

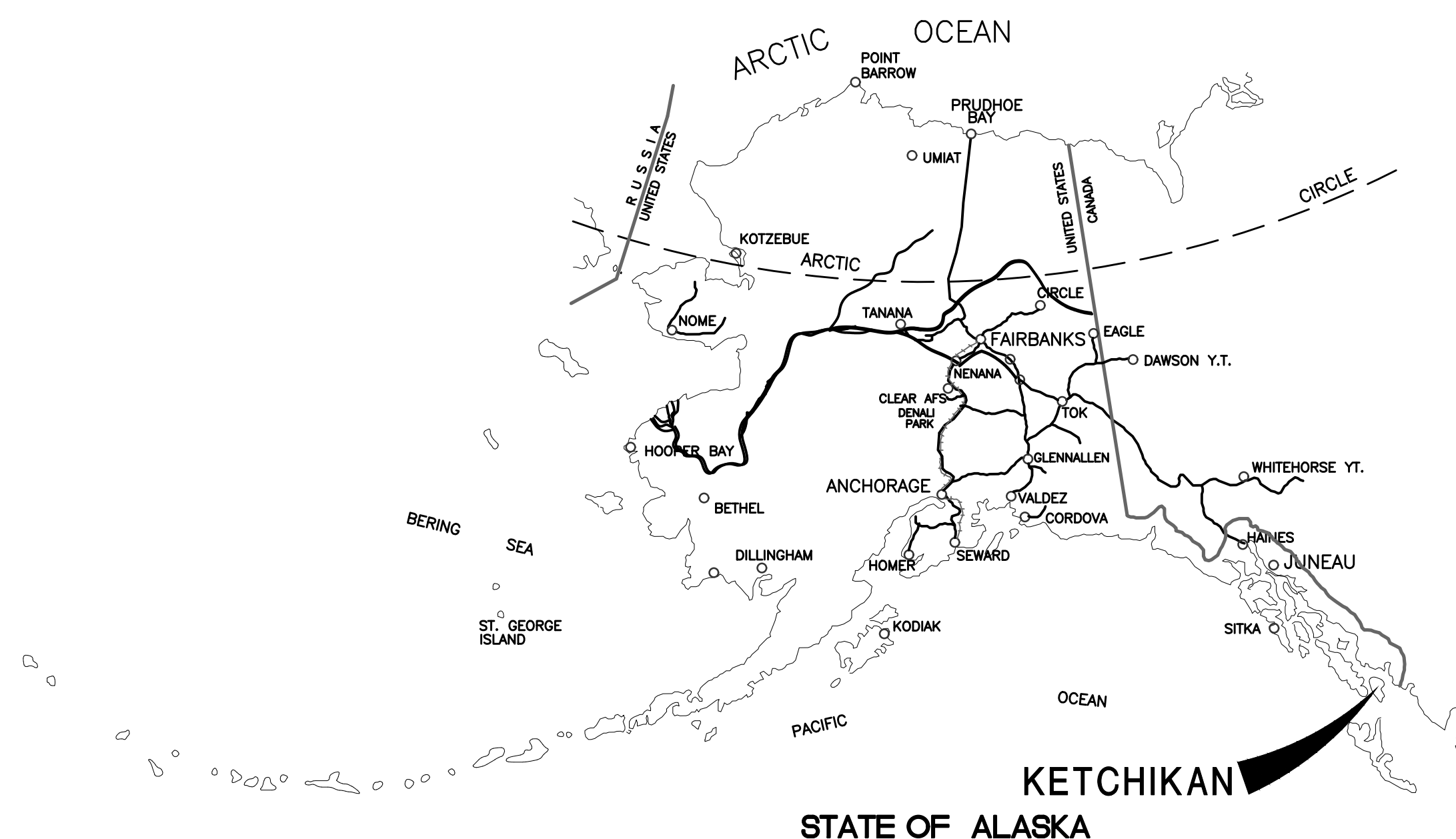
# KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP ISSUED FOR CONSTRUCTION

KETCHIKAN SHIPYARD

JULY 25, 2018

3801 N. TONGASS AVENUE, KETCHIKAN, ALASKA

## VICINITY MAP



## DRAWING INDEX

- T1.0 TITLE, INDEX, AND PROJECT LOCATION
- E0.0 LEGEND AND NOTES
- E1.0 ELECTRICAL LOCATION PLAN
- E2.0 ENLARGED PLAN—ELECTRICAL EQUIPMENT YARD
- E2.1 ENLARGED PLAN—NORTHWEST CORNER ASSEMBLY HALL
- E2.2 ENLARGED PLAN—FUTURE REPAIR HALL
- E2.3 ENLARGED PLAN—MACHINE SHOP AND AIR COMPRESSOR BUILDING
- E2.4 ENLARGED PLAN—MACHINE SHOP AND PIER 1
- E3.0 ELECTRICAL ONE—LINE DIAGRAM—BASE BID
- E3.0D ELECTRICAL ONE—LINE DIAGRAM—BASE BID—DEMO
- E3.1 ELECTRICAL ONE—LINE DIAGRAM—ALT. 1
- E3.1D ELECTRICAL ONE—LINE DIAGRAM—ALT. 1—DEMO
- E3.2 ELECTRICAL ONE—LINE DIAGRAM—ALT. 2
- E3.2D ELECTRICAL ONE—LINE DIAGRAM—ALT. 2—DEMO
- E3.3 ELECTRICAL ONE—LINE DIAGRAM—ALT. 3
- E3.3D ELECTRICAL ONE—LINE DIAGRAM—ALT. 3—DEMO
- E4.0D 480V ONE—LINE DIAGRAMS—BASE BID—DEMO
- E4.0 480V ONE—LINE DIAGRAMS—BASE BID
- E4.1 480V ONE—LINE DIAGRAMS—ALT. 1 & 2
- E4.2 480V ONE—LINE DIAGRAMS—ALT. 3
- E4.3D 480V ONE—LINE DIAGRAMS—ALT. 4—DEMO
- E4.3 480V ONE—LINE DIAGRAMS—ALT. 4
- E4.4D 480V ONE—LINE DIAGRAMS—ALT. 4—DEMO
- E4.4 480V ONE—LINE DIAGRAMS—ALT. 4
- E4.5D 480V ONE—LINE DIAGRAMS—ALT. 4—DEMO
- E4.5 480V ONE—LINE DIAGRAMS—ALT. 4
- E5.0 ELECTRICAL DETAILS
- E5.1 ELECTRICAL DETAILS—REFERENCE DRAWING
- C5.0 CIVIL DETAILS
- S0.0 STRUCTURAL NOTES
- S5.0 STRUCTURAL DETAILS
- S5.1 HANDHOLE EXTENSION DETAIL
- S5.2 TYPICAL EQUIPMENT PAD PLAN AND SECTION



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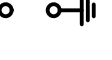


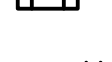


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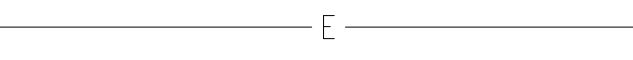
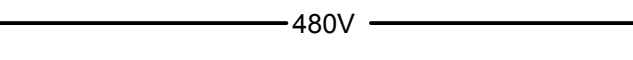


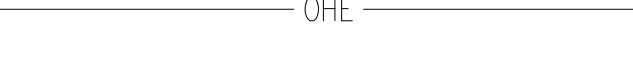
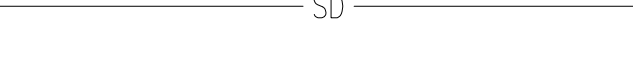


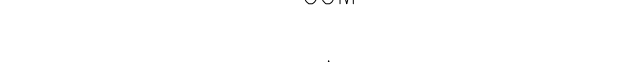



## ELECTRICAL ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
A	AMPERE	MAX	MAXIMUM
AC	ALTERNATING CURRENT	MCB	MAIN CIRCUIT BREAKER
AFF	ABOVE FINISHED FLOOR	MDP	MAIN DISTRIBUTION PANEL
AFG	ABOVE FINISHED GRADE	MECH	MECHANICAL
AHU	AIR HANDLING UNIT	MFR	MANUFACTURER
APS	AUXILIARY POWER SUPPLY	MH	MANHOLE
BATT	BATTERY	MIN	MINIMUM
BAS	BUILDING AUTOMATION SYSTEM	MLO	MAIN LUGS ONLY
BLDG	BUILDING	MM	MULTI MODE
BRKR	BREAKER	MSSB	MAIN SERVICE SWITCHBOARD
C	CABLE, CONDUIT, COIL	MTD	MOUNTED
CAB	CABINET	MTG	MOUNTING
CAT	CATEGORY	MTR	MOTOR
CB	CIRCUIT BREAKER	MTU	MAIN TERMINAL UNIT
CKT	CIRCUIT	MW	MICROWAVE
CLG	CEILING	N	NORTH
CO	CONDUIT ONLY	NC	NORMALLY CLOSED
COMM	COMMUNICATIONS	NIC	NOT IN CONTRACT
CR	CONTROL RELAY	NL	NIGHT LIGHT
CTL	CONTROL	NRTL	NATIONALLY RECOGNIZED
CU	CONDENSING UNIT		TESTING LAB
D	DEEP	NTS	NOT TO SCALE
DDC	DIRECT DIGITAL CONTROLS	OPS	OPERATIONS
DISC	DISCONNECT	PC	PHOTOCELL
DWG	DRAWING	PH	PHASE
E	EAST	PKG	PACKAGE
EA	EACH	PNL	PANEL, PANELBOARD
EF	EXHAUST FAN	PVC	POLYVINYL CHLORIDE CONDUIT
ELEC	ELECTRICAL	RCPT	RECEPTACLE
EMERG EQUIP (E), EXIST	EMERGENCY EQUIPMENT	RM	ROOM
EXT	EXISTING, EXTERIOR	S	SOUTH
FA	FIRE ALARM	SECT	SECTION
FAA	FIRE ALARM ANNUNCIATOR	SHLD	SHIELDED
FACP	FIRE ALARM CONTROL PANEL	SPEC	SPECIFICATIONS
FDR	FEEDER	SPS	SHORE POWER STATION
FIXT	FIXTURE	STBY	STANDBY
FLEX	FLEXIBLE	STD	STANDARD
FM	FACTORY MUTUAL	STL	STEEL
FVNR	FULL VOLTAGE NON REVERSING	SW	SWITCH
FT	FEET, FOOT	SYS	SYSTEM
FUT	FUTURE	TDU	TUBE DISTRIBUTION UNIT
GALV	GALVANIZED	TEMP	TEMPORARY, TEMPERATURE
GFI, G	GROUND FAULT INTERRUPTER	TTB	TELEPHONE TERMINAL BACK BOARD
GND	GROUND	TWPR	TWISTED PAIR
GRS	GALVANIZED RIGID STEEL	TYP	TYPICAL
H	HIGH DIMENSION	UGC	UNDERGROUND COMMUNICATIONS
HDPE	HIGH DENSITY POLYETHYLENE	UGE	UNDERGROUND ELECTRICAL
HH	HANDHOLE	UH	UNIT HEATER
HP	HORSEPOWER	V	VOLT
HZ	HERTZ - CYCLES PER SEC	VFI	VACUUM FAULT INTERRUPTER
IC	INTERRUPTING CAPACITY	W	WATT, WIDE, WEST
ID	INSIDE DIMENSION	WHM	WATT HOUR METER
IN	INCH	WP	WEATHERPROOF-WHILE-IN-USE
JB, J-BOX	JUNCTION BOX	XFMR	TRANSFORMER
kmil	THOUSAND CIRCULAR MILS	Z	IMPEDANCE
KVA	KILOVOLT AMPERES		
KW	KILOWATT		
KWH	KILOWATT HOUR		
KPU	KETCHIKAN PUBLIC UTILITIES		
LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT		

## SYMBOLS LEGEND:

	DISCONNECT SWITCH
	WYE
	DELTA
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	AUTOMATIC TRANSFER SWITCH
	LIGHTNING ARRESTOR
	CIRCUIT BREAKER
	SEPARABLE CONNECTOR
	FUSE WITH RATING
	FUSED CONTACT SWITCH
	FUSED DISCONNECT SWITCH

## LINE TYPES:

	EXISTING UNDERGROUND ELECTRICAL
	UNDERGROUND ELECTRICAL - 480V
	UNDERGROUND ELECTRICAL - 12470V
	UNDERGROUND ELECTRICAL - 34500V
	OVERHEAD ELECTRICAL
	STORM DRAIN
	SEWER
	WATER
	UNDERGROUND COMMUNICATIONS
	AIR
	FENCE
	EXISTING FENCE

## GENERAL NOTES:

1. THE ELECTRICAL INSTALLATION SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE AND 2017 NATIONAL ELECTRICAL SAFETY CODE AS AMENDED AND ADOPTED BY THE CITY OF KETCHIKAN.
2. THE ELECTRICAL INSTALLATION SHALL COMPLY NECA STANDARDS OF INSTALLATION.
3. ALL ELECTRICAL EQUIPMENT AND MATERIALS SHALL BE LISTED AND LABELED FOR THEIR INTENDED APPLICATION BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION.
4. CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES AND STRUCTURES AFFECTING THE WORK. NOTIFY THE PROJECT MANAGER IN WRITING OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THOSE SHOWN IN THE CONTRACT DOCUMENTS WHICH ADVERSELY IMPACT THE WORK.
5. EXISTING EQUIPMENT INFORMATION SHOWN ON THESE DRAWINGS SHOULD BE FIELD VERIFIED. CONFIRM NEW EQUIPMENT LOCATIONS WITH OWNER AND ADJUST AS REQUIRED.
6. CONTRACTOR SHALL MAINTAIN A RED-LINE SET OF CONSTRUCTION DOCUMENTS DURING CONSTRUCTION. RED-LINE DRAWINGS SHALL BE SUBMITTED TO THE OWNER UPON PROJECT COMPLETION.
7. ALL CONDUCTORS SHALL BE COPPER.
8. ALL LOW VOLTAGE (600V AND BELOW) WIRING SHALL BE TYPE XHHW-2, UNLESS NOTED OTHERWISE.
9. ALL MEDIUM VOLTAGE (ABOVE 600V) WIRING SHALL BE TYPE MV-105, UNLESS NOTED OTHERWISE. PULL CABLES INTO EXISTING OR PRE-INSTALLED DUCTS, UNLESS NOTED OTHERWISE. WHERE MULTIPLE DUCTS EXIST, USE BOTTOM DUCTS.
10. THE CONTRACTOR SHALL PROVIDE AND INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS OR CABLING.
11. OUTAGES OF ELECTRICAL, TELECOMMUNICATIONS, OR OTHER SYSTEMS SHALL BE COORDINATED WITH PROJECT MANAGER IN ACCORDANCE WITH DIVISION 1 SPECIFICATIONS.
12. ANY PENETRATION OF THE BUILDING VAPOR BARRIER SYSTEM SHALL BE APPROPRIATELY SEALED TO RETAIN THE INTEGRITY OF THE WALL SYSTEM.
13. CUT AND PATCH EXISTING BUILDING SURFACES OR PAVED SURFACES AS REQUIRED TO INSTALL NEW WIRING. ANY PATCHES SHALL BE FINISHED TO MATCH THE EXISTING ADJACENT SURFACES.
14. WHERE CONDUITS ENTER MANHOLE, ENCLOSURE OR PAD WITH ROUGH EDGES, PROVIDE BELLED ENDS FOR PVC CONDUIT. WHERE INSTALLATION OF BELLED ENDS IS NOT PRACTICAL, FILE SMOOTH ALL ROUGH EDGES. GRIND SMOOTH ROUGH EDGES OF STEEL CONDUIT AND PROVIDE GROUNDED INSULATING BUSHINGS.
15. ALL NEW PAD MOUNTED EQUIPMENT SHALL BE PROPERLY SECURED AND LOCKED.
16. DETERMINE AND RECORD THE ROTATION OF ALL THREE-PHASE SERVICES PRIOR TO PERFORMING ANY WORK. PRIOR TO RE-ENERGIZING SERVICE, CONFIRM THAT ROTATION WAS NOT CHANGED.
17. THE BASIS OF DESIGN FOR THE PAD MOUNTED EQUIPMENT FOUNDATIONS ARE PRE-CAST EQUIPMENT PADMOUNTS WITH RISERS. SEE S5.2 FOR DETAILS.

## MAJOR ELECTRICAL EQUIPMENT - BASIS OF DESIGN

TAG	DESCRIPTION	BID ITEM	LOCATION	PLAN DWG #	ONE-LINE DWG #	RATINGS	MANUFACTURER / SERIES OR APPROVED EQUAL	NOTES
CB-1	PAD MOUNT CIRCUIT BREAKER	BASE BID	ELECTRICAL EQUIPMENT YARD	E2.0	E3.0	35kV, 600A, 3 PHASE	COOPER POWER SYSTEMS / KP S E-VF5-37	DEAD FRONT, STAINLESS STEEL CONSTRUCTION, VACUUM FAULT INTERRUPTER, 3-PHASE GROUP OPERATED, ELECTRONIC TRIP CONTROL. THIS EQUIPMENT IS SUBJECT TO REVIEW AND APPROVAL BY KPU.
P1	PAD MOUNT TRANSFORMER	BASE BID	ELECTRICAL EQUIPMENT YARD	E2.0	E3.0	34.5kV:12.47Y/7.2kV, 5000 kVA	COOPER POWER SYSTEMS / VFI	DEAD FRONT, SECONDARY VFI, KNAN, ANSI C57.12.29
P5	PAD MOUNT TRANSFORMER	BASE BID	PIER 1	E2.4	E3.0	12.47kV:480Y/277V, 2500 kVA	COOPER POWER SYSTEMS / VFI	DEAD FRONT, LOOP FEED, PRIMARY VFI, KNAN, ANSI C57.12.29
P6	PAD MOUNT TRANSFORMER	BASE BID	MACHINE SHOP	E2.4	E3.0	12.47kV:480Y/277V, 500 kVA	COOPER POWER SYSTEMS / COMPARTMENTAL	DEAD FRONT, LOOP FEED, CURRENT LIMITING & BAYONET PRIMARY FUSES, KNAN, ANSI C57.12.29
P7	PAD MOUNT TRANSFORMER	ALTERNATE #2	AIR COMPRESSOR BLDG	E2.3	E3.2	12.47kV:480Y/277V, 750 kVA	COOPER POWER SYSTEMS / COMPARTMENTAL	DEAD FRONT, LOOP FEED, CURRENT LIMITING & BAYONET PRIMARY FUSES, KNAN, ANSI C57.12.29
P8	PAD MOUNT TRANSFORMER	ALTERNATE #1	MACHINE SHOP	E2.3	E3.1	12.47kV:480Y/277V, 500 kVA	COOPER POWER SYSTEMS / COMPARTMENTAL	DEAD FRONT, LOOP FEED, CURRENT LIMITING & BAYONET PRIMARY FUSES, KNAN, ANSI C57.12.29
P9	PAD MOUNT TRANSFORMER	ALTERNATE #3	OPERATIONS BLDG	E2.2	E3.3	12.47kV:480Y/277V, 150 kVA	COOPER POWER SYSTEMS / COMPARTMENTAL	DEAD FRONT, LOOP FEED, CURRENT LIMITING & BAYONET PRIMARY FUSES, KNAN, ANSI C57.12.29
P10	PAD MOUNT TRANSFORMER	ALTERNATE #3	BERTH 1	E2.2	E3.3	12.47kV:480Y/277V, 1500 kVA	COOPER POWER SYSTEMS / VFI	DEAD FRONT, LOOP FEED, PRIMARY VFI, KNAN, ANSI C57.12.29
S2	PAD MOUNT SWITCH	ALTERNATE #2	OPERATIONS BLDG	E2.2	E3.2	14.4kV, 3 PHASE, 600A, 4 WAY	S&C ELECTRIC / PME-10	DEAD FRONT, ANSI C57.12.29, 4 SWITCH WAYS
S3	PAD MOUNT SWITCH	BASE BID	ELECTRICAL EQUIPMENT YARD	E2.0	E3.0	14.4kV, 3 PHASE, 600A, 4 WAY	S&C ELECTRIC / VISTA 413	DEAD FRONT, ANSI C57.12.29, 3 SWITCH WAYS, 1 FAULT INTERRUPTER WAY
S4	PAD MOUNT SWITCH	ALTERNATE #2	ELECTRICAL EQUIPMENT YARD	E2.0	E3.2	14.4kV, 3 PHASE, 600A, 4 WAY	S&C ELECTRIC / VISTA 413	DEAD FRONT, ANSI C57.12.29, 3 SWITCH WAYS, 1 FAULT INTERRUPTER WAY
SB-1	LOW VOLTAGE SWITCHBOARD	BASE BID	PIER 1	E2.4	E4.0	480Y/277V, 3PH, 4W, 3000A, NEMA 1, 65KAIC	SQUARE D / POWER ZONE CENTER	WITH WALK IN WEATHER SHELTER
UMC-1	PAD MOUNT UTILTY METERING CABINET	BASE BID	ELECTRICAL EQUIPMENT YARD	E2.0	E3.0	35kV, 600A, 3 PHASE, RADIAL FEED	FEDERAL PACIFIC PMDF-335-R6-600	DEAD FRONT, STAINLESS STEEL CONSTRUCTION. PROVIDE WITH (3) ABB CLASS 0.15S CT'S AND (3) PT'S. THIS EQUIPMENT IS SBUJECT TO REVIEW AND APPROVAL BY KPU.

Revisions	
ISSUED FOR CONSTRUCTION	0

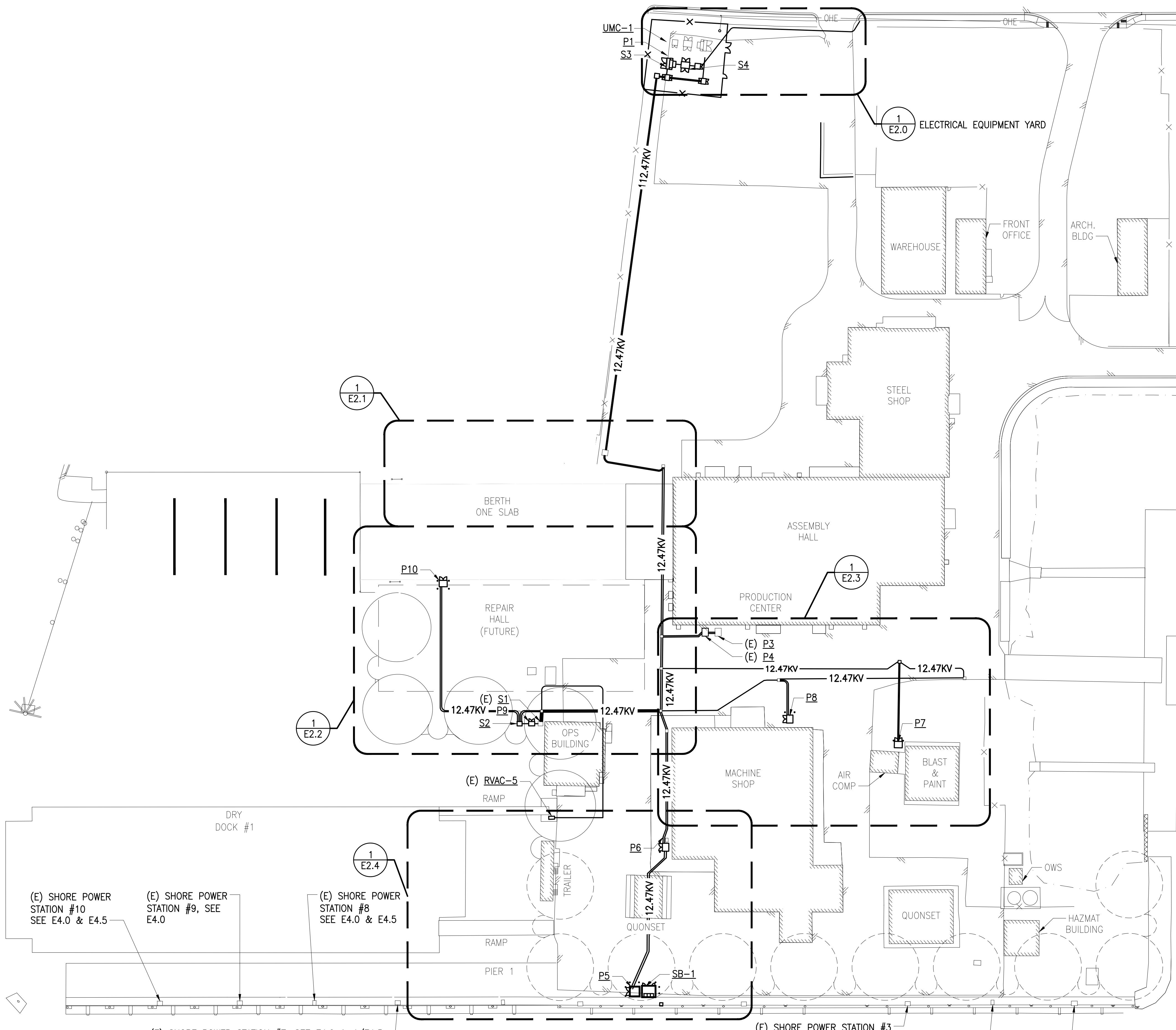
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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**LEGEND AND NOTES**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E0.0</b>
Of	Sheets





**SCOPE OF WORK SUMMARY:**

THE SCOPE OF WORK IS DIVIDED INTO A BASE BID AND FOUR ADDITIVE ALTERNATE BID ITEMS. REFER TO ONE-LINE DIAGRAMS ON SHEETS E3.0 THROUGH E4.5 FOR THE DEFINITION OF EACH BID ITEM.

**BASE BID INCLUDES:**

- GRADING, LEVELING AND FENCING THE ELECTRICAL EQUIPMENT YARD.
- INSTALLATION OF 34.5 KV SERVICE; 34.5 KV CIRCUIT BREAKER CB-1; UTILITY METERING CABINET UMC-1; SWITCH S3; TRANSFORMERS P1, P5, P6; 480V SWITCHBOARD SB-1 WITH WALK-IN WEATHER SHELTER; MANHOLE EHM 6.
- INSTALLATION OF CONDUIT FROM EMH 2 TO (E) HANDHOLE AND FROM P5 TO P6.
- REMOVAL OF 480V WIRING FROM EXISTING CONDUITS FROM EXISTING MAIN DISTRIBUTION SWITCHBOARD TO MACHINE SHOP MDP-3 AND SHORE POWER STATIONS #5, #6, #8 AND #9.
- INSTALLATION OF 12.47KV CABLES IN EXISTING AND NEW CONDUIT.
- INSTALLATION OF 480V CONDUCTORS AND CONDUIT FROM P5 TO SB-1.
- INSTALLATION OF 480V CONDUCTORS IN EXISTING CONDUIT FROM SB-1 SHORE POWER STATIONS #5, #6, #8 & #9.
- SHORTENING AND RECONNECTION OF EXISTING 480V CONDUCTORS FOR SHORE POWER STATIONS #1, #2 & #4 TO SB-1.
- INSTALLATION OF 480V CONDUCTORS IN EXISTING CONDUIT FROM P6 TO MACHINE SHOP MDP-3.
- DEMOLITION OF THE EXISTING 34.5 KV SERVICE.
- DISCONNECTING AND ABANDONING IN PLACE TRANSFORMER #2 AND PRIMARY METERING & RELAYING CABINET.

**ADDITIVE ALTERNATE #1 INCLUDES:**

- INSTALLATION OF TRANSFORMER P8.
- REMOVAL OF 480V WIRING FROM EXISTING CONDUITS FROM EXISTING MAIN DISTRIBUTION SWITCHBOARD TO MACHINE SHOP 1200A SWITCHBOARD.
- INSTALLATION OF 12.47KV CABLES IN EXISTING CONDUIT.
- INSTALLATION OF 480V CONDUCTORS IN EXISTING CONDUIT FROM P8 TO MACHINE SHOP MAIN SWITCHBOARD.

**ADDITIVE ALTERNATE #2 INCLUDES:**

- INSTALLATION OF TRANSFORMER P7.
- REMOVAL OF 480V WIRING FROM EXISTING CONDUITS FROM EXISTING MAIN DISTRIBUTION SWITCHBOARD TO AIR COMPRESSOR BUILDING.
- INSTALLATION OF 12.47KV CABLES IN EXISTING CONDUIT.
- INSTALLATION OF 480V CONDUCTORS IN EXISTING CONDUIT FROM P7 TO AIR COMPRESSOR BUILDING MAIN SWITCHBOARD; CIRCUIT BREAKER IN AIR COMPRESSOR BUILDING MAIN SWITCHBOARD; 480V WIRING FROM AIR COMPRESSOR BUILDING MAIN SWITCHBOARD TO SMALL AIR COMPRESSOR ENCLOSED CIRCUIT BREAKER.
- INSTALLATION OF SWITCHES S2 AND S4.

**ADDITIVE ALTERNATE #3 INCLUDES:**

- INSTALLATION OF TRANSFORMERS P9 AND P10.
- REMOVAL OF 480V WIRING FROM EXISTING CONDUITS FROM EXISTING MAIN DISTRIBUTION SWITCHBOARD TO BERTH 1 RACK 'A' AND OPERATIONS BUILDING.
- REMOVAL OF 12.47KV WIRING FROM SWITCH RVAC-7 TO SWITCH RVAC-5.
- INSTALLATION OF UNDERGROUND CONDUIT.
- INSTALLATION OF 12.47KV CABLES IN NEW AND EXISTING CONDUIT.
- DISCONNECTING AND ABANDONING IN PLACE SWITCH RVAC-7, TRANSFORMER #1 AND MAIN 480V DISTRIBUTION SWITCHBOARD.

**ADDITIVE ALTERNATE #4 INCLUDES:**

- REMOVAL OF 480V WIRING FROM CONDUITS BETWEEN SB-1 AND SHORE POWER STATIONS #1, #2 AND #4; BETWEEN SHORE POWER STATIONS #3 AND #4; BETWEEN SHORE POWER STATIONS #5 AND #7; AND BETWEEN SHORE POWER STATIONS #9 AND #10.
- INSTALL OF 480V WIRING TO SHORE POWER STATIONS #1, #2, #3, #4, #7 AND #10 IN EXISTING CONDUIT.
- REPAIRS AND UPGRADES TO SHORE POWER STATIONS. SEE SHEETS E4.3 THROUGH E4.5 FOR MORE INFORMATION.

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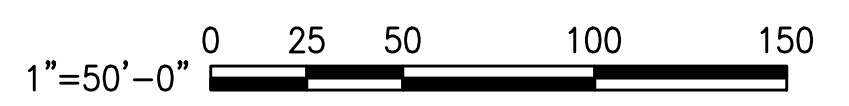
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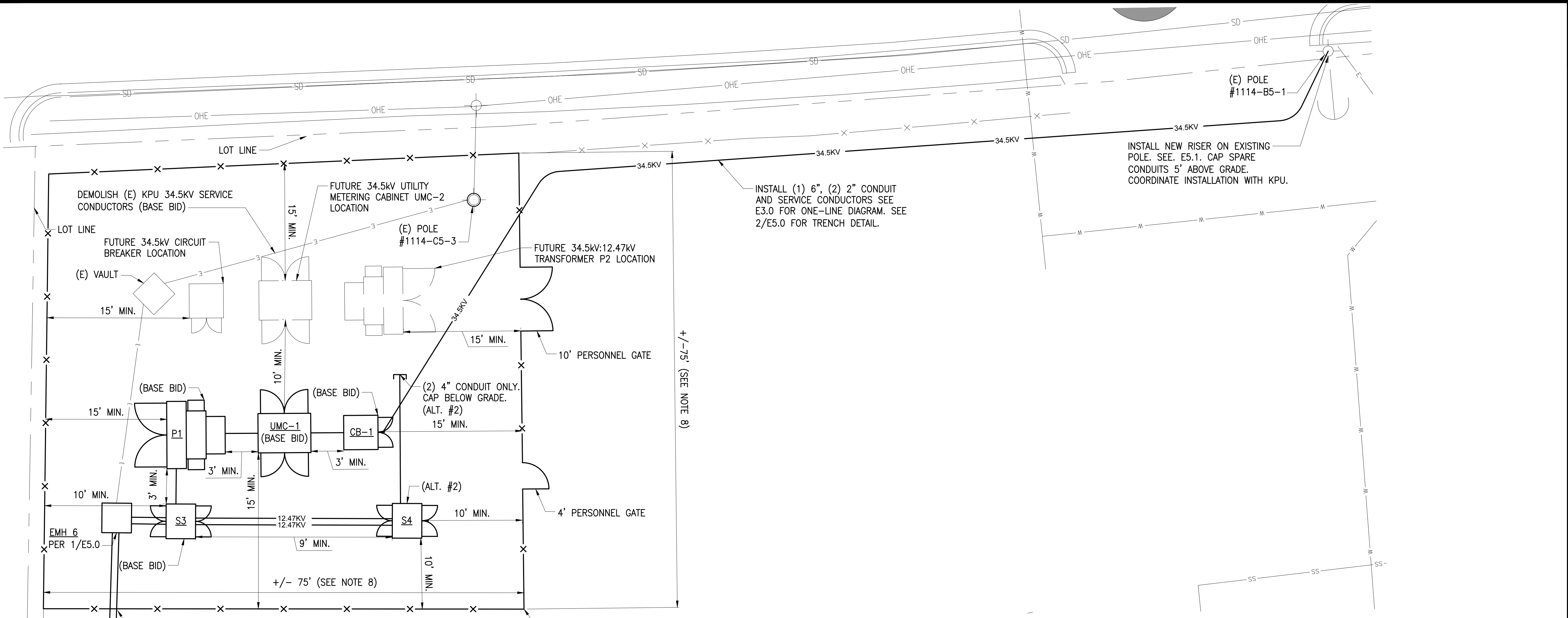
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**ELECTRICAL LOCATION PLAN**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E1.0</b>
Of	Sheets

**1 ELECTRICAL LOCATION PLAN**  
SCALE: 1" = 50'-0"  
NORTH

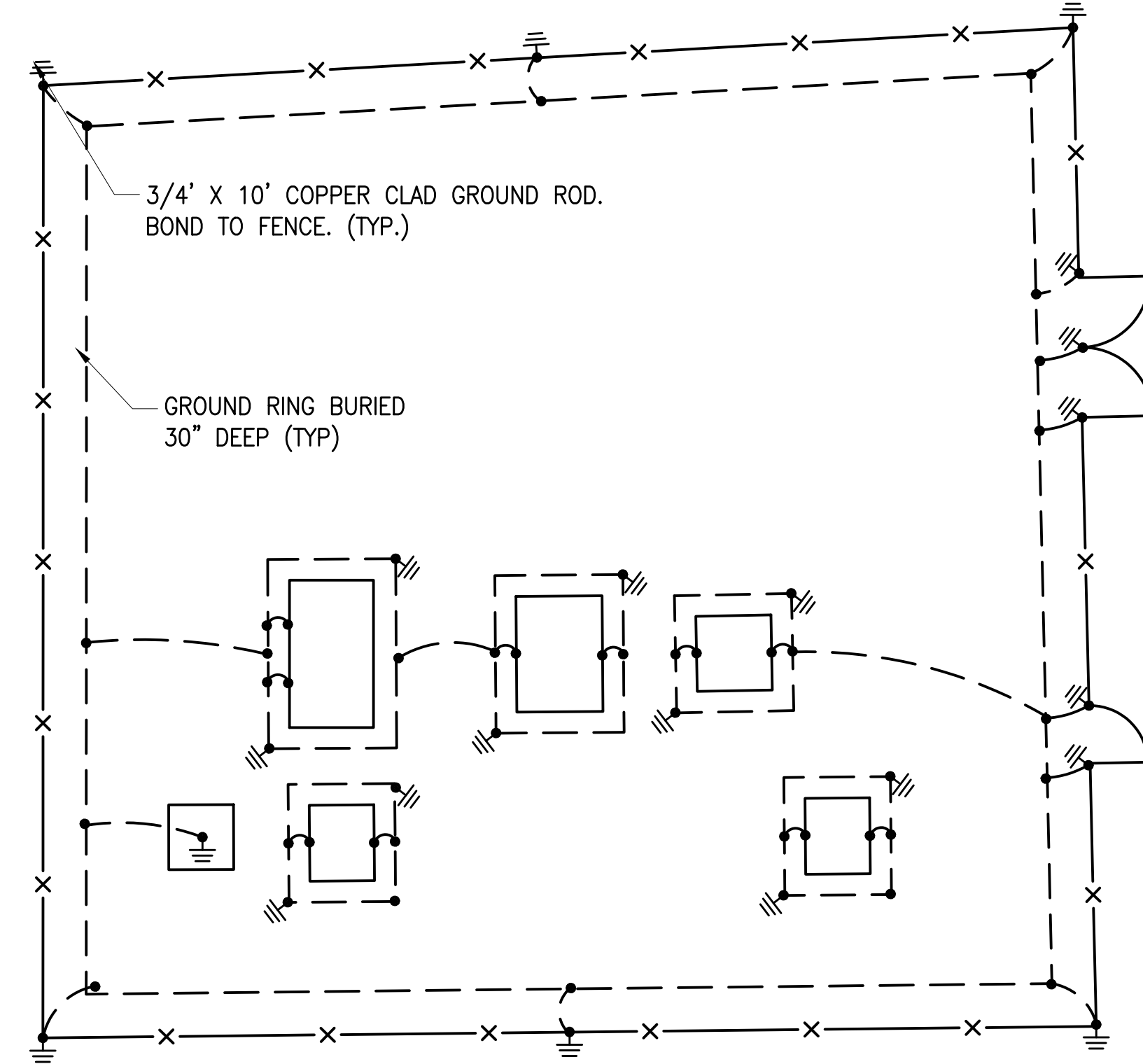






**SHEET NOTES:**

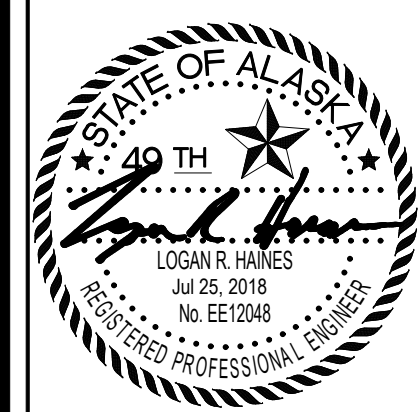
- THIS SHEET DEPICTS WORK INCLUDED IN THE BASE BID AND ADDITIVE ALTERNATE #2.
- THE BASE BID INCLUDES INSTALLATION OF CHAIN LINK FENCING, SERVICE RISER AND CONDUIT, CB-1, UMC-1, P1, S3, EMH 6 AND ASSOCIATED WIRING. SEE ONE-LINE DIAGRAM ON SHEET E3.0 FOR MORE INFORMATION.
- ADDITIVE ALTERNATE #2 INCLUDES THE INSTALLATION OF S4 AND ASSOCIATED WIRING. SEE ONE-LINE DIAGRAM ON SHEET E3.2 FOR MORE INFORMATION.
- CONTRACTOR SHALL LOCATE EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION.
- LIVE PARTS OF 12.47KV EQUIPMENT SHALL BE LOCATED A MINIMUM OF 10' FROM FENCE.
- LIVE PARTS OF 34.5KV EQUIPMENT SHALL BE LOCATED A MINIMUM OF 15' FROM FENCE.
- MINIMUM SEPARATION DISTANCES BETWEEN PIECES OF EQUIPMENT SHOWN ARE BASED ON FM LOSS PROTECTION DATA SHEET 5-4 FOR FM APPROVED EQUIPMENT FILLED WITH FM APPROVED LESS FLAMMABLE LIQUID.
- ADJUST EQUIPMENT LAYOUT AND FENCE LAYOUT AS NEEDED, BASED ON DIMENSIONS OF ACTUAL EQUIPMENT PURCHASED. MAINTAIN MINIMUM CLEARANCES SHOWN.
- GROUNDING AND BONDING OF THE FENCE AND FENCE GATES SHALL BE IN ACCORDANCE WITH THE NESC AND NEC. FENCE POSTS, FENCE FABRIC AND BARBED WIRE STRANDS SHALL BE BONDED TO THE GROUND RING. REFER TO CIVIL FOR FENCE DETAILS.
- ALL BELOW GRADE BONDS SHALL BE EXOTHERMICALLY WELDED OR IRREVERSIBLY CRIMPED.
- ALL GROUNDING CONDUCTORS SHOWN SHALL BE #4/0 AWG BARE COPPER. ALL CONNECTIONS SHALL BE EXOTHERMICALLY WELDED.
- SEE 2/E5.0 FOR TRENCH DETAIL.



**2 GROUNDING SCHEMATIC**  
SCALE:NTS

Revisions	
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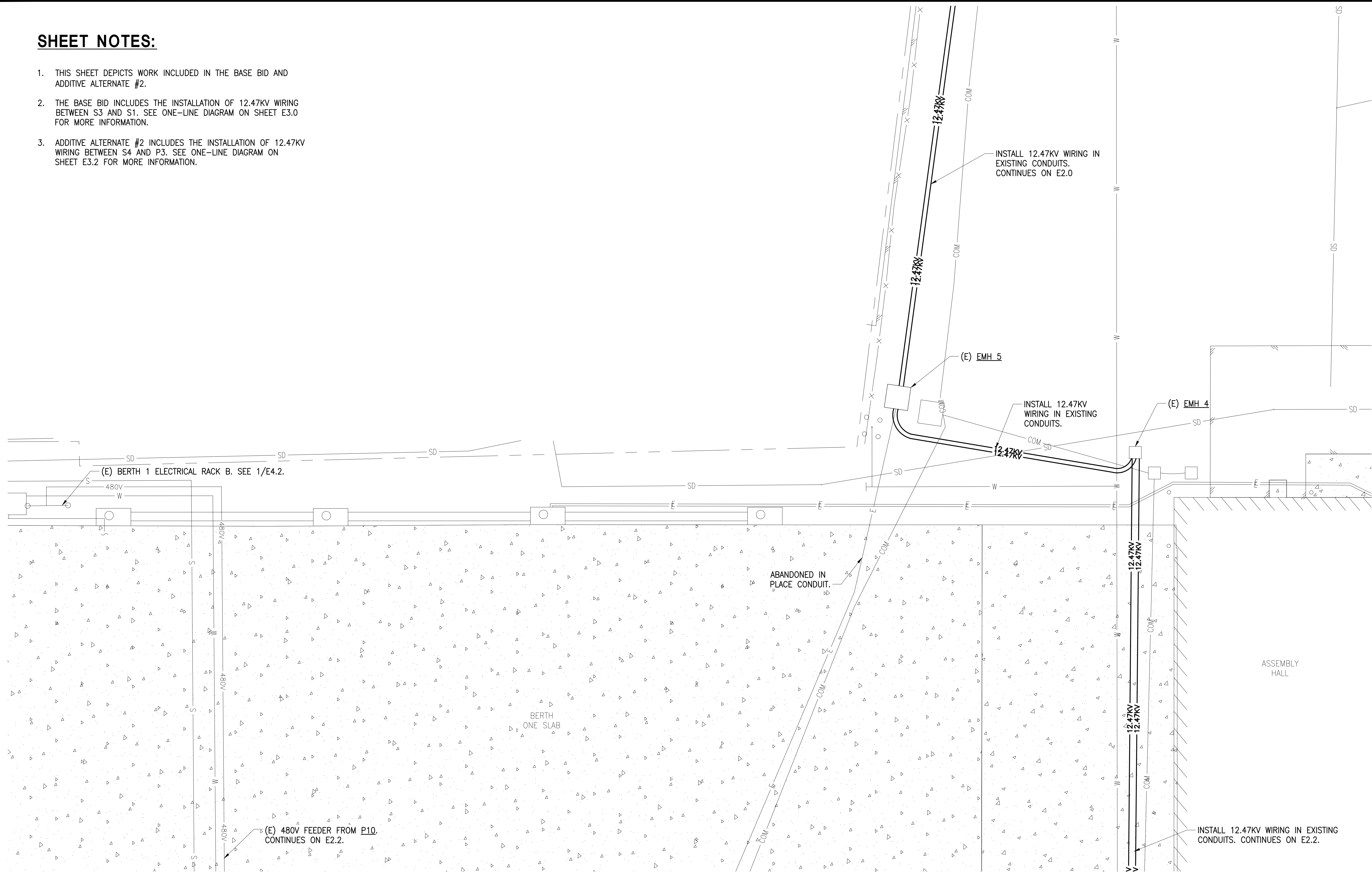
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3801 N. TONGASS AVENUE  
**ENLARGED PLAN - ELECTRICAL EQUIPMENT YARD**

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Of	Sheets



**SHEET NOTES:**

1. THIS SHEET DEPICTS WORK INCLUDED IN THE BASE BID AND ADDITIVE ALTERNATE #2.
2. THE BASE BID INCLUDES THE INSTALLATION OF 12.47KV WIRING BETWEEN S3 AND S1. SEE ONE-LINE DIAGRAM ON SHEET E3.0 FOR MORE INFORMATION.
3. ADDITIVE ALTERNATE #2 INCLUDES THE INSTALLATION OF 12.47KV WIRING BETWEEN S4 AND P3. SEE ONE-LINE DIAGRAM ON SHEET E3.2 FOR MORE INFORMATION.



