Hello Paradise Valley Committee,

Subject: Formal plan review for the proposed solar installation at the Irvin Kessler residents (6210 E. Indian Bend Rd, Paradise Valley)

Thank you for taking the time to review the proposed Kessler solar submittal. The following submittal represents a low profile fully concealed rooftop solar electric system. Aneva Solar will make all efforts to keep the solar installation totally discrete. Our goal is to completely satisfy the committee's requirements and the Homeowners expectations.

- All solar panels and racking will be concealed per section 2207.ll.E by a 20" metal facia installed at the roof level by the builder (Racking height 13"). This roof level facia will have a LRV of 23.
- All solar arrays will not be visible from the same or lower elevation
- The solar racking system used will match the facia's LRV rating of 23.
- The LG solar panels used will have black frames.
- The solar systems inverters will be located in the utility room of the home.
- The solar meter and disconnect will be screened in to match the home.
- There will be no exterior conduit visible at the same or lower elevations of the home.
- The solar meter and disconnect will be located in the homes utility corridor along with existing HVAC and electrical equipment. Please see the note on page three of the plans.

Thank you for your time.

Best regards,

Anthony Iannucci
Owner/Project Manager
Phone: 480 390 4822
www.anevasolar.com
AZ ROC# 287715 [K-11]

TOWN OF PARADISE VALLEY HILLSIDE BUILDING CONSTRUCTION APPLICATION AND PLAN CHECK SHEETS

(This document is to be used after April 1, 2007)

DATE: 8/23/17

SUBDIVISION NAME: INDIAN BEND VISTAS 1

ADDRESS OF PROPERTY 6210 E. Indian Bend Rd, Paradise Valley

LEGAL DESCRIPTION: _____

ARCHITECT: Charles S. Stinson (NAME) 952 473 9503 (PHONE NUMBER)

18304 Minnetonka Blvd, DeepHaven, MN 55391 (ADDRESS) info@charlesrstinson.com (E-MAIL ADDRESS)

ENGINEER/OTHER: _____ (NAME) _____ (PHONE NUMBER)

_____ (ADDRESS) _____ (E-MAIL ADDRESS)

OWNER: Irvin Kessler (PRINT NAME) _____ (PHONE NUMBER)

6210 E. Indian Bend Rd, Paradise Valley (ADDRESS) kessler@providentadvisors.com (E-MAIL ADDRESS)

_____ (SIGNATURE OF OWNER OR REPRESENTATIVE) 8/23/17 (DATE)

ANEVA SOLAR

Hello Paradise Valley Committee,

Subject: Formal plan review for the proposed solar installation at the Irvin Kessler residents (6210 E. Indian Bend Rd, Paradise Valley)

Thank you for taking the time to review the proposed Kessler solar submittal. The following submittal represents a low profile fully concealed rooftop solar electric system. Aneva Solar will make all efforts to keep the solar installation totally discrete. Our goal is to completely satisfy the committee's requirements and the Homeowners expectations.

- All solar panels and racking will be concealed per section 2207.II.E by a 20" metal facia installed at the roof level by the builder (Racking height 13"). This roof level facia will have a LRV of 23.
- All solar arrays will not be visible from the same or lower elevation
- The solar racking system used will match the facia's LRV rating of 23.
- The LG solar panels used will have black frames.
- The solar systems inverters will be located in the utility room of the home.
- The solar meter and disconnect will be screened in to match the home.
- There will be no exterior conduit visible at the same or lower elevations of the home.

Thank you for your time.

Best regards,

Anthony Iannucci
Owner/Project Manager
Phone: 480 390 4822
www.anevasolar.com
AZ ROC# 287715 [K-11]
ANEVA SOLAR

Combined Plan Review Notification

Date

Address of recipient

Subject: Formal Plan review for the proposed Kessler residents roof top solar project

An application has been submitted to the Town of Paradise Valley for a new home at 6210 East Indian Bend Rd, Paradise Valley. In compliance with Town Requirements, this letter is being sent to you as a courtesy to inform you of the pending application. The Hillside Building Committee will be reviewing this application on Wednesday, September 28th 2017 AM at the Paradise Valley Town Hall Located at 6401 East Lincoln Drive.

The purpose of the combined Plan Review meeting is for the Hillside Committee to review the submittal for compliance with goals, purposes, and specific criteria of the Town of Paradise Valley Hillside Development Regulations.

The Hillside Committee will approve, approve with stipulations, or deny the submittal.

This meeting is open to the public and you may feel free to attend.

If you have any questions, please call me at 480-390-4822

Sincerely,

Anthony Iannucci

Owner/Project Manager

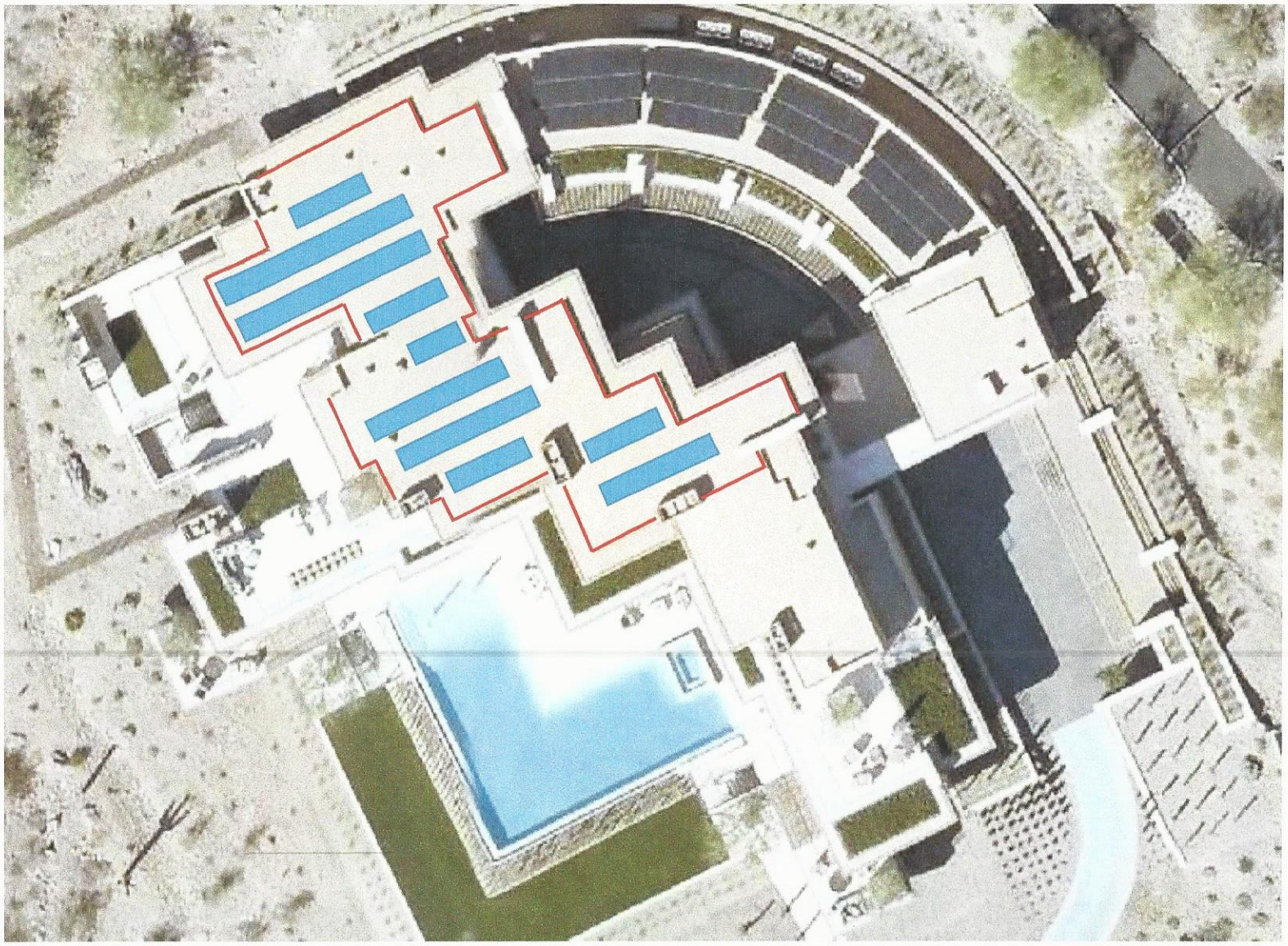
Phone: 480 390 4822

www.anevasolar.com

AZ ROC# 287715 [K-11]

ANEVA SOLAR

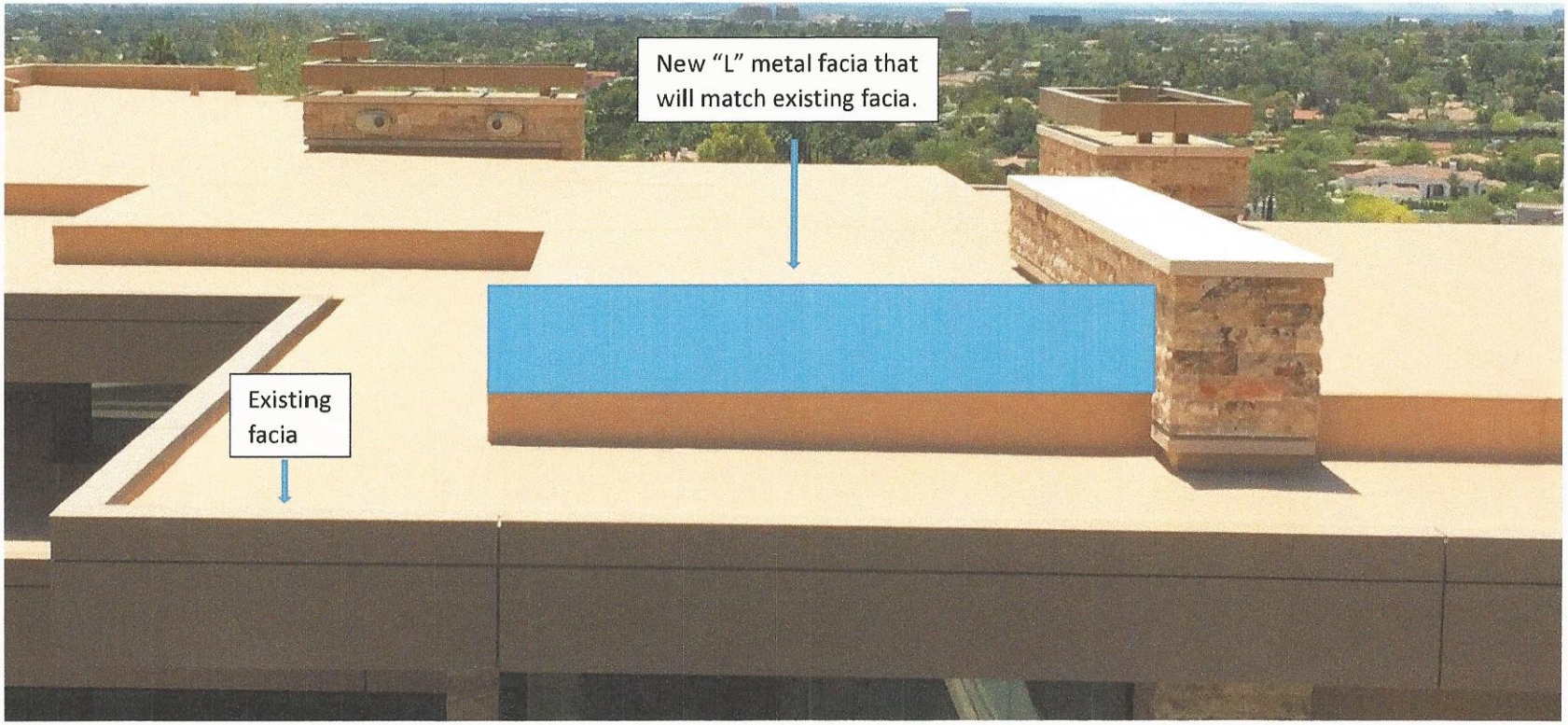
Kessler Residents Proposed solar project-6210 E. Indian Bend Rd, Paradise Valley, Arizona



