; fabric awnings, possible flat steel/wood building supported canopy.*

Finding: Denial The Historic Review Board is tasked with finding the least impactful full ADA ramp option. The Secretary of Interior often recommends using contrasting materials with a lighter, simpler design to reduce the impact on historic buildings. In this case, the resource is the Mcloughlin Conservation District.

A black powder-coated metal ramp with simple railings spaced at the minimum needed to meet building code allows for the least amount of visual impact. Additionally, the use of a contrasting material will help further to reduce the massing of the ramp on the building; this differentiation addresses the Historic

Review Board's concerns that the previous wood ramp was adversely impacting the foursquare design of the building as the ramp appeared to be an extension the building.

As the applicant has provided multiple versions of plans and elevation over the course of this application, some of which were not constructed as proposed, the Board requested a final design that incorporated their direction on various elements discussed over the course of many months to ensure they can be constructed as proposed.

Per AP 21-0006, the massing and design of the proposed rear ramp resulted in a structure that would no longer read as a Foursquare-inspired design when viewed from the side, which was highly visible from 5th Ave, lacked appropriate mitigation and that the applicant failed to show that less impactful alternatives were fully considered and proved infeasible. Although ADA requirements do apply to structures that are subject to historic resource protections, the ADA does not exempt owners from complying with historic resource requirements to the extent possible. This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the needed evidence to show that the proposal provides the best option that balance the needs of the applicant and the impact on the historic district.

17.40.065 - Historic Preservation Incentives.

A. Purpose. Historic preservation incentives increase the potential for historically designated properties to be used, protected, renovated, and preserved. Incentives make preservation more attractive to owners of locally designated structures because they provide flexibility and economic opportunities.

B. Eligibility for Historic Preservation Incentives. All exterior alterations of designated structures and new construction in historic and conservation districts are eligible for historic preservation incentives if the exterior alteration or new construction has received a certificate of appropriateness from the Historic Review Board per OCMC 17.50.110(c).

C. Incentives Allowed. The dimensional standards of the underlying zone as well as for accessory buildings (OCMC 17.54.100) may be adjusted to allow for compatible development if the expansion or new construction is approved through historic design review.

D. Process. The Applicant must request the incentive at the time of application to the Historic Review Board.

Finding: Not applicable. No preservation incentives are proposed.

CONCLUSION AND RECOMMENDATION

This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the necessary evidence to identify an ADA ramp option that preserves the character of the historic district, to the extent feasible. Without the benefit of additional submittals, the Board lacks the necessary evidence to determine if the proposed design, as conditioned, will satisfy the standards. Staff **recommends Denial of GLUA 22-00031: HR 22-0011 1020 5th Steet** as the proposal does not demonstrate a concerted effort to protect historic resources and meet the needs of the Applicant under the Americans with Disabilities Act, particularly the obligation to ensure that new construction does not introduce a new building style that “dilutes and distracts from the historic context of the district”.

EXHIBITS

1. Applicant Submittal (HR 22-0011)
 - a. November 15, 2022 Memo from Erin Ward, Heritage Consulting Group.
 - b. Applicant Submittal Metal Ramp
 - i. Side elevation
 - ii. Rear elevation

- iii. Revised landscape plan
- iv. Metal spec
- c. Applicant Submittal Wood Ramp

2. Secretary of Interior Standards for Rehabilitation- Accessibility

ONFILE

- 3. HR 20-001 (*Original Approval*)
 - a. Staff Report and Notice of Decision
 - b. Plans
- 4. HR 21-0020 (*Denial of Full ADA ramp and Approval of a smaller side entry ADA ramp*)
 - a. Staff Report and Notice of Decision
 - b. Plans
- 5. AP 21-0006 *City Commission (Denial of Full ADA ramp and Approval of a smaller side entry ADA ramp)*
 - a. Staff Report and Notice of Decision
 - b. Plans
- 6. Historic Review Board and City Commission Meetings –
All Public Hearing for Planning Files GLUA 21-00052 / HR-21-00020 Modification of HR 20-00001,
and AP 21-0006

The following meeting agendas, videos, staff report and exhibits for this project are available for viewing at <https://www.orcity.org/meetings> and are part of the record.

Date	City Website
September 28, 2021 Historic Review Board Meeting	https://www.orcity.org/bc-hrb/historic-review-board-13
October 26, 2021 Historic Review Board Meeting	https://www.orcity.org/bc-hrb/historic-review-board-15
November 30, 2021 Historic Review Board Meeting	https://www.orcity.org/bc-hrb/historic-review-board-16
February 2, 2022 City Commission Meeting	https://www.orcity.org/citycommission/city-commission-regular-meeting-revised-18
February 16, 2022 City Commission Meeting	https://www.orcity.org/citycommission/city-commission-regular-meeting-15



CITY OF OREGON CITY

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Staff Report

To: Historic Review Board **Agenda Date:** 1/24/2023

From: Christina Robertson-Gardiner, Senior Planner

SUBJECT: GLUA 22-00031: HR-22-00010 resubmission for a full ADA ramp modification of HR 20-00001 -1020 5th Street

STAFF RECOMMENDATION: This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the necessary evidence to identify an ADA ramp option that preserves the character of the historic district, to the extent feasible. Without the benefit of additional submittals, the Board lacks the necessary evidence to determine if the proposed design, as conditioned, will satisfy the standards. Staff **recommends Denial of GLUA 22-00031: HR 22-0011 1020 5th Street** as the proposal does not demonstrate a concerted effort to protect historic resources and meet the needs of the Applicant under the Americans with Disabilities Act, particularly the obligation to ensure that new construction does not introduce a new building style that “dilutes and distracts from the historic context of the district”.

BACKGROUND:

At the November 22, 2022, Historic Review Board meeting, the Board reviewed the submittal and found that there was a lack of evidence in the record to support the revised ADA ramp design that transitioned from the wood railings (side door entrances) to metal railings (rear door entrance), they provided a list of additional materials needed for the record. Without this critical evidence, the HRB found that they could not approve the application with conditions.

They provided a list of submittals that would be needed to demonstrate a concerted effort to protect historic resources and meets the needs of the Applicant under the Americans with Disabilities Act. As of January 17, 2023, the applicant has not submitted any of the requested materials.

Although ADA requirements do apply to structures that are subject to historic resource protections, the ADA does not exempt owners from complying with historic resource requirements to the extent possible. The crux of the Historic Review analysis of this proposal, as previously explained, is that the burden is on the Applicant to show the

evidence necessary to conclude that a full exterior ramp is an architecturally compatible means of allowing residents to access the second floor of the house on a sloped lot.

As found in AP 21-0006, the massing and design of the proposed rear ramp resulted in a structure that would no longer read as a Foursquare-inspired design when viewed from the side, which was highly visible from 5th Ave, lacked appropriate mitigation and that the applicant failed to show that less impactful alternatives were fully considered and proved infeasible.

This application (HR 22-0011) with a revised design (wood + metal) full ADA ramp to the rear elevation continues to lack the needed evidence to show that the proposal provides the best option that balance the needs of the applicant and the impact on the historic district. As the items listed above were not submitted, staff recommended the denial of this application. Without this critical evidence, the Board will not be able to approve the application with conditions.

OPTIONS:

1. Approve the proposal with modified conditions and provide revised findings
2. Deny the application with findings found in the attached staff report
3. Continue the hearing, request more information and a extension of the 120-day date to September 2, 2023 (maximum extension allowed by state law)



KARNAFEL|DESIGNS
VANCOUVER, WA
503.313.7055
KARNAFEL@GMAIL.COM

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PROJECT TITLE:
YIP RESIDENCE
5TH ST JQ ADAMS ST
OREGON CITY, OR 97045

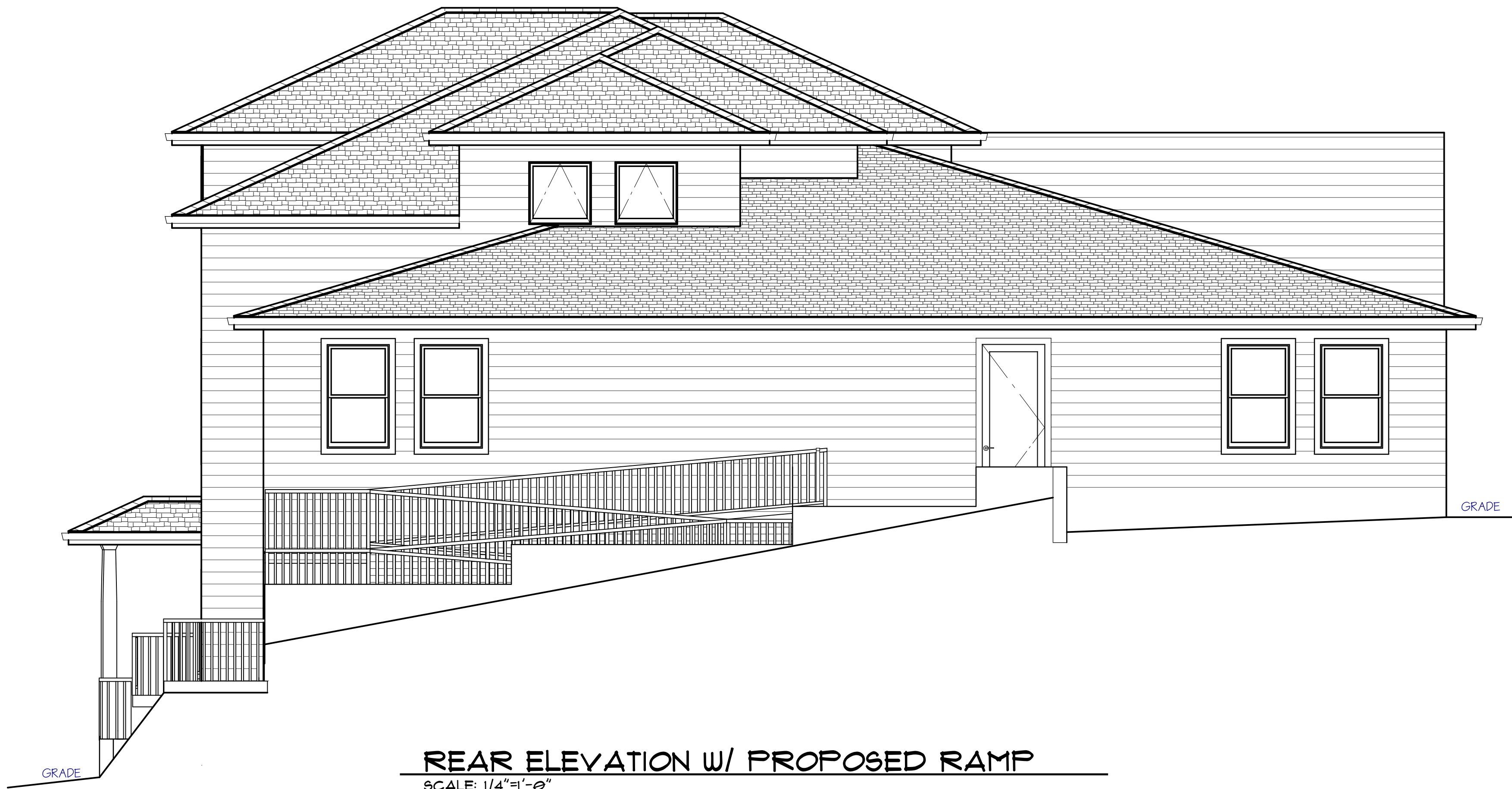
DRAWING TITLE:
EXTERIOR ELEVATIONS

DATE
NOVEMBER 16, 2022

SHEET NO:
G1.0

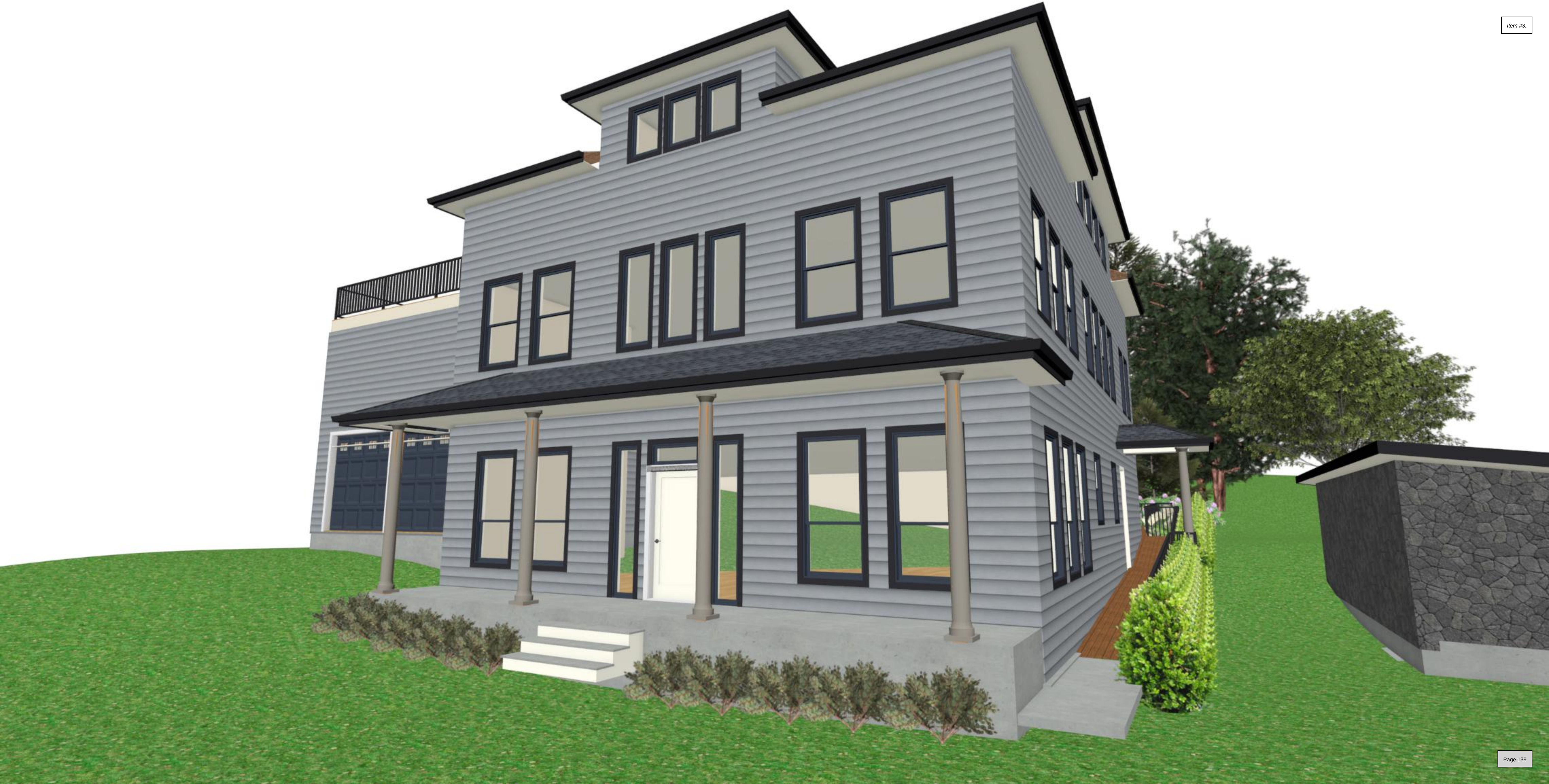


RIGHT ELEVATION W/ PROPOSED RAMP
SCALE: 1/4"=1'-0"



REAR ELEVATION W/ PROPOSED RAMP
SCALE: 1/4"=1'-0"





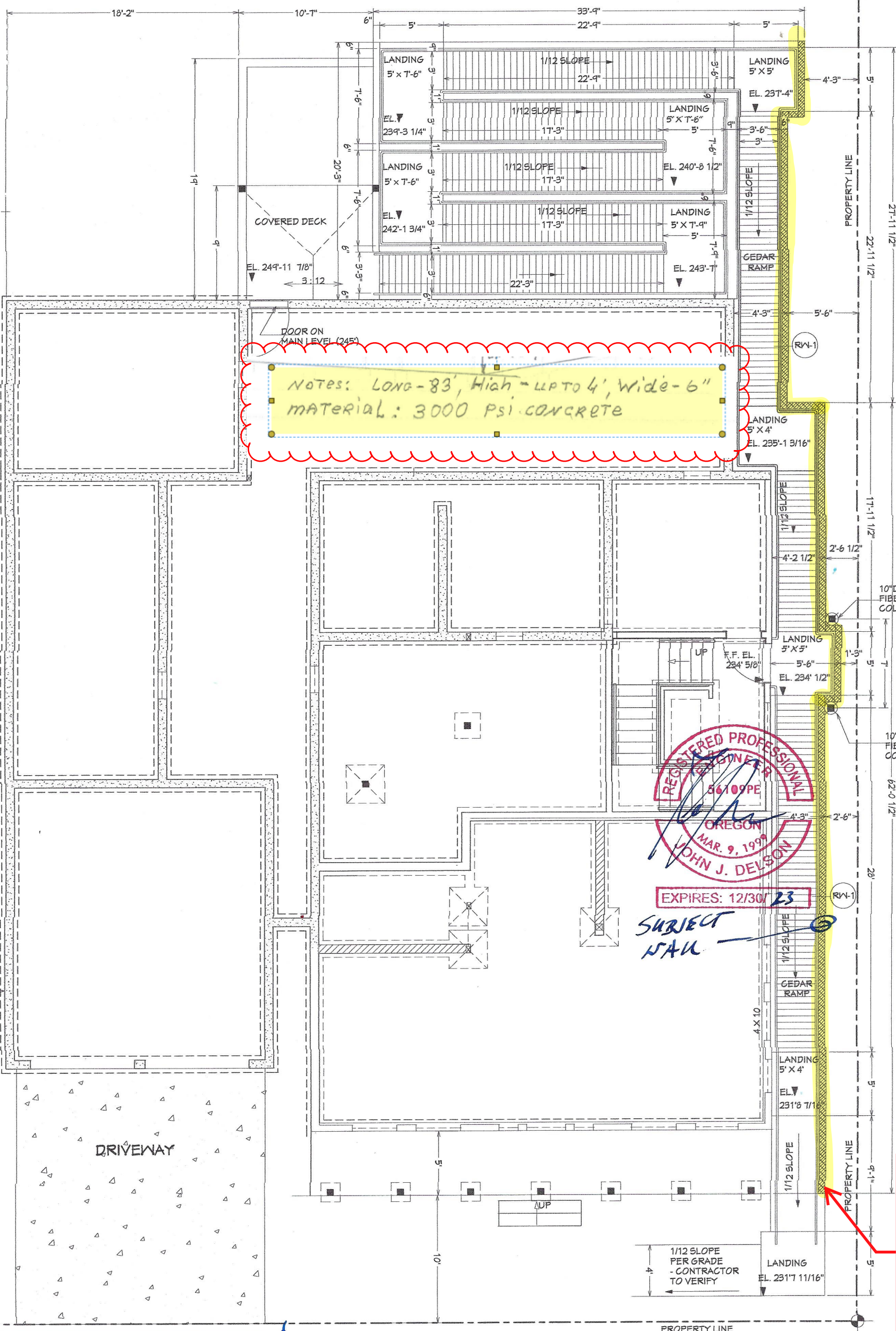


Item #3.



Page 141

Retaining Wall
ONLY



REGISTERED PROFESSIONAL
ENGINEER
56109PE
OREGON
MAR. 9, 1999
JOHN J. DELSON
EXPIRES: 12/30/23
SUBJECT
NAIL

Concrete retaining wall approved by Planning

C.Robertson-Gardiner
10.25.22

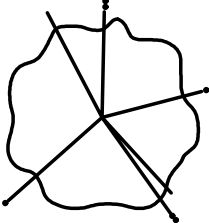
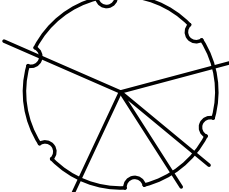
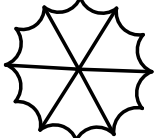
No other portion of this plan is approved by Planning with this permit.

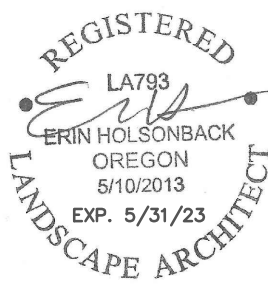
ONLY concrete retaining wall approved by DS and wall shall be per Planning conditions. No other portion of this plan is approved. Sang Pau 11/2/2022

SITE PLAN W/ ADA RAMP
1/8"=1'-0"

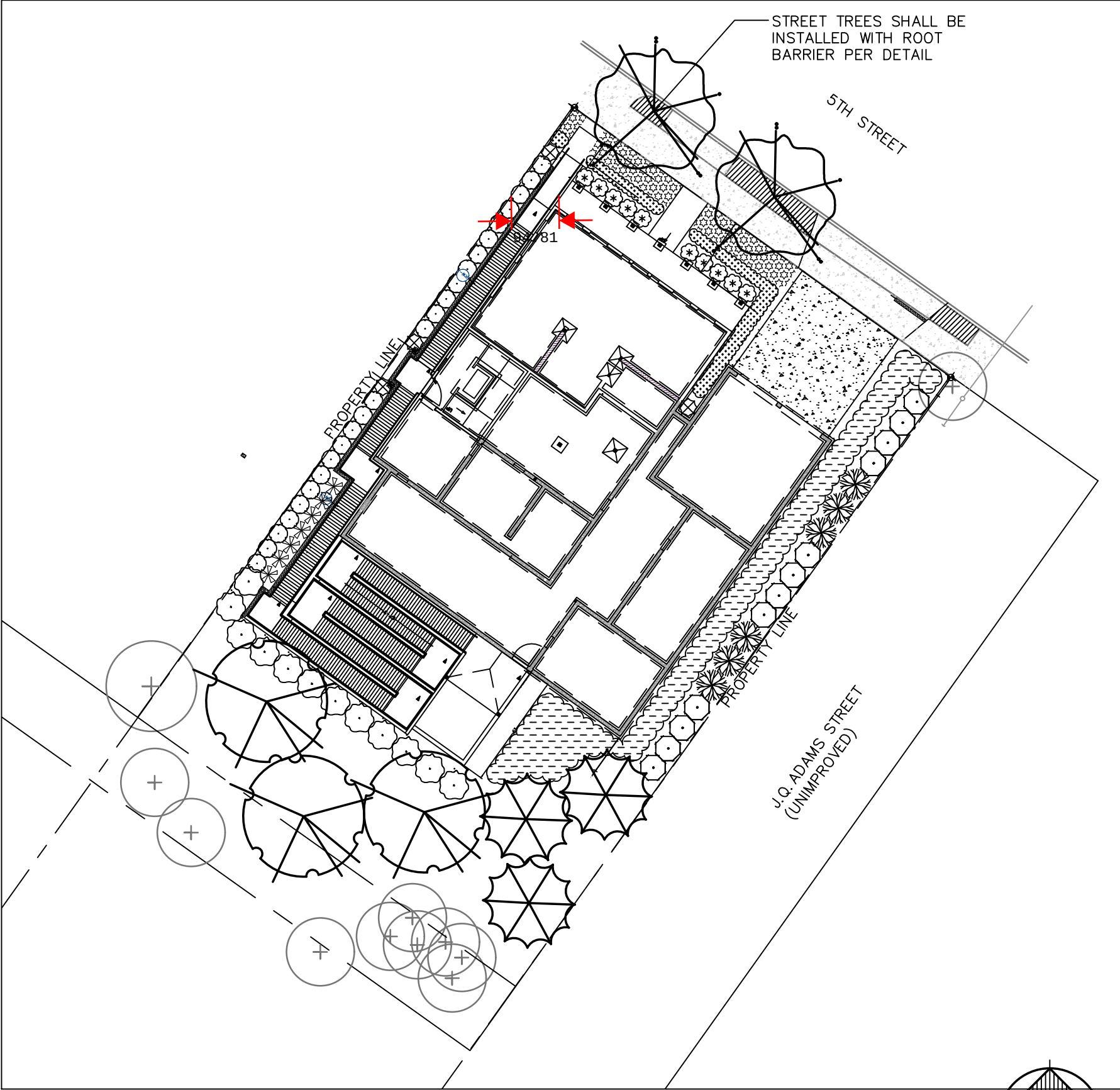
PLANT LIST:

SYMBOL	QTY.	LATIN NAME/ Common Name	SIZE	SPACING
--------	------	-------------------------	------	---------

STREET TREES				
	2	SYRINGA RETICULATA Japanese Tree Lilac	2" cal.	As Shown
MITIGATION TREES				
	3	CORNUS NUTALLII Pacific Dogwood	2" cal.	As Shown
	3	TSUGA HETEROPHYLLA Western Hemlock	6' ht.	As Shown
SHRUBS				
	32	NANDINA DOMESTICA 'HARBOR BELLE' Harbor Belle Nandina	2 gal.	2' o.c.
	10	PIERIS JAPONICA 'LITTLE HEATH' Little Heath Pieris	5 gal.	3' o.c.
	4	TAXUS MEDIA 'STONEHENDGE' Stonehendge Yew	5 gal.	3' o.c.
	6	CORNUS ALBA 'BAILHALO' Ivory Halo Dogwood	2 gal.	5' o.c.
	7	HYDRANGEA PANICULATA 'LITTLE LIME' Little Lime Hydrangea	2 gal.	3' o.c.
	12	VACCINIUM OVATUM Evergreen Huckleberry	5 gal.	4' o.c.
	24	BUXUS SEMPERVIRENS 'GREEN MOUNTAIN' Green Mountain Boxwood	2 gal.	3' o.c.
	12	CAMELLIA JAPONICA 'NUCCIO'S GEM' Nuccio's Gem Camellia	5 gal.	6' o.c.
	35	MAHONIA REPENS Creeping Mahonia	1 gal.	3' o.c.
GROUNDCOVER				
	14	ARCTOSTAPHYLOS U.U. 'WOOD'S DWARF' Wood's Dwarf Kinnikinnick	1 gal.	3' o.c.
	63	EPIMEDIUM PERRALCHICUM 'FROHNLEITEN' Frohnleiten Bishop's Hat	1 gal.	2' o.c.
	44	LIRIOPE MUSCARI 'BIG BLUE' Big Blue Lily Turf	1 gal.	2' o.c.

