

ADDENDUM NO. ONE

JOB NAME: Knox Co Parks Electrical Rehabilitation

PROJECT NUMBER: 23-800-291-1

DATE OF ADDENDUM: 03/25/2024



Dustin Barth, P.E.
Indiana Registration No. 12200401

THIS ADDENDUM FORMS A PART OF THE CONTRACT DOCUMENTS AND IS ISSUED IN ACCORDANCE WITH THE INSTRUCTIONS TO BIDDERS. ACKNOWLEDGE RECEIPT OF THIS ADDENDUM BY SIGNING THE ADDENDUM ACKNOWLEDGEMENT SECTION OF YOUR PROPOSAL.

RFI's:

1. Sheet E101A Electrical Keyed Note 17. What size of HDPE conduit? And Does it extend from the existing riser pole all the way to XMFR 1? No Cabling, Just Pull String?
 - a. The conduit would be the same size as called out, 3 ½". The rest would be coordinated with duke.
2. Sheet E101C. What does the #1 & #3 indicated on the sectionalizer Boxes?
 - a. The 1 indicates it is a pull through sectionalizer cabinet. The 3 indicates it is a 3 way sectionalizer cabinet.
3. Sheet E101C. Electrical Keyed Note 7 & 8. Are both of these new& to be provided/installed by the EC?
 - a. These are existing.
4. Sheet E101C. Electrical Keyed Note 13. Is this to be installed by EC?
 - a. This is to be installed and provided by EC.
5. Sheet E101E. Electrical Keyed Note 15. Where is this located?
 - a. This is labeled as XMFR 5. The electrical keyed note 9 is attached to the location mistakenly.

6. Sheet E101E. Electrical Keyed Note 16. Key Note #16 appears to be a com line rather than a light pole/base? If a light pole, can we please get specs on the pole/fixtures?
 - a. Specific Brand name not called out. Contractor to provide submittal or approval prior to ordering.
7. Do you have any specs or info for the EV charging station that is part of an alternate bid?
 - a. There is no spec or detail for the EV charging station. This would also be a single vehicle charging station.
8. Drawing E101E, there are (3) Key Note #9s by the Campground RR/Shower Facility that don't appear to match up to the KN #9 description.
 - a. The note is mislabeled and should be 15 on the xmfr. The others the note is wrong and will be updated.
9. Where is the 100kVA transformer for Alt. #4 located?
 - a. This is to replace a xmfr if needed.
10. For the conduits with the #1/0 EPR conductors, it is only (2) conductors in each conduit, correct? No ground wire or anything?
 - a. There will be only the 2 conductors per conduit. The wire itself will have a concentric neutral. The wire will be grounded at the xmfr.

Drawings:

1. Drawing Sheet No: E101D
Drawing Title: ELECTRICAL SITE PLAN
Revision: Clarified the EV Charging station plan note.
2. Drawing Sheet No: E101E
Drawing Title: ELECTRICAL SITE PLAN
Revision: Changed the plan note for XMFR 5 from 9 to 15.
3. Drawing Sheet No: E101E
Drawing Title: ELECTRICAL SITE PLAN
Revision: Changed 9 electrical note.

END OF ADDENDUM 1

100% CONSTRUCTION DOCUMENT SET

KNOX COUNTY PARKS ELECTRICAL REHABILITATION

VINCENNES, IN 47591

#	Revision	Date
1	ADDENDUM NO. 1	3/25/24

Project #: 23-800-291-1
 Designed By: JAR/JJH
 Drawn By: JAR/JJH
 Checked By: JAR
 Date: 02/28/2024



OVERALL ELECTRICAL
 SITE PLAN
E100A

GENERAL ELECTRICAL NOTES (APPLIES TO ALL SHEETS):

- PROVIDE SCHEDULE 40 PVC CONDUITS FOR ALL CONDUITS INSTALLED UNDERGROUND NOT SPECIFIED AS HDPE.
- PROVIDE STAINLESS STEEL FOR ALL MOUNTING HARDWARE.
- ALL LOCATIONS SHOWN ARE APPROXIMATE AND MAY BE SLIGHTLY DIFFERENT. COORDINATE WITH ENGINEER AND OWNER PRIOR TO DIGGING WHEN FINAL TRENCH/CONDUIT ROUTES HAVE BEEN CHOSEN BY CONTRACTOR.

DRAWING INDEX:

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E101E	ELECTRICAL SITE PLAN
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E105	PHOTO REFERENCE SHEET
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AERIAL PHOTO OVERALL SITE PLAN

PRINT DATE: 3/25/24
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**KNOX COUNTY PARKS
 ELECTRICAL REHABILITATION**

VINCENNES, IN 47591

- GENERAL ELECTRICAL NOTES (APPLIES TO ALL SHEETS):
- A. PROVIDE SCHEDULE 40 PVC CONDUITS FOR ALL CONDUITS INSTALLED UNDERGROUND NOT SPECIFIED AS HDPE.
 - B. PROVIDE STAINLESS STEEL FOR ALL MOUNTING HARDWARE.
 - C. ALL LOCATIONS SHOWN ARE APPROXIMATE AND MAY BE SLIGHTLY DIFFERENT. PRIVATE LOCATES WERE PERFORMED BY GPRS.
 - D. CONTRACTOR MAY CHOOSE TO UTILIZE DIRECTIONAL BORE AT LOCATIONS AS LONG AS COST TO PROJECT DOES NOT INCREASE.
 - E. CONTRACTOR SHALL FOLLOW ALL NEC AND NFPA GUIDELINES AND REGULATIONS FOR ENTIRE PROJECT.
 - F. IT IS EXPECTED THAT CURRENT POWER NOT BE INTERRUPTED UNTIL READY TO MAKE FINAL CONNECTIONS.



EXISTING MAIN ENTRANCE SITE PLAN

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OVERALL ELECTRICAL
 SITE PLAN
E100B

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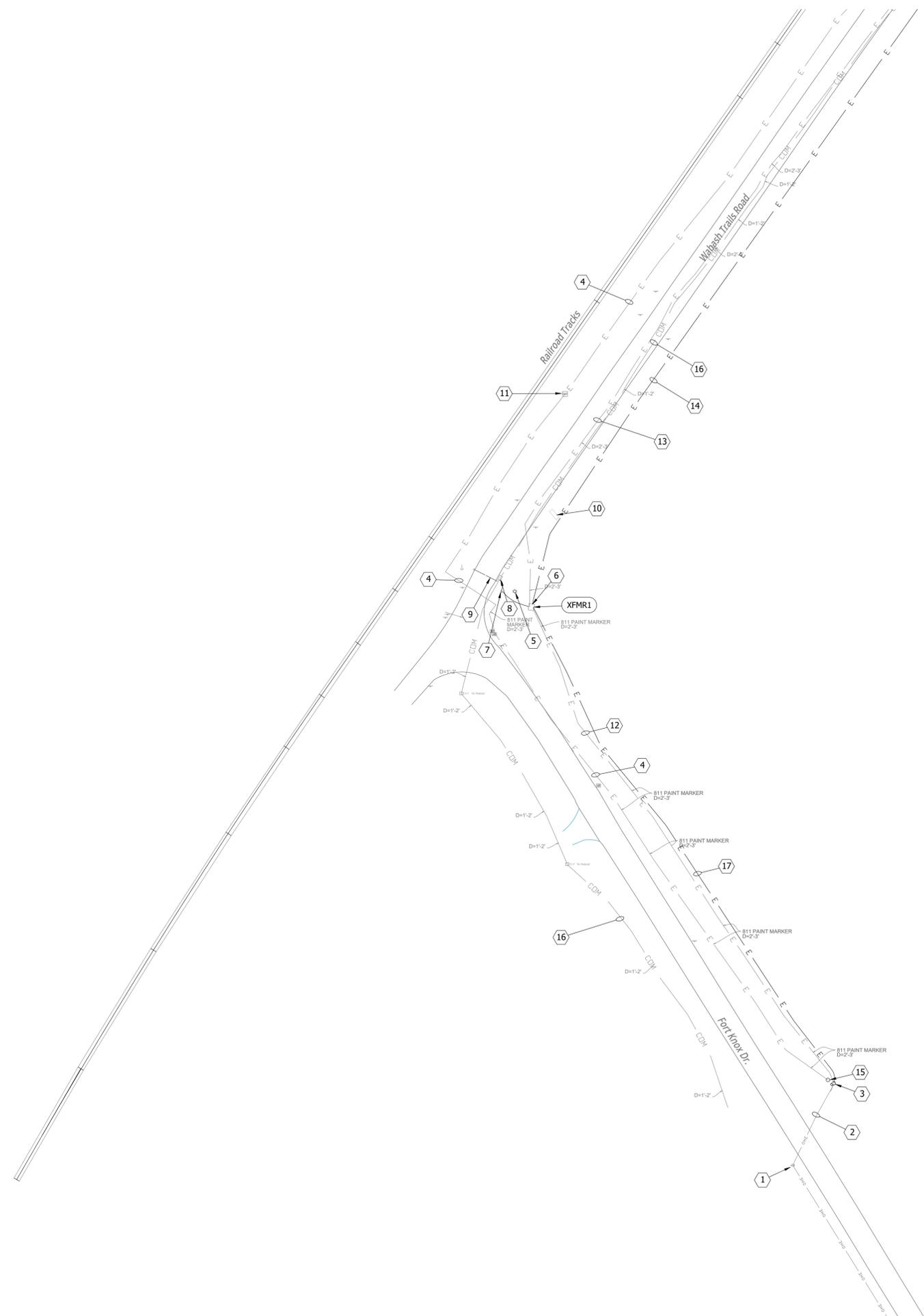
Justin Barth



ELECTRICAL SITE PLAN

E101A

- ELECTRICAL KEYED NOTES: ○
- EXISTING UTILITY METER AND POLE. OVERHEAD ACROSS ROAD.
 - PRIMARY OVERHEAD SERVICE.
 - SERVICE POLE WITH RISER TO UNDERGROUND FEEDING EXISTING PARK ENTRANCE TRANSFORMER.
 - EXISTING UTILITY UNDERGROUND SERVICE FEED FOR CSX STATION - NOT PART OF PARK UTILITIES.
 - EXISTING SITE LIGHTING POLE/LIGHT - TO REMAIN.
 - EXISTING 120/240V 1PH PAD MOUNTED TRANSFORMER - TO REMAIN.
 - EXISTING UTILITY METER.
 - EXISTING GATE CONTROL BOX/MOTOR.
 - EXISTING MOTORIZED ENTRANCE GATE.
 - CONCRETE PAD AND SIGN - COORDINATE WITH OWNER PRIOR TO MOVING FOR NEW SERVICE TRENCH.
 - ELECTRIC UTILITY JUNCTION BOX TO CSX STATION - NOT PART OF PARK.
 - EXISTING UNDERGROUND UTILITY FROM TERMINAL POLE TO FIRST TRANSFORMER.
 - EXISTING UNDERGROUND PRIVATE DIRECT BURIAL CONDUCTOR. ABANDON IN PLACE.
 - INSTALL 3 1/2" HDPE SDR-13.5 CONDUIT WITH 1/0 ERP CONDUCTOR.
 - CSX RISER AND TERMINAL POLE.
 - EXISTING UNDERGROUND COMMUNICATIONS - DO NOT DISTURB.
 - PROVIDE 6' OF HDPE UP THE EXISTING RISER POLE. COORDINATE WITH UTILITY FOR DISCONNECT OF EXISTING AND CONNECTION OF NEW MAIN FEED CABLE.



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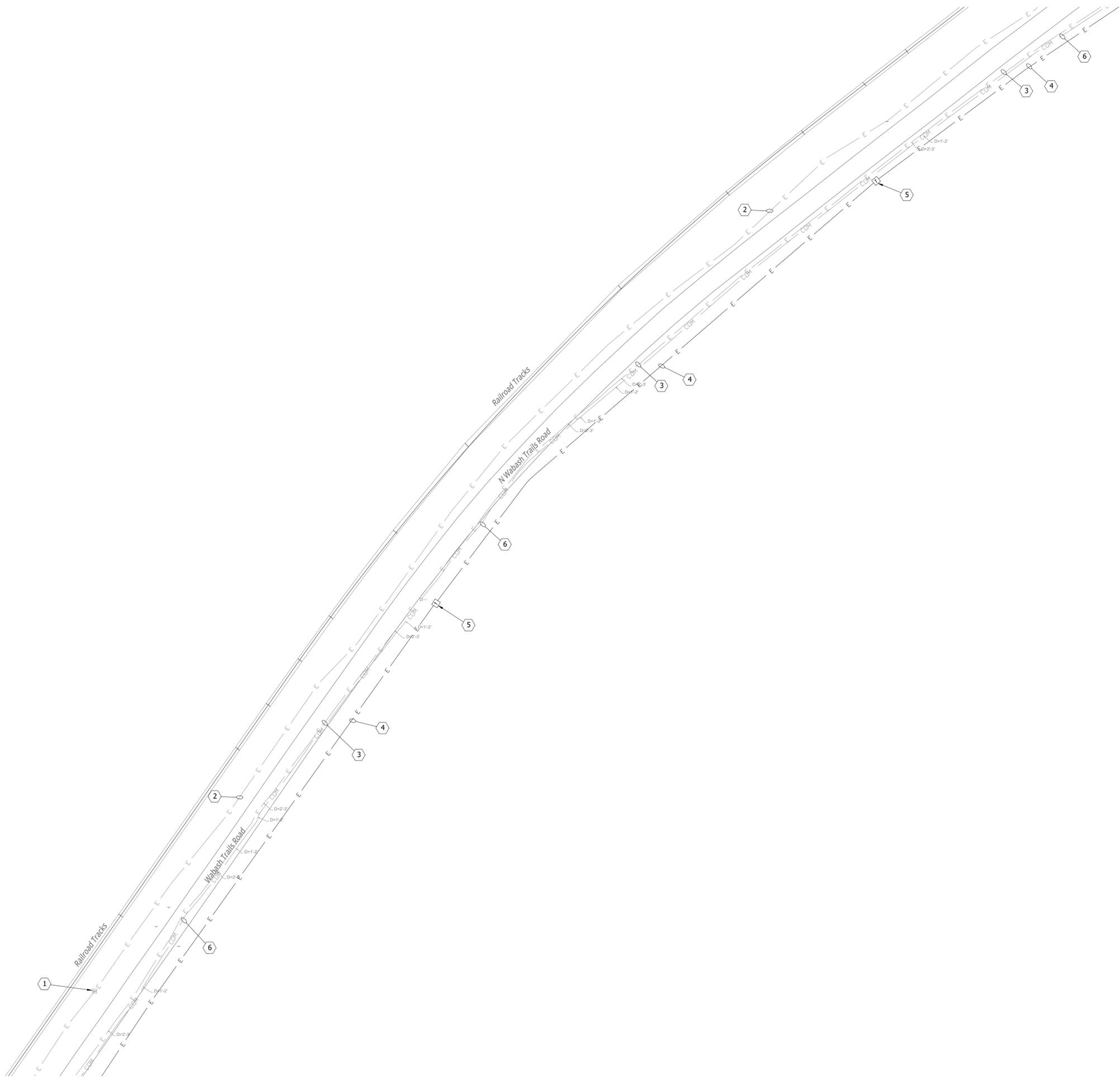


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ELECTRICAL SITE PLAN
E101B

- ELECTRICAL KEYED NOTES: ○
1. ELECTRIC UTILITY JUNCTION BOX TO CSX STATION - NOT PART OF PARK.
 2. EXISTING UNDERGROUND ELECTRICAL FEED TO CSX STATION.
 3. EXISTING UNDERGROUND PRIVATE DIRECT BURIAL ELECTRICAL CONDUCTOR.
 4. INSTALL NEW 3 1/2" HDPE SDR-13.5 CONDUIT WITH 1/0 ERP CONDUCTOR.
 5. INSTALL QUAZITE PULL BOX FOR POWER/HDPE. 24"X36"X30".
 6. EXISTING COMMUNICATIONS LINE - DO NOT DISTURB.

