DIRECTORY OF PLAN PAGES

PROJECT DETAILS

PROPERTY OWNER	(INFO WITHHELD FOR PUBLIC SAMPLE)
BUSINESS NAME	(INFO WITHHELD FOR PUBLIC SAMPLE)
PROPERTY ADDRESS	(INFO WITHHELD FOR PUBLIC SAMPLE)
ACCOUNT NO.	(INFO WITHHELD FOR PUBLIC SAMPLE)
AHJ	CITY OF BREMERTON
PROPERTY CLASS	137 - 50+ LIVING UNITS
CONST. TYPE	ROOF-MOUNTED PHOTOVOLTAIC ARRAY
OBSERVED CODES	2020 NATIONAL ELECTRICAL CODE (NEC) **2020 WASHINGTON ADMINISTRATIVE CODE (WAC)** **2021 WASHINGTON STATE ENERGY CODE** **2021 INTERNATIONAL CODES** REVISED CODE OF WASHINGTON (RCW) WASHINGTON BUILDING CODE & STATE AMENDMENTS APPLICABLE CITY CODE WHEN PRESENT OSHA 29 CFR 1910.269 UNDERWRITERS LABORATORIES (UL) STANDARDS
STRUCT. METHOD	ASCE7-16

CONTRACTOR INFORMATION

CONTRACTOR	(INFO WITHHELD FOR PUBLIC SAMPLE)
LICENSE NO.	(INFO WITHHELD FOR PUBLIC SAMPLE)
ADDRESS	(INFO WITHHELD FOR PUBLIC SAMPLE)
PHONE	(INFO WITHHELD FOR PUBLIC SAMPLE)
CONTRACTOR SIGNATURE	

PLAN DESIGNER INFORMATION

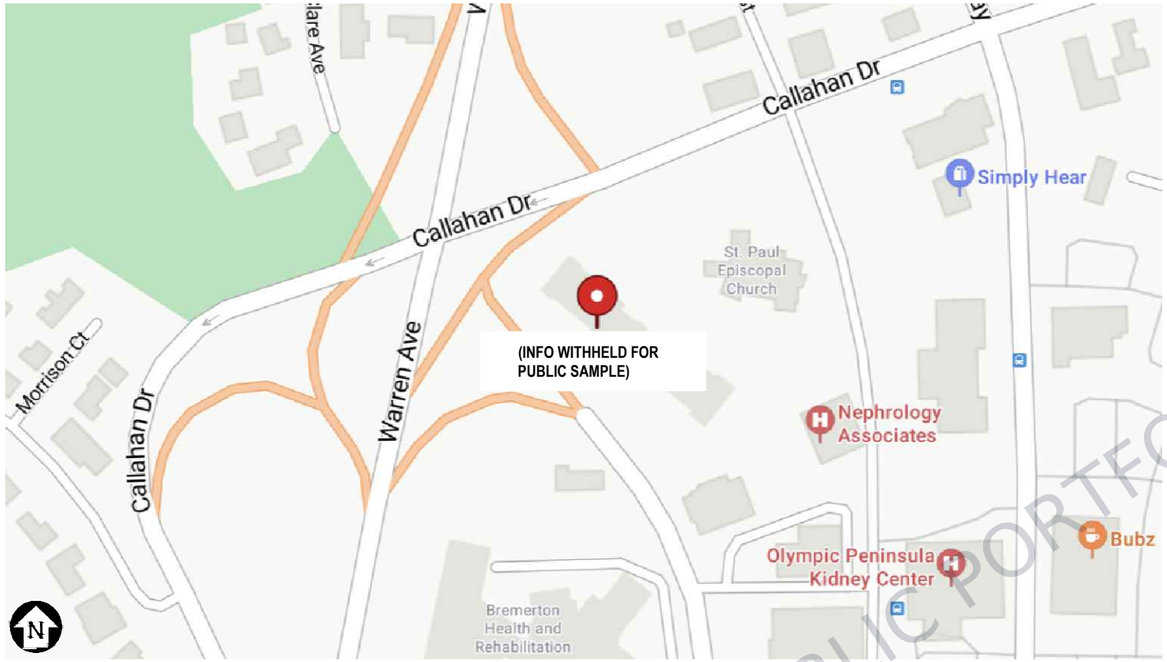
COMPANY	GEMINI SOLAR DESIGN, LLC.
NAME	SANJAY CHRISTOPHER MALLIPUDI
ADDRESS	495 HOWARD HEIGHTS ROAD FRESHWATER, CA 95503
PHONE	(609) 802-5743
PLAN DESIGNER SIGNATURE	Sanjay Mallipudi

SYSTEM DETAILS

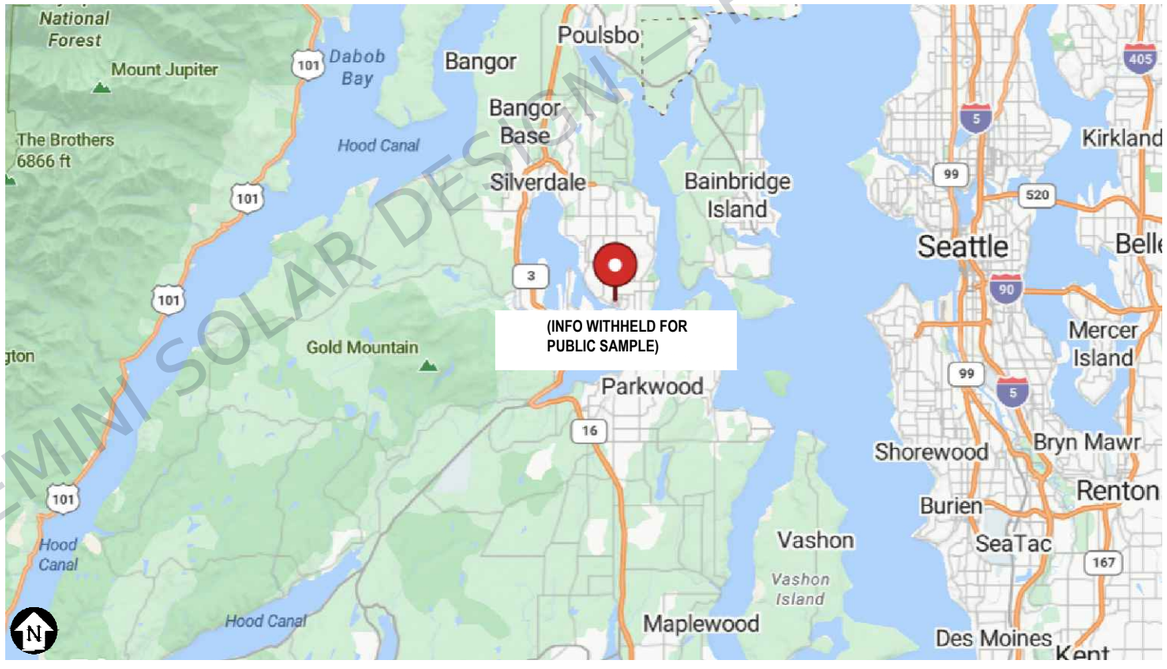
DC RATING OF SYSTEM	143.520W
TOTAL MAXIMUM CONTINUOUS OUTPUT AC CURRENT @ 208VAC, 3-Ø	363.32A
MICROINVERTER	(276) ENPHASE IQ8P-3P-72-E-US
MODULE	(276) SILFAB SOLAR SIL-520 QM
BRANCH CONFIGURATION	23 BRANCHES OF 12 MICROINVERTERS
INTERCONNECTION	LOAD-SIDE TAP

SITE SPECIFICATIONS

UTILITY SERVICE	120 / 208VAC, 3-Ø, 4-WIRE
MAIN DISTRIBUTION SWITCHBOARD	***2500A RATED BUSBAR*** ***2500A / 3P MAIN BREAKER***
ASHRAE EXTREME ANNUAL MEAN MINIMUM DENSITY DRY BULB TEMP.	-7°C
ASHRAE 2% ANNUAL DRY DENSITY BULB TEMP.	29°C
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II



1 PV-1 PLOT
SCALE: NTS



2 PV-1 LOCALE
SCALE: NTS

CONSTRUCTION NOTES

1	CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO INITIATING CONSTRUCTION.
2	CONTRACTOR SHALL REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
3	ALL EQUIPMENT SHALL BE LISTED BY THE U.L. (OR EQUAL) AND LISTED FOR ITS SPECIFIC APPLICATION.
4	ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.
5	ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	ACCESS TO ELECTRICAL COMPONENTS OVER 150 VOLTS TO GROUND SHALL BE RESTRICTED TO QUALIFIED PERSONNEL.
7	ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 VOLTS AND 75°C WET ENVIRONMENT, UNLESS OTHERWISE NOTED.
8	WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
9	PV MODULES FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER G.E.C. PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
10	PV MODULES RACKING RAIL SHALL BE BONDED TO BARE COPPER G.E.C VIA WEEB LUG, ILSCO GBL-4DBT LAY-IN LUG, OR EQUIVALENT LISTED LUG.
11	GROUNDING ELECTRODE CONDUCTOR (G.E.C) SHALL BE CONTINUOUS AND/OR IRREVERSIBLY SPLICED
12	ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
13	WORKING SPACE AROUND ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC SECTION 110.26.

SCOPE OF WORK DESCRIPTION

THE PROPOSED SYSTEM IS A ROOF MOUNTED PHOTOVOLTAIC ARRAY UTILIZING MICROINVERTERS. THE PHOTOVOLTAIC (PV) SYSTEM IS TO BE INSTALLED ON THE PROPERTY CLASS "137 - 50+ LIVING UNITS" STRUCTURE IN THE CITY OF BREMERTON, WASHINGTON. THE ENERGY PRODUCED BY THE PV SYSTEM SHALL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ON-SITE ELECTRICAL EQUIPMENT **VIA A LOAD-SIDE TAP POINT OF CONNECTION.** THIS PROJECT DOES NOT INCLUDE STORAGE BATTERIES.

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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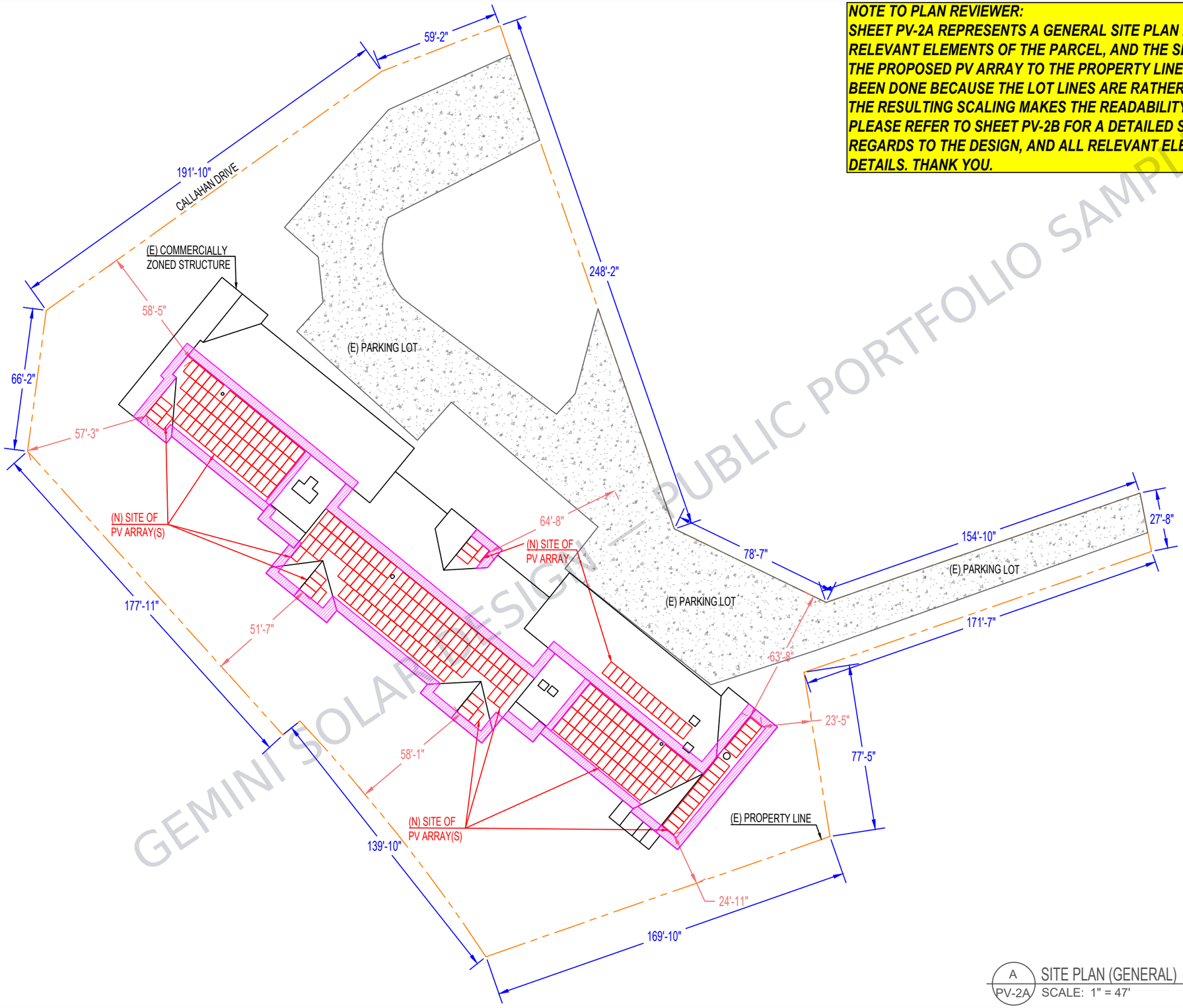
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

PROJECT INFO

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-1



NOTE TO PLAN REVIEWER:
SHEET PV-2A REPRESENTS A GENERAL SITE PLAN DEPICTING THE RELEVANT ELEMENTS OF THE PARCEL, AND THE SETBACKS FROM THE PROPOSED PV ARRAY TO THE PROPERTY LINES. THIS HAS BEEN DONE BECAUSE THE LOT LINES ARE RATHER LARGE, AND THE RESULTING SCALING MAKES THE READABILITY DIFFICULT. PLEASE REFER TO SHEET PV-2B FOR A DETAILED SITE PLAN WITH REGARDS TO THE DESIGN, AND ALL RELEVANT ELECTRICAL DETAILS. THANK YOU.

A PV-2A SITE PLAN (GENERAL)
SCALE: 1" = 47'

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
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LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

SITE PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-2A

SPECIAL CONDUIT NOTE

ALL ENPHASE BRANCH CIRCUITS SHALL BE 10 AWG THWN-2 CU, AFTER BEING TRANSITIONED TO EMT CONDUIT. HOWEVER, WHEN 7 OR MORE ENPHASE BRANCH CIRCUITS ARE IN A SINGLE EMT CONDUIT, THE WIRE GAUGE SHALL BE UPSIZED TO 8 AWG THWN-2 CU (>20 CURRENT CARRYING CONDUCTORS). ADDITIONALLY, ON THE FINAL CONDUIT RUNS FROM THE ROOF-TOP TO THE INTERIOR MECHANICAL ROOM, THOSE CONDUCTORS SHALL ALL BE SIZED AT 8 AWG THWN-2 CU.

SITE PLAN NOTES

1	CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC 319.0(D).
2	CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC 310.8(C).
3	ARRAYS SHALL BE INSTALLED IN A WAY THAT ENSURES THAT PV SOURCE CONDUCTORS SHALL NOT BE READILY ACCESSIBLE.

