

Chapter 3: ~~Structural~~ Installation Requirements

301.1 Racking Installations; General:

Frames, braces and attaching devices exposed to the weather shall be constructed of materials approved for exterior locations and protected from corrosion or deterioration. Racking and racking supports shall be mounted to structural components and will be attached to the structural components through the use of screws, bolts, j bolts, or other approved means in accordance with manufacturer's or engineer's instructions. Screws smaller than No. 10 or bolts smaller than 1/4" shall not be allowed, in addition, the use of plywood, particle board or chipboard as the sole supporting means for racking shall not be allowed.

301.1.1 Arrays: Roof Mounted

Array panels shall be anchored to roof structural components in a manner to resist wind, snow, vibration or seismic loading in compliance with the applicable Oregon Building Codes. Anchors secured to and through roofing material shall be made in a manner to maintain the water integrity of the roof covering. Roof drainage shall not be impaired by the installation of panels or racking. Panels which are not an integral part of the roofing system shall be installed in a manner so as to preserve the integrity of the roof surface; inspection of the attachment method shall occur prior to setting of panels.

301.1.2 Arrays: Pole or other structure mounted systems:

Arrays mounted to pole or structures other than a roof shall be anchored in a manner to resist wind, snow, vibration, or seismic loading. Engineered drawings detailing soil conditions, depth of concrete base, concrete base rebar makeup may be required to approval of permit. Any pole mounted solar installation shall have the concrete or supporting base no less in depth than the frost line as required in the Oregon Structural Specialty Code. Alternate attachment and support methods may be approved by the authority having jurisdiction.

301.1.3 Arrays: Ground Mounted

In addition to being anchored in a manner to resist wind, snow, vibration, or seismic loading, panels installed at ground level shall be at least six (6) inches (152 mm) above the ground level.

301.2 Equipment Location:

Components shall not be so located as to interfere with the normal operation and use of windows, doors, or other required facilities or obstruct access to equipment such as: inverters, batteries, electrical disconnects, meters, valves. Array ~~Panels-Modules~~ constructed of combustible materials shall not be located on or adjacent to construction required to be of non-combustible materials or in special fire areas unless approved by the Authority Having Jurisdiction.

301.3 Controls:

Required electrical, mechanical, safety, and operating controls shall be of such design and construction as to be suitable for installation in the environment in which they are located.

301.4 Protection:

Any portion of the solar system installed where it may be subjected to mechanical damage shall be guarded against such damage by being installed behind barriers such as bollards, fences, or other approve means or when located within a garage be elevated a minimum of 48" above finished garage floor or located out of the normal path of a vehicle.

301.5 Fire Safety Requirements/Fire Fighter Access:

Solar arrays which function as building components shall comply with the Building Code, and shall not reduce the required fire-resistance or fire classification of the structure. Examples include but are not limited to: curtain walls, membrane roofing, sky lights and solar windows.

On residential structures, solar arrays shall maintain a minimum clearance of 36" from all edges, peaks, valleys, roof access points, skylights. In addition, a minimum 36" wide pathway shall be maintained to access skylights, roof hatches, HVAC equipment or other equipment requiring maintenance. On commercial structures a 48" wide pathway shall be maintained from all edges, peaks, valleys, roof access points, skylights. In addition, a minimum 48" wide pathway shall be maintained to access skylights, roof hatches, HVAC equipment or other equipment requiring maintenance, this pathway shall be directly over roof structural members. (See attached examples for best design practices).

Installation of conductors, conduits, combiner boxes, disconnects shall be made in such a manner as to ~~not create~~ minimize a tripping hazard or impede fire-fighter access nor cross through the required pathway.

Each solar array string shall be installed with a visible D/C disconnect. This disconnect shall be marked "Array # D/C disconnect". Letters shall be a minimum of 1" in height, suitable for the environment and red in color.

301.6 This space reserved for examples of "best practice" installations relating to fire fighter access.

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301.1.1 Arrays: Roof Mounted

Array ~~panels~~modules shall be ~~anchored to roof structural components~~installed in a manner to resist wind, snow, vibration or seismic loading in compliance with the applicable Oregon Building Codes. Anchors secured to and through roofing material shall be made in a manner to maintain the water integrity of the roof covering. Roof drainage shall not be impaired by the installation of panels or racking. ~~Panels~~Modules which are not an integral part of the roofing system shall be installed in a manner so as to preserve the integrity of the roof surface; inspection of the attachment method shall occur prior to setting of ~~panels~~modules.

