PV NOTES & SPECS

PHOTOVOLTAIC CONSTRUCTION NOTES:
1. ALL PV MODULES AND ASSOCIATED EQUIPMENT SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE.
2. LIVE PARTS OF PV SOURCE CIRCUITS AND PV OUTPUT CIRCUITS OVER 150V TO GROUND SHALL NOT BE ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS WHILE ENERGIZED.
3. THE ROOF MOUNTED PV MODULES SHALL HAVE THE SAME OR BETTER LISTED FIRE RESISTANCE RATING THAN THAT OF THE BUILDING ROOF COVERING MATERIAL.
4. NO PIPING, DUCTS, OR EQUIPMENT FOREIGN TO THE ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE LOCATED WITHIN THE DEDICATED SPACE ABOVE THE ELECTRICAL EQUIPMENT.
5. ALL CONNECTORS AND COUPLERS ARE SET SCREW TYPE UNLESS OTHERWISE NOTED WHEN RUN INSIDE A BUILDING. ALL EXTERIOR CONNECTORS AND COUPLERS SHALL BE RAIN TIGHT.

GROUNDING:
1. ALL SERVICES SUPPLYING THE BUILDING SHALL HAVE THE SAME GROUNDING ELECTRODE SYSTEM.
2. REMOVAL OF A GRID INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTIONS BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PHOTOVOLTAIC SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTOR.
3. GROUND BOND CONDUCTOR SHALL NOT BE SPLICED.
4. USE EQUAL OR APPROVED "LAY IN LUG" ILSCO, UL-467 RATED FOR GROUNDING AND BONDING. HIGH STRENGTH COPPER ALLOY WITH SS SCREW (AS NECESSARY).
5. DC EQUIPMENT GROUND SHALL BE MINIMUM #6AWG SOLID CU WIRE TO BOND MODULE FRAMES AND RACKING WHEN INTEGRATED R WEBB GROUNDING IS NOT AVAILABLE.
6. CONTRACTOR SHALL CONFIRM BUILDING AND PANEL GROUNDING (EXISTING OR NEW WHERE APPLICABLE) PRIOR TO INSTALLATION.

PV SYSTEM COMPONENTS:
1. ALL CONDUIT RUNS SHALL BE SPECIFICALLY REVIEWED IN THE FIELD WITH THE ARCHITECT FOR APPROVAL OF MOUNTING, ROUTING, AND EXPOSURE PRIOR TO INSTALLATION.
2. ALL PV SYSTEM COMPONENTS SHALL BE LISTED BY A RECOGNIZED TESTING AGENCY, i.e. UL1741, ETC.
3. INVERTER SHALL BE EQUIPPED WITH INTEGRATED GFDI, THUS PROVIDING GROUND FAULT PROTECTION.
4. ALL ENCLOSURES MOUNTED TO EXTERIOR WALLS SHALL BE MINIMUM NEMA 3R RATED.
5. ALL COMBINER BOXES SHALL BE MINIMUM NEMA 4X.
6. ALL REQUIRED CONDUCTORS SPLICES SHALL BE MADE WITH UL LISTED COMPONENTS.
7. ALL PV MODULES AND INVERTERS SHALL BE RECOGNIZED AND APPROVED BY THE CALIFORNIA ENERGY COMMISSION.
8. ALL ROOF MOUNTING CONDUIT, EXTERIOR AND INTERIOR SHALL BE EMT UNLESS NOTED OTHERWISE.

CONDUCTORS:
1. ALL CONDUCTORS SHALL BE COPPER UNLESS OTHERWISE NOTED.
2. ALL PROPOSED CONDUCTORS RATED FOR 90°C., HOWEVER RATINGS SHALL BE ASSUMED TO BE 75°C FOR ALL BUILDING FEEDERS AND THEREFORE TERMINATIONS PRIOR TO CONNECTION. INTERMEDIATE JUNCTION BOX MAY BE REQUIRED TO CHANGE FROM 90°C TO 75°C. WIRING. MATERIAL SHALL BE COPPER AND 90°C RATED, SUITABLE FOR SUN EXPOSURE AND WET LOCATIONS. FIELD APPLIED COATINGS ARE NOT ACCEPTABLE.
3. ALL WIRE INSULATION TYPE SHALL BE THWN-2 OR USE-2 ON ROOF TO COMBINER BOXES.
4. EACH SOLAR PHOTOVOLTAIC MODULE HAS A POSITIVE AND NEGATIVE USE-2/RHW-2 "SUNLIGHT RESISTANT" QUICK CONNECT PLUG IN LEAD. VERIFY COMPATIBLE EXTENSION WIRES PRIOR TO INSTALLATION.
5. ALL INTER-MODULE SERIES CONNECTIONS TO BE TIE STRAPPED (WITH BLACK UV RESISTANT TIE STRAPS) AND/OR PRE-FABRICATED OR EQUAL APPROVED WIRE ROUTING TRAY SO AS TO BEST CONCEAL AND PROTECT INTERMODULE HOMERUN WIRING. ALL WIRING TO BE CONCEALED UNDER ARRAY AND/OR IN CONDUIT.
6. ALL HOMERUN WIRE RUNS BETWEEN ROWS SHALL BE MADE IN CONDUIT WITH STRAIN RELIEF FITTING OR WIRE COMPRESSION CLAMP AND CONDUIT PUTTY TO ACT AS BARRIER TO MOISTURE.
7. ALL HOMERUN WIRE RUNS OF LENGTH GREATER THAN 20' SHALL BE MADE FROM NEMA 3R MINIMUM RATED JBOX WITH THWN-2 CONDUCTORS IN CONDUIT.

DSA IR N-4

2.0 STRUCTURAL DESIGN

2.5 STRUCTURAL EXCEPTION

2.5.1.1 INDIVIDUAL & GROUPED BESS CAPACITY DOES NOT EXCEED 600KWH. SEPARATION BETWEEN GROUPS OF BESS MODULES IS IN ACCORDANCE WITH CFC 1207.8.3 AND UL9540A TESTING RESULTS. REFER TO 5PV1.11 AND 5PV3.20 FOR BESS SPACING AND DETAILS.
2.5.1.2 GROUPED BESS IS APPROXIMATELY 30 KWH NAMEPLATE PER CABINET WITH A SYSTEM TOTAL OF 60KWH NAMEPLATE.
2.5.1.3 BESS IS HOUSED IN A PAD-MOUNTED ESS CABINET THAT IS NOT A WALK-IN UNIT.
2.5.2 THE BESS MEETS THE FOLLOWING REQUIREMENTS.
2.5.2.1 STRUCTURAL CALCULATIONS FOR FOUNDATION AND ANCHORAGE OF THE BESS CABINET HAVE BEEN PROVIDED BY STRUCTURAL ENGINEER.
2.5.2.2 THE STRUCTURAL DESIGN OF THE FOUNDATION AND ANCHORAGE SHALL USE A COMPONENT IMPORTANCE FACTOR OF IP = 1.5 PER SECTION 2.2.1 ABOVE, AND THE SEISMIC ANCHORAGE SHALL UTILIZE SEISMIC COEFFICIENTS PER SECTION 2.3.1.1.
2.5.2.3 BATTERY CABINETS ARE 67.5" TALL WITH AN ASSUMED MAXIMUM HORIZONTAL DISPLACEMENT OF 2.5% OF THE HEIGHT, EQUALING 1.7 INCHES. A MINIMUM OF 36 INCHES BETWEEN CABINETS HAS BEEN PROVIDED.

3.0 FIRE AND LIFE SAFETY

3.1 GENERAL

3.1.2 BESS CHEMISTRY: LITHIUM IRON PHOSPHATE
3.1.3 OUTDOOR INSTALLATION NEAR EXPOSURE IN ACCORDANCE WITH CFC 1207.8. BESS IS IN COMPLIANCE WITH CFC 1207.5.1 AND UL9540A TESTING RESULTS, AND QUALIFIES FOR REDUCES CLEARANCES WHERE APPLICABLE. BESS SYSTEM REQUIRES AND PROVIDES:
3' FROM EXTERIOR WALL OF BUILDING,
5' FROM BUILDING DOORS, WINDOWS, AND AIR INTAKES,
10' FROM EGRESS PATHWAYS.
3.1.4 MAXIMUM QUANTITIES PER CFC 1207.5 ARE NOT EXCEEDED.
3.1.5 ALL APPLICABLE LISTINGS AND TESTING RESULTS HAVE BEEN INCLUDED AS PART OF THE SET/SUPPORTING DOCS.
3.1.6 UL9540 LISTING, UL1741 LISTING, UL1973 LISTING, AND UL9540A TEST RESULTS PROVIDED AS SUPPORTING DOCUMENTS
3.1.7 BATTERY MODULES PER CABINET: 6
BATTERY MODULE NAMEPLATE CAPACITY: 5.0 KWH
BATTERY MODULE USABLE CAPACITY: 4.5 KWH
BATTERY CABINET TOTAL CAPACITY: 27.0 KWH
BATTERY CABINET SEPARATION: MINIMUM 3' SIDE CLEARANCE FROM OTHER CABINETS
3.1.8 UL9540A TESTING RESULTS AND ANALYSIS PROVIDED AS PART OF SUPPORTING DOCUMENTS.
3.1.9 REFER TO UL9540A TESTING RESULTS.
3.1.10 ALL RELEVANT MANUFACTURER DATASHEETS HAVE BEEN PROVIDED ON SHEET 5PV4.02.
3.1.11 BATTERY MODULES AND BATTERY CABINET ARE UL9540 LISTED WHEN INSTALLED TOGETHER AND ARE NOT REQUIRED TO BE INSTALLED WITH THE INVERTER TO MEET UL9540 COMPLIANCE. REFER TO PROVIDED UL9540 CERTIFICATION.
3.1.12 REFER TO MANUFACTURER PROVIDED INSTALLATION MANUAL FOR COMMISSIONING/DECOMMISSIONING PROCEDURE. REFER TO SHEET 44 OF THE "ESP-5K HL ESS MANUAL" IN THE SUPPORTING DOCUMENTS.

3.2 LOCATION ON SITE

3.2.1 REFER TO 5PV1.10 AND 5PV1.11 FOR SITE PLAN AND BESS SYSTEM LOCATION.
3.2.2 REFER TO 5PV1.11 FOR EGRESS SEPARATION DETAILS. UL9540A TESTING RESULTS INCLUDED IN SUPPORTING DOCUMENTS INDICATE 3' SEPARATION IS ACCEPTABLE.
3.2.3 REFER TO ARCHITECTURAL AND FIRE PROTECTION SETS FOR FIRE DEPARTMENT ACCESS.
3.2.4 NO VEGETATION SHALL BE PLANTED IN ELECTRICAL YARD. VEGETATION EXTERIOR TO ELECTRICAL YARD EXCEEDS 3' DISTANCE TO BATTERY CABINETS. UL9540A TESTING RESULTS INCLUDED IN SUPPORTING DOCUMENTS INDICATE 3' SEPARATION IS ACCEPTABLE.
3.2.5 BESS IS NOT LOCATED IN AN AREA SUBJECT TO VEHICULAR DAMAGE. REFER TO 5PV1.10 AND 1/5PV1.11.
3.2.6 REFER TO ARCHITECTURAL AND FIRE PROTECTION SETS FOR FIREFIGHTING WATER PROVISIONS.
3.2.7 BESS CABINET IS EQUIPPED WITH A LOCKABLE DOOR. PV CONTRACTOR TO PROVIDE OWNER WITH KEYS.

3.3 ENCLOSURE

3.3.1 REFER TO 5PV3.20 FOR BESS ENCLOSURE DETAILS AND DIMENSIONS.
3.3.2 BESS CABINET IS A NEMA 3R OUTDOOR RATED NON-COMBUSTIBLE CARBON STEEL ENCLOSURE.
3.3.3 BESS CABINET IS NON-COMBUSTIBLE AND FREE-STANDING.
3.3.4 FIRE AND SMOKE DETECTION NOT PROVIDED. BESS IS OUTDOOR INSTALLED, AND DETECTION IS NOT REQUIRED.
3.3.5 FIRE SUPPRESSION NOT PROVIDED. FLAMES NOT DETECTED OUTSIDE THE BATTERY MODULES OR ENCLOSURE DURING THERMAL RUNAWAY, PER UL9540A TEST.
3.3.6 CABINET COOLING FANS AND MODULE/UNIT LEVEL UL9540A TESTING ARE SUFFICIENT TO NOT REQUIRE ADDITIONAL HAZARD PROTECTIONS. FIRE, GAS, AND EXPLOSION HAZARDS WERE NOT DETECTED DURING UL9540A TESTING.
3.3.7 REFER TO MANUFACTURE INSTALLATION MANUAL FOR DETAILS ON DOOR HARDWARE. BESS IS NOT A WALK-IN UNIT.
3.3.8 REFER TO LIGHTING SET FOR SITE LIGHTING AND ILLUMINATION.

3.4 SIGNAGE

3.4.1 REFER TO 5PV0.02 FOR SIGNS AND LABEL DETAILS.
3.4.2 REFER TO 5PV0.02 FOR SIGNS AND LABEL DETAILS.

PV GENERAL NOTES

1. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH THE 2022 VERSIONS OF THE CALIFORNIA ELECTRICAL CODE (BASED ON 2020 NATIONAL ELECTRICAL CODE WITH ADOPTED PORTIONS OF THE 2017 NATIONAL ELECTRICAL CODE, 2022 CALIFORNIA BUILDING CODE , 2022 CALIFORNIA MECHANICAL CODE , 2022 NATIONAL FIRE ALARM CODE (NFPA72), 2022 CALIFORNIA ENERGY CODE AND 2022 GREEN CODE.
2. THE PHOTOVOLTAIC SYSTEM DESCRIBED HEREIN SHALL BE BUILT BY A LICENSED (C-46) SOLAR CONTRACTOR OR A LICENSED (C-10) ELECTRICAL CONTRACTOR OR A LICENSED GENERAL CONTRACTOR WITH EITHER A C-10 OR A C-46 WORKING AS A SUB-CONTRACTOR TO THE GENERAL CONTRACTOR.
3. PV SYSTEM SHALL BE GUARANTEED FOR A PERIOD OF TEN (10) YEARS FROM THE DATE OF ACCEPTANCE BY THE OWNER.
4. ALL EQUIPMENT SHALL BE LISTED AND LABELED PER RECOGNIZED ELECTRICAL TESTING LABORATORY AND INSTALLED PER THE LISTING REQUIREMENTS AND THE MANUFACTURER'S INSTRUCTIONS.
5. ALL INVERTERS SHALL BE IEEE 929 COMPLIANT AND SHALL BE INSPECTED BY THE AHJ BEFORE COMMISSIONING, TESTING, AND OPERATION OF THE SYSTEM.
6. ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R, INCLUDING ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
7. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF CEC ART. 250.
8. CEC ART. 690.9 (A). ALL CIRCUITS CONNECTED TO MORE THAN ONE SOURCE SHALL HAVE OVERCURRENT DEVICES LOCATED SO AS TO PROVIDE OVERCURRENT PROTECTION FROM ALL SOURCES.
9. CEC ART. 690.18. DUE TO THE FACT THAT PV MODULES ARE ENERGIZED WHENEVER THEY ARE EXPOSED TO LIGHT, PV CONTRACTOR SHALL DISABLE THE ARRAY DURING INSTALLATION AND SERVICE BY SHORT CIRCUITING, OPEN CIRCUITING, OR COVERING THE ARRAY WITH AN OPAQUE COVERING.
10. PHOTOVOLTAIC SYSTEM SHALL BACKFEED THE DISTRIBUTION SYSTEM ON SITE PER THE REQUIREMENTS OF CEC ART. 690.64 (B). ALL BACKFEED BREAKERS SHALL BE IDENTIFIED AS SUCH AND SHALL BE SECURED IN PLACE BY AN ADDITIONAL FASTENER PER THE REQUIREMENTS OF CEC 408.36.
11. ANY SUBSTITUTED EQUIPMENT INSTALLED WITHOUT THE APPROVAL OF THE ENGINEER AND OWNER SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL WITHOUT COST TO THE OWNER. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANY ADDITIONAL WORK OR ADJUSTMENTS CAUSED BY SUBSTITUTED EQUIPMENT NEEDED FOR COMPLIANCE OR PROPER OPERATION AT NO COST TO THE OWNER.
12. THE PV SYSTEM CONTRACTOR SHALL COORDINATE WITH THE GENERAL CONTRACTOR AND THE ELECTRICAL CONTRACTOR TO INSURE THAT THE COMPLETE PV SYSTEM IS INSTALLED AS DESCRIBED IN THESE DRAWINGS.
13. FALL ARREST PROTECTION PER OSHA REQUIREMENTS SHALL BE PROVIDED FOR ALL ROOF WORK.
14. PV CONTRACTOR SHALL PROVIDE AND INSTALL ALL EQUIPMENT SHOWN ON THESE DRAWINGS EXCEPT WORK LABELED "E.C." OR "BY OTHERS". ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL WORK LABELED "E.C.".
15. ALL CONDUCTORS AND TERMINATIONS SHALL BE RATED FOR 75ºC MINIMUM. EXPOSED CONDUCTORS SHALL BE SUNLIGHT RESISTANT.
16. PER LOCAL FIRE DISTRICT REGULATIONS, ALL PV SYSTEM CONDUITS SHALL BE PERMANENTLY LABELED WITH FADE RESISTANT MATERIAL AS FOLLOWS: "CAUTION: SOLAR PV WIRING MAY REMAIN ENERGIZED AFTER DISCONNECTION DURING DAYLIGHT HOURS". INSTALL LABELS EVERY 20' AND ONE AT EYE LEVEL FOR VERTICAL CONDUIT.
17. CEC ART. 690.56 (B). BUILDING OR STRUTURES WITH BOTH UTILITY SERVICE AND A PHOTOVOLTAIC SYSTEM SHALL HAVE A PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS, IF NOT LOCATED AT THE SAME LOCATION.
18. CEC ART. 690.14. EACH DC DISCONNECT SHALL BE LABELED WITH: "SOLAR PHOTOVOLTAIC POWER SYSTEM EMERGENCY DC DISCONNECT". LABEL SHALL BE 1" X 4" MINIMUM WITH UV RESISTANT BLACK LETTERS ON YELLOW BACKGROUND.
19. CEC ART. 690.53. A PLACARD, MINIMUM 3" X 5", UV RESISTANT, AND INCLUDING WHITE LETTERS RED BACKGROUND SHALL BE PROVIDED BESIDE THE DC DISCONNECT WITH THE FOLLOWING TEXT:

   "CAUTION: SOLAR CIRCUIT DISCONNECT"
20. CEC ART. 690.14. EACH AC DISCONNECT SHALL BE LABELED WITH: "SOLAR PHOTOVOLTAIC POWER SYSTEM AC DISCONNECT". LABEL SHALL BE 1" X 4" MINIMUM WITH UV RESISTANT BLACK LETTERS ON YELLOW BACKGROUND.
21. CEC ART. 690.17. EACH AC DISCONNECT SHALL ALSO BE LABELED WITH : "WARNING!- ELECTRIC SHOCK HAZARD-DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN IN THE OPEN POSITION". LABEL SHALL BE 1" X 4" MINIMUM WITH UV RESISTANT BLACK LETTERS ON YELLOW BACKGROUND.
22. CEC ART 690.35(F). THE PHOTOVOLTAIC POWER SOURCE SHALL BE LABELED WITH THE FOLLOWING WARNING AT EACH JUNCTION BOX, COMBINER BOX, DISCONNECT, AND DEVICE WHERE THE UNGROUNDED CIRCUITS MAY BE EXPOSED DURING SERVICE: "WARNING ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED BUT MAY BE ENERGIZED."
23. ALL NEW WIRING FROM COMBINER BOXES TO SE SHALL BE COPPER 600VOLT INSULATION TYPE "THWN-2" - U.O.N..
24. ALL NEW WIRING FROM ARRAY TO COMBINER BOXES SHALL BE COPPER USE-2. EXPOSED CONDUCTORS SHALL BE SUNLIGHT RESISTANT.
25. ELECTRICAL EQUIPMENT SHALL BE LISTED BY A CALIFORNIA RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVED DEPARTMENT.
26. NO PIPING, DUCTS OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT SHAL BE PERMITTED TO BE LOCATED WITHIN THE DEDICATED SPACE ABOVE THE ELECTRICAL EQUIPMENT.
27. UNLESS OTHERWISE NOTED ALL EQUIPMENT IS EXTERIOR.
28. CEC ART. 690.49 REMOVAL OF UTILITY-INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTION GROUNDING ELECTRODE CONDUCTOR AND THE PHOTOVOLTAIC SOURCE AND/OR OUTPUT CIRCUIT GROUNDING CONDUCTOR.
29. FUSES SHALL BE PROVIDED WITH REJECTION TYPE FUSE HOLDERS.
30. SYSTEM LAYOUT IS CONCEPTUAL ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE SET OF P.V. CONSTRUCTION DOCUMENTS BASED ON CONCEPTUAL PLANS AND SPECIFICATIONS TO BE SUBMITTED SEPARATELY TO BUILDING DEPARTMENT FOR APPROVAL.
31. PV CONTRACTOR SHALL PROVIDE A PERMANENT PLAQUE OR DIRECTORY DENOTING ALL ELECTRIC POWER SOURCES ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT LOCATIONS OF ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED.
32. CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND REPORT ANY DISCREPANCIES TO SUPERINTENDENDT, PROJECT MANAGER OR CONSTRUCTION MANAGER BEFORE COMMENCING WORK.
33. PRIOR TO START OF PROJECT, COORDINATE WITH PROJECT MANAGER FOR LOCATING ALL EQUIPMENT AND STORAGE AREAS.
34. EXISTING SITE DAMAGED BY NEW CONSTRUCTION SHALL BE REPLACED OR REPAIRED TO A CONDITION EQUAL TO PRE-CONSTRUCTION, OR BETTER.
35. ALL CONDUITS EXPOSED IN ELECTRICAL PADS OR ROOMS SHALL BE OF TYPE AS SPECIFIED IN THE SINGLE LINE. ALL CONDUIT BELOW GRADE SHALL BE ELECTRICAL PVC. CONDUITS PENETRATING FIRE RATED AREAS SHALL BE SEALED, INSIDE AND OUTSIDE OF CONDUIT, WITH APPROVED FIRE STOP MATERIAL TO MAINTAIN THE SAME FIRE RATINGS AS ORIGINAL. CONDUIT RUNS SHOWN ARE DIAGRAMATIC. CONDUIT SHALL BE SECURED AT 10 FT MINIMUM INTERVALS. EXACT LOCATIONS AND CONDUIT RUNS TO BE DETERMINED IN THE FIELD PRIOR TO BID. SUBCONTRACTOR SHALL PROVIDE DOCUMENTATION AND LEGIBLE DRAWINGS OF ALL CONDUIT PLACEMENT DEVIATING FROM PLANS.
36. GROUNDING SYSTEM USED IS A COMBINED AC/DC SYSTEM.
37. ALL PV MODULES, ASSOCIATED EQUIPMENT AND WIRING MATERIAL SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE.
38. ALL FIELD INSTALLED JUNCTION, PULL AND OUTLET BOXES LOCATED BEHIND MODULES OR PANELS SHALL BE ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE(S) OR PANEL(S) SECURED BY REMOVABLE FASTENERS.
39. PV SYSTEM WEIGHT IS LESS THAN 3.0-POUNDS/SQUARE FOOT.
42. BATTERY OVERCURRENT DEVICES MUST BE OF CURRENT-LIMITING WHERE THE AVAILABLE DC FAULT CURRENT OF A BATTERY EXCEEDS THE INTERRUPTING OR WITHSTAND RATINGS OF EQUIPMENT (NORMAL OVERCURRENT DEVICES, DISCONNECT MEANS, ETC.) IN A CIRCUIT (690.71(C)).
43. CURRENT LIMITING FUSES SHALL COMPLY WITH 690.16.
44. CIRCUIT BREAKERS THAT ARE MARKED "LINE" AND "LOAD" ARE NOT PERMITTED TO BE BACK-FED. (690.10(E)).
45. THE INSTALLATION OF ONE OR MORE ELECTRICAL ELECTRICAL POWER PRODUCTION SOURCES OPERATING IN PARALLEL WITH A PRIMARY SOURCE(S) OF ELECTRICITY SHALL BE INSTALLED ONLY BY A QUALIFIED PERSONS.
46. EACH SIDE OF A POWER TRANSFORMER SHALL BE CONSIDERED AS PRIMARY AND PROTECTED IN ACCORDANCE WITH CEC 450.3.
47. PROVIDE LABELING TO INDICATE MAXIMUM SERIES FUSES AND RATING FOR EACH ARRAY.

GENERAL NOTES & SPECS

1. PROVIDE ALL MATERIALS AND LABOR AS REQUIRED TO ACHIEVE A COMPLETE AND OPERATIONAL SYSTEM.
2. COORDINATE AND OBTAIN APPROVALS FROM ALL RESPECTIVE UTILITY COMPANIES AS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION.
3. INSTALL RACEWAY SYSTEMS AS FOLLOWS:
   a. USE RIGID GALVANIZED STEEL IN ALL AREAS EXPOSED TO WEATHER OR PHYSICAL DAMAGE.
   b. USE FLEXIBLE METALLIC CONDUIT ONLY IN AREAS AS PERMITTED BY LOCAL CODE AUTHORITY. USE SEAL-TITE IN AREAS EXPOSED TO WEATHER.
   c. USE COMPRESSION TYPE FITTINGS FOR ELECTRICAL METALLIC TUBING WHERE UTILIZED.
   d. USE P.V.C. CONDUIT UNDERGROUND WITH CODE SIZED GROUND. CONDUIT RISERS AND STUBS ABOVE GRADE SHALL BE I.M.C. WITH HALF-LAPPED TAPE COVERING OR P.V.C. COATING.
4. ALL NEW WIRING SHALL BE COPPER TYPE "THHN/THWN" - UON.
5. CONDUIT FOR ROOF MOUNTED EQUIPMENT SHALL BE ROUTED BELOW THE ROOF WITHIN THE BUILDING.
6. ALL FIXTURE, DEVICE, ETC.. LOCATIONS SHALL BE VERIFIED WITH ARCHITECTURAL DRAWINGS AS WELL AS EQUIPMENT SUPPLIER REQUIREMENTS PRIOR TO ANY ROUGH-IN WORK.
7. THESE DRAWINGS ARE DIAGRAMMATIC AND REPRESENT THE INTENT OF EQUIPMENT, DEVICES, ETC... TO BE CONNECTED AND THE CIRCUITS TO WHICH THEY ARE TO BE CONNECTED TO. CONTRACTOR SHALL INSTALL ALL CONDUIT, J-BOXES, ETC... AS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM.
8. ALL EXTERIOR EQUIPMENT SHALL BE WEATHERPROOF.
9. ELECTRICAL CONTRACTOR SHALL PERFORM ALL WORK IN STRICT ACCORDANCE WITH ALL LOCAL, STATE, AND NATIONAL GOVERNING CODES.
10. ALL EQUIPMENT SHALL BE NEW AND BEAR A "UL" LABEL - U.O.N..
11. COMPLETE ELECTRICAL INSTALLATION SHALL BE GUARANTEED IN WRITING FOR A PERIOD OF (1) YEAR - UON.
12. ELECTRICAL CONTRACTOR SHALL INCLUDE IN BID - COSTS FOR ALL PHOTOVOLTAIC / ENERGY STORAGE COMPONENTS, CONDUITS, DEVICES, ETC... AS DEEMED NECESSARY FOR A COMPLETE AND OPERATIONAL PV/BESS SYSTEM SYSTEM.
13. ELECTRICAL CONTRACTOR SHALL VISIT SITE PRIOR TO BID DATE, TO VERIFY ALL EXISTING CONDITIONS TO BE ENCOUNTERED IN THE INSTALLATION OF ALL NEW EQUIPMENT, FIXTURES, DEVICES, FEEDERS, ETC.. EXACT INSTALLATION METHOD AND REQUIREMENTS SHALL BE VERIFIED AND DETERMINED PRIOR TO BID DATE. CONTRACTORS SHALL IMMEDIATELY NOTIFY THIS ENGINEER OF ANY REQUIRED MODIFICATIONS WHICH ARE NOT SHOWN ON THESE DRAWINGS. SUBMITTAL OF BID INDICATES CONTRACTOR IS AWARE OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED.
14. ALL ELECTRICAL EQUIPMENT CHARACTERISTICS, LOCATIONS, AND CONNECTION REQUIREMENTS SHALL BE VERIFIED PRIOR TO ANY ROUGH-IN WORK.
15. ELECTRICAL CONTRACTOR SHALL FURNISH THE FOLLOWING SHOP DRAWINGS FOR PRIOR APPROVAL:
   a. ALL SUBSTITUTED PV / BATTERY EQUIPMENT.
   b. ALL ELECTRICAL SERVICE EQUIPMENT, DISTRIBUTION EQUIPMENT AND PANELBOARDS.
   c. OTHER ITEMS AS SPECIFICALLY INDICATED.

THESE ITEMS SHALL BE APPROVED BY THIS OFFICE PRIOR TO ANY COMMENCEMENT OF PLACING ORDERS OR PERFORMING ANY ROUGH-IN WORK:

20. COMPLETE ELECTRICAL SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH THE PRESENTLY ADOPTED EDITION OF THE NEC ARTICLE 250.
21. PENETRATIONS OF ALL FIRE RATED WALLS OR CEILINGS SHALL BE FIRE RATED IN ACCORDANCE WITH ALL LOCAL, STATE, AND NATIONAL CODES.
22. PROVIDE ENGRAVED PLASTIC NAMEPLATES FOR ALL MAJOR ELECTRICAL EQUIPMENT.
23. PROVIDE THE OWNER AND THIS ENGINEER WITH ONE SET OF ELECTRICAL "AS-BUILTS" AT THE COMPLETION OF JOB.
24. ALL DISCONNECT SWITCHES TO BE PROVIDED WITH REJECTION TYPE FUSE HOLDERS.
25. ELECTRICAL CONTRACTOR SHALL PREPARE AND SUBMIT CALIFORNIA ENERGY COMMISSION TITLE 24 FORMS AS THEY APPLY TO THE BUILDING DEPARTMENT PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY.
26. PROVIDE GREEN EQUIPMENT GROUNDING CONDUCTOR IN ALL FEEDER AND BRANCH CIRCUIT CONDUITS SIZED PER NEC 250-122.
27. ELECTRICAL EQUIPMENT SHALL BE LISTED BY AHJ RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVED BY THE AUTHORITY HAVING JURISDICTION.

PERMITTING / PLANNING NOTES

THIS PV SYSTEM INSTALLATION IS SUBJECT TO INSPECTION BY THE AUTHORITY HAVING JURISDICTION (DSA.)

1. THIS PROJECT SHALL CONFORM TO THE FOLLOWING CODE VERSIONS

   APPLICABLE CODES
   1.1. 2025 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR
   1.2. 2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
   1.3. 2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
   1.4. 2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
   1.5. 2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
   1.6. 2022 CALIFORNIA ENERGY CODE, PART 6, TITLE 24 CCR
   1.7. 2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
   1.8. 2022 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
   1.9. 2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
   1.10. 2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
   1.11. TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

   APPLICABLE STANDARDS
   FOR A LIST OF APPLICABLE STANDARDS, INCLUDING CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS, REFER TO CBC CHAPTER 35 AND CFC CHAPTER 80.
2. ROOFTOP MOUNTED PV SYSTEM MEETS FIRE CLASSIFICATION PER CBC 1505.9 CLASS 'A'. PV MODULES AND ASSOCIATED RACKING SYSTEM ARE LISTED AND IDENTIFIED WITH FIRE CLASSIFICATION IN ACCORDANCE WITH UL 1703 AND UL 2703.
3. SYSTEM UTILIZES SOLAREDGE DC POWER OPTIMIZERS WHICH MEET 690.12 RAPID SHUTDOWN REQUIREMENTS.
4. 110.2 APPROVAL: ALL ELECTRICAL EQUIPMENT SHALL BE LABELED, LISTED OR CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCREDITED BY THE UNITED STATES OCCUPATIONAL SAFETY HEALTH ADMINISTRATION.
5. ELECTRICAL EQUIPMENT SHALL BE LISTED BY AN AHJ RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVED BY THE DEPARTMENT.

REFERENCES AND ABBREVIATIONS

A / 60	LIGHTING FIXTURE DESIGNATION
1 / E-1	DETAIL REFERENCE
1	KEYNOTE REFERENCE
123	KITCHEN EQUIPMENT
A	AMPS
AIC	AMPS INTERRUPTING CAPACITY
AC	ALTERNATING CURREN
AFC	ABOVE FINISHED COUNTER
AFF	ABOVE FINISH FLOOR
C	CONDUIT
CO	CONDUIT ONLY w/PULL ROPE
CU	COPPER
DAS	DATA ACQUISITION SYSTEM
DC	DIRECT CURRENT
ER	EXITING TO REMAIN
EM	EMERGENCY
EMT	ELECTRIC METALLIC TUBING
(ER)	EXISTING TO BE REMOVED
FLA	FULL LOAD AMPS
G	GROUND
GFI	GROUND FAULT INTERRUPTER
Imp	MAXIMUM POWER POINT CURRENT (AMPS)
SSC	SHORT CIRCUIT CURRENT
kW	1,000 WATTS
M	METER
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
(N)	NEW
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NL	NIGHT LIGHT
OC	ON CENTER
MPPT	MAXIMUM POWER POINT (IN WATTS)
PNL	PANEL
PVC	POLY VINYL CHLORIDE
(R)	RELOCATED
RGS	RIGID GALVANIZED STEEL
SCCR	SHORT CIRCUIT CURRENT RATING
SQFT	SQUARE FEET
STC	STANDARD TEST CONDITION
TCR	TEMPERATURE CORRECTION FACTOR
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VA	VOLT AMPS (AC)
VL	VERIFY LOCATION
Vop	MAXIMUM POWER POINT (VOLTAGE)
Voc	OPEN CIRCUIT VOLTAGE
W	WATTS
WP	WEATHERPROOF

SHEET INDEX

5PV0.01	PV COVER SHEET
5PV0.02	PV LABEL SHEET
5PV0.10	PV SINGLE LINE DIAGRAM
5PV0.11	PV SINGLE LINE DIAGRAM
5PV0.50	PV TITLE 24 COMPLIANCE FORMS
5PV0.60	PV ELECTRICAL DETAILS
5PV1.00	PV OVERALL SITE PLAN
5PV1.10	PV FIRST FLOOR PLAN
5PV1.11	PV ENLARGED ELECTRICAL AREAS
5PV2.00	PV ROOF PLAN
5PV2.10	PV ROOF PLAN - BUILDING C & D
5PV2.20	PV ROOF PLAN - BUILDING E
5PV2.30	PV ROOF PLAN - BUILDING F
5PV2.50	PV MOUNTING PLAN
5PV3.00	PV MOUNTING CALCULATIONS
5PV3.10	PV MOUNTING DETAILS
5PV3.20	BESS MOUNTING DETAILS
5PV4.00	PV DATASHEETS
5PV4.01	PV DATASHEETS
5PV4.02	BESS DATASHEETS
5PV4.03	DISCONNECT DATASHEETS

SCOPE OF WORK

PROVIDE UTILITY INTERACTIVE ROOF MOUNTED PHOTOVOLTAIC SYSTEM (APPROX. 136.16 kW-DC) AND LITHIUM-ION BATTERY ENERGY STORAGE SYSTEM (APPROX. 54 USABLE/60 NAMEPLATE kWh.)

PLANS CONSISTING OF PV MODULES, MOUNTING RAILS AND APPARATUS, INVERTERS SYSTEM, BATTERY UNITS, BATTERY CABINET, DISCONNECTS, GROUNDING, AC SERVICE CONNECTION, CONDUIT, AND CONDUCTORS (AC AND DC) FOR FULLY OPERABLE SYSTEM ON THE ROOF OF, WITHIN DEDICATED INDOOR ELECTRICAL ROOM SPACES OF FOUR (4) NEW BUILDINGS AT PARADISE CANYON ELEMENTRY SCHOOL, AS WELL AS OUTDOOR ELECTRICAL YARD SPACES.

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DATE: 05/07/2026

Practice

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LA CAÑADA UNIFIED SCHOOL DISTRICT
ESTABLISHED 1885

Salas O'Brien.

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Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

ROY L. LOPEZ
No. 13442
Exp. 09/30/26

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE
NO. C-014869
REN. 05-31-27

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08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

PV COVER SHEET

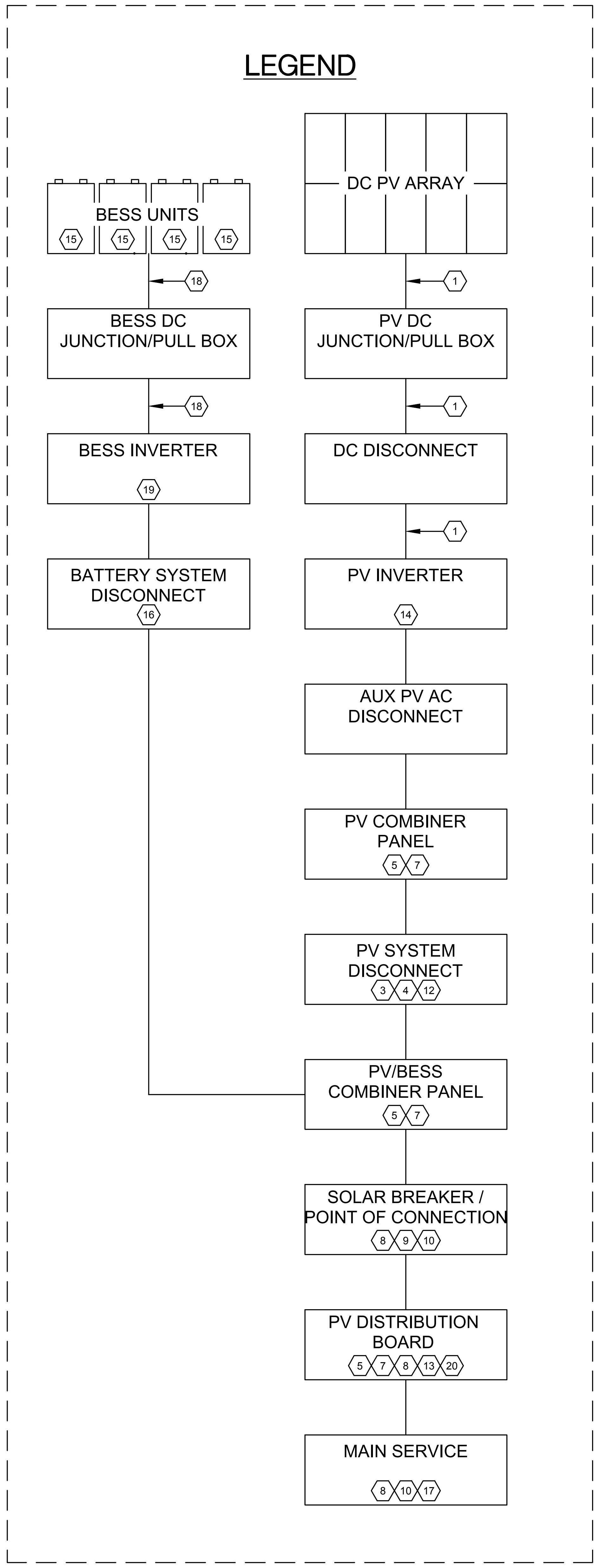
5PV0.01

SCALE: AS INDICATED

PLOT DATE

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

PV/BESS LABELS



1

SOLAR PV DC CIRCUIT

MARKINGS SHALL BE PLACED EVERY 10', AT TURNS, AND ABOVE AND/OR BELOW PENETRATIONS AND ALL DC COMBINER AND JUNCTION BOXES.

6-1/2 x 1", STICKER
WHITE TEXT ON RED BACKGROUND

2

MAXIMUM DC VOLTAGE
1000 V
OF PV SYSTEM

NEC 690.13 (B)

4-1/4 x 1"
WHITE TEXT ON RED BACKGROUND
WHITE HORIZONTAL CENTER STRIPE

3

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT: 132.75 A
NOMINAL OPERATING AC VOLTAGE: 480 V

NEC 690.54

4-1/4 x 1"
WHITE TEXT ON RED BACKGROUND
WHITE FILL IN BOXES

4

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

NEC 690.13 (B)

6 x 1-3/4", WHITE TEXT ON RED BACKGROUND

5

⚠ WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 110.27 (C)

4 x 2"
WARNING AREA: BLACK TEXT ON ORANGE BACKGROUND
REST OF LABEL: BLACK TEXT ON WHITE BACKGROUND

6

⚠ WARNING

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

NEC 690.13 (B), 706.15 (C)

4 x 2"
WARNING AREA: BLACK TEXT ON ORANGE BACKGROUND
REST OF LABEL: BLACK TEXT ON WHITE BACKGROUND

7

⚠ WARNING

PHOTOVOLTAIC SYSTEM COMBINER PANEL

DO NOT ADD LOADS

NEC 705.12 (B) (3)

4 x 2"
WARNING AREA: BLACK TEXT ON ORANGE BACKGROUND
REST OF LABEL: BLACK TEXT ON WHITE BACKGROUND

8

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC AND BATTERY ENERGY STORAGE SYSTEM

NEC 690.59

4-1/4 x 1"
BLACK TEXT ON ORANGE BACKGROUND

9

⚠ WARNING

POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

NEC 705.12 (B) (3)

2-3/4" x 1-3/4"
BLACK TEXT ON ORANGE BACKGROUND

10

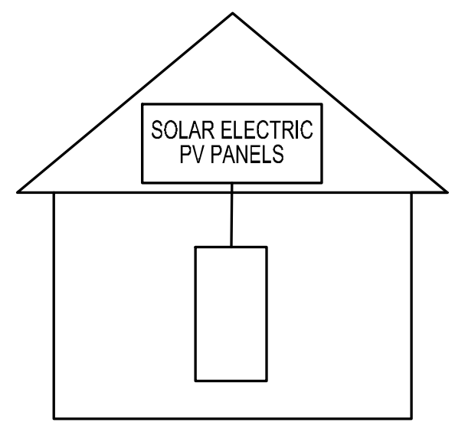
⚠ WARNING
SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFED

NEC 705.12 (E)

11

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



NEC 690.56 (C)

6 x 4"
The title "SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN" shall utilize capitalized characters with a minimum height of 9.5 mm (3/8 in.) in black on yellow background, and the remaining characters shall be capitalized with a minimum height of 4.8 mm (3/16 in.) in black on white background.

12

RAPID SHUTDOWN FOR SOLAR PV SYSTEM

NEC 690.56 (C) (2)

6 x 1-3/4", WHITE TEXT ON RED BACKGROUND, REFLECTIVE

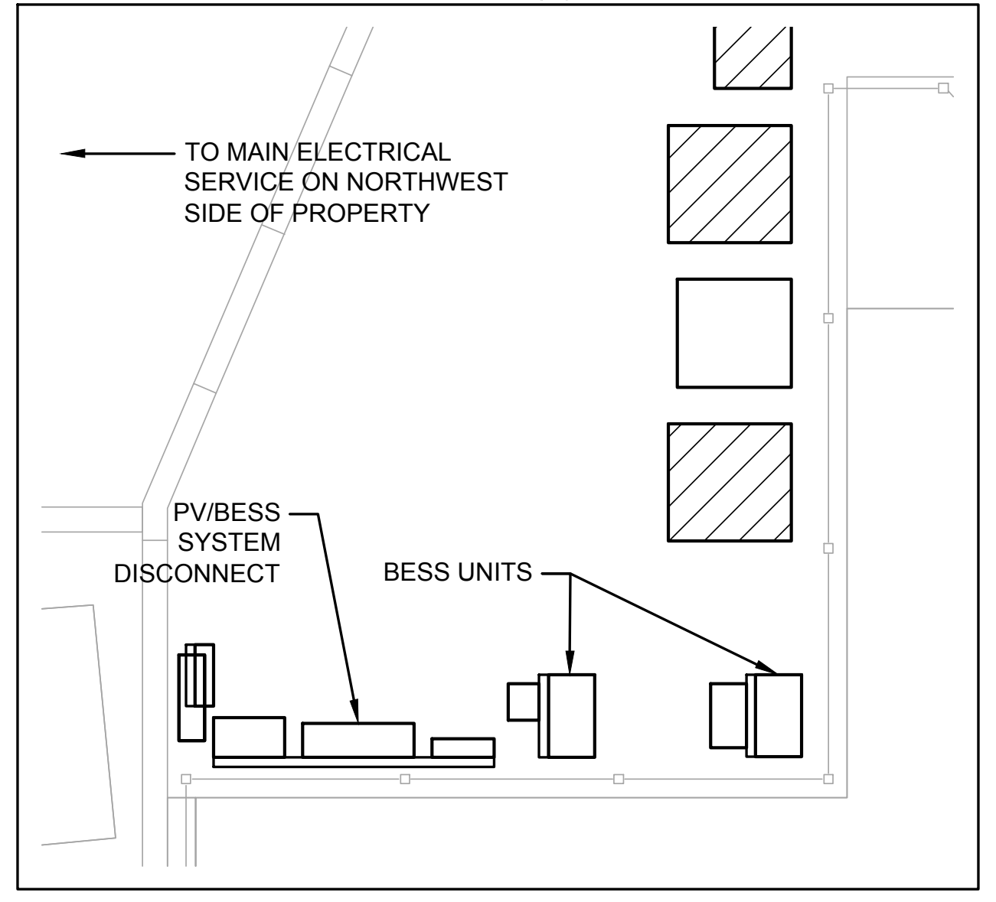
The label shall be reflective, with all letters capitalized and having a minimum height of 9.5 mm (3/8 in.) in white on red background.

13

CAUTION

MULTIPLE SOURCES OF POWER

SOURCES: UTILITY GRID, BATTERY ENERGY STORAGE SYSTEM, AND PHOTOVOLTAIC SYSTEM.
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECT(S) LOCATED AS SHOWN.


TO MAIN ELECTRICAL SERVICE ON NORTHWEST SIDE OF PROPERTY
PV/BESS SYSTEM DISCONNECT
BESS UNITS

RATED AC OUTPUT CURRENT: 200 A
NOMINAL OPERATING AC VOLTAGE: 480 V

NEC 690.56 (B), 705.10 NEC 690.31 (D)(2)

14

PHOTOVOLTAIC SYSTEM INVERTER 'QA'

PHOTOVOLTAIC SYSTEM INVERTER 'QB'

PHOTOVOLTAIC SYSTEM INVERTER 'QC'

15

BATTERY UNIT 1

BATTERY UNIT 2

16

ENERGY STORAGE SYSTEM DISCONNECT

NOMINAL ESS AC VOLTAGE	480 V
MAX. ESS DC VOLTAGE	691 V
AVAILABLE FAULT CURRENT DERIVED FROM THE ESS	A
DATE CALCULATION PERFORMED	

NEC 706.15 (C)
CEC 706.15 (C)

WHITE TEXT ON RED BACKGROUND

17

⚠ WARNING

ARC FLASH AND SHOCK HAZARD.
APPROPRIATE PPE REQUIRED.
FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY.
REFER TO NFPA 70E.

NEC 706.15 (C)
CEC 706.15 (C)

WARNING AREA: BLACK TEXT ON ORANGE BACKGROUND
REST OF LABEL: BLACK TEXT ON WHITE BACKGROUND

18

BATTERY SYSTEM DC CIRCUIT

MARKINGS SHALL BE PLACED EVERY 10', AT TURNS, AND ABOVE AND/OR BELOW PENETRATIONS AND ALL DC COMBINER AND JUNCTION BOXES.

6-1/2 x 1", STICKER
WHITE TEXT ON RED BACKGROUND

19

BESS INVERTER 1

20

⚠ WARNING

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

NEC 705.12 (B) (3)

4 x 3"
WHITE TEXT ON RED BACKGROUND

SHEET NOTES

1. LABELS INTENDED TO BE AFFIXED TO CONDUIT MAY BE OF STICKER TYPE. ALL OTHER LABELS SHALL BE PLACARD TYPE UNLESS OTHERWISE INDICATED.

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Irvine, CA 92618

Project No.: 2022-01629-05

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No. 13442
Exp. 09/30/26
ELECTRICAL

PARADISE CANYON E.S.

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471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE
NO. C-014869
REN. 05-31-27

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DRAWING TITLE

PV LABEL SHEET

5PV0.02

SCALE: AS INDICATED

PLOT DATE

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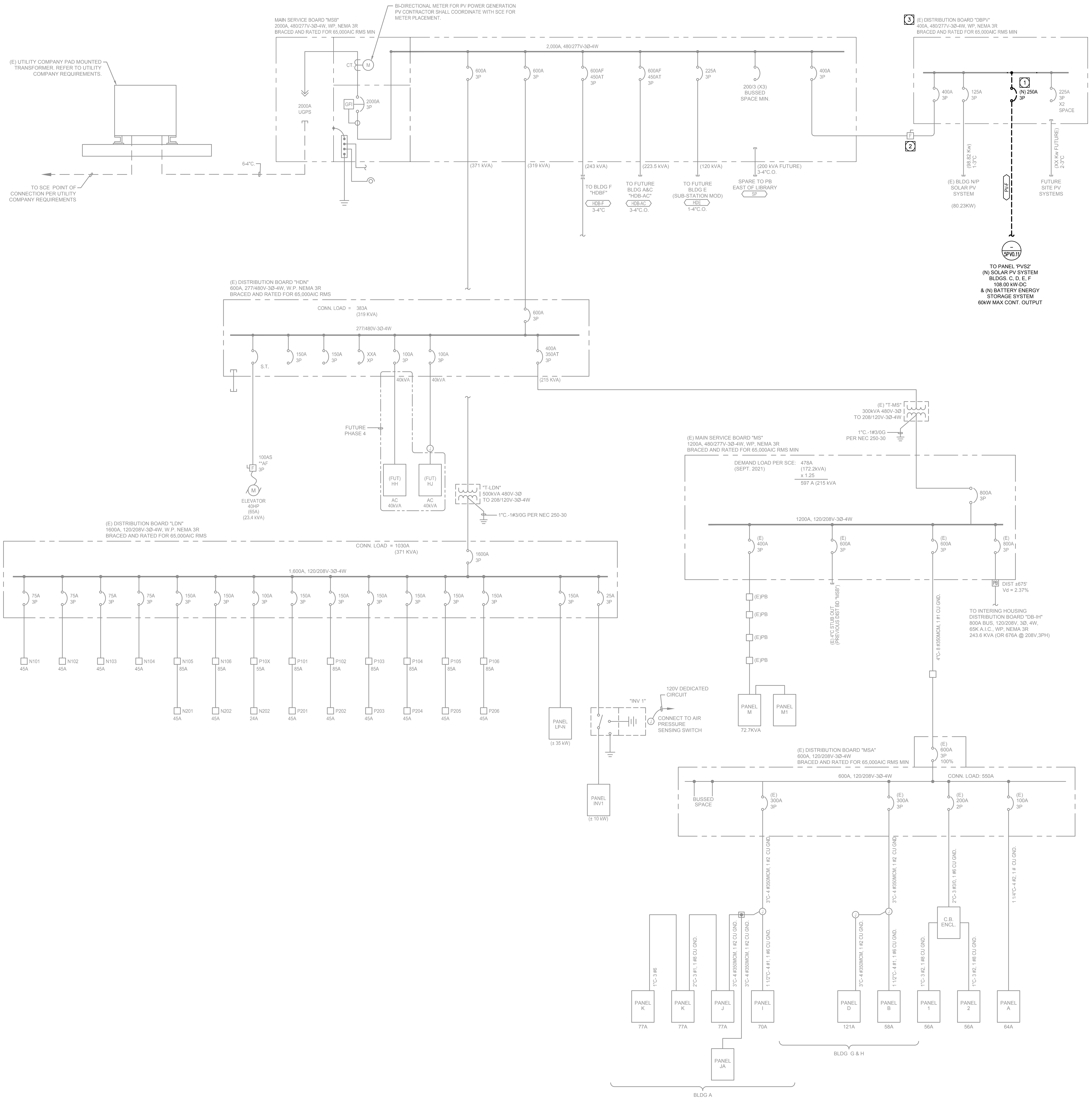
BI-DIRECTIONAL METER FOR PV POWER GENERATION
PV CONTRACTOR SHALL COORDINATE WITH SCE FOR
METER PLACEMENT.
MAIN SERVICE BOARD "MSB"
2000A, 480/277V-3Ø-4W, WP, NEMA 3R
BRACED AND RATED FOR 65,000AIC RMS MIN
(E) UTILITY COMPANY PAD MOUNTED TRANSFORMER. REFER TO UTILITY COMPANY REQUIREMENTS.
TO SCE POINT OF CONNECTION PER UTILITY COMPANY REQUIREMENTS
6-4"C.
CT.
M
2000A
UGPS
GFI
2000A
3P
2,000A, 480/277V-3Ø-4W
600A 3P
600A 3P
600AF 450AT 3P
600AF 450AT 3P
225A 3P
200/3 (X3) BUSSED SPACE MIN.
400A 3P
(371 kVA)
(319 kVA)
(243 kVA)
(223.5 kVA)
(120 kVA)
(200 kVA FUTURE) 3-4"C.O.
TO BLDG F "HDBF"
HDB-F
3-4"C
TO FUTURE BLDG A&C "HDB-AC"
HDB-AC
3-4"C.O.
TO FUTURE BLDG E (SUB-STATION MOD)
HDE
1-4"C.O.
SPARE TO PB EAST OF LIBRARY
SP
3
(E) DISTRIBUTION BOARD "DBPV"
400A, 480/277V-3Ø-4W, WP, NEMA 3R
BRACED AND RATED FOR 65,000AIC RMS MIN
400A 3P
125A 3P
1
(N) 250A 3P
225A 3P X2 SPACE
F
2
(98.82 Kw) 1-3"C
(E) BLDG N/P SOLAR PV SYSTEM
(80.23KW)
PV-F
(XX Kw FUTURE) 2-3"C
FUTURE SITE PV SYSTEMS
5PV0.11
TO PANEL 'PVS2'
(N) SOLAR PV SYSTEM
BLDGS. C, D, E, F
108.00 kW-DC
& (N) BATTERY ENERGY
STORAGE SYSTEM
60kW MAX CONT. OUTPUT
(E) DISTRIBUTION BOARD "HDN"
600A, 277/480V-3Ø-4W, W.P. NEMA 3R
BRACED AND RATED FOR 65,000AIC RMS
CONN. LOAD = 383A (319 KVA)
600A 3P
277/480V-3Ø-4W
S.T.
150A 3P
150A 3P
XXA XP
100A 3P
100A 3P
400A 350AT 3P
40kVA
40kVA
(215 KVA)
FUTURE PHASE 4
100AS **AF 3P
F
M
ELEVATOR 40HP (65A) (23.4 kVA)
(FUT) HH
AC 40kVA
(FUT) HJ
AC 40kVA
J
"T-LDN"
500kVA 480V-3Ø
TO 208/120V-3Ø-4W
1"C.-1#3/0G PER NEC 250-30
(E) DISTRIBUTION BOARD "LDN"
1600A, 120/208V-3Ø-4W, W.P. NEMA 3R
BRACED AND RATED FOR 65,000AIC RMS
CONN. LOAD = 1030A (371 KVA)
1600A 3P
1,600A, 120/208V-3Ø-4W
75A 3P
75A 3P
75A 3P
75A 3P
150A 3P
150A 3P
100A 3P
150A 3P
150A 3P
150A 3P
150A 3P
150A 3P
150A 3P
150A 3P
25A 3P
N101 45A
N102 45A
N103 45A
N104 45A
N105 85A
N106 85A
P10X 55A
P101 85A
P102 85A
P103 85A
P104 85A
P105 85A
P106 85A
N201 45A
N202 45A
N202 24A
P201 45A
P202 45A
P203 45A
P204 45A
P205 45A
P206 45A
PANEL LP-N
(± 35 kW)
"INV 1"
J
120V DEDICATED CIRCUIT
CONNECT TO AIR PRESSURE SENSING SWITCH
PANEL INV1
(± 10 kW)
(E) "T-MS"
300kVA 480V-3Ø
TO 208/120V-3Ø-4W
1"C.-1#3/0G PER NEC 250-30
(E) MAIN SERVICE BOARD "MS"
1200A, 480/277V-3Ø-4W, WP, NEMA 3R
BRACED AND RATED FOR 65,000AIC RMS MIN
DEMAND LOAD PER SCE: 478A (172.2kVA)
(SEPT. 2021)
x 1.25
597 A (215 kVA
800A 3P
1200A, 120/208V-3Ø-4W
(E) 400A 3P
(E) 600A 3P
(E) 600A 3P
(E) 800A 3P
(E)PB
(E)PB
(E)PB
(E)PB
(E) 4"C STUB OUT (PREVIOUS DIST BD "MSB")
4"C- 8 #350MCM, 1 #1 CU GND.
PB
DIST ±675'
Vd = 2.37%
TO INTERING HOUSING
DISTRIBUTION BOARD "DB-IH"
800A BUS, 120/208V, 3Ø, 4W,
65K A.I.C., WP, NEMA 3R
243.6 KVA (OR 676A @ 208V,3PH)
PANEL M
72.7KVA
PANEL M1
(E) DISTRIBUTION BOARD "MSA"
600A, 120/208V-3Ø-4W
BRACED AND RATED FOR 65,000AIC RMS MIN
(E) 600A 3P 100%
600A, 120/208V-3Ø-4W
CONN. LOAD: 550A
BUSSED SPACE
(E) 300A 3P
(E) 300A 3P
(E) 200A 2P
(E) 100A 3P
3"C- 4 #350MCM, 1 #2 CU GND.
3"C- 4 #350MCM, 1 #2 CU GND.
2"C- 3 #3/0, 1 #6 CU GND.
1 1/4"C- 4 #2, 1 # CU GND.
J
J
J
C.B. ENCL.
1"C- 3 #6
2"C- 3 #1, 1 #8 CU GND.
3"C- 4 #350MCM, 1 #2 CU GND.
3"C- 4 #350MCM, 1 #2 CU GND.
1 1/2"C- 4 #1, 1 #6 CU GND.
3"C- 4 #350MCM, 1 #2 CU GND.
1 1/2"C- 4 #1, 1 #6 CU GND.
1"C- 3 #2, 1 #8 CU GND.
1"C- 3 #2, 1 #8 CU GND.
PANEL K 77A
PANEL K 77A
PANEL J 77A
PANEL I 70A
PANEL D 121A
PANEL B 58A
PANEL 1 56A
PANEL 2 56A
PANEL A 64A
PANEL JA
BLDG A
BLDG G & H

SHEET NOTES

① EXISTING 125A CB TO BE REPLACED WITH NEW CIRCUIT BREAKER OF SIZE SHOWN. MATCH ALL EXISTING DISTRIBUTION BOARD CHARACTERISTICS. BREAKER MUST BE RATED FOR BACKFEED APPLICATION.

② EXISTING 400AS DISCONNECT. REPLACE EXISTING 125A FUSES WITH 400A FUSES. CONTRACTOR TO VERIFY SIZE OF EXISTING DISCONNECT AND FUSES PRIOR TO ROUGH-IN.

③ EXISTING EQUIPMENT SHOWN FOR REFERENCE ONLY. CONTRACTOR TO VERIFY EQUIPMENT BEFORE INSTALLATION OF PV SYSTEM.

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DRAWING TITLE

PV SINGLE LINE DIAGRAM

5PV0.10

SCALE: AS INDICATED
PLOT DATE

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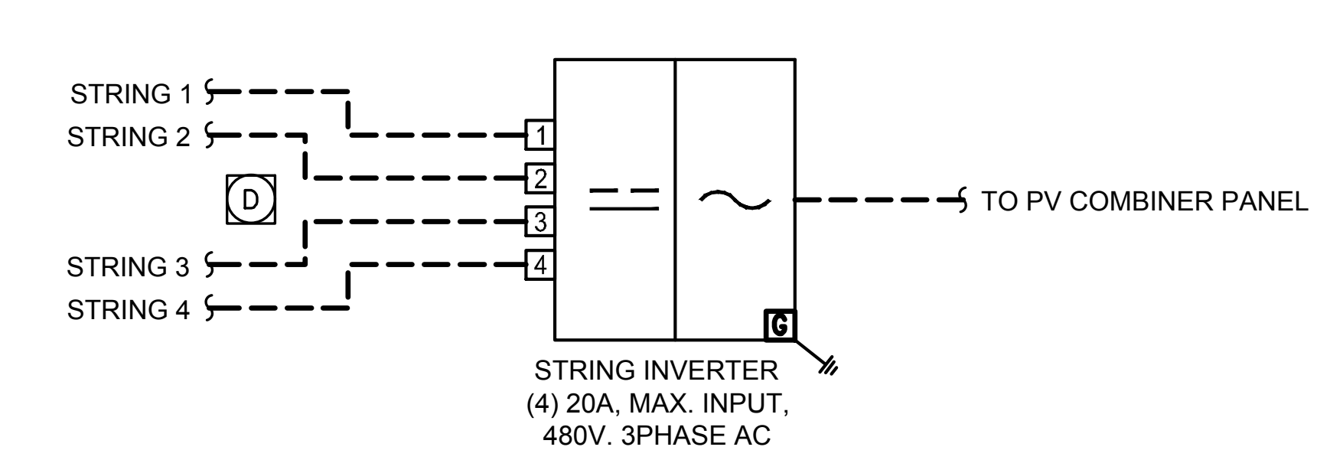
TYPICAL PV INVERTER


STRING 1
STRING 2
D
STRING 3
STRING 4
1
2
3
4
G
TO PV COMBINER PANEL
STRING INVERTER
(4) 20A, MAX. INPUT,
480V, 3PHASE AC

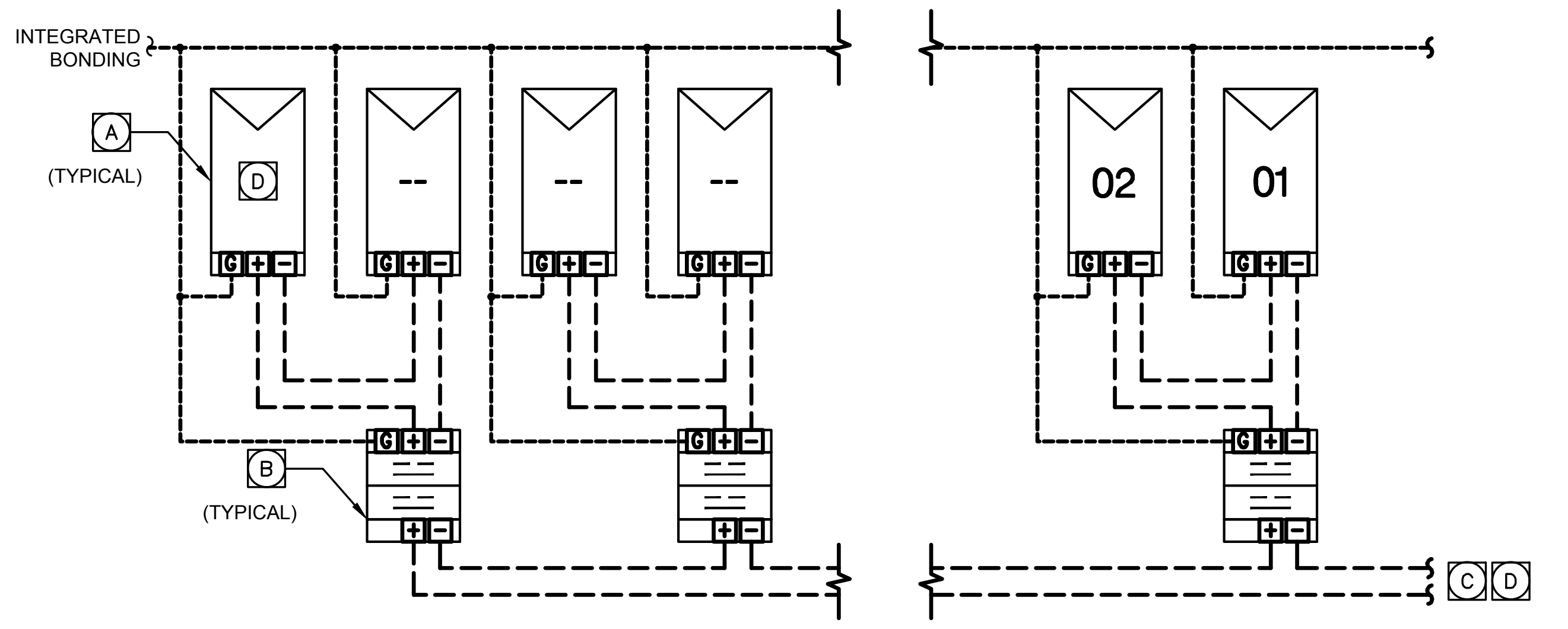
TYPICAL PV STRING

Ⓐ PV MODULES CONNECTED IN SERIES AND MOUNTED TO RACKING SYSTEM PER MANUFACTURER REQUIREMENTS TO MEET INTEGRATED BONDING REQUIREMENTS.

Ⓑ PV MODULE POWER OPTIMIZER CONNECTED TO A MAXIMUM OF TWO PV MODULES IN SERIES. RAPID SHUTDOWN DEVICES ARE NORMALLY OPEN SWITCHING DEVICES THAT WILL DE-ENERGIZE THE PV ARRAY IN ACCORDANCE WITH RAPID SHUTDOWN REQUIREMENTS.

Ⓒ ALL CONDUCTORS LEAVING THE PV ARRAY BOUNDARY SHALL TRANSITION THROUGH A WATERPROOF JUNCTION BOX INTO SPECIFIED CONDUIT. FREE AIR CONDUCTORS WITHIN ARRAY SHALL BE SECURED TO PV RACKING PER MANUFACTURER INSTRUCTIONS.

Ⓓ REFER TO INVERTER SCHEDULE ON THIS SHEET FOR STRING LENGTHS, INPUT INFORMATION, AND INVERTER MODEL.


INTEGRATED
BONDING
A
(TYPICAL)
D
--
--
--
02
01
B
(TYPICAL)
C
D

SHEET NOTES

① CIRCUIT BREAKER SHALL BE RATED FOR BACK FEED APPLICATION, WITH AIC RATING AS INDICATED IN CONDUCTOR SCHEDULE. SEE SHEET 5PV0.01 AND 5PV0.02 NOTES FOR IDENTIFICATION AND LABEL REQUIREMENTS.

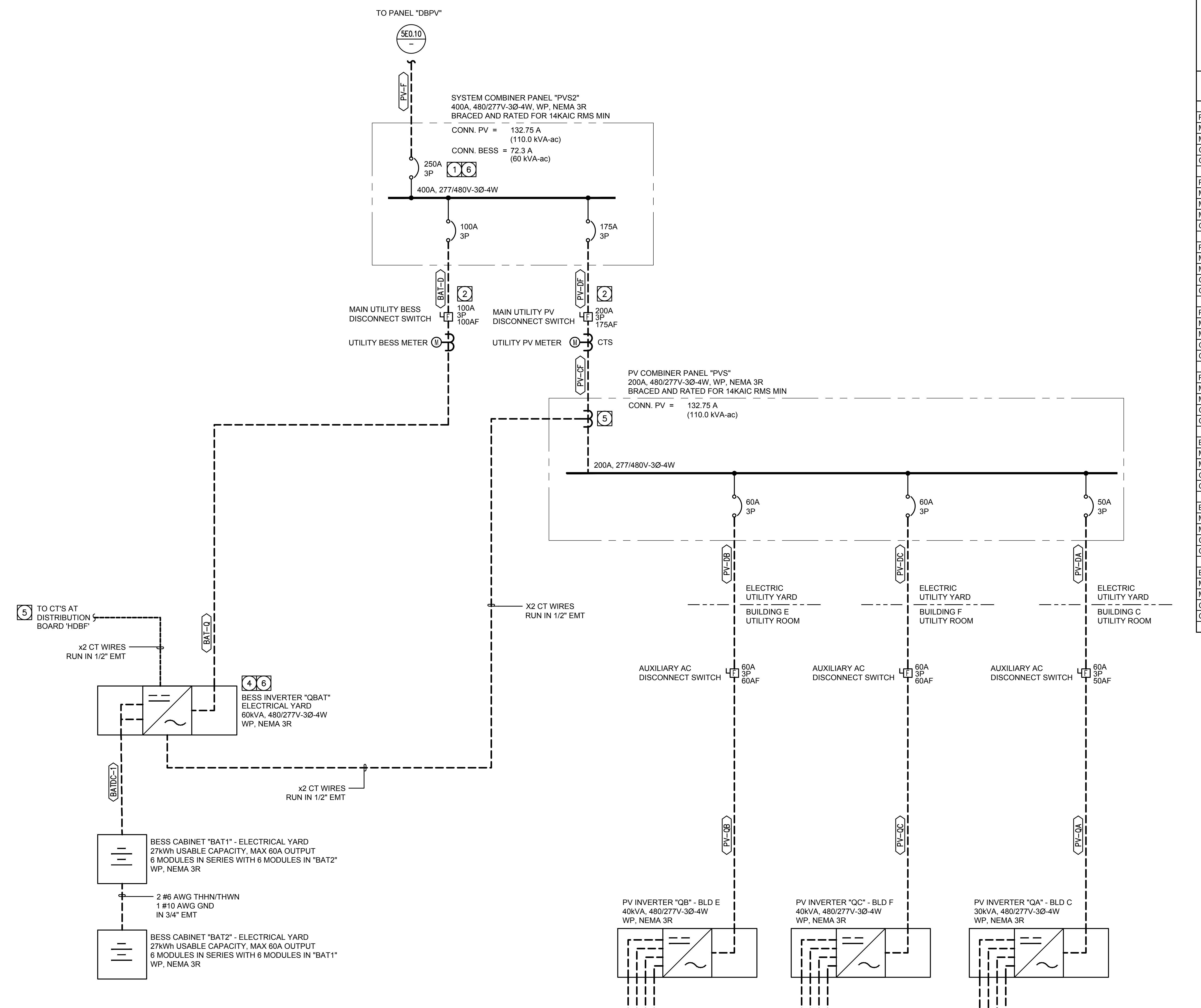
② PV FUSED DISCONNECT WITH VIEWABLE WINDOW, WITH AIC RATING AS INDICATED IN CONDUCTOR SCHEDULE. SEE SHEET 5PV0.01 AND PV0.02 NOTES FOR IDENTIFICATION AND LABEL REQUIREMENTS.