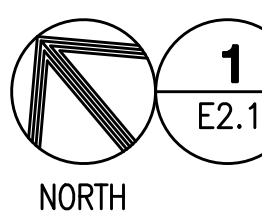
Revisions	
ISSUED FOR CONSTRUCTION	0

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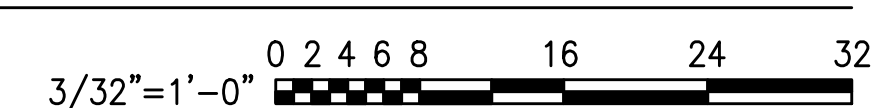
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE  
**ENLARGED PLAN - NORTHWEST CORNER**  
**ASSEMBLY HALL**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E2.1</b>
Of	Sheets



**1 ENLARGED PLAN - NORTHWEST CORNER ASSEMBLY HALL**

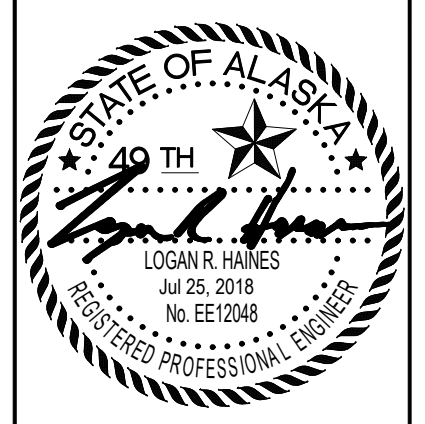
E2.1 SCALE: 3/32" = 1'-0"





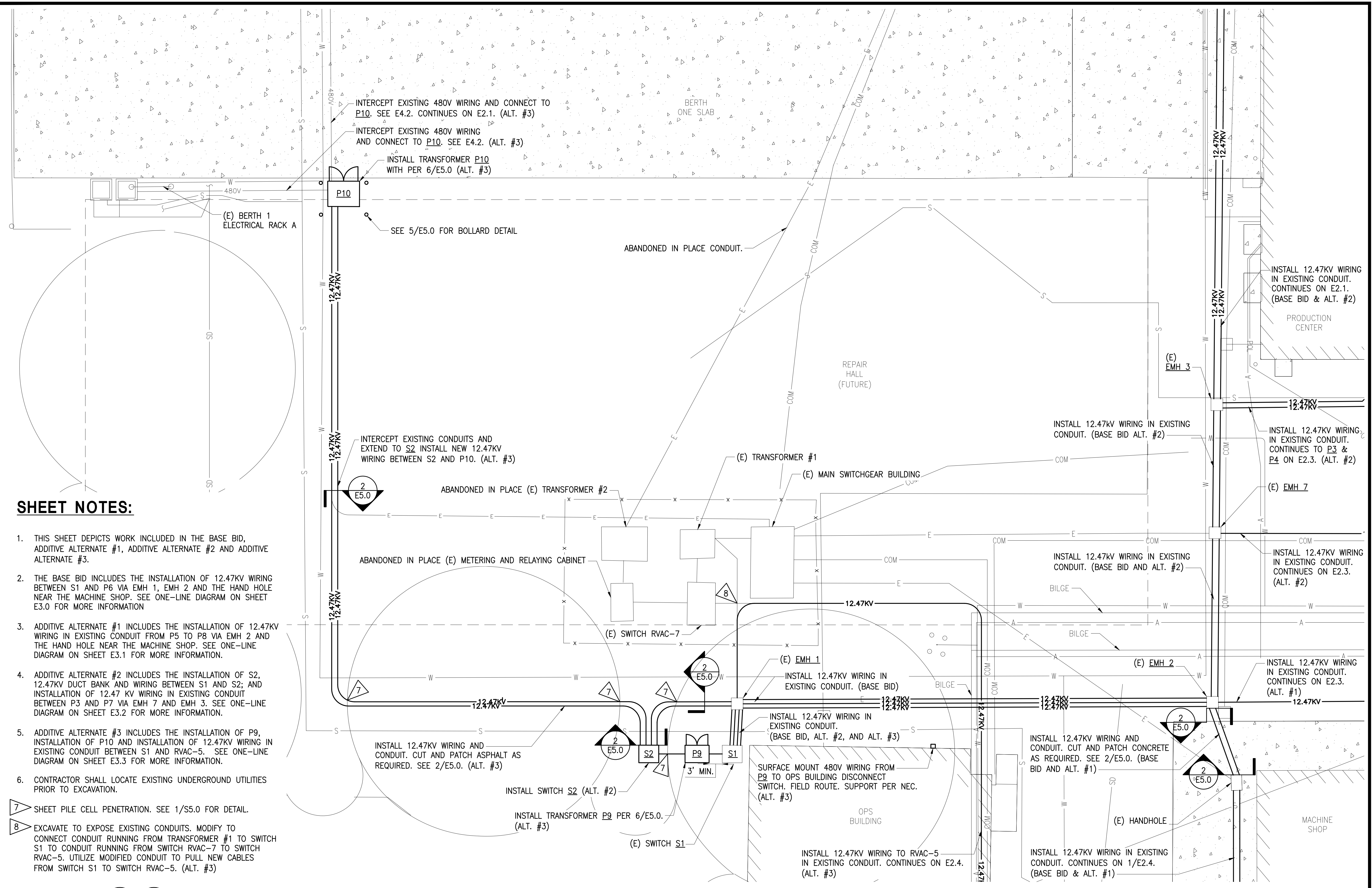
Revisions	
ISSUED FOR CONSTRUCTION	0

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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP  
3801 N. TONGASS AVENUE  
ENLARGED PLAN - FUTURE REPAIR HALL**

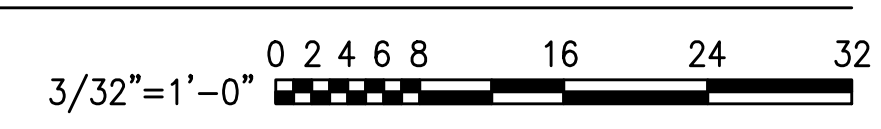
Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E2.2</b>
Of	Sheets



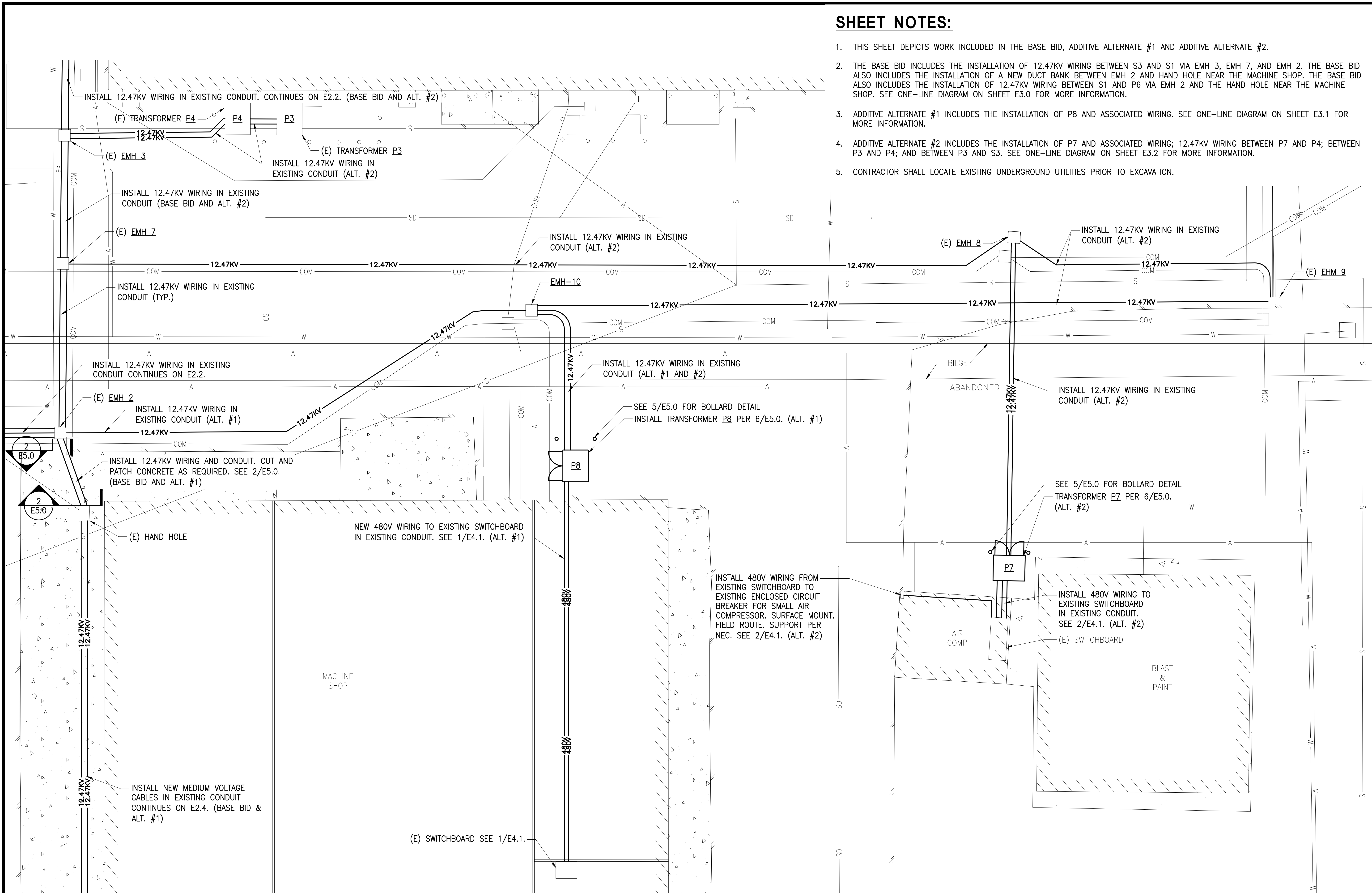
**SHEET NOTES:**

- THIS SHEET DEPICTS WORK INCLUDED IN THE BASE BID, ADDITIVE ALTERNATE #1, ADDITIVE ALTERNATE #2 AND ADDITIVE ALTERNATE #3.
  - THE BASE BID INCLUDES THE INSTALLATION OF 12.47KV WIRING BETWEEN S1 AND P6 VIA EMH 1, EMH 2 AND THE HAND HOLE NEAR THE MACHINE SHOP. SEE ONE-LINE DIAGRAM ON SHEET E3.0 FOR MORE INFORMATION
  - ADDITIVE ALTERNATE #1 INCLUDES THE INSTALLATION OF 12.47KV WIRING IN EXISTING CONDUIT FROM P5 TO P8 VIA EMH 2 AND THE HAND HOLE NEAR THE MACHINE SHOP. SEE ONE-LINE DIAGRAM ON SHEET E3.1 FOR MORE INFORMATION.
  - ADDITIVE ALTERNATE #2 INCLUDES THE INSTALLATION OF S2, 12.47KV DUCT BANK AND WIRING BETWEEN S1 AND S2; AND INSTALLATION OF 12.47 KV WIRING IN EXISTING CONDUIT BETWEEN P3 AND P7 VIA EMH 7 AND EMH 3. SEE ONE-LINE DIAGRAM ON SHEET E3.2 FOR MORE INFORMATION.
  - ADDITIVE ALTERNATE #3 INCLUDES THE INSTALLATION OF P9, INSTALLATION OF P10 AND INSTALLATION OF 12.47KV WIRING IN EXISTING CONDUIT BETWEEN S1 AND RVAC-5. SEE ONE-LINE DIAGRAM ON SHEET E3.3 FOR MORE INFORMATION.
  - CONTRACTOR SHALL LOCATE EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION.
- 7 SHEET PILE CELL PENETRATION. SEE 1/SS.0 FOR DETAIL.
- 8 EXCAVATE TO EXPOSE EXISTING CONDUITS. MODIFY TO CONNECT CONDUIT RUNNING FROM TRANSFORMER #1 TO SWITCH S1 TO CONDUIT RUNNING FROM SWITCH RVAC-7 TO SWITCH RVAC-5. UTILIZE MODIFIED CONDUIT TO PULL NEW CABLES FROM SWITCH S1 TO SWITCH RVAC-5. (ALT. #3)

**1 ENLARGED PLAN - FUTURE REPAIR HALL**  
E2.2 SCALE: 3/32" = 1'-0"  
NORTH







**SHEET NOTES:**

1. THIS SHEET DEPICTS WORK INCLUDED IN THE BASE BID, ADDITIVE ALTERNATE #1 AND ADDITIVE ALTERNATE #2.
2. THE BASE BID INCLUDES THE INSTALLATION OF 12.47KV WIRING BETWEEN S3 AND S1 VIA EMH 3, EMH 7, AND EMH 2. THE BASE BID ALSO INCLUDES THE INSTALLATION OF A NEW DUCT BANK BETWEEN EMH 2 AND HAND HOLE NEAR THE MACHINE SHOP. THE BASE BID ALSO INCLUDES THE INSTALLATION OF 12.47KV WIRING BETWEEN S1 AND P6 VIA EMH 2 AND THE HAND HOLE NEAR THE MACHINE SHOP. SEE ONE-LINE DIAGRAM ON SHEET E3.0 FOR MORE INFORMATION.
3. ADDITIVE ALTERNATE #1 INCLUDES THE INSTALLATION OF P8 AND ASSOCIATED WIRING. SEE ONE-LINE DIAGRAM ON SHEET E3.1 FOR MORE INFORMATION.
4. ADDITIVE ALTERNATE #2 INCLUDES THE INSTALLATION OF P7 AND ASSOCIATED WIRING; 12.47KV WIRING BETWEEN P7 AND P4; BETWEEN P3 AND P4; AND BETWEEN P3 AND S3. SEE ONE-LINE DIAGRAM ON SHEET E3.2 FOR MORE INFORMATION.
5. CONTRACTOR SHALL LOCATE EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION.

Revisions	
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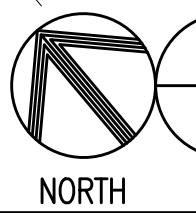
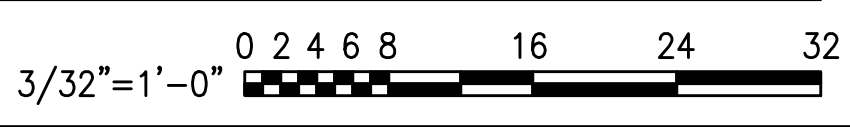


**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE  
**ENLARGED PLAN - MACHINE SHOP AND AIR COMPRESSOR BUILDING**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E2.3</b>
Of	Sheets


**1 ENLARGED PLAN - MACHINE SHOP & AIR COMPRESSOR BUILDING**

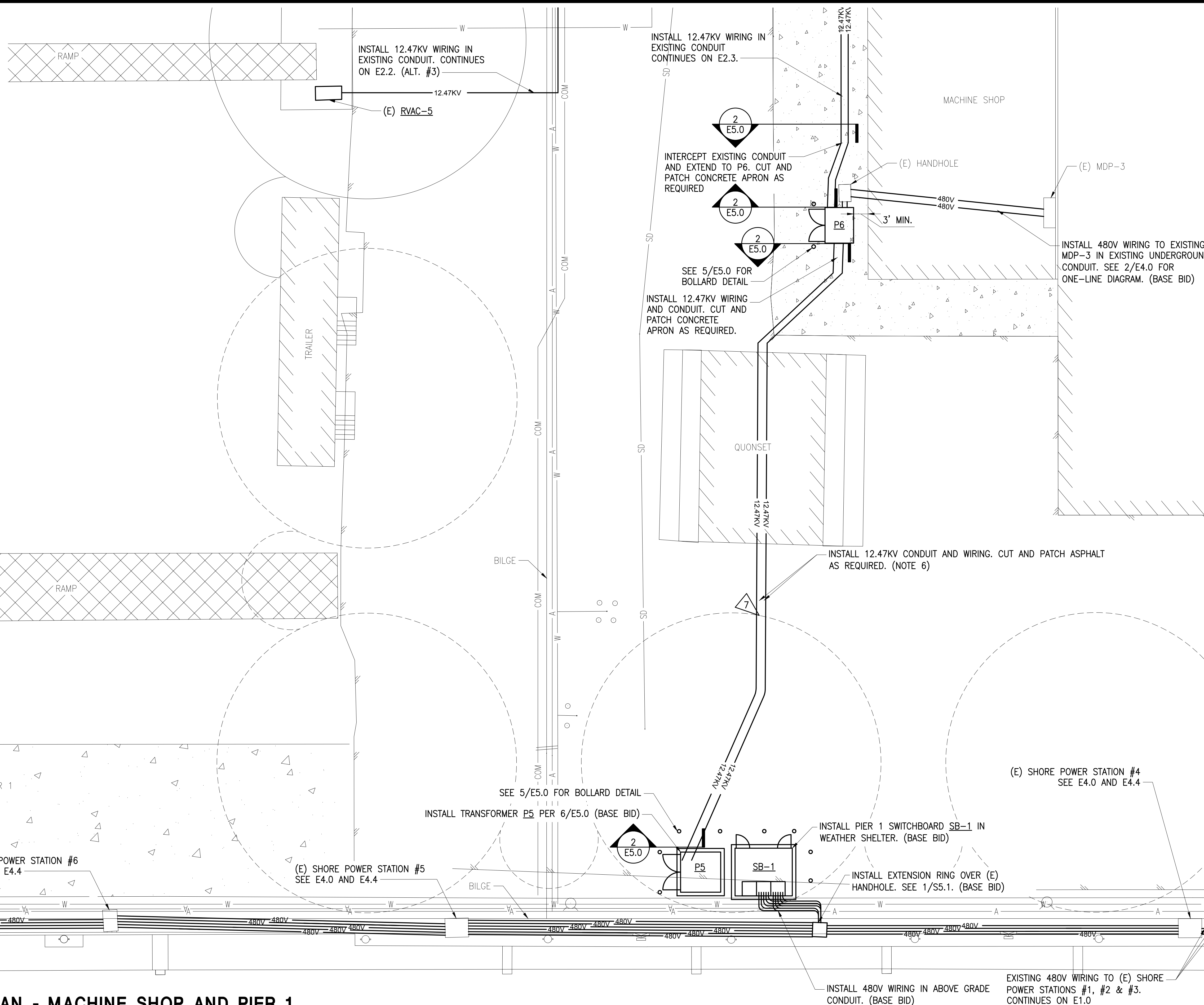
SCALE: 3/32" = 1'-0"





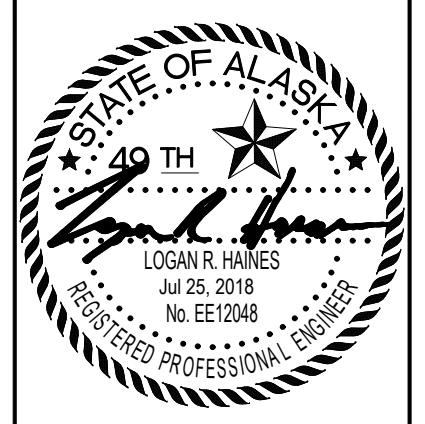
**SHEET NOTES:**

- THIS SHEET DEPICTS WORK INCLUDED IN THE BASE BID, ADDITIVE ALTERNATE #1 AND ADDITIVE ALTERNATE #4.
- THE BASE BID INCLUDES THE INSTALLATION OF P5, P6, SB-1, THE DUCT BANK BETWEEN P5 AND P6 AND ASSOCIATED 12.47KV WIRING. THE BASE BID ALSO INCLUDES THE INSTALLATION OF 480V WIRING IN EXISTING CONDUIT BETWEEN SB-1 AND SHORE POWER STATIONS #5, #6, #8 AND #9. SEE ONE-LINE DIAGRAMS ON SHEETS E3.0 AND E4.0 FOR MORE INFORMATION.
- ADDITIVE ALTERNATE #1 INCLUDES THE INSTALLATION OF 12.47KV WIRING IN EXISTING CONDUIT FROM P5 TO P8. SEE ONE-LINE DIAGRAM ON SHEET E3.1 FOR MORE INFORMATION.
- ADDITIVE ALTERNATE #4 INCLUDES THE INSTALLATION OF 480V WIRING IN EXISTING CONDUIT BETWEEN SB-1 AND SHORE POWER STATIONS #1, #2, #3 #4, #7 AND #10. ADDITIVE ALTERNATE #4 ALSO INCLUDES MODIFICATIONS TO SHORE POWER STATIONS #1, #2, #3, #4, #5, #6, #7, AND #8 TO CORRECT CODE DEFICIENCIES. SEE ONE-LINE DIAGRAMS ON SHEETS E4.3, E4.4 AND E4.5 FOR MORE INFORMATION.
- CONTRACTOR SHALL LOCATE EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION.
- PROVIDE PAVEMENT STRIPING PER OWNERS DIRECTION.
-  SHEET PILE CELL PENETRATION. SEE 1/S5.0 FOR DETAIL.



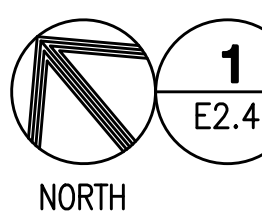
Revisions	
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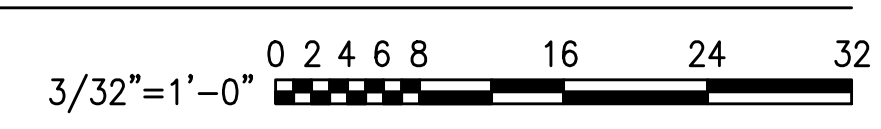


**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE  
**ENLARGED PLAN - MACHINE SHOP AND PIER 1**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E2.4</b>
Of	Sheets



**1 ENLARGED PLAN - MACHINE SHOP AND PIER 1**  
 E2.4 SCALE: 3/32" = 1'-0"





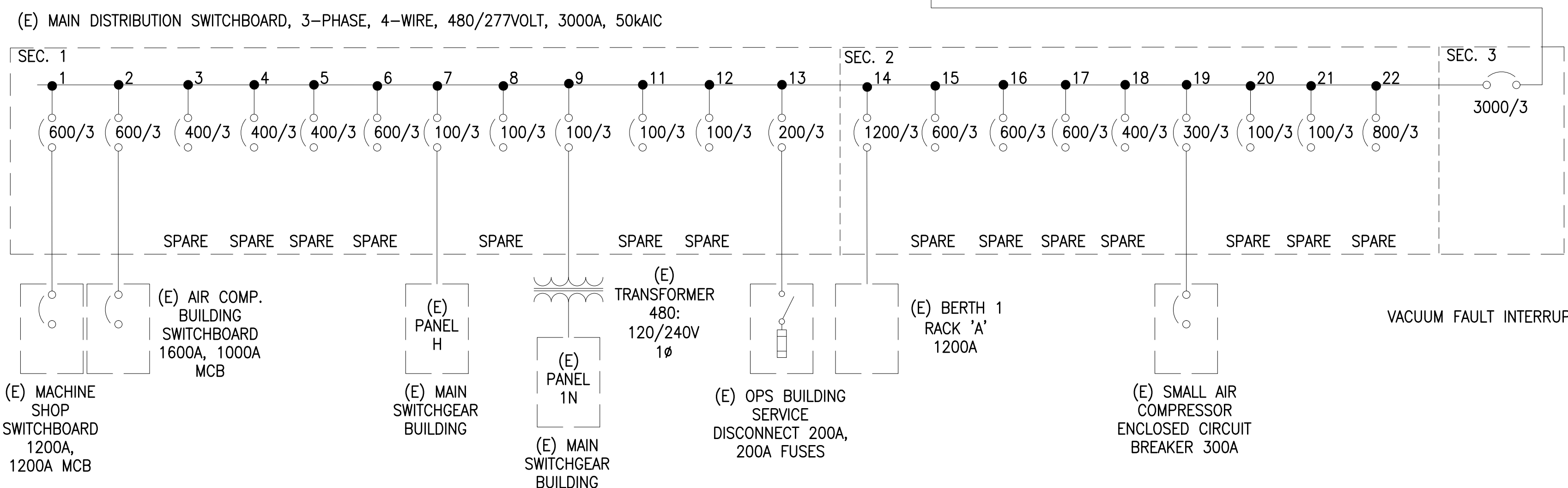
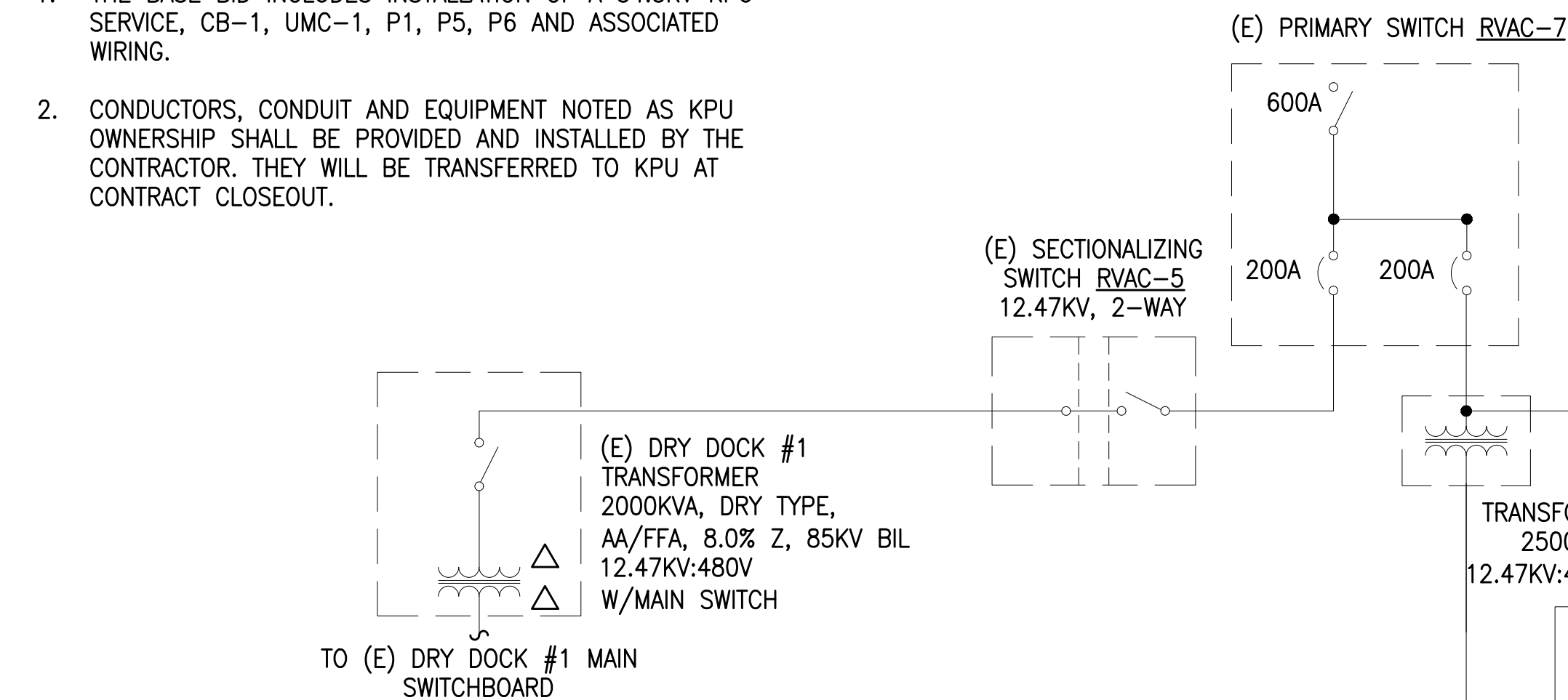
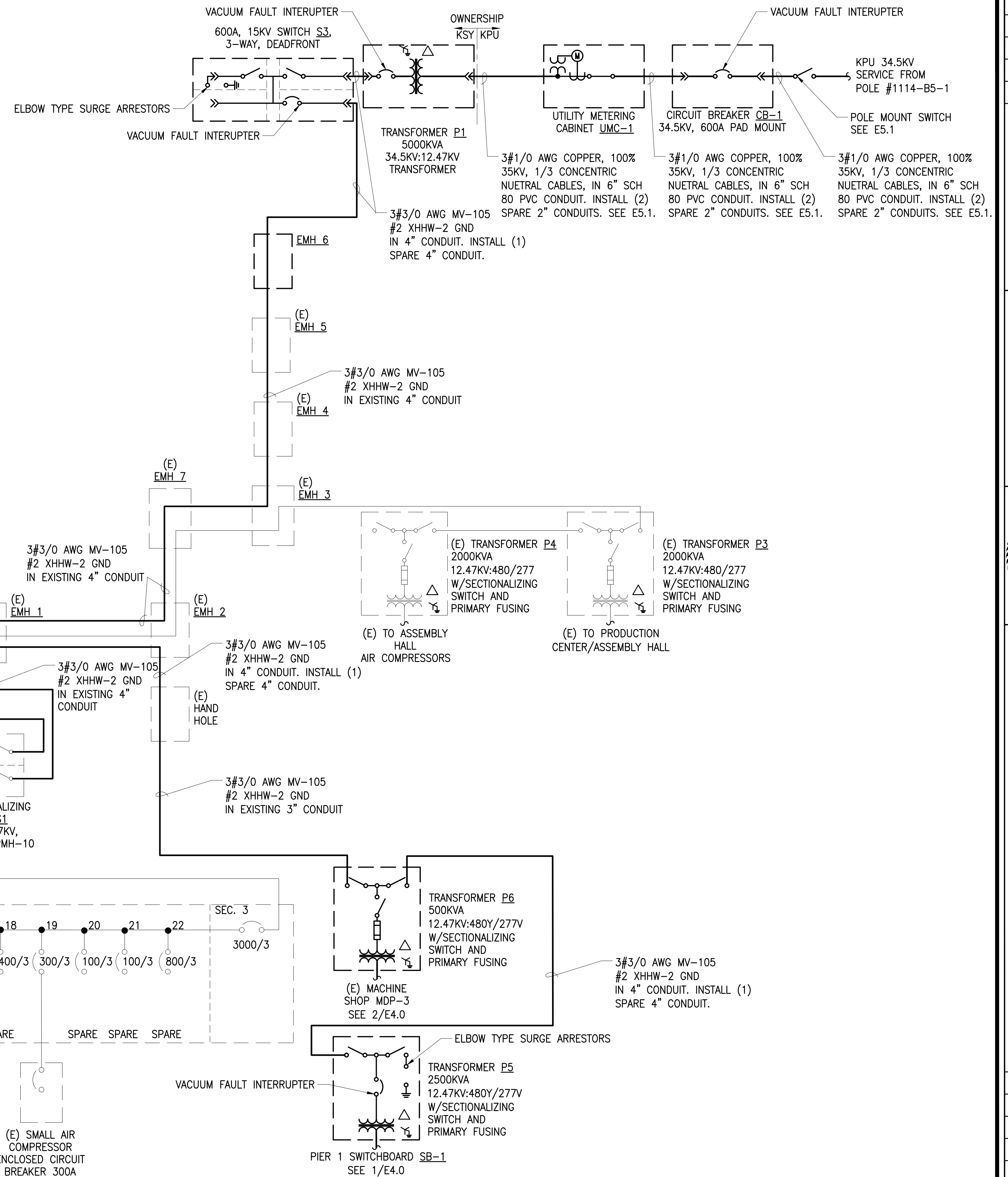
## BASIS OF DESIGN OCPD SETTINGS

ITEM/TAG	DESCRIPTION	LOCATION	TYPE	RATING/SETTING
CB-1	SERVICE DISCONNECT	ELECTRICAL EQUIPMENT YARD	VFI	PHASE OVERCURRENT: CURVE EF, TRIP 90 PHASE HIGH CURRENT: 7X TOC GROUND OVERCURRENT: CURVE EF, TRIP 90 GROUND HIGH CURRENT 7X TOC
P1	PAD MOUNT TRANSFORMER	ELECTRICAL EQUIPMENT YARD	SECONDARY VFI	PHASE OVERCURRENT: CURVE EF, TRIP 230 PHASE HIGH CURRENT: 15X TOC GROUND OVERCURRENT: CURVE EF, TRIP 230 GROUND HIGH CURRENT 15X TOC
S3	PAD MOUNT SWITCH	ELECTRICAL EQUIPMENT YARD	VFI	PHASE OVERCURRENT: CURVE EF, TRIP 200 PHASE HIGH CURRENT: 11X TOC GROUND OVERCURRENT: CURVE EF, TRIP 200 GROUND HIGH CURRENT 11X TOC
P5	PAD MOUNT TRANSFORMER	PIER 1	PRIMARY VFI	PHASE OVERCURRENT: CURVE EF, TRIP 150 PHASE HIGH CURRENT: 7X TOC GROUND OVERCURRENT: CURVE EF, TRIP 150 GROUND HIGH CURRENT 7X TOC
P6	PAD MOUNT TRANSFORMER	MACHINE SHOP	DUAL ELEMENT BAY-O-NET	C12 (50A)
P6	PAD MOUNT TRANSFORMER	MACHINE SHOP	CURRENT LIMITING BACKUP ELSP	100A

NOTE: FINAL FUSE SELECTION AND VFI SETTINGS SHALL BE COORDINATED WITH MANUFACTURER'S RECOMMENDATIONS, BASED ON ACTUAL EQUIPMENT INSTALLED.

### SHEET NOTES:

- THE BASE BID INCLUDES INSTALLATION OF A 34.5KV KPU SERVICE, CB-1, UMC-1, P1, P5, P6 AND ASSOCIATED WIRING.
- CONDUCTORS, CONDUIT AND EQUIPMENT NOTED AS KPU OWNERSHIP SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. THEY WILL BE TRANSFERRED TO KPU AT CONTRACT CLOSEOUT.



Revisions	
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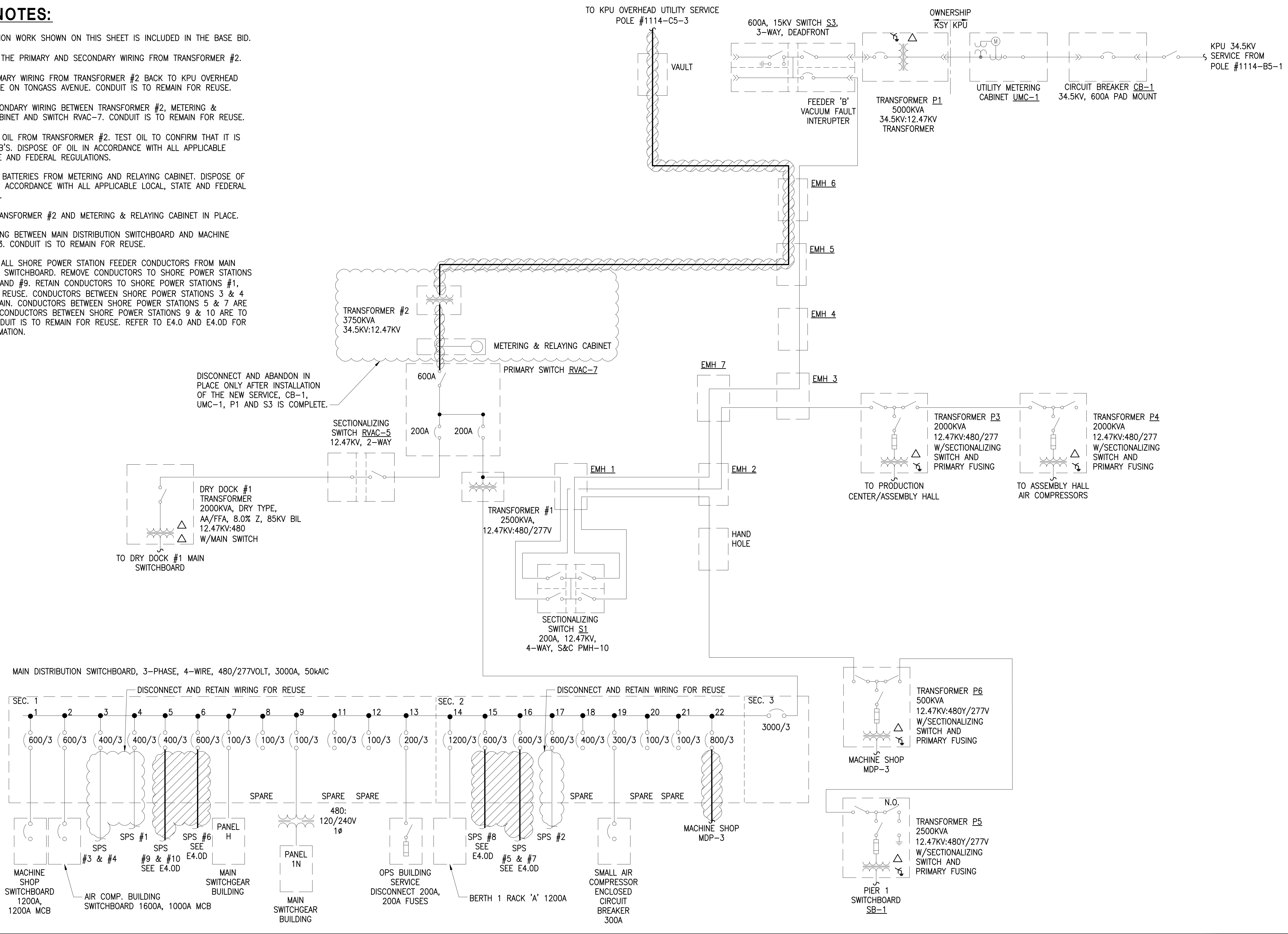
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**ELECTRICAL ONE-LINE DIAGRAM - BASE BID**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.0</b>
Of	Sheets



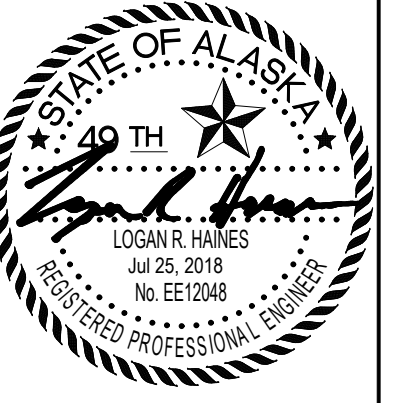
**SHEET NOTES:**

1. ALL DEMOLITION WORK SHOWN ON THIS SHEET IS INCLUDED IN THE BASE BID.
2. DISCONNECT THE PRIMARY AND SECONDARY WIRING FROM TRANSFORMER #2.
3. REMOVE PRIMARY WIRING FROM TRANSFORMER #2 BACK TO KPU OVERHEAD SERVICE POLE ON TONGASS AVENUE. CONDUIT IS TO REMAIN FOR REUSE.
4. REMOVE SECONDARY WIRING BETWEEN TRANSFORMER #2, METERING & RELAYING CABINET AND SWITCH RVAC-7. CONDUIT IS TO REMAIN FOR REUSE.
5. REMOVE ALL OIL FROM TRANSFORMER #2. TEST OIL TO CONFIRM THAT IT IS FREE OF PCB'S. DISPOSE OF OIL IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
6. REMOVE ALL BATTERIES FROM METERING AND RELAYING CABINET. DISPOSE OF BATTERIES IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
7. ABANDON TRANSFORMER #2 AND METERING & RELAYING CABINET IN PLACE.
8. REMOVE WIRING BETWEEN MAIN DISTRIBUTION SWITCHBOARD AND MACHINE SHOP MDP-3. CONDUIT IS TO REMAIN FOR REUSE.
9. DISCONNECT ALL SHORE POWER STATION FEEDER CONDUCTORS FROM MAIN DISTRIBUTION SWITCHBOARD. REMOVE CONDUCTORS TO SHORE POWER STATIONS #5, #6, #8 AND #9. RETAIN CONDUCTORS TO SHORE POWER STATIONS #1, #2, #3 FOR REUSE. CONDUCTORS BETWEEN SHORE POWER STATIONS 3 & 4 ARE TO REMAIN. CONDUCTORS BETWEEN SHORE POWER STATIONS 5 & 7 ARE TO REMAIN. CONDUCTORS BETWEEN SHORE POWER STATIONS 9 & 10 ARE TO REMAIN. CONDUIT IS TO REMAIN FOR REUSE. REFER TO E4.0 AND E4.0D FOR MORE INFORMATION.



