

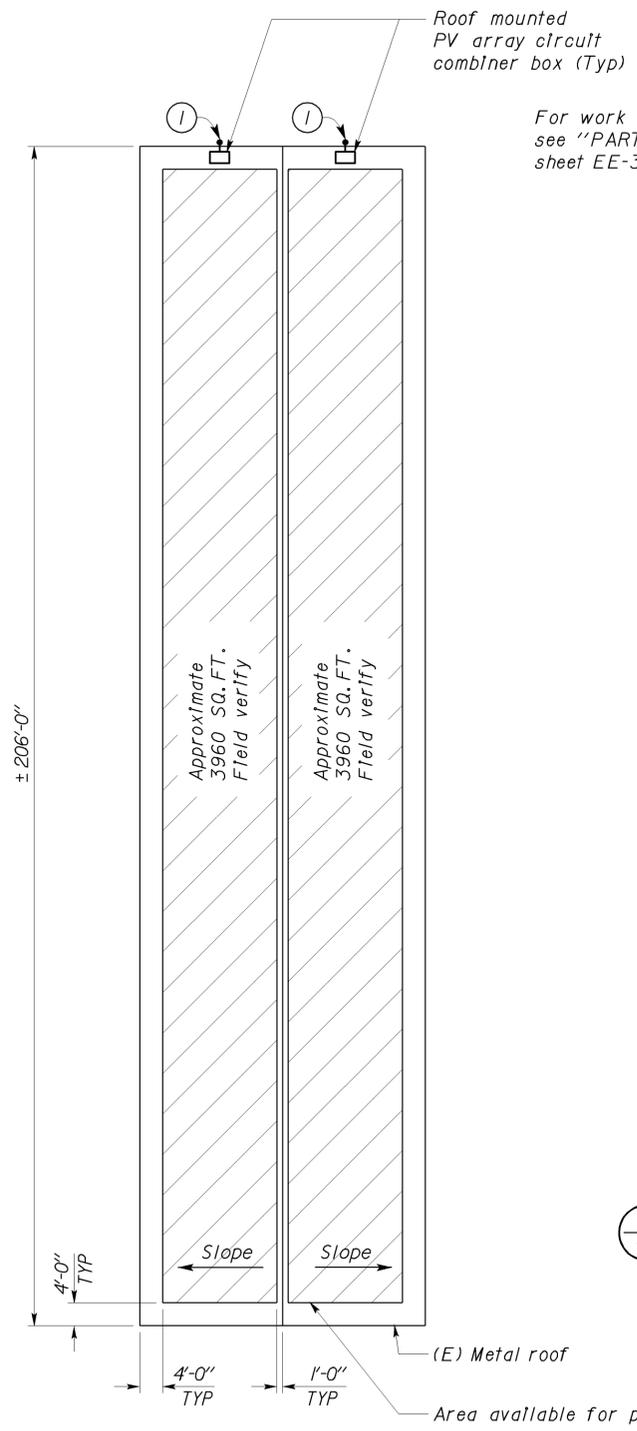
DIST.	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SLO	5506		3	5

REGISTERED ELECTRICAL ENGINEER: *J. Torkelson*  
 DATE: 11-16-09  
 REGISTERED PROFESSIONAL ENGINEER: J. TORKELSON  
 No. 13742  
 Exp. 6-30-11  
 ELEC  
 STATE OF CALIFORNIA