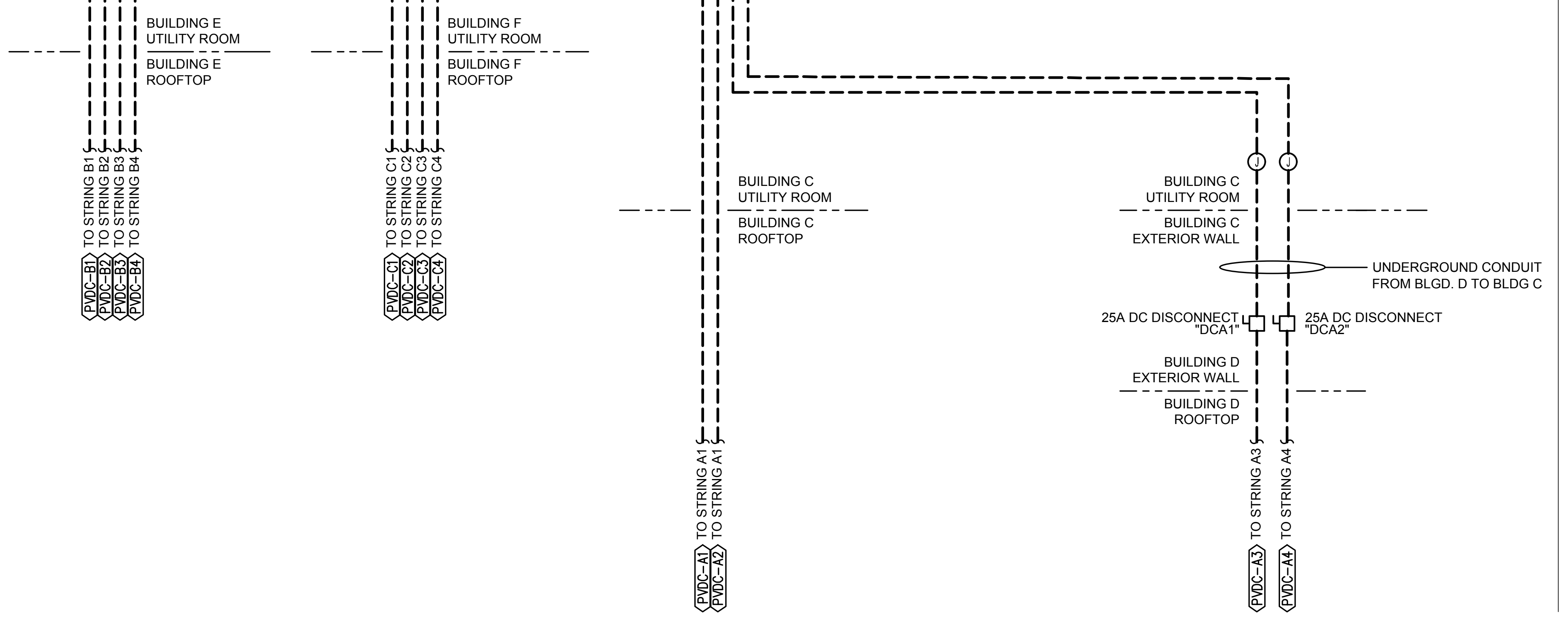
③ CIRCUIT BREAKERS IN PV COMBINER PANEL SHALL BE RATED FOR BACK FEED APPLICATION. PANELS AND BREAKERS ARE TO HAVE AIC RATING AS INDICATED IN CONDUCTOR SCHEDULE.

④ BESS INVERTER TO CHARGE/DISCHARGE ATTACHED BESS BATTERY.
CONTRACTOR SHALL CONFIGURE BESS FOR TIME OF USE (TOU) DISCHARGE PROFILE IN ACCORDANCE WITH JA11.

⑤ PV CURRENT TRANSFORMERS TO BESS INVERTER.

⑥ CONTRACTOR SHALL CONFIGURE THE BESS INVERTER POWER CONTROL SYSTEM TO LIMIT THE MAXIMUM OUTPUT OF THE SYSTEM COMBINER PANEL TO EXPORT NO MORE THAN : 166 kVA
MAX PV SUPPLY (UNCONTROLLED): 110.0 kVA
MAX BESS SUPPLY (CONTROLLED): 60.0 kVA


TO PANEL "DBPV"
5E0.10
–
PV-F
SYSTEM COMBINER PANEL "PVS2"
400A, 480/277V-3Ø-4W, WP, NEMA 3R
BRACED AND RATED FOR 14KAIC RMS MIN
CONN. PV = 132.75 A (110.0 kVA-ac)
CONN. BESS = 72.3 A (60 kVA-ac)
250A 3P
1 6
400A, 277/480V-3Ø-4W
100A 3P
175A 3P
BAT-D
2
MAIN UTILITY BESS DISCONNECT SWITCH
100A 3P 100AF
UTILITY BESS METER
M
PV-DF
2
MAIN UTILITY PV DISCONNECT SWITCH
200A 3P 175AF
UTILITY PV METER
CTS
PV-CF
PV COMBINER PANEL "PVS"
200A, 480/277V-3Ø-4W, WP, NEMA 3R
BRACED AND RATED FOR 14KAIC RMS MIN
CONN. PV = 132.75 A (110.0 kVA-ac)
5
200A, 277/480V-3Ø-4W
60A 3P
60A 3P
50A 3P
PV-DB
PV-DC
PV-DA
ELECTRIC UTILITY YARD
BUILDING E UTILITY ROOM
BUILDING F UTILITY ROOM
BUILDING C UTILITY ROOM
AUXILIARY AC DISCONNECT SWITCH
60A 3P 60AF
60A 3P 60AF
50A 3P 50AF
5
TO CT'S AT DISTRIBUTION BOARD 'HDBF'
x2 CT WIRES RUN IN 1/2" EMT
X2 CT WIRES RUN IN 1/2" EMT
BAT-Q
4 6
BESS INVERTER "QBAT"
ELECTRICAL YARD
60kVA, 480/277V-3Ø-4W
WP, NEMA 3R
x2 CT WIRES RUN IN 1/2" EMT
BATDC-1
BESS CABINET "BAT1" - ELECTRICAL YARD
27kWh USABLE CAPACITY, MAX 60A OUTPUT
6 MODULES IN SERIES WITH 6 MODULES IN "BAT2"
WP, NEMA 3R
2 #6 AWG THHN/THWN
1 #10 AWG GND
IN 3/4" EMT
BESS CABINET "BAT2" - ELECTRICAL YARD
27kWh USABLE CAPACITY, MAX 60A OUTPUT
6 MODULES IN SERIES WITH 6 MODULES IN "BAT1"
WP, NEMA 3R
PV-QB
PV-QC
PV-QA
PV INVERTER "QB" - BLD E
40kVA, 480/277V-3Ø-4W
WP, NEMA 3R
PV INVERTER "QC" - BLD F
40kVA, 480/277V-3Ø-4W
WP, NEMA 3R
PV INVERTER "QA" - BLD C
30kVA, 480/277V-3Ø-4W
WP, NEMA 3R


BUILDING E UTILITY ROOM
BUILDING E ROOFTOP
BUILDING F UTILITY ROOM
BUILDING F ROOFTOP
TO STRING B1
TO STRING B2
TO STRING B3
TO STRING B4
PVDC-B1
PVDC-B2
PVDC-B3
PVDC-B4
TO STRING C1
TO STRING C2
TO STRING C3
TO STRING C4
PVDC-C1
PVDC-C2
PVDC-C3
PVDC-C4
BUILDING C UTILITY ROOM
BUILDING C ROOFTOP
TO STRING A1
TO STRING A1
PVDC-A1
PVDC-A2
J
J
BUILDING C UTILITY ROOM
BUILDING C EXTERIOR WALL
UNDERGROUND CONDUIT FROM BLGD. D TO BLDG C
25A DC DISCONNECT "DCA1"
25A DC DISCONNECT "DCA2"
BUILDING D EXTERIOR WALL
BUILDING D ROOFTOP
TO STRING A3
TO STRING A4
PVDC-A3
PVDC-A4

EQUIPMENT SCHEDULE

PV MODULE (ALL INVERTERS)			
MAKE	CANADIAN SOLAR	VOC	39.3V
MODEL	CS6.1-54TM-460H TOPHiKu6	VMP	33.4V
OUTPUT	460W-dc	ISC	14.69A
QUANTITY	296	IMP	13.78A
PV OPTIMIZER (ALL INVERTERS)			
MAKE	SOLAREDGE		
MODEL	U650 OPTIMIZER		
MODULES PER	1 MODULE		
QUANTITY	120 OPTIMIZERS		
PV INVERTER "QA" (BUILDING C & D)			
MAKE	SOLAREDGE	STRING A1	20 MODULES
MODEL	SE30K	STRING A2	21 MODULES
OUTPUT	30,000VA	STRING A3	21 MODULES
QUANTITY	1	STRING A4	21 MODULES
PV INVERTER "QB" (BUILDING E)			
MAKE	SOLAREDGE	STRING B1	30 MODULES
MODEL	SE40K	STRING B2	30 MODULES
OUTPUT	40,000VA	STRING B3	27 MODULES
QUANTITY	1	STRING B4	27 MODULES
PV INVERTER "QC" (BUILDING F)			
MAKE	SOLAREDGE	STRING C1	26 MODULES
MODEL	SE40K	STRING C2	25 MODULES
OUTPUT	40,000VA	STRING C3	25 MODULES
QUANTITY	1	STRING C4	23 MODULES
BESS INVERTER "QBAT" (ELECTRICAL YARD)			
MAKE	SOL-ARK		
MODEL	60K-3P-480V		
OUTPUT	60,000VA		
QUANTITY	1		
BESS CABINET "BAT1/BAT2" (ELECTRICAL YARD)			
MAKE	ENDURENERGY		
MODEL	ESP-BU30		
CAPACITY	1-6 ESS UNITS		
QUANTITY	2		
ESS MODULE (ELECTRICAL YARD)			
MAKE	ENDURENERGY		
MODEL	SE40K		
CAPACITY	5kWh		
QUANTITY	12		

SHORT CIRCUIT CALCULATION
(BASED ON BUSSMANN METHOD)

OMB
Electrical Engineers, Inc.

VOLTAGE DROP CALCULATION
Ref: 2017 NEC Handbook, Table 9, Pages 1116 - 1118

OMB
Electrical Engineers, Inc.

Source Point	Source AFC Amps	Calculating Point	Phase Type	Line Voltage Volts	Ckt or OCP Amps	Conductor / Bus Insulation	Conductor / Bus Type	Conductor / Bus Feeder Name	Conductor / Bus Size	Adjusted Allow Amps	Conduit Material	Conduit Type	Conduit Size (q'ty) dia.	Length L (ft)	AFC Amps	AIC rating minimum	Loads Calculate @	Calculated Loads KVA	Calculated Loads Amps	PF %	Z_C Ω/1000ft	circuit VD%	total VD%	Notes
	65,000	DIST BOARD "DBPV"	3Ø4W	480											65,000	65K								
DIST BOARD "DBPV"	65,000	SYSTEM COMBINER "PVS2"	3Ø4W	480	250	THHN/THWN	sgl cond 600V Cu	PV-F	2 Sets of 4 #3/0 AWG & #3 AWG Gnd	383	PVC	PVC80	(2) 2 1/2"	550	11,540	14K	80%	166.3	200.0	100%	0.082	1.63%	**1.63%**	♦
SYSTEM COMBINER "PVS2"	11,540	PV DISCONNECT "PVD"	3Ø4W	480	250	THHN/THWN	sgl cond 600V Cu	PV-DF	2 Sets of 4 #2/0 AWG & #4 AWG Gnd	320	PVC	PVC80	(2) 2"	5	11,436	14K	80%	166.3	200.0	100%	0.100	0.02%	**1.65%**	
PV DISCONNECT "PVD"	11,436	PV COMBINER "PVS"	3Ø4W	480	200	THHN/THWN	sgl cond 600V Cu	PV-CF	1 Set of 4 #3/0 AWG & #6 AWG Gnd	185	PVC	PVC80	2"	5	11,269	14K	80%	133.0	160.0	100%	0.082	0.02%	**1.67%**	
	-														-				-		-			
PV COMBINER "PVS"	11,269	PV DISCONNECT "PVDA"	3Ø4W	480	60	THHN/THWN	sgl cond 600V Cu	PV-AD	1 Set of 4 #2 AWG & #8 AWG Gnd	95	PVC	PVC80	1 1/2"	200	4,804	14K	80%	39.9	48.0	100%	0.200	0.69%	**2.36%**	♦
PV DISCONNECT "PVDA"	4,804	PV INVERTER "QA"	3Ø4W	480	60	THHN/THWN	sgl cond 600V Cu	PV-QA	1 Set of 4 #4 AWG & #10 AWG Gnd	70	Steel	EMT	1 1/4"	3	4,740	14K	80%	39.9	48.0	100%	0.310	0.02%	**2.38%**	
PV INVERTER "QA"	4,740	PV STRING "A1"	3Ø4W	480	25	THHN/THWN	sgl cond 600V Cu	PVDC-A1	1 Set of 4 #8 AWG & #8 AWG Gnd	40	Steel	EMT	3/4"	75	2,599	14K	80%	16.6	20.0	100%	0.780	0.42%	**2.80%**	♦
PV INVERTER "QA"	4,740	PV STRING "A2"	3Ø4W	480	25	THHN/THWN	sgl cond 600V Cu	PVDC-A2	1 Set of 4 #10 AWG & #10 AWG Gnd	30	Steel	EMT	1/2"	65	2,222	14K	80%	16.6	20.0	100%	1.200	0.56%	**2.94%**	
PV INVERTER "QA"	4,740	DC DISCONNECT "DCA1"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-A1D	1 Set of 2 #10 AWG & #10 AWG Gnd	30	PVC	PVC80	1/2"	50	3,197	14K	80%	20.0	20.0	100%	1.200	0.24%	**2.62%**	
DC DISCONNECT "DCA1"	3,197	PV STRING "A3"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-A3	1 Set of 2 #8 AWG & #8 AWG Gnd	40	Steel	EMT	1/2"	105	2,234	14K	80%	20.0	20.0	100%	0.780	0.33%	**2.95%**	♦
PV INVERTER "QA"	4,740	DC DISCONNECT "DCA2"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-A2D	1 Set of 2 #10 AWG & #10 AWG Gnd	30	PVC	PVC80	1/2"	50	3,197	14K	80%	20.0	20.0	100%	1.200	0.24%	**2.62%**	
DC DISCONNECT "DCA2"	3,197	PV STRING "A4"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-A4	1 Set of 2 #8 AWG & #8 AWG Gnd	40	Steel	EMT	1/2"	120	2,141	14K	80%	20.0	20.0	100%	0.780	0.37%	**2.99%**	♦
	-														-				-		-			
PV COMBINER "PVS"	11,269	PV DISCONNECT "PVDB"	3Ø4W	480	60	THHN/THWN	sgl cond 600V Cu	PV-BD	1 Set of 4 #4 AWG & #10 AWG Gnd	70	PVC	PVC80	1 1/4"	75	6,270	14K	80%	39.9	48.0	100%	0.310	0.40%	**2.07%**	
PV DISCONNECT "PVDB"	6,270	PV INVERTER "QB"	3Ø4W	480	60	THHN/THWN	sgl cond 600V Cu	PV-QB	1 Set of 4 #4 AWG & #10 AWG Gnd	70	Steel	EMT	1 1/4"	5	6,089	14K	80%	39.9	48.0	100%	0.310	0.03%	**2.10%**	
PV INVERTER "QB"	6,089	PV STRING "B1"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-B1	1 Set of 2 #10 AWG & #10 AWG Gnd	30	Steel	EMT	1/2"	25	4,647	14K	80%	20.0	20.0	100%	1.200	0.12%	**2.22%**	
PV INVERTER "QB"	6,089	PV STRING "B2"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-B2	1 Set of 2 #8 AWG & #8 AWG Gnd	40	Steel	EMT	1/2"	75	3,838	14K	80%	20.0	20.0	100%	0.780	0.23%	**2.33%**	♦
PV INVERTER "QB"	6,089	PV STRING "B3"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-B3	1 Set of 2 #10 AWG & #10 AWG Gnd	30	Steel	EMT	1/2"	125	2,386	14K	80%	20.0	20.0	100%	1.200	0.60%	**2.70%**	
PV INVERTER "QB"	6,089	PV STRING "B4"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-B4	1 Set of 2 #8 AWG & #8 AWG Gnd	40	Steel	EMT	1/2"	160	2,705	14K	80%	20.0	20.0	100%	0.780	0.50%	**2.60%**	♦
	-														-				-		-			
PV COMBINER "PVS"	11,269	PV DISCONNECT "PVDC"	3Ø4W	480	50	THHN/THWN	sgl cond 600V Cu	PV-CD	1 Set of 4 #6 AWG & #10 AWG Gnd	55	PVC	PVC80	1"	100	4,215	14K	80%	33.3	40.0	100%	0.490	0.71%	**2.38%**	
PV DISCONNECT "PVDC"	4,215	PV INVERTER "QC"	3Ø4W	480	50	THHN/THWN	sgl cond 600V Cu	PV-QD	1 Set of 4 #6 AWG & #10 AWG Gnd	55	Steel	EMT	1"	3	4,137	14K	80%	33.3	40.0	100%	0.490	0.02%	**2.40%**	
PV INVERTER "QC"	4,137	PV STRING "C1"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-C1	1 Set of 2 #10 AWG & #10 AWG Gnd	30	Steel	EMT	1/2"	40	3,094	14K	80%	20.0	20.0	100%	1.200	0.19%	**2.59%**	
PV INVERTER "QC"	4,137	PV STRING "C2"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-C2	1 Set of 2 #8 AWG & #8 AWG Gnd	40	Steel	EMT	1/2"	65	3,075	14K	80%	20.0	20.0	100%	0.780	0.20%	**2.60%**	♦
PV INVERTER "QC"	4,137	PV STRING "C3"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-C3	1 Set of 2 #10 AWG & #10 AWG Gnd	30	Steel	EMT	1/2"	120	2,056	14K	80%	20.0	20.0	100%	1.200	0.58%	**2.97%**	
PV INVERTER "QC"	4,137	PV STRING "C4"	1Ø2W	1000	25	THHN/THWN	sgl cond 600V Cu	PVDC-C4	1 Set of 2 #8 AWG & #8 AWG Gnd	40	Steel	EMT	1/2"	150	2,302	14K	80%	20.0	20.0	100%	0.780	0.47%	**2.87%**	♦
	-														-				-		-			
SYSTEM COMBINER "PVS2"	11,540	BESS DISCONNECT "BATD"	3Ø4W	480	90	THHN/THWN	sgl cond 600V Cu	BAT-D	1 Set of 4 #2 AWG & #8 AWG Gnd	95	PVC	PVC80	1 1/2"	6	11,082	14K	80%	59.9	72.0	100%	0.200	0.03%	**1.66%**	
BESS DISCONNECT "BATD"	11,082	BESS INVERTER "QBAT"	3Ø4W	480	100	THHN/THWN	sgl cond 600V Cu	BAT-Q	1 Set of 4 #1 AWG & #8 AWG Gnd	110	PVC	PVC80	1 1/2"	10	10,520	14K	80%	66.5	80.0	100%	0.160	0.05%	**1.70%**	
BESS INVERTER "QBAT"	10,520	BESS CABINET "BAT1"	1Ø2W	336	60	THHN/THWN	sgl cond 600V Cu	BATDC-1	1 Set of 2 #4 AWG & #10 AWG Gnd	70	PVC	PVC80	1"	2	10,187	14K	80%	16.1	48.0	100%	0.310	0.02%	**1.72%**	
BESS CABINET "BAT1"	10,187	BESS CABINET "BAT2"	1Ø2W	336	60	THHN/THWN	sgl cond 600V Cu	BATDC-2	1 Set of 2 #4 AWG & #10 AWG Gnd	70	PVC	PVC80	1"	10	8,793	14K	80%	16.1	48.0	100%	0.310	0.09%	**1.81%**	
	-														-				-		-			
	-														-				-		-			

NOTES:
♦ Equipment Grounding Conductors have been increased to comply with NEC 250.122 (B) & (F).

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

Salas O'Brien
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

Exp. 09/30/26

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE
NO. C-014869
REN. 05-31-27

ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

PV SINGLE LINE DIAGRAM

5PV0.11

SCALE: AS INDICATED
PLOT DATE

STATE OF CALIFORNIA

Solar And Battery

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	**NRCC-SAB-E**

This document is used to demonstrate compliance with prescriptive PV and battery requirements in 140.10/170.2 for nonresidential, multifamily and mixed-use buildings and prescriptive solar thermal requirements in 170.2(d)3C for multifamily and hotel/ motel occupancies. When PV/battery/solar thermal requirements don't apply or are traded using the performance approach, this document demonstrates compliance with mandatory solar readiness requirements in 110.10/ 160.8 for newly constructed buildings which are either multifamily ten stories or fewer, hotel/motel ten stories or fewer or all other nonresidential buildings three stories or fewer. It is also used to demonstrate compliance with solar readiness in 110.10/ 160.8 for additions to nonresidential, multifamily or hotel/motel building types which add more than 2,000 ft^2 of roof area. Alterations, or additions of less than 2,000 ft^2 of roof area, are not required to comply with solar readiness, solar PV and battery requirements and do not need to complete this document.

Project Name: Paradise Canyon Elementary School - Pkg 5	**Report Page:** (Page 1 of 6)
Project Address: 471 K W L C d F r d CA 91011	**Date Prepared:** 2026-03-16T15:01:48-04:00

A. GENERAL INFORMATION

01	Project Location (city)	La Cañada Flintridge	04	Building Occupancies	School or Classroom
02	Climate Zone	9	05	Construction Type	New construction
03	Conditioned Floor Area (ft^2)	17714	06	Number of Stories	Bldg <= 3 stories

B. PROJECT SCOPE

The compliance path the project is using to comply per 110.10(b)1B/ 140.10/ 170.2(g and h) is indicated below.

Compliance with Solar Photovoltaic (PV) and Battery Requirements in 140.10/ 170.2(g and h)

	01	
☒	Provided PV system and battery storage sized per 140.10/ 170.2 (g and h)	The project has included an installed PV system and battery storage system per requirements in 140.10/ 170.2(g and h) as documented in Table J.
☐	Exception to PV and Battery: Not enough Solar Access Roof Area	The total of all available Solar Access Roof Area(s) of the project site is less than three percent of the conditioned floor area as documented in Table J.
☐	Exception to PV and Battery: Required PV < 4kW	The required PV system size is less than 4 kW dc as documented in Table J..
☐	Exception to PV and Battery: No contiguous Solar Access Roof Area	The Solar Access Roof Area(s) of the project site contains less than 80 contiguous square feet as documented in Table J.
☐	Exception to PV and Battery: Can't meet snow load	The project has a roof design where the enforcement authority has verified it is not possible for the PV system, including panels, modules, components, supports, and attachments to the roof structure, to meet ASCE 7-16 Chapter 7, Snow Loads.
☐	Exception to PV and Battery: Multi-tenant without VNEM or Community Solar	The project is a multi-tenant building in an area where a load serving entity does not provide either a Virtual Net Metering (VNEM) or community solar program.
☐	The prescriptive PV/battery requirement has been traded off using the performance compliance approach as documented on the PRF Certificate of Compliance form.	

STATE OF CALIFORNIA

Solar And Battery

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	**NRCC-SAB-E**
Project Name: Paradise Canyon Elementary School - Pkg 4	**Report Page:** (Page 4 of 6)
	Date Prepared: 2026-03-16T15:01:48-04:00

J. PHOTOVOLTAIC (PV) AND BATTERY SYSTEMS

This table documents compliance with prescriptive photovoltaic and battery system requirements in 140.10/ 170.2(g and h). Unless the project meets one of the listed exceptions, or trades-off PV in an energy model using performance path, 140.10/ 170.2(g and h) requires installed photovoltaic and battery systems for newly constructed buildings. The installed PV systems must meet the minimum requirements in Joint Appendix 11.

Photovoltaic (PV) System

01	02	03	04	05	06	07	08
Occupancy	Conditioned Floor Area (ft^2)	Area of New Roof[1] (ft^2)	Roof Area < 70% Solar Access[2] (ft^2)	Plansheet or Document showing Solar Access Calculations	Occupied Roof Area[3] (ft^2)	Solar Access Roof Area (SARA) (ft^2)	Min Size of PV System Required (kWdc)
School or Classroom	2,534	3,097	0	See sheet 5PV1.00.	0	3,097	4.13
School or Classroom	2,534	3,097	0	See sheet 5PV1.00.	0	3,097	4.13
School or Classroom	6,568	8,053	0	See sheet 5PV1.00.	0	8,053	10.71
School or Classroom	6,078	7,434	0	See sheet 5PV1.00.	0	7,434	9.91
						Total Min Size PV System Required for all Spaces (kWdc):	303
						Total Size PV System in Design (kWdc):	136.16

[1] FOOTNOTES: Includes the area of the building's roof space capable of structurally supporting a PV system and the area of all roof space on covered parking areas, carports, and all other newly constructed structures on the site that are compatible with supporting a PV system per Title 24, Part 2 Section 1511.2.

[2] Solar access must be determined using CEC approved solar access calculation tools found at https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/solar-assessment-tools.

[3] As specified by CBC Section 503.1.4.

STATE OF CALIFORNIA

Solar And Battery

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	**NRCC-SAB-E**
Project Name: Paradise Canyon Elementary School - Pkg 5	**Report Page:** (Page 2 of 6)
	Date Prepared: 2026-03-16T15:01:48-04:00

Compliance with Solar Thermal Water Heating Requirements in 170.2(d)3C (Multifamiily and hotel/ motel occupancies only)

	01
☐	The project includes a hotel/motel or multifamily occupancy with a gas or propane central water-heating system (serves 2+ dwelling units) and includes a permanently installed domestic solar water-heating system to comply with 170.2(d)3C and Reference Residential Appendix RA4, as documented in Table H. Compliance meets Exception 2 to solar ready requirements in 110.10(b).

C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through I. Note: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance or see the applicable Table referenced below.

<table>
<tr><th colspan="3">Allocated Solar Zone</th><th rowspan="3">OR</th><th colspan="3">Installed PV System</th><th rowspan="3">OR</th><th colspan="3">Installed SWH System</th><th rowspan="3">OR</th><th colspan="2">Smart Tstat and Alternative EE Measure</th><th>Compliance Results</th></tr>
<tr><td>01</td><td rowspan="2"><=</td><td>02</td><td>03</td><td rowspan="2"><=</td><td>04</td><td>05</td><td rowspan="2"><=</td><td>06</td><td>07</td><td>08</td><td rowspan="4">COMPLIES</td></tr>
<tr><td>Required Minimum Area (ft²)</td><td>Designated Area (ft²)</td><td>Required Minimum DC Power Rating (Watts)</td><td>Designed DC Power Rating (Watts)</td><td>Required Minimum Solar Savings Fraction</td><td>Designed/Rated Solar Savings Fraction</td><td>JA5 Compliant Thermostat Specified?</td><td>Alternative Energy Efficiency Measure</td></tr>
<tr><td colspan="3">(See Table F)</td><td></td><td colspan="3">(See Tables G or J)</td><td></td><td colspan="3">(See Table H)</td><td></td><td colspan="2">(See Table I)</td></tr>
<tr><td></td><td><=</td><td></td><td>OR</td><td>28,880</td><td><=</td><td>136,160</td><td>OR</td><td></td><td><=</td><td></td><td>OR</td><td></td><td></td></tr>
<tr><td colspan="3"></td><td colspan="11">Location in construction documents showing the location for inverters and metering equipment and a pathway for the routing of conduit/ plumbing to the electrical service/ water heating system per §110.10(c).</td><td></td></tr>
<tr><td colspan="14">Battery storage system design meets the minimum requirements in Joint Appendix JA12 and the minimum energy (kWh)/ power (kW) capacity per Table J.</td><td>COMPLIES</td></tr>
</table>

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

One or more tenant building types within your project has less than 5,000 sf of conditioned space. This building type will not be factored into the battery sizing calculation per Exception 3 to Section 140.10(b)

STATE OF CALIFORNIA

Solar And Battery

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	**NRCC-SAB-E**
Project Name: Paradise Canyon Elementary School - Pkg 5	**Report Page:** (Page 5 of 6)
	Date Prepared: 2026-03-16T15:01:48-04:00

Battery Storage System

01	02	03	04	05
Space Type	Min Size of PV Applicable To Battery Sizing (kWdc)	Rated Single Charge-Discharge AC Efficiency of Battery System[1]	Min Battery Rated Energy Capacity Required (kWh)	Min Power Capacity of Battery Required (kWdc)
School or Classroom	4.13	0.9	8.14	1.89
School or Classroom	4.13	0.9	8.14	1.89
School or Classroom	10.71	0.9	21.11	4.92
School or Classroom	9.91	0.9	19.53	4.55
		Total Min Energy (kWh) and Power (kW) Capacity Required	40.65	9.49
		Total Energy (kWh) and Power (kW) Capacity in Design	54	36.86

[1] FOOTNOTE: Rated single charge-discharge cycle AC to AC (round trip) efficiency of the battery storage system

K. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selections have been changed by the permit applicant, an explanation should be included Table E. Additional Remarks and ExceptionalConditionMessageCCSABE += UserChangedSelectionInCI. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-SAB-01-E - Must be submitted for all buildings that must comply with solar readiness or PV/Battery requirements.

L. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no forms required for this project.

STATE OF CALIFORNIA

Solar And Battery

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	**NRCC-SAB-E**
Project Name: Paradise Canyon Elementary School - Pkg 5	**Report Page:** (Page 3 of 6)
	Date Prepared: 2026-03-16T15:01:48-04:00

E. ADDITIONAL REMARKS

This table is includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. ALLOCATED SOLAR ZONE

This section does not apply to this project.

G. PERMANENTLY INSTALLED SOLAR PV FOR SOLAR READY EXCEPTION

This section does not apply to this project.

H. PERMANENTLY INSTALLED SOLAR HOT WATER SYSTEMS

This section does not apply to this project.

I. SMART THERMOSTATS AND ALTERNATIVE EFFICIENCY MEASURE FOR SOLAR READY EXCEPTION

This section does not apply to this project.

STATE OF CALIFORNIA

Solar And Battery

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	**NRCC-SAB-E**
Project Name: Paradise Canyon Elementary School - Pkg 5	**Report Page:** (Page 6 of 6)
Project Address: 471 Knight Way, La Cañada Flintridge, CA 91011	**Date Prepared:** 2026-03-16T15:01:48-04:00

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Margo Marcinkowski	Documentation Author Signature:
Company: Salas O'Brien	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Margo Marcinkowski	Responsible Designer Signature:
Company: Salas O'Brien	Date Signed:
Address:	License:
City/State/Zip:	Phone:

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

Salas O'Brien
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

ROY L. LOPEZ
No. 13442
Exp. 09/30/26
ELECTRICAL

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE
NO. C-014869
REN. 05-31-27

ISSUE DATE	DESCRIPTION
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08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

PV TITLE 24
COMPLIANCE FORMS

5PV0.50

SCALE: AS INDICATED

PLOT DATE

SEE DETAIL
2/5E0.60

FIRE PENETRATION DETAIL

SCALE
NONE
1

SEE DETAIL
4/5E0.60

TYPICAL TRENCH DETAIL (CONCRETE ENCASED)

SCALE
NONE
2

SEE DETAIL
8/5E0.61

CONDUIT AT SEISMIC JOINT DETAILS

SCALE
NONE
4

SEE STRUCTURAL DETAIL
8/5PV3.20

TYPICAL INVERTER MOUNTING DETAIL

SCALE
NONE
3

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#	REVISION DATE	DESCRIPTION

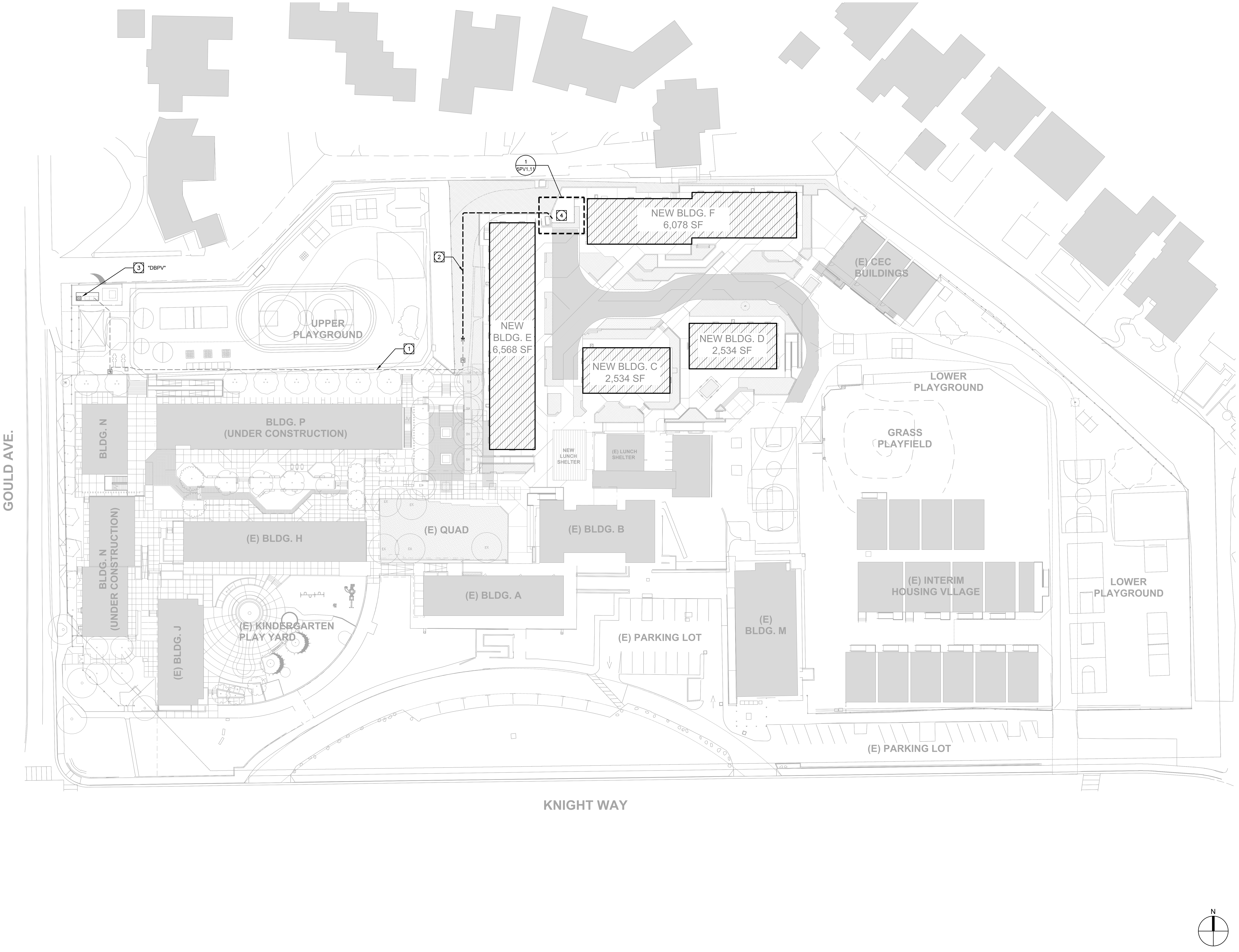
DRAWING TITLE

PV
ELECTRICAL DETAILS

5PV0.60

SCALE: AS INDICATED

PLOT DATE


NEW BLDG. F
6,078 SF
NEW BLDG. E
6,568 SF
NEW BLDG. D
2,534 SF
NEW BLDG. C
2,534 SF
1
5PV1.11
1
2
3
"DBPV"
4
UPPER PLAYGROUND
(E) CEC BUILDINGS
LOWER PLAYGROUND
GRASS PLAYFIELD
BLDG. N
BLDG. P
(UNDER CONSTRUCTION)
NEW LUNCH SHELTER
(E) LUNCH SHELTER
(E) BLDG. H
(E) QUAD
(E) BLDG. B
BLDG. N
(UNDER CONSTRUCTION)
(E) BLDG. A
(E) BLDG. J
(E) KINDERGARTEN PLAY YARD
(E) PARKING LOT
(E)
BLDG. M
(E) INTERIM HOUSING VLLAGE
LOWER PLAYGROUND
(E) PARKING LOT
GOULD AVE.
KNIGHT WAY
N

PV OVERALL SITE PLAN	SCALE NOT TO SCALE	1

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

BUILDING AND ROOF AREA INFORMATION

	CONDITIONED FLOOR AREA	TOTAL ROOF AREA	SOLAR ZONE
BUILDING C	2,534 SF	3,097 SF	1,494 SF
BUILDING D	2,534 SF	3,097 SF	1,375 SF
BUILDING E	6,568 SF	8,053 SF	3,549 SF
BUILDING F	6,078 SF	7,434 SF	3,324 SF
TOTAL	17,714 SF	21,681 SF	9,742 SF

PRESCRIPTIVE PV REQ.

	BLDG C	BLDG D	BLDG E	BLDG F
GROSS AREA:	2,534ft^2	2,534ft^2	6,568ft^2	6,078ft^2
REQ. PV SIZE:	4.13kW	4.13kW	10.71kW	9.91kW
REQUIRED BESS CAPACITY:	N/A* ~~8.14kWh~~	N/A* ~~8.14kWh~~	21.11kWh	19.53kWh
REQUIRED BESS OUTPUT:	N/A* ~~1.89kW~~	N/A* ~~1.89kW~~	4.92kW	4.55kW

*SECTION 140.10(B)
EXCEPTION 2:
NO BATTERY STORAGE SYSTEM IS REQUIRED IN BUILDINGS WITH BATTERY STORAGE SYSTEM REQUIREMENT LESS THAN 10kWh.

NOTE: AN ASSUMED BATTERY EFFICIENCY OF 89.9% WAS USED IN THESE CALCULATIONS.

TOTAL REQUIRED PV SYSTEM SIZE:	28.88 kW
DESIGNED PV SYSTEM SIZE:	136.16 kW

DESIGNED PV SYSTEM SIZE IS IN COMPLIANCE WITH PRESCRIPTIVE MINIMUMS.

TOTAL REQUIRED BESS CAPACITY:	40.65 kWh
DESIGNED NAMEPLATE BESS CAPACITY:	60.00 kWh
DESIGNED USABLE BESS CAPACITY:	54.00 kWh

DESIGNED BESS SIZE IS IN COMPLIANCE WITH PRESCRIPTIVE MINIMUMS.

TOTAL REQUIRED BESS OUTPUT:	9.49 kW
DESIGNED BESS OUTPUT:	36.86 kW

DESIGNED BESS OUTPUT IS IN COMPLIANCE WITH PRESCRIPTIVE MINIMUMS.

SITE PLAN NOTES

1. EXISTING UNDERGROUND ELECTRICAL CONDUIT AND PULL BOXES. LOCATION PROVIDED FOR REFERENCE ONLY. REFER TO SHEET 5E1-11 FOR MORE INFORMATION. CONTRACTOR TO VERIFY CONDUIT LOCATION AND SIZE PRIOR TO ROUGH-IN.
2. NEW UNDERGROUND ELECTRICAL CONDUIT AND PULL BOXES. LOCATION PROVIDED FOR REFERENCE ONLY. REFER TO SHEET 5E1-11 FOR MORE INFORMATION. CONTRACTOR TO VERIFY CONDUIT LOCATION AND SIZE PRIOR TO ROUGH-IN.
3. LOCATION OF EXISTING DISTRIBUTION BOARD "DBPV". REFER TO 5PV0.10 FOR INTERCONNECTION INFORMATION.
4. LOCATION OF NEW ELECTRICAL EQUIPMENT PAD, PV/BESS AC COMBINER PANELS "PVS" AND "PVS2," AND BESS EQUIPMENT. REFER TO ENLARGEMENT 1/5PV1.11 FOR EQUIPMENT LOCATIONS.

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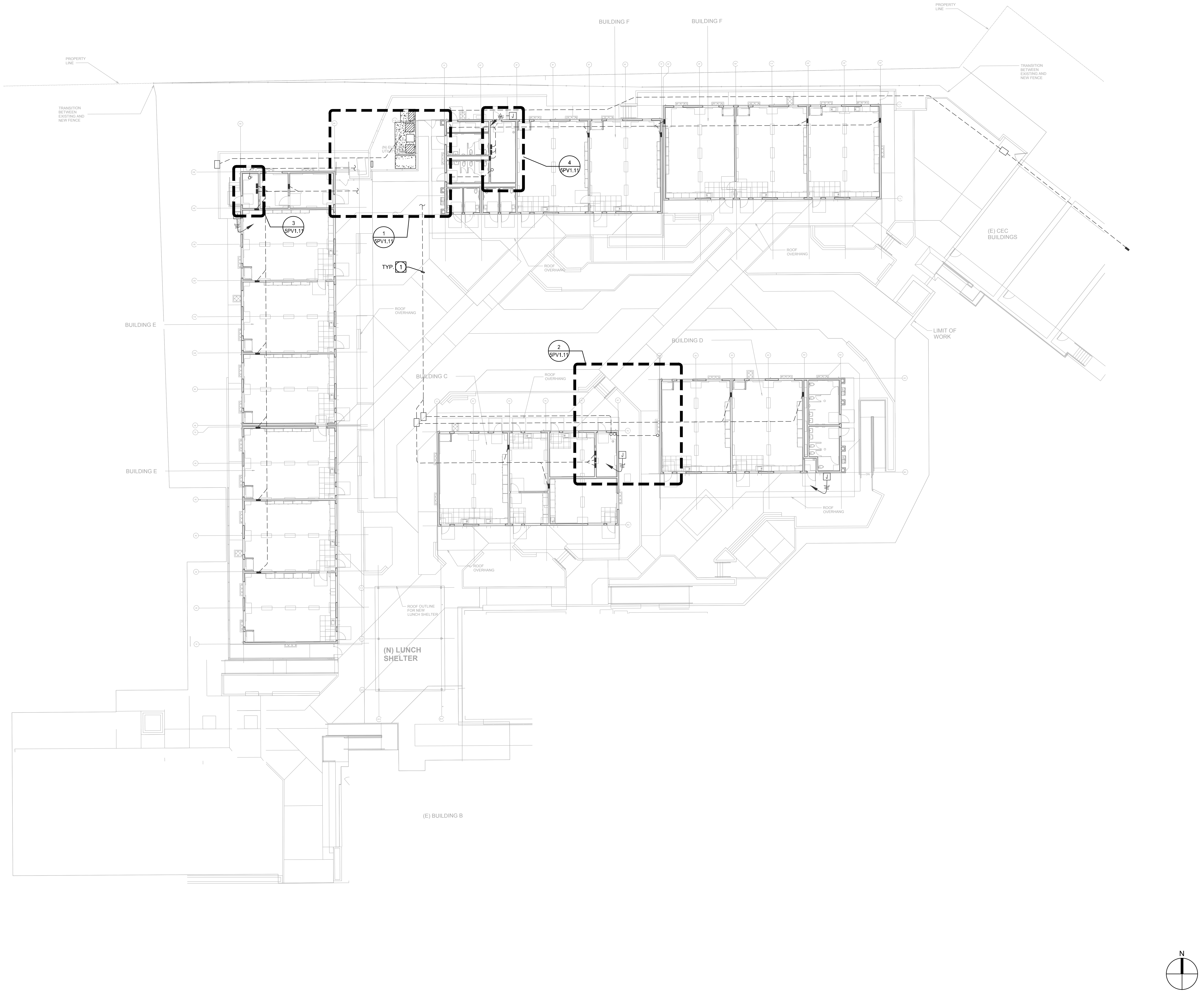
DRAWING TITLE

PV
OVERALL SITE PLAN

5PV1.00

SCALE: AS INDICATED
PLOT DATE



PV FIRST FLOOR PLAN

SCALE
1/16"=1'-0"
1

GENERAL NOTES

THE FOLLOWING NOTES ARE PROVIDED AS A BASELINE TO ESTABLISH MINIMUM LEVEL REQUIREMENTS, FOR QUALITY OF WORK AND FOR COORDINATION. ANY UTILITY COMPANY PLANS AND REQUIREMENTS SHALL TAKE PRECEDENCE OVER RESPECTIVE UTILITY STRUCTURE WORK.

1. CALL UNDERGROUND SERVICE ALERT (USA) AT 800-422-4133, OR APPLICABLE STATE AND LOCAL DIG SAFE OR UNDERGROUND ALERT HOTLINES PRIOR TO START OF CONSTRUCTION WORK.
2. COORDINATE ALL UNDERGROUND STRUCTURES AND CONDUIT ROUTING WITH ARCHITECT/LANDSCAPE ARCHITECT PRIOR TO ROUGH-IN TO ENSURE THAT SUCH ITEMS ARE NOT PLACED IN CIRTICAL LANDSCAPE PLANTING/HARDSCAPE AREAS.
3. ALL CONDUITS ROUTED ON SITE, INCLUDING ENTRANCES AND EXITS TO SITE OR CUSTOMER OWNED UTILITY VAULTS, MAINTENANCE HOLES, HAND HOLES, PULL BOXES, ETC. SHALL MAINTAIN A MINIMUM COVER OF 24" BELOW FINISH GRADE AT ALL CONDITIONS, UNLESS OTHERWISE NOTED. ALL COSTS SHALL BE INCLUDED IN BASE BID FOR ANY SPECIFIC UTILITY COMPANY CONDUIT DEPTHS AND REQUIREMENTS IN EXCESS OF 24"BELOW FINISH GRADE.
4. VAULTS, MANHOLES AND PULL BOXES SHALL BE EQUIPPED WITH KNOCKOUT PANELS OR PRECAST INDIVIDUAL CONDUIT OPENINGS. CONDUITS SHALL ONLY ENTER AND EXIT ON END/SHORT WALLS. CONDUITS MAY NOT ENTER AND EXIT ON SIDE/LONG WALLS, FLOORS OR CEILING UNLESS SPECIFICALLY NOTED. CONTRACTOR SHALL INCLUDE PROPOSED CONDUIT ENTRY/EXIT DIAGRAMS AS PART OF SUBMITTALS.
5. VAULTS, MANHOLES AND PULL BOXES SHALL BE SLURRY BACKFILLED 5' AROUND DUCTS OUT FROM VAULT WALL ENTRANCE/EXIT LOCATIONS. DUCTS SHALL BE INSTALLED/CUT FLUSH WITH INTERIOR OF VAULT, MANHOLE OR PULLBOX WALLS AND GROUTED AROUND ENTRANCES.
6. CONDUITS PASSING UNDER BUILDING PERIMETERS SHALL BE ENCASED IN LIGHTWEIGHT CONCRETE OR OTHER APPROVED IMPERVIOUS MATERIAL TO PREVENT WATER INFILTRATION.
7. CONDUIT BEND RADII FOR BUILDING ENTRANCES AND AT POLES SHALL BE MINIMUM 24" FOR CONDUITS 2" AND LESS INTERNAL DIAMETER AND MINIMUM 48" FOR CONDUITS GREATER THAN 2" INTERNAL DIAMETER.
8. PROVIDE CONDUIT SWEEP RADIUS BETWEEN VAULTS OF 20 FEET WITH MAXIMUM OF (2) 90 DEGREE SWEEPS BETWEEN VAULTS. MINIMUM RADIUS OF 12'6" SHALL BE APPROVED THROUGH RFI PROCESS.
9. ALL VAULTS, MANHOLES AND PULL BOXES SHALL BE EQUIPPED WITH RACKING, GROUNDING, LUGS AND BOLT-DOWN COVERS UNLESS NOTED OTHERWISE.
10. VAULTS AND MANHOLES SHALL BE PROVIDED WITH ROUND COVERS AND EXTENSION RINGS, AS REQUIRED, FOR INSTALLATION FLUSH WITH FINISH GRADE. PROVIDE EACH VAULT AND MANHOLE WITH PERSONNEL LADDER AND (3) SEGMENTS OF WALL TO WALL CABLE RACKING ON EACH LONG WALL.
11. VAULTS, MANHOLES AND PULL BOX COVERS/LIDS SHALL BE IDENTIFIED PER SPECIFICATIONS (I.E. POWER, SIGNAL, FIRE, ETC.), INCLUDING ALL INTERIOR LINE AND LOW VOLTAGE CABLING, AND SPARE CONDUITS.
12. PROVIDE 8" DEEP COMPACTED ½"DIA GRAVEL BASE UNDER EACH VAULT, MANHOLE OR PULL BOX ENSURING EVEN DISTRIBUTION OF INSTALLATION PRESSURE ON FLOOR OF STRUCTURE AND DRAINAGE OF LIQUID FROM VAULT FLOOR.
13. VAULTS, MANHOLES AND PULL BOXES SHALL BE PROVIDED WITH AN 8' X ¾"DIA COPPER CLAD GROUND ROD DRIVEN THROUGH A DESIGNATED CORED HOLE IN THE FLOOR TO ALLOW FOR GROUNDING OF ITEMS WITHIN.
14. VAULTS, MANHOLES AND PULL BOXES LOCATED IN PAVED OR POTENTIAL/PERCEIVED TRAFFIC AREAS SHALL BE PROVIDED WITH H20 LOADING, TRAFFIC RATED COVERS.
15. CONTRACTOR SHALL INCLUDE AS PART OF HIS BASE BID ALL COSTS TO COMPLY WITH ALL REQUIREMENTS FOR CONFINED SPACE ENTRY PER CAL OSHA REQUIREMENTS 29 CFR-1910.146, 29 CFR-1910.268, ETC. DURING ANY CONFINED SPACE ENTRY.
16. ANY DUCTS LEAVING A VAULT, MANHOLE OR PULLBOX ROUTED INTO A FACILITY SHALL BE PLUGGED AT EACH END UTILIZING APPROPRIATELY SIZED CARLON OR JACKMOON REMOVABLE MECHANICAL PLUGS TO PREVENT THE INFILTRATION OF GAS AND/OR WATER INTO THE FACILITY.
17. CONTRACTOR SHALL SEAL ALL UNDERGROUND DUCTS BETWEEN VAULTS, MANHOLES AND PULLBOXES WITH APPROPRIATELY SIZED CARLON OR JACKMOON MECHANCIAL DUCT PLUGS UNLESS NOTED OTHERWISE. DUCT PLUG MUST RESULT IN A WATER/GAS AND AIRTIGHT SEAL. DUCTS CONTAINING MAXCELL FABRIC INNERDUCT SHALL BE SEALED WITH MAXCELL INFLATION BAG KITS PER MANUFACTURER INSTALLATION DIRECTIONS.
18. CONTRACTOR SHALL MANDREL AND SWAB CLEAN ALL DUCTS IMMEDIATELY AFTER DUCT INSTALLATION AND PRIOR TO INSTALLATION OF ANY AND ALL CABLES.
19. SEE PULL BOX DETAILS AND SPECIFICATION FOR ADDITIONAL REQUIREMENTS.

KEYNOTES

1 UNDERGROUND CONDUIT AND PULL BOXES SHOWN FOR REFERENCE ONLY. REFER TO 5E2.10 FOR MORE INFORMATION. REFER TO SHEET 5E0.60 FOR TRENCH, CONDUIT, AND PULL BOX DETAILS.

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DRAWING TITLE

PV
FIRST FLOOR PLAN

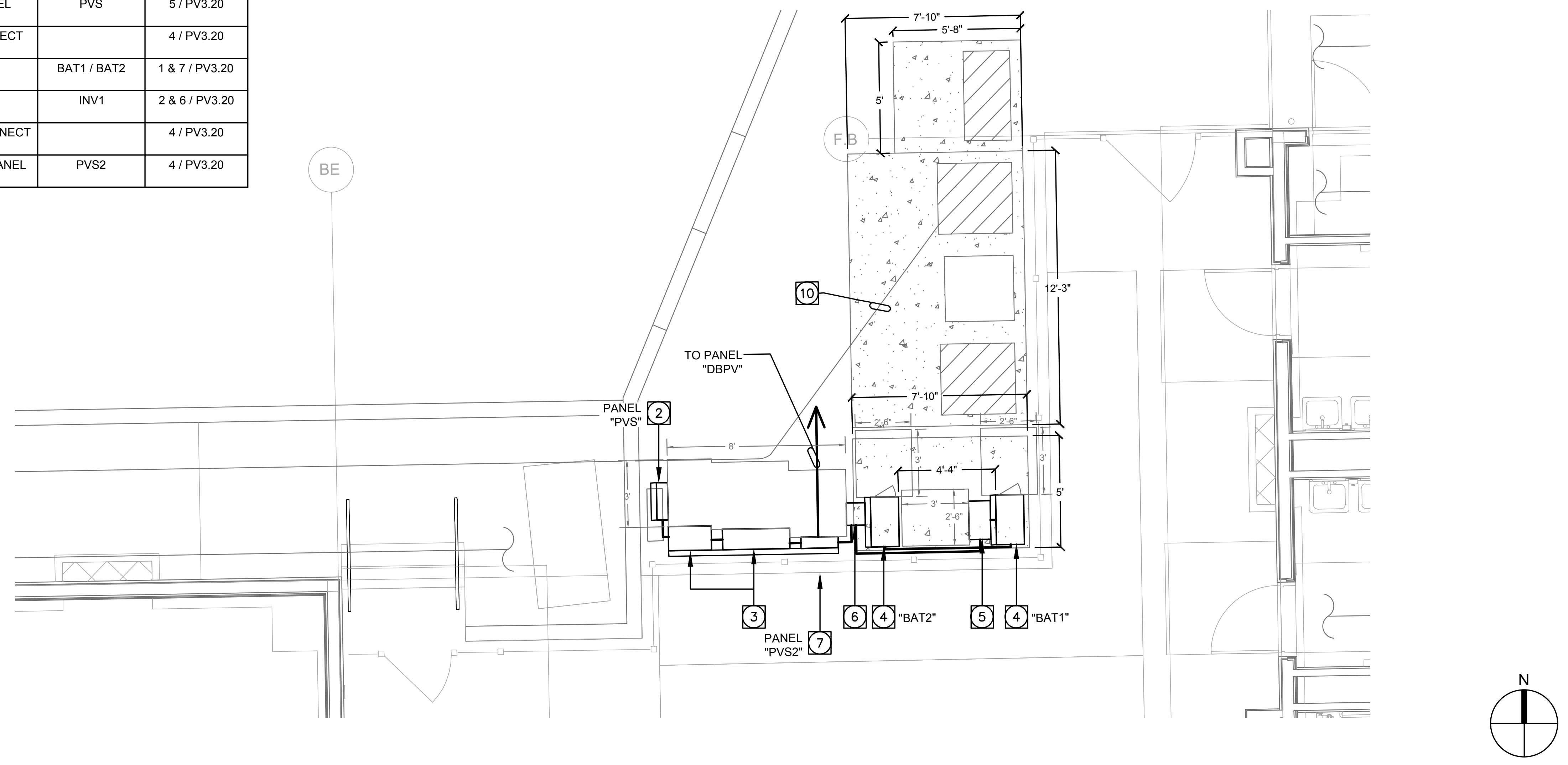
5PV1.10

SCALE: AS INDICATED
PLOT DATE

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

PV & BESS EQUIPMENT YARD

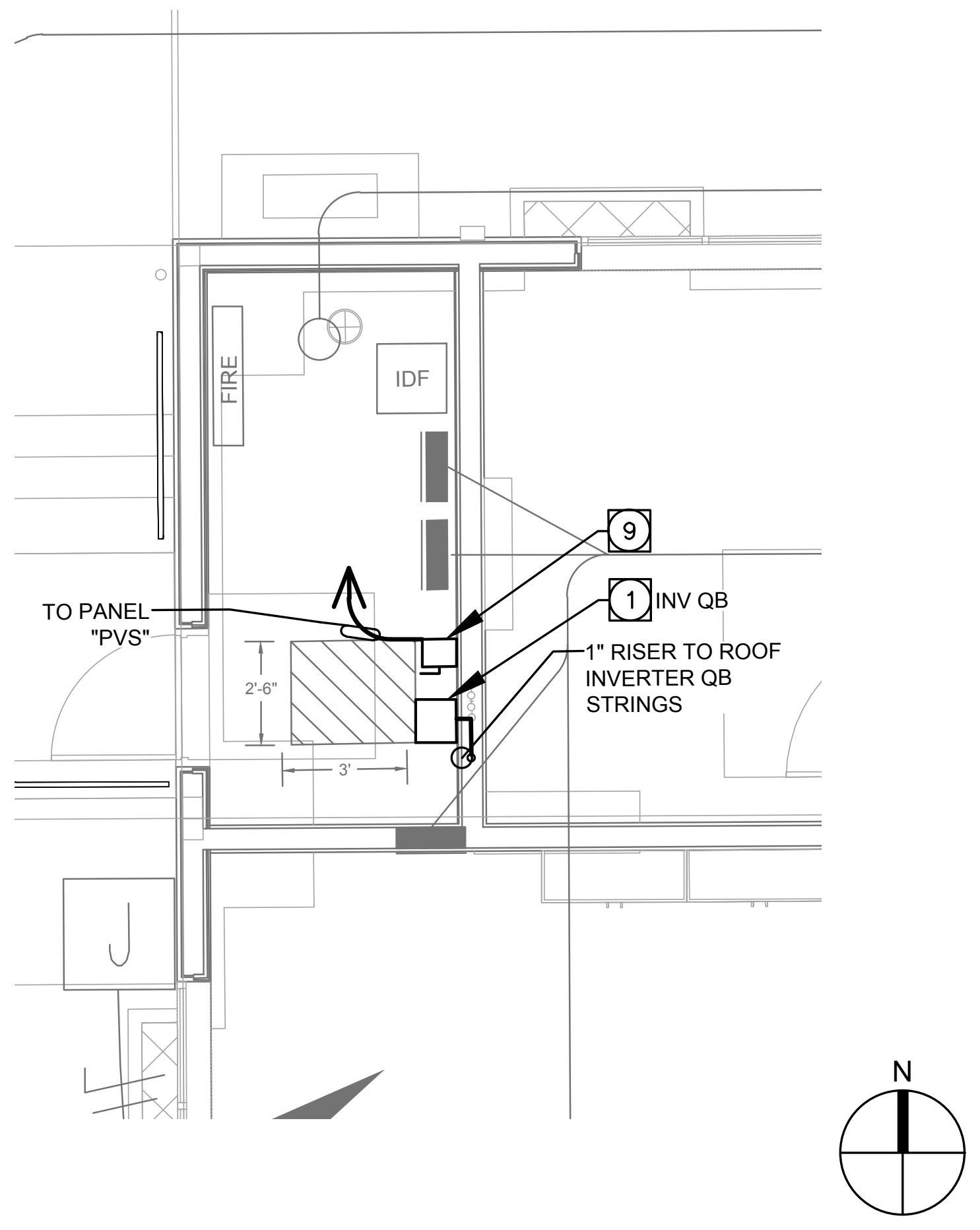
NOTE	EQUIPMENT	NAME	DETAIL
2	PV COMBINER PANEL	PVS	5 / PV3.20
3	PV METER & DISCONNECT		4 / PV3.20
4	BATTERY UNIT	BAT1 / BAT2	1 & 7 / PV3.20
5	BESS INVERTER	INV1	2 & 6 / PV3.20
6	BESS METER & DISCONNECT		4 / PV3.20
7	BESS/PV COMBINER PANEL	PVS2	4 / PV3.20


BE
F.B
7'-10"
5'-8"
5'
12'-3"
10
TO PANEL "DBPV"
PANEL "PVS" 2
8'
3'
7'-10"
2'-6"
2'-6"
3'
4'-4"
3'
2'-6"
5'
3
PANEL "PVS2" 7
6
4 "BAT2"
5
4 "BAT1"
N

ELECTRIC UTILITY YARD

SCALE 1/4"=1'-0"

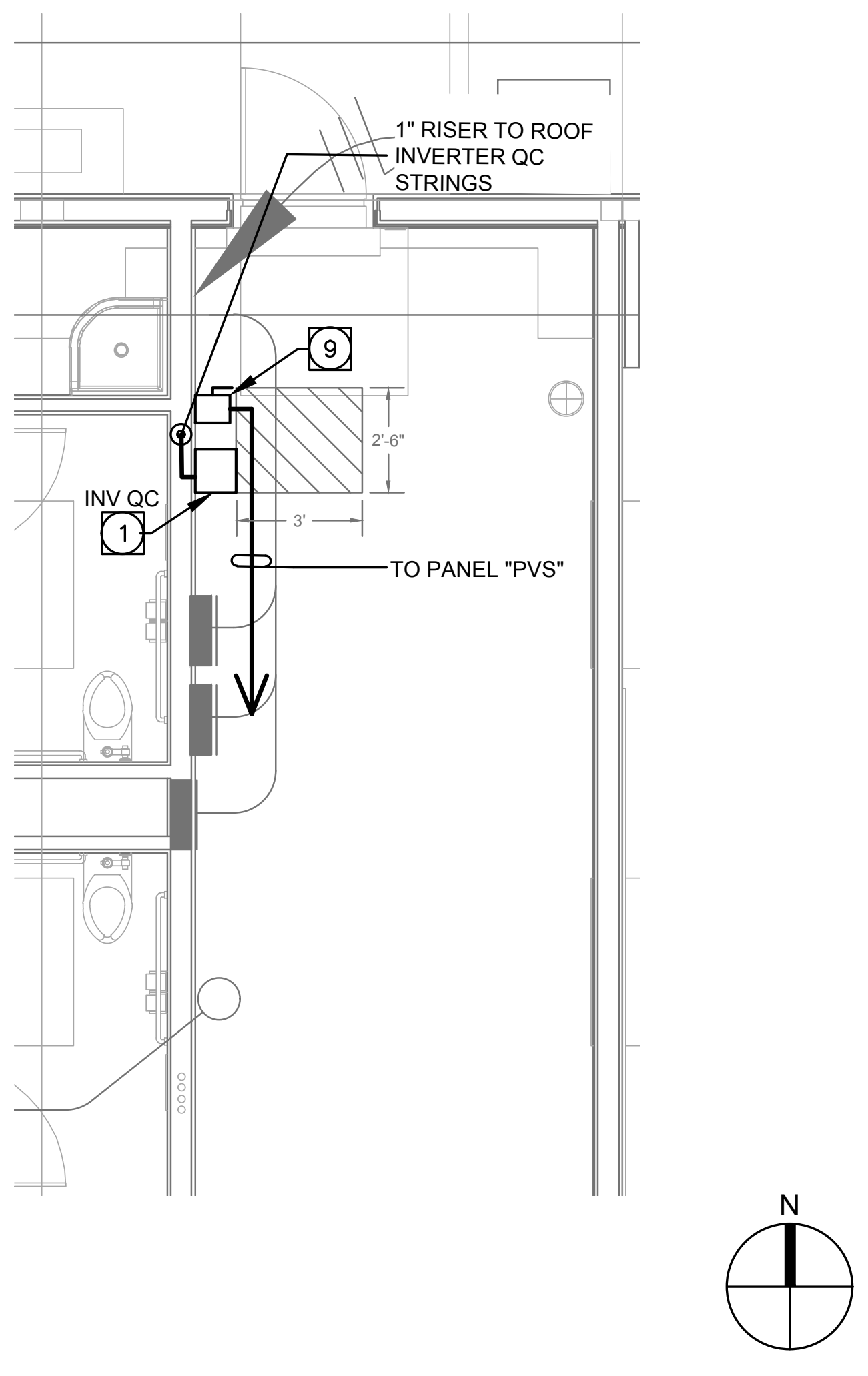
1


FIRE
IDF
9
1 INV QB
TO PANEL "PVS"
1" RISER TO ROOF INVERTER QB STRINGS
2'-6"
3'
N

BUILDING E UTILITY ROOM

SCALE 1/4"=1'-0"

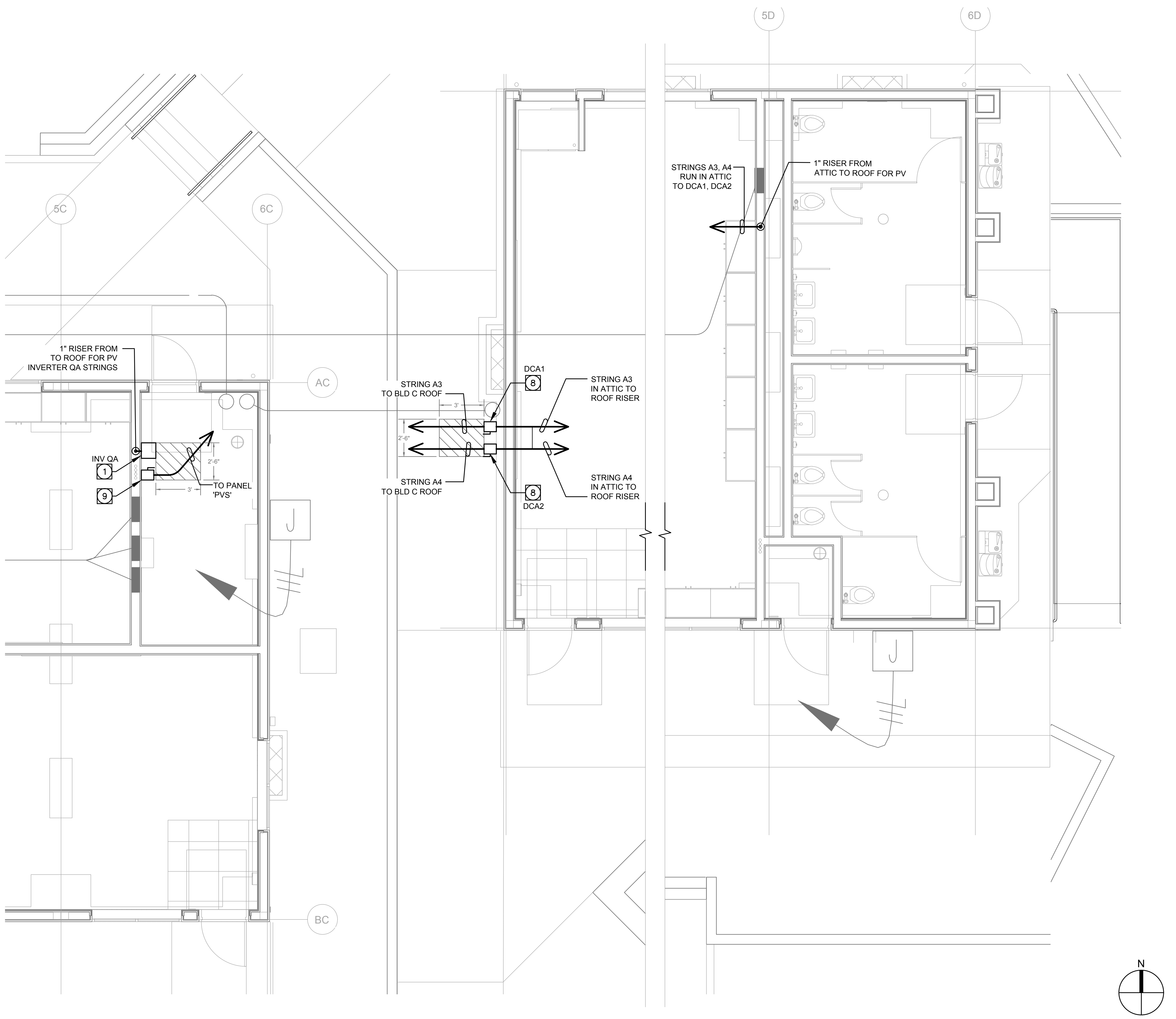
3


1" RISER TO ROOF INVERTER QC STRINGS
9
2'-6"
INV QC 1
3'
TO PANEL "PVS"
N

BUILDING F UTILITY ROOM

SCALE 1/4"=1'-0"

4


5D
6D
5C
6C
AC
BC
STRINGS A3, A4 RUN IN ATTIC TO DCA1, DCA2
1" RISER FROM ATTIC TO ROOF FOR PV
1" RISER FROM TO ROOF FOR PV INVERTER QA STRINGS
INV QA 1
9
2'-6"
3'
TO PANEL 'PVS'
STRING A3 TO BLD C ROOF
DCA1 8
3'
2'-6"
STRING A3 IN ATTIC TO ROOF RISER
STRING A4 TO BLD C ROOF
8 DCA2
STRING A4 IN ATTIC TO ROOF RISER
N

BUILDING C UTILITY ROOM, BETWEEN BUILDINGS C & D

SCALE 1/4"=1'-0"

2

SHEET NOTES

1. PHOTOVOLTAIC INVERTER WITH INTEGRATED DC DISCONNECT. FOR CONVERSION OF DC CURRENT TO AC CURRENT.
2. PHOTOVOLTAIC COMBINER PANEL "PVS" FOR COMBINATION OF PV INVERTER AC OUTPUTS.
3. PHOTOVOLTAIC MAIN UTILITY AC FUSED DISCONNECT SWITCH (WITH VIEWING WINDOW), AND METERING ASSEMBLY. NEMA 3R. FOR UTILITY REQUIREMENTS.
4. BESS CABINET FOR STORAGE OF PV GENERATED POWER. NEMA 3R RATED NON-COMBUSTABLE ENCLOSURE WITH LOCKABLE DOOR AND INTERNAL BATTERY MODULES.
5. BATTERY ESS BIDIRECTIONAL INVERTER . FOR CONVERSION OF AC TO DC TO AC FOR BATTERY CHARGE AND DISCHARGE CYCLE. INVERTER ACTS AS BATTERY MANAGEMENT SYSTEM FOR BATTERY UNIT.
6. BESS MAIN UTILITY AC FUSED DISCONNECT SWITCH (WITH VIEWING WINDOW), AND METERING ASSEMBLY FOR UTILITY REQUIREMENTS.
7. SYSTEM COMBINER PANEL "PVS2" FOR COMBINATION OF PV AND BESS INVERTER AC OUTPUTS.
8. AUXILLARY DC DISCONNECT SWITCH FOR ISOLATION OF DC CIRCUITS AT SEPERATE BUILDING.
9. AUXILLARY AC DISCONNECT SWITCH FOR ISOLATION OF AC CIRCUITS AT SEPERATE BUILDING.
10. UNDERGROUND CONDUIT AND PULL BOXES SHOWN FOR REFERENCE. REFER TO ELECTRICAL SET FOR DETAILS. TYP.

