

## PV SYSTEM DETAILS

ARRAY TYPE: GROUND MOUNT  
 DC SYSTEM SIZE: 1.40 MW DC  
 DC SYSTEM VOLTAGE: 1500 V  
 AC SYSTEM SIZE: 1.00 MW AC @ PF 1.0  
 MODULES: (3456) TRINA TSM-DEG15HC.20 405W  
 INVERTERS: (8) CPS SCH125KTL-D0/US-600  
 RACKING: ARRAY TECHNOLOGIES HORIZONTAL TRACKER  
 AZIMUTH: 180 DEG  
 ARRAY PITCH: SAT (SINGLE AXIS TRACKER)

# SV CSG NORTHFIELD LLC

## (44.473361, -93.220431)

## INSPECTION ITEMS

**SUNVEST**  
SOLAR LLC  
Developing • Financial • Relationships  
(608) 527-3990 www.sunvest.com

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

CONTRACTOR SHALL STRICTLY ADHERE TO THE FOLLOWING CODE STANDARDS UNLESS OTHERWISE NOTED  
WITHIN THE DRAWING; NEC. 2017, IBC. 2015, IFC. 2015 AND APPLICABLE LOCAL CODES.

## PROGRESS INSPECTIONS:

ROUGH ELECTRIC:  REQUIRED  NOT REQUIRED  
 ROUGH BUILDING:  REQUIRED  NOT REQUIRED

## FINAL INSPECTIONS:

ELECTRIC:  REQUIRED  NOT REQUIRED  
 BUILDING:  REQUIRED  NOT REQUIRED  
 OTHER:  REQUIRED  NOT REQUIRED

CONTRACTOR SHALL BE KNOWLEDGEABLE OF ANY LOCAL AHJ INSPECTIONS REQUIRED NOT LISTED.

65' TO 330TH STREET W  
CASE #: 04193986  
SITE LAT: 44.473361  
SITE LONG: -93.220431  
POI LAT: 44.471648  
POI LONG: -93.219834  
SUBSTATION: NORTHFIELD

