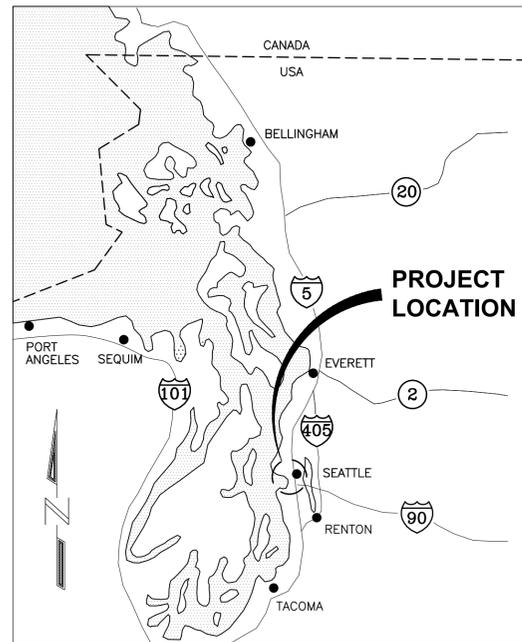
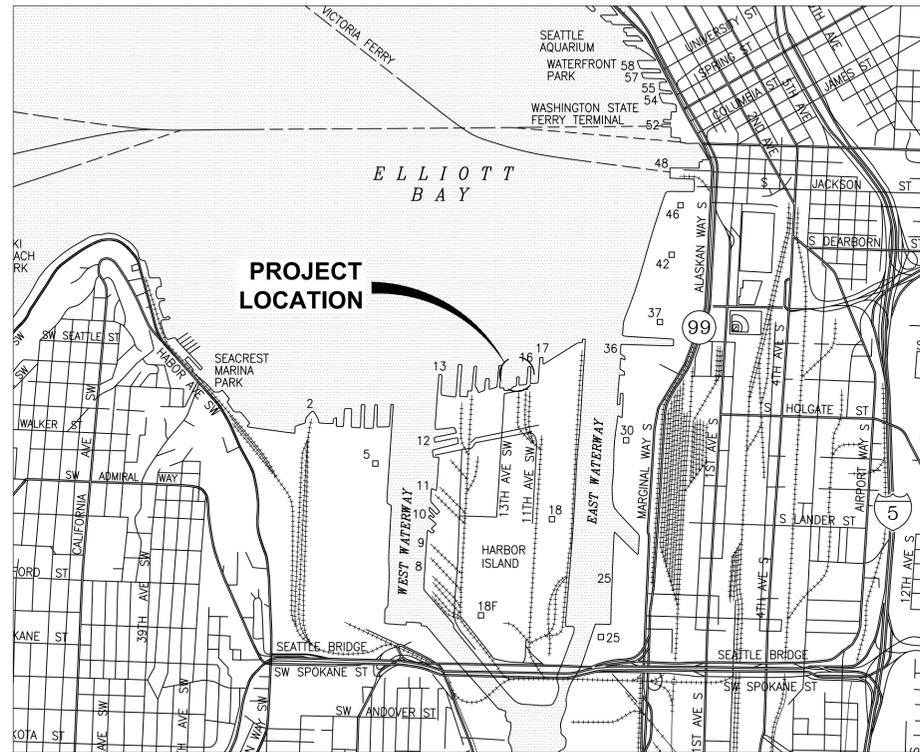


ALASKA RAILROAD CORPORATION PIER 15.5 ELECTRICAL UPGRADE PROJECT SEATTLE, WA



VICINITY MAP



LOCATION MAP

SHEET INDEX

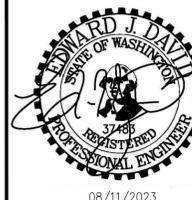
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REVISIONS		
REV	DATE	DESCRIPTION
0	08/11/2023	ISSUED FOR BID

ISSUED FOR BID			
ALASKA RAILROAD PIER 15.5 ELECTRICAL UPGRADE PROJECT			
TITLE SHEET & SHEET INDEX			
DESIGNED BY:	EJD	PROJECT NO:	224017
DRAWN BY:	KDD	DATE:	JULY 2023
CHECKED BY:	EJD	SCALE:	NONE
			G1.00

PROJECT NOTES

- GENERAL: WORK SHALL BE DONE IN ACCORDANCE WITH NFPA 70 AS ADOPTED BY THE CITY OF SEATTLE, KING COUNTY, AND THE STATE OF WASHINGTON.
- LOCATIONS OF ELECTRICAL DEVICES, LIGHTING FIXTURES, ETC., INDICATED ON CIVIL / STRUCTURAL PLANS - INCLUDING SECTIONS, ELEVATIONS, NOTES, OR OTHER INDICATORS - TAKE PRECEDENCE OVER LOCATIONS SHOWN ON ELECTRICAL DRAWINGS.
- REFER TO CIVIL, STRUCTURAL, MECHANICAL, LANDSCAPE, ETC., DRAWINGS FOR WORK OUTSIDE OF ELECTRICAL DIVISIONS. INFORMATION CONVEYED WITHIN THE ELECTRICAL DRAWINGS ILLUSTRATING OR REFERENCING WORK OF OTHER DIVISIONS IS FOR REFERENCE ONLY. SPECIFICATION BY THE APPROPRIATE DIVISIONS SHALL APPLY.
- GENERAL NOTES ARE SHOWN ON SHEETS MOST RELEVANT TO SPECIFIC NOTE; HOWEVER, GENERAL NOTES ON EACH SHEET SHALL APPLY IN PRACTICE TO ALL ELECTRICAL DRAWINGS.
- NOT ALL COMPONENTS OF THE ELECTRICAL SYSTEMS ARE SHOWN (FOR SIMPLICITY). PROVIDE MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTEM.
- STAINLESS STEEL HARDWARE - MATERIALS USED FOR THE MOUNTING AND SUPPORT OF BOXES, CABLES, RACEWAYS, LIGHT FIXTURES, OUTLETS, AND OTHER DIVISION 16 EQUIPMENT, ARE TO BE 316 STAINLESS STEEL. THIS APPLIES TO THE AFOREMENTIONED COMPONENTS WHEN INSTALLED OUTSIDE ABOVE GRADE.
- EXCEPT WHERE SPECIFICALLY DETAILED OR SPECIFIED, ELECTRICAL DRAWINGS ARE DIAGRAMMATIC. EXACT LOCATIONS OF ELECTRICAL EQUIPMENT IS APPROXIMATE. CHANGES MADE BY THE OWNER IN LOCATING ELECTRICAL COMPONENTS OF UP TO TEN FEET HORIZONTALLY MAY BE MADE WITHOUT APPROVAL OF ENGINEER.
- COORDINATE LOCATIONS OF ELECTRICAL AND COMMUNICATION CHASES AND CONDUITS WITH OTHER TRADES. ADJUST LOCATIONS AS NECESSARY TO AVOID CONFLICTS.
- FIELD VERIFY EXISTING CONDITIONS PRIOR TO ORDERING MATERIALS.
- SCOPE OF WORK: THE SCOPE OF ELECTRICAL WORK FOR THIS PROJECT INCLUDES THE FOLLOWING:
 - GENERAL: DEMOLISH EXISTING MOTOR CONTROL CENTER IN BUILDING. PROVIDE INDIVIDUAL COMBINATION MOTOR STARTERS TO MATCH EXISTING MCC STARTERS AND RECONNECT POWER/CONTROL WIRING. RELOCATE ELECTRICAL EQUIPMENT AND WIRING INSIDE BUILDING TO ACCOMMODATE NEW DEVICES. AN INTERIM INSTALLATION IS REQUIRED TO LIMIT DOWNTIME. IN THE INTERIM STEP NEW EQUIPMENT IS TEMPORARILY MOUNTED OUTSIDE THE ELECTRICAL BUILDING WHILE INTERIOR EQUIPMENT IS BEING DEMOLISHED AND RELOCATED.
 - DOWNTIME: DOWNTIME SHALL BE LIMITED TO 12-HOUR PERIODS AS APPROVED - IN ADVANCE - BY ALASKA RAILROAD CORPORATION (ARC). THE PROJECT SITE SHALL BE FULLY OPERATIONAL AT THE END OF EACH BUSINESS DAY WITH NO SITE IMPEDIMENTS OR OBSTRUCTIONS. OBTAIN PERMISSION FROM ARC FOR OUTAGES (14) WORKING DAYS IN ADVANCE OF DESIRED OUTAGE DATES. LIMIT OUTAGE TO (1) DAY; RESTORE POWER AND FUNCTIONALITY PRIOR TO 6PM ON THE DAY OF OUTAGE.

NOTE: SITE CONSTRUCTION WORK IS NOT PERMITTED ON DAYS WHEN BARGE LOADING OPERATIONS ARE TAKING PLACE; SEE ARC SCHEDULE FOR APPLICABLE DATES. PROVIDE AN ELECTRICIAN ON-SITE DURING BARGE LOADING OPERATIONS WHILE INTERIM ELECTRICAL EQUIPMENT IS IN OPERATION. THE SITE ELECTRICIAN WILL PERFORM ELECTRICAL REPAIRS OR CORRECTIONS NECESSARY TO ENSURE CONTINUED OPERATION OF THE SITE.
 - SERVICE & SEATTLE CITY LIGHT (SCL): CONTACT, SCHEDULE, AND COORDINATE SERVICE CHANGES WITH SCL FOR INSTALLATION OF NEW SERVICE CONDUCTORS AND SERVICE EQUIPMENT. OUTAGE LIMITATIONS NOTED IN OTHER SECTIONS APPLY TO SERVICE CHANGES. PROVIDE RACEWAYS, SUPPORTS, AND OTHER ELECTRICAL MATERIALS, REQUIRED BY SCL, PER SCL CONSTRUCTION STANDARDS.
 - PERMITS: GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS AND PAY ALL GOVERNMENT TAXES, FEES AND OTHER COSTS IN CONNECTION WITH THIS WORK. OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION OF THE WORK AND DELIVER SAME TO THE ENGINEER AT THE TIME OF SUBSTANTIAL COMPLETION AND BEFORE REQUEST FOR FINAL PAYMENT.
 - DEMOLITION: REMOVE AND DISPOSE OF EXISTING ELECTRICAL SYSTEMS AND EQUIPMENT IDENTIFIED FOR DEMOLITION. MAINTAIN EXISTING ELECTRICAL SYSTEMS TO REMAIN.

