

## 1 |

- 2 |

## 3 |

4 |

6 |

6 |

## An aerial photograph of a residential property. A large, multi-story house with a complex roofline is situated in the lower-left quadrant. A paved driveway leads from the house to a detached, single-story garage with a dark roof, located in the upper-right quadrant. The property is surrounded by lush green grass, numerous trees, and a large field of tall grass or crops in the upper-left corner. A small, rectangular structure is visible in the lower-right corner.

01

NOT TO SCALE

02

NOT TO SCALE

W	
	S

SHEET NUMBER	SHEET TITLE
T-001	COVER PAGE
G-001	NOTES
A-101	SITE PLAN
A-102	ELECTRICAL PLAN
A-103	SOLAR ATTACHMENT PLAN
E-601	LINE DIAGRAM
E-602	DESIGN TABLES
E-603	PLACARDS
S-501	ASSEMBLY DETAILS
S-502	ASSEMBLY DETAILS
S-503	ASSEMBLY DETAILS
R-001	RESOURCE DOCUMENT
R-002	RESOURCE DOCUMENT
R-003	RESOURCE DOCUMENT
R-004	RESOURCE DOCUMENT
R-005	RESOURCE DOCUMENT
R-006	RESOURCE DOCUMENT

<b><u>OWNER</u></b>	
NAME:	DR. CHRISTOPHER RITCHLIN
<b><u>PROJECT MANAGER</u></b>	
NAME:	QUINN PORZIO
PHONE:	(716) 697-7190
<b><u>CONTRACTOR</u></b>	
NAME:	BUFFALO SOLAR INC.
PHONE:	(716) 800-7775

BUILDING:	TOWN OF CANANDAIGUA
ZONING:	TOWN OF CANANDAIGUA
UTILITY:	RG&E

OCCUPANCY:	II
CONSTRUCTION:	SINGLE-FAMILY
ZONING:	RESIDENTIAL
GROUND SNOW LOAD:	50 PSF
WIND EXPOSURE:	C
WIND SPEED:	115 MPH

BUILDING:	NYSBC 2020, NYSRC 2020
ELECTRICAL:	NEC 2017
FIRE:	NYSFC 2020



**PHONE:** (716) 800-7775  
**ADDRESS:** 3279 WALDEN AVENUE  
DEPEW, NY 14043

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# RITCHLIN RESIDENCE

**ENGINEER OF RECORD**

COVER PAGE

DESIGN BY: A.Y.

## REVISIONS

SHEET 1)

	A	B	C	D	E	F	G	H
1	2.1.1	<b>SITE NOTES:</b>						
	2.1.2	THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.		2.5.4	THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(B)(2)(3)].	2.7.9	PHASE C OR L3- BLUE, YELLOW, ORANGE*, OR OTHER CONVENTION NEUTRAL- WHITE OR GREY	
	2.1.3	THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING OR MECHANICAL. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.					* IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].	
	2.1.4						ELECTRICAL WIRES IN TRENCH SHALL BE ATLEAST 18IN. BELOW GRADE (RESIDENTIAL).	
2	2.2.1	<b>EQUIPMENT LOCATIONS</b>		2.5.5	AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (B)(2)(3)(C).			
	2.2.2	ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.						
	2.2.3	WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).		2.5.6	FEEDER TAP INTERCONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (B)(2)(1)			
	2.2.3	JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.		2.5.7	SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42			
	2.2.4	ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.		2.5.8	BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (B)(5)].			
	2.2.5	ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.						
	2.2.6	ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.		2.6.1	<b>DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:</b>			
3	2.2.7	SOLAR ARRAY LOCATION SHALL BE ADJUSTED ACCORDINGLY TO MEET LOCAL SETBACK REQUIREMENTS.		2.6.2	DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS). DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.			
	2.3.1	<b>STRUCTURAL NOTES:</b>		2.6.3	BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED. THEREFORE BOTH MUST OPEN WHERE A DISCONNECT IS REQUIRED, ACCORDING TO NEC 690.13.			
	2.3.2	RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAIL MANUFACTURER'S INSTRUCTIONS.		2.6.4	ISOLATING DEVICES OR EQUIPMENT DISCONNECTING MEANS SHALL BE INSTALLED IN CIRCUITS CONNECTED TO EQUIPMENT AT A LOCATION WITHIN THE EQUIPMENT, OR WITHIN SIGHT AND WITHIN 10 FT OF THE EQUIPMENT. AN EQUIPMENT DISCONNECTING MEANS SHALL BE PERMITTED TO BE REMOTE FROM THE EQUIPMENT WHERE THE EQUIPMENT DISCONNECTING MEANS CAN BE REMOTELY OPERATED FROM WITHIN 10 FT OF THE EQUIPMENT, ACCORDING TO NEC 690.15 (A).			
	2.3.3	JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IT SHALL BE SEALED PER LOCAL REQUIREMENTS.		2.6.5	PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D)			
	2.3.4	ALL PV RELATED ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.		2.6.6	ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.			
4	2.4.1	<b>GROUNDING NOTES:</b>						
	2.4.2	GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVISES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.		2.6.7	BOTH POSITIVE AND NEGATIVE PV CONDUCTORS ARE UNGROUNDED, THEREFORE BOTH REQUIRE OVER-CURRENT PROTECTION, ACCORDING TO NEC 240.21. (SEE EXCEPTION IN NEC 690.9)			
	2.4.3	PV SYSTEMS REQUIRE AN EQUIPMENT GROUNDING CONDUCTOR. ALL METAL ELECTRICAL EQUIPMENT AND STRUCTURAL COMPONENTS BONDED TO GROUND, IN ACCORDANCE WITH 250.134 OR 250.136(A). ONLY THE DC CONDUCTORS ARE UNGROUNDED.		2.6.8	IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.			
	2.4.4	PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.		2.6.9				
	2.4.5	METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURE CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).						
	2.4.6	EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.		2.7.1	<b>WIRING &amp; CONDUIT NOTES:</b>			
	2.4.7	THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.		2.7.2	ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.			
5	2.4.8	GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]		2.7.3	ALL CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.			
	2.4.9	THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.		2.7.4	EXPOSED PV SOURCE CIRCUITS AND OUTPUT CIRCUITS SHALL USE WIRE LISTED AND IDENTIFIED AS PHOTOVOLTAIC (PV) WIRE [690.31 (C)]. PV MODULES WIRE LEADS SHALL BE LISTED FOR USE ON PV ARRAYS, ACCORDING TO NEC 690.31 (A).			
	2.4.10	DC PV ARRAYS SHALL BE PROVIDED WITH DC GROUND-FAULT PROTECTION MEETING THE REQUIREMENTS OF 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS.		2.7.5	PV WIRE BLACK WIRE MAY BE FIELD-MARKED WHITE [NEC 200.6 (A)(6)].			
				2.7.6	MODULE WIRING SHALL BE LOCATED AND SECURED UNDER THE ARRAY. ACCORDING TO NEC 200.7, UNGROUNDED SYSTEMS DC CONDUCTORS COLORED OR MARKED AS FOLLOWS:			
6	2.5.1	<b>INTERCONNECTION NOTES:</b>						
	2.5.2	LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 705.12 (B)]		2.7.7	DC POSITIVE- RED, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN DC NEGATIVE- BLACK, OR OTHER COLOR EXCLUDING WHITE, GREY AND GREEN			
	2.5.3	THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY		2.7.8	AC CONDUCTORS COLORED OR MARKED AS FOLLOWS: PHASE A OR L1- BLACK PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE			
	A	B	C	D	E	F	G	H



## CONTRACTOR

BUFFALO SOLAR INC.

