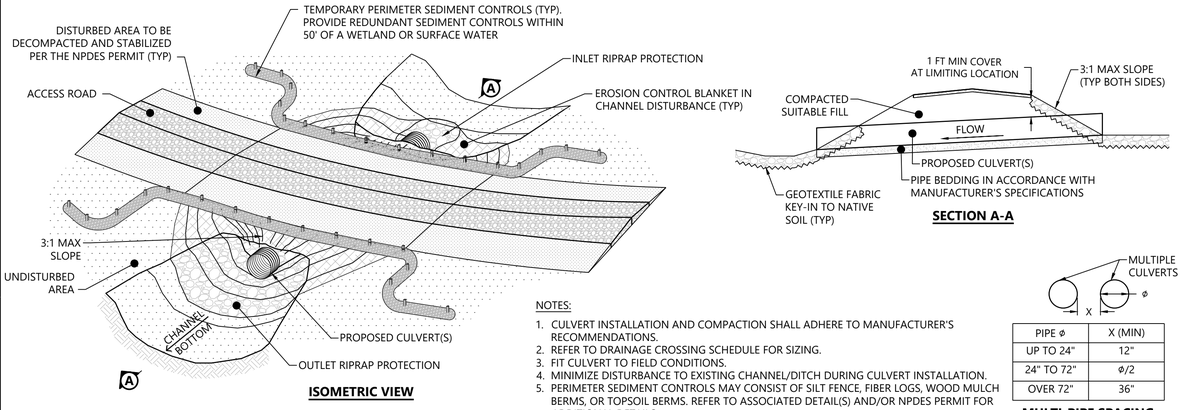


ISOMETRIC VIEW

SECTION A-A

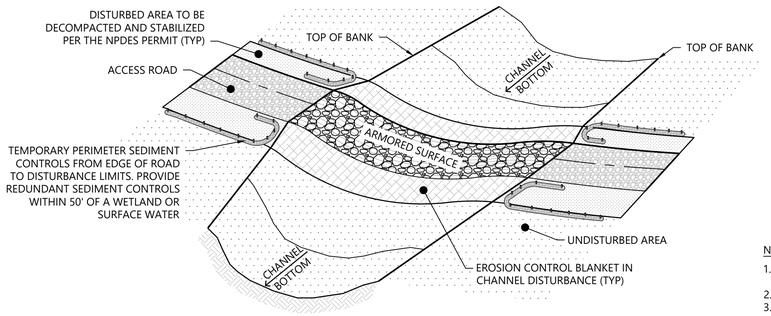
NOTES:

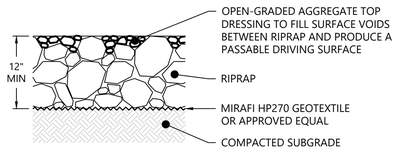
1. CULVERT INSTALLATION AND COMPACTION SHALL ADHERE TO MANUFACTURER'S RECOMMENDATIONS.
2. REFER TO DRAINAGE CROSSING SCHEDULE FOR SIZING.
3. FIT CULVERT TO FIELD CONDITIONS.
4. MINIMIZE DISTURBANCE TO EXISTING CHANNEL/DITCH DURING CULVERT INSTALLATION.
5. PERIMETER SEDIMENT CONTROLS MAY CONSIST OF SILT FENCE, FIBER LOGS, WOOD MULCH BERMS, OR TOPSOIL BERMS. REFER TO ASSOCIATED DETAIL(S) AND/OR NPDES PERMIT FOR ADDITIONAL DETAILS.

PIPE ϕ	X (MIN)
UP TO 24"	12"
24" TO 72"	ϕ/2
OVER 72"	36"

MULTI-PIPE SPACING

Westwood | CULVERT CROSSING | NOT TO SCALE | DN-03



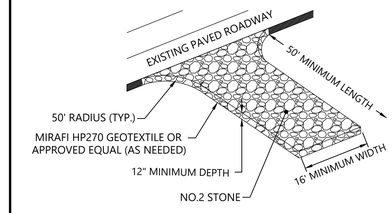


STANDARD ARMORED SURFACE

NOTES:

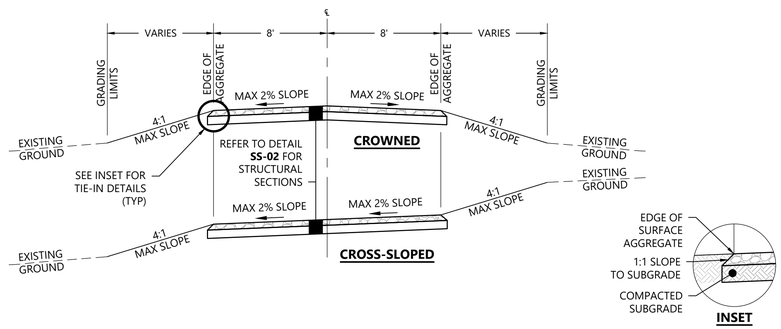
1. CHANNEL SIDE SLOPES MAY REQUIRE MODIFICATION TO CONSTRUCT THE ACCESS ROAD THROUGH THE CHANNEL TO MEET REQUIREMENTS OF CONSTRUCTION AND DELIVERY VEHICLES.
2. THE ACCESS ROAD SHALL CROSS THE CHANNEL AS CLOSE TO PERPENDICULAR AS POSSIBLE.
3. THE FINISHED ACCESS ROAD SURFACE SHALL BE AT AN ELEVATION THAT ALLOWS WATER TO FLOW THROUGH THE CHANNEL UNIMPEDED AND WITHOUT PONDING UPSTREAM OF ROAD OR ON THE ROAD SURFACE.
4. ARMORED SURFACE SHALL EXTEND THROUGH THE CHANNEL BOTTOM AND UP THE CHANNEL SIDE SLOPES TO THE OBSERVED TOP OF BANK OF THE CHANNEL, UNLESS OTHERWISE NOTED.
5. PERIMETER SEDIMENT CONTROL MAY CONSIST OF SILT FENCE, FIBERLOGS, WOOD MULCH BERMS, OR TOPSOIL BERMS. REFER TO APPROPRIATE DETAIL FOR INSTALLATION REQUIREMENTS.
6. STABILIZE DISTURBED GROUND IN ACCORDANCE WITH THE NPDES PERMIT.
7. CROSSING MAY BE INSTALLED DURING THE PROJECT RESTORATION PHASE. IF INSTALLED DURING CONSTRUCTION, MONITOR THE CROSSING FOR DAMAGE FROM CONSTRUCTION TRAFFIC. ADDITIONAL MAINTENANCE OR REPAIRS MAY BE REQUIRED.

Westwood | STANDARD DUTY LOW WATER CROSSING | NOT TO SCALE | DN-01



NOTES:
ROCK CONSTRUCTION ENTRANCE SHOULD CONTAIN MAXIMUM SIDE SLOPES OF 4:1.
ROCK ENTRANCE SHOULD BE INSPECTED AND MAINTAINED REGULARLY. ROCK ENTRANCE LENGTH MAY NEED TO BE EXTENDED IN CLAY SOILS.

Westwood | ROCK CONSTRUCTION ENTRANCE (NOT TO SCALE) | GD05

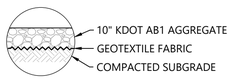


INSET

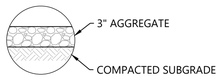
NOTES:

1. ENSURE THAT ROADS REMAIN WELL-DRAINED.
2. CONSTRUCT CROSS-SLOPE WHERE ROADS ARE CONSTRUCTED ON A SIDE SLOPE, AND WHERE OTHERWISE NOTED ON PLANS.
3. SLOPES SHOWN ARE TYPICAL. SOME ROAD LOCATIONS MAY REQUIRE VARIATIONS IN SLOPE.
4. ALL DISTURBED GROUND NOT COVERED WITH AGGREGATE SHALL BE STABILIZED PER THE NPDES PERMIT.

Westwood | TYPICAL ACCESS ROAD | NOT TO SCALE | RD-05



ACCESS ROAD SECTION



TEMPORARY LAYDOWN SECTION

NOTES:

1. REFER TO CONSTRUCTION SPECIFICATIONS, AGGREGATE REQUIREMENTS, AND TESTING REQUIREMENTS.
2. STRUCTURAL SECTIONS SHOWN ARE THE MINIMUM THICKNESS DURING NORMAL FIELD CONDITIONS. THE SECTIONS MAY NEED TO BE INCREASED BASED ON ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION. CONDITIONS INCLUDE, BUT ARE NOT LIMITED TO, CONSTRUCTION DURING UNUSUALLY WET PERIODS, IN LOW/WET AREAS OR SOFT SOILS.
3. AGGREGATE DEPTHS SPECIFIED ARE DEPTHS REMAINING AT THE END OF CONSTRUCTION.

Westwood | STRUCTURAL CROSS SECTIONS | NOT TO SCALE | SS-02

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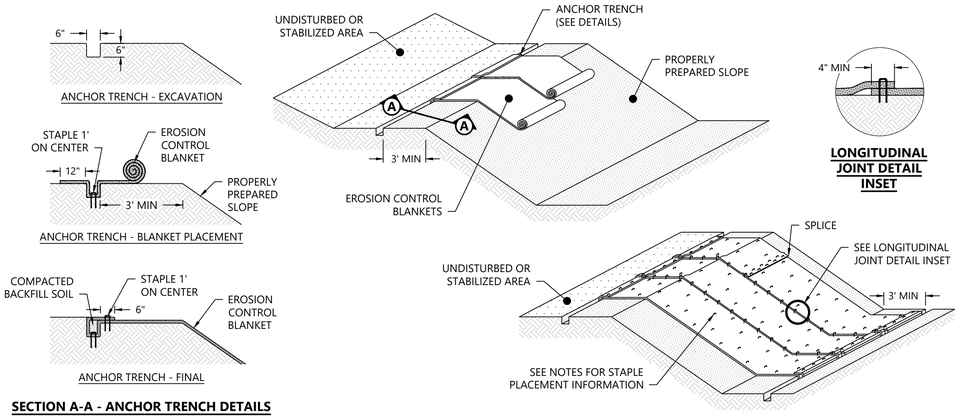


SECTION A-A - ANCHOR TRENCH DETAILS

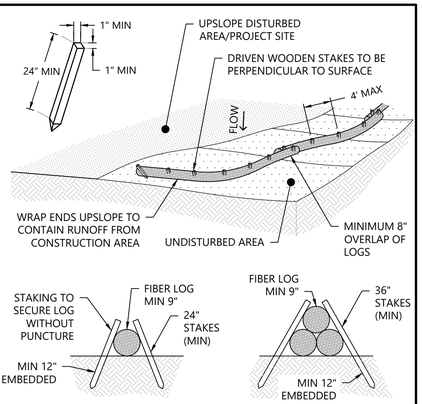
NOTES:

1. EROSION CONTROL BLANKETS ARE INTENDED TO BE USED AS AN IMMEDIATE MULCH COVER FOR DISTURBED SLOPES THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDED.
2. EROSION CONTROL BLANKETS SHALL BE INSTALLED ACCORDING TO MANUFACTURERS SPECIFICATIONS. WHEN NOT AVAILABLE, INSTALL ACCORDING TO THIS DETAIL AND THE FOLLOWING NOTES:
   - 2.1. STEP ONE: SITE PREPARATION. TO PREVENT TENTING THE SITE SHOULD BE FINE GRADED TO A SMOOTH PROFILE AND RELATIVELY FREE FROM ALL WEEDS, CLODS, STONES, ROOTS, STICKS, RIVULETS, GULLIES, CRUSTING, AND CAKING. FILL ANY VOIDS AND MAKE SURE THE SLOPE IS COMPACTED PROPERLY.
   - 2.2. STEP TWO: ADEQUATE TOPSOIL SHALL BE REAPPLIED AFTER GRADING PRIOR TO SEEDING.
   - 2.3. STEP THREE: SEEDING. SEEDING WITHOUT MULCH SHOULD BE APPLIED TO THE AREA TO BE VEGETATED.
   - 2.4. STEP FOUR: PREPARE THE ANCHOR TRENCH. AT THE TOP OF THE SLOPE EXCAVATE AN ANCHOR TRENCH 6" X 6". THE EROSION CONTROL BLANKET WILL BE ANCHORED INTO THE TRENCH BY STAPLES. ALLOW A MINIMUM OF 3' FROM THE CREST OF THE SLOPE TO THE ANCHOR TRENCH.
   - 2.5. STEP FIVE: SECURE THE EROSION CONTROL BLANKET IN THE ANCHOR TRENCH. BEGIN EROSION CONTROL BLANKET PLACEMENT 30" ABOVE THE ANCHOR TRENCH. PLACE THE EROSION CONTROL BLANKET INTO THE ANCHOR TRENCH. ANCHOR THE EROSION CONTROL BLANKET WITH STAPLES 1' ON CENTER IN THE ANCHOR TRENCH WHEN NO OTHER GUIDANCE IS AVAILABLE. BE SURE THE DRIVE STAPLES OR STAKES FLUSH WITH THE SOIL SURFACE. BACKFILL THE ANCHOR TRENCH AND COMPACT THE SOIL. PLACE SEED OVER THE COMPACTED SOIL. COVER THE COMPACTED SOIL WITH THE REMAINING 12" OF THE TERMINAL END OF THE EROSION CONTROL BLANKET. STAPLE OR STAKE TERMINAL END DOWN SLOPE OF THE ANCHOR TRENCH ON 1' CENTERS.
   - 2.6. STEP SIX: EROSION CONTROL BLANKET DEPLOYMENT. STARTING AT THE CREST OF THE SLOPE, ROLL THE EROSION CONTROL BLANKET DOWN THE SLOPE IN A CONTROLLED MANNER TO PREVENT EXCESSIVE STRETCHING. APPROXIMATELY EVERY 20'-25' PULL THE EROSION CONTROL BLANKET TO TAKE OUT ANY EXCESS SLACK. THE GOAL IS TO HAVE THE EROSION CONTROL BLANKET CONTOUR AND INITIATE CONTACT WITH THE SOIL.
   - 2.7. STEP SEVEN: STAPLE OR STAKE THE EROSION CONTROL BLANKET. SECURE THE OVERLAP OR THE EDGES WITH STAPLES. THE TYPICAL INSTALLATION WILL REQUIRE ONE STAPLE PLACED AT 3' INTERVALS ALONG THE VERTICAL LENGTH OF THE EROSION CONTROL BLANKET. STAPLES SHOULD BE STAGGERED EVERY 18" TO 24" HORIZONTALLY ACROSS THE EROSION CONTROL BLANKET. IF THE EROSION CONTROL BLANKET NEEDS TO BE SPLICED IN THE MIDDLE OF A SLOPE BE SURE THE EROSION CONTROL BLANKET IS "SHINGLED" WITH UP-SLOPE EROSION CONTROL BLANKET OVERLAPPING THE DOWN-SLOPE EROSION CONTROL BLANKET. THERE SHOULD BE A MINIMUM OF 4" OF OVERLAP IN A SPLICE. USE A STAPLE CHECK SLOT TO SECURE THE OVERLAP. A STAPLE CHECK SLOT IS MADE BY PLACING A ROW OF STAPLES 4" ON CENTER AND THEN PLACING A SECOND ROW OF STAPLES 4" ON CENTER, STAGGERED FROM THE FIRST ROW.
   - 2.8. STEP EIGHT: SECURING THE EROSION CONTROL BLANKET AT THE TOE OF THE SLOPE. ROLL THE EROSION CONTROL BLANKET 36" PAST THE TOE OF THE SLOPE. STAPLE OR STAKE TERMINAL END OF THE EROSION CONTROL BLANKET ON 1' CENTERS.

Westwood	EROSION CONTROL BLANKET INSTALLATION FOR SLOPE	NOT TO SCALE	SW-01

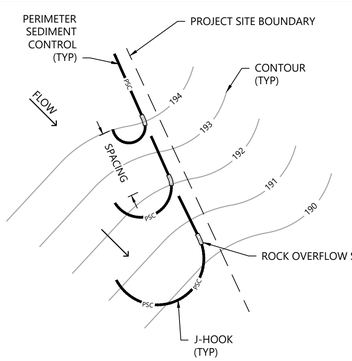
NOTES:

1. FIBER LOGS SHALL BE INSTALLED PRIOR TO UPSLOPE DISTURBANCE ACTIVITIES COMMENCE.
2. FIBER LOGS SHALL BE PREFABRICATED AND MADE FROM CERTIFIED STRAW, WOOD, OR COCONUT FIBER MATERIAL BOUND INTO A TIGHT TUBULAR LOG BY NETTING. USE A 9" DIA. LOG MINIMUM.
3. TRENCHES SHALL BE CREATED ALONG THE SLOPE OF THE PERIMETER. THE TRENCH DEPTH SHOULD BE 1/4 TO 1/3 OF THE THICKNESS OF THE LOG, AND THE WIDTH SHOULD EQUAL THE LOG DIAMETER, IN ORDER TO PROVIDE AREA TO BACKFILL THE TRENCH.
4. STAKE FIBER LOGS INTO THE TRENCH. DRIVE STAKES AT THE END OF EACH FIBER LOG AND SPACED 4 FEET MAXIMUM ON CENTER. USE HARD WOOD STAKES WITH NOMINAL CLASSIFICATION OF AT LEAST 1" BY 1" AND A MINIMUM LENGTH OF 24". STAKES SHALL BE EMBEDDED A MINIMUM DEPTH OF 12".
5. LOGS SHALL BE INSTALLED PERPENDICULAR TO WATER MOVEMENT, AND PARALLEL TO THE SLOPE CONTOUR.
6. TURN THE ENDS OF THE FIBER LOGS UP SLOPE TO PREVENT RUNOFF FROM GOING AROUND THE LOG. THE UPSLOPE POINT SHOULD BE A MINIMUM 12" HIGHER IN ELEVATION THAN THE LOW POINT.
7. IF MORE THAN ONE FIBER LOG IS PLACED IN A ROW, THE LOGS SHOULD BE OVERLAPPED A MINIMUM OF 8 INCHES, NOT ABUTTED.
8. FIBER LOGS ENCASED WITH PLASTIC NETTING ARE USED FOR A TEMPORARY APPLICATION ONLY AND SHOULD BE REMOVED FOLLOWING STABILIZATION. FIBER LOGS USED IN A PERMANENT APPLICATION SHALL BE ENCASED WITH A BIODEGRADABLE MATERIAL AND MAY BE LEFT IN.
9. TEMPORARY INSTALLATIONS SHOULD ONLY BE REMOVED WHEN UP GRADIENT AREAS ARE STABILIZED PER GENERAL PERMIT REQUIREMENTS, AND/OR POLLUTANT SOURCES NO LONGER PRESENT A HAZARD. BUT, THEY SHOULD ALSO BE REMOVED BEFORE VEGETATION BECOMES TOO MATURE SO THAT THE REMOVAL PROCESS DOES NOT DISTURB MORE SOIL AND VEGETATION THAN IS NECESSARY
10. FIBER LOGS MUST BE INSPECTED IN ACCORDANCE WITH GENERAL PERMIT REQUIREMENTS FOR THE ASSOCIATED PROJECT TYPE AND RISK LEVEL.
11. REPAIR OR REPLACE SPLIT, TORN, UNRAVELING, OR SLUMPING FIBER LOGS.
12. SEDIMENT THAT ACCUMULATES UPSLOPE OF THE BMP SHOULD BE PERIODICALLY REMOVED IN ORDER TO MAINTAIN BMP EFFECTIVENESS. REFER TO CONSTRUCTION GENERAL PERMIT FOR SEDIMENT ACCUMULATION MAINTENANCE INTERVALS.
13. RILL, UNDERMINING, AND/OR GULLIES MAY BEGIN TO FORM FOLLOWING MAJOR STORM EVENTS WHERE RUNOFF HAS OVERTOPPED THE FIBER LOGS. THESE RILLS OR GULLIES SHOULD BE PROMPTLY REPAIRED.



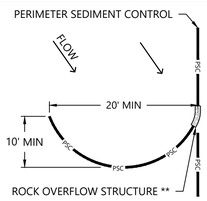
NO PUNCTURE METHOD **STACKING METHOD**

Westwood	PERIMETER SEDIMENT CONTROL - FIBER LOGS	NOT TO SCALE	SW-13



PERSPECTIVE VIEW

** ROCK OVERFLOWS MAY BE OMITTED WHEN FIBER LOGS ARE UTILIZED AS PERIMETER SEDIMENT CONTROL (PSC)



J-HOOK DETAIL

J-HOOK SPACING	
SLOPE	MAXIMUM SPACING (FT)
2:1	25'
3:1	50'
4:1	75'
5:1 OR FLATTER	100'

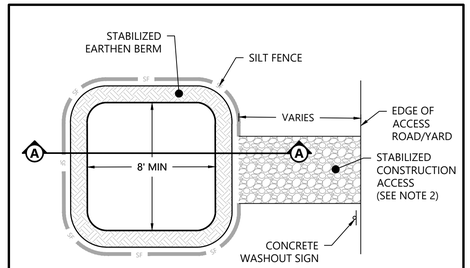
APPLICATION NOTES:

1. INSTALL J-HOOKS WHENEVER THE PERIMETER SEDIMENT CONTROL (PSC) BARRIER IS INSTALLED AT AN ANGLE OF 30 DEGREES OR GREATER FROM PARALLEL TO CONTOURS.
2. ADHERE TO J-HOOK SPACING REQUIREMENTS ACCORDING TO SURFACE SLOPE DETAILED IN TABLE.
3. WHERE MINIMUM HOOK DIMENSIONS SHOWN CANNOT BE ACHIEVED, NARROWER HOOKS MAY BE USED WITH HIGHER FREQUENCY SPACING.
4. WHERE PONDING DEPTH BEGINS TO EXCEED 1.5 FEET OR THE PSC BARRIER AND ROCK OUTLET OTHERWISE FAIL TO PROVIDE CONTROL, FREQUENCY AND SIZING OF J-HOOKS MUST BE ADJUSTED TO REMEDY THE ISSUE.

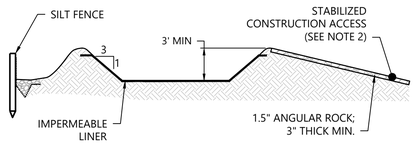
INSTALLATION NOTES:

1. INSTALL J-HOOK LOCATED IMMEDIATELY DOWN GRADIENT FROM THE ROCK OUTLET TO ENSURE THE WATER IS NOT DIVERTED TO THE LOWEST AREAS WHERE A COMPLEX SLOPE EXISTS.
2. UP-GRADIENT PSC BARRIER AND J-HOOK ARE ONE CONTINUOUS BARRIER.
3. START DOWN-GRADIENT PSC BARRIER AS CLOSE AS POSSIBLE TO THE UP-GRADIENT J-HOOK.
4. TOP OF PSC BARRIER ELEVATIONS AT THE END OF J-HOOK NEED TO BE HIGHER THAN THE TOP OF BARRIER ELEVATIONS AT THE MIDDLE OF J-HOOK.
5. TOP OF BARRIER ELEVATIONS AT THE MIDDLE OF J-HOOK NEED TO BE HIGHER THAN THE ROCK OUTLET ELEVATIONS.

Westwood	PERIMETER SEDIMENT CONTROL - J-HOOK APPLICATION	NOT TO SCALE	SW-18



PLAN VIEW

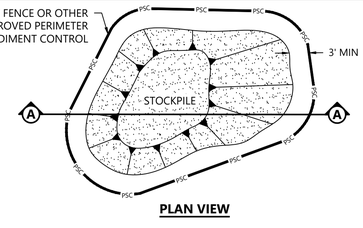


SECTION A-A

NOTES:

1. CONCRETE WASHOUT AREAS SHALL BE LINED WITH A 10 MIL PLASTIC IMPERMEABLE LINER TO PREVENT CONCRETE WASHOUT WATER FROM INFILTRATING/CONTACTING WITH SOIL.
2. PROVIDE STABILIZED CONSTRUCTION ACCESS IF SEDIMENT TRACKING CONTROLS ARE NECESSARY.
3. ALTERNATE WASHOUT SYSTEMS MAY BE USED IF APPROVED.
4. REFER TO PROJECT NPDES PERMIT FOR ADDITIONAL CONSTRUCTION, MAINTENANCE, AND REMOVAL REQUIREMENTS

Westwood	CONCRETE WASHOUT AREA	NOT TO SCALE	SW-60



PLAN VIEW

SECTION A-A

NOTE:

SOIL STOCKPILES SHALL BE LOCATED ON SITE AND BE ENCLOSED WITH SILT FENCE OR OTHER APPROVED PERIMETER SEDIMENT CONTROL. IF THE SOIL IS TO REMAIN EXPOSED FOR MORE THAN 7 DAYS, IT SHALL BE HAND BROADCASTED AND MULCHED ACCORDING TO THE NPDES PERMIT.

Westwood	SOIL STOCKPILE PROTECTION	NOT TO SCALE	SW-10

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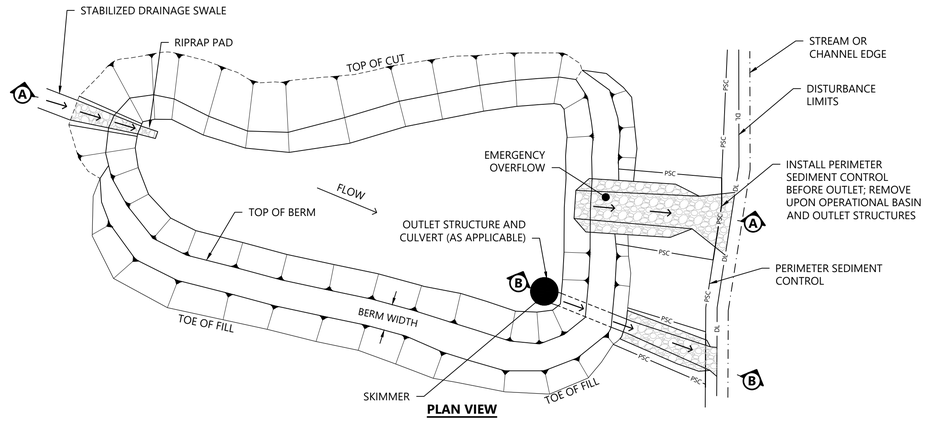
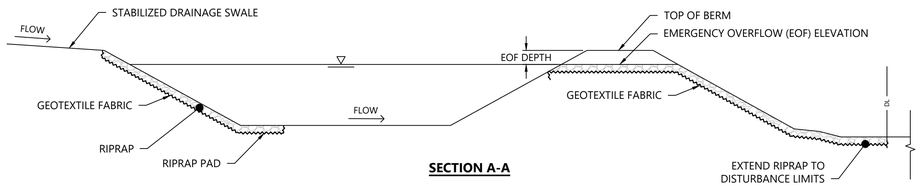
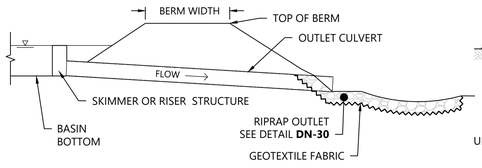


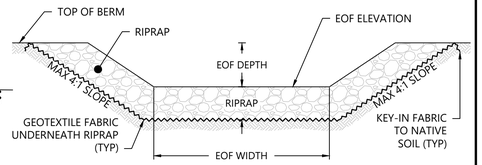
PLAN VIEW



SECTION A-A



SECTION B-B



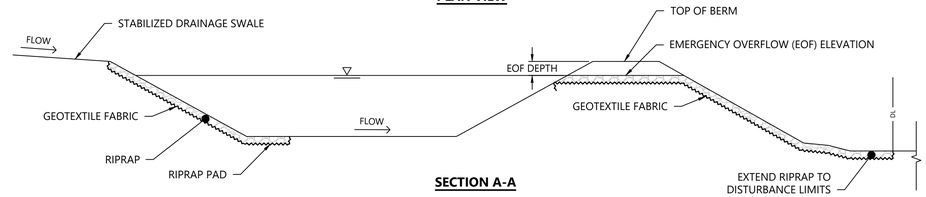
EMERGENCY OVERFLOW (EOF) DETAIL

NOTES:

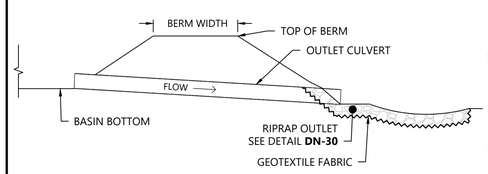
1. SEE PLANS FOR BASIN LOCATIONS.
2. ALL GRADED SLOPES SHALL BE A MAXIMUM 4H:1V UNLESS SHOWN OTHERWISE.
3. REFER TO PROJECT SWPPP AND ESC PLAN FOR ADDITIONAL BASIN BMPS AND INSPECTION AND MAINTENANCE PROCEDURES.
4. IMMEDIATELY FOLLOWING BASIN CONSTRUCTION, THE SIDE SLOPES OF THE BASIN SHALL BE FULLY STABILIZED. TEMPORARY EROSION AND SEDIMENT CONTROL FEATURES SHALL REMAIN UNTIL PROJECT SITE IS FULLY STABILIZED AND THE BASIN IS RESTORED OR CONVERTED TO PERMANENT CONDITIONS.

Westwood	TEMPORARY SEDIMENTATION BASIN (NOT TO SCALE)	DN-40

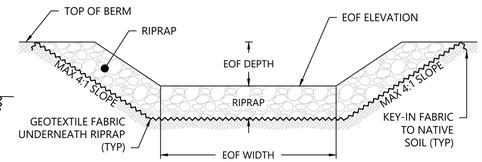
PLAN VIEW



SECTION A-A



SECTION B-B

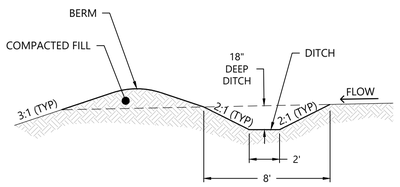


EMERGENCY OVERFLOW (EOF) DETAIL

NOTES:

1. SEE PLANS FOR BASIN LOCATION.
2. ALL GRADED SLOPES SHALL BE A MAXIMUM 4H:1V UNLESS SHOWN OTHERWISE.
3. INSPECT AND MAINTAIN BASIN AND ITS STRUCTURES IN ACCORDANCE WITH THE OPERATIONS AND MAINTENANCE PLAN.
4. IMMEDIATELY FOLLOWING BASIN CONSTRUCTION, THE SIDE SLOPES OF THE BASIN SHALL BE FULLY STABILIZED. TEMPORARY EROSION AND SEDIMENT CONTROL FEATURES SHALL REMAIN UNTIL PROJECT SITE IS FULLY STABILIZED AND THE BASIN CONVERTED TO PERMANENT CONDITIONS.

Westwood	PERMANENT STORMWATER DETENTION BASIN (NOT TO SCALE)	DN-41



PROFILE VIEW

NOTES:

1. CUT CREATED FROM DITCH SHALL BE USED AS FILL TO BUILD ADJACENT BERM.
2. STABILIZE BERM AND DITCH IN ACCORDANCE WITH NPDES PERMIT.

Westwood	BROW DITCH/BERM - VEGETATED (NOT TO SCALE)	DN-27

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D	11/13/23	Permitting Site Plans	CRS	EFE	RJG

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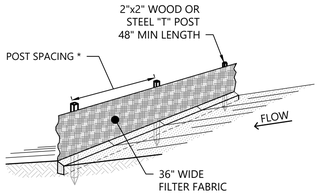
Douglas County, Kansas

Typical Details

FOR CONDITIONAL USE PERMIT

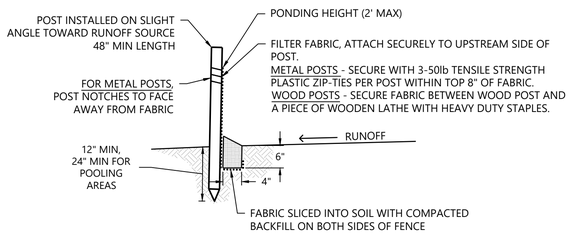
DATE: 11/13/2023

SHEET: C502 REV: D



* 7' MAX FOR OPEN RUNS
4' MAX FOR POOLING AREAS

PERSPECTIVE VIEW

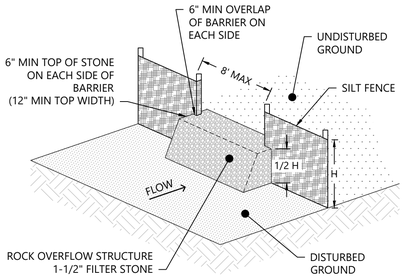


POST AND TRENCH DETAIL

NOTES:

1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC WIDTH SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN 2 , ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NO. 30.
2. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH SUPPORT POST. THERE SHOULD BE A 3 FT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
4. ALL ENDS OF THE SILT FENCE SHALL BE WRAPPED UPSLOPE SO THE ELEVATION OF THE BOTTOM OF FABRIC IS HIGHER THAN "PONDING HEIGHT".
5. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATED TO **1/3 HEIGHT** OF THE FABRIC OR MORE.
6. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
7. SILT FENCE SHOULD REMAIN IN PLACE AND MAINTAINED UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED.
8. INSTALL A SECOND ROW OF SILT FENCE APPROXIMATELY 5' FROM INITIAL ROW WHEN REDUNDANT PROTECTION IS REQUIRED WITHIN 50' OF WETLANDS AND STREAMS.
9. AVOID SPLICED SECTIONS IN LOW LYING (LOAD BEARING) LOCATIONS.

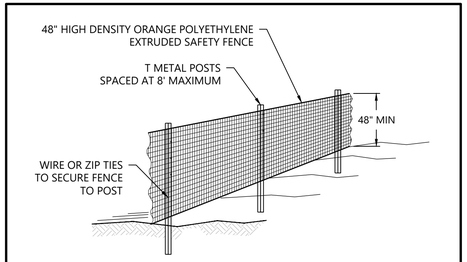
Westwood	SILT FENCE	SW-11
	NOT TO SCALE	



NOTES:

1. LOCATIONS OF ROCK OVERFLOW STRUCTURES INDICATED ON PLANS AND AS DETERMINED BY CONTRACTOR BASED ON FIELD CONDITIONS TO MAINTAIN PERMIT COMPLIANCE.
2. ROCK OVERFLOW STRUCTURES ARE RECOMMENDED AT ALL LOW POINTS AND AT A SPACING OF 300 FEET WHERE NO LOW POINT IS APPARENT.

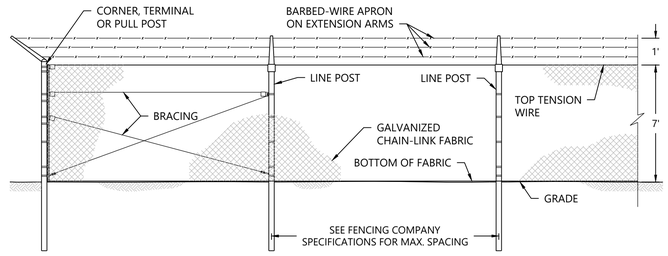
Westwood	ROCK OVERFLOW STRUCTURE FOR SILT FENCE	SW-19
	NOT TO SCALE	



NOTES:

1. INSTALL FENCE AROUND PROTECTED AREAS PRIOR TO CONSTRUCTION ACTIVITIES IN THE VICINITY.
2. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN; ANY CHANGED TO FENCE SHALL BE APPROVED.
3. CULTURALLY SENSITIVE AREAS SHALL NOT BE DISTURBED DURING SAFETY FENCE INSTALLATION/REMOVAL.
4. FOR TREE PRESERVATION PURPOSES, INSTALL HIGH VISIBILITY 3 FEET OUTSIDE OF THE DRIP LINE OF THE TREE.
5. FENCE SHOULD BE TAUT AND FASTENED SECURELY TO THE POSTS.
6. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION, AND REMOVED ONCE CONSTRUCTION ACTIVITIES ARE CONCLUDED.

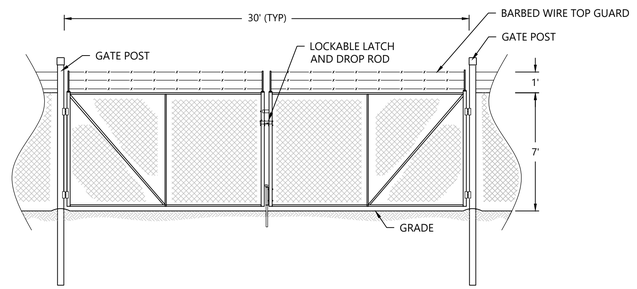
Westwood	SENSITIVE AREAS - PROTECTION FENCE	FN-52
	NOT TO SCALE	



NOTES:

1. TYPICAL FENCE AND GATE INFORMATION SHOWN IS INTENDED FOR PLANNING PURPOSES. ACTUAL DIMENSIONS AND INFORMATION TO BE PROVIDED BY FENCE SUPPLIER.
2. REFER TO FENCE SUPPLIER SPECIFICATIONS AND DETAILS.
3. STRUCTURAL DESIGN OF FENCE POSTS AND FOUNDATIONS TO BE PROVIDED BY FENCE SUPPLIER. STRUCTURAL PLANS AND FENCE SUPPLIER DRAWINGS SHALL SUPERSEDE THIS DETAIL IF CONFLICTS ARE PRESENT.
4. FENCE AND GATE TYPE TO BE APPROVED BY OWNER PRIOR TO CONSTRUCTION.

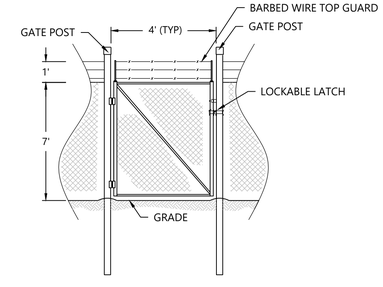
Westwood	SUBSTATION SECURITY FENCE	FN-01
	NOT TO SCALE	



NOTES:

1. SEE NOTES ON DETAIL **FN-01**.
2. GATE TO BE SELF LOCKING TO PREVENT UNAUTHORIZED ACCESS.

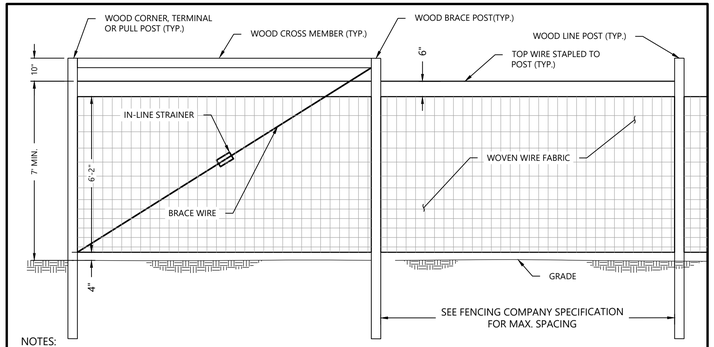
Westwood	SUBSTATION SECURITY VEHICLE GATE	FN-02
	NOT TO SCALE	



NOTES:

1. SEE NOTES ON DETAIL **FN-01**.

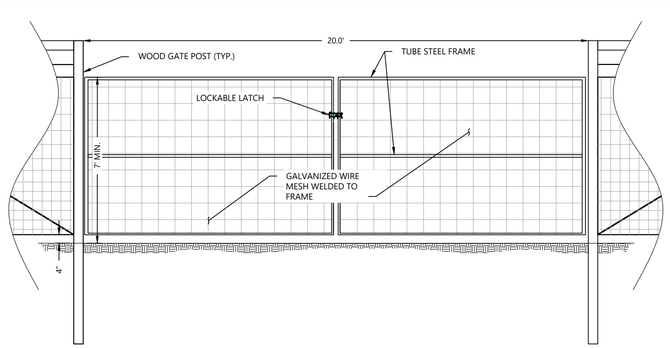
Westwood	SUBSTATION SECURITY PERSONNEL GATE	FN-03
	NOT TO SCALE	



NOTES:

1. TYPICAL FENCE AND GATE INFORMATION SHOWN IS INTENDED FOR PLANNING PURPOSES. ACTUAL DIMENSIONS AND INFORMATION TO BE PROVIDED BY FENCE SUPPLIER.
2. REFER TO FENCE SUPPLIER SPECIFICATIONS AND DETAILS.
3. STRUCTURAL DESIGN OF FENCE POSTS AND FOUNDATIONS TO BE PROVIDED BY FENCE SUPPLIER. STRUCTURAL PLANS AND FENCE SUPPLIER DRAWINGS SHALL SUPERSEDE THIS DETAIL IF CONFLICTS ARE PRESENT.
4. FENCE AND GATE TYPE TO BE APPROVED BY OWNER PRIOR TO CONSTRUCTION.

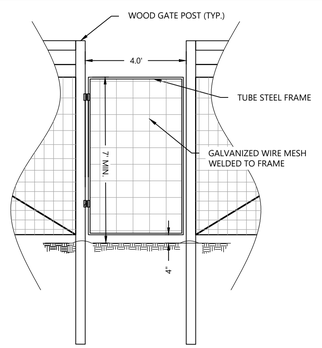
Westwood	MODULE AREA PERIMETER FENCE	FN-04
	NOT TO SCALE	



NOTES:

1. SEE NOTES ON DETAIL **FN-04**.
2. GATE TO BE SELF LOCKING TO PREVENT UNAUTHORIZED ACCESS.

Westwood	MODULE AREA VEHICLE GATE	FN-05
	NOT TO SCALE	



NOTES:

1. SEE NOTES ON DETAIL **FN-04**.

Westwood	MODULE AREA PERSONNEL GATE	FN-06
	NOT TO SCALE	

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR PROJECT, LLC.

422 Admiral Blvd,
Kansas City, MO 64106

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	08/14/23	Permitting Site Plans	SJM	EFE	RJG
B	11/02/23	Permitting Site Plans	SJM	EFE	RJG
C	11/10/23	Permitting Site Plans	CRS	EFE	RJG
D	11/13/23	Permitting Site Plans	CRS	EFE	RJG

Kansas Sky Energy Center

Douglas County, Kansas

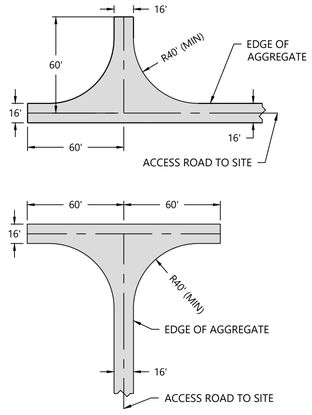
Typical Details

FOR CONDITIONAL USE PERMIT

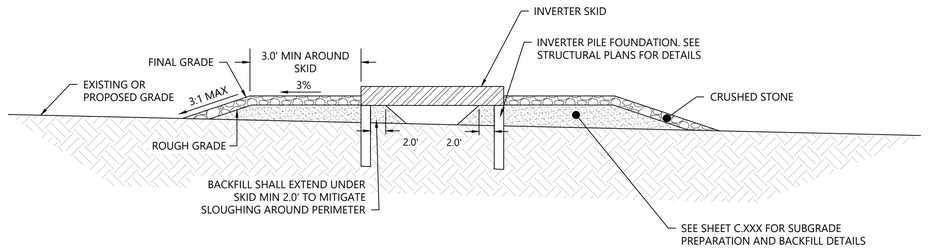
DATE: 11/13/2023

SHEET: C503

REV: D



Westwood	PERMANENT HAMMERHEAD TURNAROUND	RD-31
	NOT TO SCALE	

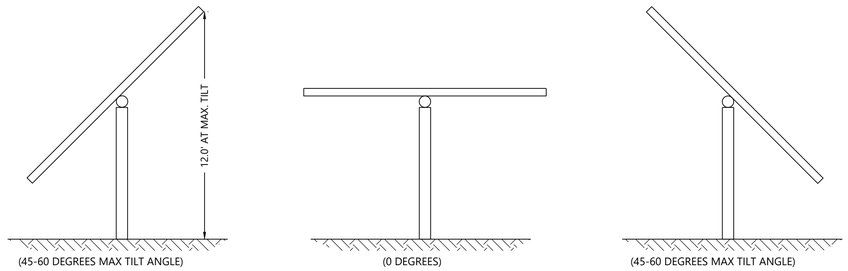


SECTION VIEW

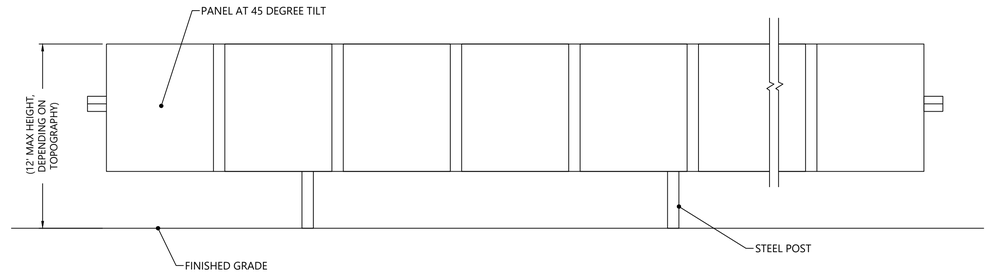
NOTES:

1. PROVIDE 1' OF FREEBOARD ABOVE THE 100 YR FLOOD DEPTH TO THE TOP OF INVERTER SKID
2. VERIFY EXISTING GRADE IN FIELD PRIOR TO PREPARING SUBGRADE
3. TOP OF SKID ELEVATION MAY BE RAISED HIGHER THAN MINIMUM SKID ELEVATION. SEE STRUCTURAL PLAN SET FOR MIN AND MAX PILE REVEALS
4. SEE STRUCTURAL PLAN SET FOR PILE FOUNDATION, CAP PLATE, AND PILE/PLACEMENT/SPACING DETAILS

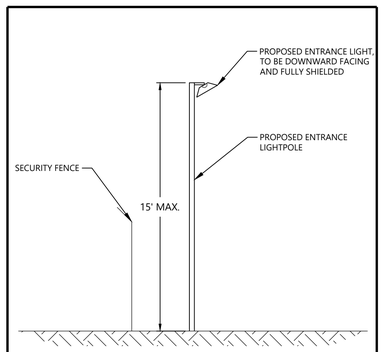
Westwood	TYPICAL INVERTER SKID SERVICE APRON	SL-01
	NOT TO SCALE	



Westwood	TYPICAL SOLAR TRACKER PROFILE VIEWS	TRK01
	(NOT TO SCALE)	



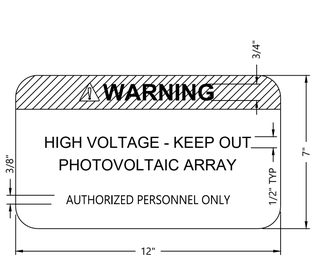
Westwood	EAST OR WEST - TYPICAL TRACKER ELEVATION	TRK02
	(NOT TO SCALE)	



NOTES:

1. LIGHTING SHALL COMPLY WITH COUNTY LIGHTING ORDINANCES
2. LIGHTING PER LP01 TO BE INSTALLED ONLY WITHIN SUBSTATION/O&M AREAS, NO LIGHTING IN MODULE AREAS.
3. NO LIGHT SOURCE SHALL BE DIRECTED OFF-SITE.
4. ALL EXTERIOR LIGHTING SHALL BE MOTION ACTIVATED AND ON A TIMER, OR SWITCH OPERATED.
5. COLOR TEMPERATURE SHALL BE NO MORE THAN 3000K IF LED LIGHTS ARE USED.

Westwood	TYPICAL LIGHTING	LP01
	NOT TO SCALE	



SAFETY SIGN

SITE IDENTIFICATION SIGN

NOTES:

1. SITE IDENTIFICATION SIGNS SHALL BE PLACES AT ENTRANCES TO ALL FENCED AREAS.
2. SAFETY SIGNS SHALL BE PLACES EVERY 500' ALONG PROJECT FENCE.
3. SIGNS WILL NOT BE LIT.

Westwood	TYPICAL SIGNAGE	SN-01
	NOT TO SCALE	

Westwood

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Kansas Sky Energy Center

Douglas County, Kansas

Typical Details

FOR CONDITIONAL USE PERMIT

DATE: 11/13/2023

SHEET: C504 REV: D

Know what's below. Call before you dig.

