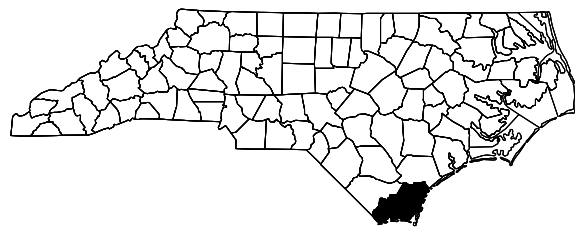


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	-	1	31
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
16SP.6.3.1	---	P.E./CONST.	
16SP.6.3.2	---	P.E./CONST.	

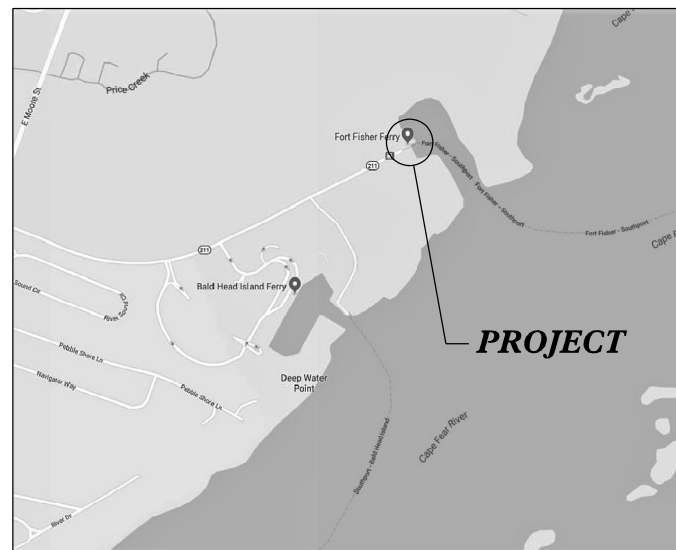


BRUNSWICK / NEW HANOVER

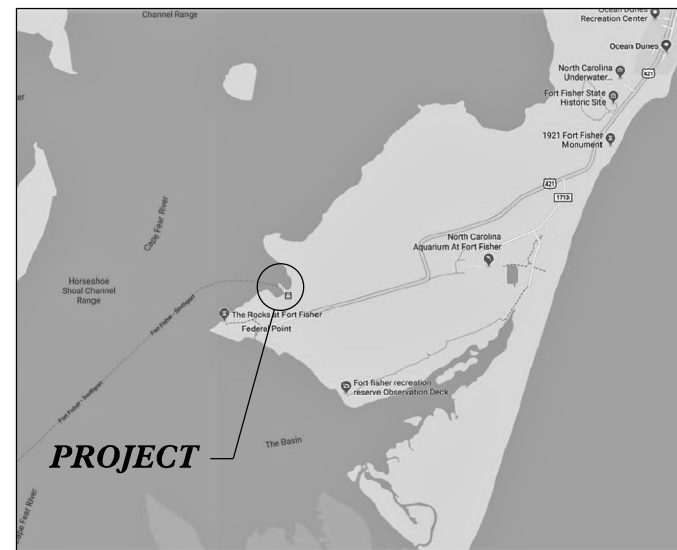
LOCATION: **SOUTHPORT RAMP**
BRIDGE #090209 ON FERRY ROAD SE

FORT FISHER RAMP
BRIDGE #640050 ON FT. FISHER BOULEVARD S

TYPE OF WORK: **STRUCTURAL, MECHANICAL AND ELECTRICAL REHABILITATION OF EXISTING RAMP STRUCTURES**

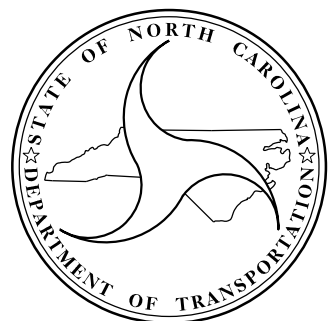


VICINITY MAP - SOUTHPORT RAMP



VICINITY MAP - FORT FISHER RAMP

CONTRACT: DA00432 PROJECT: 16SP.6.3.1 / 16SP.6.3.2



DESIGN DATA

BRUNSWICK COUNTY
BRIDGE #090209 ADT = —

NEW HANOVER COUNTY
BRIDGE #640050 ADT = —

PROJECT LENGTH

BRUNSWICK COUNTY
BRIDGE #090209 = 0.05 MILES

NEW HANOVER COUNTY
BRIDGE #640050 = 0.02 MILES

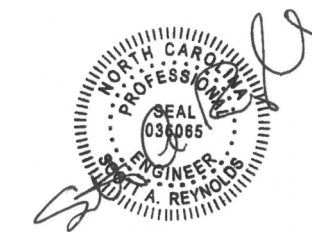
Prepared in the Office of:
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR. RALEIGH, N.C. 27610

TIMOTHY M. SHERRILL, P.E.
PROJECT ENGINEER

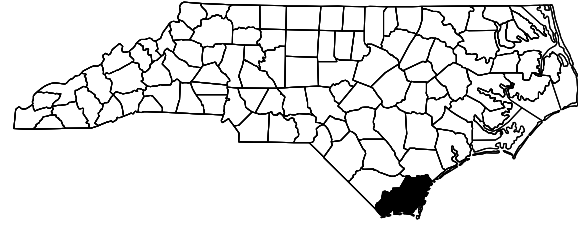
2018 STANDARD SPECIFICATIONS

LETTING DATE:
XXXXXX, XX, XXXX



SCOTT REYNOLDS, P.E.
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS



BRUNSWICK / NEW HANOVER

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	-	1A	31
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
16SP.6.3.1		P.E./CONST.	
16SP.6.3.2	—	P.E./CONST.	

LOCATION: **SOUTHPORT RAMP**
BRIDGE #090209 ON FERRY ROAD SE

FORT FISHER RAMP
BRIDGE #640050 ON FT. FISHER BOULEVARD S

TYPE OF WORK: **STRUCTURAL, MECHANICAL AND ELECTRICAL REHABILITATION OF EXISTING RAMP STRUCTURES**

INDEX OF SHEETS

- | | | | |
|------------|---|-------------|--|
| 1 | TITLE SHEET | M-4 | FLOATING MECHANISM ASSEMBLY |
| 1A | INDEX OF SHEETS | M-5 | FLOATING MECHANISM DETAILS |
| 2 | SUMMARY OF QUANTITIES | M-6 | HYDRAULIC SCHEMATIC |
| S-1 | GENERAL NOTES | M-7 | HPU DETAILS |
| S-2 | PLAN AND ELEVATION FOR SOUTHPORT FERRY BASIN | E-1 | SCOPE OF WORK, GENERAL NOTES, SYMBOLS AND LEGENDS |
| S-3 | PLAN AND ELEVATION FOR FORT FISHER FERRY BASIN | E-2 | ELECTRICAL PLAN - SOUTHPORT |
| S-4 | EXISTING LIFT BENT REMOVAL AND REPAIR DETAILS I | E-3 | ELECTRICAL PLAN - FORT FISHER |
| S-5 | EXISTING LIFT BENT REMOVAL AND REPAIR DETAILS II | E-4 | ELECTRICAL WIRING DIAGRAM - SOUTHPORT |
| S-6 | LIFT BENT MODIFICATIONS | E-5 | ELECTRICAL WIRING DIAGRAM - FORT FISHER |
| S-7 | LIFT BENT DETAILS | E-6 | ELECTRICAL WIRING DIAGRAM PLC INPUT |
| S-8 | ACCESS PLATFORM DETAILS - I | E-7 | ELECTRICAL WIRING DIAGRAM PLC OUTPUT |
| S-9 | ACCESS PLATFORM DETAILS - II | E-8 | CONTROL PENDANT DETAILS |
| M-1 | HYDRAULIC PIPING | E-9 | ELECTRICAL LAYOUT |
| M-2 | EXTENT OF TRAVEL LAYOUT | E-10 | CONDUIT BLOCK DIAGRAM - SOUTHPORT |
| M-3 | HYDRAULIC CYLINDER ASSEMBLY | E-11 | CONDUIT BLOCK DIAGRAM - FORT FISHER |
| | | E-12 | HPU CONTROL BACKPANEL |

CONTRACT: DA00432 PROJECT: 16SP.6.3.1 / 16SP.6.3.2

GENERAL NOTES

1. APPLICABLE CODES, MANUALS, AND SPECIFICATIONS:
 - AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17TH EDITION
 - AASHTO STANDARD SPECIFICATIONS FOR MOVABLE HIGHWAY BRIDGES, 1988
 - AASHTO GUIDE SPECIFICATIONS FOR BRIDGES VULNERABLE TO COASTAL STORMS
 - AASHTO GUIDE SPECIFICATIONS AND COMMENTARY FOR VESSEL COLLISION DESIGN OF HIGHWAY BRIDGES
 - NCDOT STRUCTURES MANAGEMENT UNIT MANUAL (INCLUDING POLICY MEMOS)
 - NCDOT BRIDGE POLICY MANUAL
 - NCDOT STRUCTURES MANAGEMENT UNIT PROJECT SPECIAL PROVISIONS
 - NCDOT GEOTECHNICAL ENGINEERING UNIT GUIDELINES AND PROCEDURES MANUAL FOR SUBSURFACE INVESTIGATIONS
 - NCDOT STRUCTURES MANAGEMENT UNIT STANDARD DRAWINGS
 - NORTH CAROLINA STATE BUILDING CODE
 - NFPA 101: LIFE SAFETY CODE
2. THESE PLANS ARE UNCOMPLETE UNLESS ACCOMPANIED BY THE SUPPLEMENTAL SPECIFICATIONS AND SPEACIAL PROVISIONS INCLUDED IN THE CONTRACT DOCUMENTS.
3. VERTICAL DATUM:
 - ALL ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
4. ENVIRONMENT:
 - HIGHLY CORROSIVE FOR ALL ELEMENTS OF THE FERRY RAMPS
5. DESIGN LOADINGS:
 - A. DEAD LOADS:
 - STRUCTURAL STEEL 490 PCF
 - REINFORCED CONCRETE 150 PCF
 - UNREINFORCED LIGHTWEIGHT CONCRETE 115 PCF
 - REINFORCED LIGHTWEIGHT CONCRETE 120 PCF
 - B. LIVE LOADS:
 - HS20-44 TRUCK WITH IMPACT
 - C. WIND LOAD:
 - AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17TH EDITION
 - AASHTO STANDARD SPECIFICATIONS FOR MOVABLE HIGHWAY BRIDGES, 1988
 - D. ICE LOAD:
 - NOT APPLICABLE
 - E. VESSEL COLLISION LOAD:
 - AS PER AASHTO GUIDE SPECIFICATIONS AND COMMENTARY FOR VESSEL COLLISION DESIGN OF HIGHWAY BRIDGES
 - F. UTILITIES LOAD:
 - NO ALLOWANCE FOR UTILITY LOADS HAS BEEN INCLUDED IN THE DESIGN
6. ALL STEEL DESIGNATED AS FRACTURE CRITICAL (FCM) AND ALL WELDING IN TENSION AREAS OF FRACTURE CRITICAL MEMBERS, REGARDLESS OF DIRECTION OF STRESS, SHALL MEET CURRENT REQUIREMENTS OF AWS D1.5 FRACTURE CONTROL PLAN FOR NON REDUNDANT MEMBERS.
7. ALL STEEL DESIGNATED (FCM) SHALL MEET ASTM A709 SUPPLEMENTAL REQUIREMENTS FOR TOUGHNESS FOR (FCM), FURNISHED TO ZONE 2.
8. ALL CONNECTION PLATES AND ANGLES FOR FCM SHALL BE CONSIDERED FCM. THIS INCLUDES STIFFENERS FOR FCM.
9. ALL WELDS THAT JOIN AT LEAST ONE PLATE DESIGNATED AS FRACTURE CRITICAL SHALL BE CONSIDERED FCW, REGARDLESS OF DIRECTION OF STRESS, AND SHALL MEET REQUIREMENTS OF AWS FRACTURE CONTROL PLAN FOR NON REDUNDANT MEMBERS.
10. ALL WELDING ELETRODES SHALL BE OF E70XXM SERIES TO CONFORM WITH AWS D1.5 BRIDGE WELDING CODE.

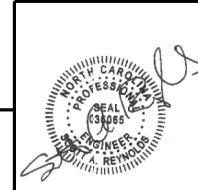
11. ALL FAYING SURFACES OF CONNECTIONS SHALL BE CLEANED AND PAINTED WITH A ZINC RICH PRIMER WHICH MEETS ASTM A325 CLASS B SLIP COEFFICIENT AND CREEP TESTING REQUIREMENTS (SLIP COEFFICIENT NOT LESS THAN 0.50).
12. ALL INFORMATION ON THE EXISTING STRUCTURE SHOWN ON THESE PLANS WAS OBTAINED FROM THE EXISTING DRAWINGS OF THE ORIGINAL CONSTRUCTION AND SUBSEQUENT REHABILITATION CONTRACTS, BUT MAY DIFFER FROM ACTUAL AS-BUILT CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS AND EXISTING BRIDGE CONDITION AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES AND INTERFERENCES BEFORE COMMENCING WITH THE WORK.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
 STATION: 17+01.73/1+99.80

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 RALEIGH

GENERAL NOTES

FOR SOUTHPORT AND
 FORT FISHER BASINS



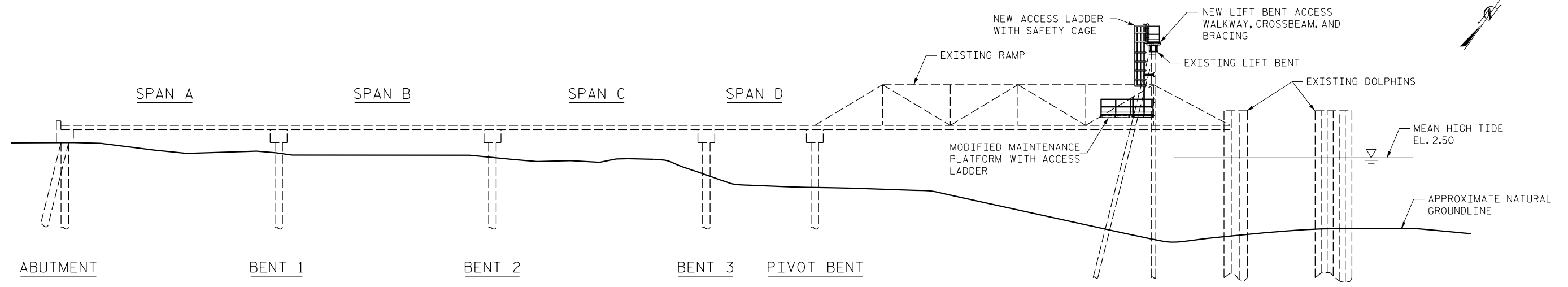
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engineering that moves you
 180 ADMIRAL COCHRANE DR
 SUITE 555, ANNAPOLIS, MD 21401

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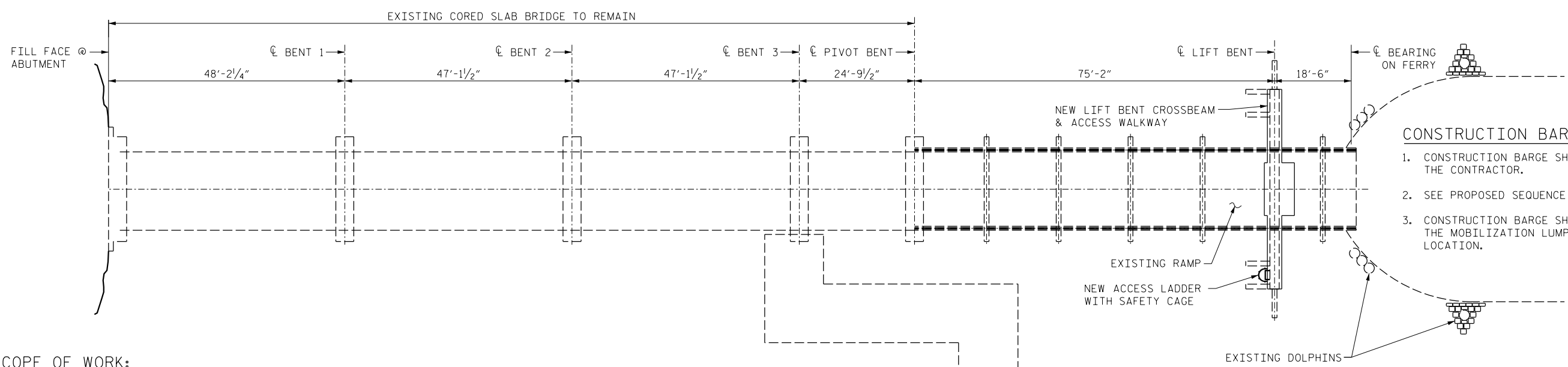
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CHECKED BY : ES	DATE : DEC. 2018
DESIGN ENGINEER OF RECORD : DN	DATE : DEC. 2018



ELEVATION
NOT TO SCALE



PLAN
NOT TO SCALE

- CONSTRUCTION BARGE NOTES:**
1. CONSTRUCTION BARGE SHALL BE PROVIDED BY THE CONTRACTOR.
 2. SEE PROPOSED SEQUENCE OF WORK ITEM NO.1.
 3. CONSTRUCTION BARGE SHALL BE PAID FOR UNDER THE MOBILIZATION LUMP SUM ITEM FOR EACH LOCATION.

SCOPE OF WORK:

1. DEMOLITION OF SPECIFIED EXISTING LIFT BENT MEMBERS.
2. STRUCTURAL MODIFICATIONS TO EXISTING LIFT BENT.
3. ERECTION OF NEW STRUCTURAL MEMBERS.
4. INSTALLATION OF NEW ACCESS WALKWAYS, PLATFORMS, AND LADDERS.
5. CLEAN AND REPAINT REMAINING EXISTING LIFT BENT MEMBERS.
6. PAINT NEW STRUCTURAL STEEL MEMBERS.
7. INSTALLATION OF NEW HYDRAULIC SYSTEM.
8. NEW ELECTRICAL EQUIPMENT INSTALLED.
9. INSTALL NEW TRAFFIC GATE.

PROPOSED SEQUENCE OF WORK:

- | | | |
|--------------------------------------|----------------------------------|--|
| 1. LOWER RAMP ON TO BARGE AND SECURE | 5. INSTALL NEW LIFT BENT MEMBERS | 9. CONDUCT ACCEPTANCE TESTING |
| 2. REMOVE EXISTING COUNTERWEIGHTS | 6. PERFORM STRUCTURAL REPAIRS | 10. PREPARE AND SUBMIT OPERATION AND MAINTENANCE MANUALS |
| 3. REMOVE EXISTING MECH/ELEC SYSTEMS | 7. CLEAN AND PAINT | 11. PREPARE AND SUBMIT AS-BUILT DOCUMENTS |
| 4. REMOVE ELEMENTS OF LIFT BENT | 8. INSTALL NEW MECH/ELEC SYSTEMS | |

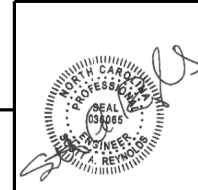
PROJECT NO. **16SP.6.3.1/16SP.6.3.2**
BRUNSWICK COUNTY
 STATION: **17+01.73**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**PLAN AND ELEVATION
 SOUTHPORT FERRY BASIN**

FOR SOUTHPORT FERRY BASIN

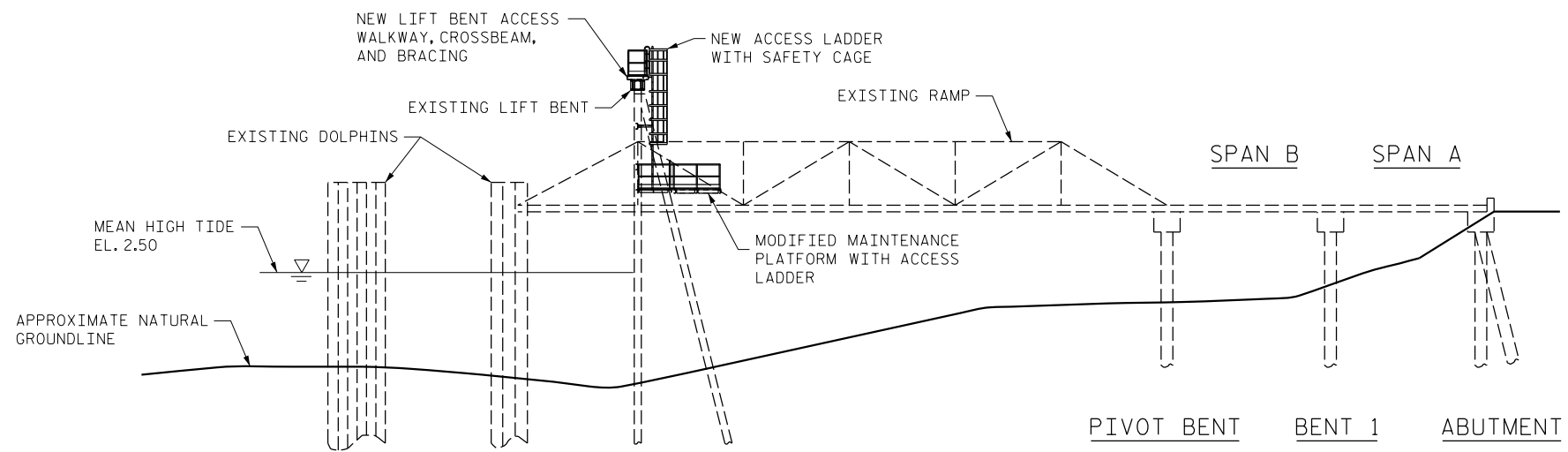
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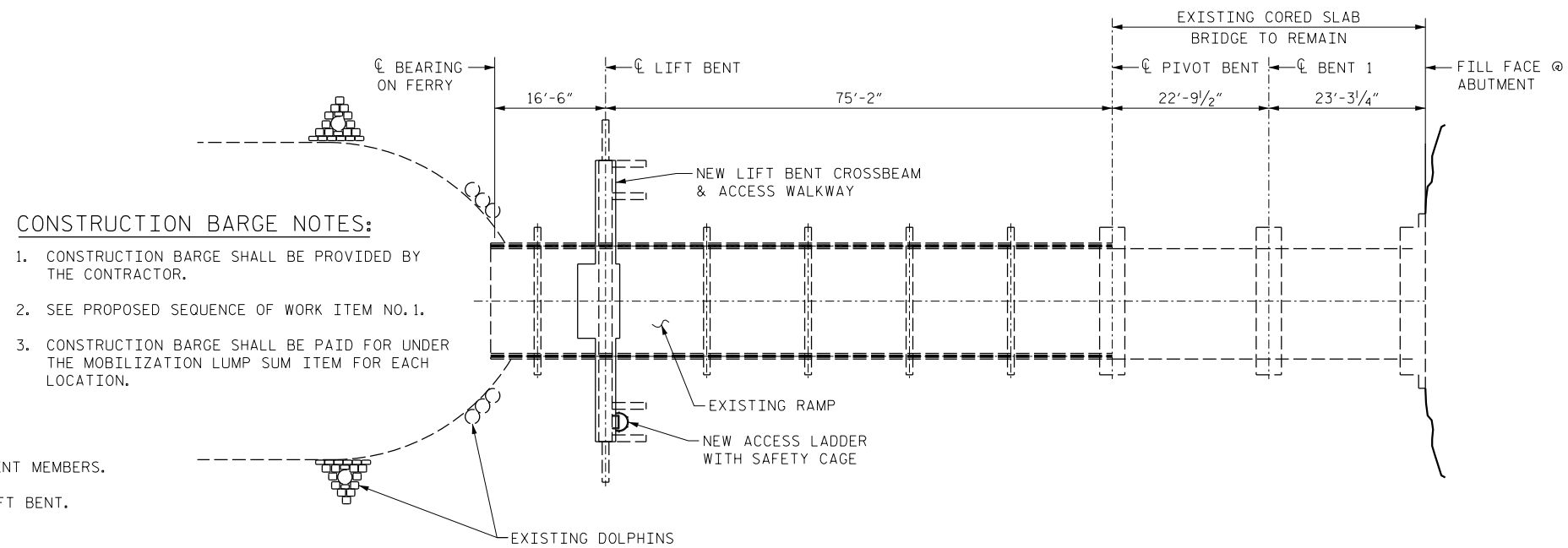
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ELEVATION
NOT TO SCALE



PLAN
NOT TO SCALE

CONSTRUCTION BARGE NOTES:

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2. SEE PROPOSED SEQUENCE OF WORK ITEM NO. 1.
3. CONSTRUCTION BARGE SHALL BE PAID FOR UNDER THE MOBILIZATION LUMP SUM ITEM FOR EACH LOCATION.

SCOPE OF WORK:

1. DEMOLITION OF SPECIFIED EXISTING LIFT BENT MEMBERS.
2. STRUCTURAL MODIFICATIONS TO EXISTING LIFT BENT.
3. ERECTION OF NEW STRUCTURAL MEMBERS.
4. INSTALLATION OF NEW ACCESS WALKWAYS, PLATFORMS, AND LADDERS.
5. CLEAN AND REPAINT REMAINING EXISTING LIFT BENT MEMBERS.
6. PAINT NEW STRUCTURAL STEEL MEMBERS.
7. INSTALLATION OF NEW HYDRAULIC SYSTEM.
8. NEW ELECTRICAL EQUIPMENT INSTALLED.
9. INSTALL NEW TRAFFIC GATE.

PROPOSED SEQUENCE OF WORK:

- | | | |
|--------------------------------------|----------------------------------|--|
| 1. LOWER RAMP ON TO BARGE AND SECURE | 5. INSTALL NEW LIFT BENT MEMBERS | 9. CONDUCT ACCEPTANCE TESTING |
| 2. REMOVE EXISTING COUNTERWEIGHTS | 6. PERFORM STRUCTURAL REPAIRS | 10. PREPARE AND SUBMIT OPERATION AND MAINTENANCE MANUALS |
| 3. REMOVE EXISTING MECH/ELEC SYSTEMS | 7. CLEAN AND PAINT | 11. PREPARE AND SUBMIT AS-BUILT DOCUMENTS |
| 4. REMOVE ELEMENTS OF LIFT BENT | 8. INSTALL NEW MECH/ELEC SYSTEMS | |

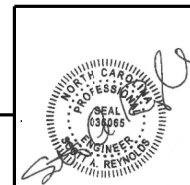
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NEW HANOVER COUNTY
 STATION: 1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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PLAN AND ELEVATION
 FORT FISHER FERRY BASIN

FOR FORT FISHER FERRY BASIN

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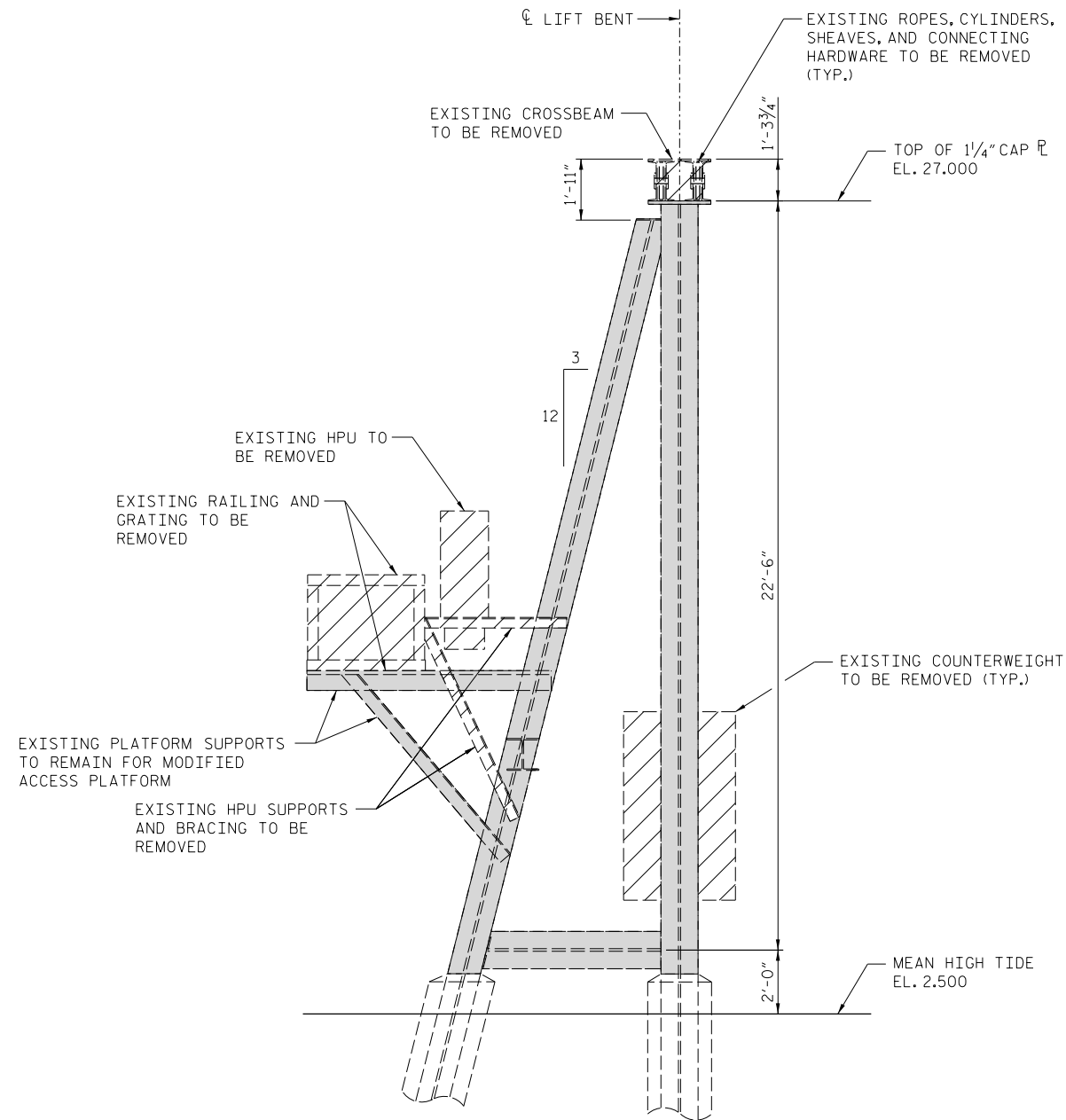
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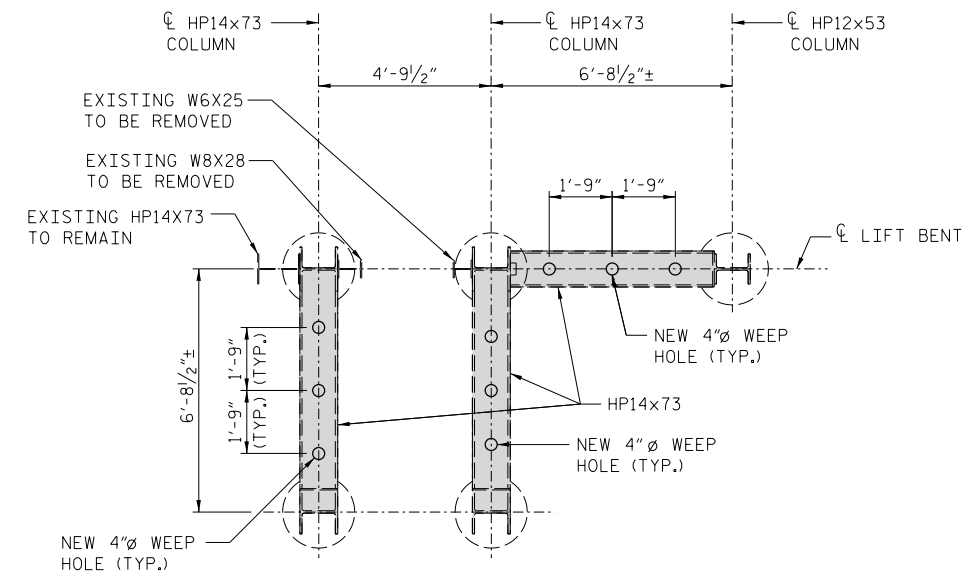
SECTION A-A

SCALE: 3/8" = 1'-0"

- EXISTING STRUCTURE TO BE REMOVED
- EXISTING STRUCTURE TO BE BLAST CLEANED AND PAINTED

NOTES:

1. SEE SHEET NO. S-4 FOR ADDITIONAL REMOVAL AND REPAIR NOTES.
2. NEW WEEP HOLES SHALL BE PAID FOR UNDER "REMOVAL OF EXISTING STRUCTURES".



