

City of San Clemente SUBMITTAL GUIDELINE *Revised 6/16/2014*
SOLAR PHOTO-VOLTAIC SYSTEM OVER SINGLE FAMILY DWELLING

ADMINISTRATIVE

1. Provide (2) sets of plans, 11" x 17" minimum plan sheet size. Provide space for City approval stamps.
 - a) Imprint on plans the manufacturer's equipment specification sheets with listings for all proposed PV equipment (inverters, modules, combiner boxes, etc.) Do not reduce size of specification sheets.
 - b) Lateral engineering calculations *may be 8-1/2" x 11" sheets.* Do not attach calc sheets to plans.
 - c) City forms BA-5 and BI-27 may be imprinted on, or stapled to the plans. (see attached forms)
2. Note (imprint) on the plans: "Notify serving utility before activation of PV system"
3. Note (imprint) on the plans: "Manufacturers product installation instructions shall be available at time of inspection"
4. Plans must be signed by State of California licensed contractor with any of the following classifications "A", "B", "C-46", "C-10", (licensed electrical engineer, stamp, sign, and date). Provide signature and contractor license number on each plan sheet.

ROOF PLAN

1. Provide a scaled and dimensioned roof plan projected on a site plan. (Minimum scale 1/8" equals 1ft.) Show the location and dimensions of all existing and proposed solar voltaic equipment and PV arrays.
2. Provide detail drawing or illustration of system support connections to roof, specify min. embedment.
3. Provide detail drawing or illustration for flashing and water proofing at system supports.
4. Provide a partial roof framing plan. Show new and existing supporting rafters, beams and headers include rafter size, span, and spacing. Identify roof sheathing and roofing materials.
Alternate: Framing plan not required if arrays are supported at a maximum spacing of 4 ft.
5. Provide calculations by a licensed professional engineer or architect to verify supporting members are adequate for existing and proposed loads.
Alternate: Calculations not required if arrays are supported at a maximum spacing of 4 ft.
6. Provide lateral calculations by a licensed professional engineer or architect per CBC showing that affected existing lateral resisting elements are no more than 10% overstressed according to CBC.
Lateral analysis is not required if total area of new and existing arrays less than 250 sq. ft. over a second story roof, or 350 sq. ft. over a first story roof.

1. Inverter Information: Manufacturers specifications sheets, model number, and maximum D.C. input.
2. P.V. Module: Manufacturers specifications sheets, model number, open circuit voltage (VOC), short-circuit current (ISC) & max series fuse.
3. On the roof plan, show all PV equipment, conduits, AC/DC disconnects, and all PV arrays.
4. Single Line Diagram: show array configuration, conduit and conductor sizes with derating calculations.
5. Array Information: show number of modules in series, number of parallel source circuits.
6. Wiring and Over Current Protection: show conductor ampacities, adjusted with all derating factors, show rating and location of all over current devices (OCD)
7. If combiner box installed, or where more than two strings of modules are electrically connected together in parallel, each individual string shall be protected by its own over current protection or feeders sized for sum of all short circuit current of all strings.
8. System Labels and Warnings: show signage on the plans per current edition of California Electrical Code.
9. Grounding Details: show equipment ground conductor, ground electrode conductor from inverter to new grounding electrode system or existing grounding electrode system.
10. Module grounding: show on plans drawing or illustration detail per manufacturer requirement.
11. Disconnects: (1) shall be permanently marked to identify it as a P.V. system disconnect (2) shall be readily accessible, either on the outside of a building or structure or inside nearest the point of entrance of the system conductors.
12. Direct Current Systems: Circuits run inside a building or structure (provide penetration weather proofing detail) shall be contained in metallic raceways or enclosures from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means.
13. Direct Current Systems: Show on plans compliance 2014 CEC Article 690.11, Arc-Fault Circuit Protection.
14. Point of Connection: The sum of the main breaker and PV breaker shall not exceed 120% of the rating of the panel bus bar. CEC Article 690.64, 705.12 (D)(2) Provide calculation on the plans. (see page 4)

Imprint on Plans the following CA FIRE CODE DC CIRCUIT MARKING REQUIREMENTS.

