

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH 2014 NATIONAL ELECTRIC CODE (NEC), 2015 INTERNATIONAL RESIDENTIAL CODE (IRC), 2014 NATIONAL BUILDING CODE (NBC), 2015 INTERNATIONAL BUILDING CODE (IBC), 2015 INTERNATIONAL PLUMBING CODE (IPC), AND ALL STATE AND LOCAL BUILDING, ELECTRICAL, AND PLUMBING CODES.
2. DRAWINGS HAVE BEEN DETAILED ACCORDING TO UL LISTING REQUIREMENTS.

SITE NOTES

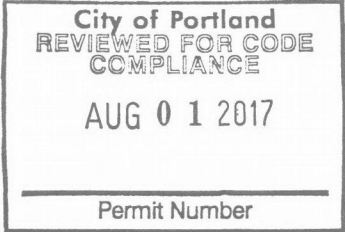
1. A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS AN UTILITY NTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
3. THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
4. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION [NEC 110.26]
5. 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 250-64B. THE GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT PER NEC 250.64C.]
3. 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.
7. RIGID CONDUIT (AND/OR NIPPLES) MUST HAVE A PULL BUSHING TO PROTECT WIRES.
3. BOLTED CONNECTION REQUIRED IN DC DISCONNECTS ON THE WHITE GROUND 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

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 MANUFACTURERS' INSTALLATION REQUIREMENTS.
3. AS INDICATED BY DESIGN, OTHER NRTL LISTED MODULE GROUNDING DEVICES MAY BE USED N 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.
3. CONDUIT POINT OF PENETRATION FROM EXTERIOR TO INTERIOR TO BE INSTALLED AND SEALED WITH A SUITABLE SEALING COMPOUND.
3. 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.
3. MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC UNLESS NOT AVAILABLE.
3. 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 690.4 (B).
10. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE.

EQUIPMENT LOCATIONS

1. ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY [NEC 110.26].
2. EQUIPMENT INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY [NEC 690.31 (A)-(B)] AND [NEC TABLE 310.15 (B)(2)(C)].
3. ADDITIONAL AC DISCONNECTS SHALL BE PROVIDED WHERE THE INVERTER IS NOT ADJACENT TO THE UTILITY AC DISCONNECT, OR NOT WITHIN SIGHT OF THE UTILITY AC DISCONNECT.
4. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
5. ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.



AERIAL VIEW



ASCE 7-10 WIND SPEED: 120 MPH  
GROUND SNOW LOAD: 20 PSF  
EXPOSURE CATEGORY: C  
SEISMIC DESIGN CATEGORY: D

OCCUPANCY - R3  
CONSTRUCTION - V-B  
ZONING: RESIDENTIAL

SCOPE OF WORK

DC SYSTEM SIZE: 6.38 kW DC  
ROOF TYPE: COMP SHINGLE  
MODULE: (22) Q.CELL Q.PEAK BLK-G4 1 290  
INVERTER(S): SOLARDEGE SE5000A-US,---  
RACKING: IRON RIDGE XR10 PV Mounting & Racking System

ANCHORED ON MAX 48 INCH CENTERS USING UL LISTED RACKING SYSTEM TO SPEC.  
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). 300.4  
SOLADECK JUNCTION BOXES MOUNTED FLUSH W/ROOF SURFACE WILL BE USED IF CONDUIT RUN DETERMINED IN THE FIELD TO BE RAN THROUGH ATTIC. DC CONDUCTORS SIZED WITH DERATES TO 1/2" ABOVE ROOF SURFACE PER NEC 310.15(B)(3)(C), IF CONDUIT RAN ON ROOF IT WILL BE INSTALLED AT LEAST 1/2" FROM ROOF SURFACE.