ABBREVIATIONS

A	AMP	AMPERES	EF	EXHAUST FAN	LCP	LIGHT CONTROL PANEL	PRI	PRIMARY	
AF	AMPERE (RATED) FUSES	EMT	ELECTRICAL METALLIC TUBING	MAX	MAXIMUM	PSE	PUGET POWER ENERGY	REQD	REQUIRED
AFB	ABOVE FINISHED FLOOR	ENCL	ENCLOSURE	MCA	MINIMUM CIRCUIT AMPERES	RNC	RIGID NONMETALLIC CONDUIT (PVC)	RS	RAPID START
AFG	ABOVE FINISHED GRADE	EOL	END OF LINE	MFR	MANUFACTURER	RS	RAPID START	SEC	SECONDARY
AL	ALUMINUM (ALLOY)	EPA	EFFECTIVE PROJECTED AREA	MIN	MINIMUM	SPDT	SINGLE POLE DOUBLE THROW	SWR	SWITCHGEAR
ALC	AUTOMATED LIGHTING CONTROL	EWC	ELECTRIC WATER COOLER	MISC	MISCELLANEOUS	SURF	SURFACE	SWBD	SWITCHBOARD
AS	AMPERE (RATED) SWITCH	EWH	ELECTRIC WATER HEATER	MLO	MAIN LUGS ONLY	SWR	SWITCHGEAR	SWR	SWITCHGEAR
ATS	AUTOMATIC TRANSFER SWITCH	FA	FIRE ALARM	NC	NORMALLY CLOSED	TB	TERMINAL BOARD	TDC	TIME DELAY CLOSING
AUTO	AUTOMATIC	FAA	FIRE ALARM ANNUNCIATOR	NEC	NATIONAL ELECTRICAL CODE	TEL	TELEPHONE	TDO	TIME DELAY OPENING
AUX	AUXILIARY	FC	FOOT CANDLES	-N-	NEUTRAL (GROUNDED CONDUCTOR)	TYP	TYPICAL	UL	UNDERWRITERS LAB
AWG	AMERICAN WIRE GAUGE	FLA	FULL LOAD AMPERES	FLX	FLEXIBLE	UON	UNLESS OTHERWISE NOTED	URS	UNINTERRUPTIBLE POWER SUPPLY
BAT	BATTERY	FLEX	FLEXIBLE	FU	FUSE	V	VOLTS	VA	VOLT-AMPERES
BFG	BELOW FINISHED GRADE	GEN	GENERATOR	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOC.	VFD	VARIABLE FREQUENCY DRIVE	W	WATT
C	CONDUIT (CIRCULAR RACEWAY)	GFI	GROUND FAULT CIRCUIT INTERRUPTER	NL	NORMALLY OPEN	W	WATT	W	WATT
CAB	CABINET	GND	GROUND	NO	NORMALLY OPEN	W	WATT	W	WATT
CB	CIRCUIT BREAKER	GRC	GALVANIZED RIGID STEEL CONDUIT	NTS	NOT TO SCALE	W	WATT	W	WATT
CFM	CUBIC FEET PER MINUTE	GRD	IN-GROUND	OC	ON CENTER	W	WATT	W	WATT
CKT	CIRCUIT	HP	HORSEPOWER	OD	OUTSIDE DIAMETER	W	WATT	W	WATT
CLG	CEILING	HZ	HERTZ (CYCLES PER SECOND)	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED	W	WATT	W	WATT
CO	CONDUIT ONLY	IES	ILLUMINATING ENGINEERING SOCIETY	OFI	OWNER FURNISHED, OWNER INSTALLED	W	WATT	W	WATT
CT	CURRENT TRANSFORMER	IG	ISOLATED GROUND	OS	OCCUPANCY SENSOR	W	WATT	W	WATT
CU	COPPER	IMC	INTERMEDIATE METAL CONDUIT	P	POLE	W	WATT	W	WATT
DC	DIRECT CURRENT	K	KEY OPERATED	PB	PUSH-BUTTON	W	WATT	W	WATT
DISC	DISCONNECT	KM	THOUSAND CIRCULAR MILS	PH	PENDANT	W	WATT	W	WATT
DIA	DIAMETER	KO	KNOCK OUT	PH	PHASE	W	WATT	W	WATT
DIV	DIVISION	KW	KILOWATTS	PNL	PANEL	W	WATT	W	WATT
DP	DISTRIBUTION PANEL	KVA	KILO VOLT-AMPERES	+POS	POSITIVE	W	WATT	W	WATT
DPDT	DOUBLE POLE DOUBLE THROW					W	WATT	W	WATT
DPST	DOUBLE POLE SINGLE THROW					W	WATT	W	WATT
DWG	DRAWING					W	WATT	W	WATT
E, (E)	EXISTING					W	WATT	W	WATT

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
[FACP]	FIRE ALARM CONTROL PANEL
[FARA]	FIRE ALARM REMOTE ANNUNCIATOR
[F]	FIRE ALARM SYSTEM MANUAL PULL STATION, WALL MOUNTED
[F]	SPEAKER - CEILING, WALL MOUNTED
[F]	STROBE, WALL MOUNTED (X = CANDELA RATING)
[F]	COMBINATION SPEAKER/STROBE, WALL MOUNTED (X = CANDELA RATING)
[TS]	SPRINKLER VALVE TAMPER SWITCH LOCATION
[TS]	SPRINKLER FLOW SWITCH CONNECTION
[F]	SMOKE DETECTOR, CEILING OR PLENUM MOUNTED, PHOTOELECTRIC TYPE UON
[F]	SMOKE SENSOR, DUCT MOUNTED, WITH SAMPLING TUBES, PHOTOELECTRIC TYPE UON
[F]	ELECTROMAGNETIC DOOR HOLDER, WALL MOUNTED
[F]	FIREMAN'S PHONE JACK, WALL MOUNTED
[F]	FIREMAN'S PHONE HAND SET, WALL MOUNTED
[FSD]	FIRE ALARM CONNECTION TO COMBINATION FIRE/SMOKE DAMPER
[F]	FLAME DETECTOR (FLICKER DETECTOR)
[F]	LIGHT (LIGHT, SIGNAL LIGHT, INDICATOR LAMP, STROBE)
[F]	HEAT DETECTOR, CEILING MOUNTED, RATE OF RISE AND FIXED TEMPERATURE TYPE, UON
[F]	HEAT DETECTOR - FIXED TEMP. ONLY
[F]	HEAT DETECTOR - RATE OF RISE ONLY
[FIV]	POST INDICATOR VALVE (PIV) CONNECTION

SYMBOL	DESCRIPTION
[E]	EQUIPMENT TERMINAL BOARD 8" HIGH X WIDTH AS SHOWN, FIRE TREATED
[E]	COMBO TELEPHONE/DATA OUTLET - WALL
[E]	TELEPHONE OUTLET - WALL
[E]	DATA OUTLET - WALL
[E]	SPEAKER - WALL, CEILING
[E]	VOLUME CONTROL - WALL
[E]	BELL
[E]	BUZZER
[E]	CHIME
[E]	SYSTEM CLOCK - WALL, CEILING
[E]	MASTER ANTENNA TV OUTLET
[E]	MICROPHONE / HANDSET OUTLETS

SYMBOL	DESCRIPTION
[CCTV]	CCTV SECURITY CAMERA
[D]	DOOR POSITION MONITOR SWITCH
[D]	INFRARED REQUEST TO EXIT DEVICE - WALL/CEILING MOUNTED
[D]	INTERCOM STATION - WALL, DESK MOUNTED, M = MASTER STATION
[D]	PUSH-BUTTON STATION
[CR]	CARD READER - WALL MOUNTED
[L]	ELECTRIC LOCK
[L]	ELECTRIC STRIKE
[L]	MAGNETIC LOCK
[L]	ELECTRIC POWER TRANSFER HINGE

SYMBOL	DESCRIPTION
[F]	FLUORESCENT RECESSED LUMINAIRE (REFER TO LUMINAIRE SCHEDULE FOR TYPE)
[F]	FLUORESCENT SURFACE-MOUNTED LUMINAIRE (REFER TO LUMINAIRE SCHEDULE)
[F]	SHADING OF ANY LUMINAIRE INDICATES CONNECTION TO EMERGENCY CIRCUIT.
[F]	HID FIXTURE
[F]	LIGHTED BOLLARD OR DOWNLIGHT (INTERIOR SPACES)
[F]	FLOOR OR GRADE MOUNTED FIXTURE
[F]	WALL WASH - SURFACE, RECESSED CEILING MOUNT
[F]	TRACK LIGHTING WITH HEADS AS INDICATED.
[F]	FLUORESCENT STRIPLIGHT - POWER FEED SECTION, FEED THROUGH SECTION, LENGTH AS SHOWN.
[F]	FLUORESCENT WALL BRACKET - RESTROOM
[F]	STEP LIGHT FIXTURE
[F]	ADA APPROVED WALL SCONCE
[F]	ILLUMINATED EXIT SIGN, SHADED QUADRANT INDICATES FACES, ARROW AS SHOWN
[F]	POLE MOUNTED LUMINAIRE
[F]	"FOOT" INDICATES WALL MOUNTED LUMINAIRE
[XXX]	FIXTURE TYPE IDENTIFICATION DESIGNATION
[F]	BATTERY POWER EMERGENCY UNIT EQUIPMENT (SEE SCHEDULE FOR QUANTITY OF HEADS) - WALL, CEILING MOUNTED.
[F]	REMOTE HEAD
[F]	OPTICAL SENSOR AND REFLECTOR

SYMBOL	DESCRIPTION
[S]	SINGLE POLE SWITCH (SUPERScript DENOTES SIMILARLY MARKED LUMINAIRES CONTROLLED TOGETHER)
[S]	TWO POLE SWITCH
[S]	THREE WAY SWITCH
[S]	FOUR WAY SWITCH
[S]	KEY OPERATED SWITCH
[S]	DIMMER SWITCH, NUMBER INDICATES WATTAGE RATING. IF NOT SHOWN SHOW MINIMUM
[S]	SWITCH WITH PILOT (PILOT IS "ON" WHEN SWITCH IS "ON")
[S]	SWITCH WITH PILOT (PILOT IS "ON" WHEN SWITCH IS "OFF")
[S]	TIMER SWITCH
[S]	WEATHERPROOF SWITCH
[S]	MOTOR RATED TOGGLE WITH THERMAL OVERLOAD PROTECTION
[S]	PHOTOCELL
[S]	TIME CLOCK
[S]	WALL MOUNTED DUAL LEVEL SWITCHING OCCUPANCY SENSOR
[S]	EMERGENCY POWER OFF, HEAVY-DUTY OIL TIGHT RED MUSHROOM HEAD PUSH-BUTTON
[S]	LIGHTING CONTROL PANEL
[S]	LIGHTING CONTROL STATION

SYMBOL	DESCRIPTION
[B]	BRANCH CIRCUIT PANELBOARDS, SURFACE AND RECESS MOUNTED
[B]	SOLID = 120/208V HATCHED= 277/480V
[T]	TRANSFORMER
[B]	SERVICE AND/OR DISTRIBUTION EQUIPMENT
[B]	MOTOR CONNECTION, X = HORSEPOWER (WHERE SHOWN)
[B]	CONNECTION TO DIV. 15 FURNISHED VARIABLE FREQUENCY DRIVE WITH INTEGRAL DISCONNECT DIV. 16 TO INSTALL VFD EQUIPMENT
[B]	DISCONNECT SWITCH, SIZE AS NOTED OR IF NOT SHOWN SIZE PER CONNECTED MOTOR SIZE (MECH-BY DIVISION 15, TYP.)
[B]	FUSED DISCONNECT SWITCH, SIZE AS NOTED OR IF NOT SHOWN SIZE PER CONNECTED MOTOR SIZE (MECH-BY DIVISION 15, TYP.)
[B]	DISCONNECT W/ MAGNETIC MOTOR STARTER (CONTROLLER) OR CONTACTOR, SIZE AS NOTED OR IF NOT SHOWN SIZE PER CONNECTED MOTOR SIZE (MECH-BY DIVISION 15, TYP.)
[B]	MAGNETIC MOTOR STARTER (CONTROLLER) OR CONTACTOR SIZE AS NOTED OR IF NOT SHOWN SIZE PER CONNECTED MOTOR SIZE (MECH-BY DIVISION 15, TYP.)