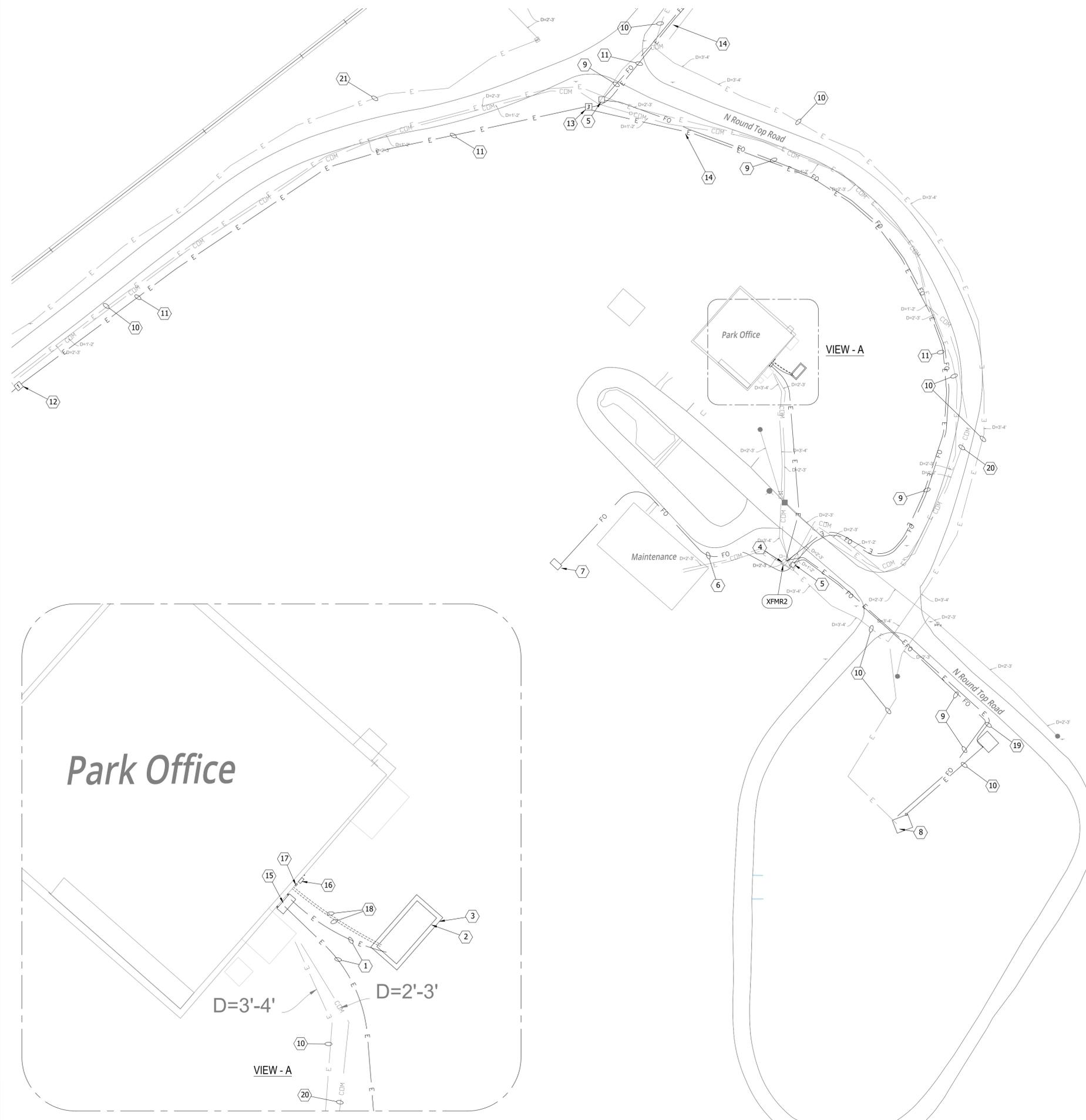


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ELECTRICAL REHABILITATION

VINCENNES, IN 47591

- ELECTRICAL KEYED NOTES: ○
- BID ALTERNATE: PROPOSED NEW CABLE AND CONDUIT. SEE ONE-LINE. THIS WILL REPLACE ANY CURRENT DIRECT BURIED CABLES.
 - BID ALTERNATE: PROPOSED NEW GENERATOR. SEE ONE-LINE AND DETAILS.
 - BID ALTERNATE: PROPOSED NEW GENERATOR PAD. SEE ONE-LINE AND DETAILS.
 - EXISTING 100KVA PAD MOUNT TRANSFORMER.
 - FIBER OPTIC JUNCTION BOX.
 - FIBER OPTIC CONDUIT: 1-1/2" HDPE SDR-13.5; 18" DEPTH WHERE TRENCHED SEPARATE FROM POWER.
 - MAINTENANCE BUILDING F.O. CABINET.
 - UPPER LOOP F.O. CABINET.
 - FIBER OPTIC CONDUIT: 1-1/2" HDPE SR-13.5 (18" DEPTH); COMBINED IN TRENCH WITH ELECTRICAL POWER CABLES (24" DEPTH).
 - EXISTING UNDERGROUND PRIVATE DIRECT BURIAL ELECTRICAL CONDUCTOR.
 - INSTALL 3 1/2" HDPE SDR-13.5 CONDUIT WITH 1/0 ERP CONDUCTOR FED THROUGH.
 - INSTALL SECTIONALIZER TO PULL THROUGH.
 - 3/0 SECTIONALIZER BOX.
 - TRENCH FOR NEW ELECTRICAL MAIN FEED AND FIBER OPTIC CONDUITS - INSTALLED TOGETHER. SEE DETAILS.
 - BID ALTERNATE: 200A AUTOMATIC TRANSFER SWITCH (ATS) SIMILAR TO ASCO 300 SERIES.
 - EXISTING OFFICE SERVICE ENTRANCE DISCONNECT.
 - EXISTING TELEPHONE BOX - DO NOT DISTURB.
 - BID ALTERNATE: 1" CONDUITS AND WIRE FOR BLOCK HEATER AND REMOTE ANNUNCIATOR. SEE ONE-LINE.
 - NEW CONDUIT/WIRE. SEE ONE-LINE.
 - EXISTING COMMUNICATIONS LINE - DO NOT DISTURB.
 - EXISTING UTILITY UNDERGROUND SERVICE FEED FOR CSX STATION - NOT PART OF PARK UTILITIES.



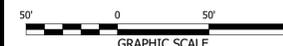
EXISTING PARK OFFICE AND UPPER CAMP
AREA SITE PLAN

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ELECTRICAL SITE PLAN

E101C

KNOX COUNTY PARKS
ELECTRICAL REHABILITATION

VINCENNES, IN 47591

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ELECTRICAL SITE PLAN

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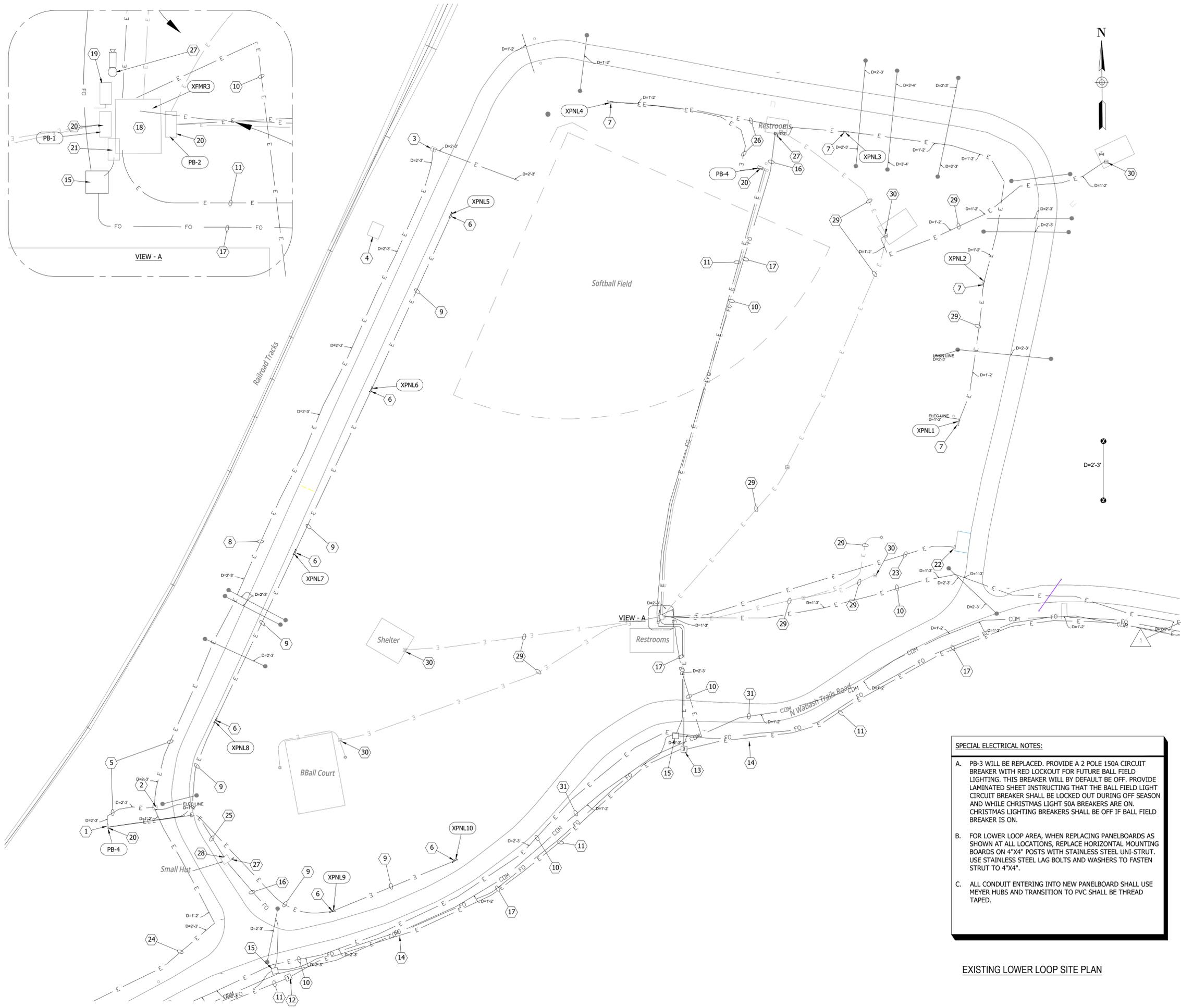
ELECTRICAL KEYED NOTES: ○

- EXISTING METER RACK WITH 200A METER BASE/UTILITY METER AND 200A DISTRIBUTION PANEL. PROVIDE NEW 200A DISTRIBUTION PANEL. THIS PANEL IS ON A SEPARATE SERVICE THAN THE PARK AND WILL BE DEDICATED FOR CHRISTMAS LIGHTING AROUND PARK AREA. SEE PHOTOS SHEET AND ONE-LINE.
- EXISTING 25KVA PAD MOUNT TRANSFORMER. THIS IS DUKE ENERGY PROPERTY AND NOT PART OF PARK EQUIPMENT.
- EXISTING 25KVA PAD MOUNT TRANSFORMER - CSX STATION PROPERTY. THIS TRANSFORMER IS TAPPED AND FEEDS PARK 25KVA TRANSFORMER. DUKE ENERGY PROPERTY AND NOT PART OF PARK EQUIPMENT.
- EXISTING CSX STATION.
- EXISTING UNDERGROUND ELECTRICAL. TO REMAIN (DUKE ENERGY).
- NEW CHRISTMAS LIGHT DEDICATED CIRCUIT PEDESTAL. 50A RATED, NEMA3R BRANCH PANEL AND (2) DUPLEX WEATHERPROOF RECEPTACLES. MATCH EXISTING. SEE PHOTOS SHEET.
- EXISTING CHRISTMAS LIGHT DEDICATED CIRCUIT PEDESTAL. 50A RATED. SEE PHOTOS SHEET.
- EXISTING DIRECT BURIED SERVICE CABLE TO EXISTING TRANSFORMER - TO REMAIN (DUKE ENERGY).
- PROPOSED ELECTRIC POWER CABLE FOR 50A CHRISTMAS LIGHT PEDESTALS. DIRECT BURIED ALUMINUM CABLE - MINIMUM 24" DEEP. SEE ONE-LINE.
- EXISTING UNDERGROUND PRIVATE DIRECT BURIAL ELECTRICAL CONDUCTOR.
- NEW INSTALL: 3 1/2" HDPE SDR-13.5 CONDUIT WITH 1/0 ERP CONDUCTOR FED THROUGH.
- INSTALL SECTIONALIZER CABINET TO PULL THROUGH.
- 3/8" SECTIONALIZER BOX.
- TRENCH NEW INSTALLS TOGETHER.
- FIBER OPTIC UNDERGROUND PULL BOX. SIMILAR TO CARSON 2436 24"x36"x24".
- FIBER OPTIC CONDUIT: 1-1/2" HDPE SDR-13.5; 18" DEPTH WHERE TRENCHED SEPARATE FROM POWER.
- FIBER OPTIC CONDUIT: 1-1/2" HDPE SDR-13.5; INSTALLED WITHIN SAME TRENCH AS NEW POWER CONDUIT.
- EXISTING 100KVA TRANSFORMER (SIZE NEEDS CONFIRMED).
- EXISTING 200A FUSED DISCONNECT.
- EXISTING 200A PANELBOARD. PROVIDE ALTERNATE BID FOR REPLACEMENT OF PB-1 THROUGH PB-4. REPLACEMENT SHALL BE STAINLESS STEEL TYPE WITH PADLOCKABLE DOOR. SEE SCHEDULES.
- EXISTING INTERNET SERVICE BOX.
- ALTERNATE BID: PROVIDE ELECTRIC VEHICLE CHARGING STATION AND CONNECT COMPLETE VIA CIRCUITS INDICATED. CHARGING STATION WILL BE A SINGLE VEHICLE STATION WITH A SINGLE CONNECTOR. PROVIDE SIE-B4001 OR APPROVED EQUAL. PROVIDE BASE PER MANUFACTURER'S RECOMMENDATION.
- ALTERNATE BID: EV CHARGING STATION POWER: 3 - #1 CU OR 3 - 2/0 AL, DIRECT BURIAL ACCEPTABLE TO THIS LOCATION.
- EXISTING PRIMARY FEED FOR CSX STATION. DO NOT DISTURB.
- NEW 50A CIRCUIT TO PANEL IN HUT.
- EXISTING UNDERGROUND ELECTRICAL FOR CHRISTMAS LIGHT PEDESTALS.
- NEW 20 FOOT LIGHT POLE FOR 360° SECURITY CAMERA. POLE AND POLE INSTALLATION BY CONTRACTOR, CAMERA AND WEATHERPROOF ETHERNET CABLE BY OTHERS.
- PROVIDE 50A BREAKER PANEL WITH 2 - 20A CIRCUIT BREAKERS. 1 - 20A BREAKER FOR FUTURE FIBER EQUIPMENT AND 1 - 20A BREAKER FOR INSIDE RECEPTACLE AND 1 OUTSIDE WEATHERPROOF RECEPTACLE.
- EXISTING ELECTRICAL DIRECT BURIED CABLES.
- EXISTING ELECTRICAL JUNCTION BOX.
- EXISTING UNDERGROUND COMMUNICATIONS CABLE - DO NOT DISTURB.

SPECIAL ELECTRICAL NOTES:

- PB-3 WILL BE REPLACED. PROVIDE A 2 POLE 150A CIRCUIT BREAKER WITH RED LOCKOUT FOR FUTURE BALL FIELD LIGHTING. THIS BREAKER WILL BY DEFAULT BE OFF. PROVIDE LAMINATED SHEET INSTRUCTING THAT THE BALL FIELD LIGHT CIRCUIT BREAKER SHALL BE LOCKED OUT DURING OFF SEASON AND WHILE CHRISTMAS LIGHT 50A BREAKERS ARE ON. CHRISTMAS LIGHTING BREAKERS SHALL BE OFF IF BALL FIELD BREAKER IS ON.
- FOR LOWER LOOP AREA, WHEN REPLACING PANELBOARDS AS SHOWN AT ALL LOCATIONS, REPLACE HORIZONTAL MOUNTING BOARDS ON 4"x4" POSTS WITH STAINLESS STEEL UNI-STRUT. USE STAINLESS STEEL LAG BOLTS AND WASHERS TO FASTEN STRUT TO 4"x4".
- ALL CONDUIT ENTERING INTO NEW PANELBOARD SHALL USE MEYER HUBS AND TRANSITION TO PVC SHALL BE THREAD TAPED.

EXISTING LOWER LOOP SITE PLAN



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100% CONSTRUCTION DOCUMENT SET
KNOX COUNTY PARKS
ELECTRICAL REHABILITATION

VINCENNES, IN 47591

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ELECTRICAL SITE PLAN

E101E

ELECTRICAL KEYED NOTES: ○

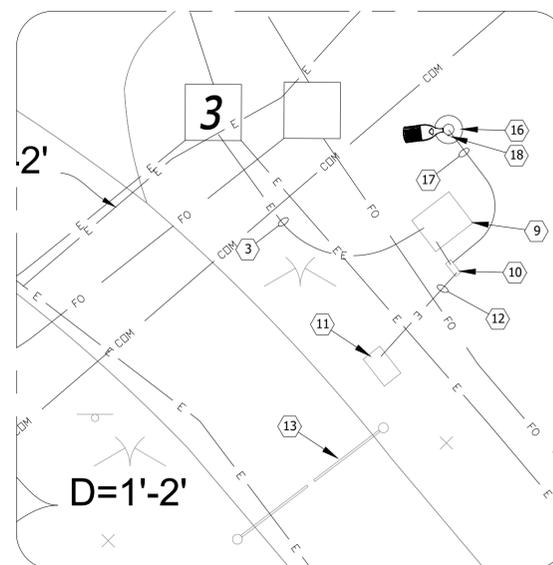
1. FIBER OPTIC CONDUIT: 1-1/2" HDPE SDR-13.5; 18" DEPTH WHERE TRENCHED SEPARATE FROM POWER.
2. EXISTING UNDERGROUND PRIVATE DIRECT BURIAL CONDUCTOR.
3. INSTALL 3 1/2" HDPE SDR-13.5 CONDUIT WITH 1/O ERP CONDUCTOR FED THROUGH.
4. EXISTING 3/O SECTIONALIZING CABINET.
5. INSTALL QUAZITE PULL BOX, 24"x36"x30".
6. TRENCH NEW INSTALLS TOGETHER.
7. 14" X 20" UNDERGROUND PULL BOX FOR FIBER OPTICS (TYPICAL).
8. EXISTING CAMPER SITE 100A MAIN SERVICE PEDESTALS WITH (2) 50A SITE BREAKERS. TYPICAL THROUGHOUT.
9. EXISTING 400 AMP PANEL BOARD.
10. NEW 120/240V, 1PH, 60A MINI-POWER DISTRIBUTION CENTER. 8 SLOT WITH 4 - 20A BRANCH CIRCUIT BREAKERS.
11. NEW GATE CONTROLLER WITH PHOTO SENSORS. SIMILAR TO EXISTING AT MAIN GATE. DKS MODEL 6300-080, 1/2 HP, 120V 1PH. INCLUDE REPLACEMENT OF EXISTING 4" SQUARE TUBING GATE WITH SIMILAR TO MAIN GATE. SEE PHOTOS.
12. 2 - #12 CU, 1 - #12 CU GND. 3/4" C. (CONDUIT FOR THIS MAY BE HDPE OR SCHEDULE 40 PVC)
13. EXISTING GATE. REPLACE WITH NEW RAILED GATE SIMILAR TO MAIN GATE. SEE PHOTO THIS SHEET.
14. EXISTING UNDERGROUND COMMUNICATIONS CABLE - DO NOT DISTURB.
15. EXISTING HOWARD 167KVA, 34.5/19.9KV TO 120/240V PAD MOUNT TRANSFORMER. FOR ALTERNATE BID, PROVIDE PRICING TO REPLACE WITH HOWARD 167KVA, PART# 6185-372970-400 OR APPROVED EQUAL.
16. LED SITE LIGHTING WITH BASE AND POLE. SEE DETAILS SHEET.
17. 4 - #12 CU, 2 - #12 GND; 3/4" CONDUIT. (ONE CIRCUIT FOR LIGHT, ONE CIRCUIT FOR RECEPTACLE)
18. 20A WEATHERPROOF RECEPTACLE.