301.1.2 Arrays: Pole or other structure mounted systems:

Arrays mounted to pole or structures other than a roof shall be anchored in a manner to resist wind, snow, vibration, or seismic loading. Engineered drawings detailing soil conditions, depth of concrete base, concrete reinforcement may be required. Any pole mounted solar installation shall have the concrete or supporting base no less in depth than the frost line as required in the Oregon Structural Specialty Code. Alternate attachment and support methods may be approved by the authority having jurisdiction.

In addition to being anchored in a manner to resist wind, snow, vibration, or seismic loading, panels/modules installed at ground level shall be at least six (6) inches (152 mm) above the ground level.

301.4 Protection:

Any portion of the solar system installed where it may be subjected to mechanical damage shall be guarded against such damage by being installed behind barriers such as bollards, fences, or other approve means or when located within a garage be elevated a minimum of 48" above finished garage floor or located out of the normal path of a vehicle.

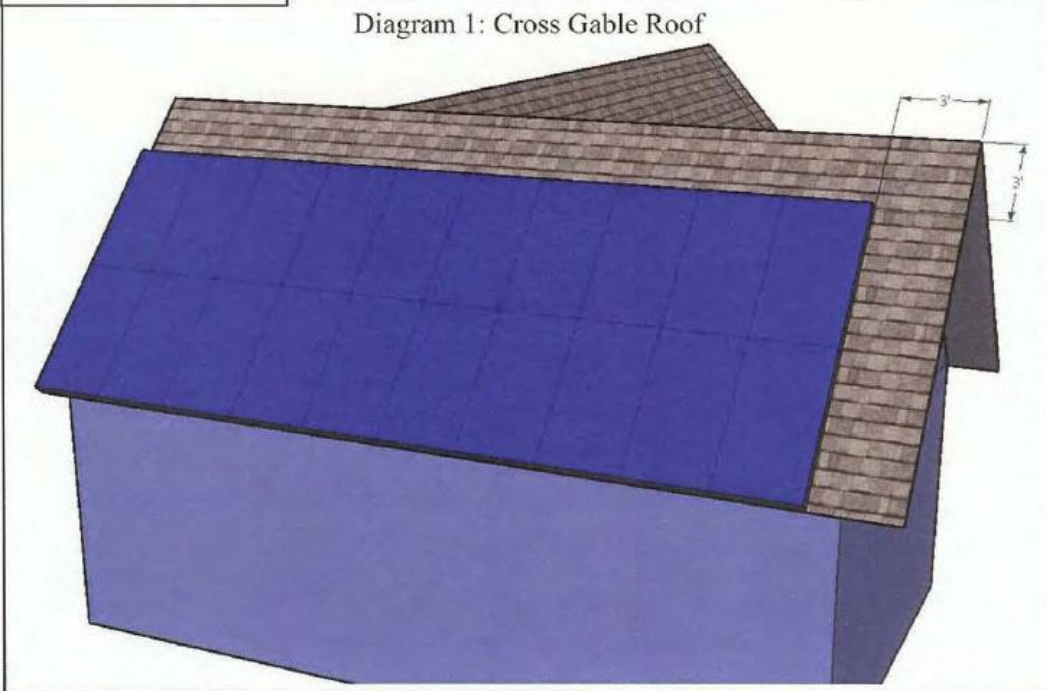
~~This space reserved for examples of "best practice" installations relating to fire fighter access.~~

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Examples of "best practice" installations relating to fire fighter access