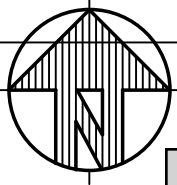


OTTEN + ASSOCIATES
LANDSCAPE ARCHITECTURE
3933 South Kelly Avenue, Suite B
Portland, OR, 97239
(503) 972-0311
www.ottenla.com



LANDSCAPE PLAN (11/15/2022)

SCALE 1" = 20'-0"

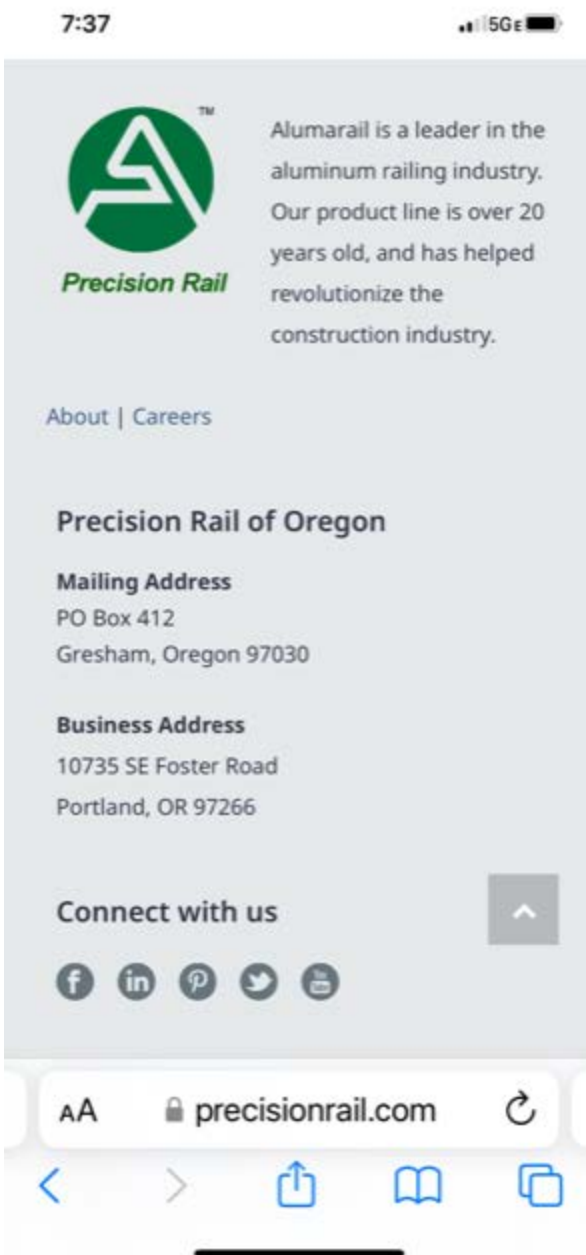


5th STREET + J.Q. ADAMS STREET

From: [Bogdan S](#)
To: [Christina Robertson-Gardiner](#)
Cc: [Bogdan Smolinets](#)
Subject: Black aluminum railing
Date: Tuesday, October 25, 2022 9:23:44 AM
Attachments: [IMG_5164.PNG](#)
[IMG_5163.PNG](#)
[IMG_5162.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.

Black color Alumarail by Precision Rail



7:34

5G

Alumarail Benefits & Advantages

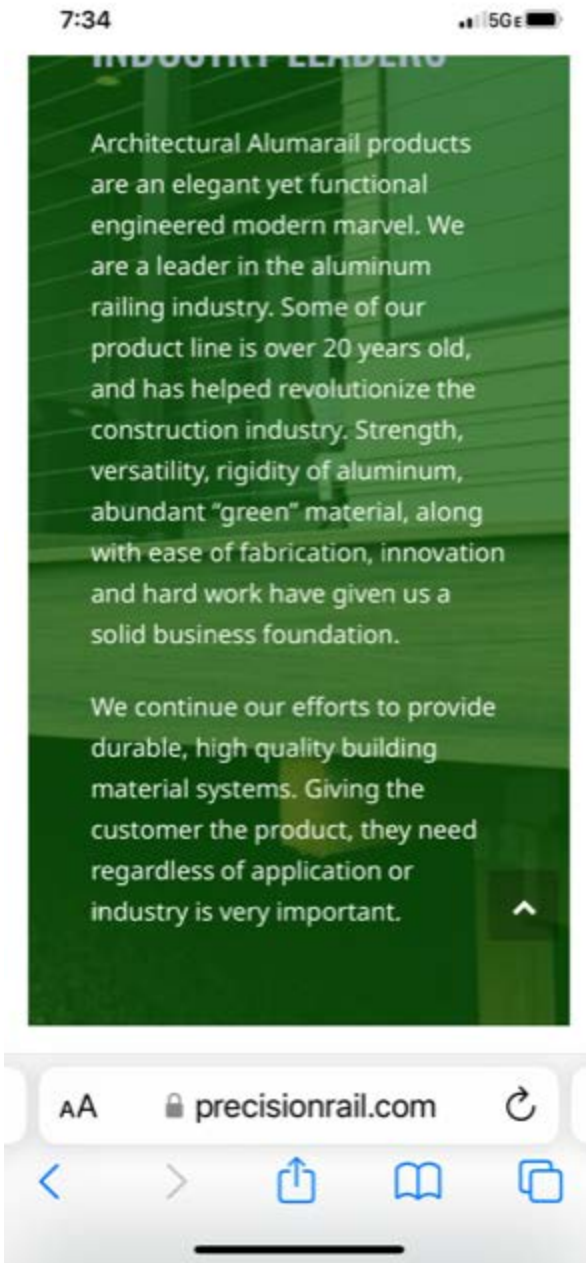
ENGINEERED TO BE
VERSATILE, SIMPLE,
YET ELEGANT

Alumarail products are designed to be easily installed by the do-it-yourself customer or by professional carpenters at competitive prices. Aluminum is a superior alternative for steel in most railing and fencing applications.

Alumarail products are engineered to meet your city, county, and state permitting requirements.

Alumarail works well for any deck, balcony, terrace, windbreaks, stairs, sunshade, or fencing needs.

 precisionrail.com



Sent from my iPhone

From: [Bogdan Smolinets](#)
To: [Christina Robertson-Gardiner](#); [Bogdan Smolinets](#)
Subject: ADA Ramp rail sample
Date: Tuesday, October 25, 2022 9:28:12 AM
Attachments: [IMG_5160.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.

The same product like over garage railing in black color.



Sent from my iPad

Ramp Assessment

Item #3.

1020 5th Street, Oregon City, OR
HR-22-00010



Prepared for:

NW Custom Homes Inc.
15730 SE Bybee Dr.
Portland OR 97236

Prepared by:

Heritage Consulting Group
(215) 248-1260
www.heritage-consulting.com

November 14, 2022



NW Custom Homes Inc. is proposing to install an ADA accessible ramp at 1020 5th Street, Oregon City, OR, in order to provide barrier-free access to the first floor office and second floor residence. NW Custom Homes Inc. retained Heritage Consulting Group to complete an analysis of the alternative ADA options and the proposed design of the ramp as directed by the Historic Review Board on September 27, 2022.

The property at 1020 5th Street is located within the McLoughlin Historic Conservation District but is not a historic building as it was constructed in 2022. The construction of the property was approved by the Oregon City Historic Review Board. The proposed ADA accessible ramp is currently under review by the Historic Review Board which requested additional information regarding the Alternative Options Analysis, landscape plan, and revised design.

Per the request of the Historic Review Board, the proponent has reviewed the alternative options suggested to provide full ADA access to the building interior. The alternative options included the addition of an interior chair lift or residential elevator, the addition of exterior stairs and an exterior chair lift, the installation of the ramp at the southeast elevation using the natural topography, the use of alternative materials such as metal in the design as included in the final drawings that were proposed and approved as part of HR20-0001, reduction in the size of the rear porch and massing of the ramp, installation of a taller retaining wall, and revising the landscape design. The construction of the building is largely complete so any options that require major modification to the design including the installation of an interior chair lift or elevator would be cost prohibitive. Additionally, the applicant is concerned about the maintenance for these items and that they will be rendered useless during inclement weather or a power outage. The topography along the southeast elevation does not meet the code requirements for the rise of the ramp. A larger retaining wall would be more visually intrusive than the ramp itself and block the natural view shed.

That being said, a number of the suggested alternative options have been incorporated into the revised design. The applicant is proposing to utilize a painted metal railing rather than wood. The use of metal will allow for a lighter, airier railing. Additionally, the porch has been scaled back to serve as a covered landing at the entrance rather than a porch. The massing of the ramp at the rear has been significantly reduced limiting the number of switchbacks to the minimum required to meet code. The revised design incorporates planters that will help to limit visibility of the proposed ramp and the applicant will plant native and historically compatible plantings at the rear and side elevations. These design revisions have reduced the physical and visual impact on the adjacent properties as well as the Conservation District as a whole.

In conclusion, it is our professional opinion that the current design of the ramp is the option that provides the ADA access required while most sensitively addressing the potential impacts to the surrounding historic district. The proposed design merges the recommendations made by the HRB and planning staff including the use of alternative materials, reduction in massing, and suggested landscaping with the needs of the building's future occupants. In deference to the surrounding conservation district, the proposed ramp is in keeping with the guidance provided by the National Park Service's *Preservation Brief 32: Making Historic Properties Accessible* and will provide the safest, long-lasting, minimally invasive access to the subject building.

In 2021 the Historic Review Board and the City planning staff provided alternative options for ADA access to the building as part of their response to the original application for the ramp (HR21-00020). On September 27th, 2022, the Historic Review Board and City planning staff reintroduced these alternatives in response to the appeal (AP21-00006). Below is an assessment of each alternative as it relates to the subject project:

1. *An interior ADA access from the ground floor through the garage, interior stairway, or other means.*

At this time, the construction of the building is largely complete. As construction is nearly complete, undertaking a change to the interior design to accommodate an interior means of ADA access would be cost-prohibitive on the part of the owner and is not feasible. The industry standard cost for a chair lift is approximately \$5,000. The industry standard cost for a residential elevator is approximately \$30,000. These prices do not include the cost of undertaking a change to the interior programming of the building. In addition, it is our understanding that the zoning of this area requires that the property be mixed-use (commercial and residential). As the building proposes a commercial use at the first floor and a residential use at the second floor, two separate points of entry are needed to ensure resident and building safety. Creating a shared interior lobby space would remove needed square footage from the commercial space and would not provide the residential space with a separate entrance. As there will be individual entrances to each floor, the currently proposed exterior ramp provides full ADA access to both floors.

2. *A noncommercial interior chair lift or residential-scaled elevator.*

As explained in item 1, the construction of the building is nearly complete and therefore the addition of an interior chair lift or residential scaled elevator would require major modifications to the home and would be cost-prohibitive on the part of the owner. In looking into these alternatives, the home owner expressed concern about the necessary upkeep and maintenance of an interior chair lift and residential-scaled elevator for providing ADA access as both options would be rendered unusable during power outages or inclement weather.

3. *A chair lift accommodation along exterior stairs that hugged the building.*

In exploring the option of installing a chair lift at the exterior stairs, it was determined that the addition of the exterior stair, chair lift, and associated mechanical equipment would add a great deal more visible massing to the building and would have a larger visual impact to the surrounding district than the proposed ramp solution. As currently designed, the proposed exterior ramp is minimally intrusive to the surrounding district with much of it located at the rear of the property. In addition, there is concern that an exterior chair lift would be rendered unusable during power outages or inclement weather and would thus not provide full ADA access to the building. Finally, the installation of an exterior chair lift would be cost-prohibitive and would require many changes to the already constructed property, rendering it not feasible.

4. *An ADA-compliant design relying on the existing uphill topography on the left or southeast side elevation.*

The applicant explored the potential of constructing the exterior ramp at several different locations around the building. The southeast side of the building cannot be used as the grade of the topography does not meet the code requirements for rise of the ramp. Additionally, the proposed ramp provides ADA access to the first floor office space as

well as the second floor residential space and the first floor entrance is located on the opposite side of the building. As such the current proposed design provides full ADA access to the interior in a location that is facing the rear of the building and is the least visually intrusive to the surrounding district.

5. *The use of materials and design that create a lighter, airier appearance, such as painted metal.*

In response to the comments received, the design of the ramp has been revised to utilize a painted metal railing rather than wood. The use of metal will allow for a lighter, airier railing and will match what is already installed along the garage roofline. The simple Alumarail by Precision Rail railing design (as shown in the photograph below) is compatible with the conservation district and the Craftsman design of the subject building. Additionally, this type of railing was previously approved for the subject building and therefore will provide a consistent appearance and aesthetic.



Photo of garage showing existing garage railing with use of Alumarail by Precision Rail

6. *Consider whether the removal or reduction in the depth of the rear porch would reduce the massing of the ADA ramp.*

In response to the comments received, the applicant has revised the design of the rear porch to be smaller in scale and to serve merely as a covered landing at the second floor entrance. Additionally, the massing of the rear ramp has been significantly reduced, limiting the number of switchbacks to the minimum required to meet code. The proponent will add planters facing the rear to further minimize the visibility of the ramp to the surrounding district and adjacent neighbors.

7. *Utilizing a taller retaining wall (assuming that it is made of appropriate materials) toward the rear along the side to provide some level of initial screening that can be further subsidized with plantings.*

In response to comments received, the applicant has explored the option of a taller retaining wall at the rear of the ramp. While a taller wall would provide additional screening, the construction of a taller retaining wall would be more visually intrusive to the surrounding district. In contrast, the metal railing of the ramp, as proposed, is minimally intrusive to the surrounding district and is low in height. This solution allows more of the previously approved building to remain exposed and does not create a large,

visual barrier. The design of the ramp is in keeping with the NPS guidance from Preservation Brief 32, which dictates the use of, compatible yet distinguishable materials. A larger retaining wall would draw further attention to the area and obscure the natural view shed. In addition to the planters the applicant will plant native and historically compatible plantings at the rear and side of the building to further screen the ramp.

8. *Provide a revised landscape plan that incorporates the proposed replacement retaining wall and mitigation planting along with some indication that the selected plant types are appropriate for the location.*

The applicant has discussed the proposed landscape plan with staff and understands that the landscaping will need to be compatible with the conservation district. It is our understanding that the plantings will either need to be native to the area or historically compatible and of the English garden variety and will further follow up with staff regarding proposed plantings to ensure they are compatible with the district.

RAMP ASSESSMENT

While the subject property is not a historic property, it is located within the McLoughlin Historic Conservation District and the design of the new construction and ramp are in keeping with the requirements of the surrounding district. Historic districts and their associated properties were not always designed with ADA access in mind. With the introduction of the Americans with Disabilities Act in 1990 many historic properties required modifications to allow for ADA access and to keep up with current codes. The NPS has released guidance on the intersection of ADA and Preservation, most notably *Preservation Brief 32: Making Historic Properties Accessible*. While the subject property is not a historic property, and the premise of a Conservation District instead of a Historic District, in essence is to afford additional flexibility so long as the character of the district is retained, this Preservation Brief was utilized for guidance on how to design historically compatible ADA access within a historic setting. Preservation Brief 32 states “Solutions should provide the greatest amount of accessibility without threatening or destroying those materials and features that make a property significant.” The Brief also states:

“Modifications to improve accessibility should generally be based on the following priorities:

- 1) Making the main or a prominent public entrance and primary public spaces accessible, including a path to the entrance;
- 2) Providing access to goods, services, and programs;
- 3) Providing accessible restroom facilities; and,
- 4) Creating access to amenities and secondary spaces.”

The subject property has two levels with different uses that require ADA access. The first floor office space that is required by zoning is being accessed by the ramp at the northwest elevation. The second floor residence is accessed at the rear southwest elevation. The placement of the ramp leading to these entrances is minimally visible from public rights of way, located on secondary and rear elevations, and compatibly designed, which is in keeping with National Park Service (NPS) Guidance. NPS guidance states, “New accessible features such as ramps, lifts, elevators, and elevator towers should be added in the least intrusive locations. Adding these features to primary elevations and significant interior spaces is discouraged.”

The design of the ramp has been modified in response to comments received from the Historic Review Board to reduce the massing at the rear of the building and limiting the switchbacks to meet minimum code requirements. NPS guidance states, “The steepest allowable slope for a ramp is usually 1:12 (8%), but gentler slopes should be used whenever possible to accommodate people with

limited strength. Greater changes in elevation require larger and longer ramps to meet accessibility scoping provisions and may require an intermediate landing.” The natural topography surrounding the building presents challenges in providing ADA access and a longer ramp is required to provide the gentle slopes needed. That being said, the proposed design has the smallest number of switchbacks and landings required to meet current code requirements without creating too steep a slope. The length and massing of the ramp is required to provide code compliant ADA access to the first and second floors.

Preservation Brief 32 indicates “the design of new features should also be differentiated from the design of the historic property.” In terms of the subject property, while the use of a painted metal railing in the district may seem atypical, its simple design is clearly distinguishable from adjacent historic properties and is compatible with the Craftsman design of the subject building and buildings throughout the district. Additionally, the use of metal allows for a more streamlined look that reduces the appearance of massing to the ramp and building and allows the ramp to read as a more open space. The use of native and historically compatible plantings along the ramp at the northwest and southwest elevations will further obscure the appearance of the ramp and further lessen any potential visual impacts to the surrounding district.

It is our professional opinion, that of the proposed alternative options and previous versions of the ramp design, the current proposed design is the best option available for providing ADA access to the subject building while protecting the visual character that defines the conservation district. The design merges the needs of the Americans with Disabilities Act and the need for preservation by providing a minimally intrusive design that meets the minimum code requirements. Thoughtful consideration has been put into the recommendations made by the HRB and planning staff. The proposed changes to the ramp’s materiality, massing, and landscaping will provide the building’s occupants with safe access to the property while maintaining the character defining character of the McLoughlin Historic Conservation District.

Heritage is a national firm that assists the owners and developers of older and historic buildings in understanding the relative significance of their resources, navigating the regulatory redevelopment processes, and securing financial opportunities from federal, state and local incentives. The firm is staffed by seasoned historic preservation professionals who meet the Professional Qualifications Standards under the category of *Historic Architecture* and *Architectural History* in the Secretary of the Interior's Standards and Guidelines, *Code of Federal Regulations, 36 CFR Part 61*.

Heritage does not provide accounting services, tax advice, or legal advice. You are urged to review any accounting, tax or legal matters which may be involved in the historic consulting advice provided by Heritage with an appropriate accountant or lawyer. Additionally, Heritage is not responsible for incorrect facts provided to Heritage by the client or its architect, design professionals, contractor, or consultant.

32 PRESERVATION BRIEFS

Making Historic Properties Accessible

Thomas C. Jester and Sharon C. Park, AIA



U.S. Department of the Interior
National Park Service
Cultural Resources
Heritage Preservation Services

Historically, most buildings and landscapes were not designed to be readily accessible for people with disabilities. In recent years, however, emphasis has been placed on preserving historically significant properties, and on making these properties—and the activities within them—more accessible to people with disabilities. With the passage of the Americans with Disabilities Act in 1990, access to properties open to the public is now a civil right.

This Preservation Brief introduces the complex issue of providing accessibility at historic properties, and underscores the need to balance accessibility and historic preservation. It provides guidance on making historic properties accessible while preserving their historic character; the Brief also provides examples to show that independent physical accessibility at historic properties can be achieved with careful planning, consultation, and sensitive design. While the Brief focuses primarily on making buildings and their sites accessible, it also includes a section on historic landscapes. The Brief will assist historic property owners, design professionals, and administrators in evaluating their historic properties so that the highest level of accessibility can be provided while minimizing changes to historic materials and features. Because many projects encompassing accessibility work are complex, it is advisable to consult with experts in the fields of historic preservation and accessibility before proceeding with permanent physical changes to historic properties.

Modifications to historic properties to increase accessibility may be as simple as a small, inexpensive ramp to overcome one entrance step, or may involve changes to exterior and interior features. The Brief does not provide a detailed explanation of local or State accessibility laws as they vary from jurisdiction to jurisdiction. A concise explanation of several federal accessibility laws is included on page 13.

Planning Accessibility Modifications

Historic properties are distinguished by features, materials, spaces, and spatial relationships that contribute to their historic character. Often these elements, such as steep terrain, monumental steps, narrow or heavy doors, decorative ornamental hardware, and narrow pathways and corridors, pose barriers to persons with disabilities, particularly to wheelchair users (See Figure 1).

A three-step approach is recommended to identify and implement accessibility modifications that will protect the integrity and historic character of historic properties:

- 1) Review the historical significance of the property and identify character-defining features;
- 2) Assess the property's existing and required level of accessibility; and
- 3) Evaluate accessibility options within a preservation context.