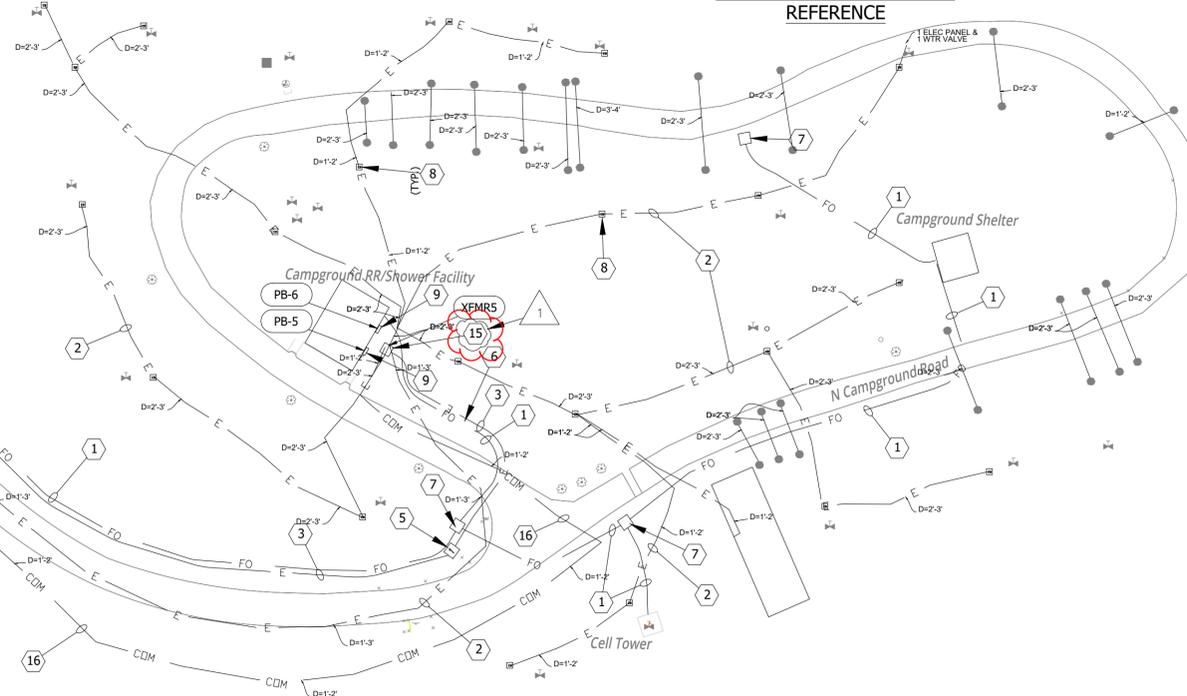
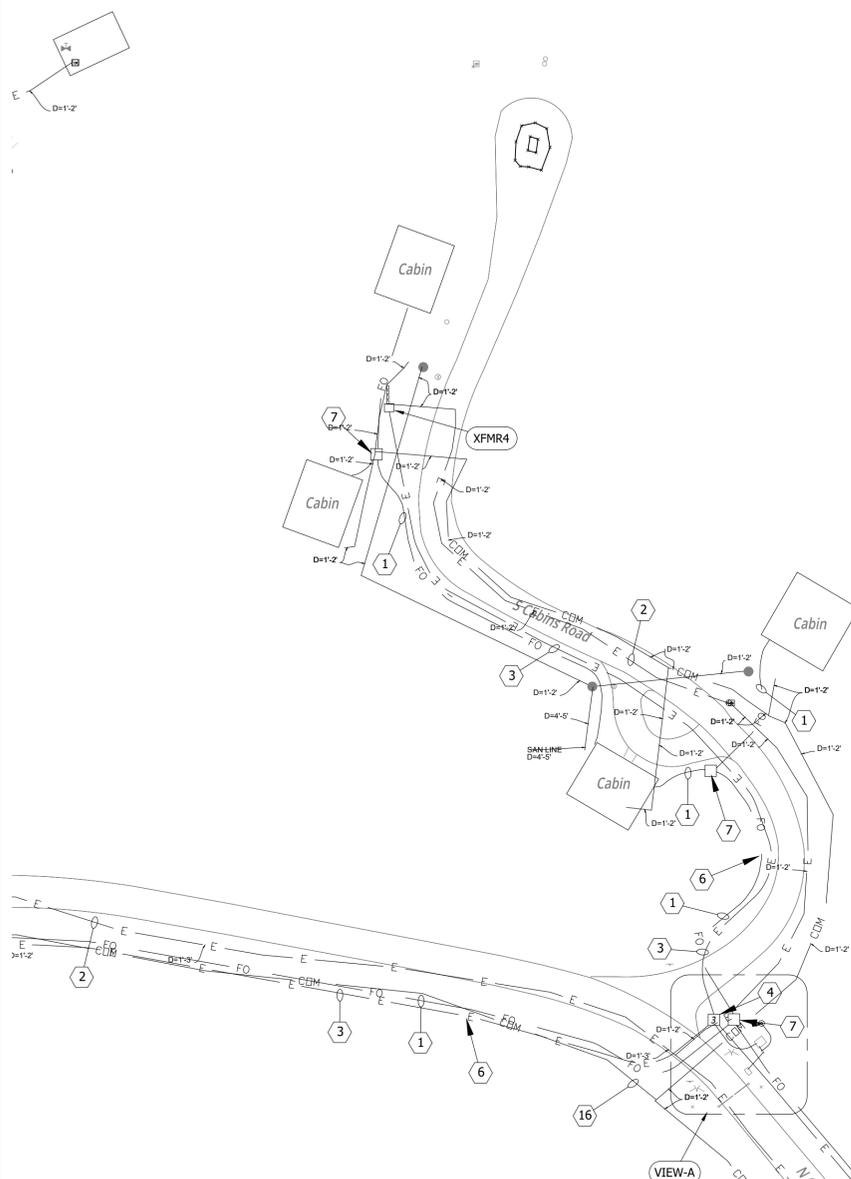
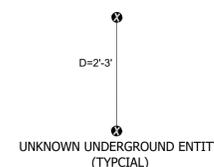
EXISTING GATE



EXISTING MAIN GATE - FOR REFERENCE



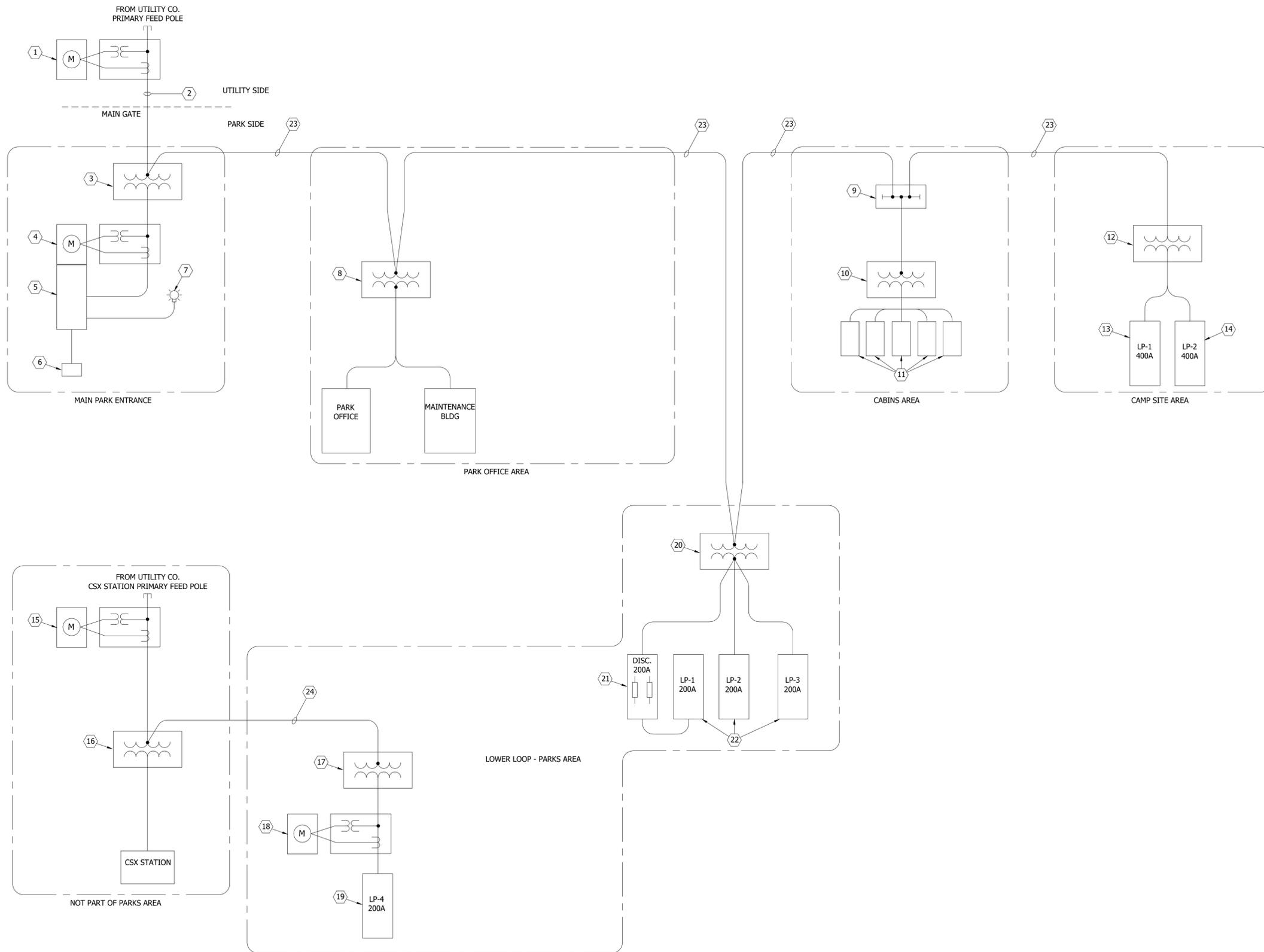
VIEW - A
*(TAGGED ITEMS IN THIS VIEW WILL BE A BID ALTERNATE)



EXISTING CAMPSITE SITE PLAN

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**KNOX COUNTY PARKS
 ELECTRICAL REHABILITATION**

VINCENNES, IN 47591



- ELECTRICAL KEYED NOTES: ○
- EXISTING PRIMARY UTILITY METER. METER LOCATED ON POLE ON FORT KNOX DRIVE.
 - DIRECT BURIED UNDERGROUND SERVICE FEED ALONG FORT KNOX DRIVE TO GATE ENTRANCE TRANSFORMER.
 - EXISTING PARK GATE ENTRANCE PAD MOUNTED 25KVA, 34.5KV/19.9KV TRANSFORMER - SECONDARY 120/240V - TO REMAIN.
 - EXISTING PARK GATE ENTRANCE UTILITY METER - TO REMAIN.
 - EXISTING PARK GATE ENTRANCE LOAD CENTER - TO REMAIN.
 - EXISTING GATE OPENER CONTROL BOX - TO REMAIN.
 - EXISTING PARK GATE ENTRANCE SITE LIGHT AND POLE - TO REMAIN.
 - EXISTING OFFICE/MAINTENANCE BUILDING AREA PAD MOUNTED 100KVA, 34.5KV/19.9KV TRANSFORMER - SECONDARY 120/240V - TO REMAIN.
 - EXISTING SECTIONALIZING CABINET BOX AT ENTRANCE TO CABIN AREA - TO REMAIN AND REUSED FOR NEW SERVICE FEED.
 - EXISTING CABIN AREA PAD MOUNTED 25KVA, 34.5KV/19.9KV TRANSFORMER - SECONDARY 120/240V - TO REMAIN.
 - EXISTING CABIN AREA 120/240V DISTRIBUTION PANELS - TO REMAIN.
 - EXISTING CAMP SITE PAD MOUNTED 167KVA, 34.5KV/19.9KV TRANSFORMER - SECONDARY 120/240V. PROVIDE BID ALTERNATE TO REPLACE THIS TRANSFORMER SIMILAR TO HOWARD 6185-372970-400 OR APPROVED EQUAL.
 - EXISTING CAMP SITE 400A DISTRIBUTION PANEL FEEDING CAMP SITE SLOTS - TO REMAIN.
 - EXISTING CAMP SITE 400A DISTRIBUTION PANEL FEEDING CAMP SITE SLOTS AND OTHER LOCAL BUILDINGS - TO REMAIN.
 - EXISTING CSX STATION UTILITY METER LOCATED ON POLE NEXT TO SWITCH HOUSE. THIS METER IS SEPARATE FROM OTHER PARK SERVICE.
 - EXISTING CSX STATION PAD MOUNTED 25KVA, 34.5KV/19.9KV TRANSFORMER - SECONDARY 120/240V - TO REMAIN. THIS TRANSFORMER IS MOUNTED IN PARK AREA NEAR CSX SWITCH HOUSE.
 - EXISTING LOWER LOOP AREA PAD MOUNTED 25KVA, 34.5KV/19.9KV TRANSFORMER - SECONDARY 120/240V - TO REMAIN. THIS TRANSFORMER IS TAPPED FROM CSX STATION TRANSFORMER AS NOTED IN NOTE 16.
 - EXISTING LOWER LOOP AREA UTILITY METER - TO REMAIN. THIS METER IS A SEPARATE FEED FROM OTHER PARK SERVICE. THIS SERVICE FED FROM CSX STATION TRANSFORMER - TO REMAIN.
 - EXISTING LOWER LOOP AREA 200A DISTRIBUTION PANEL. THIS PANEL TO BE REPLACED WITH NEW 200A DISTRIBUTION PANEL AND UTILIZED FOR NEW PARK CHRISTMAS LIGHT PEDESTALS.
 - EXISTING LOWER LOOP AREA PAD MOUNTED 100KVA (UNKNOWN - NEEDS CONFIRMED), 34.5KV/19.9KV TRANSFORMER - SECONDARY 120/240V - TO REMAIN.
 - EXISTING LOWER LOOP AREA 200A FUSED DISCONNECT - TO BE REPLACED.
 - EXISTING LOWER LOOP AREA 200A DISTRIBUTION PANELS - TO BE REPLACED.
 - EXISTING UNDERGROUND, DIRECT BURIED TRANSFORMER PRIMARY FEED CABLES.
 - EXISTING DUKE ENERGY UNDERGROUND SERVICE CABLES. DO NOT DISTURB.