(E) STRUCTURE
PROPERTY CLASS:
137 - 50+ LIVING UNITS

(N) PV ARRAY #1
129° AZIMUTH, 4:12 PITCH
(4) SILFAB SOLAR SIL-520 QM
(4) ENPHASE IQ8P-3P-72-E-US

(N) PV ARRAY #2
219° AZIMUTH, 4:12 PITCH
(65) SILFAB SOLAR SIL-520 QM
(65) ENPHASE IQ8P-3P-72-E-US

(N) PV ARRAY #3
219° AZIMUTH, 4:12 PITCH
(105) SILFAB SOLAR SIL-520 QM
(105) ENPHASE IQ8P-3P-72-E-US

(N) PV ARRAY #4
129° AZIMUTH, 4:12 PITCH
(4) SILFAB SOLAR SIL-520 QM
(4) ENPHASE IQ8P-3P-72-E-US

(N) PV ARRAY #8
129° AZIMUTH, 4:12 PITCH
(4) SILFAB SOLAR SIL-520 QM
(4) ENPHASE IQ8P-3P-72-E-US

36"

48"

FIRE ACCESS PATHWAYS
AS PER INTL. FIRE CODE
(48" PERIMETER PATH)

36"

(N) PV ARRAY #5
129° AZIMUTH, 4:12 PITCH
(4) SILFAB SOLAR SIL-520 QM
(4) ENPHASE IQ8P-3P-72-E-US

(N) PV ARRAY #6
219° AZIMUTH, 4:12 PITCH
(61) SILFAB SOLAR SIL-520 QM
(61) ENPHASE IQ8P-3P-72-E-US

(N) UTILITY AC DISCONNECT (DS1),
600A RATED, 3-ϕ , 4-WIRE, 3-POLE
EQUIP WITH (3) X 500A FUSES, 240VAC
DISCONNECT SHALL BE A VISIBLE, LOCKABLE, KNIFE SWITCH DISCONNECT AS PER UTILITY MEANS OF DISCONNECTION FOR THE LOAD-SIDE TAP POINT OF CONNECTION
(LOC. IN MECHANICAL ROOM, ADJACENT TO MAIN SWITCHBOARD)

(E) UTILITY METER / MAIN SWITCHBOARD
2500A RATED BUSBAR, 2500A / 3P MAIN BREAKER
120 / 208VAC, 3-ϕ , 4-WIRE
(N) LOAD-SIDE TAP POINT OF INTERCONNECTION AS PER NEC 240.21(B)(1) & NEC 705.12 LENGTH OF TAP CONDUCTORS IS 8 FEET (TO TAKE PLACE WITHIN THIS ENCLOSURE)
(LOC. INSIDE MECHANICAL ROOM)

(N) 600A SOLAR-ONLY LOAD CENTER
120 / 208VAC - 3ϕ - 4W - NEMA 1R, MLO
(LOC. INSIDE MECHANICAL ROOM)

(N) IQ GATEWAY COMMERCIAL 2
MODEL: ENV-IQ8-AM3-3P
SHALL BE POWERED BY (N) 20A / 3P
CIRCUIT BREAKER LOCATED IN
THE 600A SOLAR-ONLY LOAD CENTER
(LOC. INSIDE MECHANICAL ROOM)

(N) PV ARRAY #9
39° AZIMUTH, 4:12 PITCH
(13) SILFAB SOLAR SIL-520 QM
(13) ENPHASE IQ8P-3P-72-E-US

(N) PV ARRAY #7
129° AZIMUTH, 4:12 PITCH
(16) SILFAB SOLAR SIL-520 QM
(16) ENPHASE IQ8P-3P-72-E-US

AREA OF ALL PV ARRAYS : 7,061 SQ. FT
AREA OF ROOF SURFACE : 26,400 SQ. FT
SOLAR PERCENT COVERAGE : ~26.8%

A PV-2B SITE PLAN (DETAILED)
SCALE: 1" = 27'

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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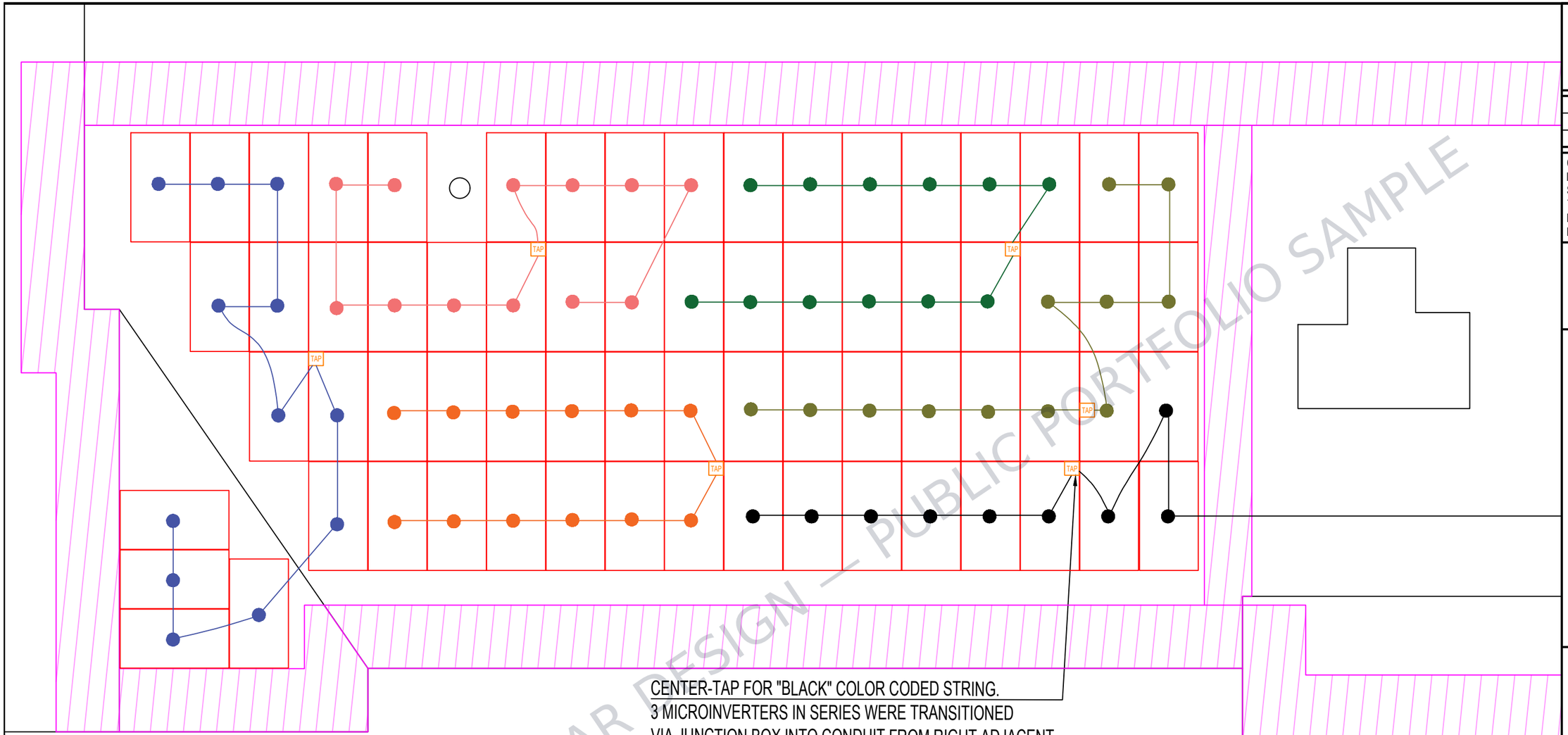
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

SITE PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-2B



CENTER-TAP FOR "BLACK" COLOR CODED STRING.
3 MICROINVERTERS IN SERIES WERE TRANSITIONED
VIA JUNCTION BOX INTO CONDUIT FROM RIGHT ADJACENT
ROOF PLANE TO CONNECT TO THIS CENTER-TAP.
(PLEASE SEE SHEET PV-2D, ZONE B)

- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
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- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)

A PV-2C STRINGING & CENTER-TAP MAP (ZONE A)
SCALE: 1" = 7'

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
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LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

STRINGING CONFIG.

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-2C

THIS IS A JUNCTION BOX, NOT A CENTER-TAP.
3 MICROINVERTERS IN SERIES SHALL BE WIRED, THEN TRANSITIONED TO CONDUIT TO CONNECT TO THE CENTER-TAP ON THE LEFT ADJACENT ROOF PLANE, "BLACK" COLOR CODED STRING
(PLEASE SEE SHEET PV-2C, ZONE A)

THIS IS A JUNCTION BOX, NOT A CENTER-TAP. 6 MICROINVERTERS SHALL BE WIRED IN SERIES ON THIS ROOF PLANE, THEN TRANSITIONED TO CONDUIT TO CONNECT TO THE CENTER-TAP ON THE RIGHT ADJACENT ROOF PLANE, "LIME" COLOR CODED STRING
(PLEASE SEE SHEET PV-2E, ZONE C)

PUBLIC PORTFOLIO SAMPLE
GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
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- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)

A PV-2D STRINGING & CENTER-TAP MAP (ZONE B)
SCALE: 1" = 9'

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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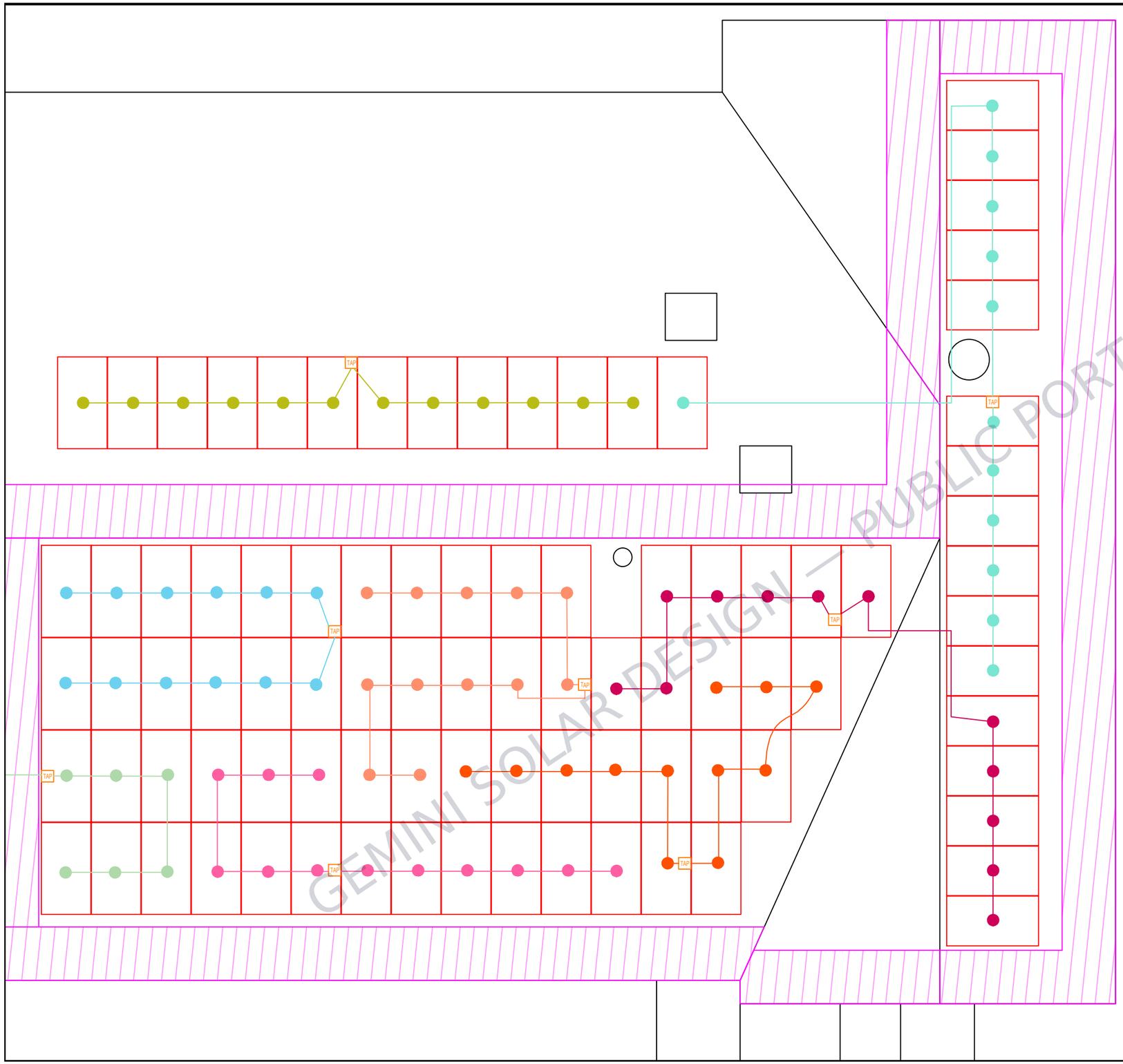
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

STRINGING CONFIG.

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-2D



- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
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- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)
- 1 BRANCH OF 12 MICROINVERTERS (ENPHASE IQ8P-3P-72-E-US)

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

A PV-2E STRINGING & CENTER-TAP MAP (ZONE C)
SCALE: 1" = 8'

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

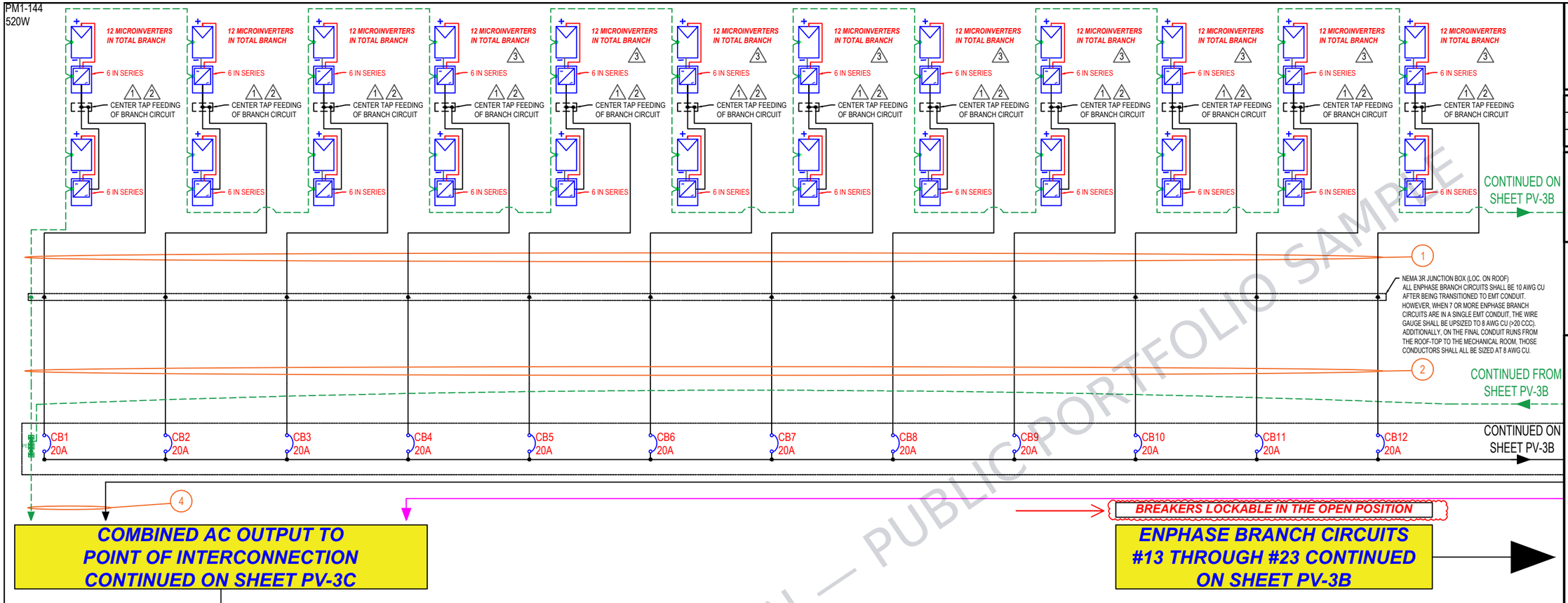
(INFO WITHHELD FOR PUBLIC SAMPLE)

STRINGING CONFIG.

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-2E

PM1-144
520W



PLEASE SEE SHEET PV-3D FOR THE CORRESPONDING DATA TABLES & EQUIPMENT SPECIFICATIONS.

PLEASE SEE SHEET PV-3E FOR THE WIRE & CONDUCTOR SCHEDULE FOR THIS SINGLE-LINE DIAGRAM.

SEPARATE SHEETS WERE CREATED DUE TO SPACE LIMITATIONS.

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

A PV-3A SINGLE-LINE DIAGRAM (ENPHASE BRANCH CIRCUITS #1 THROUGH #12)
SCALE: N/A

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-3A

PM145-276
520W

(TYP. OF 276 UNITS)
ENPHASE MICROINVERTER
MODEL: IQ8P-3P-72-E-US

12 MICROINVERTERS IN TOTAL BRANCH
6 IN SERIES
CENTER TAP FEEDING OF BRANCH CIRCUIT

CONTD. FROM SHEET PV-3A

CONTD. ON SHEET PV-3A

CONTD. FROM SHEET PV-3A

CB13 20A | CB14 20A | CB15 20A | CB16 20A | CB17 20A | CB18 20A | CB19 20A | CB20 20A | CB21 20A | CB22 20A | CB23 20A | CB24 20A

1

NEMA 3R JUNCTION BOX (LOC. ON ROOF)
ALL ENPHASE BRANCH CIRCUITS SHALL BE 10 AWG CU AFTER BEING TRANSITIONED TO EMT CONDUIT. HOWEVER, WHEN 7 OR MORE ENPHASE BRANCH CIRCUITS ARE IN A SINGLE EMT CONDUIT, THE WIRE GAUGE SHALL BE UPSIZED TO 8 AWG CU (>20 CCC). ADDITIONALLY, ON THE FINAL CONDUIT RUNS FROM THE ROOF-TOP TO THE MECHANICAL ROOM, THOSE CONDUCTORS SHALL ALL BE SIZED AT 8 AWG CU.