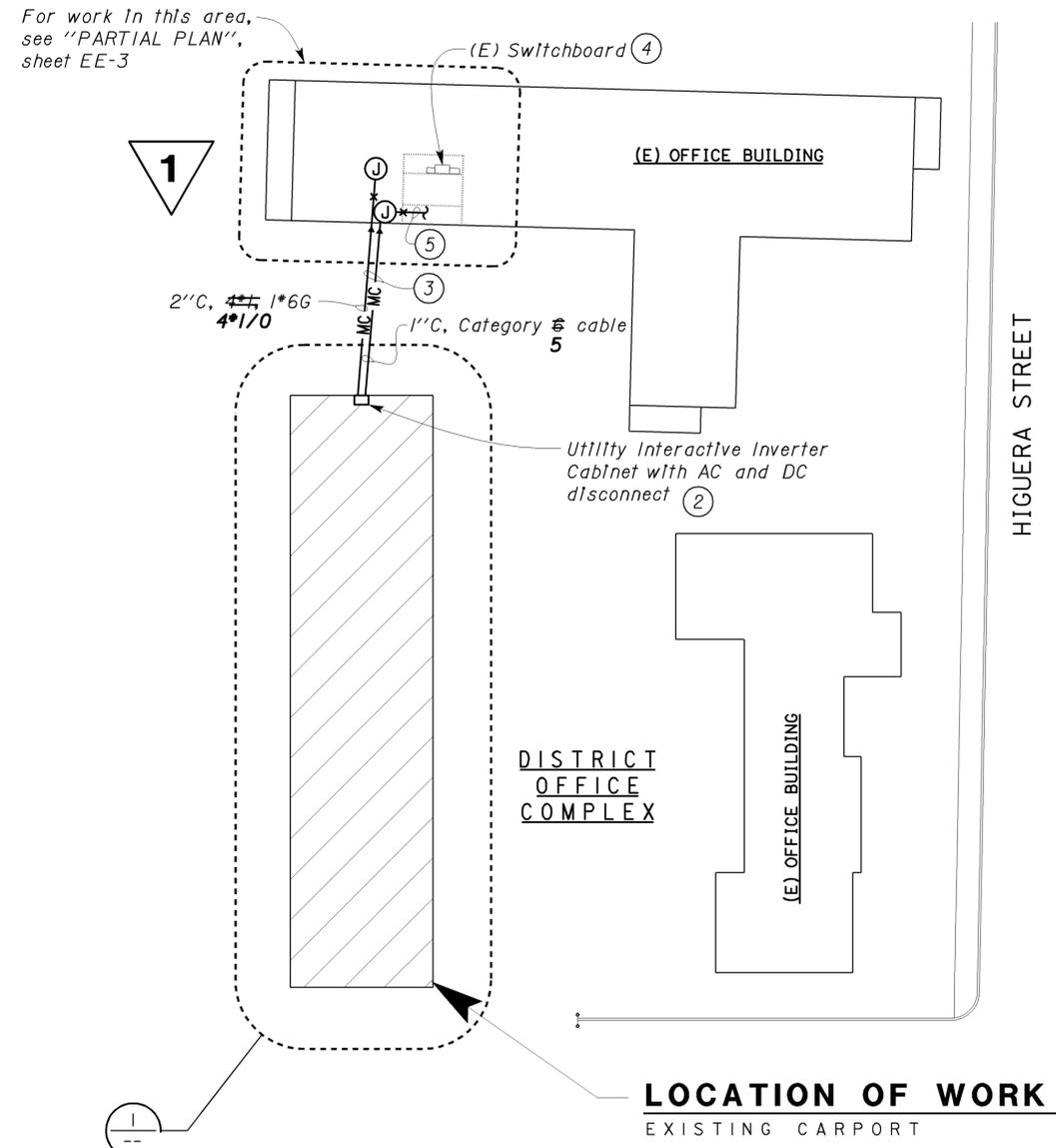
1-21-10  
 PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

**CALIFORNIA STATE FIRE MARSHAL APPROVED**  
 Approval of this plan does not authorize or approve any omission or deviation from applicable regulations. Final approval is subject to field inspection. One set of approved plans shall be available on the project site at all times.  
 Reviewed by: *JASON D. DeWITT*  
 Approval date: 01-21-10