**PHONE:** (716) 800-7775

ADDRESS: 3279 WALDEN AVENUE  
DEPEW, NY 14043

**LIC. NO.:**

**PHIC. NO.:**

ELE. NO.: MEL11-561082

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NEW PV SYSTEM: 26.660 kWp

# RITCHLIN RESIDENCE

4459 MIDDLE CHESHIRE RD  
CANANDAIGUA, NY 14424  
APN: 32240012600122121

# ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

## NOTES

DATE: 09.11.2020

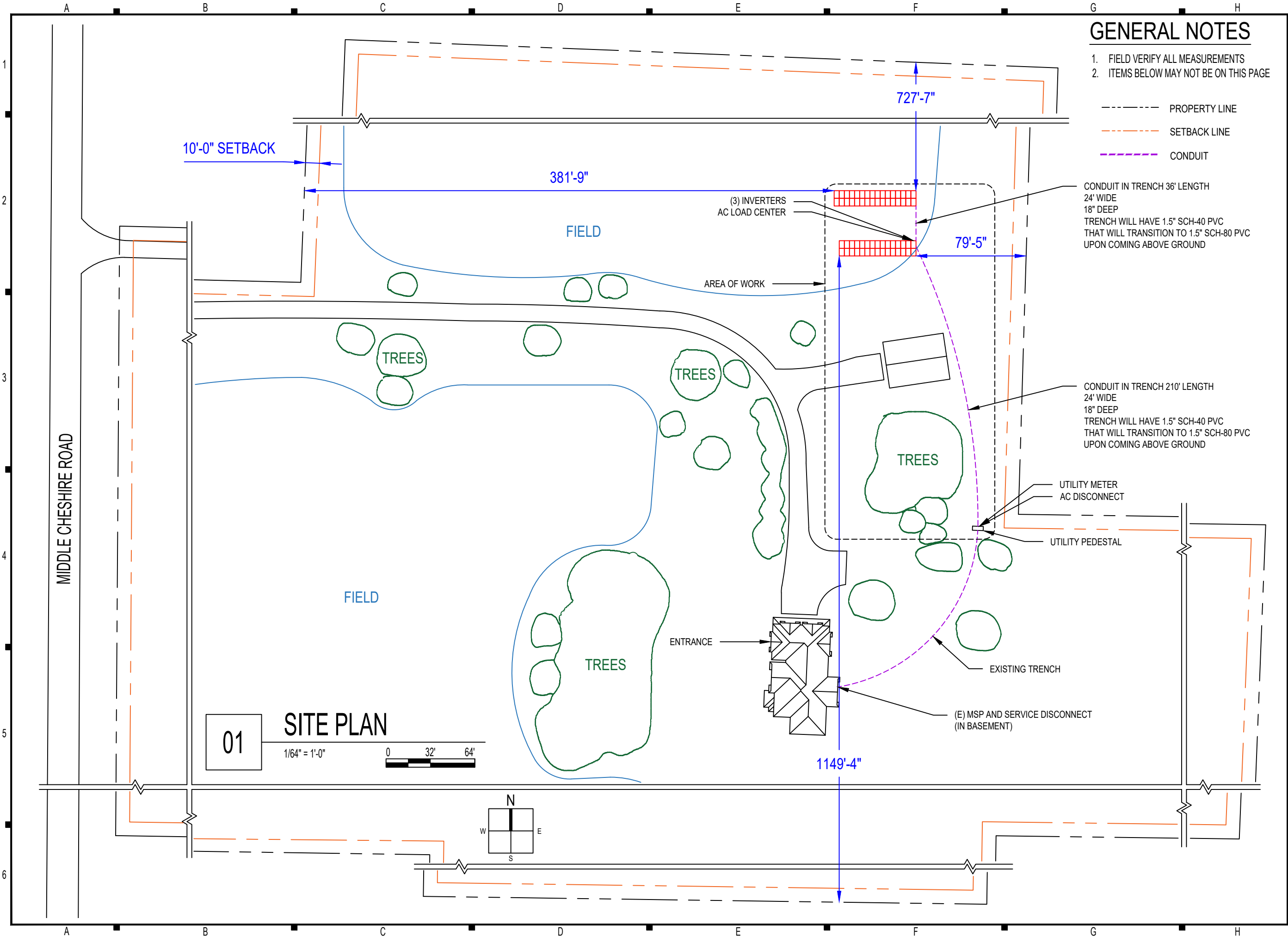
**DESIGN BY: A.Y.**

**CHECKED BY:** M.M.

## REVISIONS

G-001.00

SHEET 2



GENERAL NOTES

- 1. FIELD VERIFY ALL MEASUREMENTS
- 2. ITEMS BELOW MAY NOT BE ON THIS PAGE

- PROPERTY LINE
- - - - - SETBACK LINE
- - - - - CONDUIT

CONDUIT IN TRENCH 36' LENGTH  
24' WIDE  
18" DEEP  
TRENCH WILL HAVE 1.5" SCH-40 PVC  
THAT WILL TRANSITION TO 1.5" SCH-80 PVC  
UPON COMING ABOVE GROUND

CONDUIT IN TRENCH 210' LENGTH  
24' WIDE  
18" DEEP  
TRENCH WILL HAVE 1.5" SCH-40 PVC  
THAT WILL TRANSITION TO 1.5" SCH-80 PVC  
UPON COMING ABOVE GROUND

UTILITY METER  
AC DISCONNECT

UTILITY PEDESTAL

EXISTING TRENCH

(E) MSP AND SERVICE DISCONNECT  
(IN BASEMENT)



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APN: 32240012600122121

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

SITE PLAN

DATE: 09.11.2020

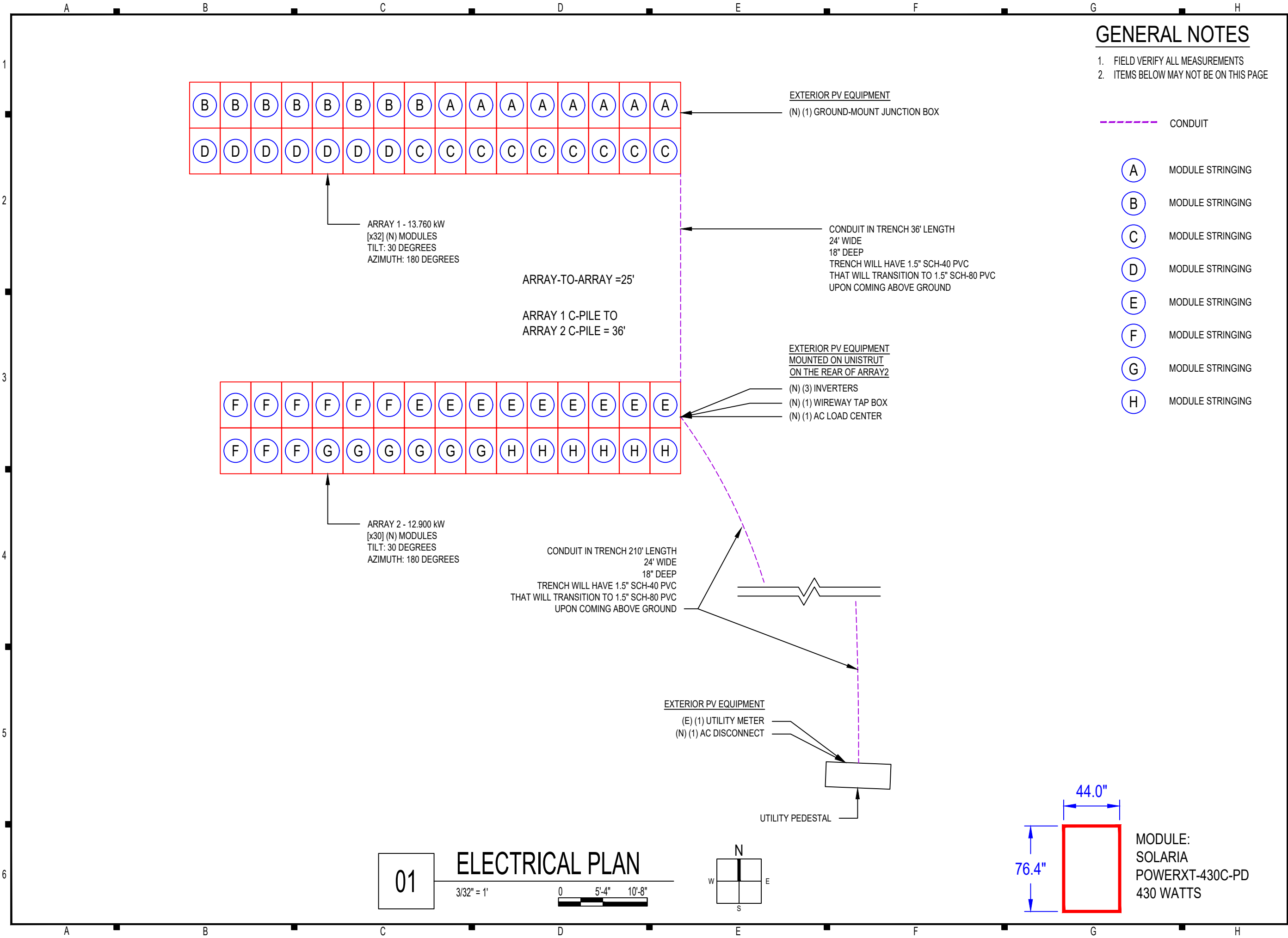
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REVISIONS

