

PROJECT NOTES

GENERAL NOTES

- 1) CONTRACTOR SHALL VISIT THE SITE, VERIFY ALL EXISTING DIMENSIONS, AS BUILT CONDITIONS, STRUCTURES, SITE IMPROVEMENTS, ETC. PRIOR TO BIDDING.
- 2) CONTRACTOR SHALL PROTECT EXISTING UTILITIES, LANDSCAPING, WALLS, ETC. NOT TO BE DEMOLISHED. ALL DAMAGE SHALL BE REPAIRED / REPLACED TO THE SATISFACTION OF THE CONTRACTING OFFICER AT NO COST TO THE STATE.
- 3) CONTRACTOR SHALL ALLOW FOR CONSTRUCTION TOLERANCE IN ORDER TO MEET THE MINIMUM AND MAXIMUM REQUIREMENTS AS INDICATED IN THE CONSTRUCTION DRAWINGS AND SPECIFICATIONS.
- 4) ALL NEW EXPOSED CONCRETE, CMU, METAL (EXCEPT STAINLESS STEEL & COPPER) AND WOOD SURFACES SHALL RECEIVE APPROPRIATE SURFACE PREPARATION AND BE PAINTED UNLESS OTHERWISE INDICATED. FINISH HARDWARE, FINISH ELECTRICAL FIXTURES, AND PLUMBING FIXTURES AND FITTINGS SHALL NOT BE PAINTED UNLESS NOTED OTHERWISE.
- 5) CONTRACTOR SHALL PROMPTLY NOTIFY THE CONTRACTING OFFICER OF ANY DISCREPANCIES AND/OR CONDITIONS WHICH WOULD PREVENT HIM FROM FULFILLING THE TERMS OF THE CONTRACT.
- 6) CONTRACTOR SHALL PROVIDE DISSIMILAR METAL PROTECTION.
- 7) PROVIDE BLOCKING AS REQUIRED WITHIN WALLS TO ASSURE PROPER ANCHORING. PROVIDE APPROPRIATE ANCHORS COMPATIBLE WITH WALL CONSTRUCTION.
- 8) ALL WORK SHOWN ON THE DRAWINGS IS NEW, UNLESS OTHERWISE NOTED.

STAGING AREA

- 1) A FINAL APPROVED DECISION/LOCATION WILL HAVE TO BE MADE BETWEEN THE CONTRACTOR AND THE CONTRACTING OFFICER PRIOR TO CONSTRUCTION.
- 2) THE CONTRACTOR SHALL IDENTIFY THE LOCATION OF IRRIGATION IN THE AREA AND THE ACCESS PATH LEADING UP TO IT.
- 3) THE IRRIGATION SYSTEM SHALL BE TESTED PRIOR TO USE OF THE AREA FOR STAGING TO DETERMINE THE CONDITION/OPERATION OF THE IRRIGATION SYSTEM.
- 4) THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY DAMAGE TO GRASSING AND IRRIGATION SYSTEM AND SHALL RESTORE THE SITE TO ITS ORIGINAL CONDITION AT THE COMPLETION OF USING THE AREA FOR STAGING.

CALL BEFORE YOU DIG:

IF WORK IS UNDER OR NEAR AN ELECTRICAL SERVICE LINE, INVESTIGATE BEFORE YOU START WORK.
CALL: (866) 423-7287 (STATEWIDE).

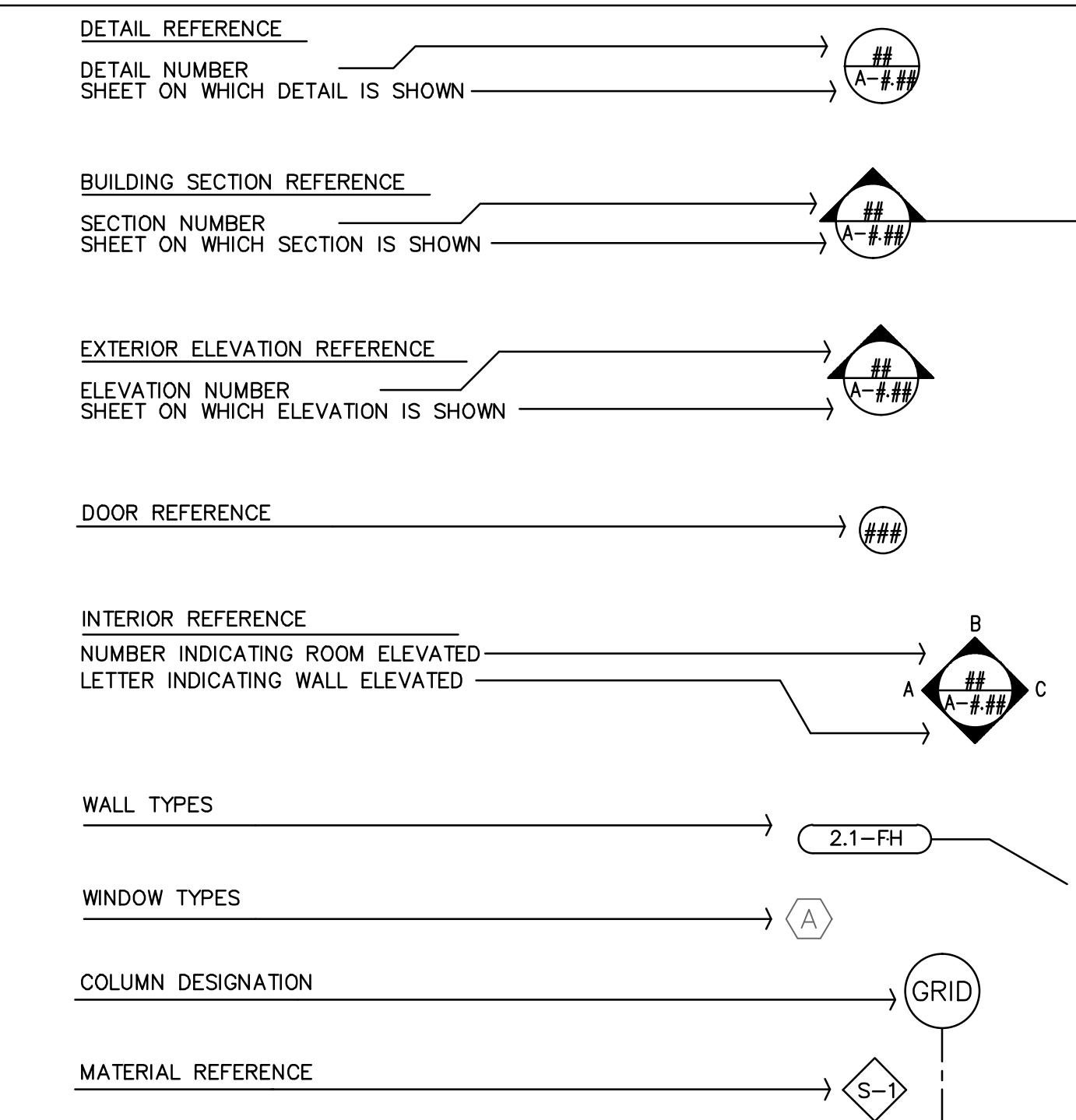
ENVIRONMENTAL NOTES:

GENERAL

- 1) SIX (6) LEAD-CONTAINING PAINTS (LCP) WERE IDENTIFIED ON THE SUBJECT BUILDING. THE IDENTIFIED LCP WERE:
 - OFF-WHITE PAINT ON CONCRETE BRICK WALL, EXTERIOR THROUGHOUT THE BUILDING.
 - OFF-WHITE PAINT ON WOOD ROOF UNDERSIDE, EXTERIOR THROUGHOUT THE BUILDING.
 - WHITE PAINT ON CONCRETE BRICK WALLS IN ROOMS 35 - 47A AND IN HALLWAY 2
 - OFF-WHITE PAINT ON CONCRETE WALL IN HALLWAY 2.
 - WHITE PAINT ON CONCRETE WALLS IN ROOM 46, HALLWAY 1, AND HALLWAY 2.
 - OFF-WHITE PAINT ON DRYWALL WALLS AND CEILINGS IN ROOMS 8, 15 AND IN ROOMS 35 & 42.
- 2) ONE (1) ARSENIC-CONTAINING MATERIAL WAS FOUND; APPROXIMATELY 1,500 SQUARE FEET OF WHITE 2' X 2' ACOUSTIC CEILING AND WALL TILES IN ROOM 50.
- 3) NO ASBESTOS-CONTAINING MATERIALS WERE IDENTIFIED DURING THIS SURVEY.

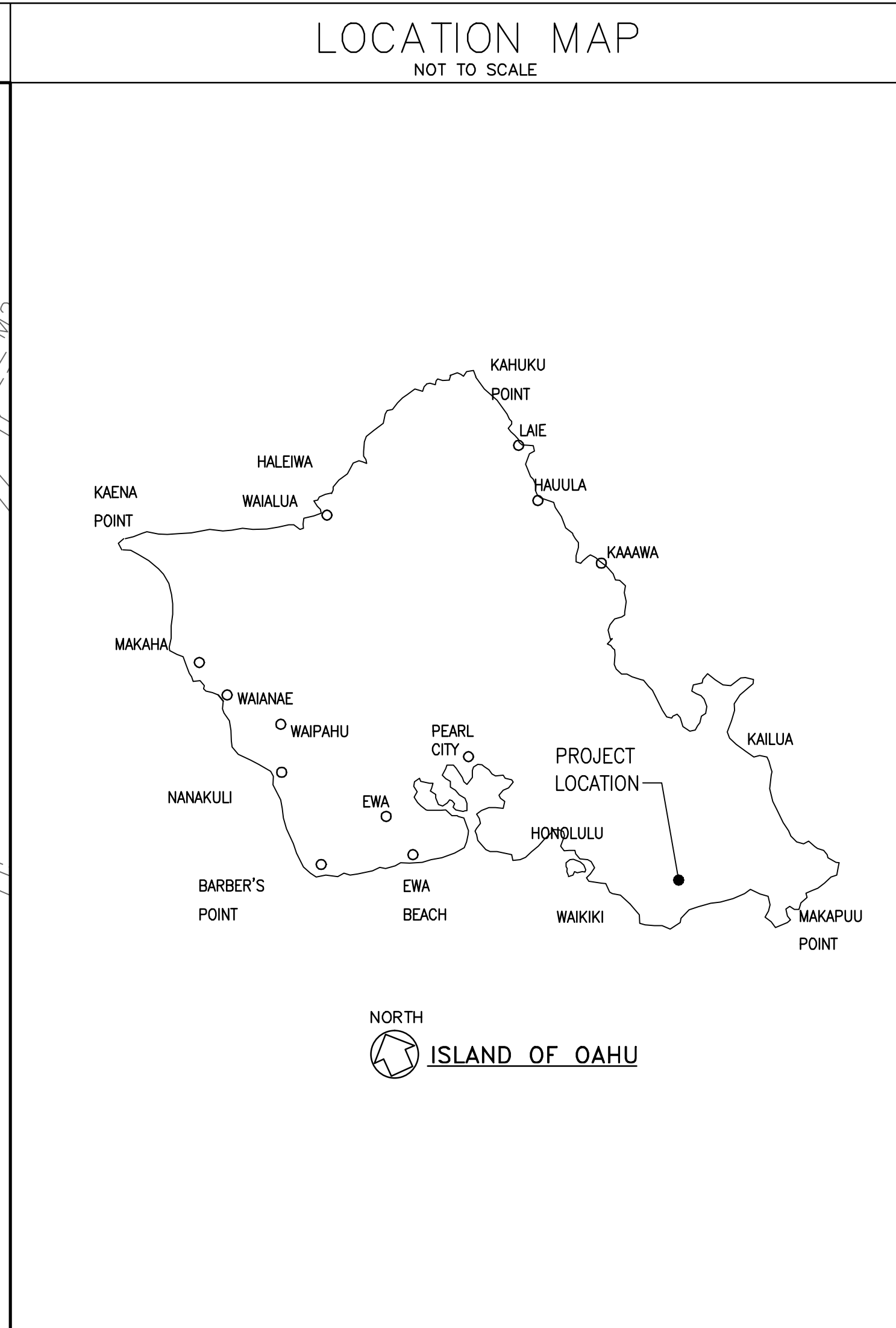
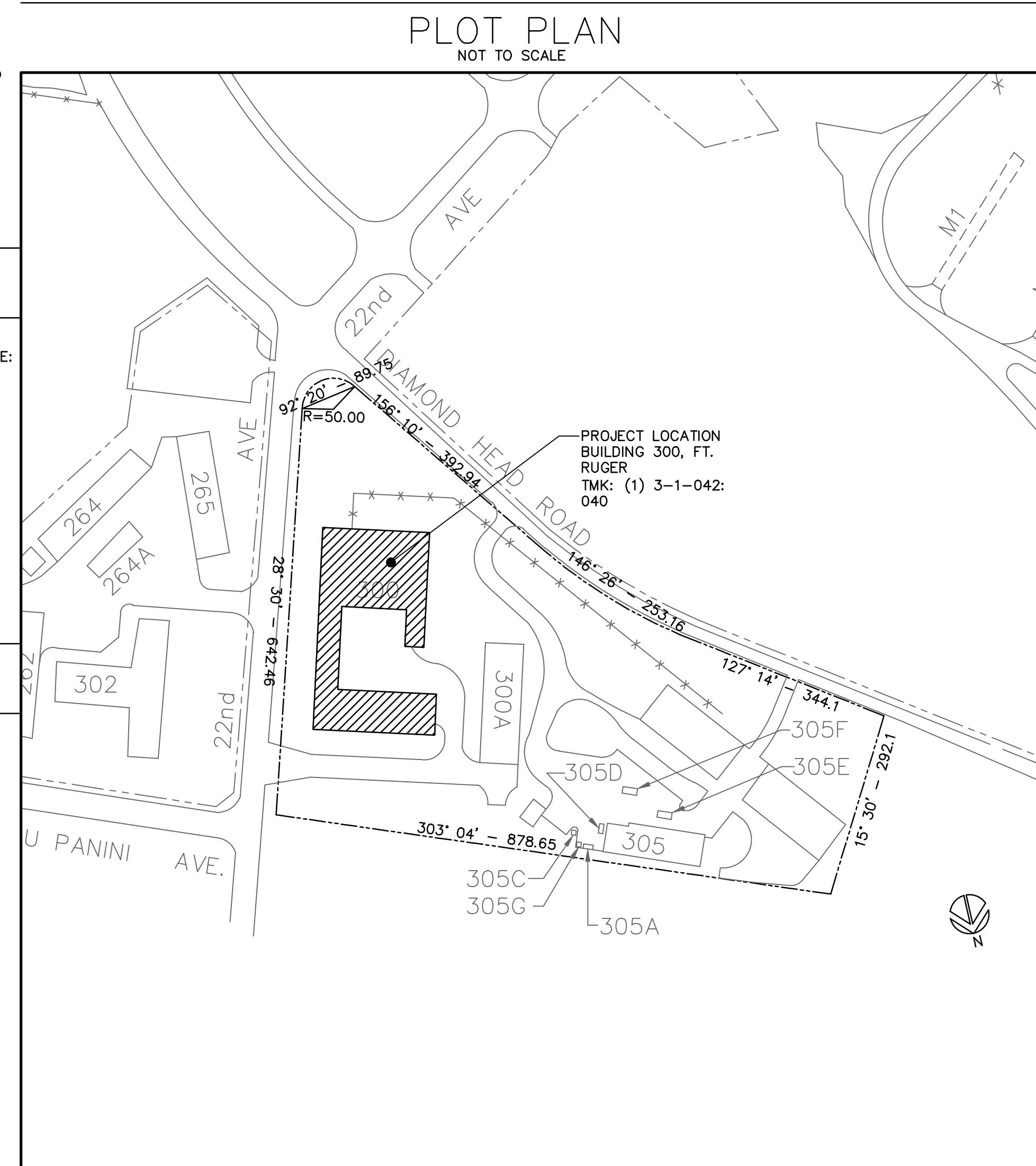
BASED ON THE SURVEY FINDINGS, CONTRACTORS ARE REQUIRED TO CONDUCT WORK IN ACCORDANCE WITH 29 CFR 1926.1118, THE OSHA INORGANIC ARSENIC CONSTRUCTION STANDARD, AND 29 CFR 1926.62, THE OSHA LEAD CONSTRUCTION STANDARD.