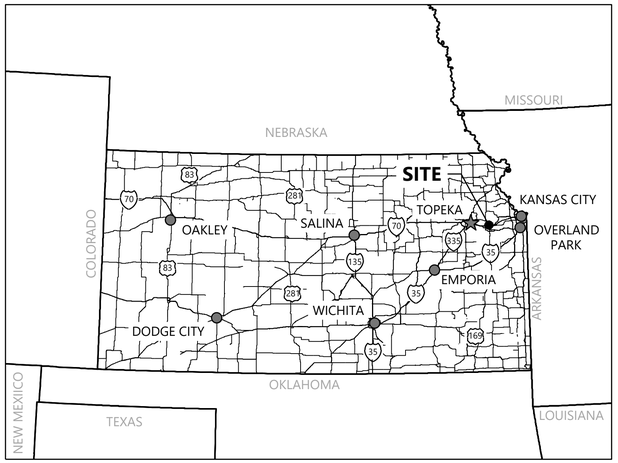
Kansas Sky Energy Center

Douglas County, Kansas

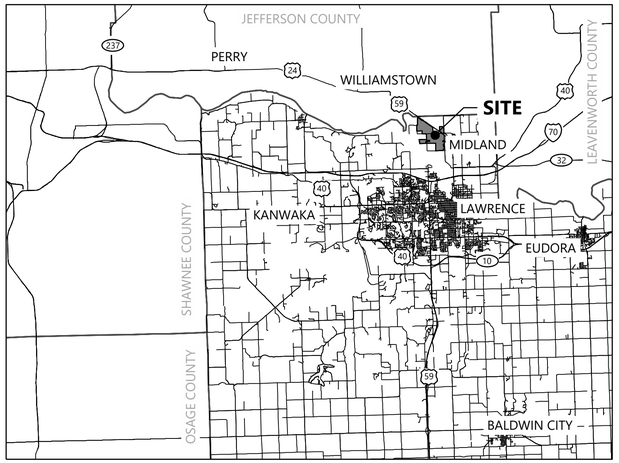
Project Number: 09100007

Structural Construction Plans

REGIONAL MAP



VICINITY MAP



Sheet List Table	
SHEET NUMBER	SHEET TITLE
S000	Cover
S100	PV Pile Foundation Details
S200	Inverter Foundation Details

CONTACT INFORMATION				
	COMPANY	**CONTACT**	**PHONE**	**ADDRESS**
PROJECT OWNER	FREE STATE SOLAR PROJECT, LLC	BRIANNA BACA	(531) 203-0181	422 ADMIRAL BLVD., KANSAS CITY, MO 64106
PROJECT DEVELOPER	FREE STATE SOLAR PROJECT, LLC	BRIANNA BACA	(531) 203-0181	422 ADMIRAL BLVD., KANSAS CITY, MO 64106
PROJECT OPERATOR	FREE STATE SOLAR PROJECT, LLC	BRIANNA BACA	(531) 203-0181	422 ADMIRAL BLVD., KANSAS CITY, MO 64106
PROJECT MANAGER	WESTWOOD PROFESSIONAL SERVICES	LEVI MITCHELL	(608) 621-6602	8401 GREENWAY BLVD., SUITE 400 MIDDLETON, WI 53562
PROJECT CIVIL ENGINEER	WESTWOOD PROFESSIONAL SERVICES	ERIK ELLIOTT	(984) 202-7498	8401 GREENWAY BLVD., SUITE 400 MIDDLETON, WI 53562

Westwood

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westwoodps.com

Westwood Professional Services, Inc.

PREPARED FOR:

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422 Admiral Blvd,
Kansas City, MO 64106

REVISIONS:

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A	04/28/2023	30% REVIEW SUBMITTAL	JTZ	REG	
B	05/24/2023	30% REVIEW SUBMITTAL	JTZ	REG	

Kansas Sky Energy Center

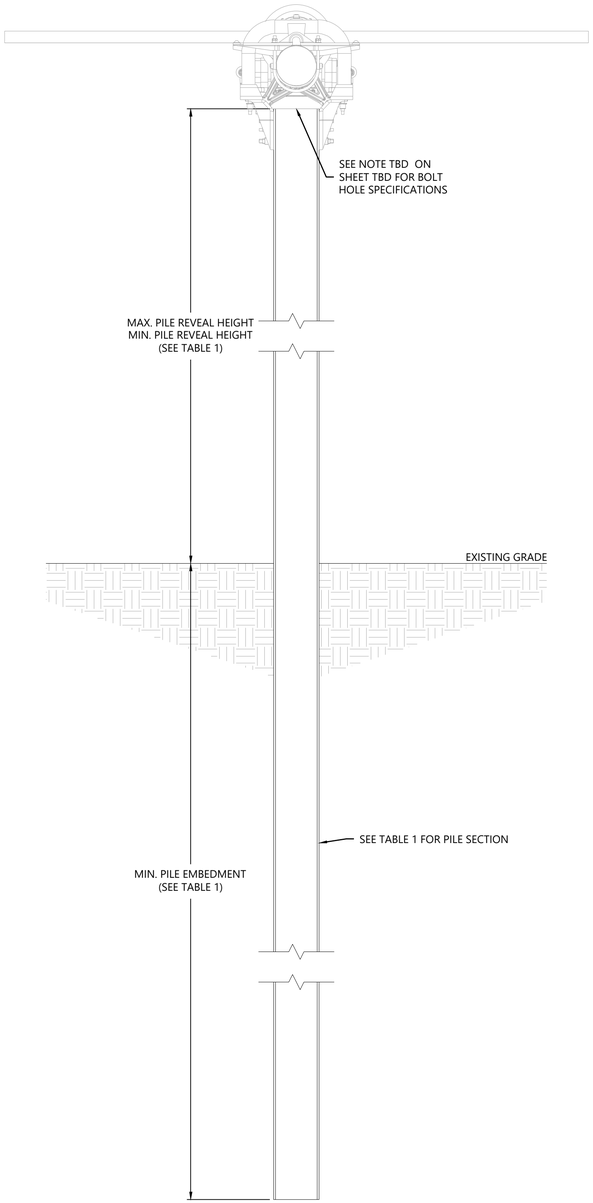
Douglas County, Kansas

Cover

NOT FOR CONSTRUCTION

DATE: 05/24/2023

SHEET: S000 REV: B



1 PV Pile Foundation Cross Section
Driven Pile Option (N.T.S.)

TABLE 1 - PV RACKING FOUNDATION SPECIFICATIONS

PILE TYPE	SECTION [5]	MINIMUM EMBEDMENT [1,3] (FT)	MINIMUM REVEAL HEIGHT [2] (FT)	MAXIMUM REVEAL HEIGHT [3] (FT)
INTERIOR ARRAY (STANDARD ARRAY PIER)	W6x12	8.50	4.14	5.00
INTERIOR & EDGE MOTOR (STANDARD MOTOR PIER)	W6x20	8.50	4.14	5.00
EDGE ARRAY (STANDARD ARRAY PIER, EDGE)	W6x16	9.00	4.14	5.00
EXTERIOR ARRAY (HEAVY ARRAY PIER & HEAVY ARRAY PIER, EDGE)	W6X16	9.50	4.14	5.00
EXTERIOR MOTOR (HEAVY MOTOR PIER)	W6x20	9.50	4.14	5.00

(1) MINIMUM EMBEDMENT CONTROLLED BY LATERAL STABILITY AND ACCOUNTS FOR UP TO 6" OF SCOUR.
(2) MINIMUM REVEAL HEIGHT PROVIDES 18" OF CLEARANCE FROM EDGE OF MODULE AT 52° MAXIMUM TILT TO GRADE. ADDITIONAL REVEAL HEIGHT ME BE REQUIRED TO PROVIDE ADEQUATE FREEBOARD TO FLOOD WATER AND SNOW DEPTH AS WELL AS CAB CLEARANCES.
(3) MINIMUM EMBEDMENT AND MAXIMUM REVEAL HEIGHT ACCOUNTS FOR 6" OF SCOUR.
(4) THIS TABLE IS INTENDED TO PROVIDE A SUMMARY OF THE PRELIMINARY FOUNDATIONS USED ON THIS PROJECT. THIS TABLE SHOULD NOT BE USE FOR FINAL PILE PROCUREMENT OR QUALITY CONTROL.
(5) GALVANIZE ALL DRIVEN STEEL FOUNDATIONS PER ASTM A123 WITH A MINIMUM GALVANIZATION THICKNESS OF 5.0 MILS.
(6) PV DESIGN TABLE 1 IS PRELIMINARY AND SUBJECT TO CHANGE PENDING MORE DETAILED ANALYSIS. ACTUAL DESIGN DETAILS WILL BE DETERMINED DURING THE FINAL DESIGN PHASE.
(7) DESIGN ASSUMES DOES NOT ACCOUNT FOR UPLIFT FORCES FROM FROST/SWELL POTENTIAL AS NO GUIDANCE WAS PROVIDED IN PRELIMINARY GEOTECHNICAL REPORT.
(8) PRELIMINARY GEOTECH REPORT REFERENCED: PRELIMINARY GEOTECHNICAL ENGINEERING STUDY, FREE STATE SOLAR PROJECT, DOUGLAS COUNTY, KANSAS, DATED SEPTEMBER 1, 2022 BY KLEINFELDER, P# 20225756.001A
(9) ADDITIONAL OPPORTUNITIES TO OPTIMIZE DESIGN WILL BE INVESTIGATED IN FINAL DESIGN.
(10) CORROSION CONSIDERED IN DESIGN WAS ESTIMATED AND FINAL CORROSION RATES SHALL BE DETERMINED BY A QUALIFIED CORROSION ANALYSIS.

TABLE 2 - KANSAS SKY 30% SOLAR BASIS OF DESIGN (PRELIMINARY)

GENERAL STRUCTURAL DESIGN CRITERIA		
CRITERIA	VALUE	NOTES
BUILDING CODE	IBC 2018	DOUGLAS COUNTY ADOPTED BUILDING CODE + AMENDMENTS
DESIGN LIFE	35 YEARS PLANT (40 YEARS FOR PILES)	EXHIBIT A
RISK CATEGORY	I	ASCE 7-16
WIND SPEED	103 MPH	ASCE 7-16
SNOW LOAD	20 PSF	ASCE 7-16
EQUIPMENT MANUFACTURER(S)	PV RACKING: NEXTRACKER	
FOUDATION TYPE(S)	PV RACKING: DRIVEN PILE	
STEEL PILE DESIGN CRITERIA		
CRITERIA	VALUE	NOTES
COLUMNS PER RACK	14	BASED ON NEXTRACKER TOPL
MINIMUM PILE REVEAL HEIGHT	4.14 FT	ASSUMED, BASED ON NEXTRACKER DESIGN GUIDE
MAXIMUM PILE REVEAL HEIGHT	5 FT	ASSUMED, REVEAL FROM NEXTRACKER TOPL
MAXIMUM TORQUE TUBE HEIGHT	5.75 FT	ASSUMED, NEXTRACKER TOPL
CAB SYSTEM	YES	ASSUMED
MAXIMUM N-S SLOPE	5°	ASSUMED FOR 30% DESIGN. BASED ON DOCUMENT FROM A SIMILAR PROJECT.
STEEL SECTIONS	ASTM A992	
CORROSION PROTECTION	ASTM A123 MINIMUM	
CORROSION RATE	ZINC: 0.54 MIL/YR STEEL: 1.71 MIL/YR	PRELIMINARY, NOT FOR FINAL DESIGN
CLEARANCE DESIGN CRITERIA		
CRITERIA	VALUE	NOTES
FLOOD DEPTH (100 YR.)	TBD	PENDING HYDROLOGY ANALYSIS
FLOOD SCOUR DEPTH	6"	ASSUMED FOR 30%, PENDING HYDRO REPORT
SNOW DEPTH	TBD	
FREEBOARD	6" MODULE (WITH FLOOD STOW ABILITY) 12" MODULE (WITH NO FLOOD STOW ABILITY)	PER EXHIBIT A
CLEARANCE	12" MODULE TO GRADE (SITE ISN'T VEGETATED) 18" MODULE TO GRADE (SITE IS VEGETATED) 12" CABLE TO GRADE	PER EXHIBIT A
GEOTECHNICAL DESIGN CRITERIA		
CRITERIA	VALUE	NOTES
SKIN FRICTION (ULTIMATE)	350 PSF	PRELIMINARY GEOTECH REPORT, SEE NOTE 8 UNDER TABLE 1
END BEARING (ULTIMATE)	3500 PSF	PRELIMINARY GEOTECH REPORT, SEE NOTE 8 UNDER TABLE 1
LPILE SOIL MODEL	MODIFIED STILL CLAY W/O FREE WATER EFFECTIVE UNIT WEIGHT (PCF): 105 COHESION, (PSF): 1,000 STRAIN FACTOR: DEFAULT INITIAL TANGENT MODULUS, K (PCI): DEFAULT	PRELIMINARY GEOTECH REPORT, SEE NOTE 8 UNDER TABLE 1
FROST DEPTH	TBD	PENDING GEOTECH GUIDANCE
ADFREEZE PRESSURE	TBD	PENDING GEOTECH GUIDANCE
DEPTH OF SOIL IGNORED	AXIAL: 1 FT LATERAL: 0.5 FT	PRELIMINARY GEOTECH REPORT, SEE NOTE 8 UNDER TABLE 1

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Kansas City, MO 64106

REVISIONS:

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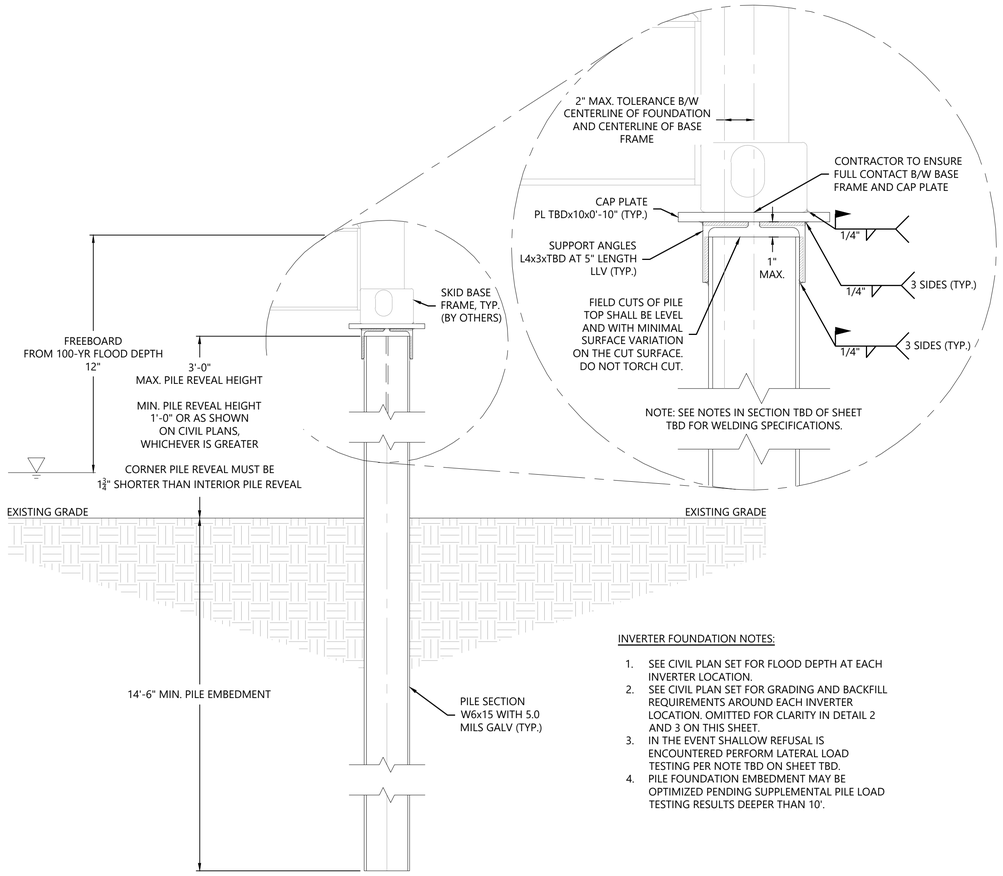
A	04/28/2023	30% REVIEW SUBMITTAL	JTZ	REG	
B	05/24/2023	30% REVIEW SUBMITTAL	JTZ	REG	

Kansas Sky Energy Center
Douglas County, Kansas

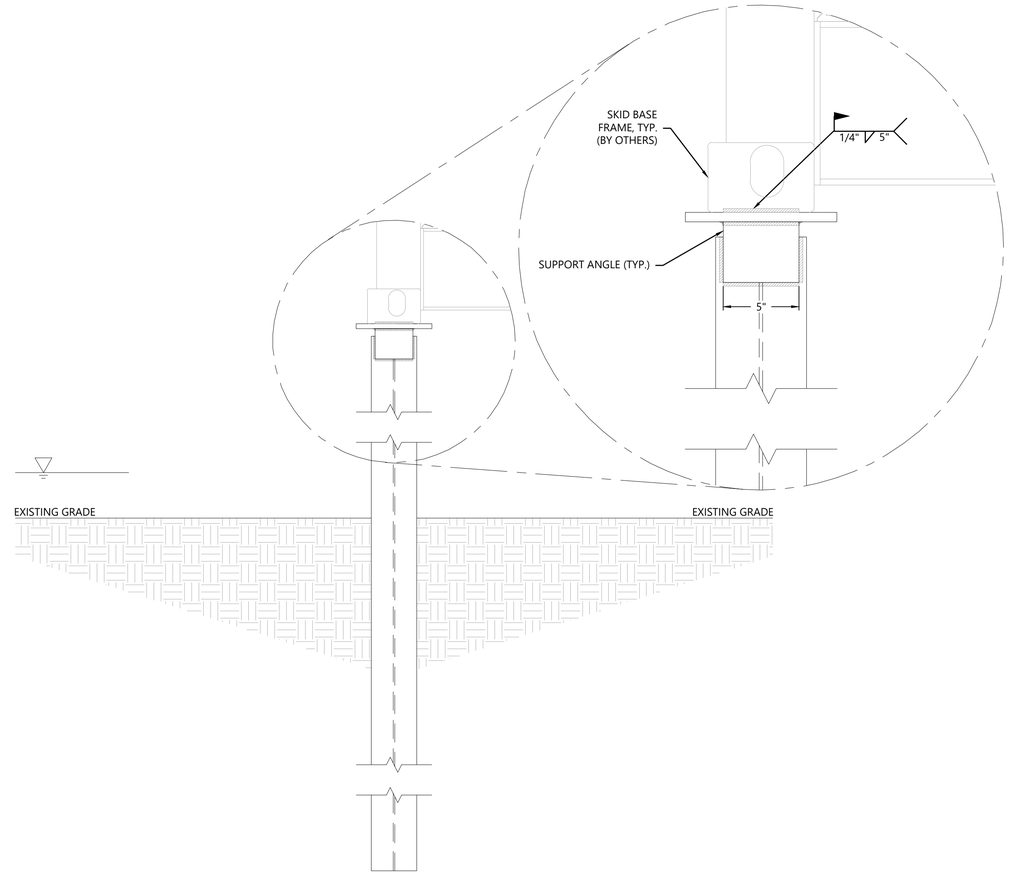
PV Pile Foundation Details

NOT FOR CONSTRUCTION

DATE: 05/24/2023
SHEET: S100
REV: B



2 Typical Corner Pile Section
N.T.S.

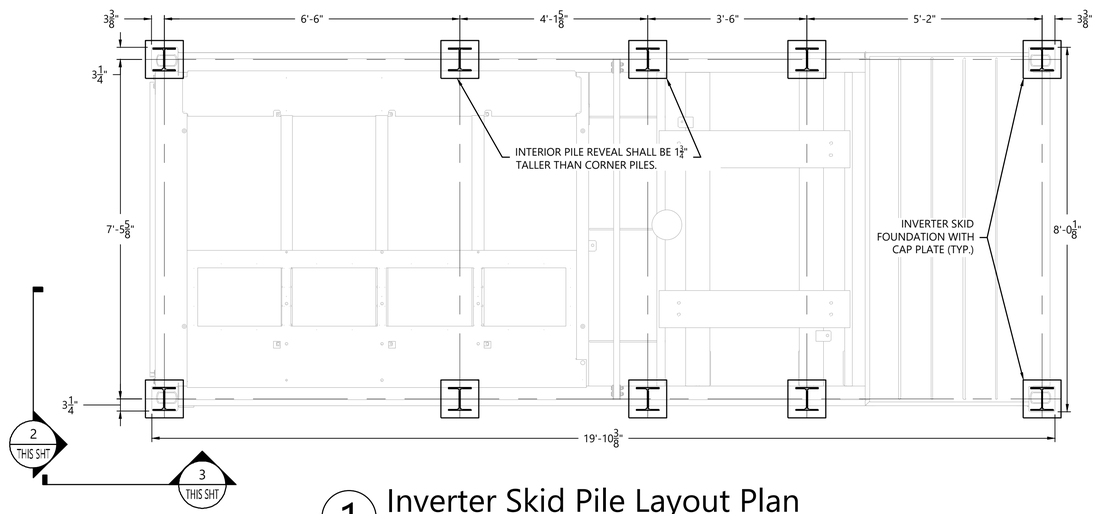


3 Typical Corner Pile Section
N.T.S.

INVERTER FOUNDATION NOTES:

1. SEE CIVIL PLAN SET FOR FLOOD DEPTH AT EACH INVERTER LOCATION.
2. SEE CIVIL PLAN SET FOR GRADING AND BACKFILL REQUIREMENTS AROUND EACH INVERTER LOCATION. OMITTED FOR CLARITY IN DETAIL 2 AND 3 ON THIS SHEET.
3. IN THE EVENT SHALLOW REFUSAL IS ENCOUNTERED PERFORM LATERAL LOAD TESTING PER NOTE TBD ON SHEET TBD.
4. PILE FOUNDATION EMBEDMENT MAY BE OPTIMIZED PENDING SUPPLEMENTAL PILE LOAD TESTING RESULTS DEEPER THAN 10'.

INVERTER FOUNDATION TOLERANCE TABLE	
ITEM	TOLERANCE
HORIZONTAL LOCATION (WIDTH DIRECTION)	± 2"
HORIZONTAL LOCATION (LENGTH DIRECTION)	± 2"
TWIST ABOUT CENTERLINE	± 0.5°
PLUMBNESS	± 1.5°
PILE ELEVATION	± 1"
CAP PLATE ELEVATION	± 0.125"
NOTE: TOLERANCES ARE FROM EACH POST'S FINAL PLANNED LOCATION. POST TOLERANCES ARE SPECIFIC TO EACH PILE ONLY AND NOT CUMULATIVE IN ANY DIRECTION.	



1 Inverter Skid Pile Layout Plan
N.T.S.

Westwood
Phone (608) 821-6600
8401 Greenway Blvd., Suite 400
Middleton, WI 53562
westwoodps.com
Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR PROJECT, LLC.

422 Admiral Blvd,
Kansas City, MO 64106

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	04/28/2023	30% REVIEW SUBMITTAL	JTZ	REG	
B	05/24/2023	30% REVIEW SUBMITTAL	JTZ	REG	

Kansas Sky Energy Center
Douglas County, Kansas

Inverter Foundation Details

NOT FOR CONSTRUCTION

DATE: 05/24/2023
SHEET: S200
REV: B

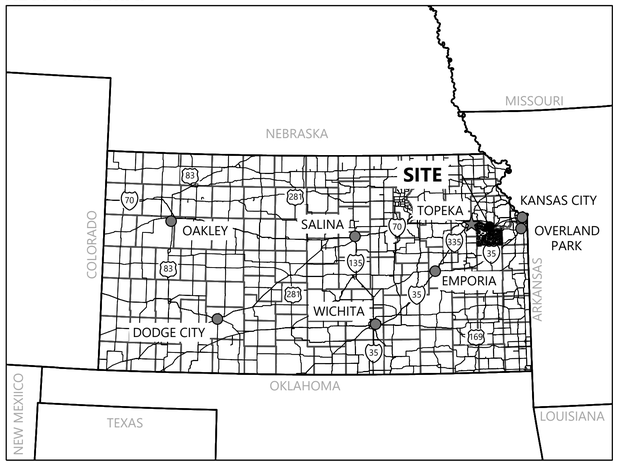
Know what's below. Call before you dig.

Kansas Sky Energy Center

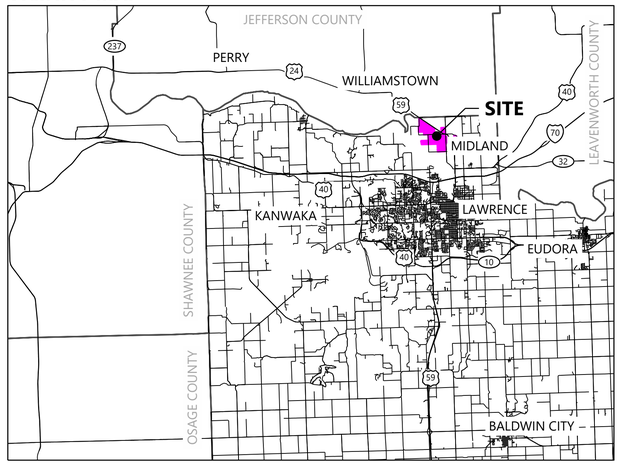
Douglas County, Kansas

Electrical Construction Plans

REGIONAL MAP



VICINITY MAP



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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center
Douglas County, Kansas

Electrical Cover Sheet

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E0000 REV: C

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SHEET NUMBER	SHEET TITLE	LAST REVISION
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E0001	Sheet Index	C
E0010	Electrical Notes	C
E0020	Electrical Symbology, Equipment Labeling & Abbreviations	C
E0040	Labels & Markings	C
-	Not Used	-
E0050	Project Design Summary	C
E0300	Overall Site Plan	D
E1000	Overall MVAC Site Plan	D
E1100	MVAC Site Plan	D
E1101	MVAC Site Plan	D
E1102	MVAC Site Plan	D
E1300	MVAC Single Line Diagram - Circuit 1	C
E1301	MVAC Single Line Diagram - Circuit 2	C
E1302	MVAC Single Line Diagram - Circuit 3	C
E1303	MVAC Single Line Diagram - Circuit 4	C
E1304	MVAC Single Line Diagram - Circuit 5	C
E1305	MVAC Single Line Diagram - Circuit 6	C
E1306	MVAC Single Line Diagram - Circuit 7	C
E1307	MVAC Single Line Diagram - Circuit 8	C
E2000	DC Site Plan - Block 3	C
E2002	DC Site Plan - Block 14	C
E2300	Inverter Collection Line Diagram	C
E2301	DC Level II Single Line Diagram	C
E3300	String Wiring Harness Diagram - 15A & 14A	C
E3301	String Wiring Harness Diagram - 13A & 12A	C
E3302	String Wiring Harness Diagram - 10A	C
E6000	Overall Communication Site Plan	D
E6200	Fiber Optic Single Line Diagram	C
E7010	Inverter Details	C
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E7661	Overhead Utility Crossing Details	C
E8900	Module Specifications	C
E8901	Inverter Specifications	C

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PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
D	08/09/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

Douglas County, Kansas

Sheet Index

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E0001

REV: C

SECTION 16010 - GENERAL PROVISIONS - ELECTRICAL

A. The work included under Division 16 shall consist of furnishing labor and materials necessary for the complete installation of lighting, power, and photovoltaic systems shown on the drawings. All work shall be complete and left in operating condition at completion of Contract.

B. Include minor items that are obviously and reasonably necessary to complete the installation and usually included in similar work. Such items include bolts, nuts, anchors, brackets, sleeves, and minor offsets in conduit, junction boxes, etc

C. Some equipment and materials provided under other divisions may require composite work crews because of trade jurisdiction. It is the Contractor's or Subcontractor's responsibility to review all Contract Documents to determine where these composite crews are required.

D. All temporary and permanent permits and licenses required in connection with this Division's work shall be the responsibility of the Contractor awarded that work.

E. Installation shall meet or exceed current applicable codes, ordinances and regulations in effect at the site. If a Contractor or Subcontractor observes that the Contract Documents are at variance with governing codes and regulations, they shall promptly notify the Engineer in writing, who will respond to such variances in writing. If the Contractor performs work knowing it is not compliant with applicable codes, and does not notify the Engineer, the Contractor shall assume full responsibility and bear all costs attributable to correcting the non-complying work.

F. The reference to Codes and Standards shall not permit a lower grade of construction where Contract Documents call for workmanship and/or materials in excess of those references.

G. Where the terms "provide" or "shall be" are used in this Division or on the drawings, they shall be taken to mean "The Contractor shall furnish and install".

H. If equipment or materials other than those specified in the design of this project are proposed to be used on this project, the Contractor and supplier shall check it for dimensional differences, electrical requirements and any other potential variances. This comparison shall be made for manufacturers specified as well as those proposed prior to requesting approval. The Contractor shall be responsible for any extra costs incurred as a result of Substitutions, including those of other contractors, such as might be due to (but not limited to) different electrical, mechanical and architectural requirements.

I. Shop Drawings:

1. Carefully examine all shop drawings noting capacity, arrangement and physical dimensions and mark the drawings as being reviewed and approved prior to submitting to the Engineer. Where catalog data is submitted which includes items which do not apply to this project, those items shall be clearly marked out or relevant items clearly noted. Any deviations from the documents shall be so noted by the Contractor or equipment supplier. The intent and requirements of the drawings and specifications shall be adhered to at all times and are not waived or superseded in any way by the shop drawing submittal or review.
2. Submit a minimum (1) electronic copy of shop drawings for review and approval. Contractor shall retain a final approved copy for incorporation in the Operation and Maintenance Manuals.
3. If returned shop drawings are marked "NO EXCEPTIONS TAKEN", no additional submittal is required. If the shop drawing is marked "MAKE CORRECTIONS NOTED", the changes noted on the shop drawings are to be incorporated, with no further resubmittal required. If marked "REVISE AND RESUBMIT", changes noted on the shop drawings are to be made and the drawings resubmitted for review. If marked "REJECTED", the equipment submitted is unacceptable and different equipment or materials need to be submitted.

J. No asbestos or PCB containing materials of any type shall be used on this Project.

K. Consult the Contract Drawings and Specifications of all other Divisions and other trades for correlating information and layout work so that it will not interfere with other trades. Verify all dimensions and conditions. If conflicts occur such that resolution is not possible by the affected trades on the job, the Engineer shall be notified and a resolution will be worked out.

L. Electrical equipment enclosures (switchboards, panelboards, transformers, relay cabinets, systems racks/cabinets, combiner boxes, etc.) shall be vacuumed and wiped clean prior to energizing and again at substantial completion.

M. Install material and equipment in accordance with Manufacturers' recommendations, instructions, and current N.E.C.A. standards.

N. Install equipment and materials to provide required access for servicing and maintenance. Coordinate final equipment location with required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.

O. Record Drawings: As work progresses, in a neat and legible manner, record all changes or deviations from the contract drawings. Submit Record Drawings to Engineer for review at completion of Work. The Record Drawings will become part of the Operation and Maintenance Manual package submitted to the Owner after the completion of the project.

SECTION 16050 - BASIC MATERIALS AND METHODS

A. All materials shall be new, as specified or approved, and in original packaging. Catalog numbers specified shall be verified with vendors prior to ordering material.

B. All materials shall be listed by a NRTL (i.e. UL, ETL, etc.) and have an associated label unless special fabrication of material is required. Special fabricated material shall be fabricated using listed components and procedures.

C. Where the word "provide" is used, it shall require the electrical subcontractor to furnish and install material complete to a workable system.

D. All work shall be tested in accordance with industry accepted standards. Before testing, a thorough visual inspection shall be made to detect connection problems, damaged components, poor workmanship, inappropriate overcurrent protection, debris, etc. Testing apparatus shall be certified or demonstrated to be accurate within reasonable limits. Competent personnel familiar with the test equipment shall perform all tests. If testing procedures employed are not satisfactory to the Engineer, outside testing will be done at the electrical subcontractor's expense.

E. Electrical subcontractor to identify all electrical equipment with engraved 1/4" white letters on black plates. Inscriptions shall indicate the name, voltage, phase, wires, feeder size, feeder source and location of source, and the device number.

F. All low voltage cables shall be bundled and labeled as to their function within terminal cabinets, wireways and cable trays.

G. Branch circuitry shall match circuit numbers as shown on the drawings and as scheduled. Any required deviation shall be indicated on the record drawings drawings.

H. All opening into equipment shall be sealed to prevent entry of insects and rodents.

SECTION 16110 - RACEWAYS

A. Construction shall be as per Underwriter's Laboratories Standard UL 870 for wireways, auxiliary gutters and associated fittings.

B. Wireways shall be painted steel with hinged removable cover, which can be used as either a hinged cover or set screw cover. Shall be fabricated such that the entire length of wireway and fittings permit lay-in wiring application. Cross sectional area shall be 6" x 6" minimum unless otherwise noted. Raintight wireway shall be NEMA 3R construction with gaskets and a corrosion resistant finish.

C. Where required, provide cable strain relief, grounding connectors, expansion fittings.

D. Schedule 40 PVC shall be used for all raceways where not restricted by this section or specifically noted otherwise. Schedule 80 PVC shall be used where above ground or transitions where emerging from ground and exposed to physical damage.

E. PVC conduit used above grade shall be UV resistant type.

F. Flexible liquid tight conduit shall be used on all motor, moving, and vibrating equipment connections. Use minimum 1/2" size with grounding type fittings and provide grounding conductor.

G. Conduit shall not be mounted on mechanical or other equipment which vibrates except at connection points.

H. Installations of underground wiring shall be in trench, duct or conduit or by plowing in place as specified on plans.

I. Underground raceways or direct burial cables shall be installed to meet the following requirements:

1. Spacing between exterior surfaces of underground conduits/cables shall be not less than the following:
   a. 2 inches between communications (copper) conduits/cables
   b. 2 inches between AC conduits/cables operating at not over 1000 volts
   c. 6 inches between a communications conduit/cable and any power conduit/cable (AC or DC not over 100V) in the same trench
   d. 12 inches between a communications conduit/cable and any power conduit/cable (AC or DC over 1000V) in the same trench, unless noted otherwise
   e. 6 inches between AC conduits/cables operating at over 1000 volts
   f. 6 inches between AC power conduits/cables and DC power conduits/cables.
   g. 6 inches between armored fiber optic cable or in metallic conduit and power conduits/cables (AC or DC)
2. Where crossing perpendicular, spacing between exterior surface of underground conduits/cables shall be not less than the following:
   a. 6 inches between AC and DC power conduits/cables operating at any voltage.
   b. 12 inches between conduits/cables containing AC and DC power conduits operating at any voltage and communications (copper) conduits/cables.

J. All underground raceways or wiring when specified in excavated trenches shall have backfill compacted. Refer to compaction requirements in trench compaction details. Backfill immediately around conduits/conductors to be a minimum of 3" native soil free from debris and organic material. Backfill surrounding direct buried cables shall be free of rocks 3/8" or larger, debris and organic material. Thermal conductivity of imported backfill shall be tested in accordance with ASTM D5334-08 to confirm the thermal resistively is equal to or less than that of the native soil or, if applicable, the specific requirements on these plans.

K. All plowing of underground raceways or wiring specified shall be accomplished using equipment and construction methods meeting the following criteria:
   a. Plowing shall not cause excessive bending of cables or ducts. Care should be taken not to exceed bending radius of cables or ducts allowed by NEC.
   b. The plow must be provided with means to assure positive holddown of the plow blade to provide proper depth at all times.
   c. When several cables or ducts are installed in a single operation, the plow shall have feeds for each cable or duct to provide specified separation.
   d. If an underground obstruction is encountered, the plow shall be lifted out of the ground and the obstruction removed by hand digging. Care must be taken that the cable has no bends sharper than the bending radius allowed by NEC and is not subject to excessive tension and/or any damage. Any necessary backfill shall be compacted per compaction requirements in civil drawings.
   d. After installation of cable or duct by plowing, the disturbed earth shall be leveled and compacted per compaction requirements in civil drawings.
   f. End of cable shall be tapped immediately after cutting to prevent moisture entering the cable.

L. Underground conduit shall be installed to allow drainage into manholes/handholes a minimum of 4 inches per 100 feet of horizontal run. Where conduits or ducts enter a manhole, handhole, or above grade cabinet, each shall be permanently identified by means of plastic fiber, laminated plastic or non-corrosive metal tags to indicate origination point.

M. When non-metallic conduit requires field bending, utilize a hot-bending appliance. Use of torches to bend conduit is unacceptable.

N. Where conduits terminate in handholes/vaults or in pad mounted equipment, terminate conduits a minimum of 4 inches above bedding or slab. Conduits shall use bell ends. Where routed through slabs, provide sleeves to allow settling/heaving of slab.

O. Where HDPE innerduct is used, Schedule 40 PVC or Schedule 80 PVC (where subject to damage) conduit shall be used for transitions to above grade.

SECTION 16120 - WIRING AND CABLE

A. Building Wire:
   1. Description: Single conductor insulated wire.
   2. Conductor: 98% Commercially pure copper conductors or AA-8000 series aluminum alloy compact stranded conductors
   3. Insulation Voltage Rating: 600 volts and 2000 volts
   4. Insulation: ANSI/NFPA 70, 90° C Type THHN-2, THWN-2, XHHW-2, RHW-2, USE-2, and PV
   5. Exposed PV module wiring and combiner box feeders shall be 2000 volt tray rated PV type.
   6. 600V AC wiring installed below grade shall be type XHHW-2, RHW-2, or USE-2.

B. Approved direct burial cable assembly shall be used only where approved.

C. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

D. Neatly trim and lace wiring inside boxes, equipment, and panelboards.

E. Clean conductor surfaces before installing lugs and connectors.

F. Make splices, taps and terminations to carry full ampacity of conductors with no perceptible temperature rise.

G. Parallel 3-phase feeder runs in conduit shall have all three phase conductors (including neutral and ground where required) installed in each conduit. Grouping a single phase (or two phases) in a single conduit is not permitted.

H. Identification
   1. Control wiring shall be marked at both ends as to its function.
   2. Spare conductors shall be identified as such.

I. Direct burial wiring to meet spacing requirements under section 16110/I.

J. Aluminum cable is allowed for all MV cables and any LVAC and DC cables #6 AWG and larger unless otherwise specified.

SECTION 16125 - MEDIUM VOLTAGE CABLES

A. Cables for the 34.5 KV system shall be UD 35 KV MV-105 Listed single conductor, insulated, shielded and jacketed medium voltage type power cable with 100% insulation level, 90° C continuous operation rating, 130° C emergency rating, 250° C short circuit rating.

B. Cable shall have ASTM B-609 aluminum conductors with Class B stranding in accordance with ASTM B-231, moisture blocked strands, an extruded semi-conducting shield layer (40 mil min.) over the conductor for stress control, direct-burial XLPE insulation (345 mils min.), a concentric copper neutral, and moisture/chemical/oil/flame resistant PVC jacket.

C. Cables shall be Manufactured by Okonite, Prysmian, Southwire, General Cable, WTEC, or approved equal.

D. All MV cables must use cable termination kit manufactured by 3M, TE Connectivity, Eaton/Cooper, or Richards.

E. Complete installation shall be per National Electrical Code Articles 310 and 328. Do not exceed manufacturer's published maximum pulling tension or sidewall pressure. Provide sufficient slack in cable, ground and drain wires to permit elbow connectors to be moved to their respective parking stands.

F. All cables shall be labeled at each end at an accessible location for viewing. Label shall indicate circuit, phase, and destination/origination. Labels shall be black phenolic with white lettering and secured with a minimum of (2) UV-resistant zip ties.

G. Splices and terminations shall be made by an experienced journeyman whose qualifications are subject to approval by the Engineer. No splices shall be allowed unless specifically noted. No underground splices are permitted. Fiberglass splice boxes are not permitted unless approved by owner. All splices to be approved by owner.

H. Arrange phases at termination points, A-B-C from left to right or top to bottom as viewed from the front.

I. Test all cables according to IEEE Standard 400. Each power cable over 1000V shall be given a continuity test, and each medium voltage cable shall be given a continuity and a VLF test after installation and after terminations having been made. All single conductor cables shall be tested between conductors and ground with metallic shield and the other two conductors grounded to the same ground. Each conductor shall be successively tested in the same manner. Direct current voltages shall be applied with negative polarity to the cable conductor. See testing procedures as required.

J. No cable shall be permanently energized until a copy of its test record is approved by the Engineer.

K. In addition to any testing specified herein, perform testing consistent with the requirements of the applicable codes, NETA Acceptance Testing criteria, and the manufacturers' current quality assurance program.

L. Direct burial wiring to meet spacing requirements under section 16110/I.

SECTION 16130 - BOXES

A. Pull and junction boxes shall be code gauge, gasketed, painted, galvanized steel, PVC, or fiberglass. Covers shall be secured with screws.

B. Outlet boxes shall be cast malleable iron with threaded hubs or PVC and be of high conductive metal to maintain maximum electric continuity.

C. All outlets shall be equipped with outlet boxes approved for the use.

D. Covers or plates for boxes shall conform substantially to the outlet of the boxes with no projecting edges or corners.

E. Conduit fittings ("LB", "C", "T") or types approved for the location may be employed as required to facilitate pulling in conductors.

F. Provide pull and above ground junction boxes to facilitate pulling or splicing of conductors.

G. Mount boxes to allow for maximum flexibility.

H. Install grounding bushings with bonding conductor on all metallic feeder conduits entering box. Ground bushings and bonding conductors are not required on branch circuit conduits.

SECTION 16340 - MEDIUM VOLTAGE SECTIONALIZING CABINETS/MEDIUM VOLTAGE JUNCTION BOXES

A. Sectionalizing cabinets shall be designed for burial with the junction modules mounted above the ground line. Pedestals shall be in complete conformance with ANSI C57.12.28, Pad-mounted Equipment Enclosure Integrity Standard.

B. Sectionalizing cabinets shall be Manufactured by Nordic, Cooper, Hubbell, G&W, Power Design Inc., Highline, Federal Pacific, Hoffman, S&C or approved equal.

C. Enlosure shall be 3/16" nominal thickness fire resistant, laminate, fiberglass, with munsell green gel coat finish or shall be 12 gauge galvanized steel, with munsell green polyester powder coat finish. Enclosure access doors shall utilize stainless steel hinges and shall have provisions for padlocking. Doors shall have provisions for securing in the open position.

D. Provide junction panels with bushings to accommodate the size and quantity of dead break elbows indicated on drawings.

E. Provide ground bar in unit for bonding of ground conductors and concentric neutrals.

F. Provide fiberglass ground sleeve extending 36" below cabinet installed on a 6" pea rock base to allow drainage.

SECTION 16440 - DISCONNECT SWITCHES

A. All disconnect switches shall be NEMA heavy duty Type H.D., horsepower rated, and U.L. listed. Disconnects shall be Eaton, GE, Square D, Siemens or approved equal.

B. Provide auxiliary disconnect contacts for control circuits when supplied from an independent source.

C. Switch Interior - All switches shall have switch blades which are fully visible in the off position when the door is open. Switches shall be of dead-front construction with permanently attached arc suppressors hinged or otherwise attached to permit easy access to line-side lugs without removal of the arc suppressor. Lugs shall be UL listed for copper and/or aluminum cables and front removable. All current carrying parts shall be plated by electrolytic processes.

D. Switch Mechanism - Switches shall have a quick-make and quick-break operating handle and mechanism which shall be an integral part of the box, not the cover. Switches shall have a dual cover interlock to prevent unauthorized opening of the switch door in the ON position or closing of the switch mechanism with the door open. Switches shall provisions for locking the switch in both the ON and the OFF positions by padlock.

E. Enclosures shall be NEMA 3R enclosures unless otherwise specified. Raintight covers shall be securable in the open position. Enclosures shall be code gauge (UL 98) galvanized steel (NEMA 3R). They shall be treated with a rust-inhibiting phosphate and finished in gray baked enamel.

F. Install disconnect switches in an accessible location as convenient as possible to equipment served.

G. Switches shall be rated for the voltage and system type they are used for.

SECTION 16450 - GROUNDING

A. Provide complete grounding systems as described herein and as shown on the drawings.

B. All grounding components shall be listed for the purpose they are installed for. Components shall be Manufactured by AMPACT, Burndy, CADWELD, ITT Blackburn, Ilsco, or Lyncole.

C. Ground rods shall be 3/4 inch diameter by 10 feet long copper clad steel. Connecting cables shall be copper as indicated on drawings. All ground conductors exposed to the elements or in direct contact with the earth shall be tin coated or bare copper.

D. All metallic conduits, supports, cabinets, non-current carrying parts of equipment, and metallic structures shall be solidly grounded to form a continuous permanent and effective grounded system.

E. All wireways, metal enclosures, cable trays and similar parts of the electrical installation described herein shall be grounded.

F. UFER grounds shall be via exothermically weld connection to a minimum of (2) continuous 20'-0" sections of rebar encased in the concrete footings/piers with a minimum of 2" of concrete cover. Rebar shall be a minimum of a #4 and shall NOT be epoxy coated. If multiple pieces of rebar are required to provide the 20'-0" lengths, they shall be welded together to provide a continuous ground path.

G. The special attention of the Contractor is called to metallic building components and mechanical piping which must be grounded in an approved manner according to the NEC.

H. Provide a continuous grounding conductor for each feeder serving several panelboards. Connect this ground conductor to each related cabinet ground bar.

I. For LVAC circuits less than 1000 VAC not supplied by cables a with integral ground wire, provide a separate green insulated equipment grounding conductor for each single or three phase feeder and each branch circuit with a three phase protective device. Install the required grounding conductor in the common conduit with the related phase/hot and neutral conductors. Where parallel feeders are installed in more than one raceway, provide a green insulated equipment grounding conductor in each raceway.

J. Single Phase Branch Circuits for Lighting, Receptacles, Motors and Other Similar Equipment: Provide single phase branch circuits serving lighting, receptacles, motors, and other similar equipment consisting of phase, neutral, and green insulated equipment ground conductor installed in a common conduit.

K. Single Phase Branch Circuits for Special Equipment: Provide single phase branch circuits serving special equipment, and all branch circuits installed in nonmetallic or flexible conduits with a separate grounding conductor.

L. All transformers shall be bonded to the grounding electrode system as well as building steel (where applicable).

M. Bond all cable tray and equipment racks to ground with a minimum 4/0 AWG ground conductor.

N. Connections to the PV modules shall be installed such that removal of a module from the string does not interrupt the grounded conductor to another string. Sets of modules connected in series rated at 50 volts or more with or without blocking diodes, and having a single overcurrent device shall be considered a string.

O. When required by the testing plan, the resistance to earth shall be measured using a 3-point fall of potential test with the inverter station ground grid isolated. Results shall be compared to grounding model/study to verify field measured earth resistance is within the same order of magnitude as the grounding model/study.

SECTION 16475 - FUSES

A. DC fuses for PV string circuits shall be 1500Vdc rated HP15M as Manufactured by Mersen.

B. DC fuses for PV feeders shall be Class J or gPV type as Manufactured by Bussman, Mersen, or Littelfuse.

C. Fuses in switchboard, 601A and larger shall be Class L type and be Bussman Class L, Limitron KTU (or Hi Cap KRP-C), CEFCO Class L, CLL, Ferraz Shawmut Class L, Amp Trap A4BY, or Littelfuse Class L, KLP-C.

D. Fuses for feeder circuits 600A and less shall be Class RK1 and be Bussman Low Peak LPN-RK (250V) or LPS-RK (600V); CEFCO Lo-Ip LON-RK (250V) or LOS-RK (600V); Ferraz Shawmut Amp-Trap II A2D-R (250V) or A6D-R (600 V); or Littelfuse Little Peak LLN-RK (250V) or LLS-RK (600V).

E. Fuses for motor circuits shall be Class RK5 type and be Bussman Fusetron FRN-R (250V) or FRS-R (600 V); CEFCO CEFCON CRN-R (250V) or CRS-R (600V); Ferraz Shawmut Trionic TR-R (250 V) or TRS-R (600 V); or Littelfuse Slo-Blo FLN-RL (250V) or FLS-R (600V).

F. For in-line fuses and weatherproof assembly, provide Bussman Tron Type HEB fuse holder and Type KTK fuse with 1A0513 boot or equal.

