

**FINDINGS AND RECOMMENDATION
OFFICE OF PLANNING AND ZONING
ANNE ARUNDEL COUNTY, MARYLAND**

APPLICANT: University of Maryland
Medical System Corporation

ASSESSMENT DISTRICT: 5

CASE NUMBER: 2024-0045-V

COUNCIL DISTRICT: 1

HEARING DATE: May 9, 2024

PREPARED BY: Jennifer Lechner
Planner



REQUEST

The applicant is requesting a variance to allow an accessory structure (solar carport) in the front yard of a nonwaterfront lot and with less setbacks than required on property located at 920 Elkridge Landing Road in Linthicum Heights.

LOCATION AND DESCRIPTION OF SITE

The subject site consists of approximately 6.55 acres of land and is located with frontage on the north and west sides of Elkridge Landing Road. It is identified as Lot 1 of Parcel 154 in Grid 12 on Tax Map 3 in the Linthicum Heights subdivision. The property is zoned W1 – Industrial Park District. The current zoning was adopted by the comprehensive zoning for Council District 1, effective July 10, 2011. The property is not located within the Chesapeake Bay Critical Area. It is currently improved with a four-story office building and associated facilities.

PROPOSAL

The applicant proposes to install six (6) carport canopy solar arrays over the existing parking lot on their property.

REQUESTED VARIANCES

§ 18-2-204(b) of the Anne Arundel County Zoning Ordinance provides that an accessory structure may not be located in the front yard of a nonwaterfront lot.

The easternmost carport canopy solar array (44.6' x 165.1') will be located in the front yard, necessitating a variance.

A review of the bulk regulations for development within the W1 District reveals that a setback variance is not required.

FINDINGS

The subject property is irregular in shape and exceeds the minimum lot size of 40,000 square feet and the minimum lot width of 150 feet for lots in the W1 District. A review of the 2024 County

aerial photography shows that the general area consists of various commercial buildings with associated parking lots.

The applicant's letter explains that the requested variance will help achieve their renewable energy goals, as well as provide parking cover for vehicles. Without the use of the front parking lot, the applicant argues that the viability of the project as a whole would be undermined and would generate insufficient energy to justify the project. Their letter, supplement and site exhibits explain that they have evaluated alternative locations for the proposed solar panels, and found that the existing shade and tree cover, underground utilities, and age of the existing roof prevent viable solar from being located in those areas. In addition to the age of the roof, the applicant asserts that the system sizes on the roof would have been significantly smaller than the carport designs. The applicant offers to add or relocate building signage as necessary to ensure the building can be located by the public.

The applicant has also indicated that the canopies are preferred over roof mounted arrays, and serve a dual purpose of providing clean energy while also diminishing the adverse impacts of overheated asphalt. The applicant further believes that the solar canopies will not alter the essential character of the neighborhood or district as the subject property is located in a commercial neighborhood surrounded by office uses.

Agency Comments

The **Health Department** notes that the property is served by public water and sewer facilities, and has no objection to the above-referenced request.

The **Development Division** defers to the Zoning Division regarding the requested variance.

Variance Criteria

For the granting of a zoning variance, a determination must be made as to whether, because of certain unique physical conditions peculiar to or inherent in the particular lot or because of exceptional circumstances other than financial considerations, strict implementation of the Code would result in practical difficulties or an unnecessary hardship. The need sufficient to justify a variance must be substantial and urgent and not merely for the convenience of the applicant.

In this particular case, the subject property is oversized with respect to the minimum lot width and areas requirements of the Code. The bulk of the proposed solar arrays are proposed to be located behind the 4-story office building. However, due to the length of the road that curves some 90 degrees around the east side of the site and the angle that the existing building has been located, the area that is proposed for the location of solar arrays is, for Code purposes, considered to be the front yard. This lot condition creates a practical difficulty in developing the lot in strict compliance with the Code. In effect, the easternmost carport mounted solar array would be located in what is functionally the side of the office building.

Therefore, the granting of the variance would not alter the essential character of the neighborhood or district in which the lot is located, would not substantially impair the appropriate use or development of adjacent property, nor would it be detrimental to the public

welfare. A landscape buffer could be provided to screen the carports along the road.

As such, this Office supports the requested variance for the proposed carport solar arrays.

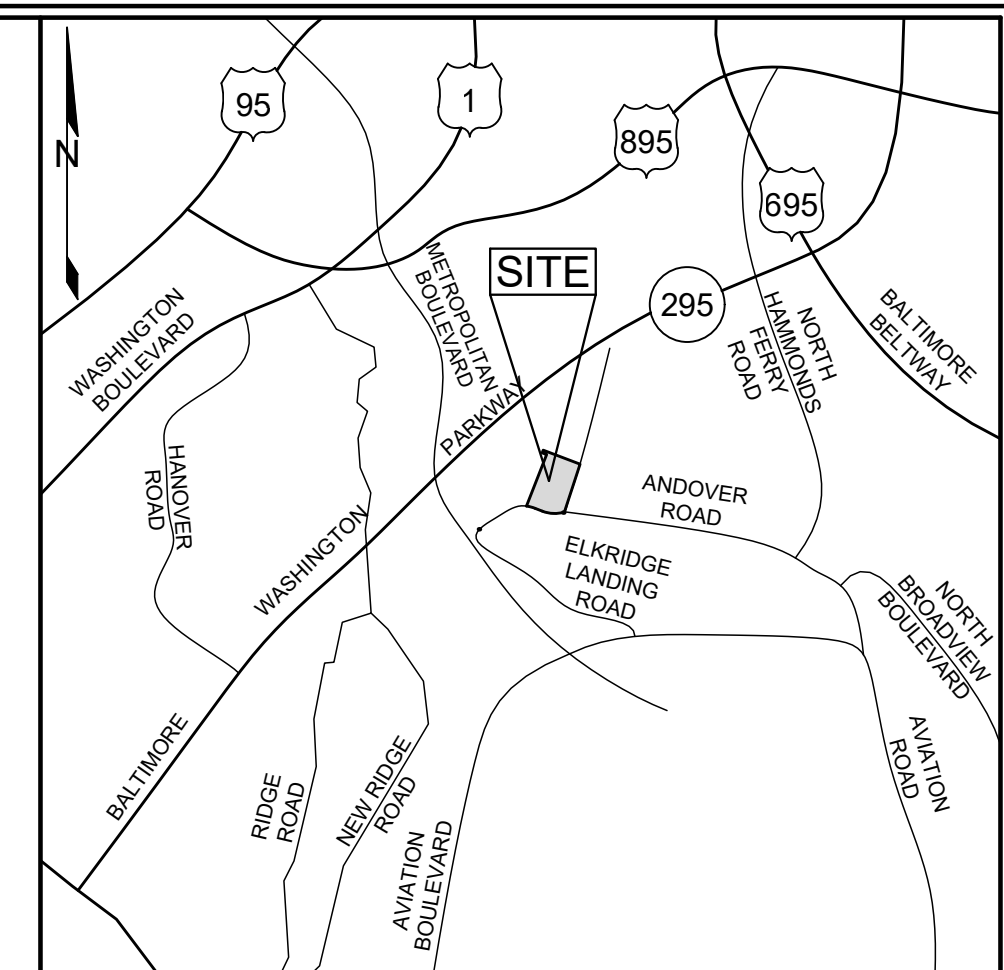
RECOMMENDATION

Based upon the standards set forth in § 18-16-305 of the Code under which a variance may be granted, this Office recommends *approval* of a zoning variance to § 18-2-204(b) to allow the ground mounted solar arrays in the front yard of a nonwaterfront lot.

DISCLAIMER: This recommendation does not constitute a building permit. In order for the applicant(s) to construct the structure(s) as proposed, the applicant(s) shall apply for and obtain the necessary building permits and obtain any other approvals required to perform the work described herein. This includes but is not limited to verifying the legal status of the lot, resolving adequacy of public facilities, and demonstrating compliance with environmental site design criteria.

LEGEND

EXISTING CONTOUR (FIELD RUN) 382
 EXISTING CONTOUR (GIS) 382
 PROPOSED CONTOUR 382.3
 EXISTING SPOT ELEVATION 382.3
 PROPOSED SPOT ELEVATION 382.33
 DIRECTION OF FLOW
 PROPOSED SOLAR AREA
 EXISTING LIGHT POLE TO BE REMOVED
 EXISTING ELECTRIC E
 EXISTING COMMUNICATIONS T



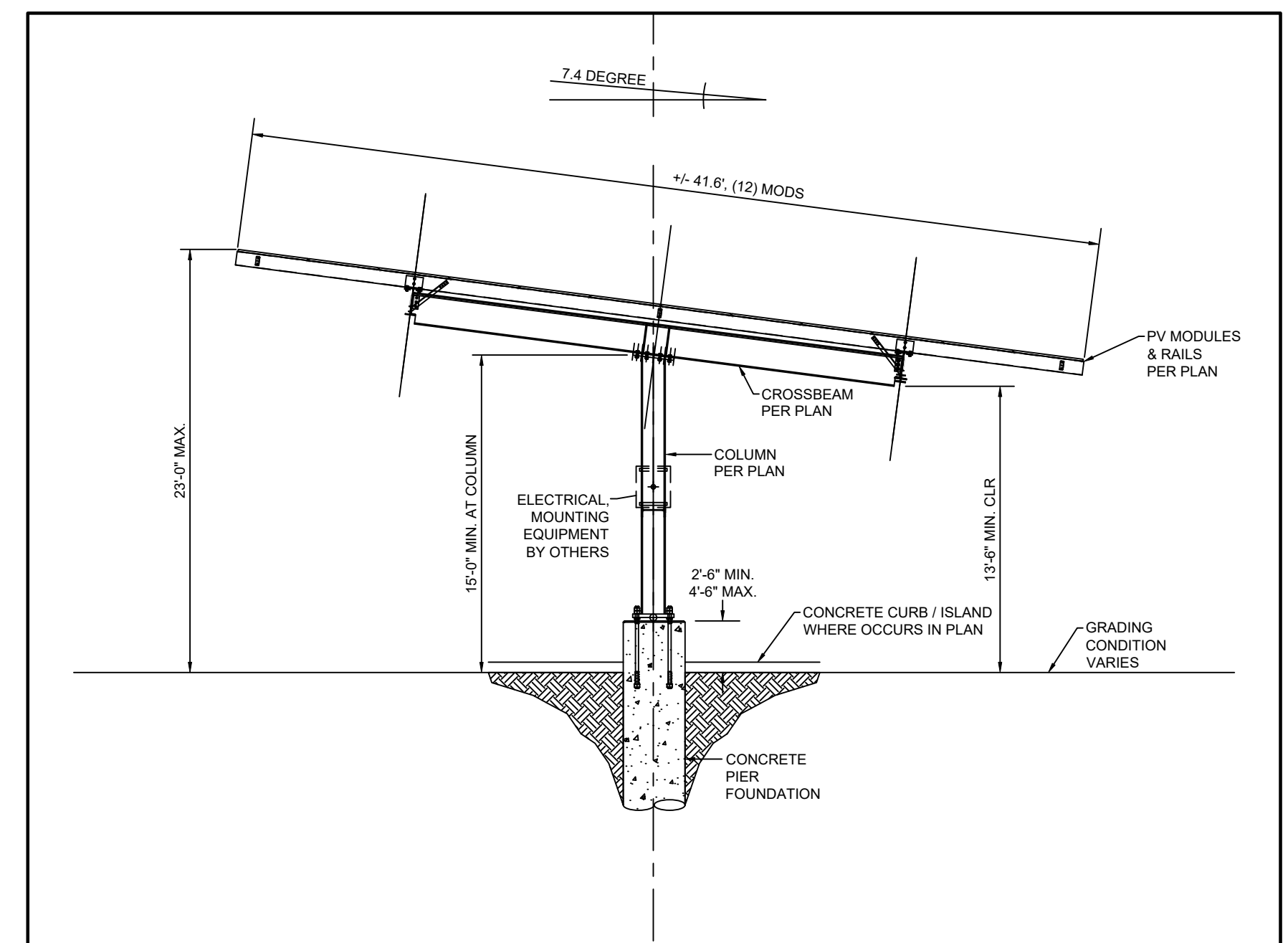
VICINITY MAP
SCALE: 1"=2000'

CURVE TABLE

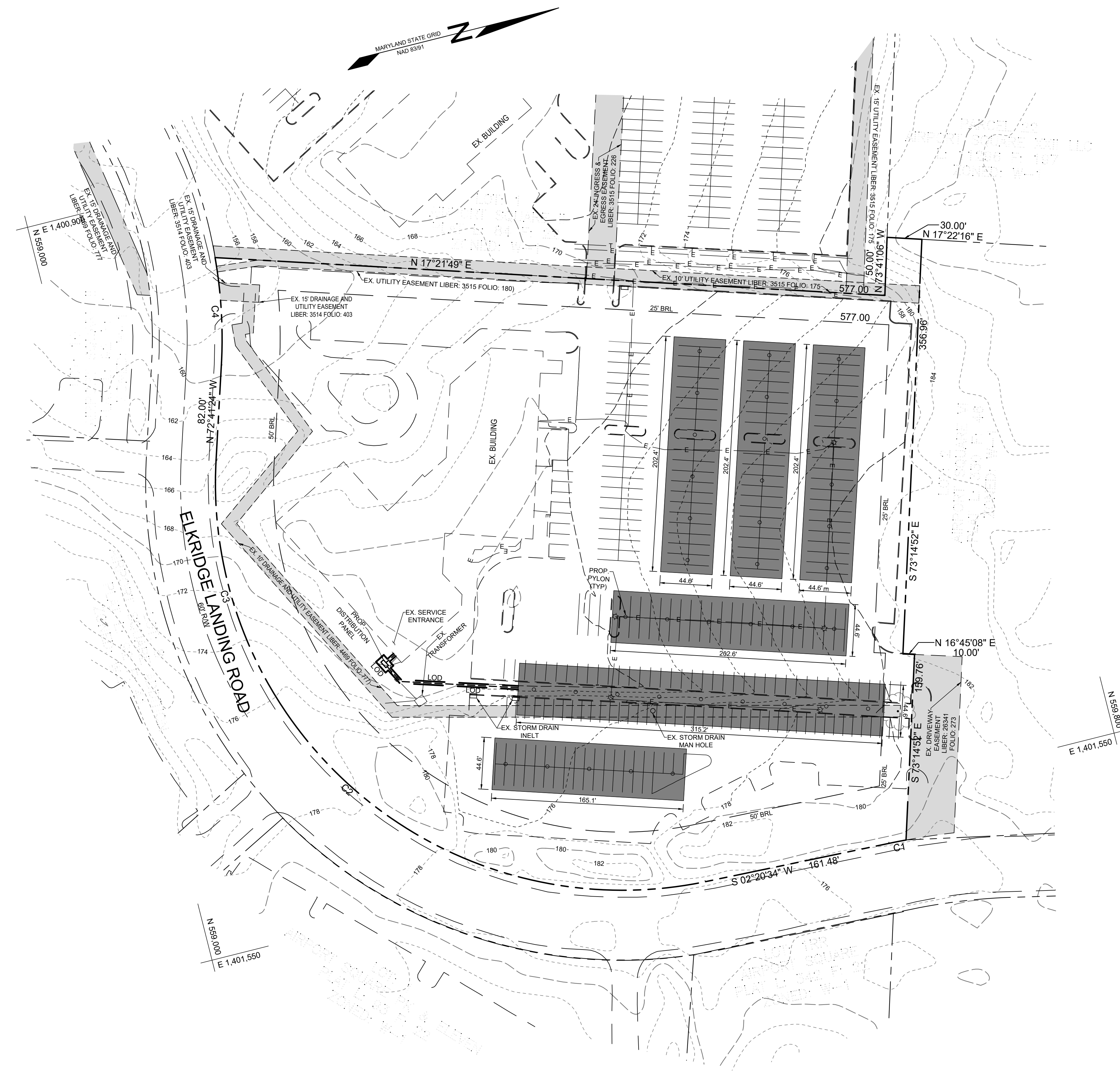
CURVE	RADIUS	LENGTH	DELTA	TANGENT	CHORD BEARING	CHORD
C1	630.00'	14.68'	01°20'05"	7.34'	S 03°00'37" W	14.68'
C2	350.00'	407.32'	06°40'48"	230.26'	S 35°40'58" W	384.72'
C3	350.00'	234.46'	38°22'54"	121.82'	S 88°12'49" W	230.10'
C4	405.00'	92.61'	13°06'05"	46.51'	N 79°14'26" W	92.41'

GENERAL NOTES

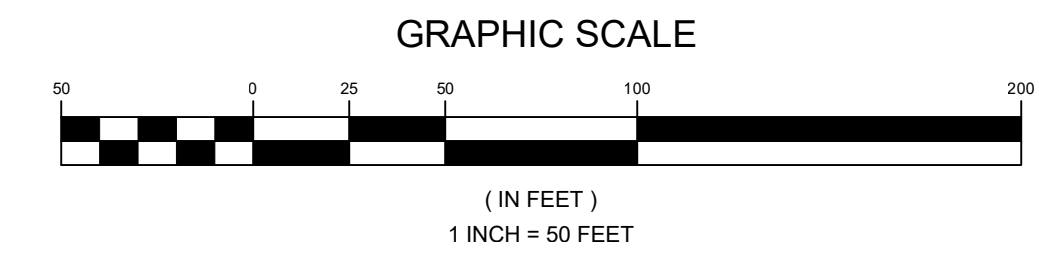
- SUBJECT PROPERTY ZONED W-1
- TOTAL AREA OF PROPERTY = 6.54 ACRES±
- PROPERTY ADDRESS: 920 ELKRIDGE LANDING ROAD, LINTHICUM MARYLAND 21090
- DEED REFERENCE: LIBER: 26341 FOLIO: 249
- PREVIOUS ANNE ARUNDEL COUNTY FILE NUMBERS: PLAT #17072
- THE BOUNDARY SHOWN HERE ON IS BASED ON A BOUNDARY SURVEY PERFORMED BY SEG LAND SURVEYING IN JUNE OF 2023.
- THE TOPOGRAPHY SHOWN WITHIN THE DEVELOPMENT AREA IS BASED ON A TOPOGRAPHIC SURVEY PERFORMED BY SEG LAND SURVEYING IN JUNE OF 2023. TOPOGRAPHY OUTSIDE OF THE AREA OF DEVELOPMENT IS BASED ANNE ARUNDEL COUNTY GIS.
- THE LOTS SHOWN HEREON COMPLY WITH THE MINIMUM OWNERSHIP, WIDTH AND LOT AREA AS REQUIRED BY THE MARYLAND STATE DEPARTMENT OF THE ENVIRONMENT.
- PUBLIC WATER AND SEWER WILL BE USED WITHIN THIS SITE.
- EXISTING BUILDING FOOTPRINT : 27,228 SF
- SOLAR CAR PORT TOTAL FOOTPRINT: 58,936 SF
- SITE LIMIT OF DISTURBANCE:
 - SOLAR PYLON = 7,088SF X 34 PYLONS = 240,335SF
 - 3' WIDE TRENCH FOR UTILITY INSTALLATION = 367,695SF
 - 1 TRANSFORMER PAD = 195SF
- TOTAL LIMIT OF DISTURBANCE = 240,335 + 367,695 + 19 = 672,025SF
- ELECTRICAL DESIGN BY: **PARASOL STRUCTURES**



SOLAR CARPORT DETAIL
NOT TO SCALE
NOTE: LIGHTING TO BE PROVIDED UNDER PANELS



PLAN VIEW
SCALE: 1" = 50'



DEVELOPER

CI RENEWABLES
1340 SMITH AVENUE, SUITE 200
BALTIMORE, MARYLAND 21209
C/O WALTER SERAFYN
WALTER.SERAFYN@CIRENEWCOM

OWNER

UNIVERSITY OF MARYLAND MEDICAL SYSTEM CORPORATION
250 WEST PRATT STREET, SUITE 1400
BALTIMORE, MARYLAND 21090

SITE PLAN

UMMS SOLAR 2

920 ELKRIDGE LANDING ROAD

TAX MAP 3 GRID 12
1ST ELECTION DISTRICT

PARCEL 154
ANNE ARUNDEL COUNTY, MARYLAND

SILL ENGINEERING GROUP, LLC

16005 Frederick Road, 2nd Floor
Woodbine, Maryland 21797
Phone: 443.325.5076
Fax: 410.696.2022
Email: info@sillengineering.com
Civil Engineering for Land Development

DESIGN BY:	PS
DRAWN BY:	ZS
CHECKED BY:	PS
SCALE:	AS SHOWN
DATE:	MARCH 15, 2024
PROJECT #:	23-008
SHEET #:	1 of 1

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 32025, EXPIRATION DATE JUNE 20, 2025



March 25, 2024

Anne Arundel County: Office of Planning and Zoning
2664 Riva Dr #170
Annapolis, MD 21401

RE: Letter of Explanation 920 Elkridge Landing, Linthicum – Accessory Structure Variance for Carport Solar Structure; Case 2024-0045V

To Whom It May Concern:

We are submitting this Letter of Explanation as a request for variance in connection with our Prefile for a solar carport structure located at 920 Elkridge Landing. Based on our coordination with our engineering team, Sill Engineering Group, it is our understanding that Carport structures with solar panels would be considered accessory structures/use and that accessory structures in a W1 District must be set back 25 feet from the side and rear lot lines and may not be located in the front yard.

Per to section 18-16-305 we are requesting a variance to allow carport structures to be located within the “front yard” which is the front parking lot of this building. We are meeting all other setback requirements.

Our goal is to help the building owner, University of Maryland Medical System (UMMS), achieve their renewable energy goals; and this project both helps achieve this as well as providing parking cover for vehicles. The proposed solar structure is shown to be installed exclusively over existing parking lot areas that are already impervious surfaces so that there is minimal disturbance of vegetated areas. For this building, because of how Elkridge Landing Rd curves, two sides of the building are considered the “front yard” of the building. The parking area is what would typically be considered the back of the building, as there is a formal front entrance on the other side. In order to provide a project large enough for UMMS to have a viable system that will help meet their renewable goals, the proposal includes solar over the majority of the parking lot area, which necessitates the use of the “front yard” area.



If there are any concerns regarding the structure blocking building identification, our team is willing to work with UMMS to add or relocate building signage as necessary to ensure the building can be located by the public.

Full plans including dimensions, layout, height of structures, setbacks, etc. are included in this prefilng package. We believe this variance meets the requirements of section 18-16-305.

Should there be any questions, please contact me at eric.metcalf@cirenew.com or 443-462-2650.

Very truly yours,
CI Renewables

A handwritten signature in blue ink that reads 'Eric Metcalf'.

Eric Metcalf
Vice President - Construction

Cc: Walter Serafyn (CIR)
Sill Engineering Group

IN RE: * BEFORE THE
UNIVERSITY OF MARYLAND * ANNE ARUNDEL COUNTY
MEDICAL SYSTEM CORP. * OFFICE OF ADMINISTRATIVE
* HEARINGS
* Case No: 2024-0045-V

***** **
SUPPLEMENT TO VARIANCE PETITION

Petitioner, University of Maryland Medical System Corporation (“UMMS”) is seeking a variance from the bulk regulations of the Anne Arundel County Zoning Regulations to allow an “accessory structure” in the front yard of the subject parcel. This variance is necessary to allow canopy solar panels over an existing parking lot to provide energy to the UMMS structure on site. In the absence of this variance, Petitioner will be unable to construct canopy solar over the existing parking lot to the front of the Property, which will undermine the viability of the project as a whole and generate insufficient energy to justify the project.

Canopy solar provides a higher and better use for the UMMS parking lots than empty asphalt. In the absence of these canopies, the asphalt will absorb and disperse heat, which has adverse impacts for the surrounding area and UMMS employees. Solar canopies serve a dual purpose of providing clean energy while also diminishing the adverse impacts of overheated asphalt.

Due to the nature of solar canopies and the benefits derived from green energy, Petitioner submits that there are exceptional circumstances other than financial considerations that prompt the need for this variance to avoid practical difficulties or unnecessary hardship and to enable the Petitioner to develop the lot.

Petitioner’s request is also in compliance with the criteria under AAZR § 18-16-305(c):

(1) the variance is the minimum variance necessary to afford relief;

Petitioner is seeking a variance from the bulk regulation prohibiting accessory structures in the front yard of the lot. Petitioner has evaluated alternative locations for the proposed solar panels; however, existing shade and tree cover prevent viable solar from being located in these areas. Petitioner complies with all other bulk regulations applicable to the site. The requested variance is the minimum necessary to afford relief.

(2) the granting of the variance will not:

(i) alter the essential character of the neighborhood or district in which the lot is located;

The subject Property is located in a commercial neighborhood surrounding by office uses. The solar canopies, if allowed pursuant to this variance, will not alter the essential character of the neighborhood or commercial district in which the lot is located.

(ii) substantially impair the appropriate use or development of adjacent property;

The proposed solar canopies will not impact the appropriate use or development of adjacent properties.

(iii) reduce forest cover in the limited development and resource conservation areas of the critical area;

Not applicable.

(iv) be contrary to acceptable clearing and replanting practices required for development in the critical area or a bog protection area; nor

Not applicable.

(v) be detrimental to the public welfare.

Quite to the contrary, as stated above this variance will substantially contribute to the public welfare by providing clean energy to the property owner and diminish the harmful impacts of over-heated asphalt parking.

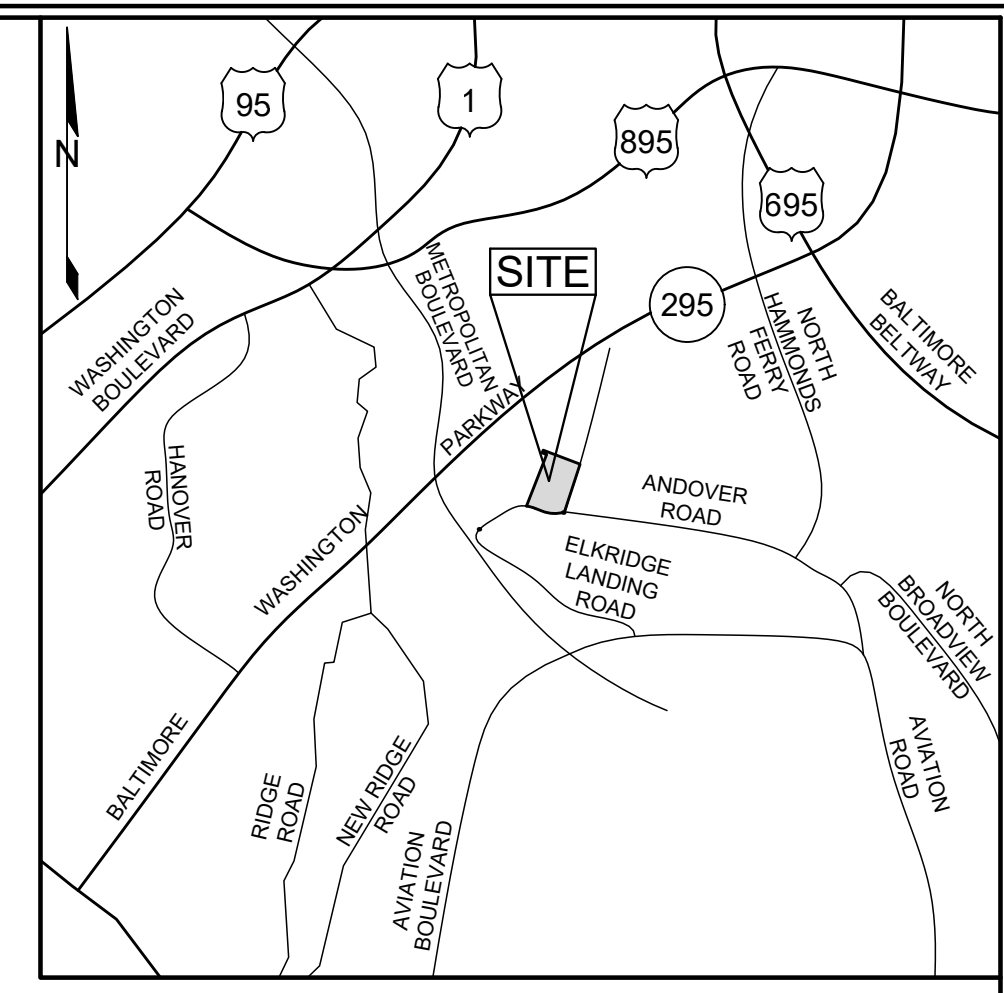
Site Exhibit UMMS 920

Existing utility easement

This area gets shade

LEGEND

- EXISTING CONTOUR (FIELD RUN) 382
- EXISTING LIGHT POLE TO BE REMOVED
- EXISTING ELECTRIC
- EXISTING COMMUNICATIONS

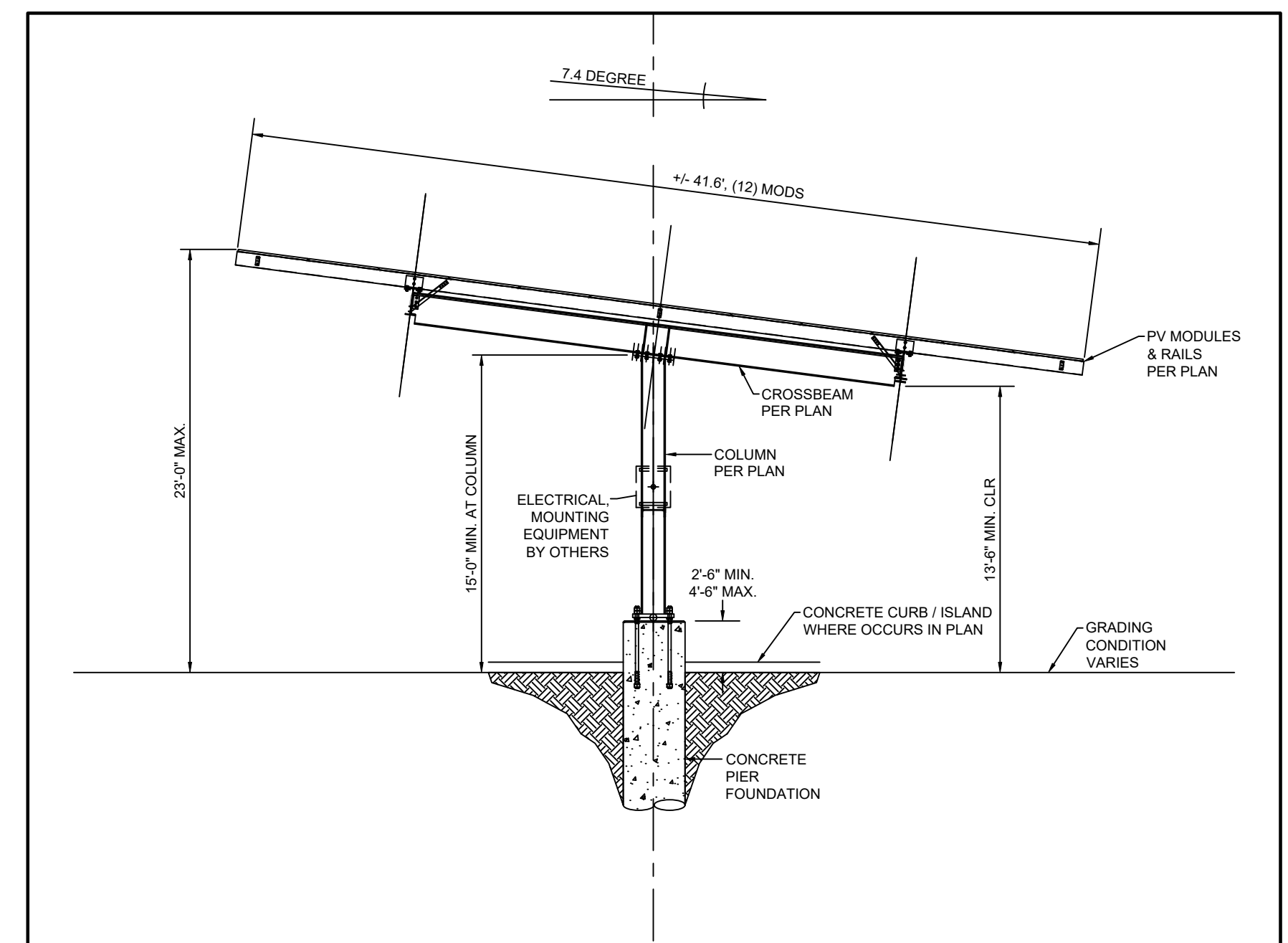


VICINITY MAP
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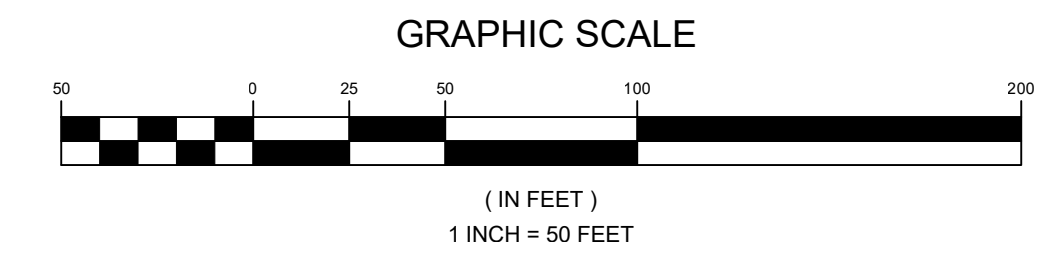
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12. ELECTRICAL DESIGN BY: **PARASOL STRUCTURES**



SOLAR CARPORT DETAIL
NOT TO SCALE

NOTE: LIGHTING TO BE PROVIDED UNDER PANELS

PLAN VIEW
SCALE: 1" = 50'



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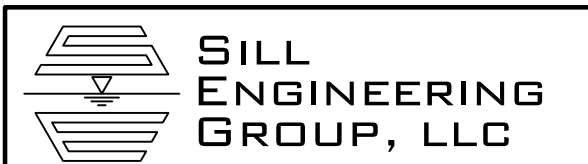
SITE PLAN

UMMS SOLAR 2

920 ELKRIDGE LANDING ROAD

TAX MAP 3 GRID 12
1ST ELECTION DISTRICT

PARCEL 154
ANNE ARUNDEL COUNTY, MARYLAND



16005 Frederick Road, 2nd Floor
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Phone: 443.325.5076
Fax: 410.696.2022
Email: info@sillengineering.com
Civil Engineering for Land Development

DESIGN BY:	PS
DRAWN BY:	ZS
CHECKED BY:	PS
SCALE:	AS SHOWN
DATE:	MARCH 15, 2024
PROJECT #:	23-008
SHEET #:	1 of 1

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Panel Type	Znshine Solar ZXM6-SHLDD144-540/M
Azimuth:	Various
Tilt:	ST: 7.4°
# of Panels:	2,112
Est. kWp DC	1,140.48
Est. Yield	1,300 kWh / kWp DC
Est. Production	1,482,000 kWh

Satellite View Exhibit

UMMS 920



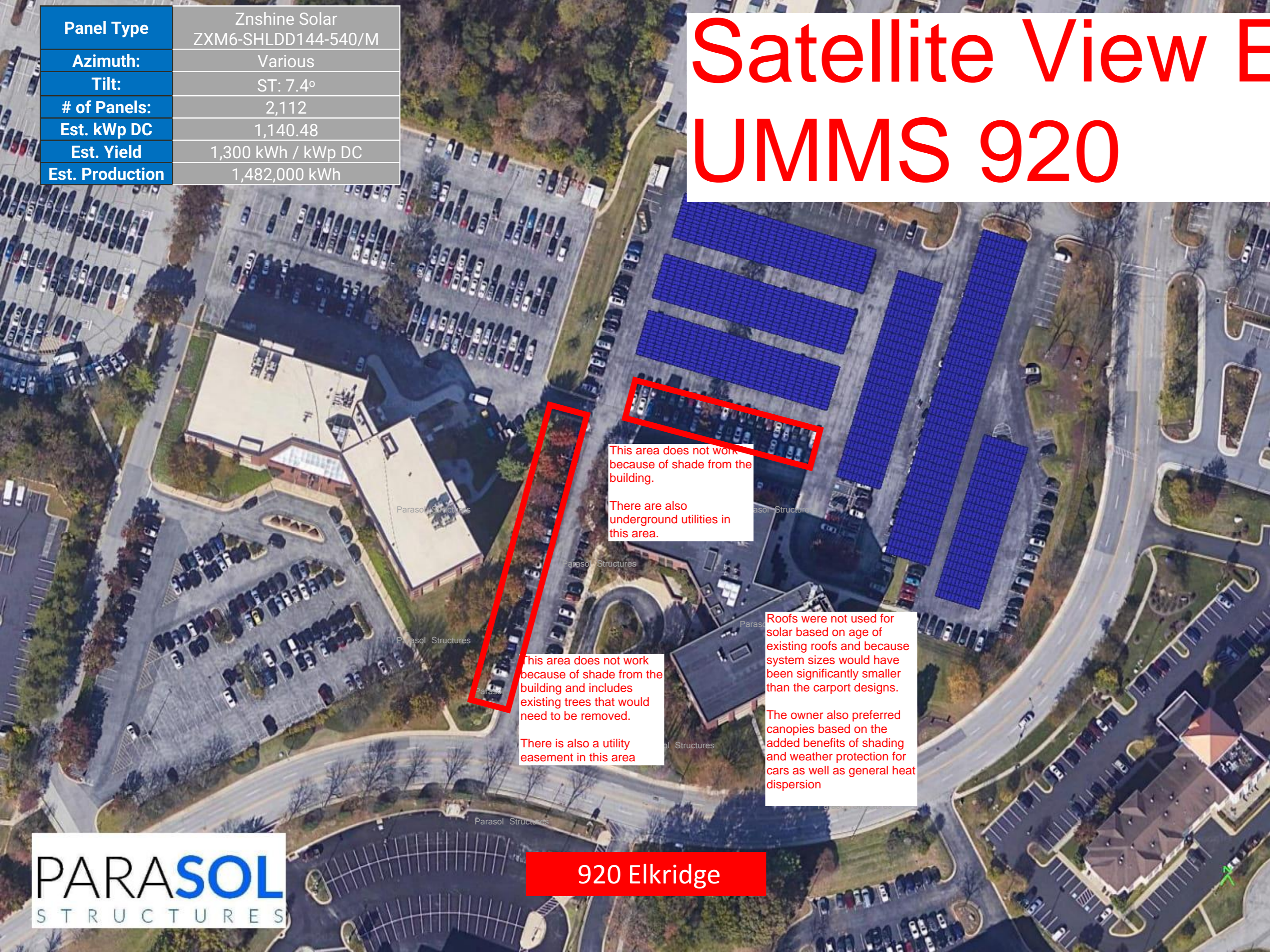
CLIENT: CI RENEWABLES
 CARPORT: PARASOL CARPORT ST
 LOCATION: UNIVERSITY OF MARYLAND MEDICAL CENTER
 920 ELKRIDGE LANDING RD
 LINTHICUM HEIGHTS, MD 21090



GENERAL NOTES:

1. Result of easement reports and underground utilities may affect final placement of solar arrays.
2. Conflicting trees and other obstructions will have to be removed, trimmed, or relocated
3. Detailed analysis of the effect of shade on arrays has not been performed.
4. Soil analysis has not been performed
5. It is assumed that the site is not in a flood plain.
6. Structural Analysis of the Garage has not been performed

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This area does not work because of shade from the building.