DC CIRCUIT MARKING REQUIREMENTS

Materials used for marking shall be weather resistant. UL 969 shall be used as a standard for weather rating (UL listing of markings is not required).

Marking is required on all interior and exterior DC conduit, raceways, enclosures, cable assemblies and junction boxes to alert the fire service to avoid cutting them. Marking shall be placed every 10 feet, at turns and above and/or below penetrations, and at all DC combiner and junction boxes.

Marking Content and Format

Marking Content: CAUTION: SOLAR CIRCUIT

- Red Background
- White Lettering
- Minimum 3/8" Letter Height
- All capital letters
- Arial or similar font, Non-bold
- Reflective weather resistant material suitable for the environment (durable adhesive materials must meet this requirement)

Show compliance CA Fire Code Access Requirements

Residential Buildings with hip roof layouts:

Modules shall be located in a manner that provides one three-foot wide clear access pathway from the eave to the ridge on each roof slope where panels are located. The access pathway shall be located at a structurally strong location on the building (such as a bearing wall)

Residential Buildings with a single ridge:

Modules shall be located in a manner that provides two three-foot wide access pathways from the eave to the ridge on each roof slope where panels are located.

Hips and Valleys: Modules shall be located no closer than one and one half feet to a hip or a valley if panels are to be placed on both sides of a hip or valley. If the panels are to be located on only one side of a hip or valley, that is of equal length then the panels may be placed directly adjacent to the hip or valley.

Show compliance CA Fire Code location of DC conductors and conduits

Conduit, wiring systems and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities.

Conduit runs between sub arrays and to DC combiner boxes shall use the design that minimizes the total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box. The DC combiner boxes are to be located such that conduit runs are minimized in the pathways between arrays.

To limit the hazard of cutting live conduit in venting operations, DC wiring shall be run in metallic conduit or raceways when located within enclosed spaces in a building and shall be run, to the maximum, extent possible, along the bottom of load-bearing member.

690.64 Point of Connection.

(B) Load Side.

2. Bus or Conductor Rating. The sum of the ampere ratings of overcurrent devices in circuits supplying power to a bus bar or conductor shall not exceed 120 percent of the rating of the busbar or conductor. In systems with panel boards connected in series, the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all bus bars and conductors.

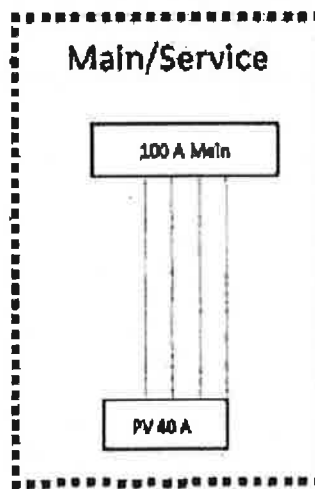
The Main Service panel has 125 amp rated bus and a 100 amp breaker. The PV has a 40 amp breaker. The sum of the back fed breakers cannot exceed 120% of the bus rating:

$$125A \times 120\% = 150 A$$

The Sum:

$$100A + 40A = 140A$$

Complies, the sum did not exceed 120%.





