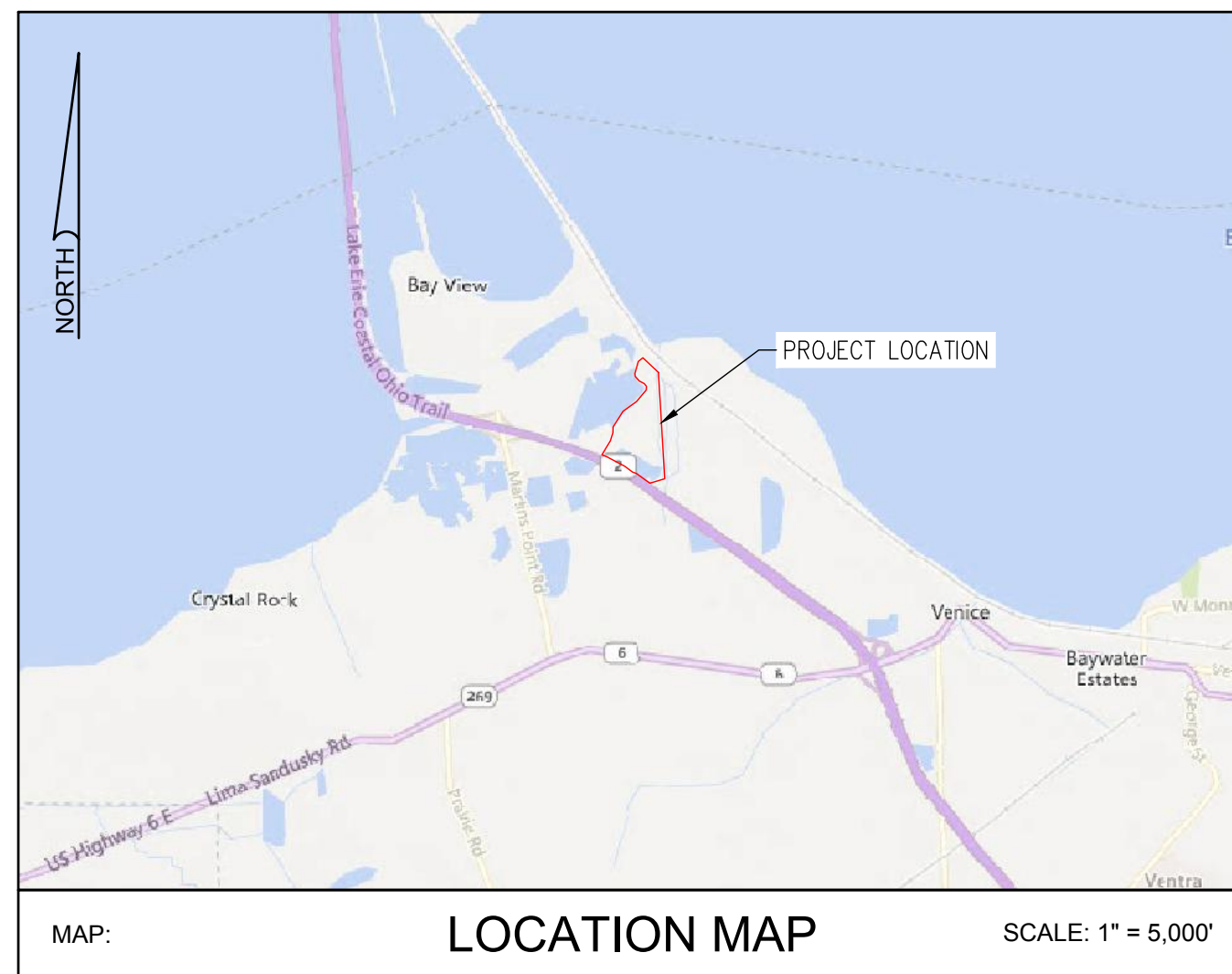


CONSTRUCTION PLANS FOR: B-MARSH RECONNECTION PROJECT

ERIE SOIL & WATER CONSERVATION DISTRICT MARGARETTA TOWNSHIP, ERIE COUNTY, OHIO



SURVEYOR NOTES:

THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON ABOVE GROUND STRUCTURES AND RECORD DRAWINGS PROVIDED TO THE SURVEYOR. LOCATIONS OF UNDERGROUND UTILITIES/STRUCTURES MAY VARY FROM LOCATIONS SHOWN HEREON. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. NO EXCAVATIONS WERE MADE DURING THE PROGRESS OF THIS SURVEY TO LOCATE BURIED UTILITIES/STRUCTURES.

TOPOGRAPHIC AND BATHYMETRIC SURVEY PERFORMED BY: VERDANTAS LLC
DATE OF FIELD WORK: JUNE-AUGUST 2025
EVERY DOCUMENT OF RECORD REVIEWED AND CONSIDERED AS PART OF THIS SURVEY IS NOTED HEREON.

ELECTRONIC TOPOGRAPHIC SURVEY IS AVAILABLE UPON REQUEST.

ALL ELEVATIONS ARE IN FEET AND THE VERTICAL DATUM IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

BASIS OF BEARINGS:

THE BEARINGS SHOWN HEREIN ARE BASED ON OHIO STATE PLANE COORDINATE SYSTEM. NORTH SYSTEM, NAD83 (2011).

BENCHMARKS:

AS PER THE TOPOGRAPHIC AND BATHYMETRIC SURVEY PREPARED BY VERDANTAS LLC, THE CONTRACTOR AND/OR HIS SURVEYOR SHALL BE RESPONSIBLE TO CROSS CHECK ALL CONTROLS FOR DISTURBANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

BM1 - CROSS CUT SET IN CONIC OF GUARDRAIL POST
N 654333.10
E 1881077.41
Z 578.30

BM2 - RAILROAD SPIKE SET IN FOG LINE IN PAVEMENT
N 655296.12
E 1885562.19
Z 576.56

FLOODZONE INFORMATION

THIS SITE IS LOCATED WITHIN A SPECIAL FLOOD HAZARD AREA BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY ON FLOOD INSURANCE RATE MAP, MAP NO. 39043C0058F WITH AN EFFECTIVE DATE OF SEPTEMBER 1, 2022 IN ERIE COUNTY, OHIO.

CULTURAL RESOURCES DISCOVERY NOTE

IF CULTURAL RESOURCE ITEMS ARE FOUND DURING CONSTRUCTION, IMMEDIATELY STOP WORK AND NOTIFY BRYAN LEE, NRCS CULTURAL RESOURCES SPECIALIST AT (614)-255-2487.

PRE-CONSTRUCTION NOTICE

THESE PLANS HAVE BEEN PREPARED USING THE MOST ACCURATE INFORMATION AND DATA AVAILABLE AT THE TIME OF PREPARATION. FIELD CONDITIONS MAY BE ENCOUNTERED DURING CONSTRUCTION WHICH VARY FROM THOSE DEPICTED HEREIN. MODIFICATIONS TO THE DESIGN AS SHOWN MAY BE REQUIRED BASED ON FIELD CONDITIONS AT THE TIME OF CONSTRUCTION. IN ANY EVENT, THE ENGINEERING OBJECTIVES OF THE DESIGN SHALL BE MET. IF FIELD CONDITIONS ARE ENCOUNTERED PRIOR TO CONSTRUCTION OR DURING CONSTRUCTION THAT DIFFER SIGNIFICANTLY FROM THE CONDITIONS SHOWN ON THE PLANS, THE CONTRACTOR MUST STOP WORK AND NOTIFY THE OWNER AND ENGINEER IMMEDIATELY.

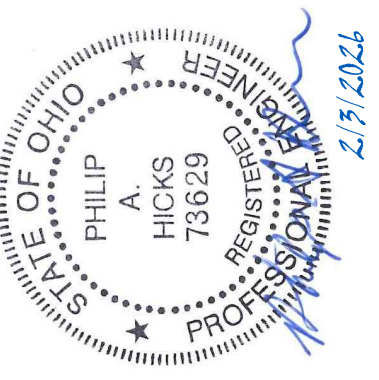


SHEET LIST TABLE

SHEET NO.	SHEET TITLE
C1.0	TITLE
C2.0	GENERAL NOTES & LEGEND
C2.1	PUMP SPECIFICATIONS & NOTES
C3.0	EXISTING CONDITIONS (NORTH)
C3.1	EXISTING CONDITIONS (SOUTH)
C4.0	OVERALL SITE PLAN (NORTH)
C4.1	OVERALL SITE PLAN (SOUTH)
C5.0	BORROW AREA GRADING PLAN
C6.0	DIKE REHABILITATION SECTIONS
C7.0	DEMOLITION PLAN
C8.0	PUMP PLAN
C9.0	CONSTRUCTION DETAILS
C9.1	PUMP DETAILS
C9.2	PUMP DETAILS
C10.0	ELECTRICAL LEGEND & SPECIFICATIONS
C10.1	SHIELDED CABLE & ELEC. ID. SPECIFICATIONS
C10.2	VFD SPECIFICATIONS (1)
C10.3	VFD SPECIFICATIONS (2)
C10.4	ELECTRICAL SITE PLANS & DETAILS



219 SOUTH ERIE STREET
TOLEDO, OHIO 43604-8607
TEL. 419.365.2018



DESIGNED BY	DRAWN BY	CHECKED BY	PROJECT NO.
LMS	LMS	JMK	34388

CHKD BY	DATE	REVISION	No.

MARGARETTA TOWNSHIP-ERIE COUNTY-OHIO B-MARSH RECONNECTION PROJECT CONSTRUCTION PLANS TITLE
DATE 02-03-2026
SCALE AS NOTED
SHEET C1.0



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STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
33-01054.003

B MARSH LLC
33-01057.002

WETLAND RESERVE
EASEMENT

B-MARSH

EX. TOP OF DIKE

MATCH LINE
SEE SHEET C3.0

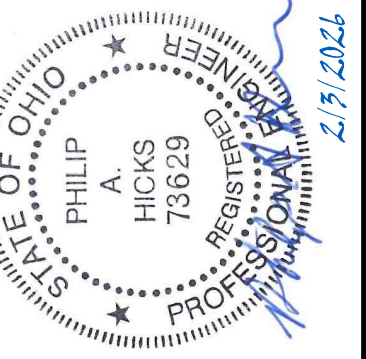
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STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
33-01057.001

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verdantas

219 SOUTH ERIE STREET
TOLEDO, OHIO 43604-8607
TEL. 419.365.2018



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DRAWN BY	LMS
CHECKED BY	JMK
PROJECT NO.	34388
CHKD BY	
DATE	
REVISION	
No.	

MARGARETTA TOWNSHIP-ERIE COUNTY-OHIO
B-MARSH
RECONNECTION PROJECT
CONSTRUCTION PLANS
EXISTING CONDITIONS (SOUTH)

DATE 02-03-2026

SCALE AS NOTED

SHEET **C3.1**

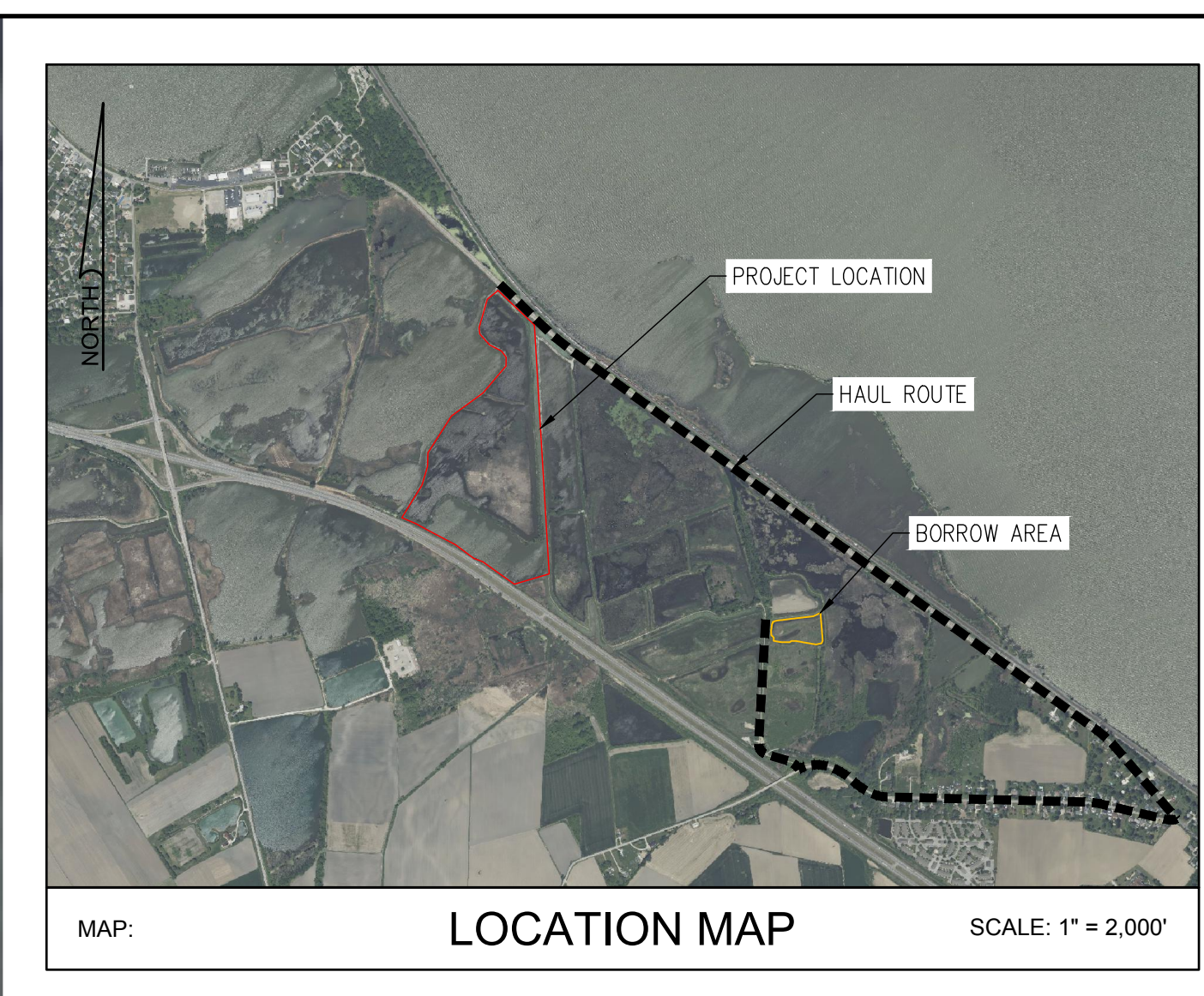


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NOTES:

