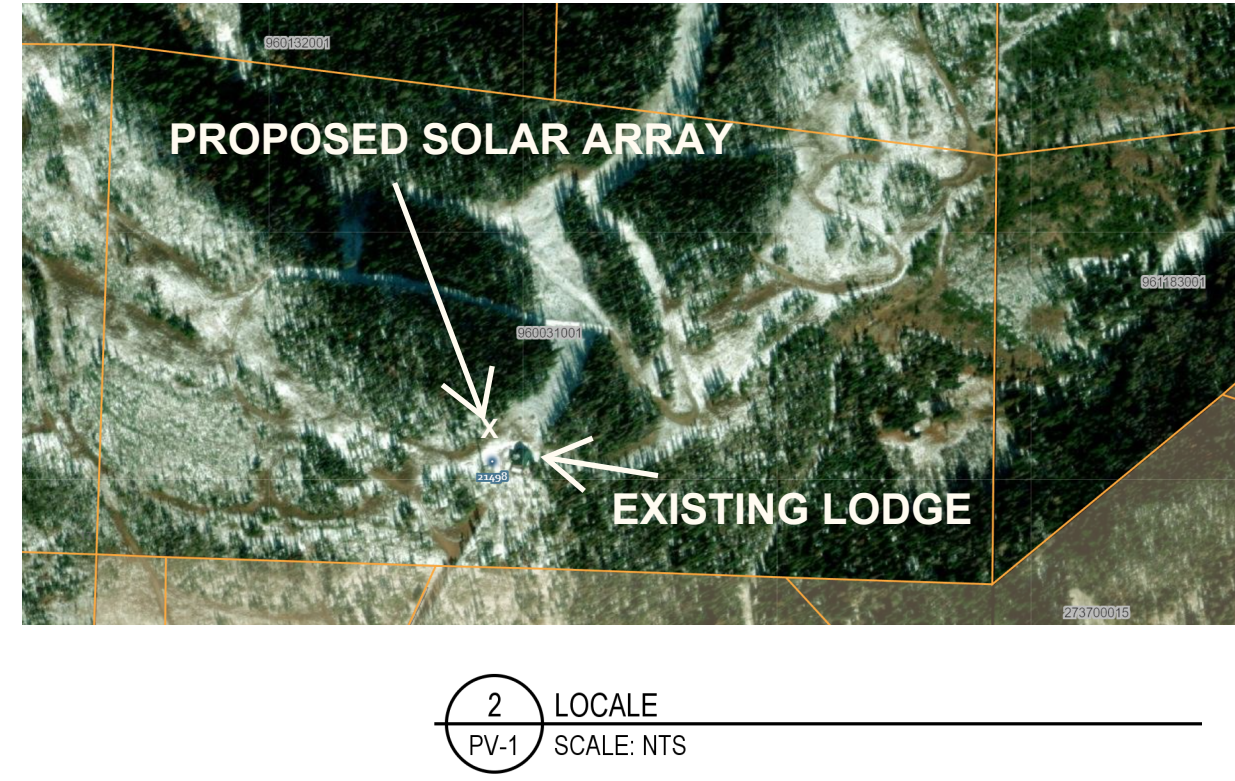
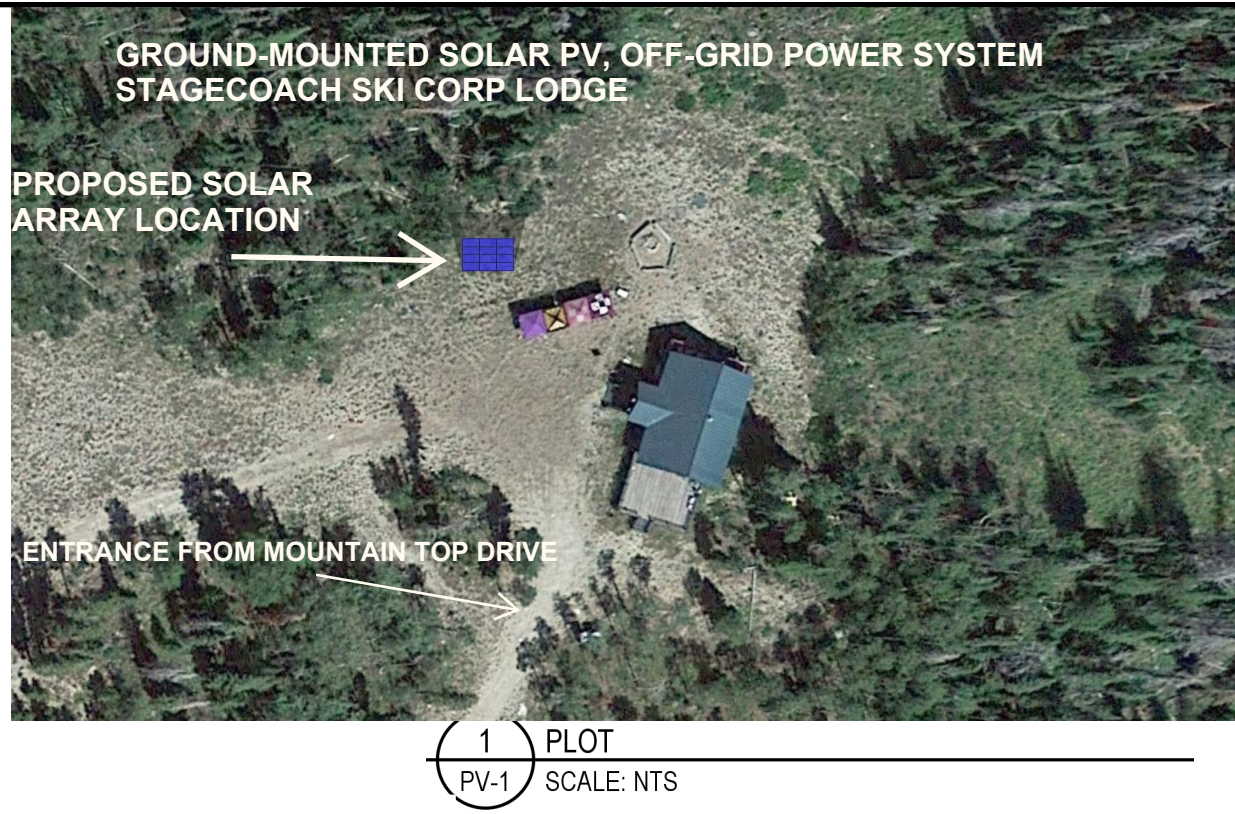


