



Required Eligibility Checklist for Residential Solar Photovoltaic Permits for One- and Two-Family Dwellings

GENERAL REQUIREMENTS

- | | | |
|---|----------------------------|----------------------------|
| A. System size is 10 kW AC CEC rating or less | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| B. The solar array is flush roof-mounted on one- or two-family dwelling or accessory structure | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| C. The solar panel/module arrays will not exceed the maximum legal building height per cities or county ordinance | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| D. Solar system is utility interactive and without other power production sources | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| E. Permit application is completed and attached. Online Application Section B is required for online submittals. | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| F. Roof mounted plans are approved by the City Planning Department for Moraga, Orinda, Lafayette, Clayton, and Hercules | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| G. If submitting in the office, 3 sets of plans are included that are 11 x 17 minimum size. If submitting online, 1 multi-page, 11 x 17 size and bookmarked PDF file for the plan set. Plans shall include roof plans showing module locations and existing framing information. Show inverter, batteries, and all equipment for the system and locations for the equipment. Allow 2 x 6 space for Comments and Stamps. Go to www.cccounty.us/solar for standards of online submittal. | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| H. Provide manufacturer's installation and grounding instructions for modules | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| I. Provide manufacturer's <u>specification</u> sheet for all components but not limited to: | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 1) Modules | | |
| 2) Inverter | | |
| 3) Microinverter | | |
| 4) Power Optimizers | | |
| 5) Any Alternate Power Sources such as generators, batteries, fuel cells, windmills or existing solar systems | | |
| 6) Mounting/racking systems | | |

ELECTRICAL REQUIREMENTS

- | | | |
|---|----------------------------|----------------------------|
| A. No more than four photovoltaic module strings are connected to each Maximum PowerPoint Tracking (MPPT) input where source circuit fusing is included in the inverter | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 1) No more than two strings per MPPT input where source circuit fusing is not included | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 2) Fuses (if needed) are rated to the series fuse rating of the PV module | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 3) No more than one noninverter-integrated DC combiner is utilized per inverter | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| B. For central inverter systems: No more than two inverters are utilized | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| C. The PV system is interconnected to a single-phase AC service panel of nominal 120/220 Vac with a bus bar rating of 200 A or less | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| D. The PV system is connected to the load side of the utility distribution equipment | <input type="checkbox"/> Y | <input type="checkbox"/> N |

STRUCTURAL REQUIREMENTS

- | | | |
|---|----------------------------|----------------------------|
| A. A completed Structural Criteria and supporting documentation is attached (if required) | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| B. Provide details for the racks and show the anchoring details for the attachments to the roof | <input type="checkbox"/> Y | <input type="checkbox"/> N |

FIRE SAFETY REQUIREMENTS

- A. Fire classification of solar system is provided ☐ Y ☐ N
- B. All required markings and labels are provided ☐ Y ☐ N
- C. A diagram of the roof layout of all panels, modules, clear access pathways and approximate locations of electrical disconnecting means and roof access points is completed and attached. See attached sample of roof access points. ☐ Y ☐ N

Notes:

- 1. These criteria are intended for expedited solar permitting process.***
- 2. If any items are checked NO, revise design to fit within Eligibility Checklist, otherwise permit application will go through standard process.***

PLEASE READ AND INITIAL EACH ITEM BELOW:

_____ I HAVE VERIFIED ALL INFORMATION IS CORRECT AND INCLUDED IN MY SUBMITTAL.

IF I HAVE SUBMITTED DIGITAL FILES FOR PLAN REVIEW AND PERMIT ISSUANCE, I AGREE TO PROVIDE ONE COPY OF THE REVIEWED AND APPROVED PLANS IN COLOR, 11 X 17 SIZE FOR THE FIELD INSPECTOR.

_____ FAILURE TO PROVIDE THE PLANS IN THE FORMAT STATED ABOVE MAY RESULT IN A RE-INSPECTION FEE.

SIGNATURE _____

PRINTED NAME _____

**REQUIRED STRUCTURAL CRITERIA FOR RESIDENTIAL
FLUSH-MOUNTED ROOFTOP SOLAR ARRAYS**

Electronic Plan Submittal or Plan Review will not be performed on this project if one or more items below are checked NO. Submittal in the office with 3 sets of paper plans will be required.