SECTION B-B

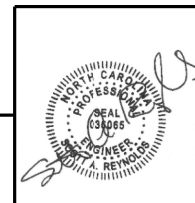
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SCALE: 3/8" = 1'-0"

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
 STATION: 17+01.73/1+99.80

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EXISTING LIFT BENT REMOVAL
 AND REPAIR DETAILS II

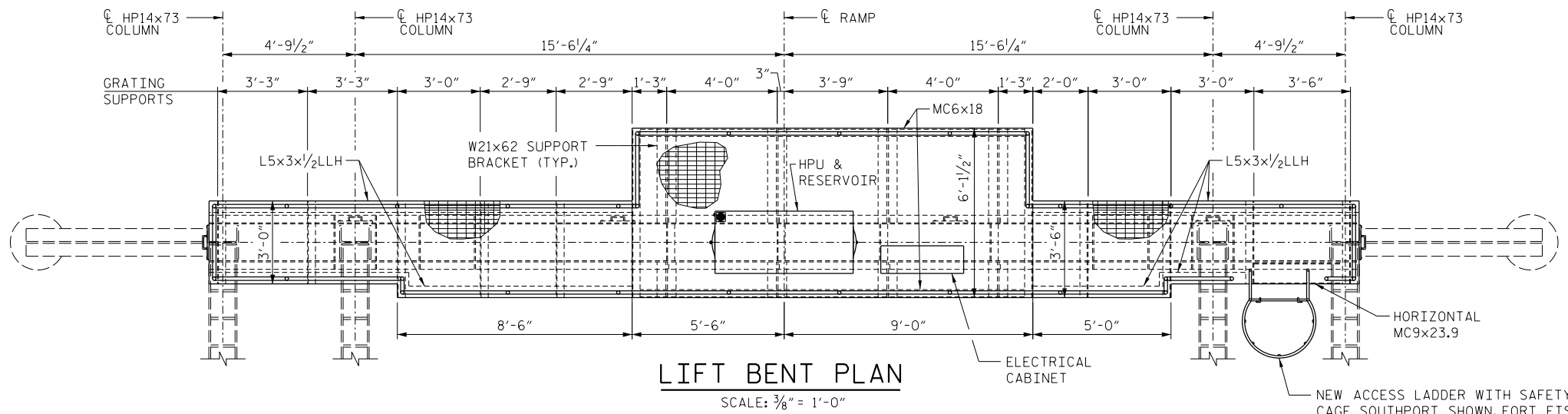
FOR SOUTHPORT AND
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REVISIONS						SHEET NO.
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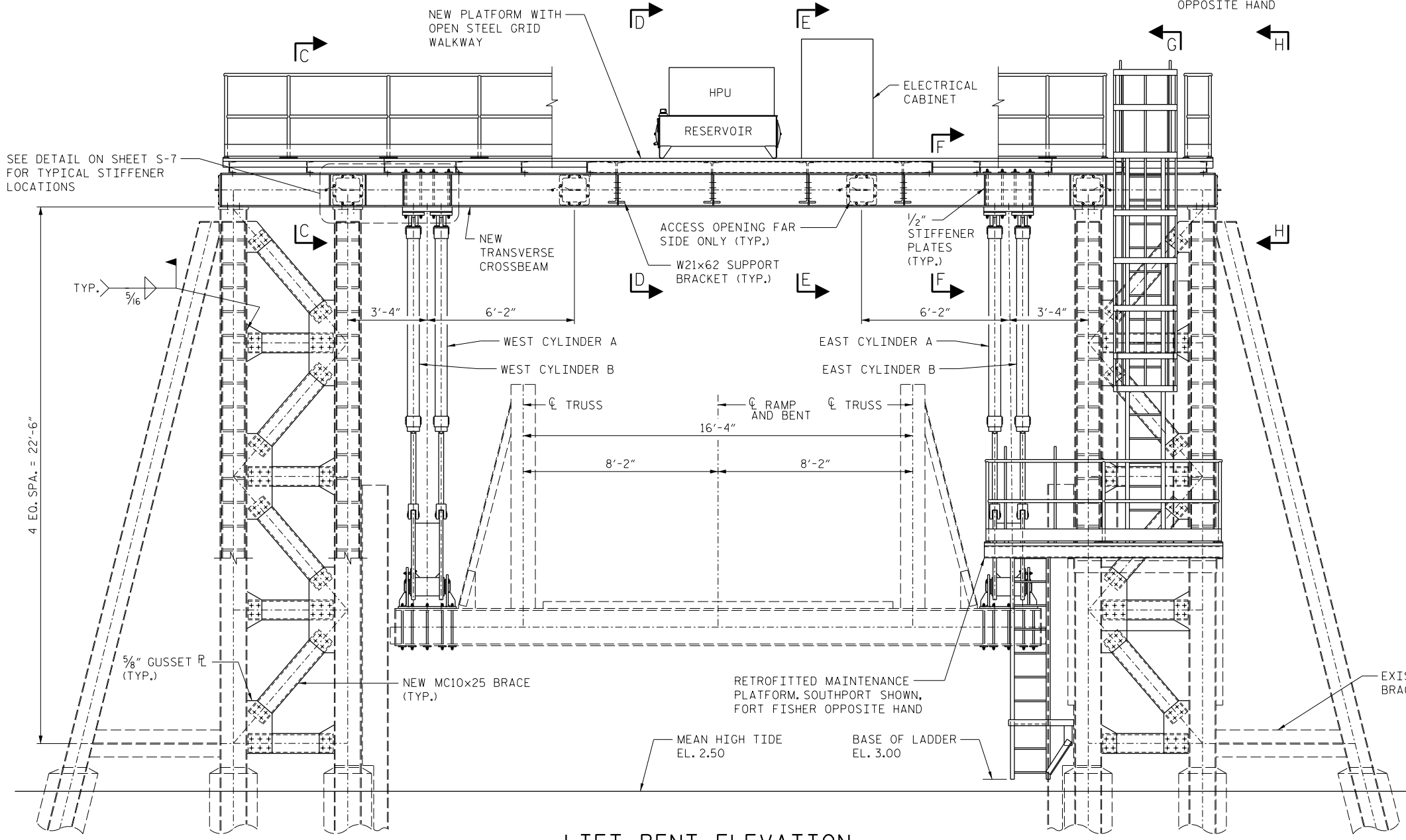


LIFT BENT PLAN

SCALE: 3/8" = 1'-0"

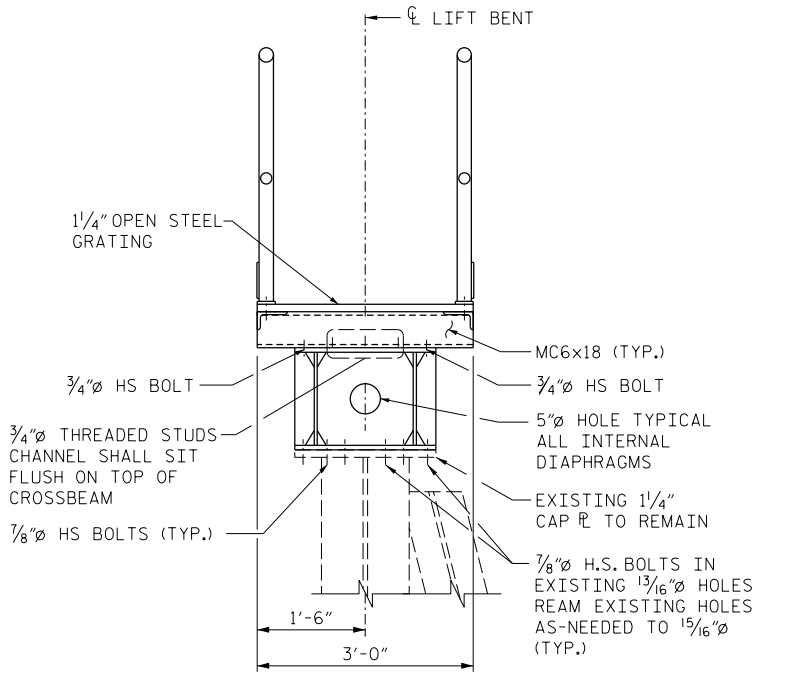
NOTES:

1. ALL NEW STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 50. STRUCTURAL STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
2. IN ADDITION TO GALVANIZATION, ALL NEW STRUCTURAL STEEL MEMBERS SHALL BE PAINTED WITH RUST-OLEUM C9578 PAINT SYSTEM (COAL TAR EPOXY). SEE SHEETS S-4 AND S-5 FOR ADDITIONAL PAINTING DETAILS.
3. ALL BOLTS SHALL BE 7/8" DIAM. HIGH STRENGTH ASTM F3125, GRADE A325, TYPE 1 UNLESS NOTED OTHERWISE. BOLTS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1072-5 OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
4. ALL THREADED STUDS SHALL BE 3/4" DIAM. NELSON CFL FULLY THREADED STUDS, OR APPROVED EQUIVALENT. THREADED STUDS SHALL BE ZINC PLATED MILD STEEL.
5. LIGHT DUTY WELDED STEEL GRATING SHALL BE TYPE 19-W-4 WITH A MAIN BAR SIZE OF 1/4" x 3/16" AS MANUFACTURED BY OHIO GRATINGS, INC. OR APPROVED EQUIVALENT. GRATING SHALL BE GALVANIZED WITH ONGRIP SPRAY TRACTION SURFACE APPLIED.
6. SUPPORTS FOR THE HPU, RESERVOIR, AND ELECTRICAL CABINET SHALL BE PROVIDED BY THE CONTRACTOR FOR REVIEW AND APPROVAL BY THE ENGINEER. SUPPORT DETAILS SHALL BE PROVIDED AFTER APPROVAL OF SHOP DRAWING AND CATALOG CUTS FOR THE APPLICABLE MECH/ELEC COMPONENTS AND SHALL BE COORDINATED WITH THE STEEL DETAILER'S CROSSBEAM DETAILS. FOR ADDITIONAL SUPPORT INFORMATION, SEE THE PROJECTS SPECIAL PROVISIONS.
7. LIFT BENT MODIFICATIONS SHALL BE PAID UNDER THE LUMP SUM APPROX. 23,800LBS STRUCTURAL STEEL PAY ITEM FOR EACH LOCATION.



LIFT BENT ELEVATION

SCALE: 3/8" = 1'-0"



SECTION C-C

SCALE: 3/4" = 1'-0"

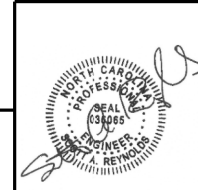
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 BRUNSWICK/NEW HANOVER COUNTY
 STATION: 17+01.73/1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

LIFT BENT MODIFICATIONS

FOR SOUTHPORT AND
 FORT FISHER BASINS

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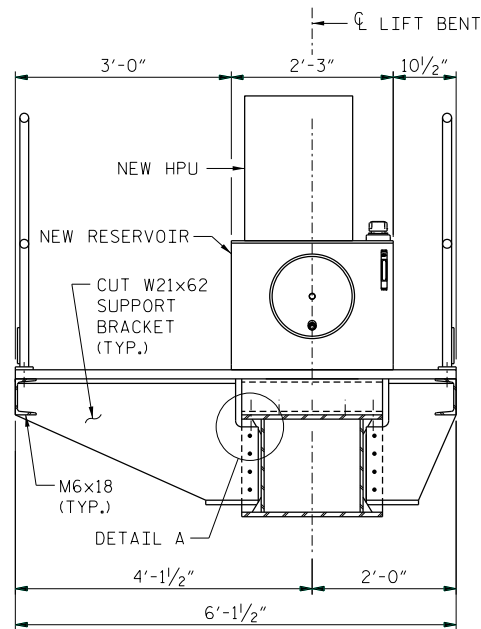


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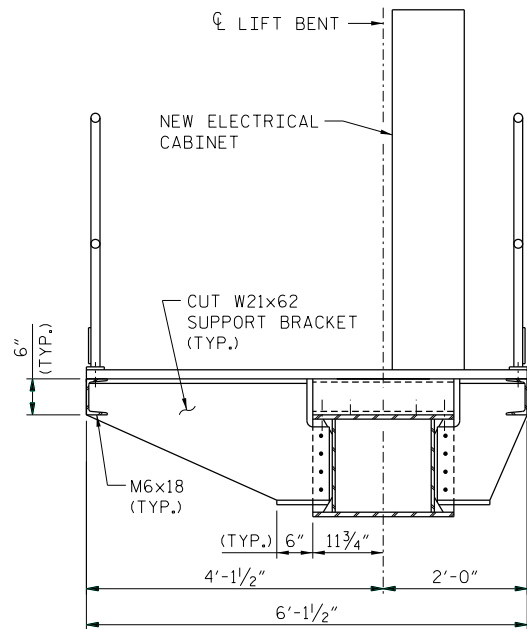
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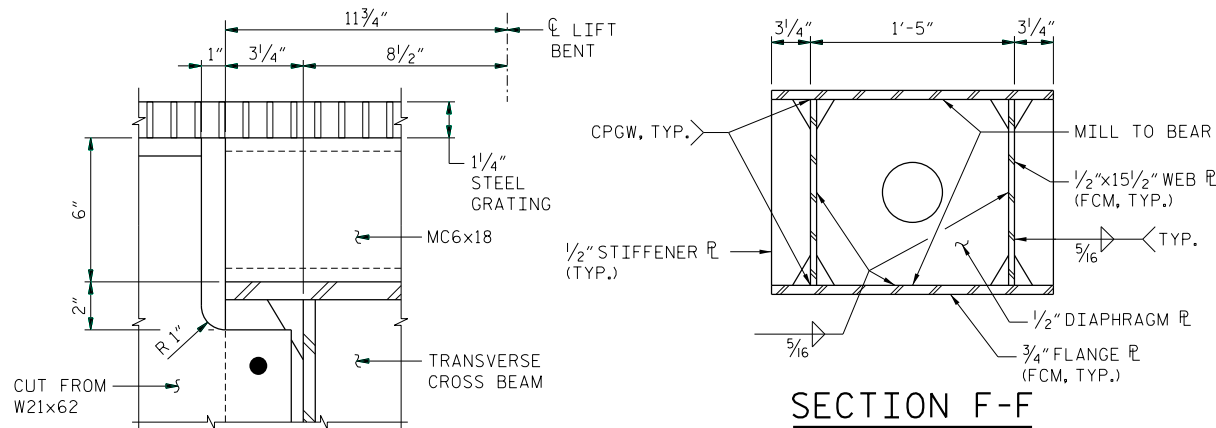
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SECTION D-D
SCALE: 3/4" = 1'-0"

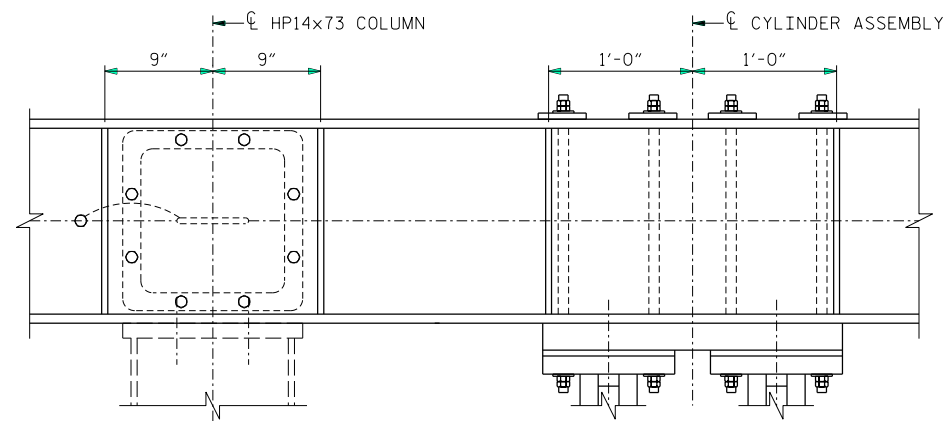


SECTION E-E
SCALE: 3/4" = 1'-0"

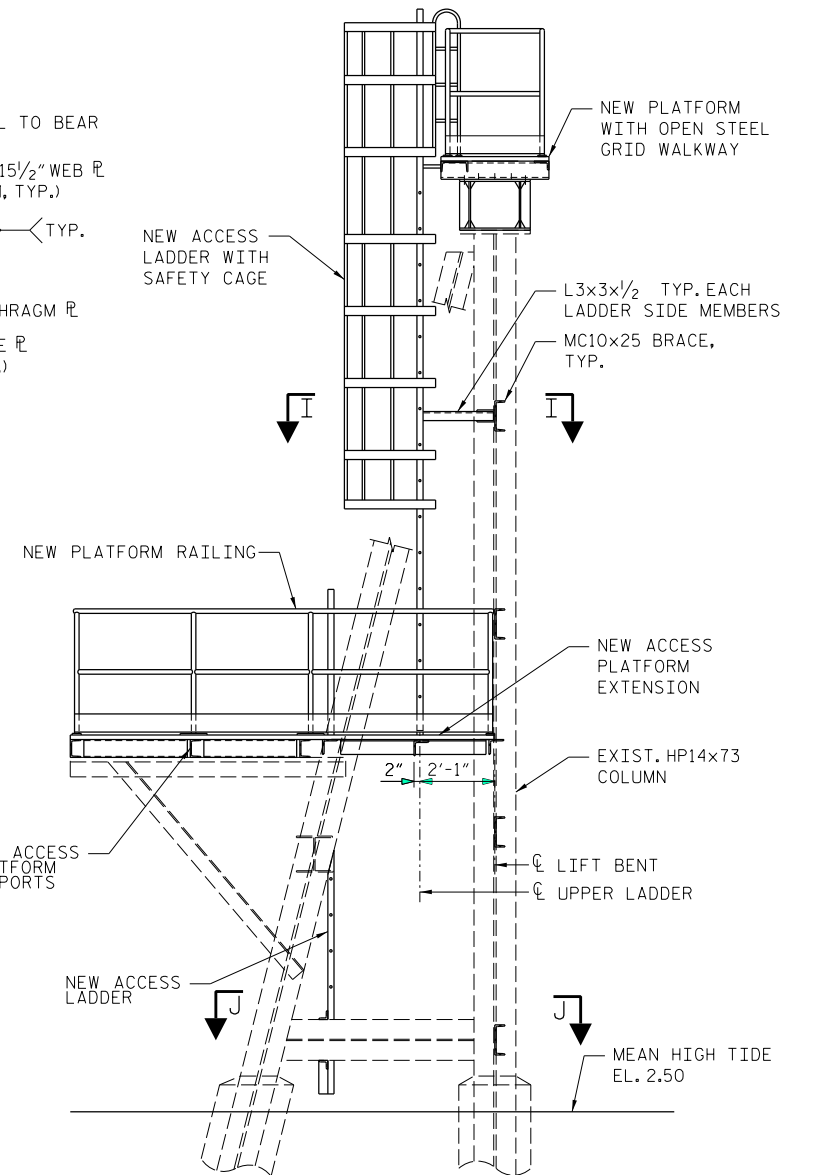


SECTION F-F
SCALE: 1/2" = 1'-0"

NOTE: GRATING NOT SHOWN FOR CLARITY



TYPICAL STIFFENER LOCATION DETAIL
SCALE: 1/2" = 1'-0"

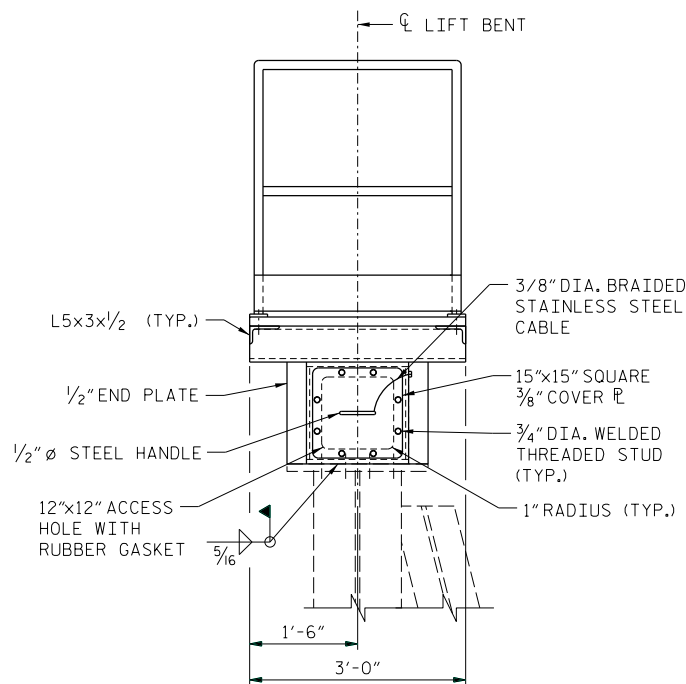


SECTION G-G
SCALE: 3/8" = 1'-0"

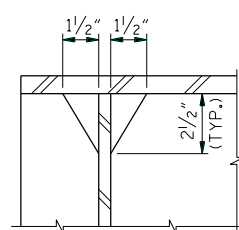
NOTES:

1. ALL BOX WELDS SHOWN SHALL BE ULTRASONICALLY TESTED INCLUDING BACK-UP BAR SPLICE WELDS.
2. BACK-UP BARS FOR ALL BOX WELDS SHALL BE TESTED BY RADIOGRAPHIC INSPECTION PRIOR TO ASSEMBLY OF BOX.
3. FOR ADDITIONAL LIFT BENT MODIFICATION NOTES, SEE SHEET NO. S-6.
4. WORK THIS SHEET WITH SHEET NOS. S-6, S-8 AND S-9.

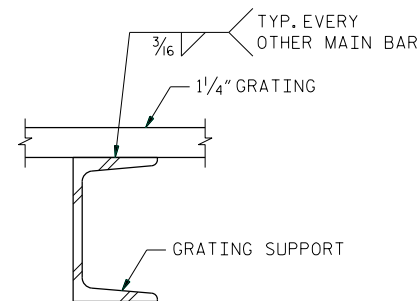
PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
STATION: 17+01.73/1+99.80



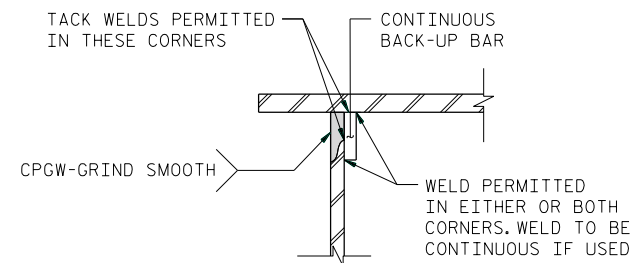
SECTION H-H
SCALE: 3/4" = 1'-0"



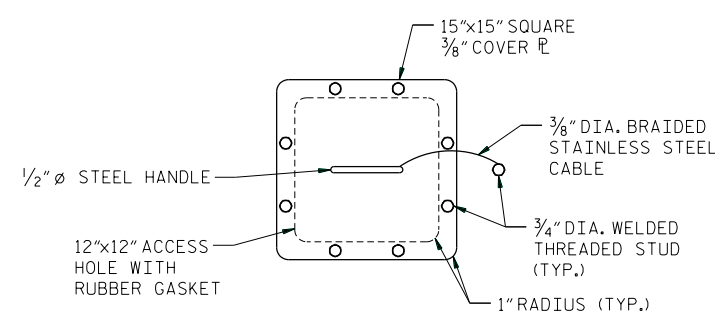
TYPICAL STIFFENER CLIP DETAIL
SCALE: 3" = 1'-0"



TYPICAL GRATING CONNECTION DETAIL
SCALE: 3" = 1'-0"

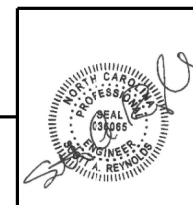


TYPICAL BOX WELD DETAIL
NOT TO SCALE



TYPICAL ACCESS HOLE DETAIL
SCALE: 1/2" = 1'-0"

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LIFT BENT DETAILS
FOR SOUTHPORT AND FORT FISHER BASINS

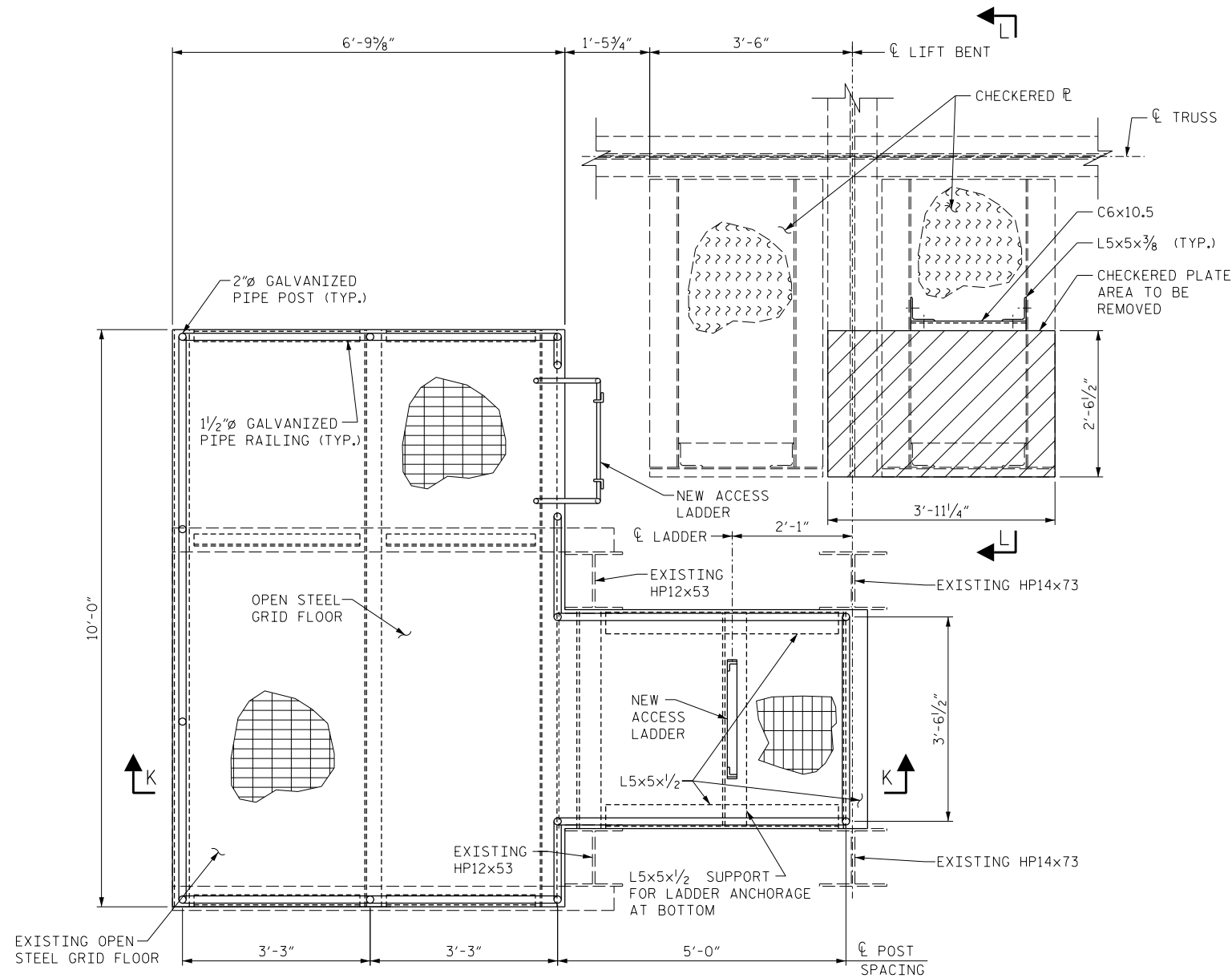
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 31