**EXISTING CARPORT ROOF PLAN**  
 1  
 SCALE 1/16" = 1'-0"



**PARTIAL SITE PLAN**  
 SCALE 1/32" = 1'-0"

**General Notes:**

- The Contractor shall verify true north prior to installation of PV system.
- All AC/DC feeder conduit and conductors and equipment grounding conductors shall be sized to meet or exceed the following:
  - Total net voltage drop of the PV electrical power generation system from PV source to the existing Main Switchboard to be equal to or less than 2%.
  - Upon occurrence of any kind of fault at any point in the system, overcurrent protective devices shall trip instantaneously.
- Upon a written request, the Contractor may obtain as-built drawings from the Engineer in the field.
- Not all electrical/mechanical equipment and conduit systems are shown.
- Location of all existing equipment and conduit systems as shown are approximate only. Contractor shall verify the exact location of all equipment and conduit systems in the field if needed.
- Saw cut existing paved surfaces at places where required for installation of underground conduit system and repair disturbed surfaces to match existing.
- Core drill 8" concrete wall and 8" block wall for each conduit to access the existing Office Building.

**Notes:**

- 2" C, with DC conductors and equipment grounding conductor, to Utility Interactive Inverter Cabinet.
- Mount cabinet on existing concrete floor along inside wall. Provide anchor bolts and brackets as recommended by Inverter's manufacturer.
- Saw cut existing pavement, trench and install 2" C, 4# 1\*6G and 1" C, Category 5 cable.
- Existing Switchboard is Westinghouse, 480/277 V, 600-ampere. Install 125-ampere, 3-pole circuit breaker in available space.
- 1" C, Category 5 cable to Telephone/Local area network terminal board located in adjacent room. existing Cat 5 outlet in the Reprographics Room.

**1 REVISED PER ADDENDUM No. 1 DATED JANUARY 27, 2011**

THIS DRAWING ACCURATE FOR ELECTRICAL WORK ONLY.

DESIGN BY <i>Jim Torkelson</i> CHECKED <i>Tech Ngov</i>	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES	BRIDGE NO. 49M5506	<b>DISTRICT 5 MAIN OFFICE PHOTOVOLTAIC SYSTEM</b> PARTIAL SITE PLAN AND ROOF PLAN	SHEET EE-1
DETAILS BY <i>J. Kwong/L. Monson</i> CHECKED <i>Tech Ngov</i>		ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	POST MILE		
QUANTITIES BY <i>Jim Torkelson</i> CHECKED <i>Alan Torres</i>		UNIT PROJECT NUMBER & PHASE 1221 05000202351	DISREGARD PRINTS BEARING EARLIER REVISION DATES		REVISION DATES (PRELIMINARY STAGE ONLY)

DOES SD Imperial Rev.10/09 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3 UNIT PROJECT NUMBER & PHASE 1221 05000202351 DISREGARD PRINTS BEARING EARLIER REVISION DATES 10/7/09 12/26/09 1/27/10 SHEET OF 25-JAN-2011 14:48 ee\_01.add

DIST.	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SLO	5506		4	5

 REGISTERED ELECTRICAL ENGINEER	11-16-09 DATE
1-21-10 PLANS APPROVAL DATE	
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**Photovoltaic Module**

PV modules shall be polycrystalline silicon cell type module, with interconnection connectors rated for 90°C. PV modules shall be UL 1703 listed, with a maximum system voltage of 600 VDC. PV module manufacturer shall be one of those manufacturers listed as an eligible California Solar Initiative (CSI) PV module manufacturer.

**Photovoltaic Array Circuit Combiner Box**

PV array circuit combiner box shall be factory assembled, 600 VDC rated combiner box, with fused input circuits, two isolated DC bus bars, ground bus bar, all enclosed inside NEMA 3R lockable hinged cover enclosure. The combiner box shall be UL 1741 listed.