UTILITY CUSTOMER OF RECORD  
SV CSG NORTHFIELD LLC

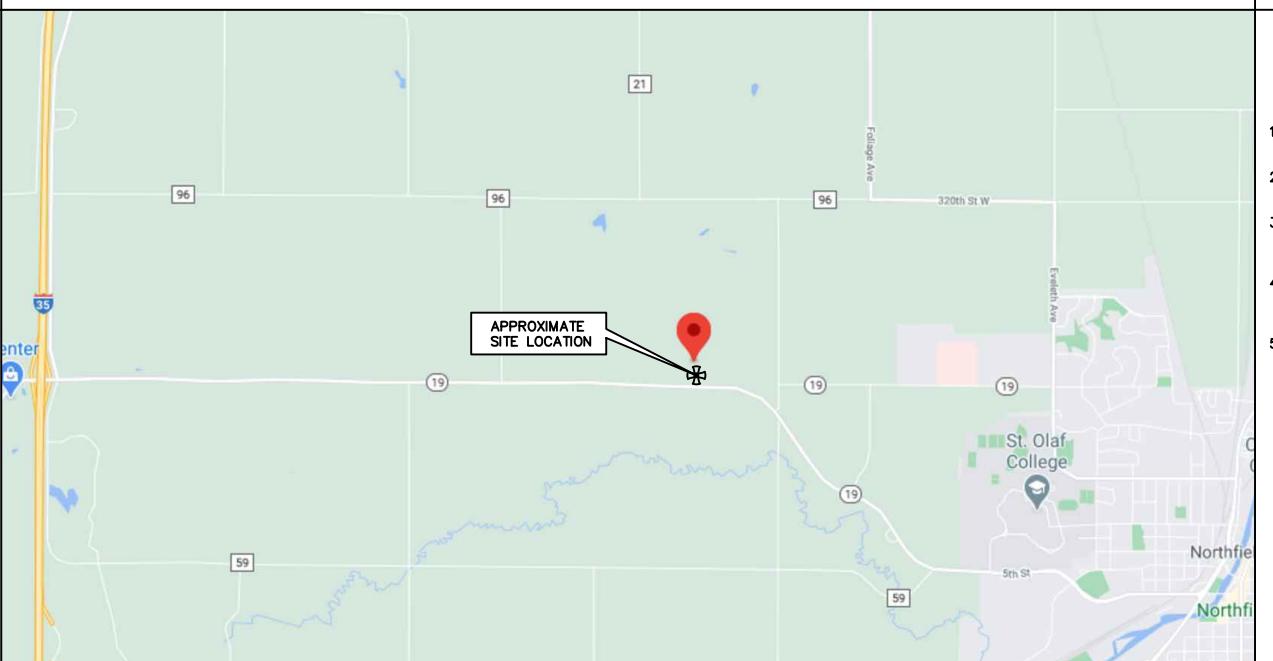
GARDEN NAME:  
PINKMAN SOLAR

## SCOPE OF WORK

## LOCATION MAP

## NOTES

1. CONTRACTOR SHALL ACCEPT, VERIFY AND INSTALL ALL MATERIAL AS LISTED ABOVE AND ON THE B.O.M. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE DEVELOPER IMMEDIATELY.
2. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED AS PER MANUFACTURES GUIDELINES SET FORTH IN THE INSTRUCTION MANUAL AND AS PER NEC. 110.(D)
3. CONTRACTOR SHALL PROVIDE PROTECTIVE MATERIALS TO PREVENT DAMAGE TO EXISTING BUILDINGS OR EQUIPMENT AND PROPOSED BUILDINGS OR EQUIPMENT.
4. CONTRACTOR SHALL PERFORM A PRE-CONSTRUCTION SITE WALK AT LEAST 5 DAYS PRIOR TO MOBILIZATION TO CONFIRM SITE CONDITIONS, STAGING AREAS AND ANY OTHER SITE SPECIFIC DETAILS REQUIRED. ANY ISSUES SHALL BE PHOTO DOCUMENTED ALONG WITH A WRITTEN REPORT AND PROVIDED IMMEDIATELY TO THE NECESSARY PARTIES.
5. IF DEVELOPER IS NOT CALLED, CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL TESTING/INSPECTION REQUIRED TO APPROVE SITE AT ENGINEERS DISCRETION.
6. PRIOR TO FINAL SIGN-OFF THE CONTRACTOR SHALL PROVIDE A LETTER OF COMPLIANCE FOR THE WORK DONE. THE LETTER MUST REFERENCE THAT THE WORK WAS DONE IN ACCORDANCE TO THE DRAWINGS AND IN COMPLIANCE WITH THE BUILDING CODE OF THE APPLICABLE AUTHORITY HAVING JURISDICTION.



1. THE APPLICANT PROPOSES TO INSTALL PV MODULES AND WEATHER PROOF EQUIPMENT FOR AN UNMANNED FACILITY.
2. EQUIPMENT IS UNMANNED AND NOT FOR HUMAN HABITATION, HANDICAP ACCESS IS THEREFORE NOT REQUIRED.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. NON-CONFORMING CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
4. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER AND DEVELOPER FOR REMEDIAL OR CORRECTIVE ACTION.
5. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.

## DISCLAIMER

IT IS A VIOLATION OF THE LAW FOR ANY PERSON UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DOCUMENT. UNLESS EXPLICITLY AGREED TO BY THE ENGINEER IN WRITING, THE ENGINEER DISCLAIMS ALL LIABILITY ASSOCIATED WITH THE REUSE, ALTERATION OR MODIFICATION OF THE CONTENTS HEREIN.

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.

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## SITE INFORMATION

## AERIAL MAP

DWG NO:

## DRAWING INDEX

## SHEET TITLE

F L

E K

D J

C I

B H

A G

REV DATE REV DATE

DRAWN BY: CDR CHECKED BY: CHKR

SCALE: AS NOTED JOB NO: JOB\_NO

SV CSG NORTHFIELD LLC

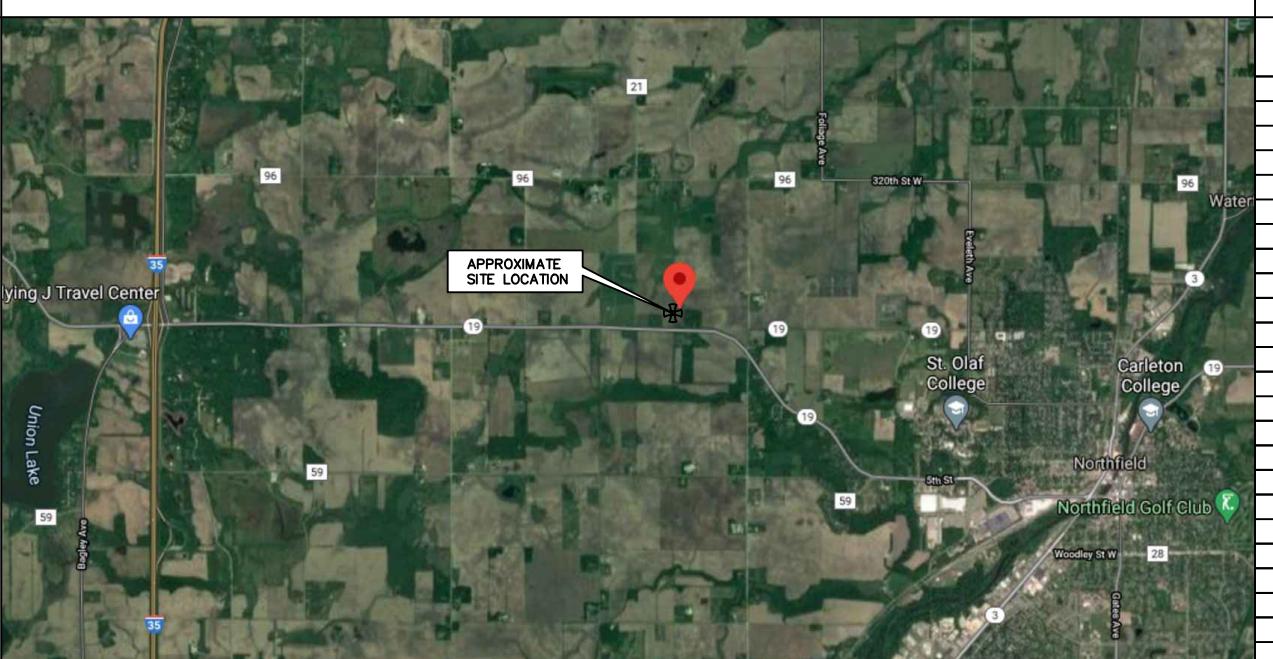
RICE COUNTY  
(44.473361, -93.220431)

SHEET TITLE

TITLE SHEET

DWG. NO.