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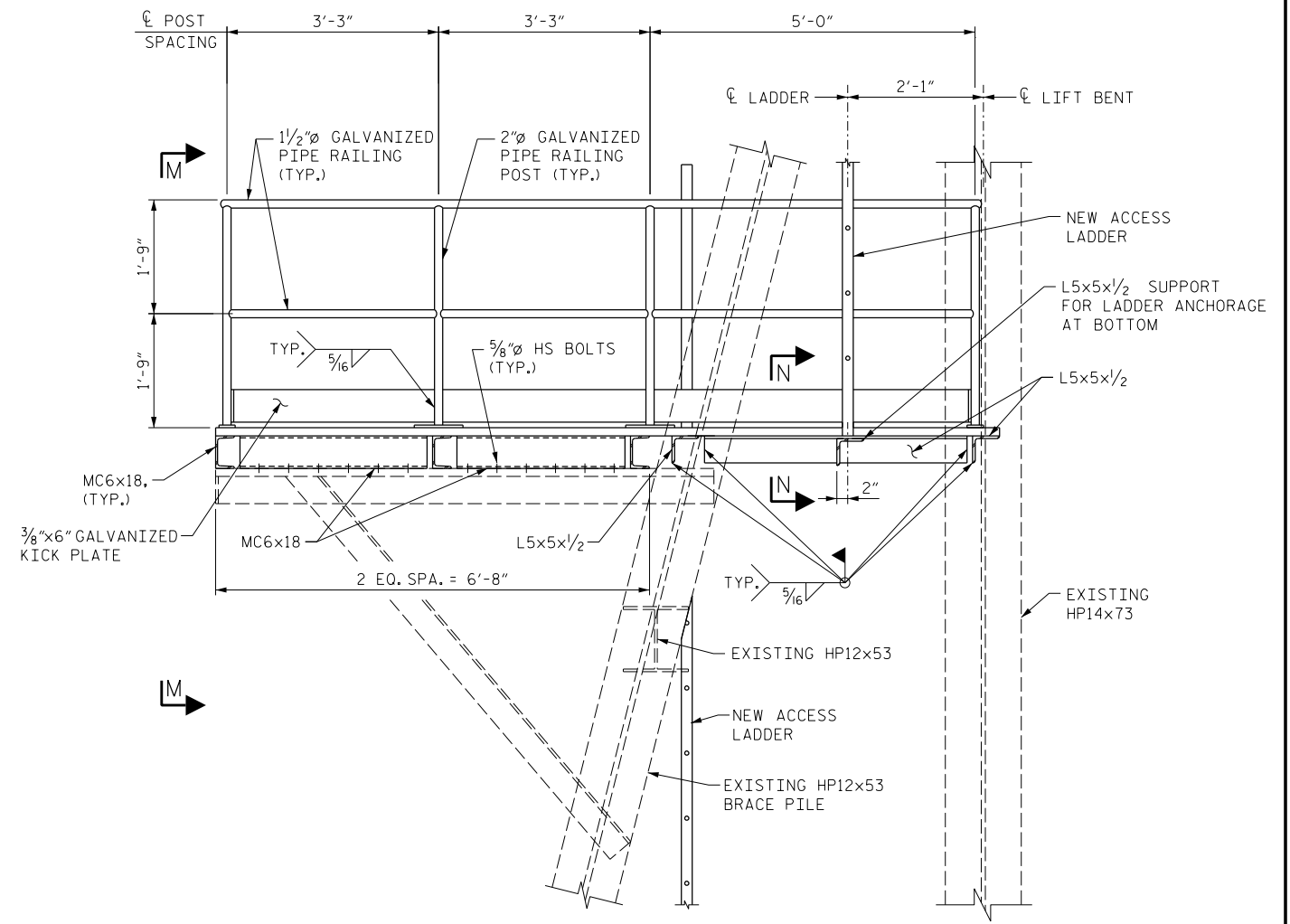
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DRAWN BY : RP DATE : DEC. 2018
CHECKED BY : DN DATE : DEC. 2018
DESIGN ENGINEER OF RECORD : SAR DATE : DEC. 2018



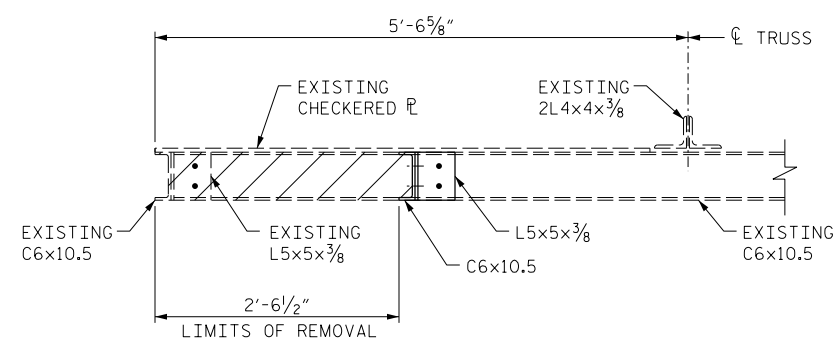
FLOOR PLAN

SCALE: 3/4" = 1'-0"



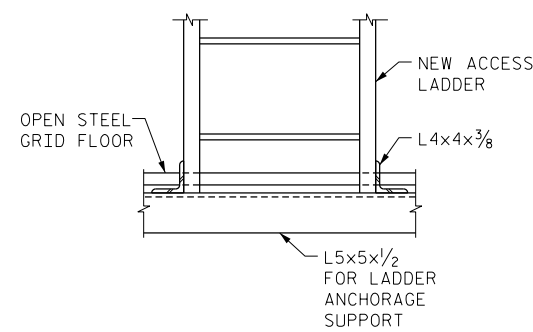
SECTION K-K

SCALE: 3/4" = 1'-0"



SECTION L-L

SCALE: 1" = 1'-0"



SECTION N-N

SCALE: 1" = 1'-0"

NOTES:

1. ALL NEW ACCESS LADDERS, SAFETY CAGES, AND ACCOMPANYING HARDWARE SHALL BE GALVANIZED.
2. ALL OPEN STEEL GRATING SHALL BE GALVANIZED WITH TRACTION SURFACE APPLIED. SEE SHEET NO. S-6 FOR ADDITIONAL GRATING DETAILS.
3. ALL NEW HANDRAILS, KICKPLATES, POSTS, BASEPLATES, AND ACCOMPANYING HARDWARE SHALL BE GALVANIZED.
4. PROVIDE VENT AND DRAIN HOLES IN HANDRAILS AND POSTS AS-NEEDED FOR GALVANIZING.
5. FOR TYPICAL RAILING DETAILS, SEE SHEET NO. S-9.
6. ALL LADDERS, SAFETY CAGES AND ACCOMPANYING HARDWARE SHALL BE PAID FOR UNDER "APPROX. 23,800 LBS. STRUCTURAL STEEL".
7. ALL GRATING, POSTS, HANDRAILS, KICKPLATES, BASEPLATES, AND ACCOMPANYING HARDWARE SHALL BE PAID FOR UNDER "APPROX. 23,800 LBS. STRUCTURAL STEEL".

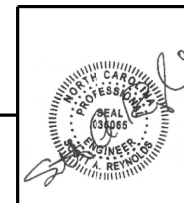
EXISTING STRUCTURE TO BE REMOVED

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BRUNSWICK/NEW HANOVER COUNTY
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ACCESS PLATFORM DETAILS I

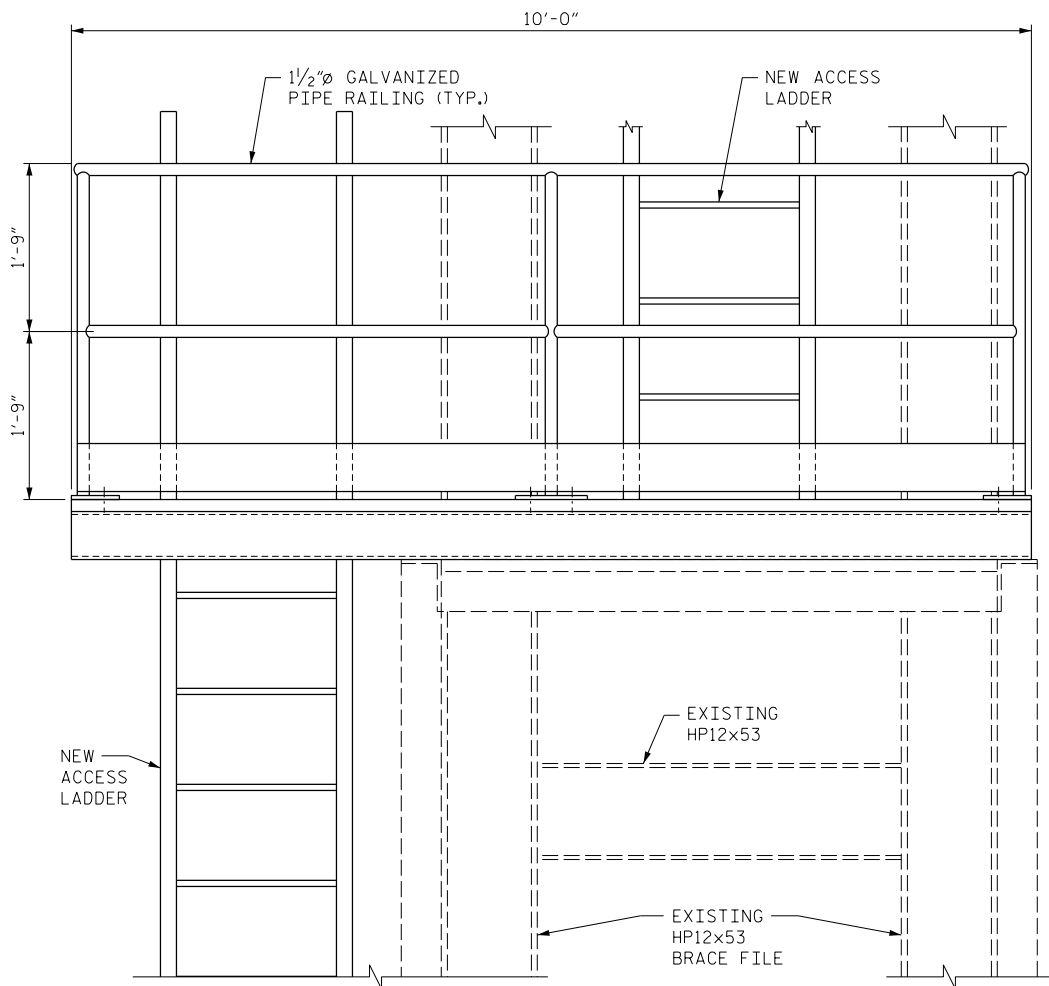
FOR SOUTHPORT AND FORT FISHER BASINS



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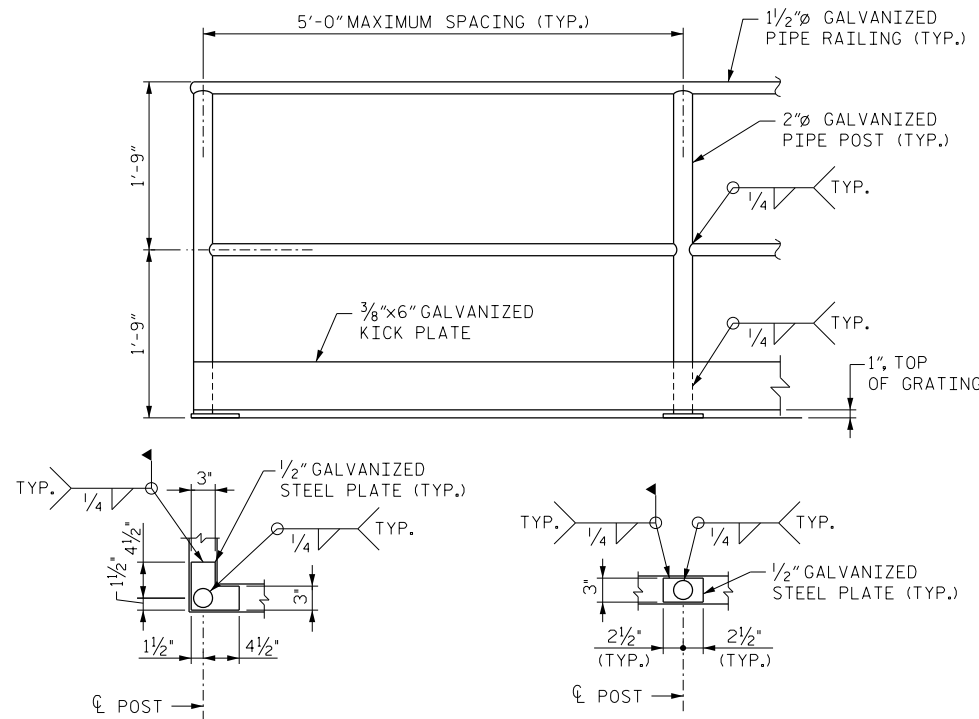
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			31



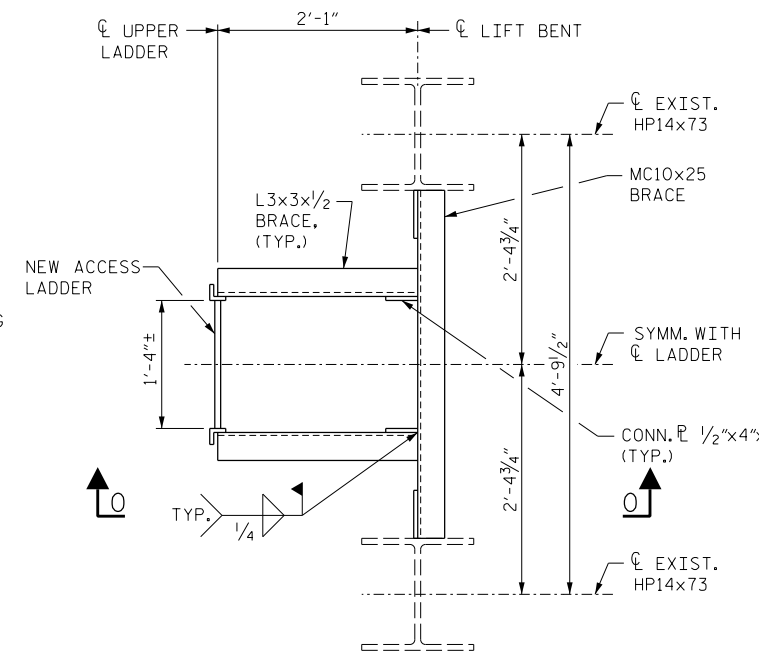
VIEW M-M

SCALE: 1" = 1'-0"
NOTE: COLUMN BRACING NOT SHOWN FOR CLARITY.



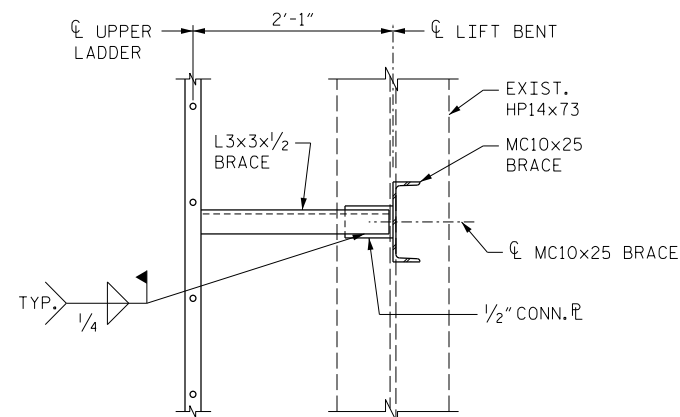
TYPICAL RAILING DETAILS

SCALE: 1" = 1'-0"



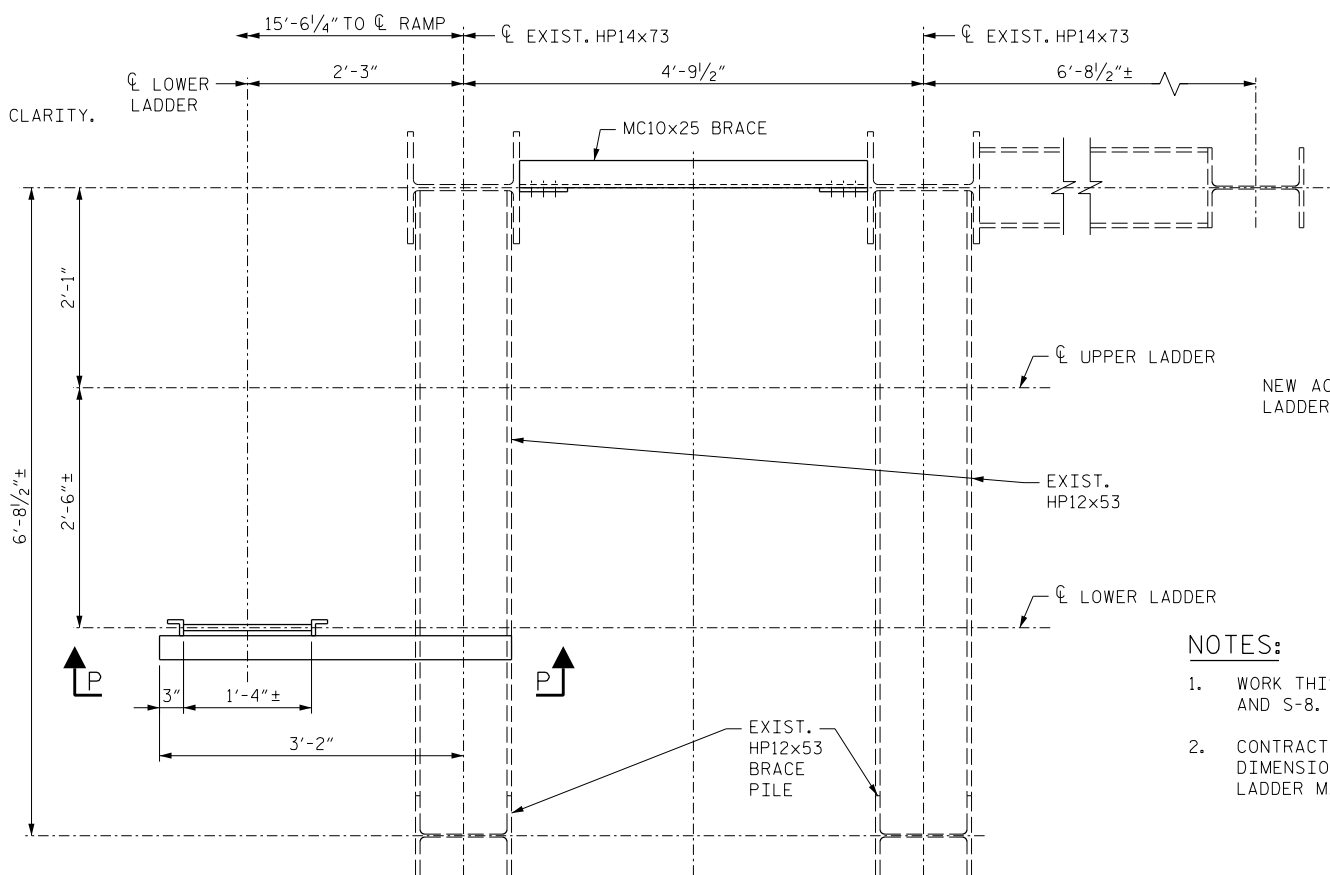
SECTION I-I

SCALE: 1" = 1'-0"



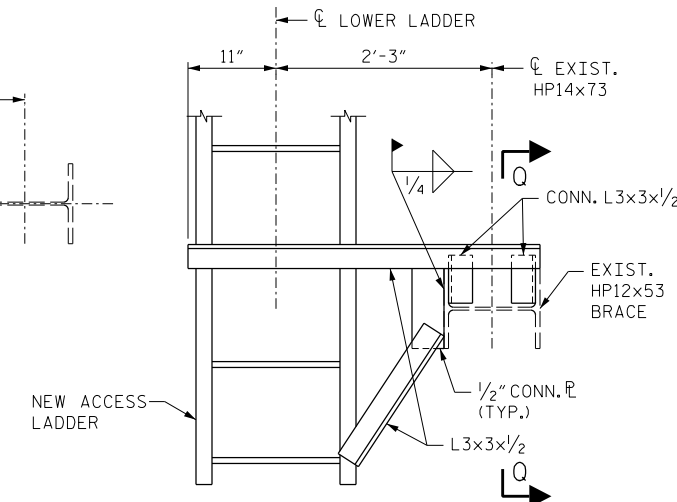
SECTION O-O

SCALE: 1" = 1'-0"



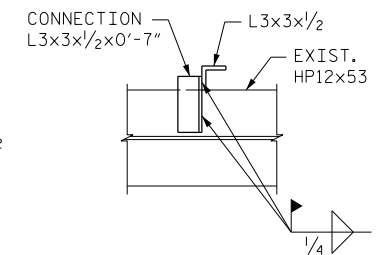
SECTION J-J

SCALE: 1" = 1'-0"



SECTION P-P

SCALE: 1" = 1'-0"



SECTION Q-Q

SCALE: 1" = 1'-0"

NOTES:

1. WORK THIS SHEET WITH SHEET NOS. S-7 AND S-8.
2. CONTRACTOR TO COORDINATE LADDER DIMENSIONS AND DETAILS WITH LADDER MANUFACTURER/SUPPLIER.

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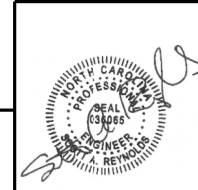
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ACCESS PLATFORM DETAILS II

FOR SOUTHPORT AND FORT FISHER BASINS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			31

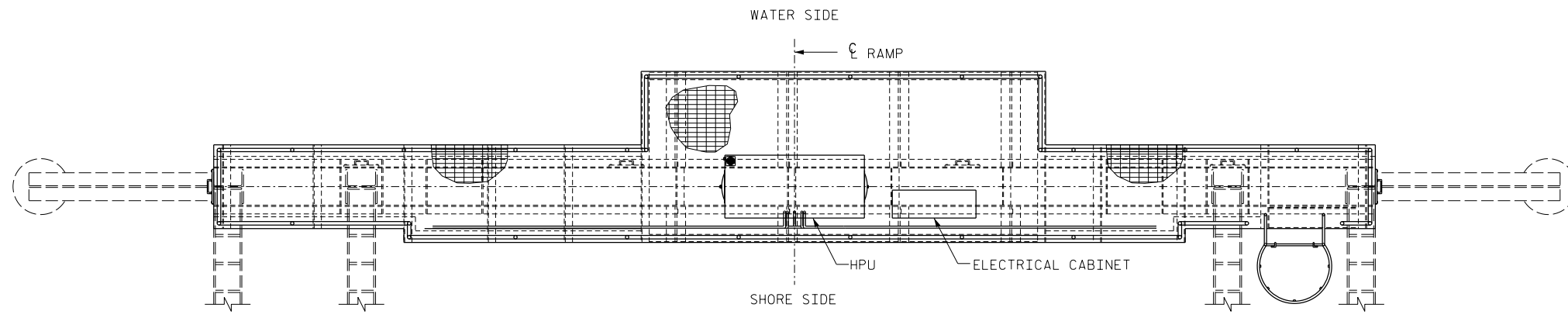
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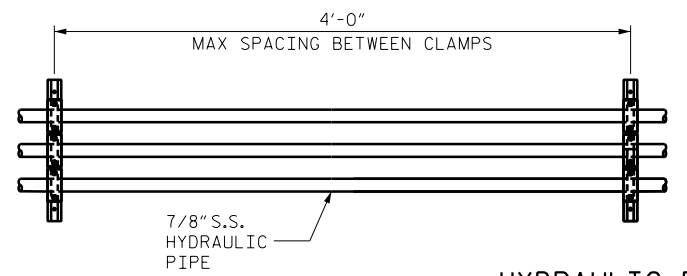
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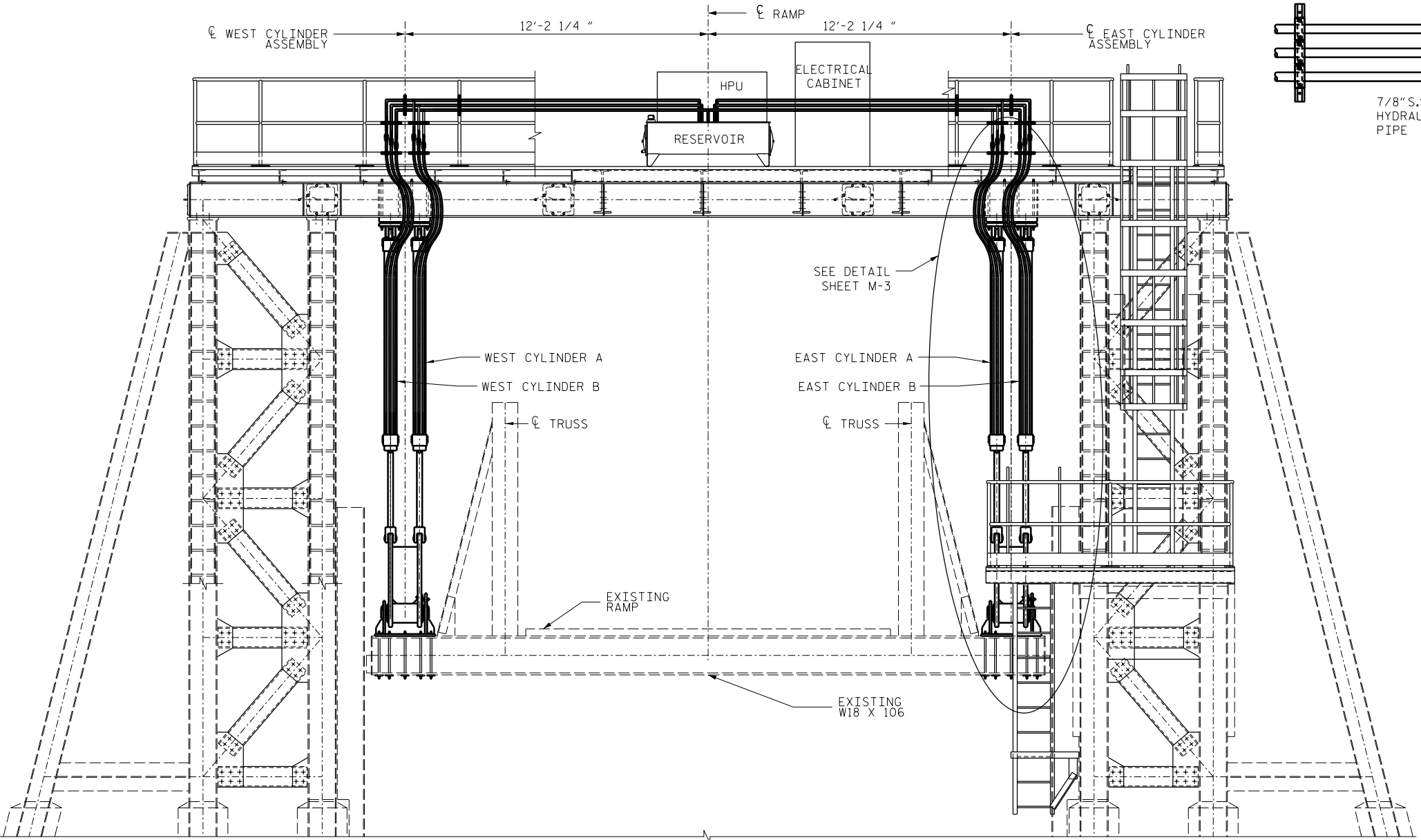
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DESIGN ENGINEER OF RECORD : DN	DATE : DEC. 2018



HYDRAULIC PIPING PLAN
SCALE: 3/8" = 1'-0"



HYDRAULIC PIPE MOUNTING DETAILS
SCALE: 1 1/2" = 1'-0"



HYDRAULIC PIPING ELEVATION
SCALE: 3/8" = 1'-0"

FULL ACCESS PLATFORM NOT SHOWN FOR CLARITY
UPPER CYLINDER CONNECTIONS NOT SHOWN FOR CLARITY

NOTE:
1. FOR MACHINERY NOTES, SEE SHEET M-3.