Proposed solar module locations-

Proposed "L" facia location to screen solar array-

Kessler Residents Proposed solar project-6210 E. Indian Bend Rd, Paradise Valley, Arizona



Anthony Iannucci

Owner/Project Manager

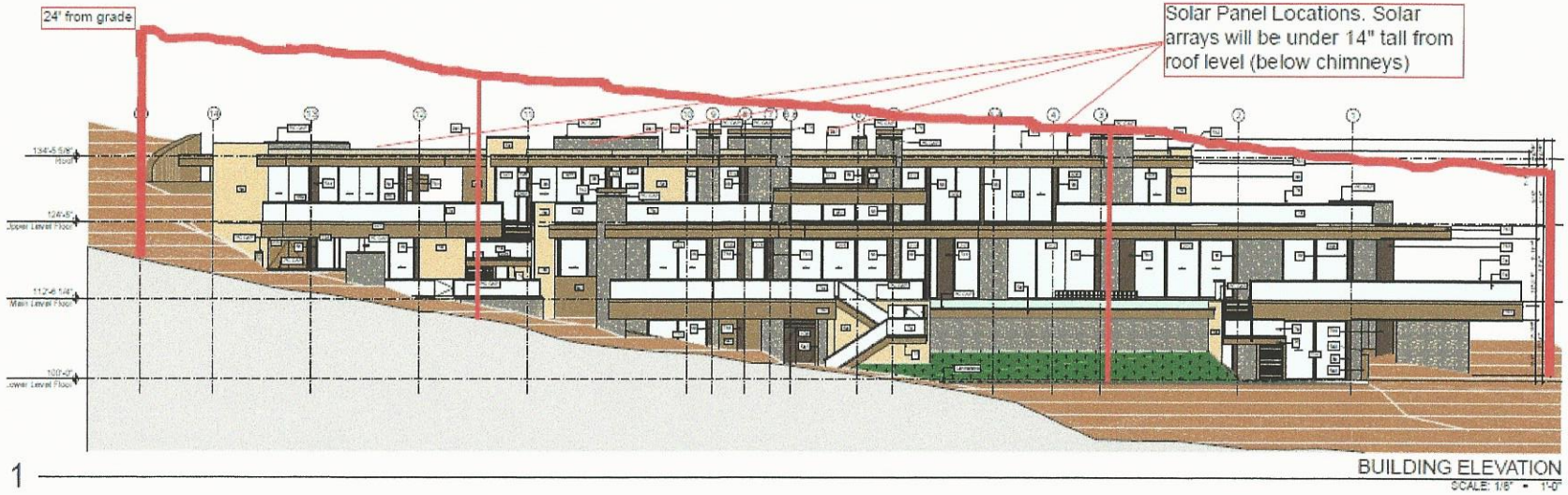
Phone: 480 390 4822

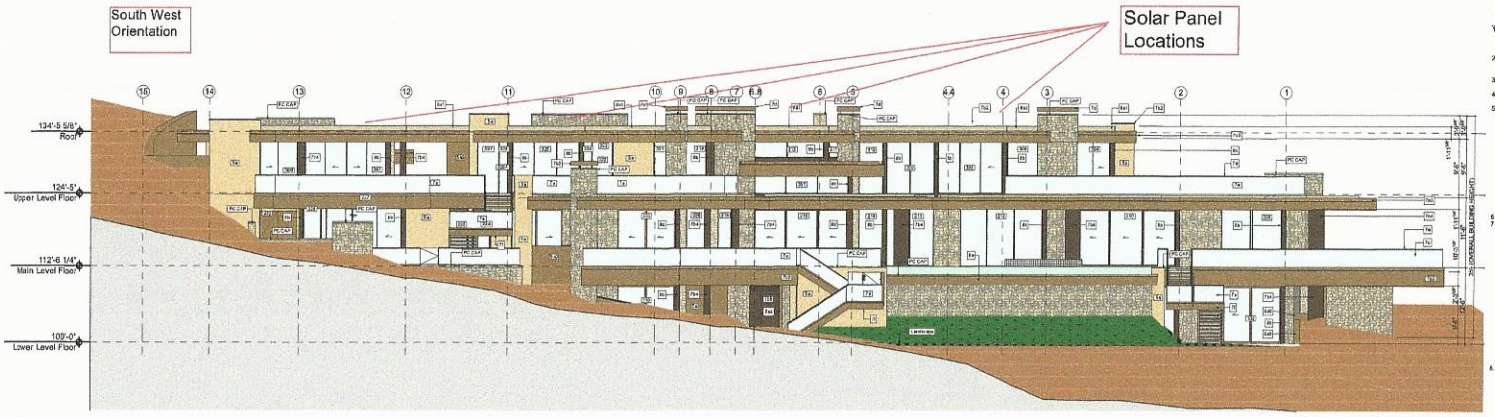
www.anevasolar.com

AZ ROC# 287715 [CR-11]

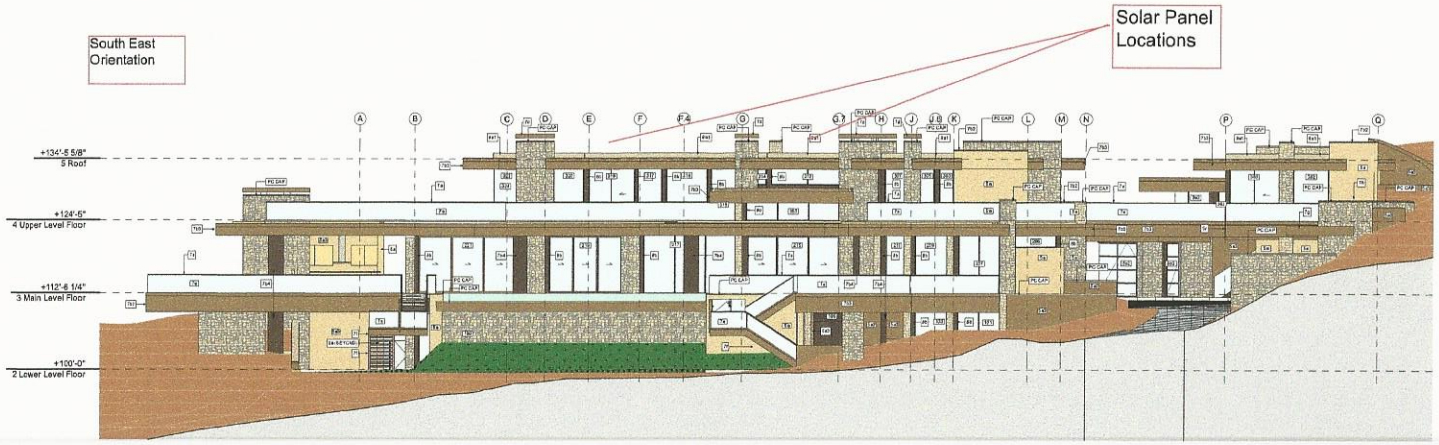
ANEVA SOLAR

Kessler cross section

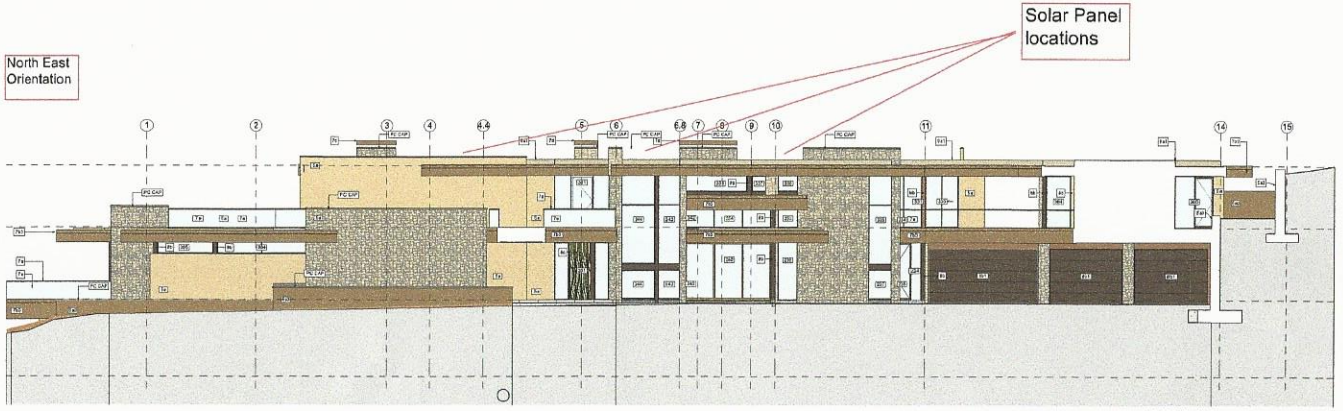




1 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



2 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



3 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"

ELEVATION NOTES

1. GENERAL REQUIREMENTS
   a. SEE ALSO ARCHITECTURAL SPECIFICATIONS SHEET FOR ADDITIONAL DESIGN AND CONSTRUCTION INFORMATION
   b. VERIFY ALL COLOR CHOICES AND FINISHES WITH ARCHITECT
2. EXISTING CONDITIONS
   a. SEE SCHEMATIC SITE PLAN AND LANDSCAPE DRAWINGS FOR RELATIONSHIP WITH EXISTING CONTOURS
3. VERIFY ALL EXTERIOR LANDSCAPE WALLS AND WALKS WITH LANDSCAPE ARCHITECT
4. SOFFITS:
   a. "ACRYLIC TEXTURED FINISH" ON EXTERIOR SHEATHING BOARD.
5. EXTERIOR FINISHES
   a. "TEXTURED PLASTIC COATING" FINISH (SEE DIV. 9). PRIMARY COLOR TO BE VERIFIED. ALL UNNOTED AREAS ARE PRIMARY COLOR, U.N.O. PRIMARY COLOR TO BE DUNN EDWARDS "GRAHAM CRACKER"
   a1. FINISH COAT OVER STUCCO BASE COAT, U.N.O.
   a2. PROVIDE CONTROL JOINTS WHERE NOTED OR REQUIRED
   a3. SECONDARY COLOR, TO BE DUNN EDWARDS "TEDDY BEAR" AT ACCENT AREAS
   a4. ACCENT COLOR TO MATCH WINDOW FRAME COLOR.
   a5. PROVIDE CAPILLARY BARRIER (WEEP SCREED), AT ALL WALLS UTILIZING WOOD FRAMING, AT MINIMUM 4" ABOVE GRADE. SEE DETAIL 28/A201 FOR ADDITIONAL INFO.
   b. ASHLER STONE MASONRY VENEER FINISH (STN-1). VERIFY TYPE AND PATTERN W/ARCHITECT & OWNER (SEE DIV. 4)
   c. EXPANSION JOINT. SEE DETAILS AND SPECS.
6. WOOD
7. METAL
   a. HORIZONTAL GLASS CAP RAIL (1 1/2" x 1 1/2"), TOP OF CAP RAIL AT 36" ABOVE WALK SURFACE.
   b. PRE-FINISHED CLADDING
   b1. SEE ALSO ROOF AND WINDOW NOTES FOR ADDITIONAL PRE-FINISHED TRIM
   b2. METAL WALL COPING @ TOP OF WALLS WITH COLOR TO MATCH WALL SURFACE BELOW
   b3. METAL WALL PANEL FASCIA AND ROOF EDGE TERMINATION: COLOR TO BE "TEDDY BEAR"
   b4. METAL WALL PANEL CLADDING COLUMN ENCLOSURE. COLOR TO MATCH WINDOW CLADDING
   c. STRUCTURAL COLUMNS, COLOR TO MATCH WINDOW CLADDING
   d. CHIMNEY SHROUD & SUPPORTS. COLOR TO BE "TEDDY BEAR"
   e. GLASS RAILING SYSTEM AND HANDRAIL CAP (1 1/2" X 1 1/2") HANDRAIL CAP HANDRAIL HEIGHT AT 36", MEASURED VERTICALLY FROM THE SLOPED PLANE ADJOINING THE TREAD NOSINGS.
   f. STEEL STAIR STRINGER, COLOR TO BE "TEDDY BEAR"
   g. STEEL TRELLIS. COLOR TO BE "TEDDY BEAR"
   h. SPIRAL METAL STAIR, OMITTED
8. EXTERIOR WINDOWS & DOORS
   a. WINDOWS AND GLASS PANEL DOORS. SEE PLANS AND OPENING SCHEDULE. COLOR TO BE "WILLIAMSBURG BRONZE"
   b. PROVIDE MATCHING CLAD TRIMS FOR ALL CORNERS AND WINDOW COLUMNS U.N.O. COLOR TO MATCH WINDOW CLADDING
   b1. GARAGE DOORS (GD-1)
   b2. GARAGE DOORS (GD-2)
   c. WOOD PIVOT HINGED ENTRY DOOR W/ 8" WIDE BRONZE PLATE ON HARDWARE SIDE. DOOR MANUFACTURER TO PROVIDE SHOP DRAWINGS FOR REVIEW.
9. ROOFS
   a. ROOF MEMBRANE TYPE 1 @ UPPER LEVEL FLAT ROOF: (SEE ROOF SURFACE TYPES) PVC MEMBRANE, SLOPED TO DRAIN
   a1. VERTICAL ROOF TRANSITION. SEE DETAIL
   b. ROOF MEMBRANE TYPE 2 @ TERRACE ROOFS: (SEE ROOF SURFACE TYPES) MONOLITHIC, FLUID APPLIED MEMBRANE
   b1. PRE-FINISHED METAL FLASHING, COLOR TO BE VERIFIED.

I certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Architect under the laws of the State of ARIZONA

Signature

Date

Registration No.

These documents are instruments of service and as such remain the property of the Architect. Publish or use them only with Architect's approval.

CHARLES R. STINSON ARCHITECT
18304 MINNETONKA BLVD, DEEPHAVEN, MN 55391
P: 952-473-9503
WWW.CRSARCH.COM

KESSLER RESIDENCE
IRV & BARB KESSLER
6315 EAST NOHAN BEND ROAD
PARADISE VALLEY, ARIZONA

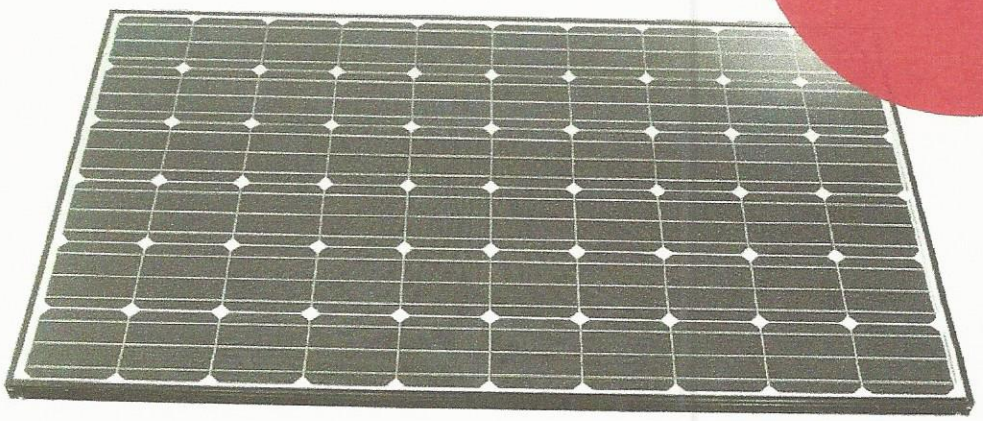
DATE: 12/27/2012
REVISIONS:

12/11/2013
04/14/2014

A201
EXTERIOR ELEVATIONS

LG
Life's Good

Innovation for a Better Life



LG Mono X® Plus

LG285S1C-G4

60 cell

LG Mono X® Plus is LG Electronics' high-quality monocrystalline module. The quality is the result of our strong commitment to developing a module to improve benefits for customers. Features of LG Mono X® Plus include durability, convenient installation, and aesthetic exterior.

APPROVED PRODUCT
KM 564573 BS EN 61215
Photovoltaic Modules

Enhanced Performance Warranty

LG Mono X® Plus provides the enhanced performance warranty. The initial degradation has been improved from -3% to -2%, and the annual degradation has also changed from -0.7%/yr to -0.6%/yr.

Improved Product Warranty

In addition to the enhanced performance warranty, LG has extended the product warranty of LG Mono X® Plus for additional 2 years with its newly reinforced frame design.

Outstanding Durability

With newly reinforced frame design, LG Mono X® Plus can endure the static snow load up to 6000 Pa, and the static wind load up to 5400 Pa.

Reduced LID (LiLY Technology)

LG Mono X® Plus has improved the initial degradation by applying LG's new LiLY(LID-improvement for Lifetime Yield) Technology, which controls formation of Boron-Oxygen pair, the key factor of LID.

Aesthetic Roof

LG Mono X® Plus may increase the house value with its shiny black frames. Also, it looks similar to all-black module from a long distance.

Light and Convenient

LG Mono X® Plus is carefully designed to benefit installers by allowing quick installation with a weight of just 17kg and better grips.

About LG Electronics

LG Electronics is a global player who has been committed to expanding its core vary based on solar power business as well

LG MonoX® Plus LG285S1C-G4

Mechanical Properties

Cells	6 x 10
Cell Vendor	LG
Cell Type	Monocrystalline / P-type
Cell Dimensions	156.75 x 156.75 mm / 6 inches
# of Busbar	3
Dimensions (L x W x H)	1640 x 1000 x 40 mm 64.57 x 39.37 x 1.57 inch
Front Load	6000 Pa / 125 psf
Rear Load	5400 Pa / 113 psf
Weight	17.0 ± 0.5 kg / 37.48 ± 1.1 lbs
Connector Type	MC4, MC4 Compatible, IP67
Junction Box	IP67 with 3 Bypass Diodes
Length of Cables	2 x 1000 mm / 2 x 39.37 inch
Glass	High Transmission Tempered Glass
Frame	Anodized Aluminum

Certifications and Warranty

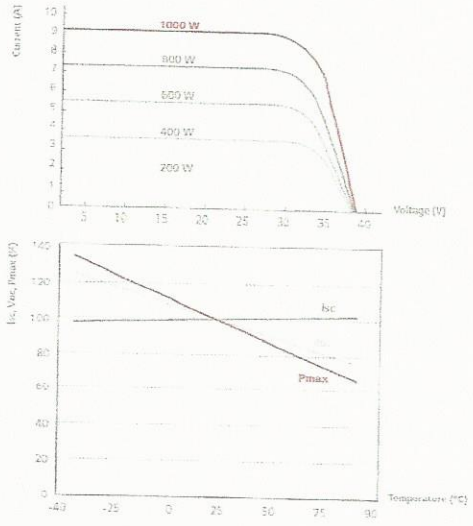
Certifications	IEC 61215, IEC 61730-1/-2
	IEC 62716 (Ammonia Test)
	IEC 61701 (Salt Mist Corrosion Test)
	ISO 9001
	UL 1703
Module Fire Performance (USA)	Type 2 (UL 1703)
Fire Rating (for CANADA)	Class C (ULC/ORD C1703)
Product Warranty	12 years
Output Warranty of Pmax	Linear warranty*

* 1) 1st year 98% 2) After 2nd year 0.6% annual degradation 3) 83.6% for 25 years

Temperature Characteristics

NOCT	46 ± 3 °C
Pmpp	-0.42 %/°C
Voc	-0.30 %/°C
Isc	0.03 %/°C

Characteristic Curves



Electrical Properties (STC *)

Module Type	285 W
MPP Voltage (Vmpp)	32.3
MPP Current (Impp)	8.88
Open Circuit Voltage (Voc)	39.0
Short Circuit Current (Isc)	9.43
Module Efficiency (%)	17.4
Operating Temperature (°C)	-40 ~ +90
Maximum System Voltage (V)	1000 (IEC, UL)
Maximum Series Fuse Rating (A)	15
Power Tolerance (%)	0 ~ +3

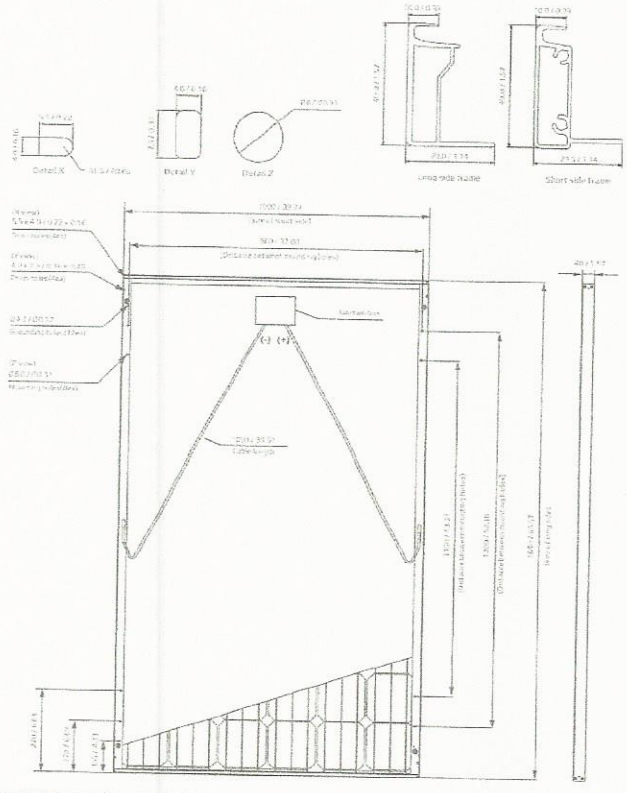
* STC (Standard Test Condition): Irradiance 1000 W/m², module temperature 25 °C, AM 1.5
* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion
* The typical change in module efficiency at 200 W/m² in relation to 1000 W/m² is -4.5%.

Electrical Properties (NOCT*)

Module Type	285 W
Maximum Power (Pmax)	209
MPP Voltage (Vmpp)	29.5
MPP Current (Impp)	7.08
Open Circuit Voltage (Voc)	36.1
Short Circuit Current (Isc)	7.56

* NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m², ambient temperature 20°C, wind speed 1 m/s

Dimensions (mm/in)



* The distance between the center of the mounting/grounding holes

LG Life's Good

North America Solar Business Team
LG Electronics U.S.A. Inc.
1000 Sylvan Ave, Englewood Cliffs, NJ 07632