SHEET INDEX

- PV1 - COVER SHEET  
PV2 - PROPERTY PLAN  
PV3 - SITE PLAN  
PV4 - EQUIPMENT & ATTACHMENT DETAIL  
PV4.2 - EQUIPMENT & ATTACHMENT DETAIL  
PV5 - ELECTRICAL SINGLE LINE DIAGRAM  
PV6 - ELECTRICAL CALCULATIONS & STRING DIAGRAM  
PV7 - MBD CALCS. (IF NEEDED)  
PV8 - LABELS & LOCATIONS  
PV9 - STRING & SE OPTIMIZER  
PV10 - PLACARD (IF NEEDED - NEC 690.56(B))

STRUCTURAL ONLY  
July 14, 2017



1220 S. 630 E STE. 430  
AMERICAN FORK, UT 84003

800-377-4480  
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PROJECT MANAGER:  
SCOTT GURNEY  
385-498-4401

CONTRACTOR:  
BLUE RAVEN SOLAR  
800.377.4480

SITE INFORMATION:  
BRIAN VAN HORN  
4734 NORTHEAST 78TH PLACE  
PORTLAND, OR 97218

DC SYSTEM SIZE:  
6.38 kW DC

DRAWING BY  
MIKE PRATT

DATE  
July 11, 2017

PROJECT NUMBER  
34002723

SHEET NAME  
COVER SHEET

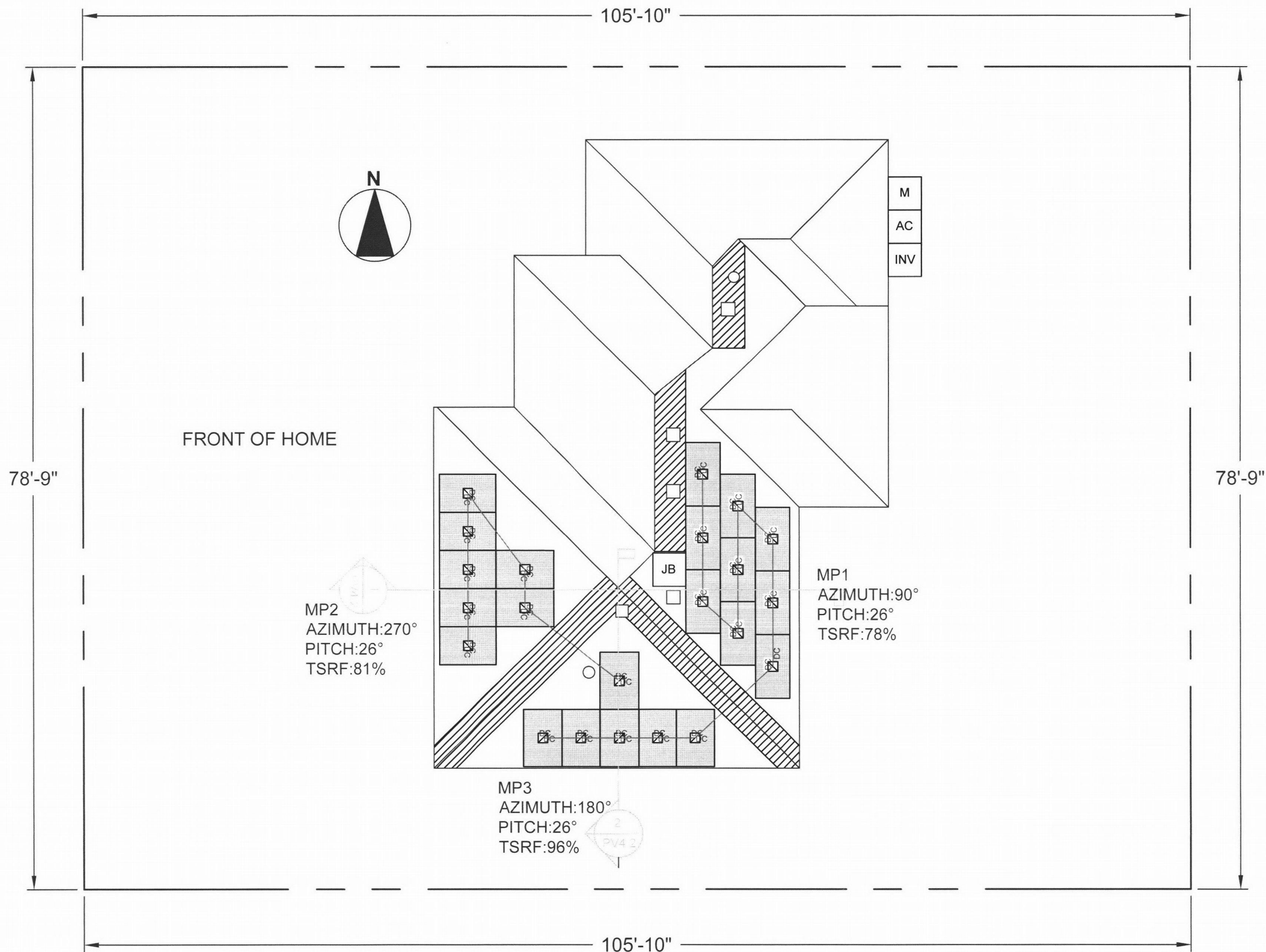
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PV1