Special Requirements and Minimum Construction Standards

BA-5

CONSTRUCTION HOURS ARE ALLOWED BETWEEN 7:00 AM AND 6:00 PM ON WEEKDAYS, SATURDAYS 8:00 AM AND 6:00 PM, NO CONSTRUCTION ON SUNDAYS AND RECOGNIZED HOLIDAYS. (CHAPTER 8.48, SCMC)

APPROVED PLANS SHALL BE AVAILABLE AT THE JOB SITE DURING INSPECTIONS. (CHAPTER 15.08, SCMC)

SANITARY FACILITY FOR CONSTRUCTION SITE MUST BE PROVIDED. (CHAPTER 15.04, SCMC)

FINAL INSPECTIONS SHALL BE COMPLETED AND APPROVED FOR ANY REMODELING, ADDITION OR TENANT IMPROVEMENT PROJECT. (CHAPTER 15.08, SCMC)

SPECIAL INSPECTION REQUIREMENT: FOR MULTI-RESIDENTIAL AND COMMERCIAL BUILDINGS WITH 2 STORIES OR MORE. PLANNING AND BUILDING INSPECTIONS ARE REQUIRED FOR EACH FLOOR LEVEL. DUE TO SPECIAL AND UNUSUAL TOPOGRAPHICAL CONDITIONS AT THE SITE, A SURVEYOR'S CERTIFICATION FOR THE COMPLIANCE OF THE FIRST FLOOR'S SLAB OR FINISH FLOOR SHALL BE REQUIRED. (SCBD POLICY)

RETAINING WALLS WHICH ARE NOT A PART OF THE STRUCTURE, INCLUDING MASONRY GARDEN WALLS, WILL REQUIRE A SEPARATE PERMIT UNLESS NOTED OTHERWISE. (CHAPTER 12-08, SCMC)

CURBS, GUTTERS AND SIDEWALKS ARE REQUIRED. (CHAPTER 12-08, SCMC)

ALL ROOF WATER SHALL BE DRAINED BY ROOF GUTTERS AND DRAIN PIPES TO THE STREET OR OTHER APPROVED LOCATION BY GUTTERS AND PIPING OR BY USE OF AN APPROVED NON-ERODIBLE SURFACE DRAIN. WATER SHALL NOT DRAIN OVER PUBLIC SIDEWALKS. (CHAPTER 15-20, SCMC)

NO FERROUS WATER PIPING UNDERGROUND. COPPER WATER PIPING UNDER SLAB FLOORS SHALL BE TYPE "K" PLACED IN SAND BED & PROTECTED WITH PLASTIC SLEEVE WHEN PENETRATING SLAB. (CHAPT 15.08.020.20, SCMC)

3/4" HOSE BIB REQUIRED IN FRONT AND BACK OF BUILDING. (CHAPTER 15-20, SCMC)

A 1/2" CONDUIT SHALL BE RUN FROM THE WATER METER BOX TO THE TELEPHONE JUNCTION BOX, ONE PAIR OF NO. 19 CONTROL WIRES SHALL BE INSTALLED FOR USE BY THE WATER DIVISION. (SCWD)

APPROVED BACKFLOW DEVICES SHALL BE INSTALLED ON COMMERCIAL IRRIGATION SYSTEMS, NON-RESIDENTIAL BUILDINGS OR ANY OTHER FACILITY AS REQUIRED BY CHAPTER 13-04, SCMC. QUESTIONS AND INSPECTION REQUESTS MAY BE ADDRESSED TO THE UTILITY MANAGER AT (949) 366-1553.

NO ALUMINUM WIRE WILL BE USED WITHOUT PRIOR APPROVAL FROM BUILDING OFFICIAL. (CHAPT 15-12, SCMC)

LOW FLUSH FIXTURES (1.6 GAL TOILETS, 1 GAL URINALS, & 2.5 GAL SHOWER HEADS) ARE REQUIRED. (STATE LAW)

TRASH AND CONSTRUCTION DEBRIS CONTAINERS, PORTABLE TOILETS, AND CONSTRUCTION EQUIPMENT SHALL NOT ENCROACH ONTO PUBLIC SIDEWALKS AND STREETS. (CHAPTER 12.20, SCMC)