SYMBOLS



PHOTOVOLTAIC SYSTEM FOR BUILDING 300 AT DIAMOND HEAD

FOR THE STATE OF HAWAII, DEPARTMENT OF DEFENSE
HAWAII ARMY NATIONAL GUARD
JOB NO. CA-1105-C
4087 DIAMOND HEAD RD,
HONOLULU, HAWAII
TMK: (1) 3-1-042:040



SHEET INDEX

GENERAL T-1	TITLE, PROJECT INDEX, PROJECT DATA, SITE PLAN
STRUCTURAL S-1.1 S-2.1 S-3.1	GENERAL NOTES AND TYPICAL DETAILS STRUCTURAL ROOF PLAN SECTION AND DETAILS
ELECTRICAL E-1 E-2 E-3 E-4	ELECTRICAL LEGEND, GENERAL NOTES, PV NOTES ONE-LINE, PV ONE-LINE, PV METERING DIAGRAM NEW PV ROOF PLAN ELECTRICAL ROOM PLAN, MOUNTING DETAILS

APPROVALS

OFFICE OF THE ENGINEER, NATIONAL GUARD OF HAWAII DEPARTMENT OF DEFENSE, STATE OF HAWAII	DATE
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PROJECT TEAM

ELECTRICAL ENGINEER INSYNERGY ENGINEERING INC. 828 FORT ST MALL -- STE 500 HONOLULU, HI 96813 Ph: (808) 521-3373 Fx: (808) 521-3993 WEB: www.insynergeng.com PM: GARRET MASUDA	ARCHITECT in+FORM Design, Inc 1441 Kapiolani Boulevard, Suite 208 Honolulu, HI 96814 Ph: (808) 946-3676 Fx: (808) 947-6728 WEB: www.ifdesigninc.com PM: CHAD OKINAKA
ENVIRONMENTAL CONSULTANT Myounghee Noh & Associates, L.L.C. 99-1046 IWAENA STREET, 210A AIEA, HI 96701 Ph: (808) 484-9214 Fx: (808) 484-4660 WEB: www.noh-associates.com PM: AKARI IHARA	STRUCTURAL ENGINEER Tonimura & Associates 925 Bethel St - Ste 309 Honolulu, HI 96813 Ph: (808) 536-7692 Fx: (808) 537-9022 PM: ADRIAN LEE

REVISION NO.	SYMBOL	DESCRIPTION	SHT. OF	DATE	APPROVED

DEPARTMENTS OF THE ARMY AND AIR NATIONAL GUARD OF HAWAII OFFICE OF THE ENGINEER, FORT RUGER, HAWAII	
PHOTOVOLTAIC RENEWABLE ENERGY SYSTEM FOR BUILDING 300	
DIAMOND HEAD	OAHU HAWAII
TITLE, PROJECT INDEX, PROJECT DATA, SITE PLAN	
INSYNERGY ENGINEERING, INC.	JOB NO. CA-1105-C
DESIGN BY: SN	CHECKED BY: CM
DRAWN BY: KR	APPROVED BY: GM
SCALE: AS NOTED	DATE: JUN 2012
	SHEET 1 OF 8

LICENSE EXPIRATION: APRIL 30, 2016

Garret A. Masuda
This Work was prepared by me or under my Supervision. Construction of this Project will be under my Observation.

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE BUILDING CODE OF THE HONOLULU CITY AND COUNTY (LATEST).
2. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE DRAWINGS AND SPECIFICATIONS.
3. THE GENERAL NOTES AND TYPICAL DETAILS SHALL APPLY UNLESS OTHERWISE SHOWN.
4. DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON DRAWINGS.
5. DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY INDICATED BUT ARE OF SIMILAR CHARACTER TO DETAILS SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO REVIEW BY THE ENGINEER.
6. ALL INFORMATION SHOWN ON THE DRAWINGS RELATIVE TO EXISTING CONDITIONS IS GIVEN AS THE BEST PRESENT KNOWLEDGE, BUT WITHOUT GUARANTEE OF ACCURACY. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO THE START OF THE JOB AND NOTIFY ALL DISCREPANCIES TO THE ARCHITECT.
7. ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT BEFORE PROCEEDING WITH ANY WORK SO INVOLVED.
8. DURING THE CONSTRUCTION PERIOD THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE BUILDING AND THE PROTECTION OF ADJACENT PROPERTIES, STRUCTURES, STREETS AND UTILITIES FROM DAMAGE. THE CONTRACTOR SHALL PROVIDE ADEQUATE SHORING, BRACING AND GUYS IN ACCORDANCE WITH ALL NATIONAL, STATE AND LOCAL SAFETY STANDARDS. ANY DEVIATION MUST BE APPROVED BY OSHA.
9. ALL ERECTION PROCEDURES SHALL CONFORM TO OSHA STANDARDS. ANY DEVIATION MUST BE APPROVED BY OSHA.
10. THE CONTRACTOR SHALL NOTIFY TANIMURA & ASSOCIATES (PH. 536-1692) TWO (2) WORKING DAYS PRIOR TO BEGINNING ANY WORK WHICH WILL CONCEAL STRUCTURAL ELEMENT SUCH AS POURING CONCRETE (CONCEALING REINFORCING) OR SHEATHING WALLS (CONCEALING HOLD DOWN ANCHORS).

EXISTING ROOF FRAMING:

1. CONTRACTOR SHALL ENSURE THAT THE EXISTING ROOF RAFTERS TO SUPPORT THE NEW PHOTOVOLTAIC ARRAY IS STRUCTURALLY SOUND AND SUITABLE TO SUPPORT THE NEW REINFORCING AND PHOTOVOLTAIC ARRAY.
2. IF ANY STRUCTURAL DAMAGE IS FOUND, THE CONTRACTOR SHALL BE RESPONSIBLE TO HIRE A STRUCTURAL ENGINEER LICENSED IN THE STATE OF HAWAII TO DESIGN A REPAIR DETAIL. THE CONTRACTOR SHALL SUBMIT THIS REPAIR DETAIL AND STRUCTURAL CALCULATIONS TO THE CONTRACTING OFFICER FOR REVIEW AND APPROVAL BEFORE STARTING THE REPAIR WORK.

COLD-FORMED METAL FRAMING:

1. MEMBER REFERENCES: ALL MEMBERS NOTED ON THE DRAWINGS ARE DESIGNATED BY 2004 AISI STANDARD FOR COLD FORMED STEEL FRAMING - GENERAL PROVISIONS. ALL COLD-FORMED MEMBERS FOR THIS PROJECT SHALL CONFORM TO THE AISI SPECIFICATION FOR THE DESIGN OF COLD-FORMED STRUCTURAL MEMBERS, 1996 EDITION.
2. ALL MEMBERS SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM A653 STRUCTURAL QUALITY SHEET STEEL. MEMBERS 54 MILS AND THICKER SHALL BE GRADE 50 KSI. MEMBERS LESS THAN 54 MILS THICK SHALL BE GRADE 33 KSI.
3. ALL MEMBERS SHALL HAVE A MINIMUM PROTECTIVE COATING EQUAL TO G60 GALVANIZED FINISH.
4. ALL SCREWED FASTENERS (METAL TO METAL) SHALL BE STANDARD THREADED, SELF DRILLING FASTENERS. USE APPROPRIATE THREADS AND HEADS FOR THEIR INTENDED USE. UNLESS NOTED OTHERWISE, ALL SCREWS NOTED ON DRAWINGS MAY BE No. 8, No. 10 OR No. 12. IN GENERAL USE NO. 12 SCREWS FOR THICK GAUGE MATERIAL.
5. AT CONNECTIONS WHERE THE SCREW TIP WILL BE EMBEDDED INTO WOOD, WOOD SCREWS SHALL BE USED. PREDRILL THE OUTER FLY LIGHT GAUGE STEEL MEMBERS AS REQUIRED.