1. ROOF CHECKS**A. Visual Review/Contractor's Site Audit of Existing Conditions:**

- 1) Is the roof a single roof without a reroof overlay? ☐ Y ☐ N
- 2) Does the roof structure appear structurally sound, without signs of alterations or significant structural deterioration or sagging, as illustrated in Figure 1? ☐ Y ☐ N

B. Roof Structure Data:

- 1) Measured roof slope (e.g. 6:12): _____:12
- 2) Measured rafter spacing (center-to-center): _____ inch
- 3) Type of roof framing (rafter or manufactured truss): ☐ Rafter ☐ Truss

2. SOLAR ARRAY CHECKS**A. Flush-mounted Solar Array:**

- 1) Is the plane of the modules (panels) parallel to the plane of the roof? ☐ Y ☐ N
- 2) Is there a minimum 2" and a maximum 10" gap between underside of module and the roof surface? ☐ Y ☐ N
- 3) Modules do not overhang any roof edges (ridges, hops, gable ends, eaves)? ☐ Y ☐ N

B. Do the modules plus support components weigh no more than:

4 psf for photovoltaic arrays or 5 psf for solar thermal arrays? ☐ Y ☐ N

C. Does the array cover no more than half of the total roof area (all roof planes)?

☐ Y ☐ N

D. Are solar support component manufacturer's project-specific completed worksheets, tables with relevant cells circled, or web-based calculator results attached?

☐ Y ☐ N

E. Is a roof plan of the module and anchor layout attached? (see Figure 2)

☐ Y ☐ N

F. Downward Load Check (Anchor Layout Check):

- 1) Proposed anchor horizontal spacing (see Figure 2): _____' - _____"ft-in
- 2) Horizontal anchor spacing per Table 1: _____' - _____"ft-in
- 3) Is proposed anchor horizontal spacing less than Table 1 spacing? ☐ Y ☐ N

G. Wind Uplift Check (Anchor Fastener Check):

- 1) Anchor fastener data (see Figure 3):
- a. Diameter of lag screw, hanger bolt or self-drilling screw: _____ inch
- b. Embedment depth of rafter: _____ inch
- c. Number of screws per anchor (typically one): _____
- d. Are 5/16" diameter lag screws with 2.5" embedment into the rafter used, OR does the anchor fastener meet the manufacturer's guidelines? ☐ Y ☐ N

3. SUMMARY

A. All items above are checked YES. No additional calculations are required.

B. One or more items are checked NO. Attach project-specific drawings and calculations stamped and signed by a California-licensed Civil or Structural Engineer.

C. Electronic Plan Submittal or Plan Review will not be performed on this project if one or more items are checked NO.

Job Address: _____ Permit #: _____

Contractor/Installer: _____ License # & Class: _____

Signature: _____ Date: _____ Phone #: _____

Table 1. Maximum Horizontal Anchor Spacing				
Roof Slope		Rafter Spacing		
		16" o.c.	24" o.c.	32" o.c.
Photovoltaic Arrays (4 psf max)				
Flat to 6:12	0° to 26°	5'-4"	6'-0"	5'-4"
7:12 to 12:12	27° to 45°	1'-4"	2'-0"	2'-8"
13:12 to 24:12	46° to 63°	1'-4"	2'-0"	2'-8"

Solar support component manufacturer's guidelines may be relied upon to ensure the array above the roof is properly designed, but manufacturer's guidelines typically do NOT check to ensure that the roof itself can support the concentrated loads from the solar array. Table 1 assumes that the roof complied with the building code in effect at the time of construction, and places limits on anchor horizontal spacing to ensure that a roof structure is not overloaded under either downward loads or wind uplift loads. Note 4 below lists the basic assumptions upon which this table is based.