ADDRESS NUMBERS IN CONTRASTING COLOR TO THE STRUCTURE FOR RESIDENTIAL A MIN. OF 4" HIGH; FOR NON-RESIDENTIAL, A MIN. OF 8" HIGH TO BE PLACED ON THE FRONT OF THE BUILDINGS. EACH UNIT SHALL BE IDENTIFIED WITH AN ALPHABETICAL LETTER AND THE RELATED GARAGE MUST BE SIMILARLY MARKED. (SECTION 10.208 - UFB & CHAPTER 8-16, SCMC)

SUBDIVIDER SHALL NOT PAVE ANY STREET UNDER WHICH CABLE TV CONDUIT IS TO BE PLACED WITHOUT ACTUAL NOTICE TO COX COMMUNICATIONS FOR THE INSTALLATION OF CABLE CONDUIT. NOTICE SHALL BE SENT TO THE FOLLOWING ADDRESS: GENERAL MGR, COX COMMUNICATIONS; 29947 AVE DE LA BANDERAS, RANCHO SANTA MARGARITA, CA 92688 (949) 546-2000.

ELECTRIC AND GAS METERS WILL NOT BE SET UNTIL ALL PHASES OF WORK ARE COMPLETED AND CERTIFICATE OF OCCUPANCY HAS BEEN ISSUED. (SCBD POLICY).

NOTE: SCMC: San Clemente Municipal Code; SCBD: San Clemente Building Division; SCWD: San Clemente Water Division



POLLUTION PREVENTION FOR CONSTRUCTION

BI-27

All construction projects regardless of size are required, at a minimum, to implement an effective combination of erosion and sediment control methods and follow Best Management Practices (BMP's) during the construction process.

Construction sites need to follow good housekeeping practices in order to prevent pollutants from entering the storm drains.

Typical construction site issues to address include:

- Stockpile Management
- Concrete & Mortar Waste Management
- Solid Waste Management
- Sanitary / Septic Waste Management
- Hazardous Materials - Delivery, Storage & Use

***MUST BE IMPRINTED ON ALL NEW CONSTRUCTION/ADDITION PLANS

3.2 Minimum Requirements

All construction projects regardless of size are required, at a minimum, to implement an effective combination of erosion and sediment controls and waste and materials management Best Management Practices. These minimum requirements are summarized in Table 3-2 and must be conveyed to construction contractors as part of the plan notes or on a separate erosion control plan as required by the agency.

Table 3-2
Minimum Requirements for All Construction Sites

Category	Minimum Requirements
Erosion and Sediment Control	Sediments from areas disturbed by construction shall be retained on site using an effective combination of erosion and stockpiles of soil shall be properly contained to minimize sediment transport from the site to streets, drainage facilities or adjacent properties via runoff, vehicle tracking, or wind.
Waste and Materials Management Control	Construction-related materials, wastes, spills or residues shall be retained on site to minimize transport from the site to streets, drainage facilities, or adjoining property by wind or runoff.

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Remember: The ocean begins at your front door!



BMPs: Easy Solutions for Keeping Our Ocean Waters Clean

Best Management Practices (BMPs) are activities such as good housekeeping practices, pollution prevention techniques, educational practices and maintenance procedures. Many BMPs are easy and inexpensive. Construction sites should follow the tips below to prevent pollutants from entering storm drains in the first place, and help protect our environment, our families' health and safety and our local economy.

Stockpile Management:

- Protect all stockpiles from storm water run-on using temporary perimeter sediment barriers such as berms, dikes, fiber rolls, silt fences, sand or gravel bags, or straw bale barriers.
- During the rainy season, stock piles must be covered and have a temporary sediment barrier at all times.
- During the non rainy season, stockpiles must be covered at the end of each work day and have a temporary sediment barrier at all times. Implement wind control practices as appropriate.