PV array circuit combiner box shall have the following components:

- DIN rail mounted touch safe fuse holders with fuse.
- Positive DC bus bar, negative DC bus bar and ground bus bar.
- DIN rail mounted Grid-Tie surge arrester: The surge arrester shall be rated to withstand 20 kA (8/20 micro second) induced transient surge type, and compatible to use with grounded PV arrays.

**Utility Interactive Inverter Cabinet**

Utility Interactive Inverter cabinet shall be outdoor type, factory assembled cabinet consisting of the following equipment:

- DC/AC Inverter: DC/AC Inverter rated at maximum continuous output power of 75kW, 480/277 V, 3-phase, 4-wire, at a power factor of 0.99 or greater, efficiency 95.5%, with input operating voltage range between 330 to 600 VDC, and maximum DC input current shall be 91 A. Inverter shall be capable of operating at ambient temperature range (Full power) of -4°F to +122°F. DC/AC Inverter manufacturer shall be one of those manufacturers listed as an eligible California Solar Initiative (CSI) DC/AC Inverter manufacturer.
- Fused sub-array combiner, with minimum of 4 array inputs for positive DC, negative DC, and DC ground bus bars. Positive array inputs fuse size to match loading.
- Built-in DC and AC disconnect switches, size to match loading.
- Integrated 75kVA, 480/277 V, 3-phase, 4-wire, output isolation type transformer.
- Ground fault protection.
- Integrated AC and DC surge protections.
- Integrated AC and DC contactors.
- Pre-charge circuit.
- Human Machine Interface (HMI): AC/DC Inverter's HMI shall be equipped with LCD and keypad displaying main menu. HMI main menu shall display system monitoring, status and faults, and operation. Monitoring menu shall display system status, metering, daily, weekly and monthly energy production. Status and faults menu shall display status messages, system output, and number of faults. Operation menu shall display control and settings.
- Local and remote monitoring systems capabilities.
- AC ground bus bars.
- NEMA 3R enclosure: Enclosure shall be NEMA 3R, 14-gauge, and powder-coated standard factory finish steel enclosure. All screws, latches, hinge pins and similar hardware shall be stainless steel. HMI, AC and DC disconnect switches and equipment rating labels shall be mounted on the exterior door. Exterior door shall have interlock switch and be lockable with a padlock. The cabinet shall have MEV13 rated filtered, top entry forced air cooling system with one fan, sloped roof, and shall be suitable for Seismic Design Category D compliance.