DIRECTORY OF PAGES	
PV-1	PROJECT SUMMARY
	SITE PLAN
APPENDIX	ENGINEERING REPORT
	SINGLE-LINE DIAGRAM
	EQUIPMENT DATASHEETS

PROJECT DETAILS	
PROPERTY OWNER	STAGECOACH SKI CORP
PROPERTY ADDRESS	21498 MOUNTAIN TOP DRIVE, OAK CREEK
APN	960031001
ZONING	AF
USE AND OCCUPANCY	
AHJ	COUNTY OF ROUTT
UTILITY COMPANY	
ELECTRICAL CODE	2020 NEC (NFPA 70)

CONTRACTOR INFORMATION	
COMPANY	SUNWISE SOLAR, LLC
LICENSE NUMBER	010556 (NABCEP PV INSTALLATION PROF.)
ADDRESS	1143 OAK ST, STEAMBOAT SPRINGS, CO 80487
PHONE NUMBER	(970) 819-0840



SCOPE OF WORK

THIS PROJECT INVOLVES THE INSTALLATION OF AN OFF-GRID, SOLAR WITH STORAGE POWER SYSTEM. THE SOLAR PANELS WILL BE RACKED USING A PRE-ENGINEERED GROUND-MOUNTED RACKING SYSTEM. THE RACKED MODULES WILL BE ELECTRICALLY CONNECTED TO A DC-DC BATTERY CHARGER WHICH CHARGES BATTERIES, FEEDING AN INVERTER WHICH INVERTS DC TO AC POWER, POWERING LOADS.

THIS DOCUMENT HAS BEEN PREPARED FOR THE PURPOSE OF DESCRIBING THE DESIGN OF A PROPOSED PV SYSTEM WITH ENOUGH DETAIL TO DEMONSTRATE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS. THE DOCUMENT SHALL NOT BE RELIED UPON AS A SUBSTITUTE FOR FOLLOWING MANUFACTURER INSTALLATION INSTRUCTIONS. THE SYSTEM SHALL COMPLY WITH ALL MANUFACTURERS LISTING AND INSTALLATION INSTRUCTIONS, AS WELL AS ALL APPLICABLE CODES. NOTHING IN THIS DOCUMENT SHALL BE INTERPRETED IN A WAY THAT OVERRIDES THEM.

SYSTEM DETAILS	
	OFF-GRID PV, BATTERY, INVERTER POWER SYSTEM
DC RATING OF SYSTEM	5,760W
AC RATING OF SYSTEM	15,000W
AC OUTPUT CURRENT	62.5A
INVERTER(S)	1 X SOL ARK 15KW
MODULE	QCELL SOLAR 480-WATT
ARRAY WIRING	(2) STRINGS OF 6 MODULES

INTERCONNECTION DETAILS	
N/A	OFF-GRID
SERVICE	N/A

SITE DETAILS	
ASHRAE EXTREME LOW	-25°C (-13°F)
ASHRAE 2% HIGH	30°C (86°F)
CLIMATE DATA SOURCE	HAYDEN/YAMPA (AWOS) (KHDN)
WIND SPEED	115 MPH
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	
GROUND SNOW LOAD	232 PSF