Contact: lg.solar@lge.com

Innovation for a Better Life

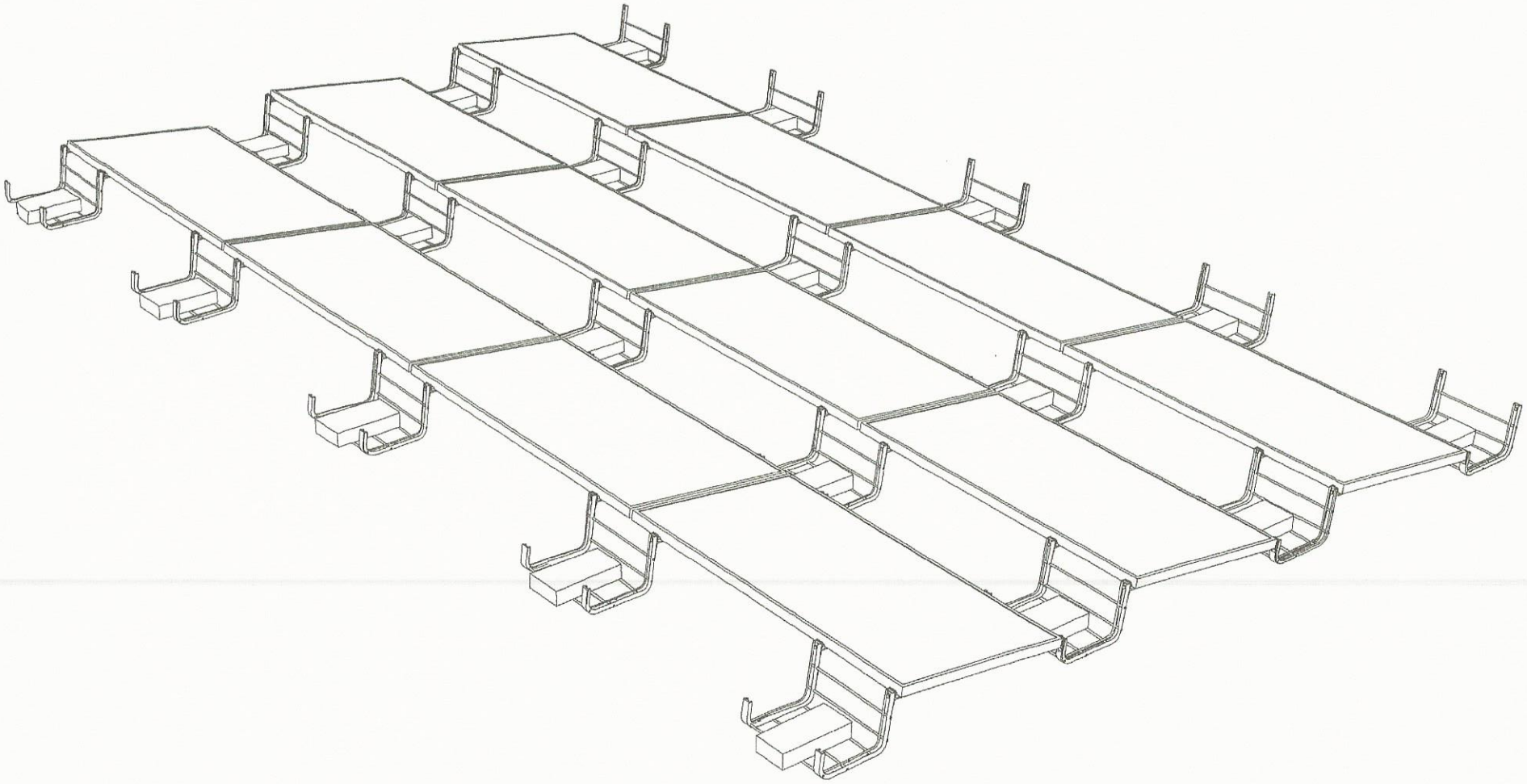
UNIRAC

A MIRTI GROUP COMPANY

PUB131010

UNIRAC RM

DESIGN & ENGINEERING



UNIRAC

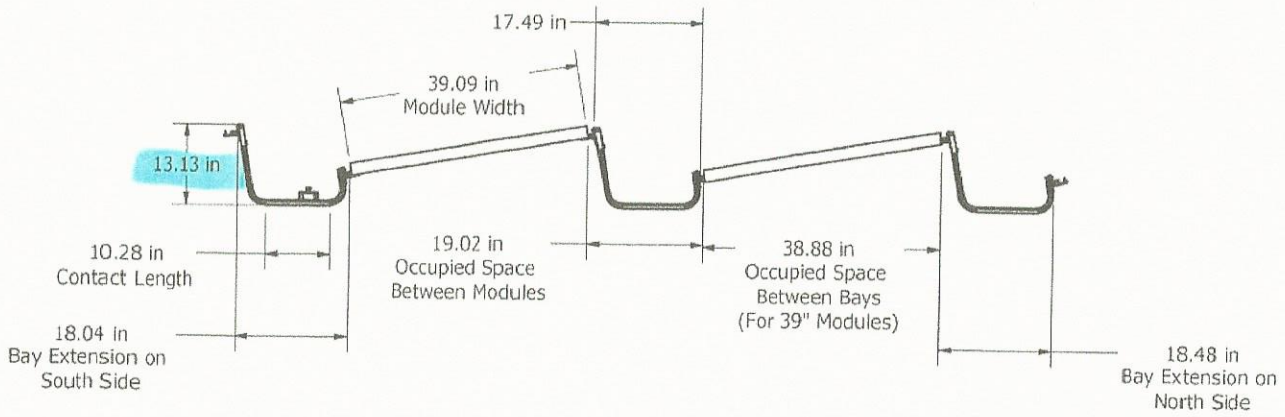
UNIRAC RM
DESIGN & ENGINEERING

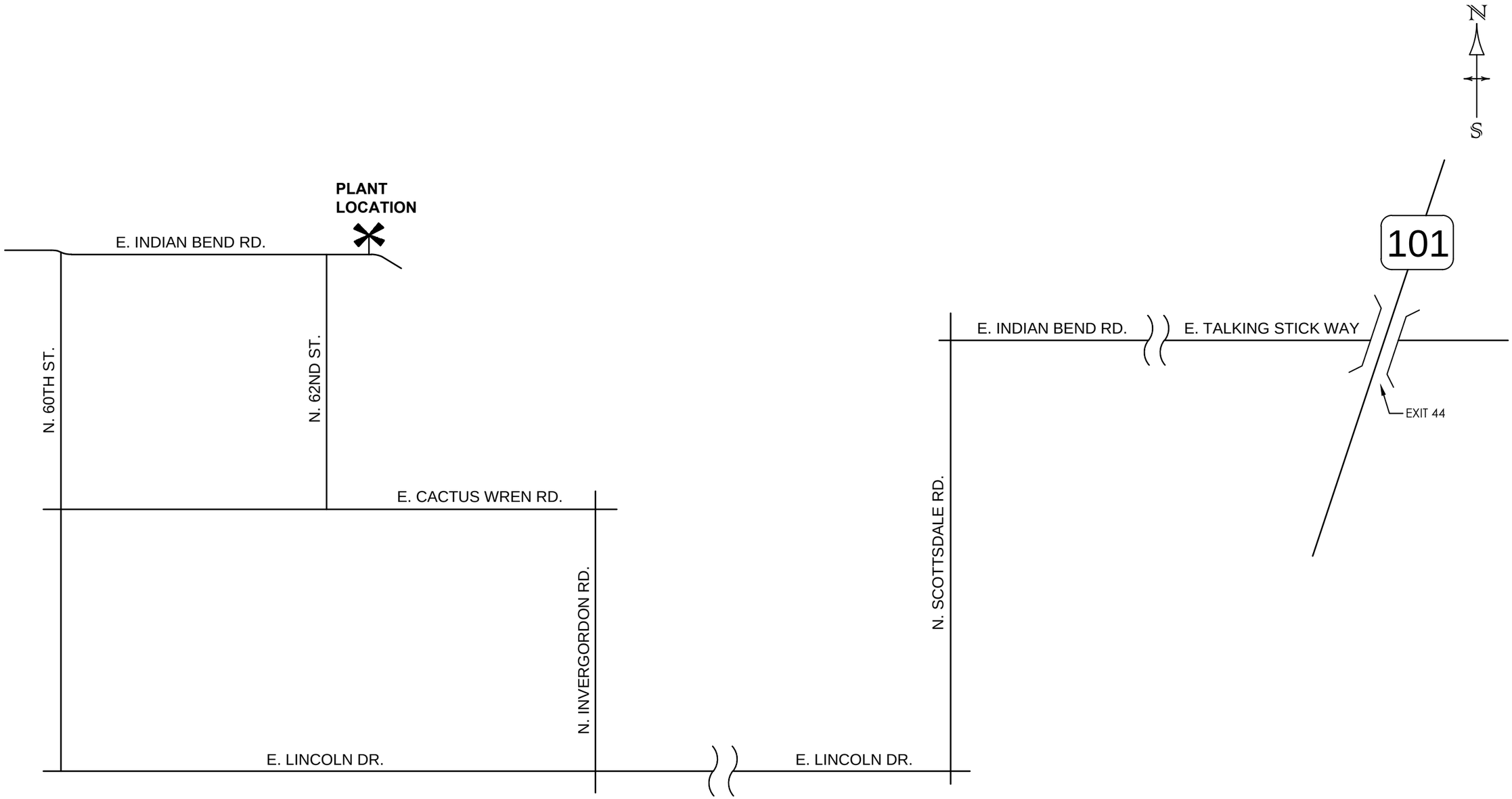
Solar Module Racking Height

4.2 ROW SPACING BASED ON BAY DIMENSIONS

The RM ballast bay will dictate the spacing between rows. The figure below shows the typical spacing between modules rows:

Be sure to take this spacing into account when determining how to occupy your roof space effectively in the North-South direction.





GILBERT, ARIZONA 85296
623-570-5727
WWW.PENINSULAELECTRICALSERVICES.COM

PENINSULA ELECTRICAL SERVICES, LLC
* PHOTOVOLTAIC DESIGN * ELECTRICAL PLAN REVIEW * ELECTRICAL INSPECTIONS *

ANEVA SOLAR
9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
WWW.ANEVASOLAR.COM

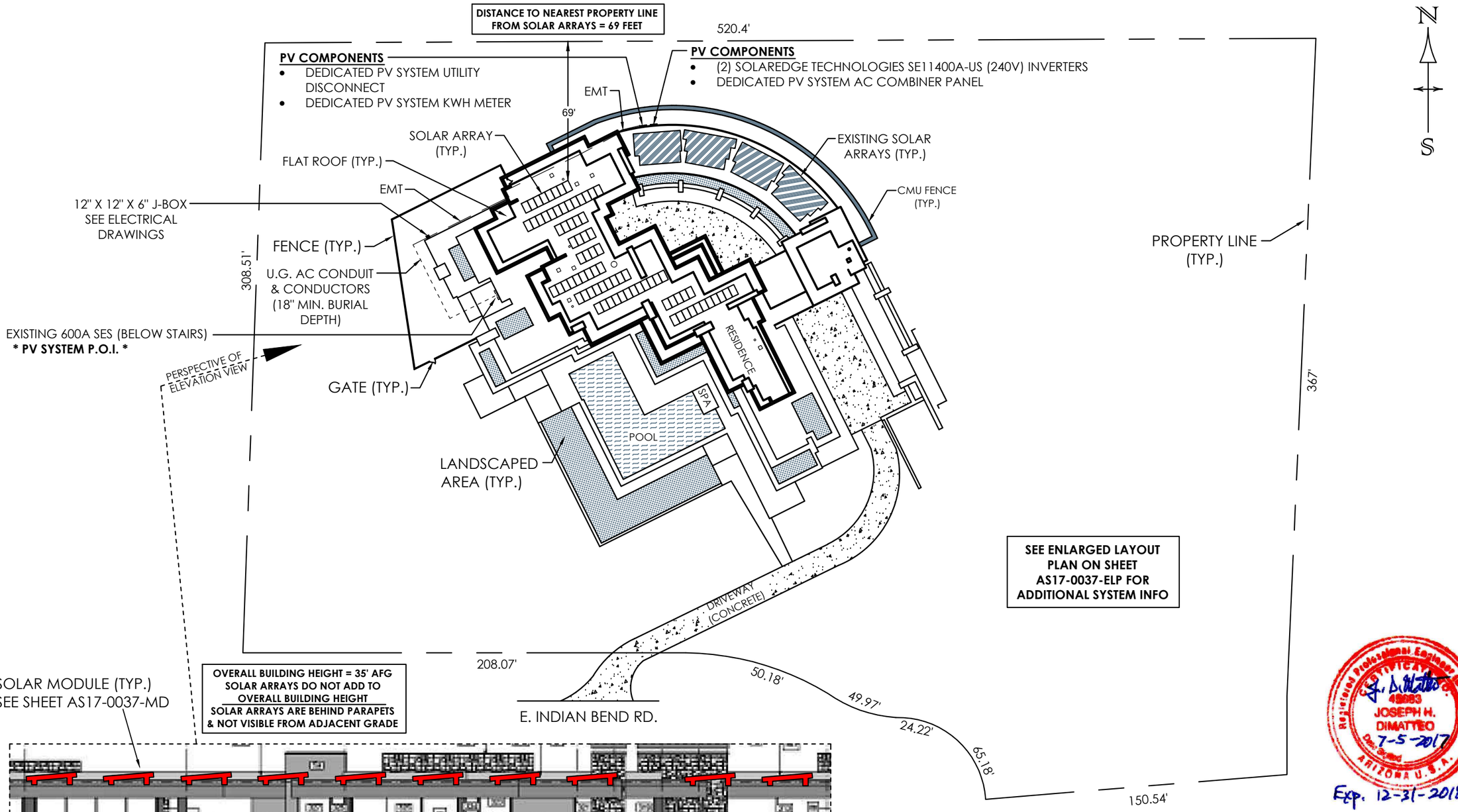
APPROVALS		DATE
DESIGN:	SMT	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