EXISTING PARK ELECTRICAL ONE-LINE

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 DRAWING FILE: P:\23-800-291-1 KNOX CO PARKS ELECTRICAL REHABILITATION\03 DESIGN\02 EXISTING ELECTRICAL ONE-LINE.DWG

100% CONSTRUCTION DOCUMENT SET
**KNOX COUNTY PARKS
 ELECTRICAL REHABILITATION**

VINCENNES, IN 47591

Project #: 23-800-291-1

Designed By: JAR/JJH

Drawn By: JAR/JJH

Checked By: JAR

Date: 02/28/2024

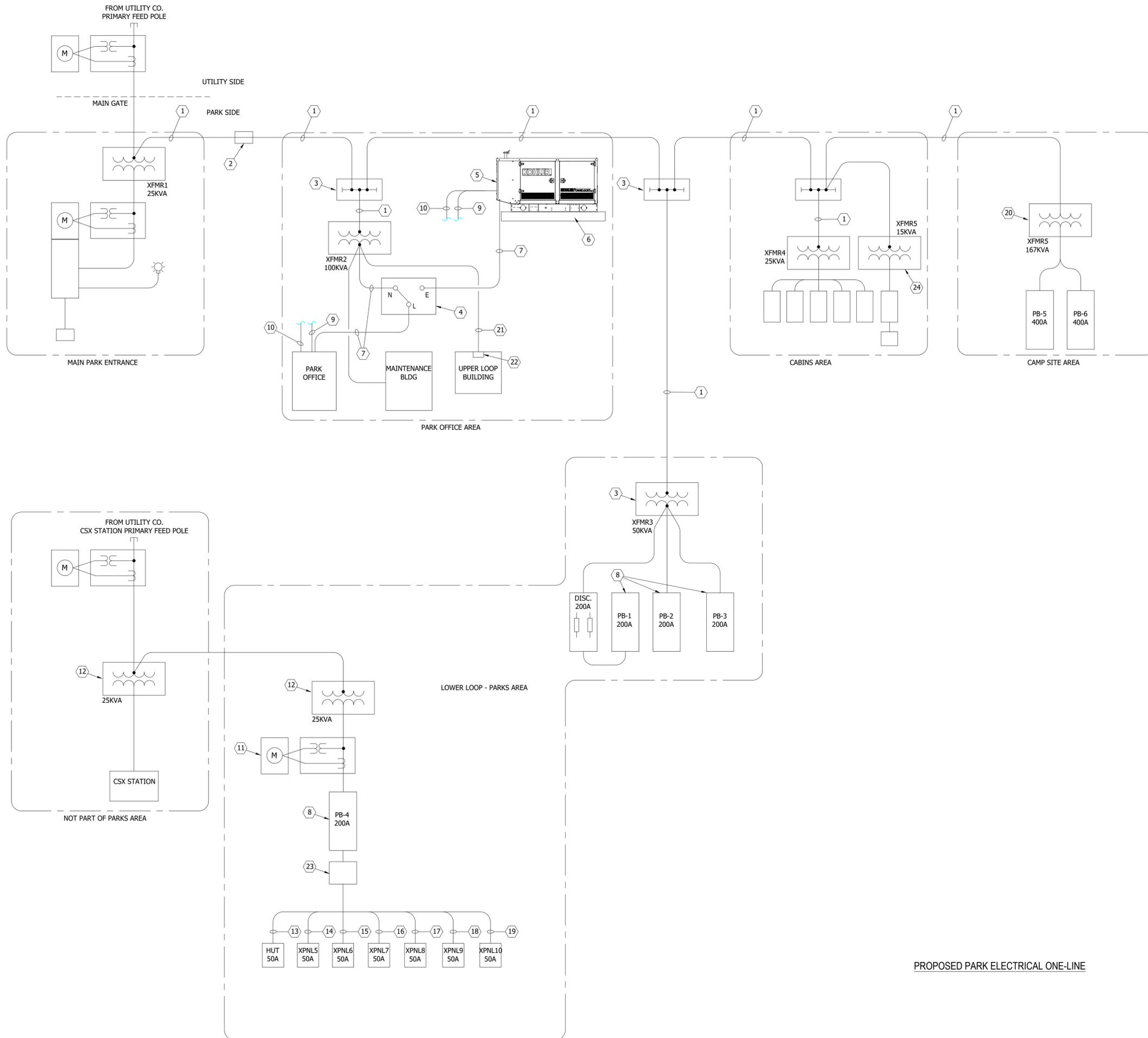


Justin Barth

NEW ELECTRICAL
ONE-LINE

E103

- ELECTRICAL KEYED NOTES: ○
- PROPOSED 35KV 100% EPR CABLE WITH CONCENTRIC NEUTRAL 2 - 1/0 AL IN 3-1/2" HDPE SDR-13.5. SIMILAR TO SOUTHWIRE 619194.
 - PROPOSED QUAZITE ELECTRICAL PULL BOX. SEE SITE PLANS FOR LOCATIONS.
 - PROPOSED SECTIONALIZING CABINET 3-WAY MULTI-TAP ELECTRICAL JUNCTION BOX. SEE SITE PLANS FOR LOCATIONS.
 - ALTERNATE BID: PROPOSED NEMA3R 200A AUTOMATIC TRANSFER SWITCH SIMILAR TO ASCO SERIES 300.
 - ALTERNATE BID: PROPOSED 45KW DIESEL GENERATOR WITH ATTENUATED SOUND ENCLOSURE AND MINIMUM 24 HOUR TANK. SEE DETAILS.
 - ALTERNATE BID: GENERATOR PAD. SEE SITE PLANS FOR LOCATION.
 - ALTERNATE BID: 3 - 300KCMIL AL OR 3 - #3/0 CU, 3-1/2" HDPE SDR-13.5.
 - PROPOSED NEMA4X 200A DISTRIBUTION PANEL.
 - ALTERNATE BID: REMOTE ANNUNCIATOR PANEL CABLE 1" C. COORDINATE WITH OWNER LOCATION WITHIN OFFICE AREA.
 - ALTERNATE BID: BLOCK HEATER, 2 - #10 CU, 1 - #10 CU GND, 1" C. CONNECT TO EXISTING OFFICE 200A LIGHTING PANEL.
 - EXISTING LOWER LOOP EXTENDED SERVICE UTILITY METER. THIS SERVICE IS CONNECTED TO CSX STATION.
 - EXISTING 25KVA TRANSFORMER - PROPERTY OF DUKE ENERGY.
 - TO HUT - 3 #6 CU OR 3 #3 AL, 1 1/2" HDPE SDP-13.5.
 - TO XPNL5 - MIN WIRE SIZE FOR THIS DISTANCE - 3/0 CU OR 300KCMIL AL.
 - TO XPNL6 - MIN WIRE SIZE FOR THIS DISTANCE - 2/0 CU OR 4/0 AL.
 - TO XPNL7 - MIN WIRE SIZE FOR THIS DISTANCE - #1 CU OR 2/0 AL.
 - TO XPNL8 - MIN WIRE SIZE FOR THIS DISTANCE - #3 CU OR #2 AL.
 - TO XPNL9 - MIN WIRE SIZE FOR THIS DISTANCE - #3 CU OR #1 AL.
 - TO XPNL10 - MIN WIRE SIZE FOR THIS DISTANCE - #1 CU OR 2/0 AL.
 - ALTERNATE BID: REPLACE CURRENT TRANSFORMER.
 - 3 - 1/0 CU, 1-1/2" HDPE SDR-13.5; OR 3 - 3/0 AL, 3-1/2" HDPE SDR-13.5.
 - 240V, 50A PANELBOARD WITH MAIN BREAKER.
 - 24" X 24" X 8" STAINLESS STEEL PULL BOX FOR WIRE SIZE REDUCTION AND POLARIS CONNECTIONS FROM LONG/LARGER WIRE RUNS.
 - SEE SHEET E101E FOR DETAILS.



PROPOSED PARK ELECTRICAL ONE-LINE

PRINT DATE: 3/25/24
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- ELECTRICAL KEYED NOTES: ○
1. PROVIDE PROVISION FOR FUTURE BALL FIELD LIGHTING. THIS 2P CIRCUIT BREAKER WILL BE PROVIDED WITH LOCKOUT. BALL FIELD BREAKERS WILL BE ON IF LIGHTS INSTALLED AND DURING SEASON. XPNL BREAKERS WILL BE OFF WHEN BALL FIELD BREAKER IS ON AND VICE VERSA.
 2. ALTERNATE BID: NEW STAINLESS STEEL BRANCH LOAD CENTERS.

BRANCH CIRCUIT PANELBOARD SCHEDULE										
PANEL :	LOCATION:	MOUNTING:	RATING:	MAIN:	REMARKS:					
PB-1	LOWER LOOP AREA	<input type="checkbox"/> SURFACE <input type="checkbox"/> FLUSH	200A., 120/240V 1PH., 3W.	<input checked="" type="checkbox"/> 200A. M.C.B. <input type="checkbox"/> 200A. M.L.O.	PROVIDE OPTIONS MARKED WITH <input checked="" type="checkbox"/>					
LOAD DESIGNATION	CKT. BKR.	CKT. NO.	PHASE			CKT. NO.	CKT. BKR.	LOAD DESIGNATION		
UNKNOWN	2P-100	1				2	2P-60	UNKNOWN		
		3				4				
SPARE	2P-60	5				6	2P-50	UNKNOWN		
		7				8				
SPARE	2P-50	9				10	2P-60	UNKNOWN		
		11				12				
PROVISION		13				14	2P-60	UNKNOWN		
		15				16				
SPARE	1P-20	17				18	1P-30	UNKNOWN		
SPARE	1P-20	19				20	1P-20	INTERNET EQUIPMENT		
SPARE	1P-20	21				22	1P-20	SPARE		
SPARE	1P-20	23				24	1P-20	SPARE		
PROVISION		25				26		PROVISION		
PROVISION		27				28		PROVISION		
PROVISION		29				30		PROVISION		
PROVISION		31				32		PROVISION		
PROVISION		33				34		PROVISION		
PROVISION		35				36		PROVISION		
		kVA		0.0	0.0	0.0				
<input type="checkbox"/> 200% NEUTRAL BUSBAR	<input type="checkbox"/> 10,000 A.I.C.	<input type="checkbox"/> SWITCH-DUTY C.Bs	<input checked="" type="checkbox"/> CU. BUSBARS & LUGS							
<input checked="" type="checkbox"/> 100% NEUTRAL BUSBAR	<input checked="" type="checkbox"/> 25,000 A.I.C.	<input checked="" type="checkbox"/> BOLT-IN C.Bs	<input type="checkbox"/> AL. BUSBARS & LUGS							
<input checked="" type="checkbox"/> EQUIPMENT GROUND BUSBAR	<input checked="" type="checkbox"/> INTEGRAL SPD	<input checked="" type="checkbox"/> NEMA 12	<input type="checkbox"/> NEMA 3R	<input type="checkbox"/> NEMA 4X						

BRANCH CIRCUIT PANELBOARD SCHEDULE										
PANEL :	LOCATION:	MOUNTING:	RATING:	MAIN:	REMARKS:					
PB-2	LOWER LOOP AREA	<input type="checkbox"/> SURFACE <input type="checkbox"/> FLUSH	200A., 120/240V 1PH., 3W.	<input type="checkbox"/> 200A. M.C.B. <input type="checkbox"/> 200A. M.L.O.	PROVIDE OPTIONS MARKED WITH <input checked="" type="checkbox"/>					
LOAD DESIGNATION	CKT. BKR.	CKT. NO.	PHASE			CKT. NO.	CKT. BKR.	LOAD DESIGNATION		
UNKNOWN	1P-20	1				2	1P-20	DAWN LIGHT		
BATHROOMS	1P-20	3				4	1P-30	SPARE		
SPARE	1P-20	5				6	1P-20	SPARE		
SPARE	1P-20	7				8	1P-20	SPARE		
UNKNOWN	1P-100	9				10	1P-20	SPARE		
		11				12	1P-20	SPARE		
PROVISION		13				14		PROVISION		
PROVISION		15				16		PROVISION		
PROVISION		17				18		PROVISION		
PROVISION		19				20		PROVISION		
PROVISION		21				22		PROVISION		
PROVISION		23				24		PROVISION		
PROVISION		25				26		PROVISION		
PROVISION		27				28		PROVISION		
PROVISION		29				30		PROVISION		
PROVISION		31				32		PROVISION		
PROVISION		33				34		PROVISION		
PROVISION		35				36		PROVISION		
		kVA		0.0	0.0	0.0				
<input type="checkbox"/> 200% NEUTRAL BUSBAR	<input type="checkbox"/> 10,000 A.I.C.	<input type="checkbox"/> SWITCH-DUTY C.Bs	<input checked="" type="checkbox"/> CU. BUSBARS & LUGS							
<input checked="" type="checkbox"/> 100% NEUTRAL BUSBAR	<input checked="" type="checkbox"/> 25,000 A.I.C.	<input checked="" type="checkbox"/> BOLT-IN C.Bs	<input type="checkbox"/> AL. BUSBARS & LUGS							
<input checked="" type="checkbox"/> EQUIPMENT GROUND BUSBAR	<input checked="" type="checkbox"/> INTEGRAL SPD	<input checked="" type="checkbox"/> NEMA 12	<input type="checkbox"/> NEMA 3R	<input type="checkbox"/> NEMA 4X						

BRANCH CIRCUIT PANELBOARD SCHEDULE										
PANEL :	LOCATION:	MOUNTING:	RATING:	MAIN:	REMARKS:					
PB-3	LOWER LOOP AREA	<input type="checkbox"/> SURFACE <input type="checkbox"/> FLUSH	200A., 120/240V 1PH., 3W.	<input type="checkbox"/> 200A. M.C.B. <input type="checkbox"/> 200A. M.L.O.	PROVIDE OPTIONS MARKED WITH <input checked="" type="checkbox"/>					
LOAD DESIGNATION	CKT. BKR.	CKT. NO.	PHASE			CKT. NO.	CKT. BKR.	LOAD DESIGNATION		
XPNL1	2P-50	1				2	2P-50	XPNL2		
		3				4				
XPNL3	2P-50	5				6	2P-50	XPNL4		
		7				8				
BATHROOMS	1P-30	9				10	1P-30	LOCAL RECEPTACLES		
SPARE	1P-30	11				12	1P-30	SPARE		
SPARE	1P-30	13				14	1P-30	SPARE		
INTERNET	1P-20	15				16	1P-20	SPARE		
SPARE	1P-20	17				18	1P-20	SPARE		
SPARE	1P-20	19				20	1P-20	SPARE		
PROVISION		21				22	2P-100	BALL FIELD LIGHTS (FUTURE)		
PROVISION		23				24		PROVISION		
PROVISION		25				26		PROVISION		
PROVISION		27				28		PROVISION		
PROVISION		29				30		PROVISION		
PROVISION		31				32		PROVISION		
PROVISION		33				34		PROVISION		
PROVISION		35				36		PROVISION		
		kVA		0.0	0.0	0.0				
<input type="checkbox"/> 200% NEUTRAL BUSBAR	<input type="checkbox"/> 10,000 A.I.C.	<input type="checkbox"/> SWITCH-DUTY C.Bs	<input checked="" type="checkbox"/> CU. BUSBARS & LUGS							
<input checked="" type="checkbox"/> 100% NEUTRAL BUSBAR	<input checked="" type="checkbox"/> 25,000 A.I.C.	<input checked="" type="checkbox"/> BOLT-IN C.Bs	<input type="checkbox"/> AL. BUSBARS & LUGS							
<input checked="" type="checkbox"/> EQUIPMENT GROUND BUSBAR	<input checked="" type="checkbox"/> INTEGRAL SPD	<input checked="" type="checkbox"/> NEMA 12	<input type="checkbox"/> NEMA 3R	<input type="checkbox"/> NEMA 4X						

BRANCH CIRCUIT PANELBOARD SCHEDULE										
PANEL :	LOCATION:	MOUNTING:	RATING:	MAIN:	REMARKS:					
PB-4	LOWER LOOP AREA	<input type="checkbox"/> SURFACE <input type="checkbox"/> FLUSH	200A., 120/240V 1PH., 3W.	<input type="checkbox"/> 200A. M.C.B. <input type="checkbox"/> 200A. M.L.O.	PROVIDE OPTIONS MARKED WITH <input checked="" type="checkbox"/>					
LOAD DESIGNATION	CKT. BKR.	CKT. NO.	PHASE			CKT. NO.	CKT. BKR.	LOAD DESIGNATION		
XPNL5	2P-50	1				2	2P-50	XPNL6		
		3				4				
XPNL7	2P-50	5				6	2P-50	XPNL8		
		7				8				
XPNL9	2P-50	9				10	2P-50	XPNL10		
		11				12				
HUT	2P-50	13				14	2P-50	SPARE		
SPARE	1P-20	15				16	1P-20	SPARE		
SPARE	1P-20	17				18	1P-20	SPARE		
SPARE	1P-20	19				20	1P-20	SPARE		
SPARE	1P-20	21				22	1P-20	SPARE		
SPARE	1P-20	23				24	1P-20	SPARE		
PROVISION		25				26		PROVISION		
PROVISION		27				28		PROVISION		
PROVISION		29				30		PROVISION		
PROVISION		31				32		PROVISION		
PROVISION		33				34		PROVISION		
PROVISION		35				36		PROVISION		
		kVA		0.0	0.0	0.0				
<input type="checkbox"/> 200% NEUTRAL BUSBAR	<input type="checkbox"/> 10,000 A.I.C.	<input type="checkbox"/> SWITCH-DUTY C.Bs	<input checked="" type="checkbox"/> CU. BUSBARS & LUGS							
<input checked="" type="checkbox"/> 100% NEUTRAL BUSBAR	<input checked="" type="checkbox"/> 25,000 A.I.C.	<input checked="" type="checkbox"/> BOLT-IN C.Bs	<input type="checkbox"/> AL. BUSBARS & LUGS							
<input checked="" type="checkbox"/> EQUIPMENT GROUND BUSBAR	<input checked="" type="checkbox"/> INTEGRAL SPD	<input checked="" type="checkbox"/> NEMA 12	<input type="checkbox"/> NEMA 3R	<input type="checkbox"/> NEMA 4X						

PANEL SCHEDULES FOR REPLACED UNITS

#	Revision	Date
1	ADDENDUM NO. 1	3/25/24

Project #: 23-800-291-1
Designed By: JAR/JJH
Drawn By: JAR/JJH
Checked By: JAR
Date: 02/28/2024



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DESIGNED BY: JAR/JJH
EDITED BY: JAR/JJH



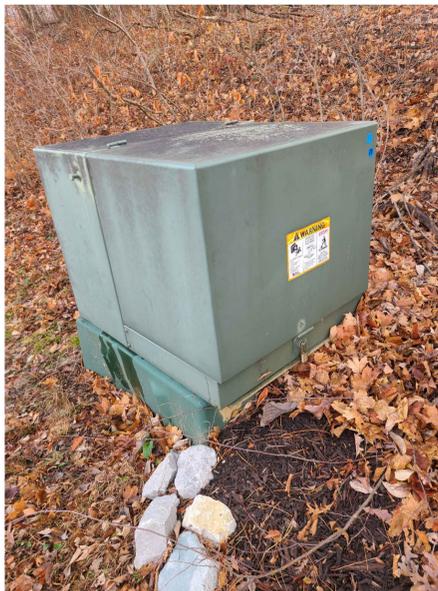
PARK OFFICE - EAST SIDE ELECTRICAL ENTRANCE - ALTERNATE BID ATs TO BE MOUNTED TO LEFT OF SERVICE ENTRANCE