PHOTOVOLTAIC ARRAY SUPPORT:

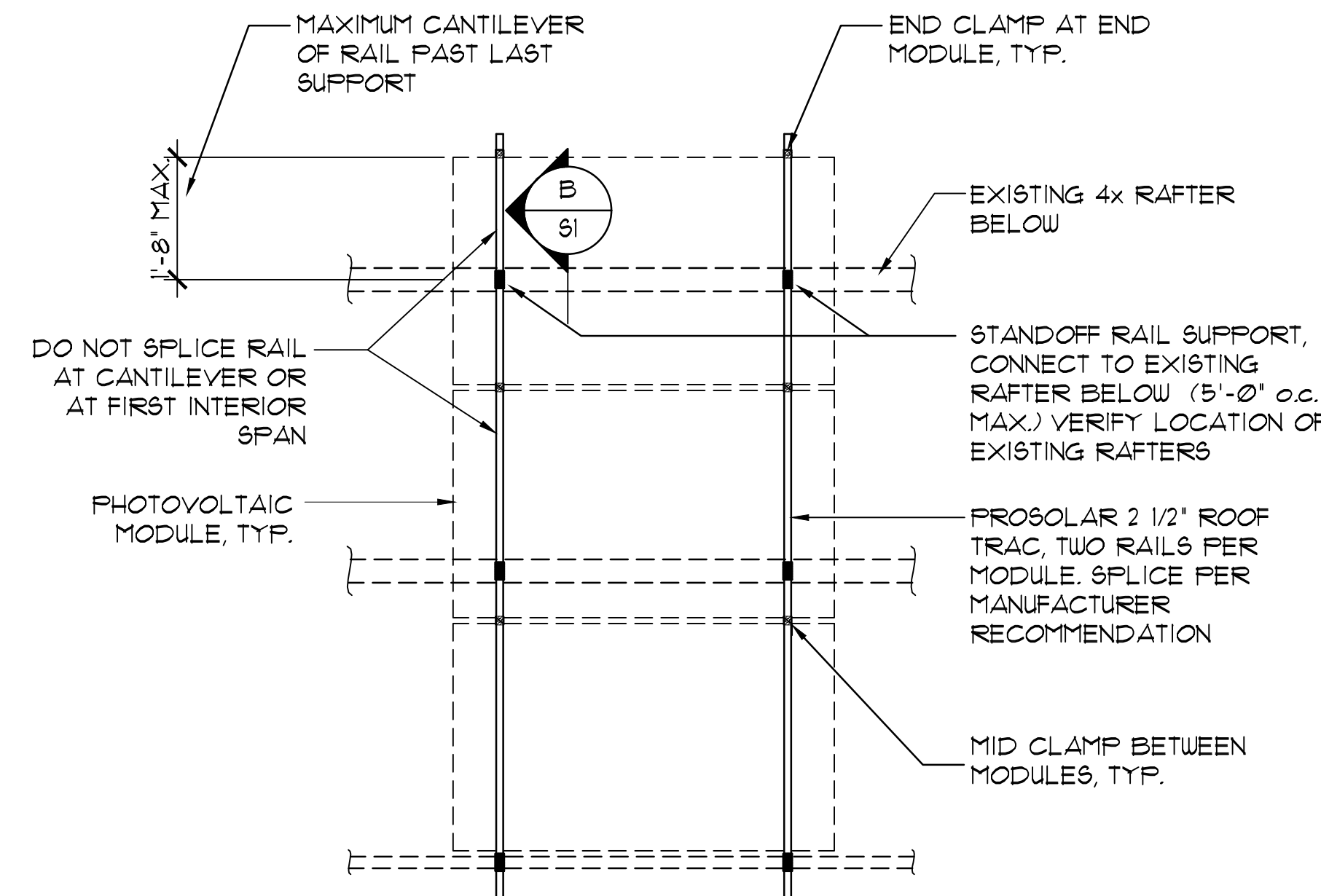
1. CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT THE PHOTO VOLTAIC SUPPORT FRAMING IS COMPATIBLE WITH THE PHOTO VOLTAIC SYSTEM BEING INSTALLED.
2. THE CONTRACT DRAWINGS INDICATE FRAMING COMPONENTS FROM ONE MANUFACTURER. IF THE CONTRACTOR WISHES TO DEVIATE FROM THE SUPPORT FRAMING THAT IS SHOWN, THE CONTRACTOR WILL BE RESPONSIBLE TO HIRE A STRUCTURAL ENGINEER LICENSED IN THE STATE OF HAWAII TO DESIGN, PROVIDE STRUCTURAL CALCULATIONS, PROVIDE SHOP DRAWINGS OF CONNECTION DETAILS TO BE REVIEWED AND APPROVED. ALSO SUBMIT NER REPORTS AND/OR TESTING RESULTS FOR THE PROPOSED FRAMING COMPONENTS. THE STRUCTURAL SUPPORT FRAMING SHALL BE DESIGNED ACCORDING TO THE CRITERIA LISTED ON THIS SHEET.

DESIGN CRITERIA

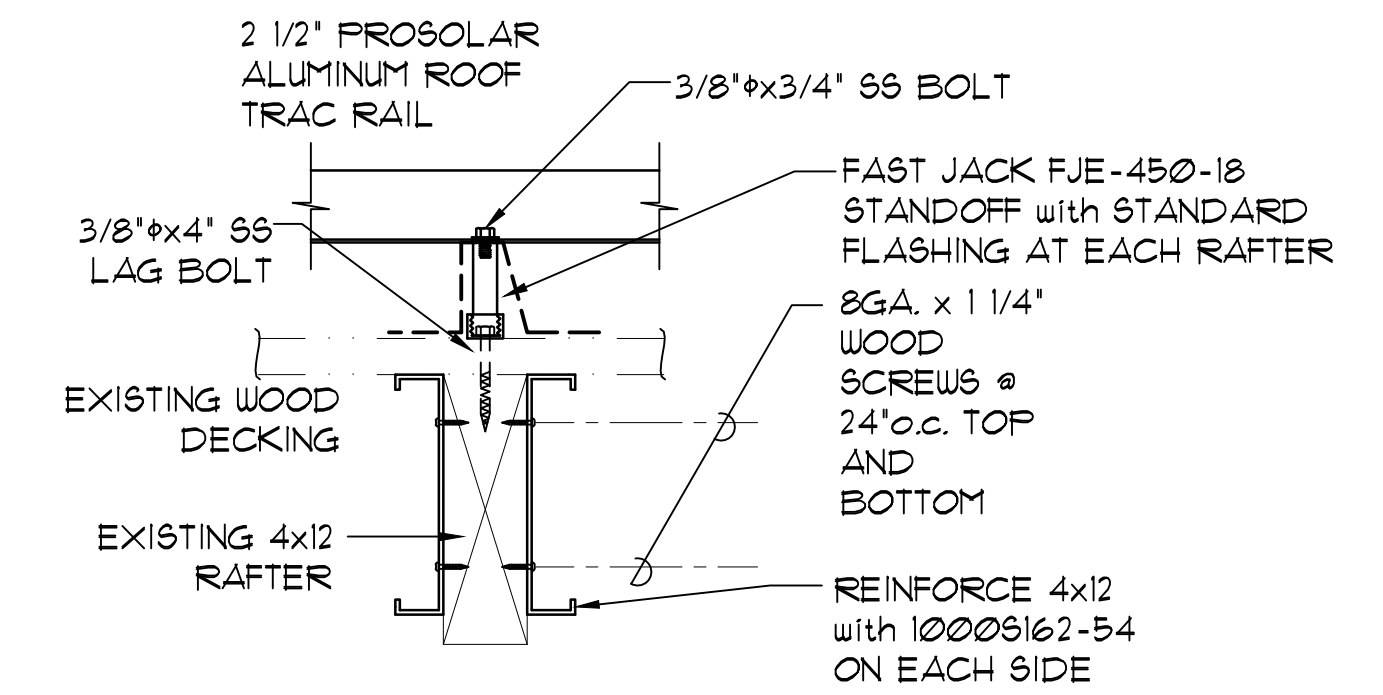
1. CODES: 2006 INTERNATIONAL BUILDING CODE
2. WIND
 - BASIC WIND SPEED (3 SECOND GUST) 105 MPH
 - WIND IMPORTANCE FACTOR I_w B
 - WIND EXPOSURE Kz: TOPOGRAPHIC FACTOR 1.6
3. ROOF LIVE LOAD 20 PSF

SPECIAL INSPECTION

SPECIAL INSPECTION NOT REQUIRED

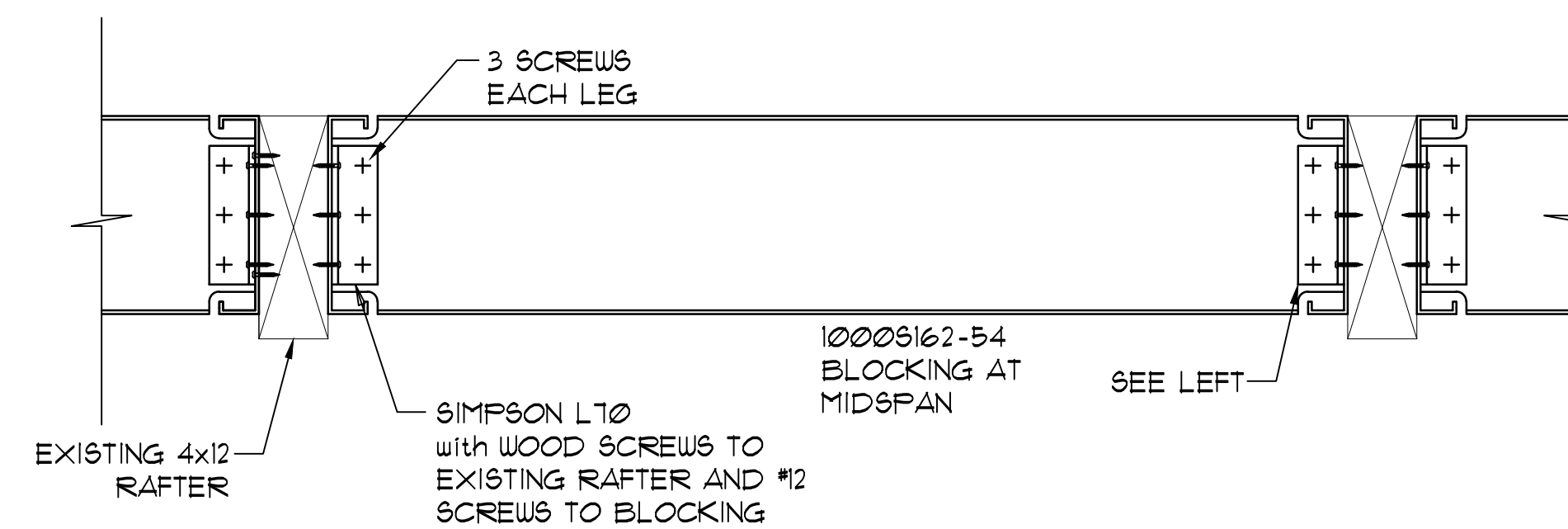


PLAN- SCHEMATIC RAIL SUPPORT (A) 6-11
SC: 1/4" = 1'-0"



NOTE: FOR EXISTING SURFACE MOUNTED ELECTRICAL CONDUITS ON WOOD RAFTERS, REMOVE BRACKETS FOR CONDUITS AND REATTACH CONDUITS TO SIDE OF COLD FORMED STEEL JOIST WITH NEW BRACKETS AND SCREWS AS REQUIRED.

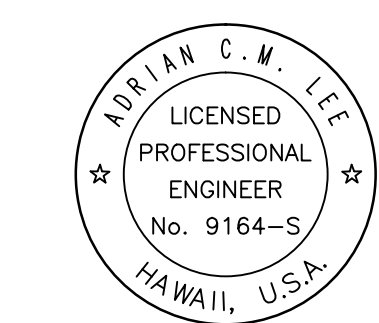
STANDOFF CONNECTION B (B) 6-11
SC: 1 1/2" = 1'-0"