- EMBANKMENT FILL SHALL BE SOURCED FROM WITHIN THE IDENTIFIED LIMITS OF THE BORROW AREA. THE GRADES IDENTIFIED ARE THE ANTICIPATED EXCAVATION GRADES TO GENERATE APPROXIMATELY 3,500 CY. AREA SHALL BE EXCAVATED GENERALLY IN ACCORDANCE WITH THE INTENT OF THE GRADES SHOWN (I.E., MAINTAIN/PROMOTE DRAINAGE TO AGRIDRAIN IN NORTHWEST CORNER) TO OBTAIN THE VOLUME REQUIRED.



verdantas
 219 SOUTH ERIE STREET
 TOLEDO, OHIO 43604-8607
 TEL. 419.365.2018

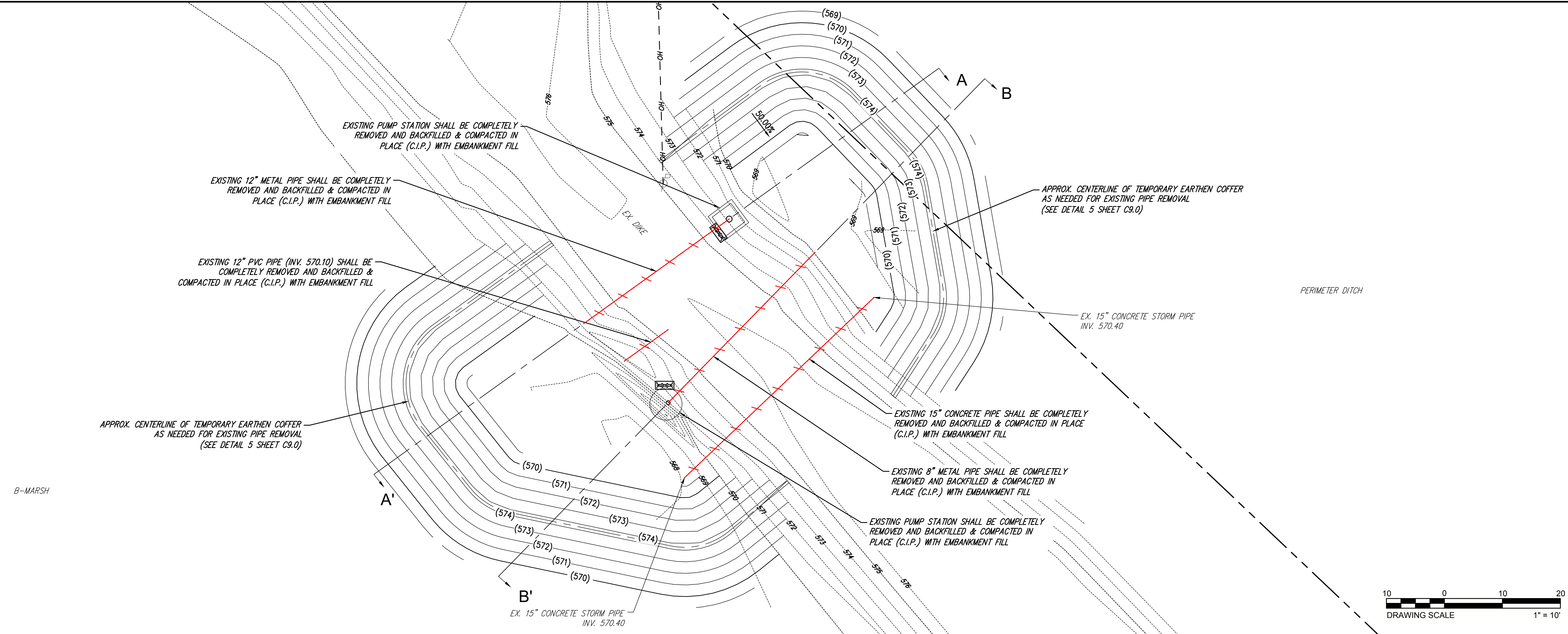
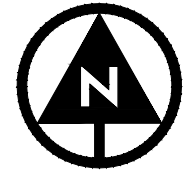


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CHECKED BY	JMK
PROJECT NO.	34888
CHKD BY	
DATE	
REVISION	
No.	

MARGARETTA TOWNSHIP-ERIE COUNTY-OHIO
B-MARSH RECONNECTION PROJECT
CONSTRUCTION PLANS
BORROW AREA GRADING PLAN

DATE	02-03-2026
SCALE	AS NOTED
SHEET	C5.0





EXISTING PUMP STATION SHALL BE COMPLETELY REMOVED AND BACKFILLED & COMPACTED IN PLACE (C.I.P.) WITH EMBANKMENT FILL

EXISTING 12\"/>

EXISTING 12\"/>

EXISTING 12\"/>

APPROX. CENTERLINE OF TEMPORARY EARTHEN COFFER AS NEEDED FOR EXISTING PIPE REMOVAL (SEE DETAIL 5 SHEET C9.0)

EX. 15\"/>

PERIMETER DITCH

EX. 15\"/>

EXISTING 15\"/>

EXISTING 8\"/>

EXISTING PUMP STATION SHALL BE COMPLETELY REMOVED AND BACKFILLED & COMPACTED IN PLACE (C.I.P.) WITH EMBANKMENT FILL

APPROX. CENTERLINE OF TEMPORARY EARTHEN COFFER AS NEEDED FOR EXISTING PIPE REMOVAL (SEE DETAIL 5 SHEET C9.0)

B-MARSH

A'

B'

EX. 15\"/>

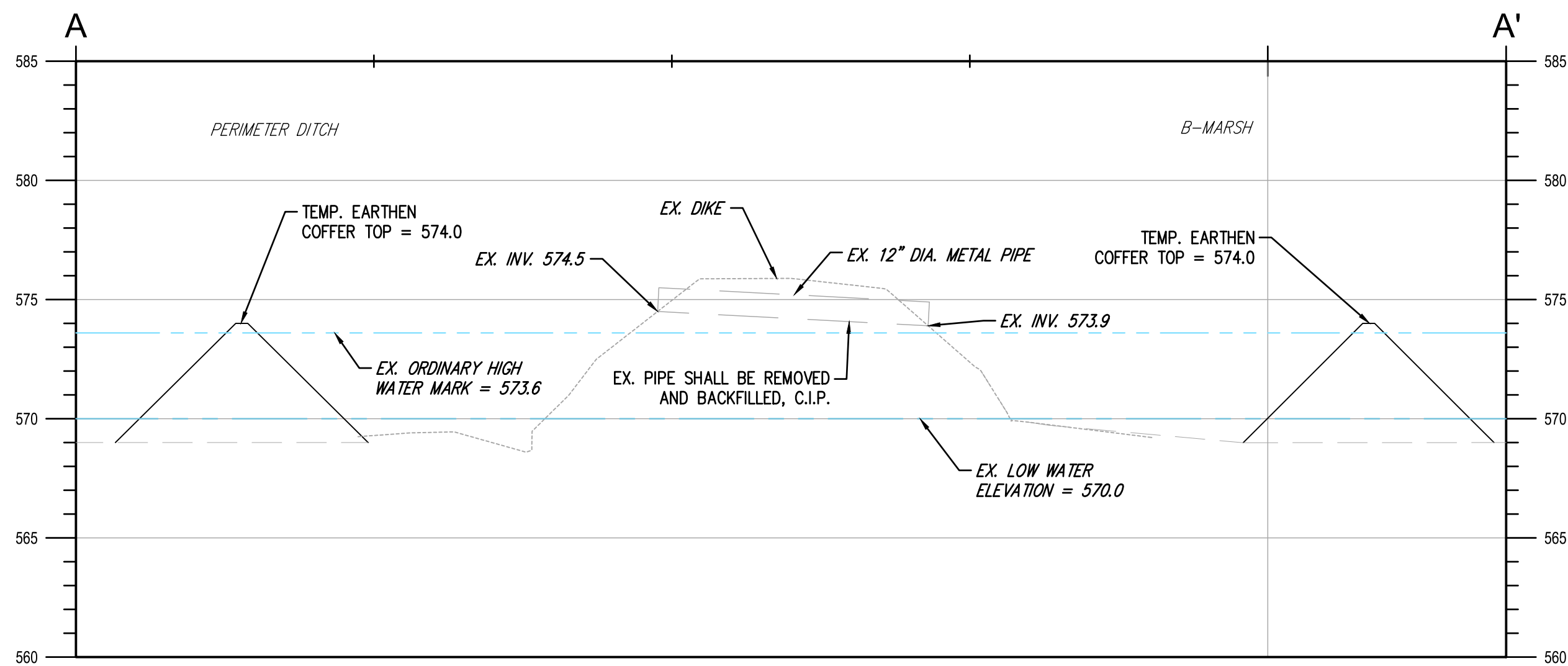


LEGEND

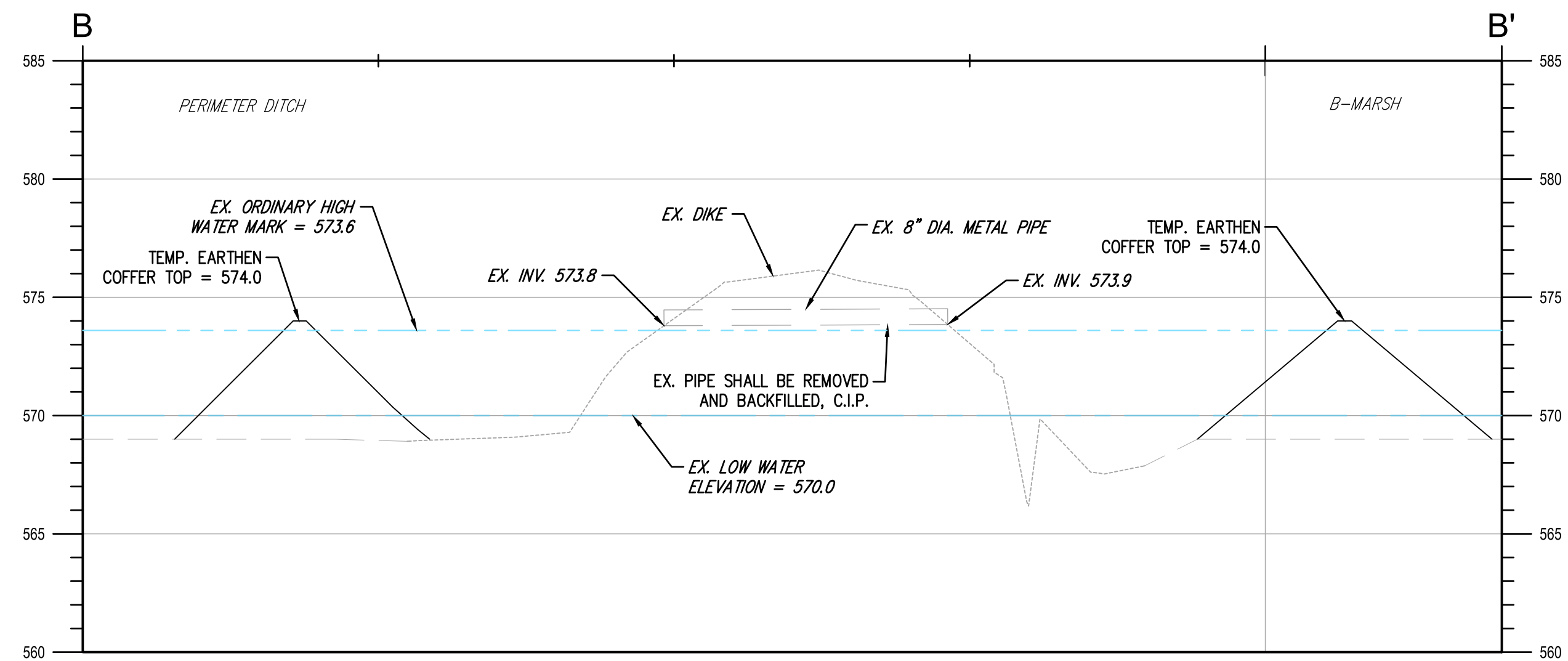
- EX. GRADE
- - - - - EX. GRADE (APPROXIMATED)
- EX. ORDINARY HIGH WATER MARK = 573.6
- EX. LOW WATER ELEVATION = 570.0
- PR. GRADE

DEMOLITION SECTIONS

HORIZONTAL SCALE: 1"=10'
 VERTICAL SCALE: 1"=5'



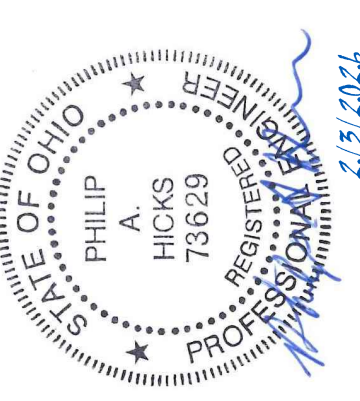
CROSS SECTION A-A'



CROSS SECTION B-B'

NOTES:

1. TEMPORARY EARTHEN COFFER DAM SHALL REMAIN IN PLACE THROUGH THE DURATION OF CONSTRUCTION.



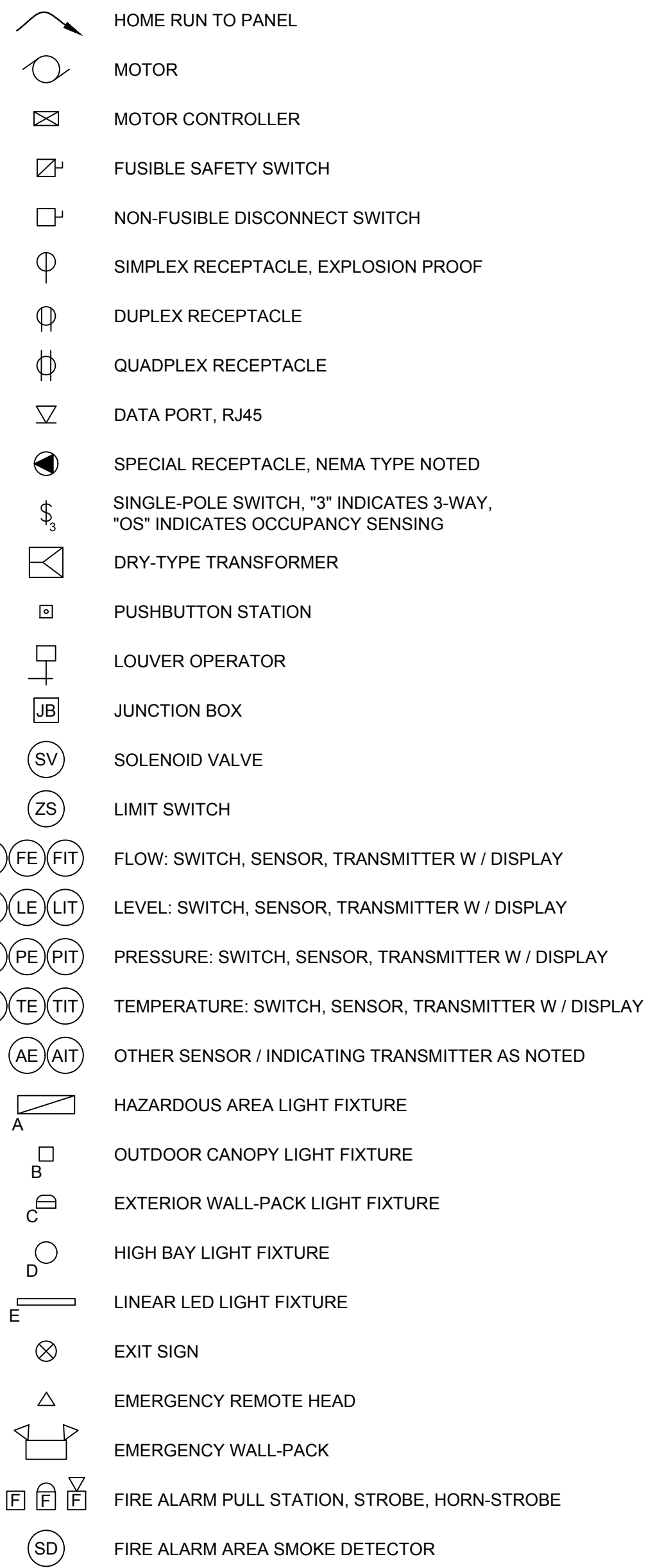
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CHECKED BY	JMK
PROJECT NO.	34398
CHKD BY	
DATE	
REVISION	
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MARGARETTA TOWNSHIP-ERIE COUNTY-OHIO
B-MARSH RECONNECTION PROJECT
CONSTRUCTION PLANS
DEMOLITION PLAN

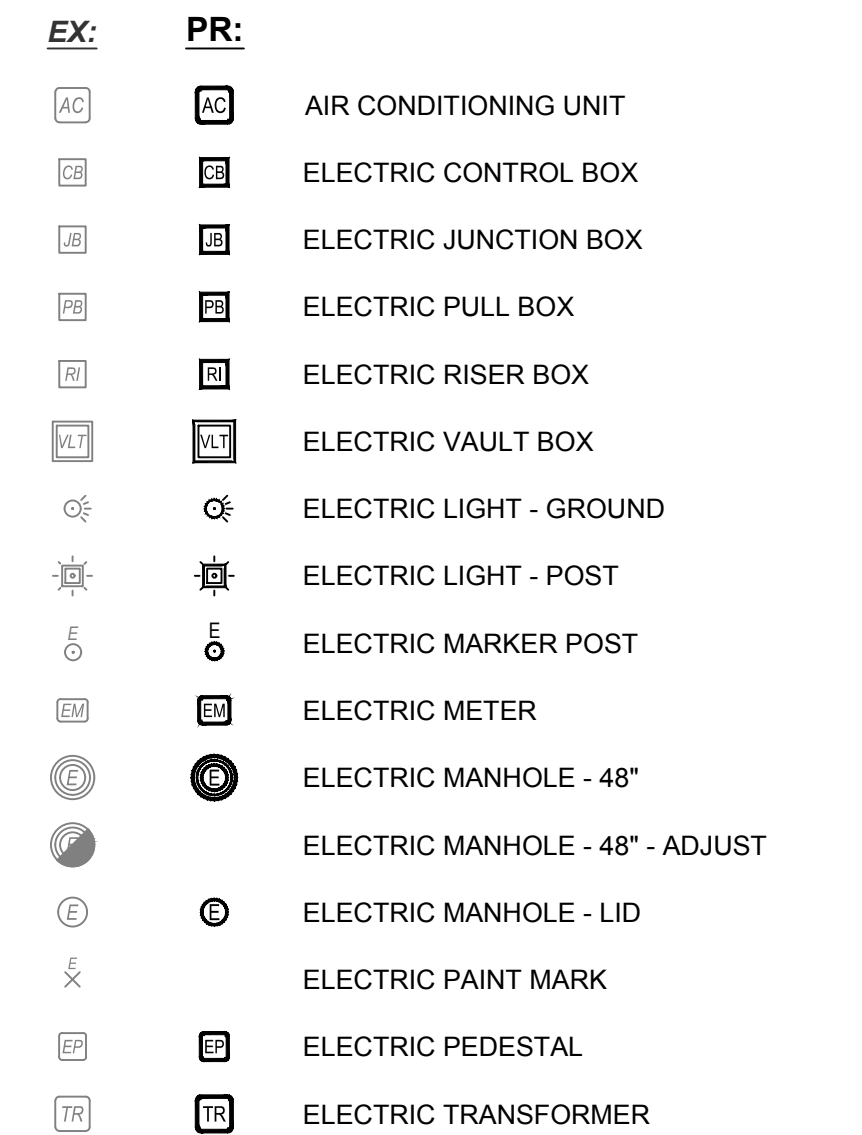
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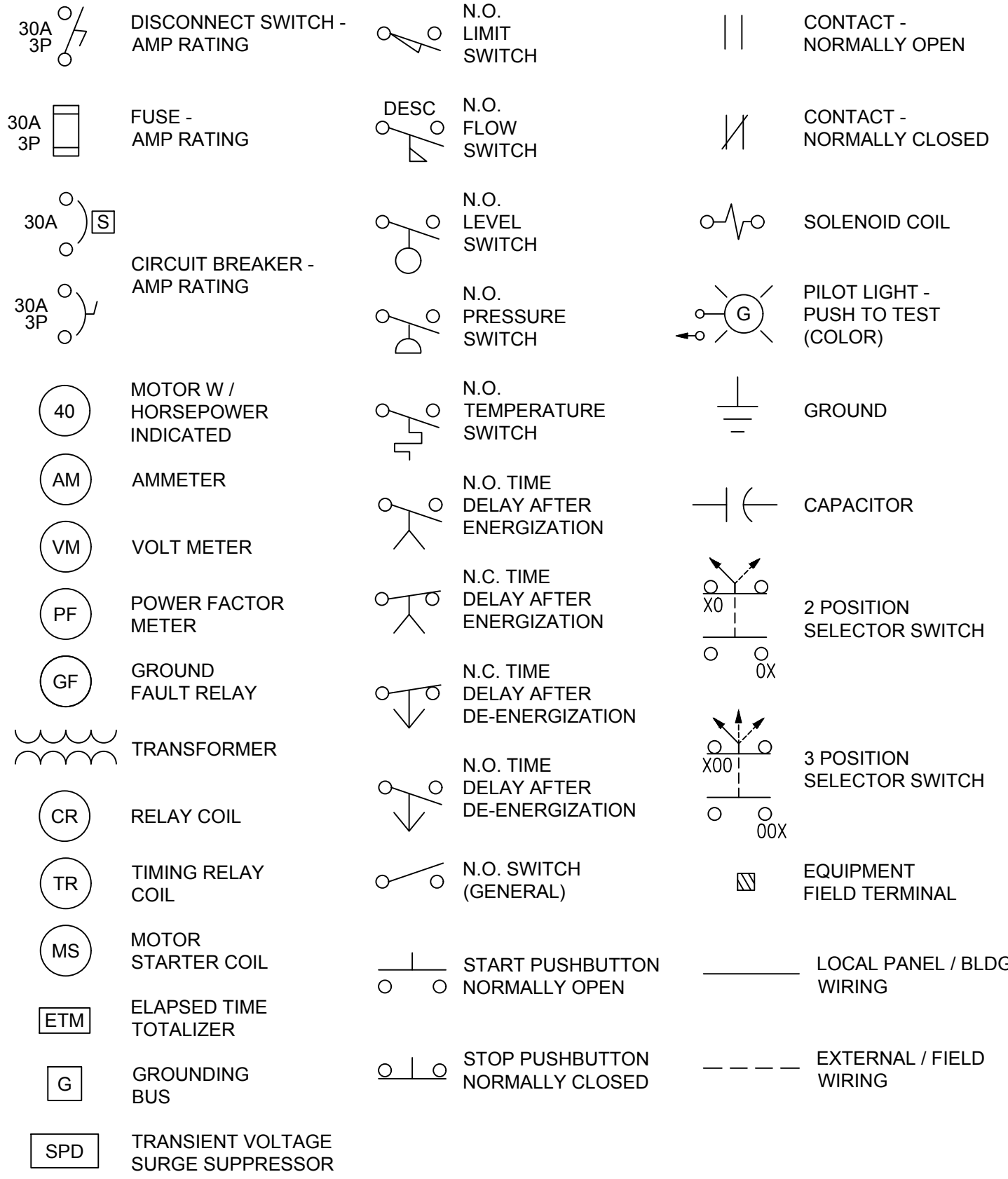
ELECTRICAL SYMBOLS - PLAN:



ELECTRIC SYMBOLS - UTILITIES:



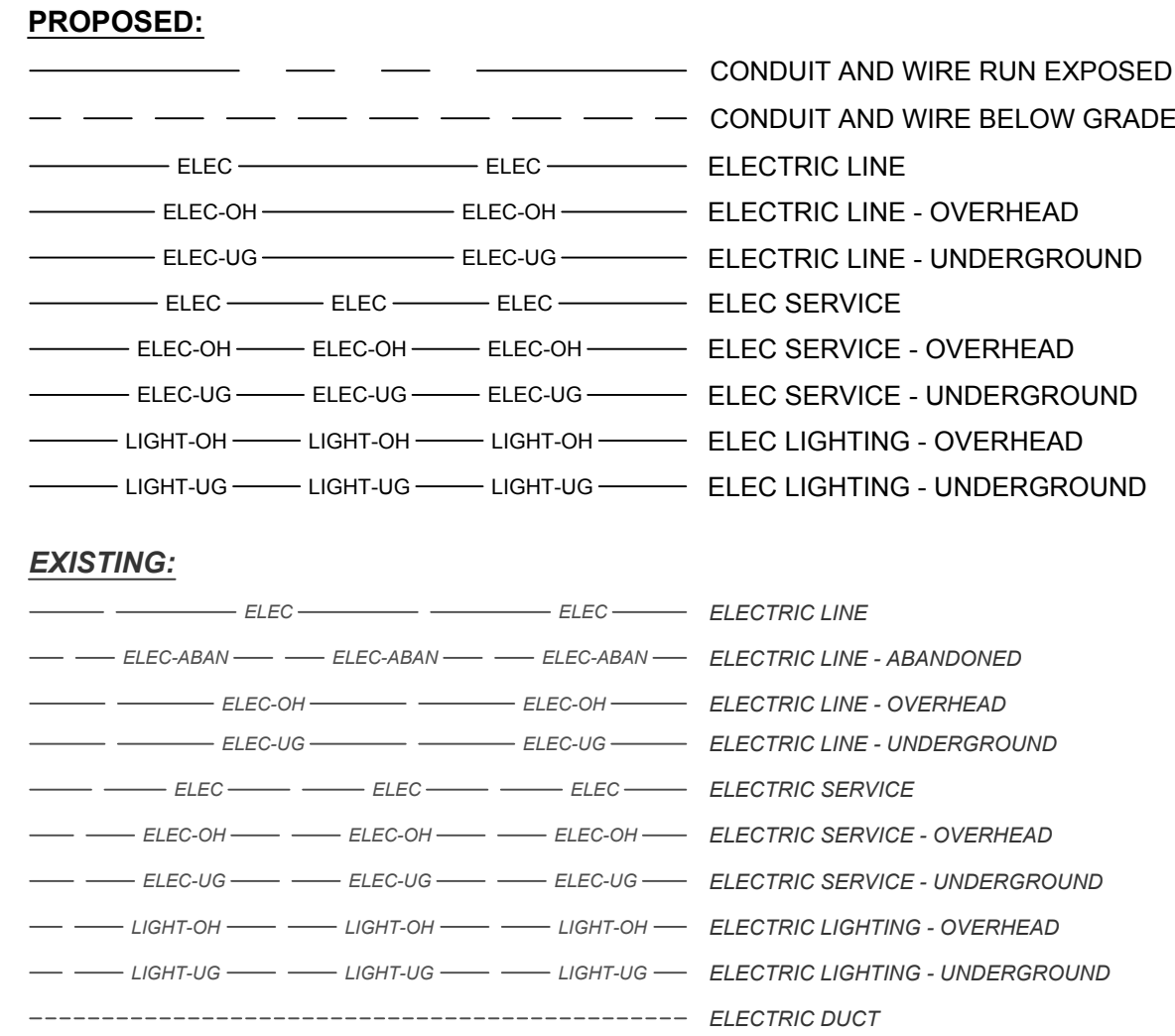
SINGLE LINE, ELEMENTARY, & INTERCONNECTION DIAGRAMS (ONLY) SYMBOLOGY:



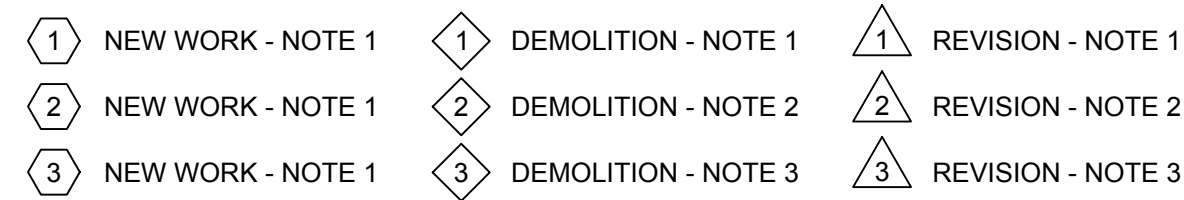
ABBREVIATIONS:

x-CSC	x-CONDUCTOR SHIELDED CABLE	IAW	IN ACCORDANCE WITH	R	RELAY
A	AMPS	ICP	INSTRUMENTATION & CONTROL PANEL	RCP	REINFORCED CONCRETE PIPE
AF	AMPERE FRAME	IPP	INSTRUMENT POWER PANEL	RGS	RIGID GALVANIZED STEEL
AFB	ABOVE FINISHED FLOOR	JB	JUNCTION BOX	RL	RUN LIGHT
AFG	ABOVE FINISHED GRADE	JBC	JUNCTION BOX - CONTROL	SCP	SURGE CONTROL PANEL
AI	ANALOG INPUT (PLC)	JBM	JUNCTION BOX - METERING	SCR	SILICON-CONTROLLED RECTIFIER
AL	ALUMINUM	JBP	JUNCTION BOX - POWER	SEC	SECONDARY
AM	AMMETER	KCM	KILO (1000) CIRCULAR MILL	SF	SUPPLY FAN
AO	ANALOG OUTPUT (PLC)	KVA	KILOVOLT AMPERES	SHLD	SHIELDED
AP	ALARM PANEL	KVAR	KILOVOLT AMPERES-REACTIVE	SPK	SPEAKER
AT	AMPERE TRIP	KW	KILOWATT	SPS	SHEAR PIN SWITCH
AWG	AMERICAN WIRE GAUGE	LA	LIGHTNING ARRESTOR	SS	SELECTOR SWITCH / STAINLESS STEEL
C	CONDUIT	LGT	LIGHT	SSOR	SOLID STATE OVERLOAD RELAY
CAP	CAPACITOR	LOR	LOCAL/OFF/REMOTE SELECTOR SWITCH	SSPB	START/STOP PUSHBUTTON
CB	CIRCUIT BREAKER	LP	LIGHTING PANEL	SSS	SOLID STATE STARTER
CJB	CONTROL JUNCTION BOX	LS	LEVEL SWITCH	STD	STANDARD
CP	CONTROL PANEL	LT	PILOT LIGHT	STP	SHIELDED TWISTED PAIR
CPT	CONTROL POWER TRANSFORMER	MCC	MOTOR CONTROL CENTER	STR	STARTER
CR	CORROSION RESISTANT	MCP	MOTOR CIRCUIT PROTECTOR	SV	SOLENOID VALVE
CS	CONTROL STATION	MDP	MAIN DISTRIBUTION PANEL	SW	SWITCH
CT	CURRENT TRANSFORMER	MJB	METERING JUNCTION BOX	T	TELEPHONE
Cu	COPPER	NEC	NATIONAL ELECTRICAL CODE	TB	TERMINAL BLOCK
DB	DUCT BANK	NEMA	NATIONAL ELECTRICAL MFR ASSOC.	TC	TIME CLOCK
DI	DIGITAL INPUT (PLC)	NEU	NEUTRAL	TD	TRENCH DUCT
DO	DIGITAL OUTPUT (PLC)	NFDS	NON-FUSED DISCONNECT SWITCH	TEB	TELEPHONE EQUIPMENT BACKBOARD
EAG	ELECTRICALLY ACTIVATED GATE	OCSS	OPEN/CLOSE SELECTOR SWITCH	TEMP	TEMPERATURE
EAV	ELECTRICALLY ACTIVATED VALVE	OL	OVERLOAD	TOC	TOP OF CONCRETE
EF	EXHAUST FAN	O-O	ON/OFF SELECTOR SWITCH	TOR	THERMAL OVERLOAD RELAY
ESPB	EMERGENCY STOP PUSHBUTTON (MAINTAINED)	OS	OCCUPANCY SENSING	TR	TIMING RELAY
ETM	ELAPSED TIME MONITOR	OTS	OVER TORQUE SWITCH	TSTAT	THERMOSTAT
EWD	ELEMENTARY WIRING DIAGRAM	P	POLE	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
FDS	FUSED DISCONNECT SWITCH	PB	PULL BOX; PUSHBUTTON	UH	UNIT HEATER
FLA	FULL LOAD AMPERES	PBC	PULL BOX - CONTROL	UNO	UNLESS NOTED OTHERWISE
FS	FLOW SWITCH	PBM	PULL BOX - METERING	UPS	UNINTERRUPTIBLE POWER SUPPLY
FVC	FULL VOLTAGE CONTACTOR	PBP	PULL BOX - POWER	UTP	UNSHIELDED TWISTED PAIR
FVNR-1	FULL VOLTAGE NON-REVERSING STARTER, SIZE 1	PC	PHOTO CONTROL	V	VOLTS
GFI	GROUND FAULT INTERRUPTER	PF	POWER FACTOR	VC	VOLUME CONTROL
GND	GROUND	PH	PHASE	VFD	VARIABLE FREQUENCY DRIVE
GFR	GROUND FAULT RELAY	PJB	POWER JUNCTION BOX	VM	VOLT METER
HOA	HAND/OFF/AUTO SELECTOR SWITCH	PLC	PROGRAMMABLE LOGIC CONTROLLER	XP	EXPLOSION PROOF
HP	HORSEPOWER	PP	POWER PANEL	XF	TRANSFORMER
HTR	HEATER	PRI	PRIMARY	WP	WEATHERPROOF
HTS	HIGH TORQUE SWITCH	PS	PRESSURE SWITCH	ZS	LIMIT SWITCH
Hz	HERTZ	PT	POTENTIAL TRANSFORMER		

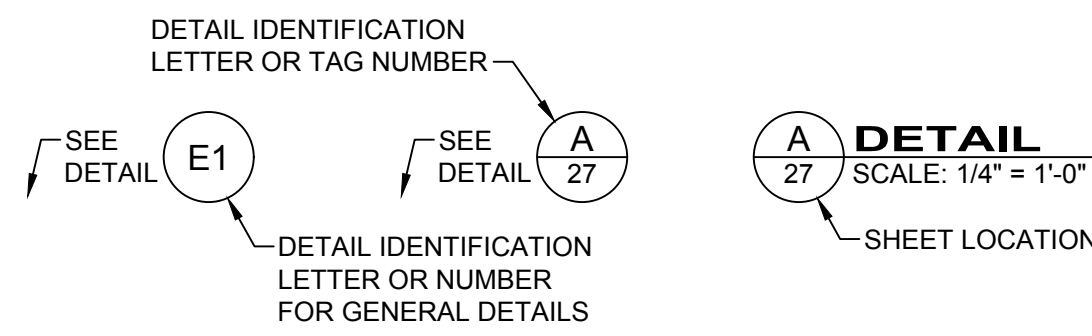
ELECTRICAL LINE SYMBOLOGY:



ELECTRICAL CODED NOTES:



ELECTRICAL DETAIL REFERENCE:

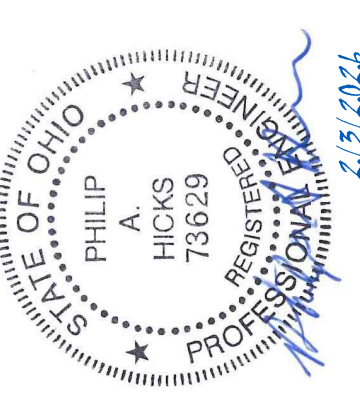


GENERAL ELECTRICAL SPECIFICATIONS

- THE ELECTRICAL CONTRACTOR SHALL APPLY FOR AND SECURE ALL COSTS AND CHARGES FOR PERMITS, CONSTRUCTION, AND MISCELLANEOUS WORK ASSOCIATED WITH AND REQUIRED FOR THE COMPLETION OF THE PROJECT ELECTRICAL WORK.
- THE ELECTRICAL CONTRACTOR SHALL ARRANGE FOR ALL INSPECTIONS OF ELECTRICAL WORK BY ALL INSPECTION AUTHORITIES HAVING JURISDICTION. COPIES OF INSPECTION REPORTS SHALL BE MADE AVAILABLE TO THE OWNER UPON REQUEST, AND THREE (3) COPIES OF THE APPROVED FINAL INSPECTION REPORT SHALL ACCOMPANY THE REQUEST FOR FINAL PAYMENT.
- ALL WORK SHALL BE IN STRICT ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, OHIO BUILDING CODE, LOCAL CODES AND ORDINANCES WHERE APPLICABLE, AND REQUIREMENTS OF O.S.H.A.
- ALL MATERIALS AND EQUIPMENT FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR SHALL BE NEW, U.L. LISTED OR LABELED, AND CONFORM TO NEMA AND ANSI STANDARD WHERE APPLICABLE.
- THE CONTRACTOR SHALL VISIT THE SITE AND FULLY FAMILIARIZE HIMSELF WITH ALL CONDITIONS WHICH AFFECT HIS WORK PRIOR TO BID. COORDINATE AND SCHEDULE WORK WITH OTHER TRADES TO ENSURE SATISFACTORY PERFORMANCE, AVOID DELAYS AND DUPLICATIONS AND MEET THE OWNER'S COMPLETION SCHEDULE FOR THE USE OF THE BUILDING.
- ALL WORK SHALL BE INSTALLED BY WORKMEN FULLY SKILLED IN THE WORK TO BE PERFORMED. REPAIR OR REPLACE EXISTING EQUIPMENT OR PROPERTY OF THE OWNER DAMAGED BY ELECTRICAL TRADES WORKMEN.
- THE ELECTRICAL CONTRACTOR SHALL GUARANTEE MATERIALS AND WORKMANSHIP PROVIDED BY HIM FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF OWNER'S FINAL ACCEPTANCE. REPAIR OR REPLACE ANY DEFECTIVE MATERIALS OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER WITHIN THE GUARANTEE PERIOD.
- ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT. CONDUIT SHALL BE EMT, INTERMEDIATE, OR RIGID GALVANIZED IN ACCORDANCE WITH AND AS PERMITTED BY THE NATIONAL ELECTRICAL CODE OR LOCAL/STATE CODES AS APPLICABLE. UNDERGROUND CONDUIT SHALL BE SCHEDULE 40 PVC, 1" MINIMUM.
- FURNISH AND INSTALL PULL BOXES, JUNCTION, AND DEVICE BOXES OF SUITABLE CODE GAUGE AND SIZE. ALL TERMINATIONS IN IN-GROUND PULL BOXES SHALL BE LIQUID-TIGHT.
- ELECTRICAL WIRES SHALL BE MINIMUM #12 AWG, COPPER, 600 V RATED. #14 AWG COPPER SHALL BE PERMISSIBLE FOR CONTROL CIRCUITRY. AMPACITY RATINGS SHALL BE BASED UPON 75°C RATINGS.
 - A. #14, #12, AND #10 AWG CONDUCTORS SHALL BE "THHN/THWN".
 - B. #8 AND LARGER SHALL BE STRANDED "THHN/THWN".
- FLEXIBLE METAL CONDUIT INCLUDING LIQUIDTIGHT SHALL BE PERMITTED WHERE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND LOCAL CODE PROVISIONS. FLEXIBLE METAL CONDUIT SHALL CONTAIN A SEPARATE GROUNDING CONDUCTOR AND BE TERMINATED WITH APPROPRIATE FITTINGS.
- THE DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO DESCRIBE THE WORK REQUIRED. THE ELECTRICAL CONTRACTOR SHALL ACCURATELY FIELD MEASURE AND LAY OUT HIS WORK TO EFFECTIVELY ACHIEVE A STRUCTURALLY COORDINATED INSTALLATION WITH THE BUILDING LAYOUT AND OTHER TRADES.
- COORDINATE ALL SERVICE ENTRANCE REQUIREMENTS WITH THE LOCAL ELECTRIC UTILITY COMPANY TO ENSURE COMPLIANCE TO UTILITY COMPANY REQUIREMENTS. PROVIDE A COMPLETE GROUNDING SYSTEM.
- DISCONNECTION, RECONNECTION, AND RELOCATION OF EQUIPMENT SHALL BE COORDINATED SO AS TO CAUSE MINIMAL DISRUPTION OF SERVICE.
- RECEPTACLES SHALL BE 20A, 125 VAC RATED, HUBBELL #5362, LEVITON, PASS & SEYMOUR, OR APPROVED EQUAL EQUIPMENT.
- SWITCHES SHALL BE 20A, 120/277 VAC RATED, SINGLE, DOUBLE POLE, THREE OR FOUR WAY AS INDICATED ON THE PLANS; HUBBELL SERIES 1220, LEVITON, PASS & SEYMOUR, OR APPROVED EQUAL.
- DEVICE COVER PLATES SHALL BE STAINLESS STEEL OF A TYPE TO SUIT DEVICE. MULTIPLE GANGED PLATES SHALL BE USED WHERE DEVICES ARE ADJACENT TO EACH OTHER. WEATHERPROOF RECEPTACLES SHALL BE EQUIPPED WITH SPRING TYPE CAP COVER PLATES.
- ELECTRICAL DISTRIBUTION PANELS SHALL BE SURFACE MOUNTED DEAD FRONT, WITH CODE GAUGE BACKBOX, LOCKABLE HINGED DOOR, U.L. LISTED AND CONFORMING TO NEMA STANDARDS, SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT. PANEL SHALL BE EQUIPPED WITH SINGLE POLE OR DOUBLE POLE BOLTED BRANCH CIRCUIT BREAKERS AS INDICATED. CIRCUIT BREAKERS SHALL BE RATED 10,000 A.I.C. SYMMETRICAL. PANELBOARDS SHALL BE BY SQUARE-D OR APPROVED EQUAL. MULTI-POLE CIRCUIT BREAKERS SHALL BE COMMON TRIP. PROVIDE MOTOR FEEDER BREAKERS WITH LOCK-OUT PROVISIONS.
- PROVIDE TYPEWRITTEN PANELBOARD CIRCUIT DIRECTORY IN PANELBOARD DOOR IDENTIFYING ALL ACTIVE CIRCUITS AND SPARES. ACTIVE CIRCUITS SHALL DESIGNATE EQUIPMENT SERVED.
- IDENTIFY PANELBOARDS AND USAGE OF PANELBOARD CIRCUIT BREAKERS WITH PLASTIC LAMICOID NAMEPLATES. NAMEPLATES SHALL INDICATE PANEL DESIGNATION, VOLTAGE, AND USE.
- BALANCE ALL LOADS IN PANELBOARDS.
- FLOAT SWITCHES
 - A. THE LEVEL DETECTING DEVICES SHALL BE AT LEAST 5-1/2 INCH IN DIAMETER OR BETTER, PVC OR POLYPROPYLENE FLOAT THAT DOES NOT USE A MERCURY SWITCH INSIDE AND FLEXIBLY SUPPORTED BY A PVC JACKETED HEAVY-DUTY CABLE.
 - B. THE FLOAT SWITCH SHALL HAVE A 20 AMP RATING AT 120 VAC. THE FLOAT SWITCH SHALL CLOSE ON RISING LEVEL. EACH FLOAT SWITCH SHALL HAVE A NORMALLY OPEN AND NORMALLY CLOSED CONTACT.
 - C. CABLE SHALL BE LONG ENOUGH TO TERMINATE IN A FIELD-MOUNTED JUNCTION BOX WITH TERMINAL STRIPS PROVIDED FOR POWER AND FLOAT SWITCH CONNECTIONS.
 - D. THE FLOATS SHALL BE MOUNTED ON TWO (2) INCH STAINLESS STEEL PIPE USING 316 STAINLESS STEEL CLAMPS OR PLASTIC ZIP TIES. THE PIPE SHALL BE CLAMPED TO THE WALL USING 316 STAINLESS STEEL CLAMPS. THE LENGTH OF THE PIPE AND FLOAT CABLE SHALL BE SIZED BY THE CONTRACTOR.
 - E. THE FLOATS SHALL BE MANUFACTURED BY ANCHOR SCIENTIFIC COMPANY, DRYDEN AQUA, PEPPERL + FUCHS, OR APPROVED EQUAL.