Table 1 Notes:

1. Anchors are also known as "stand-offs", "feet", "mounts" or "points of attachment". Horizontal anchor spacing is also known as "cross-slope" or "east-west" anchor spacing (see Figure 2).
2. If anchors are staggered from row-to-row going up the roof, the anchor spacing may be twice that shown above, but no greater than 6'-0".
3. For manufactured plated wood trusses at slopes of flat to 6:12, the horizontal anchor spacing shall not exceed 4'-0" and anchors in adjacent rows shall be staggered.
4. This table is based on the following assumptions:
 - The roof structure conformed to building code requirements at the time it was built.
 - The attached list of criteria are met.
 - Mean roof height is not greater than 40 feet.
 - Roof sheathing is at least 7/16" thick oriented strand board or plywood. 1x skip sheathing is acceptable.
 - If the dwelling is in Wind Exposure B (typical urban, suburban or wooded areas farther than 500 yards from large open fields), no more than one of the following conditions apply:
 - The dwelling is located in a special wind region with design wind speed between 115 and 130 mph per ASCE 7-10, or
 - The dwelling is located on the top half of a tall hill, provided average slope steeper is less than 15%.
 - If the dwelling is In Wind Exposure C (within 500 yards of large open fields or grasslands), all of the following conditions apply:
 - Design wind speed is 110 mph or less (not in a Special Wind Region), and
 - The dwelling is not located on the top half of a tall hill.
 - The solar array displaces roof live loads (temporary construction loads) that the roof was originally designed to carry.
 - The Structural Technical Appendix provides additional information about analysis assumptions.
(http://www.opr.ca.gov/docs/Solar_Structural_Technical_Appendix.pdf)

Figure 1. Roof Visual Structural Review (Contractor's Site Audit) of Existing Conditions.

The site auditor should verify the following:

1. No visually apparent disallowed rafter holes, notches and truss modifications as shown below.
2. No visually apparent structural decay or un-repaired fire damage.
3. Roof sag, measured in inches, is not more than the rafter or ridge beam length in feet divided by 20.

Rafters that fail the above criteria should not be used to support solar arrays unless they are first strengthened.