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DRAWING TITLE

PV ENLARGED ELECTRICAL AREAS

5PV1.11

SCALE: AS INDICATED

PLOT DATE

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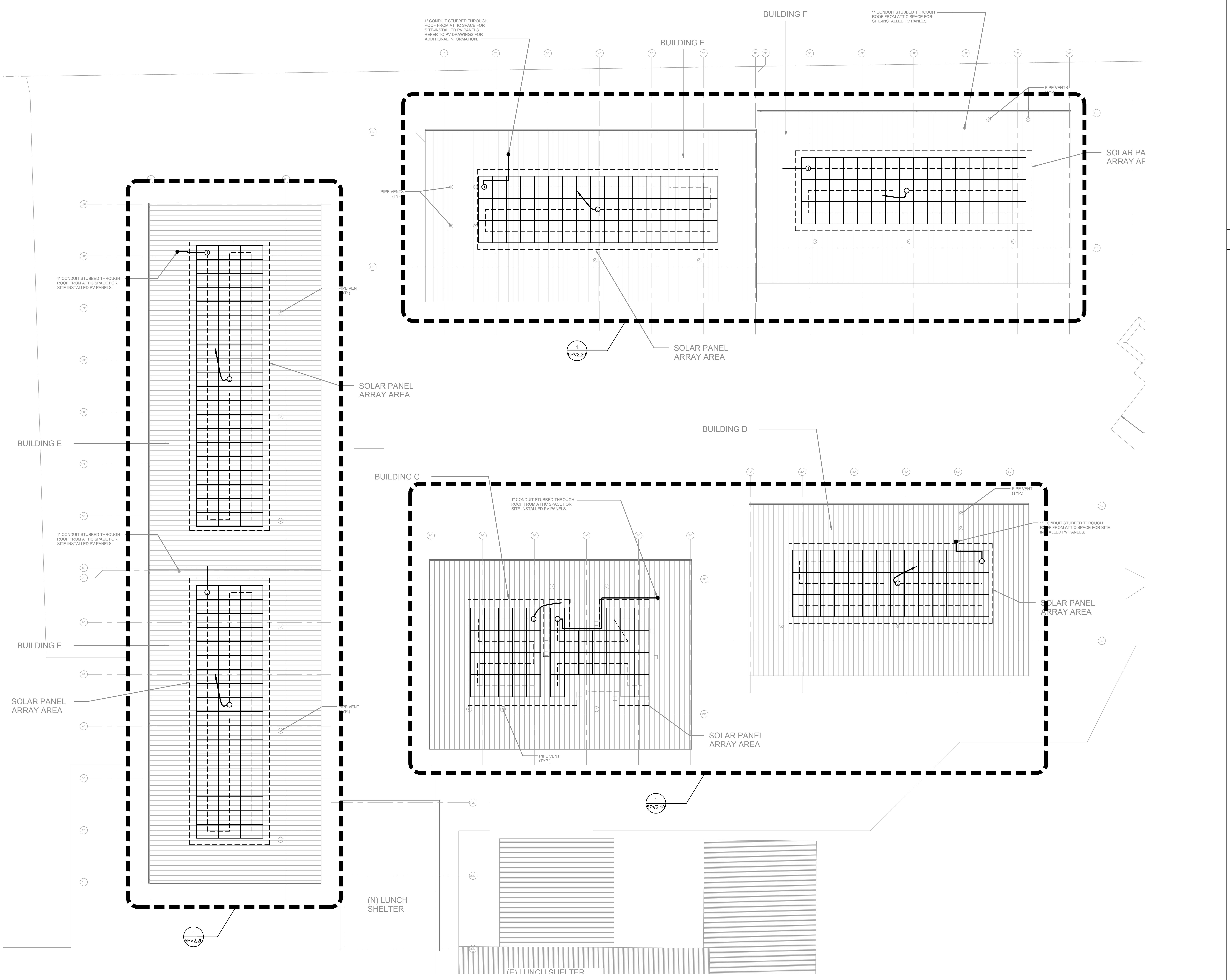
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS. REFER TO PV DRAWINGS FOR ADDITIONAL INFORMATION.
BUILDING F
BUILDING F
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
PIPE VENTS (TYP.)
PIPE VENTS (TYP.)
SOLAR PA
ARRAY AR
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
PIPE VENT (TYP.)
SOLAR PANEL ARRAY AREA
1 5PV2.30
SOLAR PANEL ARRAY AREA
BUILDING E
BUILDING D
BUILDING C
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
PIPE VENT (TYP.)
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
SOLAR PANEL ARRAY AREA
BUILDING E
SOLAR PANEL ARRAY AREA
PIPE VENT (TYP.)
PIPE VENT (TYP.)
SOLAR PANEL ARRAY AREA
1 5PV2.10
(N) LUNCH SHELTER
1 5PV2.20
(E) LUNCH SHELTER
N

PV ROOF PLAN

SCALE
3/32"=1'-0"

1

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GENERAL NOTES

1. ALL ROOF MOUNTED EQUIPMENT SHALL BE WEATHERPROOF, NEMA 3R RATED UNLESS NOTED OTHERWISE.
2. ELECTRICAL CONTRACTOR SHALL REFER TO MECHANCIAL/PLUMBING AND ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND CHARACTERISTICS OF ALL EQUIPMENT IDENTIFIED ON ROOF PLAN, INCLUDING ANY MECHANICAL EQUIPMENT CONNECTION SCHEDULES WITHIN ELECTRICAL PLANS. INCLUDE ALL WORK NECESSARY FOR SYSTEM CONNECTIONS AS PART OF BASE BID.
3. ELECTRICAL CONTRACTOR SHALL COORDINATE THE ROUTING OF UNIT/DEVICE CONDUIT AND WIRING TO ROOF MOUNTED EQUIPMENT WITH THE EQUIPMENT INSTALLER PRIOR TO ROUGH IN. ROUTE ALL WIRING BELOW ROOF IN AN ACCESSIBLE CEILING AND UP TO UNIT WITHIN THE MECHANICAL CURB ASSEMBLIES.
4. ALL TEMPERATURE AND CONTROL INTERLOCK CONDUIT, AND LINE VOLTAGE CONDUCTORS, SHALL BE BY ELECTRICAL CONTRACTOR UNLESS NOTED OTHERWISE. VERIFY WITH MECHANICAL/PLUMBING DRAWINGS FOR ALL HAVC INTERLOCK AND CONTROL REQUIREMENTS. SEE MECHANICAL/PLUMBING EQUIPMENT SCHEDULE SHEET FOR ADDITIONAL INFORMATION.
5. PROVIDE IDENTIFICATION FOR ALL ROOF MOUNTED EQUIPMENT PER ELECTRICAL SPECIFICATIONS.
7. CONTRACTOR TO VERIFY THAT ALL MECHANICAL EQUIPMENT DISCONNECT SWITCHES ARE PROVIDED WITH THE CORRECT NEC CODE CLEARANCE OF 3'-0" IN FRONT PRIOR TO ROUGH-IN. ANY MODIFICATIONS AND/OR ADDITIONAL WORK NECESSARY SHALL BE INCLUDED IN BASE BID.
8. PLUMBING CONTRACTOR TO COORDINATE WITH PV CONTRACTOR TO COORDINATE LOCATION OF PLUMBING VENTS AND EQUIPMENT WITH PV MODULE LOCATION PRIOR TO ROUGH IN.

KEYNOTES

1 NOT USED.

PV DC SYSTEM SIZE

BUILDING NAME	# OF MODS.	MOD. WATTS	DC SIZE (kW)
BUILDING C	41	460	18.86
BUILDING D	42	460	19.32
BUILDING E	114	460	52.44
BUILDING F	99	460	45.54
TOTAL	296	460	136.16

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

LA CAÑADA UNIFIED SCHOOL DISTRICT
ESTABLISHED 1885

Salas O'Brien.
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

REGISTERED PROFESSIONAL ENGINEER
ROY L. LOPEZ
No. 13442
Exp. 09/30/26
ELECTRICAL
STATE OF CALIFORNIA

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

LICENSED ARCHITECT
HARRY R DRAKE
NO. C-014869
REN. 05-31-27
STATE OF CALIFORNIA

ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

PV ROOF PLAN

5PV2.00

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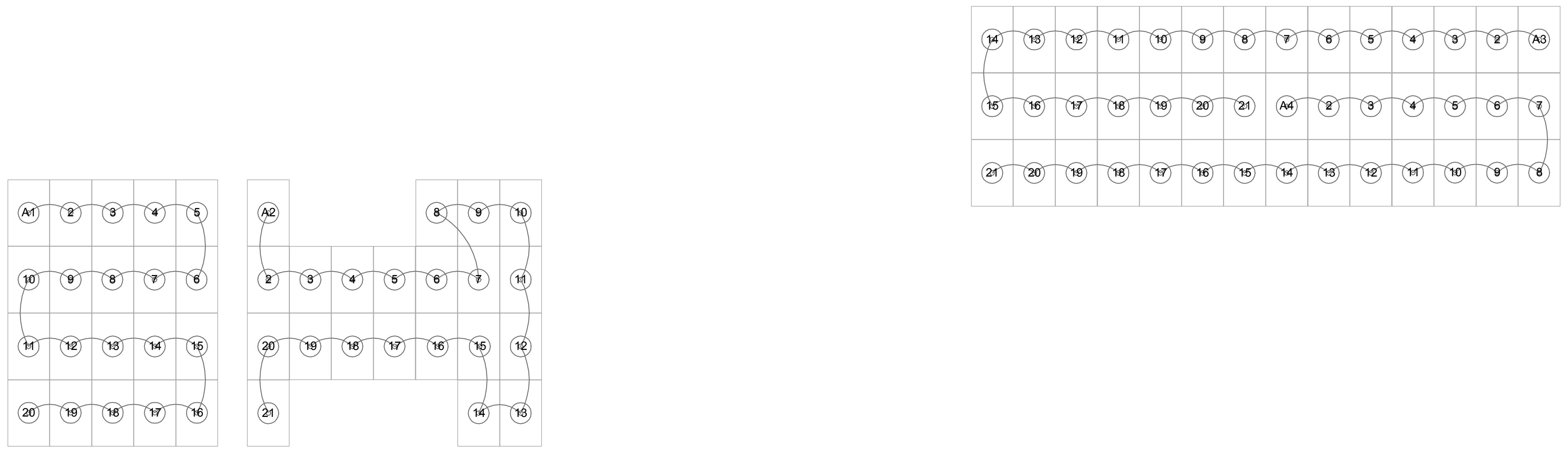
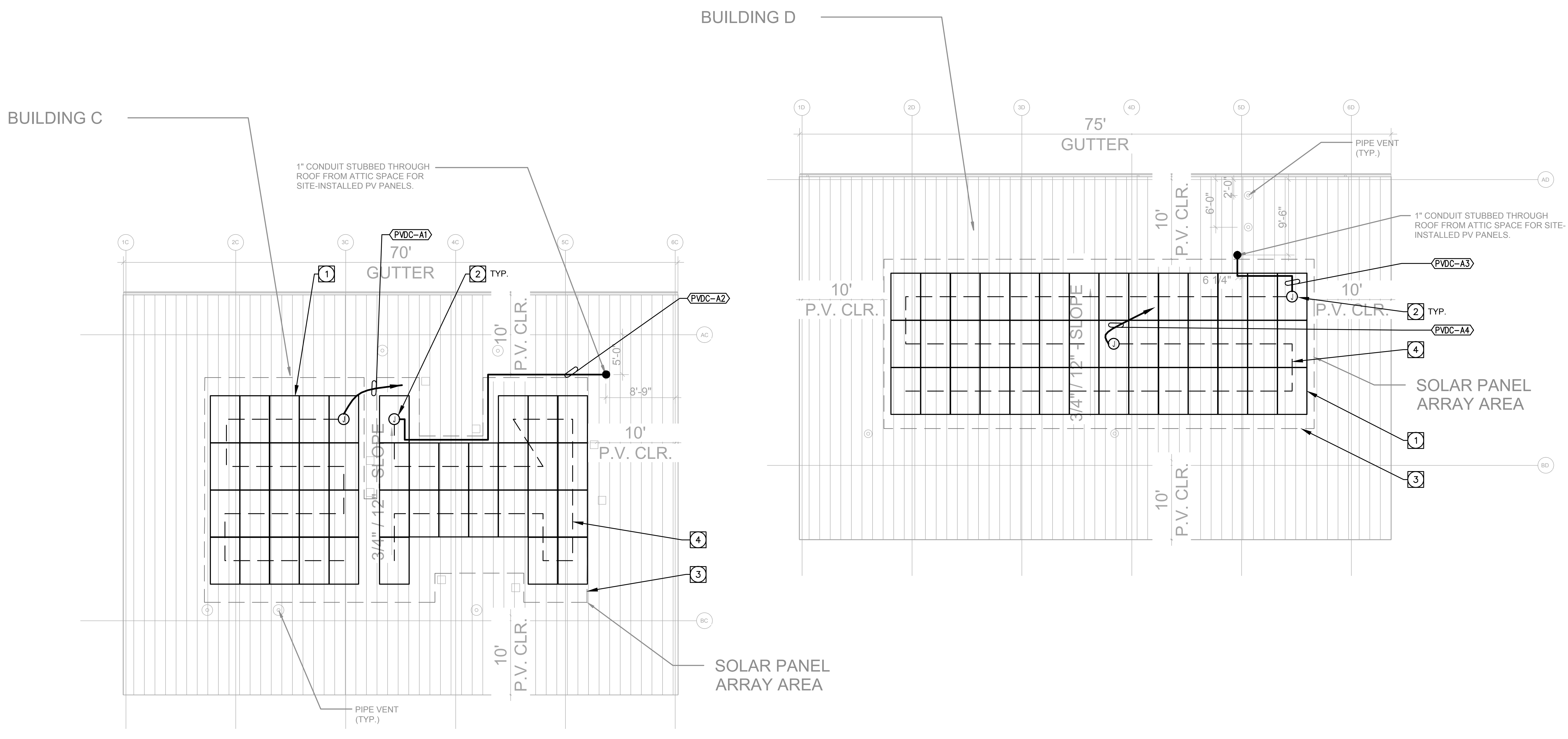
PLOT DATE


A1
2
3
4
5
10
9
8
7
6
11
12
13
14
15
20
19
18
17
16
A2
8
9
10
2
3
4
5
6
7
11
20
19
18
17
16
15
12
21
14
13
14
13
12
11
10
9
8
7
6
5
4
3
2
A3
15
16
17
18
19
20
21
A4
2
3
4
5
6
7
21
20
19
18
17
16
15
14
13
12
11
10
9
8

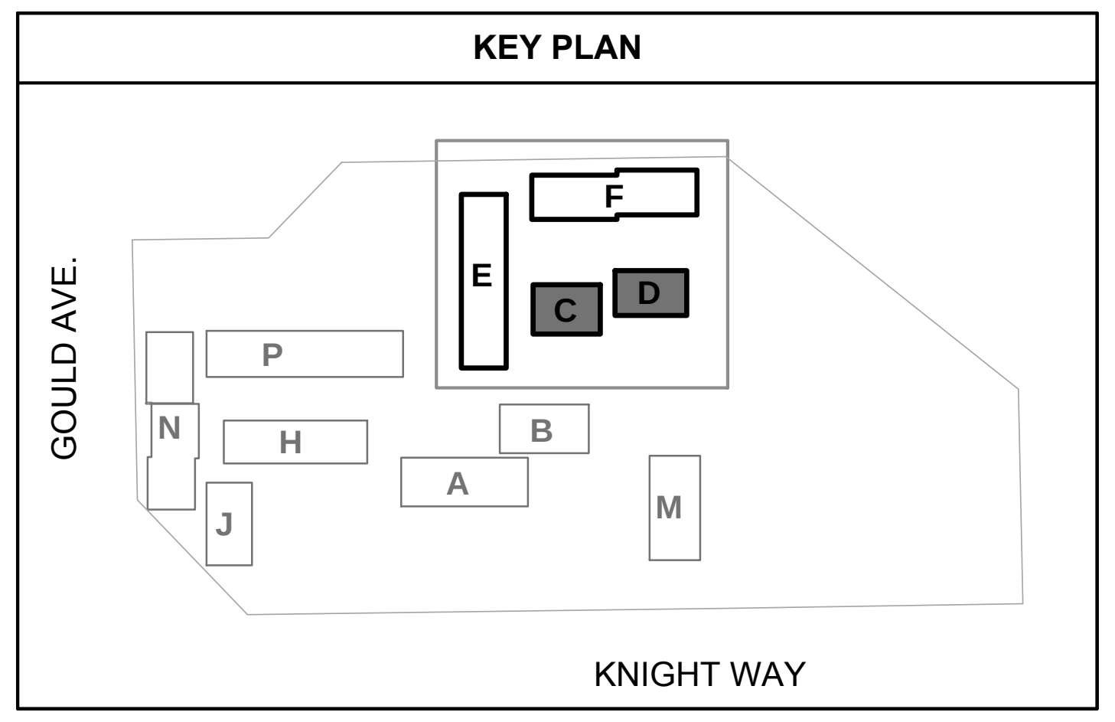
PV STRINGING PLAN - BUILDING C & D

SCALE
1/8"=1'-0"

2


BUILDING C
BUILDING D
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
PVDC-A1
PVDC-A2
PVDC-A3
PVDC-A4
1C
2C
3C
4C
5C
6C
AC
BC
1D
2D
3D
4D
5D
6D
AD
BD
70'
GUTTER
75'
GUTTER
1
2
TYP.
3
4
10'
P.V. CLR.
5'-0"
8'-9"
6'-0"
2'-0"
9'-6"
6 1/4"
3/4" / 12" - SLOPE
J
PIPE VENT
(TYP.)
SOLAR PANEL
ARRAY AREA

KEY PLAN


F
E
C
D
P
N
H
B
A
J
M
GOULD AVE.
KNIGHT WAY

N

PV ROOF PLAN - BUILDING C & D

SCALE
1/8"=1'-0"

1

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

STRINGING LEGEND

QA ⊠ SE30KUS	126% (DC TO AC)	
A1	20 x U650	20 MODULES
A2	21 x U650	21 MODULES
A3	21 x U650	21 MODULES
A4	21 x U650	21 MODULES
QB ⊠ SE40K-US	131% (DC TO AC)	
B1	30 x U650	30 MODULES
B2	30 x U650	30 MODULES
B3	27 x U650	27 MODULES
B4	27 x U650	27 MODULES
QC ⊠ SE40KUS	113% (DC TO AC)	
C1	26 x U650	26 MODULES
C2	25 x U650	25 MODULES
C3	25 x U650	25 MODULES
C4	23 x U650	23 MODULES

GENERAL NOTES

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KEYNOTES

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② WP JUNCTION BOX ON ROOF. TRANSITION TO 1" PV SYSTEM CONDUIT FOR DC CONDUCTORS DOWN TO PV INVERTER. REFER TO 5PV0.11, 5PV1.10 AND 5PV 1.11 FOR DETAILS.

③ BOUNDARY OF SOLAR INSTALLATION AREA. PV MODULES SHALL NOT BE INSTALLED OUTSIDE OF THIS BOUNDARY IN ORDER TO FACILITATE FIRE ROOF ACCESS AND PROVIDE CLEARANCE FOR ROOF ANCHOR USAGE.

④ PV DC STRING. NUMBER OF MODULES PER OPTIMIZER DEVICE AND NUMBER OF OPTIMIZER DEVICES PER STRING PER MANUFACTURER PLAN.

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Project No.: 2022-01629-05

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03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

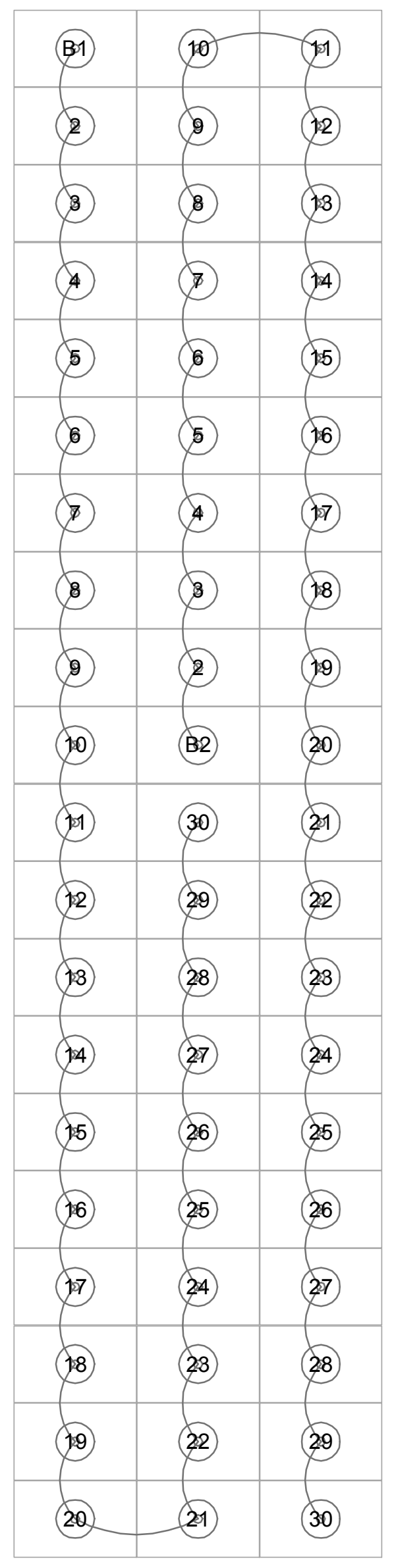
PV ROOF PLAN
BLDG C & D

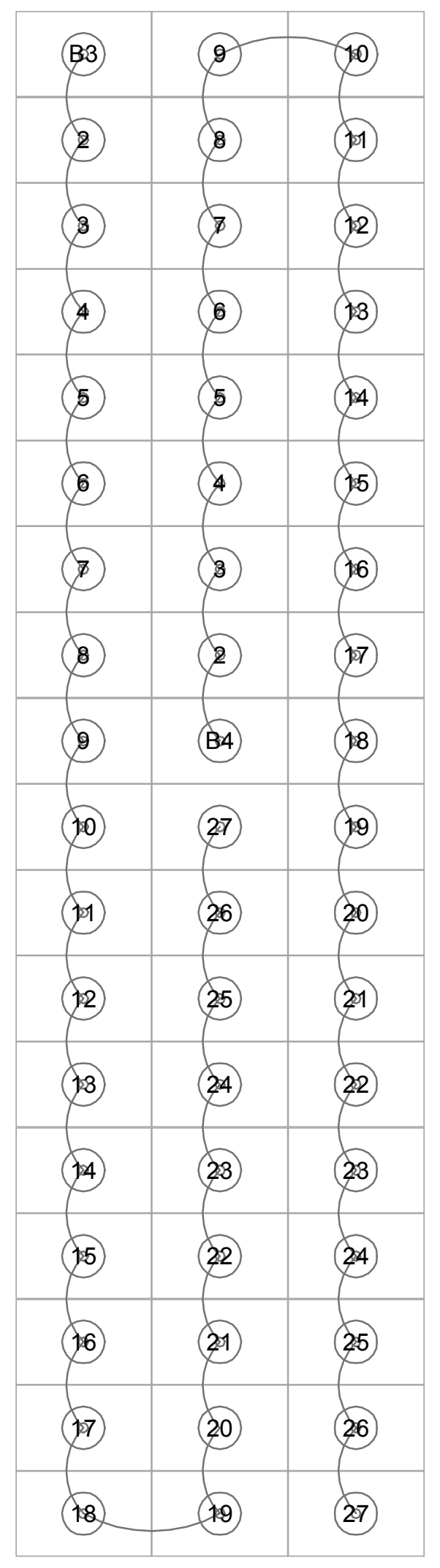
5PV2.10

SCALE: AS INDICATED
PLOT DATE

STRINGING LEGEND

QA ▨ SE30KUS		126% (DC TO AC)
(A1)	20 x U650	20 MODULES
(A2)	21 x U650	21 MODULES
(A3)	21 x U650	21 MODULES
(A4)	21 x U650	21 MODULES
QB ▨ SE40K-US		131% (DC TO AC)
(B1)	30 x U650	30 MODULES
(B2)	30 x U650	30 MODULES
(B3)	27 x U650	27 MODULES
(B4)	27 x U650	27 MODULES
QC ▨ SE40KUS		113% (DC TO AC)
(C1)	26 x U650	26 MODULES
(C2)	25 x U650	25 MODULES
(C3)	25 x U650	25 MODULES
(C4)	23 x U650	23 MODULES

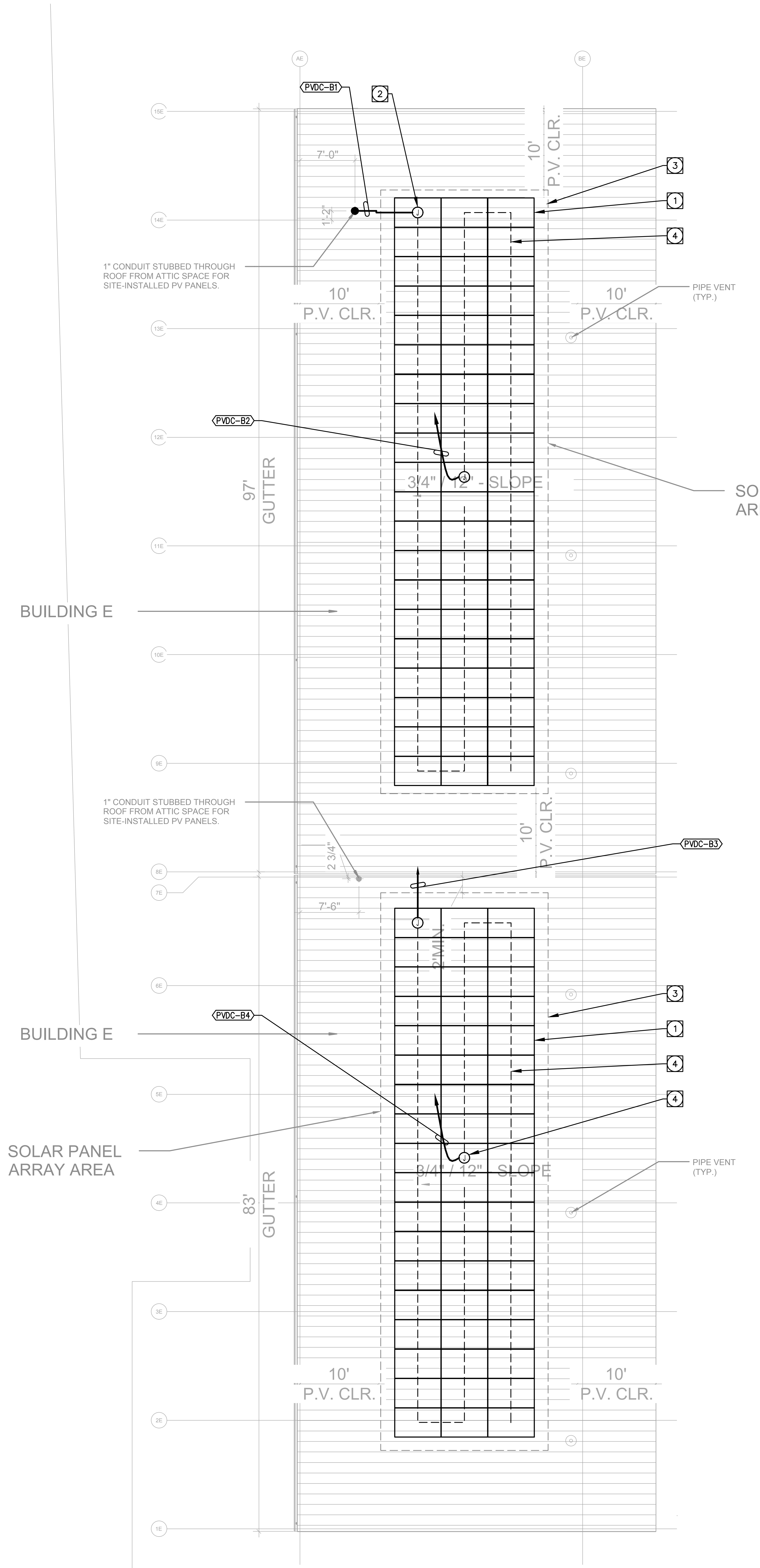

B1
B2
1
30
20
21


B3
B4
1
27
18
19

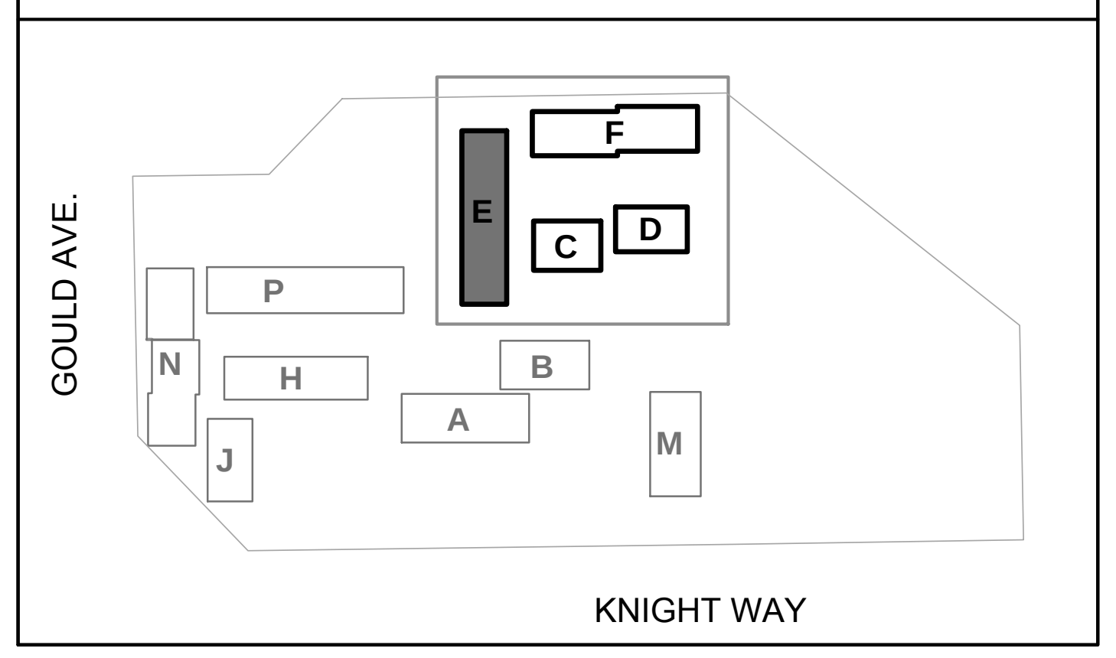
PV STRINGING PLAN - BUILDING E

SCALE 1/8"=1'-0"

2


AE
BE
PVDC-B1
2
3
1
4
7'-0"
1'-2"
10' P.V. CLR.
10' P.V. CLR.
10' P.V. CLR.
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
PIPE VENT (TYP.)
PVDC-B2
3/4" / 12" - SLOPE
SOLAR PANEL ARRAY AREA
97' GUTTER
BUILDING E
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
2 3/4"
10' P.V. CLR.
PVDC-B3
7'-6"
2'MIN
3
1
4
4
PVDC-B4
BUILDING E
SOLAR PANEL ARRAY AREA
3/4" / 12" SLOPE
PIPE VENT (TYP.)
83' GUTTER
10' P.V. CLR.
10' P.V. CLR.
15E
14E
13E
12E
11E
10E

KEY PLAN


GOULD AVE.
F
E
C
D
P
N
H
B
A
M
J
KNIGHT WAY

PV ROOF PLAN - BUILDING E

SCALE 1/8"=1'-0"

1

GENERAL NOTES

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8. PLUMBING CONTRACTOR TO COORDINATE WITH PV CONTRACTOR TO COORDINATE LOCATION OF PLUMBING VENTS AND EQUIPMENT WITH PV MODULE LOCATION PRIOR TO ROUGH IN.

KEYNOTES

1. PHOTOVOLTAIC MODULE, TYPICAL. REFER TO EQUIPMENT INFORMATION ON SHEET 5PV0.11 FOR MORE INFORMATION.
2. WP JUNCTION BOX ON ROOF. TRANSITION TO 1" PV SYSTEM CONDUIT FOR DC CONDUCTORS DOWN TO PV INVERTER. REFER TO 5PV0.11, 5PV1.10 AND 5PV 1.11 FOR DETAILS.
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12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

PV ROOF PLAN
BLDG E

5PV2.20

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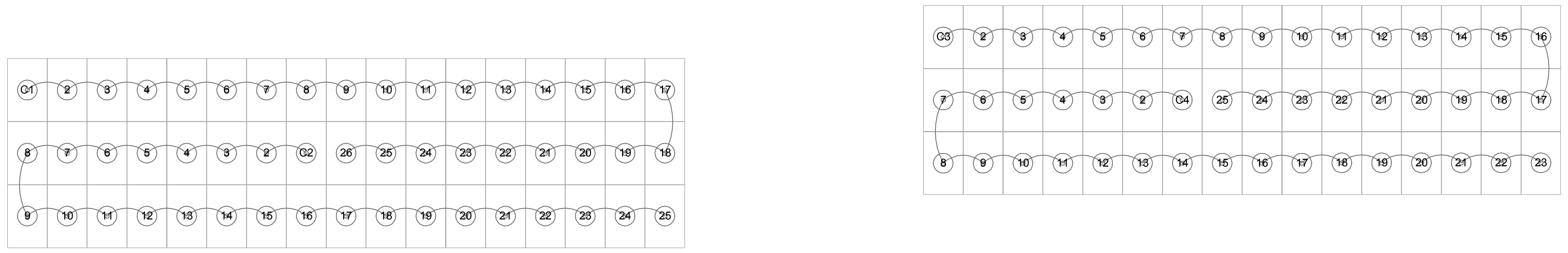

STRINGING LEGEND

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(A1)	20 x U650	20 MODULES
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(A3)	21 x U650	21 MODULES
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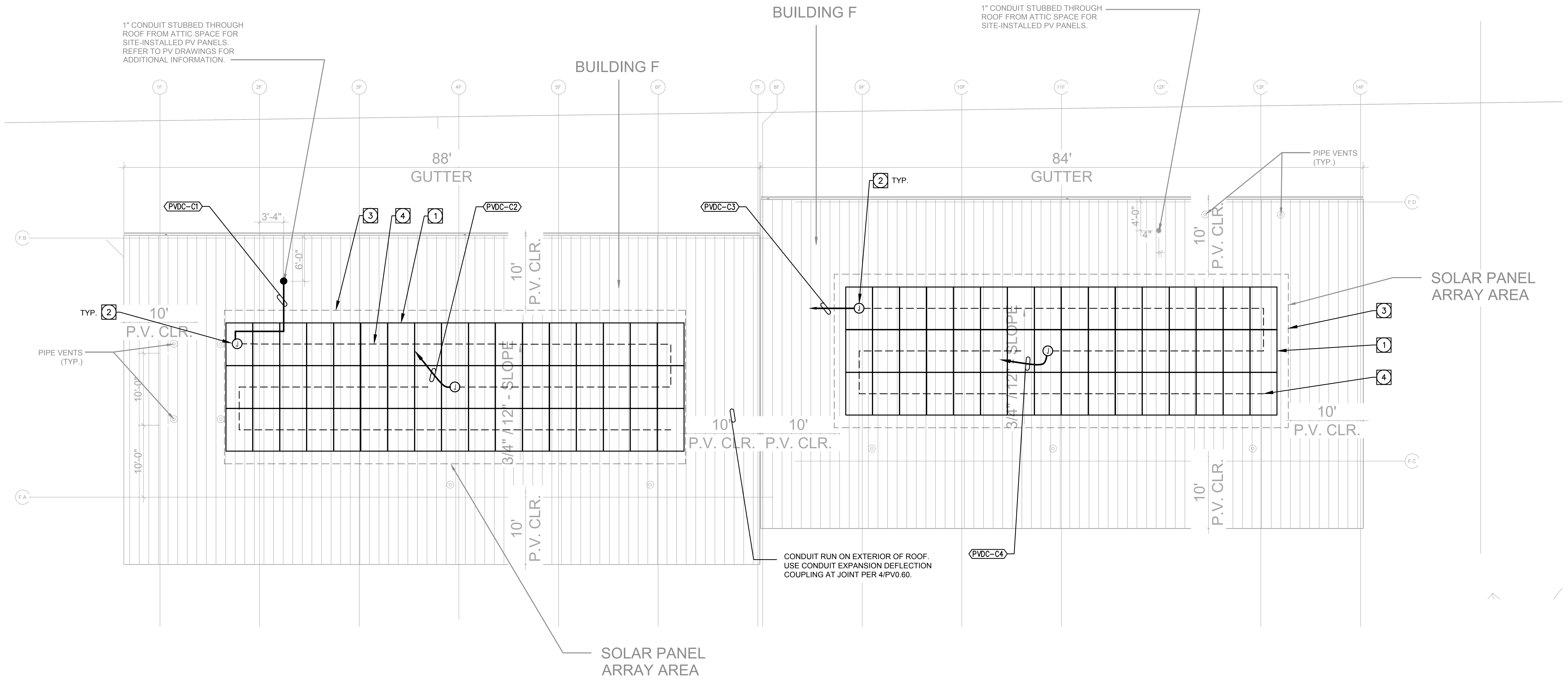
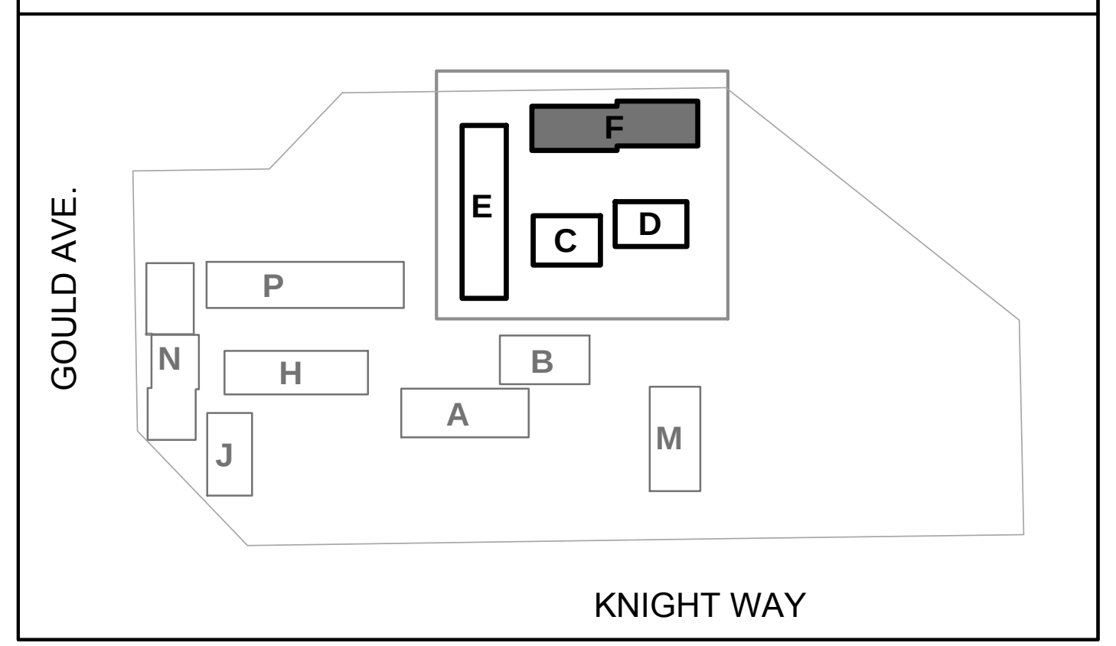
(B1)	30 x U650	30 MODULES
(B2)	30 x U650	30 MODULES
(B3)	27 x U650	27 MODULES
(B4)	27 x U650	27 MODULES
QC ▨ SE40KUS		113% (DC TO AC)
(C1)	26 x U650	26 MODULES
(C2)	25 x U650	25 MODULES
(C3)	25 x U650	25 MODULES
(C4)	23 x U650	23 MODULES

PV STRINGING PLAN - BUILDING F

SCALE
1/8"=1'-0"
2


1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS. REFER TO PV DRAWINGS FOR ADDITIONAL INFORMATION.
BUILDING F
BUILDING F
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
88'
GUTTER
84'
GUTTER
PIPE VENTS (TYP.)
PVDC-C1
PVDC-C2
PVDC-C3
PVDC-C4
3'-4"
6'-0"
4'-0"
4"
TYP. 2
2 TYP.
10' P.V. CLR.
3/4" /12" - SLOPE
SOLAR PANEL ARRAY AREA
10'-0"
CONDUIT RUN ON EXTERIOR OF ROOF. USE CONDUIT EXPANSION DEFLECTION COUPLING AT JOINT PER 4/PV0.60.
1F
2F
3F
4F
5F
6F
7F
8F
9F
10F
11F
12F
13F
14F
F.A
F.B
F.C
F.D

KEY PLAN


GOULD AVE.
KNIGHT WAY
F
E
C
D
P
N
H
B
A
J
M

N

PV ROOF PLAN - BUILDING F

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

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① PHOTOVOLTAIC MODULE, TYPICAL. REFER TO EQUIPMENT INFORMATION ON SHEET 5PV0.11 FOR MORE INFORMATION.

② WP JUNCTION BOX ON ROOF. TRANSITION TO 1" PV SYSTEM CONDUIT FOR DC CONDUCTORS DOWN TO PV INVERTER. REFER TO 5PV0.11, 5PV1.10 AND 5PV 1.11 FOR DETAILS.

③ BOUNDARY OF SOLAR INSTALLATION AREA. PV MODULES SHALL NOT BE INSTALLED OUTSIDE OF THIS BOUNDARY IN ORDER TO FACILITATE FIRE ROOF ACCESS AND PROVIDE CLEARANCE FOR ROOF ANCHOR USAGE.

④ PV DC STRING. NUMBER OF MODULES PER OPTIMIZER DEVICE AND NUMBER OF OPTIMIZER DEVICES PER STRING PER MANUFACTURER PLAN.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

Salas O'Brien
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

ROY L. LOPEZ
No. 13442
Exp. 09/30/26
ELECTRICAL

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

LICENSED ARCHITECT
HARRY R DRAKE
NO. C-014869
REN. 05-31-27

ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

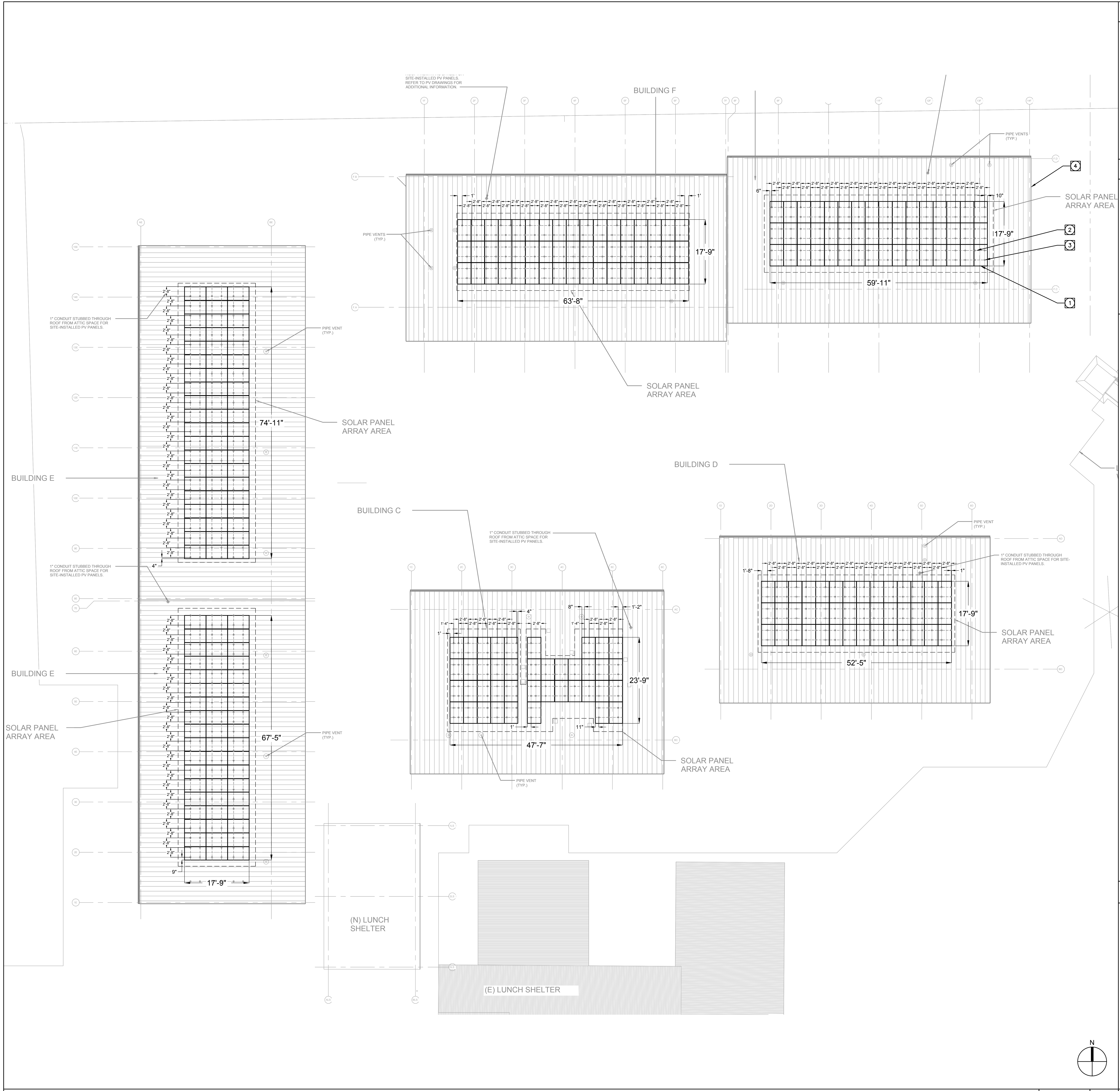
DRAWING TITLE

PV ROOF PLAN
BLDG F

5PV2.30

SCALE: AS INDICATED

PLOT DATE


BUILDING F
BUILDING E
BUILDING E
BUILDING D
BUILDING C
SOLAR PANEL ARRAY AREA
SOLAR PANEL ARRAY AREA
SOLAR PANEL ARRAY AREA
SOLAR PANEL ARRAY AREA
SOLAR PANEL ARRAY AREA
SOLAR PANEL ARRAY AREA
SITE-INSTALLED PV PANELS. REFER TO PV DRAWINGS FOR ADDITIONAL INFORMATION.
1" CONDUIT STUBBED THROUGH ROOF FROM ATTIC SPACE FOR SITE-INSTALLED PV PANELS.
PIPE VENTS (TYP.)
PIPE VENT (TYP.)
63'-8"
17'-9"
59'-11"
74'-11"
67'-5"
47'-7"
23'-9"
52'-5"
2'-8"
(N) LUNCH SHELTER
(E) LUNCH SHELTER
N

PV MOUNTING PLAN	SCALE 3/32"=1'-0"	1

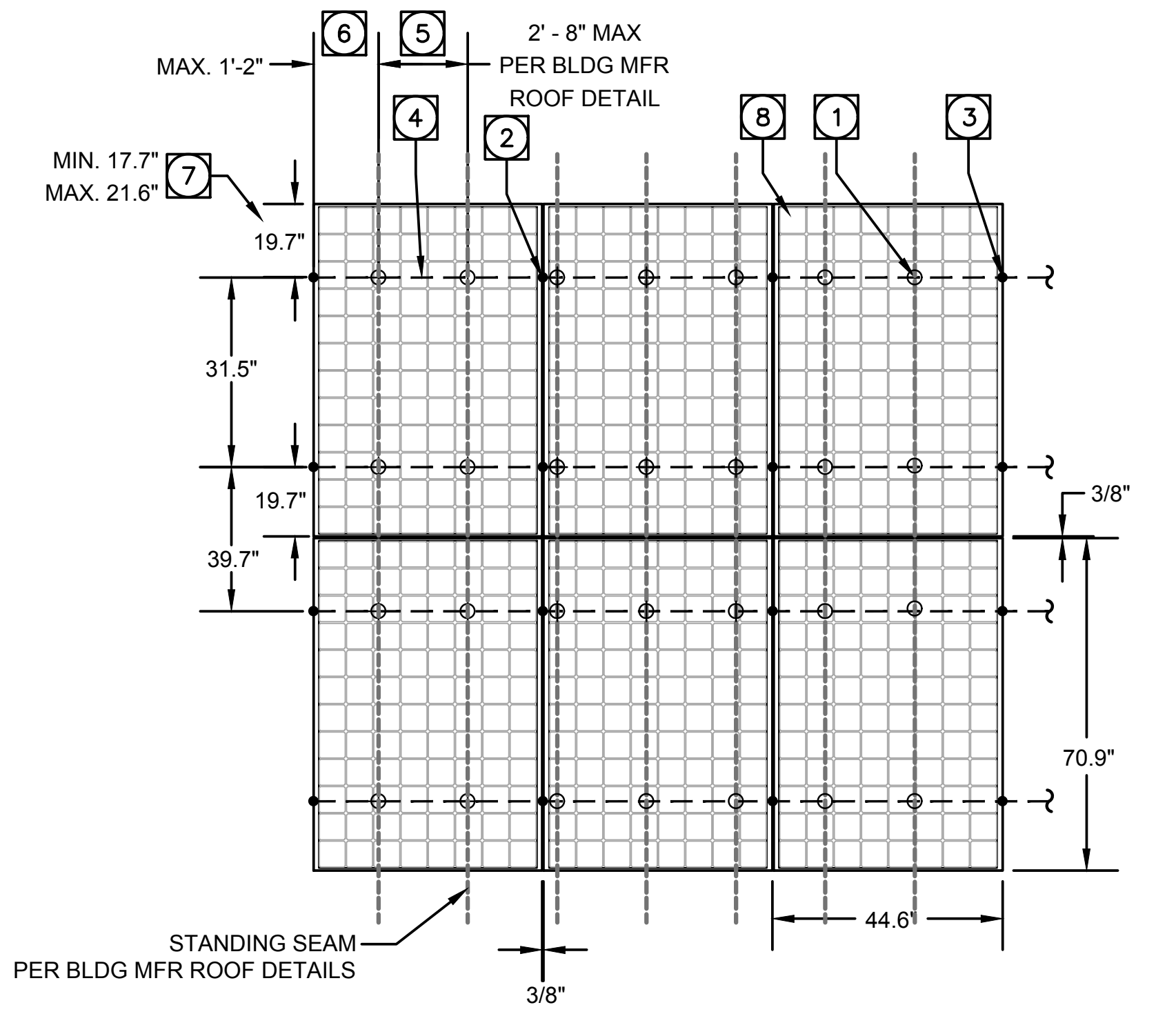
SHEET NOTES

1. PV ARRAY MOUNTED ON SLOPED ROOF SECTIONS TO BE MOUNTED PARALLEL WITH THE ROOF SURFACE.
2. PV RAIL. PV MODULES MOUNTED TO RAIL PER SHEET 5PV3.10.
3. PV MOUNTING POINT. SHOWN MOUNTING POINTS ARE DIAGRAMMATIC, CONTRACTOR SHALL COORDINATE WITH STRUCTURAL ENGINEER ON MOUNTING LOCATIONS. REFER TO RACKING DETAIL (2), THIS SHEET, FOR MAX SPANS. REFER TO DETAILS ON SHEET 5PV3.10 FOR PV RAIL MOUNTING DETAILS. REFER TO STRUCTURAL SET FOR ENGINEERING OF ATTACHMENT BETWEEN ROOF STRUCTURE AND STANDING SEAM METAL ROOFING.
4. ROOF STRUCTURE BY OTHERS. REFER TO STRUCTURAL AND ARCHITECTURAL SETS FOR ENGINEERING AND DETAILS.

GENERAL NOTES

1. FIELD QC TESTING – SSMR CLAMPS
   - 1.1. TESTING BY DSA-ACCEPTED LEA; LOAD RATE PER AC428 §3.2.5.
   - 1.2. TEST 20 CONSECUTIVE CONNECTORS; IF ALL PASS, TEST 10% OF REMAINING BY ZONE. TEST LOAD AND GOVERNING ROOF AREA PER 5PV3.00 COMPLIANCE TABLE.
   - 1.3. REPORT LOADS, ZONE LOCATIONS, SLIP/DEFORMATION, TORQUE VERIFICATION; REPAIR ROOFING PER MFGR/SEOR.
   - 1.4. DSA 103: INCLUDE “ROOF CLAMP QC TESTING (IR 16-8 §5.1.3)”.
2. RAILS & SPLICES – STRUCTURAL ALLOWABLES
   - 2.1. RAIL: IRONRIDGE XR100 MAX SPAN = 2'-8" MAX CANTILEVER = 3'-0"
   - 2.2. SPLICE: XR SPLICE
     - 2.2.1. ALLOW. SHEAR/AXIAL/ROTATION = PER IRONRIDGE DA (PV3.00) / ENG. LETTER
   - 2.3. L-FOOT/ADAPTER: SQUARE-BOLT L-FOOT; TORQUE PER IRONRIDGE DETAIL 11/5PV3.10

NOTE: VALUES GOVERN INSTALLATION SHOWN; DO NOT EXCEED PV3.00 ZONE REACTION LIMITS.


6
5
MAX. 1'-2"
2' - 8" MAX PER BLDG MFR ROOF DETAIL
4
2
8
1
3
MIN. 17.7" MAX. 21.6"
7
19.7"
31.5"
19.7"
39.7"
3/8"
70.9"
44.6"
STANDING SEAM PER BLDG MFR ROOF DETAILS
3/8"

NOTE: SHOWN DETAIL IS DIAGRAMMATIC, NOT TO SCALE, AND SHOWN TO EXPRESS THE GENERAL INTENT OF THE DESIGN. REFER TO DETAIL SHEETS FOR COMPONENT DETAILS.

1. PV RACKING TO ROOF ATTACHMENT POINT.
2. PV MODULE MIDCLAMP ATTACHMENT POINT TO PV RAIL.
3. PV MODULE ENDCLAMP ATTACHMENT POINT TO PV RAIL.
4. PV RACKING SYSTEM BEAM/MOUNTING RAIL.
5. MAXIMUM STAND OFF SEPARATION SHALL BE BASED ON MANUFACTURER PROVIDED CALCULATIONS.
6. MAXIMUM CANTILEVER DISTANCE SHALL BE BASED ON MANUFACTURER PROVIDED CALCULATIONS.
7. DISTANCE FROM EDGE DETERMINED BY ALLOWABLE CLAMPING LOCATIONS BASED ON MANUFACTURER REQUIREMENTS.
8. PV MODULE.

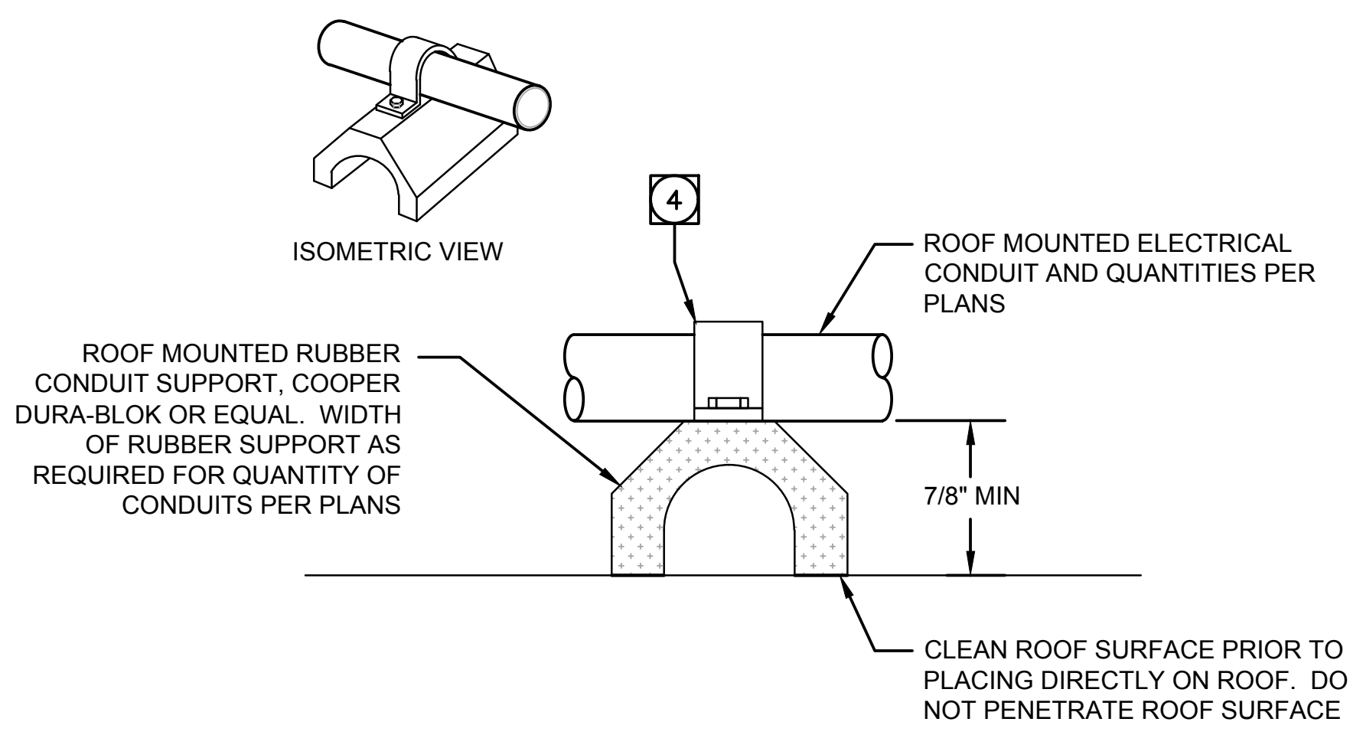
PV MODULE RATINGS	ALLOWABLE DESIGN LOAD: TEST LOAD / 1.5 (SAFETY FACTOR)
MAXIMUM TEST LOAD (FRONT): 7000 Pa = 146.2 PSF 21.96 SF x 146.2 PSF = +3,210 LBS / MODULE	ALLOWABLE LOAD (FRONT): 146.2 PSF / 1.5 = 97.4 PSF +3,210 / 1.5 = +2,140 LBS / MODULE
MAXIMUM TEST LOAD (REAR): -2400 Pa = -50.13 PSF 21.96 SF x 50.13 PSF = -1,100.9 LBS/MODULE	ALLOWABLE LOAD (REAR): 50.13 PSF / 1.5 = 33.4 PSF -1,100.9 / 1.5 = 733.9 LBS/MODULE

REFERENCE 5PV3.00 FOR DETAILED PV ARRAY LOAD AND FORCE CALCULATIONS

THESE VALUES APPLY TO PORTRAIT MOUNTED MODULES WITH (2) RAILS PARALLEL TO SHORT EDGE OF THE MODULE, WITH (4) CLAMPS ON LONG EDGE.

REFER TO SHEET 5PV3.00 FOR CLAMPING RANGE DETAILS.

ARRAY DIAGRAM	SCALE NTS	2


ISOMETRIC VIEW
4
ROOF MOUNTED ELECTRICAL CONDUIT AND QUANTITIES PER PLANS
ROOF MOUNTED RUBBER CONDUIT SUPPORT, COOPER DURA-BLOK OR EQUAL. WIDTH OF RUBBER SUPPORT AS REQUIRED FOR QUANTITY OF CONDUITS PER PLANS
7/8" MIN
CLEAN ROOF SURFACE PRIOR TO PLACING DIRECTLY ON ROOF. DO NOT PENETRATE ROOF SURFACE

ROOF CONDUIT SUPPORT	SCALE NTS	3

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#	REVISION DATE	DESCRIPTION

DRAWING TITLE

PV MOUNTING PLAN

5PV2.50

SCALE: AS INDICATED

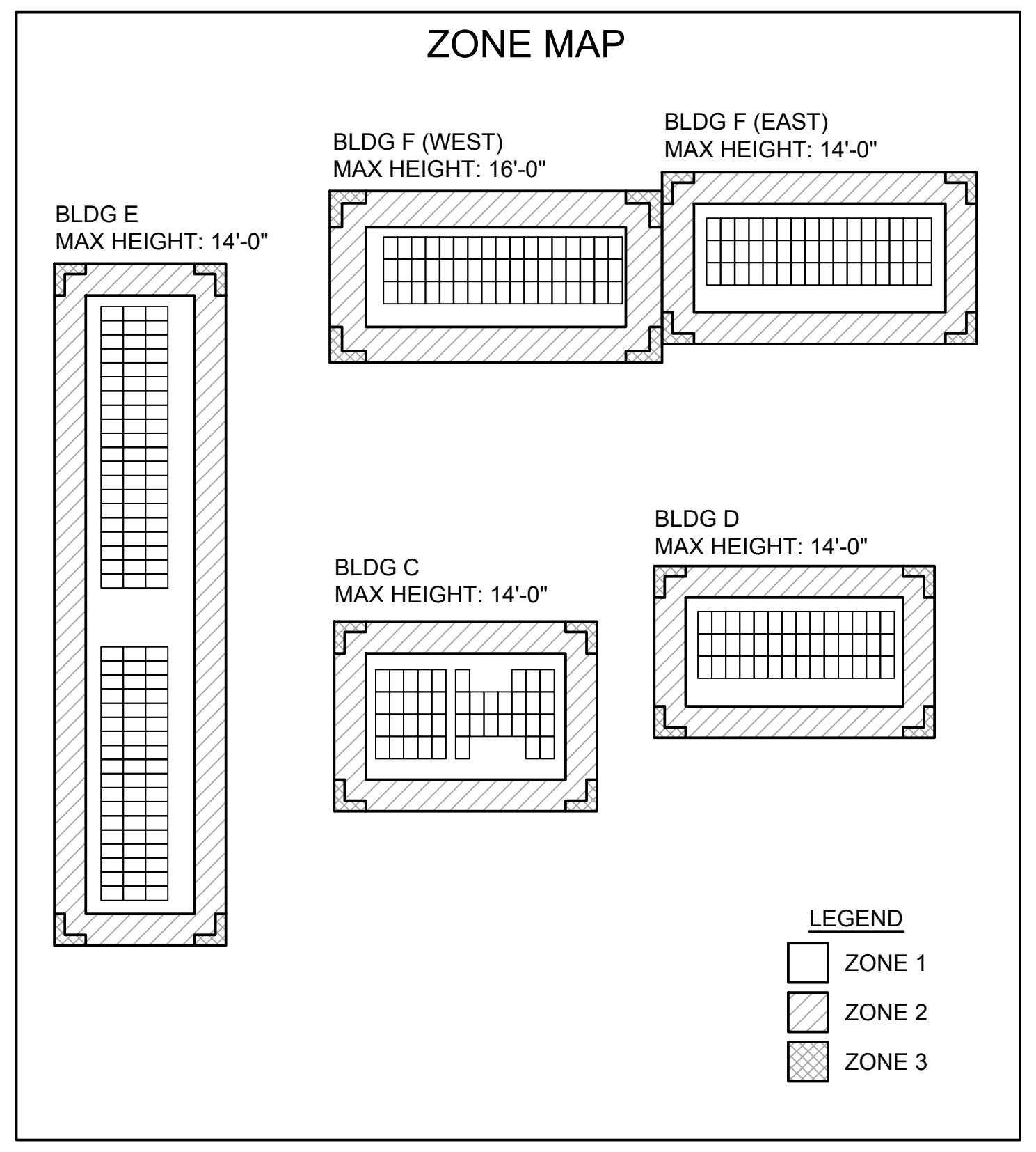
PLOT DATE

WIND DESIGN BASIS & REACTIONS

- DESIGN PER CBC §1609A; ASCE 7-16 §29.4.4 (PV PARALLEL TO ROOF).
- PARAMETERS: VULT = 100 MPH; EXPOSURE = C; RISK CAT = II; ROOF SLOPE = 0–7°.
- IRONRIDGE DA OUTPUT (XR100 RAILS):
  - MAX SPAN: 10'-8"; MAX CANTILEVER: 3'.
    - DESIGNED SPAN BETWEEN SSMR CLAMP ATTACHMENTS: 2'-8"
  - ALL MODULES IN ZONE 1.
  - REFER TO PV STRUCTURAL CALCULATION DOCUMENT FOR UPLIFT FORCE.
  - DEMANDS ≤ CAPACITIES PER ESR-3869 (CLAMPS) AND IRONRIDGE ALLOWABLES.

SEE IRONRIDGE DA REPORT AND STRUCTURAL CALCULATIONS FOR FULL DETAILS.

ZONE MAP



IRONRIDGE DESIGN ASSISTANT CERTIFICATION LETTER

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

Attn: Sean McDonald, CEO, IronRidge Inc.
Date: January 7th, 2026

Re: Engineering Certification for the IronRidge Design Assistant-XR and AIRE Flat Roof Systems

The IronRidge Design Assistant (DA) software includes structural analysis for the IronRidge XR system (XR10, XR100 and XR1000 rails) and AIRE system (A1 and A2 Rails), when used in flat or low-pitched roofs defined as where the roof slope does not exceed 7 degrees from the horizontal. The IronRidge XR and AIRE Flat Roof Systems include two proprietary systems, including the Flush Mount System which is applied when modules are set parallel to the roof, and Tilt Mount System which accommodates module tilts ranging from 4 degrees to 30 degrees relative to the roof surface. Both systems are capable of supporting photovoltaic (PV) modules installed in portrait or landscape orientation. PV modules are supported by extruded aluminum rails and secured to the rails with IronRidge mounting clamps. The rails are side mounted to a selected roof attachment with stainless steel bonding hardware and the attachment is secured directly to the underlying roof structure.

This letter certifies that the IronRidge Design Assistant, used for the structural analysis of the IronRidge XR or Aire Flat Roof Systems, complies with the following codes and design criteria. When the IronRidge XR and AIRE Flat Roof systems are installed according to the IronRidge DA project report and manufacturer's installation guidance, compliance with below codes and design criteria is met.

Building Codes:

1. 2025 California Building Code
2. ASCE/SEI 7-10, 7-16, 7-22, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
3. International Building Code, 2012-2024 Edition
4. International Residential Code 2012-2024 Edition
5. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
6. Aluminum Design Manual 2015 & 2020, by The Aluminum Association, Inc.
7. ANSI/AWC NDS-2015 & 2018, National Design Specification for Wood Construction, by the American Wood Council
8. SEAOC (Structural Engineer Association of California) report PV2-2017 Wind Design for Solar Arrays

Sincerely,

C 95382
EXP. 12.31.2027

Matthew S Kuzila

Digitally signed by Matthew S Kuzila
Date: 2026.01.07 09:54:17 -07'00'

Matthew S Kuzila, P.E.

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The IronRidge DA meets the above code requirements provided the following Design Criteria.

Design Criteria:

a. Structure Risk Category II, III.
b. Basic Wind Speed 90-180 (mph) per ASCE 7 Chapter 26 Figures 26.5-1B & 26.5-1C.
c. Wind Exposure Category = B, C & D.
d. Topographic Factor Kzt = 1.0.
e. Roof Zones per ASCE 7-16, 7-22 Chapter 29.
f. Exposed modules per ASCE 7-16, 7-22 Chapter 29.
g. Ground Snow Load = 0-120 (psf) per ASCE 7 Fig. 7.2-1.
    a. No other special snow conditions are considered including unbalanced, drifting, sliding, retention, ponding snow or rain on snow surcharge.
h. Building Height Max=60', defined as the average of the roof eave height measured from grade.
i. Roof Pitch = 0-7 degrees.
j. Seismic Importance = 1.0.
k. Flush System minimum 2" clearance and maximum 10" clearance from top of PV panel to roof surface.
l. Tilt System maximum 2' clearance from roof to the leading edge of the module and maximum 4' clearance from the roof to the rear edge of the module.

Roof Attachments that are analyzed in the Ironridge DA online tool are limited to IronRidge and QuickMount branded products. Third party supplied roof attachments are not reviewed; when using third party attachments the structural capacity, connection to IronRidge Rails and applicability to a specific project are to be verified by a registered design professional.

The IronRidge DA online tool is intended to be used under the responsibility of a registered design professional where required by the authority having jurisdiction. Any user of the IronRidge DA shall have sufficient structural engineering knowledge and experience to understand the required design criteria per the above applicable building codes, verify if the IronRidge DA is applicable to the project, and select the appropriate values for all input parameters within the IronRidge DA.

This certification excludes evaluation of:

1. The structure to support the loads imposed on the building by the array; including, but not limited to, strength and deflection of structural framing members, fastening and/or strength of roofing materials, and/or the effects of snow accumulation on the structure.
2. The capacity of the solar module frame to resist the loads.

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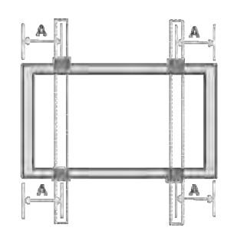
PV MODULE INSTALLATION MANUAL CLAMPING REQUIREMENTS

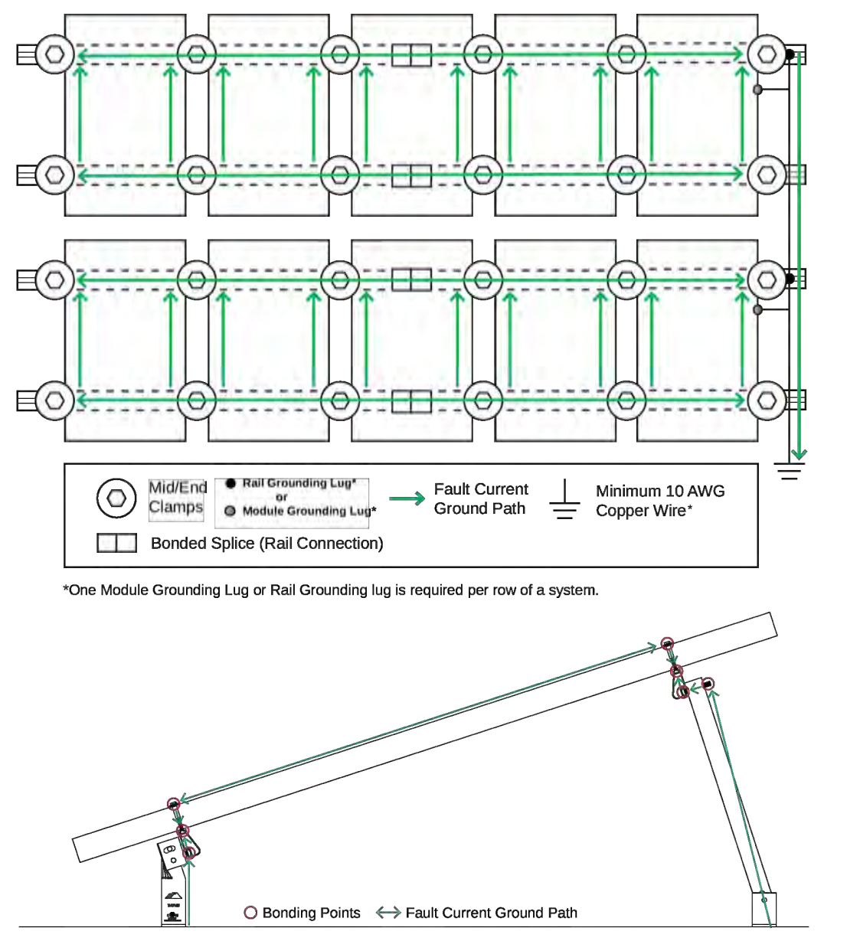
6.2.1 Clamp mounting on long side of frame and rails perpendicular to the long side frame



Module Types	Max Mechanical Load (Pa)*								
	+1800/ -1800	+2000/ -2000	+2400/ -2400	+3600/ -2400	+5400/ -2400	+5400/ -3600	+5400/- 4000	+7000/- 3200	+7000/ -5400
	A Range (mm)								
CS6L-MS	60-200°	/	/	300-600	400-500	/	/	/	/
CS6R-MS CS6RB-MS	/	20-100	100-600	200-500	300-400	/	/	/	/
CS6RA-MS	/	/	/	20-100	200-400	/	/	/	/
CS6R-MS-HL CS6R-MB-HL	/	/	0-100	100-600	/	250-550	/	/	400-500
CS6W-MS (F35A¹ Frame)/ CS7L-MS	/	/	300-600	/	400-500	/	/	/	/
CS6W-MS (F45¹ Frame)/ CS6W-T CS7N-MS (F53A² &F56² Frame)	/	/	300-600	/	450-550	/	/	/	/
CS6.1-54TM-H	/	/	0-200	200-650	/	300-550	/	/	450-550
CS6.1-60TM-H	/	0-200	/	200-650	300-550	/	/	450-550	/
CS7N-MS (F63² Frame)	/	/	/	300-600	450-550 ⁴	/	/	/	/
CS7L-MS (F63² Frame)	/	/	/	300-600	400-500	/	/	/	/
CS6R-T	/	20-100	100-600	200-500	300-400	/	/	/	/
CS6W-MB-AG CS6W-TB-AG	/	/	/	300-600	400-500	/	/	/	/
CS6.1-72TB CS6.1-72TD CS7N-MB-AG CS7N-TB-AG	/	/	/	/	450-550	/	/	/	/
CS7L-MB-AG	/	/	/	/	400-500	/	/	/	/

PV RACKING GROUNDING DIAGRAM

Grounding Diagram


Mid/End Clamps
Rail Grounding Lug* or Module Grounding Lug*
Fault Current Ground Path
Minimum 10 AWG Copper Wire*
Bonded Splice (Rail Connection)
Bonding Points
Fault Current Ground Path

*One Module Grounding Lug or Rail Grounding lug is required per row of a system.