A-101.00  
(SHEET 3)





GENERAL NOTES

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-----	CONDUIT
(A)	MODULE STRINGING
(B)	MODULE STRINGING
(C)	MODULE STRINGING
(D)	MODULE STRINGING
(E)	MODULE STRINGING
(F)	MODULE STRINGING
(G)	MODULE STRINGING
(H)	MODULE STRINGING



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NEW PV SYSTEM: 26.660 kWp

RITCHLIN  
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ENGINEER OF RECORD

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ELECTRICAL PLAN

DATE: 09.11.2020

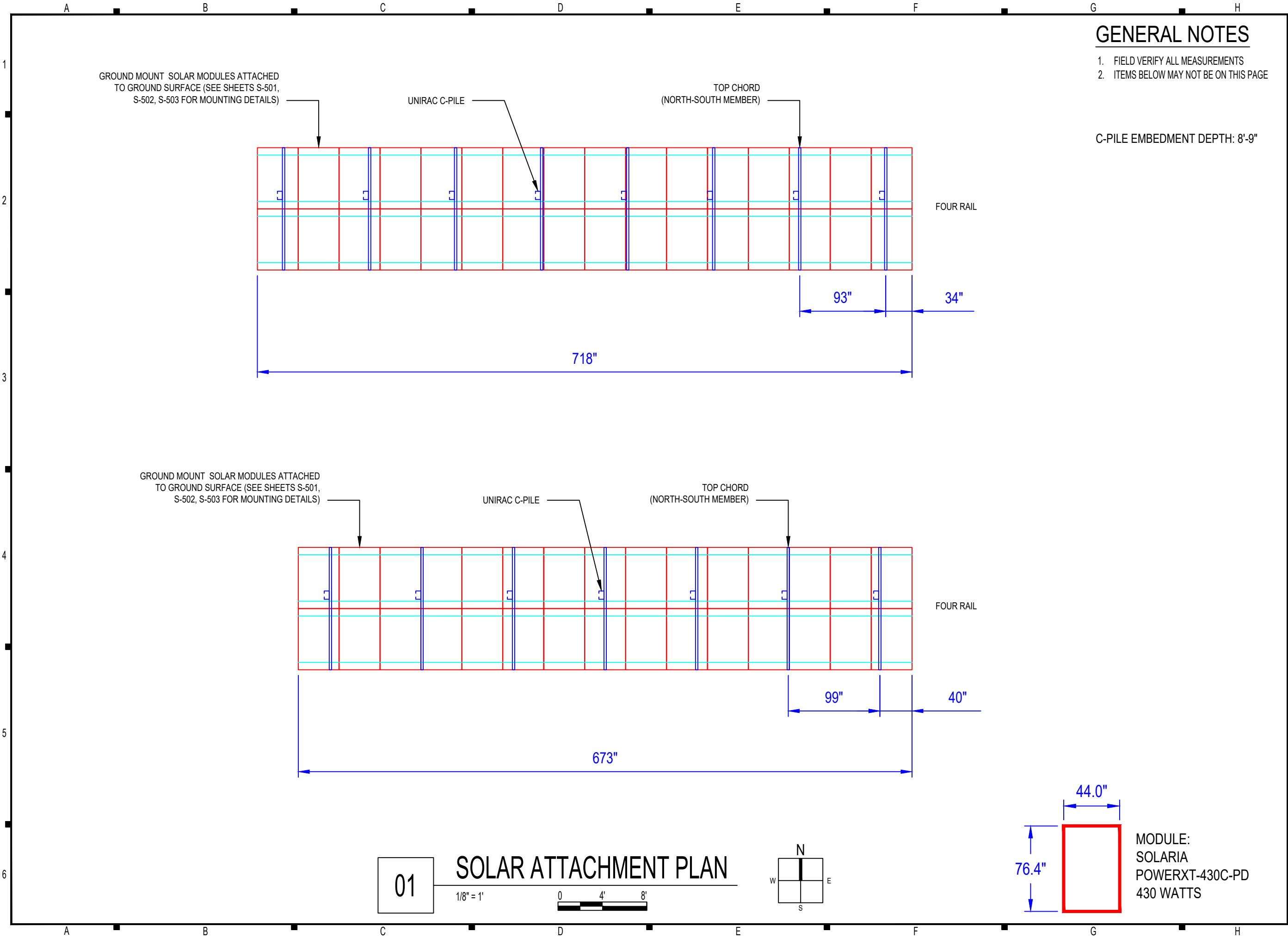
DESIGN BY: A.Y.

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REVISIONS

A-102.00  
(SHEET 4)





## GENERAL NOTES

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C-PILE EMBEDMENT DEPTH: 8'-9"



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NEW PV SYSTEM: 26.660 kWp

## RITCHLIN RESIDENCE

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APN: 32240012600122121

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### SOLAR ATTACHMENT PLAN

DATE: 09.11.2020

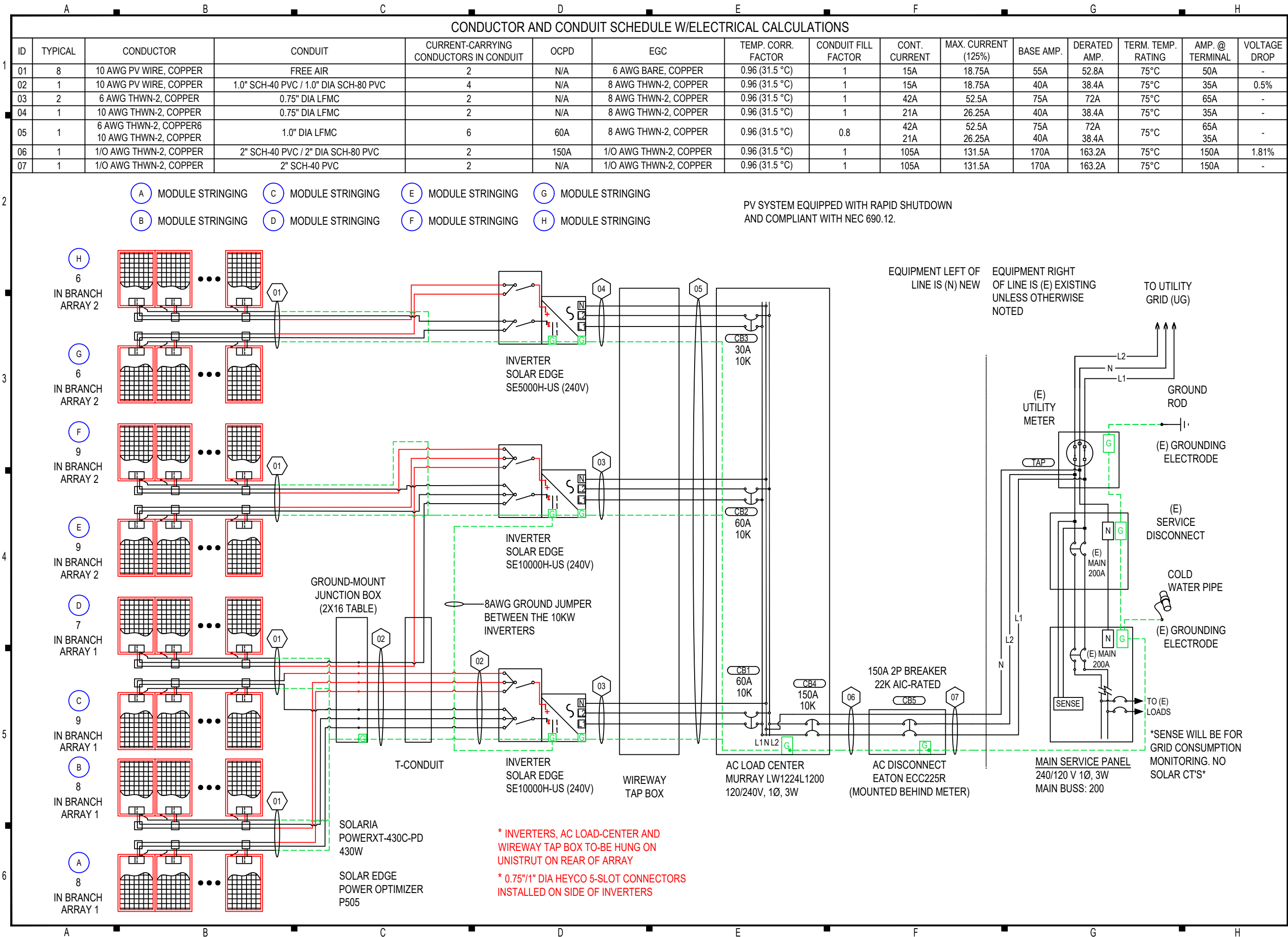
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REVISIONS