G. For protection of control circuit transformers, provide Bussman Type FNQ time delay fuses or equal.

H. Install fuses to allow viewing of "Blown-Fuse" indicators through viewing windows in gear, where provided.

I. Provide label inside each switch and motor starter cover stating type of fuse required for replacement.

SECTION 16630 - COMBINER BOXES

A. Provide 1500V combiner box(s) Listed to UL 1741, complete with circuitry as necessary to protect the equipment including disconnect switch with finger-safe fuse holders having all necessary fusing. Combiner boxes shall be Eaton/Cooper, Shoals, SolarBos, Amtec, Teal, Bentek, WTEC, or approved equal.

B. A finger-safe, non-fused load break disconnect is required and it shall be interlocked to prevent the opening of the cover when the switch is in the ON position. Interlock shall be defeatable for testing purposes. Handle must be lockable in OFF position.

C. All fuse holders shall be finger-safe.

D. The combiner box shall be arranged to have a minimum number of input circuits and fuse sizes as indicated on the combiner box schedules for a negatively grounded system. Input fuse holders shall be rated 30A fuses.

E. Enclosures shall be a minimum of NEMA 3/IP54 with seamless door gaskets and an integral disconnect rated as indicated on the combiner box schedules.

F. All wire terminations/lugs shall be Listed for 90°C field terminations.

G. Combiner boxes including disconnect and fuses shall be Listed for continuous operation at 100% of its collector bus/disconnect rating.

H. Provide units with integral DC surge protection devices rated for 40kA discharge current (8/20 µs) and maximum continuous operating voltage of 1500Vdc

I. Equipment shall have a nameplate installed and mounted to the front cover and indicate, at a minimum: number of input circuits, ampere rating of input circuits, voltage rating, short-circuit current rating, and integrated disconnect ampere rating.

J. Combiner box Manufacturer shall review combiner box schedules and verify combiner boxes enclosures are large enough and configured to allow termination of the size and quantity of string and feeder conductors/conduits indicated on the schedules.

K. Provide typed PV string directory inside cover to denote strings and their associated fuse/terminal number.

L. All combiner box components shall be pre-wired before arriving to site.

M. Provide a directory of combiner boxes at each inverter to facilitate location and shut down of DC sources.

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

Douglas County, Kansas

Electrical Notes

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E0010

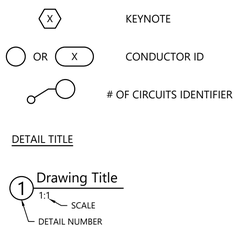
REV: C

N:\09100214.00_CAD_Electrical\09100214.00 - E0010 Electrical Notes.dwg 7/13/2023 4:08 PM Guillermo Hernandez

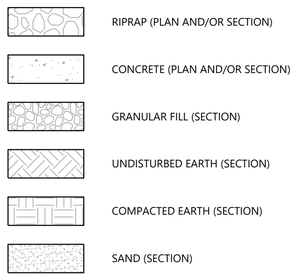
ABBREVIATIONS

A, AMP	AMPERE
AAT	AMBIENT AIR TEMPERATURE SENSOR
ABAN	ABANDON
AC	ALTERNATING CURRENT
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AHJ	AUTHORITY HAVING JUSTISDICTION
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
ALIG	ALIGNMENT
ALT	ALTERNATE
ANE	ANEMOMETER
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE
BAT	BATTERY
BESS	BATTERY ENERGY STORAGE SYSTEM
BKR	BREAKER
BLDG	BUILDING
BRD	BOARD
BSTR	BATTERY STRING CIRCUIT CONDUCTOR
BTSW	BATTERY STRING SWITCH
BUS	BUS CONDUCTOR
C	CONDUCTOR
CA	CAPACITOR BANK
CAB	CABINET
CB	CIRCUIT BREAKER
CCS	COPPER CLAD STEEL
CE	CONCRETE EDGE
CHGR	BATTERY CHARGER
CIP	CAST-IN-PLACE
CL	CENTERLINE
CLM	CELLULAR MODEM
CLR	CLEAR, CLEARANCE
CMB	COMBINER BOX
CMP	CORRUGATED METAL PIPE
CMW	CAB MESSENGER WIRE
CNT	CONDUIT
COMM	COPPER COMMUNICATION CABLE
CT	CURRENT TRANSFORMER
CTR	CENTER
CU	COPPER
DC	DIRECT CURRENT
DEMO	DEMOLITION
DIA, ⌀	DIAMETER
DISC	DISCONNECT
DWG	DRAWING
EA	EACH
EMT	ELECTRICAL METAL TUBING
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EQUIP	EQUIPMENT
EST	ESTIMATE
EXIST	EXISTING
F	FUSE
FG	FINISHED GRADE
FO	FIBER OPTIC
FOMM	FIBER OPTIC - MULTI MODE
FOPP	FIBER OPTIC PATCH PANEL
FOSM	FIBER OPTIC - SINGLE MODE
FOSB	FIBER OPTIC SPLICE BOX/ENCLOSURE
FT	FEET/FOOT
FS	FUSE
GEN	GENERAL
GFI	GROUND FAULT INTERRUPTER
GRND	GROUND CONDUCTOR
GR	GRADE
GSU	GENERATION STEP-UP UNIT
GSW	GANG-OPERATED SWITCH
HH	HANDHOLE/UNDERGROUND PULL BOX
HP	HORSE POWER
HPC	HIGH PRESSURE CONTACT SWITCH
HPY	HORIZONTAL PYRANOMETER
HZ	HERTZ
ID	INSIDE DIAMETER
IMC	INTERMEDIATE METALLIC CONDUIT
IN	INCH
INS	INSULATOR
INV	INVERTER
JB	JUNCTION BOX (J-BOX)
JBM	JUNCTION BOX - MEDIUM VOLTAGE
JMP	JUMPER CONDUCTOR
kV	KILOVOLT
kVA	KILOVOLT AMPERE
kVAR	KILOVOLT AMPERE REACTIVE
kW	KILOWATT
kWH	KILOWATT HOUR
LBD	LOAD BREAK DISCONNECT
LBS	POUNDS
LV	LOW VOLTAGE
LVAC	LOW VOLTAGE ALTERNATING CURRENT
MAX	MAXIMUM
MCB	MINIATURE CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MET	METEOROLOGICAL STATION
MIN	MINIMUM
MLO	MAIN LUG ONLY
MPNL	METER PANEL
MPT	MAIN POWER TRANSFORMER
MTR	MOTOR
MTS	MANUAL TRANSFER SWITCH
MVAC	MEDIUM VOLTAGE ALTERNATING CURRENT
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NGR	NEUTRAL GROUNDING REACTOR
NTS	NOT TO SCALE
OHC	OVERHEAD CONDUCTOR
PCU	POWER CONVERSION UNIT
POA	PLANE OF ARRAY PYRANOMETER
POH	POWER OVERHEAD
PCC	POINT OF COMMON COUPLING
PED	PEDESTAL
PF	POWER FACTOR
PH,Φ	PHASE
PNL	PANEL
POI	POINT OF INTERCONNECTION
PPC	POWER PLANT CONTROLLER
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
PWR	POWER
OPGW	OPTICAL PATH GROUND WIRE
QTY	QUANTITY
R	RADIUS
R&R	REMOVE AND REPLACE
R&S	REMOVE AND SALVAGE
RCB	RECOMBINER BOX
REF	REFERENCE
REL	RELAY
REQD	REQUIRED
REV	REVISION
RMT	REVENUE METER
SA	SURGE ARRESTER
SB	SPLICE BOX
SCH	SCHEDULE
SEC	SECTIONALIZER
SF	SQUARE FEET
SHT	SHEET
SOG	SLAB ON GRADE
SPD	SURGE PROTECTOR DEVICE
SPEC	SPECIFICATION
STR	PHOTOVOLTAIC STRING CIRCUIT
SW	SWITCH
SWBD	SWITCHBOARD
SWF	SWITCH - FUSED
SWG	SWITCHGEAR
TC	TRACKER CONTROLLER
TEL	TELEPHONE
THS	THERMAL SENSOR
TOS	TOP OF SLAB/TOE OF SLOPE
TRNK	TRUNK CONDUCTOR
TT	TORQUE TUBE
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UCT	UNDERGROUND CABLE TERMINATION
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTIL	UTILITY
V	VOLT
VA	VOLT AMPERE
VT	VOLTAGE TRANSFORMER
W	WATT
WP	WEATHERPROOF
WSS	WIND STOW SWITCHES
WVA	WEATHER VANE
XFMR	TRANSFORMER

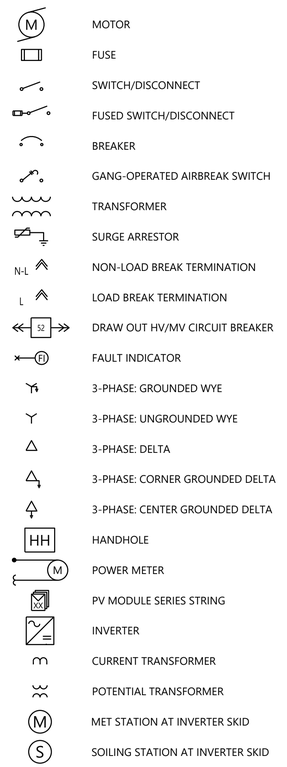
GENERAL SYMBOLOGY



MATERIALS IN PLAN/SECTION



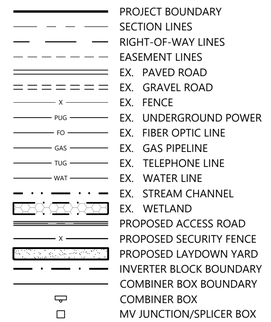
SCHEMATIC SYMBOLOGY



NOTES

1. THIS IS A STANDARD SYMBOLOGY AND ABBREVIATION SHEET. ALL SYMBOLS AND ABBREVIATIONS ARE NOT NECESSARILY USED ON THIS PROJECT.
2. THESE SYMBOLS AND ABBREVIATIONS APPLY TO THE ENTIRE SET OF ELECTRICAL (EXXXX) DRAWINGS.
3. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.
4. REFER TO SUBSTATION DESIGN DOCUMENTS AND MATCH THE COLOR CODING FOR MEDIUM VOLTAGE CONDUCTORS
5. CONTRACTOR SHALL VERIFY THAT WIRING CODE COMPLIES WITH AHJ WIRING CODE.

PLAN SYMBOLOGY



APPROVED WIRE COLOR CODING: AC CONDUCTORS

	MEDIUM VOLTAGE	277/480-600V	UNDER 277V
PHASE A	SEE NOTE 4	BROWN	-
PHASE B	SEE NOTE 4	ORANGE	RED
PHASE C	SEE NOTE 4	YELLOW	BLUE
GROUNDED CONDUCTOR	-	GREY	WHITE
GROUNDING CONDUCTOR	GREEN OR BARE	GREEN or BARE	GREEN or BARE
GROUNDING ELECTRODE CONDUCTOR	-	GREEN W/ ORANGE	GREEN W/ ORANGE

APPROVED WIRE COLOR CODING: DC CONDUCTORS

POSITIVE (+) CONDUCTOR	RED
NEGATIVE (-) CONDUCTOR (GROUNDED)	BLACK
GROUNDING CONDUCTOR	GREEN OR BARE

EQUIPMENT LABELING

EQUIPMENT TYPE	LABEL FORMAT	DESCRIPTION	EXAMPLE	INDICATION
STRING	##.LBD#.STR#	BLOCK/INVERTER STATION NUMBER . LOAD BREAK DISCONNECT NUMBER . STRING NUMBER	24.LBD8.STR4	4TH STRING GOING TO LOAD BREAK DISCONNECT 8 IN BLOCK 24
LOAD BREAK DISCONNECT	##.LBD# or ##.RCB#.LBD#	BLOCK/INVERTER STATION NUMBER . RECOMBINER NUMBER (IF NEEDED) . LOAD BREAK DISCONNECT NUMBER	24.RCB1.LBD8	LOAD BREAK DISCONNECT 8 GOING TO RECOMBINER 1 IN BLOCK 24
INVERTER	BLOCK.##	BLOCK/INVERTER STATION NUMBER .	BLOCK.24	INVERTER 24
TRACKER MOTOR	##.TM#	BLOCK/INVERTER STATION NUMBER . TRACKER MOTOR NUMBER	15.TM3	TRACKER MOTOR 3 LOCATED IN BLOCK 15
INVERTER STEP-UP TRANSFORMER	##.XFMR#	BLOCK/INVERTER STATION NUMBER . TRANSFORMER NUMBER	15.XFM1	TRANSFORMER 1 LOCATED IN BLOCK 15
RECOMBINER	##.INV#.RCB#	BLOCK/INVERTER STATION NUMBER . INVERTER NUMBER . RECOMBINER NUMBER	24.I3.RCB2	RECOMBINER 2 GOING TO INVERTER 3 LOCATED IN BLOCK 24
SECTIONALIZER (JUNCTION BOX)	SEC #.# or JB #.#	SECTIONALIZER (OR JUNCTION BOX). CIRCUIT IDENTIFIER . NUMBER	SEC.A.9 (or JB.A.9)	9TH SECTIONALIZER (OR JUNCTION BOX) FOR CIRCUIT A

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Kansas Sky Energy Center

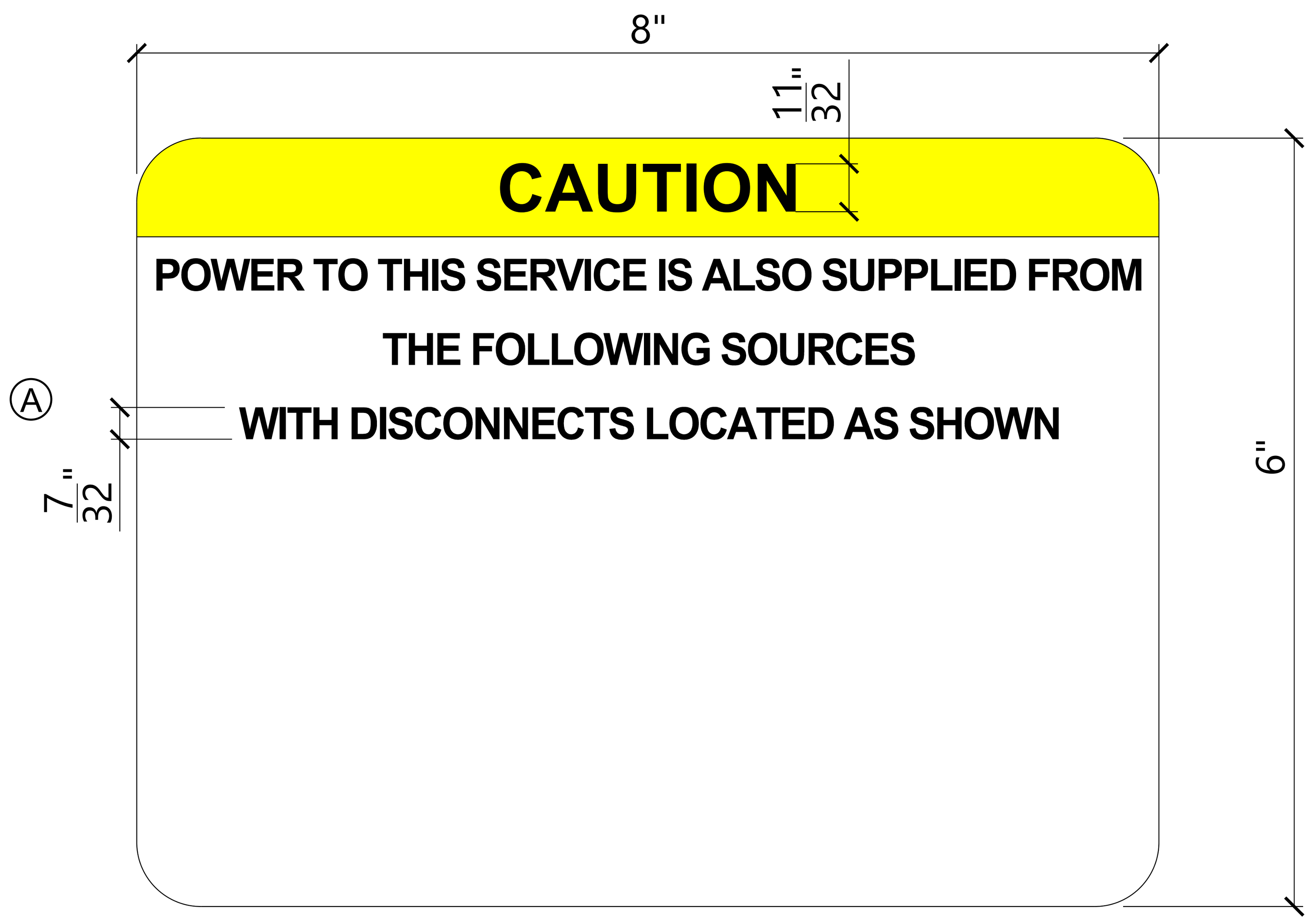
Douglas County, Kansas

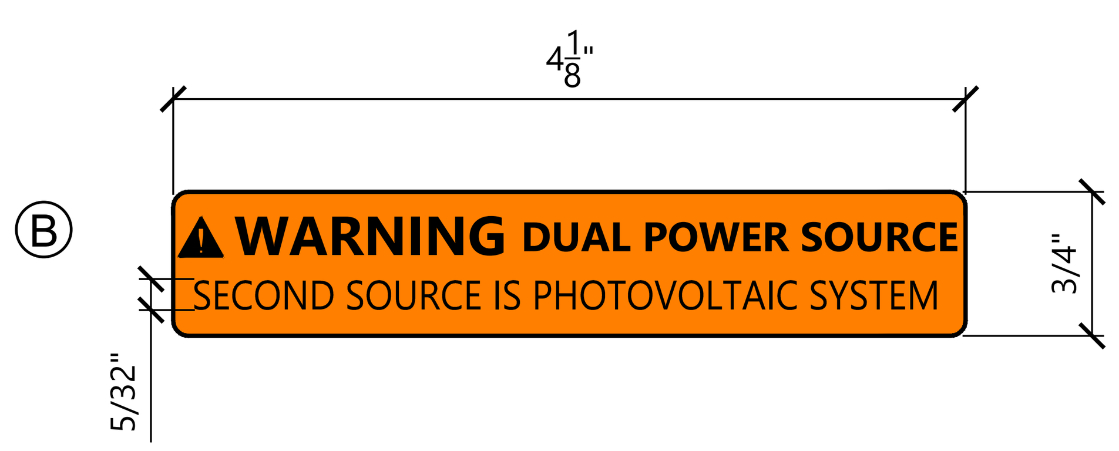
Electrical Symbology, Equipment Labeling & Abbreviations

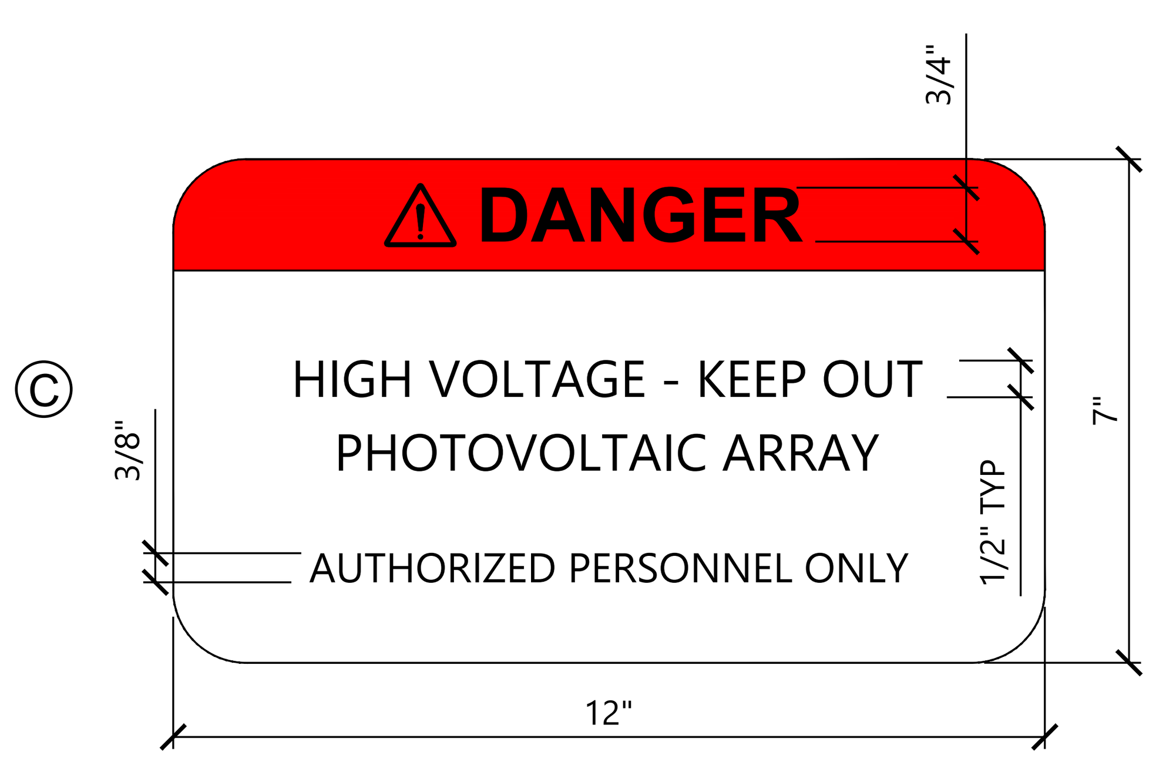
NOT FOR CONSTRUCTION

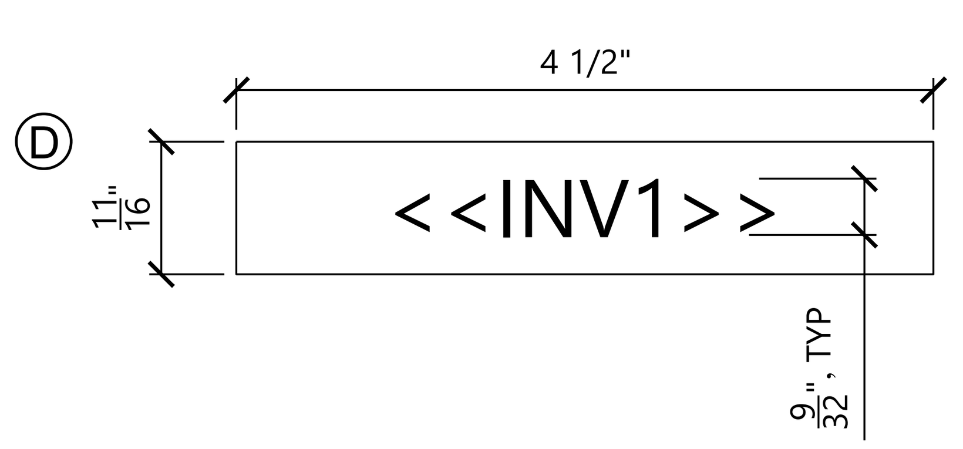
DATE: 07/13/2023

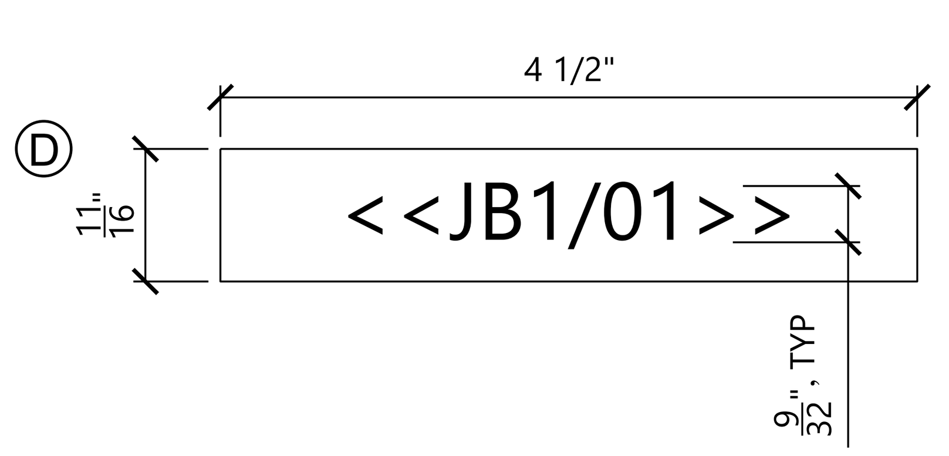
SHEET: E0020 REV: C

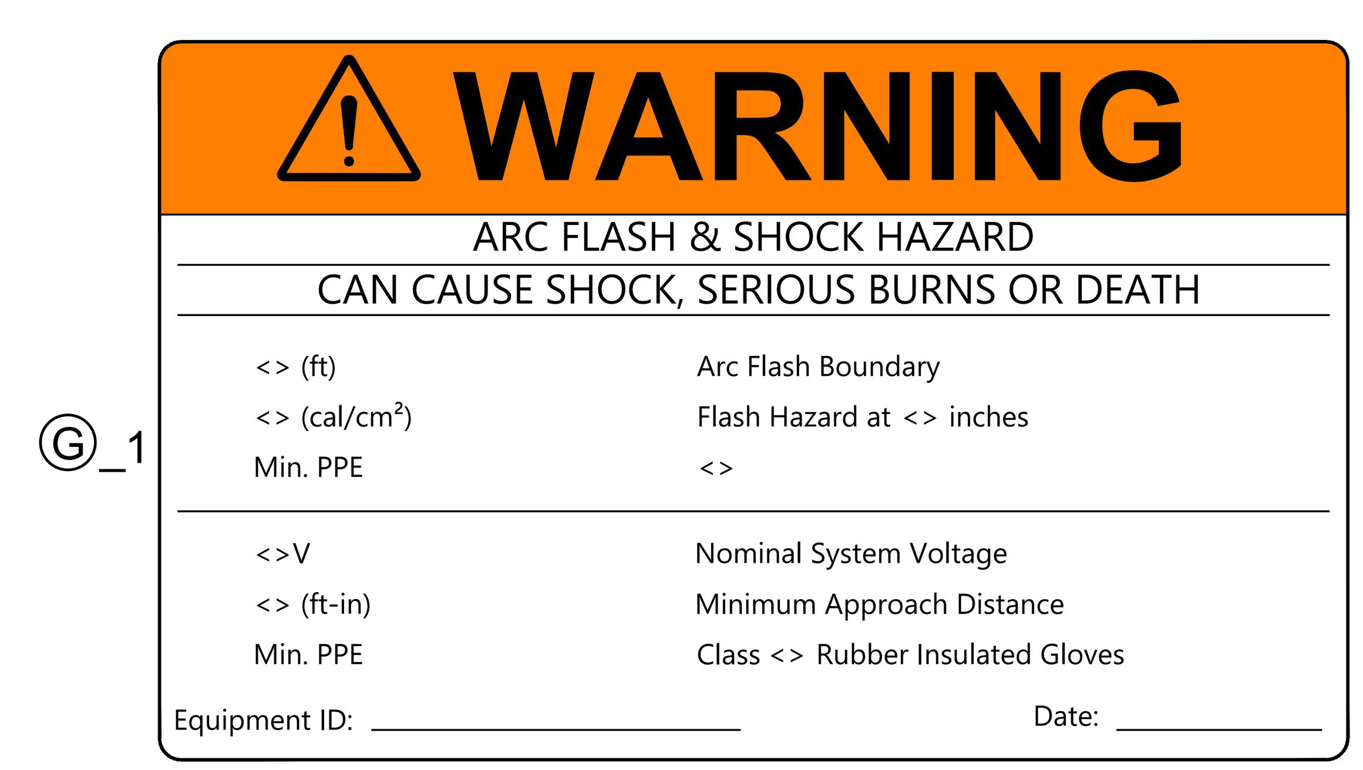


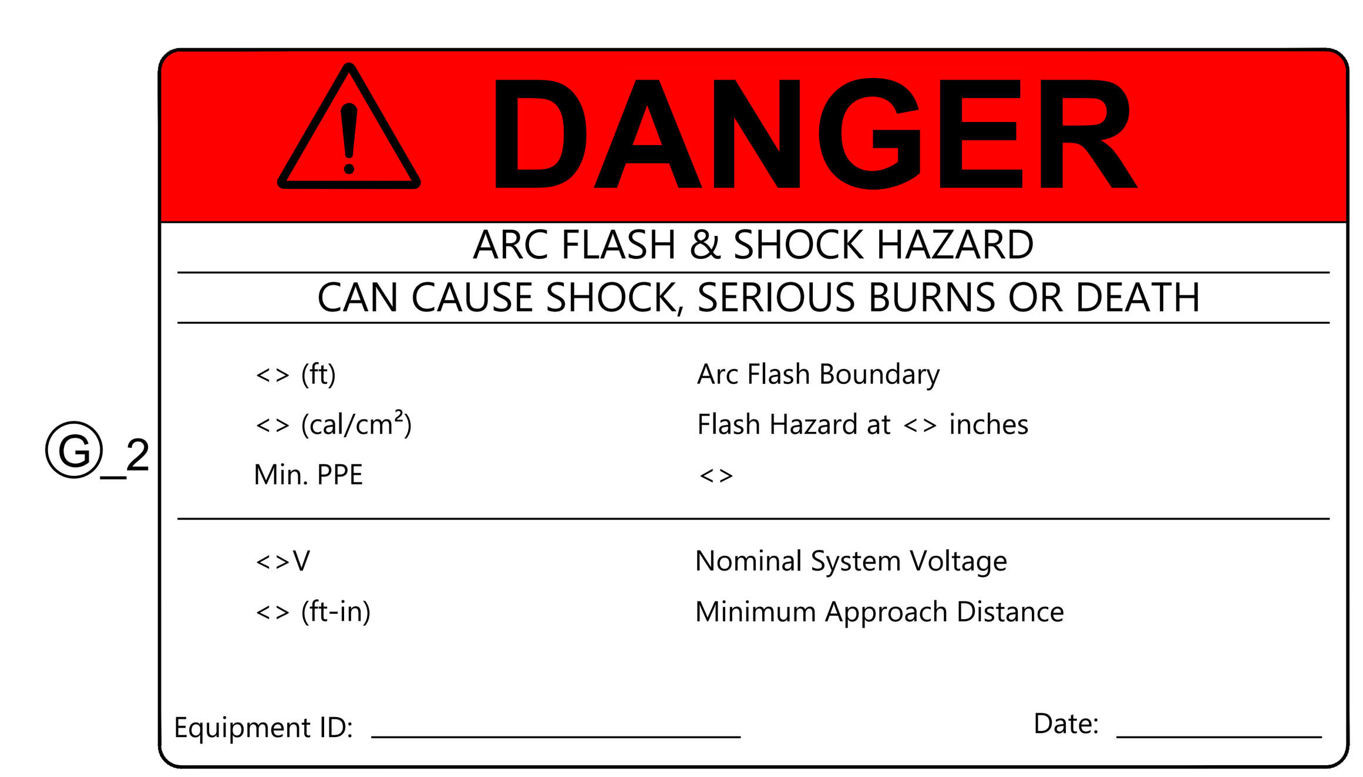












LABELS AND MARKINGS LEGEND

- (A) CAUTION LABEL FOR THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC DISCONNECTING MEANS. THIS PLAQUE SHALL BE APPLIED TO THE MAIN SERVICE DISCONNECTING MEANS. CUSTOM LABEL WITH WHITE BACKGROUND AND BLACK LETTERS. SHOW LOCATION OF ALL PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS ON SITE PLAN.
- (B) WARNING LABEL FOR DUAL POWER SOURCE PRESENT. APPLY TO UTILITY PRODUCTION METER, CUSTOMER METER AND PULL BOXES.
- (C) DANGER LABEL FOR CHAIN LINK SECURITY FENCE; SPACED EVERY 200 FEET AROUND PERIMETER OF ARRAY. SIGNS SHALL BE AT LEAST 14 GAUGE GALVANIZED STEEL OR ALUMINUM OR MINIMUM 3/32" THICK UV STABILIZED POLYCARBONATE OR PLEXIGLASS WITH 20 YEAR MINIMUM LIFE UV RESISTANT PAINT/LAMINATE FINISH. FASTEN TO FENCE WITH A MINIMUM OF (4) GALVANIZED STEEL OR 1/4" NOMINAL HEAVY DUTY UV STABILIZED ZIP TIES
- (D) GENERIC EQUIPMENT NUMBERING LABEL. TWO EXAMPLES SHOWN. EQUIPMENT TO USE THE LABEL TYPE: PCU, JUNCTION BOX, STRINGS, LOAD BREAK DISCONNECTS, SPLICE BOXES, MET STATIONS.
- (E) CONDUIT RUN FROM COMBINER TO INVERTER. (AS NEEDED)
- (F) LABEL FOR AC DISCONNECT INFORMATION. LOCATED AT INVERTER STATIONS. LABEL WITH RED BACKGROUND AND WHITE LETTERS. INFORMATION IN BLACK LETTERS WITHIN WHITE BOXES.
- (G) ARC FLASH WARNING LABEL SHALL BE PLACED ON ALL EQUIPMENT AS REQUIRED BY NEC 110.16 INCLUDING, BUT NOT LIMITED TO, COMBINER BOXES, DISCONNECTS, INVERTERS, PANEL BOARDS AND SWITCHBOARDS. TOTAL QUANTITY TO BE DETERMINED BY CONTRACTOR. LABEL SHOWN IS AN EXAMPLE - VALUES WILL VARY BETWEEN EQUIPMENT. CHOOSE APPROPRIATE LABEL FOR APPROPRIATE HAZARD CONDITION. WARNING LABEL DESIGNATES INCIDENT ENERGY < 40 CAL/CM^2 AND DANGER LABEL DESIGNATES INCIDENT ENERGY >= 40 CAL/CM^2.
- (H) LABEL FOR UTILITY MAIN AC DISCONNECT. APPLIED TO SERVICE DISCONNECTING MEANS AND PHOTOVOLTAIC DISCONNECTING MEANS. LABEL WITH RED BACKGROUND AND WHITE LETTERS. LABEL TO BE REFLECTIVE.
- (I) LABEL FOR DC DISCONNECT INFORMATION. APPLY TO ALL LOAD BREAK DISCONNECTS AND RECOMBINER CABINETS.
- (J) LABEL FOR CABLE TRAYS AT LBD/SB GROUPINGS. TO BE PLACED AT A READILY VISIBLE LOCATION ON ALL CABLE TRAYS WITH SPACING OF LABELS NOT TO EXCEED TEN (10) FT.

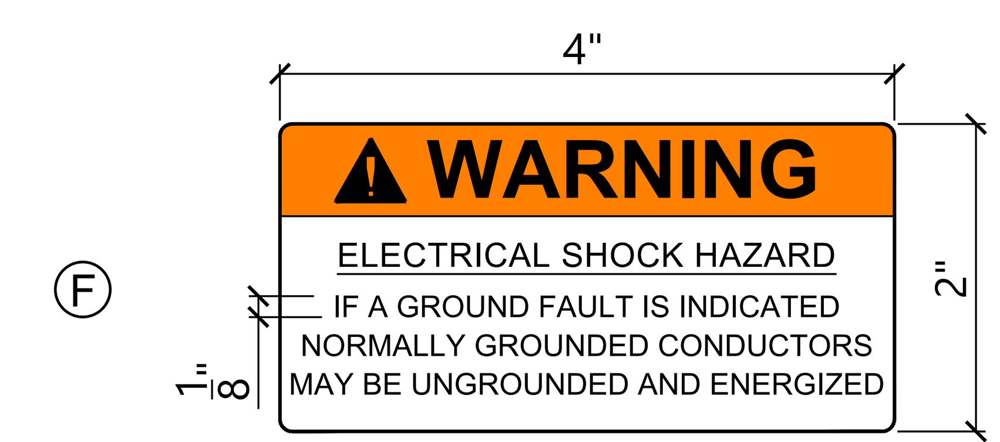
NOTES

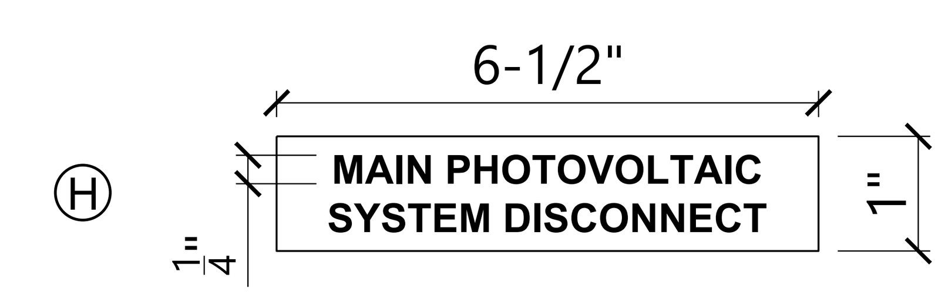
1. BATTERY ENCLOSURE MODULES SHALL BE SUPPLIED FROM THE MANUFACTURER WITH MARKINGS PRE-APPLIED TO MEET THE REQUIREMENTS OF THE NEC.
2. PCU SKIDS SHALL BE SUPPLIED FROM THE MANUFACTURER WITH THE APPROPRIATE LABELS AND MARKINGS TO MEET THE REQUIREMENTS OF THE NEC.
3. FINAL LABEL QUANTITIES, TEXT, AND LOCATIONS TO BE DETERMINED BY CONTRACTOR.
4. THE LABELING, MARKING, IDENTIFICATION, AND GROUPING REQUIREMENTS OF THE 2017 EDITION OF THE NATIONAL ELECTRIC CODE SHALL BE APPLICABLE TO THIS BATTERY ENERGY STORAGE PROJECT.
5. IN ADDITION TO NEC-REQUIRED LABELING, ALL MAJOR ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED PER SPECIFICATIONS IN THIS PLAN SET. LABELS SHALL BE SUITABLE FOR THE ENVIRONMENT IN WHICH THEY ARE INSTALLED.
6. INTERCONNECTION EQUIPMENT AND MATERIALS, INCLUDING SHARED EQUIPMENT WITH THE UTILITY, SHALL BE LABELED PER UTILITY SPECIFICATIONS.
7. ALL WARNING, CAUTION AND/OR DANGER LABELS TO COMPLY WITH ANSI Z535.4-2011 STANDARD FOR PROPER TEXT SIZE, DESIGN, ETC.
8. BELOW IS A LIST OF MAJOR SECTIONS OF THE NEC WHICH OUTLINE BATTERY LABELING AND MARKING. THIS LIST, NOR THE EXAMPLES SHOWN ON THIS SHEET, SHOULD NOT BE CONSIDERED EXHAUSTIVE. CONTRACTOR IS REQUIRED TO UNDERSTAND THE NEC LABELING REQUIREMENTS AND APPLY THESE REQUIREMENTS TO PROJECT AS REQUIRED. SECTIONS IN ITALICS ARE DIRECT QUOTES FROM NEC.

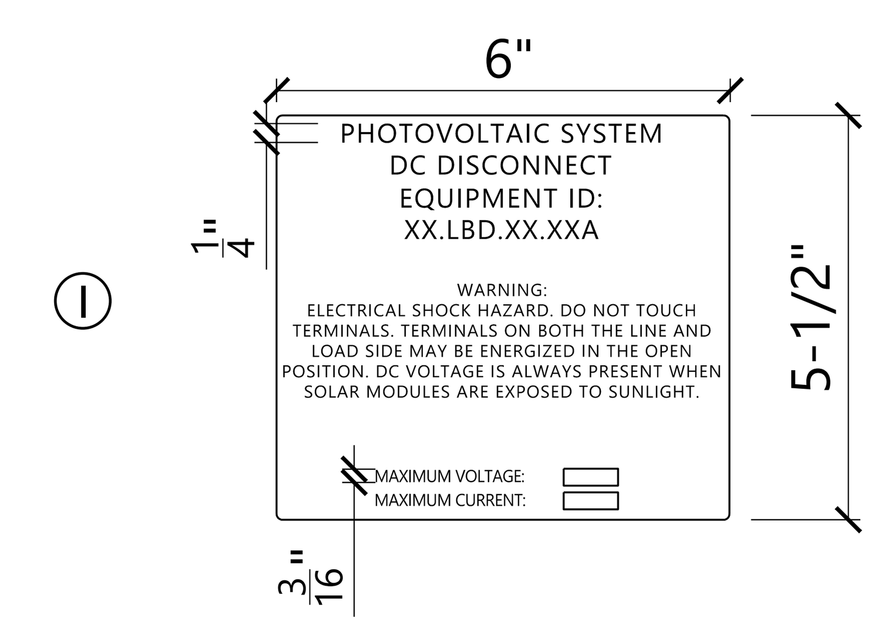
   NEC 480.7(D)
   DC DISCONNECTING MEANS LABELING.

   NEC 706.7
   DC DISCONNECTING MEANS LABELING.

   NEC 706.11
   SYSTEM DIRECTORY PLACARD.







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Kansas Sky Energy Center

Douglas County, Kansas

Labels & Markings

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E0040 REV: C

KANSAS SKY ENERGY CENTER DESIGN SUMMARY

CAPACITY		INVERTER		TRANSFORMER		TRACKER		MODULE	
NAMEPLATE MWdc	195.62	MAKE	SMA	KVA	4400	MAKE	NEXTRACKER	MAKE	CSI
NAMEPLATE MWac @39.6°C	144.32	MODEL	SC4400UP-US	TYPE	STEP UP	MODEL	NX HORIZON	MODEL	CS7N-670TB-AG
MWac @POI	159.00	KVA @35°C	4400	VOLTAGE	34.5 KVAC (DELTA) - 660VAC (WYE)			WATTAGE	670
		DERATED KVA	3520					MODULES PER STRING	29

BLOCK	MV CIRCUIT NUMBER	MODULE PITCH (FT)	MV CIRCUIT ROUTING	INVERTER	TRANSFORMER	MODULE		BLOCK CHARACTERISTICS									
				QUANTITY	QUANTITY	MODEL	WATTAGE (W)	QUANTITY OF STRINGS	QUANTITY OF MODULES	QUANTITY OF 3-STRING TRACKERS	QUANTITY OF 2-STRING TRACKERS	QUANTITY OF 1-STRING TRACKERS	QUANTITY OF LBDS	DC NAMEPLATE CAPACITY (KW-DC)	CAPACITY @ POI (KW-AC)	DC:AC ILR @ 35°C	DC:AC RATIO @ POI
BLOCK 01	CKT 1	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	58	33	7		4799.21	3878.05	1.363	1.238
BLOCK 02	CKT 1	21.1	UG	1	1	CS7N-670TB-AG	670	246	7134	68	19	4		4779.78	3878.05	1.358	1.233
BLOCK 03	CKT 1	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	72	13	5	18	4799.21	3878.05	1.363	1.238
BLOCK 04	CKT 2	21.1	UG	1	1	CS7N-670TB-AG	670	242	7018	37	56	19		4702.06	3878.05	1.336	1.212
BLOCK 05	CKT 2	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	57	38	0		4799.21	3878.05	1.363	1.238
BLOCK 06	CKT 2	21.1	UG	1	1	CS7N-670TB-AG	670	204	5916	50	27	0		3963.72	3878.05	1.126	1.022
BLOCK 07	CKT 2	21.1	UG	1	1	CS7N-670TB-AG	670	246	7134	60	28	10		4779.78	3878.05	1.358	1.233
BLOCK 08	CKT 2	21.1	UG	1	1	CS7N-670TB-AG	670	250	7250	76	6	10		4857.50	3878.05	1.380	1.253
BLOCK 09	CKT 2	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	72	10	11		4799.21	3878.05	1.363	1.238
BLOCK 10	CKT 3	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	71	17	0		4799.21	3878.05	1.363	1.238
BLOCK 11	CKT 3	21.1	UG	1	1	CS7N-670TB-AG	670	246	7134	54	39	6		4779.78	3878.05	1.358	1.233
BLOCK 12	CKT 3	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	54	30	25		4799.21	3878.05	1.363	1.238
BLOCK 13	CKT 3	21.1	UG	1	1	CS7N-670TB-AG	670	246	7134	78	6	0		4779.78	3878.05	1.358	1.233
BLOCK 14	CKT 3	21.1	UG	1	1	CS7N-670TB-AG	670	245	7105	80	0	5	18	4760.35	3878.05	1.352	1.228
BLOCK 15	CKT 3	21.1	UG	1	1	CS7N-670TB-AG	670	262	7598	80	11	0		5090.66	3878.05	1.446	1.313
BLOCK 16	CKT 1	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	79	5	0		4799.21	3878.05	1.363	1.238
BLOCK 17	CKT 1	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	66	20	9		4799.21	3878.05	1.363	1.238
BLOCK 18	CKT 4	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	77	8	0		4799.21	3878.05	1.363	1.238
BLOCK 19	CKT 4	21.1	UG	1	1	CS7N-670TB-AG	670	246	7134	78	6	0		4779.78	3878.05	1.358	1.233
BLOCK 20	CKT 4	21.1	UG	1	1	CS7N-670TB-AG	670	217	6293	67	8	0		4216.31	3878.05	1.198	1.087
BLOCK 21	CKT 4	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	45	29	54		4799.21	3878.05	1.363	1.238
BLOCK 22	CKT 4	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	73	8	12		4799.21	3878.05	1.363	1.238
BLOCK 23	CKT 5	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	77	8	0		4799.21	3878.05	1.363	1.238
BLOCK 24	CKT 5	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	74	11	3		4799.21	3878.05	1.363	1.238
BLOCK 25	CKT 5	21.1	UG	1	1	CS7N-670TB-AG	670	243	7047	72	11	5		4721.49	3878.05	1.341	1.217
BLOCK 26	CKT 5	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	79	5	0		4799.21	3878.05	1.363	1.238
BLOCK 27	CKT 5	21.1	UG	1	1	CS7N-670TB-AG	670	253	7337	61	25	20		4915.79	3878.05	1.397	1.268
BLOCK 28	CKT 7	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	46	40	29		4799.21	3878.05	1.363	1.238
BLOCK 29	CKT 7	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	73	14	0		4799.21	3878.05	1.363	1.238
BLOCK 30	CKT 7	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	63	29	0		4799.21	3878.05	1.363	1.238
BLOCK 31	CKT 7	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	59	35	0		4799.21	3878.05	1.363	1.238
BLOCK 32	CKT 7	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	49	39	22		4799.21	3878.05	1.363	1.238
BLOCK 33	CKT 7	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	53	31	26		4799.21	3878.05	1.363	1.238
BLOCK 34	CKT 6	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	68	11	21		4799.21	3878.05	1.363	1.238
BLOCK 35	CKT 6	21.1	UG	1	1	CS7N-670TB-AG	670	250	7250	80	5	0		4857.50	3878.05	1.380	1.253
BLOCK 36	CKT 6	21.1	UG	1	1	CS7N-670TB-AG	670	248	7192	58	37	0		4818.64	3878.05	1.369	1.243
BLOCK 37	CKT 6	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	81	2	0		4799.21	3878.05	1.363	1.238
BLOCK 38	CKT 6	21.1	UG	1	1	CS7N-670TB-AG	670	250	7250	66	21	10		4857.50	3878.05	1.380	1.253
BLOCK 39	CKT 7	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	57	16	44		4799.21	3878.05	1.363	1.238
BLOCK 40	CKT 8	21.1	UG	1	1	CS7N-670TB-AG	670	246	7134	60	23	20		4779.78	3878.05	1.358	1.233
BLOCK 41	CKT 9	21.1	UG	1	1	CS7N-670TB-AG	670	247	7163	49	32	36		4799.21	3878.05	1.363	1.238
			TOTALS	41	41		TOTALS	10,068	291,972	2,677	812	413	36	195,621	159,000	1.355	1.230

NEC METHOD: $V_{oc.max.1000^W/_{m^2}} = 46.7\,V \cdot \left(1 + \left(25°C - (-21.2°C)\right)\left(\frac{0.26\%}{°C}\right)\right) = 52.31\,V$

SAM METHOD:

Module	Watt (W)	Array Max Vmp (V)	% of Time Greater Than 1325V	Voc (V)	Array Max Voc (V)	% of Time Greater than 1500V
Canadian Solar TOPBiHiKu7	670	1282.85	0	46.7	1468.92	0

