

I am requesting a variance for the installation of solar panels on a pitched roof of a Hillside home at 6204 N Hogan Cir Paradise Valley AZ 85253

This request is compliant with the height restrictions as at no point are the panels higher than the peak of the roof, they sit close to the roof tiles and stand no more than 8 inches off the existing roof materials and sit 3 feet below the ridge.

1. "Such variance ... will serve not merely as a convenience to the applicant, but [is] necessary to alleviate some demonstrable hardship or difficulty so great as warrant a variance under the circumstances."

a. Applicant is seeking to reduce the cost of electricity that his home requires to run in a reasonable fashion. The only way to reduce the size of said power bills is for the applicant to generate power at the location of the residence instead of purchasing it from the local utility company. As such the addition of a power generating system [solar] is required for the applicant to reduce the hardship of the electric bills.

B. The array will consist of 3 arrays with a total of 36 panels. 2 arrays with 6 panels each located (*one on the main roof structure*) (The other will be on the front entry structure roof 3 foot below the ridge line) and 1 with 24 panels located 3 feet below ridge of main roof structure on the south facing roof of the main residence etc.). The array will be placed on the south side of the 2 northern most rear roofs. The most southern roof has large trees as shown by the large arrow in the photo below. This would decrease productions and removing the tree would increase cost.



C. The size of the system is based on the homes needs for electricity and any change to a larger size panels or wattage would result in additional expense to the homeowner. The geography of the lot does not allow for the placement of a ground mount due to shading and from existing vegetation and other obstacles like pools and tennis courts. This would also increase the expense of the array significantly and lower production due to additional trenching, cement work and materials to accomplish the same result.

D. This fulfills the Variance Criteria's based on the following reasons:

- i. Variance Criteria #1: Solar is the only viable option in the valley for alternative electric generation (i.e. wind doesn't blow consistently, and solar roof tiles overheat in the AZ climate as they are not designed to withstand the AZ prolonged heat.) The roof tiles are also awfully expensive and increase the cost of the project to accomplish the same result.
- ii. Variance Criteria #2: This home was built in 1972 and was just purchased June of 2019 so no pre planning for solar could have been completed decades earlier. The design and layout of the property will only allow for limited southern or western exposure placement. Other exposures would decrease effectiveness of the array and desired result of performance to maximize savings and offset or electrical expenses.
- iii. Variance Criteria #3 since the panels will have black back sheet, black inverters and a black racking system is the least intrusive option available in the solar industry) and minimizes the impact of this installation from viewpoints on the valley floor and adjacent slopes and lots. The home sits at a lower elevation than the neighbors as shown in the photo below. This is how the house sits below the street and therefore the panels are not very visible with the existing vegetation.

Below Photo of ariel view of property showing lower elevation than neighbors homes



Variance Criteria #4: The square footage of house is 5196 sq ft– This array is designed to maximize efficiency and offset the daytime power while limiting the sell back to SRP, this will help with the increasing rates of power. This system is designed based on the homeowners needs and trends in the market of like size homes with similar amenities and conditions.

V. Variance Criteria #5.

1. Per the Maricopa County Aerial photo, it appears that other homes on other neighboring lots have solar panels/installations. Lot 1 parcel 169-22-133 was achieved through right seen below



And Nute Variance - 4517 E. Foothill Drive (APN: 169-11-069) Case No. BA-19-02 was approved through variance



1. Because this is a hillside lot with a pitched roof this requires a variance. Such privileges are enjoyed by other R-43 lots (i.e. if this was a hillside home with a flat roof it would be allowed and all non-hillside lots regardless of roof style are allowed rooftop solar by right).
2. The “special circumstances, hardship, or difficulty [do not] arise out of a misunderstanding or mistake...”
 - a. The applicant did not have a misunderstanding or made a mistake regarding the cost of electricity and the power bills associated with it.
3. “Such variance from ... the strict application of the terms of [the Zoning Ordinance] ... are in harmony with it’s general purposes and intents ...”
 - a. The power generating system [rooftop] solar will be installed in such a way that is both aesthetically appealing and non-disruptive to the overall aesthetic of the area. This is in

The general purpose and intent of the Zoning Ordinance.

4. "The special circumstances, hardship, or difficult applicable to the property are [not] self-imposed by the property owner, or predecessor..."

a. A certain amount of power is required for a residence to operate in a manner which is considered normal and reasonable. This requirement is by the nature of the residence and not though the intentional actions of the homeowner outside the normal power consumption of living in the residence.

5. "Because of special circumstances applicable to the property, including it's size, shape, topography, location, or surroundings, the strict application of the zoning ordinance will deprive such property of privileges enjoyed by other property of the same classification in the same zoning district."

a. Other properties within the same zoning classification have been allowed to have solar power systems installed on their rooftops. This was primarily allowed since the profile of the roof allowed for the solar modules to be hidden from view through various means such as an existing parapet wall on a flat roof section of the home.

b. The applicant's property does not feature any rooftops that would allow for a similar less-visible installation, so a similar type of installation would not be possible. If such screening methods were used on the available roof surfaces, it would not only significantly impact the aesthetic of the home in a extremely negative way, but would also negatively affect the production of the solar modules to a degree that would make them ineffective at providing sufficient power generation.

c. Therefor for the applicant to enjoy the same privilege of a solar power system on the residence, the power generating modules must be placed in a more visible location.

6. The variance would not "Constitute a grant of special privilege inconsistent with the limitations upon other properties in the vicinity and zone in which such property is located"

a. This variance would not violate the primary purpose of such ordinance in that it will be installed in such a way to maintain the aesthetic appeal of the property. Therefor this variance does not allow for a privilege that is inconsistent with the existing Zoning Ordinance's limitation on other properties in the area.

In addition, is not possible to decrease the size of the array to minimize the visual impact of the system. The applicant is already using a high efficiency panel with a high-power density, as such there is no way to decrease the size of the system while maintain the required levels of power generation needed to service the requirements of the residence.

Additionally, the system is designed to be placed on the southernmost exposure direction to optimize power free from obstructions and vegetation

production in a way that is necessary for the electrical needs of the home. To place the modules on a different exposure would negatively affect the production of the system and require additional modules.

As such, due to the required location of the module's placement, it is not a viable option to screen the modules with either plant life or manmade screens as the screening will cause significant shading to the array. The adjacent lot is at a higher elevation with the lot line relatively close to the roof where the solar modules are being placed. If a screen either man-made or natural (ie trees) they would have to be placed close to the roof in question to remain on the applicant's yard – additionally they would need to be sufficiently high to a point to block their visibility from the adjacent lot, but in turn would also block solar access due to their height and relative proximity to that roof.

Below: Applicant lot is at a lower elevation on the side of the solar array.

Below: If natural/man made barrier were to be high enough to visually screen the modules, it would also shade the modules and significantly reduce production.

Additionally, a ground mounted array is not an option due to the available space and topography of the lot. For one, there is significant tree coverage of the lot which would need to be removed to provide acceptable solar access and would significantly impact the natural aesthetic of the lot. Additionally, there is no location that would provide sufficient space for a ground mounted array without being in the front yard or setbacks.

Therefore there are no locations in which the array can be constructed on the ground. There is simply just not enough room on the lot that would work with a ground mount.

The existing Property Wall would not be tall enough and would have to be raised to almost 15 feet high at a significant cost and eyesore to all to attempt to screen a ground mounted array as well as the ground is sloping up from the picture below you can see from the below photos. In addition, all the river rock and wood stair landscaping would need to be removed. This new wall would then shade the array thus decreasing the performance of the panels. Also, almost all of the trees would need to be removed as they will all be casting shade on the array throughout the day.

Below: Ariel Photo of plot



Street view looking south from the culdesac



Additional equipment such as the metal work and cement pouring would also be required as shown in the photo's below.



The screening was already designed to be hidden by the topography of the lot and is below the Ground level covered by roof as shown in the picture below.

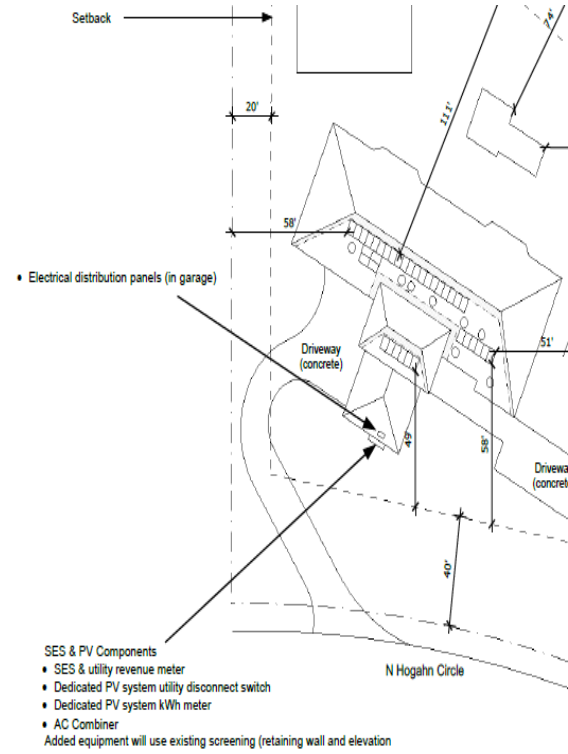


Photo Below is the proposed placement of meter and disconnect legally required



Finally, other solar generating options are not viable for this property. A common suggestion is solar roofing tiles which replace the existing roofing tiles. However, these tiles are significantly less production per square foot which would increase the amount of square footage needed to achieve the required

system size, thus increasing the visual impact further. Additionally, since there is no air flow between the surface of the roof and the module itself, the modules suffer from overheating, especially in the Arizona desert. Our experience has shown that these overheating issues reduce the production of the system significantly and in many cases can result in an electrical failure which can lead to damage or fire to the home. While these tiles have been popularized by more forward-facing companies such as Tesla, many of the above-mentioned issues and safety concerns are why these tiles are almost never used in Arizona or have yet to be released.



The above caption is from the street view above the residence. Most of the panels would be hidden by the trees and plants the panels are to be placed



The caption above is from the norther side of the property facing south





2. Panel Data

Changing the panel wattage would significantly increase the project cost to accomplish the same result. Higher wattage panels such as the LG 370 and 380 watt panels are not readily available due to shortages in manufacturing from COVID-19, Using the higher wattage inverters the IQ7+ only add cost to the project and are only required for panels 350 watts or higher to avoid clipping.

Scope of work:

Installation of a solar photovoltaic system at the Tan residence, located at 6204 N Hogahn Circle, Paradise Valley, AZ 85253.

The power generated by the PV system will be interconnected with the utility grid through the electrical service equipment. The PV system does not include storage batteries.