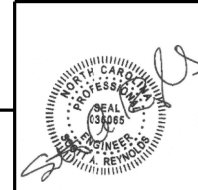
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HYDRAULIC PIPING LAYOUT

FOR SOUTHPORT AND FORT FISHER BASINS

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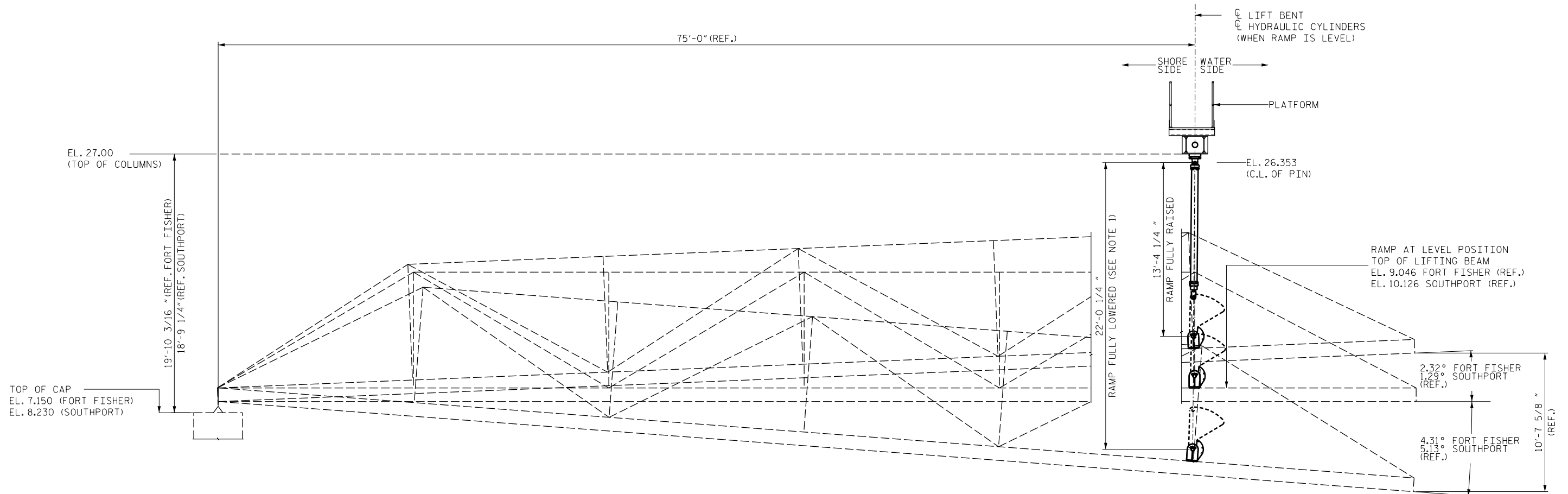
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	M-1
1			3			TOTAL SHEETS
2			4			31

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default 12/28/2018 c:\users\thawkins\hpr\od\dms03400\M-1 Hydraulic Piping .dgn

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12/28/2018 c:\users\thawkins\hpr\dms03400\M-2 Ramp_Extent_of_Travel.dgn



RAMP EXTENT OF TRAVEL
 SCALE: 1/4" = 1'-0"
 CYLINDER ONLY SHOWN WITH RAMP
 FULLY RAISED FOR CLARITY

- NOTES:**
1. RAMP LOCATION WITH EXISTING CYLINDERS FULLY EXTENDED, WITH CHAINS IN TENSION, TO MATCH RAMP POSITION WHEN LOWERED WITH NEW CYLINDERS FULLY EXTENDED AND FLOATING MECHANISM IN TENSION. CONTRACTOR TO FIELD VERIFY AND SURVEY RAMP POSITION WITH EXISTING EQUIPMENT AND ENSURE NEW CYLINDERS AND BENT LOCATION TO MATCH EXISTING RAMP LOWERED POSITION.
 2. CONTRACTOR TO FIELD VERIFY ALL NOTED ELEVATIONS.
 3. FOR ADDITIONAL MACHINERY NOTES, SEE SHEET M-3.

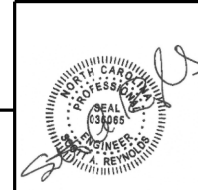
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EXTENT OF TRAVEL
 FOR SOUTHPORT AND
 FORT FISHER BASINS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	M-2
1			3			TOTAL SHEETS
2			4			31

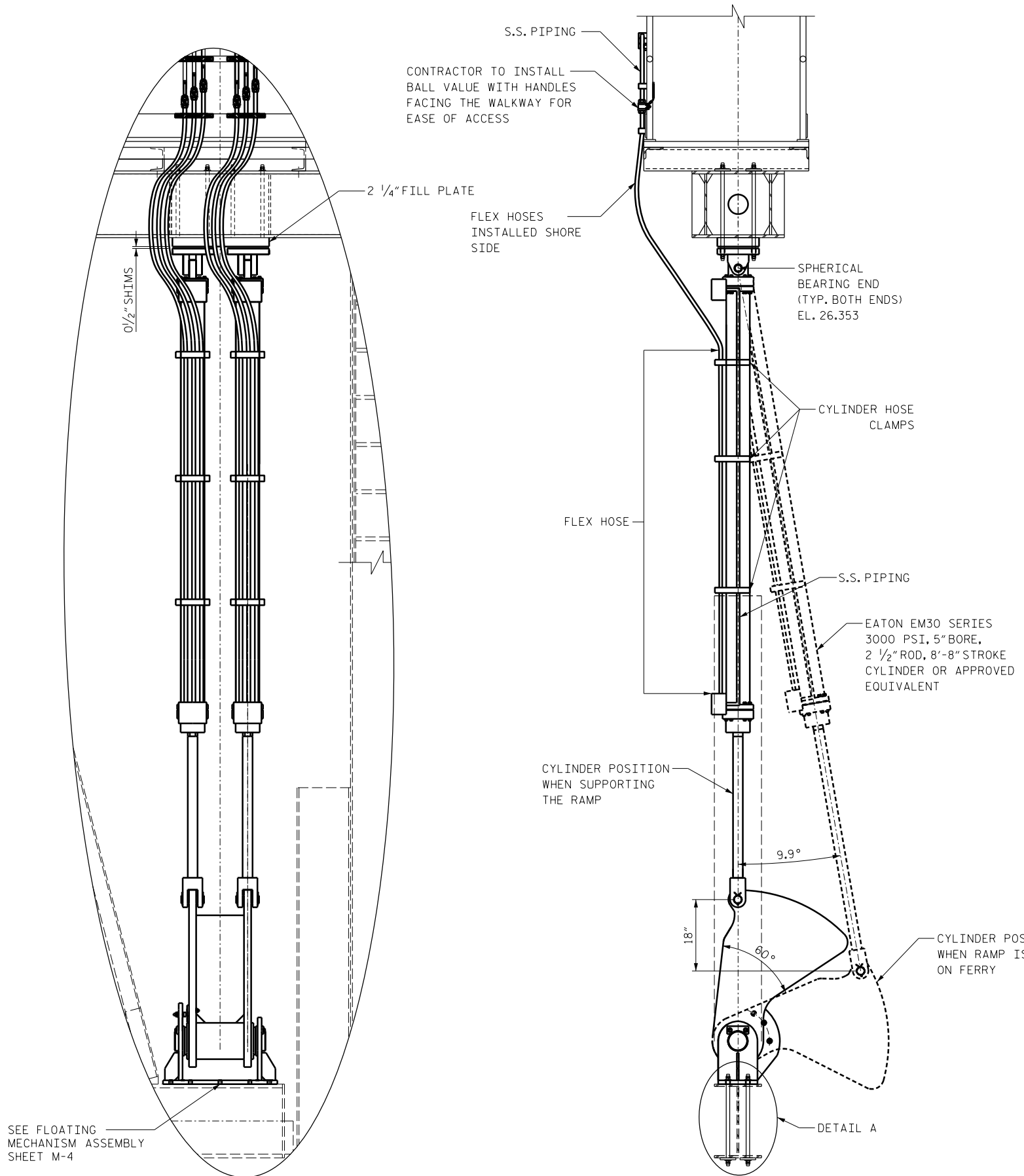
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DETAIL - CYLINDER ASSEMBLY

SCALE: 3/4" = 1'-0"

(2) AS SHOWN

(2) OPPOSITE HAND

LADDER NOT SHOWN FOR CLARITY

CYLINDER SIDE ELEVATION

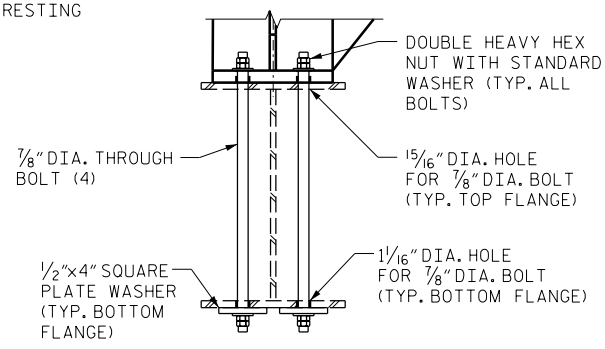
SCALE: 3/4" = 1'-0"

GENERAL MACHINERY NOTES:

1. THESE PLANS ARE BASED ON THE ORIGINAL CONTRACT PLANS (CIRCA 1988), WHICH ARE INCLUDED FOR REFERENCE. THE ORIGINAL CONTRACT PLANS HAVE NOT BEEN VERIFIED. THE CONTRACTOR SHALL PERFORM ACCURATE FIELD MEASUREMENTS TO VERIFY ACTUAL SIZES OF EXISTING COMPONENTS, MEMBERS AND ALL DIMENSIONS SHOWN ON THE PLANS. ADDITIONAL FIELD MEASUREMENTS TO ACCURATELY LOCATE THE OPTIMAL POSITIONS AND/OR ALIGNMENTS OF THE MACHINERY AND MACHINERY SUPPORTS SHALL BE PERFORMED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER. ANY DEVIATIONS FROM THE ORIGINAL AND/OR REHABILITATION CONTRACT PLANS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER. RECORD ALL DEVIATIONS ON THE SUBMITTED SHOP DRAWINGS WHEN THEY ARE REQUIRED.
2. ALL DIMENSIONS FOR MACHINE FINISHED SURFACES SHALL BE HELD TO +/- 0.005 INCH, EXCEPT AS OTHERWISE REQUIRED BY THE PLANS OR SPECIFICATIONS.
3. PROVIDE GALVANIZED ASTM A449 H.S. BOLTS, AS REQUIRED, TO CONNECT MACHINERY TO STRUCTURAL STEEL, UNLESS OTHERWISE NOTED. ALL ASTM A449 H.S. BOLTS CONNECTING MACHINERY TO STRUCTURAL STEEL SHALL HAVE A CLEARANCE OF NOT MORE THAN 0.010 INCH BETWEEN THE BOLT SHANK AND THE HOLE.
4. EACH BOLT SHALL HAVE A PLAIN HARDENED WASHER UNDER THE HEAD AND THE NUT. PLAIN HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND NUTS SHALL CONFORM TO ASTM A563.
5. PROVIDE ALL NEW STAINLESS STEEL SHIM PACKS FOR LEVELING AND ALIGNING OF ALL MACHINERY COMPONENTS. SHIM PACKS SHALL BE 1/2 INCH NOMINAL THICKNESS, UNLESS OTHERWISE SPECIFIED, WITH ADJUSTMENT VARIATIONS TO 1/16 INCH.
6. FITS AND FINISHES FOR THE MACHINERY SHALL BE AS FOLLOWS UNLESS OTHERWISE NOTED:

SURFACE	FIT (ANSI)	FINISH (MICROINCHES)
MACHINERY BASE ON STEEL	-	250
MACHINERY PARTS IN FIXED CONTACT	-	125
SHAFTS (EXPOSED SURFACES)	-	63
SHAFTS (JOURNAL SURFACES)	RC6	8
BUSHINGS (JOURNAL SURFACES)	RC6	16
SPLIT BUSHING IN BASE	LC1	125
SOLID BUSHING IN BASE (TO 1/4" WALL)	FN1	63
SOLID BUSHING IN BASE (OVER 1/4" WALL)	FN2	63
HUBS ON SHAFTS (TO 2" BORE)	FN2	32
HUBS ON SHAFTS (OVER 2" BORE)	FN2	63
TURND BOLTS IN FINISHED HOLES	LC6	63
SLIDING BEARINGS	RC6	32
KEYS AND KEYSEATS	CLASS 2	63

7. FITS FOR CYLINDRICAL PARTS SHOWN ABOVE SHALL ALSO APPLY TO THE MAJOR DIMENSIONS OF NON-CYLINDRICAL PARTS.
8. CLEANING, PAINTING AND, AS APPLICABLE, LUBRICATING SHALL BE INCLUDED UNDER EACH MACHINERY ITEM.
9. MODEL NUMBERS AND DETAILS FOR STANDARD COMPONENTS ARE BASED ON MANUFACTURER'S CATALOG DATA CURRENT AT THE TIME THE PLANS WERE PREPARED. EQUIVALENT MODELS FROM OTHER MANUFACTURERS MAY BE PROPOSED FOR SUBSTITUTION BY THE CONTRACTOR AND FOR APPROVAL BY THE ENGINEER. ALL RELATED STRUCTURAL, MECHANICAL, ARCHITECTURAL AND ELECTRICAL DETAILS SHALL BE REVISED BY THE CONTRACTOR TO SUIT THE CERTIFIED DIMENSIONS OF THE COMPONENTS ACTUALLY FURNISHED AT NO ADDITIONAL COST.
10. ALL NEW MOUNTING SURFACES USED TO SUPPORT MACHINERY COMPONENTS SHALL BE VERIFIED AS BEING FLAT. FLAT SHALL BE DEFINED AS MEASURING WITHIN 0.010 OF AN INCH PER FOOT OF THE SURFACE. ALL EXISTING MOUNTING SURFACES FOR NEW EQUIPMENT SHALL BE PREPARED BY REMOVAL OF PAINT AND APPLYING THIN COAT OF EPOXY FILLER TO FILL UNEVEN STEEL PITS OR CORROSION LOSS. SURFACE SHALL THEN BE PRIMED FOR CONNECTION TO NEW STEEL.
11. WHERE PERMANENT MACHINERY REMOVAL OR CLEANING/REHABILITATION IS REQUIRED, ALL ITEMS SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH ALL ENVIRONMENTAL REGULATIONS AND LOCAL AND STATE LAW. THESE ITEMS SHALL INCLUDE BUT NOT BE LIMITED TO COMPONENTS CONTAINING LEAD PAINT, ASBESTOS, LUBRICANTS AND ANY OTHER ENVIRONMENTALLY SENSITIVE MATERIAL.
12. ELECTRICAL ITEMS SUCH AS MOTORS ARE TO BE FURNISHED UNDER THE ELECTRICAL WORK ITEM, HOWEVER THESE ITEMS ARE TO BE INSTALLED AND ALIGNED AS PART OF THE MACHINERY WORK.
13. HYDRAULIC MACHINERY SHALL BE PAID FOR UNDER THE LUMP SUM RAMP HYDRAULIC SYSTEM FOR EACH STRUCTURE.



DETAIL A

SCALE: 1/2" = 1'-0"

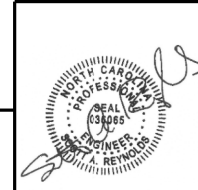
CROSSBEAM CONNECTION SIMILAR

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HYDRAULIC CYLINDER ASSEMBLY

FOR SOUTHPORT AND FORT FISHER BASINS



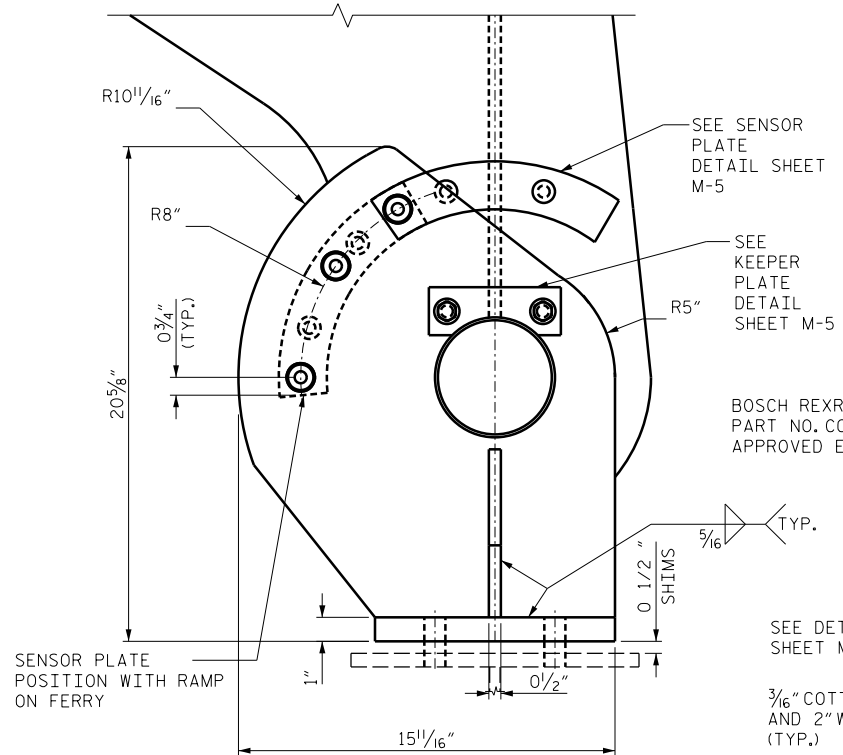
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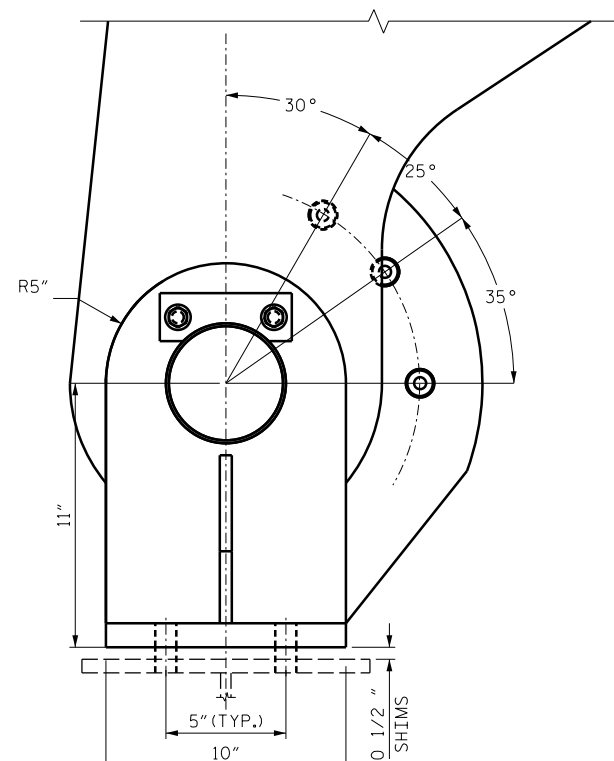
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NO.	BY:	DATE:	NO.	BY:	DATE:	M-3
1			3			TOTAL SHEETS
2			4			31

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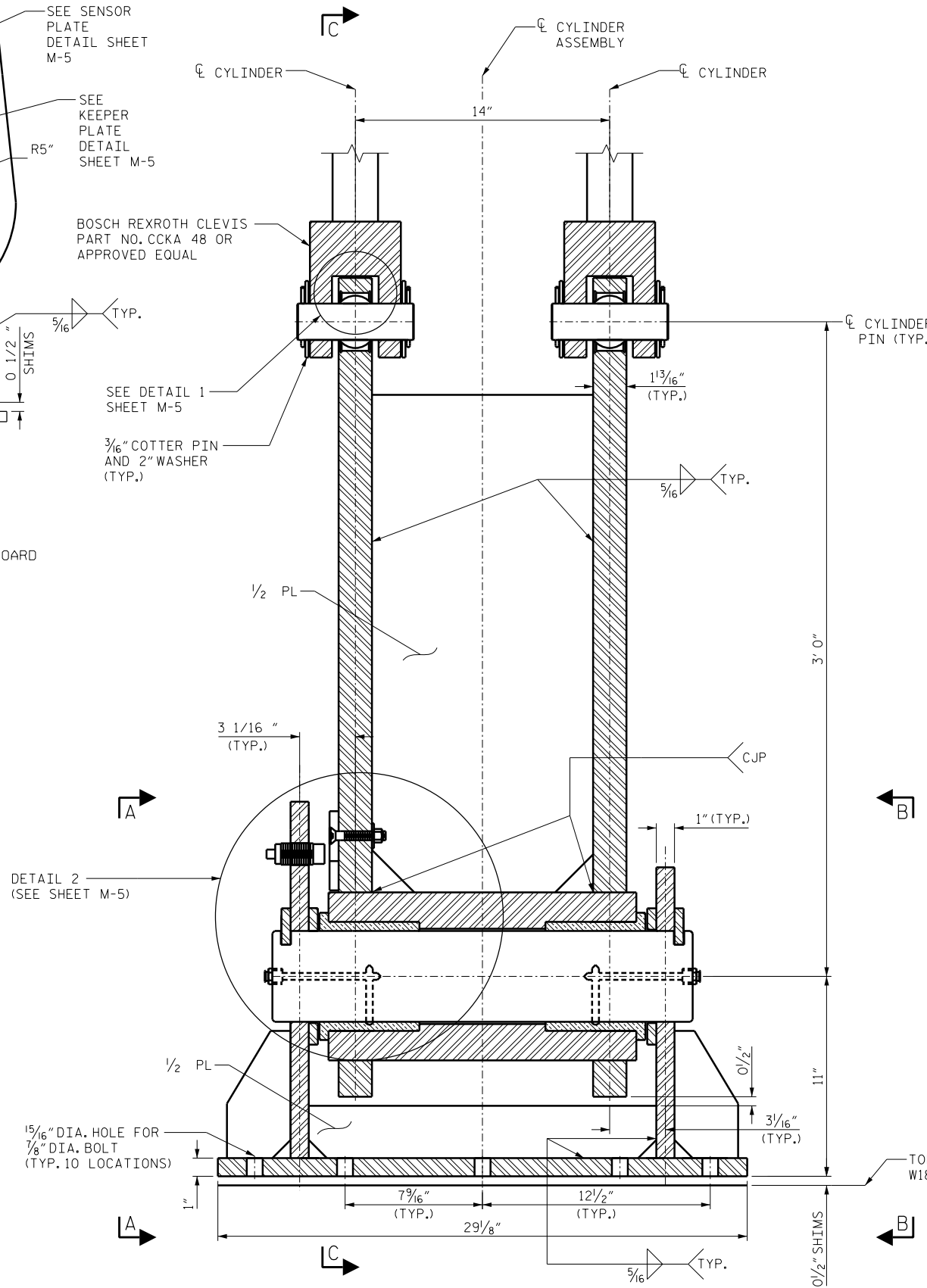
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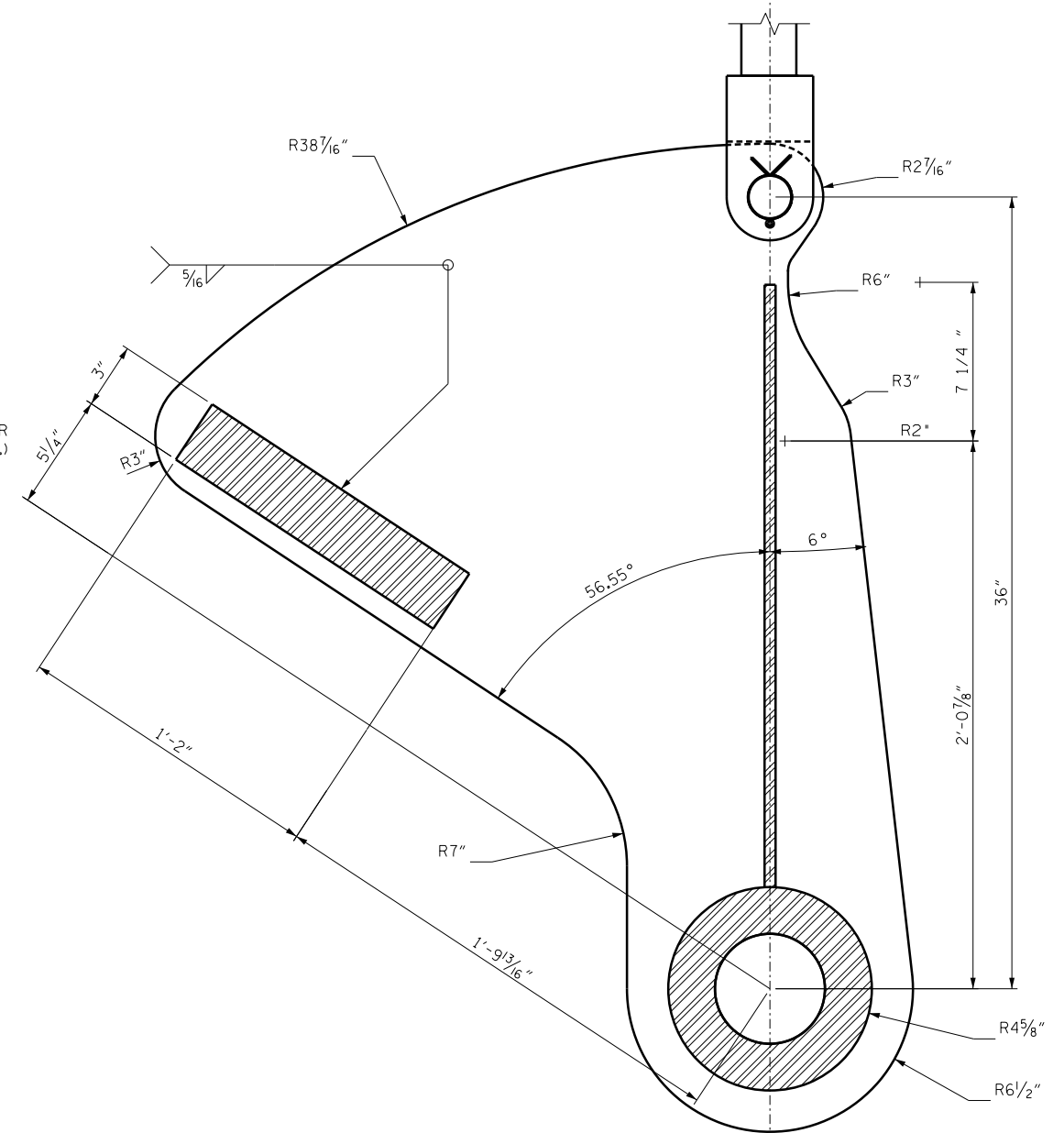
VIEW A-A
SCALE: 3" = 1'-0"
INBOARD SIDE, FACING OUTBOARD



VIEW B-B
SCALE: 3" = 1'-0"



MECHANISM ELEVATION
SCALE: 3" = 1'-0"
(2) REQUIRED AS SHOWN.
(2) REQUIRED OPPOSITE HAND



SECTION C-C
SCALE: 3" = 1'-0"
SENSOR PLATE & BASE NOT SHOWN FOR CLARITY

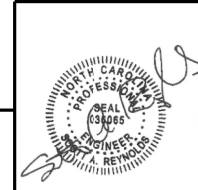
NOTES:

1. FOR FLOATING MECHANISM MATERIAL LIST, SEE SHEET M-5.
2. AFTER COMPLETION OF WELDMENT, AND BEFORE FINAL MACHINING, THE FLOATING MECHANISM WELDMENT SHALL BE STRESS RELIEVED BY HEAT TREATMENT.