Westwood

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

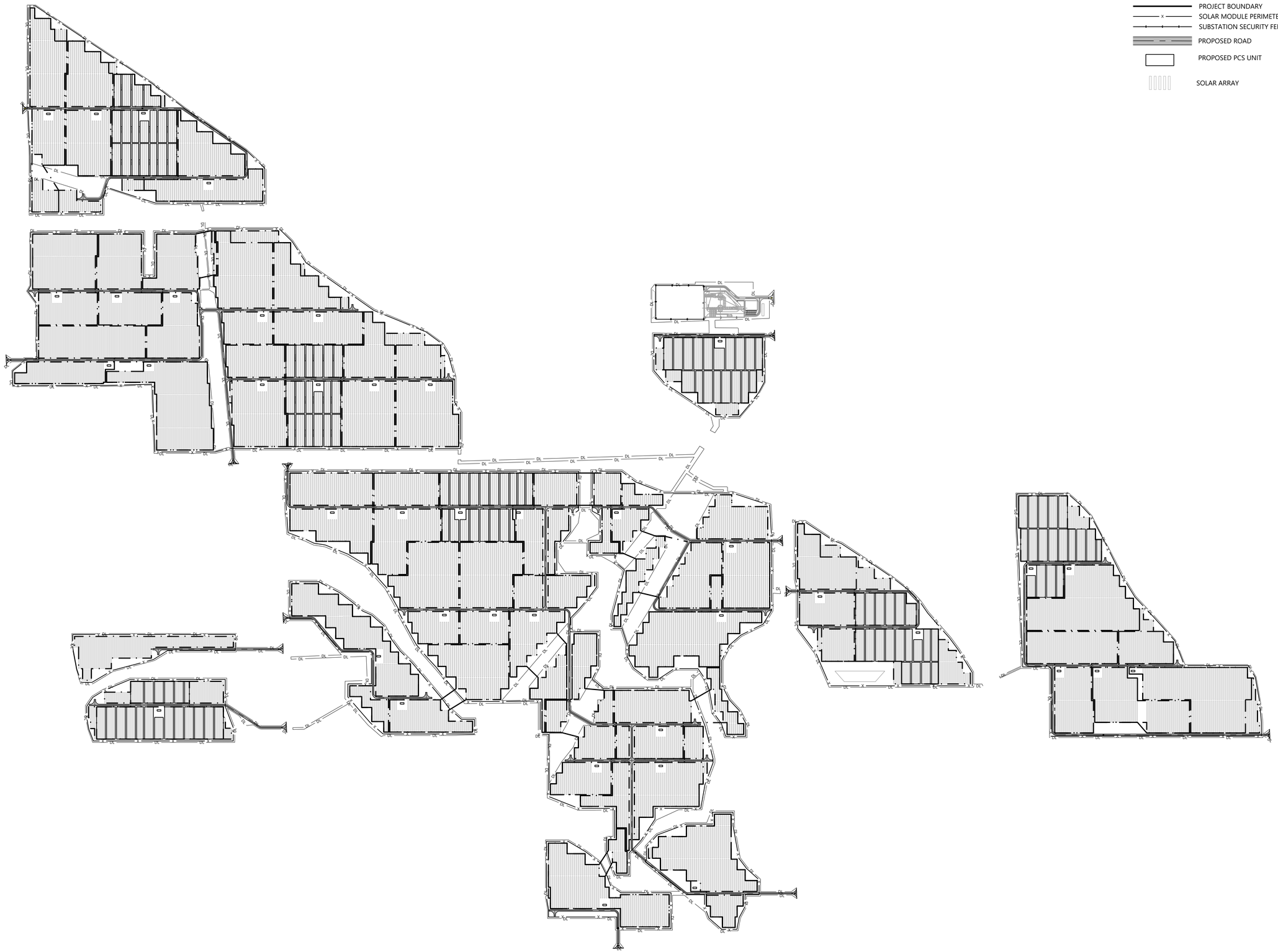
Kansas Sky Energy Center
Douglas County, Kansas

Project Design Summary

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E0050 REV: C



LEGEND

- PROJECT BOUNDARY
- SOLAR MODULE PERIMETER FENCE
- SUBSTATION SECURITY FENCE
- PROPOSED ROAD
- PROPOSED PCS UNIT
- SOLAR ARRAY

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D	08/09/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

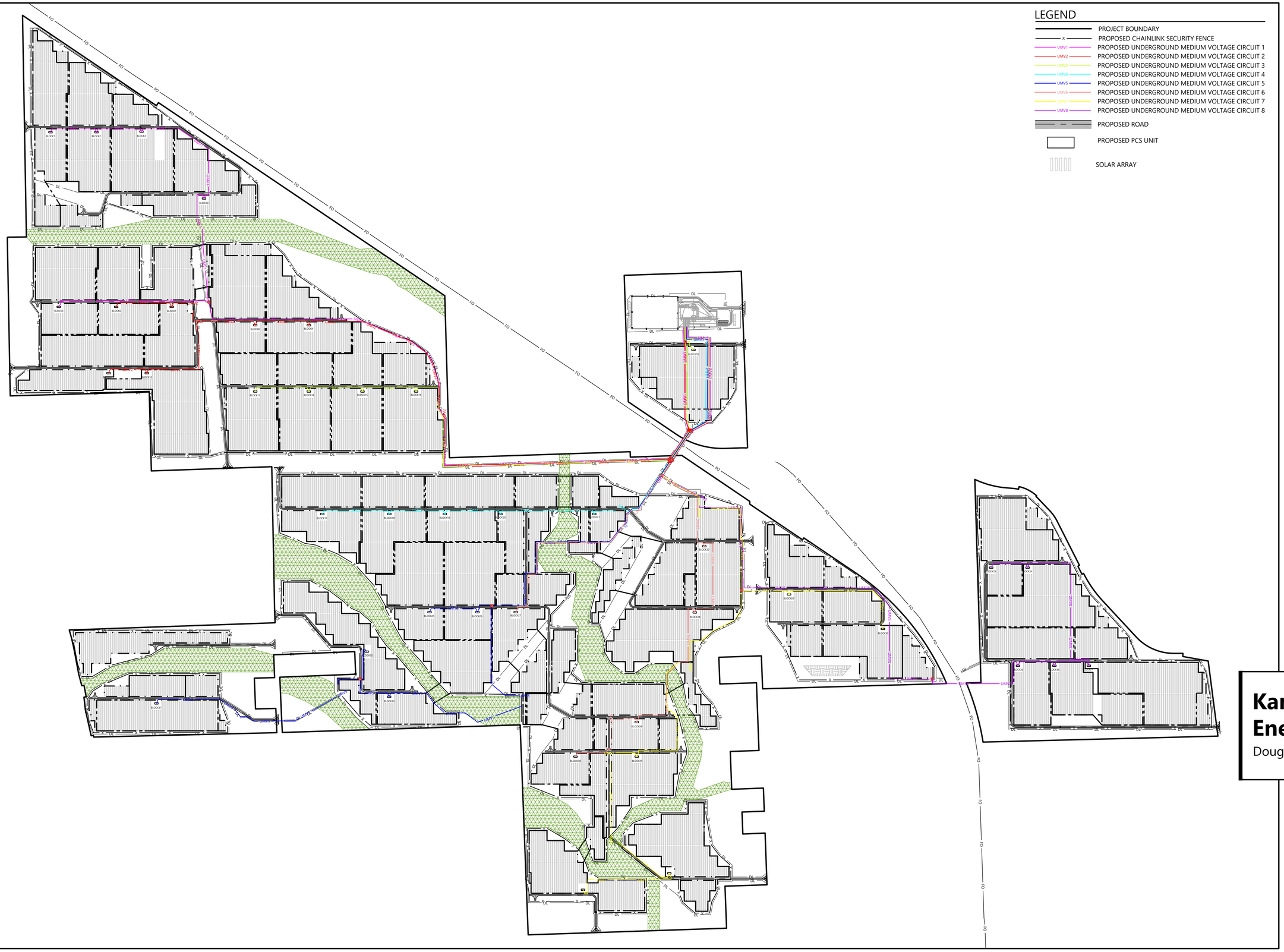
Douglas County, Kansas

Overall Site Plan

NOT FOR CONSTRUCTION

DATE: 08/09/2023

SHEET: E0300 REV: D



LEGEND

- PROJECT BOUNDARY
- PROPOSED CHAINLINK SECURITY FENCE
- UMV1 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 1
- UMV2 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 2
- UMV3 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 3
- UMV4 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 4
- UMV5 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 5
- UMV6 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 6
- UMV7 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 7
- UMV8 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 8
- PROPOSED ROAD
- PROPOSED PCS UNIT
- SOLAR ARRAY

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
D	08/09/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

0' 500' 1000' 1500'

Kansas Sky Energy Center

Douglas County, Kansas

Overall MVAC Site Plan

NOT FOR CONSTRUCTION

DATE: 08/09/2023

SHEET: E1000 REV: D

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LEGEND

- PROJECT BOUNDARY
- PROPOSED CHAINLINK SECURITY FENCE
- UMV1 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 1
- UMV2 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 2
- UMV3 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 3
- UMV4 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 4
- UMV5 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 5
- UMV6 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 6
- UMV7 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 7
- UMV8 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 8
- PROPOSED ROAD
- PROPOSED PCS UNIT
- SOLAR ARRAY

KEY MAP

Westwood

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
D	08/09/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

0' 300' 600' 900'

Kansas Sky Energy Center

Douglas County, Kansas

MVAC Site Plan

NOT FOR CONSTRUCTION

DATE: 08/09/2023

SHEET: E1100 REV: D

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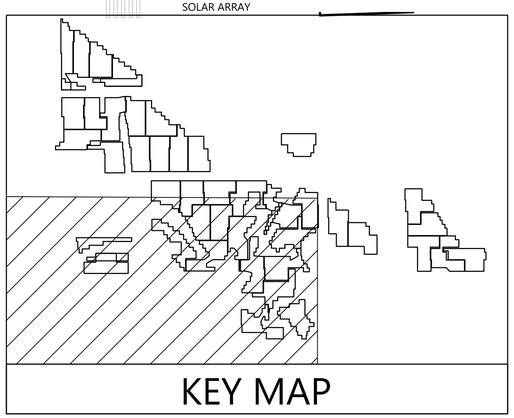
LEGEND

- PROJECT BOUNDARY
- PROPOSED CHAINLINK SECURITY FENCE
- UMV1 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 1
- UMV2 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 2
- UMV3 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 3
- UMV4 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 4
- UMV5 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 5
- UMV6 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 6
- UMV7 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 7
- UMV8 — PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 8
- PROPOSED ROAD
- PROPOSED PCS UNIT
- SOLAR ARRAY



KEY MAP

Westwood

Phone (608) 821-6600 8401 Greenway Blvd., Suite 400 Middleton, WI 53562 westwoodps.com

Westwood Professional Services, Inc.

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FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
D	08/09/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

0' 300' 600' 900'

Kansas Sky Energy Center

Douglas County, Kansas

MVAC Site Plan

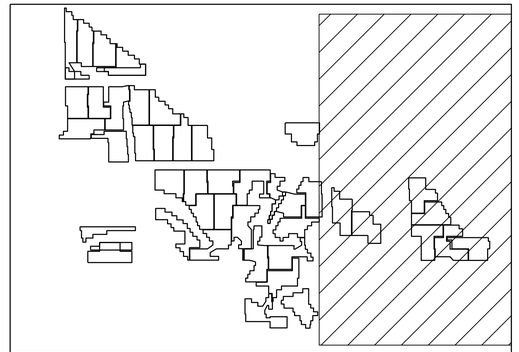
NOT FOR CONSTRUCTION

DATE: 08/09/2023

SHEET: E1101 REV: D

LEGEND

- PROJECT BOUNDARY
- PROPOSED CHAINLINK SECURITY FENCE
- UMV1 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 1
- UMV2 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 2
- UMV3 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 3
- UMV4 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 4
- UMV5 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 5
- UMV6 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 6
- UMV7 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 7
- UMV8 PROPOSED UNDERGROUND MEDIUM VOLTAGE CIRCUIT 8
- PROPOSED ROAD
- PROPOSED PCS UNIT
- SOLAR ARRAY



KEY MAP

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PREPARED FOR:

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A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
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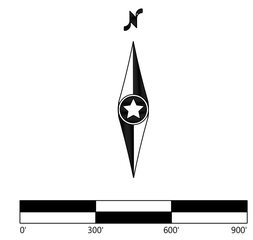
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
D	08/09/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME



Kansas Sky Energy Center

Douglas County, Kansas

MVAC Site Plan

NOT FOR CONSTRUCTION

DATE: 08/09/2023

SHEET: E1102 REV: D

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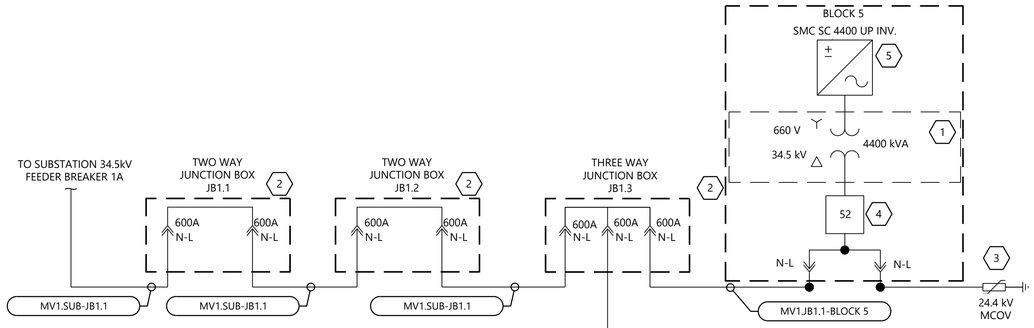
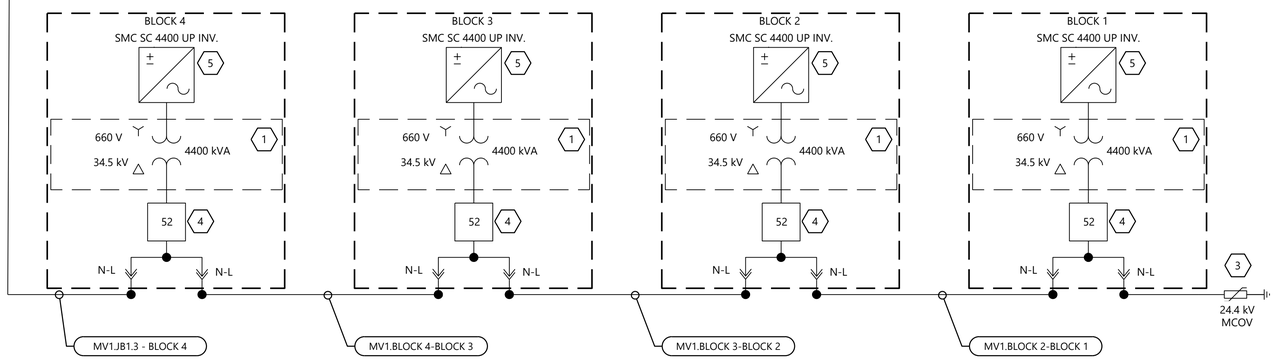




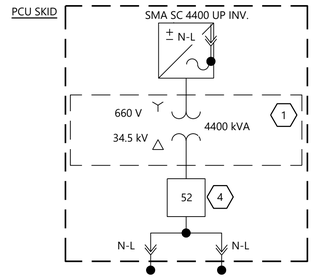
GENERAL NOTES

1. STEP-UP TRANSFORMERS ARE OWNER FURNISHED AND INSTALLED BY MANUFACTURER WITHIN PCU STATION. PCU STATION DESIGNED AND ASSEMBLED BY OTHERS AND SHOWN FOR REFERENCE ONLY.
2. TRANSFORMER PRIMARY PROVIDED WITH 600A NON-LOAD (N-L) BREAK TERMINATIONS. CONTRACTOR TO PROVIDE LOAD-BREAK (L) REDUCING TAP BUSHINGS FOR LOAD-BREAK ELBOW CONNECTIONS WHERE REQUIRED.
3. PROVIDE EXTERNAL SURGE ARRESTERS AT TRANSFORMERS, ELBOW CONNECTED ON THE HIGH VOLTAGE SIDE OF TRANSFORMER WHERE SHOWN.
4. 48" BEND RADIUS MINIMUM FOR ALL MV CONDUIT BENDS.
5. INSTALL ALL EQUIPMENT AND WIRING IN ACCORDANCE WITH THE NEC, NESC, AND ALL APPLICABLE REQUIREMENTS OF THE LOCAL UTILITY COMPANY AND LOCAL AUTHORITY HAVING JURISDICTION.
6. PLACEMENT OF JUNCTION BOXES AND SPLICES ARE APPROXIMATE AND WILL NEED TO BE MICROSITED BY CONSTRUCTION TEAM. MARKED LENGTHS SHOULD NOT DEVIATE MORE THAN 2,000 FEET FROM THE LOCATION MARKED. QUANTITIES SHOULD NOT DEVIATE FROM PLANSET WITHOUT APPROVAL FROM OWNER.
7. SPLICES TO BE INSTALLED 100' BACK FROM CROSSING EASEMENTS WHERE POSSIBLE AND KEPT WITHIN PROJECT BOUNDARY.

KEY NOTES

1. 4,400 KVA @ 25°C /3,960 KVA @ 50°C, 34500D/660Y V THREE-WINDING SKID MOUNTED STEP-UP TRANSFORMER. SUPPLIED BY MANUFACTURER AS PART OF 4,400 KVA @ 25°C/ 3,960 KVA @ 50°C SKID STATION. REFER TO MANUFACTURER-SUPPLIED DRAWINGS.
2. 600A JUNCTION BOX.
3. SURGE ARRESTER. COORDINATION WITH SUBSTATION SURGE ARRESTERS IS REQUIRED AND WILL BE BY OTHERS.
4. 38kV, 600A SWITCHGEAR.

LEGEND



MVAC WIRING SCHEDULE

CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
1	MV1.SUB-JB1/1	SUB	JB1/1	34.5	368.17	1,159	1000	AL	1	0.0632%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV1.JB1/1-JB1/2	JB1/1	JB1/2	34.5	368.17	390	1000	AL	1	0.0219%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV1.JB1/2-JB1/3	JB1/2	JB1/3	34.5	368.17	6,457	1000	AL	1	0.3310%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV1.JB1/3-BLOCK5	JB1/3	BLOCK5	34.5	368.17	1,733	1000	AL	1	0.0903%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV1.JB1/3-BLOCK4	JB1/3	BLOCK4	34.5	294.53	1,314	750	AL	1	0.0704%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV1.BLOCK4-BLOCK3	BLOCK4	BLOCK3	34.5	220.90	1,422	500	AL	1	0.0819%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV1.BLOCK3-BLOCK2	BLOCK3	BLOCK2	34.5	147.27	550	4/0	AL	1	0.0488%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV1.BLOCK2-BLOCK1	BLOCK2	BLOCK1	34.5	73.63	569	4/0	AL	1	0.0252%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

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PREPARED FOR:

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PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

Douglas County, Kansas

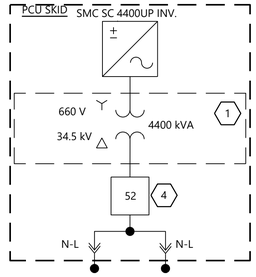
MVAC Single Line Diagram - Circuit 1

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E1300 REV: C

LEGEND



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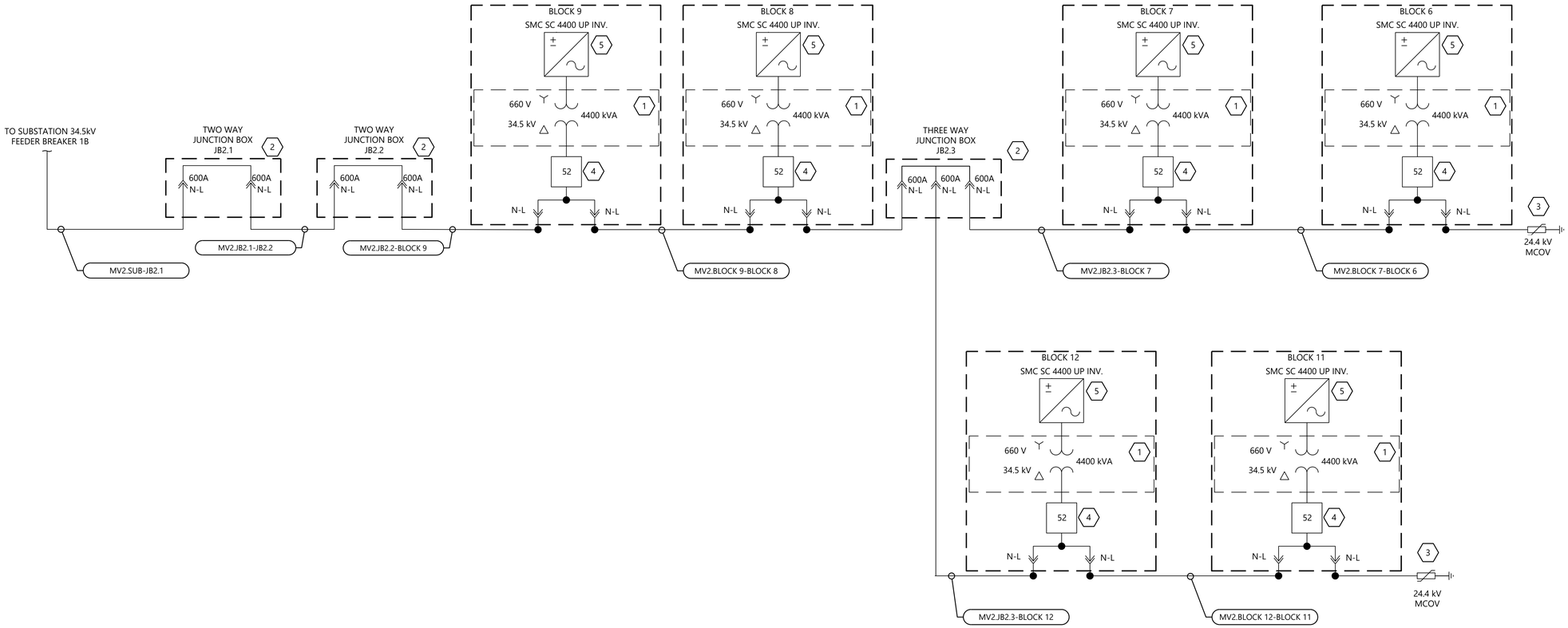

MVAC WIRING SCHEDULE

CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
2	MV2.SUB-JB2/1	SUB	JB2/1	34.5	441.80	1,160	1250	AL	1	0.0637%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.JB2/1-JB2/2	JB2/1	JB2/2	34.5	441.80	390	1250	AL	1	0.0221%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.JB2/2-BLOCK.9	JB2/2	BLOCK.9	34.5	441.80	5,230	1250	AL	1	0.2706%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.BLOCK.9-BLOCK.8	BLOCK.9	BLOCK.8	34.5	368.17	648	1000	AL	1	0.0351%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.BLOCK.8-JB2/3	BLOCK.8	JB2/3	34.5	294.53	630	750	AL	1	0.0348%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.JB2/3-BLOCK.7	JB2/3	BLOCK.7	34.5	147.27	527	4/0	AL	1	0.0469%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.BLOCK.7-BLOCK.6	BLOCK.7	BLOCK.6	34.5	73.63	674	4/0	AL	1	0.0295%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.JB2/3-BLOCK12	JB2/3	BLOCK12	34.5	147.27	1,171	4/0	AL	1	0.1002%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV2.BLOCK12-BLOCK11	BLOCK12	BLOCK11	34.5	73.63	485	4/0	AL	1	0.0217%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

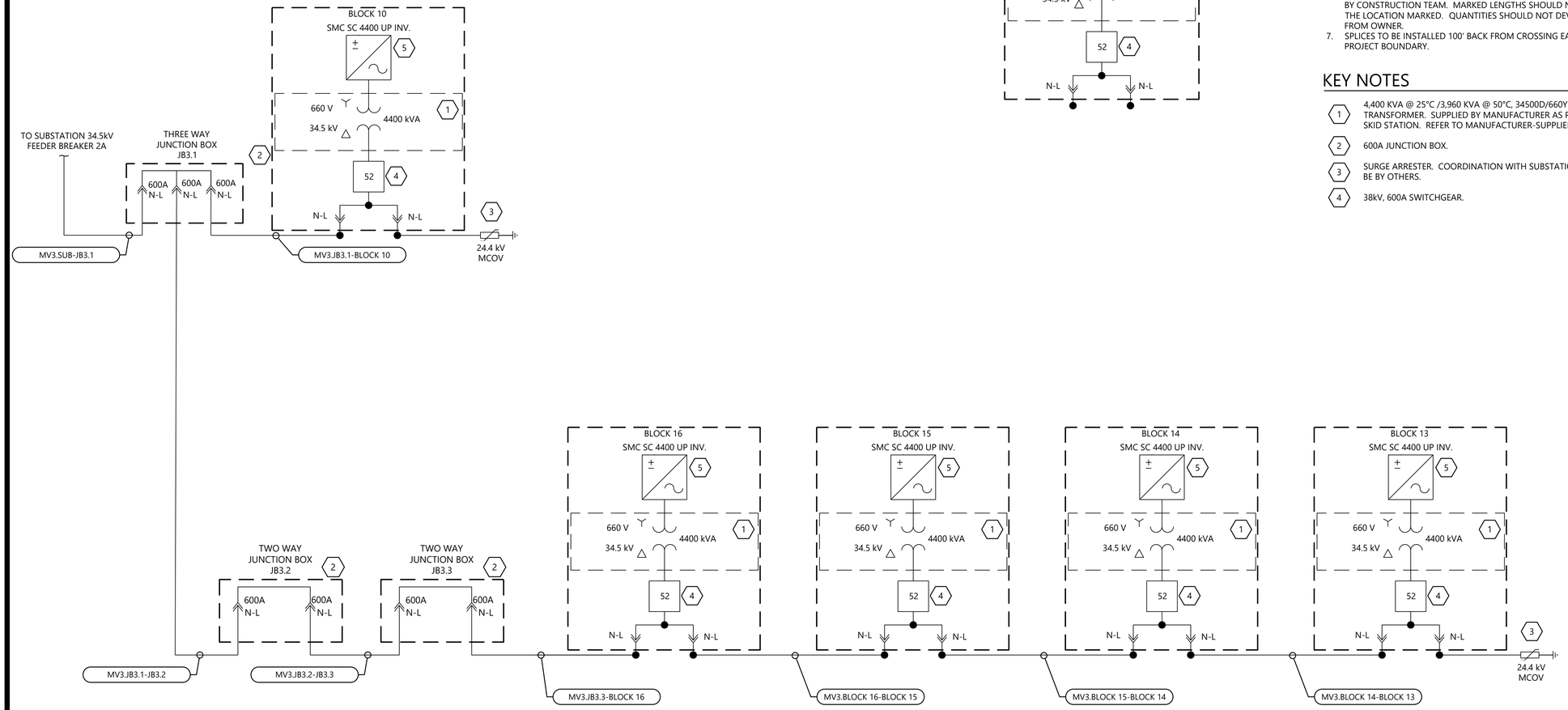
Douglas County, Kansas

MVAC Single Line Diagram - Circuit 2

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E1301 REV: C



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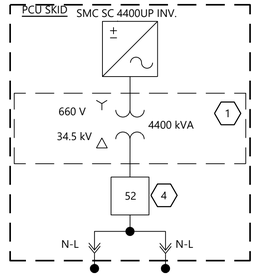

GENERAL NOTES

1. STEP-UP TRANSFORMERS ARE OWNER FURNISHED AND INSTALLED BY MANUFACTURER WITHIN PCU STATION. PCU STATION DESIGNED AND ASSEMBLED BY OTHERS AND SHOWN FOR REFERENCE ONLY.
2. TRANSFORMER PRIMARY PROVIDED WITH 600A NON-LOAD (N-L) BREAK TERMINATIONS. CONTRACTOR TO PROVIDE LOAD-BREAK (L) REDUCING TAP BUSHINGS FOR LOAD-BREAK ELBOW CONNECTIONS WHERE REQUIRED.
3. PROVIDE EXTERNAL SURGE ARRESTERS AT TRANSFORMERS, ELBOW CONNECTED ON THE HIGH VOLTAGE SIDE OF TRANSFORMER WHERE SHOWN.
4. 48" BEND RADIUS MINIMUM FOR ALL MV CONDUIT BENDS.
5. INSTALL ALL EQUIPMENT AND WIRING IN ACCORDANCE WITH THE NEC, NESC, AND ALL APPLICABLE REQUIREMENTS OF THE LOCAL UTILITY COMPANY AND LOCAL AUTHORITY HAVING JURISDICTION.
6. PLACEMENT OF JUNCTION BOXES AND SPLICES ARE APPROXIMATE AND WILL NEED TO BE MICROSITED BY CONSTRUCTION TEAM. MARKED LENGTHS SHOULD NOT DEVIATE MORE THAN 2,000 FEET FROM THE LOCATION MARKED. QUANTITIES SHOULD NOT DEVIATE FROM PLANSET WITHOUT APPROVAL FROM OWNER.
7. SPLICES TO BE INSTALLED 100' BACK FROM CROSSING EASEMENTS WHERE POSSIBLE AND KEPT WITHIN PROJECT BOUNDARY.

KEY NOTES

1. 4,400 KVA @ 25°C /3,960 KVA @ 50°C, 34500D/660Y V THREE-WINDING SKID MOUNTED STEP-UP TRANSFORMER. SUPPLIED BY MANUFACTURER AS PART OF 4,400 KVA @ 25°C/ 3,960 KVA @ 50°C SKID STATION. REFER TO MANUFACTURER-SUPPLIED DRAWINGS.
2. 600A JUNCTION BOX.
3. SURGE ARRESTER. COORDINATION WITH SUBSTATION SURGE ARRESTERS IS REQUIRED AND WILL BE BY OTHERS.
4. 38kV, 600A SWITCHGEAR.

MVAC WIRING SCHEDULE

CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
3	MV3.SUB-JB3/1	SUB	JB3/1	34.5	368.17	167	1000	AL	1	0.0127%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV3.JB3/1-BLOCK10	JB3/1	BLOCK10	34.5	73.63	154	4/0	AL	1	0.0080%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV3.JB3/1-JB3/2	JB3/1	JB3/2	34.5	294.53	995	750	AL	1	0.0539%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV3.JB3/2-JB3/3	JB3/2	JB3/3	34.5	294.53	380	750	AL	1	0.0218%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV3.JB3/3-BLOCK16	JB3/3	BLOCK16	34.5	294.53	3,703	750	AL	1	0.1947%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV3.BLOCK16-BLOCK15	BLOCK16	BLOCK15	34.5	220.90	654	500	AL	1	0.0389%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV3.BLOCK15-BLOCK14	BLOCK15	BLOCK14	34.5	147.27	654	4/0	AL	1	0.0574%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV3.BLOCK14-BLOCK13	BLOCK14	BLOCK13	34.5	73.63	655	4/0	AL	1	0.0288%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

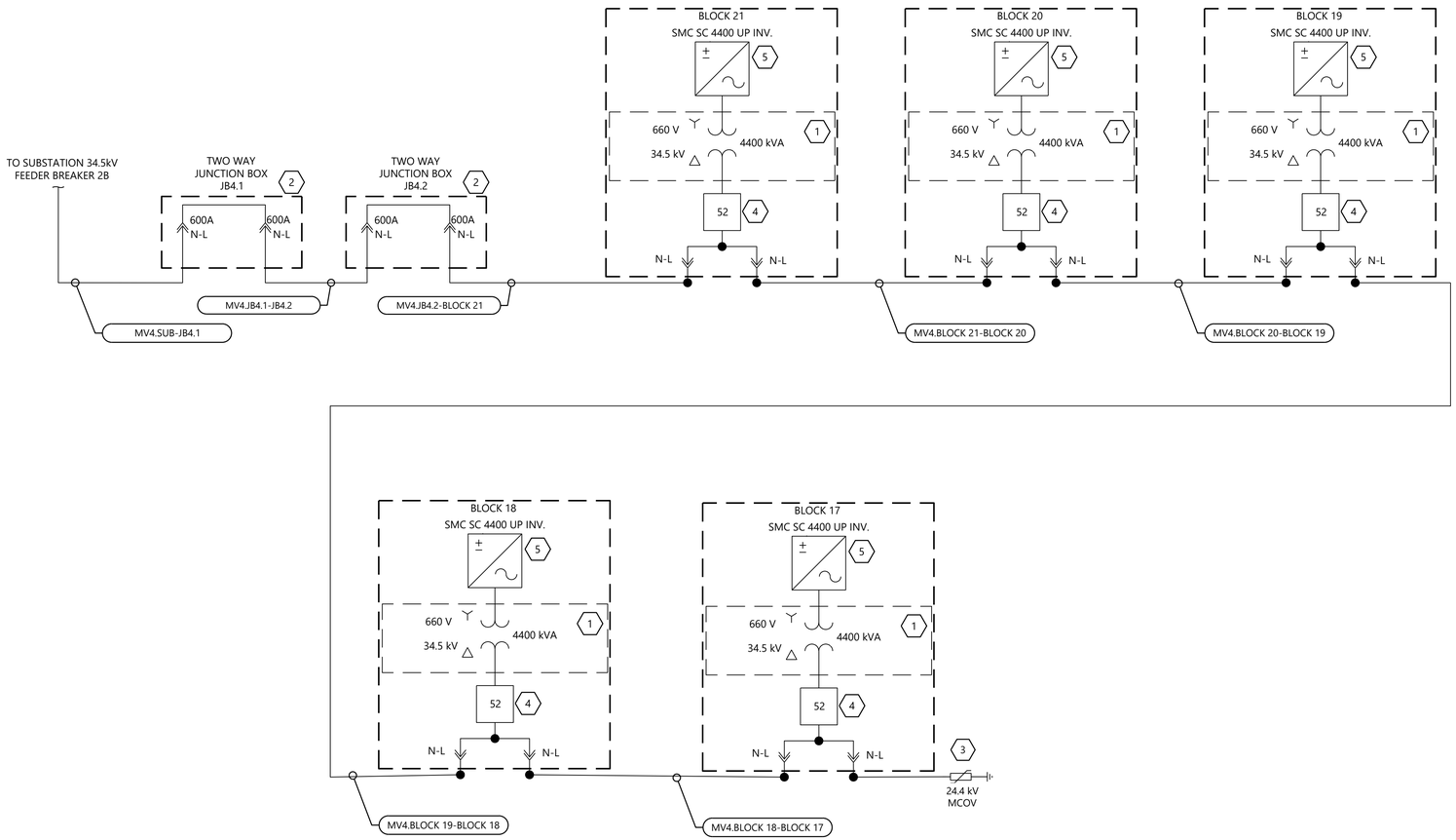
Kansas Sky Energy Center
Douglas County, Kansas

MVAC Single Line Diagram - Circuit 3

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E1302 REV: C



GENERAL NOTES

1. STEP-UP TRANSFORMERS ARE OWNER FURNISHED AND INSTALLED BY MANUFACTURER WITHIN PCU STATION. PCU STATION DESIGNED AND ASSEMBLED BY OTHERS AND SHOWN FOR REFERENCE ONLY.
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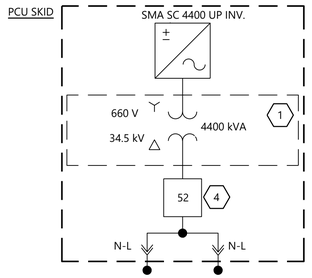
3. PROVIDE EXTERNAL SURGE ARRESTERS AT TRANSFORMERS, ELBOW CONNECTED ON THE HIGH VOLTAGE SIDE OF TRANSFORMER WHERE SHOWN.
4. 48" BEND RADIUS MINIMUM FOR ALL MV CONDUIT BENDS.
5. INSTALL ALL EQUIPMENT AND WIRING IN ACCORDANCE WITH THE NEC, NESC, AND ALL APPLICABLE REQUIREMENTS OF THE LOCAL UTILITY COMPANY AND LOCAL AUTHORITY HAVING JURISDICTION.
6. PLACEMENT OF JUNCTION BOXES AND SPLICES ARE APPROXIMATE AND WILL NEED TO BE MICROSITED BY CONSTRUCTION TEAM. MARKED LENGTHS SHOULD NOT DEVIATE MORE THAN 2,000 FEET FROM THE LOCATION MARKED. QUANTITIES SHOULD NOT DEVIATE FROM PLANSET WITHOUT APPROVAL FROM OWNER.
7. SPLICES TO BE INSTALLED 100' BACK FROM CROSSING EASEMENTS WHERE POSSIBLE AND KEPT WITHIN PROJECT BOUNDARY.

KEY NOTES

1. 4,400 KVA @ 25°C /3,960 KVA @ 50°C, 34500D/660Y V THREE-WINDING SKID MOUNTED STEP-UP TRANSFORMER. SUPPLIED BY MANUFACTURER AS PART OF 4,400 KVA @ 25°C/ 3,960 KVA @ 50°C SKID STATION. REFER TO MANUFACTURER-SUPPLIED DRAWINGS.
2. 600A JUNCTION BOX.
3. SURGE ARRESTER. COORDINATION WITH SUBSTATION SURGE ARRESTERS IS REQUIRED AND WILL BE BY OTHERS.
4. 38kV, 600A SWITCHGEAR.

LEGEND



	MVAC WIRING SCHEDULE												
CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
4	MV4.SUB-JB4/1	SUB	JB4/1	34.5	368.17	1,468	1000	AL	1	0.0790%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV4.JB4/1-JB4/2	JB4/1	JB4/2	34.5	368.17	420	1000	AL	1	0.0234%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV4.JB4/2-BLOCK21	JB4/2	BLOCK21	34.5	368.17	1,157	1000	AL	1	0.0610%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV4.BLOCK21-BLOCK20	BLOCK21	BLOCK20	34.5	294.53	1,098	750	AL	1	0.0592%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV4.BLOCK20-BLOCK19	BLOCK20	BLOCK19	34.5	220.90	671	500	AL	1	0.0398%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV4.BLOCK19-BLOCK18	BLOCK19	BLOCK18	34.5	147.27	671	4/0	AL	1	0.0588%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV4.BLOCK18-BLOCK17	BLOCK18	BLOCK17	34.5	73.63	799	4/0	AL	1	0.0347%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

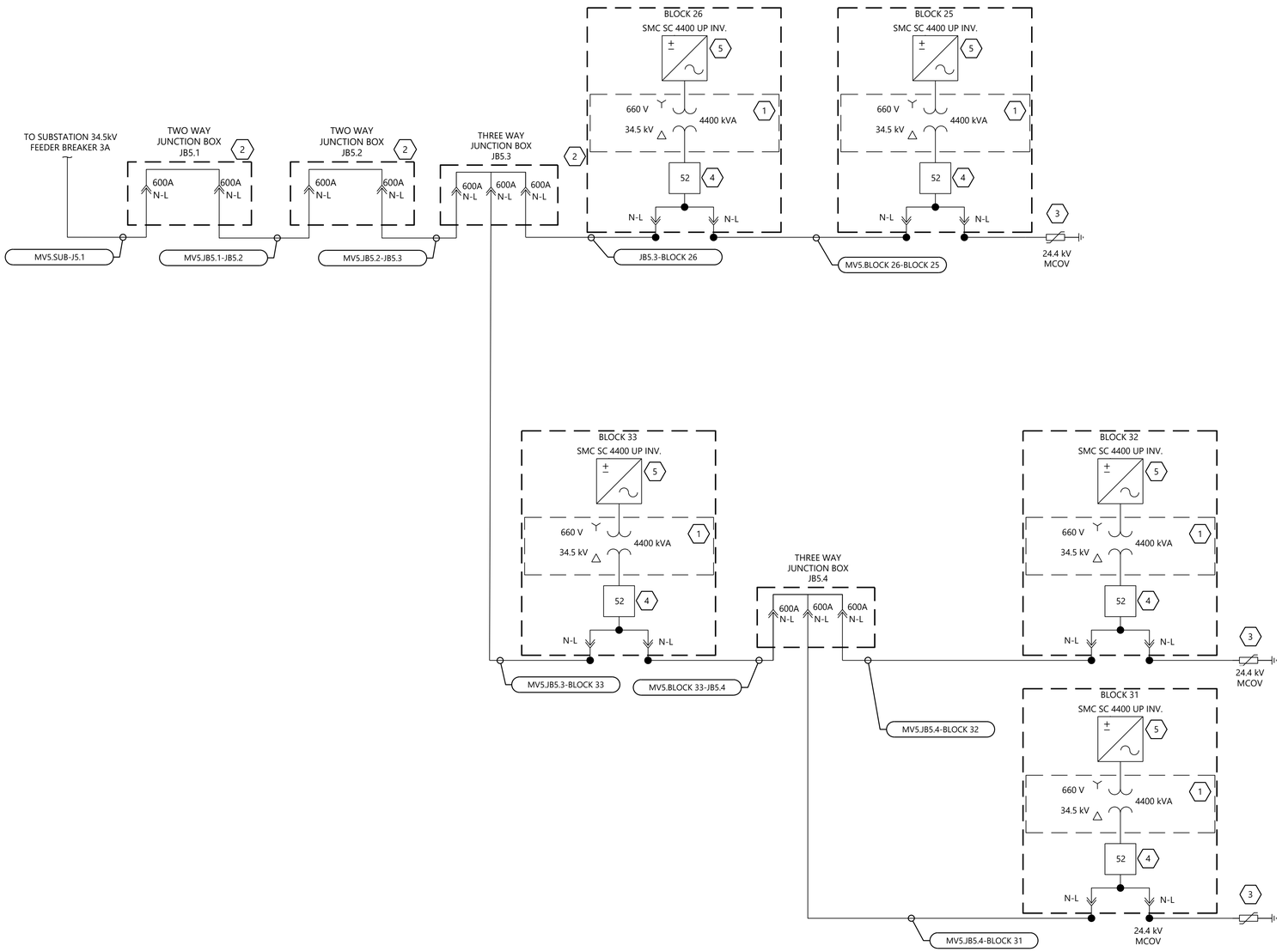
Douglas County, Kansas

MVAC Single Line Diagram - Circuit 4

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E1303 REV: C



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1. STEP-UP TRANSFORMERS ARE OWNER FURNISHED AND INSTALLED BY MANUFACTURER WITHIN PCU STATION. PCU STATION DESIGNED AND ASSEMBLED BY OTHERS AND SHOWN FOR REFERENCE ONLY.
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3. PROVIDE EXTERNAL SURGE ARRESTERS AT TRANSFORMERS, ELBOW CONNECTED ON THE HIGH VOLTAGE SIDE OF TRANSFORMER WHERE SHOWN.
4. 48" BEND RADIUS MINIMUM FOR ALL MV CONDUIT BENDS.
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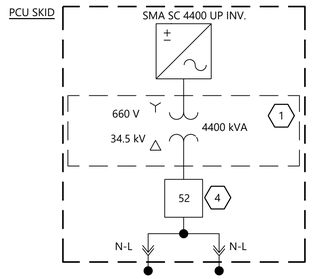
7. SPLICES TO BE INSTALLED 100' BACK FROM CROSSING EASEMENTS WHERE POSSIBLE AND KEPT WITHIN PROJECT BOUNDARY.

KEY NOTES

1. 4,400 KVA @ 25°C /3,960 KVA @ 50°C, 34500D/660Y V THREE-WINDING SKID MOUNTED STEP-UP TRANSFORMER. SUPPLIED BY MANUFACTURER AS PART OF 4,400 KVA @ 25°C/ 3,960 KVA @ 50°C SKID STATION. REFER TO MANUFACTURER-SUPPLIED DRAWINGS.
2. 600A JUNCTION BOX.
3. SURGE ARRESTER. COORDINATION WITH SUBSTATION SURGE ARRESTERS IS REQUIRED AND WILL BE BY OTHERS.
4. 38kV, 600A SWITCHGEAR.

LEGEND



MVAC WIRING SCHEDULE

CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
5	MV5.SUB-JB5/1	SUB	JB5/1	34.5	368.17	1,496	1000	AL	1	0.0804%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.JB5/1-JB5/2	JB5/1	JB5/2	34.5	368.17	410	1000	AL	1	0.0229%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.JB5/2-JB5/3	JB5/2	JB5/3	34.5	368.17	3,185	1000	AL	1	0.1643%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.JB5/3-BLOCK26	JB5/3	BLOCK26	34.5	368.17	215	1000	AL	1	0.0130%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.BLOCK26-BLOCK25	BLOCK26	BLOCK25	34.5	294.53	590	750	AL	1	0.0328%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.JB5/3-BLOCK33	JB5/3	BLOCK33	34.5	220.90	3,035	500	AL	1	0.1722%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.BLOCK33-JB5/4	BLOCK33	JB5/4	34.5	147.27	505	4/0	AL	1	0.0450%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.JB5/4-BLOCK32	JB5/4	BLOCK32	34.5	73.63	416	4/0	AL	1	0.0189%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV5.JB5/4-BLOCK31	JB5/4	BLOCK31	34.5	73.63	2,644	4/0	AL	1	0.1110%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

Westwood

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PREPARED FOR:

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PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

Douglas County, Kansas

MVAC Single Line Diagram - Circuit 5

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E1304 REV: C

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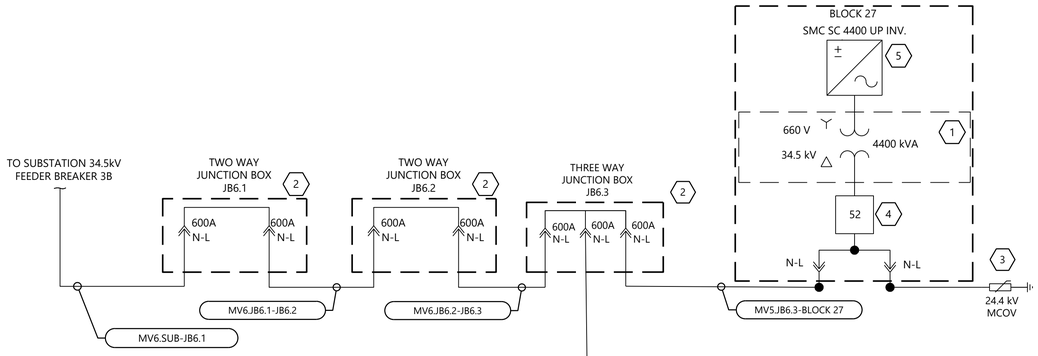

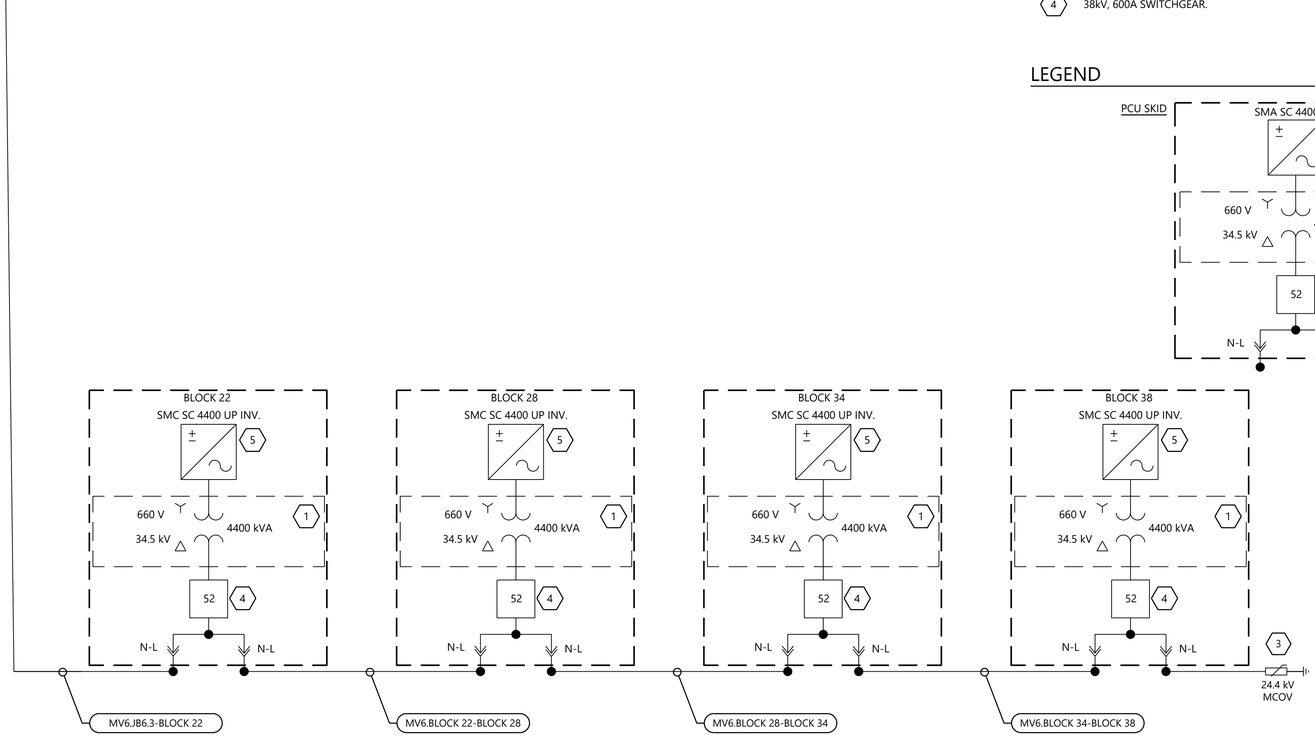

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3. PROVIDE EXTERNAL SURGE ARRESTERS AT TRANSFORMERS, ELBOW CONNECTED ON THE HIGH VOLTAGE SIDE OF TRANSFORMER WHERE SHOWN.
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KEY NOTES

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2. 600A JUNCTION BOX.
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4. 38kV, 600A SWITCHGEAR.