1) Review the Historical Significance of the Property

If the property has been designated as historic (properties that are listed in, or eligible for listing in the National Register of Historic Places, or designated under State or local law), the property's nomination file should be reviewed to learn about its significance. Local preservation commissions and State Historic Preservation Offices can usually provide

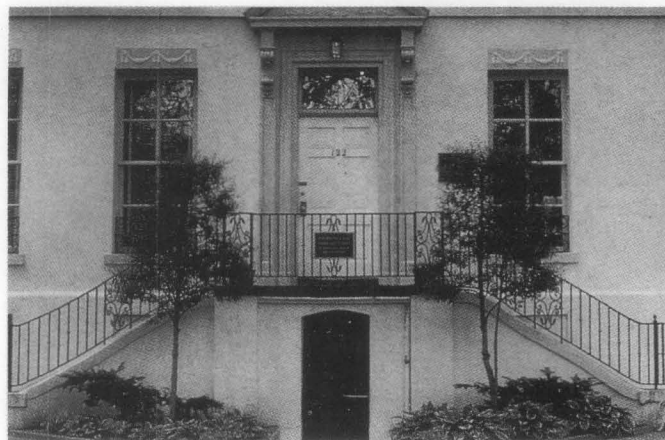
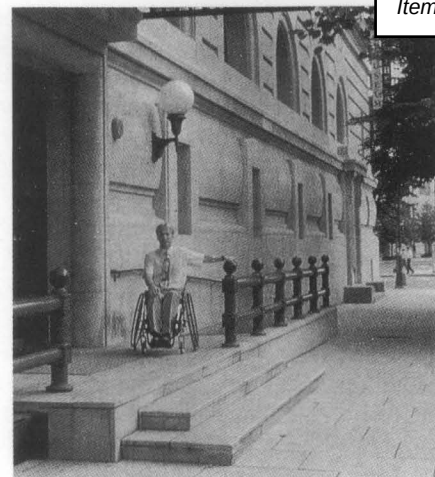


Figure 1. It is important to identify the materials, features, and spaces that should be preserved when planning accessibility modifications. These may include stairs, railings, doors, and door surrounds. Photo: National Park Service files.

copies of the nomination file and are also resources for additional information and assistance. Review of the written documentation should always be supplemented with a physical investigation to identify which character-defining features and spaces must be protected whenever any changes are anticipated. If the level of documentation for a property's significance is limited, it may be necessary to have a preservation professional identify specific historic features, materials, and spaces that should be protected.

For most historic properties, the construction materials, the form and style of the property, the principal elevations, the major architectural or landscape features, and the principal public spaces constitute some of the elements that should be preserved. Every effort should be made to minimize damage to the materials and features that convey a property's historical significance when making modifications for accessibility. Very small or highly significant properties that have never been altered may be extremely difficult to modify.

Secondary spaces and finishes and features that may be less important to the historic character should also be identified; these may generally be altered without jeopardizing the historical significance of a property. Non-significant spaces, secondary pathways, later additions, previously altered areas, utilitarian spaces, and service areas can usually be modified without threatening or destroying a property's historical significance.

2) Assess the Property's Existing and Required Level of Accessibility

A building survey or assessment will provide a thorough evaluation of a property's accessibility. Most surveys identify accessibility barriers in the following areas: building and site entrances; surface textures, widths and slopes of walkways; parking; grade changes; size, weight and configuration of doorways; interior corridors and path of travel restrictions; elevators; and public toilets and amenities (See Figure 2). Simple audits can be completed by property owners using readily available checklists (See Further Reading). Accessibility specialists can be hired to assess barriers in more complex properties, especially those with multiple buildings, steep terrain, or interpretive programs. Persons with disabilities can be particularly helpful in assessing specific barriers.

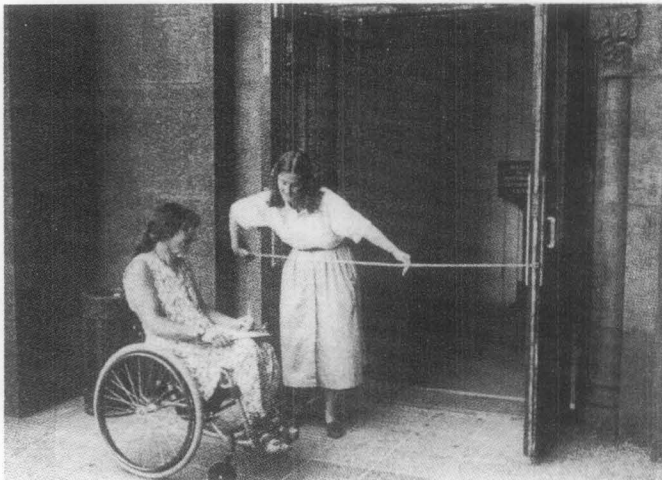


Figure 2. Surveys of historic properties can identify accessibility barriers. Persons with disabilities and accessibility consultants should participate whenever possible. Photo: Thomas Jester.

All applicable accessibility requirements—local codes and federal laws—should be reviewed carefully before undertaking any accessibility modification. Since many States and localities have their own accessibility regulations and codes (each with their own requirements for dimensions and technical requirements), owners should use the most stringent accessibility requirements when implementing modifications. The Americans with Disability Act Accessibility Guidelines (ADAAG) is the document that should be consulted when complying with the Americans with Disabilities Act (ADA) requirements.

3) Identify and Evaluate Accessibility Options within a Preservation Context

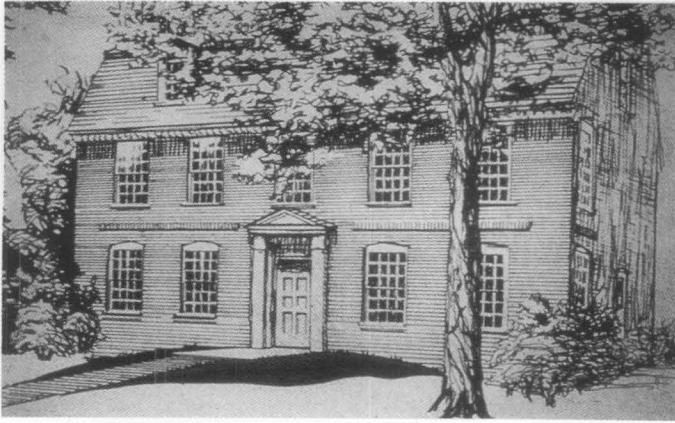
Once a property's significant materials and features have been identified, and existing and required levels of accessibility have been established, solutions can be developed (See Figure 3). Solutions should provide the greatest amount of accessibility without threatening or destroying those materials and features that make a property significant. Modifications may usually be phased over time as funds are available, and interim solutions can be considered until more permanent solutions are implemented. A team comprised of persons with disabilities, accessibility and historic preservation professionals, and building inspectors should be consulted as accessibility solutions are developed.

Modifications to improve accessibility should generally be based on the following priorities:

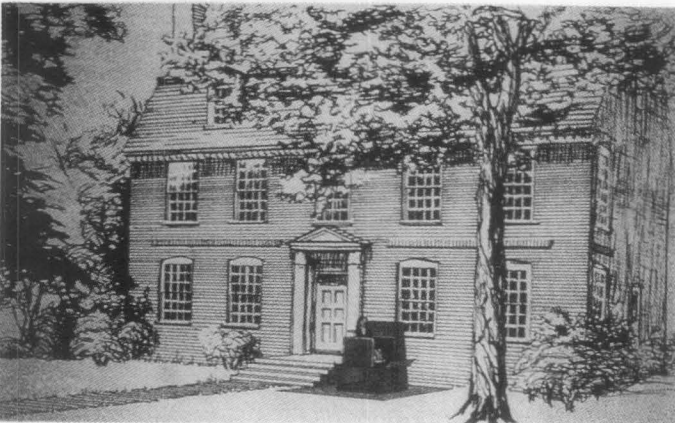
- 1) Making the main or a prominent public entrance and primary public spaces accessible, including a path to the entrance;
- 2) Providing access to goods, services, and programs;
- 3) Providing accessible restroom facilities; and,
- 4) Creating access to amenities and secondary spaces.

All proposed changes should be evaluated for conformance with the Secretary of the Interior's "Standards for the Treatment of Historic Properties," which were created for property owners to guide preservation work. These Standards stress the importance of retaining and protecting the materials and features that convey a property's historical significance. Thus, when new features are incorporated for accessibility, historic materials and features should be retained whenever possible. Accessibility modifications should be in scale with the historic property, visually compatible, and, whenever possible, reversible. Reversible means that if the new feature were removed at a later date, the essential form and integrity of the property would be unimpaired. The design of new features should also be differentiated from the design of the historic property so that the evolution of the property is evident. See *Making Historic Buildings Accessible* on page 9.

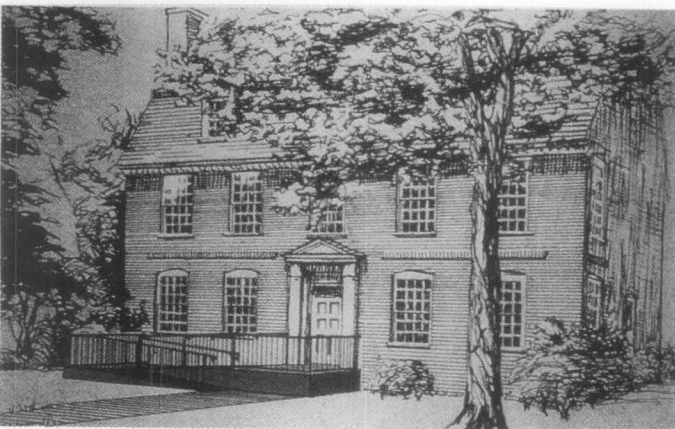
In general, when historic properties are altered, they should be made as accessible as possible. However, if an owner or a project team believes that certain modifications would threaten or destroy the significance of the property, the State Historic Preservation Officer should be consulted to determine whether or not any special accessibility provisions may be used. Special accessibility provisions for historic properties will vary depending on the applicable accessibility requirements.



A.



B.



C.

Figure 3. Before implementing accessibility modifications, owners should consider the potential effect on their historic property. At the Derby House in Salem, Massachusetts, several solutions to make the entrance accessible were considered, including regrading (a); a lift (b); and a ramp (c). The solution, an entrance on a secondary elevation, preserves the building's architectural significance and is convenient to designated parking. Drawings: National Park Service Files..

In some cases, programmatic access may be the only option for extremely small or unaltered historic properties, such as a two-story house museum with no internal elevator. Programmatic access for historic properties refers to alternative methods of providing services, information, and experiences when physical access cannot be provided. It

may mean offering an audio-visual program showing an inaccessible upper floor of a historic house museum, providing interpretive panels from a vista at an inaccessible terraced garden, or creating a tactile model of a historic monument for people with visual impairments.

Accessibility Solutions

The goal in selecting appropriate solutions for specific historic properties is to provide a high level of accessibility without compromising significant features or the overall character of the property. The following sections describe accessibility solutions and offer guidance on specific historic property components, namely the building site, entrances, interiors, landscapes, amenities, and new additions. Several solutions are discussed in each section, referencing dimensions and technical requirements from the ADA's accessibility guidelines, ADAAG. State and local requirements, however, may differ from the ADA requirements. Before making any modification owners should be aware of all applicable accessibility requirements.

The Building Site

An accessible route from a parking lot, sidewalk, and public street to the entrance of a historic building or facility is essential. An accessible route, to the maximum extent possible, should be the circulation route used by the general public. Critical elements of accessible routes are their widths, slopes, cross slopes, and surface texture. Each of these route elements must be appropriately designed so that the route can be used by everyone, including people with disabilities. The distance between the arrival and destination points should also be as short as possible. Sites containing designed landscapes should be carefully evaluated before making accessibility modifications. Historic landscapes are described in greater detail on pages 10 and 11.

Providing Convenient Parking. If parking is provided, it should be as convenient as possible for people with disabilities. Specially designated parking can often be created to improve accessibility (See Figure 4). Modifications to parking configurations and pathways should not alter significant landscape features.

Creating an Accessible Route. The route or path through a site to a historic building's entrance should be wide enough, generally at least 3 feet (91 cm), to accommodate visitors

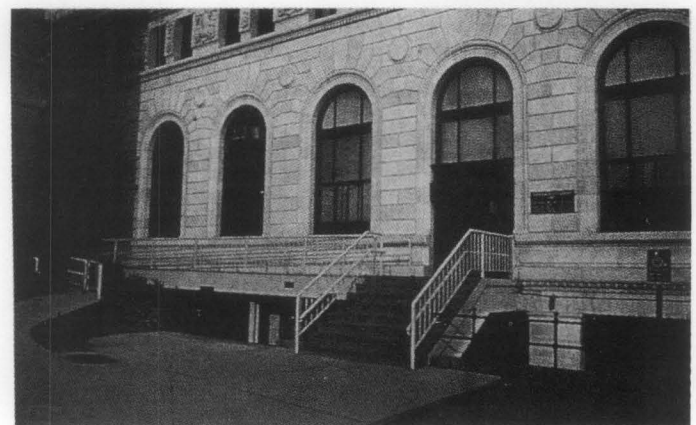


Figure 4. Parking designated for people with disabilities is provided near an accessible entrance to the Springfield Library in Springfield, Massachusetts. Photo: William Smith.

with disabilities and must be appropriately graded with a stable, firm, and slip-resistant surface. Existing paths should be modified to meet these requirements whenever possible as long as doing so would not threaten or destroy significant materials and features.

Existing surfaces can often be stabilized by providing a new base and resetting the paving materials, or by modifying the path surface. In some situations it may be appropriate to create a new path through an inaccessible area. At large properties, it may be possible to regrade a slope to less than 1:20 (5%), or to introduce one or more carefully planned ramps. Clear directional signs should mark the path from arrival to destination.

Entrances

Whenever possible, access to historic buildings should be through a primary public entrance. In historic buildings, if this cannot be achieved without permanent damage to character-defining features, at least one entrance used by the public should be made accessible. If the accessible entrance is not the primary public entrance, directional signs should direct visitors to the accessible entrance (See Figure 5). A rear or service entrance should be avoided as the only mean of entering a building.

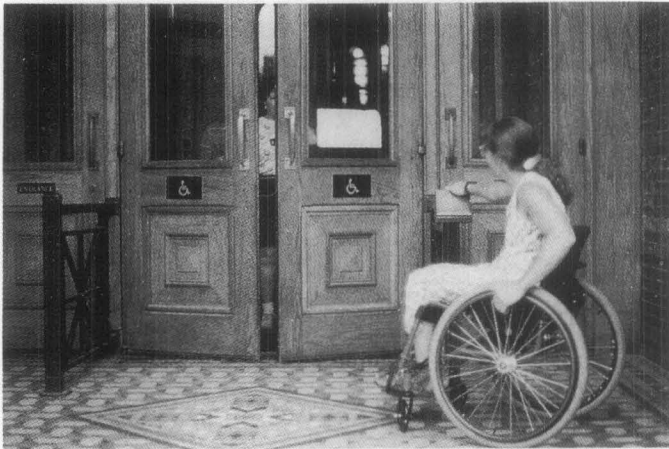


Figure 5. A universal access symbol clearly marks the Arts and Industries Building in Washington, D.C., and a push plate (right) engages the automatic door-opener. Photo: Thomas Jester.

Creating an accessible entrance usually involves overcoming a change in elevation. Steps, landings, doors, and thresholds, all part of the entrance, often pose barriers for persons with disabilities. To preserve the integrity of these features, a number of solutions are available to increase accessibility. Typical solutions include regrading, incorporating ramps, installing wheelchair lifts, creating new entrances, and modifying doors, hardware, and thresholds.

Regrading an Entrance. In some cases, when the entrance steps and landscape features are not highly significant, it may be possible to regrade to provide a smooth entrance into a building. If the existing steps are historic masonry, they should be buried, whenever possible, and not removed (See Figure 6).

Incorporating Ramps. Permanent ramps are perhaps the most common means to make an entrance accessible. As a new feature, ramps should be carefully designed and appropriately located to preserve a property's historic character (See Figure 7). Ramps should be located at public

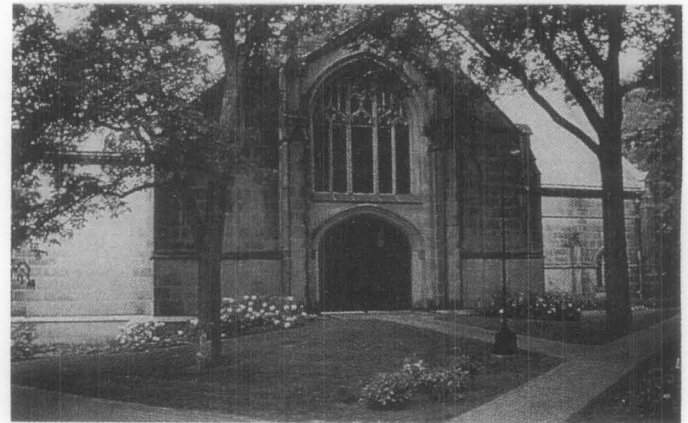


Figure 6. Entrances can be regraded to make a building accessible as long as no significant landscape features will be destroyed and as long as the building's historic character is preserved. The Houghton Chapel (a) in Wellesley, Massachusetts, was made accessible by regrading over the historic steps (b). Photos: Carol R. Johnson & Associates.



Figure 7. This ramp is convenient for visitors with disabilities and preserves the building's historic character. The design is also compatible in scale with the building. Photo: William Smith.

entrances used by everyone whenever possible, preferably where there is minimal change in grade. Ramps should also be located to minimize the loss of historic features at the connection points—porch railings, steps, and windows—and should preserve the overall historic setting and character of the property. Larger buildings may have below grade areas that can accommodate a ramp down to an entrance (See Figure 8). Below grade entrances can be considered if the ramp leads to a publicly used interior, such as an auditorium, or if the building is serviced by a public elevator. Ramps can often be incorporated

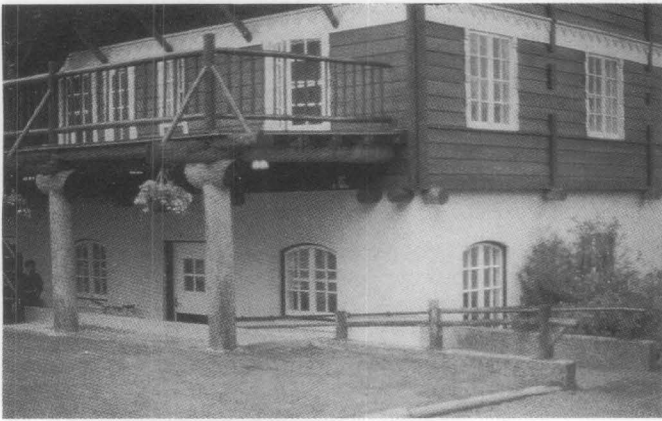


Figure 8. A new below-grade ramp provides access to Lake MacDonald Lodge in Glacier National Park. Photo: Thomas Jester

historic features, such as cheek-walls or railings, to minimize the visual effect (See Figure 9).

The steepest allowable slope for a ramp is usually 1:12 (8%), but gentler slopes should be used whenever possible to accommodate people with limited strength. Greater changes in elevation require larger and longer ramps to meet accessibility scoping provisions and may require an intermediate landing. Most codes allow a slightly steeper ramp for historic buildings to overcome one step.

Ramps can be faced with a variety of materials, including wood, brick, and stone. Often the type and quality of the materials determines how compatible a ramp design will be with a historic property (See Figure 10). Unpainted pressure-treated wood should not be used to construct ramps because it usually appears temporary and is not visually compatible with most historic properties. Railings



Figure 9. This ramp was created by infilling the window-well and slightly modifying the historic railing. The ramp preserves this building's historic character. Photo: Thomas Jester.

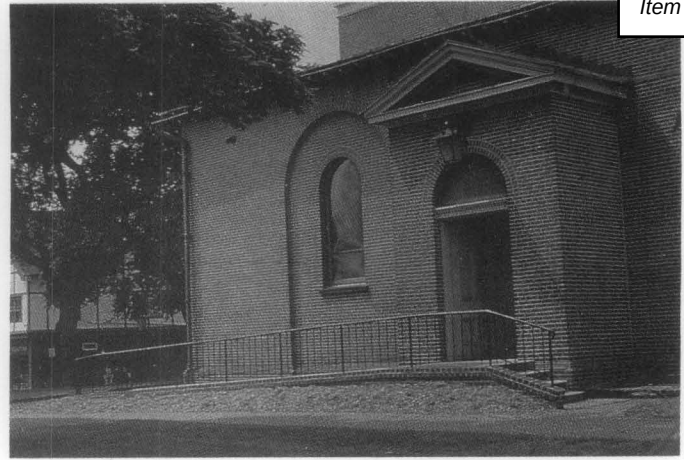


Figure 10. This brick ramp provides access to St. Anne's Episcopal Church in Annapolis, Maryland. Its design is compatible with the historic building. Photo: Charity V. Davidson.

should be simple in design, distinguishable from other historic features, and should extend one foot beyond the sloped area (See Figure 11).

Ramp landings must be large enough for wheelchair users, usually at least 5 feet by 5 feet (152.5 cm by 152.5 cm), and the top landing must be at the level of the door threshold. It may be possible to reset steps by creating a ramp to accommodate minor level changes and to meet the threshold without significantly altering a property's historic character. If a building's existing landing is not wide or deep enough to accommodate a ramp, it may be



Figure 11. Simple, contemporary railings that extend beyond the ramp slope make this ramp compatible with the industrial character of this building. Photo: Thomas Jester.

necessary to modify the entry to create a wider landing. Long ramps, such as switchbacks, require intermediate landings, and all ramps should be detailed with an appropriate edge and railing for wheelchair users and visually impaired individuals.

Temporary or portable ramps are usually constructed of light-weight materials and, thus, are rarely safe or visually compatible with historic properties. Moreover, portable ramps are often stored until needed and, therefore, do not meet accessibility requirements for independent access. Temporary and portable ramps, however, may be an acceptable interim solution to improve accessibility until a permanent solution can be implemented (See Figure 12).

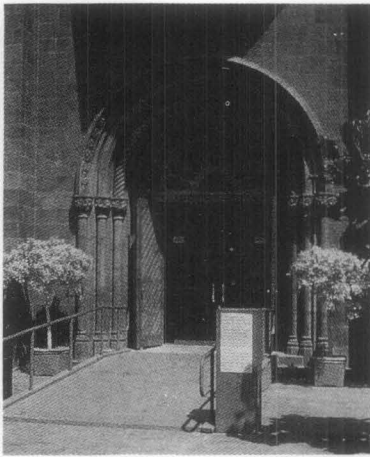


Figure 12. The Smithsonian Institution installed a temporary ramp on its visitor's center to allow adequate time to design an appropriate permanent ramp. Photo: Thomas Jester.

Installing Wheelchair Lifts. Platforms lifts and inclined stair lifts, both of which accommodate only one person, can be used to overcome changes of elevation ranging from three to 10 feet (.9 m-3 m) in height. However, many States have restrictions on the use of wheelchair lifts, so all applicable codes should be reviewed carefully before installing one.

Inclined stair lifts, which carry a wheelchair on a platform up a flight of stairs, may be employed selectively.

They tend to be visually intrusive, although they are relatively reversible. Platform lifts can be used when there is inadequate space for a ramp. However, such lifts should be installed in unobtrusive locations and under cover to minimize maintenance if at all possible (See Figure 13). A similar, but more expensive platform lift has a retracting railing that lowers into the ground, minimizing the visual effect to historic properties (See Figure 14). Mechanical lifts have drawbacks at historic properties with high public visitation because their capacity is limited, they sometimes cannot be operated independently, and they require frequent maintenance.

Considering a New Entrance. When it is not possible to modify an existing entrance, it may be possible to develop a new entrance by creating an entirely new opening in an appropriate location, or by using a secondary window for an opening. This solution should only be considered after exhausting all possibilities for modifying existing entrances (See Figure 15).