There are also underground utilities in this area.

This area does not work because of shade from the building and includes existing trees that would need to be removed.

There is also a utility easement in this area

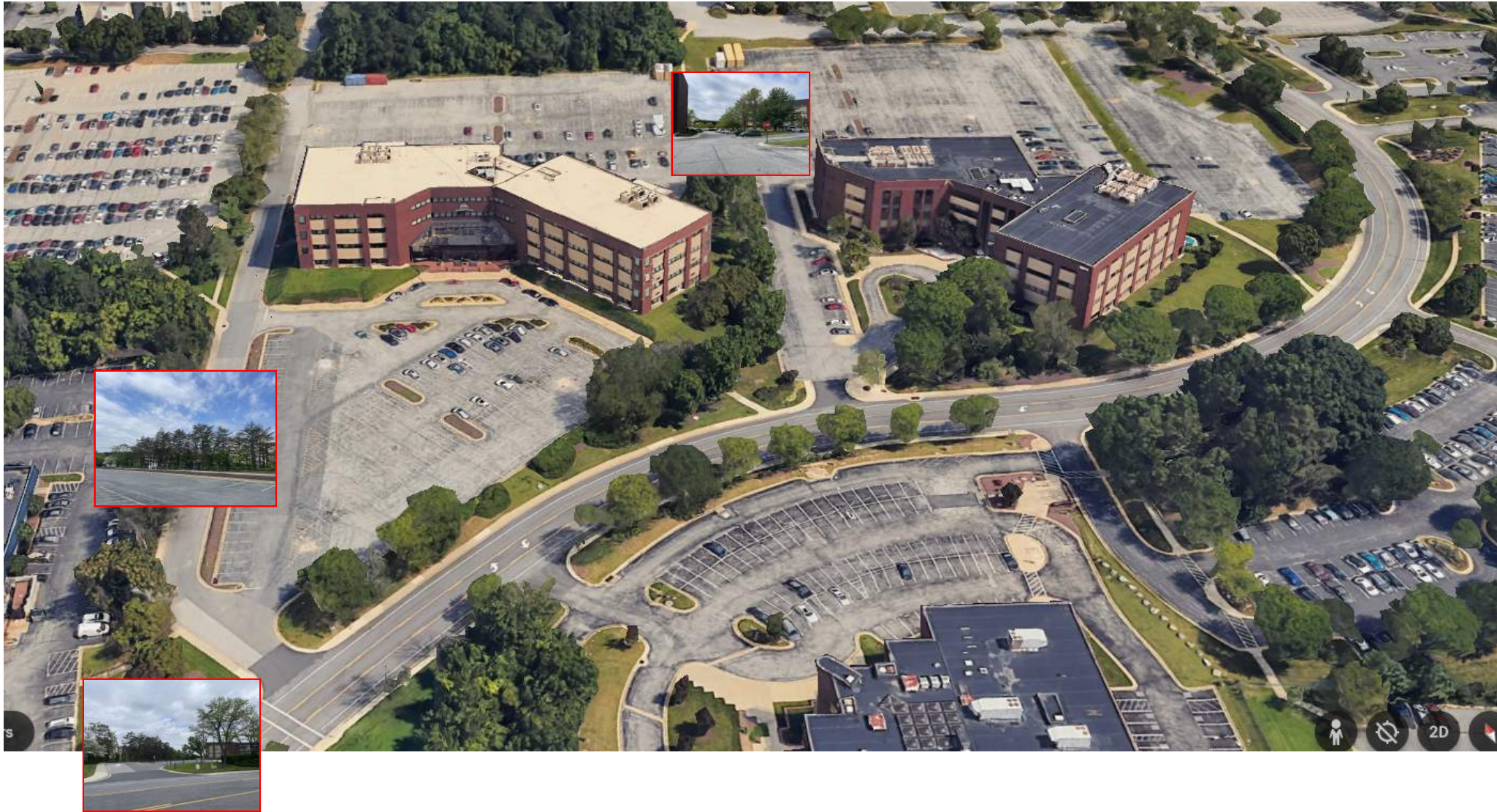
Roofs were not used for solar based on age of existing roofs and because system sizes would have been significantly smaller than the carport designs.

The owner also preferred canopies based on the added benefits of shading and weather protection for cars as well as general heat dispersion



920 Elkridge

Additional Views UMMS 900 and 920

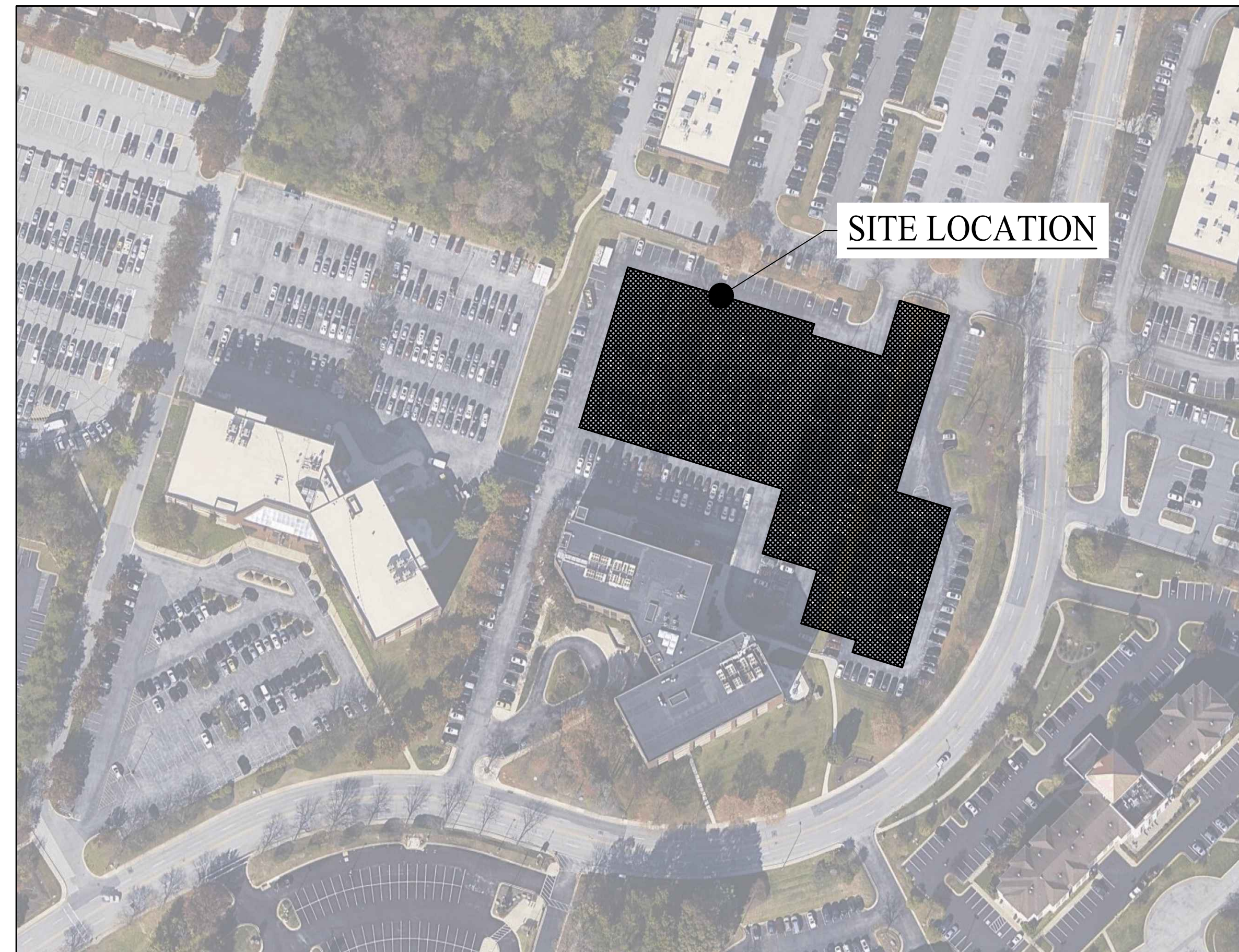


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UMMS PARASOL 920 ELKRIDGE PV

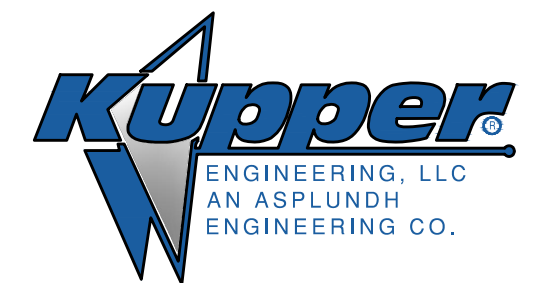
DC SIZE: 1186.8KW; AC SIZE: 950KW

920 ELKRIDGE LANDING RD
LINTHICUM HEIGHTS, MD 21090



SITE LOCATION
LATITUDE 39°12'07"N
LONGITUDE 76°41'10"W

Delonghi, A. P. / 10/20/2023



AMBLER YARDS
300 BROOKSIDE AVE. BLDG #14
AMBLER, PA 19002
TELEPHONE 215-884-5970



**UMMS PARASOL -
920 ELKRIDGE**

920 ELKRIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

REV.	DESCRIPTION	DATE	BY:	CHK:
A	ISSUE FOR INTERCONNECTION	07/12/2023	EMJ	RK
B	ISSUE FOR INTERCONNECTION	07/19/2023	EMJ	PAP
C	ISSUE FOR CIVIL REVIEW	08/01/2023	EMJ	RK
D	ISSUE FOR 30% REVIEW	09/08/2023	EMJ	RK
E	ISSUE FOR 90% PROGRESS	11/15/2023	EMJ	PAP

PROJECT NO.	SCALE
406-22	AS NOTED

PROJECT
COVER SHEET

DRAWING NO.

COVER

PRELIMINARY
NOT FOR CONSTRUCTION

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ELECTRICAL ABBREVIATIONS

(E)	EXISTING TO REMAIN	JB	JUNCTION BOX	(E)	EXISTING TO REMAIN	JB	JUNCTION BOX
(ED)	EXISTING TO BE DEMOLISHED	JW	JACKET WATER	(ER)	EXISTING TO BE RELOCATED	JWH	JACKET WATER HEATER
(N)	NEW	JWP	JACKET WATER PUMP	(RL)	EXISTING SHOWN RELOCATED	K	KILO, THOUSANDS
A	AMP, AMPERES	LC	LIGHTING CONTROL	A/C	AIR CONDITIONER	LFM	LIQUIDTIGHT FLEXIBLE METAL
AC	AIR COMPRESSOR	LOP	LUBE OIL PUMP	AF	AMPERE FRAME	LP	LIGHTING PANEL
AG	ABOVE FINISHED FLOOR	LSIG	LONG, SHORT, INSTANTANEOUS AND GROUND FAULT TRIP FUNCTIONS	AG, A/G	ABOVE FINISHED GRADE	LTG	LIGHTING
AIC	ABOVE GROUND AMPERES INTERRUPTING CAPACITY	LTNG	LIGHTING	AT	AMPERE TRIP	LV	LOW VOLTAGE (600V OR LESS)
ATS	AUTOMATIC TRANSFER SWITCH	LVP	LOW VOLTAGE PANEL	BAS	BUILDING AUTOMATION SYSTEM	M	MEGA, MILLIONS
BC	BATTERY CHARGER	MAX	MAXIMUM	BC	BREAKER	MC	MECHANICAL EQUIPMENT
BOC	BOTTOM OF CABINET	MCB	MAIN CIRCUIT BREAKER	BOC	BOTTOM OF CABINET	MCCR	MAIN CIRCUIT BREAKER
BP	BY-PASS	MCC	MOTOR CENTER	BR	BATTERY RACK	MCOV	MAXIMUM CONTINUOUS OPERATING VOLTAGE
BTU	BRITISH THERMAL UNIT	MCP	MOTOR CIRCUIT PROTECTOR	C	CONDUIT	MDP	MAIN DISTRIBUTION PANEL
CAB	CABINET	MDSB	MAIN DISTRIBUTION SWITCHBOARD	CB, C/B	CIRCUIT BREAKER	MDSW	MAIN DISTRIBUTION SWITCHGEAR
CP	CONTROL PANEL	MH	MANHOLE	CKT	CIRCUIT	MIN	MINIMUM
CLG	CEILING	MLO	MAIN LUGS ONLY	CMU	CONCRETE MASONRY UNIT	MM	MULTI-MODE (FIBER OPTIC CABLE)
CONTN	CONTINUATION	MST	MOTOR STARTER	CP	CONTROL PANEL	MV	MEDIUM VOLTAGE (5000V-15000V)
CPS	CONTINUOUS POWER SYSTEMS	N	NEUTRAL	CT	CURRENT TRANSFORMER	NC	NORMALLY CLOSE
CT	CURRENT TRANSFORMER	NEC	NATIONAL ELECTRICAL CODE	DEG	DEGREE	NFA	NATIONAL FIRE PROTECTION AGENCY
DEG	DEGREE	NFR	NEUTRAL GROUNDING RESISTOR	DIST	DISTRIBUTION	NIC	NOT IN CONTRACT
DD	DIRECT ON LINE, ACROSS THE LINE, LINE VOLTAGE DISTRIBUTION PANEL	NO	NORMALLY OPEN	DOL	DIRECT ON LINE, ACROSS THE LINE, LINE VOLTAGE DISTRIBUTION PANEL	NL	NIGHT LIGHT
DP	DIRECT TRANSFER TRIP	NTS	NOT TO SCALE	CP	CONTROL PANEL	NO	NORMALLY OPEN
DTT	DRAWING	OH, OH	OVERHEAD POLES, PHASE(S)	EF	EXHAUST FAN	PC	POWER CENTER
DWG	DRAWING	P	POLES, PHASE(S)	EHU	ELECTRIC HEAT UNIT	PLOP	PRE-LUBE OIL PUMP
EBH	ELECTRIC BASEBOARD HEAT	PC	POWER CENTER	ELEC	ELECTRIC	PNL	PANEL, PANELBOARD
EC	ELECTRICAL CONTRACTOR	PLOP	PRE-LUBE OIL PUMP	ECC	ETHERNET COMMUNICATIONS CABINET	PP	POWER PANEL
EE	ELECTRICAL EQUIPMENT	PNL	PANEL, PANELBOARD	EE	ELECTRICAL EQUIPMENT	PR	PRIMARY
EF	EXHAUST FAN	PP	POWER PANEL	EHU	ELECTRIC HEAT UNIT	PT	POWER TRANSFORMER
EHU	ELECTRIC HEAT UNIT	PR	PRIMARY	ELEC	ELECTRIC	PVC	POLYETHYLENE VINYL CHLORIDE
ELEC	ELECTRIC	PT	POWER TRANSFORMER	EMCP	ELECTRONIC MODULAR CONTROL PANEL	REC	RECESSED
EMCP	ELECTRONIC MODULAR CONTROL PANEL	REC	RECESSED	EMERG	EMERGENCY	RECEPT	RECEPTACLE
EMERG	EMERGENCY	RECEPT	RECEPTACLE	EMT	ELECTRICAL METALLIC TUBING	RGS	RIGID GALVANIZED STEEL
EMT	ELECTRICAL METALLIC TUBING	RGS	RIGID GALVANIZED STEEL	EOI	ENGINEER PROCURE CONSTRUCT	RM	ROOM
EOI	ENGINEER PROCURE CONSTRUCT	RM	ROOM	EPC	EMERGENCY POWER OFF	RP	RECEPTACLE PANEL
EPC	EMERGENCY POWER OFF	RP	RECEPTACLE PANEL	EPO	EQUAL	SA	SURGE ARRESTER
EPO	EQUAL	SA	SURGE ARRESTER	EQ	EMERGENCY STOP CONTROL RELAY	SN	SOLID NEUTRAL
ESCR	EMERGENCY STOP CONTROL RELAY	SN	SOLID NEUTRAL	FA	FIRE ALARM	SEC	SECONDARY
FA	FIRE ALARM	SEC	SECONDARY	FD	FERRIS (CAST IRON) DEEP BOX (W/ HUB)	SF	SUPPLY FAN
FD	FERRIS (CAST IRON) DEEP BOX (W/ HUB)	SF	SUPPLY FAN	FDR	FEEDER	SIS	SYNTHETIC INSULATED SWITCHBOARD (WIRE) SPECIFICATIONS
FDR	FEEDER	SIS	SYNTHETIC INSULATED SWITCHBOARD (WIRE) SPECIFICATIONS	FDT	FUEL DAY TANK	STP	SHIELDED TWISTED PAIR
FDX	FIXTURE	STP	SHIELDED TWISTED PAIR	FS	FERRIS (CAST IRON) SHALLOW BOX (W/ HUB)	STR	STARTER
FS	FERRIS (CAST IRON) SHALLOW BOX (W/ HUB)	STR	STARTER	FU	FUSE	STT	SHIELDED TWISTED TRIPLET
FU	FUSE	STT	SHIELDED TWISTED TRIPLET	FVNR	FULL VOLTAGE NON-REVERSING	SW	SWITCH
FVNR	FULL VOLTAGE NON-REVERSING	SW	SWITCH	FVR	FULL VOLTAGE REVERSING	SWBD	SWITCHBOARD
G, GEN	GENERATOR	SWBD	SWITCHBOARD	GND	GROUND	SWGR	SWITCHGEAR
GND	GROUND	SWGR	SWITCHGEAR	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	TM	THERMAL/MAGNETIC
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	TM	THERMAL/MAGNETIC	GFI	GROUND FAULT INTERRUPTER (5 MA)	TDR	TIME DELAY RELAY
GFI	GROUND FAULT INTERRUPTER (5 MA)	TDR	TIME DELAY RELAY	GFP	GROUND FAULT INTERRUPTER (30 MA)	TYP	TYPICAL
GFP	GROUND FAULT INTERRUPTER (30 MA)	TYP	TYPICAL	GSU	STEP UP	UG, U/G	UNDERGROUND
GSU	STEP UP	UG, U/G	UNDERGROUND	GV	GAS VALVE	UON	UNLESS OTHERWISE NOTED
GV	GAS VALVE	UON	UNLESS OTHERWISE NOTED	GYP	GYPNUM BOARD	UPS	UNINTERRUPTIBLE POWER SOURCE
GYP	GYPNUM BOARD	UPS	UNINTERRUPTIBLE POWER SOURCE	HH	HAND HOLE	V	VOLTS
HH	HAND HOLE	V	VOLTS	HOA	HAND-OFF-AUTOMATIC	VA	VOLT-AMPERE
HOA	HAND-OFF-AUTOMATIC	VA	VOLT-AMPERE	HP	HORSEPOWER	VFD	VARIABLE FREQUENCY DRIVE
HP	HORSEPOWER	VFD	VARIABLE FREQUENCY DRIVE	HT	HEAT TRACE	W	WATT(S), WIRE(S)
HT	HEAT TRACE	W	WATT(S), WIRE(S)	HTR	HEATER	W	WATT(S), WIRE(S)
HTR	HEATER	W	WATT(S), WIRE(S)	HV	HIGH VOLTAGE (ABOVE 15000V)	W/O	WITHOUT
HV	HIGH VOLTAGE (ABOVE 15000V)	W/O	WITHOUT	HVP	HIGH VOLTAGE PANEL	WP	WEATHERPROOF
HVP	HIGH VOLTAGE PANEL	WP	WEATHERPROOF	HX	HEAT EXCHANGER	XFMR	TRANSFORMER
HX	HEAT EXCHANGER	XFMR	TRANSFORMER	HZ	HERTZ	XP	EXPLOSION PROOF
HZ	HERTZ	XP	EXPLOSION PROOF				

LOW VOLTAGE COLOR CODE

AC	208/120V	480/277V	120/240V	MEDIUM VOLTAGE
PHASE A	BLACK	BROWN	BLACK	1 STRIPE
PHASE B	RED	ORANGE	BLACK	2 STRIPES
PHASE C	BLUE	YELLOW	---	3 STRIPES
NEUTRAL	WHITE	GRAY	---	
GROUND	GREEN	GREEN	---	
2000VDC SUPPLY	2-WIRE GROUNDED RED	2-WIRE UNGROUNDED RED		
RETURN	---	BLACK		
GROUNDED RETURN	WHITE	---		
EQUIPMENT GROUND	GREEN	GREEN		
125VDC SUPPLY	2-WIRE GROUNDED ORANGE	2-WIRE UNGROUNDED ORANGE		
RETURN	---	GRAY		
GROUNDED RETURN	WHITE	---		
EQUIPMENT GROUND	GREEN	GREEN		

SINGLE LINE DIAGRAM

	TRANSFORMER		CIRCUIT BREAKER
	CURRENT LIMITING CIRCUIT BREAKER		THERMAL OVERLOAD
	DISCONNECT DEVICE FOR DRAWOUT EQUIPMENT		NON-FUSED SWITCH
	FUSE		FUSED SWITCH
	LIGHTNING ARRESTOR		CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER		POTENTIAL TRANSFORMER WITH FUSE
	STOP BUTTON MOMENTARY CONTACT		START BUTTON MOMENTARY CONTACT
	GROUND CONNECTION		BATTERY
	NORMALLY OPEN CONTACT		NORMALLY CLOSED CONTACT
	METER		GENERATOR
	TRANSFER SWITCH		AMMETER
	AMMETER SWITCH		VOLTMETER
	VOLTMETER SWITCH		KIRK KEY INTERLOCK
	WATT-HOUR METER		C/B WITH SHUNT TRIP
	DELTA CONNECTION		GROUNDED WYE CONNECTION
	CONTACTOR		RELAY
	POWER FACTOR CORRECTION CAPACITOR		TRANSIENT VOLTAGE SURGE SUPPRESSION
	INDICATING LAMP		ELECTRIC POLE
	POINT OF CONNECTION TO EXISTING EQUIPMENT.		POINT OF DISCONNECTION TO EXISTING EQUIPMENT.
	TEST SWITCH BLOCK		CT SHORTING BLOCKS

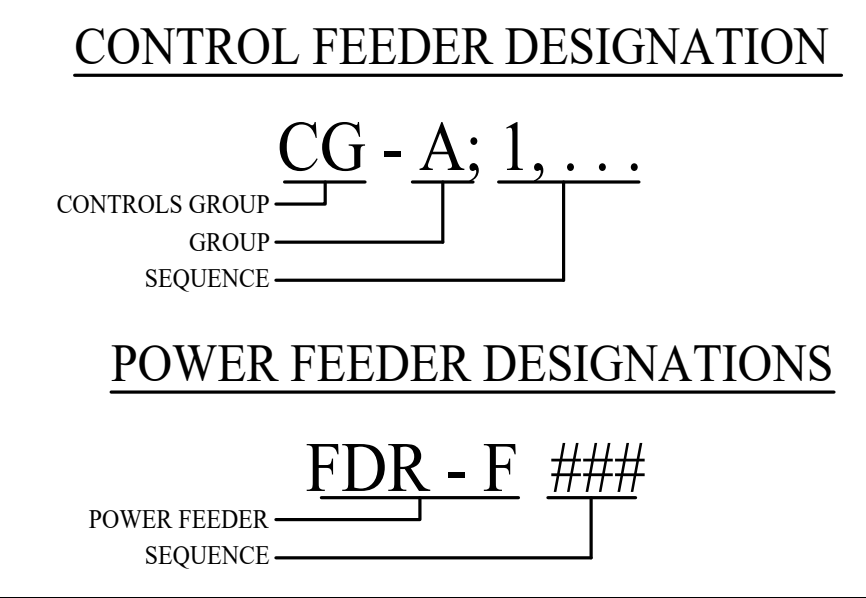
POWER DISTRIBUTION

	208/120 VOLT PANELBOARD
	TRANSFORMER
	JUNCTION BOX
	NON-FUSED DISCONNECT SWITCH
	ENCLOSED CIRCUIT BREAKER
	FUSED DISCONNECT SWITCH
	SELECTOR SWITCH
	HOA - HAND-OFF-AUTO
	MAGNETIC MOTOR STARTER
	COMBINATION MAGNETIC MOTOR STARTER AND DISCONNECT SWITCH
	MOTOR HORSEPOWER AS INDICATED
	HOMERUN TO PANEL (DESCRIPTION ON LOW VOLTAGE CIRCUITRY)
	CONCEALED WIRING IN WALL OR CEILING
	CONCEALED WIRING IN OR UNDER FLOOR SLAB OR ACCESS FLOOR
	CONDUIT SEAL
	EXPOSED WIRING
	UNDERGROUND WIRING
	CONDUIT DOWN
	CONDUIT UP
	EQUIPMENT DESIGNATION
	REFER TO KEY NOTES
	UPPER CASE LETTER INDICATES CONTINUATION LINE
	20A DUPLEX RECEPTACLE OUTLET

DEVICE NUMBERS AND ACRONYMS

15 - SPEED - OR FREQUENCY, MATCHING DEVICE
21 - DISTANCE RELAY
24 - VOLTS PER HERTZ RELAY
25 - SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
26 - THERMAL DEVICE, "Q" INDICATES OIL TEMPERATURE
27 - UNDERVOLTAGE RELAY
32 - DIRECTIONAL POWER RELAY (REVERSE)
33 - POSITION SWITCH
38 - BEARING PROTECTIVE DEVICE
40 - FIELD (OVER/UNDER EXCITATION) RELAY
41 - FIELD CIRCUIT BREAKER
43 - MANUAL TRANSFER OR SELECTOR DEVICE
46 - REVERSE-PHASE OR NEGATIVE SEQUENCE CURRENT RELAY
47 - PHASE-SEQUENCE OR PHASE-BALANCE VOLTAGE RELAY
49 - THERMAL RELAY
50 - INSTANTANEOUS OVERCURRENT RELAY, "BF" INDICATES BREAKER FAILURE PROTECTION
51 - INVERSE TIME OVERCURRENT RELAY, "G" INDICATES GROUND OVERCURRENT, "V" INDICATES VOLTAGE RESTRAINT
52 - AC CIRCUIT BREAKER
59 - OVERVOLTAGE RELAY
59N - ZERO SEQUENCE GROUND OVERVOLTAGE
63 - PRESSURE SWITCH, "X" INDICATES TRANSFORMER TANK PRESSURE
67 - AC DIRECTIONAL OVERCURRENT RELAY
71 - LIQUID LEVEL SWITCH
80 - FLOW SWITCH
81 - FREQUENCY RELAY, "O" INDICATES OVER FREQUENCY "U" INDICATES UNDER FREQUENCY
86 - LOCKOUT RELAY
87 - DIFFERENTIAL PROTECTIVE RELAY, "G" INDICATES GENERATOR DIFFERENTIAL
88 - AUXILIARY MOTOR OR MOTOR GENERATOR
92 - VOLTAGE AND POWER DIRECTIONAL RELAY
95 - FOR SPECIFIC APPLICATIONS NOT OF THE ABOVE
96 - FOR SPECIFIC APPLICATIONS NOT OF THE ABOVE
97 - FOR SPECIFIC APPLICATIONS NOT OF THE ABOVE
98 - FOR SPECIFIC APPLICATIONS NOT OF THE ABOVE
99 - FOR SPECIFIC APPLICATIONS NOT OF THE ABOVE
AFD - ARC FLASH DETECTOR
CLK - CLOCK OR TIMING SOURCE
DDR - DYNAMIC DISTURBANCE RECORDER
DFR - DIGITAL FAULT RECORDER
ENV - ENVIRONMENTAL DATA
HIZ - HIGH IMPEDANCE FAULT DETECTOR
HMI - HUMAN MACHINE INTERFACE
HST - HISTORIAN
LGC - SCHEME LOGIC
MET - SUBSTATION METERING
PDC - PHASOR DATA CONCENTRATOR
PMU - PHASOR MEASUREMENT UNIT
PQM - POWER QUALITY MONITOR
RIO - REMOTE INPUT/OUTPUT DEVICE
RTU - REMOTE TERMINAL UNIT/DATA CONCENTRATOR
SER - SEQUENCE OF EVENTS RECORDER
TCM - TRIP CIRCUIT MONITOR
SOTF - SWITCH ON TO FAULT

FEEDER DESIGNATION



LINE TYPES

	"LIGHT" LINES AND SYMBOLS INDICATE EXISTING
	"BOLD LINES" AND SYMBOLS INDICATE NEW WORK
	"BOLD DASHED LINES" AND SYMBOLS INDICATE DEMOLITION WORK OR UNDERGROUND WORK

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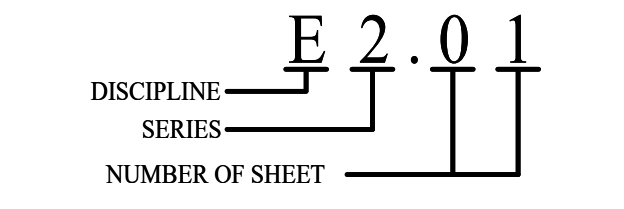
ELECTRICAL GENERAL NOTES

- FOR EXACT LOCATIONS OF ALL EQUIPMENT REFER TO CIVIL SITE PLANS.
- ENTIRE INSTALLATION, INCLUDING MATERIALS, EQUIPMENT AND WORKMANSHIP, SHALL CONFORM WITH THE LATEST LOCAL ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE (NEC 2017), WITH ALL APPLICABLE LAWS, LOCAL CODES AND REGULATIONS AND REGULATORY BODIES HAVING JURISDICTION OVER THIS WORK, INCLUDING NUCC.
- ENTIRE SITE SHALL BE ENCLOSED BY FENCE AND ONLY ACCESSIBLE BY QUALIFIED PERSONNEL.
- ALL OUTDOOR ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN NEMA 3R ENCLOSURE, UNLESS NOTED OTHERWISE.
- ELECTRICAL CONTRACTOR SHALL EXAMINE THE DRAWINGS OF ALL TRADES AND COORDINATE THEIR WORK TO AVOID INTERFERENCE WITH STRUCTURE.
- ALL PV ELECTRICAL WIRING UNLESS OTHERWISE NOTED SHALL BE 2,000V-90°C PV WIRE.
- THE E.C. SHALL PROVIDE SHOP DRAWINGS FOR ALL ELECTRICAL EQUIPMENT AND COMPONENTS THEY PROVIDE. PROVIDE ELECTRONIC PDF SETS OF DRAWINGS TO THE ENGINEER.
- THE WORD "PROVIDE" AS USED WITHIN THESE CONTRACT DOCUMENTS SHALL MEAN TO: "PROVIDE AND INSTALL".
- OBTAIN ALL REQUIRED STATE AND LOCAL MUNICIPALITY/CITY PERMITS FOR ALL ELECTRICAL WORK.
- ALL NEW ELECTRICAL MATERIAL AND EQUIPMENT SHALL BE LISTED BY THE UNDERWRITERS' LABORATORIES, INC. (UL) AND BEAR THE UL LABEL.
- ELECTRICAL RACEWAY CONNECTIONS TO VIBRATING EQUIPMENT AND MACHINERY SUCH AS MOTORS, TRANSFORMERS, ETC. SHALL BE MADE WITH FLEXIBLE METAL CONDUIT.
- PROVIDE GROUNDING IN ACCORDANCE WITH NEC ARTICLES 250 AND 690. ALL GROUNDING WIRE, LUGS, FEEDER AND BUS SHALL BE COPPER. ALL BRANCH CIRCUIT WIRING SHALL CONTAIN A COPPER GROUNDING WIRE. NO FLEXIBLE METAL CONDUIT OF ANY KIND SHALL BE USED AS THE EQUIPMENT GROUNDING CONDUCTOR.
- PROVIDE PLASTIC EMBOSSED IDENTIFICATION PLATES ON ALL ELECTRICAL EQUIPMENT INCLUDED IN THIS PROJECT AND EQUIPMENT FURNISHED BY OTHERS. ATTACH WITH SUITABLE ADHESIVE. PROVIDE IDENTIFICATION FOR ALL TRANSFORMERS, DISCONNECTS, CIRCUIT BREAKERS, COMBINER BOXES, JUNCTION BOXES, PANELS, ETC.
- DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN A RECORD SET OF INSTALLATION PRINTS. THE CONTRACTOR SHALL NEATLY AND CLEARLY RECORD ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS. AT THE COMPLETION OF WORK, THE CONTRACTOR SHALL RETURN THE MARKED PRINTS WITH ALL INFORMATION MAINTAINED DURING CONSTRUCTION TO THE ENGINEER FOR SUBMISSION TO THE OWNER.
- KUPPER ENGINEERING, LLC INCORPORATES COMMERCIAL MANUFACTURED ITEM(S) OR COMPONENT(S) IN THE PREPARATION OF THIS PLAN, AND RELIES UPON THE MANUFACTURER'S STATED OR IDENTIFIED SPECIFICATIONS AND PROPERTIES IN THE PREPARATION OF THIS PLAN. KUPPER ENGINEERING, LLC HAS NOT UNDERTAKEN ANY INDEPENDENT EXAMINATION, TESTING OR ANALYSIS TO VERIFY THE MANUFACTURER'S SPECIFICATIONS OR PROPERTIES FOR ANY ITEM OR COMPONENT. (KUPPER ENGINEERING, LLC MAKES NO REPRESENTATIONS OR WARRANTIES AS TO THE ACCURACY OF THE SPECIFICATIONS OR PROPERTIES ASSOCIATED WITH ANY ITEM OR COMPONENT UTILIZED IN THIS PLAN.)
- KUPPER ENGINEERING, LLC HAS RELIED UPON INFORMATION PROVIDED TO IT BY OTHERS IN PREPARATION OF THESE PLANS. THIS INFORMATION HAS BEEN USED IN THE DEVELOPMENT OF THESE PLANS. KUPPER ENGINEERING, LLC SHALL NOT BE HELD RESPONSIBLE FOR THE ACCURACY OF THIS INFORMATION; NOR FIELD CHANGES DURING INSTALLATION AND CONSTRUCTION.

