KEYNOTES WITH PREFIX 'E' DENOTES EQUIPMENT KEYNOTE.

SEE EQUIPMENT SPECIFICATIONS IN DRAWING PV-1.2

KEYNOTES WITH PREFIX 'P' DENOTES PLACARD KEYNOTE.

KEYNOTES WITH PREFIX 'W' DENOTES WIRING KEYNOTE. SEE

KEYNOTE. SEE KEYNOTES SHOWN IN SAME SHEET.

SEE WIRING SPECIFICATIONS IN DRAWING PV-1.4

WIRING SPECIFICATIONS IN DRAWING PV-1.2

 \mathbf{m}

THIS WORK SHALL CONSIST OF PERFORMING ALL WORK INCLUDING FURNISHING ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES REQUIRED TO CONSTRUCT, CONNECT AND INSTALL THE COMPLETE COMMERCIAL GRADE PHOTOVOLTAIC SYSTEM IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS AND THESE SPECIFICATIONS.

THIS WORK SHALL CONSIST OF DESIGNING, FURNISHING AND INSTALLING A FULLY OPERATIONAL SOLAR PHOTOVOLTAIC (PV) SYSTEM IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS AND THESE SPECIFICATIONS.

THE PV SYSTEM SHALL BE A UTILITY INTERACTIVE ELECTRIC GENERATING SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING THE COMPLETE PV SYSTEM INCLUDING THE FOLLOWING:

SUPPORT SYSTEM FOR ELECTRICAL CONDUITS AND COMPONENTS.

PLANS ARE DIAGRAMMATIC AND ARE INTENDED TO ESTABLISH BASIC DIMENSION OF UNITS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN THE PV SYSTEM IS DELIVERED TO THE JOBSITE.

DEFINITIONS

ARRAY: A MECHANICALLY—INTEGRATED ASSEMBLY OF MODULES, TOGETHER WITH SUPPORT STRUCTURE AND FOUNDATION, THERMAL CONTROL, AND OTHER COMPONENTS, IF USED, TO FORM A DC POWER-PRODUCING UNIT.

CSI: CALIFORNIA SOLAR INITIATIVE.

CEC-AC RATING: RATING AS DEFINED BY THE CSI.

INSOLATION: SUNLIGHT, DIRECT AND/OR DIFFUSE. THE INTEGRATED INTENSITY OF SUNLIGHT REACHING A GIVEN AREA, USUALLY EXPRESSED IN WATTS PER SQUARE METER PER DAY. THIS MEASUREMENT MAY BE USED TO EXPRESS THE AVERAGE AMOUNT OF SOLAR ENERGY FALLING ON DIFFERENT REGIONS OF THE COUNTRY.

PV MODULE: A NUMBER OF SOLAR CELLS CONNECTED TOGETHER ELECTRICALLY AND SEALED INSIDE A WEATHERPROOF PACKAGE WITH A CLEAR FACE.

NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY.

PHOTOVOLTAIC (PV): PERTAINING TO THE DIRECT CONVERSION OF LIGHT INTO ELECTRICITY.

PTC (PVUSA TEST CONDITIONS): TEST CONDITIONS APPLIED TO PV MODULES INTENDED TO REPRESENT WATTAGE DURING OPERATION. IRRADIANCE OF 94.92 WATTS/FT2, 68°F AMBIENT TEMPERATURE, 3.28-FEET/SECOND WIND SPEED, AND AN AIR MASS OF 1.5.

STRING: A NUMBER OF MODULES INTERCONNECTED ELECTRICALLY IN SERIES TO PRODUCE THE OPERATING VOLTAGE REQUIRED BY THE LOAD.

STANDARD TEST CONDITIONS (STC): TEST CONDITIONS APPLIED TO PV MODULES. IRRADIANCE OF 92.94 WATTS/FT2, CELL TEMPERATURE OF 77°F AMBIENT TEMPERATURE, AND AN AIR MASS OF 1.5.

UTILITY-INTERACTIVE INVERTER: AN INVERTER THAT CAN FUNCTION ONLY WHEN ELECTRICALLY CONNECTED TO THE UTILITY GRID, AND USES THE VOLTAGE AND FREQUENCY ON THE UTILITY LINE AS A CONTROL PARAMETER TO ENSURE THAT THE PHOTOVOLTAIC ARRAY'S DC OUTPUT IS CONVERTED TO AC POWER FULLY SYNCHRONIZED WITH THE UTILITY POWER.

SYSTEM DESCRIPTION

PERFORMANCE REQUIREMENTS: THE PV SYSTEM SHALL BE DESIGNED FOR LIFE EXPECTANCY OF 25 YEARS. THE PV SYSTEM SHALL BE SIZED TO MEET OR EXCEED ALTERNATING CURRENT (AC) ENERGY GENERATION REQUIREMENTS AS SHOWN ON THE PLANS. AVAILABLE AREAS FOR MOUNTING PV MODULES ARE SHOWN ON THE PLANS. ALTERNATING CURRENT KILOWATTS OF ENERGY GENERATION SHALL TAKE INTO CONSIDERATION SYSTEM LOSSES, INCLUDING BUT NOT LIMITED TO WIRE LOSSES, FAULT PROTECTION LOSSES, INVERTER EFFICIENCY, AND PV SYSTEM COMPONENT DEGRADATION OVER LIFE EXPECTANCY OF SYSTEM. PV MODULE MANUFACTURER SHALL WARRANT THAT SELECTED PHOTOVOLTAIC MODULES SHALL PRODUCE NO LESS THAN 80 PERCENT OF THE MAXIMUM RATED POWER DURING THE FIRST 20 YEARS OF THEIR SERVICE.

SUBMITTALS

PRE-CONSTRUCTION SUBMITTALS:

PRE-CONSTRUCTION SUBMITTALS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO THE START OF CONSTRUCTION. PRE-CONSTRUCTION SUBMITTALS SHALL INCLUDE THE FOLLOWING: 1. TEST CERTIFICATIONS: WRITTEN RESULTS OBTAINED FROM MANUFACTURER OR INDEPENDENT THIRD PARTY CERTIFICATIONS REQUIRED UNDER "QUALITY ASSURANCE" OF THIS SECTION.

2. PV MANUFACTURER AND PV INSTALLER QUALIFICATIONS: PV MANUFACTURER AND PV INSTALLER SHALL VERIFY MINIMUM

5 YEARS OF PV COMMERCIAL EXPERIENCE. 3. CALIFORNIA CONTRACTORS' LICENSE NUMBER.

MANUFACTURER'S INSTRUCTIONS:

- 4. MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS. INDICATE BY TRANSMITTAL THAT COPIES OF INSTRUCTIONS AND RECOMMENDATIONS HAVE BEEN DISTRIBUTED TO THE INSTALLER. 5. BILL OF MATERIALS (BOM) INCLUDING MANUFACTURER AND
- PART NUMBER. 6. CUT SHEETS OF EACH ITEM LISTED ON THE BOM AND TEST
- CERTIFICATION DATA. 7. WORKING DRAWINGS AND DESIGN CALCULATIONS.