Retrofitting Doors. Historic doors generally should not be replaced, nor should door frames on the primary elevation be widened, as this may alter an important feature of a historic design. However, if a building's historic doors have been removed, there may be greater latitude in designing a compatible new entrance. Most accessibility standards require at least a 32" (82 cm) clear opening with manageable door opening pressures. The most desirable preservation solution to improve accessibility is retaining historic doors and upgrading the door pressure with one of several devices. Automatic door openers

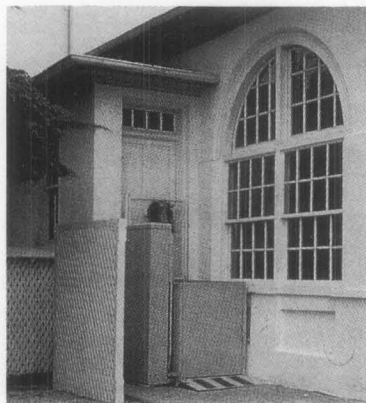


Figure 13. Platform lifts like the one used on this building require minimal space and can be removed without damaging historic materials. Shielded with lattice work, this lift is also protected by the roof eaves. Approach path should be stable, firm, and slip resistant. Photo: Sharon Park.

Readily Achievable Accessibility Modifications



Many accessibility solutions can be implemented easily and inexpensively without destroying the significance of historic properties. While it may not be possible to undertake all of the modifications listed below, each change will improve accessibility.

Sites and Entrances

- Creating a designated parking space.
- Installing ramps.
- Making curb cuts.

Interiors

- Repositioning shelves.
- Rearranging tables, displays, and furniture.
- Repositioning telephones.
- Adding raised markings on elevator control buttons.
- Installing flashing alarm lights.
- Installing offset hinges to widen doorways.
- Installing or adding accessible door hardware.
- Adding an accessible water fountain, or providing a paper cup dispenser at an inaccessible water fountain.

Restrooms

- Installing grab bars in toilet stalls.
- Rearranging toilet partitions to increase maneuvering space.
- Insulating lavatory pipes under sinks to prevent burns.
- Installing a higher toilet seat.
- Installing a full-length bathroom mirror.
- Repositioning the paper towel dispenser.



Figure 14. At the Lieutenant Governor's Mansion in Frankfort, Kentucky, a retracting lift (b) was installed to minimize the visual effect on this historic building when not in use (a). Photos: Aging Technology Incorporated.

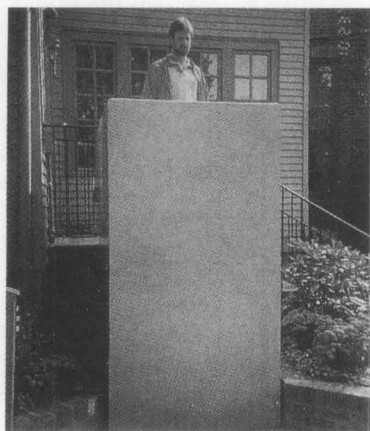


Figure 15. A new entrance to the elevator lobby replaces a window at Faneuil Hall in Boston, Massachusetts. The new entrance is appropriately differentiated from the historic design. Photo: Paul Holtz.

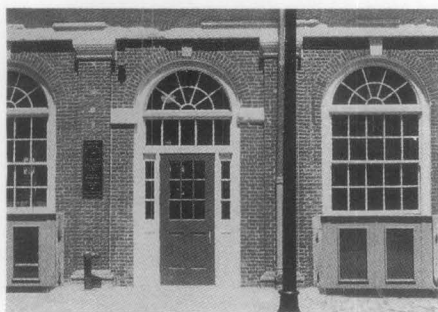


Figure 16. During the rehabilitation of the Rookery in Chicago, the original entrance was modified to create an accessible entrance. Two revolving doors were replaced with a new one flanked by new doors, one of which is operated with a push-plate door opener. Photo: Thomas Jester.

(operated by push buttons, mats, or electronic eyes) and power-assisted door openers can eliminate or reduce door pressures that are accessibility barriers, and make single or double-leaf doors fully operational (See Figure 16).

Adapting Door Hardware. If a door opening is within an inch or two of meeting the 32" (81 cm) clear opening requirement, it may be possible to replace the standard hinges with off-set hinges to increase the size of the door opening as much as 1 1/2" (3.8 cm). Historic hardware can be retained in place, or adapted with the addition of an automatic opener, of which there are several types. Door hardware can also be retrofitted to reduce door pressures. For example, friction hinges can be retrofitted with ball-bearing inserts, and door closers can be rethreaded to reduce the door pressure.

Altering Door Thresholds. A door threshold that exceeds the allowable height, generally 1/2" (1.3 cm), can be altered or removed with one that meets applicable accessibility

requirements. If the threshold is deemed to be significant, a bevel can be added on each side to reduce its height (See Figure 17). Another solution is to replace the threshold with one that meets applicable accessibility requirements and is visually compatible with the historic entrance.

Moving Through Historic Interiors

Persons with disabilities should have independent access to all public areas and facilities inside historic buildings. The extent to which a historic interior can be modified depends on the significance of its materials, plan, spaces, features, and finishes. Primary spaces are often more difficult to modify without changing their character. Secondary spaces may generally be changed without compromising a building's historic character. Signs should clearly mark the route to accessible restrooms, telephones, and other accessible areas.

Installing Ramps and Wheelchair Lifts. If space permits, ramps and wheelchair lifts can also be used to increase accessibility inside buildings (See Figures 18 & 19). However, some States and localities restrict interior uses of wheelchair lifts for life-safety reasons. Care should be taken to install these new features where they can be readily accessed. Ramps and wheelchair lifts are described in detail on pages 4-6.

Upgrading Elevators. Elevators are an efficient means of providing accessibility between floors. Some buildings have existing historic elevators that are not adequately accessible for persons with disabilities because of their size, location, or detailing, but they may also contribute to the historical significance of a building. Significant historic elevators can usually be upgraded to improve accessibility. Control panels can be modified with a "wand" on a cord to make the control panel accessible, and timing devices can usually be adjusted.

Retrofitting Door Knobs. Historic door knobs and other hardware may be difficult to grip and turn. In recent years, lever-handles have been developed to replace door knobs. Other lever-handle devices can be added to existing hardware. If it is not possible or appropriate to retrofit existing door knobs, doors can be left open during operating hours (unless doing so would violate life safety codes), and power-assisted door openers can be installed. It may only be necessary to retrofit specific doorknobs to create an accessible path of travel and accessible restrooms.

Threshold Modifications

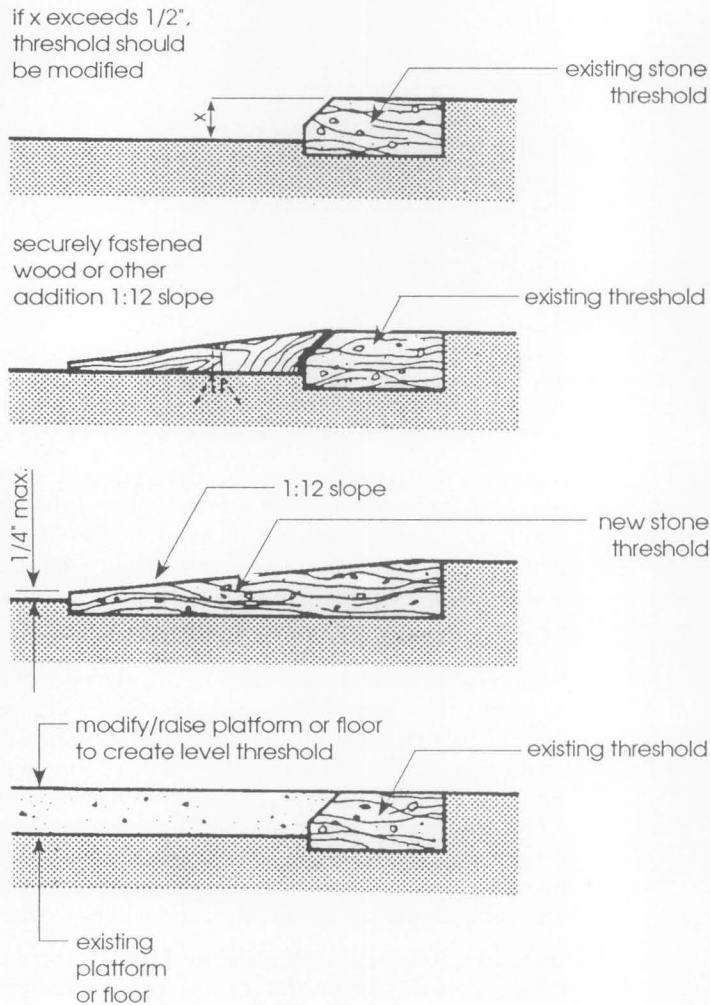


Figure 17. Thresholds that exceed allowable heights can be modified several ways to increase accessibility. Source: Uniform Federal Accessibility Standard (UFAS) Retrofit Manual.

Modifying Interior Stairs. Stairs are the primary barriers for many people with disabilities. However, there are some ways to modify stairs to assist people who are able to navigate them. It may be appropriate to add hand railings if none exist. Railings should be 1 1/4" (3.8 cm) in diameter and return to the wall so straps and bags do not catch. Color-contrasting, slip-resistant strips will help people with visual impairments. Finally, beveled or closed risers are recommended unless the stairs are highly significant, because open risers catch feet (See Figure 20).

Building Amenities

Some amenities in historic buildings, such as restrooms, seating, telephones, drinking fountains, counters, may contribute to a building's historic character. They will often require modification to improve their use by persons with disabilities. In many cases, supplementing existing amenities, rather than changing or removing them, will increase access and minimize changes to historic features and materials.

Upgrading Restrooms. Restrooms may have historic fixtures such as sinks, urinals, or marble partitions that can

be retained in the process of making modifications. For example, larger restrooms can sometimes be reconfigured by relocating or combining partitions to create an accessible toilet stall. Other changes to consider are adding grab bars around toilets, covering hot water pipes under sinks with insulation to prevent burns, and providing a sink, mirror, and paper dispenser at a height suitable for wheelchair users. A unisex restroom may be created if it is technically infeasible to create two fully accessible restrooms, or if doing so would threaten or destroy the significance of the building. It is important to remember that restroom fixtures, such as sinks, urinals, and partitions, may be historic, and therefore, should be preserved whenever possible.

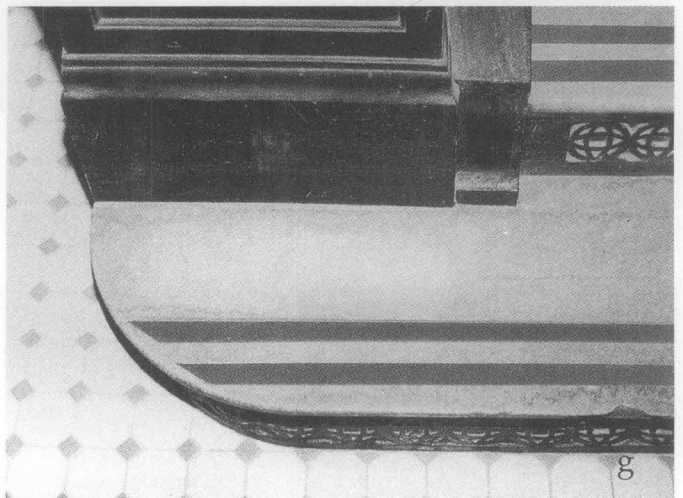
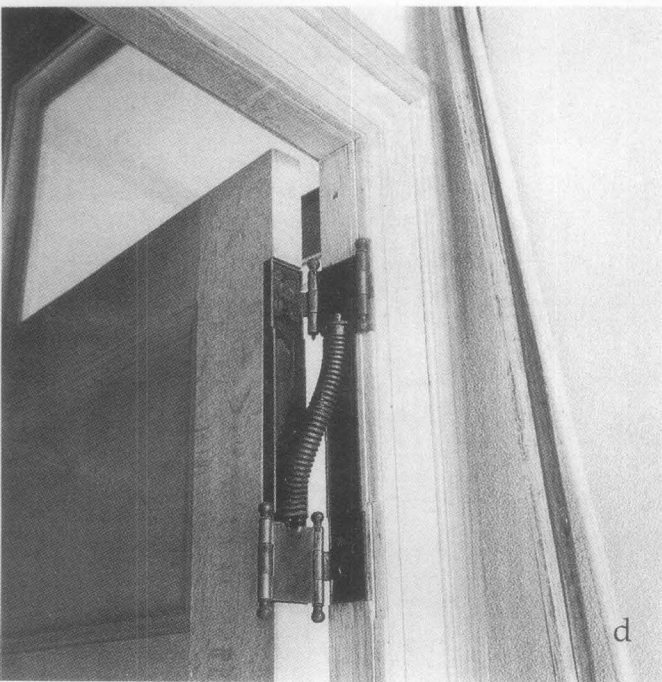
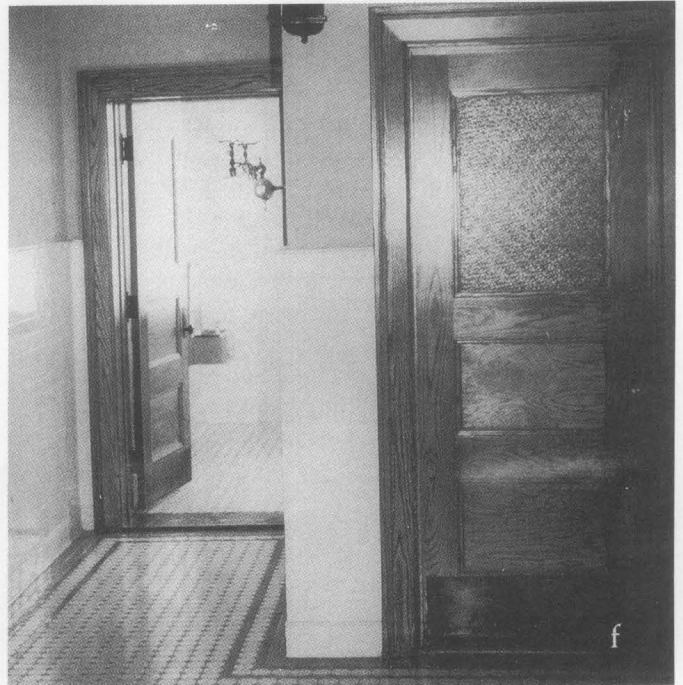
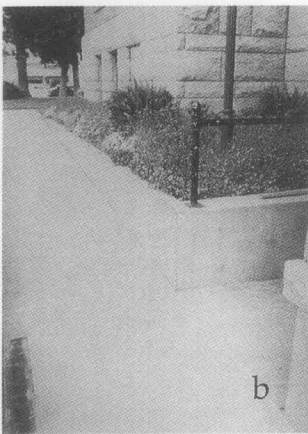
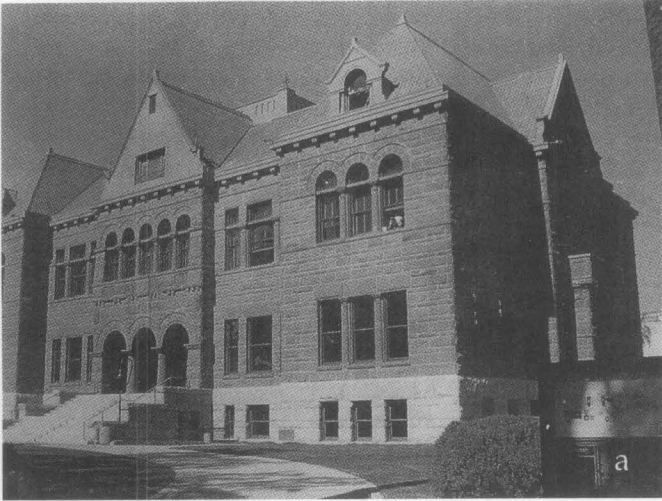
Modifying Other Amenities. Other amenities inside historic buildings may require modification. Seating in a theater, for example, can be made accessible by removing some seats in several areas (See Figure 21). New seating that is accessible can also be added at the end of existing rows, either with or without a level floor surface. Readily removable seats may be installed in wheelchair spaces when the spaces are not required to accommodate wheelchair users. Historic water fountains can be retained and new, two-tiered fountains installed if space permits. If public telephones are provided, it may be necessary to install at least a Text Telephone (TT), also known as a Telecommunication Device for the Deaf (TDD) (See Figure 22). Historic service counters commonly found in banks, theaters, and hotels generally should not be altered. It is preferable to add an accessible counter on the end of a historic counter if feasible. Modified or new counters should not exceed 36" (91.5 cm) in height.



Figure 18. Symmetrical ramps at the Mayflower Hotel in Washington, D.C., provide access to the hotel's lower level. The design for the ramps respects the historic character of this landmark building. Photo: Thomas Jester.

MAKING A HISTORIC BUILDING ACCESSIBLE

Item #3.



The Orange County Courthouse (a), located in Santa Ana, California, was rehabilitated in the late 1980s as a county museum. As part of the rehabilitation, the architect sensitively integrated numerous modifications to increase accessibility. To preserve the building's primary elevation, a new public entrance was created on the rear elevation where parking spaces are located. A ramp (b) leads to the accessible entrance that can be opened with a push-plate automatic door-opener (c). Modifications to interior features also increased accessibility. To create an accessible path of travel, offset hinges (d) were installed on doors that were narrower than 32 inches (81.3 cm). Other doors were rethreaded to reduce the door pressure. Beveling the 1" high thresholds (e) reduced their height to approximately 1/4 inch (.64 cm). The project architect also converted a storeroom into an accessible restroom (f). The original stairway, which has open grillwork, was made more accessible by applying slip-resistant pressure tape to the marble steps (g). And the original elevator was upgraded with raised markings, alarm lights, and voice floor indicators. Photos: Milford Wayne Donaldson, FAIA.

MAKING HISTORIC LANDSCAPES ACCESSIBLE

Item #3.

To successfully incorporate access into historic landscapes, the planning process is similar to that of other historic properties. Careful research and inventory should be undertaken to determine which materials and features convey the landscape's historical significance. As part of this evaluation, those features that are character-defining (topographical variation, vegetation, circulation, structures, furnishings, objects) should be identified. Historic finishes, details, and materials that also contribute to a landscape's significance should also be documented and evaluated prior to determining an approach to landscape accessibility. For example, aspects of the pedestrian circulation system that need to be understood include walk width, aggregate size, pavement pattern, texture, relief, and joint details. The context of the walk should be understood including its edges and surrounding area. Modifications to surface textures or widths of pathways can often be made with minimal effect on significant landscape features (a) and (b).

Additionally, areas of secondary importance such as altered paths should be identified -- especially those where the accessibility modifications will not destroy a landscape's significance. By identifying those features that are contributing or non-contributing, a sympathetic circulation experience can then be developed.

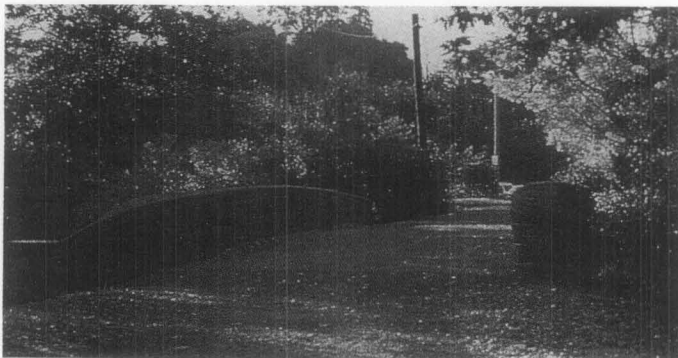
After assessing a landscape's integrity, accessibility solutions can be considered. Full access throughout a historic landscape may not always be possible. Generally, it is easier to provide accessibility to larger, more open

sites where there is a greater variety of public experiences. However, when a landscape is uniformly steep, it may only be possible to make discrete portions of a historic landscape accessible, and viewers may only be able to experience the landscape from selected vantage points along a prescribed pedestrian or vehicular access route. When defining such a route, the interpretive value of the user experience should be considered; in other words, does the route provide physical or visual access to those areas that are critical to understand the meaning of the landscape?

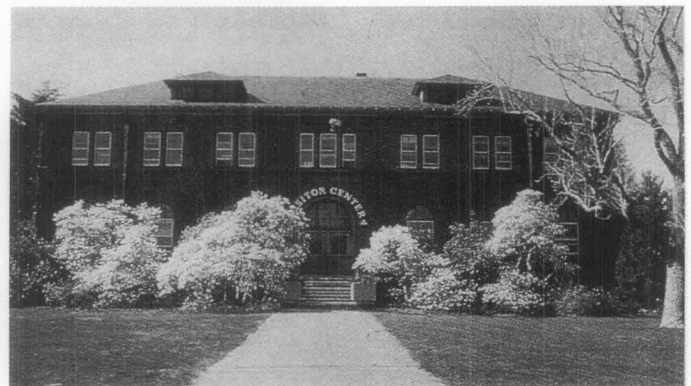
The following accessibility solutions address three common landscape situations: 1) structures with low integrity landscapes; 2) structures and landscapes of equal significance; and, 3) landscapes of primary significance with inaccessible terrain.

1. The Hunnewell Visitors Center at the Arnold Arboretum in Jamaica Plain, Massachusetts, was constructed in 1892. Its immediate setting has changed considerably over time (c). Since the existing landscape immediately surrounding this structure has little remaining integrity, the new accessibility solution has the latitude to integrate a broad program including site orientation, circulation, interpretation, and maintenance.

The new design, which has few ornamental plants, references the original planting design principles, with a strong emphasis on form, color, and texture. In contrast with the earlier designs, the new plantings were set away from the facade of this historic building,



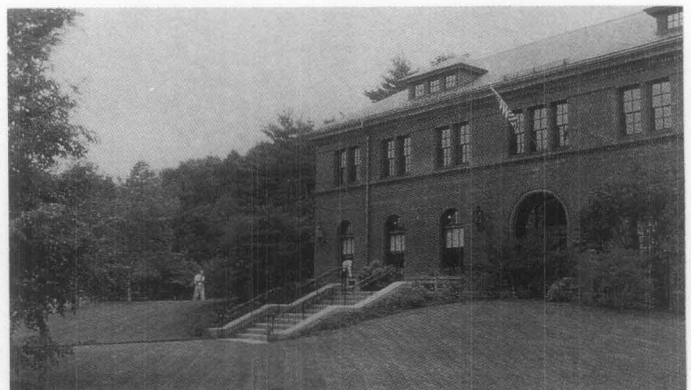
(a.) To improve accessibility in Boston's Emerald Necklace Parks, standard asphalt paving was replaced in selected areas with an imbedded aggregate surface that is more in keeping with the landscape's historic appearance. Photo: Charles Birnbaum.



(c.) Hunnewell Visitor's Center before rehabilitation, revealing the altered landscapes. Photo: Jennifer Jones, Carol R. Johnson and associates.



(b.) The Friendly Garden at Ranchos Los Alamitos, a historic estate with designed gardens in southern California, was made accessible with limited widening of its existing approach path. Photo: Ranchos Los Alamitos Foundation.



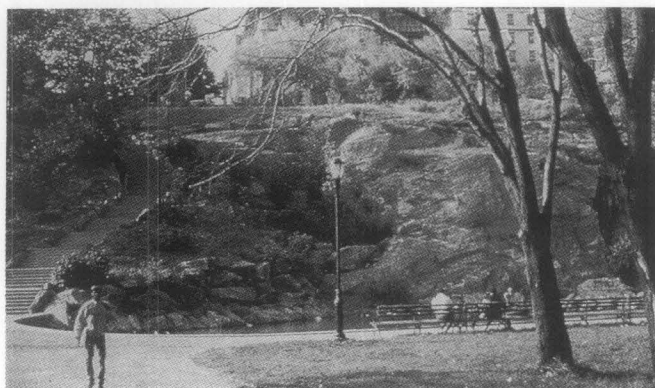
(d.) Hunnewell Visitors Center's entrance following rehabilitation, integrating an accessible path (left), platform, and new steps. Photo: Charles Birnbaum.

allowing the visitor to enjoy its architectural detail. A new walk winds up the gentle earthen berm and is vegetated with plantings that enhance the interpretive experience from the point of orientation (d). The new curvilinear walks also provide a connection to the larger arboretum landscape for everyone.

