DUBLIN
CALIFORNIA

Community Development Department
Building & Safety Division
100 Civic Plaza, Dublin, CA 94568 • Ph: (925) 833-6620 • www.dublin.ca.gov

# Residential Photovoltaic Solar Systems
# Plan Submittal Checklist: Ground • Roof Mounted

## Purpose

This handout summarizes the permit process and fees for the installation and inspection of Small Residential Solar Photovoltaic (PV) Systems. It also provides information about submittal requirements, structural requirements, fire classification, and the inspection process. The following guideline shall be reviewed before commencing any work.

## Additional Agency Approvals

**Planning.** If installing a ground- mounted PV system please contact planning staff at **(925) 833-6610** to ensure zoning regulations are met.

**PG&E.** Contact their Solar Customer Service line at **(877) 743-4112** to verify the agency's requirements.

## Review Process

Provided that all the code regulations and plan criteria are complete, the review and permit may be issued over-the-counter.

As an option, applicants can apply **electronically** via email permits@dublin.ca.gov and submit the complete documentation as listed below. A permit technician will notify the applicant confirming receipt of the application with further instructions on plan check status and fee payment.

Note: Ground- mounted PV systems will require a normal plan review submittal.

## Plan Submittal for Construction

Complete plans and documents can be submitted directly to the Building & Safety Division counter between 8:00 am to 4:00 pm, Monday through Friday. Contact the **Building & Safety Division** at **(925) 833-6620** for fee or submittal inquiries

### A. Permit Application

A fully completed and signed Permit Application Worksheet.

### B. Plans and Documents

- ❑ Two (2) complete sets of plans for roof- mount; three (3) for ground- mount. Plans must be signed by designer or stamped and signed by licensed professional (if applicable).
- ❑ Two (2) sets of structural calculations prepared, stamped and signed by a California design professional (if applicable).
- ❑ Two (2) copies of manufacturer's specifications for the proposed PV panels and PV inverter(s) showing all electrical information.
- ❑ Two copies of electrical panel and sub-panel photos (must be legible).
- ❑ If main electrical service is 125 amps or less, provide electrical load calculations.
- ❑ Permit fee payment.

### C. Plan Size

Plans must be drawn to scale, fully dimensioned and legible on minimum 11 x 17 inch paper (e.g., site plan: 1/8-in = 1-ft) in a concise, detailed and professional manner.

1. **Cover Sheet / Site Plan.** Identify job address; name and address of owner, contractor and contact person; address, phone number, title and registration of designer or design professional; clear description of work; applicable codes; sheet index. Show lot and major components on the property and lot lines.
2. **Roof Plan.** Show the slope of the roof and location of the proposed PV panels; minimum access pathways at all PV locations and roof access points in relation to any ridge, hip or valley.

   Identify type and number of roof coverings and subsequent weatherproofing of the roof. Show all existing plumbing and mechanical vents.
3. **Framing Plan.** Roof- mounted solar projects shall include a roof framing and support structure plan; specify spacing and size (trusses or rafters) of framing members; maximum weight of individual PV panels; attachment details of panels to roof structure; size and weight of ballasts; access, pathways and spacing requirements per CRC R324.6.

Where alterations are required to existing structures, structural plans shall be provided that are sufficient in detail and scope to demonstrate the required load path to the ground. This method is not eligible for over-the-counter review.

***Note: Structural calculations shall be required if the total weight of the photovoltaic system is over five pounds per square foot.***

Ground-mounted solar systems shall include a foundation and framing plan; footing details; connection details for solar water heater system. Show complete details identifying the load path to the ground.

4. **Manufacturer's Electrical Data Sheets.** Electrical single-line diagram identifying all devices installed in the PV system and total kVA rating of system; point of interconnection with the utility supplied wiring system; details of main breaker; PV breaker and rating of bussing; type and size of all conduit and conductors throughout the PV system; overcurrent protection; inverter; disconnects; signage; AC connection to building; grounding and bonding of rails and modules.

   Manufacturer's specifications and installation instructions for all manufactured components: PV modules, inverter(s), combiner box (if used), disconnects, mounting system with base and rail attachment and connections.

5. **Verification of Existing Service.** Provide copies of photos of the existing main service panelboard and any sub-panels and photos of their interior labels. The electrical single-line diagram shall be representative of field conditions.

## Inspection Guidelines

### General

- ✓ Customer / installer shall provide approved plans on site for inspector.
- ✓ Photovoltaic module number and location of installation must match approved site plan.