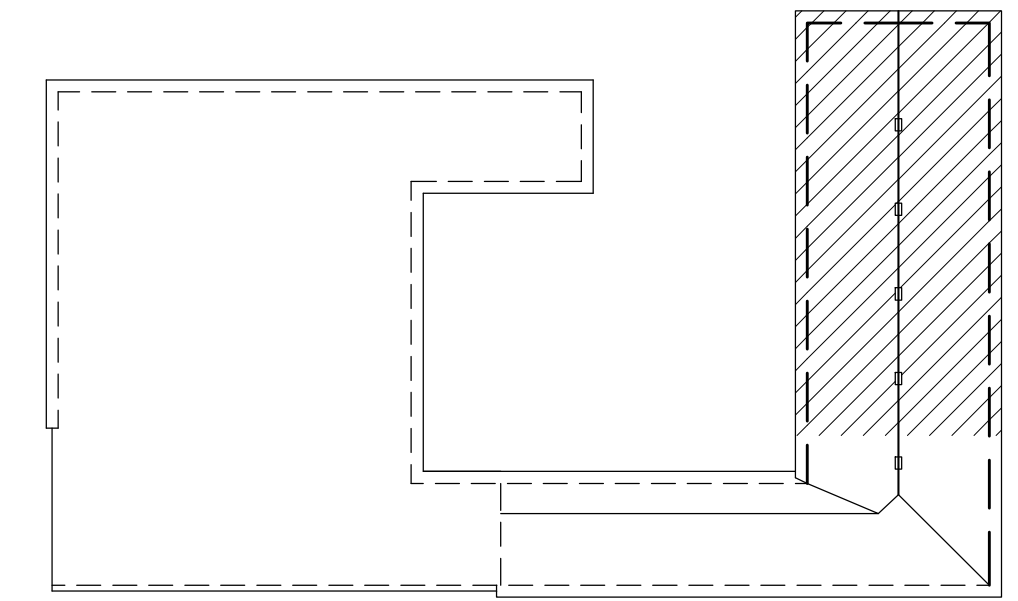
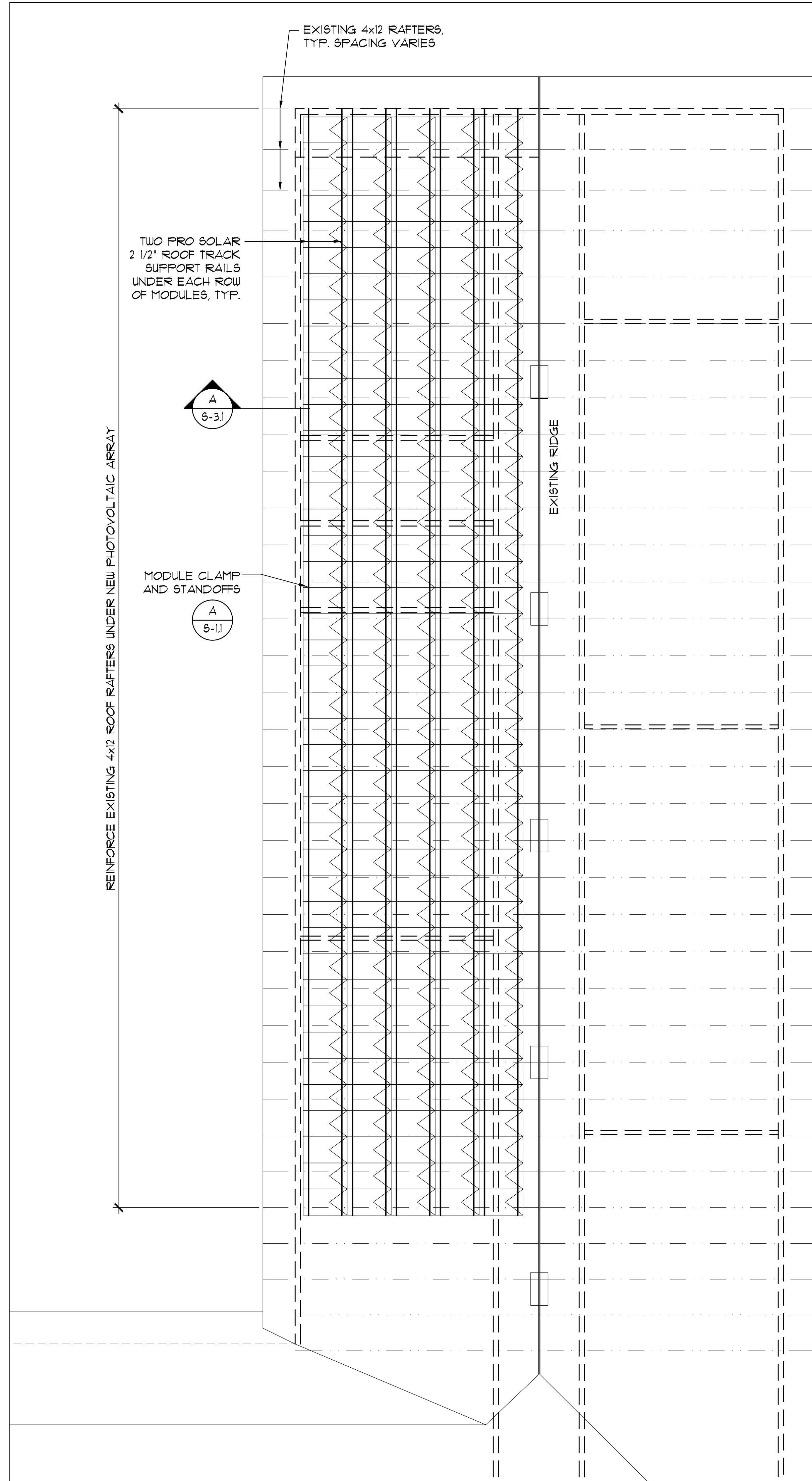
NOTE: AT JOISTS TO BE REINFORCED, REMOVE EXISTING WOOD BLOCKING NEAR MIDSPAN AND REPLACE WITH THIS STEEL BLOCKING.

MIDSPAN BLOCKING DETAIL (C) 6-11
SC: 1 1/2" = 1'-0"

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PHOTOVOLTAIC RENEWABLE ENERGY SYSTEM FOR BUILDING 300					
DIAMOND HEAD		OAHU	HAWAII		
GENERAL NOTES AND TYPICAL DETAILS					
TANIMURA & ASSOCIATES, INC.			JOB NO.	DRAWING NO.	
DESIGN BY: AL	CHECKED BY: TT	CA-1105-C	S-1.1		
DRAWN BY: AL	APPROVED BY: TT	DATE	SHEET		
SCALE: AS NOTED	JUN 2012	2			8
			SHTS.		



LICENSE EXPIRATION: APRIL 30, 2016
Adrian Lee
 This work was prepared by me or under my supervision. Generation of this Project will be under my observation.



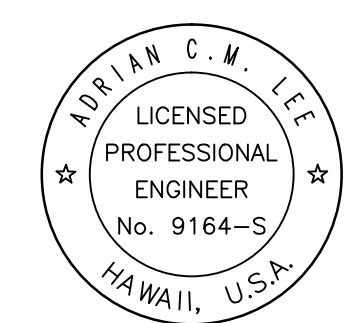
KEY PLAN

- NOTES:
1. LEAVE EXISTING ROOF INTACT.
 2. REINFORCE EXISTING ROOF RAFTERS AS SHOWN BEFORE INSTALLING NEW PHOTOVOLTAIC ARRAY.
 3. NEW MOUNTING RAILS ARE SHOWN 8" FROM EACH END OF THE PHOTOVOLTAIC MODULES. VERIFY WITH MANUFACTURER.

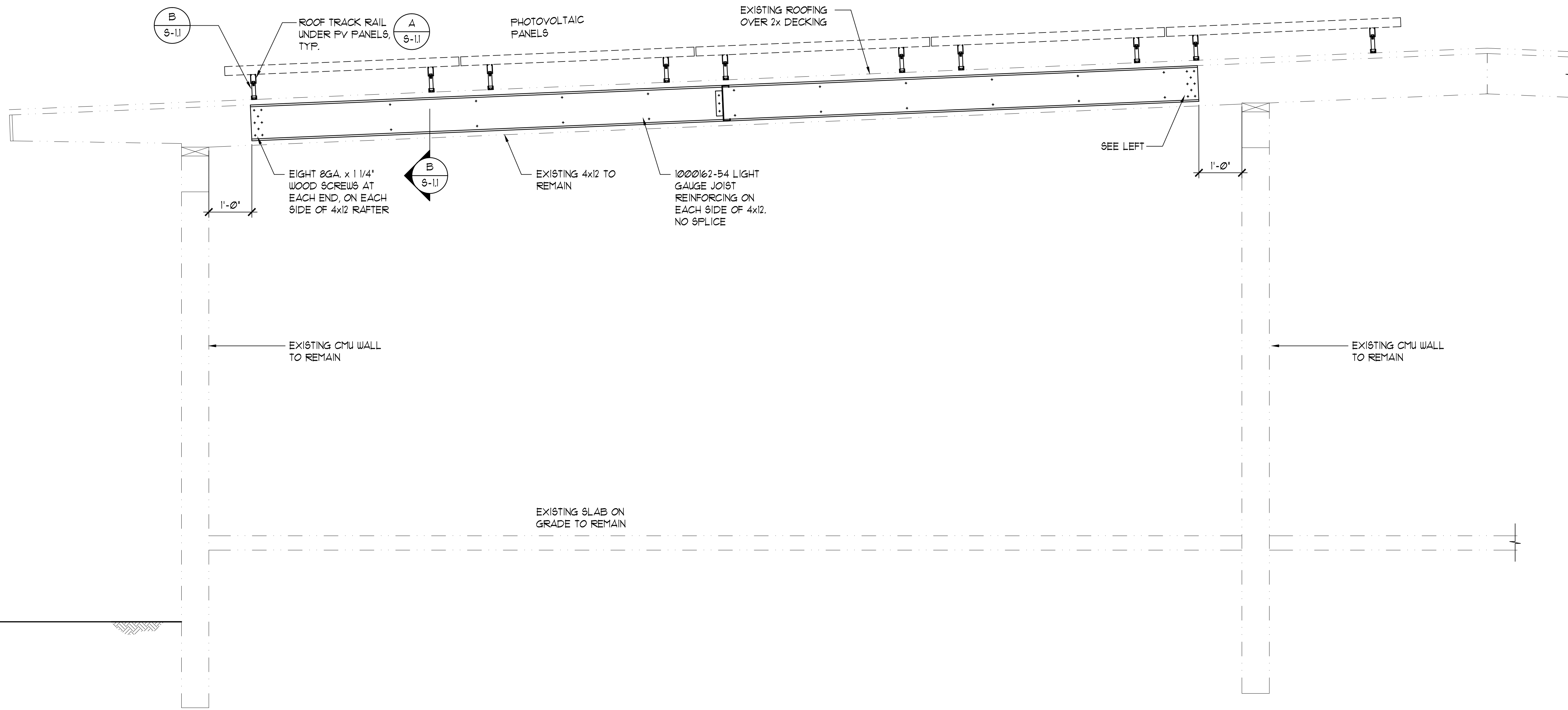
STRUCTURAL ROOF PLAN

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

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DIAMOND HEAD		OAHU	HAWAII		
STRUCTURAL ROOF PLAN					
TANIMURA & ASSOCIATES, INC.			JOB NO.	DRAWING NO.	
DESIGN BY: AL	CHECKED BY: TT	DATE: JUN 2012	CA-1105-C	S-2.1	
DRAWN BY: AL	APPROVED BY: TT	SCALE: AS NOTED	DATE: JUN 2012	SHEET 3	OF 8 SHEETS

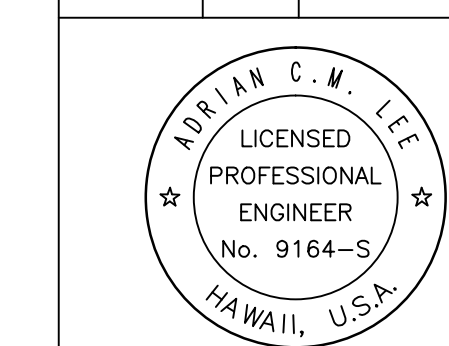
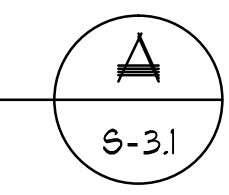


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Adrian Lee
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SECTION THROUGH BUILDING

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



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PHOTOVOLTAIC RENEWABLE ENERGY SYSTEM FOR BUILDING 300						
DIAMOND HEAD		OAHU	HAWAII			
SECTION						
TANIMURA & ASSOCIATES, INC.		JOB NO.	DRAWING NO.			
DESIGN BY: AL	CHECKED BY: TT	CA-1105-C	S-3.1			
DRAWN BY: AL	APPROVED BY: TT	DATE	SHEET			
SCALE: AS NOTED	JUN 2012	4	OF 8 SHEETS			

PHOTOVOLTAIC SYSTEM LEGEND			
SYMBOLS			DESCRIPTION
EXIST	NEW	MTG HT	
PHOTOVOLTAIC			
			PHOTOVOLTAIC ROOF MOUNTED MODULE
			PV COMBINER BOX, COMBINER #1 SHOWN
ELECTRICAL LEGEND			
		18" FLR-4	JUNCTION BOX, STANDARD, WALL MOUNTED
			JUNCTION BOX, STANDARD, CEILING MOUNTED
			PULL & JUNCTION BOX, SIZE PER NEC
		-	DISCONNECT SWITCH, HP RATED
		-	PANELBOARD OR LOADCENTER
		18" FLR-4	RECEPTACLE, DUPLEX, NEMA 5-20R
		18" FLR-4	RECEPTACLE, GFCI
			HOMERUN RACEWAY & WIRING
			FLEXIBLE RACEWAY & WIRING
			RACEWAY & WIRING, UNDERGROUND
			RACEWAY & WIRING, EXPOSED
			RACEWAY & WIRING, CONCEALED IN FLOOR OR BELOW GRADE
			ELECTRICAL RACEWAY & WIRING, HATCHMARKS INDICATE NO. OF CURRENT CARRYING CONDUCTORS. NO HATCH MARKS INDICATE TWO CURRENT CARRYING CONDUCTORS. PROVIDE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR SIZED PER NEC.
COMMUNICATION LEGEND			
		18" FLR-4	DATA OUTLET, SINGLE JACK

GENERAL NOTES:

- ALL MATERIAL, DEVICE AND WIRING LOCATED OUTDOORS SHALL BE RATED FOR WET CONDITIONS.
- ALL EQUIPMENT SHALL BE CAPABLE OF FITTING IN THE SPACES LOCATED WHILE MEETING THE MANUFACTURER'S RECOMMENDED ACCESS REQUIREMENTS. REVIEW ALL SPACES WHERE THE EQUIPMENT IS TO BE INSTALLED PRIOR TO ORDERING THE EQUIPMENT. NOTIFY THE OWNER OF INADEQUATE CLEARANCES OR CONDITIONS THAT WILL PREVENT THE PROPER INSTALLATION, MAINTENANCE, AND OPERATIONS OF THE EQUIPMENT.
- PAINT ALL EXPOSED ELECTRICAL MATERIAL, INCLUDING CONDUIT, JUNCTION BOXES, PANELS, AND DEVICES TO MATCH SURROUNDING FINISH, EXCEPT THOSE IN THE ELECTRICAL ROOMS.
- SEAL ALL PENETRATIONS THROUGH FIRE RATED WALLS AND SLABS USING A U.L. LISTED FIRE RATED SEALANT TO MAINTAIN THE FIRE PROTECTION INTEGRITY OF THE WALLS.
- PROVIDE AN INSULATED GREEN GROUNDING CONDUCTOR, SIZED PER NATIONAL ELECTRICAL CODE, FOR ALL CIRCUITS. INSTALL THIS CONDUCTOR IN ALL RACEWAYS INCLUDING THOSE INSTALLED FOR SWITCH LEGS AND ATTACH TO THE DEVICE, LUMINAIRE, OR EQUIPMENT USING A SUITABLE GROUNDING LUG.
- PROVIDE PULLSTRING IN ALL EMPTY RACEWAYS.
- POWER OUTAGE SHALL BE KEPT TO A MINIMUM. COORDINATE POWER OUTAGES WITH THE OWNER IN WRITING AT LEAST 2 WEEKS PRIOR TO DATE OF ACTUAL POWER OUTAGE.
- THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT FOR TEMPORARY CONSTRUCTION POWER AS REQUIRED.
- SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF WORK, THE CONTRACTOR SHALL MARK SUCH CHANGES ON THE AS-BUILT DRAWINGS. IF THESE CHANGES REQUIRE ALTERNATE METHODS TO THOSE SPECIFIED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SUBMIT DRAWINGS SHOWING THE PROPOSED ALTERNATE METHODS TO THE PROJECT INSPECTOR. THE CONTRACTOR SHALL NOT PROCEED UNTIL APPROVAL IS OBTAINED. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION SHALL NOT BE CONSIDERED AN ITEM FOR EXTRA COST.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. TESTING SHALL BE DONE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- PROVIDE TESTING BY OPERATING THE INSTALLATION AND RUNNING TESTS TO DEMONSTRATE ITS OPERATIONS AND COMPLIANCE WITH THE EQUIPMENT SPECIFICATIONS TEST ALL WIRING AND EQUIPMENT TO INSURE PROPER OPERATION ACCORDING TO FUNCTIONS SPECIFIED HEREIN AND ON THE DRAWINGS.
- WARRANTY:
ALL WORK IN THIS SECTION SHALL BE UNDER WARRANTY FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE WORK AS A WHOLE BY THE CONTRACTING OFFICER. SHOULD ANY EQUIPMENT OR MATERIAL FAIL WITHIN THIS PERIOD, THE CONTRACTOR SHALL REPLACE OR REPAIR THAT ITEM AT NO COST FOR MATERIAL AND/OR SERVICES IF SUCH IS DUE TO FAULTY WORKMANSHIP OR QUALITY OF MATERIAL FURNISHED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO ANY PART OF THE PREMISES CAUSED BY FAILURE IN THE EQUIPMENT FURNISHED AS PART OF THE CONTRACT DRAWINGS FOR A PERIOD OF ONE YEAR AFTER THE FINAL ACCEPTANCE OF THE WORK AS A WHOLE.
- ALL EQUIPMENT SHALL BE DESIGNED AND INSTALLED FOR USE IN A SEISMIC ZONE 2A AREA.
- REPAIR ANY DAMAGE TO EXISTING CONSTRUCTION RESULTING FROM THE INSTALLATION OF ELECTRICAL ITEMS. THE AREAS REPAIRED SHALL MATCH THE ADJACENT SURFACES IN TEXTURE AND COLOR.
- THE DRAWINGS AND THE SPECIFICATIONS ARE NOT FABRICATION DRAWINGS OR STEP BY STEP INSTRUCTIONS. THEIR INTENT IS TO ESTABLISH THE MINIMUM STANDARD OF PERFORMANCE THAT IS ACCEPTABLE FOR THE PROJECT. ALL THE WORK AND EVERY DEVICE IS NOT NECESSARILY DESCRIBED OR INDICATED, THE CONTRACTOR IS EXPECTED TO INCLUDE IN HIS BID BY HIS FORESIGHT FROM PREVIOUS EXPERIENCE OR WITH A DOLLAR CONTINGENCY AMOUNT FOR UNFORESEEN EXPENSES. THE CONTRACTOR SHOULD BE FAMILIAR WITH ARCHITECTURAL, STRUCTURAL, CIVIL PLANS, ETC. BEFORE MAKING A BID. IF THE CONTRACTOR NEEDS STEP BY STEP INSTRUCTIONS TO COMPLETE THIS WORK OR IF HE IS NOT FAMILIAR WITH THE LOCAL CODES OR THE TYPE OF SYSTEMS BEING INSTALLED. HE IS ADVISED NOT TO SUBMIT A BID OR TO WORK ON THIS PROJECT. FIELD MEASURING AND COORDINATING WITH OTHER TRADES IS MANDATORY. ALTHOUGH THEY SHOULD BE SIMILAR TO THE ACTUAL DIMENSIONS, THE ENGINEER IS NOT GUARANTEED THE ACCURACY OF THE DIMENSIONS OF THE WORK SHOWN. DO NOT SCALE DIMENSIONS OFF OF THE PLANS FOR FABRICATIONS. VERIFY WITH FIELD MEASUREMENT. COORDINATE EACH EQUIPMENT SIZE WITH THE LOCATION WHERE IT IS TO BE INSTALLED BEFORE ORDERING. NOTIFY ENGINEER IF SPACE DOES NOT ALLOW FOR EQUIPMENT SPECIFIED. ALL SUCH DIMENSIONS SHALL BE VERIFIED BY THE CONTRACTOR AND IT IS HIS RESPONSIBILITY TO FIT WORK INTO SPACE ALLOWED. ALL OFFSETS AND SMALL CHANGES IN ROUTING ARE CONSIDERED A PART OF THE SCOPE OF THE BASE BID FOR THIS PROJECT AND SHALL BE APPROVED BEFORE INSTALLATION.
- CONTRACTOR SHALL VERIFY EXACT LOCATION AND REQUIREMENTS FOR ALL EQUIPMENT BEFORE INSTALLING.
- LOCATIONS SHOWN ARE APPROXIMATE AND CONTRACTOR SHALL SELECT LOCATIONS TO SUIT FIELD CONDITIONS SUBJECT TO APPROVAL. "AS-BUILT" DRAWINGS SHALL BE SUBMITTED BY CONTRACTOR INDICATING ALL DEVIATIONS.
- ALL WIRES SHALL BE IN 3/4 INCH MINIMUM CONDUIT. CONDUIT SHALL NOT EXCEED 100 FEET AND OR MORE THAN A TOTAL OF 360 DEGREES IN BENDS BETWEEN PULL BOXES.
- LABEL ALL WIRE, BOXES, AND CONDUITS.
- ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH THE 2008 NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, NFPA, AND ALL LOCAL AUTHORITIES HAVING JURISDICTION.
- VERIFY EXISTING ELECTRICAL SYSTEMS AND CONDITIONS PRIOR TO START OF WORK.
- DEVICE SHALL BE U.L. APPROVED OR TESTED AND APPROVED BY THE NATIONALLY RECOGNIZED LAB.
- FURNISH ALL CONDUITS, RACEWAYS, CONDUCTORS, DISCONNECTS, COMBINER BOXES, PULL BOXES, HANDHOLES, JUNCTION BOXES, DEVICES, AND OTHER MATERIALS NECESSARY FOR COMPLETE OPERATIONAL ELECTRICAL SYSTEMS.
- ELECTRICAL SERVICE INSTALLATION COORDINATION IS THE RESPONSIBILITY OF THE CONTRACTOR, ALL PROVISIONS OF THE ELECTRICAL SERVICE INSTALLATION MANUAL HECO HAWAIIAN ELECTRIC COMPANY, INC. AND EUSERC SHALL BE FOLLOWED AND ADHERED TO.
- ELECTRICAL CONTRACTOR SHALL NOTE ANY EXISTING ELECTRICAL CODE ISSUES AND REPORT THEM TO THE OWNER AND THE ELECTRICAL ENGINEER.
- ENERGY SYSTEM POINT OF CONNECTION SHALL MEET REQUIREMENTS OF NEC 690.84, PROPERLY SIZE KAIC RATING OF BREAKERS.
- PV MODULES AND EQUIPMENT SHALL BE INSTALLED ACCORDING TO MECHANICAL AND STRUCTURAL ENGINEER REQUIREMENTS.
- CONDUCTOR LISTING SHALL MATCH THE INTENDED USE.
- INSTALL ALL EQUIPMENT IN ACCORDANCE WITH NEC ARTICLE 690.

GENERAL NOTES (CONTINUED):

- FOR GFCI CIRCUIT TO FUNCTION, THE SOLAR ARRAY GROUND MUST BE CONNECTED TO THE PV ARRAY POSITIVE OR NEGATIVE LEADS. BONDING OF THE SAFETY GROUND TO THE GROUNDED LEG OF THE ARRAY ANYWHERE BUT THE INVERTER WILL BYPASS GFCI.
- CAPACITY OF CONDUCTORS IS ADJUSTED FOR INSTANCES WHERE THERE WERE MORE THAN THREE CURRENT-CARRYING CONDUCTORS IN A RACEWAY. 80% FACTOR IS USED IF THE MAX # IS 6.
- PVC SHALL BE SCHEDULE 80 IN EXTERIOR AREAS PRONE TO MECHANICAL STRESS. ALL OTHER EXTERIOR AREAS PVC SHALL BE SCHEDULE 40. METALLIC RACEWAYS SHALL BE USED AT ALL BUILDING INTERIOR LOCATIONS.
- ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ALL LOCAL AUTHORITIES AND UTILITIES HAVING JURISDICTION PRIOR TO ORDERING EQUIPMENT AND PRIOR TO INSTALLATION/LOCATION OF EQUIPMENT.
- ALL PV CONDUCTORS SHALL BE THWN-2.
- ELECTRICAL CONTRACTOR SHALL MEASURE VOLTAGE OF EACH STRING OF P.V. ARRAYS WITH FUSE REMOVED. ELECTRICAL CONTRACTOR SHALL VERIFY THAT NO STRING DEVIATES MORE THAN 5% FROM THE ARRAY. IF STRING VARIATION IS MORE THAN 5% THIS SHALL BE INVESTIGATED AND THEN REPORTED TO THE ENGINEER.
- ELECTRICAL CONTRACTOR SHALL MEASURE VOLTAGE AT EACH COMBINER BOX. ELECTRICAL CONTRACTOR SHALL MEASURE EACH DC VOLTAGE FEED AT THE INVERTER. ELECTRICAL CONTRACTOR SHALL VERIFY THAT VOLTAGE DROP OF EACH DC RUN FROM COMBINER TO INVERTER DOES NOT DROP MORE THAN 1.5%. IF VOLTAGE DROP IS MORE THAN 1.5% THIS SHALL BE INVESTIGATED AND REPORTED TO THE ENGINEER.
- ELECTRICAL CONTRACTOR SHALL TAKE THE NECESSARY SAFETY PRECAUTIONS TO INSURE THAT NO PERSON IS EXPOSED TO DANGEROUS LEVELS OF VOLTAGE OF CURRENT WITHOUT THE NECESSARY SAFETY EQUIPMENT AND PROCEDURES IN PLACE. CONSTRUCTION AREAS SHALL BE SECURED AND PROPER SIGNAGE BE IN PLACE, OSHA REGULATIONS SHALL BE ADHERED TO.
- ELECTRICAL CONTRACTOR SHALL VERIFY THAT PV INVERTER WILL AUTOMATICALLY SHUTDOWN WHEN THE UTILITY LINE POWER IS LOST. ELECTRICAL CONTRACTOR SHALL VERIFY THAT THE PV INVERTER WILL COME ONLINE (AFTER 5 MINUTES) ONCE UTILITY LINE POWER IS RESTORED. IF ANY EQUIPMENT FAILS TO FUNCTION, INFORM THE ENGINEER.
- ELECTRICAL CONTRACTOR SHALL CONFIRM AND TEST THE GROUND FAULT PROTECTIVE DEVICES (GFPD) WORKS PROPERLY.
- ELECTRICAL CONTRACTOR SHALL CONFIRM THAT THE INVERTER POWER GENERATION (KW) SHOWN IN THE INVERTER INSTRUMENTATION MATCHES ACTUAL KW PRODUCED.
- EXTERNAL AC DISCONNECTS, AND INVERTER AC DISCONNECTS SHALL BE LABELED "WARNING, ELECTRICAL SHOCK HAZARD. DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINES SIDE AND THE LOADS SIDE MAY BE ENERGIZED IN THE OPEN POSITION."
- PROVIDE ALL JUNCTION AND PULLBOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT, WHETHER OR NOT SPECIFICALLY INDICATED ON THE PLANS. SIZE BOXES PER THE NATIONAL ELECTRICAL CODE.