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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE

**ELECTRICAL ONE-LINE DIAGRAM - BASE BID - DEMO**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.0D</b>
Of	Sheets



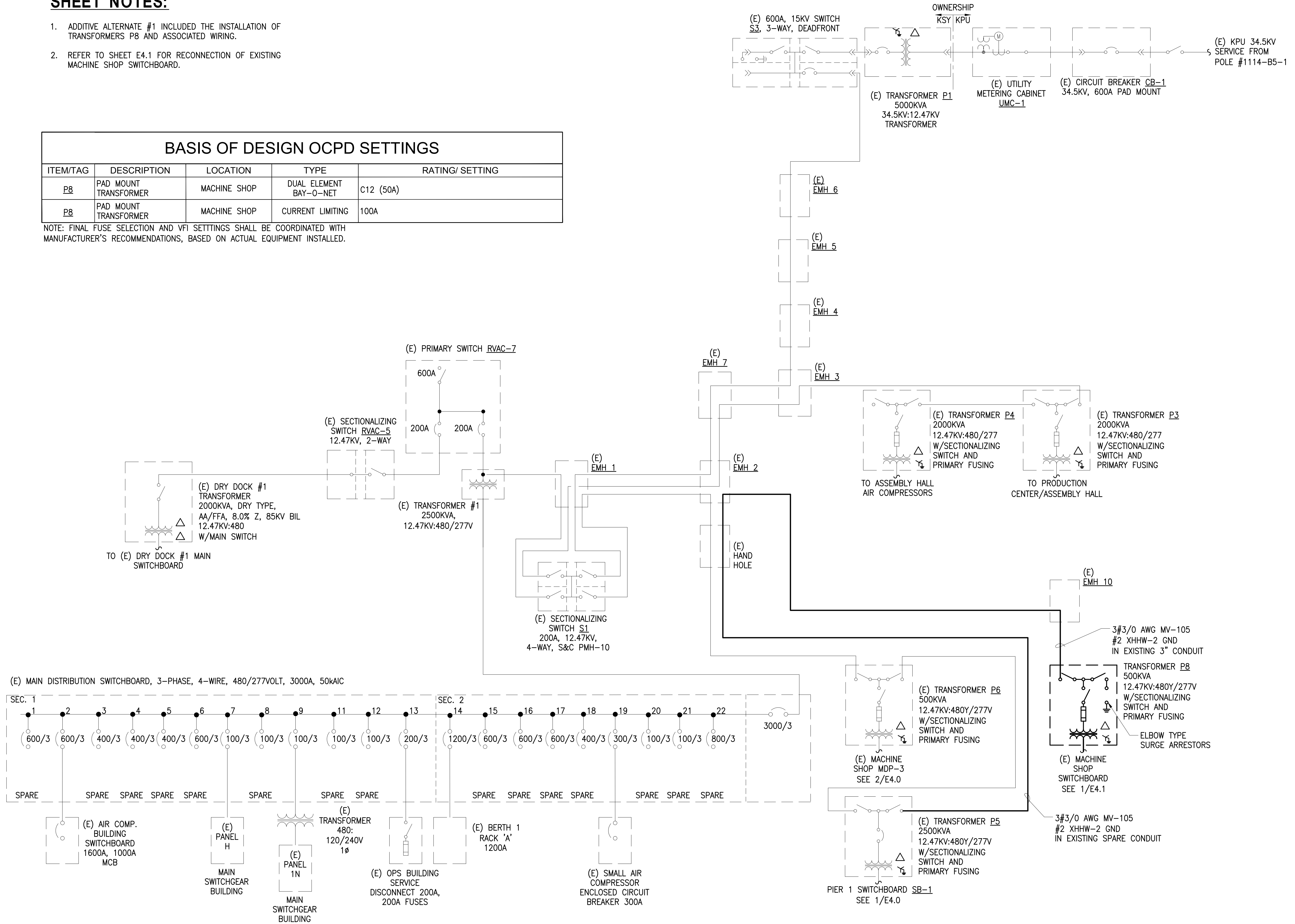
**SHEET NOTES:**

1. ADDITIVE ALTERNATE #1 INCLUDED THE INSTALLATION OF TRANSFORMERS P8 AND ASSOCIATED WIRING.
2. REFER TO SHEET E4.1 FOR RECONNECTION OF EXISTING MACHINE SHOP SWITCHBOARD.

**BASIS OF DESIGN OCPD SETTINGS**

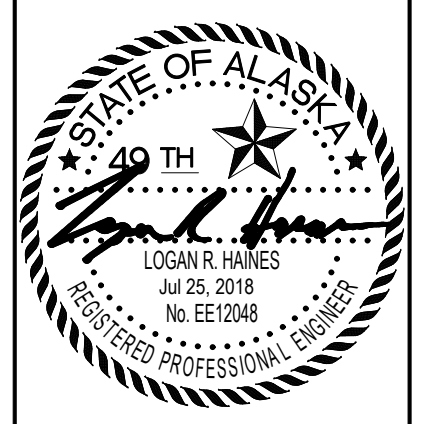
ITEM/TAG	DESCRIPTION	LOCATION	TYPE	RATING/ SETTING
P8	PAD MOUNT TRANSFORMER	MACHINE SHOP	DUAL ELEMENT BAY-O-NET	C12 (50A)
P8	PAD MOUNT TRANSFORMER	MACHINE SHOP	CURRENT LIMITING	100A

NOTE: FINAL FUSE SELECTION AND VFI SETTINGS SHALL BE COORDINATED WITH MANUFACTURER'S RECOMMENDATIONS, BASED ON ACTUAL EQUIPMENT INSTALLED.



Revisions	
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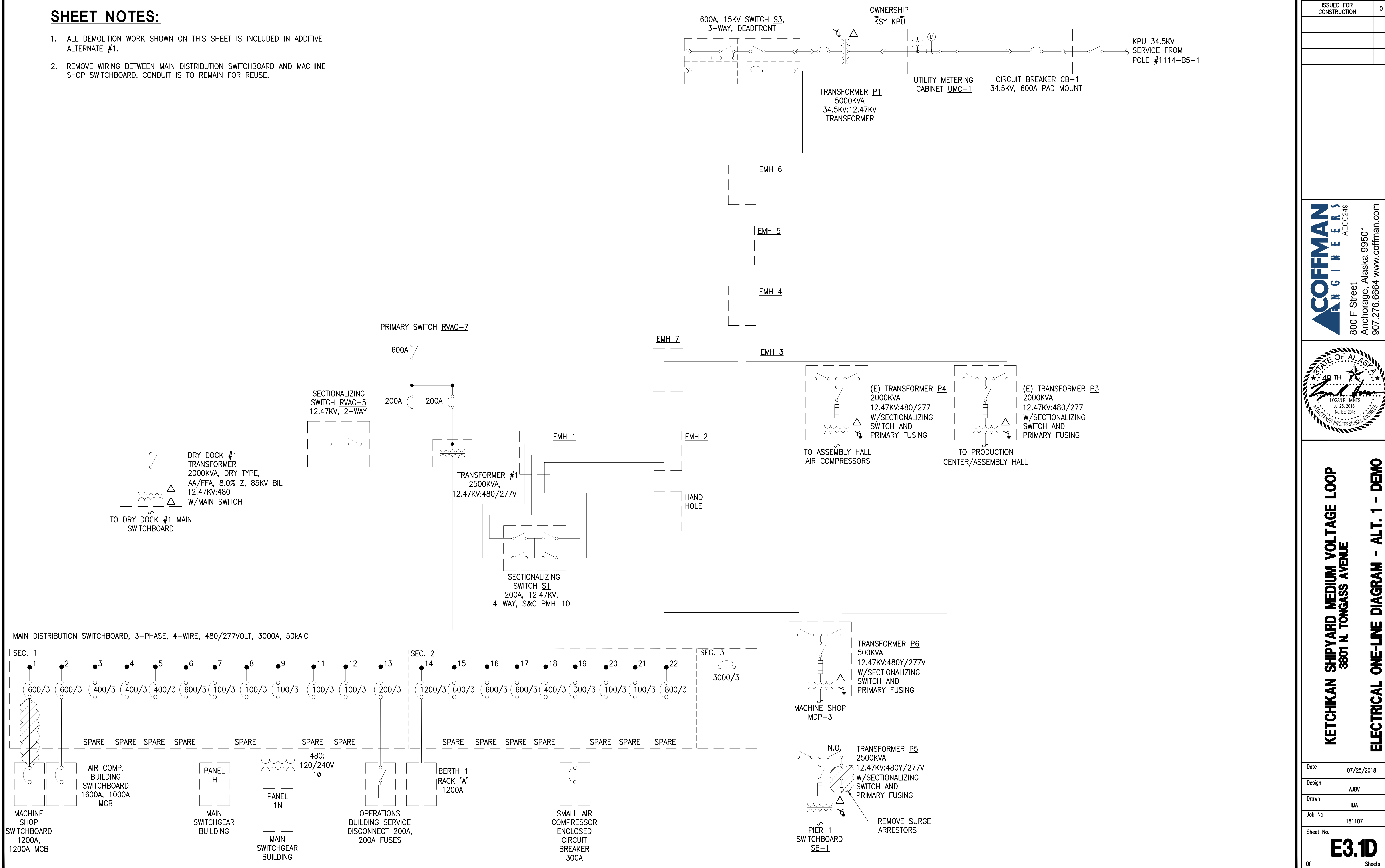
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE  
**ELECTRICAL ONE-LINE DIAGRAM - ALT. 1**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.1</b>
Of	Sheets



**SHEET NOTES:**

1. ALL DEMOLITION WORK SHOWN ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #1.
2. REMOVE WIRING BETWEEN MAIN DISTRIBUTION SWITCHBOARD AND MACHINE SHOP SWITCHBOARD. CONDUIT IS TO REMAIN FOR REUSE.



Revisions	
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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE  
**ELECTRICAL ONE-LINE DIAGRAM - ALT. 1 - DEMO**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.1D</b>
Of	Sheets



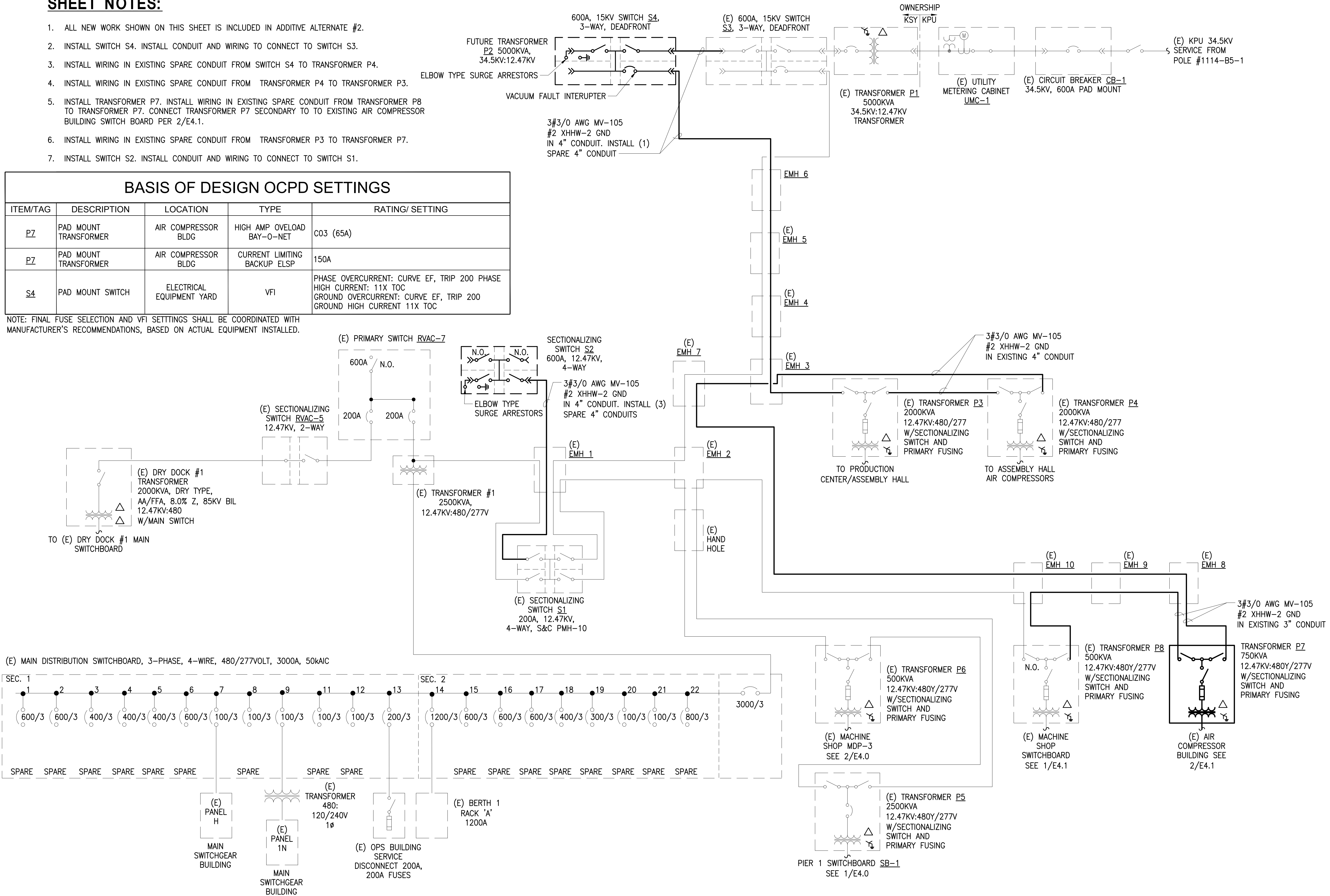
**SHEET NOTES:**

1. ALL NEW WORK SHOWN ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #2.
2. INSTALL SWITCH S4. INSTALL CONDUIT AND WIRING TO CONNECT TO SWITCH S3.
3. INSTALL WIRING IN EXISTING SPARE CONDUIT FROM SWITCH S4 TO TRANSFORMER P4.
4. INSTALL WIRING IN EXISTING SPARE CONDUIT FROM TRANSFORMER P4 TO TRANSFORMER P3.
5. INSTALL TRANSFORMER P7. INSTALL WIRING IN EXISTING SPARE CONDUIT FROM TRANSFORMER P8 TO TRANSFORMER P7. CONNECT TRANSFORMER P7 SECONDARY TO TO EXISTING AIR COMPRESSOR BUILDING SWITCH BOARD PER 2/E4.1.
6. INSTALL WIRING IN EXISTING SPARE CONDUIT FROM TRANSFORMER P3 TO TRANSFORMER P7.
7. INSTALL SWITCH S2. INSTALL CONDUIT AND WIRING TO CONNECT TO SWITCH S1.

**BASIS OF DESIGN OCPD SETTINGS**

ITEM/TAG	DESCRIPTION	LOCATION	TYPE	RATING/SETTING
P7	PAD MOUNT TRANSFORMER	AIR COMPRESSOR BLDG	HIGH AMP OVELOAD BAY-0-NET	C03 (65A)
P7	PAD MOUNT TRANSFORMER	AIR COMPRESSOR BLDG	CURRENT LIMITING BACKUP ELSP	150A
S4	PAD MOUNT SWITCH	ELECTRICAL EQUIPMENT YARD	VFI	PHASE OVERCURRENT: CURVE EF, TRIP 200 HIGH CURRENT: 11X TOC GROUND OVERCURRENT: CURVE EF, TRIP 200 GROUND HIGH CURRENT 11X TOC

NOTE: FINAL FUSE SELECTION AND VFI SETTINGS SHALL BE COORDINATED WITH MANUFACTURER'S RECOMMENDATIONS, BASED ON ACTUAL EQUIPMENT INSTALLED.



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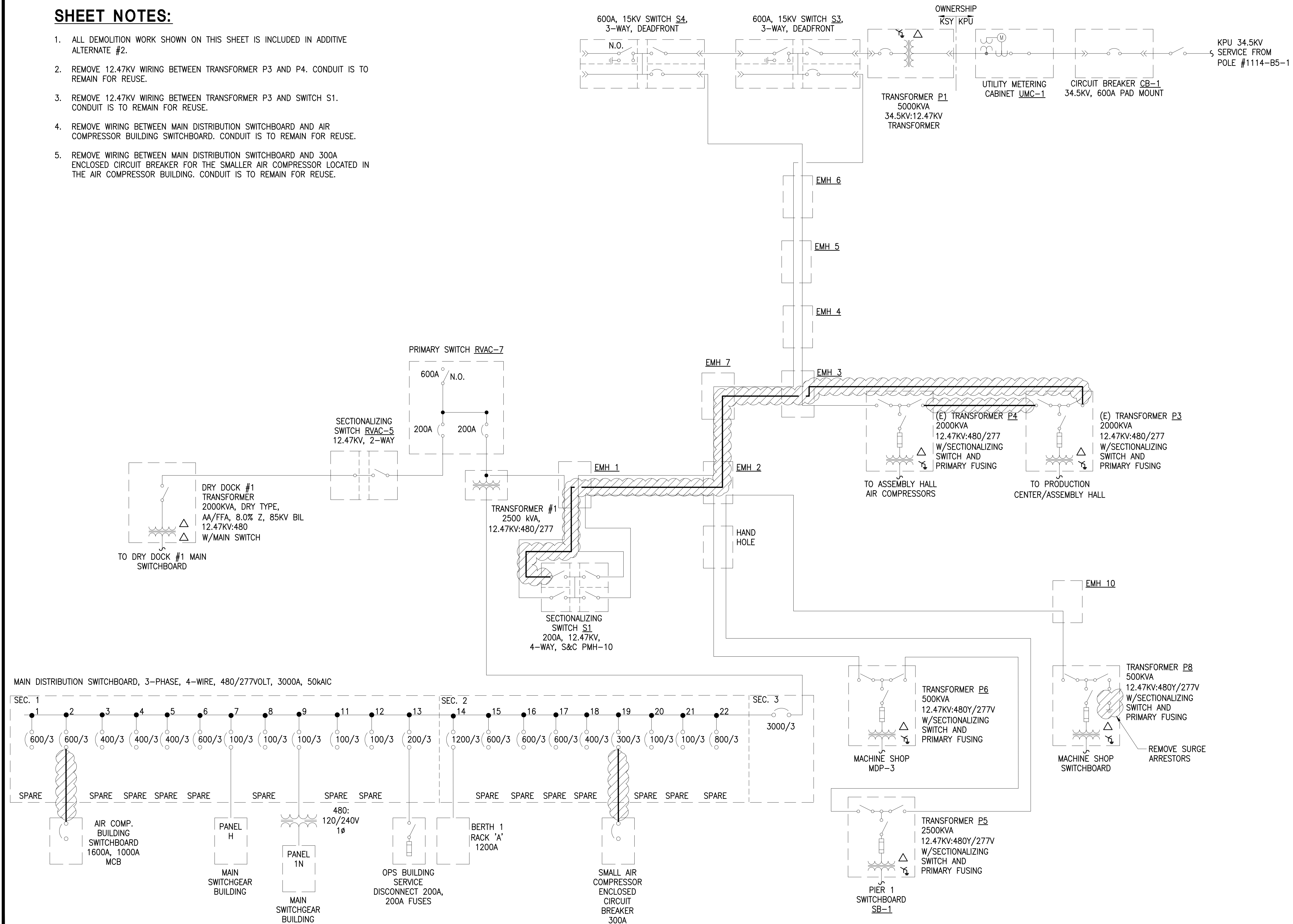
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**ELECTRICAL ONE-LINE DIAGRAM - ALT. 2**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.2</b>
Of	Sheets



**SHEET NOTES:**

1. ALL DEMOLITION WORK SHOWN ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #2.
2. REMOVE 12.47KV WIRING BETWEEN TRANSFORMER P3 AND P4. CONDUIT IS TO REMAIN FOR REUSE.
3. REMOVE 12.47KV WIRING BETWEEN TRANSFORMER P3 AND SWITCH S1. CONDUIT IS TO REMAIN FOR REUSE.
4. REMOVE WIRING BETWEEN MAIN DISTRIBUTION SWITCHBOARD AND AIR COMPRESSOR BUILDING SWITCHBOARD. CONDUIT IS TO REMAIN FOR REUSE.
5. REMOVE WIRING BETWEEN MAIN DISTRIBUTION SWITCHBOARD AND 300A ENCLOSED CIRCUIT BREAKER FOR THE SMALLER AIR COMPRESSOR LOCATED IN THE AIR COMPRESSOR BUILDING. CONDUIT IS TO REMAIN FOR REUSE.



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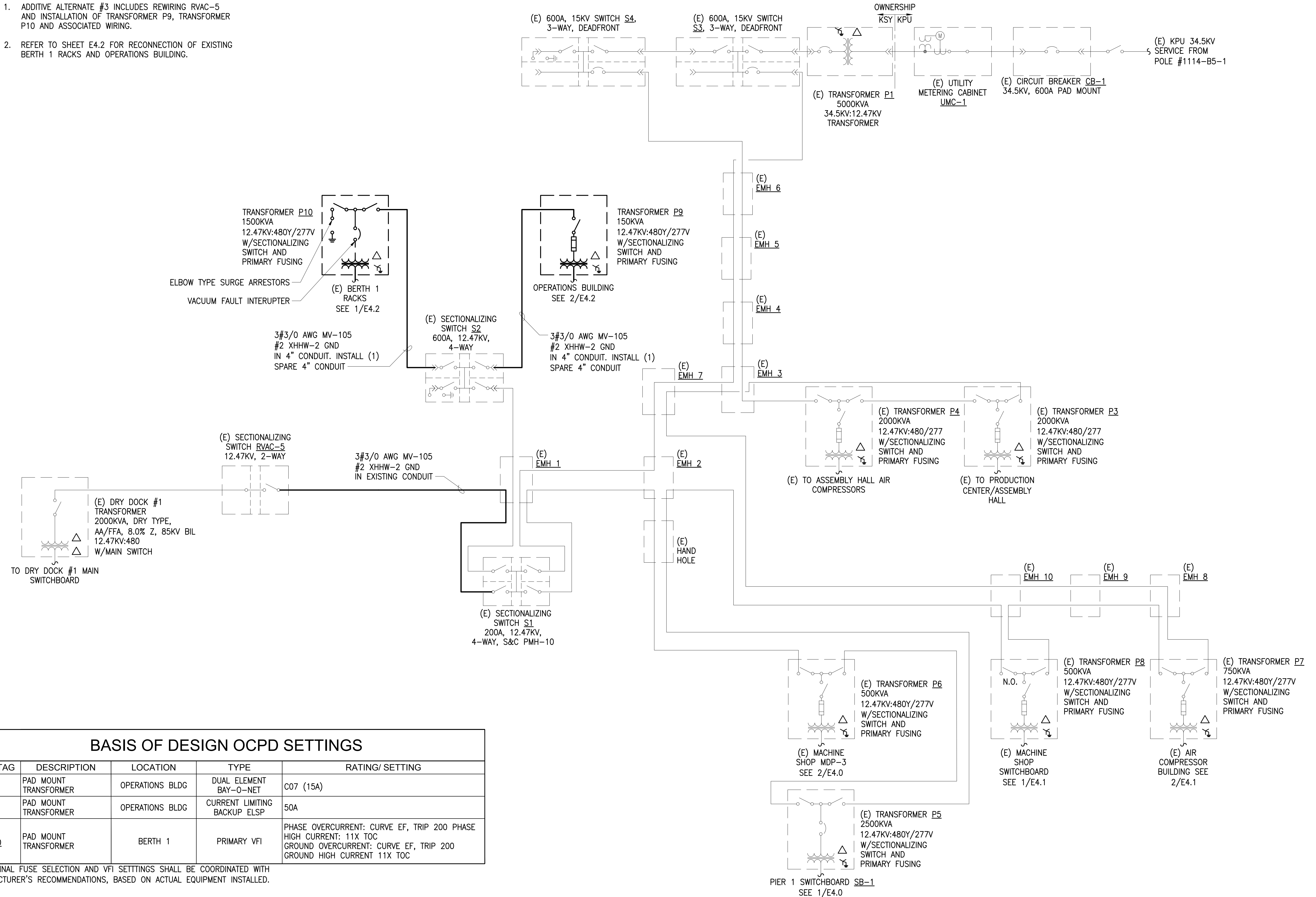
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE  
**ELECTRICAL ONE-LINE DIAGRAM - ALT. 2 - DEMO**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.2D</b>
Of	Sheets



**SHEET NOTES:**

1. ADDITIVE ALTERNATE #3 INCLUDES REWIRING RVAC-5 AND INSTALLATION OF TRANSFORMER P9, TRANSFORMER P10 AND ASSOCIATED WIRING.
2. REFER TO SHEET E4.2 FOR RECONNECTION OF EXISTING BERTH 1 RACKS AND OPERATIONS BUILDING.



**BASIS OF DESIGN OCPD SETTINGS**

ITEM/TAG	DESCRIPTION	LOCATION	TYPE	RATING/ SETTING
P9	PAD MOUNT TRANSFORMER	OPERATIONS BLDG	DUAL ELEMENT BAY-O-NET	C07 (15A)
P9	PAD MOUNT TRANSFORMER	OPERATIONS BLDG	CURRENT LIMITING BACKUP ELSP	50A
P10	PAD MOUNT TRANSFORMER	BERTH 1	PRIMARY VFI	PHASE OVERCURRENT: CURVE EF, TRIP 200 PHASE HIGH CURRENT: 11X TOC GROUND OVERCURRENT: CURVE EF, TRIP 200 GROUND HIGH CURRENT 11X TOC

NOTE: FINAL FUSE SELECTION AND VFI SETTINGS SHALL BE COORDINATED WITH MANUFACTURER'S RECOMMENDATIONS, BASED ON ACTUAL EQUIPMENT INSTALLED.

Revisions	
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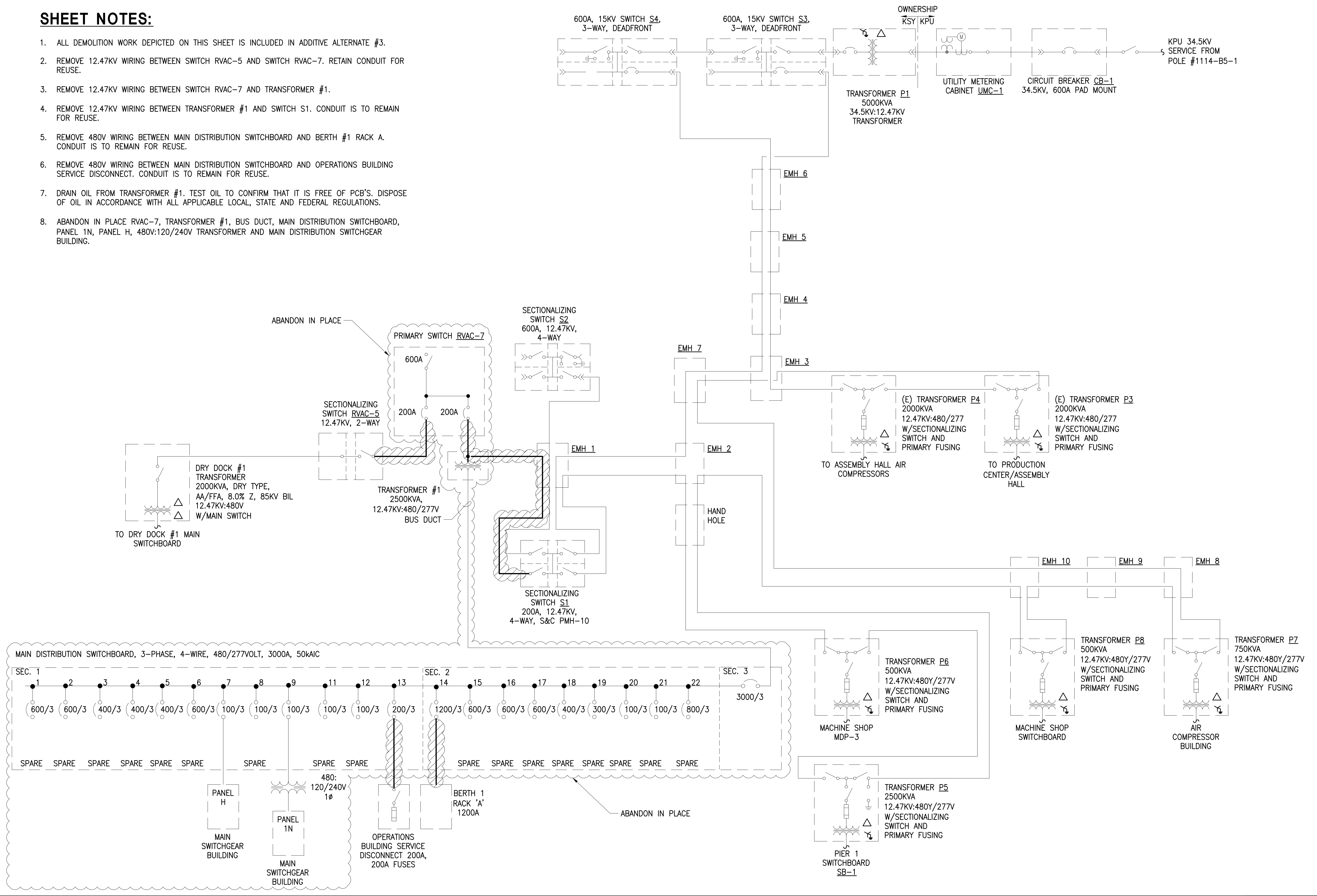
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**ELECTRICAL ONE-LINE DIAGRAM - ALT. 3**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.3</b>
Of	Sheets



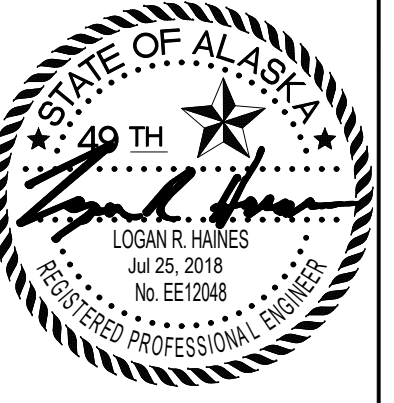
**SHEET NOTES:**

1. ALL DEMOLITION WORK DEPICTED ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #3.
2. REMOVE 12.47KV WIRING BETWEEN SWITCH RVAC-5 AND SWITCH RVAC-7. RETAIN CONDUIT FOR REUSE.
3. REMOVE 12.47KV WIRING BETWEEN SWITCH RVAC-7 AND TRANSFORMER #1.
4. REMOVE 12.47KV WIRING BETWEEN TRANSFORMER #1 AND SWITCH S1. CONDUIT IS TO REMAIN FOR REUSE.
5. REMOVE 480V WIRING BETWEEN MAIN DISTRIBUTION SWITCHBOARD AND BERTH #1 RACK A. CONDUIT IS TO REMAIN FOR REUSE.
6. REMOVE 480V WIRING BETWEEN MAIN DISTRIBUTION SWITCHBOARD AND OPERATIONS BUILDING SERVICE DISCONNECT. CONDUIT IS TO REMAIN FOR REUSE.
7. DRAIN OIL FROM TRANSFORMER #1. TEST OIL TO CONFIRM THAT IT IS FREE OF PCB'S. DISPOSE OF OIL IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
8. ABANDON IN PLACE RVAC-7, TRANSFORMER #1, BUS DUCT, MAIN DISTRIBUTION SWITCHBOARD, PANEL 1N, PANEL H, 480V:120/240V TRANSFORMER AND MAIN DISTRIBUTION SWITCHGEAR BUILDING.



Revisions	
ISSUED FOR CONSTRUCTION	0

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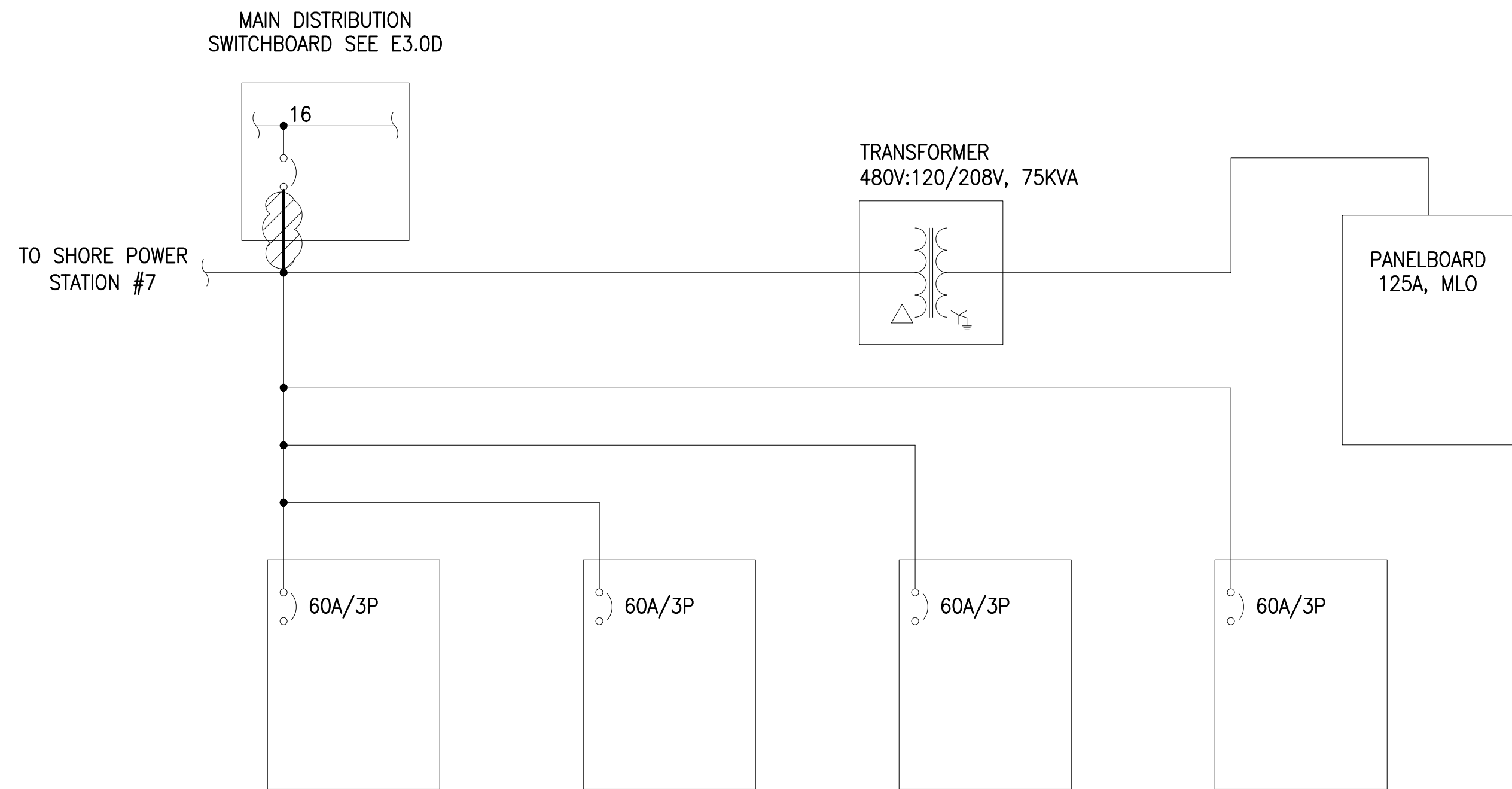


**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
 3801 N. TONGASS AVENUE

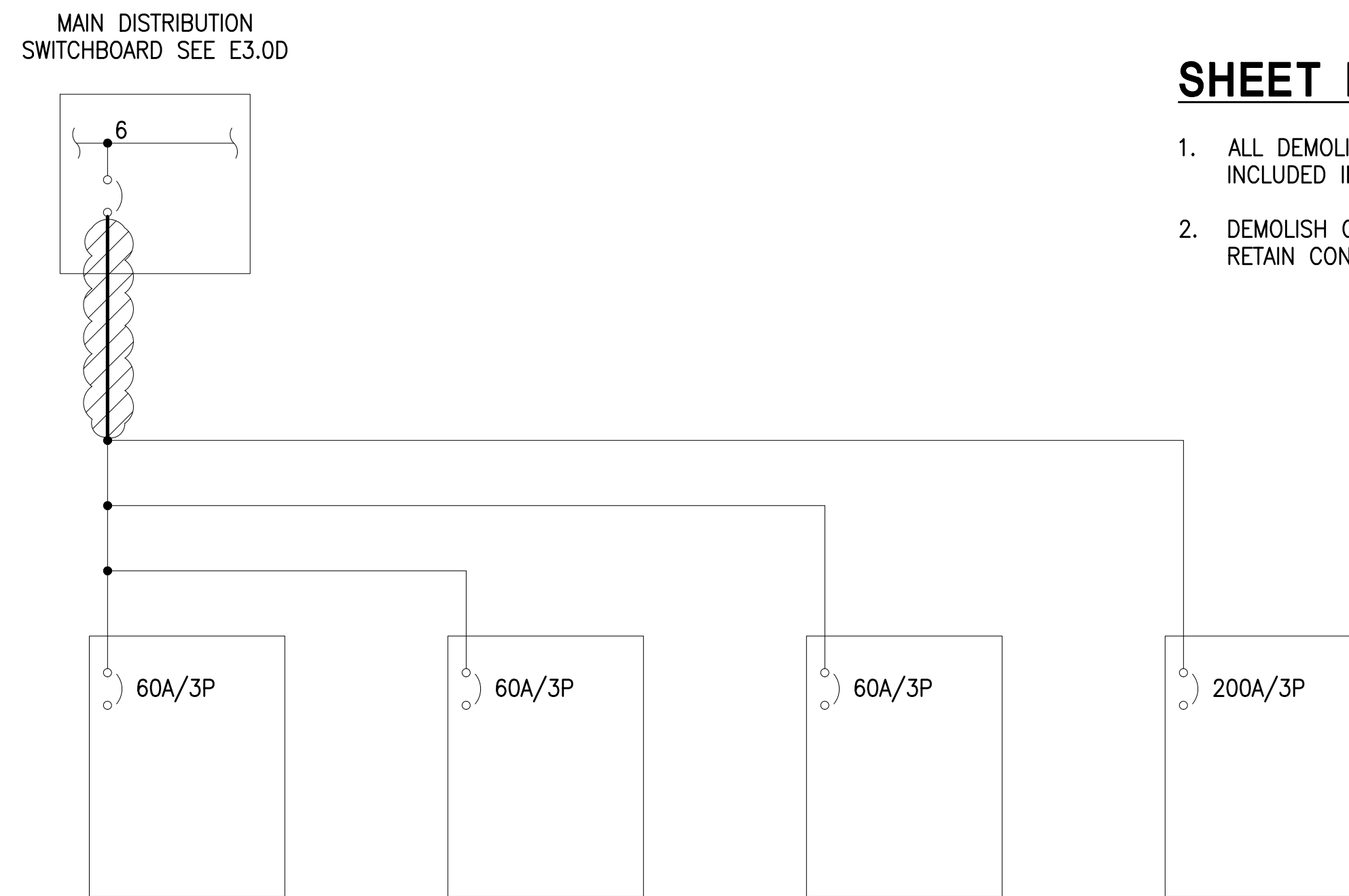
**ELECTRICAL ONE-LINE DIAGRAM - ALT. 3 - DEMO**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E3.3D</b>
Of	Sheets

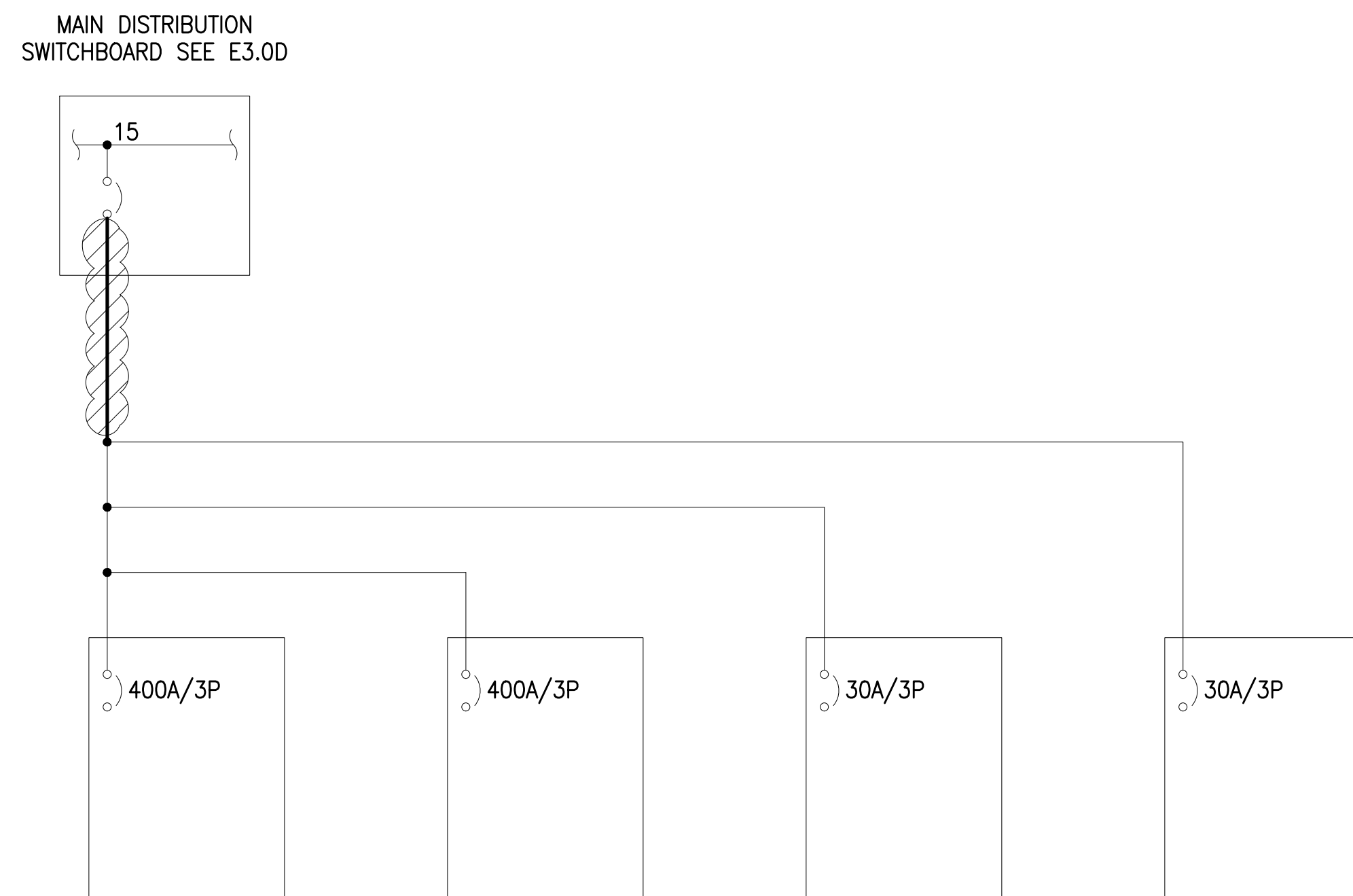




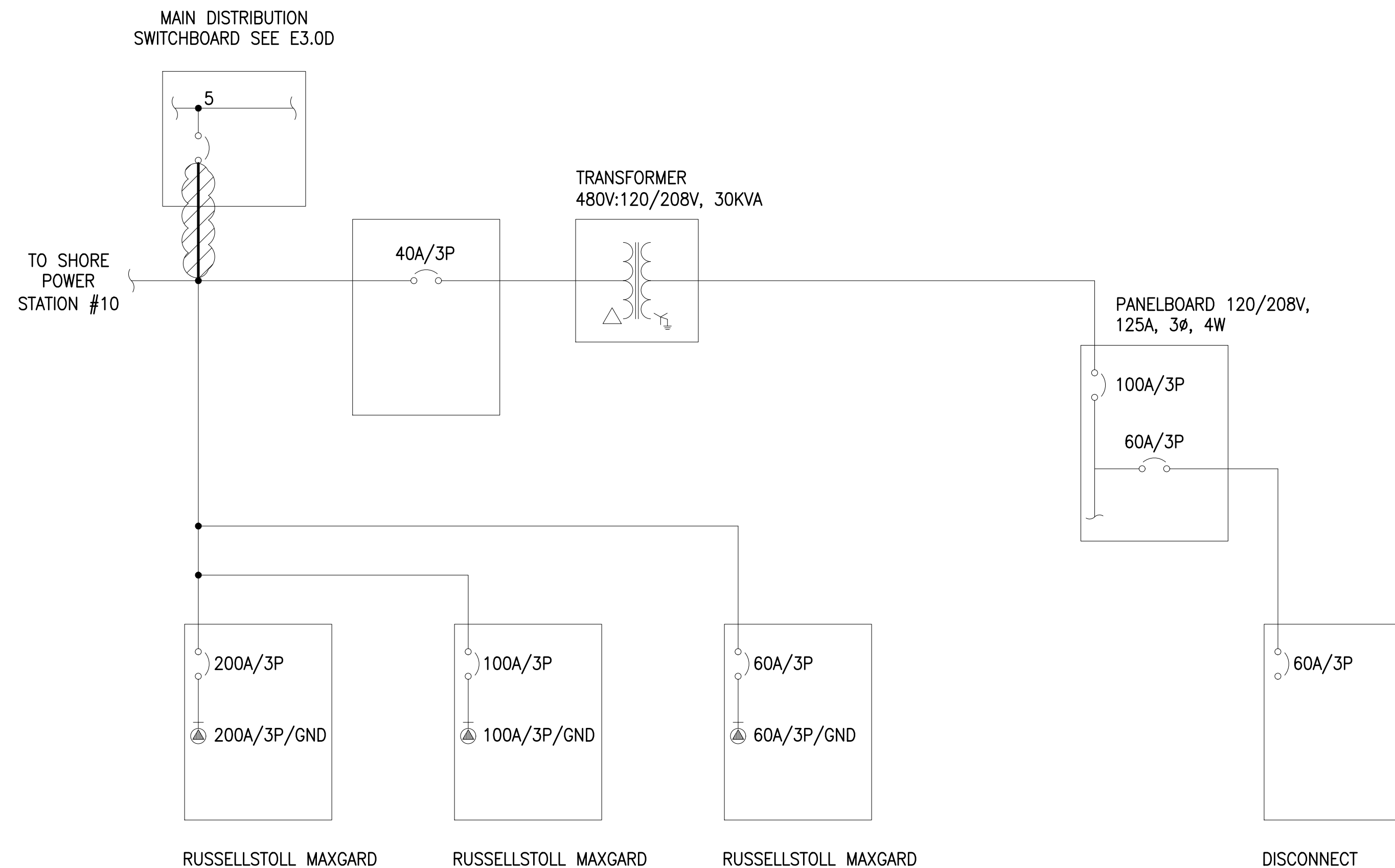
**1 SHORE POWER STATION #5 ONE-LINE DIAGRAM - DEMOLITION**  
E4.0D SCALE:NTS



**2 SHORE POWER STATION #6 ONE-LINE DIAGRAM - DEMOLITION**  
E4.0D SCALE:NTS



**3 SHORE POWER STATION #8 ONE-LINE DIAGRAM - DEMOLITION**  
E4.0D SCALE:NTS



**4 SHORE POWER STATION #9 ONE-LINE DIAGRAM - DEMOLITION**  
E4.0D SCALE:NTS

**SHEET NOTES:**

1. ALL DEMOLITION WORK DEPICTED ON THIS SHEET IS INCLUDED IN THE BASE BID.
2. DEMOLISH CONDUCTORS IDENTIFIED BACK TO SOURCE. RETAIN CONDUIT FOR REUSE.