3

(N) 600A SOLAR-ONLY LOAD CENTER
120 / 208VAC - 3Φ - 4W - NEMA 1R, MLO
(LOC. INSIDE MECHANICAL ROOM)

4

CONTINUED ON SHEET PV-3A

BREAKERS LOCKABLE IN THE OPEN POSITION

ENPHASE BRANCH CIRCUITS #1 THROUGH #12 CONTINUED FROM SHEET PV-3A

PLEASE SEE SHEET PV-3D FOR THE CORRESPONDING DATA TABLES & EQUIPMENT SPECIFICATIONS.

PLEASE SEE SHEET PV-3E FOR THE WIRE & CONDUCTOR SCHEDULE FOR THIS SINGLE-LINE DIAGRAM.

SEPARATE SHEETS WERE CREATED DUE TO SPACE LIMITATIONS.

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

A PV-3B SINGLE-LINE DIAGRAM (ENPHASE BRANCH CIRCUITS #13 THROUGH #23)
SCALE: N/A

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-3B

CONTD. FROM SHEET PV-3A

CONTD. FROM SHEET PV-3A

4

F1-3
500A
DS1
600A

PE

(N) UTILITY AC DISCONNECT (DS1),
600A RATED, 3-ϕ , 4-WIRE, 3-POLE
EQUIP WITH (3) X 500A FUSES, 240VAC
DISCONNECT SHALL BE A VISIBLE, LOCKABLE, KNIFE SWITCH DISCONNECT AS PER UTILITY MEANS OF DISCONNECTION FOR THE LOAD-SIDE TAP POINT OF CONNECTION
(LOC. IN MECHANICAL ROOM, ADJACENT TO MAIN SWITCHBOARD)

5

3 PRODUCTION
CTS 600A

5

LENGTH OF TAP CONDUCTORS IS 8 FEET.

TO UTILITY GRID @
120 / 208VAC, 3-Ø, 4-WIRE

(EX) DONE BY OTHERS
NOT PART OF SCOPE

6

3 CONSUMPTION
CTS 600A
(OPTIONAL)

KWHR

(E) 2500A / 3P MAIN BREAKER

(N) LOAD-SIDE TAP POINT OF INTERCONNECTION AS PER NEC 240.21(B)(1) & NEC 705.12 (WITHIN THIS ENCLOSURE)

LOADS...

(N) IQ GATEWAY COMMERCIAL 2
MODEL: ENV-IQ8-AM3-3P

N PE

(E) UTILITY METER / MAIN SWITCHBOARD
120 / 208VAC, 3-ϕ , 4-WIRE
2500A RATED BUSBAR
2500A / 3P MAIN BREAKER
(LOC. INSIDE MECHANICAL ROOM)

NEUTRAL TO GROUND BOND
LOCATED HERE IN MAIN SWITCHBOARD

(E) GEC

CONTD. FROM SHEET PV-3A

A. IT IS CONFIRMED THAT THE FUSES AND THE MAIN CIRCUIT BREAKER CAN INTERRUPT THE MAXIMUM SHORT CIRCUIT CURRENT FROM THE PSE TRANSFORMER. THE MAXIMUM SHORT-CIRCUIT RATING OF THE SWITCHGEAR SECTION IS 65K AMPS RMS SYMMETRICAL AT 208 VOLTS MAXIMUM. WHEN PROTECTED, INTERNALLY OR EXTERNALLY, BY A 2500 AMPERE MAXIMUM CLASS L FUSE, THE SECTION IS RATED FOR USA ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 200K AMPS RMS SYMMETRICAL AT 208 VOLTS MAXIMUM. PLEASE SEE BELOW FOR NAMEPLATE OF THIS SWITCHGEAR SECTION.

B. THE AGGREGATE FAULT CURRENT (AC SHORT CIRCUIT FAULT CURRENT) OF THE MICROINVERTER UTILIZED IN THIS PROJECT IS 2.29 ARMS. PLEASE SEE SHEET PV-9 FOR THIS PARAMETER. THE SPEC SHEET FOR THE MICROINVERTER HAS BEEN UPDATED WITH NEWER VERSION THAT CALLS OUT THIS PARAMETER.

OUTPUT DATA (AC)		IQ8P-3P-72-E-US/IQ8P-3P-72-E-DOM-US[1]	
Peak output power	VA	480	
Maximum continuous output power	VA	475	
Nominal (L-L) voltage/range[3]	V	208/183-229	220/198-242
Maximum continuous output current	A	2.28	2.16
Nominal frequency	Hz	60	
Extended frequency range	Hz	47-68	
AC short circuit fault current over three cycles	Arms	2.29	
Maximum microinverters per 20 A three-phase branch circuit[4]	–	12	
Overvoltage class AC port	–	III	
Power factor setting	–	1.0	
Power factor (adjustable)	–	0.85 leading ... 0.85 lagging	

C. THE GENERATOR MAX DESIGN FAULT CONTRIBUTION CURRENT WOULD BE 52.67 ARMS. THIS VALUE WAS DERIVED BY TAKING THE NUMBER OF MICROINVERTER STRINGS (23) MULTIPLIED BY THE AC SHORT CIRCUIT FAULT CURRENT PER STRING (2.29 ARMS). 23 X 2.29 ARMS = 52.67 ARMS.

PLEASE SEE SHEET PV-3D FOR THECORRESPONDING DATA TABLES & EQUIPMENT SPECIFICATIONS.

PLEASE SEE SHEET PV-3E FOR THE WIRE & CONDUCTOR SCHEDULE FOR THIS SINGLE-LINE DIAGRAM.

SEPARATE SHEETS WERE CREATED DUE TO SPACE LIMITATIONS.

A
PV-3C
SINGLE-LINE DIAGRAM (COMBINED AC OUTPUT TO POINT OF INTERCONNECTION)
SCALE: N/A

GEMINI SOLAR DESIGN - PORTFOLIO SAMPLE

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-3C

PV MODULE

REF.	TYP.	MODULE	STC POWER	ISC	IMP	VOC	VMP	SERIES FUSE RATING
PM1-276	276	SILFAB SOLAR SIL-520 QM	520W	13.65A	12.85A	47.52V	40.48V	25A

MICROINVERTER

REF.	TYP.	MICROINVERTER	GROUND	NOMINAL (L-L) VOLTAGE/RANGE	MAX OCPD SIZE	MAXIMUM CONTINUOUS OUTPUT POWER	MAXIMUM CONTINUOUS OUTPUT CURRENT	MAX. DC CONTINUOUS CURRENT (MODULE IMP)	MAXIMUM INPUT DC VOLTAGE	CEC WEIGHTED EFFICIENCY
I1-276	276	ENPHASE IQ8P-3P-72-E-US	INTEGRATED	208VAC / 183–229VAC	20A	475W	2.28A (1-Ø)	14A	63VDC	97.5%

SYSTEM SUMMARY

	ENPHASE BRANCH CIRCUIT (TYP. OF 23 BRANCHES)
ARRAY STC POWER PER BRANCH	6,240W
MICROINVERTERS PER BRANCH	12
MAXIMUM CONTINUOUS OUTPUT AC CURRENT @ 208VAC, 3-Ø	15.80A
MAXIMUM CONTINUOUS OUTPUT POWER PER BRANCH	5,700W

TOTAL COMBINED SYSTEM SUMMARY

TOTAL COMBINED ARRAY STC POWER	143,520W
TOTAL QUANTITY OF MICROINVERTERS IN SYSTEM	276
TOTAL MAXIMUM CONTINUOUS OUTPUT AC CURRENT @ 208VAC, 3-Ø	363.32A
TOTAL MAXIMUM CONTINUOUS OUTPUT POWER	131,100W

SCHEMATIC NOTES

1	FIELD WIREABLE ADAPTER CABLE & CONNECTOR FOR CENTER FEEDING OF AC BRANCH CIRCUIT **FIELD WIREABLE ADAPTER CABLES (QD-LINKFW-10)**
2	FIELD WIREABLE ADAPTER CABLE & CONNECTOR FOR CENTER FEEDING OF AC BRANCH CIRCUIT **THREE PHASE MALE FIELD WIREABLE (QD-CONN-10M)**
3	THE FIRST AC CONNECTOR IN EACH MICROINVERTER BRANCH CIRCUIT IS SUITABLE AS A DISCONNECTING MEANS.
4	OUTPUT OF THE MICROINVERTER BRANCH CIRCUITS SHALL BE BACKFED INTO A 600A SOLAR-ONLY COMBINER PANEL FOR COMBINATION PURPOSES. PLEASE SEE THE OCPD SCHEDULE FOR THE BREAKER SIZES FOR EACH BRANCH CIRCUIT, RESPECTIVELY.
5	DISCONNECT SHALL BE A VISIBLE, LOCKABLE, KNIFE SWITCH DISCONNECT AS PER UTILITY.
6	LOAD-SIDE TAP POINT OF INTERCONNECTION SHALL TAKE PLACE AS PER NEC 240.21(B)(1) & NEC 705.12. LENGTH OF TAP CONDUCTORS SHALL NOT EXCEED 10 FEET.

LENGTH OF TAP CONDUCTORS IS 8 FEET.

OCPD SCHEDULE

REF.	TYP.	POLES	CURRENT RATING	RATED VOLTAGE
CB1 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB2 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB3 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB4 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB5 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB6 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB7 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB8 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB9 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB10 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB11 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB12 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB13 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB14 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB15 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB16 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB17 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB18 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB19 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB20 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB21 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB22 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
CB23 (ENPHASE BRANCH CIRCUIT)	1	3	20A	208VAC
F1-3 (UTILITY AC DISCONNECT FUSES)	3	N/A	500A	208VAC
CB24 (ENPHASE IQ GATEWAY COMMERCIAL 2)	1	3	20A	208VAC

UTILITY AC DISCONNECT SCHEDULE

REF.	FUSIBLE	POLES	CURRENT RATING	RATED VOLTAGE
UTILITY AC DISCONNECT (DS1) 3-POLE KNIFE DISCONNECT, FUSIBLE	YES	3	600A	208VAC

GEMINI SOLAR DESIGN
PUBLIC PORTFOLIO SAMPLE

A PV-3D SINGLE-LINE DIAGRAM (DATA TABLES & EQUIPMENT SPECIFICATIONS)
SCALE: N/A

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-3D

CONDUCTOR SCHEDULE WITH NEC ELECTRICAL CALCULATIONS

ID	TYP	DESCRIPTION	CONDUCTOR	CONDUIT	NO. OF CURRENT CARRYING CNDRS. IN CNDT.	FILL %	RATED AMPS	OCPD	EGC	TEMP. CORR. FACTOR @ 90°C TEMP. RATING	FILL ADJ. FACTOR	CONT. CURRENT	MAX. CURRENT	TERMINAL RATING CHECK @ 75°C TEMP. RATING SHALL EXCEED 1.25X CONT. CURRENT	BASE AMPACITY @ 90°C TEMP. RATING	CONDITIONS OF USE (COU) @ 90°C TEMP. RATING
1	23	MICROINVERTER OUTPUT: MICROINVERTER TO JUNCTION BOX	12 AWG THWN-2 COPPER ***(ENPHASE RAW QD CABLE)***	***FREE AIR*** ***(DIRECT HOMERUN TO J-BOX LOCATED UNDER THE SOLAR MODULE)***	N/A	N/A	15.80A (TYP. OF ALL BRANCH CIRCUITS #1 THROUGH #23)	N/A	6 AWG BARE COPPER	0.76 (51°C)	1.0	15.80A (TYP. OF ALL BRANCH CIRCUITS)	19.75A (TYP. OF ALL BRANCH CIRCUITS)	25A > 19.75A PASS	***40A*** ***(IN FREE AIR)***	***40A*** ***(IN FREE AIR)***
2	1	MICROINVERTER OUTPUT (TRANSITIONED): JUNCTION BOX TO 600A SOLAR-ONLY LOAD CENTER	8 AWG THWN-2 COPPER	***2 1/2" DIA. EMT***	***36*** ***(L1, L2, L3) X 12*** ****(NEUTRAL IS NOT A CCC IN THIS DESIGN)****	25.2%	15.80A (BRANCH #1) 15.80A (BRANCH #2) 15.80A (BRANCH #3) 15.80A (BRANCH #4) 15.80A (BRANCH #5) 15.80A (BRANCH #6) 15.80A (BRANCH #7) 15.80A (BRANCH #8) 15.80A (BRANCH #9) 15.80A (BRANCH #10) 15.80A (BRANCH #11) 15.80A (BRANCH #12)	20A / 3P (CB1) 20A / 3P (CB2) 20A / 3P (CB3) 20A / 3P (CB4) 20A / 3P (CB5) 20A / 3P (CB6) 20A / 3P (CB7) 20A / 3P (CB8) 20A / 3P (CB9) 20A / 3P (CB10) 20A / 3P (CB11) 20A / 3P (CB12)	8 AWG THWN-2 COPPER	0.76 (51°C)	0.4	15.80A (BRANCH #1) 15.80A (BRANCH #2) 15.80A (BRANCH #3) 15.80A (BRANCH #4) 15.80A (BRANCH #5) 15.80A (BRANCH #6) 15.80A (BRANCH #7) 15.80A (BRANCH #8) 15.80A (BRANCH #9) 15.80A (BRANCH #10) 15.80A (BRANCH #11) 15.80A (BRANCH #12)	19.75A (BRANCH #1) 19.75A (BRANCH #2) 19.75A (BRANCH #3) 19.75A (BRANCH #4) 19.75A (BRANCH #5) 19.75A (BRANCH #6) 19.75A (BRANCH #7) 19.75A (BRANCH #8) 19.75A (BRANCH #9) 19.75A (BRANCH #10) 19.75A (BRANCH #11) 19.75A (BRANCH #12)	50A > 19.75A PASS	***55A*** ***(IN CONDUIT)***	***22A*** ***(IN CONDUIT)***
3	1	MICROINVERTER OUTPUT (TRANSITIONED): JUNCTION BOX TO 600A SOLAR-ONLY LOAD CENTER	8 AWG THWN-2 COPPER	***2 1/2" DIA. EMT***	***33*** ***(L1, L2, L3) X 11*** ****(NEUTRAL IS NOT A CCC IN THIS DESIGN)****	23.3%	15.80A (BRANCH #13) 15.80A (BRANCH #14) 15.80A (BRANCH #15) 15.80A (BRANCH #16) 15.80A (BRANCH #17) 15.80A (BRANCH #18) 15.80A (BRANCH #19) 15.80A (BRANCH #20) 15.80A (BRANCH #21) 15.80A (BRANCH #22) 15.80A (BRANCH #23)	20A / 3P (CB13) 20A / 3P (CB14) 20A / 3P (CB15) 20A / 3P (CB16) 20A / 3P (CB17) 20A / 3P (CB18) 20A / 3P (CB19) 20A / 3P (CB20) 20A / 3P (CB21) 20A / 3P (CB22) 20A / 3P (CB23)	8 AWG THWN-2 COPPER	0.76 (51°C)	0.4	15.80A (BRANCH #13) 15.80A (BRANCH #14) 15.80A (BRANCH #15) 15.80A (BRANCH #16) 15.80A (BRANCH #17) 15.80A (BRANCH #18) 15.80A (BRANCH #19) 15.80A (BRANCH #20) 15.80A (BRANCH #21) 15.80A (BRANCH #22) 15.80A (BRANCH #23)	19.75A (BRANCH #13) 19.75A (BRANCH #14) 19.75A (BRANCH #15) 19.75A (BRANCH #16) 19.75A (BRANCH #17) 19.75A (BRANCH #18) 19.75A (BRANCH #19) 19.75A (BRANCH #20) 19.75A (BRANCH #21) 19.75A (BRANCH #22) 19.75A (BRANCH #23)	50A > 19.75A PASS	***55A*** ***(IN CONDUIT)***	***22A*** ***(IN CONDUIT)***
4	1	COMBINED OUTPUT OF MICROINVERTERS: 600A SOLAR-ONLY LOAD PANEL TO UTILITY AC DISCONNECT (DS1)	2 PARALLEL SETS OF 4/0 AWG THWN-2 COPPER	***(TYP. OF 2)*** ***2 1/2" DIA. EMT***	***3*** ***(L1, L2, L3) X 1*** ****(NEUTRAL IS NOT A CCC IN THIS DESIGN)****	24.8%	363.32A	500A (F1-3) 600A / 3P (DS1)	1 AWG THWN-2 COPPER	1.0 (29°C)	1.0	363.32A	454.15A	460A > 454.15A PASS	***520A*** ***(IN CONDUIT)***	***520A*** ***(IN CONDUIT)***
5	1	UTILITY AC DISCONNECT (DS1) OUTPUT: UTILITY AC DISCONNECT (DS1) TO ***LOAD-SIDE TAP P.O.C. (TO BE MADE AS PER NEC 240.21(B)(1) & NEC 705.12)*** ***LENGTH OF TAP CONDUCTORS IS 8 FEET.***	2 PARALLEL SETS OF 250 MCM (KCMIL) THHN / THWN-2 COPPER	***(TYP. OF 2)*** ***3" DIA. SCH. 40 PVC***	***3*** ***(L1, L2, L3) X 1*** ****(NEUTRAL IS NOT A CCC IN THIS DESIGN)****	29.1%	363.32A	N/A	350 MCM (KCMIL) THHN / THWN-2 COPPER	1.0 (29°C)	1.0	363.32A	454.15A	510A > 454.15A PASS	***580A*** ***(IN CONDUIT)***	***580A*** ***(IN CONDUIT)***

ALL CONDUCTORS, OCPD SIZES AND TYPES SPECIFIED ACCORDING TO NEC ARTICLES 690.8(A)(1), NEC ARTICLE 240, AND NEC ARTICLE 690.7.