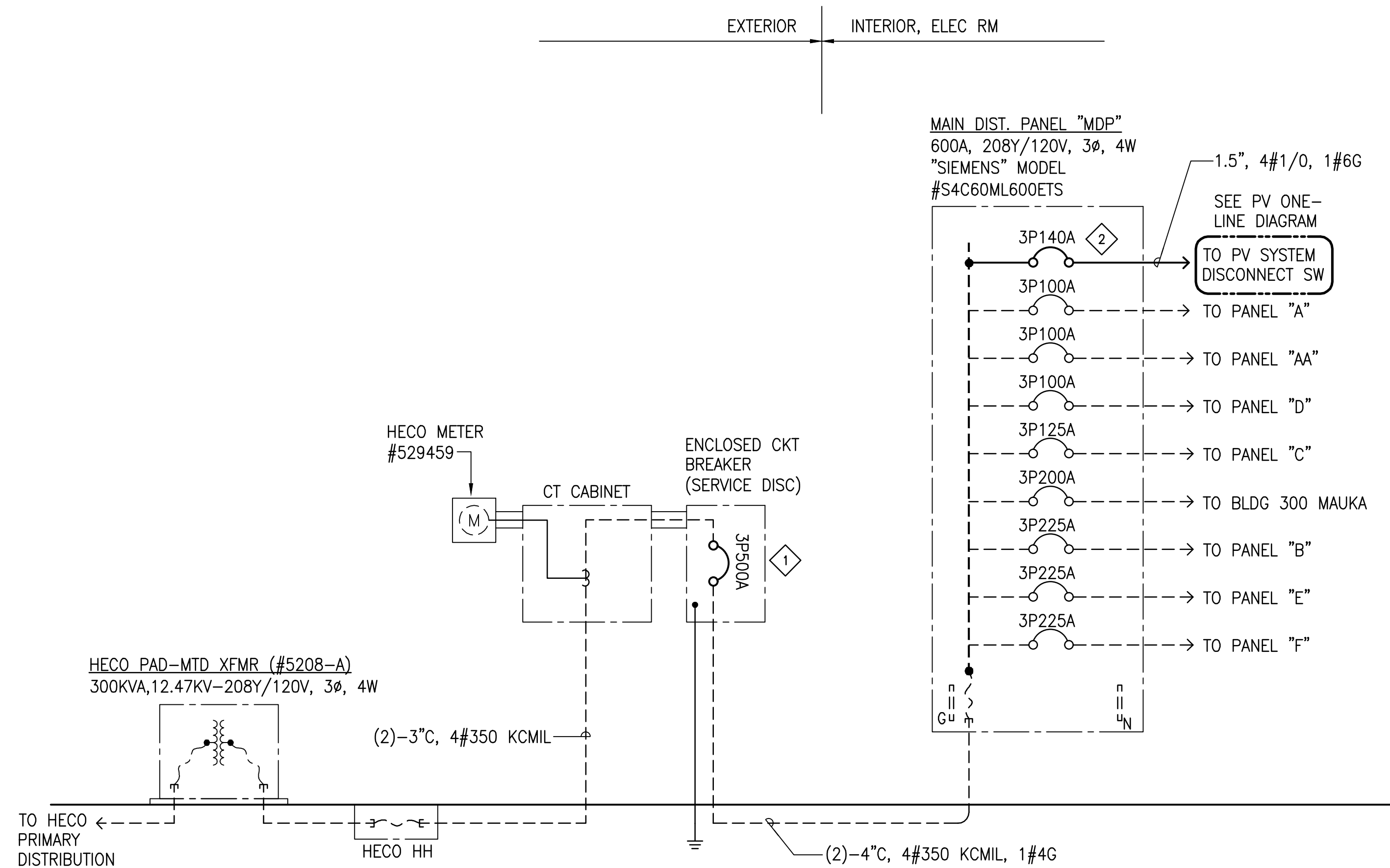
PV GENERAL NOTES:

- PHOTOVOLTAIC SYSTEM FOR BUILDING 300, FORT RUGER; PROVIDE DC PHOTOVOLTAIC (PV) SYSTEM INCLUDING, BUT NOT LIMITED TO, PV PANELS, PANEL MOUNTING SYSTEMS, PV INVERTERS, COMBINER BOXES, AC & DC DISCONNECT SWITCHES, CONDUIT & WIRING ON THE EXISTING ROOF OF THE BUILDING 300. WORK SHALL INCLUDE DESIGN, PERMITS, PURCHASE, SUPPLY, INSTALLATION, TESTING, AND COMMISSIONING OF THE SYSTEM, INCLUDING ALL APPURTENANCES AND INCIDENTAL ITEMS NECESSARY FOR A TURN-KEY, FULLY OPERATIONAL GRID-TIE SYSTEM.
- PV PANELS SHALL BE HIGH EFFICIENCY CRYSTALLINE SOLAR CELLS AND HAVE NO LESS THAN 13% PANEL EFFICIENCY, 10 YEAR PRODUCT WARRANTY AND A 25 YEAR PERFORMANCE WARRANTY. PV PANELS SHALL BE INSTALLED ON THE ROOF WITHIN THE DESIGNATED AREAS AS SHOWN ON THE ARCHITECTURAL/ELECTRICAL DRAWINGS. PV INSTALLATION SHALL NOT VOID THE WARRANTY OF THE ROOF SYSTEM. THE CONTRACTOR SHALL CONFIRM THE ABILITY OF THE BUILDING TO ACCOMMODATE THE ADDITIONAL COLLATERAL LOAD OF THE PV PANELS AND ACCOMPANYING MOUNTING HARDWARE.
- THE PV INVERTER SHALL BE IEEE 1547 QUALIFIED, HIGH-EFFICIENCY UTILITY GRADE AND RATED FOR EXTERIOR USE WITH SEALED ELECTRONICS. THE INVERTER SHALL BE RATED FOR OUTDOOR USE WITH PROTECTION FROM WEATHER IF NECESSARY AND SHALL HAVE A 10 YEAR MANUFACTURER'S WARRANTY.
- THE COMBINER BOX AND JUNCTION BOXES SHALL BE NEMA-3R. LOCATION AND NUMBER OF BOXES SHALL MATCH THE PV SYSTEM DESIGN.
- THE CONTRACTOR SHALL COORDINATE AND WORK WITH HECO ON INSTALLATION OF THE INTERCONNECTION FACILITIES. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL REQUIRED EQUIPMENT ON THE BUILDING'S SIDE OF THE INTERCONNECTION. LOCATION OF THE AC DISCONNECT SWITCH SHALL BE ACCESSIBLE 24 HOURS A DAY AND APPROVED BY HECO.
- THE CONTRACTOR SHALL SUBMIT PV SYSTEM DRAWINGS TO THE ENGINEER FOR APPROVAL. DRAWINGS SHALL INCLUDE PLANS, ONE-LINE DIAGRAMS, INSTALLATION DETAILS AND EQUIPMENT DATA.
- THE PV SYSTEM INSTALLER SHALL REFER TO DESIGNED DRAWINGS FOR SPECIAL REQUIREMENTS FOR ANY WORK TO BE PERFORMED ON THE BUILDING'S ROOF. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE ROOF PRIOR TO CONSTRUCTION AND COORDINATE CONSTRUCTION/REPAIR OF ALL ROOFING RELATED WORK IN CONFORMANCE WITH THE ROOFING MANUFACTURER'S REQUIREMENTS TO MAINTAIN THE INTEGRITY OF THE ROOFING WARRANTY.

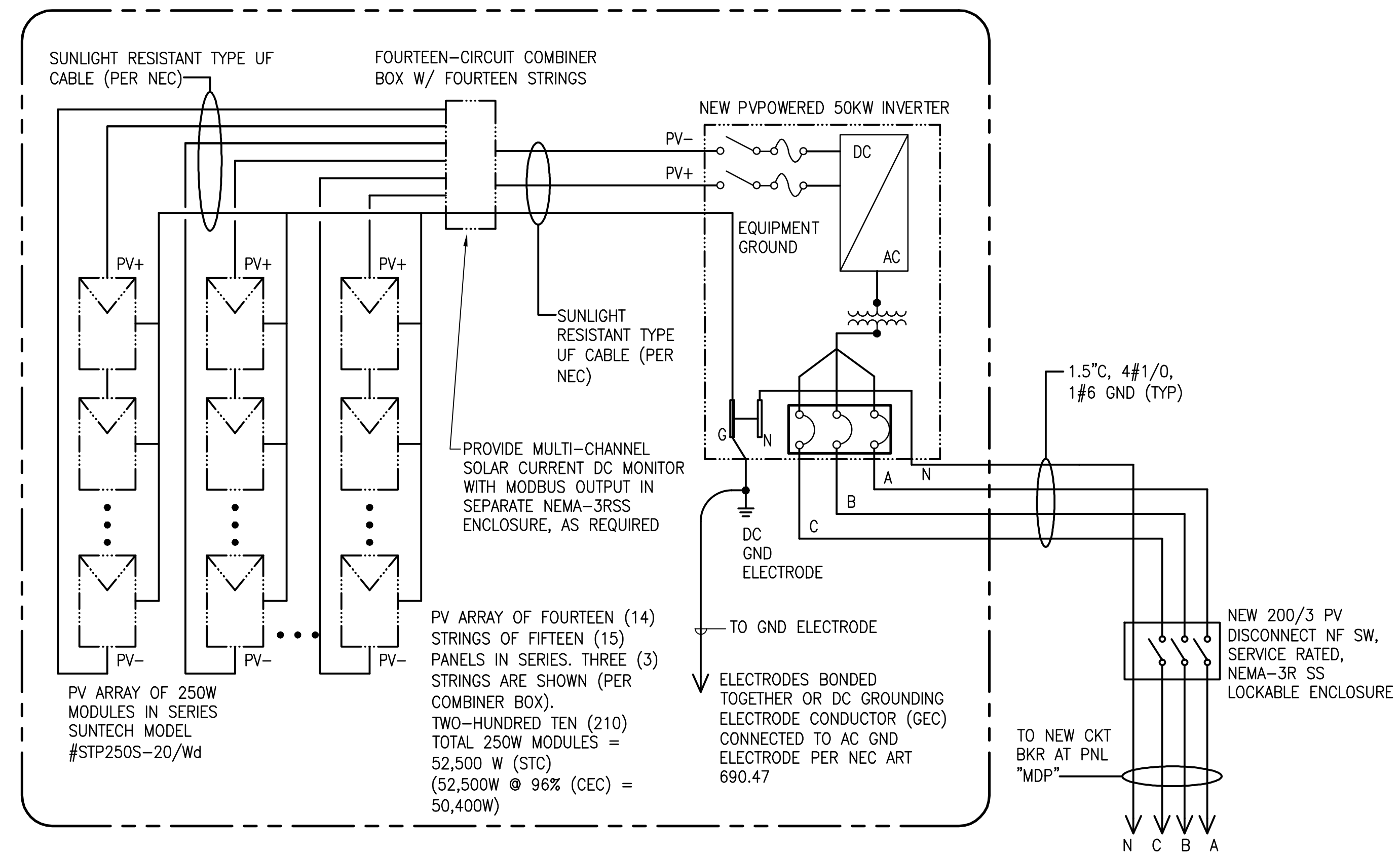
REVISION NO.	SYMBOL	DESCRIPTION	SHEET OF	DATE	APPROVED:
DEPARTMENTS OF THE ARMY AND AIR NATIONAL GUARD OF HAWAII OFFICE OF THE ENGINEER, FORT RUGER, HAWAII					
PHOTOVOLTAIC RENEWABLE ENERGY SYSTEM FOR BUILDING 300					
DIAMOND HEAD		OAHU	HAWAII		
ELECTRICAL LEGEND, GENERAL NOTES, PV NOTES					
INSYNERGY ENGINEERING, INC.			JOB NO.	DRAWING NO.	
DESIGN BY: SN	CHECKED BY: CM	DATE: CA-1105-C			
DRAWN BY: KR	APPROVED BY: GM	DATE: JUN 2012			
SCALE: AS NOTED			SHEET 5	SHTS. 8	