SYMBOL	DESCRIPTION
[R]	SIMPLEX RECEPTACLE - WALL, CEILING, FLOOR
[R]	DUPLEX RECEPTACLE - WALL, CEILING, FLOOR
[R]	DOUBLE DUPLEX RECEPTACLE - WALL, CLG, FLOOR
[R]	DUPLEX RECEPTACLE AT SPECIAL HEIGHT
[R]	DOUBLE DUPLEX RECEPTACLE AT SPECIAL HEIGHT
[R]	DUPLEX RECEPTACLE - WALL - DEDICATED
[R]	DUPLEX RECEPTACLE - WALL - HALF SWITCHED
[R]	DUPLEX RECEPTACLE - WALL - ABOVE COUNTER/BACKSPASH - SEE ARCHITECTURAL DRAWINGS
[R]	DUPLEX RECEPTACLE - WALL - WITH INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER
[R]	DUPLEX RECEPTACLE W/ WEATHERPROOF COVER
[R]	SPECIAL PURPOSE RECEPTACLE - WALL - CEILING NEMA CONFIGURATION AS NOTED
[R]	ELECTRICAL EQUIPMENT CONNECTION, PROVIDE #10 AWG NEUTRALS. USE LIQUID-TIGHT FLEX.
[R]	FLUSH FLOOR BOX DEVICE - DEVICE TYPES PER SYMBOLS SHOWN.
[R]	PEDESTAL FLOOR DEVICE - DEVICE TYPES PER SYMBOLS SHOWN.
[R]	TWO-PIECE SURFACE METAL RACEWAY WITH RECEPTACLE AS NOTED, LENGTH AS INDICATED ON THE DRAWINGS AND WITH ALL FITTINGS AS REQUIRED
[R]	TELE/POWER POLE, POWER POLE
[R]	COURTSTAY PHONE WITH ENCLOSURE
[R]	TWO-PIECE SURFACE METAL RACEWAY WITH RECEPTACLE AT P.O.C. (LENGTH AS INDICATED)
[R]	POWER PEDESTAL X = 30 = 30A, 120V OUTLET X = 50 = 50A, 120/240V OUTLET X = 20GFCI = 20A, 120V DUPLEX GFCI PROTECTED OUTLET Y = DUCK OR ROW ID # Z = SLIP NUMBER(S) (1) POWER HEAD EA NOTE: 'X' DESIGNATES OUTLET PER SLIP. MULTIPLE REFERENCES (30%) INDICATES MULTIPLE OUTLETS PER SLIP.

SYMBOL	DESCRIPTION
[H]	HAND/OFF/AUTO SWITCH
[S]	SWITCH
[S]	OVERLOADS
[S]	NORMALLY CLOSED CONTACTOR OR RELAY CONTACTS
[S]	NORMALLY OPEN CONTACTOR OR RELAY CONTACTS
[S]	BUS DUCT
[S]	BUS BAR
[S]	BATTERY (GENERAL)
[S]	CONNECTOR, FEMALE AND MALE RESPECTIVELY
[S]	CONTACTOR COIL
[S]	RELAY COIL
[S]	TRANSIENT VOLTAGE SURGE SUPPRESSOR
[S]	CURRENT TRANSFORMER
[S]	POTENTIAL TRANSFORMER
[S]	NORMALLY OPEN PUSH BUTTON
[S]	NORMALLY CLOSED PUSH BUTTON
[S]	METER, POWER FACTOR
[S]	METER, KILOWATT HOUR
[S]	METER, COMBINATION KILOWATT HOUR/KVAR METER
[S]	UTILITY CO. APPROVED SOCKET WITH METER INSTALLED
[S]	DELTA CONNECTION
[S]	GROUND WYE CONNECTOR
[S]	CONNECTION TO GROUND
[S]	CIRCUIT BREAKER XXX = AMPACITY Y = POLES
[S]	FUSED SWITCH, WITH FUSE AND SWITCH AMPERE RATING
[S]	CIRCUIT BREAKER, MEDIUM VOLTAGE, DRAWOUT
[S]	DRAWOUT CIRCUIT BREAKER
[S]	GROUND FAULT TRIP UNIT
[S]	KEY INTERLOCK
[S]	CAPACITOR, POWER FACTOR CORRECTION, SIZE IN KVAR
[S]	MOTOR - GENERATOR
[S]	SOLENOID

SYMBOL	DESCRIPTION
[C]	CONDUIT CONCEALED IN CEILING OR WALL, LINE WEIGHT TOP TO BOTTOM = NEW, EXISTING TO REMAIN.
[C]	CONDUIT CONCEALED IN OR BELOW CONCRETE UNDER GRADE, UNDER PIER, IN CEILING SPACE OF FLOOR BELOW, LINE WEIGHT TOP TO BOTTOM = NEW, EXISTING TO REMAIN.
[C]	CONDUIT EXPOSED, LINE WEIGHT TOP TO BOTTOM = NEW, EXISTING TO REMAIN.
[C]	EXISTING CONDUIT & WIRING TO BE REMOVED
[C]	COMMUNICATION CONDUIT / CABLE
[C]	MEDIUM VOLTAGE CONDUIT
[C]	LOW VOLTAGE CONDUCTORS
[C]	GROUNDING GRID OR CONDUCTORS
[C]	CABLE TV WIRE / CONDUIT
[C]	AERIAL CONDUCTOR(S)/OVERHEAD LINE
[C]	STROKES INDICATE QUANTITY OF #12 AWG. CONDUCTORS. UON. NOTE: NOT ALL WIRING IS SHOWN ON DRAWING. CONTRACTOR SHALL SCHEDULE OR STANDARD WIRING PRACTICES FOR BRANCH CIRCUITS.
[C]	GROUND
[C]	HOT
[C]	GROUND, ISOLATED
[C]	NEUTRAL
[C]	HOME RUN TO INDICATED DESTINATION, 3/4" MIN. UON
[C]	CONDUIT RUN TURNED UP THROUGH FLOOR OR CEILING. CORE AS REQUIRED.
[C]	CONDUIT STUBBED OUT AT LOCATION SHOWN. PROVIDED INSULATED BUSHING & PULLROPE.
[C]	TELEPHONE/DATA SLEEVE THROUGH WALL, ABOVE CEILING. EXTEND TO ACCESSIBLE LOCATION BOTH SIDES. TERMINATE WITH BUSHINGS. (1) 1/4" CO UON. COORDINATE LOCATIONS WITH CABLE INSTALLER(S) PRIOR TO ROUGH-IN.
[C]	CABLE TRAY
[C]	JUNCTION BOXES WALL, CEILING AND FLUSH FLOOR MOUNTED. 4" SQ. BOX, UON.
[C]	PULL BOX, MIN. SIZE PER NEC, UON.
[C]	FLEXIBLE CONDUIT CONNECTION
[C]	GROUND ROD CONNECTION
[C]	GROUND ROD CONNECTION WITH TEST WELL BOX
[C]	LIGHTNING SYSTEM AIR TERMINAL
[C]	UNDERGROUND PULLBOX/Vault (P=POWER T=TEL/COM=UTILITY)
[C]	UNDERGROUND PULLBOX/Vault (PLASTIC)
[C]	HANDHOLE

SYMBOL	DESCRIPTION
[X]	SHEET NOTE REFERENCE (FLAG NOTES)
[XXX]	FEEDER NOMINAL AMPACITY & TYPE. SEE FEEDER SCHEDULE.
[X]	KITCHEN EQUIPMENT REFERENCE
[X]	REFER TO DETAIL NO. ON DRAWING INDICATED. NOT ALL DETAIL REFERENCES ARE SHOWN. ALL DETAILS APPLY TO ALL APPLICABLE SITUATIONS, UON.
[X]	ELEVATION/PHOTO TAG: REFER TO NUMBER AND SHEET INDICATED
[X]	SECTION TAG: REFER TO DETAIL NO. ON DRAWING. NOT ALL DETAIL REFERENCES ARE SHOWN. ALL DETAILS APPLY.

ISSUED FOR BID

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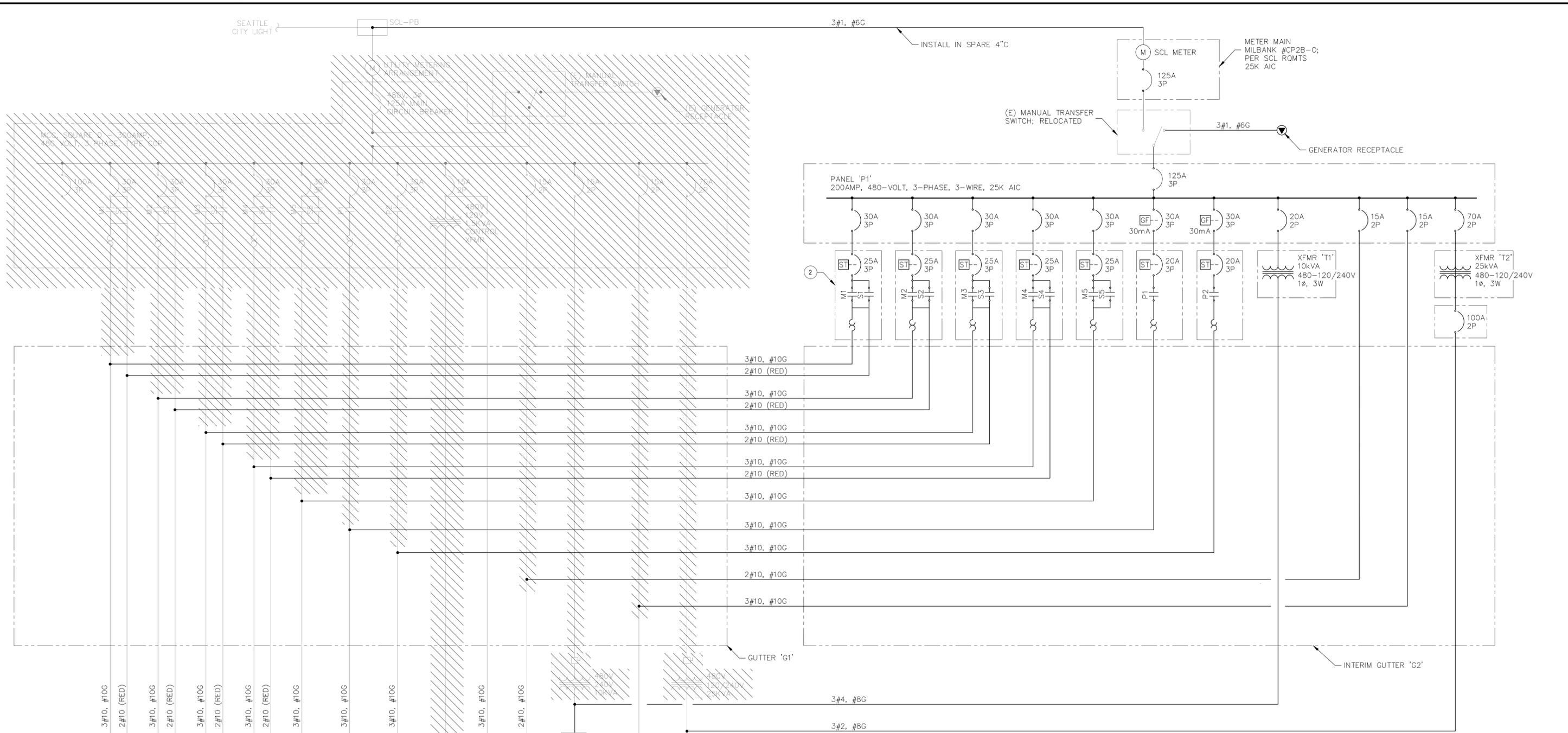
EDWARD J. DAVID
REGISTERED PROFESSIONAL ENGINEER
08/11/2023

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TITLE:	SYMBOLS & ABBREVIATIONS		
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DRAWN BY:	KDD	DATE:	JULY 2023
CHECKED BY:	EJD	SCALE:	NONE
SHEET NO:	E0.00		

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SHEET NOTES

- REMOVE (4) EXISTING 20A-1P CIRCUIT BREAKERS, CIRCUITS 2,4,6,&8, AND (1) 20A-2P CIRCUIT BREAKER, CIRCUIT 1/3, SERVING OVERWATER EQUIPMENT AND REPLACE WITH 30mA GFCI BREAKERS. PANEL IS SQUARE D 'QO' LOAD CENTER.
- CONNECT CONTROL CIRCUITS FROM FIELD CONTROL DEVICES TO MOTOR STARTERS; TYPICAL.

GENERAL NOTES

- M-1, M-2, M-3, M-4, P-1 & P-2 ARE 3 POLE STARTERS. S-1, S-2, S-3, S-4 ARE SINGLE PHASE CONTACTORS. (2 SWITCHING POLES, 1 PILOT CONTACT).
- VERIFY AVAILABLE FAULT CURRENT WITH SCL PRIOR TO ORDERING EQUIPMENT.
- ALL CIRCUIT BREAKERS OF MOTOR STARTERS TO BE EQUIPPED WITH SHUNT TRIP COILS.
- PROVIDE COPPER CONDUCTORS SIZES PER CODE.

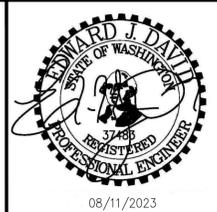
SINGLE LINE WIRING DIAGRAM



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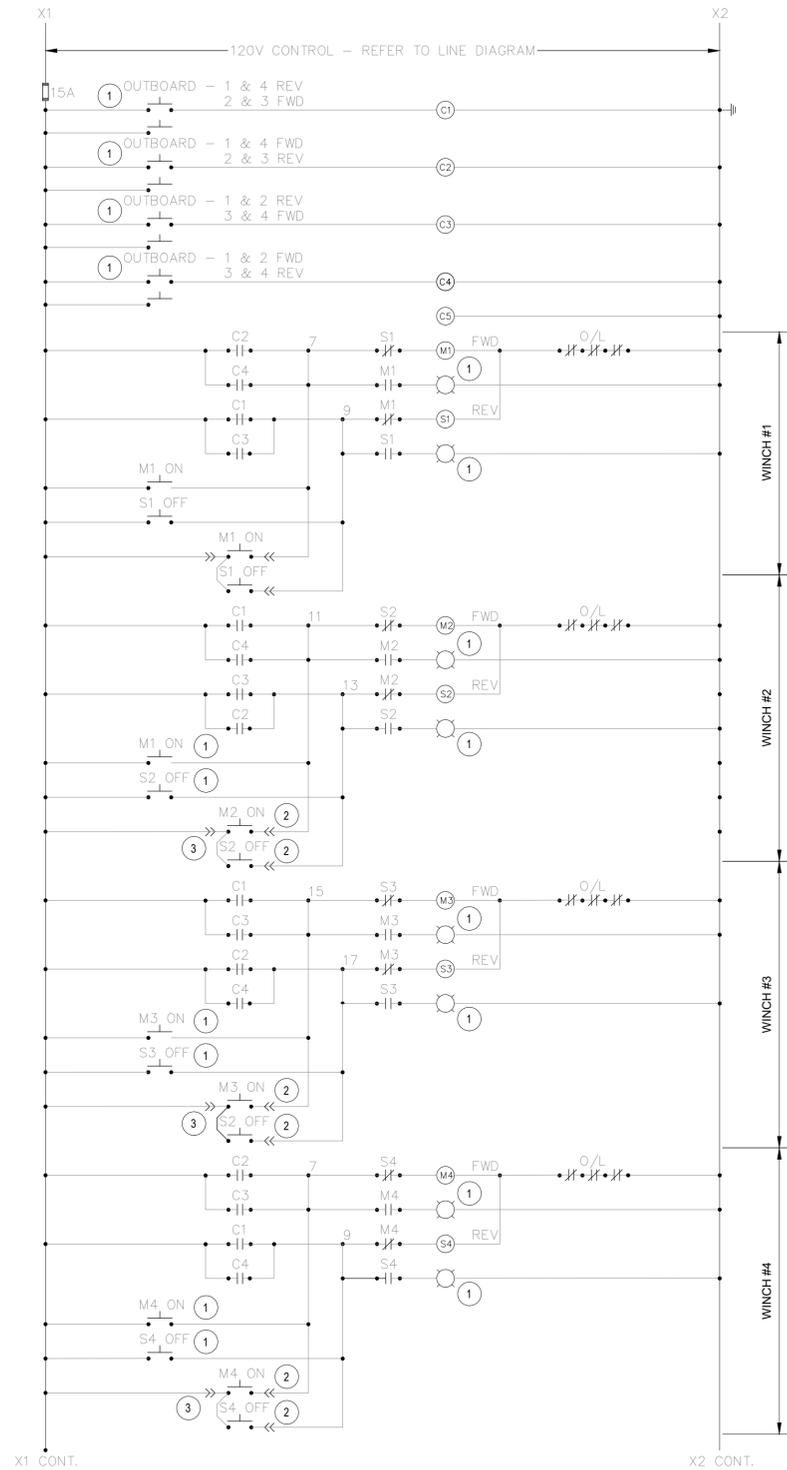
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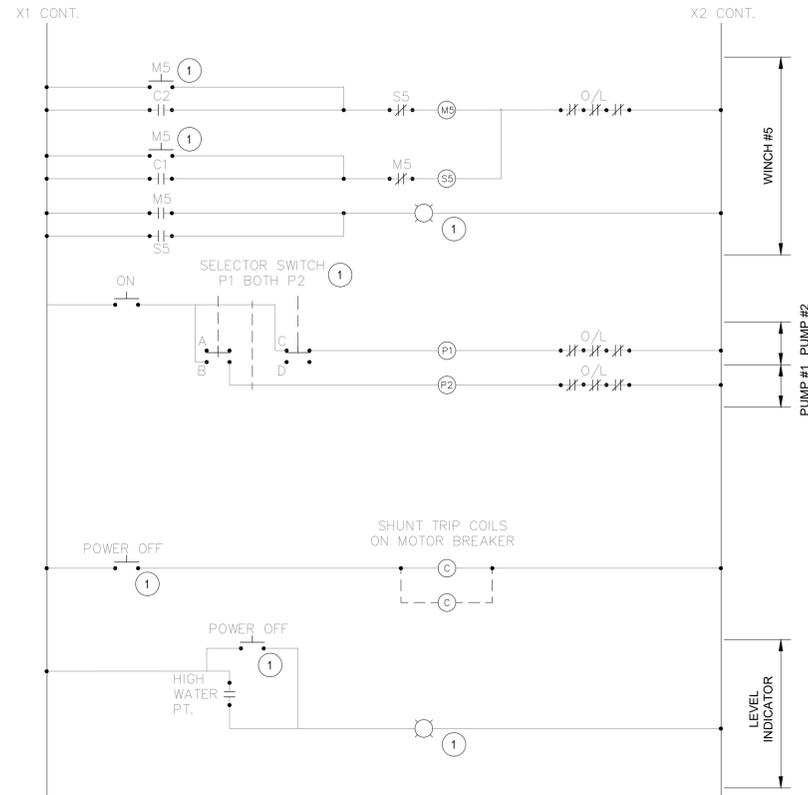
REVISIONS		
REV	DATE	DESCRIPTION
0	08/11/2023	ISSUED FOR BID

ISSUED FOR BID			
ALASKA RAILROAD PIER 15.5 ELECTRICAL UPGRADE PROJECT			
SINGLE LINE WIRING DIAGRAM			
DESIGNED BY:	EJD	PROJECT NO:	224017
DRAWN BY:	KDD	DATE:	JULY 2023
CHECKED BY:	EJD	SCALE:	NONE
			SHEET NO: E1.00

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CONTROL SCHEMATIC



- ① EQUIPMENT MARKED IS MOUNTED IN CONTROL STATION ON RAMP.
- ② EQUIPMENT MARKED IS MOUNDED IN PORTABLE STATION.
- ③ RECEPTACLE CONNECTION AT WINCH LOCATION FOR PORTABLE CONTROL STATION.

AUTOMATIC OPERATION SCHEDULE

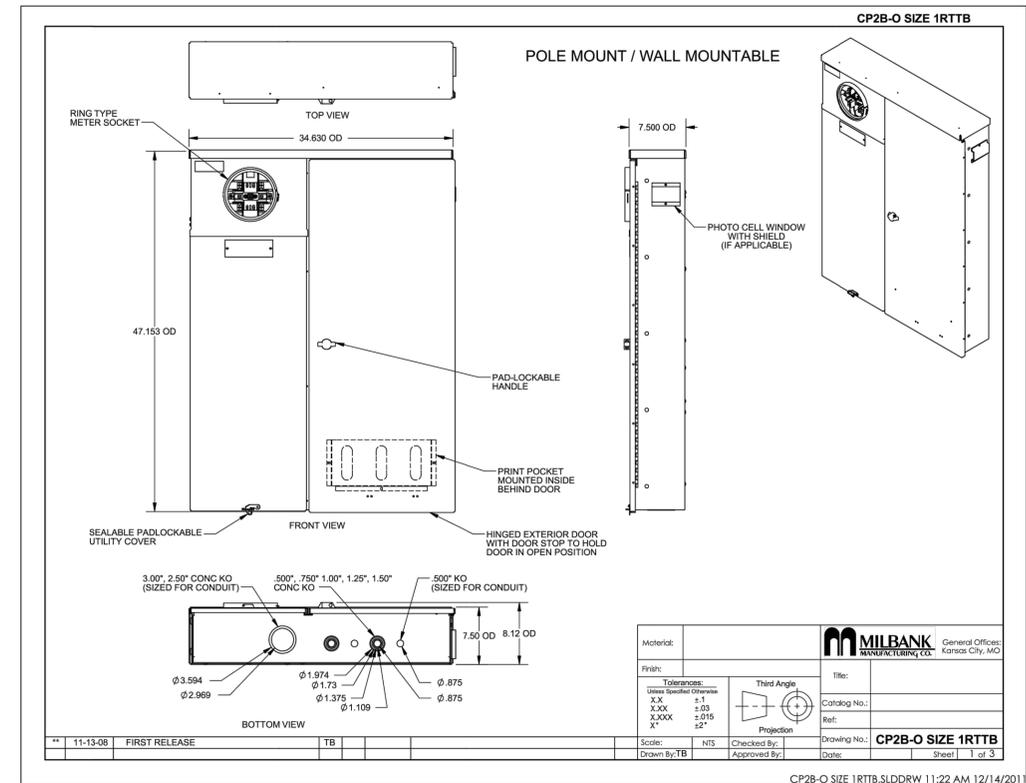
MOVEMENT OF BARGE	WINCH #1		WINCH #2		WINCH #3		WINCH #4		WINCH #5	
	M1	S1	M2	S2	M3	S3	M4	S4	M5	S5
OUTBOARD	---	---	---	---	---	---	---	---	---	---
INBOARD	○	---	○	---	○	---	○	---	---	---
RIGHT	---	○	---	○	---	○	---	---	---	---
LEFT	○	---	○	---	○	---	○	---	---	---

○ CONTROL PANEL LIGHT "ON"

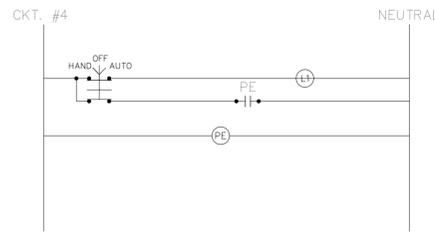
MANUAL OPERATION SCHEDULE

WINCH NO.	OUTBOARD		INBOARD		RIGHT		LEFT	
	M	S	M	S	M	S	M	S
1		X	X			X	X	
2	X			X		X	X	
3	X			X	X			X
4		X	X		X			X
5		X	X					

X PUSH BUTTON DEPRESSED



METER/MAIN - CATALOG CUT

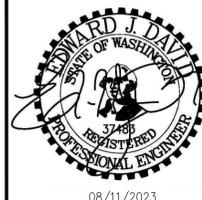


FLOOD LIGHT CONTROL



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ISSUED FOR BID

PROJECT:	ALASKA RAILROAD PIER 15.5 ELECTRICAL UPGRADE PROJECT		
TITLE:	CONTROL SCHEMATIC & FLOOD LIGHT CONTROL		
DESIGNED BY:	EJD	PROJECT NO:	224017
DRAWN BY:	KDD	DATE:	JULY 2023
CHECKED BY:	EJD	SCALE:	NONE
SHEET NO:	E1.01		

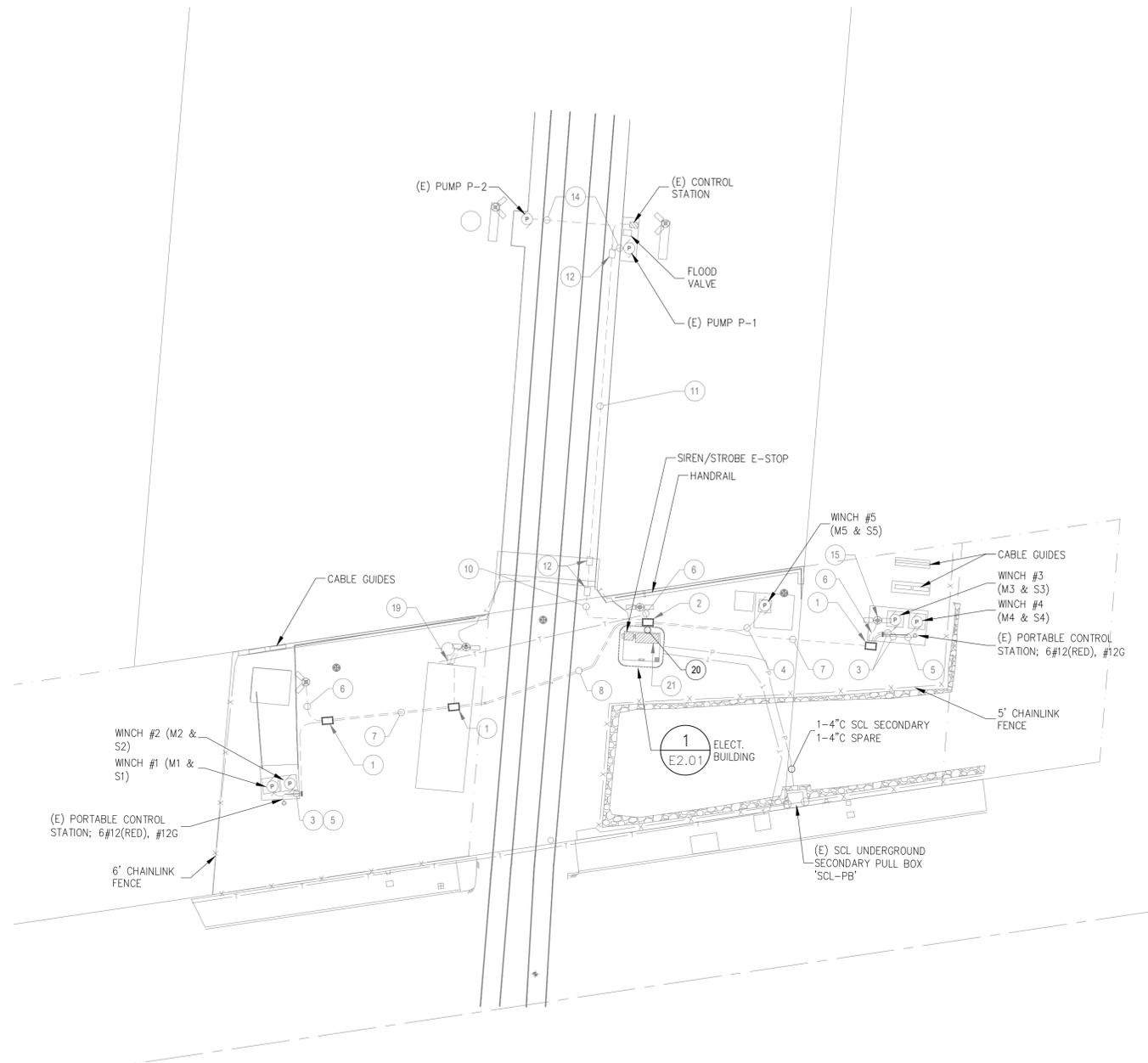
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GENERAL NOTES

- EXISTING SITE EQUIPMENT, FEEDERS, AND DEVICES, SHOWN FOR REFERENCE. VERIFY CONNECTIONS AND WIRING DURING CONSTRUCTION; UPDATE/ANNOTATE FIELD AS-BUILTS.

SHEET NOTES

- (E) HANDHOLE 2'x3'x3' (UTILITY VAULT #233LA).
- (E) HANDHOLE 4'x4'x4' (UTILITY VAULT #444LA).
- (E) 1" C RGS, 3#10 (MOTOR), 2#10 (BRAKE), 1#10G.
- (E) 1" C PVC, SCHED. 80 UG. 1" C RGS STUB-UP AND ABOVE GRADE, 3#10 (MOTOR), 2#10 (BRAKE), 1#10G.
- (E) 1" C RGS, 6#12, 1#12G.
- (E) 2" C PVC, SCHED. 80, 2#12, 1#12G
- (E) 2" C PVC, SCHED. 80, 6#10 (MOTOR), 4#10 (BRAKE), 1#10G. 2" C PVC, SCHED. 80, 2#12 (LIGHTS), 6#12 (CONTROL), 1#12G. 2" C PVC SCHED. 80, (SPARE).
- (E) 2" C PVC, SCHED. 80, 6#10 (MOTOR), 4#10 (BRAKE), 1#10G. 2" C PVC, SCHED. 80, 2#12 (LIGHTS), 6#12 (CONTROL), 2#10 (SHACK POWER), 1#10G. 2" C PVC SCHED. 80, (SPARE).
- (E) 1" C RGS, 3#10, 1#10G (SHACK POWER).
- (E) 2" C PVC, SCHED. 80, 40#12 (CONTROL), 1#12G. 2" C PVC, SCHED. 80, 6#10 (PUMPS), 3#10 (120V POWER), 2#10 (HORN), 1#8G. 2" C PVC SCHED. 80, (SPARE).
- (E) 2" C PVC, SCHED. 80, 40#12 (CONTROL), 1#12G. 1" C PVC, SCHED. 80, 6#10 (PUMPS), 1#10G. 2" C PVC SCHED. 80, (SPARE). 1" C PVC, SCHED. 80, 3#10 (120V POWER), 2#10 (HORN) 1#10G.
- (E) 14"x18"x9" FIBERGLASS BOX (HOFFMAN #A-18149JFGR).
- (E) NOT USED (FIRE PUMP NOT INSTALLED).
- (E) .75" C RGS, 3#10, 1#10G (PUMPS).
- (E) 20-FOOT POLE MOUNTED LUMINAIRE(S).
- (E) POLE MOUNTED LUMINAIRE.
- NOT USED.
- NOT USED.
- (E) CONNECTION TO BREAK SHACK.
- (E) (8) 2" C PVC COATED RGS (WITH POWER AND CONTROL CONDUCTORS) TO MCC. DISCONNECT EXISTING AND RECONNECT TO MOTOR STARTERS IN INTERIM AND FINAL LOCATIONS.
- EXISTING MCC.
- NOT USED.
- EXISTING LOAD-CENTER.
- NOT USED.
- (E) 2" C, 40#12 (CONTROL), 1#12G.
- (E) .75" C RGS, 3#12 (CONTROL), 1#12G.



INCOMING ELECTRICAL SERVICE DIVISION OF RESPONSIBILITY					
	ELEC. CONTR.	UTILITY CO.		ELEC. CONTR.	UTILITY CO.
PRIMARY CONDUIT	<input type="checkbox"/>	<input type="checkbox"/>	SECONDARY CONDUIT	<input type="checkbox"/>	<input type="checkbox"/>
PRIMARY CONDUCTORS	<input type="checkbox"/>	<input type="checkbox"/>	SECONDARY CONDUCTORS	<input checked="" type="checkbox"/>	<input type="checkbox"/>
TRANSFORMER	<input type="checkbox"/>	<input type="checkbox"/>	C/T ENCLOSURE	<input type="checkbox"/>	<input type="checkbox"/>
TRANSFORMER PAD	<input type="checkbox"/>	<input type="checkbox"/>	C/T's	<input type="checkbox"/>	<input type="checkbox"/>
PRIMARY GROUNDING	<input type="checkbox"/>	<input type="checkbox"/>	METER BASE	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BOLLARDS	<input type="checkbox"/>	<input type="checkbox"/>	METER	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TRANSFORMER CONNECTIONS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	METER GROUNDING	<input checked="" type="checkbox"/>	<input type="checkbox"/>

NOTES: 1. CONTACT AND COORDINATE ALL REQUIREMENTS AND RESPONSIBILITIES WITH SERVING UTILITY COMPANIES PRIOR TO SUBMITTING BID. 2. ALL SERVICE INSTALLATION WORK SHALL BE IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF THE SERVING UTILITIES.	POWER UTILITY CONTACT: SEATTLE CITY LIGHT PHONE: (xxx) xxx-xxxx FAX: ()
--	--

HARBOR POWER ENG., INC. HAS CONTACTED THE UTILITIES BUT HAS NOT RECEIVED IN WRITING THE FINAL REQUIREMENTS FROM THE POWER UTILITY. THESE DRAWINGS INDICATE OUR BEST ESTIMATION OF THEIR REQUIREMENTS. PRIOR TO BID OR ANY CONSTRUCTION CONTACT THE UTILITY COMPANY AND OBTAIN IN WRITING THEIR REQUIREMENTS.

ELECTRICAL SITE PLAN



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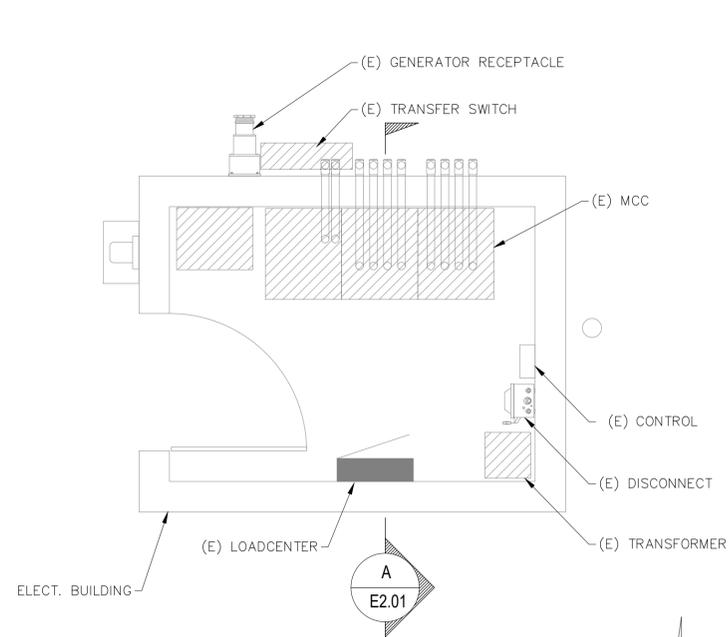


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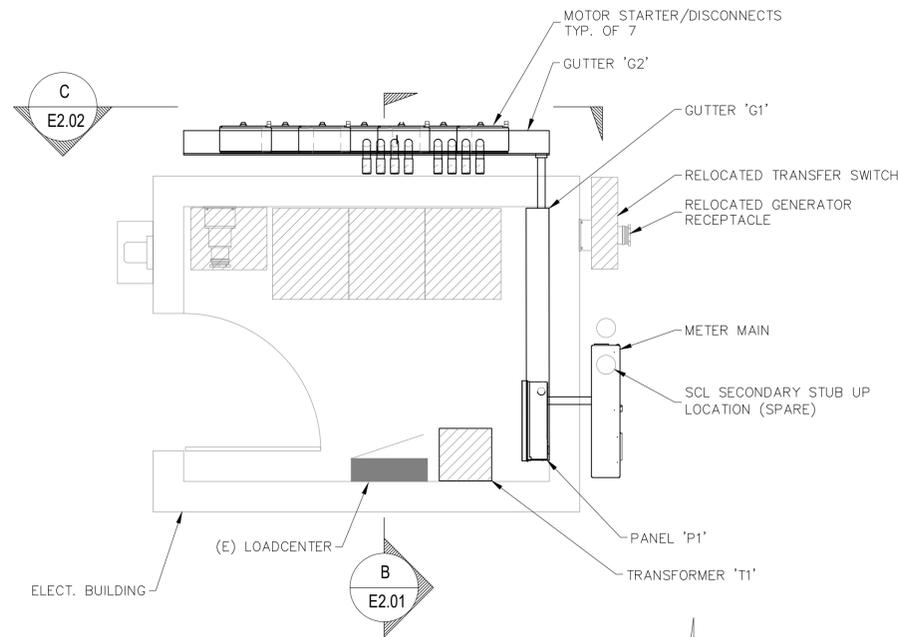
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REV	DATE	DESCRIPTION
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ALASKA RAILROAD PIER 15.5 ELECTRICAL UPGRADE PROJECT			
ELECTRICAL SITE PLAN			
DESIGNED BY:	EJD	PROJECT NO:	224017
DRAWN BY:	KDD	DATE:	JULY 2023
CHECKED BY:	EJD	SCALE:	AS NOTED
			SHEET NO: E2.00

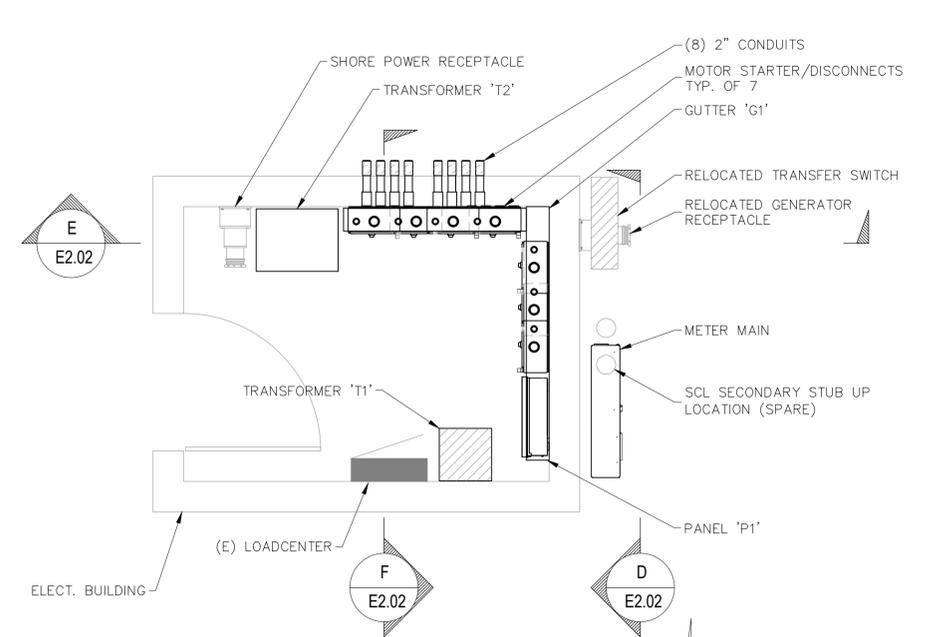
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1 ELECTRICAL PLAN - EXISTING



2 ELECTRICAL PLAN - INTERIM



3 ELECTRICAL PLAN - FINAL



GENERAL NOTES

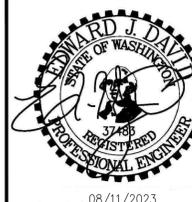
1. ADJUST EQUIPMENT ARRANGEMENT, BACKBOARDS, MOUNTING, ETC., TO ACCOMMODATE APPROVED EQUIPMENT SELECTIONS.
2. MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL.
3. EXACT ARRANGEMENT AND INSTALLATION APPROACH FOR INTERIM CONFIGURATION MAY BE ADJUSTED OR CHANGED PROVIDED THAT INSTALLATION IS CODE COMPLIANT, REQUIREMENTS LIMITING DOWNTIME ARE MET, AND INSTALLATION DOES NOT IMPEDE OPERATIONS.
4. CORE DRILL CMU AS REQUIRED FOR CONDUIT PENETRATIONS. GROUT/SEAL AROUND INSTALLED CONDUITS.



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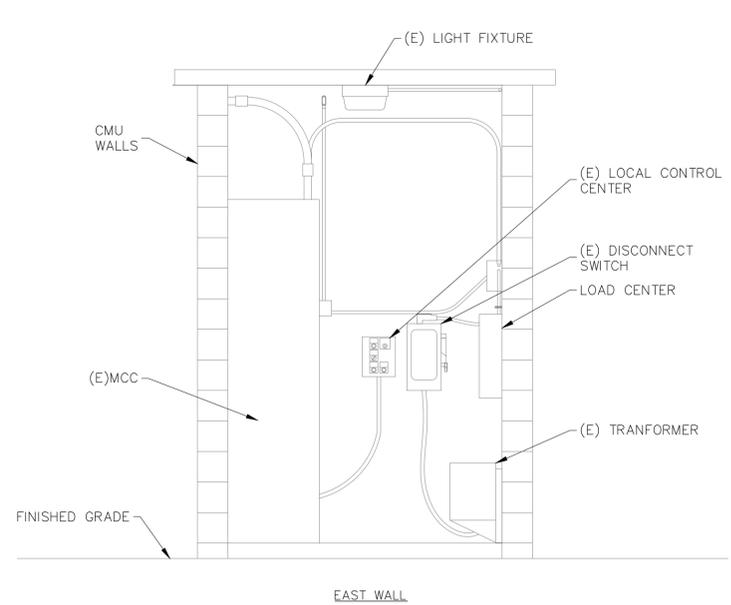
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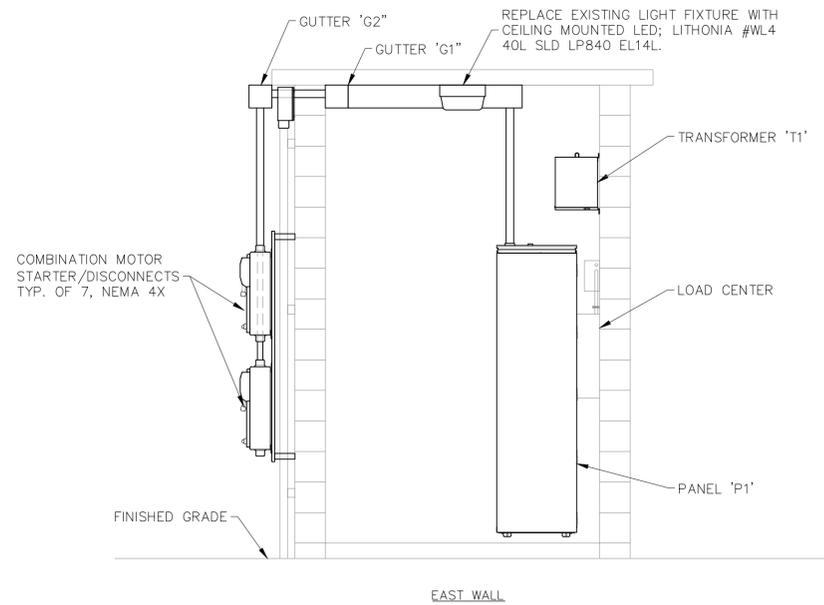


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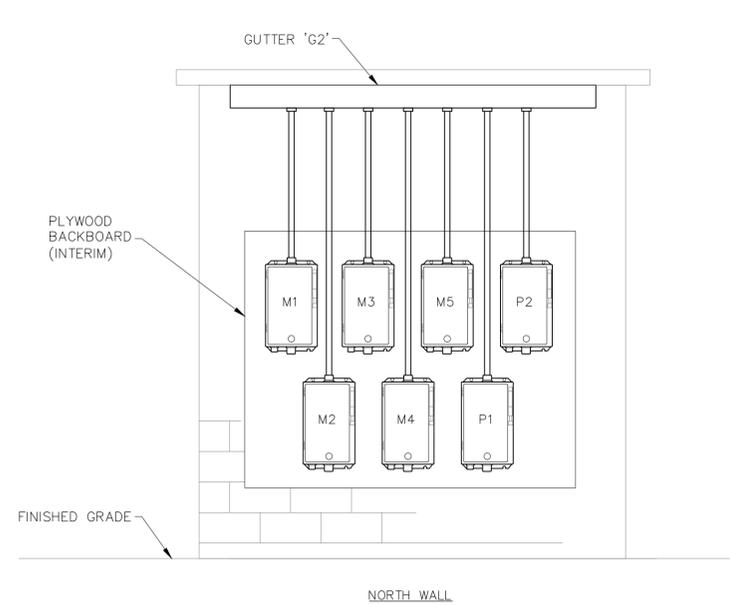
ISSUED FOR BID			
ALASKA RAILROAD PIER 15.5 ELECTRICAL UPGRADE PROJECT			
ENLARGED ELECTRICAL PLANS			
DESIGNED BY:	EJD	PROJECT NO:	224017
DRAWN BY:	KDD	DATE:	JULY 2023
CHECKED BY:	EJD	SCALE:	AS NOTED
			SHEET NO: E2.01



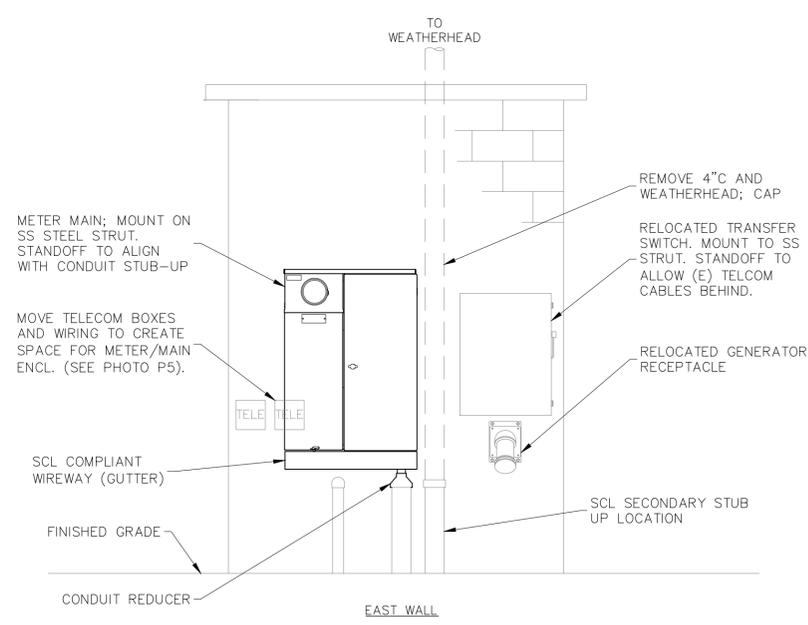
A INTERIOR ELEVATION - EXISTING
E2.01 ELEVATION - NOT TO SCALE



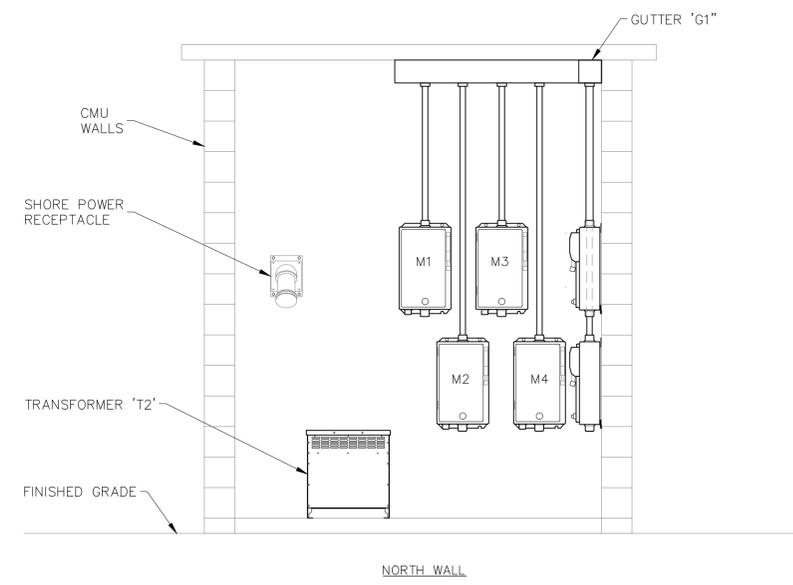
B INTERIOR ELEVATION - INTERIM
E2.01 ELEVATION - NOT TO SCALE



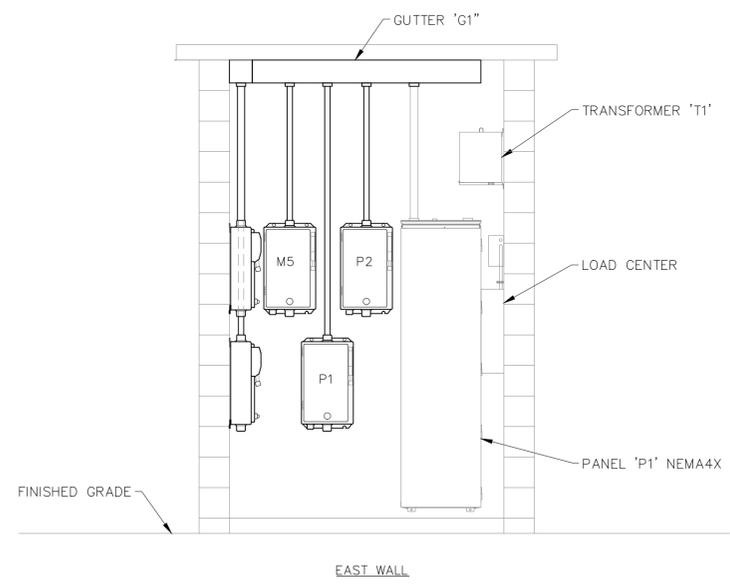
C EXTERIOR ELEVATION - INTERIM
E2.01 ELEVATION - NOT TO SCALE



D EXTERIOR ELEVATION - FINAL
E2.01 ELEVATION - NOT TO SCALE



E INTERIOR ELEVATION - FINAL
E2.01 ELEVATION - NOT TO SCALE

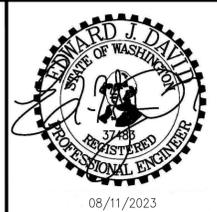


F INTERIOR ELEVATION - FINAL
E2.01 ELEVATION - NOT TO SCALE



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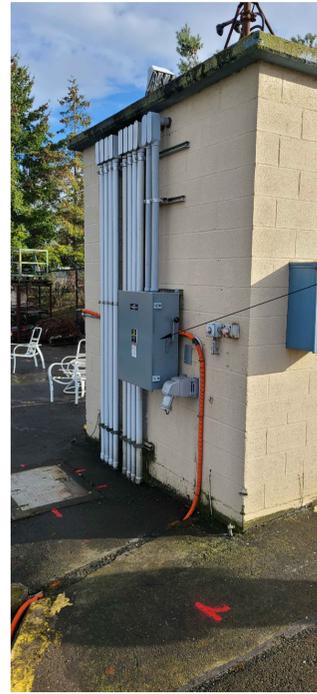
ISSUED FOR BID			
ALASKA RAILROAD PIER 15.5 SEATTLE, WA			
ELECTRICAL ELEVATIONS			
DESIGNED BY:	EJD	PROJECT NO:	224017
DRAWN BY:	KDD	DATE:	JULY 2023
CHECKED BY:	EJD	SCALE:	AS NOTED
			SHEET NO: E2.01

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EXISTING WEATHERHEAD #2; TO BE REMOVED. REMOVE SUPPORT AND SEAL ROOF SURFACE WITH APPROVED PRODUCT.

P1
-
BLDG EXT. - WEST



EXISTING TRANSFER SWITCH & OUTLET

P2
-
BLDG EXT. - NORTH (#1)



P3
-
BLDG EXT. - NORTH (#2)



P4
-
BLDG EXT. - EAST (#1)



P5
-
BLDG EXT. - EAST (#2)



CUT/REMOVE EXCESS STRUT (BEYOND CLAMP); TWO PLACES

SPARE CONDUIT TO SCL-PB

P6
-
BLDG EXT. - EAST (#3)



EXISTING MOTOR CONTROL CENTER (MCC)

P7
-
BLDG INT. - NORTH WALL



EXISTING LOAD CENTER

P8
-
BLDG INT. - N & E WALL



P9
-
BLDG INT. - NORTH WALL



P10
-
BLDG INT. - E & S WALL
ISSUED FOR BID

HPe HARBOR POWER ENGINEERS, INC.
ELECTRICAL ENGINEERING FOR COASTAL & WATERFRONT FACILITIES
PM: ED DAVID, PE TEL: 206.855.4600

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EDWARD J. DAVID
STATE OF WASHINGTON
37489
REGISTERED PROFESSIONAL ENGINEER
08/11/2023

REVISIONS		
REV	DATE	DESCRIPTION
0	08/11/2023	ISSUED FOR BID

PROJECT: ALASKA RAILROAD PIER 15.5 ELECTRICAL UPGRADE PROJECT			
TITLE: PHOTOS			
DESIGNED BY: EJD	PROJECT NO: 224017	SHEET NO:	
DRAWN BY: KDD	DATE: JULY 2023	E3.00	
CHECKED BY: EJD	SCALE: NONE		

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BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
 - A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, APPLY TO THIS SECTION.
- 1.2 DEFINITIONS
 - A. EMT: ELECTRICAL METALLIC TUBING.
 - B. LFMC: LIQUIDTIGHT FLEXIBLE METAL CONDUIT.
 - C. RNC: RIGID NONMETALLIC CONDUIT.
- 1.3 SUBMITTALS
 - A. FIELD TEST REPORTS: INDICATE AND INTERPRET TEST RESULTS FOR COMPLIANCE WITH PERFORMANCE REQUIREMENTS.
 - B. FOR EACH TYPE OF PRODUCT INTENDED FOR USE, INCLUDING RACEWAYS, WIRE, SPLICE KITS, FITTINGS, ETC. INCLUDE CLEARLY MARKED MANUFACTURERS TECHNICAL DATA.
- 1.4 RECORD DRAWINGS
 - A. MAINTAIN CONTINUOUSLY UPDATED REDLINE DRAWINGS DURING PROGRESS OF THE PROJECT. SHOW ALL CHANGES FROM THE CONTRACT DOCUMENTS.
- 1.5 QUALITY ASSURANCE
 - A. 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.
 - B. COMPLY WITH NFPA 70 AND OSHA.
- 1.6 COORDINATION
 - A. COORDINATE CHASES, SLOTS, INSERTS, SLEEVES, AND OPENINGS WITH GENERAL CONSTRUCTION WORK AND ARRANGE IN STRUCTURE DURING PROGRESS OF CONSTRUCTION TO FACILITATE THE ELECTRICAL INSTALLATIONS THAT FOLLOW.
 - B. SCHEDULE REQUIRED ELECTRICAL OUTAGES AT LEAST 7 DAYS IN ADVANCE. OUTAGES SHALL BE SCHEDULED AFTER NORMAL BUSINESS HOURS OF IMPACTED FACILITIES.
 - C. FURNISH SUPPORT STRUCTURES - SCAFFOLDING, RIGGING, FLOATATION, ETC.- NECESSARY TO COMPLETE THE ELECTRICAL INSTALLATION. REMOVE STRUCTURES UPON COMPLETION OF THE PROJECT.
- 1.7 WARRANTY
 - A. CONTRACTOR SHALL WARRANT ENTIRE SYSTEM FOR A PERIOD OF NOT LESS THAN ONE YEAR. THIS WARRANTY SHALL INCLUDE ALL INSTALLED COMPONENTS UNDER THIS CONTRACT.

PART 2 - PRODUCTS

- 2.1 SUPPORTING DEVICES
 - A. FOR USE OUTDOORS: 316 STAINLESS STEEL. GALVANIZED STEEL AND NON-METALLIC COMPONENTS ARE NOT PERMITTED FOR USE AS SUPPORTING HARDWARE EXCEPT WHERE SPECIFICALLY NOTED.
- 2.2 ELECTRICAL IDENTIFICATION
 - A. IDENTIFICATION DEVICES: A SINGLE TYPE OF IDENTIFICATION PRODUCT FOR EACH APPLICATION CATEGORY. USE COLORS PRESCRIBED BY ANSI A13.1, NFPA 70, AND THESE SPECIFICATIONS.
 - B. CABLE LABELS: COMPLY WITH ANSI A13.1, TABLE 3, FOR MINIMUM SIZE OF LETTERS FOR LEGEND AND MINIMUM LENGTH OF COLOR FIELD FOR EACH RACEWAY AND CABLE SIZE.
 - 1. TYPE: PREPRINTED, FLEXIBLE, SELF-ADHESIVE, VINYL. LEGEND IS OVER-LAMINATED WITH A CLEAR, WEATHER- AND CHEMICAL-RESISTANT COATING.
 - 2. LEGEND: INDICATE VOLTAGE.

PART 3 - EXECUTION

- 3.1 ELECTRICAL EQUIPMENT INSTALLATION
 - A. MATERIALS AND COMPONENTS: INSTALL LEVEL, PLUMB, AND PARALLEL AND PERPENDICULAR TO OTHER STRUCTURAL SYSTEMS AND COMPONENTS, UNLESS OTHERWISE INDICATED.
 - B. EQUIPMENT: INSTALL TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT OF COMPONENTS. CONNECT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE WITH OTHER INSTALLATIONS.
 - C. PROVIDE NECESSARY BENDS, OFFSETS, BOXES, ETC., AS NECESSARY TO AVOID CONFLICTS.
- 3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION
 - A. WET AND DAMP LOCATIONS: STAINLESS STEEL COMPONENTS.
 - B. DRY LOCATIONS: STEEL MATERIALS.
- 3.3 SUPPORT INSTALLATION
 - A. INSTALL SUPPORT DEVICES TO SECURELY AND PERMANENTLY FASTEN AND SUPPORT ELECTRICAL COMPONENTS.
- 3.4 DEMOLITION
 - A. PROTECT EXISTING ELECTRICAL EQUIPMENT AND INSTALLATIONS INDICATED TO REMAIN. IF

DAMAGED OR DISTURBED IN THE COURSE OF THE WORK, REMOVE DAMAGED PORTIONS AND INSTALL NEW PRODUCTS OF EQUAL CAPACITY, QUALITY, AND FUNCTIONALITY AT NO ADDITIONAL COST TO OWNER.

- B. REMOVE DEMOLISHED MATERIAL FROM PROJECT SITE.
- C. REMOVE, STORE, CLEAN, REINSTALL, RECONNECT, AND MAKE OPERATIONAL COMPONENTS INDICATED FOR RELOCATION.

3.5 FIELD QUALITY CONTROL

- A. INSPECT INSTALLED COMPONENTS FOR DAMAGE AND FAULTY WORK, INCLUDING THE FOLLOWING:
 - 1. CONTROL SYSTEM AND WIRING.
 - 2. RACEWAYS.
 - 3. WIRE AND CONNECTORS.
 - 4. SUPPORTING DEVICES FOR ELECTRICAL COMPONENTS.
 - 5. ELECTRICAL IDENTIFICATION.
 - 6. ELECTRICAL DEMOLITION.
- 3.6 CLEANING AND PROTECTION
 - A. ON COMPLETION OF INSTALLATION, INCLUDING OUTLETS, FITTINGS, AND DEVICES, INSPECT EXPOSED FINISH. REMOVE BURRS, DIRT, PAINT SPOTS, AND CONSTRUCTION DEBRIS.
 - B. PROTECT EQUIPMENT AND INSTALLATIONS AND MAINTAIN CONDITIONS TO ENSURE THAT COATINGS, FINISHES, AND CABINETS ARE WITHOUT DAMAGE OR DETERIORATION AT TIME OF SUBSTANTIAL COMPLETION.

CONDUCTORS AND CABLES

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
 - D. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, APPLY TO THIS SECTION.
- 1.2 SUBMITTALS
 - A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
- 1.3 QUALITY ASSURANCE
 - A. 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.
 - B. COMPLY WITH NFPA 70.

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
 - A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE MANUFACTURERS SPECIFIED.
- 2.2 CONDUCTORS AND CABLES
 - A. AVAILABLE MANUFACTURERS:
 - 1. AMERICAN INSULATED WIRE CORP.; A LEVITON COMPANY.
 - 2. GENERAL CABLE CORPORATION.
 - 3. SOUTHWIRE COMPANY.
 - B. CONDUCTOR MATERIAL: COPPER COMPLYING WITH NEMA WC 5 OR 7; SOLID CONDUCTOR FOR NO. 10 AWG AND SMALLER, STRANDED FOR NO. 8 AWG AND LARGER.
 - C. CONDUCTOR INSULATION TYPES: TYPE XHHW COMPLYING WITH NEMA WC 5 OR 7.

2.3 CONNECTORS AND SPLICES

- A. AVAILABLE MANUFACTURERS:
 - 1. HUBBELL/ANDERSON.
 - 2. O-Z/GEDNEY; EGS ELECTRICAL GROUP LLC.
 - 3. 3M COMPANY; ELECTRICAL PRODUCTS DIVISION.
- B. DESCRIPTION: FACTORY-FABRICATED CONNECTORS AND SPLICES OF SIZE, AMPACITY RATING, MATERIAL, TYPE, AND CLASS FOR APPLICATION AND SERVICE INDICATED. SPLICES SHALL BE GEL ENCAPSULATED TYPE - NO EXCEPTIONS. SPLICE KITS SHALL BE UL LISTED FOR THE APPLICATION.

PART 3 - EXECUTION

- 3.1 CONDUCTOR AND INSULATION APPLICATIONS
 - A. FEEDERS AND BRANCH CIRCUITS: TYPE XHHW SINGLE CONDUCTORS IN RACEWAY.
- 3.2 INSTALLATION
 - PRIOR TO INSTALLATION OF CONDUCTORS ENSURE ALL CHASES ARE SMOOTH AND FREE OF SHARP EDGES AND DEBRIS.
- 3.3 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 AND UL 486B.

- B. MAKE SPLICES AND TAPS THAT ARE COMPATIBLE WITH CONDUCTOR MATERIAL AND THAT POSSESS EQUIVALENT OR BETTER MECHANICAL STRENGTH AND INSULATION RATINGS THAN UNSPLICED CONDUCTORS.
- 3.4 FIELD QUALITY CONTROL
 - A. TESTING: PERFORM THE FOLLOWING FIELD QUALITY-CONTROL TESTING:
 - 1. AFTER INSTALLING CONDUCTORS AND CABLES AND BEFORE ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS.
 - 2. PERFORM EACH ELECTRICAL TEST AND VISUAL AND MECHANICAL INSPECTION STATED IN NETA ATS, SECTION 7.3.1. CERTIFY COMPLIANCE WITH TEST PARAMETERS.

RACEWAYS AND BOXES

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
 - A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, APPLY TO THIS SECTION.
- 1.2 DEFINITIONS
 - A. EMT: ELECTRICAL METALLIC TUBING.
 - B. LFMC: LIQUIDTIGHT FLEXIBLE METAL CONDUIT.
 - C. RNC: RIGID NONMETALLIC CONDUIT.
- 1.3 SUBMITTALS
 - A. PRODUCT DATA: FOR RACEWAYS, WIREWAYS AND FITTINGS, BOXES, ENCLOSURES, AND CABINETS.
- 1.4 QUALITY ASSURANCE
 - A. 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.
 - B. COMPLY WITH NFPA 70.

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
 - A. IN OTHER PART 2 ARTICLES WHERE SUBPARAGRAPH TITLES BELOW INTRODUCE LISTS, THE FOLLOWING REQUIREMENTS APPLY FOR PRODUCT SELECTION:
 - 1. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE MANUFACTURERS SPECIFIED.
- 2.2 METAL CONDUIT AND TUBING
 - A. AVAILABLE MANUFACTURERS:
 - 1. GRINNELL CO./TYCO INTERNATIONAL; ALLIED TUBE AND CONDUIT DIV.
 - 2. LTV STEEL TUBULAR PRODUCTS COMPANY.
 - 3. O-Z GEDNEY; UNIT OF GENERAL SIGNAL.
 - B. RIGID STEEL, AND PVC COATED RIGID STEEL, CONDUIT: ANSI C80.1.
 - C. LFMC: FLEXIBLE STEEL CONDUIT WITH PVC JACKET.
 - D. FITTINGS: NEMA FB 1; COMPATIBLE WITH CONDUIT AND TUBING MATERIALS.
- 2.3 BOXES, ENCLOSURES, AND CABINETS
 - A. MANUFACTURERS:
 - 1. COOPER CROUSE-HINDS; DIV. OF COOPER INDUSTRIES, INC.
 - 2. EMERSON/GENERAL SIGNAL; APPLETON ELECTRIC COMPANY.
 - 3. HOFFMAN.
 - 4. HUBBELL, INC.; KILLARK ELECTRIC MANUFACTURING CO.
 - 5. O-Z/GEDNEY; UNIT OF GENERAL SIGNAL.
 - 6. SKYLINE ELECTRIC CO., SEATTLE, WA.
 - B. NON-METALLIC OUTLET AND DEVICE BOXES: NOT ALLOWED.
 - C. SHEET METAL OUTLET AND DEVICE BOXES: NOT ALLOWED.
 - D. CAST-METAL OUTLET AND DEVICE BOXES: NEMA FB 1, TYPE FS/FD, WITH GASKETED COVER.
 - E. HINGED-COVER ENCLOSURES: NEMA 250, TYPE 4, WITH HINGE COVER AND FLUSH LATCH.
 - 1. METAL ENCLOSURES: STAINLESS STEEL, FINISHED INSIDE AND OUT, UNLESS NOTED OR SPECIFIED OTHERWISE.

2.4 FACTORY FINISHES

- A. FINISH: FOR RACEWAY, ENCLOSURES, OR CABINET COMPONENTS, PROVIDE MANUFACTURER'S MARINE WHITE PAINT APPLIED TO FACTORY-ASSEMBLED ENCLOSURES AND CABINETS BEFORE SHIPPING - OR FACTORY GALVANIZED.

PART 3 - EXECUTION

- 3.1 RACEWAY APPLICATION
 - A. OUTDOORS:
 - 1. EXPOSED EXTERIOR: PVC COATED RIGID STEEL.
 - 2. EXPOSED INTERIOR: RIGID STEEL.
 - 3. UNDERGROUND, SINGLE RUN: RNC, RIGID STEEL WHERE REQUIRED BY CODE.
 - 4. UNDERGROUND, GROUPED: RNC.
 - 5. CONNECTION TO VIBRATING EQUIPMENT (INCLUDING TRANSFORMERS AND HYDRAULIC, PNEUMATIC, ELECTRIC SOLENOID, OR MOTOR-DRIVEN EQUIPMENT): LFMC.

- 6. BOXES AND ENCLOSURES: NEMA 250, TYPE 4X.
- B. MINIMUM RACEWAY SIZE: 3/4-INCH TRADE SIZE (DN 21).
- 3.2 INSTALLATION
 - A. KEEP RACEWAYS AT LEAST 6 INCHES (150 MM) AWAY FROM PARALLEL RUNS OF WATER PIPES; 12" FROM FUEL LINES. INSTALL HORIZONTAL RACEWAY RUNS ABOVE WATER PIPING.
 - B. COMPLETE RACEWAY INSTALLATION BEFORE STARTING CONDUCTOR INSTALLATION.
 - C. INSTALL TEMPORARY CLOSURES TO PREVENT FOREIGN MATTER FROM ENTERING RACEWAYS.
 - D. PROTECT STUB-UPS FROM DAMAGE WHERE CONDUITS RISE THROUGH SLABS. ARRANGE SO CURVED PORTIONS OF BENDS ARE NOT VISIBLE ABOVE THE FINISHED SLAB.
 - E. MAKE BENDS AND OFFSETS SO ID IS NOT REDUCED. KEEP LEGS OF BENDS IN THE SAME PLANE AND KEEP STRAIGHT LEGS OF OFFSETS PARALLEL, UNLESS OTHERWISE INDICATED.
 - F. INSTALL PULL WIRES IN EMPTY RACEWAYS. USE POLYPROPYLENE OR MONOFILAMENT PLASTIC LINE WITH NOT LESS THAN 200-LB (90-KG) TENSILE STRENGTH. LEAVE AT LEAST 24 INCHES (600 MM) OF SLACK AT EACH END OF PULL WIRE.
 - G. STUB-UP CONNECTIONS: EXTEND CONDUITS THROUGH STRUCTURE FOR CONNECTION TO FREESTANDING EQUIPMENT. INSTALL WITH AN ADJUSTABLE TOP OR COUPLING THREADED INSIDE FOR PLUGS SET FLUSH WITH FINISHED SLAB. EXTEND CONDUCTORS TO EQUIPMENT WITH RIGID STEEL CONDUIT.
- 3.3 PROTECTION
 - A. PROVIDE FINAL PROTECTION AND MAINTAIN CONDITIONS THAT ENSURE COATINGS, FINISHES, AND CABINETS ARE WITHOUT DAMAGE OR DETERIORATION AT TIME OF SUBSTANTIAL COMPLETION.
 - 1. REPAIR DAMAGE TO GALVANIZED FINISHES WITH ZINC-RICH PAINT RECOMMENDED BY MANUFACTURER.
 - 2. REPAIR DAMAGE TO PVC OR PAINT FINISHES WITH MATCHING TOUCHUP COATING RECOMMENDED BY MANUFACTURER.
- 3.4 CLEANING
 - A. AFTER COMPLETING INSTALLATION OF EXPOSED, FACTORY-FINISHED RACEWAYS AND BOXES, INSPECT EXPOSED FINISHES AND REPAIR DAMAGED FINISHES.

END OF SECTION



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REVISIONS		
REV	DATE	DESCRIPTION
0	08/11/2023	ISSUED FOR BID

ISSUED FOR BID			
ALASKA RAILROAD PIER 15.5 ELECTRICAL UPGRADE PROJECT			
ELECTRICAL SPECIFICATIONS			
DESIGNED BY:	EJD	PROJECT NO:	224017
DRAWN BY:	KDD	DATE:	AUG 2023
CHECKED BY:	EJD	SCALE:	NONE
			SHEET NO: E4.00