Concrete Waste Management:

- When obtaining ready mix concrete from a supplier, discuss their BMP procedures such as handling of concrete waste and washout before deliveries are made.
- Avoid mixing excess amounts of fresh concrete on-site.
- Perform washout of concrete trucks off site or in designated areas only and never wash out concrete trucks on the street or into storm drains, open ditches, or streams
- Never wash any concrete products including dust and silt down into the gutter or storm drain. Always monitor on-site concrete tasks, such as saw cutting, coring, grinding, and grooving to ensure proper methods are implemented.
- Concrete cutting residue should be vacuumed and never allowed to flow across pavement or left on the surface of pavement.
- A sign should be installed adjacent to each wash out facility to inform concrete equipment operators to utilize the proper facilities.
- Wash out only from mixer truck shoots into concrete washout.
- Concrete washout from concrete pumper bins can be washed out into pumper trucks and discharged into designated washout area or properly disposed of off site.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and properly disposed of.

Solid Waste Management:

- Select designated waste collection areas on site and locate containers in a covered area and / or in a secondary containment. Be sure to have enough conveniently located containers throughout the project.
- Collect site refuse daily, especially during rainy / windy conditions and plan for an adequate number of pickups. Never overfill a dumpster.
- Remove refuse promptly from all erosion and sediment control devices as well as storm drains.
- Always make sure that toxic liquids and chemicals are never disposed of in dumpsters designated for construction debris. Liquid and hazardous wastes must always be disposed of properly.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the refuse hauler.
- Recycle or salvage as much construction and demolition debris as possible.

Sanitary / Septic Waste Management

- Use only reputable, licensed sanitary / septic waste haulers.

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- Temporary sanitary facilities must be located in a convenient location away from drainage facilities, watercourses, as well as traffic and should always have secondary containment.
- Untreated raw wastewater must never overflow, be discharged or buried within the project site.
- Be sure to have enough restrooms conveniently located throughout the project.

Hazardous Material Delivery and Storage:

- Minimize storage of hazardous materials onsite, and consider storage in a covered area.
- Store materials in a designated area on pallets with secondary containment (Earth Dikes, Drainage Swales, or Lined Ditches) away from traffic, waterways, and storm drains.
- Keep ample supply of appropriate spill clean up material near storage areas.
- Conduct regular weekly inspections as well as before and after any rain events. Train employees and subcontractors.
- Be able to supply Material Safety Data Sheets (MSDS) for all materials stored and keep an accurate, up to date inventory of materials delivered and stored on site.
- Storage of reactive, ignitable or flammable liquids must comply with fire codes.
- Those trained in emergency spill cleanups must be present when dangerous materials are unloaded.
- Contain and clean up any spill immediately.
- Clean spills on dirt areas by digging up and properly disposing of the contaminated soil.

Hazardous Material Use:

- Minimize use as much as possible
- Follow manufacture instructions regarding uses, mixing, conditions, and warnings of chemicals.
- Never over apply and prepare only the amount needed.
- Never apply any chemicals immediately before a rain event, and always use the entire product before disposing the container.
- Never clean tools, paintbrushes, or rinse containers into a street, gutter, storm drain, or watercourse and always dispose of any hazardous chemicals / materials as hazardous waste.
- Use recycled and less hazardous products whenever practical.
- Non-toxic liquid wastes such as latex paints may be collected in a lined collection area. This area must be properly bermed and kept covered during rain events and at the end of every work day and must never be allowed to overflow or to be disposed of to uncovered ground.
- Liquid and hazardous wastes must always be disposed of appropriately.
- **Immediately report any significant spills to the County's 24-hour water pollution reporting hotline at 714-567-6363 or the City of San Clemente's 24 hour hot line at 949-366-1553.**

Routinely train all employees and require any contractors / sub-contractors to follow these BMPs.

Acknowledgement:

I _____ (print name) certify that I have read the preceding document regarding construction site Best Management Practices (BMPs). I have been informed that these basic BMPs must be implemented and maintained on all construction sites, and that the City may impose fines or other civil or criminal sanctions against me or my business for allowing runoff and construction debris to enter the storm drain system. I take full responsibility for maintaining basic BMPs on construction sites for which I am accountable.

Contractor Signature

Date

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