A-103.00

(SHEET 5)



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APN: 32240012600122121

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

LINE DIAGRAM

DATE: 09.11.2020

DESIGN BY: A.Y.

CHECKED BY: M.M.

REVISIONS

E-601.00  
(SHEET 6)

1	SYSTEM SUMMARY								
		INVERTER #1			INVERTER #2			INVERTER #3	
		STRING #1	STRING #2	STRING #3	STRING #1	STRING #2	STRING #3	STRING #1	STRING #2
	POWERBOX MAX OUTPUT CURRENT	15A	15A	15A	15A	15A	15A	15A	15A
	OPTIMIZERS IN SERIES	8	8	9	7	9	9	6	6
	NOMINAL STRING VOLTAGE	400V	400V	400V	400V	400V	400V	380V	380V
	ARRAY OPERATING CURRENT	8.6A	8.6A	9.68A	7.53A	9.68A	9.68A	6.79A	6.79A
	ARRAY STC POWER	10,750W			10,750W			5,160W	
	ARRAY PTC POWER	9,905W			9,905W			4,754W	
	MAX AC CURRENT	42A			42A			21A	
MAX AC POWER	10,000W			10,000W			5,000W		
DERATED (CEC) AC POWER	9,669W			9,669W			4,641W		
TOTAL STC POWER	26,660W								
TOTAL PTC POWER	24,564W								
MAX AC CURRENT	105A								
MAX AC POWER	25,000W								
DERATED (CEC) AC POWER	23,979W								

MODULES													
REF.	QTY.	MAKE AND MODEL				PMAX	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
PM1-62	62	SOLARIA POWERXT-430C-PD				430W	396.2W	11.43A	10.93A	47.3V	39.3V	-0.137V/°C (-0.29%/°C)	20A

POWER OPTIMIZERS							
REF.	QTY.	MODEL	RATED INPUT POWER	MAX OUTPUT CURRENT	MAX INPUT ISC	MAX DC VOLTAGE	WEIGHTED EFFICIENCY
PO1-62	62	SOLAR EDGE P505	505W	15A	14A	83V	98.6%

INVERTERS										
REF.	QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND	OCPD RATING	RATED POWER	MAX OUTPUT CURRENT	MAX INPUT CURRENT	MAX INPUT VOLTAGE	CEC WEIGHTED EFFICIENCY
I1-2	2	SOLAR EDGE SE10000H-US (240V)	240V	FLOATING	60A	10000W	42A	27A	480V	99.0%
I3	1	SOLAR EDGE SE5000H-US (240V)	240V	FLOATING	30A	5000W	21A	13.5A	480V	99.0%

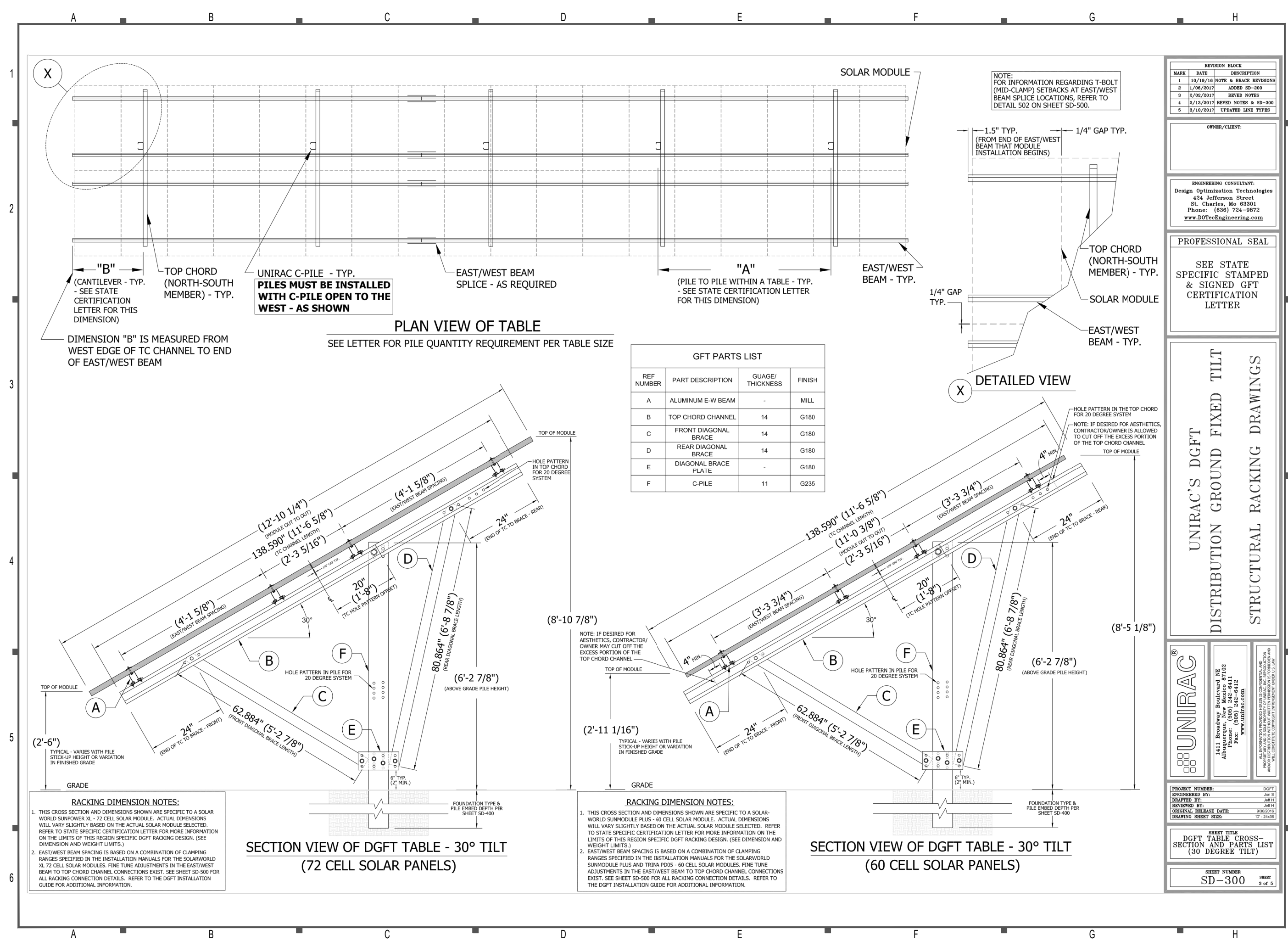
DISCONNECTS				
REF.	QTY.	MAKE AND MODEL	RATED CURRENT	MAX RATED VOLTAGE
SW1	1	EATON ECC225R OR EQUIV.	225A	240VAC