REVISION  
B

17.164640 Rev. 01.1252



4734 NORTHEAST 78TH PLACE



DC SYSTEM SIZE: 6.38 kW DC  
ROOF TYPE: COMP SHINGLE

(22) Q.CELL Q.PEAK BLK-G4 1 290  
SOLARDEGE SE5000A-US,----INVERTER

ROOF ATTACHMENTS SHALL BE SPACED  
NO GREATER THAN 24" ON CENTER IN  
ANY DIRECTION WHERE LOCATED WITHIN  
3' OF A ROOF EDGE, HIP, EAVE, OR RIDGE  
OSSC 3111.5.3 ITEM 3.35

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July 14, 2017

**VECTOR**  
ENGINEERS  
651 W. GALENA PARK BLVD., SUITE 101 DRAPER, UT 84020 P: (801) 990-1775 F: (801) 990-1776

**STRUCTURAL**  
REGISTERED PROFESSIONAL  
ENGINEER  
78187PE  
OREGON  
MAY 16, 2006  
ROGER ALWORTH  
EXPIRES 12/31/2017

### LEGEND

- INV INVERTER & DC DISCONNECT
- SUB (E) SUBPANEL
- LC (N) LOAD CENTER
- AC AC DISCONNECT
- M UTILITY METER / SERVICE PANEL
- JB JUNCTION BOX
- PV PV REVENUE METER
- FIRE SETBACK
- PV SOLAR MODULE
- EMT CONDUIT RUN (TO BE DETERMINED IN FIELD)
- PV WIRE STRING
- PROPERTY LINE

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

City of Portland  
REVIEWED FOR CODE  
COMPLIANCE  
AUG 01 2017  
Permit Number

**BLUE RAVEN**  
SOLAR

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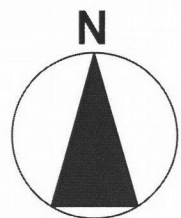
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MIKE PRATT