GEMINI SOLAR DESIGN — PUBLIC POSTING SAMPLE

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

SINGLE-LINE DIAGRAM

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-3E

A PV-3E SINGLE-LINE DIAGRAM (CONDUCTOR SCHEDULE)
SCALE: N/A

OVERALL SYSTEM RATED AC CURRENT

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
OPERATING CURRENT 363.32 AMPS
OPERATING VOLTAGE 208 VOLTS

NEC 690.14(C)(2) & NEC 690.54

WARNING

DUAL POWER SUPPLY

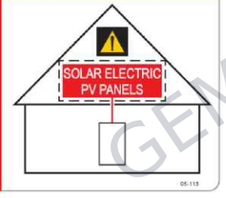
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NET METER

pvlabels.com 03-364

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

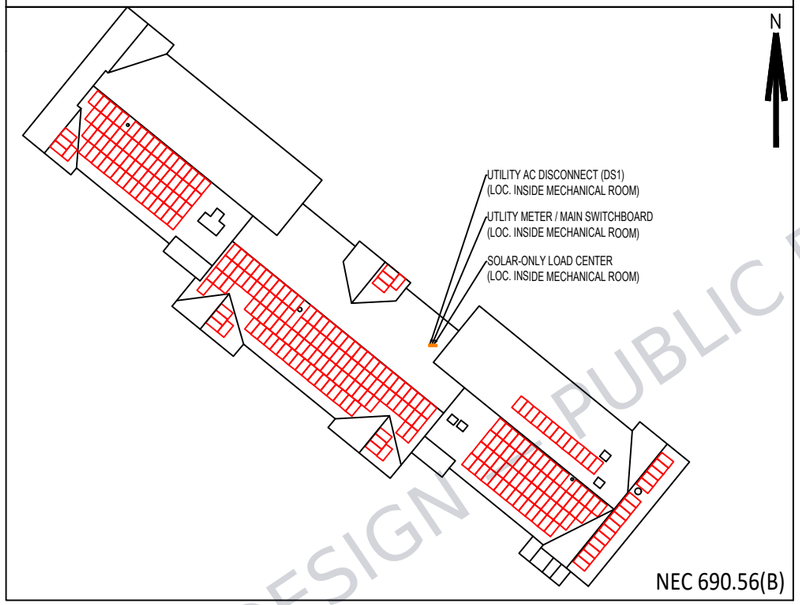
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT



SITE OVERVIEW

CAUTION

POWER TO THIS SERVICE IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN



NEC 690.56(B)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

pvlabels.com 07-316

NO LOADS SHALL BE ADDED TO THIS 600A SOLAR-ONLY COMBINER PANEL

GEMINI SOLAR DESIGN - PUBLIC PORTFOLIO SAMPLE

1 PV-4 PLACARDS
SCALE: N/A

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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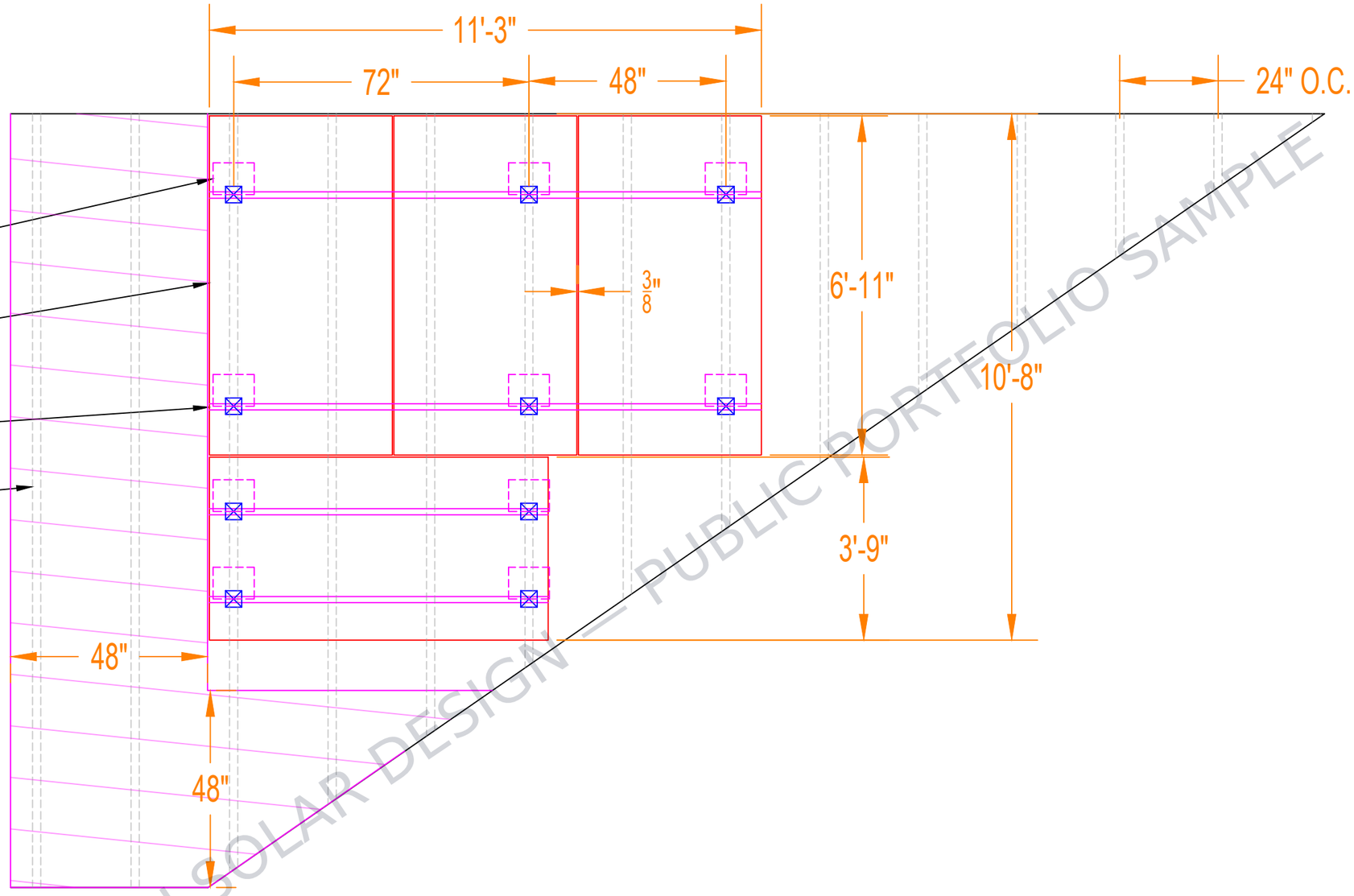
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

PLACARDS

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-4



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	4
AREA	104 SQ. FT
AZIMUTH	129°
TOTAL WEIGHT OF ARRAY	272 LBS
DEAD LOAD	2.62 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 PV-5A ATTACHMENT PLAN (ARRAY #1)
SCALE: 1" = 2'-6"

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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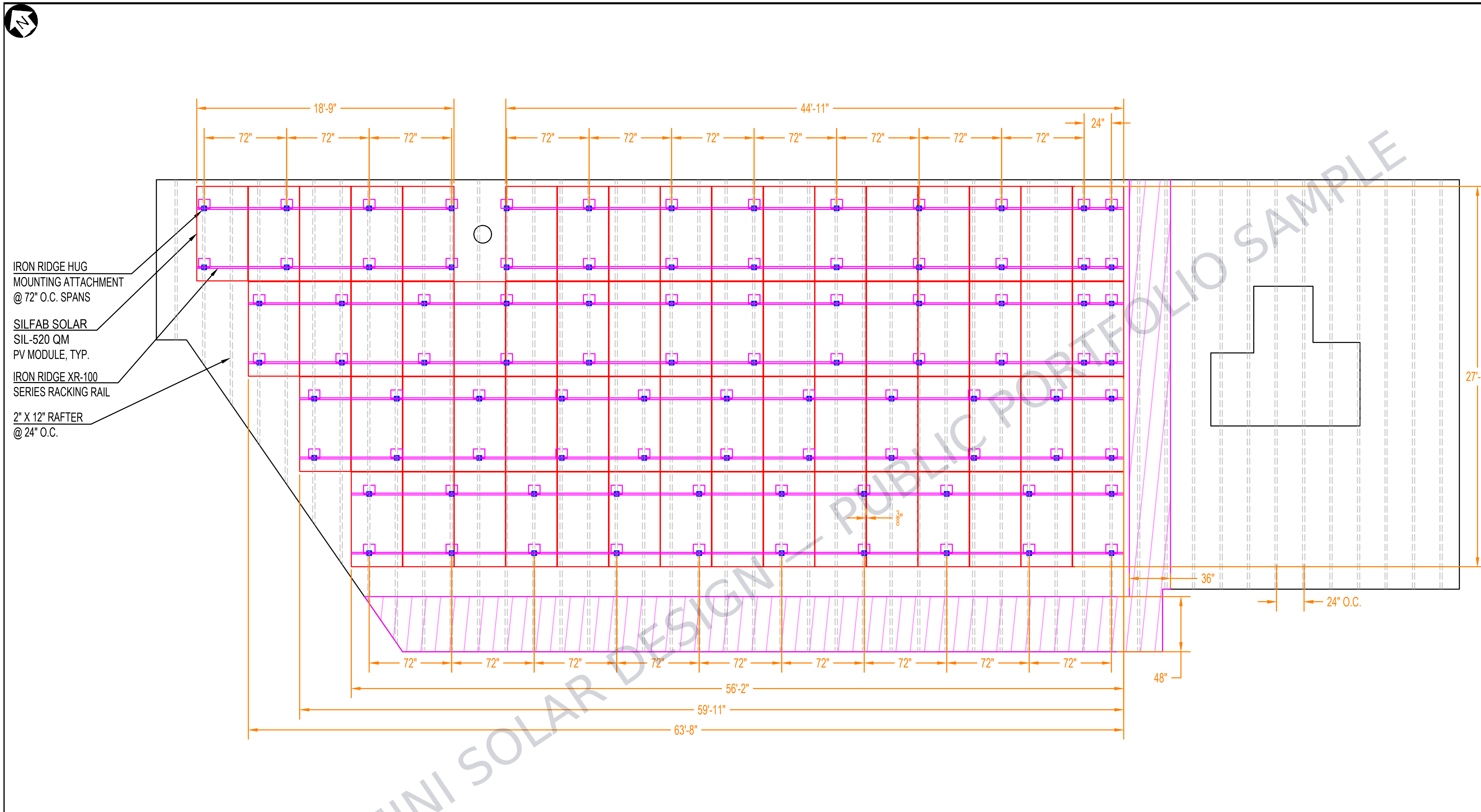
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5A



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	65
AREA	1664 SQ. FT
AZIMUTH	219°
TOTAL WEIGHT OF ARRAY	4390 LBS
DEAD LOAD	2.64 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 / PV-5B — ATTACHMENT PLAN (ARRAY #2)
SCALE: 1" = 7'-6"

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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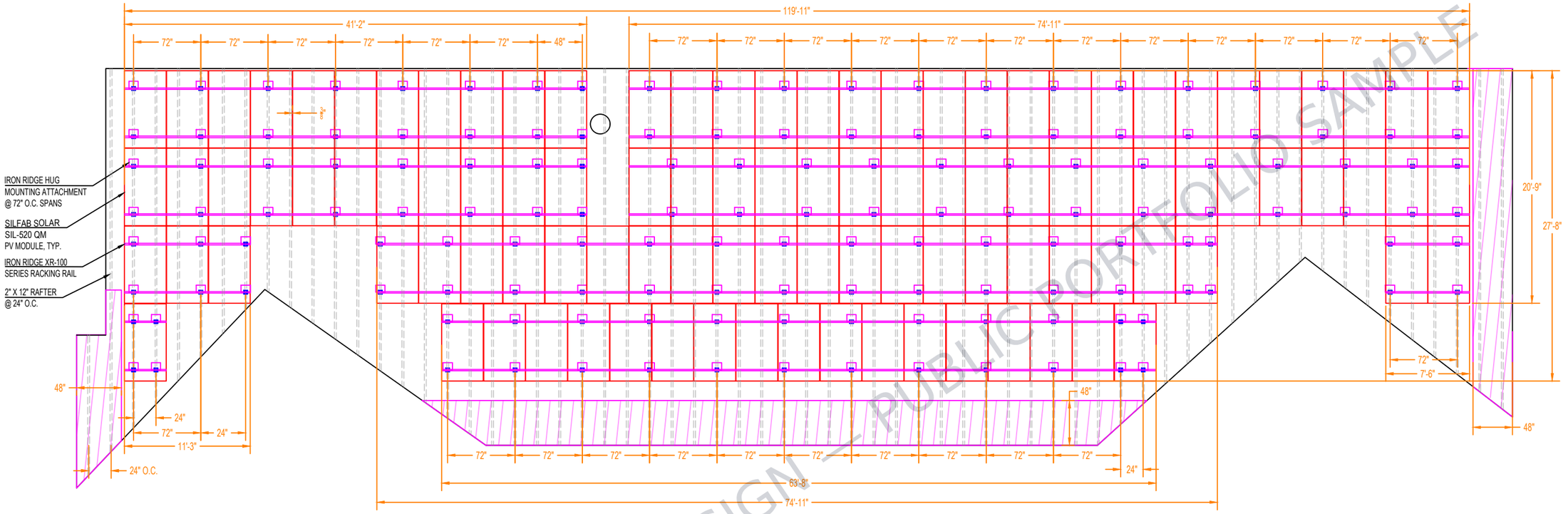
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5B



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	105
AREA	2686 SQ. FT
AZIMUTH	219°
TOTAL WEIGHT OF ARRAY	7088 LBS
DEAD LOAD	2.64 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 PV-5C — ATTACHMENT PLAN (ARRAY #3)
SCALE: 1" = 10'

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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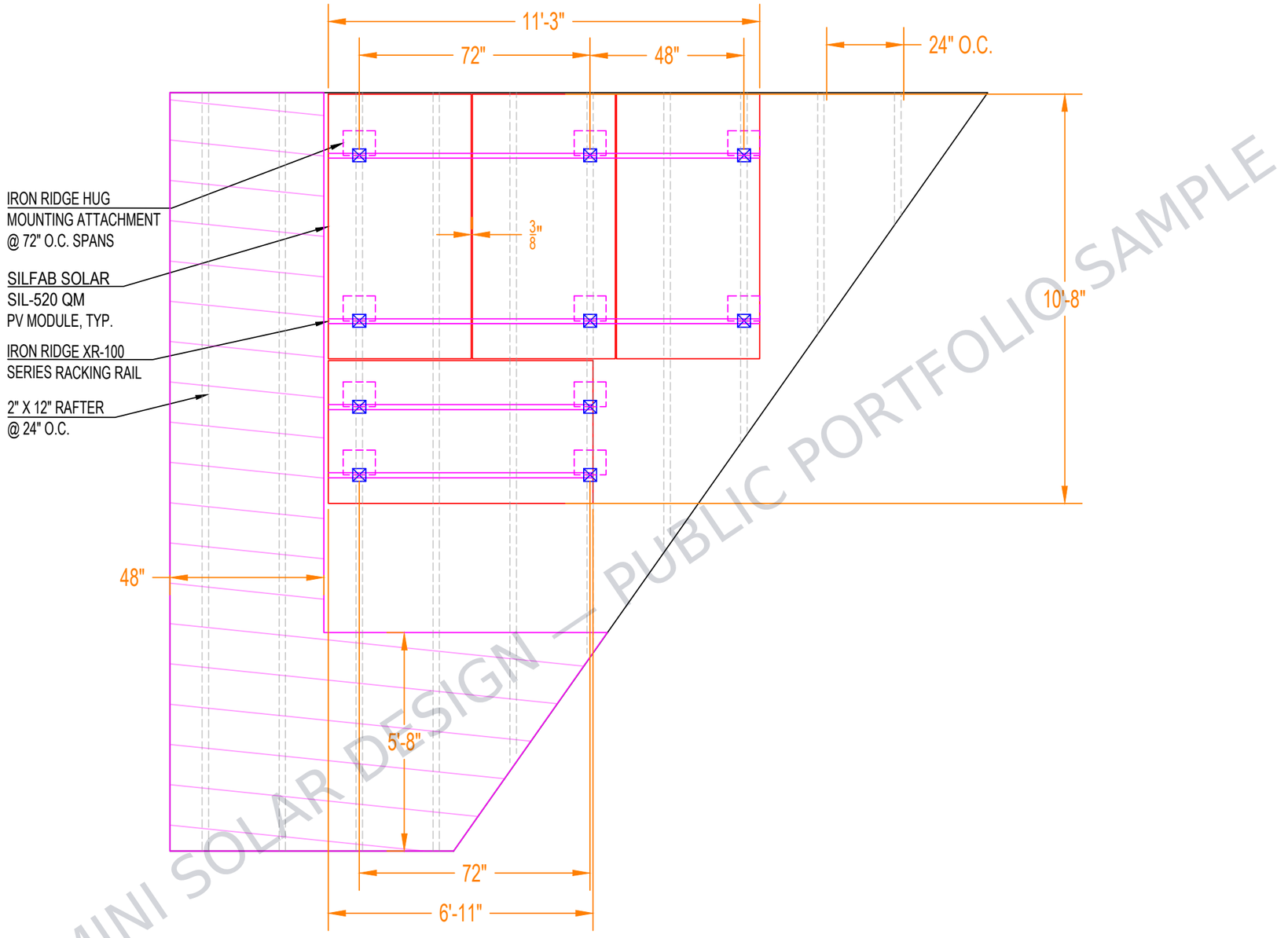
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5C