Revisions	
ISSUED FOR CONSTRUCTION	0

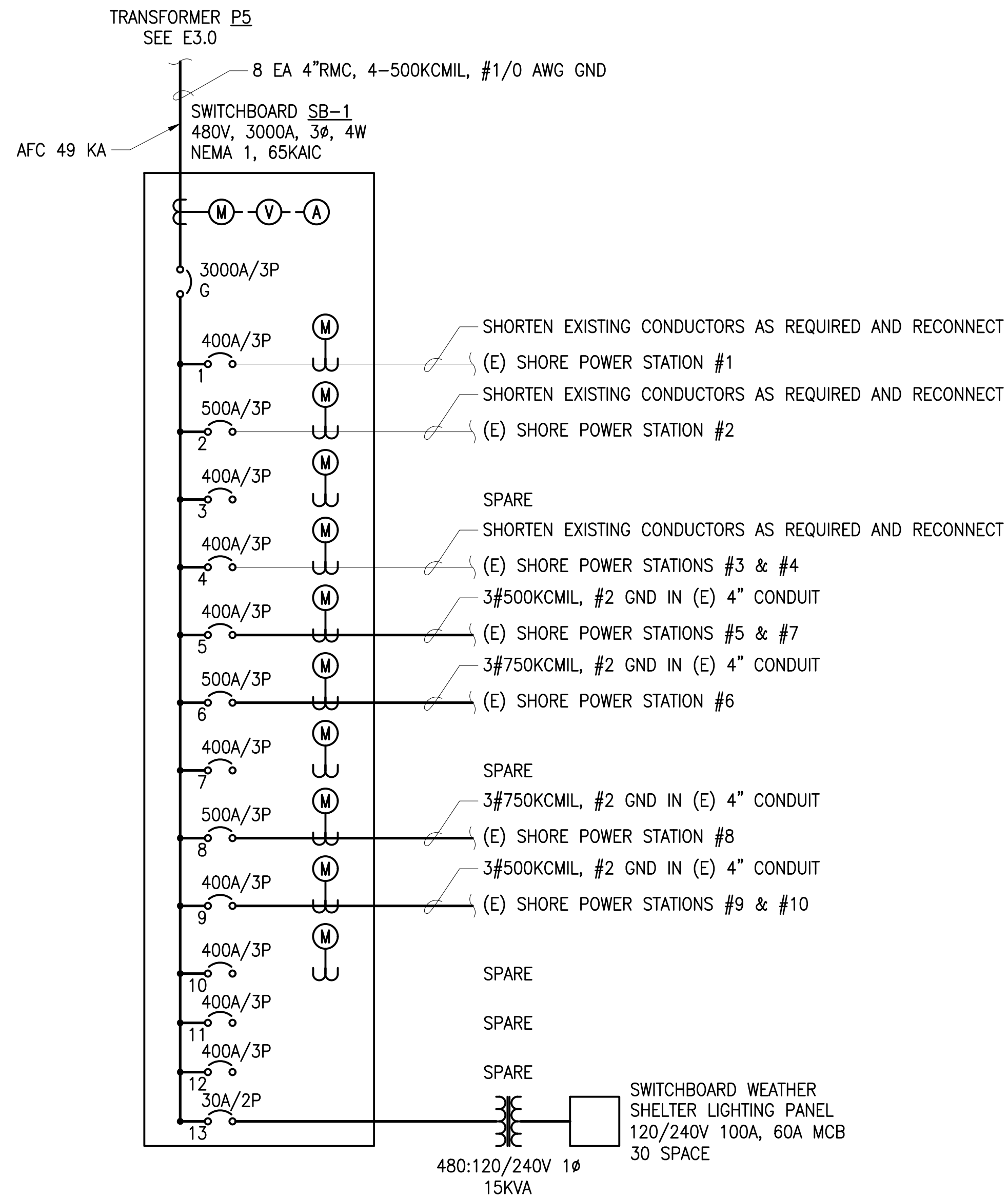
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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAMS - BASE BID - DEMO**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	E4.0D

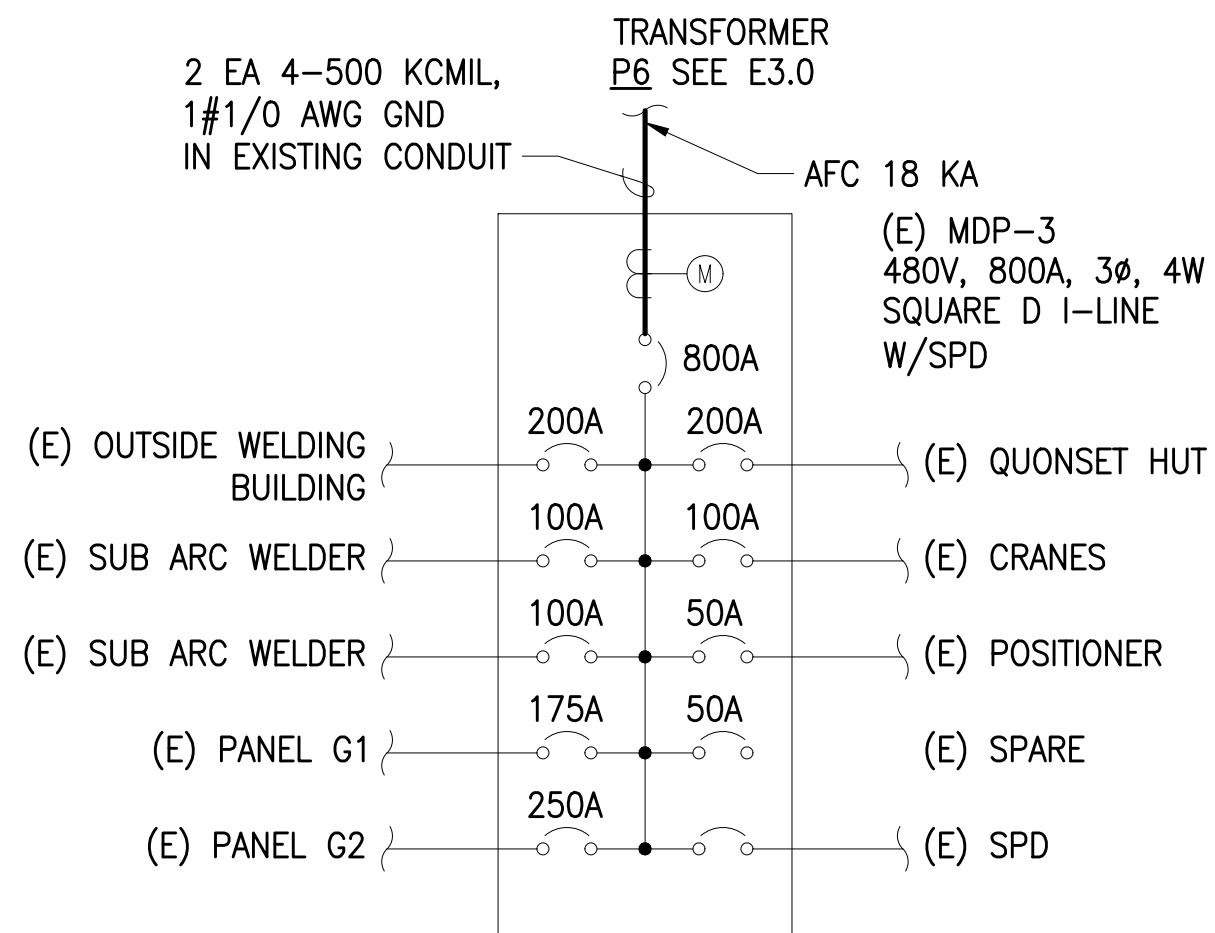
Of Sheets



**1 PIER 1 SWITCHBOARD SB-1 ONE-LINE DIAGRAM**  
E4.0 SCALE:NTS

**DETAIL NOTE:**

1. INSTALL PLACARD "DISCONNECTING MEANS FOR (E) SHORE POWER STATIONS #1-#10."
2. PROVIDE ARC ENERGY REDUCING, "MAINTENANCE MODE", SWITCH AND INDICATOR FOR MAIN CIRCUIT BREAKER.
3. SB-1 SHALL BE HOUSED IN A WEATHER PROTECTED SHELTER, SQUARE D POWER ZONE CENTER OR APPROVED EQUAL.
4. NEUTRAL AND GROUND SHALL BE BONDED AT ONLY ONE LOCATION, WITHIN TRANSFORMER.



**2 MACHINE SHOP MDP-3 ONE-LINE DIAGRAM**  
E4.0 SCALE:NTS

**DETAIL NOTES:**

1. INSTALL 480V CONDUCTORS AND CONNECT NEW TRANSFORMER SECONDARY TO EXISTING PANELBOARD.
2. REUSE EXISTING CONDUIT FOR NEW FEEDERS TO THE EXTENT PRACTICAL. EXTEND AND MODIFY AS REQUIRED.
3. NEUTRAL AND GROUND SHALL BE BONDED AT ONLY ONE LOCATION, WITHIN TRANSFORMER. REMOVE ANY EXISTING BONDS, IF PRESENT.
4. BOND EXISTING GROUNDING ELECTRODE SYSTEM TO NEW GROUNDING ELECTRODES AT TRANSFORMER.

**SHEET NOTES:**

1. ALL NEW WORK DEPICTED ON THE THIS SHEET IS INCLUDED IN THE BASE BID.
2. ALL WIRING IS EXISTING, UNLESS NOTED OTHERWISE.

Revisions	
ISSUED FOR CONSTRUCTION	0

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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
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**480V ONE-LINE DIAGRAMS - BASE BID**

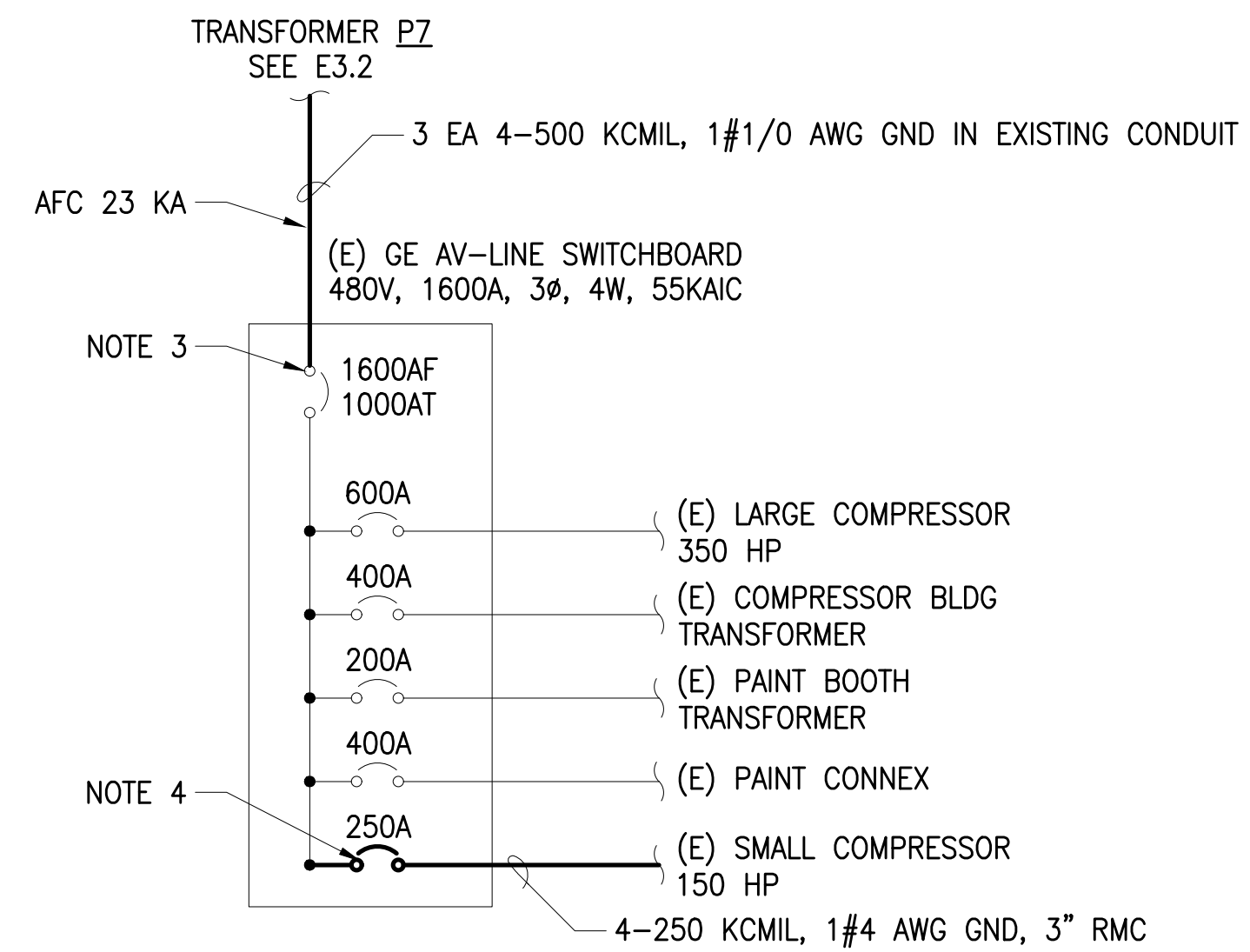
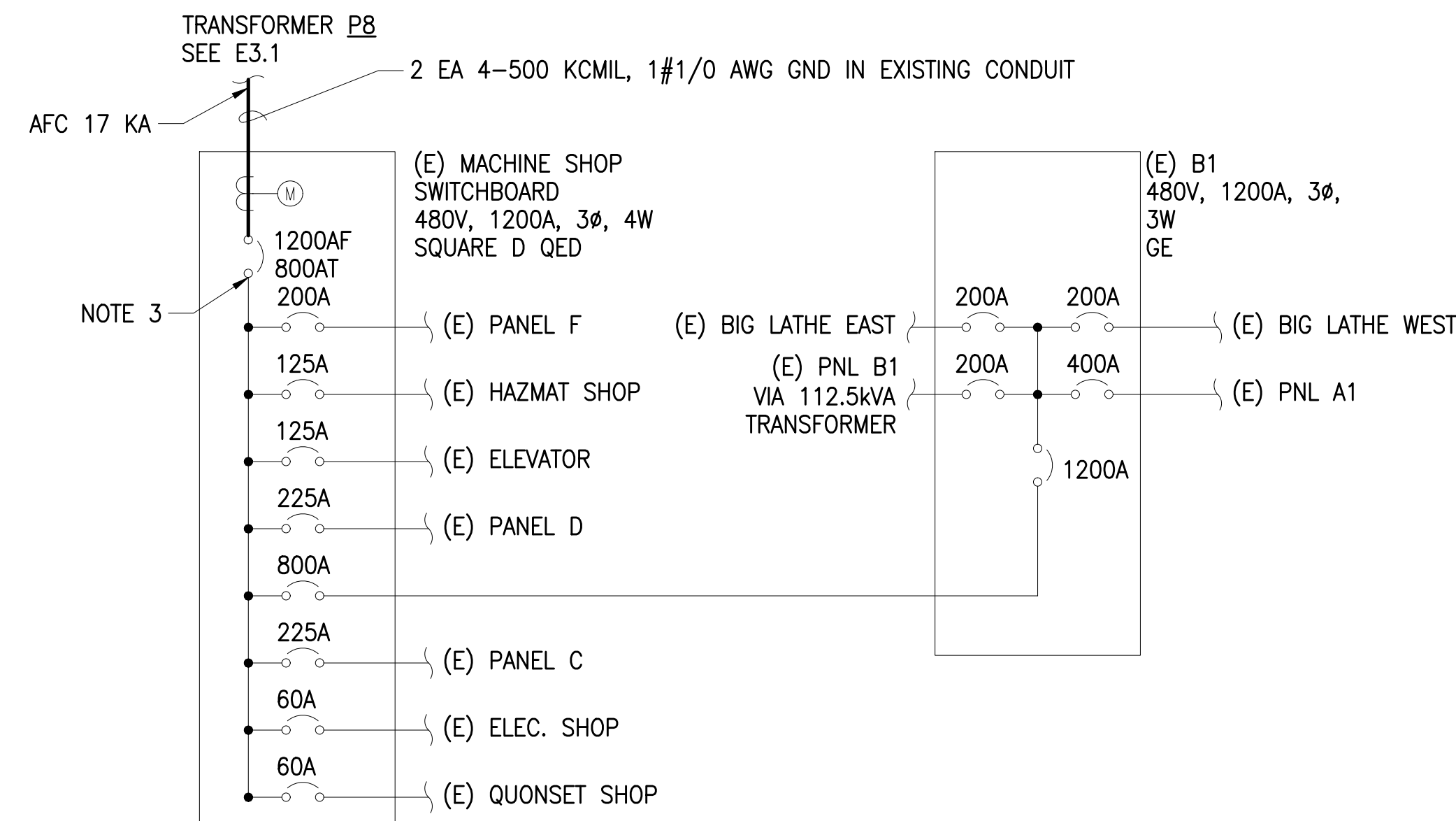
Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	E4.0



Revisions	
ISSUED FOR CONSTRUCTION	0

**SHEET NOTES:**

1. ALL NEW WORK DEPICTED ON THE THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATES #1 AND #2.
2. ALL WIRING IS EXISTING, UNLESS NOTED OTHERWISE.



**1 MACHINE SHOP SWITCHBOARD ONE-LINE DIAGRAM (ALT. 1)**  
E4.1 SCALE:NTS

**2 AIR COMPRESSOR BUILDING ONE-LINE DIAGRAM (ALT. 2)**  
E4.1 SCALE:NTS

**DETAIL 1 NOTES:**

1. PROVIDE FEEDER CONDUCTORS, TAPS, AND CONDUIT TO CONNECT NEW TRANSFORMERS TO EXISTING SWITCHBOARDS.
2. REUSE EXISTING CONDUIT TO THE EXTENT PRACTICAL FOR NEW FEEDERS.
3. ADJUST TRIP SETTING AS INDICATED.
4. NEUTRAL AND GROUND SHALL BE BONDED AT ONLY ONE LOCATION, WITHIN TRANSFORMER. REMOVE ANY EXISTING BONDS, IF PRESENT.
5. BOND EXISTING GROUNDING ELECTRODE SYSTEM TO NEW GROUNDING ELECTRODES AT TRANSFORMER.

**DETAIL 2 NOTES:**

1. PROVIDE FEEDER CONDUCTORS, TAPS, AND CONDUIT TO CONNECT NEW TRANSFORMER TO EXISTING SWITCHBOARD.
2. REUSE EXISTING CONDUIT TO THE EXTENT PRACTICAL FOR NEW FEEDERS.
3. ADJUST TRIP SETTING AS INDICATED.
4. INSTALL NEW CIRCUIT BREAKER AND FEEDER TO EXISTING SMALL AIR COMPRESSOR DISCONNECT.
5. NEUTRAL AND GROUND SHALL BE BONDED AT ONLY ONE LOCATION, WITHIN TRANSFORMER. REMOVE ANY EXISTING BONDS, IF PRESENT.
6. BOND EXISTING GROUNDING ELECTRODE SYSTEM TO NEW GROUNDING ELECTRODES AT TRANSFORMER.

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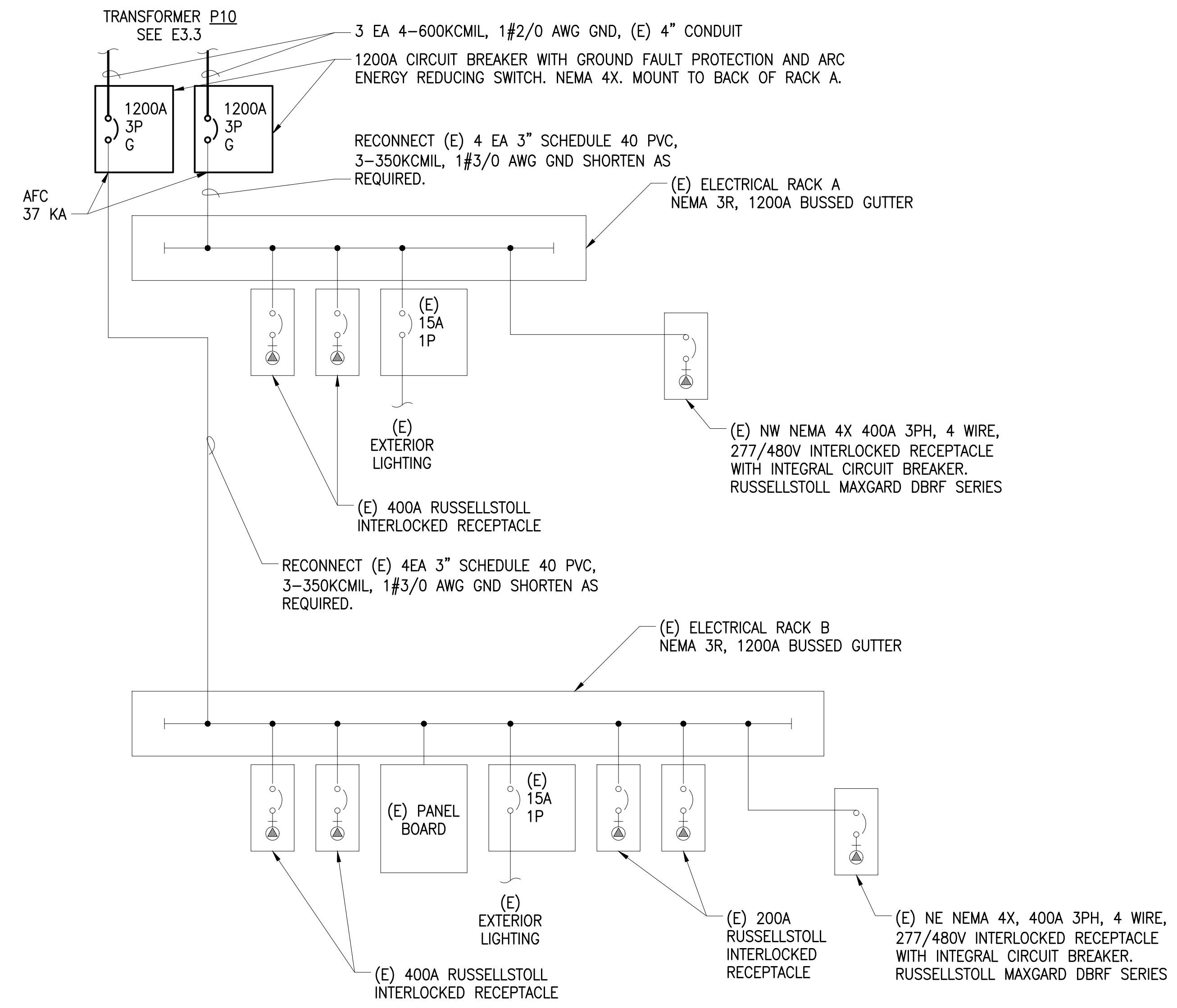
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAM - ALT. 1 & 2**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E4.1</b>
Of	Sheets

Revisions	
ISSUED FOR CONSTRUCTION	0

**SHEET NOTES:**

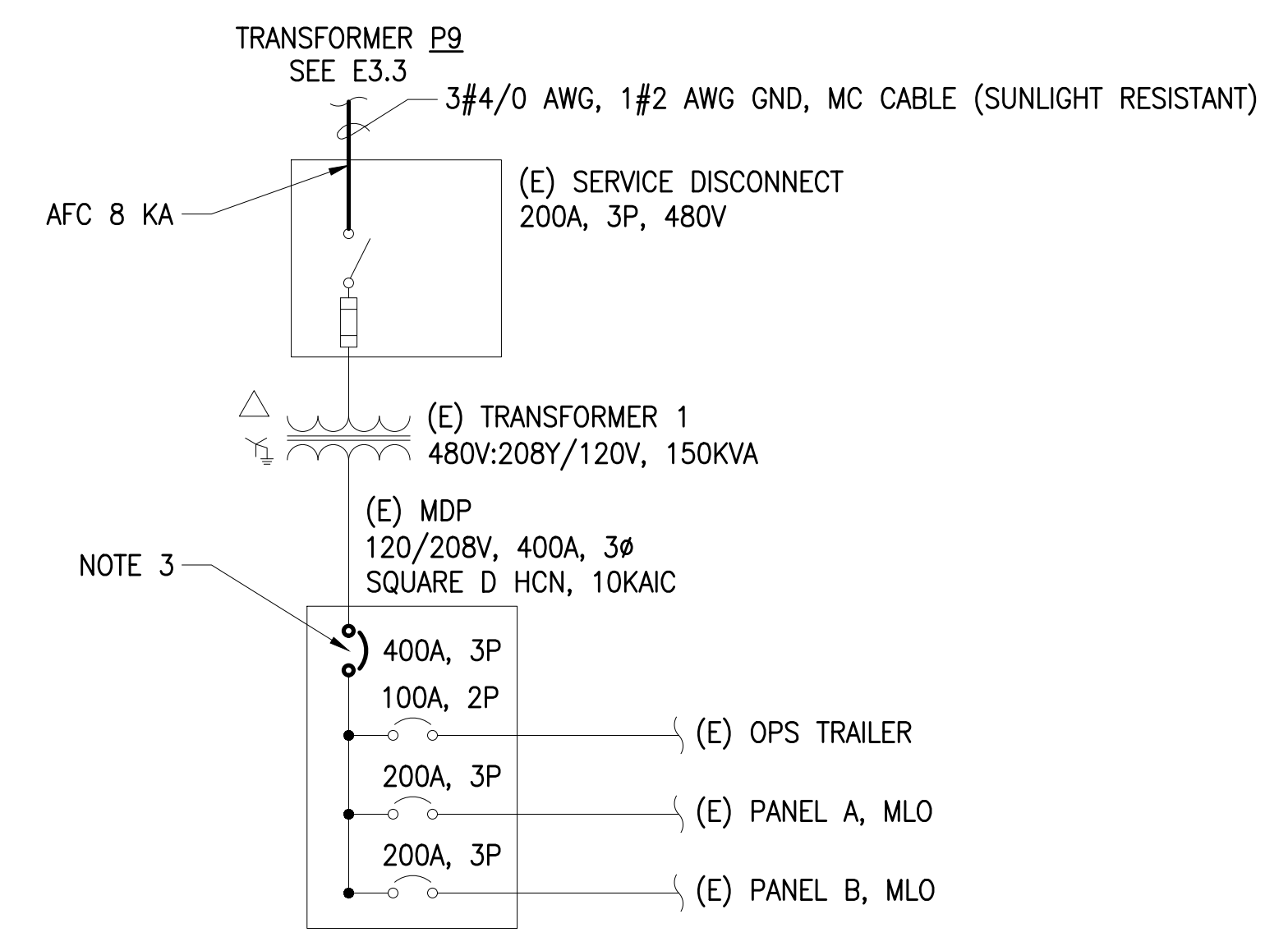
1. ALL NEW WORK DEPICTED ON THE THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #3.
2. ALL WIRING IS EXISTING, UNLESS NOTED OTHERWISE.



**1 BERTH 1 ONE-LINE DIAGRAM**  
E4.2 SCALE:NTS

**DETAIL NOTES:**

1. REUSE EXISTING CONDUIT AS PRACTICAL FOR NEW FEEDERS.
2. NEUTRAL AND GROUND SHALL BE BONDED AT ONLY ONE LOCATION, WITHIN TRANSFORMER. REMOVE ANY EXISTING BONDS, IF PRESENT.
3. BOND EXISTING GROUNDING ELECTRODE SYSTEM TO NEW GROUNDING ELECTRODES AT TRANSFORMER.

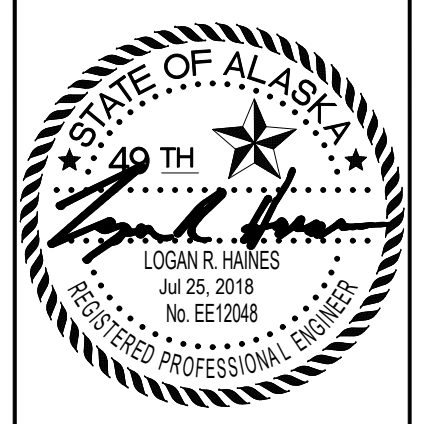


**2 OPS BUILDING ONE-LINE DIAGRAM**  
E4.2 SCALE:NTS

**DETAIL NOTES:**

1. PROVIDE FEEDER CONDUCTORS, TAPS, AND CONDUIT TO CONNECT NEW TRANSFORMERS TO EXISTING PANELBOARDS AND SWITCHBOARDS.
2. REUSE EXISTING CONDUIT AS PRACTICAL FOR NEW FEEDER.
3. INSTALL BACKFED MAIN CIRCUIT BREAKER.
4. NEUTRAL AND GROUND SHALL BE BONDED AT ONLY ONE LOCATION, WITHIN TRANSFORMER. REMOVE ANY EXISTING BONDS, IF PRESENT.
5. BOND EXISTING GROUNDING ELECTRODE SYSTEM TO NEW GROUNDING ELECTRODES AT TRANSFORMER.

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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAMS - ALT. 3**

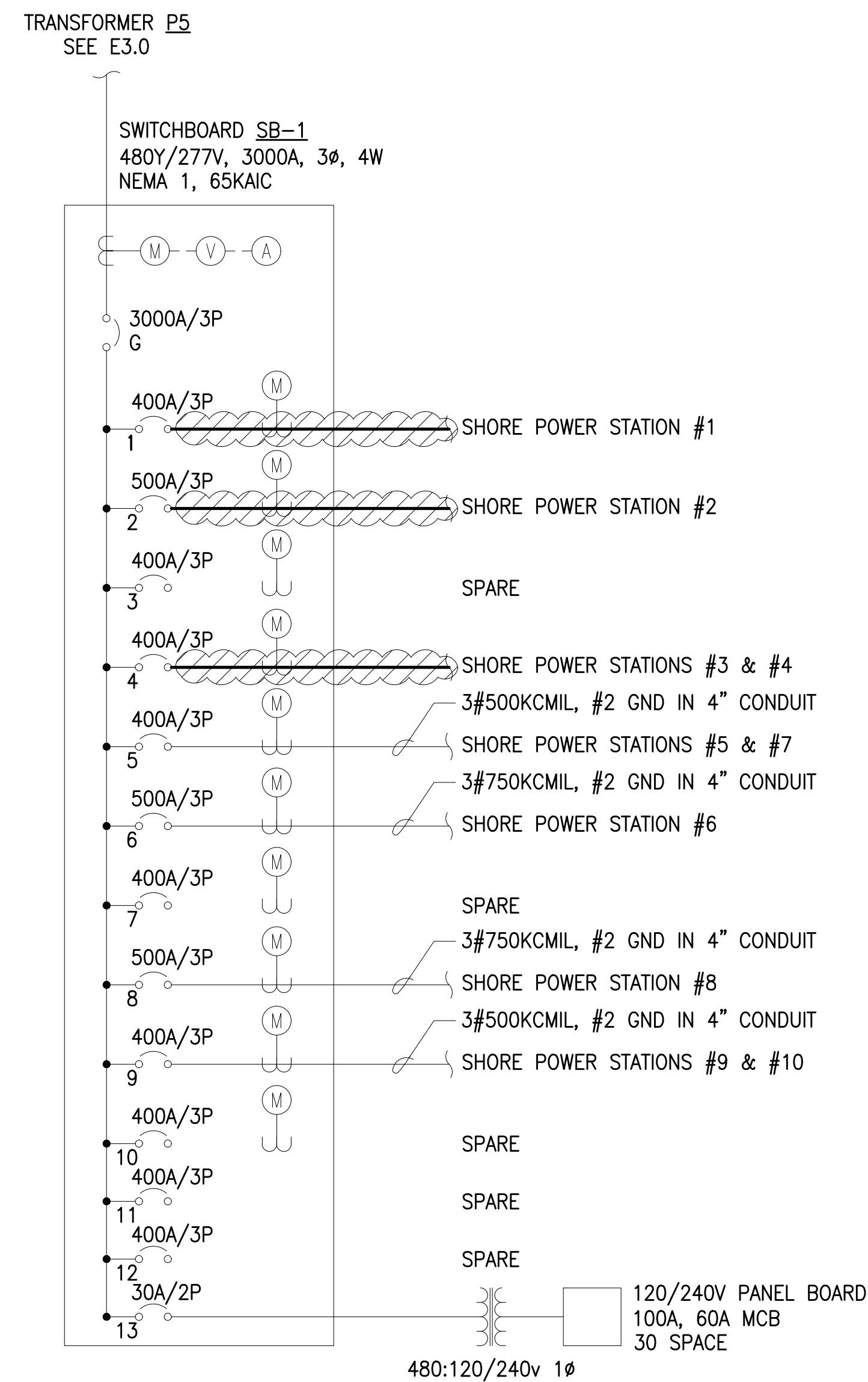
Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E4.2</b>
Of	Sheets



Revisions	
ISSUED FOR CONSTRUCTION	0

**SHEET NOTES:**

1. ALL DEMOLITION WORK DEPICTED ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #4.
2. DEMOLISH CONDUCTORS IDENTIFIED BACK TO SOURCE. RETAIN CONDUIT FOR REUSE.

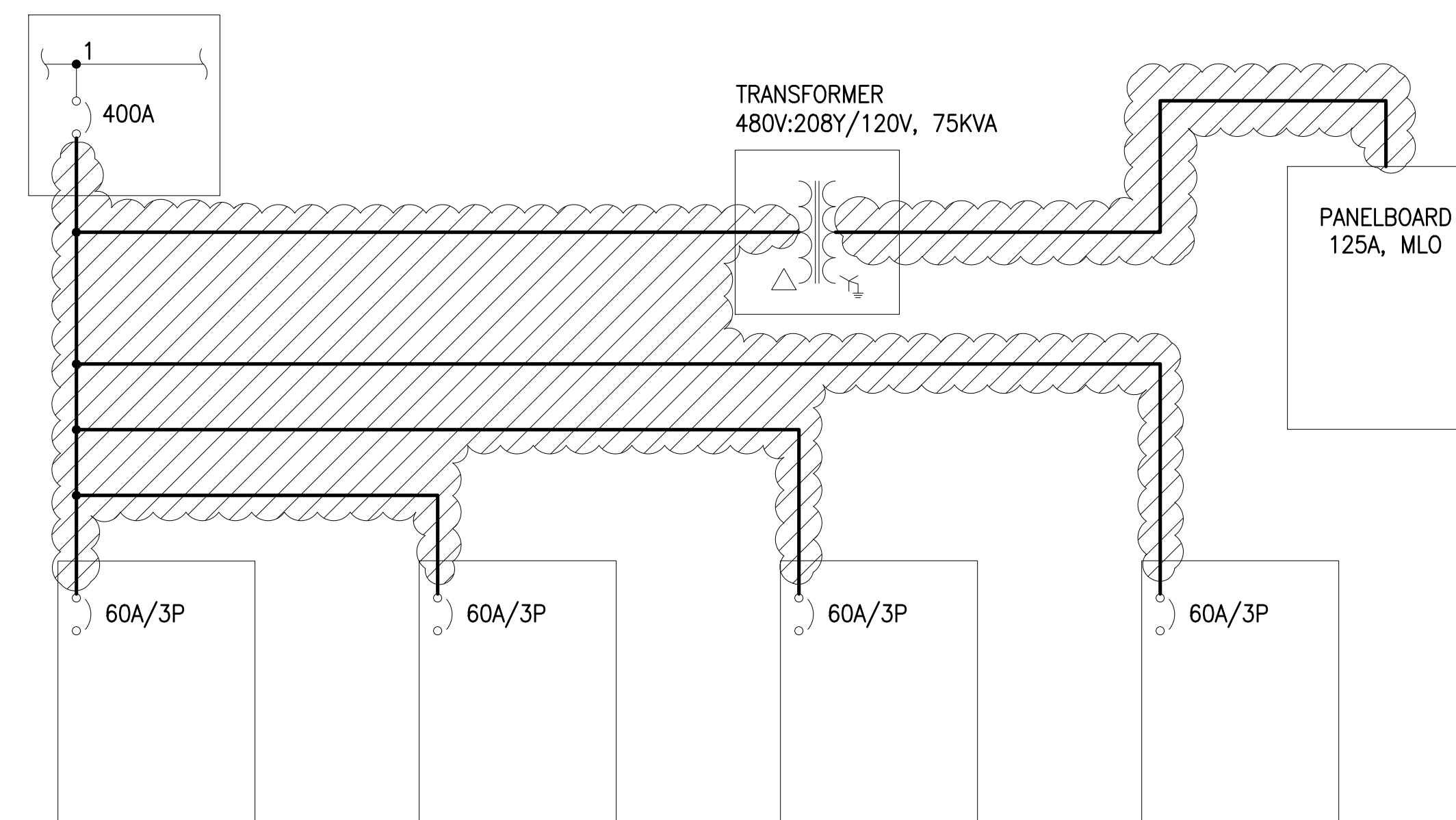


**1 PIER 1 SWITCHBOARD SB-1 ONE-LINE DIAGRAM - DEMOLITION**  
E4.3D SCALE:NTS

**DETAIL NOTE:**

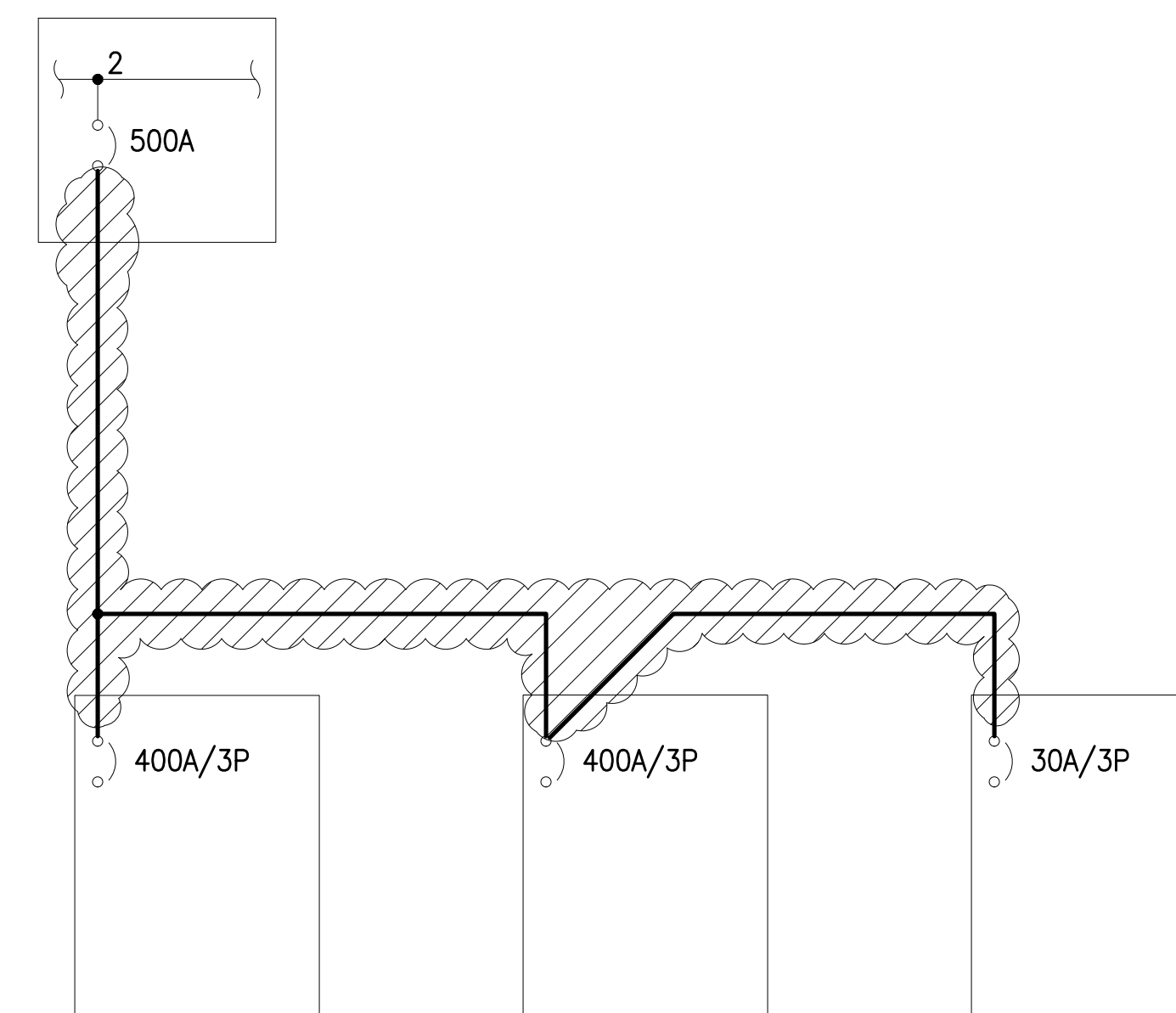
1. REMOVE FEEDER CONDUCTORS SHOWN. CONDUIT IS TO REMAIN.