ELECTRICAL DRAWING LIST

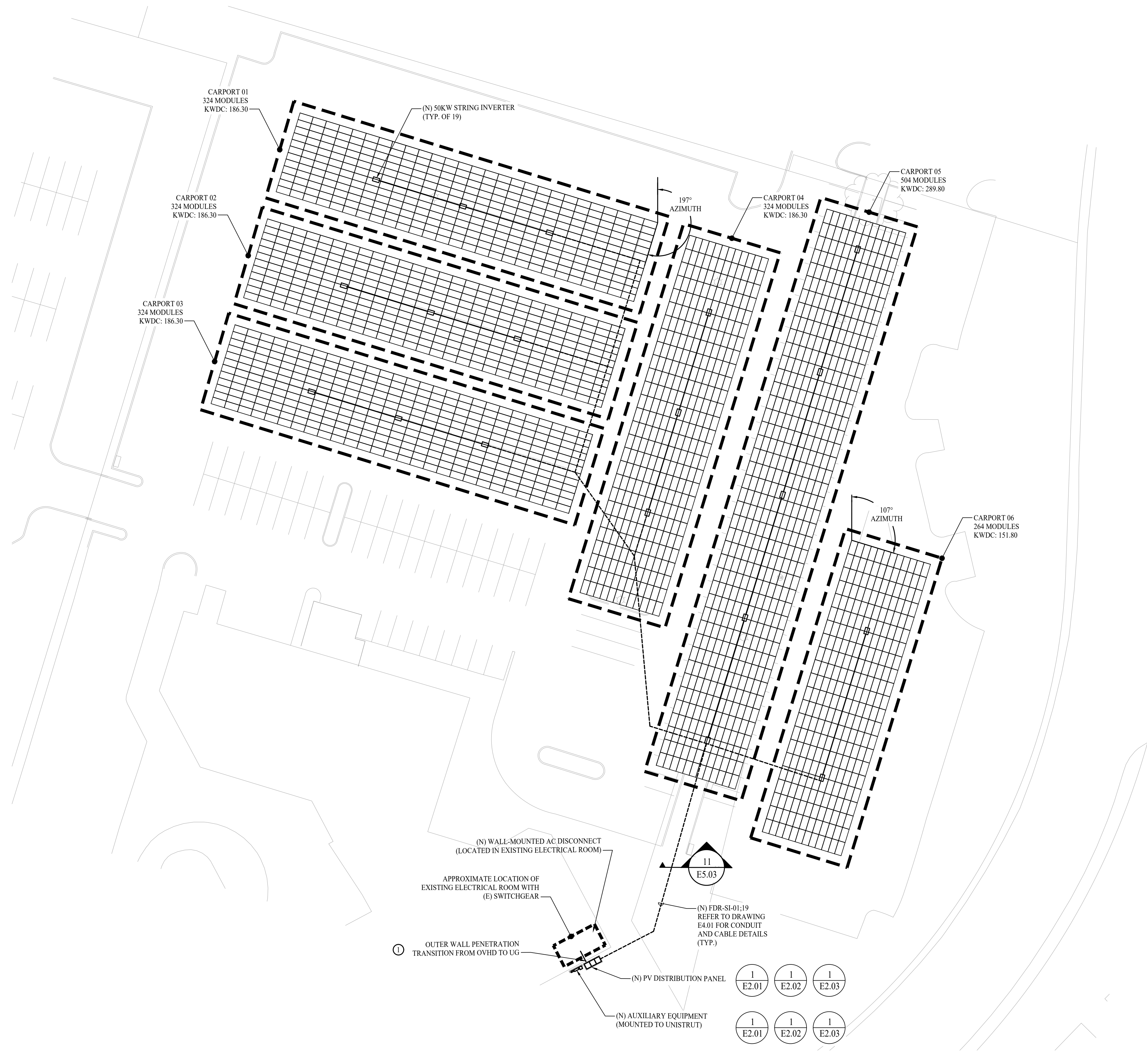
DRAWING NUMBER	DRAWING NAME	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION	FOR INTERCONNECTION
COVER	PROJECT COVER SHEET																	
E0.01	ELECTRICAL LEGEND, NOTES AND ABBREVIATIONS																	
E0.50	ELECTRICAL PV OVERALL SITE PLAN																	
E2.01	ELECTRICAL CONDUIT ROUTING PLAN - POWER																	
E2.02	ELECTRICAL CONDUIT ROUTING PLAN - CONTROLS																	
E2.03	ELECTRICAL GROUNDING PLAN																	
E2.04	ELECTRICAL PV WIRING PLAN - CARPORT 01, 02, & 03																	
E2.05	ELECTRICAL PV WIRING PLAN - CARPORT 04, 05, & 06																	
E3.01	ELECTRICAL SCHEDULES																	
E4.01	ELECTRICAL SINGLE LINE DIAGRAM																	
E5.01	ELECTRICAL DETAILS - 1																	
E5.02	ELECTRICAL DETAILS - 2																	
E5.03	ELECTRICAL DETAILS - 3																	
E5.04	ELECTRICAL DETAILS - 4																	
E5.05	ELECTRICAL DETAILS - 5																	

DRAWING NUMBER DESCRIPTION



DISCIPLINE	SERIES	FLOOR (FOR PLANS)	SHEET No.
E	0	LEGEND/SITE	1,2,3, ETC. FLOOR No.
EC	1</		

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1 ELECTRICAL SITE PLAN
SCALE: 1" = 30'-0"

SHEET NOTES:

- REFER TO E2.01 FOR ADDITIONAL POWER AND E2.02 FOR CONTROL CONDUIT ROUTING AND WIRING REQUIREMENTS.
- REFER TO E3.01 AND E4.01 FOR ADDITIONAL CONDUIT AND WIRING REQUIREMENTS.
- E.C. SHALL PROVIDE ADDITIONAL HANDHOLES WHERE REQUIRED. SIZE ALL HANDHOLES PER NEC.
- CONDUIT ROUTING LAYOUTS ARE GENERIC AND DO NOT REPRESENT ALL CONDUITS REQUIRED IN SCOPE OF WORK. MAJOR CONDUIT ROUTES ARE SHOWN TO PROVIDE COORDINATION BETWEEN TRADES AND TO LOCATE CONDUIT ENTRANCE POINTS. IN GENERAL, THESE ENTRANCE POINTS TO EQUIPMENT SHALL BE FOLLOWED TO PREVENT SHEARING OF CONDUITS FROM PAD SETTLEMENTS.
- DRAWINGS DO NOT REPRESENT EXACT END LOCATION OF WIRING AND CONDUIT. WIRING AND CONDUIT SHALL BE PROVIDED AS REQUIRED TO EXTEND TO THE FINAL TERMINAL BLOCK DESTINATIONS. E.C. SHALL COORDINATE WITH EACH MANUFACTURER'S SHOP DRAWINGS.
- COORDINATE CONDUIT ENTRY LOCATION WITH EQUIPMENT MANUFACTURER.
- SPARE CONDUIT SHALL STUB UP INSIDE SECTION OF EQUIPMENT AND CAPPED. PROVIDE PULL STRING, PRE-PULLED AND TIED AT BOTH ENDS.
- COORDINATE WITH EXISTING UNDERGROUND PIPING AND ELECTRICAL CONDUITS. E.C. SHALL HIRE A SITE UTILITY LOCATOR TO IDENTIFY ALL UNDERGROUND INTERFERENCES. HAND DIG IN AREAS WITH EXISTING UTILITIES.
- E.C. SHALL COORDINATE EXACT LOCATION OF OVERHEAD CONDUIT ROUTING IN FIELD. PROVIDE JUNCTIONS BOXES AS REQUIRED. SIZE PER NEC.

KEY NOTES:

- CONTRACTOR SHALL CONSULT WITH OWNER TO DETERMINE CONDUIT ROUTE IN FIELD, THROUGH BUILDING.

SYSTEM SPECS	
DC SYSTEM SIZE	1186.8KW
AC SYSTEM SIZE	950.00KW
MODULE MODEL	ZNSHINE: ZXM7-UHLDD144
MODULE RATING	575W
MODULE QUANTITY	2064
INVERTER MODEL	SOLECTRIA: PVL-50TL-480
STRING SIZE	16/17
INVERTER QUANTITY	19
TOTAL # OF STRINGS	127
AZIMUTH	197°/107°
TILT - RACKING	7.4° - CARPORT

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ENGINEERING CO.

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TELEPHONE 215-884-5970

CI
RENEWABLES

**UMMS PARASOL -
920 ELKCRIDGE**

920 ELKCRIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

DATE	DESCRIPTION	BY			CHK		
		DATE	DATE	DATE	DATE	DATE	DATE
07/12/2023	A ISSUE FOR INTERCONNECTION	EMJ	RK	EMJ	PAP		
07/19/2023	B ISSUE FOR INTERCONNECTION	EMJ	RK	EMJ	PAP		
08/01/2023	C ISSUE FOR CIVIL REVIEW	EMJ	RK	EMJ	PAP		
09/08/2023	D ISSUE FOR 30% REVIEW	EMJ	RK	EMJ	PAP		
11/15/2023	E ISSUE FOR 90% PROGRESS	EMJ	RK	EMJ	PAP		

PROJECT NO: 406-22 SCALE: AS NOTED

**ELECTRICAL
SITE PLAN**

DRAWING NO: **E0.50**

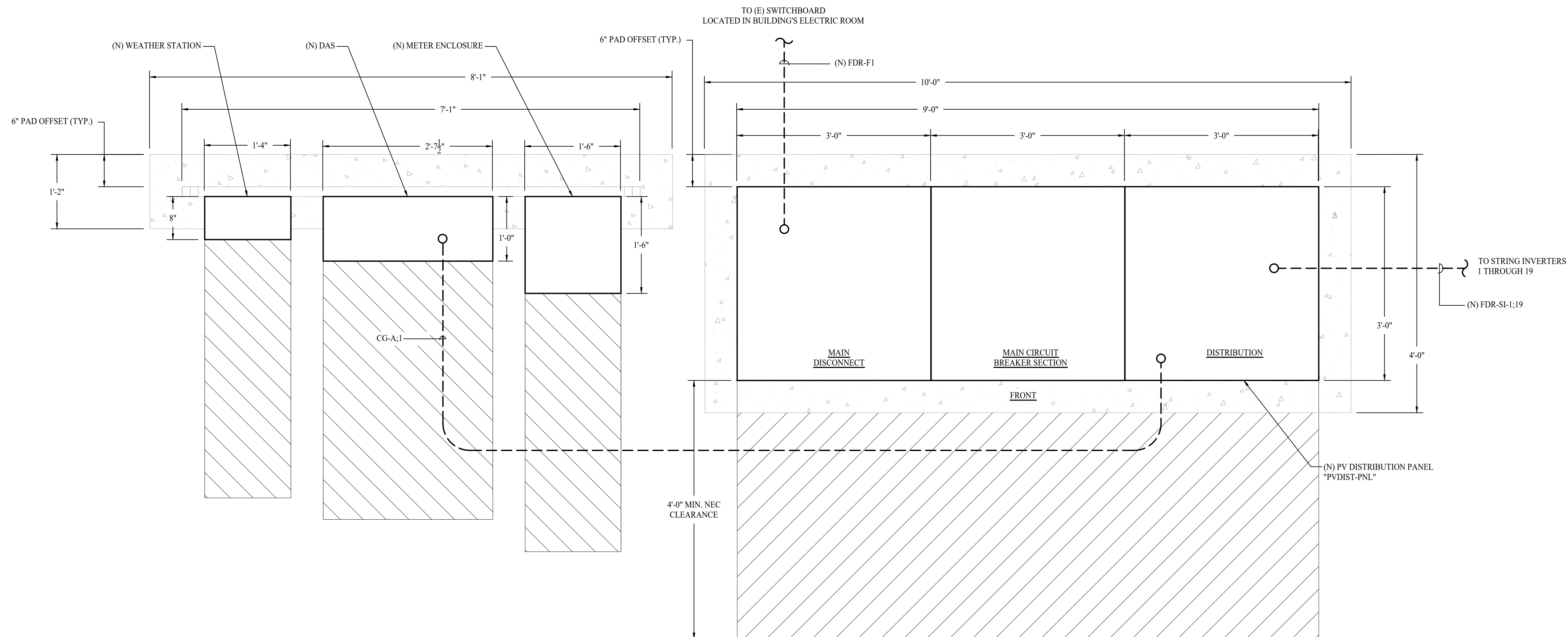
0' 1" GRAPHIC SCALE

**PRELIMINARY
NOT FOR CONSTRUCTION**

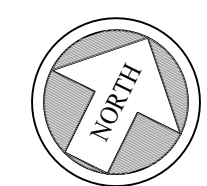
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SHEET NOTES:

1. REFER TO DRAWING E4.01 FOR SINGLE LINE DIAGRAM.
2. CONDUIT ROUTING LAYOUTS ARE GENERIC AND DO NOT REPRESENT ALL CONDUITS REQUIRED IN SCOPE OF WORK. MAJOR CONDUIT ROUTES ARE SHOWN TO PROVIDE COORDINATION BETWEEN TRADES AND TO LOCATE CONDUIT ENTRANCE POINTS. IN GENERAL, THESE ENTRANCE POINTS TO EQUIPMENT SHALL BE FOLLOWED TO PREVENT SHEARING OF CONDUITS FROM PAD SETTLEMENTS.
3. DRAWINGS DO NOT REPRESENT EXACT END LOCATION OF WIRING AND CONDUIT. WIRING AND CONDUIT SHALL BE PROVIDED AS REQUIRED TO EXTEND TO THE FINAL TERMINAL BLOCK DESTINATIONS. E.C. SHALL COORDINATE WITH EACH MANUFACTURER'S SHOP DRAWINGS.
4. COORDINATE CONDUIT ENTRY LOCATION WITH EQUIPMENT MANUFACTURER.
5. ANY EXISTING CURB, MACADAM, EXISTING STORM SEWER, VEGETATION OR UNDERGROUND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
6. FINAL PAD DESIGN BY STRUCTURAL ENGINEER.



1 ELECTRICAL CONDUIT ROUTING PLAN - POWER
SCALE: 1" = 1'-0"



0 11"
GRAPHIC SCALE

PRELIMINARY
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920 ELKRIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

REV.	DESCRIPTION	DATE	BY	CHECK
A	ISSUE FOR INTERCONNECTION	07/12/2023	EMJ	RK
B	ISSUE FOR INTERCONNECTION	07/19/2023	EMJ	PAP
C	ISSUE FOR CIVIL REVIEW	08/01/2023	EMJ	RK
D	ISSUE FOR 30% REVIEW	09/08/2023	EMJ	RK
E	ISSUE FOR 90% PROGRESS	11/15/2023	EMJ	PAP

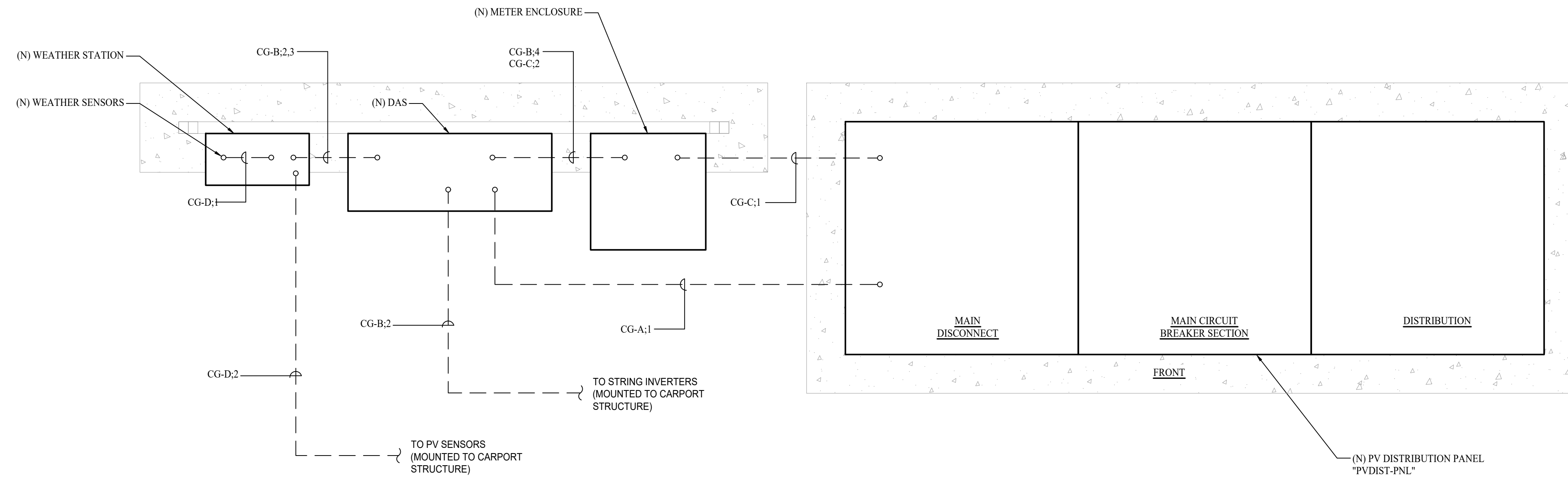
PROJECT NO. 406-22 SCALE: AS NOTED

**ELECTRICAL
CONDUIT ROUTING
PLAN - POWER**

DRAWING NO. **E2.01**

SHEET NOTES:

1. REFER TO DRAWING E2.01 FOR SHEET AND KEY NOTES.



1 ELECTRICAL CONDUIT ROUTING PLAN - CONTROLS
SCALE: 1" = 1'-0"

ELECTRICAL CONTROL-CONDUIT & WIRING SCHEDULE									
CONDUIT GROUP NO.	FROM	TO	CONDUIT #	CONDUIT	DESCRIPTION	BELOW GRADE=BG OVERHEAD=OH	VOLTAGE	WIRING	NOTES
CG-A	PV DIST. PANEL	DAS	1	1"	POWER	BG/OH	120VAC	(2) #12 AWG CU + (1) #12 AWG CU GND	120VAC POWER
CG-B	DAS	STRING INVERTERS	1	2"	MONITORING	BG	LV	RS-485	DAISY CHAINED INVERTERS
		WEATHER STATION	2	3/4"	POWER	BG	LV	(2) #20 AWG CU	WEATHER STATION POWER
		WEATHER STATION	3	3/4"	COMMUNICATIONS	BG	LV	RS-485	WEATHER STATION COMMUNICATIONS
		METER ENCLOSURE	4	1"	POWER	BG/OH	120VAC	(2) #12 AWG CU + (1) #12 AWG CU GND	120VAC POWER
CG-C	METER ENCLOSURE	PV DIST. PANEL	1	1-1/4"	MONITORING	BG/OH	LV	(11) #12 AWG CU	CT/PT WIRING (METER)
		DAS	2	2"	MONITORING	BG	LV	CAT5	METER DATA
CG-D	WEATHER STATION	AMBIENT TEMPERATURE SENSOR	1	1"	COMMUNICATIONS	OH	LV	INCLUDED WITH SENSOR	AMBIENT TEMPERATURE SENSOR
		POA/REAR-POA/BOM SENSORS	2	1"	COMMUNICATIONS	BG	LV	INCLUDED WITH SENSOR	POA/BOM SENSOR WITHIN 150 FEET

2 ELECTRICAL CONTROLS SCHEDULE
SCALE: NTS

0 1" GRAPHIC SCALE

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Kupper
ENGINEERING, LLC
AN ASPLUNDH
ENGINEERING CO.

AMBLER YARDS
300 BROOKSIDE AVE. BLDG #14
AMBLER, PA 19002
TELEPHONE 215-884-5970

CI
RENEWABLES

**UMMS PARASOL -
920 ELKRIDGE**

920 ELKRIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

DATE	BY	SCALE
07/12/2023	EMJ	RK
07/19/2023	EMJ	PAP
08/01/2023	EMJ	RK
09/08/2023	EMJ	RK
11/15/2023	EMJ	PAP

DATE	DESCRIPTION	BY	SCALE
	A ISSUE FOR INTERCONNECTION		
	B ISSUE FOR INTERCONNECTION		
	C ISSUE FOR CIVIL REVIEW		
	D ISSUE FOR 30% REVIEW		
	E ISSUE FOR 90% PROGRESS		

PROJECT NO: 406-22 SCALE: AS NOTED

**ELECTRICAL
CONDUIT ROUTING
PLAN - CONTROLS**

DRAWING NO: **E2.02**

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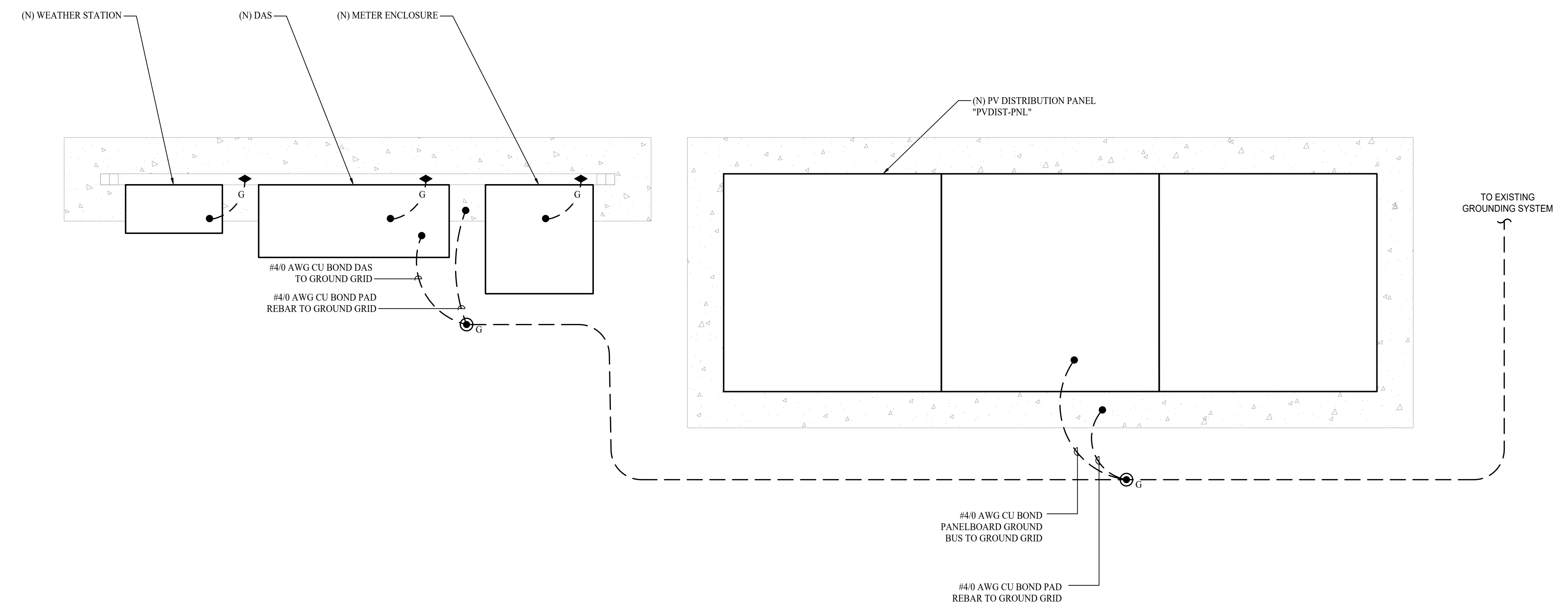
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GROUNDING LEGEND

- #40, 19-STRAND BARE SOFT DRAWN COPPER CONDUCTOR.
- ⊙ G 3/4" x 10' COPPER CLAD GROUND ROD WITH MECHANICAL CONNECTIONS.
- ⊙ G 3/4" x 10' COPPER CLAD GROUND RODS WITH GROUND ROD COUPLER AND MECHANICAL CONNECTIONS IN TEST WELL.
- G #6, SOFT DRAWN STRANDED COPPER CONDUCTOR FOR THE CONNECTION OF EQUIPMENT.

SHEET NOTES:

1. DRAWINGS DOES NOT INCORPORATE ALL BONDING CONNECTIONS. THIS IS A GUIDE ONLY. E.C. SHALL BOND ALL EQUIPMENT FOR SAFE TOUCH POTENTIALS AND (MIN.) ACCORDING TO NEC.
2. ALL ENCLOSURES SHALL BE BONDED.
3. ALL CONCRETE EQUIPMENT PADS SHALL BE BONDED PER DETAIL 7/ES-01.
4. GROUND RESISTANCE AT EQUIPMENT PADS SHALL BE 5 OHMS OR LESS TO GROUND. CONTRACTOR SHALL ADD ADDITIONAL GROUND RODS AND UNDERGROUND COPPER TO ACHIEVE THESE RESULTS. TESTING REPORTS SHALL BE PROVIDED TO THE EOR TO CONFIRM GROUNDING MEETS IEEE STANDARDS.
5. GROUND RESISTANCE AT POLES SHALL BE 10 OHMS OR LESS TO GROUND. CONTRACTOR SHALL ADD ADDITIONAL GROUND RODS AND UNDERGROUND COPPER TO ACHIEVE THESE RESULTS. TESTING REPORTS SHALL BE PROVIDED TO THE EOR TO CONFIRM GROUNDING MEETS IEEE STANDARDS.
6. GROUNDING CONNECTORS SHALL BE EITHER IRREVERSIBLE COMPRESSION OR EXOTHERMIC WELD UNLESS OTHERWISE NOTED.



1 ELECTRICAL GROUNDING PLAN
SCALE: 1" = 1'-0"



0' 1" GRAPHIC SCALE

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**UMMS PARASOL -
920 ELKRIDGE**

920 ELKRIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

DATE	BY	CHKD.
07/12/2023	EMJ	RK
07/19/2023	EMJ	PAP
08/01/2023	EMJ	RK
09/08/2023	EMJ	RK
11/15/2023	EMJ	PAP

PROJECT NO: 406-22 SCALE: AS NOTED

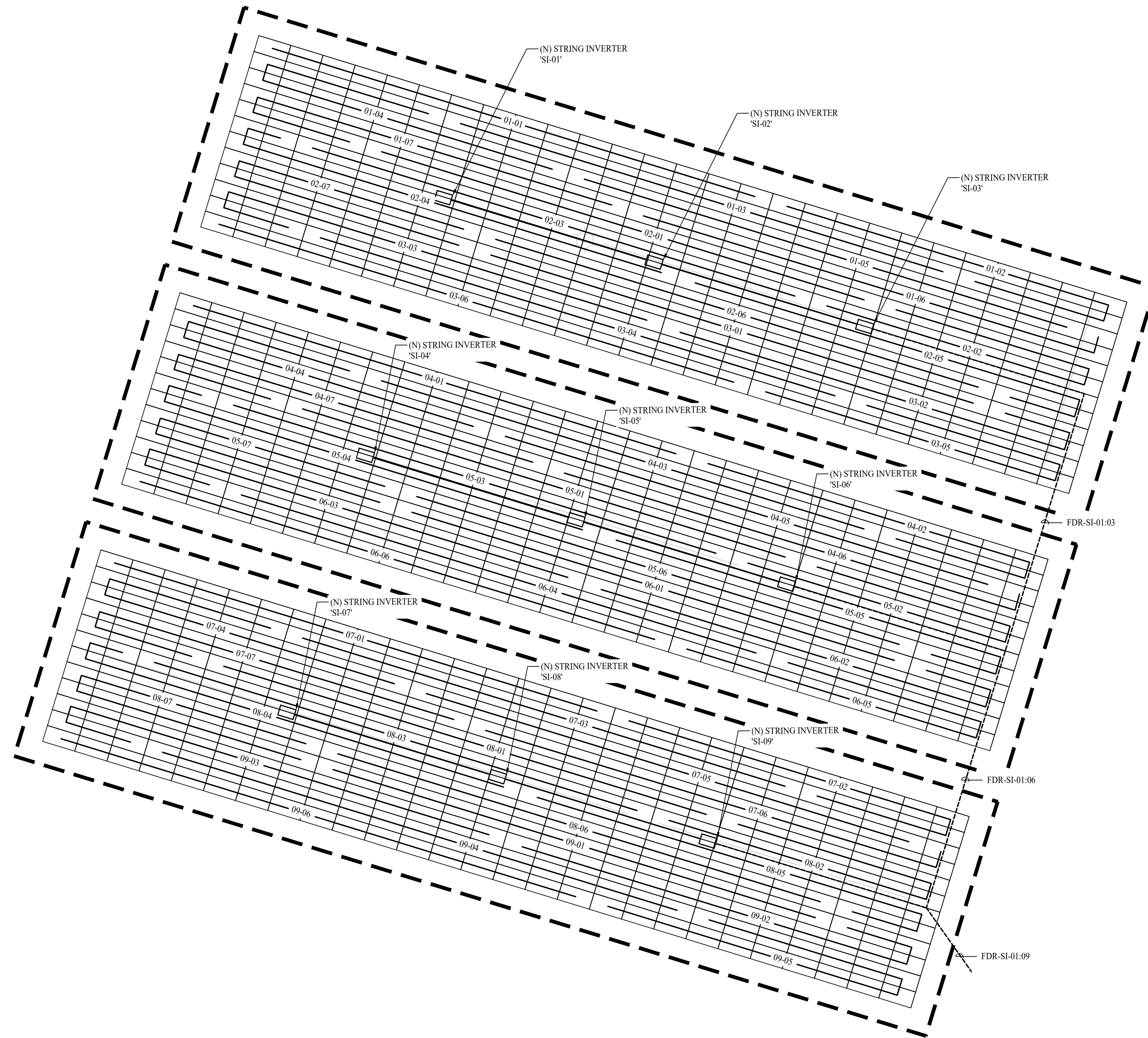
ELECTRICAL GROUNDING PLAN

DRAWING NO: **E2.03**

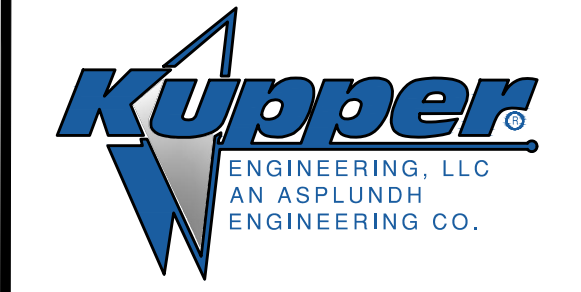
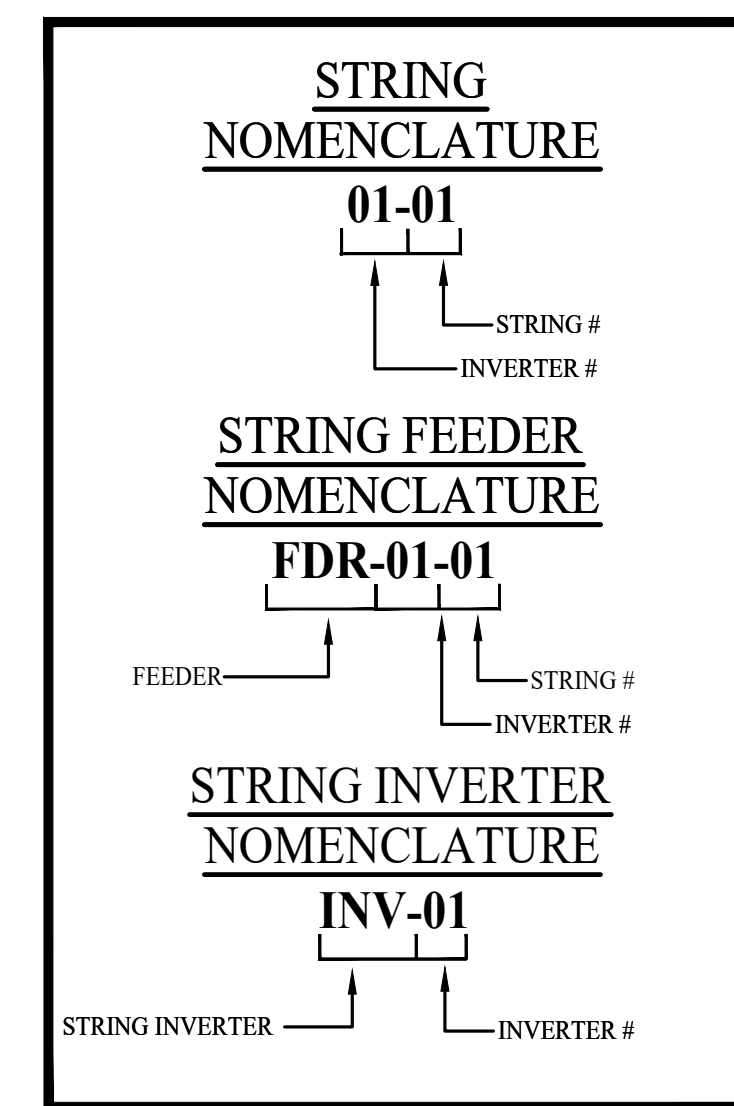
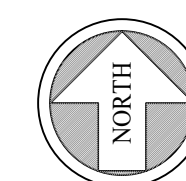
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SHEET NOTES:

1. REFER TO DRAWINGS E2.01 FOR ADDITIONAL POWER AND E2.02 FOR CONTROL, CONDUIT ROUTING AND WIRING REQUIREMENTS.
2. REFER TO DRAWING E4.01 FOR SINGLE LINE DIAGRAM.