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	4
AREA	103 SQ. FT
AZIMUTH	129°
TOTAL WEIGHT OF ARRAY	271 LBS
DEAD LOAD	2.63 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 PV-5D ATTACHMENT PLAN (ARRAY #4)
SCALE: 1" = 3'

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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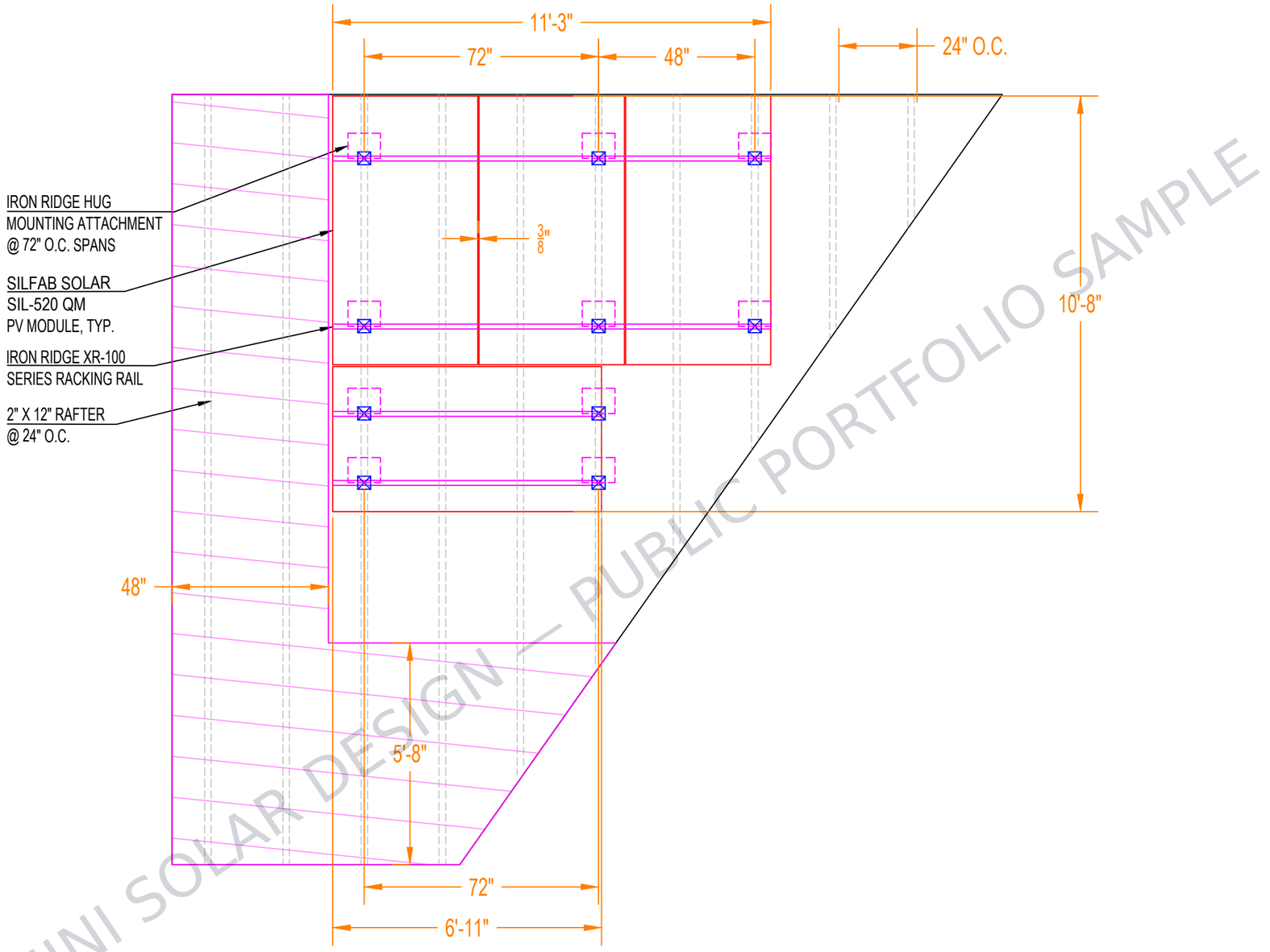
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5D



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	4
AREA	103 SQ. FT
AZIMUTH	129°
TOTAL WEIGHT OF ARRAY	271 LBS
DEAD LOAD	2.63 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 PV-5E ATTACHMENT PLAN (ARRAY #5)
SCALE: 1" = 3'

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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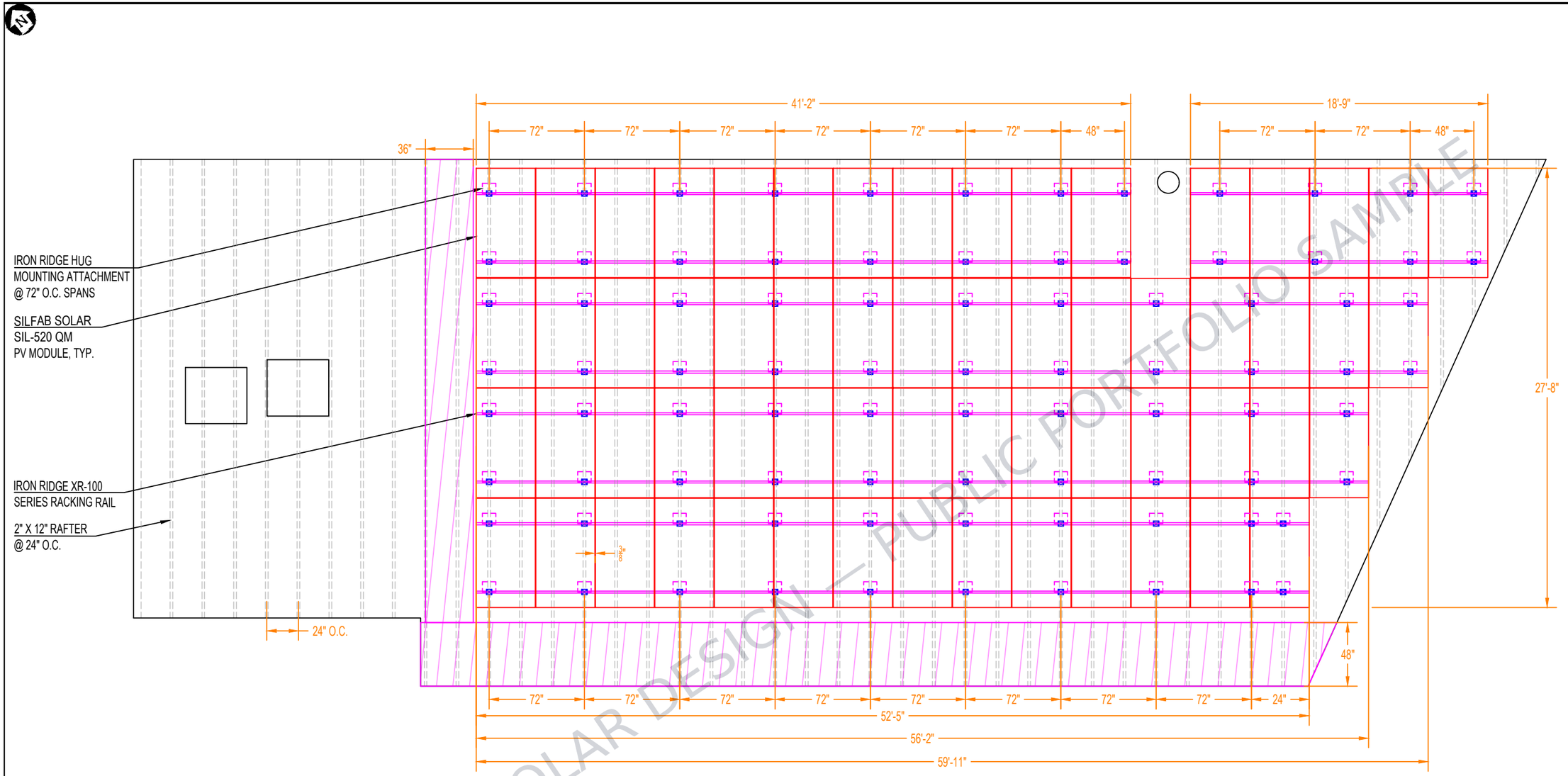
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5E



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	61
AREA	1560 SQ. FT
AZIMUTH	219°
TOTAL WEIGHT OF ARRAY	4122 LBS
DEAD LOAD	2.64 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 / PV-5F ATTACHMENT PLAN (ARRAY #6)
SCALE: 1" = 7'

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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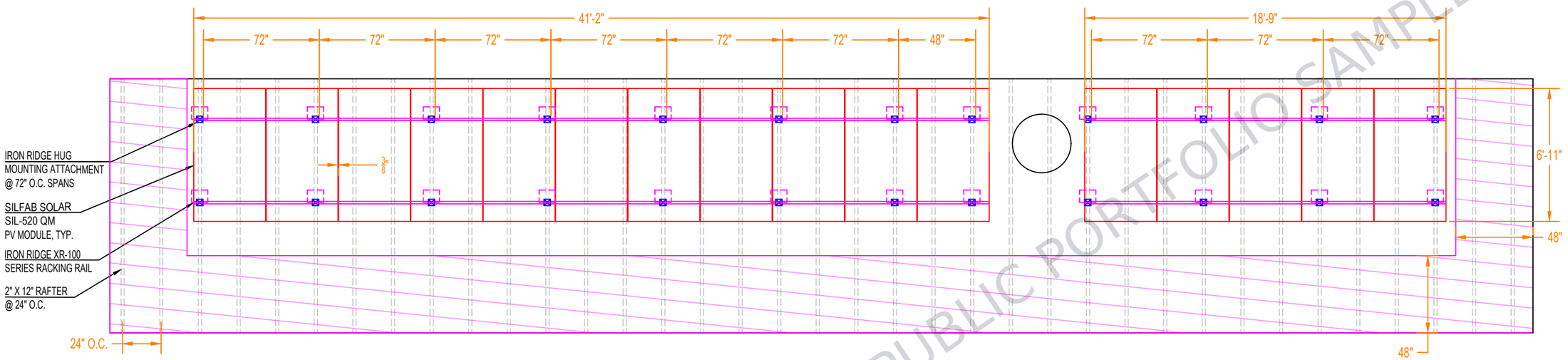
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5F



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	16
AREA	410 SQ. FT
AZIMUTH	129°
TOTAL WEIGHT OF ARRAY	1078 LBS
DEAD LOAD	2.64 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	*PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.*
4	*PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).*

1 PV-5G ATTACHMENT PLAN (ARRAY #7)
SCALE: 1" = 5'-6"

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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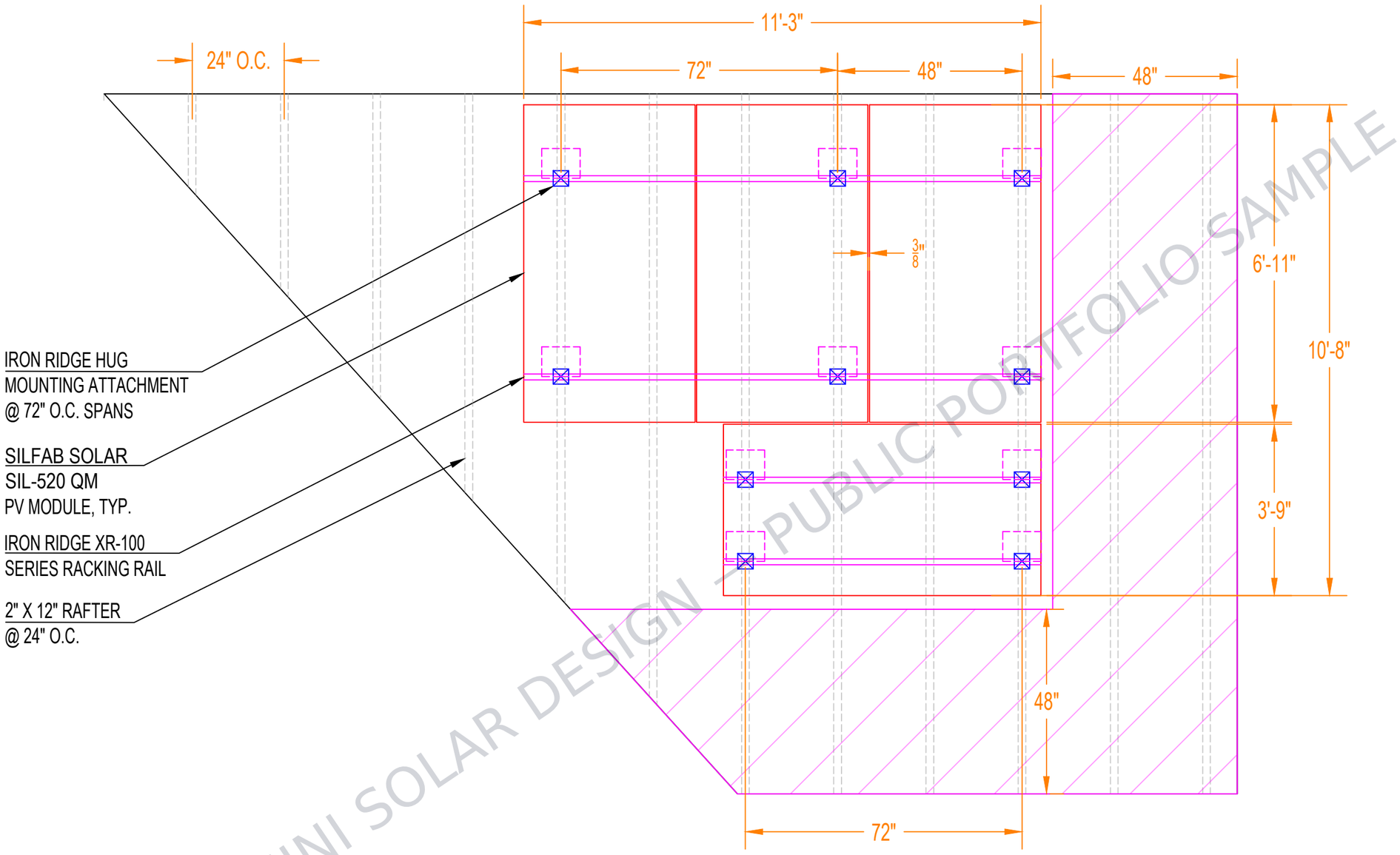
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5G



GEMINI SOLAR DESIGN - PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	4
AREA	103 SQ. FT
AZIMUTH	129°
TOTAL WEIGHT OF ARRAY	271 LBS
DEAD LOAD	2.63 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 PV-5H ATTACHMENT PLAN (ARRAY #8)
SCALE: 1" = 2'-6"