SB-1 SEE DETAIL 1 THIS SHEET



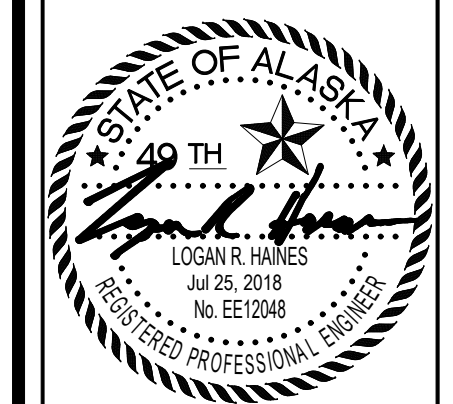
**2 SHORE POWER STATION #1 ONE-LINE DIAGRAM - DEMOLITION**  
E4.3D SCALE:NTS

SB-1 SEE 1/E4.0D



**3 SHORE POWER STATION #2 ONE-LINE DIAGRAM - DEMOLITION**  
E4.3D SCALE:NTS

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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
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**480V ONE-LINE DIAGRAMS - ALT. 4 - DEMO**

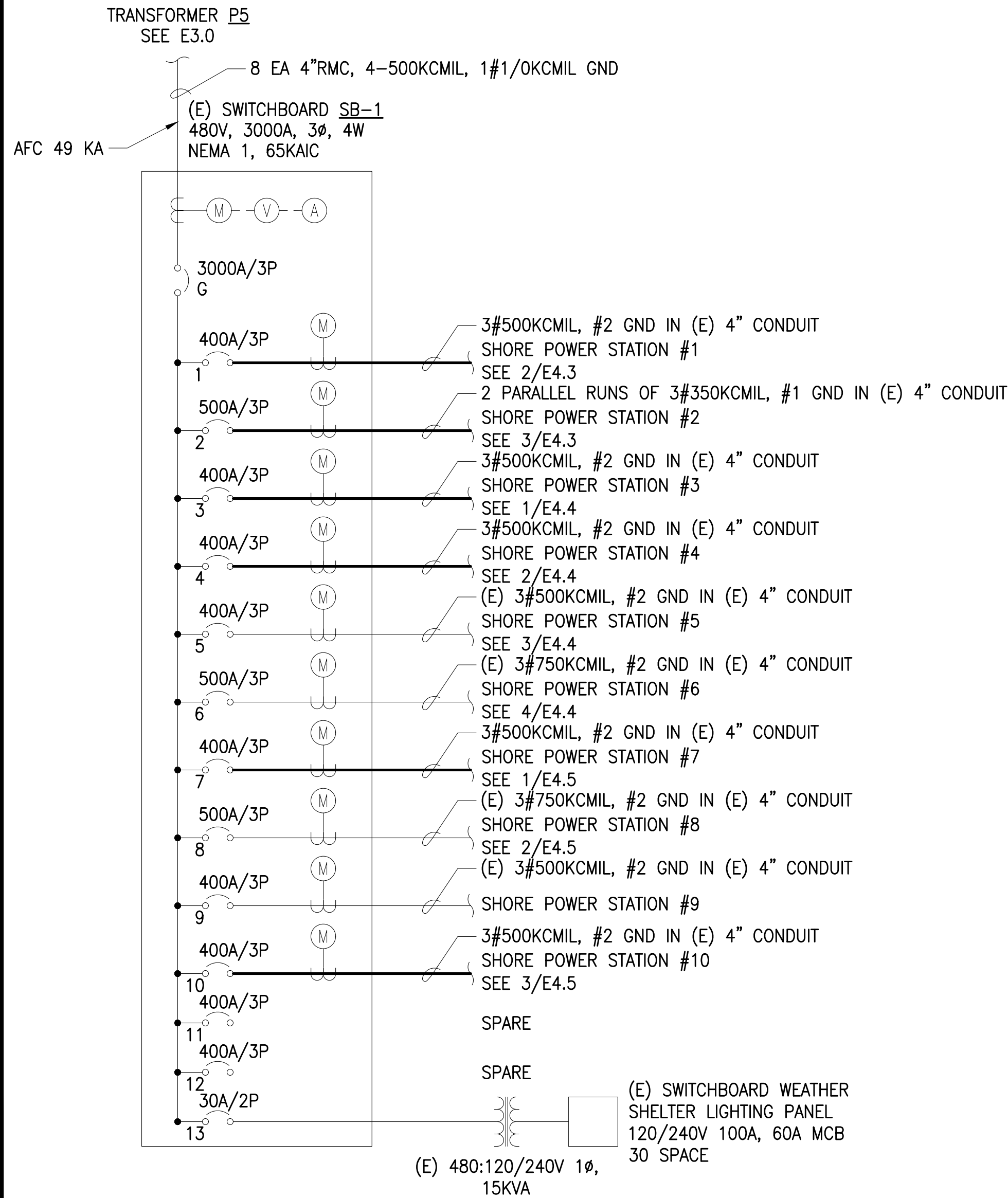
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Design	AJBV
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Job No.	181107
Sheet No.	<b>E4.3D</b>
Of	Sheets

**SHEET NOTES:**

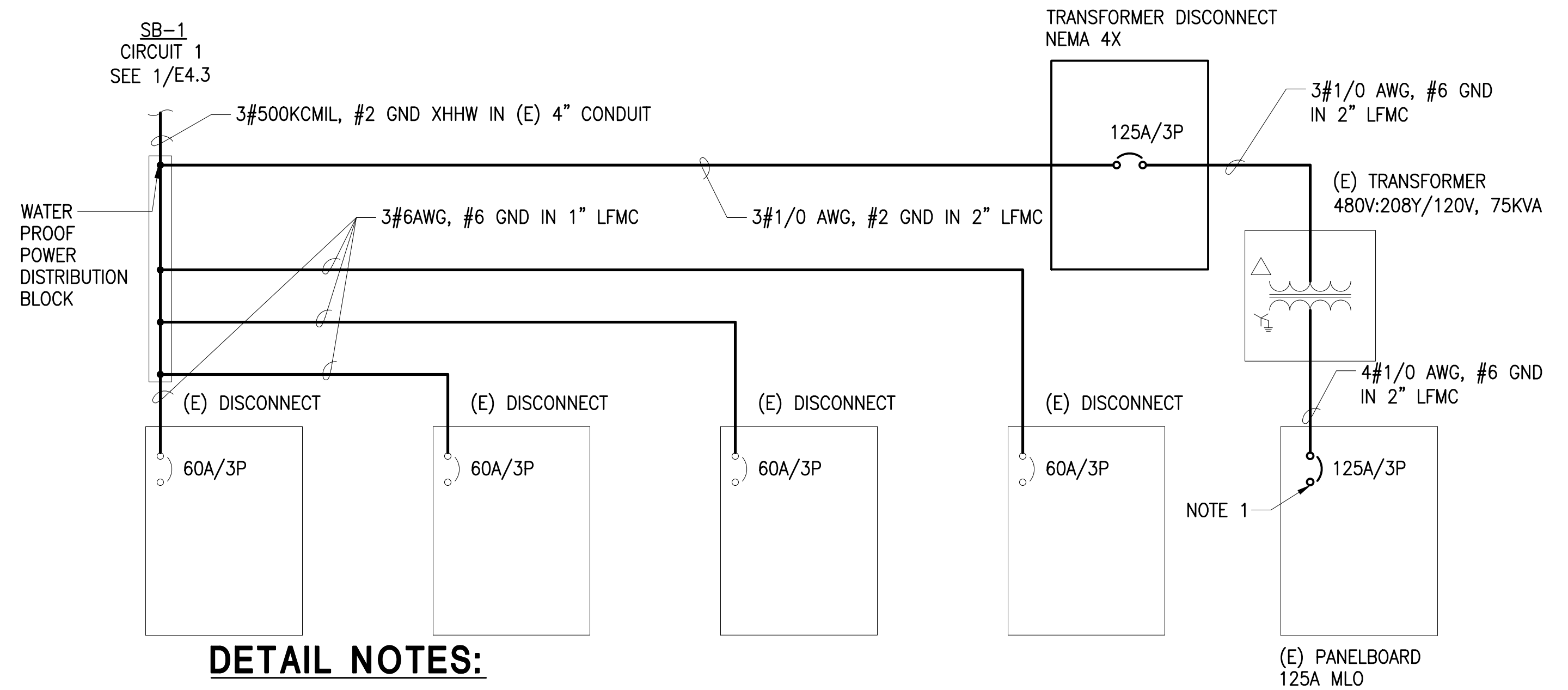
1. ALL NEW WORK DEPICTED ON THE THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #4.
2. ALL WIRING IS EXISTING, UNLESS NOTED OTHERWISE.

**DETAIL NOTES:**

1. INSTALL FEEDERS SHOWN IN EXISTING CONDUIT. CONNECT TO EXISTING EQUIPMENT.



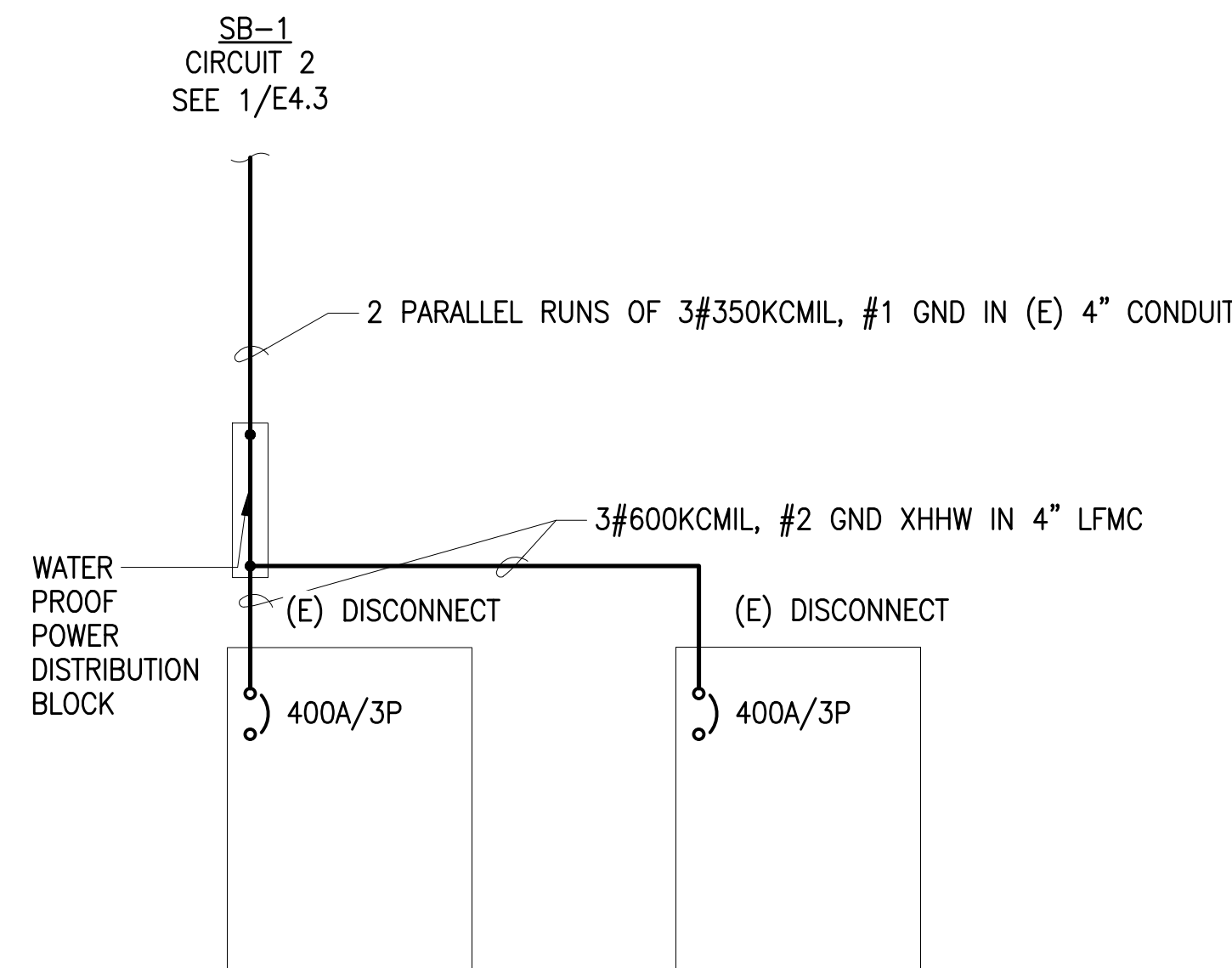
**1 PIER 1 SWITCHBOARD SB-1 ONE-LINE DIAGRAM**  
E4.3 SCALE:NTS



**DETAIL NOTES:**

1. INSTALL BACKFED MAIN CIRCUIT BREAKER.
2. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."
3. INSTALL PLACARD ON EXTERIOR OF SHORE POWER STATION: "SHORE POWER STATION #1 DISCONNECTING MEANS IS SWITCHBOARD SB-1, CIRCUIT BREAKER #1, LOCATED BETWEEN SHORE POWER STATIONS #4 & #5."

**2 SHORE POWER STATION #1 ONE-LINE DIAGRAM**  
E4.3 SCALE:NTS



**DETAIL NOTES:**

1. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."
2. INSTALL PLACARD ON EXTERIOR OF SHORE POWER STATION: "SHORE POWER STATION #2 DISCONNECTING MEANS IS SWITCHBOARD SB-1, CIRCUIT BREAKER #2, LOCATED BETWEEN SHORE POWER STATIONS #4 & #5."

**3 SHORE POWER STATION #2 ONE-LINE DIAGRAM**  
E4.3 SCALE:NTS

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3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAMS - ALT. 4**

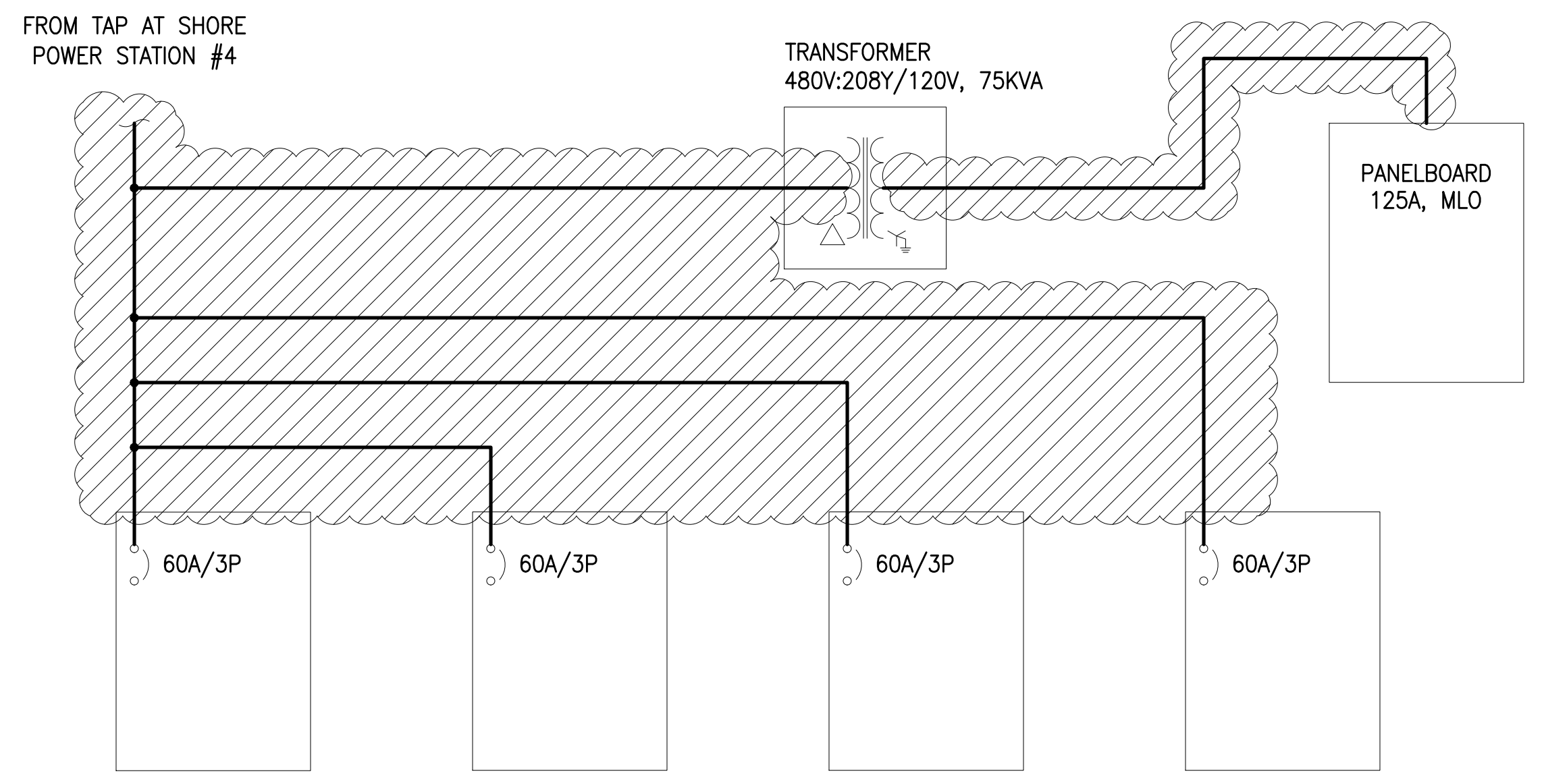
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Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E4.3</b>
Of	Sheets



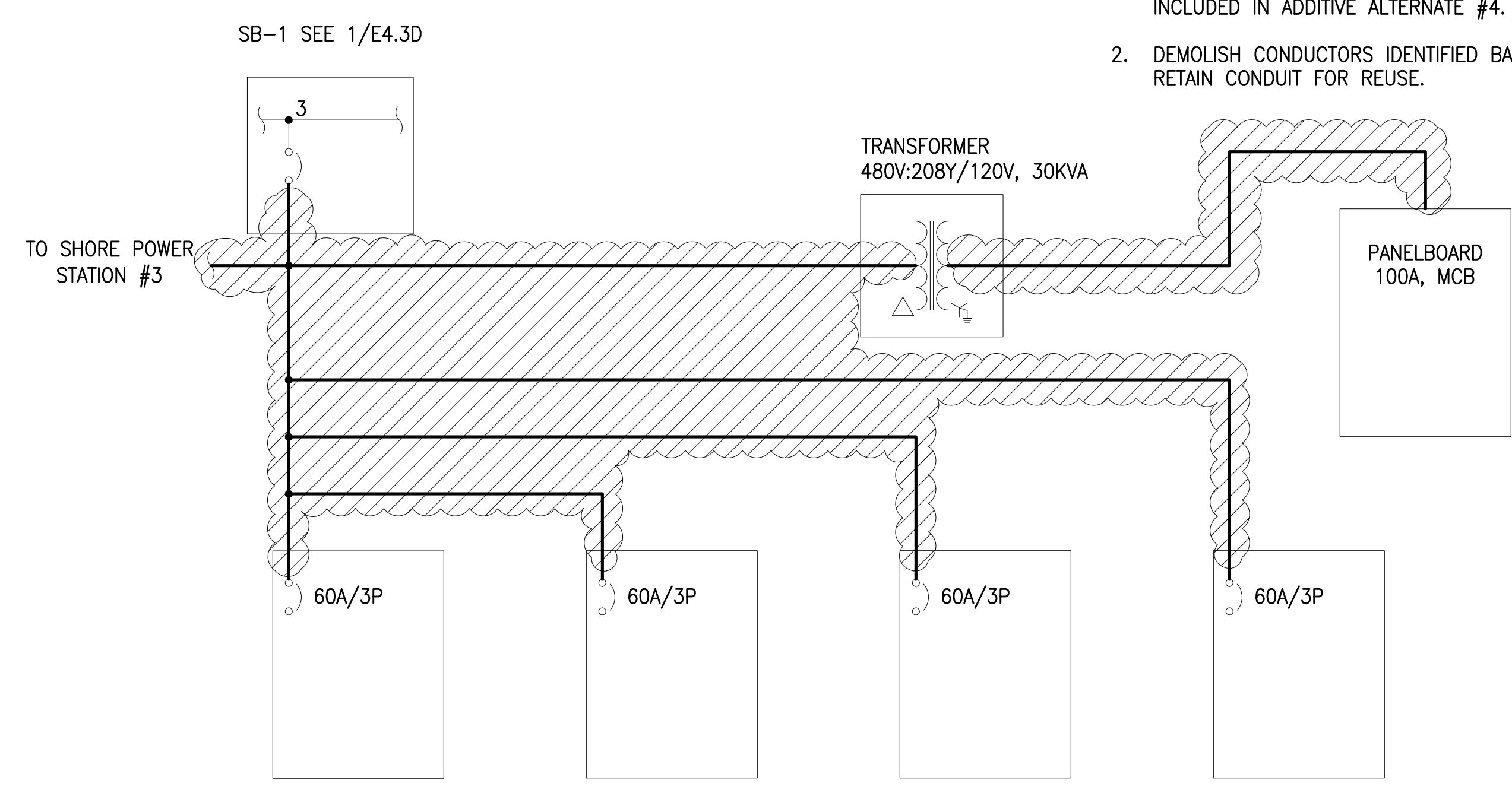
Revisions	
ISSUED FOR CONSTRUCTION	0

**SHEET NOTES:**

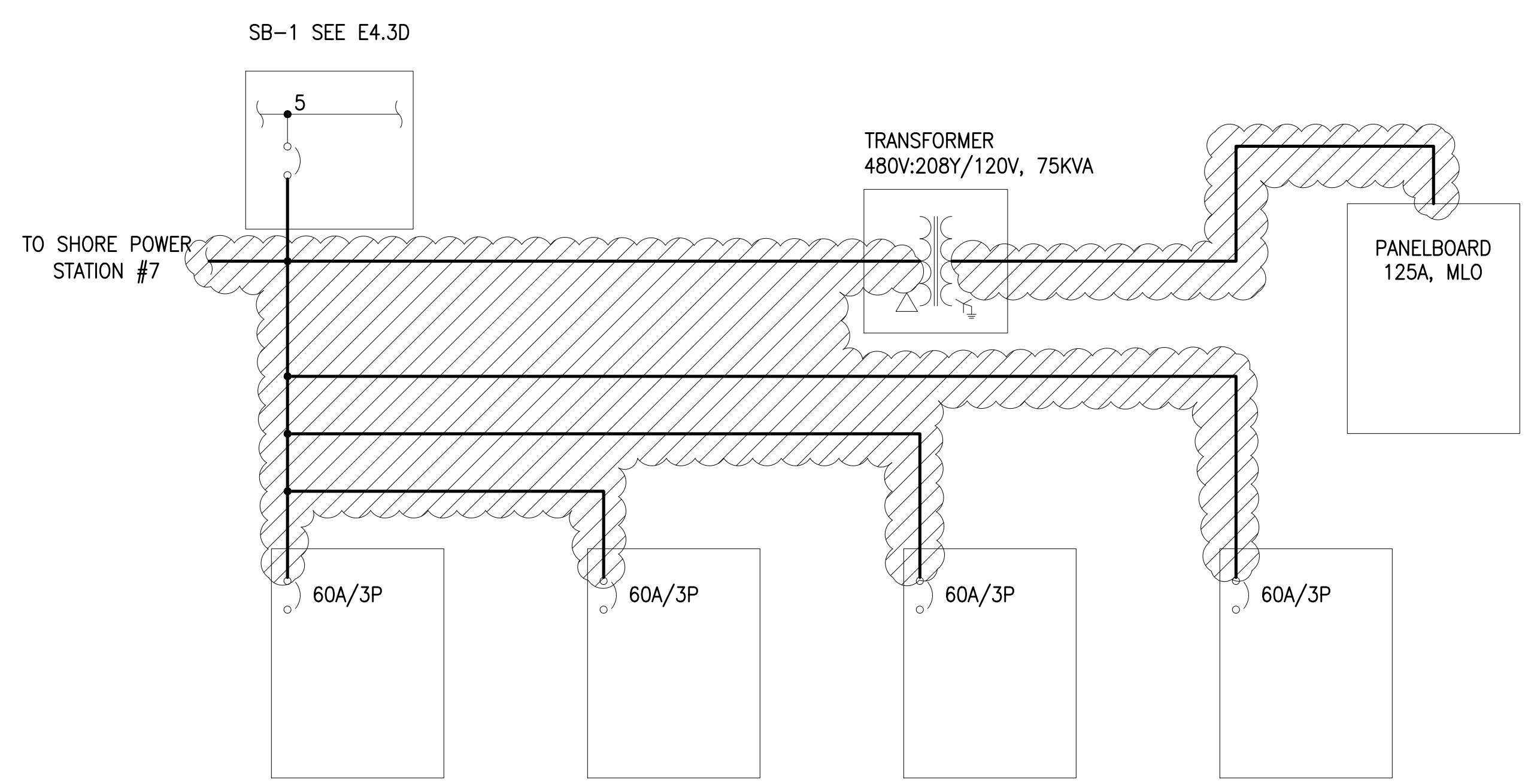
1. ALL DEMOLITION WORK DEPICTED ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #4.
2. DEMOLISH CONDUCTORS IDENTIFIED BACK TO SOURCE. RETAIN CONDUIT FOR REUSE.



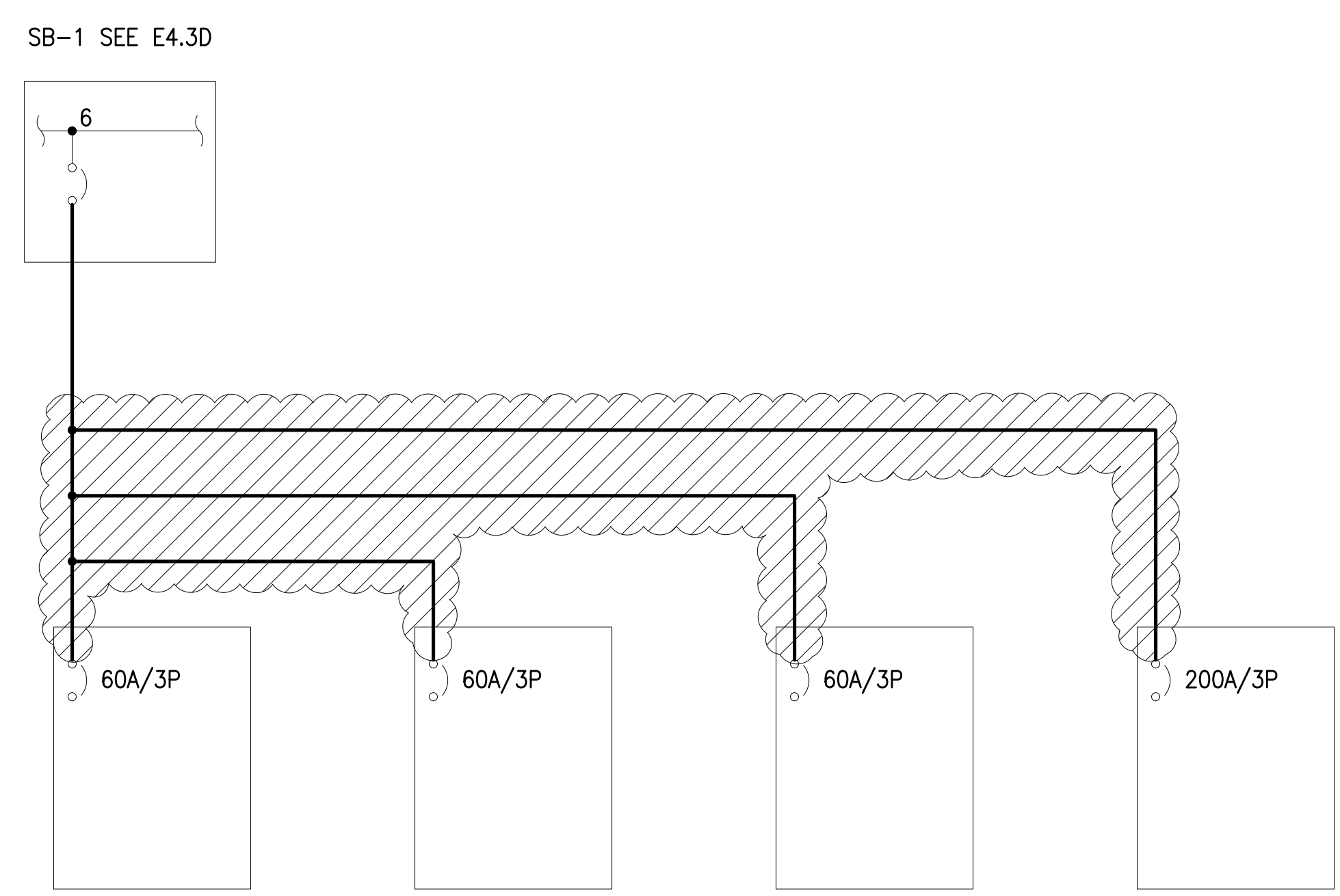
**1 SHORE POWER STATION #3 ONE-LINE DIAGRAM - DEMOLITION**  
E4.4D SCALE:NTS



**2 SHORE POWER STATION #4 ONE-LINE DIAGRAM - DEMOLITION**  
E4.4D SCALE:NTS



**3 SHORE POWER STATION #5 ONE-LINE DIAGRAM - DEMOLITION**  
E4.4D SCALE:NTS



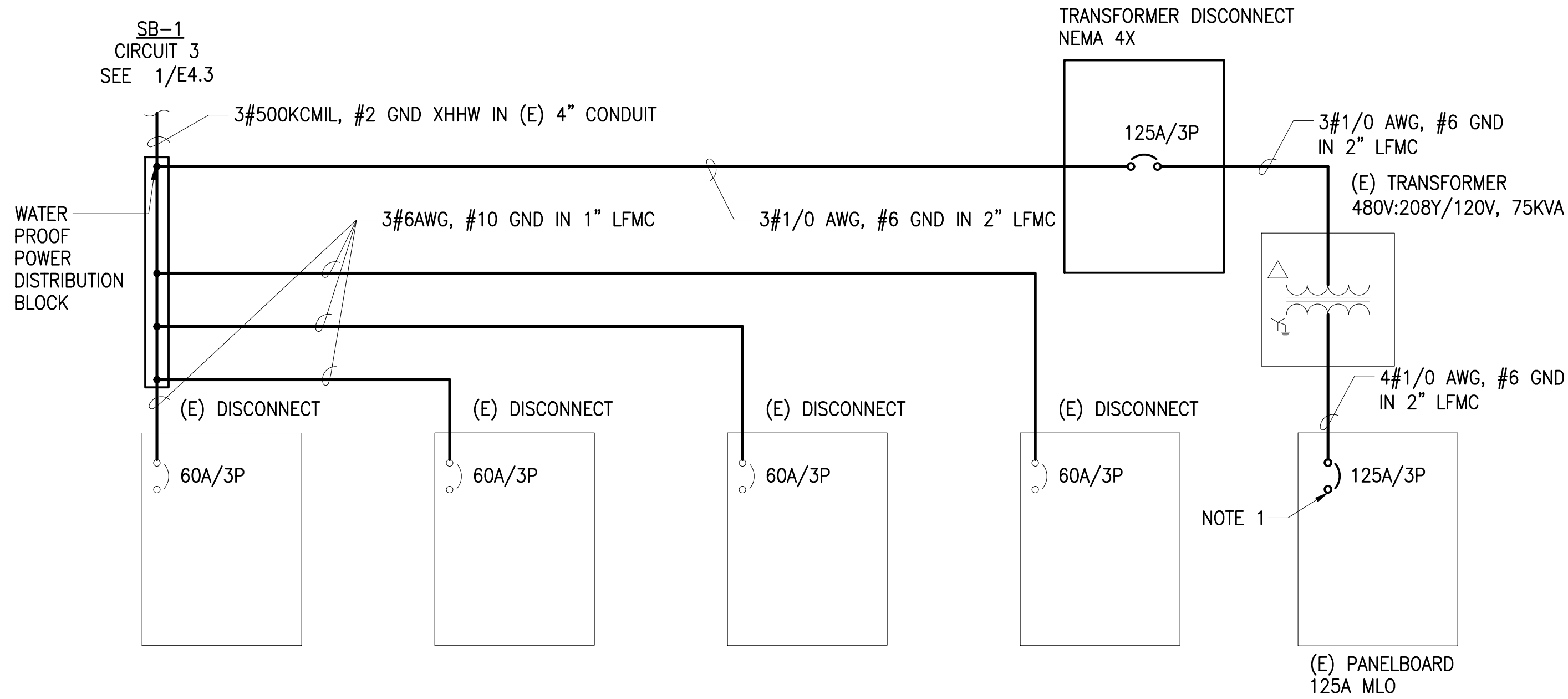
**4 SHORE POWER STATION #6 ONE-LINE DIAGRAM - DEMOLITION**  
E4.4D SCALE:NTS

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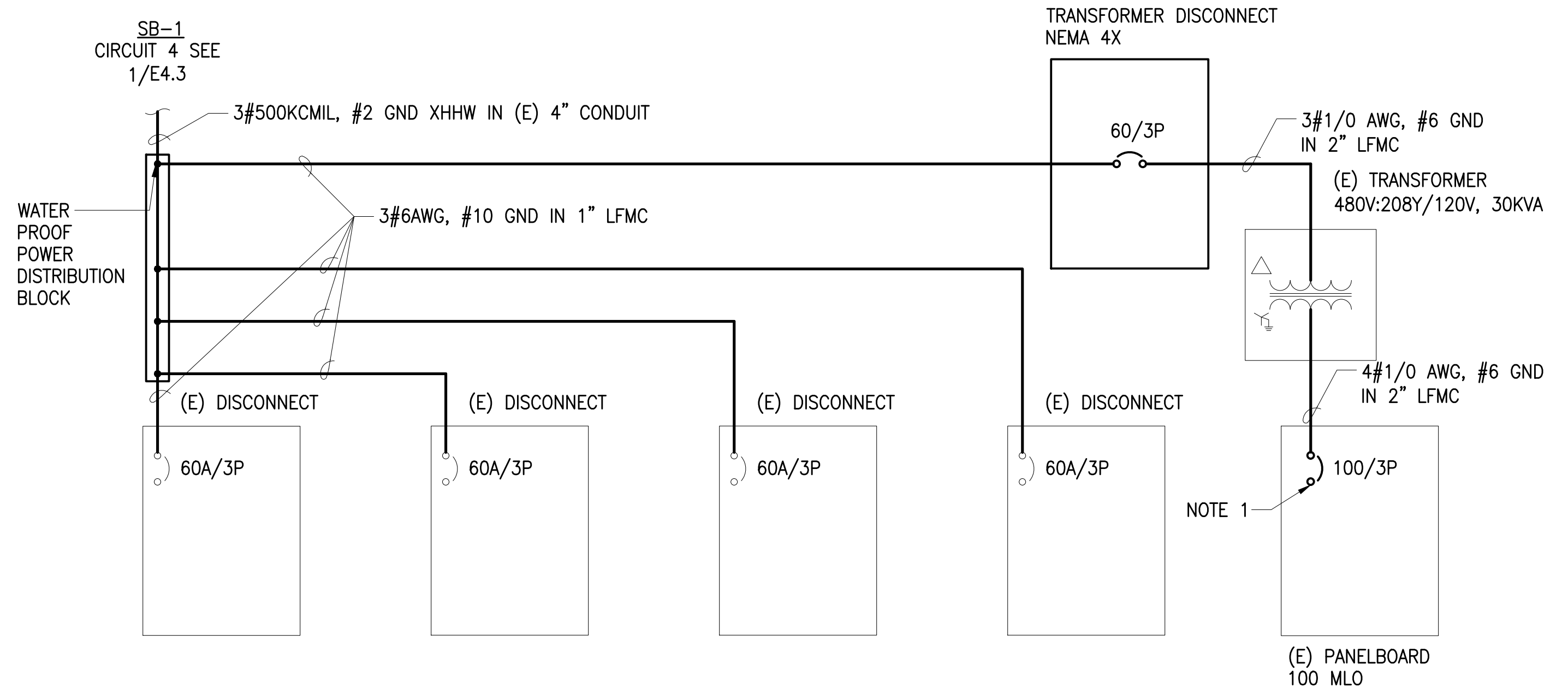
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAMS - ALT. 4 - DEMO**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E4.4D</b>
Of	Sheets



**DETAIL NOTES:**

1. INSTALL BACKFED MAIN CIRCUIT BREAKER.
2. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."
3. INSTALL PLACARD ON EXTERIOR OF SHORE POWER STATION: "SHORE POWER STATION #3 DISCONNECTING MEANS IS SWITCHBOARD SB-1, CIRCUIT BREAKER #3, LOCATED BETWEEN SHORE POWER STATIONS #4 & #5."



**DETAIL NOTES:**

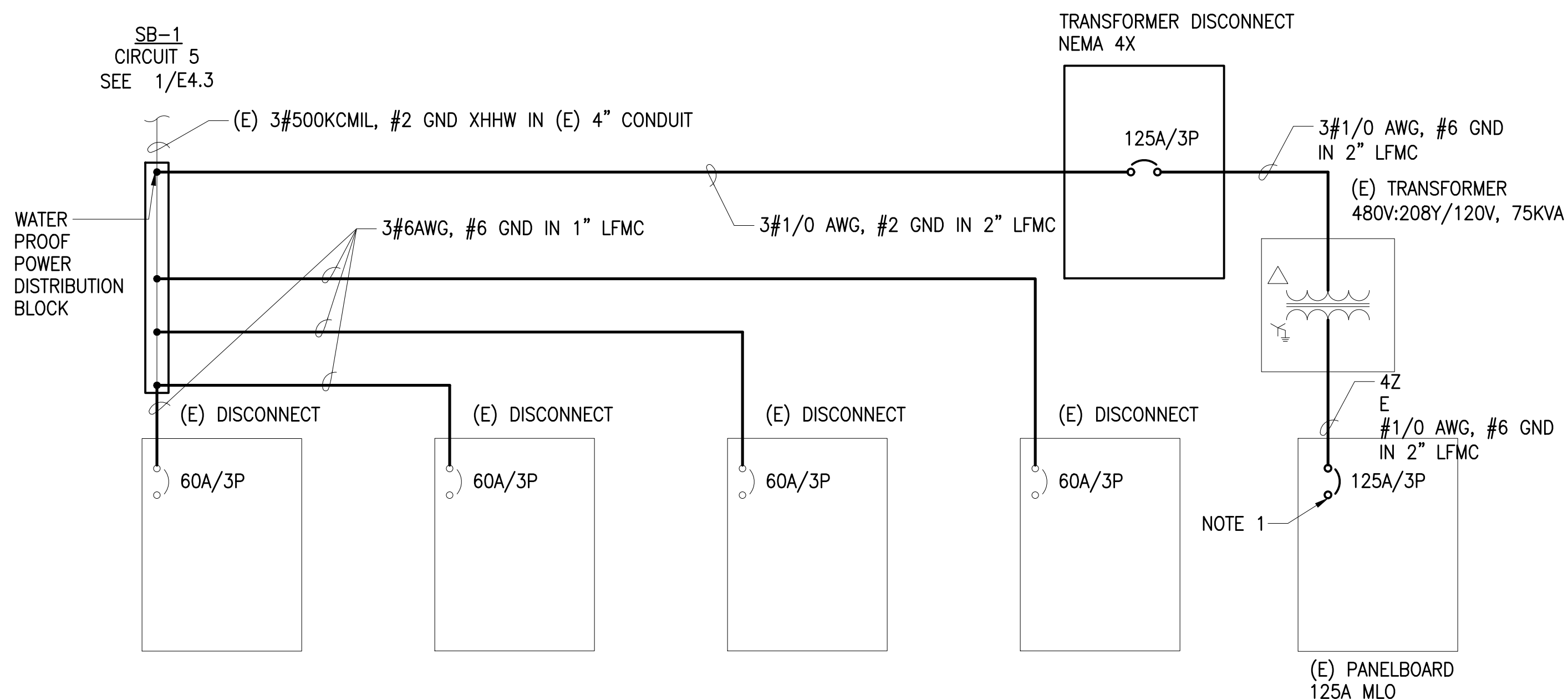
1. INSTALL BACKFED MAIN CIRCUIT BREAKER.
2. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."
3. INSTALL PLACARD ON EXTERIOR OF SHORE POWER STATION: "SHORE POWER STATION #4 DISCONNECTING MEANS IS SWITCHBOARD SB-1, CIRCUIT BREAKER #4, LOCATED BETWEEN SHORE POWER STATIONS #4 & #5."

**1 SHORE POWER STATION #3 ONE-LINE DIAGRAM**

E4.4 SCALE:NTS

**2 SHORE POWER STATION #4 ONE-LINE DIAGRAM**

E4.4 SCALE:NTS

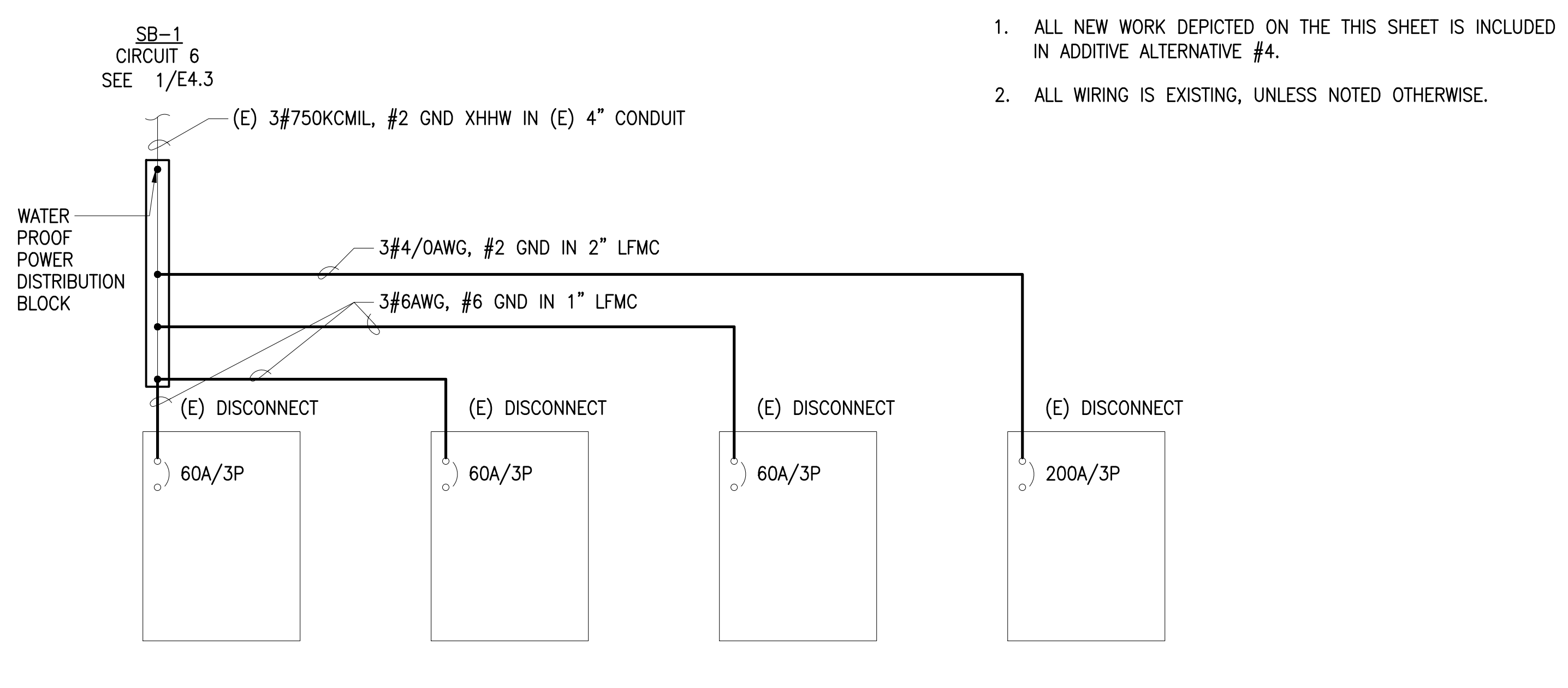


**DETAIL NOTES:**

1. INSTALL BACKFED MAIN CIRCUIT BREAKER.
2. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."
3. INSTALL PLACARD ON EXTERIOR OF SHORE POWER STATION: "SHORE POWER STATION #5 DISCONNECTING MEANS IS SWITCHBOARD SB-1, CIRCUIT BREAKER #5, LOCATED BETWEEN SHORE POWER STATIONS #4 & #5."