**T-1.00**

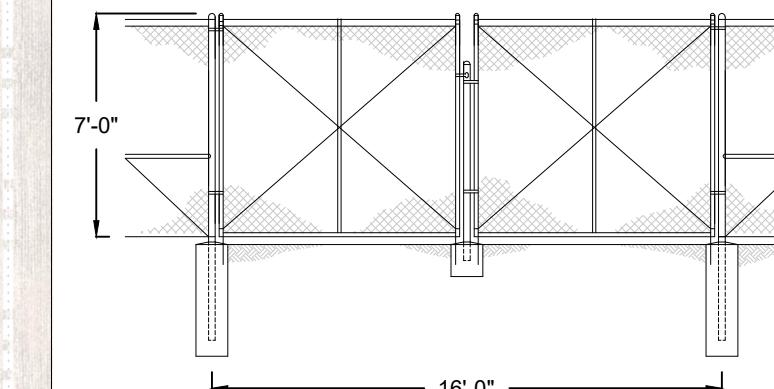


## DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE DEVELOPER OR ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

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 UTILITY CUSTOMER OF RECORD  
 SV CSG NORTHFIELD LLC

 GARDEN NAME:  
 PINKMAN SOLAR

 1  
**PV-1.0**  
 NTS

## NOTES:

1. 24/7 UNESCORTED KEYLESS ACCESS SHALL BE PROVIDED TO ALL EXCEL ENERGY EQUIPMENT.
2. AC DISCONNECT LOCATION LABEL APPLIED PER LABEL #18. E-3.00
3. ALL ACCESS ROADS 15' MINIMUM WIDTH.
4. DC COMBINERS TO BE PLACED STRATEGICALLY IN THE ARRAY FIELD
5. NO POSITION, DISTANCE OR CLEARANCE CONCERN OF OVERHEAD ELECTRIC SERVICE LINES AND/OR OTHER UTILITIES IN RELATION TO PV PANELS UNLESS NOTED.

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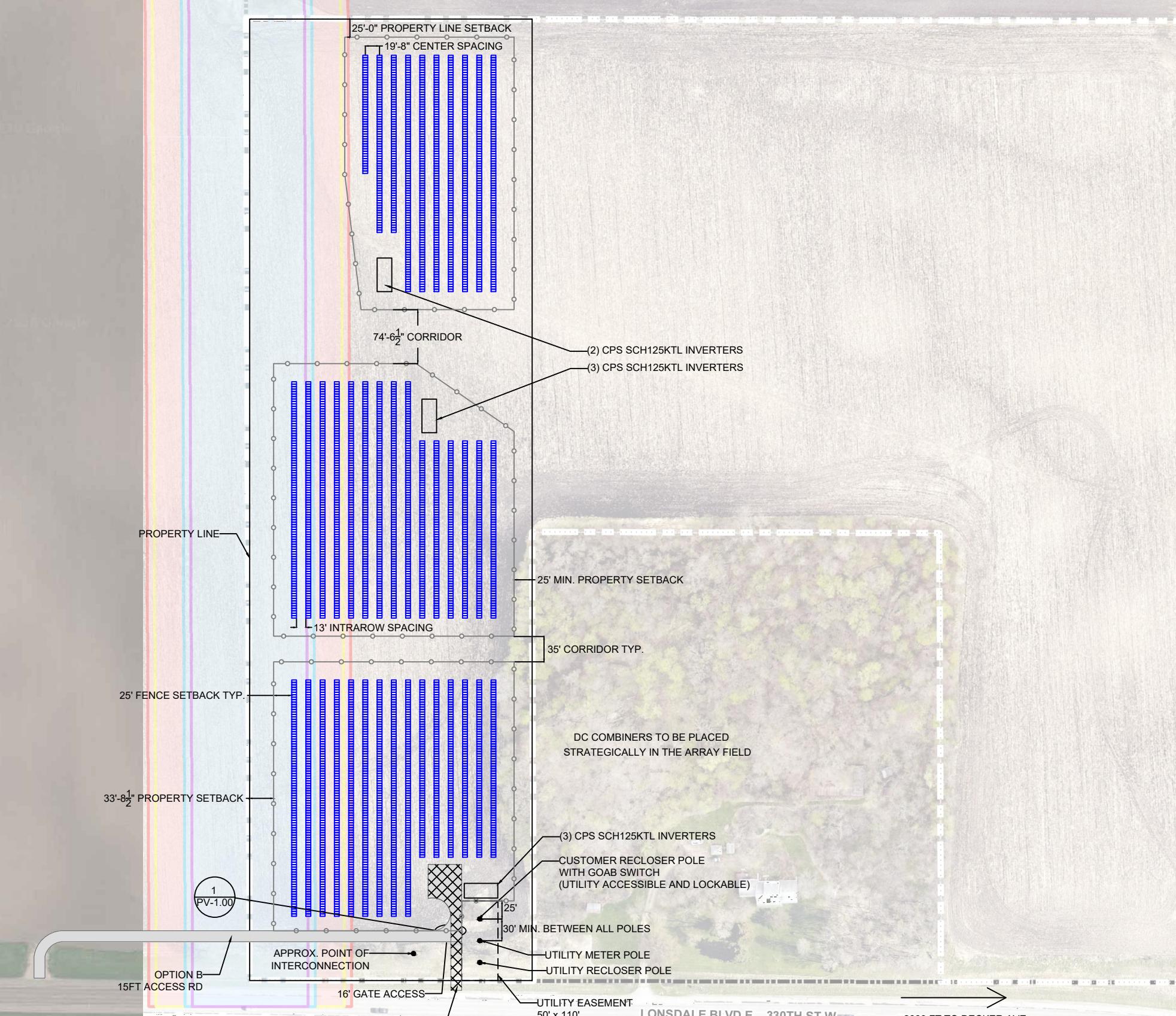
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RACKING:	ARRAY TECHNOLOGIES HORIZONTAL TRACKER
AZIMUTH:	180 DEG
ARRAY PITCH:	SAT (SINGLE AXIS TRACKER)