  ***Note:*** *Revisions to the PV panel layout shall be submitted to the Building & Safety counter for review prior to final inspection. Additional fees may be charged.*
- ✓ Customer / installer shall provide access to all areas needed for inspection.
- ✓ Roof mounted panels: Installer shall provide a proper and secured ladder(s) to access all areas.
- ✓ In house: If wiring in attic and/or garage area, the customer/installer shall ensure access to these areas.

### Roof Access and Pathways

- ✓ Verify minimum 18-in to 36-in clearance from arrays to ridge and edge of roof. (CRC R324.6)
  1. PV arrays occupying no more than 33% of the roof area (plan view),shall have no less than 18" of clear setback required on both sides of a horizontal ridge. (CRC R324.6.2)
- ✓ Verify all structural supports are properly installed and sealed per listing.
- ✓ Verify all metallic raceways, J-boxes, supports and modules are properly labeled and grounded in accordance with product listings. (CEC Art 690.43)
- ✓ Verify all exposed wiring is listed Sunlight Resistant. (CEC Art 690.31(A))
- ✓ Verify all module interconnection connectors require a tool for opening. (CEC Art 690.33)

### Rapid Shutdown

- ✓ PV system circuits installed on or in buildings shall include a rapid shutdown function that controls specific conductors as follows. (CEC Art 690.12)
  1. Controlled conductors outside of the array boundary shall comply with CEC 690.12(B)(1) and inside the array boundary shall comply with CEC 690.12(B)(2).
  2. Controlled conductors shall be limited to not more than 30 volts and 240 volt-amperes within 10 seconds of rapid shutdown initiation.
  3. Voltage and power shall be measured between any two conductors and between any conductor and ground.
  4. Include signage for rapid shutdown in accordance with CEC 690.56(1).
  5. Equipment that performs the rapid shutdown shall be listed and identified on site placard.

### DC Disconnect

- ✓ Verify proper location of DC disconnect and that it shall be readily accessible - within sight of inverter - and properly listed for 600 volt DC power. (CEC 690.13)
- ✓ If DC wiring is run through the building, a DC disconnect shall be installed prior to the conductors entering the building or the conductors shall be installed in metallic raceways or metallic enclosures from the point of entrance to the DC disconnect. All J-boxes shall be labeled. (CEC 690.31(G))
- ✓ Verify proper and permanent labeling with the following information (CEC Art 690.13(B)):

**PHOTOVOLTAIC DC DISCONNECT**

and

**WARNING**
**ELECTRIC SHOCK HAZARD**
**TERMINALS ON THE LINE AND LOAD**
**SIDES MAY BE**
**ENERGIZED IN THE OPEN POSITION**

- ✓ The DC disconnect shall also be properly and permanently labeled with the following Installed System Information: (CEC 690.53)
  (1) Maximum Voltage
  (2) Maximum Circuit Current
  (3) Maximum Rated Output Current of the Charge Controller or DC to DC Converter (if installed).
- ✓ Verify labeling of wiring. (CEC 690.4)
- ✓ Verify if DC circuits are more than 80 volts. Arc-fault protection shall be required. (CEC 690.11)

## AC Point of Connection

- ✓ The breaker must be secured in place and not be equipped with line/load connection. (CEC 690.9)

Note: Roof-top micro-inverter systems have no DC disconnect switches. AC disconnect shall be installed on the roof or at the utility panel and be capable of being locked OFF. Installed system information shall be installed on Utility Service Panel.