**3 SHORE POWER STATION #5 ONE-LINE DIAGRAM**

E4.4 SCALE:NTS



**DETAIL NOTES:**

1. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."
2. INSTALL PLACARD ON EXTERIOR OF SHORE POWER STATION: "SHORE POWER STATION #6 DISCONNECTING MEANS IS SWITCHBOARD SB-1, CIRCUIT BREAKER #6, LOCATED BETWEEN SHORE POWER STATIONS #4 & #5."

**4 SHORE POWER STATION #6 ONE-LINE DIAGRAM**

E4.4 SCALE:NTS

**SHEET NOTES:**

1. ALL NEW WORK DEPICTED ON THE THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #4.
2. ALL WIRING IS EXISTING, UNLESS NOTED OTHERWISE.

Revisions	
ISSUED FOR CONSTRUCTION	0

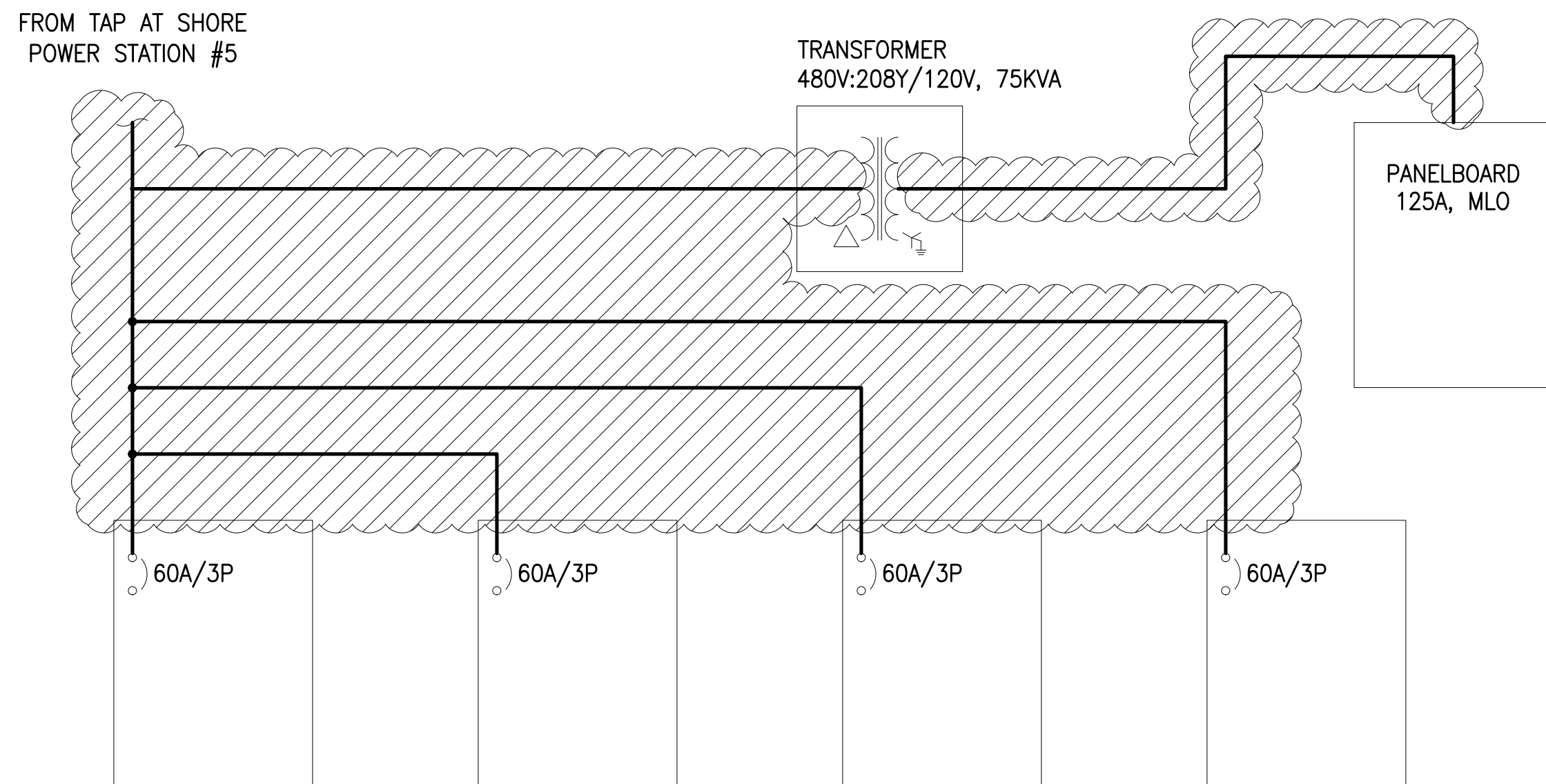
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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAMS - ALT. 4**

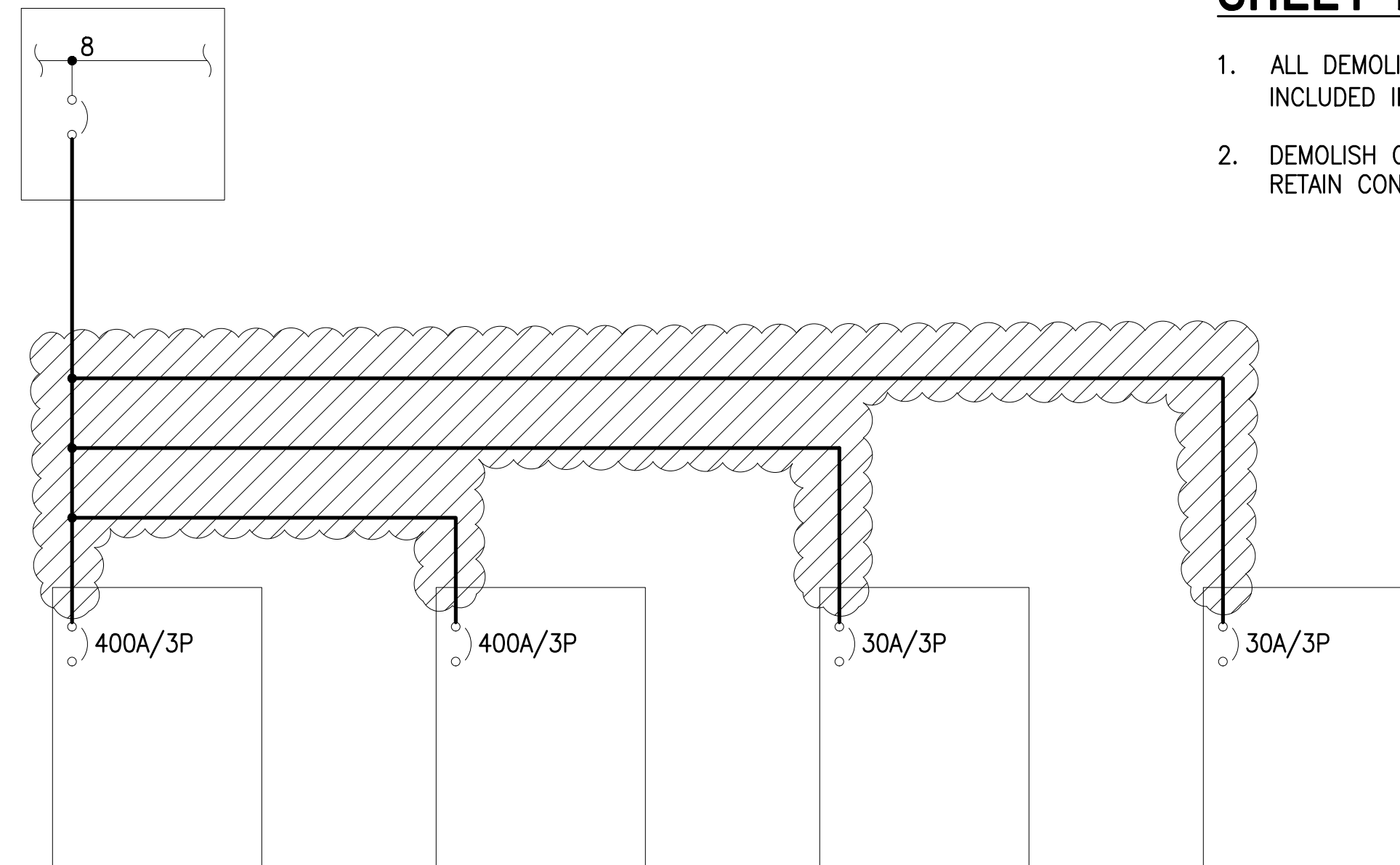
Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E4.4</b>
Of	Sheets





**1 SHORE POWER STATION #7 ONE-LINE DIAGRAM - DEMOLITION**  
E4.5D SCALE:NTS

SB-1 SEE 3/E4.0D

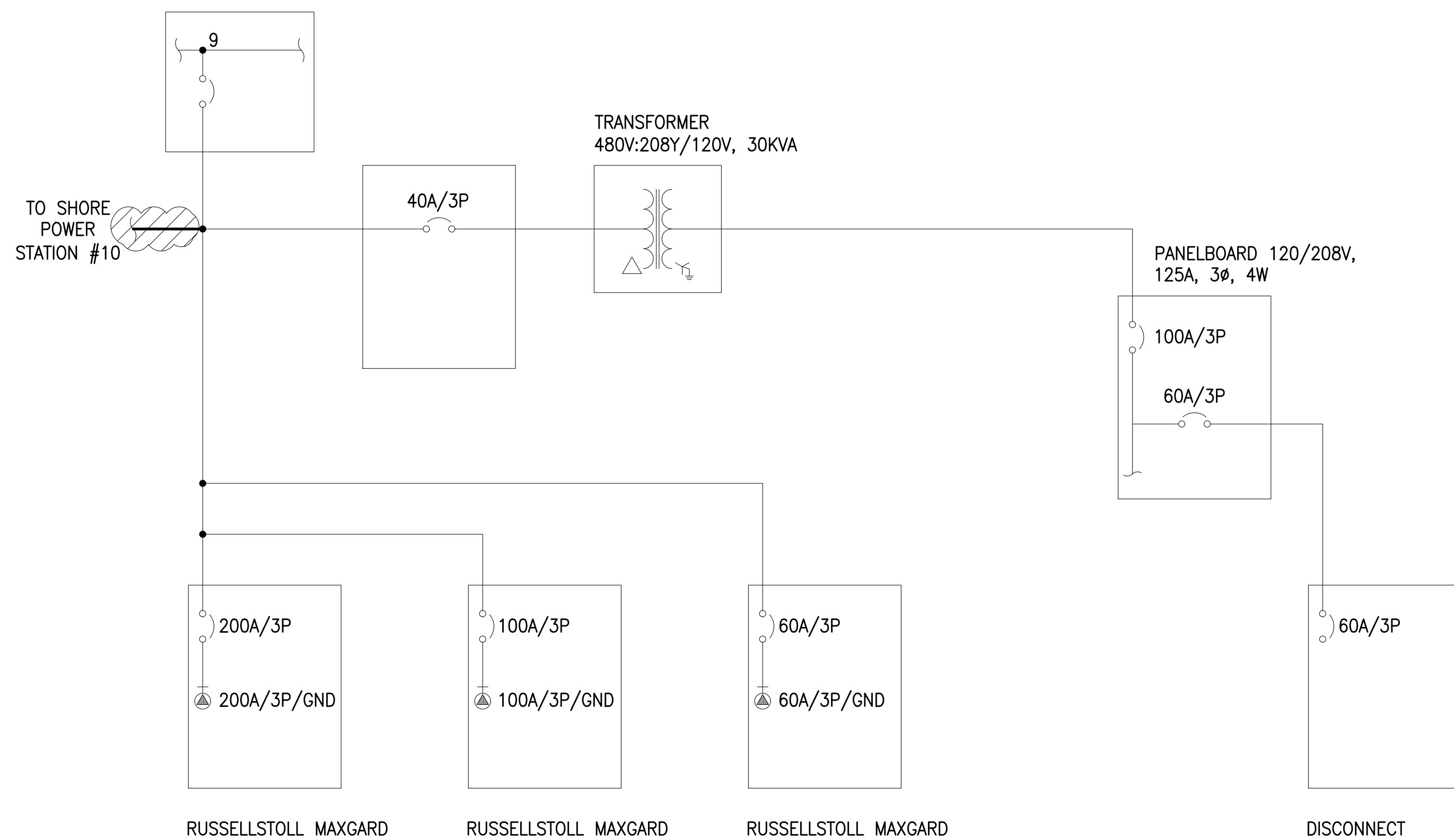


**SHEET NOTES:**

1. ALL DEMOLITION WORK DEPICTED ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #4.
2. DEMOLISH CONDUCTORS IDENTIFIED BACK TO SOURCE. RETAIN CONDUIT FOR REUSE.

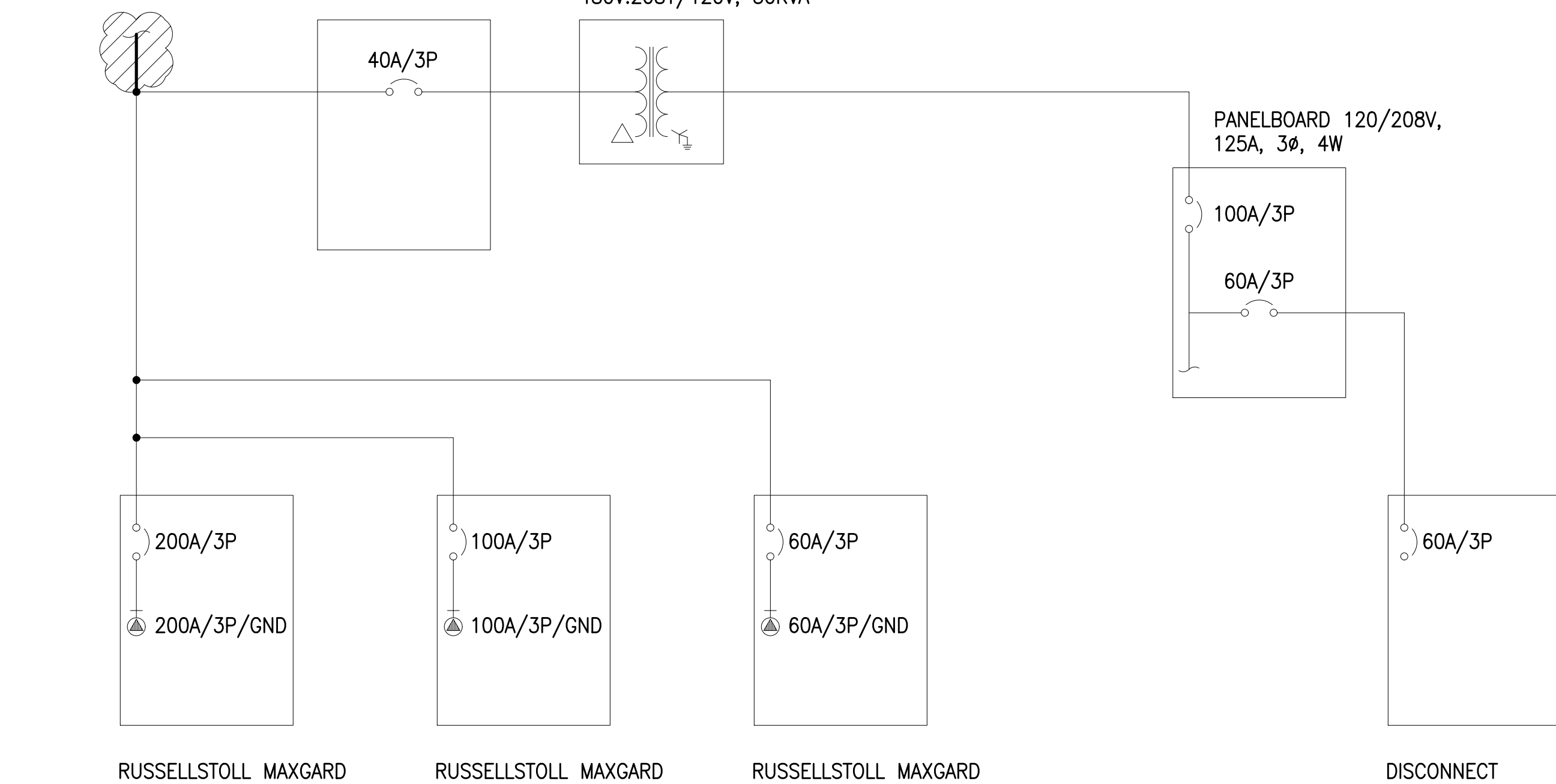
**2 SHORE POWER STATION #8 ONE-LINE DIAGRAM - DEMOLITION**  
E4.5D SCALE:NTS

SB-1 SEE 4/E4.0D



**3 SHORE POWER STATION #9 ONE-LINE DIAGRAM - DEMOLITION**  
E4.5D SCALE:NTS

FROM TAP AT SHORE POWER STATION #9



**4 SHORE POWER STATION #10 ONE-LINE DIAGRAM - DEMOLITION**  
E4.5D SCALE:NTS

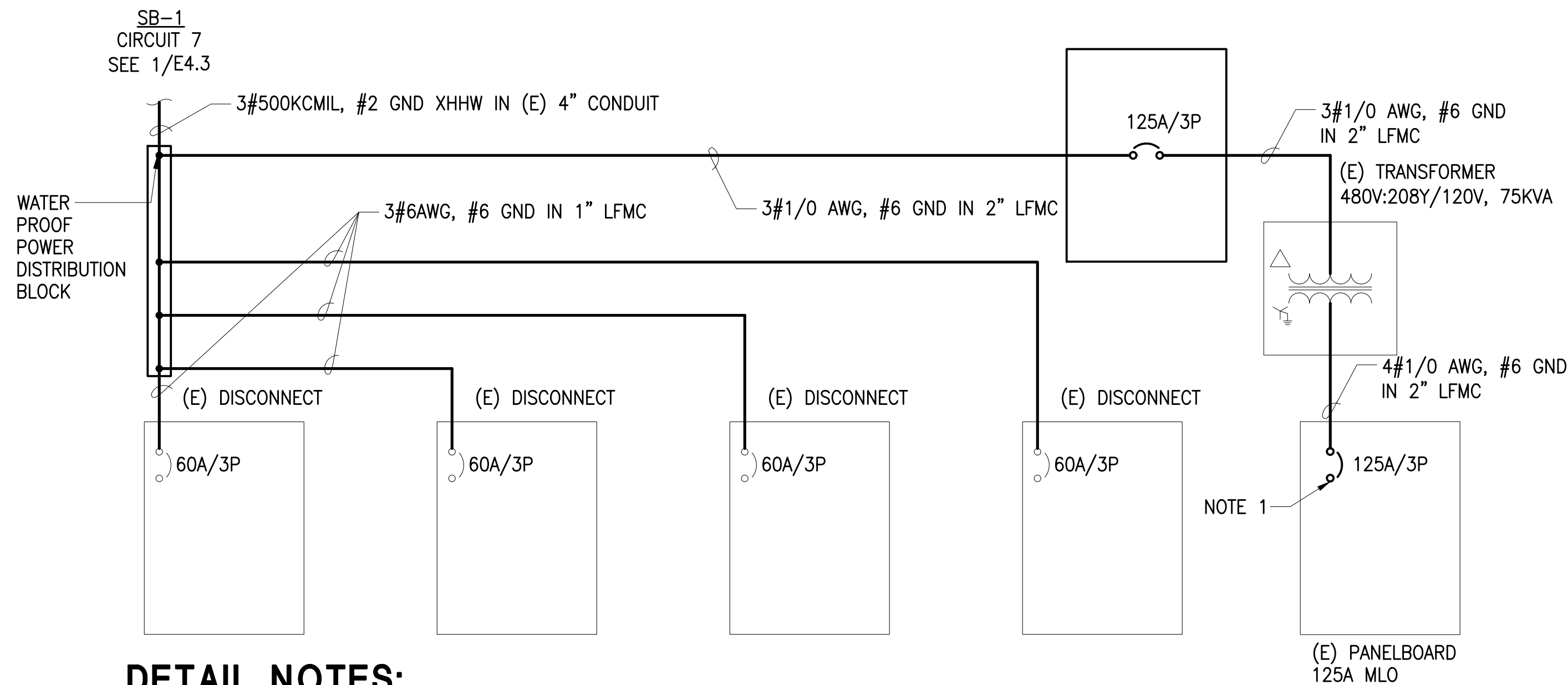
Revisions	
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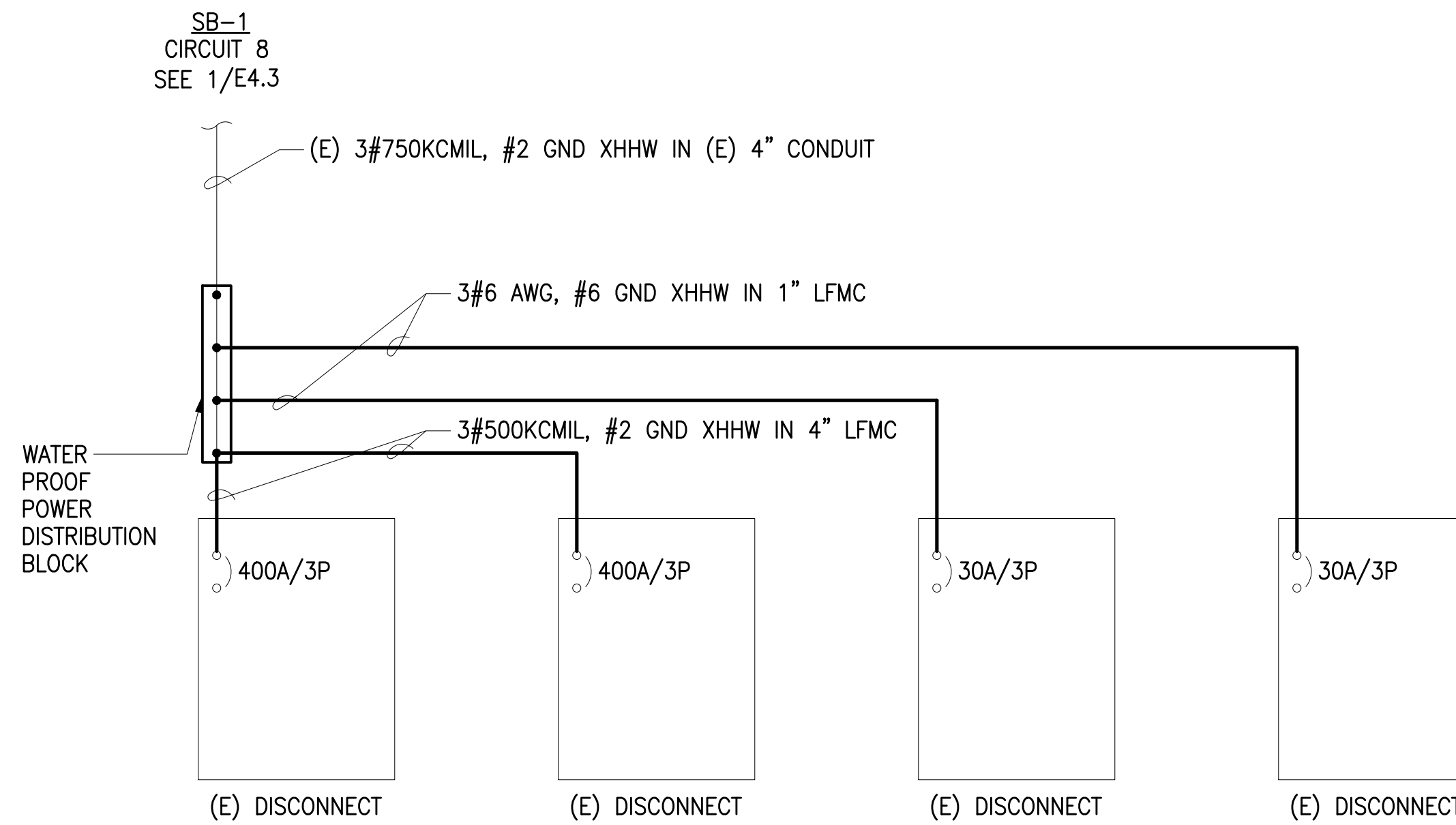
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAMS - ALT. 4 - DEMO**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E4.5D</b>
Of	Sheets



**DETAIL NOTES:**

1. INSTALL BACKFED MAIN CIRCUIT BREAKER.
2. CONNECT NEW FEEDER TO EXISTING EQUIPMENT.
3. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."



**DETAIL NOTES:**

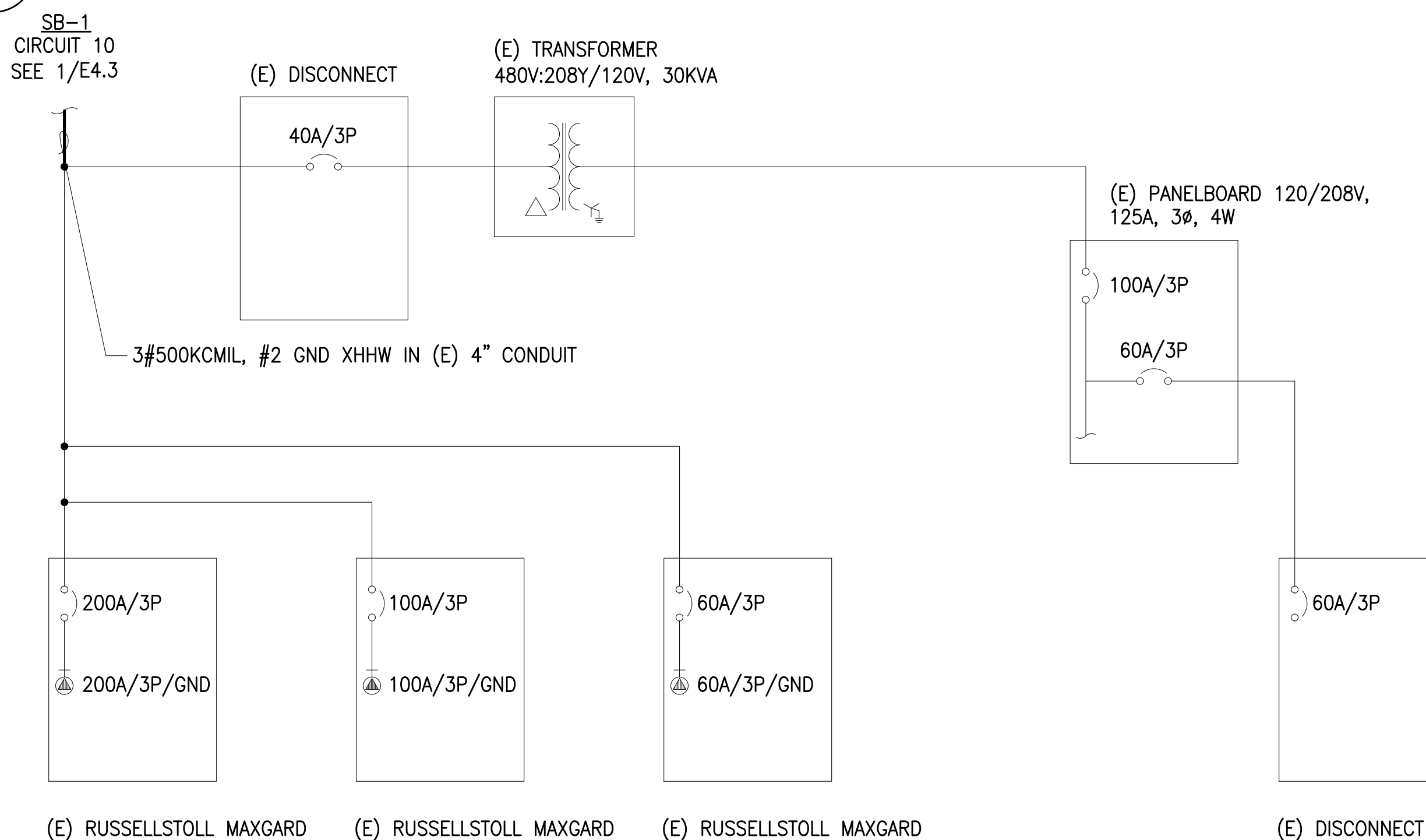
1. CONNECT NEW FEEDERS TO EXISTING EQUIPMENT.
2. INSTALL PLACARD ON ALL EQUIPMENT IN SHORE POWER STATION: "WARNING LIMITED WORKING CLEARANCE. DO NOT OPEN WHILE ENERGIZED."

**1 SHORE POWER STATION #7 ONE-LINE DIAGRAM**

E4.5 SCALE:NTS

**2 SHORE POWER STATION #8 ONE-LINE DIAGRAM**

E4.5 SCALE:NTS



**DETAIL NOTES:**

1. CONNECT NEW FEEDER TO EXISTING EQUIPMENT.
2. INSTALL PLACARD ON EXTERIOR OF SHORE POWER STATION: "SHORE POWER STATION #10 DISCONNECTING MEANS IS SWITCHBOARD SB-1, CIRCUIT BREAKER #10, LOCATED BETWEEN SHORE POWER STATIONS #4 & #5."
3. ALL WIRING IS EXISTING, UNLESS NOTED OTHERWISE.

**3 SHORE POWER STATION #10 ONE-LINE DIAGRAM**

E4.5 SCALE:NTS

**SHEET NOTES:**

1. ALL NEW WORK DEPICTED ON THE THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #4.
2. ALL WIRING IS EXISTING, UNLESS NOTED OTHERWISE.

Revisions	
ISSUED FOR CONSTRUCTION	0

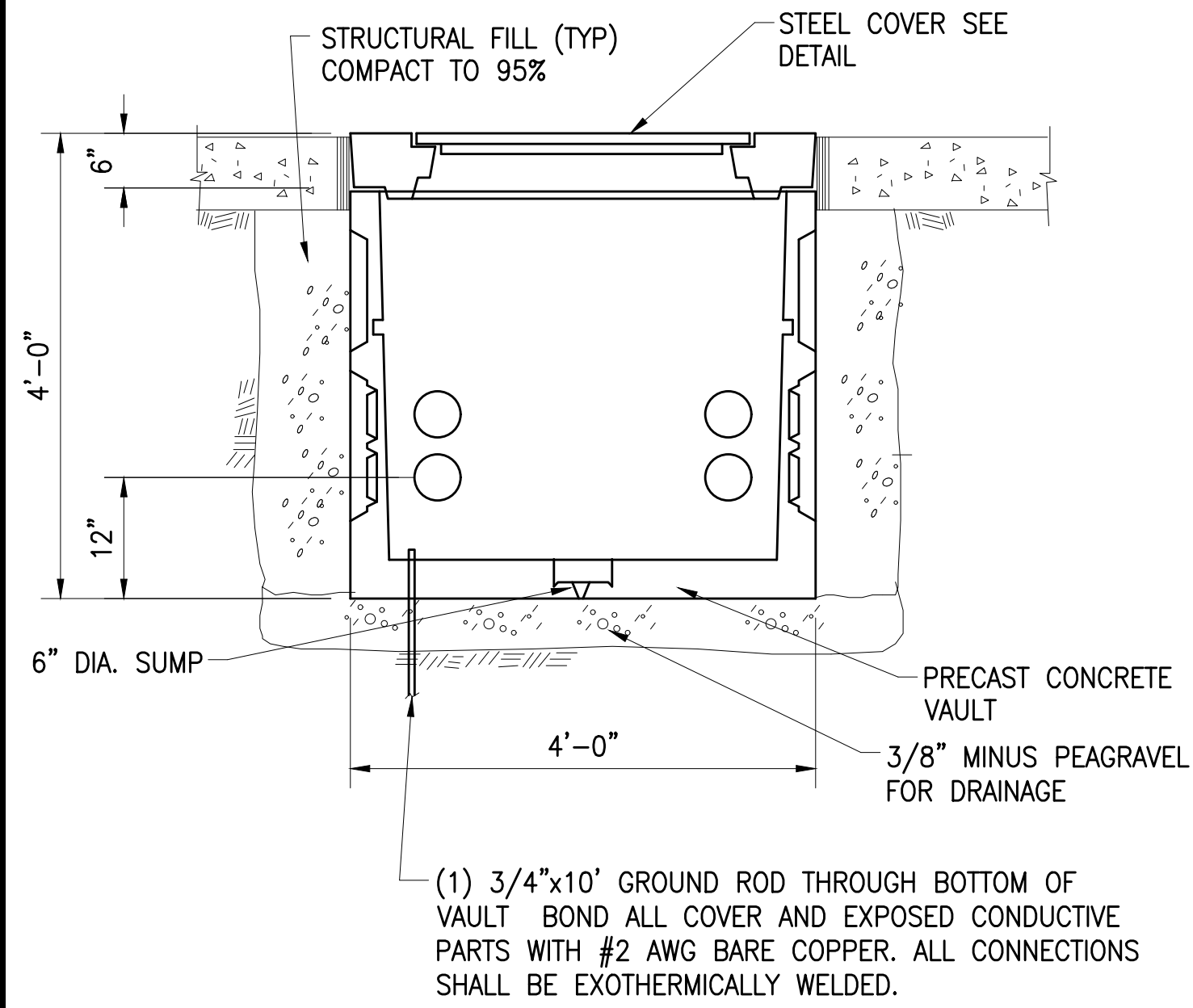
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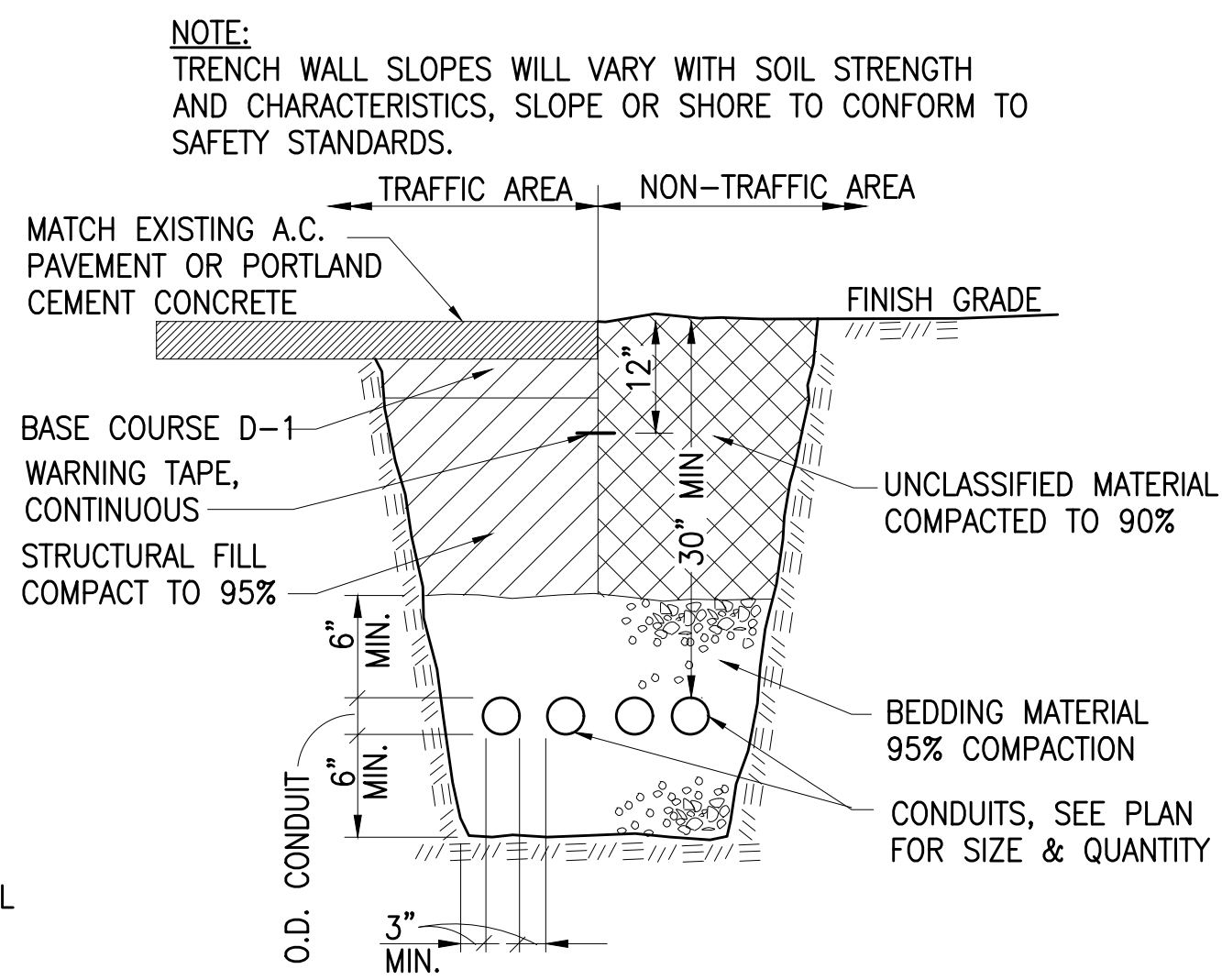
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**480V ONE-LINE DIAGRAMS - ALT. 4**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E4.5</b>
Of	Sheets