BUILDING C - PV ROOF CALCULATIONS

Project Details

Name	471 Knight Way - Building C [CS 460]	Date	04/24/2026
Location	471 Knight Way, La Cañada Flintridge, CA 91011	Total modules	41
Module	Canadian Solar: CS6.1-54TM-460H (35mm)	Total watts	18,860
Dimensions	Dimensions: 70.87" x 44.65" x 1.38" (1800.0mm x 1134.0mm x 35.0mm)	Attachments	128
ASCE	7-16	Tilt	0°
Inter-row spacing	0.0" *Calculated using solar azimuth of -41.36° and solar elevation of 19.48° at 9AM (America/Los_Angeles) on the winter solstice.*	Rail attachment hardware	Square Bolt

Roof Information

Roof material	Other	Roof attachment	L-Foot*
Rafter spacing	24"		

Load Assumptions

Wind exposure	C
Wind speed	100 mph
Ground snow load	5 psf
Attachment spacing	2.6666'
Site Elevation	1806.0 ft
S_{DS}	1.278

Building Details

Roof slope	0-7°
Risk category	II
Building height	15 ft
Building north-south	50.0 ft
Building east-west	70.0 ft
Parapet height	0.0 in

Span Details XR100 - Portrait

REFER TO
PV STRUCTURAL CALCULATION DOCUMENT

Reaction Forces XR100 - Portrait

Zone	Module Position	Uplift (PSF)	Compressive (PSF)	Down (lbs)	Uplift (lbs)	Lateral Perp (lbs)
Zone1	Normal	REFER TO PV STRUCTURAL CALCULATION DOCUMENT	14	109	61	16
	Exposed		14	109	74	16
~~Zone2~~	~~Normal~~		~~14~~	~~111~~	~~63~~	~~16~~
	~~Exposed~~		~~14~~	~~111~~	~~103~~	~~16~~
~~Zone3~~	~~Normal~~		~~14~~	~~120~~	~~75~~	~~16~~
	~~Exposed~~		~~14~~	~~120~~	~~119~~	~~16~~

The provided reactions are ASD (Allowable Stress Design) forces per ASCE 7 Section 2.4 and present combined load effects.

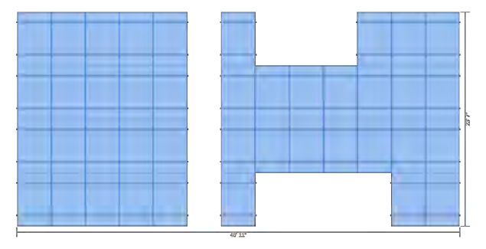
Weights and Loads

Total system weight	2,438.6 lbs
Weight/attachment	19.1 lbs
Racking weight	359.5 lbs
Distributed weight	2.7 psf

Roof Section 1

Definition	Roof Section Weights	Roof Section (all segments)
41 modules	Total weight: 2,438.6 lbs	Provided rail: 448' [32 x 168"]
East-West rail orientation	Weight/attachment: 19.1 lbs	Attachments: 128
Portrait module orientation	Total Area: 916.5 sq ft	Splices: 12
Graphical entry	Distributed weight: 2.7 psf	

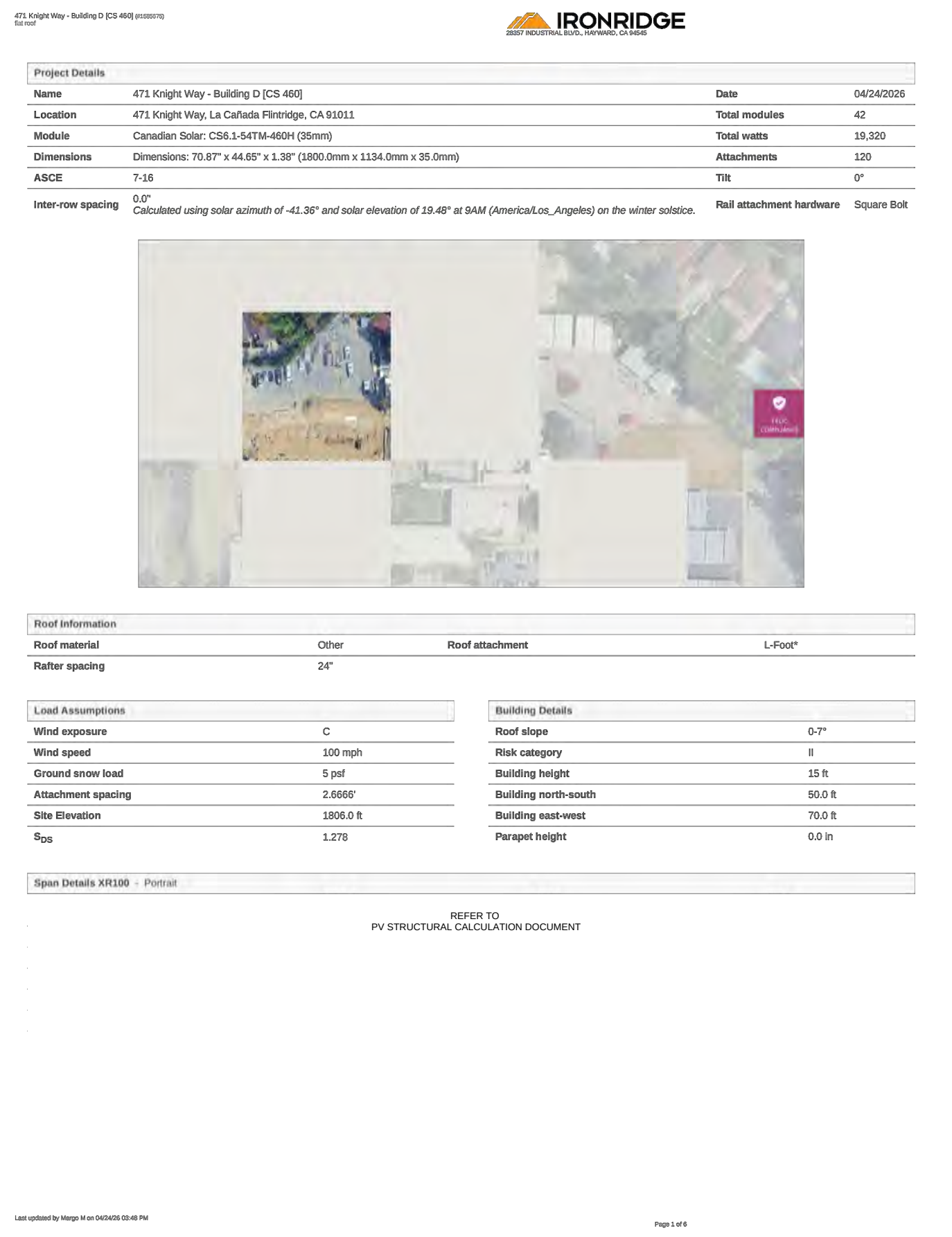
Diagram

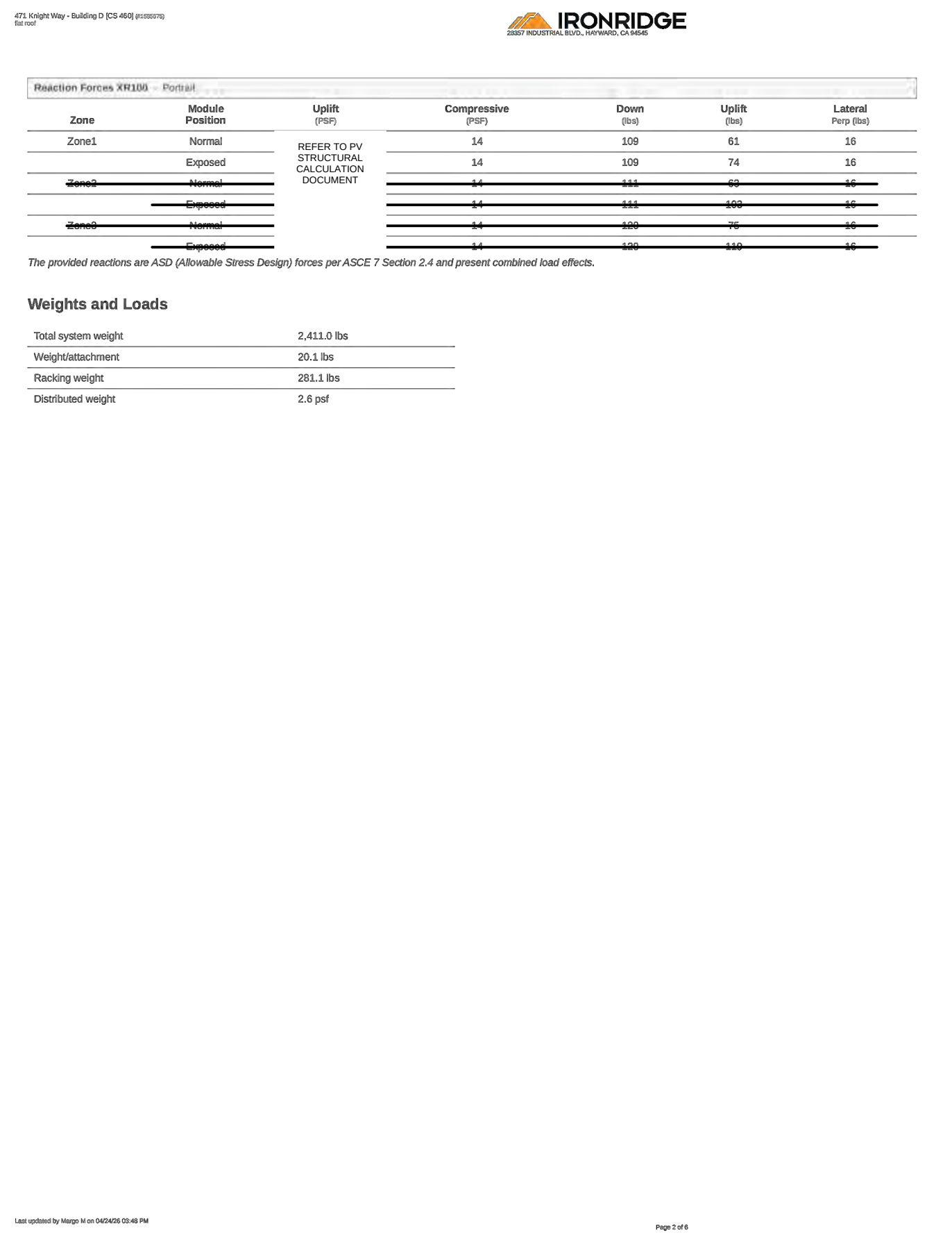


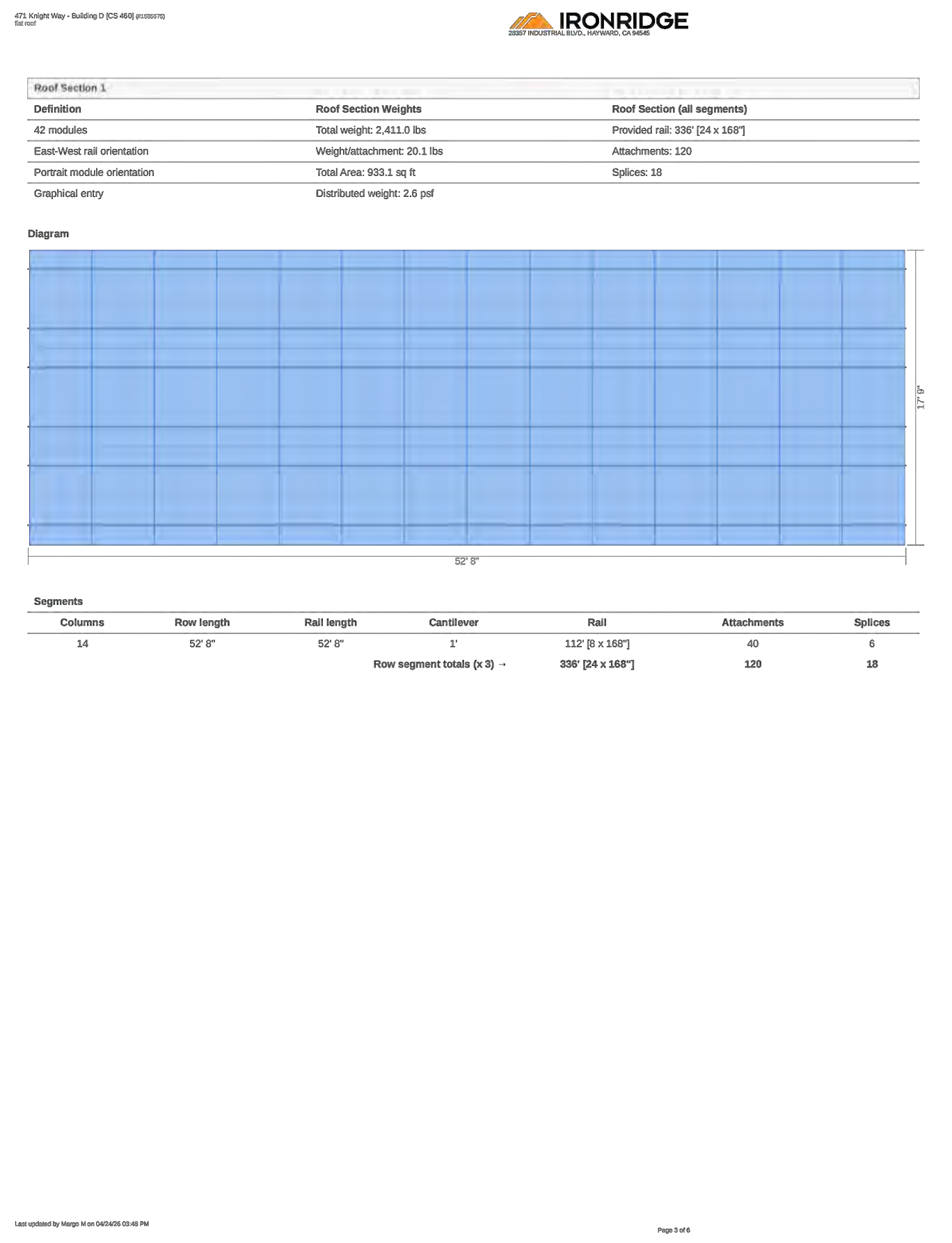
Segments

Columns	Row length	Rail length	Cantilever	Rail	Attachments	Splices
5	18' 11"	18' 11"	1"	56' [4 x 168"]	16	2
			Row segment totals (x 4) →	**224' [16 x 168"]**	**64**	**8**
1	3' 11"	3' 11"	7"	28' [2 x 168"]	4	0
			Row segment totals (x 2) →	**56' [4 x 168"]**	**8**	**0**
3	11' 5"	11' 5"	4"	**28' [2 x 168"]**	**10**	**0**
7	26' 5"	26' 5"	1' 2"	56' [4 x 168"]	20	2
			Row segment totals (x 2) →	**112' [8 x 168"]**	**40**	**4**
2	7' 8"	7' 8"	1' 2"	**28' [2 x 168"]**	**6**	**0**

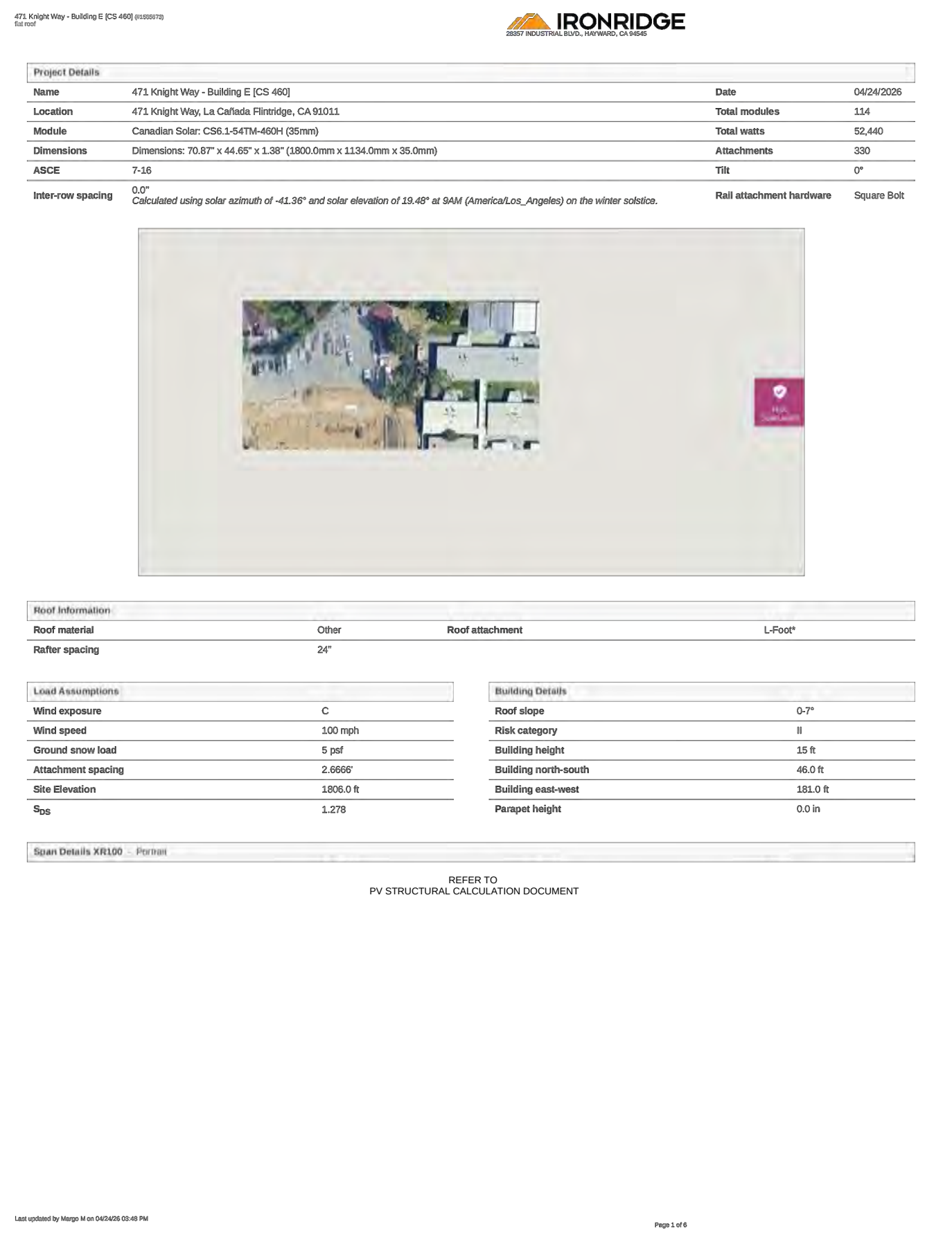
BUILDING D - PV ROOF CALCULATIONS

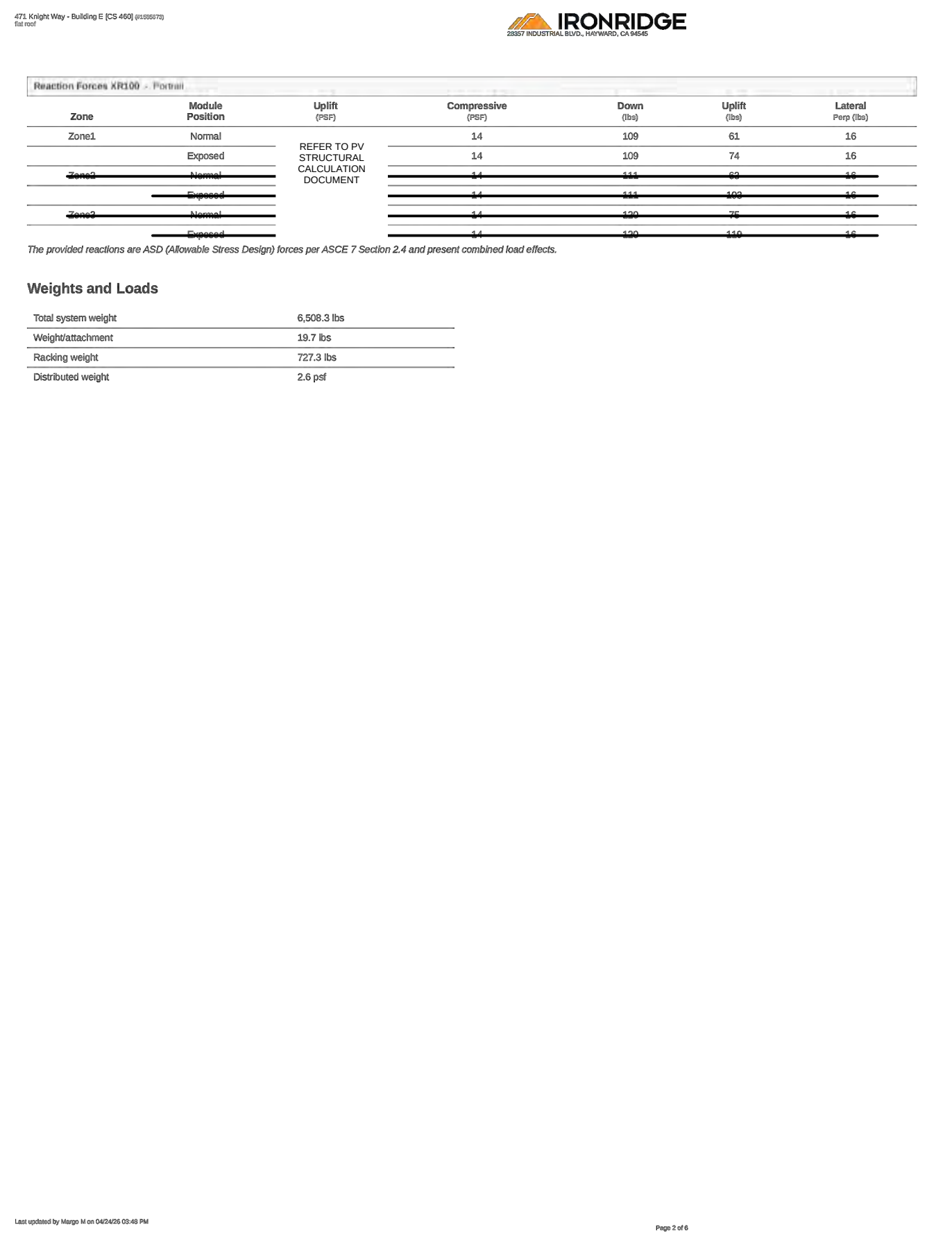


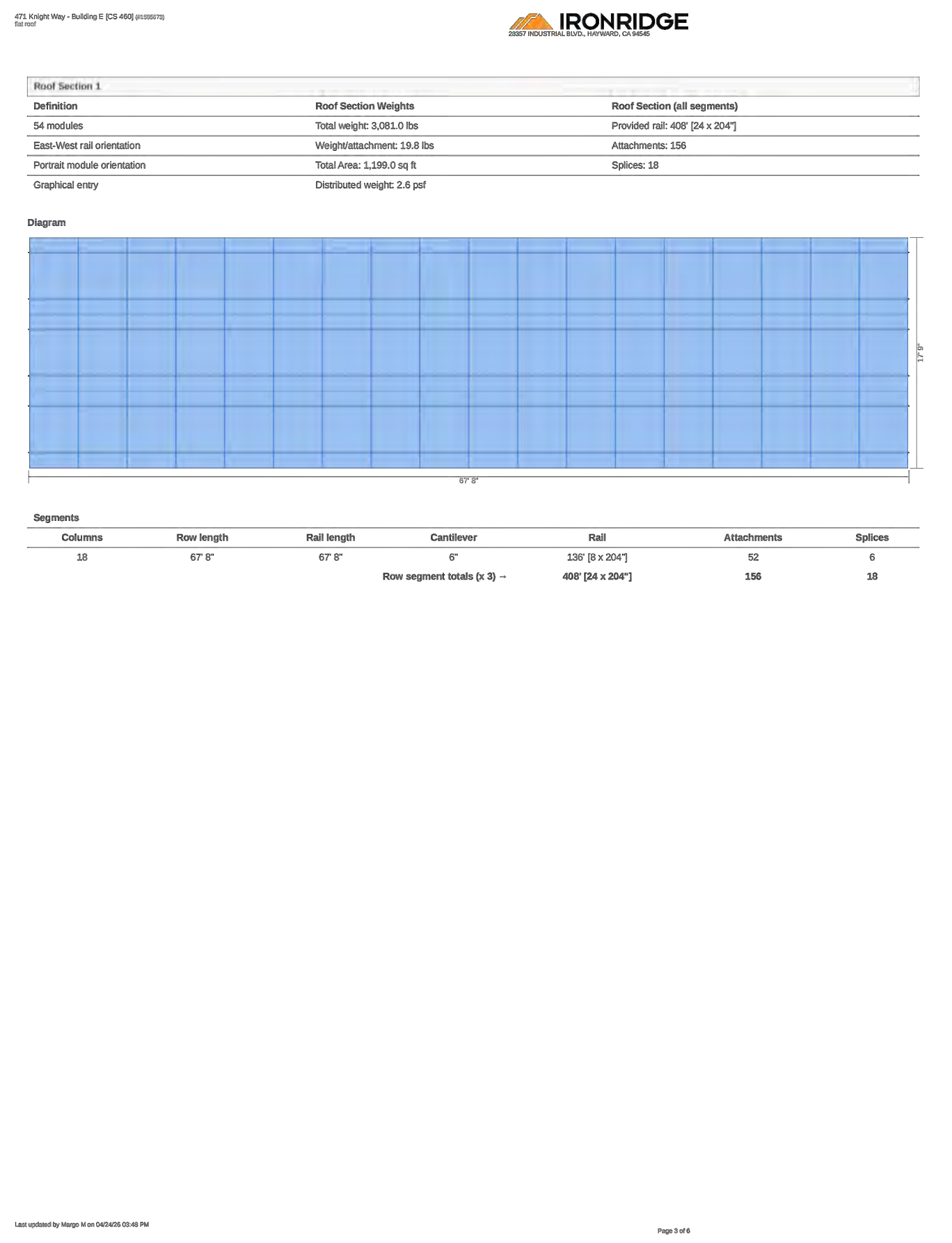


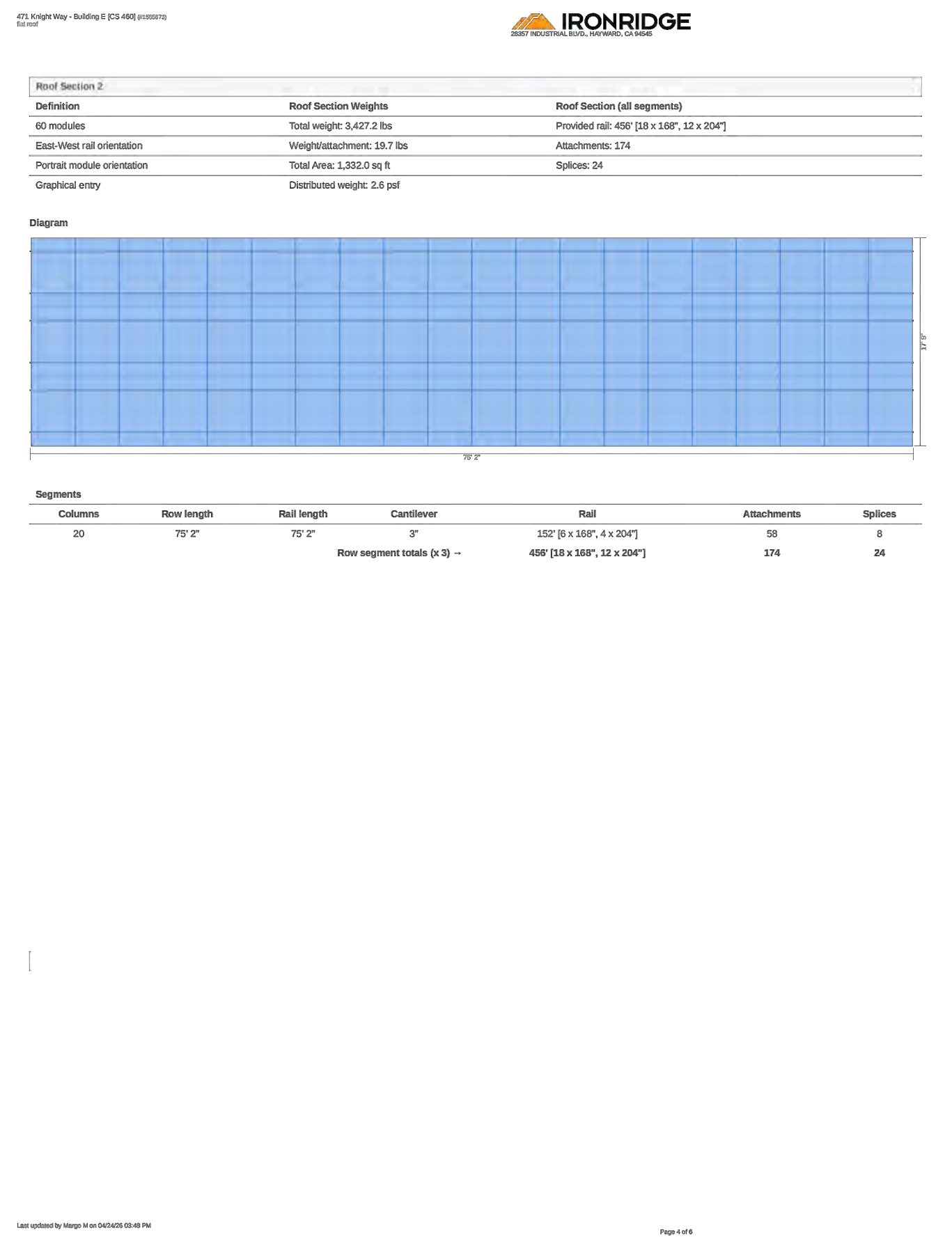


BUILDING E - PV ROOF CALCULATIONS

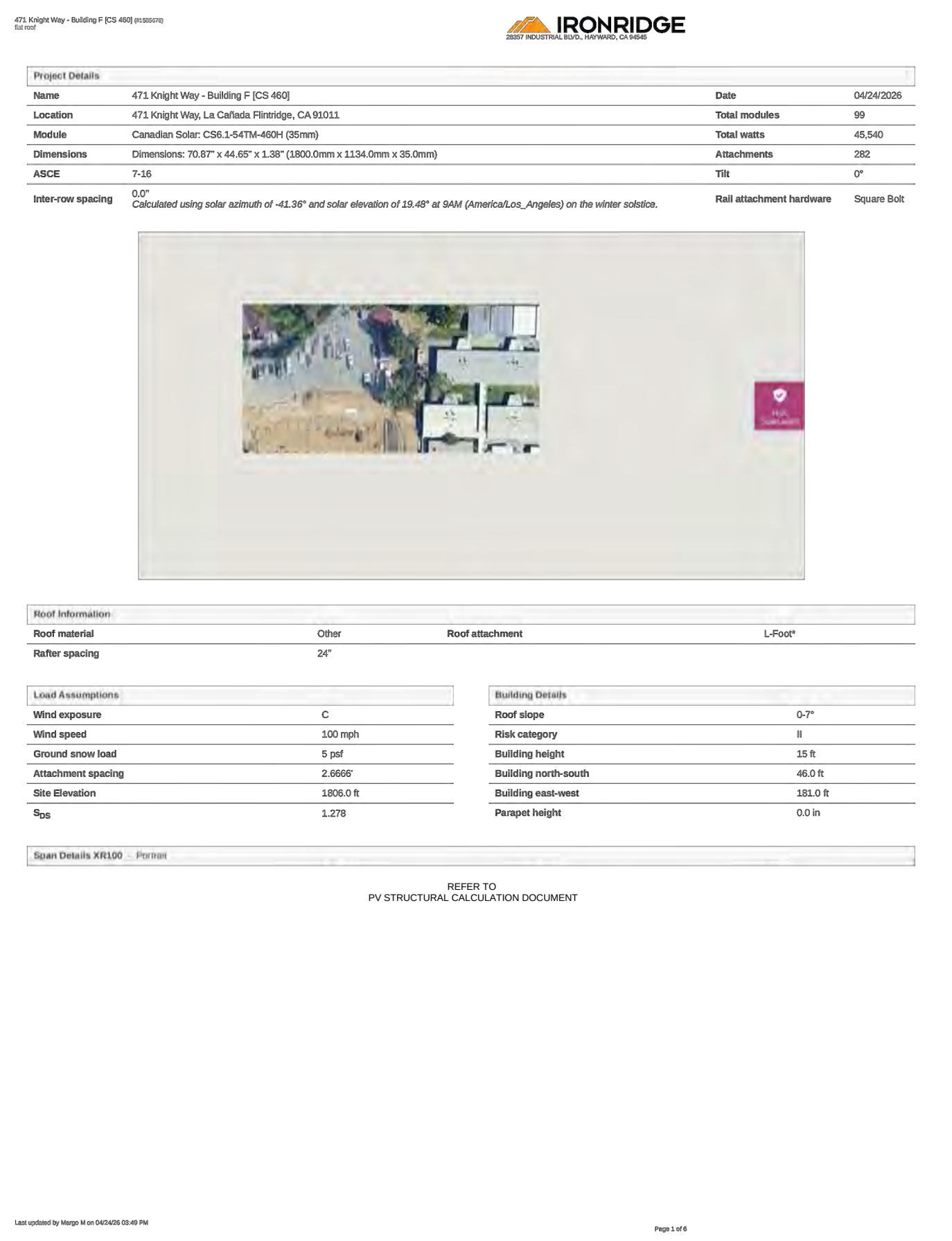


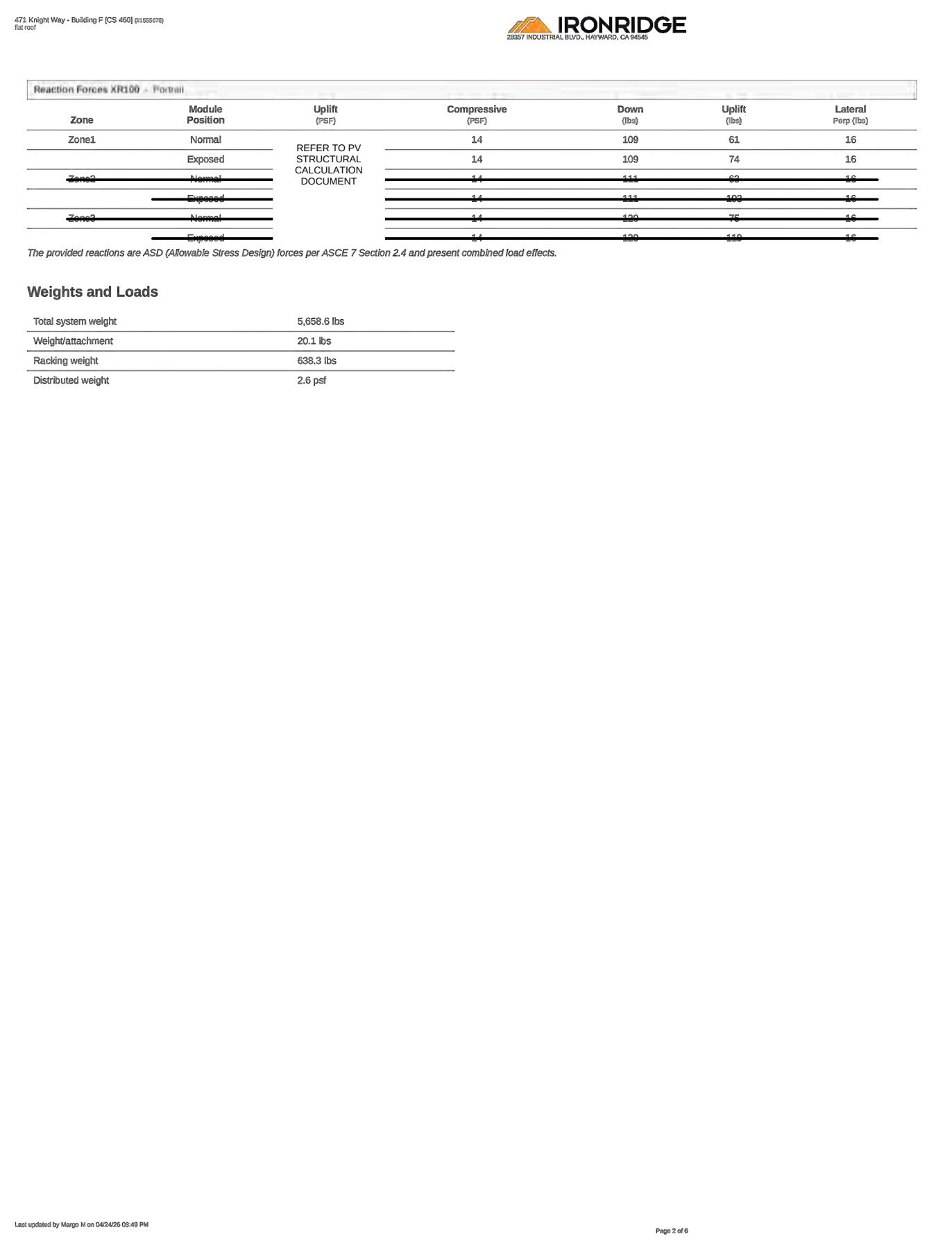


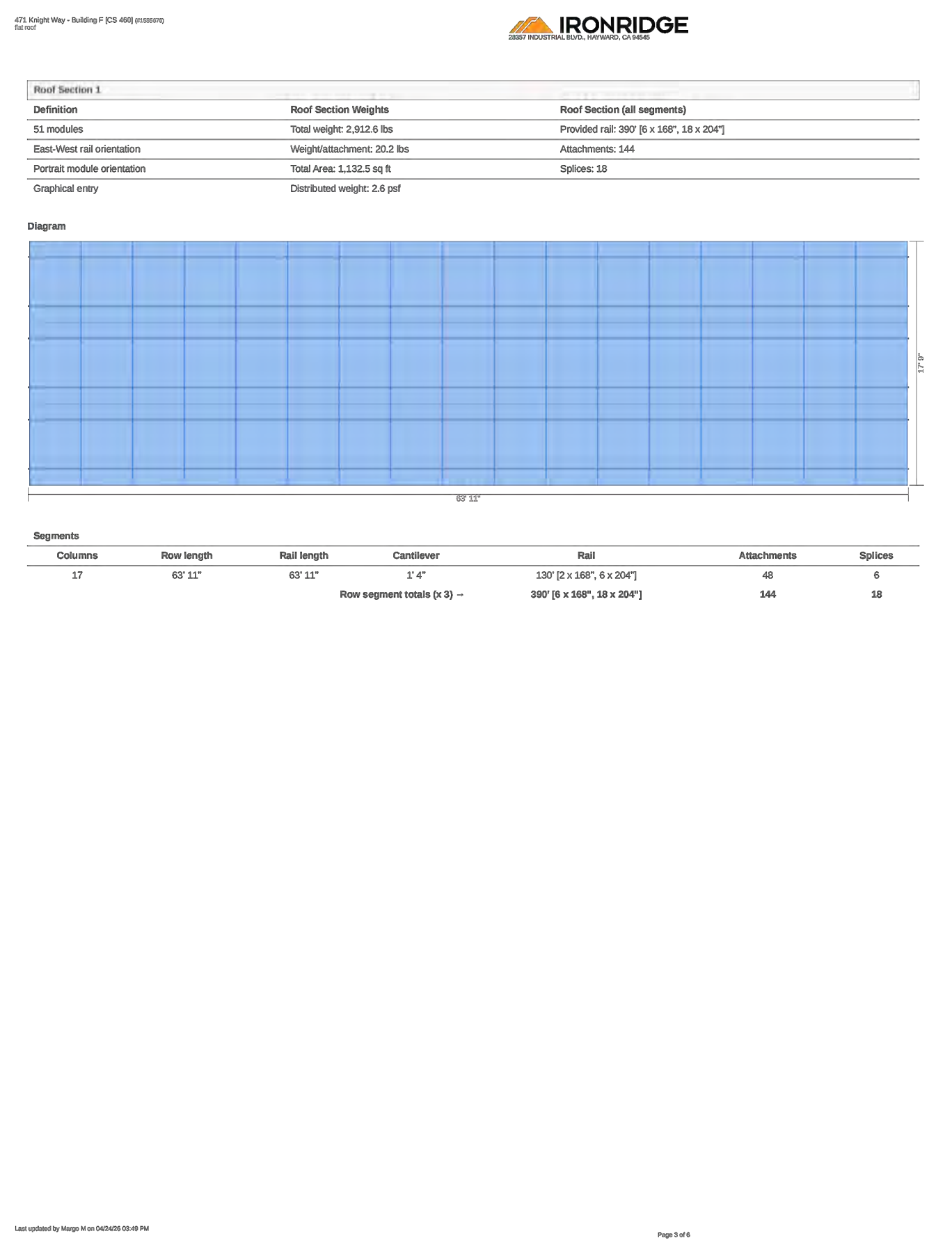


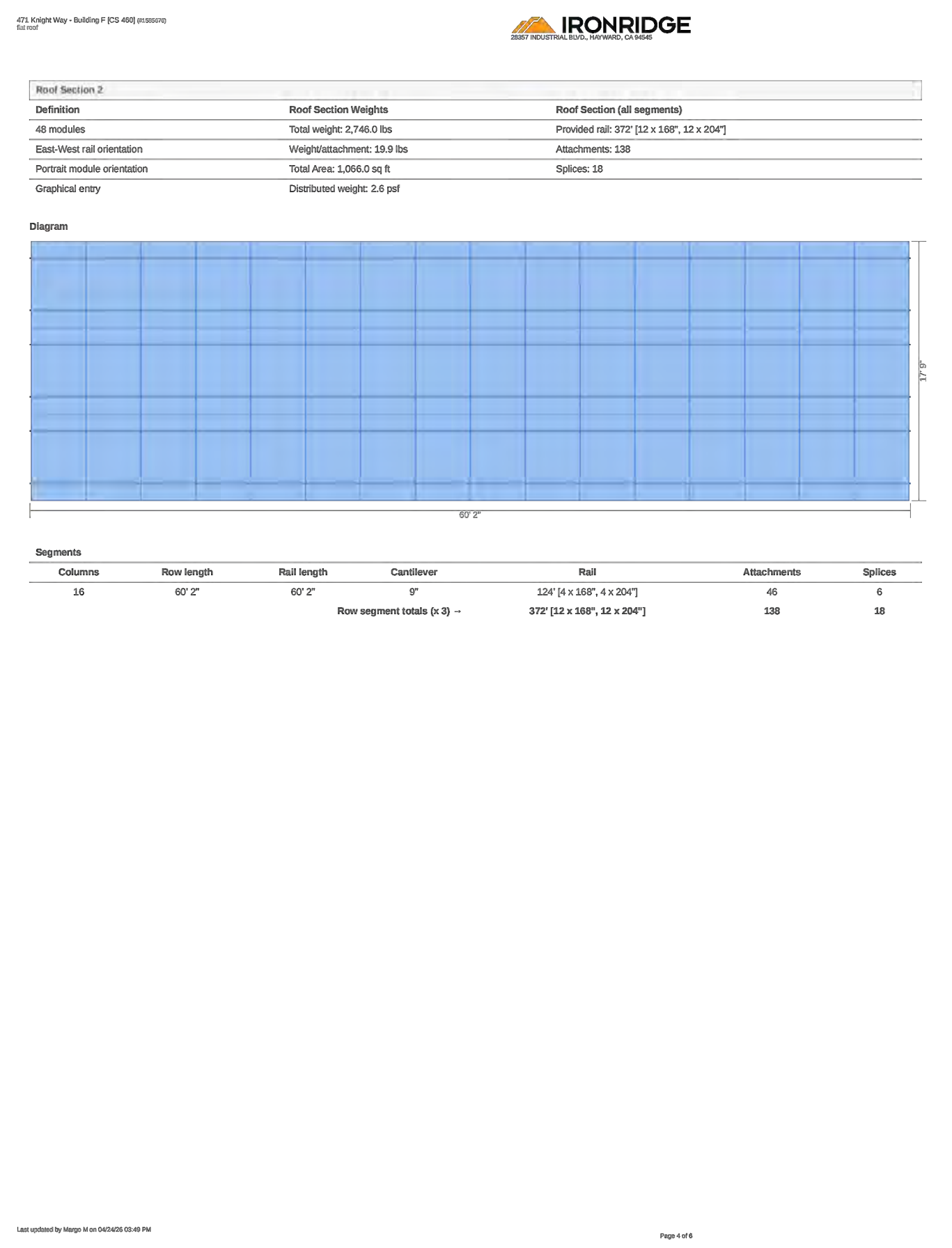


BUILDING F - PV ROOF CALCULATIONS









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LA CAÑADA UNIFIED SCHOOL DISTRICT
ESTABLISHED 1885

Salas O'Brien
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

ROY L. LOPEZ
No. 13442
Exp. 09/30/26
ELECTRICAL

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE
NO. C-014869
REN. 05-31-27

ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

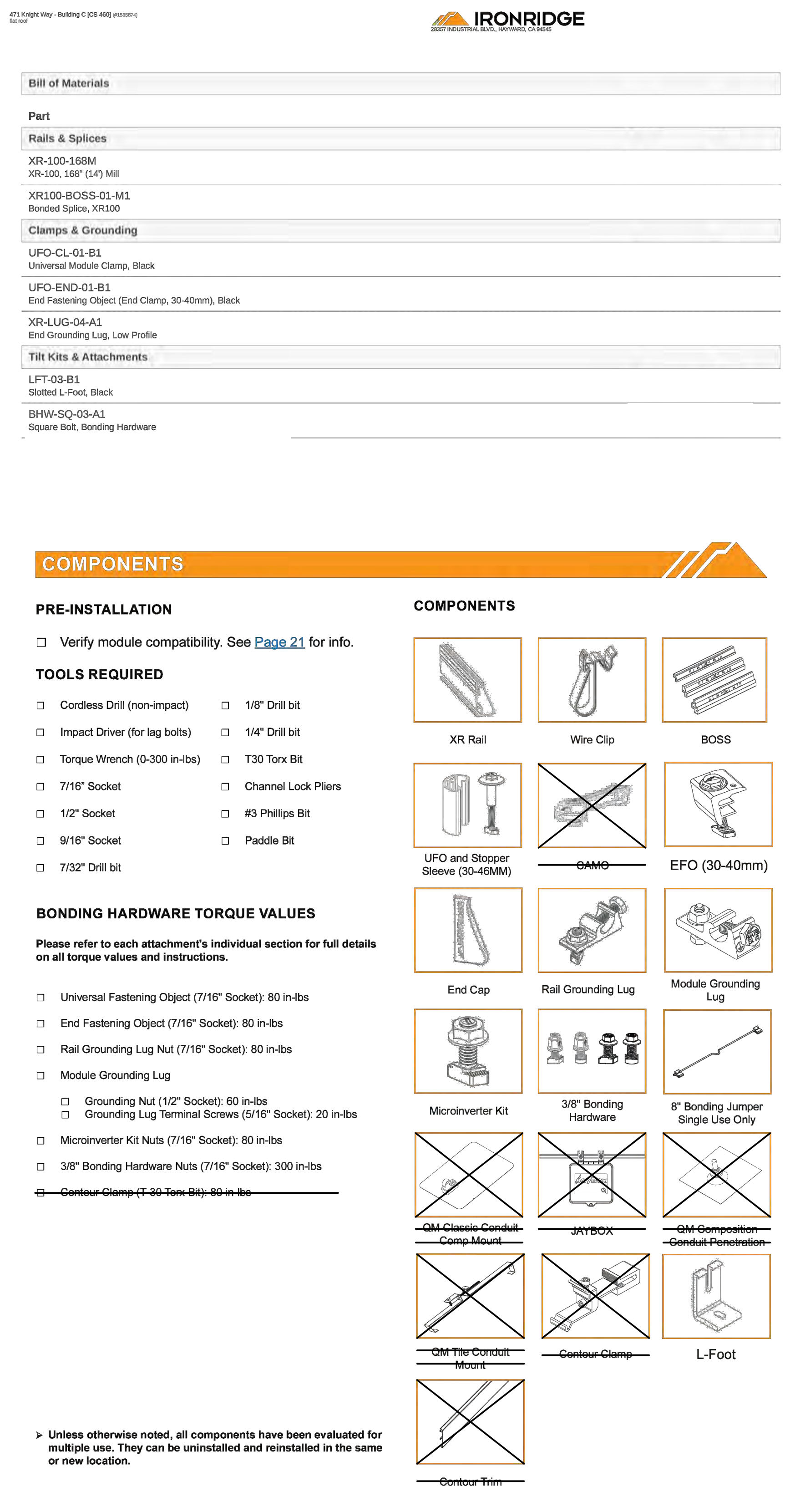
DRAWING TITLE

PV MOUNTING CALCULATIONS

5PV3.00

SCALE: AS INDICATED
PLOT DATE

If this sheet is smaller than 30" high by 42" wide then it has been reduced.



471 Knight Way - Building C [CS 460] (#1585674)
flat roof

IRONRIDGE
28357 INDUSTRIAL BLVD., HAYWARD, CA 94545

Bill of Materials

Part

Rails & Splices

XR-100-168M
XR-100, 168" (14') Mill

XR100-BOSS-01-M1
Bonded Splice, XR100

Clamps & Grounding

UFO-CL-01-B1
Universal Module Clamp, Black

UFO-END-01-B1
End Fastening Object (End Clamp, 30-40mm), Black

XR-LUG-04-A1
End Grounding Lug, Low Profile

Tilt Kits & Attachments

LFT-03-B1
Slotted L-Foot, Black

BHW-SQ-03-A1
Square Bolt, Bonding Hardware

COMPONENTS

PRE-INSTALLATION

☐ Verify module compatibility. See Page 21 for info.

TOOLS REQUIRED

- ☐ Cordless Drill (non-impact)
- ☐ Impact Driver (for lag bolts)
- ☐ Torque Wrench (0-300 in-lbs)
- ☐ 7/16" Socket
- ☐ 1/2" Socket
- ☐ 9/16" Socket
- ☐ 7/32" Drill bit
- ☐ 1/8" Drill bit
- ☐ 1/4" Drill bit
- ☐ T30 Torx Bit
- ☐ Channel Lock Pliers
- ☐ #3 Phillips Bit
- ☐ Paddle Bit

BONDING HARDWARE TORQUE VALUES

Please refer to each attachment's individual section for full details on all torque values and instructions.

- ☐ Universal Fastening Object (7/16" Socket): 80 in-lbs
- ☐ End Fastening Object (7/16" Socket): 80 in-lbs
- ☐ Rail Grounding Lug Nut (7/16" Socket): 80 in-lbs
- ☐ Module Grounding Lug
  - ☐ Grounding Nut (1/2" Socket): 60 in-lbs
  - ☐ Grounding Lug Terminal Screws (5/16" Socket): 20 in-lbs
- ☐ Microinverter Kit Nuts (7/16" Socket): 80 in-lbs
- ☐ 3/8" Bonding Hardware Nuts (7/16" Socket): 300 in-lbs
- ~~☐ Contour Clamp (T-30 Torx Bit): 80 in-lbs~~

COMPONENTS

XR Rail
Wire Clip
BOSS
UFO and Stopper Sleeve (30-46MM)
~~CAMO~~
EFO (30-40mm)
End Cap
Rail Grounding Lug
Module Grounding Lug
Microinverter Kit
3/8" Bonding Hardware
8" Bonding Jumper Single Use Only
~~QM Classic Conduit Comp Mount~~
~~JAYBOX~~
~~QM Composition Conduit Penetration~~
~~QM Tile Conduit Mount~~
~~Contour Clamp~~
L-Foot
~~Contour Trim~~

➢ **Unless otherwise noted, all components have been evaluated for multiple use. They can be uninstalled and reinstalled in the same or new location.**

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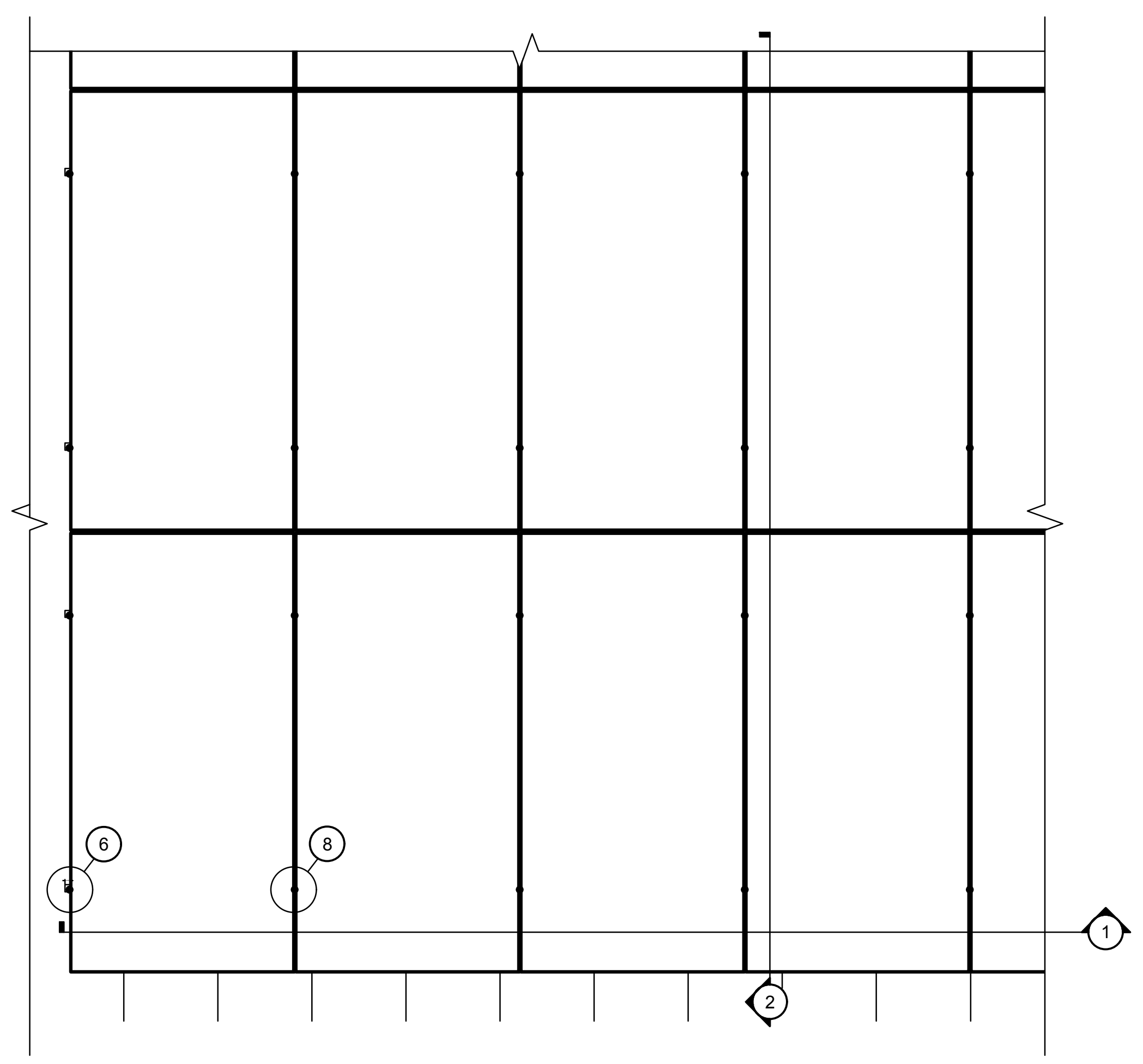
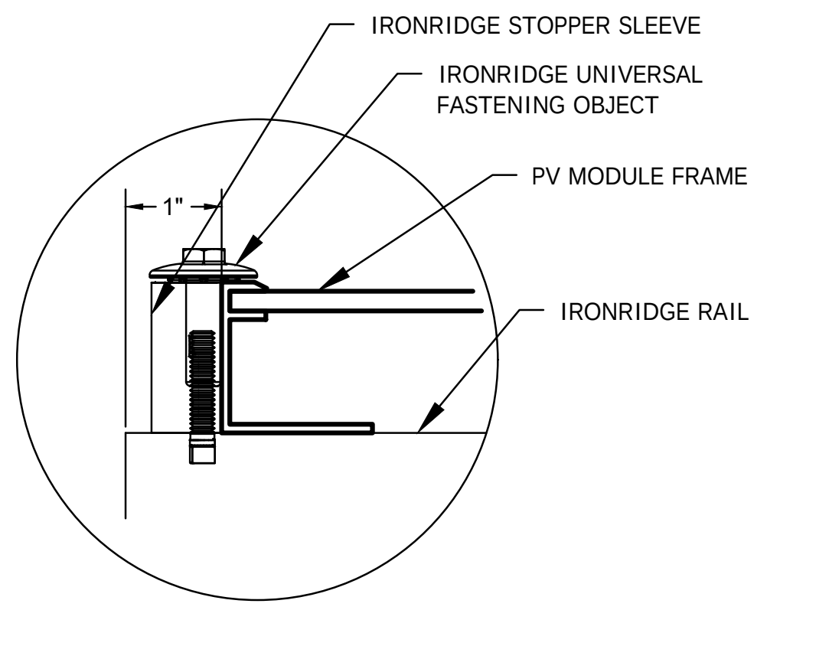
11 PV SYSTEM COMPONENTS

5PV3.10
SCALE: NTS



9 PV MOUNTING DETAIL, PLAN

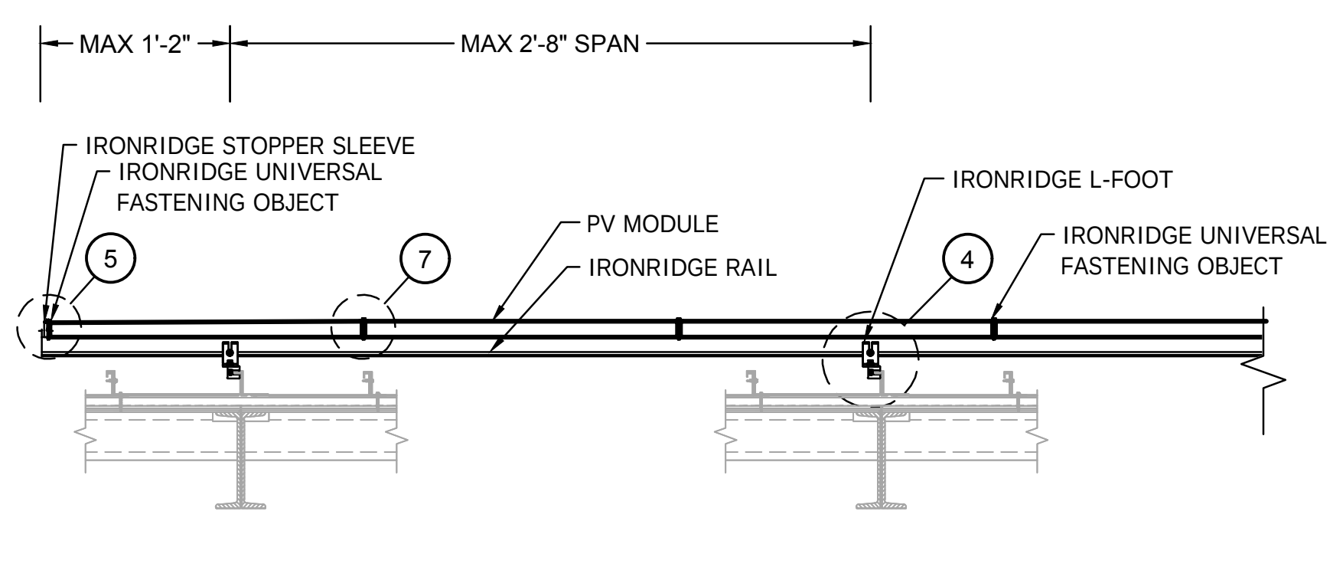
5PV3.10
SCALE: 1/2" = 1'



IRONRIDGE STOPPER SLEEVE
IRONRIDGE UNIVERSAL FASTENING OBJECT
PV MODULE FRAME
IRONRIDGE RAIL
1"

5 ENDCLAMP DETAIL, PROFILE

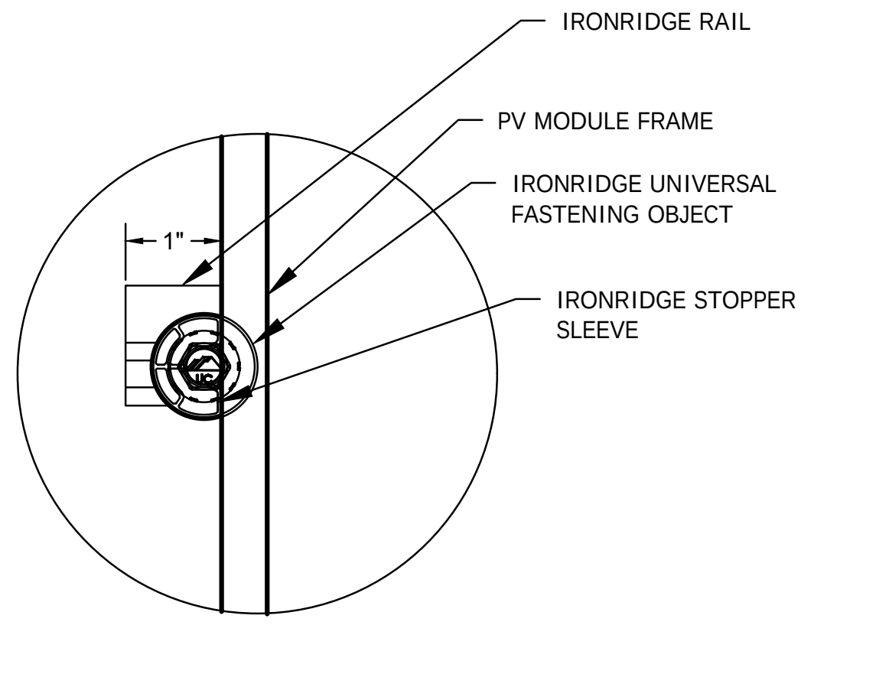
5PV3.10
SCALE: 6" = 1'



MAX 1'-2"
MAX 2'-8" SPAN
IRONRIDGE STOPPER SLEEVE
IRONRIDGE UNIVERSAL FASTENING OBJECT
PV MODULE
IRONRIDGE RAIL
IRONRIDGE L-FOOT
IRONRIDGE UNIVERSAL FASTENING OBJECT
5
7
4

1 ARRAY DETAIL, FRONT

5PV3.10
SCALE: 1/2" = 1'

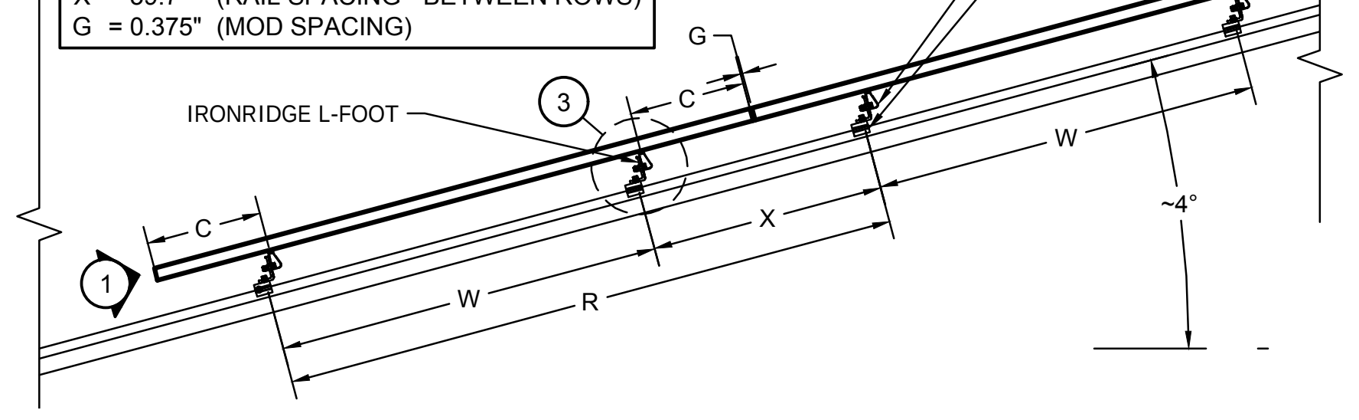


IRONRIDGE RAIL
PV MODULE FRAME
IRONRIDGE UNIVERSAL FASTENING OBJECT
IRONRIDGE STOPPER SLEEVE
1"

6 ENDCLAMP DETAIL, PLAN

5PV3.10
SCALE: 6" = 1'

C = 19.7" (RAIL CLAMP DIST. TO MOD EDGE)
R = 71.2" (OVERALL ROW HT. W/SPACING)
W = 31.5" (RAIL SPACING - WITHIN MOD)
X = 39.7" (RAIL SPACING - BETWEEN ROWS)
G = 0.375" (MOD SPACING)



IRONRIDGE RAIL
S-5-U ASSEMBLY
IRONRIDGE L-FOOT
G
C
C
W
X
W
R
~4°
3
1

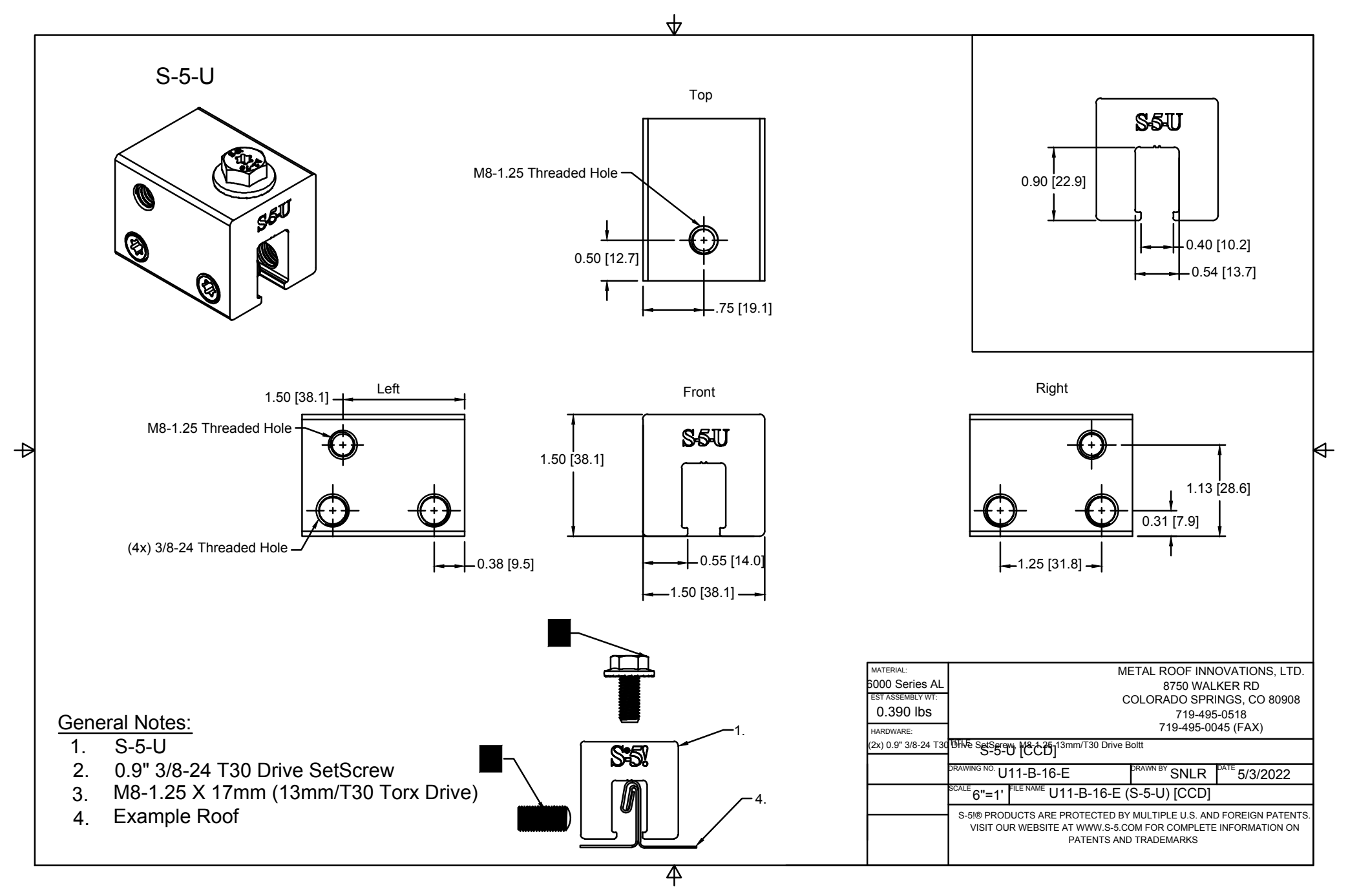
2 ARRAY DETAIL, PROFILE

5PV3.10
SCALE: 1/2" = 1'

REFER TO
PV STRUCTURAL CALCULATION DOCUMENT

12 XR100 PV RAIL SYSTEM SPAN TABLES

5PV3.10



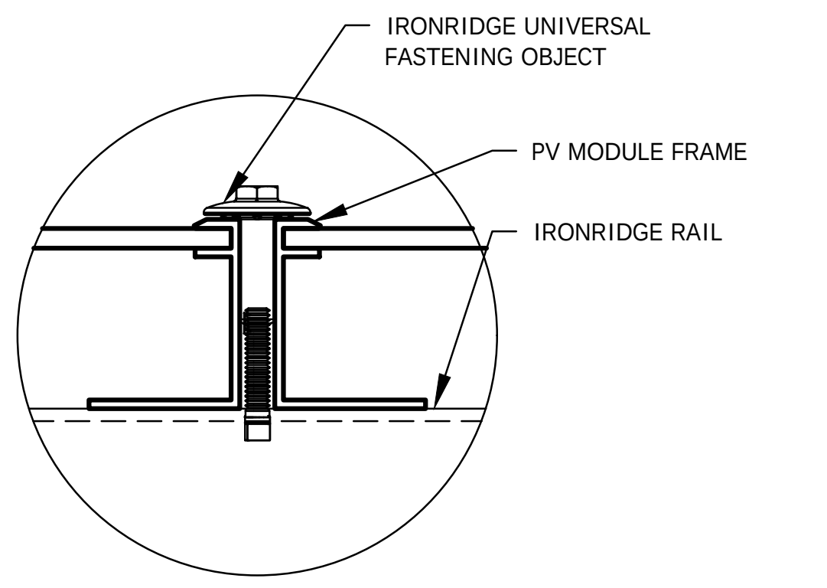
S-5-U
Top
M8-1.25 Threaded Hole
0.50 [12.7]
.75 [19.1]
S-5-U
0.90 [22.9]
0.40 [10.2]
0.54 [13.7]
Left
1.50 [38.1]
M8-1.25 Threaded Hole
(4x) 3/8-24 Threaded Hole
0.38 [9.5]
Front
1.50 [38.1]
0.55 [14.0]
1.50 [38.1]
Right
1.13 [28.6]
0.31 [7.9]
1.25 [31.8]
1.
4.