LEGEND

MVAC WIRING SCHEDULE

CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
6	MV6.SUB-JB6/1	SUB	JB6/1	34.5	368.17	1,502	1000	AL	1	0.0807%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV6.JB6/1-JB6/2	JB6/1	JB6/2	34.5	368.17	400	1000	AL	1	0.0224%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV6.JB6/2-JB6/3	JB6/2	JB6/3	34.5	368.17	195	1000	AL	1	0.0120%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV6.JB6/3-BLOCK27	JB6/3	BLOCK27	34.5	73.63	2,789	4/0	AL	1	0.1170%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV6.JB6/3-BLOCK22	JB6/3	BLOCK22	34.5	294.53	1,083	750	AL	1	0.0584%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV6.BLOCK22-BLOCK28	BLOCK22	BLOCK28	34.5	220.90	1,087	500	AL	1	0.0631%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV6.BLOCK28-BLOCK34	BLOCK28	BLOCK34	34.5	147.27	1,848	4/0	AL	1	0.1562%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV6.BLOCK34-BLOCK38	BLOCK34	BLOCK38	34.5	73.63	1,122	4/0	AL	1	0.0481%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

Westwood

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

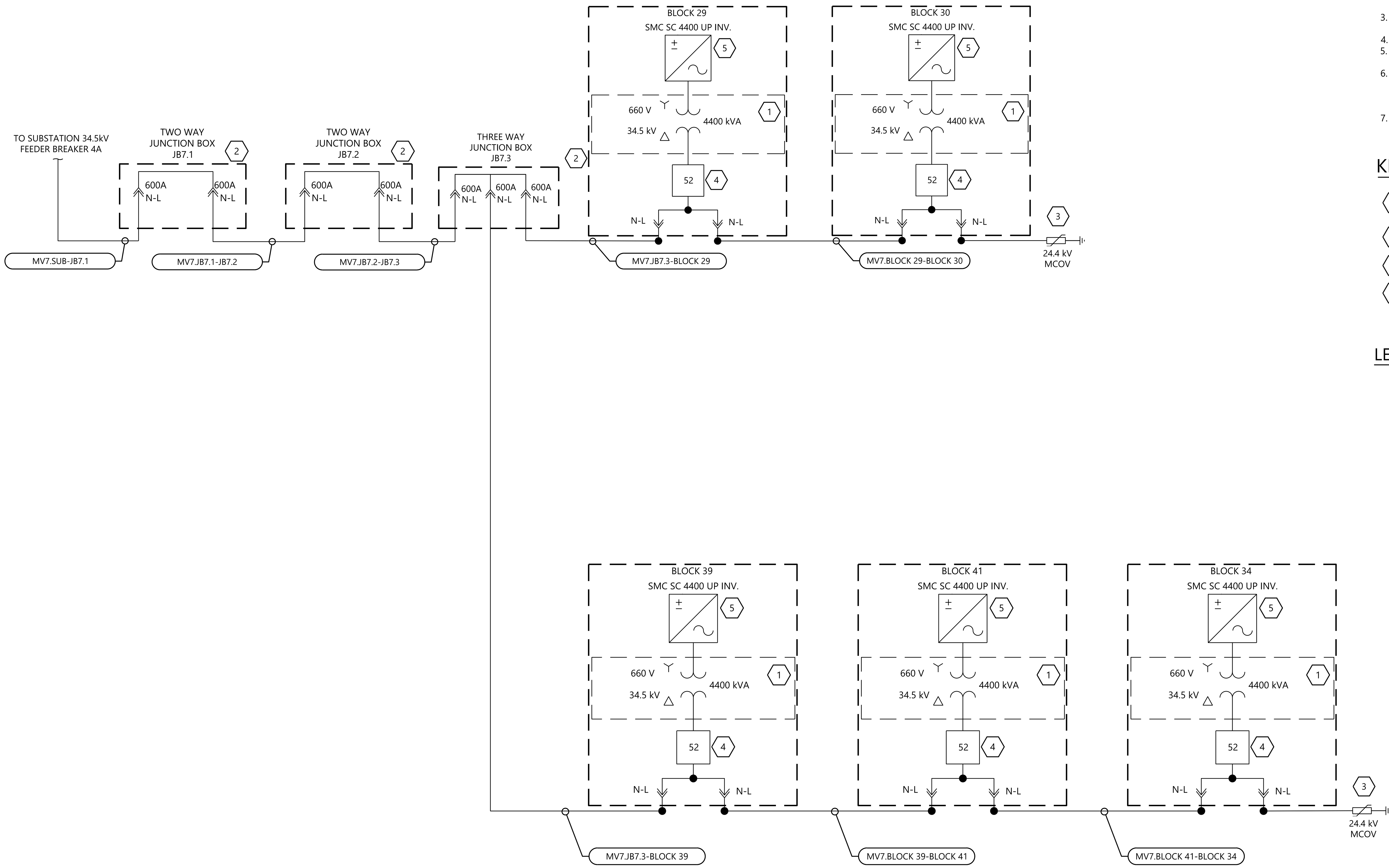
Douglas County, Kansas

MVAC Single Line Diagram - Circuit 6

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E1305 REV: C



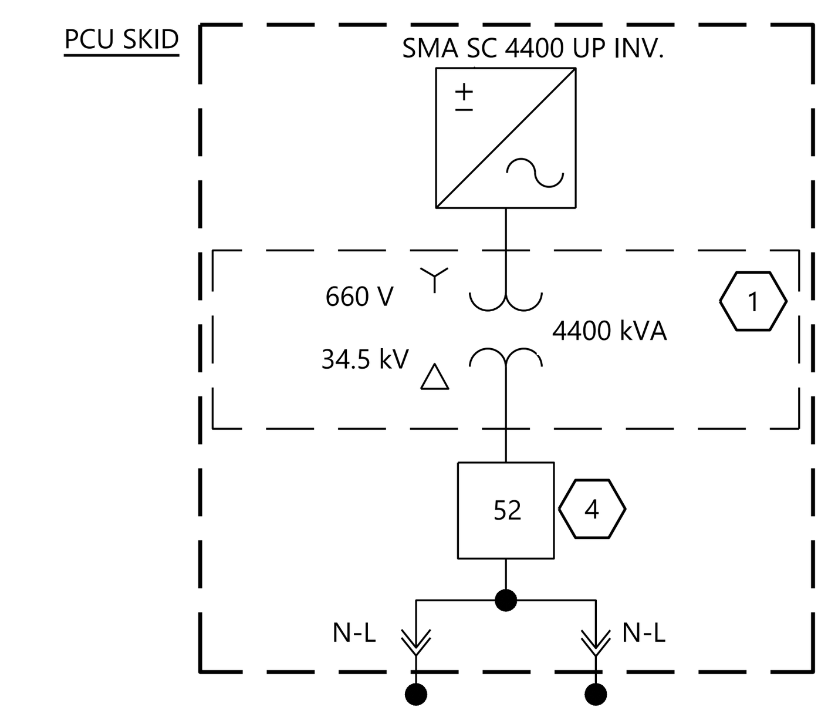
GENERAL NOTES

1. STEP-UP TRANSFORMERS ARE OWNER FURNISHED AND INSTALLED BY MANUFACTURER WITHIN PCU STATION. PCU STATION DESIGNED AND ASSEMBLED BY OTHERS AND SHOWN FOR REFERENCE ONLY.
2. TRANSFORMER PRIMARY PROVIDED WITH 600A NON-LOAD (N-L) BREAK TERMINATIONS. CONTRACTOR TO PROVIDE LOAD-BREAK (L) REDUCING TAP BUSHINGS FOR LOAD-BREAK ELBOW CONNECTIONS WHERE REQUIRED.
3. PROVIDE EXTERNAL SURGE ARRESTERS AT TRANSFORMERS, ELBOW CONNECTED ON THE HIGH VOLTAGE SIDE OF TRANSFORMER WHERE SHOWN.
4. 48" BEND RADIUS MINIMUM FOR ALL MV CONDUIT BENDS.
5. INSTALL ALL EQUIPMENT AND WIRING IN ACCORDANCE WITH THE NEC, NESC, AND ALL APPLICABLE REQUIREMENTS OF THE LOCAL UTILITY COMPANY AND LOCAL AUTHORITY HAVING JURISDICTION.
6. PLACEMENT OF JUNCTION BOXES AND SPLICES ARE APPROXIMATE AND WILL NEED TO BE MICROSITED BY CONSTRUCTION TEAM. MARKED LENGTHS SHOULD NOT DEVIATE MORE THAN 2,000 FEET FROM THE LOCATION MARKED. QUANTITIES SHOULD NOT DEVIATE FROM PLANSET WITHOUT APPROVAL FROM OWNER.
7. SPLICES TO BE INSTALLED 100' BACK FROM CROSSING EASEMENTS WHERE POSSIBLE AND KEPT WITHIN PROJECT BOUNDARY.

KEY NOTES

1. 4,400 KVA @ 25°C /3,960 KVA @ 50°C, 34500D/660Y V THREE-WINDING SKID MOUNTED STEP-UP TRANSFORMER. SUPPLIED BY MANUFACTURER AS PART OF 4,400 KVA @ 25°C/ 3,960 KVA @ 50°C SKID STATION. REFER TO MANUFACTURER-SUPPLIED DRAWINGS.
2. 600A JUNCTION BOX.
3. SURGE ARRESTER. COORDINATION WITH SUBSTATION SURGE ARRESTERS IS REQUIRED AND WILL BE BY OTHERS.
4. 38kV, 600A SWITCHGEAR.

LEGEND



MVAC WIRING SCHEDULE

CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
7	MV7.SUB-JB7/1	SUB	JB7/1	34.5	368.17	1,527	1000	AL	1	0.0820%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV7.JB7/1-JB7/2	JB7/1	JB7/2	34.5	368.17	390	1000	AL	1	0.0219%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV7.JB7/2-JB7/3	JB7/2	JB7/3	34.5	368.17	2,196	1000	AL	1	0.1139%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV7.JB7/3-BLOCK29	JB7/3	BLOCK29	34.5	147.27	552	4/0	AL	1	0.0490%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV7.BLOCK29-BLOCK30	BLOCK29	BLOCK30	34.5	73.63	1,425	4/0	AL	1	0.0606%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV7.JB7/3-BLOCK39	JB7/3	BLOCK39	34.5	220.90	2,893	500	AL	1	0.1643%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV7.BLOCK39-BLOCK41	BLOCK39	BLOCK41	34.5	147.27	2,078	4/0	AL	1	0.1752%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV7.BLOCK41-BLOCK40	BLOCK41	BLOCK40	34.5	73.63	1,235	4/0	AL	1	0.0527%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

Westwood

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PREPARED FOR:

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PREPARED FOR PROJECT NUMBER: 09100007

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

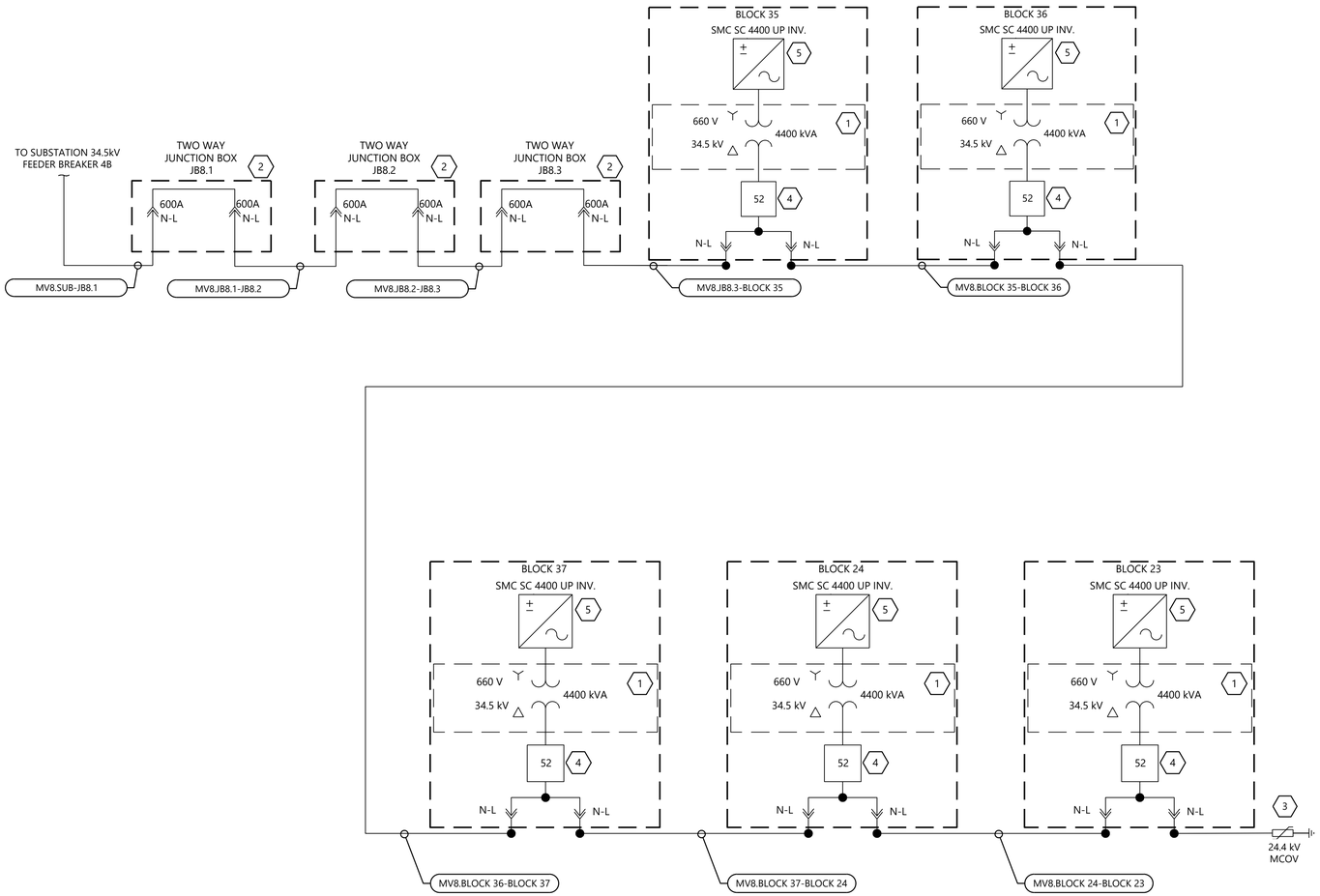
Douglas County, Kansas

MVAC Single Line Diagram - Circuit 7

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E1306 REV: C



GENERAL NOTES

1. STEP-UP TRANSFORMERS ARE OWNER FURNISHED AND INSTALLED BY MANUFACTURER WITHIN PCU STATION. PCU STATION DESIGNED AND ASSEMBLED BY OTHERS AND SHOWN FOR REFERENCE ONLY.
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3. PROVIDE EXTERNAL SURGE ARRESTERS AT TRANSFORMERS, ELBOW CONNECTED ON THE HIGH VOLTAGE SIDE OF TRANSFORMER WHERE SHOWN.
4. 48" BEND RADIUS MINIMUM FOR ALL MV CONDUIT BENDS.
5. INSTALL ALL EQUIPMENT AND WIRING IN ACCORDANCE WITH THE NEC, NESC, AND ALL APPLICABLE REQUIREMENTS OF THE LOCAL UTILITY COMPANY AND LOCAL AUTHORITY HAVING JURISDICTION.
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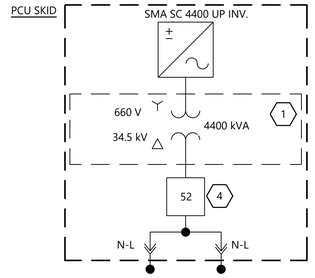
7. SPLICES TO BE INSTALLED 100' BACK FROM CROSSING EASEMENTS WHERE POSSIBLE AND KEPT WITHIN PROJECT BOUNDARY.

KEY NOTES

1. 4,400 KVA @ 25°C /3,960 KVA @ 50°C, 34500D/660Y V THREE-WINDING SKID MOUNTED STEP-UP TRANSFORMER. SUPPLIED BY MANUFACTURER AS PART OF 4,400 KVA @ 25°C/ 3,960 KVA @ 50°C SKID STATION. REFER TO MANUFACTURER-SUPPLIED DRAWINGS.
2. 600A JUNCTION BOX.
3. SURGE ARRESTER. COORDINATION WITH SUBSTATION SURGE ARRESTERS IS REQUIRED AND WILL BE BY OTHERS.
4. 38kV, 600A SWITCHGEAR.

LEGEND



MVAC WIRING SCHEDULE

CIRCUIT	CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	RATED Vac (kV)	Iac (A)	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CIRCUITS	VOLTAGE DROP %	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	CONDUCTOR SPECIFICS
8	MV8.SUB-JB8/1	SUB	JB8/1	34.5	368.17	1,534	1000	AL	1	0.0823%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV8.JB8/1-JB8/2	JB8/1	JB8/2	34.5	368.17	380	1000	AL	1	0.0214%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV8.JB8/2-JB8/3	JB8/2	JB8/3	34.5	368.17	5,182	1000	AL	1	0.2661%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV8.JB8/3-BLOCK35	JB8/3	BLOCK35	34.5	368.17	1,017	1000	AL	1	0.0539%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV8.BLOCK35-BLOCK36	BLOCK35	BLOCK36	34.5	294.53	460	750	AL	1	0.0260%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV8.BLOCK36-BLOCK37	BLOCK36	BLOCK37	34.5	220.90	439	500	AL	1	0.0268%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV8.BLOCK37-BLOCK24	BLOCK37	BLOCK24	34.5	147.27	1,844	4/0	AL	1	0.1558%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE
	MV8.BLOCK24-BLOCK23	BLOCK24	BLOCK23	34.5	73.63	459	4/0	AL	1	0.0206%	1-7#8	CCS (40%)	35KV, 1/C, Triplex, 100 % Insulation, Type MV-105, 14 x #14 CN, XLPE

Westwood

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

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A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

Kansas Sky Energy Center

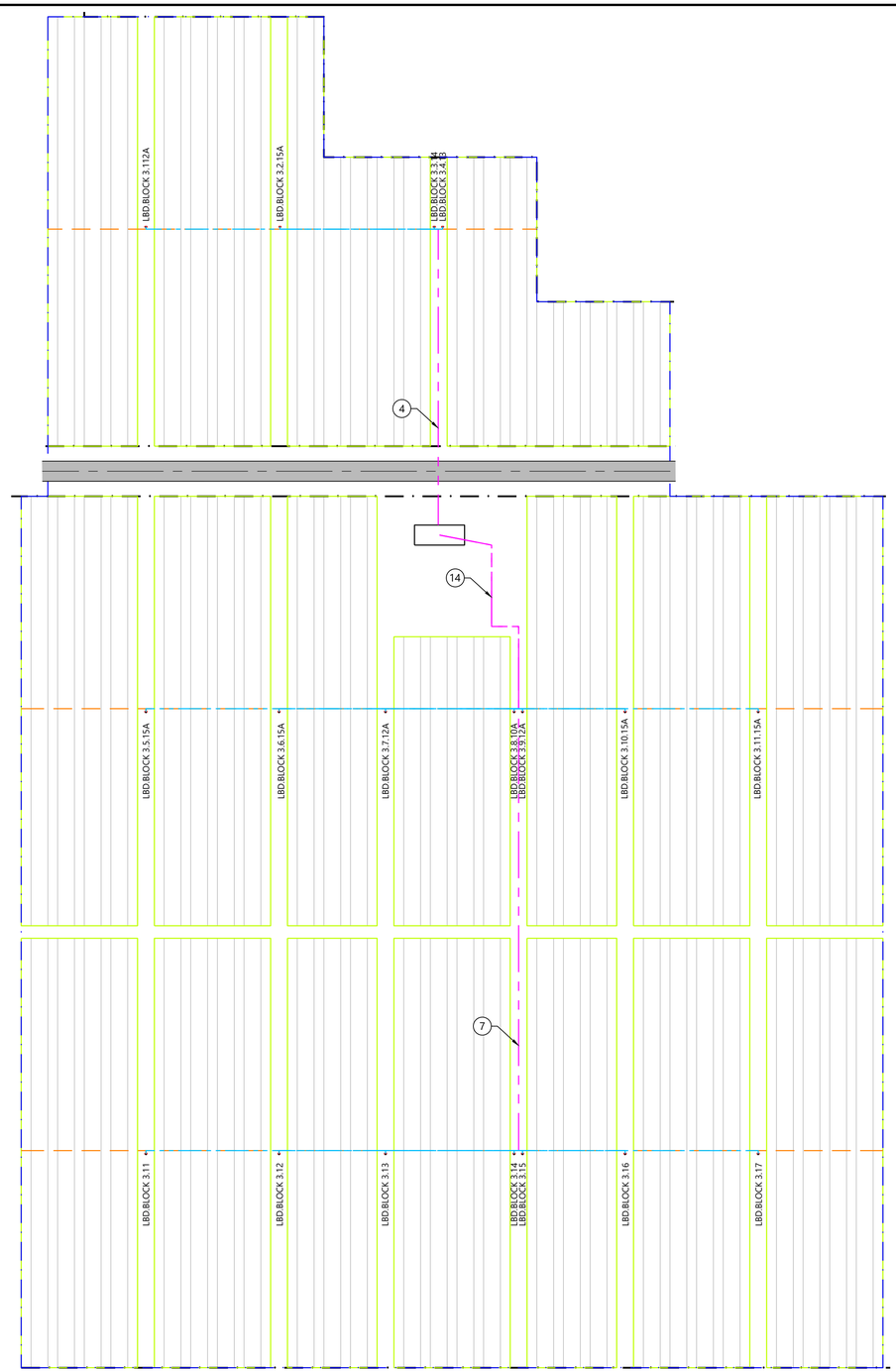
Douglas County, Kansas

MVAC Single Line Diagram - Circuit 8

NOT FOR CONSTRUCTION

DATE: 07/13/2023

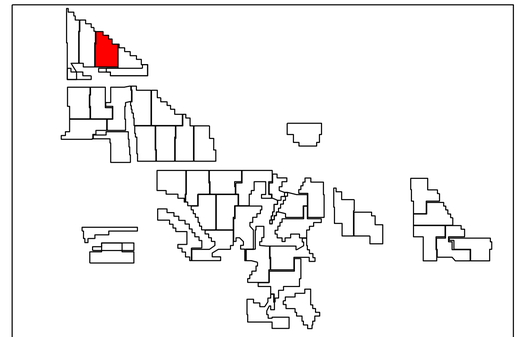
SHEET: E1307 REV: C



1 DC Site Plan - Block 3
1"=60'

LEGEND

- BLOCK BOUNDARY
- LBD BOUNDARY
- TRUNK BUS
- TRUNK EXTENSION
- DC HOMERUN
- PROPOSED ROAD
- PROPOSED PCU UNIT
- SOLAR ARRAY
- LOAD BREAK DISCONNECT BOX



KEY MAP

Westwood

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westwoodps.com

Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

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B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

0' 60' 120' 180'

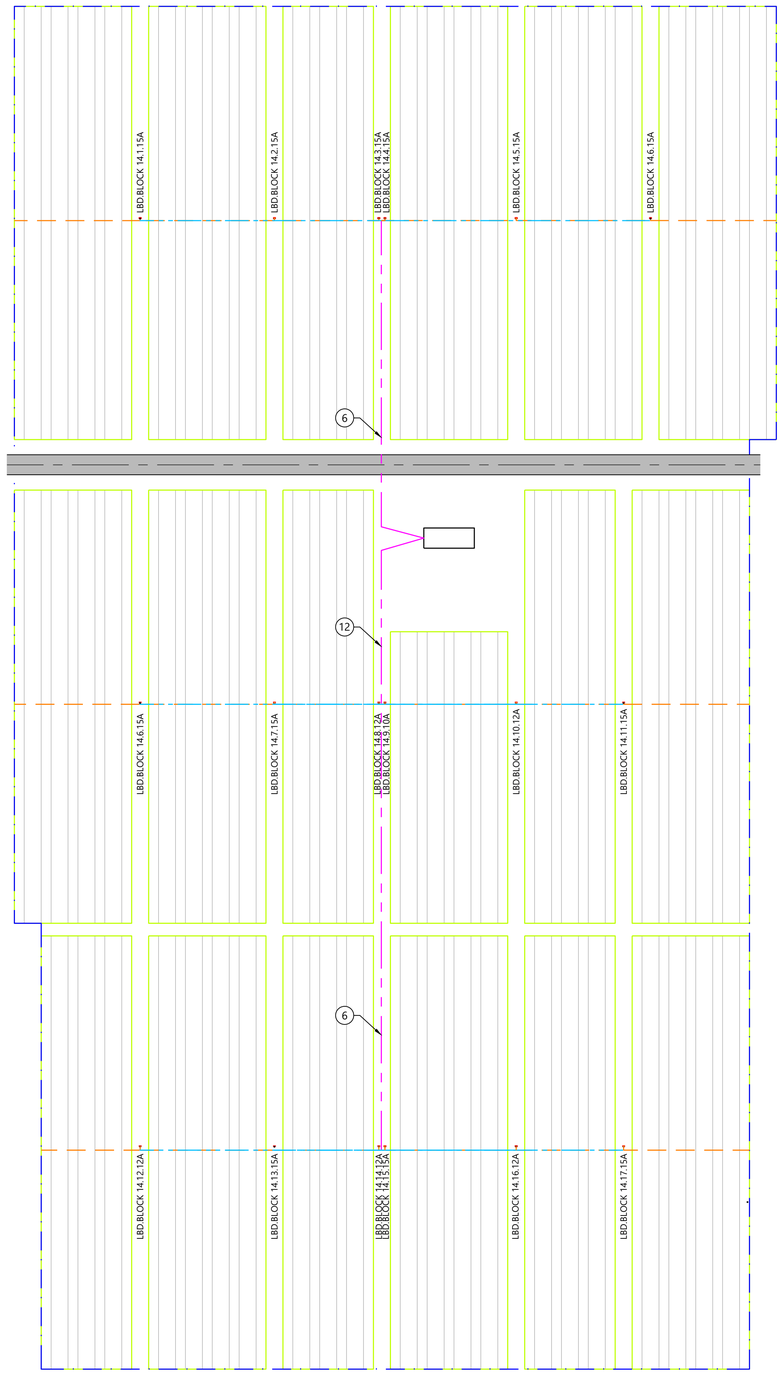
Kansas Sky Energy Center
Douglas County, Kansas

DC Site Plan - Block 3

NOT FOR CONSTRUCTION

DATE: 07/13/2023

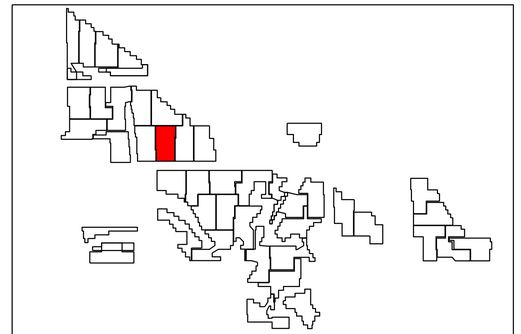
SHEET: E2000 REV: C



1 DC Site Plan - Block 14
1"=60'

LEGEND

- BLOCK BOUNDARY
- LBD BOUNDARY
- TRUNK BUS
- TRUNK EXTENSION
- DC HOMERUN
- PROPOSED ROAD
- PROPOSED PCU UNIT
- SOLAR ARRAY
- LOAD BREAK DISCONNECT BOX



KEY MAP

Westwood

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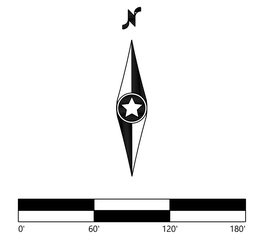
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME



Kansas Sky Energy Center
Douglas County, Kansas

DC Site Plan - Block 14

NOT FOR CONSTRUCTION

DATE: 07/13/2023

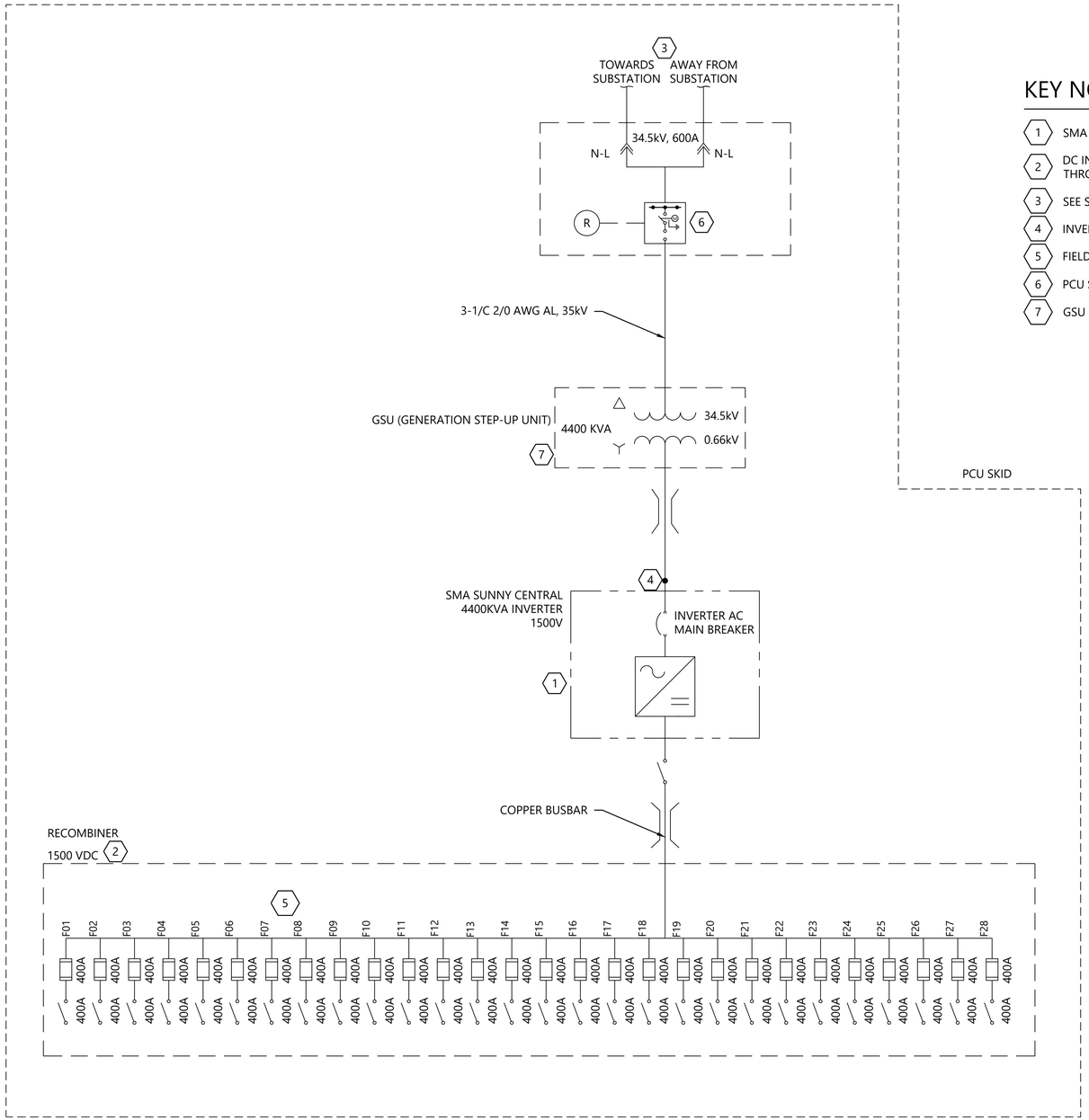
SHEET: E2002 REV: C

NOTES

1. INVERTER STATION DESIGNED AND ASSEMBLED BY OTHERS AND SHOWN FOR REFERENCE ONLY. WESTWOOD PROFESSIONAL SERVICES NOT RESPONSIBLE FOR INVERTER STATION DESIGN CONFORMING TO NEC OR ANY OTHER APPLICABLE LOCAL, STATE OR NATIONAL RECOGNIZED CODES OR REGULATIONS.
2. CONTRACTOR TO PROVIDE AND INSTALL WIRING AND EQUIPMENT EXTERNAL TO THE INVERTER STATION AS SHOWN.
3. SEE SHEETS E0020 & E0040 FOR SYMBOLOGY, ABBREVIATIONS AND LABELING REQUIREMENTS.
4. AUX RACK AND SCADA WIRING CONNECTIONS IS PENDING CONFIRMATION FROM INVERTER MANUFACTURER.

KEY NOTES

1. SMA SC4400UP 4,400kVA @ 35° C; 3960KVA @50° C
2. DC INVERTER RECOMBINER BOX 1500VDC. SEE SHEET E3200 FOR TYPICAL RECOMBINER SINGLE LINE DIAGRAM. SEE WIRING SCHEDULES ON SHEETS E3500 THROUGH E3510 FOR QUANTITY AND SIZE OF FEEDERS AND FUSES. FUSE SIZES PROVIDED BY INVERTER MANUFACTURER.
3. SEE SHEETS E1300 THROUGH E1301 MVAC ONELINE DIAGRAMS FOR CONTINUATION.
4. INVERTER AC BUS.
5. FIELD TECHNICIAN TO RECORD THE FUSE LOCATION AT TIME OF INSTALL.
6. PCU SWITCHGEAR, 38kV, 600A W/ 20kA INTERUPT
7. GSU (GENERATION STEP-UP UNIT) 4400kVA, 34.5/0.66kV, KNAN, DY11



1 Typical PCU Station Wiring Diagram
N.T.S.

Westwood
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westwoodps.com
Westwood Professional Services, Inc.

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PREPARED FOR PROJECT NUMBER: 09100007

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Kansas Sky Energy Center
Douglas County, Kansas

Inverter Collection Line Diagram

NOT FOR CONSTRUCTION

DATE: 07/13/2023

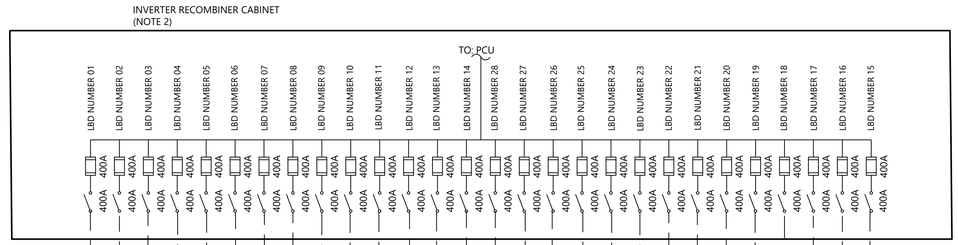
SHEET: E2300 REV: C

1. SINGLE LINE SHOWS TYPICAL RECOMBINER ENTRY.
2. PCU RECOMBINER CABINET HAS TWENTY EIGHT (28) TOTAL TERMINATIONS. CONTRACTOR TO ENSURE CABLE TERMINATIONS (UP TO 32) ARE AS EVENLY DISTRIBUTED AS POSSIBLE WITHIN THE RECOMBINER BOX.
3. SEE SHEET E2300 FOR TYPICAL INVERTER WIRING.
4. MESSENGER SIZE OF 3/8" EHS STEEL MESSENGER.
5. DC TRENCH GROUNDING SIZE OF 3AWG CU.
6. DIAGRAM SHOWS GENERAL CONCEPT FOR ROUTING. LBD/SB NUMBER X DOES NOT NEED TO BE ROUTED TO RECOMBINER INPUT NUMBER X IF ANOTHER INPUT FACILITATES INSTALLATION NEEDS. DO NOT CROSS DC HOMERUN CABLES IN TRENCHES OR WHEN ENTERING THE PCU.

LEGEND

600 kCMIL AL, UL4701 PV (DIRECT BURIED) DC HOMERUN CONDUCTOR

400A DISCONNECT SWITCH AND FOR FUSE SIZE REFER TO TABLE BELOW



LBD Number 1 (NOTE 1)

LBD Number 2 (NOTE 1)

LBD Number 3 (NOTE 1)

LBD Number 4 (NOTE 1)

LBD Number 5 (NOTE 1)

LBD Number 6 (NOTE 1)

LBD Number 7 (NOTE 1)

LBD Number 8 (NOTE 1)

LBD Number 9 (NOTE 1)

LBD Number 10 (NOTE 1)

LBD Number 11 (NOTE 1)

LBD Number 12 (NOTE 1)

LBD Number 13 (NOTE 1)

LBD Number 14 (NOTE 1)

LBD Number 15 (NOTE 1)

LBD Number 16 (NOTE 1)

LBD Number 17 (NOTE 1)

LBD Number 18 (NOTE 1)

LBD Number 19 (NOTE 1)

LBD Number 20 (NOTE 1)

LBD Number 21 (NOTE 1)

LBD Number 22 (NOTE 1)

LBD Number 23 (NOTE 1)

LBD Number 24 (NOTE 1)

LBD Number 25 (NOTE 1)

LBD Number 26 (NOTE 1)

LBD Number 27 (NOTE 1)

LBD Number 28 (NOTE 1)

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Kansas Sky Energy Center

Douglas County, Kansas

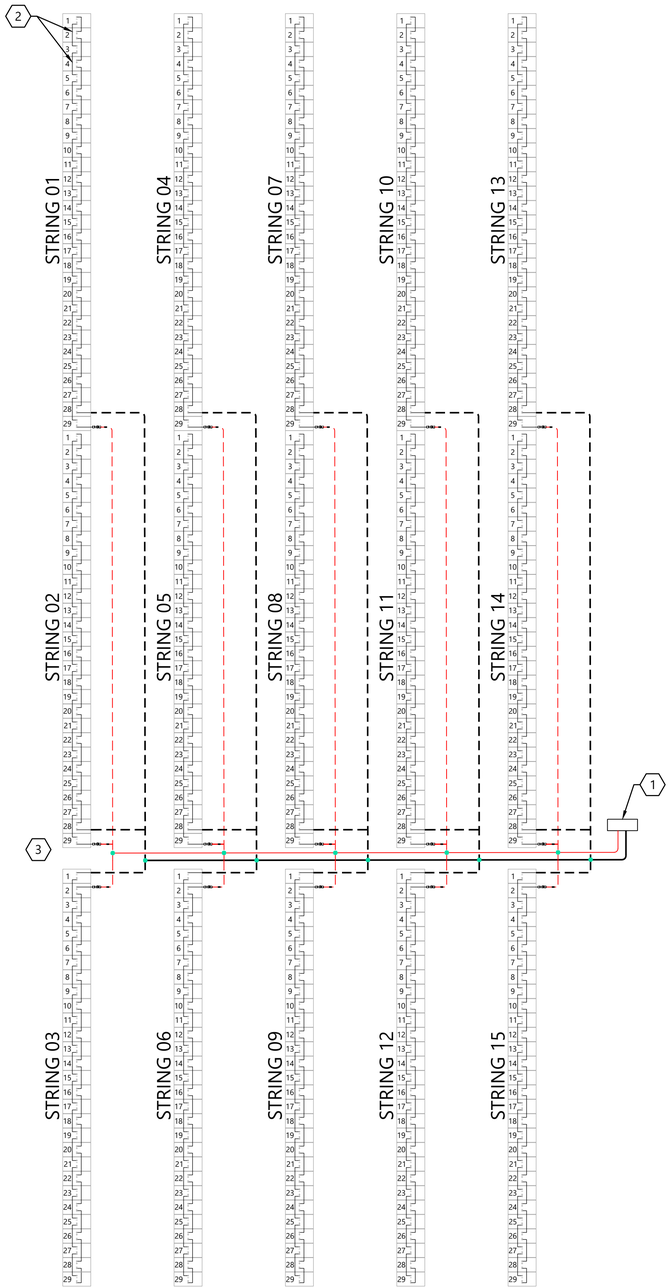
DC Level II Single Line Diagram

NOT FOR CONSTRUCTION

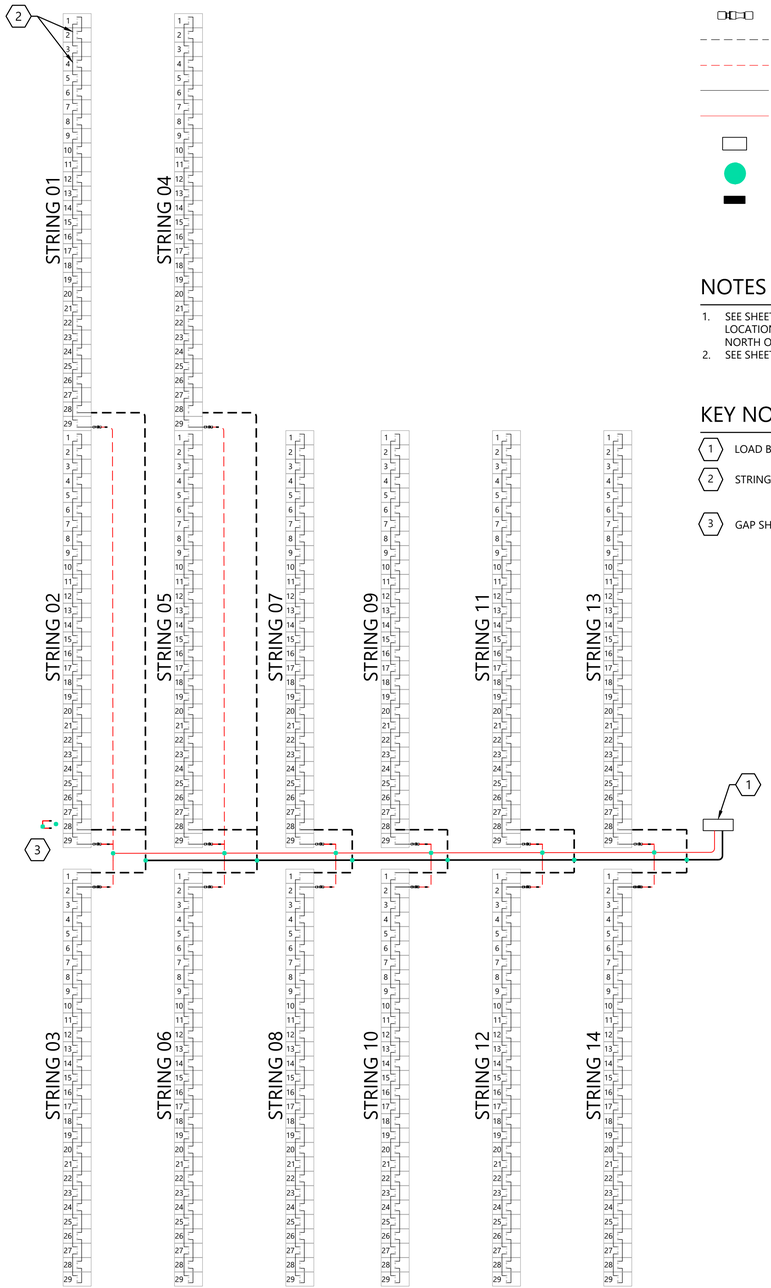
DATE: 07/13/2023

SHEET: E2301 REV: C

N:\09021\4-05_CAD_Electrical\E2300 DC Level II One Line Diagrams.dwg, 7/13/2023 4:10 PM, Gilsea Hernandez



1 String Wiring Diagram 15A
N.T.S.



1 String Wiring Diagram 14A
N.T.S.

LEGEND

- FUSE
- PV MODULE CONNECTOR (NEG -)
- PV MODULE CONNECTOR (POS +)
- 500 KCMIL PV TRUNK CONDUCTOR (NEG -)
- 500 KCMIL PV TRUNK CONDUCTOR (POS +)
- LBD
- SHOALS BLA HARNESS
- INLINE FUSE

NOTES

1. SEE SHEET E2000 THRU E2001 FOR DC SITE PLANS AND LOCATIONS OF LBD BLOCKS. LBDs SHALL ALWAYS BE NORTH OF CAB MESSENGER WIRE.
2. SEE SHEET E2300 FOR DC LEVEL II SLD.

KEY NOTES

1. LOAD BREAK DISCONNECT
2. STRING (STR) WIRING. TYPICAL.
3. GAP SHOWN FOR CAB AND MESSENGER WIRE.

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

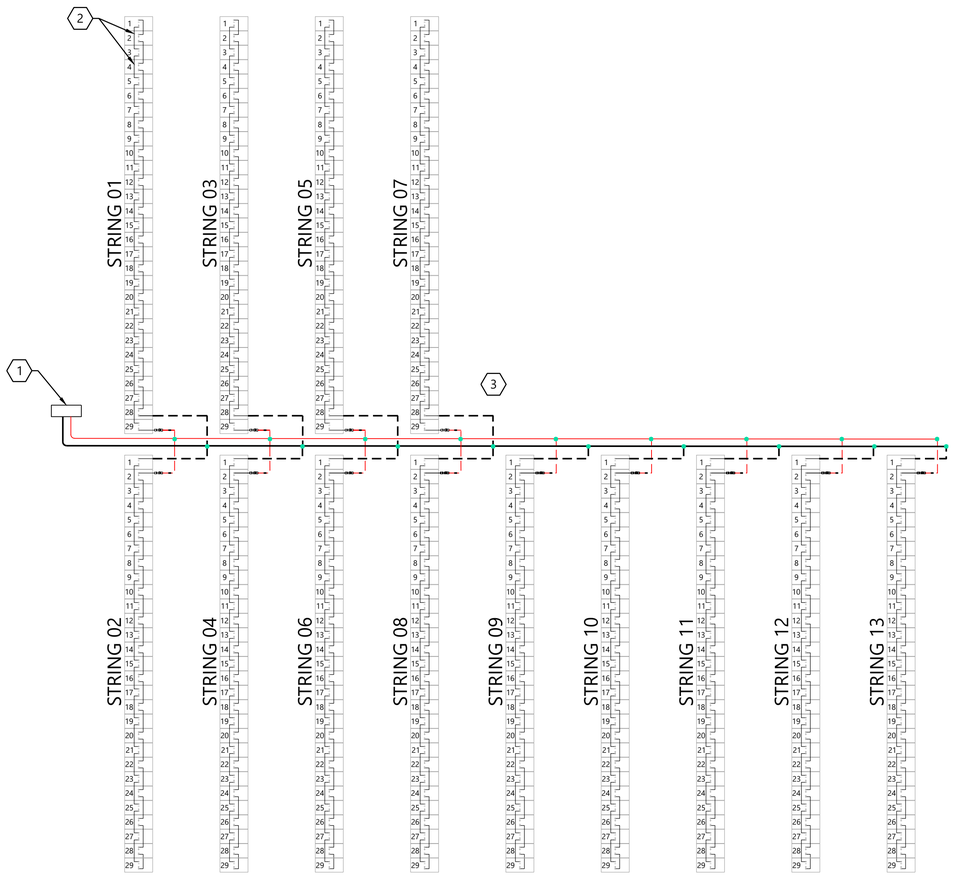
Kansas Sky Energy Center
Douglas County, Kansas

String Wiring Harness Diagram - 15A & 14A

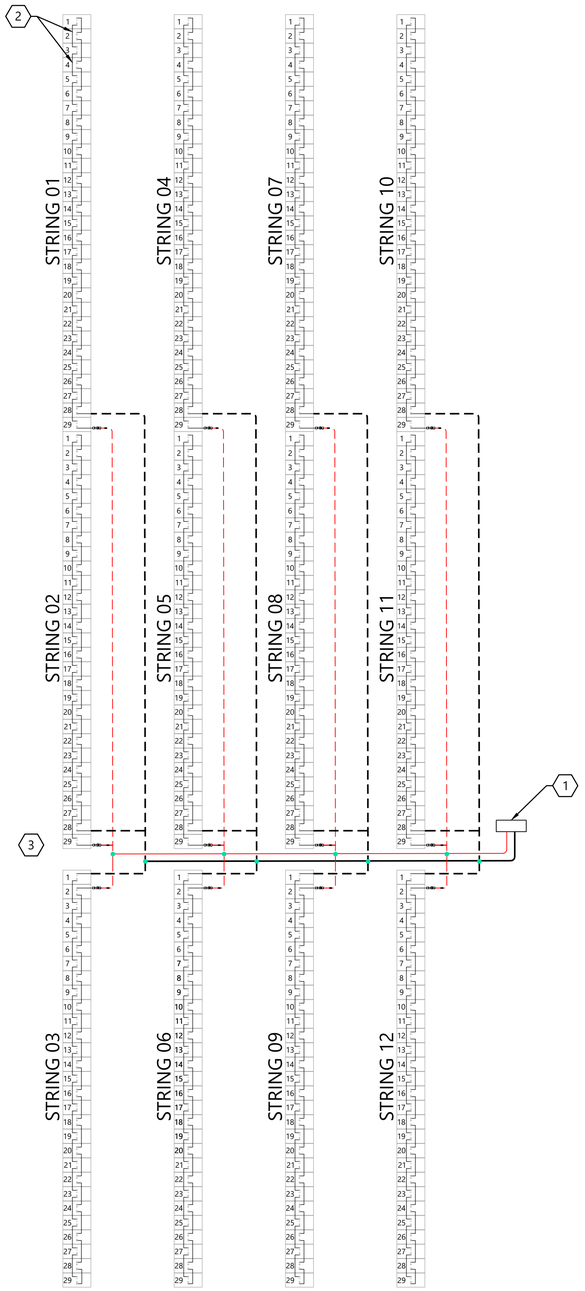
NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E3300 REV: C



1 String Wiring Diagram 13A
N.T.S.



1 String Wiring Diagram 12A
N.T.S.

LEGEND

- FUSE
- PV MODULE CONNECTOR (NEG -)
- PV MODULE CONNECTOR (POS +)
- 500 KCMIL PV TRUNK CONDUCTOR (NEG -)
- 500 KCMIL PV TRUNK CONDUCTOR (POS +)
- LBD
- SHOALS BLA HARNESS
- INLINE FUSE

NOTES

1. SEE SHEET E2000 THRU E2001 FOR DC SITE PLANS AND LOCATIONS OF LBD BLOCKS. LBDs SHALL ALWAYS BE NORTH OF CAB MESSENGER WIRE.
2. SEE SHEET E2300 FOR DC LEVEL II SLD.