## MOUNTING NOTES

1. PANELS MOUNTED ON ALUMINUM RACKING

2. PV ARRAY MOUNTES TO ROOF STRUCTURE WITH 5/16" LAGS EMBEDDED 2.5" INTO RAFTERS OR SEE NOTE #5 BELOW

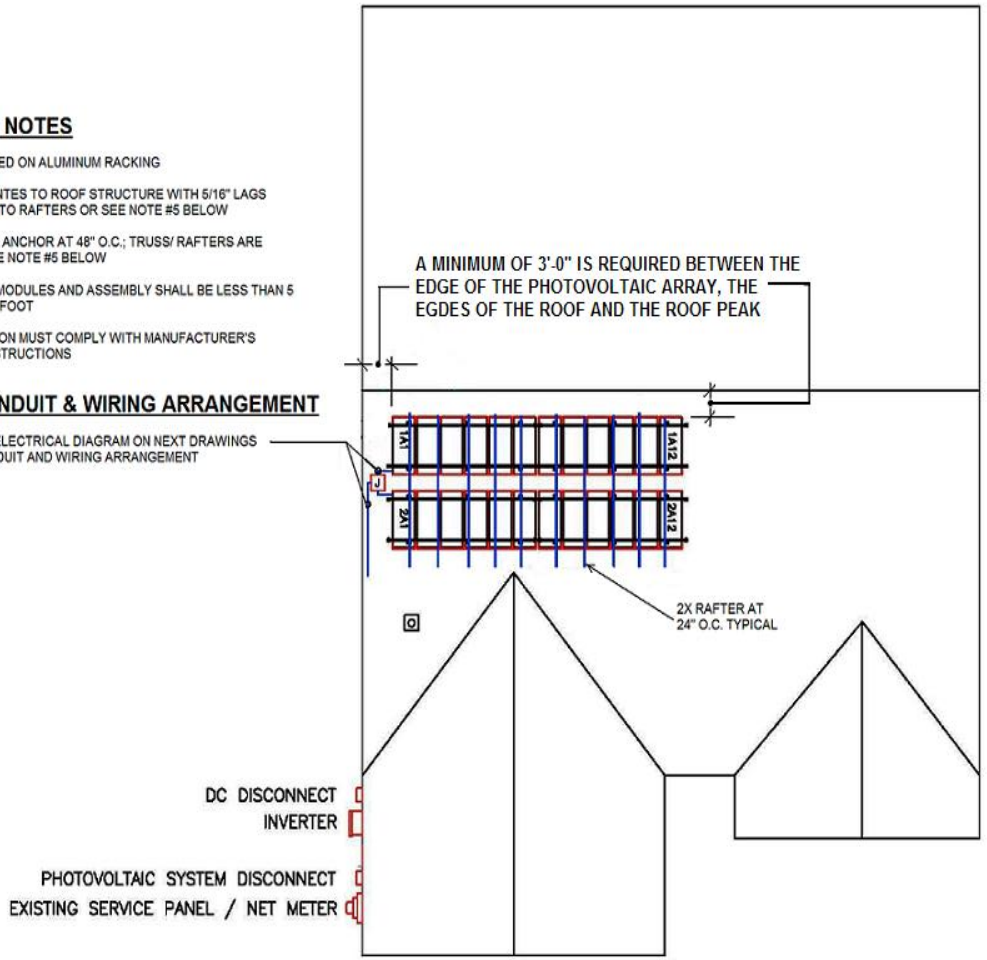
3. PV PANELS ARE ANCHOR AT 48" O.C.; TRUSS/ RAFTERS ARE AT 24" O.C. OR SEE NOTE #5 BELOW

4. WEIGHT OF PV MODULES AND ASSEMBLY SHALL BE LESS THAN 5 LBS PER SQUARE FOOT

5. ALL INSTALLATION MUST COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS

## ARRAY CONDUIT & WIRING ARRANGEMENT

SEE STANDARD ELECTRICAL DIAGRAM ON NEXT DRAWINGS FOR ARRAY CONDUIT AND WIRING ARRANGEMENT





SITE MAP

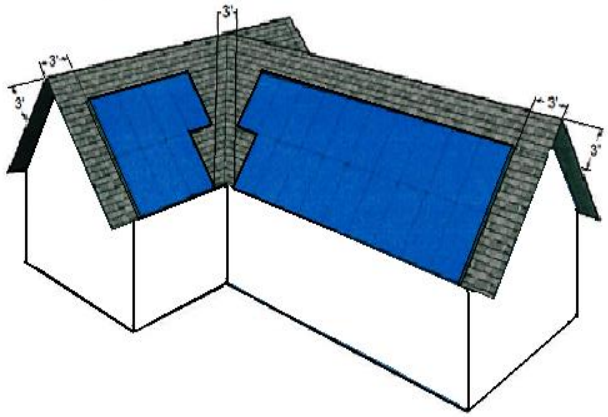



DIAGRAM: REQUIRED CLEAR ACCESS PATHWAYS

# PV ARRAY LAYOUT & WIRING PLAN


| CUSTOMER NAME | | | |
|---|---|---|---|
| ADDRESS | | | |
| DRAWN BY | | CHECK BY | |
| SCALE | NTS | DATE DRAWN | |
| COMPANY LOGO | COMPANY NAME ADDRESS | | |