General Notes:
1. S-5-U
2. 0.9" 3/8-24 T30 Drive SetScrew
3. M8-1.25 X 17mm (13mm/T30 Torx Drive)
4. Example Roof

MATERIAL: 6000 Series AL
EST ASSEMBLY WT: 0.390 lbs
HARDWARE: (2x) 0.9" 3/8-24 T30 Drive SetScrew, M8-1.25 13mm/T30 Drive Boltt
TITLE: S-5-U [CCD]
METAL ROOF INNOVATIONS, LTD.
8750 WALKER RD
COLORADO SPRINGS, CO 80908
719-495-0518
719-495-0045 (FAX)
DRAWING NO. U11-B-16-E DRAWN BY SNLR DATE 5/3/2022
SCALE 6"=1' FILE NAME U11-B-16-E (S-5-U) [CCD]
S-5!® PRODUCTS ARE PROTECTED BY MULTIPLE U.S. AND FOREIGN PATENTS. VISIT OUR WEBSITE AT WWW.S-5.COM FOR COMPLETE INFORMATION ON PATENTS AND TRADEMARKS

10 S-5-U MOUNTING CLAMP DETAIL

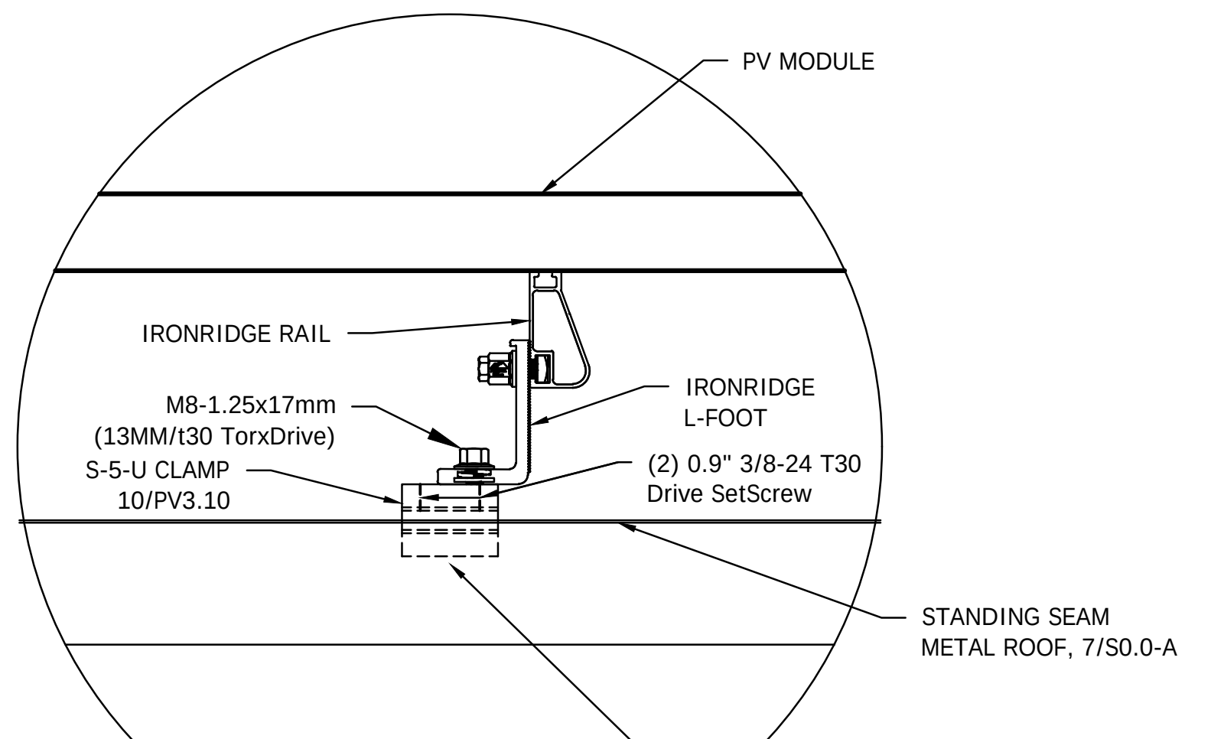
5PV3.10
SCALE: 6" = 1'



IRONRIDGE UNIVERSAL FASTENING OBJECT
PV MODULE FRAME
IRONRIDGE RAIL

7 MIDCLAMP DETAIL, PROFILE

5PV3.10
SCALE: 6" = 1'



PV MODULE
IRONRIDGE RAIL
M8-1.25x17mm (13MM/t30 TorxDrive)
S-5-U CLAMP 10/PV3.10
IRONRIDGE L-FOOT
(2) 0.9" 3/8-24 T30 Drive SetScrew
STANDING SEAM METAL ROOF, 7/S0.0-A

CLAMPS MAY OCCUR ON SAME SEAM BUT SHALL NOT OCCUR DIRECTLY ABOVE OR ADJACENT TO PAN CLIPS, PER MFR INSTALL INSTRUCTIONS. MAINTAIN THE LISTED CONNECTION CAPACITY PER THE TWINNING TEST REPORT #256022.R DATED 4/9/2025, AND.

3 PV RAIL MOUNTING DETAIL, PROFILE

5PV3.10
SCALE: 3" = 1'

PV MODULE

- CANADIAN SOLAR CS6.1-54TM-460H (5PV4.00).
- ETL LISTED TO UL 61215-1 AND UL 61730-1/2 PER INTERTEK AUTHORIZATION TO MARK, CONTROL NO. 4001505.
- INSTALL PV MODULES PER CANADIAN SOLAR INSTALLATION MANUAL FOR CS6.1 SERIES.

RACKING SYSTEM

- IRONRIDGE XR100 RAIL FLUSH MOUNT SYSTEM WITH UFO MID CLAMPS, END CLAMPS, STOPPER SLEEVES, AND L-FOOT.
- CERTIFICATION: IRONRIDGE XR RAIL FLUSH MOUNT SYSTEM ENGINEERING CERTIFICATION & SPAN TABLES, REPORT NO. 7.16 XR100, REV B (XR100 RAIL FAMILY).
- SYSTEM LISTED TO UL 2703 AS A PV RACK MOUNTING SYSTEM.
- INSTALL ALL IRONRIDGE COMPONENTS PER IRONRIDGE FLUSH MOUNT INSTALLATION MANUAL (LATEST REVISION).

ROOF CLAMP

- S-5-U STANDING SEAM ROOF CLAMP.
- TEST REPORT: TWINNING AMS TEST REPORT
- S-5-U CLAMPS INSTALLED PER S-5-U INSTALLATION INSTRUCTIONS AND TEST REPORT, INCLUDING SETSCREW TORQUE REQUIREMENTS BELOW.
- ICC-ES ESR-3869 (S-5! STANDING SEAM CLAMPS).

Specified Torque	Inch Pounds	Foot Pounds	Nm
22ga steel	160–180	13–15	18–20
All other metals and thinner gauges of steel	130–150	11–12.5	15–17

GENERAL

- ALL PRODUCTS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER INSTALLATION INSTRUCTIONS AND THIS SET OF PLANS. WHERE THERE IS A CONFLICT, THE MORE RESTRICTIVE REQUIREMENT SHALL GOVERN.

COMPLIANCE TABLE

	REQUIREMENT	DOCUMENT	SHEET
	STRUCTURAL CALCULATIONS	IRONRIDGE DESIGN ASSISTANT REPORT	5PV3.00
DSA 16-8 § 5.1 - SOLAR PV SYSTEMS SUPPORTED BY SSMR			
5.1.2	SOLAR SYSTEM DESIGN & ATTACHMENT TO SSMR		
	SSMR MOUNTING CLAMP	S5! STANDING SEAM CLAMP: S-5-U	
		DATASHEET	5PV4.00
		MANFUACTURER INSTRUCTIONS	5PV4.00*
		DETAILS	5PV3.10
	RAIL MOUNTING SYSTEM	IRONRIDGE XR RAIL SYSTEM	
		UL2703	5PV4.01
		DATASHEETS	5PV4.01
		MANUFACTURER INSTRUCTIONS	5PV4.01*
		DETAILS	5PV3.10
5.1.2.1	VALIDATION OF PV SYSTEM CONNECTING DEVICE TO SSMR		
	SSMR MOUNTING CLAMP	TWINNING AMS TEST REPORT	5PV4.01*
5.1.3	FIELD INSTALLATION QC TESTING		
	DESIGN LOAD	MAX 286 LBS PER CLAMP**	5PV3.00
	TEST LOAD (2 x DESIGN LOAD)	MIN 572 LBS PER CLAMP	5PV3.10
	TESTING RECORDS	INDICATE ON DSA 103	
	*EXCERPT PROVIDED, SEE SUPPORTING DOCUMENTS FOR FULL VERSION		
	**GOVERNING PV ARRAY ZONE 2, SEE ROOF PLANS		

IRONRIDGE ENGINEERING REPORT

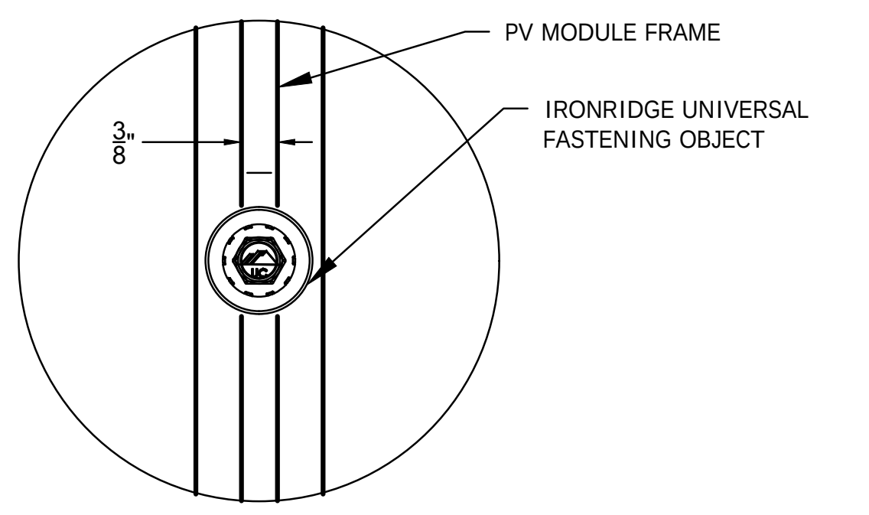
1. PV MOUNTING SYSTEM DESIGNED USING IRONRIDGE DESIGN ASSISTANT (DA).
2. IRONRIDGE DA REPORT INCLUDED WITH ALLOWABLE SPANS AND COMPONENT CAPACITIES.
3. IRONRIDGE ENGINEERING CERTIFICATION LETTER CONFIRMS THAT SYSTEMS DESIGNED IN ACCORDANCE WITH THE IRONRIDGE DA REPORT COMPLY WITH APPLICABLE STRUCTURAL REQUIREMENTS (CBC 2022 / ASCE 7-16) AND IS SIGNED AND SEALED BY A CALIFORNIA REGISTERED CIVIL OR STRUCTURAL ENGINEER PER IR 16-8 SECTION 5.1.
4. THE PV RACKING LAYOUT SHOWN IN THE PLANS MATCHES THE CONFIGURATION USED IN THE SUBMITTED DA REPORT
5. DESIGN LOADS FOR MODULE CLAMP CONNECTIONS ARE CALCULATED AND VERIFIED WITHIN THE IRONRIDGE DESIGN ASSISTANT (DA) REPORT.

ROOF CLAMP CERTIFICATION (IR 16-8 §5.1.2.1)

6. S-5-U CLAMP TO BE INSTALLED ON A VERTICAL DOUBLE-FOLDED STANDING SEAM METAL ROOF PANEL.
7. THE PROJECT ROOF SEAM GEOMETRY MATCHES THE S-5-U COMPATIBLE "UNIVERSAL PROFILE" FAMILY PER S-5-U TECHNICAL DOCUMENTATION.
8. CLAMP DESIGN CAPACITIES USED ARE BASED ON PUBLISHED TEST REPORT FOR VERTICAL DOUBLE-FOLDED STANDING SEAM ROOF PROFILES.

FIELD INSTALLATION TESTING (IR 16-8 §5.1.3)

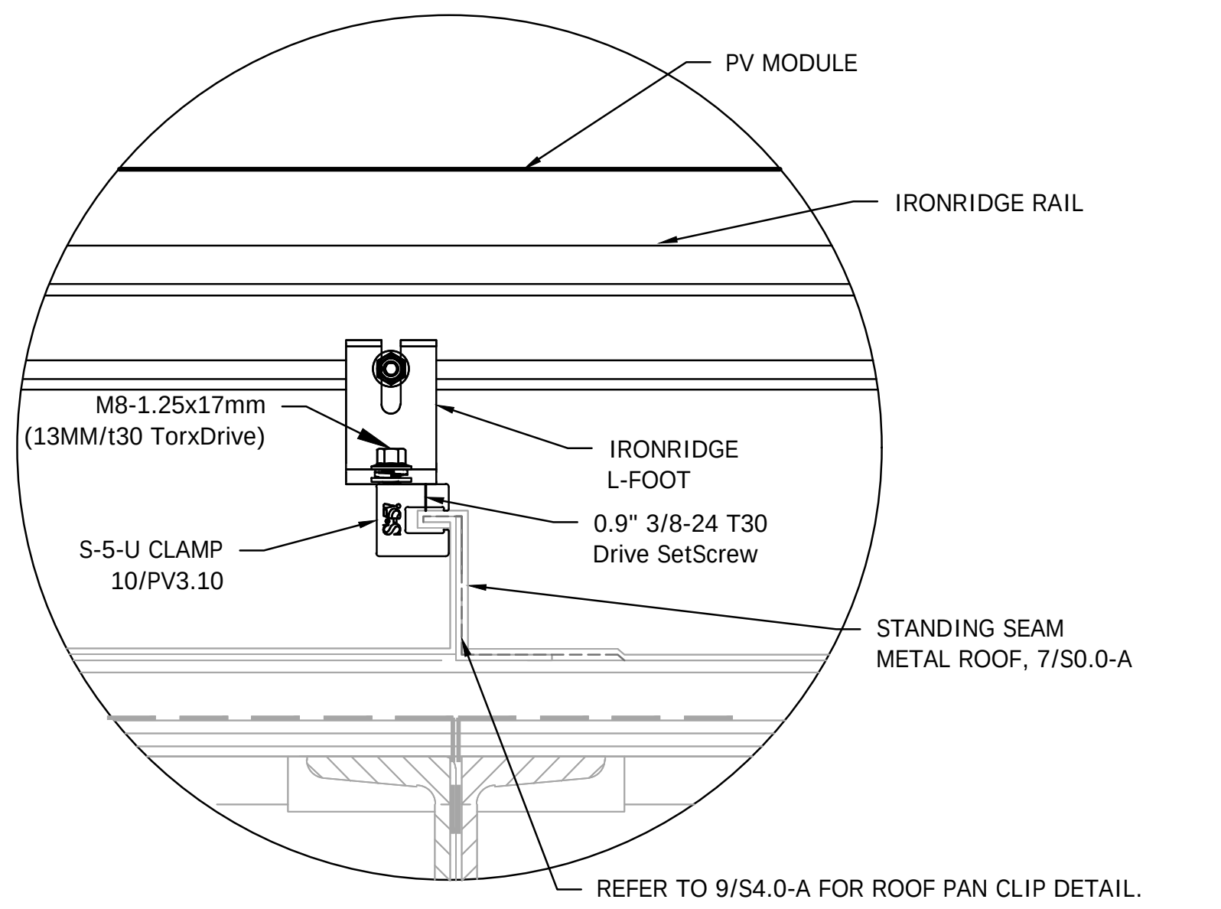
9. CONTRACTOR SHALL PERFORM FIELD PROOF TESTING OF A SAMPLE OF INSTALLED S-5-U CLAMPS TO VERIFY PROPER SETSCREW TORQUE AND CLAMP SLIP RESISTANCE, IN ACCORDANCE WITH IR 16-8 §5.1.3 AND S-5 INSTALLATION REQUIREMENTS.
10. MINIMUM TESTING: 1 CLAMP PER ARRAY OR 1% OF INSTALLED CLAMPS, WHICHEVER IS GREATER.
11. TEST LOAD SHALL BE NO LESS THAN THE LISTED VALUE ON THIS SHEET.
12. TESTING SHALL VERIFY THAT CLAMPS DO NOT SLIP UNDER A PULL TEST PER 5.1.3 WITH THE LISTED TESTING FORCE.
13. RECORD TEST RESULTS ON FIELD TEST REPORT.



PV MODULE FRAME
IRONRIDGE UNIVERSAL FASTENING OBJECT
1"

8 MIDCLAMP DETAIL, PLAN

5PV3.10
SCALE: 6" = 1'



PV MODULE
IRONRIDGE RAIL
M8-1.25x17mm (13MM/t30 TorxDrive)
IRONRIDGE L-FOOT
0.9" 3/8-24 T30 Drive SetScrew
S-5-U CLAMP 10/PV3.10
STANDING SEAM METAL ROOF, 7/S0.0-A
REFER TO 9/S4.0-A FOR ROOF PAN CLIP DETAIL.

CLAMPS MAY OCCUR ON SAME SEAM BUT SHALL NOT OCCUR DIRECTLY ABOVE OR ADJACENT TO PAN CLIPS, PER MFR INSTALL INSTRUCTIONS. MAINTAIN THE LISTED CONNECTION CAPACITY PER THE TWINNING TEST REPORT #256022.R DATED 4/9/2025, AND.

4 PV RAIL MOUNTING DETAIL, FRONT

5PV3.10
SCALE: 3" = 1'

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

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03/20/2026	DSA V3

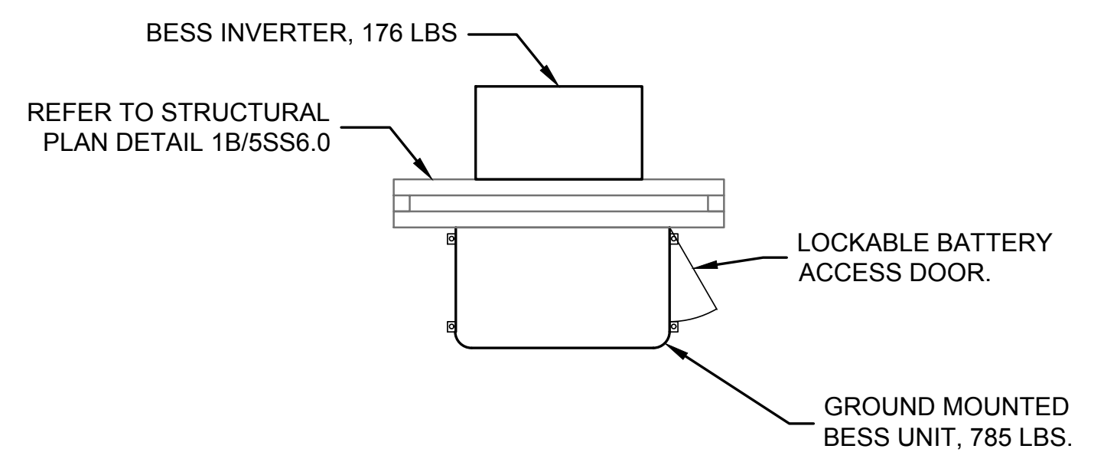
#	REVISION DATE	DESCRIPTION

DRAWING TITLE

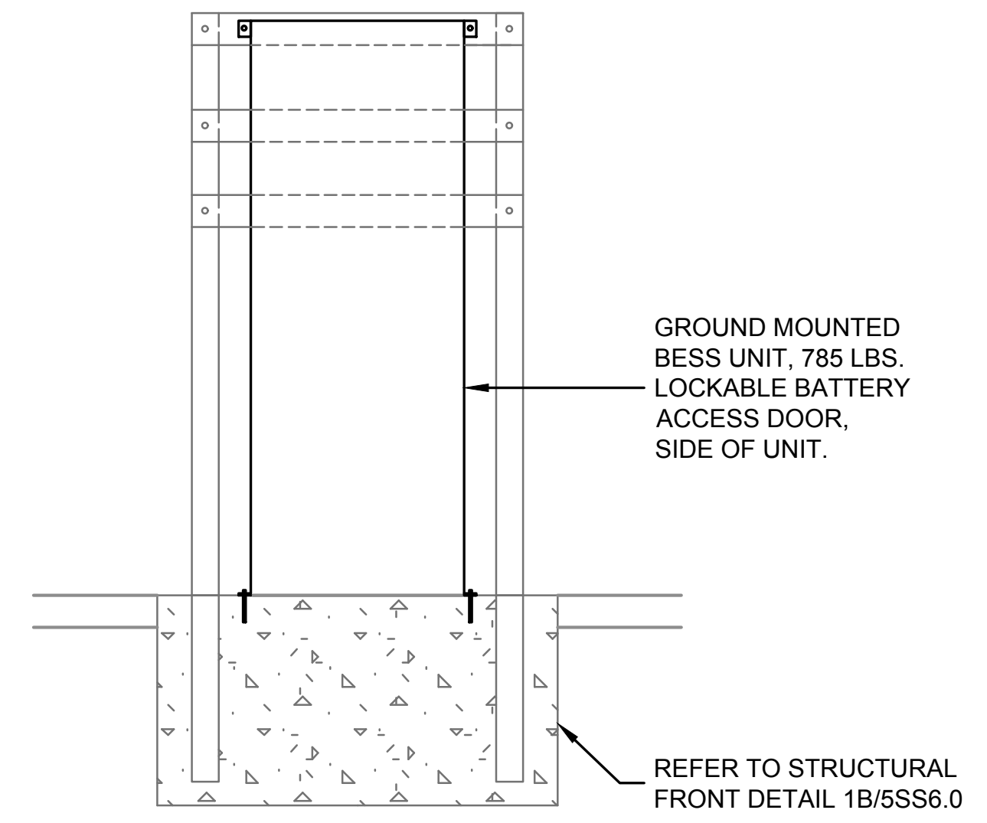
PV MOUNTING DETAILS

5PV3.10

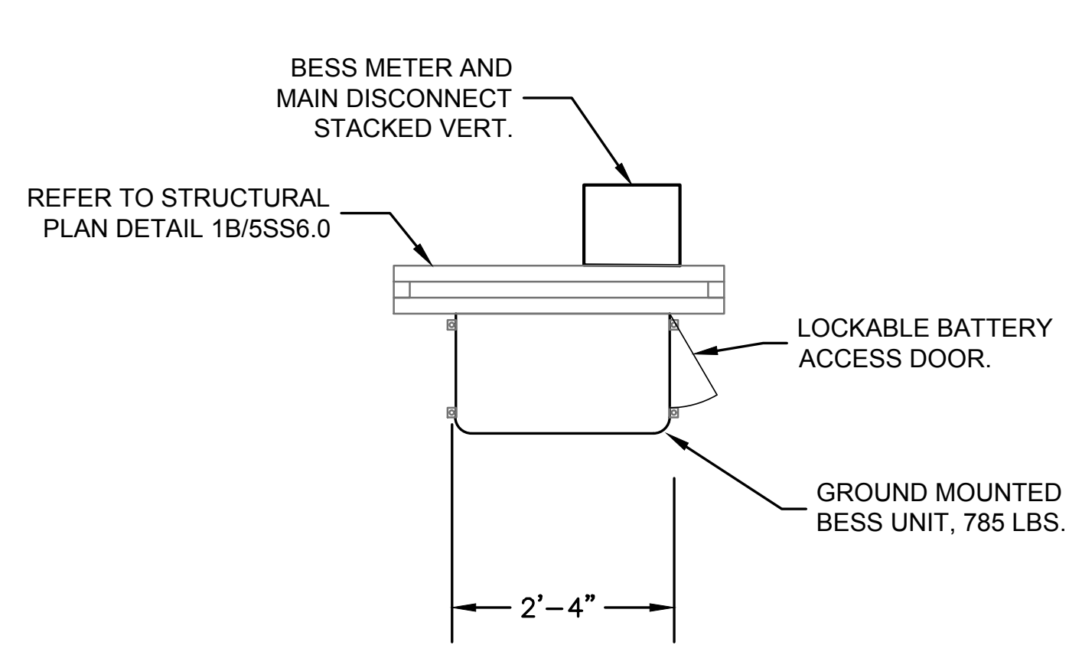
SCALE: AS INDICATED
PLOT DATE


BESS INVERTER, 176 LBS
REFER TO STRUCTURAL PLAN DETAIL 1B/5SS6.0
LOCKABLE BATTERY ACCESS DOOR.
GROUND MOUNTED BESS UNIT, 785 LBS.

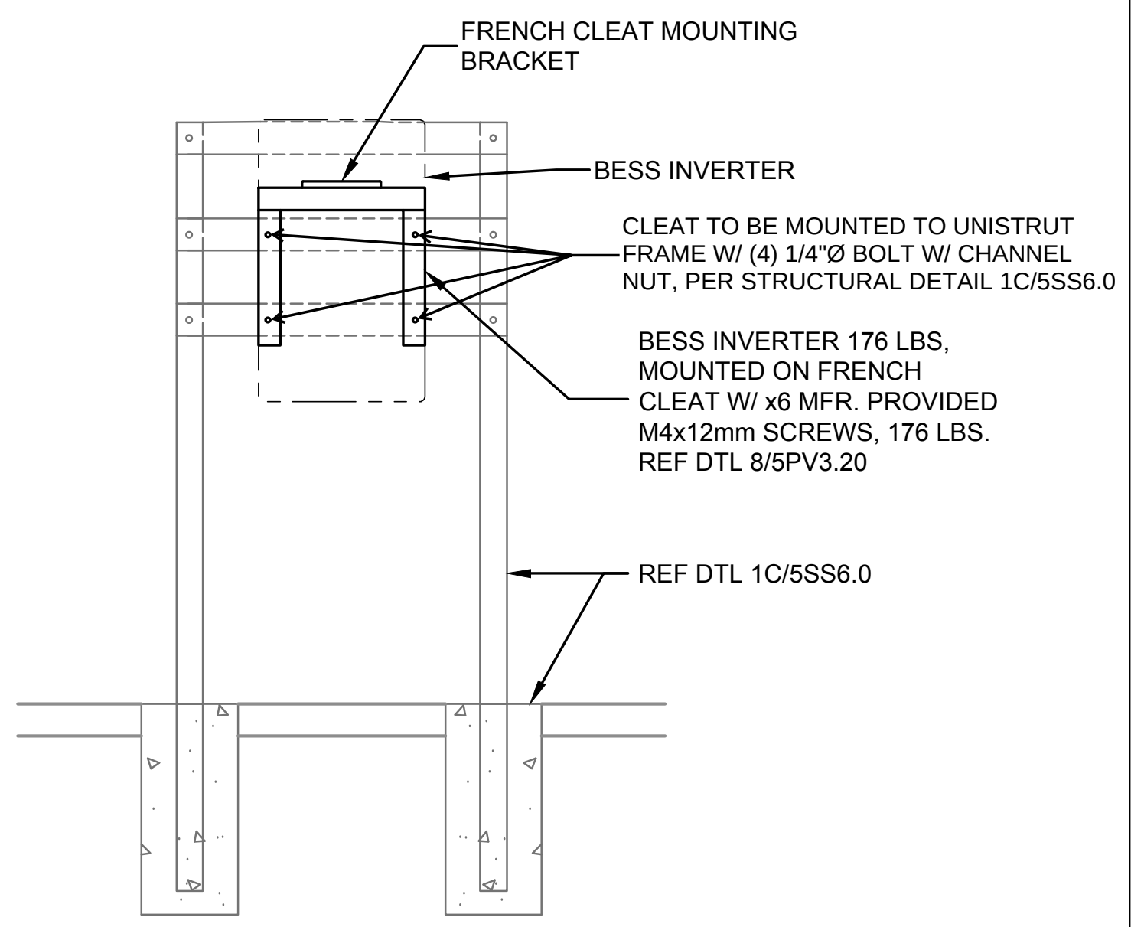
6
5PV3.20
BATTERY & INVERTER MOUNTING, TOP
SCALE: NTS


GROUND MOUNTED BESS UNIT, 785 LBS. LOCKABLE BATTERY ACCESS DOOR, SIDE OF UNIT.
REFER TO STRUCTURAL FRONT DETAIL 1B/5SS6.0

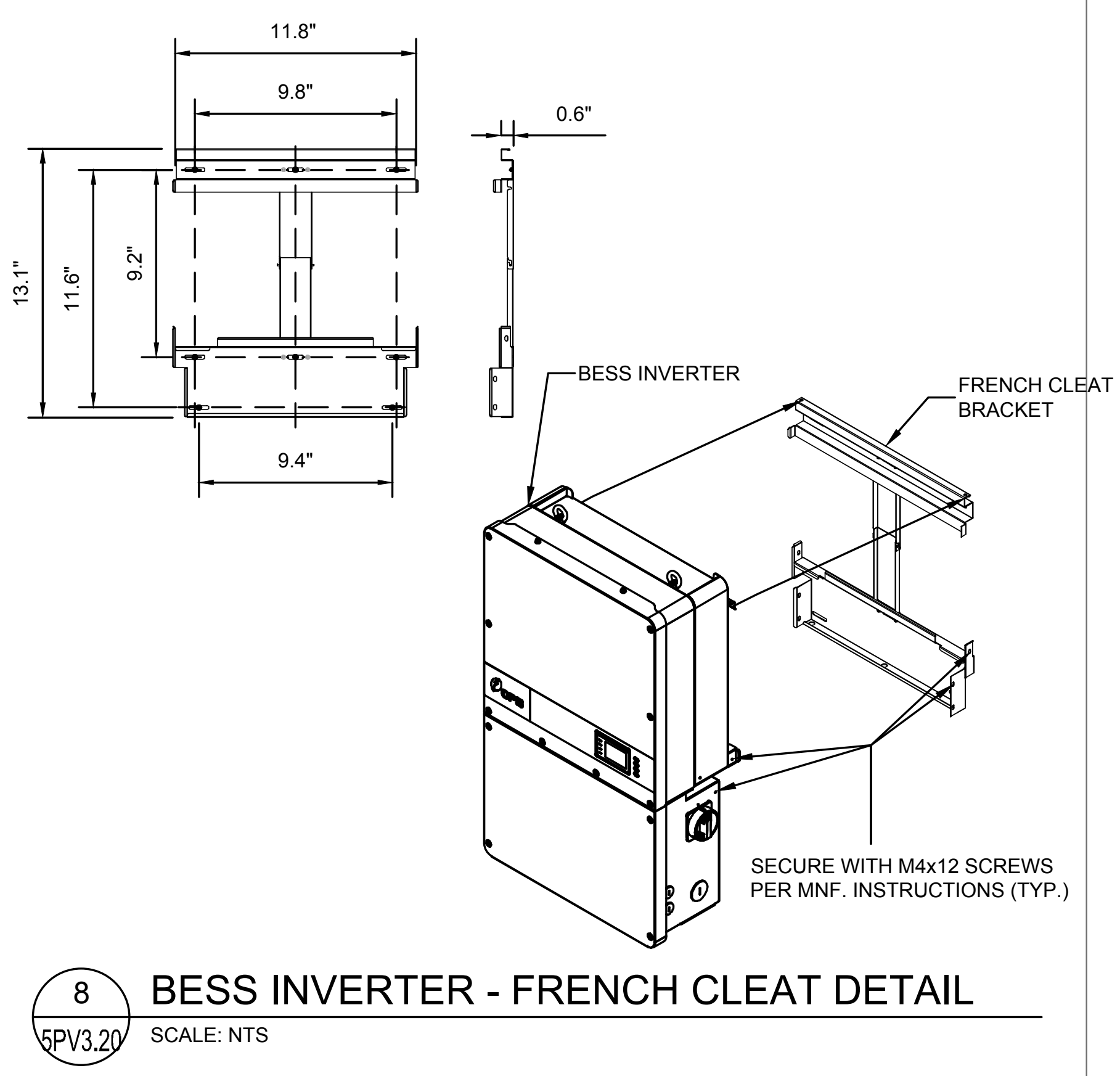
1
5PV3.20
BATTERY UNIT MOUNTING
SCALE: NTS


BESS METER AND MAIN DISCONNECT STACKED VERT.
REFER TO STRUCTURAL PLAN DETAIL 1B/5SS6.0
LOCKABLE BATTERY ACCESS DOOR.
GROUND MOUNTED BESS UNIT, 785 LBS.
2'-4"

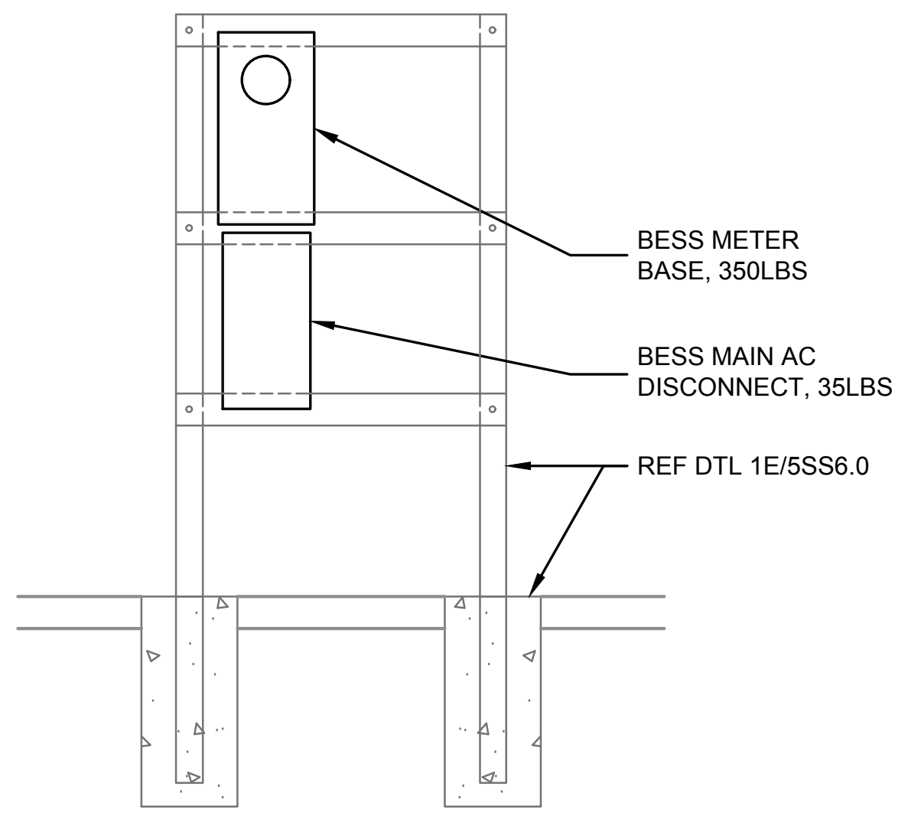
7
5PV3.20
BATTERY & METER/DISCO. MOUNTING, TOP
SCALE: 6" = 1'


FRENCH CLEAT MOUNTING BRACKET
BESS INVERTER
CLEAT TO BE MOUNTED TO UNISTRUT FRAME W/ (4) 1/4"Ø BOLT W/ CHANNEL NUT, PER STRUCTURAL DETAIL 1C/5SS6.0
BESS INVERTER 176 LBS, MOUNTED ON FRENCH CLEAT W/ x6 MFR. PROVIDED M4x12mm SCREWS, 176 LBS. REF DTL 8/5PV3.20
REF DTL 1C/5SS6.0

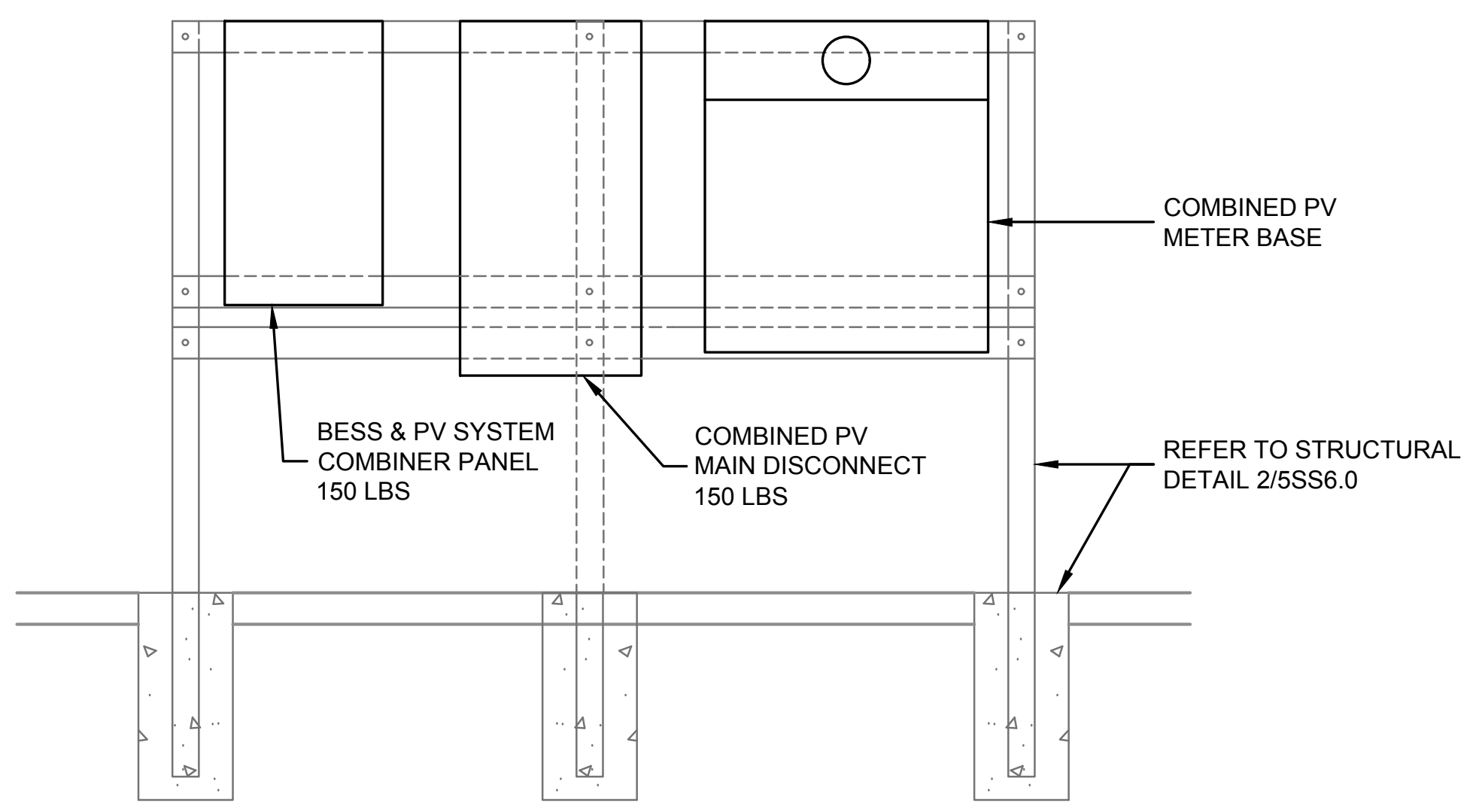
2
5PV3.20
BESS INVERTER MOUNTING
SCALE: NTS


11.8"
9.8"
0.6"
13.1"
11.6"
9.2"
9.4"
BESS INVERTER
FRENCH CLEAT MOUNTING BRACKET
SECURE WITH M4x12 SCREWS PER MNF. INSTRUCTIONS (TYP.)

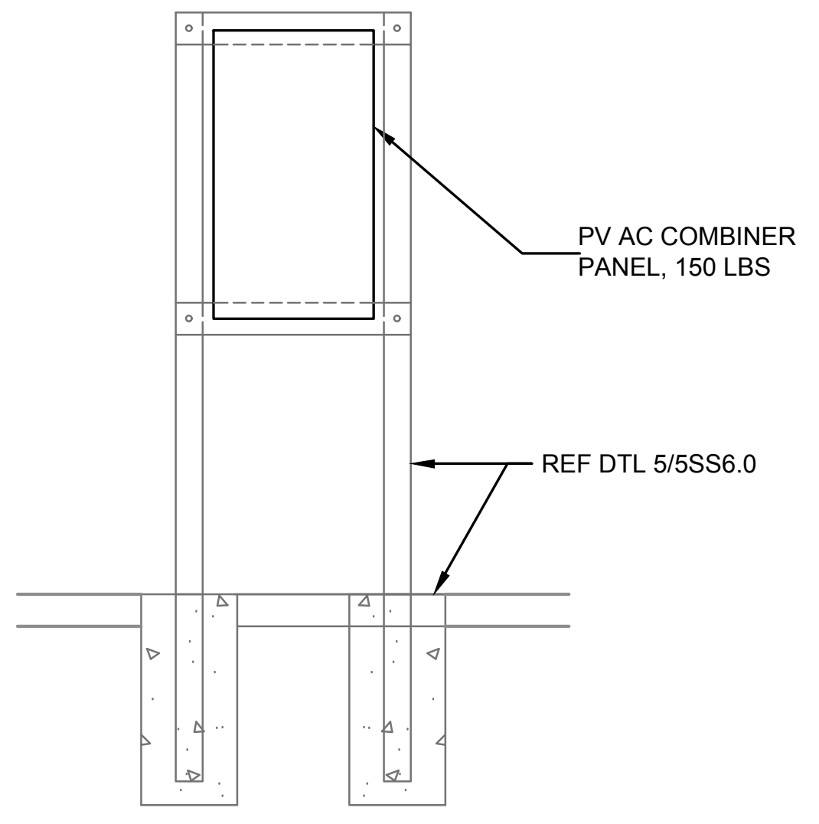
8
5PV3.20
BESS INVERTER - FRENCH CLEAT DETAIL
SCALE: NTS


BESS METER BASE, 350LBS
BESS MAIN AC DISCONNECT, 35LBS
REF DTL 1E/5SS6.0

3
5PV3.20
BESS METER & DISCONNECT MOUNTING
SCALE: NTS


COMBINED PV METER BASE
BESS & PV SYSTEM COMBINER PANEL 150 LBS
COMBINED PV MAIN DISCONNECT 150 LBS
REFER TO STRUCTURAL DETAIL 2/5SS6.0

4
5PV3.20
BESS MOUNTING DETAIL, PLAN
SCALE: 1/2" = 1'


PV AC COMBINER PANEL, 150 LBS
REF DTL 5/5SS6.0

5
5PV3.20
PV COMBINER PANEL MOUNTING,
SCALE: NTS

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07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

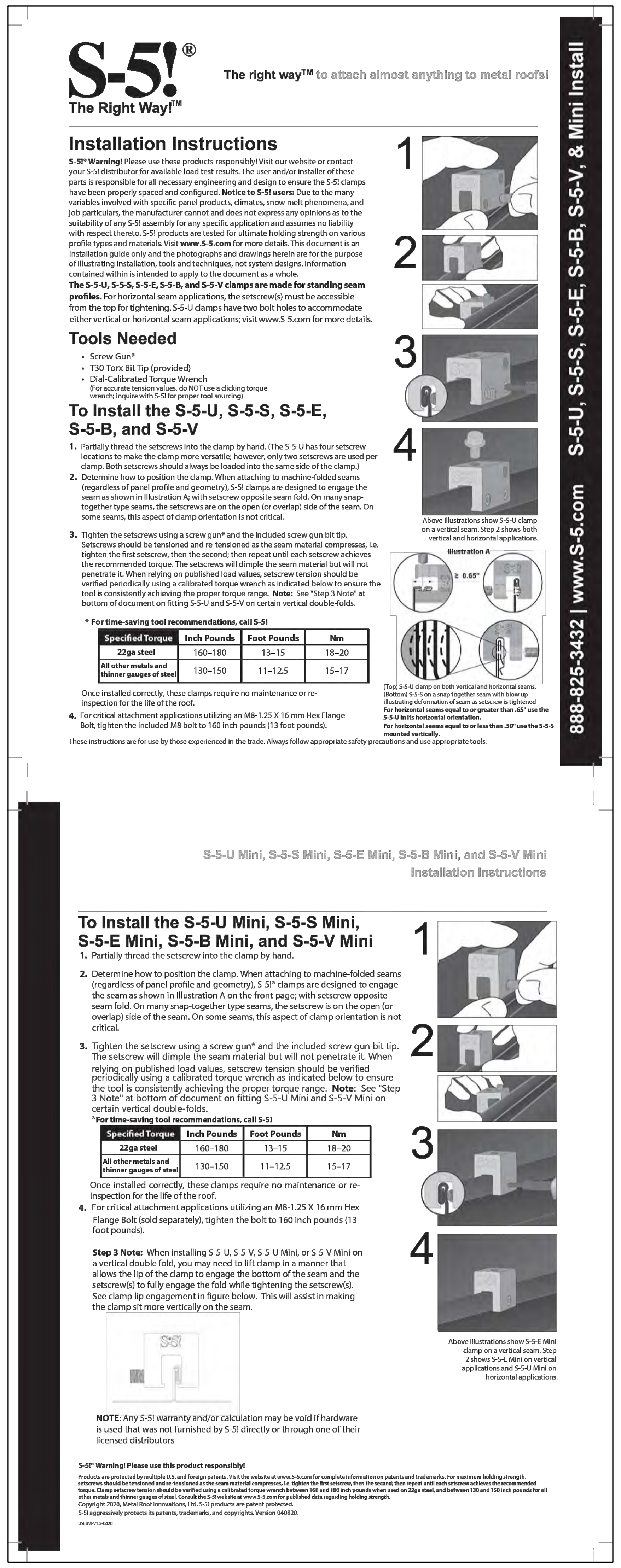
BESS MOUNTING DETAILS

5PV3.20

SCALE: AS INDICATED
PLOT DATE

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

MOUNTING CLAMP ENGINEERING REPORT TO BE SUBMITTED AS SUPPORTING DOCUMENTATION.


S-5!® The Right Way!™

The right way™ to attach almost anything to metal roofs!

Installation Instructions

Tools Needed

To Install the S-5-U, S-5-S, S-5-E, S-5-B, and S-5-V

S-5-U Mini, S-5-S Mini, S-5-E Mini, S-5-B Mini, and S-5-V Mini Installation Instructions

To Install the S-5-U Mini, S-5-S Mini, S-5-E Mini, S-5-B Mini, and S-5-V Mini

setscrews should be tensioned and re-tensioned as the seam material compresses, i.e. tighten the first setscrew, then the second; then repeat until each setscrew achieves the recommended torque. Clamp setscrew tension should be verified using a calibrated torque wrench between 160 and 180 inch pounds when used on 22ga steel, and between 130 and 150 inch pounds for all other metals and thinner gauges of steel. Consult the S-5! website at www.S-5.com for published data regarding holding strength.
Copyright 2020, Metal Roof Innovations, Ltd. S-5! products are patent protected.
S-5! aggressively protects its patents, trademarks, and copyrights. Version 040820.
USEBVI-V1.2-0420

S-5-U CLAMP INSTALLATION INSTRUCTIONS

S-5!® The Right Way!®

S-5-U Clamp

S-5-U Mini Clamp

The S-5-U clamp is our most popular and versatile clamp, fitting about 85% of the standing seam profiles in North America.

S-5-U and S-5-U Mini

The strength of the S-5-U clamp is in its simple design. The patented setscrews will slightly dimple the metal seam material but not pierce it—leaving the roof manufacturer's warranty intact.

Example Profiles

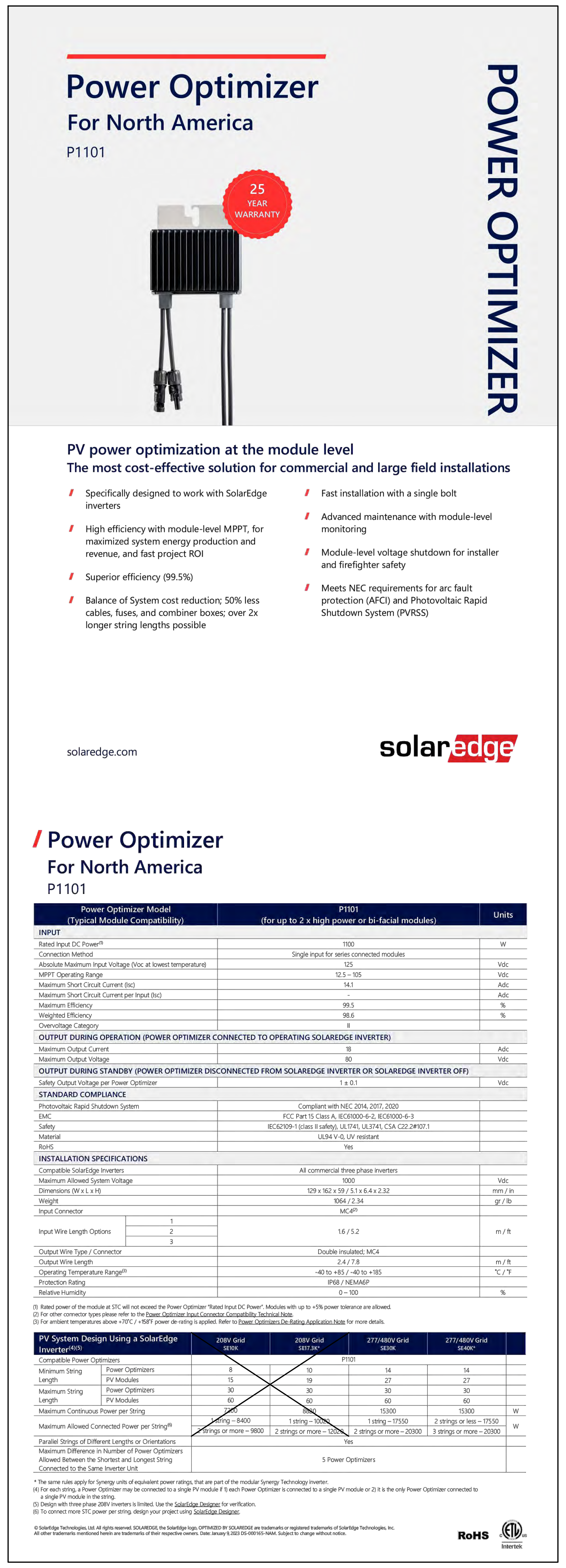
S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. Visit the website at www.S-5.com for complete information on patents and trademarks. For maximum holding strength, setscrews should be tensioned and re-tensioned as the seam material compresses. Clamp setscrew tension should be verified using a calibrated torque wrench between 160 and 180 inch pounds when used on 22ga steel, and between 130 and 150 inch pounds for all other metals and thinner gauges of steel. Consult the S-5! website at www.S-5.com for published data regarding holding strength.

Copyright 2021, Metal Roof Innovations, Ltd. S-5! products are patent protected.
S-5! aggressively protects its patents, trademarks, and copyrights. Version 081721.

Distributed by

S-5-U CLAMP DATA SHEET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For North America
P1101

POWER OPTIMIZER

PV power optimization at the module level
The most cost-effective solution for commercial and large field installations

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/ Power Optimizer
For North America
P1101

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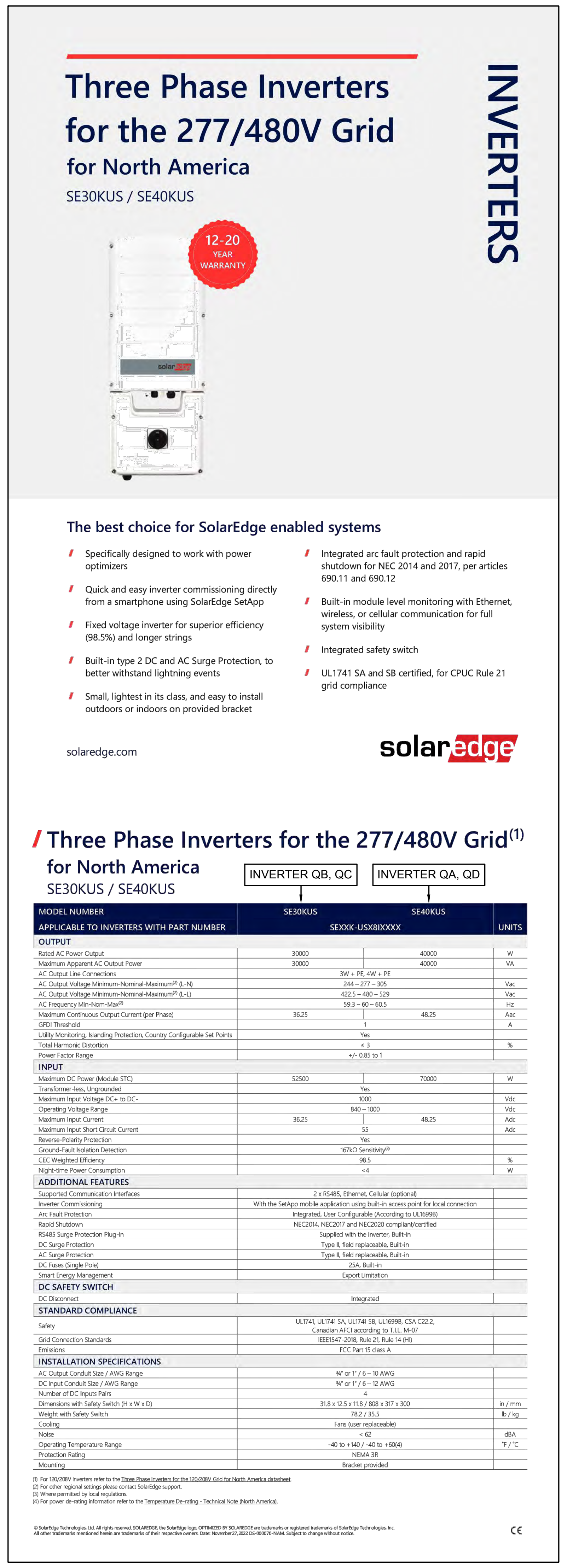
SOLAREDGE POWER OPTIMIZER DATA SHEET


Three Phase Inverters
for the 277/480V Grid
for North America
SE30KUS / SE40KUS

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/ Three Phase Inverters for the 277/480V Grid[1]
for North America
SE30KUS / SE40KUS

INVERTER QB, QC

INVERTER QA, QD

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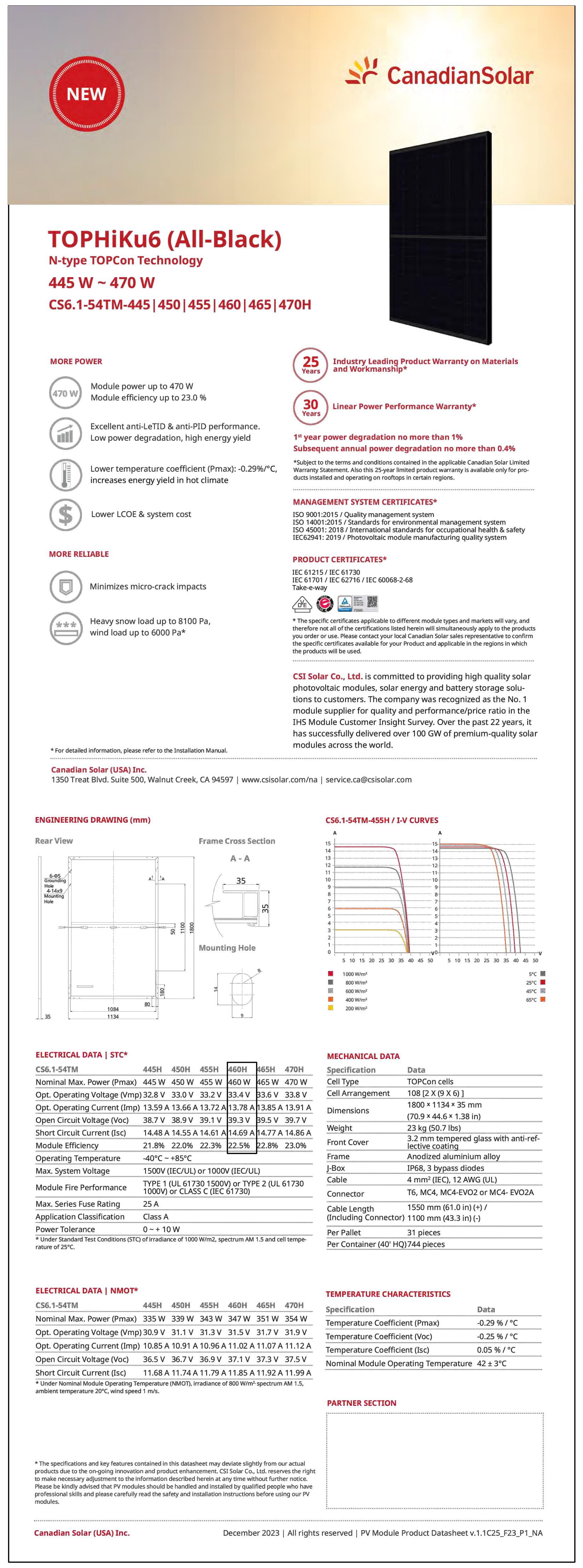
SOLAREDGE INVERTER DATA SHEET

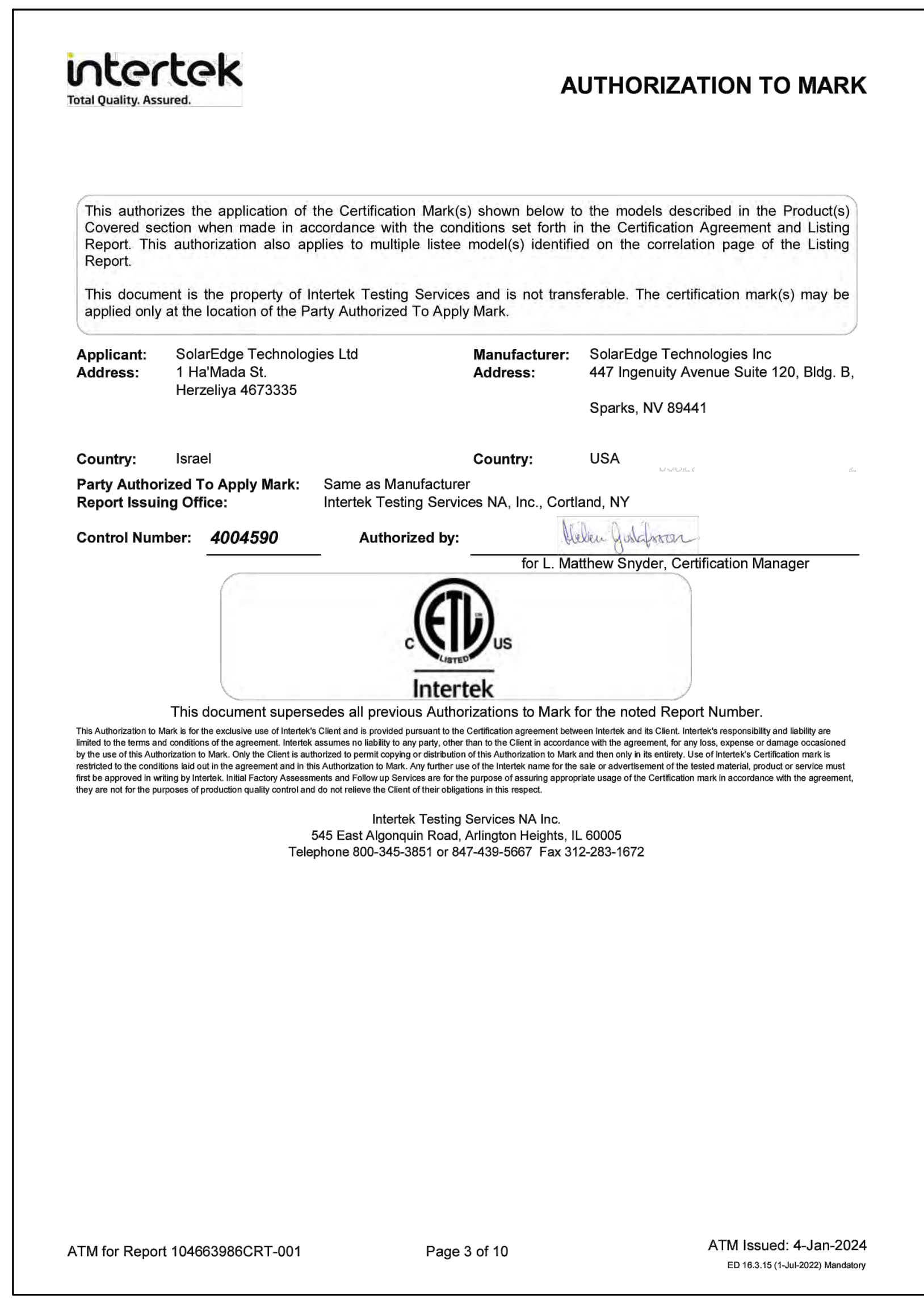

NEW

CanadianSolar

TOPHiKu6 (All-Black)
N-type TOPCon Technology
445 W ~ 470 W
CS6.1-54TM-445 | 450 | 455 | 460 | 465 | 470H

Canadian Solar (USA) Inc. December 2023 | All rights reserved | PV Module Product Datasheet v.1.1C25_F23_P1_NA

CANADIAN SOLAR PV MODULE DATA SHEET


intertek
Total Quality. Assured.

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

This document is the property of Intertek Testing Services and is not transferable. The certification mark(s) may be applied only at the location of the Party Authorized To Apply Mark.

Applicant: SolarEdge Technologies Ltd
Address: 1 Ha'Mada St.
Herzeliya 4673335

Country: Israel

Manufacturer: SolarEdge Technologies Inc
Address: 447 Ingenuity Avenue Suite 120, Bldg. B,
Sparks, NV 89441

Country: USA

Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Intertek Testing Services NA, Inc., Cortland, NY

Control Number: *4004590* **Authorized by:**
for L. Matthew Snyder, Certification Manager

C US Intertek

This document supersedes all previous Authorizations to Mark for the noted Report Number.

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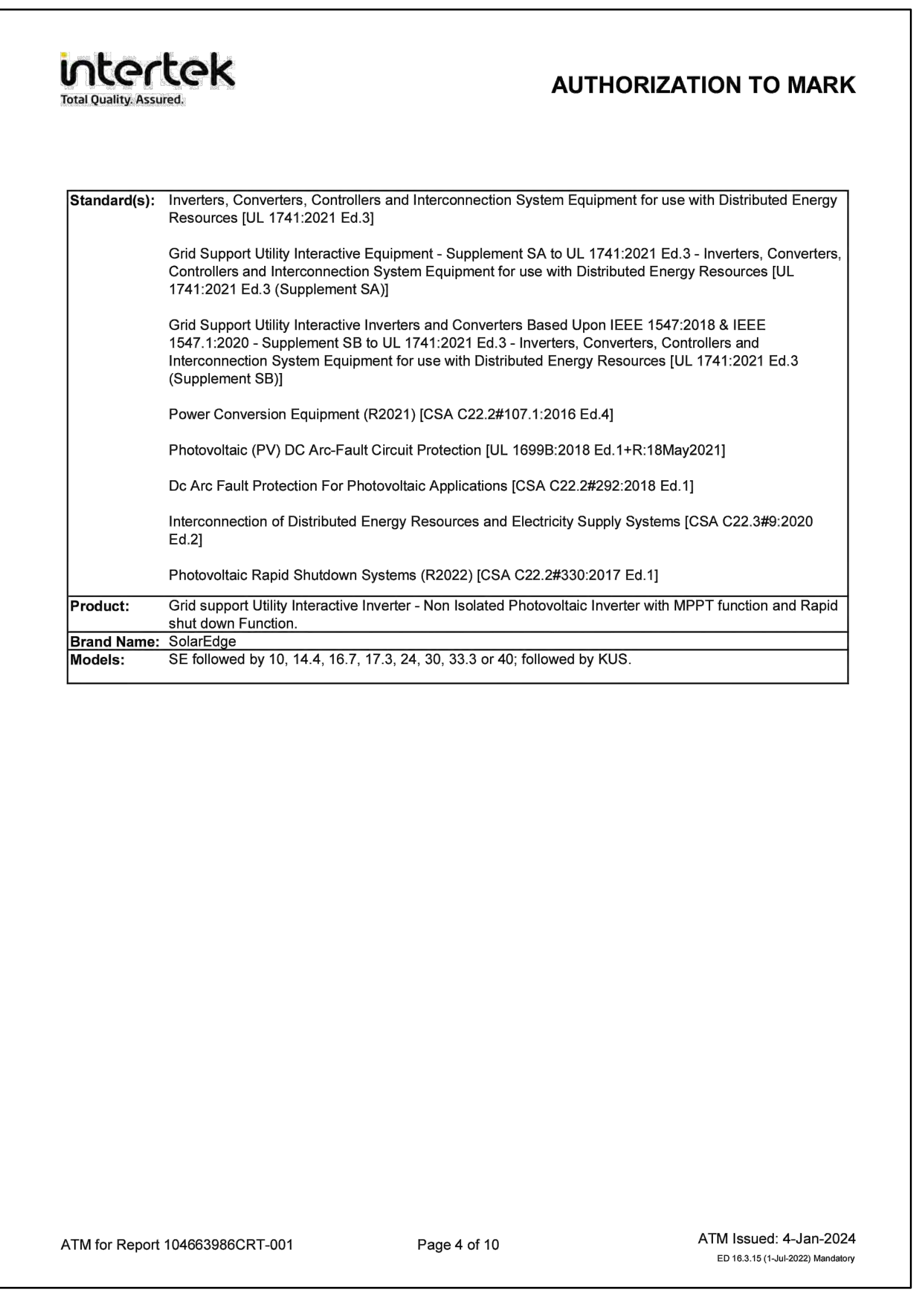
Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

ATM for Report 104663986CRT-001 Page 3 of 10 ATM Issued: 4-Jan-2024
ED 16.3.15 (1-Jul-2022) Mandatory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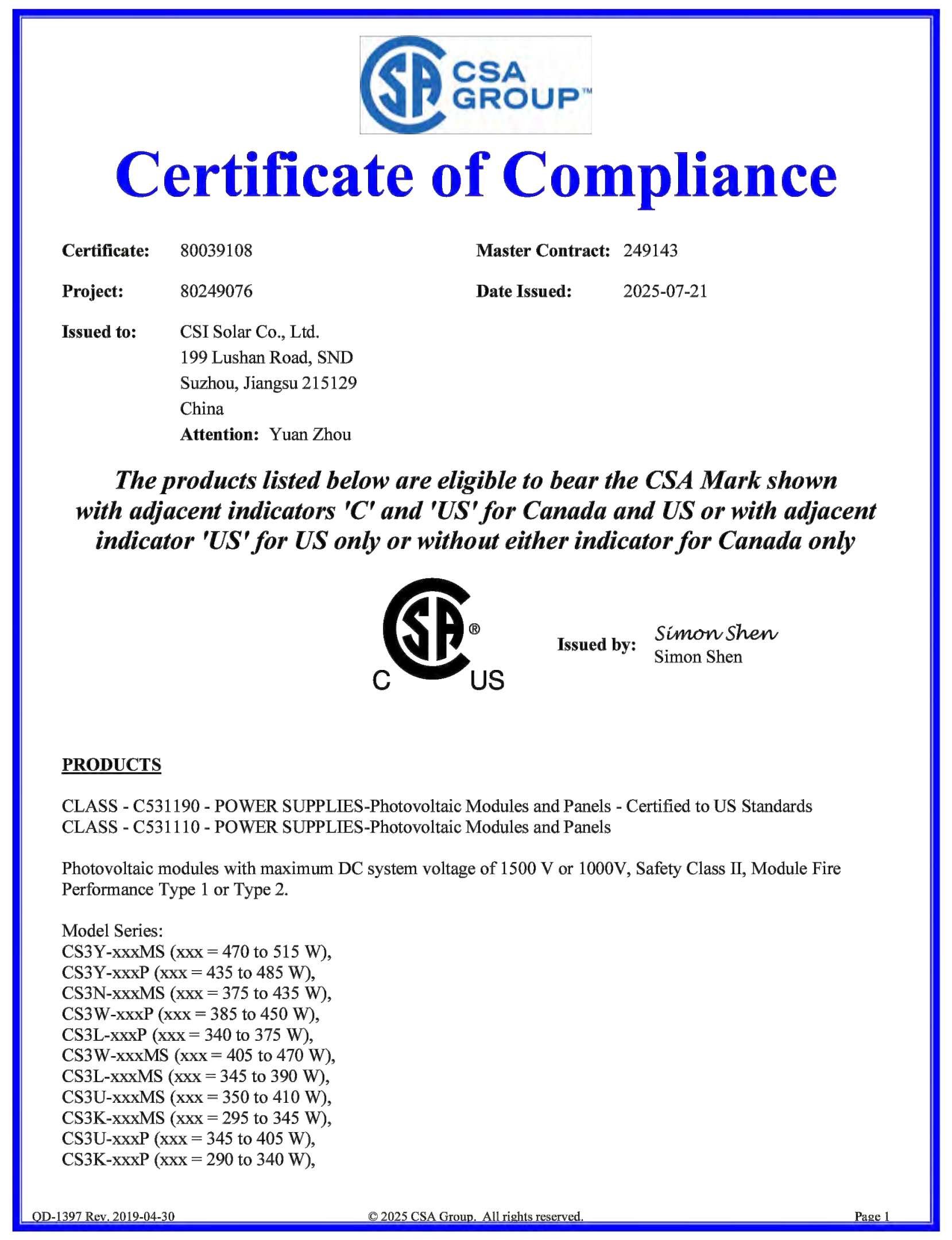
AUTHORIZATION TO MARK

Standard(s):	Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources [UL 1741:2021 Ed.3] Grid Support Utility Interactive Equipment - Supplement SA to UL 1741:2021 Ed.3 - Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources [UL 1741:2021 Ed.3 (Supplement SA)] Grid Support Utility Interactive Inverters and Converters Based Upon IEEE 1547:2018 & IEEE 1547.1:2020 - Supplement SB to UL 1741:2021 Ed.3 - Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources [UL 1741:2021 Ed.3 (Supplement SB)] Power Conversion Equipment (R2021) [CSA C22.2#107.1:2016 Ed.4] Photovoltaic (PV) DC Arc-Fault Circuit Protection [UL 1699B:2018 Ed.1+R:18May2021] Dc Arc Fault Protection For Photovoltaic Applications [CSA C22.2#292:2018 Ed.1] Interconnection of Distributed Energy Resources and Electricity Supply Systems [CSA C22.3#9:2020 Ed.2] Photovoltaic Rapid Shutdown Systems (R2022) [CSA C22.2#330:2017 Ed.1]
Product:	Grid support Utility Interactive Inverter - Non Isolated Photovoltaic Inverter with MPPT function and Rapid shut down Function.
Brand Name:	SolarEdge
Models:	SE followed by 10, 14.4, 16.7, 17.3, 24, 30, 33.3 or 40; followed by KUS.