DATE  
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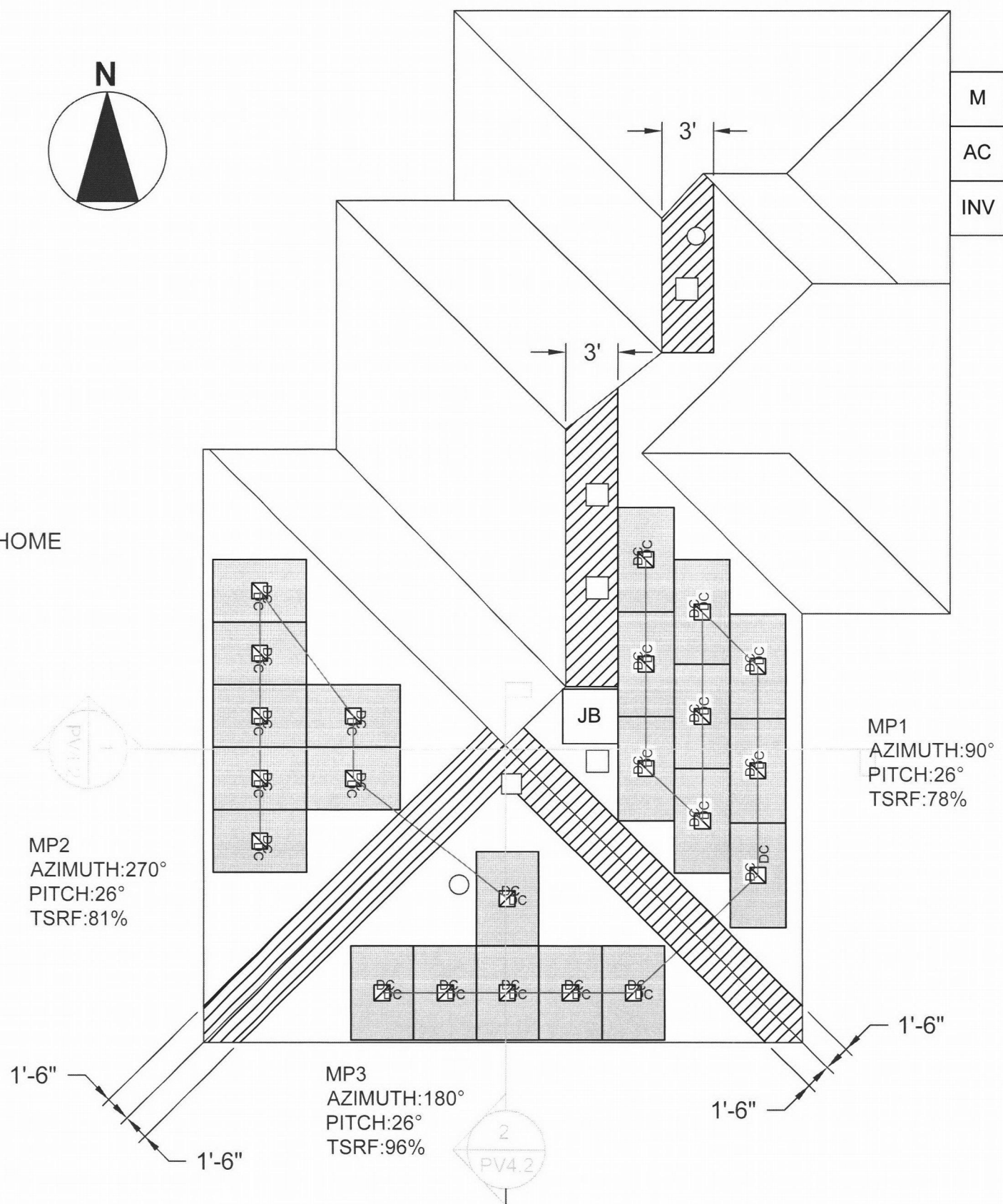
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34002723

SHEET NAME  
PROPERTY PLAN

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B



FRONT OF HOME



DC SYSTEM SIZE: 6.38 kW DC  
ROOF TYPE: COMP SHINGLE

(22) Q.CELL Q.PEAK BLK-G4 1 290  
SOLARDEGE SE5000A-US,----INVERTER

## LEGEND

INV INVERTER & DC DISCONNECT

SUB (E) SUBPANEL

LC (N) LOAD CENTER

AC AC DISCONNECT

M UTILITY METER / SERVICE PANEL

JB JUNCTION BOX

PV PV REVENUE METER

FIRE SETBACK

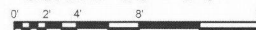
PV SOLAR MODULE

EMT CONDUIT RUN  
(TO BE DETERMINED IN FIELD)

