

INDEX OF PLANS

SHEET No.	DESCRIPTION
1	TITLE AND LOCATION MAP
STRUCTURE PLANS	
2	GENERAL PLAN AND LEGEND
3-6	ELECTRICAL PLANS

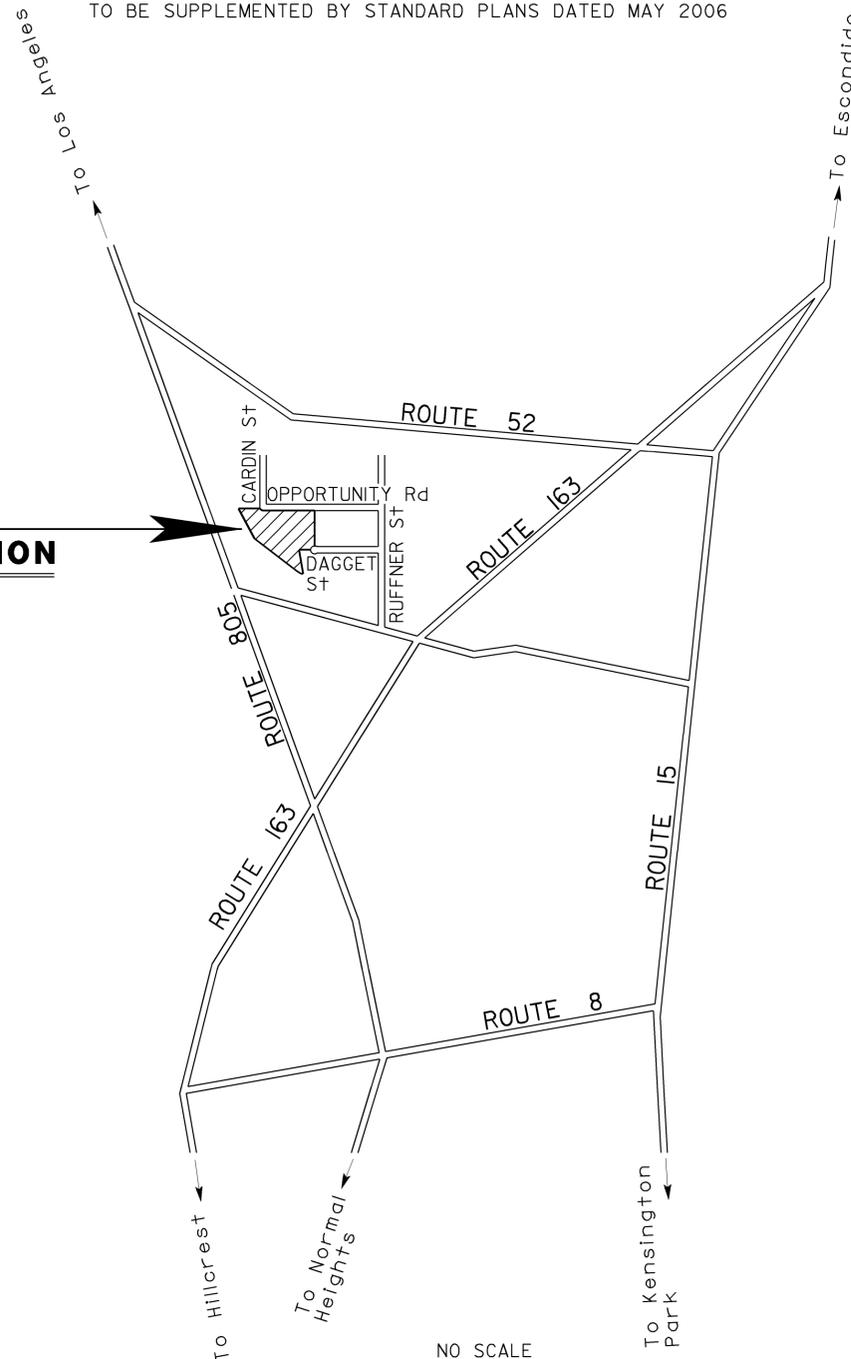
THE STANDARD PLANS LIST APPLICABLE TO THIS CONTRACT IS INCLUDED IN THE NOTICE TO BIDDERS AND SPECIAL PROVISIONS BOOK.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR BUILDING CONSTRUCTION
IN SAN DIEGO COUNTY
IN SAN DIEGO
AT
KEARNY MESA TRANSPORTATION MANAGEMENT CENTER
7183 OPPORTUNITY ROAD

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

**LOCATION OF CONSTRUCTION
KEARNY MESA TRANSPORTATION
MANAGEMENT CENTER
LOCATION CODE No. 5530**



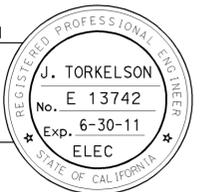
NO SCALE



**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: *Jeffery Schwartz*
JEFFERY SCHWARTZ
Approval date: 04-08-11

PHOTOVOLTAIC SYSTEM
CSFM FILE #01-37-01-0040

J. Torkelson 4-11-11
PROJECT ENGINEER DATE
REGISTERED ELECTRICAL ENGINEER
4-08-11
PLANS APPROVAL DATE



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CONTRACT No.	11-OAA034
PROJECT ID	1100020322