2. The Eugene O'Neill National Historic Site overlooks the San Ramon Valley, twenty-seven miles east of San Francisco, California. The thirteen-acre site includes a walled courtyard garden on the southeast side of the Tao House, which served as the O'Neill residence from 1937-44 (e). Within this courtyard are character-defining walks that are too narrow by today's accessibility standards, yet are a character-defining element of the historic design. To preserve the garden's integrity, the scale and the characteristics of the original circulation were maintained by creating a wheelchair route which, in part, utilizes reinforced turf. This route allows visitors with disabilities to experience the main courtyard as well.
3. Morningside Park in New York City, New York, designed by Frederick Olmstead, Sr., and Calvert Vaux in 1879, is sited on generally steep, rocky terrain (f). Respecting these dramatic grade changes, which are only accessible by extensive flights of stone stairs, physical access cannot be provided without destroying the park's integrity. In order to provide some accessibility, scenic overlooks were created that provide broad visual access to the park.



(e.) This view shows the new reinforced turf path at the Eugene O'Neill National Historic Site that preserved the narrow Historic Path. Photo: Patricia M. O'Donnell.



(f.) Steep terrain at Morningside Park in New York City cannot be made accessible without threatening or destroying this landscape's integrity. Photo: Quennell Rothschild Associates.



Figure 19. Inclined lifts can sometimes overcome interior changes of elevation where space is limited. This lift in Boston's Faneuil Hall created access to the floor and stage level of the State Room. Photo: Paul Holtz.

Considering a New Addition as an Accessibility Solution

Many new additions are constructed specifically to incorporate modern amenities such as elevators, restrooms, fire stairs, and new mechanical equipment. These new additions often create opportunities to incorporate access for people with disabilities. It may be possible, for example, to create an accessible entrance, path to public levels via a ramp, lift, or elevator (See Figure 23). However, a new addition has the potential to change a historic property's appearance and destroy significant building and landscape features. Thus, all new additions should be compatible with the size, scale, and proportions of historic features and materials that characterize a property (See Figure 24).

New additions should be carefully located to minimize connection points with the historic building, such that if the addition were to be removed in the future, the essential form and integrity of the building would remain intact. On the other hand, new additions should also be conveniently located near parking that is connected to an accessible route for people with disabilities. As new additions are incorporated, care should be taken to protect significant landscape features and archeological resources. Finally, the design for any new addition should be differentiated from the historic design so that the property's evolution over time is clear. New additions frequently make it possible to increase accessibility, while simultaneously reducing the level of change to historic features, materials, and spaces.

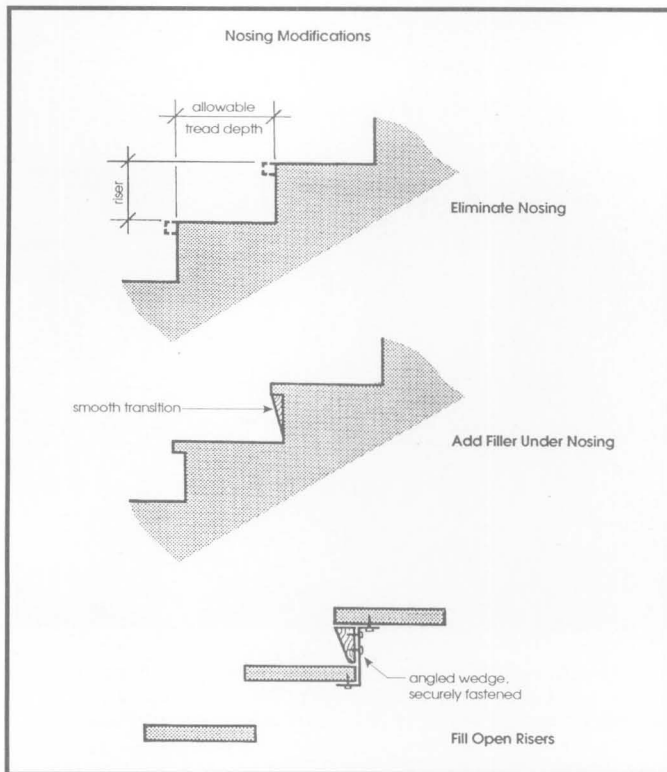


Figure 20. In certain situations it may be appropriate to modify stair nosings for persons with mobility impairments. Whenever possible, stairs should be modified by adding new materials rather than removing historic materials. Source: UFAS Retrofit Manual.

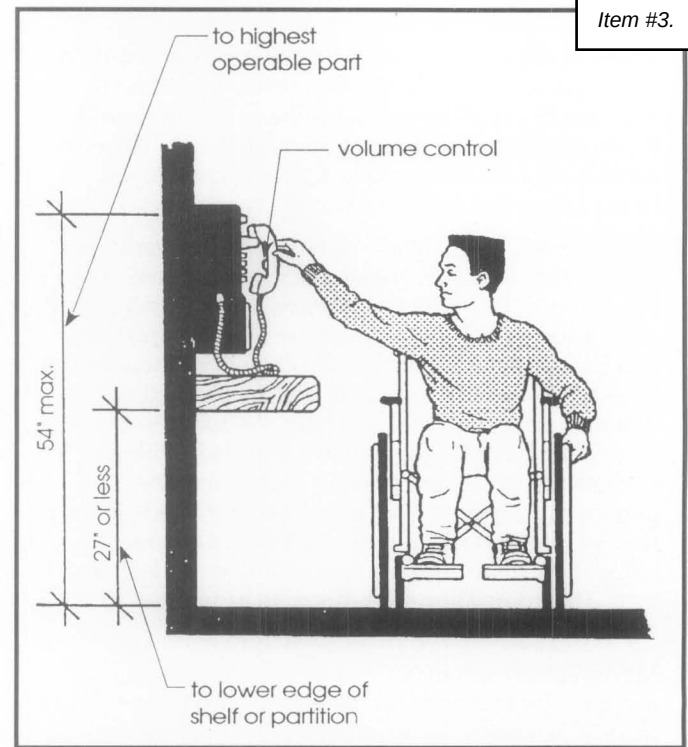
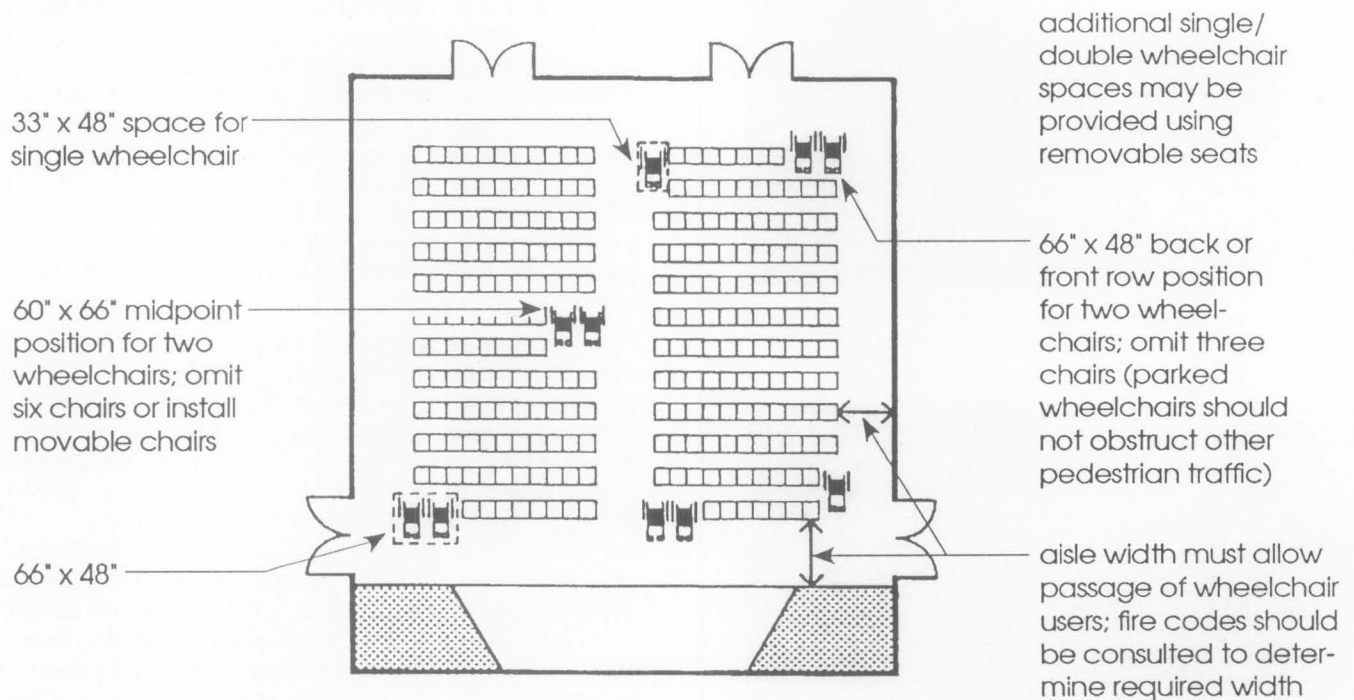


Figure 22. Amenities such as telephones should be at height that wheelchair users can reach. Changes to many amenities can be adapted with minimal effect on historic materials, features, and spaces. Source: UFAS Retrofit Manual.

Wheelchair Seating Dispersed Throughout Seating Area



Theater Style Seating

Figure 21. Seating in historic theaters and auditoriums can be changed to accommodate wheelchair users. Accessible seating areas should be on an accessible route from the building entrance. Source: UFAS Retrofit Manual.

Federal Accessibility Laws

Today, few building owners are exempt from providing accessibility for people with disabilities. Before making any accessibility modification, it is imperative to determine which laws and codes are applicable. In addition to local and State accessibility codes, the following federal accessibility laws are currently in effect:

Architectural Barriers Act (1968)

The Architectural Barriers Act stipulates that all buildings designed, constructed, and altered by the Federal Government, or with federal assistance, must be accessible. Changes made to federal buildings must meet the Uniform Federal Accessibility Standards (UFAS). Special provisions are included in UFAS for historic buildings that would be threatened or destroyed by meeting full accessibility requirements.

Rehabilitation Act (1973)

The Rehabilitation Act requires recipients of federal financial assistance to make their programs and activities accessible to everyone. Recipients are allowed to make their properties accessible by altering their building, by moving programs and activities to accessible spaces, or by making other accommodations.

Americans with Disabilities Act (1990)

Historic properties are not exempt from the Americans with Disabilities Act (ADA) requirements. To the greatest extent possible, historic buildings must be as accessible as non-historic buildings. However, it may not be possible for some historic properties to meet the general accessibility requirements.

Under Title II of the ADA, State and local governments must remove accessibility barriers either by shifting services and programs to accessible buildings, or by making alterations to existing buildings. For instance, a licensing office may be moved from a second floor to an accessible first floor space, or if this is not feasible, a mail service might be provided. However, State and local government facilities that have historic preservation as their main purpose—State-owned historic museums, historic State capitols that offer tours—must give priority to physical accessibility.

Under Title III of the ADA, owners of “public accommodations” (theaters, restaurants, retail shops, private museums) must make “readily achievable” changes; that is, changes that can be easily accomplished without much expense. This might mean installing a ramp, creating accessible parking, adding grab bars in bathrooms, or modifying door hardware. The requirement to remove barriers when it is “readily achievable” is an ongoing responsibility. When alterations, including restoration and rehabilitation work, are made, specific accessibility requirements are triggered.

Recognizing the national interest in preserving historic properties, Congress established alternative requirements for properties that cannot be made accessible without “threatening or destroying” their significance. A consultation process is outlined in the ADA’s Accessibility Guidelines for owners of historic properties who believe that making specific accessibility modifications would “threaten or destroy” the significance of their property. In these situations, after consulting with persons with disabilities and disability organizations, building owners should contact the State Historic Preservation Officer (SHPO) to determine if the special accessibility provisions for historic properties may be used. Further, if it is determined in consultation with the SHPO that compliance with the minimum requirements would also “threaten or destroy” the significance of the property, alternative methods of access, such as home delivery and audio-visual programs, may be used.

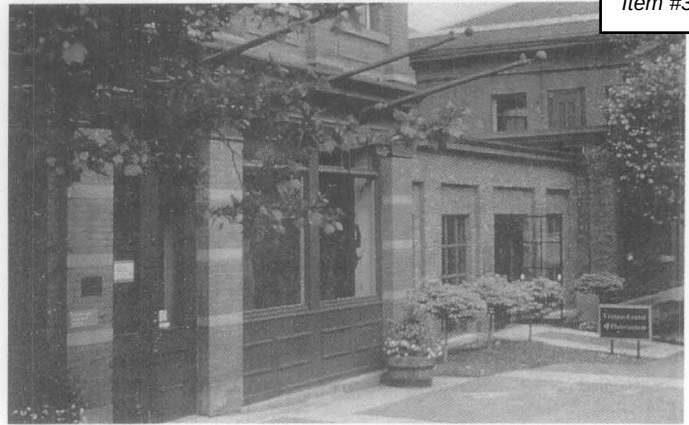


Figure 23. New additions to historic buildings can be designed to increase accessibility. A new addition links two adjacent buildings used for the Albany, New York, Visitor's Center, and incorporates an accessible entrance, restrooms, and signage. Photo: Clare Adams.

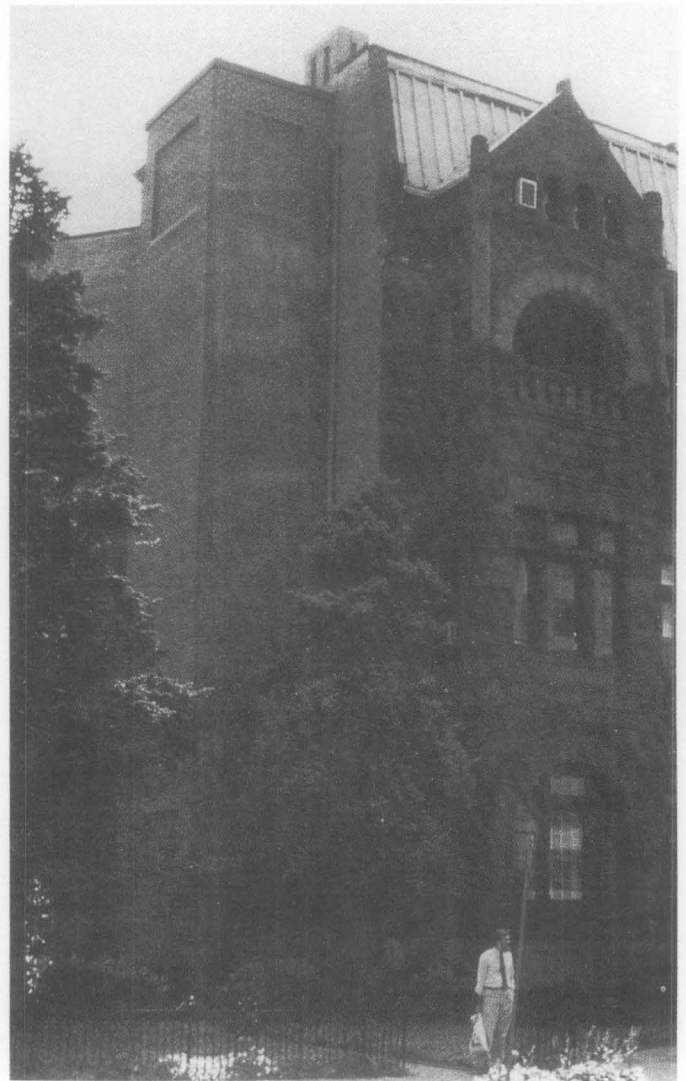


Figure 24. Creating an accessible entrance with a new elevator tower requires a compatible design. This elevator addition blends in with the historic building's materials and provides access to all public levels. Photo: Sharon Park.

Conclusion

Historic properties are irreplaceable and require special care to ensure their preservation for future generations. With the passage of the Americans with Disabilities Act, access to historic properties open to the public is a now civil right, and owners of historic properties must evaluate existing buildings and determine how they can be made more accessible. It is a challenge to evaluate properties thoroughly, to identify the applicable accessibility requirements, to explore alternatives and to implement solutions that provide independent access and are consistent with accepted historic preservation standards. Solutions for accessibility should not destroy a property's significant materials, features and spaces, but should increase accessibility as much as possible. Most historic buildings are not exempt from providing accessibility, and with careful planning, historic properties can be made more accessible, so that all citizens can enjoy our Nation's diverse heritage.



Photo: Massachusetts Historical Commission.

Acknowledgements

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Additional Reading

- Ballantyne, Duncan S. and Harold Russell Associates, Inc. *Accommodation of Disabled Visitors at Historic Sites in the National Park System*. Washington, D.C.: Park Historic Architecture Division, National Park Service, U.S. Department of the Interior, 1983.
- Goldman, Nancy. Ed. *Readily Achievable Checklist: A Survey for Accessibility*. Boston: Adaptive Environments Center, 1993.
- Hayward, Judith L. and Thomas C. Jester, compilers. *Accessibility and Historic Preservation Resource Guide*. Windsor, Vermont: Historic Windsor, Inc., 1992, revised 1993.
- Jester, Thomas C. *Preserving the Past and Making it Accessible for People with Disabilities*. Washington, D.C.: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1992.
- Parrott, Charles. *Access to Historic Buildings for the Disabled*. Washington, D.C.: U.S. Department of the Interior, 1980.
- Secretary of the Interior's Standards for the Treatment of Historic Properties*. Washington, D.C.: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1993.
- Smith, William D. and Tara Goodwin Frier. *Access to History: A Guide to Providing Access to Historic Buildings for People with Disabilities*. Boston: Massachusetts Historical Commission, 1989.
- Standards for Accessible Design: ADA Accessibility Guidelines (ADAAG)*. Washington, D.C.: U.S. Department of Justice, 1991.

Commission; Milford Wayne Donaldson, FAIA; Paul Beatty, U.S. Architectural and Transportation Barriers Compliance Board; Mid-Atlantic Regional Office, National Park Service; Western Regional Office, National Park Service.

This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments about this publication should be directed to H. Ward Jandl, Deputy Chief, Preservation Assistance Division, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127. This publication is not copyrighted and can be reproduced without penalty. Normal procedures for credit to the authors and the National Park Service are appreciated.

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Preservation Briefs

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PRESERVATION BRIEFS

32 Making Historic Properties Accessible

Thomas C. Jester and Sharon C. Park, AIA

- Planning Accessibility Modifications
- Accessibility Solutions
- Consider an Addition for Accessibility
- Making Historic Landscapes Accessible
- Federal Accessibility Laws
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Accessible historic building.
Photo: NPS files.

Historically, most buildings and landscapes were not designed to be readily accessible for people with disabilities. In recent years, however, emphasis has been placed on preserving historically significant properties, and on making these properties- and the activities within them-more accessible to people with disabilities. With the passage of the Americans with Disabilities Act in 1990, access to properties open to the public is now a civil right.



A significant entrance may be difficult to modify. Although a special challenge, sensitive changes can almost always be made to provide access while preserving the unique historic character. Photo: NPS files.

This Preservation Brief introduces the complex issue of providing accessibility at historic properties, and underscores the need to balance accessibility and historic preservation. It provides guidance on making historic properties accessible while preserving their historic character; the Brief also provides examples to show that independent physical accessibility at historic properties can be achieved with careful planning, consultation, and sensitive design. While the Brief focuses primarily on making buildings and their sites accessible, it also includes a section on historic landscapes. The Brief will assist historic property owners, design professionals, and administrators in evaluating their historic properties so that the highest level of accessibility can be provided while minimizing changes to historic materials and features. Because many projects encompassing accessibility work are complex, it is advisable to consult with experts in the fields of historic preservation and accessibility before proceeding with permanent physical changes to historic properties.

Modifications to historic properties to increase accessibility may be as simple as a small, inexpensive ramp to overcome one entrance step, or may involve changes to exterior and interior features. The Brief does not provide a detailed explanation of local or State accessibility laws as they vary from jurisdiction to jurisdiction. A concise explanation of several federal

accessibility laws is included below.

Planning Accessibility Modifications [return to top ▲](#)

Historic properties are distinguished by features, materials, spaces, and spatial relationships that contribute to their historic character. Often these elements, such as steep terrain, monumental steps, narrow or heavy doors, decorative ornamental hardware, and narrow pathways and corridors, pose barriers to persons with disabilities, particularly to wheelchair users.

A three-step approach is recommended to identify and implement accessibility modifications that will protect the integrity and historic character of historic properties:

1. Review the historical significance of the property and identify character-defining features;
2. Assess the property's existing and required level of accessibility; and
3. Evaluate accessibility options within a preservation context.

1. Review the Historical Significance

If the property has been designated as historic (properties that are listed in, or eligible for listing in the National Register of Historic Places, or designated under State or local law), the property's nomination file should be reviewed to learn about its significance. Local preservation commissions and State Historic Preservation Offices can usually provide copies of the nomination file and are also resources for additional information and assistance. Review of the written documentation should always be supplemented with a physical investigation to identify which character defining features and spaces must be protected whenever any changes are anticipated. If the level of documentation for a property's significance is limited, it may be necessary to have a preservation professional identify specific historic features, materials, and spaces that should be protected.

For most historic properties, the construction materials, the form and style of the property, the principal elevations, the major architectural or landscape features, and the principal public spaces constitute some of the elements that should be preserved. Every effort should be made to minimize damage to the materials and features that convey a property's historical significance when making modifications for accessibility. Very small or highly significant properties that have never been altered may be extremely difficult to modify.

Secondary spaces and finishes and features that may be less important to the historic character should also be identified; these may generally be altered without jeopardizing the historical significance of a property. Nonsignificant spaces, secondary pathways, later additions, previously altered areas, utilitarian spaces, and service areas can usually be modified without threatening or destroying a property's historical significance.

2. Assess the Property's Existing and Required Level of Accessibility

A building survey or assessment will provide a thorough evaluation of a property's accessibility. Most surveys identify accessibility barriers in the following areas: building and site entrances; surface textures, widths and slopes of walkways; parking; grade changes; size, weight and configuration of doorways; interior corridors and path of travel restrictions; elevators; and public toilets and amenities. Simple audits can be completed by property owners using readily available checklists (See Further Reading). Accessibility specialists can be hired to assess barriers in more complex properties, especially those with multiple buildings, steep terrain, or interpretive programs. Persons with disabilities can be particularly helpful in assessing specific barriers.

All applicable accessibility requirements—local codes, State codes and federal laws—should be reviewed carefully before undertaking any accessibility modification. Since many States and localities have their own accessibility regulations and codes (each with their own requirements for dimensions and technical requirements), owners should use the most stringent accessibility requirements when implementing modifications. The Americans with Disability Act Accessibility Guidelines (ADAAG) is the document that should be consulted when complying with the Americans with Disabilities Act (ADA) requirements.

3. Identify and Evaluate Accessibility Options within a Preservation Context

Once a property's significant materials and features have been identified, and existing and required levels of accessibility have been established, solutions can be developed. Solutions should provide the greatest amount of accessibility without threatening or destroying those materials and features that make a property significant. Modifications may usually be phased over time as funds are available, and interim solutions can be considered until more permanent solutions are implemented. A team comprised of persons with disabilities, accessibility and historic preservation professionals, and building inspectors should be consulted as accessibility solutions are developed.