ATM for Report 104663986CRT-001 Page 4 of 10 ATM Issued: 4-Jan-2024
ED 16.3.15 (1-Jul-2022) Mandatory

SOLAREDGE INVERTER UL1741 LISTING


CSA GROUP™

Certificate of Compliance

Certificate: 80039108 **Master Contract:** 249143

Project: 80249076 **Date Issued:** 2025-07-21

Issued to: CSI Solar Co., Ltd.
199 Lushan Road, SND
Suzhou, Jiangsu 215129
China
Attention: Yuan Zhou

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only

C US

Issued by: Simon Shen
Simon Shen

PRODUCTS

CLASS - C531190 - POWER SUPPLIES-Photovoltaic Modules and Panels - Certified to US Standards
CLASS - C531110 - POWER SUPPLIES-Photovoltaic Modules and Panels

Photovoltaic modules with maximum DC system voltage of 1500 V or 1000V, Safety Class II, Module Fire Performance Type 1 or Type 2.

Model Series:
CS3Y-xxxMS (xxx = 470 to 515 W),
CS3Y-xxxP (xxx = 435 to 485 W),
CS3N-xxxMS (xxx = 375 to 435 W),
CS3W-xxxP (xxx = 385 to 450 W),
CS3L-xxxP (xxx = 340 to 375 W),
CS3W-xxxMS (xxx = 405 to 470 W),
CS3L-xxxMS (xxx = 345 to 390 W),
CS3U-xxxMS (xxx = 350 to 410 W),
CS3K-xxxMS (xxx = 295 to 345 W),
CS3U-xxxP (xxx = 345 to 405 W),
CS3K-xxxP (xxx = 290 to 340 W),

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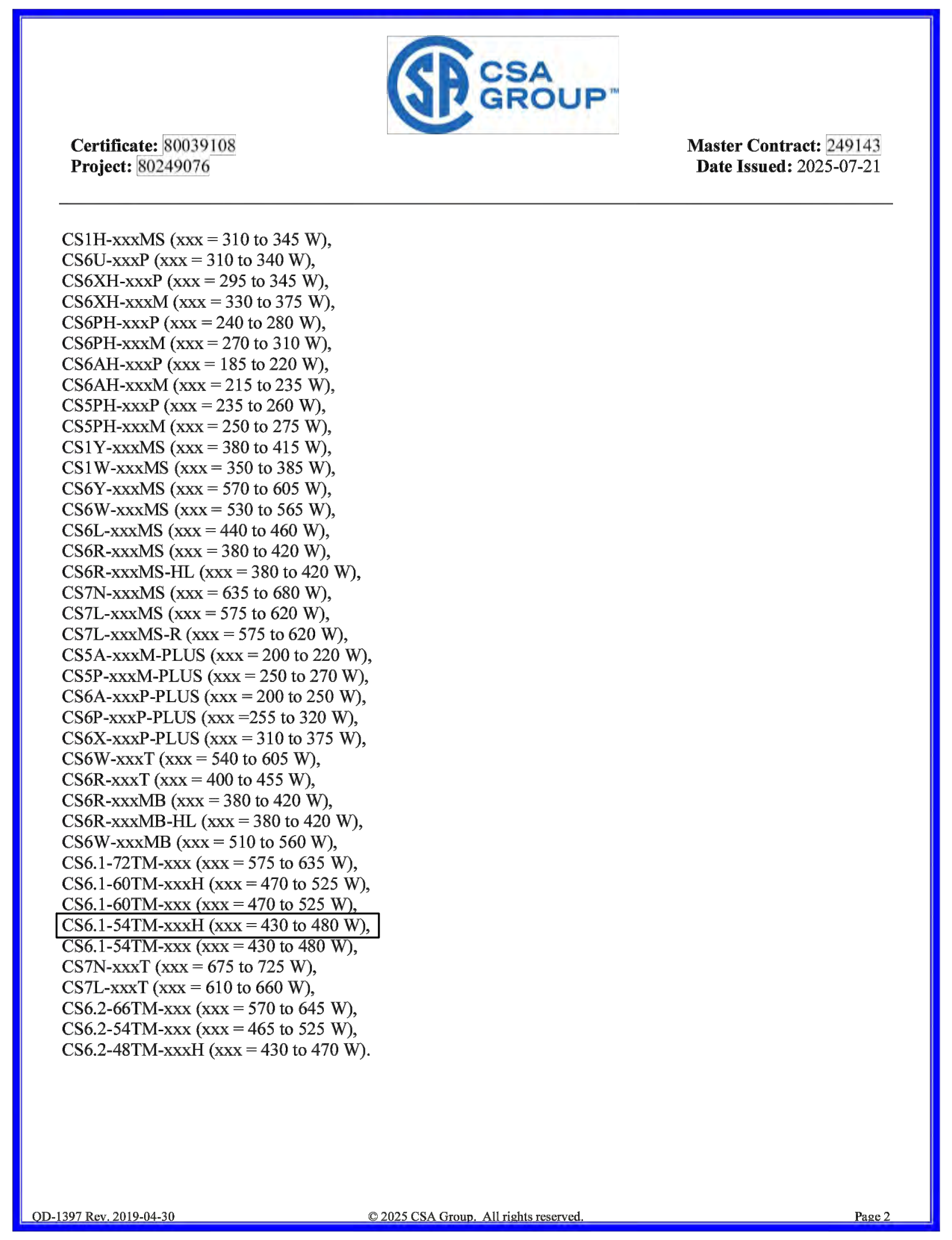
CSA GROUP™

Certificate: 80039108 **Master Contract:** 249143
Project: 80249076 **Date Issued:** 2025-07-21

CS1H-xxxMS (xxx = 310 to 345 W),
CS6U-xxxP (xxx = 310 to 340 W),
CS6XH-xxxP (xxx = 295 to 345 W),
CS6XH-xxxM (xxx = 330 to 375 W),
CS6PH-xxxP (xxx = 240 to 280 W),
CS6PH-xxxM (xxx = 270 to 310 W),
CS6AH-xxxP (xxx = 185 to 220 W),
CS6AH-xxxM (xxx = 215 to 235 W),
CS5PH-xxxP (xxx = 235 to 260 W),
CS5PH-xxxM (xxx = 250 to 275 W),
CS1Y-xxxMS (xxx = 380 to 415 W),
CS1W-xxxMS (xxx = 350 to 385 W),
CS6Y-xxxMS (xxx = 570 to 605 W),
CS6W-xxxMS (xxx = 530 to 565 W),
CS6L-xxxMS (xxx = 440 to 460 W),
CS6R-xxxMS (xxx = 380 to 420 W),
CS6R-xxxMS-HL (xxx = 380 to 420 W),
CS7N-xxxMS (xxx = 635 to 680 W),
CS7L-xxxMS (xxx = 575 to 620 W),
CS7L-xxxMS-R (xxx = 575 to 620 W),
CS5A-xxxM-PLUS (xxx = 200 to 220 W),
CS5P-xxxM-PLUS (xxx = 250 to 270 W),
CS6A-xxxP-PLUS (xxx = 200 to 250 W),
CS6P-xxxP-PLUS (xxx =255 to 320 W),
CS6X-xxxP-PLUS (xxx = 310 to 375 W),
CS6W-xxxT (xxx = 540 to 605 W),
CS6R-xxxT (xxx = 400 to 455 W),
CS6R-xxxMB (xxx = 380 to 420 W),
CS6R-xxxMB-HL (xxx = 380 to 420 W),
CS6W-xxxMB (xxx = 510 to 560 W),
CS6.1-72TM-xxx (xxx = 575 to 635 W),
CS6.1-60TM-xxxH (xxx = 470 to 525 W),
CS6.1-60TM-xxx (xxx = 470 to 525 W),
CS6.1-54TM-xxxH (xxx = 430 to 480 W),
CS6.1-54TM-xxx (xxx = 430 to 480 W),
CS7N-xxxT (xxx = 675 to 725 W),
CS7L-xxxT (xxx = 610 to 660 W),
CS6.2-66TM-xxx (xxx = 570 to 645 W),
CS6.2-54TM-xxx (xxx = 465 to 525 W),
CS6.2-48TM-xxxH (xxx = 430 to 470 W).

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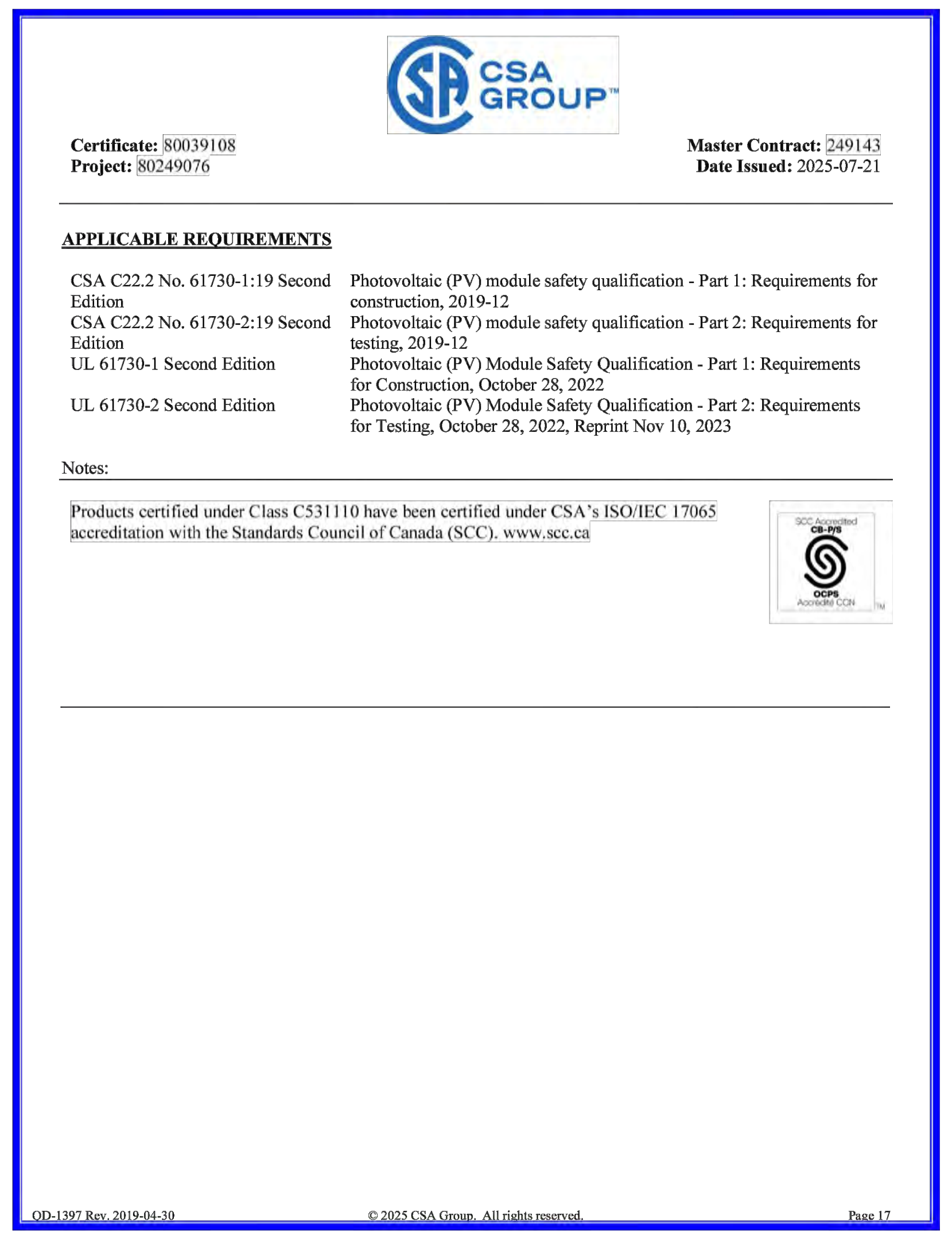
CSA GROUP™

Certificate: 80039108 **Master Contract:** 249143
Project: 80249076 **Date Issued:** 2025-07-21

APPLICABLE REQUIREMENTS

CSA C22.2 No. 61730-1:19 Second Edition	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction, 2019-12
CSA C22.2 No. 61730-2:19 Second Edition	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing, 2019-12
UL 61730-1 Second Edition	Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction, October 28, 2022
UL 61730-2 Second Edition	Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing, October 28, 2022, Reprint Nov 10, 2023

Notes:

Products certified under Class C531110 have been certified under CSA's ISO/IEC 17065 accreditation with the Standards Council of Canada (SCC). www.scc.ca

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CANADIAN SOLAR MODULE UL61730 LISTING

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

Salas O'Brien
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

Exp. 09/30/26
ELECTRICAL
STATE OF CALIFORNIA

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE
NO. C-014869
REN. 05-31-27

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ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

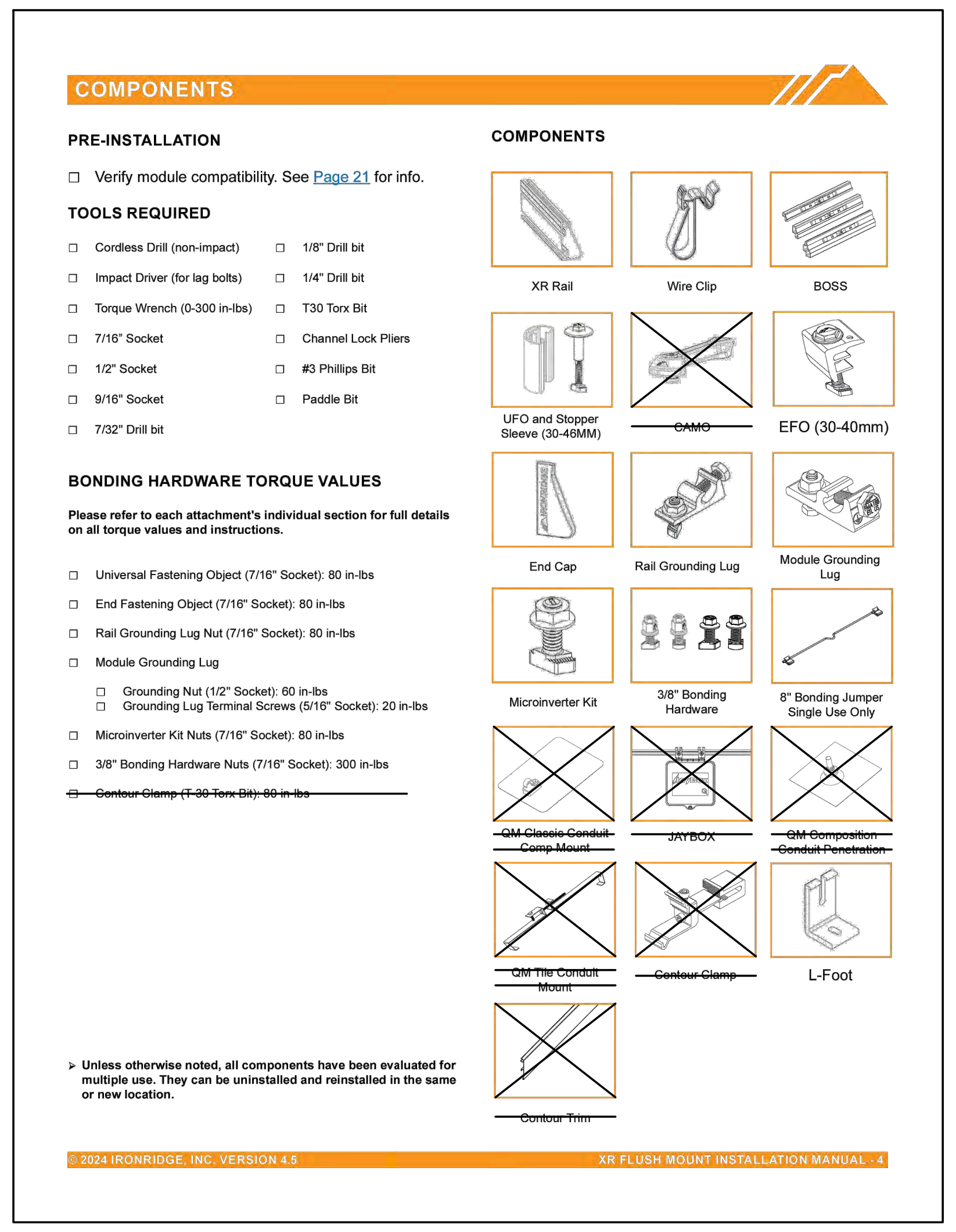
DRAWING TITLE

PV DATASHEETS

5PV4.00

SCALE: AS INDICATED

PLOT DATE



COMPONENTS

PRE-INSTALLATION

☐ Verify module compatibility. See Page 21 for info.

TOOLS REQUIRED

- ☐ Cordless Drill (non-impact)
- ☐ Impact Driver (for lag bolts)
- ☐ Torque Wrench (0-300 in-lbs)
- ☐ 7/16" Socket
- ☐ 1/2" Socket
- ☐ 9/16" Socket
- ☐ 7/32" Drill bit
- ☐ 1/8" Drill bit
- ☐ 1/4" Drill bit
- ☐ T30 Torx Bit
- ☐ Channel Lock Pliers
- ☐ #3 Phillips Bit
- ☐ Paddle Bit

BONDING HARDWARE TORQUE VALUES

Please refer to each attachment's individual section for full details on all torque values and instructions.

- ☐ Universal Fastening Object (7/16" Socket): 80 in-lbs
- ☐ End Fastening Object (7/16" Socket): 80 in-lbs
- ☐ Rail Grounding Lug Nut (7/16" Socket): 80 in-lbs
- ☐ Module Grounding Lug
  - ☐ Grounding Nut (1/2" Socket): 60 in-lbs
  - ☐ Grounding Lug Terminal Screws (5/16" Socket): 20 in-lbs
- ☐ Microinverter Kit Nuts (7/16" Socket): 80 in-lbs
- ☐ 3/8" Bonding Hardware Nuts (9/16" Socket): 300 in-lbs
- ~~Contour Clamp (T-30 Torx Bit): 60 in-lbs~~

➤ Unless otherwise noted, all components have been evaluated for multiple use. They can be uninstalled and reinstalled in the same or new location.

COMPONENTS

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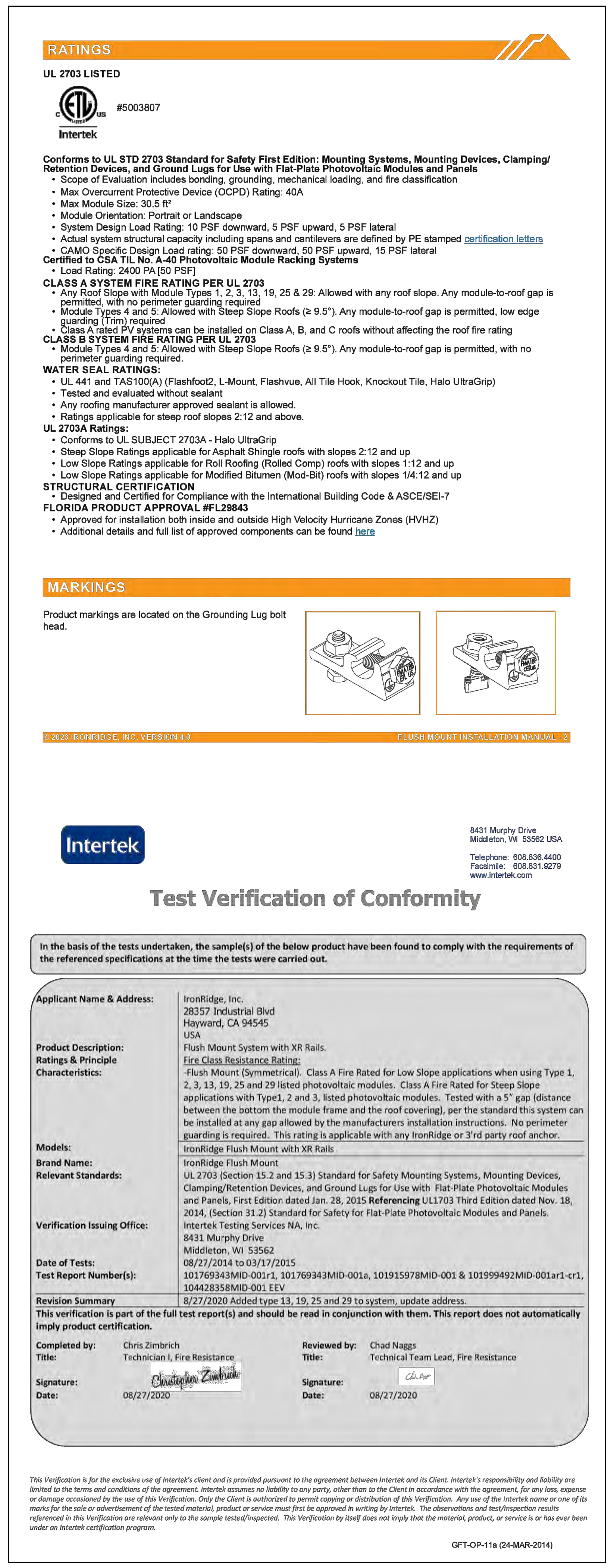
IRONRIDGE FLUSH MOUNT INSTALLATION MATERIALS



RATINGS

UL 2703 LISTED

#5003807

Conforms to UL STD 2703 Standard for Safety First Edition: Mounting Systems, Mounting Devices, Clamping/ Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels

- Scope of Evaluation includes bonding, grounding, mechanical loading, and fire classification
- Max Overcurrent Protective Device (OCPD) Rating: 40A
- Max Module Size: 30.5 ft²
- Module Orientation: Portrait or Landscape
- System Design Load Rating: 10 PSF downward, 5 PSF upward, 5 PSF lateral
- Actual system structural capacity including spans and cantilevers are defined by PE stamped certification letters
- CAMO Specific Design Load rating: 50 PSF downward, 50 PSF upward, 15 PSF lateral

Certified to CSA TIL No. A-40 Photovoltaic Module Racking Systems

- Load Rating: 2400 PA [50 PSF]

CLASS A SYSTEM FIRE RATING PER UL 2703

- Any Roof Slope with Module Types 1, 2, 3, 13, 19, 25 & 29: Allowed with any roof slope. Any module-to-roof gap is permitted, with no perimeter guarding required
- Module Types 4 and 5: Allowed with Steep Slope Roofs (≥ 9.5°). Any module-to-roof gap is permitted, low edge guarding (Trim) required
- Class A rated PV systems can be installed on Class A, B, and C roofs without affecting the roof fire rating

CLASS B SYSTEM FIRE RATING PER UL 2703

- Module Types 4 and 5: Allowed with Steep Slope Roofs (≥ 9.5°). Any module-to-roof gap is permitted, with no perimeter guarding required.

WATER SEAL RATINGS:

- UL 441 and TAS100(A) (Flashfoot2, L-Mount, Flashvue, All Tile Hook, Knockout Tile, Halo UltraGrip)
- Tested and evaluated without sealant
- Any roofing manufacturer approved sealant is allowed.
- Ratings applicable for steep roof slopes 2:12 and above.

UL 2703A Ratings:

- Conforms to UL SUBJECT 2703A - Halo UltraGrip
- Steep Slope Ratings applicable for Asphalt Shingle roofs with slopes 2:12 and up
- Low Slope Ratings applicable for Roll Roofing (Rolled Comp) roofs with slopes 1:12 and up
- Low Slope Ratings applicable for Modified Bitumen (Mod-Bit) roofs with slopes 1/4:12 and up

STRUCTURAL CERTIFICATION

- Designed and Certified for Compliance with the International Building Code & ASCE/SEI-7

FLORIDA PRODUCT APPROVAL #FL29843

- Approved for installation both inside and outside High Velocity Hurricane Zones (HVHZ)
- Additional details and full list of approved components can be found here

MARKINGS

Product markings are located on the Grounding Lug bolt head.

© 2023 IRONRIDGE, INC. VERSION 4.0 FLUSH MOUNT INSTALLATION MANUAL - 2

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. 28357 Industrial Blvd Hayward, CA 94545 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, 3, 13, 19, 25 and 29 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, 104428358MID-001 EEV
Revision Summary	8/27/2020 Added type 13, 19, 25 and 29 to system, update address.

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
Title: Technician I, Fire Resistance
Signature: Christopher Zimbrich
Date: 08/27/2020

Reviewed by: Chad Naggs
Title: Technical Team Lead, Fire Resistance
Signature:
Date: 08/27/2020

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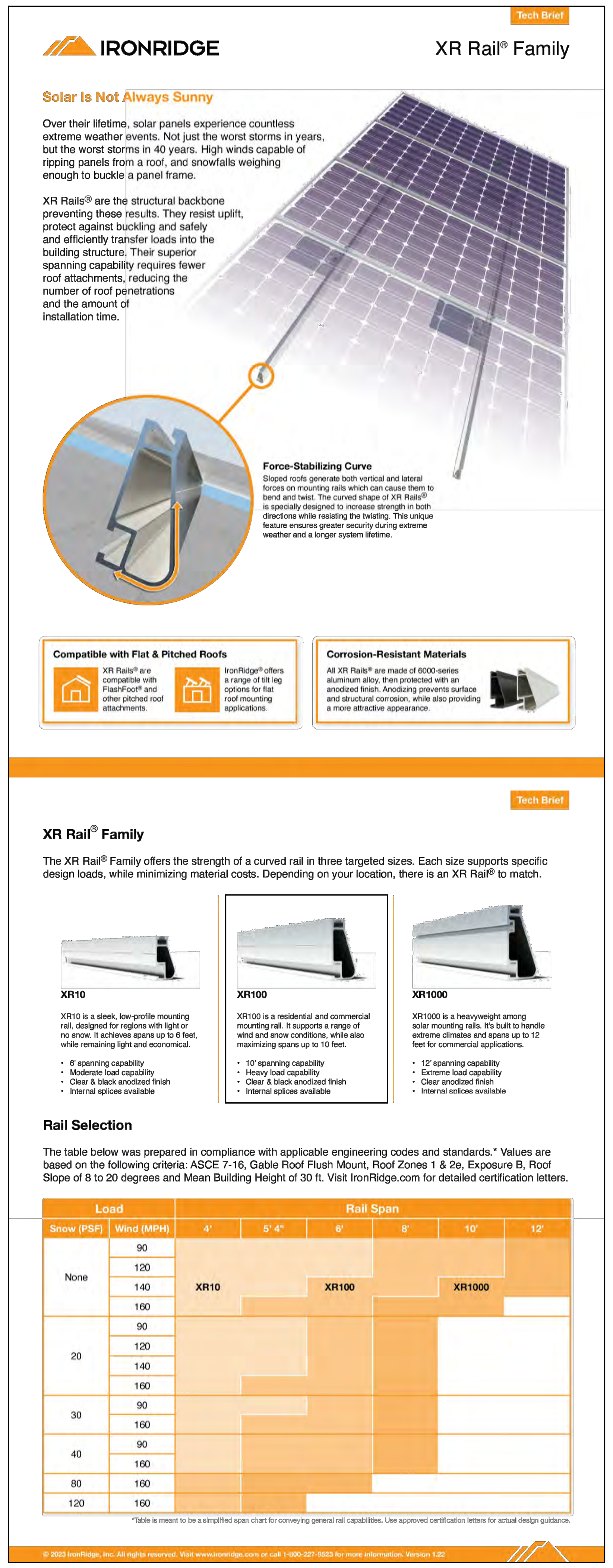
GFT-OP-11a (24-MAR-2014)

IRONRIDGE FLUSH MOUNT LISTINGS/TESTING



Tech Brief

IRONRIDGE

XR Rail® Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails® are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.

Force-Stabilizing Curve
Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails® is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs
XR Rails® are compatible with FlashFoot® and other pitched roof attachments.
IronRidge® offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials
All XR Rails® are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail® Family

The XR Rail® Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail® to match.

XR10
XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.
- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available

XR100
XR100 is a residential and commercial mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.
- 10' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000
XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications.
- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	90						
	120						
	140	XR10		XR100		XR1000	
	160						
20	90						
	120						
	140						
	160						
30	90						
	160						
40	90						
	160						
80	160						
120	160						

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

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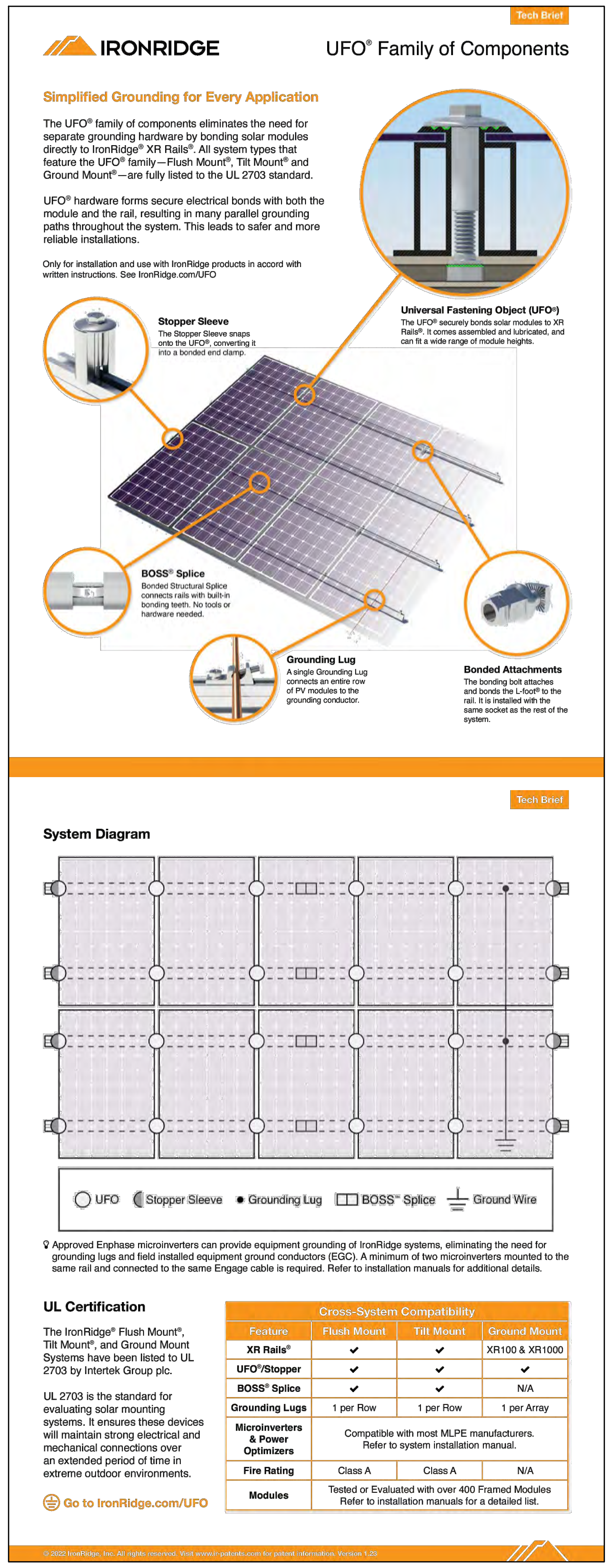
IRONRIDGE XR RAIL TECHNICAL BRIEF



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.

Only for installation and use with IronRidge products in accord with written instructions. See IronRidge.com/UFO

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.

BOSS® Splice
Bonded Structural Splice connects rails with built-in bonding teeth. No tools or hardware 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.

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®	✓	✓	XR100 & XR1000
UFO®/Stopper	✓	✓	✓
BOSS® Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Compatible with most MLPE manufacturers. Refer to system installation manual.		
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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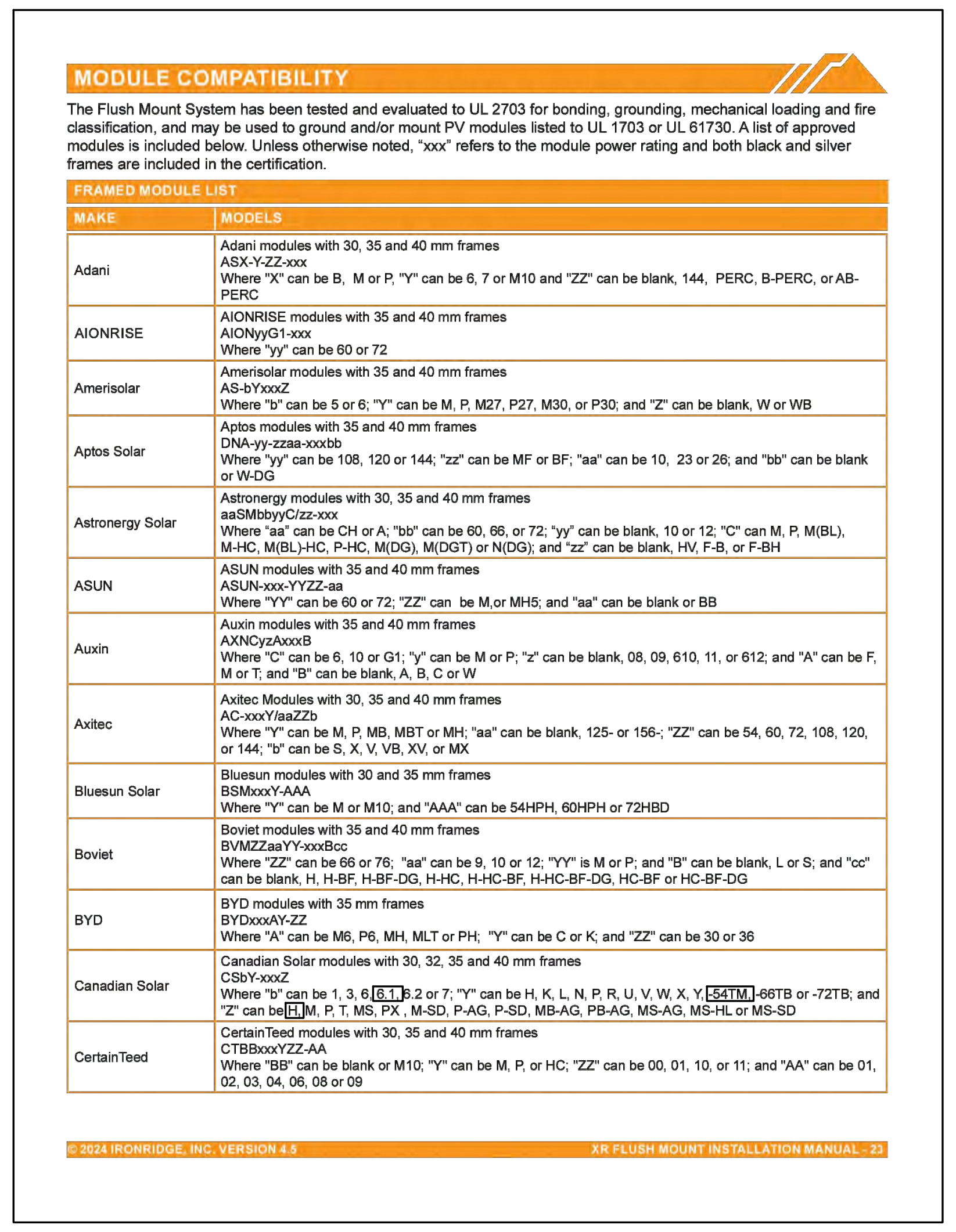
IRONRIDGE UFO TECHNICAL BRIEF



MODULE COMPATIBILITY

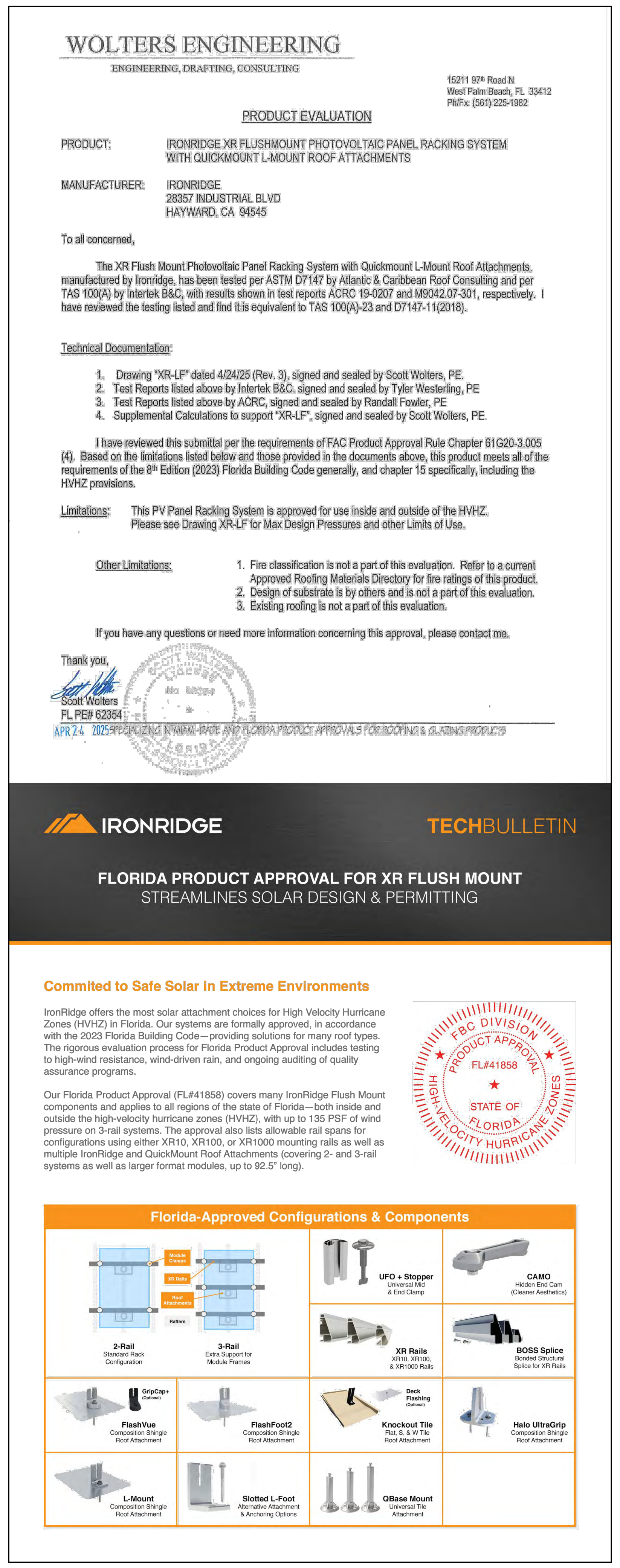
The Flush Mount System has been tested and evaluated to UL 2703 for bonding, grounding, mechanical loading and fire classification, and may be used to ground and/or mount PV modules listed to UL 1703 or UL 61730. A list of approved modules is included below. Unless otherwise noted, "xxx" refers to the module power rating and both black and silver frames are included in the certification.

FRAMED MODULE LIST

MAKE	MODELS
Adani	Adani modules with 30, 35 and 40 mm frames ASX-Y-ZZ-xxx Where "X" can be B, M or P, "Y" can be 6, 7 or M10 and "ZZ" can be blank, 144, PERC, B-PERC, or AB-PERC
AIONRISE	AIONRISE modules with 35 and 40 mm frames AIONyyG1-xxx Where "yy" can be 60 or 72
Amerisolar	Amerisolar modules with 35 and 40 mm frames AS-bYxxxZ Where "b" can be 5 or 6; "Y" can be M, P, M27, P27, M30, or P30; and "Z" can be blank, W or WB
Aptos Solar	Aptos modules with 35 and 40 mm frames DNA-yy-zzaa-xxxbb Where "yy" can be 108, 120 or 144; "zz" can be MF or BF; "aa" can be 10, 23 or 26; and "bb" can be blank or W-DG
Astronergy Solar	Astronergy modules with 30, 35 and 40 mm frames aaSMbbyyC/zz-xxx Where "aa" can be CH or A; "bb" can be 60, 66, or 72; "yy" can be blank, 10 or 12; "C" can M, P, M(BL), M-HC, M(BL)-HC, P-HC, M(DG), M(DGT) or N(DG); and "zz" can be blank, HV, F-B, or F-BH
ASUN	ASUN modules with 35 and 40 mm frames ASUN-xxx-YYZZ-aa Where "YY" can be 60 or 72; "ZZ" can be M,or MH5; and "aa" can be blank or BB
Auxin	Auxin modules with 35 and 40 mm frames AXNCyzAxxxB Where "C" can be 6, 10 or G1; "y" can be M or P; "z" can be blank, 08, 09, 610, 11, or 612; and "A" can be F, M or T; and "B" can be blank, A, B, C or W
Axitec	Axitec Modules with 30, 35 and 40 mm frames AC-xxxY/aaZZb Where "Y" can be M, P, MB, MBT or MH; "aa" can be blank, 125- or 156-; "ZZ" can be 54, 60, 72, 108, 120, or 144; "b" can be S, X, V, VB, XV, or MX
Bluesun Solar	Bluesun modules with 30 and 35 mm frames BSMxxxY-AAA Where "Y" can be M or M10; and "AAA" can be 54HPH, 60HPH or 72HBD
Boviet	Boviet modules with 35 and 40 mm frames BVMZZaaYY-xxxBcc Where "ZZ" can be 66 or 76; "aa" can be 9, 10 or 12; "YY" is M or P; and "B" can be blank, L or S; and "cc" can be blank, H, H-BF, H-BF-DG, H-HC, H-HC-BF, H-HC-BF-DG, HC-BF or HC-BF-DG
BYD	BYD modules with 35 mm frames BYDxxxAY-ZZ Where "A" can be M6, P6, MH, MLT or PH; "Y" can be C or K; and "ZZ" can be 30 or 36
Canadian Solar	Canadian Solar modules with 30, 32, 35 and 40 mm frames CSbY-xxxZ Where "b" can be 1, 3, 6, 6.1, 6.2 or 7; "Y" can be H, K, L, N, P, R, U, V, W, X, Y, -54TM, -66TB or -72TB; and "Z" can be H, M, P, T, MS, PX , M-SD, P-AG, P-SD, MB-AG, PB-AG, MS-AG, MS-HL or MS-SD
CertainTeed	CertainTeed modules with 30, 35 and 40 mm frames CTBBxxxYZZ-AA Where "BB" can be blank or M10; "Y" can be M, P, or HC; "ZZ" can be 00, 01, 10, or 11; and "AA" can be 01, 02, 03, 04, 06, 08 or 09

© 2024 IRONRIDGE, INC. VERSION 4.5 XR FLUSH MOUNT INSTALLATION MANUAL - 23

IRONRIDGE FLUSH MOUNT SYSTEM
PV MODULE COMPATIBILITY



WOLTERS ENGINEERING
ENGINEERING, DRAFTING, CONSULTING

15211 97th Road N
West Palm Beach, FL 33412
Ph/Fx: (561) 225-1982

PRODUCT EVALUATION

PRODUCT: IRONRIDGE XR FLUSHMOUNT PHOTOVOLTAIC PANEL RACKING SYSTEM WITH QUICKMOUNT L-MOUNT ROOF ATTACHMENTS

MANUFACTURER: IRONRIDGE
28357 INDUSTRIAL BLVD
HAYWARD, CA 94545

To all concerned,

The XR Flush Mount Photovoltaic Panel Racking System with Quickmount L-Mount Roof Attachments, manufactured by Ironridge, has been tested per ASTM D7147 by Atlantic & Caribbean Roof Consulting and per TAS 100(A) by Intertek B&C, with results shown in test reports ACRC 19-0207 and M9042.07-301, respectively. I have reviewed the testing listed and find it is equivalent to TAS 100(A)-23 and D7147-11(2018).

Technical Documentation:

1. Drawing "XR-LF" dated 4/24/25 (Rev. 3), signed and sealed by Scott Wolters, PE.
2. Test Reports listed above by Intertek B&C. signed and sealed by Tyler Westerling, PE
3. Test Reports listed above by ACRC, signed and sealed by Randall Fowler, PE
4. Supplemental Calculations to support "XR-LF", signed and sealed by Scott Wolters, PE.

I have reviewed this submittal per the requirements of FAC Product Approval Rule Chapter 61G20-3.005 (4). Based on the limitations listed below and those provided in the documents above, this product meets all of the requirements of the 8th Edition (2023) Florida Building Code generally, and chapter 15 specifically, including the HVHZ provisions.

Limitations: This PV Panel Racking System is approved for use inside and outside of the HVHZ. Please see Drawing XR-LF for Max Design Pressures and other Limits of Use.

Other Limitations:
1. Fire classification is not a part of this evaluation. Refer to a current Approved Roofing Materials Directory for fire ratings of this product.
2. Design of substrate is by others and is not a part of this evaluation.
3. Existing roofing is not a part of this evaluation.

If you have any questions or need more information concerning this approval, please contact me.

Thank you,

Scott Wolters
FL PE# 62354
APR 24 2025

SPECIALIZING IN MIAMI-DADE AND FLORIDA PRODUCT APPROVALS FOR ROOFING & GLAZING PRODUCTS

IRONRIDGE TECHBULLETIN

FLORIDA PRODUCT APPROVAL FOR XR FLUSH MOUNT
STREAMLINES SOLAR DESIGN & PERMITTING

Commited to Safe Solar in Extreme Environments

IronRidge offers the most solar attachment choices for High Velocity Hurricane Zones (HVHZ) in Florida. Our systems are formally approved, in accordance with the 2023 Florida Building Code—providing solutions for many roof types. The rigorous evaluation process for Florida Product Approval includes testing to high-wind resistance, wind-driven rain, and ongoing auditing of quality assurance programs.

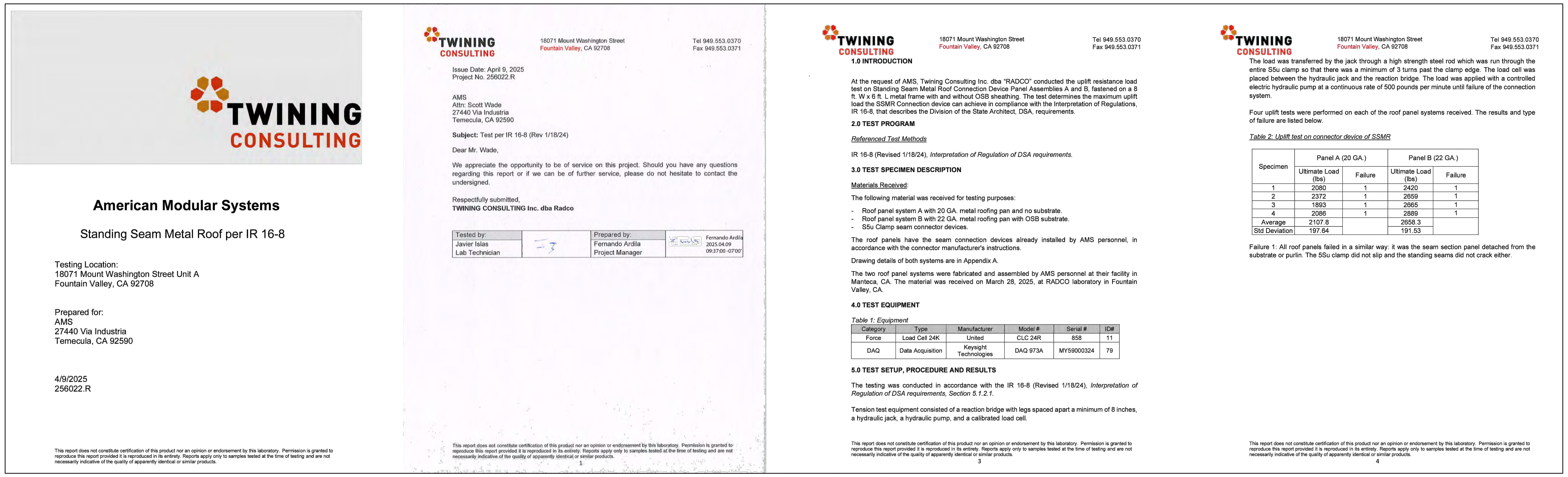
Our Florida Product Approval (FL#41858) covers many IronRidge Flush Mount components and applies to all regions of the state of Florida—both inside and outside the high-velocity hurricane zones (HVHZ), with up to 135 PSF of wind pressure on 3-rail systems. The approval also lists allowable rail spans for configurations using either XR10, XR100, or XR1000 mounting rails as well as multiple IronRidge and QuickMount Roof Attachments (covering 2- and 3-rail systems as well as larger format modules, up to 92.5" long).

FBC DIVISION PRODUCT APPROVAL FL#41858 STATE OF FLORIDA HIGH-VELOCITY HURRICANE ZONES

Florida-Approved Configurations & Components

Module Clamps
XR Rails
Roof Attachments
Rafters
2-Rail
Standard Rack Configuration
3-Rail
Extra Support for Module Frames
UFO + Stopper
Universal Mid & End Clamp
CAMO
Hidden End Cam (Cleaner Aesthetics)
XR Rails
XR10, XR100, & XR1000 Rails
BOSS Splice
Bonded Structural Splice for XR Rails
GripCap+ (Optional)
FlashVue
Composition Shingle Roof Attachment
FlashFoot2
Composition Shingle Roof Attachment
Deck Flashing (Optional)
Knockout Tile
Flat, S, & W Tile Roof Attachment
Halo UltraGrip
Composition Shingle Roof Attachment
L-Mount
Composition Shingle Roof Attachment
Slotted L-Foot
Alternative Attachment & Anchoring Options
QBase Mount
Universal Tile Attachment

IRONRIDGE HIGH VELOCITY HURRICANE ZONE
STRUCTURAL CERTIFICATION



TWINING CONSULTING

American Modular Systems

Standing Seam Metal Roof per IR 16-8

Testing Location:
18071 Mount Washington Street Unit A
Fountain Valley, CA 92708

Prepared for:
AMS
27440 Via Industria
Temecula, CA 92590

4/9/2025
256022.R

TWINING CONSULTING
18071 Mount Washington Street
Fountain Valley, CA 92708
Tel 949.553.0370
Fax 949.553.0371

Issue Date: April 9, 2025
Project No. 256022.R

AMS
Attn: Scott Wade
27440 Via Industria
Temecula, CA 92590

Subject: Test per IR 16-8 (Rev 1/18/24)

Dear Mr. Wade,

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
TWINING CONSULTING Inc. dba Radco

Tested by:		Prepared by:	
Javier Islas Lab Technician	JI	Fernando Ardila Project Manager	Fernando Ardila 2025.04.09 09:37:00 -07'00'

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. Permission is granted to reproduce this report provided it is reproduced in its entirety. Reports apply only to samples tested at the time of testing and are not necessarily indicative of the quality of apparently identical or similar products.

1

TWINING CONSULTING
18071 Mount Washington Street
Fountain Valley, CA 92708
Tel 949.553.0370
Fax 949.553.0371

1.0 INTRODUCTION

At the request of AMS, Twining Consulting Inc. dba "RADCO" conducted the uplift resistance load test on Standing Seam Metal Roof Connection Device Panel Assemblies A and B, fastened on a 8 ft. W x 6 ft. L metal frame with and without OSB sheathing. The test determines the maximum uplift load the SSMR Connection device can achieve in compliance with the Interpretation of Regulations, IR 16-8, that describes the Division of the State Architect, DSA, requirements.

2.0 TEST PROGRAM

Referenced Test Methods

IR 16-8 (Revised 1/18/24), *Interpretation of Regulation of DSA requirements.*

3.0 TEST SPECIMEN DESCRIPTION

Materials Received:

The following material was received for testing purposes:

- Roof panel system A with 20 GA. metal roofing pan and no substrate.
- Roof panel system B with 22 GA. metal roofing pan with OSB substrate.
- S5u Clamp seam connector devices.

The roof panels have the seam connection devices already installed by AMS personnel, in accordance with the connector manufacturer's instructions.

Drawing details of both systems are in Appendix A.

The two roof panel systems were fabricated and assembled by AMS personnel at their facility in Manteca, CA. The material was received on March 28, 2025, at RADCO laboratory in Fountain Valley, CA.

4.0 TEST EQUIPMENT

Table 1: Equipment

Category	Type	Manufacturer	Model #	Serial #	ID#
Force	Load Cell 24K	United	CLC 24R	858	11
DAQ	Data Acquisition	Keysight Technologies	DAQ 973A	MY59000324	79

5.0 TEST SETUP, PROCEDURE AND RESULTS

The testing was conducted in accordance with the IR 16-8 (Revised 1/18/24), *Interpretation of Regulation of DSA requirements, Section 5.1.2.1.*

Tension test equipment consisted of a reaction bridge with legs spaced apart a minimum of 8 inches, a hydraulic jack, a hydraulic pump, and a calibrated load cell.

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3

TWINING CONSULTING
18071 Mount Washington Street
Fountain Valley, CA 92708
Tel 949.553.0370
Fax 949.553.0371

The load was transferred by the jack through a high strength steel rod which was run through the entire S5u clamp so that there was a minimum of 3 turns past the clamp edge. The load cell was placed between the hydraulic jack and the reaction bridge. The load was applied with a controlled electric hydraulic pump at a continuous rate of 500 pounds per minute until failure of the connection system.

Four uplift tests were performed on each of the roof panel systems received. The results and type of failure are listed below.

Table 2: Uplift test on connector device of SSMR

Specimen	Panel A (20 GA.)		Panel B (22 GA.)	
	Ultimate Load (lbs)	Failure	Ultimate Load (lbs)	Failure
1	2080	1	2420	1
2	2372	1	2659	1
3	1893	1	2665	1
4	2086	1	2889	1
Average	2107.8		2658.3	
Std Deviation	197.64		191.53	

Failure 1: All roof panels failed in a similar way: it was the seam section panel detached from the substrate or purlin. The 5Su clamp did not slip and the standing seams did not crack either.

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4

PV MOUNTING BRACKET/SSMR TESTING SUMMARY
FULL TESTING REPORT INCLUDED IN SUPPORTING DOCS

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

Salas O'Brien.
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

ROY L. LOPEZ No. 13442 Exp. 09/30/26

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE NO. C-014869 REN. 05-31-27

ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

PV DATASHEETS

5PV4.01

SCALE: AS INDICATED

PLOT DATE

CSA Group Testing and Certification Inc.

178 Rexdale Boulevard
Etobicoke, Ontario M9W 1R3
Canada
Phone: 866-797-4272
Docket Number: OSHA-2006-0042
Certificate
Website
Certification Listing Website
Certification Mark Website

Scope of Recognition*

Recognized Testing Sites

CSA Group, Edmonton
1707-94th Street
Edmonton, Alberta T6N 1E6
Canada

CSA Group, Vancouver
13799 Commerce Parkway
Richmond, British Columbia V6V 2N9
Canada

CSA Group, Toronto
178 Rexdale Boulevard
Etobicoke, Ontario M9W 1R3
Canada

CSA Group, Montreal
865 Ellingham Street
Pointe-Claire, Quebec H9R 5E8
Canada

CSA Group, Guangzhou
No. 10, Ke Yan Road,
Guangzhou Science Park Huang Pu District, Guangzhou,
China 510663

CSA Group, Kunshan
Floor 1, Building 8 Tsinghua Science Park No. 1666
Zuchongzhi Road Kunshan, Jiangsu
China 215347

CSA GROUP
Laboratory Test Data - UL 9540A

UNREDACTED TEST REPORT INCLUDED
IN SUPPORTING DOCUMENTS.
TEST RESTULTS/PASS SUMMARY
ON PAGE 8.

Master Contract: *605627*
Report: *80187885*
Project: *80187885*

October. 20, 2023

Mr Simon Yao,
Project Manager
EndurEnergy Systems, Inc.
4701 Patrick Henry Drive,
Building 25 Santa Clara, California 95054
United States

CAN VARY. REFER TO UL9540 LISTING FOR EQUIVALENT ALTERNATIVES

Subject: *Energy Storage System Rack, model ESP-5K HL-80K (UL 9540A Test Report)*

Dear Mr Simon Yao,

We are pleased to inform you that testing of your product per UL 9540A has been completed. Applicable test(s) was witnessed at Shanghai Huahui Testing Co.,Ltd , and witnessed by CSA Group – Kunshan. Unit level of test was conducted on the sample provided and the results are enclosed in the test report.

> Note: This Test Report is not an Authorization to apply the CSA Mark to the product. The results contained in the report(s) provided are contingent upon the characteristics of the actual sample(s) used in the investigation. In the absence of a continuing inspection service, CSA provides no assurance, expressed or implied, that the contents of the report are applicable to reproductions of the sample(s). Use or reproduction of the CSA name, logo, or trademark is not permitted without the prior written consent of CSA. No references can be made to this report when using the results of this investigation for the purposes of advertising, promotion or litigation, without the prior written consent of CSA.

Please examine the enclosed documents and contact me if you have any questions or would like us to make any changes.

On behalf of CSA, I would like to thank you for your business and offer our services for your future needs.

Yours truly,

Michael Sw Wang
CSA –CCIC-CSA International Certification Co., Ltd. Kunshan Branch
Building 8, Tsinghua Science Park, No. 1666 Zu chongzhi Rd (S), Kunshan, Jiangsu (215347)

ENDURENERGY BESS
UL9540A TEST RESULTS - UNIT LEVEL

CSA GROUP
Laboratory Test Data - UL 9540A

UNREDACTED TEST REPORT INCLUDED
IN SUPPORTING DOCUMENTS.
TEST RESULTS/PASS SUMMARY
ON PAGES 3–4.

Master Contract: *605627*
Report: *80187884*
Project: *80187884*

October. 20, 2023

Mr Simon Yao,
Project Manager
EndurEnergy Systems, Inc.
4701 Patrick Henry Drive,
Building 25 Santa Clara, California 95054
United States

Subject: *Rechargeable Lithium ion Battery System, model ESP-5K HL (UL 9540A Test Report)*

Dear Mr Simon Yao,

We are pleased to inform you that testing of your product per UL 9540A has been completed. Applicable test(s) was witnessed at Shanghai Huahui Testing Co.,Ltd , and witnessed by CSA Group – Kunshan. Module level of test was conducted on the sample provided and the results are enclosed in the test report.

> Note: This Test Report is not an Authorization to apply the CSA Mark to the product. The results contained in the report(s) provided are contingent upon the characteristics of the actual sample(s) used in the investigation. In the absence of a continuing inspection service, CSA provides no assurance, expressed or implied, that the contents of the report are applicable to reproductions of the sample(s). Use or reproduction of the CSA name, logo, or trademark is not permitted without the prior written consent of CSA. No references can be made to this report when using the results of this investigation for the purposes of advertising, promotion or litigation, without the prior written consent of CSA.

Please examine the enclosed documents and contact me if you have any questions or would like us to make any changes.

On behalf of CSA, I would like to thank you for your business and offer our services for your future needs.

Yours truly,

Michael Sw Wang/Joseph Zhou
CSA –CCIC-CSA International Certification Co., Ltd. Kunshan Branch
Building 8, Tsinghua Science Park, No. 1666 Zu chongzhi Rd (S) , Kunshan, Jiangsu (215347)

Encl. *[UL 9540A Test Report]*
- *Att.1 - Module charge/discharge conditioning graphs*
- *Att.2 - Photos*
- *Att.3 - Cell temperature/voltage graph during testing*
- *Att.4 - Heat Release Rate graphs*
- *Att. 5 - Gas generation graphs*
- *Att.6 - Smoke release graph*
- *Att.7 - Notable observation during test*
- *Att.8 - Video(separated file)*

ENDURENERGY BESS
UL9540A TEST RESULTS - MODULE & CELL LEVEL

Certificate of Compliance

Certificate: 80197613 **Master Contract:** 304386

Project: 80197613 **Date Issued:** 2024-01-18

Issued To: **EndurEnergy Systems, Inc.**
4701 Patrick Henry Drive,
Building 25 Santa Clara, California 95054
United States

Attention: **Mr. Simon**

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

C US

Issued by: Michael Sw Wang
Michael Sw Wang

PRODUCTS

CLASS 3701-08 ELECTRICAL ENERGY STORAGE SYSTEMS - Certified to CUS Standard
CLASS 3701-88 ELECTRICAL ENERGY STORAGE SYSTEMS - Certified to US Standard

Li-ion Battery Energy Storage System. Refer to following table for details:

BESS Model	Component	
	Inverter	Battery
ESP-5K HL-20K	60K-3P-480V	ESP-5K HL-4S
ESP-5K HL-25K	60K-3P-480V	ESP-5K HL-5S
ESP-5K HL-30K	60K-3P-480V	ESP-5K HL-6S
ESP-5K HL-35K	60K-3P-480V	ESP-5K HL-7S
ESP-5K HL-40K	60K-3P-480V	ESP-5K HL-8S
ESP-5K HL-45K	60K-3P-480V	ESP-5K HL-9S
ESP-5K HL-50K	60K-3P-480V	ESP-5K HL-10S

Certificate: 80197613 **Master Contract:** 304386
Project: 80197613 **Date Issued:** 2024-01-18

ESP-5K HL-55K	60K-3P-480V	ESP-5K HL-11S
ESP-5K HL-60K	60K-3P-480V	ESP-5K HL-12S
ESP-5K HL-65K	60K-3P-480V	ESP-5K HL-13S
ESP-5K HL-70K	60K-3P-480V	ESP-5K HL-14S

Nomenclature: The BESS was integrated with one inverter and one or more batteries system. See below for the BESS model and battery system nomenclatures.

BESS:
ESP-5K HL-20K nP
A B C
A: ESP-5K HL: Indicate battery module name
B: 20K indicate the battery energy capacity, 20K means 20kWh, it can be replaced by 20K, 25K, 30K, 35K, 40K, 45K, 50K, 55K, 60K, 65K, 70K. Total energy capacity was the battery energy capacity multiply by number n.
C: Indicated the battery system number connected in parallel, n can be 1 ~8.

Examples:
1. ESP-5K HL-20K means it was combined with one inverter 60K-3P-480V and one battery system ESP-5K HL-4S.
2. ESP-5K HL-70K 2P means it was combined with one inverter 60K-3P-480V and two battery system ESP-5K HL-14S connected in parallel.

Battery System:
ESP-5K HL-4S
E F
E: ESP-5K HL: Indicate battery module name
F: 4S indicate the battery connected in series, 4S means four batteries connected in series, it can be replaced by 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S.

Examples: ESP-5K HL-14S means 14 batteries connected in series.

Certificate: 80197613 **Master Contract:** 304386
Project: 80197613 **Date Issued:** 2024-01-18

APPLICABLE REQUIREMENTS

ANSI/CAN/UL 9540:2023 Energy Storage Systems and Equipment, Ed 3 with Rev Jun. 28, 2023

MARKINGS

See CSA report.

Notes:

Products certified under Class 3701-08 and 3701-88 have been certified under CSA's ISO/IEC 17065 accreditation with the Standards Council of Canada (SCC). www.scc.ca

ENDURENERGY BESS UL9540

EndurEnergy Systems, Inc.
Fully-Integrated Battery Energy Storage Systems

Battery Pack
ESP-5K HL
Residential, Commercial, and Industrial
5 kWh DC Battery

Model	ESP-5K HL
Nominal Voltage	51.2 V
Working Voltage	48 V - 57.6 V
Nominal Battery Energy	5 kWh
Peak Power	5 kW 3s
Max. Continuous Discharge Rate	3 kW
Max. Continuous Charge Rate	3 kW
Max. Battery Bank Size	80 kWh per string (16 packs per string)
Max. Battery System Capacity	640 kWh per system (8 strings with 16 packs each)
Recommended C rate	0.5 C
Max. Charge & Discharge Current	60 A
Round Trip Efficiency	97%
Recommended DoD	90%
Charge Temperature Range	32 °F to 122 °F (0 °C to 50 °C)
Discharge Temperature Range	14 °F to 131°F (-10 °C to 55 °C)
Life Cycles	6000
Protection Level	IP20
Size L x W x H	17.40 x 19.70 x 5.24 in (442 x 500 x 133 mm)
Weight	101.413 lb (46.00 kg)
Battery Type	Lithium Iron Phosphate (LFP)
Warranty	10-Year
Compliance	UL1973, UL9540A, UL9540, OGPe, SGIP and CEC listed.

ESP EVERSURE POWER
Sense the Difference.
Live the Power.

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ENDURENERGY BATTERY MODULE
DATA SHEET

Certificate of Compliance

Certificate: 80177878 **Master Contract:** 605627

Project: 80177878 **Date Issued:** 2023-09-20

Issued To: **EndurEnergy Systems, Inc.**
4701 Patrick Henry Drive,
Building 25
Santa Clara, California 95054
United States

Attention: Simon Yao

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Issued by: Michael Sw Wang
Michael Sw Wang

C US

PRODUCTS

CLASS - C3701 12 - BATTERIES - Battery System for use in Stationary Applications
CLASS - C3701 82 - BATTERIES - Battery System for use in Stationary Applications - Certified to US Standards

Secondary lithium-ion battery system for use in stationary application, Models ESP-5K HL.

Certificate: 80177878 **Master Contract:** 605627
Project: 80177878 **Date Issued:** 2023-09-20

APPLICABLE REQUIREMENTS

ANSI/CAN/UL 1973:2022, Third Edition (Dated February 25, 2022) - Batteries for Use in Stationary and Motive Auxiliary Power Applications.

MARKINGS

See CSA report.

Notes:

Products certified under Class C370112, C370182 have been certified under CSA's ISO/IEC 17065 accreditation with the Standards Council of Canada (SCC). www.scc.ca

ENDURENERGY BESS UL1973

TÜV Rheinland (China) Ltd.
Member of TÜV Rheinland Group

TÜVRheinland®
Precisely Right.

Date : 11/29/2023

Portable Solar LLC (dba Sol-Ark)
805 Central Expy S
Allen, TX 75013
USA

Attn: Tom Brennan

Re. : CU US + Canada Certificate

```
Type of Equipment : (Grid Support Utility Interactive Hybrid Inverter)
Model Designation : See Certificate
Certificate No.   : CU 50608067 0001
File No.          : CN235DYA 001
Engineer/Contact  : Xingxin Tian
Standard(s)       : UL 1741:2021
                    CSA C22.2 No. 107.1-16
```

Dear Madame or Sir,

The above referenced technical equipment has been tested and was found to be in compliance with the listed test requirement(s). Enclosed, please find the TUV Rheinland approval document No. CU 50608067 0001.
It authorizes you to label the listed product(s) with the TUV Rheinland Mark identified in the approval document.
For compliance, the Test Mark must be on the approved unit.

Your product is subject to regular factory follow-up inspections as well as annual certificate and factory registration fees.

In using the TUV Rheinland Mark you are obligated to comply with the TUV Rheinland of North America Service Agreement.

If we can be of any further assistance to you, please do not hesitate to contact us.

Sincerely yours,
Certification Body

Weichun Li

Enclosure

证书的详细资料请登陆www.certipedia.com查阅，或致电我司客服热线800 999 3668 / 400 883 1300咨询

Certificate

TÜVRheinland®

Certificate no. CU 50608067 01

License Holder:
Portable Solar LLC (dba Sol-Ark)
805 Central Expy S
Allen, TX 75013
USA

Manufacturing Plant:
[redacted]

Test report no.: USA-Tianxin CN235DYA 001 **Client Reference:** TOM BRENNAN

Tested to: UL 1741:2021
CSA C22.2 No. 107.1-16

Certified Product: (Grid Support Utility Interactive Hybrid Inverter) **License Fee - Units**

```
Model Designation: 60K-3P-480V [redacted]              13

Trademark          : Sol-Ark
Other data         : See appendix
Special Remarks    :
Also evaluated to
UL1741 3rd Edition Supplement SB for grid support functions,
and IEEE 1547-2018 and IEEE1547.1-2020: Normal Operating
Performance Category B; Abnormal Operating Performance III
to the following SRDs:
-Hawaiian Electric SRD V2.0.
Continued on page 02
                                                          13
Appendix: 1, 1-162
```

Licensed Test mark:

Date of Issue (day/mo/yr)
29/11/2023

Certificate

TÜVRheinland®

Certificate no. CU 50608067 02

License Holder:
Portable Solar LLC (dba Sol-Ark)
805 Central Expy S
Allen, TX 75013
USA

Manufacturing Plant:
[redacted]

Test report no.: USA-Tianxin CN235DYA 001 **Client Reference:** TOM BRENNAN

Tested to: UL 1741:2021
CSA C22.2 No. 107.1-16

Certified Product: (Grid Support Utility Interactive Hybrid Inverter) **License Fee - Units**

```
As page 01 continuation

UL 1741 3rd Edition Supplement SB for interoperability
functions, and IEEE 1547-2018 and IEEE1547.1-2020:
using IEEE 2030.5 protocol.
UL 1699B for photovoltaic DC arc-fault circuit
interrupter protection integrated in inverter.
UL 1741 (2nd Edition, April 20, 2010) CRD,
Subject: Power Control Systems (PCS).
UL 1998 Software evaluation was performed
for safety related functions.

Appendix: 1, 1-162
```

Licensed Test mark:

Date of Issue (day/mo/yr)
29/11/2023

SOL-ARK BESS INVERTER
UL1741 LISTING

DATASHEET
60K-480V
C&I Hybrid Inverter

Inverter Model Name:	60K-3P-480V
Sol-Ark Product SKU:	60K-3P-480V
Input Data (PV)	
Max. Allowed PV Power (STC)	78,000W
MPPT Voltage Range	150-850V
Startup Voltage	180V
Max. Input Voltage [1]	1,000V
Max. operating input current per MPPT	36A
Max. short circuit current per MPPT	55A
No. of MPP Trackers	4
No. of PV Strings per MPPT	2
Max. AC Coupled Input	60,000W
Output Data (AC)	
Nominal AC Voltage (3Φ)	277/480V
Grid Frequency	50 / 60Hz
Real Power, max continuous (3Φ)	60,000W
Max. Output Current	72.3A
Peak Apparent Power (10s, off-grid, 3Φ)	90,000VA
Max. Grid Passthrough Current (10min)	200A
Continuous Grid Passthrough Current	180A
Power Factor Output Range	+/- 0.8 adjustable
Backup Transfer Time	5ms (adjustable)
CEC Efficiency	96.5%
Max Efficiency	97.5%
Design (DC to AC)	Transformerless DC
Stackable	Up to 10 in parallel
Battery Input Data (DC)	
Battery Chemistry	Lithium iron phosphate
No. of Battery Inputs	2
Battery Input Terminal Rating	50A
Nominal DC Voltage	≥ 600V
Operating Voltage Range	160 - 800V
Battery Capacity Range	50 – 9900Ah
Max. Battery Charge / Discharge Current	100A (50A per input)
Charge Controller Type	3-Stage with Equalization
Grid to Battery Charging Efficiency	96.0%
Automatic Generator Start (AGS)	2 Wire Start - Integrated
BMS Communication [2]	CANBus & RS485
General Data	
Dimensions (H x W x D)	894 x 528 x 295 mm (35.2 x 20.8 x 11.6 in)
Weight	80 Kg / 176 lb.
Enclosure	IP65 / NEMA 3R
Ambient Temperature	-40 - 60°C, >45°C Derating
Noise	< 30 dB @ 25°C (77°F)
Idle Consumption - No Load	60W
Communication and Monitoring	Wi-Fi & LAN Hardware Included
Warranty [3]	10 Years (15 Years)
Category	
Certifications and Listings (Grid Support Interactive Inverter)	UL 1741-2021 (UL1741SB), CSA C22.2 No 107.1-16, IEEE 1547-2018 & 1547a-2020 & 1547.1-2020 (SRD V2.0), UL 1741 CRD-PCS, UL1699B, CEC, SGIP [4]
PV DC Disconnect Switch – NEC 240.15	Integrated
Ground Fault Detection – NEC 690.5	Integrated
PV Rapid Shutdown Control – NEC 690.12	Integrated
PV Arc Fault Detection – NEC 690.11	Integrated
PV Input Lightning Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
Surge Protection	DC Type II / AC Type III

1. See Installation Guide for more details on sizing array strings. The highest input voltage is based on the open-circuit voltage of the array at the minimum design temperature.
2. Active BMS communication is required for all lithium batteries. A list of compatible batteries can be found on our website.
3. 5-year extension is available for purchase by registered Gold level installers only.
4. Pending listing.