PROJECT MANAGER
BRUCE LAMBERT
DESIGN ENGINEER
BALDEV S. DEHAL

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

TIME PLOTTED => 08:23
DATE PLOTTED => 11-APR-2011
TIME PLOTTED => 08:23
LAST REVISION
04-05-11

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
GP	GENERAL PLAN AND LEGEND
ELECTRICAL	
EE-1	PARTIAL SITE PLAN
EE-2	SINGLE LINE DIAGRAM GRID-TIED PHOTOVOLTAIC SYSTEM
EE-3	ROOF PLAN
EE-4	ELEVATION AND DETAILS

APPLICABLE CODES

2010 California Building Code (CBC) Title 24, Part 2 CCR
2010 California Electrical Code (CEC) Title 24, Part 3 CCR
2010 California Fire Code (CEC) Title 24, Part 9 CCR

BUILDING DATA

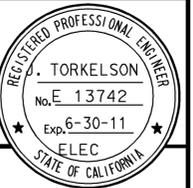
BUILDING TYPE: II-N
 FIRE ZONE:
 OCCUPANCY GROUP: GROUP B-DIVISION 2 FOR OFFICE
 GROUP R-DIVISION 1 FOR DORMITORIES
 ACTUAL BUILDING AREA: FIRST FLOOR-21,000 SF
 SECOND FLOOR-21,000 SF
 PROPOSED AREA FOR PV PANELS: 4,719 SF
 ROOF DATA: BUILT-UP ROOFING OVER RIGID INSULATION
 OVER 2 1/2" CONCRETE FILL OVER 1 1/2" GA. STEEL DECK
 OVER STEEL FRAMING

YEAR BUILDING BUILT: 1991

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DIST.	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5530		2	6

04-11-11
 REGISTERED ELECTRICAL ENGINEER DATE
 04-08-11
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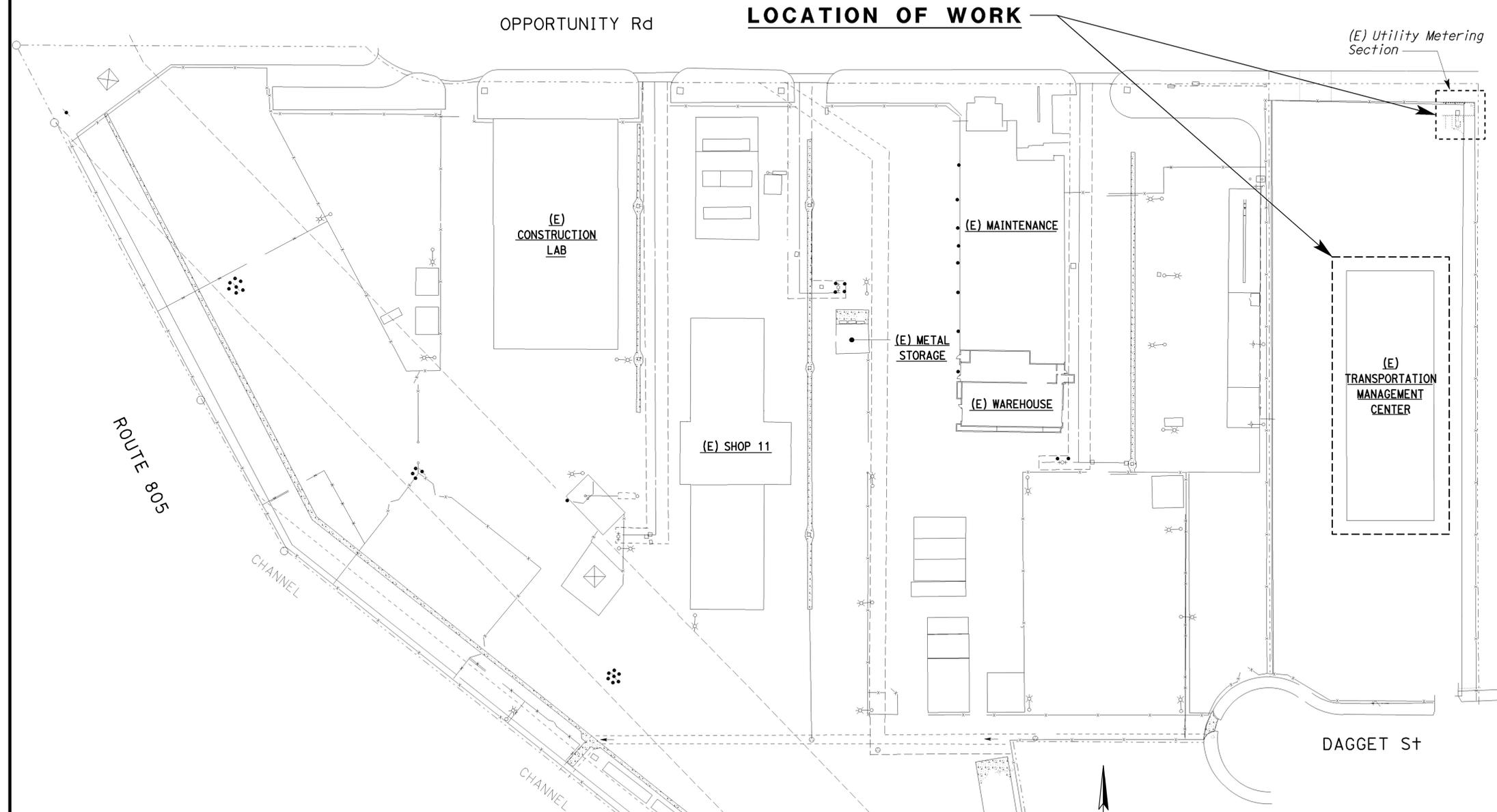


