



PRE-SUBMITTAL CHECK LIST REQUIREMENTS FOR **COMMERCIAL** PHOTOVOLTAIC PERMITS

REVISED 12/11/08

PROJECT ADDRESS _____

COMPANY _____

* PHOTOVOLTAIC PERMIT APPLICATIONS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT.

* **INITIAL REVIEW WILL BE FOR SUBMITTAL COMPLETENESS. SUBMITTERS WHOSE PROJECTS ARE DETERMINED TO BE INCOMPLETE WILL BE NOTIFIED WITHIN 5 DAYS. ONCE THE SUBMITTAL HAS BEEN DETERMINED COMPLETE, FIRST REVIEW WILL BE COMPLETED WITHIN 10 DAYS.**

AT RESUBMITTAL, ALL REVISIONS SHALL BE CLOUDED ON THE PLANS AND INDICATE DATE AND REVISION NUMBER IN THE TITLE BLOCK.

* FIELD INSTALLATION SHALL BE PER CODE/PLAN. CHANGES SHALL BE SUBMITTED TO THE CITY FOR APPROVAL PRIOR TO INSPECTION.

* **IF A NEW ROOFING SYSTEM IS GOING TO BE INSTALLED, A SEPARATE ROOFING PERMIT AND INSPECTIONS ARE REQUIRED. SEE CHECKLIST FOR SPECIFIC ROOF BEING INSTALLED.**

FOLLOW THE SFM GUIDELINES FOR SIGNAGE AND CLEARANCES. THE CA STATE FIRE MARSHALL PV GUIDELINES ARE LOCATED AT: <http://www.osfm.fire.ca.gov/training/pdf/photovoltaics/solarphotovoltaicguideline.pdf>. TO VIEW THE CITY OF PALO ALTO'S AMENDMENTS TO THESE GUIDELINES PLEASE GO TO THE FOLLOWING LINK. <http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=13907>

PLEASE VERIFY BY CHECKING THE BOX THAT EACH ITEM HAS BEEN VERIFIED AND REFERENCE A SHEET NUMBER TO THE ITEMS BELOW.

A **COMPLETED** UTILITY PHOTOVOLTAIC ELECTRIC LOAD SHEET MUST ACCOMPANY THE SUBMITTAL.

- PLAN SIZE SHALL BE 18" X 24" MINIMUM AND A MAXIMUM OF 30" X 42". FONT SIZE SHALL BE A MINIMUM OF #10 FOR VIEWING AND MICRO FILMING. PROVIDE 3 SETS. NOTE: ALL INFORMATION MUST BE SUITABLE / LEGIBLE FOR MICRO FILMING.
- PROVIDE A PDF COPY OF THE PLANS.
- POSITIVELY GROUNDED SYSTEMS MUST BE CLEARLY IDENTIFIED ON THE PLANS. SPECIFY COLOR CODING REQUIREMENTS FOR POSITIVE CONDUCTORS ON THE PLANS. _____
- WHERE SYSTEMS ARE POSITIVELY GROUNDED SYSTEMS ARE INSTALLED, SIGNAGE SHALL BE PROVIDED INDICATING "**POSITIVELY GROUNDED SYSTEM**". _____
- PROVIDE THE AVAILABLE SHORT CIRCUIT CURRENT ON ELECTRICAL EQUIPMENT FOR ALL SUPPLY SIDE TAPS. THIS INFORMATION IS AVAILABLE FROM CPA ELECTRICAL UTILITES @ (650) 566-4551 FOR MIKE MINTZ OR (650) 566-4516 FOR GOPAL JAGANNATH. _____
- PROVIDE COMPLETE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR ALL EQUIPMENT (I.E. INVERTERS, MODULES, COMBINER BOXES, RACKING SYSTEMS, JUNCTION/TRANSITION BOXES, DISCONNECTS, TRANSFORMERS, ETC..) PROVIDE 1 COPY. (PROVIDE CAD DRAWINGS FOR DISCONNECTS) **ALL DOCUMENTS SHALL BE DISTINCT AND SEPARATE TO ALLOW FOR READY REVIEW.** _____
- ALL EQUIPMENT SHALL BE LISTED TO UL 1741, 1703 STANDARDS.
- SITE AND ROOF PLANS SHALL CLEARLY SHOW THE LOCATION OF THE ELECTRICAL SERVICE, PV ARRAY, MODULES, (EACH STRING SHALL BE IDENTIFIED), COMBINER BOX, INVERTER, A/C & D/C DISCONNECTS, CONDUIT, JUNCTION BOXES AND BATTERY BANKS. _____
- ROOF PLAN SHALL INCLUDE THE LOCATION OF EXISTING EQUIPMENT. _____