Modifications to improve accessibility should generally be based on the following priorities:

1. Making the main or a prominent public entrance and primary public spaces accessible, including a path to the entrance;



This accessibility ramp is compatible with the historic building in scale and materials. Photo: William Smith.

- 2. Providing access to goods, services, and programs;
- 3. Providing accessible restroom facilities; and,
- 4. Creating access to amenities and secondary spaces.



The ramp's scale and materials are inconsistent with the historic character of the building. Photo: NPS files.

All proposed changes should be evaluated for conformance with the Secretary of the Interior's "Standards for the Treatment of Historic Properties," which were created for property owners to guide preservation work. These Standards stress the importance of retaining and protecting the materials and features that convey a property's historical significance. Thus, when new features are incorporated for accessibility, historic materials and features should be retained whenever possible. Accessibility modifications should be in scale with the historic property, visually compatible, and, whenever possible, reversible. Reversible means that if the new feature were removed at a later date, the essential form and integrity of the property would be unimpaired. The design of new features should also be differentiated from the design of the historic property so that the evolution of the property is evident.

In general, when historic properties are altered, they should be made as accessible as possible. However, if an owner or a project team believes that certain modifications would threaten or destroy the significance of the property, the State Historic Preservation Officer should be consulted to determine whether or not any special accessibility provisions may be used. Special accessibility provisions for historic properties will vary depending on the applicable accessibility requirements.

In some cases, programmatic access may be the only option for extremely small or unaltered historic properties, such as a two-story house museum with no internal elevator. Programmatic access for historic properties refers to alternative methods of providing services, information, and experiences when physical access cannot be provided. It may mean offering an audio-visual program showing an inaccessible upper floor of a historic house museum, providing interpretive panels from a vista at an inaccessible terraced garden, or creating a tactile model of a historic monument for people with visual impairments.

Accessibility Solutions [return to top ▲](#)

The goal in selecting appropriate solutions for specific historic properties is to provide a high level of accessibility without compromising significant features or the overall character of the property. The following sections describe accessibility solutions and offer guidance on specific historic property components, namely the building site, entrances, interiors, landscapes, amenities, and new additions. Several solutions are discussed in each section, referencing dimensions and technical requirements from the ADA's accessibility guidelines, ADAAG. State and local requirements, however, may differ from the ADA requirements. Before making any modification owners should be aware of all applicable accessibility requirements.

The Building Site

An accessible route from a parking lot, sidewalk, and public street to the entrance of a historic building or facility is essential. An accessible route, to the maximum extent possible, should be the circulation route used by the general public. Critical elements of accessible routes are their widths, slopes, cross slopes, and surface texture. Each of these route elements must be appropriately designed so that the route can be used by everyone, including people with disabilities.



The significant building site is now accessible to people with disabilities (note steps in front of ramp). Photo: NPS files.

The distance between the arrival and destination points should also be as short as possible. Sites containing designed landscapes should be carefully evaluated before making accessibility modifications. Historic landscapes are described in greater detail below.

Providing Convenient Parking

If parking is provided, it should be as convenient as possible for people with disabilities. Specially designated parking can often be created to improve accessibility. Modifications to parking configurations and pathways should not alter significant landscape features.

Creating an Accessible Route

The route or path through a site to a historic building's entrance should be wide enough, generally at least 3 feet (91 cm), to accommodate visitors with disabilities and must be appropriately graded with a stable, firm, and slip-resistant surface. Existing paths should be modified to meet these requirements whenever possible as long as doing so would not threaten or destroy significant materials and features.

Existing surfaces can often be stabilized by providing a new base and resetting the paving materials, or by modifying the path surface. In some situations it may be appropriate to create a new path through an inaccessible area. At large properties, it may be

possible to regrade a slope to less than 1:20 (5%), or to introduce one or more carefully planned ramps. Clear directional signs should mark the path from arrival to destination.

Entrances



The historic threshold was made accessible with a 1/2" wood bevel. Photo: NPS files.

Whenever possible, access to historic buildings should be through a primary public entrance. In historic buildings, if this cannot be achieved without permanent damage to character-defining features, at least one entrance used by the public should be made accessible. If the accessible entrance is not the primary public entrance, directional signs should direct visitors to the accessible entrance. A rear or service entrance should be avoided as the only mean of entering a building.

Creating an accessible entrance usually involves overcoming a change in elevation. Steps, landings, doors, and thresholds, all part of the entrance, often pose barriers for persons with disabilities. To preserve the integrity of these features, a number of solutions are available to increase accessibility. Typical solutions include regrading, incorporating ramps, installing wheelchair lifts, creating new entrances, and modifying doors, hardware, and thresholds.

Regrading an Entrance

In some cases, when the entrance steps and landscape features are not highly significant, it may be possible to regrade to provide a smooth entrance into a building. If the existing steps are historic masonry, they should be buried, whenever possible, and not removed.

Incorporating Ramps

Permanent ramps are perhaps the most common means to make an entrance accessible. As a new feature, ramps should be carefully designed and appropriately located to preserve a property's historic character.

Ramps should be located at public entrances used by everyone whenever possible, preferably where there is minimal change in grade. Ramps should also be located to minimize the loss of historic features at the connection points—porch railings, steps, and windows—and should preserve the overall historic setting and character of the property. Larger buildings may have below grade areas that can accommodate a ramp down to an entrance. Below grade entrances can be considered if the ramp leads to a publicly used interior, such as an auditorium, or if the building is serviced by a public elevator. Ramps can often be incorporated behind historic features, such as cheek-walls or railings, to minimize the visual effect.



A new elevator entrance was provided next to the stairs to provide universal access to the services inside. Photo: Courtesy, GSA.

The steepest allowable slope for a ramp is usually 1:12 (8%), but gentler slopes should be used whenever possible to accommodate people with limited strength. Greater changes in elevation require larger and longer ramps to meet accessibility scoping provisions and may require an intermediate landing. Most codes allow a slightly steeper ramp for historic buildings to overcome one step.

Ramps can be faced with a variety of materials, including wood, brick, and stone. Often the type and quality of the materials determines how compatible a ramp design will be with a historic property. Unpainted pressure-treated wood should not be used to construct ramps because it usually appears temporary and is not visually compatible with most historic properties.

Railings should be simple in design, distinguishable from other historic features, and should extend one foot beyond the sloped area.

Ramp landings must be large enough for wheelchair users, usually at least 5 feet by 5 feet (152.5 cm by 152.5 cm), and the top landing must be at the level of the door threshold. It may be possible to reset steps by creating a ramp to accommodate minor level changes and to meet the threshold without significantly altering a property's historic character. If a building's existing landing is not wide or deep enough to accommodate a ramp, it may be necessary to modify the entry to create a wider landing. Long ramps, such as switchbacks, require intermediate landings, and all ramps should be detailed with an appropriate edge and railing for wheelchair users and visually impaired individuals.

Temporary or portable ramps are usually constructed of light-weight materials and, thus, are rarely safe or visually compatible with historic properties. Moreover, portable ramps are often stored until needed and, therefore, do not meet accessibility requirements for independent access. Temporary and portable ramps, however, may be an acceptable interim solution to improve accessibility until a permanent solution can be implemented.

Installing Wheelchair Lifts

Platform lifts and inclined stair lifts, both of which accommodate only one person, can be used to overcome changes of elevation ranging from three to 10 feet (.9 m-3 m) in height. However, many States have restrictions on the use of wheelchair lifts, so all applicable codes should be reviewed carefully before installing one. Inclined stair lifts, which carry a wheelchair on a platform up a flight of stairs, may be employed selectively. They tend to be visually intrusive, although they are relatively reversible. Platform

can be used when there is inadequate space for a ramp. However, such lifts should be installed in unobtrusive locations and unobtrusive cover to minimize maintenance if at all possible. A similar, but more expensive platform lift has a retracting railing that lowers the ground, minimizing the visual effect to historic properties. Mechanical lifts have drawbacks at historic properties with high public visitation because their capacity is limited, they sometimes cannot be operated independently, and they require frequent maintenance.

Considering a New Entrance

When it is not possible to modify an existing entrance, it may be possible to develop a new entrance by creating an entirely new opening in an appropriate location, or by using a secondary window for an opening. This solution should only be considered after exhausting all possibilities for modifying existing entrances.

Retrofitting Doors

Historic doors generally should not be replaced, nor should door frames on the primary elevation be widened, as this may alter an important feature of a historic design. However, if a building's historic doors have been removed, there may be greater latitude in designing a compatible new entrance. Most accessibility standards require at least a 32" (82 cm) clear opening with manageable door opening pressures. The most desirable preservation solution to improve accessibility is retaining historic doors and upgrading the door pressure with one of several devices. Automatic door openers (operated by push buttons, mats, or electronic eyes) and power-assisted door openers can eliminate or reduce door pressures that are accessibility barriers, and make single or double-leaf doors fully operational.

Adapting Door Hardware

If a door opening is within an inch or two of meeting the 32" (81 cm) clear opening requirement, it may be possible to replace the standard hinges with off-set hinges to increase the size of the door opening as much as 1" (2.5 cm). Historic hardware can be retained in place, or adapted with the addition of an automatic opener, of which there are several types. Door hardware can also be retrofitted to reduce door pressures. For example, friction hinges can be retrofitted with ball-bearing inserts, and door closers can be rethreaded to reduce the door pressure.

Altering Door Thresholds

A door threshold that exceeds the allowable height, generally 1/2" (1.3 cm), can be altered or removed with one that meets applicable accessibility requirements. If the threshold is deemed to be significant, a bevel can be added on each side to reduce its height. Another solution is to replace the threshold with one that meets applicable accessibility requirements and is visually compatible with the historic entrance.

Readily Achievable Accessibility Options

Many accessibility solutions can be implemented easily and inexpensively without destroying the significance of historic properties. While it may not be possible to undertake all of the modifications listed below, each change will improve accessibility.

Sites and Entrances

- Creating a designated parking space.
- Installing ramps.
- Making curb cuts.

Interiors

- Repositioning shelves.
- Rearranging tables, displays, and furniture.
- Repositioning telephones.
- Adding raised markings on elevator control buttons.
- Installing flashing alarm lights.
- Installing offset hinges to widen doorways.
- Installing or adding accessible door hardware.
- Adding an accessible water fountain, or providing a paper cup dispenser at an inaccessible water fountain.

Restrooms

- Installing grab bars in toilet stalls.
- Rearranging toilet partitions to increase maneuvering space.



This door handle has been retrofitted to meet ADA requirements. Photo: NPS files.

- Insulating lavatory pipes under sinks to prevent burns.
- Installing a higher toilet seat.
- Installing a full-length bathroom mirror.
- Repositioning the paper towel dispenser.



A retractable lift for this historic building foyer was created using "like" materials. Photo: NPS files.

Moving Through Historic Interiors

Persons with disabilities should have independent access to all public areas and facilities inside historic buildings. The extent to which a historic interior can be modified depends on the significance of its materials, plan, spaces, features, and finishes. Primary spaces are often more difficult to modify without changing their character. Secondary spaces may generally be changed without compromising a building's historic character. Signs should clearly mark the route to accessible restrooms, telephones, and other accessible areas.

Installing Ramps and Wheelchair Lifts

If space permits, ramps and wheelchair lifts can also be used to increase accessibility inside buildings. However, some States and localities restrict interior uses of wheelchair lifts for life-safety reasons. Care should be taken to install these new features where they can be readily accessed. Ramps and wheelchair lifts are described below.

Upgrading Elevators

Elevators are an efficient means of providing accessibility between floors. Some buildings have existing historic elevators that are not adequately accessible for persons with disabilities because of their size, location, or detailing, but they may also contribute to the historical significance of a building. Significant historic elevators can usually be upgraded to improve accessibility. Control panels can be modified with a "wand" on a cord to make the control panel accessible, and timing devices can usually be adjusted.

Retrofitting Door Knobs

Historic door knobs and other hardware may be difficult to grip and turn. In recent years, lever-handles have been developed to replace door knobs. Other lever-handle devices can be added to existing hardware. If it is not possible or appropriate to retrofit existing door knobs, doors can be left open during operating hours (unless doing so would violate life safety codes), and power-assisted door openers can be installed. It may only be necessary to retrofit specific doorknobs to create an accessible path of travel and accessible restrooms.

Modifying Interior Stairs

Stairs are the primary barriers for many people with disabilities. However, there are some ways to modify stairs to assist people who are able to navigate them. It may be appropriate to add hand railings if none exist. Railings should be 1 ½" (3.8 cm) in diameter and return to the wall so straps and bags do not catch. Color-contrasting, slip-resistant strips will help people with visual impairments. Finally, beveled or closed risers are recommended unless the stairs are highly significant, because open risers catch feet.

Building Amenities

Some amenities in historic buildings, such as restrooms, seating, telephones, drinking fountains, counters, may contribute to a building's historic character. They will often require modification to improve their use by persons with disabilities. In many cases, supplementing existing amenities, rather than changing or removing them, will increase access and minimize changes to historic features and materials.

Upgrading Restrooms

Restrooms may have historic fixtures such as sinks, urinals, or marble partitions that can be retained in the process of making modifications. For example, larger restrooms can sometimes be reconfigured by relocating or combining partitions to create an accessible toilet stall. Other changes to consider are adding grab bars around toilets, covering hot water pipes under sinks with insulation to prevent burns, and providing a sink, mirror, and paper dispenser at a height suitable for wheelchair users. A unisex restroom may be created if it is technically infeasible to create two fully accessible restrooms, or if doing so would threaten or destroy the significance of the building. It is important to remember that restroom fixtures, such as sinks, urinals, and partitions, may be historic, and therefore, should be preserved whenever possible.

Modifying Other Amenities

Other amenities inside historic buildings may require modification. Seating in a theater, for example, can be made accessible by removing some seats in several areas. New seating that is accessible can also be added at the end of existing rows, either with or without a level floor surface. Readily removable seats may be installed in wheelchair spaces when the spaces are not required to accommodate wheelchair users. Historic water fountains can be retained and new, two-tiered fountains installed if space permits. If public telephones are provided, it may be necessary to install at least a Text Telephone (TT), also known as a Telecommunication Device for the Hearing (TDD).

Device for the Deaf (TDD. Historic service counters commonly found in banks, theaters, and hotels generally should not be altered. It is preferable to add an accessible counter on the end of a historic counter if feasible. Modified or new counters should not exceed 36" (91.5 cm) in height.

Considering a New Addition as an Accessibility Solution [return to top ▲](#)

Many new additions are constructed specifically to incorporate modern amenities such as elevators, restrooms, fire stairs, and new mechanical equipment. These new additions often create opportunities to incorporate access for people with disabilities. It may be possible, for example, to create an accessible entrance, path to public levels via a ramp, lift, or elevator. However, a new addition has the potential to change a historic property's appearance and destroy significant building and landscape features. Thus, all new additions should be compatible with the size, scale, and proportions of historic features and materials that characterize a property.

New additions should be carefully located to minimize connection points with the historic building, such that if the addition were to be removed in the future, the essential form and integrity of the building would remain intact. On the other hand, new additions should also be conveniently located near parking that is connected to an accessible route for people with disabilities. As new additions are incorporated, care should be taken to protect significant landscape features and archeological resources. Finally, the design for any new addition should be differentiated from the historic design so that the property's evolution over time is clear. New additions frequently make it possible to increase accessibility, while simultaneously reducing the level of change to historic features, materials, and spaces.

Making Historic Landscapes Accessible [return to top ▲](#)

To successfully incorporate access into historic landscapes, the planning process is similar to that of other historic properties. Careful research and inventory should be undertaken to determine which materials and features convey the landscape's historical significance. As part of this evaluation, those features that are character-defining (topographical variation, vegetation, circulation, structures, furnishings, objects) should be identified. Historic finishes, details, and materials that also contribute to a landscape's significance should also be documented and evaluated prior to determining an approach to landscape accessibility. For example, aspects of the pedestrian circulation system that need to be understood include walk width, aggregate size, pavement pattern, texture, relief, and joint details. The context of the walk should be understood including its edges and surrounding area. Modifications to surface textures or widths of pathways can often be made with minimal effect on significant landscape features.

Additionally, areas of secondary importance such as altered paths should be identified-especially those where the accessibility modifications will not destroy a landscape's significance. By identifying those features that are contributing or non-contributing, a sympathetic circulation experience can then be developed.

After assessing a landscape's integrity, accessibility solutions can be considered. Full access throughout a historic landscape may not always be possible. Generally, it is easier to provide accessibility to larger, more open sites where there is a greater variety of public experiences. However, when a landscape is uniformly steep, it may only be possible to make discrete portions of a historic landscape accessible, and viewers may only be able to experience the landscape from selected vantage points along a prescribed pedestrian or vehicular access route. When defining such a route, the interpretive value of the user experience should be considered; in other words, does the route provide physical or visual access to those areas that are critical to understand the meaning of the landscape?

Federal Accessibility Laws [return to top ▲](#)



The automatic door to this museum building is a practical solution for

Today, few building owners are exempt from providing accessibility for people with disabilities. Before making any accessibility modification, it is imperative to determine which laws and codes are applicable. In addition to local and State accessibility codes, the following federal accessibility laws are currently in effect:

Architectural Barriers Act (1968)

The Architectural Barriers Act stipulates that all buildings designed, constructed, and altered by the Federal Government, or with federal assistance, must be accessible. Changes made to federal buildings must meet the Uniform Federal Accessibility Standards (UFAS). Special provisions are included in UFAS for historic buildings that would be threatened or destroyed by meeting full accessibility requirements.

Rehabilitation Act (1973)

The Rehabilitation Act requires recipients of federal financial assistance to make their programs and activities accessible to everyone. Recipients are allowed to make their properties accessible by altering their building, by moving programs and activities to accessible spaces, or by making other accommodations.

universal entry. Photo: NPS files.

Americans with Disabilities Act (1990)

Item #3.

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Under Title III of the ADA, owners of "public accommodations" (theaters, restaurants, retail shops, private museums) must make "readily achievable" changes; that is, changes that can be easily accomplished without much expense. This might mean installing a ramp, creating accessible parking, adding grab bars in bathrooms, or modifying door hardware. The requirement to remove barriers when it is "readily achievable" is an ongoing responsibility. When alterations, including restoration and rehabilitation work, are made, specific accessibility requirements are triggered.

Recognizing the national interest in preserving historic properties, Congress established alternative requirements for properties that cannot be made accessible without "threatening or destroying" their significance. A consultation process is outlined in the ADA's Accessibility Guidelines for owners of historic properties who believe that making specific accessibility modifications would "threaten or destroy" the significance of their property. In these situations, after consulting with persons with disabilities and disability organizations, building owners should contact the State Historic Preservation Officer (SHPO) to determine if the special accessibility provisions for historic properties may be used. Further, if it is determined in consultation with the SHPO that compliance with the minimum requirements would also "threaten or destroy" the significance of the property, alternative methods of access, such as home delivery and audio-visual programs, may be used.

Summary and References [return to top ▲](#)

Historic properties are irreplaceable and require special care to ensure their preservation for future generations. With the passage of the Americans with Disabilities Act, access to historic properties open to the public is a now civil right, and owners of historic properties must evaluate existing buildings and determine how they can be made more accessible. It is a challenge to evaluate properties thoroughly, to identify the applicable accessibility requirements, to explore alternatives and to implement solutions that provide independent access and are consistent with accepted historic preservation standards. Solutions for accessibility should not destroy a property's significant materials, features and spaces, but should increase accessibility as much as possible. Most historic buildings are not exempt from providing accessibility, and with careful planning, historic properties can be made more accessible, so that all citizens can enjoy our Nation's diverse heritage.

Acknowledgements

Thomas C. Jester is an Architectural Historian with the Preservation Assistance Division of the National Park Service. **Sharon C. Park**, AIA, is the Senior Historical Architect with the Preservation Assistance Division, National Park Service.

The authors wish to thank Charles A. Birnbaum, ASLA, Historical Landscape Architect with the Preservation Assistance Division, National Park Service, for contributing the section on historic landscapes. The authors gratefully acknowledge the invaluable comments made by the following individuals who reviewed the draft manuscript: William Smith, Massachusetts Historical Commission; Kay Weeks, H. Ward Jandl, Michael Auer, and Charles A. Birnbaum, Preservation Assistance Division, National Park Service; Clare Adams, New York Department of Parks, Recreation and Historic Preservation; Lauren Bowlin, Maryland Historical Trust; Tom Mayes, National Trust for Historic Preservation; Elizabeth Igleheart, Maine Historic Preservation Commission; Milford Wayne Donaldson, FAIA; Paul Beatty, U.S. Architectural and Transportation Barriers Compliance Board; Mid-Atlantic Regional Office, National Park Service; Western Regional Office, National Park Service.

This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Technical Preservation Services (TPS), National Park Service prepares standards, guidelines, and other educational materials on responsible historic preservation treatments for a broad public.

September 1993

Reading List [return to top ▲](#)

Ballantyne, Duncan S. and Harold Russell Associates, Inc. *Accommodation of Disabled Visitors at Historic Sites in the National Park System*. Washington, D.C.: Park Historic Architecture Division, National Park Service, U.S. Department of the Interior, 1983.

Goldman, Nancy. Ed. *Readily Achievable Checklist: A Survey for Accessibility*. Boston: Adaptive Environments Center, 1993.

Hayward, Judith L. and Thomas C. Jester, compilers. *Accessibility and Historic Preservation Resource Guide*. Windsor, Vermont: Historic Windsor, Inc., 1992, revised 1993.

Jester, Thomas C. *Preserving the Past and Making it Accessible for People with Disabilities*. Washington, D.C.: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1992.

Parrott, Charles. *Access to Historic Buildings for the Disabled*. Washington, D.C.: U.S. Department of the Interior, 1980.

Secretary of the Interior's Standards for the Treatment of Historic Properties. Washington, D.C.: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1993.

Smith, William D. and Tara Goodwin Frier. *Access to History: A Guide to Providing Access to Historic Buildings for People with Disabilities*. Boston: Massachusetts Historical Commission, 1989.

Standards for Accessible Design: ADA Accessibility Guidelines (ADAAG). Washington, D.C.: U.S. Department of Justice, 1991.



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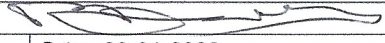


LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A) ☐ Compatibility Review ☐ WRG ☐ Comm. Fac ☐ Lot Line Adjustment ☐ Non-Conforming Use Review ☐ Natural Resource (NROD) ☐ Verification ☐ Minor Site Plan & Design Review ☐ Extension of Approval ☐ 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 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 Greenway Legislative Action (OCMC 17.50.170) ☐ Legislative
---	---	---

File Number(s):	Application Date: 09-01-2022
Project Name: YIP RESIDENCE	
Proposed Land Use or Activity: ADA RAMP	# of Lots Proposed (If Applicable):
Physical Address(es) of Site: 1020 5th Street Oregon City OR 97045	
Clackamas County Map and Tax Lot Number(s): 2-2E-31DA 10900	

Applicant(s)

Applicant(s) Signature: Bogdan Smolinets 		
Applicant(s) Name Printed: NW CUSTOM HOMES INC.		Date: 09-01-2022
Mailing Address: 15730 SE Bybee dr. Portland OR 97236		
Phone: 503-504-6754	Fax: 971-279-5606	Email: nwcustomhomes@yahoo.com

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

Property Owner #1		
Property Owner#1 Signature 		
Property Owner#1 Name Printed: Teresa Yip		Date: 09-01-2022
Mailing Address: 5835 Hamilton St. Portland OR 97221		
Ownership Address:		
Phone: 971-258-8148	Fax:	Email: yipt@aol.com

Property Owner #2		
Property Owner#2 Signature		
Property Owner#2 Name Printed:		Date:
Mailing Address:		
Ownership Address:		
Phone:	Fax:	Email:

Representative(s)

Representative(s) Signature Bogdan Smolinets 		
Representative(s) Name Printed: Bogdan Smolinets		Date: 09-01-2022
Mailing Address: 15730 SE Bybee dr. Portland OR 97236		
Phone: 503-504-6754	Fax: 971-279-5606	Email: nwcustomhomesw@yahoo.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.