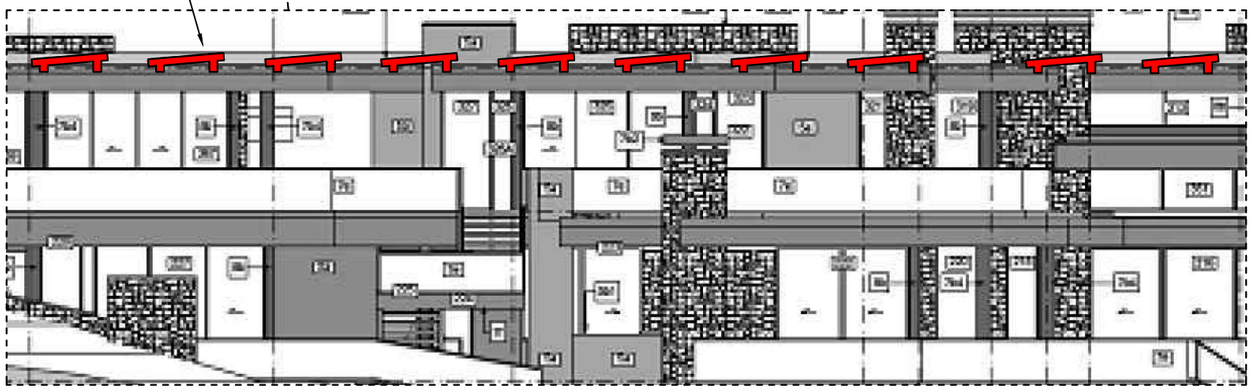
PLANT LOCATION
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-PL	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 1 OF 13





PARTIAL SOUTH-WEST ELEVATION

Registered Professional Engineer (Electrical) 49083 JOSEPH H. DIMATTEO 7-5-2017 Date Signed ARIZONA U.S.A.

Exp. 12-31-2018

GILBERT, ARIZONA 85296
623-570-5727
WWW.PENINSULAELECTRICALSERVICES.COM

PENINSULA ELECTRICAL SERVICES, LLC
* PHOTOVOLTAIC DESIGN * ELECTRICAL PLAN REVIEW * ELECTRICAL INSPECTIONS *

ANEVA SOLAR

9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
WWW.ANEVASOLAR.COM

APPROVALS		DATE
DESIGN:	PET	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

FULL SITE PLAN

22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-SP	

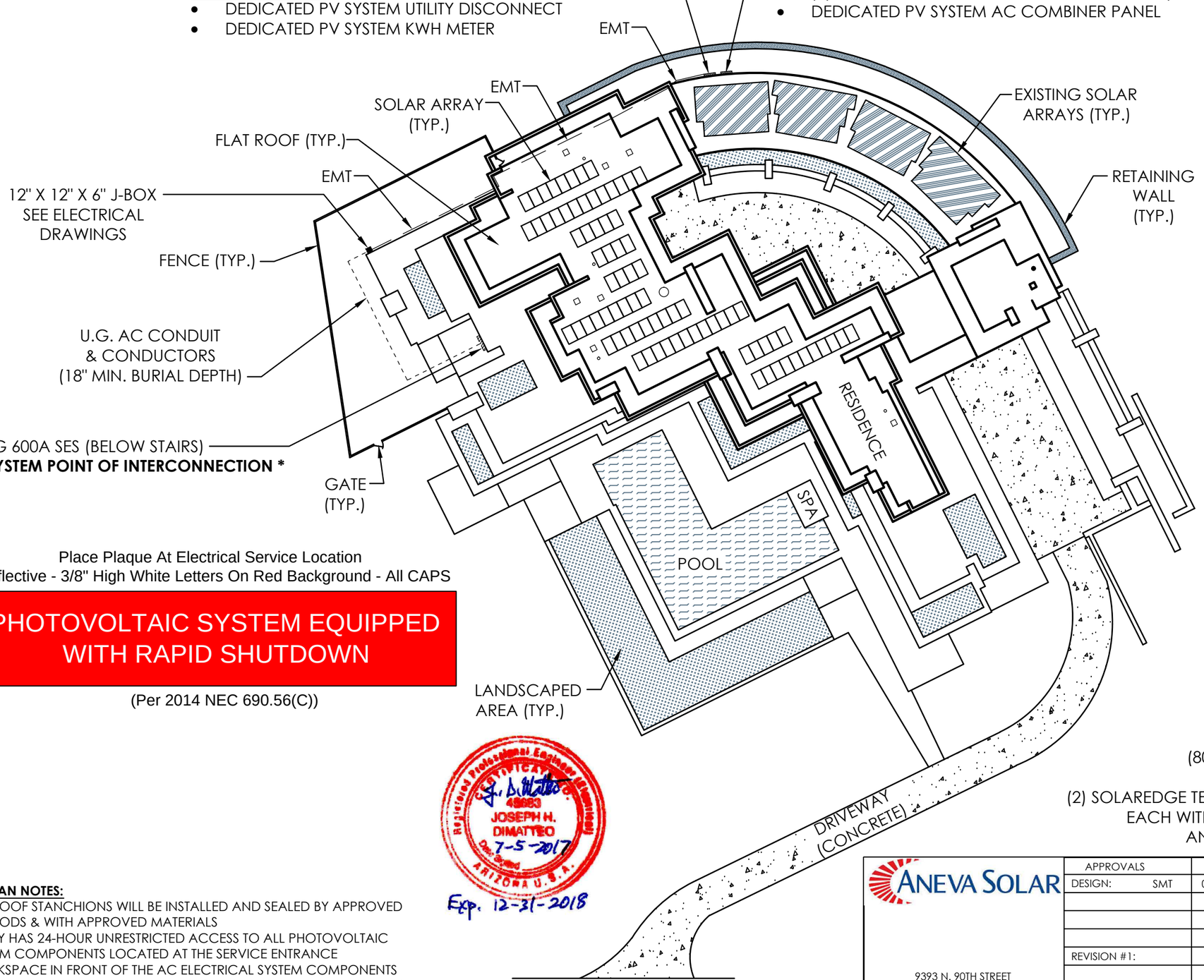
CLIENT NAME: I. KESSLER

SCALE: 1' = 60'

SHEET 2 OF 13

PV COMPONENTS
- DEDICATED PV SYSTEM UTILITY DISCONNECT
- DEDICATED PV SYSTEM KWH METER

PV COMPONENTS
- (2) SOLAREDGE TECHNOLOGIES SE11400A-US (240V) INVERTERS
- DEDICATED PV SYSTEM AC COMBINER PANEL



N

S

VENTS: □ ○

ROOF INFO:
TYPE: 2X4 MANUFACTURED TRUSS
TRUSS SPACING: 24" O.C.
MATERIAL: TPO

SOLAR ARRAYS:
AZIMUTH: 160 DEG
TILT: 5 DEG

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

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

(Per 2014 NEC 690.56(C))

22,800 WATT (22.8kW) (DC) PV ARRAY
(80) LG SOLAR LG285 S1C-G4 (285W) MODULES
(80) SOLAREDGE P300 OPTIMIZERS
(2) SOLAREDGE TECHNOLOGIES SE11400A-US (240V) INVERTERS
EACH WITH 2 STRINGS OF 13 MODULES & 13 OPTIMIZERS
AND 1 STRING OF 14 MODULES & 14 OPTIMIZERS

Registered Professional Engineer (Electrical) 48683 JOSEPH H. DIMATTEO 7-5-2017 Date Signed ARIZONA U.S.A.
Exp. 12-31-2018

SITE PLAN NOTES:
- ALL ROOF STANCHIONS WILL BE INSTALLED AND SEALED BY APPROVED METHODS & WITH APPROVED MATERIALS
- UTILITY HAS 24-HOUR 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 APS & NEC REQUIREMENTS. FOR APS REQUIREMENTS, REFER TO SECTION 300 OF THE ESRM & SECTION 8.2 OF THE APS INTERCONNECTION REQUIREMENTS
- REFER TO 301.15 OF THE APS ESRM FOR ELECTRIC METER SEPARATION BETWEEN WATER AND GAS

ANEVA SOLAR
9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
WWW.ANEVASOLAR.COM

APPROVALS		DATE
DESIGN:	SMT	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

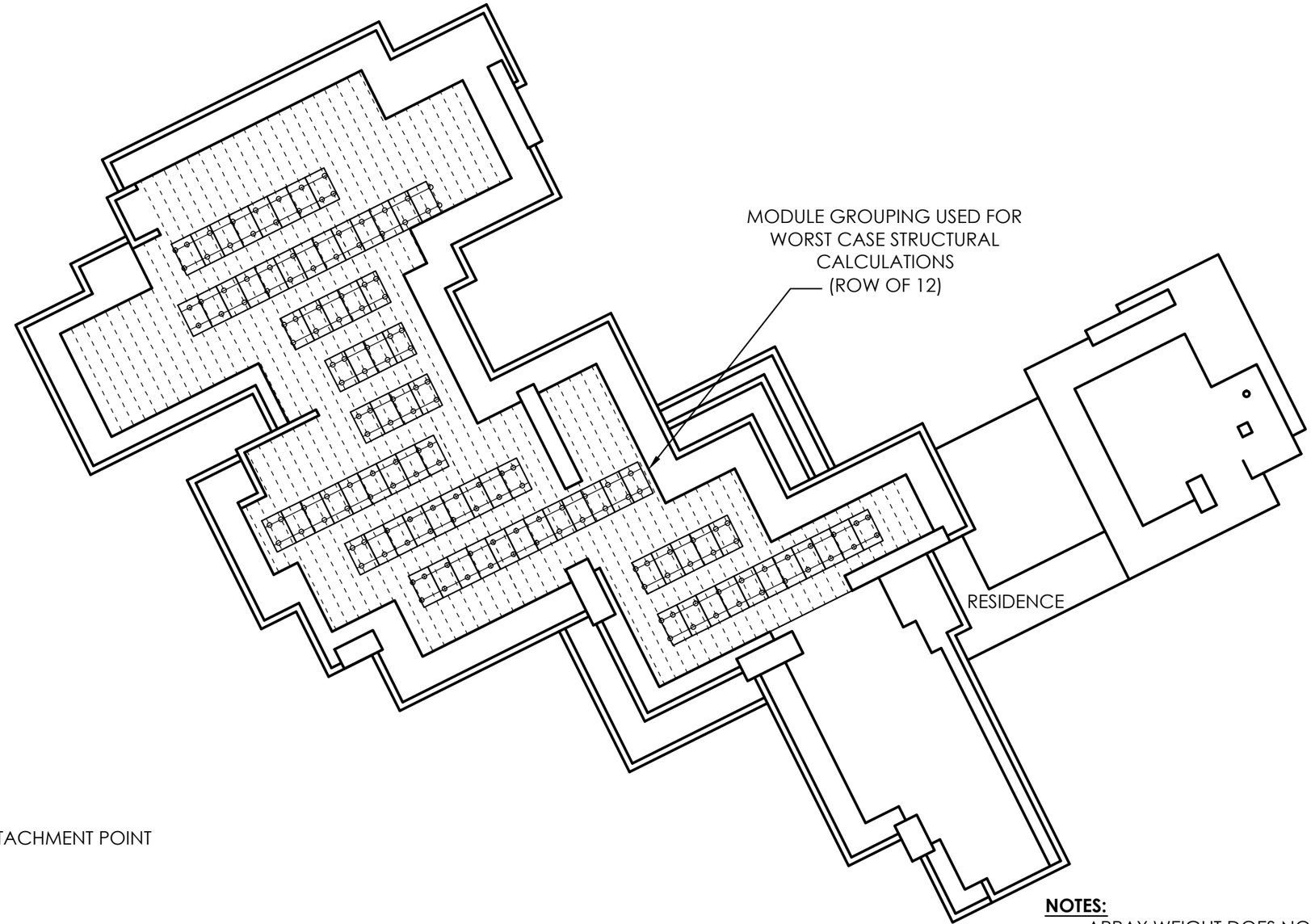
ENLARGED LAYOUT PLAN
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-ELP	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 3 OF 13

PENINSULA ELECTRICAL SERVICES, LLC
* PHOTOVOLTAIC DESIGN * ELECTRICAL PLAN REVIEW * ELECTRICAL INSPECTIONS *
GILBERT, ARIZONA 85296
623-570-5727
WWW.PENINSULAELECTRICALSERVICES.COM



N

S

- ROOF ATTACHMENT POINT

- 24" O.C. 2X4 MANUFACTURED TRUSS

- LG SOLAR LG285 S1C-G4 285W MODULE

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 4' INTERVALS.

ANEVA SOLAR

9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
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APPROVALS		DATE
DESIGN:	SMT	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

ROOF LAYOUT PLAN

22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

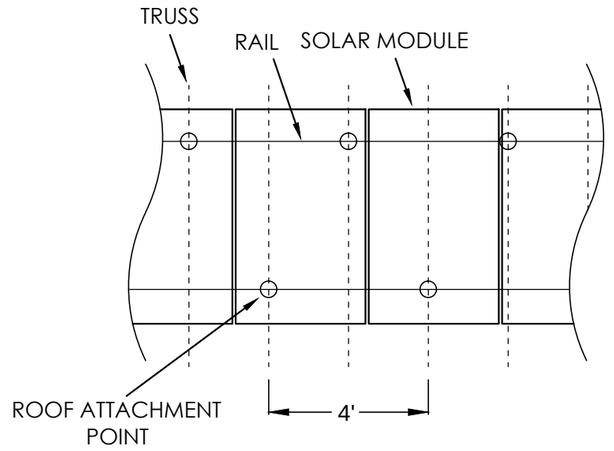
SIZE:	DWG NO:	REV:
B	AS17-0037-RL	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 4 OF 13

PENINSULA ELECTRICAL SERVICES, LLC
* PHOTOVOLTAIC DESIGN * ELECTRICAL PLAN REVIEW * ELECTRICAL INSPECTIONS *
GILBERT, ARIZONA 85296
623-570-5727
WWW.PENINSULAELECTRICALSERVICES.COM

Module Grouping	
Solar Module:	LG Solar LG285 S1C-G4
Layout Orientation:	Tilt - Portrait
Truss/Rafter:	2x4 Manufacured Truss
Spacing:	24" o.c.
Roof Type:	Flat
Roof Material:	TPO
Load Distribution	
Total Modules In Array:	12
Module weight (lbs) - With Optimizer:	39.18
Racking Weight per module (lbs):	14.0
Total weight per module (lbs):	53.2
Total Array Weight (lbs):	638.2
Module Area (sf):	17.65
Total Array Area (sf):	211.8
Distributed Load (psf):	**3.0**
Total Number of vertical supports:	22
Point Load (psf):	**29.01**
Uplift Connections:	
Panel grouping area (sf):	211.8
Total Load @ 21 psf max. wind load:	4,448
Required pullout strength per vert. support:	202.2
Connector Type:	5/16" x 4" lag bolts



RACKING INFORMATION - FLUSH PORTRAIT

- SNAP N RACK 100 SERIES - WITH STANDOFF KITS
- MAX. RAIL CANTILEVER = 24" PER MANUF.
- TRUSS SPACING = 24" O.C.
- ROOF ATTACHMENT POINTS = 4' SPACING - STAGGERED

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WWW.PENINSULAELECTRICALSERVICES.COM

ANEVA SOLAR
9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
WWW.ANEVASOLAR.COM

APPROVALS		DATE
DESIGN:	SMT	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

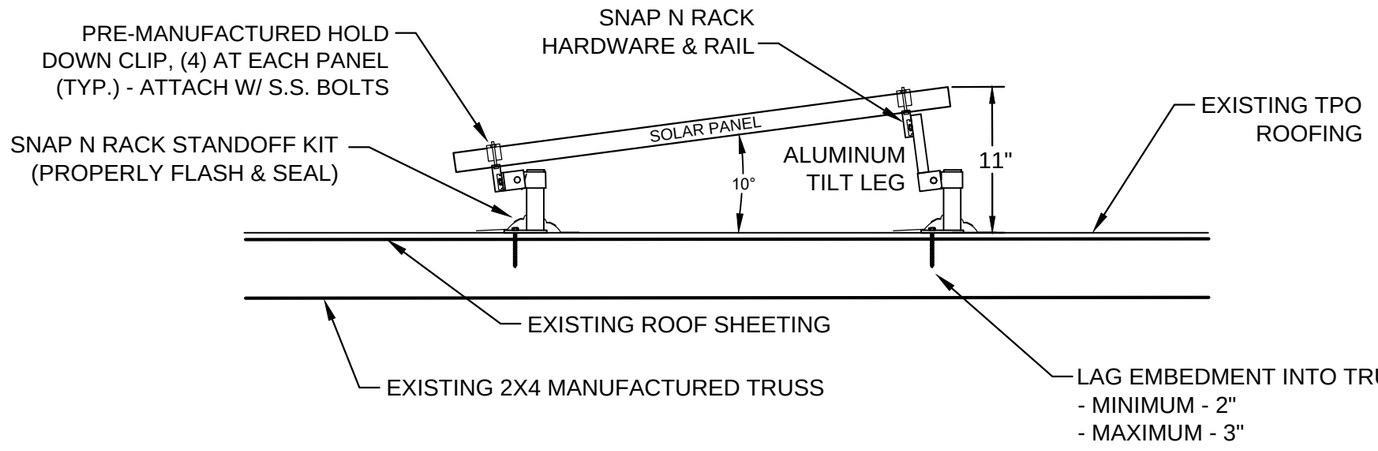
STRUCTURAL CALCS & DETAILS
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-SC	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 5 OF 13

MOUNTING DETAIL - PORTRAIT (TILT-UP MOUNT)



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APPROVALS		DATE
DESIGN:	SMT	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

MOUNTING DETAILS
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-MD	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 6 OF 13

TOTAL SYSTEM AC WATTAGE: 22,800 WATTS (22.8 KW)

NOTE: POWER OPTIMIZERS CONTROL THE CENTRAL INVERTER DC VOLTAGE. APPROXIMATELY 350VDC IS INPUT TO THE INVERTER. SEE AS17-0037-AD.

MODULES - ELECTRICAL CHARACTERISTICS
VOC = 39.00V VMP = 32.30V
ISC = 9.43A IMP = 8.88A

PV STRINGS #1, #2, #4 & #5
LG SOLAR LG285S1C-G4 (285W) MODULES
WITH ADD-ON SOLAREDGE P300 OPTIMIZERS
(1) MODULE PER OPTIMIZER MAX.
(13) MODULE STRING LENGTH
VOC = 500VDC VMP = 350VDC
ISC = 15.0A IMP = 10.59A

PV STRING #3 & #6
LG SOLAR LG285S1C-G4 (285W) MODULES
WITH ADD-ON SOLAREDGE P300 OPTIMIZERS
(1) MODULE PER OPTIMIZER MAX.
(14) MODULE STRING LENGTH
VOC = 500VDC VMP = 350VDC
ISC = 15.0A IMP = 11.40A

PV STRING #1
SEE DWG AS17-0037-AD

PV STRING #2
SEE DWG AS17-0037-AD

PV STRING #3
SEE DWG AS17-0037-AD

6 - 10 AWG CU XHHW-2
1 - 10 AWG CU. GND.
3/4" EMT

DC / AC
GROUND FAULT GFDI
ARC FAULT AFCI

<7>
11400 WATT INTERTIE INVERTER (UNGROUNDED)
SOLAREDGE MOD: SE 11400A-US (240V)
MAX DC INPUT 500V, 34.5A
MAX AC OUTPUT 240V, 47.5A
INPUT - 350 VDC NOMINAL
OUTPUT - 120/240 VAC, 1ϕ
(WITH INTEGRAL ARC-FAULT PROTECTION)

WITH AC/DC DISCONNECT
NEMA 3R

3 - 6 AWG CU THWN-2
1 - 6 AWG CU THNW-2 EGC/GEC
3/4" EMT

PV STRING #4
SEE DWG AS17-0037-AD

PV STRING #5
SEE DWG AS17-0037-AD

PV STRING #6
SEE DWG AS17-0037-AD

6 - 10 AWG CU XHHW-2
1 - 10 AWG CU. GND.
3/4" EMT

DC / AC
GROUND FAULT GFDI
ARC FAULT AFCI

<7>
11400 WATT INTERTIE INVERTER (UNGROUNDED)
SOLAREDGE MOD: SE 11400A-US (240V)
MAX DC INPUT 500V, 34.5A
MAX AC OUTPUT 240V, 47.5A
INPUT - 350 VDC NOMINAL
OUTPUT - 120/240 VAC, 1ϕ
(WITH INTEGRAL ARC-FAULT PROTECTION)

WITH AC/DC DISCONNECT
NEMA 3R

3 - 6 AWG CU THWN-2
1 - 6 AWG CU THWN-2 EGC/EGC
3/4" EMT

EXISTING ELECTRICAL SERVICE PANEL
AND UTILITY REVENUE METER
SUN VALLEY - MODEL #SVWCTML600-1D
600A - 120/240V - 3W - 1PH - NEMA 3R - 100kAIC

PULL SECTION
METERING SECTION
BI-DIRECTIONAL METER
CT SECTION
NEW FUSIBLE PULL-OUT
BOLTSWITCH #PT224
WITH CLASS "T" 110A FUSES
5 EXISTING PULL-OUTS & FEEDERS
(NO CHANGES)

AVAILABLE FAULT CURRENT = 32,755A (PER APS TABLE 800.2-1)

UTILITY GRID
120/240V
SINGLE PHASE

A PLACARD OR DIRECTORY IS TO BE INSTALLED AT THE SERVICE ENTRANCE WITH EXPLICIT DIRECTIONS TO THE LOCATION OF THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH, AS REQUIRED BY THE LOCAL UTILITY.

A PERMANENT PLACARD OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES IS TO BE INSTALLED AT THE SES PER NEC 705.10.

NEMA 3R J-BOX
12" x 12" x 6" MIN. SIZE
WITH SCREW-ON COVER
USE ILSCO INSULATED
CONNECTORS #PBT-1/0
(OR EQUIV.)

F1

3 - 1/0 AWG CU THWN-2
1 - 1/0 AWG CU THWN-2 EGC/GEC
1 1/2" EMT-PVC-EMT

ALL EQUIPMENT TERMINATIONS SHALL BE LISTED & LABELED AS 75 DEGREE C. MINIMUM

SEE FAULT CURRENT CALCULATIONS ON SHEET AS17-0037-FC

<4>,<5>
PHOTOVOLTAIC SYSTEM
UTILITY DISCONNECT SWITCH
SQUARE-D #DU324RB
3-POLE, 200A, 240VAC (NON-FUSED)

F2

3 - 1 AWG CU THWN-2
1 - 1 AWG CU THWN-2 EGC/GEC
1 1/4" EMT

<8>
DEDICATED PHOTOVOLTAIC
SYSTEM KWH METER
FORM 2S, 200A, 240V
(MILBANK - #R4518-O-W)

3 - 1 AWG CU THWN-2
1 - 1 AWG CU THWN-2 EGC/GEC
1 1/4" EMT

60A / 2P
60A / 2P

F3

<4>,<10>
DEDICATED PV SYSTEM
AC COMBINER PANEL
SQUARE-D - HOM12L200RB
(OR EQUIVALENT)
200A, 240V, NEMA 3R
10kAIC PANEL & BREAKERS

3 - 1 AWG CU THWN-2
1 - 1 AWG CU THWN-2 EGC/GEC
1 1/4" EMT

SEE NOTES DWG AS17-0037-NT

Registered Professional Engineer Certificate No. 49683 JOSEPH H. DIMATTEO Date Signed 7-5-2017 ARIZONA U.S.A.
Exp. 12-31-2018

ANEVA SOLAR
9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
WWW.ANEVASOLAR.COM

APPROVALS		DATE
DESIGN:	PET	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

ONE-LINE ELECTRICAL DIAGRAM

22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE: B | DWG NO: AS17-0037-1L | REV:

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 7 OF 13

PENINSULA ELECTRICAL SERVICES, LLC
* PHOTOVOLTAIC DESIGN * ELECTRICAL PLAN REVIEW * ELECTRICAL INSPECTIONS *
GILBERT, ARIZONA 85296
623-570-5727
WWW.PENINSULAELECTRICALSERVICES.COM

TOTAL SYSTEM AC WATTAGE: 22,800 WATTS (22.8 KW)

NOTE: POWER OPTIMIZERS CONTROL THE CENTRAL INVERTER DC VOLTAGE. APPROXIMATELY 350VDC IS INPUT TO THE INVERTER. SEE AS17-0037-AD.

MODULES - ELECTRICAL CHARACTERISTICS
VOC = 39.00V VMP = 32.30V
ISC = 9.43A IMP = 8.88A

PV STRINGS #1, #2, #4 & #5
LG SOLAR LG285S1C-G4 (285W) MODULES
WITH ADD-ON SOLAREDGE P300 OPTIMIZERS
(1) MODULE PER OPTIMIZER MAX.
(13) MODULE STRING LENGTH
VOC = 500VDC VMP = 350VDC
ISC = 15.0A IMP = 10.59A

PV STRING #3 & #6
LG SOLAR LG285S1C-G4 (285W) MODULES
WITH ADD-ON SOLAREDGE P300 OPTIMIZERS
(1) MODULE PER OPTIMIZER MAX.
(14) MODULE STRING LENGTH
VOC = 500VDC VMP = 350VDC
ISC = 15.0A IMP = 11.40A

PV STRING #1 SEE DWG AS17-0037-AD
PV STRING #2 SEE DWG AS17-0037-AD
PV STRING #3 SEE DWG AS17-0037-AD
G + −

6 - 10 AWG CU XHHW-2
1 - 10 AWG CU. GND.
3/4" EMT

DC / AC
GROUND FAULT GFDI
ARC FAULT AFCI
PE L L N

<7>
11400 WATT INTERTIE INVERTER (UNGROUNDED)
SOLAREDGE MOD: SE 11400A-US (240V)
MAX DC INPUT 500V, 34.5A
MAX AC OUTPUT 240V, 47.5A
INPUT - 350 VDC NOMINAL
OUTPUT - 120/240 VAC, 1Ø
(WITH INTEGRAL ARC-FAULT PROTECTION)

WITH AC/DC DISCONNECT
NEMA 3R

3 - 6 AWG CU THWN-2
1 - 6 AWG CU THNW-2 GEC/EGC
3/4" EMT

PV STRING #4 SEE DWG AS17-0037-AD
PV STRING #5 SEE DWG AS17-0037-AD
PV STRING #6 SEE DWG AS17-0037-AD
G + −

6 - 10 AWG CU XHHW-2
1 - 10 AWG CU. GND.
3/4" EMT

DC / AC
GROUND FAULT GFDI
ARC FAULT AFCI
PE L L N

<7>
11400 WATT INTERTIE INVERTER (UNGROUNDED)
SOLAREDGE MOD: SE 11400A-US (240V)
MAX DC INPUT 500V, 34.5A
MAX AC OUTPUT 240V, 47.5A
INPUT - 350 VDC NOMINAL
OUTPUT - 120/240 VAC, 1Ø
(WITH INTEGRAL ARC-FAULT PROTECTION)

WITH AC/DC DISCONNECT
NEMA 3R

3 - 6 AWG CU THWN-2
1 - 6 AWG CU THWN-2 EGC/GEC
3/4" EMT

EXISTING ELECTRICAL SERVICE PANEL
AND UTILITY REVENUE METER
SUN VALLEY - MODEL #SVWCTML600-1D
600A - 120/240V - 3W - 1PH - NEMA 3R - 100kAIC

PULL SECTION
METERING SECTION
BI-DIRECTIONAL METER
CT SECTION

ALL EQUIPMENT TERMINATIONS SHALL BE LISTED & LABELED AS 75 DEGREE C. MINIMUM

A PLACARD OR DIRECTORY IS TO BE INSTALLED AT THE SERVICE ENTRANCE WITH EXPLICIT DIRECTIONS TO THE LOCATION OF THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH, AS REQUIRED BY THE LOCAL UTILITY.

A PERMANENT PLACARD OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES IS TO BE INSTALLED AT THE SES PER NEC 705.10.

3 - 1 AWG CU THWN-2
1 - 1 AWG CU THWN-2 EGC/GEC
1 1/4" EMT

<4>,<5>
PHOTOVOLTAIC SYSTEM
UTILITY DISCONNECT SWITCH
SQUARE-D #DU324RB
3-POLE, 200A
240VAC (NON-FUSED)

3 - 1 AWG CU THWN-2
1 - 1 AWG CU THWN-2 EGC/GEC
1 1/4" EMT

DEDICATED PHOTOVOLTAIC
SYSTEM KWH METER
FORM 2S, 200A, 240V
(MILBANK - #R4518-O-W)
<8>

G
60A / 2P
60A / 2P
N

<4>,<10>
DEDICATED PV SYSTEM
AC COMBINER PANEL
SQUARE-D - HOM12L200RB
(OR EQUIVALENT)
200A, 240V, NEMA 3R
10kAIC PANEL & BREAKERS

NEW FUSIBLE PULL-OUT
BOLTSWITCH #PT224
WITH CLASS "T" 110A FUSES

N G
5 EXISTING PULL-OUTS & FEEDERS
(NO CHANGES)

NEMA 3R J-BOX
12" x 12" x 6" MIN. SIZE
WITH SCREW-ON COVER
USE ILSCO INSULATED
CONNECTORS #PBT-1/0
(OR EQUIV.)

SEE FAULT CURRENT CALCULATIONS ON SHEET AS17-0037-FC

AVAILABLE FAULT CURRENT = 32,755A (PER APS TABLE 800.2-1)

UTILITY GRID
120/240V
SINGLE PHASE

3 - 1/0 AWG CU THWN-2
1 - 1/0 AWG CU THWN-2 EGC/GEC
1 1/2" EMT-PVC-EMT

Registered Professional Engineer
49683
JOSEPH H. DIMATTEO
7-5-2017
Date Signed
ARIZONA U.S.A.
Exp. 12-31-2018

SEE NOTES DWG AS17-0037-NT

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PENINSULA ELECTRICAL SERVICES, LLC
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ANEVA SOLAR

9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
WWW.ANEVASOLAR.COM

APPROVALS		DATE
DESIGN:	PET	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

THREE-LINE ELECTRICAL DIAGRAM
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE: B | DWG NO: AS17-0037-3L | REV:

CLIENT NAME: I. KESSLER

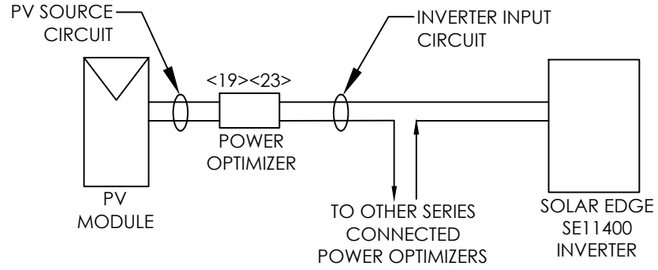
SCALE: DRAWING NOT TO SCALE | SHEET 8 OF 13

TOTAL SYSTEM AC WATTAGE: 22,800 WATTS (22.8 KW)

PV STRINGS #1, #2, #4 & #5
3705 WATT (DC) PHOTOVOLTAIC STRING
(13) LG SOLAR LG285S1C-G4 (285W) MODULES
WITH (13) ADD-ON SOLAREDGE P300 OPTIMIZERS
1 MODULE PER OPTIMIZER
VOC=500 VDC MAX. (LIMITED BY INVERTER)
ISC=15A MAX. (LIMITED BY POWER OPTIMZER)

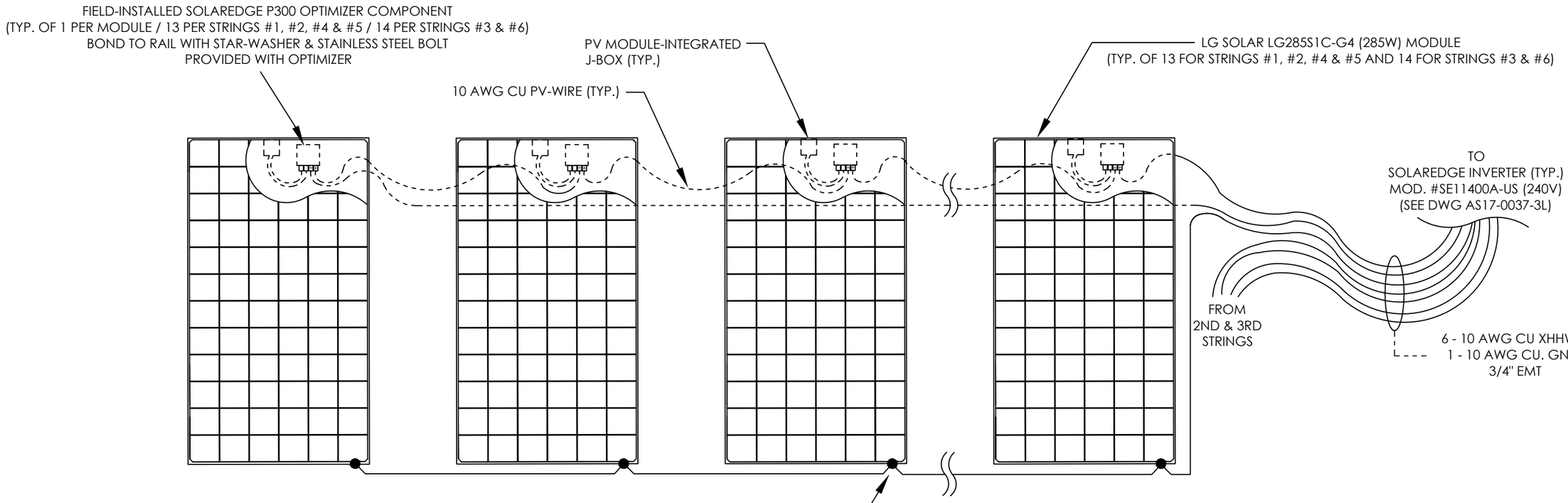
PV STRINGS #3 & #6
3990 WATT (DC) PHOTOVOLTAIC STRING
(14) LG SOLAR LG285S1C-G4 (285W) MODULES
WITH (14) ADD-ON SOLAREDGE P300 OPTIMIZERS
1 MODULE PER OPTIMIZER
VOC=500 VDC MAX. (LIMITED BY INVERTER)
ISC=15A MAX. (LIMITED BY POWER OPTIMZER)

THE INDEPENDENT INVERTER VOLTAGE CONTROL LOOP REGULATES DC VOLTAGE AT INVERTER INPUT



MODULES - ELECTRICAL CHARACTERISTICS
VOC = 39.00V VMP = 32.30V
ISC = 9.43A IMP = 8.88A

PV STRING
VOC=500 VDC MAX. (LIMITED BY INVERTER)
ISC=15A MAX. (LIMITED BY POWER OPTIMZER)



ARRAY NOTES:

1. EQUIPMENT INSTALLED IN ACCORDANCE WITH THE NEC SECTION 690 AND ALL APPLICABLE REQUIREMENTS OF SERVICE UTILITY AND AUTHORITY HAVING JURISDICTION (AHJ).
2. GROUND WIRE 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 MANUFACTURERS 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.