1 ELECTRICAL PV WIRING DIAGRAM - CARPORTS 01, 02, & 03
SCALE: 1" = 15'-0"



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PROJECT NO: 406-22 SCALE: AS NOTED

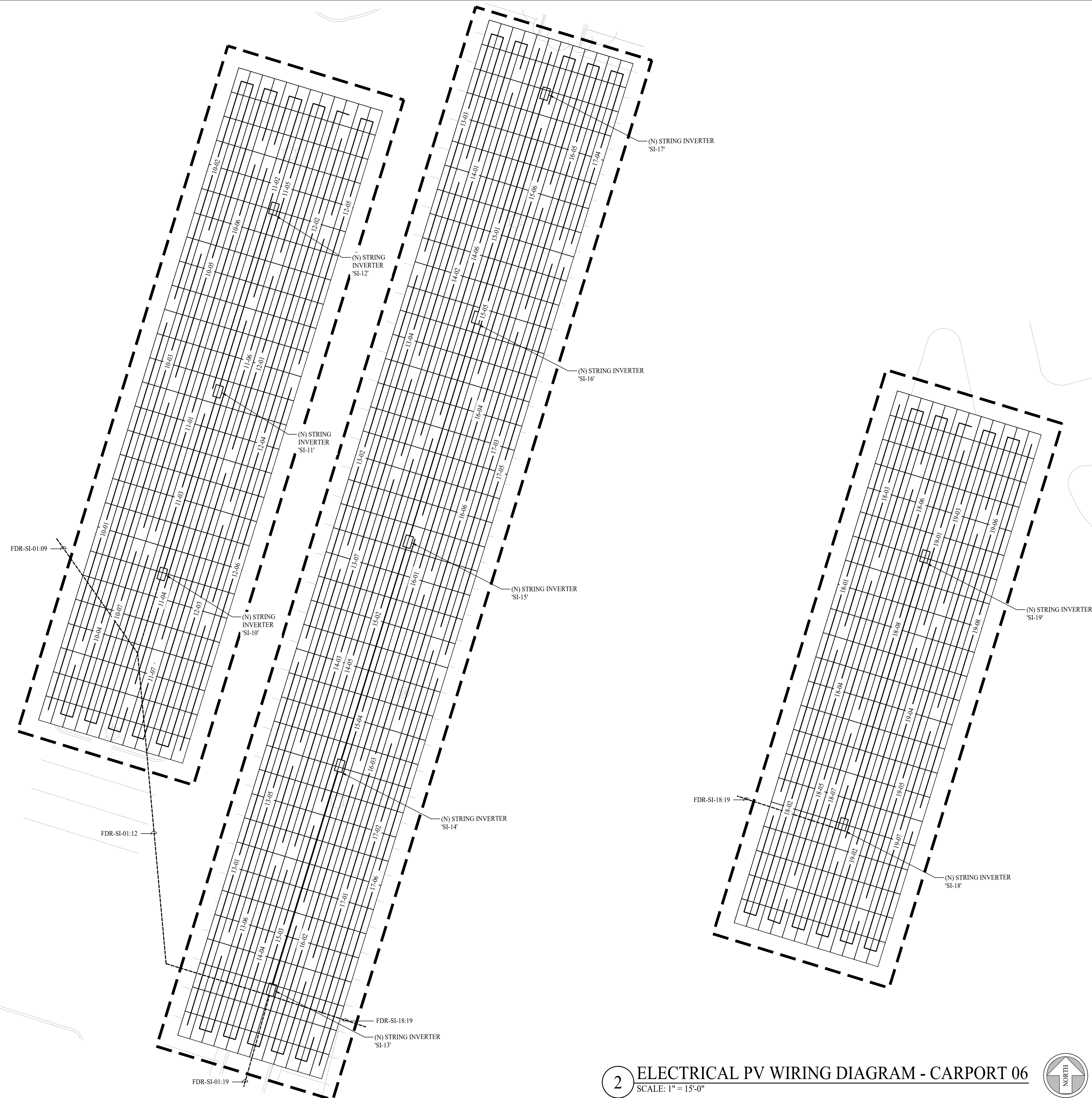
ELECTRICAL PV
WIRING DIAGRAM -
CARPORTS 01, 02, & 03

DRAWING NO:
E2.04

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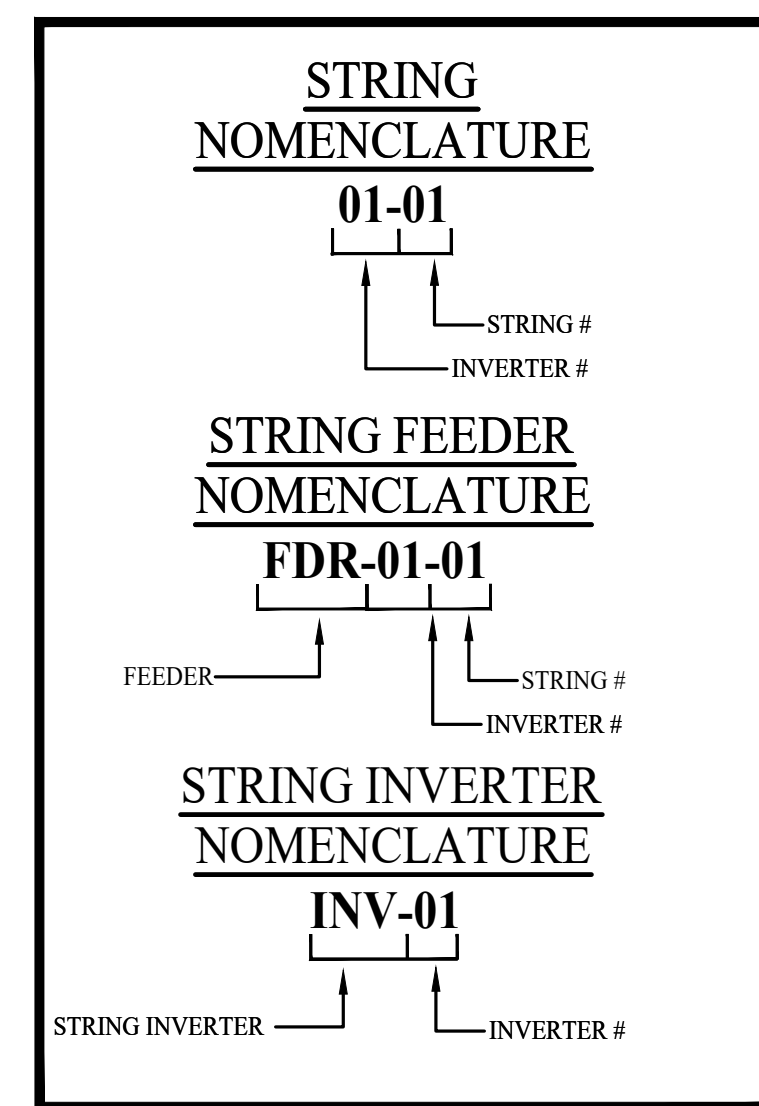
SHEET NOTES:

1. REFER TO DRAWING E2.04 FOR SHEET AND KEY NOTES.



1 ELECTRICAL PV WIRING DIAGRAM - CARPORTS 04 & 05
SCALE: 1" = 15'-0"

2 ELECTRICAL PV WIRING DIAGRAM - CARPORT 06
SCALE: 1" = 15'-0"



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**UMMS PARASOL -
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DATE	BY	SCALE
07/12/2023	EMJ	RK
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	C ISSUE FOR CIVIL REVIEW	EMJ	RK
	D ISSUE FOR 30% REVIEW	EMJ	RK
	E ISSUE FOR 90% PROGRESS	EMJ	PAP

PROJECT NO.	406-22	SCALE:	AS NOTED
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ELECTRICAL PV
WIRING DIAGRAM -
CARPORTS 04, 05, & 06

DRAWING NO:
E2.05

STC MODULE SPECS	
MAKE/MODEL:	ZNSHINE: ZXM7-UHLDD144 STC
MODULE POWER (W)	575
MODULE Vmp (V)	42.60
MODULE Voc (V)	51.30
MODULE Imp (A)	13.50
MODULE Isc (A)	14.29
MODULE Voc Temperature Coefficient (%/C)	-0.25
MODULE Vmp Temperature Coefficient (%/C)	-0.30
BSTC MODULE SPECS	
MAKE/MODEL:	ZNSHINE: ZXM7-UHLDD144 BSTC
MODULE POWER (W)	719
MODULE Vmp (V)	42.70
MODULE Voc (V)	51.40
MODULE Imp (A)	16.83
MODULE Isc (A)	17.82

STC STRING SPECS	
MODULES PER STRING	17
STRING POWER (W)	9,775
NOMINAL STRING Vmp (V)	724.20
STRING Voc (V)	872.10
STRING Imp (A)	13.50
STRING Isc (A)	14.29
MAX CIRCUIT CURRENT (A)	17.86
MIN STRING OCPD RATING (A)	22.33
CORRECTED MAX STRING Voc (V)	956.91
CORRECTED MIN STRING VOLTAGE (V)	654.89
BSTC STRING SPECS	
MODULES PER STRING	16
STRING POWER (W)	9,200
NOMINAL STRING Vmp (V)	681.60
STRING Voc (V)	820.80
STRING Imp (A)	13.50
STRING Isc (A)	14.29
MAX CIRCUIT CURRENT (A)	17.86
MIN STRING OCPD RATING (A)	22.33
CORRECTED MAX STRING Voc (V)	900.62
CORRECTED MIN STRING VOLTAGE (V)	616.37

BSTC STRING SPECS	
MODULES PER STRING	17
STRING POWER (W)	12,223
NOMINAL STRING Vmp (V)	725.90
STRING Voc (V)	873.80
STRING Imp (A)	16.83
STRING Isc (A)	17.82
MAX CIRCUIT CURRENT (A)	22.28
MIN STRING OCPD RATING (A)	27.84
FUSE RATING (A)	30.00
CORRECTED MAX STRING Voc (V)	958.78
CORRECTED MIN STRING VOLTAGE (V)	656.43
BSTC STRING SPECS	
MODULES PER STRING	16
STRING POWER (W)	11,504
NOMINAL STRING Vmp (V)	683.20
STRING Voc (V)	822.40
STRING Imp (A)	16.83
STRING Isc (A)	17.82
MAX CIRCUIT CURRENT (A)	22.28
MIN STRING OCPD RATING (A)	27.84
FUSE RATING (A)	30.00
CORRECTED MAX STRING Voc (V)	902.38
CORRECTED MIN STRING VOLTAGE (V)	617.82

INVERTER SPECS	
MAKE/MODEL:	Solectria: PVI-50TL-480
INVERTER POWER (KW)	50
MAX DC CURRENT Isc (A)	204
MAX DC VOLTAGE (V)	1000
MPPT VOLTAGE RANGE (V)	200-950
NOMINAL PHASE-TO-PHASE VOLTAGE (V)	480
NOMINAL AC POWER (kW)	50
MAX OUTPUT CURRENT (A)	66.2

SITE CONDITIONS	
METEO STATION	BALTIMORE-WASHINGTON, MD, USA (WMO: 724060)
EXTREME ANNUAL LOW TEMP (°C)	-13.9
AVERAGE HIGH AMBIENT TEMP (°C)	36.9
TILT (°)	7.4
SYSTEM SPECS	
DC CAPACITY (kW)	1186.80
AC CAPACITY (KVA)	950.00
TOTAL NUMBER OF MODULES	2064
TOTAL NUMBER OF STRINGS	127

1 PV SYSTEM RATINGS NOT TO SCALE

STRING INVERTER TAG	FEEDER TAG	MODULE NAMEPLATE (W)	TOTAL No. OF MODULES	No. OF 16 MOD STRINGS	No. OF 17 MOD STRINGS	STC SHORT CIRCUIT CURRENT Isc (A)	BSTC SHORT CIRCUIT CURRENT Isc (A)	STC RATED MAXIMUM POWER-POINT CURRENT Imp (A)	BSTC RATED MAXIMUM POWER-POINT CURRENT Imp (A)	RATED MAXIMUM POWER-POINT VOLTAGE Vmp (V)	MAXIMUM PV VOLTAGE (V)	MAXIMUM PV CURRENT (A)	TOTAL DC POWER (KW)	INVERTER KW	DC:AC RATIO	NOMINAL AC OUTPUT CURRENT (A)	MAXIMUM OUTPUT CURRENT x1.25 (A)	AC OCPD RATING (A)	THWN-2 CABLE SIZE (90 DEG) CABLE SIZE	AMPACITY (A) (60°)	CONDUIT SIZE (SCH. 40 PVC)	CONDUIT FILL %	FEEDER DISTANCE (FT)	AC V-DROP (%)
SI-1-1	FDR-SI-1-1	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	600	2.73%
SI-1-2	FDR-SI-1-2	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	550	2.50%
SI-1-3	FDR-SI-1-3	575	100	2	4	85.74	106.92	81.00	100.98	681.60	1000	133.65	57.50	50	1.15	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	505	2.29%
SI-1-4	FDR-SI-1-4	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	540	2.45%
SI-1-5	FDR-SI-1-5	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	490	2.23%
SI-1-6	FDR-SI-1-6	575	100	2	4	85.74	106.92	81.00	100.98	681.60	1000	133.65	57.50	50	1.15	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	445	2.02%
SI-1-7	FDR-SI-1-7	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	480	2.18%
SI-1-8	FDR-SI-1-8	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	430	1.95%
SI-1-9	FDR-SI-1-9	575	100	2	4	85.74	106.92	81.00	100.98	681.60	1000	133.65	57.50	50	1.15	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	385	1.75%
SI-1-10	FDR-SI-1-10	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	300	1.36%
SI-1-11	FDR-SI-1-11	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	355	1.61%
SI-1-12	FDR-SI-1-12	575	100	2	4	85.74	106.92	81.00	100.98	681.60	1000	133.65	57.50	50	1.15	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	415	1.88%
SI-1-13	FDR-SI-1-13	575	112	7	0	100.03	124.74	94.50	117.81	681.60	1000	155.93	64.40	50	1.29	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	155	0.70%
SI-1-14	FDR-SI-1-14	575	98	4	2	85.74	106.92	81.00	100.98	681.60	1000	133.65	56.35	50	1.13	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	225	1.02%
SI-1-15	FDR-SI-1-15	575	98	4	2	85.74	106.92	81.00	100.98	681.60	1000	133.65	56.35	50	1.13	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	290	1.32%
SI-1-16	FDR-SI-1-16	575	98	4	2	85.74	106.92	81.00	100.98	681.60	1000	133.65	56.35	50	1.13	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	360	1.63%
SI-1-17	FDR-SI-1-17	575	98	4	2	85.74	106.92	81.00	100.98	681.60	1000	133.65	56.35	50	1.13	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	430	1.95%
SI-1-18	FDR-SI-1-18	575	133	3	5	114.32	142.56	108.00	134.64	681.60	1000	178.20	76.48	50	1.53	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	220	1.00%
SI-1-19	FDR-SI-1-19	575	131	5	3	114.32	142.56	108.00	134.64	681.60	1000	178.20	75.33	50	1.51	66.2	83	90	(4) #2 AWG CU + (1) #8 AWG CU GND	95	1-1/2"	18.75%	300	1.36%
AVERAGE:																						373	1.69%	

2 INVERTER SCHEDULE NOT TO SCALE

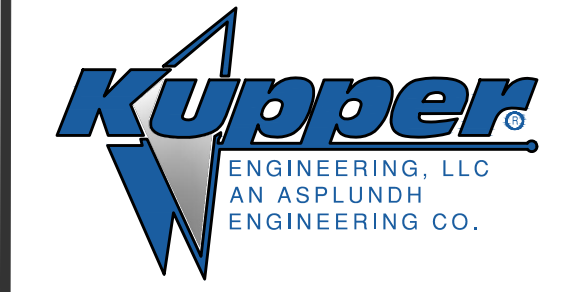
AC FEEDER SCHEDULE											
FEEDER TAG	FROM EQUIPMENT	TO EQUIPMENT	FLA (A)	NOMINAL VOLTAGE VMP (V)	CABLE SIZE	CABLE TEMPERATURE RATING (C°)	AMPACITY (A)	CONDUIT SIZE (SCH. 40 PVC)	CONDUIT FILL %	LENGTH (FT)	AC V-DROP %
FDR-1	(E) SWGR	PV DIST. PNL	1257.8	480	(4) SETS OF (4) 500 KCMIL CU + (1) #3/0 AWG CU GND	75	1520	4"	23.5%	15	0.05%

3 AC FEEDER SCHEDULE NOT TO SCALE

WORST CASE DC VOLTAGE DROP				
NUMBER OF MODULES	VMP (V)	IMP (A)	LENGTH (FT)	DC V-DROP %
16	681.60	13.50	200	1.01%

4 WORST CASE DC VOLTAGE DROP NOT TO SCALE

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UMMS PARASOL -
920 ELK RIDGE
 920 ELK RIDGE LANDING RD,
 LINTHICUM HEIGHTS, MD 21090

REV#	DESCRIPTION	DATE	BY	CHECK
A	ISSUE FOR INTERCONNECTION	07/12/2023	EMJ	RK
B	ISSUE FOR INTERCONNECTION	07/19/2023	EMJ	PAP
C	ISSUE FOR CIVIL REVIEW	08/01/2023	EMJ	RK
D	ISSUE FOR 30% REVIEW	09/08/2023	EMJ	RK
E	ISSUE FOR 90% PROGRESS	11/15/2023	EMJ	PAP

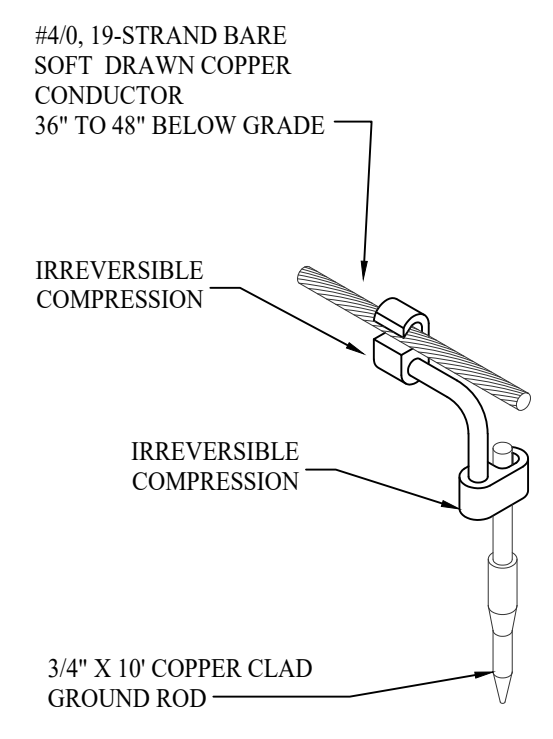
PROJECT NO: **406-22** SCALE: **AS NOTED**

ELECTRICAL SCHEDULES

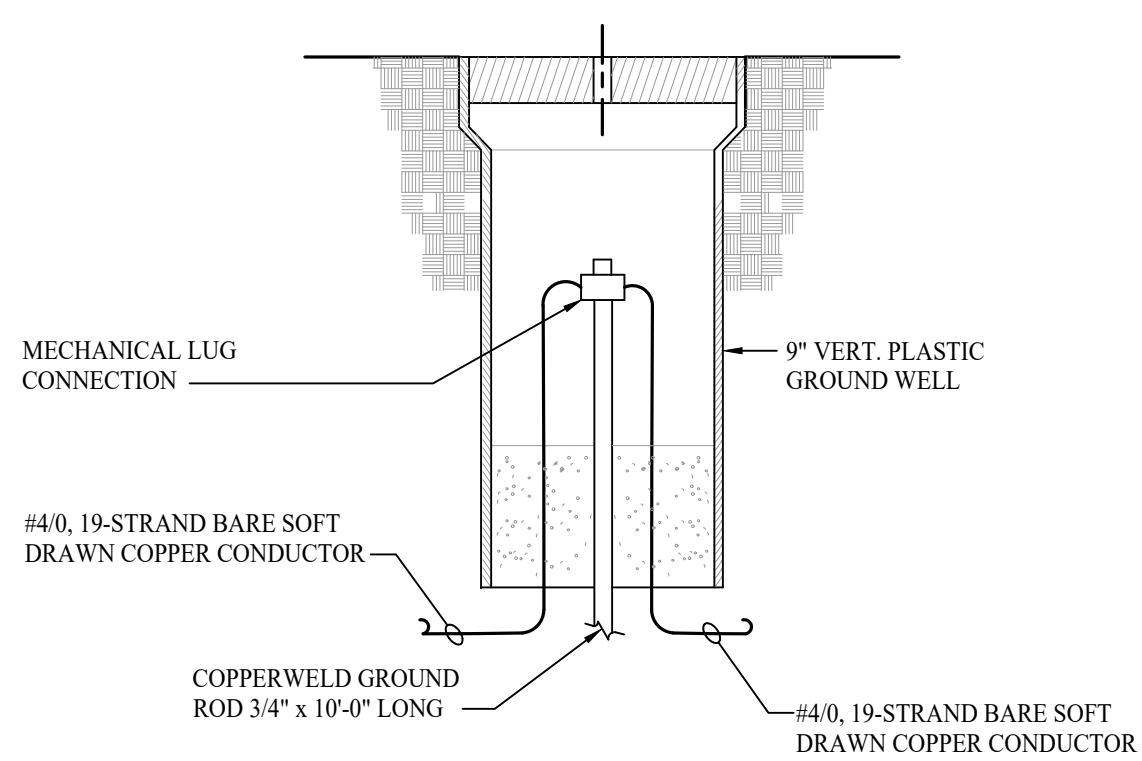
DRAWING NO: **E3.01**

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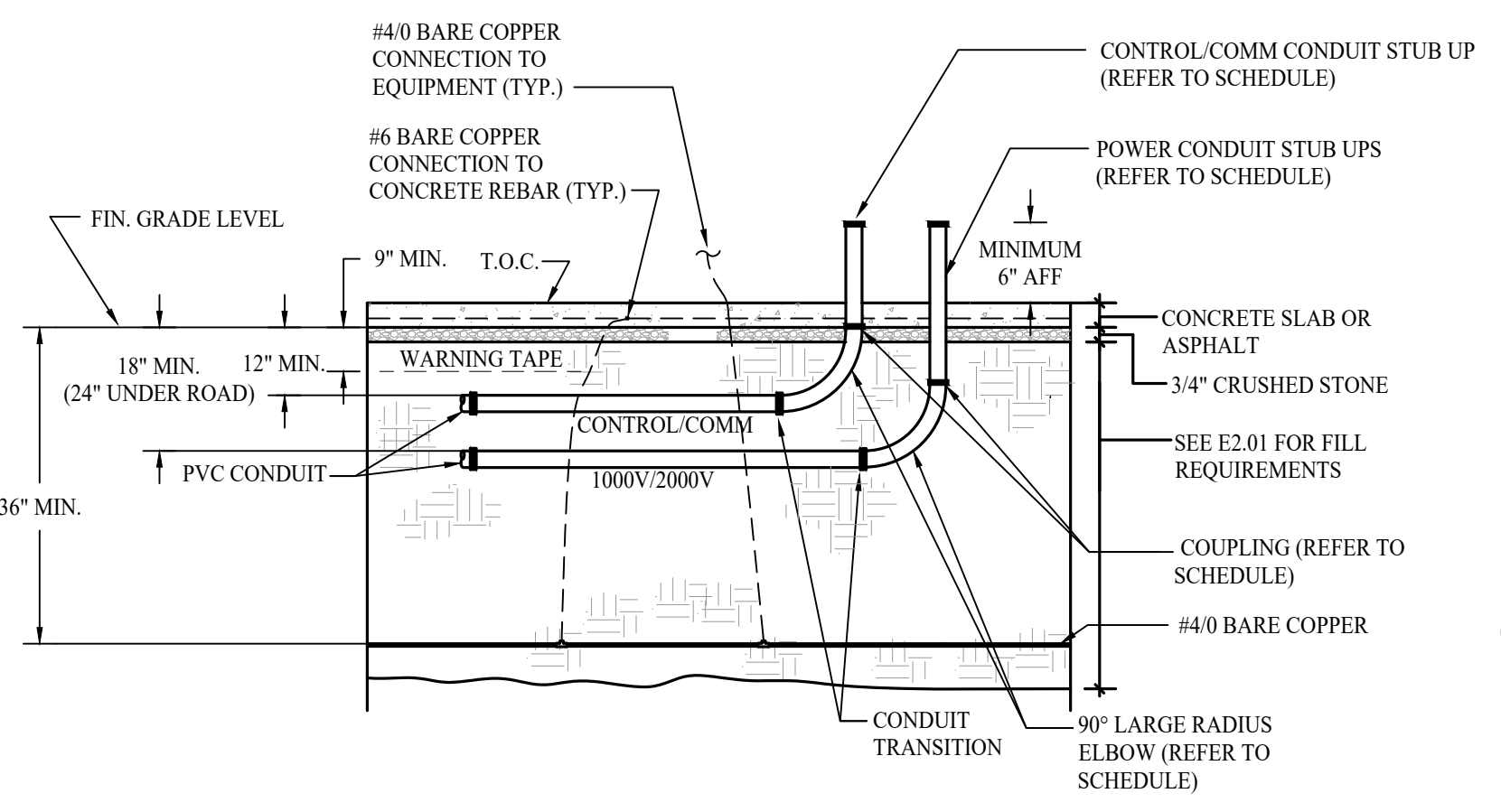


1 GROUND WIRE TO GROUND ROD CONNECTION
NOT TO SCALE

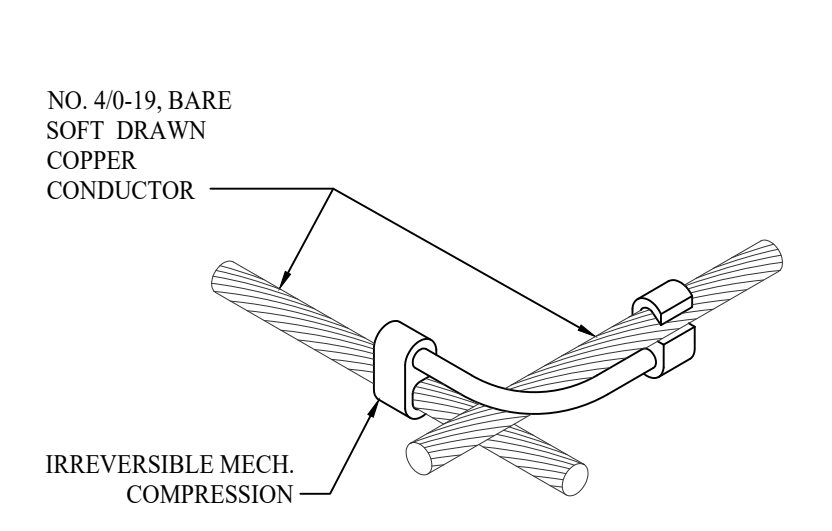


2 GROUND WELL TEST STATION DETAIL
NOT TO SCALE

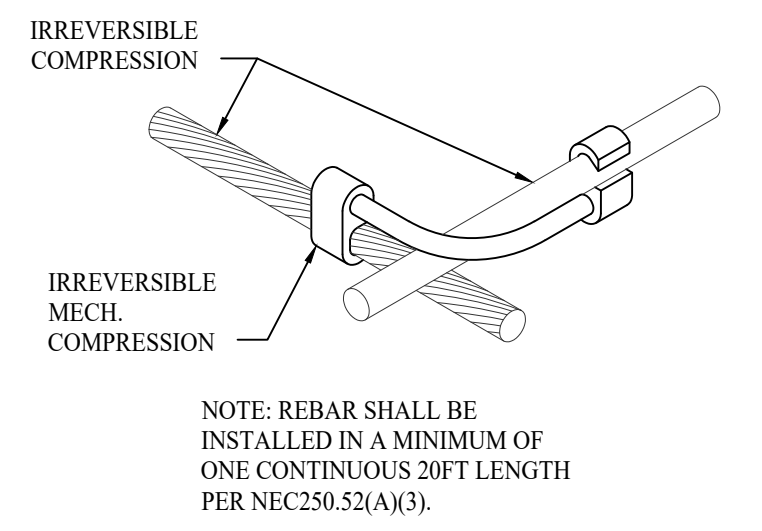
SCHEDULE OF CONDUIT STUB-UPS		
ITEM	STUB-UP IN ENCLOSURE	STUB-UP EXPOSED OPEN AREA
CONDUIT	PVC SCH. 40	PVC SCH. 80
LARGE RADIUS ELBOW	PVC SCH. 40	PVC SCH. 40



3 TYPICAL GROUND FILL AND CONDUIT STUB UP DETAIL (OUTDOORS)
NOT TO SCALE (FROST LINE: 36\"/>

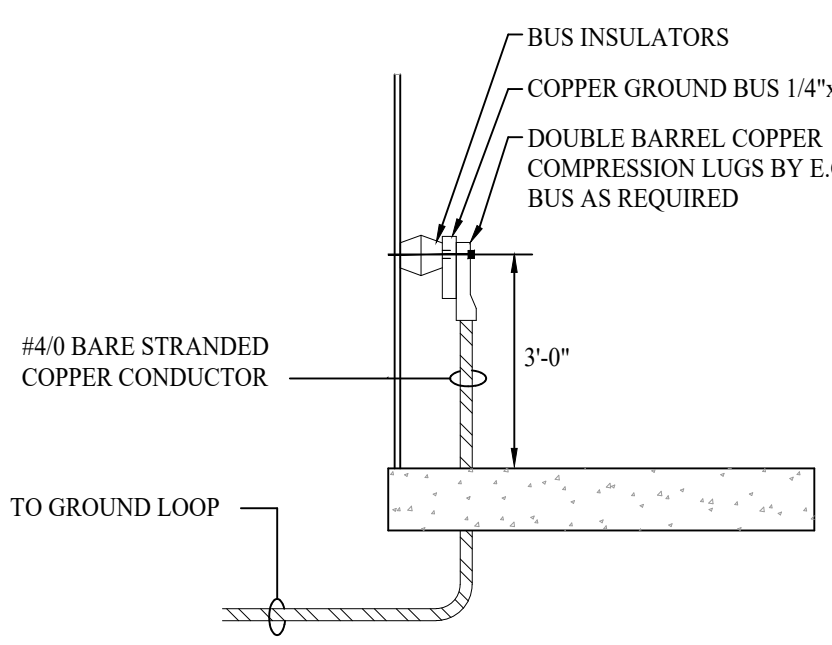


4 TYP. GROUND MECHANICAL CONNECTION DETAIL
NOT TO SCALE

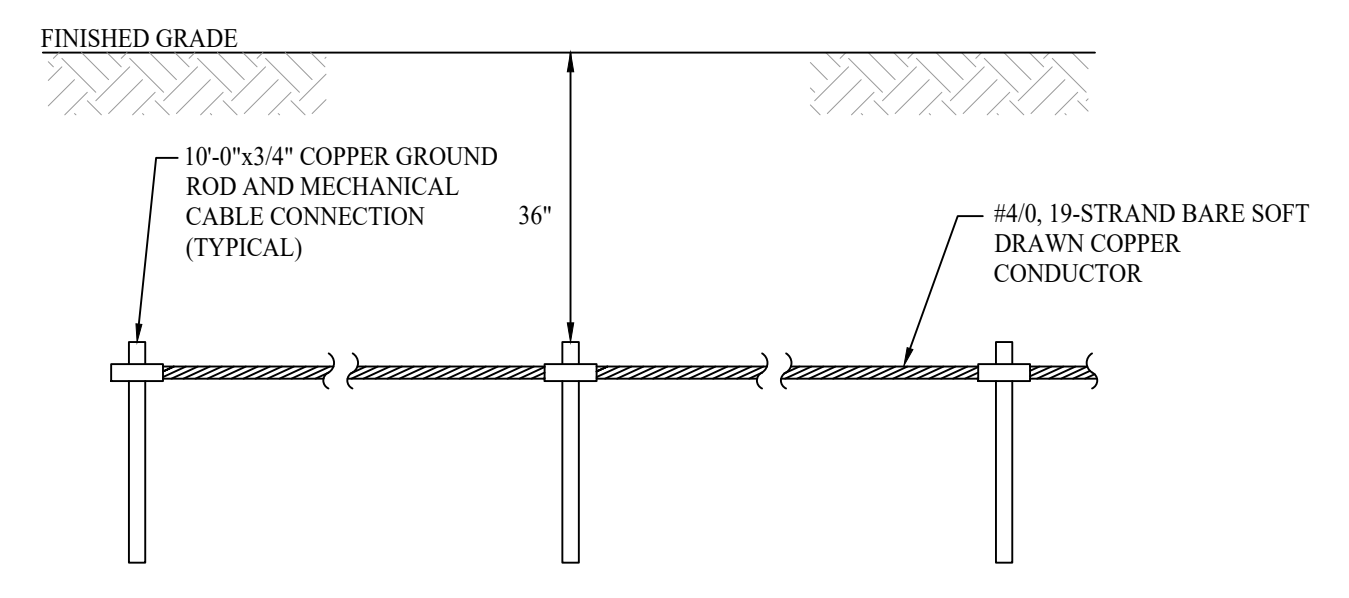


5 GROUND WIRE TO REBAR CONNECTION
NOT TO SCALE

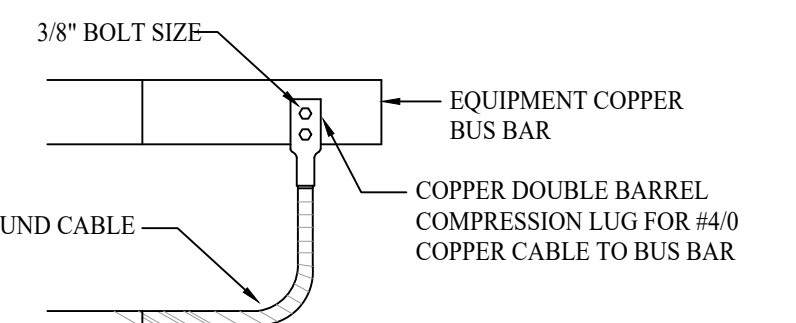
NOTE: REBAR SHALL BE INSTALLED IN A MINIMUM OF ONE CONTINUOUS 2FT LENGTH PER NEC250.52(A)(3).