P-01122

OFF-GRID SOLAR POWER SYSTEM

21498 MOUNTAIN TOP DRIVE, OAK CREEK, CO - 80467

REVIEWED FOR CODE COMPLIANCE
09/23/2022

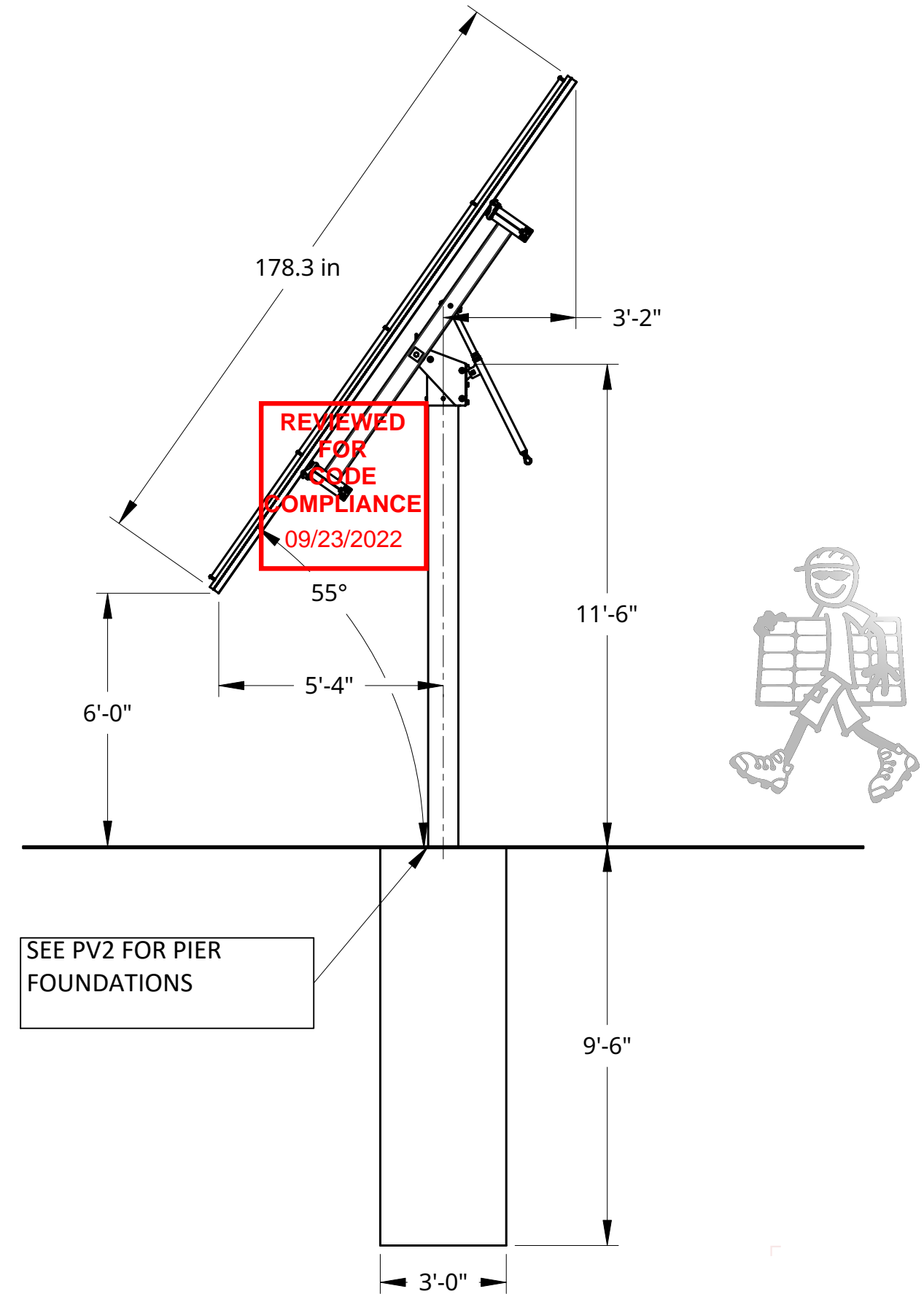
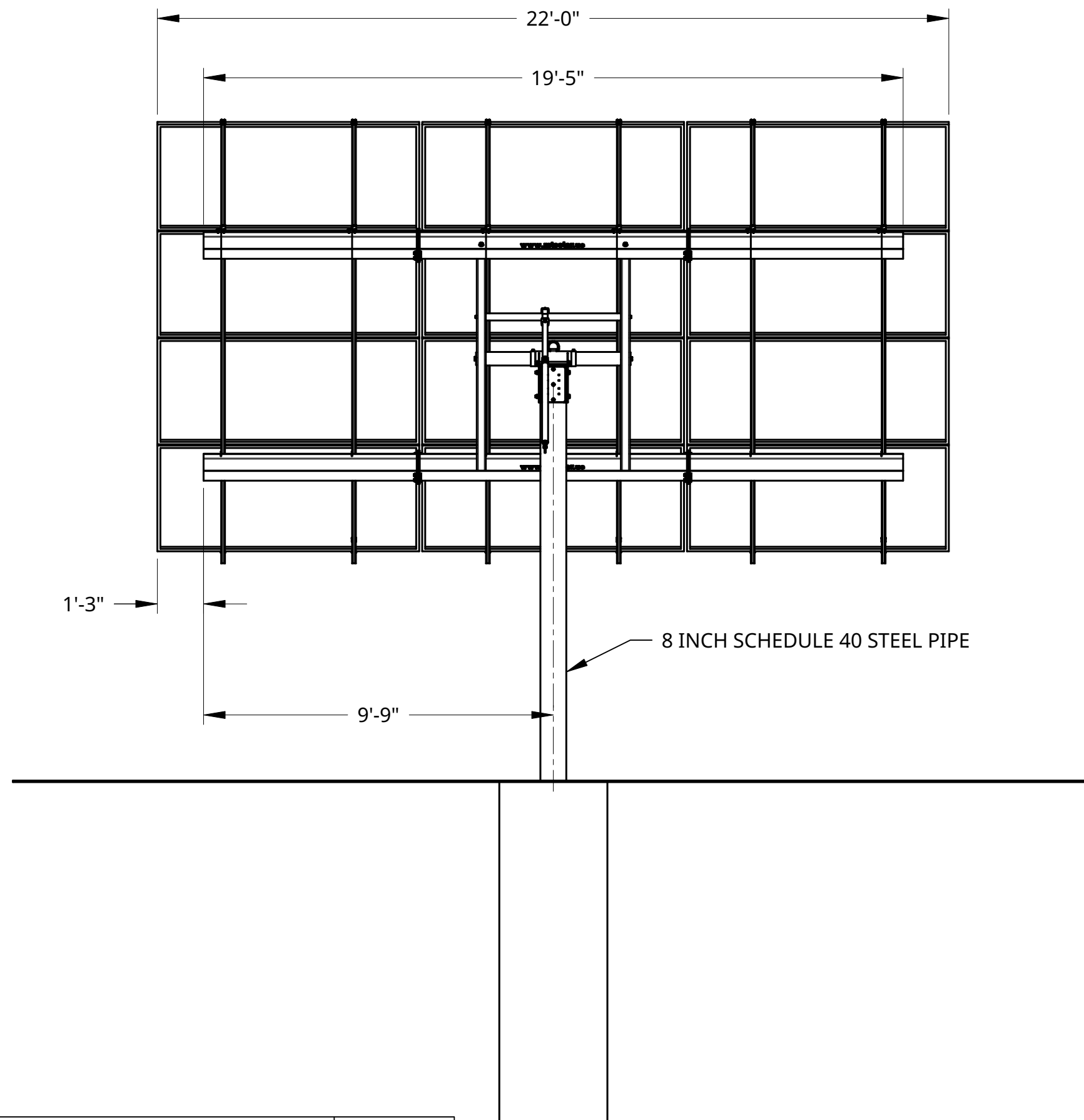
PROJECT SUMMARY	
DATE:	9/1/2022
CREATOR:	C.M.
REVIEWER:	
REVISIONS	