PV WIRE STRING

PROPERTY LINE

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



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SHEET NAME

SITE PLAN

PAGE NUMBER

PV3

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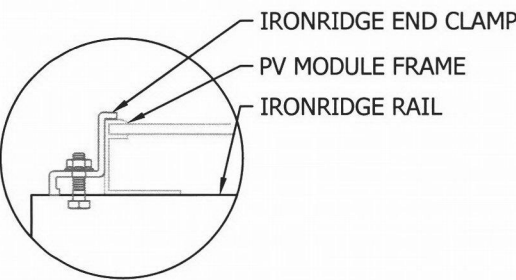


EXPIRES 12/31/2017

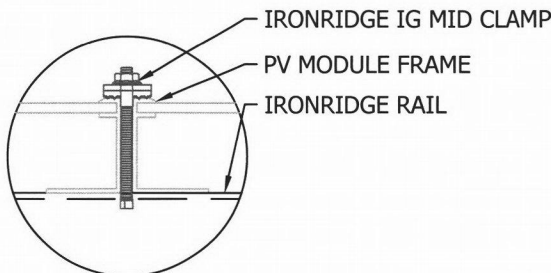


# PV ARRAY STRUCTURAL CALCULATIONS

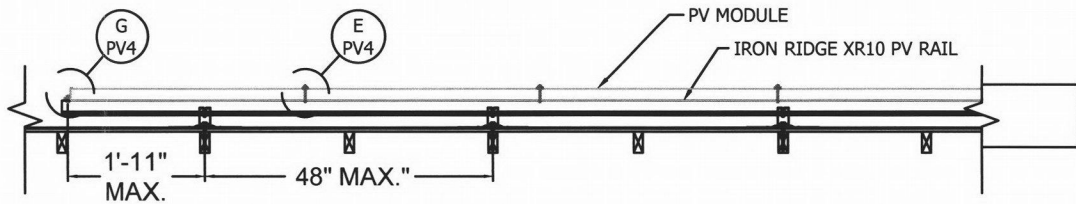
PV MODULE COUNT:	22 MODULES
# OF ATTACHMENT POINTS:	73
ARRAY AREA:	Module Count X 17.51ft <sup>2</sup> = 385.2ft <sup>2</sup>
ROOF AREA:	2369.8ft <sup>2</sup>
% OF ARRAY/ROOF:	18.1%
ARRAY WEIGHT:	Module Count x 50lbs = 1100.0lbs
DISTRIBUTED LOAD:	Array Weight ÷ Array Area = 2.86 lbs/ft <sup>2</sup>
POINT LOAD:	Array Weight ÷ Attachments = 15.2lbs/attachment



**G** DETAIL, END CLAMP FRONT  
Scale: 3" = 1'-0"



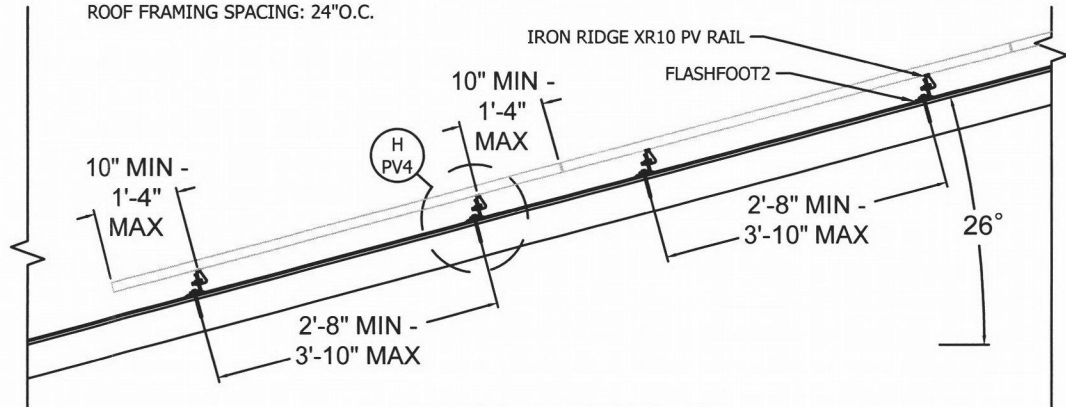
**E** DETAIL, MID CLAMP FRONT  
Scale: 3" = 1'-0"