PARK OFFICE - EXISTING 25KVA TRANSFORMER WHICH SERVICES JUST THE OFFICE AND MAINTENANCE BUILDINGS



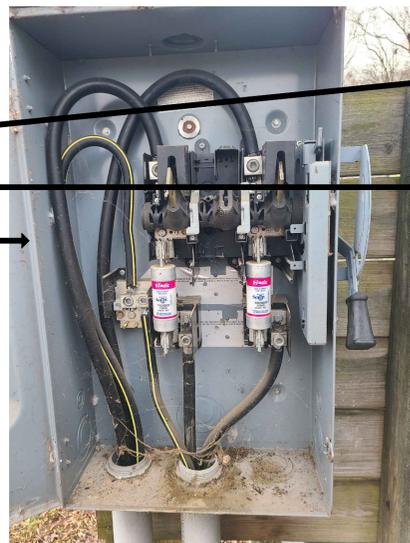
PARK GATE ENTRANCE - EXISTING 25KVA TRANSFORMER WHICH SERVICES ELECTRICAL GATE AND LOCAL SITE LIGHT



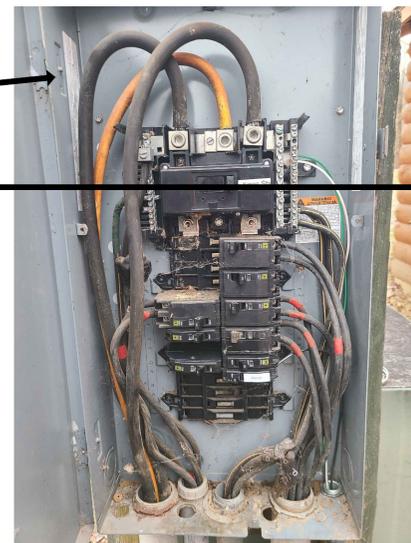
CAMPGROUND AREA BUILDING WITH (2) 400A DISTRIBUTION PANELS AND 167KVA PAD MOUNT TRANSFORMER



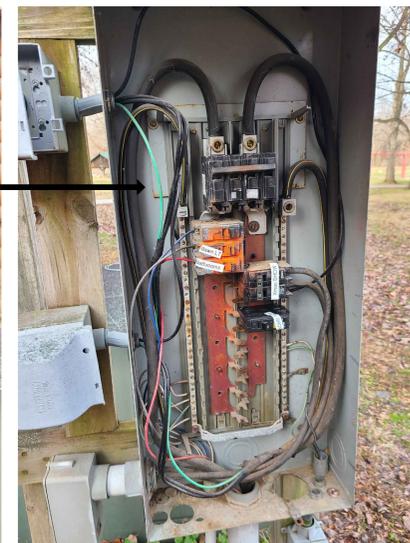
LOWER LOOP AREA TRANSFORMER AND PANELBOARDS



LOWER LOOP AREA FUSED DISCONNECT



LOWER LOOP AREA 200A DISTRIBUTION PANEL (LP-1)



LOWER LOOP AREA 200A DISTRIBUTION PANEL (LP-2)



LOWER LOOP AREA 240V PLUGS - TO REMAIN - REWIRE TO NEW DISTRIBUTION PANEL



LOWER LOOP AREA WIFI INTERNET CABINET - NEW FIBER CONDUIT TO ROUTE HERE



LOWER LOOP AREA NORTH SIDE ELECTRICAL RACK - REPLACE OUTLET WITH PERMANENTLY MOUNTED WEATHERPROOF OUTLET



LOWER LOOP AREA 200A DISTRIBUTION PANEL (LP-3)



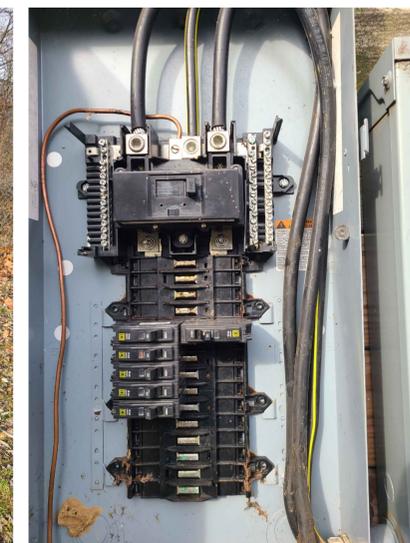
LOWER LOOP AREA 50A CHRISTMAS LIGHT PEDESTAL



LOWER LOOP AREA 25KVA PAD MOUNT TRANSFORMER - DUKE ENERGY PROPERTY (DEDICATED FOR CHRISTMAS LIGHTS)



LOWER LOOP AREA CHRISTMAS LIGHT ELECTRICAL RACK WITH METER



LOWER LOOP AREA CHRISTMAS LIGHT DEDICATED 200A METER (LP-4)

100% CONSTRUCTION DOCUMENT SET
KNOX COUNTY PARKS
ELECTRICAL REHABILITATION

#	Revision	Date
1	ADDENDUM NO. 1	3/25/24

Project #: 23-800-291-1
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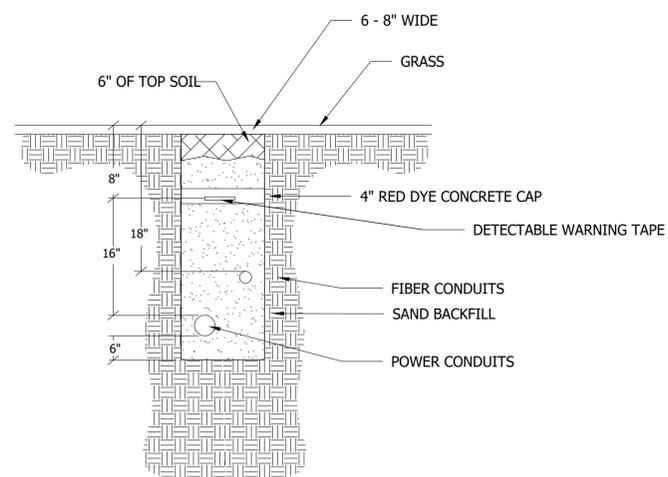


100% CONSTRUCTION DOCUMENT SET
KNOX COUNTY PARKS
ELECTRICAL REHABILITATION

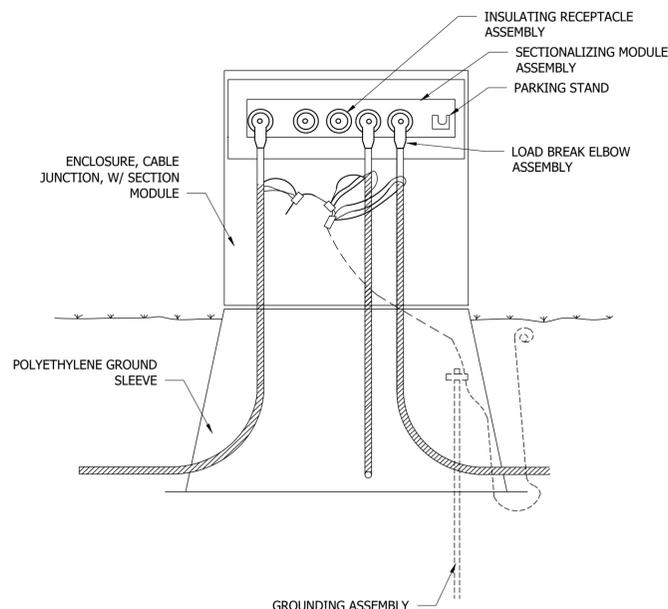
VINCENNES, IN 47591

#	Revision	Date
1	ADDENDUM NO. 1	3/25/24

Project #: 23-800-291-1
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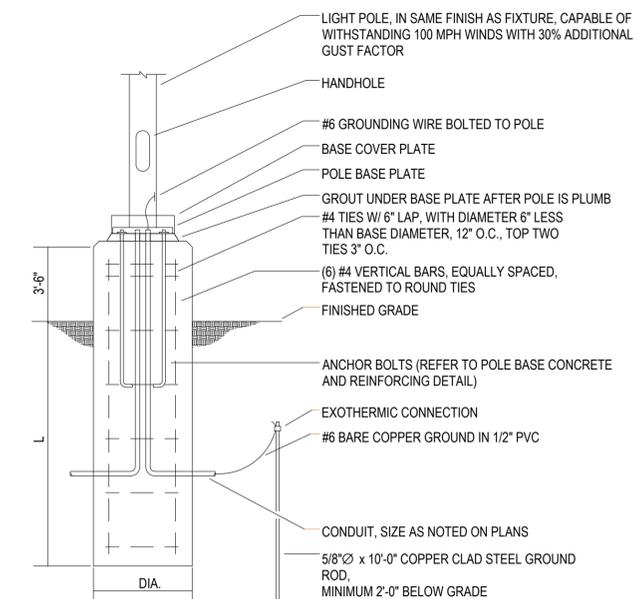
TYPICAL TRENCH DETAIL



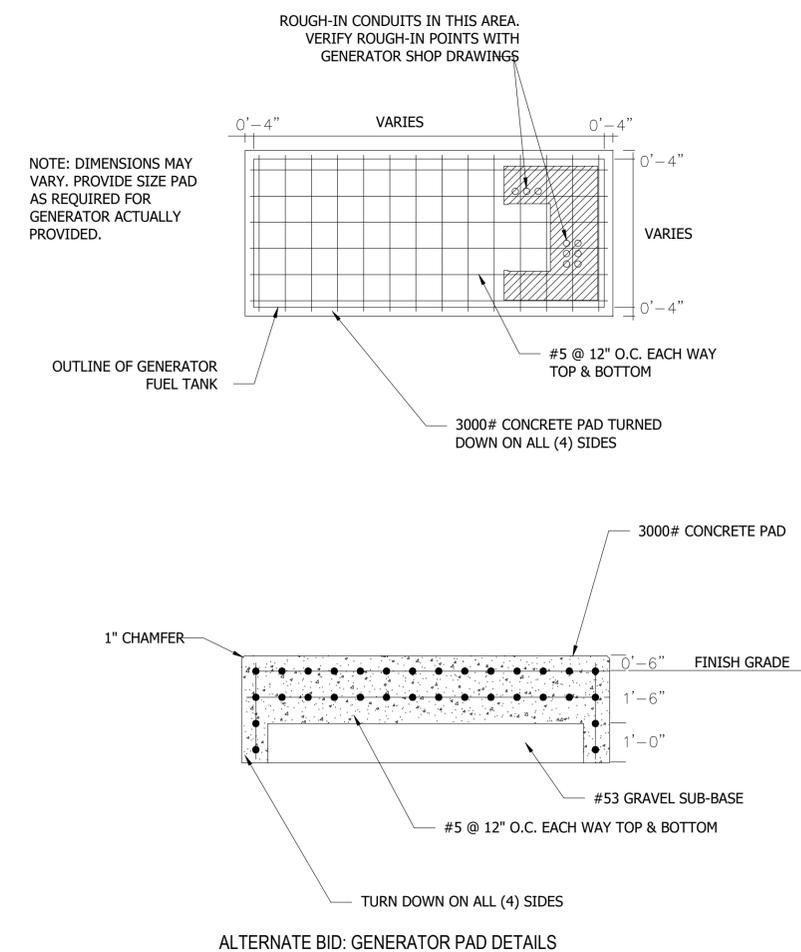
3-WAY HDPE SECTIONALIZING CABINET BASIC DETAIL

DIMENSIONS		
POLE HEIGHT	L	DIA.
12'-0"	4'-6"	1'-6"
20'-0"	5'-0"	2'-0"
30'-0"	6'-0"	2'-6"
40'-0"	7'-0"	3'-0"

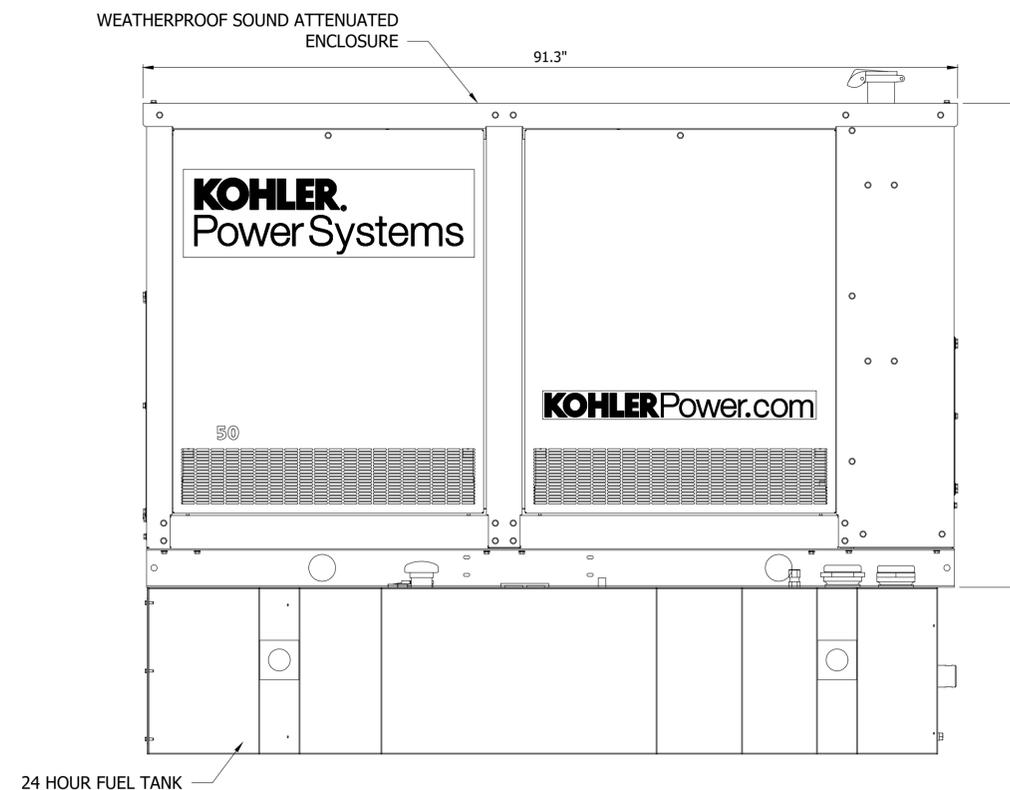
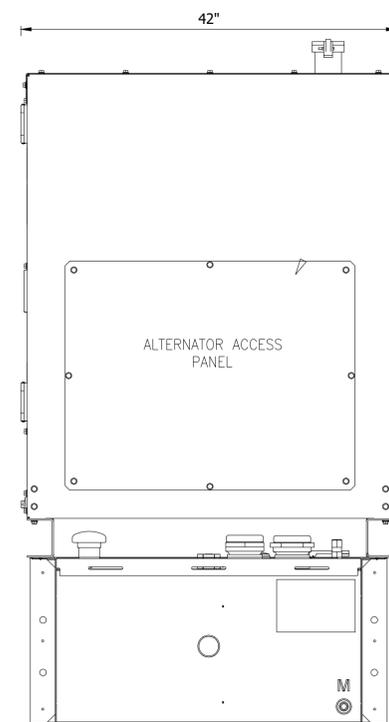
- NOTES:
- USE POLE HEIGHT - 20'
 - VERIFY ANCHOR BOLT LOCATIONS WITH MANUFACTURER'S TEMPLATE PRIOR TO BASE CONSTRUCTION.
 - REFER TO POLE BASE CONCRETE AND REINFORCING DETAIL FOR ADDITIONAL REQUIREMENTS.
 - THIS POLE BASE SHALL BE USED WHERE POLE IS IN TRAFFIC AREA WHICH IS NOT PROTECTED BY CURB OR OTHER BARRIER.



SITE LIGHTING BASIC DETAIL



ALTERNATE BID: GENERATOR PAD DETAILS



ALTERNATE BID: GENERATOR DETAILS
50KW DIESEL GENERATOR WITH SOUND
ATTENUATED ENCLOSURE AND 24 HOUR TANK

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SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions apply to work of this section.

1.02 DESCRIPTION OF WORK

A. The Common Work Results for Electrical apply to all electrical materials, equipment, installations, and services supplied under any portion of the work. The Contractor shall coordinate the Common Work Results for Electrical as applicable to any equipment, installations, and services of an electrical nature.

B. This project will be bid in line item format and will be presented with prices for each line item so that owner may have the right to select some or all of the base bid and alternate items. See bid documents for break down of items.

C. It is the intention of this Division of the Specifications and the accompanying drawings to describe and provide for the furnishing, installing, testing and placing in satisfactory and successful operation all equipment, materials, devices and necessary appurtenances to provide a complete electrical system, together with such other miscellaneous installations and equipment hereinafter specified and/or shown on the plans. The work shall include all materials, appliances and apparatus not specifically mentioned herein or noted on the plans, but which are necessary to provide a complete working installation of all electrical systems shown on the plans or described herein. Equipment and devices furnished and installed under other Divisions of this specification (or by the Owner) shall be connected under this Division. The drawings and specifications are complementary and what is called for in either, is binding as if called for in both.

D. The contract drawings indicate the extent and the general location and arrangement of equipment, conduit and wiring. The contractor shall study plans and details and shall cooperate with all other trades to prevent conflict and interference as to space requirements. Fixtures, equipment and outlets shall be located to avoid interference with mechanical or structural features. Lighting fixtures shall be symmetrically located according to the room arrangement. Raceways, junction and outlet boxes, lighting fixtures, and all other electrical equipment shall be properly supported to comply with applicable codes and good work practices.

E. The Electrical Contractor is responsible for installation of a complete and operating electrical system in accordance with the intent of the drawings and specifications.

F. All newly installed electrical wiring shall be in conduit. Direct burial is not acceptable.

G. The scale of drawings cannot show all necessary transitions, offsets, changes in direction, etc. It shall be the responsibility of the Electrical Contractor to provide all pull boxes, elbows, fittings, supports, etc. necessary to install his work to conform to structures, to preserve headroom and to keep openings and passageways clear.

H. Electrical diagrams are schematic and diagrammatic only, not necessarily to scale, and do not necessarily show physical arrangement of equipment. Electrical diagrams and plans are complementary and what is shown on either is the same as if shown on both.