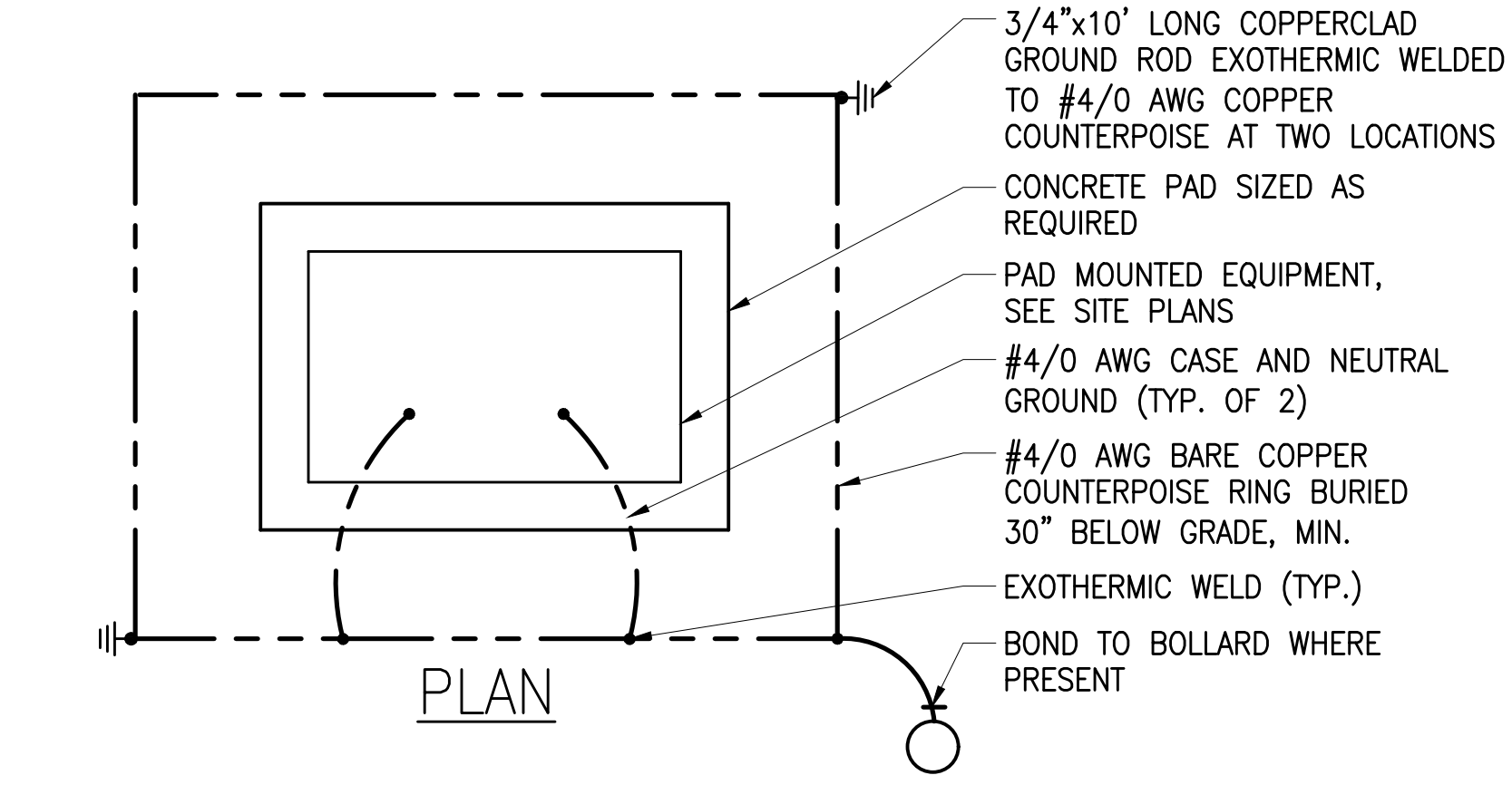




**1 TYPICAL MANHOLE DETAIL**  
E5.0 SCALE:NTS

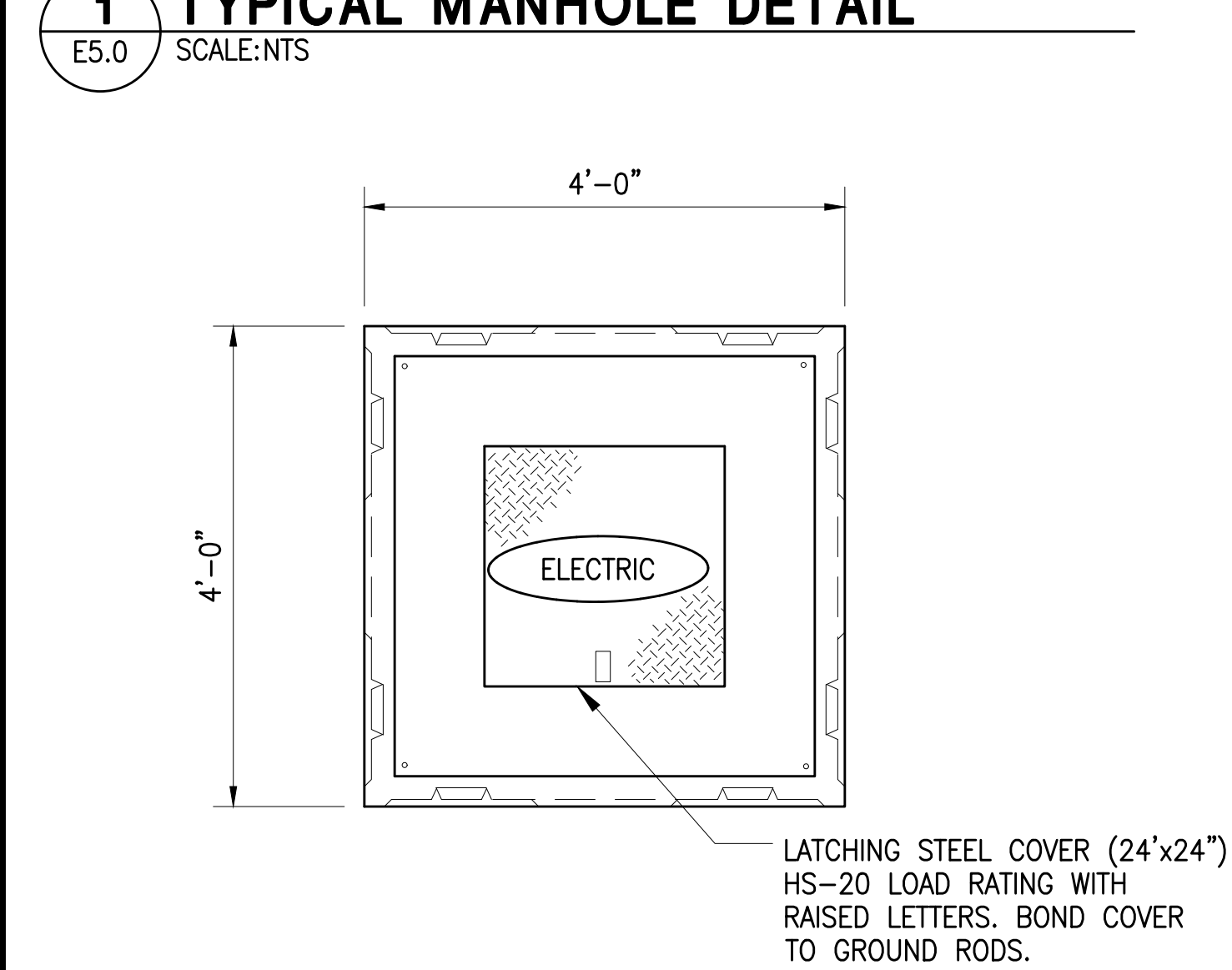


**2 TYPICAL TRENCH DETAIL**  
E5.0 SCALE:NTS

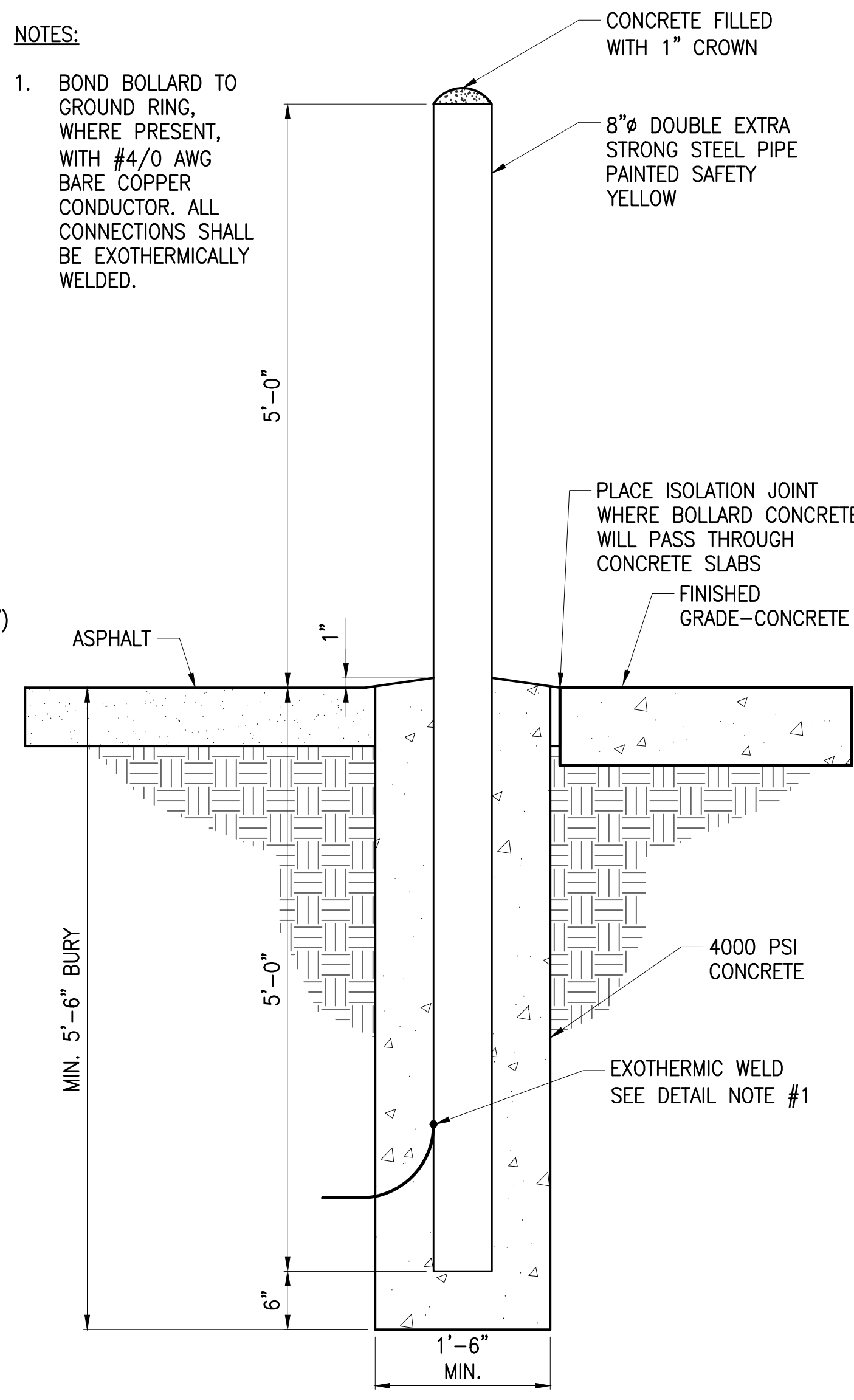


**3 TYPICAL PAD MOUNT EQUIPMENT GROUNDING DETAIL**  
E5.0 SCALE:NTS

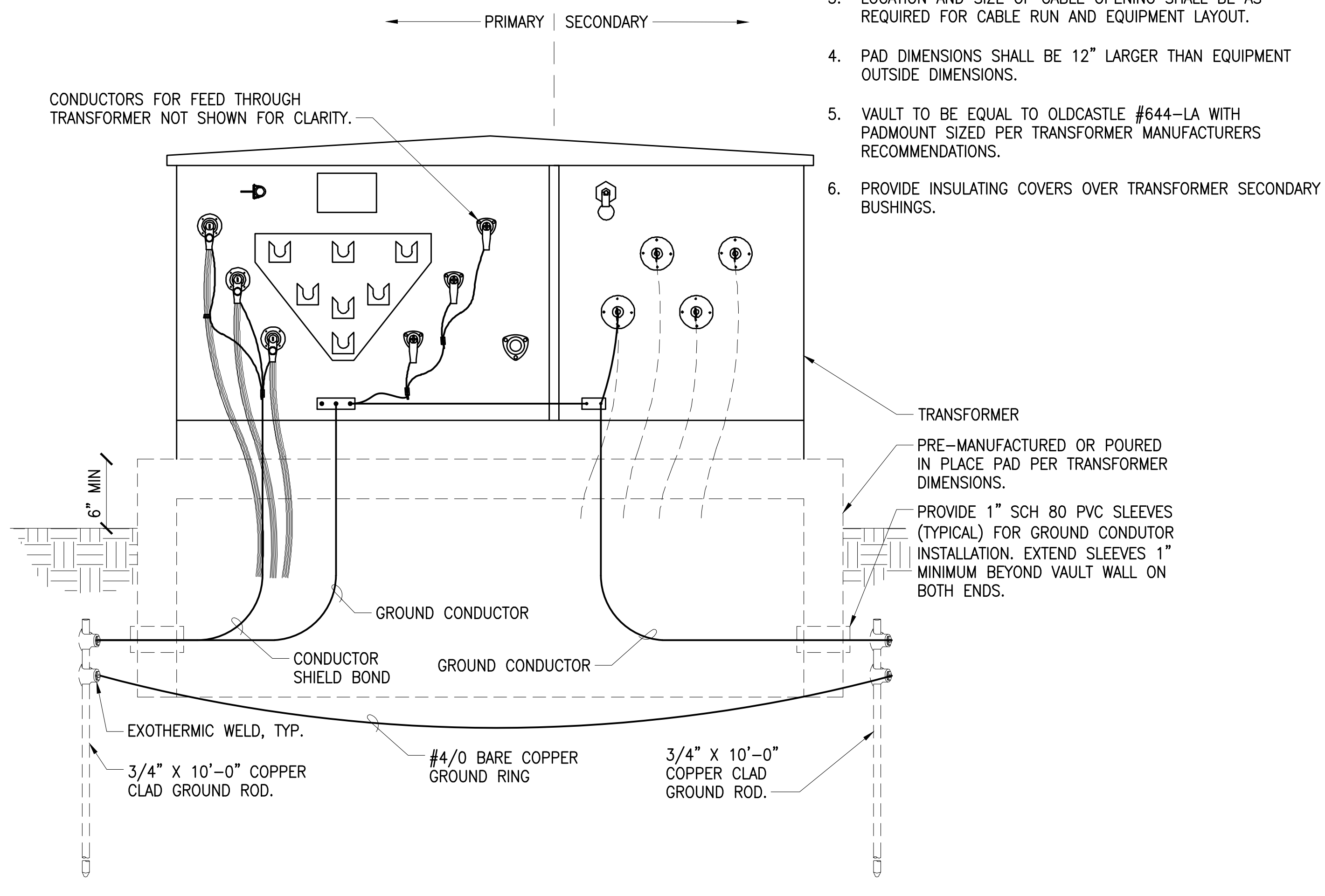
- SHEET NOTES:**
- SEE STRUCTURAL FOR EQUIPMENT PAD SPECIFICATIONS.
  - WHEN TRENCHING IN AREAS WITH PORTLAND CEMENT CONCRETE, MATCH EXISTING REINFORCING SIZE AND TYPE. DOWEL AND EPOXY INTO EXISTING SLAB AT FACE OF SAW CUT. MINIMUM SIZE AND SPACING SHALL BE #4 REINFORCEMENT @ 18" OC EACH WAY. USE 4000 PSI CONCRETE MATCH EXISTING THICKNESS FINISH TO MATCH EXISTING.
  - WHEN TRENCHING IN AREAS WITH AC PAVEMENT MATCH EXISTING THICKNESS, 2" MINIMUM. TACK COAT ALL MATCHING SURFACES.
  - BOND BOLLARDS TO EQUIPMENT GROUND RING WITH #4/0 AWG WHERE PRESENT.



**4 TYPICAL MANHOLE COVER DETAIL**  
E5.0 SCALE:NTS



**5 TYPICAL BOLLARD DETAIL**  
E5.0 SCALE:NTS



**6 PAD MOUNT TRANSFORMER ELEVATION VIEW**  
E5.0 SCALE:NTS

- NOTES:**
- PAD ASSEMBLIES INCLUDE SITE PREPARATION, BEDDING, AND DRAINAGE.
  - EQUIPMENT SHALL BE SECURED TO PAD IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
  - LOCATION AND SIZE OF CABLE OPENING SHALL BE AS REQUIRED FOR CABLE RUN AND EQUIPMENT LAYOUT.
  - PAD DIMENSIONS SHALL BE 12" LARGER THAN EQUIPMENT OUTSIDE DIMENSIONS.
  - VAULT TO BE EQUAL TO OLDCASTLE #644-LA WITH PADMOUNT SIZED PER TRANSFORMER MANUFACTURERS RECOMMENDATIONS.
  - PROVIDE INSULATING COVERS OVER TRANSFORMER SECONDARY BUSHINGS.

Revisions	
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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**ELECTRICAL DETAILS**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E5.0</b>
Of	Sheets



**SHEET NOTES:**

1. ALL NEW WORK DEPICTED ON THE THIS SHEET IS INCLUDED IN BASE BID.
2. THE 34.5KV RISER POLE DETAILS INCLUDED ON THE THIS SHEET WERE RECEIVED FROM KPU ON JULY 17, 2018 AND ARE PROVIDE FOR REFERENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE MOST UP TO DATE EDITION OF KPU'S CONSTRUCTION STANDARDS AND COMPLYING WITH ALL REQUIREMENTS THEREIN.

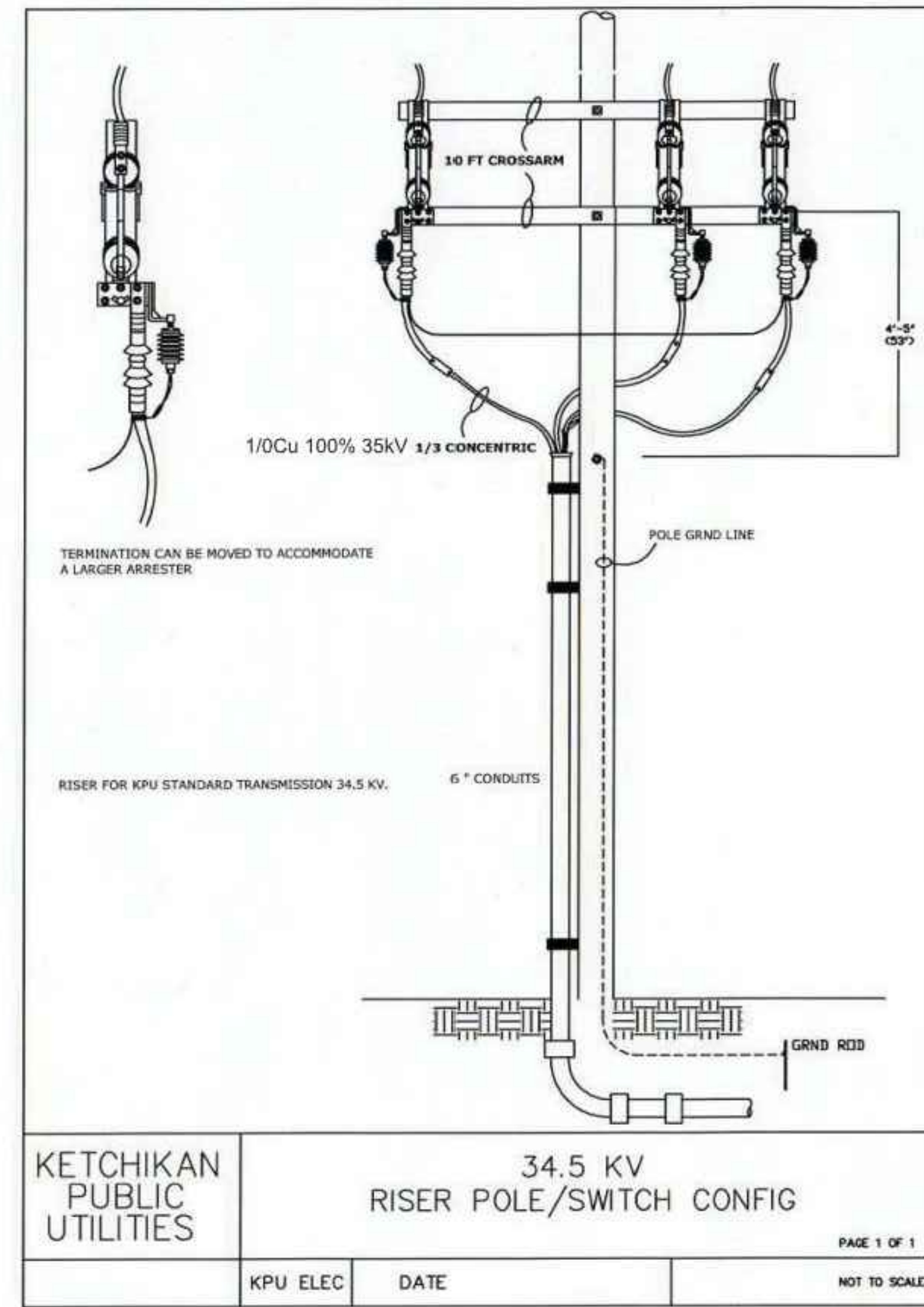
Revisions	
ISSUED FOR CONSTRUCTION	0

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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**ELECTRICAL DETAILS-REFERENCE DRAWING**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>E5.1</b>
Of	Sheets



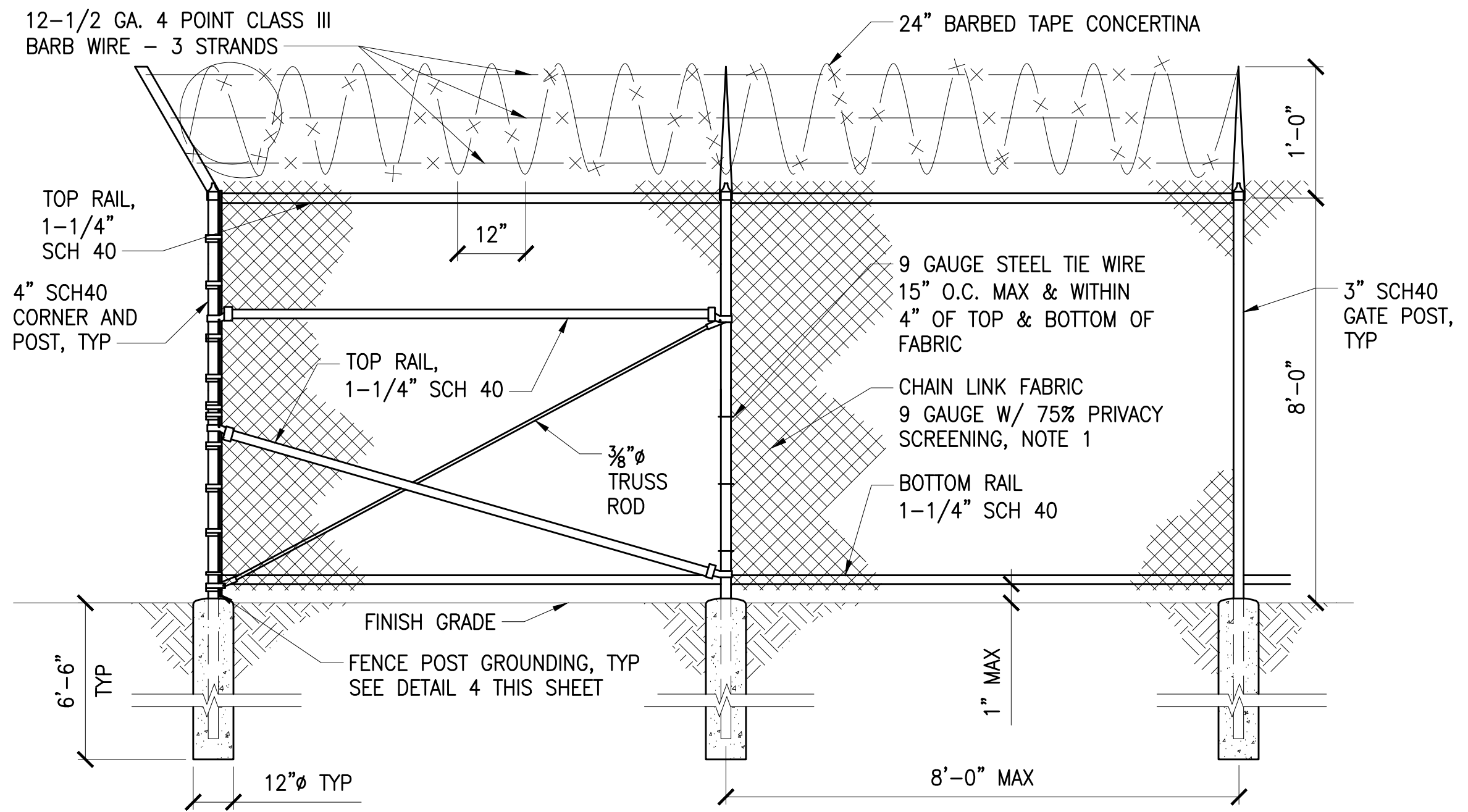
KETCHIKAN PUBLIC UTILITIES	34.5 KV RISER POLE/SWITCH CONFIG		PAGE 1 OF 1
KPU ELEC	DATE	NOT TO SCALE	

MATERIAL LIST			
ITEM	KPU NUMBER	QTY	DESCRIPTION
	17173.90	3	Termination 1/0Cu 3M Cold Shrink 7664-S-8
	17897.10	3	SOLID BLADE SWITCH (S&C cat#4943R9-E-D2-J)
	11612	3	POWER TAP GRIP (UTILCO cat#SCH-397)
			INSULATED JUMPER 1/0Cu (TO LENGTH) (use-2 or RHH or RHW-2 INSULATION)
	10828	2	BOLT MACHINE 5/8" x 14" (or as reqd)
	18358	4	WASHER, 2 1/4"x2 1/4"x2 1/4"x 9/16" hole
	10354	2	CROSS ARM, LIGHT 3 3/4"x4 3/4"x10'-0" (HUGHES BRO. TYPE 5 DRILL PATTERN)
		3	KELLEMS GRIP (HUBBELL cat#02206013)
	12052		CONDUIT 6" SCH 80 (as req)
	12052.30		CONDUIT 6" 90 ELBOW (as req)
	16388		STAND-OFF BRACKETS 12" (2 PER SECTION CONDUIT)
	10458.00	3	LIGHTNING ARRESTER 36KV (Cooper #URS3614-0A1A-0A1A)
	18220.10	3	1/2" GROUNDED BRAID WITH EYELETS (ELECTRIC MOTION cat#EM12435)
	11613	3	#8-2/0 STR CU ARRESTER LINE CONNECTORS (HUBBELL/FARGO cat#GH-2010)
	NOI		UNDER GROUND CABLE
	NOI	3	BRONZE TAP LUG (T-BOLTS) 1/0-500 (ANDERSON cat#TLD-S2-L)
	13114	3	LUGS-500 1/2"BOLT (T&B HOMAC cat#AL-500-NTN)
	16566	1	GROUND ROD (JOSLYN cat#J8338)
	11526.00	3	PLATE PARALLEL CIRCUIT CU BUS (HOMAC BCN 4670-1S)
	10461.00	3	ARRESTER FLAG BRACKET P/L 600AMP (HOMAC CEA2S375-90)
		3	DISCONNECT SW LEAD COVER
		2	Conduit 2" SCH 80 (as req) Control Power and Comms
			Conduit 2" 90 Elbow (as req) Power and Comms

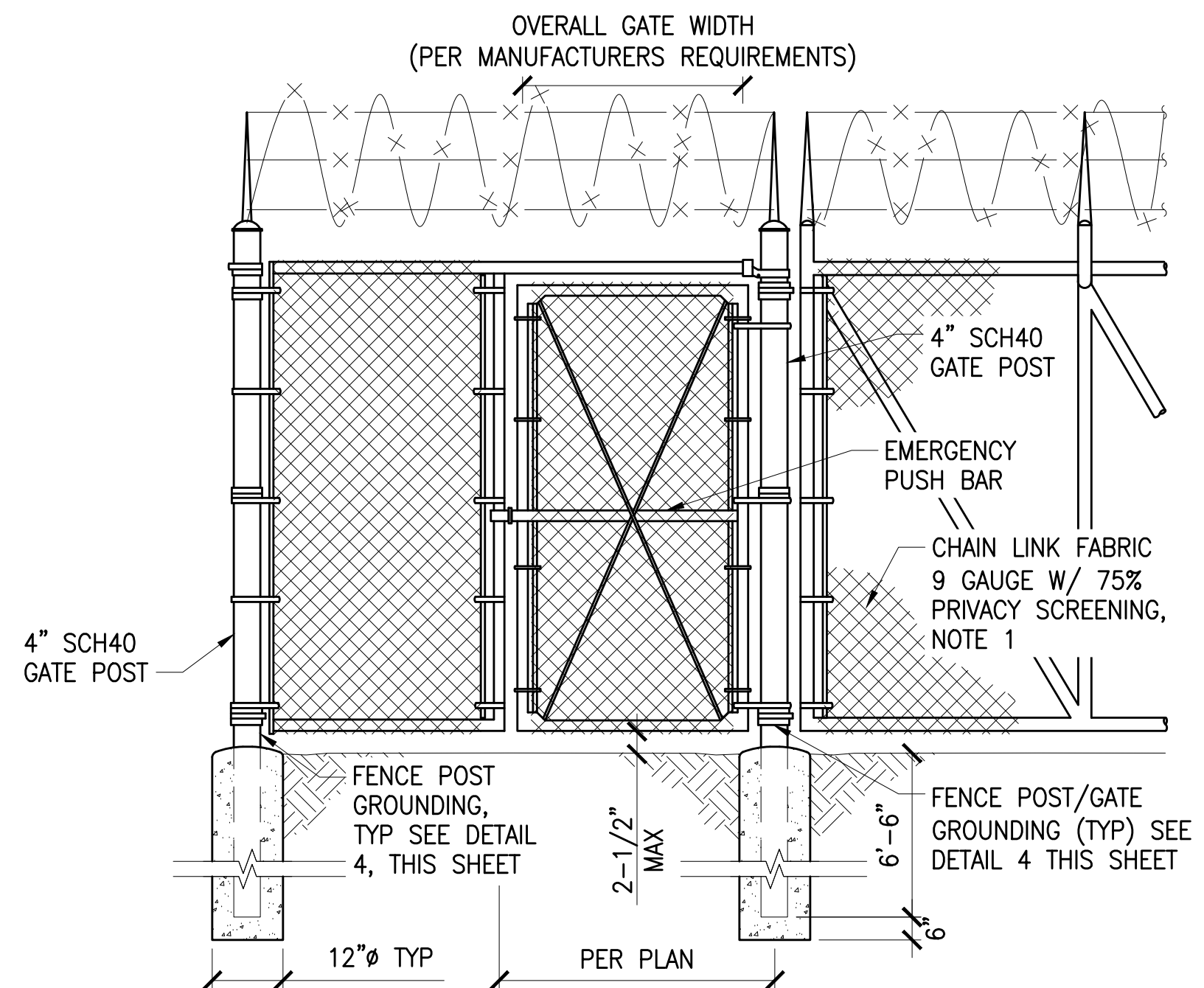
NOTE: Conduit for control power and communications is not shown. Install but do not land jumpers on line. Contact KPU Electric for questions or specific parts information.

KETCHIKAN PUBLIC UTILITIES	MATERIAL SHEET 34.5 KV RISER POLE		PAGE 2 OF 2
KPU ELEC	DATE	NOT TO SCALE	

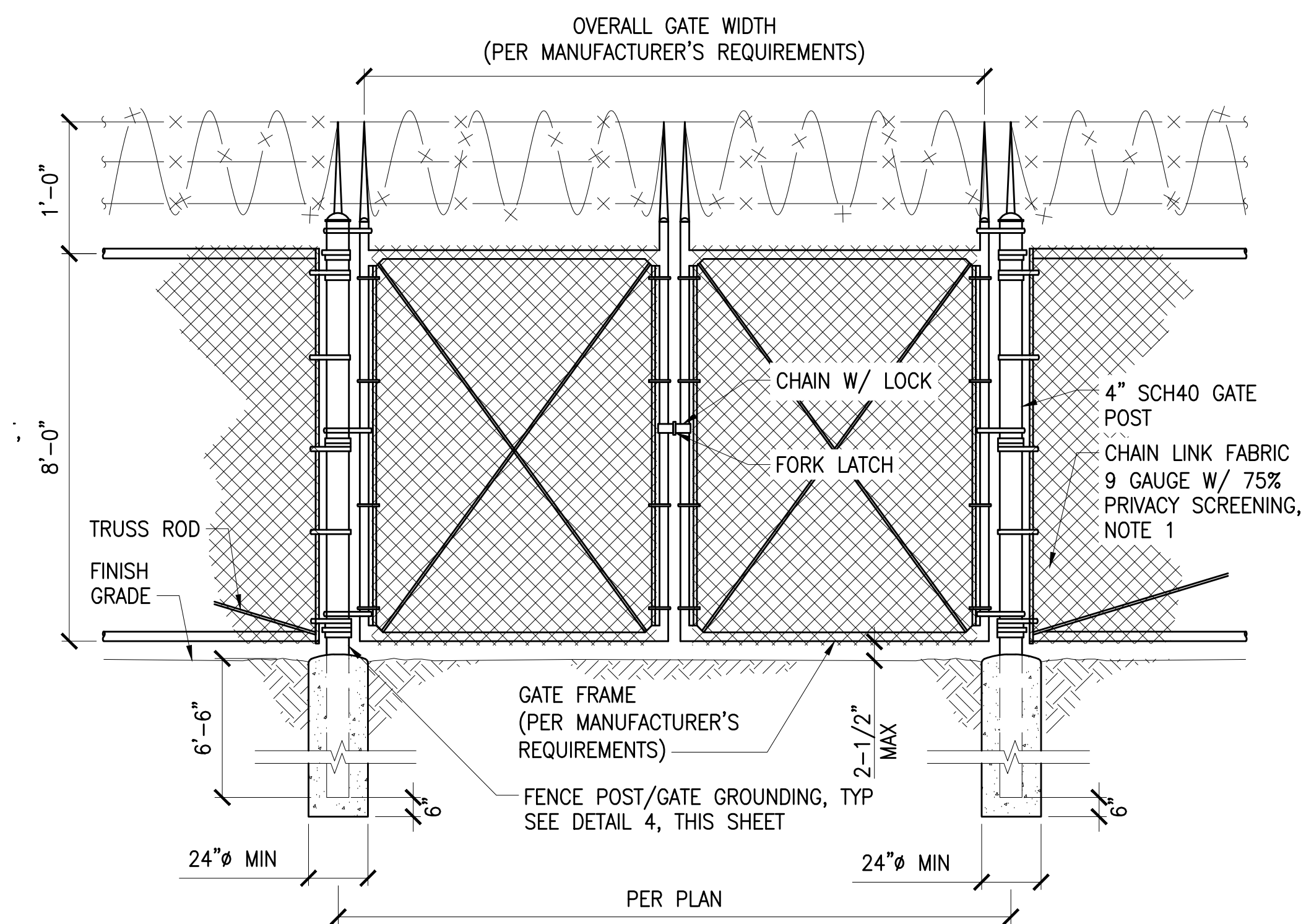




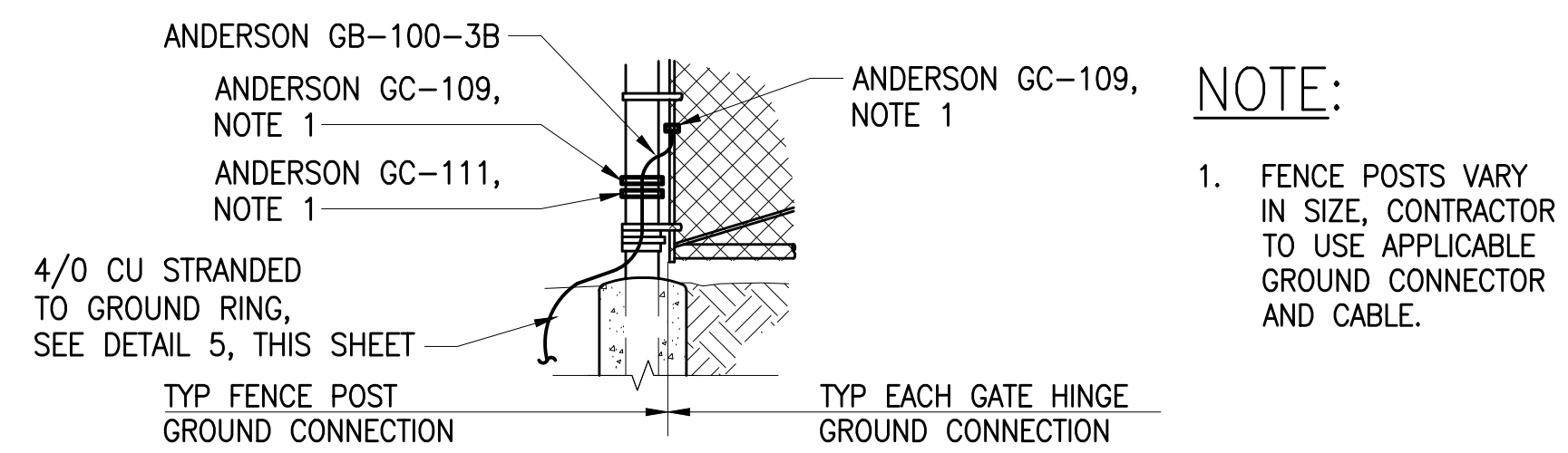
**1** TYPICAL SECURITY FENCE DETAIL  
C5.0 SCALE:NTS



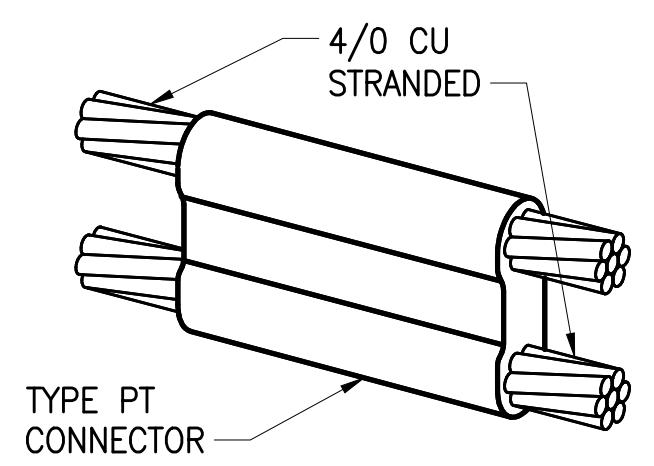
**2** PUSH BAR MAN GATE DETAIL  
C5.0 SCALE:NTS



**3** DOUBLE SWING GATE DETAIL  
C5.0 SCALE:NTS



**4** TYPICAL FENCE POST/GATE GROUND CONNECTION DETAIL  
C5.0 SCALE:NTS



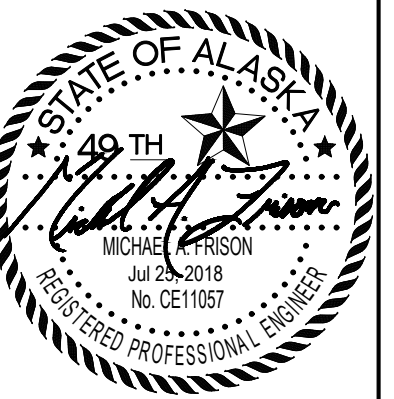
**5** CADWELD TYPE PT CONNECTOR  
C5.0 SCALE:NTS

**SHEET NOTES:**

1. PRIVACY SCREENING AND MESH SHALL BE MASTER HALCO SLATMASTER FENCE SYSTEM, OR APPROVED EQUAL. LEVEL OF SCREENING SHALL BE 75% PRIVACY SCREENING NOT SHOWN FOR CLARITY.
2. BOND ALL PORTIONS OF THE FENCE TO THE GROUNDING SYSTEM IN ACCORDANCE WITH NESC.

Revisions	
ISSUED FOR CONSTRUCTION	0

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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**CIVIL DETAILS**

Date	07/25/2018
Design	AJBV
Drawn	IMA
Job No.	181107
Sheet No.	<b>C5.0</b>
Of	Sheets



**STRUCTURAL GENERAL NOTES:**

DESIGN CODE: IBC 2012

LOADING CONDITIONS  
THE FOLLOWING LOAD CONDITIONS IN ACCORDANCE WITH ASCE 7-10 WHERE USED IN THE DESIGN OF THIS FACILITY.

- 1. RISK CATEGORY:  
ALL COMPONENTS..... II
- 2. LOAD COMBINATIONS:  
BASIS OF DESIGN..... ALLOWABLE STRESS
- 3. DEAD LOAD:  
EQUIPMENT..... SELF-WEIGHT
- 4. LIVE LOAD: (NOT APPLICABLE)

- 5. SNOW LOAD:  
GROUND SNOW LOAD..... 70 PSF  
IMPORTANCE FACTOR,  $I_s$ ..... 1.0  
EXPOSURE FACTOR,  $C_e$ ..... 1.0  
THERMAL COEFFICIENT,  $C_t$ ..... 1.0  
FLAT ROOF SNOW LOAD,  $P_f$ ..... 49 PSF

6. ATMOSPHERIC ICE LOAD: NOT APPLICABLE

- 7. WIND LOAD:  
BASIC WIND SPEED..... 140 MPH  
EXPOSURE..... D  
DIRECTIONALITY FACTOR,  $K_d$ ..... 0.85  
TOPOGRAPHIC FACTOR,  $K_{zt}$ ..... 1.00  
GUST EFFECT FACTOR,  $G$ ..... 0.85

- 8. SEISMIC LOAD:  
SITE SPECTRAL RESPONSE - SHORT,  $S_s$ ..... 0.302G  
SITE SPECTRAL RESPONSE - 1 SEC,  $S_1$ ..... 0.247G  
SITE CLASS..... "D"  
SEISMIC DESIGN CATEGORY..... "D"  
DESIGN SPECTRAL ACCELERATION - SHORT,  $S_{DS}$ ..... 0.314G  
DESIGN SPECTRAL ACCELERATION - 1 SEC,  $S_{D1}$ ..... 0.314G

ANALYSIS PROCEDURE..... ASCE 7-10 Ch. 13 - "NONSTRUCTURAL COMPONENTS"

- IMPORTANCE FACTOR,  $I_p$ ..... 1.0
- TRANSFORMERS AND METERING CABINET:  
COMPONENT AMPLIFICATION FACTOR,  $\alpha_p$ ..... 1.0  
COMPONENT RESPONSE MODIFICATION FACTOR,  $R_p$ ..... 2.5  
COMPONENT OVERSTRENGTH FACTOR,  $\alpha_o$ ..... 1.5

- SWITCHGEAR:  
COMPONENT AMPLIFICATION FACTOR,  $\alpha_p$ ..... 2.5  
COMPONENT RESPONSE MODIFICATION FACTOR,  $R_p$ ..... 6.0  
COMPONENT OVERSTRENGTH FACTOR,  $\alpha_o$ ..... 1.5

SEISMIC DESIGN FORCE,  $F_p$ ..... VARIES PER PIECE OF EQUIPMENT

- CONCURRENT VERTICAL FORCE,  $E_v$ .....  $\pm 0.20 * S_{DS} * W$
- COMPONENT WEIGHT,  $W$ ..... DL + 20% SNOW

STRUCTURAL STEEL

STRUCTURAL STEEL SHALL CONFORM TO ASTM AND AISC SPECIFICATIONS AS FOLLOWS:

- ANGLES..... ASTM A240 SS316
- PLATES..... ASTM A240 SS316

PROVIDE MILL CERTIFICATIONS WITH ALL STEEL MATERIAL.

FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL BEAMS SHALL BE ERECTED WITH THE NATURAL CAMBER UPWARDS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INCLUDE PIECE MARKS, ERECTION PLANS, AND DETAILS WITH CORRESPONDING DESIGN DOCUMENT INDICATORS.

STEEL SHALL BE CLEAN AND HAVE A UNIFORM SURFACE. GOUGES SHALL BE FILLED AND GROUND SMOOTH. SCALE AND MILL MARKS SHALL BE REMOVED. BOLTS EXPOSED IN FINISH WORK SHALL BE INSTALLED WITH THE HEADS ON THE VISIBLE SIDE OF THE CONNECTION.

STRUCTURAL STEEL WELDING

ALL STRUCTURAL STEEL WELDS SHALL BE PRE-QUALIFIED AND CONFORM TO AISC AND AWS D1.6.

- WELDERS..... CERTIFIED FOR ROD AND POSITION
- FILLER MATERIAL..... 316 STAINLESS STEEL

WELDS SHALL BE FREE OF SLAG, SPATTER, AND GOUGES. SHARP EDGES SHALL BE GROUND SMOOTH.

DO NOT ALLOW ANY CARBON STEEL OR FERROUS METAL CONTACT DURING FABRICATION OR CLEANING

REINFORCING STEEL

ALL REINFORCING STEEL SHALL CONFORM TO ACI AND ASTM SPECIFICATIONS AS FOLLOWS:

- BARS, SHOP BENT ONLY..... A615, GRADE 60
- BARS, FIELD BENT..... A706, GRADE 60
- BARS, WELDED..... A706, GRADE 60

REINFORCED CONCRETE

ALL REINFORCED CONCRETE SHALL BE IN ACCORDANCE WITH ACI AND ASTM SPECIFICATIONS AS FOLLOWS:

STRUCTURAL CONCRETE (FOR TYPICAL USE UNLESS NOTED OTHERWISE)

- COMPRESSIVE STRENGTH..... ASTM C39; 4,500 PSI AT 28 DAYS
- AGGREGATE..... ASTM C33; 1" MAX, NORMAL WEIGHT
- CEMENT..... ASTM C150; TYPE I, II, OR III
- WATER..... ASTM C94 POTABLE
- WATER/CEMENT RATIO..... NOT TO EXCEED 0.45 BY WEIGHT
- AIR ENTRAINMENT..... ASTM C260; 3½% TO 6½% BY VOLUME
- STEEL REINFORCEMENT..... ASTM A615, GR60, SHOP BENT  
ASTM A706, GR60, FIELD BENT  
GR40 PERMISSIBLE FOR #3 BARS

CONTRACTOR SHALL SUBMIT MIX DESIGNS FOR REVIEW BY ENGINEER PRIOR TO MATERIAL PURCHASE.

IF AMBIENT TEMPERATURE FALLS BELOW 40°F, PROVIDE COLD WEATHER CONCRETE PLACEMENT AND CURING PLAN TO OWNER.

ALL CONCRETE CAST AGAINST EXISTING OR RECENTLY CAST CONCRETE SHALL BE PRECEDED BY ROUGHENING EXISTING CONCRETE SURFACE TO 1/4" AMPLITUDE, CLEANING AND COATING WITH APPROVED BONDING AGENT (DAYTON SUPERIOR J40) IN ACCORDANCE WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS.

CONCRETE REINFORCEMENT COVER

MINIMUM CONCRETE COVER SHALL BE AS FOLLOWS:

- CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH..... 3 INCHES
- EXPOSED TO EARTH OR WEATHER,  $\leq \#5$ ..... 1½ INCHES
- EXPOSED TO EARTH OR WEATHER,  $> \#5$ ..... 2 INCHES

DEFERRED SUBMITTALS

THE FOLLOWING ITEMS ARE DESIGNED OR DETAILED BY OTHERS USING THE CRITERIA IN THE DESIGN DOCUMENTS AND DATA SUBMITTED BY SUPPLIERS, BUT ARE NOT INCLUDED THE DESIGN DRAWINGS, AND ARE TO BE SUBMITTED TO THE ENGINEER PRIOR TO FABRICATION:

- 1. CONCRETE FOUNDATIONS FOR NEW EQUIPMENT
- 2. CONCRETE MIX DESIGN
- 3. CONCRETE REINFORCEMENT SHOP DRAWINGS
- 4. ANCHOR ROD LAYOUT AND MATERIAL DATA

CONTRACTOR NOTES

THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES AND STRUCTURES AFFECTING THE WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND WHAT IS SHOWN IN THE CONTRACT DOCUMENTS WHICH WILL ADVERSELY AFFECT THE WORK.

THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES AND STRUCTURES AFFECTING THE WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND WHAT IS SHOWN IN THE CONTRACT DOCUMENTS WHICH WILL ADVERSELY AFFECT THE WORK.

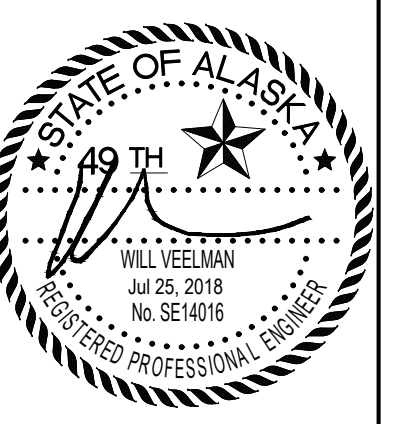
THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING REQUIRED FOR THE INSTALLATION OF ALL COMPONENTS OF THE CONTRACT.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND THE METHODS, TECHNIQUES AND SEQUENCES OF PROCEDURES REQUIRED TO PERFORM THE WORK. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD.

THESE DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO THE REVIEW AND APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD.

Revisions	
ISSUED FOR CONSTRUCTION	0

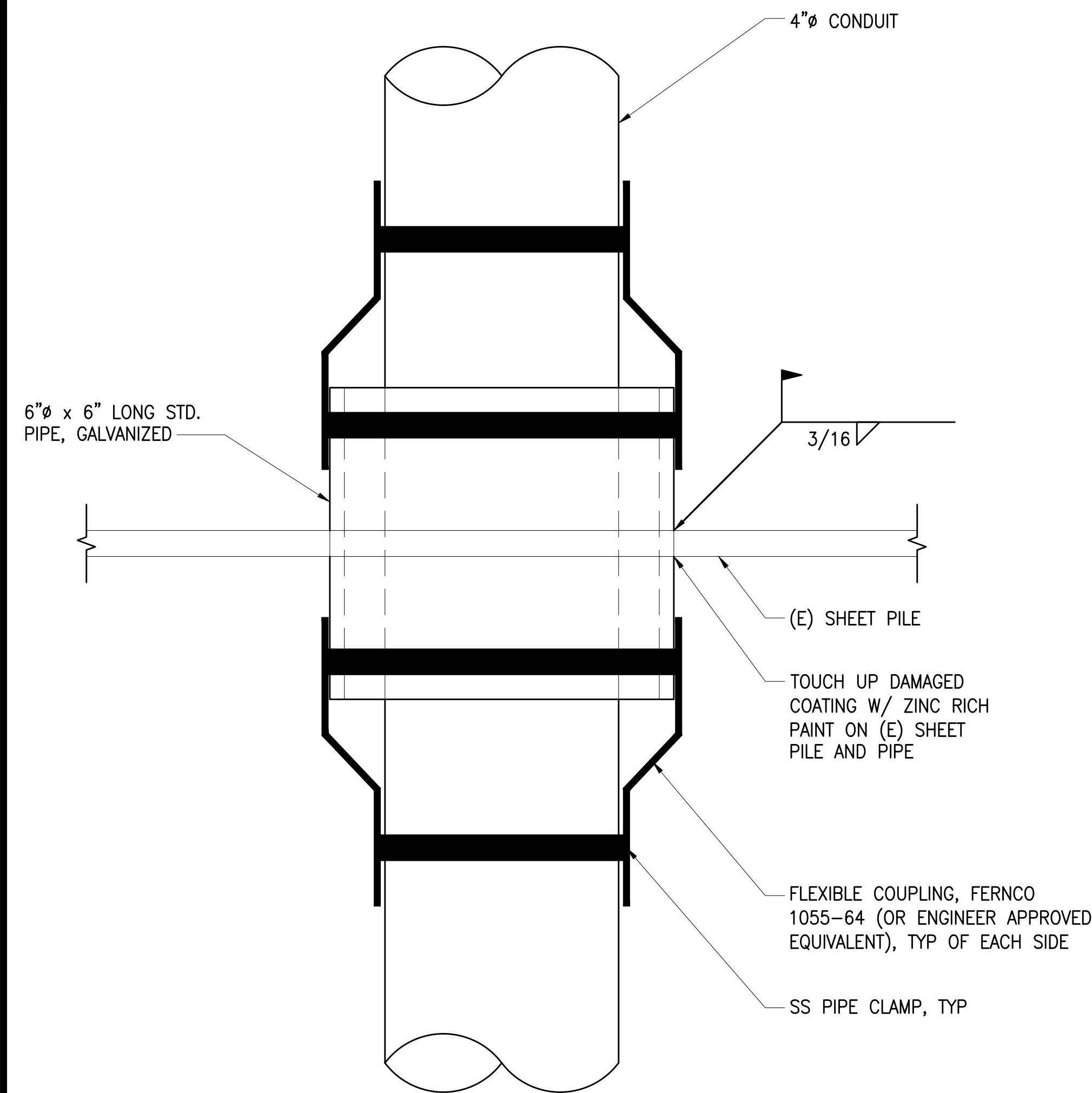
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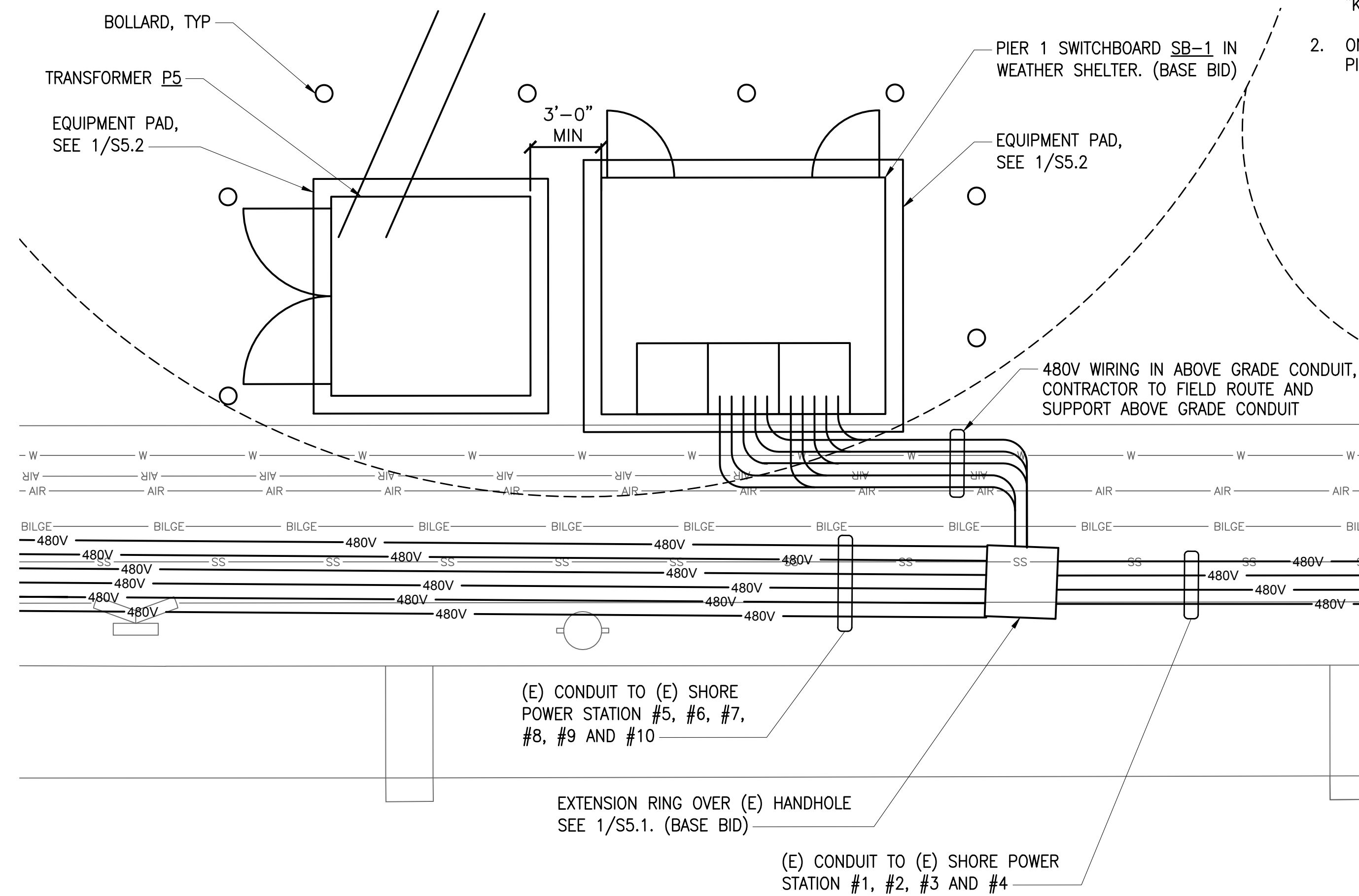
**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**STRUCTURAL NOTES**

Date	07/25/2018
Design	JMZ
Drawn	JMZ
Job No.	181107
Sheet No.	<b>S0.0</b>
Of	Sheets





**1** SHEET PILE PENETRATION DETAIL  
S5.0 SCALE:NTS



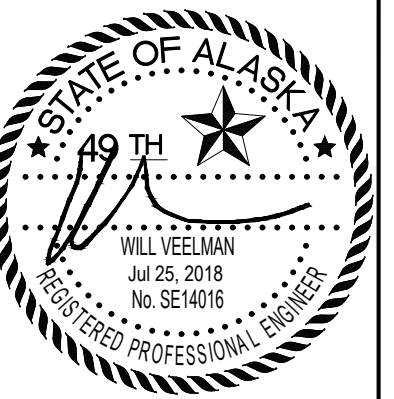
**2** ENLARGED SITE PLAN - TRANSFORMER P5 & SWITCHBOARD SB-1  
S5.0 SCALE:NTS

**SHEET NOTES:**

1. ALIGN PIPE SLEEVE AT MID-POINT OF INDIVIDUAL SHEET PILE SHEETS. DO NOT CUT SHEET PILES AT "KNUCKLE".
2. ONLY ONE PENETRATION PER INDIVIDUAL SHEET PILE.

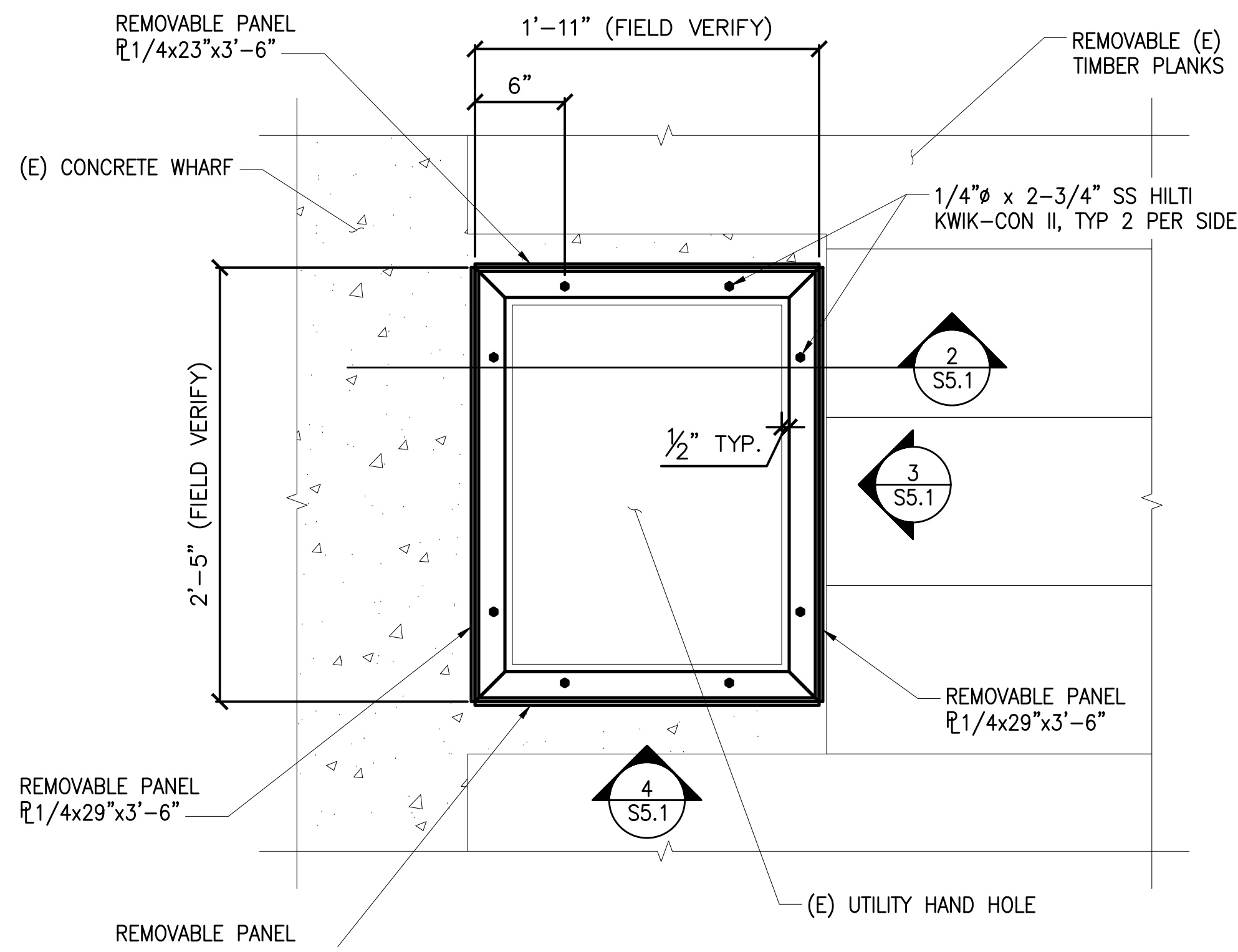
Revisions	
ISSUED FOR CONSTRUCTION	0

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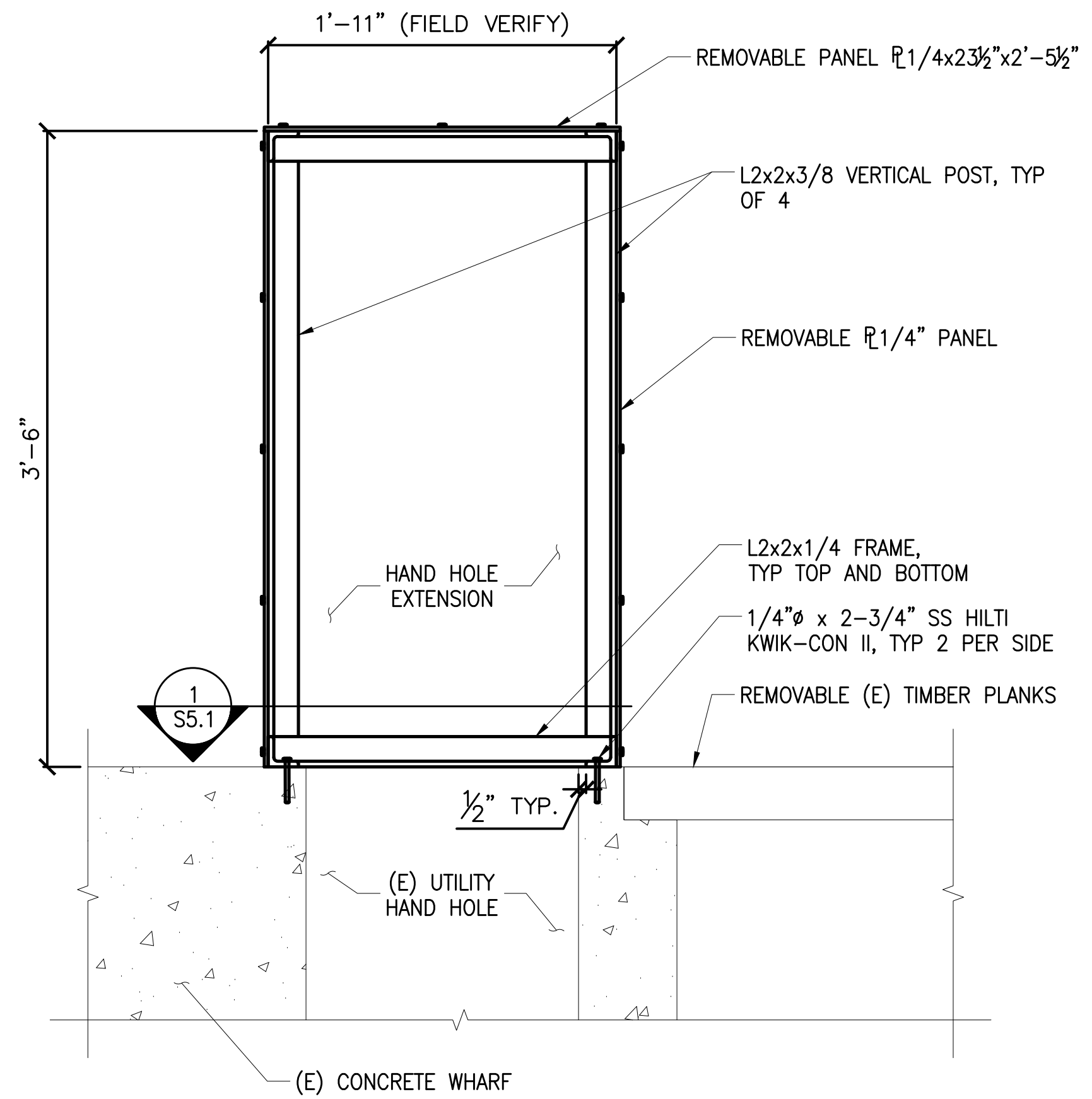


**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**STRUCTURAL DETAILS**

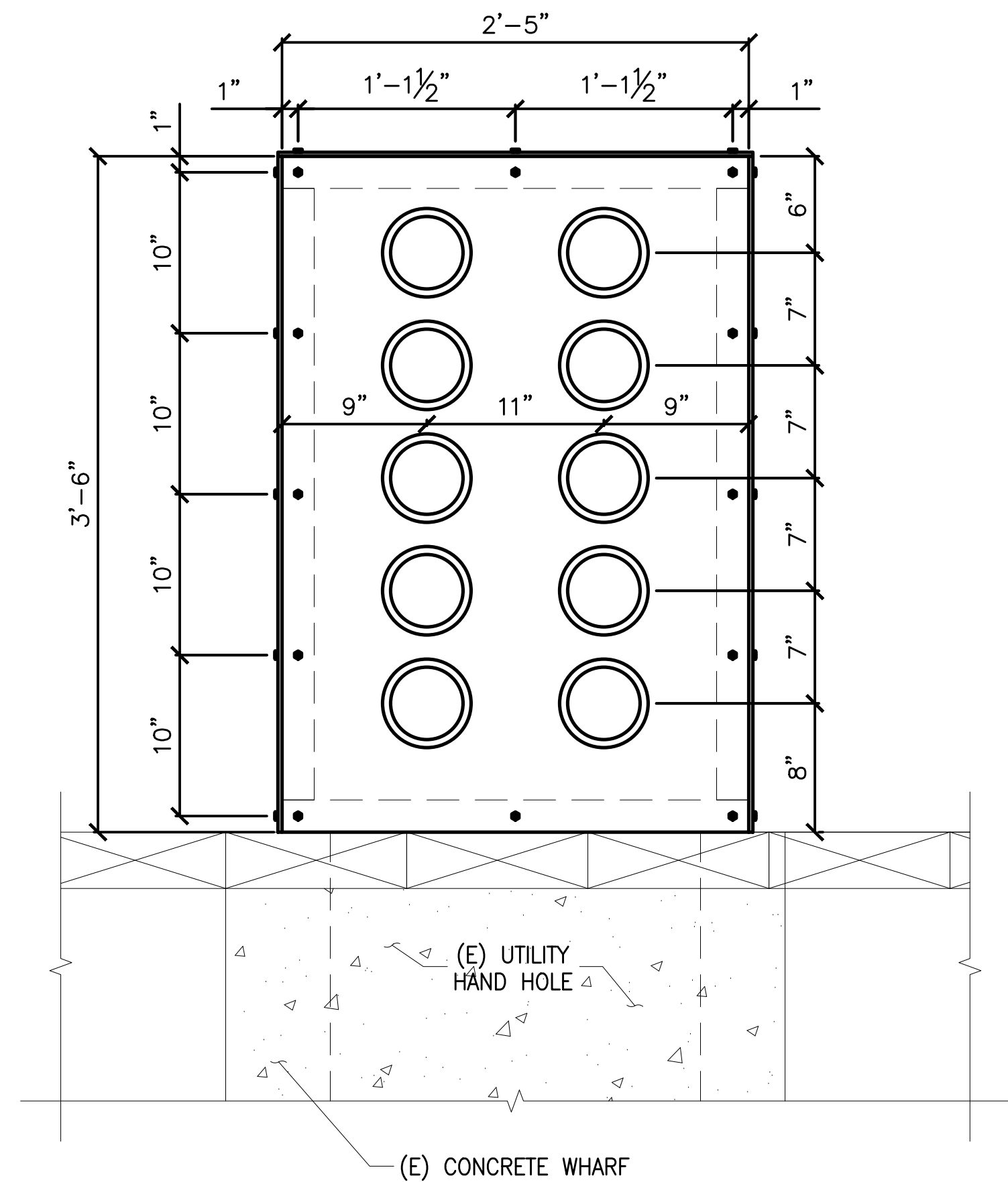
Date	07/25/2018
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Drawn	JMZ
Job No.	181107
Sheet No.	<b>S5.0</b>
Of	Sheets



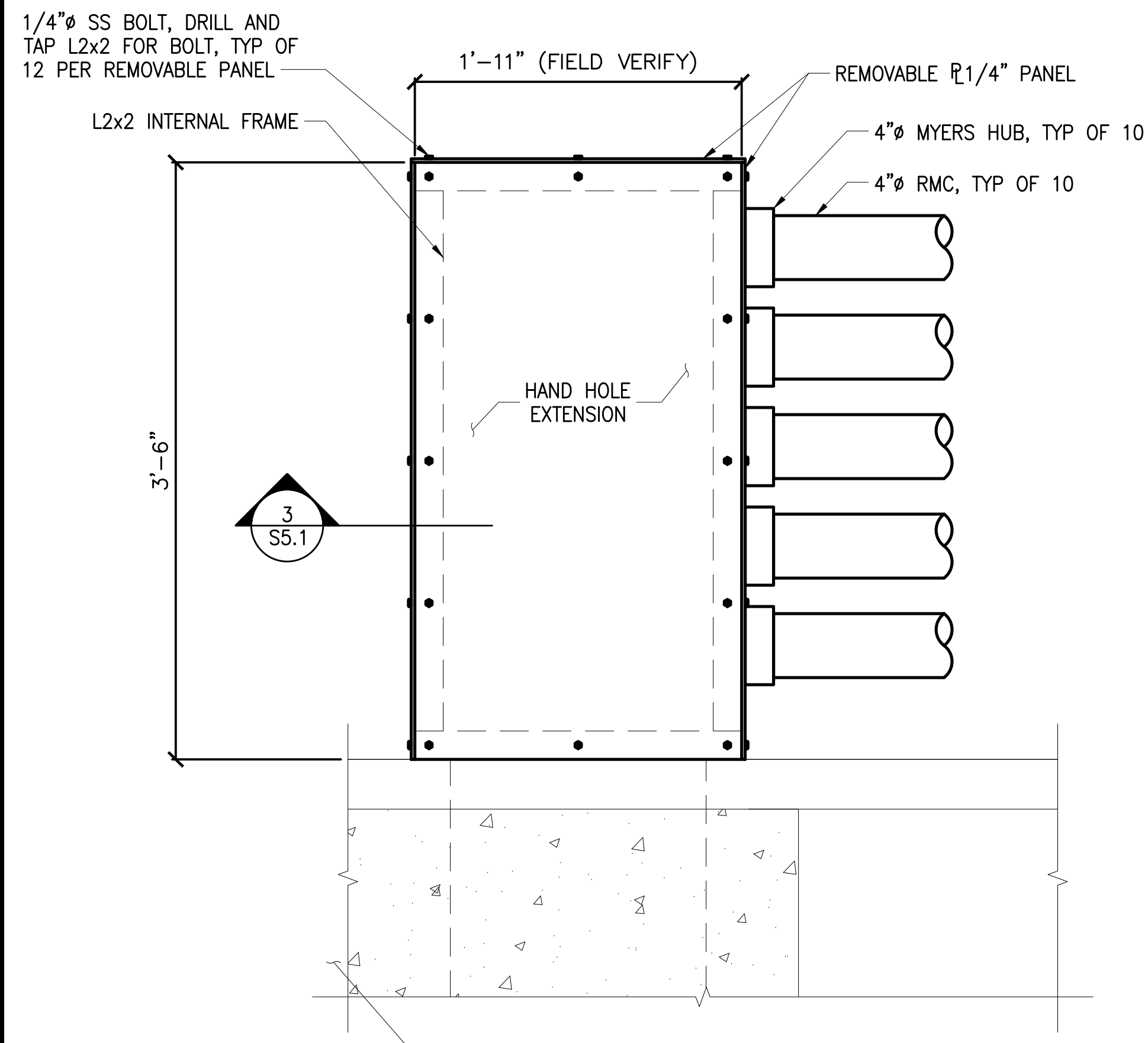
**1 (E) UTILITY HAND HOLE EXTENSION - PLAN**  
S5.1 SCALE:NTS



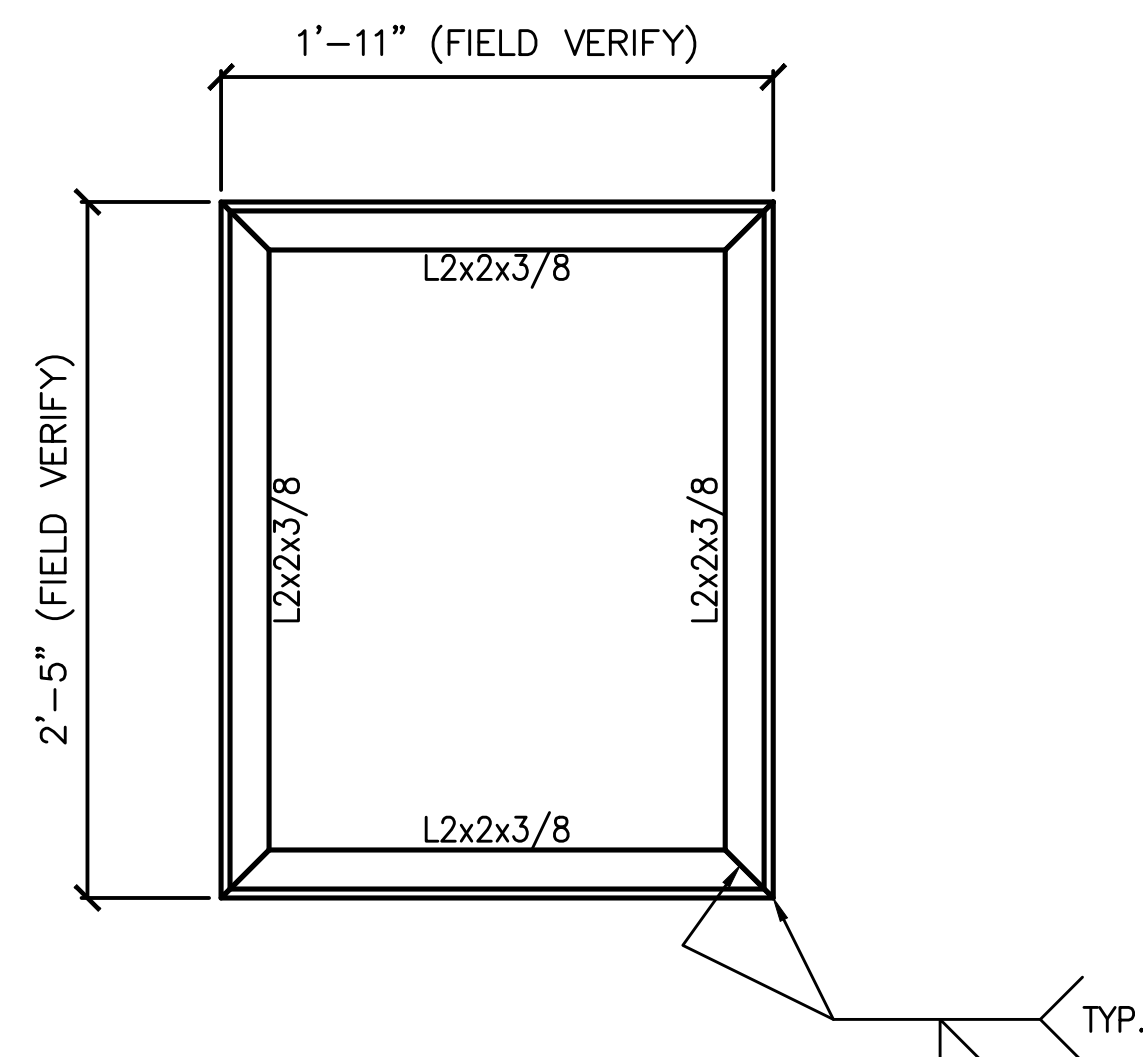
**2 (E) UTILITY HAND HOLE EXTENSION - SECTION**  
S5.1 SCALE:NTS



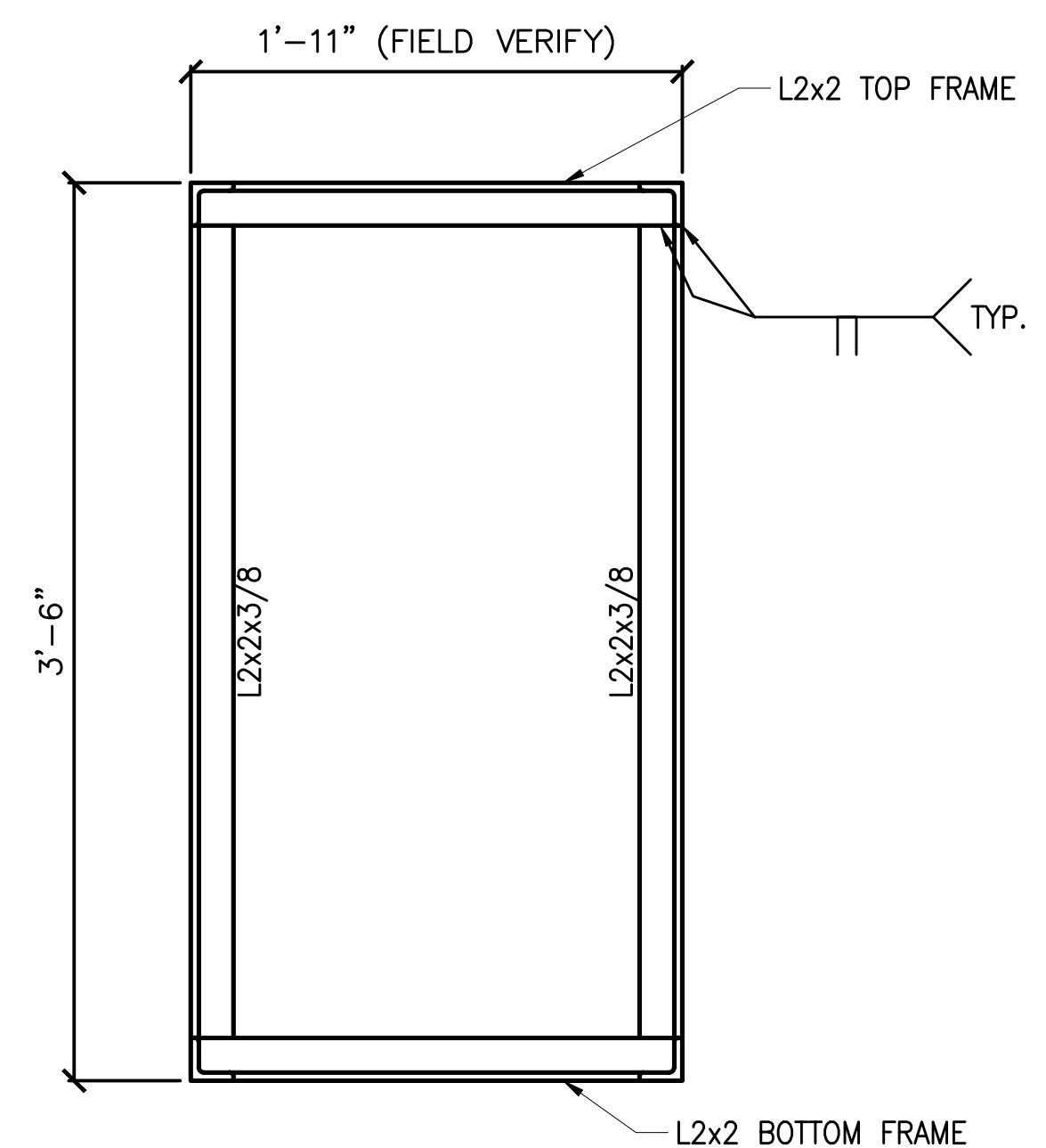
**3 (E) UTILITY HAND HOLE EXTENSION - SECTION**  
S5.1 SCALE:NTS



**4 (E) UTILITY HAND HOLE EXTENSION - SECTION**  
S5.1 SCALE:NTS



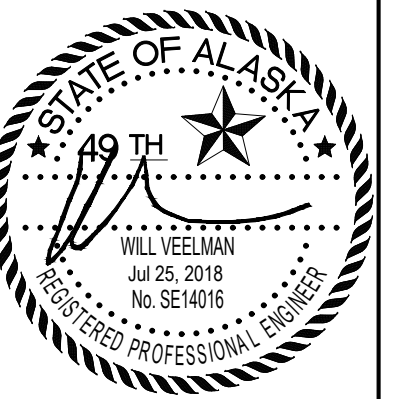
**5 TOP AND BOTTOM FRAME - PLAN**  
S5.1 SCALE:NTS



**6 TOP AND BOTTOM FRAME - ELEVATION**  
S5.1 SCALE:NTS

Revisions	
ISSUED FOR CONSTRUCTION	0

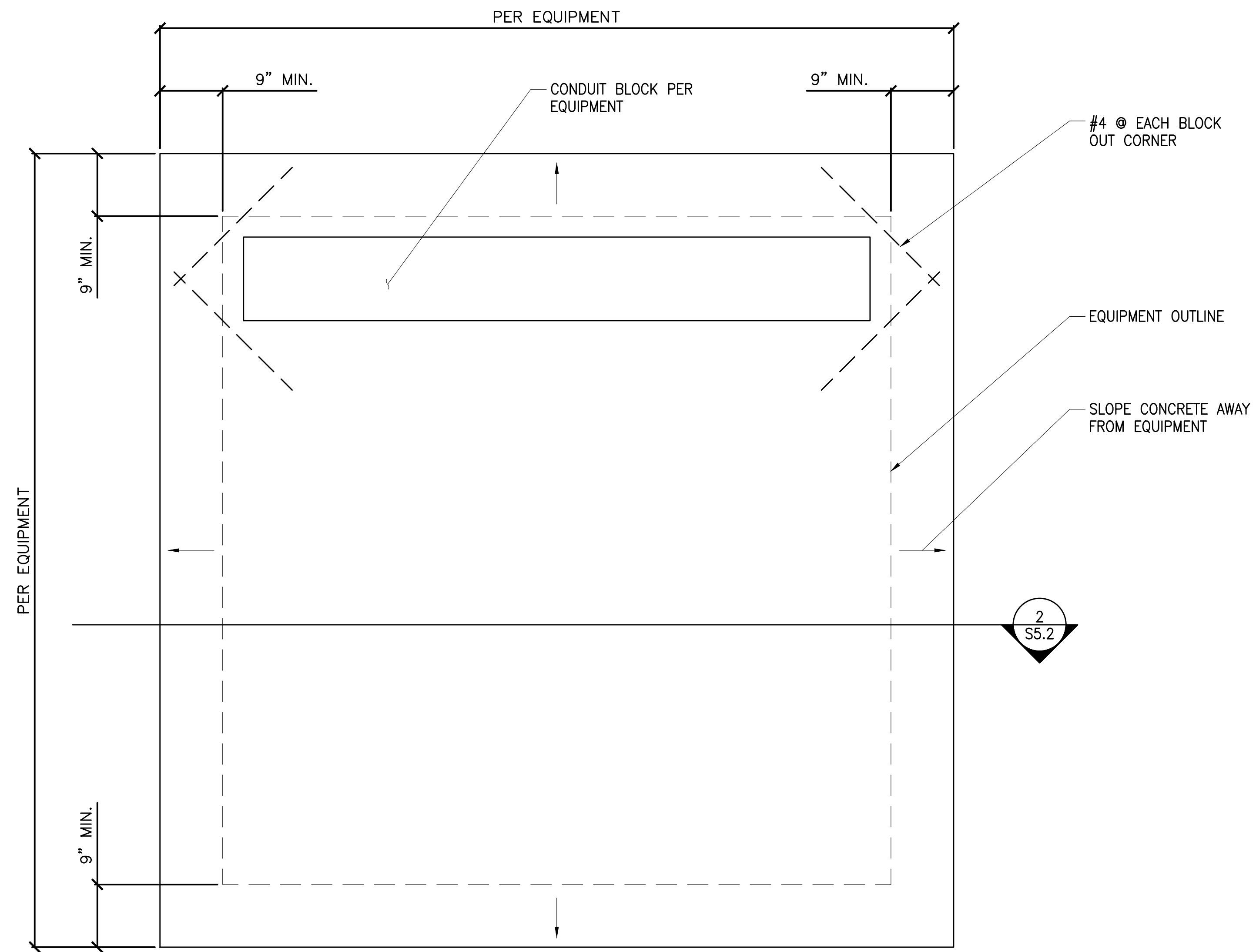
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**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
3801 N. TONGASS AVENUE  
**HANDHOLE EXTENSION DETAIL**

Date	07/25/2018
Design	JMZ
Drawn	JMZ
Job No.	181107
Sheet No.	<b>S5.1</b>
Of	Sheets



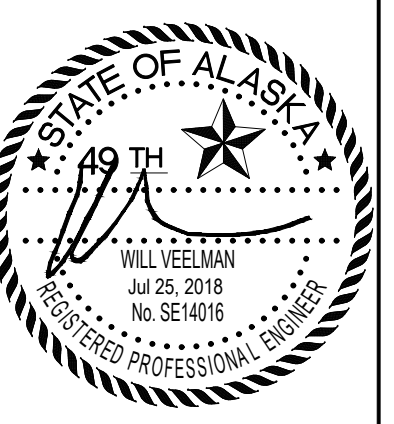


**SHEET NOTES:**

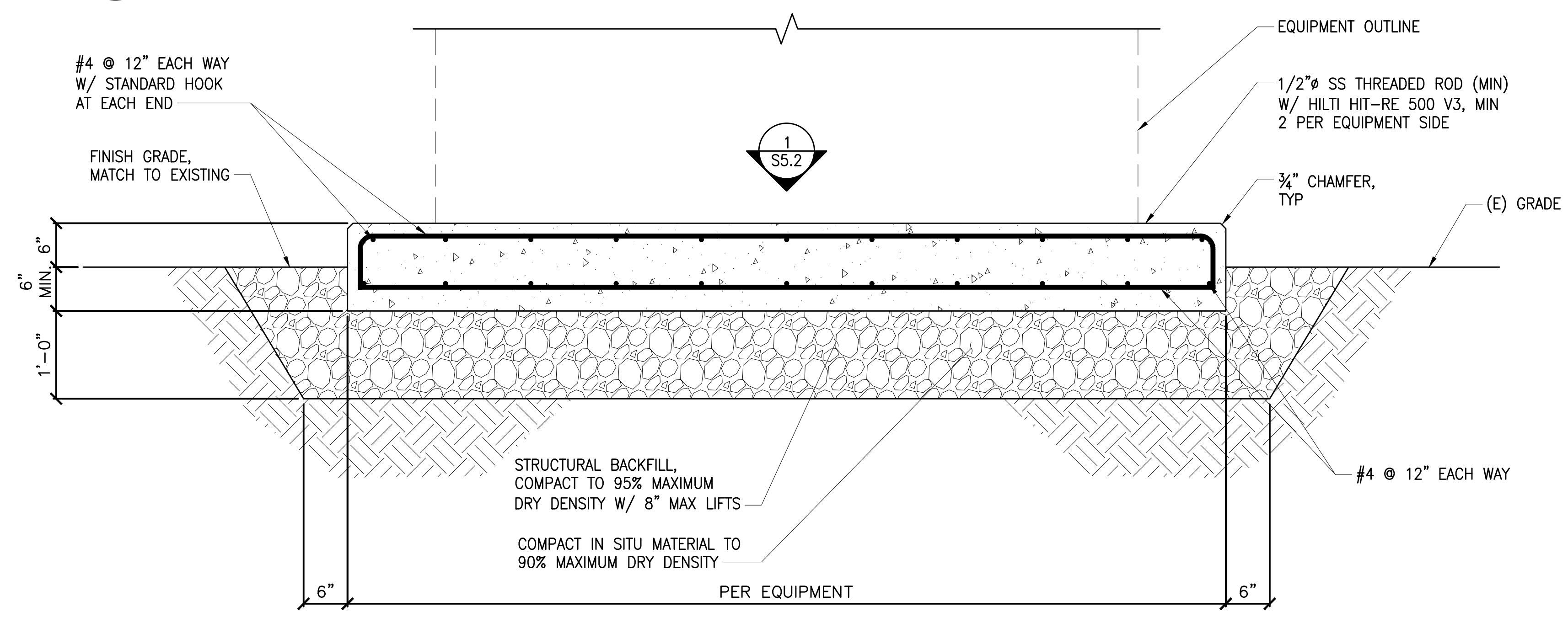
1. THE DESIGN BASIS FOR THE EQUIPMENT FOUNDATIONS IS AN OPEN BOTTOMED PRECAST EQUIPMENT PADMOUNT WITH 30" (MIN.) RISER, SIMILAR TO ALASKA SAND AND GRAVEL'S SUM1 OR OLDCASTLE PRECAST SCL EQUIPMENT PADMOUNT.
2. FOR AN ALTERNATE CAST-IN-PLACE OPTION FOR EQUIPMENT FOUNDATIONS FOLLOW MINIMUM REQUIREMENTS OUTLINED ON THIS SHEET.
3. THE CONTRACTOR SHALL PROVIDE ALASKA STAMPED DESIGN CALCULATIONS AND SHOP DRAWINGS FOR THE EQUIPMENT FOUNDATIONS TO THE OWNER FOR CONSIDERATION AND APPROVAL. SEE SHEET S0.0 FOR MINIMUM LOADING CRITERIA AND MATERIAL REQUIREMENTS.

Revisions	
ISSUED FOR CONSTRUCTION	0

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**1 ALTERNATE CONCRETE EQUIPMENT PAD - PLAN**  
 S5.2 SCALE:NTS



**2 ALTERNATE CONCRETE EQUIPMENT PAD - SECTION**  
 S5.2 SCALE:NTS

**KETCHIKAN SHIPYARD MEDIUM VOLTAGE LOOP**  
**3801 N. TONGASS AVENUE**  
**ALTERNATE EQUIPMENT PAD PLAN AND SECTION**

Date	07/25/2018
Design	JMZ
Drawn	JMZ
Job No.	181107
Sheet No.	S5.2