 SHEET TITLE  
 ARRAY LAYOUT

DWG. NO.

**PV-1.00**

**PID 430270050030**
**Proposed Major Collector**

- 80ft ROW
- 90ft ROW
- 80ft ROW 50ft Setback
- 90ft ROW 50ft Setback

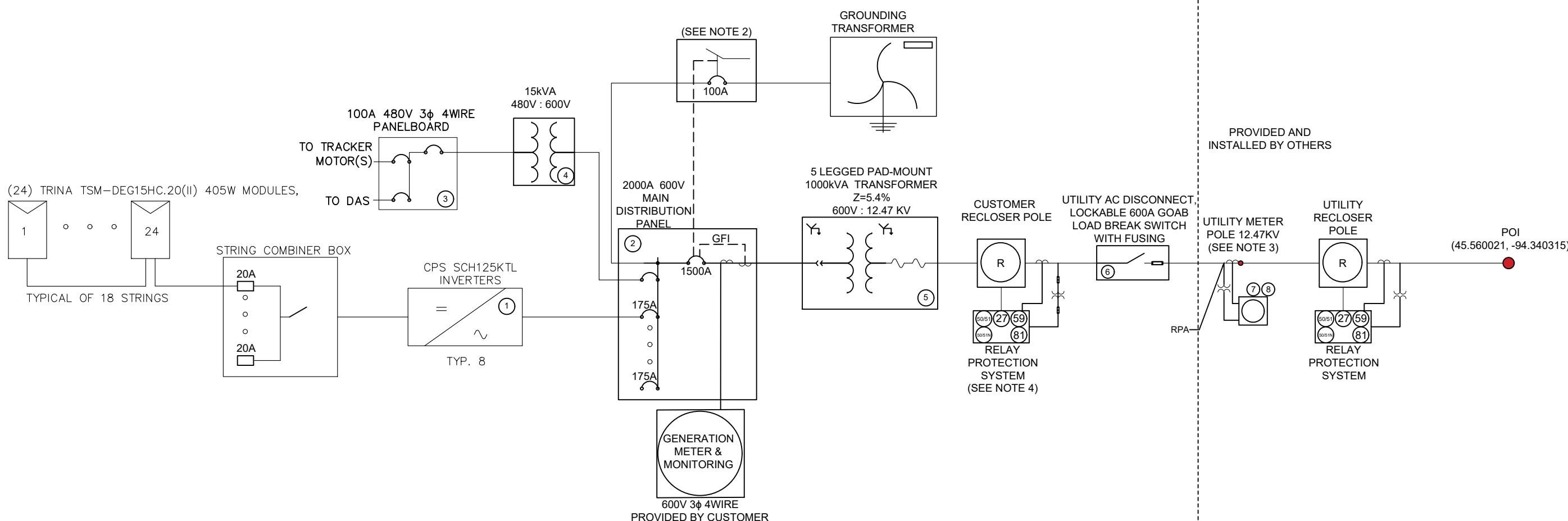
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## NOTES:

- EQUIPMENT USED SHALL BE UL-LISTED AS PER STANDARDS LISTED BELOW
  - 1.1 INVERTERS : UL1741-SA
  - 1.2 MODULES : UL1703
  - 1.3 RACKING : UL2703 OR 3703
- THE GROUNDING TRANSFORMER BREAKER SHALL INCLUDE AN AUXILIARY CONTACT. THE SWITCHGEAR MANUAL BREAKER SHALL OPEN WHEN THE AUXILIARY CONTACT INDICATES THAT THE GROUNDING TRANSFORMER BREAKER IS OPEN AND IS NOT CLOSED. THIS INTERLOCK TO BE IMPLEMENTED THROUGH THE GRI RELAY.
- UTILITY METER 3P, 4W SERVICE. PROVIDE PLACARD: "GENERATION SYSTEM CONNECTED." FINAL SPECIFICATIONS BY XCEL ENERGY. CUSTOMER TO PROVIDE AND INSTALL PER XCEL 'STANDARD FOR ELECTRIC INSTALLATION AND USE' TABLE OF RESPONSIBILITY FOR PM-10. INSTALLATION PER PM-10.
- POLE MOUNTED RECLOSE. TO FACILITATE LOSS OF PHASE TEST. VOLTAGE SENSING REQUIRED ON BOTH SIDES OF SWITCH. SHALL TRIP THE OTHER PHASES OPEN OVERVOLTAGE DETECTION DURING LOSS OF PHASE TEST. COMMUNICATES STATUS TO THE DAS.
- 24/7 UNESCORTED KEYLESS ACCESS TO XCEL ENERGY EQUIPMENT
- UTILITY METER AND UTILITY AC DISCONNECT ACCESSIBLE 24/7, VISIBLE AND LOCKABLE
- UTILITY AC DISCONNECT WITHIN 10' OF UTILITY METER
- PV SYSTEM CONNECTED VIA A SECONDARY INTERCONNECTION
- DESIGN SHALL MEET NATIONAL ELECTRIC CODE (NEC CODES) REQUIREMENTS

## KEYNOTES:

1. INVERTER: CPS SCH125KTL 3-PHASE 600V
2. MAIN DISTRIBUTION PANEL: 2000A 3 PHASE 600V
3. PANELBOARD: 100A 480V 3-PHASE 4 WIRE
4. STEP-UP TRANSFORMER: 3-PHASE 15KVA 480V: 600V
5. 5 LEGGED PAD MOUNT TRANSFORMER: 1000KVA 600V : 12.47KV
6. AC DISCONNECT: 15KV, 3-PHASE, 600A GOAB LOAD BREAK SWITCH WITH FUSING. VISIBLE OPEN TYPE
7. UTILITY METER: 12.47KV, 3 -PHASE
8. AC DISCONNECT LOCATION LABEL APPLIED PER LABEL #18, E-3.00



## GROUNDING TRANSFORMER SIZING CALCULATIONS

1 MWac Project

## REQUIREMENT 1

$$\begin{aligned} KV_{(L-L)} &= 0.6 & 0.35 KV_{(L-L)} \\ MVA_{GEN} &= 1.00 \\ Z_{BASE} &= KV^2/MVA_{GEN} = 0.360 \Omega \\ X_{0,0G} &= 0.6 \times Z_{BASE} = 0.2160 \lll \text{Ground Source } X_0 \text{ +/- 10% tolerance} \end{aligned}$$

## REQUIREMENT 2

$$\begin{aligned} \text{Verify } X_{0,0G}/R_{0,0G} \geq 4 & \\ R_{0,0G} &= 0.0442 \Omega \quad (Z_0 = 0.22 \Omega) \\ (0.9 \times X_0) / (1.1 \times R_0) &= 4.00 \lll \text{X}_0/\text{R}_0 \text{ ratio with 10% tolerance must be greater than or equal to 4} \end{aligned}$$

## REQUIREMENT 3

$$\begin{aligned} \text{Assuming voltage imbalance } (V_0) \text{ of } 4.0\% & \\ I_{BASE} &= V_{BASE} / Z_{BASE} = 962.3 \text{ A} \\ I_{0pu} &= V_0 / Z_0 = 0.0667 \text{ A} \\ I_0 &= I_{BASE} * I_{0pu} = 64.2 \text{ A} \\ I_{CONT} &= 3 * I_0 = 192.5 \text{ A} \\ 125\% \text{ of Maximum Unbalance} &= 240.6 \text{ A} \lll \text{Continuous Current Min. Rating} \end{aligned}$$

## REQUIREMENT 4

$$\begin{aligned} 3\text{PH Fault Current @ POI} &= \text{TBD} \text{ A} \\ \text{SLG Fault Current @ POI} &= \text{TBD} \text{ A} \\ \text{Generator (DG) 3PH Fault Current} &= 962.25 \text{ A} \\ \text{assuming DG short circuit contribution of: } 1.0 & \times \text{FLA} \\ \text{Utility } Z_1 &= \text{TBD} \Omega \\ \text{Utility } Z_{21} &= \text{TBD} \Omega \\ \text{Utility } Z_{20} &= \text{TBD} \Omega \\ \text{New estimated SLG Fault Current} &= \text{TBD} \text{ A} \\ \text{Estimated } \% 3I_0 \text{ in DG} &= \text{TBD} \\ \text{Estimated Fault Current} &= \text{TBD} \text{ A} \\ 110\% \text{ of } 3I_0 &= \text{TBD} \text{ A} \lll \text{5-Second Withstand Rating} \end{aligned}$$