verdantas

219 SOUTH ERIE STREET
TOLEDO, OHIO 43604-9607
TEL. 419.365.2018



DESIGNED BY	LMS	DRAWN BY	LMS	CHECKED BY	JMK	PROJECT NO.	34398
CHKD BY	DATE	REVISION					
No.							

MARGARETTA TOWNSHIP-ERIE COUNTY-OHIO
B-MARSH
RECONNECTION PROJECT
CONSTRUCTION PLANS
ELECTRICAL LEGEND & SPECIFICATIONS

DATE	02-03-2026
SCALE	AS NOTED
SHEET	C10.0

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SECTION 260520 - SHIELDED INSTRUMENTATION & VARIABLE FREQUENCY DRIVE CABLE

PART 1 - GENERAL

- 1.1 DESCRIPTION
- A. SCOPE: FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO PROVIDE SHIELDED CABLE AS SHOWN AND SPECIFIED.
- 1.2 SUBMITTALS
- A. SHOP DRAWINGS:
- COMPLY WITH GENERAL PROVISIONS.
- B. PRODUCT DATA:
- SUBMIT FOR REVIEW COPIES OF MANUFACTURER'S ENGINEERING DATA AND TECHNICAL INFORMATION FOR SHIELDED INSTRUMENTATION CABLES PROPOSED FOR USE.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- A. INSTRUMENTATION CABLE
- SINGLE SHIELDED PAIR OR TRIAD: 300 VOLT
 - TINNED COPPER, #18 AWG OR LARGER, STRANDED, POLYETHYLENE INSULATED CONDUCTORS TWISTED WITH ALUMINUM-POLYESTER SHIELD, STRANDED TINNED #20 AWG COPPER DRAIN WIRE AND OVERALL CHROME VINYL JACKET, 100 PERCENT SHIELD COVER, RATED FOR 300 VOLTS MINIMUM
 - PRODUCTS AND MANUFACTURERS:
 - BELDEN NO. 8760, NO. 8770, NO. 9318, OR NO. 9365
 - ALPHA NO. 2422, NO. 2432
 - MULTI-PAIRED SHIELDED 300 VOLT:
 - TINNED COPPER, #18 AWG, STRANDED PVC INSULATED CONDUCTORS, TWISTED IN PAIRS WITH ALUMINUM-POLYESTER SHIELD OVER EACH PAIR AND ITS STRANDED DRAIN WIRE (#20 AWG), OVERALL CHROME VINYL JACKET, 100 PERCENT SHIELD COVER
 - PRODUCTS AND MANUFACTURERS:
 - 3 PAIR - BELDEN NO. 9369
 - 6 PAIR - BELDEN NO. 9389
 - 9 PAIR - BELDEN NO. 9390
 - 11 PAIR - BELDEN NO. 9391
 - 15 PAIR - BELDEN NO. 9392
 - DEKORON POLY-SET
 - OKONITE TYPE SP-OS
- B. VARIABLE FREQUENCY DRIVE SHIELDED CABLE
- FOUR-CONDUCTOR SHIELDED CABLE
 - SHIELDING TO HAVE AN OVERALL SHIELD WITH AN 85% TINNED COPPER BRAIDED SHIELD.
 - CABLE TO BE BELDEN VARIABLE FREQUENCY DRIVE CABLE MODELS 29502 THROUGH 29535, WIRE SIZE AS INDICATED OR EQUAL.

PART 3 - EXECUTION

- 3.1 PREPARATION
- A. DELIVERY, STORAGE AND PROTECTION: COMPLY WITH GENERAL PROVISIONS.
- 3.2 INSTALLATION
- A. INSTALL IN CONDUIT SEPARATED FROM POWER CABLES UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- B. INSTALL INSTRUMENTATION CABLE CONDUITS AS FAR AS POSSIBLE FROM POWER CABLE CONDUIT.
- C. GROUND SHIELD AT ONE END ONLY, AS RECOMMENDED BY INSTRUMENT MANUFACTURER, AND AS APPROVED BY THE OWNER.
- D. TERMINATE STRANDED CONDUCTORS WITH PRE-INSULATED CRIMP TYPE RING TONGUE TERMINALS PROPERLY SIZED TO FIT FASTENING DEVICE AND TO FIT WIRE SIZE.
- E. IDENTIFICATION: IDENTIFY ALL CONDUCTORS AT EACH TERMINAL AND SPLICE LOCATION. IDENTIFICATION NUMBER LABELS SHALL BE THOMAS & BETTS TYPE WSL CABLE MARKERS OR EQUAL WITH CLEAR HEAT SHRINK TUBING OVER THE MARKER.
- F. INSTALL CAT 5E AND CAT 6 CABLING IN ACCORDANCE WITH COMMERCIAL BUILDING TELECOMMUNICATIONS PATHWAYS AND SPACES ANSI/TIA/EIA 569-A AND COMMERCIAL BUILDING TELECOMMUNICATIONS CABLING STANDARD ANSI/TIA/EIA 568-A.
- 3.3 TESTING
- A. TEST EACH CIRCUIT IN THE PRESENCE OF THE OWNER AFTER PERMANENT CABLES ARE IN PLACE TO DEMONSTRATE THAT THE CIRCUIT AND CONNECTED EQUIPMENT PERFORM SATISFACTORILY AND THAT THEY ARE FREE FROM IMPROPER GROUNDS AND SHORT CIRCUITS.
- B. MAINTAIN A WRITTEN RECORD OF CIRCUITS BEING TESTED, MARKING DOWN CIRCUIT NUMBER AND DESCRIPTIVE FUNCTION AND RESULTS OF EACH STEP IN THE TEST PROCEDURES INCLUDING REPEATED TESTS.
- C. ANY CABLE OR A PORTION OF THE CABLE WHICH FAILS WHEN TESTED SHALL BE REPLACED WITH A NEW CABLE FOR THE FULL LENGTH AND RETESTED.

END OF SECTION 260520

SECTION 260553 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
- NAMEPLATES AND LABELS
 - WIRE AND CABLE MARKERS
 - CONDUIT MARKERS
- 1.2 REFERENCES
- NFPA 70 - NATIONAL ELECTRICAL CODE
- 1.3 SUBMITTALS
- SUBMIT UNDER GENERAL PROVISIONS.
 - PRODUCT DATA: PROVIDE CATALOG DATA FOR NAMEPLATES, LABELS, AND MARKERS.
- 1.4 REGULATORY REQUIREMENTS
- CONFORM TO REQUIREMENTS OF NFPA 70.
 - FURNISH PRODUCTS LISTED AND CLASSIFIED BY UNDERWRITERS LABORATORIES, INC.

PART 2 - PRODUCTS

- 2.1 NAMEPLATES AND LABELS
- A. NAMEPLATES:
- EQUIPMENT IDENTIFICATION: ENGRAVED THREE_LAYER LAMINATED PLASTIC, BLACK LETTERS ON WHITE BACKGROUND
 - EMERGENCY POWERED EQUIPMENT: ENGRAVED THREE-LAYER LAMINATED PLASTIC, BLACK LETTERS ON RED BACKGROUND, AS REQUIRED BY NEC
 - EQUIPMENT POWER SOURCE IDENTIFICATION: ENGRAVED THREE-LAYER LAMINATED PLASTIC, BLACK LETTERS ON YELLOW BACKGROUND
- B. LOCATIONS:
- EACH ELECTRICAL DISTRIBUTION AND CONTROL EQUIPMENT ENCLOSURE
 - JUNCTION BOX
- C. LETTER SIZE:
- USE 1/8-INCH LETTERS FOR IDENTIFYING INDIVIDUAL EQUIPMENT AND LOADS.
 - USE 1/4-INCH LETTERS FOR IDENTIFYING GROUPED EQUIPMENT AND LOADS.
- D. LABELS: EMBOSSED ADHESIVE TAPE, WITH 3/16-INCH WHITE LETTERS ON BLACK BACKGROUND. USE ONLY FOR IDENTIFICATION OF INDIVIDUAL WALL SWITCHES AND RECEPTACLES, AND CONTROL DEVICE STATIONS.

2.2 WIRE MARKERS

- A. MANUFACTURERS:
- T & B SHRINK-KON HVM WIRE MARKERS
 - PANDUIT - PAN CODE HSDL
 - BRADY
- B. DESCRIPTION: TUBING TYPE WIRE MARKERS
- C. LOCATIONS: EACH CONDUCTOR AT PANELBOARD GUTTERS, OUTLET AND JUNCTION BOXES, TERMINAL STRIP, AND EACH LOAD CONNECTION.
- D. LEGEND:
- POWER AND LIGHTING CIRCUITS: BRANCH CIRCUIT OR FEEDER NUMBER INDICATED ON DRAWINGS
 - CONTROL CIRCUITS: CONTROL WIRE NUMBER INDICATED ON SCHEMATIC AND INTERCONNECTION DIAGRAMS ON DRAWINGS OR ON SHOP DRAWINGS

PART 3 - EXECUTION

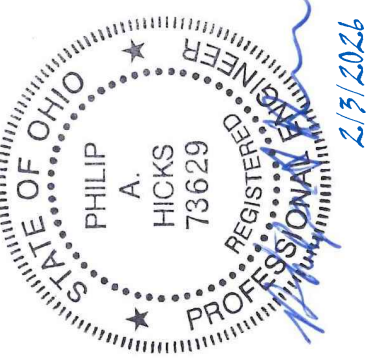
- 3.1 PREPARATION
- A. DEGREASE AND CLEAN SURFACES TO RECEIVE NAMEPLATES AND LABELS.
- 3.2 APPLICATION
- INSTALL NAMEPLATE PARALLEL TO EQUIPMENT LINES.
 - SECURE NAMEPLATE TO EQUIPMENT FRONT USING STAINLESS STEEL SCREWS, RIVETS, OR ADHESIVE.
 - IDENTIFY UNDERGROUND CONDUITS USING FOIL BACKED UNDERGROUND WARNING TAPE. INSTALL ONE TAPE PER TRENCH AT 6 INCHES BELOW FINISHED GRADE.

END OF SECTION 260553

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DESIGNED BY	LMS	DRAWN BY	LMS	CHECKED BY	JMK	PROJECT NO.	34388
CHKD BY	DATE						
No.							

MARGARETTA TOWNSHIP-ERIE COUNTY-OHIO
B-MARSH
RECONNECTION PROJECT
CONSTRUCTION PLANS
SHIELDED CABLE & ELEC. ID. SPECIFICATIONS

DATE	02-03-2026
SCALE	AS NOTED
SHEET	C10.1

SECTION 262923 - VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.1 DESCRIPTION

A. SCOPE:

- 1. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, AND INCIDENTALS AS SHOWN, SPECIFIED, AND REQUIRED TO FURNISH AND INSTALL VARIABLE FREQUENCY DRIVES, COMPLETE AND OPERATIONAL.
2. VARIABLE FREQUENCY DRIVES REQUIRED UNDER THIS SECTION ARE LOW-VOLTAGE, VOLTAGE SOURCE INVERTER, PULSE WIDTH MODULATED. VARIABLE FREQUENCY DRIVES SHALL BE CUSTOMIZED.
B. WHERE VARIABLE FREQUENCY DRIVES ARE BEING PROVIDED BY THE VENDOR OF THE ASSOCIATED DRIVEN EQUIPMENT, COSTS FOR VARIABLE FREQUENCY DRIVES SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR SAID EQUIPMENT. WHERE VARIABLE FREQUENCY DRIVES ARE NOT BEING PROVIDED BY THE VENDOR OF THE ASSOCIATED DRIVEN EQUIPMENT, COSTS FOR VARIABLE FREQUENCY DRIVES SHALL BE INCLUDED IN THE GENERAL CONTRACT PRICE.