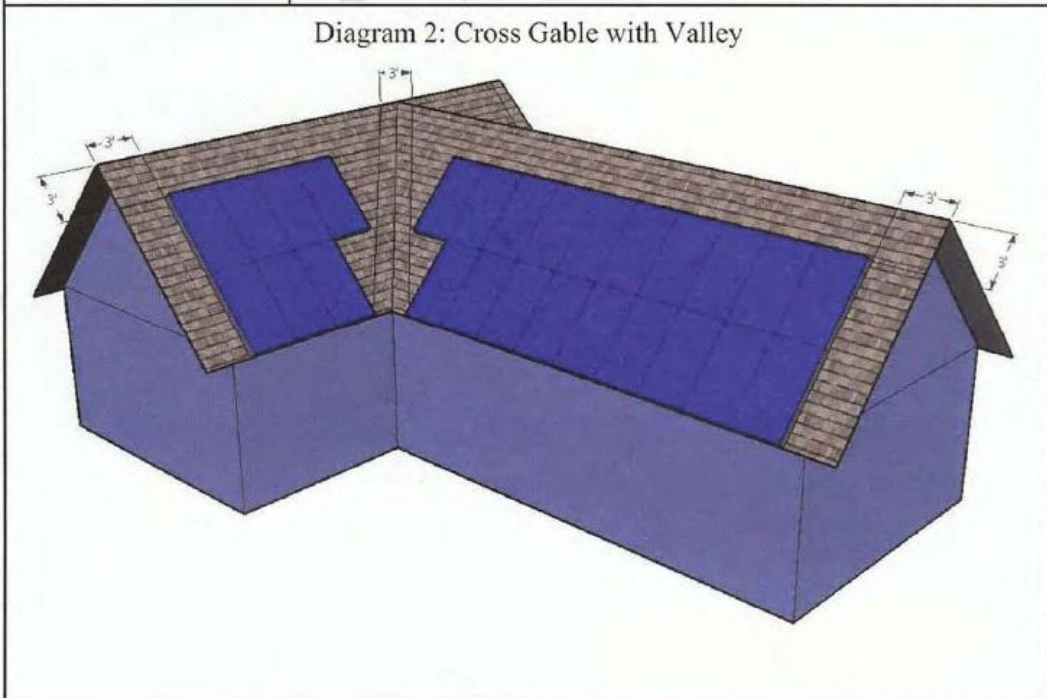
EXAMPLE 1

Diagram 1: Cross Gable Roof



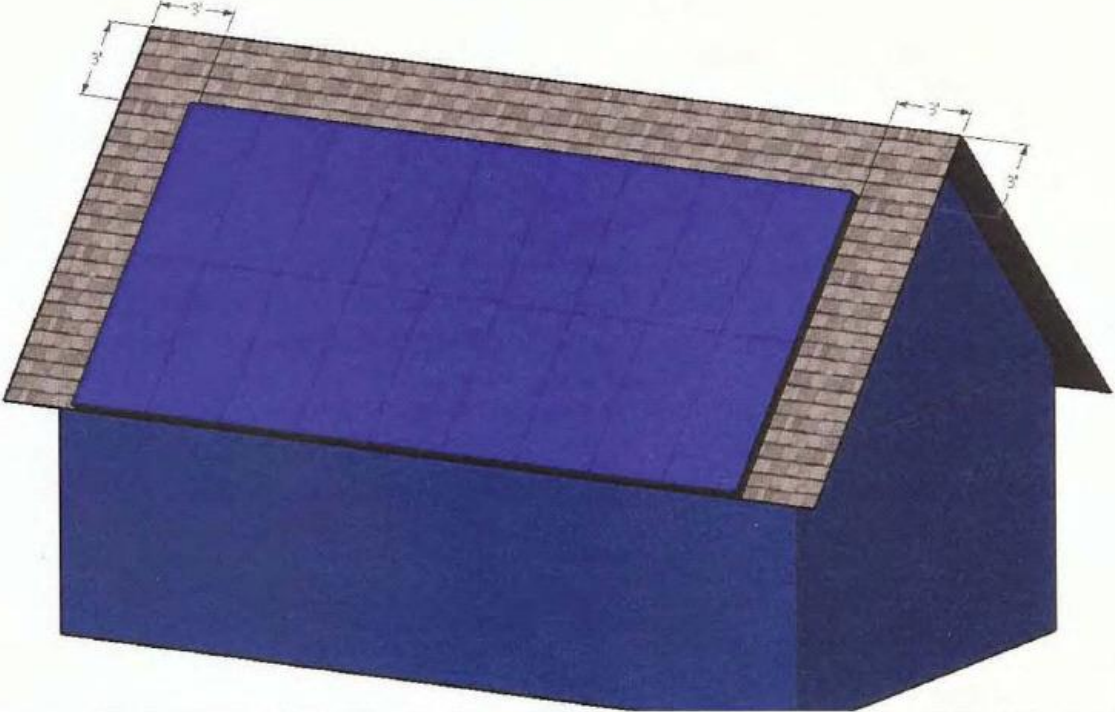
