FOR THE MEETING OF: April 17, 2025
AGENDA ITEM: 5.a

TO:	**Historic Landmarks Commission**
THROUGH:	**Lisa Anderson-Ogilvie, AICP, Deputy Community Development Director and Planning Administrator**
FROM:	**Kimberli Fitzgerald, AICP, Historic Preservation Officer**
HEARING DATE:	**April 17, 2025**
CASE NO.:	**Historic Design Review Case No. HIS25-05**
APPLICATION SUMMARY:	**A proposal to install a rooftop solar array to the roof of 506 21st St NE.**
LOCATION:	**506 21st St NE (See Attachment A)**
REQUEST	**Class 3 Major Historic Design Review of a proposal to install a solar array to the roof of the Baxter House, a historic landmark on property zoned RS (Single Family Residential) and located at 506 21st Street NE (Marion County Assessors Map and Tax Lot number: 073W26AA09900).**
APPLICANT(S):	**Earthlight Technologies LLC (Charles Bonville) on behalf Carmel Bender Charland**
APPROVAL CRITERIA:	**Salem Revised Code (SRC) Chapter 230.065 – General Guidelines for Historic Contributing Structures**
RECOMMENDATION:	**APPROVE** the proposal.

BACKGROUND

In January 2025, the applicant initiated correspondence regarding options to install solar panels to the house at 506 21st Street NE. The primary façade of the property faces west. Options utilizing the northern roof faces were discussed, since that is the least visible side of the roof from the right-of-way. Energy production for an array installed on the north side of the roof was simulated and did not provide adequate energy generation. An initial proposal was developed that included 22 solar modules in 5 sub-arrays. To explore less visible options, a site visit was conducted on February 28, 2025. From this visit, the applicant proposed removing four modules from the proposed design on the western end of the roof in order to reduce the visual impact from the western of the property. The resulting proposal was the design ultimately submitted.

On March 20, 2025, the applicant submitted materials for a Major Historic Design Review for a proposal to install a solar panel array to the roof of the Baxter House (c. 1904). The application was deemed complete for processing on March 26, 2025.

Notice of public hearing was sent by mail to surrounding property owners and tenants pursuant to Salem Revised Code (SRC) requirements on March 27, 2025. Public hearing notice was also posted on the property in accordance with the posting provision outlined in SRC 300.620. The City of Salem Historic Landmarks Commission will hold a public hearing for the case on April 17, 2025, at 5:30 p.m. and virtually (https://bit.ly/planningpublicmeetings). The state-mandated 120-day deadline to issue a final local decision, including any local appeals in this case is July 24, 2025, unless an extension is granted by the applicant.

PROPOSAL

The applicant is proposing to install 18 Rec Alpha brand Pure-RX solar modules in four subarrays to the southern exposure to the roof of the of the Baxter House (c.1904), a local historic landmark property. Each module measures approximately 48 inches by 68 inches. The facing glass is 0.13-inch solar glass with an anti-reflective coating. The solar modules will be attached in a "flush mount" orientation where the top of the modules will be approximately 4" above the existing roof plane. The attachment hardware attaches to the rafters via two lag bolts, and most are substantially out of view on account of being set back from the array edges by approximately 1 foot. Exterior control equipment including meter, cutoff and Enphase brand combiner panel will be located on the north side of the house, in an area not visible from the right-of-way. (**Attachment B).**

SUMMARY OF RECORD

The following items are submitted to the record and are available upon request: All materials submitted by the applicant and any materials and comments from public agencies, City departments, neighborhood associations, and the public; and all documents referenced in this report.

APPLICANT'S STATEMENT

A request for historic design review must be supported by proof that it conforms to all applicable criteria imposed by the Salem Revised Code. The applicants submitted a written statement, which is included in its entirety as **Attachment B** in this staff report.

Staff utilized the information from the applicant's statements to evaluate the applicant's proposal and to compose the facts and findings within the staff report. Salem Revised Code (SRC) ***Criteria****:* Chapter 230.065 – *General Guidelines for Historic Contributing Structures* are the applicable criteria for evaluation of this proposal.

FACTS & FINDINGS

1. Historic Designation

Under Salem Revised Code (SRC) Chapter 230, no development permit for a designated historic resource shall be issued without the approval of the Historic Landmarks Commission (HLC). The HLC shall approve, conditionally approve, or deny the application based on the project's conformity with the criteria. Conditions of approval, if any, shall be limited to project modifications required to meet the applicable criteria.

According to SRC 230.020(f), historic design review approval shall be granted if the application satisfies the applicable standards set forth in Chapter 230. The HLC shall render its decision supported by findings that explain conformance or lack thereof with relevant design standards state the facts relied upon in rendering the decision, and explain justification for the decision.

2. Historic Significance

According to survey records, this lot was purchased by Jason Shenafield, a carpenter in 1904, and he is listed as living at this address in 1905. The house is identified as a Queen Anne cottage and features a diagonal entry facing southwest dominated by a wraparound porch with 1/2 height turned posts on knee wall, and beaded vertical siding in the gables. In 1909 Ludwig Gehlher purchased the property and lived there for about six years. Later owners in 1913 were Eugene and Martha Whiteside; Mr. Whiteside was manager of the Valley Motor Car Company at 560 Ferry Street. In 1917 Margaret Edwards, widow of William H. Edwards bought the property and lived there for ten years. A later resident was Aaron Wells. Jeanie D. Baxter lived in the house between 1951 and 1960.

3. Neighborhood and Citizen Comments

The subject property is located within the Northeast Neighbors neighborhood association (NEN). Notification of the public hearing was sent to the neighborhood association, tenants and surrounding property owners within 250 feet of the property pursuant to Salem Revised Code (SRC) requirements on March 27, 2025. Notice of public hearing was also posted on the subject property. At the time of writing this staff report, no comments have been received from tenants within the historic district, from adjoining property owners, or from the neighborhood association (**Attachment C**).

4. City Department and Public Agency Comments

Request for comments was sent to City Departments and Agencies on March 26, 2025. No responses have been received by the date of this report.

5. Historic Design Review

The applicable criteria and factors are stated below. Following each criterion is a response and/or finding relative to the proposal.

FINDINGS

Criteria: **230.065. General Guidelines for Historic Contributing Resources.**

(a) *Except as otherwise provided in this chapter, the property shall be used for its historic purpose, or for a similar purpose that will not alter street access, landscape design, entrance(s), height, footprint, fenestration, or massing.*

Finding: There will be no changes to the purpose, street access, landscape, entrances, height, footprint, fenestration or massing. Staff recommends that the HLC find that SRC 230.065 (a) has been met.

(b) *Historic materials, finishes, and distinctive features shall, when possible, be preserved and repaired according to historic preservation methods.*

Finding: The shape of the roof will not be impacted. The solar arrays, where proposed to be installed, will be "flush mounted" parallel to the existing roof planes. Staff recommends that the HLC find that SRC 230.065 (b) has been met.

(c) *Distinctive stylistic features or examples of skilled craftsmanship significance shall be treated with sensitivity.*

Finding: The solar system project is limited to the roof. The siding, trim, paint, leaded windows and other historical features will not be impacted by the proposed solar project. The visual impact of the solar panels is mitigated somewhat because the house features a main level that is elevated approximately 5 feet above grade. This characteristic makes the panels less visually prominent when viewed from the sidewalk adjacent to the subject property. From the 21st St frontage, one roof that has visual prominence is proposed to be excluded from the energy improvement project to strike a balance between the homeowner's project goals and the historical integrity and aesthetics of the prominent façade. Staff recommends that the HLC find that SRC 230.065 (c) has been met.

(d) *Historic or original features shall be restored or reconstructed only when supported by physical or photographic evidence.*

Finding: No restoration or reconstruction is proposed. Staff recommends that the HLC find that SRC 230.065 (d) has been met.