I. Any minor changes in the location of all equipment, switchboards, panelboards, fixtures, conduits, outlets, etc. from those shown on the plans shall be made without extra charge if so directed by the Engineer or Owner before installation.

- 1. Minor changes in location shall be defined as within 15 feet in any direction, horizontally or vertically, from the location indicated on the drawings.
J. Make detailed arrangements with the Owner for selected electrical service work and any/all shutdowns required.
2. Provide temporary services: The Contractor shall be responsible for, and bear the cost of, all temporary service or equipment feeders which may be required.
3. All shutdown and power transfer work must be closely scheduled with the Owner, approved in advance by the Owner, and at the convenience of the Owner; and shall be performed only with the Owner present and/or under direct/indirect supervision of the Owner.
4. Power shutdowns and transfers must be scheduled with the Owner and all such shutdowns and transfers shall be scheduled at the Owner's convenience. At the Owner's discretion, work may be required to be performed on holidays, weekends, evenings, early mornings, and during similar non-standard work periods, without additional cost to the Owner.
a. The above requirement for performing work during non-standard work periods also applies to any work that can only be safely performed during a power shutdown.

1.03 PERMITS AND FEES

A. This work shall include the procurement of, and payment for, all permits and fees required for the performance of the electrical work.

1.04 COORDINATION OF ELECTRICAL WORK

A. Contract documents are diagrammatic in showing certain physical relationships, which must be established; such establishment and the final physical relationship is the exclusive responsibility of the Contractor.

- 1. Arrange electrical work in a neat, well-organized manner with conduit and similar services running parallel with primary lines of structures, and which shall maximize overhead clearance.
2. Locate operating and control equipment and arrange entire electrical work with adequate access for operation and maintenance, and in accordance with all applicable governing codes.
3. Advise other trades of openings required in their work, and scheduling cooperation required, for the subsequent move_in of large units of electrical work (equipment, conduits, pull boxes, etc.).
4. Coordination with equipment manufacturer for mounting, mounting components and installation procedures.

1.05 COORDINATION OF OPTION, SUBSTITUTIONS, AND ARRANGEMENT

A. Where the contract documents permit the selection from several product options, and where it becomes necessary to authorize a substitution, do not proceed with purchasing until coordination of interface requirements has been checked and satisfactorily established.

B. The Contractor will not be paid for cutting, patching, retrofitting, and finishing required for relocation of work installed due to interference and improperly located equipment.

1.06 QUALITY ASSURANCE

A. In case of difference between building codes, state laws and federal laws, local ordinances, industry standards and utility regulations and the Contract Documents, the most stringent shall govern. The Contractor shall promptly notify the Engineer in writing of any such difference.

1.07 NON_COMPLIANCE

A. Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, state and federal laws, local ordinances, industry standards and

utility regulations, they shall bear all costs in correcting all deficiencies.

B. Applicable codes and standards shall include all the state laws, local ordinances, utility company regulations and the applicable requirements of the following nationally accepted codes and standards. All of the following codes shall apply to the equipment, and equipment installation, where applicable. All equipment shall bear U.L. labels where labeled equipment is available.

C. Industry Standards, Codes and Specifications

- 1. NEC National Electrical Code (NFPA No. 70) with State Amendments
2. UBC International Building Code with State Amendments
3. ANSI C2 National Electrical Safety Code.
4. IEEE Institute of Electrical and Electronics Engineers.
5. ASTM American Society of Testing Materials.
6. IPCEA Insulated Power Cable Engineers Association.
7. NEMA National Electrical Manufacturers Association.
8. NFPA National Fire Protection Association.
9. UL Underwriters Laboratories.
10. NECA Standard of Installation, National Electrical Contractor's Association.
11. NFPA No. 101 Life Safety Code.
12. FM Factory Mutual
13. ADA Americans with Disabilities Act

D. All electric materials shall be new, in original cartons, bundles, or shipping crates and shall have a U.L. label whenever available.

E. Nothing in these drawings and specifications shall be construed to permit work not conforming to governing codes; and shall not be construed as relieving the Contractor from complying with any requirements of the plans or specifications which may exceed requirements of the hereinbefore mentioned governing codes and rules and not contrary to same.

1.08 MANUFACTURERS

A. Firms regularly engaged in the manufacture of the equipment specified of the types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years, unless specified otherwise.

1.09 INSTALLERS

A. A firm with at least 5 years of successful installation experience on projects with electrical work similar to that required for the project, unless specified otherwise.

1.10 SUBMITTALS

A. General: Provide submittals, shop drawings and descriptive data for selected items, and obtain Engineer's approval of same prior to proceeding with work.

B. Submittals shall include, but not be limited to, information on the following materials:

- 1. Disconnect Switches.
2. Circuit Breakers.
3. Lighting Fixtures.
4. Ventilated Wireways and Splice Boxes.
5. Conduit Seal Fittings.
6. Wiring and Cables.
7. Generator.
8. Automatic Transfer Switches.
9. Equipment Mounting Racks.
10. Generator Connection Devices.
11. Mounting Channels.

C. Submittals shall comply with the following:

- 1. Include complete catalog information such as construction, ratings, and insulating systems, as applicable.
2. For any material specified to meet U.L. or trade standards, furnish manufacturer's or vendor's certification that material furnished for work does in fact equal or exceed Specifications.
3. Shop drawings shall be submitted in complete groups of material (i.e., all fixtures or all switchgear, panels, etc.), and each item of material submitted shall have Contractor's stamp and be initiated by Contractor as verification that submittal has been reviewed in detail and is in fact Contractor's choice of materials. Bind catalog cuts, descriptive bulletins, and drawings, 11" x 17" or smaller, in sets with covers showing titles. Contractor shall verify dimensions of equipment and be satisfied as to code compliance for fit prior to submitting shop drawings for approval. Departure from the above noted procedure would result in rejection of the submittal and the requirement that the Contractor revise and resubmit the information. Any costs associated with delays arising out of such resubmittal process shall be the sole responsibility of the Contractor.

1.11 O&M MANUALS

A. Submit three sets of Operation and Maintenance Manuals.

1.12 WARRANTIES

All new equipment shall have a warranty of one (1) year, including all parts and labor.

SECTION 260513 - MEDIUM-VOLTAGE CABLES

This Section includes medium voltage cable and accessories, for systems rated above 600 volts to 35,000 volts.

Manufacturers found in SpecAgent for this Section were identified as representative and not as an endorsement for meeting the requirements of this specification.

This Section includes performance, proprietary, and descriptive type specifications. Edit to avoid conflicting requirements.

This Section includes the term Architect/Engineer. "Architect" is used in AIA contract documents; "Engineer" is used in EJCDC contract documents. Retain appropriate term.

See the Drawing Coordination Considerations for information needed to coordinate this specification Section with the Drawings.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- 1. Medium voltage cable.
2. Cable terminations.
3. Fireproofing tape.
4. Underground cable markers.
5. Bedding and cover materials.

1.3 REFERENCES

A. International Electrical Testing Association:

- 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Protect cable ends from entrance of moisture.

PART 2 - PRODUCTS

2.1 MEDIUM VOLTAGE CABLE

A. Manufacturers:

- 1. Southwire.
2. Or, Approved Equal.

B. Voltage: 34.5/19.9 kV.

C. Insulation Level: 100 percent of operating voltage.

D. Cable Continuous Operating Temperature Rating: MV-105.

E. Configuration: single conductor.

F. Conductor Material: Aluminum.

G. Conductor Construction: Stranded with concentric neutral.

H. Conductor Shield: Conventional Semi-conducting cross-linked copolymer.

I. Non-Armor Jacket: Linear Low Density Polyethylene

2.2 CABLE TERMINATIONS

A. Voltage: 12 to 36 kV.

B. Location: Outdoor.

C. Conductor Quantity: Single core.

D. Type: Cold shrink.

2.3 FIREPROOFING TAPE

A. Product Description: Flexible, conformable fabric, coated on one side with flame retardant, flexible polymeric or chlorinated elastomer. Non-corrosive to and compatible with cable sheaths jackets. Does not support combustion.

B. Width: Approximately 3 inches (76 mm).

C. Thickness: Not less than 0.03 inch (0.76 mm).

D. Weight: Not less than 2.5 pounds per square yard (1.4 kilogram per square meter).

2.4 UNDERGROUND CABLE MARKERS

A. Plastic Ribbon Tape: Bright colored, continuously printed, minimum 6 inches (150 mm) by 4 mil (0.10 mm) thick, manufactured for direct burial service.

B. Trace Wire: Magnetic detectable conductor, bright colored plastic covering, imprinted with "Medium Voltage Cable" in large letters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify excavations are to required grade, dry, and not over-excavated.

C. Verify conduit, trench and manholes (pullboxes) are ready to receive cable.

D. Verify routing and termination locations of cable prior to rough-in.

3.2 PREPARATION

A. Use swab to clean interior of conduit before pulling cables to insure no debris will contaminate cable insulation.

3.3 EXISTING WORK

A. Remove abandoned medium-voltage cable.

B. Maintain access to existing medium-voltage cable and other installations remaining active and requiring access. Modify installation or provide access panel.

C. Extend existing medium-voltage cable installations using materials and methods [compatible with existing electrical installations, or] as specified.

D. Clean and repair existing medium-voltage cable to remain or to be reinstalled.

3.4 INSTALLATION - BURIED MEDIUM-VOLTAGE CABLES

A. Excavate conduit trench in accordance with details drawing to accommodate both medium voltage and fiber conduits.

B. Place bedding material at trench bottom to provide uniform bedding for conduit.

C. Install cable on prepared bedding.

D. Install trace wire continuous above cable as shown in details.

E. Pipe Cover and Backfilling:

- 1. Backfill trench and maintain optimum moisture content of fill material to attain required compaction density.
2. Evenly backfill entire trench placing backfill material and compacting to proper density.
3. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
4. Do not use wheeled or tracked vehicles for tamping.

3.5 INSTALLATION

J. Avoid abrasion and other damage to cables during installation.

K. Use suitable manufacturer approved lubricants and pulling equipment.

L. Sustain cable pulling tensions and bending radii below manufacturer's recommended limits.

M. Ground cable shield at each termination and splice.

N. Install cables in manholes along wall providing longest route.

O. Arrange cable in manholes to avoid interference with duct entrances.

3.6 FIREPROOFING

A. Apply fireproofing tape to cables when installed in manholes, cable rooms, pull boxes, or other enclosures.

B. Smooth out irregularities, at splices or other locations, with insulation putty before applying fireproofing tape.

C. Apply fireproofing tape tightly around cables spirally in half-lapped wrapping or in butt jointed wrapping with second wrapping covering joints first.

D. Extend fireproofing 1 inch (25 mm) into conduit or duct.

E. Install tape with coated side toward cable.

F. Install random wrappings of plastic tape around fireproofing tape to prevent unraveling.

G. Install fireproofing to withstand a 200 Ampere arc for 30 seconds.

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

- 1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

B. Related Sections include the following:

- 1. Division 26 Section "Identification for Electrical Systems" for color-coding and other identification requirements.

C. Comply with NFPA 70.

D. All products shall be UL listed and labeled.

1.5 COMMISSIONING

A. Commissioning of components, equipment and/or system specified in this division is part of the construction process. Project closeout is dependent on successful completion of all commissioning procedures, documentation and issue closure.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. American Insulated Wire Corp.; a Leviton Company.
1. General Cable Corporation.
1. Encore Wire Corporation.
2. General Cable Technologies Corporation.
3. Southwire Company.

B. Aluminum Conductors (primary feeders): Main feeder cables interconnecting primary side of transformers with utility feed.

B.1. Aluminum cables shall be 35kv 100% EPR with full concentric neutral.

B.2. Insulation shall be 345 Mils Ethylene Propylene Rubber (EPR) / Ethylene Copolymer (EAM) 100% insulation level.

B.3. Insulation shield shall be strippable semi-conducting cross-linked copolymer.

B.4. Concentric neutral shall be helically applied soft drawn bare copper full concentric neutral.

B.5. Overall jacket to be linear low density polyethylene (LLDPE) jacket, black with red extruded stripes.

C. Copper Conductors (secondary branch): Comply with NEMA WC 70. Shall be UL labeled as type THHN-THWN, VW-1 stranded copper conductor, PVC insulated, nylon jacket, rated 90 deg C for dry locations and 75 deg C for wet locations, with 600 V insulation.

- 1. Type THHN/THWN-2: UL Listed; NEMA WC70; VW-1; Solid, uncoated copper conductors per ASTM-B3; stranded, uncoated copper conductors per ASTM-B3, ASTM-B787; and ASTM-B8; ROHS compliant; 600-volt rated; color-coded PVC insulation; rated for use in wet or dry locations at temperatures not to exceed 90 deg C.
2. Type XHHW-2: UL listed, NEMA WC70; VW-1; stranded, uncoated copper conductors per ASTM-B3, ASTM B787, and ASTM-B8; ROHS compliant; 600-volt rated; color-coded cross-linked polyethylene insulation; rated for use in wet or dry locations at temperatures not to exceed 90 deg. C.

1.1 Conductor Insulation: Comply with NEMA WC 70 for Type THHN-THWN.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Hubbell Power Systems, Inc.
2. O-Z/Gedney; EGS Electrical Group LLC.
3. 3M; Electrical Products Division.
4. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper, stranded.

B. Branch Circuits: Copper; Solid for No. AWG and smaller; Stranded for No. 8 AWG and larger.

- 1. Sizes #10 AWG and smaller: Copper, solid or stranded, but shall be consistent throughout the entire project. Do not mix the use of solid and stranded.
2. Sizes #8 AWG and larger: Copper, stranded.

C. The minimum conductor size shall be #12 AWG.

D. Voltage Drop: Branch circuit conductors shall be sized for a maximum voltage drop of 3 percent to comply with the requirements of ASHRAE Standard 90.1-2007. The following are minimum allowable conductor sizes based on circuit length. The circuit length shall be measured from the branch panelboard to the furthest device in that circuit. The phase and neutral conductors shall be sized as indicated the entire length of that circuit unless a larger size conductor is indicated on the drawings.

1. WireConductor sizes for 20A/1-Phase/120V circuits shall be as follows unless noted otherwise:

- a. Circuit length of 0 to 95 100 feet: #12 AWG.
b. Circuit length of 96 101 to 150 175 feet: #10 AWG.
c. Circuit length of 151 176 to 235 250 feet: #8 AWG.
d. Circuit length 236 to 380 over 250 feet: #6 AWG.

2. WireConductor sizes for 20A/1-Phase/277V circuits shall be as follows unless noted otherwise:

- a. Circuit length of 0 to 200 feet: #12 AWG.
b. Circuit length of 201 to 350 400 feet: #10 AWG.
c. Circuit length 351 to 550 over 400 feet: #8 AWG.
d. Circuit length 551 to 850 feet: #6 AWG.

3.2 CONDUCTOR INSULATION AND WIRING METHODS

A. Feeders: Type THHN-THWN, single conductors in raceway.

- 1. General use: Type THHN/THWN-2, single conductors in raceway.
2. Underground or below slab: Type XHHW-2, single conductors in raceway.
3. Fire pump ATS feeders (normal and emergency): Type XHHW-2 underground, encased in concrete and single conductors in raceway.

B. Branch Circuits: (minimum #12 AWG): Type THHN-THWN, single conductors in raceway.

- 1. General use: Type THHN/THWN-2, single conductors in raceway.
2. Underground or below slab: Type XHHW-2, single conductors in raceway

A. Wire installed underground: Type XHHW, single conductors in raceway.

C. Control Circuits, Lighting Control Device Wiring, and Other Division 26 Low Voltage Wiring: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. All cables and conductors shall be installed in conduit. The use of exposed (open) wiring will not be permitted. This shall include all lighting control wiring for occupancy sensors, 0-10V control, etc.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

A. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

A. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

D. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

- 1. Colors shall be continuous through the insulation from end to end. Field marking is not acceptable.

E. Each branch circuit shall be provided with a dedicated, 100 percent neutral conductor. Sharing of the neutral conductor between multiple circuits will not be allowed. Each neutral shall be clearly identified with its associated phase conductor.

F. A single raceway shall be limited to a maximum of six current carrying conductors.

G. Each branch circuit conduit shall contain a separate green equipment grounding conductor sized per NEC.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than uninsulated conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

- 1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors for compliance with requirements.
a. Megger test for insulation integrity.
b. Test all branch circuit wiring for leakage current requirements for NFPA 99 for isolation panelboard.
c. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Test Reports: Prepare a written report to record the following:

- 1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.