For Westwood Use Only		XFMER RATING	<input type="radio"/> G-wye Delta	<input checked="" type="radio"/> Zig Zag
Xfmr Size $T_{MVA}$ ( $I_0 * KV_{(L-L)}$ )		48.1 KVA	<= Xfmr Size	
Xfmr Base Impedance $T_{BASE}$ ( $KV^2/T_{MVA}$ )		7.48 Ω		
$\sqrt{(R/T_{BASE})^2 + (X/T_{BASE})^2}$		2.947 %	<= Transformer %Z	

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SCALE: AS NOTED	JOB NO: JOB_NO

SV CSG NORTHFIELD LLC

RICE COUNTY  
(44.473361, -93.220431)

SHEET TITLE  
ONE LINE DIAGRAM  
DWG. NO.  
**E-1.00**

144-Cell  
MONOCRYSTALLINE MODULE380-405W  
POWER OUTPUT RANGE19.7%  
MAXIMUM EFFICIENCY0~+5W  
POSITIVE POWER TOLERANCE

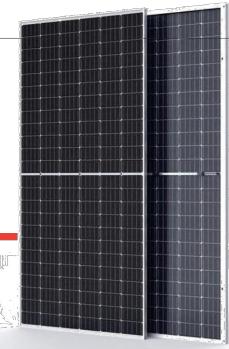
Founded in 1978, Trina Solar is the world's leading total solution provider for solar energy, with local presence around the globe. Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products to the world. We are a global, long, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We work with our partners to build mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

## Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716  
ISO 9001: Quality Management System  
ISO 14001: Environmental Management System  
ISO14064: Greenhouse Gases Emissions Verification  
OHSAS 18001: Occupation Health and Safety Management System



Trinasolar



## 100/125kW, 1500Vdc String Inverters for North America



CPS SCH100/125KTL-DO/US-600

The 100 & 125kW high power CPS three phase string inverters are designed for ground mount applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency at 99.1% peak and 98.3% CEC, wide operating voltages, broad temperature ranges and a NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications. The CPS 100/125kW products ship with the Standard or Centralized Wire-box, each fully integrated and separable with AC and DC disconnect switches. The Standard Wire-box includes touch safe fusing for up to 20 strings. The CPS Flex Gateway enables communication, controls and remote product upgrades.

## Key Features

- NEMA 70, NEC 2014 and 2017 compliant
- Touch safe DC Fuse holders adds convenience and safety
- CPS Flex Gateway enables remote FW upgrades
- Integrated AC & DC disconnect switches
- 1 MPPT with 20 fused inputs for maximum flexibility
- Copper and Aluminum compatible AC connections
- NEMA Type 4X outdoor rated, tough tested enclosure
- Advanced Smart-Grid features (CA Rule 21 certified)
- KVA Headroom yields 100kW @ 0.9PF and 125kW @ 0.95PF
- Generous 1.87 and 1.5 DC/AC Inverter Load Ratios
- Separable wire-box design for fast service
- Standard 5 year warranty with extensions to 20 years



100/125KTL Standard Wire-box



100/125KTL Centralized Wire-box



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SUBSTATION: NORTHFIELD

UTILITY CUSTOMER OF RECORD  
SV CSG NORTHFIELD LLC

GARDEN NAME:  
PINKMAN SOLAR

**NOTES:**

1. DESIGN SHALL MEET NATIONAL ELECTRIC CODE (NEC CODES) REQUIREMENTS
2. LABELS SHALL BE COMPLIANT WITH NEC 690

**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 SWELLING 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. (CEC 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. (CEC 690.54)

**KEYED NOTES:**

1. PROVIDE 9"X3" ENGLISH/SPANISH ELECTRICAL WARNING SIGN AT EACH OF THE SITE ENTRANCES AND EVERY 200' ALONG THE FENCE.
2. PROVIDE SITE DISCONNECT LOCATION PLACECARD AT EACH OF THE SITE ENTRANCES. MARK "YOU ARE HERE" AT EACH OF THE LOCATIONS ON THE MAP

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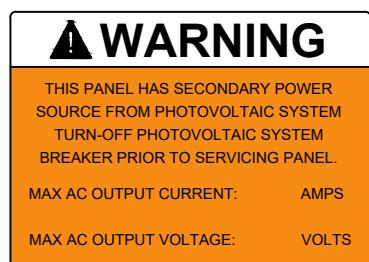
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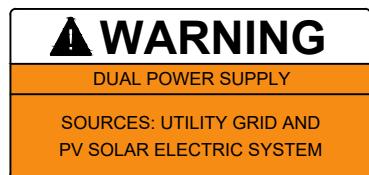
NEC LABELS

DWG. NO.