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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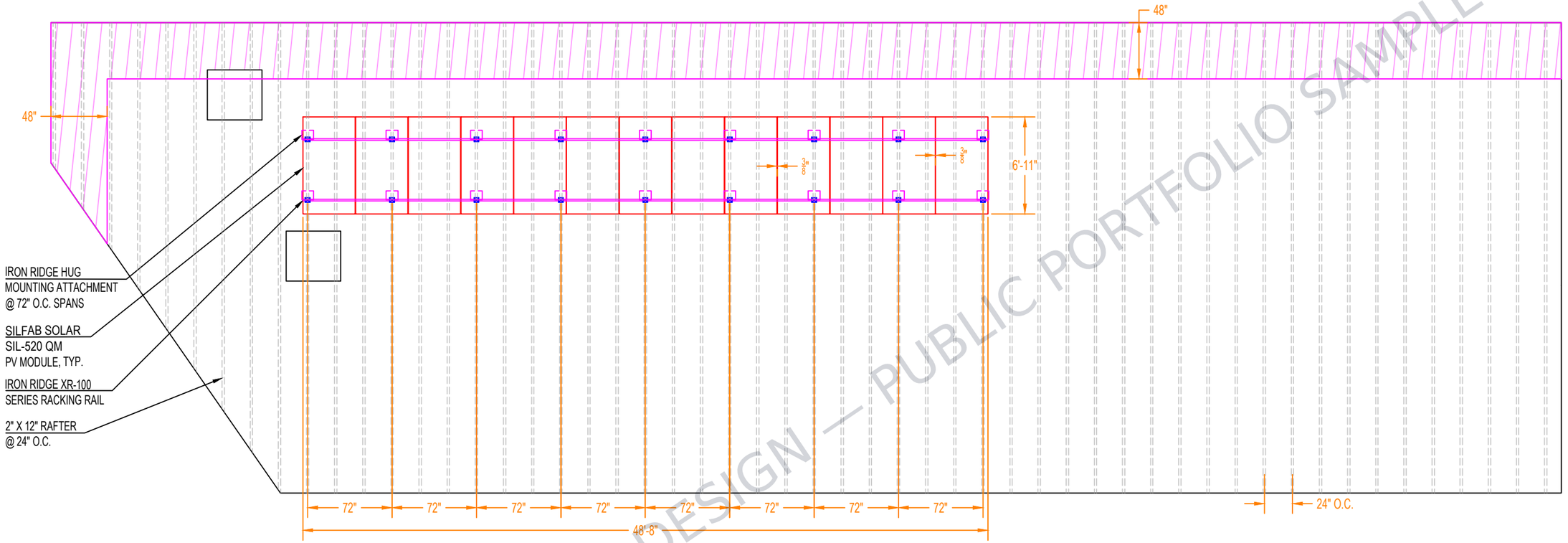
NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5H



GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

ROOF INFORMATION	
ROOF TYPE	COMPOSITE SHINGLE
PITCH	4:12
RAFTER SPACING	24" O.C.
RAFTER DIMENSIONS	2" X 12"

LAYOUT SPECIFICATIONS	
NUMBER OF MODULES	9
AREA	231 SQ. FT
AZIMUTH	309°
TOTAL WEIGHT OF ARRAY	607 LBS
DEAD LOAD	2.63 PSF

LOCAL DESIGN CRITERIA	
WIND EXPOSURE CATEGORY	B
RISK CATEGORY	II
DESIGN WIND SPEED	110 MPH
DESIGN SNOW LOAD	25 PSF

PV MODULES AND IRON RACKING SYSTEM HAVE A CLASS A FIRE RATING CLASSIFICATION.

ATTACHMENT PLAN NOTES	
1	ROOF MEMBERS AND PENETRATIONS TO BE DETERMINED IN THE FIELD.
2	THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
3	***PLEASE SEE SHEETS PV-6A AND PV-6B FOR DETAILS REGARDING THE MOUNTING ATTACHMENT TO BE USED, THE FLASHING TO BE USED, AS WELL AS THE RELEVANT CUTSHEETS.***
4	***PLEASE SEE SHEET PV-11 FOR A STRUCTURAL CERTIFICATION LETTER FOR THE IRON RIDGE FLUSH MOUNT SYSTEM. LETTER IS STAMPED BY A STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER (PE).***

1 / PV-5I ATTACHMENT PLAN (ARRAY #9)
SCALE: 1" = 7'-9"

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ATTACHMENT PLAN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-5I

Tech Brief

IRONRIDGE

QuickMount® HUG

The Respect Your Roof Deserves

When integrating with a home, solar attachments must be dependable for the lifetime of the rooftop. Due to recent innovations, many asphalt shingles have bonded courses. A mount that protects without the need to pry shingles can really speed things up.

Halo UltraGrip™ (HUG™) is here to respect the roof. Its Halo is a cast-aluminum barrier that encases the UltraGrip, our industrial-grade, foam-and-mastic seal. This allows HUG to accelerate the installation process and provide the utmost in waterproofing protection. Give your roof a HUG.™

Multi-Tiered Waterproofing
HUG utilizes a multi-tiered stack of components to provide revolutionary waterproofing protection. The Halo cast-aluminum, raised-perimeter foundation surrounds the UltraGrip base—a foam-backed mastic seal combination that prevents water intrusion by adhering and sealing with the shingle surface.

Halo UltraGrip™ is part of the QuickMount® product line.

UltraGrip™ Seal Technology
HUG UltraGrip utilizes a state-of-the-art seal design that uses a unique, foam-and-mastic combination. The foam-backed adhesive provides an entirely new flashing system that conforms and adheres to every nook and cranny of composition shingles, filling gaps and shingle step-downs (up to 1/8" in height).

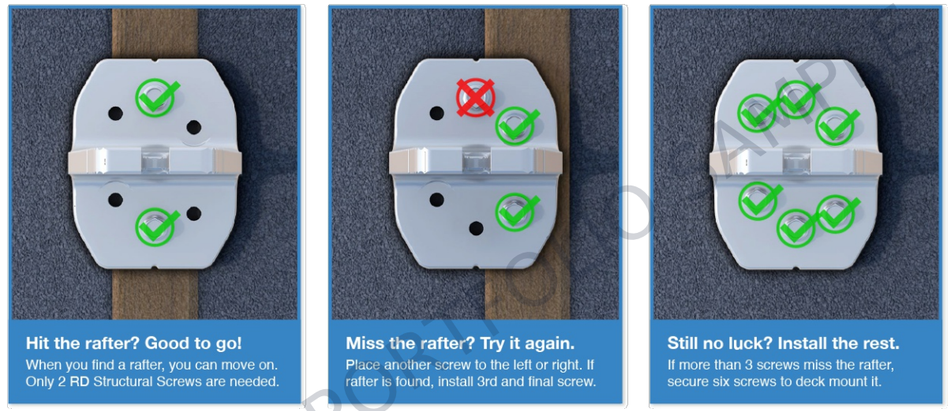
Intertek
Triple Rated & Certified to Respect the Roof™
UL 2703, 441 (27)
TAS 100(A)-95

Rafter & Deck Mounting Options
Mount HUG to the roof rafters, the roof deck, or both with our custom-engineered RD (rafter-or-deck) Structural Screw. The RD Structural Screw anchors HUG to the roof with an EPDM sealing washer, completing the stack of waterproofing barriers. See backside for more installation information.

GEMINI SOLAR DESIGN — PUBLIC SAMPLE

Tech Brief

Adaptive, Rafter-Friendly Installation



Hit the rafter? Good to go!
When you find a rafter, you can move on. Only 2 RD Structural Screws are needed.

Miss the rafter? Try it again.
Place another screw to the left or right. If rafter is found, install 3rd and final screw.

Still no luck? Install the rest.
If more than 3 screws miss the rafter, secure six screws to deck mount it.

Trusted Strength & Less Hassle

25-Year Warranty
Product guaranteed free of impairing defects.

Structural capacities of HUG™ were reviewed in many load directions, with racking rail running cross-slope or up-slope in relation to roof pitch.

For further details, see the HUG certification letters for attaching to rafters and decking.

IronRidge designed the HUG, in combination with the RD Structural Screw to streamline installs, which means the following:

- No prying shingles
- No roof nail interference
- No pilot holes necessary
- No sealant (in most cases)
- No butyl shims needed

Attachment Loading
The rafter-mounted HUG has been tested and rated to support 1004 (lbs) of uplift and 368 (lbs) of lateral load.

Structural Design
Parts are designed and certified for compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings
HUG passed both the UL 441 Section 27 "Rain Test" and TAS 100(A)-95 "Wind Driven Rain Test" by Intertek.

UL 2703 System
Systems conform to UL 2703 mechanical and bonding requirements. See Flush Mount Manual for more info.

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1 PV-6A IRON RIDGE QUICKMOUNT HUG DATASHEET
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

MOUNTING DETAIL

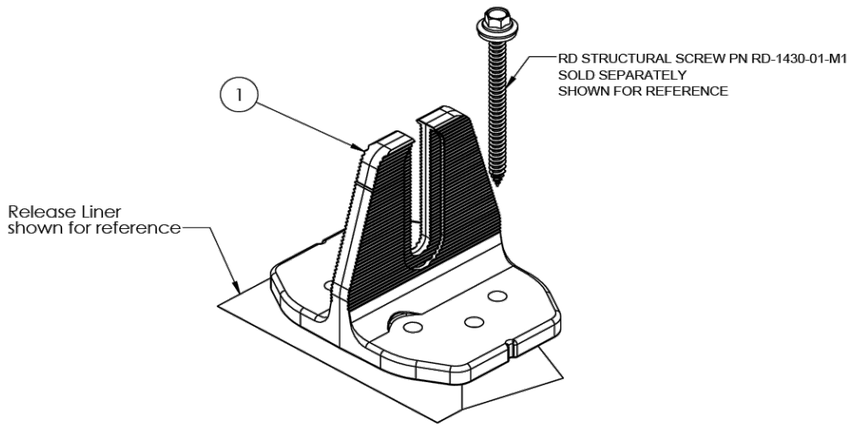
PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-6A

Cut Sheet

IRONRIDGE

QuickMount® Halo UltraGrip



ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

PART NUMBER	DESCRIPTION
QM-HUG-01-M1	Halo UltraGrip - Mill
QM-HUG-01-B1	Halo UltraGrip - Black

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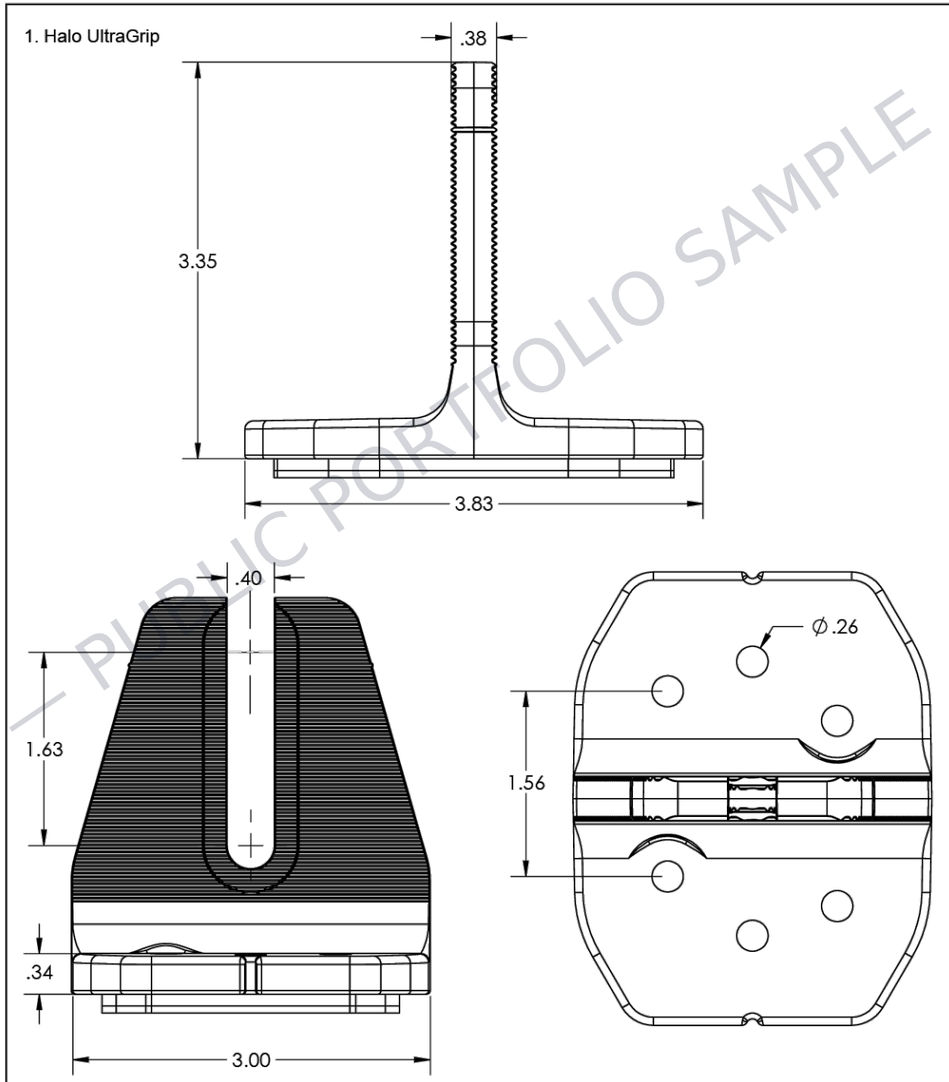
Cut Sheet

1. Halo UltraGrip



Property	Value
Material	300 Series Aluminium
Finish	Mill or Black

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GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

1 PV-6B IRON RIDGE QUICKMOUNT HUG CUTSHEET
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

MOUNTING DETAIL

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-6B

Datasheet

IRONRIDGE

Flush Mount System

Built for solar's toughest roofs.

IronRidge builds the strongest mounting system for pitched roofs in solar. Every component has been tested to the limit and proven in extreme environments.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 20-year warranty.

Strength Tested
All components evaluated for superior structural performance.

PE Certified
Pre-stamped engineering letters available in most states.

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

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

UL 2703 Listed System
Entire system and components meet newest effective UL 2703 standard.

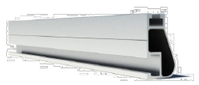
25-Year Warranty
Products guaranteed to be free of impairing defects.

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

Datasheet

XR Rails

XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear and black finish

XR100 Rail

The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

XR1000 Rail

A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

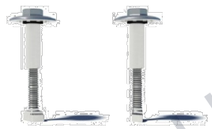
Bonded Splices

All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

Clamps & Grounding

UFOs



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

Stopper Sleeves

Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

CAMO

Bond modules to rails while staying completely hidden.

- Universal end-cam clamp
- Tool-less installation
- Fully assembled

Grounding Lugs

Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

Attachments

FlashFoot2

Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

Conduit Mount

Flash and mount conduit, strut, or junction boxes.

- Twist-on Cap eases install
- Wind-driven rain tested
- Secures ¾" or 1" conduit

Slotted L-Feet

Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

Bonding Hardware

Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

Resources

Design Assistant
Go from rough layout to fully engineered system. For free.
Go to IronRidge.com/design

NABCEP Certified Training
Earn free continuing education credits, while learning more about our systems.
Go to IronRidge.com/training

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1 PV-7 FLUSH MOUNT RACKING DATASHEET
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

RACKING DATASHEET

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-7

SILFAB COMMERCIAL NTC

SIL-520 QM

SILFAB SOLAR®

INTRODUCING NEXT-GENERATION N-TYPE CELL TECHNOLOGY

- Exclusively Manufactured in the USA
- Increased Performance in High Temperatures
- Enhanced Durability
- Lower Temperature Coefficient
- Reduced Degradation Rate
- Industry-Leading Warranty

SILFABSOLAR.COM

ELECTRICAL SPECIFICATIONS		520 QM	
Test Conditions		STC	NOTC
Module Power (Pmax)	Wp	520	384
Maximum power voltage (Vpmax)	V	40.48	37.24
Maximum power current (Ipmax)	A	12.85	10.31
Open circuit voltage (Voc)	V	47.52	43.71
Short circuit current (Isc)	A	13.65	10.96
Module efficiency	%	21.9%	20.2%
Maximum system voltage (VDC)	V	1500	
Series fuse rating	A	25	
Power Tolerance	Wp	0 to +10	

Measurement conditions: STC 1000 W/m² • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0 to +10W.