SHOP DRAWINGS:

SHOP DRAWINGS, PV MOUNTING RACK STRUCTURAL CALCULATIONS, AND PV ELECTRICAL SYSTEM ELECTRICAL CALCULATIONS SHALL BE SUBMITTED FOR APPROVAL. SHOP DRAWINGS SHALL SHOW FABRICATION, INSTALLATION, AND FINISH FOR THE PV SYSTEM AND SHALL CONSIST OF THE FOLLOWING:

- 1. FULLY DIMENSIONED PLANS AND ELEVATIONS SHOWING ALL MAJOR COMPONENTS OF THE PV SYSTEM.
- 2. DETAILS OF ELECTRICAL CONDUIT PENETRATION INTO ROOF MEMBERS AND SUPPORT SYSTEM.
- 3. WIRING DIAGRAMS INCLUDING CONDUCTOR IDENTIFICATION (ORIGIN AND DESTINATION) OF ALL POWER AND CONTROL CONDUCTORS.
- 4. ROUGH-IN REQUIREMENTS.
- 5. SYSTEM GROUNDING LOCATIONS.

PRODUCT DATA:

A LIST OF MATERIALS AND EQUIPMENT TO BE INSTALLED AND THE MANUFACTURER'S DESCRIPTIVE DATA SHALL BE SUBMITTED FOR APPROVAL PRIOR TO PROCUREMENT. ANY OTHER DATA AS REQUESTED BY THE ENGINEER SHALL ALSO BE SUBMITTED FOR APPROVAL.

MANUFACTURER'S DESCRIPTIVE DATA SHALL INCLUDE COMPLETE DESCRIPTION, PERFORMANCE DATA, RESULTS OF PV SYSTEM PERFORMANCE ESTIMATE AND INSTALLATION INSTRUCTIONS FOR THE MATERIALS AND EQUIPMENT SPECIFIED HEREIN.

QUALITY ASSURANCE:

PV MANUFACTURER QUALIFICATIONS: COMPANY SPECIALIZING IN MANUFACTURING PV MODULES WITH MINIMUM 5 YEARS DOCUMENTED EXPERIENCE.

PV INSTALLER QUALIFICATIONS: THE INSTALLER SHALL BE A REGISTERED INSTALLER LISTED ON THE CSI DATABASE.

THE INSTALLER SHALL HAVE NORTH AMERICAN BOARD OF CERTIFIED ENERGY PRACTITIONERS (NABCEP) CERTIFICATION, 2 YEARS' EXPERIENCE IN DESIGN AND INSTALLATION OF COMMERCIAL PV SYSTEMS AND PROPER LICENSING.

REGULATORY REQUIREMENTS: PROVIDE SYSTEM MEETING OR EXCEEDING THE REQUIREMENTS OF THE PROJECT PLANS AND CSI WHICHEVER IS MORE STRINGENT. CSI REQUIREMENTS CAN BE FOUND IN THE CSI HANDBOOK. COPIES OF THE HANDBOOK CAN BE FOUND AT THE FOLLOWING WEBSITE:

HTTP://WWW.GOSOLARCALIFORNIA.CA.GOV/DOCUMENTS/

CSI_HANDBOOK.PDF

WARRANTY:

THE MANUFACTURER'S LIMITED WARRANTY SHALL BE: a. SOLAR MODULE - 12-YEAR PRODUCT WARRANTY AND 25-YEAR LINEAR PERFORMANCE WARRANTY.

- b. OPTIMIZERS 25 YEAR WARRANTY
- c. INVERTERS 25 YEARS WARRANTY
- d. LABOR 10 YEAR LABOR WARRANTY INCLUDING REPLACEMENT OF INVERTERS, OPTIMIZERS OR PANELS.
- e. 25 YEARS FREE MONITORING OF MODULE LEVEL PERFORMANCE.

PV SYSTEM

PV SYSTEM COMPONENTS:

PV SYSTEM COMPONENTS SHALL BE FACTORY ASSEMBLED AND TESTED, AND SHALL CONSISTS OF THE FOLLOWING, AS SHOWN ON THE PLANS:

1. PV MODULES

GENERAL NOTES

- 2. UTILITY INTERACTIVE INVERTER CABINET
- 3. CIRCUIT COMBINER BOX
- 4. DC/AC DISCONNECT SWITCHES

PV SYSTEM COMPONENTS SHALL BE SIZED TO THE SYSTEM CAPACITY AND VOLTAGE REQUIREMENTS AS SHOWN ON THE PLANS AND BE DESIGNED TO PROVIDE MAXIMUM POWER POINT TRACKING FOR VOLTAGE AND CURRENT RANGE EXPECTED FROM PHOTOVOLTAIC ARRAY FOR TEMPERATURES AND SOLAR ISOLATION CONDITIONS EXPECTED FOR PROJECT SITE CONDITIONS.

PV SYSTEM SHOWN IS BASED ON SOLAREDGE INVERTERS AND OPTIMIZERS. CONTRACTOR SHALL GUARANTEE IN WRITING THAT THE COMBINED MAXIMUM OUTPUT VOLTAGE OF THE SOLAR MODULE STRINGS IN COMBINATION WITH USE OF THE OPTIMIZERS SHALL NOT EXCEED THE MAXIMUM INPUT VOLTAGE RATING OF THE INVERTERS.

ACCESSORIES: PROVIDE ACCESSORIES SUCH AS FACTORY ASSEMBLED AND SUITABLY SIZED CIRCUIT COMBINER BOXES WITH OVERCURRENT PROTECTION AND BUS BARS AS SHOWN ON THE PLANS AND ANY OTHER ADDITIONAL ITEMS THAT ARE NOT SHOWN BUT ARE REQUIRED FOR THE COMPLETE PV SYSTEM.

CONDUITS, FITTINGS AND CONDUCTORS

ALL CONDUITS AND FITTINGS SHALL BE AS INDICATED ON THE DRAWINGS.

EXECUTION EXAMINATION

THE CONTRACTOR SHALL VERIFY THAT ITEMS PROVIDED UNDER OTHER PORTIONS OF THESE SPECIAL PROVISIONS ARE PROPERLY SIZED AND LOCATED. EXAMINE SUPPORTING MEMBERS TO ENSURE SURFACES ARE AT PROPER ELEVATION AND PV MODULES ARE FREE FROM DIRT OR OTHER DELETERIOUS MATTER.

INSTALLATION

PV MODULE MOUNTING SYSTEM: INSTALL PV MODULES ARRAY AS SHOWN ON PLANS, IN

ACCORDANCE WITH THE PROVISIONS OF THE APPROVED WORKING DRAWINGS, AND AS DESCRIBED HEREIN. PV MODULES MOUNTING SUPPORT SHALL BE DESIGNED TO WITHSTAND LOADING AS SHOWN ON THE PLANS AND IN CONFORMANCE WITH THE LATEST CALIFORNIA BUILDING CODE. MODULE SUPPORT SYSTEMS SHALL BE DESIGNED TO ACCEPT FRAMED PV MODULES.