KEY NOTES

1. LOAD BREAK DISCONNECT
2. STRING (STR) WIRING. TYPICAL.
3. GAP SHOWN FOR CAB AND MESSENGER WIRE.

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

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A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

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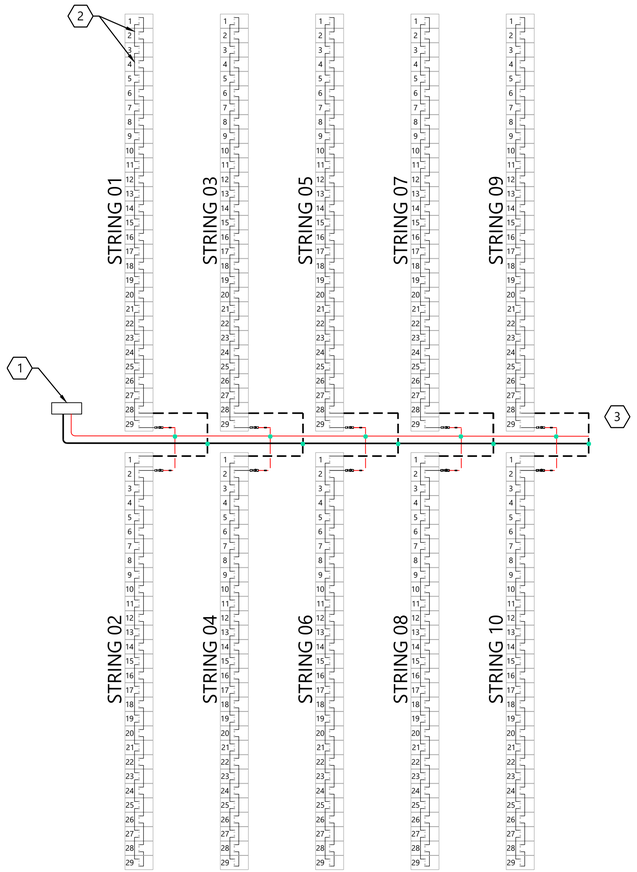
String Wiring Harness Diagram - 13A & 12A

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E3301 REV: C



1 String Wiring Diagram 10A
N.T.S.

LEGEND

- FUSE
- PV MODULE CONNECTOR (NEG -)
- PV MODULE CONNECTOR (POS +)
- 500 KCMIL PV TRUNK CONDUCTOR (NEG -)
- 500 KCMIL PV TRUNK CONDUCTOR (POS +)
- LBD
- SHOALS BLA HARNESS
- INLINE FUSE

NOTES

1. SEE SHEET E2000 THRU E2001 FOR DC SITE PLANS AND LOCATIONS OF LBD BLOCKS. LBDs SHALL ALWAYS BE NORTH OF CAB MESSENGER WIRE.
2. SEE SHEET E2300 FOR DC LEVEL II SLD.

KEY NOTES

1. LOAD BREAK DISCONNECT
2. STRING (STR) WIRING. TYPICAL.
3. GAP SHOWN FOR CAB AND MESSENGER WIRE.

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

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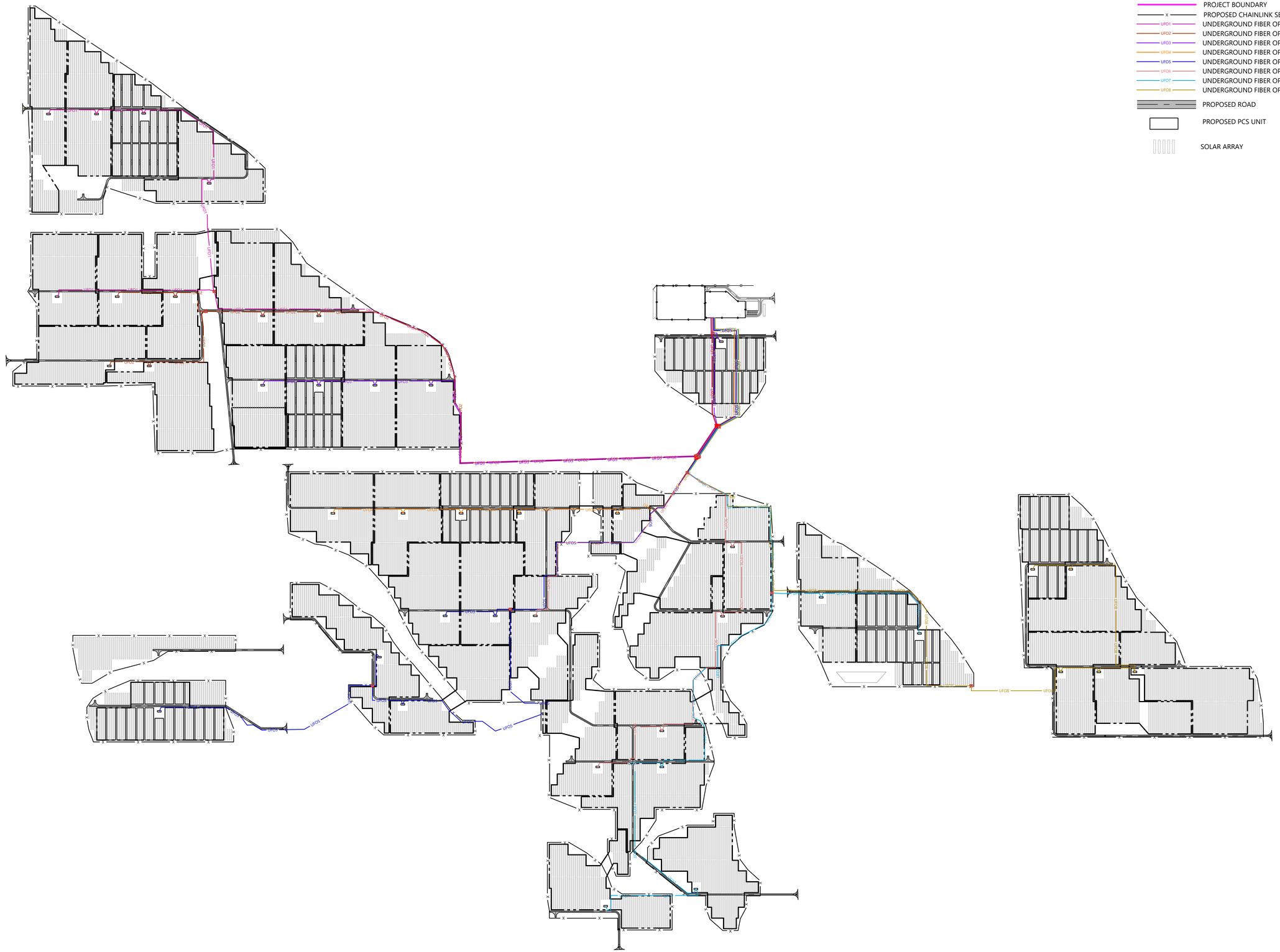
String Wiring Harness Diagram - 10A

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E3302 REV: C



LEGEND

- PROJECT BOUNDARY
- PROPOSED CHAINLINK SECURITY FENCE
- UFO1 — UNDERGROUND FIBER OPTIC CIRCUIT 1
- UFO2 — UNDERGROUND FIBER OPTIC CIRCUIT 2
- UFO3 — UNDERGROUND FIBER OPTIC CIRCUIT 3
- UFO4 — UNDERGROUND FIBER OPTIC CIRCUIT 4
- UFO5 — UNDERGROUND FIBER OPTIC CIRCUIT 5
- UFO6 — UNDERGROUND FIBER OPTIC CIRCUIT 6
- UFO7 — UNDERGROUND FIBER OPTIC CIRCUIT 7
- UFO8 — UNDERGROUND FIBER OPTIC CIRCUIT 8
- PROPOSED ROAD
- PROPOSED PCS UNIT
- SOLAR ARRAY

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
D	08/09/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

0' 500' 1000' 1500'

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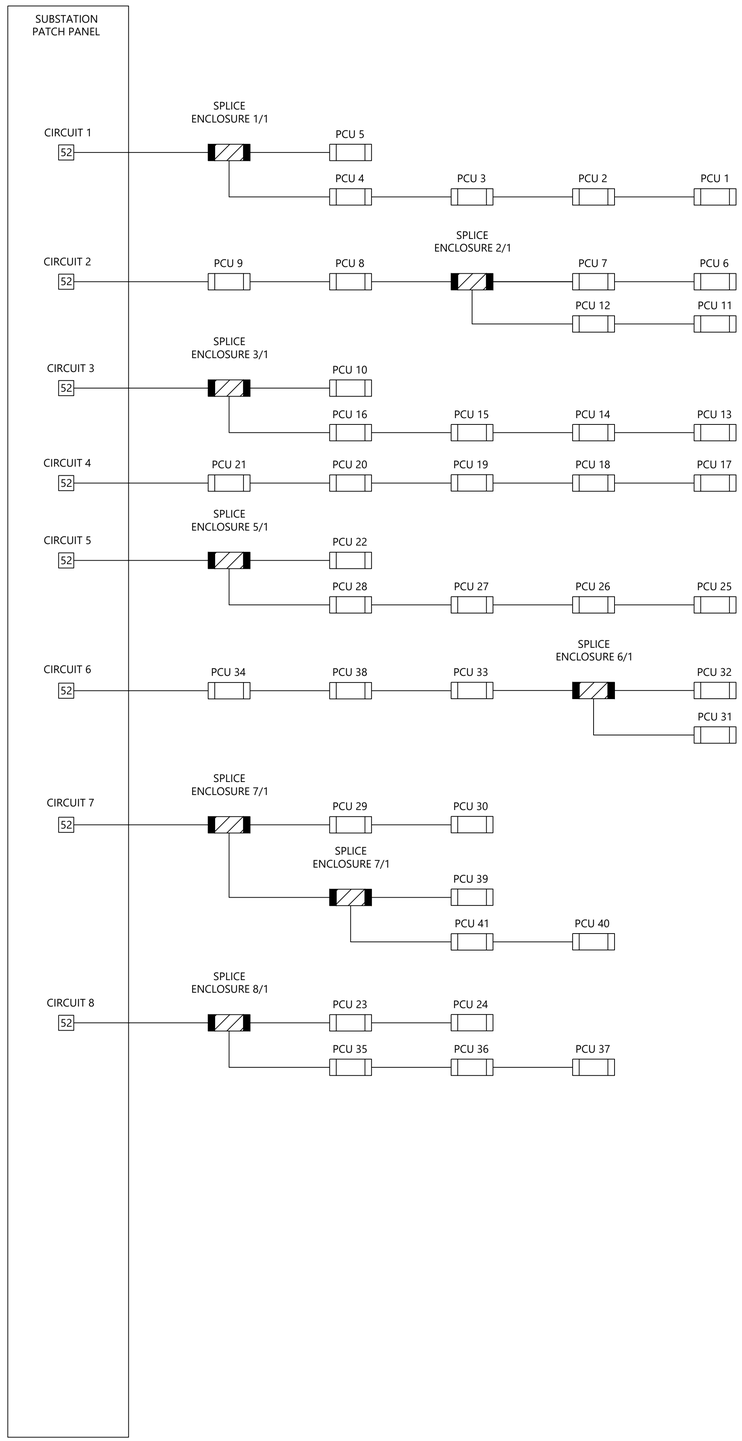
Overall Communication Site Plan

NOT FOR CONSTRUCTION

DATE: 08/09/2023

SHEET: E6000 REV: D



LEGEND

- INVERTER LOCATION
- JUNCTION BOX WITH SPLICE ENCLOSURE
- FIBER OPTIC COMMUNICATION CABLE

NOTES

1. FIBER OPTIC SPLICES SHOULD BE KEPT TO A MINIMUM WHERE POSSIBLE IN ORDER TO MINIMIZE OPTICAL PATH SIGNAL ATTENUATION.
2. TWO WAY FIBER SPLICE ENCLOSURES SHOULD BE EVERY 10,000 FT WHERE NOT TERMINATED AT EQUIPMENT AND PLACED NEAR JUNCTION BOXES WHERE POSSIBLE.

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

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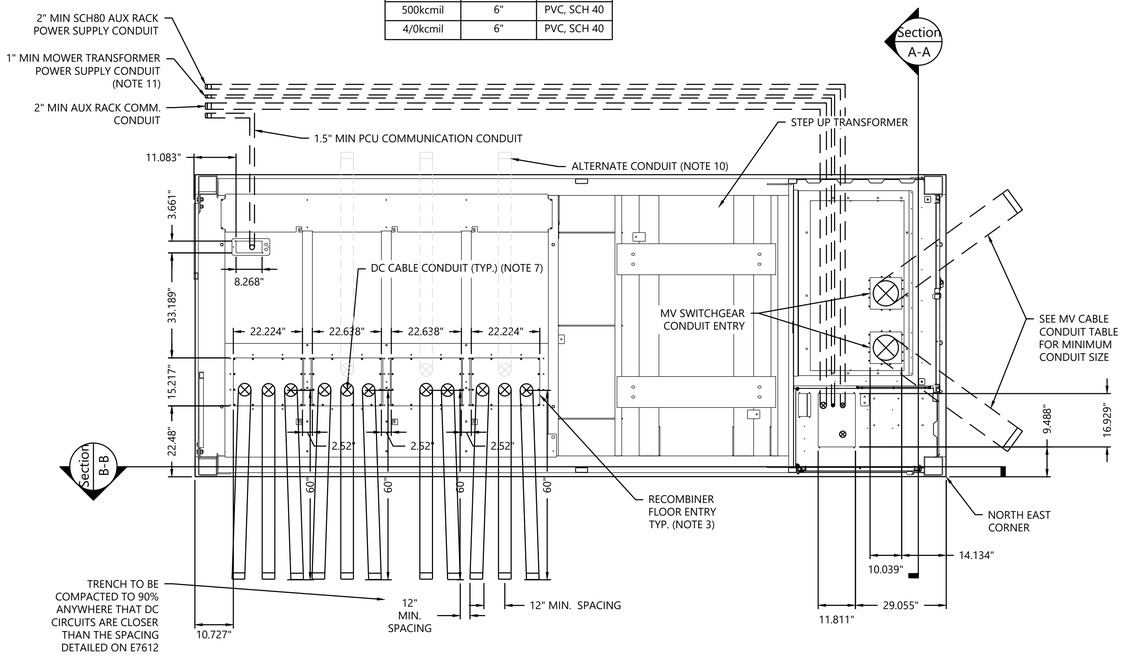
Fiber Optic Single Line Diagram

NOT FOR CONSTRUCTION

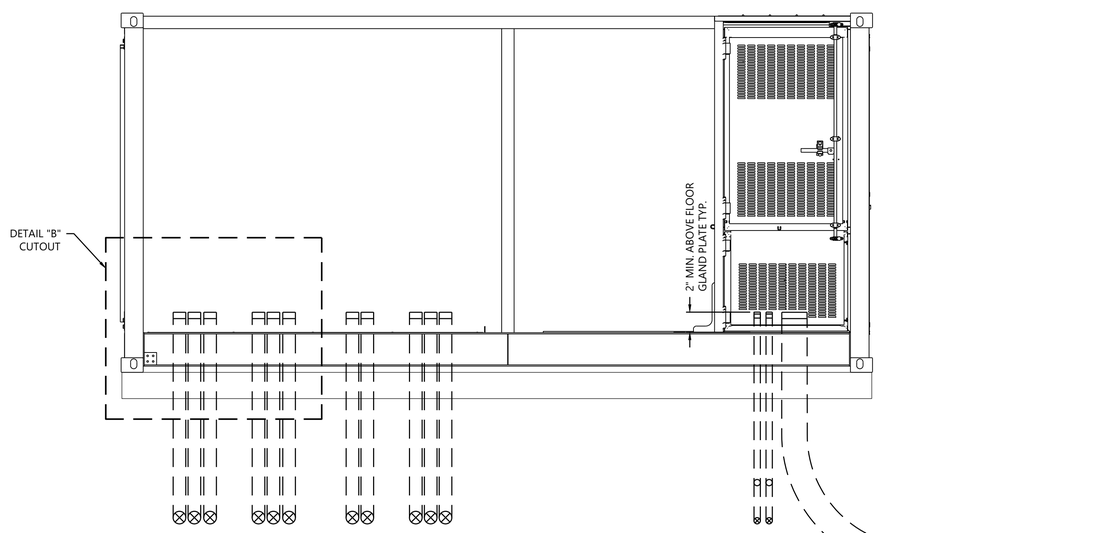
DATE: 07/13/2023

SHEET: E6200 REV: C

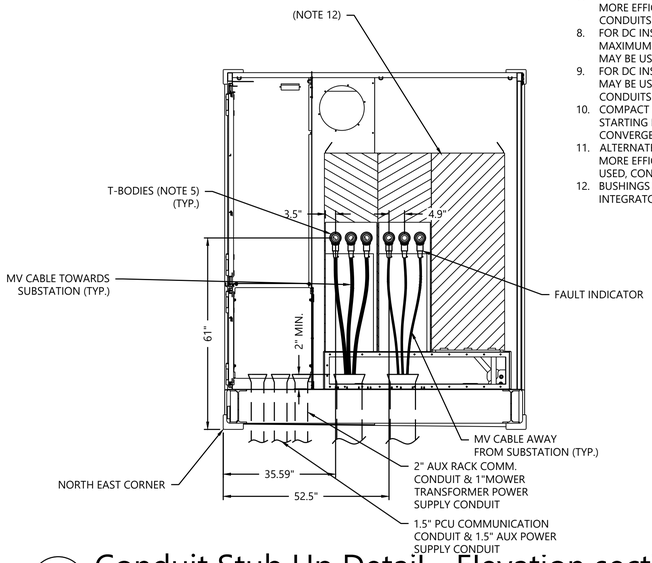
MVAC Cable Conduit		
Cable Size	**Conduit Size**	**Conduit Type**
1000kcmil	8"	PVC, SCH 40
500kcmil	6"	PVC, SCH 40
4/0kcmil	6"	PVC, SCH 40



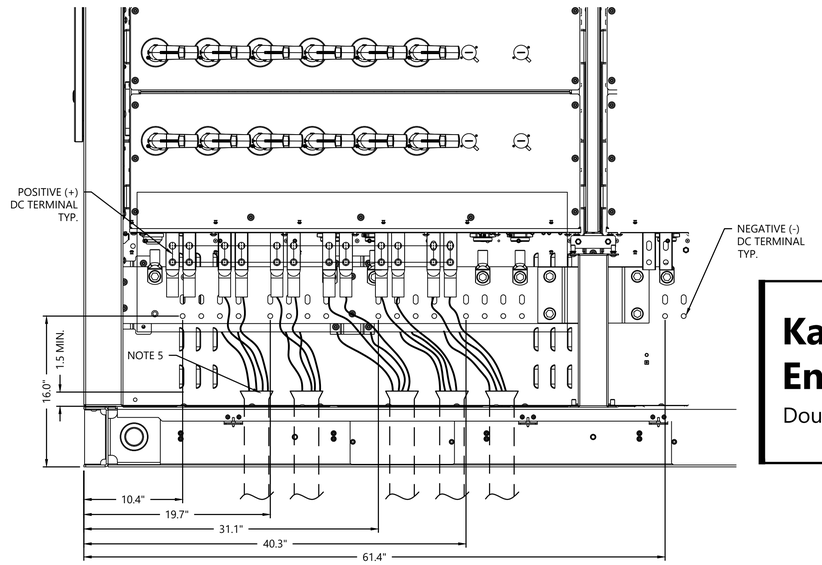
1 Conduit Stub up Detail - Top Plan
N.T.S



2 Conduit Stub up Detail - Elevation Section B-B
N.T.S.



A Conduit Stub Up Detail - Elevation section A-A
N.T.S.



B Cutout - Enlarged DC Termination Detail
N.T.S.

NOTES

1. DETAILS ARE TYPICAL AND WILL BE UPDATED WHEN INVERTER DOCUMENTATION IS GIVEN.
2. FOR AC INSTALLATION, MAXIMUM OF THREE CONDUCTOR PER CONDUIT.
3. ALL CONDUITS TO BE CAPPED WITH BELL ENDS. AFTER CABLE IS PULLED AND TERMINATED, CONDUITS SHALL BE SEALED TO PREVENT MOISTURE AND RODENT INGRESS.
4. IF NOT ALL DC INPUTS ARE USED, THE DC CABLES SHOULD BE DISTRIBUTED SYMMETRICALLY VIA THE DC CONNECTION BRACKETS.
5. ALL CABLES SHALL BE TERMINATED TO POSITIVE (+) & NEGATIVE (-) BUSBARS WITH BENDS THAT ARE GREATER THAN NEC AND MANUFACTURER'S DEFINED MINIMUM BEND RADIUS.
6. T-BODIES TO BE TE CONNECTIVITY
7. ALTERNATE CONDUITS TO BE USED IF RECOMBINER ENTRY IS MORE EFFICIENT FROM THE WEST. IF ALTERNATE CONDUITS USED, CONDUITS TO EXTEND TO EDGE OF BERM.
8. FOR DC INSTALLATION, 4" HDPE CONDUITS MAY BE USED. A MAXIMUM OF 2 DC CIRCUITS, 4 CONDUCTORS, PER CONDUIT MAY BE USED.
9. FOR DC INSTALLATION, A MAXIMUM OF 3 CONDUITS PER CUTOUT MAY BE USED. MAXIMIZE THE DISTANCE BETWEEN ADJACENT CONDUITS IN EACH CUTOUT.
10. COMPACT BACKFILL SOIL TO '90%' STANDARD PROCTOR STARTING FROM WHERE DC AND MV CIRCUITS BEGIN TO CONVERGE INTO THE INVERTER AND UP TO INVERTER.
11. ALTERNATE CONDUITS TO BE USED IF RECOMBINER ENTRY IS MORE EFFICIENT FROM THE WEST. IF ALTERNATE CONDUITS ARE USED, CONDUITS TO EXTEND TO EDGE OF BERM.
12. BUSHINGS FOR STEP UP TRANSFORMER TO BE INSTALLED BY SKID INTEGRATOR.

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PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

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C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

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Douglas County, Kansas

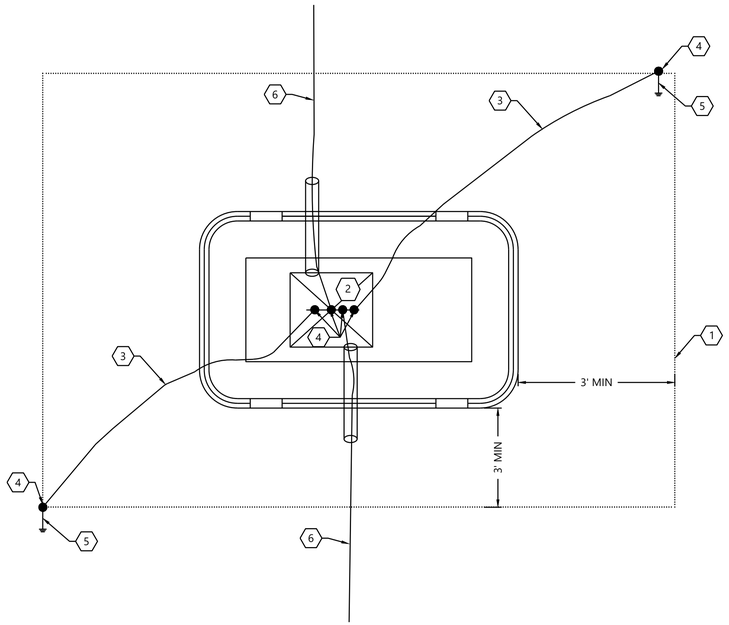
Inverter Details

NOT FOR CONSTRUCTION

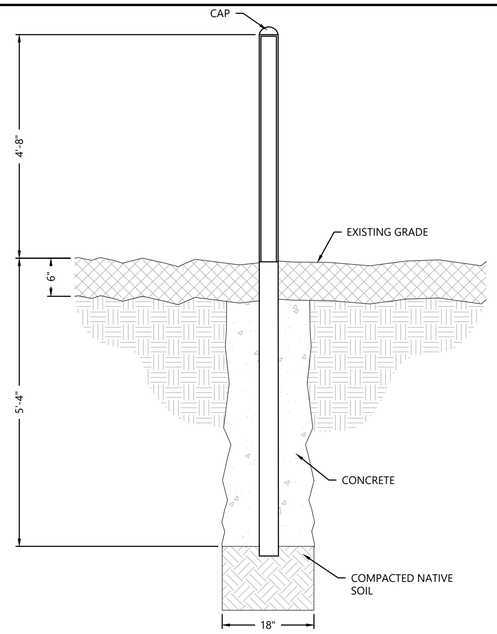
DATE: 07/13/2023

SHEET: E7010 REV: C

N:\0042114.00_Civil_Electrical\0042114.00 - E7010 Inverter Details.dwg, 7/13/2023 4:43 PM, Gilbera Hernandez



1 Junction Box Grounding Detail
N.T.S.



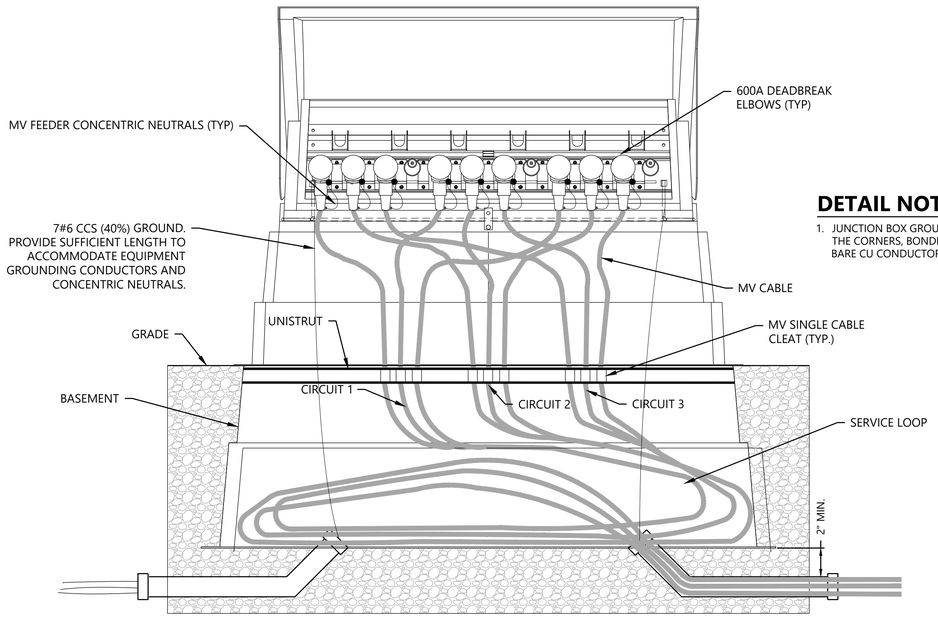
2 Bollard (Guard Post) Detail
N.T.S.

NOTES

1. PEA GRAVEL TO BE INSTALLED AROUND THE BASEMENT OF THE JUNCTION BOX.
2. BOLLARDS ARE REQUIRED AT THE CORNERS OF JUNCTION BOXES AND FIBER PEDESTALS ON SIDES EXPOSED TO VEHICLE TRAFFIC. BOLLARDS SHOULD BE PLACED FIVE (5) FEET FROM THE EQUIPMENT CORNERS. BOLLARDS SHALL BE STEEL OR PVC FILLED WITH CONCRETE AND REBAR.
3. CONTRACTOR SHALL SELECT PROPER CABLE CLEAT AND T-BODY SIZE BASED ON CABLE SIZE.

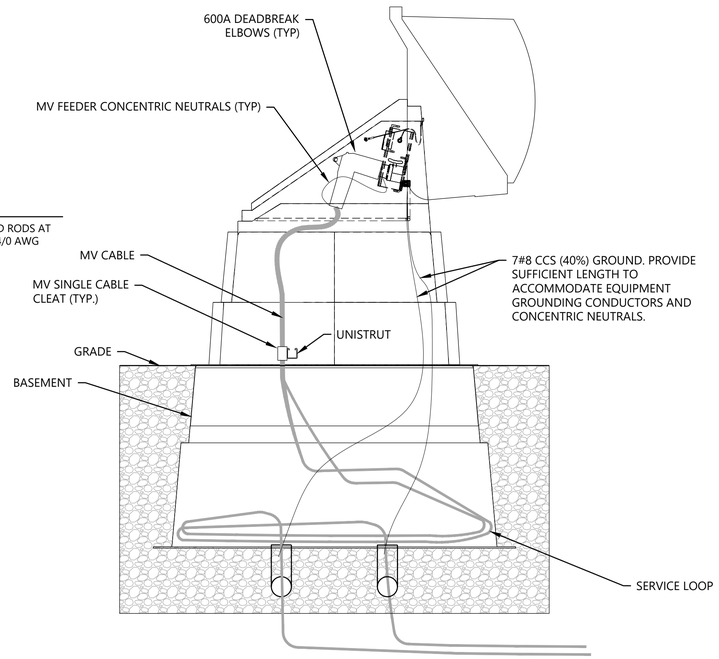
KEY NOTES

1. #4 / 0 AWG GROUND RING. 18" BELOW GRADE MINIMUM
2. PROVIDE REQUIRED LISTED GROUNDING TERMINATIONS/FITTINGS FOR QUANTITY AND SIZE OF CONDUCTORS BEING JOINED. CONNECTION OF GROUNDING ELECTRODE CONDUCTOR TO GROUNDING ELECTRODE TO BE IRREVERSIBLE.
3. #4/0 AWG JUMPER. TYPICAL. 18" BELOW GRADE MINIMUM.
4. BOND USING LISTED IRREVERSIBLE CRIMP CONNECTION OR EXOTHERMIC WELD.GROUND ROD, COPPER CLAD STEEL, 5/8" X 10' OR 3/4" X 10' IRREVERSIBLY CRIMP TO GROUND RING.
5. GROUND RODS TO BE PLACED AT A MINIMUM OF 1' FROM OPPOSITE CORNERS OF THE JUNCTION BOX.
6. TRENCH GROUND



DETAIL NOTES

1. JUNCTION BOX GROUNDING TO BE VIA TWO GROUND RODS AT THE CORNERS, BONDED TO THE GROUND BUS WITH 4/0 AWG BARE CU CONDUCTOR.



3 Junction Box Detail
N.T.S.

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Junction Box Details

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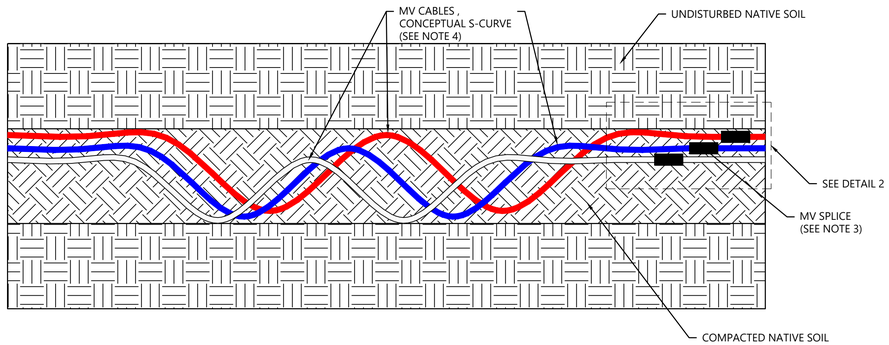
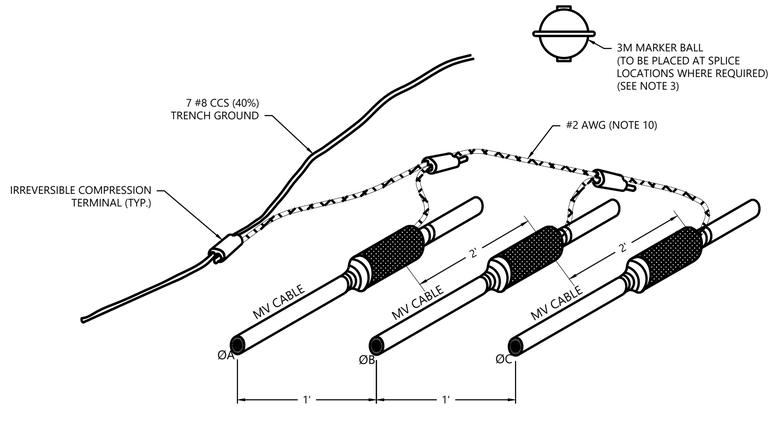
DATE: 07/13/2023

SHEET: E7011 REV: C



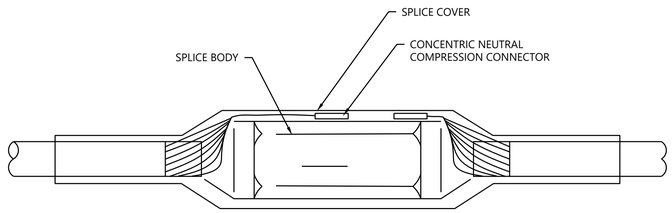
1 Splice Arrangement Detail

N.T.S - Top View



2 Splice Arrangement Detail

N.T.S.



3 Splice Detail

N.T.S.

NOTES

1. SPLICE KIT INCLUDES SPLICE BODY, SPLICE COVER AND COMPRESSION CONNECTOR.
2. PERFORM ALL SPLICES USING MANUFACTURERS INSTRUCTIONS, OWNER'S SCOPE OF WORK, AND AS SHOWN ON THE DRAWINGS.
3. PLACE MARKER BALL ABOVE SPLICE AT 24" DEPTH.
4. S-CURVE SHALL PROVIDE A MINIMUM OF 12 FEET SLACK AT EVERY SPLICE. BEND RADIUS OF CABLES TO BE A MINIMUM OF 12 TIMES CABLE DIAMETER. NO BENDS IN THE CABLE SHALL BE PERMITTED WITHIN 2 FEET OF THE SPLICE.
5. MV CABLE SLACK ON BOTH ENDS OF MV SPLICE SHALL BE EQUAL LENGTH
6. REFER TO CONCENTRIC NEUTRAL INDUCED VOLTAGE STUDY FOR SPLICE CONNECTIONS AND LOCATIONS.
7. MV CABLE ENTERING AND EXITING SLACK PIT TO BE FLAT CONFIGURATION TO 85%.
8. FIRST LIFT TO BE COMPACTED TO 90% SUBSEQUENT LIFTS TO BE COMPACTED TO 85%.
9. SPLICE REMEDIATION PROCEDURE:
   - A. LOCATE DAMAGED SECTION OF CABLE
   - B. EXCAVATE/VAC 25 FEET IN BOTH DIRECTIONS PAST THE DAMAGE.
   - C. CUT OUT DAMAGED SECTION AND REPLACE WITH NEW CABLES AND SPLICE.
   - D. PLACE GPS MARKER BALL AT EACH SPLICE LOCATION AND RECORD GPS LOCATION
10. NO SPLICES ARE ALLOWED BEYOND WHAT IS ALLOWED IN THE DESIGN WITHOUT OWNERS WRITTEN APPROVAL PRIOR TO SPLICING.

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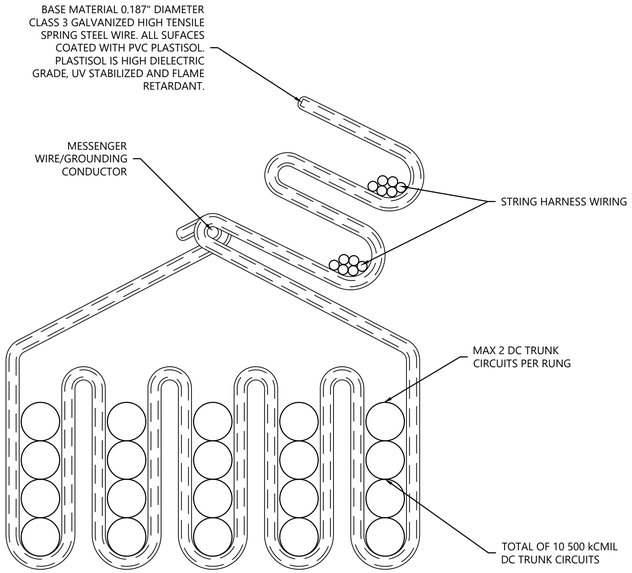
Splice Box Details

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E7012

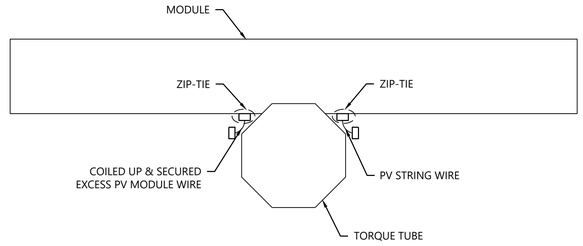
REV: C



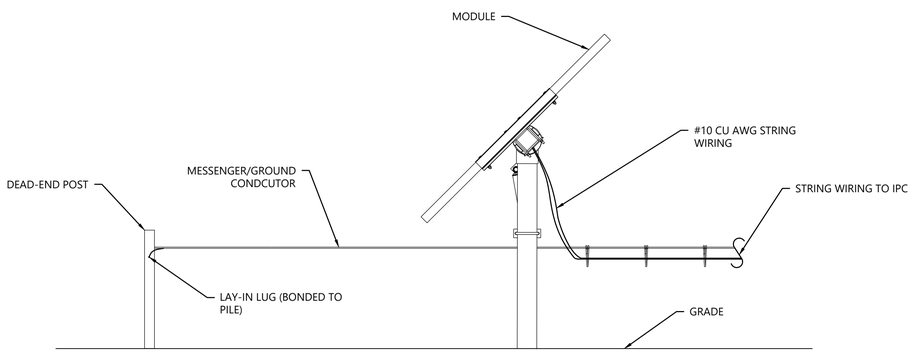
DETAIL NOTES

1. CAB FILL VARIES BY LOCATION.
2. CAB HANGAR MODEL: 10015. SEE E89XX FOR CUTSHEET.
3. DC LEVEL 1 CABLE: 2KV AL PV WIRE 500KCMIL.
4. STRING WIRE: 2KV CU PV WIRE #10 AWG.

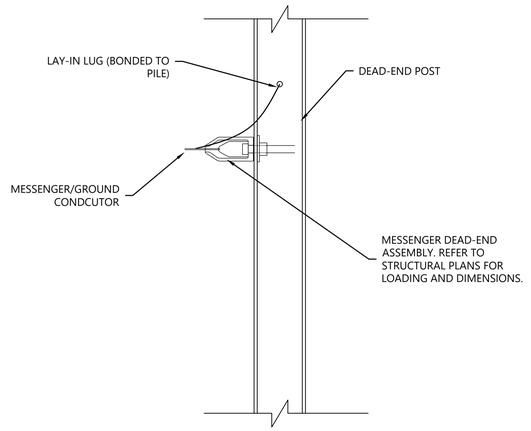
1 CAB Hanger Detail - 10015
N.T.S



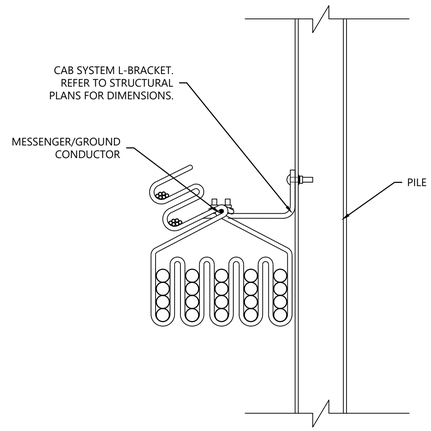
2 String Wire Management Detail
N.T.S



5 CAB Dead-End Post
N.T.S



3 Messenger Dead-End
N.T.S



4 L-Bracket Configuration
N.T.S

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Kansas Sky Energy Center
Douglas County, Kansas

DC Electrical Details

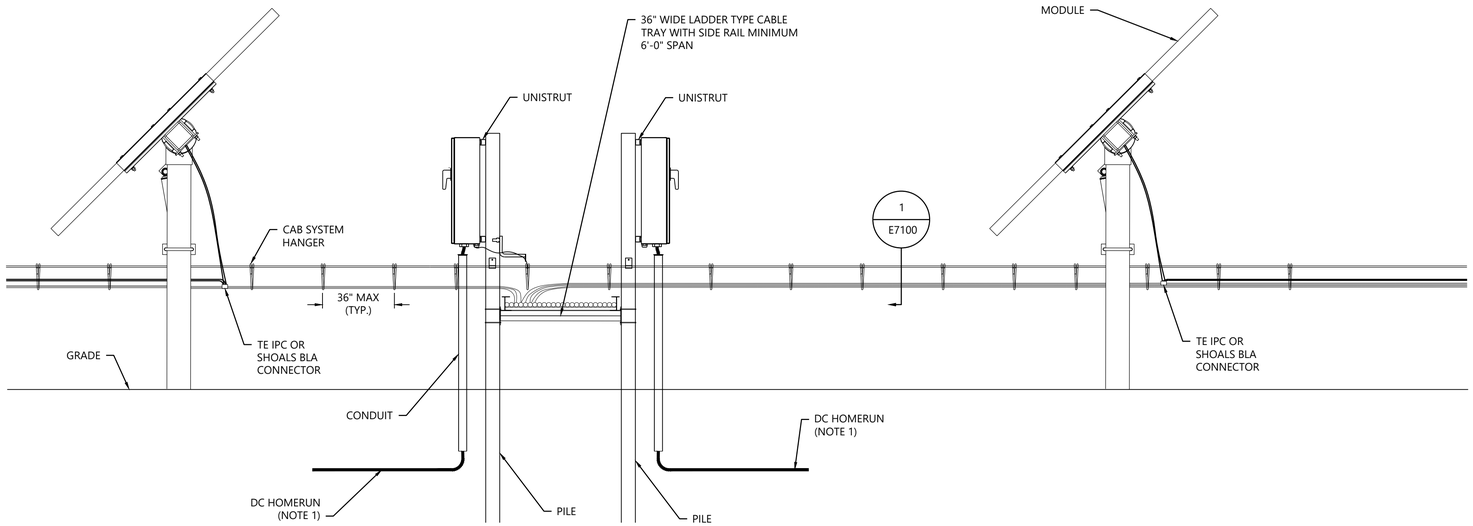
NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E7100 REV: C

NOTES

1. DC HOMERUN CABLE MAY RUN NORTH OR SOUTH TO INVERTER DEPENDING ON THE LBD GROUP LOCATION.
2. 4" (MIN.) OF CABLE SLACK.
3. TRENCH GROUND TO BE BONDED TO PILE.
4. MESSENGER WIRE TO BE BONDED TO PILE WITH #3 AWG BARE COPPER.
5. CENTER PILE(S) VARY BASED ON NUMBER OF LBDS. SEE CIVIL AND STRUCTURAL PLANS FOR NUMBER OF PILES FOR EACH RACK.
6. DIMENSIONS ARE APPROXIMATE, REFER TO STRUCTURAL AND CIVIL PACKAGE FOR FINAL VALUES.
7. CONDUITS ONLY REQUIRED AT PILES CLOSEST TO TRACKER MOTORS.



1 Typical LBD Grouping -Looking North
N.T.S.

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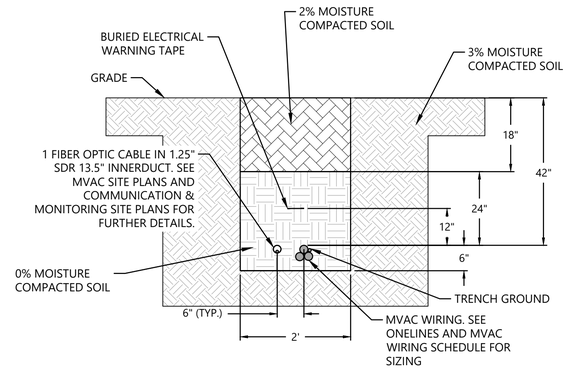
DC Electrical Details

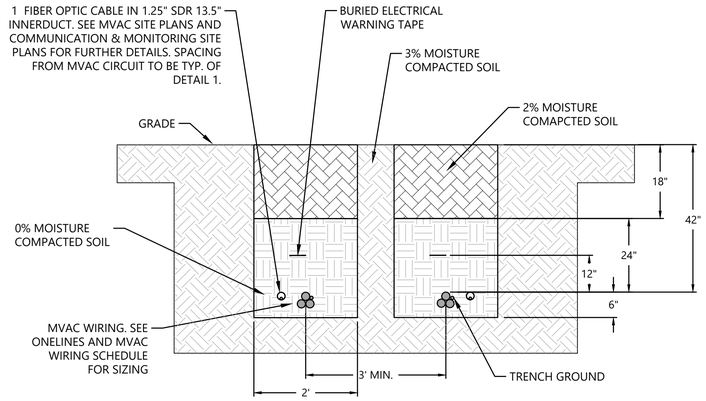
NOT FOR CONSTRUCTION

DATE: 07/13/2023

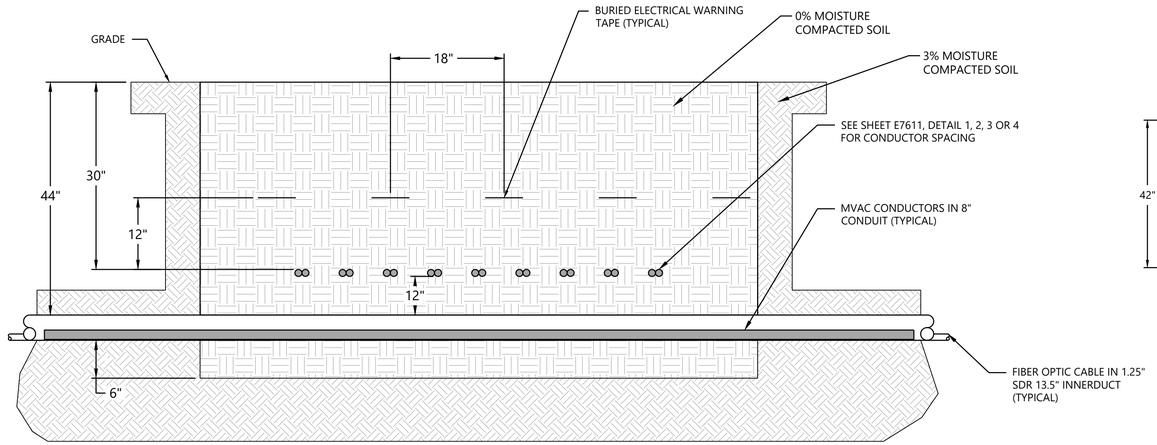
SHEET: E7101 REV: C



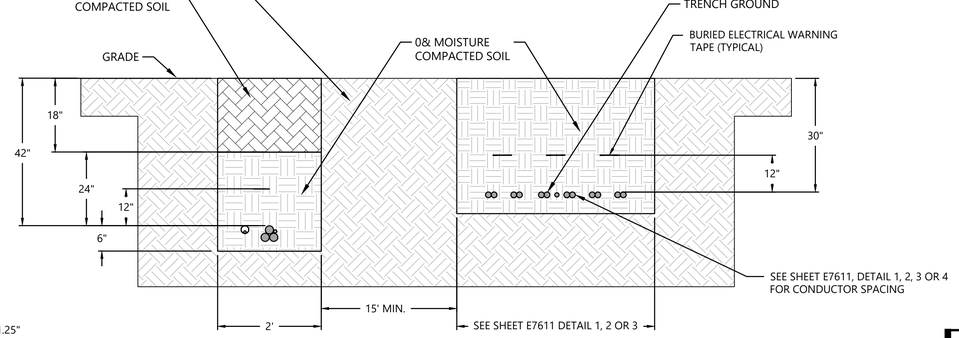
1 MVAC & Fiber Optic Trench
N.T.S.