From: [john delson](#)
To: [Bogdan Smolinets](#)
Cc: [Christina Robertson-Gardiner](#)
Subject: ADA RAMP NARRATIVES
Date: Friday, September 2, 2022 3:48:18 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 Christina,

For the upcoming meeting with HRB meeting,

We have proposed a smaller, reduced to the minimum ADA ramp, to access the main floor of the residential floor of the house.

The rear deck has been reduced from 13.5 feet x 19 feet to 5 feet x 8'-10".

We have reduced the number of turns to reach the residential floor.

The proposed solution meets the current building code, and the Federal Standards, and ADA Regulations.

The owner have elected traditional ramp solution as oppose to any electrical lift, or elevator to reduce, or eliminate highly possible power shortages, mechanical failures or maintenance issues.

Also, because of the project is near the completion, and the floor layouts does not allow for any significant alterations. The cost of proper elevator (above 100k) is also cost prohibitive solution.

Per our last meeting and discussion with James Sayers -Oregon City Building Official the "approved ADA access to the residence" by HRB, does not meet the ADA standards. We believe that the note from the building Official has been filed by James Sayers.

We have also proposed two planters, one on the right elevation, and the other on the rear elevation to visually reduce, and to screen the ramp.

Regarding front porch columns: we intended to have 12 inch round column per original plans.

Perhaps the artist rendering was not clear about it, however our technical drawings do not specify square columns.

Thank you for your consideration,

Please confirm receipt of this email.

Should you have any questions, please call us or e-mail.

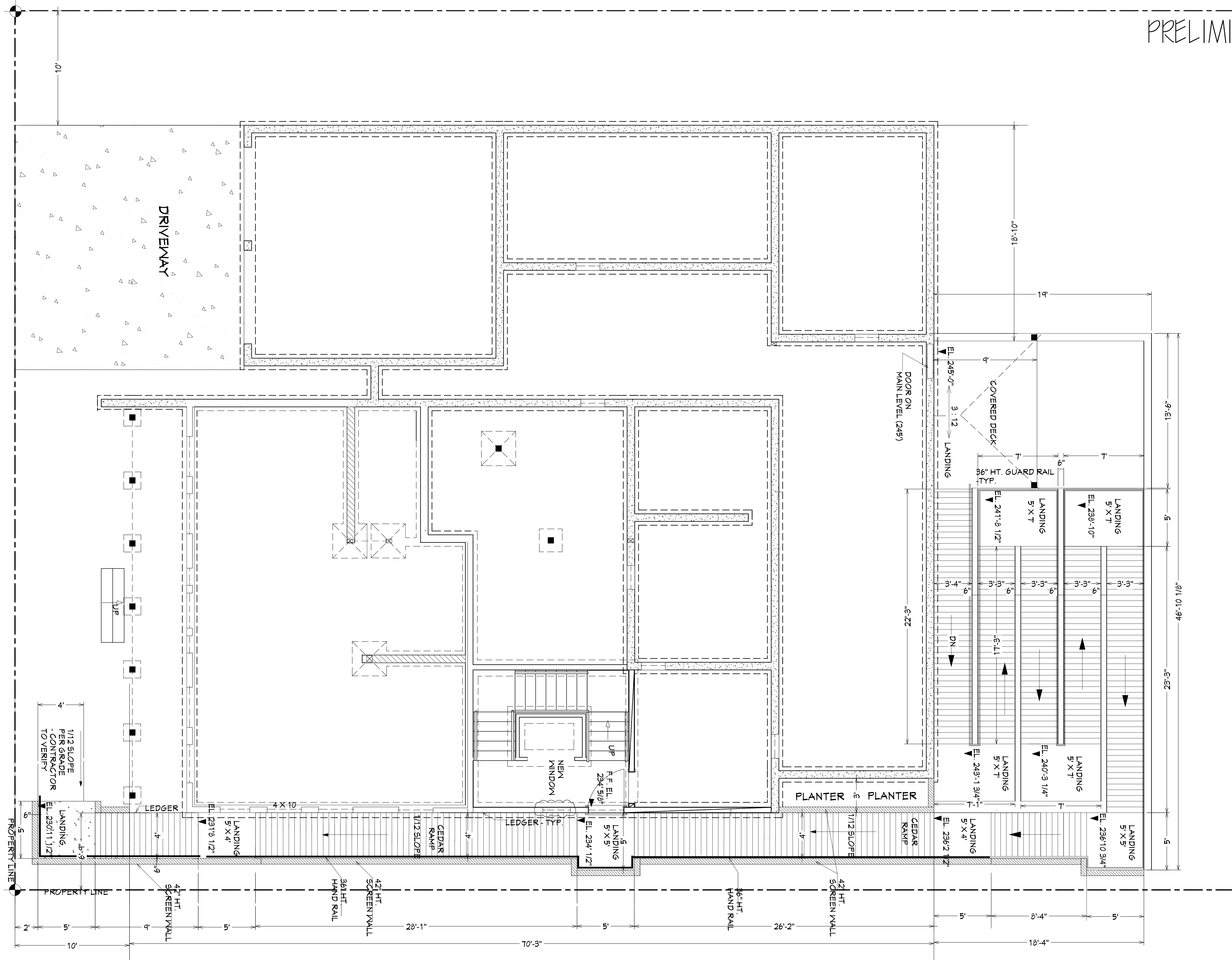
Thank you,

Respectfully,

John Delson P.E. DEI-President
p. 360-944-7094
c. 360-281-8353

cc: Bogdan Smolinets-General Contractor

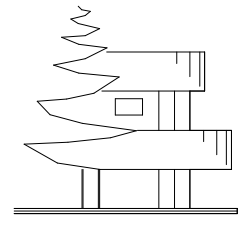




PRELIMINARY

ADU RAMP VERSION I
1/4" = 1'-0"

CONTRACTOR TO VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS AND NOTIFY ENGINEER OF RECORD IF DIFFERENT PRIOR TO START OF CONSTRUCTION ALL WORK PER LATEST ADOPTED APPLICABLE CODES -TYP.

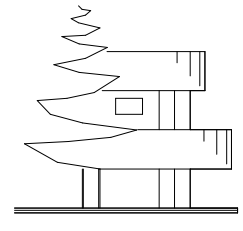


YIP RESIDENCE
5 TH ST JO-ADAMS ST
OREGON CITY, OR 97045

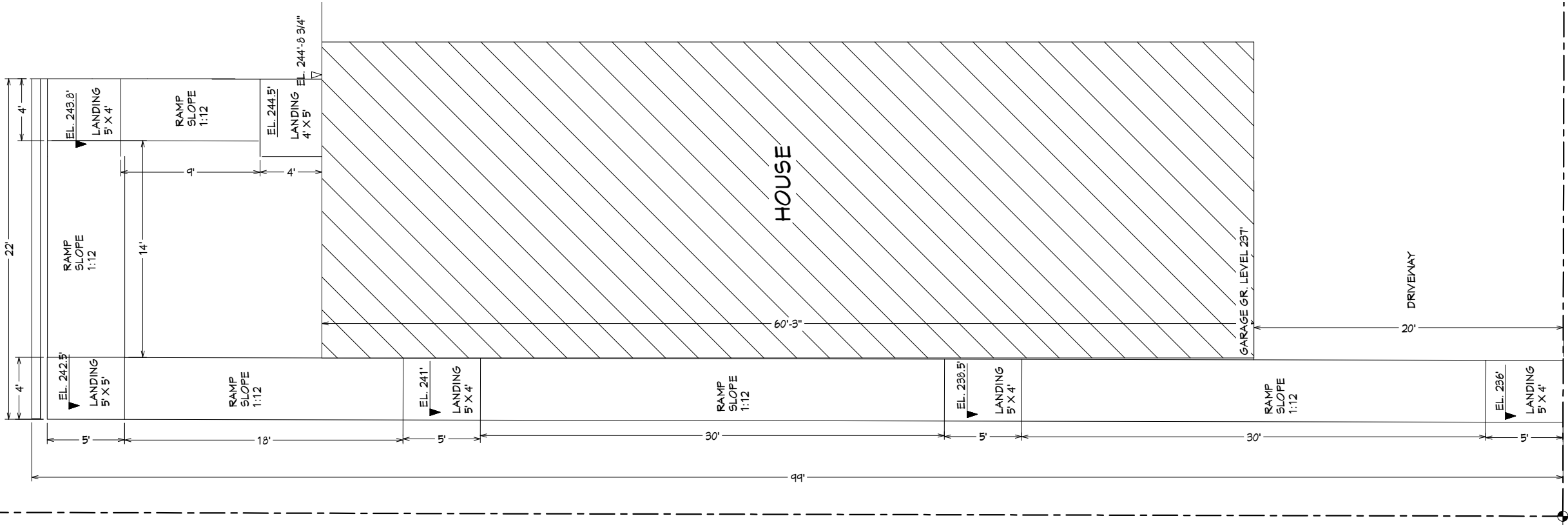
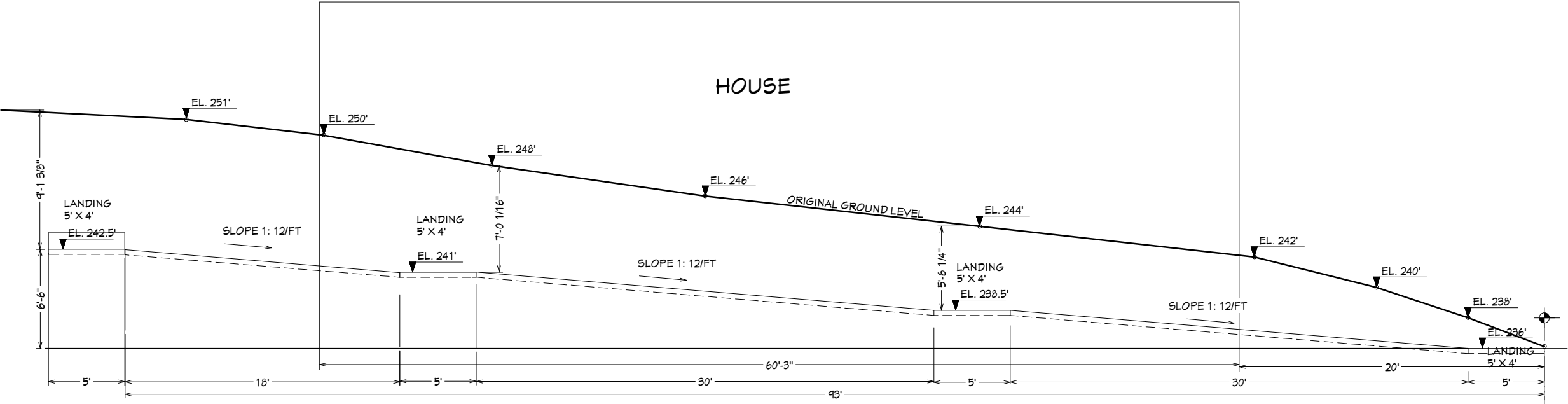
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PRELIMINARY



PROPOSED RAMP SKETCH ON LEFT SITE

1/8"=1'-0"

Item #3.

A-5

YIP- RESIDENCE

5 TH ST JQ-ADAMS ST

OREGON CITY, OR 97045

DATE: 4-11-20

LIVING AREA:

JOB NO: A19-7-52

DRAWN BY: cdf/g

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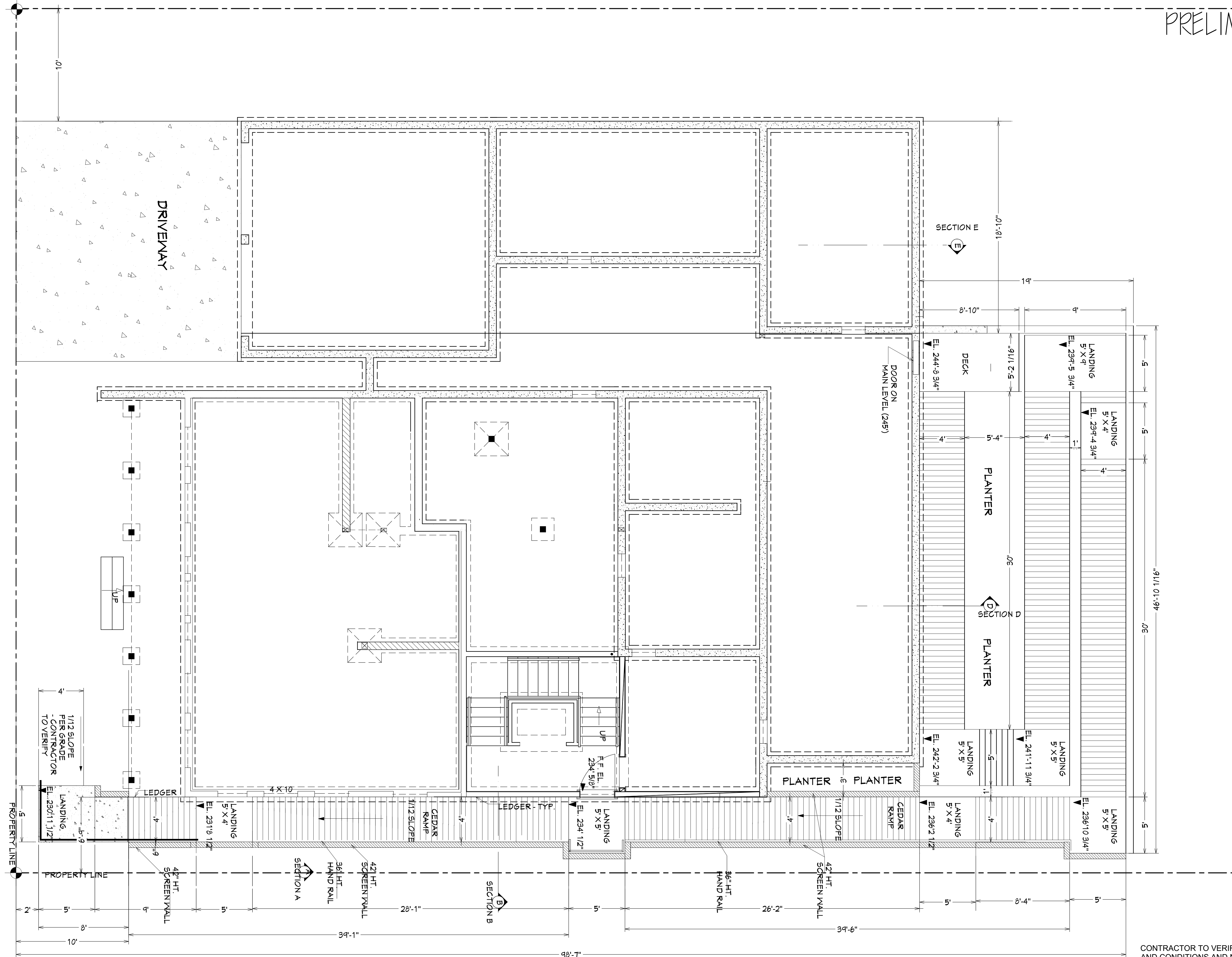
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Page 183

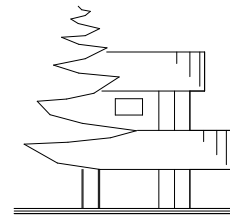


PRELIMINARY

ADU RAMP VERSION 2

1/4" = 1'-0"

CONTRACTOR TO VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS AND NOTIFY ENGINEER OF RECORD IF DIFFERENT PRIOR TO START OF CONSTRUCTION ALL WORK PER LATEST ADOPTED APPLICABLE CODES -TYP.

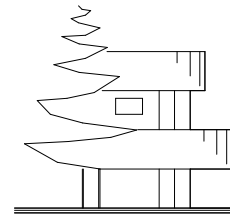


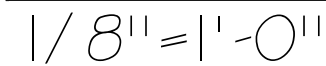
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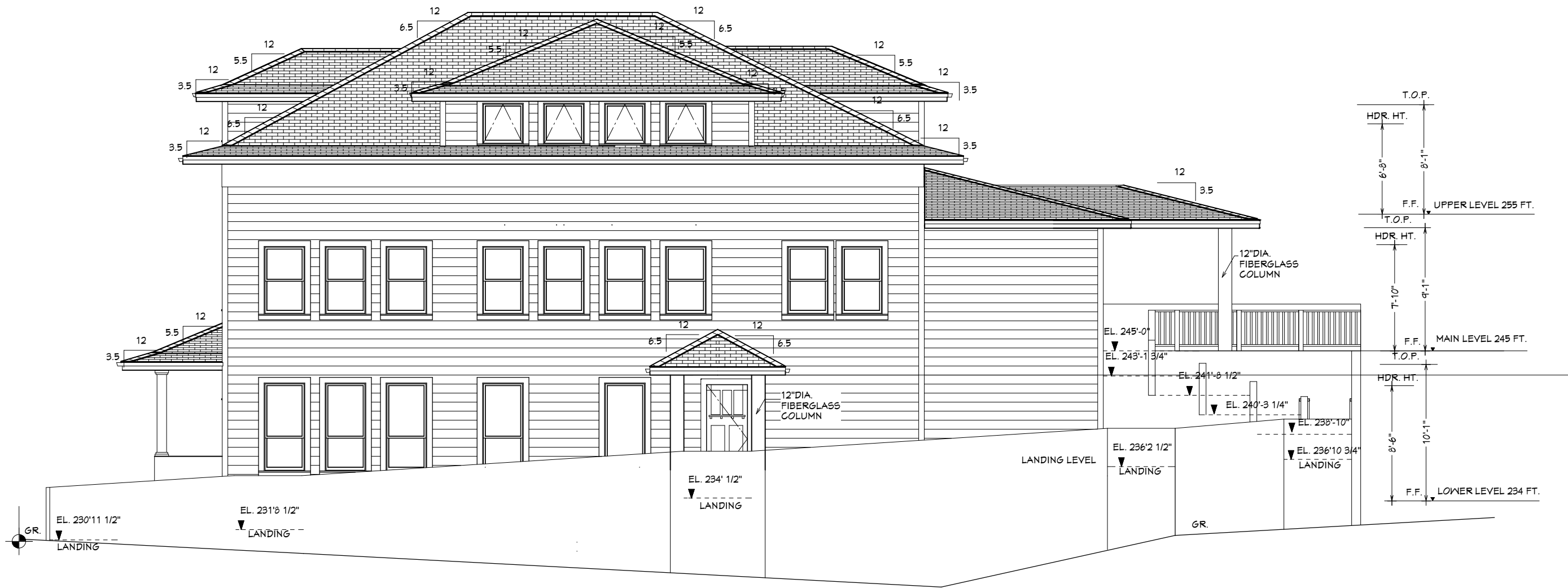




PRELIMINARY

REL MINARY





RIGHT ELEVATION WITH PROPOSED RAMP
VERSION # 1

$1/8" = 1'-0"$

PRELIMINARY

Item #3.

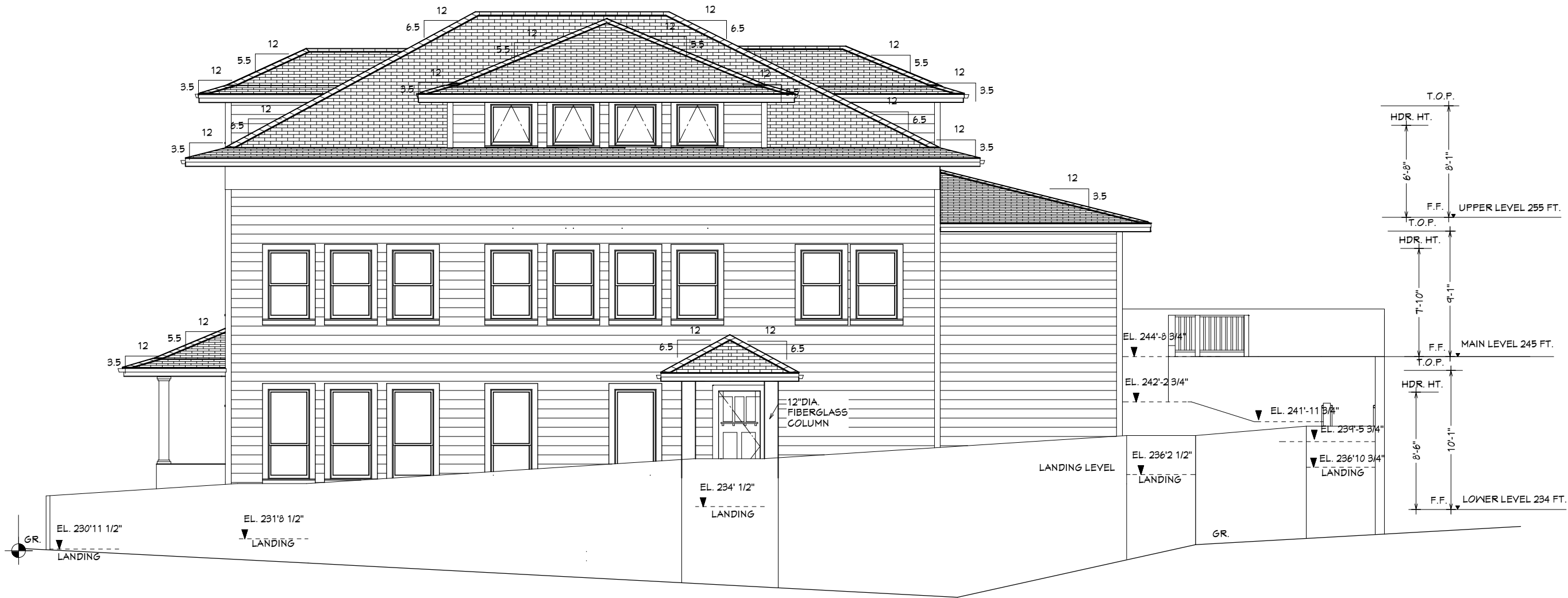
YIP RESIDENCE
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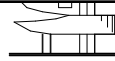


RIGHT ELEVATION WITH PROPOSED RAMP
VERSION # 2

1/8"=1'-0"

PRELIMINARY

Item #3.



YIP RESIDENCE
5TH ST JQ ADAMS ST
OREGON CITY OR 97045

DATE: 9-2-22
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JOB NO: DRAWN A19-7-52
BY: *edg*

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M C L O U G H L I N

N E I G H B O R H O O D
A S S O C I A T I O N

DATE: September 26, 2022
 TO: Historic Review Board
 Christina Robertson-Gardiner, Senior Planner

FROM: McLoughlin Neighborhood Association

RE: Comments on HR-22-00010
 Revised ADA Ramp, 1020 5th Street

The McLoughlin Neighborhood Association has reviewed the application and offers the following feedback:

MNA concurs with Staff's recommendation to extend the application so the applicant can submit the required materials and analyses to develop a complete application.

MNA would like to add the following additional comments in support of the Staff Report:

Please provide a narrative. The submitted email is not sufficient for proper review.

Please include in the application any other review memos that would support the application, such as the Building Official memo mentioned in the applicant's email.