PV-1

Permit application for steel pole and concrete ground-mounted PV array, battery/inverter, and backup generator standalone power system. *Not connected to YVEA utility grid.

SITE DIAGRAM - 21498 MOUNTAIN TOP DRIVE





ITEM	QUANTITY	NAME	MASS
1	4	BEAM-XD-WING-72-INCHES	74.8 LB
2	2	BEAM-XD-CENTER-90-INCHES	98.1 LB
3	2	TUBE-XD-3X5-90IN	86.4 LB
4	1	PIPE-XD-2IN	19.1 LB
5	1	PIPE-XD-4IN	72.4 LB
6	2	LOCK-COLLAR-4	1.2 LB
7	1	POLECAP-8	42.5 LB
8	1	BACKPLATE-8	15.4 LB
9	1	LIFT-INSERT-8	8.8 LB
10	1	ADJUSTER-SCREW	11.9 LB
11	2	BEAM-SPLICE-BOLT-KIT-XD	4.3 LB
12	3	TAMARACK-GROUND-LUG	0.1 LB
13	30	TAMARACK-50/50-CLAMP	0.1 LB
14	12	TAMARACK-RAIL-ADAPTER-WITH-BOLT	0.1 LB
15	6	TAMARACK-3.1-RAIL-CUT-178.3-INCHES	13.8 LB
16	12	BEAM-CLAMP-WITH-BOLTS	1.2 LB
17	1	SPIN PREVENTION KIT	0.3 LB
18	1	BOLT-KIT-8-TOP-BEAM	N/A
19	1	PALLET-PACKAGING-MATERIALS	N/A

COMPANY NAME **SUNWISE SOLAR | W-10339**

SKU **1P-0-8TOP-XD-72-4X3-R**

MODULE QUANTITY: 12
 MODULE WIDTH: 41 INCHES
 MODULE LENGTH: 87 INCHES
 MAXIMUM TILT: 55°
 SUMMER TILT: 25°
 MINIMUM CLEARANCE: 6'

WIND SPEED: 115 MPH
 SNOW LOAD: 232 PSF (GROUND)
 EXPOSURE CATEGORY: B
 SOIL TYPE: 4 (NON-COHESIVE)
 POLE QUANTITY: 1
 POLE RATING: 8" SCHEDULE 40

SS CORP;
 21498 Mountain Top Drive
 Oak Creek, CO, 80467



SIZE
C

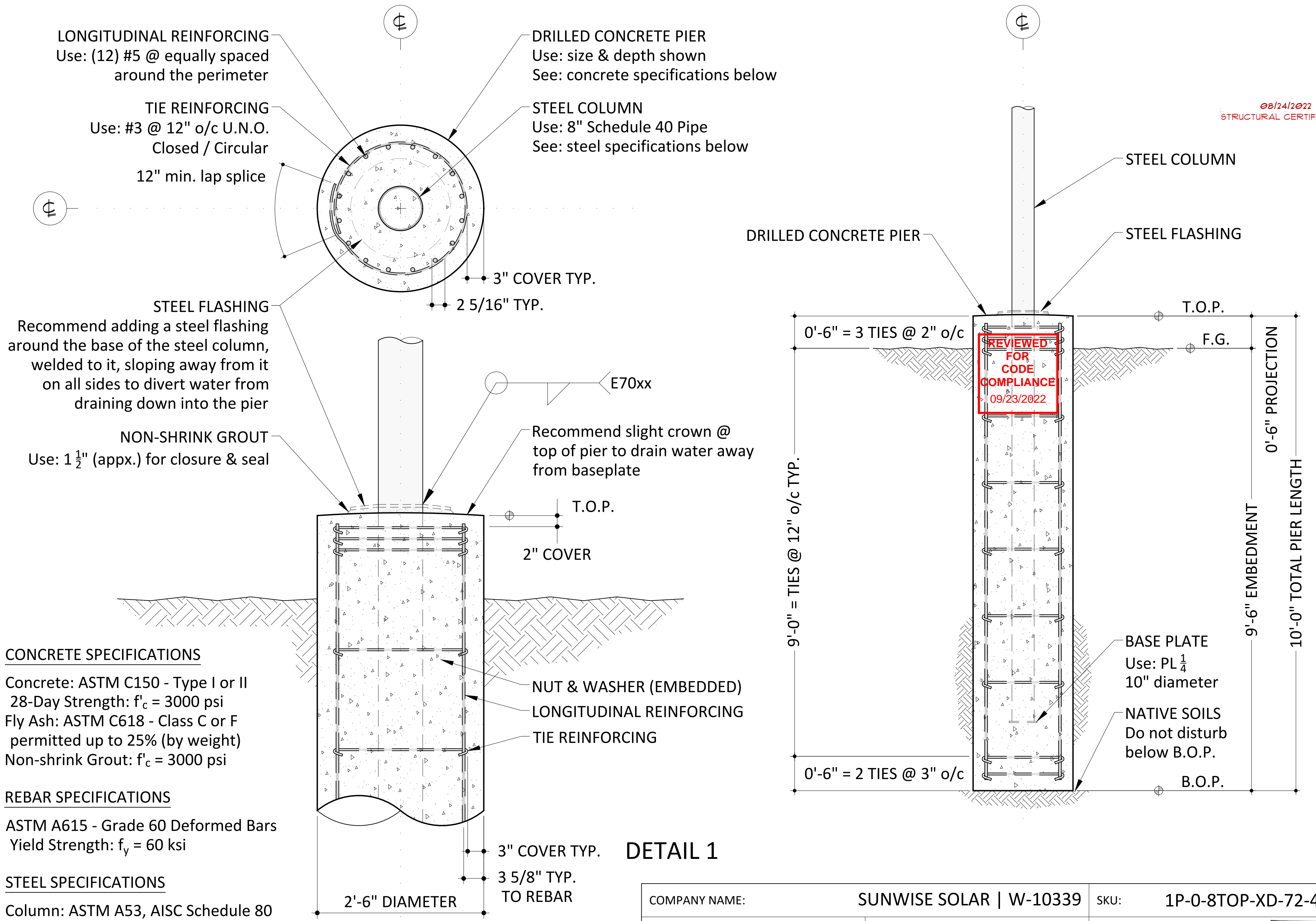
REV.
PV1

SCALE
 Not to Scale


WEIGHT

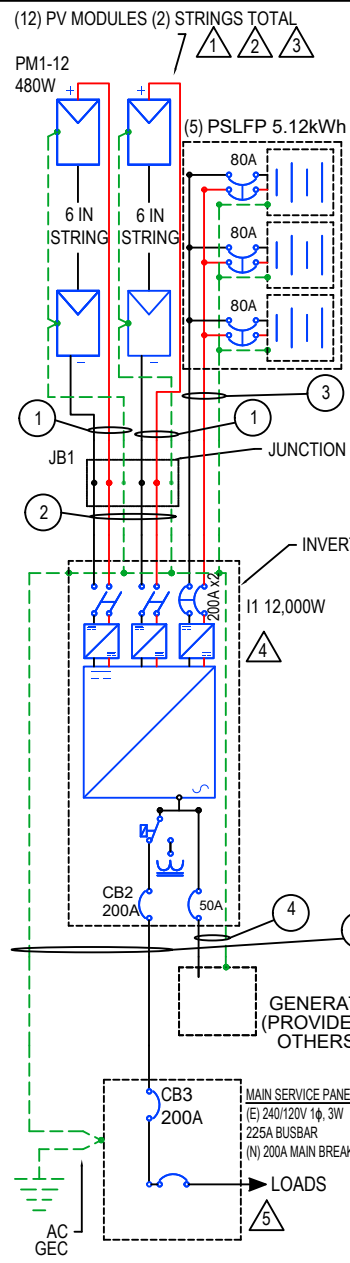
DATE
 08/24/2022

08/24/2022
 STRUCTURAL CERTIFICATION



DETAIL 1

COMPANY NAME: SUNWISE SOLAR W-10339		SKU: 1P-0-8TOP-XD-72-4x3-R
MODULE QUANTITY: 12	SNOW LOAD: 232.0 psf (ground)	SS CORP. 21498 Mountain Top Road Oak Creek, CO 80467  PV2 <small>MADE IN MONTANA, USA</small>
MODULE WIDTH: 41.0 inches	WIND SPEED: 115 mph	
MODULE LENGTH: 87.0 inches	EXPOSURE: B	
MAXIMUM TILT: 55°	SEISMIC: Design Category D	
SUMMER TILT: 25°	SOIL CLASS: 4 - Non-cohesive	
MIN. CLEARANCE: 6 feet	POLE QTY/TYPE: 8" Schedule 40	SCALE: N.T.S. WEIGHT: DATE: 08/24/2022



MODULES										
REF.	QTY.	MAKE AND MODEL	PMAX	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
PM1-12	12	Q-CELLS Q.PEAK DUO XL-G10.2 480	480W	447W	11.24A	10.66A	53.6V	44.5V	-0.145V/°C (-0.27%/°C)	20A

INVERTERS										
REF.	QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND	RATED POWER	MAX OUTPUT CURRENT	MAX INPUT CURRENT	MAX ESS CHARGING/DISCHARGING CURRENT	MAX INPUT VOLTAGE	WEIGHTED EFFICIENCY
I1	1	SOL-ARK 15K-48-ST	240V	NOT SOLIDLY GROUNDED	12,000W (BATTERY TO LOADS)	62.5A AC	78A	275.0A (ADJUSTED)	500V	96.5%

ENERGY STORAGE SYSTEMS						
REF.	QTY.	MAKE AND MODEL	CHEMISTRY	CONTINUOUS POWER OUTPUT	CONTINUOUS CURRENT	VOLTAGE RANGE
ESS1	5	POWERSYNC LFP 51.2v	LIFEPO4	12,000W	230A	44.0 VDC - 56.8 VDC

OCPDS			
REF.	QTY.	RATED CURRENT	MAX VOLTAGE
CB2	1	200A	240VAC
CB3	1	200A	240VAC

SYSTEM SUMMARY		
	MPPT 1	MPPT 2
MODULES IN SERIES	6	6
ARRAY VMP	267.2V	267.2V
ARRAY IMP	10.7A	10.7A
ARRAY MAX VOC	335V	335V
ARRAY ISC	11.2A	11.2A
ARRAY STC POWER	5,760W	
ARRAY PTC POWER	4,608W	
MAX AC CURRENT	62.5A	
MAX AC POWER OUTPUT	15,000W	
DERATED AC POWER OUTPUT	12,000W	

- ### NOTES
- ⚠ DC PV CONDUCTORS ARE NOT SOLIDLY-GROUNDED. NO DC PV CONDUCTOR SHALL BE WHITE- OR GRAY-COLORED
 - ⚠ ALL METAL ENCLOSURES, RACEWAYS, CABLES AND EXPOSED NONCURRENT-CARRYING METAL PARTS OF EQUIPMENT SHALL BE GROUNDED TO EARTH AS REQUIRED BY NEC 250.4(A) AND PART III OF ARTICLE 250 AND EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC 690.45. THE GROUNDING ELECTRODE SYSTEM SHALL ADHERE TO NEC 690.47(A) AND NEC 250.169. THE DC GROUNDING ELECTRODE SHALL BE SIZED ACCORDING TO NEC 250.166 AND INSTALLED IN COMPLIANCE WITH NEC 250.64.
 - ⚠ MAX DC VOLTAGE OF ARRAY IS 335.0V AT -25°C ((-25°C - 25°C) X -0.145V/°C + 67V) X 5 MODULES = 335.0V).
 - ⚠ INSTALLER SHALL SET SOL-ARK 15K-48-ST MAX DISCHARGE/CHARGE CURRENT TO 275A.
 - ⚠ (E) 200A MAIN BREAKER DERATED TO (N) 125A

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS																
ID	TYPICAL	CONDUCTOR	CONDUIT / CABLE	CURRENT-CARRYING CONDUCTORS IN CONDUIT / CABLE	OCPD	EGC	TEMP. CORR. FACTOR	FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERM. TEMP. RATING	LENGTH	VOLTAGE DROP
1		10 AWG PV WIRE, COPPER	FREE AIR	N/A	N/A	6 AWG BARE, COPPER	0.76 (52°C)	1.0	14.05A	17.56A	55A	41.8A	75°C	50A	12FT	0.04%
2		10 AWG THWN-2, COPPER	2" DIA. PVC	4	N/A	10 AWG THWN-2, COPPER	1.0 (30°C)	0.2	14.05A	17.56A	40A	35A	90°C	40A	115FT	1.19%
3		4/0 AWG THW, COPPER	2" FMC	4	200A	6 AWG THWN-2, COPPER	1.0 (30°C)	1.0	184A	230A	360A	360A	75°C	360A	10 FT	0.55%
4		6 AWG THWN-2, COPPER	2" SCH40 PVC	3	50A	10 AWG THWN-2, COPPER	1.0 (30°C)	1.0	50A (GEN)	40A (GEN)	55A	55A	75°C	50A	16FT	0.42%
5		4/0 XHHW	SER	3	200A	6 AWG XHHW	1.0 (30°C)	1.0	62.5A	80A	55A	55A	75°C	50A	25FT	0.33%

- ### GENERAL ELECTRICAL NOTES
- OFF-GRID POWER SYSTEM, NO UTILITY GRID PRESENT
 - CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
 - CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).

- ### GROUNDING NOTES
- ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690
 - PV MODULES SHALL BE GROUNDED TO MOUNTING RAILS USING MODULE LUGS OR RACKING INTEGRATED GROUNDING CLAMPS AS ALLOWED BY LOCAL JURISDICTION. ALL OTHER EXPOSED METAL PARTS SHALL BE GROUNDED USING UL-LISTED LAY-IN LUGS.
 - INSTALLER SHALL CONFIRM THAT MOUNTING SYSTEM HAS BEEN EVALUATED FOR COMPLIANCE WITH UL 2703 "GROUNDING AND BONDING" WHEN USED WITH PROPOSED PV MODULE.
 - IF THE EXISTING MAIN SERVICE PANEL DOES NOT HAVE A VERIFIABLE GROUNDING ELECTRODE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE.
 - AC SYSTEM GROUNDING ELECTRODE CONDUCTOR (GEC) SHALL BE A MINIMUM SIZE #8AWG WHEN INSULATED, #6AWG IF BARE WIRE.
 - EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC ARTICLE 690.45, AND BE A MINIMUM OF #10AWG WHEN NOT EXPOSED TO DAMAGE, AND #6AWG SHALL BE USED WHEN EXPOSED TO DAMAGE
 - GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN, OR MARKED GREEN IF #4AWG OR LARGER

1 SINGLE-LINE DIAGRAM
PV-2 SCALE: NTS

P-01122

GRID-TIED SOLAR POWER SYSTEM

21498 MOUNTAIN TOP DRIVE, OAK CREEK, CO 80467

REVIEWED FOR CODE COMPLIANCE
09/23/2022

SINGLE-LINE DIAGRAM

DATE: 7/1/2022
CREATED BY: C.M.
CHECKED BY:

REVISIONS	

PV-2



**REVIEWED
FOR
CODE
COMPLIANCE**
 08/23/2022

15K-2P Spec Sheet



Battery (optional) Output Power 12,000W	
Type	Lead-Acid or Li-Ion
Nominal DC Input	48V
Capacity	50 — 9900Ah
Voltage Range	43.0 — 63.0V
Continuous Battery Charging Output	275A
Charging Curve	3-Stage w/ Equalization
Grid to Batt Charging Efficiency	96.0%
External Temperature Sensor	Included
Current Shunt for Accurate % SOC	Integrated
External Gen Start Based on Voltage	Integrated
Communication to Lithium Battery	CanBus & RS485

Solar Input Power 19,500W	
Max Allowed PV Power	19,500W
Max PV Power Delivered to Battery &	15,000W
Max DC Voltage (Voc)	500V @ 26A
MPPT Voltage Range	125-425V
Starting Voltage	125V
Number of MPPT	3
Max Solar Strings Per MPPT	2
Max DC Current per MPPT (Self Lim-	26A
Max AC Coupled Input (Micro/String	19,200W

General	
Dimensions (H x W x D)	31.8" x 18.3" x 10.9"
Weight (package)	135 lbs
Enclosure	IP65 / NEMA 3R
Ambient Temperature	-40~60°C, >45°C Derating
Installation Style	Wall-Mounted
Wi-Fi & LAN Communication	Included
Standard Warranty (verified by HALT Testing)	10 Years

AC Output Power 15kW On-Grid & Off-Grid	
Connections	120/240/208V Split Phase
Continuous AC Power to Grid (On-Grid)	15,000W 62.5A-L (240V)
Continuous AC Power to Load (Off-	12,000W 50A-L (240V)
Surge AC Power 10sec	24,000VA L-L (240V)
Surge AC Power 100ms	30,000VA L-L (240V)
Parallel Stacking	Yes - Up to 12
Frequency	60/50Hz
Continuous AC Power with Grid or Generator	48,000W 200A L-L (240V)
CEC Efficiency	96.5% (Peak 97.5%)
Idle Consumption Typical—No Load	90W
Sell Back Power Modes	Limited to Household/Fully
Design (DC to AC)	Transformerless DC
Response Time (Grid-Tied to Off-Grid)	5ms
Power Factor	+/- 0.9 - 1.0

Protections & Certifications	
Electronics Certified Safety by SGS Labs to NEC & UL Specs - NEC 690.4B & NEC 705.4/6	Yes
Grid Sell Back — UL1741-2010/2018, IEE-E1547a-2003/2014, FCC 15 Class B, UL1741SB,	Yes
PV DC Disconnect Switch — NEC 240.15	Integrated
Ground Fault Detection — NEC 690.5	Integrated
PV Rapid Shutdown Control — NEC 690.12	Integrated
PV Arc Fault Detection — NEC 690.11	Integrated
PV Input Lightning Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
AC Output Breakers - 200A	Integrated
200A x 2 Battery Breaker / Disconnect	Integrated
Surge Protection	DC Type II / AC Type II

powered by

Q.ANTUM DUO Z

REVIEWED
FOR
CODE
COMPLIANCE

09/23/2022

Q.PEAK DUO XL-G10.3 / BFG 470-485

BIFACIAL DOUBLE GLASS MODULE
WITH EXCELLENT RELIABILITY
AND ADDITIONAL YIELD



BIFACIAL ENERGY YIELD GAIN OF UP TO 20%

Bifacial Q.ANTUM solar cells with zero gap cell layout make efficient use of light shining on the module rear-side for radically improved LCOE.



LOW ELECTRICITY GENERATION COSTS

Q.ANTUM DUO Z combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology for higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 21.2%.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID and Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



FRAME FOR VERSATILE MOUNTING OPTIONS

High-tech aluminum alloy frame protects from damage, enables use of a wide range of mounting structures and is certified regarding IEC for high snow (5400 Pa) and wind loads (2400 Pa).



A RELIABLE INVESTMENT

Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty².

¹ APT test conditions according to IEC/ TS 62804-1:2015 method B (-1500V, 168h) including post treatment according to IEC 61215-1-1 Ed. 2.0 (CD)

² See data sheet on rear for further information.



THE IDEAL SOLUTION FOR:



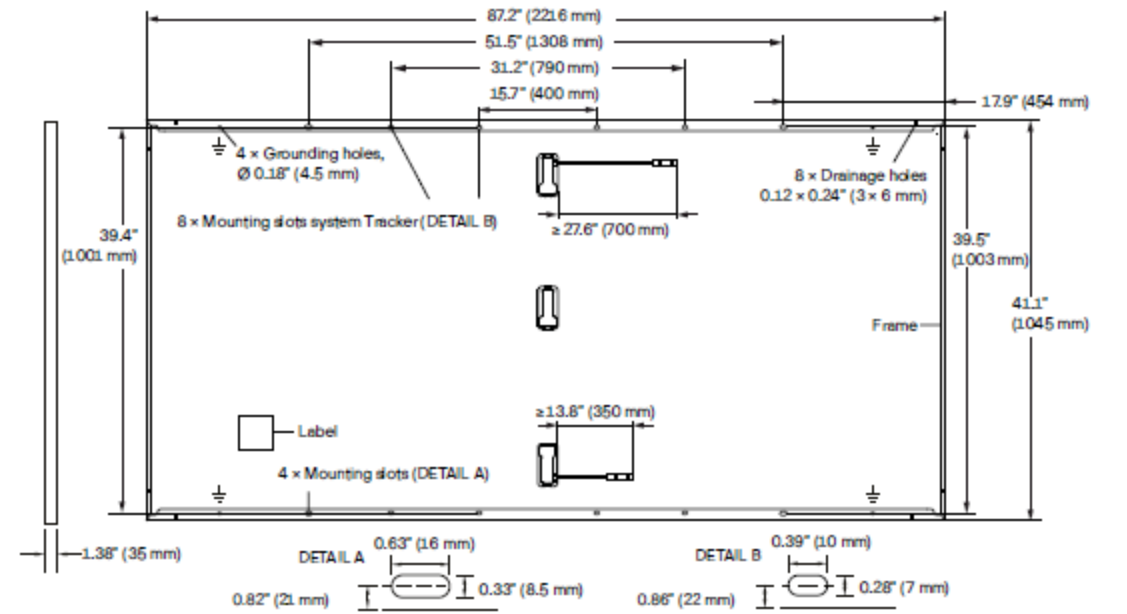
Ground-mounted
solar power plants

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	87.2 in × 41.1 in × 1.38 in (including frame) (2216 mm × 1045 mm × 35 mm)
Weight	64.2 lbs (29.1 kg)
Front Cover	0.08 in (2.0 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	0.08 in (2.0 mm) semi-tempered glass
Frame	Anodized aluminum
Cell	6 × 26 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 27.6 in (700 mm), (-) ≥ 13.8 in (350 mm)
Connector	Stäubli MC4-Evo2, Hanwha Q CELLS HQC4, IP68



ELECTRICAL CHARACTERISTICS

POWER CLASS		470	475	480	485	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ AND BSTC ¹ (POWER TOLERANCE +5 W / -0 W)						
			BSTC*	BSTC*	BSTC*	
Minimum	Power at MPP ¹	P _{MPP} [W]	470	514.1	475	519.6
	Short Circuit Current ¹	I _{SC} [A]	11.04	12.08	11.08	12.12
	Open Circuit Voltage ¹	V _{OC} [V]	52.91	53.10	53.15	53.34
	Current at MPP	I _{MPP} [A]	10.51	11.50	10.55	11.54
	Voltage at MPP	V _{MPP} [V]	44.73	44.72	45.03	45.02
	Efficiency ¹	η [%]	≥ 20.3	≥ 22.2	≥ 20.5	≥ 22.4

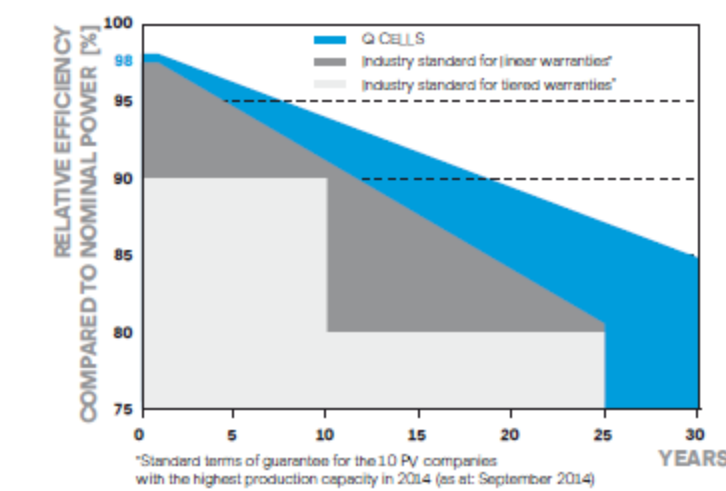
Bifaciality of P_{MPP} and I_{SC} 70% ± 5% • Bifaciality given for rear side irradiation on top of STC (front side) • According to IEC 60904-1-2

¹Measurement tolerances P_{MPP} ± 3%; I_{SC}, V_{OC} ± 5% at STC: 1000 W/m²; *at BSTC: 1000 W/m² + φ × 135 W/m², φ = 70% ± 5%, 25 ± 2 °C, AM 1.5 according to IEC 60904-3

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²						
Minimum	Power at MPP	P _{MPP} [W]	353.8	357.6	361.4	365.1
	Short Circuit Current	I _{SC} [A]	8.89	8.92	8.96	8.99
	Open Circuit Voltage	V _{OC} [V]	50.04	50.27	50.49	50.72
	Current at MPP	I _{MPP} [A]	8.27	8.30	8.34	8.37
	Voltage at MPP	V _{MPP} [V]	42.77	43.06	43.35	43.63

²800 W/m², NMOT, spectrum AM 1.5

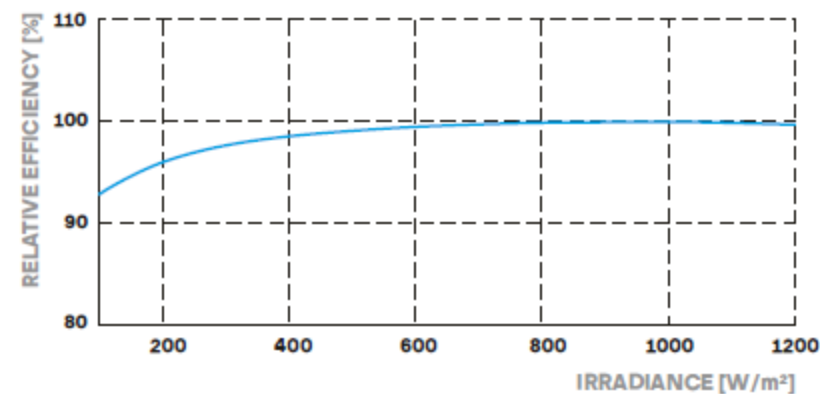
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.45% degradation per year. At least 93.95% of nominal power up to 10 years. At least 84.95% of nominal power up to 30 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I _{SC}	α	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	108 ± 5.4 (42 ± 3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1500	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 29 ⁴
Max. Design Load, Push/Pull ³	[lbs/ft ²]	75 (3600 Pa) / 33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push/Pull ³	[lbs/ft ²]	113 (5400 Pa) / 50 (2400 Pa)		

³See Installation Manual

⁴New Type is similar to Type 3 but with metallic frame

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
IEC 61215:2016, IEC 61730:2016,
U.S. Patent No. 9,893,215
(solar cells);
Certification in process.



Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us