ASHRAE EXTREME LOW	-23.6°C (-10.5°F), SOURCE: ROCHESTER-MONROE CO (43.12°; -77.68°)
ASHRAE 2% HIGH	31.5°C (88.7°F), SOURCE: ROCHESTER-MONROE CO (43.12°; -77.68°)

OCPDS			
REF.	QTY.	RATED CURRENT	MAX VOLTAGE
CB1-2	2	60A	240VAC
CB3	1	30A	240VAC
CB4-5	2	150A	240VAC







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APN: 32240012600122121

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

ASSEMBLY DETAILS

DATE: 09.11.2020

DESIGN BY: A.Y.

CHECKED BY: M.M.

REVISIONS

S-501.00

(SHEET 9)

REVISION BLOCK		
MARK	DATE	DESCRIPTION
1	10/19/16	NOTE & BRACE REVISIONS
2	1/06/2017	ADDED SD-300
3	2/02/2017	REVISED NOTES
4	2/13/2017	REVISED NOTES & SD-300
5	3/10/2017	UPDATED LINE TYPES

OWNER/CLIENT:

ENGINEERING CONSULTANT:  
Design Optimization Technologies  
424 Jefferson Street  
St. Charles, Mo 63301  
Phone: (636) 724-9872  
www.DOtecEngineering.com

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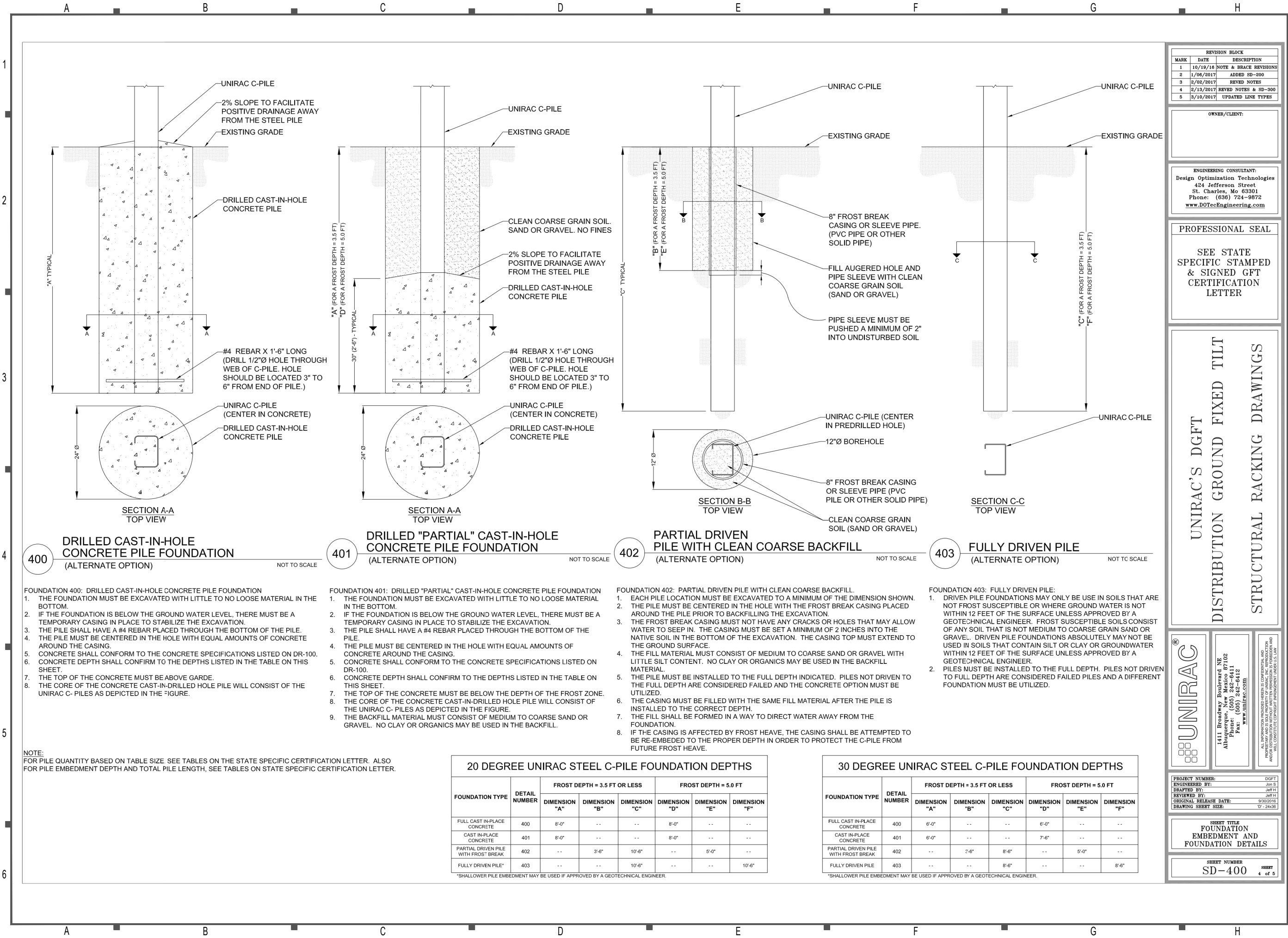
PROJECT NUMBER: DGFT  
ENGINEERED BY: Jon S.  
DRAFTED BY: Jeff H.  
REVIEWED BY: Jeff H.  
ORIGINAL RELEASE DATE: 9/30/2016  
DRAWING SHEET SIZE: 17" x 24/36"

SHEET TITLE  
DGFT TABLE CROSS-  
SECTION AND PARTS LIST  
(30 DEGREE TILT)

SHEET NUMBER  
SD-300

SHEET  
3 of 6





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NEW PV SYSTEM: 26.660 kWp

RITCHLIN  
RESIDENCE

4459 MIDDLE CHESHIRE RD  
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APN: 32240012600122121

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

ASSEMBLY DETAILS

DATE: 09.11.2020

DESIGN BY: A.Y.