EXAMPLE 2

Diagram 2: Cross Gable with Valley



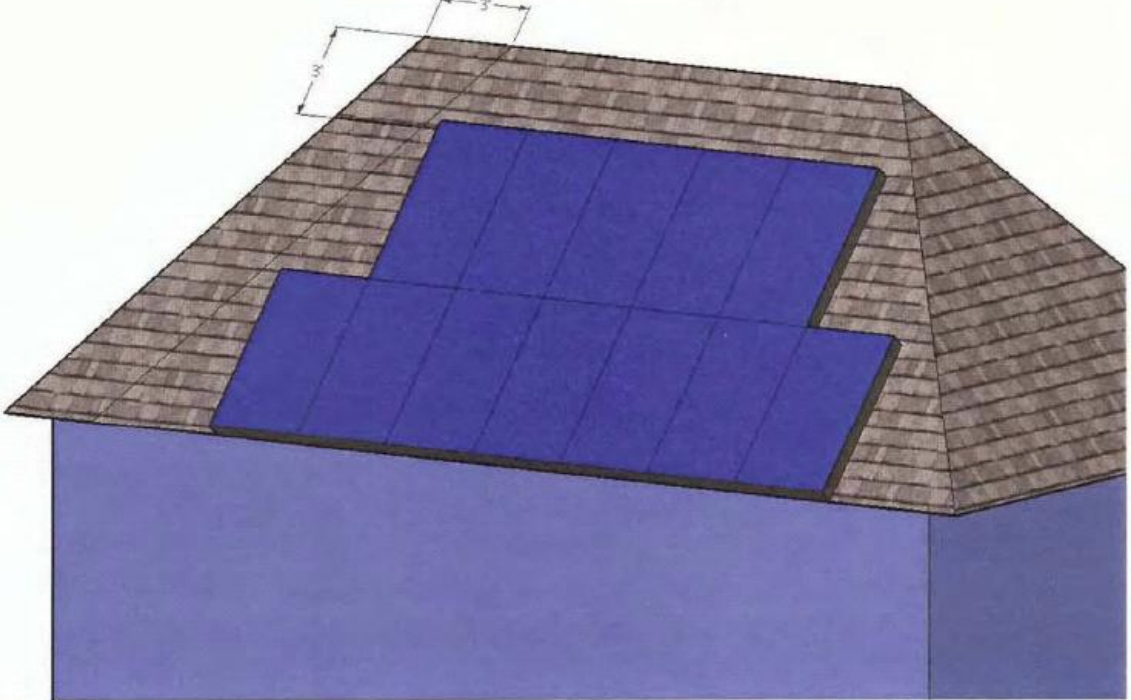
EXAMPLE 3