- SUBMIT ROOF CALCULATIONS FOR ARRAY MOUNTING POSTS. CALCULATIONS SHALL BE PREPARED BY A LICENSED STRUCTURAL ENGINEER. _____

- PROVIDE A DETAIL FOR THE ATTACHMENT OF THE PV ARRAY SUPPORTS TO THE ROOF FRAMING. INCLUDE METHOD OF WEATHER PROOFING AND WATER PROOFING. DETAIL SHALL INCLUDE FLASHING AND COUNTER FLASHING. _____

- PLANS SHALL INCLUDE ELECTRICAL ROOM LAYOUT AND LOCATION. INCLUDE ALL EXISTING EQUIPMENT AND SHOW REQUIRED WORKING CLEARANCES. _____

- ALL EQUIPMENT ON THE ROOF REQUIRING SERVICING SHALL MEET THE REQUIRED CLEARANCES OF CEC 110.26. PLANS SHALL SHOW THE REQUIRED CLEARANCES. _____

- PROVIDE THREE COPIES OF A THREE LINE DIAGRAM SHOWING ALL SYSTEM COMPONENTS, WIRE SIZES, CONDUCTOR INSULATION TYPE, METHOD OF PROTECTION (I.E. EMT) WIRE DISTANCES BETWEEN EACH PIECE OF EQUIPMENT, GROUNDING ELECTRODE SYSTEM, EQUIPMENT GROUND (AND SIZE) AND DISCONNECTS. CLEARLY INDICATE (IN WRITING ALONG WITH THE DIAGRAM) THE NUMBER OF MODULES PER STRING, STRINGS PER ARRAY AND NUMBER OF MODULES TOTAL.

- INDICATE WHERE DC WIRING WILL BE INSTALLED INSIDE AND OUTSIDE OF THE STRUCTURE. IDENTIFY DC/PV WIRING LOCATIONS ON SITE PLAN. _____

- SUBMIT COMPLETE CALCULATIONS FOR MAXIMUM SYSTEM VOLTAGE, SYSTEM STRING CURRENT, WIRE SIZING, FUSE/CIRCUIT BREAKER SIZING, CONDUIT FILL, VOLTAGE DROP, AMBIENT TEMPERATURE AND TERMINAL TEMPERATURE. CALCULATIONS SHALL SHOW ALL INTEGERS NOT JUST THE END RESULT. (EXAMPLE: SYSTEM VOLTAGE $> 11 \times 44.4 \times 1.13 = 551.8 \text{ V}$ (# OF MODULES X VOC X COLD TEMPERATURE FACTOR) _____