**DETAIL, FRONT VIEW**  
Scale: 3/8" = 1'-0"

ROOF TYPE: COMP SHINGLE  
ROOF FRAMING TYPE: RAFTERS  
ROOF FRAMING SIZE: 2X4  
ROOF FRAMING SPACING: 24"O.C.

ASCE 7-10 WIND SPEED: 120 MPH  
GROUND SNOW LOAD: 20 PSF



**DETAIL, SIDE VIEW**  
Scale: 3/8" = 1'-0"

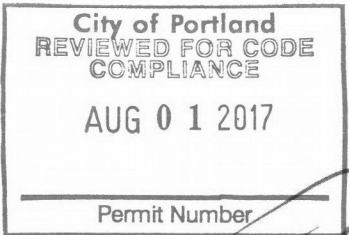
ROOF ATTACHMENTS SHALL BE SPACED NO GREATER THAN 24" ON CENTER IN ANY DIRECTION WHERE LOCATED WITHIN 3' OF A ROOF EDGE, HIP, EAVE, OR RIDGE OSSC 3111.5.3 ITEM 3.35

VECTOR ENGINEERING HAS REVIEWED THE NEW LOADS IMPOSED BY THE PROPOSED SOLAR ARRAY ON THE EXISTING STRUCTURE. THE DESIGN OF SOLAR PANEL RACKING AND ALL OTHER COMPONENTS SHOWN IS BY OTHERS.