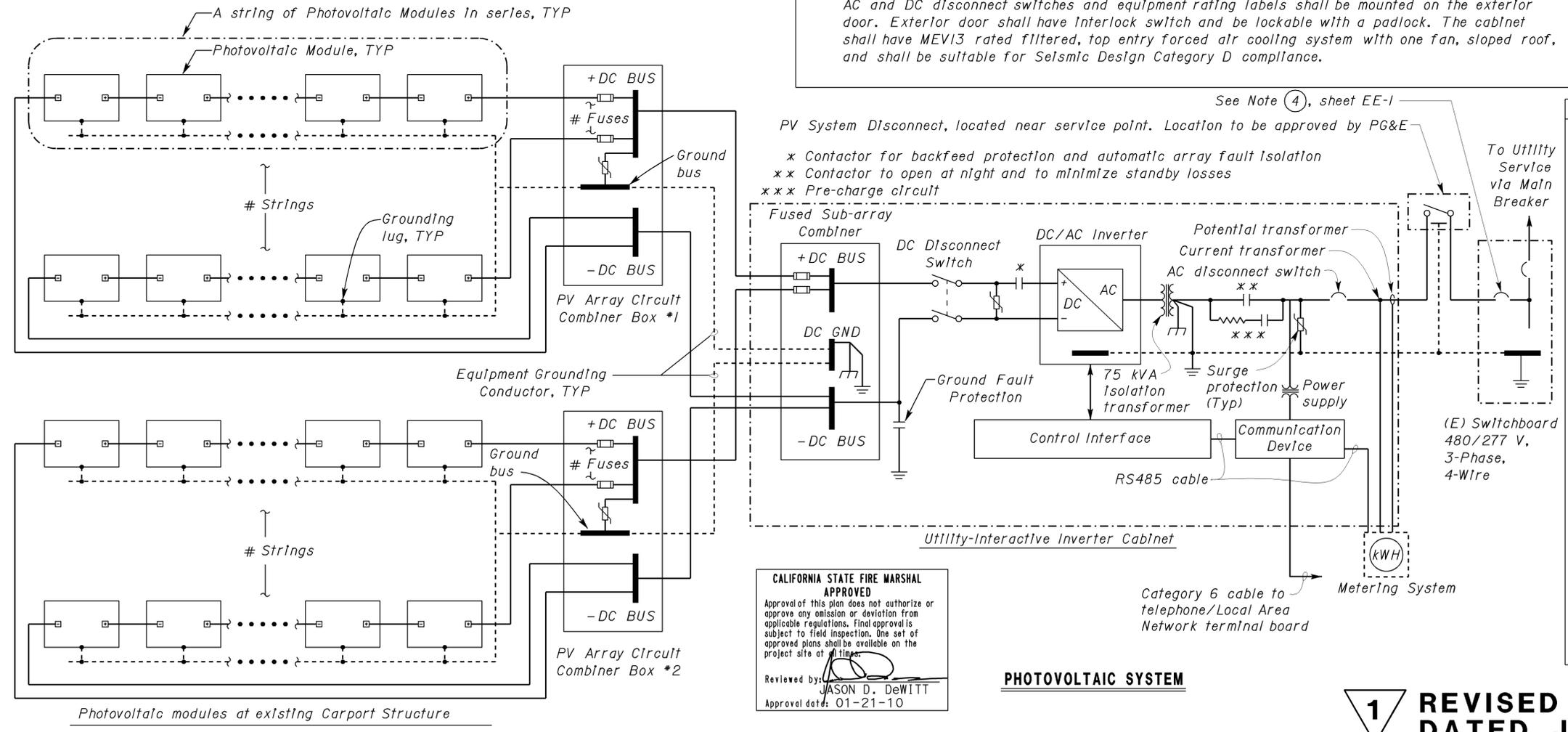
**General Notes:**

- Provide and install all necessary warning labels/markings, per Article 690 of California Electrical Code (CEC), and the State Fire Marshal's guideline for solar PV installation.
- Solar PV installation shall comply with the latest guideline from California Department of Forestry & Fire Protection, Office of the State Fire Marshal and latest Program Handbook from California Solar Initiative (CSI).

**Metering System**

Metering System shall consist of the following equipment:

- Revenue Grade Production Meter
- Power supply
- RS485 Surge Suppressor



PV System Disconnect, located near service point. Location to be approved by PG&E

- \* Contactor for backfeed protection and automatic array fault isolation
- \*\* Contactor to open at night and to minimize standby losses
- \*\*\* Pre-charge circuit

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Reviewed by: JASON D. DEWITT  
Approval date: 01-21-10

**PHOTOVOLTAIC SYSTEM**



**REVISED PER ADDENDUM No. 1 DATED JANUARY 27, 2011**

DESIGN BY: JIm Torkelson	CHECKED: Tech Ngov	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	BRIDGE NO. 49M5506	DISTRICT 5 MAIN OFFICE PHOTOVOLTAIC SYSTEM	SHEET EE-2
				POST MILE		
DETAILS BY: J. Kwong/L. Monson	CHECKED: Tech Ngov	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: 0 1 2 3	UNIT PROJECT NUMBER & PHASE: 1221 05000202351	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY): 1/17/09 1/26/10	SHEET OF
QUANTITIES BY: JIm Torkelson	CHECKED: Alan Torres	DOES SD Imperial Rev.10/09				25-JAN-2011 14:51 ee_02.add