SOL-ARK BESS INVERTER
DATA SHEET

EndurEnergy Systems, Inc.

Battery Unit
ESP-BU30
Storage Product
Up to 30.72 kWh Battery Packs with BMS

Model	ESP-BU30
Dimensions (H x W x D)	67.5 x 26.7 x 15 inches (1715 x 677 x 383 mm)
Weight	176 lb (80 kg)
Equipment Mounting Capacity	6 ESP-5K HL / 6 ESP-5100
Material	Steel
Color and finish	Gray and Black / Powder Coated
Protection Level	IP55
Warranty	10-Year
Compliance	UL9540, UL1973, CEC and SGIP pending

ESP EVERSURE POWER
Sense the Difference.
Live the Power.

Configurations (ESP-5100)						
~~Battery Packs In Parallel~~	~~1~~	~~2~~	~~3~~	~~4~~	~~5~~	~~6~~
~~Storage Capacity~~	~~100 Ah~~	~~200 Ah~~	~~300 Ah~~	~~400 Ah~~	~~500 Ah~~	~~600 Ah~~
~~Working Voltage~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~
~~Nominal Energy~~	~~5.12 kWh~~	~~10.24 kWh~~	~~15.36 kWh~~	~~20.48 kWh~~	~~25.6 kWh~~	~~30.72 kWh~~
~~Weight (lb)~~	~~277.8 lb~~	~~379.2 lb~~	~~480.6 lb~~	~~582 lb~~	~~683.4 lb~~	~~784.8 lb~~
~~Weight (kg)~~	~~126 kg~~	~~172 kg~~	~~218 kg~~	~~264 kg~~	~~310 kg~~	~~356 kg~~

Configurations (ESP-5K HL)						
~~Battery Packs In Parallel~~	~~1~~	~~2~~	~~3~~	~~4~~	~~5~~	~~6~~
~~Storage Capacity~~	~~100 Ah~~	~~200 Ah~~	~~300 Ah~~	~~400 Ah~~	~~500 Ah~~	~~600 Ah~~
~~Working Voltage~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~	~~48 V - 56 V~~
~~Nominal Energy~~	~~5 kWh~~	~~10 kWh~~	~~15 kWh~~	~~20 kWh~~	~~25 kWh~~	~~30 kWh~~
~~Weight (lb)~~	~~277.8 lb~~	~~379.2 lb~~	~~480.6 lb~~	~~582 lb~~	~~683.4 lb~~	~~784.8 lb~~
~~Weight (kg)~~	~~126 kg~~	~~172 kg~~	~~218 kg~~	~~264 kg~~	~~310 kg~~	~~356 kg~~

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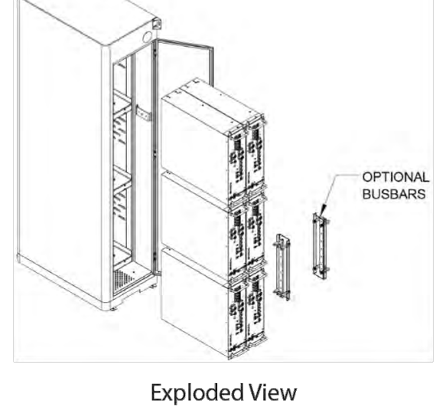
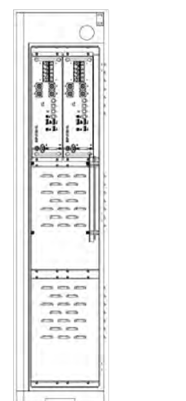
EndurEnergy Systems, Inc.

Configurations (ESP-5K HL)						
Battery Packs In Series	1	2	3	4	5	6 X2
Storage Capacity	100 Ah	100 Ah	100 Ah	100 Ah	100 Ah	100 Ah
Working Voltage	48 V - 56 V	96 V - 112 V	144 V - 168 V	192 V - 224 V	240 V - 280 V	288 V - 336 V
Nominal Energy	5 kWh	10 kWh	15 kWh	20 kWh	25 kWh	30 kWh
Weight (lb)	277.8 lb	379.2 lb	480.6 lb	582 lb	683.4 lb	784.8 lb
Weight (kg)	126 kg	172 kg	218 kg	264 kg	310 kg	356 kg

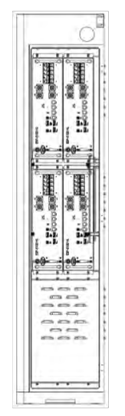
Mechanical Drawings



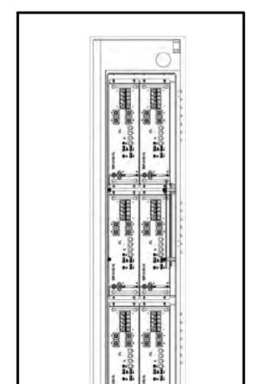
Exploded View



2 Battery Pack
Configuration



4 Battery Packs
Configuration



6 Battery Packs
Configuration

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ENDURENERGY BESS ENCLOSURE
DATA SHEET

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

LA CAÑADA UNIFIED SCHOOL DISTRICT
ESTABLISHED 1885

Salas O'Brien.
salasobrien.com 949.753.1553
Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

NO. C-014869
REN. 05-31-27

The ideas and designs represented herein and this drawing, all prepared by Practice are for the use solely with respect to this project and Practice shall retain all common law, statutory and other reserved rights including copyright and they shall not be used by others for any other purpose without written permission of Practice.

ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

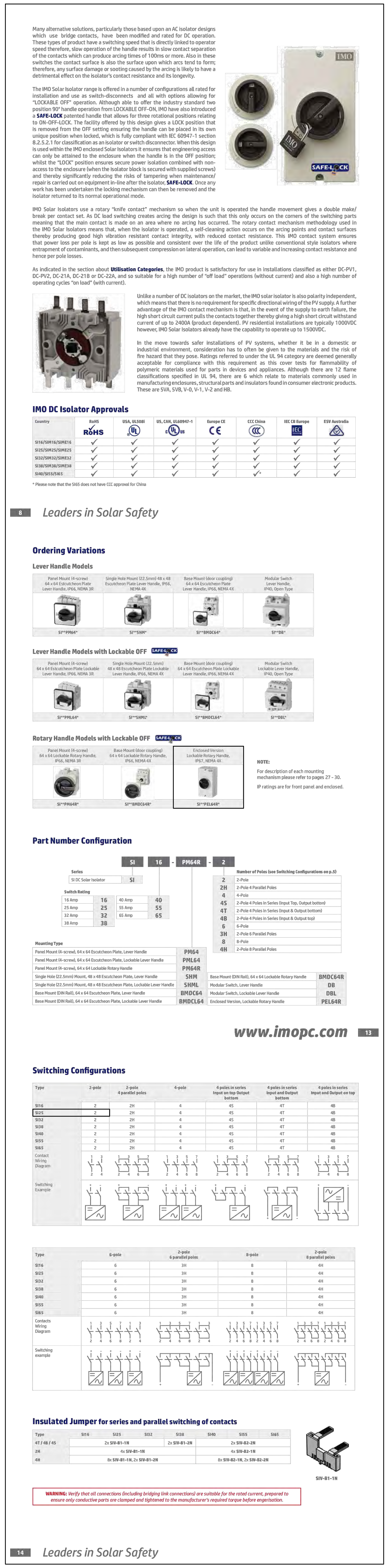
BESS DATASHEETS

5PV4.02

SCALE: AS INDICATED

PLOT DATE

If this sheet is smaller than 30" high by 42" wide then it has been reduced.



Many alternative solutions, particularly those based upon an AC isolator designs which use bridge contacts, have been modified and rated for DC operation. These types of product have a switching speed that is directly linked to operator speed therefore, slow operation of the handle results in slow contact separation of the contacts which can produce arcing times of 100ms or more. Also in these switches the contact surface is also the surface upon which arcs tend to form; therefore, any surface damage or sooting caused by the arcing is likely to have a detrimental effect on the isolator's contact resistance and its longevity.

The IMO Solar Isolator range is offered in a number of configurations all rated for installation and use as switch-disconnects and all with options allowing for "LOCKABLE OFF" operation. Although able to offer the industry standard two position 90° handle operation from LOCKABLE OFF-ON, IMO have also introduced a **SAFE-LOCK** patented handle that allows for three rotational positions relating to ON-OFF-LOCK. The facility offered by this design gives a LOCK position that is removed from the OFF setting ensuring the handle can be placed in its own unique position when locked, which is fully compliant with IEC 60947-1 section 8.2.5.2.1 for classification as an isolator or switch disconnector. When this design is used within the IMO enclosed Solar Isolators it ensures that engineering access can only be attained to the enclosure when the handle is in the OFF position; whilst the "LOCK" position ensures secure power isolation combined with non-access to the enclosure (when the isolator block is secured with supplied screws) and thereby significantly reducing the risks of tampering when maintenance/repair is carried out on equipment in-line after the isolator, **SAFE-LOCK**. Once any work has been undertaken the locking mechanism can then be removed and the isolator returned to its normal operational mode.

IMO Solar Isolators use a rotary "knife contact" mechanism so when the unit is operated the handle movement gives a double make/break per contact set. As DC load switching creates arcing the design is such that this only occurs on the corners of the switching parts meaning that the main contact is made on an area where no arcing has occurred. The rotary contact mechanism methodology used in the IMO Solar Isolators means that, when the isolator is operated, a self-cleaning action occurs on the arcing points and contact surfaces thereby producing good high vibration resistant contact integrity, with reduced contact resistance. This IMO contact system ensures that power loss per pole is kept as low as possible and consistent over the life of the product unlike conventional style isolators where entrapment of contaminants, and then subsequent compression on lateral operation, can lead to variable and increasing contact resistance and hence per pole losses.

As indicated in the section about **Utilisation Categories**, the IMO product is satisfactory for use in installations classified as either DC-PV1, DC-PV2, DC-21A, DC-21B or DC-22A, and so suitable for a high number of "off load" operations (without current) and also a high number of operating cycles "on load" (with current).

Unlike a number of DC isolators on the market, the IMO solar isolator is also polarity independent, which means that there is no requirement for specific directional wiring of the PV supply. A further advantage of the IMO contact mechanism is that, in the event of the supply to earth failure, the high short circuit current pulls the contacts together thereby giving a high short circuit withstand current of up to 2400A (product dependent). PV residential installations are typically 1000VDC however, IMO Solar Isolators already have the capability to operate up to 1500VDC.

In the move towards safer installations of PV systems, whether it be in a domestic or industrial environment, consideration has to often be given to the materials and the risk of fire hazard that they pose. Ratings referred to under the UL 94 category are deemed generally acceptable for compliance with this requirement as this cover tests for flammability of polymeric materials used for parts in devices and appliances. Although there are 12 flame classifications specified in UL 94, there are 6 which relate to materials commonly used in manufacturing enclosures, structural parts and insulators found in consumer electronic products. These are 5VA, 5VB, V-0, V-1, V-2 and HB.

IMO DC Isolator Approvals

Country	RoHS	USA, UL508i	US, CAN, UL60947-1	Europe CE	CCC China	IEC CB Europe	ESV Australia
SI16/SIM16/SIME16	✓	✓	✓	✓	✓	✓	✓
SI25/SIM25/SIME25	✓	✓	✓	✓	✓	✓	✓
SI32/SIM32/SIME32	✓	✓	✓	✓	✓	✓	✓
SI38/SIM38/SIME38	✓	✓	✓	✓	✓	✓	✓
SI40/SI55/SI65	✓	✓	✓	✓	✓*	✓	✓

* Please note that the SI65 does not have CCC approval for China

Ordering Variations

Lever Handle Models

Panel Mount (4-screw) 64 x 64 Estcutcheon Plate Lever Handle, IP66, NEMA 3R	Single Hole Mount (22.5mm) 48 x 48 Escutcheon Plate Lever Handle, IP66, NEMA 4X	Base Mount (door coupling) 64 x 64 Escutcheon Plate Lever Handle, IP66, NEMA 4X	Modular Switch Lever Handle, IP40, Open Type
SI**PM64*	SI**SHM*	SI**BMDC64*	SI**DB*

Lever Handle Models with Lockable OFF SAFE-LOCK

Panel Mount (4-screw) 64 x 64 Estcutcheon Plate Lockable Lever Handle, IP66, NEMA 3R	Single Hole Mount (22.5mm) 48 x 48 Escutcheon Plate Lockable Lever Handle, IP66, NEMA 4X	Base Mount (door coupling) 64 x 64 Escutcheon Plate Lockable Lever Handle, IP66, NEMA 4X	Modular Switch Lockable Lever Handle, IP40, Open Type
SI**PML64*	SI**SHML*	SI**BMDCL64*	SI**DBL*

Rotary Handle Models with Lockable OFF SAFE-LOCK

Panel Mount (4-screw) 64 x 64 Lockable Rotary Handle, IP66, NEMA 3R	Base Mount (door coupling) 64 x 64 Lockable Rotary Handle, IP66, NEMA 4X	Enclosed Version Lockable Rotary Handle, IP67, NEMA 4X
SI**PM64R*	SI**BMDC64R*	SI**PEL64R*

NOTE:

For description of each mounting mechanism please refer to pages 27 - 30.

IP ratings are for front panel and enclosed.

Part Number Configuration

SI 16 - PM64R - 2

Series

SI DC Solar Isolator	SI

Switch Rating

16 Amp	16	40 Amp	40
25 Amp	25	55 Amp	55
32 Amp	32	65 Amp	65
38 Amp	38		

Number of Poles (see Switching Configurations on p.5)

2	2-Pole
2H	2-Pole 4 Parallel Poles
4	4-Pole
4S	2-Pole 4 Poles in Series (Input Top, Output botton)
4T	2-Pole 4 Poles in Series (Input & Output bottom)
4B	2-Pole 4 Poles in Series (Input & Output top)
6	6-Pole
3H	2-Pole 6 Parallel Poles
8	8-Pole
4H	2-Pole 8 Parallel Poles

Mounting Type

Panel Mount (4-screw), 64 x 64 Escutcheon Plate, Lever Handle	PM64
Panel Mount (4-screw), 64 x 64 Escutcheon Plate, Lockable Lever Handle	PML64
Panel Mount (4-screw), 64 x 64 Lockable Rotary Handle	PM64R
Single Hole (22.5mm) Mount, 48 x 48 Escutcheon Plate, Lever Handle	SHM
Single Hole (22.5mm) Mount, 48 x 48 Escutcheon Plate, Lockable Lever Handle	SHML
Base Mount (DIN Rail), 64 x 64 Escutcheon Plate, Lever Handle	BMDC64
Base Mount (DIN Rail), 64 x 64 Escutcheon Plate, Lockable Lever Handle	BMDCL64
Base Mount (DIN Rail), 64 x 64 Lockable Rotary Handle	BMDC64R
Modular Switch, Lever Handle	DB
Modular Switch, Lockable Lever Handle	DBL
Enclosed Version, Lockable Rotary Handle	PEL64R

Switching Configurations

Type	2-pole	2-pole 4 parallel poles	4-pole	4 poles in series Input on top Output bottom	4 poles in series Input and Output bottom	4 poles in series Input and Output on top
SI16	2	2H	4	4S	4T	4B
SI25	2	2H	4	4S	4T	4B
SI32	2	2H	4	4S	4T	4B
SI38	2	2H	4	4S	4T	4B
SI40	2	2H	4	4S	4T	4B
SI55	2	2H	4	4S	4T	4B
SI65	2	2H	4	4S	4T	4B
Contact Wiring Diagram						
Switching Example						

Type	6-pole	2-pole 6 parallel poles	8-pole	2-pole 8 parallel poles
SI16	6	3H	8	4H
SI25	6	3H	8	4H
SI32	6	3H	8	4H
SI38	6	3H	8	4H
SI40	6	3H	8	4H
SI55	6	3H	8	4H
SI65	6	3H	8	4H
Contacts Wiring Diagram				
Switching example				

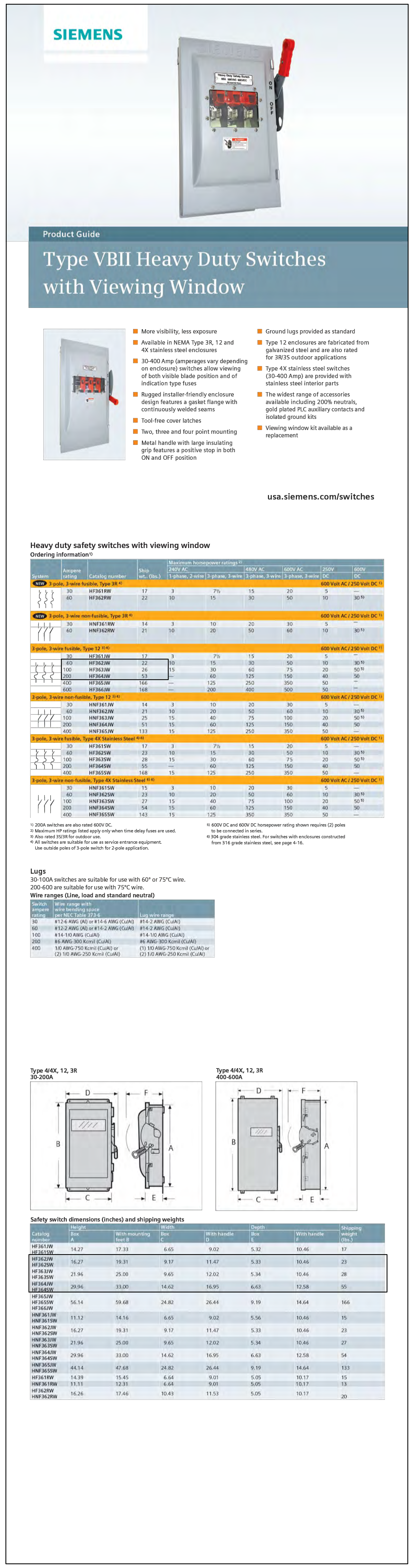
Insulated Jumper for series and parallel switching of contacts

Type	SI16	SI25	SI32	SI38	SI40	SI55	SI65
4T / 4B / 4S	2x SIV-B1-1N			2x SIV-B1-2N	2x SIV-B2-2N		
2H	4x SIV-B1-1N				4x SIV-B2-1N		
4H	8x SIV-B1-1N, 2x SIV-B1-2N				8x SIV-B2-1N, 2x SIV-B2-2N		

SIV-B1-1N

WARNING: *Verify that all connections (including bridging link connections) are suitable for the rated current, prepared to ensure only conductive parts are clamped and tightened to the manufacturer's required torque before engerisation.*

DC DISCONNECT
DATA SHEET



SIEMENS

Product Guide

Type VBII Heavy Duty Switches with Viewing Window

- More visibility, less exposure
- Available in NEMA Type 3R, 12 and 4X stainless steel enclosures
- 30-400 Amp (amperages vary depending on enclosure) switches allow viewing of both visible blade position and of indication type fuses
- Rugged installer-friendly enclosure design features a gasket flange with continuously welded seams
- Tool-free cover latches
- Two, three and four point mounting
- Metal handle with large insulating grip features a positive stop in both ON and OFF position
- Ground lugs provided as standard
- Type 12 enclosures are fabricated from galvanized steel and are also rated for 3R/3S outdoor applications
- Type 4X stainless steel switches (30-400 Amp) are provided with stainless steel interior parts
- The widest range of accessories available including 200% neutrals, gold plated PLC auxiliary contacts and isolated ground kits
- Viewing window kit available as a replacement

usa.siemens.com/switches

Heavy duty safety switches with viewing window

Ordering information[1]

System	Ampere rating	Catalog number	Ship wt.. (lbs.)	Maximum horsepower ratings[2] 240V AC 1-phase, 2-wire	240V AC 3-phase, 3-wire	480V AC 3-phase, 3-wire	600V AC 3-phase, 3-wire	250V DC	600V DC
NEW 3-pole, 3-wire fusible, Type 3R[4]								600 Volt AC / 250 Volt DC[1]	
	30	HF361RW	17	3	7½	15	20	5	—
	60	HF362RW	22	10	15	30	50	10	30[5]
NEW 3-pole, 3-wire non-fusible, Type 3R[4]								600 Volt AC / 250 Volt DC[1]	
	30	HNF361RW	14	3	10	20	30	5	—
	60	HNF362RW	21	10	20	50	60	10	30[5]
3-pole, 3-wire fusible, Type 12[3][4]								600 Volt AC / 250 Volt DC[1]	
	30	HF361JW	17	3	7½	15	20	5	—
	60	HF362JW	22	10	15	30	50	10	30[5]
	100	HF363JW	26	15	30	60	75	20	50[5]
	200	HF364JW	53	—	60	125	150	40	50
	400	HF365JW	166	—	125	250	350	50	—
	600	HF366JW	168	—	200	400	500	50	—
3-pole, 3-wire non-fusible, Type 12[3][4]								600 Volt AC / 250 Volt DC[1]	
	30	HNF361JW	14	3	10	20	30	5	—
	60	HNF362JW	21	10	20	50	60	10	30[5]
	100	HNF363JW	25	15	40	75	100	20	50[5]
	200	HNF364JW	51	15	60	125	150	40	50
	400	HNF365JW	133	15	125	250	350	50	—
3-pole, 3-wire fusible, Type 4X Stainless Steel[4][6]								600 Volt AC / 250 Volt DC[1]	
	30	HF361SW	17	3	7½	15	20	5	—
	60	HF362SW	23	10	15	30	50	10	30[5]
	100	HF363SW	28	15	30	60	75	20	50[5]
	200	HF364SW	55	—	60	125	150	40	50
	400	HF365SW	168	15	125	250	350	50	—
3-pole, 3-wire non-fusible, Type 4X Stainless Steel[4][6]								600 Volt AC / 250 Volt DC[1]	
	30	HNF361SW	15	3	10	20	30	5	—
	60	HNF362SW	23	10	20	50	60	10	30[5]
	100	HNF363SW	27	15	40	75	100	20	50[5]
	200	HNF364SW	54	15	60	125	150	40	50
	400	HNF365SW	143	15	125	350	350	50	—

[1] 200A switches are also rated 600V DC.
[2] Maximum HP ratings listed apply only when time delay fuses are used.
[3] Also rated 3S/3R for outdoor use.
[4] All switches are suitable for use as service entrance equipment. Use outside poles of 3-pole switch for 2-pole application.
[5] 600V DC and 600V DC horsepower rating shown requires (2) poles to be connected in series.
[6] 304 grade stainless steel. For switches with enclosures constructed from 316 grade stainless steel, see page 4-16.

Lugs

30-100A switches are suitable for use with 60° or 75°C wire.
200-600 are suitable for use with 75°C wire.

Wire ranges (Line, load and standard neutral)

Switch ampere rating	Wire range with wire bending space per NEC Table 373-6	Lug wire range
30	#12-6 AWG (Al) or #14-6 AWG (Cu/Al)	#14-2 AWG (Cu/Al)
60	#12-2 AWG (Al) or #14-2 AWG (Cu/Al)	#14-2 AWG (Cu/Al)
100	#14-1/0 AWG (Cu/Al)	#14-1/0 AWG (Cu/Al)
200	#6 AWG-300 Kcmil (Cu/Al)	#6 AWG-300 Kcmil (Cu/Al)
400	1/0 AWG-750 Kcmil (Cu/Al) or (2) 1/0 AWG-250 Kcmil (Cu/Al)	(1) 1/0 AWG-750 Kcmil (Cu/Al) or (2) 1/0 AWG-250 Kcmil (Cu/Al)

Type 4/4X, 12, 3R
30-200A

Type 4/4X, 12, 3R
400-600A

Safety switch dimensions (inches) and shipping weights

Catalog number	Height Box A	Height With mounting feet B	Width Box C	Width With handle D	Depth Box E	Depth With handle F	Shipping weight (lbs.)
HF361JW HF361SW	14.27	17.33	6.65	9.02	5.32	10.46	17
HF362JW HF362SW	16.27	19.31	9.17	11.47	5.33	10.46	23
HF363JW HF363SW	21.96	25.00	9.65	12.02	5.34	10.46	28
HF364JW HF364SW	29.96	33.00	14.62	16.95	6.63	12.58	55
HF365JW HF365SW HF366JW	56.14	59.68	24.82	26.44	9.19	14.64	166
HNF361JW HNF361SW	11.12	14.16	6.65	9.02	5.56	10.46	15
HNF362JW HNF362SW	16.27	19.31	9.17	11.47	5.33	10.46	23
HNF363JW HNF363SW	21.96	25.00	9.65	12.02	5.34	10.46	27
HNF364JW HNF364SW	29.96	33.00	14.62	16.95	6.63	12.58	54
HNF365JW HNF365SW	44.14	47.68	24.82	26.44	9.19	14.64	133
HF361RW	14.39	15.45	6.64	9.01	5.05	10.17	15
HNF361RW	11.11	12.31	6.64	9.01	5.05	10.17	13
HF362RW HNF362RW	16.26	17.46	10.43	11.53	5.05	10.17	20

AC DISCONNECT
DATA SHEET

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

Practice
135 W. Green St Suite 200 Pasadena, CA 91105 | 626.568.1248 | practice-la.com

LA CAÑADA UNIFIED SCHOOL DISTRICT
ESTABLISHED 1885

Salas O'Brien.

salasobrien.com 949.753.1553

Irvine
8825 Research Drive
Irvine, CA 92618

Project No.: 2022-01629-05

ROY L. LOPEZ
No. 13442
Exp. 09/30/26
ELECTRICAL

PARADISE CANYON E.S.

PACKAGE 5 - NEW NORTH BUILDINGS

471 KNIGHT WAY, LA CAÑADA FLINTRIDGE, CA 91011

PROJECT NUMBER 20911

HARRY R DRAKE
NO. C-014869
REN. 05-31-27

ISSUE DATE	DESCRIPTION
04/19/2024	100% SCHEMATIC DESIGN
07/05/2024	50% DESIGN DEVELOPMENT
08/16/2024	100% DESIGN DEVELOPMENT
04/11/2025	50% CONSTRUCTION DOCUMENTS
07/18/2025	100% CONSTRUCTION DOCUMENTS
08/06/2025	DSA V1
12/05/2025	DSA V2
03/20/2026	DSA V3

#	REVISION DATE	DESCRIPTION

DRAWING TITLE

DISCONNECT
DATASHEETS

5PV4.03

SCALE: AS INDICATED
PLOT DATE

If this sheet is smaller than 30" high by 42" wide then it has been reduced.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

GENERAL NOTES

1. ALL DIMENSIONS, CONDITIONS AND ELEVATIONS ARE TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORK OR FABRICATION. IF ANY DISCREPANCIES ARE FOUND OR IF ANY CONDITION EXISTS NOT AS SHOWN ON THE DRAWINGS THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

2. THE CONTRACTOR WILL HOLD HARMLESS, INDEMNIFY AND DEFEND THE OWNER, THE ENGINEER, AND HIS CONSULTANTS, AND EACH OF THEIR OFFICERS AND EMPLOYEES AND AGENTS, FROM ANY AND ALL LIABILITY CLAIMS, LOSSES OR DAMAGE ARISING OR ALLEGED TO ARISE FROM THE PERFORMANCE OF THE WORK DESCRIBED HEREIN, BUT NOT INCLUDING THE SOLE NEGLIGENCE OF THE OWNER, THE ENGINEER AND HIS CONSULTANTS, AND EACH OF THEIR OFFICERS AND EMPLOYEES AND AGENTS.

3. THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE DESIGN INTENT. UNLESS OTHERWISE SHOWN, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND HE SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES.

IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

ALL WORK SHALL CONFORM TO THE LATEST APPLICABLE CONSTRUCTION SAFETY REQUIREMENTS OF O.S.H.A. AND ANY OTHER GOVERNMENTAL ENTITY HAVING JURISDICTION.

4. THE DUTY OF THE ENGINEER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES, IN, ON, OR NEAR THE CONSTRUCTION SITE.

5. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER OR HIS REPRESENTATIVES DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER WHETHER OF MATERIAL OR WORK AND WHETHER PERFORMED PRIOR TO, DURING, OR AFTER COMPLETION OF CONSTRUCTION ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DRAWINGS AND SPECIFICATION, BUT THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

6. ANY CHANGES TO THE APPROVED SET OF PLANS WITHOUT NOTIFYING THE ENGINEER PRIOR TO SUCH CHANGES ABSOLVES SAID ENGINEER FROM ANY AND ALL RESPONSIBILITY WITH RESPECT TO LIABILITY, DAMAGE OR EXTRA WORK RESULTING FROM SAID CHANGES.

7. NOTES AND DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER THESE GENERAL NOTES.

8. THE TYPICAL DETAILS SHOWN ON THESE SHEETS SHALL APPLY IN ALL CASES UNLESS SPECIFICALLY SHOWN OTHERWISE. WHERE NO DETAIL IS SHOWN, CONSTRUCTION SHALL BE AS SHOWN FOR OTHER SIMILAR WORK.

9. DESIGN LOADS: RISK CATEGORY II OR RISK CATEGORY III
ROOF LIVE LOAD: 20 PSF REDUCIBLE ROOF DEAD LOAD: 3 PSF
SNOW LOAD: Pg = Ps = 20 PSF & 30.5 PSF Ce = 1.1 Ct = 1.2 Cs = 1.0
Is = 1.0 RISK CATEGORY II Is = 1.1 RISK CATEGORY III ICE LOAD = 0 PSF

SEISMIC: I_E = 1.0 AT RISK CATEGORY II OR I_E = 1.25 AT RISK CATEGORY III

SEISMIC DESIGN CATEGORY = E ρ = 1.0

STRUCTURE IS A STEEL ORDINARY CANTILEVERED COLUMN SYSTEM (G2 PER ASCE7-16)
R = 1.25/0.7 (FOR WORKING STRESS)
Ω_o = 1.25 Cd = 1.25
SOIL SITE CLASS = D
FOR 12.5' COLUMN HEIGHT T = 0.49
T > 0.5 SEC. FOR COLUMN HEIGHTS > 12.5'

BASE SHEAR: V = ρ x Cs x W
RISK CATEGORY II V = 0.56W (ASD) FOR S_{DS} = 1.0
RISK CATEGORY II V = 0.98W (ASD) FOR S_{DS} = 1.75
RISK CATEGORY III V = 0.70W (ASD) FOR S_{DS} = 1.00
RISK CATEGORY III V = 1.75W (ASD) FOR S_{DS} = 2.5

WIND LOAD: 110 MPH, EXPOSURE C RISK CATEGORY II OR RISK CATEGORY III
Kd = 0.85 Kz = 0.90 Kzt = 1.0Ke = 1.00

qh = 14.33 (qh = 0.00256 x Kz x Ke x Kzt x Kd x V^2 x 0.6 (FOR WORKING STRESS)) STRUCTURE IS DESIGNED FOR CLEAR & OBSTRUCTREO WIND FLOW. MAXIMUM BASIC WIND LOAD FOR PROJECT LOCATED IN SPECIAL WIND REGIONS SHALL BE EQUAL TO OR LESS THAN 135 mph AND CONFORM WITH THE ADOPTED ORDINANCE OF THE CITY, COUNTY OR CITY AND COUNTY IN WHICH THE PROJECT SITE IS LOCATED AND SHALL BE APPROVED BY DSA-SS.

10. GOVERNING CODE: 2022 CBC

11. ALLOWABLE SOIL BEARING IS BASED ON 1500 PSF & 100 PCFx2 PASSIVE PRESSURE PER CBC TABLE 1806A.2 & SECTION 1806A.3.4. SKIN FRICTION IS PER 1810A.3.3.1.4 & IS EQUAL TO 1500/6=250 PSF. FOR UPLIFT SKIN FRICTION SHALL BE 125 PSF (S.F. OF 2). 1/3 INCREASE NOT USED FOR ANY SOIL VALUES.

12. ALL WORK TO BE PERFORMED UNDER THE CONTINUOUS INSPECTION OF A D.S.A. APPROVED INSPECTOR.

13. ALL WORK SHALL CONFORM TO TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).

14. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY AN ADDENDA OR A CONSTRUCTION CHANGE DOCUMENT APPROVED BY THE DIVISION OF THE STATE ARCHITECT, AS REQUIRED BY SECTION 4-336, PART 1, TITLE 24, CCR AND THE ENGINEER.

15. A PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE OFFICE OF THE STATE ARCHITECT SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR.

FOUNDATION NOTES

1. ALL FOOTINGS SHALL EXTEND TO FIRM BEARING IN UNDISTUBED SOIL OR ENGINEERED FILL.

2. NOMINAL TOP OF FLOOR SLAB ELEVATION = DATUM +0'-0" UNLESS OTHERWISE NOTED.

3. ANY EXISTING FILL AT THE BUILDING PAD SHALL MEET THE 92% COMPACTION REQUIREMENTS. ALL ORGANIC MATERIAL, RUBBLE, OR OTHER DELETERIOUS MATERIAL SHALL BE REMOVED FROM THE SITE.

4. SEE ARCHITECTURAL DRAWINGS FOR LOCATION AND EXTENT OF EXTERIOR WALKWAYS.

5. ALL REINFORCING STEEL, ANCHOR BOLTS, AND OTHER EMBEDDED ITEMS SHALL BE SECURELY POSITIONED IN THE FORMS PRIOR TO POURING OF CONCRETE.

6. SHORING AND BRACING: IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND PROVIDE ADEQUATE SHORING, BRACING, AND FORM WORK AS REQUIRED FOR THE CONSTRUCTION OF THIS BUILDING. PROVIDE TEMPORARY BRACING AS REQUIRED TO HOLD THE VARIOUS ELEMENTS IN PLACE UNTIL FINAL SUPPORT IS SECURELY ANCHORED.

7. EXCAVATION: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES AND FOR PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS, AND UTILITIES IN ACCORDANCE WITH THE LOCAL BUILDING DEPARTMENT.

8. BACKFILL: DO NOT BACKFILL AROUND THE EXTERIOR PERIMETER WALL UNTIL AFTER THE WALLS ARE SUPPORTED BY THE COMPLETION OF INTERIOR FLOOR SYSTEMS. IF THE FLOOR SLABS ARE CONCRETE, DO NOT BACKFILL UNTIL 7 DAYS MINIMUM AFTER COMPLETION OF THE FLOOR SLABS. DO NOT BACKFILL UNTIL AFTER COMPLETION AND INSPECTION OF DAMP-PROOFING.

CONCRETE NOTES

1. ALL MOLDS, ORNAMENTS, GROOVES, ETC. SHOWN ON THE ARCHITECTURAL DRAWINGS SHALL BE PROVIDED FOR IN THE FORM WORK BEFORE THE CONCRETE IS POURED.

2. ALL REINFORCING STEEL, ANCHOR BOLTS, DOWELS AND OTHER EMBEDS SHALL BE IN PLACE AND SECURED TO FORM WORK PRIOR TO POURING OF CONCRETE.

3. REFER TO BOTH ARCHITECTURAL AND MECHANICAL DRAWINGS FOR LOCATION OF PLUMBING FIXTURES.

4. NO PIPES OR DUCTS SHALL BE PLACED IN CONCRETE WALLS OR STRUCTURAL SLABS UNLESS SPECIFICALLY DETAILED.

5. CONSTRUCTION JOINTS NOT INDICATED ON THE DRAWINGS SHALL BE SO MADE AND LOCATED AS NOT TO IMPAIR THE STRENGTH OF THE STRUCTURE. PROVISION SHALL BE MADE FOR TRANSFER OF SHEAR AND OTHER FORCES THROUGHOUT THE JOINTS. THE CONTRACTOR SHALL OBTAIN THE ARCHITECTS APPROVAL OF CONSTRUCTION JOINT LOCATION IN ALL STRUCTURAL SLAB, BEAMS AND SHEAR WALLS.

6. SIDES OF FOOTINGS MAY BE POURED AGAINST STABLE EARTH.

7. THE QUALITY AND DESIGN OF CONCRETE SHALL COMPLY WITH TITLE 24 PART 2 EXCEPT ITEMS NOT SPECIFICALLY COVERED THEREIN SHALL CONFORM TO ACI 318.

8. ALL REINFORCING SHALL BE NEW STOCK DEFORMED BARS CONFORMING TO ASTM A615.
   - A. #4 BARS AND SMALLER....... GRADE 40 OR 60
   - B. #5 BARS AND LARGER.........GRADE 60
   - C. SEPARATE BARS 1-1/2 DIAMETERS CLEAR OR 1-1/2" CLEAR, WHICHEVER IS LARGER.

9. MINIMUM CONCRETE COVER FOR REINFORCING SHALL BE AS FOLLOWS:
CAST AGAINST EARTH (EXCEPT SLABS ON GRADE).............................3"
SLABS ON GRADE.............................1-1/2"
EXPOSED TO EARTH OR WEATHER
#5 BARS AND SMALLER.............................1-1/2"
#6 BARS AND LARGER.............................2"
NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND
SLABS, WALLS, JOISTS
#11 BARS AND SMALLER.............................3/4"
#14 AND #16 BARS.............................1-1/2"
BEAMS, GIRDERS, COLUMNS
PRINCIPAL REINFORCING, TIES
STIRRUPS, OR SPIRALS.............................1-1/2"
SHELLS AND FOLDED PLATE MEMBERS
#5 BARS AND SMALLER.............................1/2"
#6 BARS AND LARGER.............................3/4"

10. CONCRETE SHALL HAVE FOLLOWING MINIMUM REQUIRMENTS FOR THE FOLLOWING EXPOSURE CATEGORIES & CLASSES.
F0- 3000 PSI AT 28 DAYS & MAXIMUM WATER TO CEMENT RATIO OF 0.5.
F2- 4500 PSI AT 28 DAYS & MAXIMUM WATER TO CEMENT RATIO OF 0.45 & VERIFY COMPLIANCE W/ ACI TABLE 19.3.3.1.

11. THE ENGINEER DOES NOT PROVIDE CONTRACT ADMINISTRATION FOR THE PROJECT, INCLUDING REVIEW OF CONCRETE MIXES.

12. PER ACI SECTION 19.3.2.1. FOOTING SHALL NOT BE EXPOSED TO FREEZING AND THAWING CYCLES, SHALL NOT BE EXPOSED TO WATER-SOLUBLE SULFATE IN SOIL BY PERCENT OF MASS 20.10%, SHALL NOT BE EXPOSED TO EXTERNAL SOURCE OF CHOLORIDES.

13. CEMENT SHALL COMPLY W/ ASTM C150 AND AGGREGATE SHALL COMPLY W/ ASTM C33.

STRUCTURAL STEEL NOTES

1. ALL STRUCTURAL STEEL EXCEPT W SHAPES SHALL CONFORM TO ASTM A-36 AND SHALL BE FABRICATED AND ERECTED AS PER AISC SPECIFICATIONS FOR BUILDINGS. W SHAPES SHALL CONFORM TO ASTM A992.

2. STRUCTURAL PIPE SHALL CONFORM TO ASTM A-53 GRADE "B" AND STRUCTURAL TUBING SHALL CONFORM TO ASTM A-500 GRADE "B", Fy=46KSI.

3. ALL LIGHT GAGE STEEL TO CONFORM TO ASTM A653 GRADE 55 FOR ALL STRUCTURAL SHAPES, A653 GRADE 33 FOR ALL BLOCKING, FLASHINGS, MISCELLANEOUS CONNECTION PLATES, AND ANGLES.

4. ALL UNFINISHED BOLTS SHALL BE ASTM A-307 UNLESS NOTED OTHERWISE.

5. USE AISC USUAL GAGES FOR BOLT HOLES IN ALL STEEL SECTIONS UNLESS OTHERWISE NOTED.

6. THE STEEL FABRICATOR SHALL PROVIDE ADEQUATE TEMPORARY BRACING FOR ERECTION.

7. ALL BOLT HOLES ARE TO BE 1/16" OVERSIZED. ALL BOLTS SHALL HAVE WASHERS INSTALLED UNDER BOTH HEAD & NUT. SELF DRILLING SCREWS SHALL BE PER ESR-1976 OR EQUAL.

8. ALL STEEL SHALL BE PROTECTED FROM WEATHER AS FOLLOWS: STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED (MIMIMUN ASTM A123 OR A153, CLASS D) OR PAINTED WITH ZINC-RICH PRIMER, UNDERCOAT, AND FINISH COAT; OR EQUIVALENT PAINT SYSTEM. COLD-FORMED STEEL MEMBERS SHALL BE 55% ALUMINUM-ZINC ALLOY COATED PER ASTM A792/A792M STANDARD IN ACCORDANCE TO AISI S200 TABLE A4-1, CP 90 COATING DESIGNATION.

ALL EXPOSED STEEL FASTENERS, INCLUDING CAST-IN-PLACE ANCHOR BOLTS/RODS, SHALL BE STAINLESS STEEL (TYPE 304 MINIMUM), HOT-DIP GALVANIZED (ASTM A153, CLASS D MINIMUM), OR PROTECTED WITH CORROSION-PREVENTIVE COATING THAT DEMONSTRATED NO MORE THAN 2% OF RED RUST IN MINIMUM 1,000 HOURS OF EXPOSURE IN SALT SPRAY TEST PER ASTM B117. ZINC-PLATED FASTENERS DO NOT COMPLY WITH THIS REQUIREMENT. (EXAMPLE PROPRIETARY COATINGS THAT DO COMPLY WITH THE 1,000 HOUR REQUIREMENT INCLUDE BUT ARE NOT NECESSARILY LIMITED TO: QUIK GUARD BY SIMPSON, KWIK-COTE BY HILTI, STALGARD BY ELCO, VISTACORR BY SFS INTEC, ETC.)

GOVERNING CODES:

1. 2022 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE (PART 1, TITLE 24, CCR).
2. 2022 CALIFORNIA BUILDING CODE, VOLUMES 1 & 2 (PART 2, TITLE 24, CCR).
3. 2022 CALIFORNIA ELECTRICAL CODE (PART 3, TITLE 24, CCR).
4. 2022 CALIFORNIA FIRE CODE (PART 9, TITLE 24, CCR).

NOTES

1. COVERS ARE NOT DESIGNED TO BE ENCLOSED OR FOR STORAGE OF COMBUSTIBLE MATERIALS.
2. WALKWAY COVER HAS BEEN CHECKED FOR CLEAR & OBSTRUCTED WIND FLOW CONDITION & CAN BE WITHIN 6" MIN. FROM AN EXISTING BUILDING.
3. WALKWAY PIER FOOTING HAS BEEN CHECKED FOR D.S.A. BULLETIN 09-06 REV..
4. ALL WORK SHALL COMPLY WITH C.F.C. CHAPTER 33 DURING CONSTRUCTION.

TESTING & INSPECTIONS REQUIRMENTS

1. INSPECTOR CLASS (MINIMUM REQUIREMENTS)
CLASS 2
2. SELECTION OF THE PROJECT INSPECTOR AND TESTING AGENCY
BY THE SCHOOL DISTRICT AND APPROVED BY D.S.A., A/E OF RECORD AND STRUCTURAL ENGINEER
3. COST OF THE PROJECT INSPECTOR (CA ADMIN. CODE 4-333(B) AND TESTING AGENCY (CA ADMIN. CODE 4-335)
BY THE SCHOOL DISTRICT
4. COPIES OF THE REPORT TO
ARCHITECT; STRUCTURAL ENGINEER; SCHOOL DISTRICT; D.S.A. (ORIGINAL); IOR; MANUFACTURER

NOTICE OF DISCLAIMER FOR STRUCTURAL ENGINEERING RESPONSIBILITY

1. PER TITLE 24, PART 1, SECTION 4-316 (D & E) OF THE CALIFORNIA CODE OF REGULATIONS, THE DISTRICT SHALL HIRE AN ARCHITECT OR STRUCTURAL ENGINEER TO BE IN GENERAL RESPONSIBLE CHARGE OF SITE SPECIFIC PROJECT.
2. FOR SITE SPECIFIC PROJECT GERARD HOMER & ASSOCIATES IS NOT THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE.
3. FOR SITE SPECIFIC PROJECT GERARD HOMER & ASSOCIATES RESPONSIBILITY IS LIMITED TO THE PREPARATION OF PLANS AND SPECIFICATIONS FOR A PORTION OF THE PROJECT AS DESIGNED BY THE ARCHITECT FOR INCORPORATION INTO THE PROJECT.
4. STRUCTURAL OBSERVATION OF CONSTRUCTION IS SPECIFICALLY EXCLUDED FROM GERARD HOMER & ASSOCIATES RESPONSIBILITY FOR SITE SPECIFIC PROJECT.

GENERAL NOTES

SHADE STRUCTURE TESTING & INSPECTION GUIDELINE

THE DSA-103 GUIDELINES SHOWN ON THIS SHEET IS FOR ILLUSTRATION PURPOSES ONLY TO ASSIST IN THE COMPLETION OF FUTURE PROJECT-SPECIFIC FORM DSA-103. A FORM DSA-103 IS TO BE COMPLETED FOR EACH APPLICATION THAT THIS PC IS BEING INCORPORATED INTO AND THE EXAMPLE FORM DSA-103 IS TO BE CROSSED OUT ON THIS DRAWING.

DSA 103-22 LIST OF STRUCTURAL TESTS & SPECIAL INSPECTIONS - 2022 CBC

IMPORTANT: THIS FORM IS ONLY A SUMMARY LIST OF STRUCTURAL TESTS AND SOME OF THE SPECIAL INSPECTIONS REQUIRED FOR THE PROJECT. GENERALLY, THE STRUCTURAL TESTS AND INSPECTIONS NOTED ON THIS FORM ARE THOSE THAT WILL BE PERFORMED BY THE GEOTECHNICAL ENGINEER OF RECORD, LABORATORY OF RECORD, OR SPECIAL INSPECTOR. THE ACTUAL COMPLETE TEST AND INSPECTION PROGRAM MUST BE PERFORMED AS DETAILED ON THE DSA APPROVED DOCUMENTS. THE APPENDIX AT THE BOTTOM OF THIS FORM IDENTIFIES WORK NOT SUBJECT TO DSA REQUIREMENTS FOR SPECIAL INSPECTION OR STRUCTURAL TESTING. THE PROJECT INSPECTOR IS RESPONSIBLE FOR PROVIDING INSPECTION OF ALL FACETS OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO, SPECIAL INSPECTIONS NOT LISTED ON THIS FORM SUCH AS STRUCTURAL WOOD FRAMING, HIGH-LOAD WOOD DIAPHRAGMS, COLD-FORMED STEEL FRAMING, ANCHORAGE OF NON-STRUCTURAL COMPONENTS, ETC., PER TITLE 24, PART 2, CHAPTER 17A (2022 CBC).

**NOTE: UNDEFINED SECTION & TABLE REFERENCES FOUND IN THIS DOCUMENT ARE FROM THE CBC, OR CALIFORNIA BUILDING CODE.

NOTE: REFERENCES ARE TO THE 2022 EDITION OF THE CALIFORNIA BUILDING CODE (CBC) UNLESS OTHERWISE NOTED.

TEST OR SPECIAL INSPECTION
SOILS
S1. GENERAL:
a. VERIFY THAT: SITE HAS BEEN PREPARED PROPERLY PRIOR TO PLACEMENT OF CONTROLLED FILL AND/OR EXCAVATIONS FOR FOUNDATIONS. FOUNDATION EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL. MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
S4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS);
a. INSPECT DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH PIER.
b. VERIFY PIER LOCATIONS, DIAMETERS, PLUMBNESS & LENGTHS. RECORD CONCRETE OR GROUT VOLUMES.
c. CONCRETE PIERS
CONCRETE
C1. CAST IN PLACE CONCRETE
MATERIAL VERIFICATION AND TESTING:
a. VERIFY USE OF REQUIRED DESIGN MIX.
b. IDENTIFY, SAMPLE & TEST REINFORCING STEEL.
c. DURING CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, SLUMP & AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.
d. TEST CONCRETE (COMPRESSION). f'c
e. BATCH PLANT INSPECTION - PERIODIC, DESIGN COMPLIES WITH 1705A.3.3.1 ITEM 2.
STEEL
S/A1. STRUCTURAL STEEL, COLD-FORMED STEEL & ALUMINUM USED FOR STRUCTURAL PURPOSES
MATERIAL VERIFICATION & TESTING:
a. VERIFY IDENTIFICATION OF ALL MATERIALS AND: - MILL CERTIFICATES INDICATE MATERIAL PROPERTIES THAT COMPLY WITH REQUIREMENTS. - MATERIAL SIZES, TYPES AND GRADES COMPLY WITH REQUIREMENTS.
b. TEST UNIDENTIFIED MATERIALS
c. EXAMINE SEAM WELDS OF HSS SHAPES
INSPECTION:
d. VERIFY AND DOCUMENT STEEL FABRICATION PER DSA-APPROVED CONSTRUCTION DOCUMENTS.

NOTICE OF DISCLAIMER FOR STRUCTURAL ENGINEERING RESPONSIBILITY

5. ALL CONSTRUCTION ACTIVITIES RELATED TO STRUCTURAL ENGINEERING SHALL BE DELEGATED TO A QUALIFIED ENGINEER BY THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE. THESE ACTIVITIES INCLUDE, BUT ARE NOT LIMITED TO APPROVAL OF INSPECTOR QUALIFICATIONS, STRUCTURAL OBSERVATION OF CONSTRUCTION, REVIEW OF INSPECTION REPORTS, AND SIGNING OFF THE VERIFIED REPORTS FOR COMPLETED WORK. GERARD HOMER & ASSOCIATES SHALL NOT BE LISTED ON THE DSA 1 OR BE REQUIRED TO SIGN A DSA 1.DEL.
6. GERARD HOMER & ASSOCIATES WILL BE RESPONSIBLE FOR RESPONDING TO QUESTIONS PERTAINING TO THE PLANS AND SPECIFICATIONS FOR THE SHELTER OF THE PC WHICH ARISE DURING PLAN CHECK AND CONSTRUCTION.
7. THE ARCHITECT OR DSA SHALL NOT ADD TO OR CHANGE THIS PC WITHOUT PERMISSION FROM GERARD HOMER & ASSOCIATES.

REVISIONS

NO.	DATE	BY	DESCRIPTION

GERARD HOMER
EXP. 3-31-24
S2373

PRE-CHECK (PC) DOCUMENT
CODE: 2022 C.B.C.
A SEPARATE PROJECT APPLICATION
FOR CONSTRUCTION IS REQUIRED.

SHEET INDEX

S1	GENERAL NOTES, SHEET INDEX & STRUCTURAL TESTS AND INSPECTIONS SHEET, OPTIONS TABLE & SITE SPECIFIC INFORMATION TABLE
S2	FOUNDATION PLAN, ROOF FRAMING PLAN, SECTION, DETAILS
S3	TABES & DETAILS

BUILDING DATA

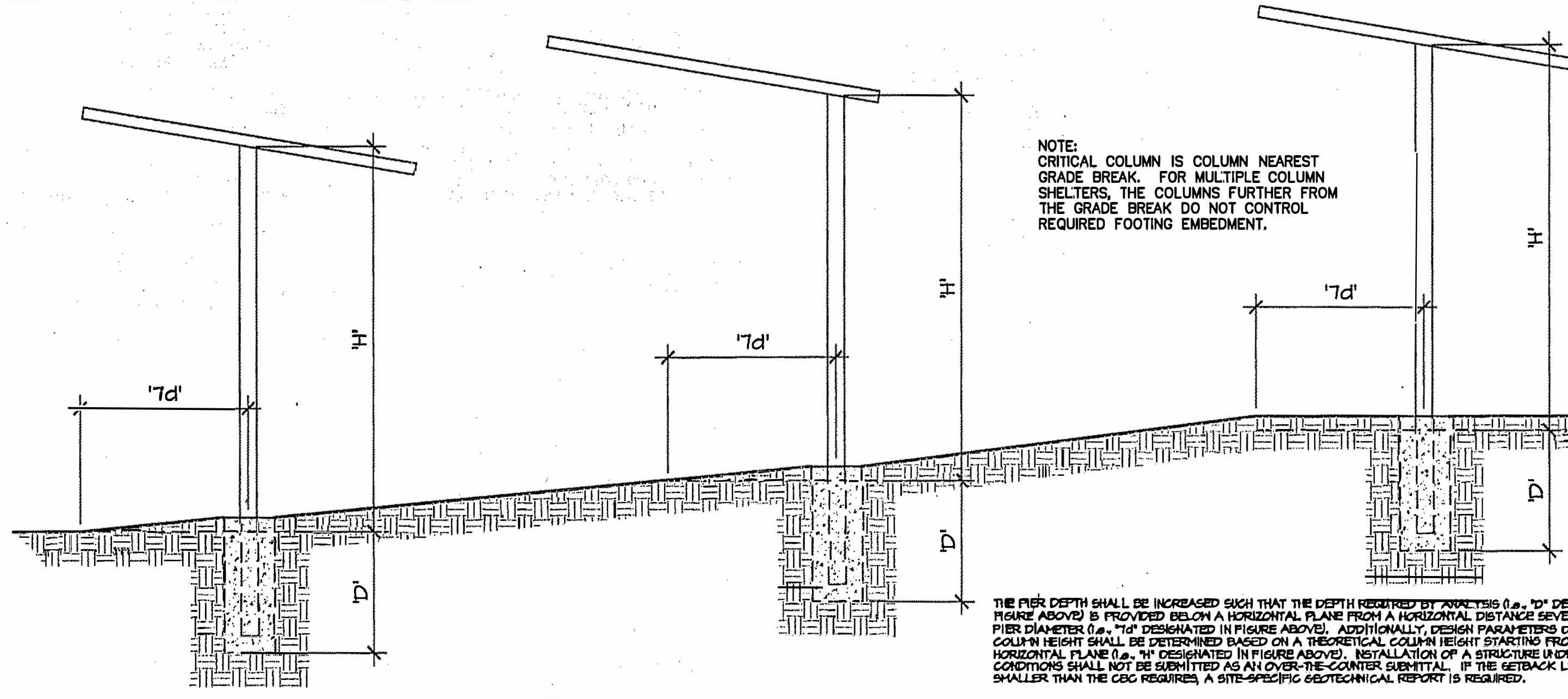
A-2 FOR LUNCH SHELTER
A-3 OCCUPANCY FOR GENERAL ASSEMBLY
II-B CONSTRUCTION
ALLOW. AREA = 9500 SQ.FT.
HEIGHT = 8'-0" MIN. TO 16'-0" MAX. COLUMN HEIGHT

SHEET INDEX & STRUCTURAL TESTS AND INSPECTIONS SHEET

4K

NOTES FOR ACHITECT TO VERIFY & COMPLY

1. GRADING PLANS, DRAINAGE IMPROVEMENTS, ROAD AND ACCESS REQUIREMENTS AND ENVIRONMENTAL HEALTH CONSIDERATIONS SHALL COMPLY.
2. SUBSTITUTIONS AFFECTING DSA REGULATED ITEMS SHALL BE CONSIDERED AS A CONSTRUCTION CHANGE DOCUMENT OR ADDENDUM, AND SHALL BE APPROVED BY DSA PRIOR TO FABRICATION AND INSTALLATION PER DSA IR A-6 AND SECTION 338(C) PART 1, TITLE 24 CCR.
3. LOCATION OF ELECTRICAL COMPONENTS MOUNTED TO COLUMNS SHALL COMPLY WITH ASCE 24-14, SECTION 7.2.
4. THE ARCHITECT SHALL VERIFY COMPLIANCE W/ 8D/S1 (IR PC-7, SECTION 5.B) IF COVER IS NEAR A SLOPE AND NOTIFY THE P.C. ENGINEER. IF COVER IS NEAR A SLOPE, THE INSTALLATION OF THIS STRUCTURE SHALL NOT BE SUBMITTED AS OVER-THE-COUNTER.



NOTE:
CRITICAL COLUMN IS COLUMN NEAREST GRADE BREAK. FOR MULTIPLE COLUMN SHELTERS, THE COLUMNS FURTHER FROM THE GRADE BREAK DO NOT CONTROL REQUIRED FOOTING EMBEDMENT.

THE PIER DEPTH SHALL BE INCREASED SUCH THAT THE DEPTH REQUIRED BY ANALYSIS (i.e., "D" DESIGNATED IN FIGURE ABOVE) IS PROVIDED BELOW A HORIZONTAL PLANE FROM A HORIZONTAL DISTANCE SEVEN TIMES THE PIER DIAMETER (i.e., "7d" DESIGNATED IN FIGURE ABOVE). ADDITIONALLY, DESIGN PARAMETERS DEPENDENT ON COLUMN HEIGHT SHALL BE DETERMINED BASED ON A THEORETICAL COLUMN HEIGHT STARTING FROM THE SAME HORIZONTAL PLANE (i.e., "H" DESIGNATED IN FIGURE ABOVE). INSTALLATION OF A STRUCTURE UNDER SUCH CONDITIONS SHALL NOT BE SUBMITTED AS AN OVER-THE-COUNTER SUBMITTAL. IF THE SETBACK LIMITS ARE SMALLER THAN THE CBC REQUIRES, A SITE-SPECIFIC GEOTECHNICAL REPORT IS REQUIRED.

SLOPED SITE FIGURE

SCALE: NONE 8D

SINGLE SLOPE LUNCH SHELTER OPTIONS TABLE

ROOF PANEL OPTION	3 P.S.F. MISCELLANEOUS DEAD LOAD	NUMBER OF BAYS	NOTES
☐ AEP SPAN HR-36		☐ ONE ☐ THREE ☐ FIVE	SEE 8K/S3 FOR ROOF DECK PROFILES & SECTION PROPERTIES. ALL PANELS CAN BE USED WITH ALL LOADING OPTIONS.
☒ McELROY MEGA-RIB	☐ YES ☒ NO	☒ TWO ☐ FOUR ☐ SIX	

LOADING	WIND SPEED (1) M.P.H.	R.C.	PITCH	SEISMIC	MAXIMUM COLUMN HEIGHT
☒ 20 PSF LL	☐ ≤ 116	II	1.5 IN 12 OR LESS	☐ LOWER SEISMIC $S_{DS} \le 1.0$	☐ 12'-6"
☐ 20 PSF SL	☐ ≤ 123	II	1 IN 12 MAX.	☐ HIGHER SEISMIC R.C. II $S_{DS} \le 1.75$	☒ 14'-6"
☐ 30 PSF SL	☐ ≤ 129	II	0.5 IN 12 MAX.	☐ LOWER SEISMIC R.C. III $S_{DS} \le 1.00$	☐ 16'-6"
	☒ ≤ 138	III	1.5 IN 12 OR LESS	☒ HIGHER SEISMIC R.C. III $S_{DS} \le 2.5$	
				☐ R.C. II $S_{DS} > 1.75$ REDUCE BAY SPACING	
				☐ R.C. III $S_{DS} > 2.5$ REDUCE BAY SPACING	

1. ROOF FRAMING MEMBERS DEPENDENT ON WIND SPEED, RISK CATEGORY AND PITCH. THE MORE WIND SPEED, THE LESS PITCH IS ALLOWED AT RISK CATEGORY II ROOF FRAMING. ROOF FRAMING MEMBERS AT RISK CATEGORY III DESIGNED FOR BOTH MAX. WIND LOAD AND PITCH.
2. 30 PSF FRAMING REQUIRED W/ 3 P.S.F. OPTIONAL MISC. DEAD LOAD & 20 P.S.F. LL OR SNOW LOAD.
3. 3 P.S.F. OPTIONAL MISC. DEAD LOAD NOT ALLOWED WITH 30 P.S.F. SNOW LOAD.
4. FOR SNOW LOAD: IF THE HORIZONTAL SEPARATION DISTANCE BETWEEN ADJACENT STRUCTURES, s, IS LESS THAN 20 FT. (6.1 M) AND LESS THAN SIX TIMES THE VERTICAL SEPARATION DISTANCE (s<6h), THEN THE REQUIREMENTS FOR THE LEEWARD DRIFT OF SECTION 7.7.1 SHALL BE USED TO DETERMINE THE DRIFT LOAD ON THE LOWER STRUCTURE. IF THE SNOW DRIFT ANALYSIS IS REQUIRED IT SHALL BE PROVIDED BY THE PC APPLICANT & THE SITE APPLICATION IS NOT ELIGIBLE FOR OVER THE COUNTER SUBMITTAL.
5. MISC. DEAD LOAD CAN INCLUDE SPRINKLERS OR SOLAR PANELS. BOTH ARE NOT ELIGIBLE FOR OVER THE COUNTER PLAN CHECK. LOADS CAN NOT BE SUPPORTED BY THE ROOF PANELS, ONLY THE BEAMS & PURLINS CAN SUPPORT MISC. DEAD LOADS.

SITE SPECIFIC INFORMATION TABLE

1.916	SEISMIC COEFFICIENT, Ss		~~SEISMIC COEFFICIENT, Sds~~ **
0.719	SEISMIC COEFFICIENT, S1 ②	101	WIND SPEED (3 SEC. GUST) @ MPH
1.0	SEISMIC COEFFICIENT, Fa	C	WIND EXPOSURE CATEGORY
1.7	SEISMIC COEFFICIENT, Fv	26.5	WIDTH OF COVER AREA IN FT.
1.916	SEISMIC COEFFICIENT, Sms	40.17	LENGTH OF COVERED AREA IN FT.
1.833	SEISMIC COEFFICIENT, Sm1 ①	1065	AREA IN SQ. FT.
0.894	SITE SPECIFIC, Cs ③	2	NUMBER OF BAYS
1.277	SEISMIC COEFFICIENT, Sds	14.5	MAXIMUM COLUMN HEIGHT IN FT.
1.218	SEISMIC COEFFICIENT, Sd1	1 IN 12	ROOF SLOPE IN./FT.
			~~SEISMIC COEFFICIENT, Sd1~~

SELECT OCCUPANT LOAD FACTOR (OLF)	
☒	ASSEMBLY-CONCENTRATED (CHAIRS NON-FIXED) 7 S.F./OCCUPANT
☐	ASSEMBLY-NONCONCENTRATED (FIXED TABLES & CHAIRS) 15 S.F./OCCUPANT
172	DETERMINE OCCUPANT LOAD = AREA/OLF
DETERMINE RISK CATEGORY	
☐	RISK CATEGORY II OCCUPANTS ≤ 300
☐	RISK CATEGORY III OCCUPANTS > 300
☒	RISK CATEGORY III ADJACENT TO RISK CATEGORY III BUILDING

NOTE: DUE TO THE PERIOD OF THE STRUCTURE, ONLY 12'-6" TALL OR LESS CAN HAVE S_{DS} REDUCED PER ASCE 7-16, 12.8.1.3.

HIGH SEISMIC DESIGN ADJUSTMENT

FOR RISK CATEGORY II WITH S_{DS} > 1.75

$\frac{20' \text{ BAYS} \times 1.75}{\text{ACTUAL } S_{DS}}$ = ☐ MAXIMUM BAY SPACING IN FEET ***

FOR RISK CATEGORY III WITH I_E = 1.25 & S_{DS} > 2.5

$\frac{20' \text{ BAYS} \times 2.5}{\text{ACTUAL } S_{DS} \times 1.25}$ = ☐ MAXIMUM BAY SPACING IN FEET ***

*** BAY SPACING ON PLAN VIEWS TO BE REVISED TO MATCH AND USE HIGHER SEISMIC COLUMNS & FOOTINGS.

① FOR THE SITE CLASS D, Sm1 SHALL BE INCREASED BY 50% UNLESS A SITE SPECIFIC GROUND MOTION HAZARD ANALYSIS IS PERFORMED. Sms SHALL NOT BE LESS THAN Sm1.

② FOR SITE CLASS E WITH S1 GREATER THAN OR EQUAL TO 0.2, PROVIDED T IS LESS THAN OR EQUAL TO Ts, EQUATION 12.6-2 SHALL BE USED.

③ PER ASCE 7-16 EQUATION 12.8-2.

GEOHAZARD REPORTS

GEOHAZARD REPORT ☐ REQUIRED ☒ NOT REQUIRED

GEOHAZARD REPORTS ARE NOT REQUIRED FOR CANTILEVERED COLUMN OPEN STRUCTURES PROVIDED THEY ARE CONSTRUCTED OF METAL, DO NOT EXCEED 4,000 SF. IN PLAN AREA AND ARE NOT LOCATED WITHIN STATE OR LOCAL GEOHAZARD ZONES. THE STRUCTURES MAY BE SPLIT INTO MULTIPLE SEISMICALLY SEPARATED STRUCTURES TO STAY BELOW THE 4,000 SF. TRIGGER.

☒ CONCRETE EXPOSURE F0 ☐ CONCRETE EXPOSURE F2*

LIQUEFIABLE SOIL OR SITE CLASS F OR E

LIQUEFIABLE SOILS ☐ YES ☒ NO

IF STRUCTURE IS LOCATED IN AN AREA WITH LIQUEFIABLE SOIL OR SITE CLASS F, OVER-THE-COUNTER SUBMITTAL IS NOT ALLOWED AND REGULAR PROJECT SUBMITTAL IS REQUIRED. IF SITE IS NOT IN A MAPPED LIQUEFACTION HAZARD ZONE, IT MAY BE PRESUMED THAT NO LIQUEFACTION HAZARD EXISTS ON THAT SITE UNLESS A SITE-SPECIFIC GEOTECHNICAL REPORT IDENTIFIES SUCH HAZARD.

* F2 IS REQUIRED FOR ANY SNOW LOAD 30 PSF OR GREATER.

** LIST ACTUAL Sds AND CAPPED VALUE IN ( ) IF USED.

IF SITE SPECIFIC PROJECT IS LOCATED IN A FLOOD ZONE OTHER THAN ZONE X, A LETTER STAMPED & SIGNED FROM A SOILS ENGINEER IS REQUIRED TO VALIDATE THE ALLOWABLE SOIL VALUES SPECIFIED ON THIS P.C., SEE GENERAL NOTE NUMBER 11.