Diagram 3: Full Gable



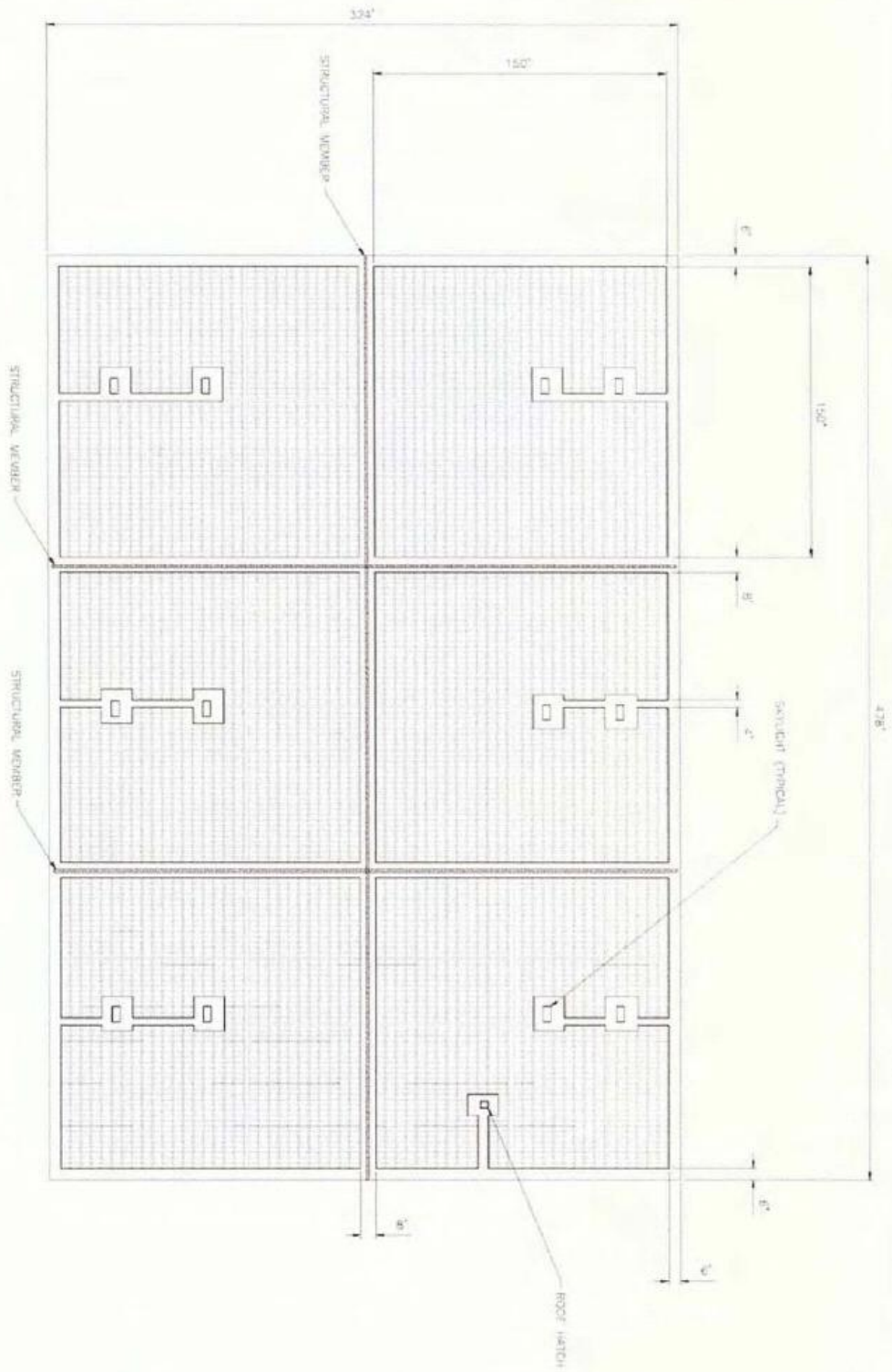
EXAMPLE 4

Example 4: Full Hip Roof



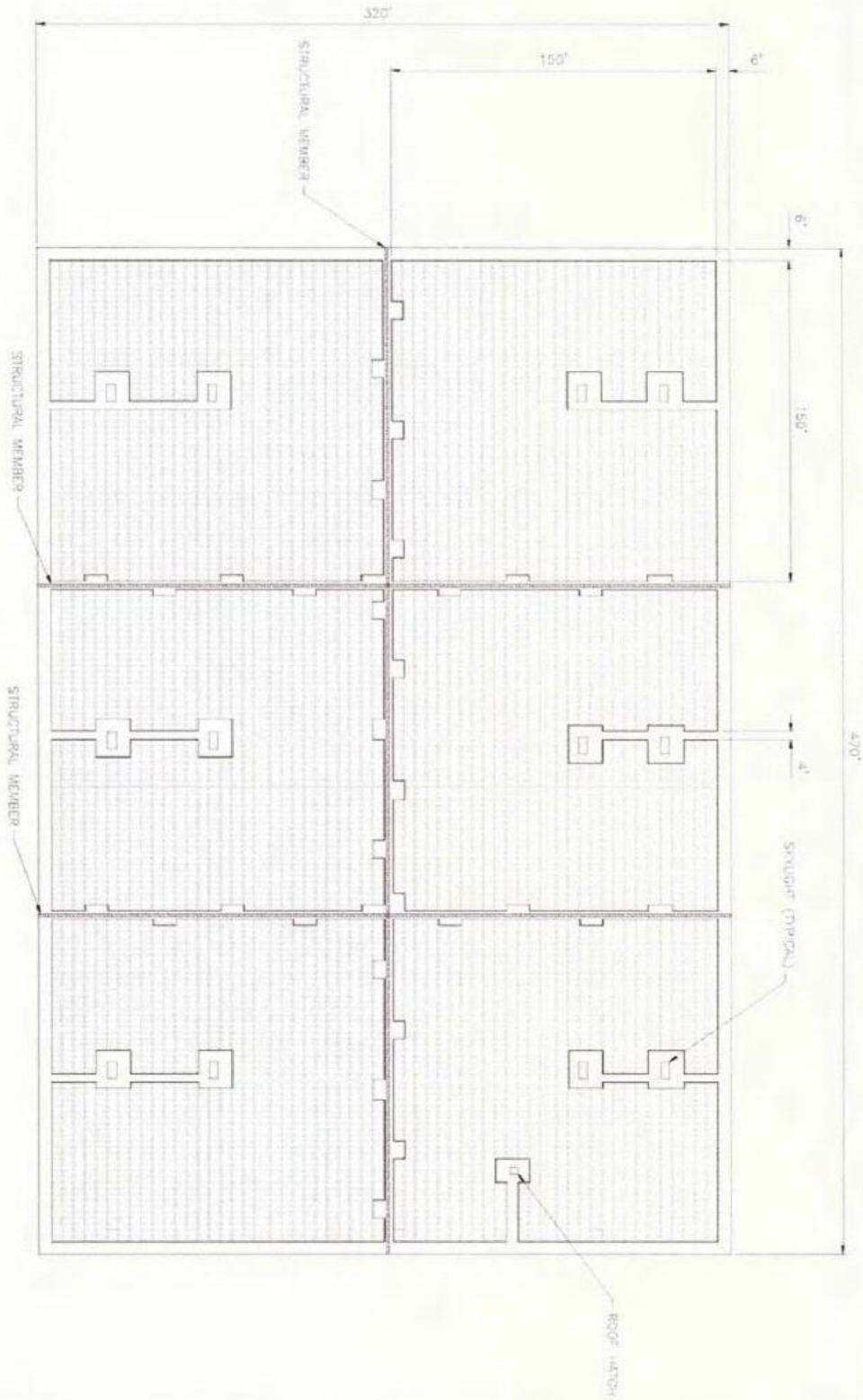