System Rating:

11.7 kW DC
8.6 kW AC

Equipment Summary:

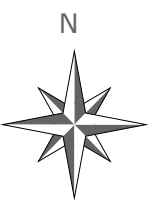
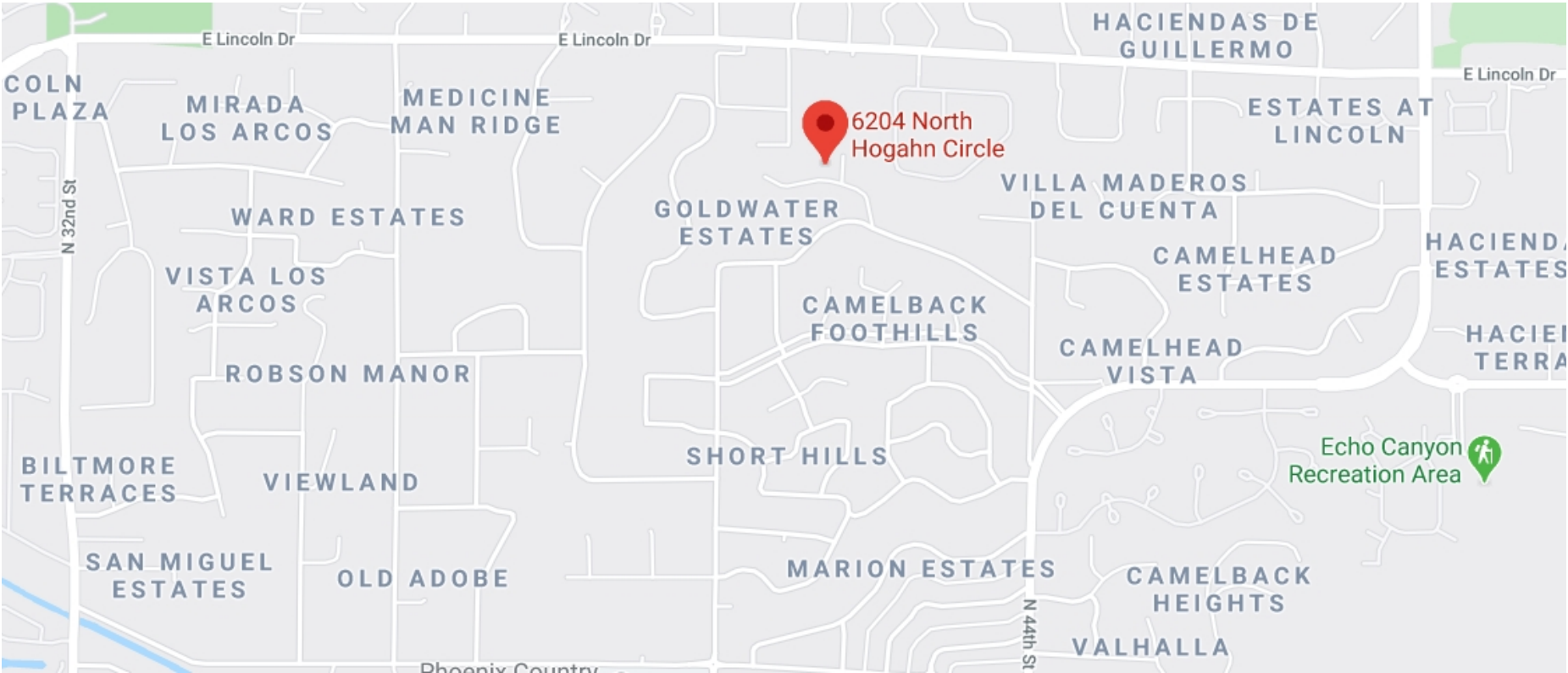
(36) LG Solar LG325N1K-V5 325 Watt PV Modules
(36) Enphase Energy IQ7-60-2-US microinverters


Drawing Index:

E-1 Cover
E-2 Site Plan
E-3 Structural Calcs & Mounting Details
E-4 One-Line Electrical Diagram
E-5 Three-Line Electrical Diagram
E-6 Array Diagram
E-7 Notes
E-8 Labels
E-9 Load Calculations
E-10 Equipment Specification Sheets

Governing Codes:

2014 National Electrical Code
2015 International Building Code
2015 International Residential Code
2015 International Fire Code
Underwriters Laboratories (UL) Standards





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AZ ROC License:
287715 (CR-11)

Version History	
Version	Date
A	7/23/20
B	12/3/20

Project name:
Tan Solar

PLANT LOCATION:
6204 N Hogahn Circle
Paradise Valley AZ 85253

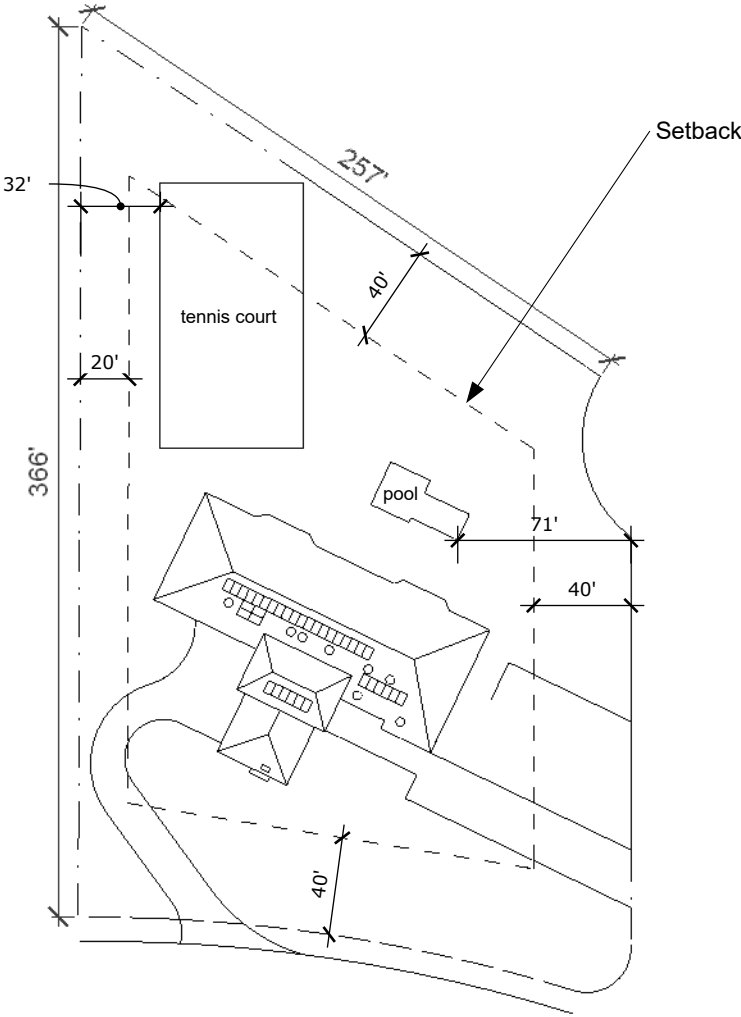
11.7 kW (DC)
8.6 kW (AC)
Grid-tied
photovoltaic system

AHJ: Paradise Valley
Utility: SRP
APN: 169-22-080C
Zoning: R-43

Cover

Dwg No:
E-1

Drawings not to scale



Fire access zones
(3" width typical):



Fences/gates do not restrict
access to utility PV meter or utility
PV disconnect

Roof Info:
Framing Type: 2x4, Mfd Truss
Spacing: 24" O.C.
Roof System/Material: Asphalt shingle

Solar Arrays:
Azimuth : 205 Deg

Pitch: 20 Deg

System Info:
11700 Watt DC PV Array
(3) arrays
(36) LG Solar LG325N1K-V5 325 Watt PV Modules
(36) Enphase Energy IQ7-60-2-US microinverters
(2) Branch circuits of 12 modules
(2) Branch circuits of 6 modules

A label shall be installed per NEC. It shall state
the following:

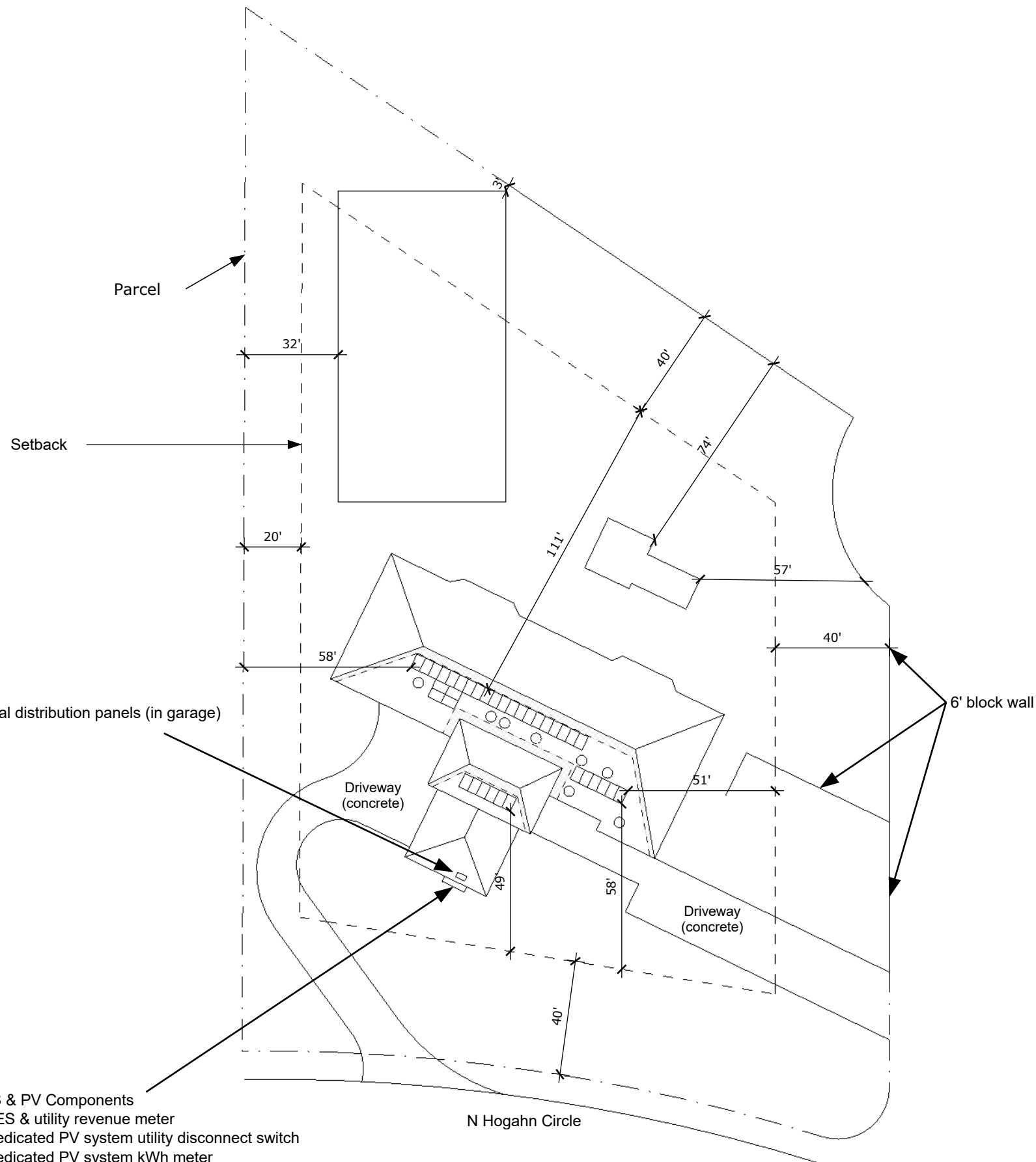
SOLAR PV SYSTEM EQUIPPED WITH RAPID
SHUTDOWN.