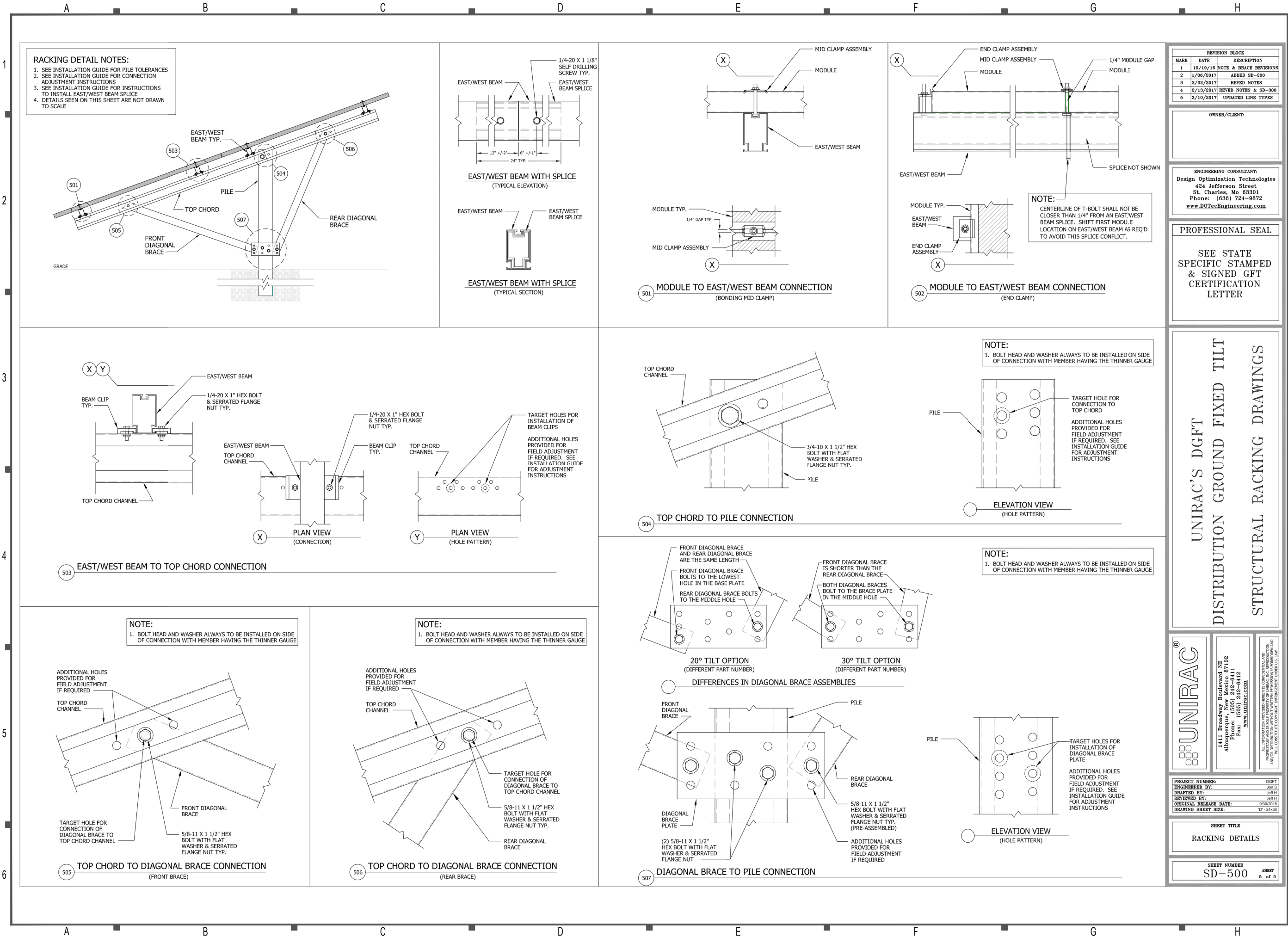
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(SHEET 10)





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ASSEMBLY DETAILS

DATE: 09.11.2020

DESIGN BY: A.Y.

CHECKED BY: M.M.

REVISIONS

S-503.00

(SHEET 11)



SOLARIA®

Solaria PowerXT® | Commercial



Solaria PowerXT®-430C-PD

Achieving up to 20% efficiency, Solaria PowerXT solar modules are one of the highest power modules in the commercial solar market. Compared to conventional modules, Solaria PowerXT modules have fewer gaps between the solar cells; this leads to higher power and superior aesthetics. Solaria PowerXT pure black commercial modules are manufactured with black backsheet and frames, giving them a striking appearance.

Developed in California, Solaria's patented cell cutting and module assembly takes processed solar wafers and turns them into PowerXT solar modules. The process starts by creating a highly reliable PowerXT cell where busbars and ribbon interconnections are eliminated. Solaria then packages the cells into the PowerXT solar module, reducing inactive space between the cells. This process leads to an exceptionally cost effective and efficient solar module.

Higher Efficiency, Higher Power

Solaria PowerXT modules achieve up to 20% efficiency; conventional modules achieve 15% – 17% efficiency. Solaria PowerXT modules are one of the highest power modules available.

Lower System Costs

Solaria PowerXT modules produce more power per square meter area. This reduces installation costs due to fewer balance of system components.

Improved Shading Tolerance

Sub-strings are interconnected in parallel, within each of the four module quadrants, which dramatically lowers the shading losses and boosts energy yield.

Improved Aesthetics

Compared to conventional modules, Solaria PowerXT modules have a more uniform appearance and improved aesthetics.

Durability and Reliability

Solder-less cell interconnections are highly reliable and designed to far exceed the industry leading 25 year warranty.

About Solaria

Established in 2000, The Solaria Corporation has created one of the industry's most respected IP portfolios, with over 100 patents encompassing materials, processes, applications, products, manufacturing automation and equipment. Headquartered in Oakland, CA, Solaria has developed a technology platform that unlocks the potential of solar energy.



The Solaria Corporation 1700 Broadway, Oakland, CA 94612 P: (510) 270-2500 www.solaria.com  
Product specifications are subject to change without notice.

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SOLARIA®

Solaria PowerXT®-430C-PD

Performance at STC (1000W/m², 25° C, AM 1.5)

Solaria PowerXT-		420C-PD	430C-PD
Max Power (P <sub>max</sub> )	[W]	420	430
Efficiency	[%]	19.4	19.8
Open Circuit Voltage (V <sub>oc</sub> )	[V]	47.1	47.3
Short Circuit Current (I <sub>sc</sub> )	[A]	11.39	11.43
Max Power Voltage (V <sub>mp</sub> )	[V]	38.8	39.3
Max Power Current (I <sub>mp</sub> )	[A]	10.82	10.93
Power Tolerance	[%]	-0/+3	-0/+3

Performance at NOCT (800W/m², 20°C Amb, Wind 1 m/s, AM 1.5)

Max Power (P <sub>max</sub> )	[W]	309	316
Open Circuit Voltage (V <sub>oc</sub> )	[V]	44.3	44.5
Short Circuit Current (I <sub>sc</sub> )	[A]	9.18	9.22
Max Power Voltage (V <sub>mp</sub> )	[V]	35.7	36.2
Max Power Current (I <sub>mp</sub> )	[A]	8.65	8.74

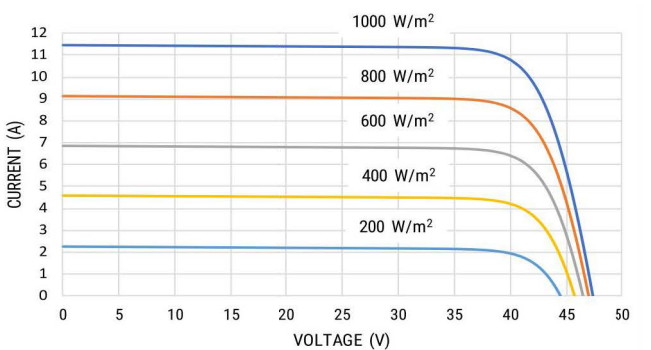
Temperature Characteristics

NOCT	[°C]	45 +/-2
Temp. Coeff. of P <sub>max</sub>	[% / °C]	-0.39
Temp. Coeff. of V <sub>oc</sub>	[% / °C]	-0.29
Temp. Coeff. of I <sub>sc</sub>	[% / °C]	0.04

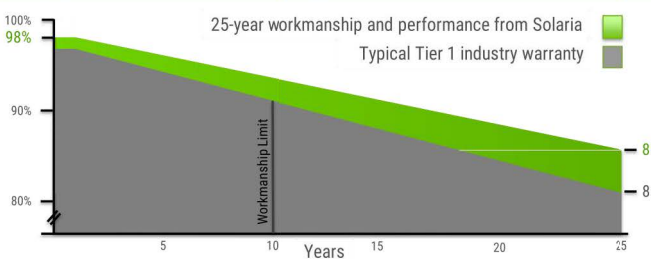
Design Parameters

Operating temperature	[°C]	-40 to +85
Max System Voltage	[V]	1000
Max Fuse Rating	[A]	20
Bypass Diodes	[#]	4

IV Curves vs. Irradiance (430W Module)