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RALEIGH
FLOATING MECHANISM ASSEMBLY
FOR SOUTHPORT AND FORT FISHER BASINS

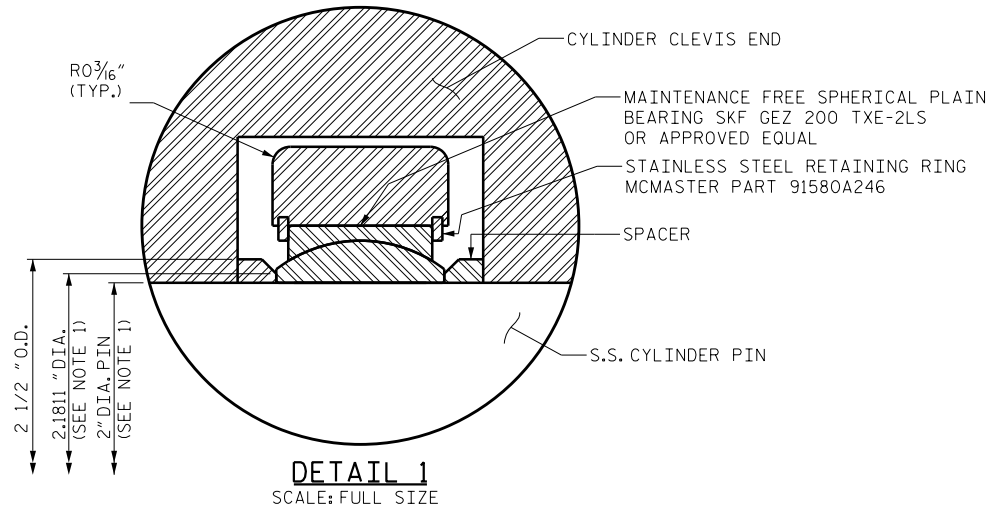
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1			3			TOTAL SHEETS
2			4			31

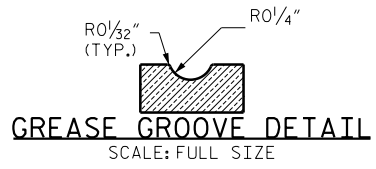
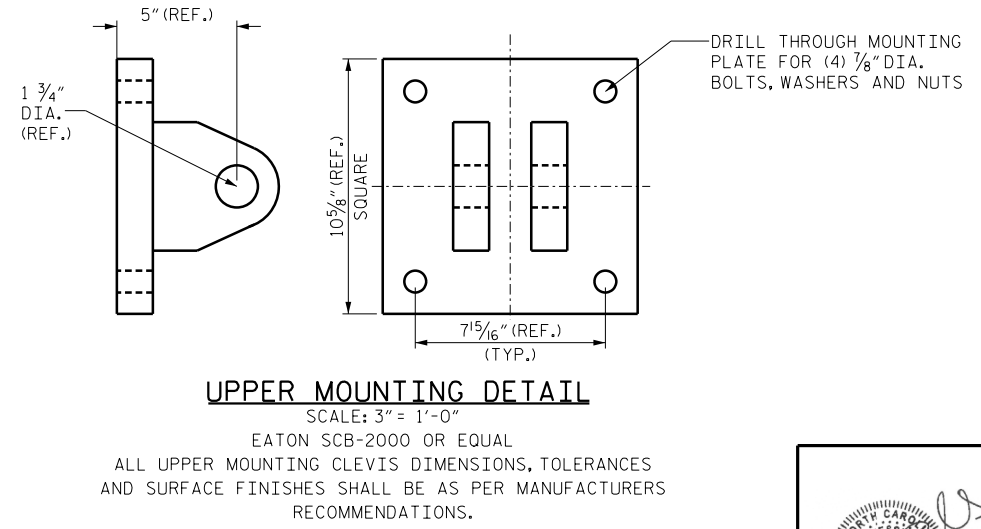
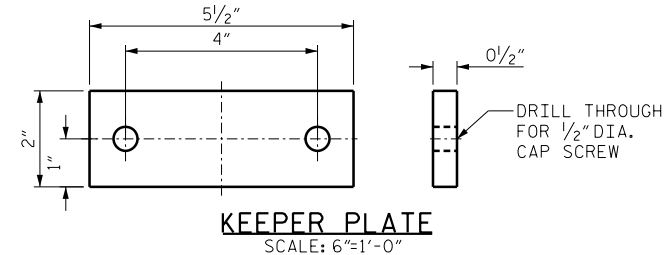
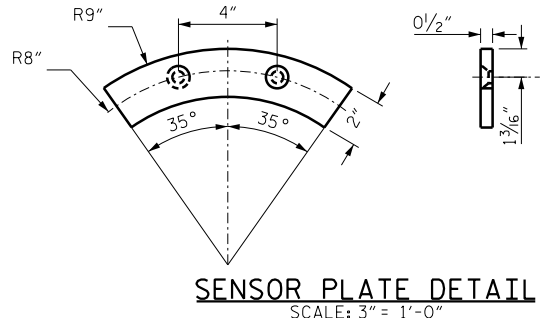
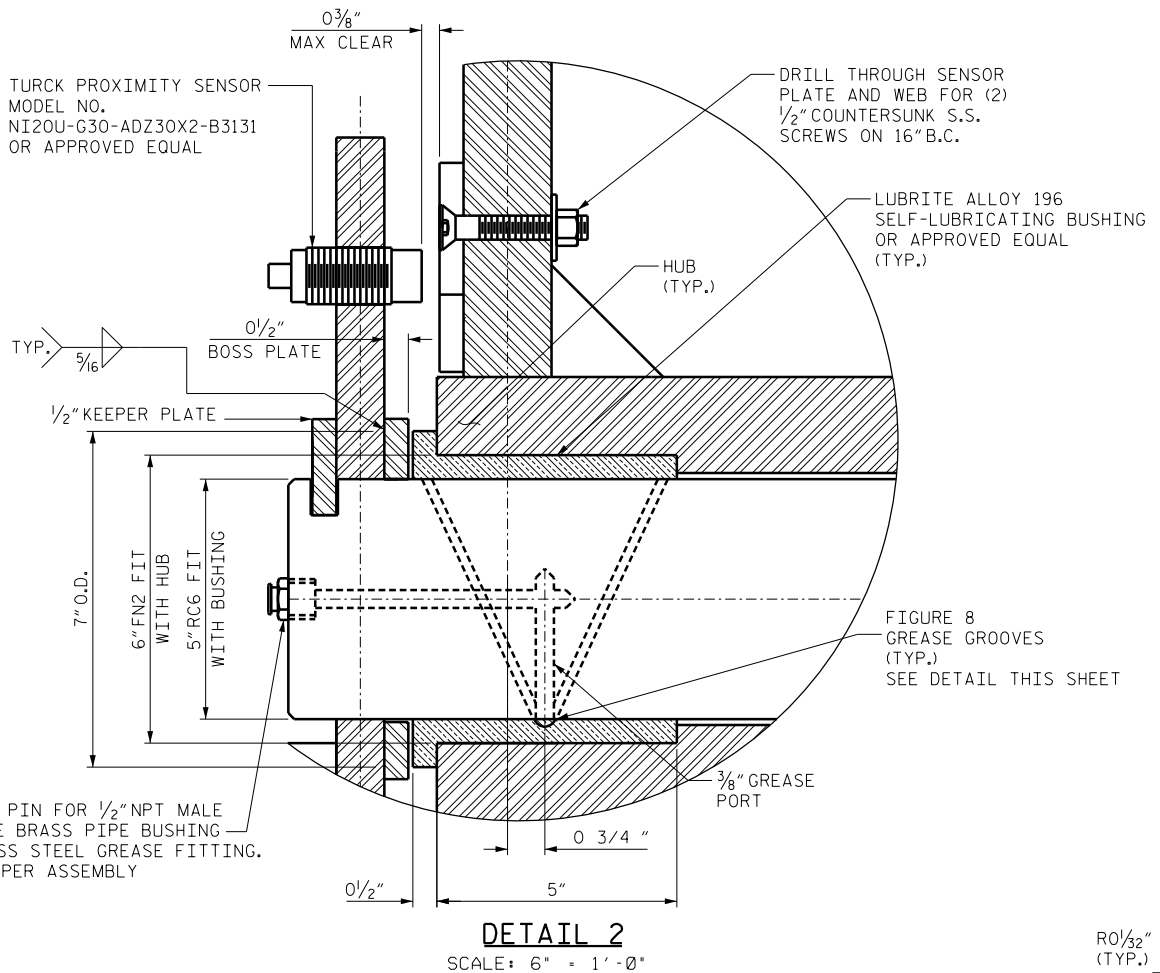
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DATE : DEC. 2018
DATE : DEC. 2018
DATE : DEC. 2018



FLOATING MECHANISM MATERIAL LIST			
PART	MATERIAL	DESIGNATION	SUPPLEMENTAL
SPACER	STAINLESS STEEL	AISI 316 SS	N/A
PIVOT PIN	STAINLESS STEEL	ASTM A564 TYPE 635 COND. H1050	N/A
CYLINDER PINS	STAINLESS STEEL	ASTM A276 TYPE 316	N/A
KEEPER PLATE	STRUCTURAL STEEL	ASTM A709 GR. 50	N/A
SELF-LUBRICATING BUSHING	BRONZE	LUBRITE ALLOY 196 (ASTM B22 C91100)	N/A
FLOATING MECHANISM & BASE	STRUCTURAL STEEL	ASTM A709 GR. 50	N/A
BOSS PLATE	STAINLESS STEEL	ASTM A276 TYPE 316	N/A
SENSOR PLATE	STRUCTURAL STEEL	ASTM A709 GR. 50	N/A

NOTES:
 1. ALL BEARING, RETAINER RING AND SPACER BUSHING RELATED DIMENSIONS, TOLERANCES AND SURFACE FINISHES SHALL BE AS PER THE MANUFACTURERS RECOMENDATION.



PROJECT NO. 16SP.6.3.1/16SP.6.3.2
 BRUNSWICK/NEW HANOVER COUNTY
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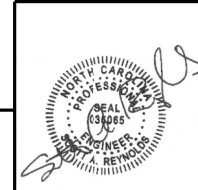
FLOATING MECHANISM DETAILS

FOR SOUTHPORT AND FORT FISHER BASINS

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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TOTAL SHEETS: 31

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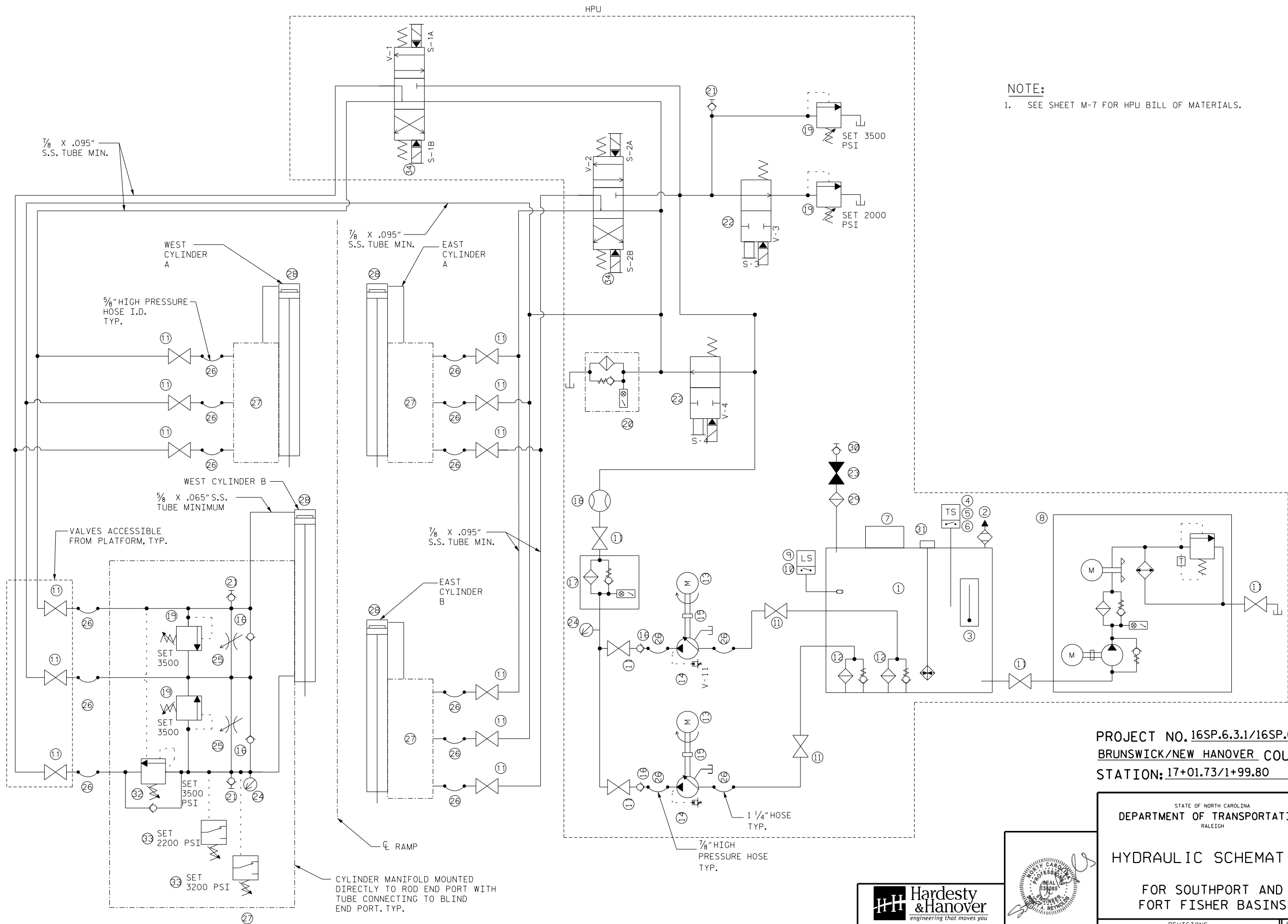


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NOTE:
1. SEE SHEET M-7 FOR HPU BILL OF MATERIALS.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
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FOR SOUTHPORT AND
FORT FISHER BASINS

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M-6
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31

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VALVE SOLENOID TABLE										
VALVE NUMBER	V-1		V-2		V-3	V-4	APPROX. PRESSURE BLIND PORT (PSI)	APPROX. PRESSURE ROD PORT (PSI)	APPROX. PRESSURE AT PUMP(S) (PSI)	APPROX. MOTOR POWER REQD. (PER PUMP) (HP)
SOLENOID NUMBER	S-1A	S-1B	S-2A	S-2B	S-3	S-4	-	-	SEE NOTE 4	-
PUMP ON SYSTEM IDLE	0	0	0	0	0	0	SEE NOTE 1	SEE NOTE 1	50	1.5
LOWER RAMP-4 CYLINDERS	0	X	0	X	0	X	345	1968	445	3.4
RAISE RAMP-4 CYLINDERS	X	0	X	0	0	X	50	1508	1608	12.5
LOWER RAMP-2 CYLINDERS	0	X	0	X	X	X	31	2907	131	1.0
RAISE RAMP-2 CYLINDERS	X	0	X	0	X	X	50	2866	2966	15.0 (SEE NOTE 2)
FLOAT-LOWER CYLINDER 4 CYLINDERS	0	X	0	X	0	X	658	1028	758	5.9
FLOAT-RAISE CYLINDER 4 CYLINDERS	X	0	X	0	0	X	50	150	250	1.6
FLOAT-LOWER CYLINDER 2 CYLINDERS	0	X	0	X	X	X	658	1028	758	5.9
FLOAT-RAISE CYLINDER 2 CYLINDERS	X	0	X	0	X	X	50	150	250	1.9

NOTES:

- PRESSURE WILL DEPEND ON WHETHER RAMP IS ON FERRY OR HANGING FROM CYLINDERS AND IF CYLINDERS ARE MOVING OR STILL.
- ASSUMED SINGLE PUMP OPERATION WHEN OPERATING WITH TWO CYLINDERS. HP LIMITED PUMP WILL BE SET TO 15 HP. IN RAISE CASE THE FLOW WILL BE REDUCED TO APPROXIMATELY 7 GPM IN ORDER TO REDUCE POWER TO 15 HP.
- PRESSURE NUMBERS ABOVE ASSUME COUNTERBALANCE VALVE WITH 3:1 PILOT RATIO AND SET TO 3000 PSI RELIEF PRESSURE.
- PUMP PRESSURE ASSUMES PARKER PV023 PUMP RATE AT 10.63 GPM FULL STROKE DISPLACEMENT BASED ON 1750 RPM INPUT. FLOW WILL BE REDUCED DUE TO VOLUMETRIC EFFICIENCY AND WHEN LIMITING POWER TO 15 HP AS PER NOTE 2 ABOVE.

HPU BILL OF MATERIALS

ITEM, DESCRIPTION

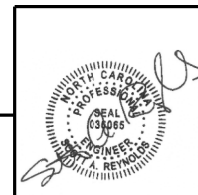
- RESERVOIR, 80 GALLONS, JIC CONFIGURATION, 316 STAINLESS STEEL CONSTRUCTION RATED FOR MARINE ENVIRONMENT.
- DESICCANT BREATHING FILTER, 3 MICRON ABSOLUTE 99% EFFICIENT.
- LEVEL INDICATOR WITH INTEGRAL THERMOMETER
- TEMPERATURE SWITCH LOW TEMPERATURE ALARM, SET 50 DEGREES FAHRENHEIT
- TEMPERATURE SWITCH HIGH TEMPERATURE ALARM, SET 120 DEGREES FAHRENHEIT
- TEMPERATURE SWITCH HIGH TEMPERATURE SHUT OFF, SET 140 DEGREES FAHRENHEIT
- CONTROL VALVE MANIFOLD
- FLUID CONDITIONER AND COOLER WITH TEMPERATURE AND PRESSURE BYPASS VALVE, FILTER WITH LOCAL FILTER BYPASS INDICATION, 99% EFFICIENT, .6 KW/°K HEAT REMOVAL, 316L STAINLESS STEEL CONSTRUCTION, RATED FOR OUTDOOR USE IN MARINE ENVIRONMENT
- LEVEL SWITCH, LOW LEVEL ALARM
- LEVEL SWITCH, LOW LEVEL SHUT OFF
- BALL VALVE, NORMALLY OPEN - FULL PORT
- FLUID SUPPLY STRAINER WITH BYPASS, STRAINER AND BYPASS TO MEET PUMP OEM RECOMMENDATION
- HPU MOTOR, 15 HP, 1750 RPM
- 3000 PSI MINIMUM 10.5 GPM PRESSURE COMPENSATED, VARIABLE DISPLACEMENT, AXIAL PISTON PUMP WITH CONSTANT HORSEPOWER CONTROLLER, AND ADJUSTABLE MAXIMUM VOLUME STOP, PARKER PV023 SERIES OR EQUAL, SET TO 15HP, 3500 PSI.
- FLEXIBLE COUPLING
- CHECK VALVE
- PRESSURE FILTER WITH BYPASS @30 PSI, 10 MICRON ABSOLUTE (MINIMUM), LOCAL BYPASS INDICATION, 99% EFFICIENT
- FLOW METER
- RELIEF VALVE
- RETURN FILTER WITH BYPASS AT 90 PSI, 10 MICRON ABSOLUTE (MINIMUM), LOCAL BYPASS INDICATION, 99% EFFICIENT
- STAUFF SIZE 20 TEST PORT
- 2/2 SOLENOID OPERATED SPOOL VALVE TO UNLOAD PUMP/LOCKOUT RELIEF VALVE.
- BALL VALVE, NORMALLY CLOSED
- PRESSURE GAUGE
- FLOW CONTROL VALVE
- FLEXIBLE HOSE, SIZE AS NOTED
- CYLINDER MANIFOLD
- SPAN DRIVE CYLINDER, SEE SHEET M-3 FOR DETAILS
- FILTER WITH 10 MICRON ABSOLUTE (MINIMUM), 99% EFFICIENT
- QUICK DISCONNECT COUPLING
- 7KW OVER THE SIZE IMMERSION HEATER WITH HEATING ELEMENTS NEAR THE BOTTOM OF THE TANK ONLY. 10W/IN' POWER DENSITY MAXIMUM.
- COUNTER BALANCE VALVE, 10GPM, 3PORT NON-VENTED 3:1 PILOT RATIO, SUN HYDRAULICS CBBCLH OR APPROVED EQUAL.
- PRESSURE SWITCH (PARKER MODEL SERIES PSB OR APPROVED EQUAL)
- SOLENOID OPERATED DIRECTIONAL CONTROL VALVE

**PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
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STATE OF NORTH CAROLINA
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HPU DETAILS

**FOR SOUTHPORT AND
FORT FISHER BASINS**



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ELECTRICAL SCOPE OF WORK

1. FIELD MEASURING AND VERIFICATION

THE CONTRACTOR SHALL PERFORM A FIELD SURVEY TO DETERMINE ALL EXISTING DIMENSIONS OF THE RAMP AND THE APPROACHES TO LOCATE ALL EXISTING EQUIPMENT. THE CONTRACTOR SHALL PERFORM A FIELD SURVEY TO VERIFY THE EXISTING CONDUIT AND WIRING TO VERIFY THE WIRE TAGS, AS-BUILT DOCUMENTATION, AND CONTRACT PLANS.

2. INCOMING (SHORE POWER) SERVICE

THE INCOMING SERVICE CONNECTED TO THE SOUTHPORT RAMP IS THREE (3) PHASE 100A, 120/208VAC PHASE FED FROM THE MAINTENANCE BUILDING. THE CONTRACTOR SHALL REPLACE THE EXISTING SERVICE FEEDER WITH NEW CABLES AS SHOWN ON THE PLANS AND ROUTE NEW CABLES IN EXISTING CONDUIT TO THE NEW RAMP PANEL R1.

THE INCOMING SERVICE CONNECTED TO THE FORT FISHER RAMP IS 100A, 240V, SINGLE PHASE AND SHALL BE REPLACED BY NCDOT WITH A NEW 3 PHASE, 4 WIRE, 400A 120/208V. THE SHORE POWER SHALL BE ROUTED TO THE NEW DISTRIBUTION PANEL ON FORT FISHER INCLUDING NEW CONDUIT AND WIRE FROM THE SERVICE POINT DESIGNATED BY NCDOT.

FURNISH AND INSTALL NEW 208/120VAC, 3 PHASE, 4 WIRE FERRY POWER DISCONNECT SWITCHES AND RECEPTACLES ON SOUTHPORT AND FORT FISHER RAMPS AND ASSOCIATED SOOW CABLES WITH PLUGS. FURNISH AND INSTALL NEW MANUAL TRANSFER SWITCH FOR EACH FERRY RAMP TO TRANSFER FROM SHORE TO FERRY POWER TO OPERATE THE HPU'S FOR EACH RAMP. PROVIDE NEW LIGHTING AND DISTRIBUTION PANELBOARDS AS SHOWN ON THE PLANS WITH MOUNTING SUPPORTS.

3. HPU MOTORS

REMOVE AND DISPOSE OF THE EXISTING HPU UNIT AND MOTOR. FURNISH AND INSTALL A NEW HPU MOTOR CONTROL ENCLOSURE WITH TWO NEW 15HP, 3 PHASE, 208VAC MOTORS AT EACH RAMP TO REPLACE THE EXISTING HPU MOTOR AS SPECIFIED UNDER THE MECHANICAL SCOPE OF WORK FOR EACH RAMP. FURNISH AND INSTALL IN-SIGHT, NEMA-4X STAINLESS STEEL DISCONNECT SWITCHES FOR EACH HPU MOTOR. FURNISH AND INSTALL A CUSTOM PENDANT MOVABLE SUPPORT ON EACH RAMP AS SHOWN ON THE PLANS. FURNISH AND INSTALL AN EMERGENCY STOP PUSHBUTTON AND ALARM ENCLOSURE AT EACH RAMP AS SHOWN ON THE PLANS. FURNISH AND INSTALL PLC SYSTEM FOR OPERATION OF THE RAMP WITH ASSOCIATED CONTROLS AS SHOWN ON THE PLANS.

4. PLC CONTROL SYSTEM, HPU CONTROL PANEL AND E-STOP PANEL

FURNISH AND INSTALL NEW PROGRAMMABLE LOGIC CONTROLLER (PLC) BASED CONTROL SYSTEM WITH A CENTRAL PROCESSING UNIT (CPU) AND I/O CARDS INSIDE THE HPU CONTROL PANEL AS SHOWN ON THE PLANS. THE PLC SHALL BE ROCKWELL AUTOMATION ALLEN-BRADLEY (AB) CONTROLLOGIX PLC. ALL REQUIRED PROGRAMMING SHALL BE PROVIDED BY THE CONTRACTOR. THE PROGRAMMABLE LOGIC CONTROLLER (PLC) SHALL BE EQUIPPED WITH AN UNINTERRUPTIBLE POWER SUPPLY (UPS).

FURNISH AND INSTALL NEW HPU CONTROL PANEL ON THE HPU PLATFORM. THE HPU CONTROL PANEL SHALL HOUSE ALL THE HPU MOTOR CONTROLS, PLC I/O CARDS AND UPS. THE COMPLETE SYSTEM INCLUDING THE CONTROL PANEL AND HYDRAULIC SYSTEM SHALL BE FURNISHED BY AN APPROVED HYDRAULIC VENDOR AS SPECIFIED UNDER THE MECHANICAL SPECIAL PROVISIONS.

FURNISH AND INSTALL NEW E-STOP PANEL AS SHOWN ON THE PLANS. THE E-STOP PANEL SHALL BE PROVIDED WITH AN ALARM BACON AS SHOWN ON THE PLANS.

5. CONDUIT AND WIRE

FURNISH AND INSTALL CONDUIT, BOXES, AND WIRE TO FULLY CONNECT THE ELECTRICAL SYSTEM AS SHOWN ON THE PLANS OR OTHERWISE REQUIRED. ALL CONDUIT SHALL BE RIGID STEEL CONDUIT, EXCEPT FOR FINAL CONNECTION TO SWITCHES AND MOTORS WHICH SHALL BE LIQUID TIGHT FLEXIBLE CONDUITS. FURNISH AND INSTALL NEW MESSENGER FLEXIBLE CALBES, A SHORE TERMINAL BOX AND A LIFT BENT TERMINAL BOX AND ANY OTHER BOXES REQUIRED TO FACILITATE INSTALLATION ON EACH RAMP. FURNISH AND INSTALL MESSENGER CABLE AND CABLE RINGS TO SUPPORT THE FLEXIBLE CONDUIT AND HYDRAULIC LINES FOR EACH RAMP. INSTALL MESSENGER CABLE AND CABLE RINGS FOR THE FLEXIBLE CONDUIT FOR EACH RAMP.

6. SUBMARINE CABLE

THE EXISTING SUBMARINE CABLES ON SOUTHPORT AND FORT FISHER RAMPS SHALL BE REMOVED AS SHOWN ON PLANS AND NOT TO BE REUSED AND CONNECTED TO THE NEW ELECTRICAL SYSTEM.

7. TRAFFIC GATE

A NEW TRAFFIC GATE SHALL BE FURNISHED AND INSTALLED AT EACH RAMP AS SHOWN ON THE PLANS WITH ASSOCIATED CONTROLS, CONTACTORS, OVERLOADS AND CIRCUIT BREAKERS. THE CONTRACTOR HAS THE OPTION OF REUSING THE EXISTING PAD FOR THE TRAFFIC GATE. FURNISH AND INSTALL LOCAL CONTROLS EITHER ON THE GATE HOUSING OR AS A SEPERATE PENDANT TO OPERATE THE GATE IN THE EVENT OF THE FAILURE OF THE MAIN CONTROL SYSTEM.

8. REMOVAL OF EXISTING EQUIPMENT

ANY PIECE OF EQUIPMENT SPECIFIED TO BE REMOVED AND/OR REPLACED AS PART OF THE PLANS AND SPECIAL PROVISIONS SHALL BE DONE AT NO ADDITIONAL COST TO NCDOT.

9. LIGHTING

THE CONTRACTOR SHALL FURNISH AND INSTALL NEW LED LIGHTS AS SHOWN ON THE PLANS. THE EXISTING RAMP LIGHTING FIXTURES ON THE FERRY RAMPS SHALL BE REMOVED AND REPLACED. A NEW LED LIGHT FIXTURE SHALL BE FURNISHED AND INSTALLED ON EACH RAMP IN APPROXIMATE LOCATION SHOWN ON THE PLANS. THE CONTRACTOR SHALL FURNISH ALL SUPPORTS, CONDUIT AND WIRE AS REQUIRED.

10. SENSORS AND SWITCHES

FURNISH AND INSTALL PROXIMITY SENSORS FOR RAMP POSITION AS SHOWN ON THE MECH PLANS (M-4) WITH ASSOCIATED CORD SETS. CONNECT, ADJUST AND MAKE OPERATIONAL TEMPERATURE SENSORS, PRESSURE SWITCHES, HEATERS AND FLOAT SWITCHES FOR HYDRAULIC SYSTEMS PROVIDED UNDER THE MECHANICAL WORK SPECIAL PROVISIONS.

11. TESTING AND COMMISSIONING

THE CONTRACTOR SHALL COMPLETELY COMMISSION THE RAMP CONTROL SYSTEM IN A FACTORY TEST. FOLLOWING INSTALLATION, THE CONTRACTOR SHALL COMMISSION AND TEST TO SHOW THE EQUIPMENT IS INSTALLED ACCURATELY AND SAFELY. ALL EQUIPMENT SHALL BE OPERATED TO THE SATISFACTION OF THE ENGINEER AND A TESTING PROCEDURE SHALL BE SUBMITTED TO RECORD THE TESTING OF ALL EQUIPMENT.

GENERAL ELECTRICAL NOTES

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC). COORDINATE ALL ELECTRICAL WORK WITH NCDOT AND OTHER CONTRACTORS ON THE SITE.
- ALL ELECTRICAL WORK SHALL BE COORDINATED WITH THE WORK OF OTHER TRADES AND SHALL BE SCHEDULED CONSISTENT WITH THE OVERALL CONSTRUCTION STAGING SEQUENCE.
- THE PLANS ARE DIAGRAMMATIC AND ARE NOT TO BE SCALED. THE LOCATIONS OF EQUIPMENT AND ROUTING OF CONDUITS SHOWN ON THE CONTRACT DRAWINGS ARE APPROXIMATE. EXACT LOCATIONS SHALL BE DETERMINED BASED UPON APPROVED SHOP DRAWINGS SUBMITTED BY THE CONTRACTOR.
- THE LOCATION AND NUMBER OF RACEWAYS AND JUNCTION BOXES SHOWN ON THE PLANS ARE OF SCHEMATIC TYPE AND DO NOT PURPORT TO BE EXACT. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL REQUIRED RACEWAYS, JUNCTION BOXES, CONDUIT FITTINGS, ELBOWS, AND HARDWARE FOR COMPLETE INSTALLATION IN ACCORDANCE WITH THE NEC WHETHER OR NOT THEY ARE EXPLICITLY SHOWN OR INDICATED ON THE CONTRACT PLANS.
- PROVIDE EQUIPMENT GROUNDING PER NEC REQUIREMENTS RUNNING SEPARATE GROUNDING WIRE IN EACH CONDUIT. GROUND CONDUCTORS SHALL BE PROVIDED IN ALL FLEXIBLE CABLES. MINIMUM SIZE GROUND CONDUCTOR SHALL BE #12 AWG. ALL TERMINAL AND JUNCTION BOXES SHALL BE GROUNDED IN ACCORDANCE WITH THE NEC.
- THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL ELECTRICAL COMPONENTS, CONDUITS, HANGERS, AND SUPPORTS, ETC. WITH THE OTHER DISCIPLINES OR AS REQUIRED BY THE ENGINEER.
- ALL CONDUCTORS SHALL BE CONNECTED TO TERMINAL BLOCKS OR DEVICES.
- ALL ELECTRICAL ENCLOSURES LOCATED IN WET LOCATIONS SHALL BE TYPE 316L STAINLESS STEEL, DUST-TIGHT, RAIN-TIGHT, WATER-TIGHT AND OIL-TIGHT NEMA-4X.
- ALL CONTACTORS AND STARTERS SHOWN ON THE DRAWINGS AS DE-ENERGIZED.
- UPON COMPLETION OF ELECTRICAL INSTALLATION, THE CONTRACTOR SHALL TEST THE COMPLETE ELECTRICAL SYSTEM FOR SHORT CIRCUITS, GROUNDS AND PROPER OPERATION IN THE PRESENCE OF THE ENGINEER.
- NOT ALL WORK OR DETAILS MAY BE EXPLICITLY SHOWN ON THESE PLANS. WHERE DETAILS ARE NOT PROVIDED OR WORK IS NOT SHOWN, THE CONTRACTOR IS RESPONSIBLE FOR COMPLETING SUCH WORK AS SPECIFIED ELSEWHERE IN THE PLANS OR SPECIAL PROVISIONS USING HIS MEANS AND METHODS AT NO ADDITIONAL COST TO NCDOT.
- ELECTRICAL WORK SHALL BE PAID FOR UNDER THE LUMP SUM RAMP ELECTRICAL SYSTEM FOR EACH STRUCTURE.