- Site Plan Notes:
- All roof stanchions will be installed and sealed by approved methods & with approved materials
 - Modules shall not be installed over vents
 - Utility disconnect will have padlocks installed at final inspection
 - Utility has 24-hr unrestricted access to all photovoltaic system components located at the service entrance.
 - Workspace in front of the AC electrical system components shall be in accordance with utility & NEC requirements.

○ = vent/skylight

- Electrical distribution panels (in garage)

- SES & PV Components
- SES & utility revenue meter
 - Dedicated PV system utility disconnect switch
 - Dedicated PV system kWh meter
 - AC Combiner
- Added equipment will use existing screening (retaining wall and elevation)



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8.6 kW (AC)
Grid-tied
photovoltaic system

AHJ: Paradise Valley
Utility: SRP

APN: 169-22-080C
Zoning: R-43

Site Plan

Dwg No:

E-2

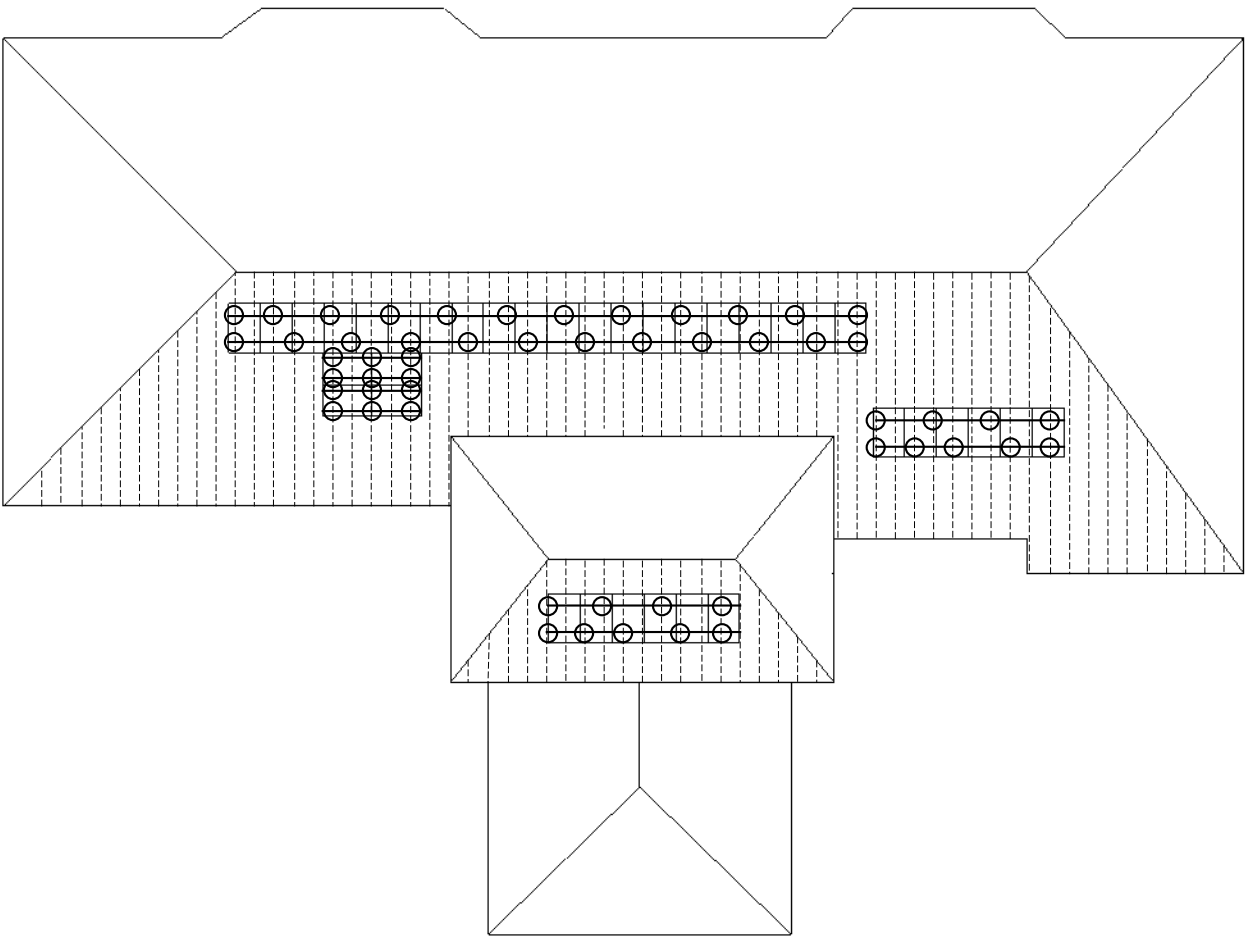
Drawings not to scale

- Notes:
- Array Weight does not exceed 5 lbs. per square foot and does not exceed a point load of 40 lbs
 - Roof attachment points spaced at 6' intervals

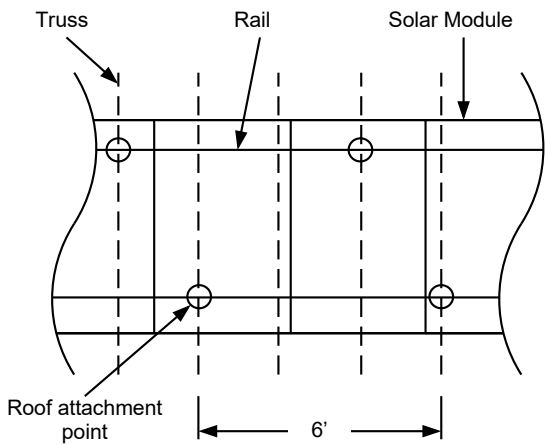
○ = Roof Attachment Point

--- = 24" O.C. Manufactured Truss

□ = Solar Module



Roof Mounting Detail
Max Height Above Roof = 7"



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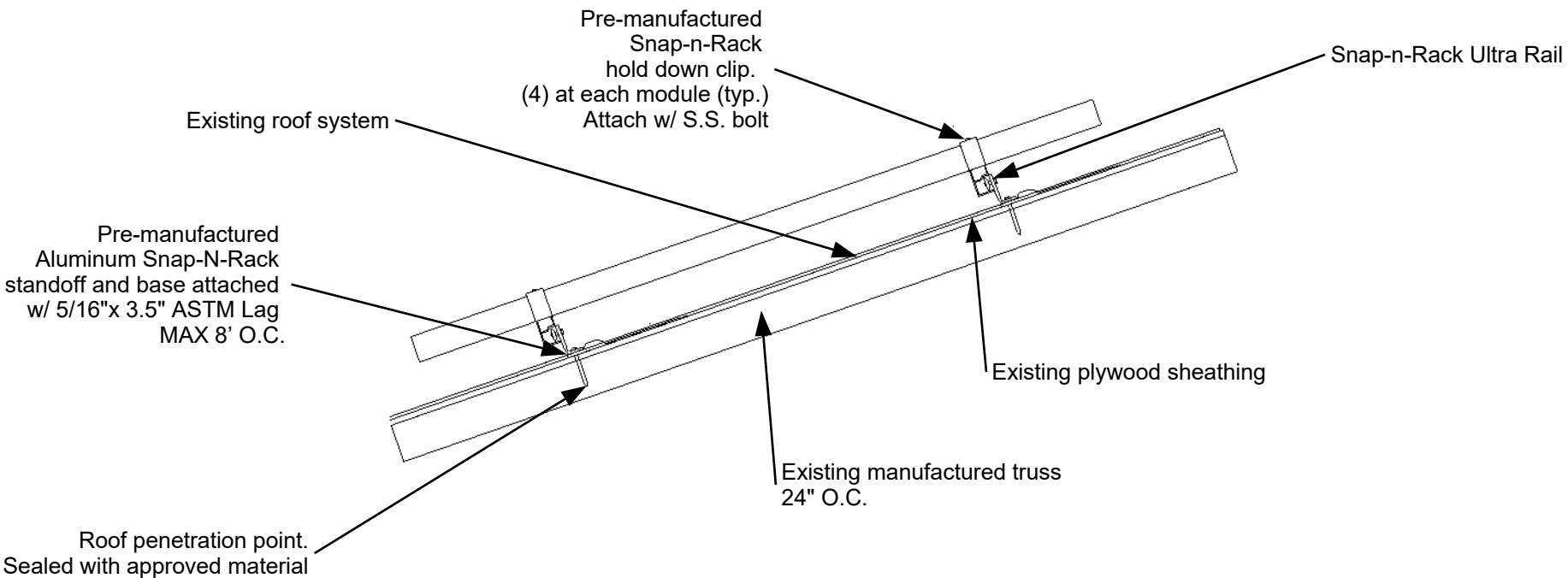
APN: 169-22-080C
Zoning: R-43

Structural Calcs &
Mounting Details

Dwg No:

E-3

Drawings not to scale



Mounting Detail

Solar Module:	LG Solar LG325N1K-V5
Orientation:	Flush: Portrait/Landsc.
Framing:	Manufactured truss
Roof type:	Pitched
Roof material:	Asphalt shingle
Spacing:	24" O.C.
Racking	SnapNRack Ultra Rail
Max cantilever (per mfr)	24"
Roof attachment points	6' staggered

Load Distribution	Array 1	Array 2	Array 3
Total modules in array:	24	6	6
Module weight:	39.7	39.7	39.7
Rack weight per module (lbs.):	6.0	6.0	6.0
Total weight per module (lbs.):	45.7	45.7	45.7
Total array weight:	1096.3	274.1	274.1
Module area (sf):	18.4	18.4	18.4
Total array area (sf):	442.6	110.6	110.6
Distributed load (psf):	2.5	2.5	2.5
Total # of vertical supports:	36	9	9
Point load (psf):	30.5	30.5	30.5

Uplift Connections

Panel grouping area (sf)	442.6	110.6	110.6
Total load @21 psf max wind load:	9293.8	2323.4	2323.4
Req'd pullout strength per support:	258.2	258.2	258.2
Connector type:	5/16" x 3.5" ASTM lag		

Panel Detail (36 total)
(36) LG Solar LG325N1K-V5 325 Watt PV Modules with
(36) Enphase Energy IQ7-60-2-US microinverter