C. RELATED SECTIONS:

- 1. SECTION 260553, ELECTRICAL IDENTIFICATION
2. SECTION 260520, SHIELDED CABLE

1.2 REFERENCES

A. STANDARDS REFERENCED IN THIS SECTION ARE:

- 1. IEEE 519, RECOMMENDED PRACTICES AND REQUIREMENTS FOR HARMONIC CONTROL IN ELECTRICAL POWER SYSTEMS.
2. NEMA AB 1, MOLDED-CASE CIRCUIT BREAKERS, MOLDED-CASE SWITCHES AND CIRCUIT BREAKER ENCLOSURES.
3. NEMA ICS 2, INDUSTRIAL CONTROL AND SYSTEMS, CONTROLLERS, CONTACTORS AND OVERLOAD RELAYS RATED 600 VOLTS.
4. NEMA ICS 7, INDUSTRIAL CONTROL AND SYSTEMS ADJUSTABLE SPEED DRIVES.
5. NEMA MG 1, MOTOR AND GENERATOR STANDARD.
6. UL 508, INDUSTRIAL CONTROL EQUIPMENT.
7. ISO 9000, QUALITY MANAGEMENT SYSTEMS, FUNDAMENTALS AND VOCABULARY.
8. ISO 9001, QUALITY MANAGEMENT SYSTEMS, REQUIREMENTS.
9. ISO 9002, QUALITY SYSTEMS, MODEL FOR QUALITY ASSURANCE IN PRODUCTION, INSTALLATION AND SERVICING.

1.3 QUALITY ASSURANCE

A. QUALIFICATIONS:

- 1. MANUFACTURER:
a. VARIABLE FREQUENCY DRIVE MANUFACTURER SHALL HAVE AT LEAST FIVE YEARS OF EXPERIENCE DESIGNING AND REGULARLY MANUFACTURING AND SERVICING SUBSTANTIALLY SIMILAR EQUIPMENT TO THAT SPECIFIED, AND SHALL SUBMIT DOCUMENTATION UPON REQUEST OF AT LEAST FIVE INSTALLATIONS IN SATISFACTORY OPERATION FOR AT LEAST FIVE YEARS.
b. MANUFACTURER SHALL BE CERTIFIED UNDER ISO 9000, ISO 9001, OR ISO 9002 FOR MATERIALS AND EQUIPMENT SPECIFIED.
c. FOR ALL REQUIRED FACTORY TESTS, VARIABLE FREQUENCY DRIVE MANUFACTURER SHALL USE A FACTORY TEST FACILITY THAT HAS CALIBRATED ITS TESTING APPARATUS IN THE PREVIOUS TWELVE MONTHS, AND IS STAFFED BY QUALIFIED, EXPERIENCED TECHNICIANS.

B. COMPONENT SUPPLY AND COMPATIBILITY:

- 1. DRIVES SPECIFIED UNDER THIS SECTION SHALL EMPLOY A LOW SWITCHING FREQUENCY OR PATTERN TO MINIMIZE INSTANTANEOUS RATE OF VOLTAGE CHANGE OVER TIME (dV/dt), AND THE ADVERSE EFFECTS OF POTENTIAL BEARING CURRENTS. WHERE ALTERNATE MANUFACTURERS ARE PROPOSED, OBTAIN MANUFACTURER RECOMMENDATIONS REGARDING BEARING CURRENTS AND PROVIDE EQUIPMENT REQUIRED AT NO ADDITIONAL COST TO OWNER.
2. EACH VARIABLE FREQUENCY DRIVE SHALL BE TOTALLY COMPATIBLE WITH ASSOCIATED DRIVEN EQUIPMENT AND MOTORS. VARIABLE FREQUENCY DRIVES SHALL BE MATCHED TO SPECIFIC LOAD REQUIREMENTS FOR EACH SYSTEM. OPERATION OF VARIABLE FREQUENCY DRIVE SHALL NOT OVERSTRESS MOTOR INSULATION.
3. SIMILAR COMPONENTS OF DRIVES ASSOCIATED WITH EACH SYSTEM SHALL BE PRODUCTS OF A SINGLE MANUFACTURER.

1.4 SUBMITTALS

A. ACTION SUBMITTALS: SUBMIT THE FOLLOWING:

- 1. SHOP DRAWINGS:
a. DIMENSIONAL INFORMATION AND CONSTRUCTION DETAILS OF ENCLOSURES. ENCLOSURE DETAILS SHALL CONSIST OF EXTERIOR AND INTERIOR FRONT DOOR WITH NAMEPLATE LEGENDS, INTERIOR DOOR FRONT AND REAR VIEWS, AND TERMINAL BLOCK LAYOUT.
b. THREE_LINE POWER AND CONTROL SCHEMATIC DIAGRAMS.
c. WIRING DIAGRAMS SHOWING THE INTERCONNECTION OF CONDUCTORS TO ALL DEVICES WITH TERMINAL ASSIGNMENTS FOR REMOTE DEVICES.
d. FUNCTIONAL DESCRIPTION OF SYSTEM OPERATION.
e. VFD HEAT DISSIPATION AT FULL LOAD, INCLUDING HEAT REJECTION/COOLING SYSTEM.
f. PRELIMINARY HARMONIC ANALYSIS SHALL UTILIZE:
1) I/L SHALL BE 80% OF THE CONNECTED LOAD.
2) THE POINT OF COMMON COUPLING (PCC) SHALL BE THE FIRST MAIN BREAKER OF THE MOTOR CONTROL CENTER WHICH THE VFD IS POWERED FROM.
3) THE LEVEL OF HARMONICS, AT THE PCC DESCRIBED ABOVE, SHALL NOT EXCEED IEEE 519 LIMITS.
2. PRODUCT DATA:
a. TECHNICAL SPECIFICATIONS.
b. CATALOG CUTS AND PRODUCT LITERATURE.
3. TESTING PLANS:
a. AT LEAST THIRTY DAYS PRIOR TO SOURCE QUALITY CONTROL TESTING, SUBMIT DESCRIPTIONS OF PROPOSED SHOP TESTING METHODS, PROCEDURES, AND APPARATUS.
b. AT LEAST THIRTY DAYS PRIOR TO FIELD QUALITY CONTROL TESTING, SUBMIT DESCRIPTIONS OF PROPOSED FIELD TESTING METHODS, PROCEDURES, AND APPARATUS.

B. INFORMATIONAL SUBMITTALS: SUBMIT THE FOLLOWING:

- 1. CERTIFICATES:
a. CERTIFICATION LETTERS FROM VARIABLE FREQUENCY DRIVE MANUFACTURER AND MOTOR MANUFACTURER THAT THE APPROVED DRIVEN EQUIPMENT HAS BEEN REVIEWED AND THAT VARIABLE FREQUENCY DRIVE UNITS AND MOTORS ARE COMPATIBLE, AND SHALL BE PROVIDED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND REQUIREMENTS OF THE DRIVEN EQUIPMENT.
2. SOURCE QUALITY CONTROL SUBMITTALS:
a. WITHIN 14 DAYS OF COMPLETING SOURCE QUALITY CONTROL TESTS AND INSPECTIONS, SUBMIT TEST RESULTS WITH INDICATION OF WHETHER ALL CRITERIA OF THE CONTRACT DOCUMENTS FOR THE SPECIFIED EQUIPMENT WERE MET.
3. FIELD QUALITY CONTROL SUBMITTALS:
a. WITHIN 14 DAYS OF COMPLETING FIELD QUALITY CONTROL TESTS AND INSPECTIONS, SUBMIT TEST RESULTS WITH INDICATION OF WHETHER ALL CRITERIA OF THE CONTRACT DOCUMENTS FOR THE SPECIFIED EQUIPMENT WERE MET.
4. MANUFACTURER REPORTS:
a. PRELIMINARY AND FINAL HARMONIC ANALYSIS.
b. WITHIN 14 DAYS OF EACH VISIT TO THE SITE BY MANUFACTURER'S REPRESENTATIVE, SUBMIT WRITTEN REPORT OF REASON FOR VISIT, PROBLEMS ENCOUNTERED, SOLUTIONS IMPLEMENTED, AND REMAINING WORK.
5. QUALIFICATIONS STATEMENTS:
a. MANUFACTURER.

C. CLOSEOUT SUBMITTALS: SUBMIT THE FOLLOWING:

- 1. OPERATION AND MAINTENANCE DATA:
a. SUBMIT COMPLETE INSTALLATION, OPERATION AND MAINTENANCE MANUALS INCLUDING TEST REPORTS, MAINTENANCE DATA AND SCHEDULES, DESCRIPTION OF OPERATION, LIST OF RECOMMENDED SPARE PARTS, AND SPARE PARTS ORDERING INFORMATION.
b. MANUALS SHALL INCLUDE RECORD DRAWINGS OF CONTROL SCHEMATICS, INCLUDING POINT-TO-POINT WIRING DIAGRAMS.
c. COMPLY WITH SECTION: OPERATION AND MAINTENANCE DATA.
d. FIELD REPORT OF FINAL HARMONIC TESTING.

D. MAINTENANCE MATERIALS SUBMITTALS: SUBMIT THE FOLLOWING:

- 1. SPARE PARTS AND EXTRA STOCK MATERIALS:
a. FURNISH, TAG, AND BOX FOR SHIPMENT AND LONG-TERM STORAGE, SPARE PARTS AND SPECIAL TOOLS FOR VARIABLE FREQUENCY DRIVES. EACH SPARE PART SET SHALL INCLUDE MANUFACTURER'S RECOMMENDED SPARE PARTS INVENTORY FOR ONE YEAR AND INCLUDE, AT MINIMUM, THE FOLLOWING:

Table with 2 columns: ITEM, QUANTITY PER FOUR VFDS PER HP RATING. Rows include: 1) TRANSISTOR AND DIODE MODULES WITH ACCESSORIES (ONE SET), 2) POWER SUPPLY MODULE (ONE), 3) FANS (ONE SET), 4) POWER FUSES (ONE SET OF EACH SIZE AND TYPE USED), 5) CONTROL POWER FUSES (TWO SETS OF EACH SIZE AND TYPE USED), 6) PILOT LIGHTS (TWO PER TEN OF EACH TYPE USED).

- 2. FURNISH A LIST OF RECOMMENDED SPARE PARTS FOR AN OPERATING PERIOD OF ONE YEAR. DESCRIBE EACH PART, THE QUANTITY RECOMMENDED, AND CURRENT UNIT PRICE.

1.5 DELIVERY, STORAGE, AND HANDLING

A. DELIVERY:

- 1. DELIVER MATERIALS TO THE SITE TO ENSURE UNINTERRUPTED PROGRESS OF THE WORK.
2. SHIPPING CONTAINERS SHALL BE DESIGNED TO BE SHIPPED BY TRUCK, RAIL, OR SHIP. INDOOR CONTAINERS SHALL BE BOLTED TO SKIDS.
3. INSPECT VARIABLE FREQUENCY DRIVE EQUIPMENT FOR SHIPPING DAMAGE OR LOOSE PARTS UPON DELIVERY. CHECK FOR EVIDENCE OF WATER THAT MAY HAVE ENTERED EQUIPMENT DURING TRANSIT.

B. HANDLING:

- 1. LIFT, ROLL OR JACK VARIABLE FREQUENCY DRIVE EQUIPMENT INTO LOCATIONS SHOWN.
2. VARIABLE FREQUENCY DRIVES SHALL BE EQUIPPED FOR HANDLING REQUIRED FOR INSTALLATION. HANDLE EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

C. STORAGE:

- 1. STORE VARIABLE FREQUENCY DRIVE EQUIPMENT IN A CLEAN, DRY LOCATION WITH CONTROLLED, UNIFORM TEMPERATURE AND HUMIDITY. PROTECT EQUIPMENT WITH COVERINGS AND MAINTAIN ENVIRONMENTAL CONTROLS.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. SYSTEM PERFORMANCE:

- 1. DRIVEN EQUIPMENT TO BE CONTROLLED BY A VARIABLE FREQUENCY DRIVE SHALL BE PROVIDED WITH A CUSTOMIZED VARIABLE FREQUENCY DRIVE. EACH DRIVE UNIT SHALL INCLUDE AN ADJUSTABLE FREQUENCY CONTROLLER WITH ASSOCIATED CONTROLS FOR CONTINUOUS SPEED ADJUSTMENT AND PROTECTION OF THE DRIVEN EQUIPMENT. OUTPUT SPEED CONTROL OF MOTOR SHALL BE CONTINUOUS THROUGHOUT SPEED RANGE OF TWO TO 60 HERTZ UNDER VARIABLE TORQUE LOAD OR CONSTANT TORQUE AS SPECIFIED FOR THE DRIVEN EQUIPMENT.
2. VARIABLE FREQUENCY DRIVES ASSOCIATED WITH EACH SET OF DRIVEN EQUIPMENT SHALL BE SIMILAR TO EACH OTHER.
3. VARIABLE FREQUENCY DRIVES SHALL BE UL-LISTED OR ETL-LISTED AND DESIGNED, BUILT, AND TESTED IN ACCORDANCE WITH NEMA AB 1, NEMA ICS 2, NEMA ICS 7, AND UL 508.
4. THE VFD SHALL NOT EMIT HARMONICS THAT EXCEED IEEE 519 LIMITS AT THE PCC.
5. THE POINT OF COMMON COUPLING FOR ALL VFDS TO BE TESTED AND CONFORM TO IEEE 519 HARMONIC LIMITS WILL BE CONSIDERED THE FIRST POINT OF CONNECTION TO THE ELECTRICAL SYSTEM, BE THAT THE MOTOR CONTROL CENTER THAT THE VFD POWER IS BEING SUPPLIED FROM AND NOT THE UTILITY CONNECTION POINT.