2 MVAC & Fiber Optic Trench - 2 Circuits
N.T.S.



3 DC & MV Crossing Detail
N.T.S.



4 MVAC & DC Parallel Trenches
N.T.S.

GENERAL NOTES

1. TRENCH BACKFILL TO CONSIST OF NATIVE SOIL WITH ALL DEBRIS AND ORGANIC MATERIALS REMOVED.
2. TRENCH BACKFILL MATERIALS SHALL BE FREE OF PARTICLES/DEBRIS THAT ARE OF A HARDNESS WHICH COULD CAUSE DAMAGE TO THE CABLES LOCATED IN THE TRENCH (E.G. STONES, CALICHE, ETC) AND THAT ARE LARGER THAN $\frac{3}{8}$" IN DIAMETER. IF THESE MATERIALS ARE OBSERVED, THEY SHALL BE SCREENED FOR BACKFILLING WITHIN 3" OF CABLES. CHUNKS OF NATIVE FAT CLAY LARGER THAN $\frac{3}{8}$" IN DIAMETER SHOULD NOT BE REMOVED FROM TRENCH BACKFILL. OCCASIONAL HARD ROCKS (E.G. PEBBLES, ROCKS, CALICHE, ETC) WITH DIAMETER $\frac{3}{8}$" AND SMALLER WILL BE ACCEPTABLE WITHIN 3" OF DIRECT BURIED CABLES.
3. FOR INFORMATION ON WIRE/CONDUIT CLEARANCE, REFER TO SHEET E0020, SECTION 16110.
4. COORDINATE WITH SHEETS E1000 THROUGH E1102 FOR MVAC ROUTING. REFER TO MVAC WIRING SCHEDULES FOR CABLE QUANTITIES AND SIZES.
5. BASED ON WORST CASE AMBIENT SOIL TEMPERATURE OF 30°C AND A WORST-CASE SOIL RESISTIVITY OF 298 °C-cm/W IN A 2'x2' BOX AROUND THE CABLE TO ACCOUNT FOR WORST-CASE DRY OUT. ABOVE THIS, A LAYER WITH A RESISTIVITY VALUE OF 210°C-cm/W WAS USED UP TO THE SURFACE. A VALUE OF 125°C-cm/W WAS USED FOR THE NATIVE SOIL RESISTIVITY.
6. MAXIMUM OF ONE FIBER OPTIC CABLE PER TRENCH RUN. KEEP FIBER OPTIC RUNS FROM THE SAME LOOP SEPARATED IN ANOTHER TRENCH. IT IS ACCEPTABLE TO TRENCH FIBER OPTIC CABLE AT THE SAME DEPTH AS MVAC WIRING. A MIN 12" OF SPACING TO BE MAINTAINED WHEN FIBER IS TRENCHED AT THE SAME DEPTH.
7. UNLESS SPECIFIED OTHERWISE COMPACT BACKFILL SOIL TO '85%', STANDARD PROCTOR. COMPACTION TO BE PERFORMED WITHIN ± 4% OF OPTIMAL MOISTURE. TRENCHES WILL BE COMPACTED TO 85% OF THE MAXIMUM DRY DENSITY OR A MINIMUM DRY DENSITY OF 77 PCF (AT NATURAL MOISTURE CONTENT), WHICHEVER IS GREATER.
8. WHEREVER TRENCH WIDTH IS UNSPECIFIED IT IS BECAUSE IT IS DICTATED BY THE NUMBER OF CONDUCTORS. THE MINIMUM SPACING BETWEEN THE CONDUCTORS HAS BEEN CALLED OUT.
9. MULTI-CIRCUIT TRENCHES TO HAVE INDICATED WARNING TAPE INSTALLED EVERY 30" ACROSS TRENCH.
10. MV CABLES TO BE IN FLAT CONFIGURATION AND SHALL BE GENERALLY PHYSICALLY TOUCHING.
    FOR DIFFICULT TERRAIN, MV PHASE CABLES ALLOWED TO BE SPACED UP TO FOUR (4) INCHES APART FOR SHORT DISTANCES. PHASE CABLES TO RETURN TO BE GENERALLY PHYSICALLY TOUCHING AS SOON AS POSSIBLE.
11. FIBER OPTIC CABLE TO BE IN 1.25" HDPE INNERDUCT.
12. WHERE CABLE CROSSES INTERNAL ROAD, COMPACTION OF TRENCH TO BE PER CIVIL COMPACTION REQUIREMENTS OR 90%, WHICHEVER IS GREATER.
13. WHERE POSSIBLE, MAINTAIN MINIMUM OF 5' EDGE OF TRENCH OFFSET FROM ROAD EDGE.

Westwood

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Westwood Professional Services, Inc.

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FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

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B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

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Douglas County, Kansas

Trenching Details

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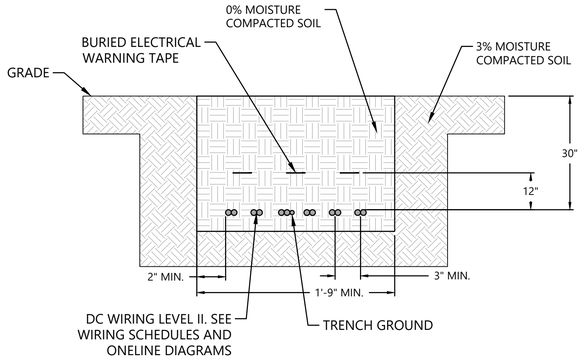
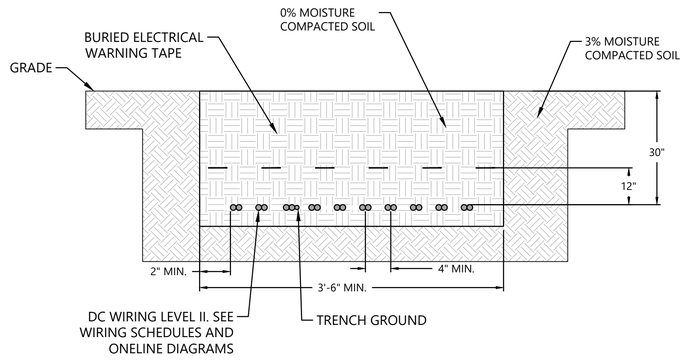
DATE: 07/13/2023

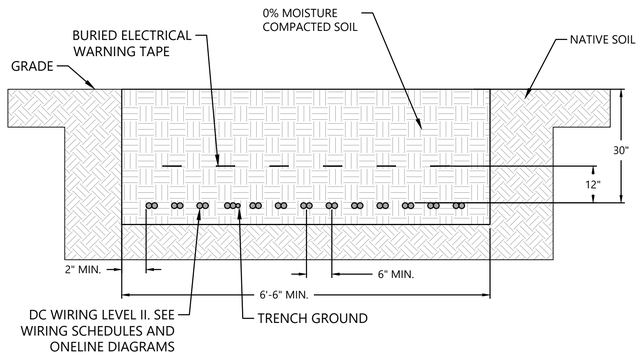
SHEET: E7610 REV: C



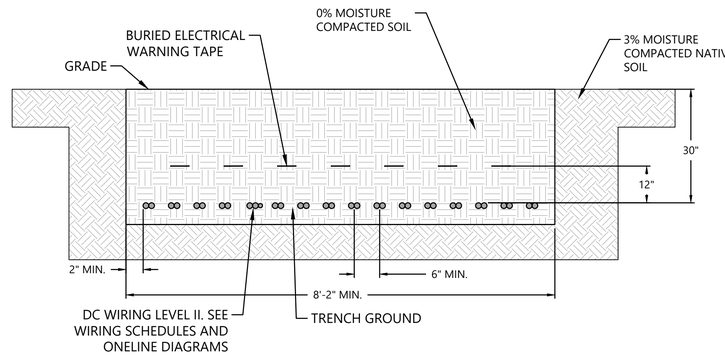
1 Max. of 6 DC Level II Circuits
N.T.S.



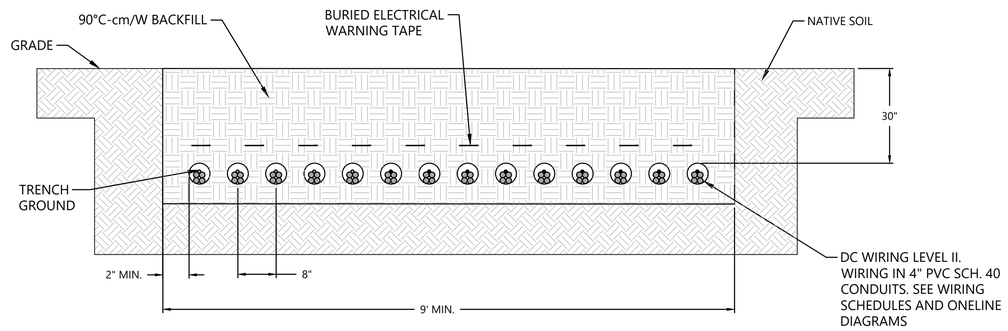
2 Max. of 10 DC Level II Circuits
N.T.S.



3 Max. of 13 DC Level II Circuits
N.T.S.



4 Max. of 16 DC Level II Circuits
N.T.S.



5 Inverter Entrance - 28 Circuits 750 KCMIL
N.T.S.

NOTES

1. TRENCH BACKFILL TO CONSIST OF SELECTED NATIVE SOIL WITH ALL DEBRIS AND ORGANIC MATERIALS REMOVED WITH THE EXCEPTION OF MOIST CLODS OF CLAY.
2. FOR INFORMATION ON WIRE/CONDUIT CLEARANCE, REFER TO SHEET E0020
3. COORDINATE WITH SHEETS E1000-E1102 FOR MVAC ROUTING. REFER TO MVAC WIRING SCHEDULES FOR CABLE QUANTITIES AND SIZES.
4. COORDINATE WITH SHEET E6200 FOR FIBER OPTIC CABLE ROUTING.
5. COORDINATE WITH SHEETS E2110-E2122 FOR DC WIRING/CABLE ROUTING. REFER TO DC WIRING SCHEDULES FOR CABLE QUANTITIES AND SIZES.
6. BASED ON AMBIENT SOIL TEMPERATURE OF 23c AT 42" DEPTH FOR AC, 24C AT 26' DEPTH FOR DC WITH A THERMAL RESISTIVITY OF 280C-cm/W FOR NATIVE SOIL BACKFILL COMPACTED TO 85% PROCTOR.
7. IT IS ACCEPTABLE TO TRENCH FIBER OPTIC CABLE AT THE SAME DEPTH AS MVAC WIRING. A MIN 12" OF SPACING TO BE MAINTAINED AT ALL TIMES.
8. UNLESS SPECIFIED OTHERWISE COMPACT BACKFILL SOIL TO '85%', STANDARD PROCTOR COMPACTION TO BE PERFORMED WET OF OPTIMAL MOISTURE.
9. CONTRACTOR SHALL BACKFILL WITHIN 12" OF THE CABLES, SHALL BE FREE OF SHARP OBJECTS, ROCKS, AND OTHER DEBRIS LARGER THAN 3/8 INCH.
10. CONTRACTOR TO USE CABLE TIES TO SECURE TREFOIL EVERY 5'.

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Trenching Details

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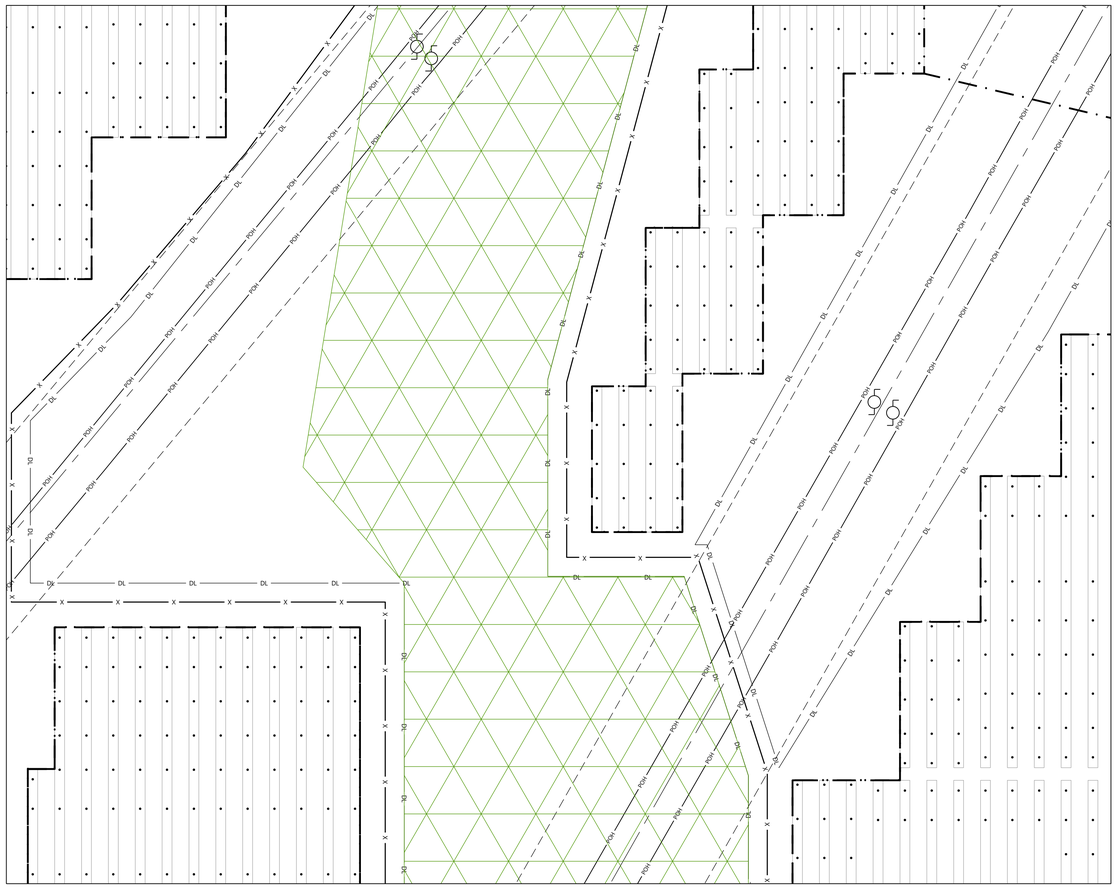
DATE: 07/13/2023

SHEET: E7611 REV: C



LEGEND

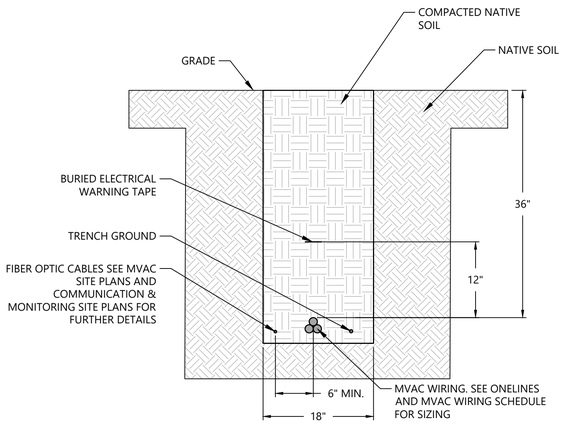
- PROJECT BOUNDARY
- RIGHT-OF-WAY LINES
- EASEMENT LINES
- EX. FENCE
- EX. MISCELLANOUS UTILITY
- EX. WATER EDGE LINE
- EX. STREAM CHANNEL
- EX. DELINEATED WETLAND
- FLOOD HAZARD AREA
- PROPOSED LAY-DOWN YARD
- PROPOSED LAY-DOWN YARD
- EX. PAVED ROAD
- EX. GRAVEL ROAD
- PROPOSED INVERTER
- PROPOSED ACCESS ROAD
- PROPOSED SECURITY FENCE
- UMV1 UNDERGROUND MVAC CIRCUIT 1
- UMV2 UNDERGROUND MVAC CIRCUIT 2
- UMV3 UNDERGROUND MVAC CIRCUIT 3
- UMV4 UNDERGROUND MVAC CIRCUIT 4
- UMV5 UNDERGROUND MVAC CIRCUIT 5
- UMV6 UNDERGROUND MVAC CIRCUIT 6
- UMV7 UNDERGROUND MVAC CIRCUIT 7
- UMV8 UNDERGROUND MVAC CIRCUIT 8
- UTILITY MARKER

NOTES

1. PROVIDE BURIED RFID BALL MARKERS FOR EACH END OF ALL TRENCHING.
2. ALL NORTHING AND EASTING COORDINATES PROVIDED IN PLAN VIEW ARE BASED ON NAD83 TEXAS STATE PLANES, SOUTH CENTRAL ZONE, US FOOT.
3. THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.
4. CONTRACTOR SHALL COORDINATE WITH ENTITIES FOR APPROVAL OF CROSSINGS OF EXISTING FIBER OPTIC LINES, OIL/GAS PIPING, OVERHEAD TRANSMISSION/DISTRIBUTION LINES, HIGHWAYS/COUNTY ROADS, ETC. ALSO, VERIFY THE EXACT CROSSING REQUIREMENTS FOR BURIAL DEPTH, DISTANCE FROM STRUCTURES, ETC. PRIOR TO PERFORMING WORK, NOTIFY ENGINEER OF ANY SPACING OR BURIAL DEPTH CHANGES REQUIRED TO CONFIRM MV CABLES HAVE SUFFICIENT CAPACITY TO ACCOMMODATE THOSE REVISIONS.
5. CONTRACTOR TO FIELD VERIFY AND COORDINATE LOCATION OF MVAC TRENCH ROUTING TO STAY CLEAR OF THE FENCE POSTS.
6. THE PROPOSED UTILITY SHALL CROSS THE R.O.W. AT A 90 DEGREE ANGLE. ANY DEVIATION FROM THE 90 DEGREE RULE MUST BE APPROVED BY THE UTILITY OWNERS.
7. WARNING SIGNS WITH COMPANY'S CONTACT INFORMATION SHALL BE INSTALLED JUST OUTSIDE OF THE R.O.W., ON BOTH SIDES DEPICTING THE CENTER LINE OF THE CONSTRUCTED UTILITIES WITHIN THE R.O.W.

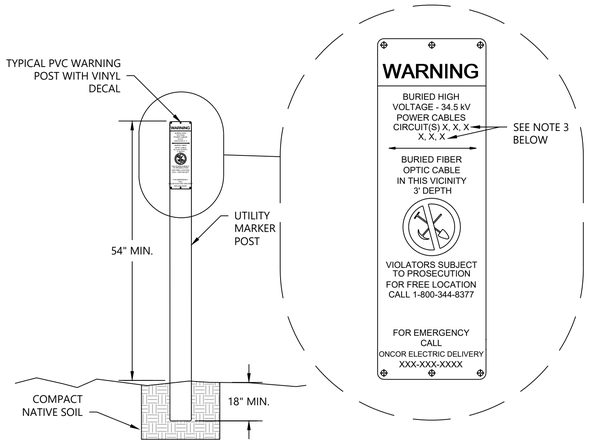
1 Overhead Utility Crossing Plan View

1" = 60'



2 MVAC & Fiber Optic Trench

N.T.S.



DETAIL NOTES

1. ABOVEGROUND MARKER SHALL BE PLACED WHERE PROPOSED UNDERGROUND INFRASTRUCTURE ENTERS AND AND EXITS RIGHT-OF WAY AND EXISTING UTILITY EASEMENTS.
2. EMS BALL MARKER SHALL BE PLACED 24"-36" BELOW GRADE WHERE UTILITY MARKER IS INSTALLED.
3. SEE SHEET E7660 FOR LIST OF CIRCUITS.
4. UTILITY MARKER ARROWS TO POINT ONLY IN DIRECTION OF CIRCUITS.

3 Utility Marker Detail

N.T.S.

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Kansas Sky Energy Center

Douglas County, Kansas

Overhead Utility Crossing Details

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E7661 REV: C

FRONT BACK

TOPBiHiKu7

N-type Bifacial TOPCon Technology

655 W ~ 670 W

CS7N-655 | 660 | 665 | 670TB-AG

MORE POWER

- EXTRA POWER — Up to 85% Power Bifaciality, more power from the back side
- Excellent anti-LeTID & anti-PID performance. Low power degradation, high energy yield
- Lower temperature coefficient (Pmax): -0.29%/°C, increases energy yield in hot climate
- Lower LCOE & system cost

MORE RELIABLE

- 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.

12 Years — Enhanced Product Warranty on Materials and Workmanship*

30 Years — Linear Power Performance Warranty*

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

*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
IEC 62941: 2019 / Photovoltaic module manufacturing quality system

PRODUCT CERTIFICATES*

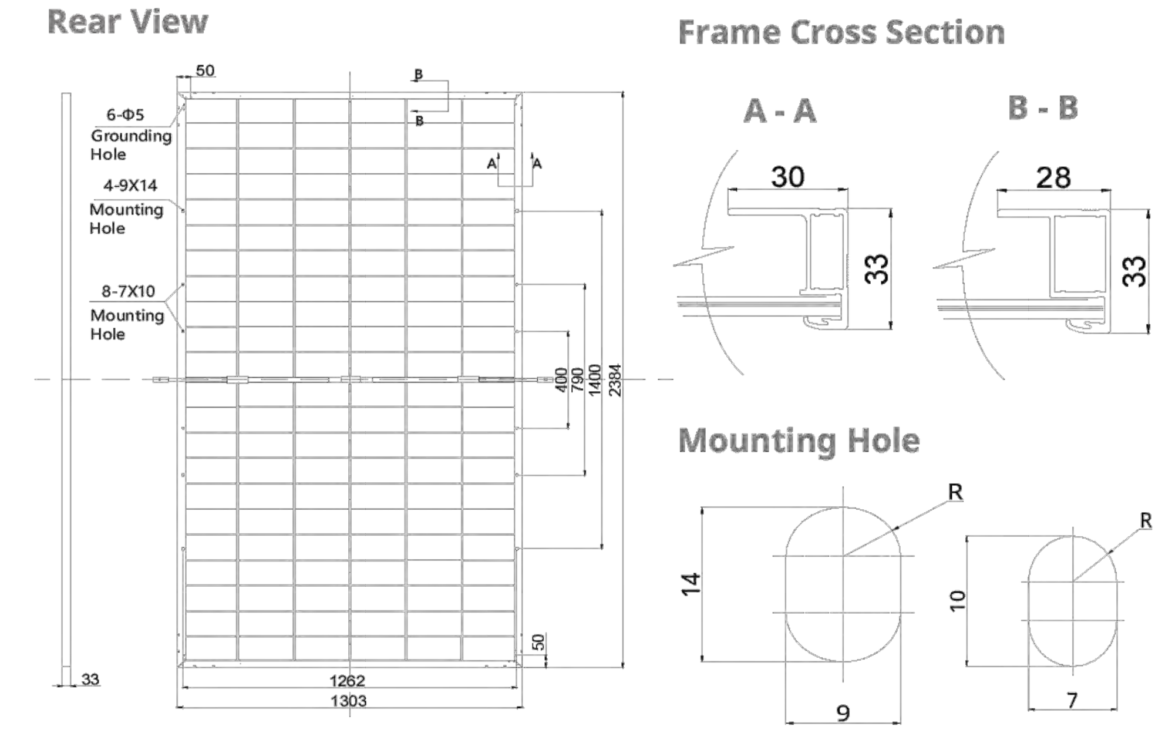
IEC 61215 / IEC 61730 / CE / INMETRO / MCS / UKCA / CGC
FSEC (US Florida) / UL 61730 / IEC 61701 / IEC 62716
IEC 60068-2-68 / Take-e-way

* 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.

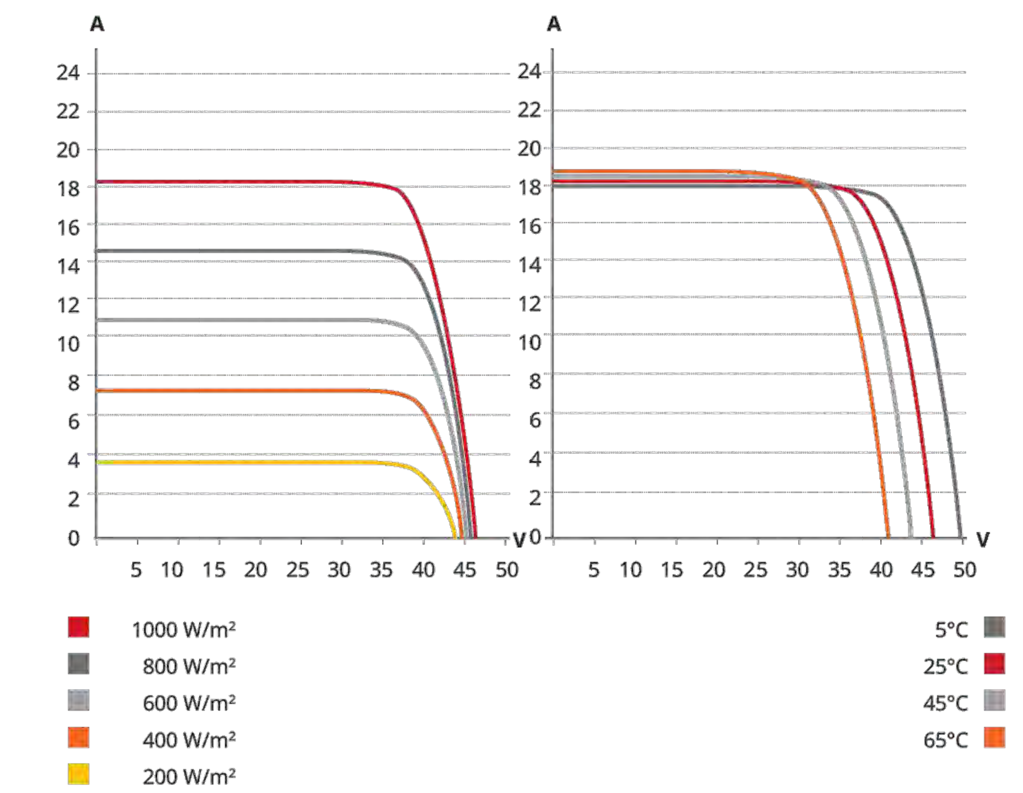
CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 22 years, it has successfully delivered over 88 GW of premium-quality solar modules across the world.

CSI Solar Co., Ltd.
1350 Treat Blvd. Suite 500, Walnut Creek, CA 94597 | www.csisolar.com/na | service.ca@csisolar.com

ENGINEERING DRAWING (mm)



CS7N-665TB-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-655TB-AG		655 W	38.2 V	17.15 A	46.1 V	18.04 A	21.1%
Bifacial Gain**	5%	688 W	38.2 V	18.01 A	46.1 V	18.94 A	22.1%
	10%	721 W	38.2 V	19.81 A	46.1 V	19.84 A	23.2%
	20%	786 W	38.2 V	20.58 A	46.1 V	21.65 A	25.3%
CS7N-660TB-AG		660 W	38.4 V	17.19 A	46.3 V	18.09 A	21.2%
Bifacial Gain**	5%	693 W	38.4 V	18.05 A	46.3 V	18.99 A	22.3%
	10%	726 W	38.4 V	19.85 A	46.3 V	19.90 A	23.4%
	20%	792 W	38.4 V	20.63 A	46.3 V	21.71 A	25.5%
CS7N-665TB-AG		665 W	38.6 V	17.23 A	46.5 V	18.14 A	21.4%
Bifacial Gain**	5%	698 W	38.6 V	18.09 A	46.5 V	19.05 A	22.5%
	10%	732 W	38.6 V	18.97 A	46.5 V	19.95 A	23.6%
	20%	798 W	38.6 V	20.68 A	46.5 V	21.77 A	25.7%
CS7N-670TB-AG		670 W	38.8 V	17.27 A	46.7 V	18.19 A	21.6%
Bifacial Gain**	5%	704 W	38.8 V	18.15 A	46.7 V	19.10 A	22.7%
	10%	737 W	38.8 V	19.00 A	46.7 V	20.01 A	23.7%
	20%	804 W	38.8 V	20.72 A	46.7 V	21.83 A	25.9%

* 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 | NMOT*

	Nominal Max. Power (Pmax)	Opt. Operating Voltage (Vmp)	Opt. Operating Current (Imp)	Open Circuit Voltage (Voc)	Short Circuit Current (Isc)
CS7N-655TB-AG	495 W	36.1 V	13.72 A	43.6 V	14.55 A
CS7N-660TB-AG	499 W	36.3 V	13.75 A	43.8 V	14.59 A
CS7N-665TB-AG	503 W	36.5 V	13.78 A	44.0 V	14.63 A
CS7N-670TB-AG	507 W	36.7 V	13.81 A	44.2 V	14.67 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

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 W
Power Bifaciality*	80 %

* Power Bifaciality = $Pmax_{rear}$ / $Pmax_{front}$, both $Pmax_{rear}$ and $Pmax_{front}$ are tested under STC, Bifaciality Tolerance: ± 5 %

MECHANICAL DATA

Specification	Data
Cell Type	TOPCon cells
Cell Arrangement	132 [2 x (11 x 6)]
Dimensions	2384 × 1303 × 33 mm (93.9 × 51.3 × 1.30 in)
Weight	37.8 kg (83.3 lbs)
Front Glass	2.0 mm heat strengthened glass with anti-reflective coating
Back Glass	2.0 mm heat strengthened glass
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4.0 mm² (IEC), 12 AWG (UL)
Cable Length (Including Connector)	410 mm (16.1 in) (+) / 250 mm (9.8 in) (-) or 2000 mm (78.7 in) (+) / 1400 mm (55.1 in) (-)
Connector	T6 or MC4 series
Per Pallet	33 pieces
Per Container (40' HQ)	594 pieces or 495 pieces (only for US & Canada)

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.29 % / °C
Temperature Coefficient (Voc)	-0.25 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	41 ± 3°C

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going 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.

PARTNER SECTION

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Kansas Sky Energy Center
Douglas County, Kansas

Module Specifications

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E8900 REV: C

SUNNY CENTRAL 4400 UP-US / 4600 UP-US

Technical data	SC 4400 UP-US	SC 4600 UP-US
Input (DC)		
MPP voltage range V_{DC} (at 25 °C / at 50 °C)	962 to 1325 V / 1000 V	1003 to 1325 V / 1025 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	934 V / 1112 V	976 V / 1153 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)	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available battery fuse size (per input)	750 A	
Output (AC)		
Nominal AC power at cos φ =1 (at 35 °C / at 50 °C)	4400 kVA[11] / 3960 kVA	4600 kVA[13] / 4140 kVA
Nominal AC power at cos φ =0.8 (at 35 °C / at 50 °C)	3520 kW[11] / 3168 kW	3680 kW[13] / 3312 kW
Nominal AC current $I_{AC, nom}$ (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] [8]	660 V / 528 V to 759 V	690 V / 552 V to 759 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[9]	> 2	
Power factor at rated power / displacement power factor adjustable[8] [10]	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency[2] / European efficiency[2] / CEC efficiency[3]	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	○ / ○	
Insulation monitoring	○	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	
Weight	<3700 kg / < 8158 lb	
Self-consumption (max.[4] / partial load[5] / average[6])	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range[8]	−25 °C to 60 °C / −13 °F to 140 °F	
Noise emission[7]	67.0 dB(A)*	
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 month/year) / 0% to 95%	
Maximum operating altitude above MSL[8] 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)	
Fresh air consumption	6500 m³/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, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 6I), 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

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 averaged 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 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 1040 V

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Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR LLC.

PREPARED FOR PROJECT NUMBER: 09100007

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	05/22/23	ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
B	06/16/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME
C	07/13/23	RE-ISSUED FOR 30% DESIGN REVIEW	GH	WME	WME

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Douglas County, Kansas

Inverter Specifications

NOT FOR CONSTRUCTION

DATE: 07/13/2023

SHEET: E8901 REV: C

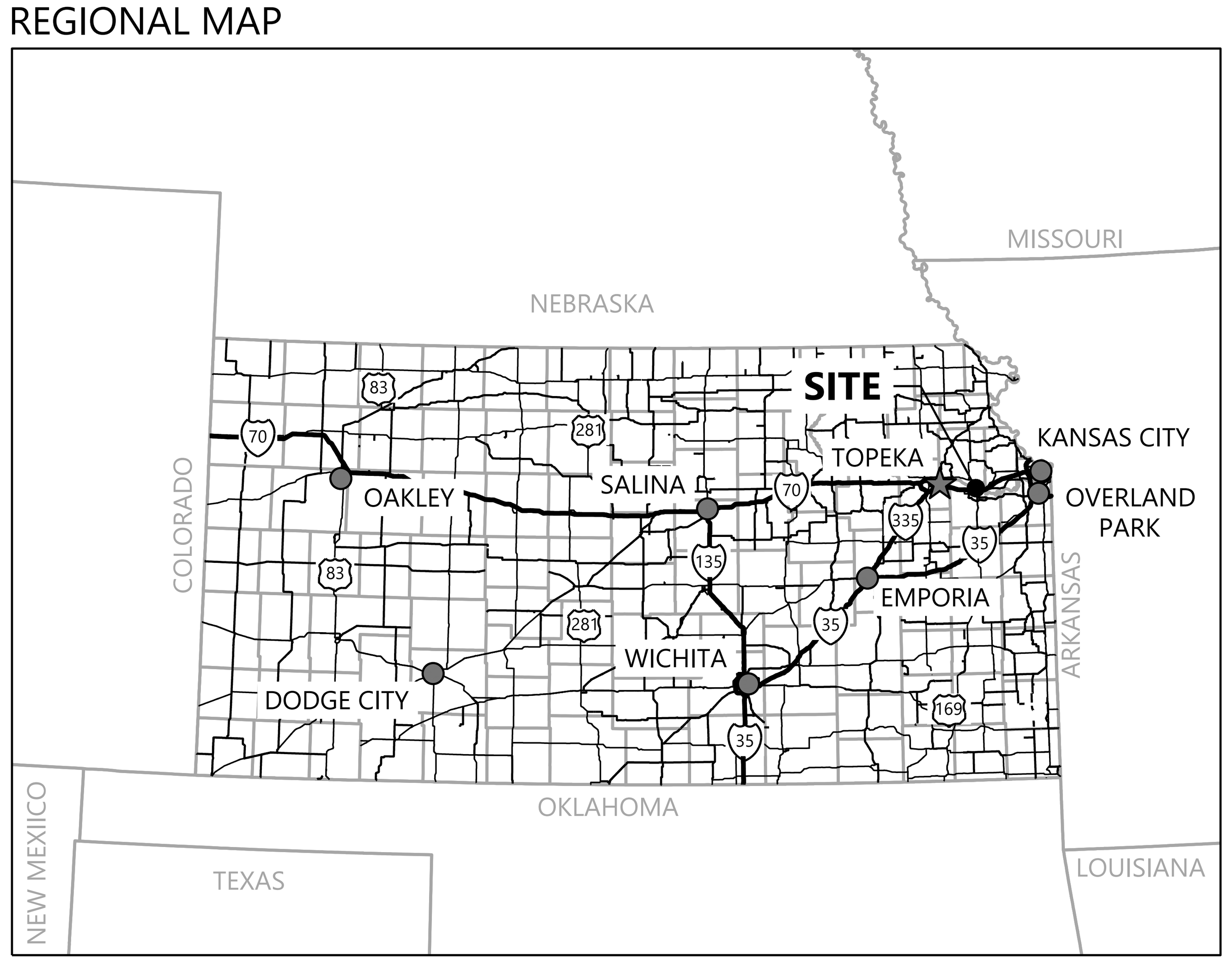
Kansas Sky Energy Center

Douglas County, Kansas

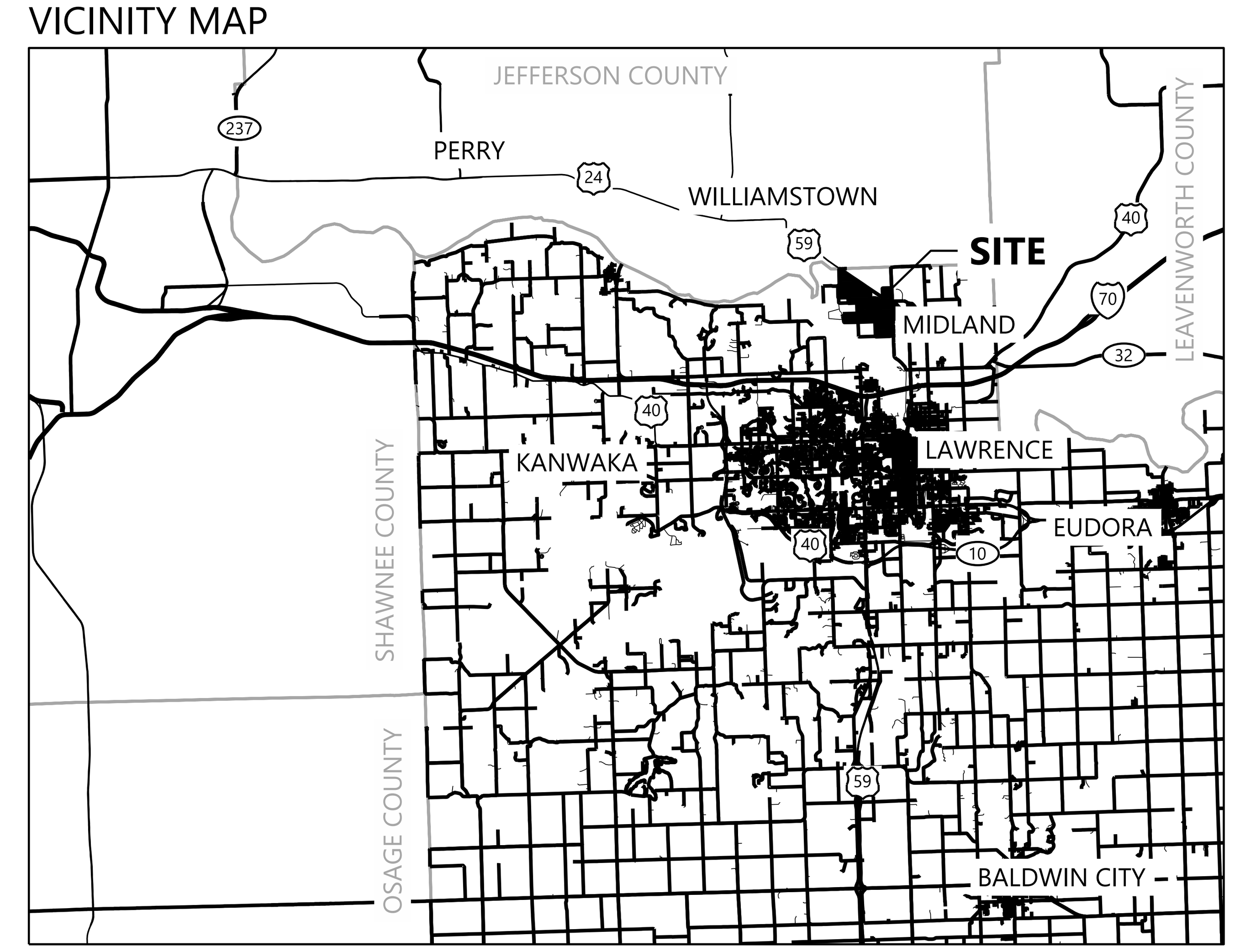
Project Number: 09100007

Substation Physical Electrical Plans

REGIONAL MAP



VICINITY MAP



Sheet List Table			
Sheet Number	Sheet Title	Revision Number	Revision Date
EP001	Cover Sheet	C	08/11/2023
EP100	General Arrangement Plan	C	08/11/2023
EP800	Major Equipment List	C	08/11/2023

CONTACT INFORMATION			
PROJECT ROLE	COMPANY	NAME	PHONE
OWNER	FREE STATE SOLAR PROJECT, LLC	BRIANNA BACA	(531) 203-0181
DEVELOPER	FREE STATE SOLAR PROJECT, LLC	BRIANNA BACA	(531) 203-0181
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REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	04/28/2023	10% SUBMITTAL - ISSUED FOR REVIEW	BWD	JMH	JLM
B	05/19/2023	10% SUBMITTAL - ISSUED FOR REVIEW	BWD	JMH	JLM
C	08/11/2023	10% SUBMITTAL - ISSUED FOR PERMIT	BWD	JMH	JLM

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Cover Sheet

NOT FOR CONSTRUCTION

DATE: 08/11/2023

SHEET: EP001 REV: C

VOLTAGE		MINIMUM METAL-TO-METAL CLEARANCE PHASE-TO-PHASE	MINIMUM CENTERLINE-TO-CENTERLINE PHASE SPACING FOR RIGID BUS	CLEARANCE TO GROUNDED PARTS FOR RIGID BUS RECOMMENDED
KV	BIL			
115	550	5'-3"	11'-0"	4'-4"
34.5	200	1'-6"	3'-6"	1'-3"

NOTES:

1. PHASING SHALL BE A,B,C. ELECTRICAL SYSTEM PHASE RELATIONSHIP TO BE:

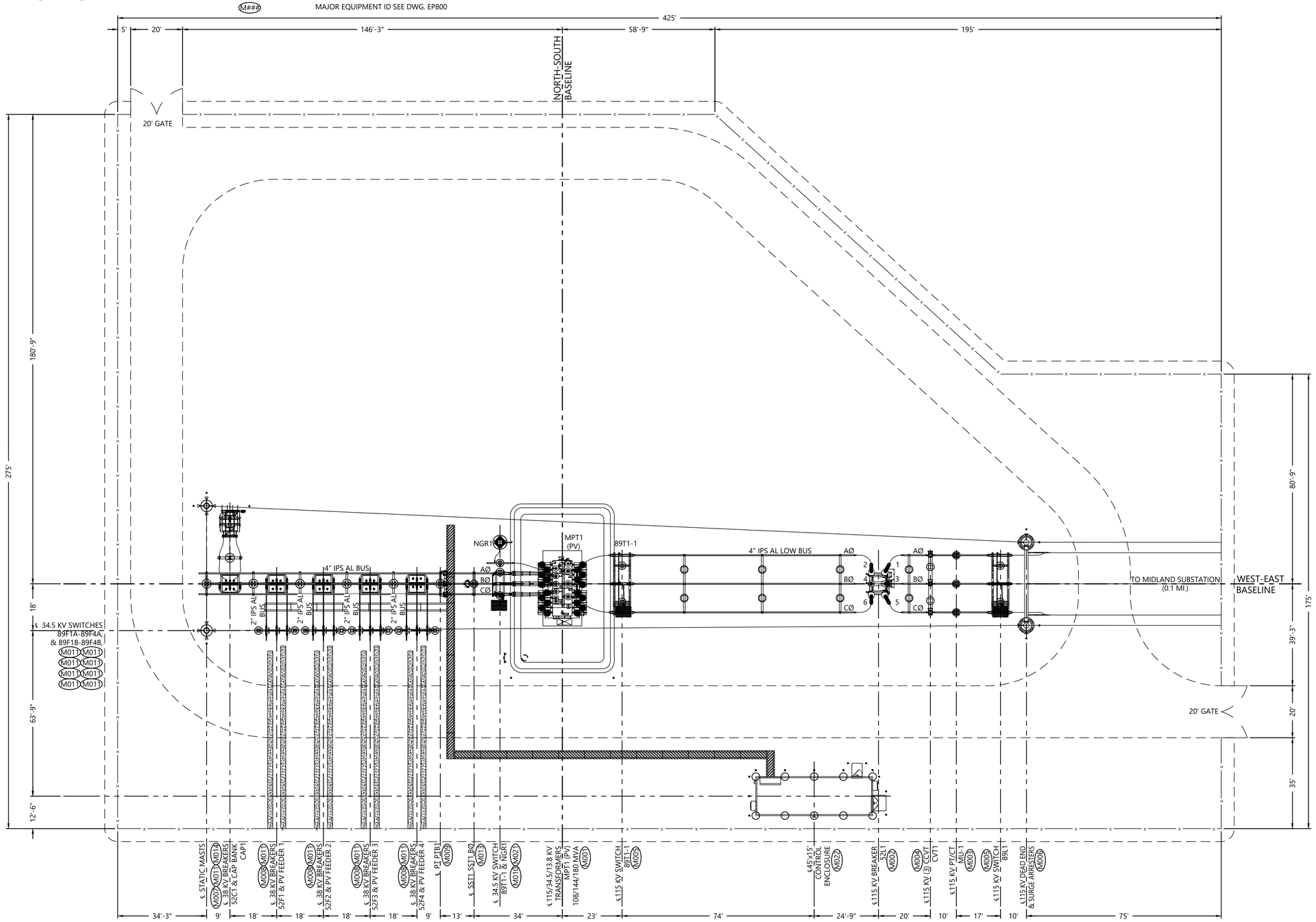
A 1 B 2 C 3

LEGEND:

- FENCE
- DRIVE AREA/EDGE OF GRAVEL
- BOLLARD
- TRENCH
- TRAFFIC RATED TRENCH
- 2' WIDE CONCRETE DUCT BANK
- LUMINAIRE LOCATION
- BUILDING EXTERIOR LUMINAIRE LOCATION
- M### MAJOR EQUIPMENT ID SEE DWG. EP800

REFERENCE DRAWINGS:

EE100 POWER ONE-LINE
EP800 MAJOR EQUIPMENT LIST



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0' 20'-0" 40'-0" 60'-0"

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General Arrangement Plan

NOT FOR CONSTRUCTION

DATE: 08/11/2023

SHEET: EP100 REV: C

ITEM	QTY.	DESCRIPTION	MANUFACTURER	PART NO.	SUPPLIER
M001	1	POWER TRANSFORMER, 115/34.5/13.8KV, 108/144/180MVA, 550/115KV BIL, Z: 6.5% @ 108MVA WITH SURGE ARRESTERS, 76KV MCOV, STATION CLASS POLYMER TYPE NEMA 4-HOLE CONNECTION, UPRIGHT MOUNTING ON TRANSFORMER			
M002	1	CIRCUIT BREAKER, 115KV, 2000A			
M003	3	COMBINED INSTRUMENT TRANSFORMER, 115KV, EXTENDED RATIO 0.15B1.8, 1000:5, SR; RF2.0, 0.3W,M,X,Y,Z			
M004	3	115KV CAPACITIVE COUPLING VOLTAGE TRANSFORMER (CCVT) 600/1000:1 & 69KV/115KV GRDY, 0.3W,M,X,Y,Z			
M005	2	MOTOR OPERATED DISCONNECT SWITCH, 115KV, 2000A, 115KV BIL, DOUBLE END BREAK, CENTER PIVOT, HORIZONTALLY MOUNTED, THREE PHASE UNIT			
M006	3	SURGE ARRESTER, 76KV, MCOV, STATION CLASS, CLAMP CONNECTION, UNDERHUNG MOUNTING			
M007	1	CIRCUIT BREAKER, 38KV, 115KV BIL, 1200A, 25KA, VACUUM TYPE			
M008	4	CIRCUIT BREAKER, 38KV, 115KV BIL, 1200A, 25KA, VACUUM TYPE WITH INTERLOCKING GROUND SWITCH			
M009	3	POTENTIAL TRANSFORMER, 38KV, 115KV BIL, SINGLE BUSHING, 20125/34500: 115/67.08V, 175/300:1, 0.3W,X,M,Y			
M010	1	GOAB DISCONNECT SWITCH, HAND OPERATED, 34.5KV, 115KV BIL, VERTICAL BREAK, THREE PHASE UNIT			
M011	39	DISCONNECT SWITCH, 34.5KV, 115KV BIL, 1200A, VERTICAL MOUNT HOOKSTICK, SINGLE PHASE, TYPE V			
M012	30	SURGE ARRESTER, 24.4 KV MCOV, POLYMER TYPE NEMA 4-HOLE CONNECTION, CANTILEVER MOUNTING, UPRIGHT (FEEDERS AND POWER TRANSFORMER)			
M013	1	STATION SERVICE TRANSFORMER, 100KVA, 115KV BIL, POLE-MOUNT, SINGLE PHASE			
M014	1	CAPACITOR BANK, THREE PHASE, 38KV, 115KV BIL, 10MVAR WITH GROUND SWITCH, PT, 20125-115/67.08V, RATIO:175/300:1, 24.4 KV MCOV SURGE ARRESTER			
M015	1	CAPACITOR SWITCHER, 38KV, 115KV BIL, 40KA WITHSTAND & MAKING CURRENT			
M016	1	CURRENT LIMITING FUSE HOLDER			
M017	1	FUSE DISCONNECT MOUNTING, 38KV, 115KV BIL, STATION VERTICAL DISCONNECT, SMD-5 TYPE			
M018	1	FUSE UNIT, 34.5KV NOMINAL, 7E			
M019	15	115KV INSULATOR, STANDARD STRENGTH, 5" B.C. TOP & 5" B.C. BOTTOM, TR288			
M020	45	38KV INSULATOR, STANDARD STRENGTH, 3" B.C., TR210			
M021	1	NEUTRAL GROUNDING REACTOR, DRY-TYPE AIR CORE, 38KV SYSTEM, 115KV BIL, 1.0 OHM WITH SURGE ARRESTER, 24.4KV MCOV, STATION CLASS POLYMER TYPE NEMA 4-HOLE CONNECTION, UPRIGHT MOUNTING			
M022	1	CONTROL ENCLOSURE W/ PREWIRED PROTECTION PANELS AND AUXILIARY EQUIPMENT IN A PREFABRICATED ENCLOSURE, 45'-0" x 15'-0"			

REFERENCE DRAWINGS:

EE100	POWER ONE-LINE
EP100	GENERAL ARRANGEMENT PLAN

NOTES:

1. CAPACITOR AND REACTOR BANKS SHALL BE FURNISHED COMPLETE WITH SURGE ARRESTERS AND VENDOR SUPPLIED MOUNTING HARDWARE.
2. THE EQUIPMENT LIST SHOWN ON THIS DRAWING REFLECTS THE MAJOR SUBSTATION EQUIPMENT ONLY. CONTRACTOR SHALL SUPPLY ALL NECESSARY PARTS AND ACCESSORIES REQUIRED TO CONSTRUCT THE COMPLETED DESIGN AS CONCEPTUALIZED IN THE PACKAGE. ALL EQUIPMENT SHALL COMPLY WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS.