ABBREVIATIONS

3P	3 POLE	M1	MOTOR 1 CONTACTOR
A	AMPS	M2	MOTOR 2 CONTACTOR
AUX	AUXILIARY	MCP	MOTOR CIRCUIT PROTECTOR
AWG	AMERICAN WIRE GAUGE	MTS	MANUAL TRANSFER SWITCH
CB	CIRCUIT BREAKER	N	NEUTRAL
CO	CYLINDER OPERATION	OL	OVERLOAD
CS	CONTROL SWITCH	PB	PUSHBUTTON
DIA	DIAMETER	PEC	PHOTO-ELECTRIC CONTROLLER
DS	DISCONNECT SWITCH	PLC	PROGRAMMABLE LOGIC CONTROLLER
DWG	DRAWING	PNL	PANEL
ES	EMERGENCY STOP PUSHBUTTON	PNLB	PANELBOARD
EXIST.	EXISTING	PRES	PRESSURE
FVNR	FULL VOLTAGE NON-REVERSING	PRI	PRIMARY
FVR	FULL VOLTAGE REVERSING	PROX	PROXIMITY SWITCH
G	GREEN	R	TRAFFIC GATE RAISE CONTACTOR
GALV.	GALVANIZED	RECPT	RECEPTACLE
GFCI	GROUND-FAULT CIRCUIT INTERRUPTER	SEC	SECONDARY
GND	GROUND	S-F-LL	FLOAT LOW LEVEL SWITCH
GEN	GENERATOR	S-PRESS	PRESSURE SWITCH
HP	HORSEPOWER	SS	SELECTOR SWITCH
HPU	HYDRAULIC POWER UNIT	S.S	STAINLESS STEEL
HTR	HEATER	S-TEMP-H	HIGH TEMPERATURE SWITCH
L	TRAFFIC GATE LOWER CONTACTOR	S-TEMP-L	LOW TEMPERATURE SWITCH
L1	LINE 1	TEMP	TEMPERATURE
L2	LINE 2	TG	TRAFFIC GATE
L3	LINE 3	TGL	TRAFFIC GATE LOWER
LED	LIGHT EMITTING DIODE	TGR	TRAFFIC GATE RAISE
LS	LIMIT SWITCH	TDR	TIME DELAY RAISE
LS-F-LL	LEVEL SWITCH FLOAT LOWER LEVEL	TVSS	TRANSIENT SURGE SUPPRESSION
LS-T-C	LEVEL SWITCH TEMPERATURE CRITICAL	UPS	UNINTERRUPTIBLE POWER SUPPLY
LT	LIGHTING	W	WATTS

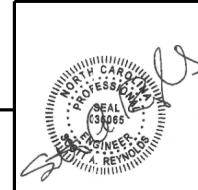
ELECTRICAL SYMBOLS

	CIRCUIT BREAKER		TEMPERATURE SWITCH
	COIL NORMALLY OPEN CONTACT		PRESSURE SWITCH
	COIL NORMALLY CLOSED CONTACT		PROXIMITY SWITCH
	RELAY/CONTACTOR COIL		FLOAT SWITCH
	LIMIT SWITCH WITH NORMALLY OPEN CONTACT		TIME RELAY CONTACT, ON-DELAY
	LIMIT SWITCH WITH NORMALLY CLOSED CONTACT		INDICATING LIGHT (WITH COLOR AS INDICATED)
	NORMALLY OPEN HELD CLOSED		TIMING RELAY COIL
	PUSHBUTTON WITH NORMALLY OPEN CONTACT		SOLENOID
	PUSHBUTTON WITH NORMALLY CLOSED CONTACT		E-STOP PUSHBUTTON
	STARTER (FULL VOLTAGE NON-REVERSING SIZE AS INDICATED)		NEW EQUIPMENT LINE WEIGHT
	STARTER (FULL VOLTAGE REVERSING STARTER SIZE 1)		EXISTING EQUIPMENT LINE WEIGHT
			FIELD WIRE
			ENCLOSURE LINE TYPE

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
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**SCOPE OF WORK,
 GENERAL NOTES,
 SYMBOLS AND LEGENDS**
**FOR SOUTHPORT AND
 FORT FISHER BASINS**

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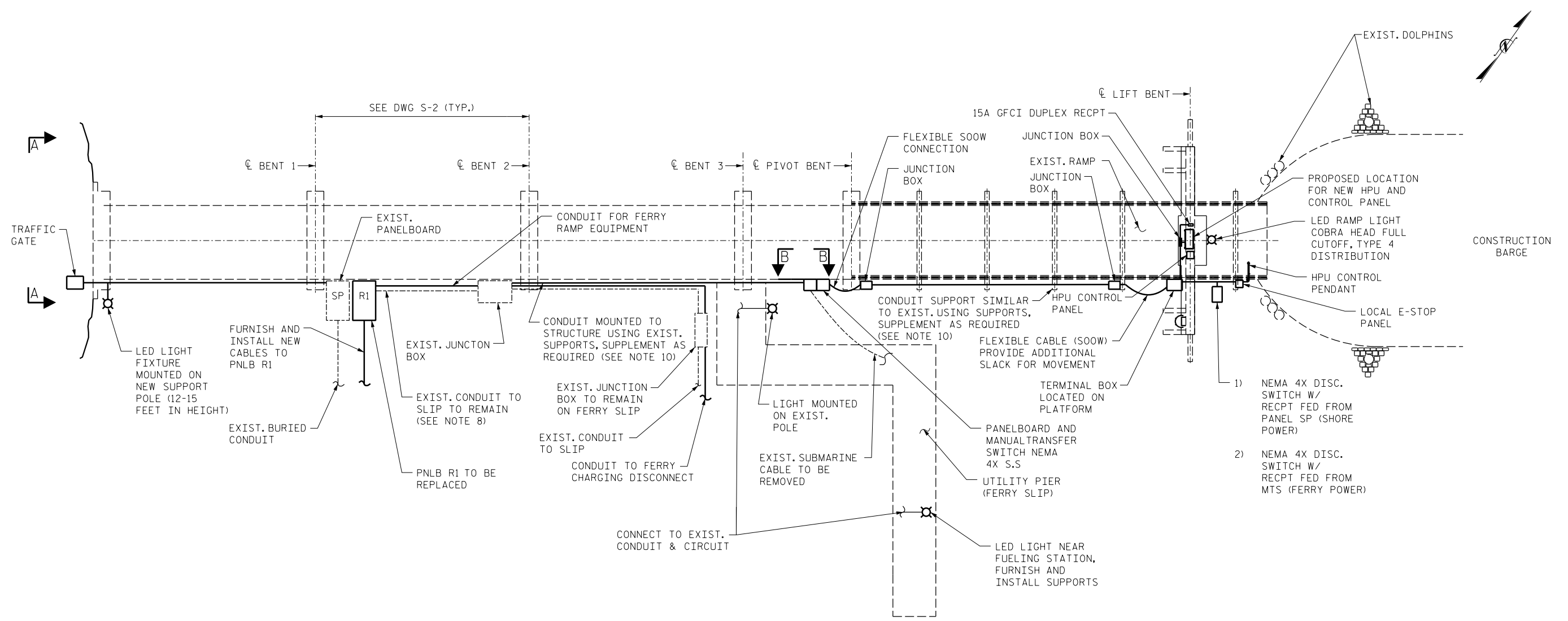


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ELECTRICAL PLAN
NOT TO SCALE

NOTES:

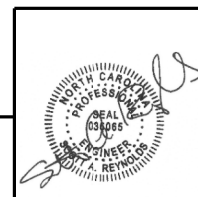
1. ALL WORK SHALL BE INSTALLED IN COMPLIANCE WITH NFPA 70, THE NATIONAL CODE.
2. PROVIDE JUNCTION BOXES, PULL BOXES, SUPPORTS, AND CONDUIT RUNS AS REQUIRED TO COMPLETE THE SYSTEM.
3. ALL RIGID STEEL CONDUIT SHALL BE SUPPORTED ON STRUCTURE AND ON BULKHEAD AT THE INTERVALS NOT EXCEED 6 FEET.
4. FOR ADDITIONAL REQUIREMENTS, SEE THE SPECIAL PROVISIONS.
5. CONTRACTOR TO FIELD VERIFY ALL EXISTING EQUIPMENT AND DIMENSIONS.
6. E-STOP PANEL SHALL INCLUDE FLOAT BEACON, EMERGENCY STOP PUSH-BUTTON AND ALARM INDICATOR AND SHALL BE LOCATED NEAR THE CONTROL PENDANT.
7. LOCAL HPU CONTROL PANEL SHALL INCLUDE AN INDICATOR FOR EACH HPU ALARM.
8. ALL CONDUIT AND WIRE RELATED TO FERRY OPERATION SHALL BE REPLACED. SEE E-10 FOR CONDUIT/WIRE SIZE AND QUANTITY REQUIREMENTS.
9. UNLESS NOTED OTHERWISE, ALL ELECTRICAL EQUIPMENT SHOWN ON THIS SHEET IS NEW.
10. CONTRACTOR MAY ELECT TO REUSE EXISTING S.S STRUT CHANNEL WITH NEW HARDWARE AND CLAMPS.
11. SEE SHEET NO. E-9 FOR SECTIONS A-A AND B-B.

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ELECTRICAL PLAN

FOR SOUTHPORT FERRY BASIN



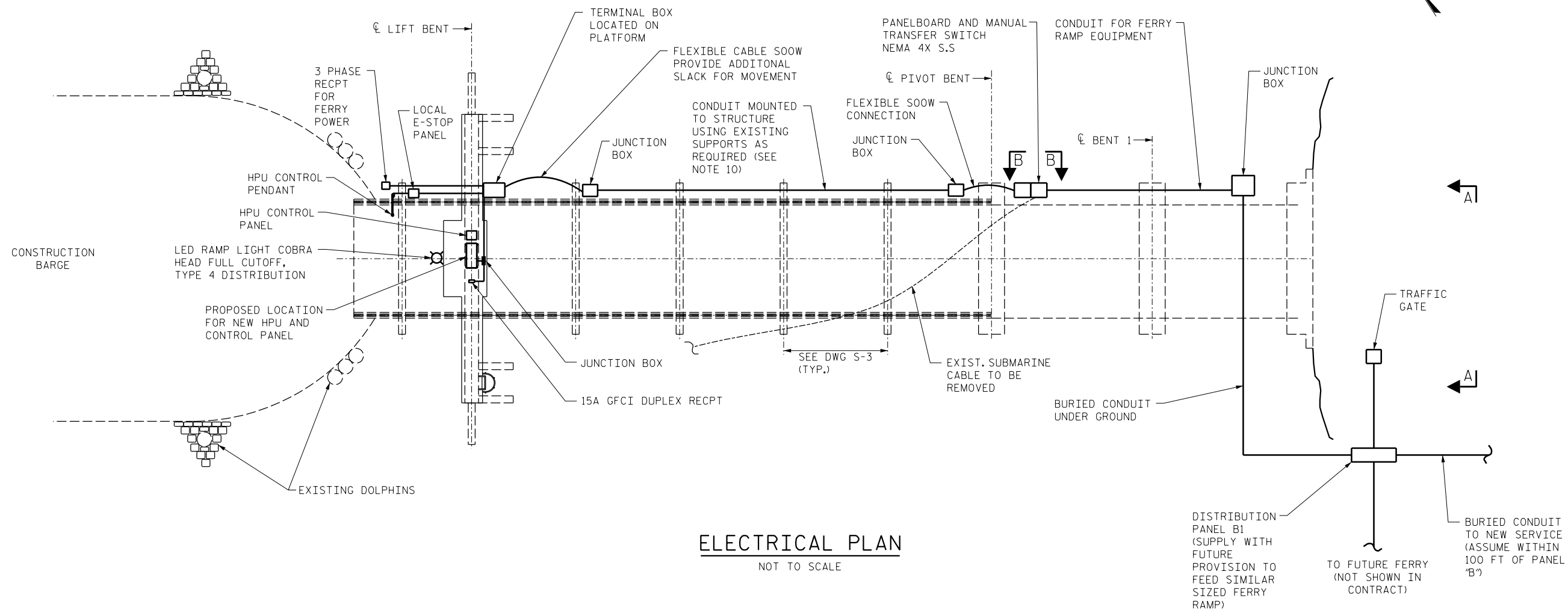
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1			3			TOTAL SHEETS
2			4			31

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ELECTRICAL PLAN

NOT TO SCALE

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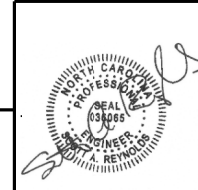
1. ALL WORK SHALL BE INSTALLED IN COMPLIANCE WITH NFPA 70, THE NATIONAL ELECTRICAL CODE.
2. PROVIDE JUNCTION BOXES, PULL BOXES, AND CONDUIT RUNS AS REQUIRED TO COMPLETE THE SYSTEM.
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4. FOR ADDITIONAL REQUIREMENTS, SEE THE SPECIAL PROVISIONS.
5. CONTRACTOR TO FIELD VERIFY ALL EXISTING EQUIPMENT AND DIMENSIONS.
6. E-STOP PANEL SHALL INCLUDE FLOAT BEACON, EMERGENCY STOP PUSH-BUTTON AND ALARM INDICATOR AND SHALL BE LOCATED NEAR THE CONTROL PENDANT.
7. LOCAL HPU CONTROL PANEL SHALL INCLUDE AN INDICATOR FOR EACH HPU ALARM.
8. ALL CONDUIT AND WIRE ON FORT FISHER SHALL BE NEW. SEE E-10 FOR CONDUIT/WIRE SIZE AND QUANTITY REQUIREMENT.
9. UNLESS NOTED OTHERWISE, ALL ELECTRICAL EQUIPMENT SHOWN ON THIS SHEET IS NEW.
10. CONTRACTOR MAY ELECT TO REUSE EXISTING S.S STRUT CHANNEL WITH NEW HARDWARE AND CLAMPS.
11. SEE SHEET NO. E-9 FOR SECTIONS A-A AND B-B.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
NEW HANOVER COUNTY
 STATION: 1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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ELECTRICAL PLAN

FOR FORT FISHER FERRY BASIN



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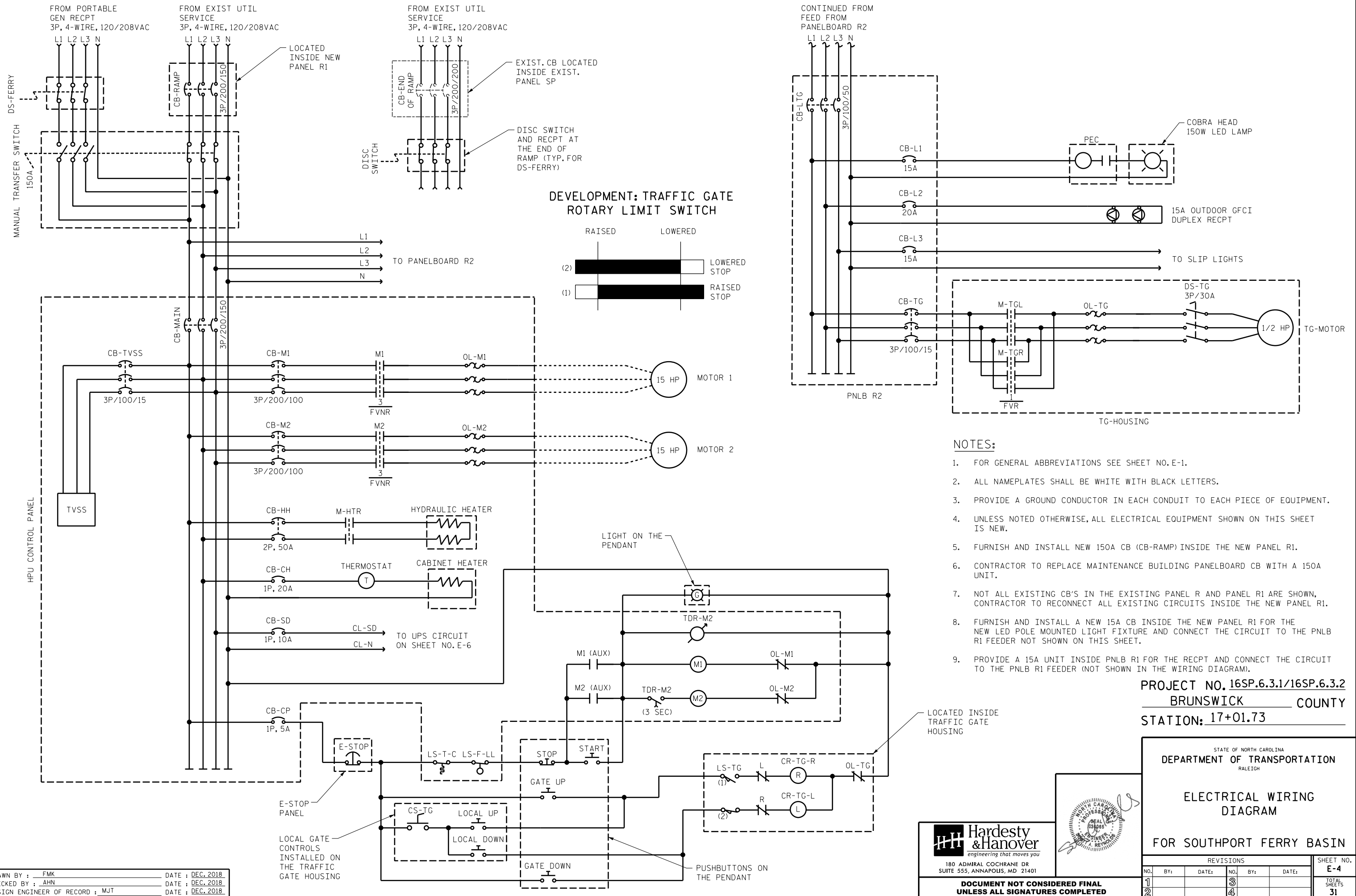
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NO.	BY:	DATE:	NO.	BY:	DATE:	E-3
1			3			TOTAL SHEETS
2			4			31

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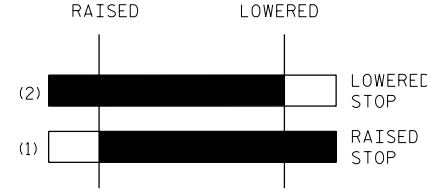
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DEVELOPMENT: TRAFFIC GATE ROTARY LIMIT SWITCH



NOTES:

- FOR GENERAL ABBREVIATIONS SEE SHEET NO. E-1.
- ALL NAMEPLATES SHALL BE WHITE WITH BLACK LETTERS.
- PROVIDE A GROUND CONDUCTOR IN EACH CONDUIT TO EACH PIECE OF EQUIPMENT.
- UNLESS NOTED OTHERWISE, ALL ELECTRICAL EQUIPMENT SHOWN ON THIS SHEET IS NEW.
- FURNISH AND INSTALL NEW 150A CB (CB-RAMP) INSIDE THE NEW PANEL R1.
- CONTRACTOR TO REPLACE MAINTENANCE BUILDING PANELBOARD CB WITH A 150A UNIT.
- NOT ALL EXISTING CB'S IN THE EXISTING PANEL R AND PANEL R1 ARE SHOWN, CONTRACTOR TO RECONNECT ALL EXISTING CIRCUITS INSIDE THE NEW PANEL R1.
- FURNISH AND INSTALL A NEW 15A CB INSIDE THE NEW PANEL R1 FOR THE NEW LED POLE MOUNTED LIGHT FIXTURE AND CONNECT THE CIRCUIT TO THE PNLB R1 FEEDER NOT SHOWN ON THIS SHEET.
- PROVIDE A 15A UNIT INSIDE PNLB R1 FOR THE RECPT AND CONNECT THE CIRCUIT TO THE PNLB R1 FEEDER (NOT SHOWN IN THE WIRING DIAGRAM).

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK COUNTY
STATION: 17+01.73

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

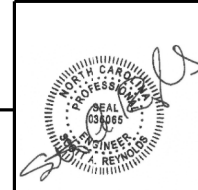
ELECTRICAL WIRING DIAGRAM

FOR SOUTHPORT FERRY BASIN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	E-4
1			3			TOTAL SHEETS
2			4			31

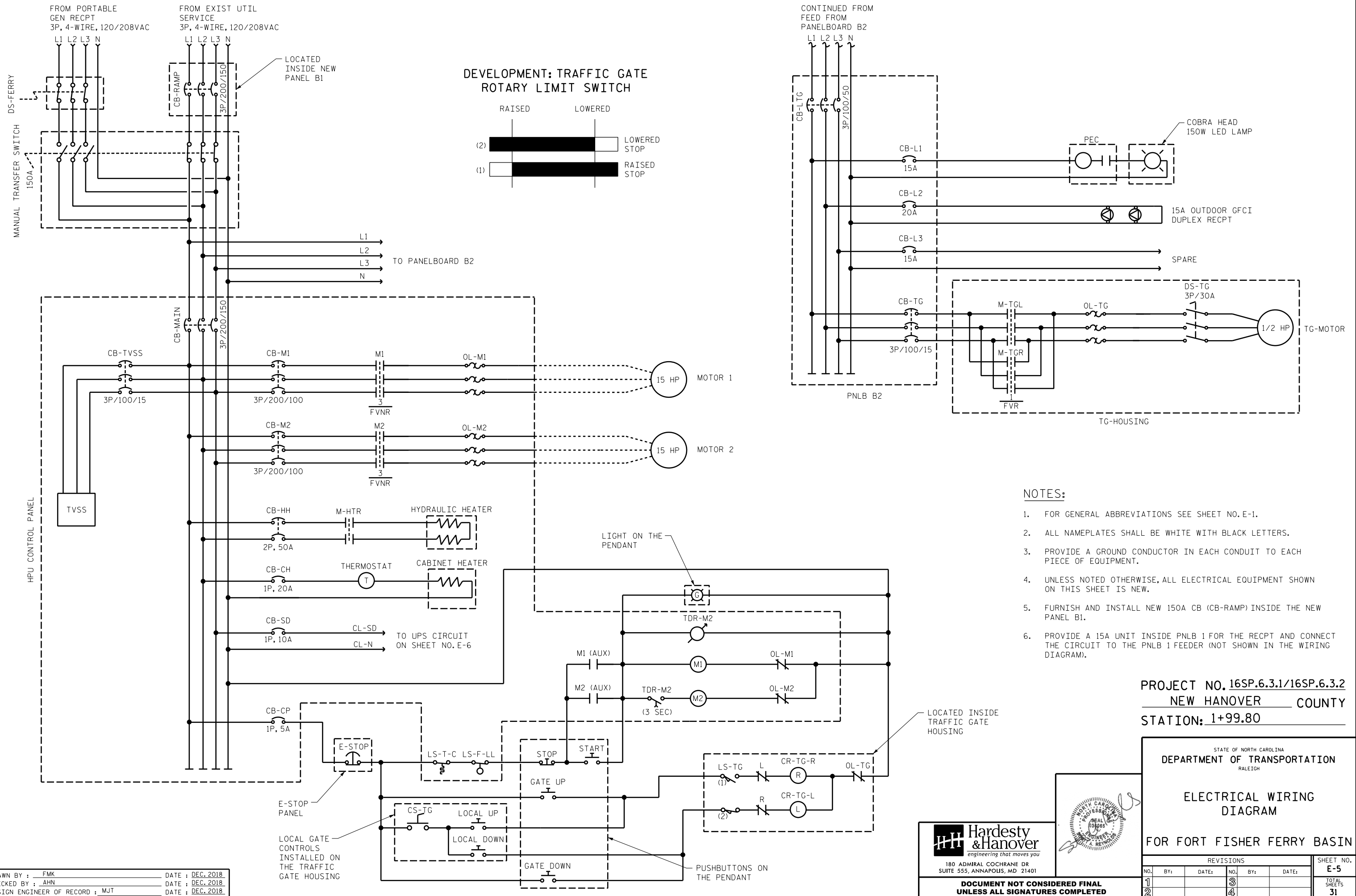
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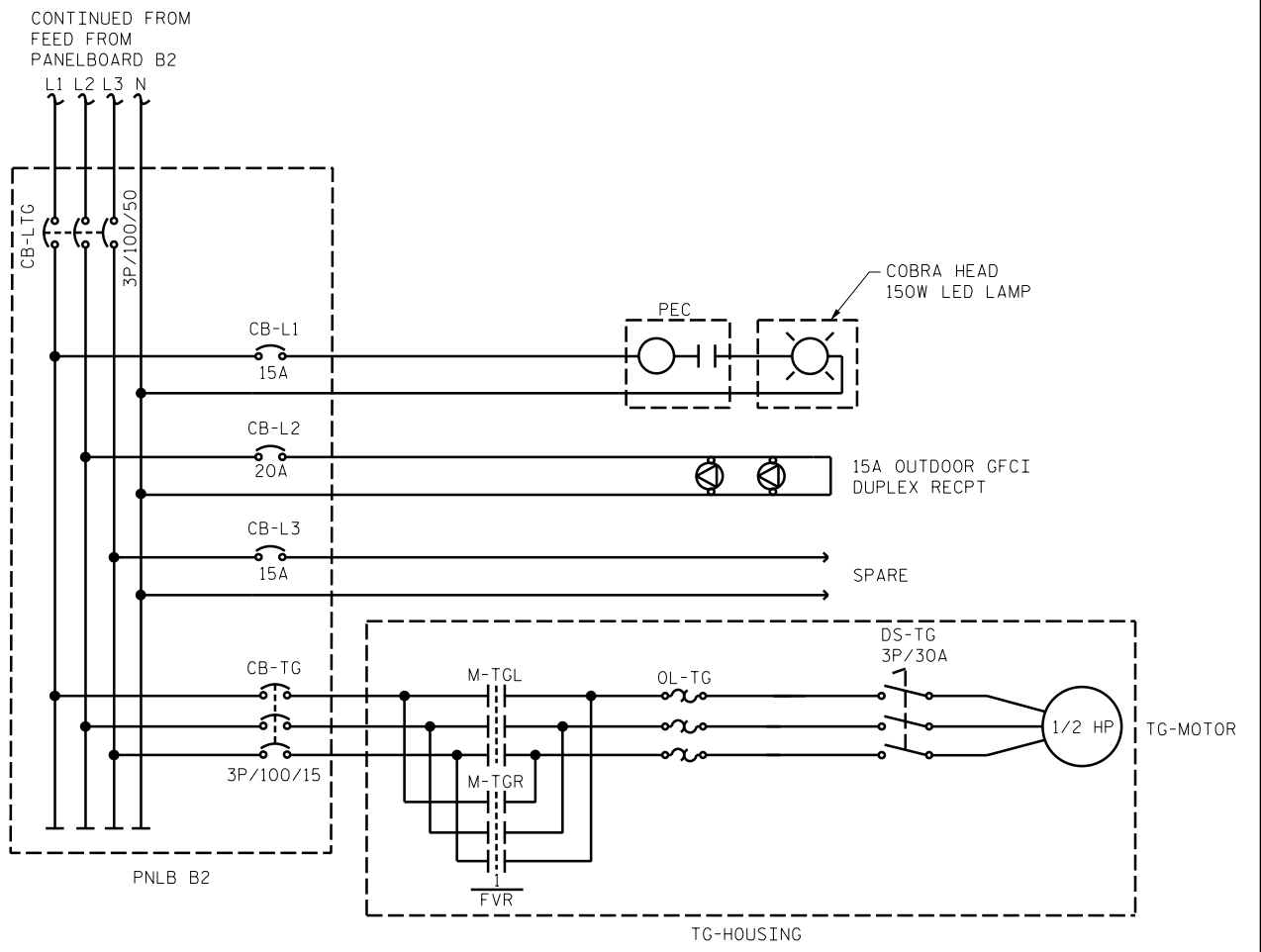
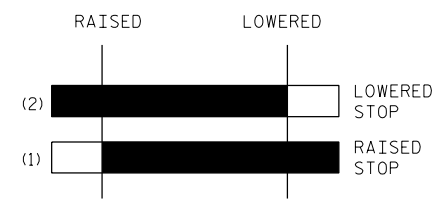


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DEVELOPMENT: TRAFFIC GATE ROTARY LIMIT SWITCH



NOTES:

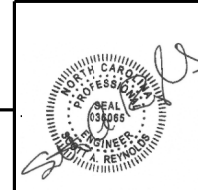
- FOR GENERAL ABBREVIATIONS SEE SHEET NO. E-1.
- ALL NAMEPLATES SHALL BE WHITE WITH BLACK LETTERS.
- PROVIDE A GROUND CONDUCTOR IN EACH CONDUIT TO EACH PIECE OF EQUIPMENT.
- UNLESS NOTED OTHERWISE, ALL ELECTRICAL EQUIPMENT SHOWN ON THIS SHEET IS NEW.
- FURNISH AND INSTALL NEW 150A CB (CB-RAMP) INSIDE THE NEW PANEL B1.
- PROVIDE A 15A UNIT INSIDE PNLB 1 FOR THE RECPT AND CONNECT THE CIRCUIT TO THE PNLB 1 FEEDER (NOT SHOWN IN THE WIRING DIAGRAM).