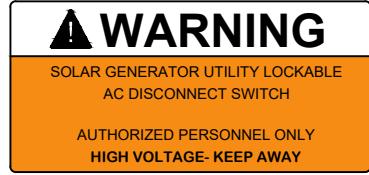
**E-3.00**



LABEL #1 PLACE AT POINT OF INTERCONNECTION



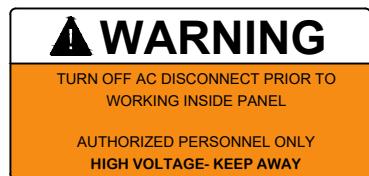
LABEL #2 PLACE AT POINT OF INTERCONNECTION



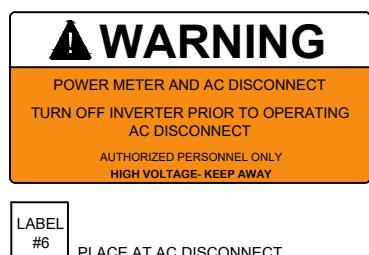
LABEL #3 PLACE AT UTILITY LOCKABLE DISCONNECT



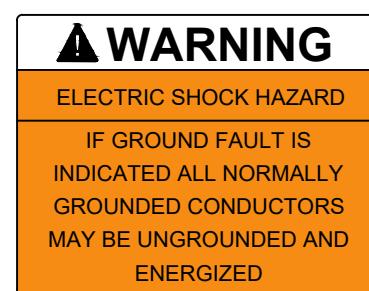
LABEL #4 PLACE AT PV SWITCHBOARD



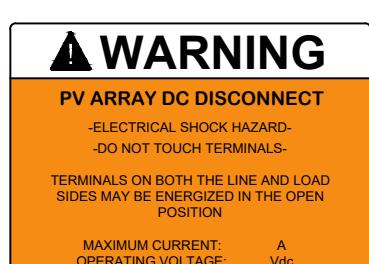
LABEL #5 PLACE AT AC COMBINER PANEL



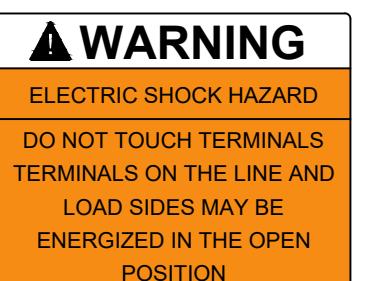
LABEL #6 PLACE AT AC DISCONNECT



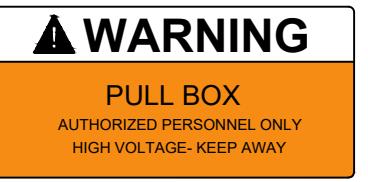
LABEL #7 PLACE AT INVERTERS



LABEL #11 PLACE ON DC DISCONNECTS



LABEL #12 PLACE ON DC DISCONNECTS AND AC DISCONNECTS



LABEL #13 PLACE AT PULL BOXES

**INV-01**

LABEL #14 PLACE AT INVERTERS

**ACB-01**

LABEL #15 PLACE AT INVERTERS

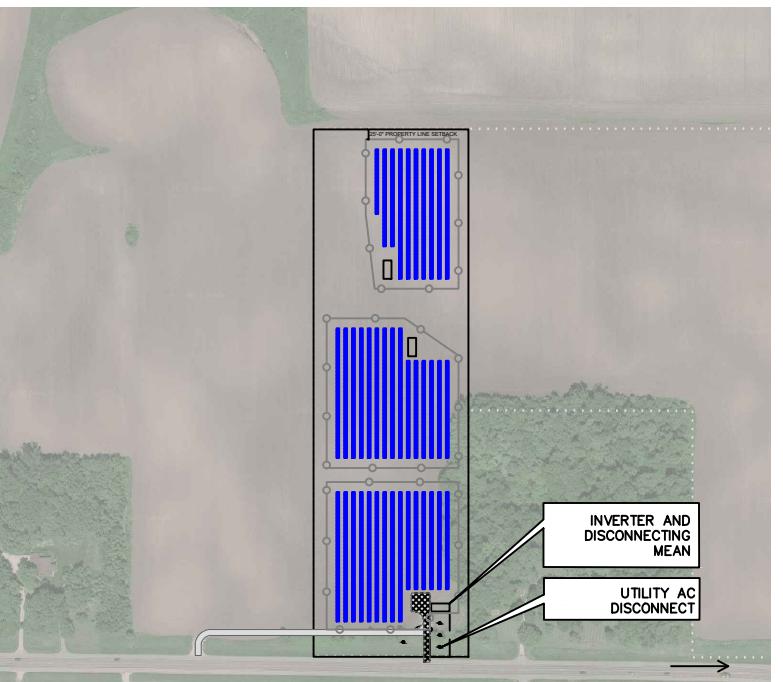
**D-01**

LABEL #16 PLACE AT SYSTEM DISCONNECT

**M-01**

LABEL #17 PLACE AT SYSTEM METER CABINET

**CAUTION**  
POWER TO THIS SITE IS SUPPLIED BY  
MULTIPLE SOURCES: DISCONNECT  
LOCATIONS ARE SHOWN BELOW



NORTHFIELD  
MAP OF PHOTOVOLTAIC POWER SOURCES  
DISCONNECTING MEANS

SITE DISCONNECT LOCATION PLACECARD

65' TO 330TH STREET W  
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 SHEET TITLE  
 GENERAL NOTES

DWG. NO.