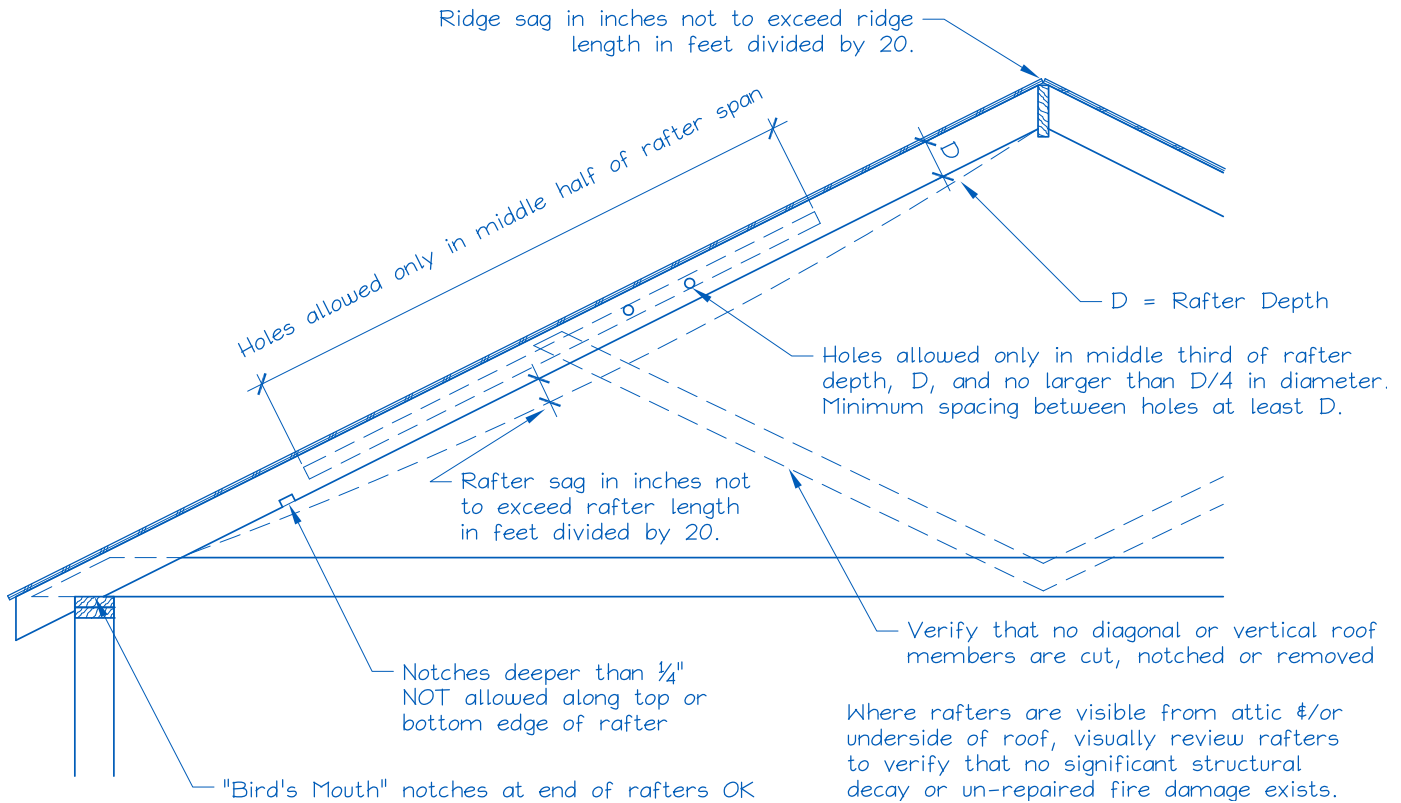


Figure 2. Sample Solar Panel Array and Anchor Layout Diagram (Roof Plan).