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
NEW HANOVER COUNTY
STATION: 1+99.80

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 RALEIGH

ELECTRICAL WIRING DIAGRAM

FOR FORT FISHER FERRY BASIN

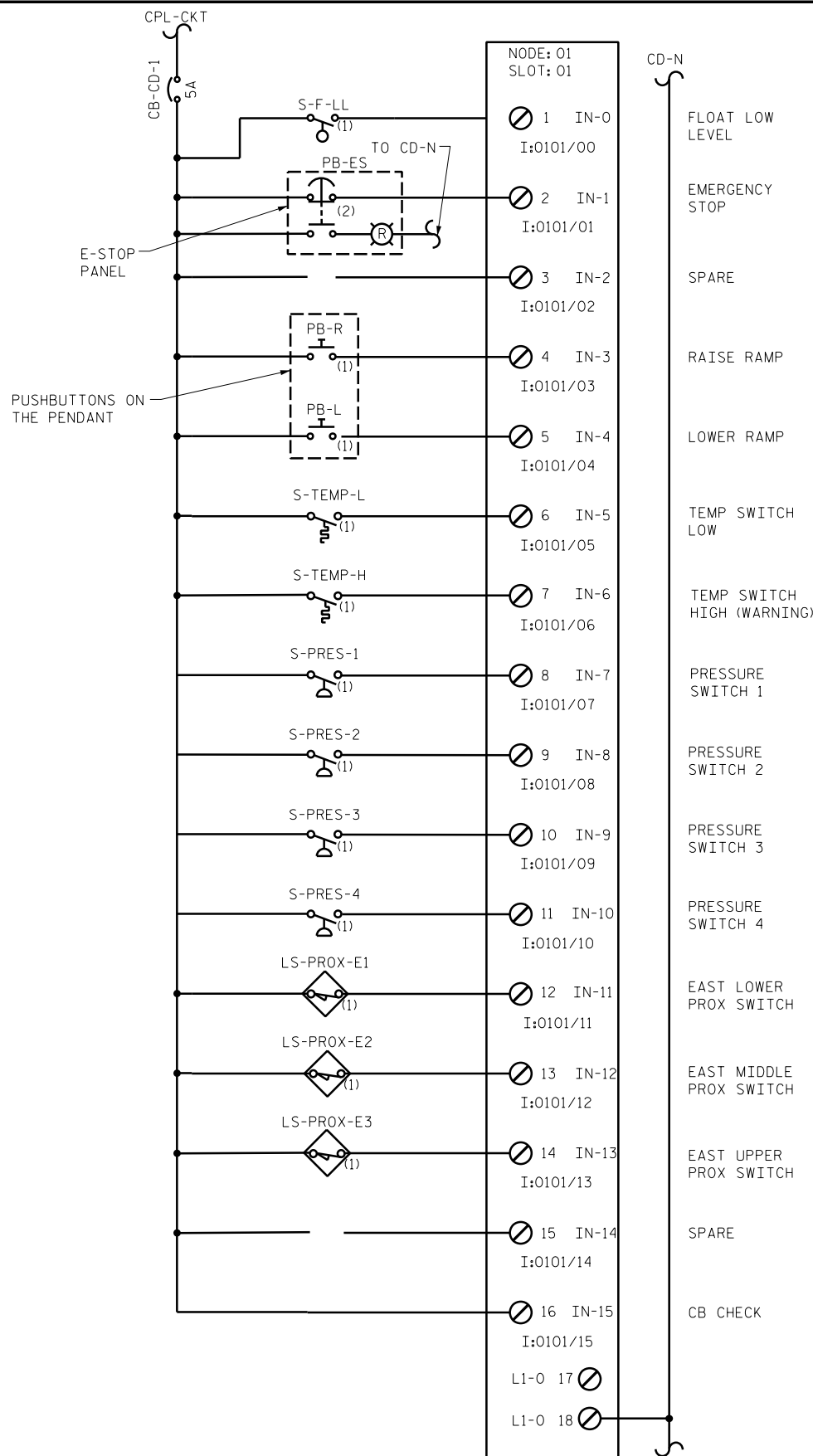
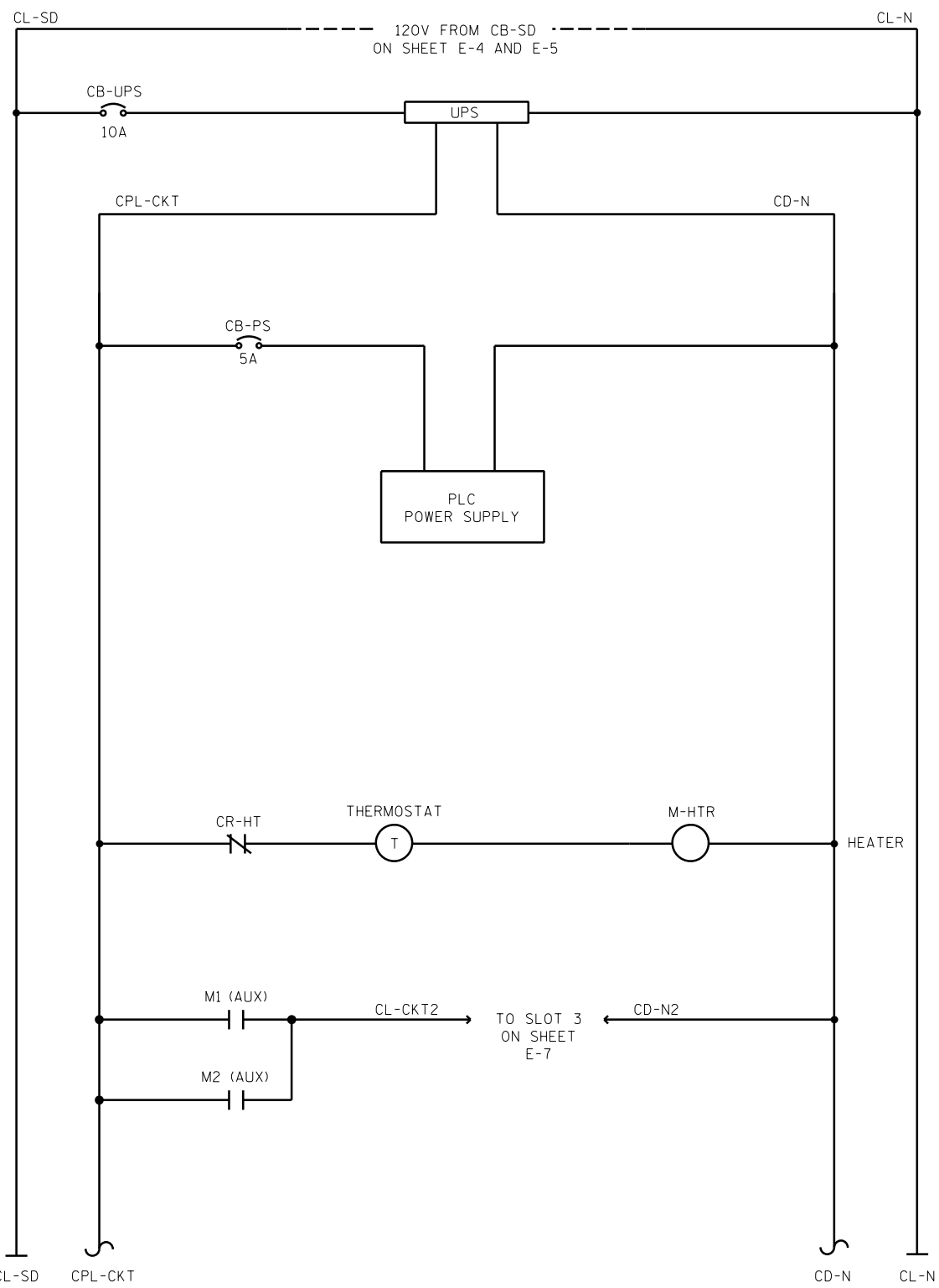


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DESIGN ENGINEER OF RECORD : MJT	DATE : DEC. 2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	E-5
1			3			TOTAL SHEETS
2			4			31



NOTES:

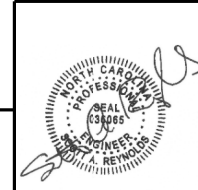
- UNLESS NOTED OTHERWISE, ALL ELECTRICAL EQUIPMENT SHOWN ON THIS SHEET IS NEW.
- ELECTRICAL WIRING DIAGRAM FOR SOUTHPORT RAMP SHOWN, FORT FISHER RAMP SHALL BE SIMILAR.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
STATION: 17+01.73/1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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**ELECTRICAL WIRING
 DIAGRAM
 PLC INPUT
 FOR SOUTHPORT AND
 FORT FISHER BASINS**

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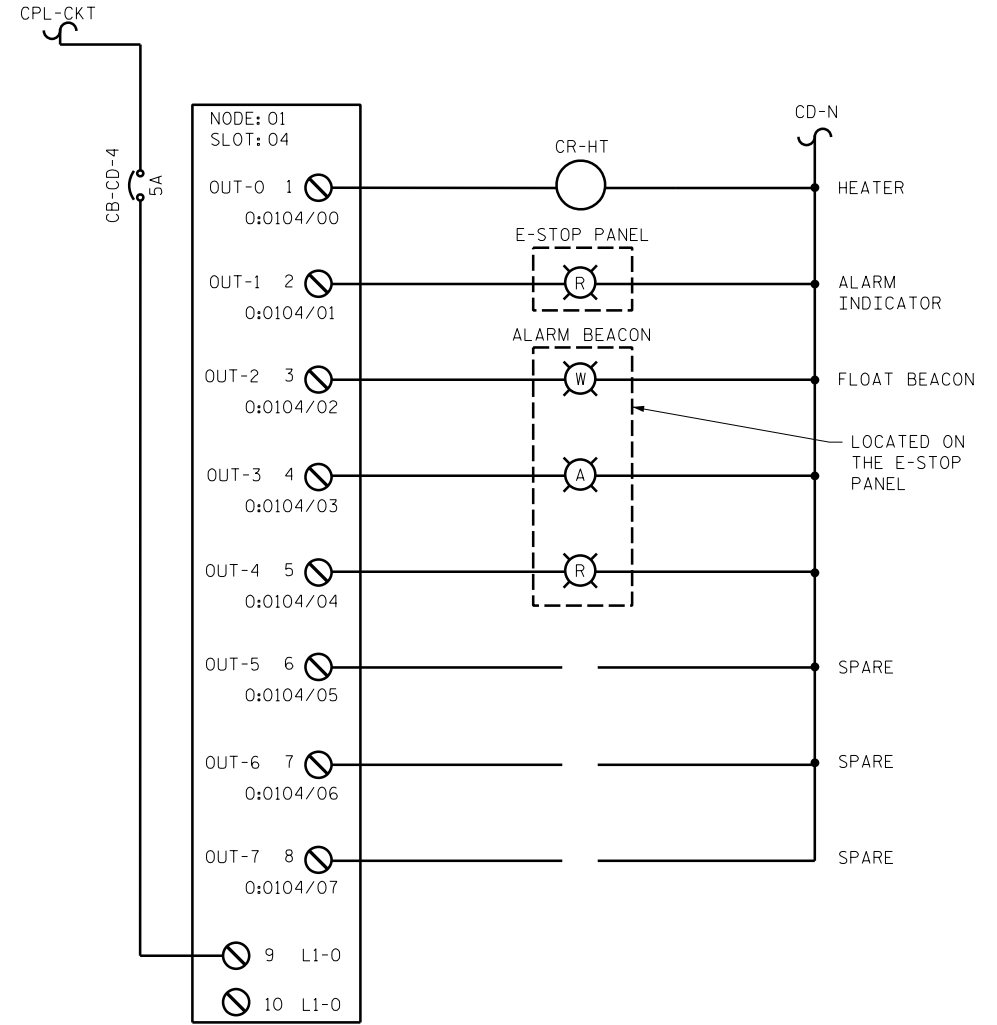
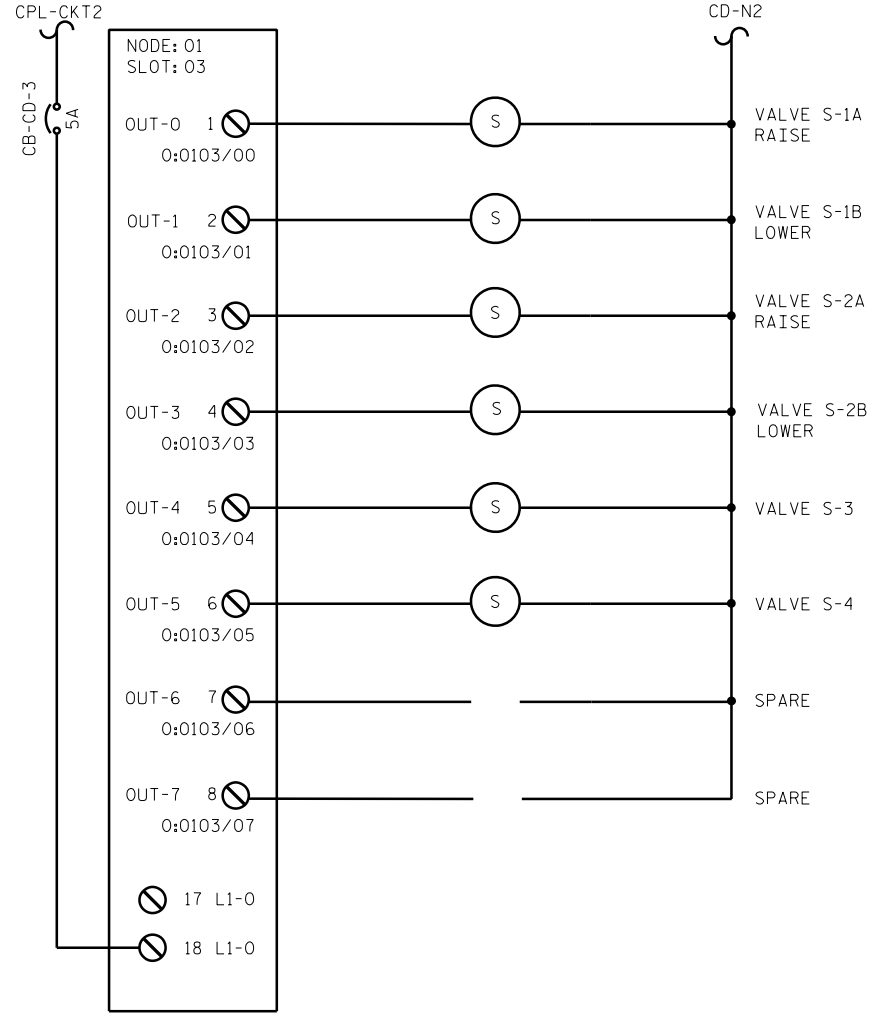
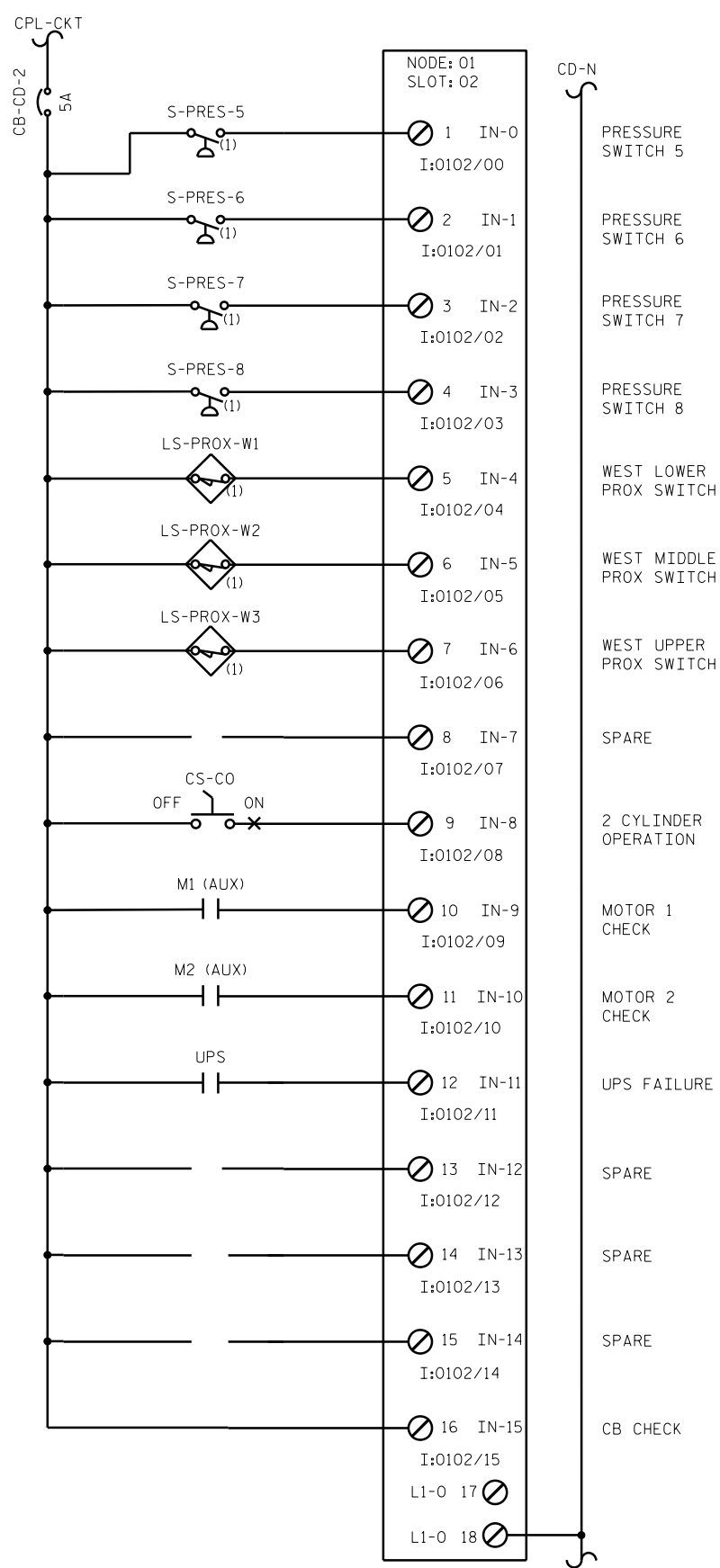
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NO.	BY:	DATE:	NO.	BY:	DATE:	E-6
1			3			TOTAL SHEETS
2			4			31

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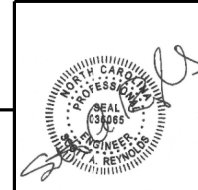
NOTES:

1. UNLESS NOTED OTHERWISE, ALL ELECTRICAL EQUIPMENT SHOWN SHALL BE NEW.
2. TWO CYLINDER OPERATION SELECTOR SWITCH LOCATED ON THE HPU CONTROL PANEL.
3. ELECTRICAL WIRING DIAGRAM FOR SOUTHPORT RAMP SHOWN, FORT FISHER RAMP SHALL BE SIMILAR.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
STATION: 17+01.73/1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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**ELECTRICAL WIRING
 DIAGRAM
 PLC OUTPUT
 FOR SOUTHPORT AND
 FORT FISHER BASINS**

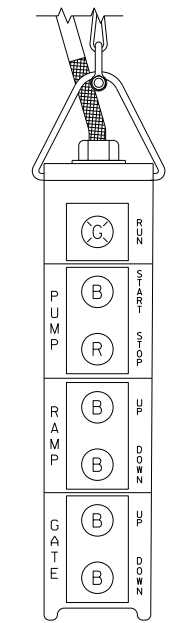
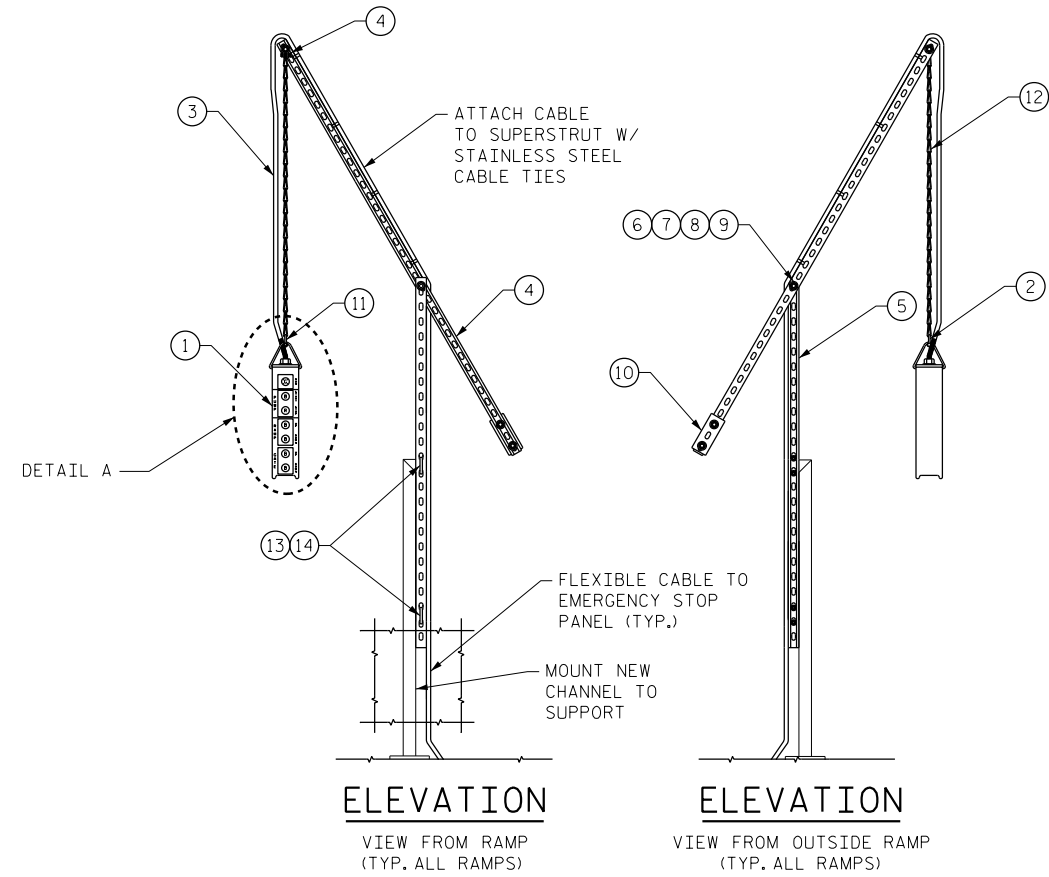


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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	E-7
1			3			TOTAL SHEETS
2			4			31

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DETAIL A
(CONTROL PENDANT)

BILL OF MATERIALS		
(QUANTITIES SHOWN ARE FOR SOUTHPORT RAMP, FORT FISHER RAMP THE SAME)		
ITEM NO.	QUANTITY	DESCRIPTION
1	1	PENDANT STATION NEMA 4X ENCLOSURE, CLASS 9001 BY SQUARE D
1	1	LEGEND PLATE (CUSTOM), CLASS 9001 BY SQUARE D, RAMP - UP - DOWN
1	1	LEGEND PLATE (CUSTOM), CLASS 9001 BY SQUARE D, GATE - UP - DOWN
1	1	LEGEND PLATE (CUSTOM), CLASS 9001 BY SQUARE D, PUMP - START - STOP
1	1	LEGEND PLATE, CLASS 9001 BY SQUARE D, RUN
1	1	LED PILOT LIGHT, GREEN, CLASS 9001 BY SQUARE D
1	1	OPERATOR PUSH BUTTON, CLASS 9001 BY SQUARE D
1	5	BLACK RUBBER BOOT, CLASS 9001 BY SQUARE D
1	1	RED RUBBER BOOT, CLASS 9001 BY SQUARE D
1	1	OPERATOR PUSH BUTTON, CLASS 9001 BY SQUARE D
2	1	DELUXE LIQUID-TIGHT CORD GRIP, SS/AL, BY KELLEMS
3	12 TO 16 FT	FLEXIBLE CABLE, 10 CONDUCTOR, BY A.I.W CORP
4	5 TO 6 FT	STAINLESS STEEL SUPERSTRUT, 12 GA 1 - 5/8" X 13/16", BY THOMAS & BETTS
5	3 FT	STAINLESS STEEL SUPERSTRUT, 12 GA 1 - 5/8" X 13/16", BY THOMAS & BETTS
6	3 IN	1/2" IP STAINLESS STEEL PIPE
7	4 IN	1/2" IP STAINLESS STEEL PIPE
8	10 IN	THREADED ROD, STAINLESS STEEL, 5/8" - 11
9	4	HEX NUT AND LOCK WASHER, STAINLESS STEEL, 5/8" - 11
10	12 LBS	COUNTERWEIGHT, 2.5" X 2.5" X 7", STAINLESS STEEL TYPE 316, DRILL/TAP 2 5/16" HOLES, BY MCMASTER-CARR
11	2	3/16" SHACKLE, STAINLESS STEEL TYPE 316, BY MCMASTER-CARR
12	2 TO 3 FT	CHAIN, STAINLESS STEEL TYPE 316L, BY MCMASTER-CARR
13	AS REQUIRED	U-BOLTS, STAINLESS STEEL, 3/16" - 16, BY MCMASTER-CARR
14	AS REQUIRED	FENDER WASHERS, STAINLESS STEEL, 3/8" X 1 1/4" OD, BY MCMASTER-CARR

NOTES:

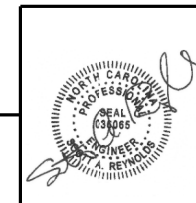
- BILL OF MATERIALS IS NOT ALL INCLUSIVE, ADDITIONAL HARDWARE AND/OR COMPONENTS MAY BE REQUIRED. CONTRACTOR SHALL VERIFY ALL COMPONENTS AND DIMENSIONS.
- ALL HARDWARE SHALL BE STAINLESS STEEL.
- UNLESS NOTED OTHERWISE, ALL ELEMENTS DEPICTED ON THIS SHEET ARE NOT TO SCALE.
- FOR ADDITIONAL REQUIREMENTS, SEE THE SPECIAL PROVISIONS.
- CONTROL PENDANT DETAILS FOR SOUTHPORT RAMP SHOWN, FORT FISHER RAMP SIMILAR.
- UNLESS STATED OTHERWISE, ALL ELECTRICAL EQUIPMENT SHOWN ON THIS SHEET IS NEW.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
 STATION: 17+01.73/1+99.80

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CONTROL
 PENDANT DETAILS
 FOR SOUTHPORT AND
 FORT FISHER BASINS

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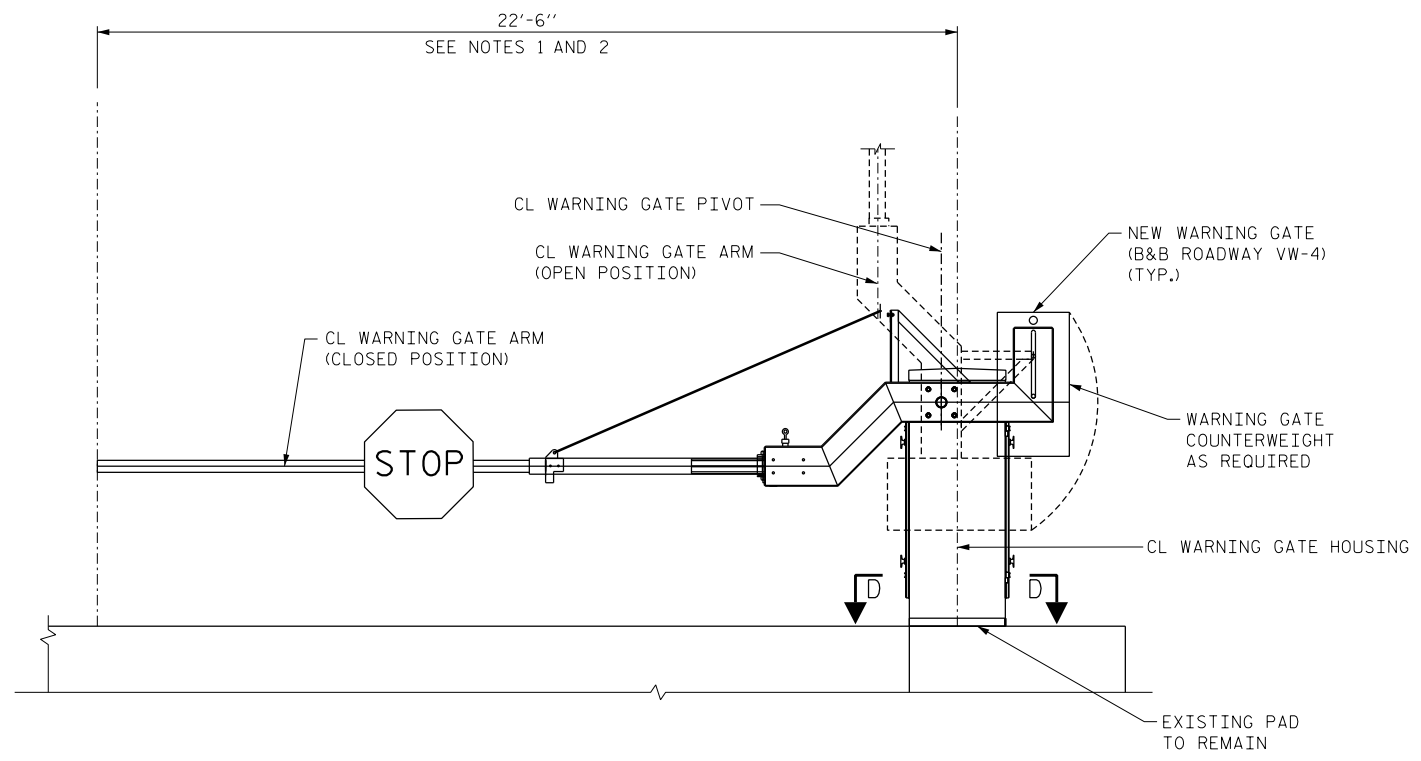
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SHEET NO.
E-8
 TOTAL SHEETS
31