2.2 MANUFACTURERS

A. PROVIDE VARIABLE FREQUENCY DRIVES BY ONE OF THE FOLLOWING:

- 1. SCHNEIDER ELECTRIC
2. ABB
3. ALLEN-BRADLEY
4. EATON
5. TOSHIBA
6. DANFOSS
7. OR EQUAL

- 2.3 APPROVED EQUAL: OTHER MANUFACTURERS MUST BE PRE-QUALIFIED BEFORE ONE (1) WEEK PRIOR TO BID OPENING. PREQUALIFICATION SHALL CONSIST OF SUBMITTING INFORMATION LISTED IN PARAGRAPHS 1.3 AND 1.4 ABOVE TO THE ENGINEER A MINIMUM OF TWO (2) WEEKS PRIOR TO THE BID OPENING DATE. APPROVAL OF EQUAL MANUFACTURERS (IF ANY) WILL BE MADE BY ADDENDUM PRIOR TO THE BID OPENING.

- A. PROVIDE EACH VARIABLE FREQUENCY DRIVE WITH A WALL HANGING, FRONT-ACCESS, STAINLESS STEEL, NEMA 3R, FILTERED AND GASKETED ENCLOSURE. ENCLOSURE SHALL HOUSE ALL COMPONENTS REQUIRED FOR THE ASSOCIATED VARIABLE FREQUENCY DRIVE.

- B. ENCLOSURE SHALL PROVIDE ADEQUATE COOLING FOR COMPONENTS WITHIN AND INCLUDE NEGATIVE VENTILATION WITH RAIN GUARDS OVER THE VENTS AND SHALL BE SUITABLE FOR PADLOCKING.

- C. ENCLOSURE DOOR SHALL INCLUDE MANUAL OPERATOR DEVICES PER MOTOR CONTROL DIAGRAM IN ORDER TO ENABLE ACCESS TO CONTROLLER'S INTERFACE.

- D. EQUIP ENCLOSURE FRONT WITH NAMEPLATES FOR IDENTIFICATION OF EQUIPMENT AND OPERATING FUNCTIONS. NAMEPLATES SHALL BE IN ACCORDANCE WITH SECTION 260553, ELECTRICAL IDENTIFICATION.

- E. EQUIP ENCLOSURE WITH PHENOLIC TYPE TERMINAL BLOCKS SUITABLY LABELED FOR ALL INTERNAL AND REMOTE WIRING REQUIREMENTS, PLUS TWENTY PERCENT SPARE.

2.4 ADJUSTABLE FREQUENCY CONTROLLER

A. GENERAL:

- 1. ADJUSTABLE FREQUENCY CONTROLLER SHALL BE MICROPROCESSOR-BASED, PULSE WIDTH MODULATED DESIGN, SUITABLE FOR OPERATION ON A 240-VOLT, SINGLE-PHASE SUPPLY. CONTROLLER SHALL PRODUCE AN ADJUSTABLE AC VOLTAGE/FREQUENCY OUTPUT TO VARY SPEED OF DRIVEN EQUIPMENT. CONTROLLER SHALL CONSIST OF THE FOLLOWING SECTIONS:
a. THE DRIVE SHALL BE A PWM (PULSE WIDTH MODULATED) INVERTER USING IGBT TRANSISTORS.
2. CONTROLLER SWITCHING FREQUENCY SHALL BE ADJUSTABLE AND ALLOW OPERATION AT 5,000 HERTZ OR LESS. CONTROLLER TECHNOLOGY SHALL INCLUDE A SWITCHING SCHEME THAT REDUCES THE AV/AI OF OUTPUT SUPPLY.
3. CONTROLLER'S SOLID-STATE CONVERTER INPUT SECTION SWITCHING DEVICES SHALL HAVE 1600-VOLT PIV RATING.

- 4. OVERLOAD RATING OF 110 PERCENT VARIABLE TORQUE, 150 PERCENT CONSTANT TORQUE FOR ONE MINUTE.
5. RMS HARMONIC CONTENT OF OUTPUT CURRENT SHALL BE LESS THAN FIVE PERCENT OF FUNDAMENTAL CURRENT.
6. ABLE TO WITHSTAND OUTPUT TERMINAL LINE-TO-LINE SHORT CIRCUITS WITHOUT COMPONENT FAILURE.

B. OPERATING CRITERIA:

1. OPERATING CRITERIA SHALL BE IN ACCORDANCE WITH THE FOLLOWING:

- a. AMBIENT TEMPERATURE RANGE OF ZERO TO 40 °C
b. OPERATIONAL HUMIDITY OF UP TO 90 PERCENT NON-CONDENSING
c. ALTITUDE UP TO 3,300 FEET ABOVE SEA LEVEL
d. NOMINAL VOLTAGE OF 240-VOLTS PLUS OR MINUS TEN PERCENT, SINGLE-PHASE, TWO-WIRE. INCLUDE AN UNDER-VOLTAGE FEATURE TO ALLOW TRIP-FREE OPERATION DOWN TO 35 PERCENT UNDERVOLTAGE.
e. NOMINAL FREQUENCY OF 60 HERTZ PLUS OR MINUS THREE HERTZ
f. INPUT POWER FACTOR OF 95 PERCENT DISPLACEMENT POWER FACTOR AT ALL OPERATING SPEEDS
g. EFFICIENCY OF 96 PERCENT AT FULL SPEED AND FULL LOAD

C. FEATURES:

1. CONTROLLER SHALL HAVE THE FOLLOWING FEATURES:

- a. DIGITAL KEYPAD AND DISPLAY MODULE SHALL PROVIDE PARAMETER SETTING, ADJUSTMENTS, AND MONITORING OF CONTROL FUNCTIONS AND FAULTS. DISPLAY MESSAGES SHALL BE IN ENGLISH.
b. SERIAL COMMUNICATION PORT SHALL ALLOW CONNECTING TO PROGRAMMABLE CONTROLLER INTERFACE USING MANUFACTURER STANDARD PROTOCOL.
c. INDEPENDENT ACCELERATION/DECELERATION RATES SHALL PROVIDE TWO TO 600 SECONDS MINIMUM. WHEN CALLED TO STOP, MOTOR SHALL DECELERATE TO MINIMUM SPEED BEFORE STOPPING.
d. POWER LOSS FEATURE SHALL ALLOW FIVE CYCLE RIDE-THROUGH CAPABILITY FOR INPUT SUPPLY INTERRUPTIONS.
e. TIME DELAY AUTOMATIC RESTART SHALL ALLOW RESTART AFTER CONTROLLER FAULT CONDITIONS HAVE BEEN CLEARED WITH PROGRAMMABLE ATTEMPTS.
f. COASTING MOTOR RESTART SHALL ALLOW CONTROLLER TO RESTART INTO A COASTING MOTOR WITHOUT DAMAGE OR TRIPPING.
g. ISOLATED CONTROL INPUTS AND OUTPUTS

D. PROTECTION:

1. CONTROLLER SHALL HAVE PROTECTIVE FUNCTIONS AS FOLLOWS:

- a. INPUT LINE METAL OXIDE VARISTOR TRANSIENT PROTECTION
b. ELECTRONIC OVER-CURRENT TRIP, INSTANTANEOUS AND INVERSE-TIME OVERLOAD PROTECTION WITH THERMAL MEMORY RETENTION
c. OVER-TEMPERATURE TRIP TEMPERATURE PROTECTION
d. CURRENT LIMIT TRIP PROTECTION
e. INPUT LINE OVER- AND UNDER-VOLTAGE TRIP PROTECTION
f. GROUND FAULT TRIP PROTECTION

2. POWER LINE CONSIDERATIONS:

- a. THE DRIVE SHALL BE DESIGNED TO OPERATE IN ACCORDANCE WITH ALL PERFORMANCE REQUIREMENTS OF THE CONTRACT DOCUMENTS FROM A POWER SOURCE THAT CONTAINS A MAXIMUM OF 5% TOTAL VOLTAGE HARMONIC DISTORTION, MEET CURRENT DISTORTION AS DEFINED BY IEEE-519-1992.
b. EACH VFD OR MULTIPLE SETS OF VFDS SHALL BE DESIGNED AND INSTALLED SUCH THAT: THE TOTAL VOLTAGE HARMONIC DISTORTION REFLECTED BACK TO THE POWER SOURCE IS A MAXIMUM OF 5%.
c. WHEN LINE REACTORS AND HARMONIC FILTERS ARE REQUIRED THEY SHALL BE PROVIDED BY VFD SUPPLIER AND SHALL BE RATED FOR, AND COMPATIBLE WITH, EACH VFD. THEY SHALL FUNCTION AS A COMPLETE SYSTEM. ADDITIONAL HARMONIC FILTERS BEYOND THOSE SHOWN ON DRAWINGS MAY BE REQUIRED IN ORDER TO COMPLY WITH THE ABOVE PARAMETERS. THE LINE REACTORS AND HARMONIC TRAPS SHALL BE MOUNTED INSIDE THE RESPECTIVE VFD ENCLOSURES. TRAPS SHALL BE CURRENT LIMITING AND FUSE-PROTECTED AS A MINIMUM AND SHALL PROTECT INTERNAL WIRING AND COMPONENTS ON EACH PHASE. DATA ON THESE ITEMS SHALL BE INCLUDED WITH VFD SHOP DRAWINGS.
d. THE VFD SUPPLIER SHALL PERFORM A COMPUTER SIMULATED POWER SYSTEM STUDY TO VERIFY COMPLIANCE WITH THE PARAMETERS AS STATED HEREIN. THE RESULTS OF THIS STUDY SHALL BE SUBMITTED TO THE ENGINEER. AT A MINIMUM, THE SUBMITTED RESULTS OF THIS STUDY SHALL INCLUDE:
1) RESULTS SUMMARY SHEET WHICH BRIEFLY DESCRIBES THE POWER SYSTEM CONFIGURATION ANALYZED AND WHICH STATES THE CALCULATED VALUES OF TOTAL HARMONIC DISTORTION
2) DETAILED LIST OF THE AMPLITUDE OF HARMONIC CURRENTS AND VOLTAGES TO THE 50TH HARMONIC
3) IF IEEE 519 IS MET AND WHERE ON THE POWER DISTRIBUTION
e. THE CONTRACTOR SHALL SUPPLY THE VFD SUPPLIER WITH ALL POWER SYSTEM DATA REQUIRED TO PERFORM THE ABOVE-DESCRIBED STUDY. THESE DATA MAY INCLUDE BUT ARE NOT LIMITED TO:
1) A COMPLETE ONE-LINE DIAGRAM OF THE SUBJECT ELECTRICAL DISTRIBUTION SYSTEM
2) COMPLETE ELECTRICAL DATA ON ALL EQUIPMENT SHOWN ON THE ONE-LINE DIAGRAM IS REQUIRED. AT A MINIMUM, THIS DATA SHALL CONSIST OF:
a) TRANSFORMERS - kVA, PRIMARY VOLTAGE, SECONDARY VOLTAGE, SHORT CIRCUIT CAPACITY OR IMPEDANCE.
b) MOTORS - HORSEPOWER, BASE SPEED, FULL LOAD RMS CURRENT (FLA).
c) GENERATORS - SHORT CIRCUIT CAPACITY OR SUBTRANSIENT REACTANCES (X/D), POWER FACTOR, kW, X/R RATIO.
3) IF THE DISTRIBUTION SYSTEM CAN FUNCTION IN MORE THAN ONE CONFIGURATION, THE CONFIGURATION(S) TO BE ANALYZED SHALL BE CLEARLY DEFINED. ANY OTHER INFORMATION WHICH MAY AFFECT THE BEHAVIOR OF THE DISTRIBUTION SYSTEM SHALL ALSO BE PROVIDED.

SECTION 262923 CONTINUED ON NEXT SHEET

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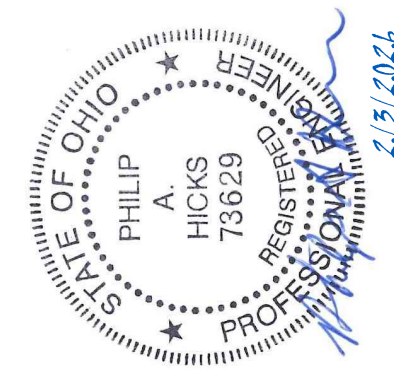


Table with 4 columns: DESIGNED BY (LMS), DRAWN BY (LMS), CHECKED BY (JMK), PROJECT NO. (34398)

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MARGARETTA TOWNSHIP-ERIE COUNTY-OHIO
B-MARSH
RECONNECTION PROJECT
CONSTRUCTION PLANS
VFD SPECIFICATIONS (1)

DATE 02-03-2026

SCALE AS NOTED

SHEET C10.2

(SECTION 262923 - VARIABLE FREQUENCY DRIVES, CONT.)

2.5 CONTROLS

A. GENERAL:

- 1. EQUIP EACH VARIABLE FREQUENCY DRIVE CONTROL SYSTEM WITH RELAYS, SWITCHES, FUSES, INDICATING LIGHTS, AND COMPONENTS REQUIRED FOR A COMPLETE, FUNCTIONAL SYSTEM.
- 2. VARIABLE FREQUENCY DRIVE CONTROL SHALL BE POWERED FROM A SUITABLY SIZED AND PROTECTED CONTROL POWER TRANSFORMER.
- 3. VARIABLE FREQUENCY DRIVE CONTROL SHALL INCLUDE STATUS INDICATORS, CONTROLLER, AND SYSTEM FAULT CONDITION DISPLAYS AND OPERATING CONTROLS. PROVIDE STATUS INDICATORS AND OPERATING CONTROLS ASSOCIATED WITH DRIVE CONTROL ON FRONT DOOR OF ENCLOSURE.
- 4. CONTROL ARRANGEMENT SHALL BE SUCH THAT VARIABLE FREQUENCY DRIVE INTERNAL ELECTRONIC SUPPLY VOLTAGE IS ISOLATED FROM FIELD WIRING.