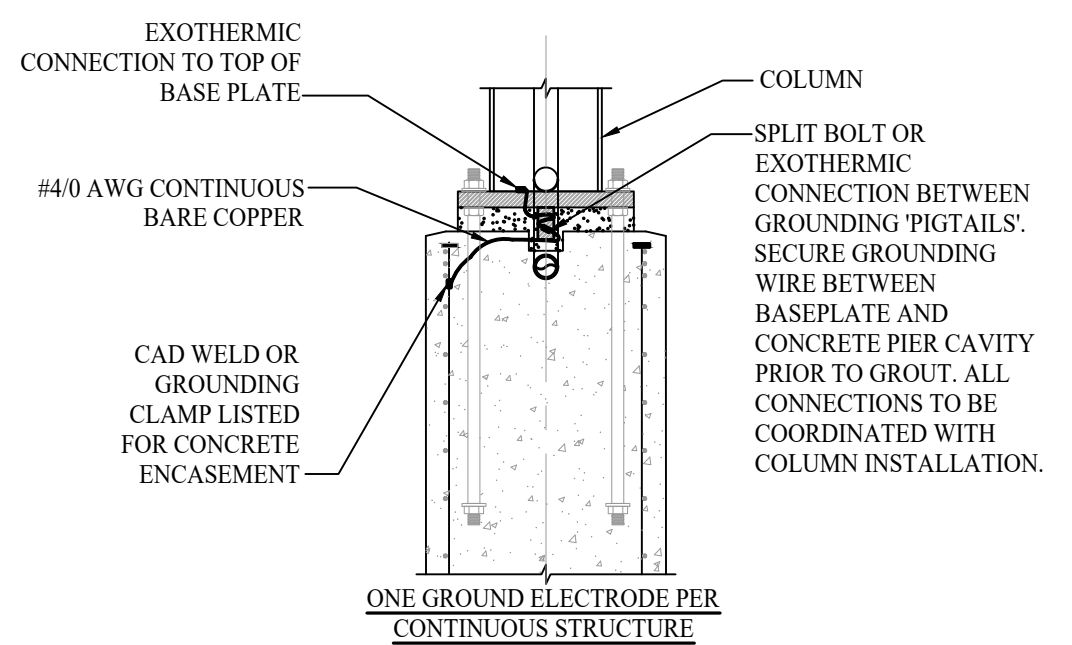
6 GROUND BUS CONNECTION DETAIL
NOT TO SCALE



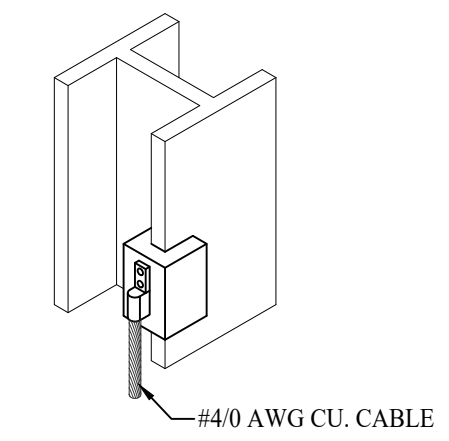
7 GROUND GRID CONNECTION DETAIL
NOT TO SCALE



8 TYP. CABLE TO GROUND BUS DETAIL
NOT TO SCALE

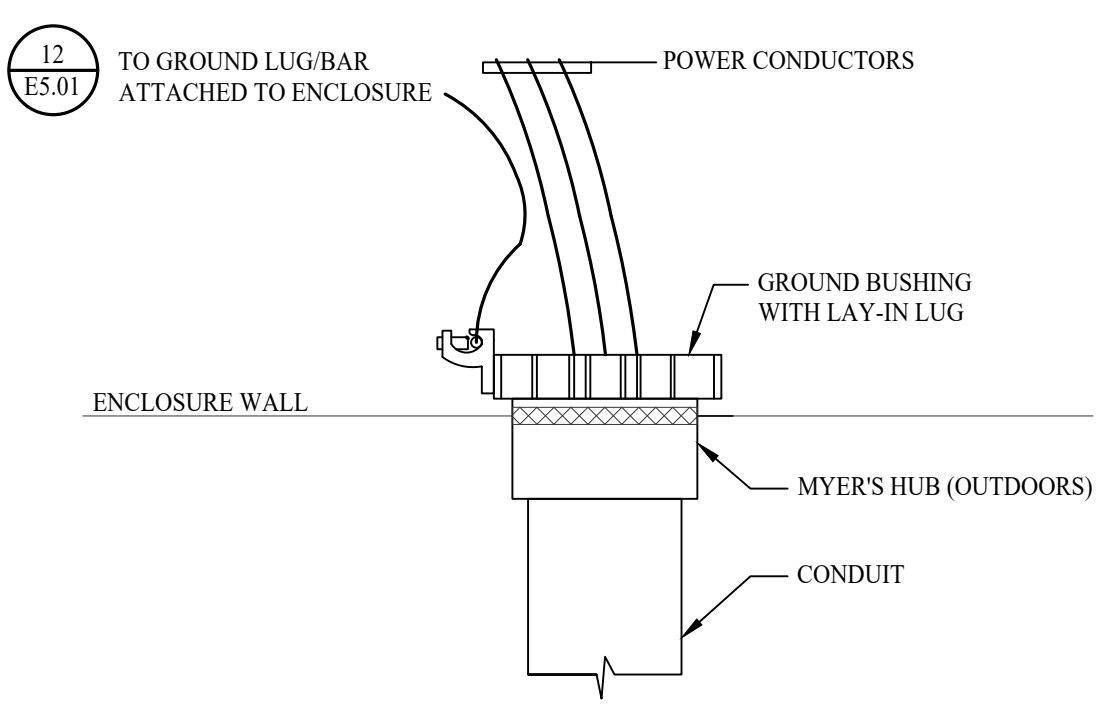


9 TYP. ARRAY COLUMN GROUNDING DETAIL
NOT TO SCALE

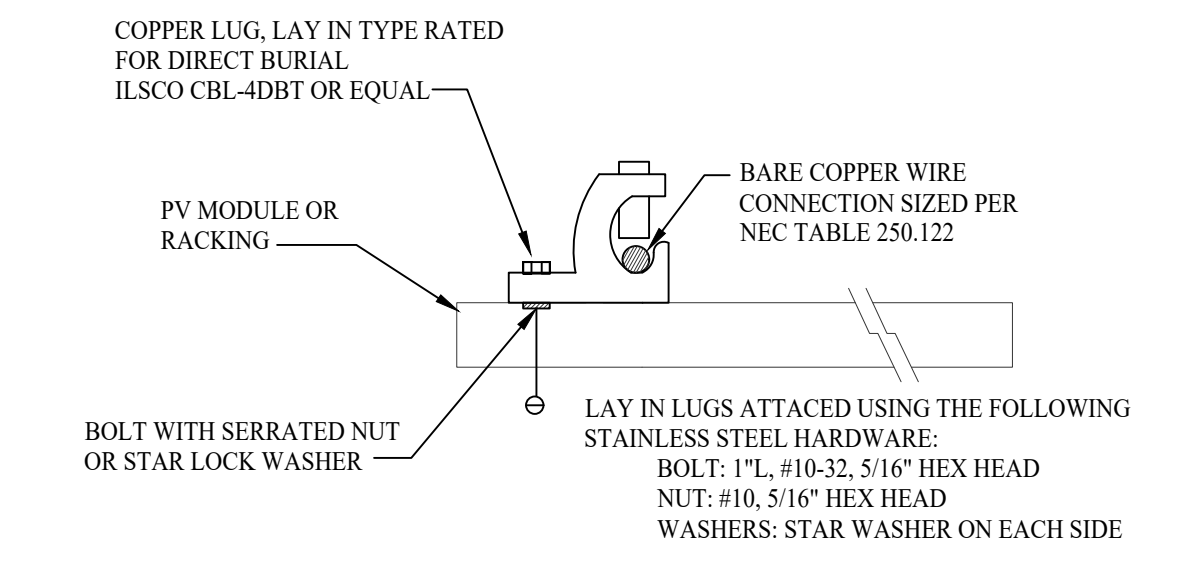


10 TYPICAL BONDING TO STEEL CONNECTION DETAIL
NOT TO SCALE

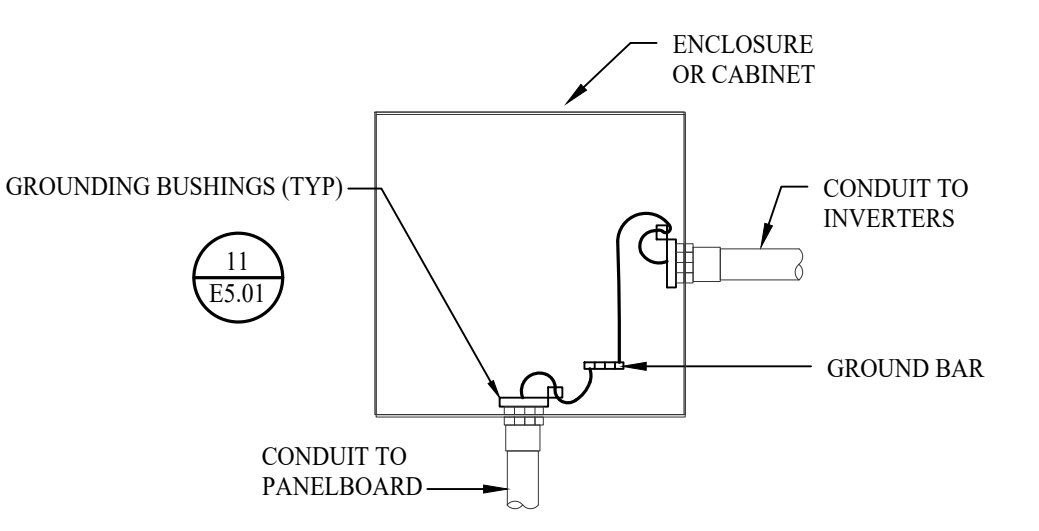
GENERAL NOTE
A. PRIOR TO CONNECTION, SCRAPE AWAY ALL PAINT AND/OR GALVANIZING THEN REAPPLY AS NECESSARY AFTER CONNECTION IS COMPLETE



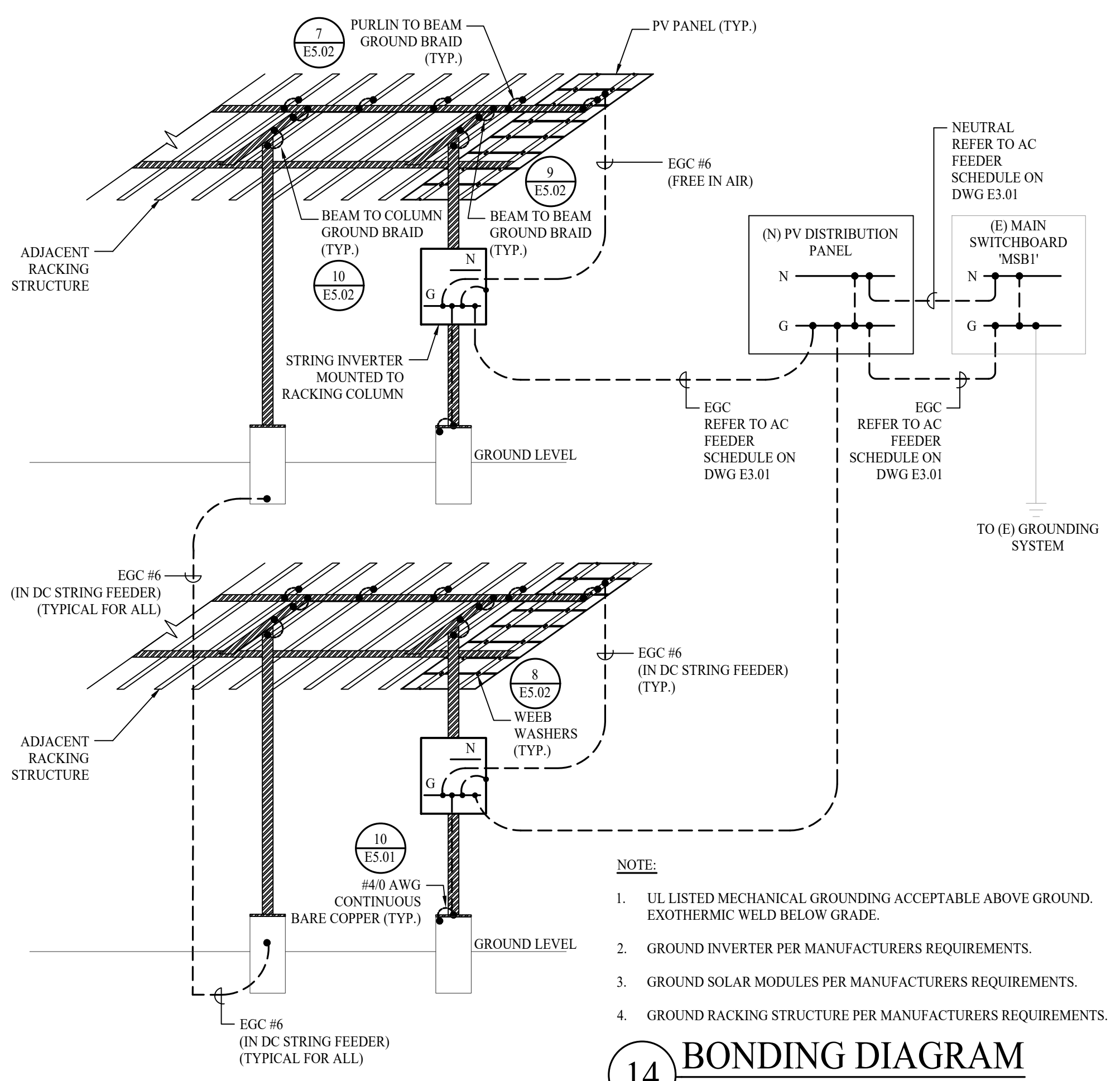
11 MYER'S HUB GROUNDING DETAIL
NOT TO SCALE



12 GROUND LUG DETAIL
NOT TO SCALE



13 PULL BOX / TROUGH GROUNDING DETAIL (METALLIC CONDUITS)
NOT TO SCALE



14 BONDING DIAGRAM
SCALE: NOT TO SCALE

0 1" GRAPHIC SCALE

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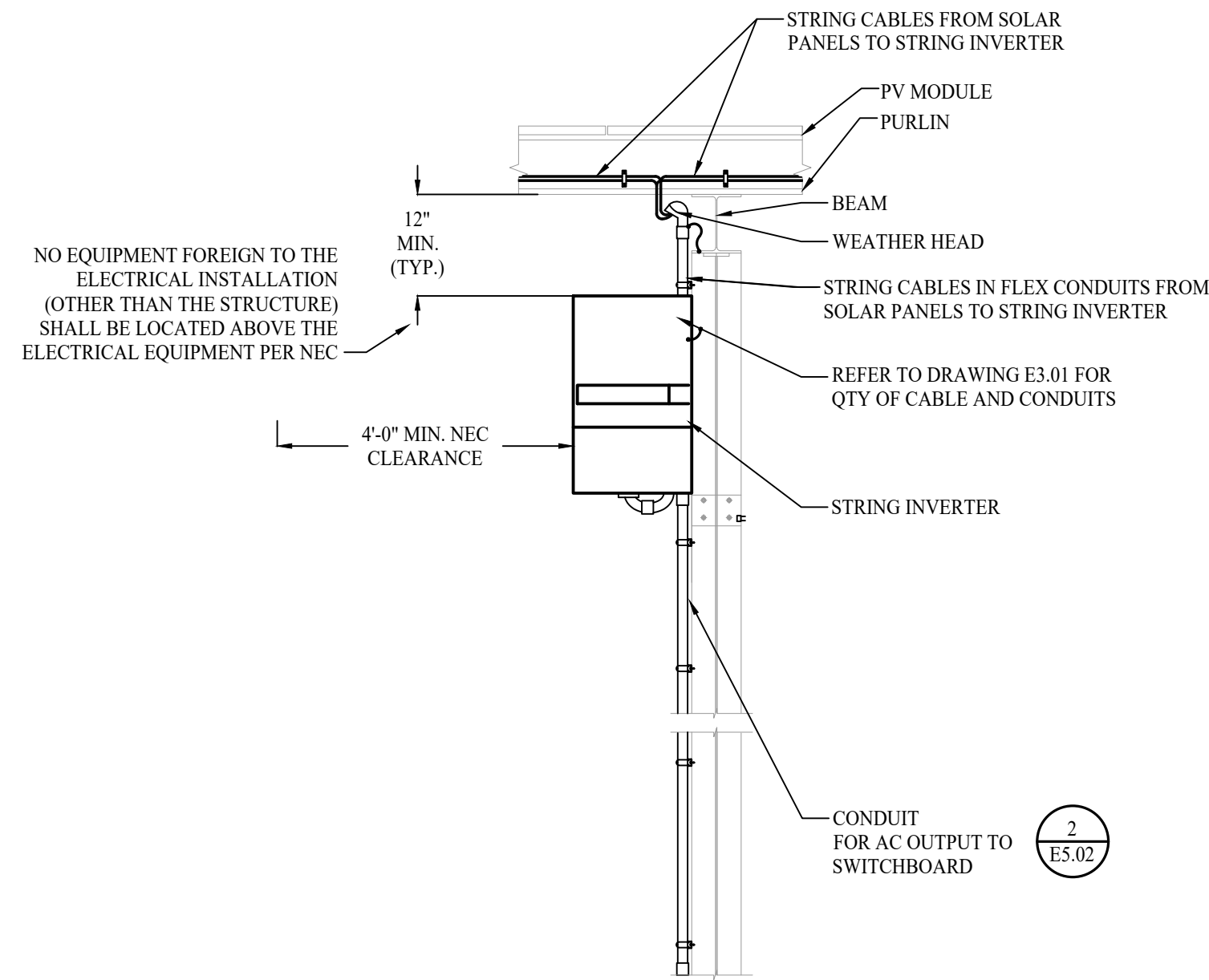
920 ELKRIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

DATE	BY	SCALE
07/12/2023	EMJ	RK
07/19/2023	EMJ	PAP
08/01/2023	EMJ	RK
09/08/2023	EMJ	RK
11/15/2023	EMJ	PAP

PROJECT NO. 406-22
SCALE: AS NOTED

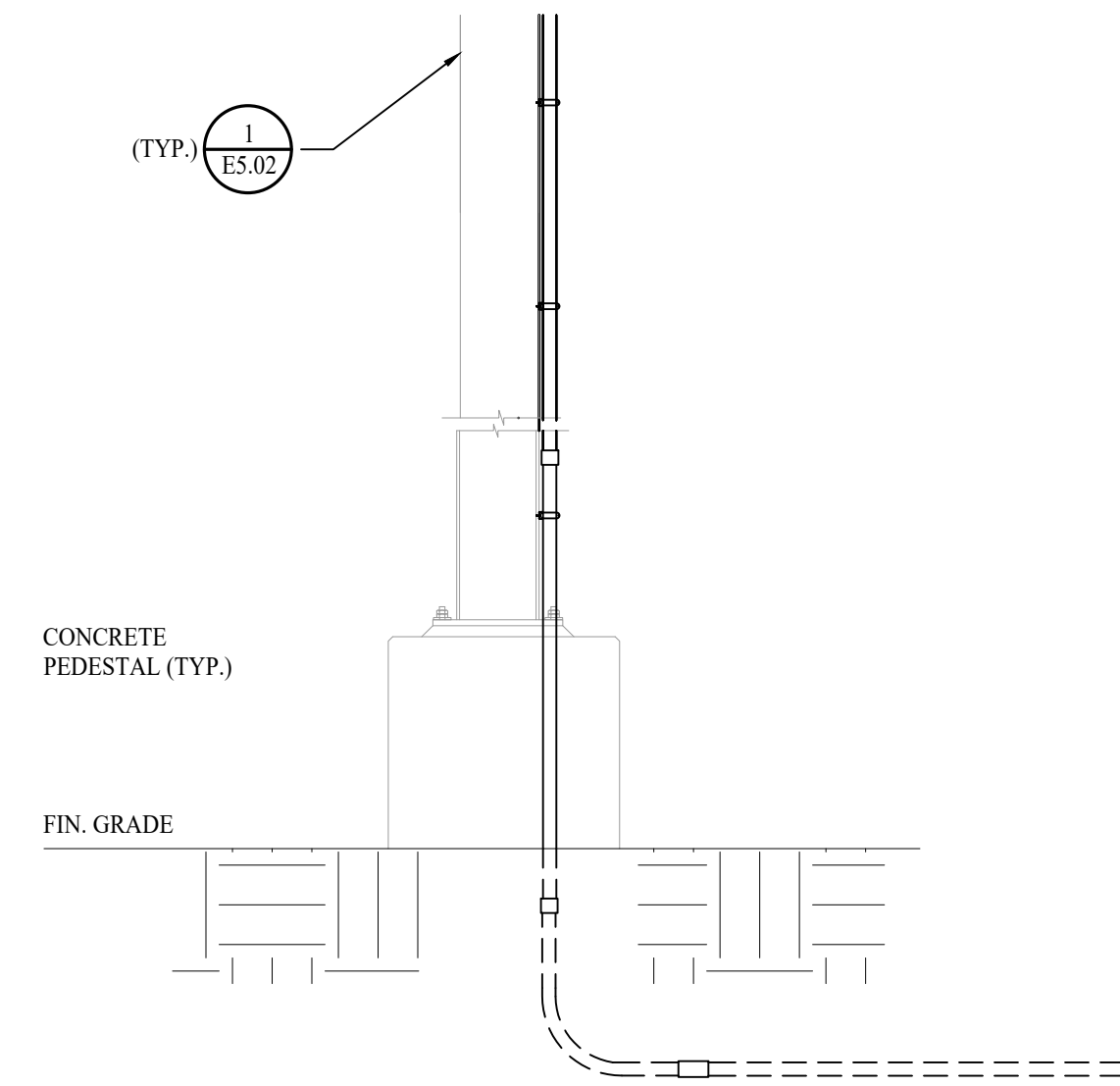
ELECTRICAL
DETAILS - 1

BRAWING NO. E5.01

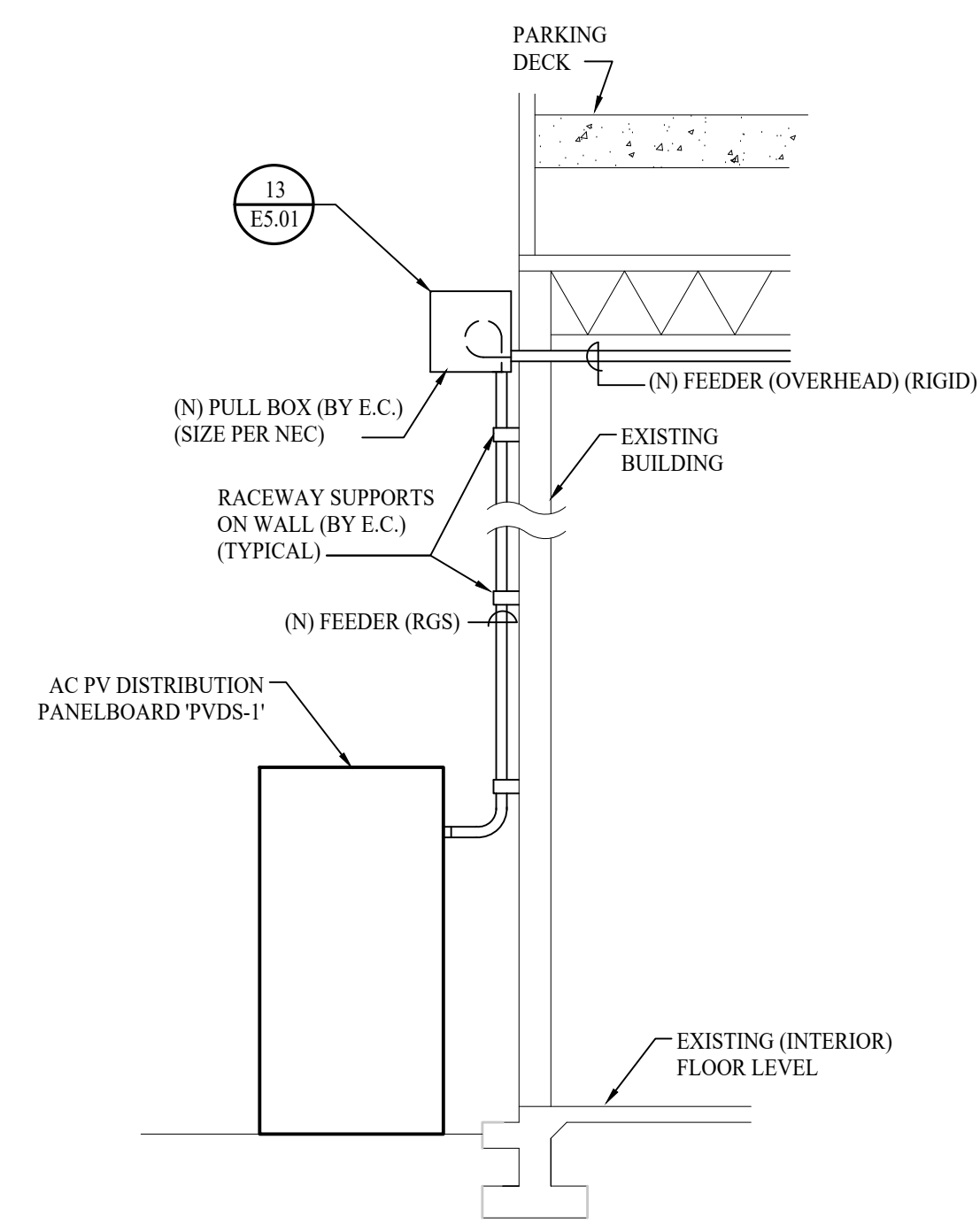


- NOTES:**
- UNLESS OTHERWISE NOTED WIRE LOOM SHALL BE USED AT ANY POINT WHERE PV CONDUCTORS CROSS SHARP EDGES.
 - E.C. SHALL NEATLY TIE WRAP AND SECURE HOMERUNS FROM PANELS TO STRING INVERTER. CARE SHALL BE TAKEN TO PROTECT HOMERUNS FROM SHARP EDGES THAT COULD DAMAGE CONDUCTORS.
 - REFER TO RFI STRUCTURAL DRAWINGS FOR EXACT DETAILS AND ADDITIONAL STRUCTURAL INFORMATION.
 - IN-LINE FUSES SHALL NOT BE LOCATED ON THE DOWNWARD PORTION OF THE DRIP LEG.

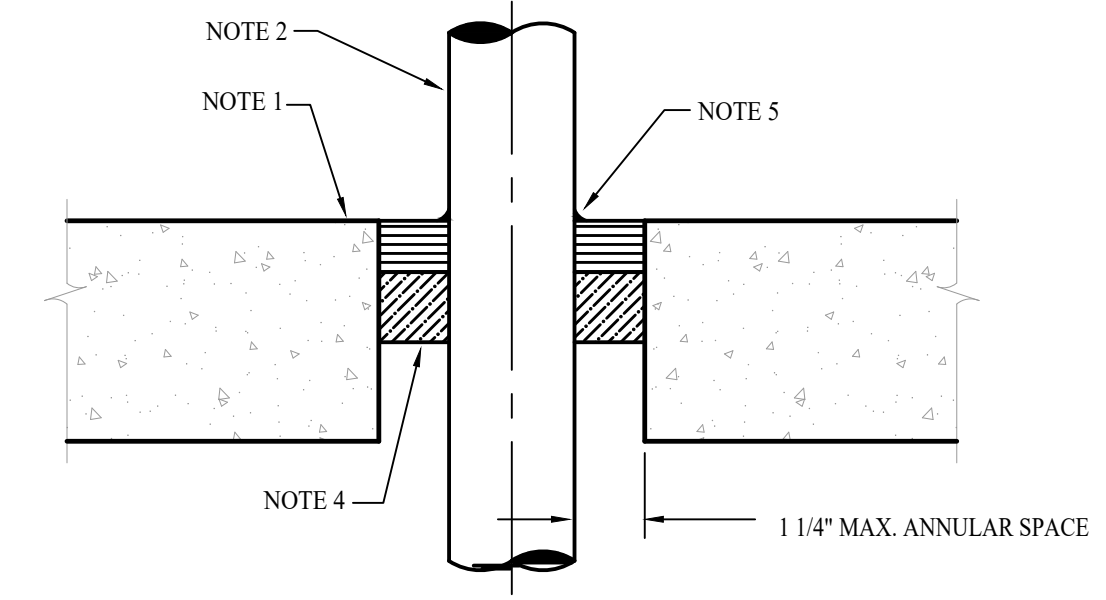
1 STRING INVERTER MOUNTING DETAILS
NOT TO SCALE



2 CONDUIT TRANSITION DETAIL
NOT TO SCALE

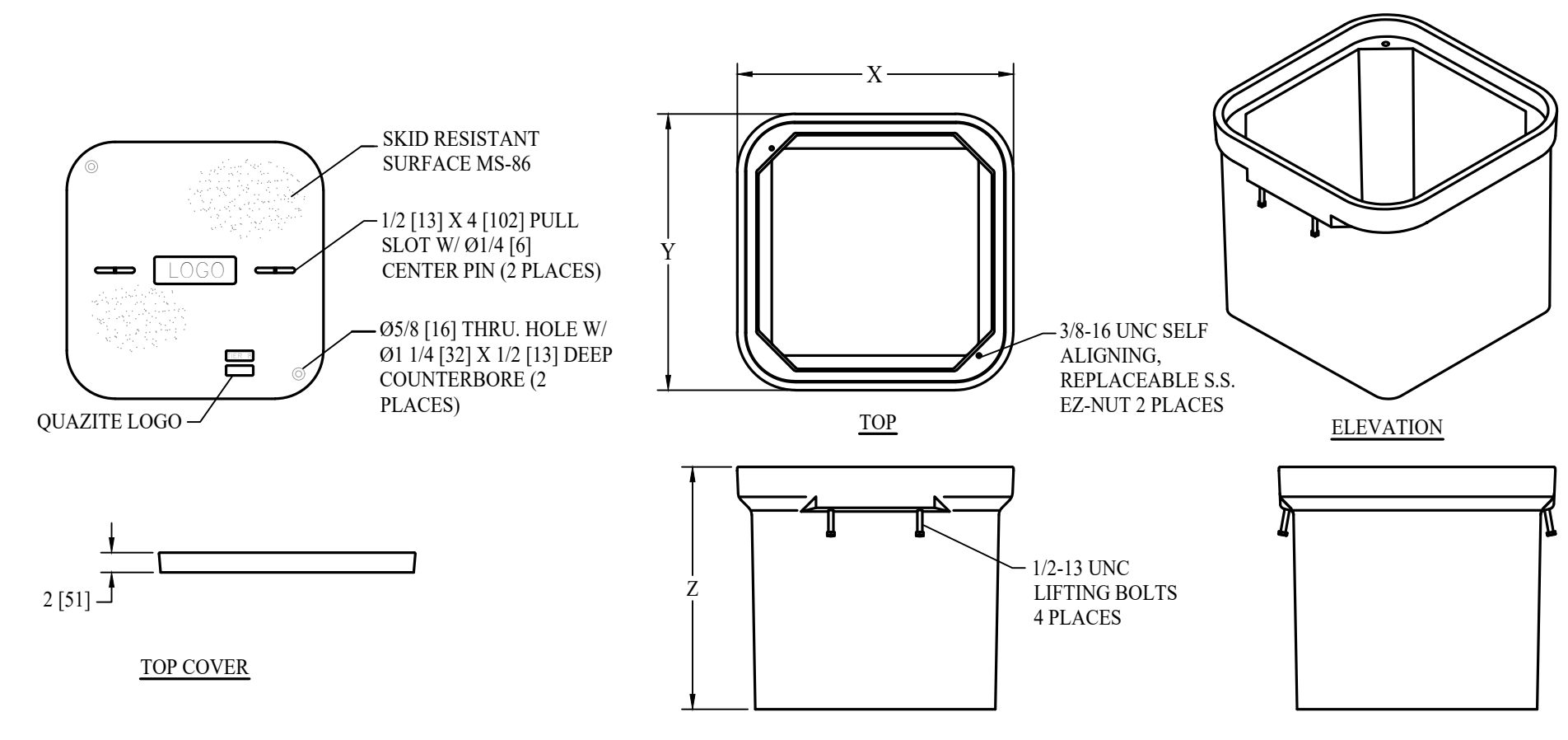


3 CONDUIT BLDG ENTRY DETAIL
NOT TO SCALE



- NOTES:**
- FLOOR OR WALL ASSEMBLY: MINIMUM 3-1/4" THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE.
 - METALLIC PIPE: NOMINAL 4" DIAMETER (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE. RIGID STEEL CONDUIT OR STEEL EMT. MAXIMUM ONE STEEL PIPE, CONDUIT OR EMT PER OPENING, CENTERED IN OPENING. THE ANNULAR SPACE BETWEEN PIPE, CONDUIT OR TUBING AND PERIPHERY OF OPENING SHALL BE MAXIMUM 3/4". PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
 - PACKING MATERIAL: (OPTIONAL, NOT SHOWN) - LOOSE CERAMIC (ALUMINA SILICA) FIBER TIGHTLY PACKED INTO ANNULAR SPACE BETWEEN THE PIPE OR CONDUIT AND THE SIDES OF THE THROUGH OPENING. WHEN USED IN FLOORS, A MINIMUM 1-1/2" THICKNESS OF FIBER IS REQUIRED WITH ITS TOP SURFACE RECESSED MINIMUM 1-1/2" BELOW TOP SURFACE OF FLOOR. WHEN USED IN WALLS, ENTIRE ANNULAR SPACE TO BE FILLED WITH TIGHTLY-PACKED FIBER EXCEPT FOR A MINIMUM 1/2" DEPTH AT EACH SURFACE OF THE WALL.
 - FILL VOID OR CAVITY MATERIALS - PUTTY: PUTTY MATERIAL THAT IS KNEADED AND PACKED TIGHTLY INTO ANNULAR SPACE. IN FLOORS, A MINIMUM 1" THICKNESS OF FILL MATERIAL SHALL BE INSTALLED SUCH THAT ITS TOP SURFACE IS RECESSED 1" BELOW TOP SURFACE OF FLOOR. WHEN OPTIONAL PACKING MATERIAL (ITEM 3) IS USED IN FLOORS, A MINIMUM 1" THICKNESS OF FILL MATERIAL SHALL BE INSTALLED SUCH THAT ITS TOP SURFACE IS RECESSED 1/2" BELOW TOP SURFACE OF FLOORS. IN WALLS, A MINIMUM 1" THICKNESS OF FILL MATERIAL SHALL BE INSTALLED SUCH THAT ITS SURFACES ARE RECESSED MINIMUM 1" FROM BOTH SURFACES OF WALL. WHEN OPTIONAL PACKING MATERIAL IS USED IN WALLS, A MINIMUM 1/2" THICKNESS OF FILL MATERIAL IS REQUIRED ON EACH SIDE OF WALL WITH THE SURFACE OF THE FILL MATERIAL FLUSH WITH EACH SURFACE OF THE WALL.
 - FIRE BARRIER CAULK "3M" CP-25WB OR EQUIVALENT SHALL BE USED. THE FIRE RATING OF THE CAULK IS BASED ON THE WET INSTALLED DEPTH. PENETRATION FIRESTOP SHALL COMPLY WITH UL THROUGH-PENETRATION FIRESTOP SYSTEM NO. 319 PER ASTM E 814 (ANSI/UL 1479) FIRE TEST.