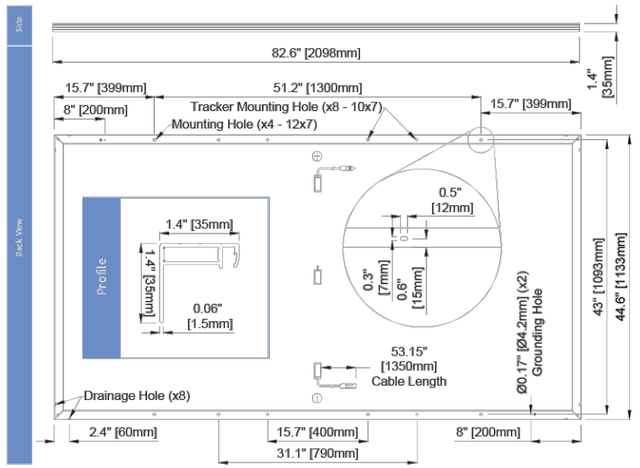
MECHANICAL PROPERTIES / COMPONENTS	METRIC	IMPERIAL
Module weight	26.2kg ± 0.2kg	57.8lbs ± 0.4lbs
Dimensions (H x L x D)	2098 mm x 1133 mm x 35 mm	82.6 in x 44.6 in x 1.37 in
Maximum surface load (wind/snow)*	2400 Pa rear load / 5400 Pa front load	50.1 lb/ft² rear load / 112.8 lb/ft² front load
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	132 Half cells - N-Type Silicon solar cell 182 mm x 91 mm	132 Half cells - N-Type Silicon solar cell 3.58 x 7.16 in
Glass	3.2 mm high transmittance, tempered, DSM antireflective coating	0.126 in high transmittance, tempered, DSM antireflective coating
Cables and connectors (refer to installation manual)	1350 mm, ø 5.7 mm, EVO2 from Staubli	53.15 in, ø 0.22 in (12AWG), EVO2 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, fluorine-free PV white backsheet	
Frame	Anodized Aluminum (Silver)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP68 rated, three diodes	

TEMPERATURE RATINGS	
Temperature Coefficient Isc	+0.04 %/°C
Temperature Coefficient Voc	-0.24 %/°C
Temperature Coefficient Pmax	-0.29 %/°C
NOCT (± 2°C)	45 °C
Operating temperature	-40/+85 °C

WARRANTIES	
Module product workmanship warranty	25 years**
Linear power performance guarantee	30 years
	≥ 98% end 1st yr ≥ 94.7% end 12th yr ≥ 90.8% end 25th yr ≥ 89.3% end 30th yr

CERTIFICATIONS		SHIPPING SPECS	
Product	UL 61215***, UL 61730***, CSA C22.2#61730***, IEC 61215***, IEC 61730***, IEC 61701 (Salt Mist Corrosion), IEC 62716 (Ammonia Corrosion), CEC Listing***, UL Fire Rating: Type 1	Modules Per Pallet:	29 or 29 (California)
		Pallets Per Truck	24 or 23 (California)
Factory	ISO9001:2015	Modules Per Truck	696 or 667 (California)

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.
** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads
*** Certification and CEC listing in progress.



SILFAB SOLAR INC.

1770 Port Drive
Burlington WA 98233 USA
T +1 360.569.4733
info@silfabsolar.com
SILFABSOLAR.COM

7149 Logistics Lane
Fort Mill SC 29715 USA
T +1 839.400.4338

240 Courtneypark Drive East
Mississauga ON L5T 2S5 Canada
T +1 905.255.2501
F +1 905.696.0267

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GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

1 PV-8 PV MODULE DATASHEET
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

(INFO WITHHELD)
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LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

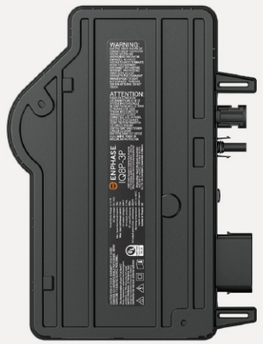
MODULE DATASHEET

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-8

ENPHASE

NORTH AMERICA | DATA SHEET



IQ8P-3P Microinverter

The high-powered, smart grid-ready Enphase IQ8P-3P Microinverter is specifically designed for 208Y VAC* three-phase interconnection for small commercial solutions.

Each microinverter integrates with the IQ Gateway Commercial 2 and the Enphase App monitoring and analysis software.

With simplified design, improved energy harvesting, and advanced monitoring, microinverters offer true peace of mind during operation and maintenance.

Easy to install

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

High productivity and reliability

- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Smart grid-ready

- 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 (UL 1741-SB) requirements

Enphase 25 year limited warranty

The IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.**

* For more information refer to "Connecting IQ8 Commercial Microinverters to other voltages."
** 25-years warranty is valid, provided an internet-connected IQ Gateway is installed.

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IQ8P-3P Microinverter

INPUT DATA (DC)	UNITS	IQ8P-3P-72-E-US/IQ8P-3P-72-E-DOM-US[1]
Commonly used modules for pairing[2]	W	380–640
Module compatibility[2]	–	54-cell/108-half-cell, 60-cell/120-half-cell, 66-cell/132-half-cell and 72-cell/144-half-cell
Maximum input DC voltage	V	63
Peak power tracking voltage	V	35.5–53
Operating range	V	16–63
Min./Max. start voltage	V	21/63
Max. DC continuous current (module I_{mp})	A	14
Max. input DC short-circuit current	A	25
Max. DC short-circuit current (module I_{sc})	A	20
Overvoltage class DC ports	–	II
DC port backfeed current	A	0
PV array configuration	–	1 × 1 ungrounded array; no additional DC side protection required; AC side protection requires max. 20 A per branch circuit

OUTPUT DATA (AC)		IQ8P-3P-72-E-US/IQ8P-3P-72-E-DOM-US[1]	
Peak output power	VA	480	
Maximum continuous output power	VA	475	
Nominal (L-L) voltage/range[3]	V	208/183–229	220/198–242
Maximum continuous output current	A	2.28	2.16
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short circuit fault current over three cycles	Arms	2.29	
Maximum microinverters per 20 A three-phase branch circuit[4]	–	12	
Overvoltage class AC port	–	III	
Power factor setting	–	1.0	
Power factor (adjustable)	–	0.85 leading ... 0.85 lagging	

EFFICIENCY		IQ8P-3P-72-E-US/IQ8P-3P-72-E-DOM-US[1]
Peak efficiency	%	97.8
CEC weighted efficiency	%	97.5

MECHANICAL DATA	IQ8P-3P-72-E-US/IQ8P-3P-72-E-DOM-US[1]
Ambient temperature range	–40°C to 65°C (–40°F to 149°F)
Relative humidity range	4% to 100% (condensing)
DC connector type[5]	Enphase EN4 bulkhead; ECA-EN4-S22-12 : EN4 (TE PV4-S SOLARLOK) 150 mm/5.9" to Stäubli MC4 adapter cable pair (default supply)[6]
Dimensions (H × W × D)	265 mm × 200 mm × 35 mm (10.4" × 7.9" × 1.4") without bracket
Weight	1.6 kg (3.5 lb)
Cooling	Natural convection
Approved for wet locations	Yes
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure
Environmental category/UV exposure rating	Outdoor—NEMA Type 6/IP67

GEMINI SOLAR DESIGN - PUBLIC PORTFOLIO SAMPLE

IQ8P-3P-DSH-00450-2.0-EN-US-2025-01-24

1 PV-9 MICROINVERTER DATASHEET
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

INVERTER DATASHEET

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-9

Intertek

8431 Murphy Drive
Middleton, WI 53562 USA

Telephone: 608.836.4400
Facsimile: 608.831.9279
www.intertek.com

Test Verification of Conformity

In the basis of the tests undertaken, the sample(s) of the below product have been found to comply with the requirements of the referenced specifications at the time the tests were carried out.

Applicant Name & Address:	IronRidge, Inc. 1495 Zephyr Ave. Hayward, CA 94544 USA
Product Description:	Flush Mount System with XR Rails.
Ratings & Principle Characteristics:	Fire Class Resistance Rating: -Flush Mount (Symmetrical). Class A Fire Rated for Low Slope applications when using Type 1, 2 and 3, listed photovoltaic modules. Class A Fire Rated for Steep Slope applications with Type1, 2 and 3, listed photovoltaic modules. Tested with a 5" gap (distance between the bottom the module frame and the roof covering), per the standard this system can be installed at any gap allowed by the manufacturers installation instructions. No perimeter guarding is required. This rating is applicable with any IronRidge or 3'rd party roof anchor.
Models:	IronRidge Flush Mount with XR Rails
Brand Name:	IronRidge Flush Mount
Relevant Standards:	UL 2703 (Section 15.2 and 15.3) Standard for Safety Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels, First Edition dated Jan. 28, 2015 **Referencing** UL1703 Third Edition dated Nov. 18, 2014, (Section 31.2) Standard for Safety for Flat-Plate Photovoltaic Modules and Panels.
Verification Issuing Office:	Intertek Testing Services NA, Inc. 8431 Murphy Drive Middleton, WI 53562
Date of Tests:	08/27/2014 to 03/17/2015
Test Report Number(s):	101769343MID-001r1, 101769343MID-001a, 101915978MID-001 & 101999492MID-001ar1-cr1.

This verification is part of the full test report(s) and should be read in conjunction with them. This report does not automatically imply product certification.

Completed by:	Chris Zimbrich	**Reviewed by:**	Chad Naggs
Title:	Technician II, Fire Resistance	**Title:**	Technician I, Fire Resistance
Signature:		**Signature:**	
Date:	05/25/2016	**Date:**	05/25/2016

This Verification is for the exclusive use of Intertek's client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Verification. Only the Client is authorized to permit copying or distribution of this Verification. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test/inspection results referenced in this Verification are relevant only to the sample tested/inspected. This Verification by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Tech Brief

IRONRIDGE

Class A Fire Rating

Background

All roofing products are tested and classified for their ability to resist fire.

Recently, these fire resistance standards were expanded to include solar equipment as part of the roof system. Specifically, this requires the modules, mounting hardware and roof covering to be tested together as a system to ensure they achieve the same fire rating as the original roof covering.

These new requirements are being adopted throughout the country in 2016.

IronRidge Certification

IronRidge was the first company to receive a Class A Fire Rating—the highest possible rating—from Intertek Group plc., a Nationally Recognized Testing Laboratory.

IronRidge Flush Mount and Tilt Mount Systems were tested on sloped and flat roofs in accordance with the new UL 1703 & UL 2703 test standards. The testing evaluated the system's ability to resist flame spread, burning material and structural damage to the roof.

Refer to the table below to determine the requirements for achieving a Class A Fire Rating on your next project.

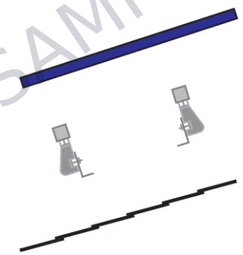
Fire Testing Process

Test Setup

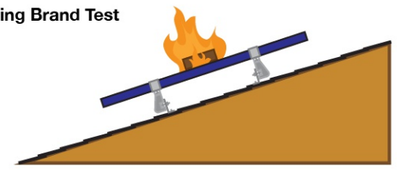
Solar Modules
Solar modules are given a Type classification based on their materials and construction.

Mounting System
Mounting is tested as part of a system that includes type-tested modules and fire-rated roof covering.

Roof Covering
Roof covering products are given a Fire Class Rating of A, B or C based on their tested fire resistance.

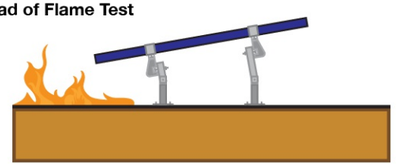


Burning Brand Test



A burning wooden block is placed on module as a fan blows at 12 mph. Flame cannot be seen on underside of roof within 90 minutes.

Spread of Flame Test



Flame at southern edge of roof is aimed up the roof as a fan blows at 12 mph. The flame cannot spread 6 feet or more in 10 minutes.

System	Roof Slope	Module	Fire Rating*
Flush Mount	Any Slope	Type 1, 2, & 3	Class A
Tilt Mount	≤ 6 Degrees	Type 1, 2, & 3	Class A

*Class A rated PV systems can be installed on Class A, B, and C roofs.

1 PV-10 CLASS A FIRE RATING DATASHEET
SCALE: NTS

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

(LOGO WITHHELD FOR SAMPLE)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

CLASS A FIRE RATING

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-10

28357 Industrial Blvd.
Hayward, CA 94545
1-800-227-9523
IronRidge.com

Attn: Corey Geiger, COO, IronRidge Inc.
Date: September 7th, 2021

Re: Structural Certification and Span Tables for the IronRidge Flush Mount System

This letter addresses the structural performance and code compliance of IronRidge's Flush Mount System. The contents of the letter shall be read in its entirety before applying to any project design. The Flush Mount System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum XR Rails and secured to the rails with IronRidge mounting clamps. The XR Rails are side mounted to a selected roof attachment with 3/8" stainless steel bonding hardware and then attached directly to the roof structure or to a stanchion that is fastened to the underlying roof structure. Assembly details of a typical Flush Mount installation and its core components are shown in Exhibit EX-0015.

The IronRidge Flush Mount System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- ASCE/SEI 7-16 Minimum Design Loads for Buildings and Other Structures (ASCE 7-16)
- 2018 International Building Code (IBC-2018)
- 2018 Washington State Building Code
- 2015 Aluminum Design Manual (ADM-2015)
- Report SEAOC (Structural Engineer Association of California) PV2-2017 Wind Design for Solar Arrays

The tables included in this letter provide the maximum allowable spans of XR Rails in the Flush Mount System for the respective loads and configurations listed, covering wind exposure categories B, C, & D, roof zones provided in ASCE 7-16 for gable & hip roof profiles, and roof slopes of 8° to 45°. The tabulated spans are applicable when the following conditions are met:

1. *Span* is the distance between two adjacent roof attachment points (measured at the center of the attachment fastener).
2. Each module shall be supported by 2 rails (2 rail system) or 3 rails (3 rail system). Spans are calculated based on 2 rail systems, and conservatively deemed acceptable for 3 rail systems.
3. The underlying roof slope, measured between the roof surface and horizontal plane, is 8º to 45º.
4. The *mean roof height*, defined as the average of the roof eave height and the roof ridge height measured from grade, does not exceed 30 feet.
5. A clearance from the underside of the array to the roof surface of 2" minimum shall be provided and the height of the array, the distance from the module top surface to the roof surface (defined as h_2), shall not exceed 10".
6. Module length and area shall not exceed the maximum values listed on the respective span tables.
7. All Flush Mount components shall be installed in a professional workmanlike manner per IronRidge's *Flush Mount Installation Manual* and other applicable standards for the general roof construction practice.

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28357 Industrial Blvd.
Hayward, CA 94545
1-800-227-9523
IronRidge.com

The span tables provided in this letter are certified based on the structural performance of IronRidge XR Rails only with no consideration of the structural adequacy of the chosen roof attachments, PV modules, or the underlying roof supporting members. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the aforementioned system components in regards to the applied or resultant loads of any chosen array configuration.

Sincerely,

2021.09.07
15:55:03
-07'00'

Gang Xuan, PE
Senior Structural Engineer

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

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1 PV-11 STATE OF WASHINGTON ENGINEERING LETTER (RACKING)
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

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PHONE: (INFO WITHHELD)
LICENSE NO. (INFO WITHHELD)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ENGINEERING LETTER

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-11

Tech Brief

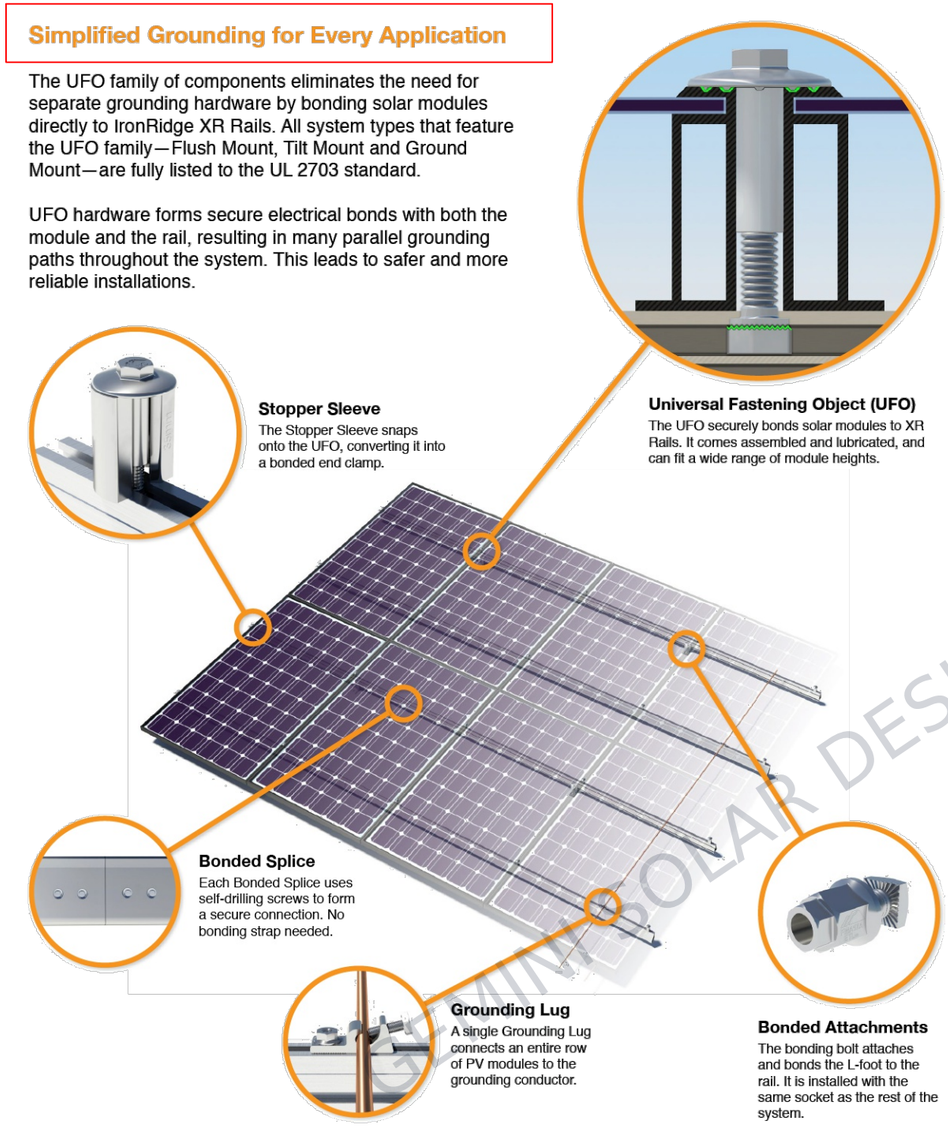
IRONRIDGE

UFO Family of Components

Simplified Grounding for Every Application

The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



Stopper Sleeve
The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.