B. CONTROL AND PILOT DEVICES:

- 1. RELAYS SHALL BE STANDARD, LATCHING TYPE, AND PNEUMATIC OR SOLID-STATE TIME-DELAY TYPE. PROVIDE RELAYS WITH CONTACTS RATED FOR TEN AMPS, QUANTITY AS REQUIRED.
- 2. PILOT DEVICES SHALL BE HEAVY DUTY TYPE, RATED 10 AMPS CONTINUOUS. INDICATING LIGHTS SHALL BE PUSH-TO-TEST FULL VOLTAGE LED TYPE.

C. OPERATION:

- 1. CONTROLS FOR EACH VARIABLE FREQUENCY DRIVE SHALL CONSIST OF ALL DEVICES NECESSARY FOR THE FOLLOWING:
 - a. STOP/START AND SPEED CONTROL: STOP/START AND SPEED CONTROL SHALL RESPOND TO DRIVE-MOUNTED SELECTOR SWITCH. WITH SWITCH IN "AUTO" POSITION, STOP/START CONTROL SHALL BE BASED ON A STOP/START RELAYS TRIGGERED BY THE STATE OF THE RESPECTIVE FLOAT SWITCH. WITH SWITCH IN "HAND" POSITION, STOP/START CONTROL SHALL BE BASED ON STOP/START PUSHBUTTONS LOCATED ADJACENT TO DRIVEN EQUIPMENT. SPEED CONTROL SHALL BE BASED ON DRIVE-MOUNTED SPEED POTENTIOMETER.

D. AUXILIARY FEATURES:

- 1. PROVIDE EACH VARIABLE FREQUENCY DRIVE WITH THE FOLLOWING:
 - a. STATUS INDICATORS: STATUS INDICATORS SHALL INCLUDE SEPARATE PILOT LIGHTS FOR INDICATION OF MOTOR RUN (GREEN).
 - b. SHUTDOWN INDICATORS: SHUTDOWN INDICATORS SHALL INCLUDE SEPARATE PILOT LIGHTS (AMBER OR RED, AS IN DIAGRAMS) FOR EACH SHUTDOWN CONDITION. ARRANGE FAULT SHUTDOWN INDICATION CIRCUITRY SO THAT, WHEN ACTIVATED, INDICATOR REQUIRES MANUAL RESET.
 - c. CONTACT OUTPUTS: CONTACT OUTPUTS SHALL INCLUDE SEPARATE DRY CONTACTS FOR REMOTE INDICATION OF MOTOR RUN, SEAL WATER ALARM FOR EQUIPMENT WITH SEAL WATER SYSTEMS, EACH SHUTDOWN CONDITION, AND CONTROLLER FAULTS.
 - d. SPEED OUTPUT: SPEED OUTPUT SHALL INCLUDE 4-20 mADC SIGNAL FOR REMOTE INDICATION OF MOTOR SPEED.

E. WIRING AND DEVICE IDENTIFICATION:

- 1. PROVIDE CONTROL WIRING AND DEVICE IDENTIFICATION FOR EACH VARIABLE FREQUENCY DRIVE:
 - a. IDENTIFY ALL CONTROL CONDUCTORS WITH PERMANENT TYPE WIRE MARKERS. EACH WIRE SHALL BE IDENTIFIED BY A UNIQUE NUMBER AND SHALL BE ATTACHED TO WIRE AT EACH TERMINATION POINT.
 - b. IDENTIFY EACH CONTROL DEVICE WITH PERMANENT TYPE MARKER. EACH DEVICE SHALL BE IDENTIFIED BY A UNIQUE NUMBER AND SHALL BE ATTACHED TO EACH DEVICE.
 - c. NUMBERING SYSTEM FOR EACH WIRE AND CONTROL DEVICE SHALL BE IDENTIFIED ON WIRING DIAGRAMS AND SHALL REFLECT ACTUAL DESIGNATIONS USED IN THE WORK.

2.6 SOURCE QUALITY CONTROL

A. TESTS:

- 1. PERFORM FACTORY TESTS ON EACH VARIABLE FREQUENCY DRIVE PRIOR TO SHIPPING. TEST SHALL CONSIST OF SIMULATING EXPECTED LOAD TO BE DRIVEN BY OPERATING LOAD THROUGH SPEED RANGES SPECIFIED FOR DRIVEN EQUIPMENT, FOR MINIMUM OF TWO HOURS PER DRIVE UNIT.
- 2. PROVIDE FACTORY CONTROL AND ALARM TESTS ON EACH DRIVE UNIT BY SIMULATING EACH CONTROL SIGNAL AND EACH ALARM FUNCTION TO VERIFY PROPER AND CORRECT DRIVE UNIT ACTION.
- 3. PERFORM SPECIFIED TESTS IN ADDITION TO STANDARD FACTORY TESTS TYPICALLY PERFORMED.

B. FACTORY TESTS AS OUTLINED ABOVE SHALL BE WITNESSED BY THE OWNER'S REPRESENTATIVE:

- 1. THE MANUFACTURER SHALL NOTIFY THE OWNER TWO (2) WEEKS PRIOR TO THE DATE THE TESTS ARE TO BE PERFORMED.
- 2. THE MANUFACTURER SHALL INCLUDE THE COST OF TRANSPORTATION AND LODGING FOR UP TO THREE (3) OWNER'S REPRESENTATIVES.

PART 3 - EXECUTION

3.1 INSPECTION

A. EXAMINE CONDITIONS UNDER WHICH THE WORK WILL BE INSTALLED AND NOTIFY ENGINEER IN WRITING OF CONDITIONS DETRIMENTAL TO PROPER AND TIMELY COMPLETION OF THE WORK. DO NOT PROCEED WITH THE WORK UNTIL UNSATISFACTORY CONDITIONS ARE CORRECTED.

3.2 INSTALLATION

- A. INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS AND IN CONFORMANCE WITH LAWS AND REGULATIONS, AND THE CONTRACT DOCUMENTS.
- B. UNLESS OTHERWISE SHOWN OR INDICATED, INSTALL EQUIPMENT AT EXISTING LOCATION OF DRIVE UNIT BEING REPLACED.
- C. INSTALL EQUIPMENT WITH SUFFICIENT ACCESS AND WORKING SPACE PROVIDED FOR READY AND SAFE OPERATION AND MAINTENANCE.
- D. FOR INSTALLATIONS AGAINST MASONRY WALLS, PROVIDE AN INSULATION BOARD, 1/4-INCH MINIMUM THICKNESS, BETWEEN EQUIPMENT AND WALL FOR CORROSION PROTECTION. TRIM BOARD NEATLY WITHIN OUTLINE OF EQUIPMENT.
- E. INSTALL ALL TERMINATIONS, LUGS, AND REQUIRED APPURTENANCES NECESSARY TO PROPERLY TERMINATE POWER SUPPLIES.
- F. INSTALL CONTROL WIRING TERMINATIONS AND APPURTENANCES NECESSARY TO COMPLETE INSTALLING CONTROL AND MONITORING DEVICES.

3.3 FIELD QUALITY CONTROL

A. SITE TESTS:

- 1. AFTER INSTALLATION, INSPECT, ADJUST, AND TEST EACH VARIABLE FREQUENCY DRIVE AT THE SITE. TESTING AND INSPECTION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND BE PERFORMED BY MANUFACTURER'S FACTORY-TRAINED REPRESENTATIVE. THROUGH CONTRACTOR, MANUFACTURER'S FACTORY-TRAINED REPRESENTATIVE SHALL INFORM OWNER AND ENGINEER WHEN EQUIPMENT IS CORRECTLY INSTALLED AND READY TO BE ENERGIZED. DO NOT ENERGIZE EQUIPMENT WITHOUT PERMISSION OF OWNER.
- 2. PERFORM THE FOLLOWING EQUIPMENT INSPECTION AND TESTING AND PROVIDE REPORTS DOCUMENTING PROCEDURES AND RESULTS.
 - a. VERIFY ALL DEVICE SETTINGS AND DRIVE ADJUSTMENTS.
 - b. INSPECT ALL MECHANICAL AND ELECTRICAL INTERLOCKS AND CONTROLS FOR PROPER OPERATION.
 - c. TEST EACH DRIVE THROUGH SPECIFIED SPEED RANGES AND LOADS FOR A MINIMUM OF TWO HOURS PER DRIVE UNIT.
 - d. TEST EACH DRIVE BY USING ACTUAL CONTROL SIGNAL FOR REMOTE AND LOCAL OPERATION.
 - e. TEST EACH DRIVE ALARM FUNCTION.
 - f. PERFORM OTHER TESTS RECOMMENDED BY EQUIPMENT MANUFACTURER.

g. PERFORM HARMONICS TESTING TO CONFIRM COMPLIANCE WITH IEEE 519 LIMITS.

- 1) TESTING OF THE HARMONIC LIMITS SHALL BE PER A VFD SYSTEM AS OPERATING UNDER NATURAL CONDITIONS.
- 2) UTILIZE THE RECORDED MAXIMUM CURRENT RECORDED FOR THE OPERATING VFD SYSTEM AS I_{LOAD} .
- 3) SUBMIT ALL CALCULATIONS, ALL COLLECTED FIELD DATA AND GRAPHS FOR REVIEW TO ENGINEER.
- 4) IF THE VFD SYSTEM FAILS TO BE AT OR BELOW ANY OR ALL OF THE IEEE 519 HARMONIC ACCEPTABLE LEVELS THE VFD MANUFACTURER SHALL INCUR ALL COSTS ASSOCIATED WITH RETESTING, ADDITIONAL HARMONIC MITIGATION EQUIPMENT, EQUIPMENT INSTALLATION AND RETESTING EXPENSES INCLUDING COSTS ASSOCIATED WITH ENGINEER TRAVEL TO WITNESS ANY AND ALL TESTING.

B. MANUFACTURER SERVICES:

- 1. UNLOADING AND INSTALLATION: MANUFACTURER'S FACTORY-TRAINED REPRESENTATIVE SHALL BE PRESENT DURING UNLOADING OF EQUIPMENT AND INSTALLATION AT EQUIPMENT'S FINAL LOCATION. REPRESENTATIVE SHALL TRAIN INSTALLING PERSONNEL IN ADVANCE IN THE PROPER HANDLING AND RIGGING OF EQUIPMENT. SERVICES BY MANUFACTURER'S REPRESENTATIVE UNDER THIS PARAGRAPH SHALL BE AT LEAST 2 EIGHT-HOUR DAYS AT THE SITE.
- 2. POST-INSTALLATION CHECK: MANUFACTURER'S FACTORY-TRAINED REPRESENTATIVE SHALL CHECK AND APPROVE THE INSTALLED EQUIPMENT BEFORE INITIAL OPERATION. MANUFACTURER SHALL CALIBRATE, SET AND PROGRAM VARIABLE FREQUENCY DRIVES PROVIDED. SERVICES BY MANUFACTURER'S REPRESENTATIVE UNDER THIS PARAGRAPH SHALL BE AT LEAST 2 EIGHT-HOUR DAYS AT THE SITE.
MANUFACTURER'S FACTORY-TRAINED REPRESENTATIVE SHALL ADJUST THE SYSTEM TO FINAL SETTINGS AS SPECIFIED IN ARTICLE 3.5 OF THIS SECTION. MANUFACTURER'S FACTORY TRAINED REPRESENTATIVE SHALL TEST AS SPECIFIED IN SECTION 3.3.A OF THIS SECTION. REPRESENTATIVE SHALL OPERATE AND TEST THE SYSTEM IN PRESENCE OF ENGINEER AND VERIFY THAT EQUIPMENT IS IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. SERVICES BY MANUFACTURER'S REPRESENTATIVE UNDER THIS PARAGRAPH SHALL BE AT LEAST 2 EIGHT-HOUR DAYS AT THE SITE.
- 3. REPRESENTATIVE SHALL REVISIT THE SITE AS OFTEN AS NECESSARY UNTIL ALL DEFICIENCIES ARE CORRECTED, PRIOR TO READINESS FOR FINAL PAYMENT.
- 4. PROVIDE SERVICES OF MANUFACTURER'S FACTORY-TRAINED REPRESENTATIVES TO CORRECT DEFECTIVE WORK WITHIN 72 HOURS OF NOTIFICATION BY OWNER DURING THE CORRECTION PERIOD SPECIFIED IN THE GENERAL CONDITIONS AS MAY BE AMENDED BY THE SUPPLEMENTARY CONDITIONS.
- 5. REPLACEMENT PARTS OR EQUIPMENT PROVIDED DURING THE CORRECTION PERIOD SHALL BE EQUAL TO OR BETTER THAN ORIGINAL.
- 6. TRAINING: PROVIDE SERVICES OF QUALIFIED FACTORY TRAINED SPECIALISTS FROM MANUFACTURER TO INSTRUCT OWNER'S OPERATIONS AND MAINTENANCE PERSONNEL IN RECOMMENDED OPERATION AND MAINTENANCE OF EQUIPMENT.

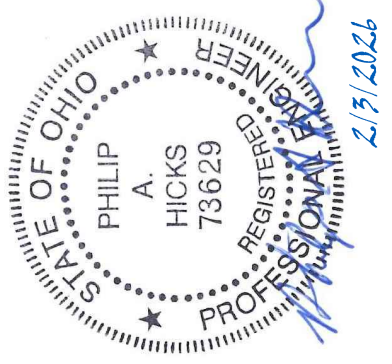
3.4 ADJUSTING

A. FOLLOWING SUBSTANTIAL COMPLETION, WHEN INSPECTION AND TESTING ARE COMPLETE AND VARIABLE FREQUENCY DRIVES ARE OPERATING, MANUFACTURER'S REPRESENTATIVE SHALL RETURN TO THE SITE AND MAKE FINAL ADJUSTMENTS AS REQUIRED TO EACH VARIABLE FREQUENCY DRIVE FURNISHED UNDER THIS SECTION.

END OF SECTION 262923

verdantas

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