4 PENETRATION FIRE-STOP FOR METAL CONDUIT THROUGH CONCRETE WALL
SCALE: NOT TO SCALE

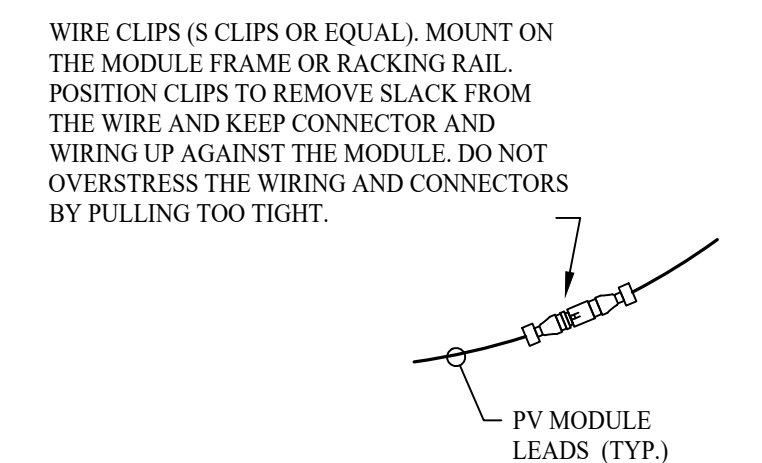


5 TYPICAL HANDHOLE DETAIL
NOT TO SCALE

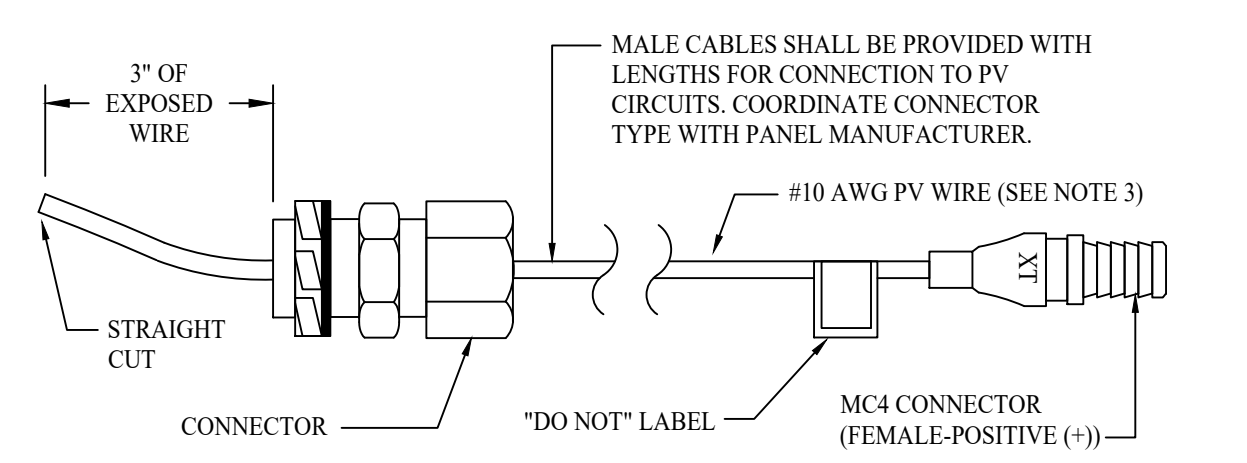
HAND HOLE SCHEDULE					
HANDHOLE DESIGNATION TYPE	WIDTH (X)	LENGTH (Y)	DEPTH (Z)	DESCRIPTION	COVER ENGRAVING
A	36"	36"	18"-24"	PULL BOX FOR POWER OR COMMUNICATIONS	ELECTRIC OR COMMUNICATIONS
B	SIZE PER NEC (MIN 48")	SIZE PER NEC (MIN 48")	SIZE PER NEC (MIN 48")	PULL BOX FOR 480V POWER OR COMMUNICATIONS	ELECTRIC OR COMMUNICATIONS
C	SIZE PER NEC (MIN 48")	SIZE PER NEC (MIN 48")	36"-48"	PULL BOX FOR 15KV POWER	ELECTRIC POWER

6 HANDHOLE SCHEDULE
NOT TO SCALE

- NOTES:**
- ALL HANDHOLES SHALL BE INSTALLED AT DEPTH TO SIT FLUSH WITH FINAL GRADE. DEPTH TO VARY BETWEEN 18"-24" AS REQUIRED. MINIMUM SIZE HANDHOLES ARE SHOWN. PROVIDE LARGER BOXES AS REQUIRED.
 - ALL HANDHOLES SHALL BE UL LISTED AND BE SUITABLE FOR TIER 15 LOADING. FOR AREAS OF DELIBERATE HEAVY VEHICLE TRAFFIC, HANDHOLES SHALL BE SUITABLE FOR H-20 LOADING.
 - ALL HANDHOLES SHALL BE EQUAL TO QUAZITE SERIES PG OR APPROVED EQUAL.
 - ALL HANDHOLES SHALL BE GASKETED, PRECAST CONCRETE OR POLYMER COMPOSITE SPLICE BOXES SUITABLE FOR POWER AND CONTROL WIRING. PROVIDE ALL HANDHOLES WITH BASES AND STAINLESS STEEL HEX BOLTS.

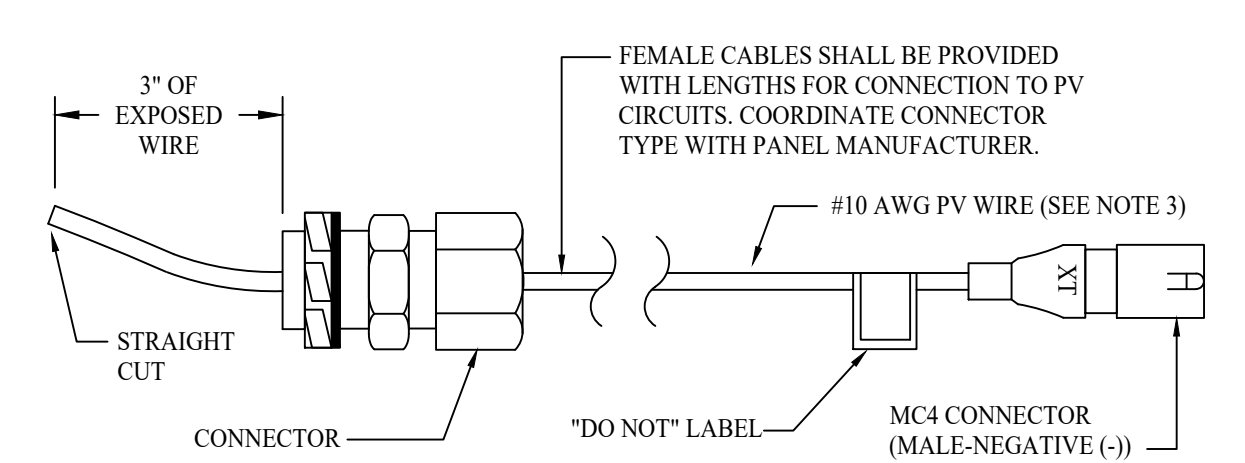


7 TYPICAL PV WIRING CLIP
NOT TO SCALE



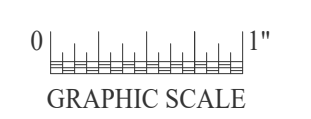
- NOTES:**
- DETAIL IS SHOWN FOR REFERENCE ONLY. INTERCONNECT WIRING SHALL BE PRE-MADE, FURNISHED, AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
 - FOR TROUBLE SHOOTING AND IDENTIFICATION PURPOSES IN EACH INVERTER LABEL EACH CONDUCTOR AS FOLLOWS: "INVERTER NUMBER #" & "STRING NUMBER". LABELS SHALL BE FUNGUS INERT, CABLE WRAP TYPE, GENERATED WITH PORTABLE LABEL MAKER.
 - CONDUCTORS SHALL BE PV COPPER CONDUCTORS, XLPE INSULATION, 2000V - 90° C RATED, AND SUNLIGHT RESISTANT.

8 INTERCONNECT WIRING TYPICAL MALE CABLE ASSEMBLY
NOT TO SCALE



- NOTES:**
- DETAIL IS SHOWN FOR REFERENCE ONLY. INTERCONNECT WIRING SHALL BE PRE-MADE, FURNISHED, AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
 - FOR TROUBLE SHOOTING AND IDENTIFICATION PURPOSES IN EACH COMBINER AND JUNCTION BOXES, LABEL EACH CONDUCTOR AS FOLLOWS: "COMBINER BOX #" & "CIRCUIT NUMBER". LABELS SHALL BE FUNGUS INERT, CABLE WRAP TYPE, GENERATED WITH PORTABLE LABEL MAKER.
 - CONDUCTORS SHALL BE PV COPPER CONDUCTORS, XLPE INSULATION, 2000V - 90° C RATED, AND SUNLIGHT RESISTANT.

9 INTERCONNECT WIRING TYPICAL FEMALE CABLE ASSEMBLY
NOT TO SCALE



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DATE	BY	SCALE
07/12/2023	EMJ	RK
07/19/2023	EMJ	PAP
08/01/2023	EMJ	RK
09/08/2023	EMJ	RK
11/15/2023	EMJ	PAP

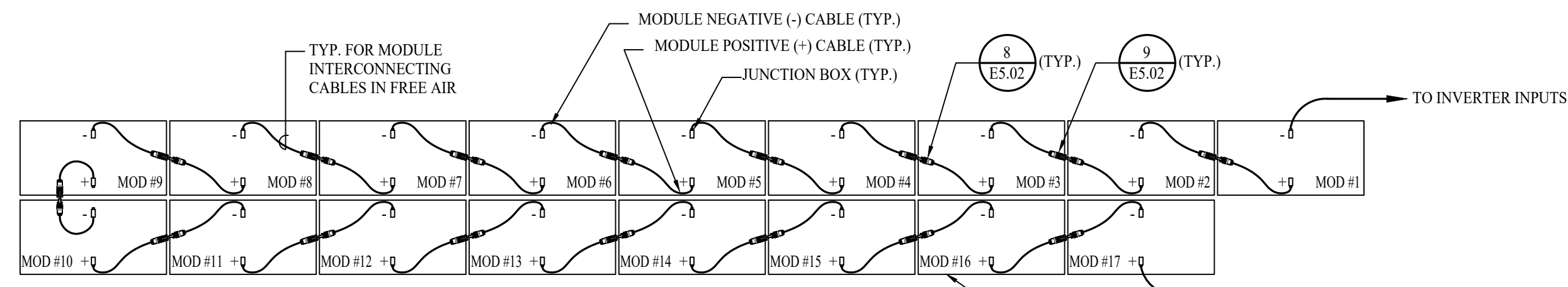
DATE	DESCRIPTION	BY	SCALE
	A ISSUE FOR INTERCONNECTION	EMJ	RK
	B ISSUE FOR INTERCONNECTION	EMJ	PAP
	C ISSUE FOR CIVIL REVIEW	EMJ	RK
	D ISSUE FOR 30% REVIEW	EMJ	RK
	E ISSUE FOR 90% PROGRESS	EMJ	PAP

PROJECT NO: 406-22 SCALE: AS NOTED

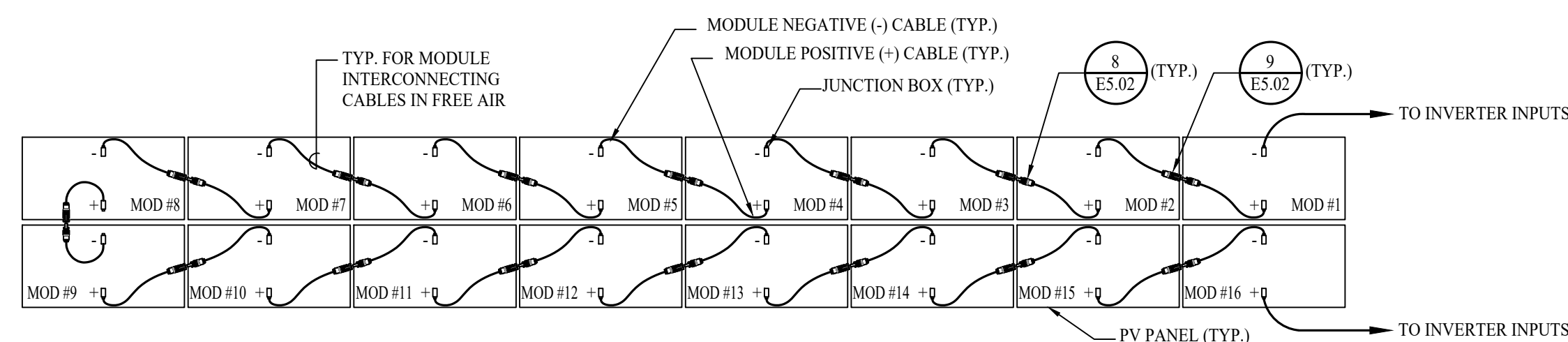
ELECTRICAL
DETAILS - 2

DRAWING NO:
E5.02

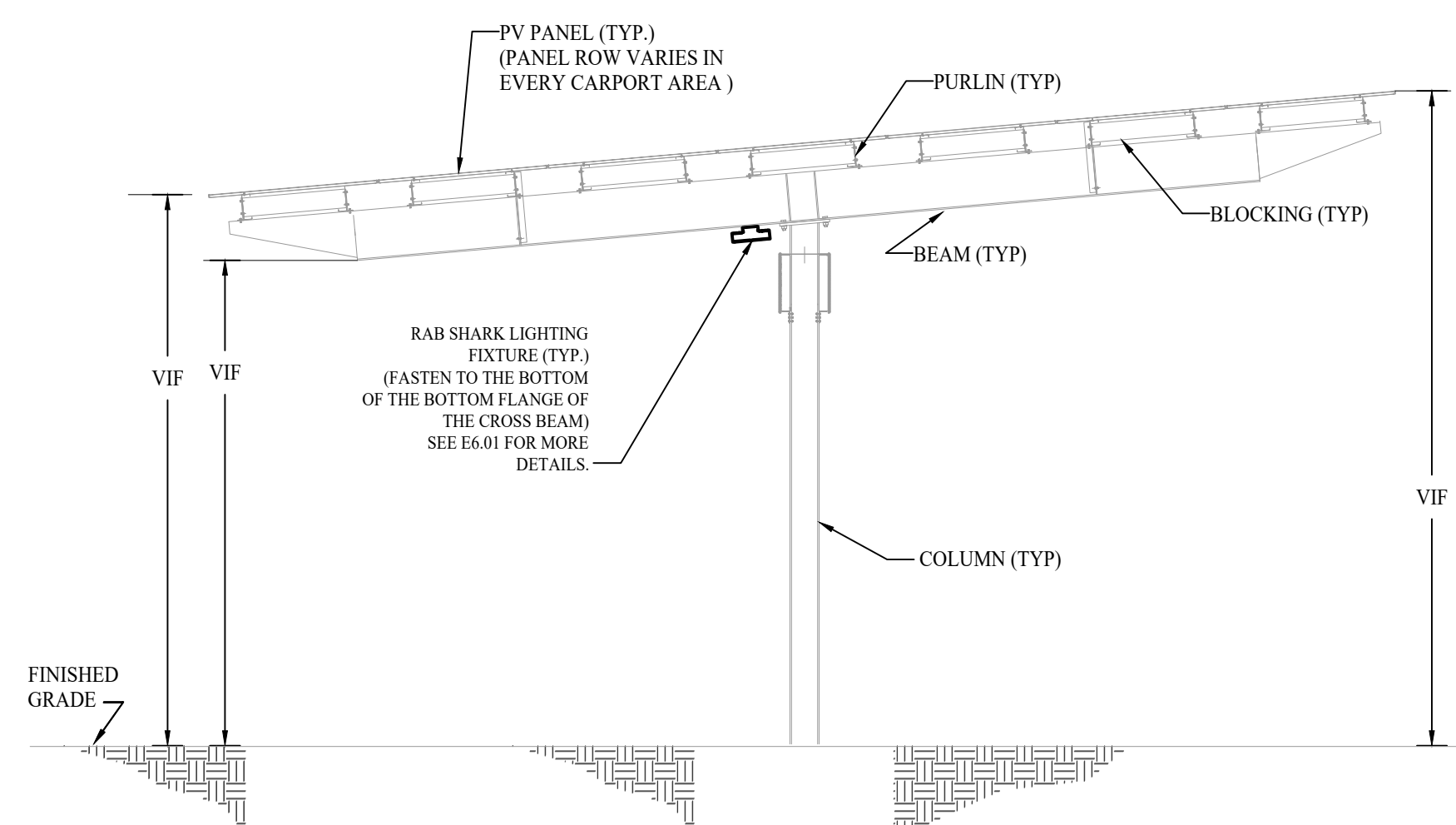
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1 TYPICAL STRING WIRING (17 MODULES)
NOT TO SCALE

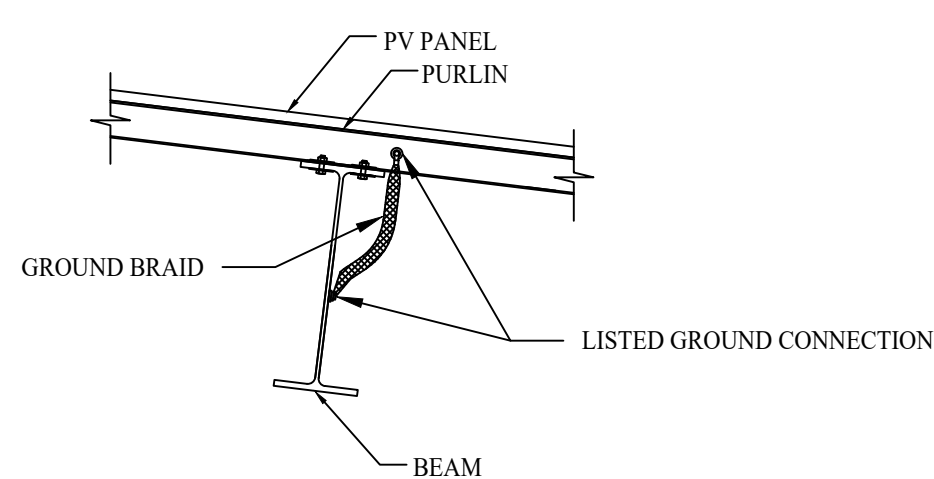


1 TYPICAL STRING WIRING (17 MODULES)
NOT TO SCALE

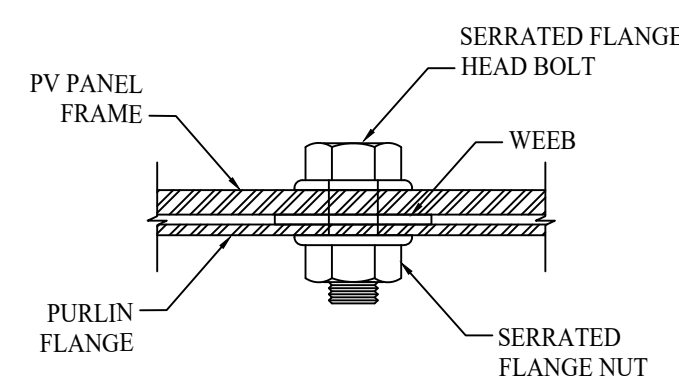


NOTE:
1. REFER TO STRUCTURAL DRAWINGS FOR STRUCTURAL MEMBERS, DIMENSIONS, HEIGHT AND ADDITIONAL PV ARRAY AND LIGHTING FIXTURE MOUNTING INFORMATION.
2. LIGHTING FIXTURES WILL BE POWERED USING EXISTING SOURCE CIRCUITS.

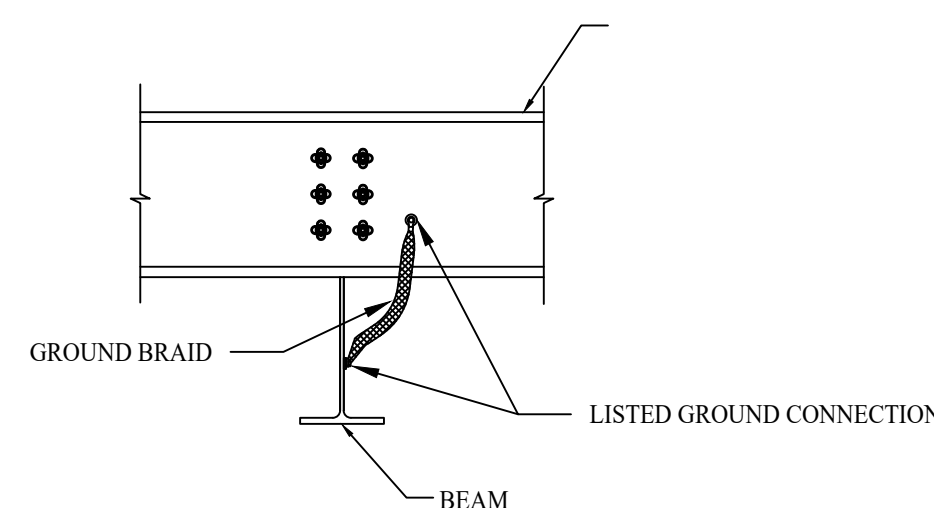
4 LIGHTING FIXTURE MOUNTING DETAILS (FOR REFERENCE ONLY)
NOT TO SCALE



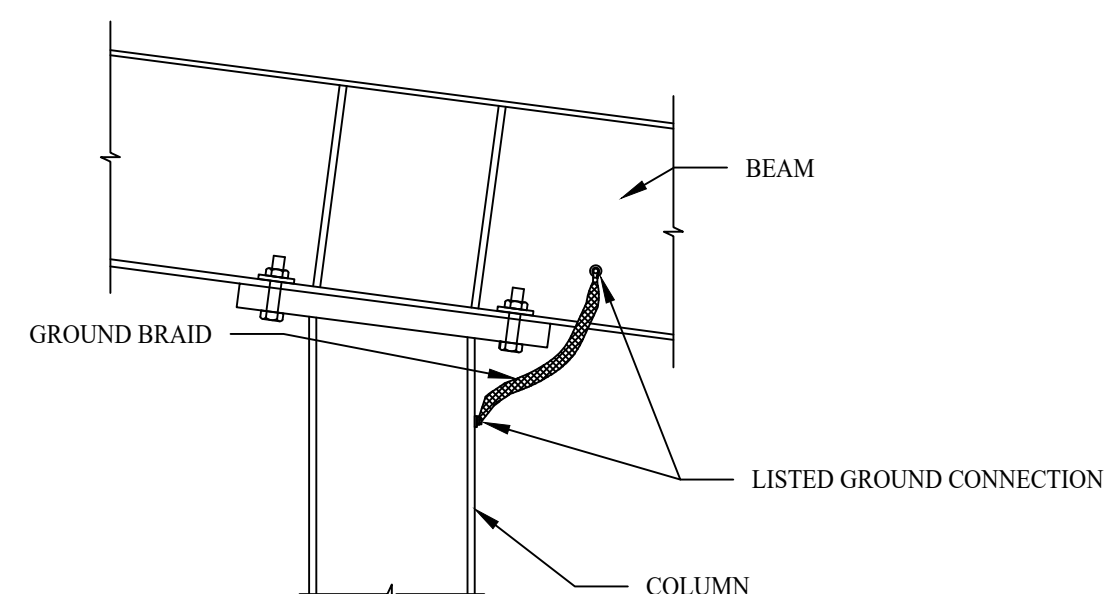
7 PURLIN TO BEAM BONDING DETAIL
NOT TO SCALE



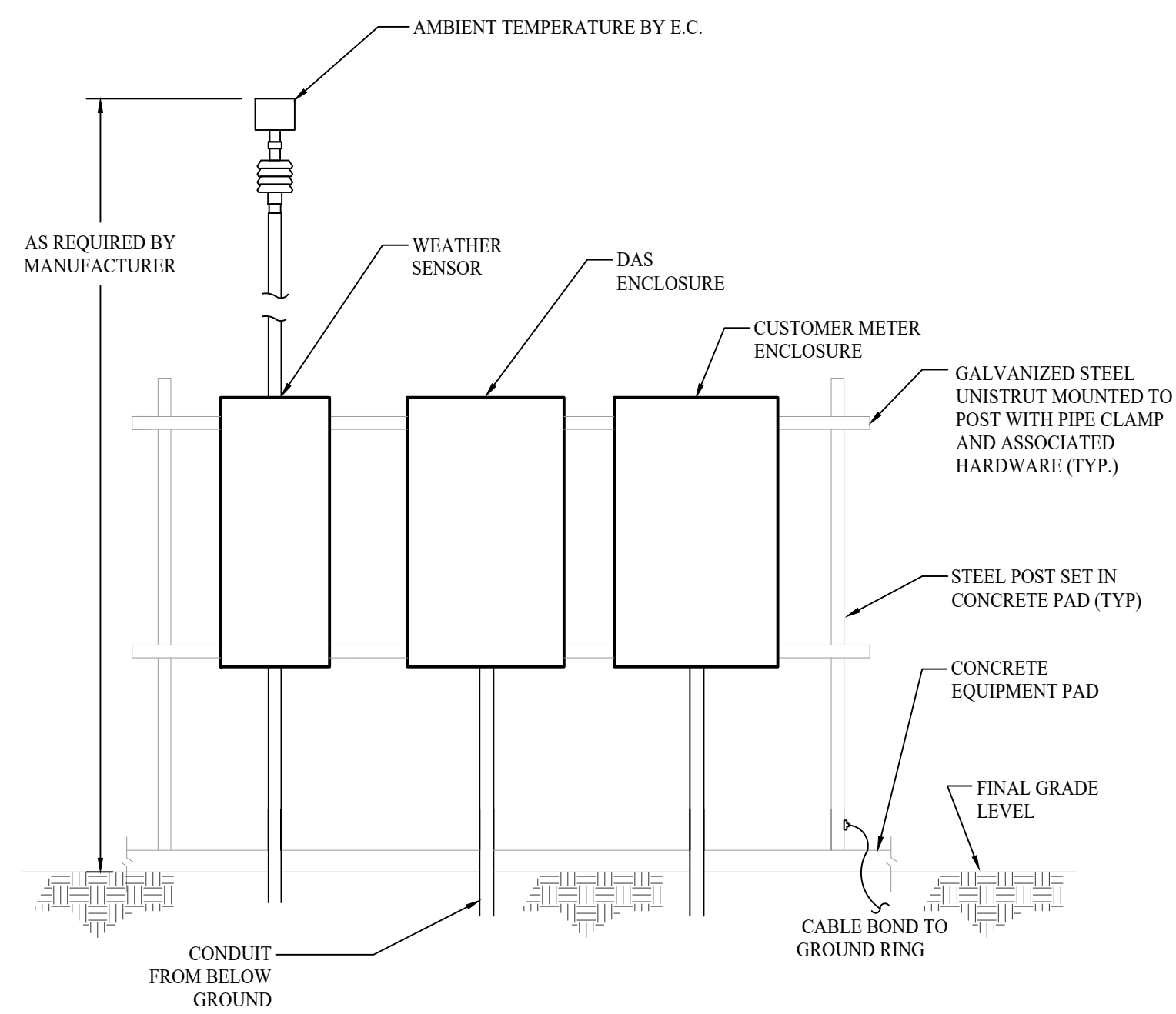
8 PV PANEL TO PURLIN BONDING DETAIL
NOT TO SCALE



9 BEAM TO BEAM BONDING DETAIL
NOT TO SCALE

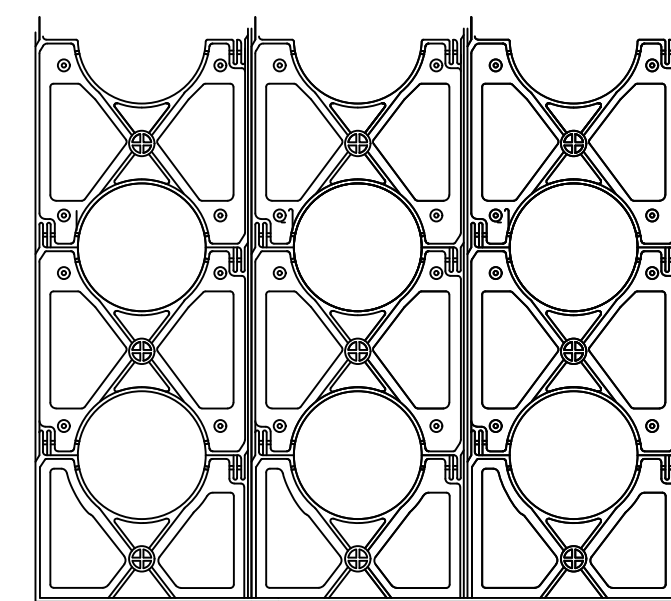


10 BEAM TO COLUMN BONDING DETAIL
NOT TO SCALE



NOTE:
COORDINATE ALL WEATHER INSTRUMENTS INSTALLATION DETAILS (HEIGHT, LOCATION, ORIENTATION) PRIOR TO INSTALLATION.