Comprehensive 25-Year Warranty



Mechanical Characteristics

Cell Type	Monocrystalline Silicon
Dimensions (L x W x H)	1939mm x 1116mm x 40mm
Weight	29 kg / 64 lbs
Glass Type / Thickness	AR Coated, Tempered / 4.0mm
Frame Type	Anodized Aluminum
Cable Type / Length	12 AWG PV Wire (UL) / 1200mm
Connector Type	MC4
Junction Box	IP67 / 4 diodes
Front Load (UL 1703)	5400 Pa / 113 psf*
Rear Load (UL 1703)	2400 Pa / 50 psf*

\* Refer to Solaria Installation Manual for details

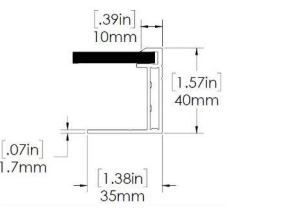
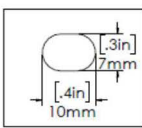
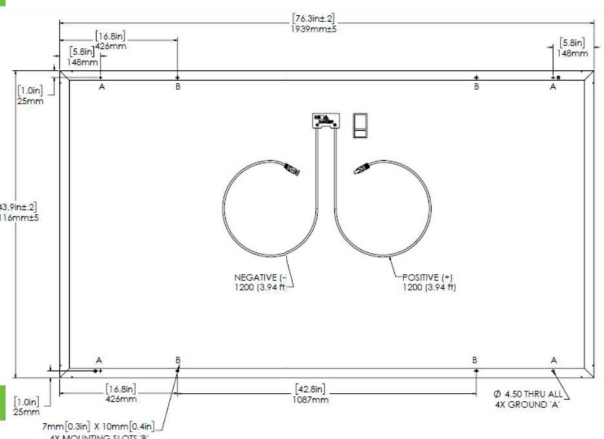
Certifications / Warranty

Certifications	UL 1703/IEC 61215/IEC 61730/CEC
Fire Type (UL 1703)	Type-1
Power & Product Warranty	25 years*

\* Warranty details at www.solaria.com

Packaging

Stacking Method	Horizontal / Palletized
Pcs / Pallet	25
Pallet Dims	1988 x 1150 x 1230 mm
Pallet Weight	748 kg / 1650 lbs
Pallets / 40-ft Container	22
Pcs / 40-ft Container	550



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# Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US



INVERTERS

## Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

[solaredge.com](https://solaredge.com)



## Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

Model Number	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER				SEXXXXH-XXXXXBXX4				
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)				59.3 - 60 - 60.5 <sup>(1)</sup>				Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor				1, adjustable -0.85 to 0.85				
GFDI Threshold				1				A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds				Yes				
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded				Yes				
Maximum Input Voltage				480				Vdc
Nominal DC Input Voltage		380				400		Vdc
Maximum Input Current @240V <sup>(2)</sup>	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V <sup>(2)</sup>	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current				45				Adc
Reverse-Polarity Protection				Yes				
Ground-Fault Isolation Detection				600k $\Omega$ Sensitivity				
Maximum Inverter Efficiency	99			99.2				%
CEC Weighted Efficiency				99			99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption				< 2.5				W

<sup>(1)</sup> For other regional settings please contact SolarEdge support

<sup>(2)</sup> A higher current source may be used; the inverter will limit its input current to the values stated

Model Number	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)						
Revenue Grade Data, ANSI C12.20	Optional <sup>(3)</sup>						
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi Access Point for local connection						
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCEI according to T.I.L. M-07						
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (H1)						
Emissions	FCC Part 15 Class B						
INSTALLATION SPECIFICATIONS							
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG				1" Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG				1" Maximum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174				21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9		38.8 / 17.6		lb / kg
Noise	< 25				<50		dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60 <sup>(4)</sup>						°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)						

<sup>(3)</sup> Revenue grade inverter P/N: SExxxxH-US000BN4

<sup>(4)</sup> Full power up to at least 50°C / 122°F; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>



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NEW PV SYSTEM: 26.660 kWp

## RITCHLIN RESIDENCE

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CANANDAIGUA, NY 14424  
APN: 32240012600122121

### ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

### RESOURCE DOCUMENT

DATE: 09.11.2020

DESIGN BY: A.Y.

CHECKED BY: M.M.

REVISIONS

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SHEET 13



# Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505



POWER OPTIMIZER

## PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com

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## Power Optimizer For North America

P320 / P340 / P370 / P400 / P405 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	P505 (for higher current modules)	
INPUT							
Rated Input DC Power <sup>(1)</sup>	320	340	370	400	405	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125 <sup>(2)</sup>	83 <sup>(2)</sup>	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11			10.1		14	Adc
Maximum DC Input Current	13.75			12.63		17.5	Adc
Maximum Efficiency	99.5						%
Weighted Efficiency	98.8					98.6	%
Overvoltage Category	II						
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)							
Maximum Output Current	15						Adc
Maximum Output Voltage	60				85		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)							
Safety Output Voltage per Power Optimizer	1 ± 0.1						Vdc
STANDARD COMPLIANCE							
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3						
Safety	IEC62109-1 (class II safety), UL1741						
RoHS	Yes						
INSTALLATION SPECIFICATIONS							
Maximum Allowed System Voltage	1000						Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters						
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1			129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	630 / 1.4			750 / 1.7	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4 <sup>(3)</sup>						
Output Wire Type / Connector	Double Insulated; MC4						
Output Wire Length	0.95 / 3.0		1.2 / 3.9				m / ft
Input Wire Length	0.16 / 0.52						m / ft
Operating Temperature Range	-40 - +85 / -40 - +185						°C / °F
Protection Rating	IP68 / NEMA6P						
Relative Humidity	0 - 100						%

<sup>(1)</sup> Rated STC power of the module. Module of up to +5% power tolerance allowed

<sup>(2)</sup> NEC 2017 requires max input voltage be not more than 80V

<sup>(3)</sup> For other connector types please contact SolarEdge

PV System Design Using a SolarEdge Inverter <sup>(4)(5)</sup>		Single Phase HD-Wave	Single phase	Three Phase 208V	Three Phase 480V	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400	8		10	18	
	P405 / P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50 <sup>(6)</sup>	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000 <sup>(7)</sup>	12750 <sup>(8)</sup>	W
Parallel Strings of Different Lengths or Orientations		Yes				

<sup>(4)</sup> For detailed string sizing information refer to: [http://www.solaredge.com/sites/default/files/string\\_sizing\\_na.pdf](http://www.solaredge.com/sites/default/files/string_sizing_na.pdf)

<sup>(5)</sup> It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string

<sup>(6)</sup> A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement

<sup>(7)</sup> For SE14.4KUS/SE43.2KUS: It is allowed to install up to 6,500W per string when 3 strings are connected to the inverter (3 strings per unit for SE43.2KUS) and when the maximum power difference between the strings is up to 1,000W

<sup>(8)</sup> For SE30KUS/SE33.3KUS/SE66.6KUS/SE100KUS: It is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE66.6KUS/SE100KUS) and when the maximum power difference between the strings is up to 2,000W

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SHEET 14

Type CH Style 3/4 in Loadcenter and Breaker Accessories

ECC225R

UPC:782114225219

Dimensions:

- Height: 5.5 IN
- Length: 25 IN
- Width: 9.5 IN

Weight:15.5 LB

Notes:Order circuit breaker separately. Rainproof panels are furnished with hcp. One ground lug accepting 1-#14-#2 is factory installed. Also, there are pre-drilled holes to accept a GBK5 ground bar. approved for service entrance.

Warranties:

- Limited lifetime

Specifications:

- Type: Circuit breaker unit enclosure
- Amperage Rating: 225A
- Interrupt Rating: 10 kAIC
- Voltage Rating: 225V
- Wire Size: Determined by circuit breaker installed
- Used With: CC circuit breakers
- Enclosure: NEMA 3R

Supporting documents:

- [Eatons Volume 1-Residential and Light Commercial](#)
- [Eaton Specification Sheet - ECC225R](#)

Certifications:

- UL Listed

Product compliance: No Data



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CONTRACTOR

BUFFALO SOLAR INC.

PHONE: (716) 800-7775  
ADDRESS: 3279 WALDEN AVENUE  
DEPEW, NY 14043

LIC. NO.:  
HIC. NO.:  
ELE. NO.: MEL11-561082

UNAUTHORIZED USE OF THIS  
DRAWING SET WITHOUT WRITTEN  
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AND WILL BE SUBJECT TO CIVIL  
DAMAGES AND PROSECUTIONS.

NEW PV SYSTEM: 26.660 kWp

RITCHLIN  
RESIDENCE

4459 MIDDLE CHESHIRE RD  
CANANDAIGUA, NY 14424  
APN: 32240012600122121

ENGINEER OF RECORD

PAPER SIZE: 11" x 17" (ANSI B)

RESOURCE DOCUMENT

DATE: 09.11.2020

DESIGN BY: A.Y.

CHECKED BY: M.M.

REVISIONS

R-004.00



# GROUND FIXED TILT



**GROUND FIXED TILT (GFT)** has evolved from more than 12 years of experience meeting a variety of project requirements. A synergy of steel components and aluminum parts deliver performance with the lowest system cost. Installation savings are captured through efficiently engineered components, optional pre-assembled parts and integrated bonding for optimized construction sequencing. GFT delivers engineered cost savings to meet your project needs.



**SCALABLE TO ANY SIZE PROJECT**  
LESS STEPS • FEWER PARTS • BEST SERVICE • QUALITY PROVIDER

# GROUND FIXED TILT



## SCALABLE TO ANY SIZE PROJECT

### ALUMINUM BEAMS WITH MAXIMUM ADJUSTABILITY

East-West aluminum beams include a top mounting slot to accommodate a variety of module sizes without customizing a design for your project. Attachment to North-South top chords is simple and quick with slots yielding maximum construction tolerances throughout the array. A series of pre-drilled holes on the foundation channel and steel top chord ease the assembly process with fewer tools and less labor.

## ENGINEERED COST SAVINGS

### PRE-ASSEMBLY & WIRE MANAGEMENT

When project optimization outweighs component costs, Unirac will pre-assemble the top mounting clamps, shifting part of the installation process to our factory and saving labor steps on the job site. Wire management simply snaps anywhere onto the aluminum beam holding bundles of wire up to 2 inches in diameter.

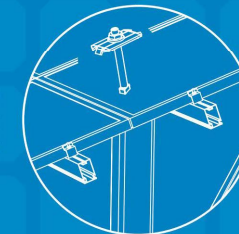
## PROJECT SUPPORT SERVICES

### DESIGN & QUOTATION ASSISTANCE

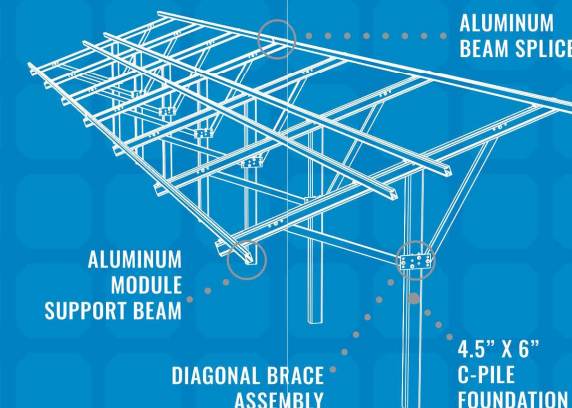
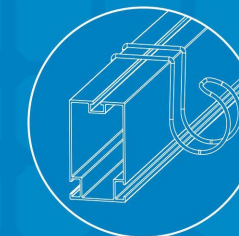
Every project receives standard drawings and calculations to aid permitting and system installation. We provide top notch project management services including design & quotation assistance, site-specific construction drawings and 3rd party structural design documentation.



TOP MOUNTING  
MODULE CLAMPS  
W/ INTEGRATED BONDING



SNAP-ON  
WIRE MANAGEMENT



## UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT



### ON-TIME DELIVERY

No waiting. Our goal is simple: Consistently deliver solutions and services correctly, efficiently and dependably to exceed your expectations. Our world-class operations provide a 99% on-time delivery to help you meet your commitment dates.



### CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and our commitment to first class business practices.



### BANKABLE WARRANTY

Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. GFT is covered by a 20-year manufacturing warranty on all parts.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

PUB2018SEP08 - PRINTED UPDATE



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SHEET 16



	A	B	C	D	E	F	G	H
1	ENGINEERING REPORT							
2	Plan review				Inspection			
	TOTAL NUMBER OF MODULES62				PRODUCTGFT			
3	TOTAL KW26.66 KW				MODULE MANUFACTURERSolaria			
	Parameters Used for Design				MODEL52 - PowerXT-400R-PM			
4	BUILDING CODEASCE 7-10				MODULE WATTS430 watts			
	BASIC WIND SPEED115.00 mph				MODULE LENGTH76.40"			
5	GROUND SNOW LOAD50.00 psf				MODULE WIDTH44.00"			
	RISK CATEGORYI				MODULE THICKNESS1.57"			
6	SEISMIC (SS)0.15				MODULE WEIGHT46.00 lbs			
	SEISMIC (S1)0.05				RAILS DIRECTIONEW			
7	ELEVATION1010.00 ft				RAILS ARRANGEMENT TYPEFour Rail			
	WIND EXPOSUREC				TILT30 degrees			
8	WIND ON ICE0.00 mph				CLAMP SELECTIONPro Clamps			
	ICE THICKNESS0.00"				FOUNDATION TYPEDriven			
9	Parameters Determined by Zip14424				FRONT EDGE HEIGHT2.50 ft			
	CITY, STATECanandaigua, NY				FOUNDATION LENGTH15.00 ft			
10	BASIC WIND SPEED115.00 mph				SUGGESTED ROW SPACING120.95"			
	GROUND SNOW LOAD35.00 psf				(Not required for design. Calculated based on latitude, tilt, and no module shading between 10am and 2pm on Dec. 21st. Customer is responsible for final row spacing and energy production.)			
Site Area 1 / Table Size 1 (count:1)								
NUMBER OF MODULES:					32			
TOTAL KW:					13.76 KW			
2X16 ARRAY RAIL LAYOUT								
246" RAIL					END-OF-RUN-SCRAP			
3 RAIL PER RUN					18.00"			
E/W ARRAY DIMENSION (MODULES ONLY)					718.00"			
E/W MAX ARRAY DIMENSION (RAIL OUT-TO-OUT)					719.00"			
N/S ARRAY DIMENSION (HORIZONTAL DISTANCE)					133.09"			
OPTIMUM "Z" DIMENSION (PILE TO PILE)					93.00"			
OPTIMUM "W" DIMENSION (WEST CANTILEVER)					34.00"			
DRIVEN FOUNDATION					No. of Foundations = 8			
					Minimum embedment length required = 8.76 ft			
					Maximum Lateral Shear Force = 1433.68 lbs			
					Maximum Axial Force = 3828.52 lbs			
					Maximum Moment = 8762.05 ft-lbs			
Site Area 1 / Table Size 2 (count:1)								
NUMBER OF MODULES:					30			
TOTAL KW:					12.90 KW			
2X15 ARRAY RAIL LAYOUT								
246" RAIL					END-OF-RUN-SCRAP			
3 RAIL PER RUN					63.00"			
E/W ARRAY DIMENSION (MODULES ONLY)					673.06"			
E/W MAX ARRAY DIMENSION (RAIL OUT-TO-OUT)					674.06"			
N/S ARRAY DIMENSION (HORIZONTAL DISTANCE)					133.09"			
OPTIMUM "Z" DIMENSION (PILE TO PILE)					99.0"			
OPTIMUM "W" DIMENSION (WEST CANTILEVER)					40.03"			
DRIVEN FOUNDATION					No. of Foundations = 7			
					Minimum embedment length required = 8.76 ft			
					Maximum Lateral Shear Force = 1344.08 lbs			
					Maximum Axial Force = 3595.56 lbs			
					Maximum Moment = 8225.33 ft-lbs			
*Refer to Unirac GFT Construction Details and Installation Guide for notes and installation details.								



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SHEET 17