EXAMPLE 5

SOLAR ARRAY EXAMPLE – LARGE COMMERCIAL
8' WALKWAYS



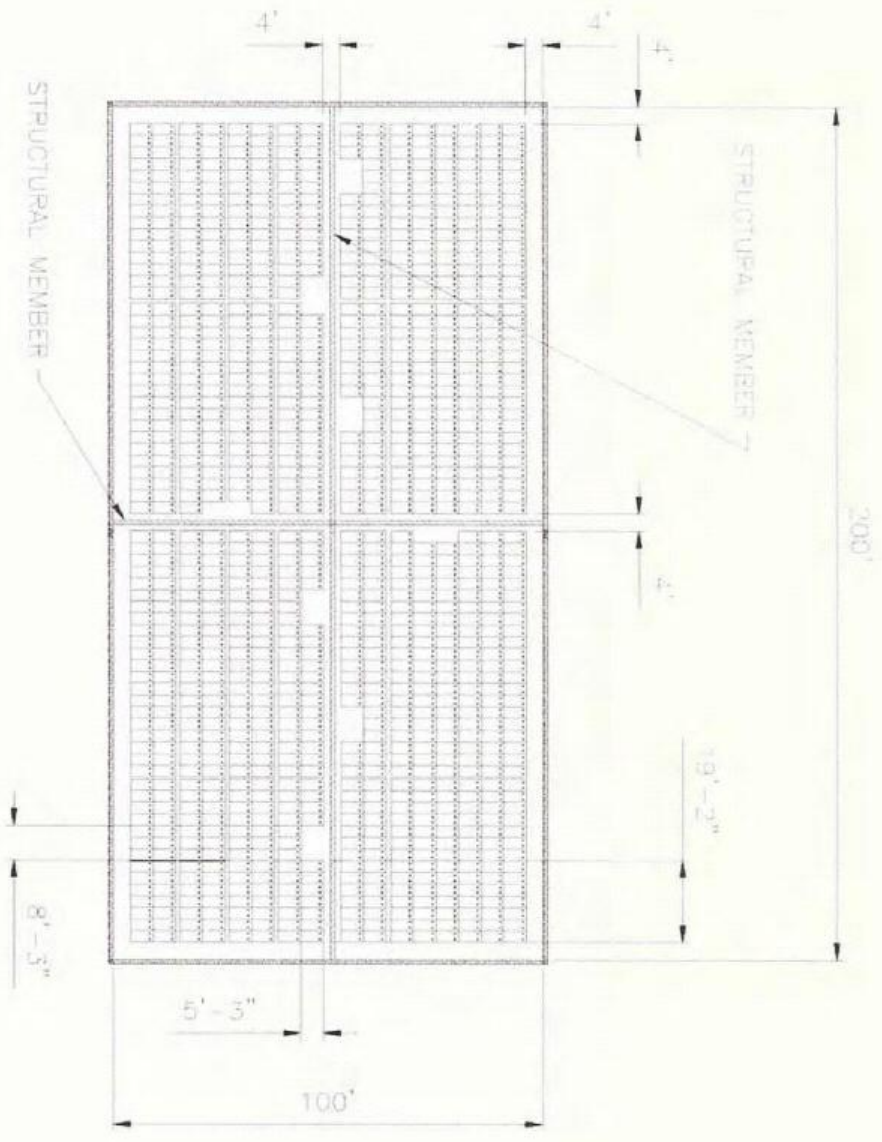
EXAMPLE 6

SOLAR ARRAY EXAMPLE – LARGE COMMERCIAL
4' WALKWAYS WITH 8' X 4' VENTING OPPORTUNITIES EVERY 20'

