



MARIN COUNTY COMMUNITY DEVELOPMENT AGENCY

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Plan Review Guidelines for Photovoltaic Systems

Document Requirements:

1. Four identical sets of plan drawings shall be made and distributed as follows:
 - a. One set shall be delivered to the fire prevention office of the local fire district authority for their review. The fire district must approve the plans as submitted or require additional alterations to the plans as listed on an accompanying "Fire Authorization Letter." This letter must be submitted to Building and Safety prior to the issuance of a permit. (See also local fire PV std. 523.)
 - b. Three sets shall be submitted to Building & Safety. All systems will be reviewed by Planning, Land Development and Environmental Health Services will also review ground mounted systems.

2. All plans shall be drawn on white paper stock, min. 11" by 17" in size and drawn to scale (min. 1":20', 1":10' preferred for site plans; min. 1/8":1', 1/4":1' preferred for elevations and plan views; min. 1/2":1' for specific details. All text must be legible and not less than 8 points in size. Boilerplate copies of manufacturer's specifications and installation instructions and other illustrative material may be printed on 8 1/2" by 11" paper.

3. Each plan set shall provide general information for the project on the title page including: name, address & phone number of the owner/applicant; address of project; assessor's parcel number; designer of the system; name, address, license number, phone and fax of the licensed contractor or designer; the size of system being installed in kilowatts, the edition of the code(s) used to design the system. Each plan sheet shall bear the name and address of the project, the assessor's parcel number of the property, the owner's name and address, the designer's name, the plan scale, as required, and the page number.

4. The designer must sign each page of the *designed* plans. If the system requires design by an electrical engineer and/or structural engineer, all pages of the respectively designed pages of the system shall be wet-stamped and signed by the respective engineer(s).

5. The plan sets shall consist of the following:
 - a. **Site Plan:** The site plan(s) shall be drawn to conform with the requirements of the County of Marin Planning and Building & Safety Divisions and shall describe the location of the system components where located on the buildings and/or lands of the particular parcel (as identified by address, adjacent street or road, and assessor's parcel number). Setbacks from the property lines to the buildings and/or ground locations on which the system(s) is built shall be shown. Plans for ground mounted systems shall also show the locations of septic systems, streams and other existing natural features, trees to be removed, easements, slides, access road(s) and accessory buildings. The distances between arrays and buildings and other land features as mentioned above, shall be indicated. Accessory buildings proposed to house electrical equipment related to a PV system shall be clearly identified.

 - b. **Elevations:** Elevations shall be provided for both roof mounted and ground mounted systems. Building elevations drawn to scale are required for all roof mounted arrays. Indicate the array height above the roof plane and grade elevation, the angles of panels and their support members. Ground mounted systems shall show a side elevation of the array height indicating the height as measured from natural or finished grade, whichever is more restrictive (i.e., higher).



- c. **Building Plans:** The plan views shall show the layout of the individual panels and indicate the supporting framework. The plans shall show the location of all components, including combiner boxes, disconnects, inverters, intermediate panels and main electrical panels and building ground. The supporting roof members shall be indicated and calculations submitted to justify the size and spacing of the members *if necessary* to support the imposed load. The plans shall detail the connections of the array framework to the roof, including the type of mounting hardware used, bolt lengths and diameters, and the means of waterproofing the roof penetrations. The framework shall be designed to carry all imposed loads, including wind and seismic. Ground mounted arrays shall also show footings and piers and any additional construction. Auxiliary buildings housing associated electrical equipment shall be detailed on the plans. New buildings shall be subject to all County of Marin regulations and require separate approvals and permits.
- d. **Electrical Plans:** All electrical plan views and details shall be drawn using standard electrical design methods, symbols and nomenclature as found in the currently approved California Electrical Code. The plans shall include the following:
- i. An electrical power design compliant with C.E.C. 690, 702 & 705 including, but not limited to, a 125% over design of all components. A three-line drawing which specifies all equipment and their locations; wire size, length and type; raceway size, length and type; and source, operating current and voltage tables at each point where the values change or are combined.
 - ii. If conductors are of such a length as to subject them to voltage line drops then provide line loss calculations and compensate with appropriate conductor sizes.
 - iii. The location, name and ampacity of all related disconnects and overcurrent devices.
 - iv. The location and panelboard size of all existing and/or newly installed electrical service equipment and sub-panels.
 - v. If a line side tap is necessary then use the appropriate tap rule and provide adequately sized conductors and overcurrent protection (min. 60 Amp).
 - vi. If the system includes a back-up battery bank and/or a standby generator then note the size and capacity of those components and specify the transfer equipment and other related controls and panelboards. Show also the structural means of supporting the battery bank. (New standby generators and transfer switches shall be subject to all County of Marin regulations and require separate approvals and permits.)
 - vii. If the building is supplied with additional sources of power (i.e., generators, wind turbines, fuel cell generators, etc.) then locate these systems on the appropriate plan pages and show their respective controls, transfer switches and integration into the building power system.
 - viii. The methods of grounding and the size, length and type of equipment grounding conductors, grounding electrode conductors, existing and new grounding electrodes. This should include specific devices that ground panels and racks. The plans shall show a continuous ground path from the individual panels to the electrode(s). A separate electrode is required at ground mounted arrays for protection from lightning strikes and to meet CEC 250.32.
 - ix. The manufacturer's specification sheets for all installed equipment, including grounding devices. All components shall be compatible with related equipment and shall be listed and approved for the uses they are intended.
 - x. A statement specifying the text and location of required signage on electrical equipment both for warning signs and electrical design summaries stating source and operating currents. Locate the signage to be posted at all equipment in compliance with CEC 690.5(c); 690.14(c)2; and 690.51-56.
- e. **Hazard Signage Plans:** The plan views of the system should locate the signage provided as required by the local fire district authority. (Contact the local fire prevention officer for your area.)
- f. **Owner's Copy: Specifications & Manuals:** The owner shall be provided with all the documentation and training necessary to safely operate and maintain the system.