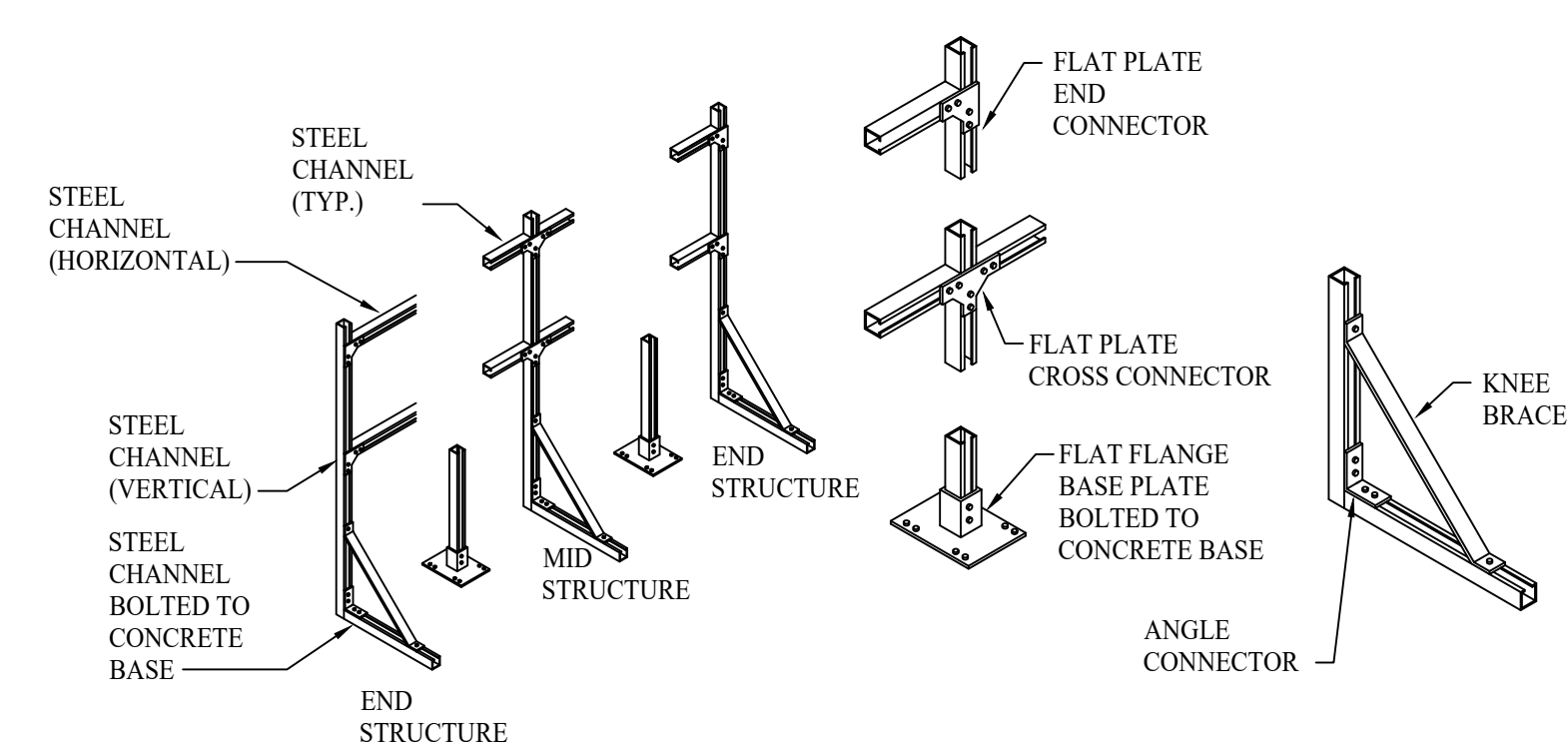
2 AUXILIARY EQUIPMENT DETAIL
NOT TO SCALE



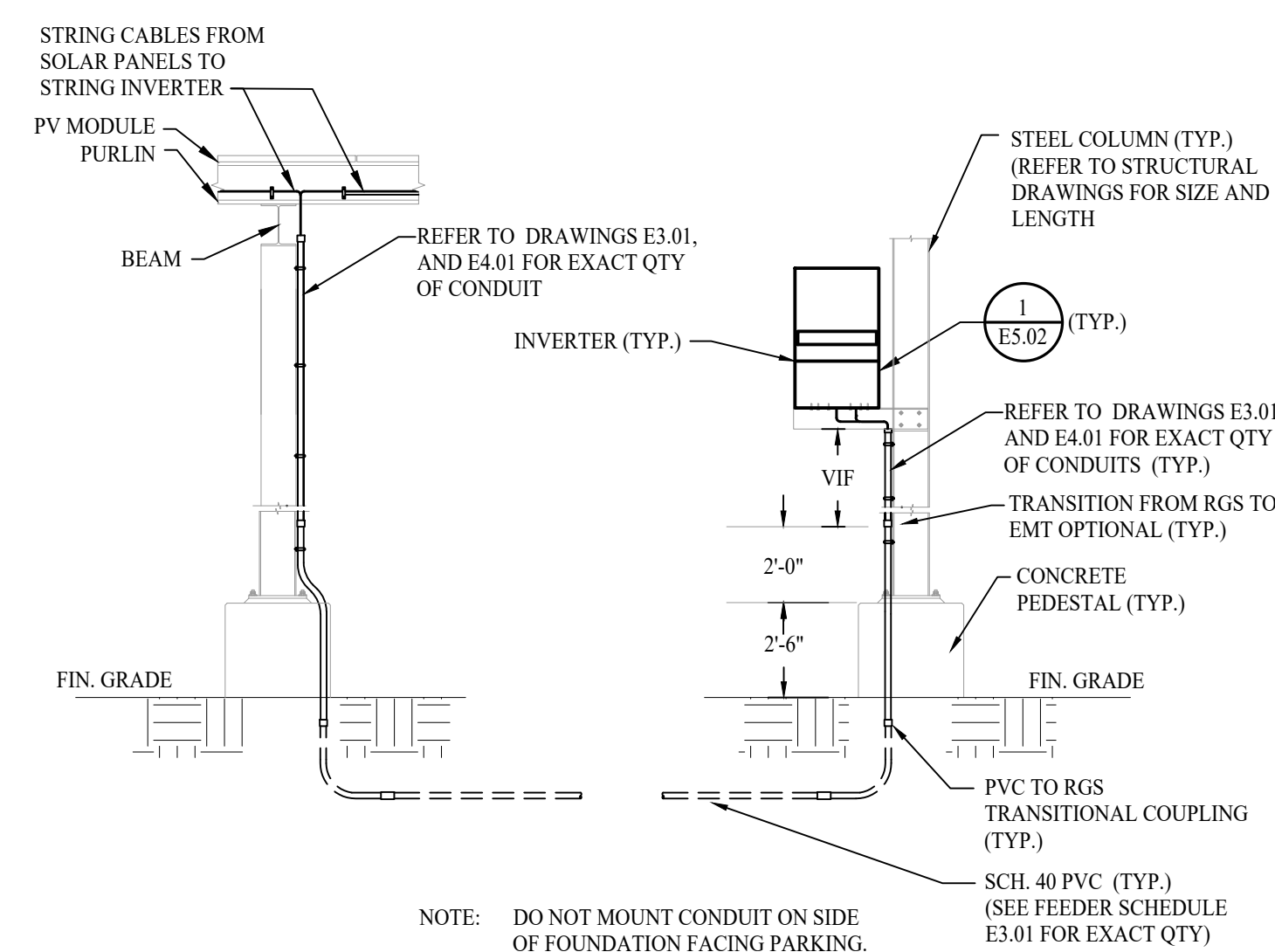
PVC SPACER NOTES:

1. PROVIDE PVC SPACERS IN CONFIGURATIONS AS REQUIRED BY CONDUIT RUNS. PROVIDE MINIMUM 3" BASE ON BOTTOM SPACER. PROVIDE MINIMUM 3" BETWEEN CONDUITS.
2. CONDUIT SPACERS SHALL BE INSTALLED EVERY 7'-0" OR PER MANUFACTURER'S RECOMMENDATIONS.
3. PROVIDE PVC SPACERS BY CARLON PRODUCTS "HI-IMPACT SPACERS" OR APPROVED EQUAL "WUNPEECE SPACERS" BY UNDERGROUND DEVICES.
4. SPACER DETAIL IS SHOWN FOR REFERENCE ONLY. DIMENSIONS SHOWN DO NOT INDICATE SPACER REQUIREMENTS. COORDINATE SPACERS ACTUAL DIMENSION WITH MANUFACTURER.

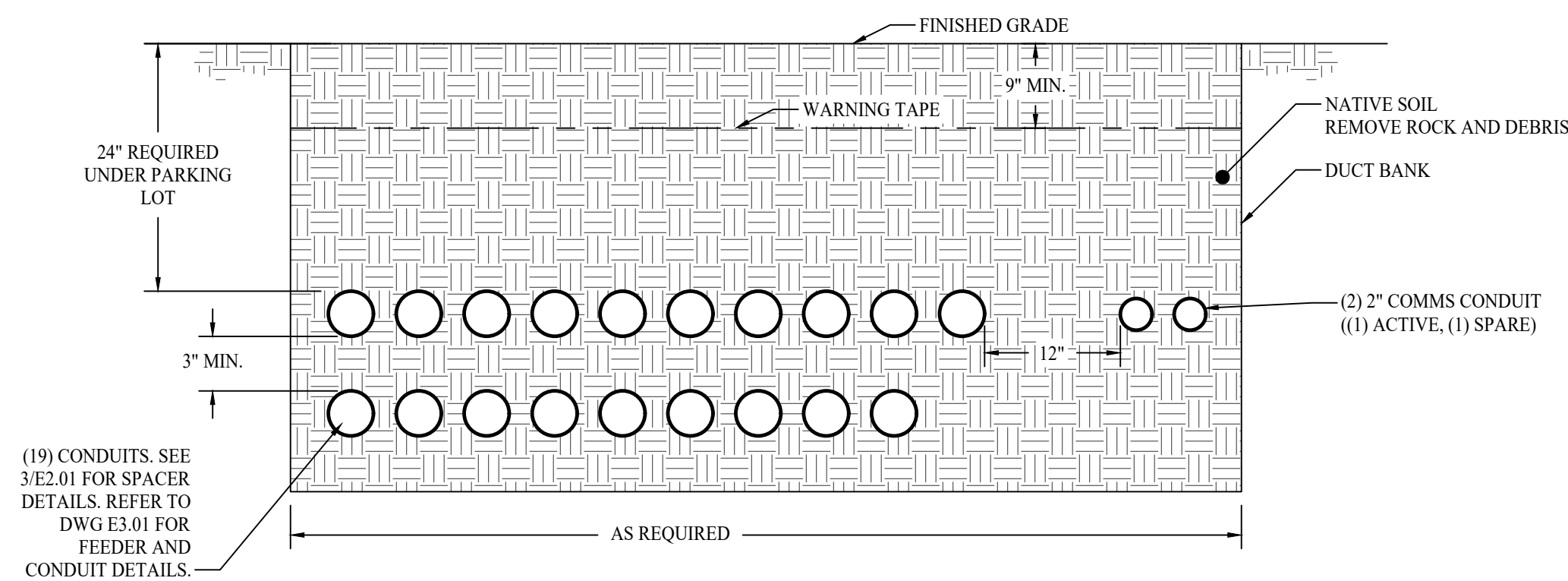
5 PVC SPACER U/G DETAIL
NOT TO SCALE



3 TYP. MISC. PANEL STEEL SUPPORTS
NOT TO SCALE



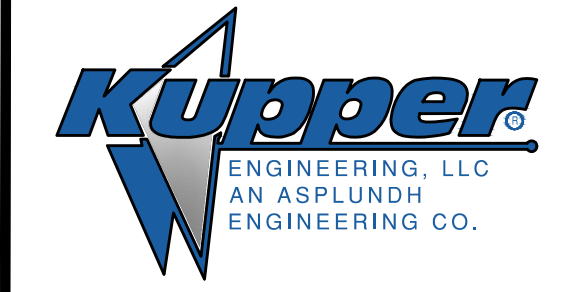
6 TYP. UNDERGROUND JUMPER DETAIL
NOT TO SCALE



11 DUCT BANK DETAIL
NOT TO SCALE

0' 1" GRAPHIC SCALE

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920 ELKRIDGE**

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DATE	BY	CHKD	DESCRIPTION
07/12/2023	EMJ	RK	ISSUE FOR INTERCONNECTION
07/19/2023	EMJ	PAP	ISSUE FOR INTERCONNECTION
08/01/2023	EMJ	RK	ISSUE FOR CIVIL REVIEW
09/08/2023	EMJ	RK	ISSUE FOR 30% REVIEW
11/15/2023	EMJ	PAP	ISSUE FOR 90% PROGRESS

PROJECT NO.	SCALE:
406-22	AS NOTED

ELECTRICAL
DETAILS - 3

DRAWING NO.

E5.03

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RECOMBINER

RECOMBINER RCB-##	
RATED MAXIMUM POWER-POINT CURRENT Imp	(REFER TO DWG E3.01) A
RATED MAXIMUM POWER-POINT VOLTAGE Vmp	(REFER TO DWG E3.01) V
MAXIMUM PV VOLTAGE	(REFER TO DWG E3.01) V
MAXIMUM PV CURRENT	(REFER TO DWG E3.01) A

NOTES:
1. PROVIDE AND INSTALL WARNING LABELS ON ALL RECOMBINERS PER NEC 690.53 REQUIREMENTS.

INVERTER DC SECTION

INVERTER INV-###	
RATED MAXIMUM POWER-POINT CURRENT Imp	(REFER TO DWG E3.01) A
RATED MAXIMUM POWER-POINT VOLTAGE Vmp	(REFER TO DWG E3.01) V
MAXIMUM PV VOLTAGE	(REFER TO DWG E3.01) V
MAXIMUM PV CURRENT	(REFER TO DWG E3.01) A

NOTES:
1. PROVIDE AND INSTALL WARNING LABELS ON ALL INVERTERS PER NEC 690.53 REQUIREMENTS.

PV POWER SOURCE

NOTES:
1. DIRECT CURRENT (DC) CIRCUITS, ALL INTERIOR AND EXTERIOR DC CONDUITS, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, AND JUNCTION BOXES ASSOCIATED WITH THE PV SYSTEM SHALL BE MARKED TO ALERT INDIVIDUALS THAT DC POWER IS PRESENT. THE MARKING SHALL BE PLACED EVERY TEN (10) FEET OR FRACTION THEREOF, AT TURNS AND ABOVE AND BELOW PENETRATIONS, AND JUNCTION BOXES. THE MARKING SHALL CONTAIN THE TEXT "PV POWER SOURCE" IN CAPITAL LETTERS A MINIMUM OF 3/8 INCHES IN HEIGHT WITH WHITE LETTERS ON A RED BACKGROUND. THE MATERIALS USED FOR MARKING SHALL BE REFLECTIVE AND WEATHER RESISTANT IN ACCORDANCE WITH UL 969 THAT IS SUITABLE FOR THE ENVIRONMENT.

1000 VOLTS DC

NOTES:
1. PROVIDE AND INSTALL LABELS AT ALL CONDUIT RUNS FROM STRINGS TO INVERTER PER NEC REQUIREMENTS.

480/277 VOLTS AC

NOTES:
1. PROVIDE AND INSTALL LABELS AT ALL 480/277VAC BUSWAYS PER NEC REQUIREMENTS.

SIGNAGE NOTES:

- SIGNAGE SHALL BE WEATHER RESISTANT. UL 696 SHALL BE USED AS A STANDARD FOR WEATHER RATINGS.
- PROVIDE PERMANENT PLACARDS AS REQUIRED BY NEC ARTICLE 690 V1 MARKING.
- PROVIDE PLACARDS ON INVERTERS PERTAINING TO GROUND FAULTS PER NEC ARTICLE 690.5 (C).
- PROVIDE PERMANENT PLACARDS FOR DISCONNECTS AS REQUIRED BY NEC 690.14 (C) (2).
- PROVIDE PLACARDS ON ALL INVERTERS PER NEC ARTICLE 690.17.

WARNING
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED,
NORMALLY GROUNDED CONDUCTORS MAY
BE UNGROUNDED AND ENERGIZED

NOTES:
1. PROVIDE AND INSTALL WARNING LABELS ON ALL INVERTERS PER NEC 690.5(C) REQUIREMENTS.

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS. TERMINALS ON
BOTH THE LINE AND LOAD SIDES MAY BE
ENERGIZED IN THE OPEN POSITION

NOTES:
1. PROVIDE AND INSTALL WARNING LABELS ON ALL DISCONNECTING MEANS PER NEC 690.17 REQUIREMENTS.

DANGER
HIGH VOLTAGE
KEEP OUT

NOTES:
1. PROVIDE AND INSTALL WARNING LABELS ON ALL ENCLOSURES CONTAINING EXPOSED LIVE PARTS OR EXPOSED CONDUCTORS OPERATING AT OVER 600 VOLTS NEC 110.34(C).

SERVICE DISCONNECT

NOTES:
1. PROVIDE AND INSTALL LABELS ON ALL SERVICE DISCONNECTS PER REQUIREMENTS OF NEC230.70(B).

DAS
DATA ACQUISITION SYSTEM FOR
SOLAR PHOTOVOLTAIC SYSTEM

NOTES:
1. PROVIDE AND INSTALL LABELS ON ALL WEATHER STATIONS AND MONITORING ENCLOSURES.

PHOTOVOLTAIC
GENERATION METER

NOTES:
1. PHOTOVOLTAIC GENERATION METER GENERIC LABEL 1 PER METER

WARNING

Arc Flash and Shock Risk
Appropriate PPE Required

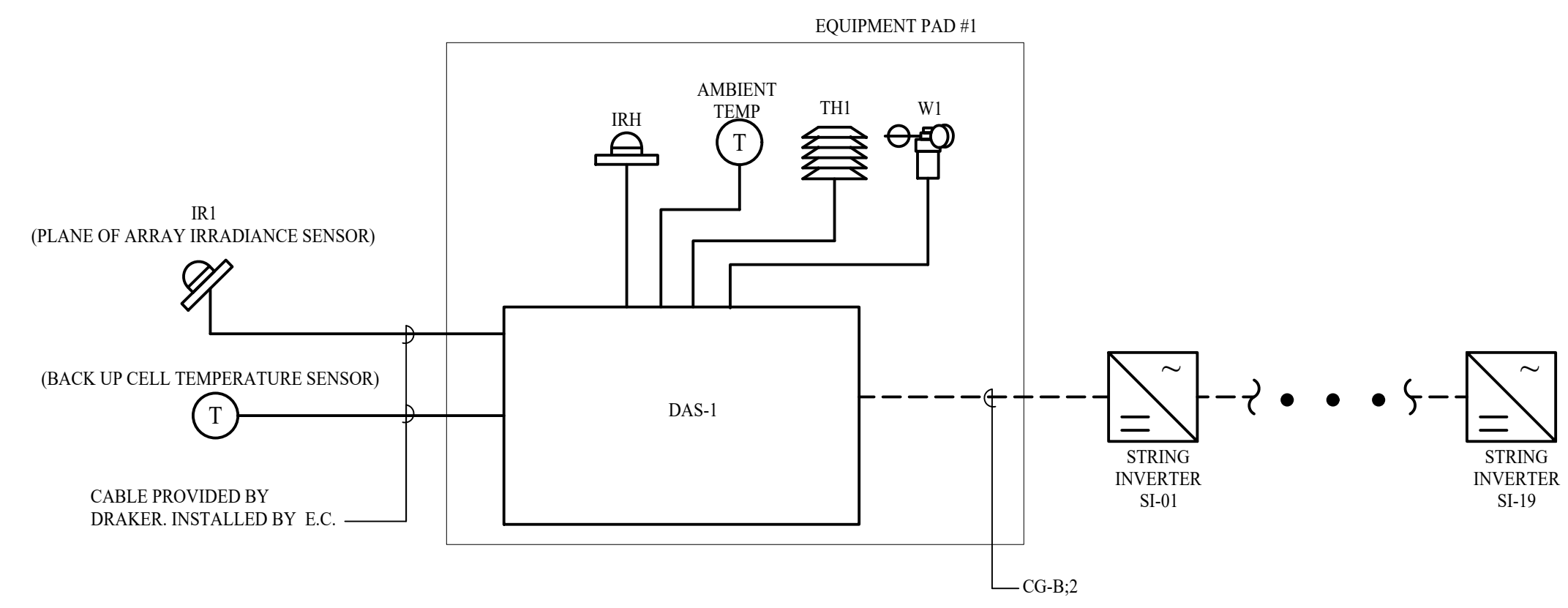
<p>FLASH PROTECTION</p> <p>Flash Risk at 36 in Min. Arc Rating: 6.2 cal/cm² Flash Protection Boundary: 196 in Glove Class: 2 PPE: Arc-rated shirt & pants + arc-rated coverall + arc-rated arc flash suit</p>	<p>SHOCK PROTECTION</p> <p>Shock Risk when cover is removed 12470 VAC Limited Approach 60 in Restricted Approach 26 in 03/01/16</p>
---	--

BUS: XFMR BUS T1

3 GENERAL ARC FLASH LABEL
NOT TO SCALE

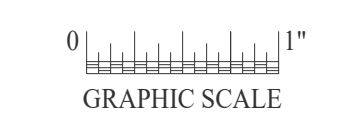
SHEET NOTES:

- SIGNAGE SHALL BE WEATHER RESISTANT. UL 696 SHALL BE USED AS A STANDARD FOR WEATHER RATINGS.
- PROVIDE PERMANENT PLACARDS AS REQUIRED BY NEC ARTICLE 690 V1 MARKING.
- PROVIDE PLACARDS ON INVERTERS PERTAINING TO GROUND FAULTS PER NEC ARTICLE 690.5 (C).
- PROVIDE PERMANENT PLACARDS FOR DISCONNECTS AS REQUIRED BY NEC 690.14 (C) (2).
- PROVIDE PLACARDS ON ALL INVERTERS AND COMBINER BOXES PER NEC ARTICLE 690.17.
- DIRECT CURRENT (DC) CIRCUITS, ALL INTERIOR AND EXTERIOR DC CONDUITS, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, AND JUNCTION BOXES ASSOCIATED WITH THE PV SYSTEM SHALL BE MARKED TO ALERT INDIVIDUALS THAT DC POWER IS PRESENT. THE MARKING SHALL BE PLACED EVERY TEN (10) FEET OR FRACTION THEREOF, AT TURNS AND ABOVE AND BELOW PENETRATIONS, AND ON ALL DC COMBINER AND JUNCTION BOXES. THE MARKING SHALL CONTAIN THE TEXT "CAUTION: PV CIRCUIT ENERGIZED" IN CAPITAL LETTERS A MINIMUM OF 3/8 INCHES IN HEIGHT WITH WHITE LETTERS ON A RED BACKGROUND. THE MATERIALS USED FOR MARKING SHALL BE REFLECTIVE AND WEATHER RESISTANT IN ACCORDANCE WITH UL 969 THAT IS SUITABLE FOR THE ENVIRONMENT.



NOTES:

- REFER TO EQUIPMENT MANUFACTURER INSTALLATION MANUALS FOR INSTALLATION AND WIRING REQUIREMENTS.
- REFER TO WEATHER STATION INSTALLATION MANUAL FOR INSTALLATION, WIRING AND MOUNTING OF SENSORS.
- INSTRUMENTS SHALL BE LOCATED AT CENTER OF ARRAY.



PRELIMINARY
NOT FOR CONSTRUCTION

1 EQUIPMENT SIGNAGE DETAILS
NOT TO SCALE



Kupper
ENGINEERING, LLC
AN ASPLUNDH
ENGINEERING CO.

AMBLER YARDS
300 BROOKSIDE AVE. BLDG #14
AMBLER, PA 19002
TELEPHONE 215-884-5970



**UMMS PARASOL -
920 ELKRIDGE**

920 ELKRIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

DATE	BY	SCALE	DESCRIPTION
07/12/2023	EMJ	RK	ISSUE FOR INTERCONNECTION
07/19/2023	EMJ	PAP	ISSUE FOR INTERCONNECTION
08/01/2023	EMJ	RK	ISSUE FOR CIVIL REVIEW
09/08/2023	EMJ	RK	ISSUE FOR 30% REVIEW
11/15/2023	EMJ	PAP	ISSUE FOR 90% PROGRESS


PROJECT NO: 406-22 SCALE: AS NOTED

ELECTRICAL
DETAILS - 4

E5.04


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ZXM7-UHLDD144 Series

16BB HALF-CELL N-Type TOPCon Bifacial Double Glass Monocrystalline PV Module



555-580W

POWER RANGE

22.45%

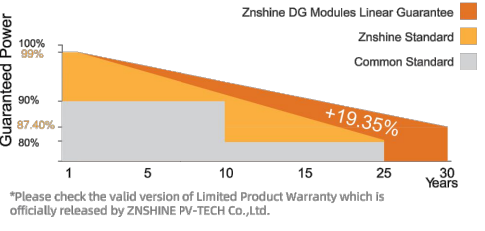
MAXIMUM EFFICIENCY

0.40%


YEARLY DEGRADATION

12 YEARS PRODUCT WARRANTY

30 YEARS OUTPUT GUARANTEE



*Please check the valid version of Limited Product Warranty which is officially released by Znshinesolar PV-10207-2023.



*No there are different certification requirements in different markets please contact your local Znshinesolar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

Key Features

Excellent Cells Efficiency

SMBB technology reduce the distance between busbars and finger grid line which is benefit to power increase.

Anti PID

Ensured PID resistance through the quality control of cell manufacturing process and raw materials.

TIER 1

Global Tier 1 bankable brand with independently certified advanced automated manufacturing.

Bifacial Technology

Up to 25% additional power gain from back side depending on albedo.

Better Weak Illumination Response

More power output in weak light condition, such as haze, cloudy, and early morning.


Adapt To Harsh Outdoor Environment

Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity environment.

Excellent Quality Management System


Warranted reliability and stringent quality assurances well beyond certified requirements.

Founded in 1988, Znshinesolar is a world's leading high-tech PV module manufacturer with the advanced production lines, the company boasts module capacity of 10 GW. Bloomberg has listed Znshinesolar as a global Tier 1 PV module maker. Today Znshinesolar has distributed its sales to more than 60 countries around the globe.

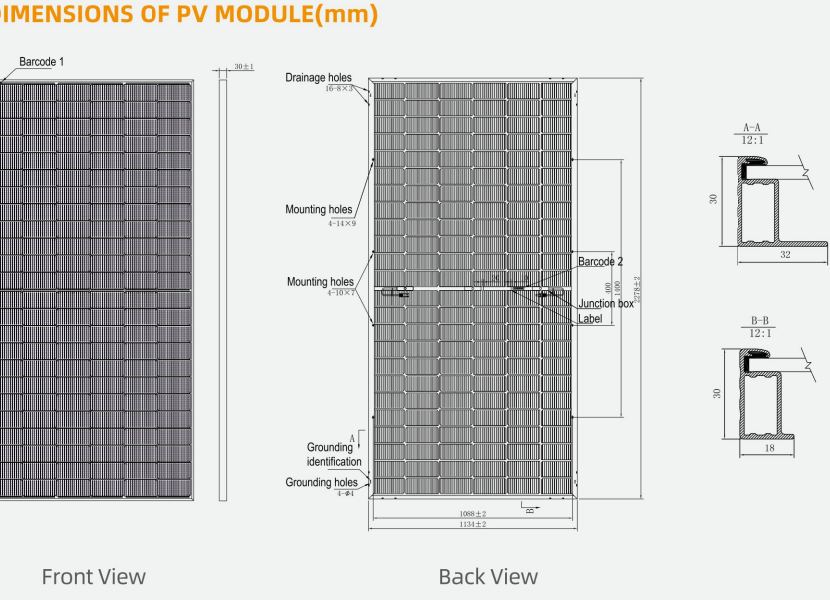


ZXM7-UHLDD144 Series

16BB HALF-CELL N-Type TOPCon Bifacial Double Glass Monocrystalline PV Module



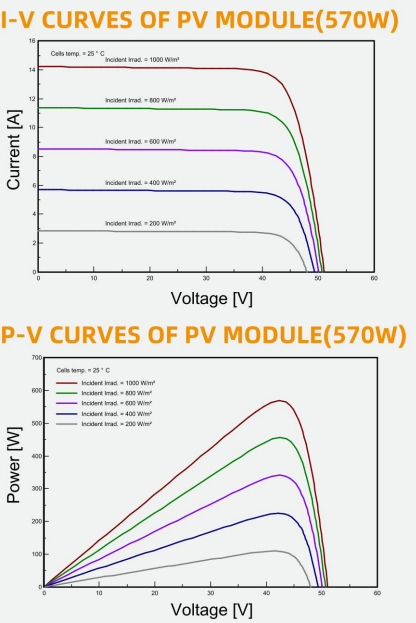
DIMENSIONS OF PV MODULE(mm)



Front View Back View

*Optional: customized frame color and cable length available upon request.

I-V CURVES OF PV MODULE(570W)



P-V CURVES OF PV MODULE(570W)

ELECTRICAL CHARACTERISTICS | STC*

Nominal Power Pmax(W)	555	560	565	570	575	580
Maximum Power Voltage Vmp(V)	41.80	42.00	42.20	42.40	42.60	42.80
Maximum Power Current Imp(A)	13.28	13.34	13.39	13.45	13.50	13.56
Open Circuit Voltage Voc(V)	50.50	50.70	50.90	51.10	51.30	51.50
Short Circuit Current Isc(A)	14.05	14.11	14.17	14.23	14.29	14.35
Module Efficiency (%)	21.48	21.68	21.87	22.07	22.26	22.45

*This data refers to the reference only and the actual data is in accordance with the panel's STC (Standard Test Condition: Irradiance 1000W/m², Module Temperature 25±0.2°C, AM 1.5, Measuring uncertainty: ±0.5%, all the electrical characteristics such as Pmax, Im, Voc and Isc).

MECHANICAL DATA

Solar cells	N-type Monocrystalline
Cells orientation	144 (6x24)
Module dimension	2278x1343x30 mm (With Frame)
Weight	31.5±0.1 kg
Glass	2.0 mm±0.05mm, High Transmission, AR Coated Heat Strengthened Glass
Junction box	IP 68, 3 diodes
Cables	4 mm², 350 mm (With Connectors)
Connectors	MC4-compatible

*Please refer to the technical document for specified connector.

TEMPERATURE RATINGS

MMQT	40°C~45°C	Maximum system voltage	1500 VDC
Temperature coefficient of Pmax	-0.366%/°C	Operating temperature	-40°C~+85°C
Temperature coefficient of Voc	-0.25%/°C	Maximum series fuse	30 A
Temperature coefficient of Isc	0.06%/°C	Front Side Maximum Static Loading	Up to 5400Pa
Refer: Bifacial Factor	0.8±0.05%	Rear Side Maximum Static Loading	Up to 2400Pa

*Refer to the technical document for specified connector.

ELECTRICAL CHARACTERISTICS WITH 25% REAR SIDE POWER GAIN*

Front power Pmax/W	555	560	565	570	575	580
Total power Pmax/W	694	700	706	713	719	725
Vmp(V)Total	41.90	42.10	42.30	42.50	42.70	42.90
Imp(A)Total	16.56	16.63	16.70	16.79	16.87	16.95
Voc(V)Total	50.60	50.80	51.00	51.20	51.40	51.60
Isc(A)Total	17.52	17.59	17.67	17.74	17.82	17.88

*This data refers to the reference only and the actual data is in accordance with the panel's STC (Standard Test Condition: Irradiance 1000W/m², Module Temperature 25±0.2°C, AM 1.5, Measuring uncertainty: ±0.5%, all the electrical characteristics such as Pmax, Im, Voc and Isc).

PACKAGING CONFIGURATION*

Pieces/Box	36
Pieces/Container(40HQ)	720

*Maximum packaging is available upon request.
*Maximum rated current for the cables for the single module and they are not part of the offer.
*This data refers to the reference only and the actual data is in accordance with the panel's STC (Standard Test Condition: Irradiance 1000W/m², Module Temperature 25±0.2°C, AM 1.5, Measuring uncertainty: ±0.5%, all the electrical characteristics such as Pmax, Im, Voc and Isc).
*Cables should be fully protected by PV module manufacturer and installed by qualified personnel who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

*Please refer to the technical document for specified connector.


*This data refers to the reference only and the actual data is in accordance with the panel's STC (Standard Test Condition: Irradiance 1000W/m², Module Temperature 25±0.2°C, AM 1.5, Measuring uncertainty: ±0.5%, all the electrical characteristics such as Pmax, Im, Voc and Isc).

Address: 14, 29th Industrial Zone, Jintan(Jiangsu) 213251, P.R. China Tel: +86 519 8622 0233

Note: Specifications included in this datasheet are subject to change without notice. ZNSHINESOLAR reserves the right of final interpretation © ZNSHINESOLAR 2022 | Version: ZXM7-UHLDD144 2303.E
No special undertaking or warranty for the suitability of special purpose or being installed in extraordinary surroundings is granted unless otherwise specifically committed by manufacturer in contract document.


1 MODULE CUTSHEET


NOT TO SCALE



PVI 50TL & PVI 60TL

3-Ph Transformerless Commercial String Inverters





Specifications

	PVI 50TL	PVI 60TL
DC Input		
Absolute Maximum Input Voltage	1000 VDC	1000 VDC
Maximum Power Input Voltage Range (MPPT)	480-850 VDC	540-850 VDC
Operating Voltage Range (MPPT)	200-950 VDC	200-950 VDC
Maximum Operating Input Current	108 A (88 A per MPPT)	114 A (88 A per MPPT)
Number of MPPT Traces	3	3
Maximum Available PV Current (Isc) x 1.25	204 A (88 A per MPPT)	204 A (88 A per MPPT)
Maximum PV Power	75 kW (30 kW per MPPT)	90 kW (33 kW per MPPT)
Start Voltage	300 V	300 V
AC Output		
Nominal Output Voltage	480 VAC, 3-Phase/3-Phase	480 VAC, 3-Phase/3-Phase
AC Voltage Range (Standard)	12±10%	12±10%
PF=1.00 - Real/Reactive Power/Output Current	50 kW / 50 kVA / 60.2 A	60 kW / 60 kVA / 72.3 A
PF=0.8 (Lag) - Real/Reactive Power/Output Current	50 kW / 65 kVA / 68.2 A	60 kW / 80 kVA / 79.4 A
Nominal Output Frequency	60 Hz	60 Hz
Output Frequency Range	57-63 Hz	57-63 Hz
Power Factor	Unity, ± 0.99 (Adjustable 0.8 leading to 0.8 lagging)	Unity, ± 0.99 (Adjustable 0.8 leading to 0.8 lagging)
Fault Current Contribution (1 Cycle PRR)	55 A	55 A
Total Harmonic Distortion (THD) @ Rated Load	<math>< 5%</math>	<math>< 5%</math>
Recommended OCPD Device	90 A	100 A
Efficiency		Type II MCM, 10kVdc, 100A (on 50/60Hz)
Peak Efficiency	99.0%	98.5%
CEC Efficiency	98.5%	98.5%
Line Loss	<math>< 2 W</math>	<math>< 2 W</math>
Integrated String Combiner		
Fused Inputs	15 Fused Positions (3 Positions per MPPT), 15 A Standard (20, 25, 30 A accepted)**	
Temperature		
Ambient Temperature Range	-22°F to +140°F (-30°C to +60°C); Derating occurs over +122°F (+50°C)	
Storage Temperature Range	5-65°C	
Relative Humidity (non-condensing)	5-95%	
Operating Altitude	13,123 ft (4,000 m); Derating occurs from 9,842 ft ± (3,000 m)	
Communications		
Data Logger Hardware	Standard, Internal	
ScreenView Web-Based Monitoring Service	Optional, External	
Remote Code Monitoring	Optional, External	
Combiner/Inverter Hardware	RS-485 Modbus RTU	
Remote Firmware Upgrades	Standard	
Remote Diagnostics	Standard	
Features & Protections		
Acc-Fault	Standard	
Smart Grid Features	LVRT, LFRFT, Volt-Wr, Frequency-Wait and Volt-Wait, Soft-Start, Soft-Stop	
Testing & Certifications		
Safety Listings & Certifications	UL 1741SA-2016, UL1699B, CSA-C22.2 #107.1, IEEE 1547a-2014	
Advanced Grid Support Functionality	Rule 21, UL 1741SA	
Listing Agency	ETL	
FCC Compliance	FCC Part 15	
Warranty		
Standard Limited Warranty	10 Years	
Enclosure		
Acoustic Noise Rating	<math>< 60</math> dBA @ 1 m at room temperature	
AC/DC Disconnect	Standard, fully integrated	
Mounting Angle**	0-90° from horizontal (vertical angles, flat)	
Dimensions (H x W x D)	39.4 in. x 23.6 in. x 10.2 in. (1,000 mm x 600 mm x 260 mm)	
Weight	Inverter: 125.5 lbs (56 kg); Wiring Box: 33 lbs (15 kg)	
Enclosure Rating (w/ Frame)	Type 4X, Polyester Powder Coated Aluminum	


**Please inquire about compatible Module-Level Power Electronics (MLPE)
**Yaskawa Solectria Solar does not supply optional fuse sizes
**Shade cover necessary required for installation of TP or 40A

SOLECTRIA SOLAR

Yaskawa Solectria Solar
300 Main Street
Lawrence, MA 01843
solectria.com

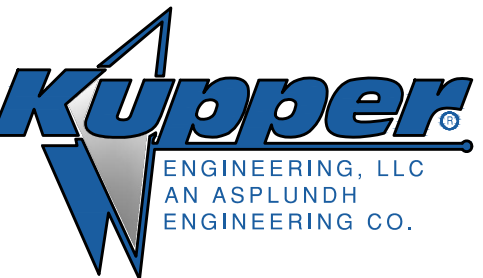
1-878-683-8700
inverters@solectria.com

DOCR-070642-P | November 2018
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2 INVERTER CUTSHEET

NOT TO SCALE



AMBLER YARDS
300 BROOKSIDE AVE, BLDG #14
AMBLER, PA 19002
TELEPHONE 215-884-5970



UMMS PARASOL - 920 ELK RIDGE

920 ELK RIDGE LANDING RD,
LINTHICUM HEIGHTS, MD 21090

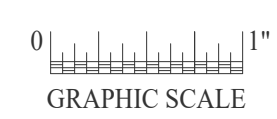
DATE	DESCRIPTION	BY	DATE	BY	DATE
07/12/2023	ISSUE FOR INTERCONNECTION	EMJ	07/19/2023	EMJ	PAP
08/01/2023	ISSUE FOR CIVIL REVIEW	EMJ	09/08/2023	EMJ	RK
11/15/2023	ISSUE FOR 30% REVIEW	EMJ			
	ISSUE FOR 90% PROGRESS	EMJ			

PROJECT NO: 406-22 SCALE: AS NOTED

ELECTRICAL
DETAILS - 5

DRAWING NO: **E5.05**

PRELIMINARY
NOT FOR CONSTRUCTION



GSN - GENERAL SITE CONSTRUCTION NOTES

1. PRIOR TO THE START OF CONSTRUCTION, THE SITE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, SIZE AND DIMENSION OF ALL UTILITIES IN AREA WHERE WORK IS TO BE PERFORMED. SUBCONTRACTOR AND/OR PARASOL ASSUMES NEITHER THE RESPONSIBILITY FOR THE LOCATION OF ENCASED AND/OR HIDDEN UTILITIES SHOWN NOR THE LACK THEREOF.
2. ANY DISCREPANCIES IN REFERENCE, COORDINATES, ELEVATIONS, EXISTING DIMENSIONS, AND DETAILS SHALL BE BROUGHT TO THE ATTENTION OF PARASOL AND/OR OWNER'S REPRESENTATIVES BEFORE PROCEEDING WITH WORK.
3. ALL WORK SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE MOST RECENT LOCAL AND NATIONAL CONSTRUCTION STANDARDS AND BUILDING CODES.
4. IN INSTANCES WHERE THE AHJ PROVIDES NO DETAILED SPECIFICATIONS, THE MATERIALS AND METHODS OF CONSTRUCTION SHALL MEET AND CONFORM TO THE REQUIREMENTS OF LOCAL CODES AND UFC REQUIREMENTS.
5. THE CONTRACTOR SHALL VERIFY ALL INFORMATION PERTAINING TO EXISTING CONDITIONS BY ACTUAL MEASUREMENT AND OBSERVATION AT THE SITE. ALL DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND THOSE SHOWN IN THE CONTRACT DOCUMENTS SHALL BE REPORTED TO THE ENGINEER OF RECORD AND PARASOL PRIOR TO FABRICATION.