LICENSE EXPIRATION: APRIL 30, 2016
Garrett A. Masuda
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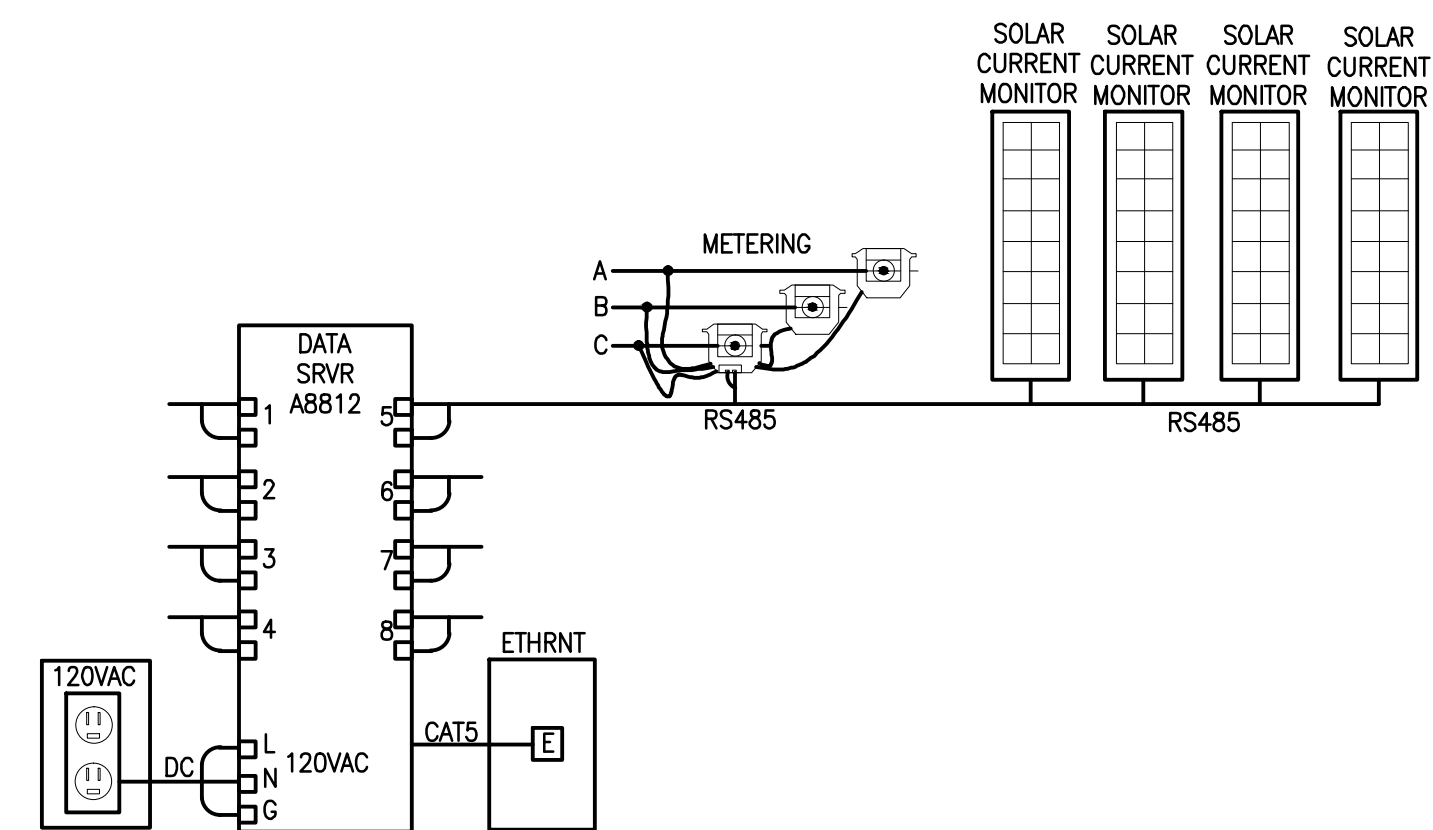
FILE DRAWER FOLDER



1 BUILDING 300, ONE-LINE DIAGRAM
E-2 NOT TO SCALE



2 BUILDING 300, PV ONE-LINE DIAGRAM
E-2 NOT TO SCALE

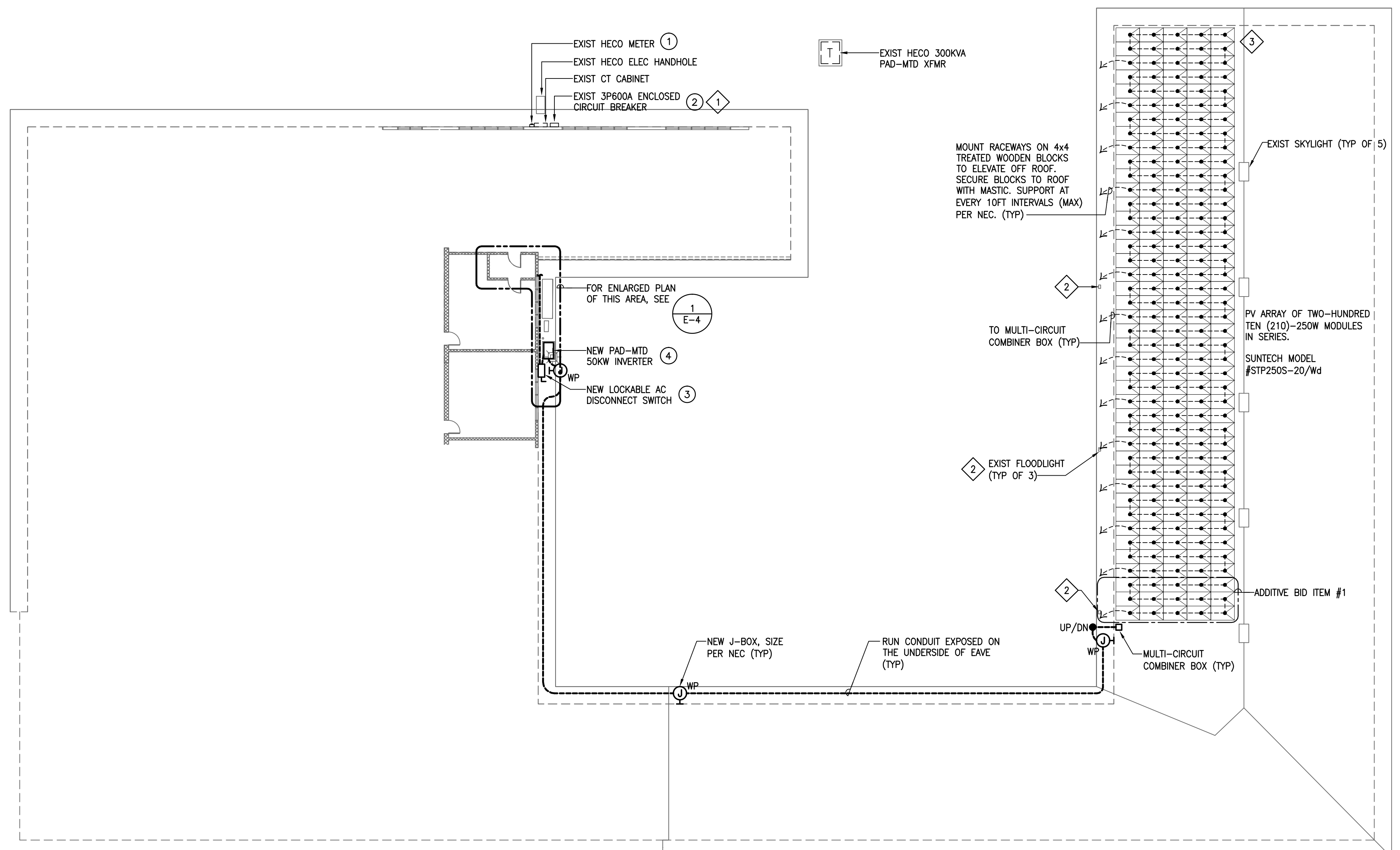


3 BUILDING 300, METERING DIAGRAM
E-2 NOT TO SCALE

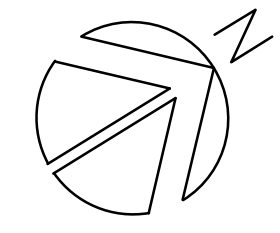
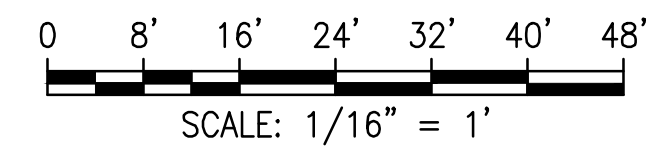
WORK NOTES:

- 1 REPLACE EXISTING 3P600A ENCLOSED CKT BREAKER (SIEMENS SENTRON #LXD63B600, SERVICE DISCONNECT), WITH NEW 3P500A BREAKER, IN EXISTING ENCLOSURE.
- 2 UTILIZE EXIST EMPTY CIRCUIT BREAKER SPACE AND PROVIDE NEW 3P150AF/140AT PV SYSTEM BREAKER. CIRCUIT BREAKER SHALL BE CAPABLE OF REVERSE FEED (BACKFED OVERCURRENT DEVICE).
- 3 PROVIDE LABELS W/ OPERATING CURRENT AND VOLTAGE DATA, FOR NEW PHOTOVOLTAIC SYSTEM ELECTRICAL EQUIPMENT.

REVISION NO.	SYMBOL	DESCRIPTION	SHT. OF.	DATE	APPROVED:
DEPARTMENTS OF THE ARMY AND AIR NATIONAL GUARD OF HAWAII OFFICE OF THE ENGINEER, FORT RUGER, HAWAII PHOTOVOLTAIC RENEWABLE ENERGY SYSTEM FOR BUILDING 300 DIAMOND HEAD OAHU HAWAII ONE-LINE, PV ONE-LINE, PV METERING DIAGRAM					
		INSYNERGY ENGINEERING, INC. JOB NO. DRAWING NO. DESIGN BY: SN CHECKED BY: GM CA-1105-C E-2 DRAWN BY: KR APPROVED BY: GM DATE SHEET SCALE: AS NOTED JUN 2012 6 OF 8 SHTS.			



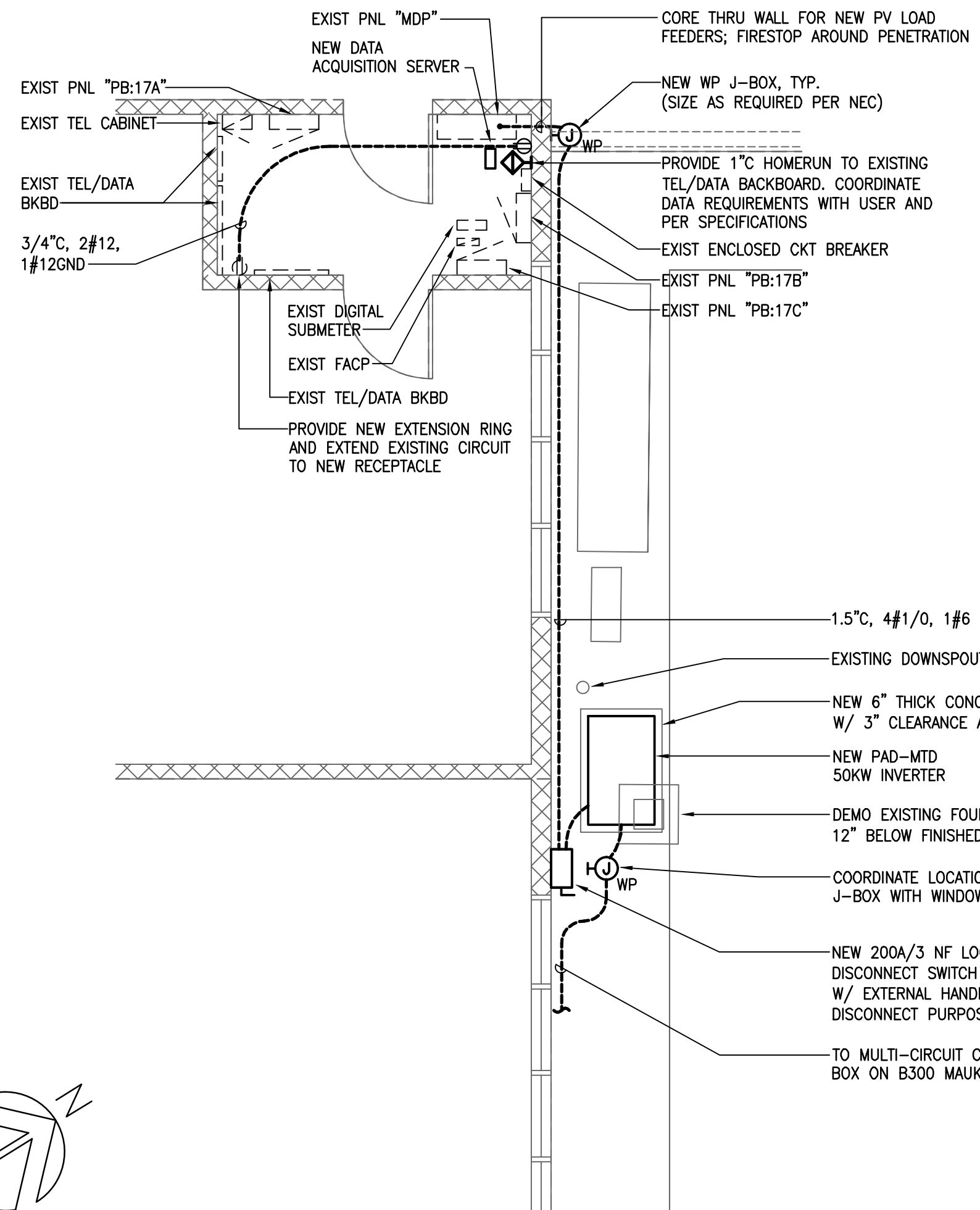
1
E-2 **BUILDING 300 - NEW PV ROOF PLAN**
SCALE: 1/16" = 1'0"



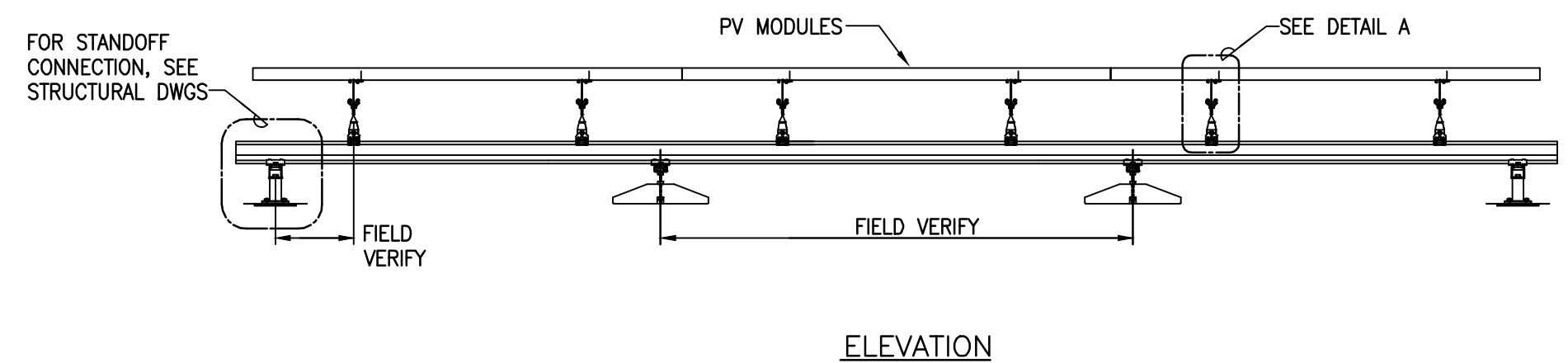
- LABELS:**
- ① INTERACTIVE PHOTOVOLTAIC POWER FLOWING THROUGH THIS PANEL
POWER TO THIS METER IS ALSO SUPPLIED BY A SOLAR PHOTOVOLTAIC SYSTEM
 - ② PHOTOVOLTAIC SYSTEM AC DISCONNECT LOCATED IN THE COURTYARD AREA, ADJACENT TO INVERTER
 - ③ PHOTOVOLTAIC SYSTEM AC DISCONNECT
 - ④ PHOTOVOLTAIC DC DISCONNECT TRANSFORMERLESS INVERTER #1
WARNING: ELECTRICAL SHOCK HAZARD THE DC CONDUCTORS OF PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

- WORK NOTES:**
- ① PROVIDE NEW 3P500A BREAKER, IN EXISTING CIRCUIT BREAKER ENCLOSURE.
 - ② EXISTING CONDUIT MOUNTED FLOODLIGHTS. ADJUST THE HEIGHT OF EXIST FLOOD LIGHTS TO 12" ABOVE ROOF.
 - ③ PROVIDE HYDROSTOPPING BELOW PHOTOVOLTAIC MODULES, EXTENDING TO 5 FEET BEYOND MODULES OR TO THE ROOF EDGE.

REVISION NO.	SYMBOL	DESCRIPTION	SHT. OF	DATE	APPROVED:
DEPARTMENTS OF THE ARMY AND AIR NATIONAL GUARD OF HAWAII OFFICE OF THE ENGINEER, FORT RUGER, HAWAII PHOTOVOLTAIC RENEWABLE ENERGY SYSTEM FOR BUILDING 300 DIAMOND HEAD OAHU HAWAII NEW PV ROOF PLAN					
		INSYNERGY ENGINEERING, INC. DESIGN BY: SN DRAWN BY: KR SCALE: AS NOTED		JOB NO. CA-1105-C CHECKED BY: GM APPROVED BY: GM DATE: JUN 2012	
LICENSE EXPIRATION: APRIL 30, 2016 <i>Garrett A. Masuda</i> <small>This Work was prepared by me or under my Supervision. Construction of this Project will be under my Observation.</small>			DRAWING NO. E-3 SHEET 7 OF 8 SHTS.		

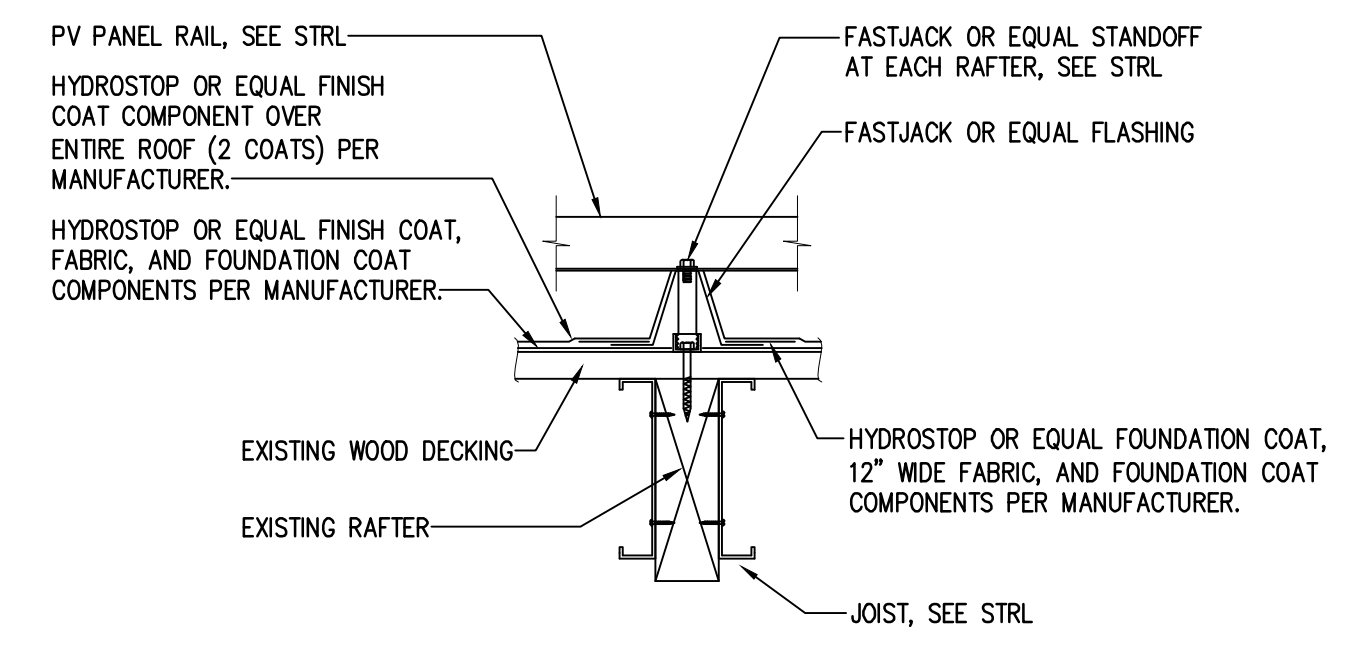
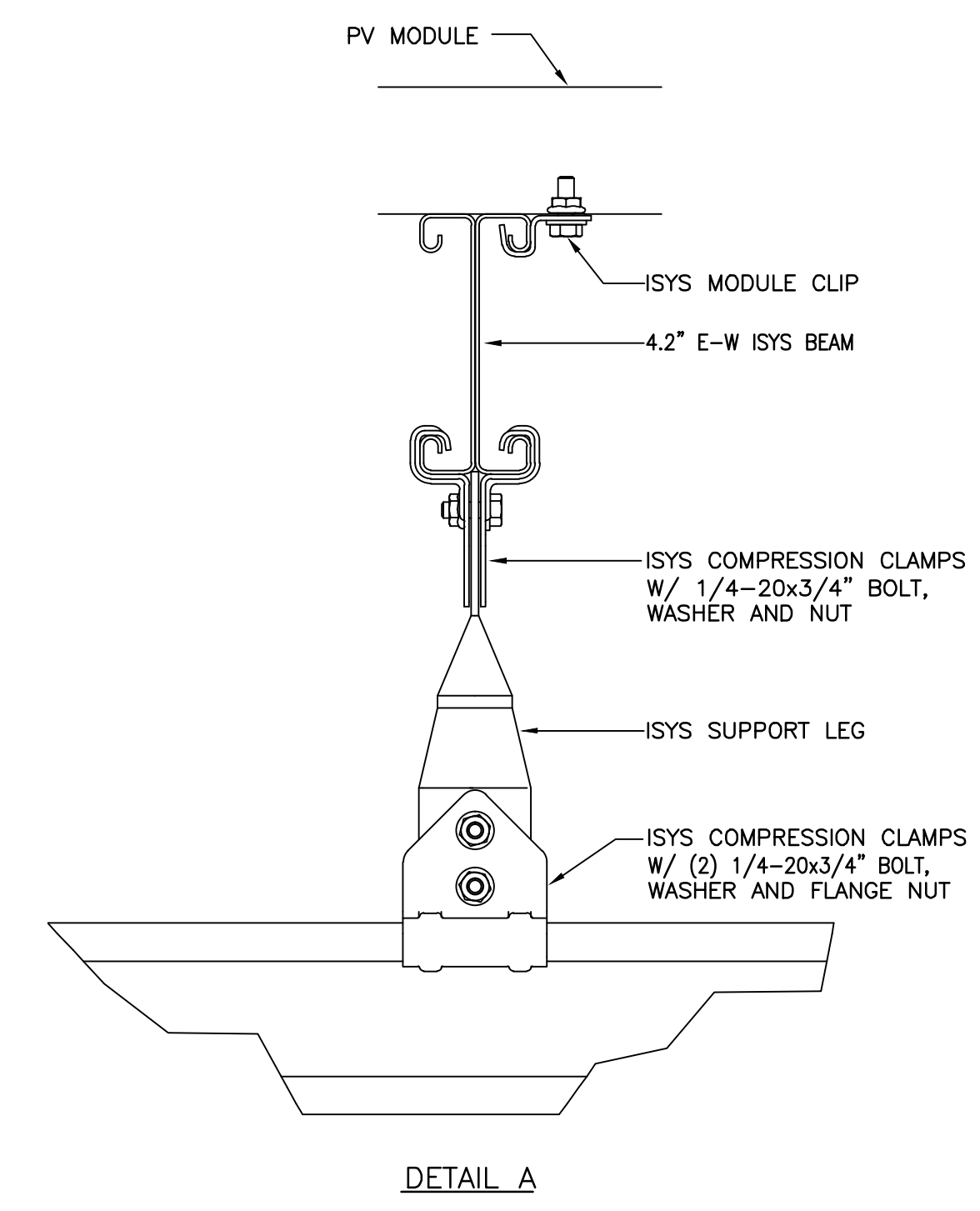


1 BUILDING 300 - ELECTRICAL ROOM PLAN
 SCALE: 1/4" = 1'0"
 0 2' 4' 6' 8' 10' 12'
 SCALE: 1/4" = 1'



- NOTE:**
1. MOUNTING SYSTEM DETAILS ARE PROVIDED AS AN AID TO ASSIST WITH PLANNING THE INSTALLATION OF THE PV MOUNTING SYSTEM. CONTRACTOR SHALL FIELD VERIFY PV MODULE RAIL AND STANDOFF CONNECTIONS, BASED ON ACTUAL EQUIPMENT SUPPLIED.
 2. TORQUE ALL 1/4" BOLTS TO 10FT-LBS, UNLESS NOTED OTHERWISE
 3. PANEL TILT SHALL FOLLOW ROOF SLOPE, TO COMPLY TO SHPD REQUIREMENTS.

2 MOUNTING DETAILS
 SCALE: NTS



3 STANDOFF DETAIL
 SCALE: NTS

REVISION NO.	SYM.	DESCRIPTION	SHT. OF	DATE	APPROVED:
DEPARTMENTS OF THE ARMY AND AIR NATIONAL GUARD OF HAWAII OFFICE OF THE ENGINEER, FORT RUGER, HAWAII PHOTOVOLTAIC RENEWABLE ENERGY SYSTEM FOR BUILDING 300 DIAMOND HEAD OAHU HAWAII ELECTRICAL ROOM PLAN, MOUNTING DETAILS					
INSYNERGY ENGINEERING, INC. DESIGN BY: SN DRAWN BY: KR SCALE: AS NOTED		CHECKED BY: GM APPROVED BY: GM		JOB NO.: CA-1105-C DATE: JUN 2012	DRAWING NO.: E-4 SHEET 8 OF 8 SHTS.

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