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July 14, 2017

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ENGINEERS

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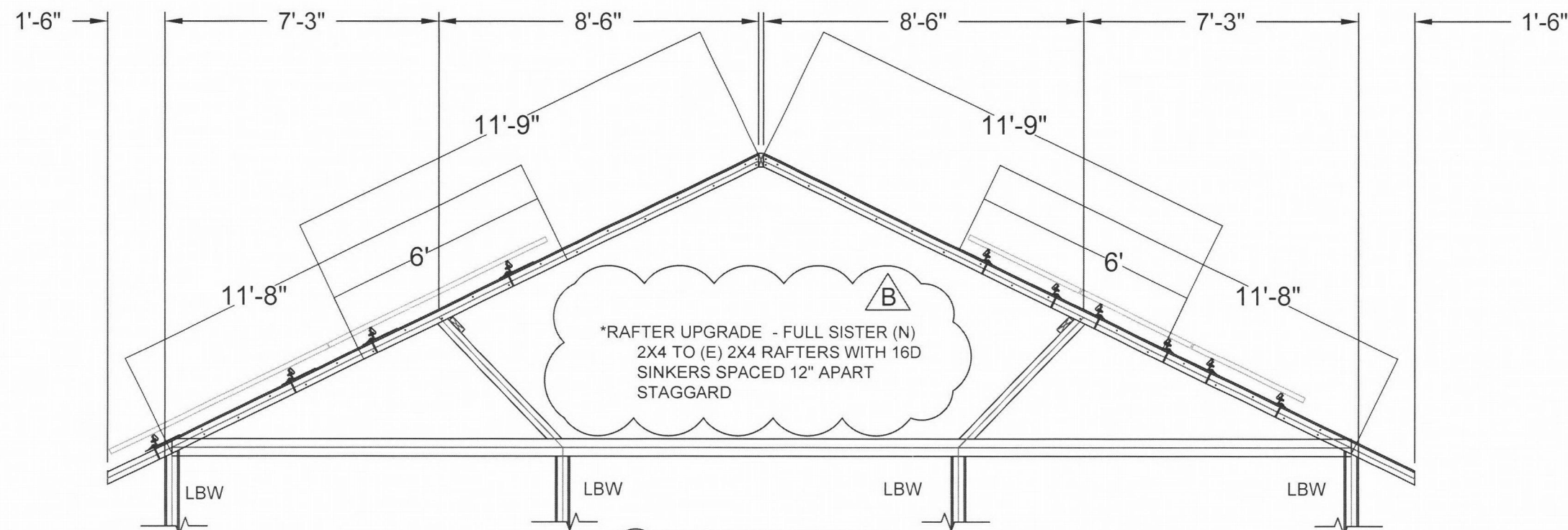
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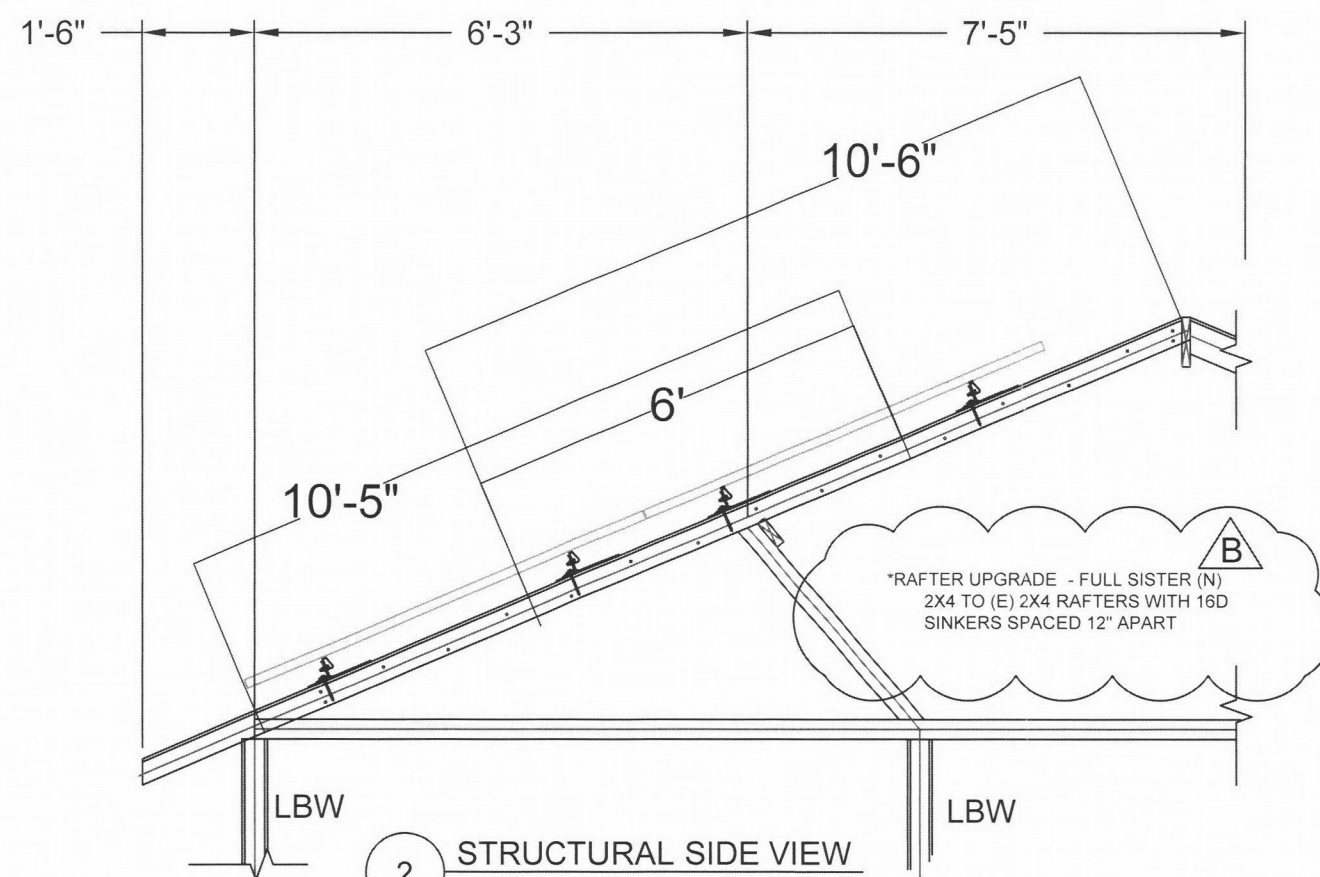
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# \* SCOPE OF REVISION