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Kansas Sky Energy Center
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Major Equipment List

NOT FOR CONSTRUCTION

DATE: 08/11/2023

SHEET: EP800 REV: C

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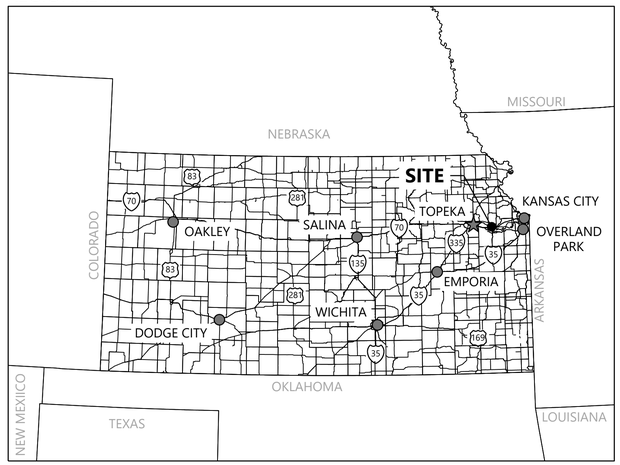
Kansas Sky Energy Center

Douglas County, Kansas

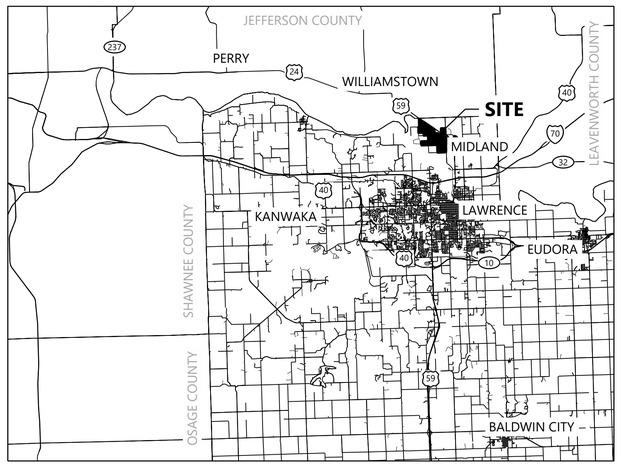
Project Number: 09100007

Substation Protection and Controls Plans

REGIONAL MAP



VICINITY MAP



P&C DRAWING LIST			
SHEET NUMBER	SHEET TABLE	SHEET REVISION	SHEET DATE
EE001	Cover Sheet	C	08/11/2023
EE003	Legend	C	08/11/2023
EE100	Power One-line	C	08/11/2023
EE101	Relay One-line	C	08/11/2023
EE102	(FUTURE USE)		
EE103	Relay One-line	C	08/11/2023
EE104	Relay One-line	C	08/11/2023

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C	08/11/2023	10% SUBMITTAL - ISSUED FOR PERMIT	WJF	ELD	JMH

Kansas Sky Energy Center
Douglas County, Kansas

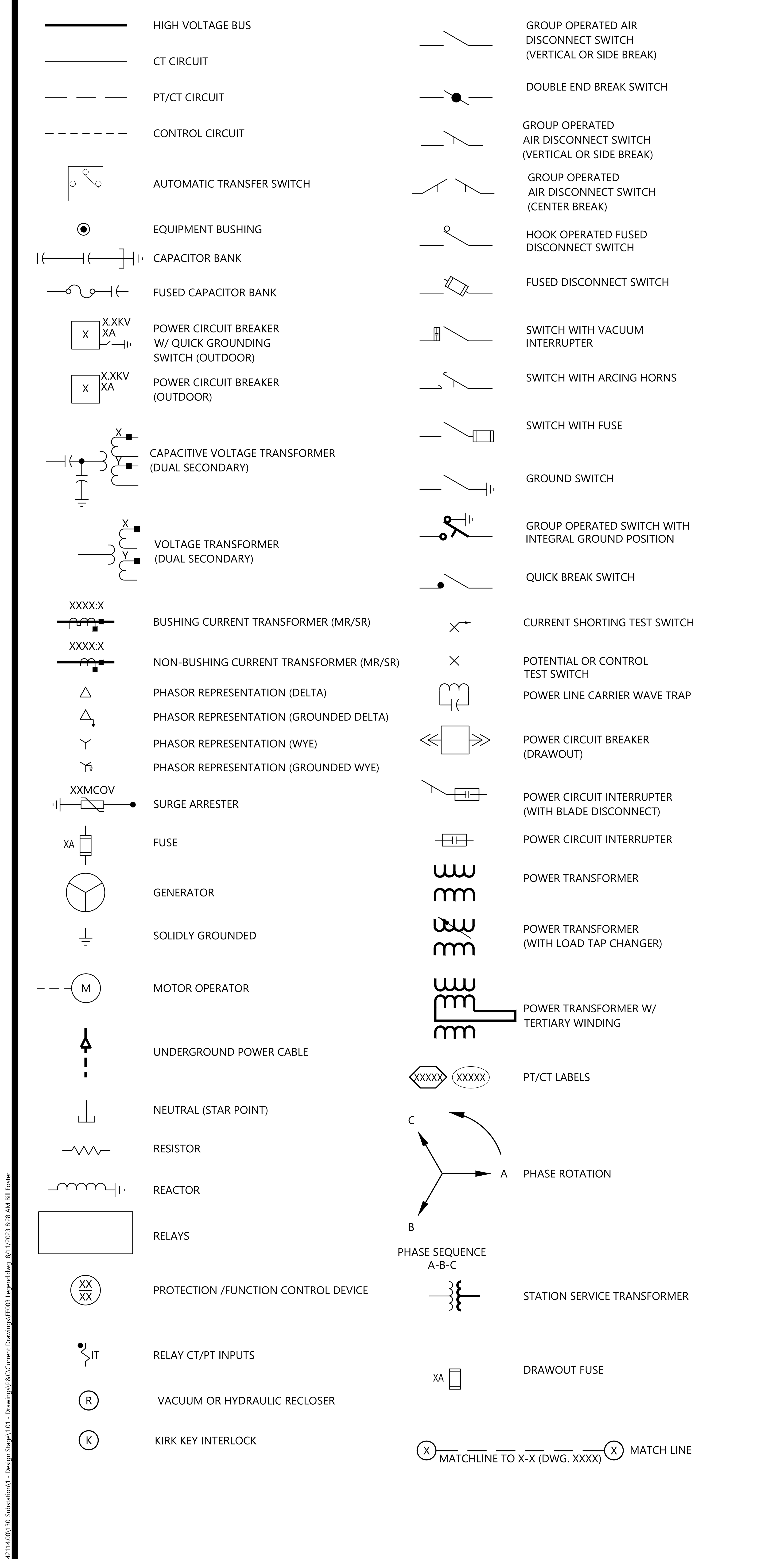
Cover Sheet

NOT FOR CONSTRUCTION

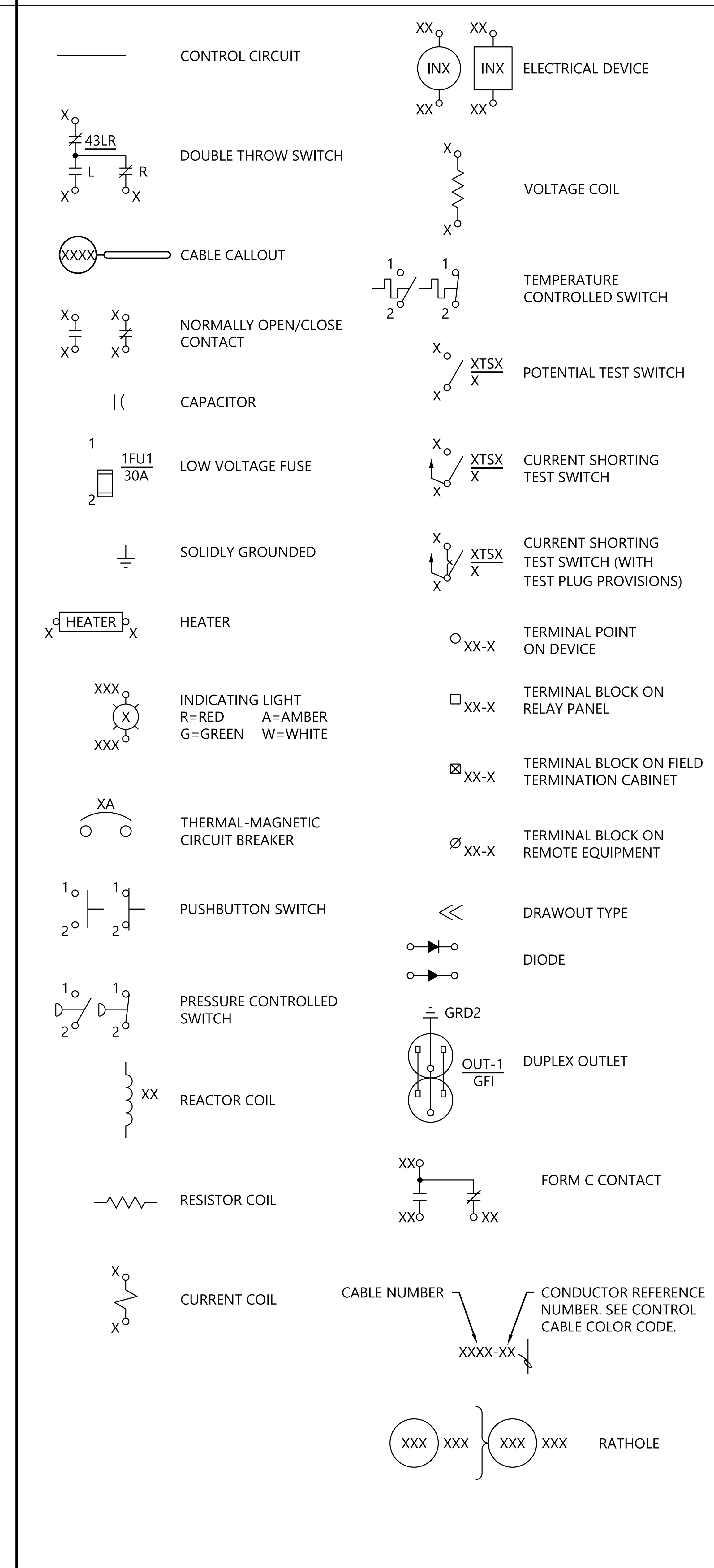
DATE: 08/11/2023

SHEET: EE001 REV: C

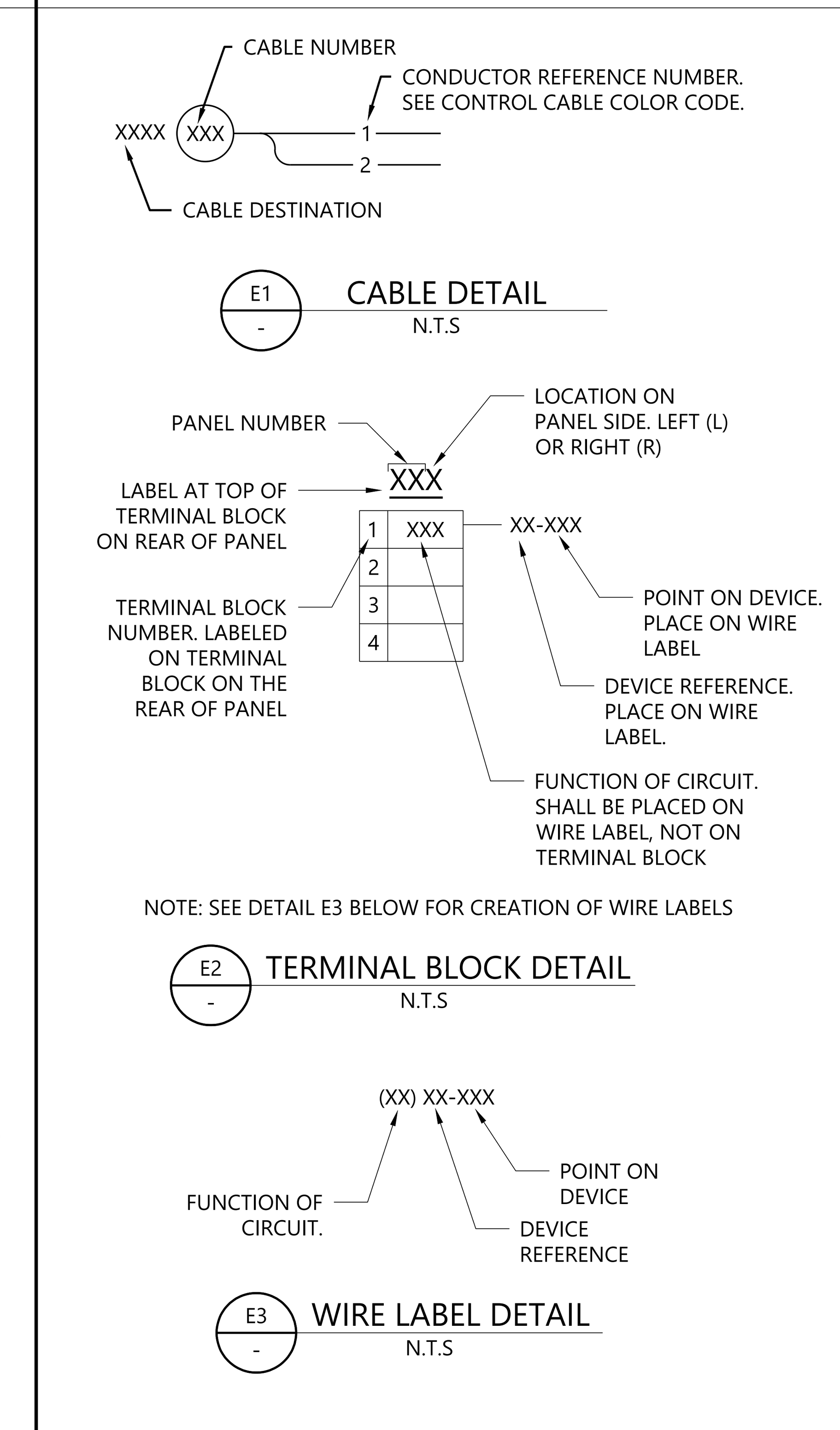
ONE LINE & THREE LINE DIAGRAM SYMBOLS


HIGH VOLTAGE BUS
CT CIRCUIT
PT/CT CIRCUIT
CONTROL CIRCUIT
AUTOMATIC TRANSFER SWITCH
EQUIPMENT BUSHING
CAPACITOR BANK
FUSED CAPACITOR BANK
X.XKV XA
POWER CIRCUIT BREAKER W/ QUICK GROUNDING SWITCH (OUTDOOR)
X.XKV XA
POWER CIRCUIT BREAKER (OUTDOOR)
CAPACITIVE VOLTAGE TRANSFORMER (DUAL SECONDARY)
VOLTAGE TRANSFORMER (DUAL SECONDARY)
XXXX:X
BUSHING CURRENT TRANSFORMER (MR/SR)
XXXX:X
NON-BUSHING CURRENT TRANSFORMER (MR/SR)
PHASOR REPRESENTATION (DELTA)
PHASOR REPRESENTATION (GROUNDED DELTA)
PHASOR REPRESENTATION (WYE)
PHASOR REPRESENTATION (GROUNDED WYE)
XXMCOV
SURGE ARRESTER
XA
FUSE
GENERATOR
SOLIDLY GROUNDED
M
MOTOR OPERATOR
UNDERGROUND POWER CABLE
NEUTRAL (STAR POINT)
RESISTOR
REACTOR
RELAYS
XX XX
PROTECTION /FUNCTION CONTROL DEVICE
IT
RELAY CT/PT INPUTS
R
VACUUM OR HYDRAULIC RECLOSER
K
KIRK KEY INTERLOCK
GROUP OPERATED AIR DISCONNECT SWITCH (VERTICAL OR SIDE BREAK)
DOUBLE END BREAK SWITCH
GROUP OPERATED AIR DISCONNECT SWITCH (VERTICAL OR SIDE BREAK)
GROUP OPERATED AIR DISCONNECT SWITCH (CENTER BREAK)
HOOK OPERATED FUSED DISCONNECT SWITCH
FUSED DISCONNECT SWITCH
SWITCH WITH VACUUM INTERRUPTER
SWITCH WITH ARCING HORNS
SWITCH WITH FUSE
GROUND SWITCH
GROUP OPERATED SWITCH WITH INTEGRAL GROUND POSITION
QUICK BREAK SWITCH
CURRENT SHORTING TEST SWITCH
POTENTIAL OR CONTROL TEST SWITCH
POWER LINE CARRIER WAVE TRAP
POWER CIRCUIT BREAKER (DRAWOUT)
POWER CIRCUIT INTERRUPTER (WITH BLADE DISCONNECT)
POWER CIRCUIT INTERRUPTER
POWER TRANSFORMER
POWER TRANSFORMER (WITH LOAD TAP CHANGER)
POWER TRANSFORMER W/ TERTIARY WINDING
XXXXX XXXXX
PT/CT LABELS
C A B
PHASE ROTATION
PHASE SEQUENCE A-B-C
STATION SERVICE TRANSFORMER
XA
DRAWOUT FUSE
X MATCHLINE TO X-X (DWG. XXXX) X
MATCH LINE

SCHEMATIC DIAGRAM SYMBOLS


CONTROL CIRCUIT
43LR
DOUBLE THROW SWITCH
XXXX
CABLE CALLOUT
NORMALLY OPEN/CLOSE CONTACT
CAPACITOR
1FU1 30A
LOW VOLTAGE FUSE
SOLIDLY GROUNDED
HEATER
HEATER
XXX
INDICATING LIGHT
R=RED A=AMBER
G=GREEN W=WHITE
XA
THERMAL-MAGNETIC CIRCUIT BREAKER
PUSHBUTTON SWITCH
PRESSURE CONTROLLED SWITCH
XX
REACTOR COIL
RESISTOR COIL
CURRENT COIL
INX INX
ELECTRICAL DEVICE
VOLTAGE COIL
TEMPERATURE CONTROLLED SWITCH
XTSX
POTENTIAL TEST SWITCH
XTSX
CURRENT SHORTING TEST SWITCH
XTSX
CURRENT SHORTING TEST SWITCH (WITH TEST PLUG PROVISIONS)
XX-X
TERMINAL POINT ON DEVICE
XX-X
TERMINAL BLOCK ON RELAY PANEL
XX-X
TERMINAL BLOCK ON FIELD TERMINATION CABINET
XX-X
TERMINAL BLOCK ON REMOTE EQUIPMENT
DRAWOUT TYPE
DIODE
GRD2
OUT-1 GFI
DUPLEX OUTLET
FORM C CONTACT
CABLE NUMBER
CONDUCTOR REFERENCE NUMBER. SEE CONTROL CABLE COLOR CODE.
XXXX-XX
XXX XXX XXX XXX
RATHOLE

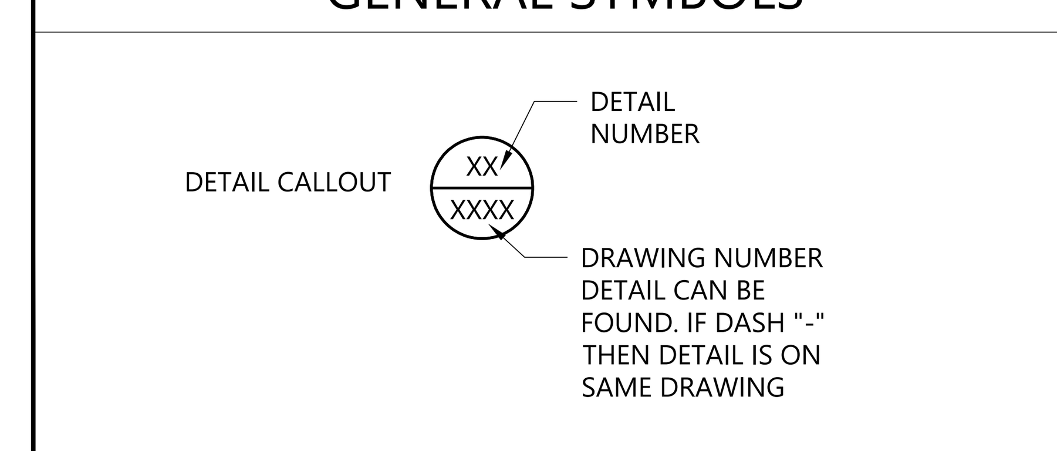
WIRING DIAGRAM DETAILS


CABLE NUMBER
CONDUCTOR REFERENCE NUMBER. SEE CONTROL CABLE COLOR CODE.
XXXX XXX
CABLE DESTINATION
E1
CABLE DETAIL
N.T.S
PANEL NUMBER
LOCATION ON PANEL SIDE. LEFT (L) OR RIGHT (R)
LABEL AT TOP OF TERMINAL BLOCK ON REAR OF PANEL
XXX
XX-XXX
TERMINAL BLOCK NUMBER. LABELED ON TERMINAL BLOCK ON THE REAR OF PANEL
POINT ON DEVICE. PLACE ON WIRE LABEL
DEVICE REFERENCE. PLACE ON WIRE LABEL.
FUNCTION OF CIRCUIT. SHALL BE PLACED ON WIRE LABEL, NOT ON TERMINAL BLOCK
NOTE: SEE DETAIL E3 BELOW FOR CREATION OF WIRE LABELS
E2
TERMINAL BLOCK DETAIL
N.T.S
(XX) XX-XXX
FUNCTION OF CIRCUIT.
POINT ON DEVICE
DEVICE REFERENCE
E3
WIRE LABEL DETAIL
N.T.S

WIRING DIAGRAM NOTES

1. REFER TO COMMUNICATION DIAGRAM FOR PORT CONNECTIONS.
2. * DENOTES # 10 AWG WIRE.
3. ** DENOTES # 16 AWG WIRE.
4. REFER TO ABOVE FOR ADDITIONAL WIRING DETAILS.

GENERAL SYMBOLS



ANSI CODES AND ABBREVIATIONS

CODE/ ABREV	DESCRIPTIONS
2	TIME-DELAY CLOSING RELAY
12	OVERSPEED DEVICE
13	SYNCHRONOUS-SPEED DEVICE
14	UNDERSPEED DEVICE
21	DISTANCE RELAY
23	TEMPERATURE CONTROLLED DEVICE
25	SYNCHRONOUS-CHECK RELAY
26	THERMAL DEVICE
27	UNDERVOLTAGE RELAY
30	ANNUNCIATOR
32	DIRECTIONAL POWER RELAY
40	FIELD RELAY
43	SELECTOR SWITCH OR RELAY
46	PHASE-BALANCE CURRENT RELAY
47	PHASE-SEQUENCE VOLTAGE RELAY
48	INCOMPLETE SEQUENCE RELAY
49	THERMAL RELAY
50	INSTANTANEOUS OVERCURRENT RELAY
51	TIME OVERCURRENT RELAY
52	CIRCUIT BREAKER
53	EXCITER OR DC GENERATOR RELAY
55	POWER FACTOR RELAY
56	FIELD APPLICATION RELAY
59	OVERVOLTAGE RELAY
60	VOLTAGE OR CURRENT BALANCE RELAY
62	TIME DELAY OPENING RELAY
63	PRESSURE SWITCH
64	GROUND DETECTOR RELAY
67	DIRECTIONAL OVERCURRENT RELAY
68	BLOCKING DEVICE
69	PERMISSIVE CONTROL DEVICE
71	LIQUID LEVEL DEVICE
74	ALARM DEVICE
77	PULSE TRANSMITTER
78	OUT-OF-STEP RELAY
79	RECLOSING RELAY
81	FREQUENCY RELAY
84	MOTOR MECHANISM
86	LOCKOUT RELAY
87	DIFFERENTIAL RELAY
88	MOTOR
89	LINE SWITCH
90	VOLTAGE REGULATING RELAY (LTC)

CODE/ ABREV	DESCRIPTIONS
94	AUXILIARY TRIPPING RELAY
101	SUPERVISORY CONTROL
a	OPEN CONTACT (OPEN WHEN DEVICE IS DE-ENERGIZED)
b	CLOSED CONTACT (CLOSED WHEN DEVICE IS DE-ENERGIZED)
AM	AMMETER
AS	AMPERE SWITCH
BF	BREAKER FAILURE
BFI	BREAKER FAILURE INITIATE
CC	CLOSE COIL
CS	CONTROL SWITCH
DPM	DIGITAL PANEL METER
DTA	DISPLAY TRANSDUCER ADAPTER
DTR	DIRECT TRIP RECEIVE
DTS	DIRECT TRIP SEND
EC	ELECTRONIC CONTROL
FU	FUSE
GFI	GROUND FAULT INTERRUPTER
HBI	HOT BUS INDICATION
HLI	HOT LINE INDICATION
LCS	LATCH CHECK SWITCH
LR	LOCAL REMOTE
LS	LOCAL-SUPERVISORY
M	METER
OC	OC OPEN CONTACTOR
PF	POWER FACTOR
PTR	PERMISSIVE TRIP RECEIVE
PTS	PERMISSIVE TRIP SEND
RC	RECLOSER CONTROL
RCV	RECORDING VOLTMETER
RVM	REVENUE METER
SCDA	SCADA CONTROL
TC	TRIP COIL
TS	TEST SWITCH
VS	VOLTAGE SWITCH
VM	VOLTMETER
XD	TRANSDUCER
(X)	MAJOR EQUIPMENT BOM #

CONTROL CABLE COLOR CODE (ICEA METHOD 1)

CONDUCTOR NO.	TABLE E-1	ABREV	CT/PT PHASING	AC PHASING	DC PHASING
1	BLACK	BK	AØ	L1	-VE
2	WHITE	W	BØ	N	+VE
3	RED	R	CØ	L2	
4	GREEN	G	RETURN	G	
5	ORANGE	O			
6	BLUE	BU			
7	WHITE BLACK	WB			
8	RED BLACK	RB			
9	GREEN BLACK	GB			
10	ORANGE BLACK	OB			
11	BLUE BLACK	BUB			
12	BLACK WHITE	BW			

FIBER OPTIC COLOR CODE

CONDUCTOR NO.	TABLE	ABREV.
1	BLUE	BU
2	ORANGE	O
3	GREEN	G
4	BROWN	BR
5	SLATE	SL
6	WHITE	W
7	RED	R
8	BLACK	BK
9	YELLOW	Y
10	VIOLET	VI
11	ROSE	RO
12	AQUA	AQ

CABLE NUMBERS

RANGE	CONTAINS
1000-1999	AC CABLES
2000-2999	DC CABLES
3000-3999	PT CABLES
4000-4999	CT CABLES
5000-6999	CONTROL CABLES
6000-6999	PANEL TO PANEL CABLES
7000-7999	COMMUNICATION CABLES

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C	08/11/2023	10% SUBMITTAL - ISSUED FOR PERMIT	WJF	ELD	JMH

Kansas Sky Energy Center

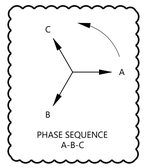
Douglas County, Kansas

Legend

NOT FOR CONSTRUCTION

DATE: 08/11/2023

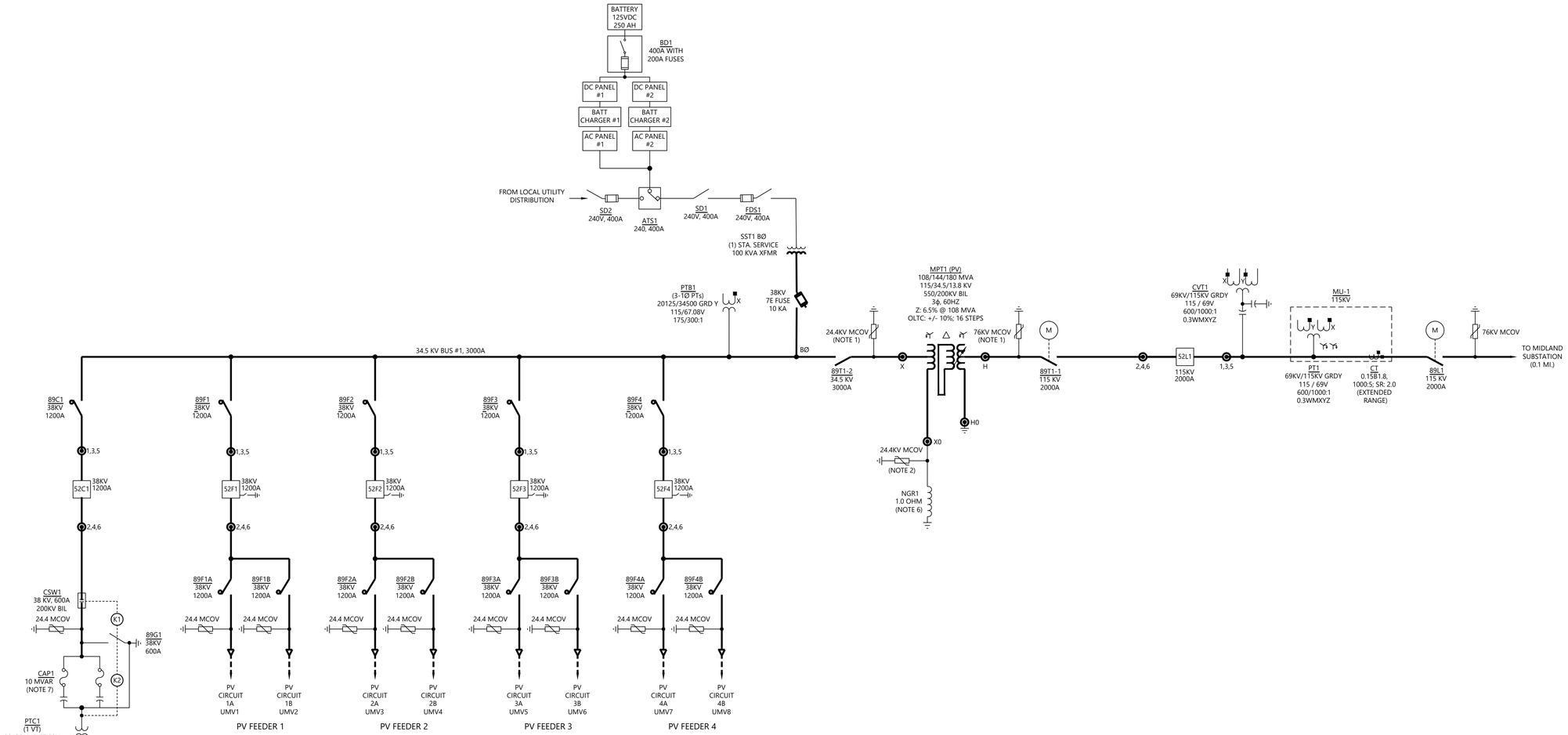
SHEET: EE003 REV: C



HOLD

NOTES

1. PROVIDED BY MPT VENDOR.
2. PROVIDED BY NGR VENDOR.
3. EQUIPMENT RATINGS SHOWN ARE PRELIMINARY.
4. AC DISCONNECT SWITCHES ARE NO-LOAD DISCONNECTS UNLESS OTHERWISE SPECIFIED.
5. SHUNT REACTIVE DEVICE TYPE, QUANTITY, AND STEP SIZE DETERMINED BASED ON THE RESULTS OF THE REACTIVE POWER STUDY.
6. NGR SIZING WILL BE DETERMINED DURING DETAILED DESIGN.
7. CAP BANK SIZING SHOWN AS PRELIMINARY.



Westwood

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Middleton, WI 53562
westwoodps.com

Westwood Professional Services, Inc.

PREPARED FOR:

FREE STATE SOLAR PROJECT, LLC.

422 Admiral Blvd,
Kansas City, MO 64106

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	04/28/2023	10% SUBMITTAL - ISSUED FOR REVIEW	WJF	ELD	JLM
B	05/19/2023	10% SUBMITTAL - ISSUED FOR REVIEW	WJF	ELD	JLM
C	08/11/2023	10% SUBMITTAL - ISSUED FOR PERMIT	WJF	ELD	JMH

Kansas Sky Energy Center

Douglas County, Kansas

Power One-line

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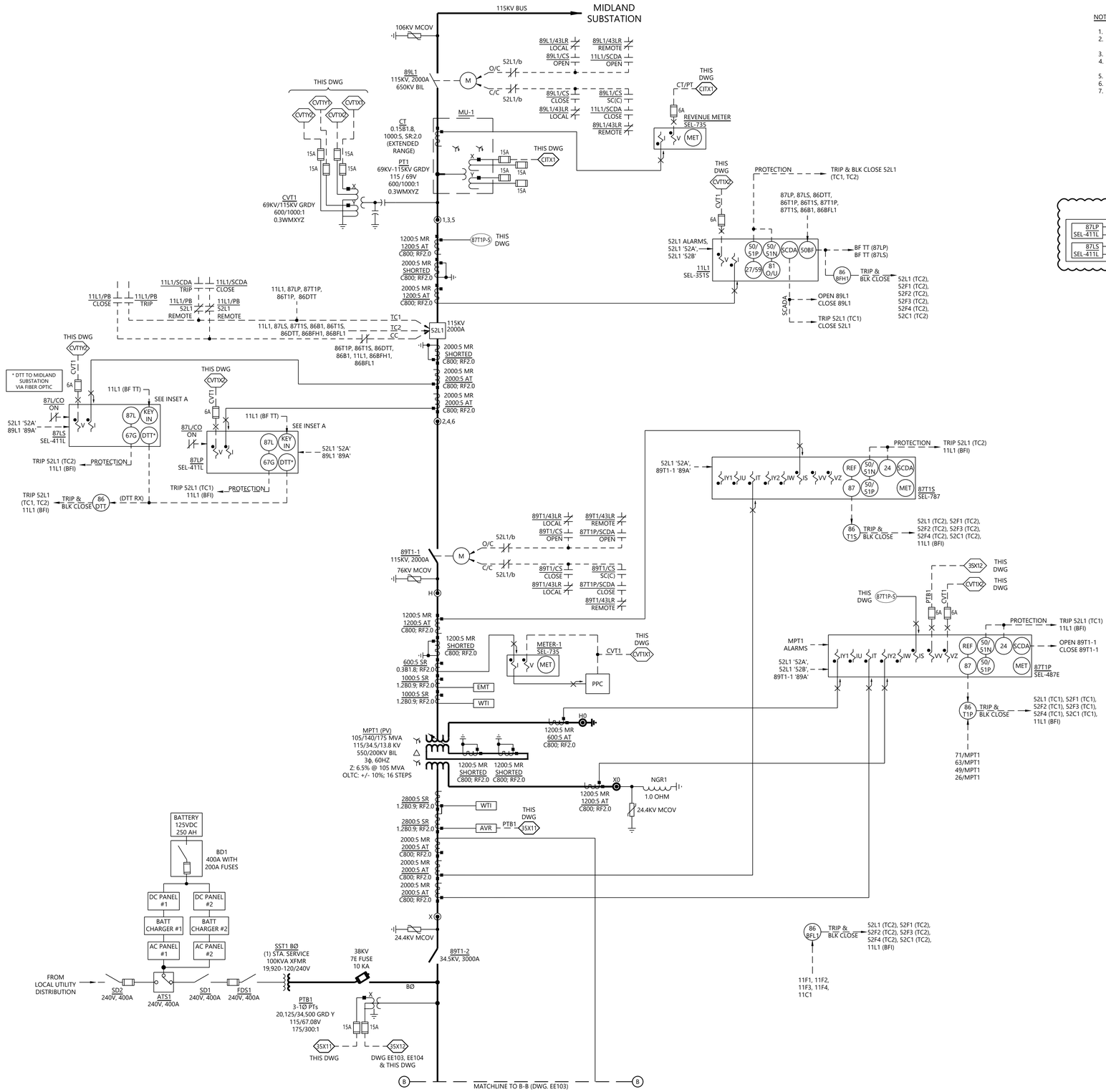
PHASE SEQUENCE
A-B-C
SEE NOTE 5



NOTES

1. LINE RELAYS WILL BE COORDINATED WITH EVERGY.
2. OPGW IS ASSUMED TO BE USED FOR COMMUNICATION TO MIDLAND STATION.
3. EQUIPMENT RATINGS SHOWN ARE PRELIMINARY.
4. AC DISCONNECT SWITCHES ARE NO-LOAD DISCONNECTS UNLESS OTHERWISE SPECIFIED.
5. PHASING TO BE CONFIRMED WITH INTERCONNECTING SUBSTATION.
6. SIZE OF NGR TO BE VERIFIED DURING DETAILED DESIGN.
7. TRANSFORMER IMPEDANCE SHOULD BE CONFIRMED BY OWNER AND SUPPLIER.

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Kansas Sky Energy Center

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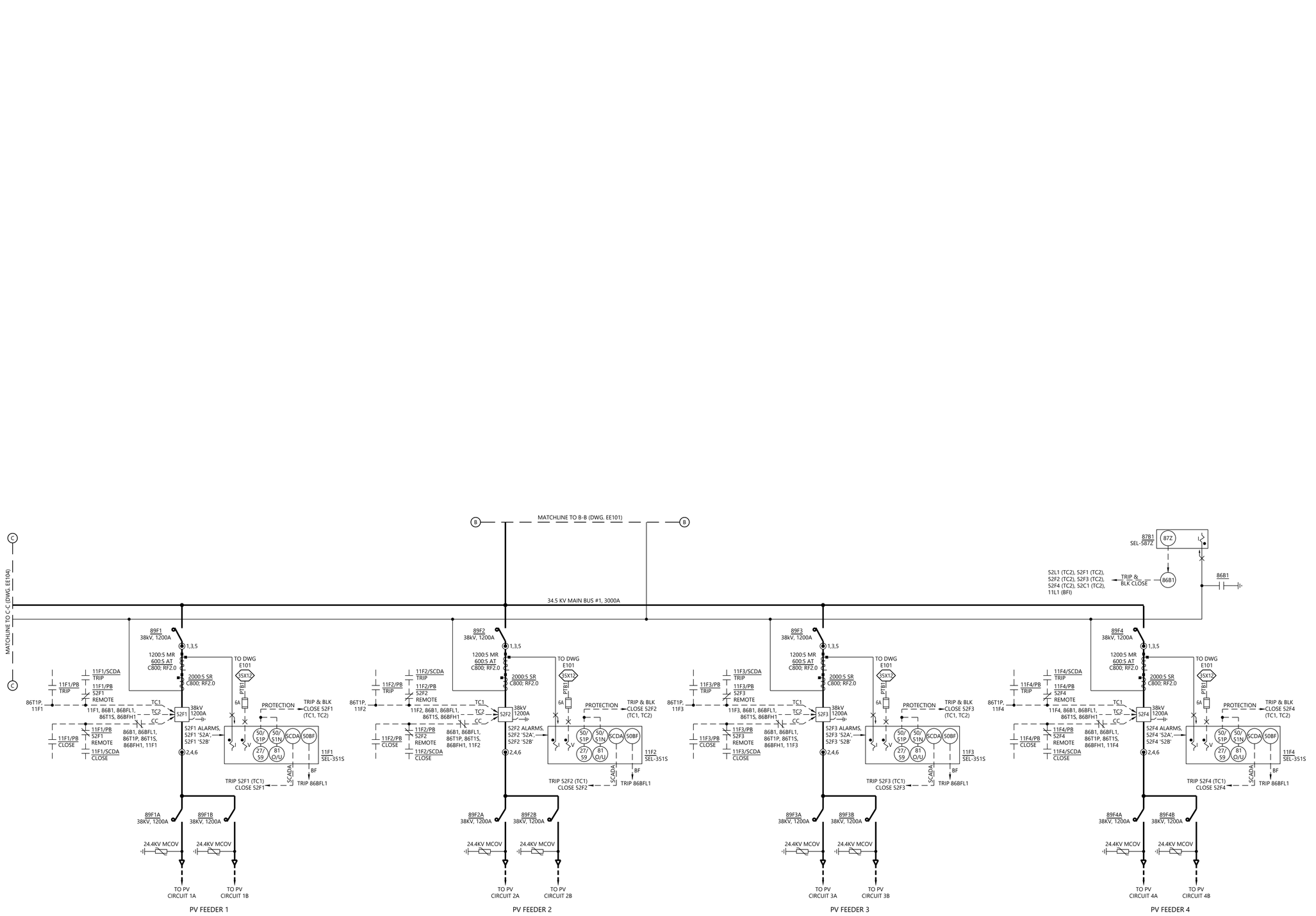

Kansas Sky Energy Center

Douglas County, Kansas

Relay One-line

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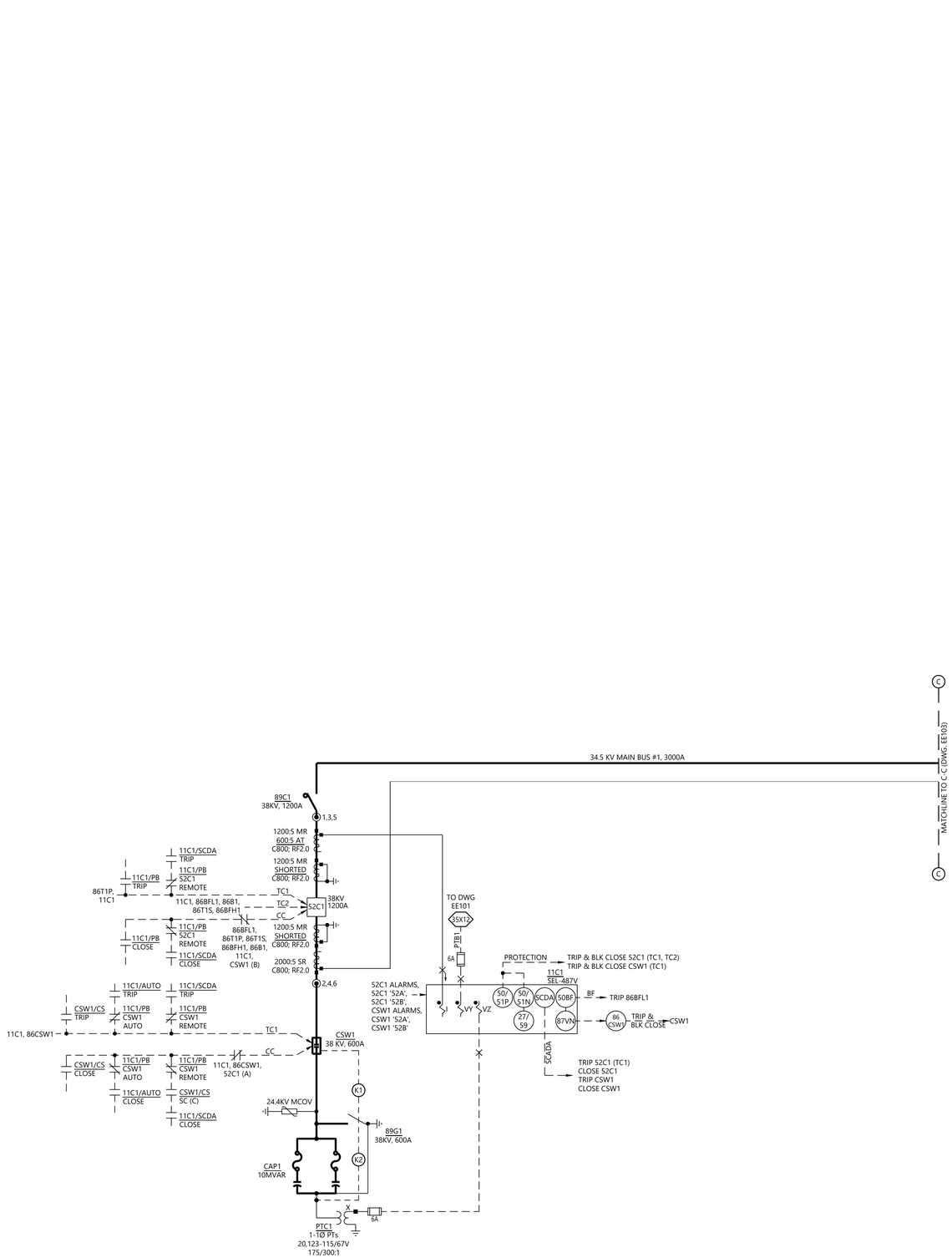

Kansas Sky Energy Center

Douglas County, Kansas

Relay One-line

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DATE: 08/11/2023

SHEET: EE104

REV: C