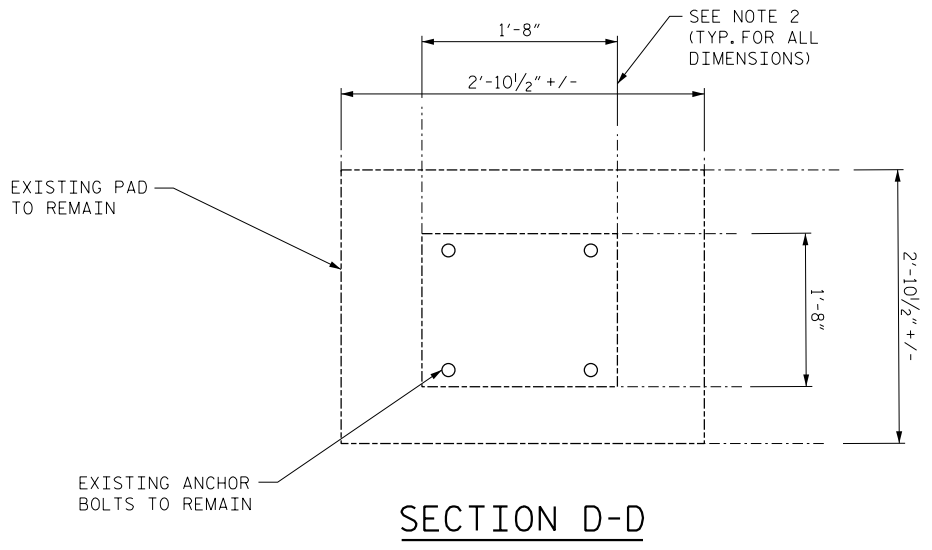
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SECTION A-A

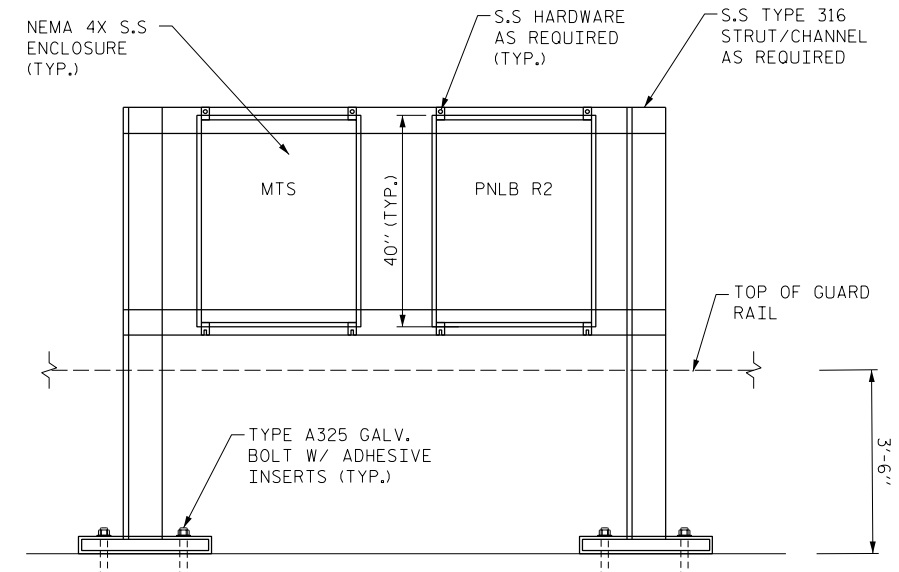
SOUTHPORT GATE SHOWN, FORT FISHER GATE SIMILAR



SECTION D-D

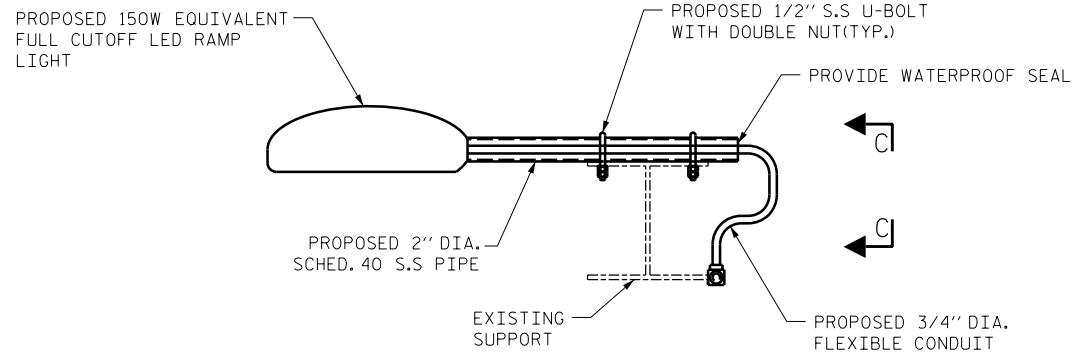
NOTES:

- GATE ARM LENGTH DIMENSION FOR SOUTHPORT RAMP SHOWN, FORT FISHER GATE ARM LENGTH SHALL BE NO LESS THAN 16 FEET.
- CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS.
- PROVIDE SLOTTED HOLES AS REQUIRED.
- UNLESS NOTED OTHERWISE, ALL ELEMENTS DEPICTED ON THIS SHEET ARE NOT TO SCALE.
- UNLESS OTHERWISE NOTED ON THIS SHEET, ALL WORK AND EQUIPMENT IS NEW.
- PNLB R2 SHOWN ON SOUTHPORT, FORT FISHER SHALL BE PNLB B2.

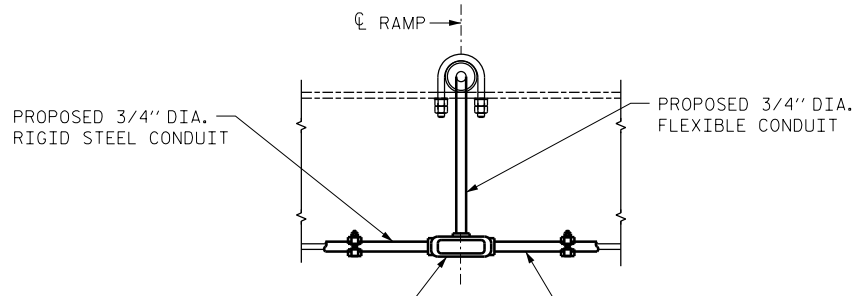


SECTION B-B

SOUTHPORT RAMP SHOWN, FORT FISHER RAMP SIMILAR



LED RAMP LIGHT DETAIL



SECTION C-C

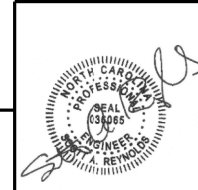
PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
STATION: 17+01.73/1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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ELECTRICAL LAYOUT

FOR SOUTHPORT AND FORT FISHER BASINS

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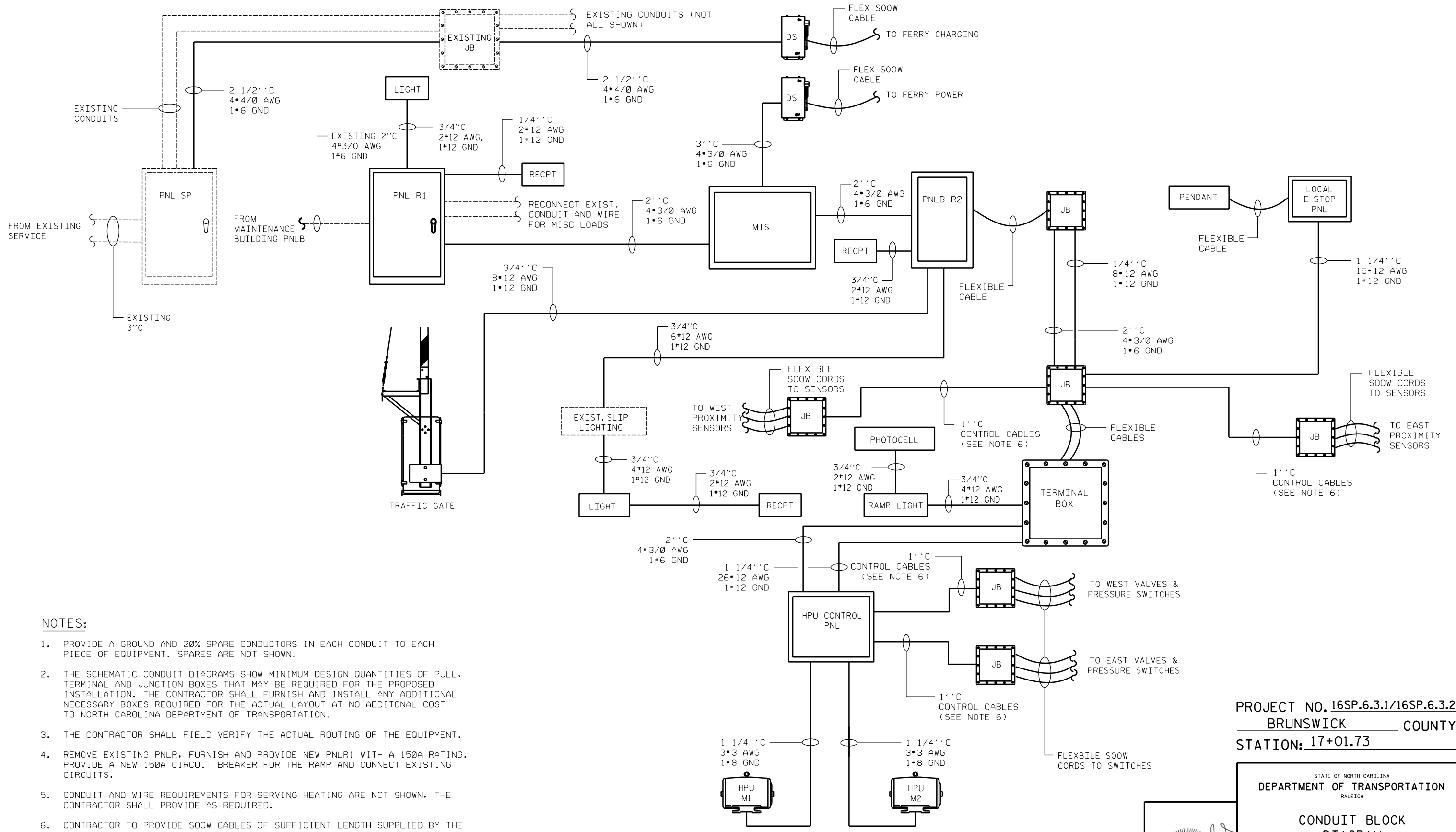
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	E-9
1			3			TOTAL SHEETS
2			4			31

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NOTES:

1. PROVIDE A GROUND AND 20% SPARE CONDUCTORS IN EACH CONDUIT TO EACH PIECE OF EQUIPMENT. SPARES ARE NOT SHOWN.
2. THE SCHEMATIC CONDUIT DIAGRAMS SHOW MINIMUM DESIGN QUANTITIES OF PULL, TERMINAL AND JUNCTION BOXES THAT MAY BE REQUIRED FOR THE PROPOSED INSTALLATION. THE CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL NECESSARY BOXES REQUIRED FOR THE ACTUAL LAYOUT AT NO ADDITIONAL COST TO NORTH CAROLINA DEPARTMENT OF TRANSPORTATION.
3. THE CONTRACTOR SHALL FIELD VERIFY THE ACTUAL ROUTING OF THE EQUIPMENT.
4. REMOVE EXISTING PNLR, FURNISH AND PROVIDE NEW PNLR1 WITH A 150A RATING. PROVIDE A NEW 150A CIRCUIT BREAKER FOR THE RAMP AND CONNECT EXISTING CIRCUITS.
5. CONDUIT AND WIRE REQUIREMENTS FOR SERVING HEATING ARE NOT SHOWN. THE CONTRACTOR SHALL PROVIDE AS REQUIRED.
6. CONTRACTOR TO PROVIDE SOOW CABLES OF SUFFICIENT LENGTH SUPPLIED BY THE SWITCH/SENSOR MANUFACTURER.
7. CONNECT THE TEMP SENSORS IN THE HPU ENCLOSURE NOT SHOWN IN THE CONDUIT BLOCK DIAGRAM.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK COUNTY
 STATION: 17+01.73

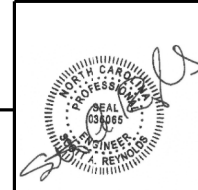
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 DEPARTMENT OF TRANSPORTATION
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**CONDUIT BLOCK
 DIAGRAM**

FOR SOUTHPORT FERRY BASIN

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DESIGN ENGINEER OF RECORD : MJT	DATE : DEC. 2018

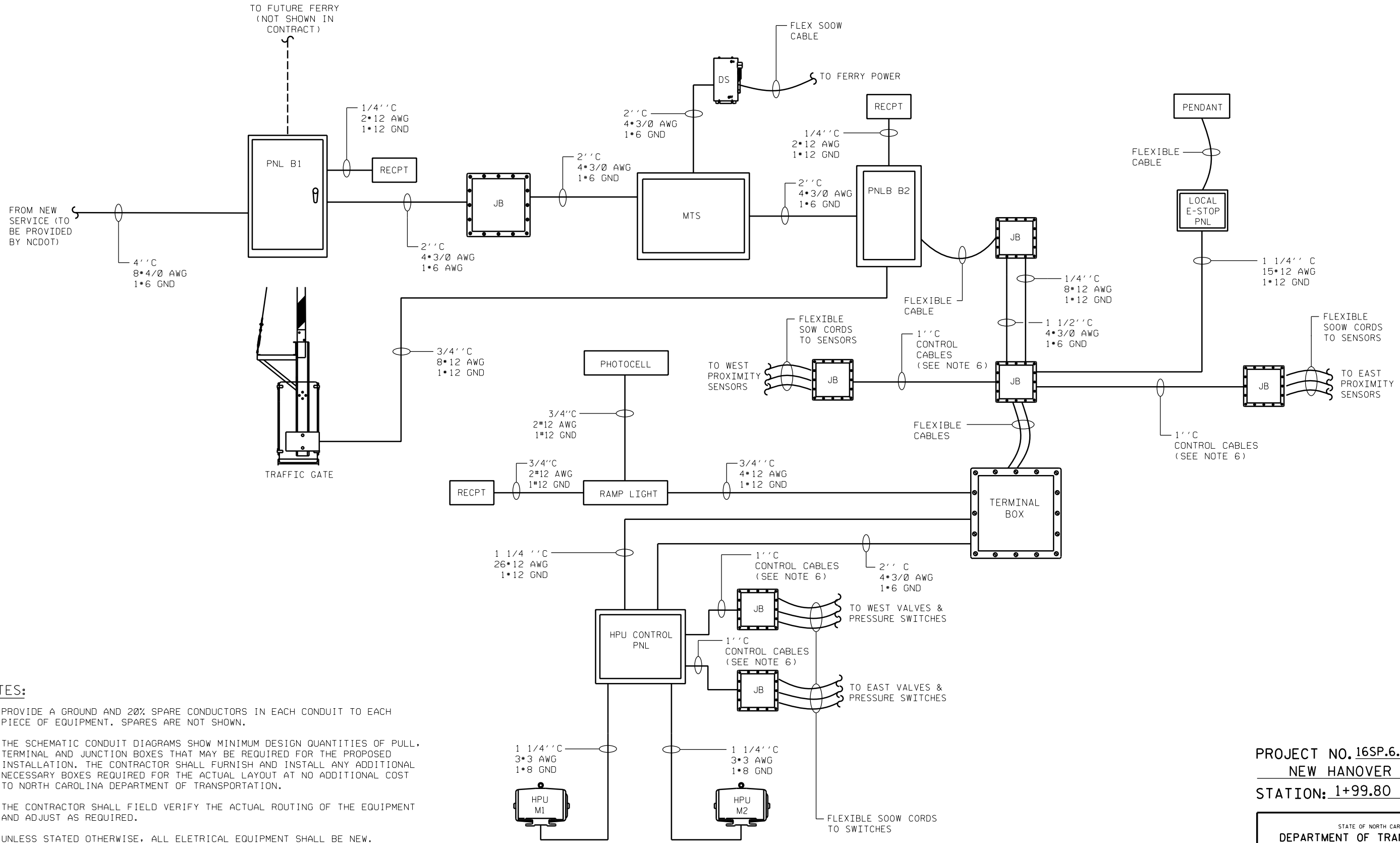
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1			3			TOTAL SHEETS
2			4			31

default 12/28/2018 c:\users\thawkins\hpr\od\dms03401\E-11 Conduit Block Diagram_Fort Fisher.dgn



NOTES:

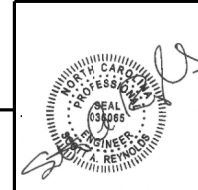
1. PROVIDE A GROUND AND 20% SPARE CONDUCTORS IN EACH CONDUIT TO EACH PIECE OF EQUIPMENT. SPARES ARE NOT SHOWN.
2. THE SCHEMATIC CONDUIT DIAGRAMS SHOW MINIMUM DESIGN QUANTITIES OF PULL, TERMINAL AND JUNCTION BOXES THAT MAY BE REQUIRED FOR THE PROPOSED INSTALLATION. THE CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL NECESSARY BOXES REQUIRED FOR THE ACTUAL LAYOUT AT NO ADDITIONAL COST TO NORTH CAROLINA DEPARTMENT OF TRANSPORTATION.
3. THE CONTRACTOR SHALL FIELD VERIFY THE ACTUAL ROUTING OF THE EQUIPMENT AND ADJUST AS REQUIRED.
4. UNLESS STATED OTHERWISE, ALL ELETRICAL EQUIPMENT SHALL BE NEW.
5. CONDUIT AND WIRE REQUIREMENTS FOR SERVING HEATING ARE NOT SHOWN. THE CONTRACTOR SHALL PROVIDE AS REQUIRED.
6. CONTRACTOR TO PROVIDE SOOW CABLES OF SUFFICIENT LENGTH SUPPLIED BY THE SWITCH/SENSOR MANUFACTURER.
7. CONNECT THE TEMP SENSORS INSIDE THE HPU ENCLOSURE (NOT SHOWN).

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
 NEW HANOVER COUNTY
 STATION: 1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

 CONDUIT BLOCK
 DIAGRAM

 FOR FORT FISHER FERRY BASIN



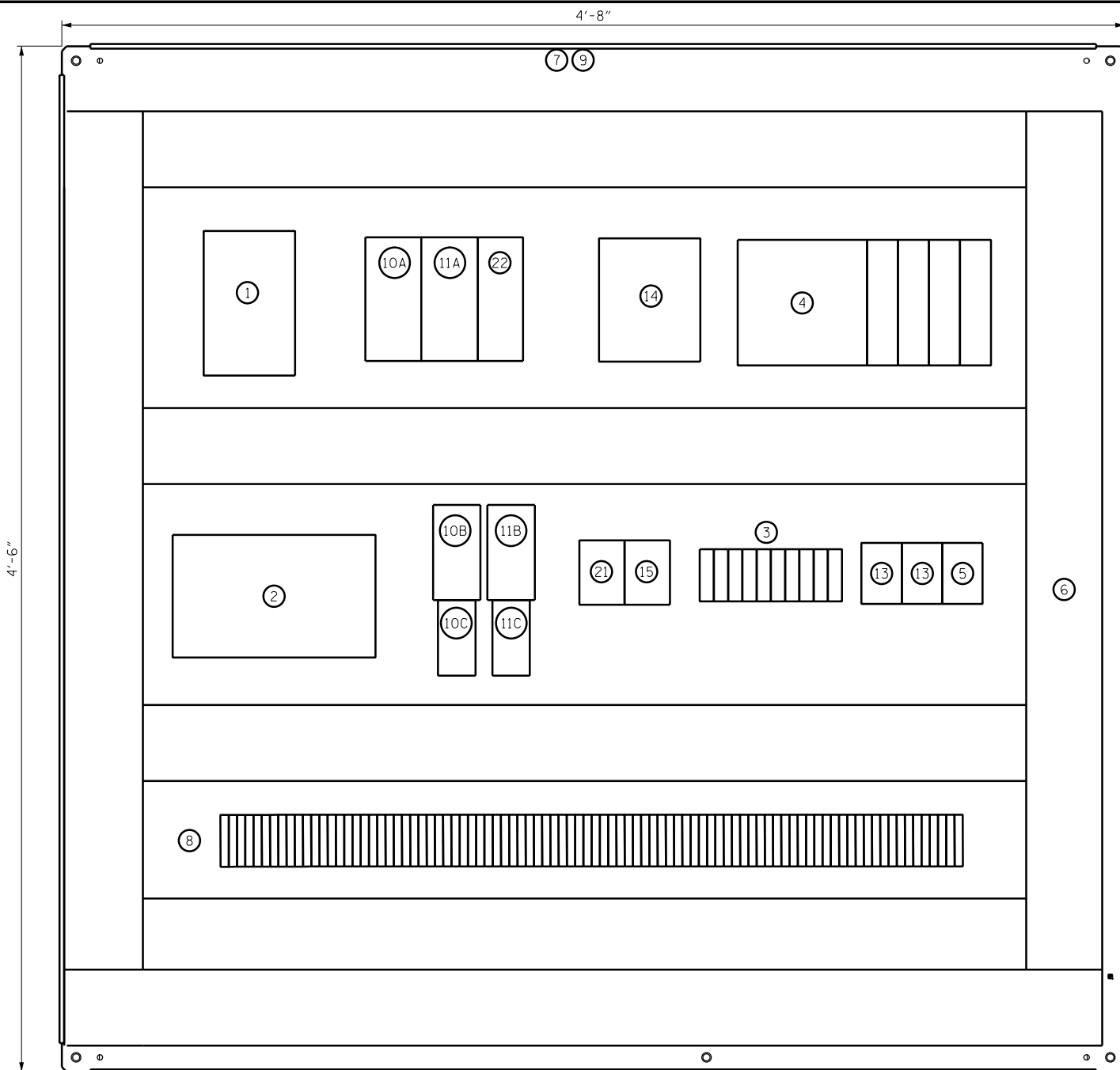
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1			3			TOTAL SHEETS	
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HPU CONTROL BACKPANEL

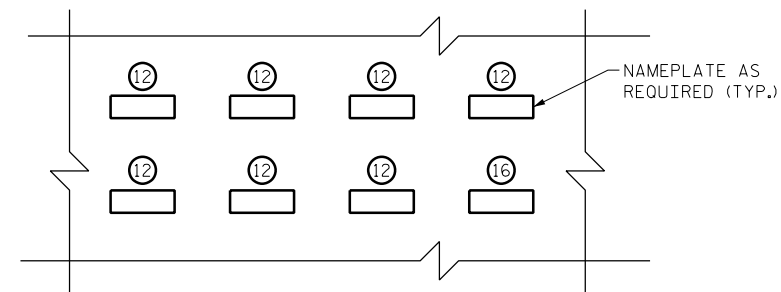
PROPOSED BILL OF MATERIALS

(QUANTITIES SHOWN ARE FOR SOUTHPORT RAMP, FORT FISHER SHALL BE SIMILAR)

ITEM NO.	DWG ID	QTY	DESCRIPTION	DESCRIPTION 1	DESCRIPTION 2
1	CB-CC	1	MAIN CIRCUIT BREAKER	3P, 240V, 150A	WITH THROUGH DOOR HANDLE
2	-	1	UPS	DIN RAIL MOUNTED	WITH ALARM CONTACT
3	CB'S	10	CIRCUIT BREAKERS	1P, 120V, 5A	
4	PLC	-	CENTRAL PROCESSING UNIT	ALLEN BRADLEY CONTROLLOGIX	
			POWER SUPPLY	24VDC, 10A	
			PLC INPUT RACK		
			PLC OUTPUT RACK		
5	TDR	1	TIME DELAY RELAY	120V, 5A	
6	-	-	WIRING DUCT, SIZE AS REQUIRED		
7	-	-	PAINTED STEEL BACK PANEL	10 GAUGE STEEL	
8	TB'S	-	TERMINAL BLOCKS	SCREW TYPE, 690V, 32A	
			DIN RAILS		
			END PLATES		
			CROSS CONNECTORS		
			TERMINAL MARKERS		
			GROUND TERMINALS		
9	-	1	NEMA 4X ENCLOSURE	72"X60"X18"	
10A	MOTOR 1	1	MOTOR 1 CB	3P, 240V, 100A	WITH THROUGH DOOR HANDLE
10B		1	MOTOR 1 CONTACTOR	3P, 240V, NEMA SIZE 3	
10C		2	AUX CONTACTS FOR CONTACTOR		
11A	MOTOR 2	1	MOTOR 2 CB	3P, 240V, 100A	WITH THROUGH DOOR HANDLE
11B		1	MOTOR 2 CONTACTOR	3P, 240V, NEMA SIZE 3	
11C		2	AUX CONTACTS FOR CONTACTOR		
12	PL	8	PILOT LIGHTS	30MM PUSH TO TEST LED INDICATING LIGHT	120VAC, 10A
13	CR	2	CONTROL RELAY	120VAC, 10A	
14	TVSS	1	TRANSIENT SURGE SUPPRESSOR		
15	CB-HH	1	HYDRAULIC HEATER CB	2P, 240V, 50A	
16	CS	1	CONTROL SWITCH	30MM 2 POSITION MAINTAINED, 120VAC, 10A	CONTACTS AS REQUIRED
17	-	1	LED ENCLOSURE LIGHT*	120VAC	
18	-	1	ENCLOSURE HEATER*	120VAC, 100W	
19	-	1	DIN RAIL GFI OUTLET*	120VAC, 15A	
20	-	1	AIR CONDITIONER*		
21	M-HTR	1	MOTOR HEATER CONTACTOR	2P, 240VAC, NEMA SIZE 2	
22	CB-TVSS	1	TVSS CIRCUIT BREAKER	3P, 240V, 15A	

* NOT SHOWN IN LAYOUT

'-' DENOTES QUANTITY AS REQUIRED PER SCHEMATIC WIRING DIAGRAMS



INDICATING LIGHT ALARM PANEL

LOCATED ON THE DOOR OF THE ENCLOSURE

NOTES:

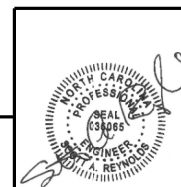
1. THE CONTRACTOR SHALL REARRANGE COMPONENTS AS REQUIRED FOR PROPER FIT ON THE BACKPANEL.
2. THE CONTRACTOR SHALL FURNISH AND INSTALL A UPS INSIDE THE ENCLOSURE AS PART OF THE PLC SYSTEM.
3. THE CONTRACTOR SHALL PROVIDE DIN RAILS (NOT SHOWN) ON THE BACKPANEL FOR MOUNTING OF THE ELECTRICAL EQUIPMENT.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL A MANUAL OPERATION SELECTOR SWITCH (ITEM #16) ON THE ENCLOSURE TO SELECT BETWEEN (2) TWO AND (4) FOUR CYLINDER OPERATION.
5. THE CONTRACTOR SHALL SUPPLY AN ENCLOSURE LIGHT, HEATER, AIR CONDITIONER AND RECEPTACLE INSIDE THE HPU ALARM CONTROL PANEL.
6. IN PLACE OF CB'S (ITEM #3), CONTRACTOR MAY PROVIDE A PANELBOARD. DETAILS AND LAYOUT SHALL BE MODIFIED ACCORDINGLY.
7. HPU CONTROL BACKPANEL FOR SOUTHPORT RAMP SHOWN, FORT FISHER RAMP SHALL BE SIMILAR.

PROJECT NO. 16SP.6.3.1/16SP.6.3.2
BRUNSWICK/NEW HANOVER COUNTY
STATION: 17+01.73/1+99.80

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

HPU CONTROL BACKPANEL

FOR SOUTHPORT AND FORT FISHER BASINS



REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.
E-12
 TOTAL SHEETS
31

DRAWN BY : FMK DATE : DEC. 2018
 CHECKED BY : AHN DATE : DEC. 2018
 DESIGN ENGINEER OF RECORD : MJT DATE : DEC. 2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED