

STRUCTURAL ENGINEER STAMP

ELECTRICAL ENGINEER STAMP

CIVIL ENGINEER STAMP

PROFESSIONAL ENGINEER STAMPS

LICENSED ELECTRICAL ENGINEER certifies that they prepared all the electrical "E" sheets in this drawing set.
LICENSED STRUCTURAL ENGINEER certifies that they prepared all of the structural "S" sheets in this drawing set.
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It should be noted that any plan sheets not identified above have been prepared and certified by others and have been included herein for informational purposes only.

R	12/22/21	X	
Q	12/8/21	W	
P	11/12/21	V	
O	10/29/21	U	
N	10/29/21	T	
M	10/27/21	S	
REV	DATE	REV	DATE
DRAWN BY: TG		CHECKED BY: RA	
SCALE: AS NOTED		JOB NO: 21-702	

DANE COUNTY SOLAR
LLC

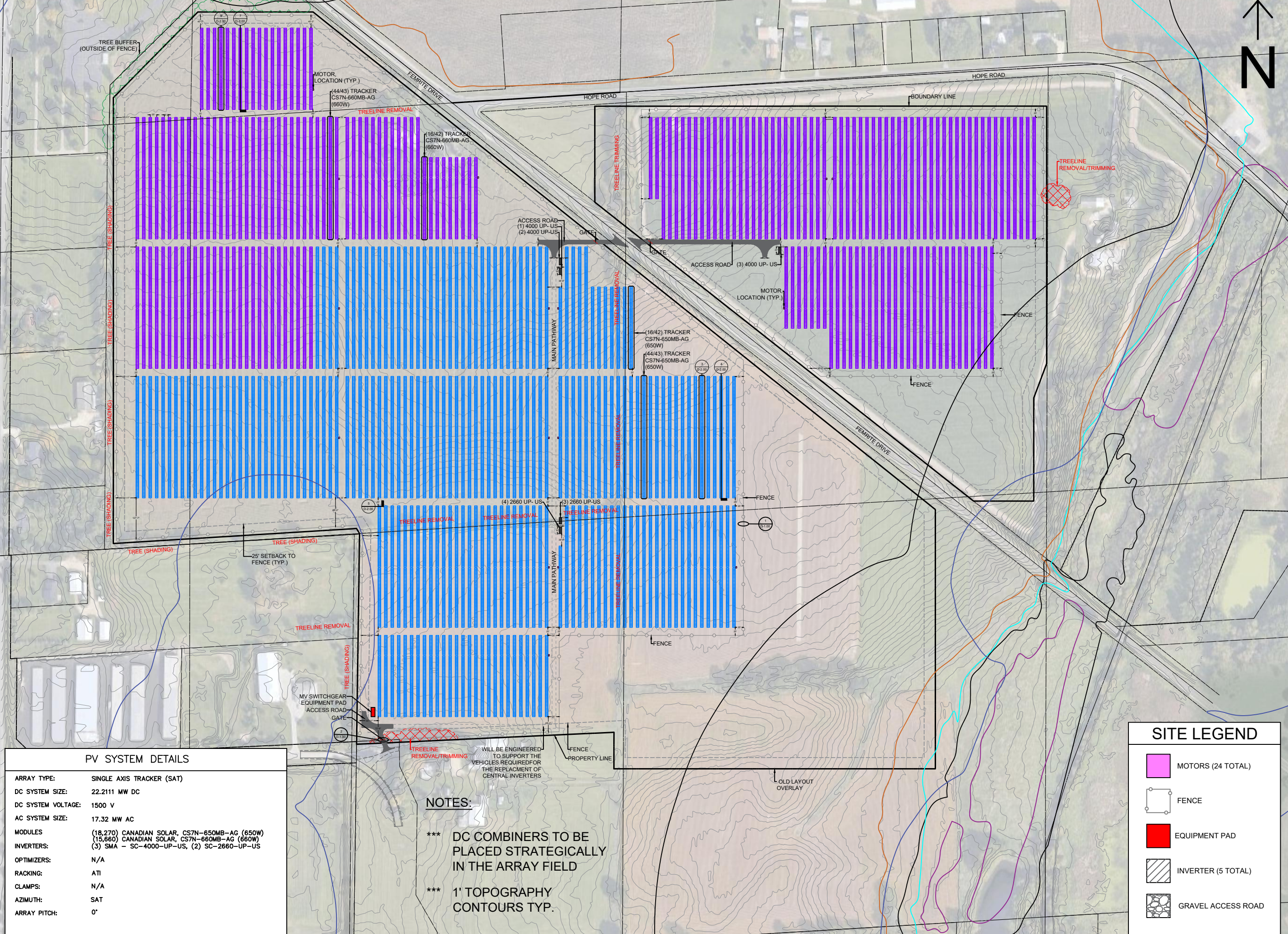
COTTAGE GROVE, WI 55016

SHEET TITLE

ARRAY LAYOUT

DWG. NO.

PV-1.00



PV SYSTEM DETAILS	
ARRAY TYPE:	SINGLE AXIS TRACKER (SAT)
DC SYSTEM SIZE:	22.2111 MW DC
DC SYSTEM VOLTAGE:	1500 V
AC SYSTEM SIZE:	17.32 MW AC
MODULES:	(18,270) CANADIAN SOLAR, CS7N-650MB-AG (650W) (15,660) CANADIAN SOLAR, CS7N-660MB-AG (660W)
INVERTERS:	(3) SMA - SC-4000-UP-US, (2) SC-2660-UP-US
OPTIMIZERS:	N/A
RACKING:	ATI
CLAMPS:	N/A
AZIMUTH:	SAT
ARRAY PITCH:	0°

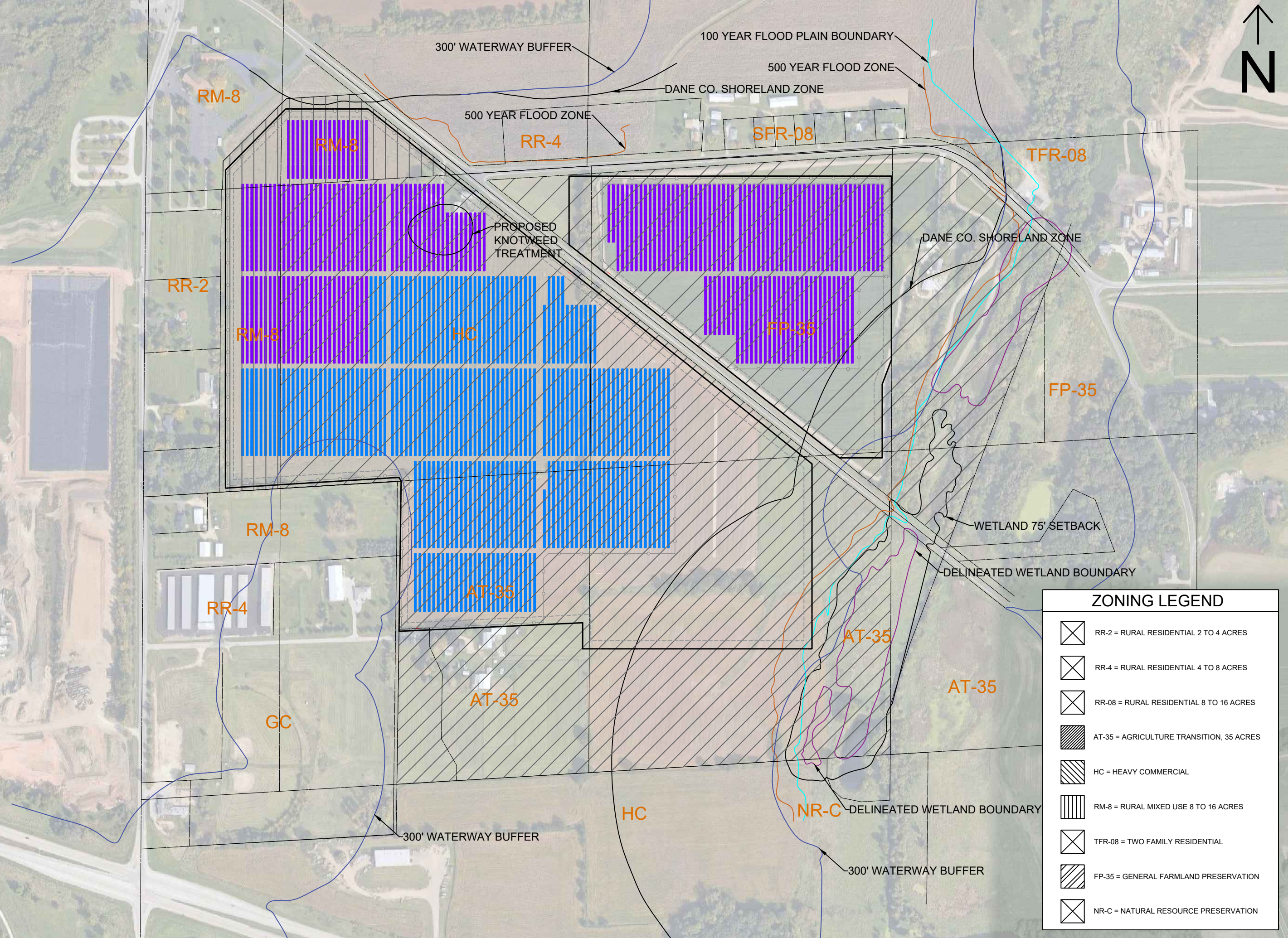
NOTES:

*** DC COMBINERS TO BE PLACED STRATEGICALLY IN THE ARRAY FIELD

*** 1' TOPOGRAPHY CONTOURS TYP.

WILL BE ENGINEERED TO SUPPORT THE VEHICLES REQUIRED FOR THE REPLACEMENT OF CENTRAL INVERTERS

SITE LEGEND	
	MOTORS (24 TOTAL)
	FENCE
	EQUIPMENT PAD
	INVERTER (5 TOTAL)
	GRAVEL ACCESS ROAD



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ZONING LEGEND	
	RR-2 = RURAL RESIDENTIAL 2 TO 4 ACRES
	RR-4 = RURAL RESIDENTIAL 4 TO 8 ACRES
	RR-08 = RURAL RESIDENTIAL 8 TO 16 ACRES
	AT-35 = AGRICULTURE TRANSITION, 35 ACRES
	HC = HEAVY COMMERCIAL
	RM-8 = RURAL MIXED USE 8 TO 16 ACRES
	TFR-08 = TWO FAMILY RESIDENTIAL
	FP-35 = GENERAL FARMLAND PRESERVATION
	NR-C = NATURAL RESOURCE PRESERVATION

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DANE COUNTY SOLAR
LLC
COTTAGE GROVE, WI 55016

SHEET TITLE
ZONING PLAN

DWG. NO.
PV-2.00



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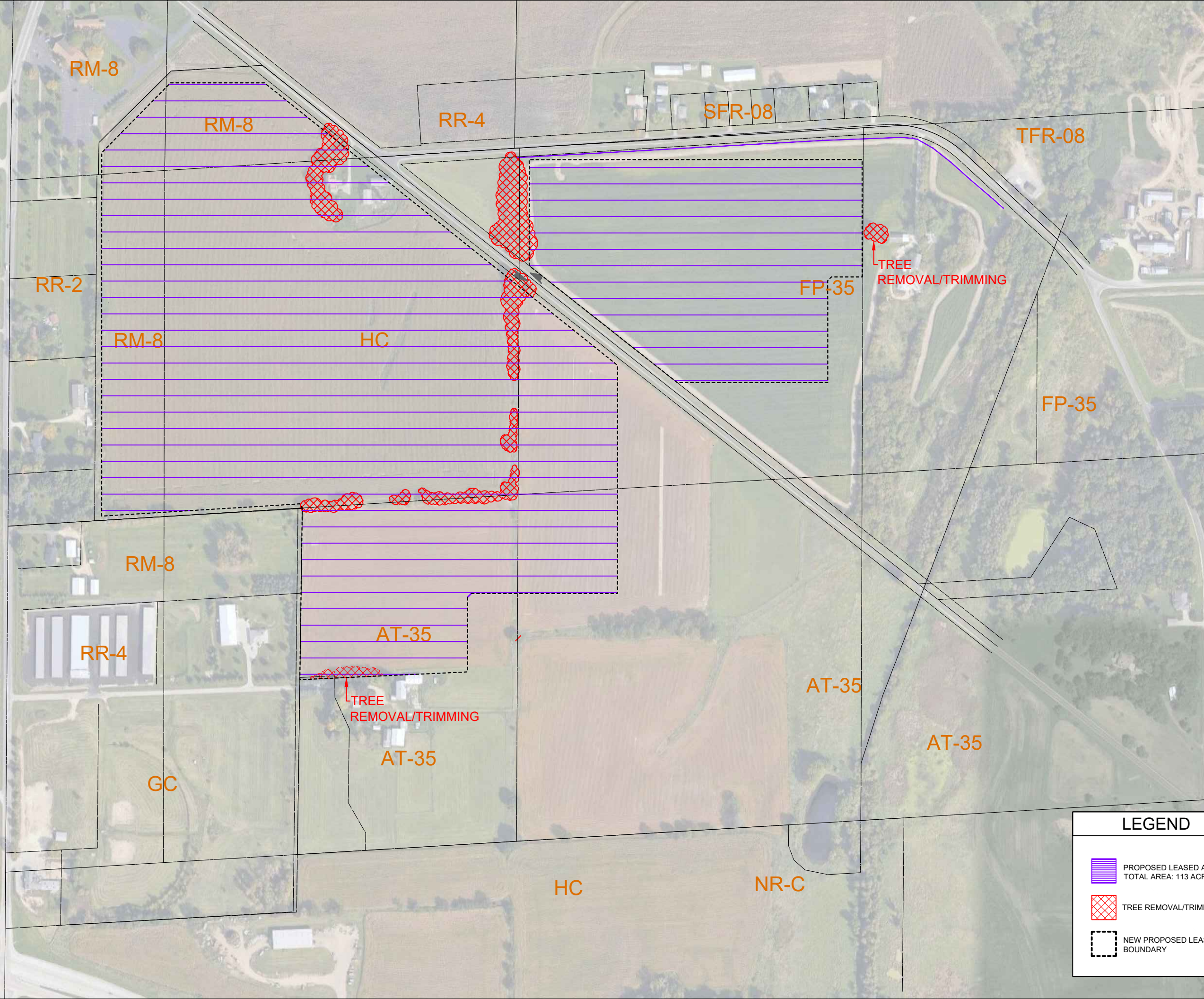
COTTAGE GROVE, WI 55016

SHEET TITLE

PROPOSED LEASED AREA MAP

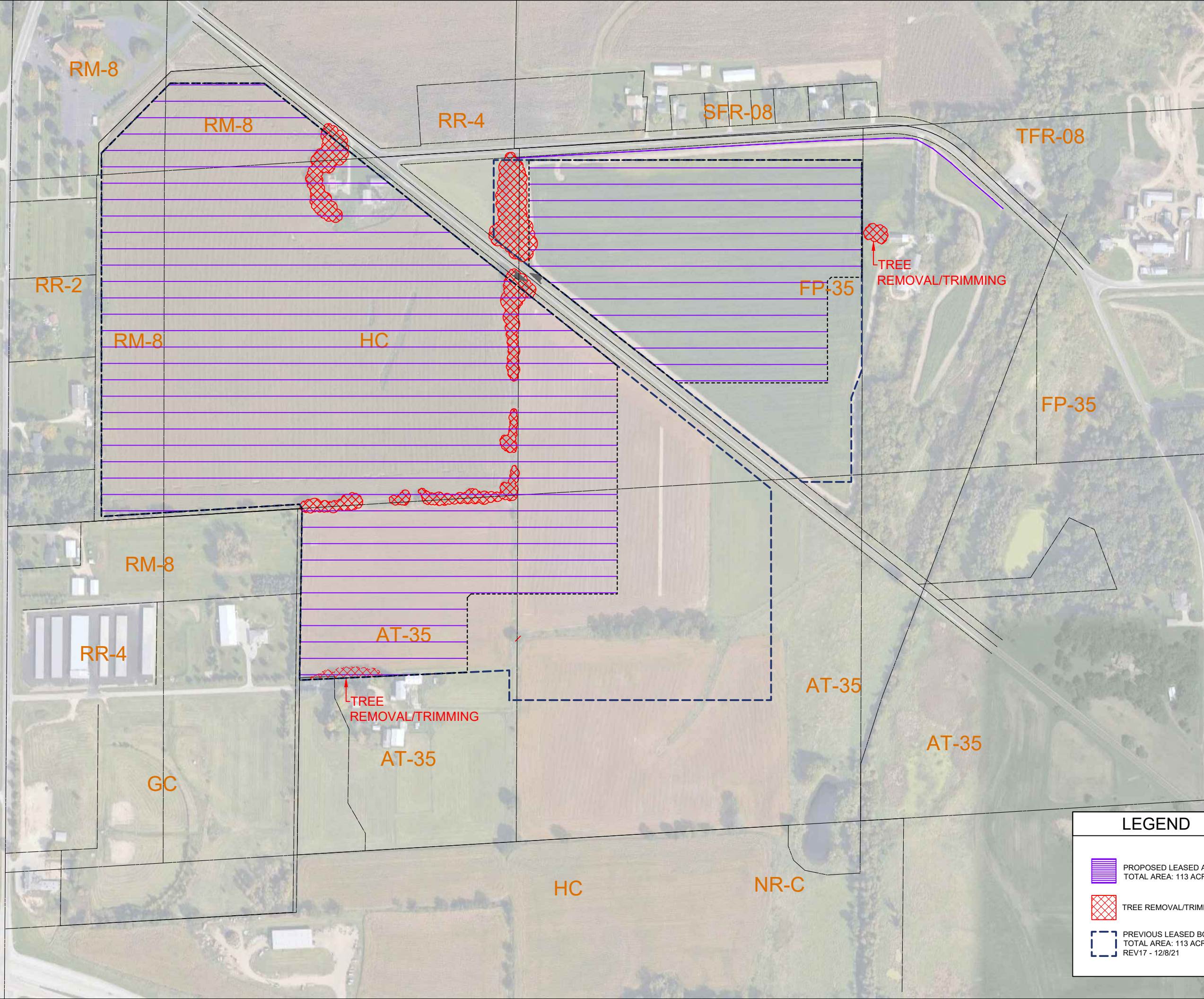
DWG. NO.

PV-2.10



LEGEND

- PROPOSED LEASED AREA
TOTAL AREA: 113 ACRES
- TREE REMOVAL/TRIMMING
- NEW PROPOSED LEASED BOUNDARY



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DANE COUNTY SOLAR
LLC

COTTAGE GROVE, WI 55016




SHEET TITLE

PROPOSED LEASED AREA MAP
OVERLAY

DWG. NO.

PV-2.20

LEGEND

-  PROPOSED LEASED AREA
TOTAL AREA: 113 ACRES
-  TREE REMOVAL/TRIMMING
-  PREVIOUS LEASED BOUNDARY
TOTAL AREA: 113 ACRES
REV17 - 12/8/21

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DANE COUNTY SOLAR LLC

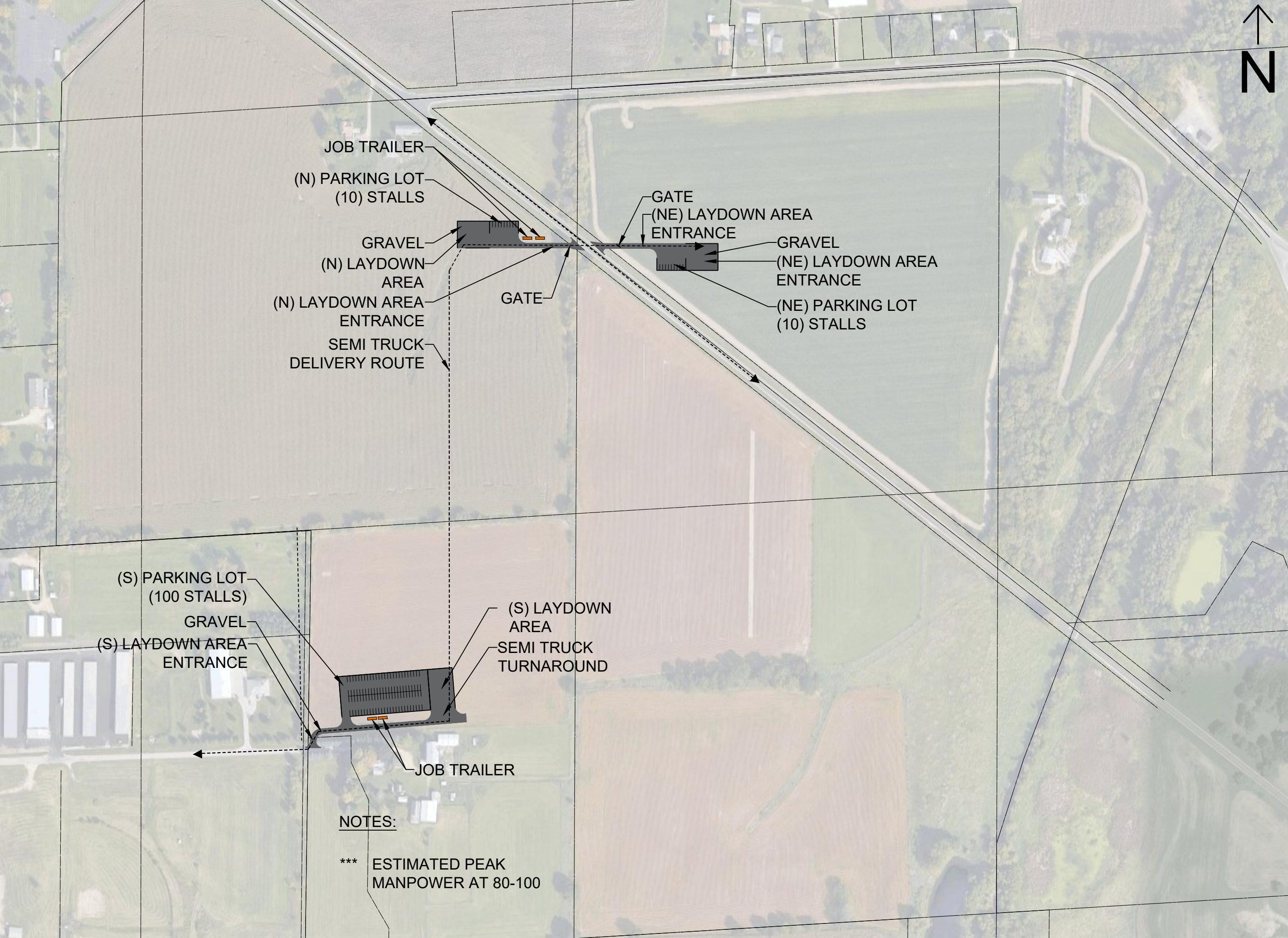
COTTAGE GROVE, WI 55016

SHEET TITLE

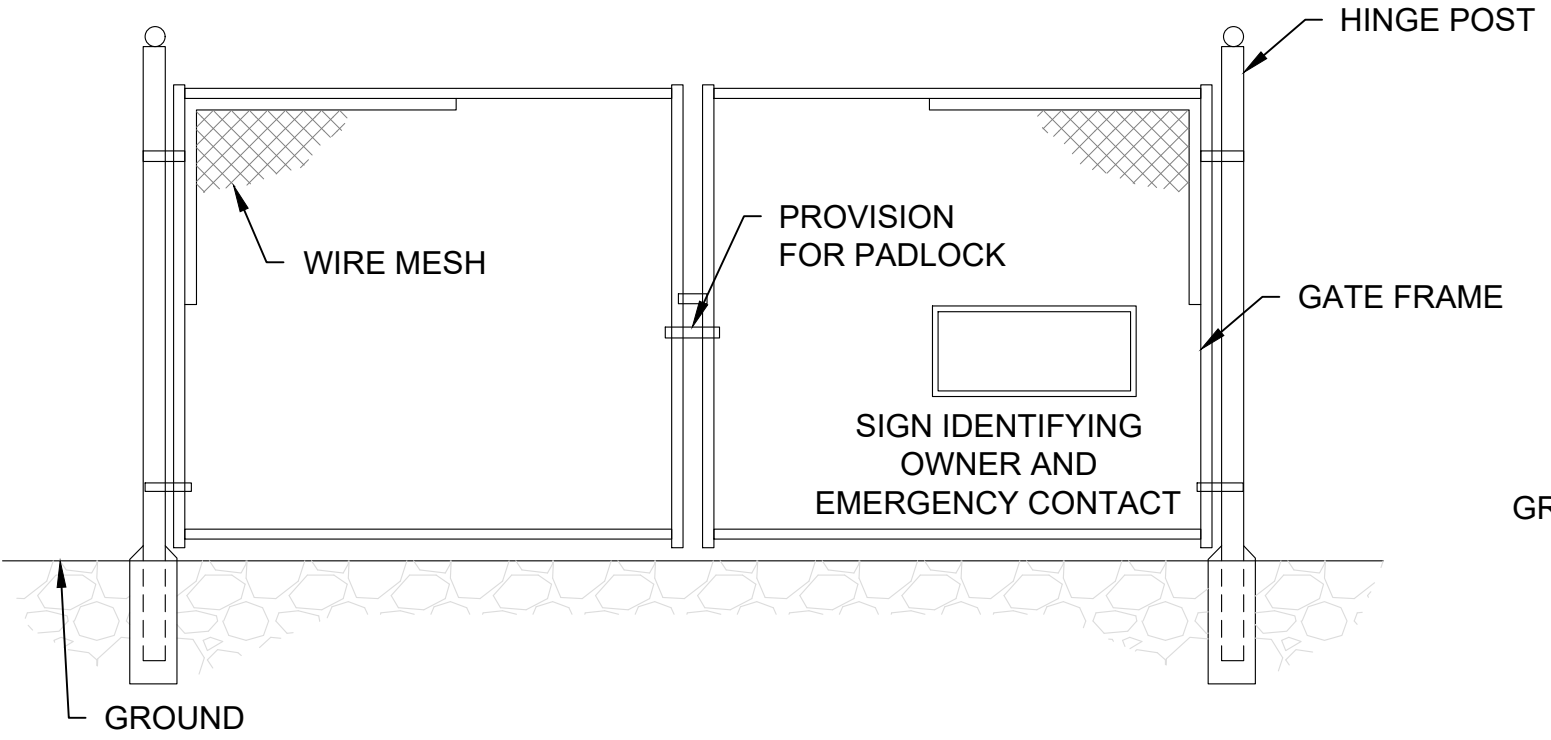
STAGING/LAYDOWN LAYOUT

DWG. NO.

PV-3.00



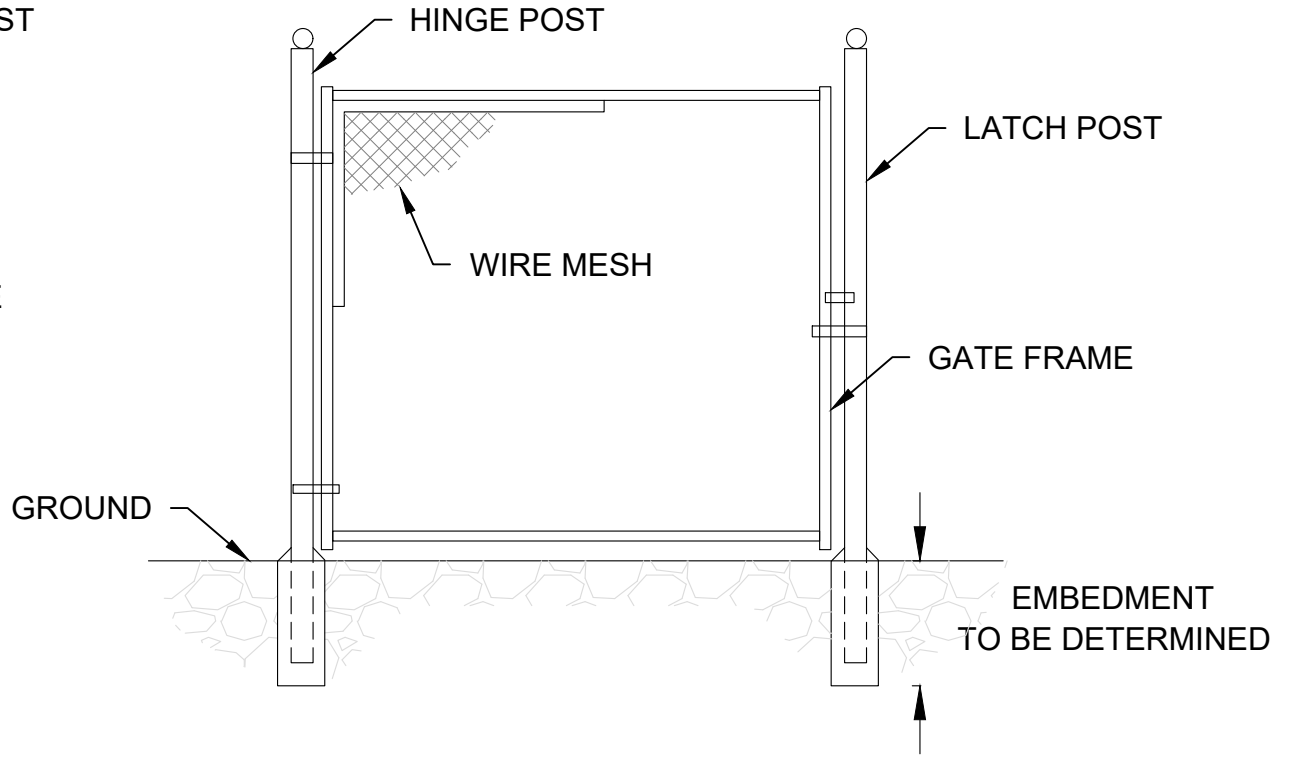
NOTES:
 *** ESTIMATED PEAK
 MANPOWER AT 80-100



1
D-1.00

8' KNOT FARM FENCE DOUBLE GATE

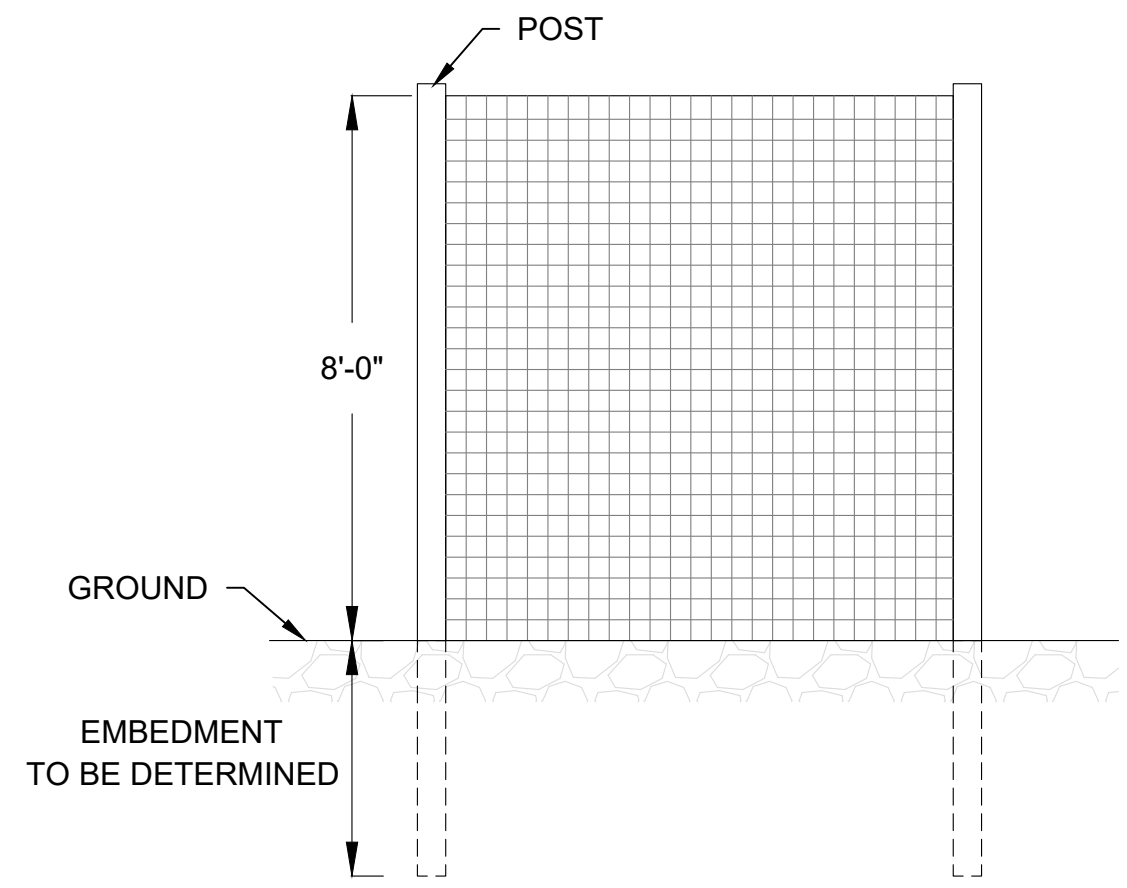
NOT TO SCALE



2
D-1.00

8' KNOT FARM FENCE PERSONNEL GATE

NOT TO SCALE



3
D-1.00

8' KNOT FARM FENCE

NOT TO SCALE

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DRAWN BY: TG CHECKED BY: RA
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DANE COUNTY SOLAR
 LLC
 COTTAGE GROVE, WI 55016

SHEET TITLE
 DETAILS

DWG. NO.
D-1.00

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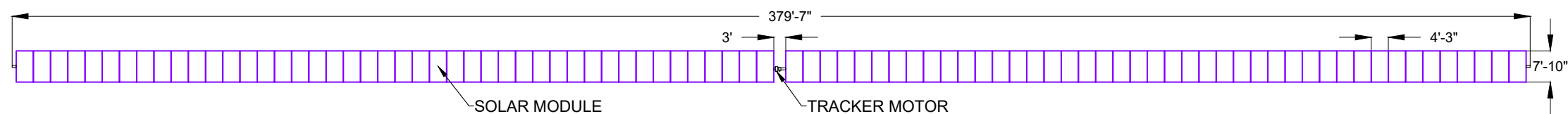
COTTAGE GROVE, WI 55016

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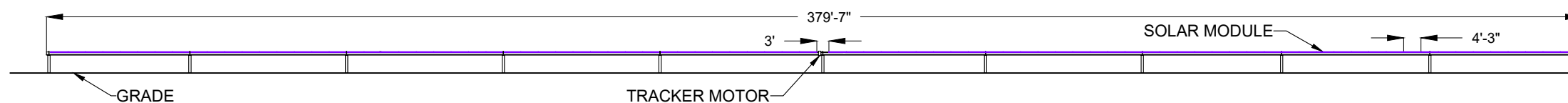
DETAILS

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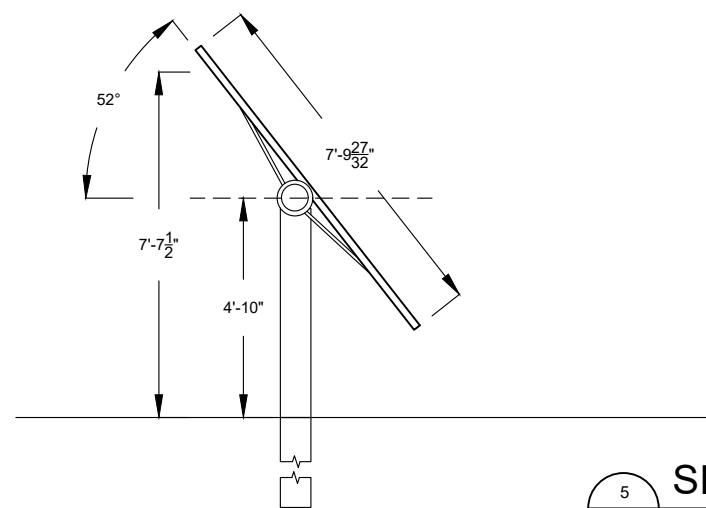
D-2.00



3 44/43 - SINGLE AXIS TRACKER TOP DOWN VIEW
PV-1.00 NOT TO SCALE



4 44/43 - SINGLE AXIS TRACKER EAST- WEST ELEVATION
PV-1.00 NOT TO SCALE



5 SINGLE AXIS TRACKER NORTH-SOUTH ELEVATION
PV-1.00 NOT TO SCALE

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LLC

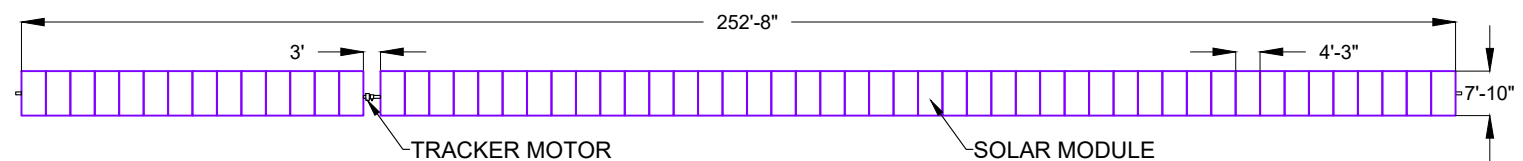
COTTAGE GROVE, WI 55016

SHEET TITLE

DETAILS

DWG. NO.

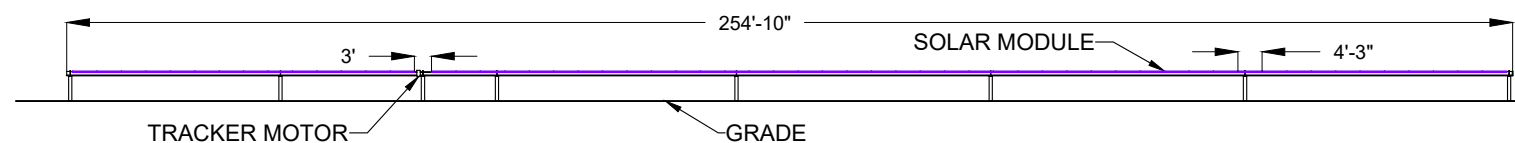
D-3.00



6
PV-1.00

16/42 - SINGLE AXIS TRACKER TOP DOWN VIEW

NOT TO SCALE



7
PV-1.00

16/42 - SINGLE AXIS TRACKER EAST- WEST ELEVATION

NOT TO SCALE

PV SYSTEM DETAILS

ARRAY TYPE:	SINGLE AXIS TRACKER (SAT)
DC SYSTEM SIZE:	22.2111 MW DC
DC SYSTEM VOLTAGE:	1500 V
AC SYSTEM SIZE:	17.32 MW AC
MODULES:	(18,270) CANADIAN SOLAR, CS7N-650MB-AG (650W) (15,660) CANADIAN SOLAR, CS7N-660MB-AG (660W)
INVERTERS:	(3) SMA - SC-4000-UP-US, (2) SC-2660-UP-US
OPTIMIZERS:	N/A
RACKING:	ATI
CLAMPS:	N/A
AZIMUTH:	SAT
ARRAY PITCH:	0°

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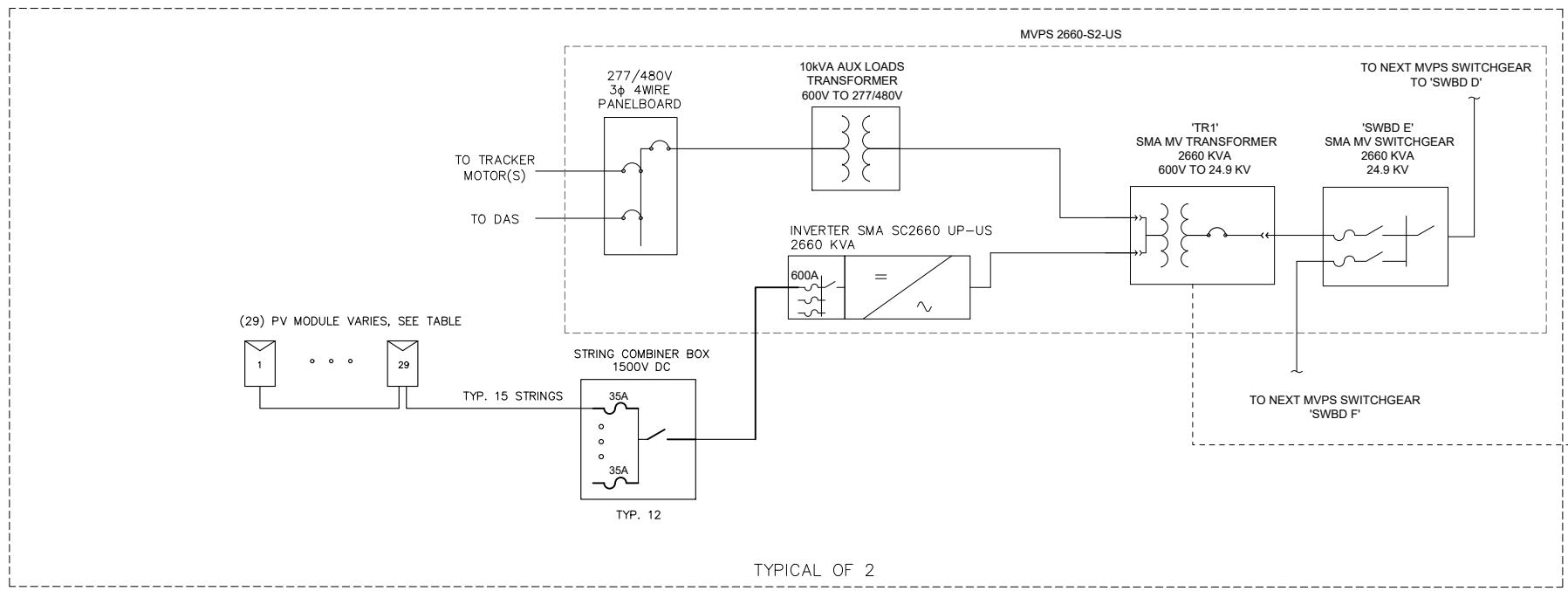
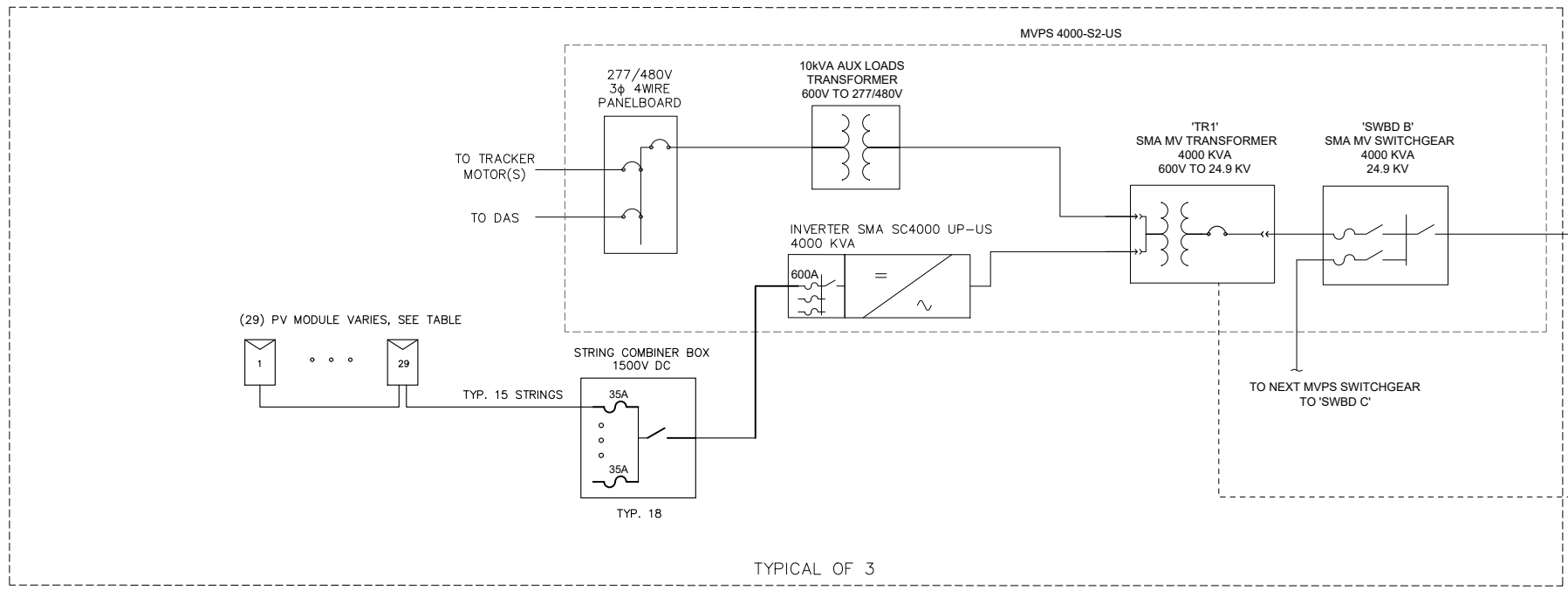
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DANE COUNTY SOLAR LLC

COTTAGE GROVE, WI 55016

SHEET TITLE
ONE LINE DIAGRAM

DWG. NO.
E-1.00



1. TRANSFORMER INTEGRATED DISCONNECT SHALL BE VISIBLE BREAK, LOCKABLE AND IN THE OPEN POSITION. PROVIDE VIEWING WINDOW IN ENCLOSURE FOR VISUAL VERIFICATION OF SWITCH POSITION WITHOUT HAVING TO OPEN TRANSFORMER ENCLOSURE.
2. FINAL GROUNDING TRANSFORMER RATINGS SHALL BE DETERMINED BASED ON RESULTS OF UTILITY STUDY.
3. FINAL RELAY PROTECTION SYSTEM FUNCTIONS AND SETTINGS TO BE COORDINATED WITH UTILITY.
4. ALL EQUIPMENT SHALL BE LISTED FOR ITS PURPOSE AND INSTALLED PER ITS LISTING AND NEC REQUIREMENTS.
5. EQUIPMENT SHOWN IS PRELIMINARY AND SUBJECT TO CHANGE BASED ON COORDINATION WITH UTILITY.

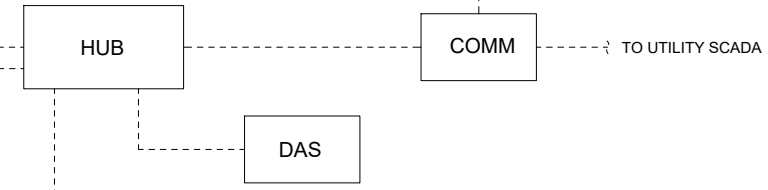
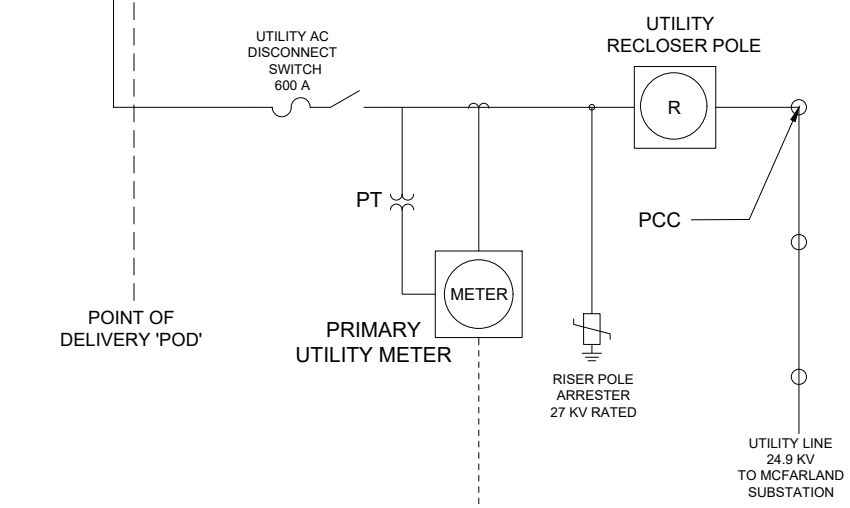


TABLE 1.1

INVERTER	PV MODULE	STRING SIZE	TOTAL STRINGS	DC POWER
1) SMA - SC 4000 UP US	CANADIAN SOLAR, CS7N-660MB-AG (660W)	29	270	5.1678 MW
2) SMA - SC 4000 UP US	CANADIAN SOLAR, CS7N-660MB-AG (660W)	29	270	5.1678 MW
3) SMA - SC 4000 UP US	CANADIAN SOLAR, CS7N-650MB-AG (650W)	29	270	5.0895 MW
4) SMA - SC 2660 UP US	CANADIAN SOLAR, CS7N-650MB-AG (650W)	29	180	3.393 MW
5) SMA - SC 2660 UP US	CANADIAN SOLAR, CS7N-650MB-AG (650W)	29	180	3.393 MW
TOTAL:			1,170	22.2111 MW



BiHiKu7

BIFACIAL MONO PERC
635 W ~ 660 W

CS7N-635 | 640 | 645 | 650 | 655 | 660MB-AG

MORE POWER

660 W Module power up to 660 W
Module efficiency up to 21.2 %

Up to 8.9 % lower LCOE
Up to 4.6 % lower system cost

Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation

Compatible with mainstream trackers, cost effective product for utility power plant

Better shading tolerance

MORE RELIABLE

40 °C lower hot spot temperature, greatly reduce module failure rate

Minimizes micro-crack impacts

Heavy snow load up to 5400 Pa, wind load up to 2400 Pa*

* For detailed information, please refer to the Installation Manual.

CANADIAN SOLAR (USA), INC.
3000 Oak Road, Suite 400, Walnut Creek, CA 94597, USA | www.csisolar.com/na | service.ca@csisolar.com

12 Years Enhanced Product Warranty on Materials and Workmanship*

30 Years Linear Power Performance Warranty*

1st year power degradation no more than 2%
Subsequent annual power degradation no more than 0.45%

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001:2018 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / INMETRO / UKCA
UL 61730 / IEC 61701 / IEC 62716 / IEC 60068-2-68
Table 4-10/9



* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

CANADIAN SOLAR (USA), INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. Canadian Solar was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey, and is a leading PV project developer and manufacturer of solar modules, with over 55 GW deployed around the world since 2001.



**FOLLOW THE SUN.
FOLLOW THE LEADER.**



**99.996% UPTIME.
ENGINEERED SIMPLICITY.**

7% LOWER LCOE

31% LOWER LIFETIME O&M

DuraTrack® HZ v3

Three decades of field-tested design improvements have resulted in the DuraTrack® HZ v3 — the most durable, reliable tracking system under the sun. While our single-bolt module clamp and forgiving tolerances streamline installation, and our flexibly linked architecture maximizes power density, it's our innovative use of fewer components and a failure-free wind management system that makes Array Technologies the best choice for solar trackers. **Better. Stronger. Smarter.**



HIGHEST POWER DENSITY.

Higher density means more power and more profit. DuraTrack HZ v3 offers the unique ability to maximize the power density of each site, boasting 100 modules per row and higher density than our closest competitor.



LEADING TERRAIN ADAPTABILITY.

Our flexibly linked architecture, with articulating driveline joints and forgiving tolerances, creates the most adaptable system on the market for following natural land contours while creating the greatest power generation potential from every site.



FEWER COMPONENTS, GREATER RELIABILITY.

Array was founded on a philosophy of engineered simplicity. Minimizing potential failure points (167 times fewer components than competitors), DuraTrack HZ v3 consistently delivers higher reliability and superior uptime.



FAILURE-FREE WIND DESIGN.

DuraTrack HZ v3 was designed and field tested to withstand some of the harshest conditions on the planet. It is the only tracker on the market that reliably handles wind events with a fully integrated, fully mechanical, passive wind-load mitigation system without the need for complex communication systems, batteries, or power.



ZERO SCHEDULED MAINTENANCE.

Maintenance-free motors and gears, lower moving parts, and industrial-grade components—what does this mean for our customers? No scheduled maintenance required. While our competitors average two unscheduled maintenance events per day, we average only one per year.



**FOLLOW THE SUN.
FOLLOW THE LEADER.**

COST VERSUS VALUE

We believe value is more than the cost of a tracking system. It's about building with forgiving tolerances and fewer parts so construction crews can work efficiently. It means protecting your investment with a failure-free wind management system. It also includes increasing power density. But most of all, value is measured in operational uptime, or reliability.

THE GLOBAL LEADER IN RELIABILITY

Array has spent decades designing and perfecting the most reliable tracker on the planet. Fewer moving parts, stronger components and intelligent design that protects your investment in the harshest weather are but a few of the innovative differences that keep your system running flawlessly all day and you resting easy at night.

ARRAY TECHNOLOGIES, INC.

3901 Midway Place NE
Albuquerque, NM 87109 USA
+1 505.881.7567
+1 855.TRACKPV (872.2578)
+1 505.881.7572
sales@arraytechinc.com
arraytechinc.com

30 GW YEARS OF OPERATION

167x FEWER COMPONENTS THAN COMPETITIVE TRACKERS

STRUCTURAL & MECHANICAL FEATURES/SPECIFICATIONS

Tracking Type	Horizontal single axis
MW per Drive Motor	Up to 1.152 MW DC using 350W crystalline
String Voltage	Up to 1,500V DC
Maximum Loaded Rows	32
Maximum Row Size	100 modules crystalline, and bifacial; 240 modules First Solar 4; 78 modules First Solar 6
Drive Type	Rotating gear drive
Motor Type	2 HP, 3 PH, 480V AC
Motors per 1 MW DC	Less than 1
East-West/North-South Dimensions	Site / module specific
Array Height	5'4" standard, adjustable (48" min height above grade)
Ground Coverage Ratio (GCR)	Flexible, 28–45% typical, others supported on request
Terrain Flexibility	N-S tolerance: 0° – 8.5° standard, 15° optional; Driveline: 40° in all directions
Modules Supported	Most commercially available, including frameless crystalline, thin film, and bifacial
Tracking Range of Motion	± 52° standard, ± 62° optional
Operating Temperature Range	-30°F to 140°F (-34°C to 60°C)
Module Configuration available.	Single-in-portrait standard, including bifacial, Four-in-landscape (thin film) also
Module Attachment	Single fastener, high-speed mounting clamps with integrated grounding. Traditional rails for crystalline in landscape, custom racking for thin film and frameless crystalline and bifacial per manufacturer specs.
Materials	Pre-galv steel, HDG steel and aluminum structural members, as required
Allowable Wind Load (ASCE 7-10)	140 mph, 3-second gust exposure C
Wind Protection	Passive mechanical system protects against wind damage — no power required

ELECTRONIC CONTROLLER FEATURES/SPECIFICATIONS

Solar Tracking Method	Algorithm with GPS input
Control Electronics	MDU plus Central Controller
Data Feed	MODBUS over Ethernet to SCADA system
Night-time Stop	Yes
Tracking Accuracy	± 2" standard, field adjustable
Backtracking	Yes

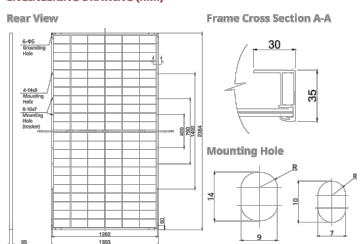
INSTALLATION, OPERATION & MAINTENANCE

Software	SmartTrack optimization available
PC Stamped Structural Calculations & Drawings	Yes
On-site Training and System Commissioning	Yes
Connection Type	Fully bolted connections, no welding
In-field Fabrication Required	No
Dry Slide Bearings and Articulating Driveline Connections	No lubrication required
Scheduled Maintenance	None required
Module Cleaning Compatibility	Robotic, Tractor, Manual

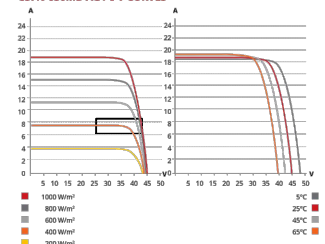
GENERAL

Annual Power Consumption (kWh per 1 MW)	400 kWh per MW per year, estimated
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ENGINEERING DRAWING (mm)



CS7N-650MB-AG / I-V CURVES



ELECTRICAL DATA | STC*

	Nominal Max. Power (Pmax)	Opt. Operating Voltage (Vmp)	Opt. Operating Current (Imp)	Open Circuit Voltage (Voc)	Short Circuit Current (Isc)	Module Efficiency
CS7N-635MB-AG	635 W	37.3 V	17.03 A	44.4 V	18.27 A	20.4%
Bifacial Gain**	5% 667 W	37.3 V	17.89 A	44.4 V	19.18 A	21.5%
	10% 699 W	37.3 V	18.74 A	44.4 V	20.10 A	22.5%
	20% 762 W	37.3 V	20.44 A	44.4 V	21.92 A	24.5%
CS7N-640MB-AG	640 W	37.5 V	17.07 A	44.6 V	18.31 A	20.6%
Bifacial Gain**	5% 672 W	37.5 V	17.92 A	44.6 V	19.23 A	21.6%
	10% 704 W	37.5 V	18.78 A	44.6 V	20.14 A	22.7%
	20% 768 W	37.5 V	20.48 A	44.6 V	21.97 A	24.7%
CS7N-645MB-AG	645 W	37.7 V	17.11 A	44.8 V	18.35 A	20.8%
Bifacial Gain**	5% 677 W	37.7 V	17.97 A	44.8 V	19.27 A	21.8%
	10% 710 W	37.7 V	18.84 A	44.8 V	20.19 A	22.9%
	20% 774 W	37.7 V	20.53 A	44.8 V	22.02 A	24.9%
CS7N-650MB-AG	650 W	37.9 V	17.16 A	45.0 V	18.39 A	20.9%
Bifacial Gain**	5% 683 W	37.9 V	18.03 A	45.0 V	19.31 A	22.0%
	10% 715 W	37.9 V	18.88 A	45.0 V	20.23 A	23.0%
	20% 780 W	37.9 V	20.59 A	45.0 V	22.07 A	25.1%
CS7N-655MB-AG	655 W	38.1 V	17.20 A	45.2 V	18.43 A	21.1%
Bifacial Gain**	5% 688 W	38.1 V	18.06 A	45.2 V	19.35 A	22.1%
	10% 721 W	38.1 V	18.93 A	45.2 V	20.27 A	23.2%
	20% 786 W	38.1 V	20.64 A	45.2 V	22.12 A	25.3%
CS7N-660MB-AG	660 W	38.3 V	17.24 A	45.4 V	18.47 A	21.2%
Bifacial Gain**	5% 693 W	38.3 V	18.10 A	45.4 V	19.39 A	22.3%
	10% 726 W	38.3 V	18.96 A	45.4 V	20.32 A	23.4%
	20% 792 W	38.3 V	20.69 A	45.4 V	22.16 A	25.5%

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

** Bifacial Gain: The additional gain from the back side compared to the power of the front side at the standard test condition. It depends on mounting structure, height, tilt angle etc) and albedo of the ground.

ELECTRICAL DATA

Operating Temperature	-40°C ~ +85°C
Max. System Voltage	1500 V (IEC/UL) or 1000 V (IEC/UL)
Module Fire Performance	TYPE 29 (UL 61730) or CLASS C (IEC61730)
Max. Series Fuse Rating	35 A
Application Classification	Class A
Power Tolerance	0 ~ +10 %
Power Bifaciality*	70 %

* Power Bifaciality = Pmax_bifacial / Pmax_monofacial, both Pmax_bifacial and Pmax_monofacial are tested under STC. Bifaciality Tolerance: ± 5 %

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the ongoing innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.



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It should be noted that any plan sheets not identified above have been prepared and certified by others and have been included herein for informational purposes only.

R	12/22/21	X	
Q	12/8/21	W	
P	11/12/21	V	
O	10/29/21	U	
N	10/29/21	T	
M	10/27/21	S	
REV	DATE	REV	DATE
DRAWN BY: TG		CHECKED BY: RA	
SCALE: AS NOTED		JOB NO: 21-702	

DANE COUNTY SOLAR LLC

COTTAGE GROVE, WI 55016

SHEET TITLE
SPEC SHEETS

DWG. NO.
E-2.00

MV POWER STATION
2660-S2 / 2800-S2 / 2930-S2 / 3060-S2



- | | | | |
|---|--|---|---|
| Robust <ul style="list-style-type: none"> Station and all individual components type-tested Optimally suited to extreme ambient conditions | Easy to Use <ul style="list-style-type: none"> Plug and play concept Completely pre-assembled for easy set-up and commissioning | Cost-Effective <ul style="list-style-type: none"> Easy planning and installation Low transport costs due to 20-foot skid | Flexible <ul style="list-style-type: none"> One design for the whole world DC-Coupling Ready Numerous options |
|---|--|---|---|

MV POWER STATION 2660-S2 / 2800-S2 / 2930-S2 / 3060-S2
Turnkey Solution for PV Power Plants and large-scale storage systems

With the power of the new robust central inverters, the Sunny Central UP or Sunny Central Storage UP, and with perfectly adapted medium-voltage components, the new MV Power Station offers even more power density and is a turnkey solution available worldwide. Being the ideal choice for the new generation of PV power plants operating at 1500 VDC, the integrated system solution is easy to transport and quick to assemble and commission. The MVPS and all components are type-tested. The MV Power Station combines rigorous plant safety with maximum energy yield and minimized deployment and operating risk. The MV Power Station is prepared for DC coupling.

MV POWER STATION
2660-S2 / 2800-S2 / 2930-S2 / 3060-S2

Technical Data	MVPS 2660-S2	MVPS 2800-S2
Input [DC]		
Available inverters	1 x SC 2660 UP	1 x SC 2800 UP
Max. input voltage	1500 V	1500 V
Number of DC inputs	dependent on the selected inverters	
Integrated zone monitoring	o	
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Output [AC] on the medium-voltage side		
Rated power at SC UP (at 25°C to +25°C / optional 50°C) ¹⁾	2660 kVA / 2260 kVA	2800 kVA / 2380 kVA
Typical nominal AC voltages	11 kV to 35 kV	11 kV to 35 kV
AC power frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Transformer vector group Dy11 / YNd11 / YNy0	o / o / o	o / o / o
Transformer cooling method	o / o / o	o / o / o
Transformer no-load losses Standard / Eco Design 1 / Eco Design 2	o / o / o	o / o / o
Transformer short-circuit losses Standard / Eco Design 1 / Eco Design 2	o / o / o	o / o / o
Reactive power feed-in (up to 40% of nominal power)	o	
Power factor at rated power / displacement power factor adjustable	1 / 0.8 overexcited to 0.8 underexcited	
Inverter efficiency		
Max. efficiency ²⁾ / European efficiency ³⁾ / CEC efficiency ⁴⁾	98.7% / 98.6% / 98.5%	98.7% / 98.6% / 98.5%
Protective devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	Medium-voltage vacuum circuit breaker	
DC overvoltage protection	Surge arrester type I	
Galvanic isolation	o	
Internal arc classification medium-voltage control room (according to IEC 62271-202)	IAC A 20 kA 1 s	
General Data		
Dimensions equal to 20-foot HC shipping container (W / H / D)	6058 mm / 2896 mm / 2438 mm	
Weight	o	
Self-consumption (max. / partial load / average) ⁵⁾	< 8.1 kW / < 1.8 kW / < 2.0 kW	
Self-consumption (standby) ⁶⁾	< 370 W	
Ambient temperature -25°C to +45°C / -25°C to +55°C / -40°C to +45°C	o / o / o	
Degree of protection according to IEC 60529	Control rooms IP20; inverter electronics IP54	
Environment: standard / harsh	o / o	
Degree of protection according to IEC 60721-3-4 (AC1, 4S2 / AC2, 4S4)	o / o	
Maximum permissible value for relative humidity	95% (for 2 months/year)	
Max. operating altitude above mean sea level 1000 m / 2000 m	o / o	
Fresh air consumption of inverter	6500 m ³ /h	
Features		
DC terminal	Terminal lug	
AC connection	Otercone angle-plug	
Tap changer for MV-transformer: without / with	o / o	
Shield winding for MV-transformer: without / with	o / o	
Monitoring package	o	
Station enclosure color	RAL 7004	
Transformer for external loads: without / 10 / 20 / 30 / 40 / 50 / 60 kVA	o / o / o / o / o / o / o	
Medium-voltage switchgear: without / 1 feeder / 3 feeders	o / o / o	
2 cable feeders with load-break switch, 1 transformer feeder with circuit breaker, internal arc classification IEC A FL 20 kA 1 s according to IEC 62271-200	o / o / o	
Short circuit rating medium voltage switchgear (20 kA 1 s / 20 kA 3 s / 25 kA 1 s)	o / o / o	
Accessories for medium-voltage switchgear: without / auxiliary contacts / motor for transformer feeder / cascade control / monitoring	o / o / o / o	
Integrated oil containment: without / with	o / o	
Industry standards (for other standards see the inverter data sheet)	IEC 60076, IEC 62271-200, IEC 62271-202, EN50588-1, CSC Certificate	
Standard features Optional features Not available		
Type designation	MVPS-2660-S2	MVPS-2800-S2

SUNNY CENTRAL
2660 UP-US / 2800 UP-US / 2930 UP-US / 3060 UP-US



- | | | | |
|--|--|--|--|
| Efficient <ul style="list-style-type: none"> Up to 4 inverters can be transported in one standard shipping container Overdimensioning up to 150% is possible Full power at ambient temperatures of up to 25 °C | Robust <ul style="list-style-type: none"> Intelligent air cooling system OptiCool for efficient cooling Suitable for outdoor use in all climatic ambient conditions worldwide | Flexible <ul style="list-style-type: none"> Conforms to all known grid requirements worldwide Q on demand Available as a single device or turnkey solution, including Medium Voltage Power Station | Easy to Use <ul style="list-style-type: none"> Integrated DC connection area Connection area for customer equipment Integrated voltage support for internal and external loads |
|--|--|--|--|

SUNNY CENTRAL
2660 UP-US / 2800 UP-US / 2930 UP-US / 3060 UP-US

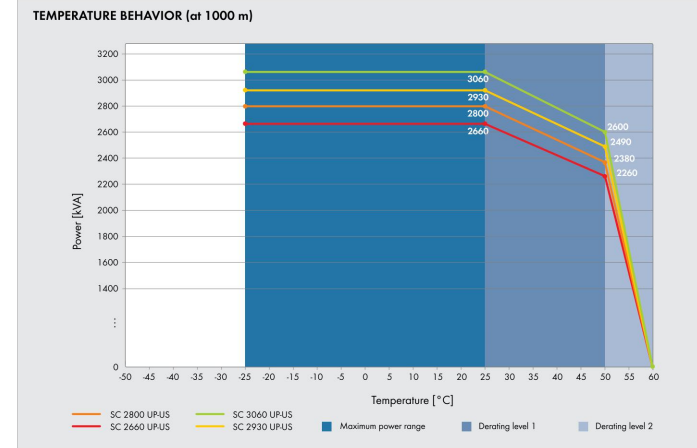
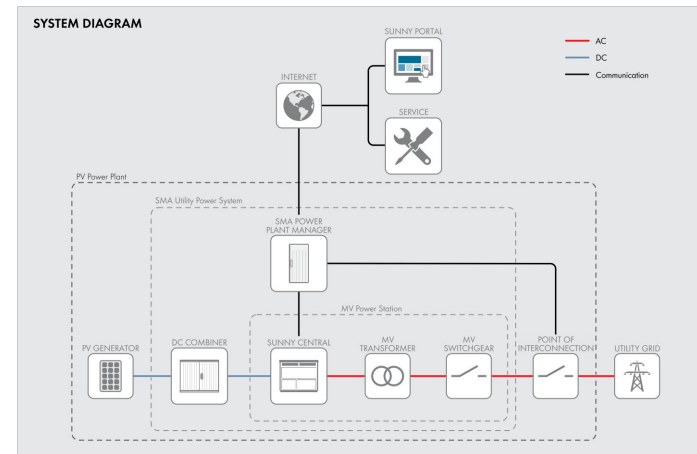
The new Sunny Central: more power per cubic meter

With an output of up to 3060 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV power plants. A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.

SUNNY CENTRAL 2660 UP-US / 2800 UP-US

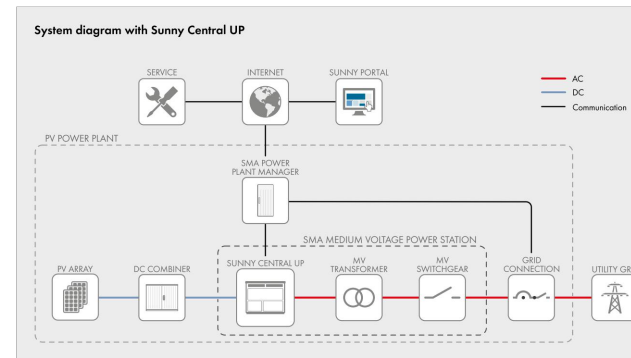
Technical data*	SC 2660 UP-US	SC 2800 UP-US
Input [DC]		
MPP voltage range V_{MPP} (at 25 °C / at 50 °C)	880 to 1325 V / 1100 V	921 to 1325 V / 1100 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, start}$	849 V / 1030 V	891 V / 1071 V
Max. input voltage $V_{DC, max}$	1500 V	1500 V
Max. input current $I_{DC, max}$	4750 A	4750 A
Max. short-circuit current $I_{DC, sc}$	6400 A	6400 A
Number of DC inputs	24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupling of battery	18 double pole fused (36 single pole fused) for PV, 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm ²	
Integrated zone monitoring	o	
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Output [AC]		
Nominal AC power at cos φ = 1 (at 25°C / at 50°C)	2660 kVA / 2260 kVA	2800 kVA / 2380 kVA
Nominal AC power at cos φ = 0.8 (at 25°C / at 50°C)	2128 kW / 1808 kW	2240 kW / 1904 kW
Nominal AC current $I_{AC, nom}$ (at 25°C / at 50°C)	2560 A / 2176 A	2566 A / 2181 A
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / nominal AC voltage range ¹⁾	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz	
Min. short-circuit ratio at the AC terminals ²⁾	1 / 0.8 overexcited to 0.8 underexcited	
Power factor at rated power / displacement power factor adjustable ³⁾	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency ²⁾ / European efficiency ³⁾ / CEC efficiency ⁴⁾	98.7%* / 98.6%* / 98.5%*	98.7%* / 98.6%* / 98.5%*
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	o / o	
Insulation monitoring	o	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2815 / 2318 / 1588 mm (110.8 / 91.3 / 62.5 inch)	
Weight	< 4000 kg / < 8818.5 lb	
Self-consumption (max. / partial load ⁵⁾ / average ⁶⁾)	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	o Integrated 8.4 kVA transformer	
Operating temperature range ⁷⁾	-25°C to 60°C / -13°F to 140°F	
Noise emission ⁸⁾	67.0 dB(A) ⁹⁾	
Temperature range (standby)	-40°C to 60°C / -40°F to 140°F	
Temperature range (storage)	-40°C to 70°C / -40°F to 158°F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 months/year) / 0% to 95%	
Maximum operating altitude above MSL ¹⁾ 1000 m / 2000 m	o / o (earlier temperature-dependent derating)	
Fresh air consumption	6500 m ³ /h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	o (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 3), CDR 61, UL 1741-SA, UL 1998, IEEE 1547, MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
Standard features Optional preliminary		

1) At nominal AC voltage, nominal AC power decreases in the same proportion
2) Efficiency measured without internal power supply
3) Efficiency measured with internal power supply
4) Self-consumption at rated operation
5) Self-consumption at < 75% Pn at 25 °C
6) Self-consumption overaged out from 5% to 100% Pn at 25 °C
7) Sound pressure level at a distance of 10 m
8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA
9) A short-circuit ratio of < 2 requires a special approval from SMA
10) Depending on the DC voltage



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Q	12/8/21	W	
P	11/12/21	V	
O	10/29/21	U	
N	10/29/21	T	
M	10/27/21	S	
REV	DATE	REV	DATE
DRAWN BY: TG		CHECKED BY: RA	
SCALE: AS NOTED		JOB NO: 21-702	

DANE COUNTY SOLAR
LLC

COTTAGE GROVE, WI 55016

SHEET TITLE
SPEC SHEETS

DWG. NO.

E-2.10

MV POWER STATION
4000-S2 / 4200-S2 / 4400-S2 / 4600-S2



- | | | | |
|---|---|---|---|
| Robust <ul style="list-style-type: none"> Station and all individual components type-tested Optimally suited to extreme ambient conditions | Easy to Use <ul style="list-style-type: none"> Plug and play concept Completely pre-assembled for easy setup and commissioning | Cost-Effective <ul style="list-style-type: none"> Easy planning and installation Low transport costs due to 20-foot skid | Flexible <ul style="list-style-type: none"> One design for the whole world DC-Coupling Ready Numerous options |
|---|---|---|---|

MV POWER STATION 4000-S2 / 4200-S2 / 4400-S2 / 4600-S2

Turnkey Solution for PV Power Plants

With the power of the new robust central inverters, the Sunny Central UP or Sunny Central Storage UP, and with perfectly adapted medium-voltage components, the new MV Power Station offers even more power density and is a turnkey solution available worldwide. The solution is the ideal choice for new generation PV power plants operating at 1500 V_{DC}. Delivered pre-configured on a 20-foot High Cube Container Skid, the solution is easy to transport and quick to assemble and commission. The MVPS and all components are type-tested. The MV Power Station combines rigorous plant safety with maximum energy yield and minimized deployment and operating risk. The MV Power Station is prepared for DC-Coupling.

SUNNY CENTRAL
4000 UP-US / 4200 UP-US / 4400 UP-US / 4600 UP-US

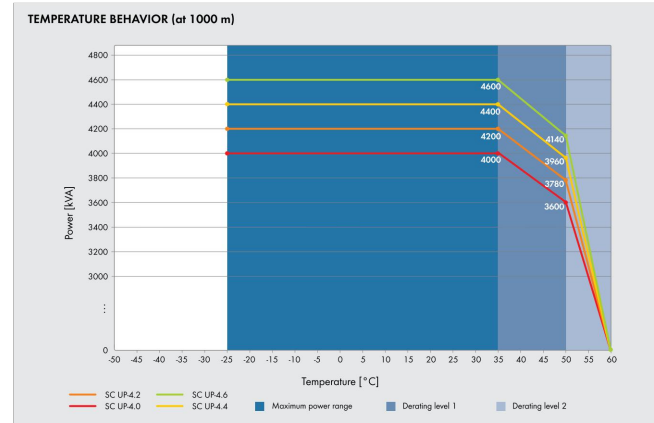
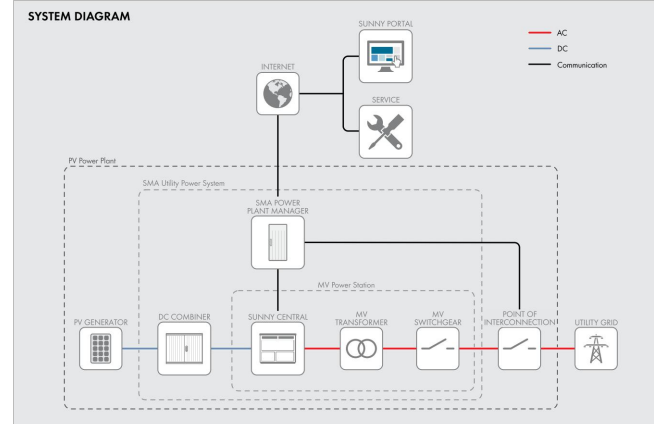


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|--|---|---|--|
| Efficient <ul style="list-style-type: none"> Up to 4 inverters can be transported in one standard shipping container Overdimensioning up to 150% is possible Full power at ambient temperatures of up to 35 °C | Robust <ul style="list-style-type: none"> Intelligent air cooling system OptiCool for efficient cooling Q on demand Available as a single device or turn-key solution, including medium-voltage block | Flexible <ul style="list-style-type: none"> Conforms to all known grid requirements worldwide Q on demand Available as a single device or turn-key solution, including medium-voltage block | Easy to Use <ul style="list-style-type: none"> Improved DC connection area Connection area for customer equipment Integrated voltage support for internal and external loads |
|--|---|---|--|

SUNNY CENTRAL
4000 UP-US / 4200 UP-US / 4400 UP-US / 4600 UP-US

The new Sunny Central: more power per cubic meter

With an output of up to 4600 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV power plants. A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.



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SMA America, LLC

MV POWER STATION
4000-S2 / 4200-S2 / 4400-S2 / 4600-S2

Technical Data	MVPS 4000-S2	MVPS 4200-S2
Input [DC]	1 x SC 4000 UP or 1 x SCS 3450 UP or 1 x SCS 3450 UPXT 1500 V	1 x SC 4200 UP or 1 x SCS 3600 UP or 1 x SCS 3600 UPXT 1500 V
Available inverters	dependent on the selected inverters	dependent on the selected inverters
Max. input voltage	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A
Number of DC inputs	24 double pole fused (32 single pole fused)	24 double pole fused (32 single pole fused)
Integrated zone monitoring	o	o
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A
Output [AC]		
Nominal AC power at cos φ = 1 (at 35°C / at 50°C)	4000 kVA / 3400 kVA	4200 kVA / 3570 kVA
Nominal AC power at cos φ = 0.8 (at 35°C / at 50°C)	3450 kVA / 2880 kVA	3620 kVA / 3020 kVA
Nominal AC current I _{LN} (at 35°C / at 50°C)	3450 A / 2880 A	3620 A / 3020 A
Max. total harmonic distortion	< 3% at nominal power	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range ¹⁾	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz	60 Hz / 57 Hz to 63 Hz
Min. short-circuit ratio at the AC terminals ²⁾	1 / 0.8 overexcited to 0.8 underexcited	1 / 0.8 overexcited to 0.8 underexcited
Power factor at rated power / displacement power factor adjustable ³⁾	98.7% / 98.6% / 98.5%	98.7% / 98.6% / 98.5%
Efficiency	98.7% / 98.6% / 98.5%	98.7% / 98.6% / 98.5%
Protective Devices		
Intrusive disconnection point	DC load break switch	DC load break switch
Outside disconnection point	AC circuit breaker	AC circuit breaker
DC overvoltage protection	Surge arrester, type I	Surge arrester, type I
AC overvoltage protection (optional)	Surge arrester, class I	Surge arrester, class I
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	Lightning Protection Level III
Ground fault monitoring / remote ground fault monitoring	o / o	o / o
Insulation monitoring	o	o
Degree of protection	NEMA 3R	NEMA 3R
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)
Weight	< 8100 kg / < 18150 lb	< 8100 kg / < 18150 lb
Self-consumption (max. / partial load ⁴⁾ / average ⁵⁾)	< 370 W	< 370 W
Self-consumption (standby)	o	o
Internal auxiliary power supply	o Integrated 8.4 kVA transformer	o Integrated 8.4 kVA transformer
Operating temperature range ⁶⁾	-25°C to 60°C / -13°F to 140°F	-25°C to 60°C / -13°F to 140°F
Noise emission ⁷⁾	67.0 dB(A)	67.0 dB(A)
Temperature range (standby)	-40°C to 60°C / -40°F to 140°F	-40°C to 60°C / -40°F to 140°F
Temperature range (storage)	-40°C to 70°C / -40°F to 158°F	-40°C to 70°C / -40°F to 158°F
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	95% to 100% (2 month/year) / 0% to 95%
Maximum operating altitude above MSL ⁸⁾ 1000 m / 2000 m	o / o [earlier temperature-dependent derating]	o / o [earlier temperature-dependent derating]
Fresh air consumption	6500 m ³ /h	6500 m ³ /h
Features		
DC connection	Terminal lug on each input (without fuse)	Terminal lug on each input (without fuse)
AC connection	With busbar system (three busbars, one per line conductor)	With busbar system (three busbars, one per line conductor)
Communication	Ethernet, Modbus Master, Modbus Slave	Ethernet, Modbus Master, Modbus Slave
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet I/O (M, Cat5)	Modbus TCP / Ethernet I/O (M, Cat5)
Enclosure / roof color	RAL 9016 / RAL 7004	RAL 9016 / RAL 7004
Supply transformer for external loads	o (2.5 kVA)	o (2.5 kVA)
Standards and directives complied with	UL 62109-1, UL 1741 [Chapter 3], CDR 61], UL 1741 SA, UL 1998, IEEE 1547, MIL-STD-810C	UL 62109-1, UL 1741 [Chapter 3], CDR 61], UL 1741 SA, UL 1998, IEEE 1547, MIL-STD-810C
EMC standards	FCC Part 15 Class A	FCC Part 15 Class A
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	VDI/VDE 2862 page 2, DIN EN ISO 9001
Standard features	o Optional	o Optional
Features		
DC terminal	Terminal lug	Terminal lug
AC connection	Outer-core angle plug	Outer-core angle plug
Tap changer for MV transformer: without / with	o / o	o / o
Shield winding for MV transformer: without / with	o / o	o / o
Monitoring package	o	o
Station enclosure color	RAL 7004	RAL 7004
Transformer for external loads: without / 10 / 20 / 30 / 40 / 50 / 60 kVA	o / o / o / o / o / o	o / o / o / o / o / o
Medium-voltage switchgear: without / 3 feeders	o / o	o / o
2 cable feeders with loadbreak switch, 1 transformer feeder with circuit breaker, internal arc classification IAC A.F. 20 kA 1 s according to IEC 62271-1000	o / o	o / o
Short circuit rating medium voltage switchgear (20 kA 1 s / 20 kA 3 s / 25 kA 1 s)	o / o / o	o / o / o
Accessories for medium-voltage switchgear: without / auxiliary contacts / motor for transformer feeder / cascade control / monitoring	o / o / o / o	o / o / o / o
Integrated oil containment: without / with	o / o	o / o
Industry standards (for other standards see file inverter datasheet)	IEC 60076, IEC 62271-200, IEC 62271-202, EN50588-1, CSC Certificate	IEC 60076, IEC 62271-200, IEC 62271-202, EN50588-1, CSC Certificate
Standard features	o Optional features	- Not available
Type designation	MVPS4000-S2	MVPS4200-S2

SUNNY CENTRAL 4000 UP-US / 4200 UP-US

Technical data	SC 4000 UP-US	SC 4200 UP-US
Input [DC]		
MPPT voltage range V _{MPPT} (at 25 °C / at 50 °C)	880 to 1325 V / 1100 V	921 to 1325 V / 1050 V
Min. input voltage V _{in, min} / Start voltage V _{in, start}	849 V / 1030 V	891 V / 1071 V
Max. input voltage V _{in, max}	1500 V	1500 V
Max. input current I _{in, max}	4750 A	4750 A
Max. short-circuit current I _{sc, max}	6400 A	6400 A
Number of DC inputs	24 double pole fused (32 single pole fused)	24 double pole fused (32 single pole fused)
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm ²	2 x 800 kcmil, 2 x 400 mm ²
Integrated zone monitoring	o	o
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A
Available battery fuse size (per input)	750 A	750 A
Output [AC]		
Nominal AC power at cos φ = 1 (at 35°C / at 50°C)	4000 kVA ¹⁾ / 3600 kVA	4200 kVA ¹⁾ / 3780 kVA
Nominal AC power at cos φ = 0.8 (at 35°C / at 50°C)	3200 kW ¹⁾ / 2880 kW	3360 kW ¹⁾ / 3024 kW
Nominal AC current I _{LN} (at 35°C / at 50°C)	3850 A / 3465 A	3850 A / 3465 A
Max. total harmonic distortion	< 3% at nominal power	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range ¹⁾	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz	60 Hz / 57 Hz to 63 Hz
Min. short-circuit ratio at the AC terminals ²⁾	1 / 0.8 overexcited to 0.8 underexcited	1 / 0.8 overexcited to 0.8 underexcited
Power factor at rated power / displacement power factor adjustable ³⁾	98.7% / 98.6% / 98.5%	98.7% / 98.6% / 98.5%
Efficiency	98.7% / 98.6% / 98.5%	98.7% / 98.6% / 98.5%
Protective Devices		
Intrusive disconnection point	DC load break switch	DC load break switch
Outside disconnection point	AC circuit breaker	AC circuit breaker
DC overvoltage protection	Surge arrester, type I	Surge arrester, type I
AC overvoltage protection (optional)	Surge arrester, class I	Surge arrester, class I
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	Lightning Protection Level III
Ground fault monitoring / remote ground fault monitoring	o / o	o / o
Insulation monitoring	o	o
Degree of protection	NEMA 3R	NEMA 3R
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)
Weight	< 8100 kg / < 18150 lb	< 8100 kg / < 18150 lb
Self-consumption (max. / partial load ⁴⁾ / average ⁵⁾)	< 370 W	< 370 W
Self-consumption (standby)	o	o
Internal auxiliary power supply	o Integrated 8.4 kVA transformer	o Integrated 8.4 kVA transformer
Operating temperature range ⁶⁾	-25°C to 60°C / -13°F to 140°F	-25°C to 60°C / -13°F to 140°F
Noise emission ⁷⁾	67.0 dB(A)	67.0 dB(A)
Temperature range (standby)	-40°C to 60°C / -40°F to 140°F	-40°C to 60°C / -40°F to 140°F
Temperature range (storage)	-40°C to 70°C / -40°F to 158°F	-40°C to 70°C / -40°F to 158°F
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	95% to 100% (2 month/year) / 0% to 95%
Maximum operating altitude above MSL ⁸⁾ 1000 m / 2000 m	o / o [earlier temperature-dependent derating]	o / o [earlier temperature-dependent derating]
Fresh air consumption	6500 m ³ /h	6500 m ³ /h
Features		
DC connection	Terminal lug on each input (without fuse)	Terminal lug on each input (without fuse)
AC connection	With busbar system (three busbars, one per line conductor)	With busbar system (three busbars, one per line conductor)
Communication	Ethernet, Modbus Master, Modbus Slave	Ethernet, Modbus Master, Modbus Slave
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet I/O (M, Cat5)	Modbus TCP / Ethernet I/O (M, Cat5)
Enclosure / roof color	RAL 9016 / RAL 7004	RAL 9016 / RAL 7004
Supply transformer for external loads	o (2.5 kVA)	o (2.5 kVA)
Standards and directives complied with	UL 62109-1, UL 1741 [Chapter 3], CDR 61], UL 1741 SA, UL 1998, IEEE 1547, MIL-STD-810C	UL 62109-1, UL 1741 [Chapter 3], CDR 61], UL 1741 SA, UL 1998, IEEE 1547, MIL-STD-810C
EMC standards	FCC Part 15 Class A	FCC Part 15 Class A
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	VDI/VDE 2862 page 2, DIN EN ISO 9001
Standard features	o Optional	o Optional
Features		
DC terminal	Terminal lug on each input (without fuse)	Terminal lug on each input (without fuse)
AC connection	With busbar system (three busbars, one per line conductor)	With busbar system (three busbars, one per line conductor)
Communication	Ethernet, Modbus Master, Modbus Slave	Ethernet, Modbus Master, Modbus Slave
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet I/O (M, Cat5)	Modbus TCP / Ethernet I/O (M, Cat5)
Enclosure / roof color	RAL 9016 / RAL 7004	RAL 9016 / RAL 7004
Supply transformer for external loads	o (2.5 kVA)	o (2.5 kVA)
Standards and directives complied with	UL 62109-1, UL 1741 [Chapter 3], CDR 61], UL 1741 SA, UL 1998, IEEE 1547, MIL-STD-810C	UL 62109-1, UL 1741 [Chapter 3], CDR 61], UL 1741 SA, UL 1998, IEEE 1547, MIL-STD-810C
EMC standards	FCC Part 15 Class A	FCC Part 15 Class A
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	VDI/VDE 2862 page 2, DIN EN ISO 9001
Standard features	o Optional	o Optional

1) At nominal AC voltage, nominal AC power decreases in the same proportion
2) Efficiency measured without internal power supply
3) Efficiency measured with internal power supply
4) Self-consumption at rated operation
5) Self-consumption at < 75% P_n at 25°C
6) Self-consumption averaged out from 5% to 100% P_n at 25°C
7) Sound pressure level at a distance of 10 m
8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.
9) A short-circuit ratio of < 2 requires a special approval from SMA
10) Depending on the DC voltage
11) Nominal power at 35°C max DC voltage of 1050 V
12) Nominal power at 35°C max DC voltage of 1000 V
13) Nominal power at 35°C max DC voltage of 1025 V

TECHNICAL DATA SHEET
Medium Voltage Transformer 4000/4200/4400/4600 (UL-Listed)
for Medium Voltage Power Station MVPS-XXXX-S2-US



TYPE	Medium-voltage transformer for inverter application
DESIGN	Three-phase-oil-transformer hermetic sealed for 12 or 24 hours-operation
RATED POWER @ 50 °C (@40°C for 40°C option)	[kVA] 3600 3780 3960 4140
RATED POWER @ 25 °C	[kVA] 4000 4200 4400 4600
RATED VOLTAGE (MV)	[kV] 12/12.47/13.2/13.8/20.6/22.86/24.9/27.6/34.5
RATED VOLTAGE (LV)¹⁾	[kV] 0.6 0.63 0.66 0.69
TAP CHANGER	With/Without
TAPPING HIGH-VOLTAGE LEVEL	[%] ±2 x 2.5%
FREQUENCY	[Hz] 60/50
VECTOR GROUP	Dy11 / YNd11 / YNy0
STANDARD NO-LOAD LOSSES @ RATED VOLTAGE (ECO)¹⁾	[kW] 4 (3.1) 4.2 (3.1) 4.4 (3.1) 4.6 (3.1)
STANDARD SHORT-CIRCUIT LOSSES @ TEMP. 75 °C (ECO)¹⁾	[kW] 40 (29.5) 41 (32.5) 42 (35.7) 43 (38)
IMPEDANCE VOLTAGE AT RATED CURRENT (@ TEMP. 75 °C, @ RATED POWER)	[%] 6 to 8.5
TYPE OF COOLING	KNAN
MAX. ALTITUDE ABOVE SEA LEVEL	[m] 1000/2000
AMBIENT TEMPERATURES (MIN. / MAX.) @ 1000 m	[°C] -25 / 50 (-25/40)
@ 2000 m	[°C] 50 (40)
MAX. OVER TEMPERATURE (HOT SPOT / WINDING / OIL)	[°C] 48 (38)
SHORT-CIRCUIT DURATION	[s] 2
MANUFACTURERS REGULATION	IEEE C57.12
INSULATION LEVEL [HV]	12/12.47/13.2/13.8 : BIL 95 AC 34 20.6/22.86/24.9 : BIL 125 AC 40 27.6/34.5 : BIL 150 AC 50
HIGH-VOLTAGE BUSHING	High voltage dead-front bushings 600A, type E, per IEEE Std. 386, aluminium
LOW-VOLTAGE BUSHING	3.6 kV bushing for at least 4000 A
MAX. DIMENSIONS (LxWxH)	1806 x 2200 x 2350
TOTAL WEIGHT (MAX.)	7500
OIL WEIGHT (MAX.)	1980
OIL TYPE	Oil based natural ester
COATING according to ISO 12944-5	C3H / C5H
NEMA ENCLOSURE TYPE	NEMA 3R
TRANSFORMER PROTECTION	- Resistance thermometer PT100 for analogue oil temperature measurement - Over pressure gauge with a changeover contact - Oil level gauge with a changeover contact - Over pressure safety valve
ACCESSORIES	- Oil filling pipe - Oil drain and sampling valve - Lifting lugs - Earthing terminals - Nameplate
*Corresponding to each rated power	Values subject to tolerances according to IEEE C57.12



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DRAWN BY: TG CHECKED BY: RA
SCALE: AS NOTED JOB NO: 21-702

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WARNING

THIS PANEL HAS SECONDARY POWER SOURCE FROM PHOTOVOLTAIC SYSTEM. TURN-OFF PHOTOVOLTAIC SYSTEM BREAKER PRIOR TO SERVICING PANEL.

RATED AC OUTPUT CURRENT: 2440 AMPS

NOMINAL OPERATING AC VOLTAGE: 480 VOLTS

LABEL #1 PLACE AT POINT OF INTERCONNECTION

WARNING

DUAL POWER SUPPLY

SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

LABEL #2 PLACE AT POINT OF INTERCONNECTION

WARNING

SOLAR GENERATOR UTILITY LOCKABLE AC DISCONNECT SWITCH

AUTHORIZED PERSONNEL ONLY HIGH VOLTAGE - KEEP AWAY

LABEL #3 PLACE AT UTILITY LOCKABLE DISCONNECT

WARNING

POTENTIAL ARC FLASH HAZARD

LABEL #4 PLACE AT PV SWITCHBOARD

WARNING

TURN OFF AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

AUTHORIZED PERSONNEL ONLY HIGH VOLTAGE - KEEP AWAY

LABEL #5 PLACE AT AC COMBINER PANEL

WARNING

PV ARRAY DC DISCONNECT

-ELECTRICAL SHOCK HAZARD-
-DO NOT TOUCH TERMINALS-
TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

MAXIMUM CIRCUIT CURRENT: 162 Adc
MAXIMUM VOLTAGE: 1000 vdc

LABEL #6 PLACE ON DC DISCONNECTS

WARNING

POWER METER AND AC DISCONNECT TURN OFF INVERTER PRIOR TO OPERATING AC DISCONNECT

AUTHORIZED PERSONNEL ONLY HIGH VOLTAGE - KEEP AWAY

LABEL #7 PLACE AT AC DISCONNECT

WARNING

ELECTRIC SHOCK HAZARD

IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL #8 PLACE ON INVERTERS

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

LABEL #11 PLACE ON DC DISCONNECTS AND INVERTERS

CAUTION SOLAR CIRCUIT

LABEL #12 PLACE ON CONDUIT, JUNCTION BOXES AND COMBINER BOXES AT EVERY 10'

WARNING

DC JUNCTION BOX

LABEL #13 PLACE ON DC JUNCTION BOXES

INV-01

LABEL #14 PLACE AT INVERTERS

ACB-01

LABEL #15 PLACE AT AC COMBINER PANELS

ACSB-01

LABEL #16 PLACE AT AC SWITCHBOARD

D-01

LABEL #17 PLACE AT SYSTEM AC DISCONNECT

M-01

LABEL #18 PLACE AT SYSTEM METER CABINET

WARNING

ELECTRIC SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL #9 PLACE ON DC DISCONNECTS AND AC DISCONNECTS

WARNING

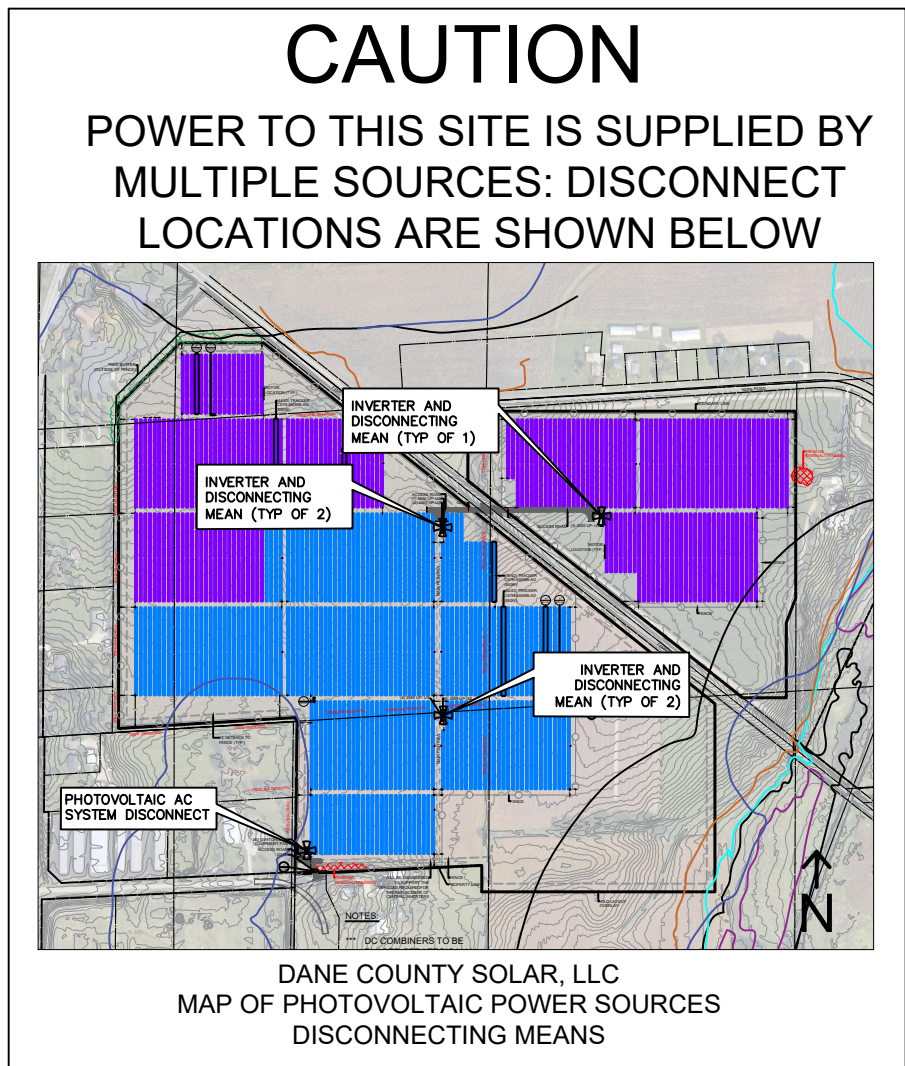
PULL BOX

AUTHORIZED PERSONNEL ONLY HIGH VOLTAGE - KEEP AWAY

LABEL #10 PLACE AT PULL BOXES

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

LABEL #19 PLACE AT RAPID SHUTDOWN DISCONNECTS



DANE COUNTY SOLAR, LLC
MAP OF PHOTOVOLTAIC POWER SOURCES
DISCONNECTING MEANS
SITE DISCONNECT LOCATION PLACECARD

SHEET NOTES:

1. SYSTEM LABELS SHALL BE PERMANENTLY ATTACHED BY MECHANICAL MEANS OR SECURED WITH UV-RESISTANT ADHESIVE.
2. MATERIALS USED IN THE CONSTRUCTION OF THE LABELS SHALL BE UV RESISTANT.
3. ELECTRICAL EQUIPMENT, SUCH AS SWITCHBOARDS, PANELBOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, AND MOTOR CONTROL CENTERS, THAT ARE IN OTHER THAN DWELLING OCCUPANCIES, AND ARE LIKELY TO REQUIRE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE WHILE ENERGIZED SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF THE EQUIPMENT. [NEC 110.16]
4. ALL INTERACTIVE SYSTEM(S) POINTS OF INTERCONNECTION WITH OTHER SOURCES SHALL BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS AS A POWER SOURCE AND WITH THE RATED AC OUTPUT CURRENT AND THE NOMINAL OPERATING AC VOLTAGE. [NEC 690.54]

KEYED NOTES:

1. PROVIDE 9" X 3" ENGLISH/SPANISH ELECTRICAL WARNING SIGN AT EACH OF THE SITE ENTRANCES AND EVERY 200' ALONG THE FENCE.
2. PROVIDE SITE DISCONNECT LOCATION PLACARD AT EACH OF THE SITE ENTRANCES. MARK "YOU ARE HERE" AT EACH OF THE LOCATIONS ON THE MAP.
3. TEXT SHALL BE CAPITALIZED AND BE MINIMUM 8" TALL.

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DANE COUNTY SOLAR
LLC

COTTAGE GROVE, WI 55016

SHEET TITLE
NEC LABELS

DWG. NO.

E-3.00



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DANE COUNTY SOLAR LLC

COTTAGE GROVE, WI 53016

SHEET TITLE
 GENERAL NOTES

DWG. NO.

G-1.00

1. GENERAL REQUIREMENTS:

- 1.1 THE WORK TO BE DONE UNDER THIS PROJECT INCLUDES PROVIDING ALL EQUIPMENT, MATERIALS, LABOR AND SERVICES NOT INCLUDED IN THE B.O.M, AND PERFORMING ALL OPERATIONS FOR COMPLETE AND OPERATING SYSTEMS. ANY WORK NOT SPECIFICALLY COVERED BUT NECESSARY TO COMPLETE THIS INSTALLATION, SHALL BE PROVIDED. ALL EQUIPMENT AND WIRING TO BE NEW AND PROVIDED UNDER THIS CONTRACT UNLESS OTHERWISE NOTED.
- 1.2 ENTIRE INSTALLATION, INCLUDING MATERIALS, EQUIPMENT AND WORKMANSHIP, SHALL CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC CODE (NEC) AS WELL AS ALL APPLICABLE LAWS AND REGULATIONS AND REGULATORY BODIES HAVING JURISDICTION OVER THIS WORK:
- 1.3 THE TERM "FURNISH" SHALL MEAN TO OBTAIN AND SUPPLY TO THE JOB SITE. THE TERM "INSTALL" SHALL MEAN TO FIX IN POSITION AND CONNECT FOR USE. THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL. THE TERM "CONTRACTOR" SHALL MEAN ELECTRICAL CONTRACTOR.
- 1.4 ONLY WRITTEN CHANGES AND/OR MODIFICATIONS APPROVED BY THE ENGINEER, CONSULTING ENGINEER OR OWNER'S REPRESENTATIVE WILL BE RECOGNIZED.
- 1.5 THE ELECTRICAL CONTRACTOR SHALL SUBMIT, FOR THE ENGINEER'S APPROVAL, DETAILED SHOP DRAWINGS OF ALL EQUIPMENT SPECIFIED.
- 1.6 CONTRACTOR SHALL COORDINATE WITH SPECIFICATIONS PROVIDED BY OTHER TRADES.
- 1.7 PROVIDE OPERATING AND MAINTENANCE MANUALS, PER SPECIFICATIONS, AND GIVE INSTRUCTIONS TO USER FOR ALL EQUIPMENT AND SYSTEMS PROVIDED UNDER THIS CONTRACT AFTER ALL ARE CLEANED AND OPERATING.
- 1.8 KEEP PREMISES FREE FROM RUBBISH. REMOVE ALL ELECTRICAL RUBBISH FROM SITE.
- 1.9 ALL WORK SHALL BE INSTALLED CONCEALED UNLESS OTHERWISE NOTED.
- 1.10 THE WORK SHALL INCLUDE ALL PANELS, DEVICES, FEEDERS AND BRANCH CIRCUIT WIRING AS REQUIRED FOR THE DISTRIBUTION SYSTEM INDICATED AND CALLED FOR ON THE DRAWINGS, REQUIRED BY SPECIFICATIONS AND AS NECESSARY FOR COMPLETE FUNCTIONAL SYSTEMS PRESENTED AND INTENDED.
- 1.11 THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR, TOOLS, EQUIPMENT, CONSUMABLES AND SERVICES REQUIRED FOR OBTAINING, DELIVERY, INSTALLATION, CONNECTION, DISCONNECTION, REMOVAL, RELOCATION, REPAIR, REPLACEMENT, TESTING AND COMMISSIONING OF ALL EQUIPMENT AND DEVICES INCLUDED IN OR NECESSARY FOR THE WORK, AS APPLICABLE. THIS INCLUDES SCAFFOLDING, LADDERS, RIGGING, HOISTING, ETC.
- 1.12 ELECTRICAL WORK SHALL INCLUDE ALL REQUIRED CUTTING, PATCHING AND THE FULL RESTORATION OF WALL AND FLOOR STRUCTURE AND SURFACES. ALL EQUIPMENT, WALLS, FLOORS, ETC., DISTURBED OR DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER, AT THE CONTRACTORS EXPENSE.
- 1.13 BEFORE SUBMITTING HIS BID, THE CONTRACTOR SHALL FULLY AQUAINT HIMSELF/HERSELF WITH THE JOB CONDITIONS AND DIFFICULTIES THAT WILL PERTAIN TO THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED, WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- 1.14 THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING UTILITIES.
- 1.15 UPON COMPLETION OF THE ELECTRICAL WORK, THE CONTRACTOR SHALL TEST THE COMPLETE ELECTRICAL SYSTEM FOR SHORTS, GROUNDS, AND PROPER OPERATION, IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE.
- 1.16 UPON COMPLETION OF WORK, THE CONTRACTOR SHALL CLEAN AND ADJUST ALL EQUIPMENT AND LIGHTING AND TEST SYSTEMS TO THE SATISFACTION OF OWNER AND ENGINEER. RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- 1.17 THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF FINISHED CONSTRUCTION PRIOR TO FABRICATION AND INSTALLATION OF FIXTURES AND EQUIPMENT.
- 1.18 EXACT ROUTING OF CONDUITS AND "MC" CABLES SHALL BE DETERMINED IN THE FIELD.

- 1.19 IF THE OWNER AND/OR HIS REPRESENTATIVE CONSIDERS ANY WORK TO BE INFERIOR, THE RESPECTIVE CONTRACTOR SHALL REPLACE SAME WITH CONTRACT STANDARD WORK WITHOUT ADDITIONAL CHARGE. ALL WORK SHALL BE DONE IN A NEAT, WORKMANLIKE MANNER, LEFT CLEAN AND FREE FROM DEFECTS, AND COMPLETELY OPERABLE.
 - 1.20 THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AS SHOWN ON THE DRAWINGS AND/OR AS SPECIFIED. ALL MATERIALS SHALL BE NEW, AND BEAR THE UL LABEL. ALL WORK SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER.
 - 1.21 DRAWINGS ARE TO BE CONSIDERED DIAGRAMMATIC, AND SHALL BE FOLLOWED AS CLOSELY AS CONDITIONS ALLOW TO COMPLETE THE INTENT OF THE CONTRACT. THE DRAWINGS AND SPECIFICATIONS COMPLIMENT ONE ANOTHER, AND WHAT IS SHOWN ON THE DRAWINGS AND NOT MENTIONED IN THE SPECIFICATIONS, AND VICE VERSA, IS TO BE INCLUDED IN THE SCOPE OF WORK.
 - 1.22 ALL EQUIPMENT CONNECTIONS SHALL BE INSTALLED PER APPLICABLE SEISMIC REQUIRMENTS.
 - 1.23 ENGINEER WILL MAKE A FINAL INSPECTION WITH THE OWNER AND CONTRACTOR AND WILL NOTIFY THE CONTRACTOR IN WRITING OF ALL PARTICULARS IN WHICH THIS INSPECTION REVEALS THAT THE WORK IS INCOMPLETE OR DEFECTIVE. THE CONTRACTOR SHALL IMMEDIATELY TAKE SUCH MEASURES AS ARE NECESSARY TO COMPLETE SUCH WORK OR REMEDY SUCH DEFICIENCIES.
 - 1.24 THE CONTRACTOR SHALL PERFORM ALL EXCAVATION, TRENCHING AND BACKFILL REQUIRED FOR ELECTRICAL WORK. BACKFILL SHALL BE SUITABLE MATERIAL PROPERLY COMPACTED TO 95% DENSITY N EACH LAYER OF SIX (6) INCH DEPTH. CONDUIT SHALL BE MINIMUM 36" BELOW FINISHED GRADE.
2. PROJECT COORDINATION:
- 2.1 THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE SITE AND NOTIFY THE OWNER OF ANY DISCREPANCIES, PRIOR TO COMMENCING WITH THE WORK.
 - 2.2 THE CONTRACTOR SHALL REVIEW AND COORDINATE WITH THE DOCUMENTS OF ALL TRADES.
 - 2.3 THE CONTRACTOR SHALL FURNISH A SCHEDULE INDICATING HIS PORTION OF TIME, WITHIN THE OVERALL SCHEDULE, REQUIRED TO COMPLETE THE WORK, IN CONJUNCTION WITH ALL TRADES. ALL WORK THAT MAY AFFECT OPERATION OF BUILDING SYSTEMS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE.
 - 2.4 REFER TO THE CONSTRUCTION DRAWINGS AND APPROPRIATE VENDORS APPROVED DIMENSIONED LAYOUT DRAWINGS FOR THE LOCATIONS OF ALL ELECTRICAL DEVICES AND EQUIPMENT.
 - A. EXTERIOR, BUILDING MOUNTED LUMINARIES
 - B. SWITCHES
 - 2.5 REFER TO THE PLUMBING DRAWINGS (IF APPLICABLE) FOR THE LOCATIONS OF THE FOLLOWING:
 - A. GENERATOR
 - 2.6 SHUT DOWN OF POWER SHALL BE COORDINATED WITH THE OWNER, ARCHITECT AND PROJECT MANAGER AT LEAST 14 WORKING DAYS PRIOR TO SHUT DOWN. SHUT DOWNS LONGER THAN 2 DAYS SHALL BE COORDINATED WITH THE ABOVE PERSONNEL AT LEAST ONE MONTH IN ADVANCE. TEMPORARY POWER FOR CONSTRUCTION SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR FOR SHUT DOWNS OVER 2 DAYS.
 - 2.7 ALL CONDUITS AND DEVICE BOXES SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR, INCLUDING ALL TECHNOLOGY CONDUITS AND BOXES.
 - 2.8 EXACT LOCATIONS OF OUTLETS AND EQUIPMENT SHALL BE COORDINATED WITH ARCHITECTURAL AND MILLWORK PLANS. ALL OUTLET AND EQUIPMENT LAYOUTS SHALL BE VERIFIED AND COORDINATED WITH WORK OF OTHER TRADES.
 - 2.9 PROVIDE TEMPORARY LIGHTING AND POWER IN ACCORDANCE WITH ARTICLE 305 OF THE NEC. TEMPORARY LIGHTING FIXTURES IN UNFINISHED AREAS SHALL REMAIN CONNECTED UNTIL REMOVAL IS REQUESTED BY THE CONTRACTOR.
 - 2.10 COLORS AND FINISHES OF ALL LIGHTING FIXTURES SHALL BE AS DETERMINED BY THE PROPERTY OWNER WHO SHALL SELECT SAME FROM THOSE AVAILABLE AS STANDARD OF THE EQUIPMENT SPECIFIED.

2.11 THE CONTRACTOR SHALL CONTACT THE BUILDING MANAGER TO OBTAIN A COPY OF THE GENERAL REQUIREMENTS AND/OR CONDITIONS TO BE USED FOR THIS PROJECT.

2.12 INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. TEMPORARY SHUT DOWNS OF ANY SYSTEM SHALL BE COORDINATED WITH AND APPROVED BY THE OWNER AND ARCHITECT.

2.13 CONTRACTOR SHALL VERIFY ALL EQUIPMENT POWER REQUIREMENTS AND REQUIRED OUTLET TYPES WITH EQUIPMENT MANUFACTURER AND OWNER PRIOR TO POWER DISTRIBUTION AND RECEPTACLE INSTALLATION.

3. PROTECTION OF WORK:

3.1 EFFECTIVELY PROTECT ALL MATERIALS AND EQUIPMENT FROM ENVIRONMENTAL AND PHYSICAL DAMAGE UNTIL FINAL ACCEPTANCE. CLOSE AND PROTECT ALL OPENINGS DURING CONSTRUCTION. PROVIDE NEW MATERIALS AND EQUIPMENT TO REPLACE ITEMS DAMAGED.

4. WARRANTIES:

4.1 ALL MATERIALS AND EQUIPMENT SHALL BE GUARANTEED IN WRITING FOR A MINIMUM OF ONE YEAR AFTER FINAL ACCEPTANCE BY OWNER.

4.2 WORKMANSHIP SHALL BE GUARANTEED IN WRITING FOR A MINIMUM OF 5 YEARS AFTER FINAL ACCEPTANCE BY OWNER

4.2 OBTAIN AND DELIVER TO THE OWNER'S REPRESENTATIVE ALL GUARANTEES AND CERTIFICATES OF COMPLIANCE.

5. PERMITS:

5.1 CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND INSPECTION FEES FOR ELECTRICAL WORK.

6. RACEWAYS:

6.1 ALL CONDUIT SHALL BE MINIMUM SIZE OF 3/4" FOR POWER CIRCUITS AND CONTROL CIRCUITS EXCEPT WHERE FLEXIBLE CONDUIT IS CALLED FOR ON PROJECT DOCUMENTS. ALL EXTERIOR EXPOSED CONDUIT SHALL BE GRC (GALVANIZED RIGID METAL CONDUIT). ALL UNDERGROUND, IN SLAB OR UNDER SLAB SHALL BE RNC (RIGID NONMETALLIC CONDUIT). CHANGE TO RIGID METALLIC CONDUIT OR INTERMEDIATE METALLIC CONDUIT BEFORE EXITING OUT OF CONCRETE OR PENETRATING A WALL, FLOOR OR ROOF. EMT IS ALLOWED IN INTERIOR DRY LOCATIONS WHERE NOT SUBJECT TO DAMAGE.

6.2 ALL FLEXIBLE CONDUIT IN WET OR DRY AREAS SHALL BE LIQUID TIGHT CONDUIT. NONMETALLIC FLEXIBLE CONDUIT IS SPECIFICALLY PROHIBITED.

6.3 CONDUIT SHALL BE RUN AT RIGHT ANGLES AND PARALLEL TO BUILDING LINES, SHALL BE NEATLY RACKED AND SECURELY FASTENED. JUNCTION BOXES SHALL BE PROVIDED WHERE REQUIRED TO FACILITATE INSTALLATION OF WIRES.

6.4 ALL CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN AN APPROVED MANNER.

6.5 ALL EMPTY RACEWAYS SHALL BE FURNISHED WITH A 200 LB. TEST NYLON DRAG LINE.

6.6 ARRANGEMENT OF CONDUIT AND EQUIPMENT SHALL BE AS INDICATED, UNLESS MODIFICATION IS REQUIRED TO AVOID INTERFERENCES.

7. BOXES:

- 7.1 INTERIOR OUTLET BOXES SHALL BE METALLIC, EXCEPT AS NOTED. FAN MOUNTING BOXES SHALL BE RATED FOR THE APPLICATION AND FOR THE WEIGHT OF THE FAN. EXTERIOR OUTLET BOXES SHALL BE CAST ALUMINUM AND SHALL BE MADE WEATHERTIGHT.
- 7.2 INTERIOR JUNCTION BOXES SHALL BE SHEET STEEL. EXTERIOR JUNCTION BOXES SHALL BE NONMETALLIC, WITH SCREW COVERS. BOXES SHALL BE SUPPORTED INDEPENDENTLY OF CONDUITS.
- 7.3 MOUNTING HEIGHTS OF EQUIPMENT AND DEVICES SHALL BE AS FOLLOWS:
 - A. RECEPTACLES (WALL MOUNTED) – 18" A.F.F.
 - B. RECEPTACLES (COUNTER HEIGHT) – 9" ABOVE COUNTER
 - C. RECEPTACLES (EXTERIOR) – 24" ABOVE FINISHED GRADE
 - D. COMMUNICATION OUTLETS – SAME AS RECEPTACLES
 - E. LIGHTING SWITCHES AND CONTROLS – 44" A.F.F.
 - F. PANELBOARDS AND CABINETS – 78" TO TOP OF ENCLOSURE
- 7.4 WHERE MULTIPLE SWITCHES AND RECEPTACLES ARE INDICATED AT THE SAME LOCATION, THEY SHALL BE MOUNTED BEHIND A COMMON FACEPLATE. TECHNOLOGY OUTLETS SHALL BE SEPARATED FROM AND BE PROVIDED WITH SEPARATE FACEPLATES FROM THE ASSOCIATED POWER RECEPTACLES.
- 7.5 RECEPTACLES SHALL BE ACCESSIBLE EXCEPT A DEDICATED RECEPTACLE MAY BE OBSTRUCTED BY THE REMOVABLE EQUIPMENT IT SERVES.
- 7.6 OUTLET BOXES IN EXISTING CONCRETE FLOORS WITH ACCESS FROM BELOW SHALL BE FIRE RATED, POKE-THROUGH TYPE FOR POWER AND LOW TENSION SERVICE. SERVICE FITTING HEADS SHALL BE ANODIZED ALUMINUM AND SHALL CONTAIN DEVICES AS SHOWN ON THE DRAWINGS. BOXES SHALL BE AS MANUFACTURED BY STEEL CITY OR HUBBELL.
- 7.7 SET BOXES SQUARE AND TRUE WITH BUILDING FINISH. INSTALL RECEPTACLE AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. SECURE TO BUILDING STRUCTURE IN ACCORDANCE WITH NEC REQUIREMENTS.
- 7.8 FURNISH OUTLET BOXES WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WHERE NO FIXTURE OR DEVICE IS INSTALLED, PROVIDE OUTLET BOX WITH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 INCH HORIZONTAL SEPARATION.

8. WIRING:

- 8.1 ALL WIRE SHALL BE MADE OF COPPER WITH INSULATION SUITABLE FOR THE APPLICABLE ENVIRONMENT AND VOLTAGE. CONTRACTOR SHALL GET APPROVAL FOR ANY OTHER WIRE TYPE.
- 8.2 UNDER NO CIRCUMSTANCES SHALL FEEDERS BE SPLICED.
- 8.3 ALL COMPUTER CIRCUITS SHALL HAVE SEPARATE NEUTRAL CONDUCTORS. ALL OTHER CIRCUITS MAY SHARE GROUND AND NEUTRAL CONDUCTORS.
- 8.4 WHERE EQUIPMENT, LIGHTING FIXTURES AND WIRING DEVICES ARE SHOWN WITH CIRCUIT NUMBERS ONLY, THE MINIMUM BRANCH CIRCUITING REQUIREMENTS SHALL BE AS FOLLOWS:
 - A. LIGHTING FIXTURES – (2)#12 & #12 GND.
 - B. RECEPTACLES – (2)#12 & #12 GND.
 - C. BRANCH CIRCUIT BREAKERS (120 VOLT) – 1P, 20A
 - D. HOMERUNS TO PANEL BOARDS SHALL CONTAIN NO MORE THAN THREE CIRCUITS.
 - E. WHERE LIGHTING SWITCH INDICATIONS ARE NOT SHOWN SWITCHES SHALL BE CONNECTED TO CONTROL ALL SWITCHED FIXTURES WITHIN THE CORRESPONDING SPACE.

8.5 ALL ELECTRICAL TERMINAL TEMPERATURE RATINGS ASSUMED TO BE 75° C UNLESS SITE CONDITIONS REQUIRE OTHERWISE.

8.6 WIRE SIZES SHALL BE INCREASED WHERE NECESSARY TO LIMIT VOLTAGE DROP AS FOLLOWS:
A. 1% TOTAL AND 2% FOR ANY INDIVIDUAL RUN, FROM MODULE TO INVERTER.
B. 1% TOTAL AND 2% FOR ANY INDIVIDUAL RUN, FROM INVERTER TO POINT OF INTERCONNECTION.

9. GROUNDING:

- 9.1 PROVIDE A COMPLETE EQUIPMENT GROUND SYSTEM FOR THE ELECTRICAL SYSTEM AS REQUIRED BY ARTICLE 250, OF THE NEC, AND AS SPECIFIED HEREIN.
- 9.2 ALL BRANCH CIRCUITS FOR POWER WIRING SHALL CONTAIN A COPPER GROUND WIRE. NO FLEXIBLE METAL CONDUIT OF ANY KIND OR LENGTH SHALL BE USED AS THE EQUIPMENT GROUNDING CONDUCTOR.

10. MECHANICAL SYSTEMS POWER:

- 10.1 EXCEPT AS OTHERWISE NOTED, EQUIPMENT FURNISHED UNDER THE MECHANICAL TRADE WILL INCLUDE MOTORS, STARTERS, CONTROL EQUIPMENT, INTERLOCK AND CONTROL WIRING. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL POWER WIRING FROM SOURCE THROUGH INTERVENING EQUIPMENT TO MOTOR TERMINALS. STARTERS SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR.
- 10.2 DISCONNECT SWITCHES SHALL BE HEAVY DUTY, HORSEPOWER RATED, QUICK MAKE, QUICK BREAK TYPE, ENCLOSED IN A HEAVY SHEET METAL ENCLOSURE WITH HINGED INTERLOCKING COVER, IN PROPER NEMA RATED ENCLOSURES. FUSED OR NON-FUSED AS REQUIRED. DISCONNECT SWITCHES SHALL BE PROVIDED BY CONTRACTOR, EXCEPT AS NOTED ON DRAWINGS.
- 10.3 THE RATING FOR DISCONNECT SWITCHES SHALL BE THE SAME AS, OR GREATER THAN, THE PROTECTIVE DEVICE SERVING THE EQUIPMENT.
- 10.4 COORDINATE ALL RECEPTACLES, PLUGS, WIRING AND LOCATIONS WITH THE EQUIPMENT PROVIDED PRIOR TO ROUGH IN.
- 10.5 A STRUT FRAME SHALL BE PROVIDED AT ALL LOCATIONS WHERE STRUCTURE WILL NOT ADEQUATELY SUPPORT EQUIPMENT, OR FOR FREESTANDING EQUIPMENT.
- 10.6 THE CONTRACTOR SHALL WIRE ALL MECHANICAL AND FIRE PROTECTION EQUIPMENT SHOWN ON THE DRAWINGS. COORDINATE WITH MECHANICAL, PLUMBING AND FIRE PROTECTION DRAWINGS.
- 10.7 ELECTRICAL EQUIPMENT SHIPPED LOOSE BY THE MANUFACTURER SHALL BE INSTALLED AND WIRED BY THE CONTRACTOR. EQUIPMENT MOUNTED IN THE DUCTWORK WILL BE MOUNTED BY THE MECHANICAL CONTRACTOR AND WIRED BY THE CONTRACTOR.
- 10.8 THE CONTRACTOR SHALL PROVIDE REMOTE INDICATORS FOR ALL DUCT DETECTORS LOCATED ABOVE REMOVABLE CEILINGS. DUCT DETECTORS SHALL BE INSTALLED FOR ALL VENTILATION UNITS WITH 200 CFM OR GREATER SUPPLY AIR. REMOTE INDICATORS SHALL BE WALL MOUNTED 12" BELOW CEILING IN CLOSE PROXIMITY TO CONCEALED DUCT DETECTOR, UON.

11. DEVICES:

- 11.1 THE CONTRACTOR SHALL VERIFY COLOR, LOCATION AND MOUNTING HEIGHT OF ALL DEVICES WITH ARCHITECT PRIOR TO INSTALLATION.
- 11.2 RECEPTACLES SHALL BE DUPLEX TYPE, 20 AMP, 125 VOLT RATING, WITH SIDE AND BACK WIRING. HUBBELL 5362 OR APPROVED EQUAL.
- 11.3 GROUND FAULT INTERRUPTERS SHALL BE SPECIFICATION GRADE. HUBBELL GF5362 OR APPROVED EQUAL.
- 11.4 SWITCHES SHALL BE SPECIFICATION GRADE, 20 AMP AT 120/277 VOLTS, QUIET, AC, SINGLE OR DOUBLE POLE, THREE OR FOUR WAY AS REQUIRED, ROCKER STYLE WITH BACK AND SIDE WIRING.
- 11.5 ALL RECEPTACLES MARKED WP SHALL BE GROUND FAULT PROTECTED AND WEATHER TIGHT WHILE IN USE.
- 11.6 THE COLOR OF FACEPLATES SHALL MATCH COLOR OF DEVICE WHICH IT COVERS. ALL PLATES SHALL BE METALLIC.

12. PANEL BOARDS:

- 12.1 PANELBOARDS: SWITCHING UNITS SHALL BE 3 PHASE, 4 WIRE CIRCUIT BREAKER TYPE UNLESS OTHERWISE NOTED ON PANEL SCHEDULES. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98% CONDUCTIVITY, AND SILVER OR TIN-PLATED JOINTS. CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME-PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN. HIGH DOORS) OR VAULT HANDLE, LOCK AND 3-POINT CATCH (LARGER THAN 48 IN. HIGH DOORS). HINGES SHALL BE SEMI-CONCEALED, 5-KNUCKLE STEEL WITH NONFERROUS PINS, 180-DEG OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. PROVIDE DOOR-IN-DOOR CONSTRUCTION. MINIMUM GUTTER SPACES FOR LIGHTING PANELS SHALL BE 5- BOTTOM. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER.
- 12.2 PROVIDE A NEW TYPE WRITTEN CIRCUIT DIRECTORY FOR EACH PANEL AFFECTED BY THIS PROJECT.
- 12.3 WHEREVER POSSIBLE, PANELBOARDS SHALL BE RECESSED IN WALL. SURFACE MOUNTED PANELBOARDS SHALL BE MOUNTED ON A PLYWOOD BACKBOARD. PLYWOOD SHALL BE MOUNTED ON TOP OF GYPSUM BOARD. PLYWOOD SHALL BE PAINTED ON ALL SIDES AND EDGES. COORDINATE WITH OWNER FOR COLOR.
- 12.4 PROVIDE LIGHTNING SURGE PROTECTION FOR MAIN SWITCHBOARD OR MAIN SERVICE PANEL BOARD. PROVIDE GROUNDING OF SURGE DEVICE PER THE NEC.
- 12.5 CIRCUIT NUMBERS SHOWN SHALL BE GENERALLY FOLLOWED. HOWEVER, CONTRACTOR IS RESPONSIBLE FOR BALANCING LOADS ON ALL PHASES AND MAY ALTER ASSIGNMENT OF CIRCUITS FOR BALANCING PHASES.
- 12.6 CIRCUIT SCHEDULES ARE INTENDED TO REPRESENT THE GENERAL WIRING NEEDS OF THE EQUIPMENT SERVICED FROM THE PANEL. THE EXACT CIRCUIT ARRANGEMENT WILL BE DETERMINED BY PANEL SHOP DRAWING AND ARRANGEMENT WILL BE DETERMINED BY PANEL SHOP DRAWING AND PANELS ACTUALLY FURNISHED.

13. LIGHTING:

13.4 PROVIDE LIGHTING FIXTURES AS SHOWN ON THE CONSTRUCTION DRAWINGS, COMPLETE WITH ALL STEMS, RODS, SUPPORTS, PLASTER FRAMES, ETC., NECESSARY FOR AN INSTALLATION IN OR ON THE MATERIAL FINISHES PROVIDED. PROVIDE ALL LAMPS FOR LIGHTING FIXTURES. FIXTURES SHALL HAVE ENERGY SAVING LAMPS, AND WHERE APPLICABLE, ENERGY SAVING BALLASTS WITH HIGH POWER FACTOR.

13.5 SEE DRAWINGS AND SPECIFICATIONS FOR FIXTURE REQUIREMENTS.

14. IDENTIFICATION:

- 14.1 PROVIDE BLACK PHENOLIC IDENTIFICATION PLATES, WITH WHITE LETTERS ON ALL ELECTRICAL EQUIPMENT FURNISHED IN THIS CONTRACT. ATTACH WITH SUITABLE ADHESIVE.
- 14.2 INSTALL NAMEPLATES ON ALL MAJOR EQUIPMENT, INCLUDE STARTERS, TRANSFORMERS, PANELBOARDS, DISCONNECT SWITCHES AND OTHER ELECTRICAL BOXES AND CABINETS INSTALLED UNDER THIS CONTRACT.
- 14.3 APPLY CABLE/CONDUCTOR IDENTIFICATION MARKERS ON EACH CABLE AND CONDUCTOR IN EACH BOX, ENCLOSURE OR CABINET.

15. RECORD DRAWINGS:

- 15.1 THE CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS. THE APPROVAL OF SHOP DRAWINGS SHALL ONLY BE CONSTRUED TO APPLY TO THE GENERAL LAYOUT AND CONFORMANCE TO THE DESIGN CONCEPT OF THE PROJECT AND FOR THE COMPLIANCE WITH THE GENERAL REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL RETAIN THE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
- 15.2 PROVIDE SHOP DRAWINGS FOR THE LIGHTING FIXTURES, PANEL BOARDS, CIRCUIT BREAKERS, WIRING DEVICES, FIRE ALARM DEVICES AND SEALS FOR FIRE AND WATER STOPPING.
- 15.3 DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN A RECORD SET OF INSTALLATION PRINTS. HE SHALL NEATLY AND CLEARLY RECORD ON THESE PRINTS ALL DEVIATIONS FROM THE CONTRACT DRAWINGS IN SIZES, LOCATIONS AND DETAILS.
- 15.4 UPON PROJECT COMPLETION, THE CONTRACTOR SHALL COMPLETE THE MARK UP OF ALL PROJECT DRAWINGS TO RECORD INSTALLED CONDITIONS.
- 15.5 REPRODUCIBLE "RECORD" DRAWINGS PREPARED IN CAD FORMAT SHALL BE PROVIDED AS INSTALLED CONDITIONS OF THE WORK. A FULL SIZE PRINT OUT OF THE "RECORD" DRAWING FILE SHALL BE PROVIDED AFTER COMPLETION OF THE INSTALLATION.
- 15.6 UPON COMPLETION AND ACCEPTANCE OF WORK, THE CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO SPRINT THE PROPER OPERATIONS AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

THESE GENERAL NOTES ACT AS THE GUIDELINES FOR CONSTRUCTION OF THE PROJECT. THEY ARE SUPERSEDED BY ANY MORE STRINGENT CONTRACT REQUIREMENTS OR PROJECT SPECIFICATION PROVIDED BY THE OWNER.



N27 W24025 PAUL CT. SUITE 100
PEWAUKEE, WI 53072
PHONE: (262)-547-1200
WWW.SUNVEST.COM

STRUCTURAL ENGINEER STAMP

ELECTRICAL ENGINEER STAMP

CIVIL ENGINEER STAMP

PROFESSIONAL ENGINEER STAMPS

LICENSED ELECTRICAL ENGINEER certifies that they prepared all the electrical "E" sheets in this drawing set.
LICENSED STRUCTURAL ENGINEER certifies that they prepared all of the structural "S" sheets in this drawing set.
LICENSED CIVIL ENGINEER certifies that they prepared all of the civil "C" sheets in this drawing set.
It should be noted that any plan sheets not identified above have been prepared and certified by others and have been included herein for informational purposes only.

R	12/22/21	X	
Q	12/8/21	W	
P	11/12/21	V	
O	10/29/21	U	
N	10/29/21	T	
M	10/27/21	S	
REV	DATE	REV	DATE
DRAWN BY: TG		CHECKED BY: RA	
SCALE: AS NOTED		JOB NO: 21-702	

DANE COUNTY SOLAR LLC

COTTAGE GROVE, WI 55016

SHEET TITLE

GENERAL NOTES

DWG. NO.

G-2.00