OPTIONS TABLE & SITE SPECIFIC INFORMATION TABLE

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

PROJECT:
SINGLE SLOPE (DOUBLE
POST) SCHOOL
LUNCH SHELTER
VALLEY SCHOOL SHELTERS

~~IDENTIFICATION STAMP~~
~~DIV. OF THE STATE ARCHITECT~~
~~APP: 02-121471 PC~~
~~REVIEWED FOR~~
~~SS ☑ FLS ☑ ACS ☑ OG ☐~~
~~DEPARTMENT OF GENERAL SERVICES~~
~~DATE: 9/25/2023~~

Gerard
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STRUCTURAL ENGINEERS
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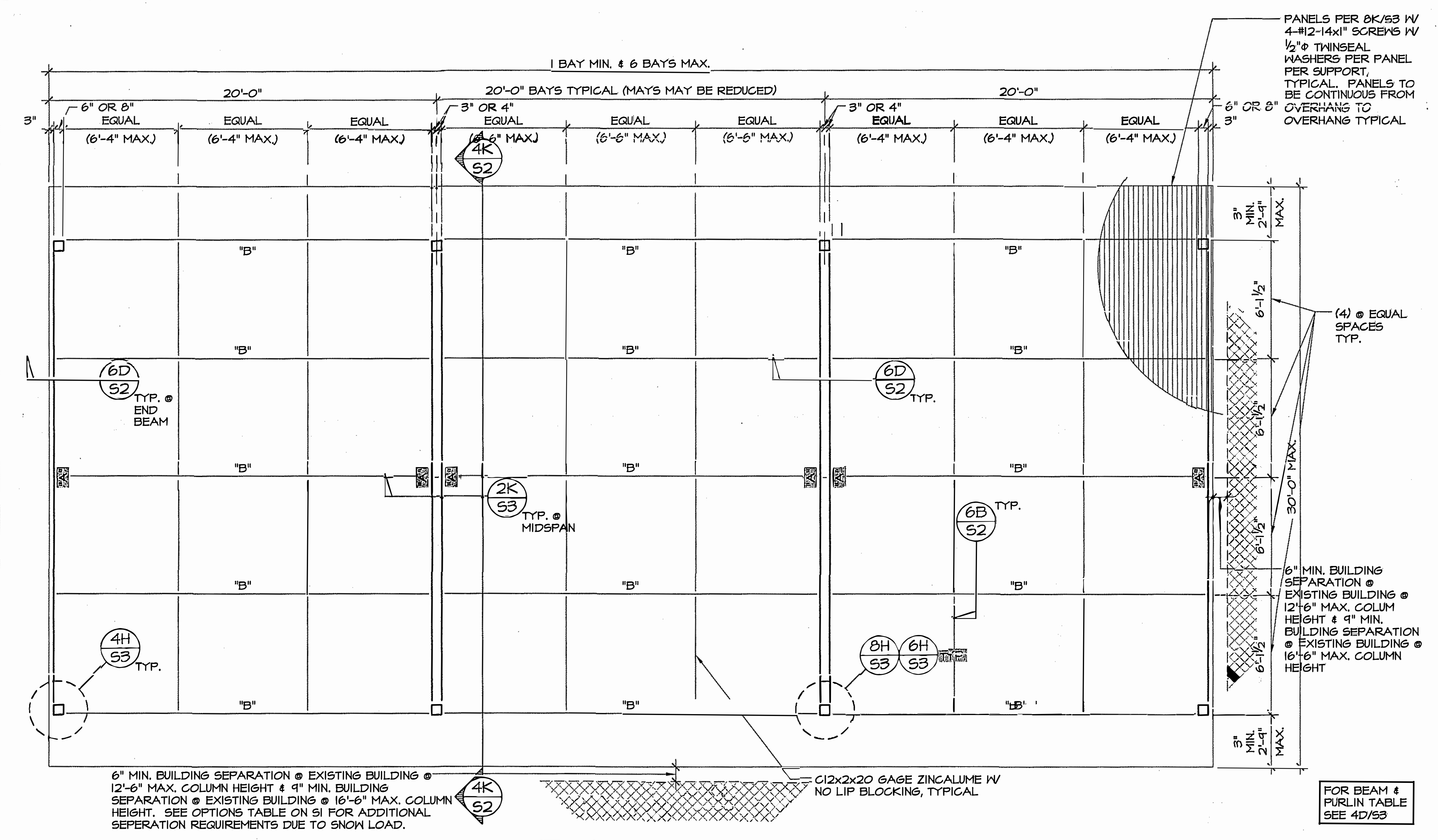
DWN BY: B.G.H.
CHKD BY: G.B.H.
DATE: 9/20/23
PROJECT NO: ~~23014~~ 7/31/25 25014 25078

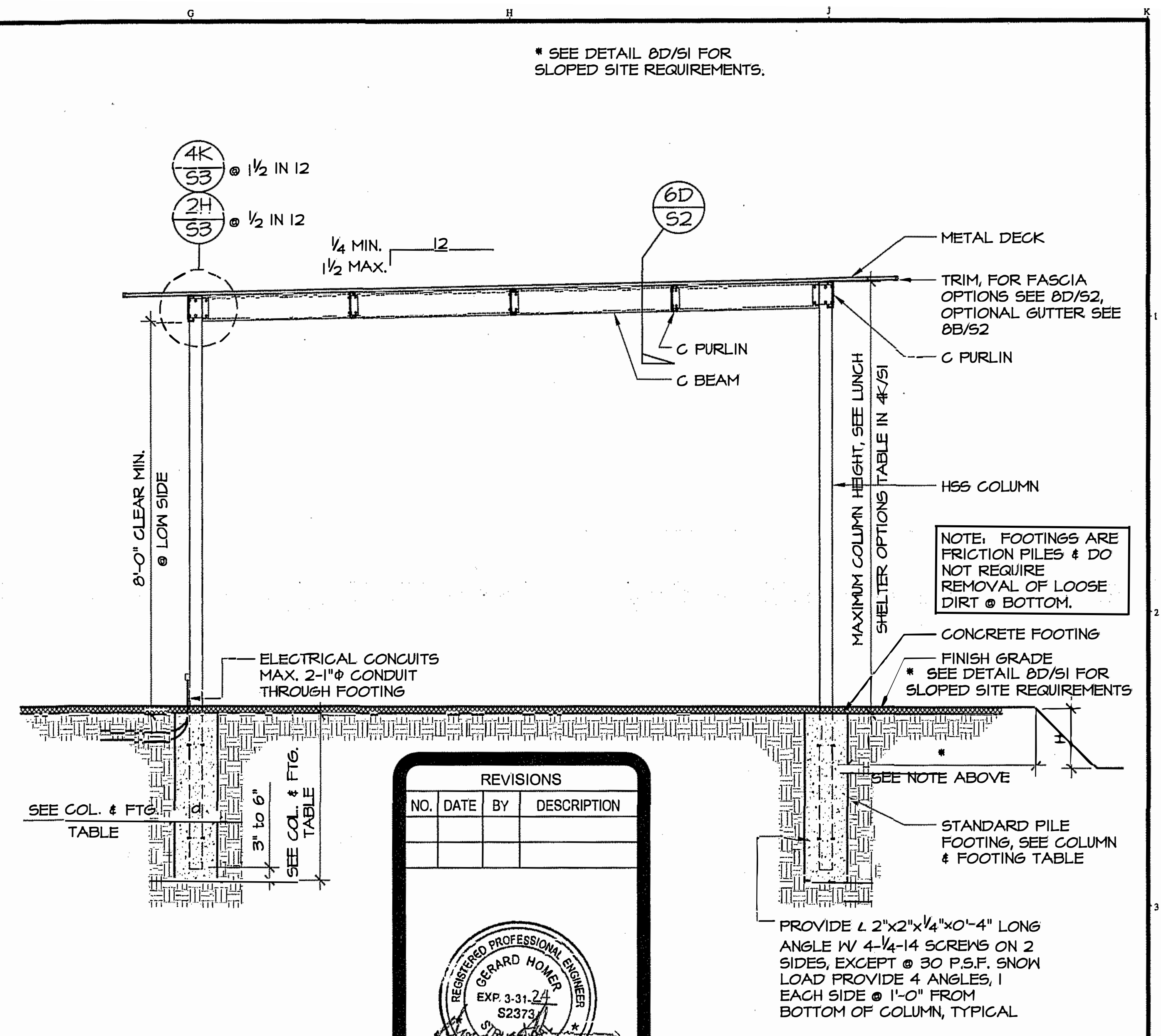
DRAWING TITLE
GENERAL NOTES
SHEET INDEX &
STRUCTURAL TESTS AND
INSPECTIONS SHEET
OPTIONS TABLE & SITE
SPECIFIC INFORMATION
TABLE

SHEET NUMBER
S1
OF 3 SHEETS

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026


PANELS PER 8K/S3 W/ 4-#12-14x1" SCREWS W/ ½"⌀ TWINSEAL WASHERS PER PANEL PER SUPPORT, TYPICAL. PANELS TO BE CONTINUOUS FROM OVERHANG TO OVERHANG TYPICAL
1 BAY MIN. & 6 BAYS MAX.
20'-0"
20'-0" BAYS TYPICAL (MAYS MAY BE REDUCED)
20'-0"
3"
6" OR 8"
3" OR 4"
3" OR 4"
6" OR 8"
3"
EQUAL
(6'-4" MAX.)
EQUAL
(6'-6" MAX.)
"B"
4K S2
6D S2 TYP. @ END BEAM
6D S2 TYP.
2K S3 TYP. @ MIDSPAN
6B S2 TYP.
4H S3 TYP.
8H S3
6H S3
3" MIN. 2'-9" MAX.
6'-1½"
30'-0" MAX.
(4) @ EQUAL SPACES TYP.
6" MIN. BUILDING SEPARATION @ EXISTING BUILDING @ 12'-6" MAX. COLUM HEIGHT & 9" MIN. BUILDING SEPARATION @ EXISTING BUILDING @ 16'-6" MAX. COLUMN HEIGHT
6" MIN. BUILDING SEPARATION @ EXISTING BUILDING @ 12'-6" MAX. COLUMN HEIGHT & 9" MIN. BUILDING SEPARATION @ EXISTING BUILDING @ 16'-6" MAX. COLUMN HEIGHT. SEE OPTIONS TABLE ON S1 FOR ADDITIONAL SEPERATION REQUIREMENTS DUE TO SNOW LOAD.
C12x2x20 GAGE ZINCALUME W/ NO LIP BLOCKING, TYPICAL
FOR BEAM & PURLIN TABLE SEE 4D/S3

ROOF FRAMING PLAN SCALE ¼" = 1'-0" 4F


* SEE DETAIL 8D/S1 FOR SLOPED SITE REQUIREMENTS.
4K S3 @ 1½ IN 12
2H S3 @ ½ IN 12
¼ MIN. 1½ MAX.
12
6D S2
METAL DECK
TRIM, FOR FASCIA OPTIONS SEE 8D/S2, OPTIONAL GUTTER SEE 8B/S2
C PURLIN
C PURLIN
C BEAM
HSS COLUMN
8'-0" CLEAR MIN. @ LOW SIDE
MAXIMUM COLUMN HEIGHT, SEE LUNCH SHELTER OPTIONS TABLE IN 4K/S1
NOTE: FOOTINGS ARE FRICTION PILES & DO NOT REQUIRE REMOVAL OF LOOSE DIRT @ BOTTOM.
CONCRETE FOOTING
FINISH GRADE
* SEE DETAIL 8D/S1 FOR SLOPED SITE REQUIREMENTS
ELECTRICAL CONDUITS MAX. 2-1"⌀ CONDUIT THROUGH FOOTING
SEE COL. & FTG. TABLE
d
3" to 6"
SEE COL. & FTG. TABLE
*
SEE NOTE ABOVE
STANDARD PILE FOOTING, SEE COLUMN & FOOTING TABLE
PROVIDE ∠ 2"x2"x¼"x0'-4" LONG ANGLE W/ 4-¼-14 SCREWS ON 2 SIDES, EXCEPT @ 30 P.S.F. SNOW LOAD PROVIDE 4 ANGLES, 1 EACH SIDE @ 1'-0" FROM BOTTOM OF COLUMN, TYPICAL

REVISIONS

NO.	DATE	BY	DESCRIPTION

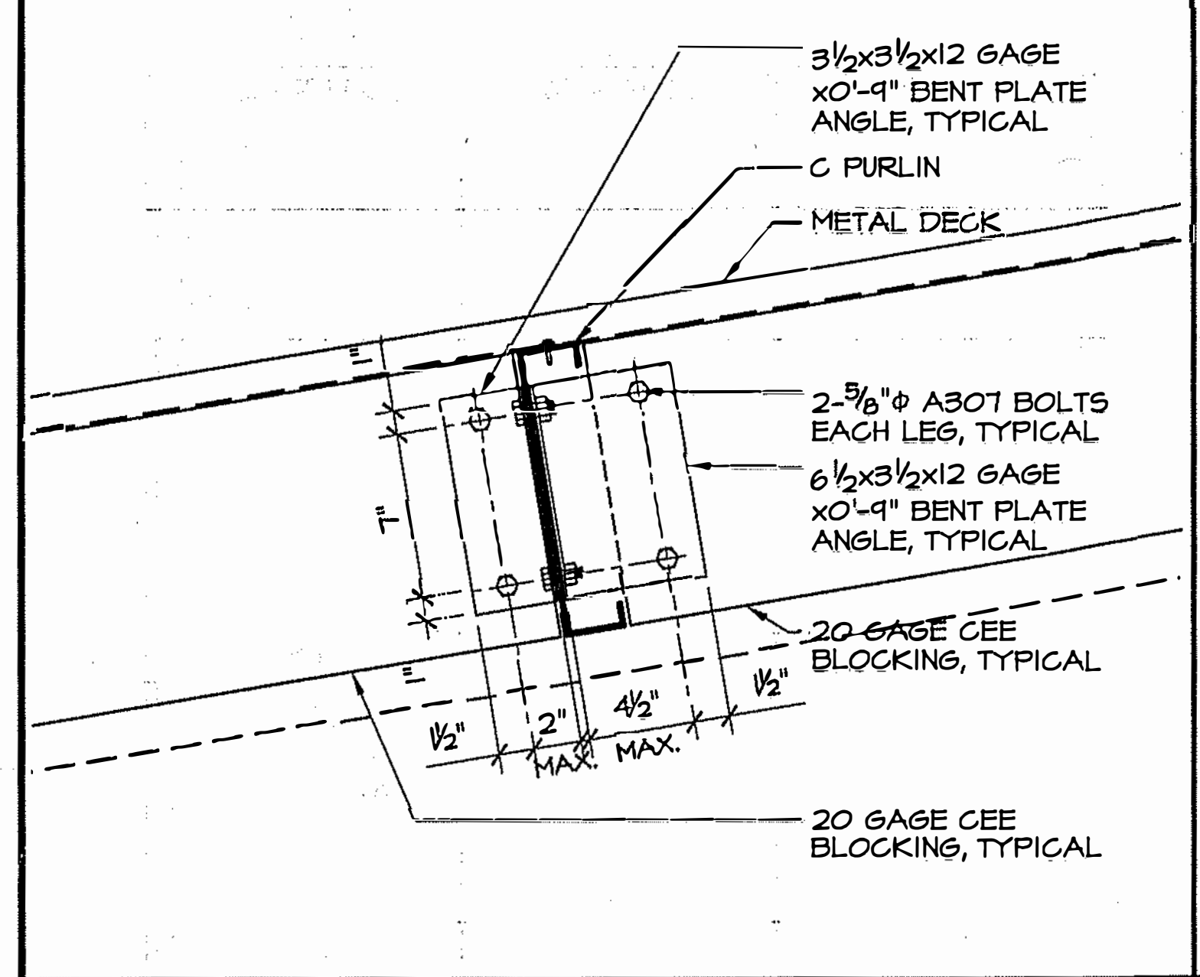
REGISTERED PROFESSIONAL ENGINEER GERARD HOMER EXP. 3-31-24 S2373 STRUCTURAL STATE OF CALIFORNIA

PRE-CHECK (PC) DOCUMENT
CODE: 2022 C.B.C.
A SEPARATE PROJECT APPLICATION FOR CONSTRUCTION IS REQUIRED.

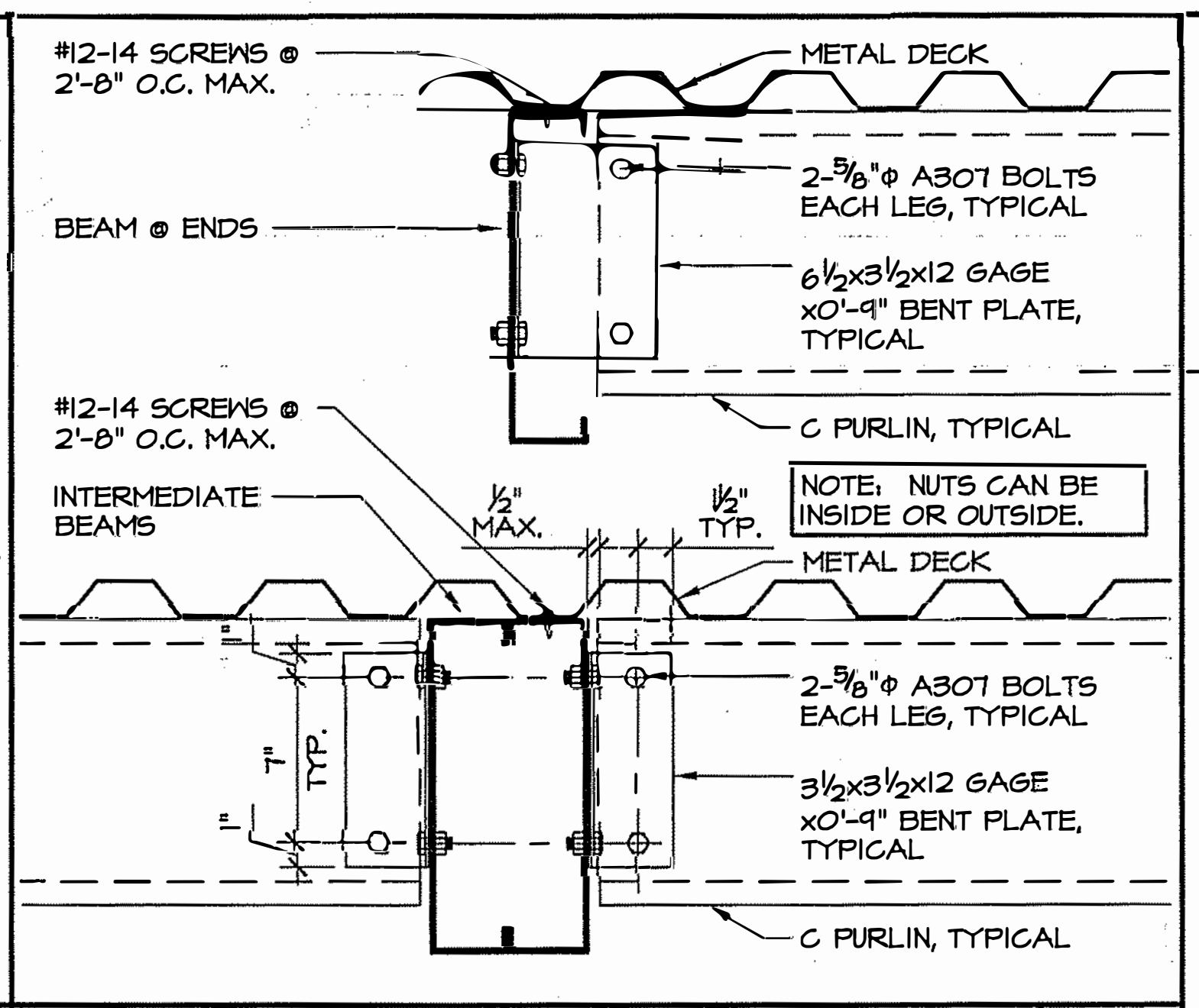
SECTION SCALE ¼" = 1'-0" 4K

PROJECT:
SINGLE SLOPE (DOUBLE POST) SCHOOL LUNCH SHELTER
VALLEY SCHOOL SHELTERS

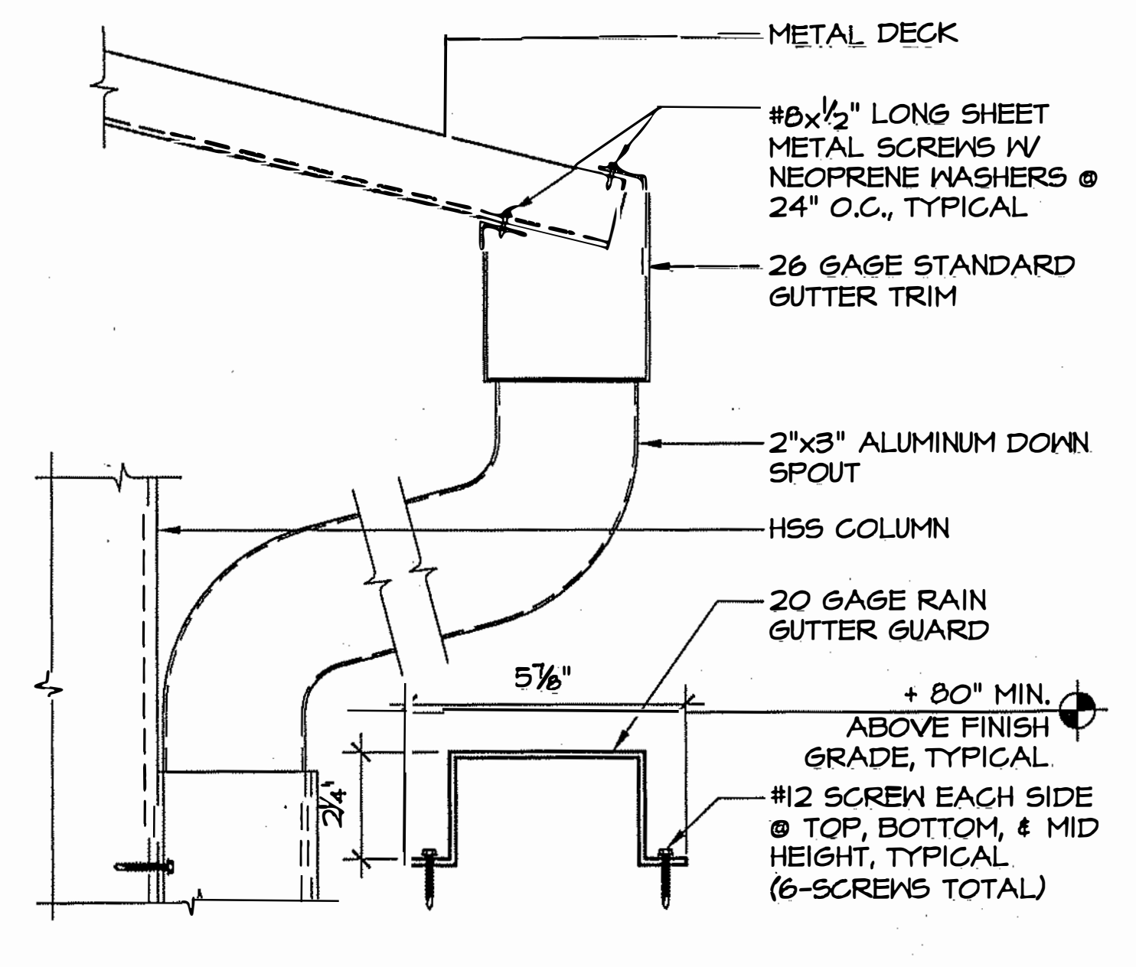
IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 02-121471 PC
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑ CG ☐
DEPARTMENT OF GENERAL SERVICES
DATE: 9/25/2023


3½x3½x12 GAGE x0'-9" BENT PLATE ANGLE, TYPICAL
C PURLIN
METAL DECK
2-⅝"⌀ A307 BOLTS EACH LEG, TYPICAL
6½x3½x12 GAGE x0'-9" BENT PLATE ANGLE, TYPICAL
20 GAGE CEE BLOCKING, TYPICAL
7"
1"
1½"
2" MAX.
4½" MAX.
1½"
20 GAGE CEE BLOCKING, TYPICAL

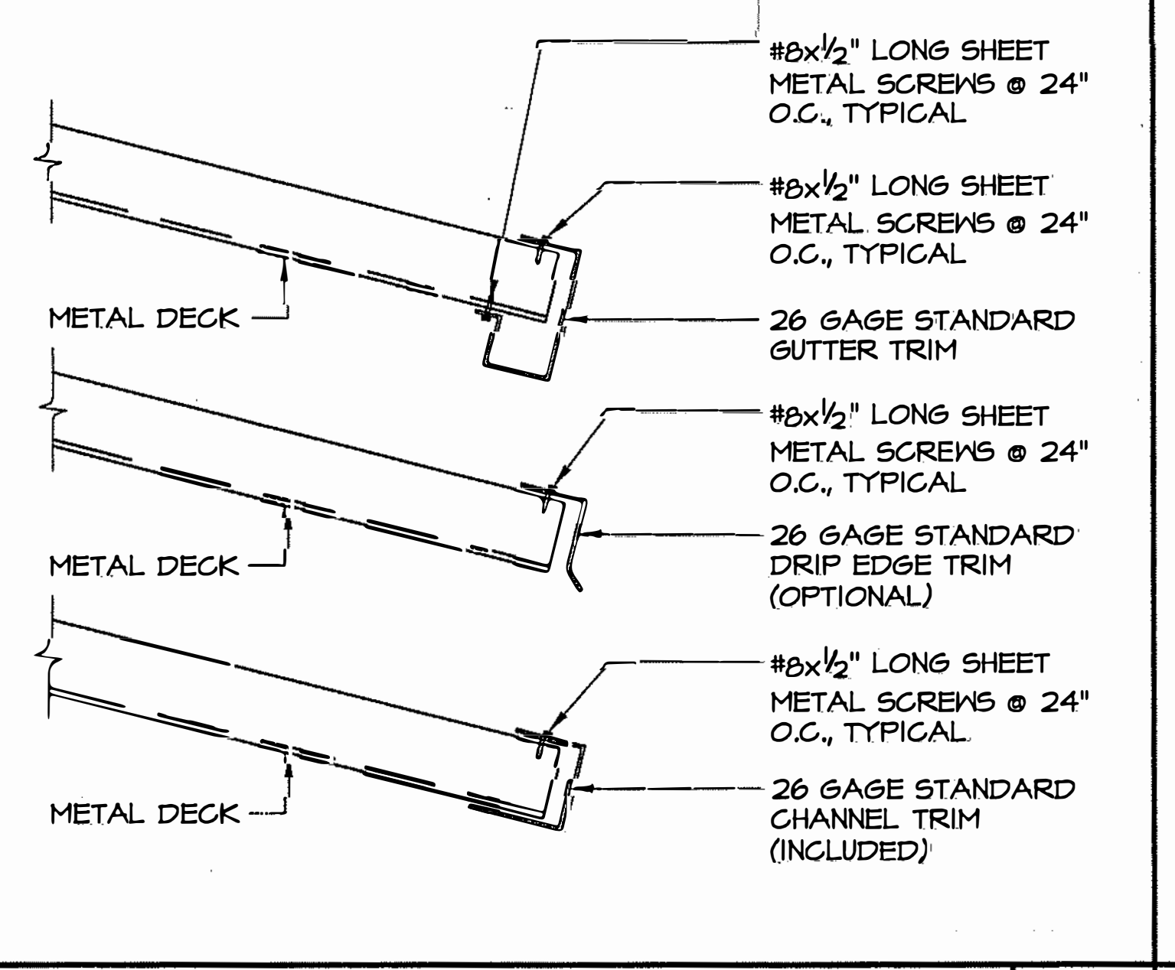
BLOCKING TO PURLIN SCALE 1½" = 1'-0" 6B


#12-14 SCREWS @ 2'-8" O.C. MAX.
METAL DECK
BEAM @ ENDS
2-⅝"⌀ A307 BOLTS EACH LEG, TYPICAL
6½x3½x12 GAGE x0'-9" BENT PLATE, TYPICAL
C PURLIN, TYPICAL
#12-14 SCREWS @ 2'-8" O.C. MAX.
INTERMEDIATE BEAMS
½" MAX.
½" TYP.
NOTE: NUTS CAN BE INSIDE OR OUTSIDE.
METAL DECK
2-⅝"⌀ A307 BOLTS EACH LEG, TYPICAL
3½x3½x12 GAGE x0'-9" BENT PLATE, TYPICAL
7"
TYP.
1"
C PURLIN, TYPICAL

PURLIN TO BEAM SCALE 1½" = 1'-0" 6D

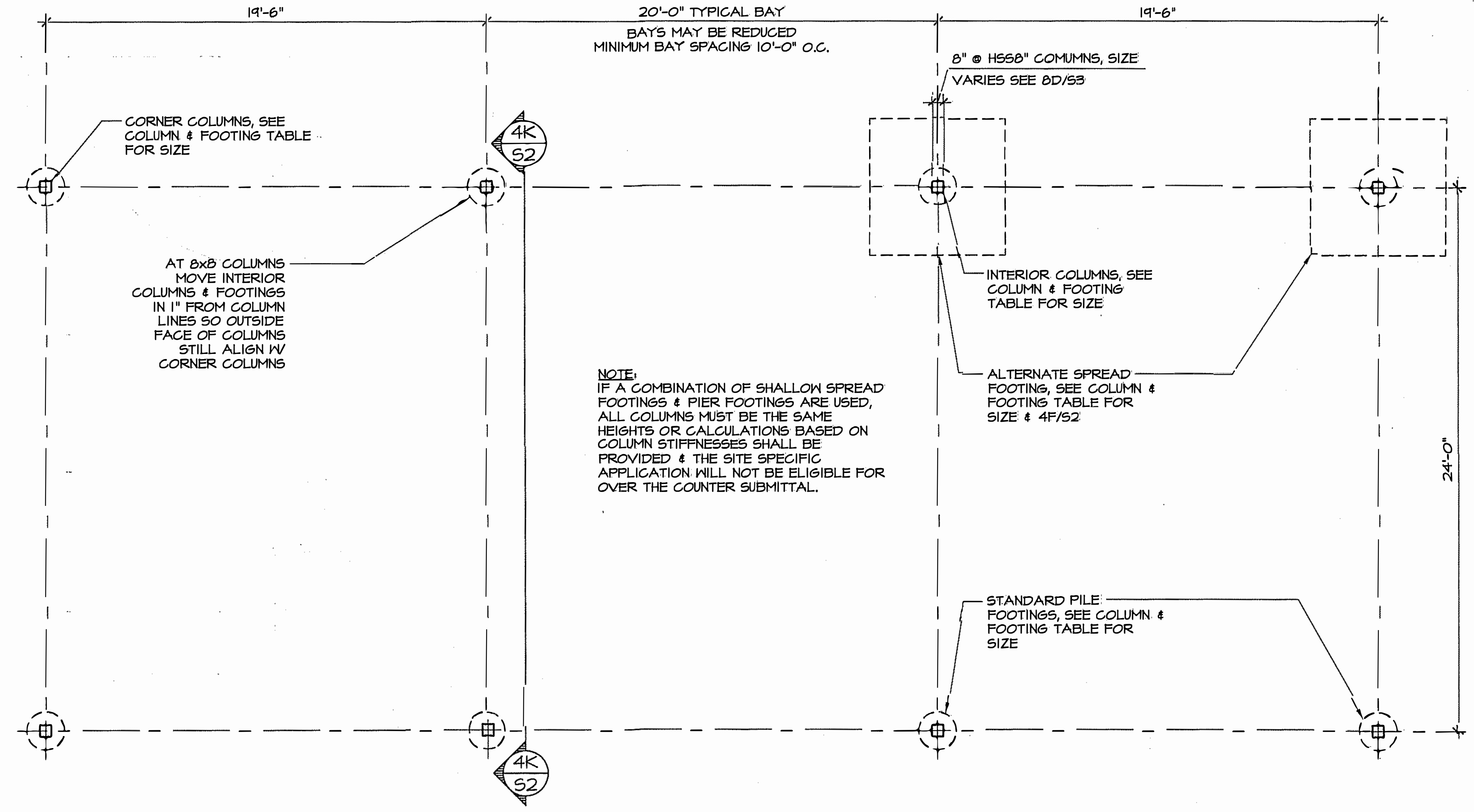

METAL DECK
#8x½" LONG SHEET METAL SCREWS W/ NEOPRENE WASHERS @ 24" O.C., TYPICAL
26 GAGE STANDARD GUTTER TRIM
2"x3" ALUMINUM DOWN SPOUT
HSS COLUMN
20 GAGE RAIN GUTTER GUARD
5⅞"
+ 80" MIN. ABOVE FINISH GRADE, TYPICAL
2¼"
#12 SCREW EACH SIDE @ TOP, BOTTOM, & MID HEIGHT, TYPICAL (6-SCREWS TOTAL)

BOX GUTTER SCALE 3" = 1'-0" 8B


#8x½" LONG SHEET METAL SCREWS @ 24" O.C., TYPICAL
#8x½" LONG SHEET METAL SCREWS @ 24" O.C., TYPICAL
METAL DECK
26 GAGE STANDARD GUTTER TRIM
#8x½" LONG SHEET METAL SCREWS @ 24" O.C., TYPICAL
METAL DECK
26 GAGE STANDARD DRIP EDGE TRIM (OPTIONAL)
#8x½" LONG SHEET METAL SCREWS @ 24" O.C., TYPICAL
METAL DECK
26 GAGE STANDARD CHANNEL TRIM (INCLUDED)

FASCIA OPTIONS SCALE 3" = 1'-0" 8D

SEE SITE SPECIFIC TABLE FOR MAX. BAY SPACING IN HIGH SEISMIC AREAS. MINIMUM BAY SPACING IS 10'-0". MINIMUM PIER SPACING IS 3 DIAMETERS PER CBC 1810A2.5.


19'-6"
20'-0" TYPICAL BAY
BAYS MAY BE REDUCED MINIMUM BAY SPACING 10'-0" O.C.
19'-6"
8" @ HSS8" COMUMNS, SIZE VARIES SEE 8D/S3
CORNER COLUMNS, SEE COLUMN & FOOTING TABLE FOR SIZE
4K S2
AT 8x8 COLUMNS MOVE INTERIOR COLUMNS & FOOTINGS IN 1" FROM COLUMN LINES SO OUTSIDE FACE OF COLUMNS STILL ALIGN W/ CORNER COLUMNS
INTERIOR COLUMNS, SEE COLUMN & FOOTING TABLE FOR SIZE
ALTERNATE SPREAD FOOTING, SEE COLUMN & FOOTING TABLE FOR SIZE & 4F/S2
24'-0"
STANDARD PILE FOOTINGS, SEE COLUMN & FOOTING TABLE FOR SIZE
4K S2

NOTE:
IF A COMBINATION OF SHALLOW SPREAD FOOTINGS & PIER FOOTINGS ARE USED, ALL COLUMNS MUST BE THE SAME HEIGHTS OR CALCULATIONS BASED ON COLUMN STIFFNESSES SHALL BE PROVIDED & THE SITE SPECIFIC APPLICATION WILL NOT BE ELIGIBLE FOR OVER THE COUNTER SUBMITTAL.

FOUNDATION PLAN SCALE ¼" = 1'-0" 8K

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DWN BY: B.G.H.	CHKD BY: G.B.H.
DATE: 9/20/23	
PROJECT NO: 23014 25073	

DRAWING TITLE
FOUNDATION PLAN
ROOF FRAMING PLAN
SECTION
DETAILS

SHEET NUMBER
S2
OF 3 SHEETS

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125476 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 05/07/2026

BEAM & PURLIN TABLE

(RISK CATEGORY)	LOADNG	BEAM "A"	PURLIN "B"
(RISK CATEGORY II) SEE NOTE 3	20 PSF LL/SL	C18x3x12 GAGE	C12x2¼x14 GAGE
	30 PSF SL	C18x3x10 GAGE	C12x2¼x12 GAGE
(RISK CATEGORY III) SEE NOTE 3	20 PSF LL/SL	C18x3x12 GAGE	C12x2¼x12 GAGE
	30 PSF SL	C18x3x10 GAGE	C12x2¼x12 GAGE

NOTES:

1. RISK CATEGORY IS PER CBC 1604A.5.
2. SEE 8K/S3 FOR SECTION PROPERTIES OF BEAMS.
3. SEE SITE SPECIFIC TABLE TO DETERMINE RISK CATEGORY.

BEAM & PURLIN TABLE 4D

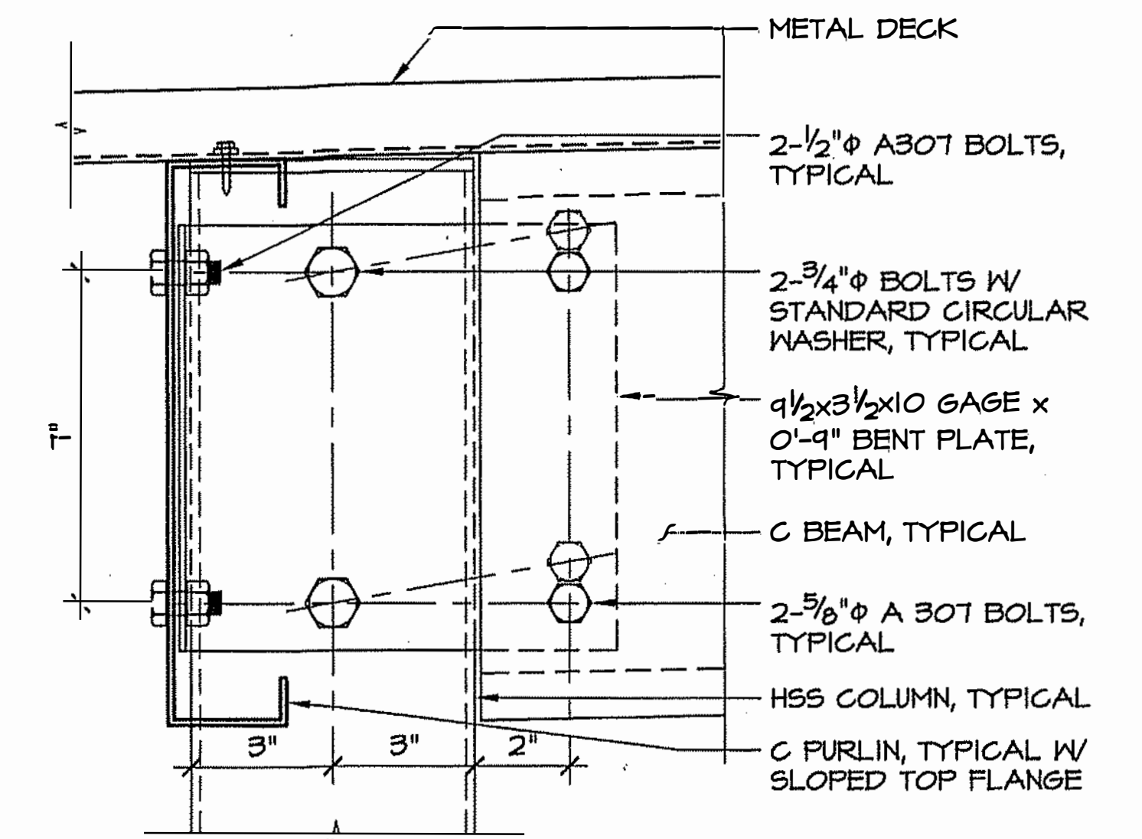
REVISIONS

NO.	DATE	BY	DESCRIPTION

GERARD HOMER
EXP. 3-31-24
S2373
STRUCTURAL
STATE OF CALIFORNIA

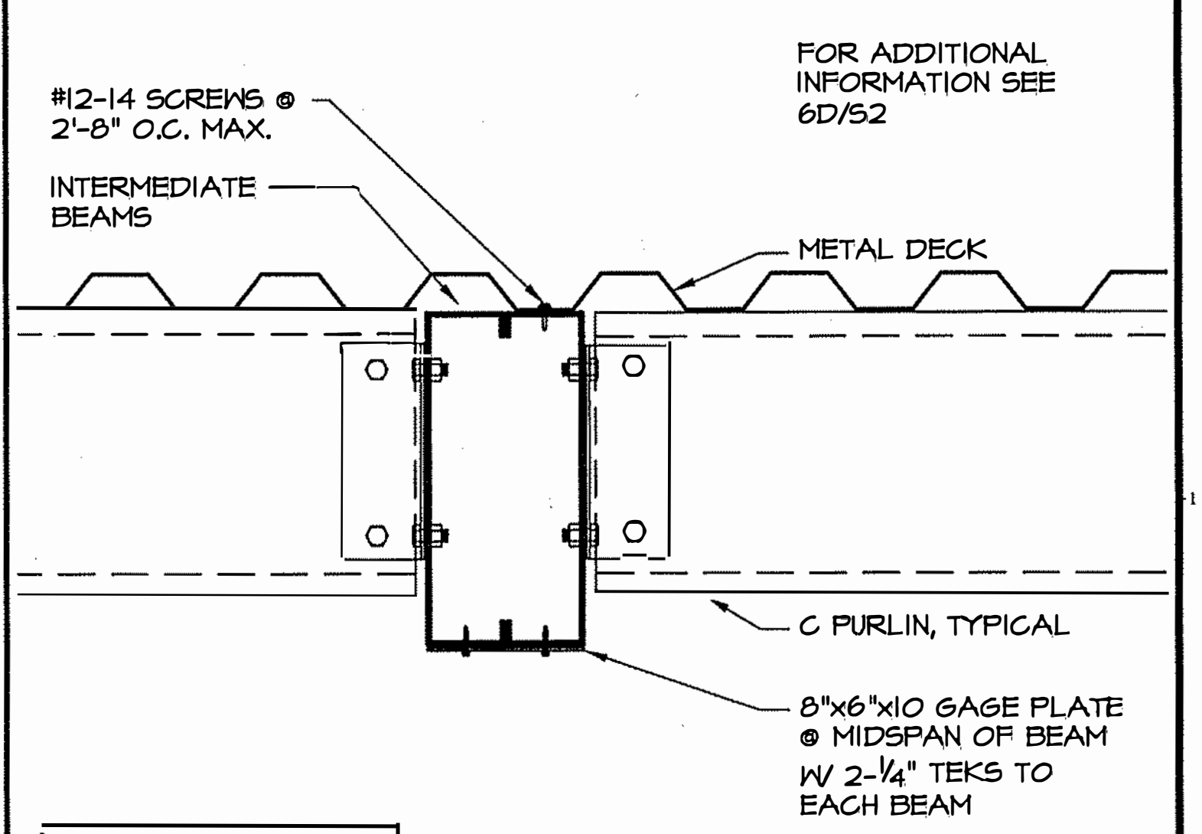
PRE-CHECK (PC) DOCUMENT
CODE: 2022 C.B.C.
A SEPARATE PROJECT APPLICATION
FOR CONSTRUCTION IS REQUIRED.

STAMPS 4F


METAL DECK
2-½"Φ A307 BOLTS, TYPICAL
2-¾"Φ BOLTS W/ STANDARD CIRCULAR WASHER, TYPICAL
9½x3½x10 GAGE x 0'-9" BENT PLATE, TYPICAL
C BEAM, TYPICAL
2-⅝"Φ A 307 BOLTS, TYPICAL
HSS COLUMN, TYPICAL
C PURLIN, TYPICAL W/ SLOPED TOP FLANGE
3"
3"
2"

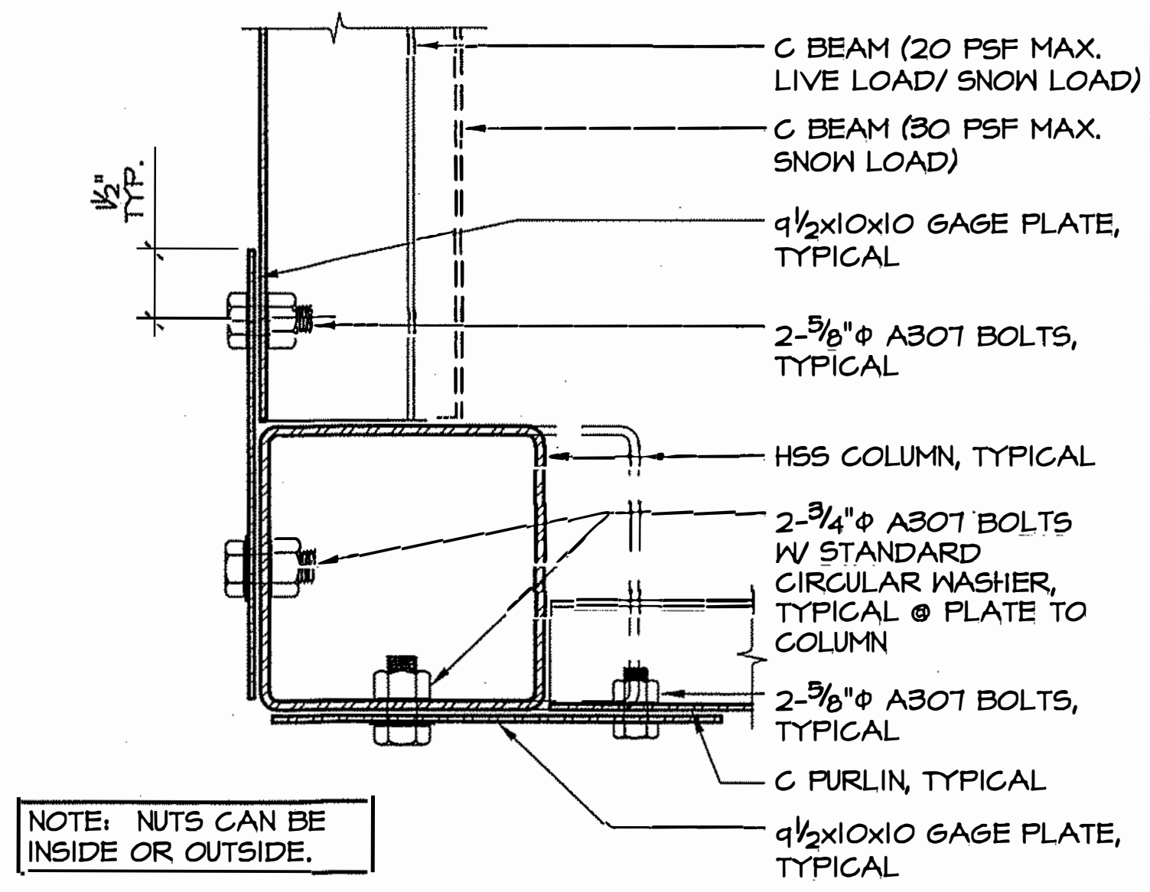
NOTE: HOLES CAN BE STAGGERED FOR ROOF SLOPES GREATER THAN ¾ IN 12 SLOPE.

BEAM TO COLUMN SCALE 3" = 1'-0" 2H


#12-14 SCREWS @ 2'-8" O.C. MAX.
INTERMEDIATE BEAMS
FOR ADDITIONAL INFORMATION SEE 6D/S2
METAL DECK
C PURLIN, TYPICAL
8"x6"x10 GAGE PLATE @ MIDSPAN OF BEAM W/ 2-¼" TEKS TO EACH BEAM

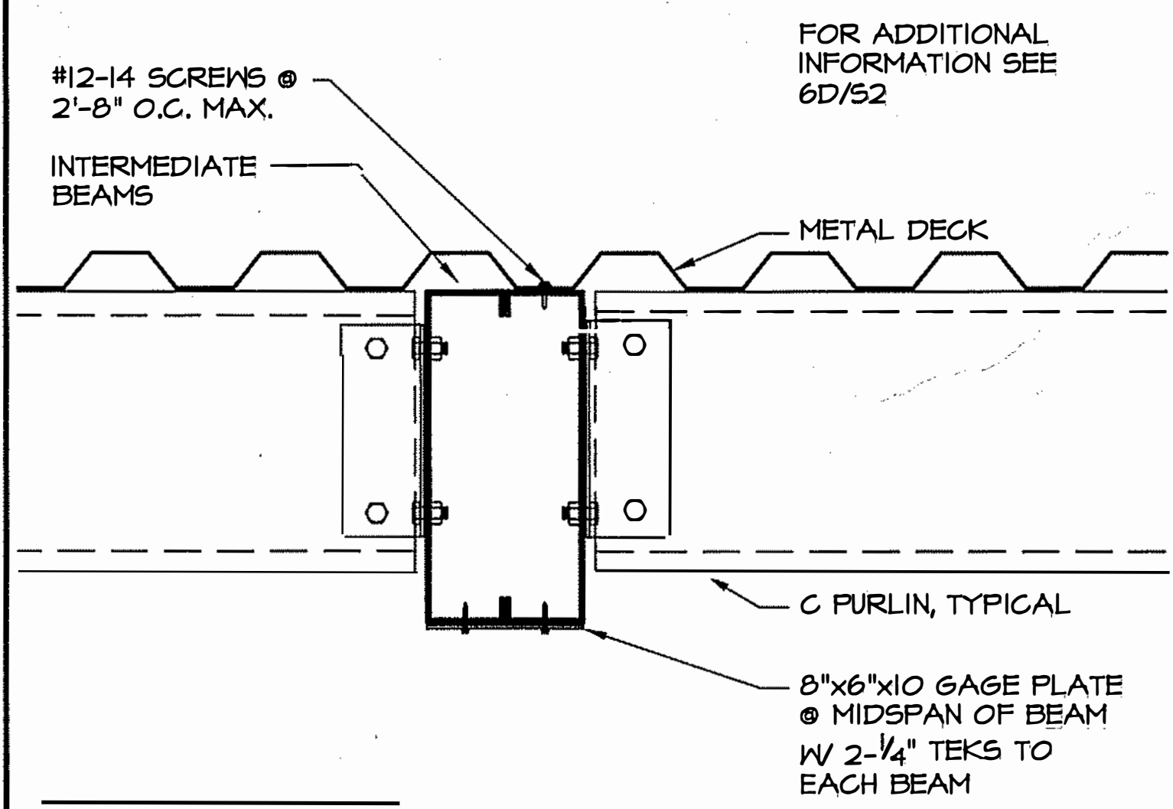
NOTE: NUTS CAN BE INSIDE OR OUTSIDE.

BEAM TIE @ MIDSPAN SCALE 1½" = 1'-0" 2K


C BEAM (20 PSF MAX. LIVE LOAD/ SNOW LOAD)
C BEAM (30 PSF MAX. SNOW LOAD)
½" TYP.
9½x10x10 GAGE PLATE, TYPICAL
2-⅝"Φ A307 BOLTS, TYPICAL
HSS COLUMN, TYPICAL
2-¾"Φ A307 BOLTS W/ STANDARD CIRCULAR WASHER, TYPICAL @ PLATE TO COLUMN
2-⅝"Φ A307 BOLTS, TYPICAL
C PURLIN, TYPICAL
9½x10x10 GAGE PLATE, TYPICAL

NOTE: NUTS CAN BE INSIDE OR OUTSIDE.

BEAM TO COLUMN @ CORNER SCALE 3" = 1'-0" 4H


#12-14 SCREWS @ 2'-8" O.C. MAX.
INTERMEDIATE BEAMS
FOR ADDITIONAL INFORMATION SEE 6D/S2
METAL DECK
C PURLIN, TYPICAL
8"x6"x10 GAGE PLATE @ MIDSPAN OF BEAM W/ 2-¼" TEKS TO EACH BEAM

NOTE: NUTS CAN BE INSIDE OR OUTSIDE.

BEAM TO COLUMN SCALE 1½" = 1'-0" 4K

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 02-121471 PC
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑ CG ☐
DATE: 9/25/2023

COLUMN & FOOTING TABLE

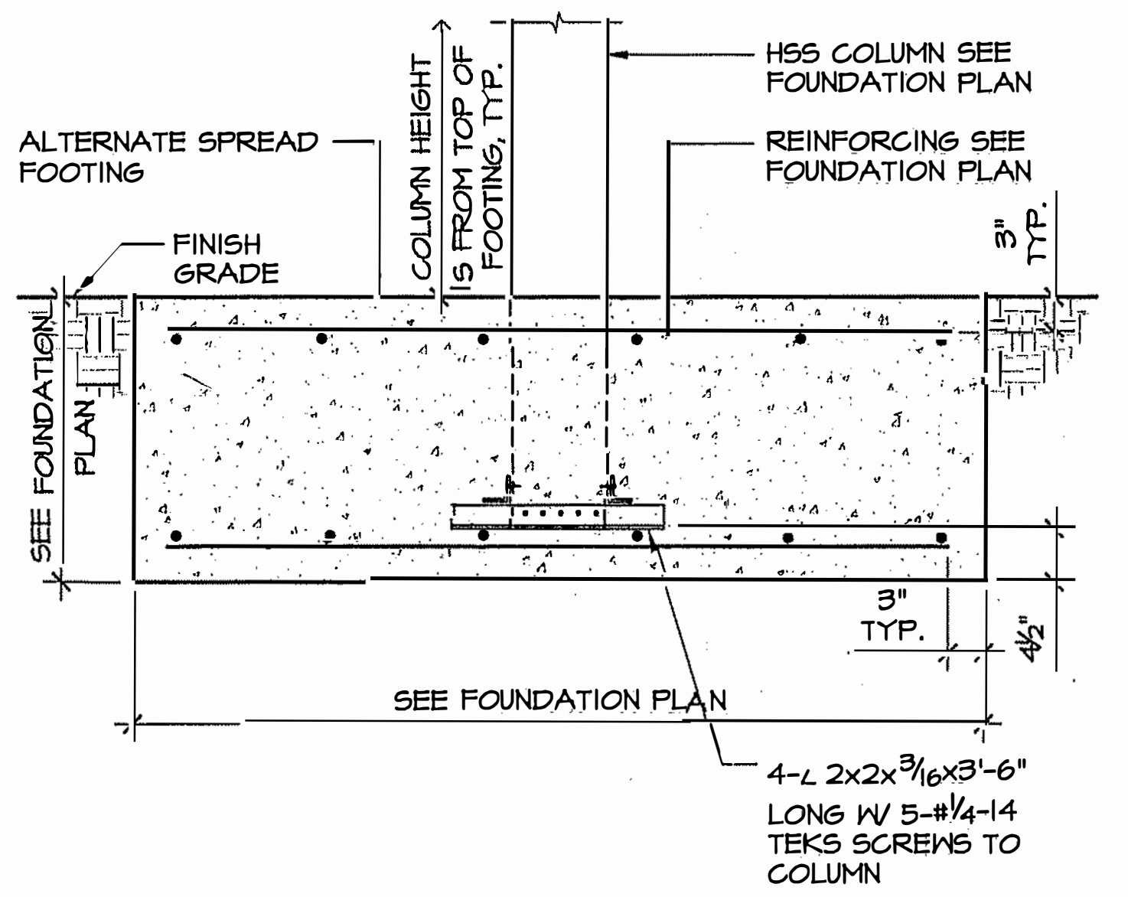
	COLUMN HEIGHT	LOADING	LOWER SEISMIC (S_{DS} ≤ 1.0) COLUMN	PILE FOOTING	1 & 10 ALTERNATE SPREAD FOOTING	HIGHER SEISMIC (S_{DS} ≤ 1.75 MAX.) (15) COLUMN	PILE FOOTING	1 & 10 ALTERNATE SPREAD FOOTING
(RISK CATEGORY II)	12'-6"	20 PSF LL	HSS6x6x3/16	1'-6"Φx8'-0"	6'-4" SQ.x2'-0"(8)	HSS8x6x1/4(5)	1'-6"Φx9'-9"	7'-0" SQ.x2'-4"(9)
		20 PSF SL		1'-6"Φx8'-9"				
		30 PSF SL	HSS8x6x3/16(4)	1'-6"Φx10'-8"			1'-6"Φx10'-8"	
		OPTIONAL MISC DEAD LOAD	HSS6x6x3/16	1'-6"Φx9'-3"	7'-0" SQ.x2'-4"(9)		1'-6"Φx11'-4"	7'-9" SQ.x2'-4"(9)
	14'-6"	20 PSF LL	HSS6x6x1/4	1'-6"Φx8'-3"	6'-4" SQ.x2'-0"(8)	HSS8x6x5/16(5)	1'-6"Φx10'-2"	7'-3" SQ.x2'-4"(9)
		20 PSF SL		1'-6"Φx8'-9"				
		30 PSF SL	HSS8x6x3/16(4)	1'-6"Φx10'-8"			1'-6"Φx10'-8"	
		OPTIONAL MISC DEAD LOAD	HSS6x6x1/4	1'-6"Φx9'-6"	7'-0" SQ.x2'-4"(9)	HSS8x6x5/16(6)	1'-6"Φx11'-9"	8'-2" SQ.x2'-4"(9)
	16'-6"	20 PSF LL	HSS6x6x1/4	1'-6"Φx8'-6"	6'-4" SQ.x2'-0"(8)	HSS8x6x1/4(5)	1'-6"Φx10'-6"	7'-6" SQ.x2'-4"(9)
		20 PSF SL		1'-6"Φx8'-9"				
		30 PSF SL	HSS8x6x3/16(4)	1'-6"Φx10'-8"			1'-6"Φx10'-8"	
		OPTIONAL MISC DEAD LOAD	HSS6x6x1/4	1'-6"Φx9'-9"	7'-0" SQ.x2'-4"(9)	HSS8x6x3/8(6)	1'-6"Φx12'-0"	8'-6" SQ.x2'-4"(10)
(RISK CATEGORY III)			LOWER SEISMIC (S_{DS} ≤ 1.0)			HIGHER SEISMIC (S_{DS} ≤ 2.5 MAX.)		
	12'-6"	20 PSF LL	HSS8x6x3/16	1'-6"Φx8'-9"	6'-10" SQ.x2'-0"(8)	HSS8x6x5/16(5)	1'-6"Φx12'-3"	9'-0" SQ.x2'-4"(10)
		20 PSF SL		1'-6"Φx9'-4"				
		30 PSF SL	HSS8x6x1/4(5)	1'-6"Φx11'-4"				
		OPTIONAL MISC DEAD LOAD	HSS8x6x3/16	1'-6"Φx10'-0"	7'-6" SQ.x2'-4"(9)	HSS8x6x1/2(7)	1'-6"Φx14'-3"	9'-10" SQ.x2'-6"(11)
	14'-6"	20 PSF LL	HSS8x6x1/4	1'-6"Φx9'-0"	6'-10" SQ.x2'-0"(8)	HSS8x6x3/8(6)	1'-6"Φx12'-8"	9'-3" SQ.x2'-4"(10)
		20 PSF SL		1'-6"Φx9'-4"				
		30 PSF SL	HSS8x6x1/4(5)	1'-6"Φx11'-4"				
		OPTIONAL MISC DEAD LOAD	HSS8x6x1/4	1'-6"Φx10'-3"	7'-6" SQ.x2'-4"(9)	HSS8x6x5/8(6)	1'-6"Φx14'-8"	10'-4" SQ.x2'-6"(11)
	16'-6"	20 PSF LL	HSS8x6x5/16	1'-6"Φx9'-3"	6'-10" SQ.x2'-0"(8)	HSS8x6x1/2(6)	1'-6"Φx13'-0"	9'-8" SQ.x2'-4"(10)
		20 PSF SL		1'-6"Φx9'-4"				
		30 PSF SL	HSS8x6x5/16(5)	1'-6"Φx11'-4"				
		OPTIONAL MISC DEAD LOAD	HSS8x6x5/16	1'-6"Φx10'-8"	7'-6" SQ.x2'-4"(9)	HSS8x6x1/2(7)	2'-0"Φx13'-6"	10'-10" SQ.x2'-6"(11)

MOVE COLUMN & FOOTING IN 1" FROM COLUMN LINE SO OUTSIDE FACE OF COLUMN STILL ALIGN W/ CORNER COLUMN

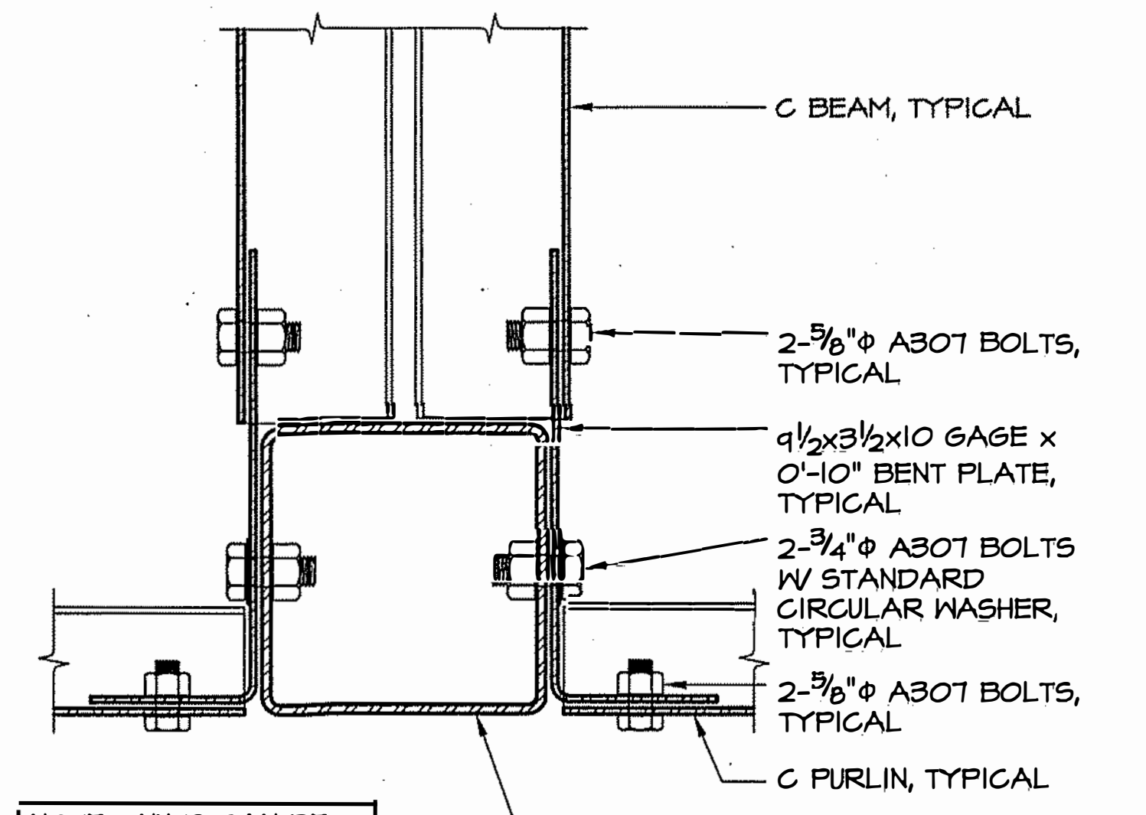
NOTES:

1. ALTERNATE SPREAD FOOTINGS ARE OPTIONAL FOOTINGS @ AN ADDITIIONAL COST.
2. NO SNOW LOAD ALLOWED W/ 3 P.S.F. MISCELLANEOUS DEAD LOAD.
3. COLUMN EMBEDMENT OF PILE FOOTING TO EXTEND INTO FOOTING 6" MAX. FROM BOTTOM, SEE SECTION 4K/S2.
4. AT CORNER COLUMN MAY USE HSS6x6x3/16.
5. AT CORNER COLUMN MAY USE HSS8x6x3/16
6. AT CORNER COLUMN MAY USE HSS8x6x1/4.
7. AT CORNER COLUMN MAY USE HSS8x6x5/16.
8. USE 6-#5 REBARS EACH WAY @ TOP & BOTTOM OF FOOTING W/ 3" MIN. COVER. KEEP COLUMN 4½" CLEAR FROM BOTTOM OF FOOTING.
9. USE 8-#5 REBARS EACH WAY @ TOP & BOTTOM OF FOOTING W/ 3" MIN. COVER. KEEP COLUMN 4½" CLEAR FROM BOTTOM OF FOOTING.
10. USE 10-#5 REBARS EACH WAY @ TOP & BOTTOM OF FOOTING W/ 3" MIN. COVER. KEEP COLUMN 4½" CLEAR FROM BOTTOM OF FOOTING.
11. USE 12-#5 REBARS EACH WAY @ TOP & BOTTOM OF FOOTING W/ 3" MIN. COVER. KEEP COLUMN 4½" CLEAR FROM BOTTOM OF FOOTING.
12. USE 4-∠ 2x2x3/16x3'-6" LONG ANGLES @ BOTTOM OF COLUMN, EACH W/ 5-¼-14 TEKS SCREWS TO COLUMN, SEE 8F/S3.
13. IF SITE SPECIFIC PROJECT IS LOCATED IN A FLOOD ZONE OTHER THAN ZONE X, A LETTER STAMPED AND SIGNED FROM A SOILS ENGINEER IS REQUIRED TO VALIDATE THE ALLOWABLE SOIL VALUES SPECIFIED ON THIS P.C., SEE GENERAL NOTES NUMBER 11.
14. MINIMUM PIER SPACING IS 3 DIAMETERS PER CBC 1810A.2.5.
15. Sds MAXIMUM OR REDUCE BAY SPACING, SEE SITE SPECIFIC INFORMATION TABLE ON SHEET S1.

COLUMN & FOOTING TABLE 8D


ALTERNATE SPREAD FOOTING
FINISH GRADE
COLUMN HEIGHT IS FROM TOP OF FOOTING, TYP.
HSS COLUMN SEE FOUNDATION PLAN
REINFORCING SEE FOUNDATION PLAN
3" TYP.
SEE FOUNDATION PLAN
3" TYP.
4½"
SEE FOUNDATION PLAN
4-∠ 2x2x3/16x3'-6" LONG W/ 5-#¼-14 TEKS SCREWS TO COLUMN

OPTIONAL SPREAD FOOTING @ ADDITIONAL COST SCALE ¾" = 1'-0" 8F

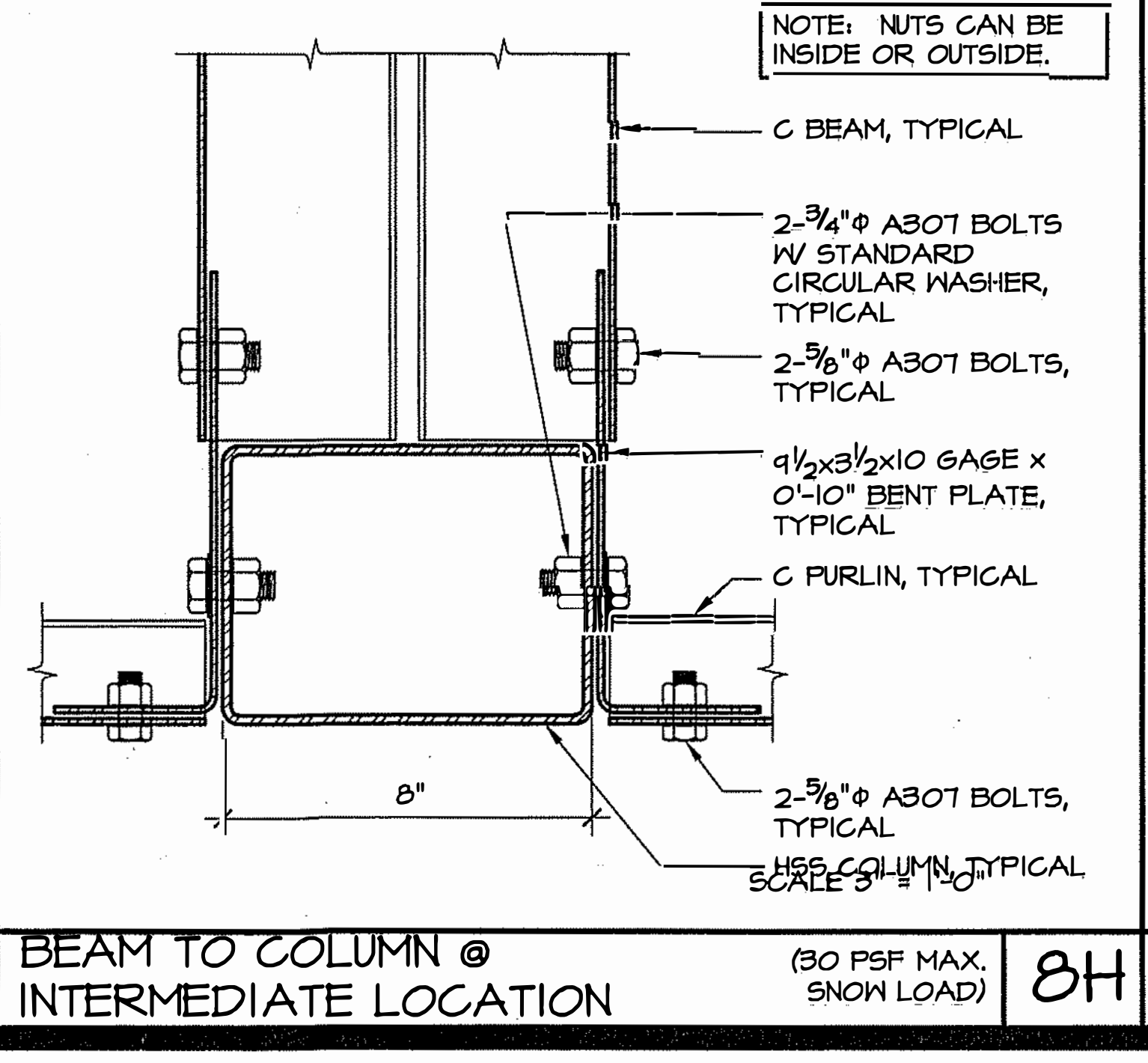

C BEAM, TYPICAL
2-⅝"Φ A307 BOLTS, TYPICAL
9½x3½x10 GAGE x 0'-10" BENT PLATE, TYPICAL
2-¾"Φ A307 BOLTS W/ STANDARD CIRCULAR WASHER, TYPICAL
2-⅝"Φ A307 BOLTS, TYPICAL
C PURLIN, TYPICAL
HSS COLUMN, TYPICAL

NOTE: NUTS CAN BE INSIDE OR OUTSIDE.

SCALE 3" = 1'-0"

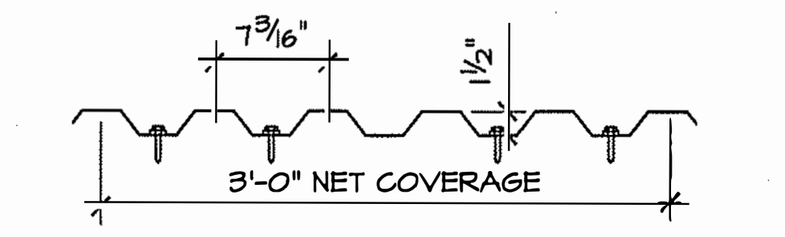
BEAM TO COLUMN @ INTERMEDIATE LOCATION (20 PSF MAX. LIVE LOAD/SNOW LOAD) 6H

NOTE: NUTS CAN BE INSIDE OR OUTSIDE.


C BEAM, TYPICAL
2-¾"Φ A307 BOLTS W/ STANDARD CIRCULAR WASHER, TYPICAL
2-⅝"Φ A307 BOLTS, TYPICAL
9½x3½x10 GAGE x 0'-10" BENT PLATE, TYPICAL
C PURLIN, TYPICAL
8"
2-⅝"Φ A307 BOLTS, TYPICAL
HSS COLUMN, TYPICAL

SCALE 3" = 1'-0"

BEAM TO COLUMN @ INTERMEDIATE LOCATION (30 PSF MAX. SNOW LOAD) 8H


7 3/16"
1½"
3'-0" NET COVERAGE

Fy = 80,000 PSI PER ASTM A653 OR ASTM A792
Fy = 50,000 PSI @ 24 GAUGE PANELS ONLY

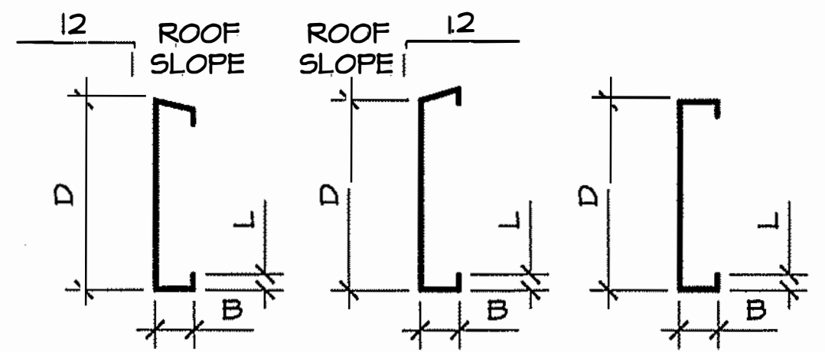
AEP SPAN HR-36 SECTION PROPERTIES

GAUGE	Wt. (lbs./ft.^{2})	I+ (In.^{4}/ft.)	S+ (In.^{3}/ft.)	I- (In.^{4}/ft.)	S- (In.^{3}/ft.)
24	1.2	0.1116	0.1234	0.1141	0.1156
26	0.98	0.0825	0.0895	0.0838	0.0839

McELROY MEGA-RIB SECTION PROPERTIES

GAUGE	Wt. (lbs./ft.^{2})	I+ (In.^{4}/ft.)	S+ (In.^{3}/ft.)	I- (In.^{4}/ft.)	S- (In.^{3}/ft.)
24	1.22	0.1038	0.1228	0.1038	0.1228
26	0.98	0.0761	0.0841	0.0761	0.0841

SECTION PROPERTIES ARE EFFECTIVE SECTION PROPERTIES TYP.


12
ROOF SLOPE
ROOF SLOPE
12
D
L
B
D
L
B
D
L
B

10, 12 & 14 GAGE STRUCTURAL BEAMS
Fy = 55 KSI MIN.
ASTM A653,
Fu = 70 KSI

CEE SECTION PROPERTIES

SECTION DxB	GAUGE	WEIGHT lb/ft.	Ae In.^{2}	AXIS X-X Ix In.^{4}	AXIS X-X Se In.^{3}	AXIS Y-Y Iy In.^{4}	AXIS Y-Y Sy In.^{3}	L In.
C12x2¼	14	4.28	0.629	24.153	3.524	0.807	0.469	1.081
C12x2¼	12	6.43	1.134	35.934	5.989	1.2	0.705	1.166
C17x3	12	8.57	1.185	83.417	8.837	2.32	0.961	0.916
C17x3	10	10.98	1.762	113.65	12.634	2.98	1.242	0.989
C18x3	12	9.02	1.256	98.693	9.909	2.5	1.035	1.042

MATERIAL PROPERTIES TABLES 8K

PROJECT:
SINGLE SLOPE (DOUBLE POST) SCHOOL LUNCH SHELTER
VALLEY SCHOOL SHELTERS

Gerard Homer and Associates
STRUCTURAL ENGINEERS
16765 SYPERT SCHOOL RD.
HOLLAND, TX. 76534
PH.: (559) 734-6675
Email: gh omerse@gmail.com

DWN BY: B.G.H.
CHKD BY: G.B.H.
DATE: 9/20/23
PROJECT NO: 23014 25078
DRAWING TITLE
TABES & DETAILS
SHEET NUMBER
S3
OF 3 SHEETS