METAL FRAMED PV MODULES SHALL BE GROUNDED AS SHOWN ON THE PLANS AND IN CONFORMANCE WITH THE LATEST CALIFORNIA ELECTRICAL CODE, ARTICLE 690.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 2 DAYS PRIOR TO INSTALLING THE PV MODULES.

UTILITY INTERACTIVE INVERTER CABINET MOUNTING: UTILITY INTERACTIVE INVERTER CABINET SHALL BE INSTALLED AS SHOWN ON THE PLANS.

CONDUIT

- 1. ALL CONDUITS SHALL BE AS SPECIFIED ON THE PLANS. LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED TO CONNECT EQUIPMENT IN LENGTH UP TO TWO FEET.
- 2. WHERE PRACTICAL, CONDUITS SHALL BE INSTALLED IN GROUPS OF PARALLEL, VERTICAL OR HORIZONTAL RUNS AND AT ELEVATIONS THAT AVOID UNNECESSARY OFFSETS.
- 3. EXPOSED CONDUIT SHALL BE INSTALLED PARALLEL AND AT RIGHT ANGLES TO THE BUILDING LINES.
- 4. CONDUITS SHALL NOT BE PLACED CLOSER THAN 12 INCHES FROM A PARALLEL HOT WATER OR STEAM PIPE OR 3 INCHES FROM SUCH LINES CROSSING PERPENDICULAR TO THE RUNS.
- 5. ALL RACEWAY SYSTEMS SHALL BE SECURED TO THE BUILDING STRUCTURES USING SPECIFIED FASTENERS, CLAMPS AND HANGERS.
- 6. ALL METAL CONDUITS, FITTINGS, AND ELBOWS IN CONTACT WITH SOIL OR CONCRETE SHALL BE WRAPPED WITH A DOUBLE LAYER OF 20-MIL THICK PIPE WRAPPING TAPE.

- 7. SINGLE CONDUIT RUNS SHALL BE SUPPORTED BY ONE HOLE CONDUIT CLAMPS. SINGLE CONDUIT RUNS ON WALLS IN DAMP OR WET LOCATIONS SHALL BE INSTALLED WITH CLAMP BACKS TO SPACE CONDUIT OFF THE SURFACE.
- MULTIPLE CONDUIT RUNS SHALL BE SUPPORTED WITH CONSTRUCTION CHANNEL SECURED TO THE BUILDING STRUCTURE. CONDUITS SHALL BE FASTENED TO CONSTRUCTION CHANNEL WITH CHANNEL COMPATIBLE PIPE CLAMPS.
- 9. RACEWAYS OF DIFFERENT TYPES SHALL BE JOINED USING APPROVED COUPLINGS OR TRANSITION FITTINGS.
- 10. EXPANSION COUPLINGS SHALL BE INSTALLED WHERE CONDUIT CROSSES A BUILDING SEPARATION OR EXPANSION JOINT.
- 11. ALL FLOOR AND WALL PENETRATIONS SHALL BE SEALED WATERTIGHT.

CONDUIT TERMINATIONS

CONDUITS SHALL BE SECURELY FASTENED TO CABINETS, BOXES AND GUTTERS USING 2 LOCKNUTS AND INSULATING METALLIC BUSHING. EMT SHALL BE SECURELY FASTENED TO CABINETS, BOXES AND GUTTERS USING CONNECTORS. CONDUIT TERMINATIONS AT EXPOSED WEATHERPROOF AND CAST BOXES SHALL BE MADE WATERTIGHT USING HUBS.

GROUNDING BUSHINGS WITH BONDING JUMPERS SHALL BE INSTALLED ON ALL CONDUITS.

CONDUCTOR AND CABLE INSTALLATION:

CONDUCTORS SHALL NOT BE INSTALLED IN CONDUITS UNTIL ALL WORK OF ANY NATURE THAT MAY CAUSE INJURY IS COMPLETED. CARE SHALL BE TAKEN IN PULLING CONDUCTORS SO THAT INSULATION IS NOT DAMAGED. AN APPROVED NON-PETROLEUM BASE AND INSULATING TYPE PULLING COMPOUND SHALL BE USED AS NEEDED.

SPLICES AND JOINTS SHALL BE INSULATED WITH INSULATION EQUIVALENT TO THAT OF THE CONDUCTOR.

ALL PRESSURE TYPE CONNECTORS AND LUGS SHALL BE RETIGHTENED AFTER THE INITIAL TEST.

PRIOR TO TESTING. THE INSTALLED PV SYSTEM SHALL BE REVIEWED. APPROVED AND ACCEPTED BY THE FIRE MARSHAL.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPATIBILITY AND ADJUSTMENT OF ALL OPERATING FUNCTIONS OF THE PV SYSTEM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, AND THESE SPECIFICATIONS.

AFTER THE LOCAL ELECTRICAL UTILITY COMPANY REPRESENTATIVE APPROVES THE PV SYSTEM, IT SHALL BE TESTED IN THE PRESENCE OF THE ENGINEER TO DEMONSTRATE THAT IT FUNCTIONS PROPERLY. THE CONTRACTOR SHALL MAKE NECESSARY REPAIRS, REPLACEMENTS, ADJUSTMENTS, AND RETESTS AT THE CONTRACTOR'S EXPENSE.

THE FUNCTIONAL TEST FOR THE COMPLETED PV SYSTEM WILL TAKE PLACE AFTER ALL THE COMPONENTS OF THE PV SYSTEMS HAVE BEEN TESTED AND ALL PUNCH LIST ITEMS HAVE BEEN CORRECTED. THE FUNCTIONAL TEST SHALL CONSIST OF TROUBLE FREE OPERATION OF THE ENTIRE PV SYSTEM FOR 5 CONSECUTIVE DAYS. IN THE EVENT ANY OF THE SYSTEM FAILS TO PERFORM SATISFACTORILY, THE ENTIRE TEST SHALL BE REPEATED AFTER THE DEFICIENCY HAS BEEN CORRECTED.

CLEANING

THE CONTRACTOR SHALL CLEAN SURFACES IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS; REMOVE EXCESS MASTIC, MASTIC SMEARS, FOREIGN MATERIALS, AND OTHER UNSIGHTLY MARKS. THE CONTRACTOR SHALL CLEAN METAL SURFACES EXERCISING CARE TO AVOID DAMAGE. THE CONTRACTOR SHALL CLEAN ENERGY GENERATING SURFACES OF THE PV MODULES TO ENSURE NO OBSTRUCTIONS BLOCK SUNLIGHT.