LEGEND

- (2) 1/2" C, PVC, 2#12 CONDUCTOR INFO (PER CONDUIT)
- CONDUIT TYPE
- CONDUIT SIZE
- NUMBER OF CONDUITS (NO NUMBER INDICATES ONE CONDUIT)
- CONDUIT EXPOSED
- MC CONDUIT, METALLIC UNDERGROUND
- PVC CONDUIT, POLYVINYL CHLORIDE, UNDERGROUND
- CONDUIT, FLEXIBLE
- CONDUIT, TURN UP
- CONDUIT, TURN DOWN
- CIRCUIT BREAKER
- GROUNDING ELECTRODE
- ENCLOSURE BOND
- ADAPTER, ONE TYPE CONDUIT TO ANOTHER
- EXISTING JUNCTION BOX
- EXISTING UNDERGROUND CONDUIT AND CONDUCTORS - REMOVE
- EXISTING CONDUIT AND CONDUCTORS-TO REMAIN UNLESS OTHERWISE NOTED
- SECTION/ELEVATION LETTER
- SHEET NUMBER
- DETAIL NUMBER
- SHEET NUMBER

ABBREVIATIONS

∅	PHASE	MIN	MINIMUM
A	AMPERE	MT	EMPTY CONDUIT
AC	ALTERNATING CURRENT	(N)	NEW
Ah	AMPERES - HOUR	P	POLE
AL	ALUMINUM	PB	PULL BOX
BC	BATTERY CHARGER	PTC	PV USA TEST CONDITIONS
BLDG	BUILDING	PV	PHOTOVOLTAIC
C	CONDUIT	STC	STANDARD TEST CONDITIONS
CB	CIRCUIT BREAKER	TYP	TYPICAL
CKT	CIRCUIT	V	VOLTS
DC	DIRECT CURRENT		
DP	DUPLEX RECEPTACLE		
(E)	EXISTING		
EO	ELECTRICALLY OPERATED		
G	GROUND		
GEN	GENERATOR		
JB	JUNCTION BOX		
MB	MAIN BREAKER		
MC	METALLIC CONDUIT		
MDP	MAIN DISTRIBUTION PANEL		



PLAN

SCALE 1" = 60'-0"

THIS DRAWING ACCURATE FOR ELECTRICAL WORK ONLY.

DESIGN SUPERVISOR <i>Alan M. Torres</i> DESIGN ENGINEER	DESIGN BY <i>Nate Dekens</i>	CHECKED <i>Alan Torres</i>	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	BRIDGE NO. 57M5530	KEARNY MESA TMC PHOTOVOLTAIC SYSTEM GENERAL PLAN AND LEGEND	SHEET GP OF
	DETAILS BY <i>Kathl Andreasen</i>	CHECKED <i>Nate Dekens</i>			POST MILE		
	QUANTITIES BY <i>Nate Dekens</i>	CHECKED <i>Alan Torres</i>	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3	UNIT 3618 PROJECT NUMBER & PHASE 1100020322S	DISREGARD PRINTS BEARING EARLIER REVISION DATES	SHEET OF	11-APR-2011 09:17 02_gp.dgn

DIST.	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5530		3	6

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 Reviewed by: *Jeffery Schwartz*
JEFFERY SCHWARTZ
 Approval date: 04-08-11

Jim A. Torkelson 04-11-11
 REGISTERED ELECTRICAL ENGINEER DATE
TORKELSON
 No. E 13742
 Exp. 6-30-11
 ELEC
 STATE OF CALIFORNIA
 04-08-11
 PLANS APPROVAL DATE

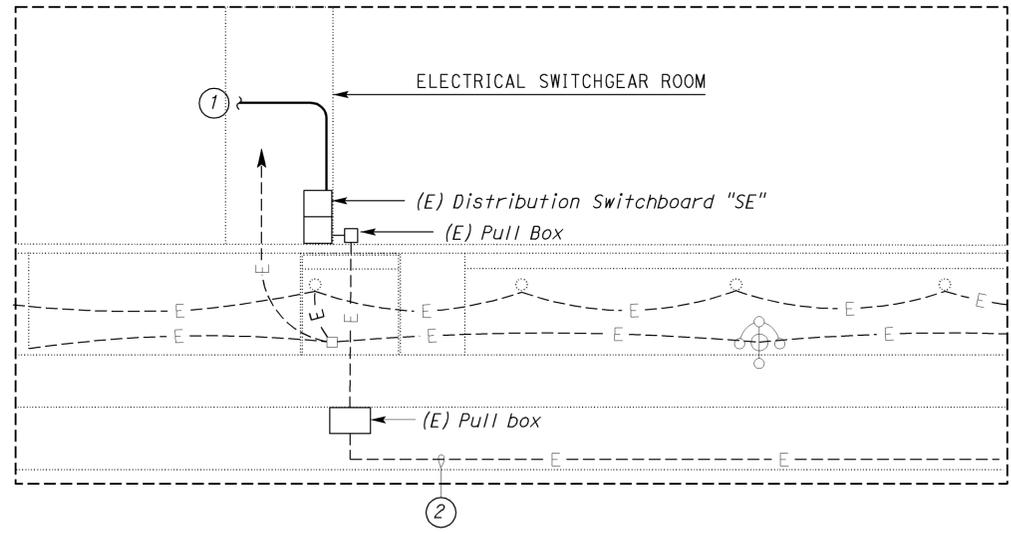
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

General Notes:

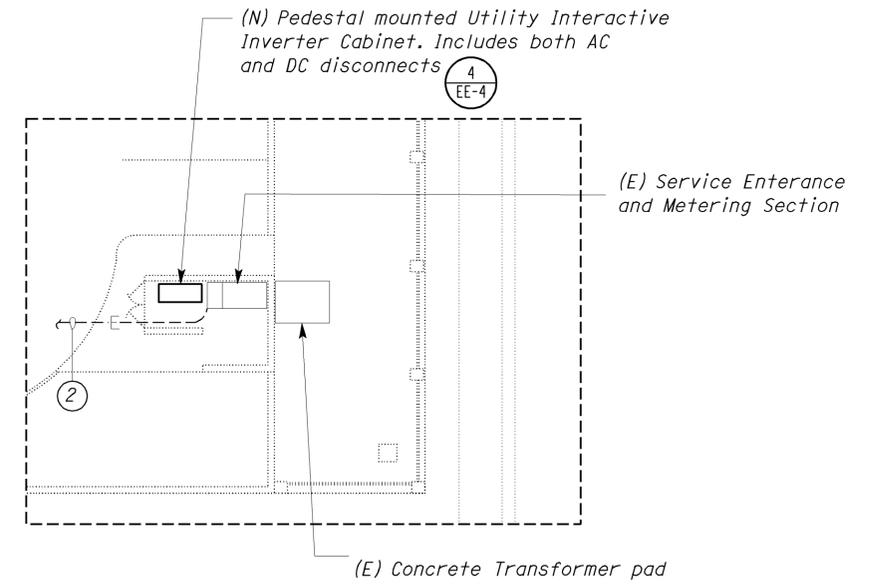
- A. Contractor is to use existing conduit system spares to route DC conductors from TMC Building to Utility Interactive Inverter Cabinet.
- B. All conduit and conductors will be as needed.

Notes:

- ① DC conductors from roof penetration routed through pipe chase area into existing spare conduit.
- ② Contractor is to use existing spare conduit to route DC conductors to Utility Interactive Inverter Metering Section located north of TMC Building.



ELECTRICAL SWITCHGEAR ROOM
NO SCALE



UTILITY METERING AND SERVICE ENTRANCE SECTIONS
NO SCALE

DOES SD Imperial Rev.1/07	DESIGN	BY <i>Nate Dekens</i>	CHECKED <i>Alan Torres</i>	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	BRIDGE NO.	57M5530	KEARNY MESA TMC PHOTOVOLTAIC SYSTEM	SHEET EE-1 OF	
	DETAILS	BY <i>Kathl Andreasen</i>	CHECKED <i>Nate Dekens</i>			POST MILE				PARTIAL SITE PLAN
	QUANTITIES	BY <i>Nate Dekens</i>	CHECKED <i>Alan Torres</i>							
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	0	1	2	3	UNIT PROJECT NUMBER & PHASE	3618 1100020322S	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	4/28/10 4/11/11	SHEET OF

11-APR-2011 08:24 03_ee_01.dgn

DIST.	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5530		4	6

REGISTERED ELECTRICAL ENGINEER	DATE 04-11-11
PLANS APPROVAL DATE 04-08-11	
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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 circuit breakers for input circuits, two isolated DC bus bars, ground bus bar, all enclosed inside NEMA 3R lockable cover enclosure. The combiner box shall be UL 1741 listed. Wiring of PV Array Circuit Combiner Box #1 and #2 are shown. Wiring for PV Array Circuit Combiner Box #3 and #4 are similar.

PV array circuit combiner box shall have the following components:

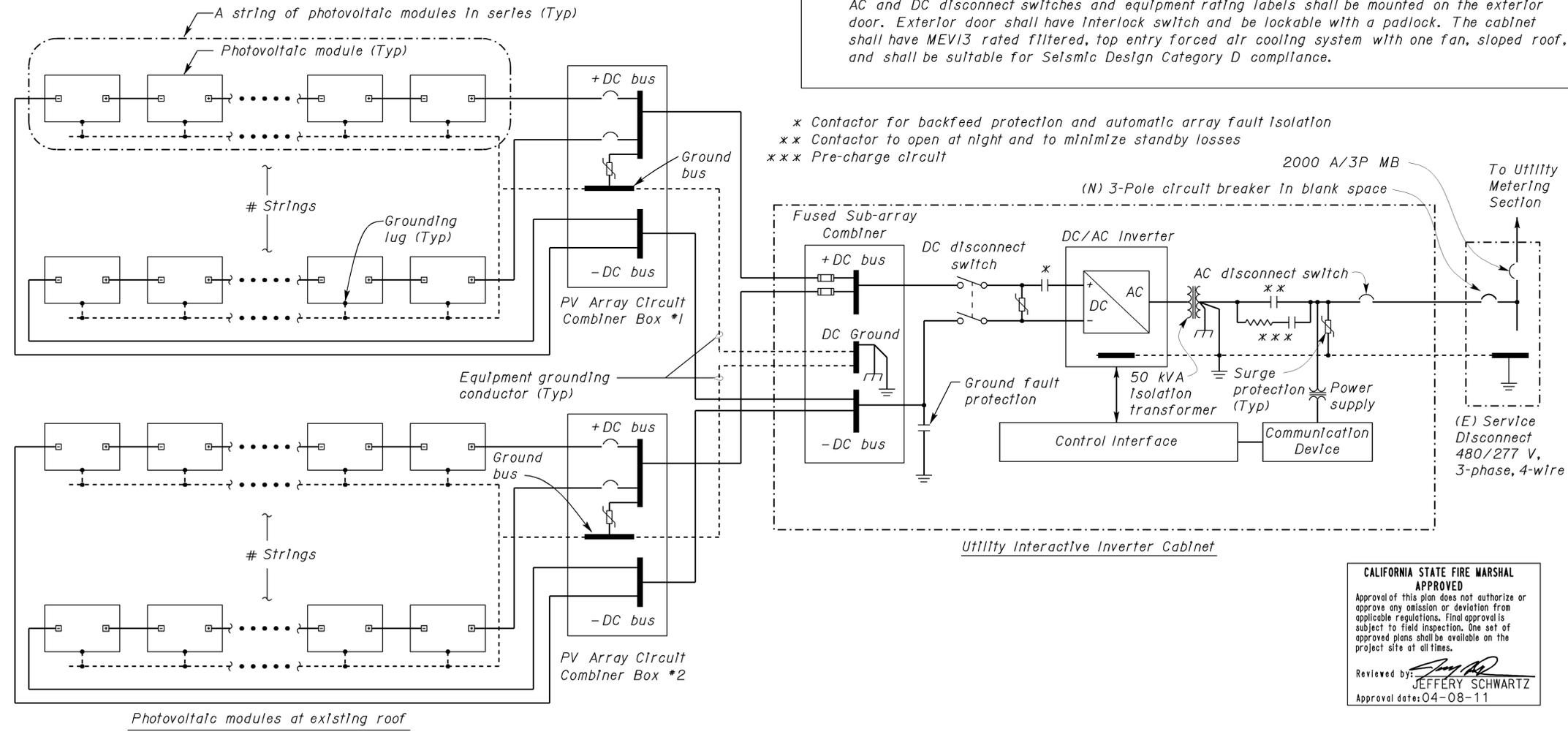
- DIN rail mounted circuit breakers.
- Positive DC bus bar, negative DC bus bar and ground bus bar.
- DIN rail mounted Grid-Tie surge arrester: The surge arrester shall be rated to withstand 20 kA (8/20 micro second) induced transient surge type, and compatible to use with grounded PV arrays

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 50 kW (50 kVA), 480/277 V, 3-phase, 4-wire, at a power factor of 0.99 or greater, efficiency 96%, with input operating voltage range between 315 to 600 VDC, and maximum DC input current shall be 248 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 50 kVA, 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): DC/AC 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), unless specifically shown otherwise on these plans.



- Photovoltaic System Requirements**
- Photovoltaic system complete design and installation details, inclusive of all engineering calculations signed by an Professional Engineer in the State of California, shall be submitted for approval by the Contractor. The PV design shall meet or exceed the following requirements:
- Total designed capacity of photovoltaic system at existing roof shall have a minimum CEC-AC rating of 40.0 kW. Number of PV modules per string shall be arranged in a manner to meet or exceed the following:
 - Maximum system voltage based on lowest expected ambient temperature at the site (Voc maximum on coldest day) shall be no less than 1% of the inverter's maximum input DC voltage range.
 - Maximum system power voltage, based on highest continuous ambient temperature at the site (Vmp on warmest day), shall be 20% greater than the inverter's minimum input DC voltage range.
 - Photovoltaic system module row spacing shall be designed to prevent shading from adjacent module.
 - All wiring, except at module interconnection, shall be concealed inside conduit system.
 - Photovoltaic system modules structural support system shall be designed to withstand wind forces of 85-mile per hour.
 - Photovoltaic system modules shall be mounted at a 10 degree tilt.
 - Photovoltaic system wiring and protective devices shall meet or exceed the requirements of all applicable codes.
 - PV Array Circuit Combiner Boxes locations as shown are arbitrary only. Contractor shall install the combiner boxes at locations that best suit the photovoltaic system strings layout.

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Reviewed by: JEFFERY SCHWARTZ
Approval date: 04-08-11

DOES SD Imperial Rev. 1/07	DESIGN	BY Nate Dekens	CHECKED Alan Torres	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	BRIDGE NO.	57M5530	KEARNY MESA TMC PHOTOVOLTAIC SYSTEM SINGLE LINE DIAGRAM GRID-TIED PHOTOVOLTAIC SYSTEM	SHEET	EE-2				
	DETAILS	BY Kathi Andreasen	CHECKED Nate Dekens			POST MILE			REVISION DATES (PRELIMINARY STAGE ONLY)	4/28/10	6/08/10	4/11/11	SHEET	OF
	QUANTITIES	BY Nate Dekens	CHECKED Alan Torres			UNIT PROJECT NUMBER & PHASE	3618 1100020322S		DISREGARD PRINTS BEARING EARLIER REVISION DATES					

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: 0 1 2 3

11-APR-2011 08:24

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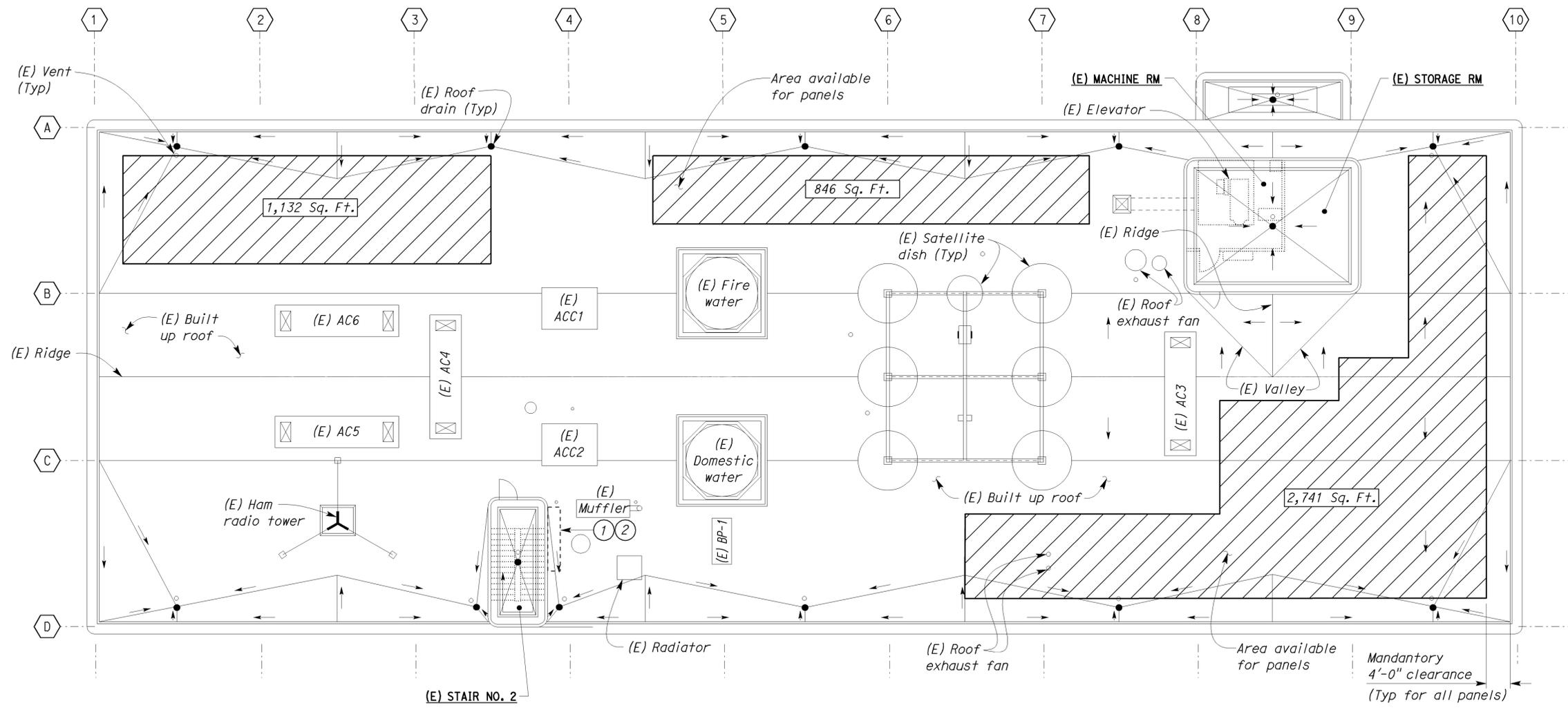
DIST.	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5530		5	6

Reviewed by: <i>Jeffery Schwartz</i> JEFFERY SCHWARTZ Approval date: 04-08-11	04-11-11 DATE REGISTERED ELECTRICAL ENGINEER	
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04-08-11 PLANS APPROVAL DATE

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- Notes:
- Contractor is to locate pipe chase area and provide roof penetration to route Photovoltaic System cabling to Electrical room.
 - Combiner boxes to be mounted on roof close to pipe chase roof penetration.

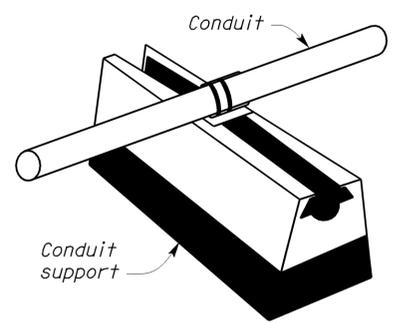
ROOF PLAN
 SCALE 3/32" = 1'-0"

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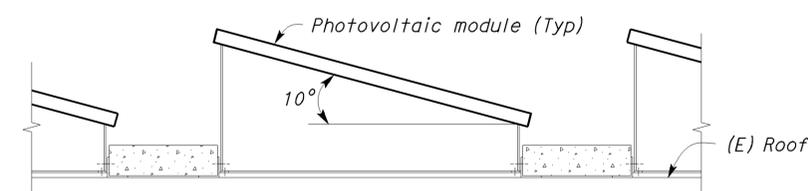
DESIGN BY <i>Nate Dekens</i> CHECKED <i>Alan Torres</i>	DETAILS BY <i>Kathl Andreasen</i> CHECKED <i>Nate Dekens</i>	QUANTITIES BY <i>Nate Dekens</i> CHECKED <i>Alan Torres</i>	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	BRIDGE NO. 57M5530	KEARNY MESA TMC PHOTOVOLTAIC SYSTEM ROOF PLAN	SHEET EE-3	
					POST MILE		REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET OF
					UNIT PROJECT NUMBER & PHASE 3618 1100020322S		DISREGARD PRINTS BEARING EARLIER REVISION DATES	4/28/10 6/8/10 4/11/11

DIST.	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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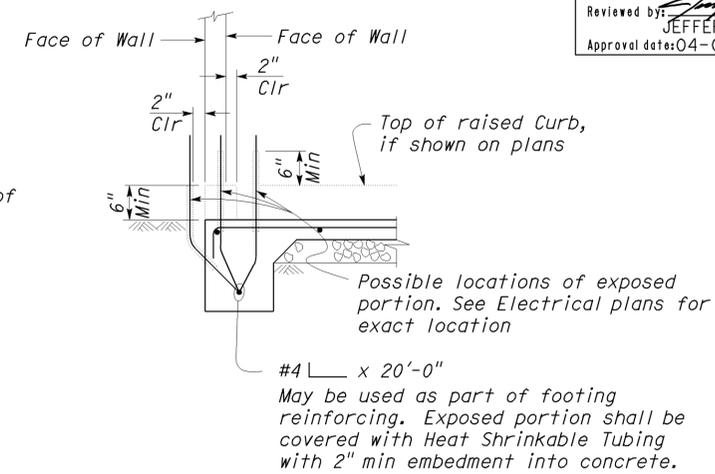
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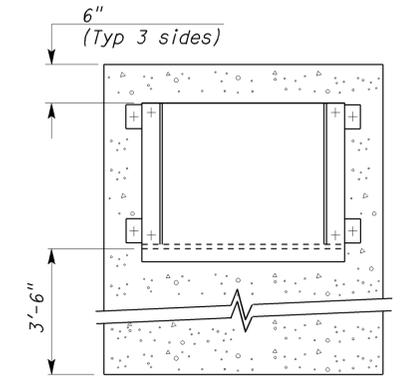
1 ROOF EXPOSED CONDUIT SUPPORT
NO SCALE



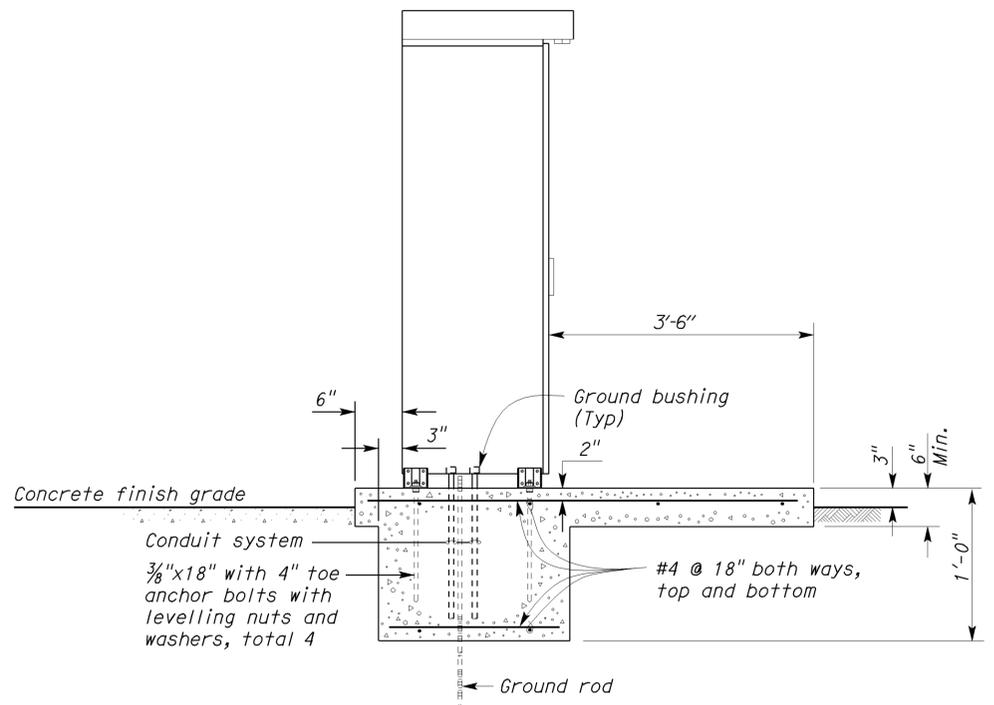
2 SELF-BALLASTED PANEL DETAIL
NO SCALE



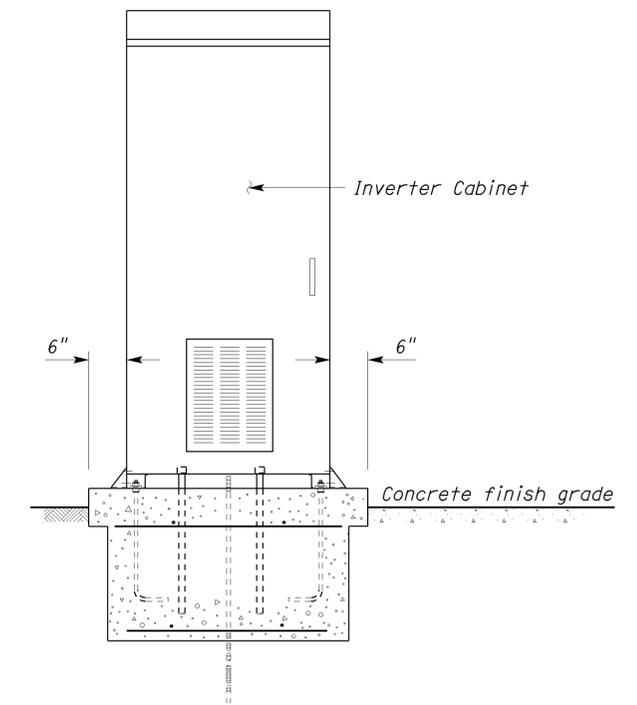
3 GROUND BAR DETAIL
NO SCALE



PLAN



SIDE



FRONT

4 UTILITY INTERACTIVE INVERTER CABINET
NO SCALE

DESIGN	BY <i>Nate Dekens</i>	CHECKED <i>Alan Torres</i>
DETAILS	BY <i>Kathl Andreasen</i>	CHECKED <i>Nate Dekens</i>
QUANTITIES	BY <i>Nate Dekens</i>	CHECKED <i>Alan Torres</i>

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF ENGINEERING SERVICES
 ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN

BRIDGE NO. 57M5530
 POST MILE

KEARNY MESA TMC PHOTOVOLTAIC SYSTEM
 ELEVATION AND DETAILS

SHEET **EE-4** OF