ALSO SEE KEYED NOTES <19> & <23> ON DWG AS17-0037-NT

Registered Professional Engineer (Electrical) CERTIFICATE 49883 JOSEPH H. DIMATTEO 7-5-2017 Date Signed ARIZONA U.S.A.
Exp. 12-31-2018

ANEVA SOLAR
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SUITE 102-353
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APPROVALS		DATE
DESIGN:	PET	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

ARRAY DIAGRAM
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-AD	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 9 OF 13

NOTES:

1. PHOTOVOLTAIC SYSTEM EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH NEC 2014 ARTICLES 690 AND 705, AND THE 2012 IRC & 2012 IFC, 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 ARTICLES 690 & 705.
2. PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUITS SHALL COMPLY WITH THE WIRING METHODS AND INSTALLATION AND MARKING REQUIREMENTS OF NEC 690.31.
3. BREAKER LABELED "PHOTOVOLTAIC ELECTRIC POWER SOURCE" AND "BREAKERS ARE BACK FED" PER NEC 705.12. BREAKER ALSO LABELED "MAXIMUM AC OUTPUT CURRENT AND OPERATING AC VOLTAGE" PER NEC 690.54. BREAKER SHALL BE POSITIONED AT THE OPPOSITE (LOAD) END FROM THE INPUT FEEDER OR MAIN CIRCUIT BREAKER LOCATION, AND LABELED "WARNING INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE", PER NEC 705.12(D)(2)(3)(b).
4. WARNING SIGN PER NEC 690.17(E) READING "WARNING - ELECTRIC SHOCK HAZARD - DO NOT TOUCH TERMINALS - TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION."
5. LABEL "PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH." SWITCH TO BE LOCKED PER 2014 NEC 690.7(D). SWITCH TO BE VISIBILE BLADE DISCONNECT PER UTILITY REQUIREMENTS AND CONFORM TO NEC 705.22.
6. LABEL "PHOTOVOLTAIC ARRAY DC DISCONNECT SWITCH" PER NEC690.13(B). LABEL WITH OPERATING CURRENT, OPERATING VOLTAGE, MAXIMUM SYSTEM VOLTAGE, AND SHORT CIRCUIT CURRENT PER NEC 690.53. SWITCH LOCKED PER NEC 690.7(D).
7. LISTING AGENCY NAMES AND NUMBERS TO BE INDICATED ON POWER INVERTER(S) AND SOLAR MODULES PER NEC 110.3 (B).
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 AND NEC 690.47.
13. LABEL "BREAKER HAS BEEN DE-RATED PER NEC 705.12(D)(2)." NO NEW LOADS.
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. THE GROUNDING ELECTRODE CONDUCTOR SHALL BE CONTINUOUS AND TERMINATE WITH AN IRREVERSIBLE CONNECTION TO THE AC GROUNDING ELECTRODE SYSTEM PER NEC 250.64.
17. AMBIENT TEMPERATURE ADJUSTED FOR CONDUITS EXPOSED TO SUNLIGHT ON OR ABOVE ROOFTOPS PER TABLE 310.15 (B)(3)(c). 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, PER NEC 690.35(F):

    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 IN STALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION THAT CONTROLS SPECIFIC CONDUCTORS IN ACCORDANCE WITH NEC 690.12. THE RAPID SHUTDOWN METHOD SHALL BE LABELED IN ACCORDANCE WITH NEC 690.56(C). SEE AS17-0006-LB FOR EXAMPLE
22. GROUNDED PV ARRAYS SHALL BE PROVIDED WITH DC GROUND-FAULT PROTECTION MEETING THE REQUIREMENTS OF NEC 690.5. UNGROUNDED PV POWER SYSTEMS SHALL INCLUDE GROUND FAULT PROTECTION FOR ALL PV SOURCE & OUTPUT CIRCUITS PER NEC 690.35.

23 SEE SHEET AS17-0037-DC

KEYS:

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

Registered Professional Engineer (Electrical) 49883 JOSEPH H. DIMATTEO 7-5-2017 Date Signed ARIZONA U.S.A.

Exp. 12-31-2018

PENINSULA ELECTRICAL SERVICES, LLC
* PHOTOVOLTAIC DESIGN * ELECTRICAL PLAN REVIEW * ELECTRICAL INSPECTIONS *
GILBERT, ARIZONA 85296
623-570-5727
WWW.PENINSULAELECTRICALSERVICES.COM

ANEVA SOLAR
9393 N. 90TH STREET
SUITE 102-353
SCOTTSDALE, ARIZONA 85258
480-390-4822
WWW.ANEVASOLAR.COM

APPROVALS		DATE
DESIGN:	PET	06-20-2017
REVISION #1:		
AHJ:	PARADISE VALLEY	
UTILITY:	APS	
AZ ROC LICENSES: 287715 (K-11)		

NOTES & KEYS
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-NT	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 10 OF 13

Dedicated kWh meter *(Black with White Lettering)*	PHOTOVOLTAIC SYSTEM METER	**LABEL SIZE: 1 X 3-1/2 INCHES** **TEXT HEIGHT: 1/4 INCHES**
Utility Disconnect switch *(Black with White Lettering)*	PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH	**LABEL SIZE: 1 X 3-1/2 INCHES** **TEXT HEIGHT: 1/4 INCHES**
Utility Disconnect switch *(Orange with Black Lettering)*	**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 *(Black with White Lettering)*	PHOTOVOLTAIC POWER SOURCE BREAKERS ARE BACKFEEDING	**LABEL SIZE: 1/2 X 1-3/4 INCHES** **TEXT HEIGHT: 1/8 (OR 1/16) INCHES**
Backfed Breaker *(Orange with Black Lettering)*	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**
AC Panel *(Black with White Lettering)*	PHOTOVOLTAIC ELECTRIC POWER SOURCE MAXIMUN AC CURRENT 95.0 A SYSTEM AC VOLTAGE 240 V	**LABEL SIZE: 1-1/2 X 3-1/2 INCHES** **TEXT HEIGHT: 3/16 INCHES**
Main Bkr De-rate *(Black with White Lettering)*	BREAKER HAS BEEN DE-RATED PER NEC 705.12	**LABEL SIZE: 1/2 X 1-3/4 INCHES** **TEXT HEIGHT: 1/8 (OR 1/16) INCHES**
DC Disconnects, Combiners, Junction Boxes (Orange with Black Lettering)	**WARNING:** ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.	**LABEL SIZE: 1 X 2 INCHES** **TEXT HEIGHT: 1/8 INCHES**

Label To Be Placed At The
Inverter / DC Disconnect
(TYP. OF BOTH INVERTERS)

Operating Current: 45.0A MAX.
Operating Voltage: 350VDC
Maximum System Voltage: 500VDC
Short Circuit Current: 45.0A MAX.

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

PHOTOVOLTAIC SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

(Per 2014 NEC 690.12)

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ELECTRICAL EQUIPMENT LABELS
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-LB	

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SCALE: DRAWING NOT TO SCALE | SHEET 11 OF 13

23. PROVIDE IDENTIFICATION PLACARDS WHICH COMPLY WITH THE FOLLOWING, AS REQUIRED BY THE 2012 EDITION OF THE INTERNATIONAL FIRE CODE.

605.11.1 MARKING

MARKING IS REQUIRED ON INTERIOR AND EXTERIOR DIRECT-CURRENT (DC) CONDUIT, ENCLOSURES, RACEWAYS, CABLE ASSEMBLIES, JUNCTION BOXES, COMBINER BOXES AND DISCONNECTS.

605.11.1.2 MARKING CONTENT

THE MARKING SHALL CONTAIN THE WORDS "WARNING: PHOTOVOLTAIC POWER SOURCE."

605.11.1.3 MAIN SERVICE DISCONNECT

THE MARKING SHALL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT IN A LOCATION CLEARLY VISIBLE FROM THE LOCATION WHERE THE DISCONNECT IS OPERATED.

605.11.1.4 LOCATION OF MARKING

MARKING SHALL BE PLACED ON INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES EVERY 10 FEET, WITHIN 1 FOOT OF TURNS OR BENDS AND WITHIN 1 FOOT ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS OR BARRIERS.

SAMPLE LABEL

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DC WARNING MARKINGS
22.8KW (AC) / 22.8KW (DC)
PHOTOVOLTAIC SYSTEM
6210 E. INDIAN BEND ROAD
PARADISE VALLEY, ARIZONA 86253

SIZE:	DWG NO:	REV:
B	AS17-0037-DC	

CLIENT NAME: I. KESSLER

SCALE: DRAWING NOT TO SCALE | SHEET 12 OF 13

I. Kessler

6210 E. Indian Bend Road - Paradise Valley, AZ 86253

Fault Current Calculation - F1

Available Fault Current - F1: 32,755 amperes (Available Fault Current at SES - Per APS Table 800.2-1)

I = kVA x 1000 / E = trans. FLA

Isca = trans. FLA x 100 x PF / transformer Z =

Isca = ampere short-circuit current RMS symmetrical.

kVA	=		
E	=	240	
trans. FLA	=	0	
PF	=		
Z	=		
Isca	=	0	amperes

Point to Point Method: Single Phase 240/120

'f ' factor = 2 x L x I / N x C x E L-N

Length (distance) (ASC)	FEET	L =	110	Copper in Nonmetallic Raceway
		Isca =	32,755	
# conductors per phase		N =	1	
Phase conductor constant		C =	9,317	Phase Conductor 1/0
Volt Line to Line		E L-L =	240	Volt
		f =	3.223	
Neutral conductor constant		C =	9,317	Neutral Conductor 1/0
Volt Line to Neutral		E L-N =	120	Volt
		f =	9.668	

Multiplier: M = 1 / 1 + f

Line to Line	M =	0.237
Line to Neutral	M =	0.094

Fault Current at J-box (1/0 to 1AWG Transition)

Isca x M = → 7,757 amperes

Isca x M = → 3,070 amperes

I. Kessler

6210 E. Indian Bend Road - Paradise Valley, AZ 86253

Fault Current Calculation - F2

Available Fault Current - F1: 7,757 amperes (Available Fault Current at J-Box - See Fault Calc F1)

I = kVA x 1000 / E = trans. FLA

Isca = trans. FLA x 100 x PF / transformer Z =

Isca = ampere short-circuit current RMS symmetrical.

kVA	=		
E	=	240	
trans. FLA	=	0	
PF	=		
Z	=		
Isca	=	0	amperes

Point to Point Method: Single Phase 240/120

'f ' factor = 2 x L x I / N x C x E L-N

Length (distance) (ASC)	FEET	L =	75	Copper in Nonmetallic Raceway
		Isca =	7,757	
# conductors per phase		N =	1	
Phase conductor constant		C =	7,493	Phase Conductor 1
Volt Line to Line		E L-L =	240	Volt
		f =	0.647	
Neutral conductor constant		C =	7,493	Neutral Conductor 1
Volt Line to Neutral		E L-N =	120	Volt
		f =	1.941	

Multiplier: M = 1 / 1 + f

Line to Line	M =	0.607
Line to Neutral	M =	0.340

Fault Current at Line-Side of PV System Utility Disc. Switch

Isca x M = → 4,710 amperes

Isca x M = → 2,638 amperes

I. Kessler

6210 E. Indian Bend Road - Paradise Valley, AZ 86253

Fault Current Calculation - F3

Available Fault Current - F1: 4,710 amperes (Avail. Fault Current at Line Side of Utility Disco - See F2)

I = kVA x 1000 / E = trans. FLA

Isca = trans. FLA x 100 x PF / transformer Z =

Isca = ampere short-circuit current RMS symmetrical.

kVA	=		
E	=	240	
trans. FLA	=	0	
PF	=		
Z	=		
Isca	=	0	amperes

Point to Point Method: Single Phase 240/120

'f ' factor = 2 x L x I / N x C x E L-N

Length (distance) (ASC)	FEET	L =	15	Copper in Nonmetallic Raceway
		Isca =	4,710	
# conductors per phase		N =	1	
Phase conductor constant		C =	7,493	Phase Conductor 1
Volt Line to Line		E L-L =	240	Volt
		f =	0.079	
Neutral conductor constant		C =	7,493	Neutral Conductor 1
Volt Line to Neutral		E L-N =	120	Volt
		f =	0.236	

Multiplier: M = 1 / 1 + f

Line to Line	M =	0.927
Line to Neutral	M =	0.809

Fault Current at PV System AC Combiner Panel

Isca x M = → 4,367 amperes

Isca x M = → 3,812 amperes

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Registered Professional Engineer (Electrical) CERTIFICATE 45883 JOSEPH H. DIMATTEO 7-5-2017 Date Signed ARIZONA U.S.A.

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FAULT CURRENT CALCULATIONS

22.8KW (AC) / 22.8KW (DC)
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