ABBREVIATIONS

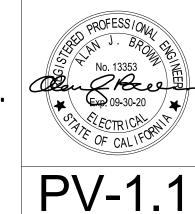
A OR AMP AMPERE AMPS INTERRUPTING CAPACITY AIC CONDUIT CIRCUIT BREAKER CKT CIRCUIT COPPER ELECTRICAL CONDUIT EXISTING GROUND HERTZ INVERTER JUNCTION BOX J-BOX OR JB THOUSAND AMPS INTERRUPTING CAPACITY KAIC KILOVOLT AMP KVA KILOVOLT ΚV KILOWATT ΚW MAXIMUM MAXNEMA NATIONAL ELECTRICAL MANUFACTURER ASSOCIATION PHASE PHOTOVOLTAIC SOLAR ARRAY TO BE DETERMINED TBD TYP. TYPICAL UNDERWRITERS LABORATORY UNLESS OTHERWISE NOTED VOLT VOLT AMPERE VOLTAGE TRANSDUCER

WATT OR WIRE

EXISTING (EQUIPMENT)

X OR EXIST.





PLANS FOR THE CONSTRUCTION OF BAY TERRACE SENIOR CENTER

PV SYSTEM SPECIFICATIONS

CITY OF S PUBLI SHEE	WBS	S-16060				
FOR CITY ENGINEER NIKKI LEWIS PRINT DCE NAME	2	6/25/2018 DATE C64460 RCE#			SUBMITTED BY: EDGAR LOZANO PROJECT MANAGER CHECKED BY:	
DESCRIPTION	APPROVED				DA AFSHARI ECT ENGINEER	
						86-1755 COORDINATE
						827-6319 3 COORDINATE
	40/	152_136_D				

CONTRACTOR 40452-136-D INSPECTOR DATE COMPLETED

FIRE DEPARTMENT REGULATIONS

1. GENERAL REQUIREMENTS

1.1 MARKING

PV SYSTEMS SHALL BE MARKED. MARKING IS NEEDED TO PROVIDE EMERGENCY RESPONDERS WITH APPROPRIATE WARNING AND GUIDANCE WITH RESPECT TO ISOLATING THE SOLAR ELECTRIC SYSTEM. THIS CAN FACILITATE IDENTIFYING ENERGIZED ELECTRICAL LINES THAT CONNECT THE SOLAR PANELS TO THE INVERTER, AS THESE SHOULD NOT BE CUT WHEN VENTING FOR SMOKE REMOVAL. MATERIALS USED FOR MARKING SHALL BE WEATHER RESISTANT. UL 969 SHALL BE USED AS A STANDARD FOR WEATHER RATING (UL LISTING OF MARKINGS IS NOT REQUIRED).

1.2 FORMAT FOR MARKINGS

RED BACKGROUND; WHITE LETTERING; MINIMUM 3/8" LETTER HEIGHT; ALL CAPITAL LETTERS ARIAL OR SIMILAR FONT, NON-BOLD

REFLECTIVE WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (DURABLE ADHESIVE MATERIALS MUST MEET THIS REQUIREMENT).

1.3 MAIN SERVICE DISCONNECT FOR COMMERCIAL APPLICATION, THE MARKING SHALL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT IN A LOCATION CLEARLY VISIBLE FROM THE LOCATION WHERE THE LEVER IS OPERATED.

MARKING CONTENT: CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

1.4 MARKING DC CIRCUIT MARKING IS REQUIRED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, AND JUNCTION BOXES TO ALERT THE FIRE SERVICE TO AVOID CUTTING THEM. MARKING SHALL BE PLACED EVERY 10 FEET, AT TURNS AND ABOVE AND/OR BELOW PENETRATIONS, AND AT ALL DC COMBINER AND JUNCTION BOXES.

MARKING CONTENT: CAUTION: DC CIRCUIT

CAUTION: DC CIRCUIT

1.5 INVERTERS

NO MARKINGS ARE REQUIRED FOR THE INVERTER.

WIRING SPECIFICATIONS

ALL CONDUITS: ALUMINUM RIGID WHERE RUN ON ROOF, RMC WHERE EXPOSED TO PHYSICAL DAMAGE, PVC SCH. 40 WHERE RUN BELOW GROUND, EMT WHERE RUN NOT SUBJECT TO PHYSICAL DAMAGE:

- W1 ARRAY MODULES INTERCONNECTED BY VENDOR SUPPLIED CONNECTORS AND GROUNDED PER NEC SECTIONS 690.43 AND 250.136A, RUN IN FREE AIR ALONG SOLAR PANEL RACKING. NOTE: HOME RUNS, ARRAY STRINGING, AND JUMPERS, TRANSITION TO CONDUIT AFTER LEAVING THE COVER OF THE ARRAYS; SEE BUILDING PLANS FOR CONDUIT ROUTING.
- $\boxed{\text{W2}}$ 3/4" CONDUIT [RUN 1/2"-3 1/2" ABOVE ROOF] W/ (2) #10 USE-2 (1000V) C.C.C. AND (1) #8 THWN-2 EQUIPMENT GROUND; AMPACITY CALCULATION 9.47A*1.25*1.25 = 14.79A; PER TABLE 310.15(B)(3)(A), 310.15(B)(3)(C) & 310.15(B)(2)(A), 9.47*1.25/0.50/0.82 = 28.87A; PER TABLE 310.15(B)(16), (@90C) 40A MAX. C.C.C. AMPACITY > 28.87A & (@75C) 35A MAX. C.C.C AMPACITY > 28.87A = OKAY
- $\boxed{\text{W3}}$ 3/4" CONDUIT [NOT ON ROOF] W/ (2) #6 THWN-2 C.C.C., (1) #8 THWN-2 NEUTRAL AND (1) #8 G.E.C.;

AMPACITY CALCULATION $\overline{42A*1.25} = 52.50A$, INVERTER OUTPUT PROTECTED BY 60A BREAKER PV SUBPANEL; 60A OCPD >= 52.50A = OKAY; PER TABLE 310.15(B)(3)(A), 310.15(B)(3)(C) & 310.15(B)(2)(A), 60A/1.0/1.04 = 57.69A; PER TABLE 310.15(B)(16), (@90C) 75A MAX. C.C.C. AMPACITY > 57.69A & (@75C) 65A MAX. C.C.C AMPACITY > 57.69A = 0KAY

 $\boxed{\text{W4}}$ 1-1/2" CONDUIT [NOT ON ROOF] W/ (2) #1/0 THWN-2 C.C.C., (1) #1/0 THWN-2 NEUTRAL AND (1) #6 G.E.C.; AMPACITY CALCULATION $\overline{42A*2*1.25=105A}$, PN SUN PANEL PROTECTED BY PV PANEL MAIN BREAKER; 125A OCPD >= 105A = OKAY; PER TABLE 310.15(B)(3)(A), 310.15(B)(3)(C) & 310.15(B)(2)(A), 105A/1.0/1.04 = 100.96A; PER TABLE 310.15(B)(16), (@90C) 170A MAX. C.C.C. AMPACITY > 100.96A & (@75C) 150A MAX. C.C.C AMPACITY > 100.96A = OKAY