G-1.00

## 1. GENERAL REQUIREMENTS:

- 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.
- 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.
- 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.
- ONLY WRITTEN CHANGES AND/OR MODIFICATIONS APPROVED BY THE ENGINEER, CONSULTING ENGINEER OR OWNER'S REPRESENTATIVE WILL BE RECOGNIZED.
- THE ELECTRICAL CONTRACTOR SHALL SUBMIT, FOR THE ENGINEER'S APPROVAL, DETAILED SHOP DRAWINGS OF ALL EQUIPMENT SPECIFIED.
- CONTRACTOR SHALL COORDINATE WITH SPECIFICATIONS PROVIDED BY OTHER TRADES.
- 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.
- KEEP PREMISES FREE FROM RUBBISH. REMOVE ALL ELECTRICAL RUBBISH FROM SITE.
- ALL WORK SHALL BE INSTALLED CONCEALED UNLESS OTHERWISE NOTED.
- 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.
- 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.
- 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 CONTRACTOR'S EXPENSE.
- 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.
- THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING UTILITIES.
- 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.
- 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.
- THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF FINISHED CONSTRUCTION PRIOR TO FABRICATION AND INSTALLATION OF FIXTURES AND EQUIPMENT.
- 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 REQUIREMENTS.

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 COMPAKTED TO 95% DENSITY IN 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.

- EXTERIOR, BUILDING MOUNTED LUMINARIES
- SWITCHES

2.5 REFER TO THE PLUMBING DRAWINGS (IF APPLICABLE) FOR THE LOCATIONS OF THE FOLLOWING:

- 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

4.3 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.

6.7 ALL RACEWAY AND WIRING SHALL BE CONCEALED IN FINISHED AREAS. RACEWAY IN MECHANICAL ROOMS, BASEMENTS AND CRAWL SPACES MAY BE SURFACE MOUNTED.

6.8 FOR CONDUITS CROSSING EXPANSION JOINTS, PROVIDE EXPANSION FITTINGS FOR SIZE 1-1/4", AND LARGER. PROVIDE SECTIONS OF FLEXIBLE CONDUIT WITH GROUNDING JUMPERS FOR SIZES 1" AND SMALLER.

6.9 THE CONTRACTOR SHALL SEAL ALL PENETRATIONS THROUGH FIRE RATED WALLS AND FLOORS WITH APPROVED FIRE RATED SEALANT. ALL PENETRATIONS THROUGH ALL WALLS AND FLOORS SHALL BE SEALED. FOR ALL SLAB PENETRATIONS THE METHOD, DEPTHS AND LOCATIONS SHALL BE PRE-APPROVED BY THE BUILDING ENGINEER PRIOR TO THE START OF WORK.

6.10 THE CONTRACTOR SHALL INSTALL DETECTABLE UNDERGROUND TAPES FOR THE PROTECTION, LOCATION AND IDENTIFICATION OF UNDERGROUND CONDUIT INSTALLATION.

6.11 EXACT ROUTING OF CONDUITS AND CABLES SHALL BE DETERMINED IN FIELD.

6.12 ALL PENETRATIONS THROUGH FLOORS SHALL BE FIRE STOPPED AND SEALED WITH APPROVED SEALANT.

6.13 ELECTRICAL RACEWAY CONNECTIONS TO VIBRATING EQUIPMENT AND MACHINERY SUCH AS MOTORS, TRANSFORMERS, ETC., SHALL BE MADE WITH FLEXIBLE LIQUID TIGHT METALLIC CONDUIT.

6.14 SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS IN HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK. MACHINE SCREWS IN METAL, BEAM CLAMPS IN FRAMEWORK AND WOOD SCREWS IN WOOD. NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO BUILDING LINES.

6.15 DO NOT RUN RACEWAYS CLOSER THAN 6 INCHES WHEN PARALLEL TO HOT WATER OR STEAM PIPES. WHEN CROSSING WATER OR STEAM PIPES CROSS A MINIMUM OF 3 INCHES ABOVE. IF CROSSING BELOW IS UNAVOIDABLE, PROVIDE DRIP SHIELDS EXTENDING 6 INCHES BEYOND THE WATER OR STEAMPIPE. BOXES INSTALLED IN PROXIMITY TO WATER OR STEAM PIPE SHALL BE RATED NEMA 4X.

SHEET TITLE

GENERAL NOTES

DWG. NO.

## 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.

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.

F	L
E	K
D	J
C	I
B	H
A	G

REV DATE      REV DATE  
DRAWN BY: CDR      CHECKED BY: CHKR  
SCALE: AS NOTED      JOB NO: JOB\_NO

SV CSG NORTHFIELD LLC  
RICE COUNTY  
(44.473361, -93.220431)

SHEET TITLE  
GENERAL NOTES

DWG. NO.

**G-1.00**

**SUNVEST**  
SOLAR LLC

Devercilities • Honesty • Relationships  
(608) 547-3899 • www.sunvest.com  
N27 W24025 PAUL CT. SUITE 100  
PEWAUKEE, WI 53072  
PHONE: (262) 547-1200  
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65' TO 330TH STREET W  
CASE #: 04193986  
SITE LAT: 44.473361  
SITE LONG: -93.220431  
POI LAT: 44.471648  
POI LONG: -93.219834  
SUBSTATION: NORTHFIELD  
UTILITY CUSTOMER OF RECORD  
SV CSG NORTHFIELD LLC  
GARDEN NAME:  
PINKMAN SOLAR