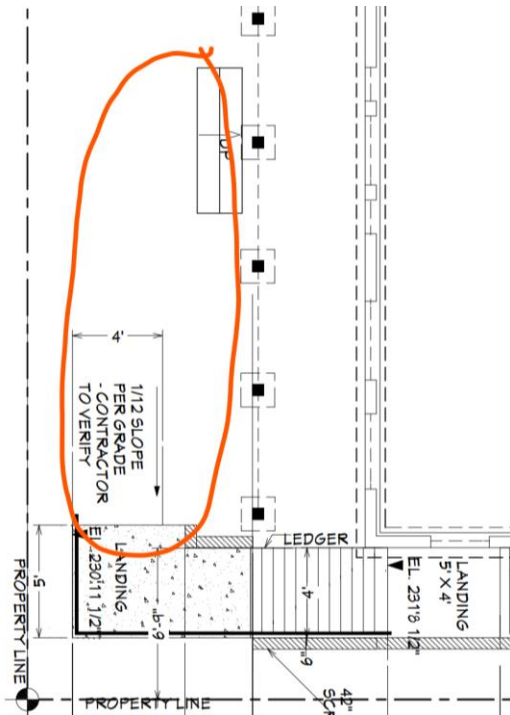
The applicant continues to assert that an elevator would be cost prohibitive but has yet to provide any supporting documentation of this. It is imperative the alternatives analysis requested repeatedly by Staff include the complex proposed ramp in its entirety (ramp, guardrails, screening walls, landscaping, etc.). All elements associated with the ramp need to be included in this estimate in order to provide a valid basis for comparison to the other requested alternatives. Since the building is nearly completed, it is reasonable to assume the applicant has actual bids for this work and can easily include them in the alternatives analysis.

The ramp needs to tie into the public sidewalk and landing at front steps. These two elements have been constructed (Figure 4 photo). Show the completed public sidewalk and front step landing with elevations as needed to demonstrate a compliant segment of ramp in front of the building (red area in sketch below). Because there is limited space to accomplish this, the public sidewalk/private ramp tie-in needs to be designed (calculated and drawn accurately) to avoid non-compliant work being demolished and replaced. Please add this to the next submittal.

M C L O U G H L I N



N E I G H B O R H O O D
A S S O C I A T I O N



Staff's Analysis Overview indicates ADA access was not brought into discussion by the applicant early in the development. It should be noted that MNA expressed concerns regarding ADA access early on, but the applicant ignored the subject until the building was well under construction.

Thank you for your consideration.

From: [Christina Delbecques-Caplan](#)
To: [Christina Delbecques-Caplan](#)
Date: Tuesday, September 20, 2022 2:49:02 PM







From: [Christina Delaney-Carlson](#)
To: [Christina Delaney-Carlson](#)
Date: Tuesday, September 20, 2022 2:49:42 PM









From: [Christina Delaney-Carroll](#)
To: [Christina Delaney-Carroll](#)
Date: Tuesday, September 27, 2022 12:52:08 PM







From: [NWKayakgirl Kayak](#)
To: [Christina Robertson-Gardiner](#)
Subject: Re: Please send me a Zoom Link
Date: Tuesday, September 27, 2022 7:21:19 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.

Thank you.

My statement at this time:

As an interested McLoughlin Neighbor that owns property adjacent to this building, I continue to ask the same questions and have yet to receive a clear response:

I wonder . . . if the owner is so adamant that this is just a residential building, why do they complain they can't afford to install commercial elevators? — just install residential lifts! We have asked several times to be shown the expenses for the interior elevator system that the owner claims are beyond their budget, and yet nothing is ever provided.

The owner is insistent that they need to adhere to commercial ADA requirements. If this is a residential building, why do they need to meet the "commercial" level laws? It is not necessary to create a monstrosity of a residential building for such a tiny little business. Keep the ramps and walkways looking residential.

I am supportive of assisted living centers in our community, and we have another such one on Madison street. Just because you are almost done shoving through on the work without complying with the recommendations, does not mean that the work is done. You are building this for an elderly vulnerable population that does not have a voice in the decisions you are making . . . ramps, elevators, lifts, exposed walkways.

Let's start working together to find a solution without circumventing the ADA requirements for a quick fix or creating a labyrinth of ramps when these future family members/residents deserve an interior elevator or lift to get to their homes. Let's find make sure there are safe means for escaping the building in an emergency. Let's make sure there is neighborhood-friendly parking for the workers and a private place for them to relax without creating "smoking" porches in our backyards.

Make this right. Make this part of our neighborhood that we live in. Make this safe for the residents that will live in it.

Thank you.

Jilene Modlin
 McLoughlin Neighborhood Resident

> On Sep 26, 2022, at 9:35 AM, Christina Robertson-Gardiner <crobertson@orc.org> wrote:

>

> Hi Jilene,

>

> The link is below.

>

> If you would like to speak tomorrow- please fill out the attached form and send it to me. If you would like to send written comments- please send them to be by 4PM tomorrow for me to be able to forward them to the Board before the meeting.

>

> Thanks!

>

> Oregon City Planning is inviting you to a scheduled Zoom meeting.

>
> Join Zoom Meeting
> <https://us02web.zoom.us/j/84485556277?pwd=TkhXSmV6R1Z6QUhNSXdqUjJPbTVwdz09>
>
> Meeting ID: 844 8555 6277
> Passcode: 421383
> One tap mobile
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> +1 646 931 3860 US
> +1 301 715 8592 US (Washington DC)
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> +1 312 626 6799 US (Chicago)
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> Meeting ID: 844 8555 6277
> Passcode: 421383
> Find your local number: <https://us02web.zoom.us/u/kbXiqLaqmp>
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> -----Original Message-----
> From: Aquilla Hurd-Ravich <ahurdravich@orccity.org>
> Sent: Monday, September 26, 2022 9:29 AM
> To: NWKayakgirl Kayak <nwkayakgirl@gmail.com>; Planning <planning@orccity.org>
> Subject: RE: Please send me a Zoom Link
>
> Hi Jilene,
> I'm checking to see if you received what you needed yet?
>
> -Aquilla
>
>
> -----Original Message-----
> From: NWKayakgirl Kayak <nwkayakgirl@gmail.com>
> Sent: Saturday, September 24, 2022 10:29 AM
> To: Planning <planning@orccity.org>
> Subject: Please send me a Zoom Link
>

> 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.

>

>

> Thank you for sending me a Zoom Link.

>

> Jilene

>

> <Testimony form fillable.pdf>

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How To's & Quick Tips

How Much Does a Stair Lift Cost to Install?

If you or a family member are struggling to navigate the stairs, installing a stair lift can be a helpful solution. Stair lift costs range between \$2,000 and \$15,000, with the national average at \$6,000.

By [Katie Flannery](#) | Updated Jul 19, 2022 6:07 PM



Photo: [depositphotos.com](#)

- **Typical Range:** \$2,000 to \$15,000
- **National Average:** \$6,000

If you or a family member are having difficulty navigating up and down stairs due to an injury, illness, or mobility issues, a stair lift may be the solution. A stair chair lift is a motor-operated device that follows a track up and down the stairs to assist someone who is unable to navigate the stairs in their home. [According to HomeAdvisor](#), stair lift costs range between \$2,000 and \$15,000, with the national average at \$6,000. The price can vary because of the style and length of the lift; a curved or extended lift can cost between \$9,000 and \$15,000, but a standard straight lift shorter than 15 feet might only cost between \$2,000 and \$6,000. The benefits of installing a stairlift outweigh the price for many homeowners. Having a stairlift ensures independence and safety for those who need it.

Think it's time to install a stair lift?

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Factors in Calculating Stair Lift Cost

Many factors impact stair lift cost. Prices differ from the national average due to staircase type, shape, length, installation and labor costs, lift and seat type, power source, and brand.

Staircase Type, Shape, and Length

Stairs come in different shapes, and there are varying stair lift types to accommodate, including straight, curved, platform, and outdoor. Straight stairs generally cost the least to fit with a lift, and curved staircases cost the most. If the staircase has landings, the lift will require a longer track, and the overall cost will

be higher.

Installation and Labor

Installation costs can run between \$1,000 and \$5,000 for many stair lift models. Prices can be higher if the stairs are steeper than average or if the lift is installed on outdoor steps made of natural materials like earth or stone. On occasion, additional work needs to be completed to install a stair lift, which can drive up the installation price. For example, installing wiring can cost between \$600 and \$2,200, building a new wall can run from \$1,000 to \$2,700, repairing drywall is \$300 to \$800, and replacing or upgrading an electrical panel ranges from \$600 to \$1,800.

Labor costs are typically included with the installation price since stair lifts need to be installed by a professional from either the company you purchased the lift from or someone from the manufacturer. If you decide to hire a third party to install the lift, labor costs usually run between \$75 to \$100 per hour.

Type of Stair Lift and Seat

Stair chair lifts are available with different types of seats. The seat affects how much space the lift takes up on the stairway and how comfortable it is to ride. Here are some available seat options and the average prices.

- **Perch seat.** A stair lift with a perch seat typically costs between \$2,500 and \$20,000. One of the newest advances in stair lift seating, a perch seat saves space by allowing the user to lean against the seat in a partially standing position while riding up and down the stairs. While these are not ideal for those with significant mobility or balance issues, this type of stair lift saves a considerable amount of space for smaller or narrow spaces where a standard lift wouldn't fit.
- **Collapsible seat.** Collapsible seat stair lifts cost between \$2,000 and \$20,000. One of the most popular styles of lift seating, the seat (and usually the footrests and armrests) fold up to save space when it's not in use. This is an excellent option for those with a narrow staircase or who want to reduce the overall stair lift footprint.
- **Angled seat.** Stair lifts with an angled seat can range between \$3,000 and \$20,000. Angled seat lift chairs tilt backward slightly, so the user feels more

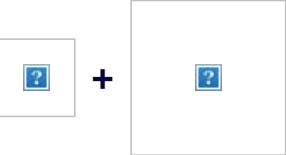
stable while using the lift. These are popular for those with significant mobility issues.

- **Swivel seat.** The average cost for a stair lift with a swivel seat is \$2,500 to \$20,000. A swivel seat pivots at the bottom or top of the stairs to allow the user to get out of the lift without twisting. The seat locks to prevent turning while moving up and down the stairs. Some high-end models will swivel automatically, and others must be moved manually.

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Power Source

Stairlifts can be battery powered or connected to an electrical outlet. Battery-operated lifts can work during a power outage, and the electric-powered ones need a battery backup if the power goes out. Electric stairlifts will cost more up front because they require more electrical wiring work, and they also cost more money to run. Electric stair lifts don't require as much maintenance as a battery-operated lift; however, a battery-operated lift needs regular battery health checks.

Brand

When deciding on a stair lift for your home, there are several options to choose from. Most manufacturers make both straight and curved lifts, but it's essential to check and ensure that the brand you choose creates a lift that will work for your needs. Here are a few trusted brands of home stair lifts and their average prices.

- AmeriGlide: \$2,000 to \$5,000
- Acorn: \$2,500 to \$5,500
- Bruno: \$3,000 to \$6,000

Stannah: \$3,000 to \$6,000

Item #3.



Photo: depositphotos.com

Additional Costs and Considerations

When budgeting for stair lift costs, it’s helpful to know any additional price factors and considerations that can increase the total cost. These can include pricing differences with renting or buying, buying a new or pre-owned lift, customizations and add-ons, outdoor lifts, and maintenance costs.

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Renting vs. Buying

If you or a family member need a stair lift for a short period while recovering from surgery or an injury, renting a lift is an option. The cost to rent a lift runs from \$300 to \$500 per month, not including installation or removal fees. Many stair lift

companies require a minimum 3-month rental agreement. Keep in mind that the installation fee can run from \$400 to \$700, removal can cost between \$300 and \$600, a refundable deposit ranges from \$500 to \$1,000, and the 3-month rental averages between \$900 and \$1,500.

Pre-Owned vs. New

Pre-owned stairlifts are available to buy for a reduced price. These lifts have been previously rented and are in excellent condition. The lifts are subjected to rigorous inspections to ensure they’re safe and in good working order. The overall price can vary depending on the brand, model, and type, but average savings can range from \$500 to \$1,500 off the cost of a new lift. It may be challenging to find a pre-owned stair lift for a curved staircase, however, since the lift track needs to be custom-made.

Customizations and Add-Ons

Custom add-ons to a stair chair lift will increase the overall price. Some of these customizations may be necessary, such as a custom track for a curved staircase or a staircase with multiple landings. These customizations can add between \$1,000 and \$10,000 to the installation price, depending on the complexity of the stairs. Some straight stair lift tracks can accommodate up to 70 feet, but anything longer can add \$50 to \$75 per linear foot. Stair lifts can typically handle users up to 250 pounds, but a heavy-duty lift may be needed for those who use wheelchairs or weigh over 250 pounds. Purchasing a heavy-duty stair lift can start at \$5,000 and range up to \$20,000 for lifts that can support over 400 pounds.

Outdoor Stair Lifts

Depending on the length, installing a stair lift outside can range from \$2,000 to \$10,000. Different materials are required for an outdoor lift to withstand extreme temperatures, rain, snow, dirt, and grime and still work correctly.

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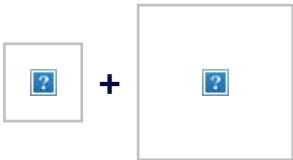
Maintenance

It’s recommended that a stair lift be professionally inspected once a year to ensure it’s in safe working order. Stair lift companies usually offer yearly maintenance inspections for between \$100 and \$200, and some retailers provide 24-hour emergency service. Be sure to ask the installer what services are offered.

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Stair Lift Cost Types

There are various types of stair lifts, and they vary by the kind of stairs they’re designed for and how they’re powered.

Battery-Operated vs. Electric Stair Lifts

The cost of a battery-powered lift ranges between \$3,000 and \$5,000. The price reflects the ease of installation because the lift doesn’t need additional wiring. A battery-operated lift will charge when it’s not in use at the charging station at the

bottom of the stairs. While a battery-operated lift will save more money in electricity costs in the long run, this type of lift requires regular battery checks and maintenance.

Electric stair lifts can average between \$4,000 and \$7,000. An electric lift plugs into an outlet to power it up and down the stairs. If there is no outlet in the stairwell, one will have to be installed, which will raise the overall installation cost. This type of stair lift typically comes with a backup battery in the event of a power outage.

Straight Stair Lift

Straight lifts are the most common type of stair lift. They're fitted to a straight staircase that doesn't bend or curve. These lifts are the easiest to install and typically run between \$2,000 and \$8,000.



Photo: [istockphoto.com](https://www.istockphoto.com)

Curved Stair Lift

Curved stair lifts are the most expensive type of lifts. They are custom-designed to fit the contours of the staircase. These can run between \$8,000 to \$20,000. For homes that have a staircase with one or more landings, an alternative to a curved lift would be two straight stairlifts, which could save thousands of dollars.

Platform Stair Lift

A platform stair lift is designed for wheelchair users to maneuver up and down the stairs. A wheelchair can be placed on a size-appropriate platform to transport users to different floors. Platform lifts can be used with both straight and curved lifts, with the price dependent on the length and type of staircase. These can cost between \$5,000 and \$20,000.

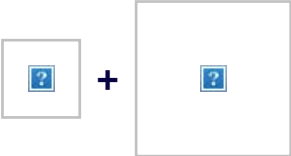
Outdoor Stair Lift

Outdoor stair lifts can range between \$4,000 and \$12,000. These lifts must withstand harsh weather conditions and still work properly, so the price is generally higher than for straight indoor lifts.

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When to Consider Getting a Stair Lift

As we age, stairs become more challenging to navigate. If you or a family member is recovering from an injury or surgery, have mobility issues, are frightened to navigate the stairs, or don't have the strength to go up and down the staircase anymore, a stair lift may be the solution.

Health and Safety Concerns

A stair lift is a safe way for those with health and safety concerns to navigate stairs. Going up and down the stairs can be dangerous and result in serious injury for those with mobility and balance issues. A motorized lift is the safest option for accessing different levels of the home.

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Reduced Mobility

Joint pain can make climbing the stairs difficult. Suppose you or a family member are experiencing knee or hip pain, joint stiffness, muscle weakness, reduced lung capacity, or are recovering from surgery. In that case, a stair lift can help regain independence.

Aging in Place

Many seniors prefer to remain in their own homes rather than move into a senior living community. A stair lift provides the option to stay at home and utilize all levels of the living space instead of just one floor. A stair lift is also a more affordable option than selling a home and finding a new one-story place to live in.

Benefits of Getting a Stair Lift

Joint pain, stability issues, lack of strength, and limited mobility can accompany aging and make stairs difficult. A stair lift is a worthwhile investment and has many benefits.

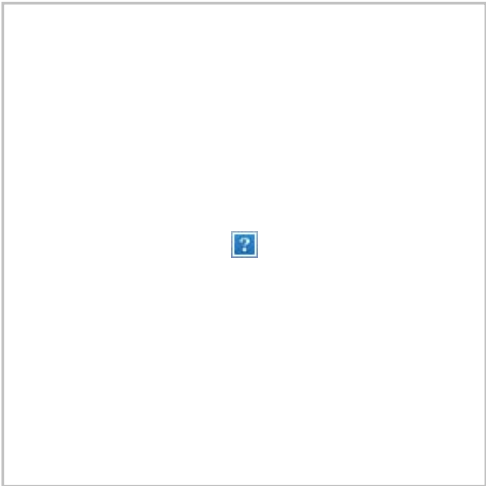
Injury Prevention

A stair lift can help prevent an injury due to falling while navigating up or down the stairs. Those with balance issues may have trouble judging the distance between steps and trip and fall. A stair lift has a built-in safety belt that will keep the user safe and avoid injury while transporting them to different levels of the home.

Ease of Use and Comfort

Most users find a stair lift easy to use: sit in the seat, fasten the safety belt, and hold the switch to go up or down the stairs. To stop the lift, simply release the switch. Some stair lifts come with a remote, which is especially helpful if more than one person uses the lift. If you’re at the top of the stairs and the lift is at the bottom, the remote will power the stair lift up to you. The seat is padded and comes with adjustable padded armrests and footrests to ensure a comfortable experience.

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Independence

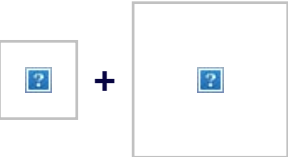
Sometimes stairs can prevent someone from using all the levels of their home,
limiting them to living on one level. A stair lift can help restore a feeling of
independence, as it allows the user access to all stories of the home since stairs
will no longer be a hindrance.



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Relatively Affordable Aging in Place Option

A stair lift is a brilliant solution for those who prefer to age at home instead of
moving to an assisted living facility or a senior living community. Although the
expense of installing a stair lift can quickly add up, it is less expensive than
moving to a single-floor home.

Stair Lift Installation: DIY vs. Hiring a Professional

While it may be tempting to buy a DIY stair lift to save some money, installing a stair lift as a DIY project is not recommended. Even though it's easy to use and operate, a stair lift is a complex piece of assistive technology. It needs to be professionally installed to ensure the user's safety. Professional installers undergo rigorous training, and they're qualified and experienced to install the lift in as little as 4 to 5 hours. It may take a bit longer to install a lift on an extra-long set of stairs. Since a staircase rarely has an electrical outlet nearby, new wiring may need to be installed before the stair lift. It's always recommended that a professional handle new wiring and outlet installation.

How to Save Money on a Stair Lift

Stair lift costs can be high, and the additional fees associated with the installation can quickly add up. One way to save money on stair lift costs is to buy the cheapest lift, but there are other ways to save without giving up the options you want.

- **Get at least three quotes.** Getting multiple quotes from reputable companies can help you get the best price on stair lift costs.
- **Negotiate.** Some companies offer promotions and will negotiate the installation price to fit within your budget.
- **Only get what you need.** The extra bells and whistles that come with high-end stair lifts are tempting, but the additional costs can quickly drain a budget. Ask for itemized pricing on the stair lifts you're interested in so you can cut the add-ons that you don't need.
- **Medicare coverage.** Standard Medicare doesn't cover stair lift costs, but specific Medicare Advantage plans might. This coverage changes year to year, so it's essential to see what expenses are covered when installing a stair lift.
- **Research grants.** Look to see if there are stair lift grants in your area. If you qualify, it can help save on installation costs.
- **Go used.** Purchasing a previously used stair lift can save significantly more money than buying a new lift.

Questions to Ask About Stair Lift Installation

Asking the right questions about stair lift costs can minimize miscommunication

and save money. Here are some questions to ask when pricing installation for a stair lift.

- Is your company insured?
- Do you have referrals?
- What kind of training do the installation professionals have?
- Who will install the stair lift?
- What kind of stair lift do I need?
- Do you provide an itemized estimate?
- What is the total cost?
- Is the lift easy to use?
- What are the stair lift safety features?
- Will other people still be able to use the staircase?
- What maintenance programs do you offer?

Does a loved one want to maintain their independence?

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FAQs

Deciding on stair lift installation while staying within your budget can be a daunting process. Here are some frequently asked questions about stair lift costs to help guide you in your decisions.

Q. Does Medicare pay for stair lifts?

Original Medicare does not pay for stair lifts, although some Medicare Advantage plans may assist. This coverage changes from year to year, so check with your

state’s program to see what is covered.

Q. Does insurance cover stair lifts?

Insurance typically does not cover stair lifts, although some types of disability or auto insurance may pay some of the cost due to injury or disability. Always double-check to see what your insurance plan says about stair lifts.

Q. Is there an alternative to a stair lift?

Some alternatives to a stair lift include moving to a one-story home or a senior living community, relying on others to help go up and down the stairs, living in one level of your home, remodeling your home, or installing an elevator or stair climbing aid.

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Q. How do I qualify for a free stair lift?

If you have a Medicare Advantage plan, research to see if it will cover part or all of the cost for a stair lift. The coverage changes from year to year, so check often. Medicaid, VA Health Care benefits, and grants from the Department of Housing and Urban Development offer assistance for stair lift installation costs.

Q. Can a stair lift be fitted to any stairs?

Stair lifts can be installed on just about any staircase, although some may be more expensive because the lift needs to be custom-built to accommodate the

curves and turns.

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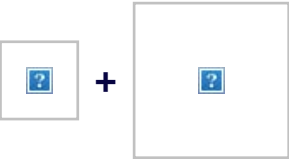
Q. How long does it take to install a stair lift?

A straight stair lift can be installed in about 2 to 3 hours, and a curved lift can take between 4 and 5 hours or more, depending on the difficulty or length of the staircase.

Sources: [HomeAdvisor](#), [Fixr](#), [Bruno](#), [HomeServe](#),

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CITY OF OREGON CITY

Staff Report

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

To: Historic Review Board **Agenda Date:** 01/24/2023
From: Christina Roberson-Gardiner, Senior Planner

SUBJECT:

2022 HRB Accomplishments

EXECUTIVE SUMMARY:

In 2022 the HRB reviewed 12 applications versus 20 in 2021, A summary of the HRB's work in 2022 is below. No action is requested; this is for informational purposes only and will be shared with the City Commission at their February 15, 2023 meeting.

Preservation Program

1. Awarded five Local Preservation Grants for window and siding repair
2. Awarded the 2022 Ruth McBride Powers Preservation Award to Hayley and Ike McGinnis For their restoration work at 610 JQ Adams Street in the McLoughlin Conservation District
3. Mailed out quarterly Historic Property Owners Welcome Packets to new owners.
4. Held work sessions to create draft design guidelines for middle Housing, presented to Canemah and McLoughlin Neighborhood Associations, and will present to City Commission at a future work session in 2023.

Historic Land Use Reviews

1. Reviewed five applications for New Construction or modifications to approved new construction projects
2. Reviewed three applications for Alterations to Historic Properties
3. Reviewed three applications for Demolition (garages)
4. Reviewed two applications for delisting and or reduction in size of the Landmark.
5. Provided Design Advice for one project