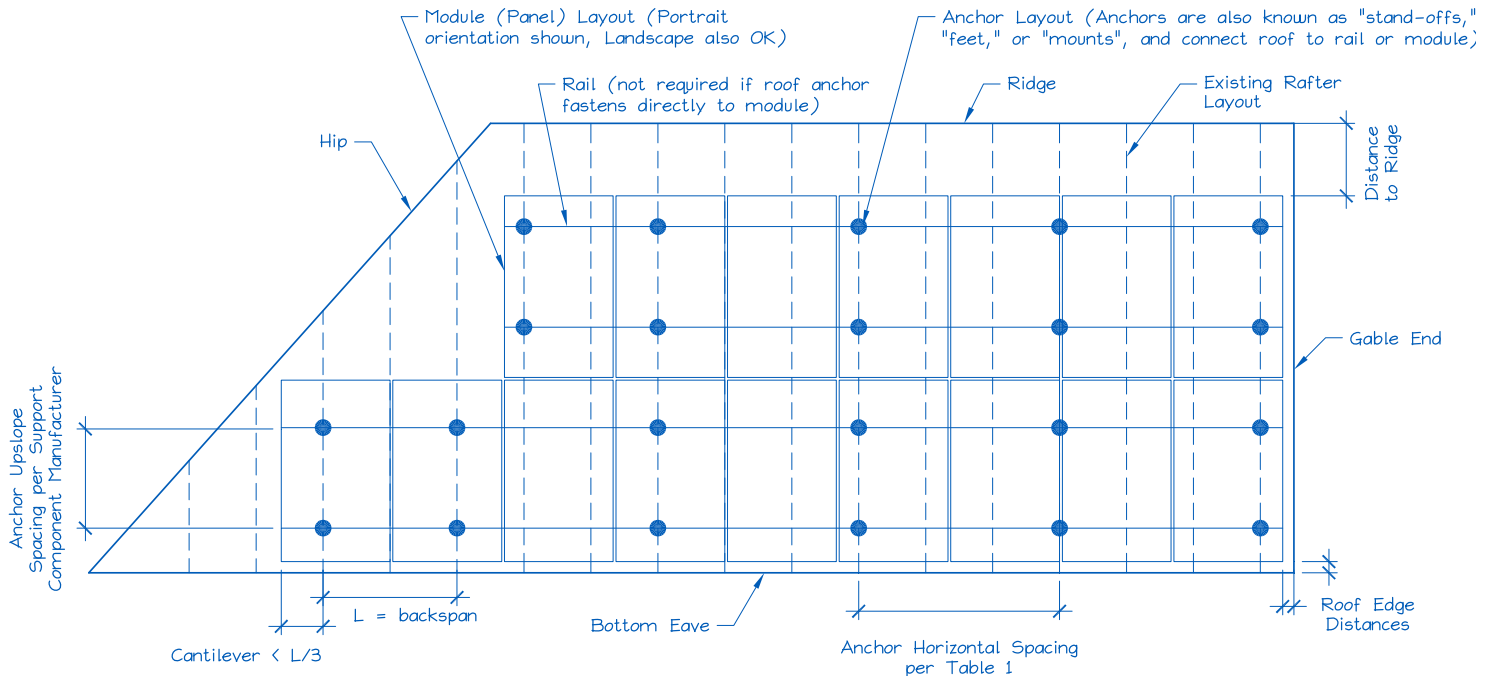
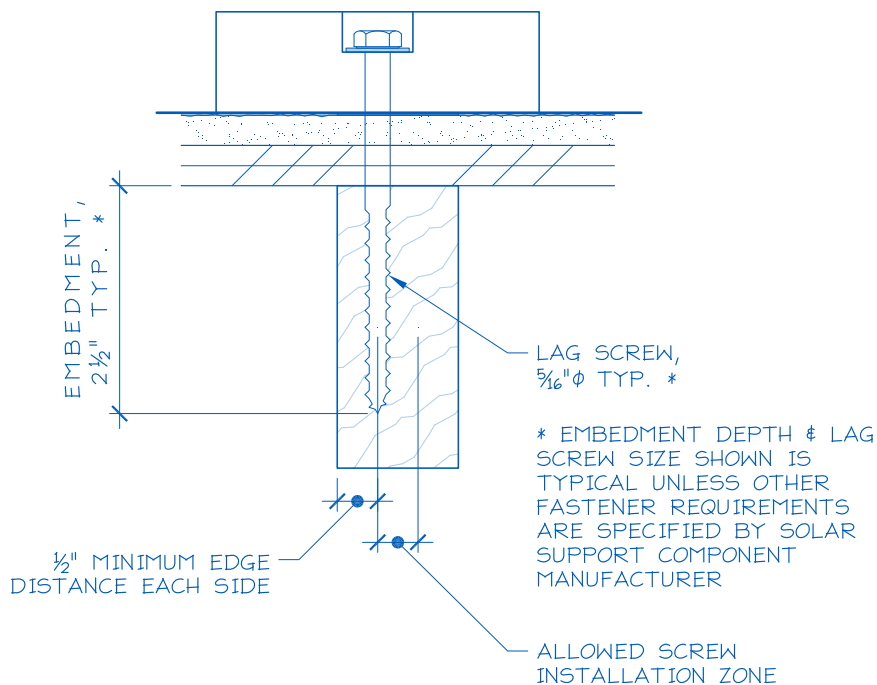


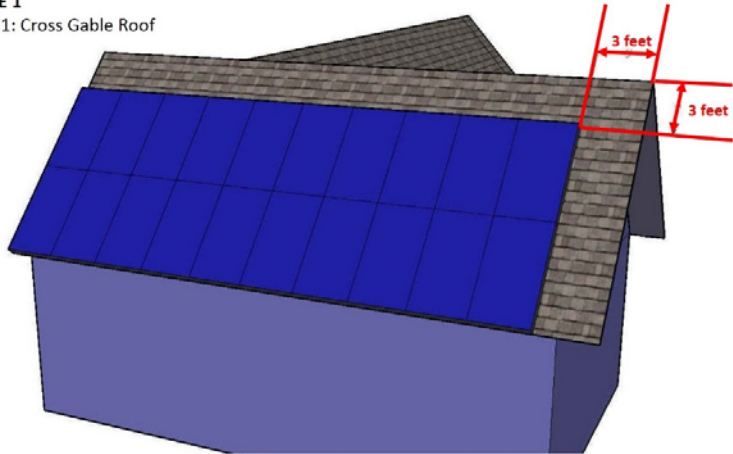
Figure 3. Typical Anchor with Lag Screw Attachment.