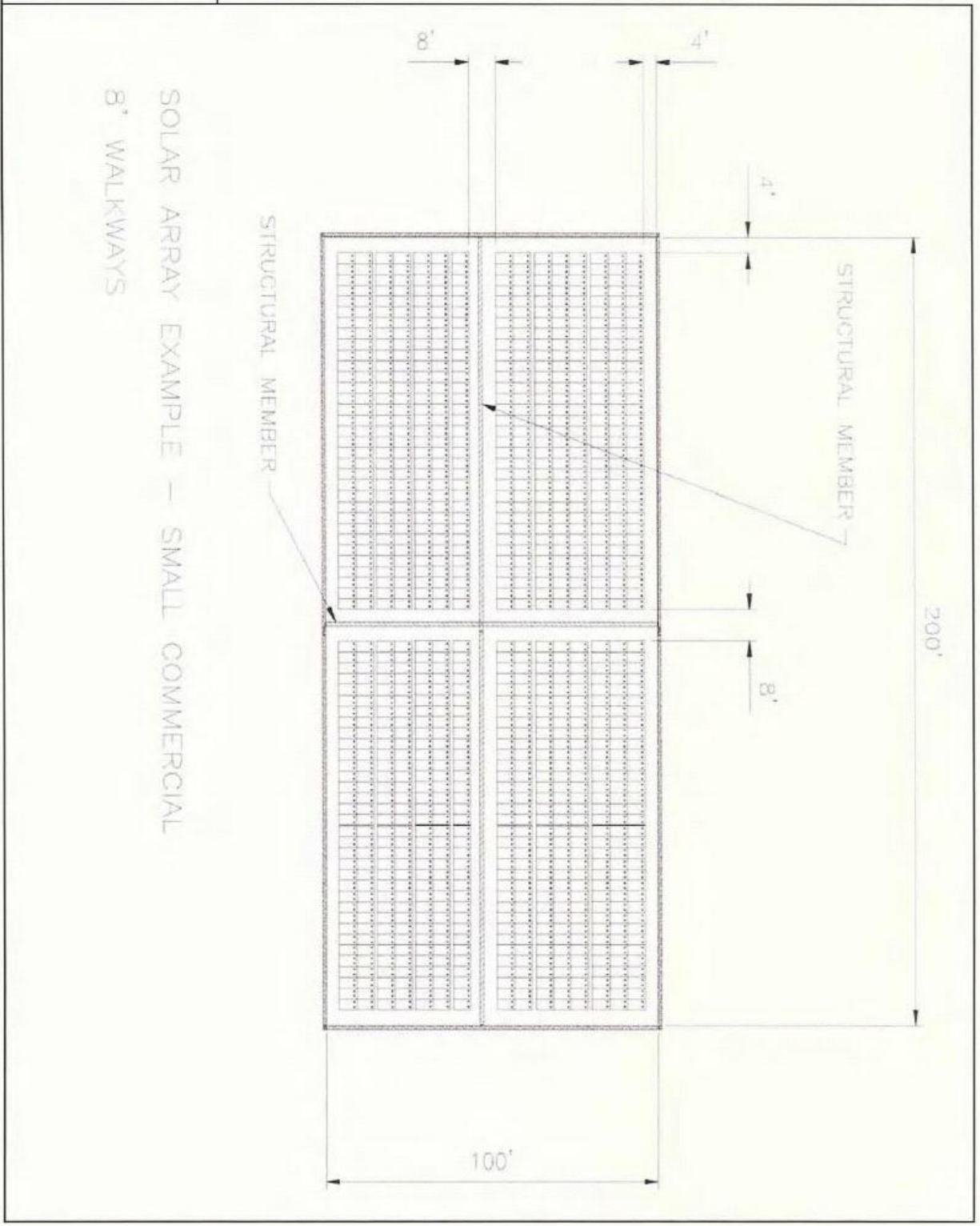


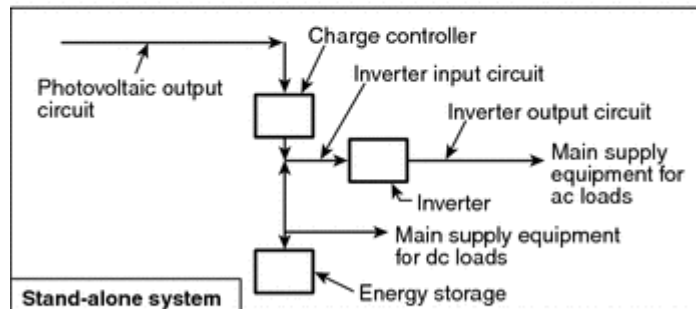
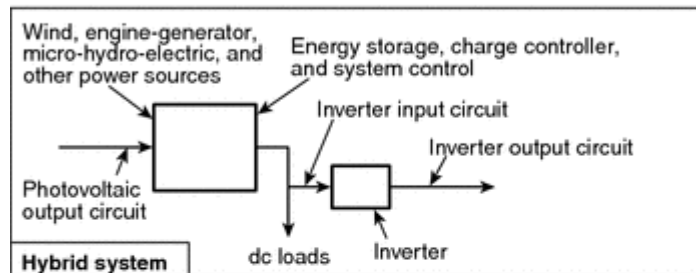
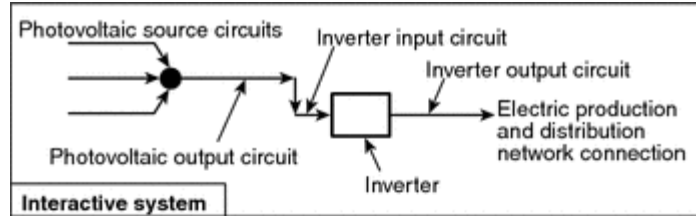
EXAMPLE 7

SOLAR ARRAY EXAMPLE - SMALL COMMERCIAL
4' WALKWAYS WITH 8' X 4' VENTING OPPORTUNITIES EVERY 20' ALONG WALKW.



EXAMPLE 8





Notes:

1. These diagrams are intended to be a means of identification for photovoltaic system components, circuits, and connections.
2. Disconnecting means and overcurrent protection required by Article 690 are not shown.
3. System grounding and equipment grounding are not shown. See Article 690, Part V.
4. Custom designs occur in each configuration, and some components are optional.

Identification of Solar Photovoltaic System Components in Common System Configurations.

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