Universal Fastening Object (UFO)
The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.

Bonded Splice
Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.

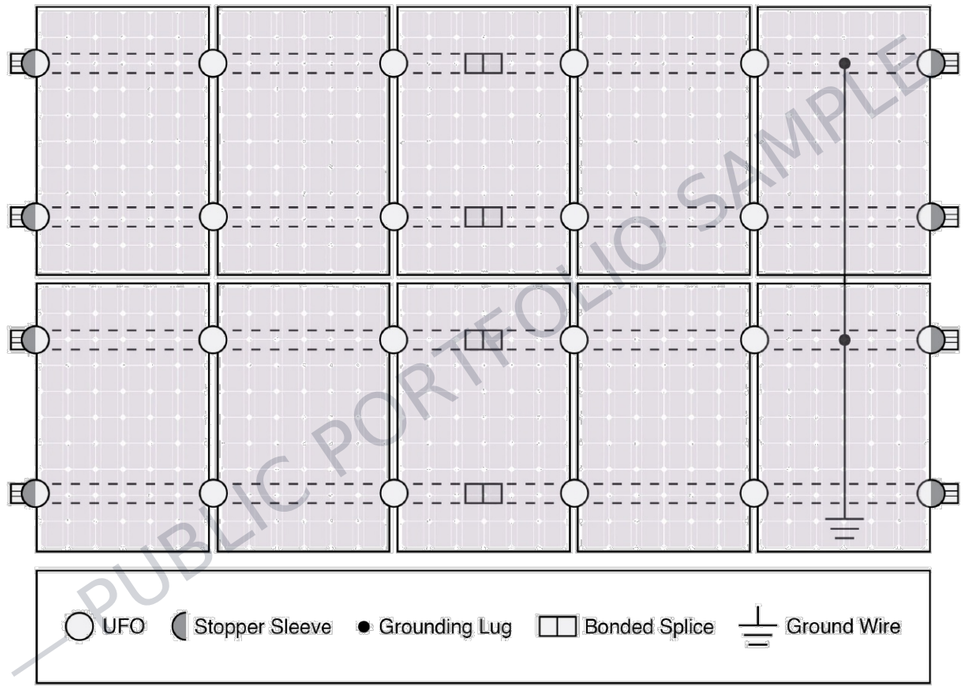
Grounding Lug
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.

Bonded Attachments
The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

GET MIN SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

Tech Brief

System Diagram



Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

Go to IronRidge.com/UFO

Cross-System Compatibility			
Feature	**Flush Mount**	**Tilt Mount**	**Ground Mount**
XR Rails	✔	✔	XR1000 Only
UFO/Stopper	✔	✔	✔
Bonded Splice	✔	✔	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		

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1 PV-12 GROUNDING DETAILS (IRON RIDGE RACKING)
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

GROUNDING DETAILS

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-12

Rapid shutdown is built-in

The 2014 and 2017 editions of the National Electrical Code (NEC 2014/NEC 2017) added new rapid shutdown requirements for PV systems installed on buildings. Enphase Microinverters fully meet rapid shutdown requirements in the new code without the need to install any additional electrical equipment.

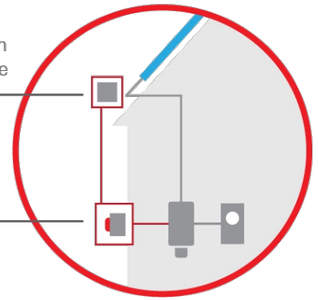
What's new in Section 690.12?
NEC 2014/2017, Section 690.12 applies to PV conductors over 10 feet from the PV array and requires that the conductors power down to 30 volts and 240 volt-amperes within 10 seconds of rapid shutdown initiation.

String inverters require work arounds for rapid shutdown

Work around.
Specialized Rapid Shutdown electrical box installed on the roof within 10 feet of array.

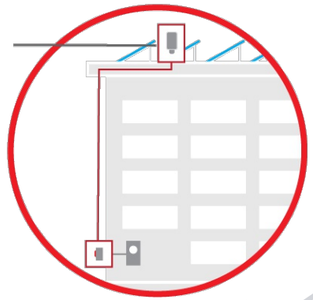
Work around.
Shutoff switch that is easily accessible to first responders on the ground.

Work around.
Extra conduit in installation.



Residential String Inverter

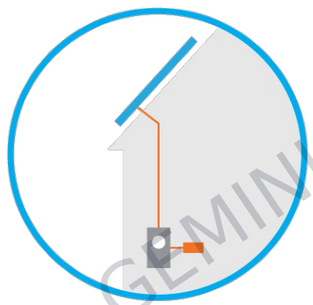
Work around.
String inverter installed on roof, a hostile environment that string inverters are not built to live in.



Commercial String Inverter

Enphase comes standard with rapid shutdown capability

All Enphase microinverters, even those that were previously installed, inherently meet rapid shutdown requirements, no additional equipment or workarounds needed



Residential Microinverter

Enphase microinverters can safely shut down automatically, leaving only low-voltage DC electricity isolated to the PV module

Commercial Microinverter

To learn more, visit **enphase.com**

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GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

1 PV-13 RAPID SHUTDOWN DATASHEET
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

RAPID SHUTDOWN

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-13

ENPHASE

DATA SHEET

IQ Gateway Commercial 2

The IQ Gateway Commercial 2 delivers solar production and energy consumption data to Enphase App, the monitoring and analysis software for comprehensive, remote maintenance and management of IQ8 Commercial Microinverter based PV systems.

With integrated revenue-grade production metering and optional consumption monitoring, the IQ Gateway Commercial 2 is the platform for total energy management and integrates with the IQ8 Commercial Microinverters.

IQ8 Commercial Series Microinverters
Extra high-powered, smart grid-ready microinverters designed to match larger format commercial PV modules.

Smart

- Enables web-based monitoring and control
- Supports bidirectional communications for remote upgrades
- Supports power export limiting and zero-export applications

Simple

- Easy system configuration using Enphase Installer App
- Flexible networking with Wi-Fi and Ethernet

Reliable

- Designed for installation indoors or outdoors in an enclosure
- 5-year warranty

Enphase 5 year limited warranty

UL LISTED

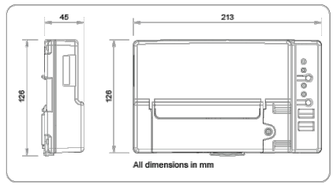
IQ Gateway Commercial 2-DSH-00212-2.0-EN-US-2023-10-31

IQ Gateway Commercial 2

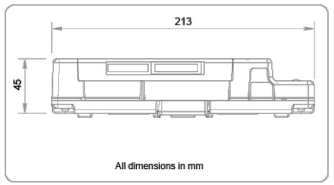
MODEL NUMBERS	UNITS	ENV2-IQC2-AM3-3P
IQ Gateway Commercial 2 ENV2-IQC2-AM3-3P	–	Three-phase communications gateway with integrated, revenue-grade PV production metering (±0.5%) and optional consumption monitoring (±2.5%). Includes three 400 A continuous rated Production CTs. This IQ Gateway Commercial 2 works only with the IQ8 Commercial Microinverters.
ACCESSORIES (ORDER SEPARATELY)		
Enphase Mobile Connect CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	–	Plug-and-play industrial-grade cellular modem with a five-year data plan (expandable to 12 years). Available in the United States, Canada, Mexico, Puerto Rico, and the U.S. Virgin Islands, where there is adequate cellular service in the installation area.
Consumption monitoring CT-600-SPLIT (order three or six, as needed)	–	Split-core current transformers enable consumption metering
CAPACITY		
Number of microinverters polled	–	Up to 276
MECHANICAL AND ELECTRICAL DATA		
Power requirements	–	208 Y/120 VAC three-phase Max 20 A overcurrent protection is required
Typical power consumption	W	5
Rated frequency	Hz	60
Dimensions (W × H × D)	cm	21.3 × 12.6 × 4.5 (8.4" × 5" × 1.8")
Weight	oz	17.6 (498 g)
Ambient temperature range	°C	-40°C to 65°C (-40°F to 149°F) -40°C to 46°C (-40°F to 115°F) if installed in an enclosure
Environmental rating	–	IP30. For installation indoors or in an NRTL-certified, NEMA-type 3R enclosure.
Altitude	m	Up to 2,000 (6,560 ft)
Production CTs	–	– Capable of measuring 400 A of continuous current with 0.5% accuracy – Accuracy of ±0.5% for revenue grade production metering (ANSI C12.20 certified) – The internal aperture measures 43 mm and can support cables up to a maximum size of 1,000 KCMIL conductors – UL2808 certified
Consumption CTs	–	– For electrical services up to 600 A, with parallel runs up to 1200 A – Aperture of 50 mm × 50 mm and can support cables up to a maximum size of 300 KCMIL conductors – Service entrance rated with UL2808 certification – Rated for pollution degree 3 – Accuracy of ±2.5% for consumption monitoring – CT wire insulation rating of 600 V
COMMUNICATION INTERFACES		
Integrated Wi-Fi	–	802.11b/g/n (2.4 GHz, 5 GHz), for connecting the Enphase Cloud via the internet
Wi-Fi range (recommended)	ft	32.8
Ethernet	–	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included) for connecting to the Enphase Cloud via the internet
Mobile Connect	–	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (to be purchased separately)
Digital I/O	–	Digital input/output for grid operator control
USB 2.0	–	For Mobile Connect
Access point (AP) mode	–	For a connection between the IQ Gateway and a mobile device running the Enphase Installer App
Metering ports	–	Up to two Consumption CTs and one Production CT
Power line communication (PLC)	kHz	90–110 (Class B) to microinverters
Web API	–	Refer to https://developer-v4.enphase.com
Local API	–	Refer to guide for local API
LED indicators	–	From top to bottom: Cloud connectivity, Wi-Fi access point mode, PV production state, PLC communications state
Configured via	–	Enphase Installer App and Enphase Installer Platform

IQ Gateway Commercial 2-DSH-00212-2.0-EN-US-2023-10-31

POWER PRODUCTION/EXPORT LIMITING VIA THE IQ GATEWAY'S DIGITAL IO	UNITS	ENV2-IQC2-AM3-3P
Maximum relays read	–	4
Capabilities supported	–	Power production limiting (Production CTs required), power export limiting (Production CTs required and Consumption CTs – "Load with Solar" configuration)
Minimum IQ Gateway version	–	v7.3.120
Cable configurations	–	18 AWG, UL-Std.62, 600 V, 105°C, and min 0.03 inches average thickness
Signal voltage range	V	2.5–5 (digital high), 0–1.9 (digital low)
Terminal blocks	in^2	Five terminals, up to 0.002 in^2
Configuration via	–	Enphase Installer App, Enphase Installer Platform (site settings)
SCOPE OF DELIVERY		
Package dimensions (H × W × D)	in	6.3" ×10.8" × 3.9"
Package weight	lb	2.2
Aluminium DIN rail	cm	12.4 (4.9 in)
Current Transformers (CTs)	–	Three CT-400-SOLID included
COMPLIANCE		
Compliance	–	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR Part 15 Class B ICES 003 IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 ANSI C12.20 IEEE 1547:2018 - UL 1741-SB, 3rd Ed.
COMPATABILITY		
Microinverter	–	IQ8H-3P and IQ8P-3P Series Microinverters



All dimensions in mm



All dimensions in mm

IQ Gateway Commercial 2-DSH-00212-2.0-EN-US-2023-10-31

GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

1 PV-14 ENPHASE IQ GATEWAY COMMERCIAL 2 DATASHEET
SCALE: NTS

(LOGO WITHHELD FOR SAMPLE)

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NEW GRID-TIED SYSTEM 143.52kW

(INFO WITHHELD FOR PUBLIC SAMPLE)

ENPHASE IQ GATEWAY

PROJECT NO: GSD-20240618-188451
DRAWN BY: SCM
DATE: 6/18/2024

PV-14

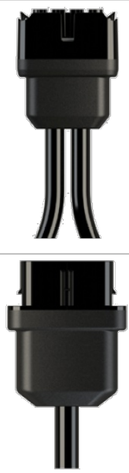
Data Sheet
Enphase QD Cable Accessories
REGION: Americas

PRELIMINARY

Enphase QD Cable Accessories

The **Enphase QD™ Cable** and accessories are integral parts of the IQ 8D-based small commercial PV system for grid-tied, three-phase, 208V PV applications.

The QD Cable works with the Enphase IQ 8D™ Microinverter (one micro for two series-connected PV modules) and provides self phase balancing and neutral sensing for phase loss protection.



Reliable

- Neutral sensing for phase loss protection
- Locking type connectors
- Rated for outdoor, wet environments, sunlight resistance, and oil resistance

Easy

- Self phase balancing
- Lightweight and simple for fast installation
- Modularly expandable
- Reduction in balance-of-system costs and installation time
- Reach customer support within one minute[1]

Field-Wireable Connectors

- Easily connect QD cables on the roof without complex wiring
- Available in male and female connector types
- UL listed (pending)

1. Average wait time for North America technical support was 0.8 minutes in Q1 2020.

To learn more about Enphase offerings, visit **enphase.com**

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Enphase QD Cable and Accessories

CONDUCTOR SPECIFICATIONS	
Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable
Flame test rating	FT4
Compliance	RoHS, OIL RES I, CE, UV resistant, combined UL for the United States
Conductor type	THHN/THWN-2 dry/wet
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.

QD CABLE TYPES / ORDERING OPTIONS

Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
QD-12-10-150	12 AWG / 277 VAC	1.4 m (4.5 ft)	Portrait	150
QD-12-20-135	12 AWG / 277 VAC	2.4 m (7.8 ft)	Landscape	135
QD-12-42-63	12 AWG / 277 VAC	4.6 m (15.1 ft)	Landscape ballast, east-west mount structure	63

ENPHASE QD CABLE ACCESSORIES

Name	Model Number	Description
Raw QD Cable	QD-12-RAW-300	300 meters of 12 AWG cable with no connectors
Field wireable connector (male)	QD-CONN-10M	Male field wireable AC connector for raw QD cable
Field wireable connector (female)	QD-CONN-10F	Female field wireable AC connector for raw QD cable
Disconnect tool	QD-DISC-10	Disconnect tool for QD Cable connectors, DC connectors, and AC module mount
QD Cable sealing caps (female)	QD-SEAL-10	One needed to cover each unused connector on the cabling
Cable clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling
Terminator	QD-TERM-10	Terminator for unused cable ends
Center tap adapter cable	QD-LINKFW-10	Link adapter cable for center tapping of QD cable when using QD-12-42-63

FIELD WIREABLE CONNECTOR (M)
Male field wireable AC connector, sold in packs of ten (QD-CONN-10M)

FIELD WIREABLE CONNECTOR (F)
Female field wireable AC connector, sold in packs of ten (QD-CONN-10F)

TERMINATOR
Terminator cap for unused cable ends, sold in packs of ten Center feed requires two per branch. (QD-TERM-10)

SEALING CAPS
Female sealing caps for unused cable connections, sold in packs of ten (QD-SEAL-10)

DISCONNECT TOOL
Plan to use at least one per installation, sold in packs of ten (QD-DISC-10)

CABLE CLIP
Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)

To learn more about Enphase offerings, visit **enphase.com**

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2021-04-01

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GEMINI SOLAR DESIGN — PUBLIC PORTFOLIO SAMPLE

1 PV-15 ENPHASE QD CABLE & ACCESSORIES DATASHEET
SCALE: NTS

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ENPHASE QD CABLE

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PV-15