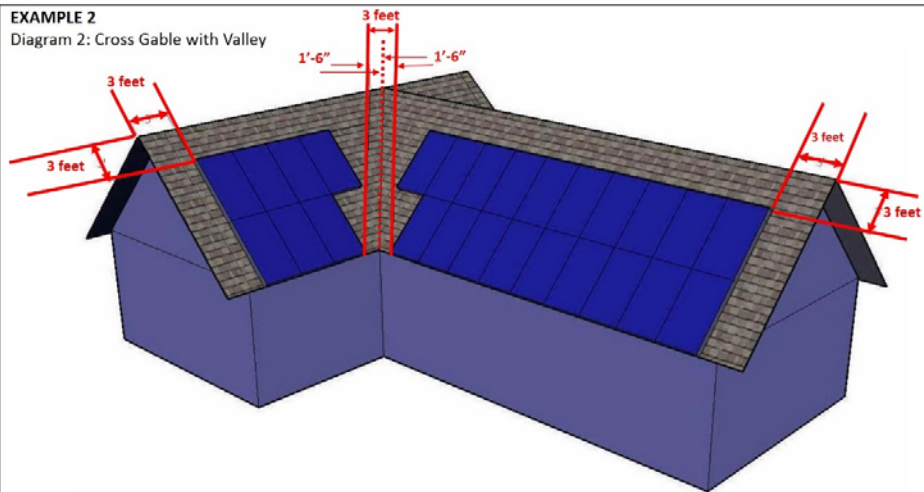
ROOF ACCESS AND PATHWAYS

Roof Access Points: Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows and doors, and located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires or signs.

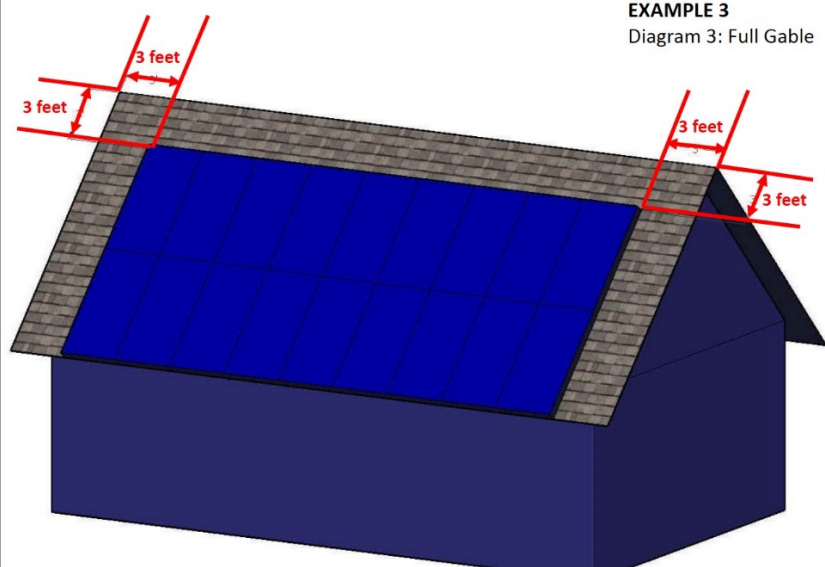
EXAMPLE 1
Diagram 1: Cross Gable Roof



EXAMPLE 2
Diagram 2: Cross Gable with Valley



EXAMPLE 3
Diagram 3: Full Gable



EXAMPLE 4
Diagram 4: Full Hip Roof