Continuous output power = 240 Watts ac
Nominal voltage = 240 V ac
Continuous output current = 1.0 A ac
Max units per branch circuit = 16
Max overcurrent protection = 20 A ac

Branch Circuits 1-2
12 panel + microinverter strings
Max continuous output power = 2880 W ac
Nominal voltage = 240 V ac
Continuous output current = 12 A ac

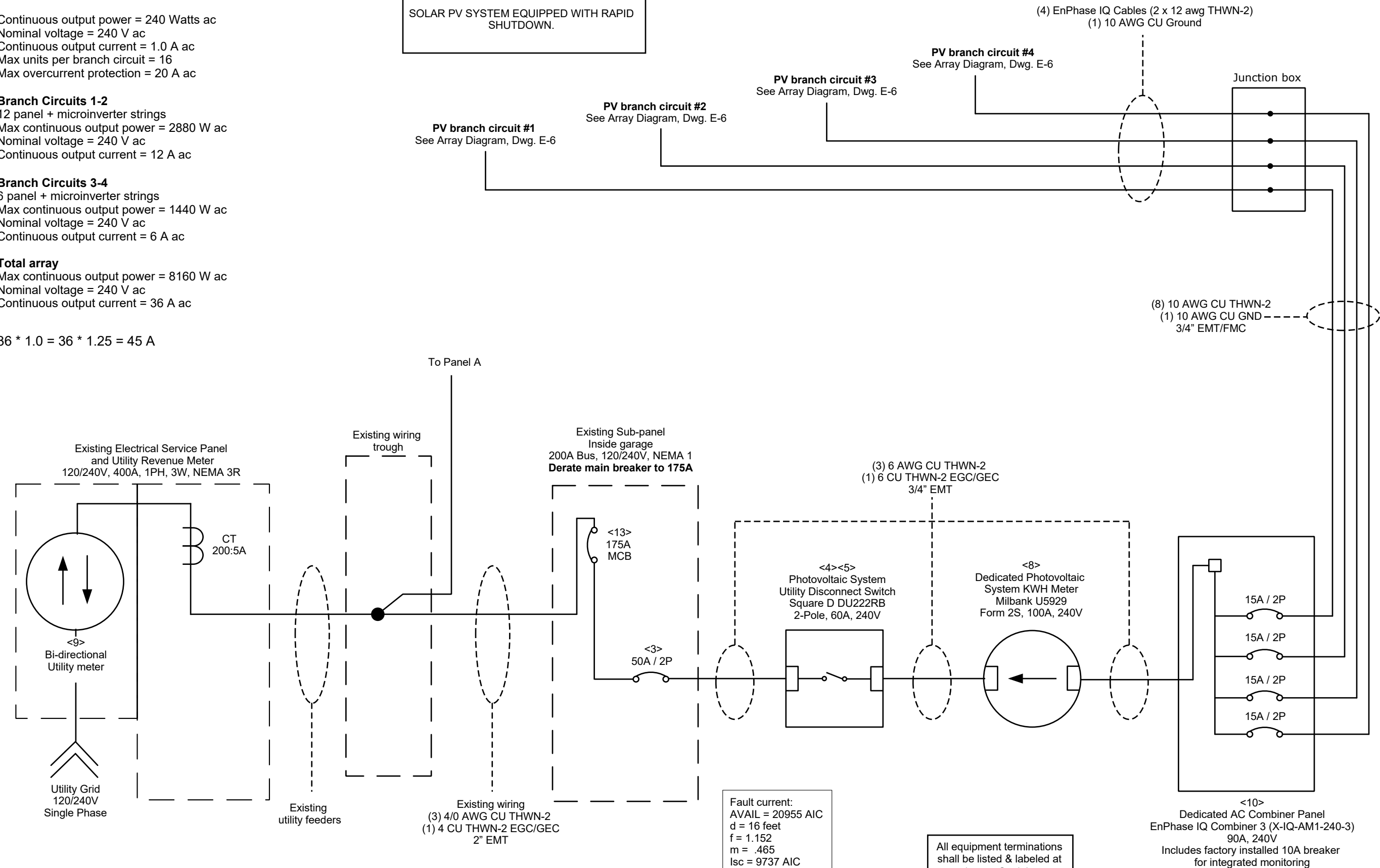
Branch Circuits 3-4
6 panel + microinverter strings
Max continuous output power = 1440 W ac
Nominal voltage = 240 V ac
Continuous output current = 6 A ac

Total array
Max continuous output power = 8160 W ac
Nominal voltage = 240 V ac
Continuous output current = 36 A ac

$$36 * 1.0 = 36 * 1.25 = 45 \text{ A}$$

A label shall be installed per NEC. It shall state the following:

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN.



For <Notes>, see Dwg. E-7



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8.6 kW (AC)
Grid-tied
photovoltaic system

AHJ: Paradise Valley
Utility: SRP
APN: 169-22-080C
Zoning: R-43

One-Line Electrical
Diagram

Dwg No:
E-4

Drawings not to scale

Panel Detail (36 total)

(36) LG Solar LG325N1K-V5 325 Watt PV Modules with
(36) Enphase Energy IQ7-60-2-US microinverter

Continuous output power = 240 Watts ac
Nominal voltage = 240 V ac
Continuous output current = 1.0 A ac
Max units per branch circuit = 16
Max overcurrent protection = 20 A ac

Branch Circuits 1-3

12 panel + microinverter strings
Max continuous output power = 2880 W ac
Nominal voltage = 240 V ac
Continuous output current = 12 A ac

Total array

Max continuous output power = 8160 W ac
Nominal voltage = 240 V ac
Continuous output current = 36 A ac

$36 * 1.0 = 36 * 1.25 = 45 \text{ A}$



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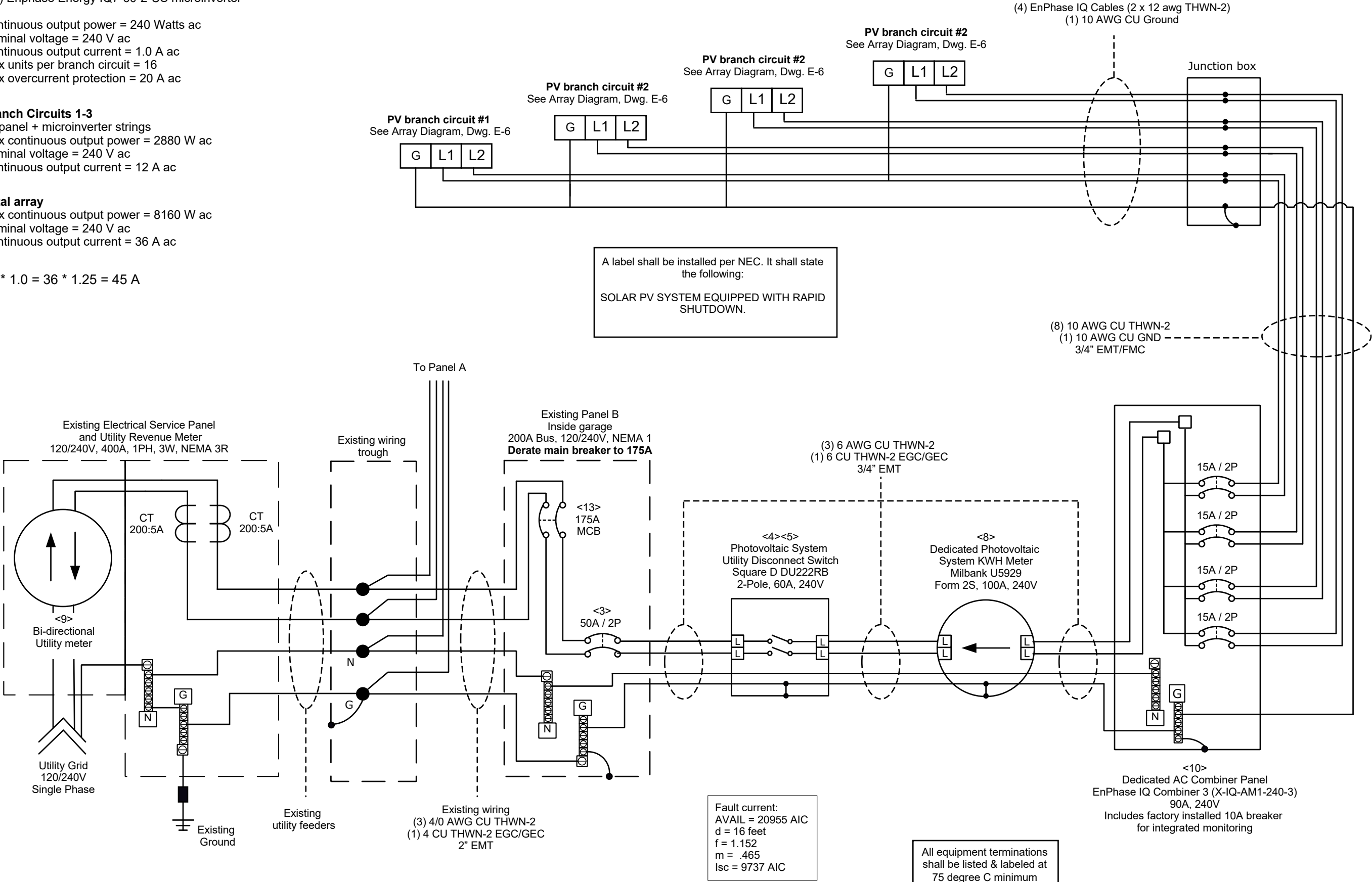
APN: 169-22-080C
Zoning: R-43

Three-Line Electrical
Diagram

Dwg No:

E-5

Drawings not to scale



For <Notes>, see Dwg. E-7

Panel Detail (36 total)

(36) LG Solar LG325N1K-V5 325 Watt PV Modules with
(36) Enphase Energy IQ7-60-2-US microinverter

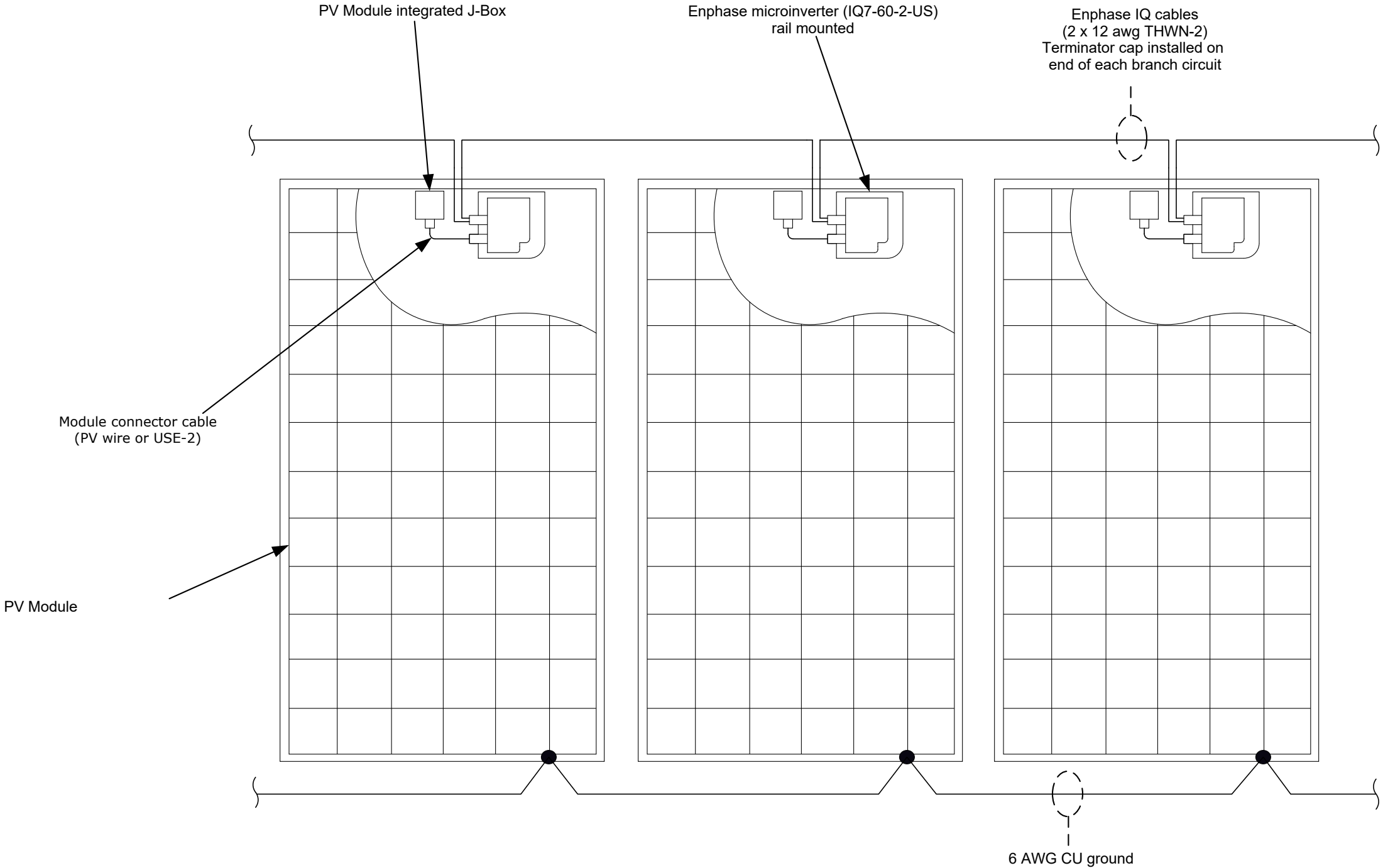
Continuous output power = 240 Watts ac
Nominal voltage = 240 V ac
Continuous output current = 1.0 A ac
Max units per branch circuit = 16
Max overcurrent protection = 20 A ac

Branch Circuits 1-3

12 panel + microinverter strings
Max continuous output power = 2880 W ac
Nominal voltage = 240 V ac
Continuous output current = 12 A ac

Total array

Max continuous output power = 8160 W ac
Nominal voltage = 240 V ac
Continuous output current = 36 A ac



- Array Notes:
1. Equipment installed in accordance with NEC section 690 and all applicable requirements of service utility and authority having jurisdiction.
 2. Grounding must be continuous and installed to allow for panel removal without disrupting continuity. All module ground connections shall be made in accordance with NEC 690.4 (C).
 3. Follow manufacturer's suggested installation practices and wiring specifications.
 4. Wires shall be rated and labeled "SUNLIGHT RESISTANT" where exposed to ambient conditions.
 5. Photovoltaic source circuit conductors, which are exposed to direct sunlight, shall be listed and identified as photovoltaic (PV) wire.
 6. Exposed PV rooftop conductors that are not located under the array shall be installed in a listed raceway, and shall include junction boxes at both ends of the raceway to transition from exposed conductors to the listed raceways per NEC 690.31(A) and (B).



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Array Diagram

Dwg No:
E-6

Drawings not to scale

NOTES:

1. Photovoltaic system equipment shall be installed in accordance with the IRC, NEC articles 690 and 705, and applicable requirements of the service utility and authority having jurisdiction. Photovoltaic system equipment will be posted with applicable warnings, signage and plaques per NEC 690, 705.10 and 705.12.
2. Photovoltaic source and output circuits shall comply with the wiring methods and installation and marking requirements of NEC. Wiring methods and enclosures containing PV source conductors must be marked with the wording "WARNING: PHOTOVOLTAIC POWER SOURCE" by labels or other approved permanent marking means suitable for the environment and placed with a maximum of 10" spacing.
3. Breaker labeled "MAXIMUM AC OUTPUT CURRENT AND OPERATING AC VOLTAGE". Breaker shall be positioned at the opposite (load) end from the input feeder or main circuit breaker location, and labeled "WARNING: POWER SOURCE OUTPUT CONNECTION - DO NOT RELOCATE THIS OVERCURRENT DEVICE".
4. Warning sign reading "WARNING - ELECTRIC SHOCK HAZARD - TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OFF POSITION"
5. Label "PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH." Switch to be lockable visible blade disconnect per utility requirements.
6. Label "PHOTOVOLTAIC ARRAY DC DISCONNECT SWITCH". Label with operating current, operating voltage, maximum system voltage, and short circuit current.
7. Listing agency names and numbers to be indicated on power inverters and solar modules
8. Labeled PHOTOVOLTAIC SYSTEM DEDICATED KWH METER.
9. Bi-directional meter to be installed by utility.
10. Dedicated photovoltaic combiner sub-panel. Label "LOADS NOT TO BE ADDED TO THIS PANEL"
11. All labels exposed to sunlight must be engraved and attached per approved method.
12. GEC installed as required by manufacturer instructions.
13. Label "BREAKER HAS BEEN DE-RATED PER NEC 705.12"
14. Existing equipment is noted with a dashed line. Solid lines denote equipment installed by Aneva Solar.
15. Wire may be run short distances outside of conduit if wire reads "SUNLIGHT RESISTANT"
16. Ambient temperature adjusted for conduits exposed to sunlight on or above rooftops. Conduit elevated min. 3 1/2"; Adder 30 DEG F.
18. All exterior equipment to be NEMA 3R.
19. The photovoltaic power source shall be labeled with the following warning at each junction box, combiner box, disconnect and device where energized, ungrounded circuits may be exposed during service:

WARNING: ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED
20. DC circuits shall be protected by a listed (DC) arc-fault circuit interrupter and shall comply with NEC 690.11.
21. PV system circuits installed on or in buildings shall include a rapid shutdown function that controls specific conductors in accordance with NEC 690.12(B)(2). The rapid shutdown method shall be labelled in accordance with NEC 690.56(C)(1)(a). See Labels, Dwg. E-9 for example.

22. PV arrays shall be provided with DC ground-fault protection. PV power systems shall include ground fault protection for all PV source & output circuits.
23. Exposed PV rooftop conductors that are not located under the array shall be installed in a listed raceway, and shall include junction boxes at both ends of the raceway to transition from exposed conductors to the listed raceways.
24. A permanent plaque shall be installed. It shall state the following: · PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN· The plaque shall be reflective with white, capitalized letters, on red background. Text height 3/8 inches minimum.
25. Label · WARNING: A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE SERVICE DISCONNECTING MEANS. FOLLOW PROPER LOCK-OUT/TAG-OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE·
26. Label "PHOTOVOLTAIC SYSTEM AC DISCONNECT SWITCH"



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Notes

Dwg No:
E-7

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Keys:

	IRREVERSIBLE CRIMP	MLO	MAIN LUG ONLY
	WIRE SPLICE/BOND	PV	PHOTOVOLTAIC
GFDI	GROUND FAULT DETECTOR & INTERRUPTER	SES	SERVICE ENTRANCE SECTION
GFPD	GROUND FAULT PROTECTION DEVICE	GND	GROUND
MCB	MAIN CIRCUIT BREAKER	NEU	NEUTRAL
OPD	OVERCURRENT PROTECTION DEVICE	GEC	GROUNDING ELECTRODE CONDUCTOR

Dedicated kWh meter
(Black with white lettering)
<8>

PHOTOVOLTAIC SYSTEM METER

LABEL SIZE: 1 X 3-1/2
INCHES
TEXT HEIGHT: 1/4 INCHES

Utility disconnect switch
(Black with white lettering)
<5>

PHOTOVOLTAIC SYSTEM
UTILITY DISCONNECT SWITCH

LABEL SIZE: 1-1/2 X 3-1/2
INCHES
TEXT HEIGHT:1/4 INCHES

Disconnect switches,
combiners, junction boxes
(Red with white lettering)
<4>

WARNING
ELECTRIC SHOCK HAZARD
- DO NOT TOUCH TERMINALS -
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OFF POSITION

LABEL SIZE: 1-1/2 X 3-1/2
INCHES
TEXT HEIGHT:
"WARNING" 1/4 INCHES
OTHER TEXT - 3/16 INCHES

Backfed breaker
(Red with white lettering)
<3>

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL SIZE: 7/8 X 2 INCHES
TEXT HEIGHT: 1/8 (OR 1/16) INCHES

DC Warning Markings
Sample label for compliance
with International Fire Code
(see Notes <23>)

WARNING: PHOTOVOLTAIC
POWER SOURCE

AC panel
(Black with white lettering)
<3>

PHOTOVOLTAIC ELECTRIC POWER SOURCE
BREAKERS ARE BACKFED

MAXIMUM AC CURRENT 36 A
SYSTEM AC VOLTAGE 240 V

LABEL SIZE: 1-1/2 X 3-1/2
INCHES
TEXT HEIGHT: 3/16 INCHES

Main breaker de-rate
(Black with white lettering)

BREAKER HAS BEEN DERATED
PER NEC 705.12

LABEL SIZE: 1/2 X 1-3/4 INCHES
TEXT HEIGHT: 1/8 (OR 1/16) INCHES

Place Plaque At Electrical
Service Location
Reflective - 3/8" High White
Letters On Red Background

PHOTOVOLTAIC SYSTEM EQUIPPED
WITH RAPID SHUTDOWN



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www.anevasolar.com
480.462.6382

AZ ROC License:
287715 (CR-11)

Version History

Version	Date
A	7/23/20
B	12/3/20

Project name:
Tan Solar

PLANT LOCATION:
6204 N Hogahn Circle
Paradise Valley AZ 85253

11.7 kW (DC)
8.6 kW (AC)
Grid-tied
photovoltaic system

AHJ: Paradise Valley
Utility: SRP

APN: 169-22-080C
Zoning: R-43

Labels

Dwg No:

E-8

Drawings not to scale



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Load Calculations

Dwg No:
E-9

Drawings not to scale

Existing Panel Schedule - Panel A					
Residential Panel	200 AMP	120/240V, 1PH, 3W, MAIN 200A/2P		NEMA 3R	SURFACE MOUNTED
Location SES	Type	AIC RATING 22k/10kA SERIES RATED			
USE/AREA SERVED	CB	SPACE NUMBER	SPACE NUMBER	CB	USE/AREA SERVED
AC 1	90A/2P	1	2	90A/2P	AC 2
		3	4		
heat	60A/2P	5	6	60A/2P	heat
		7	8		
range	40A/2P	9	10	20A/1P	workshop
		11	12	15A/1P	lights
AH 1	30A/2P	13	14	15A/1P	lights
		15	16	15A/1P	lights
AH 2	30A/2P	17	18	15A/1P	lights
		19	20	15A/1P	lights
water heater	30A/2P	21	22	30A/2P	oven
		23	24		
laundry	20A/1P	25	26		
		27	28		
		29	30		
		31	32		
		33	34		
		35	36		
		37	38		
		39	40		

THE 400A 'SES' SERVES (2) LOAD CENTERS, EACH WITH 200A MAIN BREAKER AND BUS BAR. IN USING NEC 220.82, THE CALCULATION OF THE SERVICE LOAD FOR PANEL B IS 109A. THEREFORE PANEL B WOULD BE PERMITTED TO BE SERVED BY A 175A MCB.

PER NEC 690.64(B)(2), THE SUM OF THE AMPERE RATINGS OF THE OCP DEVICES SUPPLYING POWER TO THE BUS BAR CANNOT EXCEED 120 PERCENT OF THE BUS BAR RATING.

Load Calculations (Per NEC 220.82)			
<u>GENERAL LOADS (Panel B):</u>			
5196 sq. ft. @ 3VA/sq. ft.	15588	VA	
Two Small Appliance	3000	VA	
Laundry circuit	1500	VA	
Dishwasher/Disposal	1800	VA	
Refrigerator	1800	VA	
water heater	5000	VA	
jacuzzi	9000	VA	
oven	5000	VA	
pool	3000	VA	
Dryer	5000	VA	
	50688	VA	
First 10,000 at 100%	10000	VA	
Remainder at 40%	16275	VA	
GENERAL LOADS:	26275	VA	
<u>HVAC LOADS</u>			
None: All on panel A	0	VA	
HVAC LOADS:	0	VA	
<u>TOTAL SERVICE LOAD (PANEL B):</u>			
GENERAL LOADS:	26275	VA	
HVAC LOADS:	0	VA	
TOTAL LOAD:	26275	VA	
<u>CALCULATED LOAD FOR SERVICE:</u>			
26275 VA/ 240V =	109	AMPS	
THEREFORE, PANEL B WOULD BE			
PERMITTED TO BE SERVED BY A 175A MCB			

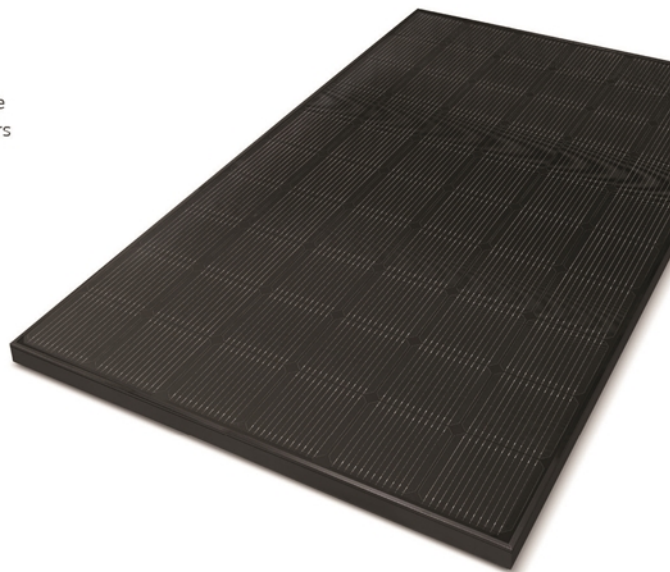
Existing Panel Schedule - Panel B					
Residential Panel	200 AMP	120/240V, 1PH, 3W, MAIN 200A/2P		NEMA 3R	SURFACE MOUNTED
Location SES	Type	AIC RATING 22k/10kA SERIES RATED			
USE/AREA SERVED	CB	SPACE NUMBER	SPACE NUMBER	CB	USE/AREA SERVED
hot water	30A/2P	1	2	30A/2P	oven
		3	4		
dryer	30A/2P	5	6	50A/2P	jacuzzi heat
		7	8		
dishwasher	20A/2P	9	10	15A/1P	garage
		11	12	20A/1P	master bath
fridge	20A/1P	13	14	20A/1P	bath gfi
washer	20A/1P	15	16	20A/1P	garage fridge
lights	15A/1P	17	18	20A/1P	kitchen gfi
master	15A/1P	19	20	20A/1P	kitchen gfi
lights	15A/1P	21	22	20A/1P	general
lights	15A/1P	23	24	20A/1P	general
lights	15A/1P	25	26	15A/1P	garage
garage	20A/1P	27	28	15A/1P	family room
microwave	20A/1P	29	30	15A/1P	lights
pool	20A/2P	31	32	20A/1P	gate
		33	34	20A/1P	fountain
		35	36		
		37	38		
		39	40		

LG NeON[®] 2 Black

LG325N1K-V5

325W

The LG NeON[®] 2 is LG's best selling solar module, and is one of the most powerful and versatile modules on the market today. Featuring LG's Cello Technology, the LG NeON[®] 2 increases power output. New updates include an extended performance warranty from 86% to 90.08% to give customers higher performance and reliability.



60

LG NeON[®] 2 Black

LG325N1K-V5

General Data

Cell Properties (Material/Type)	Monocrystalline/N-type
Cell Maker	LG
Cell Configuration	60 Cells (6 x 10)
Number of Busbars	12EA
Module Dimensions (L x W x H)	1,686mm x 1,016mm x 40 mm
Weight	17.1 kg
Glass (Material)	Tempered Glass with AR Coating
Backsheet (Color)	Black
Frame (Material)	Anodized Aluminium
Junction Box (Protection Degree)	IP 68 with 3 Bypass Diodes
Cables (Length)	1,000mm x 2EA
Connector (Type/Maker)	MC 4/MC

Certifications and Warranty

Certifications	IEC 61215-1/-1-1/2:2016, IEC 61730-1/2:2016, UL 1703 ISO 9001, ISO 14001, ISO 50001 OHSAS 18001
Salt Mist Corrosion Test	IEC 62701:2012 Severity 6
Ammonia Corrosion Test	IEC 62716:2013
Module Fire Performance	Type 2 (UL 1703)
Fire Rating	Class C (UL 790, ULC/ORD C 1703)
Solar Module Product Warranty	25 Years
Solar Module Output Warranty	Linear Warranty*

Improved: 1st Year 98%, from 2-24th year: 0.33%/year down, after 25th year: 90.08%

Temperature Characteristics

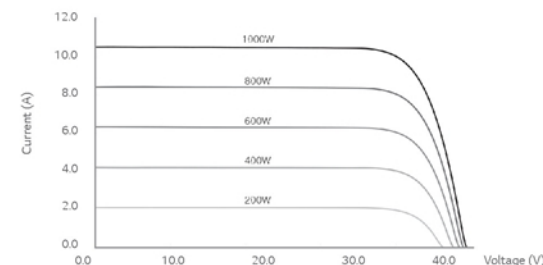
NMOT*	[°C]	42 ± 3
Pmax	[%/°C]	-0.36
Voc	[%/°C]	-0.27
Isc	[%/°C]	0.03

* NMOT (Nominal Module Operating Temperature): Irradiance 800 W/m², Ambient temperature 20 °C, Wind speed 1 m/s, Spectrum AM 1.5

Electrical Properties (NMOT)

Model	LG325N1K-V5	
Maximum Power (Pmax)	[W]	243
MPP Voltage (Vmpp)	[V]	31.5
MPP Current (Impp)	[A]	7.69
Open Circuit Voltage (Voc)	[V]	38.4
Short Circuit Current (Isc)	[A]	8.23

I-V Curves



Electrical Properties (STC*)

Electrical Properties (STC)		Model	LG325N1K-V5
Maximum Power (Pmax)	[W]		325
MPP Voltage (Vmpp)	[V]		33.7
MPP Current (Impp)	[A]		9.65
Open Circuit Voltage (Voc ± 5%)	[V]		40.9
Short Circuit Current (Isc ± 5%)	[A]		10.23
Module Efficiency	[%]		19.0
Power Tolerance	[%]		0 ~ +3

* STC (Standard Test Condition): Irradiance 1000 W/m², cell temperature 25 °C, AM 1.5

Operating Conditions

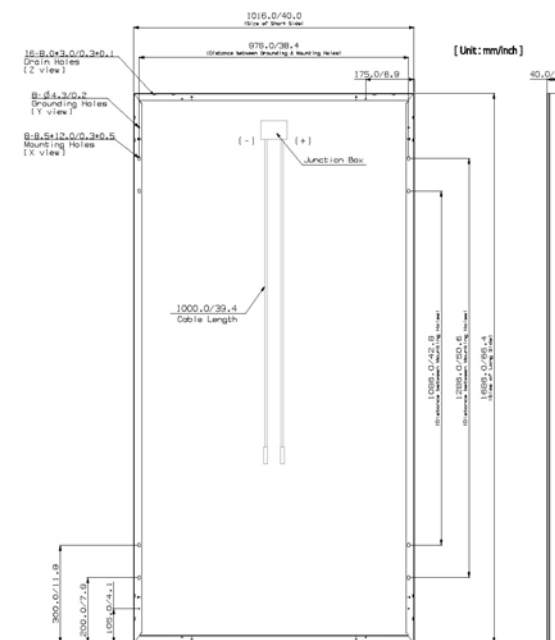
Operating Temperature	[°C]	-40 ~ +90
Maximum System Voltage	[V]	1,000(UL), 1000(IEC)
Maximum Series Fuse Rating	[A]	20
Mechanical Test Load (Front)	[Pa/psf]	5,400/113
Mechanical Test Load (Rear)	[Pa/psf]	4,000/84

* Test Load = Design load x Safety Factor (1.5)

Packaging Configuration

Number of Modules per Pallet	[EA]	25
Number of Modules per 40ft HQ Container	[EA]	650
Packaging Box Dimensions (L x W x H)	[mm]	1,750 x 1,120 x 1,221
Packaging Box Gross Weight	[kg]	464

Dimensions (mm/inch)



Features



Enhanced Performance Warranty

LG NeON[®] 2 Black has an enhanced performance warranty. After 25 years, LG NeON[®] 2 Black is guaranteed at least 90.08% of initial performance.



Enhanced Product Warranty

LG has extended the warranty of the NeON[®] 2 Black to 25 years including labor, which is top level in the industry.



Better Performance on a Sunny Day

LG NeON[®] 2 Black now performs better on sunny days, thanks to its improved temperature coefficient.



Roof Aesthetics

LG NeON[®] 2 Black has been designed with aesthetics in mind using thinner wires that appear all black at a distance. LG NeON[®] 2 Black can increase the value of a property with its modern design.

When you go solar, ask for the brand you can trust: LG Solar

About LG Electronics

LG Electronics is a global leader in electronic products in the clean energy markets by offering solar PV panels and energy storage systems. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first MonoX[®] series to the market, which is now available in 32 countries. The NeON[®] (previous MonoX[®] NeON), NeON[®]2, NeON[®]2 BiFacial won the "International AWARD" in 2013, 2015 and 2016, which demonstrates LG's leadership and innovation in the solar industry.

LG Solar



LG Electronics Inc.
Solar Business Division
2000 Millbrook Drive
Lincolnshire, IL 60069
www.lg-solar.com

Product specifications are subject to change without notice.
LG325N1K-V5.pdf

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AHJ: Paradise Valley
Utility: SRP

APN: 169-22-080C
Zoning: R-43

Equipment
Specification Sheets

Dwg No:

E-10

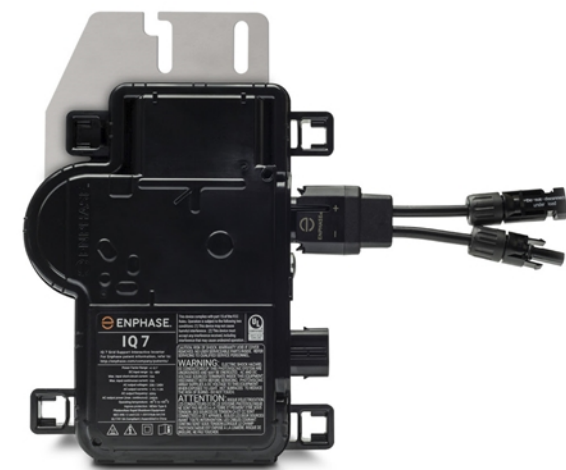
Drawings not to scale

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)		IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings ¹		235 W - 350 W +		235 W - 440 W +	
Module compatibility		60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage		48 V		60 V	
Peak power tracking voltage		27 V - 37 V		27 V - 45 V	
Operating range		16 V - 48 V		16 V - 60 V	
Min/Max start voltage		22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)		15 A		15 A	
Overvoltage class DC port		II		II	
DC port backfeed current		0 A		0 A	
PV array configuration		1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)		IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power		250 VA		295 VA	
Maximum continuous output power		240 VA		290 VA	
Nominal (L-L) voltage/range ²		240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current		1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency		60 Hz		60 Hz	
Extended frequency range		47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles		5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit ³		16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port		III		III	
AC port backfeed current		0 A		0 A	
Power factor setting		1.0		1.0	
Power factor (adjustable)		0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY		@240 V	@208 V	@240 V	@208 V
Peak efficiency		97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency		97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA					
Ambient temperature range		-40°C to +65°C			
Relative humidity range		4% to 100% (condensing)			
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)		MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (WxHxD)		212 mm x 175 mm x 30.2 mm (without bracket)			
Weight		1.08 kg (2.38 lbs)			
Cooling		Natural convection - No fans			
Approved for wet locations		Yes			
Pollution degree		PD3			
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating		NEMA Type 6 / outdoor			
FEATURES					
Communication		Power Line Communication (PLC)			
Monitoring		Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means		The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance		CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

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Zoning: R-43

Equipment
Specification Sheets

Dwg No:

E-11

Drawings not to scale

Enphase Q Cable Accessories

The **Enphase Q Cable™** and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.

Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste

Field-Wireable Connectors





- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

Enphase Q Cable Accessories

CONDUCTOR SPECIFICATIONS	
Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable
Flame test rating	FT4
Compliance	RoHS, OIL RES I, CE, UV resistant, combined UL for the United States
Conductor type	THHN/THWN-2 dry/wet
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.

Q CABLE TYPES / ORDERING OPTIONS				
Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200

ENPHASE Q CABLE ACCESSORIES		
Name	Model Number	Description
Raw Q Cable	Q-12-RAW-200	300 meters of 12 AWG cable with no connectors
Field-wireable connector (male)	Q-CONN-10M	Make connections from any open connector
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector
Cable Clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling
Terminator	Q-TERM-10	Terminator cap for unused cable ends
Friends PV2 to MC4 adaptor	ECA-S20-S22	Connect PV module using MC4 connectors to IQ micros with Friends PV2 bulkhead connectors
Friends PV2 to UTX adaptor	ECA-S20-S25	Connect PV module using UTX connectors to IQ micros with Friends PV2 bulkhead connectors
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)

	TERMINATOR Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)		SEALING CAPS Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)
	DISCONNECT TOOL Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)		CABLE CLIP Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)

To learn more about Enphase offerings, visit enphase.com



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2018-05-24



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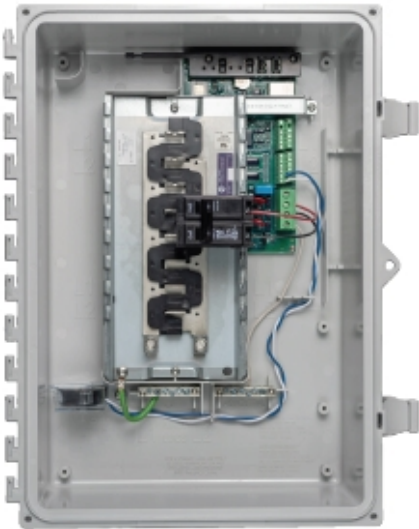
E-12

Drawings not to scale

Enphase IQ Combiner 3

(X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.



Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed



Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and REPLACEMENT PARTS (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity 2
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)
COMPLIANCE	
Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit enphase.com

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2018-09-13



9393 N. 90th Street
Suite 102-353
Scottsdale, AZ 85258
www.anevasolar.com
480.462.6382

AZ ROC License:
287715 (CR-11)

Version History

Version	Date
A	7/23/20
B	12/3/20

Project name:
Tan Solar

PLANT LOCATION:
6204 N Hogahn Circle
Paradise Valley AZ 85253

11.7 kW (DC)
8.6 kW (AC)
Grid-tied
photovoltaic system

AHJ: Paradise Valley
Utility: SRP

APN: 169-22-080C
Zoning: R-43

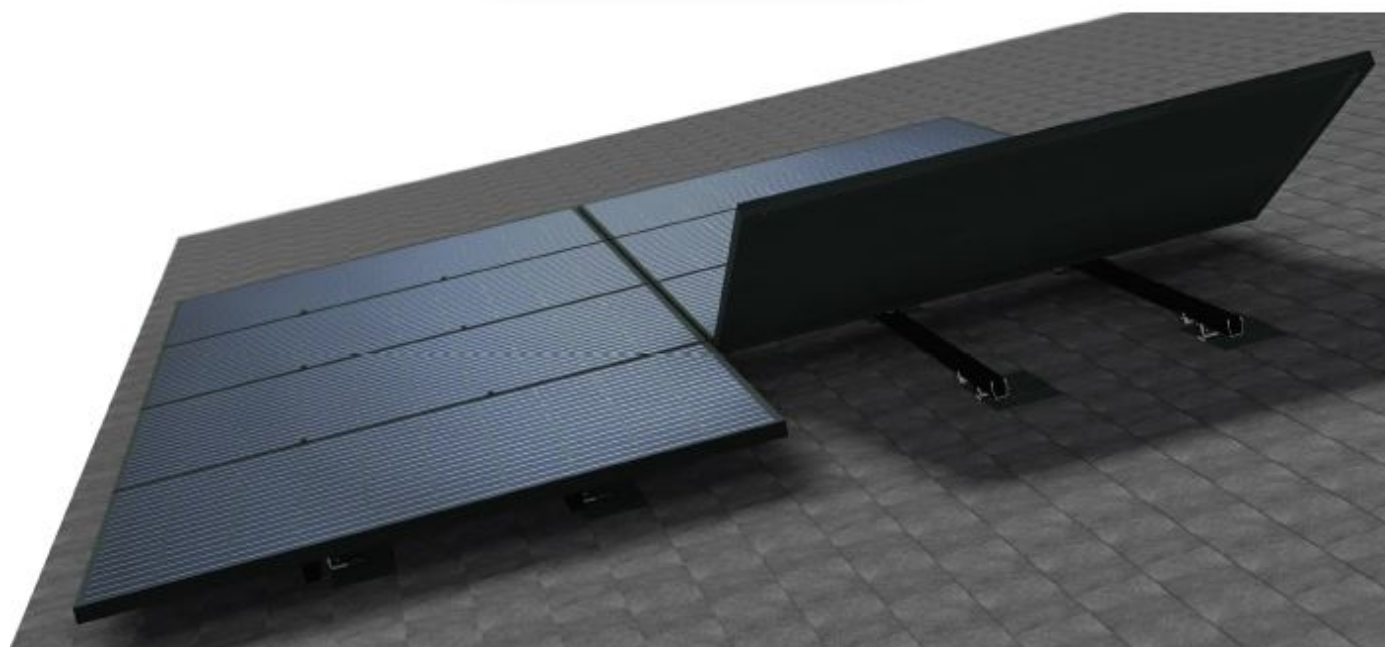
Equipment
Specification Sheets

Dwg No:

E-13

Drawings not to scale

Ultra Rail



The Ultimate Value in Rooftop Solar



Industry leading Wire Management Solutions



Mounts available for all roof types



An install experience unlike any other



Compatible with all Series 100 Module Clamps & Accessories

Start Installing Ultra Rail Today

RESOURCES
DESIGN
WHERE TO BUY

snapnrack.com/resources
snapnrack.com/configurator
snapnrack.com/where-to-buy

The SnapNrack Ultra Rail

is a sleek, lightweight rail solution for mounting solar modules on the roof.

The Entire System is a Snap to Install

- New Ultra Rail Mounts include snap-in brackets for attaching rail
- Compatible with all the SnapNrack Mid Clamps and End Clamps customers love
- Universal End Clamps and snap-in End Caps provide a clean look to the array edge



Unparalleled Wire Management

- Open rail channel provides room for running wires resulting in a long-lasting quality install
- Industry best wire management offering includes Junction Boxes, Universal Wire Clamps, MLPE Attachment Kits, and Conduit Clamps
- System is fully bonded and listed to UL 2703 Standard

The Largest Span Capabilities of any Light Rail Solution

This table was prepared in compliance with applicable engineering codes and standards. Values are based on the following:

- ASCE 7-10
- Chapter 30 Wind Loads & Chapter 7 Snow Loads
- Roof Slope: 7 - 27 deg
- Roof Height: 0 - 30 ft
- Exposure: B
- Roof Zone: 1
- Module Orientation: Portrait
- Roof Type: Comp

Visit SnapNrack.com for detailed span tables and certifications.

System Span Key
6 ft Spans
4 ft Spans
2 ft Spans

Ultra Rail, UR-40 Rail System Spans

	Wind (mph)																
	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	190	
0																	
5																	
10																	
15																	
20																	
25																	
30																	
35																	
40																	
45																	
50																	
60																	
70																	
80																	
90																	
100																	
110																	
120																	

Quality. Innovative. Superior.

SnapNrack Solar Mounting Solutions are engineered to optimize material use and labor resources and improve overall installation quality and safety.

877-732-2860

www.snapnrack.com

contact@snapnrack.com

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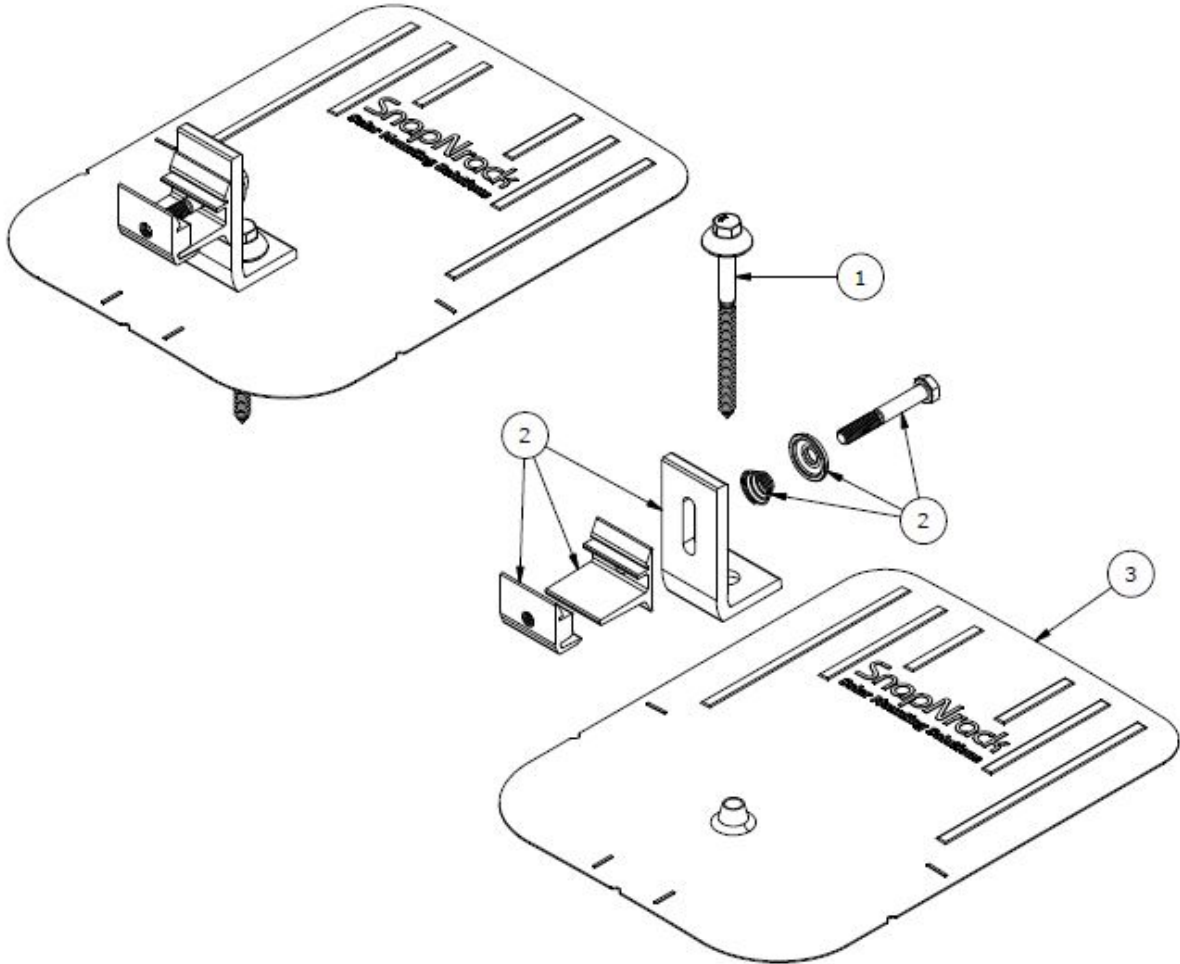
Equipment
Specification Sheets

Dwg No:

E-14

Drawings not to scale

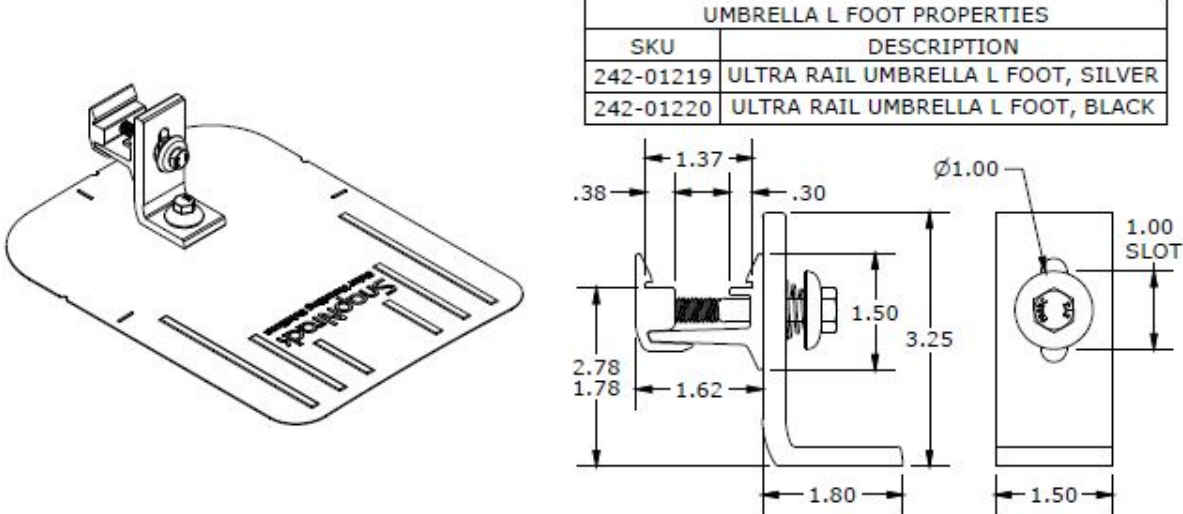
DESCRIPTION:	SNAPNRACK, ULTRA RAIL COMP KIT	DRAWN BY:	mwatkins	
PART NUMBER(S):	SEE BELOW	REVISION:	B	
				556 MARKET STREET, 28TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE: (415) 580-8900 • FAX: (415) 580-8902 THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY. ANY REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF BLANULUS SOUTH LLC.



PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	242-92266	SNAPNRACK, UMBRELLA LAG, TYPE 3, 4IN, SS
2	1	242-01219, 242-01220	SNAPNRACK, ULTRA FOOT FOR U FLASHING, SILVER / BLACK
3	1	232-01375, 232-01376	SNAPNRACK, COMP FLASHING, 9IN X 12IN, SILVER / BLACK ALUM

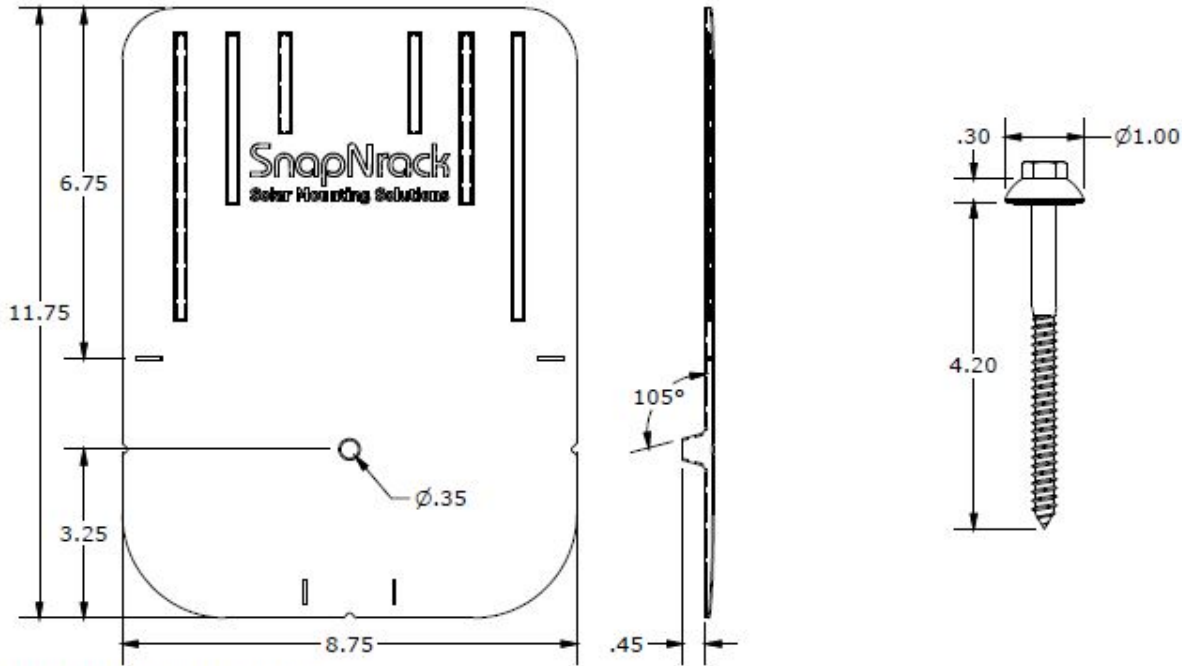
MATERIALS:	6000 SERIES ALUMINUM, STAINLESS STEEL, RUBBER
DESIGN LOAD (LBS):	405 UP, 788 DOWN, 236 SIDE
ULTIMATE LOAD (LBS):	2006 UP, 4000 DOWN, 1070 SIDE
TORQUE SPECIFICATION:	12 LB-FT
CERTIFICATION:	UL 2703, FILE E359313; WIND-DRIVEN RAIN TEST FROM UL SUBJECT 2582
WEIGHT (LBS):	0.80

DESCRIPTION:	SNAPNRACK, ULTRA RAIL COMP KIT	DRAWN BY:	mwatkins	
PART NUMBER(S):	SEE BELOW	REVISION:	B	
				556 MARKET STREET, 28TH FLOOR • SAN FRANCISCO, CA 94105 USA PHONE: (415) 580-8900 • FAX: (415) 580-8902
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UMBRELLA L FOOT PROPERTIES	
SKU	DESCRIPTION
242-01219	ULTRA RAIL UMBRELLA L FOOT, SILVER
242-01220	ULTRA RAIL UMBRELLA L FOOT, BLACK

COMP FLASHING PROPERTIES	
SKU	DESCRIPTION
232-01375	COMP FLASHING, 9" X 12", BLACK ALUM
232-01376	COMP FLASHING, 9" X 12", SILVER ALUM



ALL DIMENSIONS IN INCHES



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