100% CONSTRUCTION DOCUMENT SET
KNOX COUNTY PARKS
ELECTRICAL REHABILITATION

VINCENNES, IN 47591

Table with 3 columns: #, Revision, Date. Row 1: 1, ADDENDUM NO. 1, 3/25/24

Project #: 23-800-291-1

Designed By: JAR/JJH

Drawn By: JAR/JJH

Checked By: JAR

Date: 02/28/2024



#	Revision	Date
1	ADDENDUM NO. 1	3/25/24

Project #: 23-800-291-1

Designed By: JAR/JJH

Drawn By: JAR/JJH

Checked By: JAR

Date: 02/28/2024



Justin Barth

requirements as defined in IEEE Std. C57.12.28™-2014 standard. Munsell Green color 7GY 3.29-1.5 (standard); ANSI Grey 70; Desert Tan FS-595B-33446; Eagle Feather Tan FS-595-23578; Tobacco Brown FS-595C-30108

- d) Enclosure must include a top hinged removable cover and allow one person operation. Cover must also include a wind stop to prevent accidental closing.
- e) Enclosure must include a deep angled recessed door with low sill for easy accessibility.
- f) Enclosure must include universal mounting plates painted light grey for optimum visibility of cable terminations and must accept the following: (a) 200 A, 15, 25 & 35 kV, two-, three- and four-position loadbreak junctions (enclosure size dependent), (b) 600 A, 15/25 & 35 kV, two-, three- and four-position deadbreak junctions (enclosure size dependent), (c) 600 A, 15, 25, & 28 kV Class loadbreak connector system (square configuration (enclosure size dependent).
- g) Enclosures must be available with junctions as listed in 3.8, installed.
- h) Enclosure must include "parking lot" parking stand design providing multiple options for parking of accessories and providing rigidity to the back of the enclosure to prevent oil-canning during operation.
- i) Enclosure must provide a minimum of 1 parking stand pocket per phase.
- j) Enclosure must include a minimum of one grounding provision per phase.
- k) Enclosure must include provisions for lifting.
- l) Enclosure must include a recessed lock pocket, padlock hasp and pentahead bolt for security.
- m) Dimensions: Enclosures must be available in the following sizes: 4.1.1 30"H X 24"W X 22"D 4.1.2 30"H X 30"W X 22"D 4.1.3 30"H X 48"W X 22"D 4.1.4 30"H X 66"W X 22"D 4.1.5 30"H X 84"W X 22"D 4.1.6 30"H X 98"W X 30"D.
- n) Optional Features 5.1 3/8" ground bar installed.
- o) Ground Sleeves: Fiberglass ground sleeves to accommodate enclosures must be available in 18" and 30" heights.
- p) Base Extensions: Steel base extensions to accommodate enclosures must be available in 18" and 24" heights.

C. Raceway/Duct Sealing Compound

- 1. Compound shall be non-hardening, putty like consistency workable at temperatures as low as 35° F. Compound shall not slump at a temperature of 300° F. and shall readily adhere to clean surfaces of plastic ducts, metallic conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals. Compound shall have no injurious effect on worker's hands and materials.

D. Extra Materials

- 1. Furnish the following extra materials matching products installed, packaged with protective covering for storage and with identification labels clearly describing contents.
- 2. Cable stanchions, support arms, insulators, and associated fasteners in the quantity of 10 percent of those installed for actual use in this project.

PART 2 - EXECUTION

2.1 INSTALLATION

A. General: Provide manholes, handholes, and underground pull boxes of sizes, and shapes as indicated. Determine final grading of ducts as influenced by possible adjustments in other utilities and surface features and discovery of underground obstructions before installing manholes, handholes, and underground pull boxes. Install units plumb and level and with orientation and depth coordinated with arrangement of connecting ducts to minimize bends and deflections required for proper entrances.

B. Install manholes and handholes in approximate locations shown on plans in accordance with manufacturer's written instructions. Coordinate exact location with other utilities grading, paving and owner's representative.

C. Duct Entrances to Manholes and Handholes: End bells spaced approximately 10 inches center to center for 5 inch ducts (5" typical or 4") and varied proportionately for other duct sizes. The change from regular spacing to end bell spacing shall start 10 feet from the end bell and shall be made without reducing duct line slope and without forming a trap in the line. Grout end bells into manhole walls from both sides to provide watertight entrances. Slope ducts away from building, towards manhole.

D. Drainage: Install drains in bottom of units where indicated. Arrange to coordinate with drainage provisions indicated or specified.

E. Precast Access: Install access to manhole and handholes through cast iron frame and cover. Use 36" diameter cover except as indicated. Install precast concrete rings and seal with joint sealant as described in Part 2 of this specification. In addition, caulk all seams and joints inside and out. Set frames in paved areas and traffic ways flush with finished grade. Set other frames 1 inch above finished grade.

F. Waterproofing: Apply waterproofing to exterior surfaces of units after concrete has cured at least 3 days. After ducts have been connected and grouted in, and prior to backfilling, waterproof joints and connections and touch up abrasions and scars. Waterproof exterior of manhole chimneys after brick mortar has cured at least 3 days.

G. Field Installed Bolting Anchors: Do not drill deeper than 3 7/8 inches for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

H. Manholes provisions for future duct(s) to consist of formed opening(s) with structural steel placed around to permit easy knockout of opening in future.

2.2 INSTALLATION OF PRECAST MANHOLES, HANDHOLES, AND UNDERGROUND PULL BOXES

A. Install in accordance with ASTM C 891, "Standard Practice for Installation of Underground Precast Concrete Utility Structures," and manufacturer's instructions.

B. Support units on a minimum 12 inch deep level bed of #8 crushed stone.

C. Compact backfill as required to set units securely in place. Backfill and grading shall be sloped to drain surface water away from access covers.

2.3 CLEANING AND RESTORATION

A. Clean all internal surfaces including sump. Remove all foreign material.

B. All manholes, handholes, and pull boxes shall be field inspected prior to acceptance by the Owner. Contractor shall be responsible for pumping manholes, handholes, and pull boxes to allow access for inspection.

B. Tap Changer: Externally-operated type.

C. Primary Terminations: Bushing wells conforming to IEEE 386; furnish. Include bushings for insulated loadbreak connectors. Porcelain insulator with clamp-type connector acceptable.

D. Primary Switching: Fused air switch, gang operated.

E. Primary Overcurrent Protection: Current-limiting fuses conforming to ANSI C37.47.

F. Secondary Terminations: Spade lugs.

G. Secondary Switching and Overcurrent Protection: Molded case circuit breaker conforming to UL 489.

2.6 FABRICATION

A. Conform to requirements of ANSI C57.12.28.

2.7 FACTORY FINISHING

A. Finish Color: Manufacturer's standard.

2.8 SOURCE QUALITY CONTROL (AND TESTS)

A. Provide factory tests conforming to IEEE C57.12.91. Include routine tests as defined in ANSI C57.12.55 and the following other tests:

- 1. Impedance voltage and load loss.
- 2. Dielectric tests.
- 3. Audible sound level.
- 4. Short circuit capability.
- 5. Telephone influence factor (TIF).

B. Make completed transformer available for inspection after installed. Notify Owner and Engineer at least seven days before inspection is allowed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify pads and supports are suitable for installation.

3.2 EXISTING WORK

A. Disconnect and remove abandoned pad-mounted transformers. Cut abandoned raceway flush with surface of concrete pad.

B. Clean and repair existing pad-mounted transformers to remain or to be reinstalled.

C. Any replaced transformer shall be returned to owner. Contractor shall relocate to owner's requested location.

3.3 INSTALLATION

A. Install in accordance with IEEE C57.94.

B. Install plumb and level on concrete pad.

C. Install safety labels in accordance with NEMA 260.

D. Install engraved plastic nameplates in accordance with Section 260553.

E. Ground and bond substation in accordance with Section 260526.

SECTION 26 05 81 - MANHOLES, HANDHOLES AND UNDERGROUND PULL BOXES

PART 1 - PRODUCTS

1.1 MANUFACTURERS

- A. Pull Boxes.
 - 1. Quazite by Hubbell
 - 2. Syntertech by Oldcastle
 - 3. MacLean Highline
- B. Sectionalizing Cabinets.
 - 1. Hubbell Power Systems, Inc.
 - 2. Eaton's Cooper Power series
 - 3. Or equivalent.

1.2 MATERIALS

- A. Underground Pull Boxes
 - 1. Underground pull boxes shall be factory fabricated of fiberglass reinforced polymer concrete. Boxes shall be stackable with minimum dimensions:
 - 11" W x 18" L x 16" D
 - 17" W x 30" L x 16" D.
 - 2. Covers: Provide heavy duty covers, Tier 15 rated for a service load of 15,000 pounds over a 10-inch square area. Covers shall read "High Voltage", "Electric", or "Telecom" as indicated. Covers shall be secured with stainless steel penta_head bolts.
 - 3. Openings: Openings shall be provided for duct number and size as indicated on plan.
- B. Sectionalizing Cabinets

1. All characteristics, definitions, and terminology, except as specifically covered in this specification, shall be in accordance with the latest revision of the following standards:

- a) IEEE Std C57.12.28™-2014 standard - IEEE Standard for Pad-Mounted Equipment - Enclosure Integrity
- b) IEEE Std C57.12.38™-2014 standard - IEEE Standard for Pad-Mounted-Type, Self-Cooled, Single-Phase Distribution (Parking Stands Only).
- c) IEEE Std 386™-2006 standard - IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V.

2. Construction

- a) The sectionalizing enclosure must be formed fiberglass or continuous seam-welded and manufactured of 12-gauge HRP0 mild steel.
- b) All hardware must be stainless steel for corrosion resistance.
- c) Enclosure must be available in the colors shown below and meet the finish

not indicated.

C. Panelboard Enclosures: Provide galvanized sheet steel cabinet enclosures, in sizes required and or other NEMA types as indicated, code_gauge, minimum 16_gauge thickness. Provide NEMA 4X stainless steel enclosures for all outdoor panelboards.

D. Construct with multiple knockouts and wiring gutters. Provide fronts with adjustable trim clamps, and doors with flush locks and keys; all panelboard enclosures shall be keyed alike, with concealed door hinges. Equip with interior circuit_directory frame, and card with clear plastic covering. Provide baked gray enamel finish over a rust inhibitor coating. Design enclosures for recessed or surface mounting, as applicable. Provide enclosures, which are fabricated by the same manufacturer as the panelboards and which mate properly with the panelboards to be enclosed.

PART 3 _ EXECUTION

3.01 INSTALLATION OF PANELBOARDS

A. General: Install panelboards and enclosures as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC standards and NECA's "Standard of Installation", and in compliance with standard recognized industry practices to ensure that products fulfill requirements.

B. Coordinate installation of panelboards and enclosures with wire and raceway installation work. Coordinate exact locations with other trades to ensure no space conflicts and no transgressions of dedicated panelboard space by piping and ductwork.

C. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A. Where manufacturer's torque requirements are more stringent, manufacturer's requirements shall be followed.

D. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secure. Use unistrut type channels for mounting to exterior walls where moisture contamination may be possible.

E. Provide properly wired electrical connections within enclosures. Wiring must be neatly routed, with wire management means installed as required for a neat and professional final appearance.

F. Fill in panelboard's circuit directory card upon completion of installation work. Directory cards shall be typed and 8-1/2" x 11" copies shall be provided as part of the O & M Manual.

G. All outdoor panelboards shall be mounted on stainless steel uni-strut with all stainless steel mounting hardware.

3.02 GROUNDING

A. Provide equipment grounding connection for panelboards as indicated. All panelboard feeders and branch circuits shall have green insulated equipment ground conductors, or conductors identified with green phasing tape (no. 6 awg and larger). Tighten connections to comply with tightening torques specified in UL Stds 486A, to assure permanent and effective grounds.

3.03 FIELD QUALITY CONTROL

A. Prior to energizing of circuitry, check tightness of all accessible connections for compliance with manufacturer's tightening torque specifications.

B. Prior to energizing panelboards, check panelboard busbar and feeder phase_to_phase, and phase_to_ground insulation resistance levels to ensure no ground-faults and no short-circuits exist.

C. Prior to energizing, check branch circuit panelboards for electrical continuity of circuits, and check for short_circuits and ground-faults.

D. Subsequent to wire and cable hook_ups, energize panelboards and demonstrate compliance with requirements. Where necessary, correct malfunctions and replace faulty components in the field, and then re-test to demonstrate compliance.

E. Provide "Brady" type numbered wire tags to identify all circuits.

F. Check for proper phase arrangement and rotation; A-B-C left-to-right and top-to-bottom.

G. Identify feeder circuit with color coding.

SECTION 261200 - MEDIUM-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes liquid filled pad-mounted distribution transformers.
- B. Contractor shall supply as base bid (1) one 25KVA medium voltage pad mounted dry type transformer for storage at owner's requested location. 34.5/19.9kV to 120/240v single phase.
- C. Alternate Bid: Provide alternate bid pricing to replace 167KVA medium voltage transformer at existing campground area. This transformer supplies 120/240v service at 800A.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C37.47 - American National Standard Specifications for Distribution Fuse Disconnecting Switches, Fuse Supports, and Current-Limiting Fuses.
 - 2. ANSI C57.12.26 - Pad-Mounted Compartmental-Type, Self-Cooled, Single-Phase Distribution Transformers for Use with Separable Insulated High-Voltage Connectors, High Voltage, 34 500 Grd Y/19 920 Volts and Below; 2500 kVA and Smaller.
 - 3. ANSI C57.12.28 - Pad-Mounted Equipment - Enclosure Integrity.
- B. Institute of Electrical and Electronics Engineers:
 - 1. IEEE 386 - Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V.
 - 2. IEEE C57.12.00 - Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.
 - 3. IEEE C57.12.90 - Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and IEEE Guide for Short Circuit Testing of Distribution and Power Transformers.
 - 4. IEEE C57.13 - Standard Requirements for Instrument Transformers.

- 5. IEEE C57.106 - Guide for Acceptance and Maintenance of Insulating Oil in Equipment.
- 6. IEEE C57.111 - Guide for Acceptance of Silicone Insulating Fluid and Its Maintenance in Transformers.
- 7. IEEE C57-121 - Guide for Acceptance and Maintenance of Less-Flammable Hydrocarbon Fluid in Transformers.

C. National Electrical Manufacturers Association:

- 1. NEMA 260 - Safety Labels for Padmounted Switchgear and Transformers Sited in Public Areas.

D. International Electrical Testing Association:

- 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

E. Underwriters Laboratories Inc.:

- 1. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate electrical characteristics and connection requirements, outline dimensions, connection and support points, weight, specified ratings and materials.

C. Product Data: Submit electrical characteristics and connection requirements, standard model design tests, and options.

D. Test Reports: Indicate procedures and results for specified factory and field testing and inspection.

E. Manufacturer's Field Reports: Indicate activities on site, adverse findings, and recommendations.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Include copy of manufacturer's certified drawings.

C. Operation and Maintenance Data: Submit maintenance procedures for sampling and maintaining fluid.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Testing Agency: Company specializing in testing products specified in this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling, storing, and protecting products.

B. Protect dry type transformers from moisture by using heaters in accordance with manufacturer's instructions.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish one each of special tools required to operate and maintain transformer.

1.9 EXTRA MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two of each size and type fuse.

PART 2 - PRODUCTS

2.1 PAD MOUNT TRANSFORMERS

- A. Manufacturers:
 - 1. Howard Power Solutions (match existing)
 - 2. Eaton
 - 3. Or, approved equal.
- B. Product Description: ANSI C57.12.26, single phase, pad mounted transformer unit.
- C. Cooling and Temperature Rise: IEEE C57.12.00; Class OA. 65 degrees C, self-cooled.
- D. Insulating Liquid: Oil conforming to IEEE C57.106.

2.3 SERVICE CONDITIONS

- A. Meet requirements for usual service conditions.
- B. Maximum Ambient Temperature: 104 degrees F with 24-hour average temperature not exceeding 86 degrees F (30 degrees C). For dry-type transformers, lowest standard temperature condition is minus 22 degrees F.
- C. Altitude: Usual altitude is below 3300 feet above sea level.
- D. Load Current Harmonic Factor: .05 for each unit, maximum.

2.4 RATINGS

- A. Capacity: 25 to 167 kVA.
- B. Primary Voltage: 34.5/19.9 kV.
- C. Taps: Standard primary taps.
- D. Secondary Voltage: 120/240 volts.
- E. Impedance: 5.75 percent maximum.
- F. Basic Impulse Level: 60 kV.

2.5 ACCESSORIES

A. Accessories: standard accessories.

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 _ GENERAL

1.01 INDUSTRY STANDARDS

A. Current editions of publications of the following institutes are referred to in this section.

- 1. American National Standards Institutes, ANSI.

PART 2 _ PRODUCTS

2.01 MATERIALS AND PRODUCTS

- A. Nameplates: Engraved plastic laminate.
- B. Letters of nameplates shall be white and a minimum of 3/16" high. Color of nameplate shall be black, unless otherwise noted or indicated, with stainless steel fasteners.
- C. Wire/cable tags shall be self_adhesive wrap_around vinyl cloth; Brady, Ideal, or approved equal.

PART 3 _ EXECUTION

3.01 NAMEPLATES

- A. Provide engraved laminate nameplates on all of the following devices listing the equipment name, equipment controlled or served and the circuit number.
 - 1. Main fused switch or main circuit breaker.
 - 2. Control panels, variable frequency drives, motor starters and contactors.
 - 3. Branch circuit panels.
 - 4. Other major equipment and components.
- B. On the inside of each box indicate the circuit number of the circuit serving the device by using a cable tag.
- C. In pull boxes, and within switchboards, panelboards, motor starters, switches, etc. and at the equipment served by the circuit or feeder, on each cable of feeder circuits, and on each cable of all motor circuits, provide a cable tag identifying circuit number and phase.
- D. All Instrument and Control wires and cables shall be similarly tagged as noted above.

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of panelboard, and enclosure work is indicated by drawings and schedules.

B. Types of panelboards and enclosures in this section include the following:

- 1. 120/240V or 120/208V Panelboards.

1.02 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of panelboards and enclosures, of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 3 years.

B. Installer's Qualifications: A firm with at least 3 years of successful installation experience on projects utilizing panelboards similar to those required for this project.

C. NEC Compliance: Comply with NEC as applicable to installation of panelboards, cabinets, and cutout boxes, including NEC Article 408.30-58, 550.11-12.

D. UL Compliance: Comply with applicable requirements of Std No. 67, "Electric Panelboards", and Std No.'s 50, 869, 486A, and 1053 pertaining to panelboards, accessories and enclosures. Provide units, which are UL_listed and labeled.

E. NEMA Compliance: Comply with NEMA Stds. Pub/No, 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)", Pub/No. PB 1, "Panelboards", and Pub/No. PB 1.1, "Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less." Comply with NEMA Pub. No. PB1.2, "Application Guide for Ground_fault Protective Devices for Equipment", where applicable.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's data on panelboards.