GSN - COORDINATION NOTES

1. PARASOL ANTICIPATES THAT THE TOPS OF ALL EXISTING CONCRETE PIERS AND WALLS SHALL BE AT ELEVATIONS SPECIFIED HEREIN.
2. INSTALLATION ERRORS IN PRECAST CONSTRUCTION ARE TO BE CORRECTED BY THE GENERAL CONTRACTOR PRIOR TO THE ARRIVAL OF THE ERECTION CREW AND PRIOR TO THE ERECTION OF THE STRUCTURE.
3. ANY EXISTING UTILITY FINDINGS THAT CONFLICT WITH THE RECORD OF KNOWN CONDITIONS SHALL BE REPORTED TO PARASOL AND/OR THE OWNER'S REPRESENTATIVE.

STEEL FABRICATION NOTES

1. ALL STEEL FABRICATED FOR THIS PROJECT IS ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (A.E.S.S.)
2. PURLINS ARE TO BE FINISHED AS FOLLOWS:
 - A. HOT DIP GALVANIZING G90 PER ASTM 653
3. COLUMNS AND CROSSBEAMS ARE TO BE FINISHED AS FOLLOWS:
 - A. HOT DIP GALVANIZING PER ASTM 1218
4. NUTS, BOLTS & WASHERS
 - A. HOT DIP GALVANIZING PER ASTM 153
5. FOR TOUCH UP AND CLEANING
 - A. USE SOLVENTS OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL (SSPC)
 - B. WIRE BRUSH CLEAN WITH SOLVENTS RECOMMENDED BY FINISH MANUFACTURER AND TOUCH-UP WITH SAME FINISH SYSTEMS DESCRIBED ABOVE

COLD WEATHER NOTES

1. IN COLD WEATHER CONDITIONS PLEASE NOTE THAT COMPLETION OF SOME TEMPERATURE DEPENDENT WORK MAY BE DELAYED UNTIL TEMPERATURES REACH 45 DEGREES F AND RISING. THIS WORK MAY INCLUDE:
 - A. BASE PLATE GROUTING
 - B. PARGING
 - C. LINE STRIPING
 - D. TOUCH-UP PAINTING

SHEET NUMBER	SHEET NAME	30% DESIGN PROGRESS	60% DESIGN PROGRESS	90% DESIGN PROGRESS	100% DESIGN PROGRESS
PV-000	PROJECT LOCATION & DRAWING LIST	•			
PV-101	SITE PLAN - FOUNDATION	•			
PV-102	SITE PLAN - PV LAYOUT	•			
TOTAL # SHEETS: 3					



PARASOL
STRUCTURES
NEW YORK BOSTON
WWW.PARASOLSTRUCTURES.COM

PROJECT # : 23011

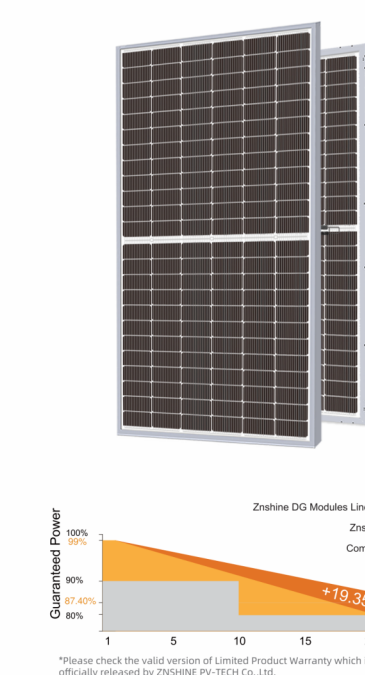
THIS DRAWING AND ALL THE INFORMATION CONTAINED HEREIN IS THE INTELLECTUAL PROPERTY OF PARASOL STRUCTURES. IT IS AUTHORIZED FOR THE SOLE USE OF THE PROJECT LOCATED AT ADDRESS BELOW.
AND LIMITED TO THE SCOPE OF WORK CONTRACTED WITH PARASOL STRUCTURES. THIS DRAWING IS NOT TO BE REPRODUCED, DISCLOSED, DISTRIBUTED OR REUSED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF PARASOL STRUCTURES.



KPFF Job # : 0000000

ENGINEER'S STAMP

30% DESIGN PROGRESS 01/25/24

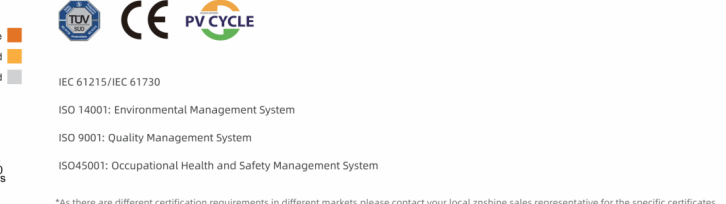


ZXM7-UHLEDD144 Series

168B HALF-CELL N-Type TOPCon Bifacial Double Glass Monocrystalline PV Module

555-580W **22.45%** **0.40%**
POWER RANGE MAXIMUM EFFICIENCY YEARLY DEGRADATION

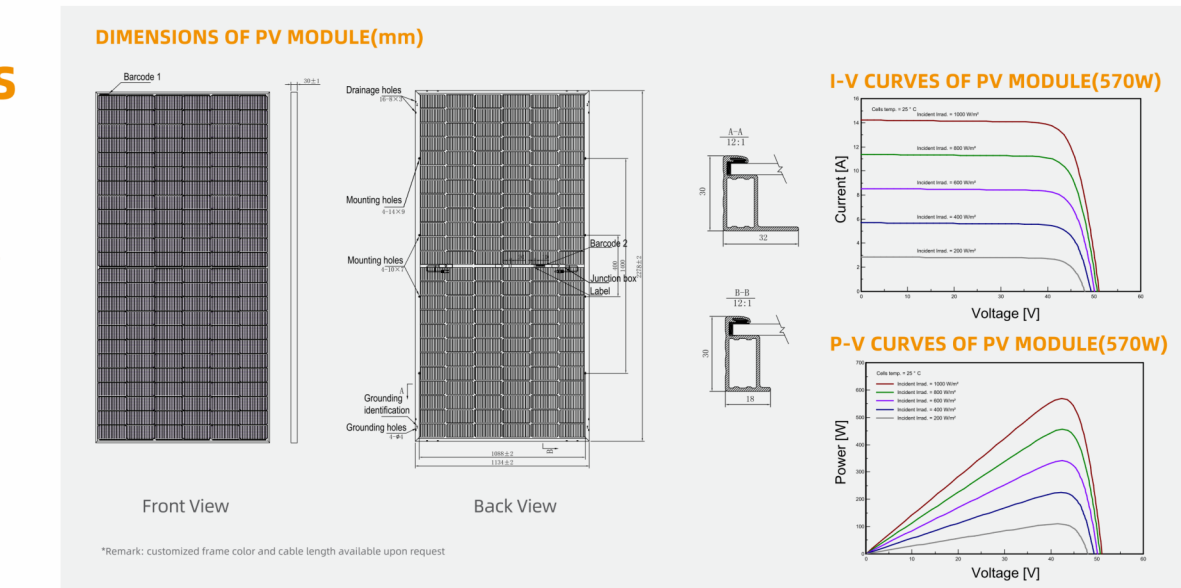
12 YEARS PRODUCT WARRANTY 10 YEARS OUTPUT GUARANTEE



Key Features

- Excellent Cells Efficiency**
SMB technology reduce the distance between busbars and finger grid line which is benefit to power increase.
- Anti PID**
Ensured PID resistance through the quality control of cell manufacturing process and raw materials.
- TIER 1**
Global, Tier 1 bankable brand, with independently certified advanced, automated manufacturing.
- Bifacial Technology**
Up to 25% additional power gain from back side depending on albedo.
- Better Weak Illumination Response**
More power output in weak light condition, such as haze, cloudy, and early morning.
- Adapt to Harsh Outdoor Environment**
Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity environment.
- Excellent Quality Management System**
Warranted reliability and stringent quality assurances well beyond certified requirements.

ZXM7-UHLEDD144 Series 168B HALF-CELL N-Type TOPCon Bifacial Double Glass Monocrystalline PV Module

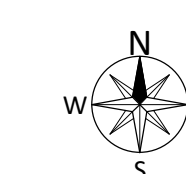


ELECTRICAL CHARACTERISTICS 10°C		MECHANICAL DATA	
Maximum Power (Pmax)	555, 564, 573, 579, 576, 580	Module Type	N-Type Monocrystalline
Maximum Power Voltage (Vmp)	41.80, 42.00, 42.20, 42.40, 42.60, 42.80	Cell Connections	144 (6x24)
Maximum Power Current (Imp)	13.28, 13.43, 13.54, 13.65, 13.53, 13.54	Module Dimension	2278x1343x35mm (93.2x53.0x1.38")
Open Circuit Voltage (Voc)	50.58, 50.79, 50.98, 51.18, 51.30, 51.33	Weight	31.50kg (69.4lb)
Short Circuit Current (Isc)	14.65, 14.77, 14.87, 14.93, 14.93, 14.93	Glass	2.0mm (2mm), High Transmission, All-Clear Heat Strengthened Glass
Module Efficiency (%)	21.48, 21.68, 21.87, 22.05, 22.20, 22.45	Interdigitated Back Contact (IBC)	YES
Electrical Characteristics 25°C Maximum Power (Pmax) 555, 564, 573, 579, 576, 580 Maximum Power Voltage (Vmp) 41.80, 42.00, 42.20, 42.40, 42.60, 42.80 Maximum Power Current (Imp) 13.28, 13.43, 13.54, 13.65, 13.53, 13.54 Open Circuit Voltage (Voc) 50.58, 50.79, 50.98, 51.18, 51.30, 51.33 Short Circuit Current (Isc) 14.65, 14.77, 14.87, 14.93, 14.93, 14.93 Module Efficiency (%) 21.48, 21.68, 21.87, 22.05, 22.20, 22.45		TEMPERATURE RATINGS Working Temperature Range -40°C to 85°C Maximum System Voltage 1000V DC Maximum System Current 15A DC Maximum System Power 555W Maximum System Voltage 1000V DC Maximum System Current 15A DC Maximum System Power 555W	

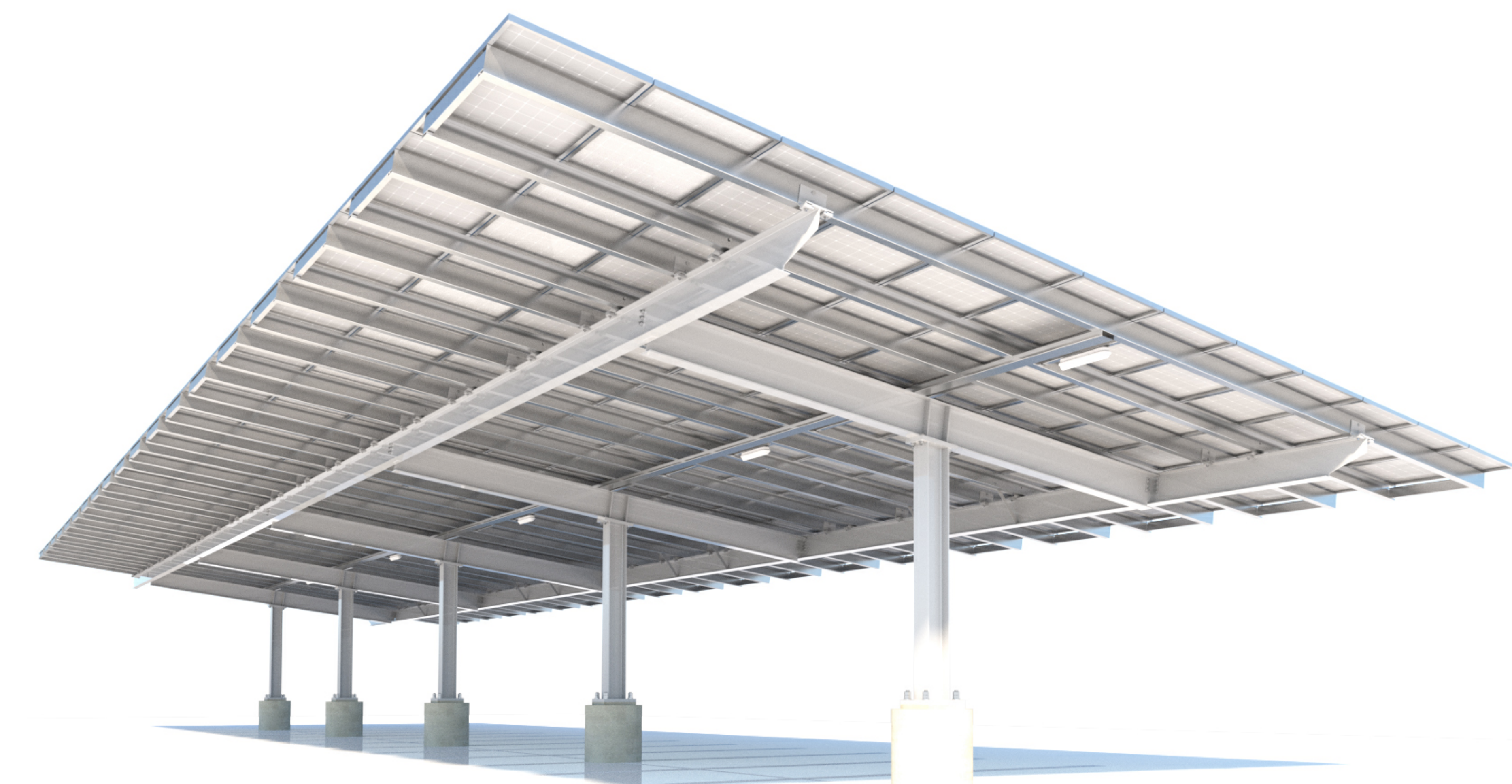
2 PV PANEL SPECIFICATION
N.T.S.



1 PROJECT LOCATION MAP
N.T.S.



3 SAMPLE PROJECT IMAGE
N.T.S.



PROJECT TITLE
UMMS-2

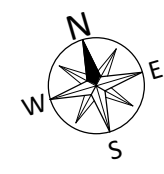
PROJECT ADDRESS
920 ELKRIDGE LANDING RD
LINTHICUM HEIGHTS, MD 21080

SHEET TITLE
PROJECT LOCATION & DRAWING LIST

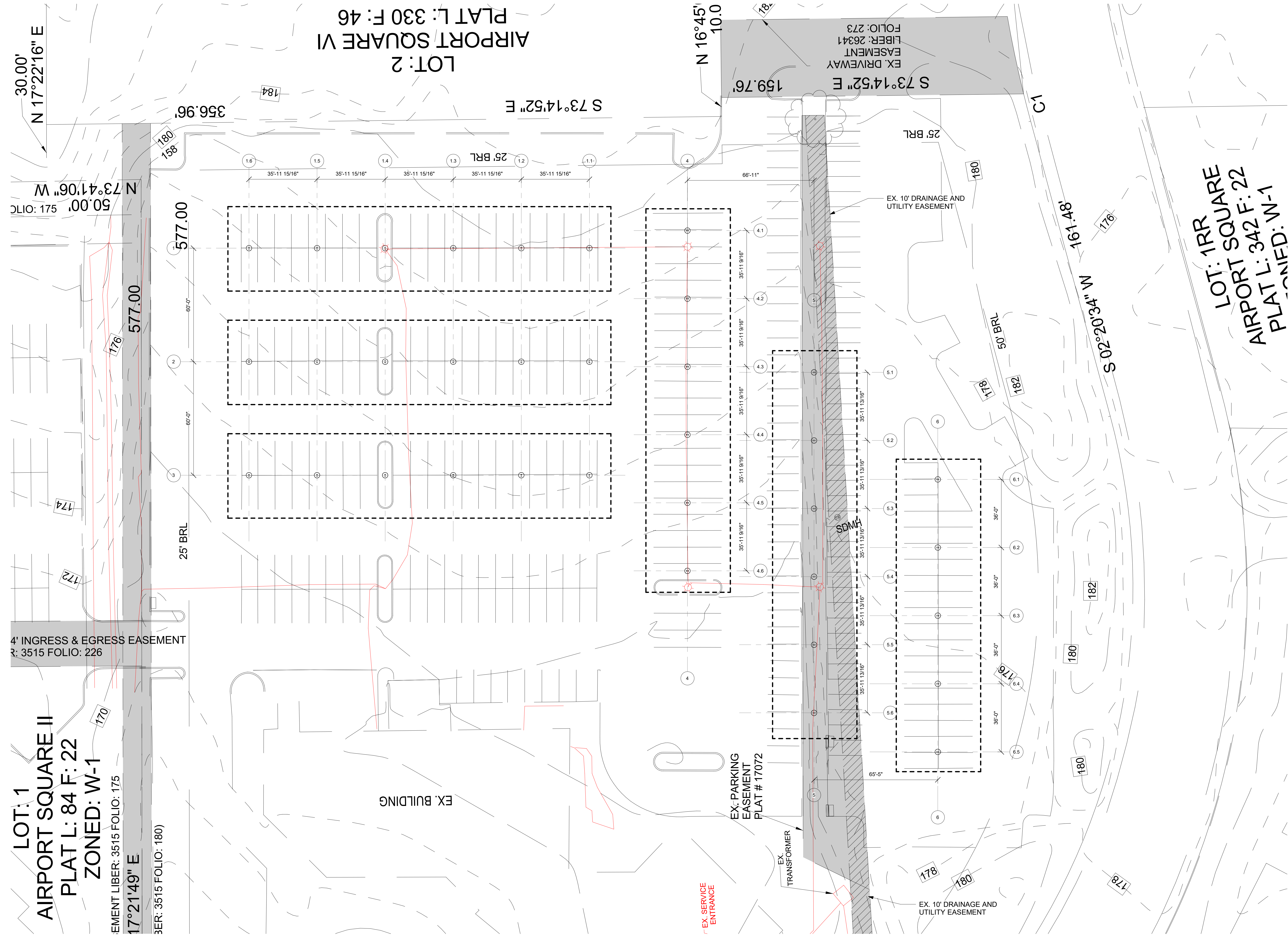
ISSUED SET / REVISIONS	DATE	DESCRIPTION
1	08/2023	30% DESIGN PROGRESS
2	09/2023	60% DESIGN PROGRESS
3	10/2023	90% DESIGN PROGRESS
4	11/2023	100% DESIGN PROGRESS

DESIGNED BY: PARASOL
DRAWN BY: ZS
CHECKED BY: KPFF
APPROVED BY: KPFF
ORIGINAL SHEET SIZE: 42" x 30"
SCALE: 0 1/2" = 1"

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PV-000
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1 SITE PLAN - FOUNDATION
3/8" = 1'-0"



FOUNDATION SCHEDULE			
CANOPY	MARK	TYPE	QTY
B01	F-36.14	FOUNDATION (DRILLED PIER)	6
B02	F-36.14	FOUNDATION (DRILLED PIER)	6
B03	F-36.14	FOUNDATION (DRILLED PIER)	6
B04	F-36.14	FOUNDATION (DRILLED PIER)	6
B05	F-36.14	FOUNDATION (DRILLED PIER)	6
B06	F-36.14	FOUNDATION (DRILLED PIER)	5
TOTAL # PIERS: 35			



PROJECT # : 23011
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kpff
Consulting Engineers
KPFff Job # : 0000000
ENGINEER'S STAMP

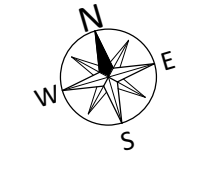
30% DESIGN
PROGRESS
01/25/24

PROJECT TITLE
UMMS-2
PROJECT ADDRESS
500 ELKBRIDGE LANDING RD.
LINTHICUM HEIGHTS, MD 21080
SHEET TITLE
SITE PLAN - FOUNDATION

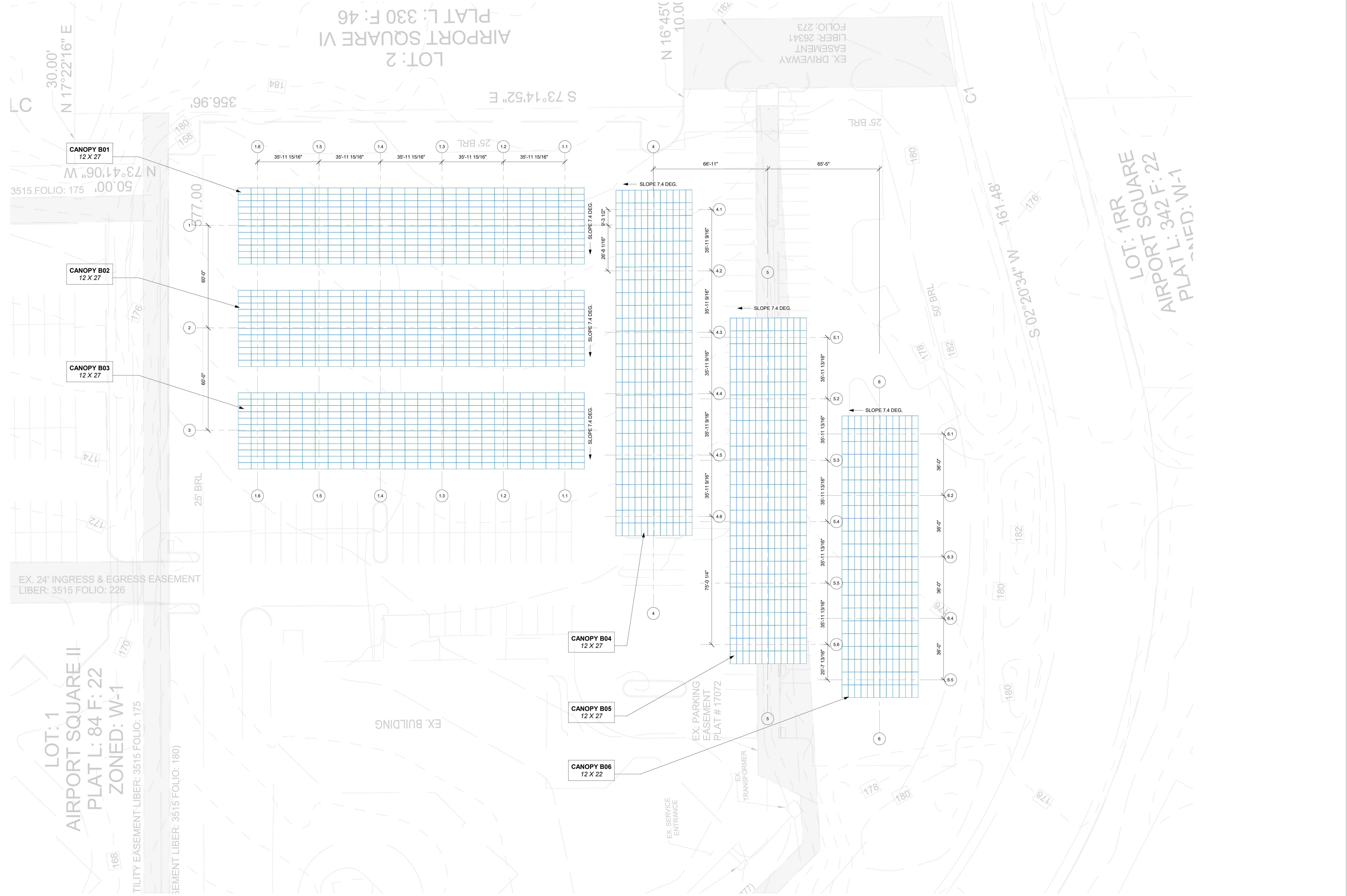
ISSUED SET / REVISIONS	DATE	DESCRIPTION
SYM	08/2022	30% DESIGN PROGRESS
	08/2022	60% DESIGN PROGRESS

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1 OVERALL SITE PLAN
3/64" = 1'-0"



PV PANEL SCHEDULE					
CANOPY	SIZE	MATERIAL	WATTAGE	QTY	SYSTEM SIZE (kWp)
B01	12 x 27	ZNSHINE SOLAR ZXM7-UHLLDD144	575	324	186.30
B02	12 x 27	ZNSHINE SOLAR ZXM7-UHLLDD144	575	324	186.30
B03	12 x 27	ZNSHINE SOLAR ZXM7-UHLLDD144	575	324	186.30
B04	12 x 27	ZNSHINE SOLAR ZXM7-UHLLDD144	575	324	186.30
B05	12 x 27	ZNSHINE SOLAR ZXM7-UHLLDD144	575	324	186.30
B06	12 x 22	ZNSHINE SOLAR ZXM7-UHLLDD144	575	264	151.80
TOTAL:				1,884	1,083.30



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PROJECT #: 23011
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kpff Consulting Engineers

KPFF Job # : 0000000

ENGINEER'S STAMP

30% DESIGN
PROGRESS
01/25/24

PROJECT TITLE
UMMS-2

PROJECT ADDRESS
500 ELKBRIDGE LANE RD
LINTHICUM HEIGHTS, MD 21080

SHEET TITLE
SITE PLAN - PV LAYOUT

ISSUED SET / REVISIONS	DATE	DESCRIPTION
SYM	08/2023	30% DESIGN PROGRESS
	08/2023	60% DESIGN PROGRESS

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SCALE: 0 1/2" = 1"

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PV-102

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MARYLAND
DEPARTMENT OF HEALTH

J. Howard Beard Health Services Building
3 Harry S. Truman Parkway
Annapolis, Maryland 21401
Phone: 410-222-7095 Fax: 410-222-7294
Maryland Relay (TTY): 711
www.aahealth.org

Tonii Gedin, RN, DNP
Health Officer

MEMORANDUM

TO: Sadé Medina, Zoning Applications
Planning and Zoning Department, MS-6301

FROM: Brian Chew, Program Manager *BC*
Bureau of Environmental Health

DATE: March 12, 2024

RE: University of Maryland Systems Company
920 Elkridge Landing Road
Linthicum Heights, MD 21090

NUMBER: 2024-0045-V

SUBJECT: Variance/Special Exception/Rezoning

The Health Department has reviewed the above referenced variance to allow accessory structure (Solar Carport structures) with less setbacks than required and in the front yard of a nonwaterfront lot.

The Health Department has reviewed the above-referenced request. The property is served by public water and sewer facilities. The Health Department has no objection to the above-referenced request.

If you have further questions or comments, please contact Brian Chew at 410-222-7413.

cc: Sterling Seay



M A R Y L A N D
Office of Planning and Zoning

Jenny B. Dempsey
Planning and Zoning Officer

MEMORANDUM

TO: Sterling Seay, Planning Administrator, Zoning Division

FROM: Dan Beverungen, Planner, Regional Team

VIA: Courtney Wilson, Planning Administrator, Regional Team

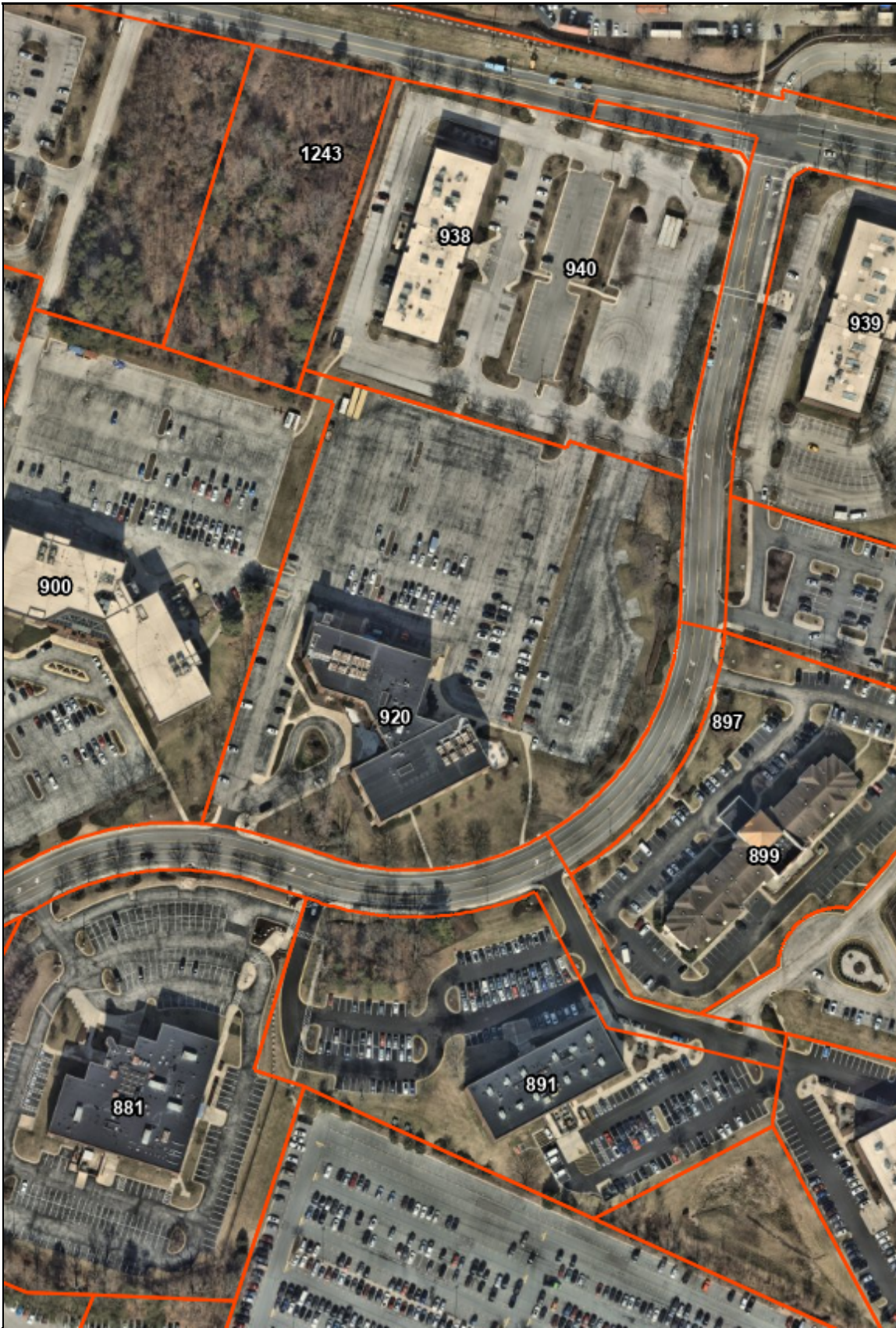
SUBJECT: 920 Elkridge Landing Road, Linthicum Heights, 20190
2024-0045-V

DATE: March 20, 2024

This memorandum is in response to the Zoning Division request for comments regarding a variance to the provisions of Article 18-2-204 to allow for the placement of an accessory structure in the front yard of a non-waterfront lot. While the Development Division defers to the Zoning Division regarding whether the application complies with the requisite criteria for the granting of these applications, as stated in Article 18, Title 16 of County Code, the following is offered:

1. The proposed development will be subject to Preliminary and Site Development Plan requirements found in Article 17, Title 4 of County Code. A comprehensive review of the proposed development will occur during the Site Development Plan review process. Prior to the initiation of the development review process, the applicant is encouraged to contact the Regional Team to determine if the application may be eligible for procedural relief.
2. The proposed development is subject to compliance with the Landscape Manual. In accordance with Section III(F), the portion of the site impacted by the proposed alterations shall conform to the standards of the Landscape Manual. A review for compliance with the Landscape Manual will occur with the review of the required Landscape Plans during the development review process.

920 Elkridge Landing Rd



Legend

Foundation

Addressing




Parcels




Parcels - Annapolis City



0 250 500 ft

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Notes

February 2024