(e) *Changes that have taken place to a historic resource over the course of time are evidence of the history and development of a historic resource and its environment, and should be recognized and respected. These changes may have acquired historic significance in their own right, and this significance should be recognized and respected.*

Finding: No significant changes are impacted by the proposal. Staff recommends that the HLC find that SRC 230.065 (e) is met.

(f) *Additions and alterations to a historic resource shall be designed and constructed to minimize changes to the historic resource.*

Finding: The 18 proposed solar panels will be approximately 48 by 68 inches in size, black with anti-reflective coating glass. Their installation will comprise a majority (approximately 80%) of the of the south roof of the resource, which currently is comprised of black composition shingling on the surface. The most architecturally detailed elevation faces west, and the busiest street also is to the west of the resource. For these reasons, the primary elevation is the west elevation. To minimize the visual impact, the solar modules are proposed to not be installed on the western end of the south roof face that is plainly visible from the sidewalk at 21st & Breyman streets. The proposed design is the least visible arrangement that would qualify for solar incentives provided by Energy Trust of Oregon. While the solar panel installation will have a minimal adverse visual impact to the resource, the panel installation and associated equipment have been designed to minimize changes to the resource and the installation itself is reversable. Staff recommends that the HLC find that SRC 230.065 (f) has

been met.

(g) *Additions and alterations shall be constructed with the least possible loss of historic materials and so that significant features are not obscured, damaged, or destroyed.*

Finding: The solar modules will be attached in a "flush mount" orientation where the top of the modules will be approximately 4" above the existing roof plane. The attachment hardware attaches to the rafters via two lag bolts, and most are substantially out of view on account of being set back from the array edges by approximately 1 foot. There will be a minimal loss of historic materials and none of the features below the roof line will be affected. The utility meter is on the back of the house and some electrical equipment will be mounted on the adjacent exterior. Staff recommends that the HLC find that SRC 230.065 (g) is met.

(h) *Structural deficiencies in a historic resource shall be corrected without visually changing the composition, design, texture or other visual qualities.*

Finding: No structural repairs are proposed as part of this project. Staff recommends that the HLC find that SRC 230.065 (h) is not applicable to the evaluation of this proposal.

(i) *Excavation or re-grading shall not be allowed adjacent to or within the site of a historic resource which could cause the foundation to settle, shift, or fail, or have a similar effect on adjacent historic resources.*

Finding: No excavation or re-grading is proposed. Staff recommends that the HLC find that SRC 230.065 (i) is not applicable to the evaluation of this proposal.

RECOMMENDATION

Based upon the information presented in the application, plans submitted for review, and findings as presented in this staff report, staff recommends that the Historic Landmarks Commission **APPROVE** the proposal.

DECISION ALTERNATIVES

1. APPROVE the proposal as submitted by the applicant.

2. APPROVE the proposal with conditions to satisfy specific standard(s).

3. DENY the proposal based on noncompliance with identified standards in SRC 230, indicating which standard(s) is not met and the reason(s) the standard is not met.

Attachments: A. Vicinity Map
B. Applicant's Submittal Materials
C. Comments

Prepared by Jake Morris, Historic Preservation Planner

Vicinity Map
506 21st St NE

Legend

- Taxlots
- Urban Growth Boundary
- City Limits
- Outside Salem City Limits
- Historic District
- Schools
- Parks

0 100 200 400 Feet

CITY OF Salem AT YOUR SERVICE
Community Planning and Development

C:\Users\jjmorris\Desktop\CURRENT CASES\HIS25-05 solar 21st st\25-106502-PLN-MAP.mxd - 3/21/2025 @ 4:10:02 PM

Site Map- 506 21st St NE

03/22/2025

0.02 0 0.01 0.02 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
City of Salem, Oregon.

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

NOT TO BE USED FOR NAVIGATION

Sec. 230.065. - General guidelines for historic contributing resources.

(a) Except as otherwise provided in this chapter, the property shall be used for its historic purpose, or for a similar purpose that will not alter street access, landscape design, entrance(s), height, footprint, fenestration, or massing.

Response:

There will be no changes to the purpose, street access, landscape, entrances, height, footprint, fenestration or massing.

(b) Historic materials, finishes, and distinctive features shall, when possible, be preserved and repaired according to historic preservation methods.

Response:

The roof structure was recently updated with new asphalt composition shingles, and the flat prominence of structure has a new membrane roof and surround flashing.

The shape of the roof will not be impacted. The solar arrays, where proposed to be installed, will be "flush mounted" parallel to the existing roof planes.

(c) Distinctive stylistic features or examples of skilled craftsmanship significance shall be treated with sensitivity.

Response:

The solar system project is limited to the roof. The siding, trim, paint, leaded windows and other historical features will not be impacted by the proposed energy improvement.

The house features a main level that is elevated approximately 5 feet above grade, which makes the many of the roof surfaces not visible when standing on the sidewalk adjacent to the subject property. From the 21st St frontage, one roof that has visual prominence is proposed to be excluded from the energy improvement project to strike a balance between the homeowner's project goals and the historical integrity and aesthetics of the prominent façade.

(d) Historic or original features shall be restored or reconstructed only when supported by physical or photographic evidence.

Response:

No restoration or reconstruction is proposed.

(e) Changes that have taken place to a historic resource over the course of time are evidence of the history and development of a historic resource and its environment, and should be recognized and

respected. These changes may have acquired historic significance in their own right, and this significance should be recognized and respected.

Response:

No notable changes have been identified, nor proposed for modification.

(f) Additions and alterations to a historic resource shall be designed and constructed to minimize changes to the historic resource.

Response:

The homeowner seeks to modernize the energy efficiency of the property for financially and environmentally beneficial reasons.

The proper frontage of the residence faces to the west, on 21st St NE. The roof presents a gable with a window in the unfinished and unhabitable attic.

The secondary frontage of the residence faces to Breyman St NE, and includes access to off-street parking.

Because the home is constructed on the north side of the cross street, the secondary façade is also the south-facing roof.

To minimize the visual impact, the solar modules are proposed to not be installed on the roof face that is plainly visible from the sidewalk at 21st & Breyman. The remainder of the roof surfaces are substantially not visible from the immediate property when alighting to the 21st St frontage.

The somewhat common approach, for properties subject to City of Salem Chapter 230, of restricting the energy improvements to the rear roofs is not feasible on this property. Due to the solar productivity thresholds that are required to qualify for solar incentives provided by Energy Trust of Oregon, solar modules must be placed on southerly-facing roofs with minimal shading. Furthermore, the homeowner will realize far greater financial and environmental benefits by having good sun exposure for the solar modules.

(g) Additions and alterations shall be constructed with the least possible loss of historic materials and so that significant features are not obscured, damaged, or destroyed.

Response:

The solar modules will be attached in a “flush mount” orientation where the top of the modules will be approximately 4” above the existing roof plane. The attachment hardware attaches to the rafters via two lag bolts, and most are substantially out of view on account of being set back from the array edges by approximately 1 foot.

There will be no loss of historic materials and none of the features below the roof line will be affected. The utility meter is on the back of the house and some electrical equipment will be mounted on the adjacent exterior.

(h) Structural deficiencies in a historic resource shall be corrected without visually changing the composition, design, texture or other visual qualities.

Response:

No structural repairs are planned. Some sheathing in the roof substructure has already been replaced where deficient.

(i) Excavation or re-grading shall not be allowed adjacent to or within the site of a historic resource which could cause the foundation to settle, shift, or fail, or have a similar effect on adjacent historic resources.

Response:

No re-grading is planned.

South

west

GENERAL NOTES

1.1.1 **PROJECT NOTES:**

1.1.2 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.

1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION .

1.1.4 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4 & NEC 690.60: **PV MODULES:** UL1703, IEC61730, AND IEC61215, AND TYPE 1 FIRE RATING **INVERTERS:** UL 1741 CERTIFIED, IEEE 1547, 929, 519 **COMBINER BOX(ES):** UL 1703 OR UL 1741 ACCESSORY. PV MOUNTING SYSTEM: UL2703, AND CLASS A FIRE RATED PER UL 2703.

1.1.5 NEC 690.35 REFERS SPECIFICALLY TO "UNGROUNDED" PV POWER SYSTEMS. ALSO DESIGNATED AS "TRANSFORMERLESS" BY INVERTER MANUFACTURERS AND "NON-ISOLATED" BY UNDERWRITERS LABORATORY.

1.1.6 INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE LISTED FOR THIS USE [NEC 690.35 (G)].

1.1.7 AS SPECIFIED BY THE AHJ, EQUIPMENT USED IN UNGROUNDED SYSTEMS LABELED ACCORDING TO NEC 690.35 (F).

1.1.8 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.

1.1.9 ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, PHOTOVOLTAIC MOUNTING SYSTEMS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D). SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].

1.1.10 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

1.2.1 **SCOPE OF WORK:**

1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.

1.3.1 **WORK INCLUDES:**

1.3.2 PHOTOVOLTAIC MOUNTING SYSTEMS - IRONRIDGE HUG

1.3.3 PV RACKING SYSTEM INSTALLATION - IRONRIDGE AIRE RAIL A1

1.3.4 PV MODULE AND INVERTER INSTALLATION - REC SOLAR REC460AA PURE-RX SOLAR MODULES / ENPHASE IQ8X-80-M-US MICROINVERTERS

1.3.5 PV EQUIPMENT GROUNDING

1.3.6 PV SYSTEM WIRING TO A ROOF-MOUNTED JUNCTION BOX

1.3.7 PV LOAD CENTERS (IF INCLUDED)

1.3.8 PV METERING/MONITORING (IF INCLUDED)

1.3.9 PV DISCONNECTS

1.3.10 PV FINAL COMMISSIONING

1.3.11 (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV

1.3.12 SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE

SCOPE OF WORK

SYSTEM SIZE: STC: 22 X 460W = 10.120KW
PTC: 22 X 438.8W = 9.654KW
(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

ATTACHMENT TYPE: IRONRIDGE HUG

MSP UPGRADE: NO

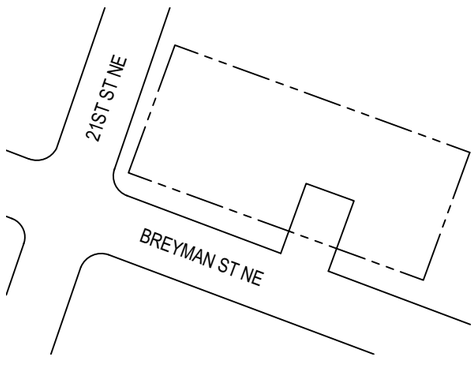
NEW PV SYSTEM: 10.120 kWp

CARMEL BENDER RESIDENCE

506 21ST ST NE,
SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900

01 AERIAL PHOTO

NOT TO SCALE



02 PLOT MAP

NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
96171PE
OREGON
MAY 12, 2020
ARASH ZANDIEH
Exp. 06/30/2026

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
G-1	COVER PAGE
G-2	NOTES
PV-1	SITE PLAN
PV-2	SOLAR RACKING PLAN
PV-3	ASSEMBLY DETAILS
PV-4	ELECTRICAL PLAN
PV-5	LINE DIAGRAM
PV-6	DESIGN TABLES
PV-7	PLACARDS & LABELS
PV-8	RESOURCE DOCUMENT
PV-9	RESOURCE DOCUMENT
PV-10	RESOURCE DOCUMENT
PV-11	RESOURCE DOCUMENT
PV-12	RESOURCE DOCUMENT

PROJECT INFORMATION

OWNER
NAME: CARMEL BENDER
PHONE: 503-544-9909
E-MAIL: CARMEL.E.BENDER@GMAIL.COM

PROJECT MANAGER
NAME: CHARLES BONVILLE
PHONE: 503-874-4142

CONTRACTOR
NAME: EARTHLIGHT TECHNOLOGIES
PHONE: 503-874-4142

AUTHORITIES HAVING JURISDICTION
ELECTRICAL: SALEM CITY
BUILDING: SALEM CITY
ZONING: SALEM CITY
UTILITY: PGE

DESIGN SPECIFICATIONS
OCCUPANCY: R-3
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
RISK CATEGORY: II
GROUND SNOW LOAD: 25 PSF
WIND EXPOSURE: B
WIND SPEED: 98 MPH

APPLICABLE CODES & STANDARDS
2023 NEC, 2023 ORSC, 2022 OSSC & 2023 OESC

FOR OFFICIAL USE

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

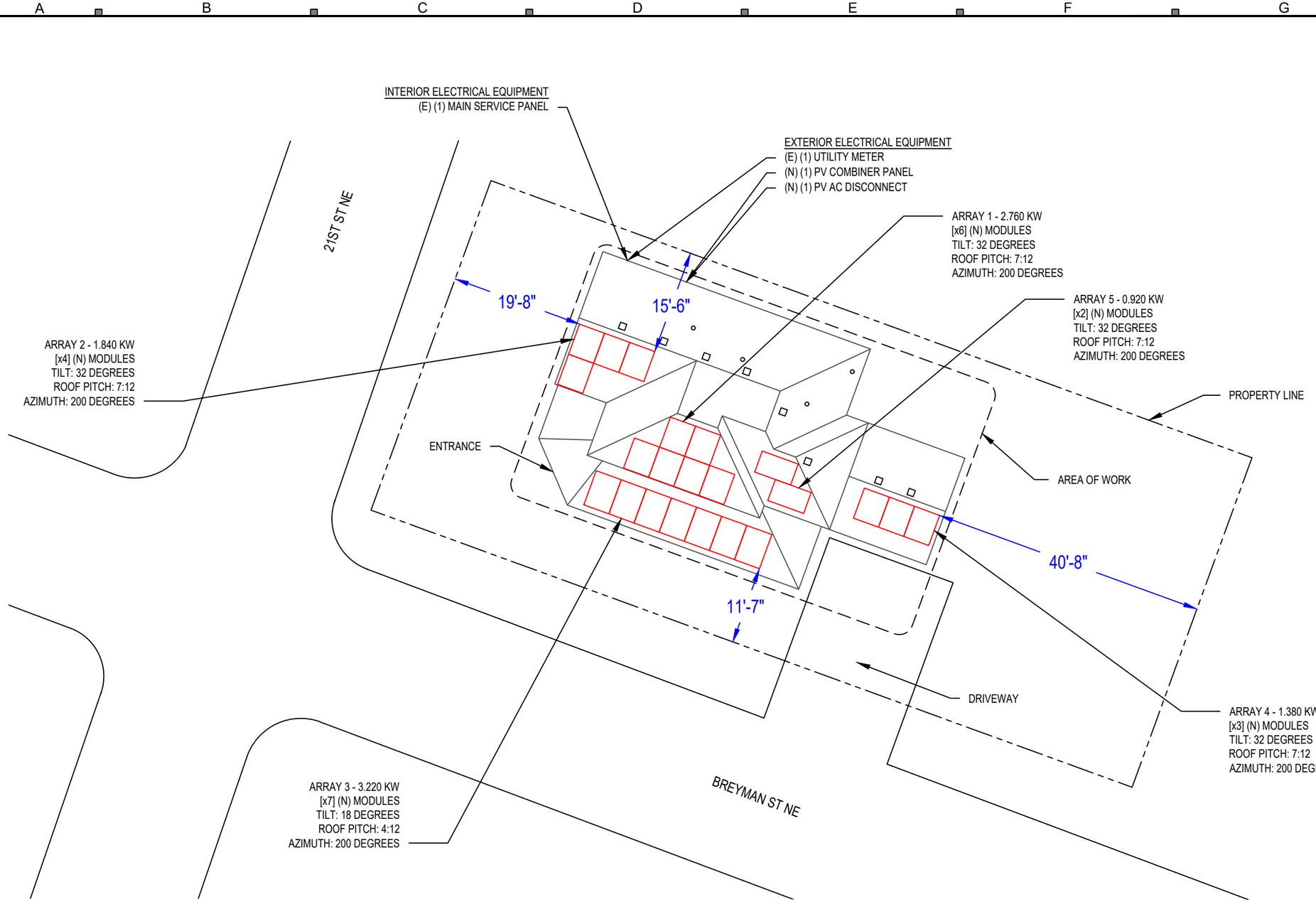
COVER PAGE

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: G-1



FOR OFFICIAL USE

GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS
2. ITEMS BELOW MAY NOT BE ON THIS PAGE

PROPERTY LINE

REGISTERED PROFESSIONAL ENGINEER
96171PE
OREGON
MAY 12, 2020
ARASH ZANDIEH
Exp. 06/30/2026

01 SITE PLAN

1/16" = 1'-0"

0 8' 16'

N
W E
S

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

SITE PLAN

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-1

GENERAL NOTES

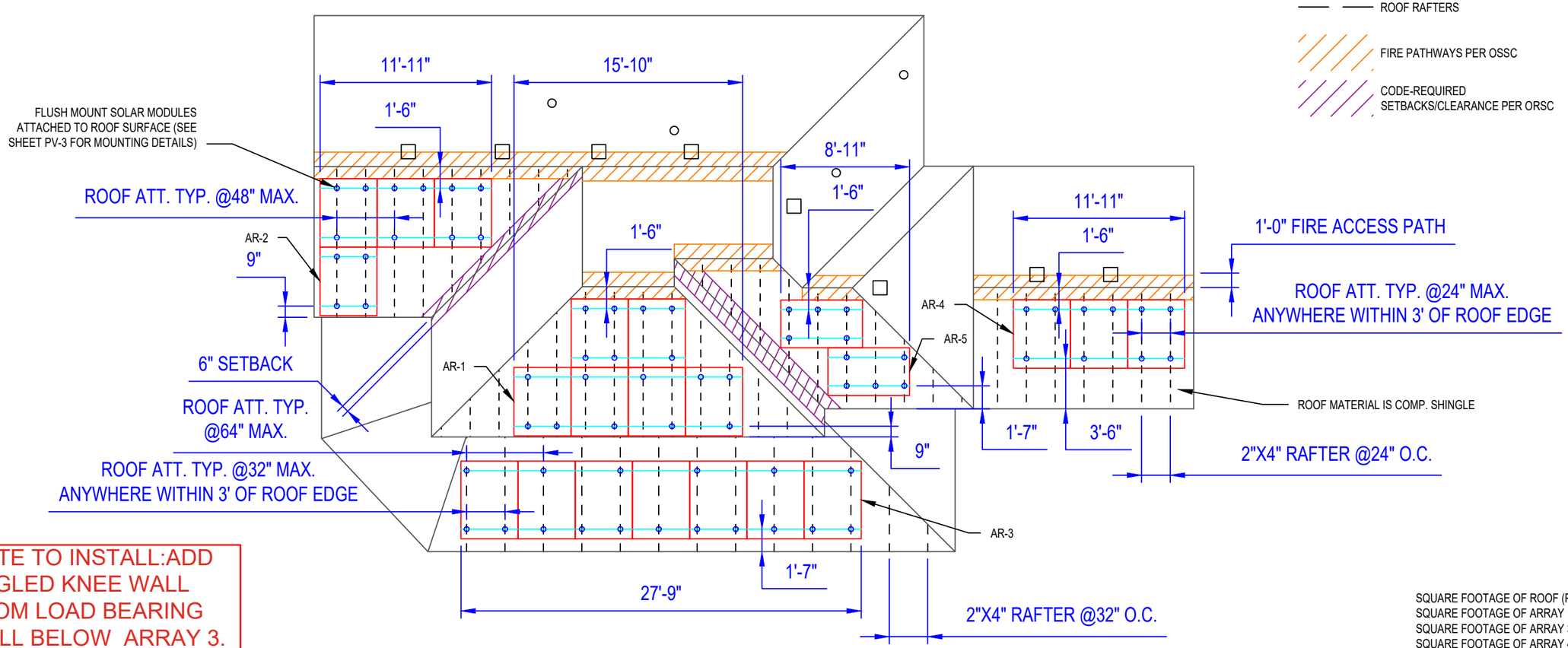
1. FIELD VERIFY ALL MEASUREMENTS
2. ITEMS BELOW MAY NOT BE ON THIS PAGE

ROOF RAFTERS

FIRE PATHWAYS PER OSSC

CODE-REQUIRED SETBACKS/CLEARANCE PER ORSC

FOR OFFICIAL USE



NOTE TO INSTALL:ADD ANGLED KNEE WALL FROM LOAD BEARING WALL BELOW ARRAY 3.

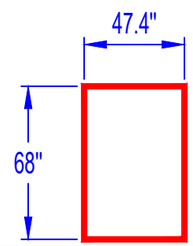
NOTE TO INSTALL:ADD (N) RAFTER SISTERING WHERE THE MAX UNSUPPORTED SPAN FOR 2x6 RAFTERS EXCEEDS 8'-9" FT UNDER THE ARRAY - SEE STRUCTURAL CALCS FOR DETAILS

SQUARE FOOTAGE OF ROOF (PLAN VIEW) = 2233.76 SQ. FT.
SQUARE FOOTAGE OF ARRAY 1, 2, 5 ROOF & CONN. ATTIC = 1447.48 SQ. FT.
SQUARE FOOTAGE OF ARRAY 3 ROOF & CONN. ATTIC = 422.78 SQ. FT.
SQUARE FOOTAGE OF ARRAY 4 ROOF & CONN. ATTIC = 306.91 SQ. FT.
PERCENTAGE OF ROOF COVERED BY THE ARRAY 1 = 9.28%
PERCENTAGE OF ROOF COVERED BY THE ARRAY 2 = 6.19%
PERCENTAGE OF ROOF COVERED BY THE ARRAY 3 = 37.06%
PERCENTAGE OF ROOF COVERED BY THE ARRAY 4 = 21.88%
PERCENTAGE OF ROOF COVERED BY THE ARRAY 5 = 3.09%

REGISTERED PROFESSIONAL ENGINEER
96171PE
OREGON
MAY 12, 2020
ARASH ZANDIEH
Exp. 06/30/2026

01 SOLAR RACKING PLAN

1/8" = 1'-0" 0 4' 8'



MODULE:
REC SOLAR
REC460AA PURE-RX
460 WATTS

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

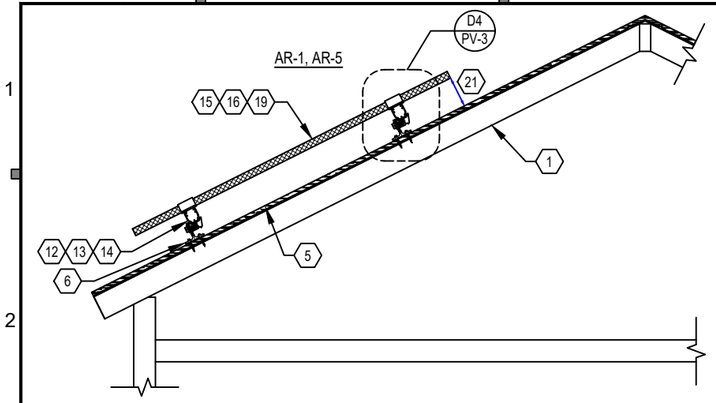
SOLAR RACKING PLAN

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

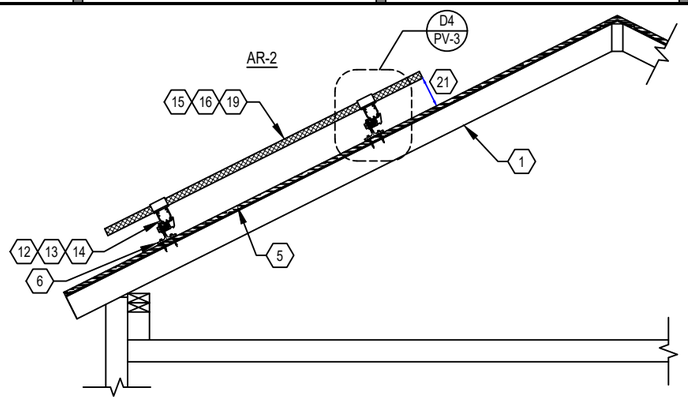
DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-2



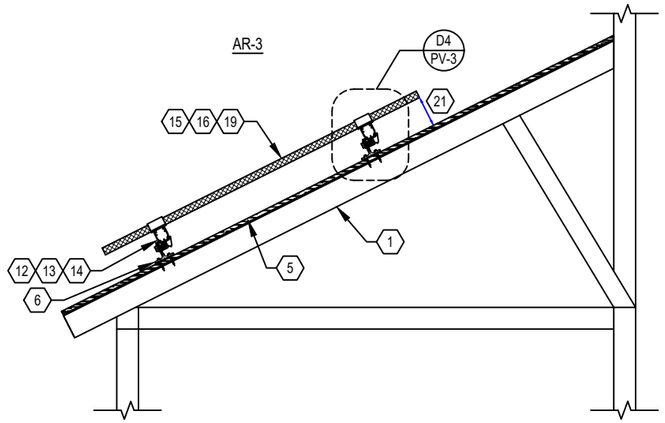
D1.1 RACKING DETAIL (TRANSVERSE)

NOT TO SCALE



D1.2 RACKING DETAIL (TRANSVERSE)

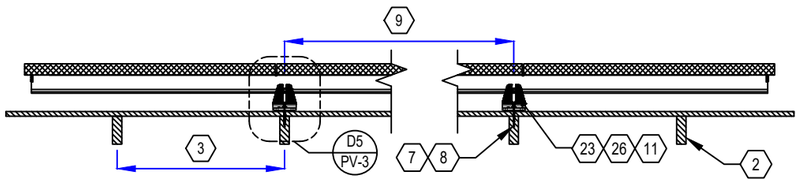
NOT TO SCALE



D1.3 RACKING DETAIL (TRANSVERSE)

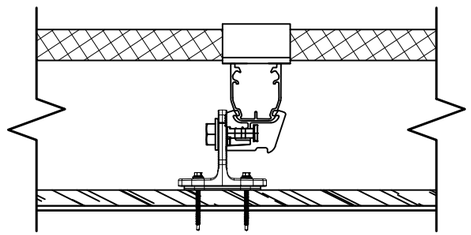
NOT TO SCALE

FOR OFFICIAL USE



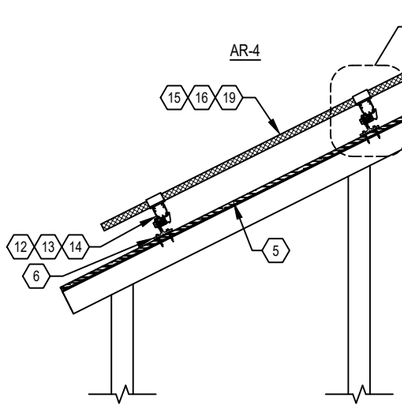
D2 RACKING DETAIL (LONGITUDINAL)

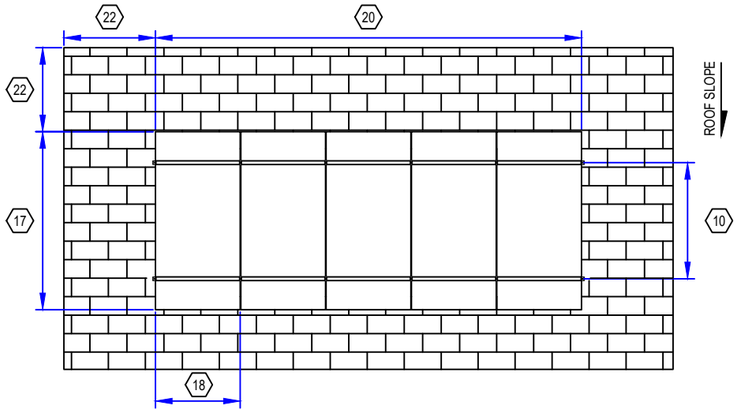
NOT TO SCALE



D4 DETAIL (TRANSVERSE)

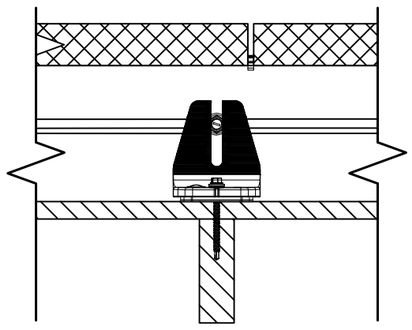
NOT TO SCALE





D3 RACKING DETAIL (TOP)

NOT TO SCALE



D5 DETAIL (LONGITUDINAL)

NOT TO SCALE

D1.4 RACKING DETAIL (TRANSVERSE)

NOT TO SCALE

NOTES:
FOR ARRAY 1 ROOF, ATTACH SISTER RAFTERS ON 4 RAFTERS.
THE PE-CALCULATED MAX ALLOWABLE SPAN WITHOUT SISTERING IS 8' 9".
FOR ARRAY 3 ROOF, CORRECT THE STRUCTURE WITH KNEE BRACES TO THE BEARING WALL. AFTER CORRECTION, THE MAX SPAN WILL BE NO GREATER THAN THE PE-CALCULATED MAXIMUM OF 7'.

SHEET KEYNOTES

1. ROOF STRUCTURE: AR1 - AR3, AR5: SINGLE SPAN RAFTER; AR4: RAFTERS SUPPORTED BY LBW
2. RAFTER SIZE: 2X4 IN. NOMINAL
3. RAFTER SPACING: AR1, AR2, AR4, AR5: 24; AR3: 32 IN. O.C.
4. MAX. RAFTER SPAN: AR1: 7 FT. - 3 IN., AR2: 8 FT. - 9 IN., AR3: 7 FT., AR4: 4 FT. - 6 IN., AR5: 7 FT. - 3 IN.
5. ROOF MATERIAL: COMP. SHINGLE
6. ROOF ATTACHMENT TYPE: IRONRIDGE HUG
7. LAG BOLT DIAMETER: 5/16 IN.
8. LAG BOLT EMBEDMENT: 2 1/2 IN.
9. MAX. HORIZONTAL STANDOFF: AR1, AR2, AR4, AR5: 48; AR3: 64 IN.
10. MAX. VERTICAL STANDOFF: LANDSCAPE: 26 IN., PORTRAIT: 33 IN.
11. STANDOFF STAGGERING: YES
12. RAIL MANUFACTURER (OR EQUIV.): IRONRIDGE
13. RAIL MODEL (OR EQUIVALENT): AIRE RAIL A1
14. RAIL WEIGHT: 0.45 PLF
15. MODULE MANUFACTURER: REC SOLAR
16. MODULE MODEL: REC460AA PURE-RX
17. MODULE LENGTH: 68"
18. MODULE WIDTH: 47.4"
19. MODULE WEIGHT: 50 LBS.
20. SEE PV-2 FOR DIMENSION(S)
21. MODULE CLEARANCE: 0'-4"
22. MODULE MIN. FIRE OFFSET: 12" FROM RIDGE, 0" FROM HIPS, 6" FROM VALLEYS (IF ANY)
23. TOTAL # OF ATTACHMENTS: 68.
24. TOTAL AREA: 492.43 SQ. FT.
25. TOTAL WEIGHT: 1234.76 LBS.
26. WEIGHT PER ATTACHMENT: 18.16 LBS.
27. DISTRIBUTED LOAD: 2.51 PSF

REGISTERED PROFESSIONAL ENGINEER
96171PE
OREGON
MAY 12, 2020
ARASH ZANDIEH
Exp. 06/30/2026

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight
SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

ASSEMBLY DETAILS

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-3

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS

ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL	LENGTH	VOLTAGE DROP
1	3	12 AWG THWN-2 COPPER ENPHASE ENGAGE CABLE	FREE AIR	2	N/A	6 AWG BARE, COPPER	0.96 (33.6 °C)	1	15.8A	19.75A	25A	24A	75°C	25A	42.5 FT.	0.61%
2	1	10 AWG THWN-2, COPPER	0.75" DIA EMT	6	20A	10 AWG THWN-2, COPPER	0.96 (33.6 °C)	0.8	15.8A	19.75A	40A	30.72A	75°C	35A	75 FT.	1.09%
3	1	8 AWG THWN-2, COPPER	0.75" DIA EMT	2	N/A	10 AWG THWN-2, COPPER	0.96 (33.6 °C)	1	34.76A	43.45A	55A	52.8A	75°C	50A	5 FT.	0.10%
4	1	8 AWG THWN-2, COPPER	0.75" DIA EMT	2	45A	10 AWG THWN-2, COPPER	0.96 (33.6 °C)	1	34.76A	43.45A	55A	52.8A	75°C	50A	9 FT.	0.18%

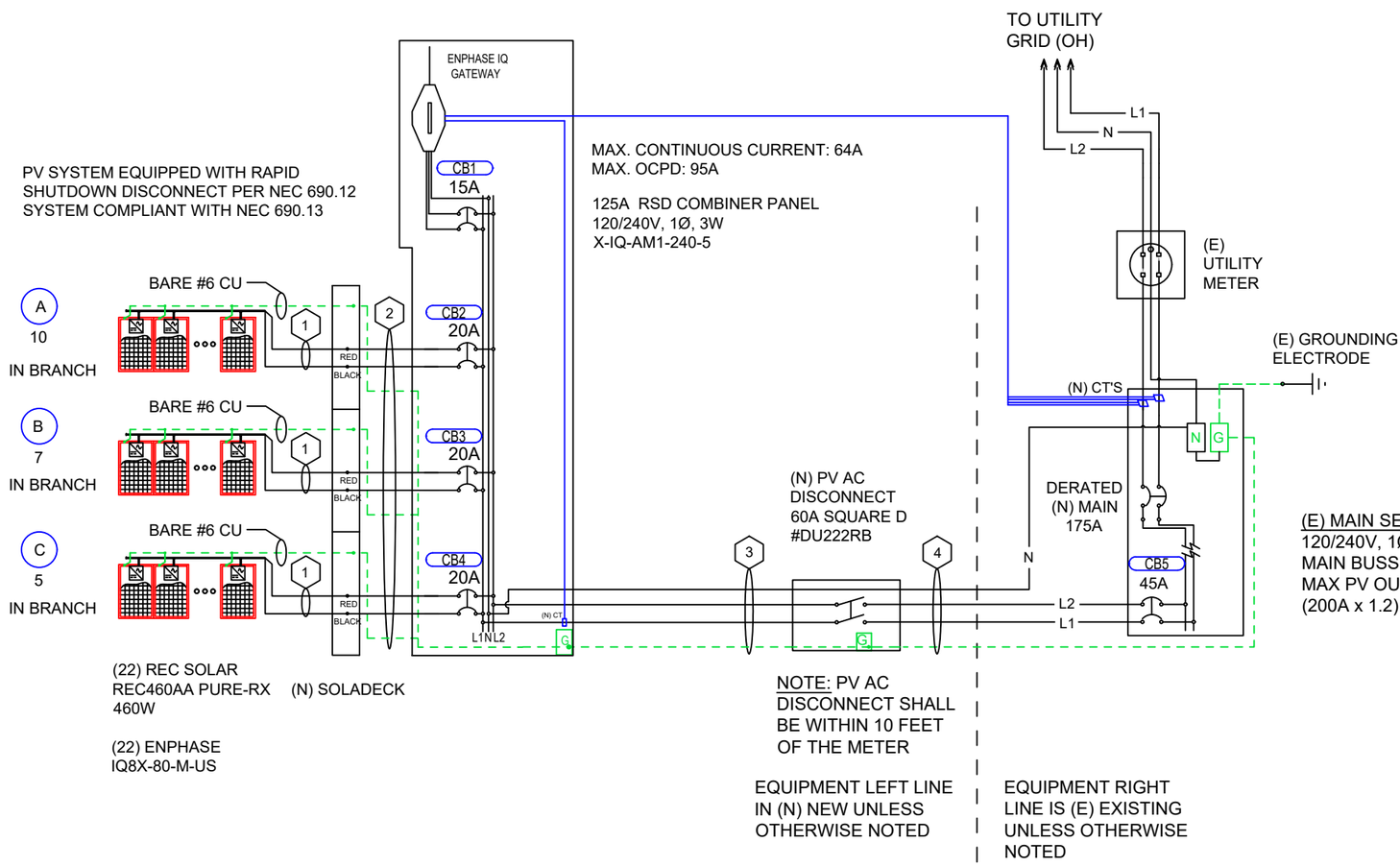
MAX. VD 1.98%

FOR OFFICIAL USE

A MODULE BRANCH

B MODULE BRANCH

C MODULE BRANCH



CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

LINE DIAGRAM

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-5

REC ALPHA® PURE-RX SERIES

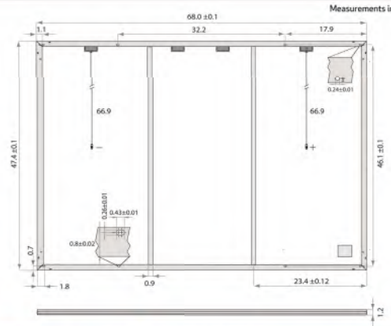
DATASHEET

REC
SOLAR'S MOST TRUSTED

GENERAL DATA

Cell Type	88 half-cut bifacial REC heterojunction cells, with gapless technology
Glass	0.13 in. solar glass with anti-reflective surface treatment in accordance with EN12150
Backsheet	Highly resistant polymer (Black)
Frame	Anodized aluminum (Black)
Junction Box	4-part, 4 bypass diodes, IP68 rated, in accordance with IEC 62790
Connectors	Stäubli MC4 PV-KBT4/KST4 (12AWG) in accordance with IEC 62852, IP68 only when connected
Cable	12 AWG solar cable, 66.9 in. + 66.9 in. in accordance with EN50618
Dimensions	68 x 47.4 x 1.2 in. (22.4 ft²)
Weight	50 lbs
Origin	Made in Singapore

Measurements in inches



ELECTRICAL DATA

PRODUCT CODE*: RECxxxAA Pure-RX

		450	460	470
STC	Power Output - P_{MAX} (W_P)	450	460	470
	Watt Class Sorting - (W)	0/+10	0/+10	0/+10
	Nominal Power Voltage - V_{MPP} (V)	54.3	54.9	55.4
	Nominal Power Current - I_{MPP} (A)	8.29	8.38	8.49
	Open Circuit Voltage - V_{OC} (V)	65.1	65.3	65.6
	Short Circuit Current - I_{SC} (A)	8.81	8.88	8.95
	Power Density (W/ft²)	20.1	20.5	21.0
	Panel Efficiency (%)	21.6	22.1	22.6
NMOT	Power Output - P_{MAX} (W_P)	343	350	358
	Nominal Power Voltage - V_{MPP} (V)	51.2	51.7	52.2
	Nominal Power Current - I_{MPP} (A)	6.70	6.77	6.86
	Open Circuit Voltage - V_{OC} (V)	61.3	61.6	61.8
	Short Circuit Current - I_{SC} (A)	7.11	7.17	7.23

Values at standard test conditions (STC: air mass AM 1.5, irradiance 1000 W/m², temperature 77°F (25°C)), based on a production spread with a tolerance of P_{MPP}, V_{OC} & I_{SC} ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM 1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s)). *Where xxx indicates the nominal power class (P_{MPP}) at STC above.

MAXIMUM RATINGS*

Operational Temperature	-40 °F - 185 °F
System Voltage	1000 V
Maximum Test Load (front)	+7000 Pa (146 lb/ft²)
Maximum Test Load (rear)	-4000 Pa (83.4 lb/ft²)
Max Series Fuse Rating	25 A
Max Reverse Current	25 A

* See installation manual for mounting instructions. Design load = Test load / 1.5 (safety factor)

TEMPERATURE RATINGS*

Nominal Module Operating Temperature	44 °C ± 2°C
Temperature coefficient of P_{MAX}	-0.24% /K
Temperature coefficient of V_{OC}	-0.24% /K
Temperature coefficient of I_{SC}	0.04% /K

*The temperature coefficients stated are linear values

DELIVERY INFORMATION

Panels per Pallet	33
Panels per 40 ft GP/high cube container	594 (18 Pallets)
Panels per 53 ft truck	792 (24 Pallets)

Available from:

CERTIFICATIONS

IEC 61215:2021; IEC61730:2016; UL61730

ISO 11925-2	Ignitability (EN 13501-1 Class E)
IEC 62716	Ammonia Resistance
IEC 61701	Salt Mist (SM6)
IEC 61215:2016	Hailstone (35mm)
UL 61730	Fire Type 2

ISO 14001; ISO9001; IEC45001; IEC62941

take-e-way
Take-e-way WEEE-compliant scheme

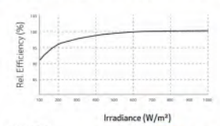
WARRANTY

	Standard	REC ProTrust	
Installed by an REC Certified Professional	No	Yes	Yes
System Size	All	<25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

The REC ProTrust Warranty is only available on panels purchased through an REC Certified Solar Professional installer. Warranty conditions apply. See www.recgroup.com for more details

LOW LIGHT BEHAVIOR

Typical low irradiance performance of module at STC:



Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.

REC Solar PTE. LTD.
20 Tuas South Ave. 14
Singapore 637312
post@recgroup.com
www.recgroup.com

REC

FOR OFFICIAL USE

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight
SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-8

ENPHASE.

PRELIMINARY DATASHEET

IQ8X Microinverter

Our newest IQ8 Series 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 mode. This chip is built using advanced 55-nm technology with high-speed digital logic and superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

IQ8X Microinverter is the latest addition to this family, designed to support PV modules with high input DC voltage and cell counts, such as 80-half-cut cells, 88-half-cut cells and 96-cells.

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

Enphase 25 year limited warranty

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 the IQ8 Series Microinverters with integrated MC4 connectors.

CERTIFIED SAFETY

IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conform with regulations when installed according to the manufacturer's instructions.

*Meets UL 1741 only when installed with IQ System Controller 2 and 3.

Easy to install

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

High productivity and reliability

- Produces 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) and IEEE 1547:2018 (UL 1741-SB)

NOTE:

- IQ8 Series Microinverters cannot be mixed with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, and so on) in the same system.
- IQ Gateway is required to change the default grid profile at the time of installation to meet local Authority Having Jurisdiction (AHJ) requirements.

IQ8X Microinverter

INPUT DATA (DC)	UNIT	IQ8X-80-M-US
Commonly used module pairings [1]	W	320–540
Module compatibility	–	To meet compatibility, PV modules must be within the following maximum input DC voltage and maximum module I_{sc}. Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator
MPPT voltage range	V	43–60
Operating range	V	25–79.5
Minimum and maximum start voltage	V	30–79.5
Maximum input DC voltage	V	79.5
Maximum continuous operating DC current	A	10
Maximum input DC short-circuit current	A	16
Maximum module I_{sc}	A	13
Overvoltage class DC port	–	II
DC port backfeed current	mA	0
PV array configuration	–	Ungrounded array; no additional DC side protection required; AC side protection requires maximum 20 A per branch circuit

OUTPUT DATA (AC)	UNIT	IQ8X-80-M-US @240 VAC	IQ8X-80-M-US @208 VAC
Peak output power	VA	384	366
Maximum continuous output power	VA	380	360
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	208, single-phase (L-L), 120° [4]
Minimum and maximum grid voltage [2]	V	211–264	183–229
Max. continuous output current	A	1.58	1.73
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short circuit fault current over three cycles	A_{rms}	2.70	
Maximum units per 20 A (L-L) branch circuit [3]	–	10	9
Total harmonic distortion	%	<5	
Overvoltage class AC port	–	III	
AC port backfeed current	mA	18	
Power factor setting	–	1.0	
Grid-tied power factor (adjustable)	–	0.85 leading ... 0.85 lagging	
Peak efficiency	%	97.3	97.0
CEC weighted efficiency	%	96.5	96.5
Nighttime power consumption	mW	26	12

MECHANICAL DATA	
Ambient temperature range	-40°C to 65°C (-40°F to 149°F)
Relative humidity range	4% to 100% (condensing)
DC connector type	Stäubli MC4
Dimensions (H × W × D); Weight	212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs)
Cooling	Natural convection – no fans
Approved for wet locations; Pollution degree	Yes; PD3
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure
Environmental category; UV exposure rating	NEMA Type 6; outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to the manufacturer's instructions.

(1) No enforced DC/AC ratio.
(2) Nominal voltage range can be extended beyond nominal if required by the utility.
(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.
(4) IQ8X is not certified for use with Enphase Three Phase Network Protection Relay (NPR-3P-208-NA) and therefore designed for single-phase operation only. Check with the local utility requirements if you wish to install single phase inverter across three phases.

IQ8X-MC4-DSH-00185-2.0-EN-US-2023-11-16

FOR OFFICIAL USE

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-9

ENPHASE

DATA SHEET

X-IQ-AM1-240-5
X-IQ-AM1-240-5C

IQ Combiner 5/5C

The IQ Combiner 5/5C consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications. IQ Combiner 5/5C uses wired control communication and is compatible with IQ System Controller 3/3G and IQ Battery 5P.

The IQ Combiner 5/5C, IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provide a complete grid-agnostic Enphase Energy System.

IQ Series Microinverters
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) simplify the installation process.

IQ System Controller 3/3G
Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.

IQ Battery 5P
Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters.

IQ Load Controller
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect (CELLMODEM-M1-06-SP-05), only with IQ Combiner 5C
- Supports flexible networking: Wi-Fi, Ethernet, or cellular
- Provides production metering (revenue grade) and consumption monitoring

Easy to install

- Mounts to one stud with centered brackets
- Supports bottom, back, and side conduit entries
- Supports up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV branch circuits
- Bluetooth-based Wi-Fi provisioning for easy Wi-Fi setup

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- 5-year limited warranty
- 2-year labor reimbursement program coverage included for both the IQ Combiner SKUs*
- UL1741 Listed

5-year limited warranty

*For country-specific warranty information, see the https://enphase.com/installers/resources/warranty page.

IQ Combiner 5/5C

MODEL NUMBER	
IQ Combiner 5 (X-IQ-AM1-240-5)	IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSIC12.20 ±0.5%), consumption monitoring (± 2.5%), and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat.
IQ Combiner 5C (X-IQ-AM1-240-5C)	IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%) and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05)[1]. Includes a silver solar shield to deflect heat.
WHAT'S IN THE BOX	
IQ Gateway printed circuit board	IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System
Busbar	80 A busbar with support for 1 × IQ Gateway breaker and 4 × 20 A breaker for installing IQ Series Microinverters and IQ Battery 5P
IQ Gateway breaker	Circuit breaker, 2-pole, 10 A/15 A
Production CT	Pre-wired revenue-grade solid-core CT, accurate up to ±0.5%
Consumption CT	Two consumption metering clamp CTs, shipped with the box, accurate up to ±2.5%
IQ Battery CT	One battery metering clamp CT, shipped with the box, accurate up to ±2.5%
CTRL board	Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P
Enphase Mobile Connect (only with IQ Combiner 5C)	4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan
Accessories kit	Spare control headers for the COMMS-KIT-02 board
ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY)	
CELLMODEM-M1-06-SP-05	4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan
CELLMODEM-M1-06-AT-05	4G-based LTE-M1 cellular modem with a 5-year AT&T data plan
Circuit breakers (off-the-shelf)	Supports Eaton BR2XX, Siemens Q2XX and GE/ABB THQL21XX Series circuit breakers (XX represents 10, 15, 20, 30, 40, 50, or 60). Also supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with the hold-down kit.
Circuit breakers (provided by Enphase)	BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (more details in the "Accessories" section)
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 5/5C
XA-ENV2-PCBA-5	IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 5/5C
X-IQ-NA-HD-125A	Hold-down kit compatible with Eaton BR-B Series circuit breakers (with screws)
XA-COMMS2-PCBA-5	Replacement COMMS-KIT-02 printed circuit board (PCB) for IQ Combiner 5/5C
ELECTRICAL SPECIFICATIONS	
Rating	80 A
System voltage and frequency	120/240 VAC, 60 Hz
Busbar rating	125 A
Fault current rating	10 kAIC
Maximum continuous current rating (input from PV/storage)	64 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included)
Maximum total branch circuit breaker rating (input)	80 A of distributed generation/95 A with IQ Gateway breaker included
IQ Gateway breaker	10 A or 15 A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-CLAMP)	A pair of 200 A clamp-style current transformers is included with the box
IQ Battery metering CT	200 A clamp-style current transformer for IQ Battery metering, included with the box

1. A plug-and-play industrial-grade cell modem for systems of up to 60 microinverters. Available in the United States, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.

FOR OFFICIAL USE

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

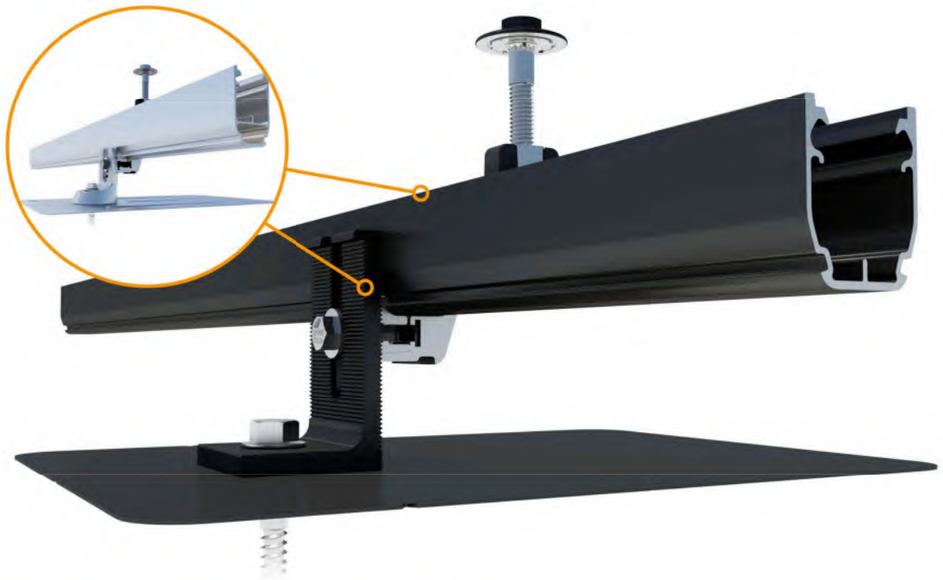
DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-10

Datasheet

IRONRIDGE

Aire™ Racking System



Breathe easy with accelerated installations.

The Aire™ racking system has been carefully crafted to streamline every part of the installation process, taking out all of the tiresome hassles—so that you get off the roof and on to your next project faster than ever.

Aire™ retains the strength and reliability that IronRidge installers have come to depend on. Whether you're a seasoned installer with years under your belt or just getting started in solar, breathe easy with open Aire™.

Strength Tested
All components have been evaluated for superior structural performance.

PE Certified
Pre-stamped engineering letters are available online for most states.

Class A Fire Rating
Certified to maintain the fire resistance rating of the existing roof structure.

Design Assistant
Free online software makes it simple to create, share, and price projects.

UL 2703 Listed System
Entire system and components meet the latest effective UL 2703 standards.

25-Year Warranty
Products are guaranteed to arrive without any impairing defects.

Rails

Aire™ A1 Rail

The lighter, open Aire™ rail for standard conditions.
- 6' spanning capability
- Wire management tray
- Mill or anodized black

Aire™ A2 Rail

The tougher, open Aire™ rail for higher load capacity.
- 8' spanning capability
- Wire management tray
- Mill or anodized black

Aire™ Rail Ties

Structurally connect and bond Aire™ Rails together.
- Reinstallable, up to 5x
- Internal splice design
- No more splice rules

Aire™ Dock

Connects Aire™ Rails to attachments with ease.
- Clicks on, slides easily
- Drops into open slots
- Anodized assembly

Clamps & Grounding

Aire™ Lock Mids

Securely bond between modules to Aire™ Rails.
- Fits 30-40mm modules
- Utilizes UFO® design
- Minimal 1/2" gap

Aire™ Lock Ends

Securely bond modules to Aire™ Rails along ends.
- Fits 30-40mm modules
- Easy rail engagement
- Clean aesthetics

Aire™ Lock Stealth

Securely bonds modules to rail ends, entirely hidden.
- Angled for easy install
- Robust tether leash
- Fits most modules

Aire™ Lug

Bonds Aire™ Rails to grounding conductors.
- Simplified with single bolt
- Low-profile form factor
- Works with 10-6 AWG

Accessories

Aire™ Caps

Block entry and provide a finished look to Aire™ Rails.
- Stay secure on rail ends
- Symmetrical, with drain
- Cover rough-cut ends

Aire™ Clip

Keeps wiring contained in open Aire™ Rail channels.
- No module interference
- Simple press-in design
- Slot for easy removal

Aire™ MLPE Mount

Securely bonds MLPE and accessories to Aire™ Rails.
- Glove-friendly installation
- Lays flush in rail channel
- Low profile form factor

Aire™ All Tile Hook

Attaches rails to tile roofs, with Aire™ Dock included.
- Works on flat, S, & W tiles
- Single-socket installation
- Optional deck flashing

Resources

Design Assistant
Quickly go from rough layout to fully engineered system.
Go to IronRidge.com/design

Approved for FL Hurricane Zones
Aire™ has Florida Product Approval. Additional details can be found on the Florida Building Code website.
Learn More at bit.ly/florida-aire

FOR OFFICIAL USE

CONTRACTOR

EARTHLIGHT TECHNOLOGIES
812 McCLAINE ST
SILVERTON, OR 97381
PHONE: 503-874-4142
CONTRACTOR LICENSE: 201408

earthlight SOLAR AND ENERGY SOLUTIONS

CARMEL BENDER RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
506 21ST ST NE, SALEM, OR 97301
ASSESSOR'S #: 073W26AA09900
PHONE: 503-544-9909

RESOURCE DOCUMENT

SYSTEM AC SIZE @ STC: 8.360 kW SYSTEM DC SIZE @ STC: 10.120 kW

(22) REC SOLAR REC460AA PURE-RX MODULES
(22) ENPHASE IQ8X-80-M-US MICROINVERTERS

DRAWN: V.D.
CHECKED: D.A.
REV: PERMIT SET
DATE: 12/31/2024

PAGE: PV-11

Original vs modified design:

The original design produces 11,258 kWh annually with 22 modules in 5 sub-arrays.

Original vs modified design:

The modified design with 18 modules in 4-subarrays produces 10,863 kWh annually.