PART 2 _ PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering electrical panelboard products, which may be incorporated in the work, include the following:

- 1. Eaton/Cutler-Hammer.

SECTION 263213 - ENGINE GENERATORS (Alternate Bid)

PART 1 GENERAL

1.01 SUMMARY

A. Extent of diesel emergency power generator work is indicated by drawings and specification herein, and is hereby defined to include, but not be limited to, diesel engine, electrical generator, engine starting system including batteries and charger, instrument control panel, automatic exerciser control, fuel tank, remote emergency shut-off, output contacts and wiring to remote annunciator, engine block heater, critical class exhaust silencer, outdoor weather enclosure, emergency power system wiring, all accessories required for a complete installation.
1. Diesel emergency power generator shall be pre-assembled by the manufacturer.
2. Scope: Furnish and Install new generator at the park office as shown on drawings. Generator, pad, ATS, new conduit/wiring and installation are all part of an alternate bid package and shall be listed as a separate line item in bid documents.
3. Generator KW to be as noted on drawings.

B. Refer to other Division sections for wires/cables, electrical boxes and fittings, panelboards, and wiring devices which are required in conjunction with engine_generator and emergency power system work.
1. Emergency generators warranty shall be for a minimum of one (1) year from date of owner acceptance of installation and startup procedures.
2. The warranty shall include all parts, labor, and travel time.

C. Operational Test and Full Load Test: Conducted after installation to ensure satisfactory operation and compliance with specification.
D. Operating Instructions: Provided to Owner as specified herein.
E. Instruction of Personnel: Manufacturer's representative, in cooperation with Contractor, shall instruct Owner's personnel in the operation and maintenance of the plant.
F. Factory Fabricated Assembly: Complete engine generator set, fuel system, silencer, accessories shall be delivered to the job site fully assembled, factory tested, and ready to be set in place.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's data on engine_driven generator set and components, fuel system, transfer switch, and all accessories.
B. Wiring Diagrams: Submit wiring diagrams for engine_driven generator unit showing connections to control panels, automatic and manual transfer switches, remote indication, and ancillary equipment. Differentiate between portions of wiring that are manufacturer_installed and portions that are field_installed.

PART 2 PRODUCTS

2.01 PERMANENTLY INSTALLED DIESEL ENGINE GENERATOR SETS

A. Latest commercial design, complete with four-stroke diesel engine, complete with components and features described in Section 1.01 of this specification.
B. Pre-Approved Manufacturers:
1. Kohler
2. Cummins/Onan
3. Caterpillar/Olympian
4. DDC/MTU
5. Generac

C. Electrical Characteristics:
1. kW rating: As noted on drawings.
2. Nominal RPM: 1800
3. Power Factor: 0.8
4. Frequency: 60 Hz
5. 120/240V, 1 Phase, 3 Wire, field connectable for different voltages.
6. Maximum Starting Voltage Dip: 30%
7. Maximum Running Surge Voltage Dip: 15%
8. Maximum Frequency Dip: 10%
9. Maximum Temperature Rise: 125° C
10. Permanent Magnet Generator

D. Engine shall be water cooled with 50% glycol antifreeze coolant, four stroke design with electronic governor, engine safety controls, thermostatically controlled water jacket heater, fuel and oil filters, engine driven fuel pump and oil pump, 12 or 24 volt DC starting, battery, and battery charging system.

E. Engine instrument panel shall be engine mounted and shall include water temperature gauge, lube oil pressure gauge, running hour meter, voltage and ampere meters, local operating control switches, frequency meter, phase selector switch, rheostat for AC voltage adjustment, interface for remote annunciator, battery system charging/status indicators, and fuel leak detection status. Instrument panel and all integral controls shall be pre_wired and tested at the factory. Provide a fuel quantity gauge either integral to control panel or separately mounted within engine-generator compartment.
1. Per NFPA 37, a remote means of shutting down the engine shall be provided. Provide identification nameplate.

F. Manufacturer shall provide input/output terminations and contacts for remote control and annunciation, and shall also provide local control and annunciation.

G. Remote Control Capabilities: Arrange controls so that it shall be possible to start-stop the emergency generator and control the position of the automatic transfer switch via future SCADA system. Control shall be independent of normal power status. It shall be possible to locally lock-out remote control for servicing and safety.

H. The alternator shall be a 3-pole, revolving field design with temperature compensated solid state voltage regulator and brushless rotating rectifier exciter system. No brushes will be allowed. The stator shall be directly connected to the engine flywheel housing, and the rotor shall be driven through a semiflexible driving flange to insure permanent alignment. The insulation system shall be Class F as defined by NEMA MG1-1.65. The 3-phase, broad range alternator shall be 12 lead, reconnectable. The unit shall be equipped with a 300 percent short circuit sustaining feature.

I. Exhaust gas emissions shall meet or exceed all current IDEM, local ordinances, and current EPA Emissions standards.

J. Engine mounted circuit breakers shall be molded case type, single phase, 100% rated, of ampere rating indicated on drawings, metal enclosed, and shall provide manual disconnect, overload protection, and short circuit protection functions.

K. Cooling system shall be an engine mounted coolant radiator, engine driven fan, and engine driven water pump. Radiator shall be fully assembled and filled with 50% glycol coolant at the factory. Cooling system capacity shall be suitable for full load continuous operation at 120 degrees F ambient air temperature. Coolant shall be protected to -30 degrees F. Cooling system shall have an electrically operated jacket heater with thermostat, rated for a 20 Ampere (maximum load of 16 A), 120 or 240V branch circuit, provided with toggle disconnect switch inside engine-generator enclosure.

L. Fuel system shall have a sub-base mounted steel tank, with fuel gauge, venting, fill line, engine driven fuel pump, fuel filter, fuel lines, injectors, high and low fuel warning contacts. Entire system shall be factory assembled. Manufacturer's Dealer shall fill with fuel and shall refill after on-site load test so that Owner receives full fuel capacity at time of substantial completion.

1. Fuel tank shall be of double-wall secondary containment construction and shall have fuel leak detection system.
2. Fuel system and tank shall be UL Listed and comply with all current EPA, IDEM, and local ordinances.
3. Fuel tank shall have a 2" safety buffer above required fuel capacity fill line; fuel fill line shall end at required fuel capacity line. A .125" fuel drainback orifice shall be required in the fuel fill line at 1" above the required fuel capacity line (to allow drainback of fuel fill line into tank).
4. Fuel Capacity: Provide minimum of 24 hours of operation at full generator rated load.

M. Exhaust system shall include a critical type silencer and stainless steel flexible fittings, exhaust shall be insulated with high temperature flomat fiber blanket and installed completely, including mechanical support independent of engine. Exhaust silencer and piping size shall be large enough so that engine back pressure limits are not exceeded. The silencer can be externally mounted above the weatherproof housing.

N. Complete assembly shall mount to a heavy_duty steel skid base, which shall be epoxy anchor bolted to a new reinforced concrete pad. Isolation pads shall be provided between engine/generator and the skid.

O. Provide a completely assembled and factory finished weather-tight outdoor enclosure. Provide access doors for servicing on both sides. Provide air intake and radiator exhaust louvers.

P. Housing shall be of corrosion resistant steel, weatherproof, with air intake and exhaust louvers, manufacturer's standard painted finish, with hinged and lockable doors, and air intake and exhaust louvers designed for required flow and silencing.

Q. Batteries and Charger:

1. Emergency generator manufacturer shall furnish and install Lead Acid type batteries for engine starting. Size for three consecutive starting attempts of fifteen seconds duration each, minimum, at low temperature.
2. Emergency generator manufacturer shall furnish and install automatic battery charger for Lead Acid type batteries; 2-rate, solid state, regulated output and alarm output.

R. Accessories
1. Include the following accessories: Engine Block Heater.

PART 3 _ EXECUTION

3.01 INSTALLATION

A. Contractor shall install engine generator system in accordance with approved shop drawings and manufacturer's instructions. Coordinate with all trades with regard to scheduling of work. Protect from damage during remaining construction activities.

3.02 START_UP AND OPERATIONAL TEST

A. Furnish all fluids (by Manufacturer's Dealer) not factory installed including fuel (by Manufacturer's Dealer). Spare elements shall also be provided for one change of fuel, oil, and air filters for each of the permanently installed engine generators.

B. Check_out of final installation and connections shall be performed by factory authorized technical personnel.

C. Load bank test shall be performed by manufacturer's dealer for the permanently installed emergency generator sets, as scheduled below. Operating parameters recorded and submitted to Engineer for approval. Factory technicians shall submit statement of acceptance before final acceptance by Engineer and Owner.

1. Load Bank Testing Schedule:
a. 25% for 30 min.
b. 50% for 30 min.
c. 75% for 30 min.
d. 100% for 2 hours
2. Demonstrate that all accessories are operating properly.
3. Demonstrate that automatic transfer switches are functioning properly.
4. Schedule all testing 48 hours in advance with Owner/Engineer.
5. Demonstrate that all remote indication and remote control features are functioning properly.
6. Refill fuel to capacity.

D. Conduct Owner training (by manufacturer's dealer). Provide 8 hours of training for Owner's personnel.

E. Submit as_built record drawings and specifications, and submit Operation and Maintenance Manuals to Engineer for approval and forwarding to Owner (both Contractor and manufacturer).

SECTION 26 36 00 - AUTOMATIC TRANSFER SWITCHES (Alternate Bid)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes transfer switches rated 600 V and less, including the following:
1. Automatic, closed transition, bypass/isolation switches.
2. Remote annunciation and control system.
B. Project Restrictions:
1. Dimensions: The maximum dimensions allowed for each transfer switch shall be 38-inches wide by 39-inches deep. Switches with dimensions larger than these will not be approved without Engineer of Record written permission.
2. Access: Each transfer switch shall require front access only. Switches requiring side or rear access will not be approved.
C. Related Sections include the following:
1. Division Section "Engine Generators."
2. Division Section "Commissioning of Electrical Systems".

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within 60 miles of the project site.
B. Source Limitations: Obtain automatic closed transition bypass isolation switches, remote annunciator and control panels through one source from a single manufacturer. Shall be sourced through the engine generator supplier per Division Section "Engine Generators".
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
D. Comply with NEMA ICS 1.
E. Comply with NFPA 70.
F. Comply with NFPA 99.
G. Comply with NFPA 110.
H. Comply with UL 1008 unless requirements of these Specifications are stricter.
I. Comply with IBC 2006 for seismic requirements.

1.4 COORDINATION

A. Coordinate size and location of concrete bases if required. Cast anchor-bolt inserts into bases.
B. Coordinate final location with owner based on drawings.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace equipment and associated components that fail in materials or workmanship within a minimum warranty period of 36 months from date of Project Substantial Completion.

1.6 COMMISSIONING

A. Commissioning of components, equipment and/or system specified in this division is part of the construction process. Project closeout is dependent on successful completion of all commissioning procedures, documentation and issue closure. See Section 01 91 13 for detailed commissioning requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ASCO Power Technologies, LP.
2. Russelectric, Inc.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Indicated Current Ratings: 200A; Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
E. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.
F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
2. Switch action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
G. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations. Color-coding and wire and cable tape markers are specified in Division 26 Section "Identification for Electrical Systems."
1. Designated terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-terminal arrangement and field wiring space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control wiring: Equipped with lugs suitable for connection to terminal strips.
I. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.
J. Enclosures: NEMA Type 3R for exterior mounting, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with Level 1 equipment according to NFPA 110.
B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.
C. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
D. Digital Communication Interface: Matched to capability of remote annunciator and control panels.
E. Include the following functions and characteristics for automatic closed transition transfer switches:
1. Fully automatic make-before-break operation.
2. Load transfer without interruption, through momentary interconnection of both power sources not exceeding 100 ms.
3. Initiation of no interruption transfer: Controlled by in-phase monitor and sensors confirming both sources are present and acceptable.
a. Initiation occurs without active control of generator.
b. Controls ensure that closed-transition load transfer closure occurs only when the 2 sources are within plus or minus 5 electrical degrees maximum, and plus or minus 5 percent maximum voltage difference.
4. Failure of power source serving load initiates automatic break-before-make transfer.
G. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase. Relay compares phase relationship and frequency difference between normal and emergency sources and initiates transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer is initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
H. Motor Disconnect and Timing Relay: Controls designate starters so they disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters is through wiring external to automatic transfer switch. Time delay for reconnecting individual motor loads is adjustable between 1 and 60 seconds, and settings are as indicated. Relay contacts handling motor-control circuit inrush and seal currents are rated for actual currents to be encountered.

1. Automatic Transfer-Switch Features:
1. Under-voltage sensing for each phase of normal source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
2. Adjustable time delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
3. Voltage/frequency lockout relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time delay for retransfer to normal source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained under-voltage of emergency source, provided normal supply has been restored.
5. Test switch: Simulate normal-source failure.
6. Switch-position pilot lights: Indicate source to which load is connected.
7. Source-available indicating lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
a. Normal power supervision: Green light with nameplate engraved "Normal Source Available."
b. Emergency power supervision: Red light with nameplate engraved "Emergency Source Available."

8. Unassigned auxiliary contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer override switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine starting contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine shutdown contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
12. Engine-generator exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
a. Exerciser transfer selector switch: Permits selection of exercise with and without load transfer.
b. Push-button programming control with digital display of settings.
c. Integral battery operation of time switch when normal control power is not available.

13. Generator load bank load dump feature: Provide a load dump auxiliary contact within each automatic transfer switch that will initiate the load dump feature at a portable load bank. The purpose of this feature is to prevent the generator from seeing load applied via a portable load bank when the building calls for emergency power via the transfer switches.
14. BMS interface: Provide contacts as required for BMS interface to monitor each transfer switch as follows:
a. Switch in normal position.
b. Switch in emergency position.
c. Switch in bypass.

J. Include the following functions and characteristics for bypass/isolation switches:
15. Comply with requirements for Level 1 equipment according to NFPA 110.
16. Manual type, arranged to select and connect either source of power directly to load, isolating transfer switch from load and from both power sources.
17. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. While isolated, interlocks prevent transfer-switch operation, except for testing or maintenance.
18. Draw-out arrangement for transfer switch: Provide physical separation from live parts and accessibility for testing and maintenance operations.

19. Bypass/isolation switch current, voltage, closing and short circuit withstand ratings: Equal to or greater than those of associated automatic transfer switch, and with same phase arrangement and number of poles.
20. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.

21. Operability: Constructed so load bypass and transfer-switch isolation can be performed by 1 person in no more than 2 operations in 15 seconds or less.
22. Legend: Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
23. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.
24. Factory-installed copper bus bars; plated at connection points and braced for the indicated available short-circuit current.
K. Terminal provisions for a remote contact which opens to signal, the CTTS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad or serial port.
L. One set of double pole, double throw contacts that operate when normal source voltage is available and one set of double pole, double throw contacts that operate when emergency source voltage is available.
M. Load shedding circuit initiated by the removal of the control voltage to a relay to match generator capacity to the load. Relay de-energization transfer load to the normal source, regardless of its acceptability. 24 VDC customer supplied control voltage.

2.4 REMOTE ANNUNCIATOR AND CONTROL SYSTEM

A. Functional Description: Include the following functions for indicated transfer switches:
1. Indication of sources available as defined by actual pickup and drop-out settings of transfer switch controls.
2. Indication of switch position.
3. Indication of switch in test mode.
4. Indication of failure of digital communication link.
5. Key switch or user code access to control functions of panel.
6. Control switch test initiation.
7. Control of switch operation in either direction.
B. Malfunction of annunciator, annunciation and control panel or communication link shall not affect functions of automatic transfer switch. In the event of failure of communication link, automatic transfer switch automatically reverts to standalone, self-contained operation. Automatic transfer switch sensing, controlling or operating function shall not depend on remove panel for proper operation.
C. Remote Annunciation and Control Panel: Solid state components. Include the following features:
1. Controls and indicating lights grouped together for each transfer switch.
2. Label each indicator light control group. Indicate transfer switch controls, location of switch and load it serves.
3. Digital communications capability: Matched to that of transfer switches supervised.
4. Mounting, flush, modular, steel cabinet unless otherwise indicated.

2.6 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Wall mount to exterior with stainless steel uni-strut and stainless steel mounting hardware.
B. Arc Flash Labeling: Comply with Division 26 Section "Electrical System Fault Analysis, Coordination and Arc Flash Study" for arc flash labeling requirements.
C. Identify components according to Division 26 Section "Identification for Electrical Systems." The labels shall be viewable from the front of the equipment without opening any doors or covers. Include the following information:
1. Designation.
2. Fed from normal and emergency.
3. Equipment served.
4. Voltage, phase, wire.
5. Ampere.
6. Feeder sizes.
E. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary, to accommodate required wiring.
B. Ground equipment according to Division Section "Grounding and Bonding for Electrical Systems."
C. Connect wiring according to Division Section "Low-Voltage Electrical Power Conductors and Cables."
D. Generator Load Bank Load Dump Feature: Provide wiring from the load dump auxiliary contact within each automatic transfer switch to the generator load bank docking station to prevent load bank operation when building calls for emergency power. Independent and separate sets of conductors shall be provided from each transfer switch out to the terminal strip in the first load dump enclosure.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
B. Perform tests and inspections and prepare test reports.
1. Manufacturer's field service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
C. Coordinate tests with tests of generator and run them concurrently.
D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
E. Remove and replace malfunctioning units and retest as specified above.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Division 01 Section "Demonstration and Training."
B. Coordinate this training with that for generator equipment.

#	Revision	Date
1	ADDENDUM NO. 1	3/25/24

Project #: 23-800-291-1

Designed By: JAR/JJH

Drawn By: JAR/JJH

Checked By: JAR

Date: 02/28/2024



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