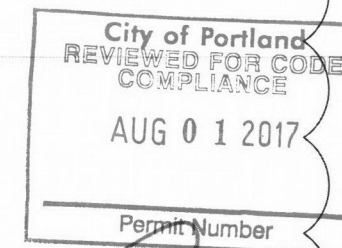
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3111.5.3 ITEM 3.35



1 STRUCTURAL SIDE VIEW  
Scale: Not to Scale  
RAFTERS 2X4 @ 24" OC



2 STRUCTURAL SIDE VIEW  
Scale: Not to Scale  
RAFTERS 2X4 @ 24" OC



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SHEET NAME  
EQUIP. DETAIL

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PV4.2  
REVISION  
B





# City of Portland, Oregon - Bureau of Development Services

1900 SW Fourth Avenue • Portland, Oregon 97201 | 503-823-7300 | [www.portlandoregon.gov/bds](http://www.portlandoregon.gov/bds)



## Permit Revision Submittal Requirements and Application

A Permit Revision is required when there are proposed changes to the project after the permit has been issued. This may arise due to discrepancies between the city-approved permit drawings and actual field conditions, or the customer has changed their mind about an aspect of the project. In all cases, a revision to the existing permit must be submitted, reviewed and approved.

### Applicants will provide:

☒ A copy of this application

☒ Three (3) sets of plans that clearly reflect the proposed change(s).

Drawings and calculations must be stamped and signed by the Architect and/or the Engineer of Record, if applicable.

☒ One (1) copy of the original city approved permit drawings. (NOTE: If your project has an assigned process manager please contact them regarding submittal of the revision).

☒ Two (2) sets of calculations, if applicable

☐ Inspector's correction notice, if revision is due to an inspection correction

☐ Revision fee (paid at time of submittal)

### Contact Information:

Contact name Zach Scholfield

Address 1220 S 630 E #430

City Ammon Fork State UT Zip Code 84003

Phone 385-482-0045 Email Permitting.Department@BlueRaven.Com

Value of proposed revision \$0.00 Issued permit # 17-164640

Job site address 4734 NE 78th PL

Description of revision fastener tech changed for structural upgrade

### Fees:

The Permit Revisions are subject to fees associated with plan review, processing and any increase in project value. Additional fees may apply if adding plumbing fixtures.

The Bureau of Development Services fee schedule is available under the fees tab on the BDS web site at: [www.portlandoregon.gov/bds](http://www.portlandoregon.gov/bds). Fees are updated annually on July 1st.

### Helpful Information:

**Bureau of Development Services**  
City of Portland, Oregon  
1900 SW 4th Avenue, Portland, OR 97201  
[www.portlandoregon.gov/bds](http://www.portlandoregon.gov/bds)

### Submit your plans in person to:

Development Services Center (DSC), First Floor,  
For Hours Call 503-823-7310

### Important Telephone Numbers:

BDS main number .....503-823-7300  
DSC automated information line .....503-823-7310  
Building code information .....503-823-1456  
BDS 24 hour inspection request line .....503-823-7000  
Residential information for  
one and two family dwelling .....503-823-7388  
General Permit Processing and  
Fee Estimate info .....503-823-7357  
City of Portland TTY .....503-823-6868