- WHERE DC CONDUCTORS ARE INSTALLED UNDERGROUND, CONDUCTORS SHALL BE BURIED 18" OR MORE BELOW GRADE AND A WARNING TAPE INSTALLED 12" ABOVE THE CONDUIT. **CEC 300.5 (D) (1)** _____
- PLANS SHALL IDENTIFY LISTED MEANS OF BONDING FOR PHOTOVOLTAIC MODULES. PROVIDE DEVICE LISTINGS. (METHOD OF GROUNDING SHALL REFLECT THE METHOD OF GROUNDING SPECIFIED BY THE MODULE MANUFACTURER.)_____
- PALO ALTO UTILITIES REQUIRES AN AC DISCONNECT TO BE LOCATED WITHIN SIGHT AND WITHIN 10 FEET FROM THE MAIN ELECTRICAL SERVICE. THE AC DISCONNECT SHALL BE READILY ACCESSIBLE, VISIBLE-BLADE, AND LOCKABLE. _____
- THE CITY OF PALO ALTO REQUIRES SEPARATE AC AND DC DISCONNECTS AT THE INVERTER. INTERGRADED DISCONNECTS ARE NOT ACCEPTED.
- WHERE STRINGS ARE COMBINED, A COMBINER BOX SHALL BE INSTALLED. THE COMBINER BOX SHALL BE LISTED BY AN ACCREDITED TESTING LABORATORY/FACTORY ASSEMBLED.
- SHOW LOCATION, TYPE AND NUMBER OF BATTERIES TO BE USED. SHOW ALL VENTILATION REQUIREMENTS. SHOW HOW BATTERIES ARE SECURED TO PREVENT MOVEMENT. _____
- SHOW SIZE AND LOCATION OF ALL OVERCURRENT PROTECTION DEVICES. _____
- PROVIDE AN AC/DC GROUNDING ELECTRODE SYSTEM PER (CEC 690.47 (C)). WHERE AN EXISTING GROUNDING ELECTRODE SYSTEM IS A DRIVEN GROUND ROD, AN ADDITIONAL GROUND ROD SHALL BE DRIVEN TO COMPLY WITH CEC 250.56. GROUNDING ELECTRODE SYSTEM MUST BE ILLUSTRATED ON THE PLANS. _____

- PLANS SHALL SPECIFY TYPE, SIZE AND LOCATION OF EXISTING AC GROUNDING ELECTRODE. _____

- WHERE THE GROUNDING ELECTRODE SYSTEM IS A UFER, EACH ELECTRICAL SERVICE MUST ATTACH SEPARATELY TO THE UFER WITH A CONTINUOUS GROUNDING ELECTRODE CONDUCTOR. ATTACHMENTS TO A UFER REQUIRE A LISTED REBAR CLAMP IS REQUIRED. _____

- WIRE DIAGRAM SHALL SHOW BONDING FROM THE PV GROUNDING ELECTRODE SYSTEM TO THE EXISTING AC GROUNDING ELECTRODE. SPECIFY GROUNDING ELECTRODE CONDUCTOR SIZE TO COMPLY WITH ARTICLE 690.47. _____

- MARKING IS REQUIRED ON DC CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES AND JUNCTION BOXES. **“CAUTION: SOLAR CIRCUIT”**. MARKING SHALL BE REFLECTIVE, WEATHER RESISTANT AND SUITABLE FOR THE ENVIRONMENT. MARKING SHALL BE EVERY 10’, AT TURNS AND ABOVE AND/OR BELOW PENETRATIONS AND AT ALL DC COMBINER AND JUNCTION BOXES. LABELS SHOULD BE RED BACKGROUND, WHITE LETTERING 3/8” HIGH MINIMUM, AND CAPITALIZE ALL LETTERS (NOT BOLD). _____

- INDICATE THAT A PERMANENT PHENOLIC PLAQUE WILL BE PLACED AT THE SERVICE ENTRANCE EQUIPMENT DENOTING ALL ELECTRICAL POWER SOURCES AND LOCATION OF ONSITE EMERGENCY POWER SOURCES (CEC 705.10) **““WARNING” 2 SOURCES OF POWER PV/AC DISCONNECT @ ADJACENT LOCATION”** SIGNAGE SHALL BE RED BACKGROUND WITH WHITE ENGRAVED LETTERS. MINIMUM SIZE SHALL BE 3”X4” (INDICATE THIS ON PLANS) _____

- A PERMANENT PHENOLIC PLAQUE SHALL BE PLACED AT THE POINT OF INTERCONNECTION STATING THE **MAXIMUM AC OUTPUT OPERATING CURRENT** AND THE **OPERATING AC VOLTAGE**. _____

- WHEN DC WIRING IS RUN THROUGH THE BUILDING AND THE DC DISCONNECT IS LOCATED OTHER THAN AT THE MAIN SERVICE, A PERMANENT PHENOLIC/ENGRAVED PLAQUE SHALL BE PLACED ON THE MAIN SERVICE SPECIFYING LOCATION OF DC DISCONNECT. A DC DISCONNECT LOCATED NEAREST THE POINT OF ENTRY IS RECOMMENDED. (CEC 690.14 (C)(1)) (INDICATE THIS ON PLANS)

- PROVIDE PERMANENT PHENOLIC PLAQUES AT ALL AC AND DC DISCONNECTS (CEC 690.14 (C)(2)) “PHOTOVOLTAIC ARRAY DC DISCONNECT SWITCH” OR “PHOTOVOLTAIC ARRAY AC DISCONNECT SWITCH” (INDICATE THIS ON PLANS) _____
- LOAD CENTERS USED AS PV CIRCUIT COMBINER BOXES SHALL BE LABELED...“PHOTOVOLTAIC SOURCE CIRCUITS ONLY. NO ADDITIONAL CIRCUITS ALLOWED”. _____
- ADDITIONAL SIGNAGE REQUIRED AT POWER SOURCE DISCONNECT PROVIDING OPERATING CURRENT AND VOLTAGE, MAXIMUM SYSTEM VOLTAGE AND SHORT-CIRCUIT CURRENT. (CEC 690.53)

- PROVIDE A PERMANENT PHENOLIC PLAQUE AT THE MAIN ELECTRICAL SERVICE WHEN A SUPPLY SIDE TAP IS NECESSARY. “CAUTION! SUPPLY SIDE TAP. OPEN AND LOCK AC DISCONNECT BEFORE REMOVING THE METER. _____
- WHERE INVERTERS ARE LOCATED OTHER THAN @ THE MAIN ELECTRICAL SERVICE LOCATIONS, A PERMANENT PHENOLIC PLAQUE OR DIRECTORY DENOTING ALL ELECTRICAL POWER SOURCES SHALL BE INSTALLED. (CEC 690.14 (D), 705.10) _____
- PROVIDE A PERMANENT PHENOLIC PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND PV SYSTEM DISCONNECTING MEANS, IF NOT LOCATED AT THE SAME LOCATION, ON BUILDINGS OR STRUCTURES WITH BOTH UTILITY SERVICE AND A PHOTOVOLTAIC SYSTEM. _____

- PLANS SHALL INCLUDE A TORQUE SCHEDULE FOR ALL THE EQUIPMENT CONNECTIONS. THE SCHEDULE SHALL INCLUDE THE FOLLOWING: INVERTER MOUNTING HARDWARE, INVERTER CONNECTIONS, DISCONNECTS, COMBINER BOXES, BREAKERS, AND MODULE CLIPS, RACKING SYSTEM, LUG AND PANEL HARDWARE. THE TORQUE SPECIFICATIONS SHALL BE IN INCH/LBS OR FT./LBS PER THE MANUFACTURER'S LISTING. INCLUDE CONNECTOR TORQUE SPECIFICATIONS FOR DEVICES SUCH AS BURNDY, POLARIS AND ALL CRIMPING DEVICES. _____
- PHOTOVOLTAIC INSTALLTIONS WEST OF 280 REQUIRE MODULES TO CARRY A MINIMUM CLASS "B" FIRERATING

I AM THE PROJECT PV DESIGNER/ENGINEER AND HAVE READ AND VERIFIED THAT ALL INFORMATION HAS BEEN PROVIDED FOR REVIEW AS SPECIFIED ABOVE.

NAME _____ DATE _____
 ADDRESS _____
 DESIGNER CELL PHONE # _____
 DESIGNER E-MAIL _____
 DESIGNER SIGNATURE _____

SUBMITTALS FOUND TO BE INCOMPLETE MAY BE RETURNED TO APPLICANT FOR RESUBMITTAL.