EQUIPMENT SPECIFICATIONS

ISC: 9.94A

- E1 Q.CELL DUO BLK-G5 320 (320W) MODULE VMP: 33.8V IMP: 9.47A VOC: 40.56V
- E2 SOLAREDGE SE10000A-US 10KVA INVERTER PHASES: 1 AC VOLTAGE: 240 ENCLOSURE: NEMA 3R MAX A IN: 30.5A PER MPPT MAX DC VOLTAGE: 500V MAX A OUT: 42A MAX W OUT: 10000W CEC LISTED EFFICIENCY @ 240V: 97.5% COMES WITH AUTO-RAPID SHUTOFF SYSTEM SEE DATA SHEET ON SHEET PV-5.1
- E3 PV AC SUBPANEL MANUFACTURER: EATON OR EQUIVALENT TYPE: 1PH 3W AMPERE RATING: 225A ENCLOSURE: NEMA 3R VOLTAGE: 120/240V MAIN BREAKER: 125A, 2P PV CIRCUIT BREAKERS: (2) 60A, 2P INTERRUPT RATING: 22K A.I.C. FULLY RATED NOTE: PV SUB PANEL ONLY. DO NOT ADD LOADS. MAX IMBALANCE: OA

RATED INPUT DC POWER: 320W MAX A IN: 10A PER MPPT MAX V OUT: 60VDC MAX A OUT: 15A MAX V IN: 48VDC MAX A IN: 13.75A MAX SYSTEM VOLTAGE: 1000VDC ENCLOSURE: NEMA 6P

SEE DATA SHEET ON SHEET PV-5.1

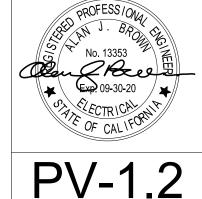
F4 SOLAREDGE POWER OPTIMIZER

DESIGN NOTE: THE PV SYSTEM DESIGN IS BASED ON EQUIPMENT SPECIFIED ON THIS SHEET. IF THE CONTRACTOR SELECTS TO SUBSTITUTE THE EQUIPMENT AS AN "OR EQUAL" SYSTEM, THEN THE CONTRACTOR SHALL BE REQUIRED TO PREPARE AND SUBMIT A COMPLETE DESIGN PACKAGE WITH THE SUBSTITUTED EQUIPMENT, AT NO ADDITIONAL COST. IN ORDER TO MAINTAIN THE NET ZERO RATING OF THE BUILDING, ANY SUBSTITUTE EQUIPMENT AND SYSTEM SHALL HAVE AN EQUAL OR GREATER AC AND KWH RATED OUTPUT COMPARED TO THE SPECIFIED SYSTEM. THE DESIGN OF ANY PROPOSED "OR EQUAL" SYSTEM SHALL HAVE A SIMILAR ROOF LAYOUT OF THE PV PANELS WITH EACH ENTIRE PV STRING CONSISTING OF PV PANELS EITHER ON THE SOUTH FACING ROOF OR THE WEST FACING ROOF. PV PANELS ON A SINGLE STRING CANNOT BE CONTAIN PANELS FROM BOTH ROOF FACES WHICH COULD POTENTIALLY CREATE UNEVEN CURRENT FLOWS.

BSE PROJECT NO. 805-125 BSE ENGINEERING, INC. 10680 TREENA ST., SUITE 100

SAN DIEGO, CA 92131

TEL: 858.800.6000 FAX: 858.800.6001



PLANS FOR THE CONSTRUCTION OF BAY TERRACE SENIOR CENTER

WIRING AND EQUIPMENT SPECIFICATIONS

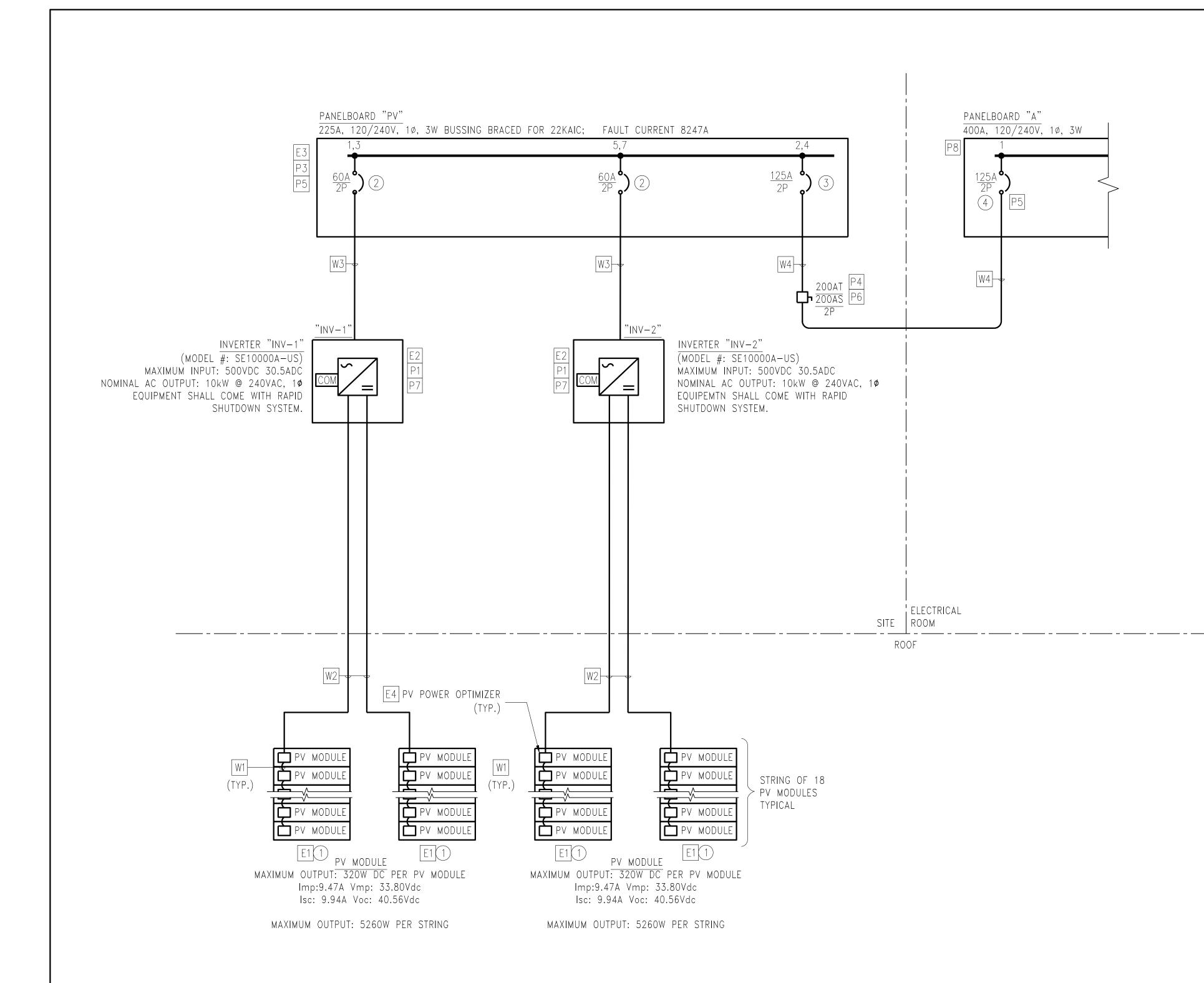
CITY OF S PUBL SHE	WBSS-1606							
FOR CITY ENGINEER NIKKI LEWIS	FOR CITY ENGINEER			6/25/2018 DATE C64460				
PRINT DCE NAME			RCE#			CHECKED BY: HODA AFSHARI		
DESCRIPTION			APPROVED DATE		PROJECT ENGINEER			
						86-1755 7 COORDINATE		
						827-6319 3 COORDINATE		
DATE STARTED DATE COMPLETED						-52-137-D		

SHALL BE ROUTED AND INSTALLED TO PREVENT INTERRUPTION OF THE GROUND PATH IF ANY MODULE IS REMOVED. INTEGRATED GROUND AS AN APPROVED EQUIVALENT IS ACCEPTABLE. EXAMPLE ARRAY STRINGING,

GROUNDING NOTE: EQUIPMENT GROUNDING OF MODULE FRAME AND RACKING

1 STRINGS SHOWN 65FT MAX.

CONTRACTOR INSPECTOR



GENERAL NOTES:

- 1. REFER TO PV-1.2 FOR FEEDER SCHEDULE.
- 2. CONTRACTOR SHALL GUARANTEE IN WRITING THAT THE COMBINED MAXIMUM OUTPUT VOLTAGE OF THE PV MODULES STRINGS AND OPTIMIZERS SHALL NOT EXCEED THE MAXIMUM INPUT VOLTAGE RATING OF THE INVERTER.

NOTES:

- 1) ROOF-MOUNTED PV SUB-ARRAY. EACH INVERTER TO HAVE TWO (2) STRING. EACH STRING TO HAVE 18 MODULES. PV MODULES TO BE PRE-EQUIPPED WITH VENDOR SUPPLIED CONNECTORS.
- 2 PROVIDE A 60A/2P, 22KAIC CIRCUIT BREAKER WITH CLEAR INDICATION FOR ON/OFF POSITION AS PER NEC 404.11. FOR EACH INVERTER. CIRCUIT BREAKER TO BE SUITABLE FOR BACKFEED.
- 3 TO BE LABELED "CONNECT TO PANEL-A". CIRCUIT BREAKER TO BE SUITABLE FOR BACKFEED. CIRCUIT BREAKER TO SHOW CLEAR INDICATION FOR ON/OFF POSITION AS PER NEC 404.11.
- TO BE LABELED "CONNECT TO PHOTOVOLTAIC SYSTEM 4 PANEL-PV". CIRCUIT BREAKER TO BE SUITABLE FOR BACKFEED. CIRCUIT BREAKER TO SHOW CLEAR INDICATION FOR ON/OFF POSITION AS PER NEC 404.11.

BSE PROJECT NO. 805-125 BSE ENGINEERING, INC. 10680 TREENA ST., SUITE 100 SAN DIEGO, CA 92131 TEL: 858.800.6000 FAX: 858.800.6001



PLANS FOR THE CONSTRUCTION OF BAY TERRACE SENIOR CENTER

SINGLE LINE DIAGRAM

CITY OF S PUBLIC	WBS S-16060								
FOR CITY ENGINEER NIKKI LEWIS PRINT DCE NAME	<u></u>	6/25/2018 DATE C64460 RCE#			EDGAR LOZANO PROJECT MANAGER CHECKED BY: HODA AFSHARI				
DESCRIPTION	APPROVED	APPROVED DATE FILMED							
						86-1755 7 COORDINATE			
						827-6319 3 COORDINATE			
	404	52_138_D							

SINGLE LINE DIAGRAM

CONTRACTOR

DATE COMPLETED

40452-138-D

CAUTION

PHOTOVOLTAIC INVERTER

INVERTER 1 OF 2

WARNING

ELECTRIC SHOCK HAZARD TERMINALS ON BOTH THE

LINE AND LOAD SIDES MAY BE ENERGIZED

DC ELECTRICAL SPECIFICATIONS: VMP = 2 @ 608.4V

IMP = 2 @ 9.47A

VOC = 2 @ 730.08VISC = 2 @ 9.94A

AC ELECTRICAL SPECIFICATIONS:

VOLTAGE: 240V FEEDS: PV SUBPANEL

PHOTOVOLTAIC INVERTER

INVERTER 2 OF 2

WARNING ELECTRIC SHOCK HAZARD

TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED

DC ELECTRICAL SPECIFICATIONS:

VMP = 2 @ 608.4VIMP = 2 @ 9.47A

VOC = 2 @ 730.08V

ISC = 2 @ 9.94A

FEEDS: PV SUBPANEL

AC ELECTRICAL SPECIFICATIONS: VOLTAGE: 240V

PV AC SUBPANEL

WARNING ELECTRIC SHOCK HAZARD TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED

DO NOT ADD LOADS!

IN THE OPEN POSITION DUAL POWER SUPPLY-PHOTOVOLTAIC SYSTEM AC ELECTRICAL SPECIFICATIONS:

VOLTAGE: 240V CONNECTION: LINE TAP IN MAIN SWITCHBOARD

FED BY: INVERTERS 1-2

PV DISCONNECT FOR UTILITY OPERATION

CAUTION: SOLAR CIRCUIT

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM.

TURN SWITCH TO THE "OFF" POSITION TO SHUTDOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS IN ARRAY REMAIN ENERGIZED IN SUNLIGHT.

NOTE: ABOVE SIGNAGE TO BE PRINTED IN WHITE ON RED BACKGROUND AS PER NEC 690.56

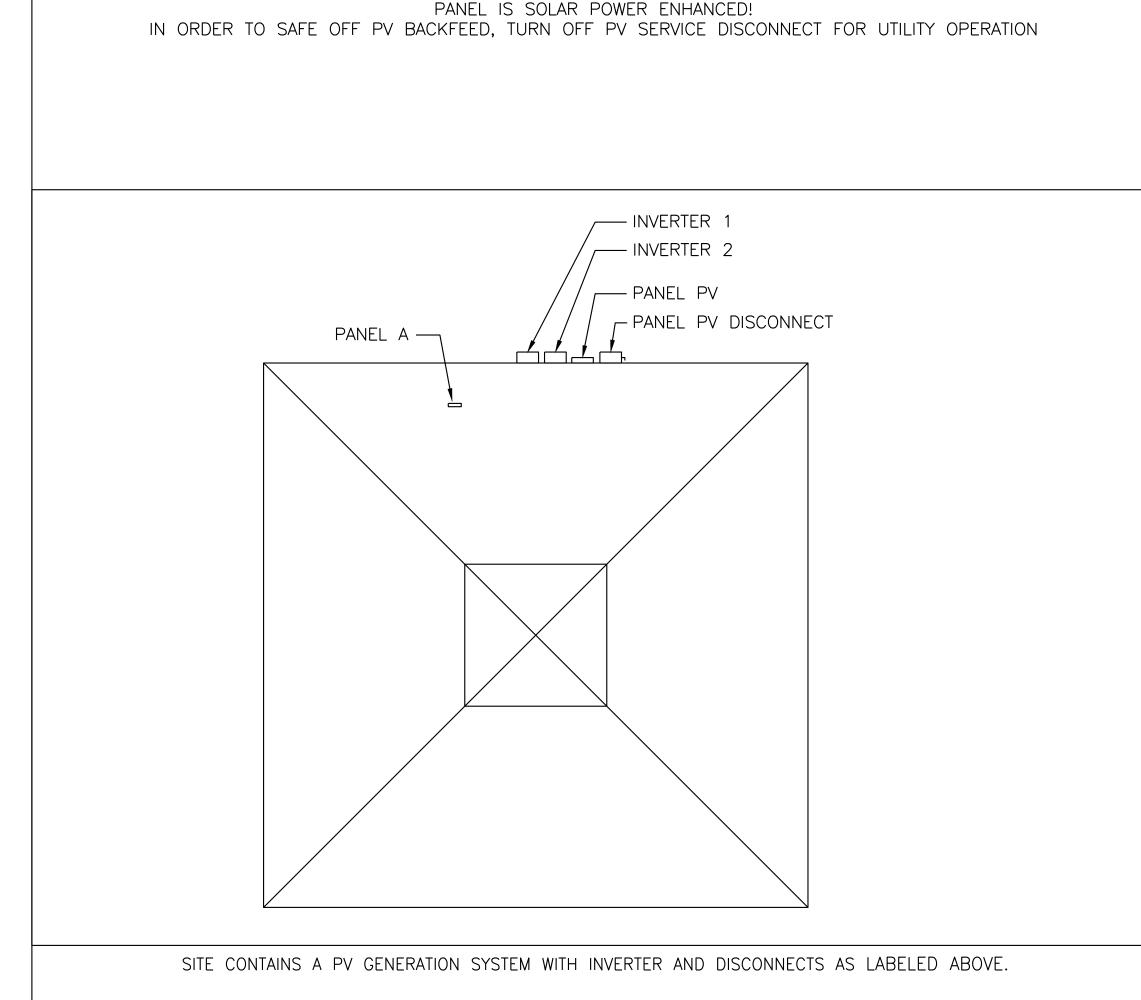
SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN.

NOTE: ABOVE SIGNAGE TO BE PRINTED IN WHITE ON RED BACKGROUND AS PER NEC 690.56

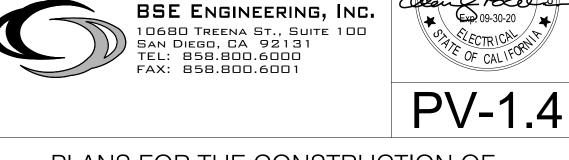
	PLACARD NOTES									
ALL PLACARDS ARE TO BE IN ACCORDANCE WITH UTILITY CO-GENERATION, NEC 2014 AND CEC 2016 SIGNAGE										
	PLACARD:	S SHALL BE	OF WEATHERPROOF CONSTRUCTION. FASTEN PLACARDS WITH STAINLESS STEEL MACHINE SCREWS,							
NO SELF ADHESIVE LABELS ALLOWED										
	NUMBER	LOCATION								
	P1 P2	1 OF EACH	FRONT OF ASSOCIATED INVERTER ON EXTERIOR OF BLDG.							
	P3	1	FRONT COVER OF PV SUBPANEL.							
	P4	1	PV DISCONNECT FOR UTILITY OPERATION ON EXTERIOR OF BLDG.							
	P5	1	PANEL "A" NEXT TO BREAKER FOR PANEL "PV" IN ELECTRICAL ROOM.							
	P6	1	SURFACE OF PANEL PV DISCONNECT.							
	P7	2	ONE TO EACH PV INVERTER.							
	P8	2	PANEL "A" DOOR IN ELECTRICAL ROOM AND METER PEDESTAL.							

GENERAL NOTE:

PROVIDE ALL PLACARDS AS REQUIRED BY AUTHORITY HAVING JURISDICTION (AHJ) WHETHER OR NOT SHOWN ON THIS SHEET.



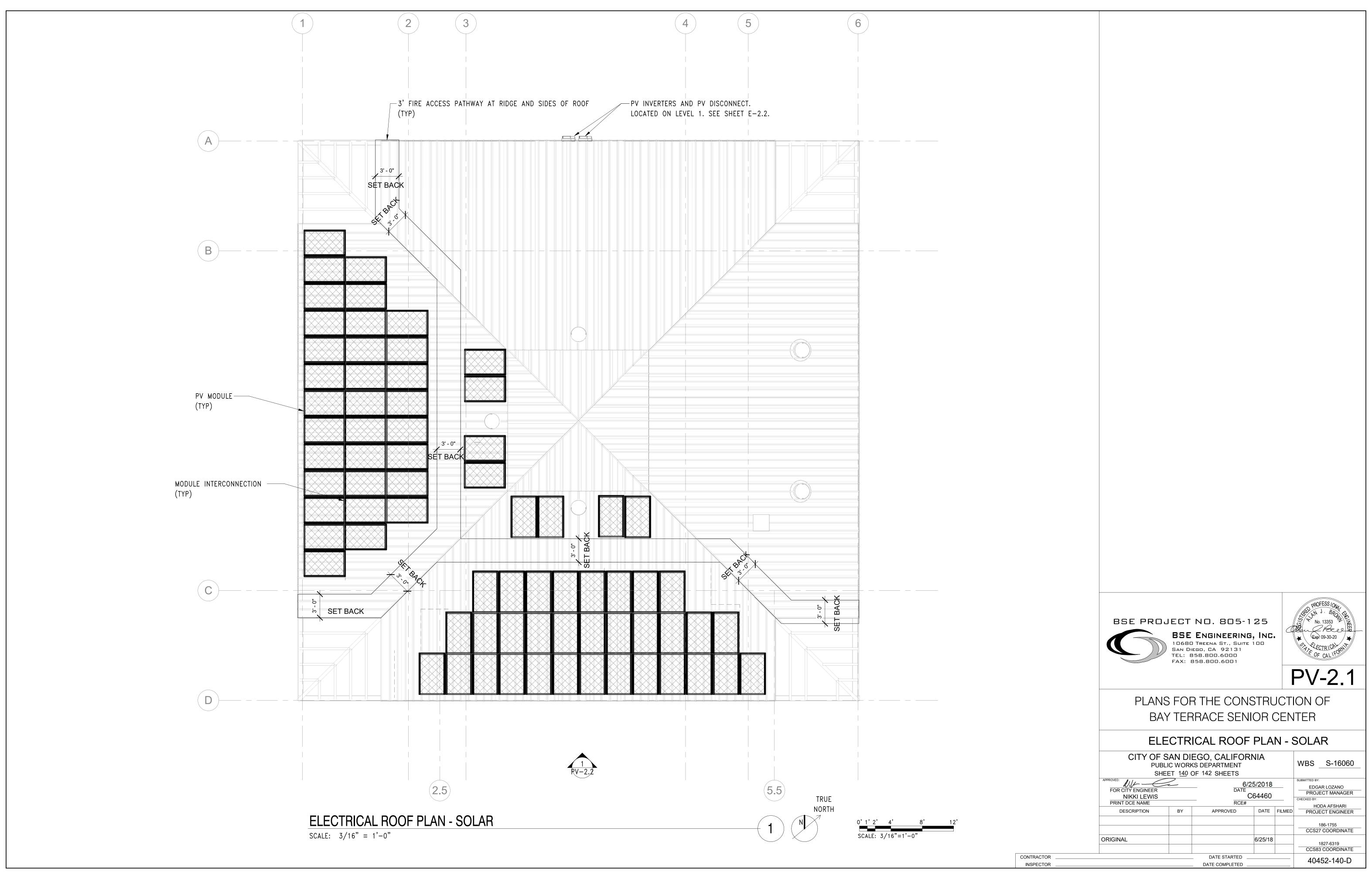
CONTRACTOR

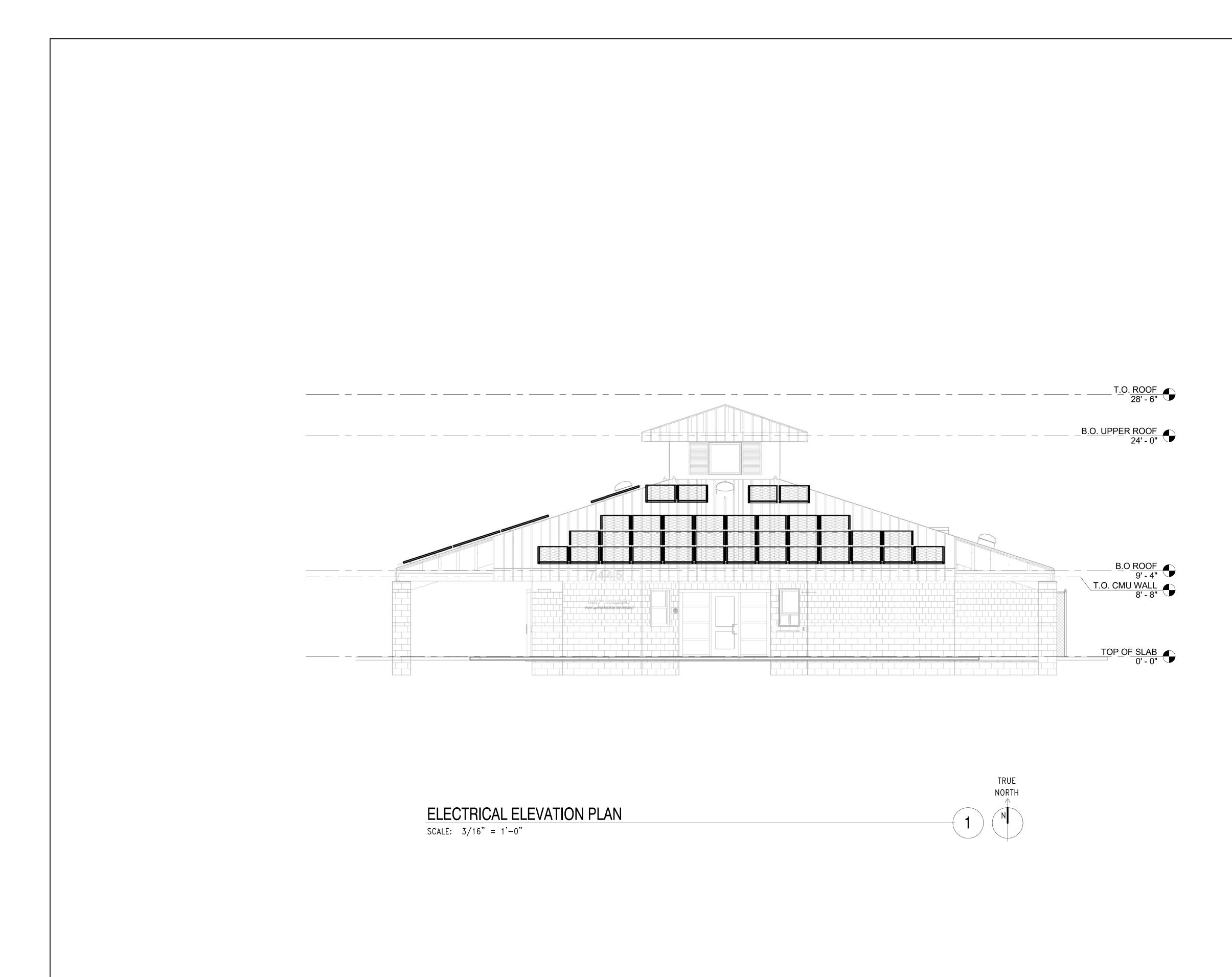


BSE PROJECT NO. 805-125

PLANS FOR THE CONSTRUCTION OF BAY TERRACE SENIOR CENTER

PLACARDS									
CITY OF S PUBL SHE	WBS	S-16060							
APPROVED: ULL 6/25/2018 FOR CITY ENGINEER NIKKI LEWIS PRINT DCE NAME 6/25/2018 DATE C64460 RCE#					EDGAR LOZANO PROJECT MANAGER CHECKED BY:				
DESCRIPTION			APPROVED DATE FILMED			DDA AFSHARI ECT ENGINEER 186-1755 7 COORDINATE			
					1827-6319 CCS83 COORDINATE				
DATE STARTED DATE COMPLETED						52-139-D			





BSE PROJECT NO. 805-125

BSE ENGINEERING, INC.

10680 TREENA ST., SUITE 100

SAN DIEGO, CA 92131

TEL: 858.800.6000

FAX: 858.800.6001

PV-2.2

PLANS FOR THE CONSTRUCTION OF BAY TERRACE SENIOR CENTER

ELECTRICAL ROOF PLAN - ELEVATIONS

	PUBLIC	C WORK	EGO, CALIFORI S DEPARTMENT OF 142 SHEETS	WBS <u>S-16060</u>			
	FOR CITY ENGINEER NIKKI LEWIS PRINT DCE NAME DESCRIPTION BY		6/25/2018 DATE C64460			SUBMITTED BY: EDGAR LOZANO PROJECT MANAGER	
			RCE#	FILMED	HODA AFSHA PROJECT ENGII		
						186-1755 CCS27 COORDI	NATE
	ORIGINAL			6/25/18		1827-6319 CCS83 COORDI	NATE
	,	40452-141-D					

CONTRACTOR

C:\Users\scervantes\Documents\805—125 Bay Terrace Senior Ctr Bldg — MEP.

