

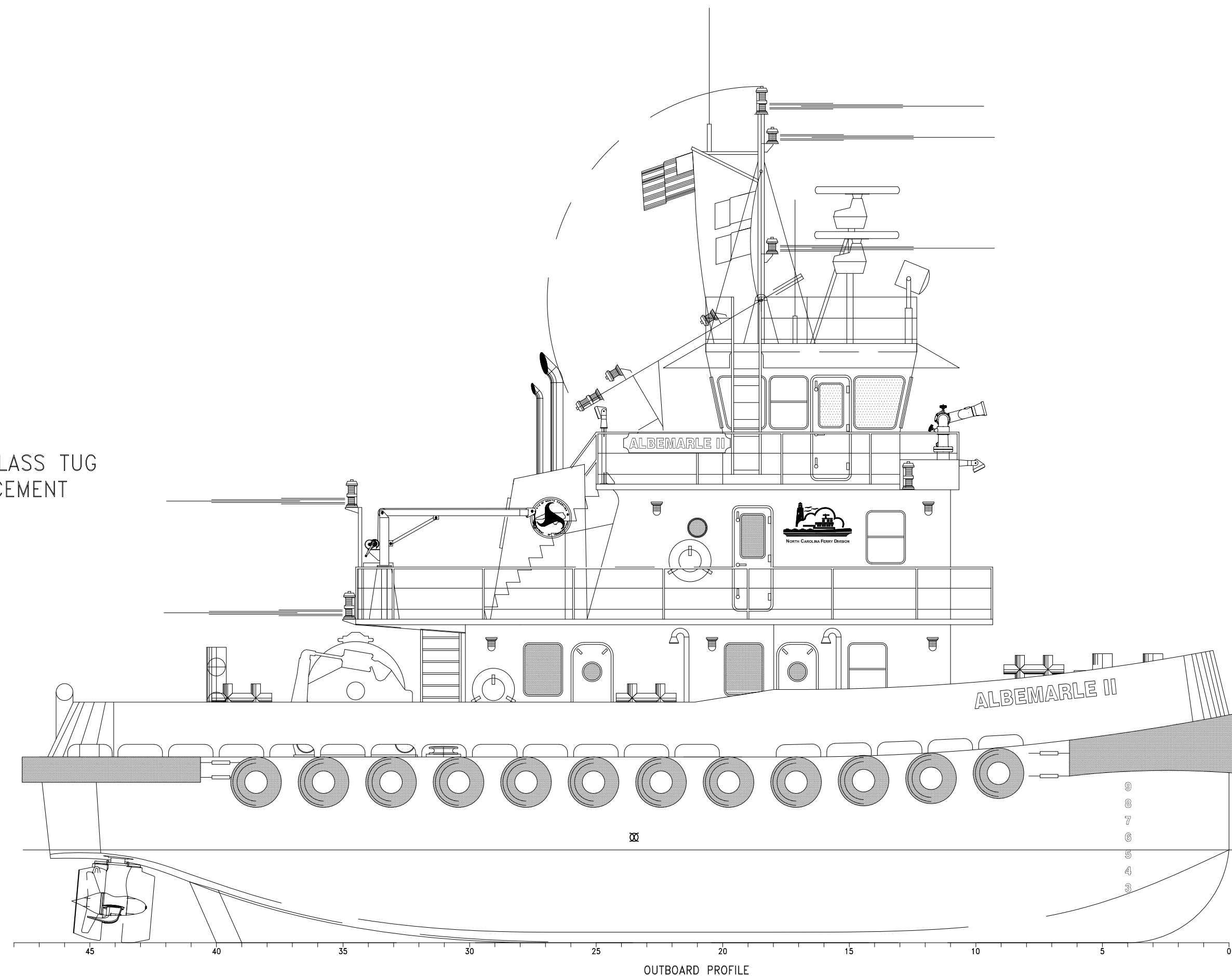
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VESSEL NAME: ALBEMARLE II  
 CONTRACT NO.: C204260  
 TIP NUMBER: F-5703A  
 WBS NUMBER: 47256.1.1  
 PROJECT: Z-DRIVE SOUND CLASS TUG  
 ALBEMARLE REPLACEMENT

VESSEL PARTICULARS  
 LENGTH OVERALL HULL 70'-6"  
 BEAM - MOLDED 30'-0"  
 DEPTH AT SIDE 11'-0"  
 LIGHTSHIP DISPLACEMENT 161 LT  
 FULL LOAD DISPLACEMENT 215 LT



LIST OF DRAWINGS:

DRAWING NUMBER:	DRAWING TITLE:	DRAWING NUMBER:	DRAWING TITLE:
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2. 17-1372-101	LINESPLAN	22. 17-1372-265	DECK MACHINERY HYDRAULIC SYSTEM DETAILS
3. 17-1372-110	BOTTOM & SIDESHELL STRUCTURAL DETAILS	23. 17-1372-320	ELECTRICAL ONE-LINE DIAGRAM
4. 17-1372-117	TRANSVERSE FRAME STRUCTURAL DETAILS	24. 17-1372-331	POWERDECK WIRING DETAILS
5. 17-1372-120	INBOARD STRUCTURAL DETAILS	25. 17-1372-422	LIGHTING BLOCK DIAGRAM
6. 17-1372-121	HULL W.T. FLATS & BULKHEADS STRUCTURAL DETAILS	26. 17-1372-506	VENTS & FILLS
7. 17-1372-122	TYPICAL STRUCTURAL SECTION	27. 17-1372-514	HVAC SYSTEM
8. 17-1372-131	MAIN DECK STRUCTURAL DETAILS	28. 17-1372-521	BILGE & FIREMAIN PIPING DETAILS
9. 17-1372-132	2ND DECK STRUCTURAL DETAILS	29. 17-1372-528	SEWAGE PIPING DETAILS
10. 17-1372-133	3RD DECK STRUCTURAL DETAILS	30. 17-1372-533	POTABLE WATER PIPING
11. 17-1372-152	MAIN DECK DECKHOUSE BULKHEADS STRUCTURAL DETAILS	31. 17-1372-551	COMPRESSED AIR SYSTEM DETAILS
12. 17-1372-153	2ND DECK DECKHOUSE BULKHEADS STRUCTURAL DETAILS	32. 17-1372-600	BULWARKS STRUCTURAL DETAILS
13. 17-1372-154	PILOTHOUSE STRUCTURAL DETAILS	33. 17-1372-612	RAILS & STANCHIONS STRUCTURAL DETAILS
14. 17-1372-167	HATCHES & MANHOLES SCHEDULE	34. 17-1372-622	BELOWDECKS WALKING FLAT STRUCTURAL DETAILS
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17. 17-1372-200	MACHINERY ARRANGEMENTS	37. 17-1372-635	INSULATION SCHEDULE
18. 17-1372-256	ENGINE & GENSET COOLING SYSTEM DETAILS	38. 17-1372-655	CREW, GALLEY, STATEROOMS & STATEROOMS
19. 17-1372-259	ENGINE & GENSET EXHAUST DETAILS	39. 17-1372-680	LIFE, EMERGENCY & FIRE-FIGHTING EQUIPMENT
20. 17-1372-261	FUEL OIL PIPING DETAILS	40. 17-1372-684	FENDERING DETAILS

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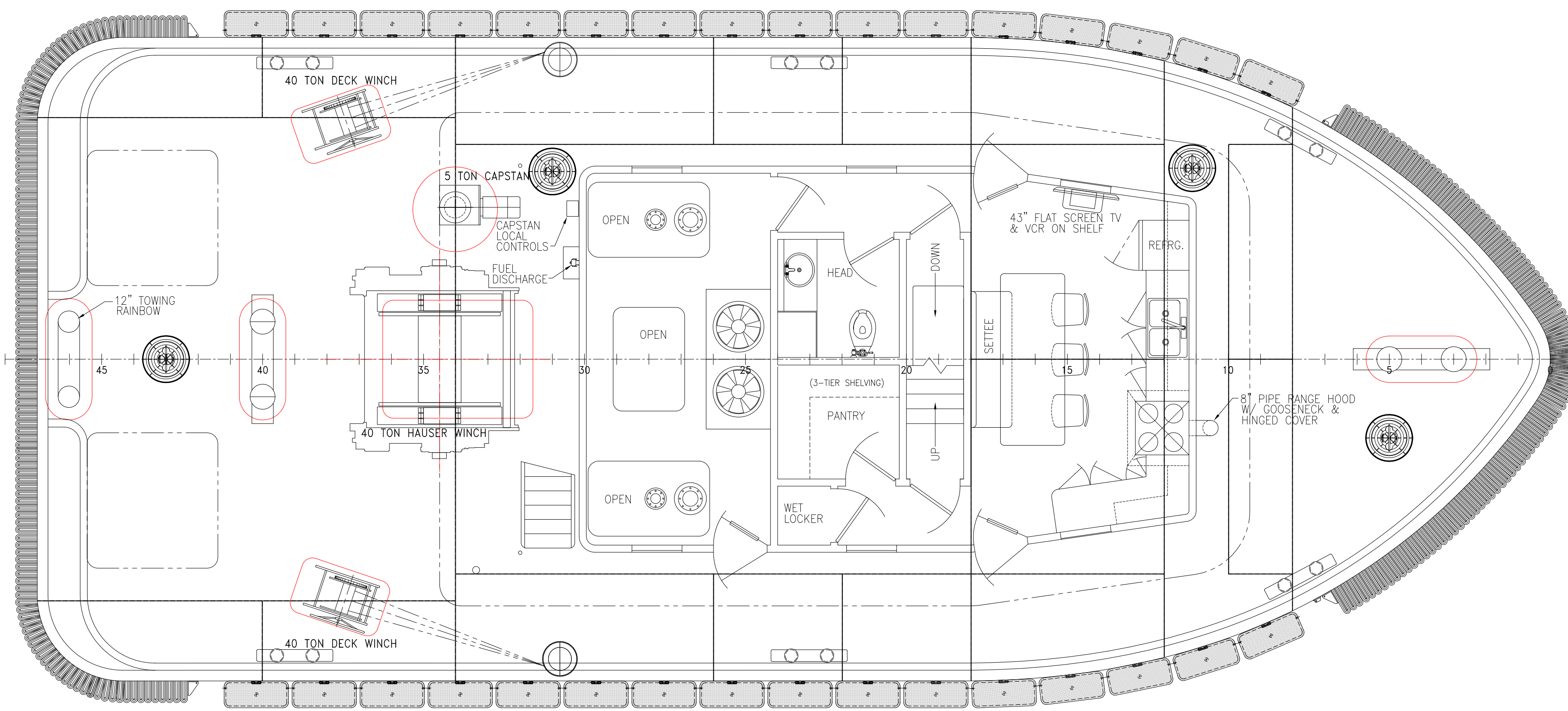
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Title: 70.5'x30'x11' NCDOT TOWBOAT

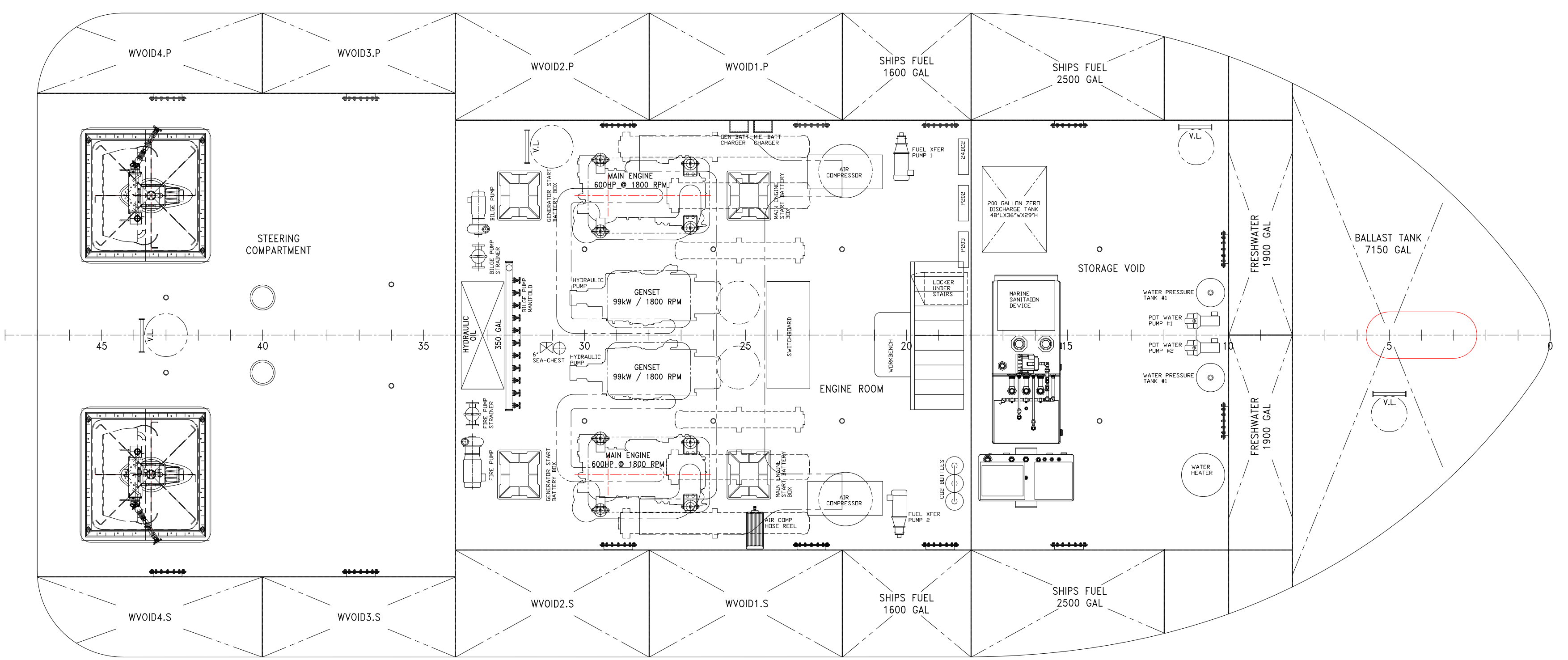
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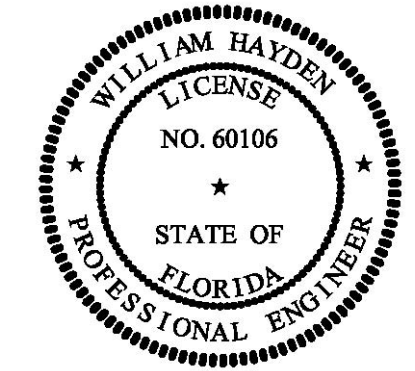
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MAIN DECK ARRANGEMENTS



HOLD ARRANGEMENTS



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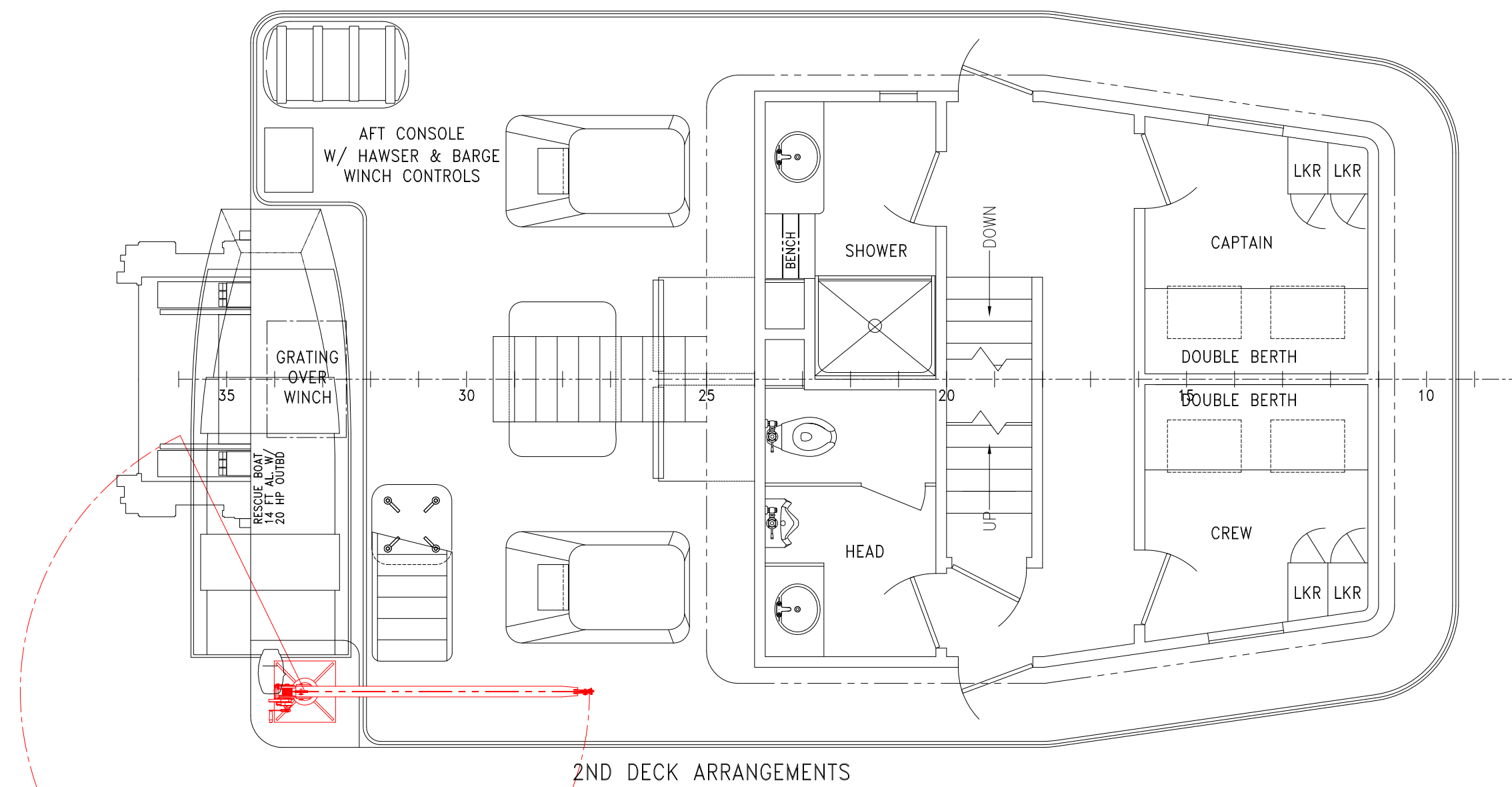
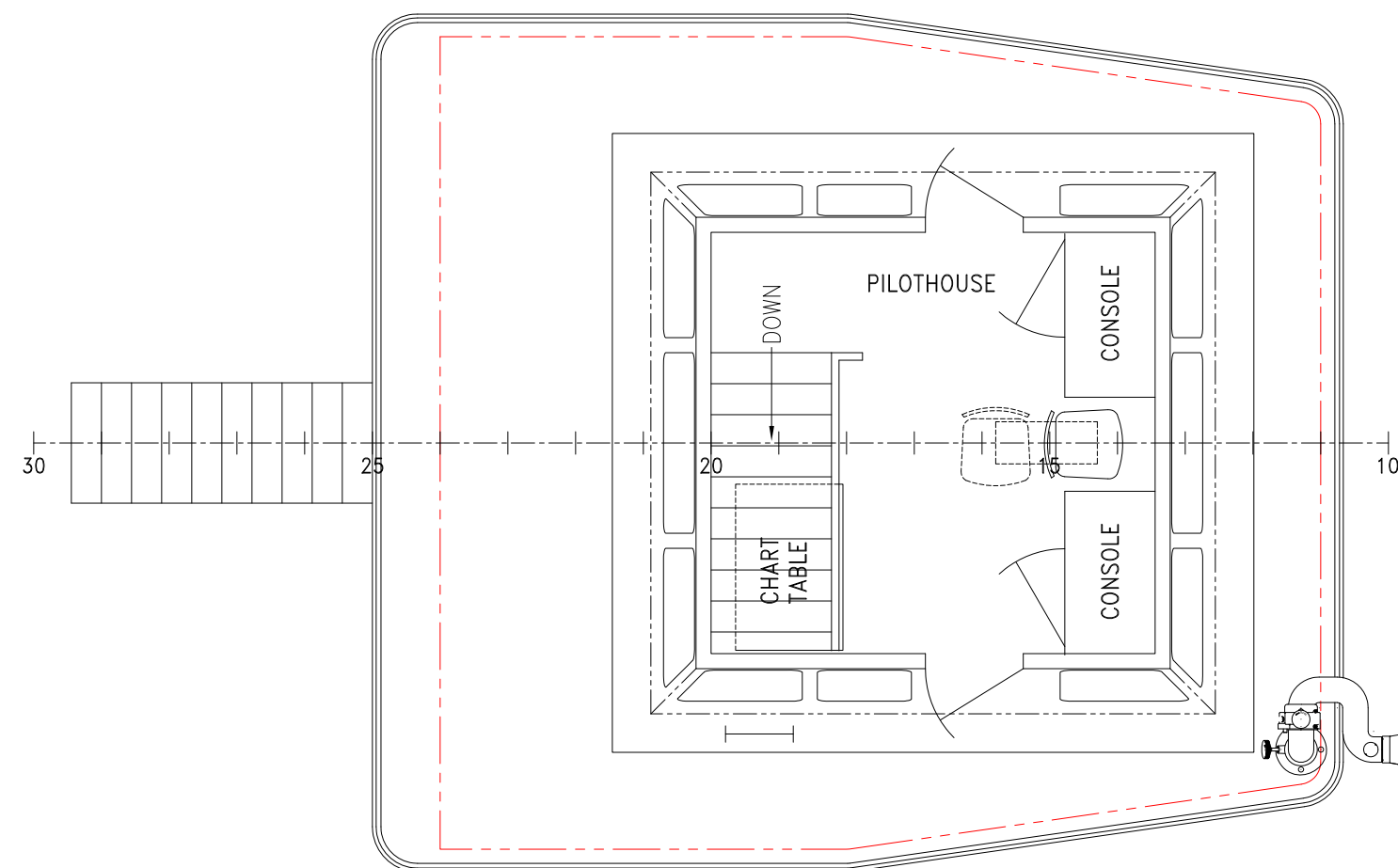
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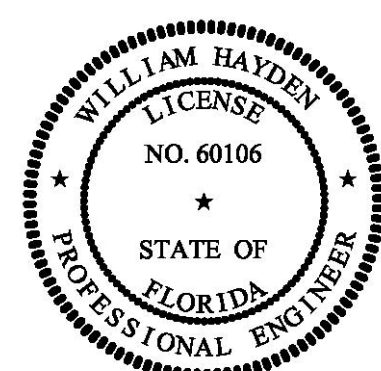
**GENERAL ARRANGEMENTS  
HOLD & MAIN DECK**

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Sht. 1 of 3

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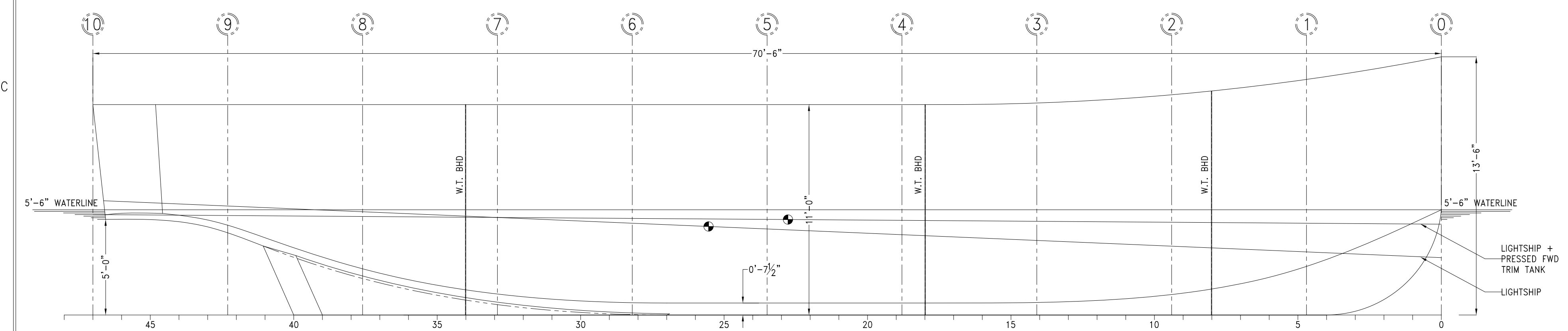


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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**GENERAL ARRANGEMENTS**  
**2ND & 3RD DECKS**

Dwg. No. 17-1372-100 Alt. No. 1  
 Sht. 2 of 3

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**VESSEL PARTICULARS**

LENGTH OVERALL HULL 70'-6"  
 BEAM - MOLDED 30'-0"  
 DEPTH AT SIDE 11'-0"  
 LIGHTSHIP DISPLACEMENT 161 LT  
 FULL LOAD DISPLACEMENT 215 LT

**DRYDOCKING**

-KEEL BLOCKS @ 6'-0" CENTERS UNDER FRAMING  
 -CHINE BLOCKS AT ALL XVERSE BHDS @ FRS 8, 18 & 34  
 -KEEL & CHINE BLOCKS SHALL BE MINIMUM 2'x2' PADS OF HARDWOOD OR COMPOSITE MATERIAL  
 MINIMUM AREA OF HULL BLOCKING = 48 SQ. FT

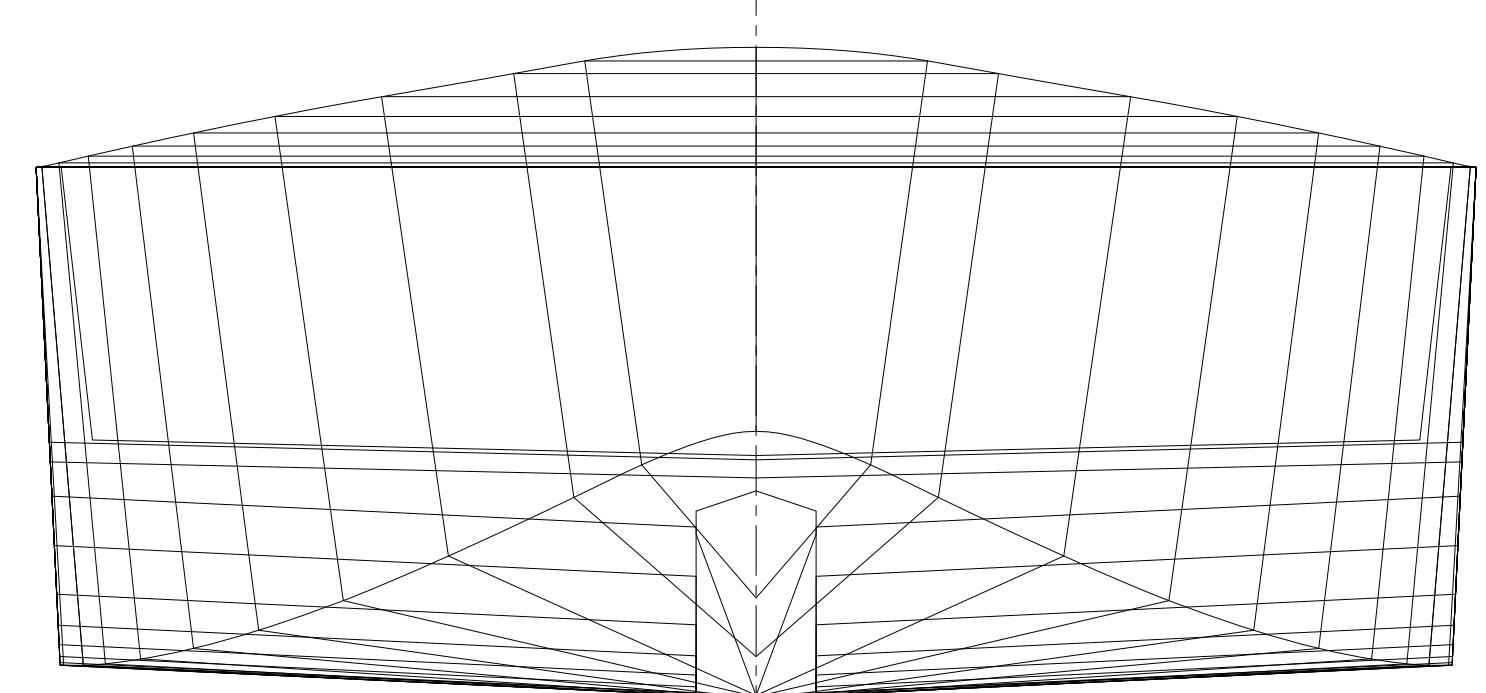
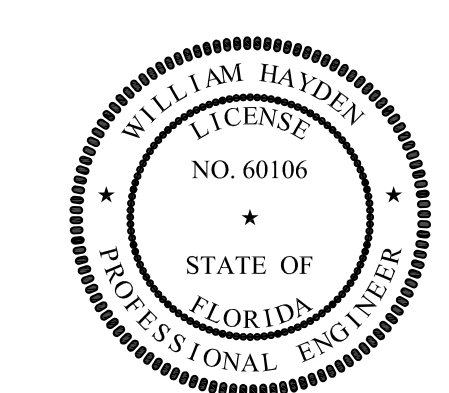
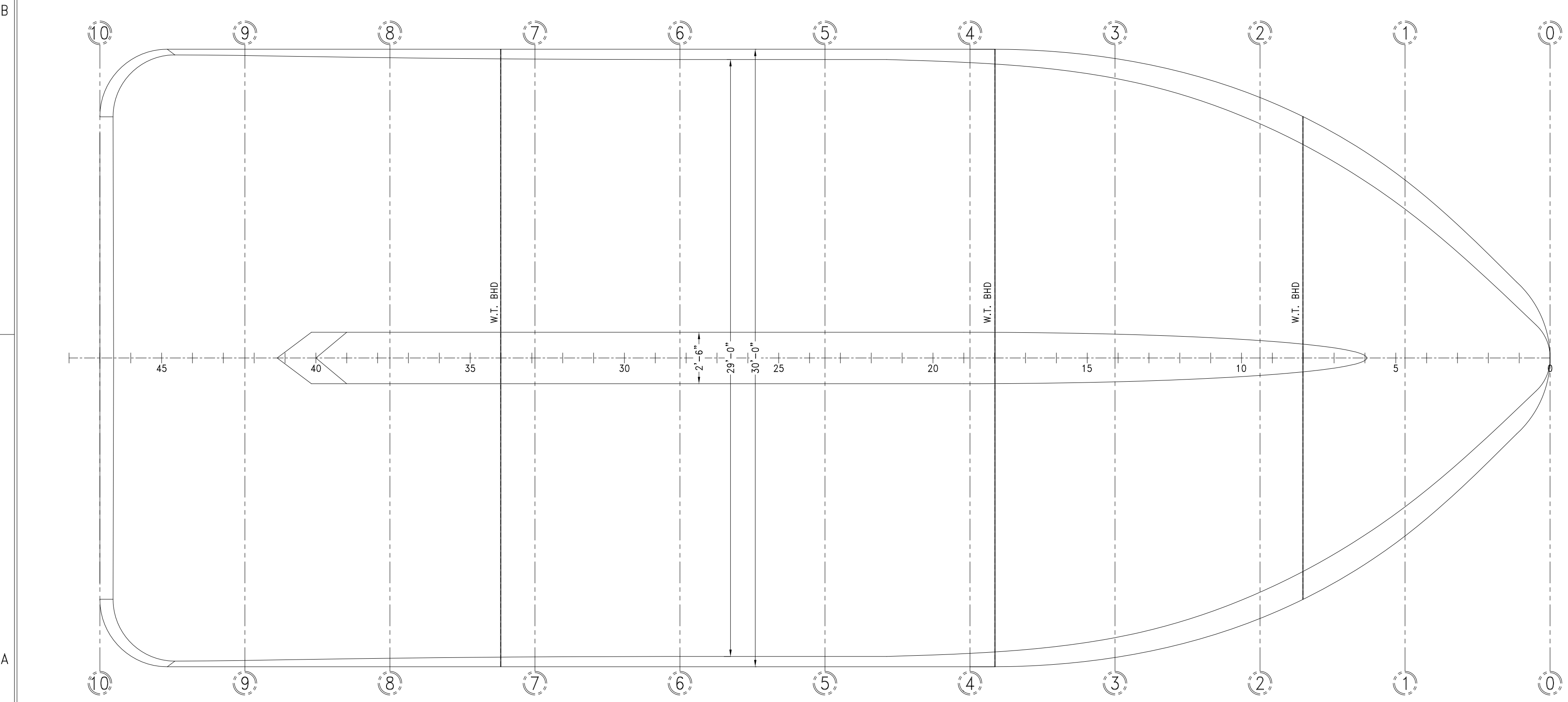


TABLE OF OFFSETS (FEET-INCHES-EIGHTHS)	POINT 1		POINT 2		POINT 3		POINT 4		POINT 5		POINT 6	
	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT
FRAME 1	0-0-0	2-0-3	2-4-5	4-9-5	3-6-7	13-2-5	0-0-0	13-2-5				
FRAME 2	0-0-0	0-9-5+	3-9-4+	4-1-3+	5-0-4+	12-11-3+	0-0-0	12-11-3+				
FRAME 3	0-0-0	0-2-2+	5-1-6	3-5-6+	6-5-6	12-8-3+	0-0-0	12-8-3+				
FRAME 4	0-0-0	0-0-0	6-4-7+	2-10-6+	7-9-5	12-5-5	0-0-0	12-5-5				
FRAME 6	0-0-0	0-0-0	0-1-3+	0-0-0	8-7-1+	1-11-5+	10-0-2	12-0-6	0-0-0	12-0-6		
FRAME 8	0-0-0	0-0-0	0-8-0+	0-0-0	10-4-3	1-4-2+	11-8-5	11-8-5	0-0-0	11-8-5		
FRAME 10	0-0-0	0-0-0	0-10-7	0-0-0	11-8-5	0-11-5+	12-11-7+	11-5-2+	0-0-0	11-5-2+		
FRAME 12	0-0-0	0-0-0	1-0-5+	0-0-0	12-9-7	0-9-1	13-10-7+	11-2-6+	0-0-0	11-2-6+		
FRAME 14	0-0-0	0-0-0	1-1-7	0-0-0	13-6-5+	0-7-7	14-6-2+	11-1-0+	0-0-0	11-1-0+		
FRAME 16	0-0-0	0-0-0	1-2-5	0-0-0	14-0-1+	0-7-4	14-10-4+	11-0-1+	0-0-0	11-0-1+		
FRAME 18	0-0-0	0-0-0	1-2-7+	0-0-0	14-0-1+	0-7-4	14-10-4+	11-0-1+	0-0-0	11-0-1+		
FRAME 20	0-0-0	0-0-0	1-3-0	0-0-0	14-5-1	0-7-4	15-0-0	11-0-0	0-0-0	11-0-0		
FRAME 22	0-0-0	0-0-0	1-3-0	0-0-0	14-6-0	0-7-4	15-0-0	11-0-0	0-0-0	11-0-0		
FRAME 24	0-0-0	0-0-0	1-3-0	0-0-0	14-6-0	0-7-4	15-0-0	11-0-0	0-0-0	11-0-0		
FRAME 26	0-0-0	0-0-0	1-3-0	0-0-0	14-6-0	0-7-4	15-0-0	11-0-0	0-0-0	11-0-0		
FRAME 28	0-0-0	0-0-0	1-3-0	0-0-0	1-3-0	0-0-6+	14-6-0	0-7-4	15-0-0	11-0-0	0-0-0	11-0-0
FRAME 30	0-0-0	0-0-0	1-3-0	0-0-0	1-3-0	0-2-2	14-6-0+	0-8-6+	15-0-0	11-0-0	0-0-0	11-0-0
FRAME 32	0-0-0	0-0-0	1-3-0	0-0-0	1-3-0	0-5-1+	14-6-1+	0-11-3+	15-0-0	11-0-0	0-0-0	11-0-0
FRAME 34	0-0-0	0-0-0	1-3-0	0-0-0	1-3-0	0-9-7	14-6-3	1-3-12	15-0-0	11-0-0	0-0-0	11-0-0
FRAME 36	0-0-0	0-0-0	1-3-0	0-0-0	1-3-0	1-4-4	14-6-5+	1-10-1	15-0-0	11-0-0	0-0-0	11-0-0
FRAME 38	0-0-0	0-0-0	1-3-0	0-0-0	1-3-0	2-1-3	14-7-1	2-6-7+	15-0-0	11-0-0	0-0-0	11-0-0
FRAME 40	0-0-0	0-0-0	1-3-0	2-11-1+	1-3-0	3-0-5+	14-7-5+	3-6-1+	15-0-0	11-0-0	0-0-0	11-0-0
FRAME 42	0-0-0	4-1-5+	14-8-2	4-6-5+	15-0-0	11-0-0	0-0-0	11-0-0				
FRAME 44	0-0-0	4-10-4	14-8-5	5-2-4+	15-0-0	11-0-0	0-0-0	11-0-0				
FRAME 46	0-0-0	4-11-7+	13-9-7+	5-3-6+	14-5-5+	11-0-0	0-0-0	11-0-0				



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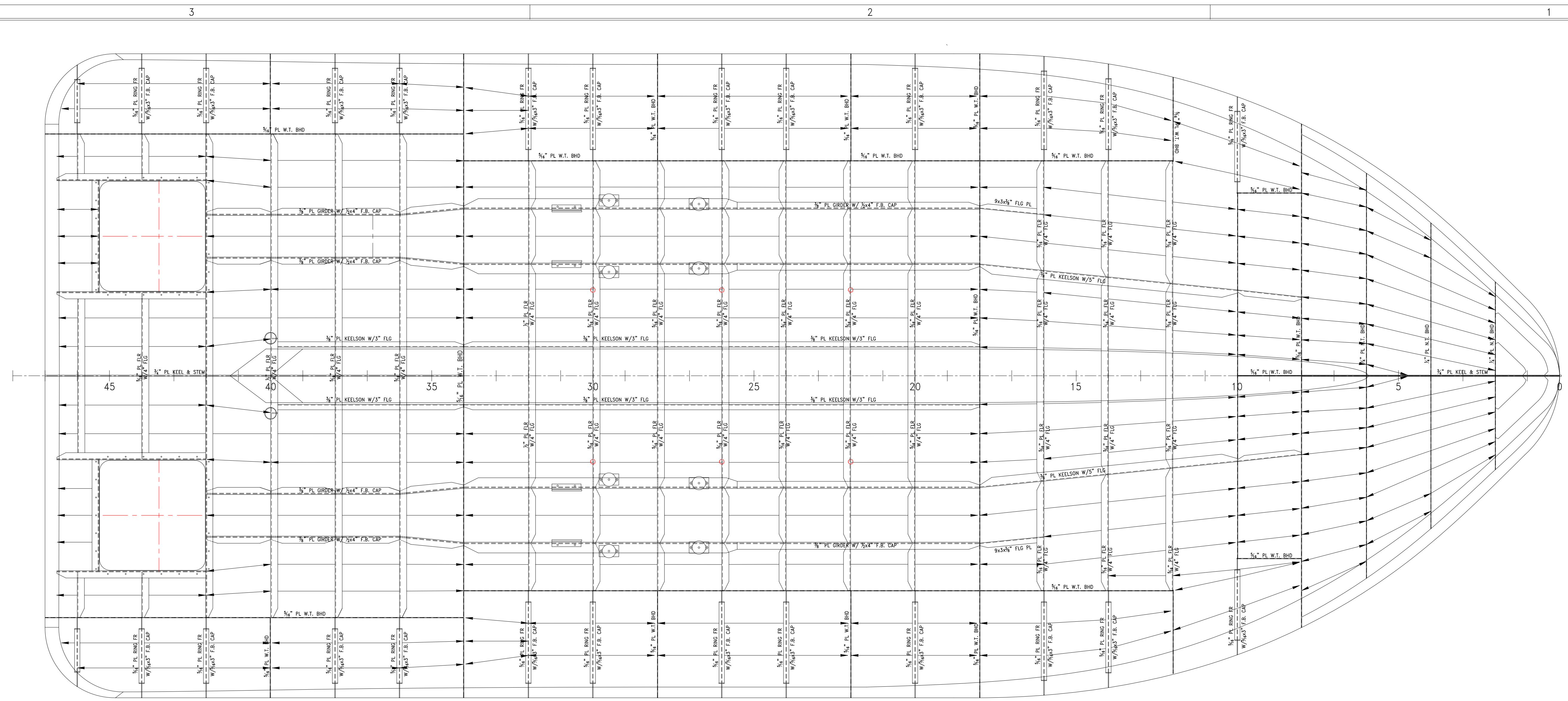
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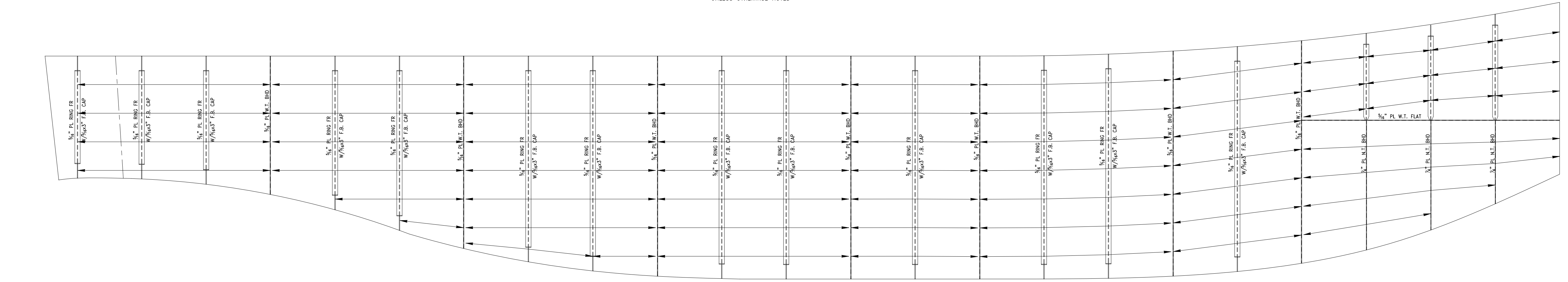
**LINESPLAN**

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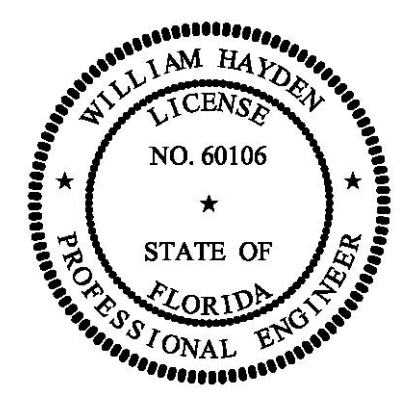
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BOTTOMSHELL STRUCTURAL PLAN  
 1/2" PL W/ 3"x3" F.B. LONG STIFFENERS  
 UNLESS OTHERWISE NOTED



SIDESHELL STRUCTURAL PLAN  
 1/2" PL W/ 3"x3" F.B. LONG STIFFENERS  
 UNLESS OTHERWISE NOTED  
 PORT SIDE SHOWN LKG OUTED  
 STD SIMILAR; OPP. HAND



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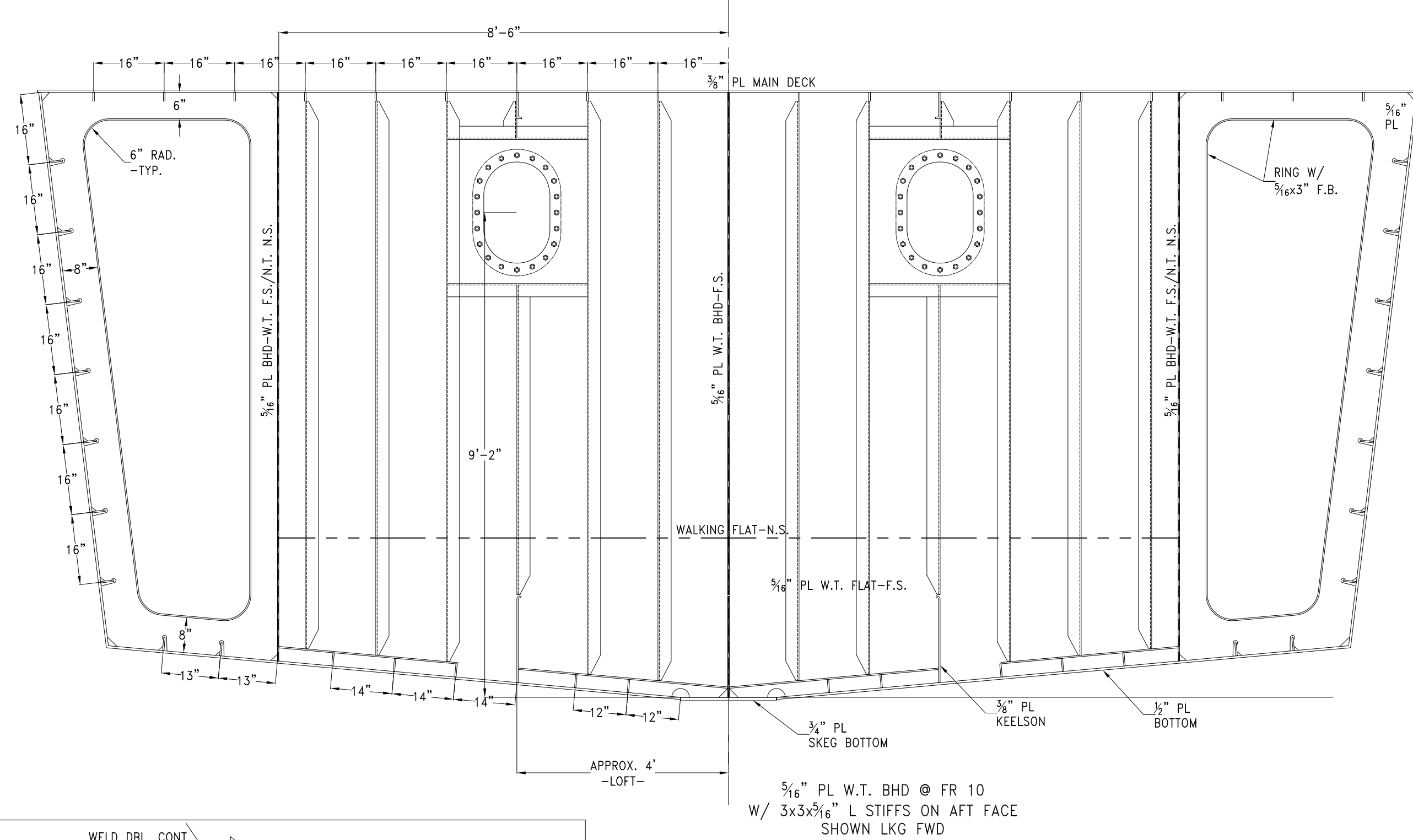
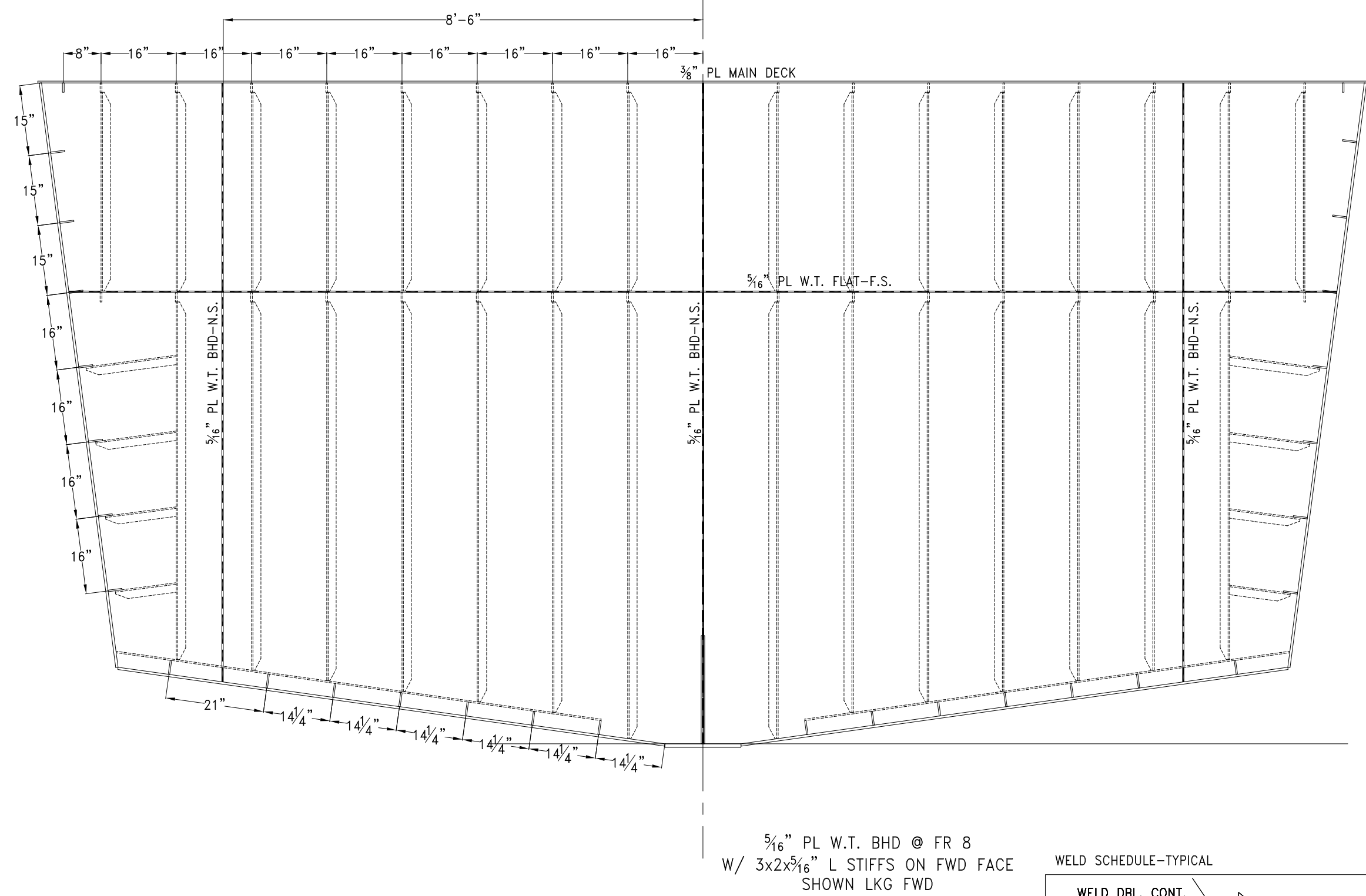
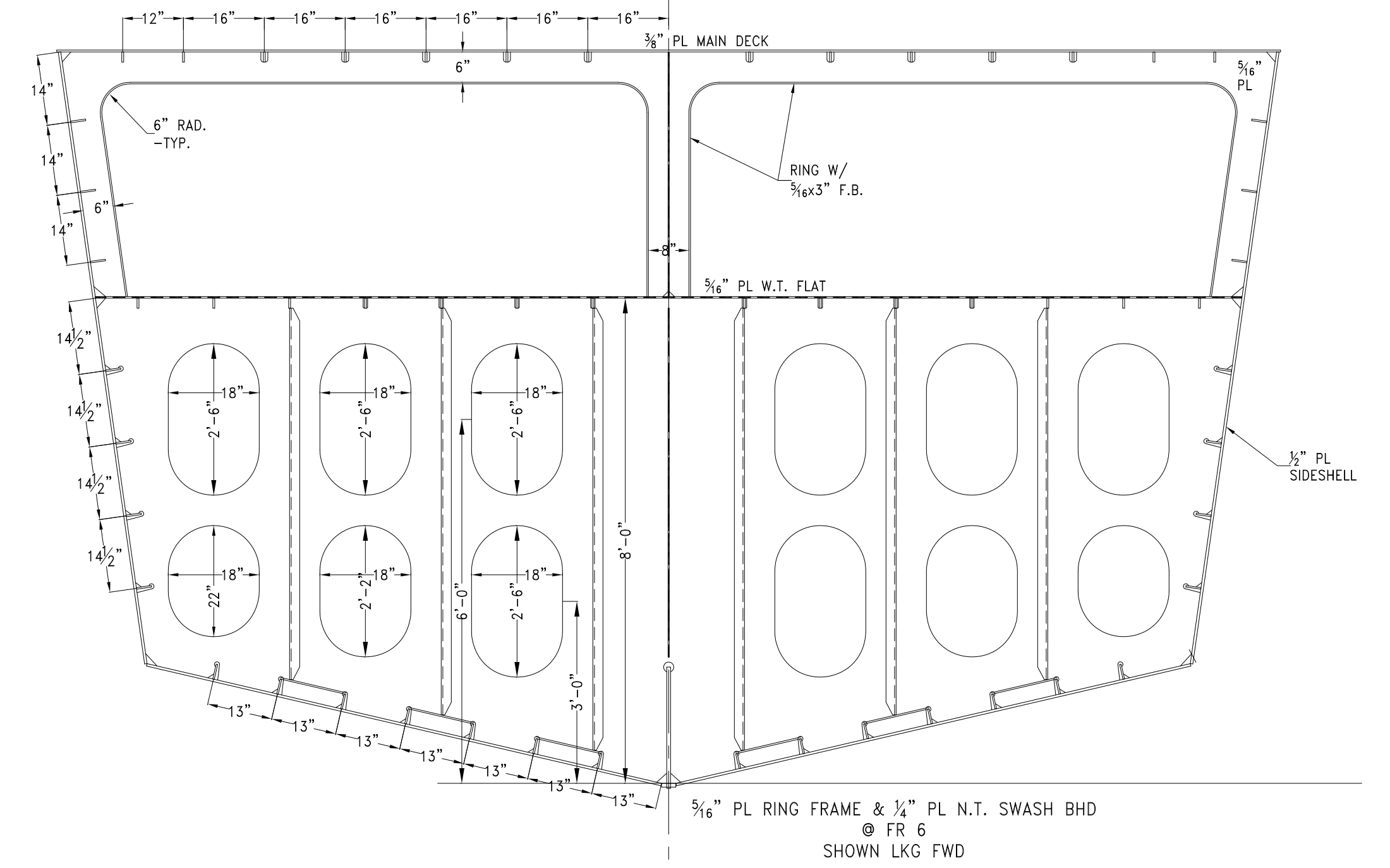
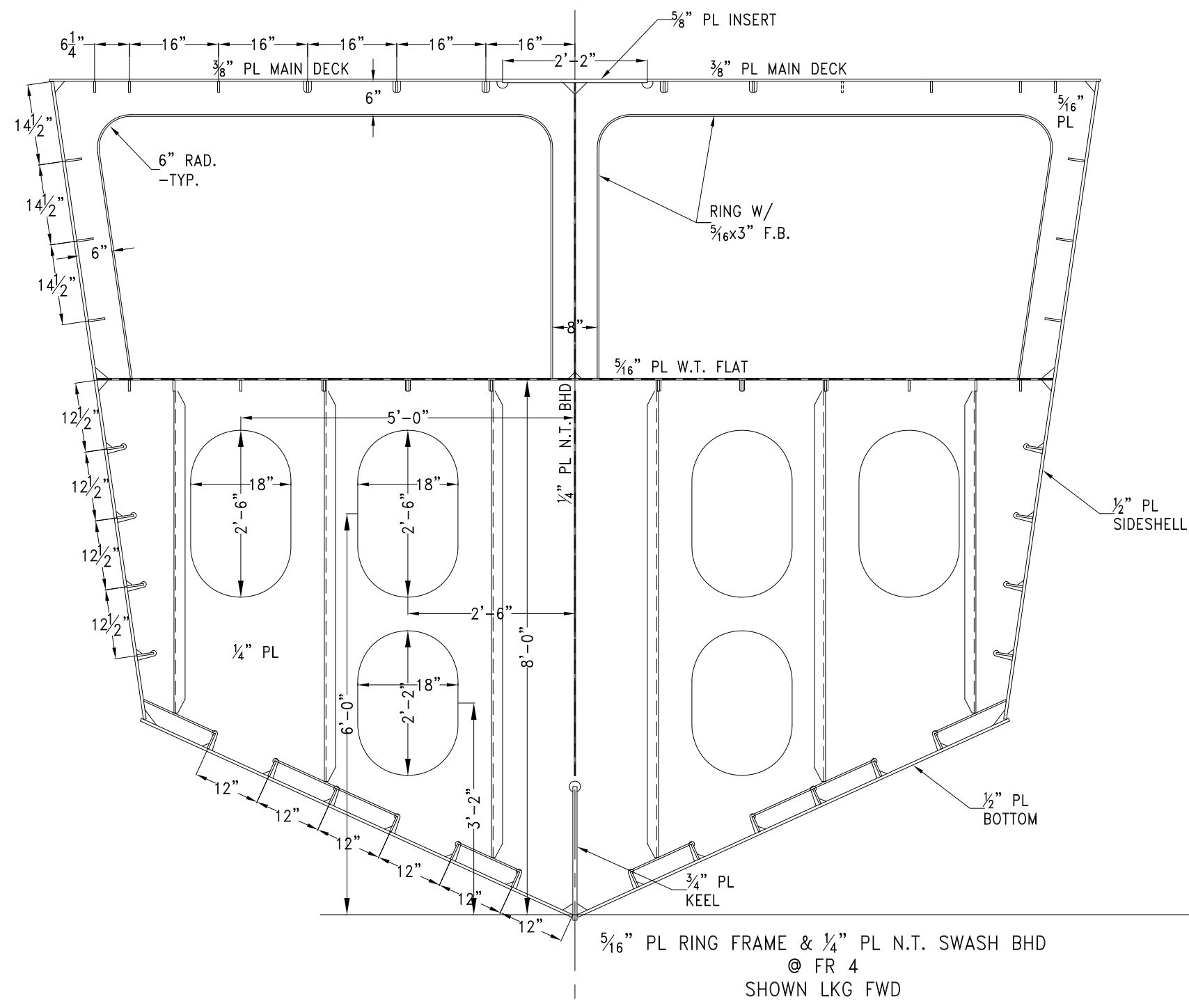
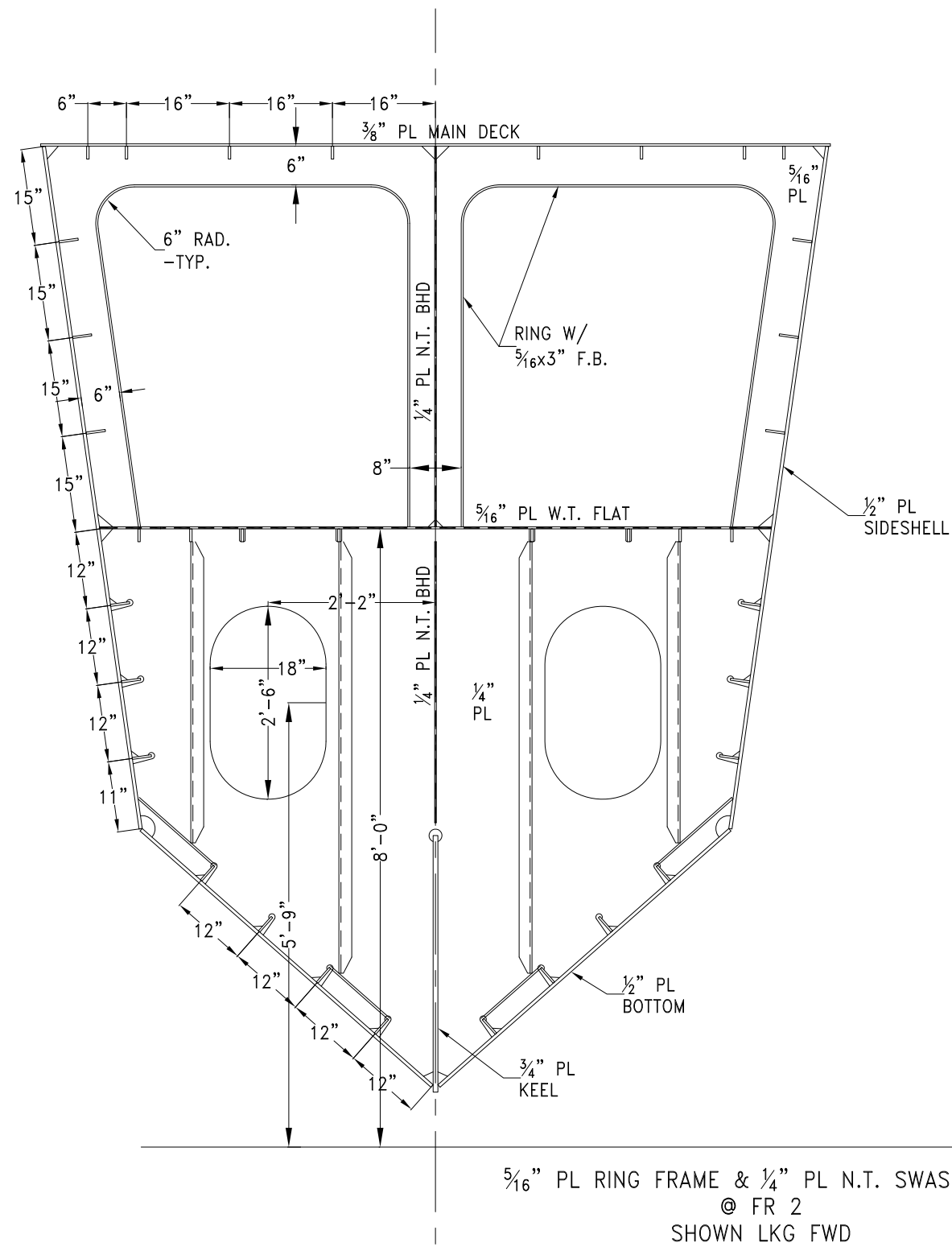
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**BOTTOM & SIDESHELL  
 STRUCTURAL DETAILS**

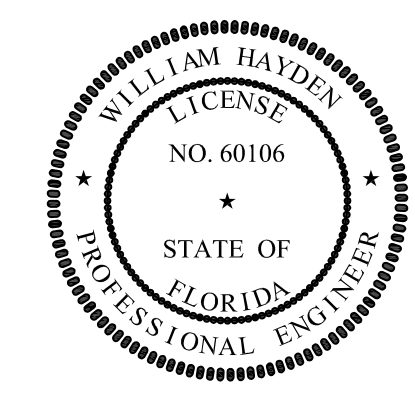
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WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/2" EACH END	1/4" 3-8	TRANSVERSE FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR 3" EACH END	1/4" 3-10	LONGITUDINAL STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF TYP.	3/16" 1/2 1/2-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS TO SIDESHELL PLATING	WELD DBL. CONT. FOR 8" EACH END	1/4" 3-10	TRANSVERSE FRAMES TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF TYP.	1/4" 3-12	LONG. STIFFENERS TO HULL	WELD DBL. CONT. FOR 8" EACH END	1/4" 3-9	LONGITUDINAL GIRDERS TO MAIN DECK
	1/4" 3-12	W.T. BHDS TO SHELL PLATING	WELD DBL. CONT. FOR 8" EACH END	1/4" 3-12	STIFFENERS TO N.T. BHDS
	1/4" 3-10	N.T. BHDS TO SHELL PLATING		1/4" 3-10	RIDER PLATES TO RING FRAMES
DOUBLE CONTINUOUS		ALL STRUCTURE IWO ENGINE GIRDERS FRAME 18 TO 34		1/4"	1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING 3. STANCHIONS AND END PADS



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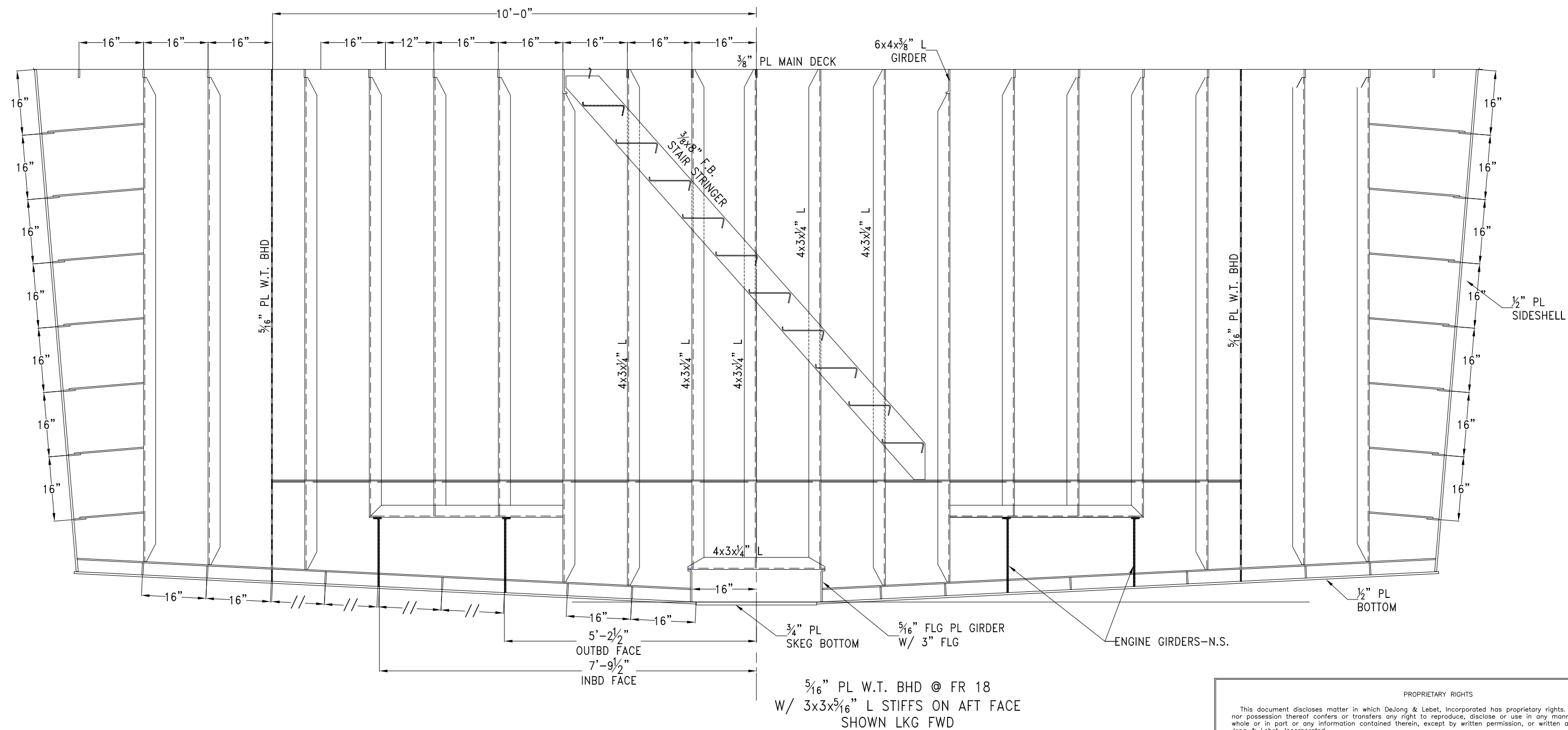
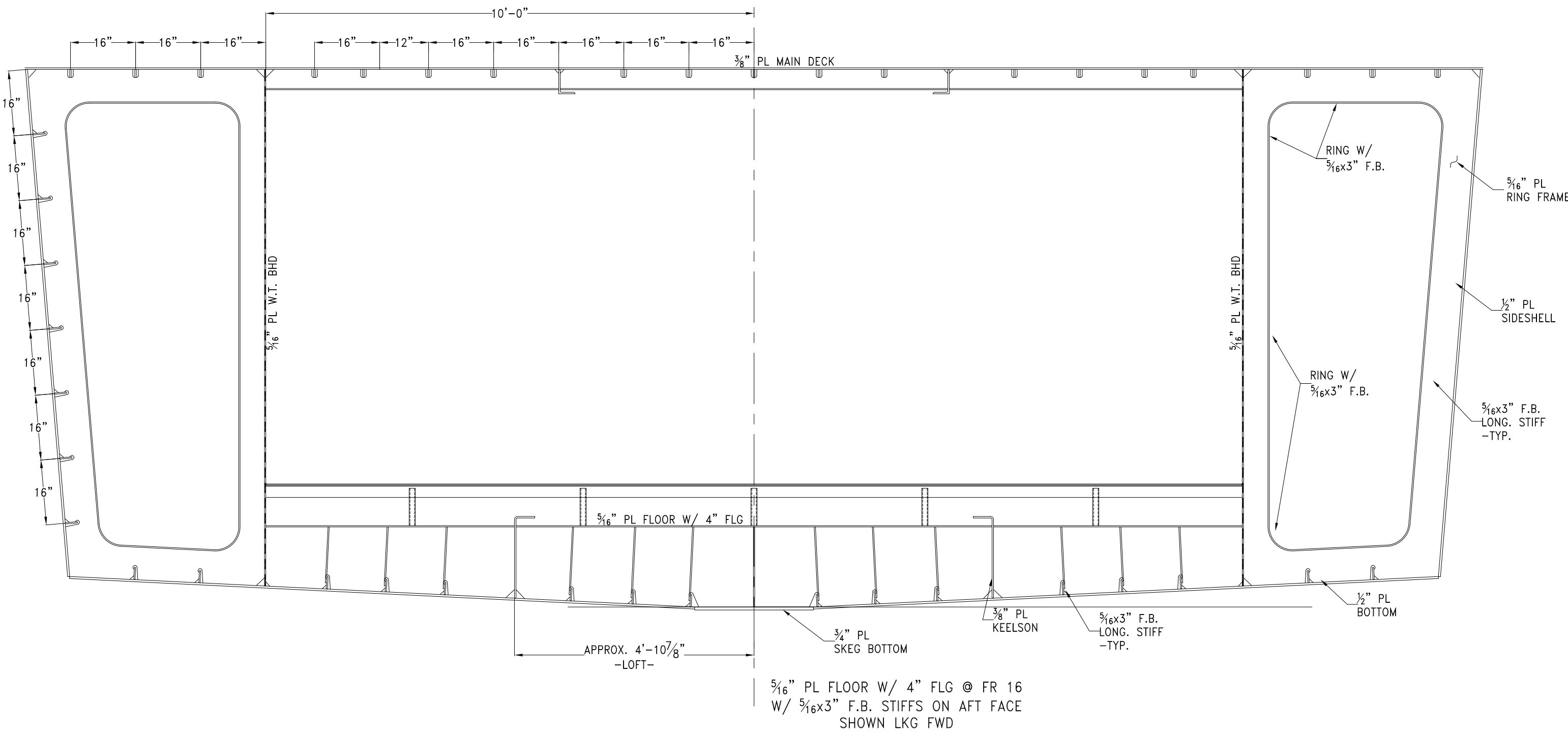
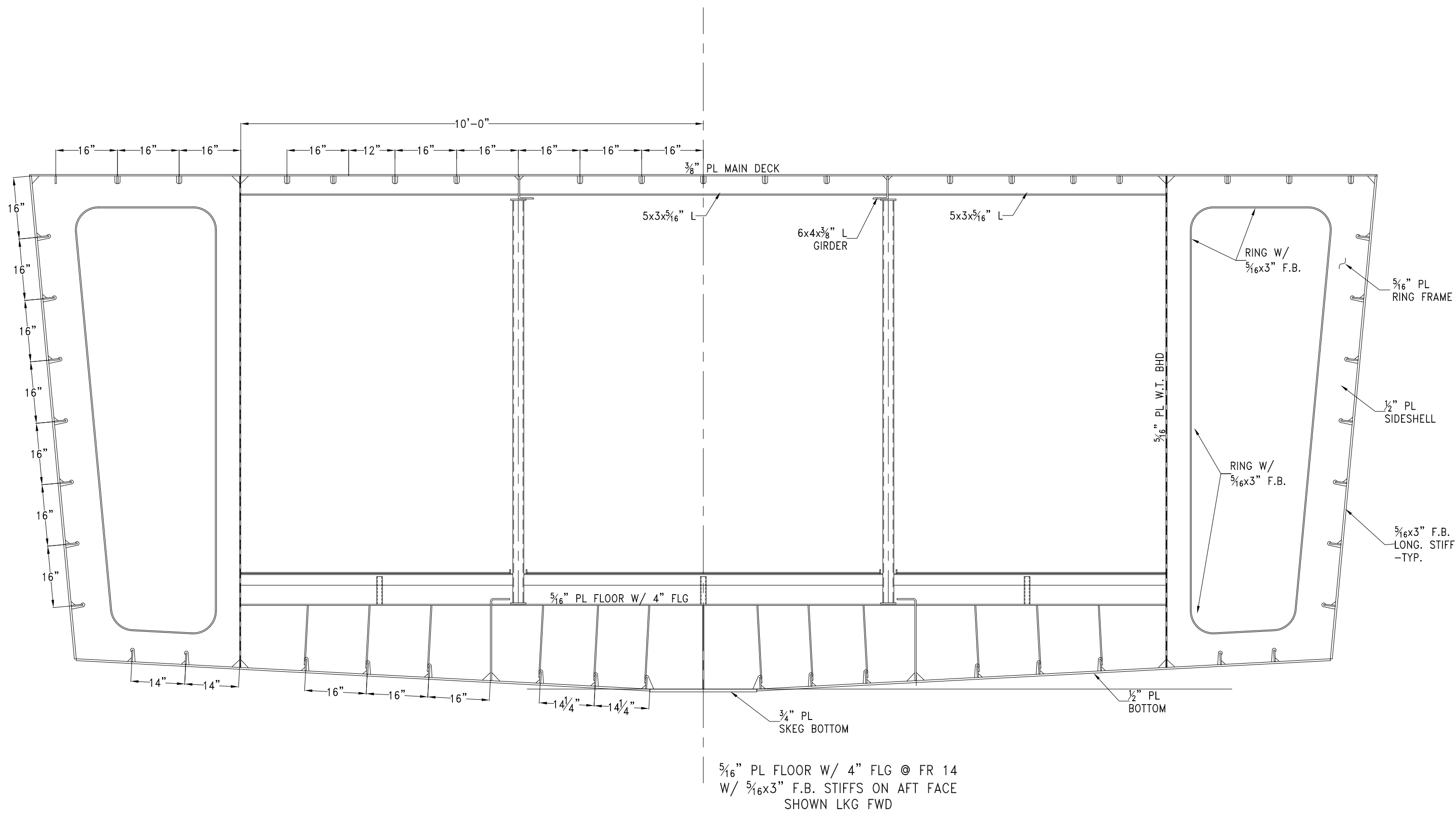
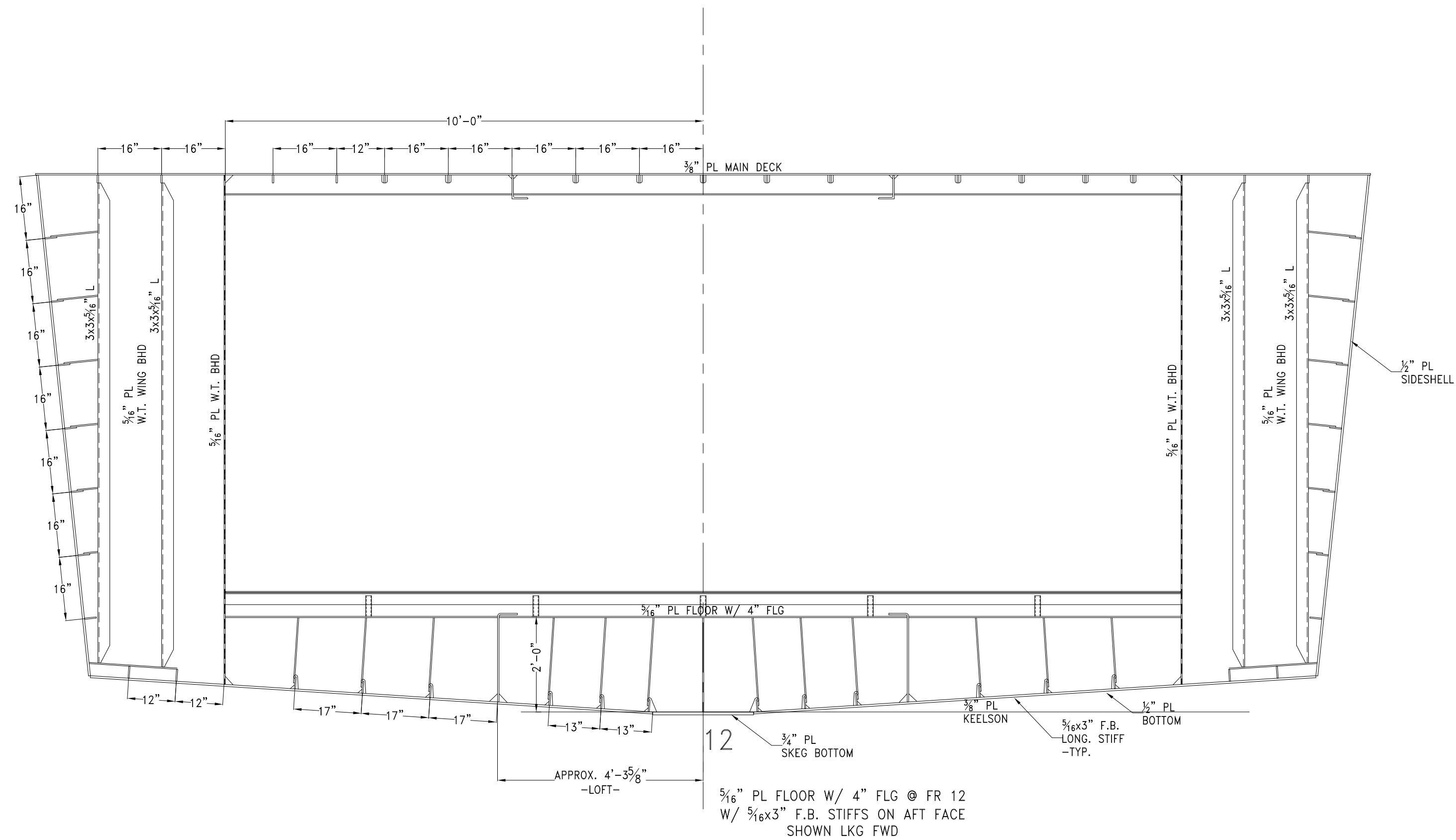
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**TRANSVERSE HULL SECTIONS  
FRAMES 2 THRU 10**

Dwg. No. 17-1372-117 Art. No. 0  
Sht. 1 of 6

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
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ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/2" @ EACH END	1/4" 3-8	TRANSVERSE FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR 3" @ EACH END	1/4" 3-10	LONGITUDINAL STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END	3/16" 1/2-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS TO SIDESHELL PLATING	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-10	TRANSVERSE FRAMES TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END	1/4" 3-12	LONG. STIFFENERS TO HULL	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-9	LONGITUDINAL GIRDERS TO MAIN DECK
	1/4" 3-12	W.T. BHDS TO SHELL PLATING	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-12	STIFFENERS TO N.T. BHDS
	1/4" 3-10	N.T. BHDS TO SHELL PLATING		1/4" 3-10	RIDER PLATES TO RING FRAMES
DOUBLE CONTINUOUS		ALL STRUCTURE IWO ENGINE GIRDERS FRAME 18 TO 34		1/4"	1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING 3. STANCHIONS AND END PADS

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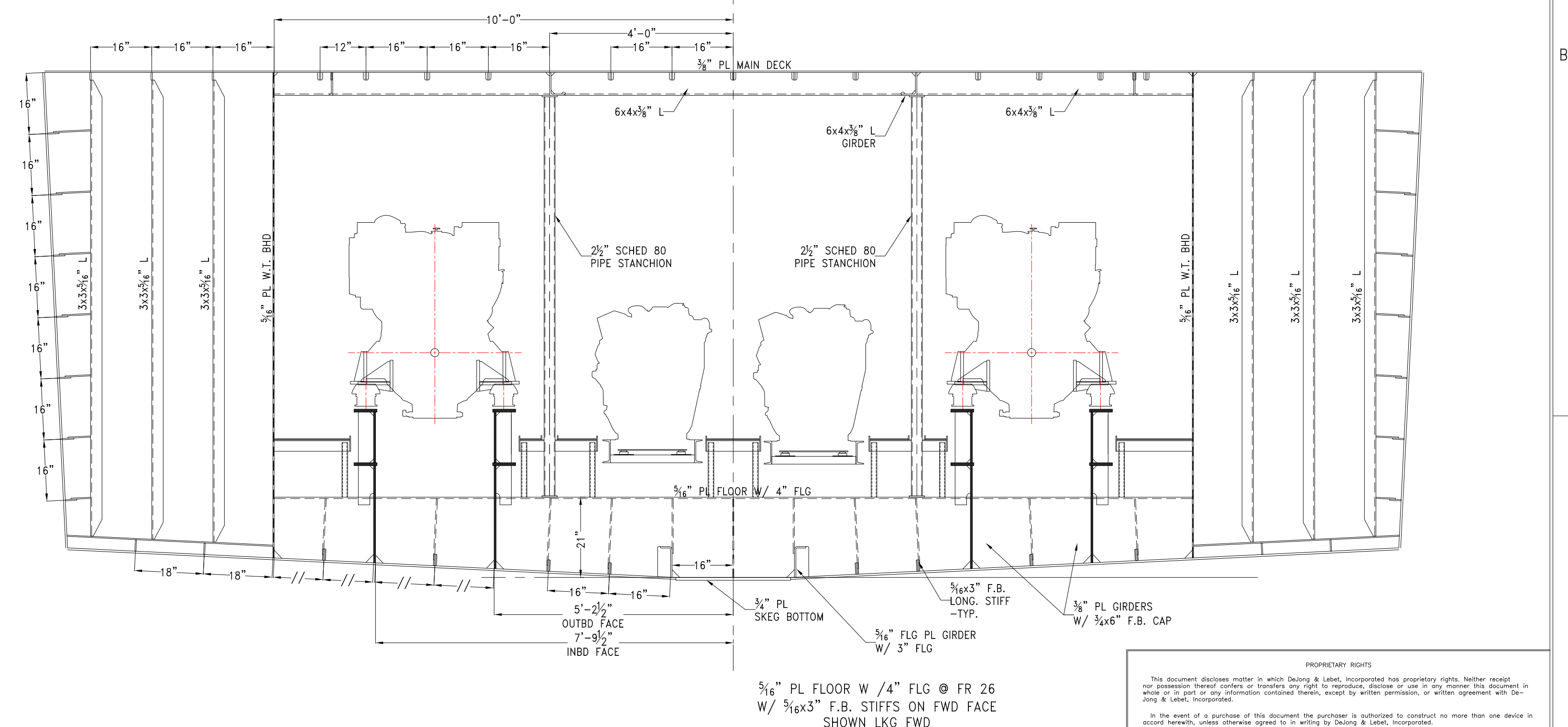
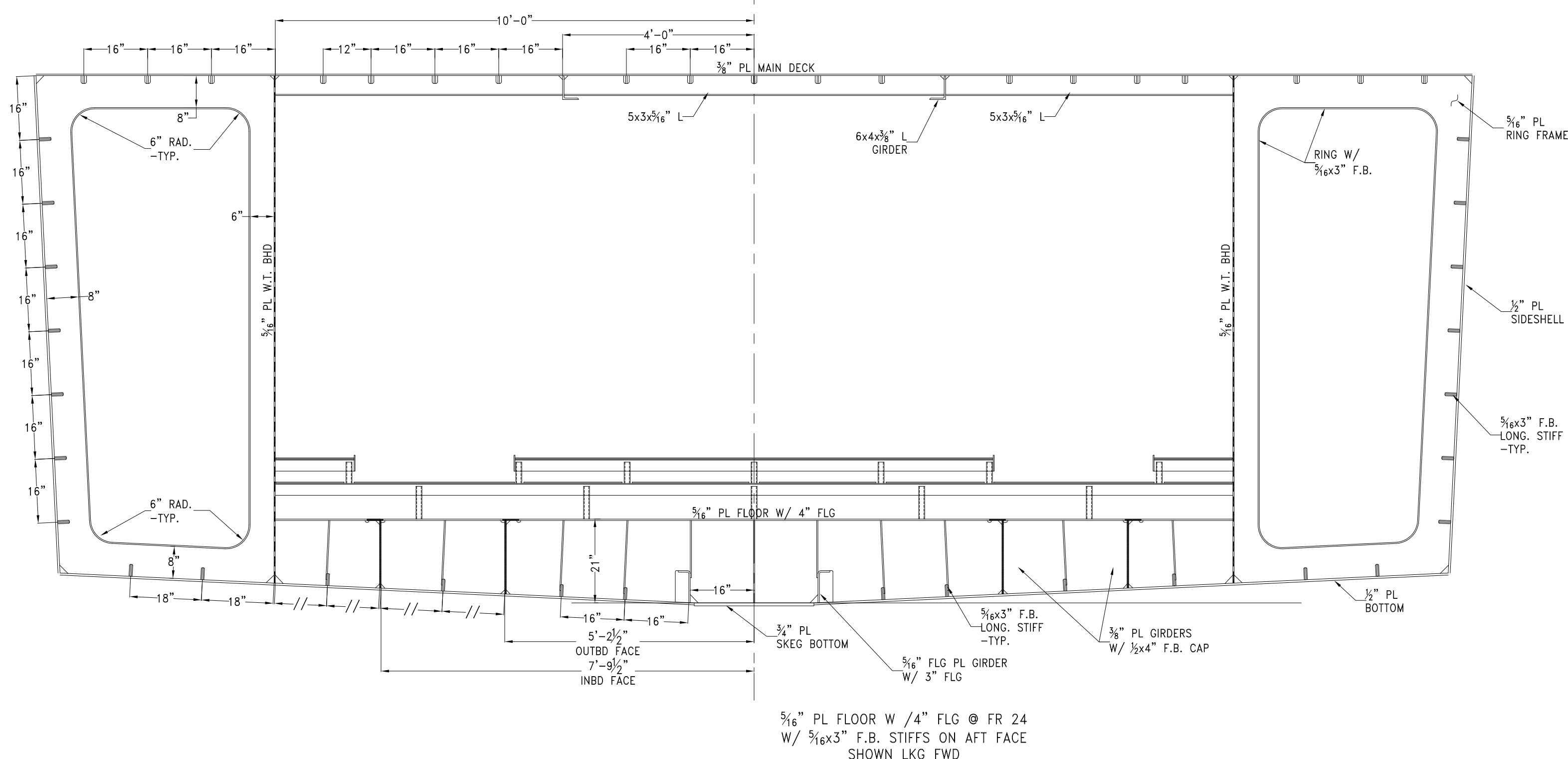
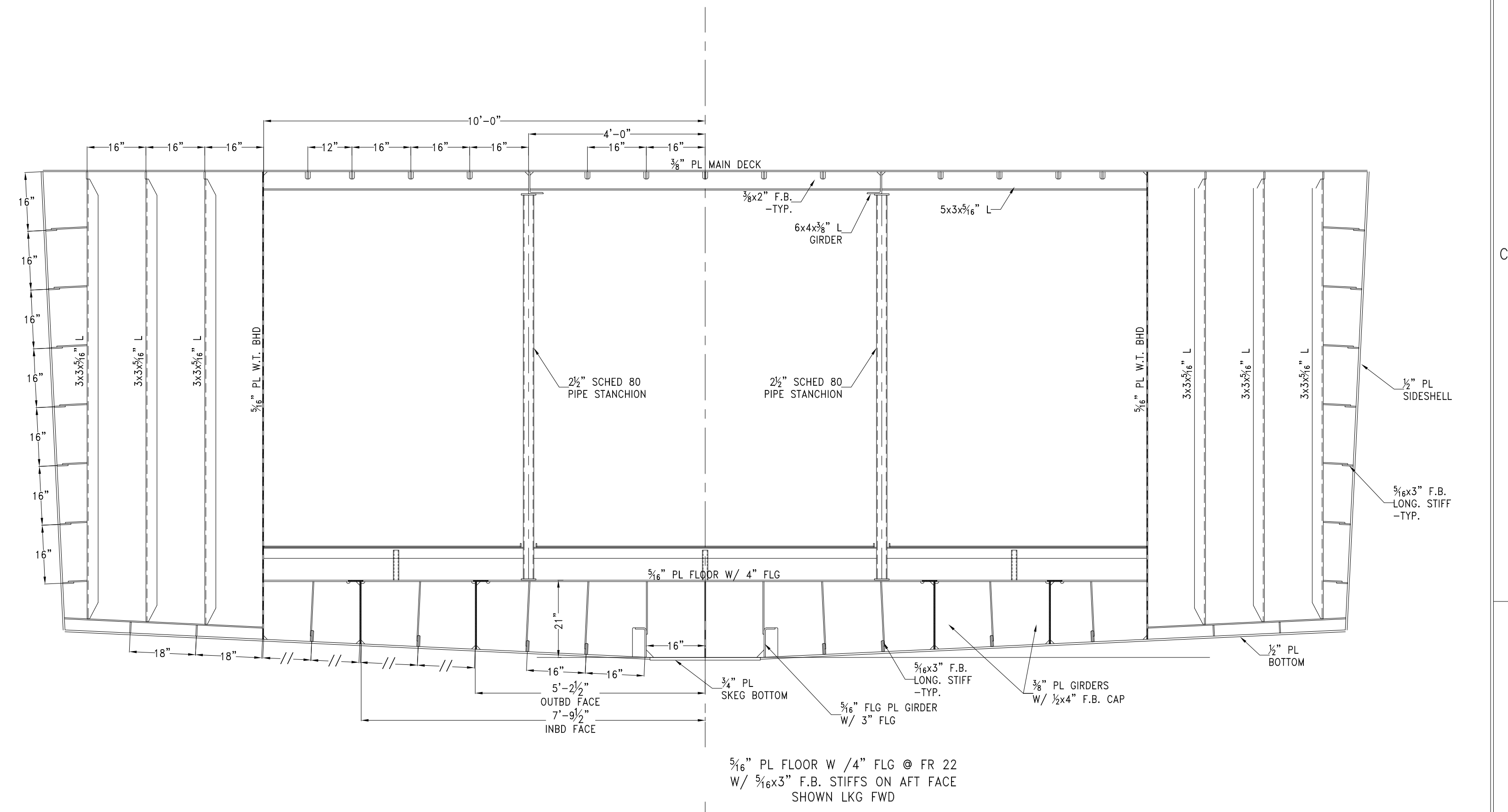
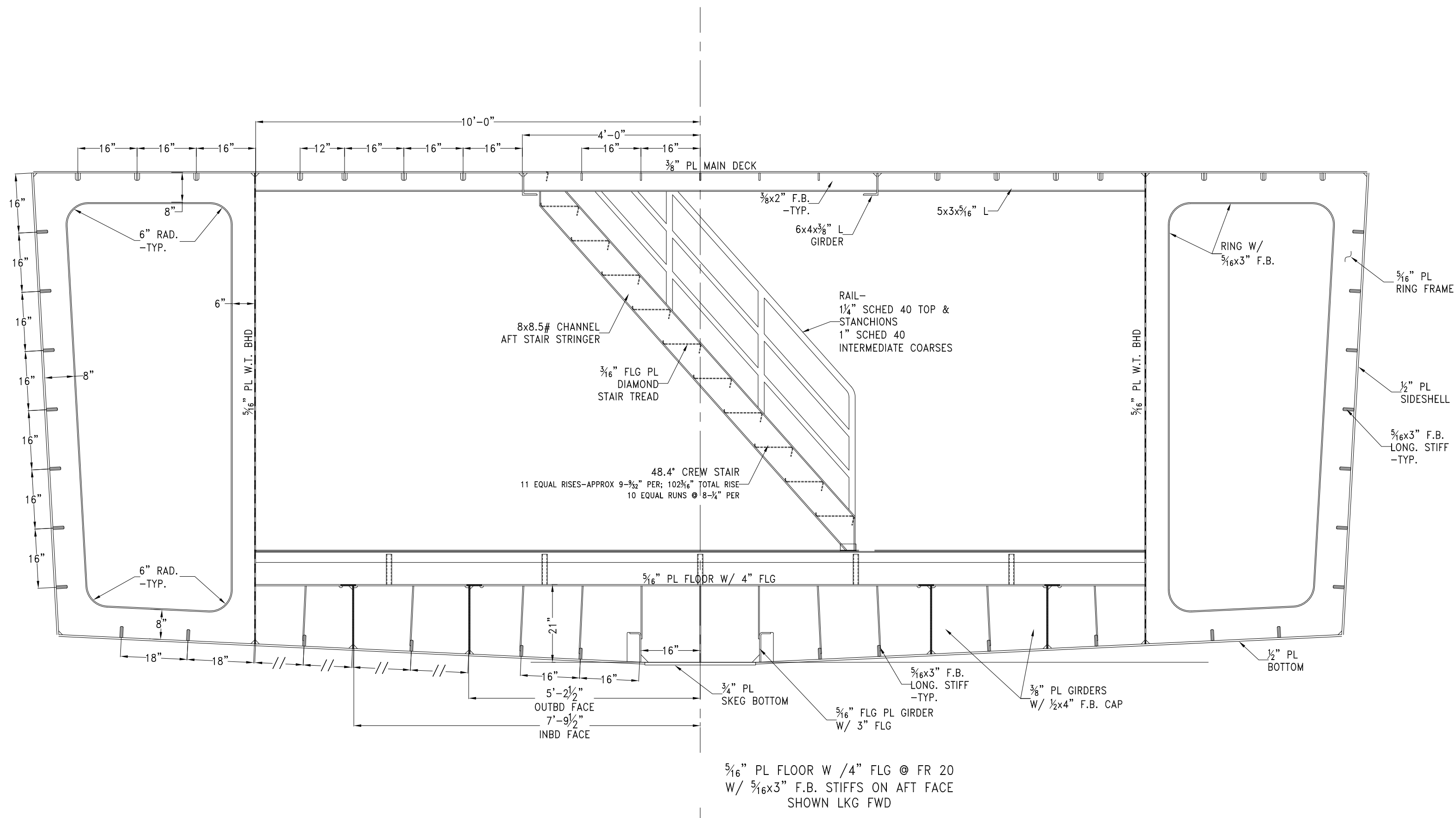
Title: 70.5'x30'x11' NCDOT TOWBOAT

**TRANSVERSE HULL SECTIONS  
FRAMES 12 THRU 18**

Dwg. No. 17-1372-117 Art. No. 0  
Sht. 2 of 6

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_





**WELD SCHEDULE-TYPICAL**

<p>WELD DBL. CONT. FOR 2 1/2\"/&gt; </p>	<p>WELD DBL. CONT. FOR 3\"/&gt; </p>
<p>WELD DBL. CONT. FOR 100% OF STIFF L @ EACH END TYP.</p>	<p>WELD DBL. CONT. FOR 8\"/&gt; </p>
<p>WELD DBL. CONT. FOR 100% OF STIFF L @ EACH END TYP.</p>	<p>WELD DBL. CONT. FOR 8\"/&gt; </p>
<p>1/4\"/&gt; </p>	<p>WELD DBL. CONT. FOR 8\"/&gt; </p>
<p>1/4\"/&gt; </p>	<p>WELD DBL. CONT. FOR 8\"/&gt; </p>
<p>DOUBLE CONTINUOUS</p>	<p>1/4\"/&gt; </p>

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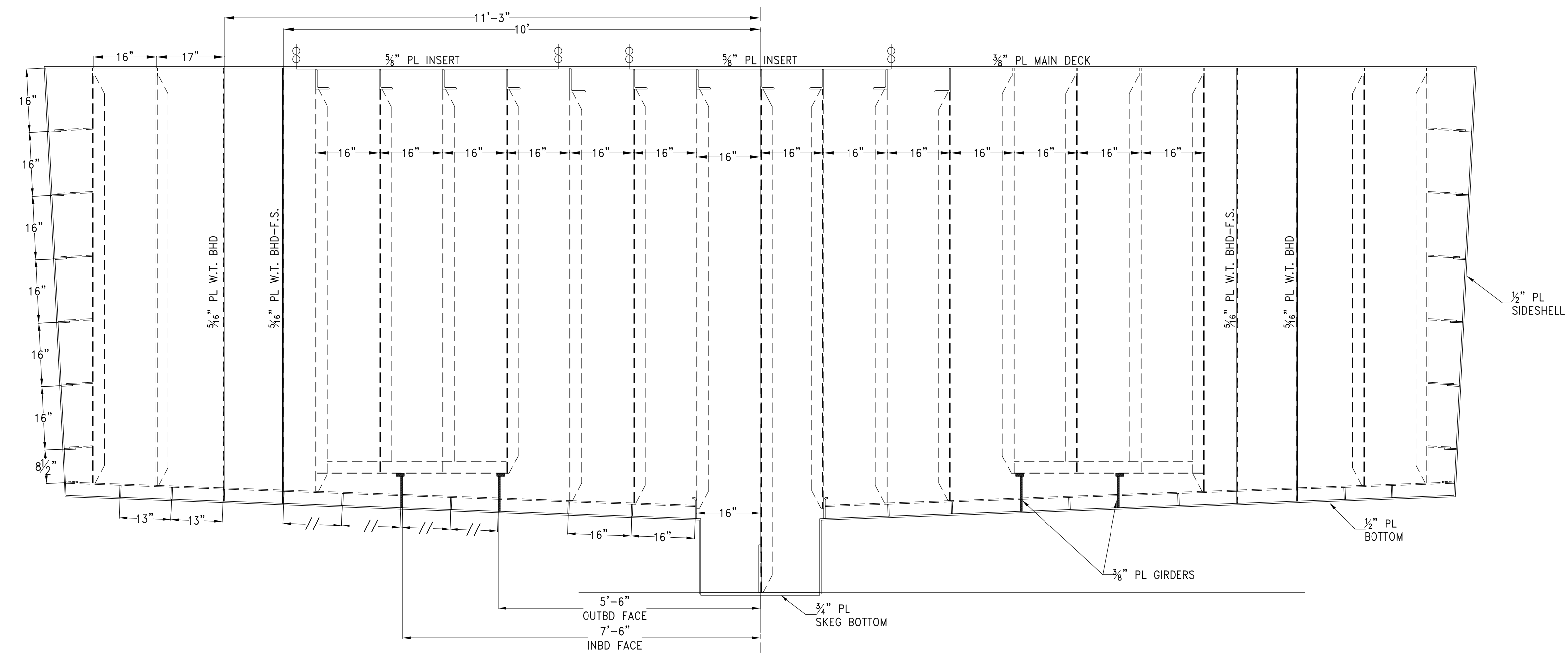
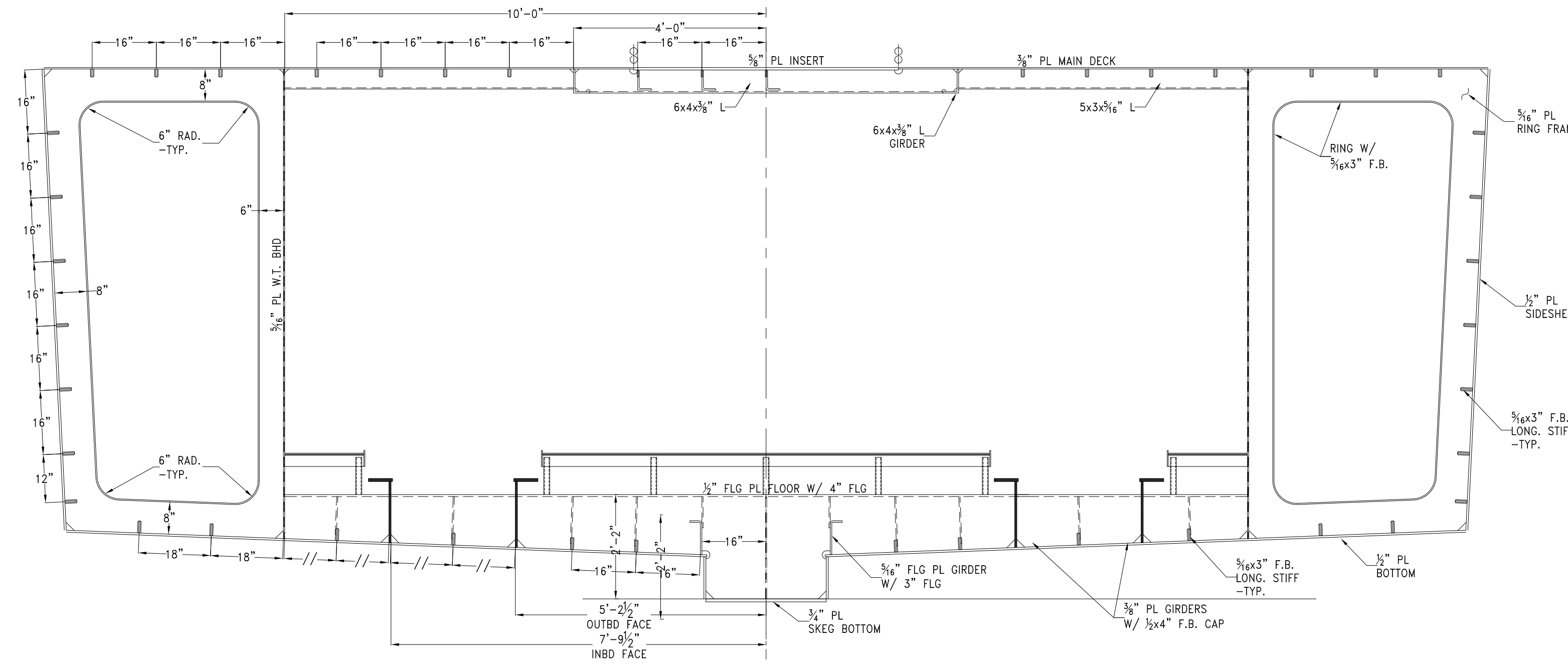
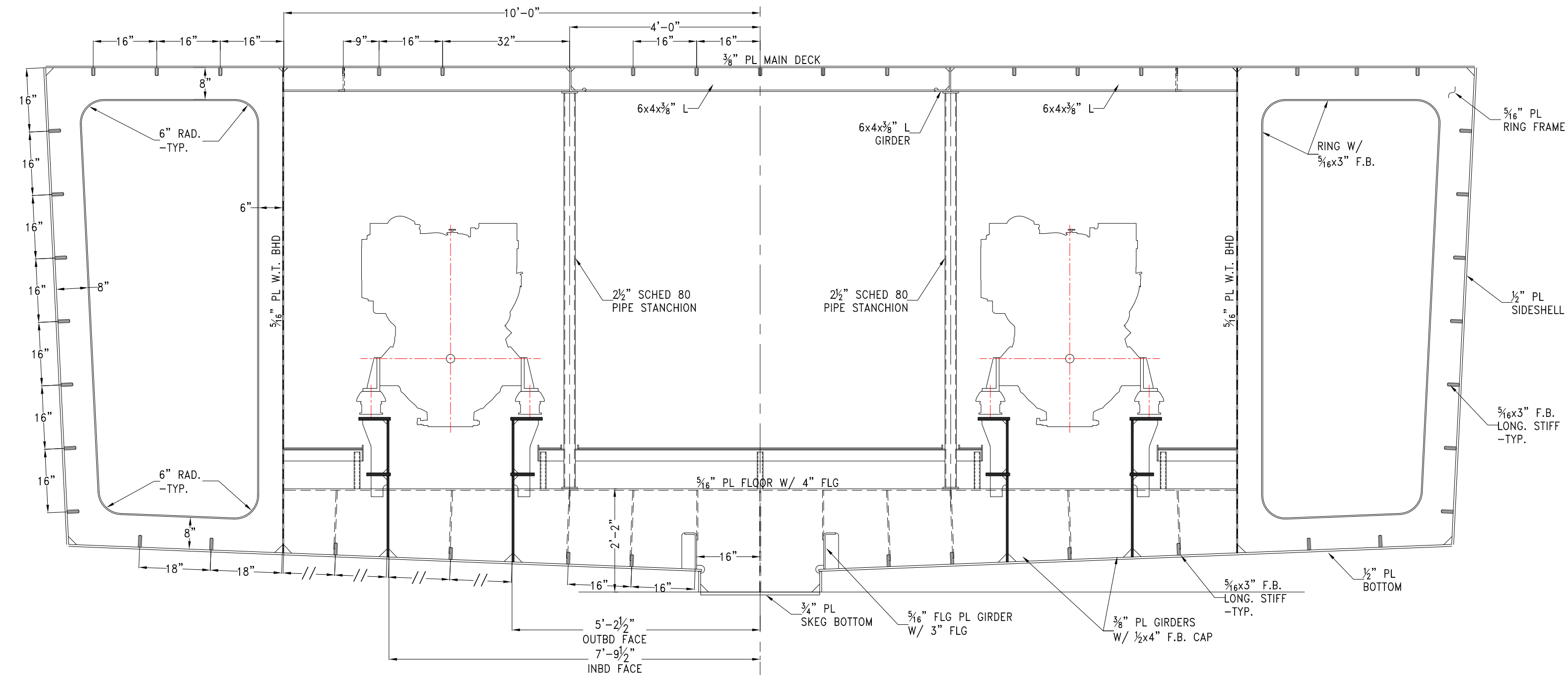
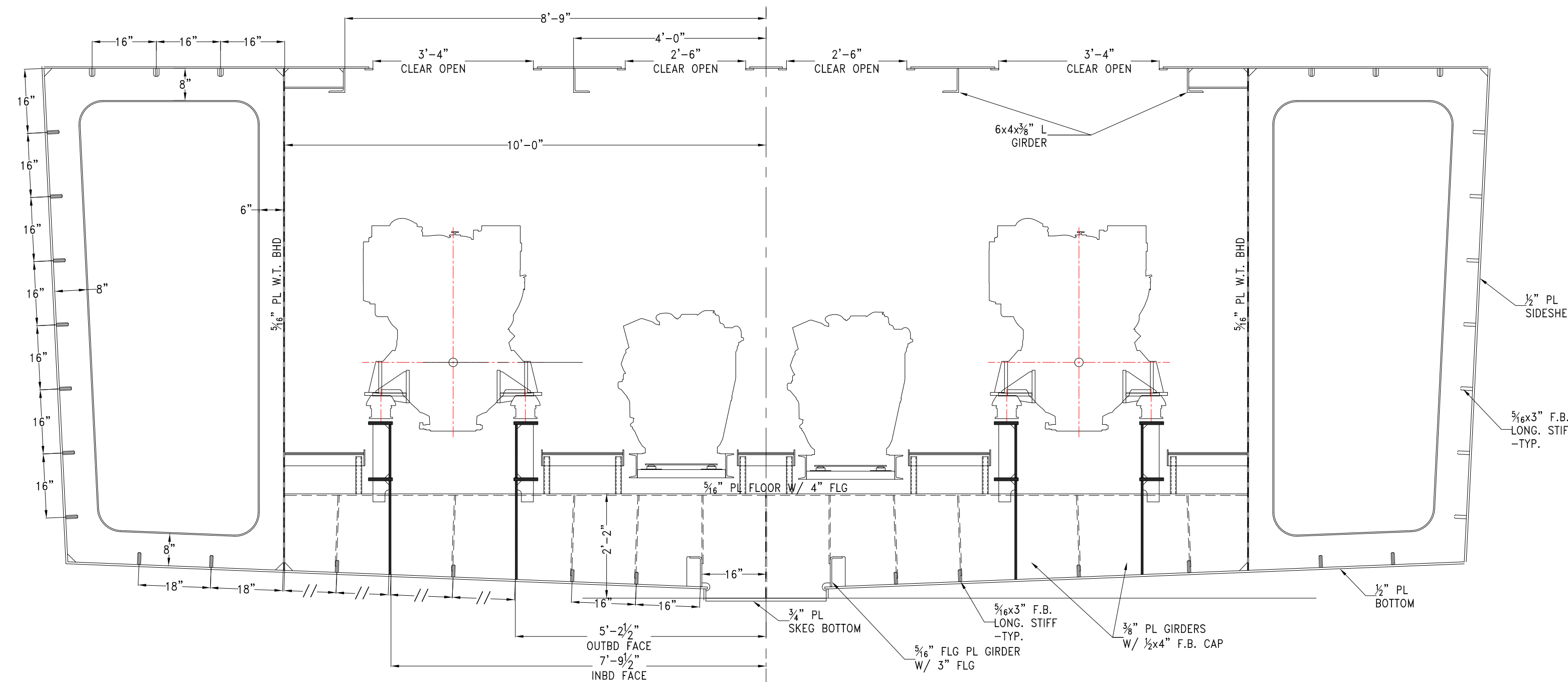
Phone: (904) 599-3673  
 Fax: (904) 599-1522  
 Info@dejongandlebet.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

**TRANSVERSE HULL SECTIONS  
 FRAMES 20 THRU 26**

Dwg. No. 17-1372-117 Art. No. 0  
 Sht. 3 of 6

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/2" @ EACH END	1/4" 3-8	TRANSVERSE FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR 3" @ EACH END	1/4" 3-10	LONGITUDINAL STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END	3/16" 1/2 1/2-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS TO SIDESHELL PLATING	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-10	TRANSVERSE FRAMES TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END	1/4" 3-12	LONG. STIFFENERS TO HULL	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-9	LONGITUDINAL GIRDERS TO MAIN DECK
	1/4" 3-12	W.T. BHDS TO SHELL PLATING	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-12	STIFFENERS TO N.T. BHDS
	1/4" 3-10	N.T. BHDS TO SHELL PLATING		1/4" 3-10	RIDER PLATES TO RING FRAMES
DOUBLE CONTINUOUS		ALL STRUCTURE IWO ENGINE GIRDERS FRAME 18 TO 34		1/4"	1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING 3. STANCHIONS AND END PADS

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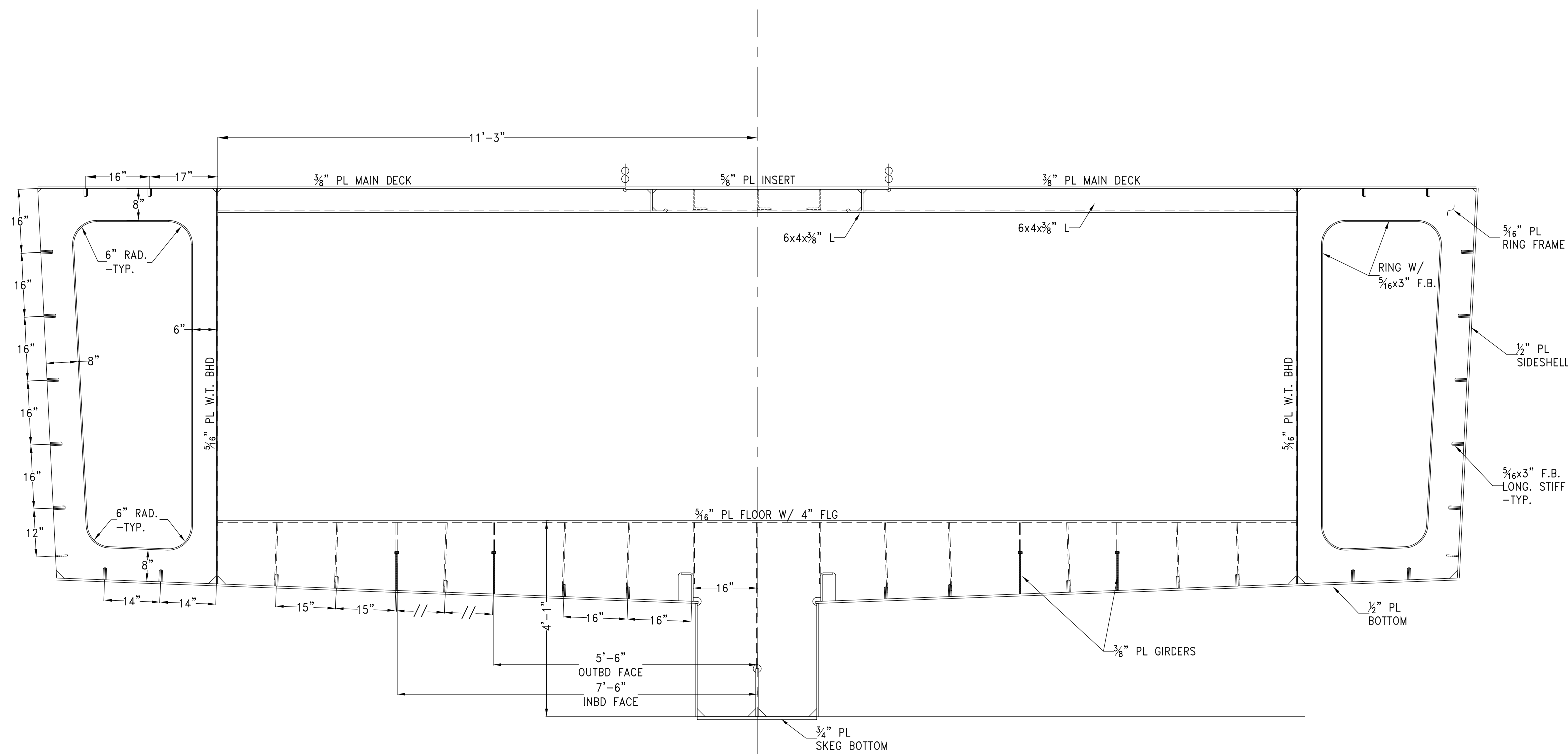
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 Fax: (904) 599-1522  
 Info@dejongandlebel.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

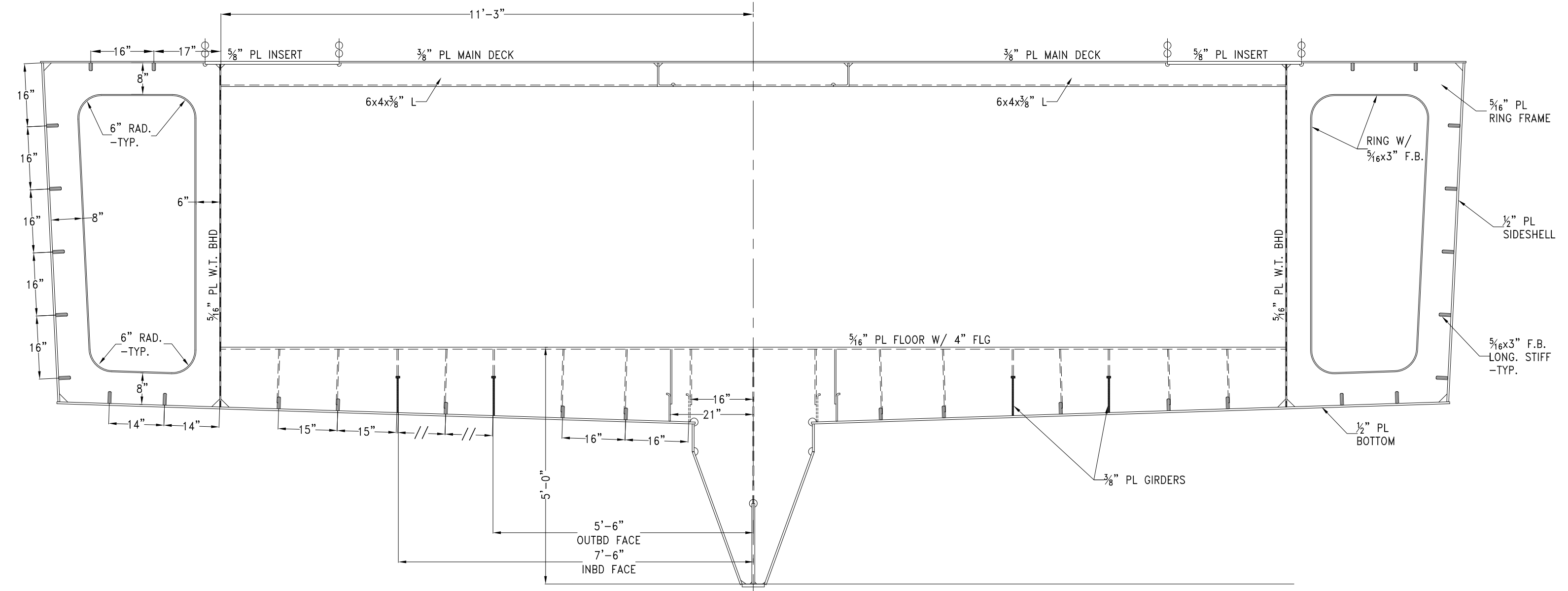
**TRANSVERSE HULL SECTIONS  
 FRAMES 28 THRU 34**

Dwg. No. 17-1372-117 Art. No. 0  
 Sht. 4 of 6

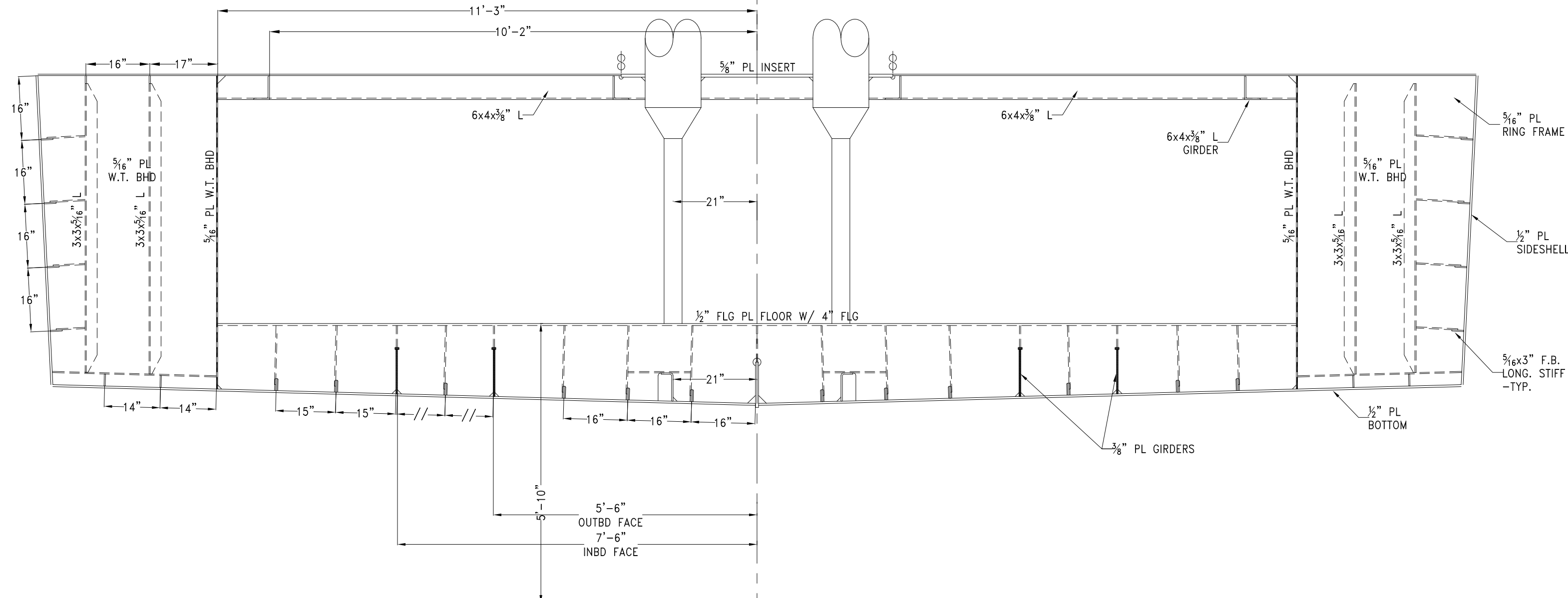
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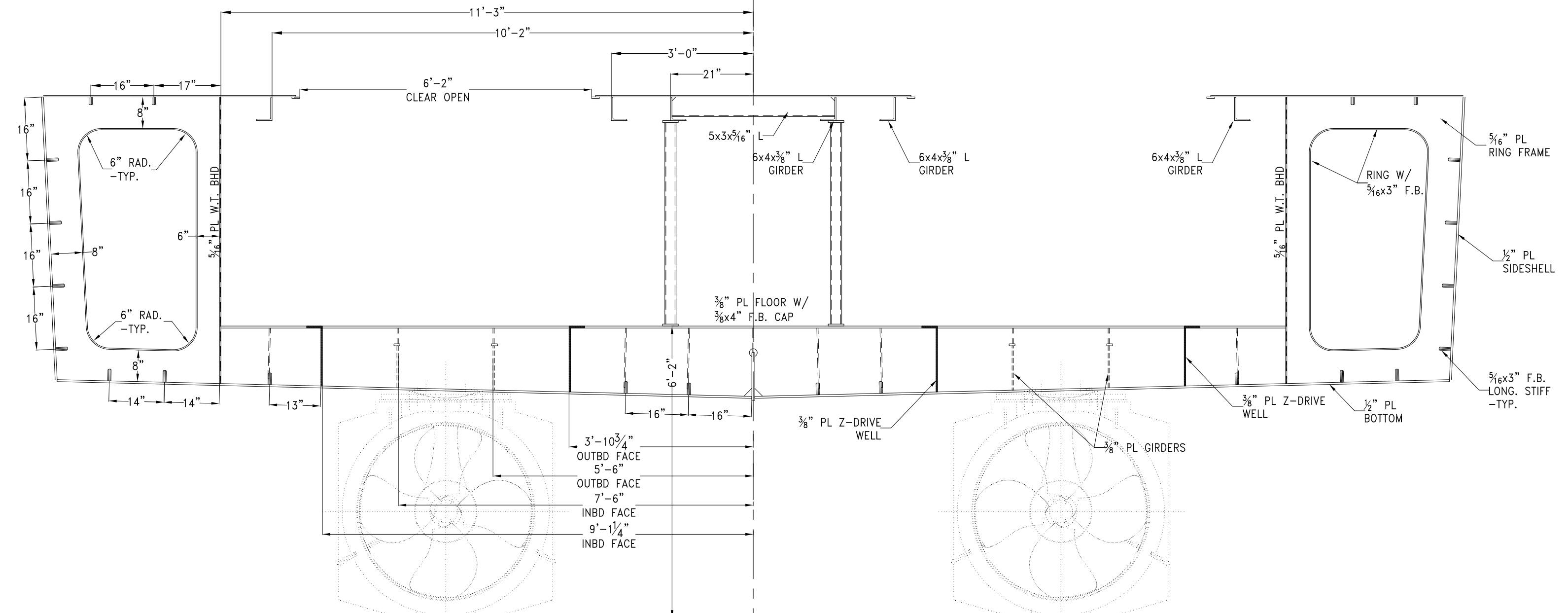
3/16" PL FLOOR W/ 4" FLG @ FR 36  
W/ 3/16x3" F.B. STIFFS ON FWD FACE  
SHOWN LKG FWD



3/16" PL FLOOR W/ 4" FLG @ FR 38  
W/ 3/16x3" F.B. STIFFS ON FWD FACE  
SHOWN LKG FWD



1/2" PL FLOOR @ FR 40  
W/ 3/16x3" F.B. STIFFS ON FWD FACE  
SHOWN LKG FWD



3/8" PL FLOOR W/ 3/16x4" F.B. CAP @ FR 42  
W/ 3/16x3" F.B. STIFFS ON FWD FACE  
SHOWN LKG FWD

WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/2" @ EACH END	1/4" 3-8	TRANSVERSE FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-10	LONGITUDINAL STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF @ EACH END	3/16" 1/2 1/2-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS TO SIDESHELL PLATING	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-10	TRANSVERSE FRAMES TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF @ EACH END	1/4" 3-12	LONG. STIFFENERS TO HULL	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-9	LONGITUDINAL GIRDERS TO MAIN DECK
	1/4" 3-12	W.T. BHDS TO SHELL PLATING	WELD DBL. CONT. FOR 8" @ EACH END	1/4" 3-12	STIFFENERS TO N.T. BHDS
	1/4" 3-10	N.T. BHDS TO SHELL PLATING		1/4" 3-10	RIDER PLATES TO RING FRAMES
DOUBLE CONTINUOUS		ALL STRUCTURE IWO ENGINE GIRDERS FRAME 18 TO 34			1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING 3. STANCHIONS AND END PADS

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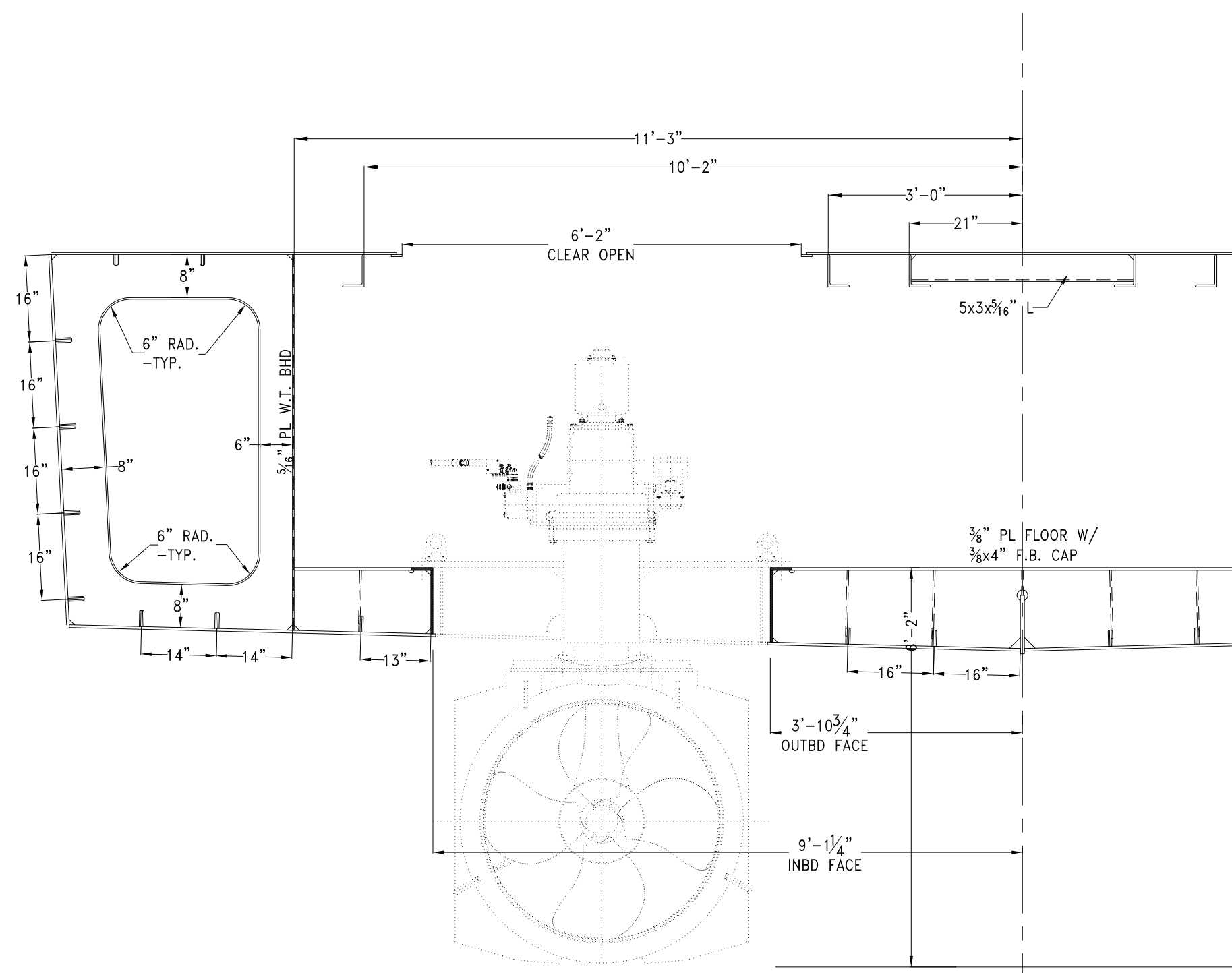
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Fax: (904) 598-1522  
Info@dejongandlebel.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

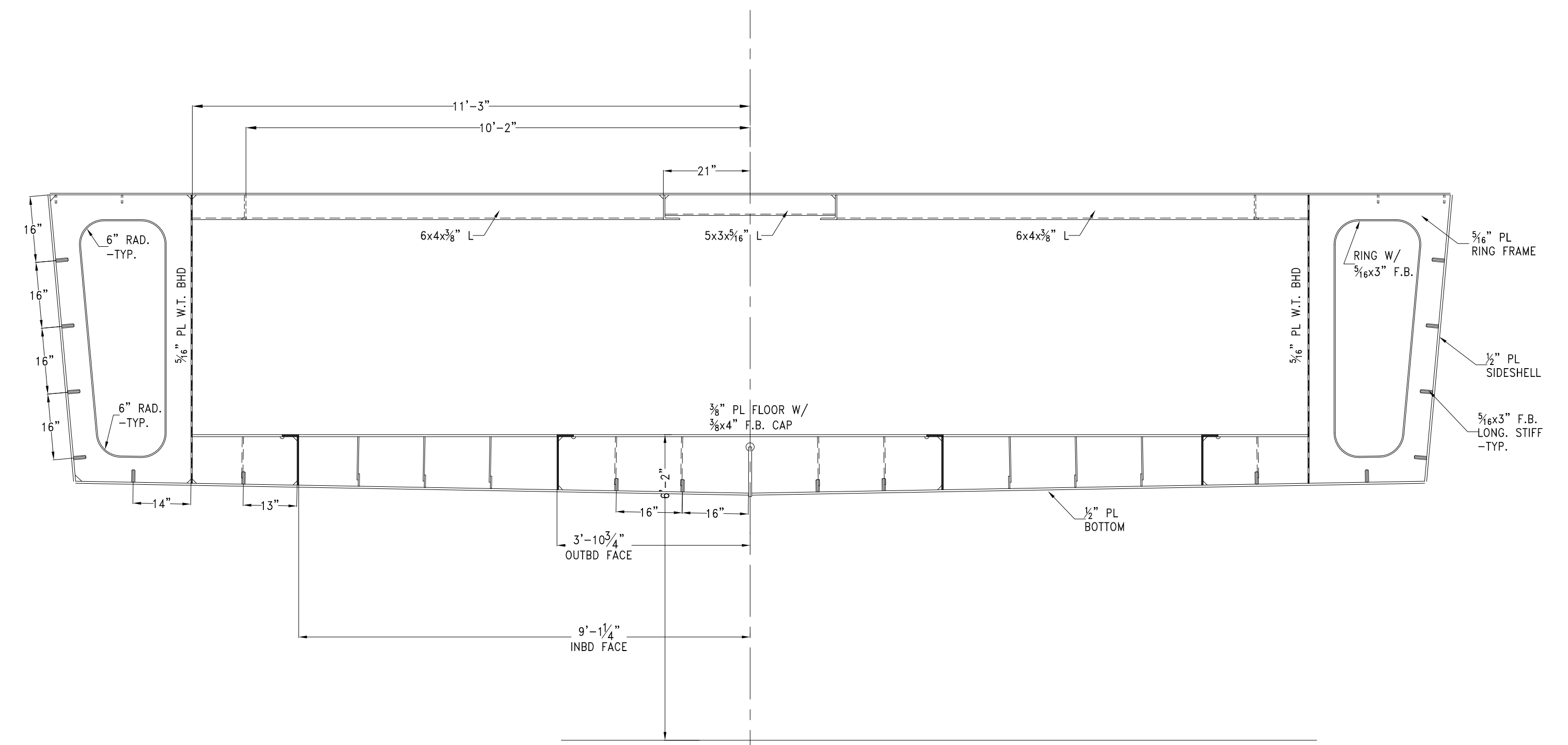
**TRANSVERSE HULL SECTIONS  
FRAMES 36 THRU 42**

Dwg. No. 17-1372-117 Art. No. 0 Sht. 5 of 6

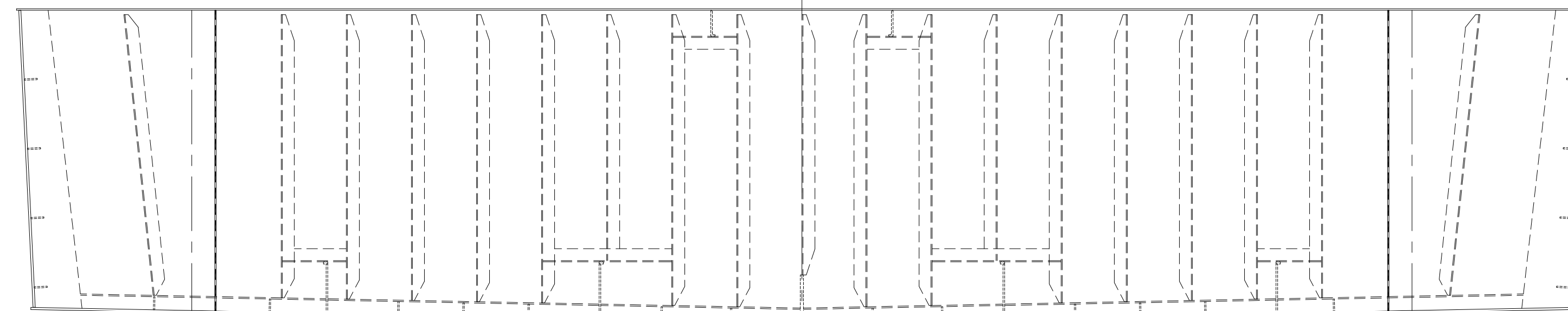
Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
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App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



44  
 3/8" PL FLOOR W/ 3/8x4" F.B. CAP @ FR 44  
 W/ 3/8x3" F.B. STIFFS ON FWD FACE  
 SHOWN LKG FWD



46  
 3/8" PL FLOOR W/ 3/8x4" F.B. CAP @ FR 46  
 W/ 3/8x3" F.B. STIFFS ON FWD FACE  
 SHOWN LKG FWD



TRANSOM  
 1/2" PL TRANSOM W/ 3x3x3/16" L STIFFENERS  
 ON FWD FACE  
 SHOWN LKG FWD

WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/8" @ EACH END	1/4" 3-8	TRANSVERSE FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR 6" @ EACH END	1/4" 3-10	LONGITUDINAL STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END	3/16" 1/2 1/2-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS TO SIDESHELL PLATING	WELD DBL. CONT. FOR 6" @ EACH END	1/4" 3-10	TRANSVERSE FRAMES TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END	1/4" 3-12	LONG. STIFFENERS TO HULL	WELD DBL. CONT. FOR 6" @ EACH END	1/4" 3-9	LONGITUDINAL GIRDERS TO MAIN DECK
	1/4" 3-12	W.T. BHDS TO SHELL PLATING	WELD DBL. CONT. FOR 6" @ EACH END	1/4" 3-12	STIFFENERS TO N.T. BHDS
	1/4" 3-10	N.T. BHDS TO SHELL PLATING		1/4" 3-10	RIDER PLATES TO RING FRAMES
DOUBLE CONTINUOUS		ALL STRUCTURE IWO ENGINE GIRDERS FRAME 18 TO 34		1/4" 3-10	1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING 3. STANCHIONS AND END PADS

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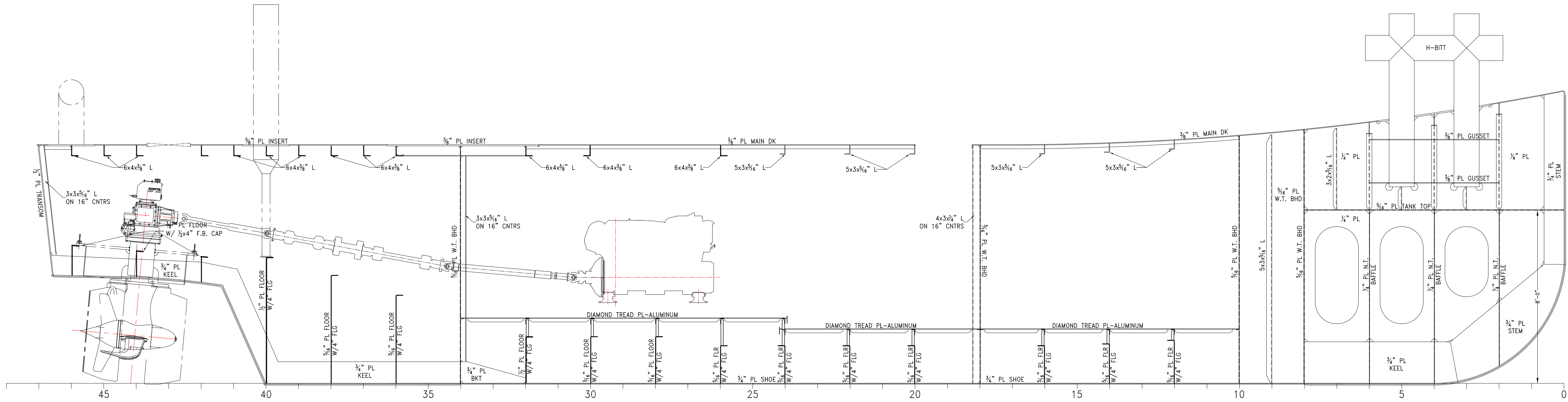
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Title: 70.5'x30'x11' NCDOT TOWBOAT

**TRANSVERSE HULL SECTIONS  
 FRAMES 44 THRU TRANSOM**

Dwg. No. 17-1372-117 Art. No. 0  
 Sht. 6 of 6

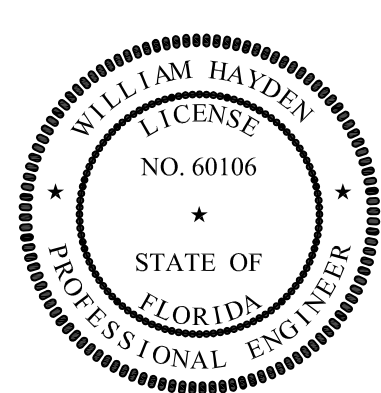
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 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



INBOARD STRUCTURAL PROFILE

WELD SCHEDULE-TYPICAL

<p>WELD DBL. CONT. FOR EACH END</p> <p>TRANSVERSE FRAMES TO HULL &amp; SIDESHELL</p>	<p>WELD DBL. CONT. FOR EACH END</p> <p>LONGITUDINAL STIFFENERS TO MAIN DECK</p>
<p>WELD DBL. CONT. FOR LOSS OF STIFF L TYP.</p> <p>1. STIFFENERS TO W.T. BHDS 2. STIFFENERS TO SIDESHELL PLATING</p>	<p>WELD DBL. CONT. FOR EACH END</p> <p>TRANSVERSE FRAMES TO MAIN DECK</p>
<p>WELD DBL. CONT. FOR LOSS OF STIFF L TYP.</p> <p>LONG. STIFFENERS TO HULL</p>	<p>WELD DBL. CONT. FOR EACH END</p> <p>STIFFENERS TO N.T. BHDS</p>
<p>W.T. BHDS TO SHELL PLATING</p>	<p>RIDER PLATES TO RING FRAMES</p>
<p>N.T. BHDS TO SHELL PLATING</p>	<p>1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING</p>

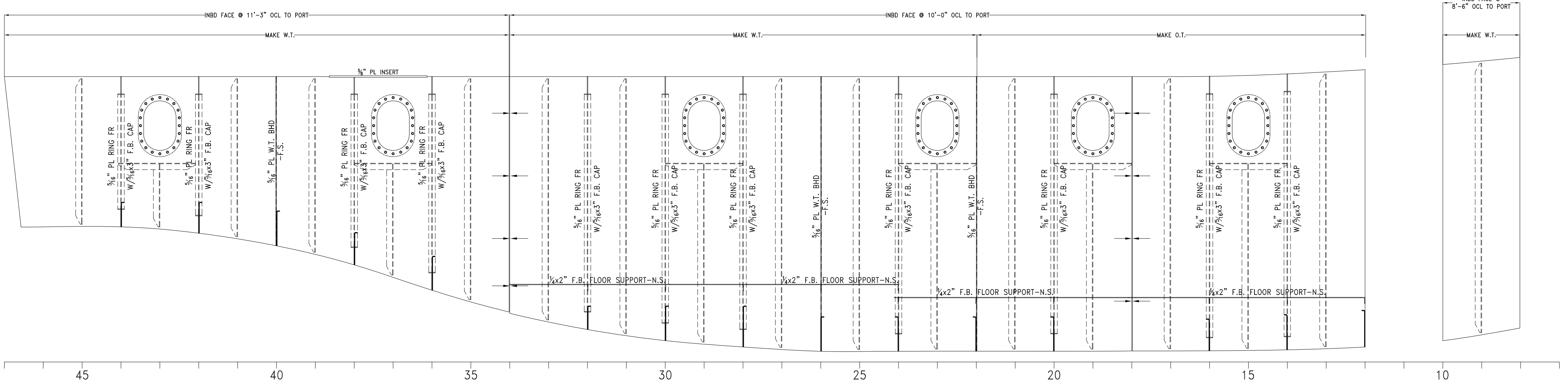


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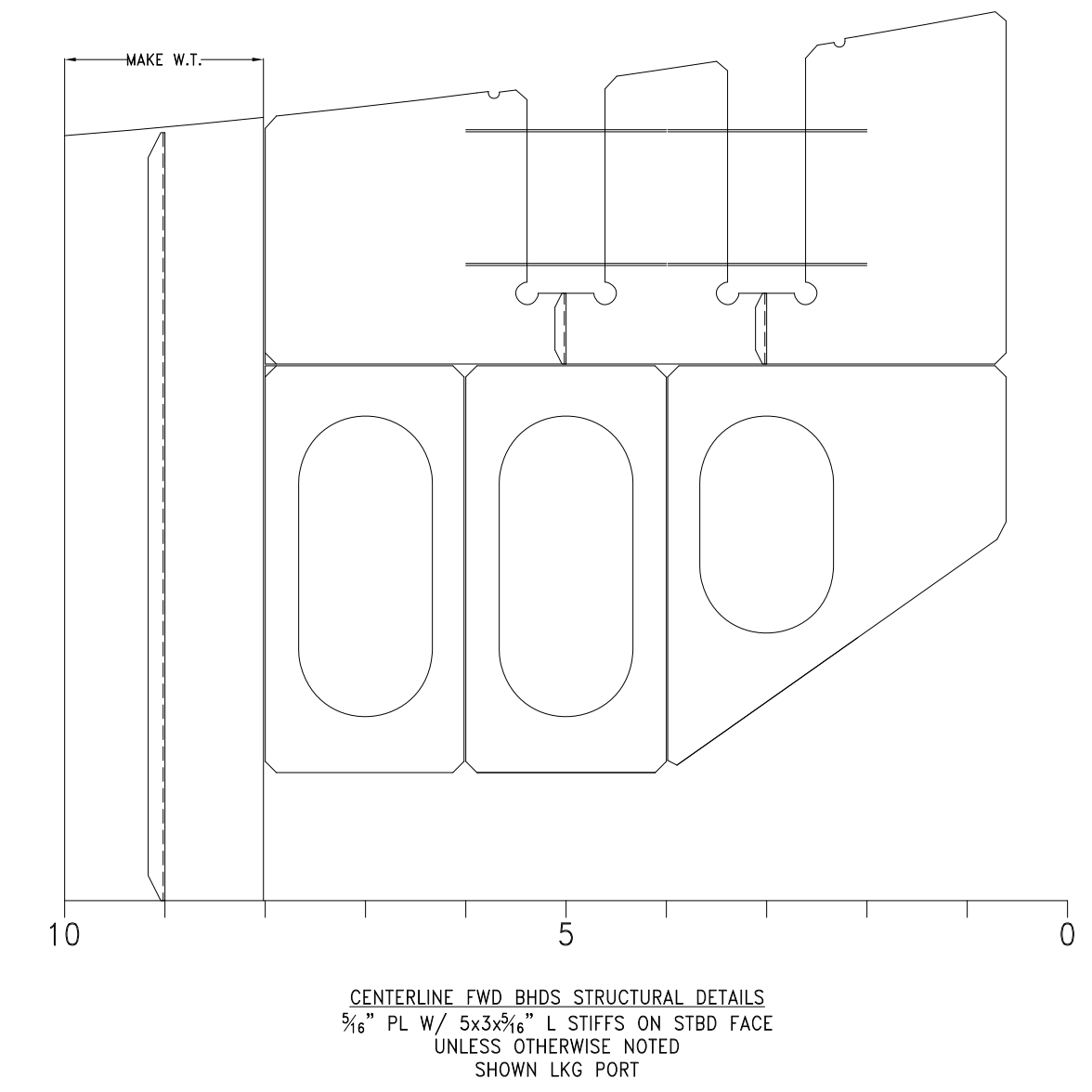
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**INBD STRUCTURAL PROFILE**

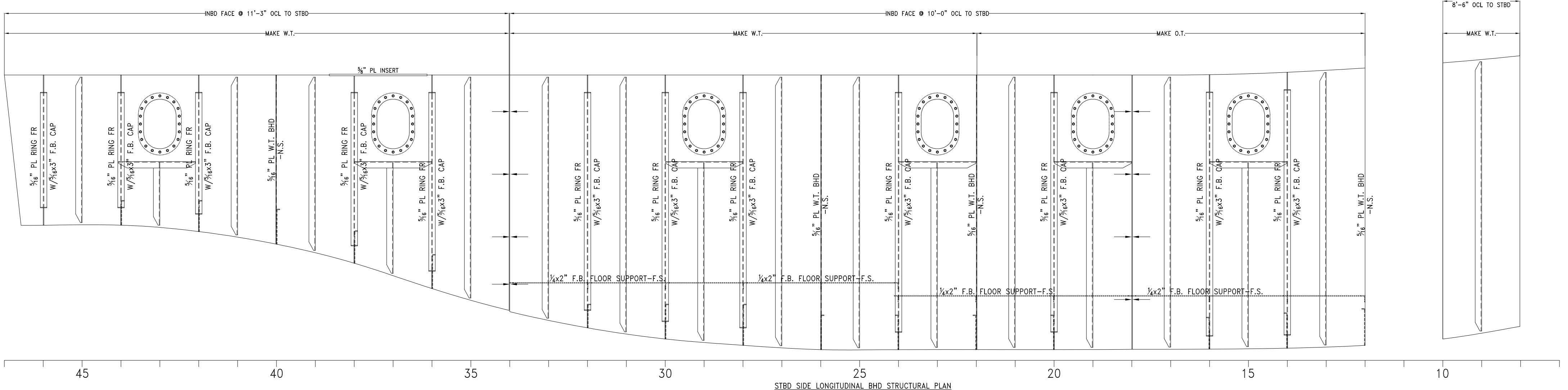
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 Sht. 1 of 1  
 Date: JUNE 05, 2018  
 Scale: 3/8" = 1'-0"  
 USCG App'l: \_\_\_\_\_



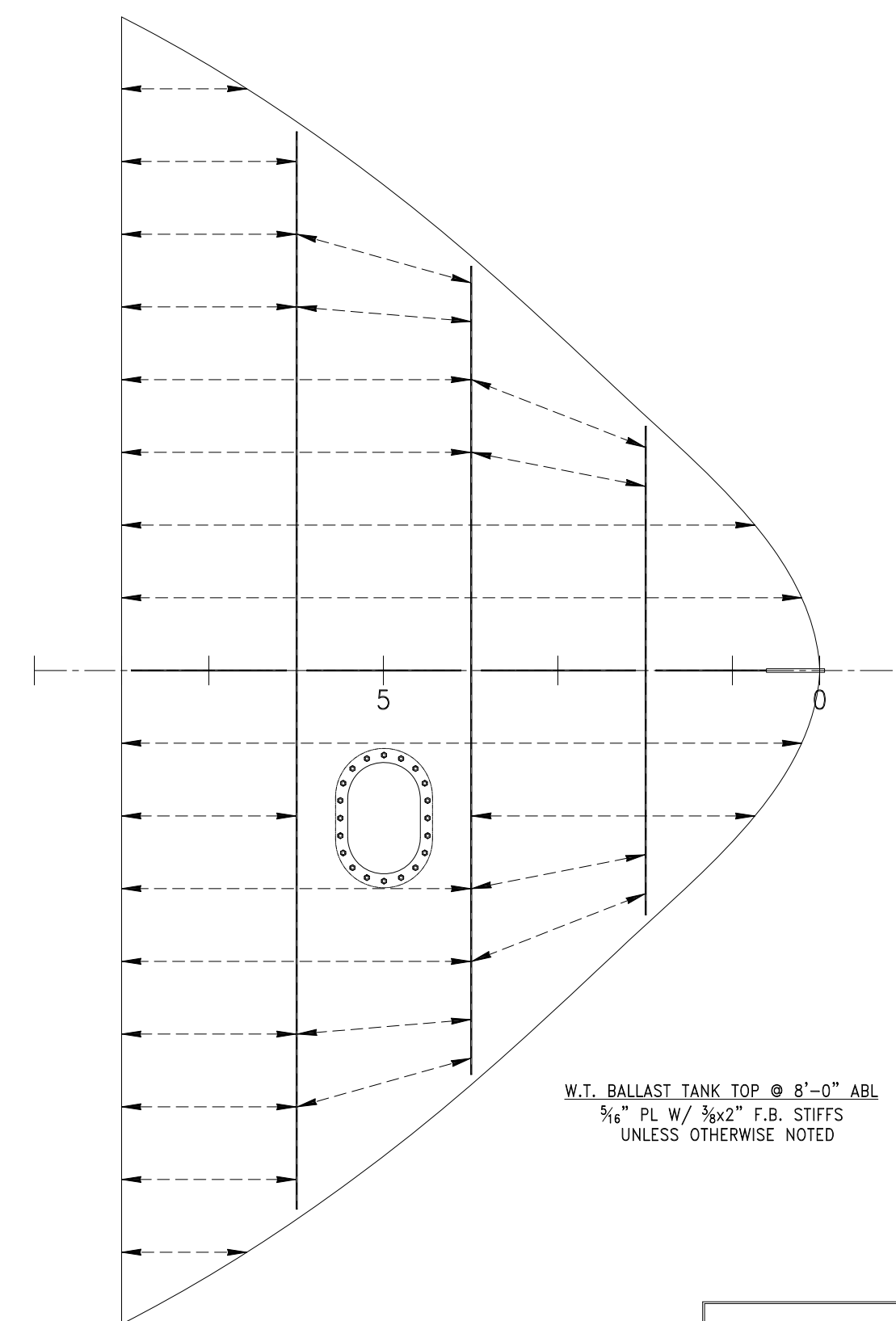
PORT SIDE LONGITUDINAL BHD STRUCTURAL PLAN  
 3/4" PL W/ 5x3x3/4" L STIFFS ON OUTBD FACE  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG PORT



CENTERLINE FWD BHDs STRUCTURAL DETAILS  
 3/4" PL W/ 5x3x3/4" L STIFFS ON STBD FACE  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG PORT



STBD SIDE LONGITUDINAL BHD STRUCTURAL PLAN  
 3/4" PL W/ 5x3x3/4" L STIFFS ON OUTBD FACE  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG PORT



W.T. BALLAST TANK TOP @ 8'-0" ABL  
 1/2" PL W/ 3/4x2" F.B. STIFFS  
 UNLESS OTHERWISE NOTED

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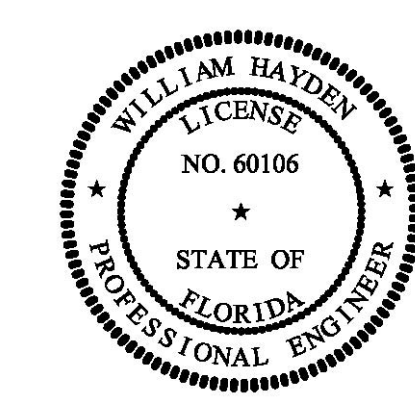
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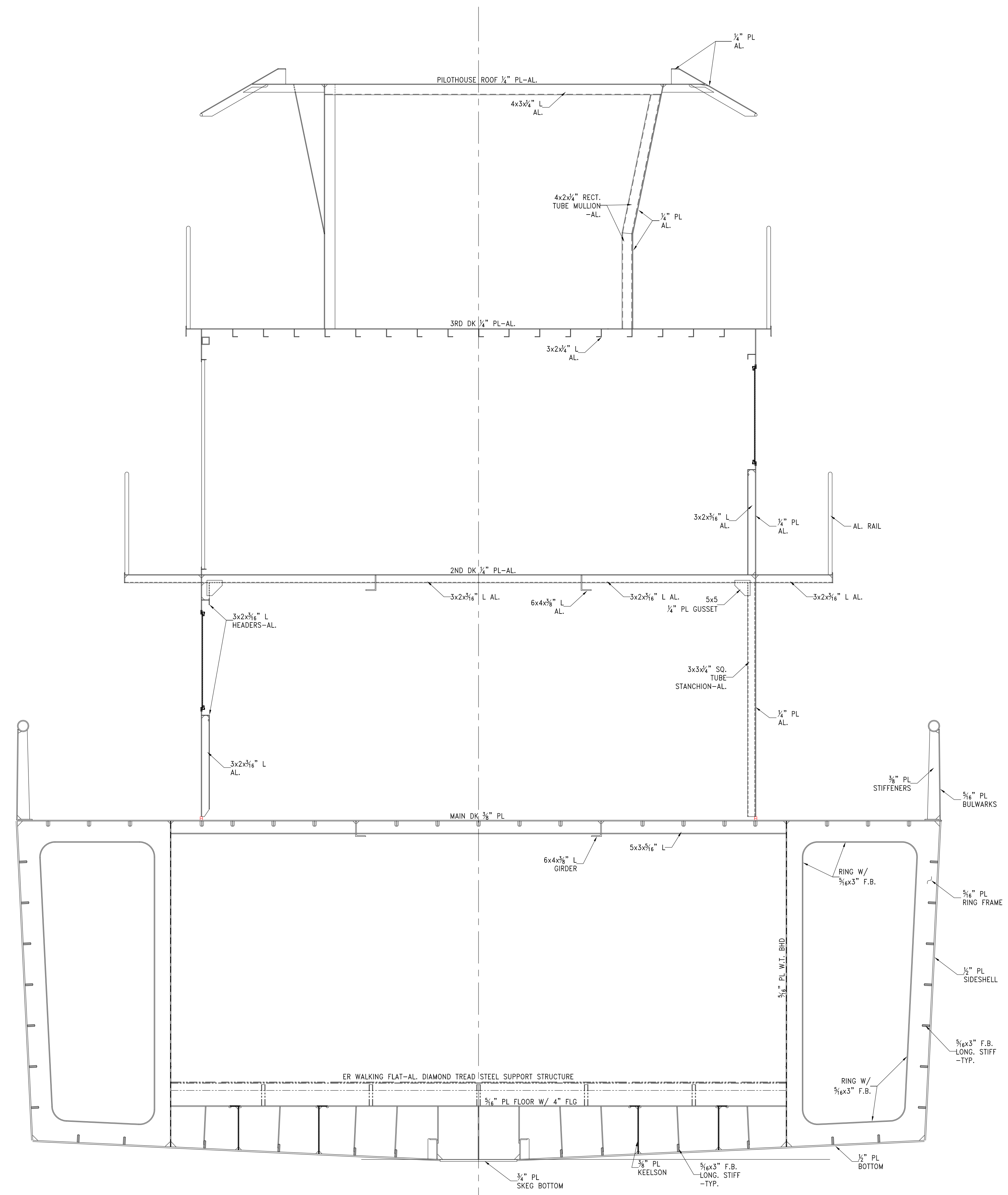
Title: 70.5'x30'x11' NCDOT TOWBOAT

**HULL FLATS & BHDs  
 STRUCTURAL DETAILS**

Dwg. No. 17-1372-121  
 Art. No. 0  
 Sht. 1 of 1

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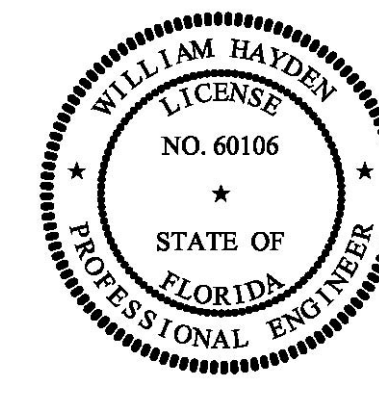
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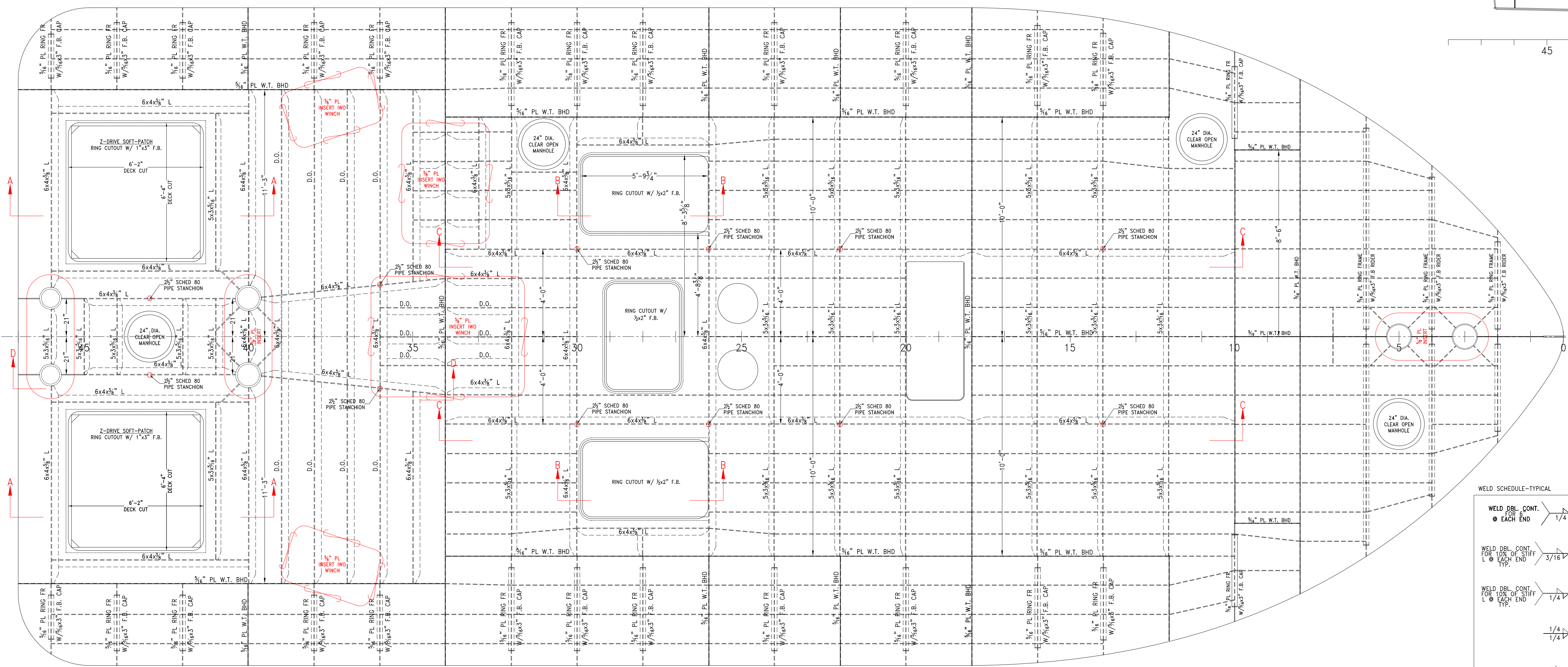
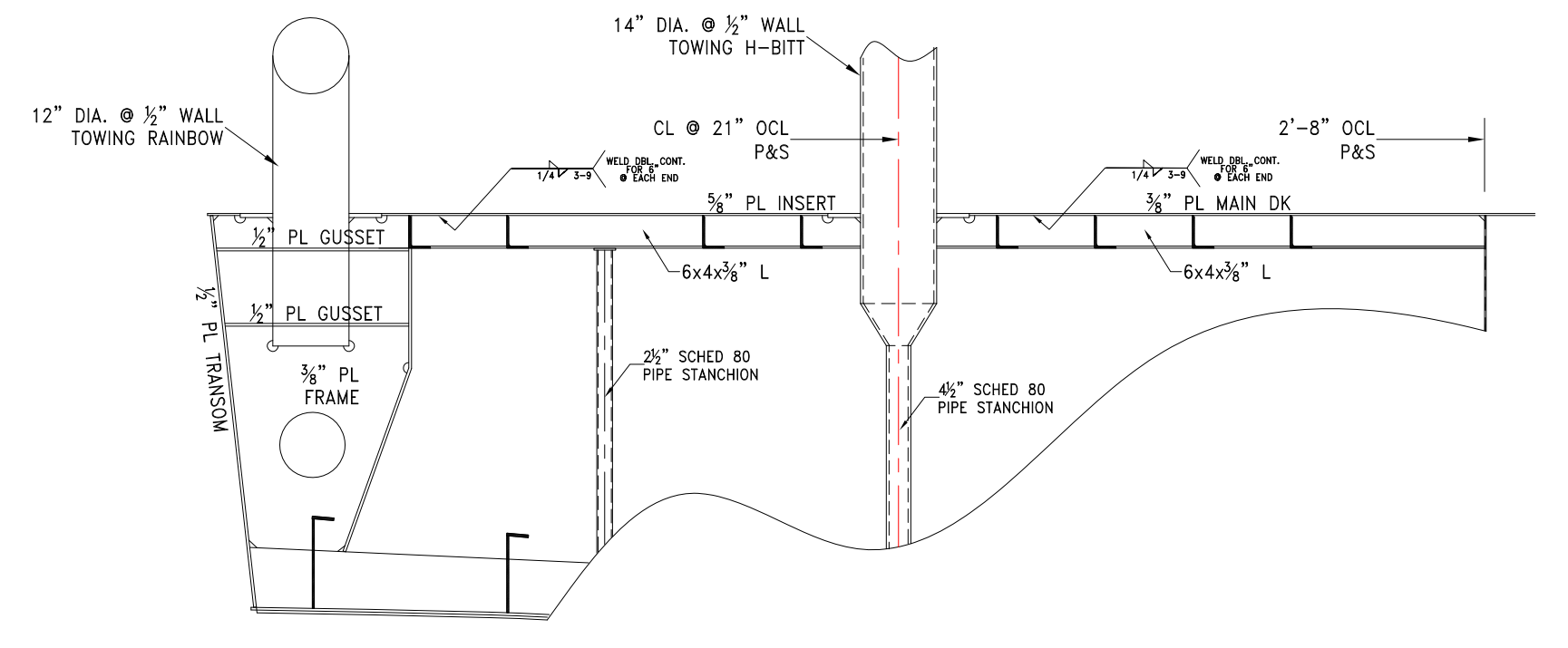
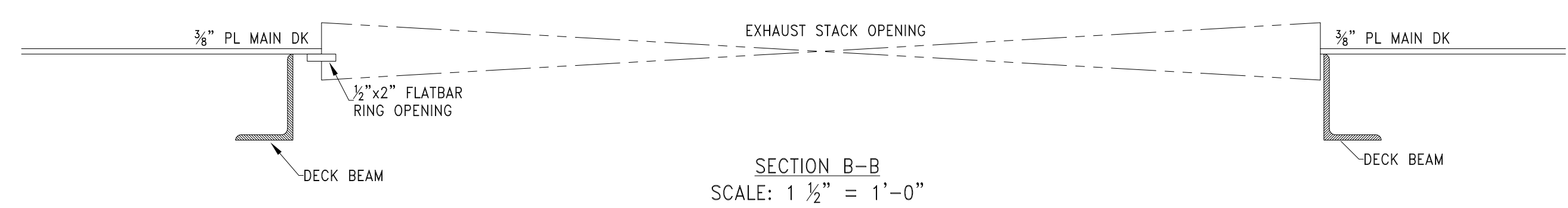
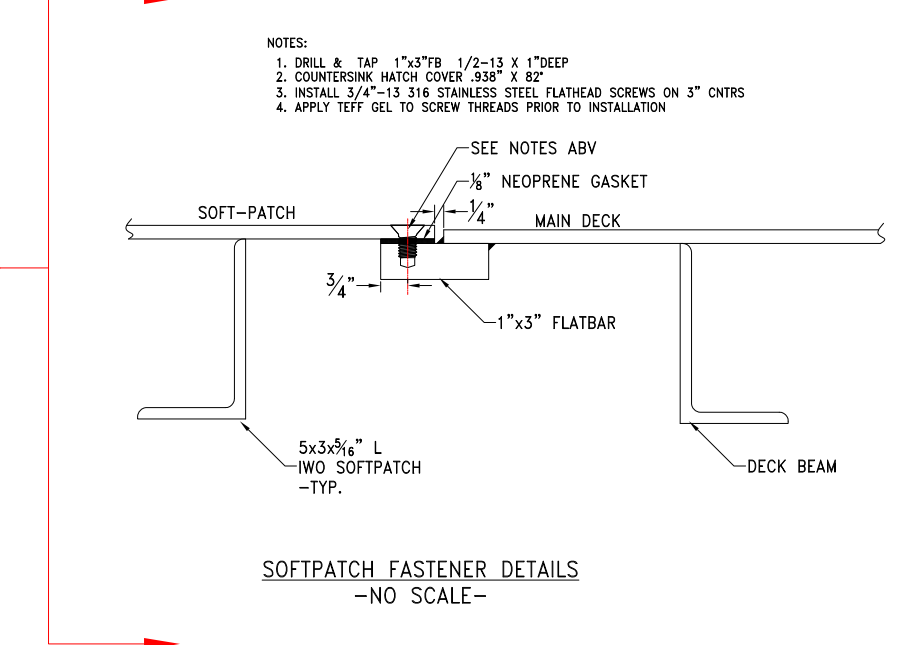
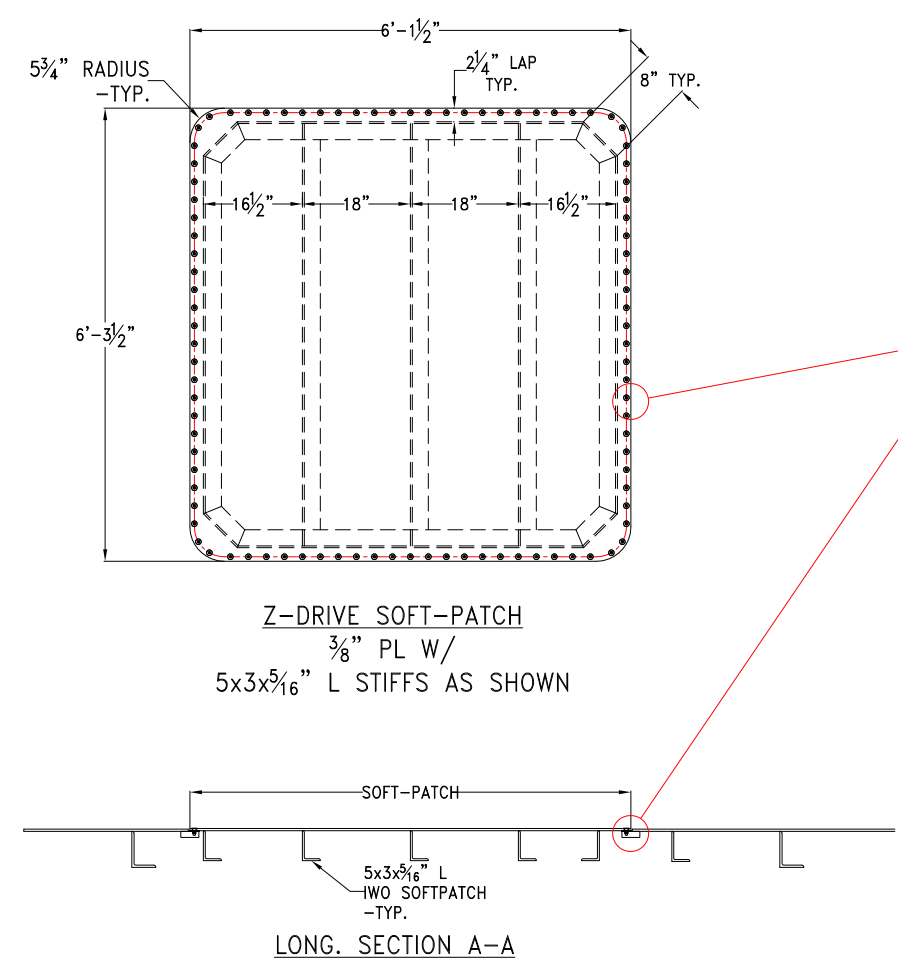
Title: 70.5'x30'x11' NCDOT TOWBOAT

**TYPICAL STRUCTURAL SECTION**

Dwg. No. 17-1372-122 Alt. No. 0  
Sht. 1 of 1

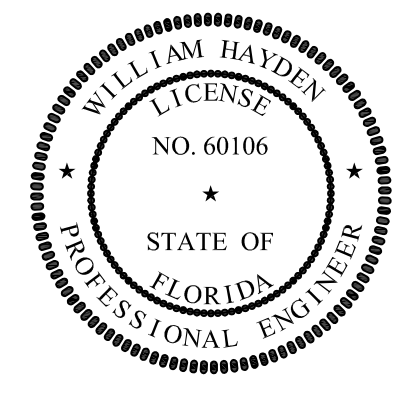
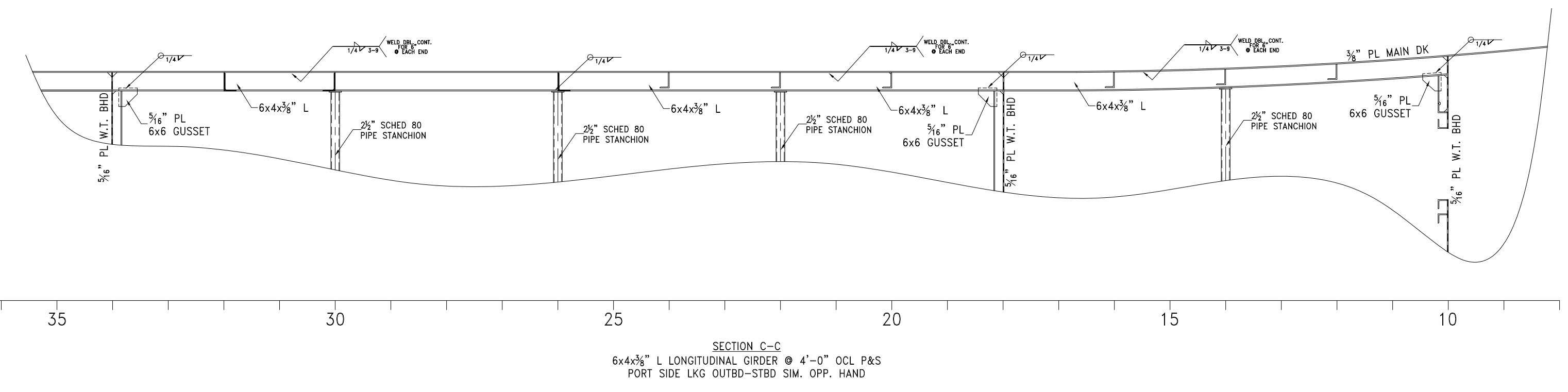
Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_





**WELD SCHEDULE-TYPICAL**

WELD DBL. CONT. FOR EACH END	1/4" 3-8	TRANSVERSE FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR EACH END	1/4" 3-10	LONGITUDINAL STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 100% OF STIFF L	3/16" 1/2 1/2-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS TO SIDESHELL PLATING	WELD DBL. CONT. FOR EACH END	1/4" 3-10	TRANSVERSE FRAMES TO MAIN DECK
WELD DBL. CONT. FOR 100% OF STIFF L	1/4" 3-12	LONG. STIFFENERS TO HULL	WELD DBL. CONT. FOR EACH END	1/4" 3-9	LONGITUDINAL GIRDERS TO MAIN DECK
	1/4" 3-12	W.T. BHDS TO SHELL PLATING		1/4" 3-10	RIDER PLATES TO RING FRAMES
	1/4" 1/2	N.T. BHDS TO SHELL PLATING		1/4" 3-10	1. CORNER BRACKETING 2. STANCHIONS & END PADS



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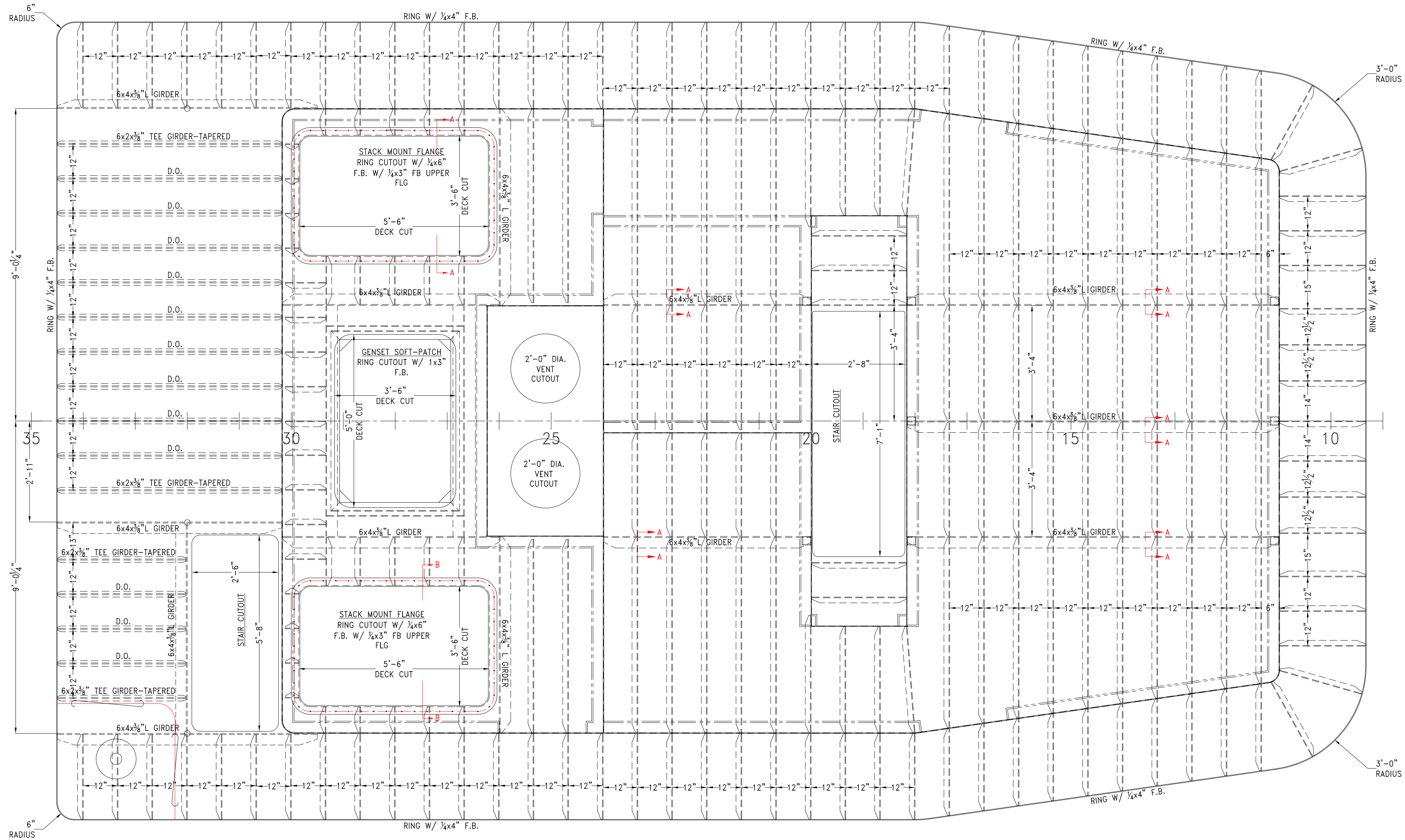
Title: 70.5'x30'x11' NCDOT TOWBOAT

**MAIN DECK STRUCTURAL DETAILS**

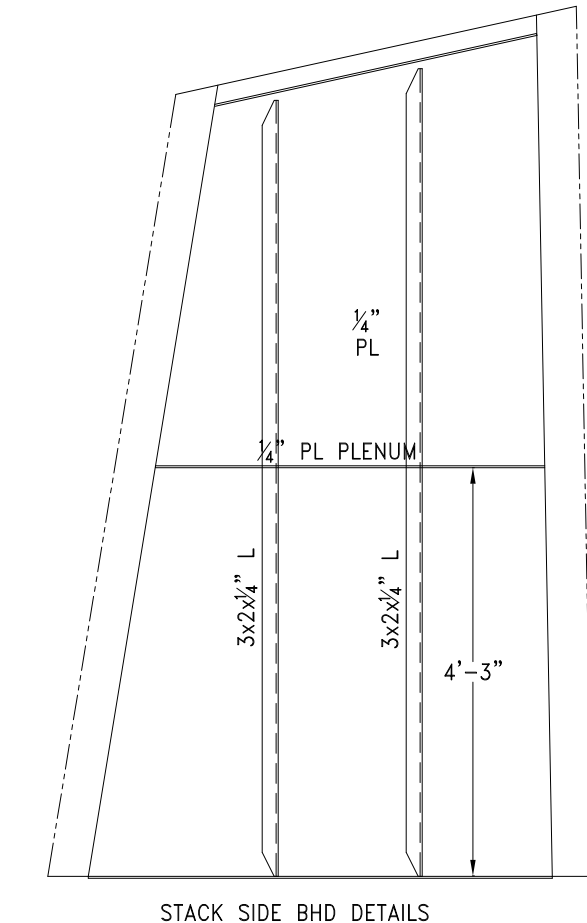
Dwg. No. 17-1372-131  
Art. No. 0  
Sht. 1 of 1

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Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
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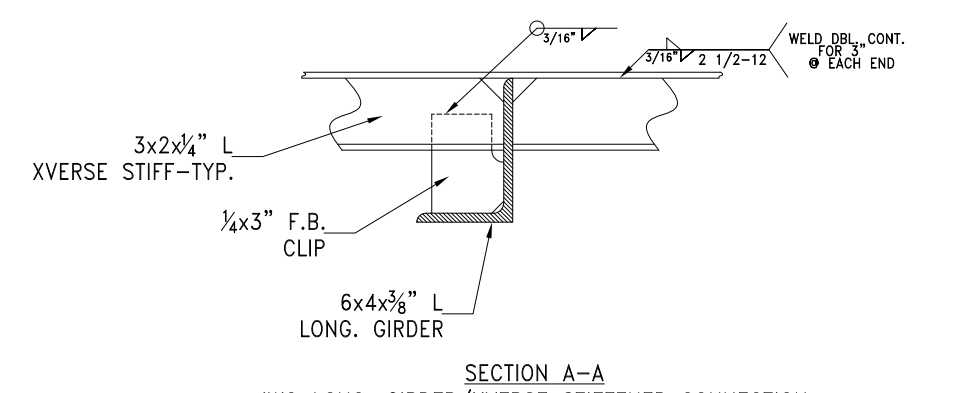




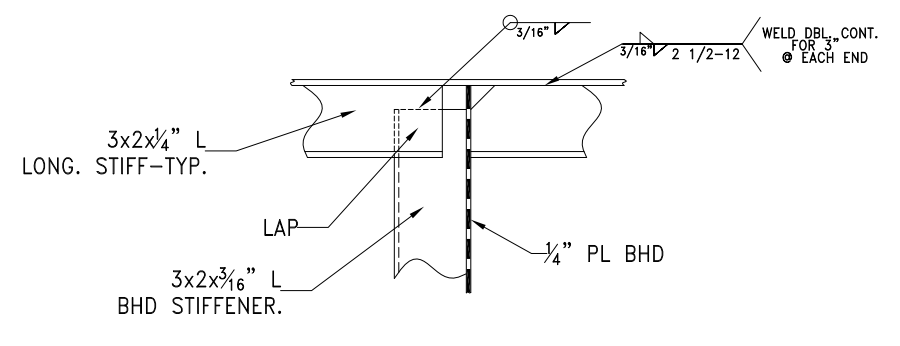
2ND DECK STRUCTURAL DETAILS  
 1/4" PL W/ 3x2x1/2" L ON 12" CNTRS  
 UNLESS OTHERWISE NOTED



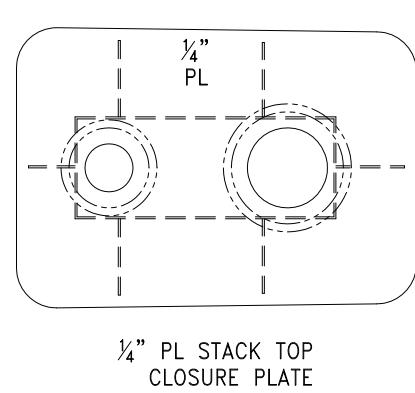
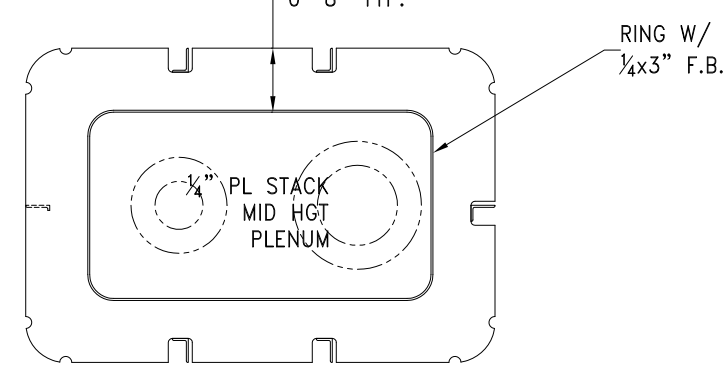
STACK SIDE BHD DETAILS



SECTION A-A  
 TWO LONG GIRDER/XVERSE STIFFENER CONNECTION  
 SCALE: 1 1/2" = 1'-0"



TYPICAL SECTION B-B  
 DECK STIFFENERS  
 BHD CONNECTION  
 SCALE: 1 1/2" = 1'-0"

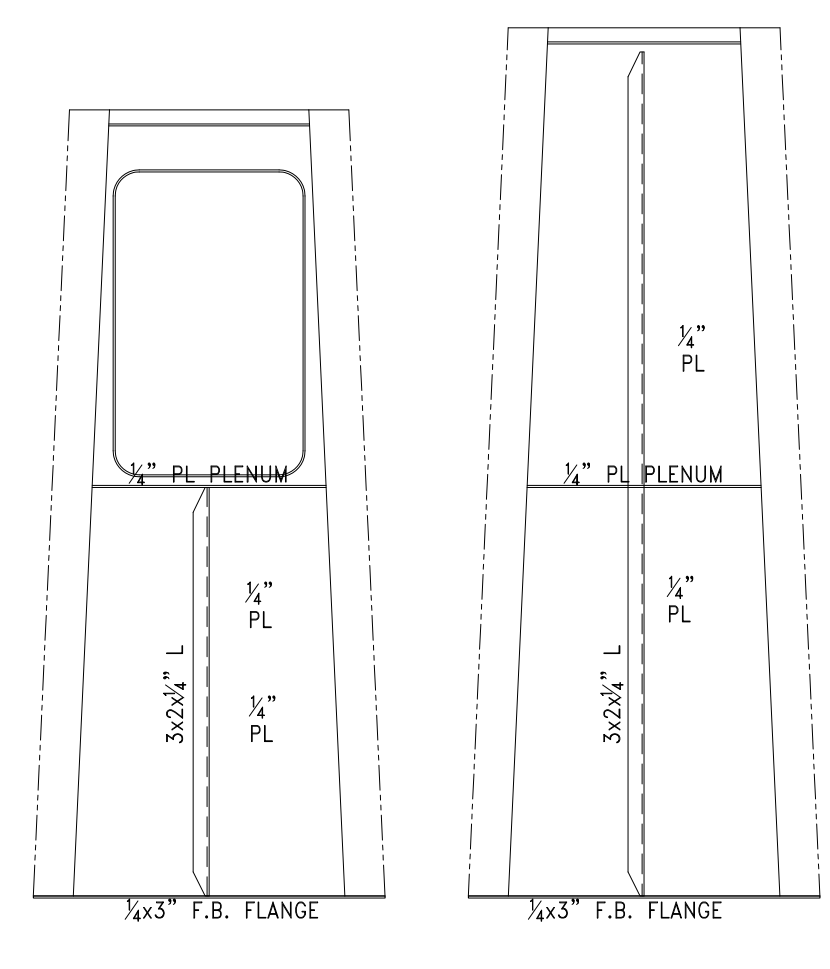


1/4" PL STACK TOP CLOSURE PLATE

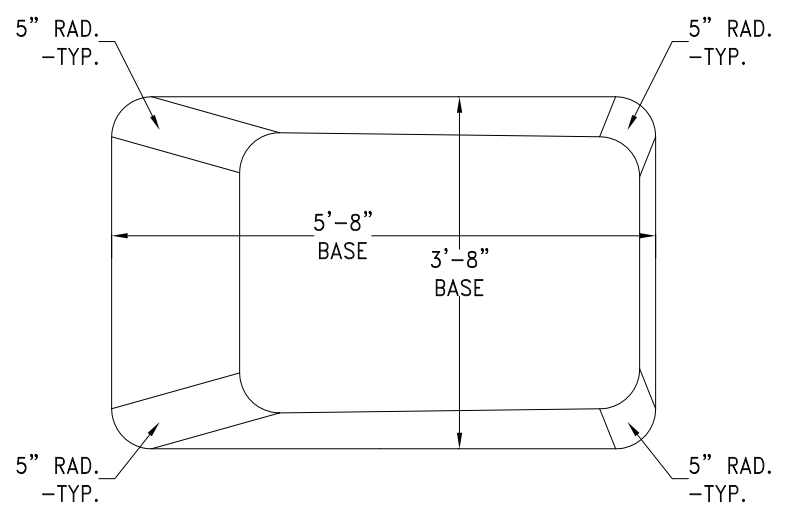
WELD SCHEDULE-TYPICAL

WELD DEL. CONT. EACH END	3/16" V2 1/2-10	GIRDERS TO DECK PLATE
WELD DEL. CONT. EACH END	3/16" V2 1/2-12	1. STIFFENERS TO DECK PLATE 2. STIFFENERS TO BHD'S
	3/16"	1. CORNER BRACKETING 2. STIFFENER LAPS 3. MULLIONS @ ENDS
	3/16" V2 1/2-12	LOWER BULKHEAD EDGE TO DECKS
	3/16" V2 1/2-12	UPPER BULKHEAD EDGE TO DECKS

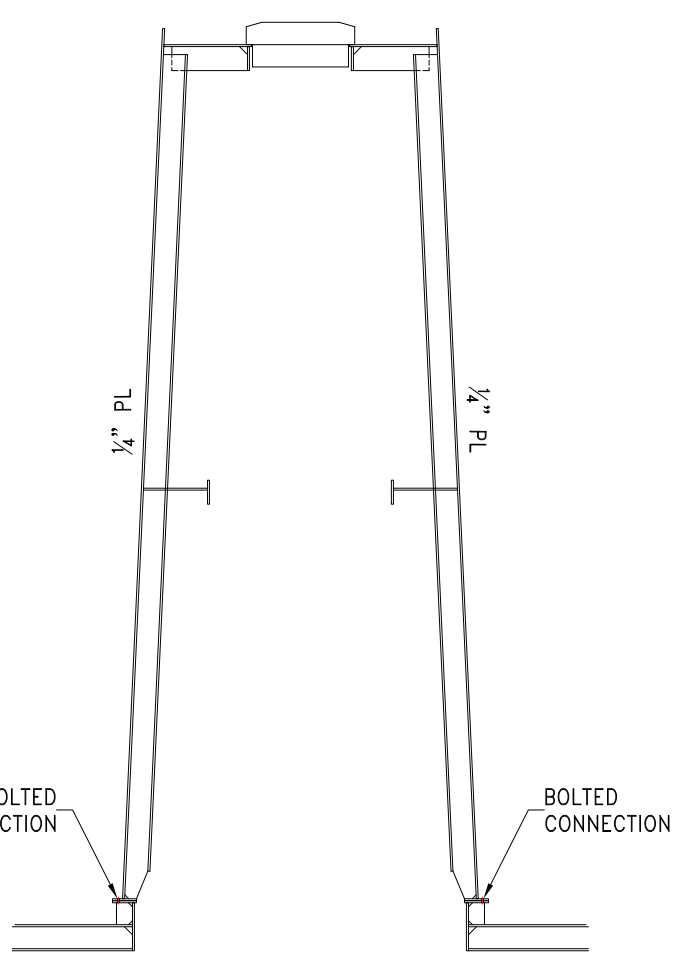
ALL DECKHOUSE CONSTRUCTION  
 5086 H116 AL. PLATING  
 6061-T6 AL. EXTRUSIONS



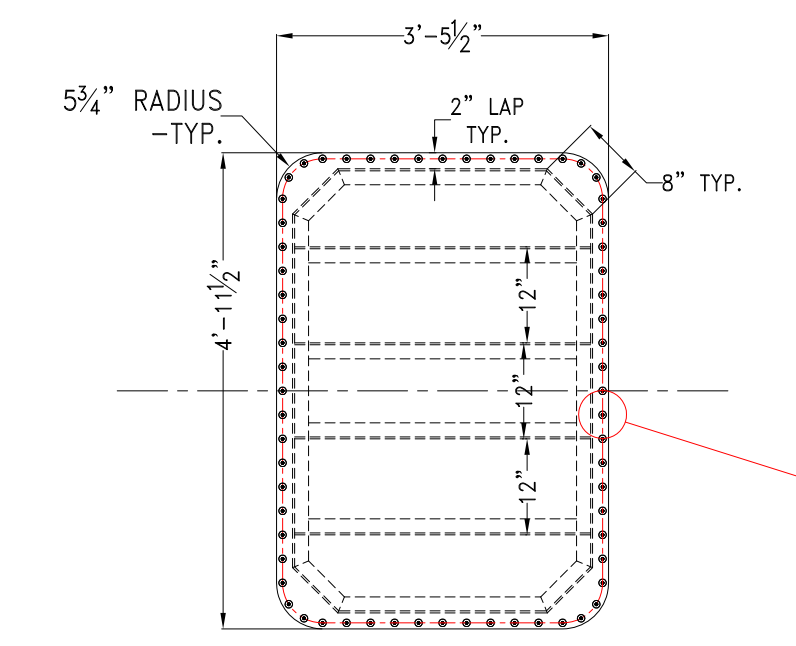
STACK FORE & AFT BHD DETAILS



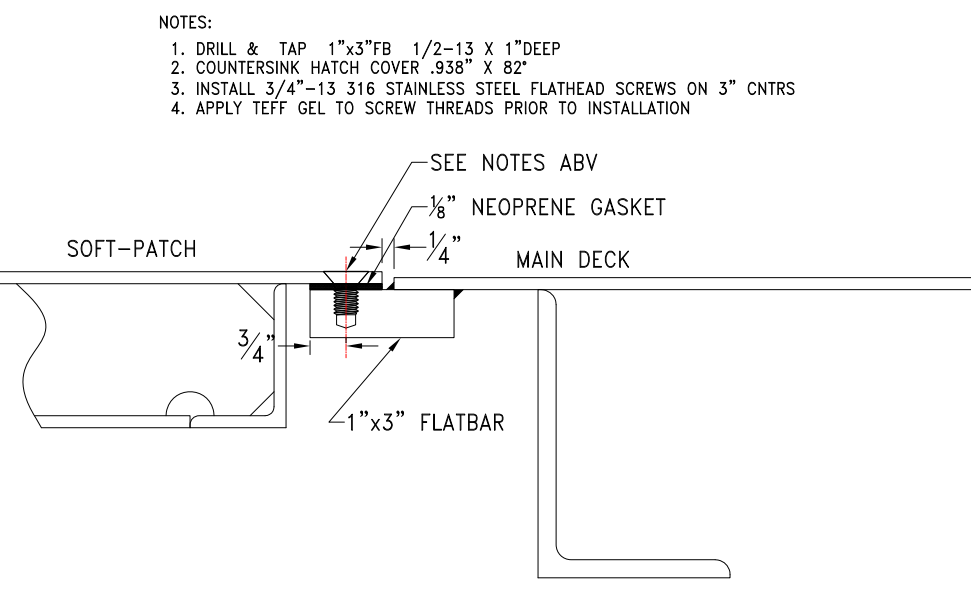
LONGITUDINAL SECTION  
 @ STACK CL



TYP. XVERSE STACK STRUCTURAL SECTION



2ND DK SOFT-PATCH  
 1/4" PL W/  
 3x2x1/2" L STIFFS AS SHOWN  
 MATERIAL: ALUMINUM, 5086-H116 PLATE, 6061-T6 SHAPES



2ND DECK SOFTPATCH FASTENER DETAILS  
 -NO SCALE-

- NOTES:
1. DRILL & TAP 1"x3" FB 1/2-13 X 1" DEEP
  2. COUNTERSINK HATCH COVER 3/8" X 8"
  3. INSTALL 3/4"x13 316 STAINLESS STEEL FLATHEAD SCREWS ON 3" CNTRS
  4. APPLY TEFF GEL TO SCREW THREADS PRIOR TO INSTALLATION

SEE NOTES ABV  
 1/8" NEOPRENE GASKET  
 1"x3" FLATBAR

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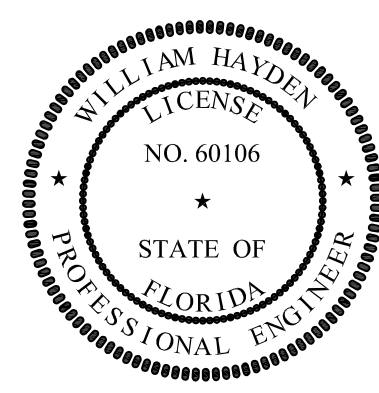
Phone: (904) 599-3673  
 Fax: (904) 599-1522  
 Info@dejongandlebel.com

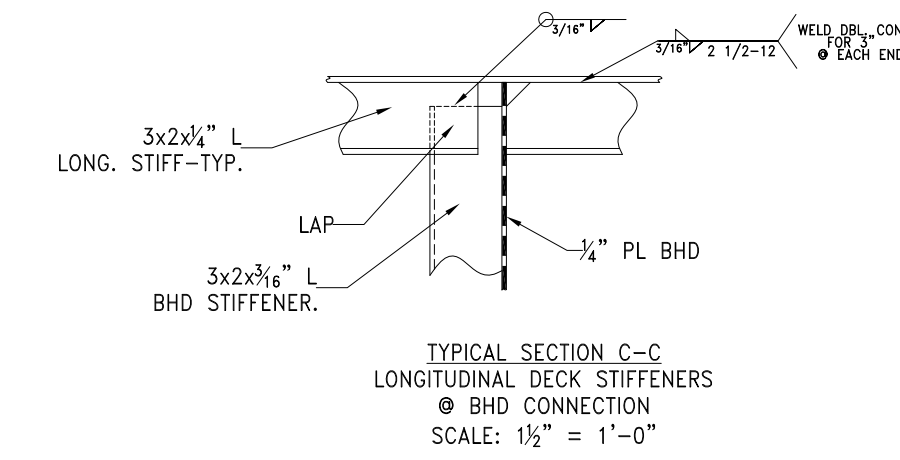
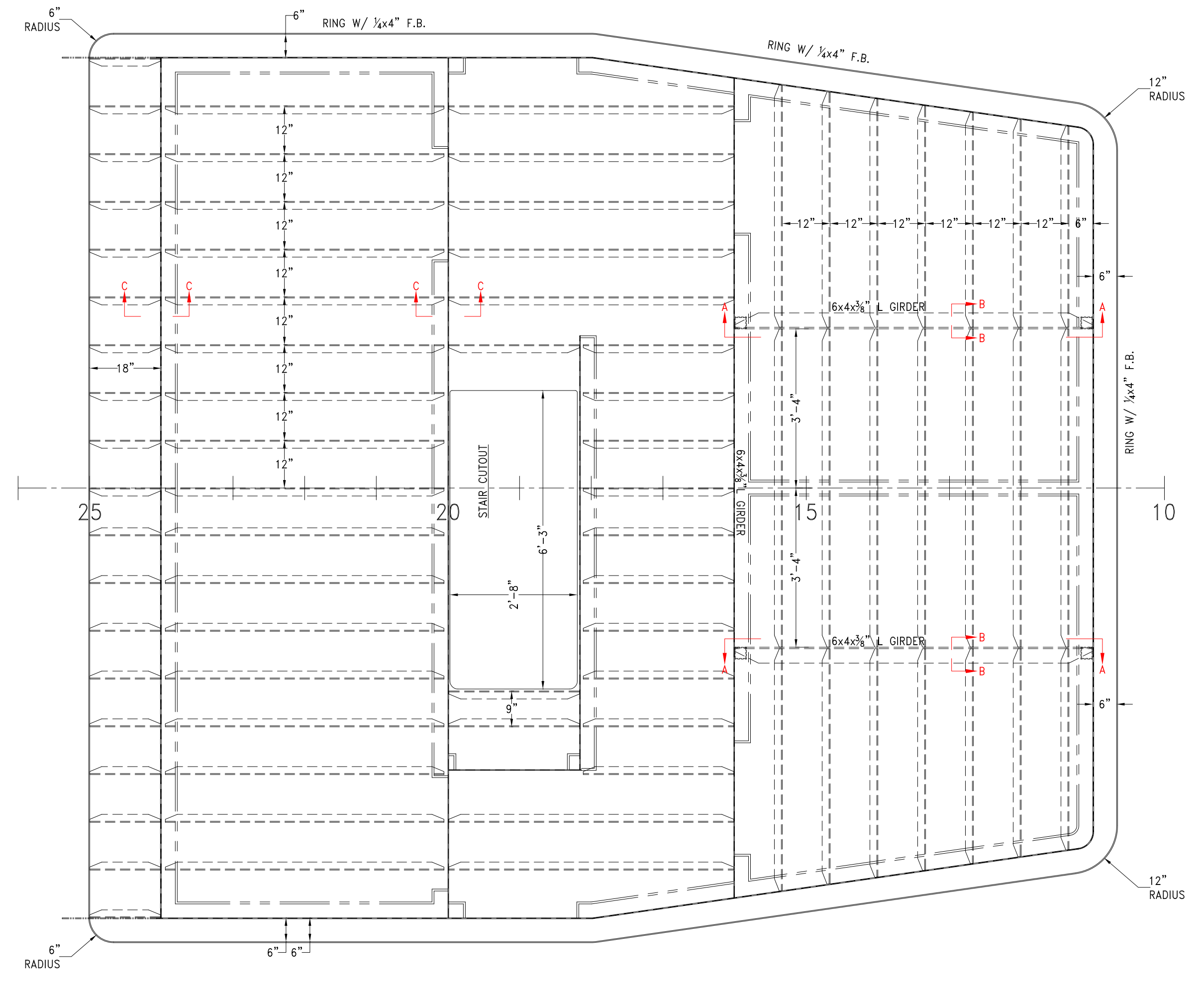
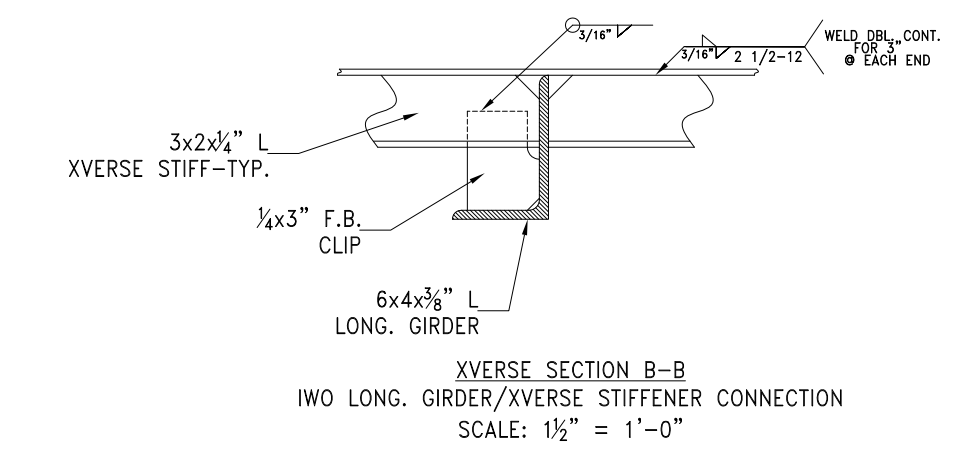
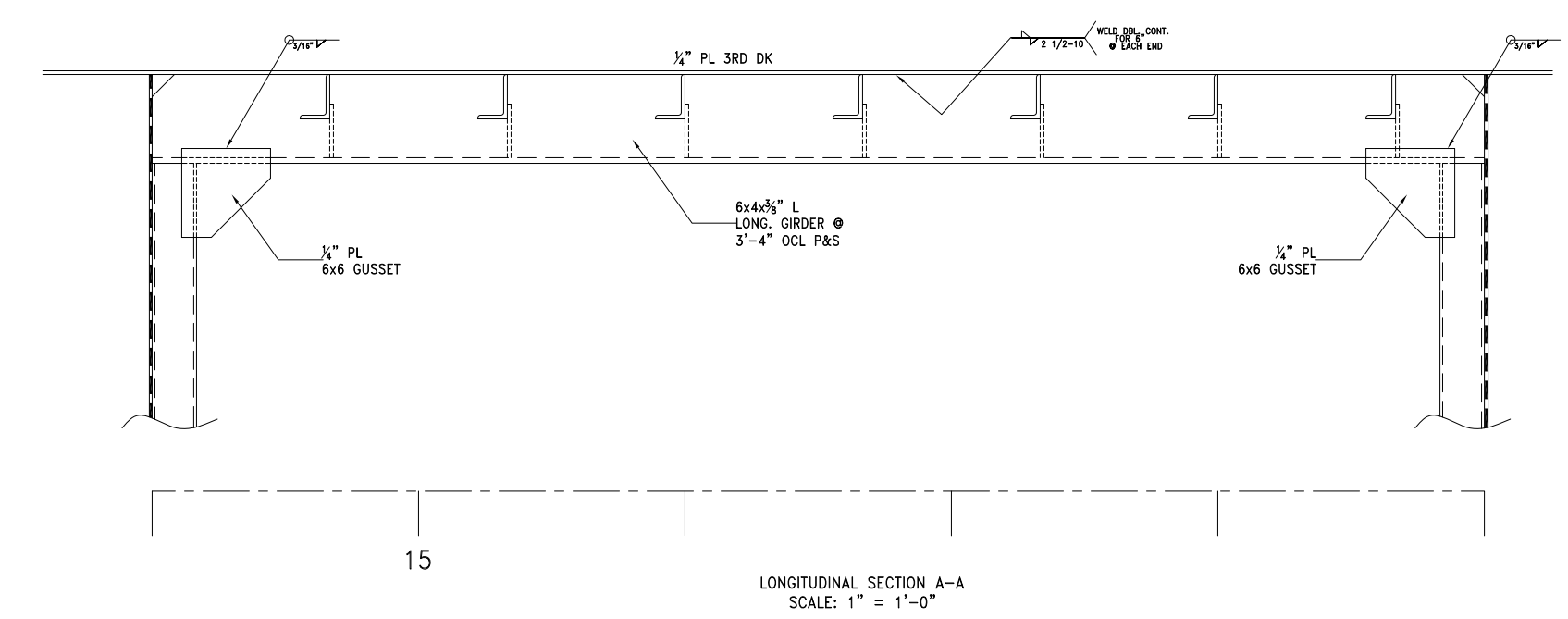
Title: 70.5'x30'x11' NCDOT TOWBOAT

**2ND DECK STRUCTURAL DETAILS**

Dwg. No. 17-1372-132 Alt. No. 0  
 Sht. 1 of 1

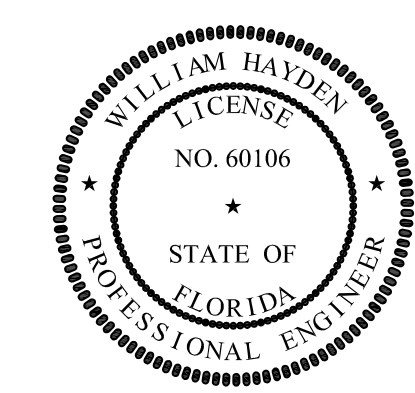
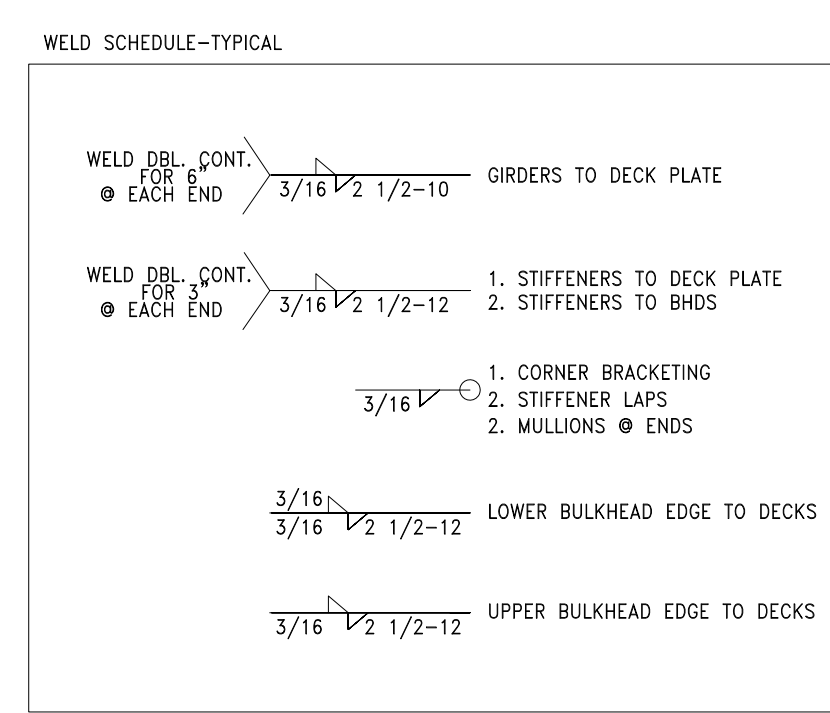
Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: Date:  
 App'd By: Scale: 1/2" = 1'-0"  
 ABS App'l: USCG App'l:





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3RD DECK STRUCTURAL DETAILS  
 1/2\"/>



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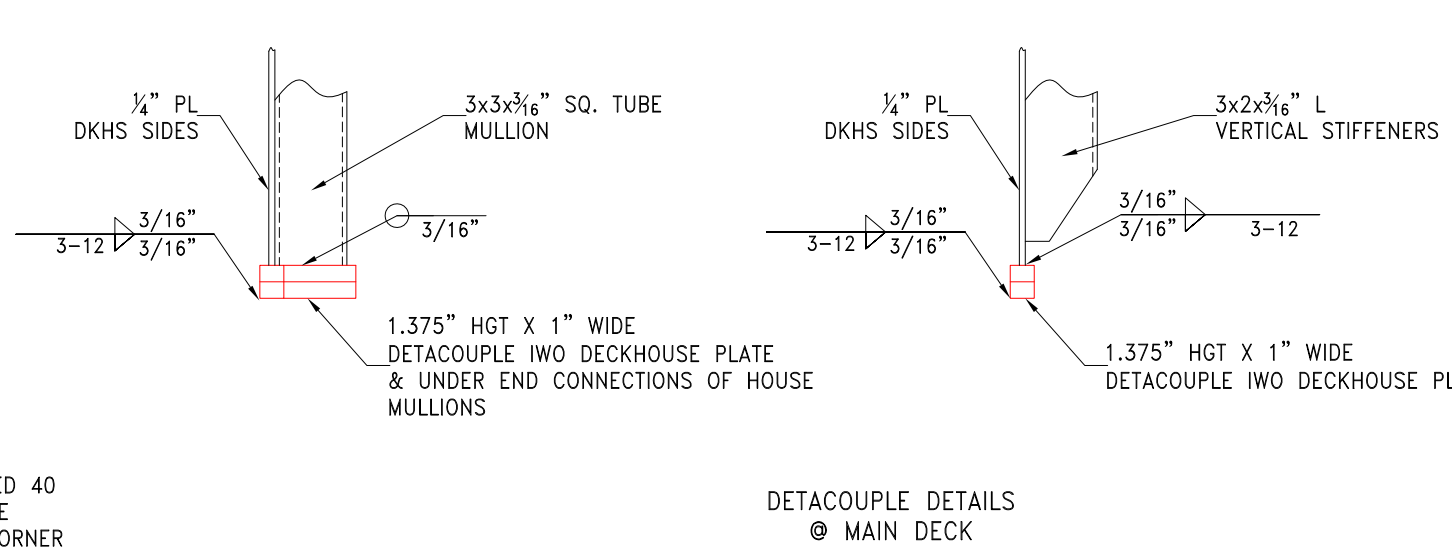
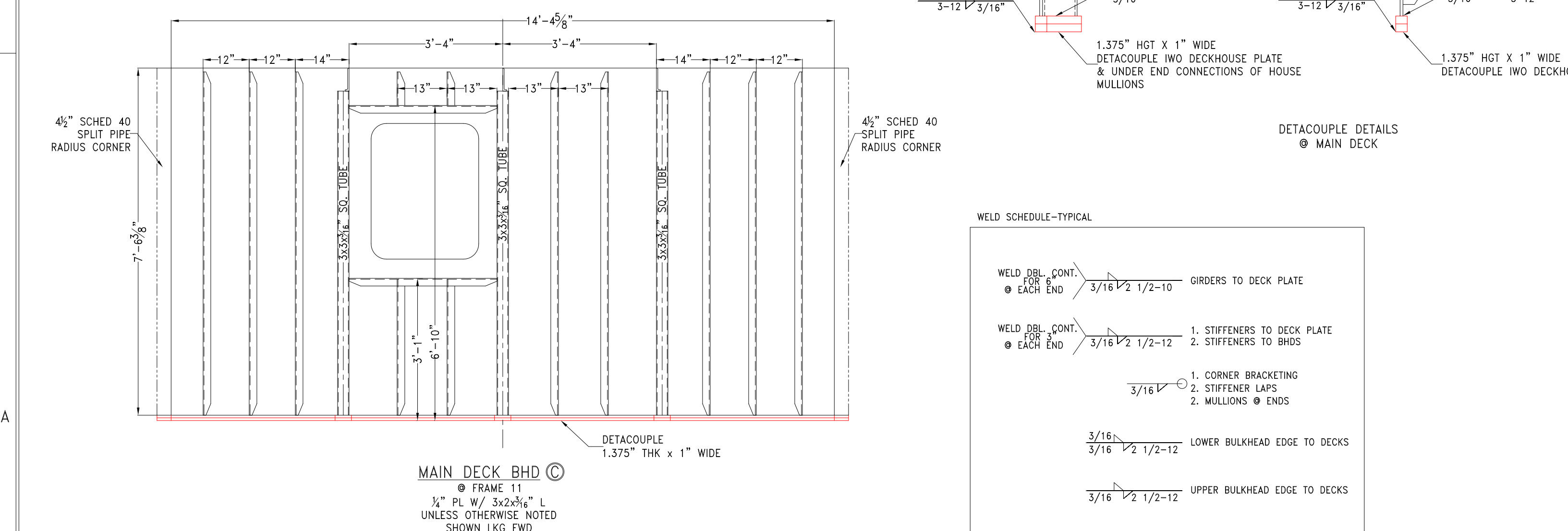
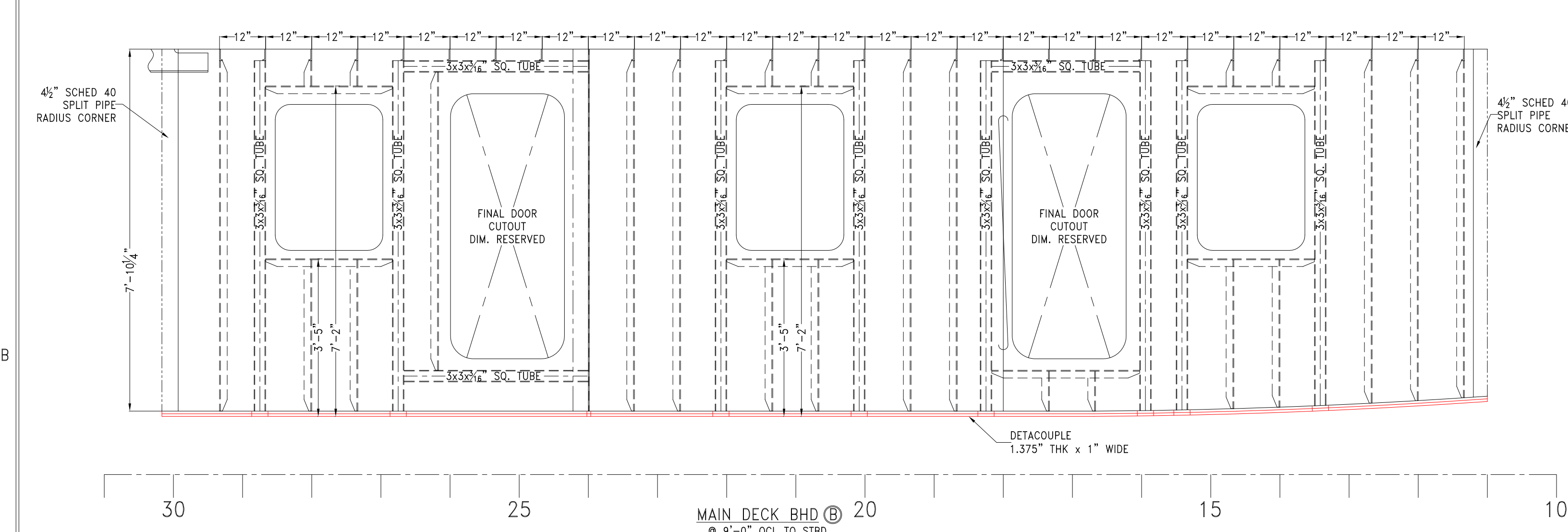
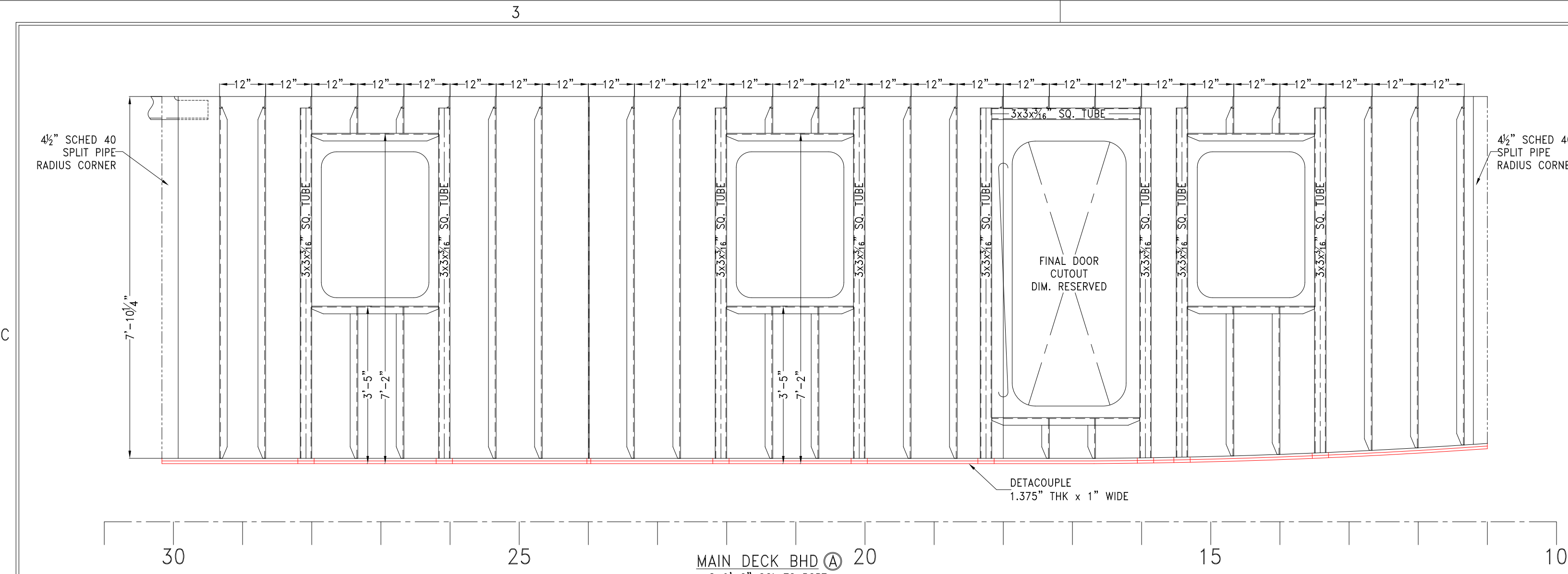
Phone: (904) 399-3673  
 Fax: (904) 599-1522  
 info@dejongandlebet.com

Title: 70.5'x30'x11' NCD07 TOWBOAT

**3RD DECK STRUCTURAL DETAILS**

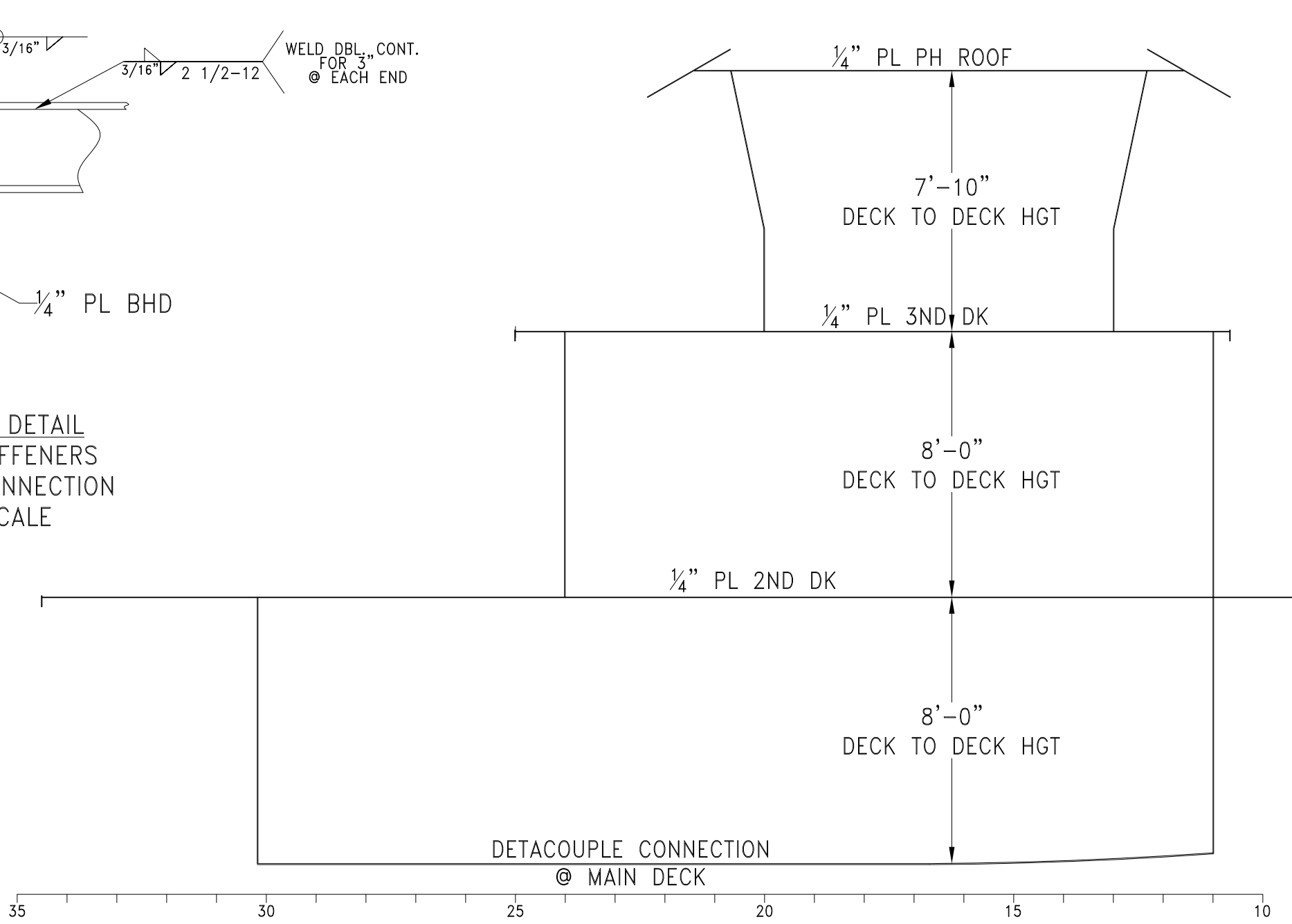
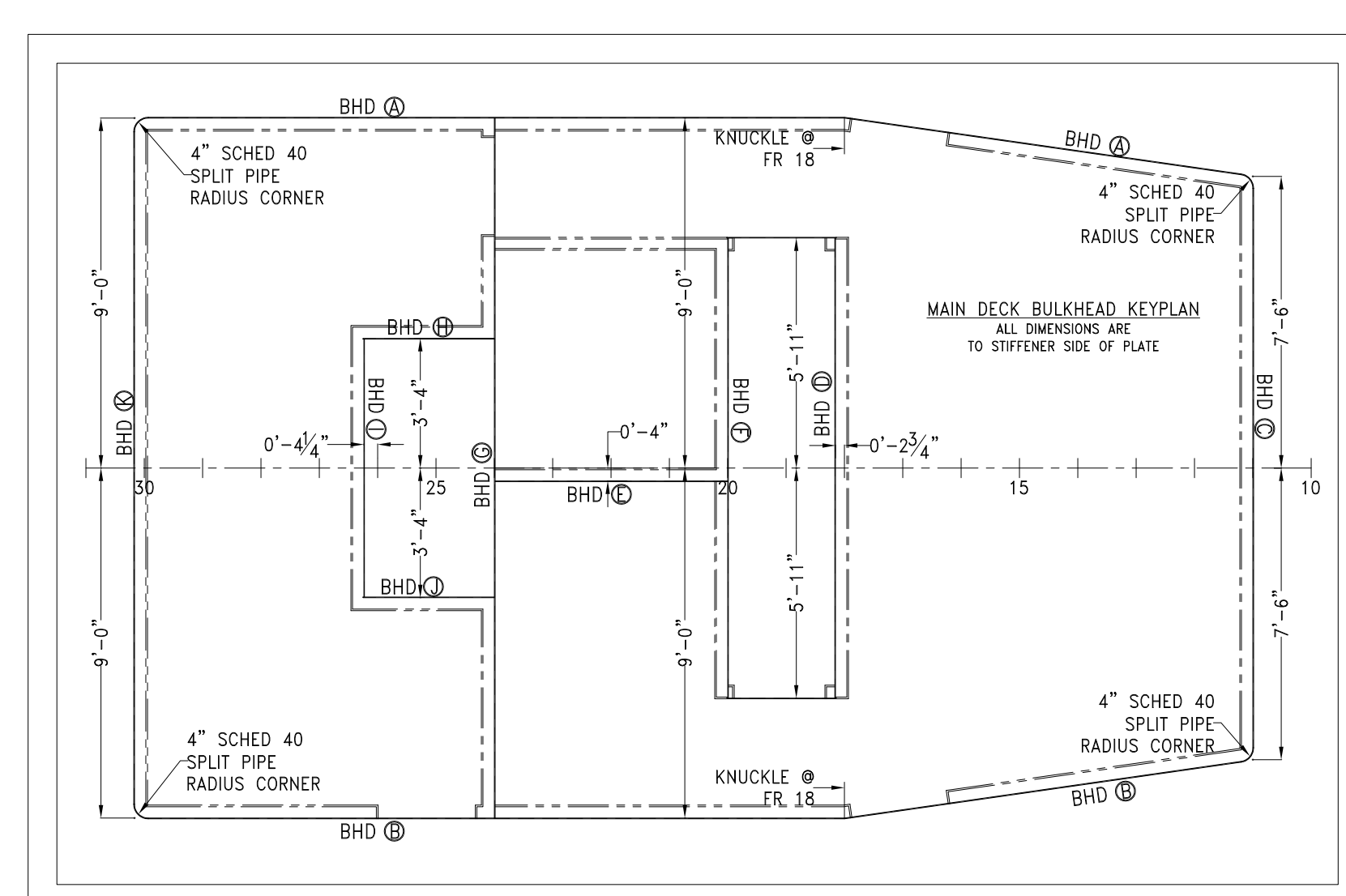
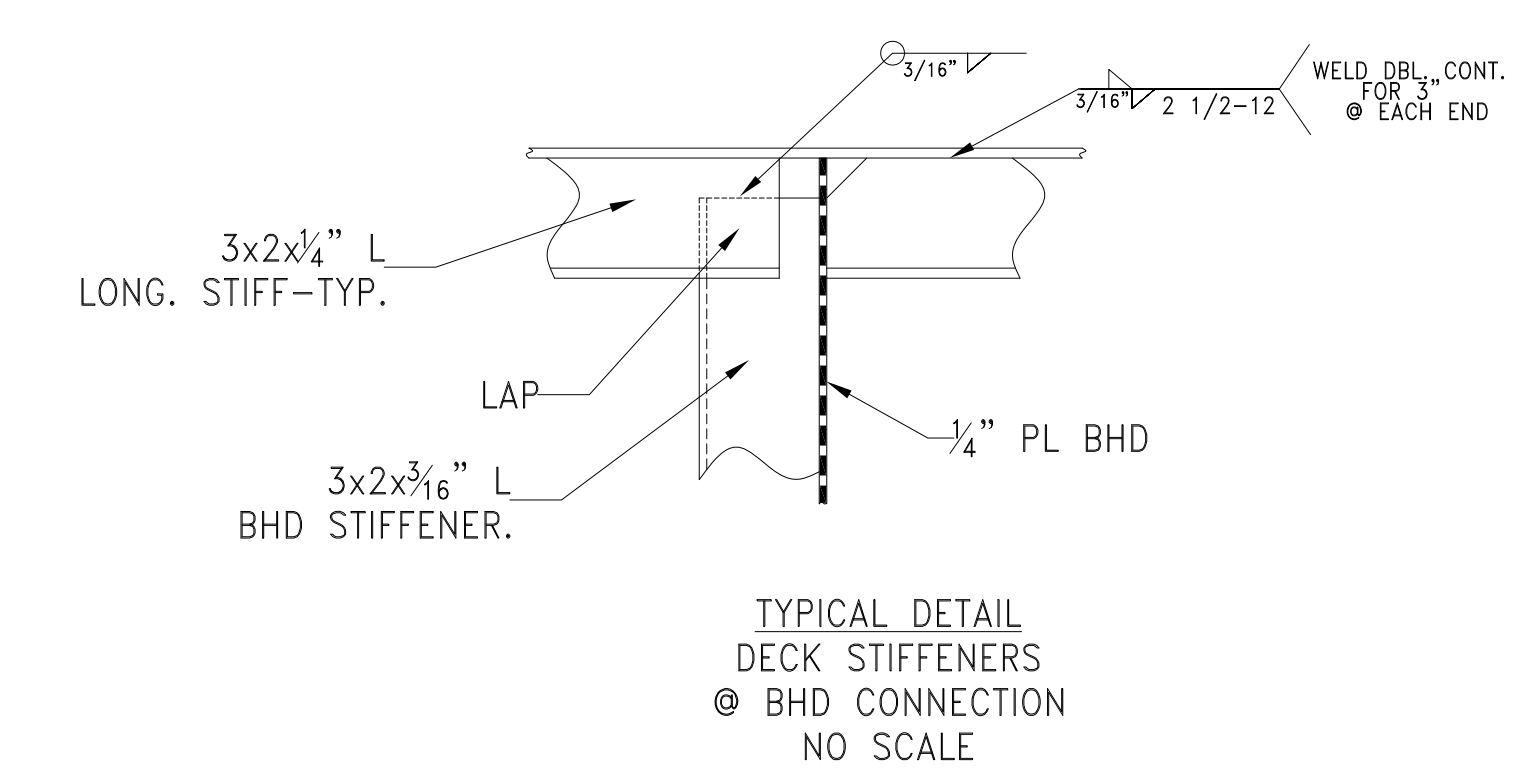
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 Sht. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
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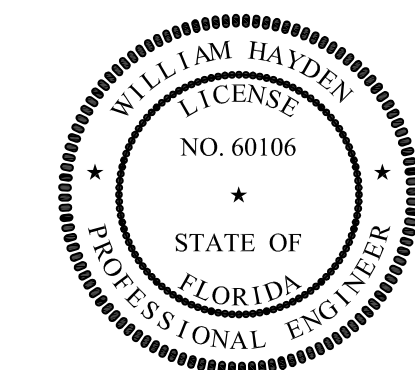


**WELD SCHEDULE-TYPICAL**

WELD DBL. CONT. @ EACH END	3/16" x 1/2" x 1-10"	GIRDERS TO DECK PLATE
WELD DBL. CONT. @ EACH END	3/16" x 1/2" x 1-12"	1. STIFFENERS TO DECK PLATE 2. STIFFENERS TO BHD'S
	3/16"	1. CORNER BRACKETING 2. STIFFENER LAPS 2. MULLIONS @ ENDS
	3/16" x 1/2" x 1-12"	LOWER BULKHEAD EDGE TO DECKS
	3/16" x 1/2" x 1-12"	UPPER BULKHEAD EDGE TO DECKS



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Title: 70.5'x30'x11' NCDOT TOWBOAT

**MAIN DECK DECKHOUSE  
 BHD DETAILS**

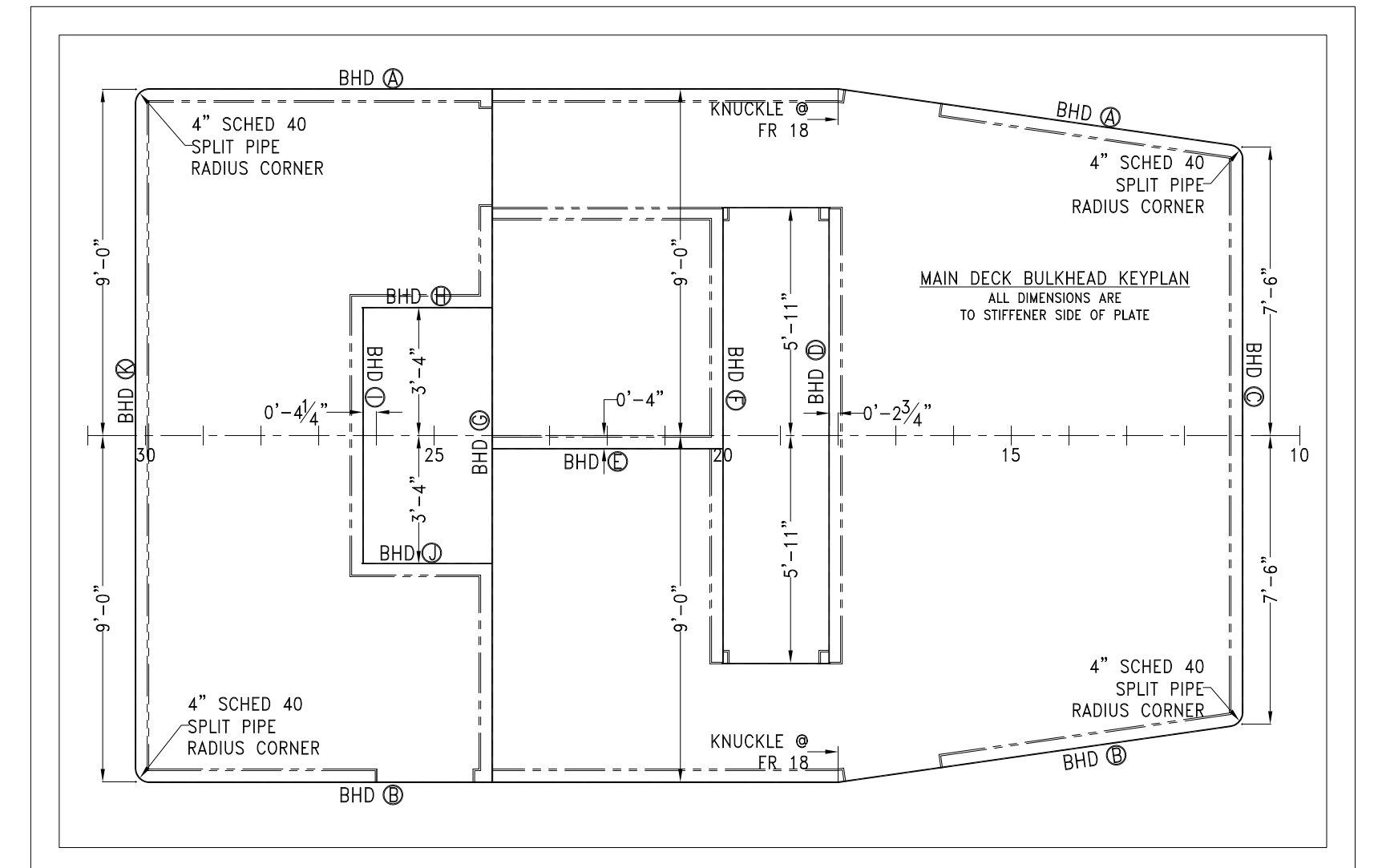
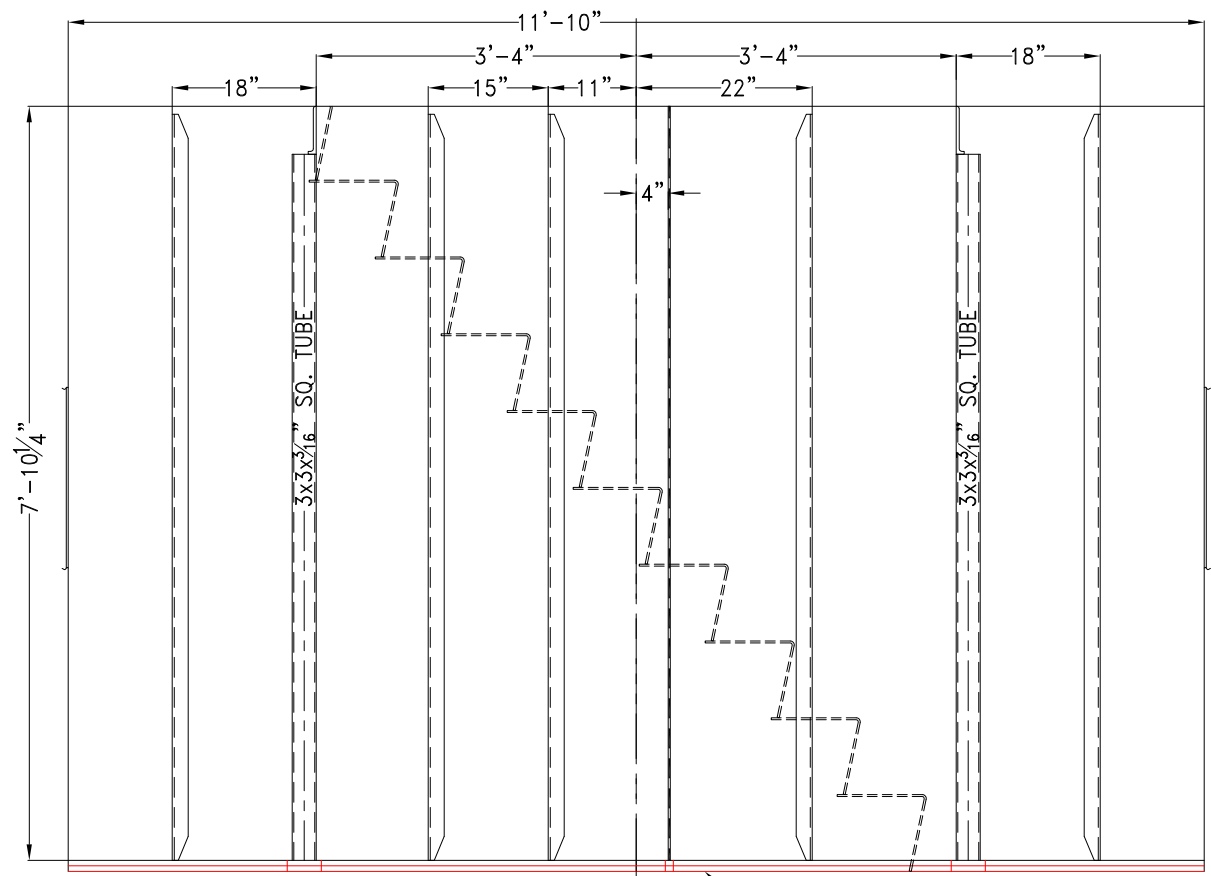
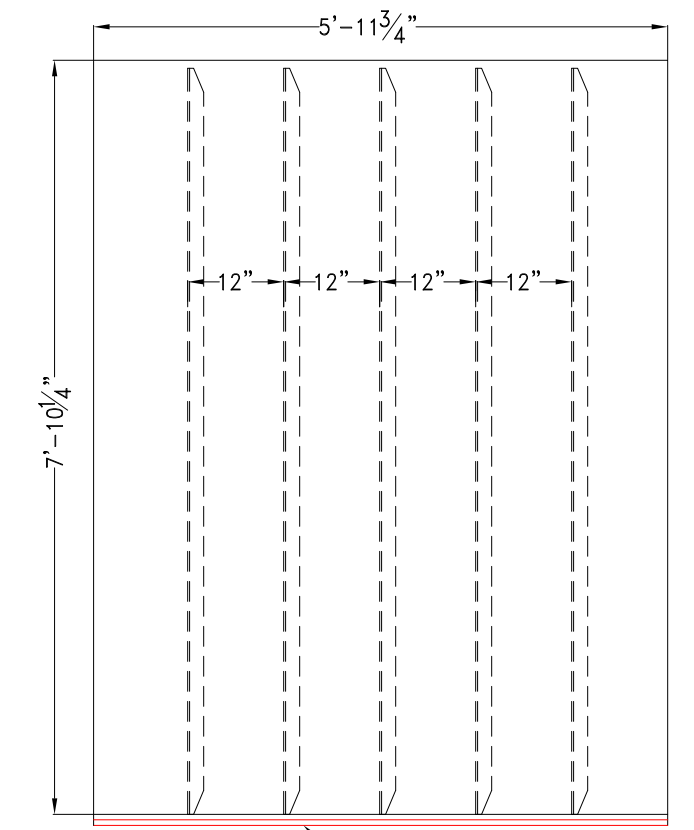
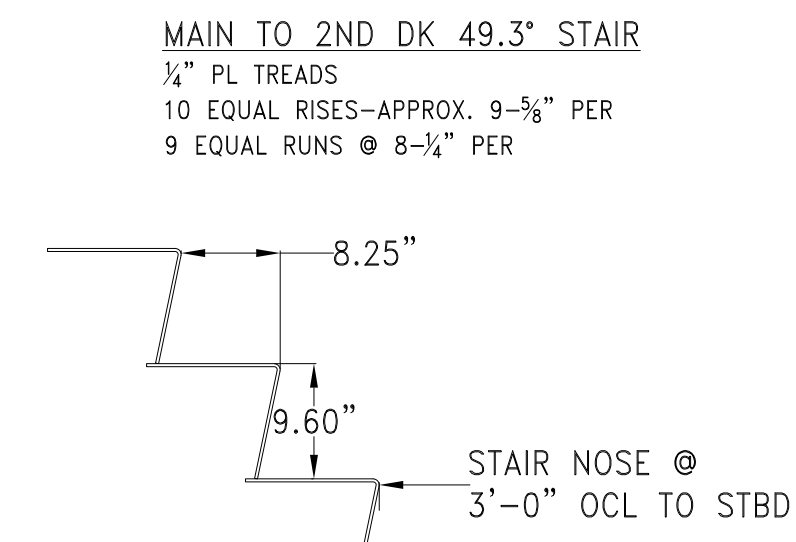
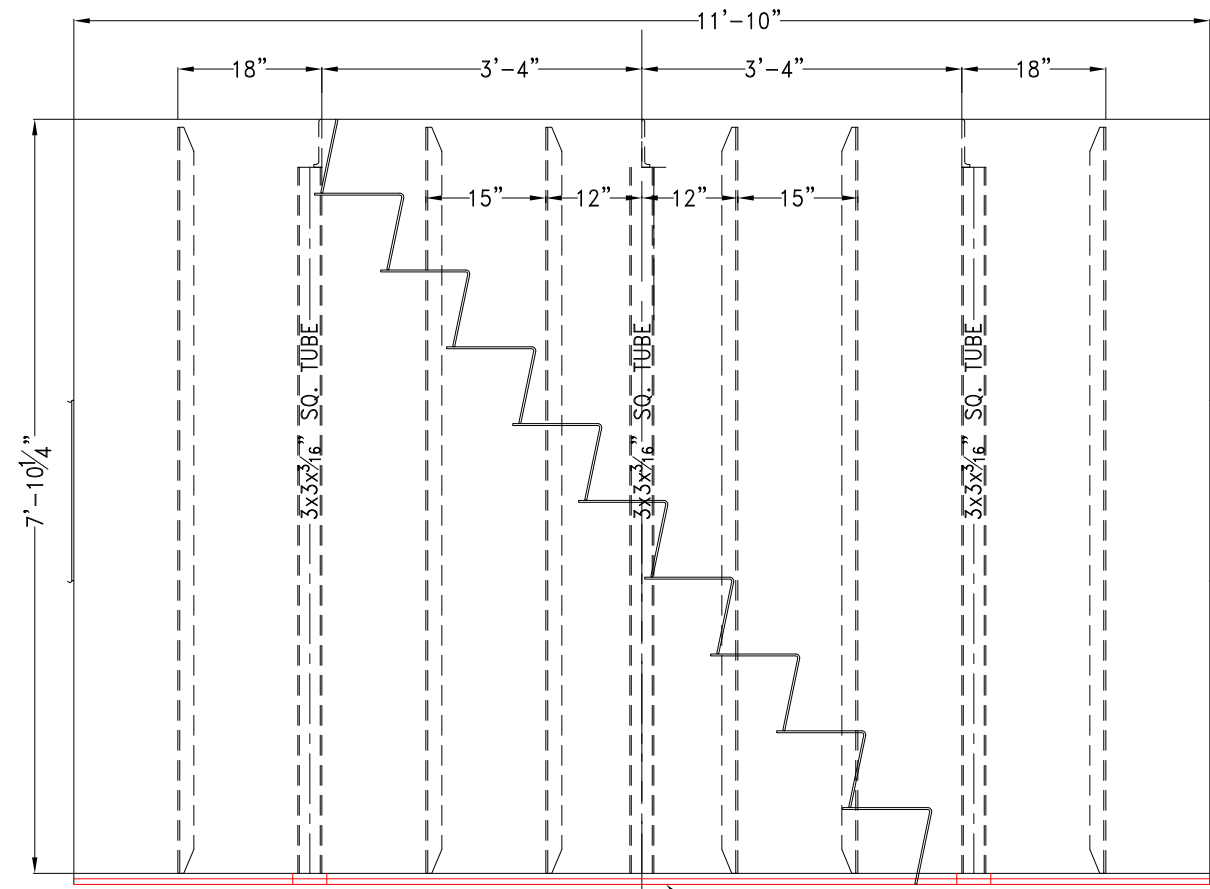
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 Sht. 1 of 2

Art. No. 0  
 Date: JUNE 05, 2018

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

Drawn By: JACOB CONNALLY  
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 App'd By:  
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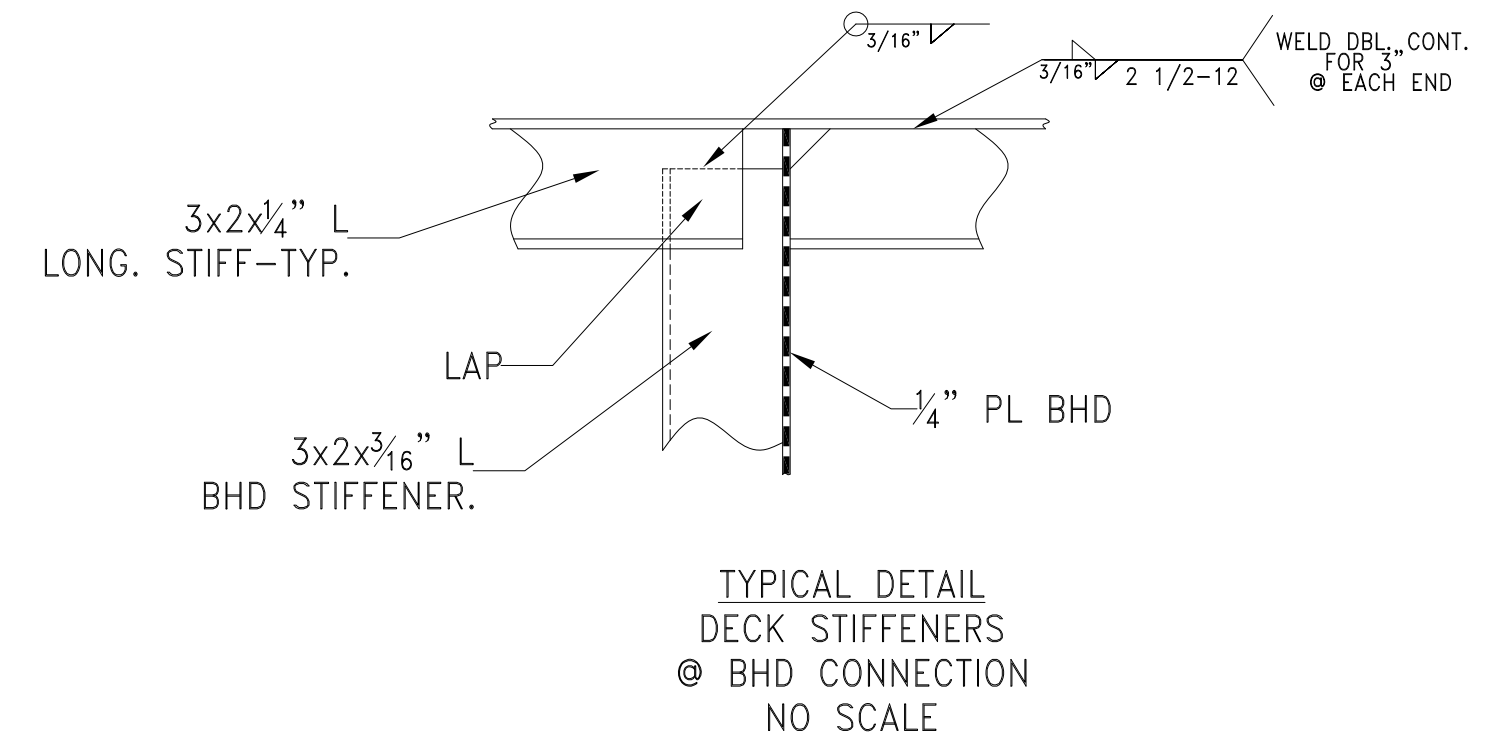
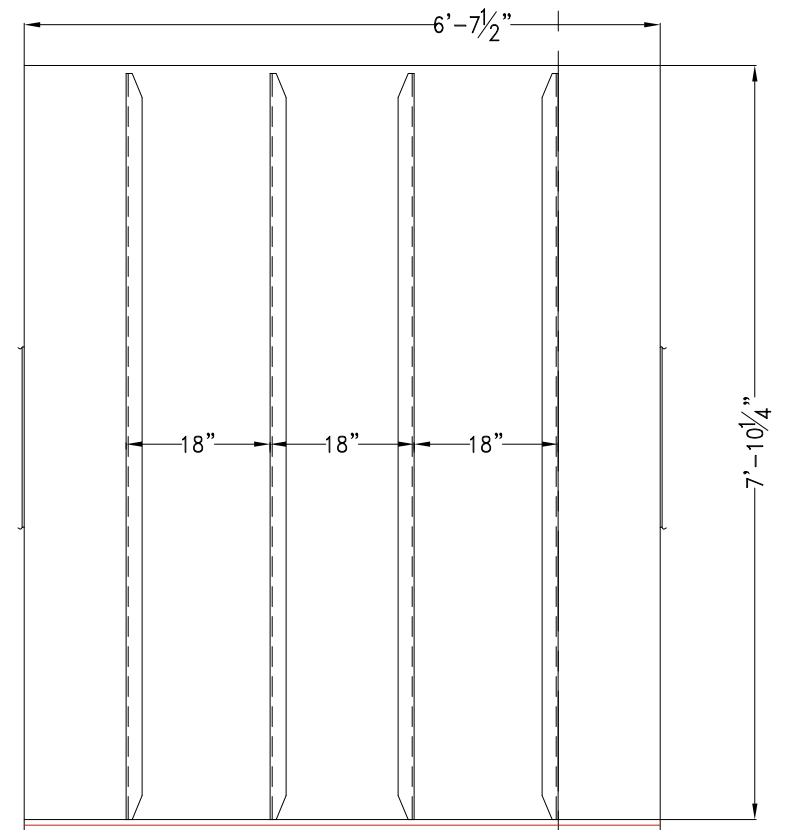
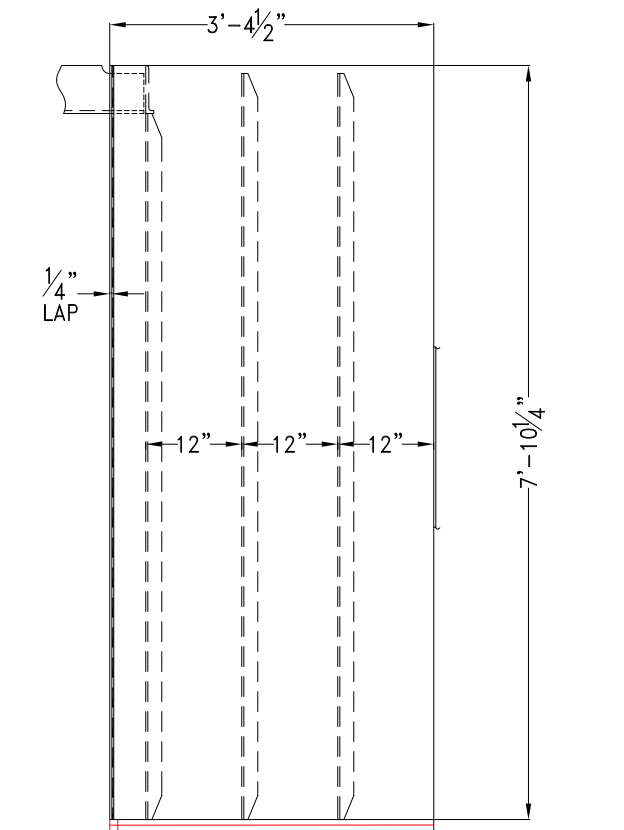
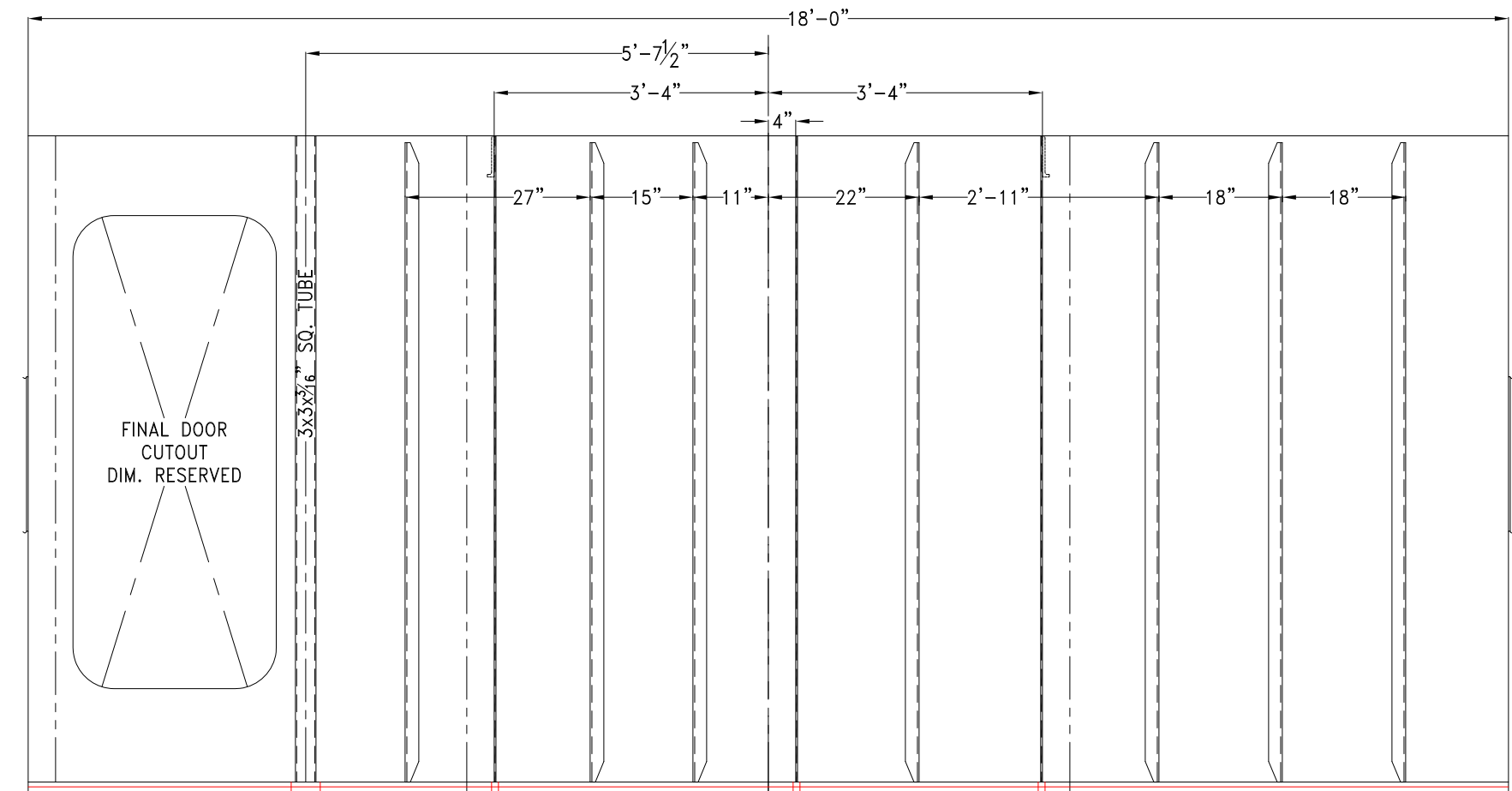
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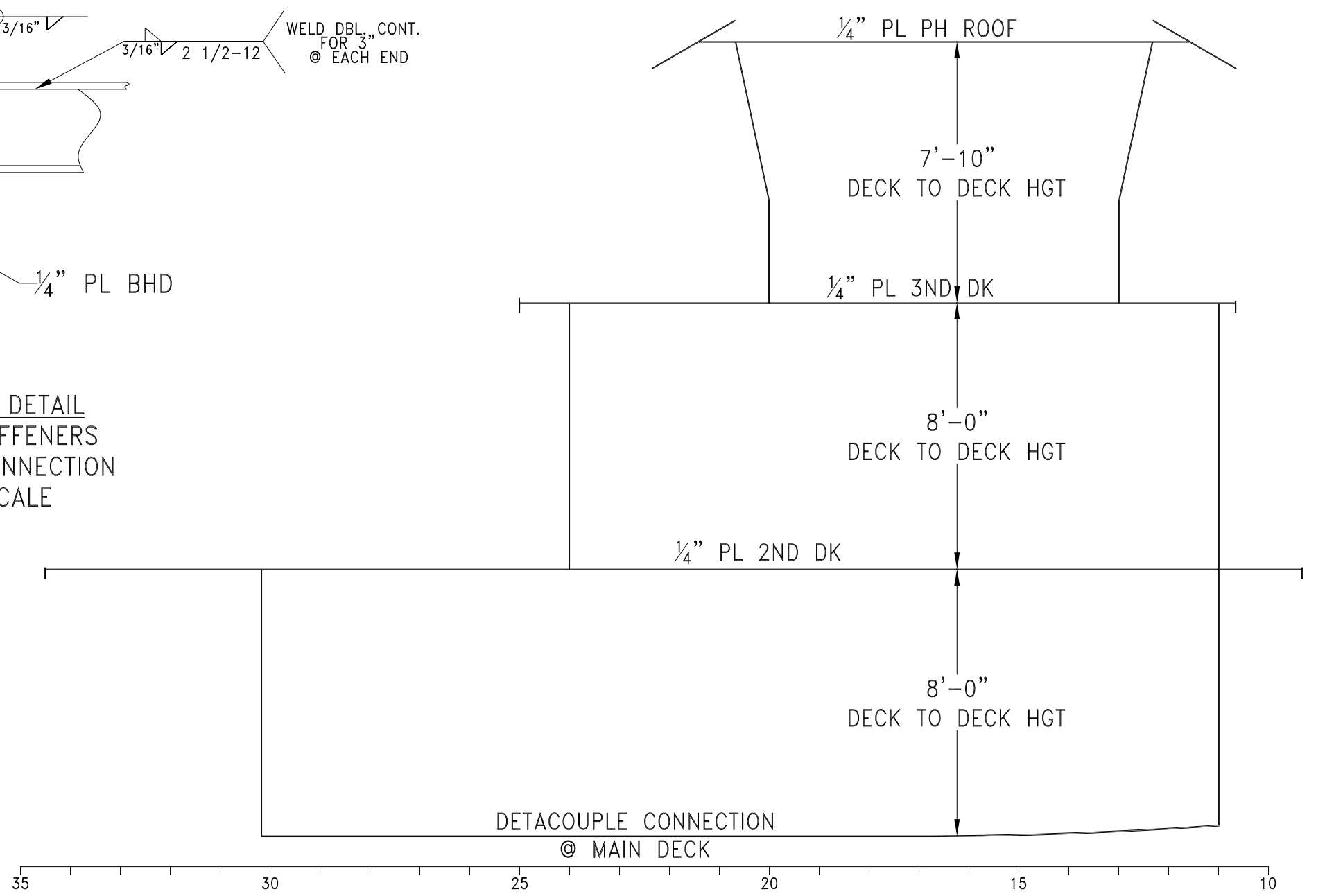
MAIN DECK BHD ①  
 @ 0'-2 3/4" AFT FRAME 18  
 3/8" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD

MAIN DECK BHD ③  
 @ 0'-4" TO STBD  
 3/8" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD

MAIN DECK BHD ⑤  
 @ FR 20  
 3/8" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD



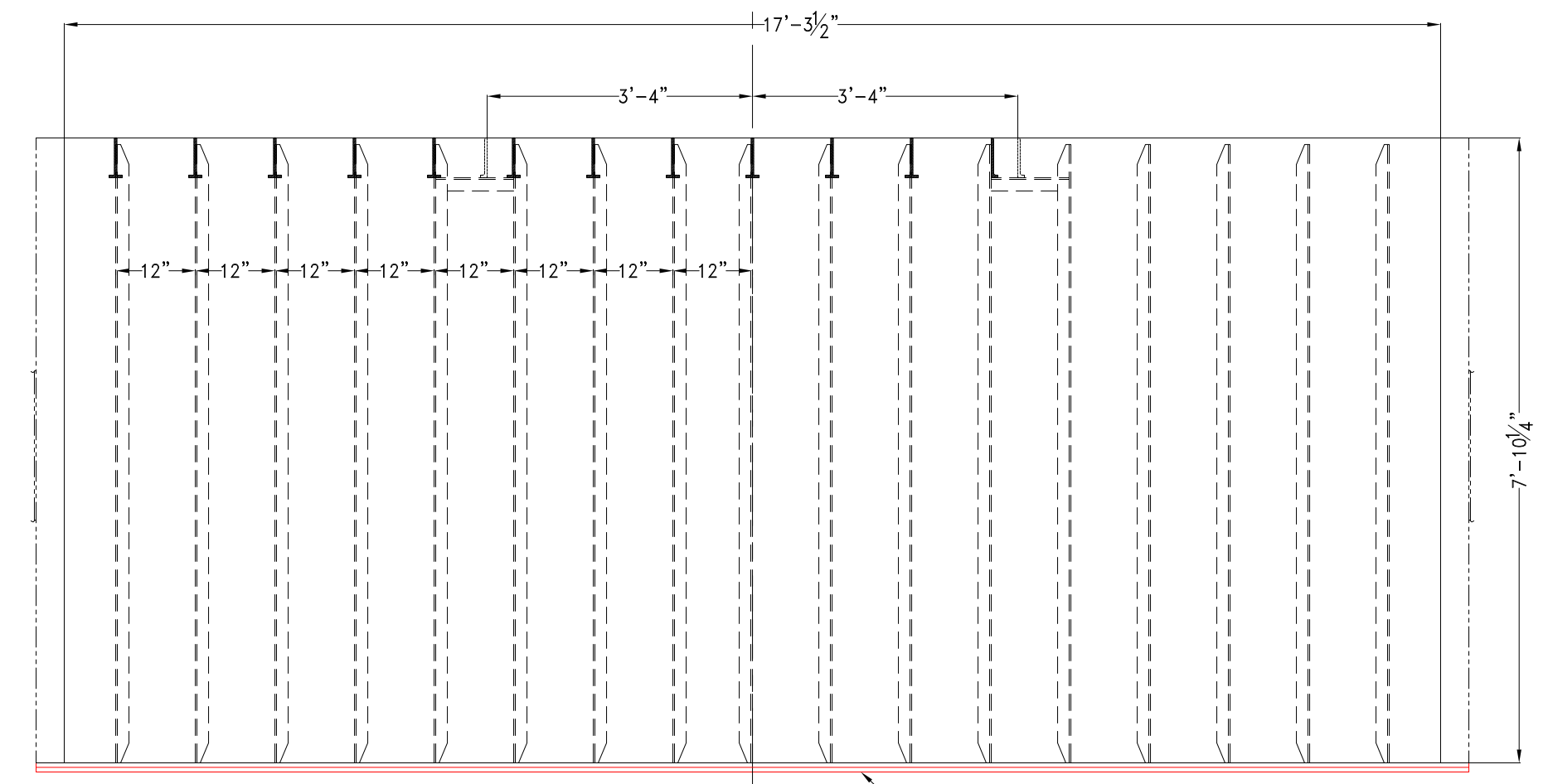
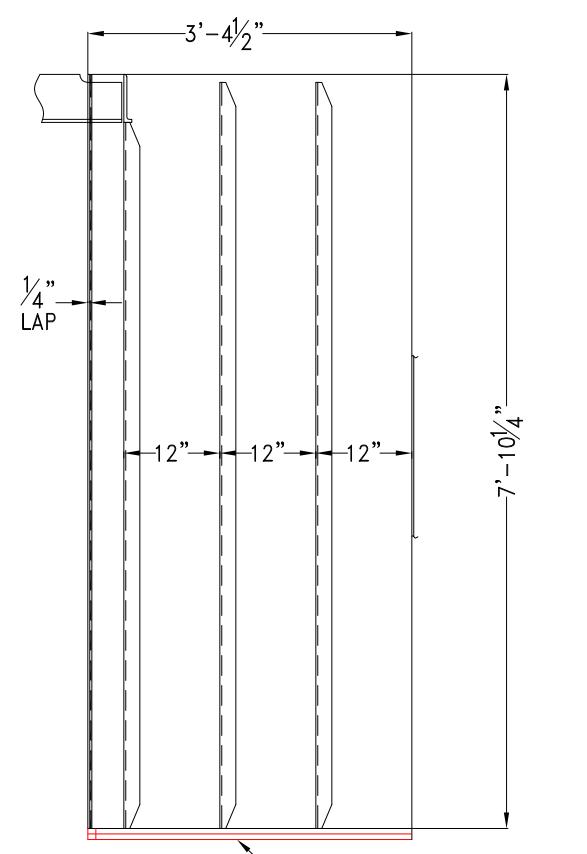
TYPICAL DETAIL  
 DECK STIFFENERS  
 @ BHD CONNECTION  
 NO SCALE



MAIN DECK BHD ④  
 @ FRAME 24  
 1/4" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD

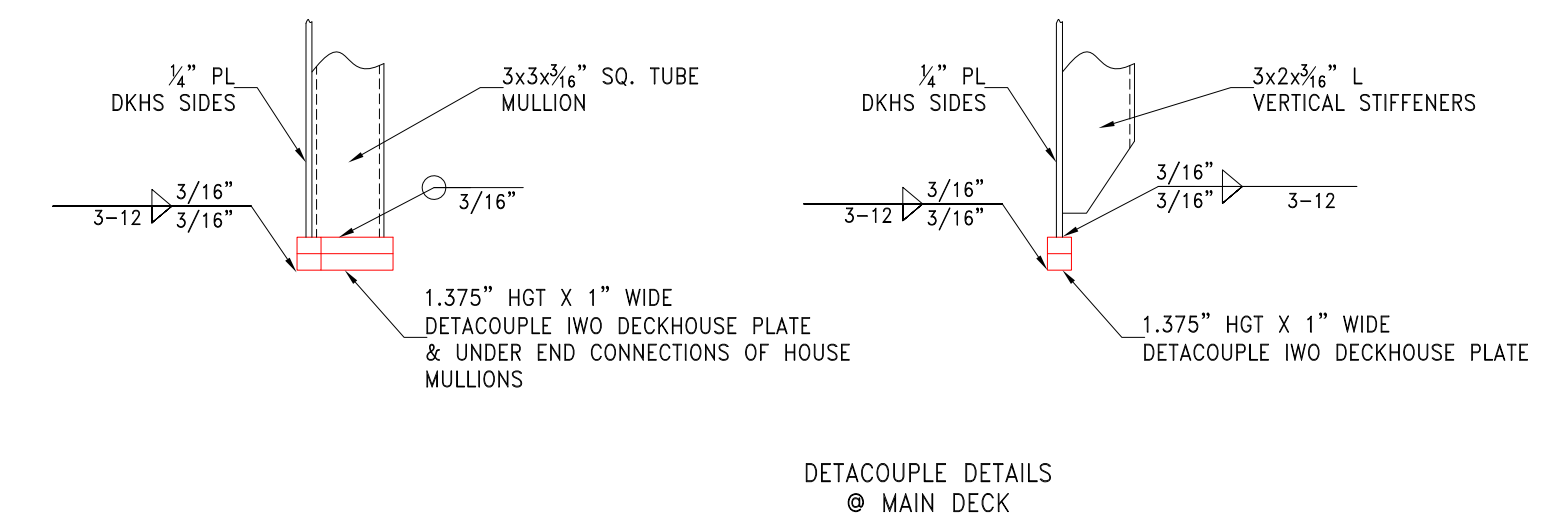
MAIN DECK BHD ⑥  
 @ 3'-4" OCL TO PORT  
 3/8" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD

MAIN DECK BHD ⑧  
 @ 0'-4" AFT FR 26  
 3/8" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD



WELD SCHEDULE-TYPICAL

WELD DBL CONT. @ EACH END	3/16" x 2 1/2-10	GIRDERS TO DECK PLATE
WELD DBL CONT. @ EACH END	3/16" x 2 1/2-12	1. STIFFENERS TO DECK PLATE 2. STIFFENERS TO BHDs
	3/16" x 1	1. CORNER BRACKETING 2. STIFFENER LAPS 2. MULLIONS @ ENDS
	3/16" x 2 1/2-12	LOWER BULKHEAD EDGE TO DECKs
	3/16" x 2 1/2-12	UPPER BULKHEAD EDGE TO DECKs



DETACOUPE DETAILS  
 @ MAIN DECK

MAIN DECK BHD ⑨  
 @ 3'-4" OCL TO STBD  
 3/8" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD

MAIN DECK BHD ⑪  
 @ FRAME 24  
 1/4" PL W/ 3x2x3/16" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG FWD

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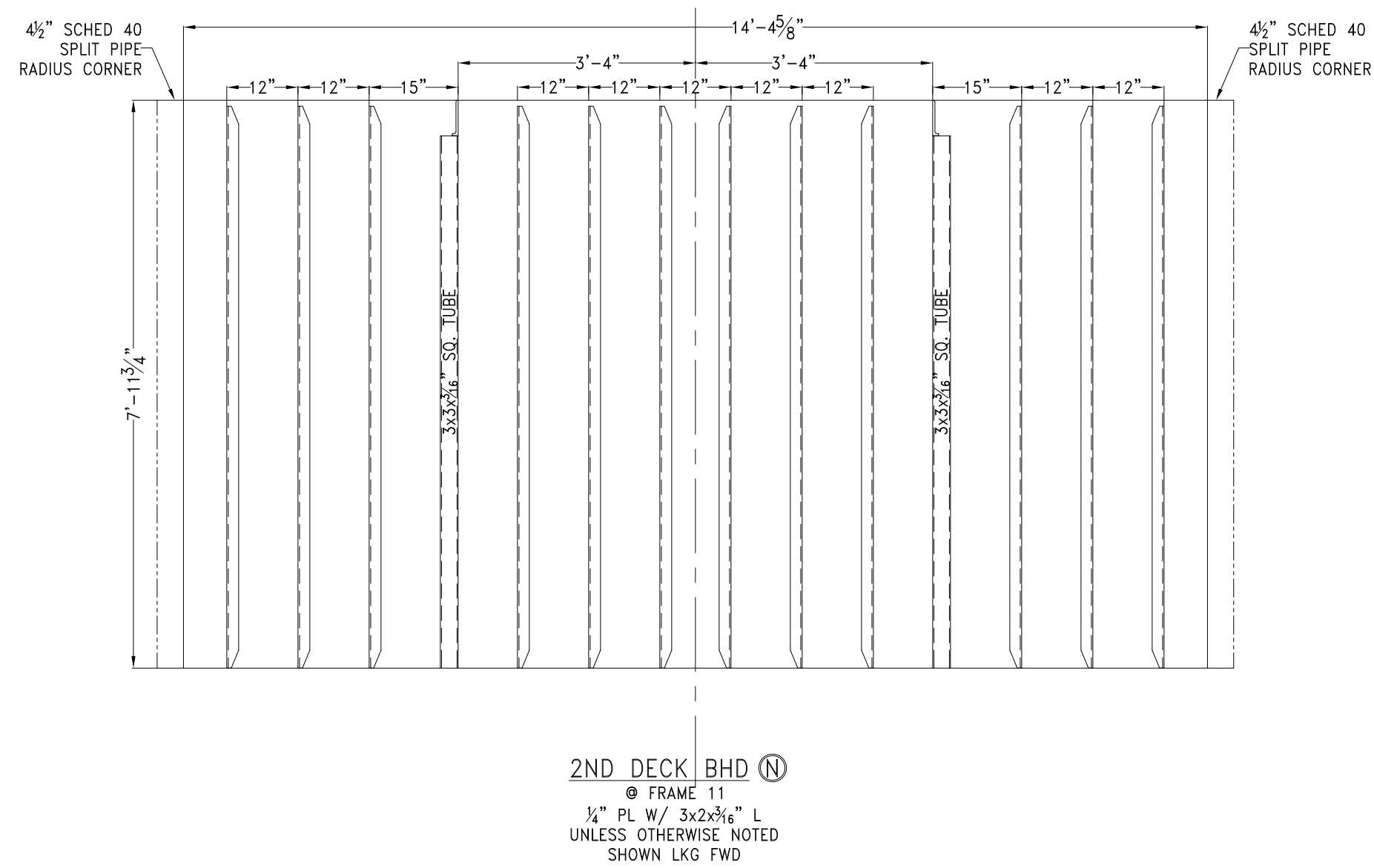
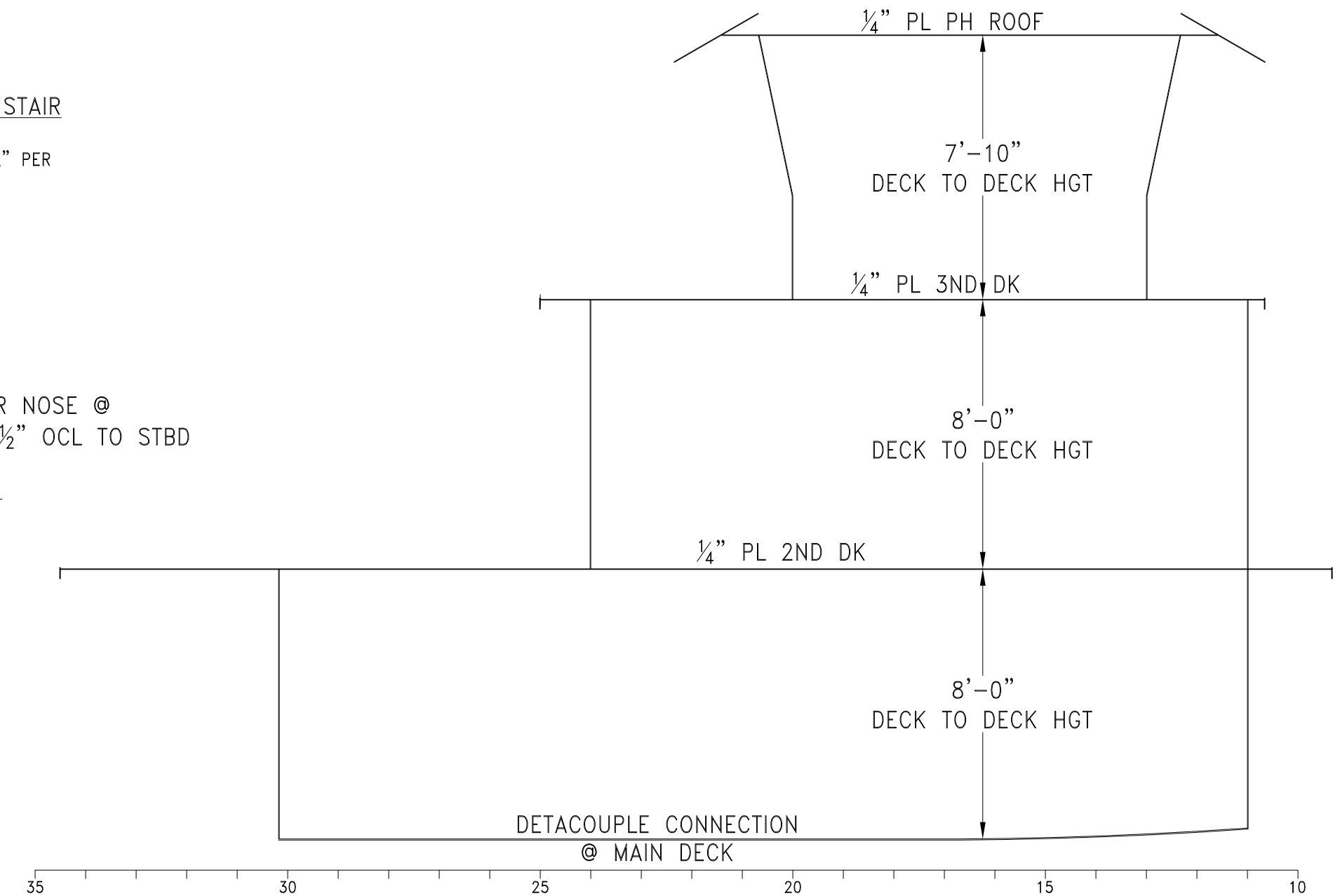
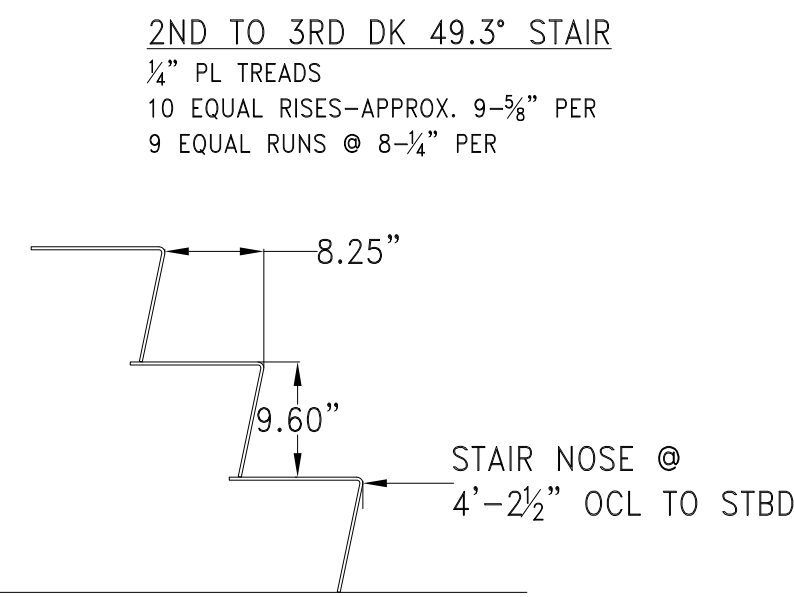
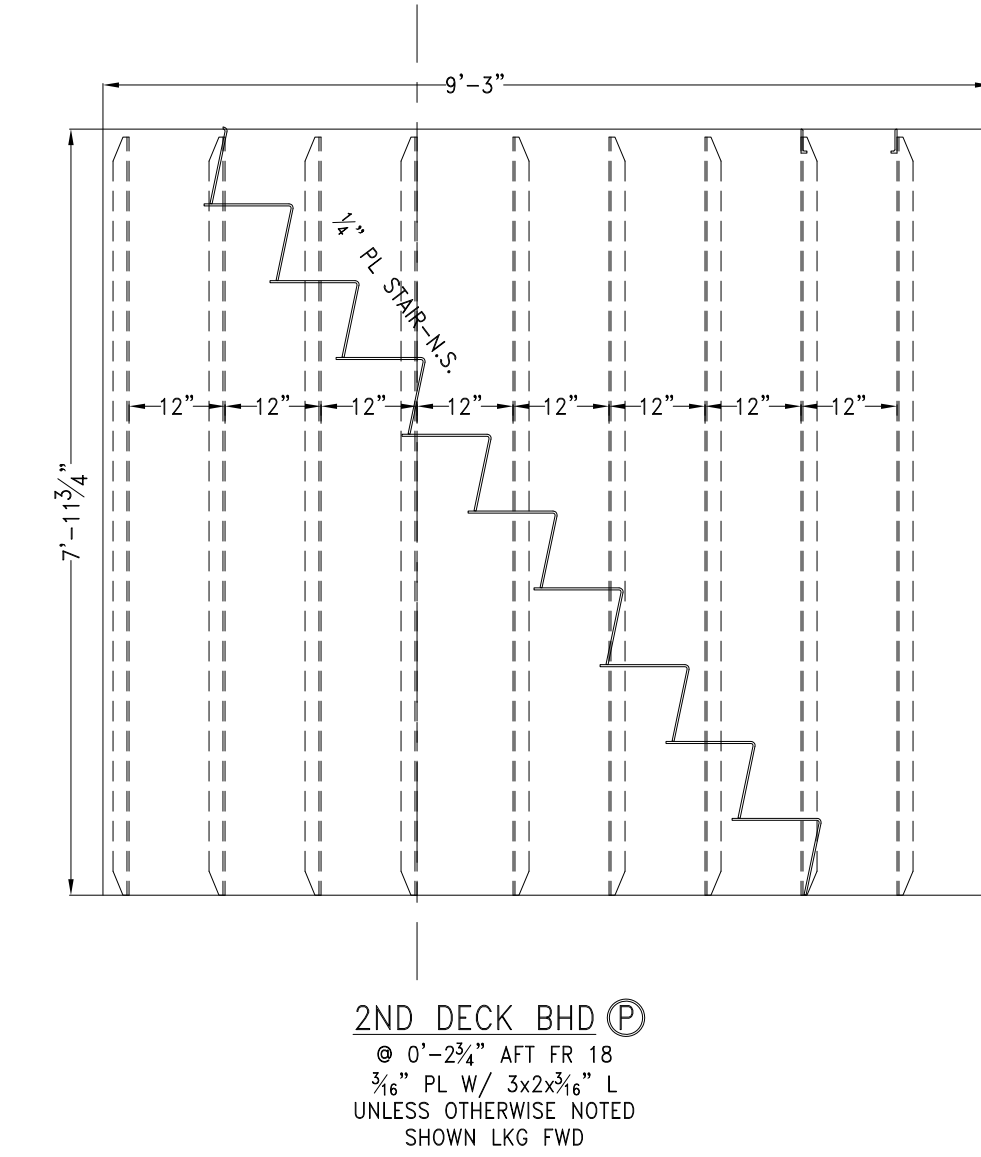
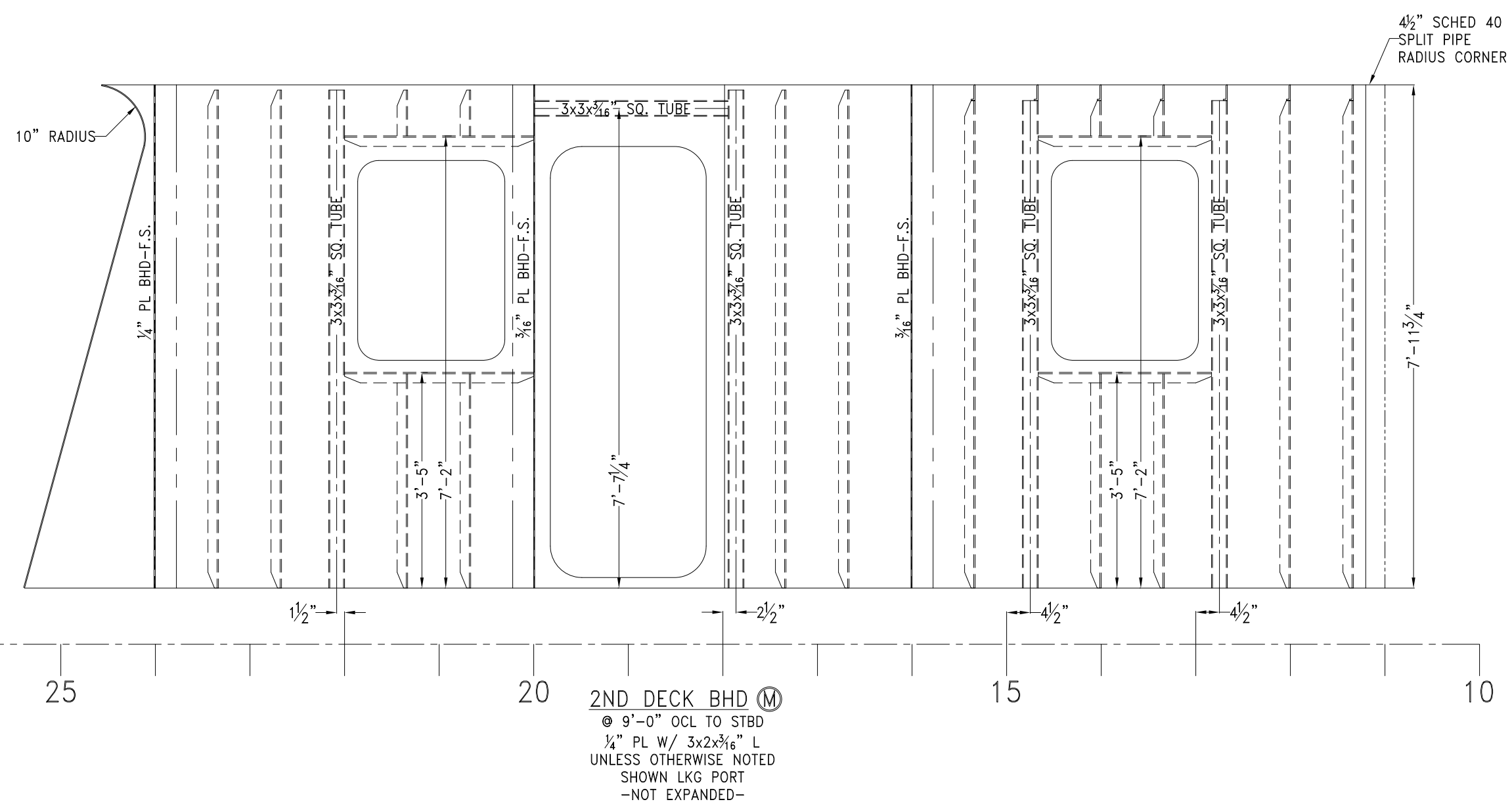
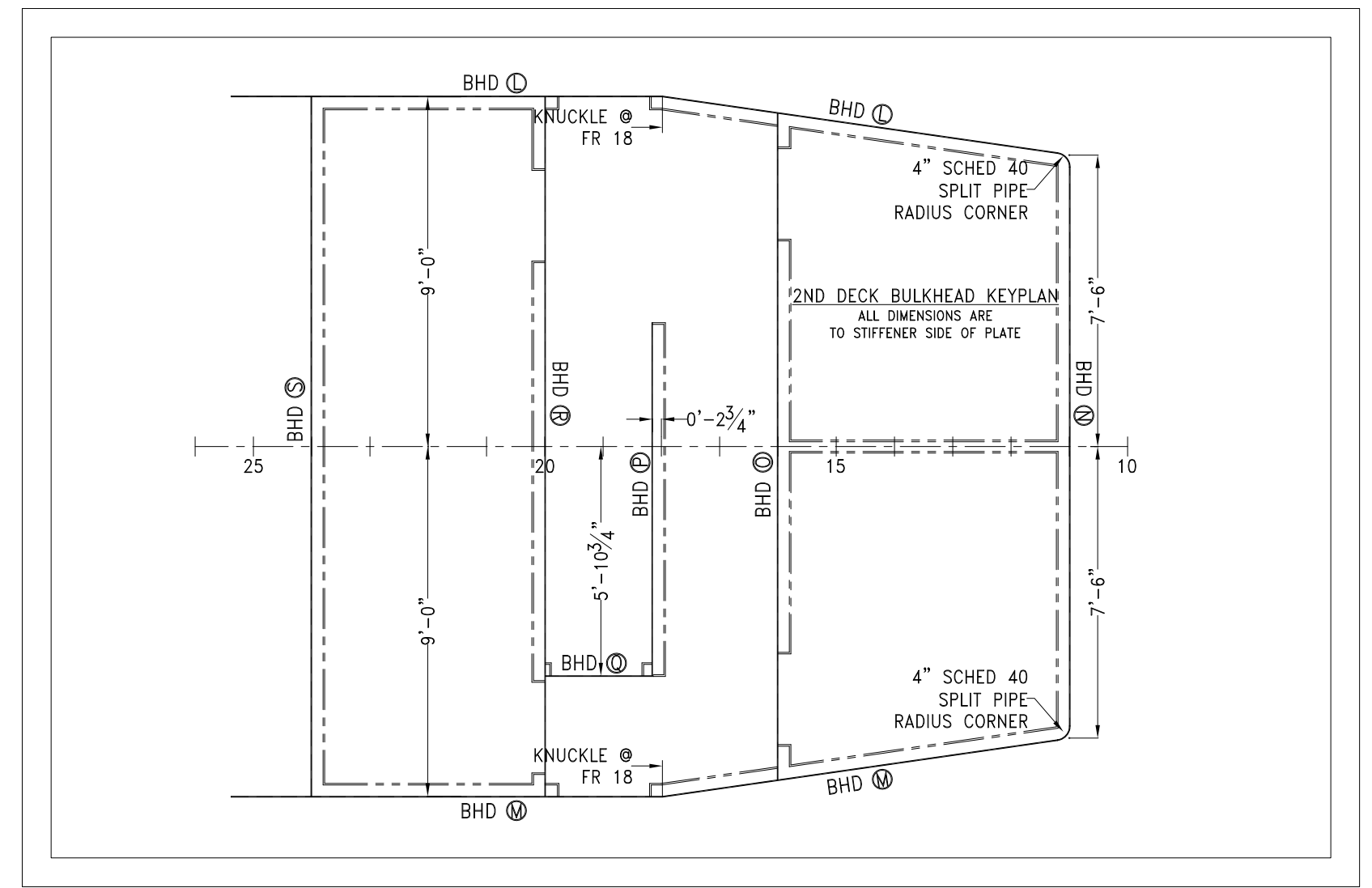
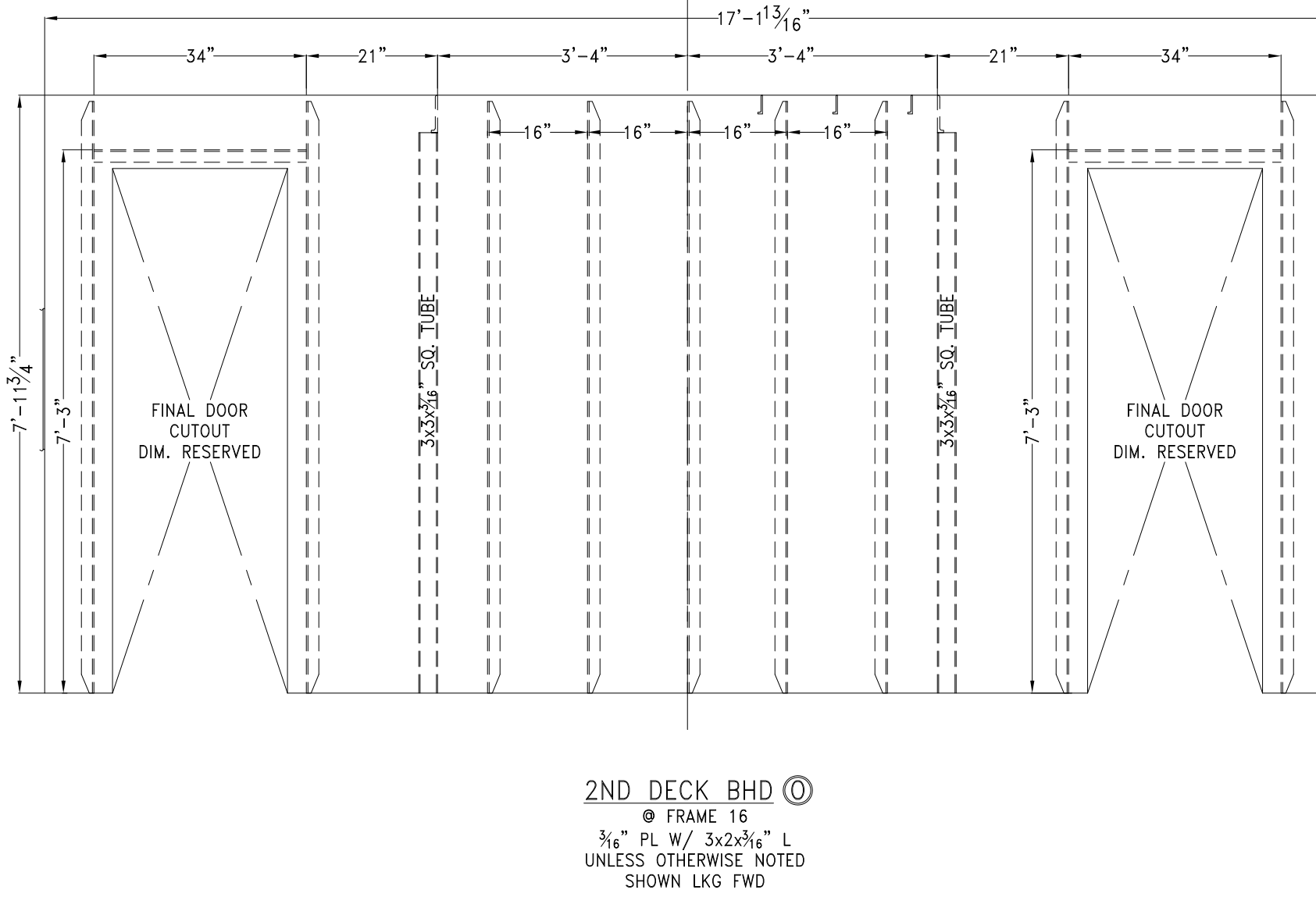
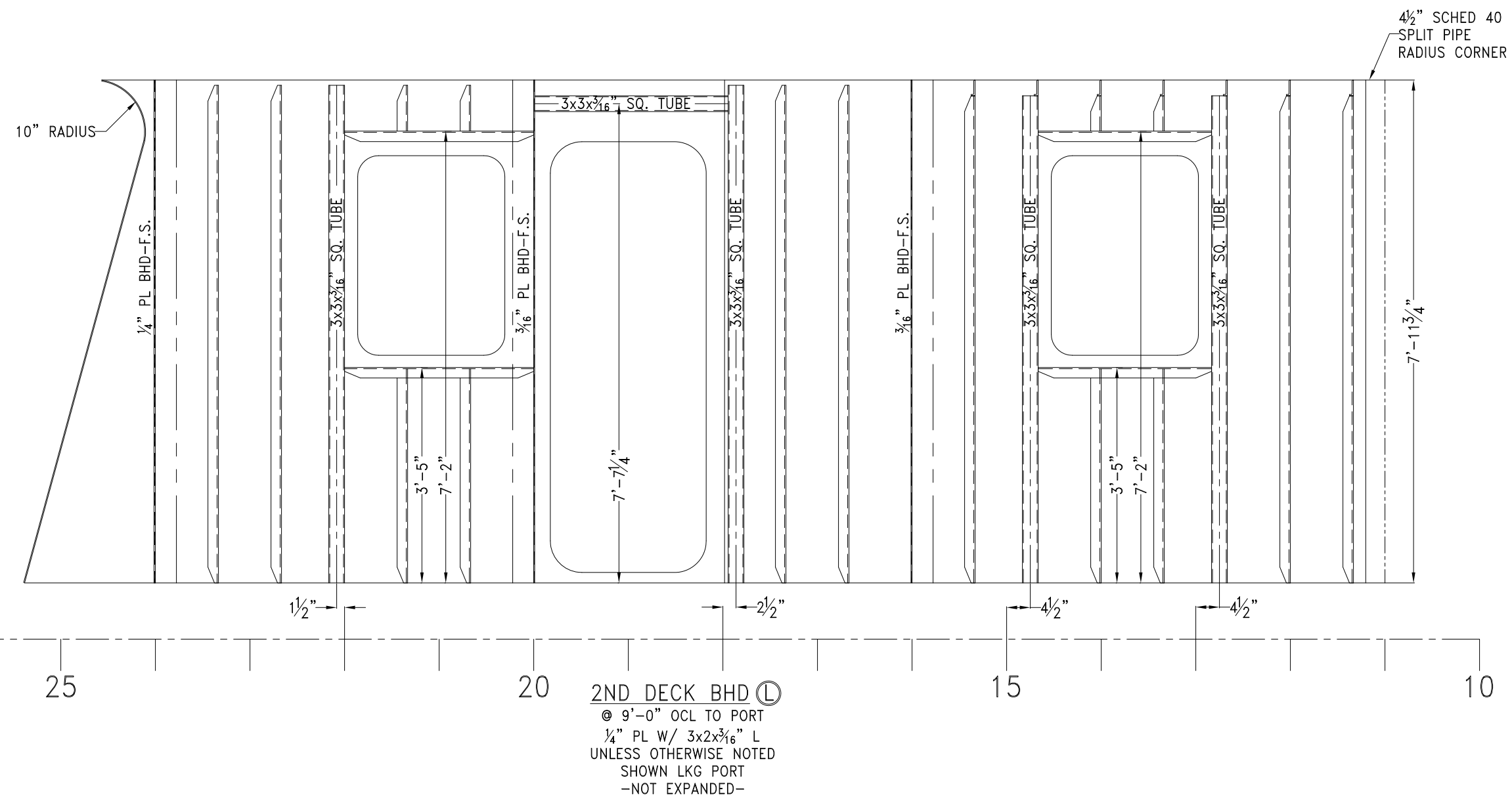
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**MAIN DECK DECKHOUSE  
 BHD DETAILS**

Dwg. No. 17-1372-152  
 Sht. 2 of 2

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: Date:  
 App'd By: Scale: 1/2" = 1'-0"  
 ABS App'l: USCG App'l:



**WELD SCHEDULE-TYPICAL**

- WELD DBL CONT. EACH END: 3/16 V2 1/2-10 GIRDERS TO DECK PLATE
- WELD DBL CONT. EACH END: 3/16 V2 1/2-12 1. STIFFENERS TO DECK PLATE, 2. STIFFENERS TO BHDS
- 3/16 V2 1/2-11 1. CORNER BRACKETING, 2. STIFFENER LAPS, 3. MULLIONS @ ENDS
- 3/16 V2 1/2-12 LOWER BULKHEAD EDGE TO DECKS
- 3/16 V2 1/2-12 UPPER BULKHEAD EDGE TO DECKS

ALL DECKHOUSE CONSTRUCTION  
 5086 H116 AL. PLATING  
 6061-T6 AL. EXTRUSIONS



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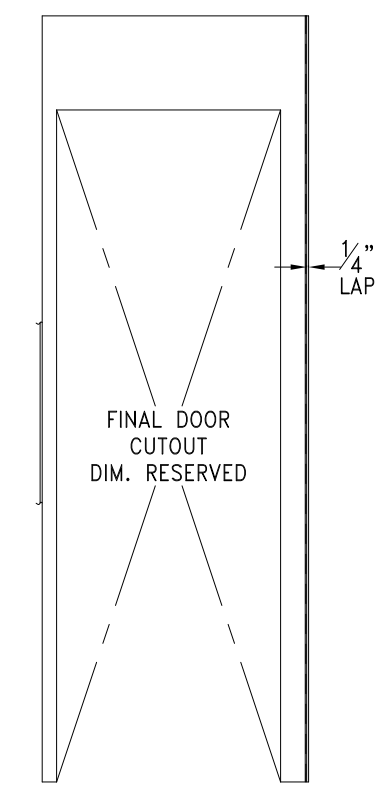
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 Fax: (904) 599-1522  
 info@dejongandlebet.com

Title: 70.5'x30'x11' NCD0T TOWBOAT

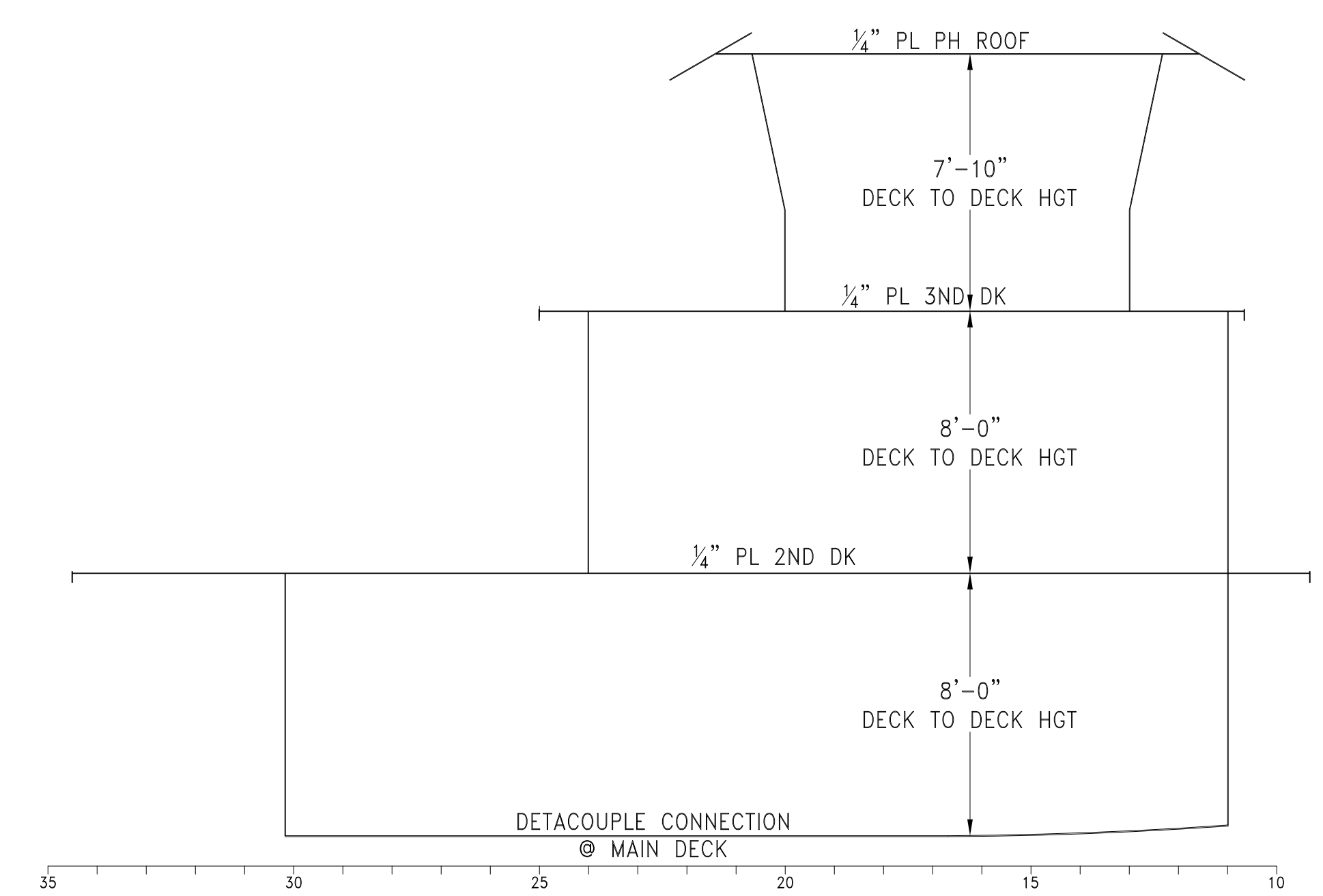
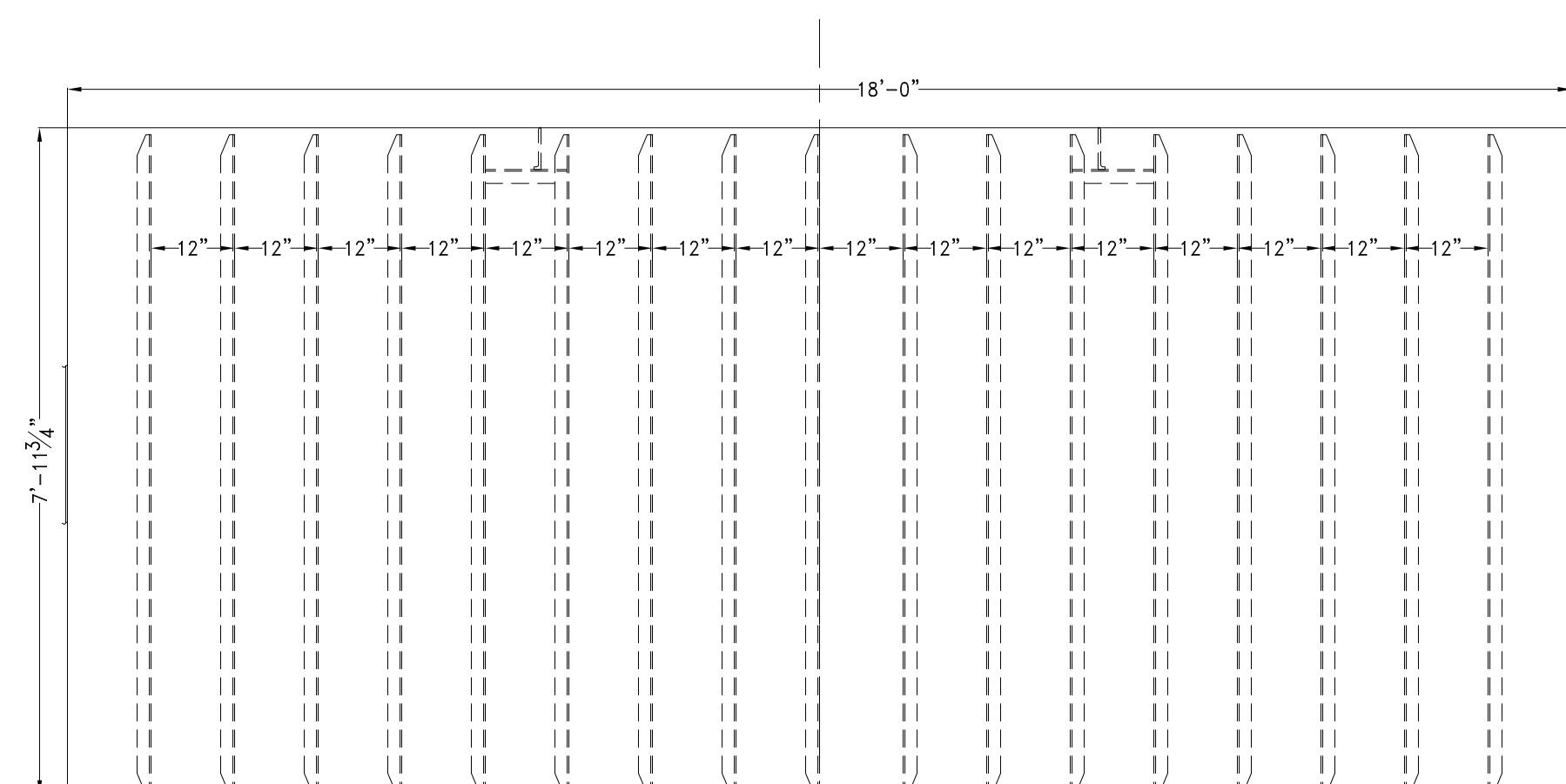
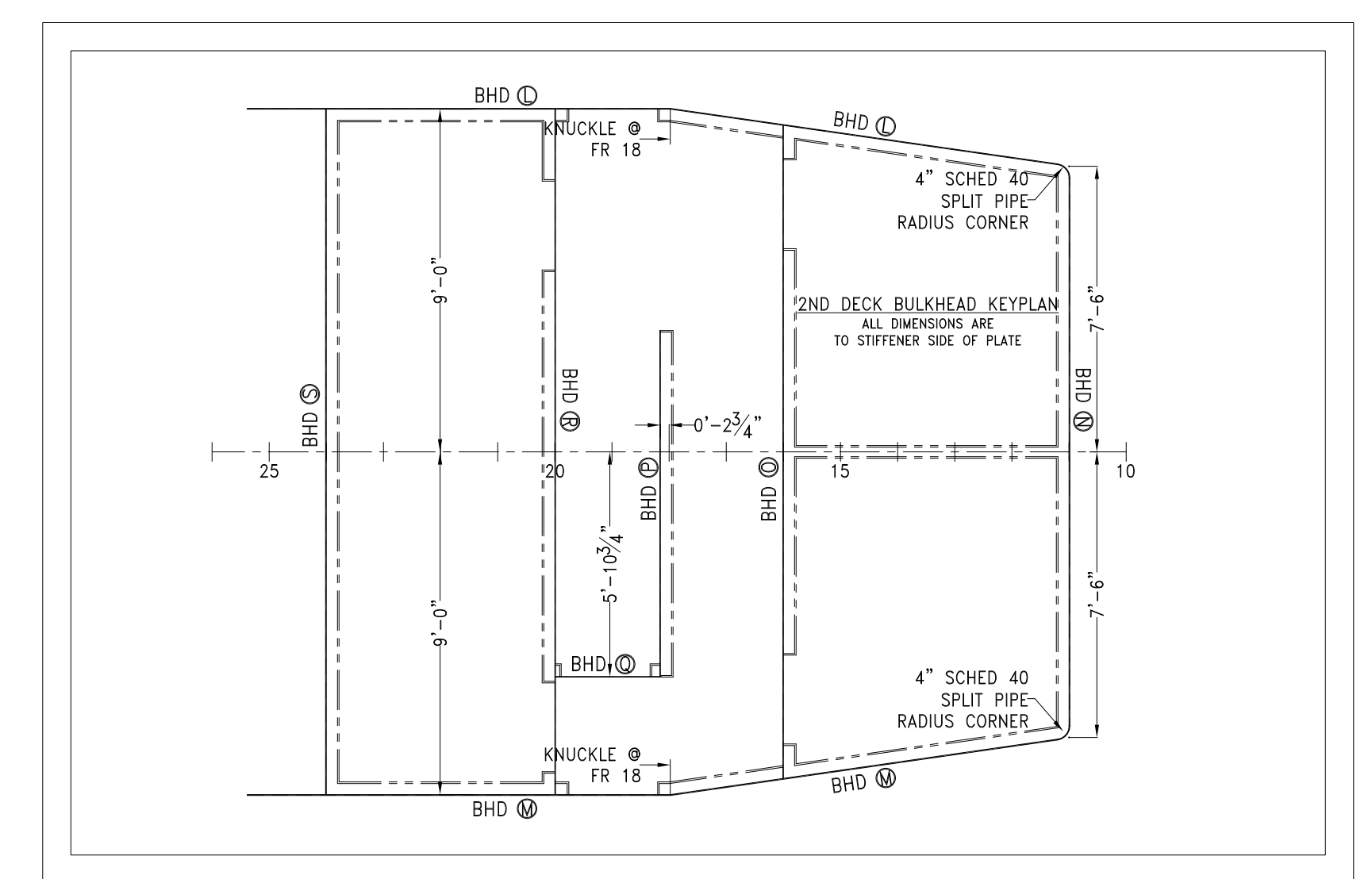
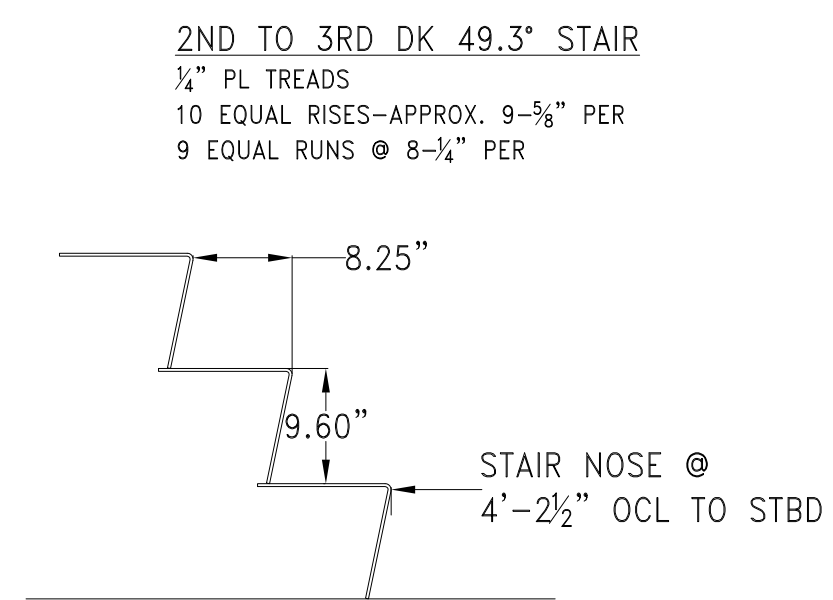
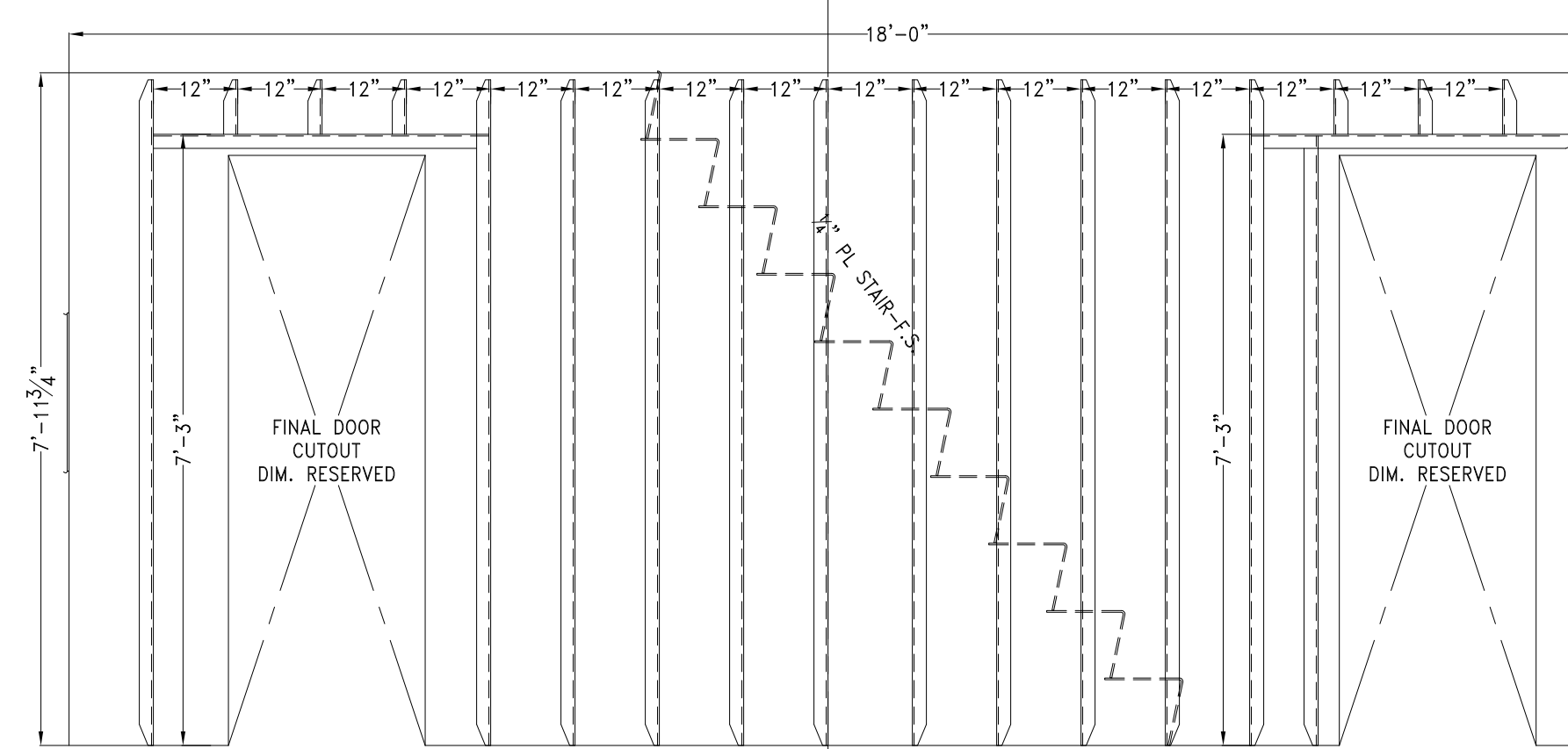
**2ND DECK DECKHOUSE  
 BHD STRUCTURAL DETAILS**

Dwg. No. 17-1372-153 Alt. No. 0  
 Sht. 1 of 2

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



20 MAIN DECK BHD Ⓞ  
 Ⓞ FRAME 20  
 Ⓞ 5'-10 1/2" OCL TO STBD  
 Ⓞ 1/2" PL W/ 3x2x3/8" L  
 UNLESS OTHERWISE NOTED  
 SHOWN LKG PORT



ALL DECKHOUSE CONSTRUCTION  
 5086 H116 AL. PLATING  
 6061-T6 AL. EXTRUSIONS

WELD SCHEDULE—TYPICAL

WELD DBL CONT. EACH END 3/16 V2 1/2-10 GIRDERS TO DECK PLATE

WELD DBL CONT. EACH END 3/16 V2 1/2-12 1. STIFFENERS TO DECK PLATE  
 2. STIFFENERS TO BHD

1. CORNER BRACKETING  
 2. STIFFENER LAPS  
 3. MULLIONS @ ENDS

3/16 V2 1/2-12 LOWER BULKHEAD EDGE TO DECK

3/16 V2 1/2-12 UPPER BULKHEAD EDGE TO DECK

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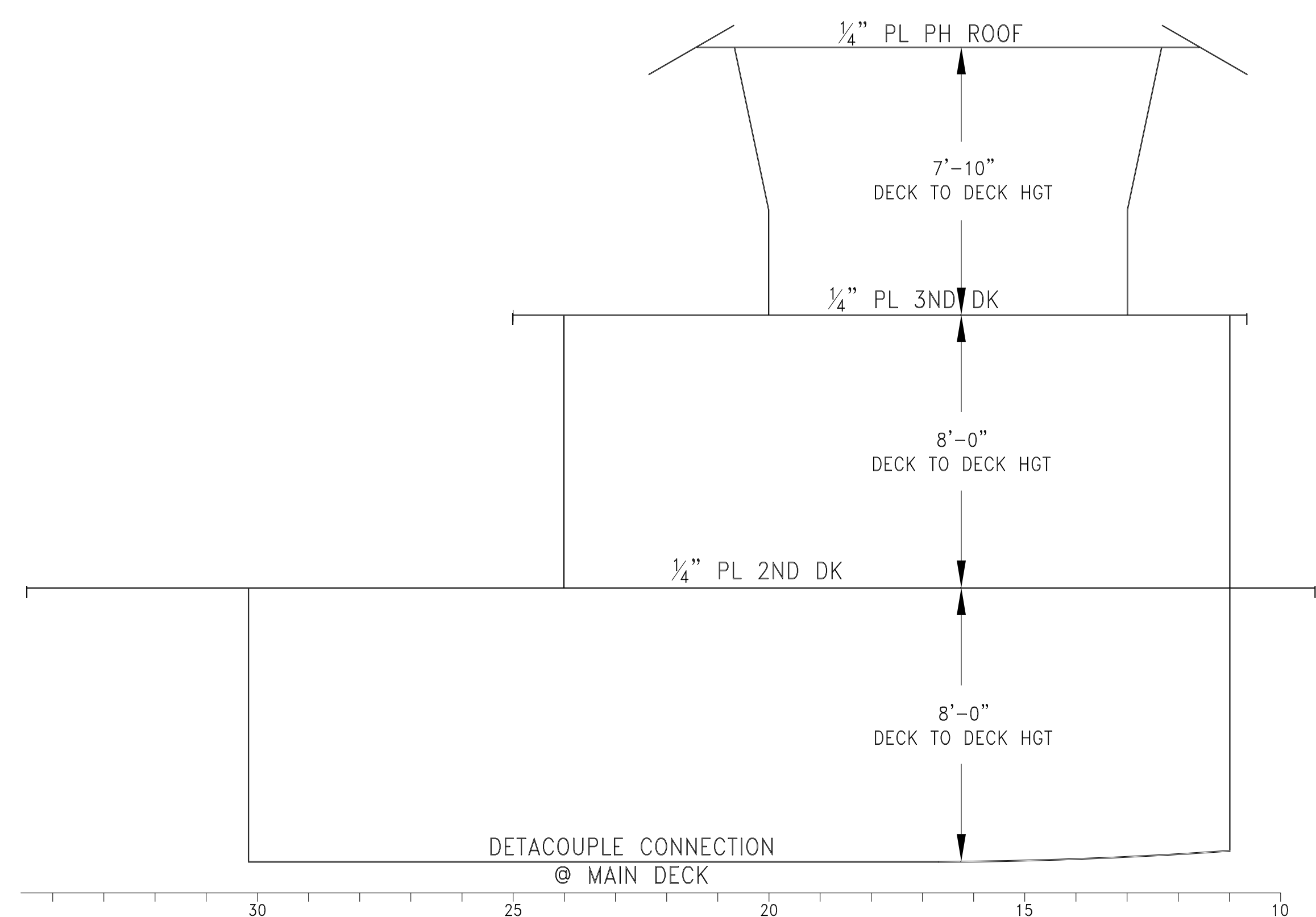
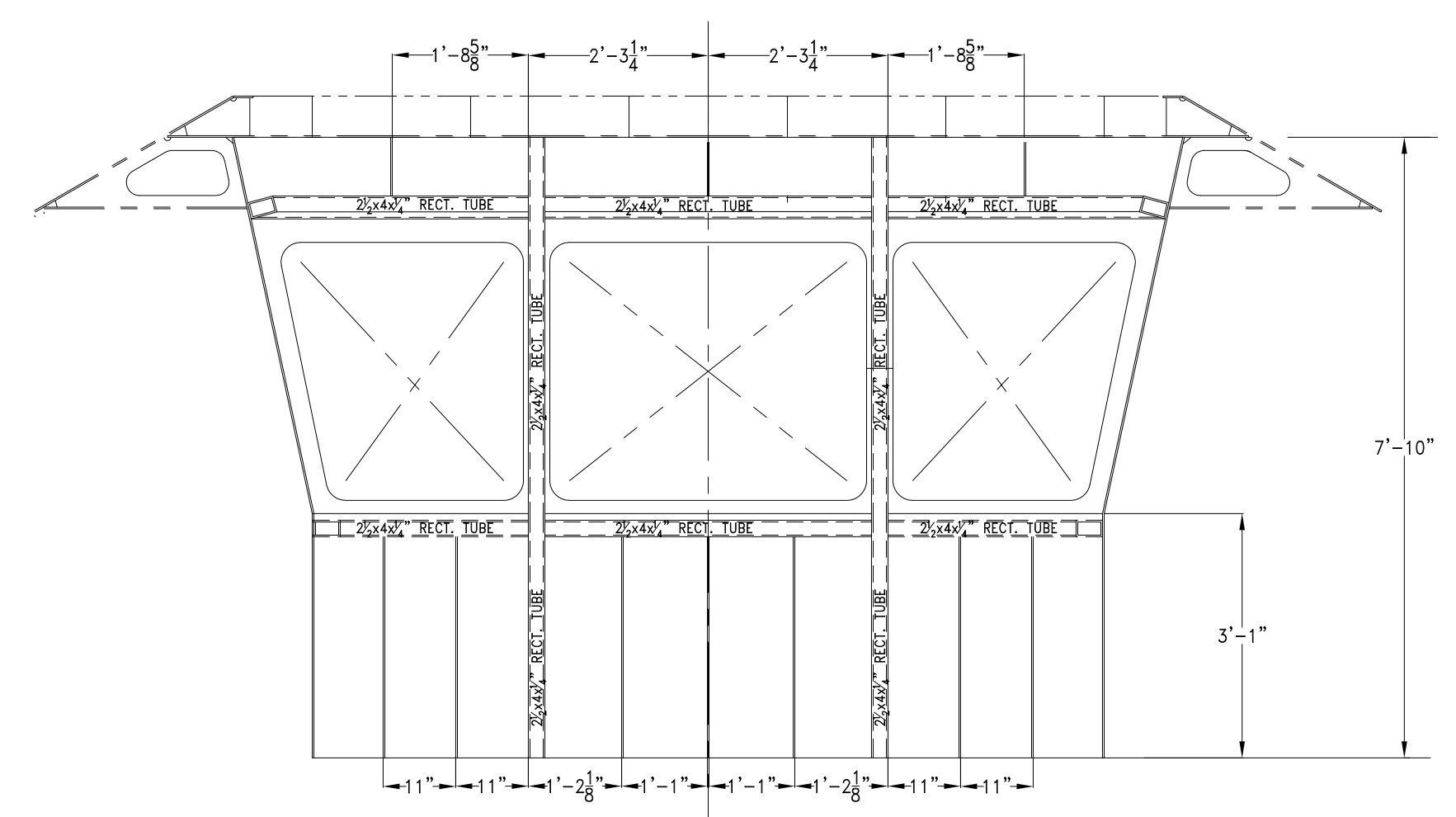
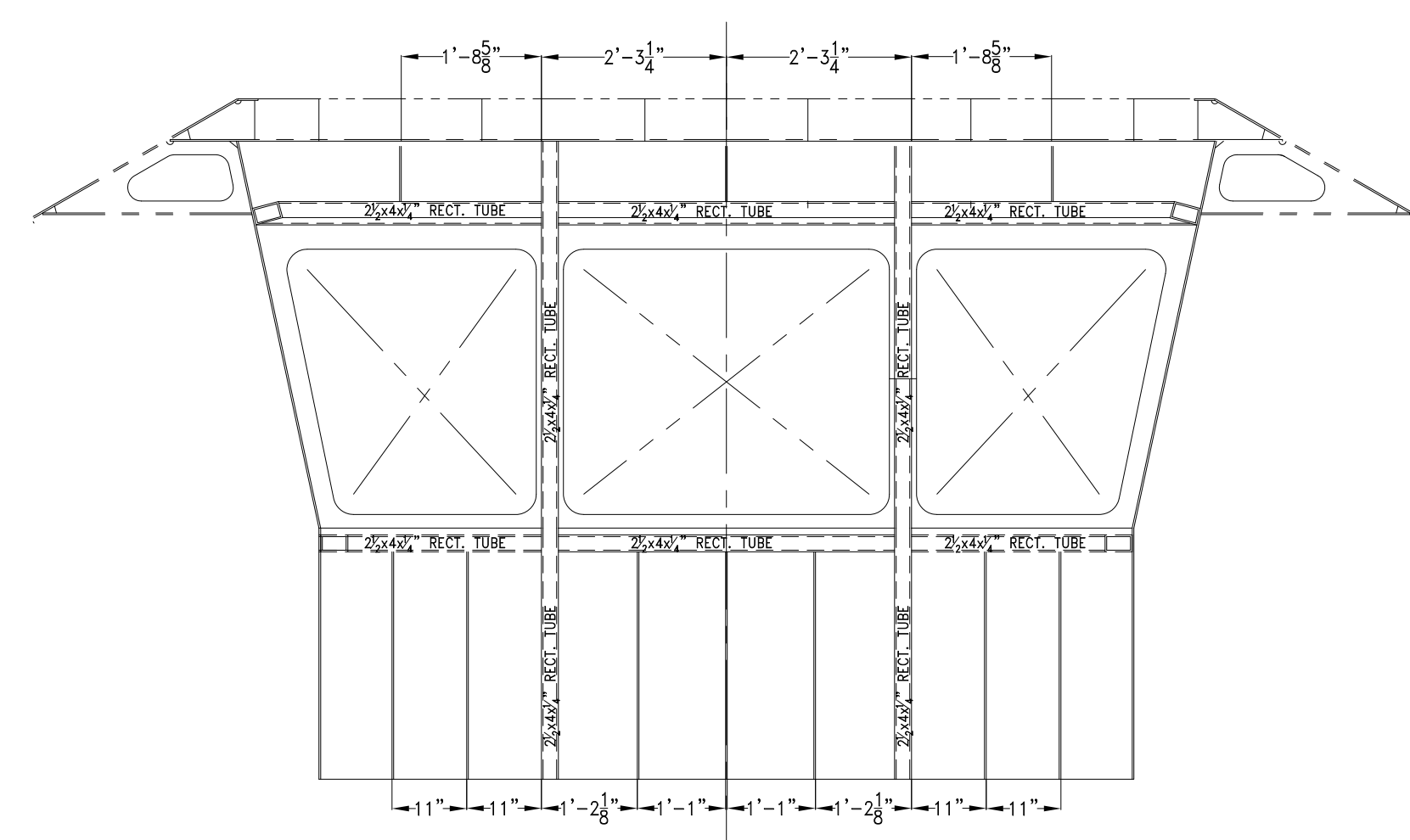
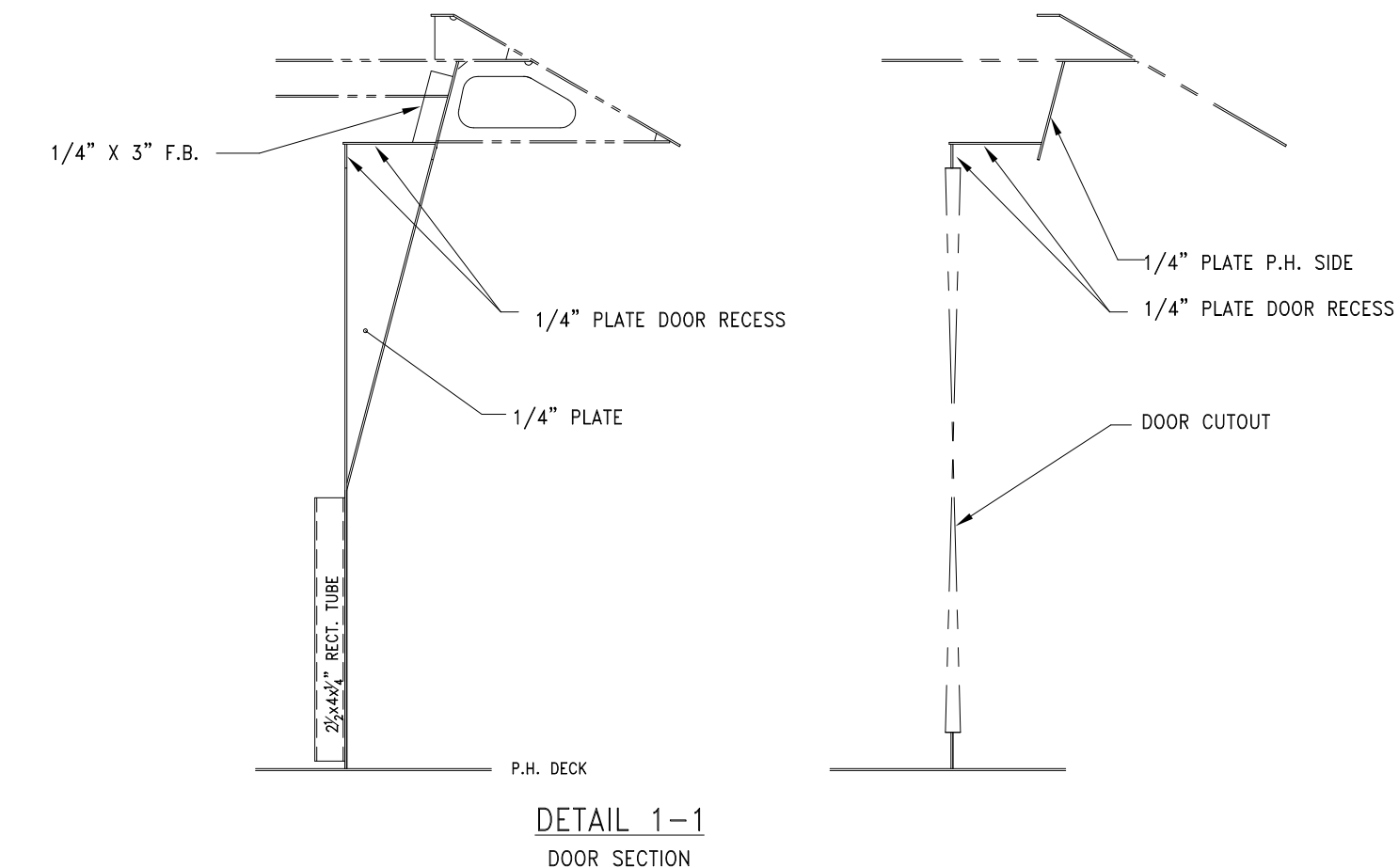
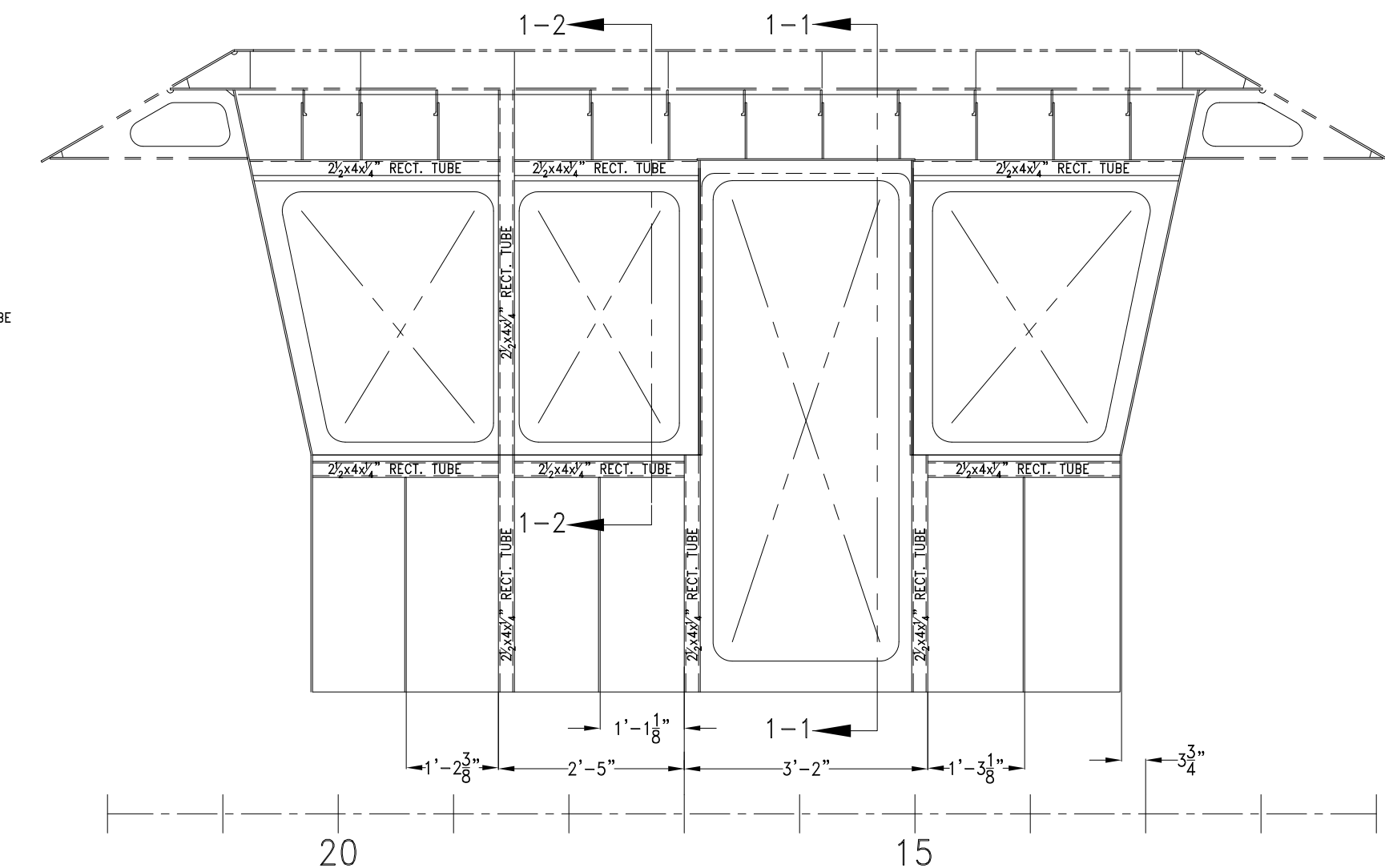
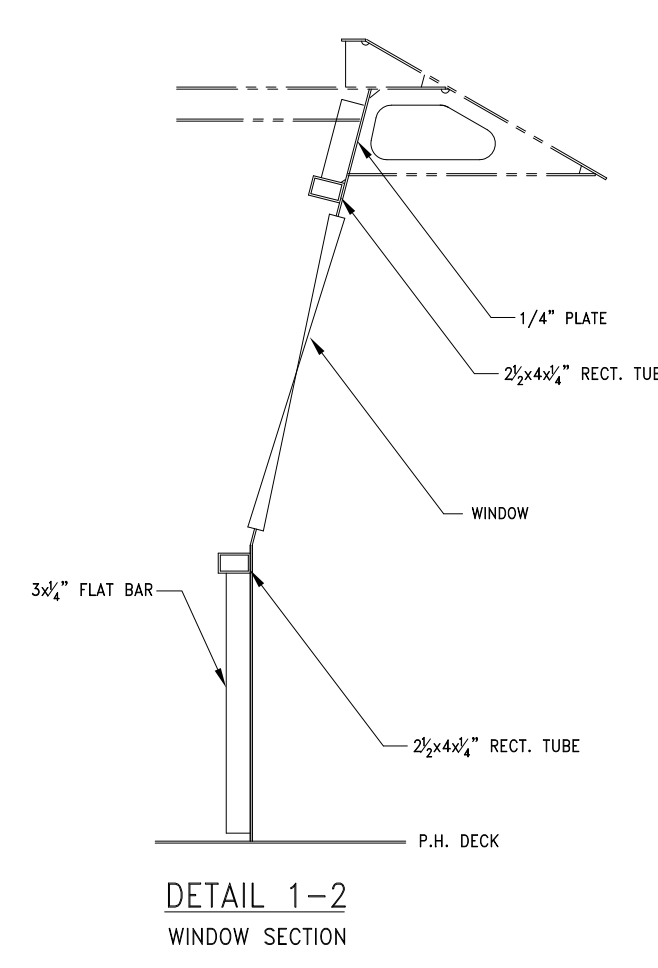
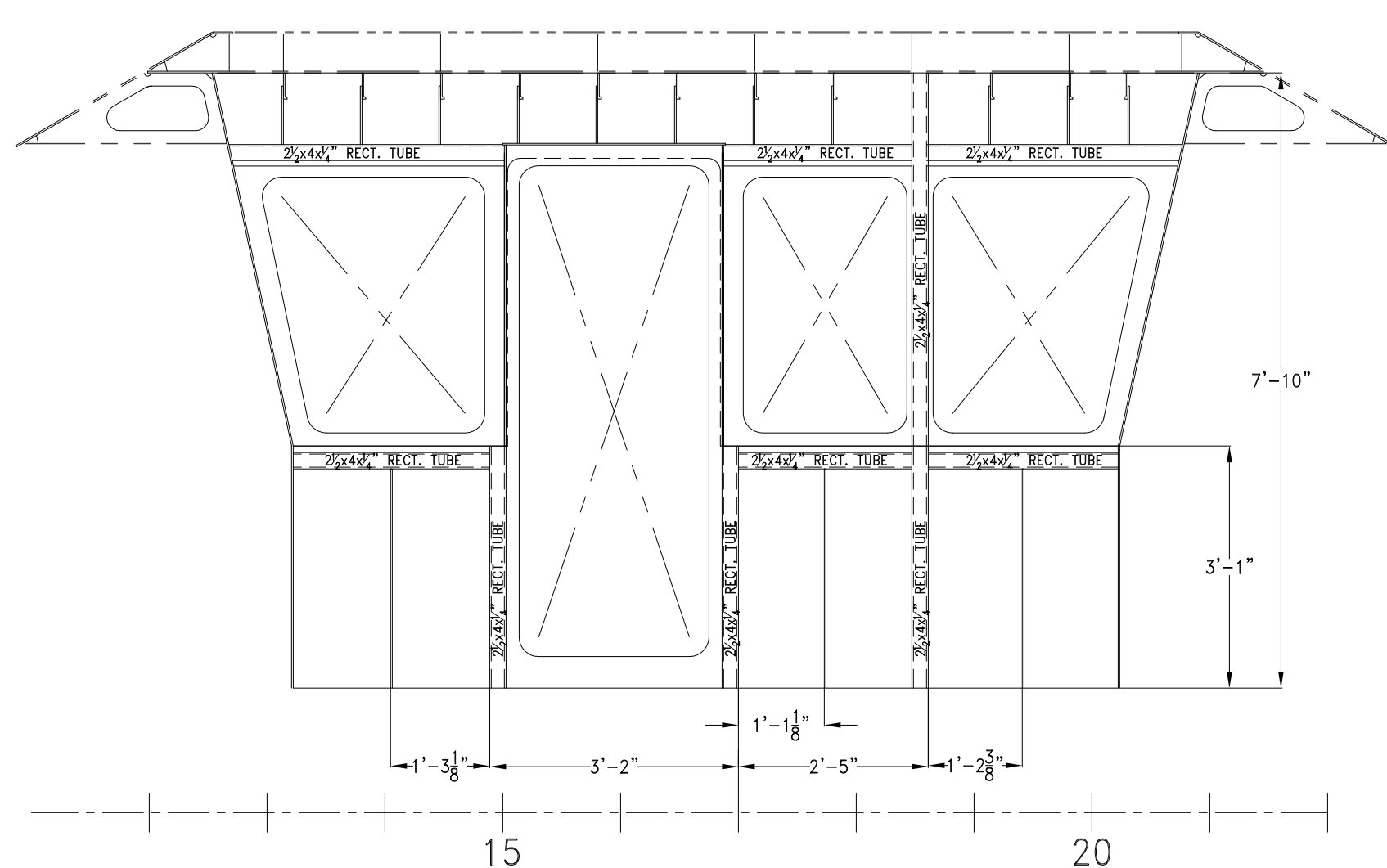
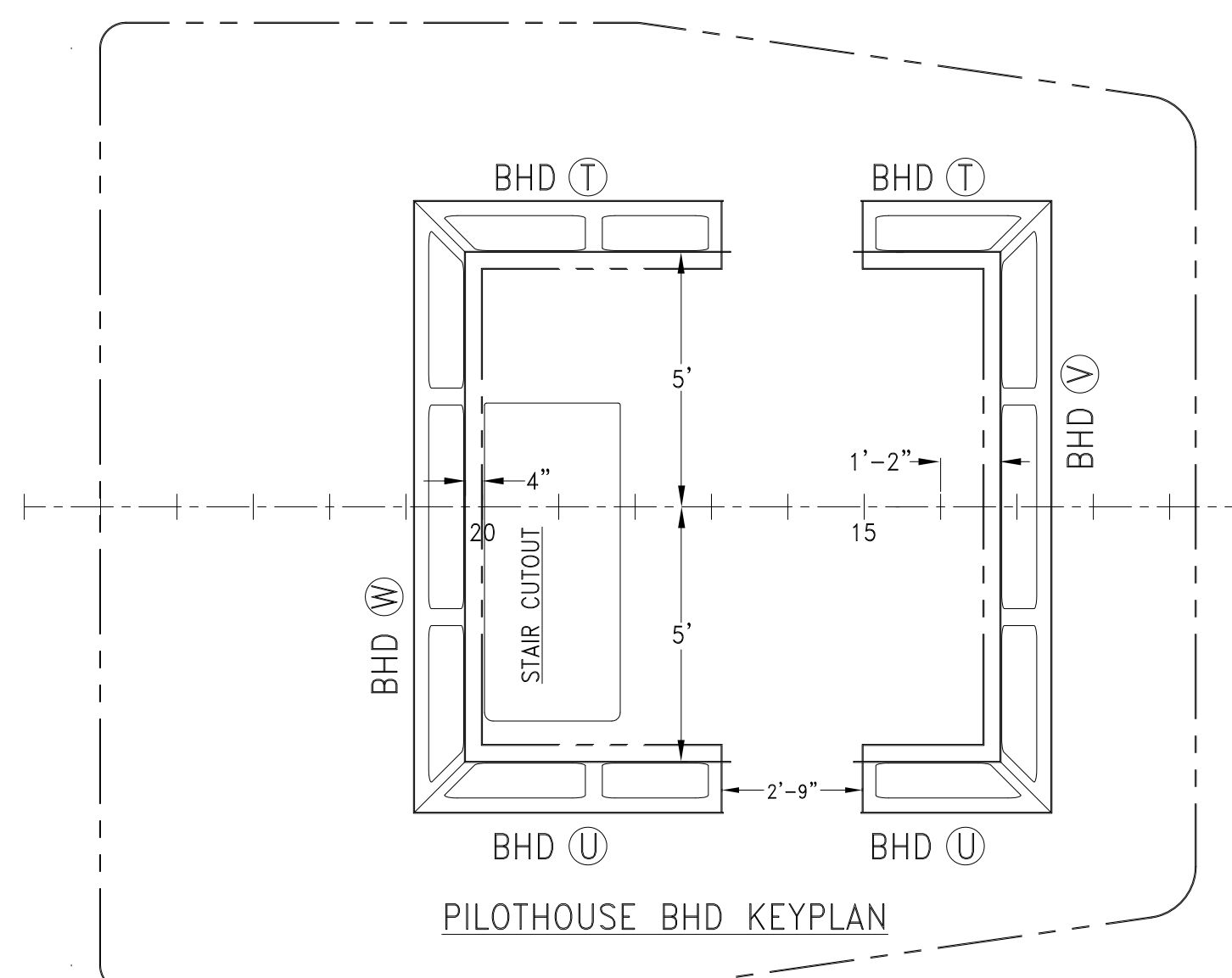
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Title: 70.5'x30'x11' NCD07 TOWBOAT

**2ND DECK DECKHOUSE  
 BHD STRUCTURAL DETAILS**

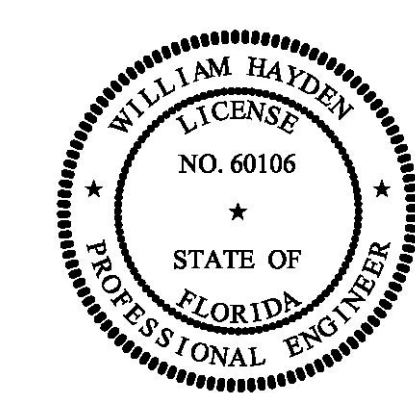
Dwg. No. 17-1372-153 Alt. No. 0  
 Sht. 2 of 2

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: Date: \_\_\_\_\_  
 App'd By: Scale: 1/2" = 1'-0"  
 ABS App'l: USCG App'l: \_\_\_\_\_



**WELD SCHEDULE-TYPICAL**

WELD DBL CONT. FOR EACH END	3/16 1/2 1/2-10	GIRDERS TO DECK PLATE
WELD DBL CONT. FOR EACH END	3/16 1/2 1/2-12	1. STIFFENERS TO DECK PLATE 2. STIFFENERS TO BHD'S
	3/16	1. CORNER BRACKETING 2. STIFFENER LAPS
	3/16 1/2 1/2-12	2. MULLIONS @ ENDS
	3/16 1/2 1/2-12	LOWER BULKHEAD EDGE TO DECKS
	3/16 1/2 1/2-12	UPPER BULKHEAD EDGE TO DECKS



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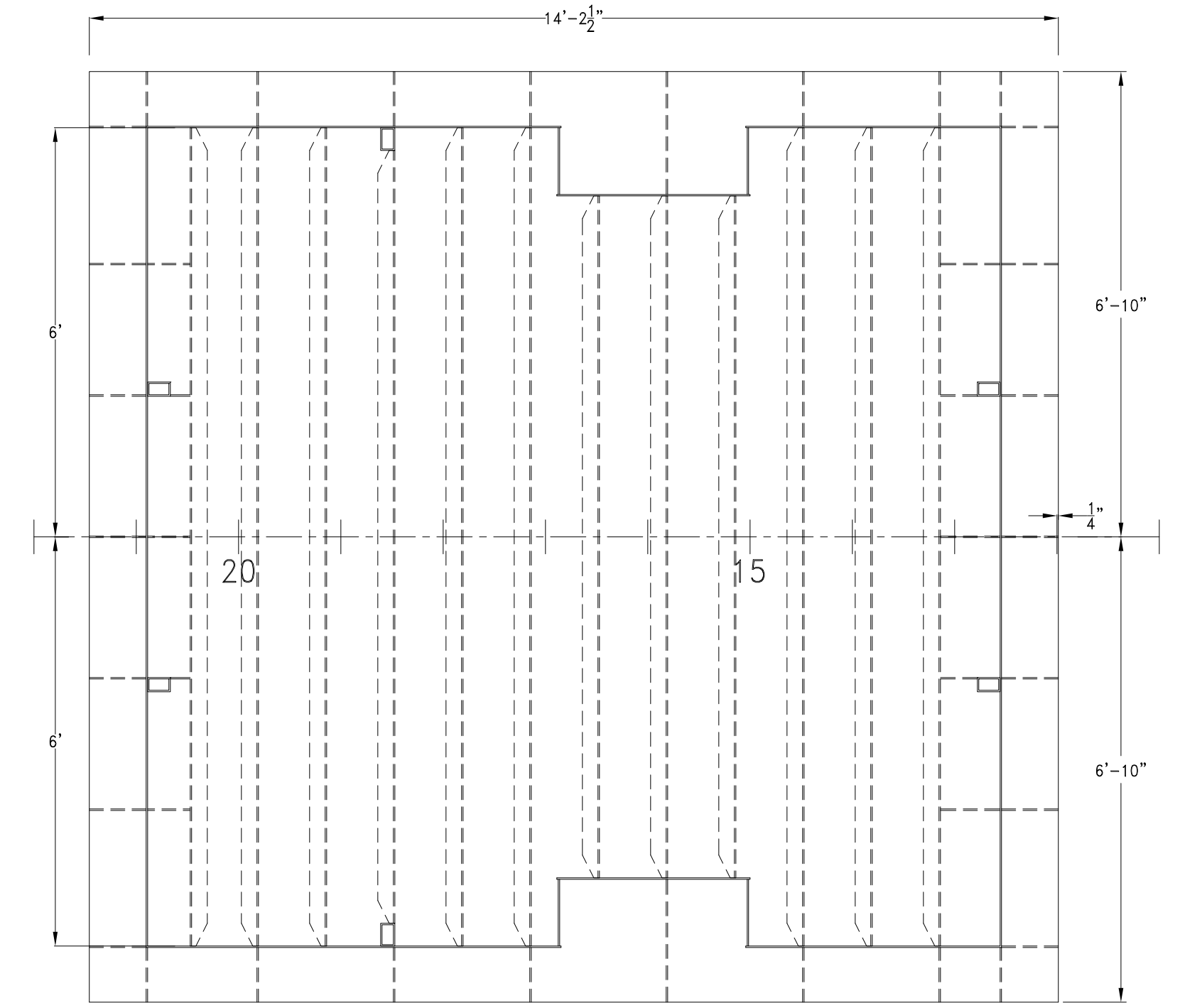
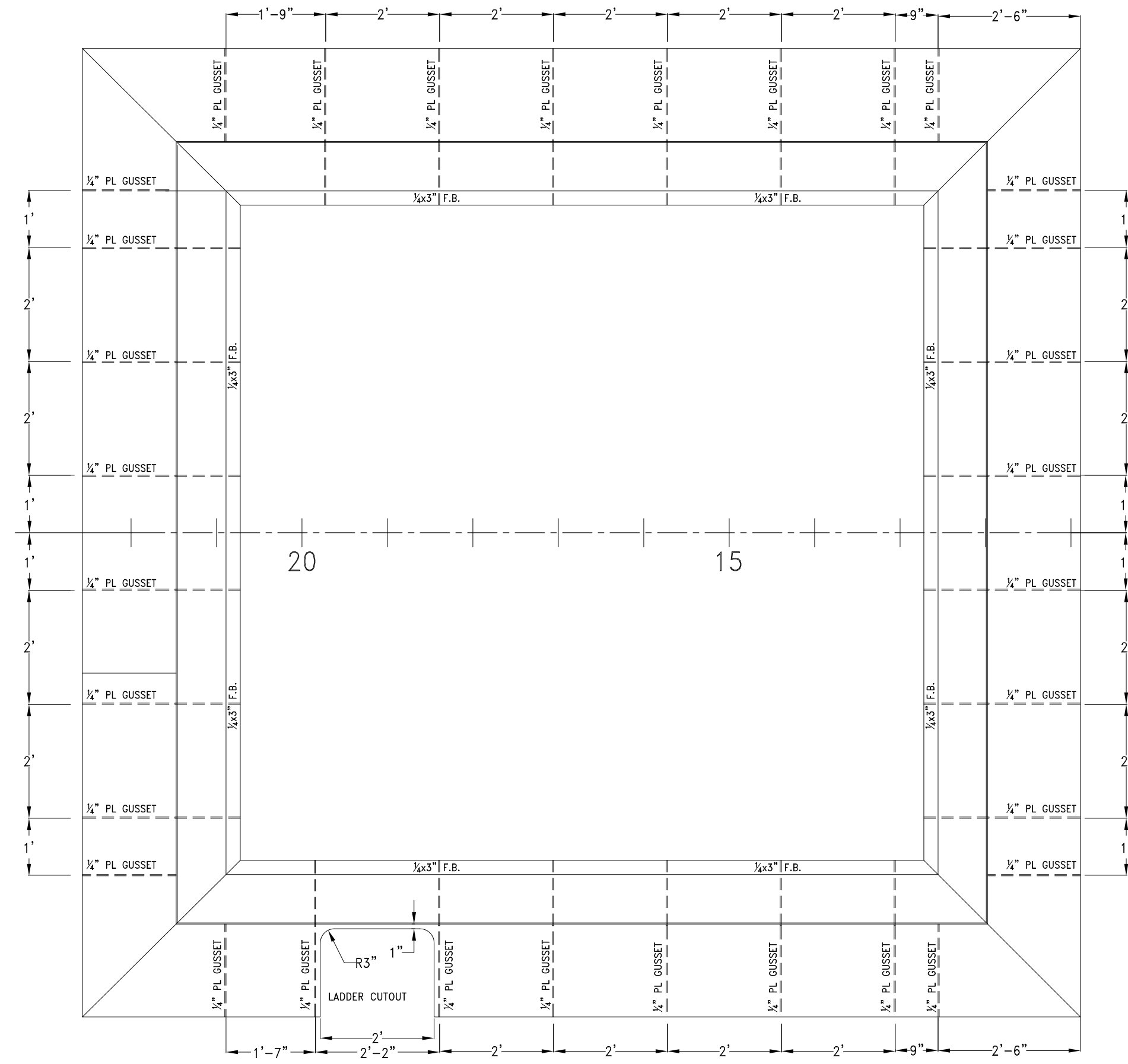
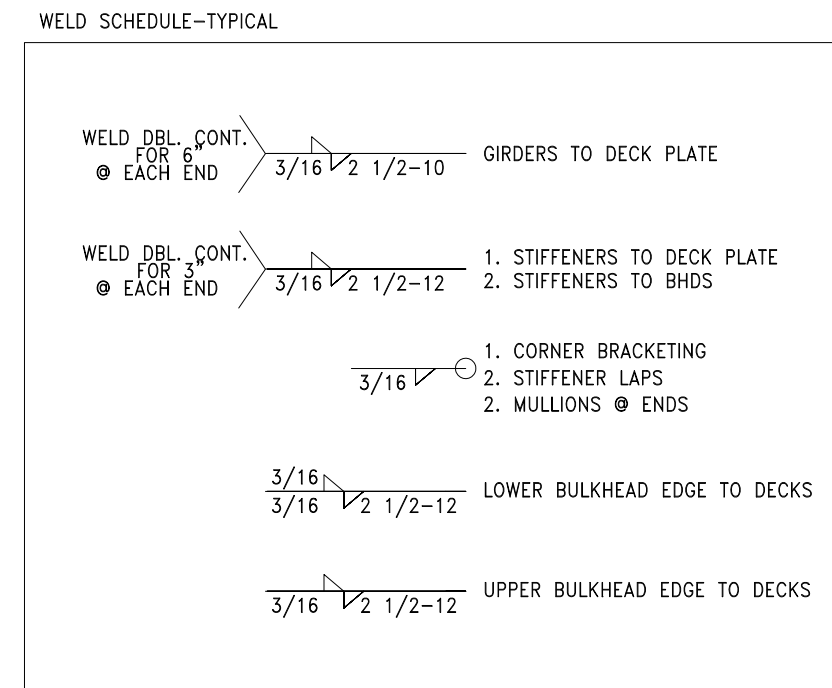
Title: 70.5'x30'x11' NCDOT TOWBOAT

**PILOTHOUSE STRUCTURAL DETAILS**

Dwg. No. 17-1372-154 Alt. No. 0 Sht. 1 of 2

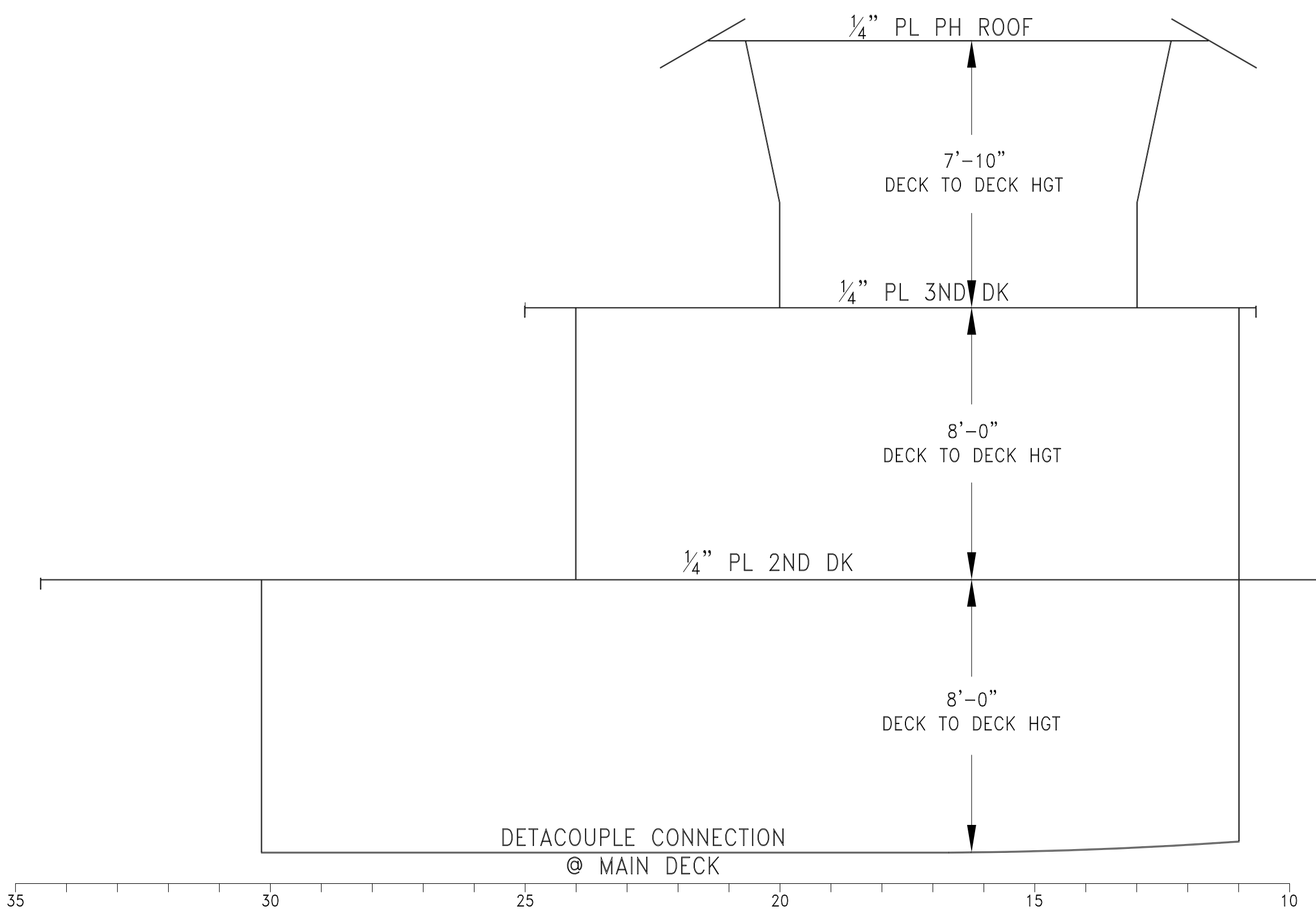
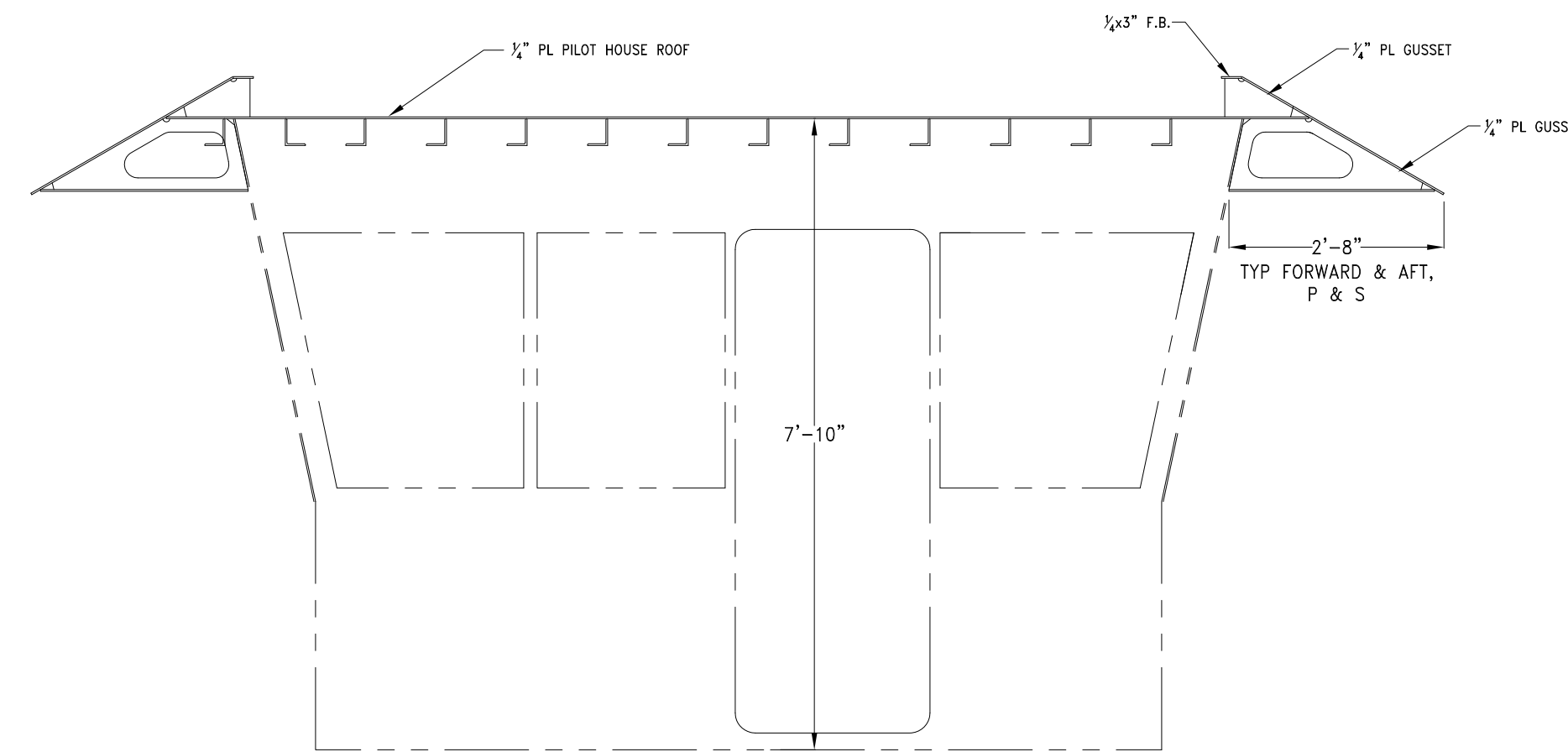
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App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

- GENERAL NOTES -	
NO.	DESCRIPTION
1.	STRUCTURAL STEEL TO MEET ABS GRADE A STANDARDS
2.	UNBRACKETED STIFFENERS OF SHELL, WATERTIGHT AND OILTIGHT BHDS AND HOUSE FRONTS ARE TO HAVE DOUBLE CONT. WELDS FOR 1/10 OF THEIR LENGTH AT EACH END.
3.	UNBRACKETED STIFFENERS OF MONTIGHT STRUCTURAL BHDS, DECKHOUSE SIDES AND AFTER ENDS ARE TO HAVE A PAIR OF MATCHING INTERMITTENT WELDS AT EACH END.
4.	THE WELDING OF LONGITUDINALS MAY BE AS REQ. UNDER FRAMES OR DECK'S ABOVE, IN ADDITION, THEY ARE TO HAVE DOUBLE CONTINUOUS WELDS AT THE END AND IN WAY OF TRANSVERSES EQUAL IN LENGTH TO THE DEPTH OF THE LONGITUDINAL. FOR DECK LONGITUDINALS ONLY A MATCHED PAIR OF WELDS IS REQ. AT THE TRANSVERSES. FOR SLAB LONGITUDINALS THE ATTACHMENT IS TO BE MADE DOUBLE CONTINUOUS
5.	FILLET WELDS OF A SIZE $w$ WHICH IS 0.3 TIMES THE THICKNESS OF THE THINNER PLATE BUT NEED NOT BE GREATER THAN 5/16 IN.
6.	SHIPYARD TO PROVIDE RATHOLES, SNIPES & CUTOUTS TO ALLOW FOR ADEQUATE DRAINAGE TO THE BILGE AT CENTERLINE.



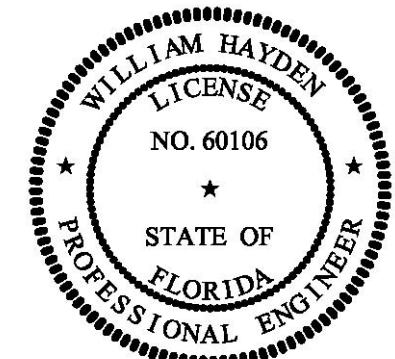
**PILOTHOUSE ROOF STRUCTURAL DETAILS**  
 $\frac{1}{4}$ " PL W/ 4x3x $\frac{1}{2}$ " L ON 12" CNTRS  
 UNLESS OTHERWISE NOTED

**PILOTHOUSE ROOF COAMING STRUCTURAL DETAILS**  
 $\frac{1}{4}$ " PL STIFFENED AS SHOWN



35 30 25 20 15 10

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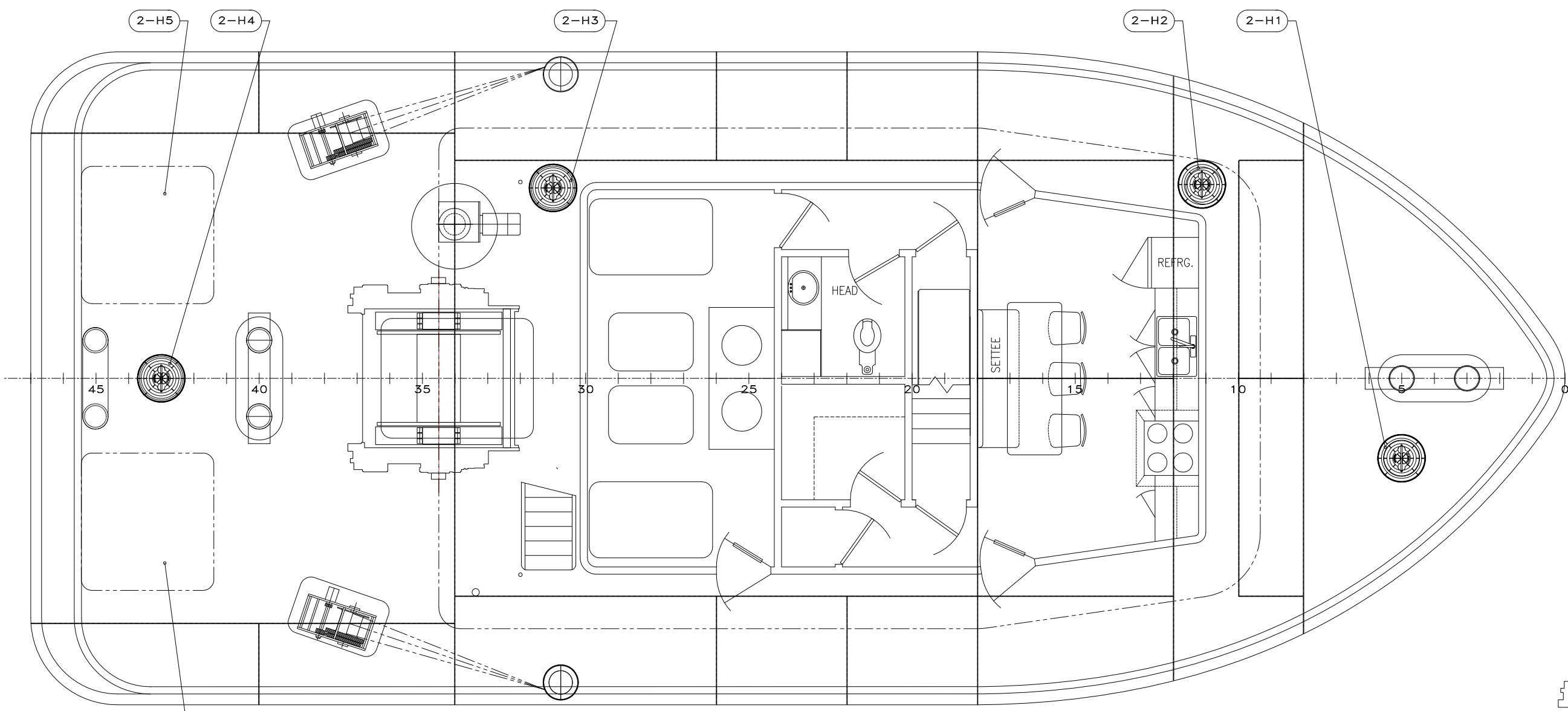
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Title: 70.5'x30'x11' NCD0T TOWBOAT

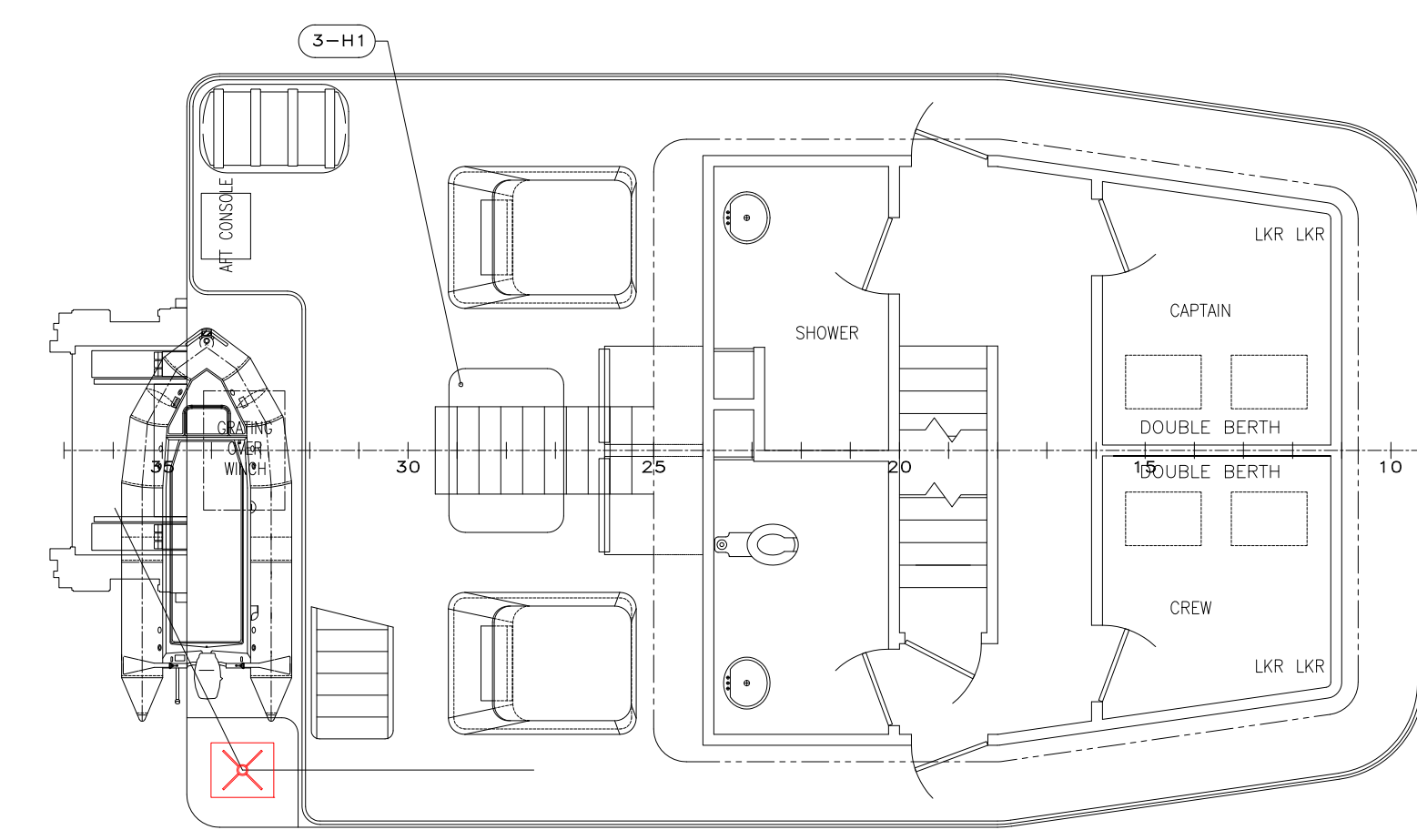
**PILOTHOUSE STRUCTURAL DETAILS**

Dwg. No. 17-1372-154 Alt. No. 0 Sht. 2 of 2  
 Date: JUNE 05, 2018  
 Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

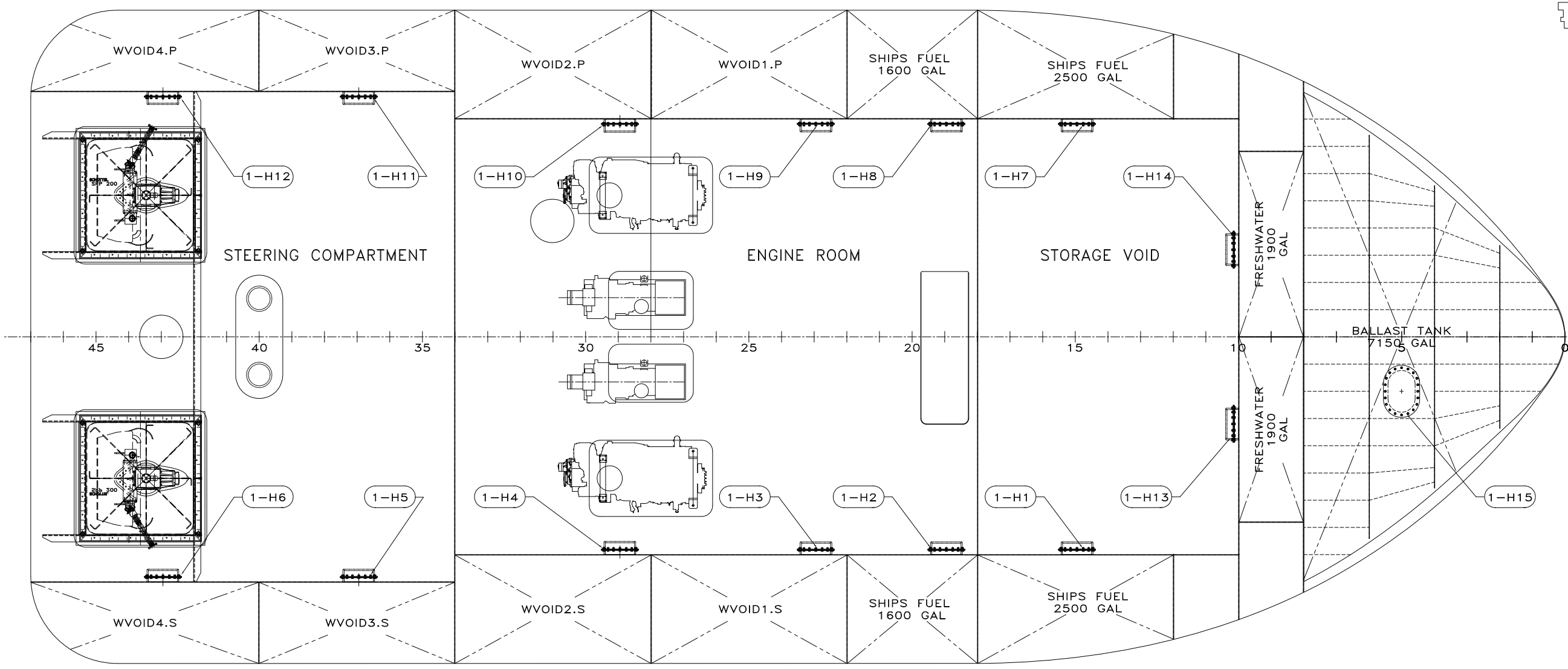




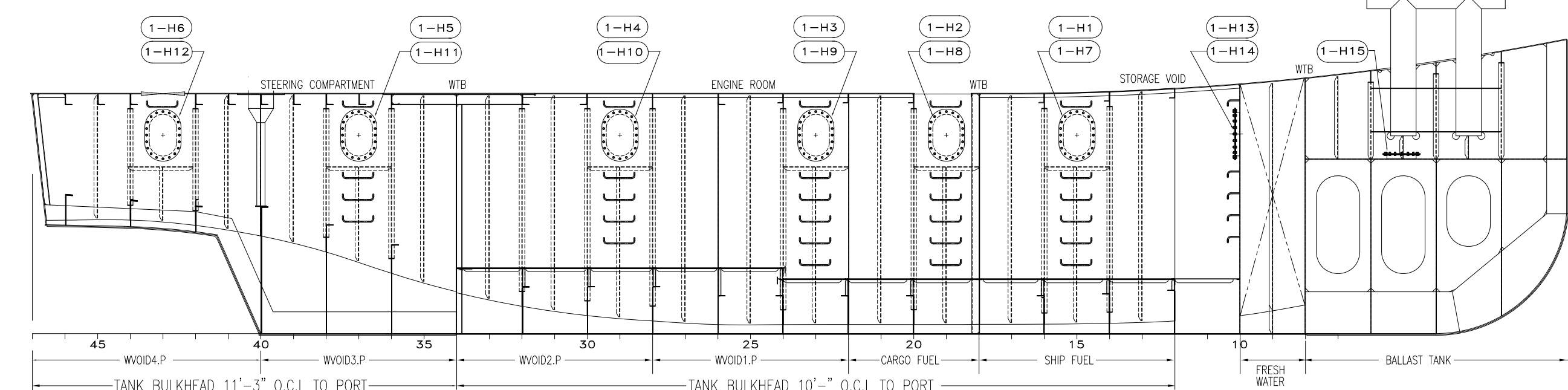
PLAN MAIN DECK



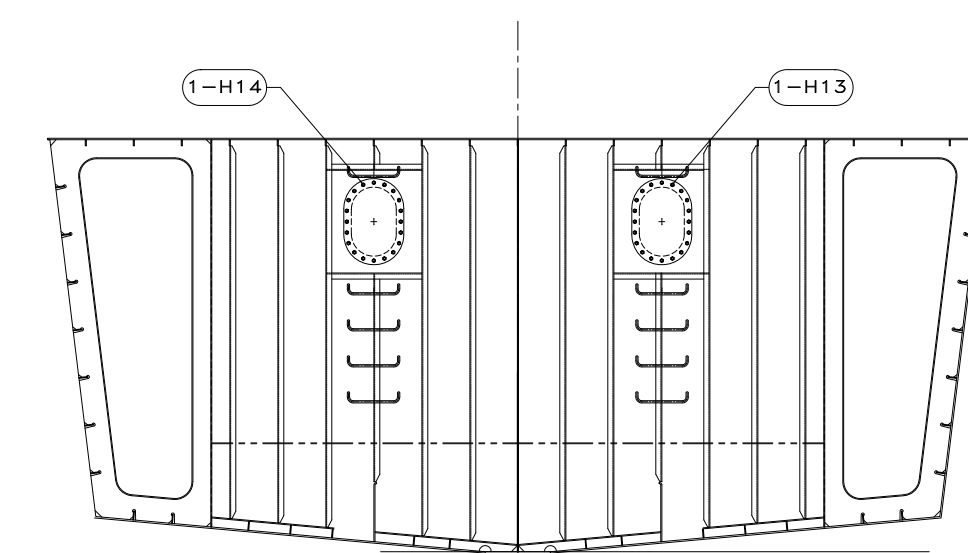
PLAN 2ND DECK



PLAN VIEW HOLD



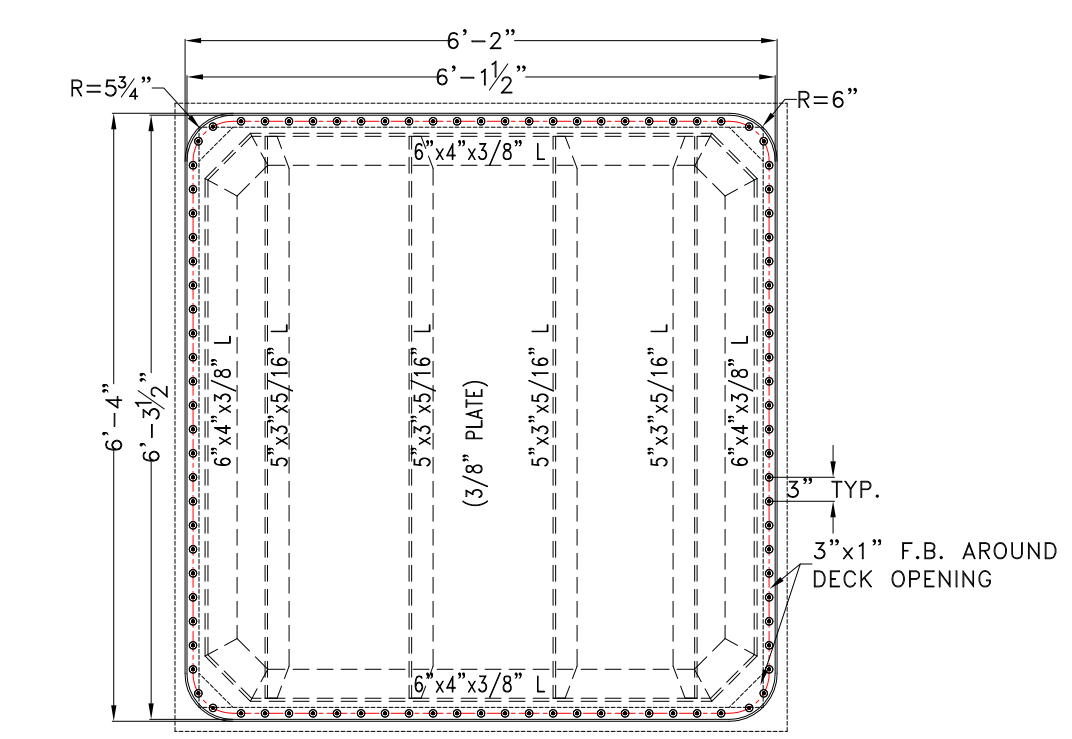
PROFILE VIEW HOLD  
PORT SIDE SHOWN, STBD SIDE MIRROR IMAGE



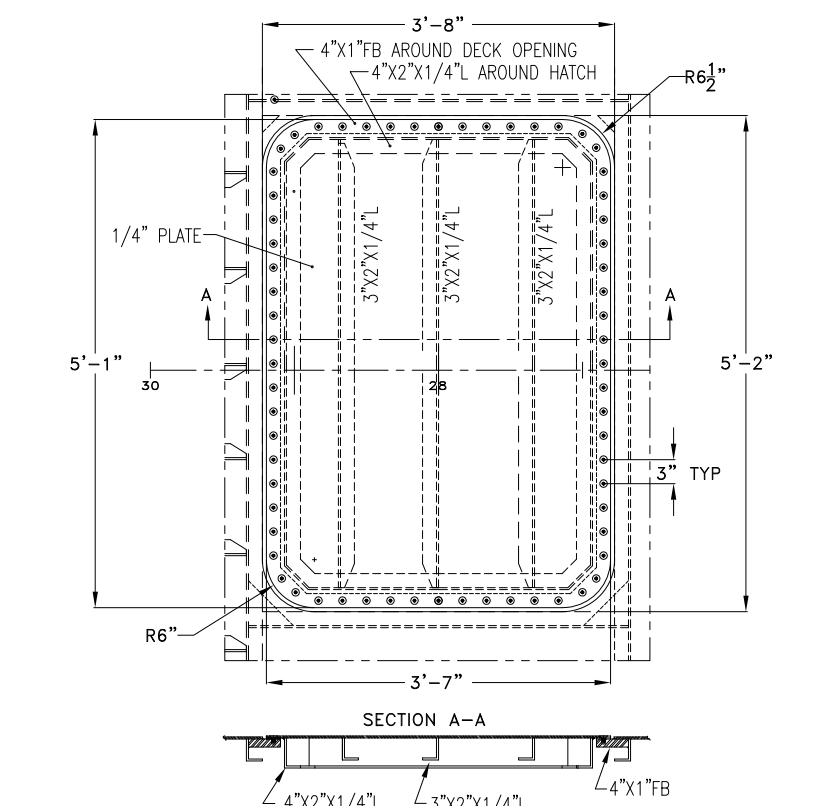
FRAM 10 LOOKING FWD

HATCH SCHEDULE

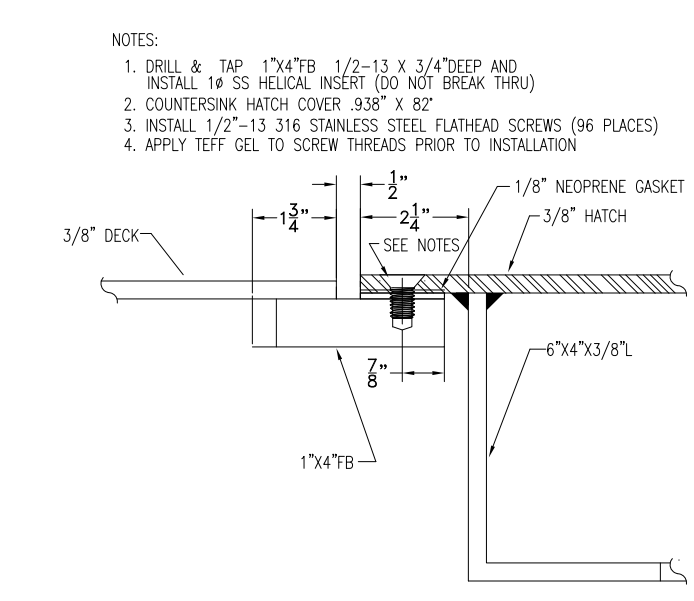
ITEM	SIZE	DESCRIPTION	COMPARTMENT	LOCATION	PART NUMBER	MANUFACTURER	MATERIAL	COAMING	REMARKS
1-H1	15'x23'	HATCH, RAISED, MULTIFOLD, OILTIGHT	STORAGE VOID	F.O. TANK, STBD			STEEL	2.5"	
1-H2	15'x23'	HATCH, RAISED, MULTIFOLD, OILTIGHT	ENGINE ROOM	CARGO F.O. TANK, STBD			STEEL	2.5"	
1-H3	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	ENGINE ROOM	WATER VOID TANK 15			STEEL	2.5"	
1-H4	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	ENGINE ROOM	WATER VOID TANK 25			STEEL	2.5"	
1-H5	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	STEERING COMP.	WATER VOID TANK 35			STEEL	2.5"	
1-H6	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	STEERING COMP.	WATER VOID TANK 45			STEEL	2.5"	
1-H7	15'x23'	HATCH, RAISED, MULTIFOLD, OILTIGHT	STORAGE VOID	F.O. TANK, PORT			STEEL	2.5"	
1-H8	15'x23'	HATCH, RAISED, MULTIFOLD, OILTIGHT	ENGINE ROOM	CARGO F.O. TANK, PORT			STEEL	2.5"	
1-H9	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	ENGINE ROOM	WATER VOID TANK 1P			STEEL	2.5"	
1-H10	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	ENGINE ROOM	WATER VOID TANK 2P			STEEL	2.5"	
1-H11	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	STEERING COMP.	WATER VOID TANK 3P			STEEL	2.5"	
1-H12	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	STEERING COMP.	WATER VOID TANK 4P			STEEL	2.5"	
1-H13	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	STORAGE VOID F10	STBD FRESH WATER TANK			STEEL	2.5"	
1-H14	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	STORAGE VOID F10	PORT FRESH WATER TANK			STEEL	2.5"	
1-H15	15'x23'	HATCH, RAISED, MULTIFOLD, WATERTIGHT	FOREPEAK	BALLAST TANK			STEEL	2.5"	
<b>MAIN DECK</b>									
2-H1	#24"	HATCH, WATERTIGHT, O.A., STEEL RING	FOREPEAK	MAIN DECK BOW			ALUM./STEEL		
2-H2	#24"	HATCH, WATERTIGHT, O.A., STEEL RING	STORAGE VOID	MAIN DECK FWD PORT			ALUM./STEEL		
2-H3	#24"	HATCH, WATERTIGHT, O.A., STEEL RING	ENGINE ROOM	MAIN DECK AFT PORT			ALUM./STEEL		
2-H4	#24"	HATCH, WATERTIGHT, O.A., STEEL RING	STEERING COMP.	MAIN DECK STERN C.L.			ALUM./STEEL		
2-H5	SEE DWG	HATCH, EQUIPMENT REMOVAL	STEERING COMP.	MAIN DECK STERN PORT			STEEL		SEE DETAIL 3-H5 & 3-H5A
2-H6	SEE DWG	HATCH, EQUIPMENT REMOVAL	STEERING COMP.	MAIN DECK STERN STBD			STEEL		SEE DETAIL 3-H6 & 3-H6A
<b>2ND DECK</b>									
3-H1	SEE DWG	HATCH, GENERATOR REMOVAL	ENGINE ROOM	2ND DECK AFT			ALUMINUM		SEE DETAIL 3-H1 & 3-H1A



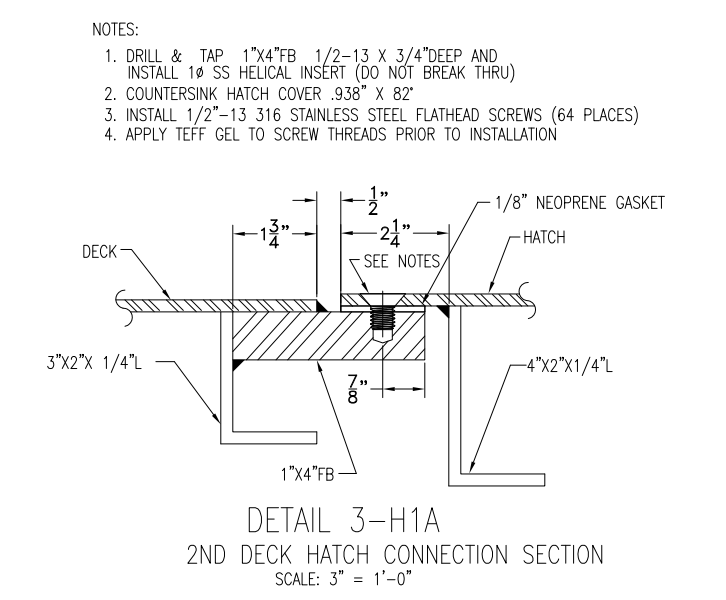
DETAIL 2-H5  
MAIN DECK Z-DRIVE HATCHES (2 EA)  
SCALE: 1/2" = 1'-0"  
MATERIAL: A36 STEEL



DETAIL 3-H1  
2ND DECK HATCH  
SCALE: 1/2" = 1'-0"  
MATERIAL: ALUMINUM, 5086-1116 PLATE, 6061-16 SHAPES



DETAIL 3-H5A  
MAIN DECK Z-DRIVE HATCH SECTION  
SCALE: 3" = 1'-0"



DETAIL 3-H1A  
2ND DECK HATCH CONNECTION SECTION  
SCALE: 3" = 1'-0"

NOTES:

1. DRILL & TAP 1/2"x13/16" 1/2"-13 x 3/4" DEEP AND INSTALL 1# SS HELICAL INSERT (DO NOT BREAK THRU)
2. COUNTERSINK HATCH COVER 3/8" x 8"
3. INSTALL 1/2"-13 316 STAINLESS STEEL FLATHEAD SCREWS (64 PLACES)
4. APPLY TEFY GEL TO SCREW THREADS PRIOR TO INSTALLATION

NOTES:

1. DRILL & TAP 1/2"x13/16" 1/2"-13 x 3/4" DEEP AND INSTALL 1# SS HELICAL INSERT (DO NOT BREAK THRU)
2. COUNTERSINK HATCH COVER 3/8" x 8"
3. INSTALL 1/2"-13 316 STAINLESS STEEL FLATHEAD SCREWS (64 PLACES)
4. APPLY TEFY GEL TO SCREW THREADS PRIOR TO INSTALLATION

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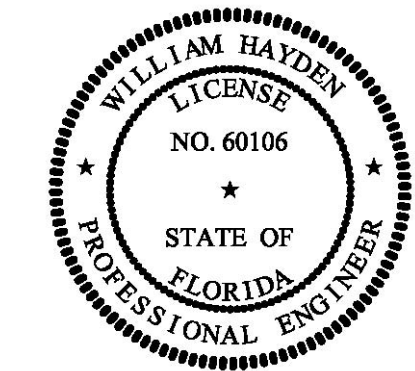
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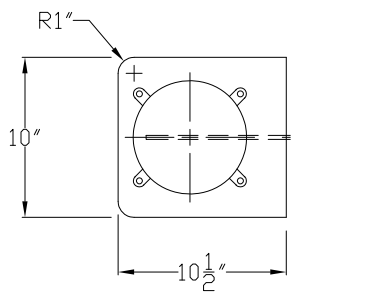
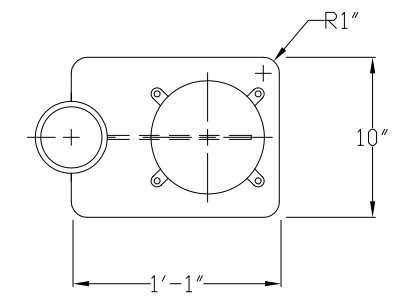
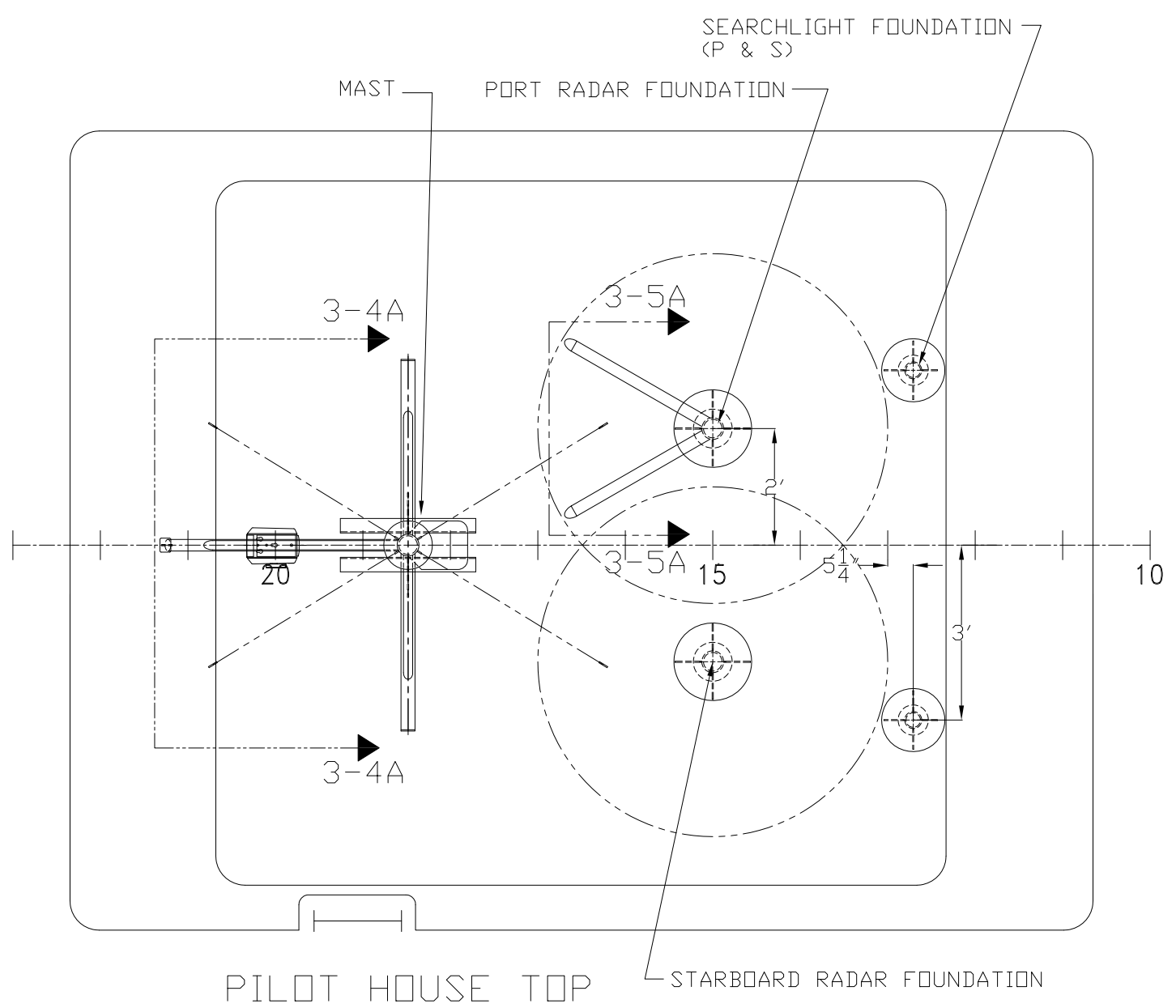
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 Info@dejongandlebet.com

Title: 70.5'x30'x11" NCDOT TOWBOAT

**HATCHES & MANHOLES**

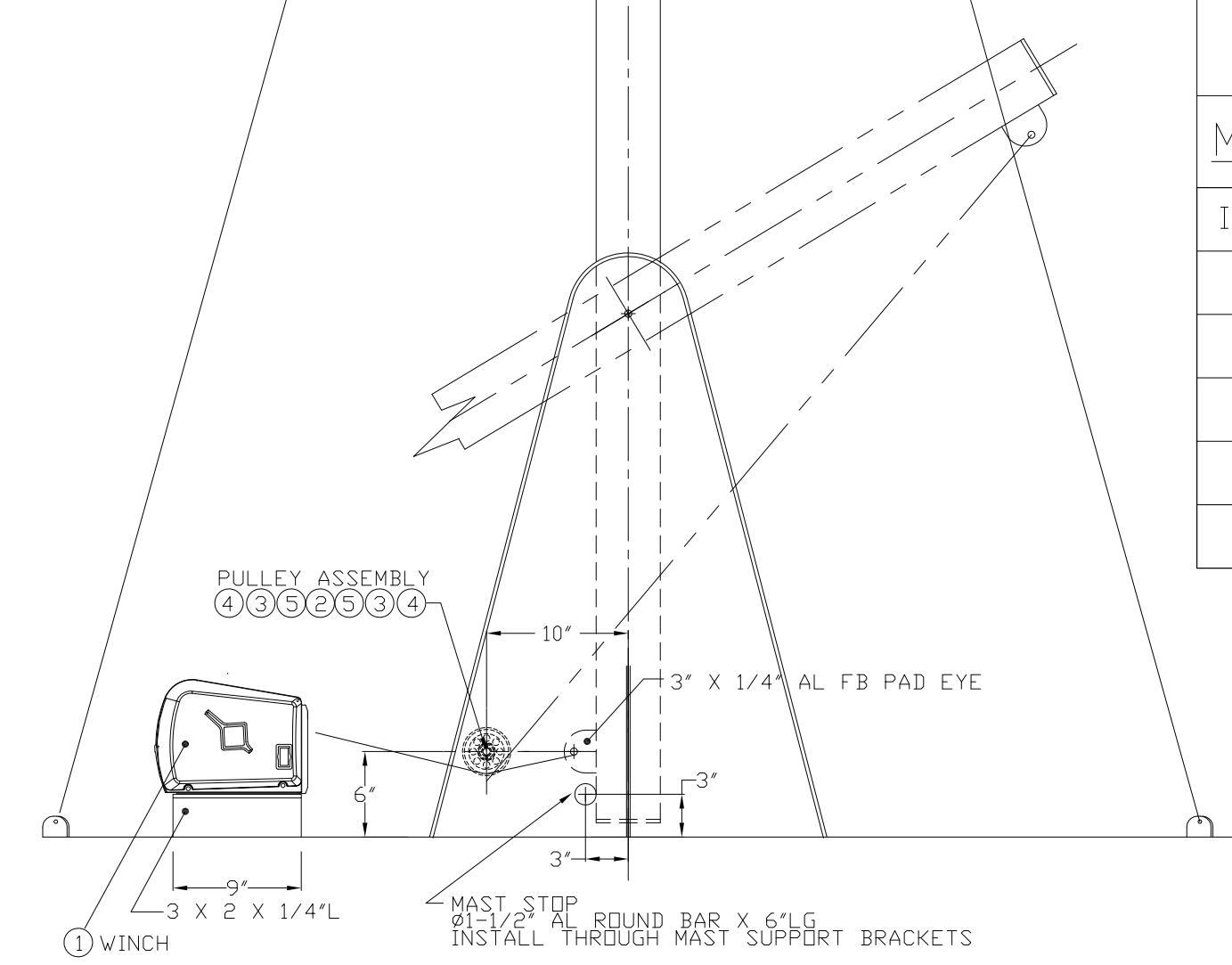
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 Checked By: JAH  
 App'd By: JAH  
 ABS App'l: JAH  
 Date: JULY 19, 2018  
 Scale: UNLESS NOTED OTHERWISE  
 USCG App'l: JAH





DETAIL "A"  
TYP NAV LIGHT MOUNT  
(UNLESS OTHERWISE NOTED)  
SCALE: 1" = 1'-0"

DETAIL "B"  
STERN LIGHT MOUNT  
SCALE: 1" = 1'-0"

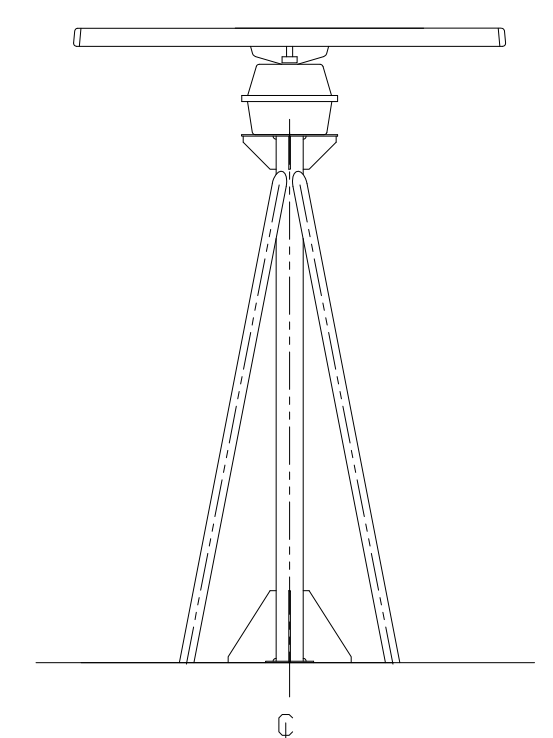


DETAIL "C"  
MAST BASE ASSEMBLY  
SCALE: 1" = 1'-0"

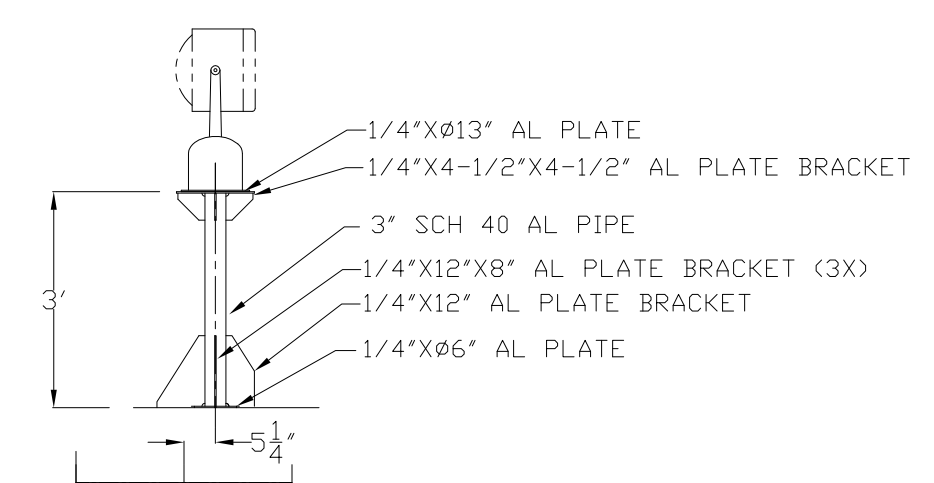
### BILL OF MATERIALS

#### MAST ASSEMBLY SCHEDULE

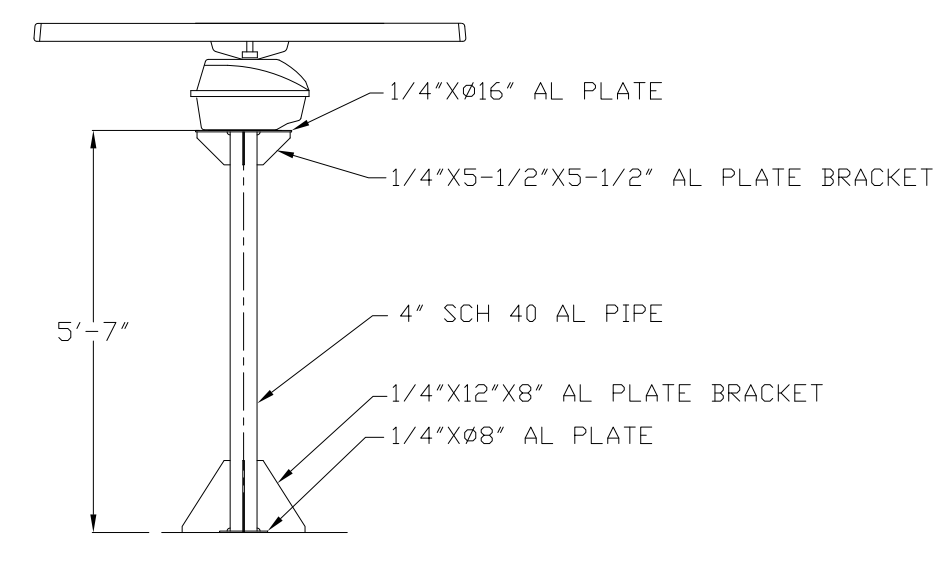
ITEM	QTY.	DESCRIPTION	MANUFACTURER #	REMARKS
1	1	WINCH, ELECTRIC, 120VAC, 1200 LB, 3/16" CABLE	DUTTON-LAINSON SA5000AC	DR EQUAL
2	1	PULLEY, WIRE ROPE, 3/16", Ø 1/2" SHAFT STAINLESS STEEL	MCMASER-CARR 3628T22	DR EQUAL
3	2	SHAFT, ROTARY, STAINLESS STEEL W/ RETAINING RING GROOVES	MCMASER-CARR 2025K11	DR EQUAL
4	4	RETAINING RING, 1/2", EXTERNAL,, SS	MCMASER-CARR 95304A251	DR EQUAL
5	2	COLLAR, SHAFT, TWO-PIECE, STAINLESS STEEL	MCMASER-CARR 6436K34	DR EQUAL



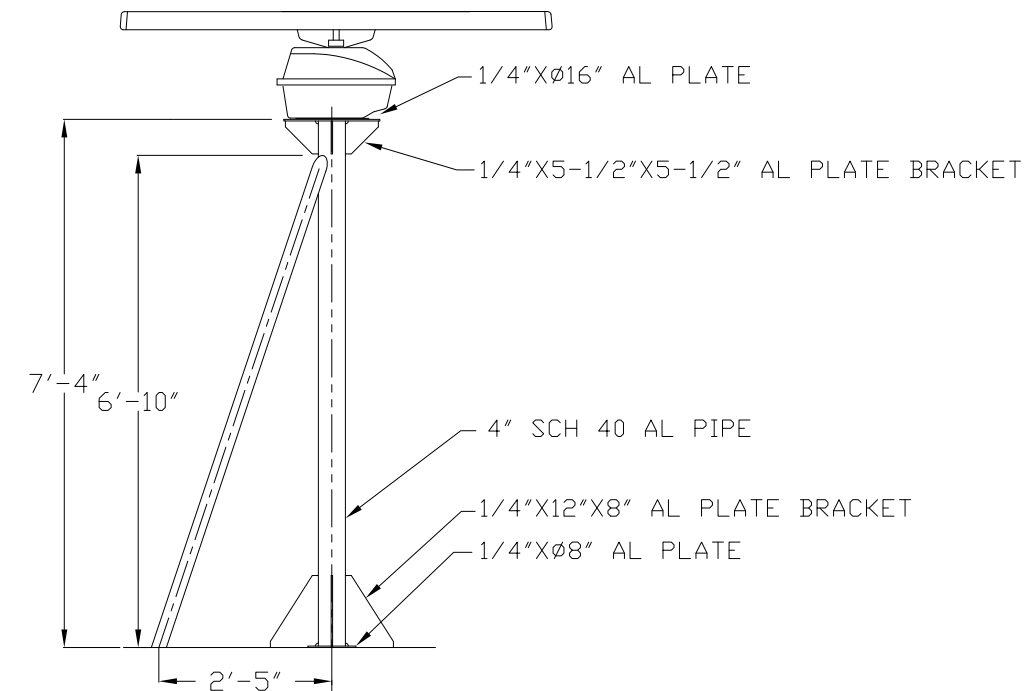
SECTION 3-5A  
PORT RADAR MAST  
2'-0" DCL  
SCALE: 3/8"=1'-0"



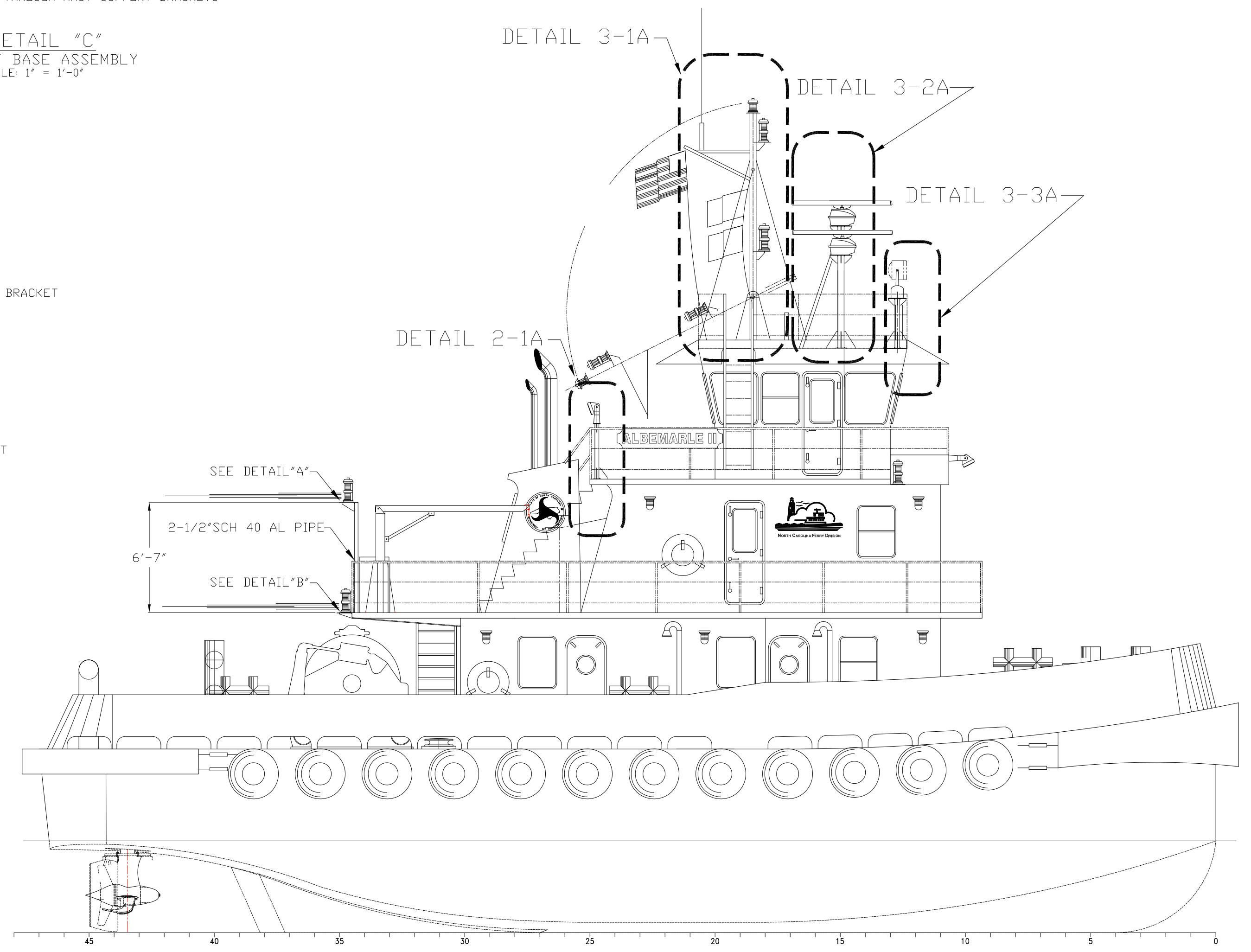
ELEVATION 3-3A  
SEARCHLIGHT FOUNDATION (2 EA)  
3'-0" DCL (P & S)  
SCALE: 3/8"=1'-0"



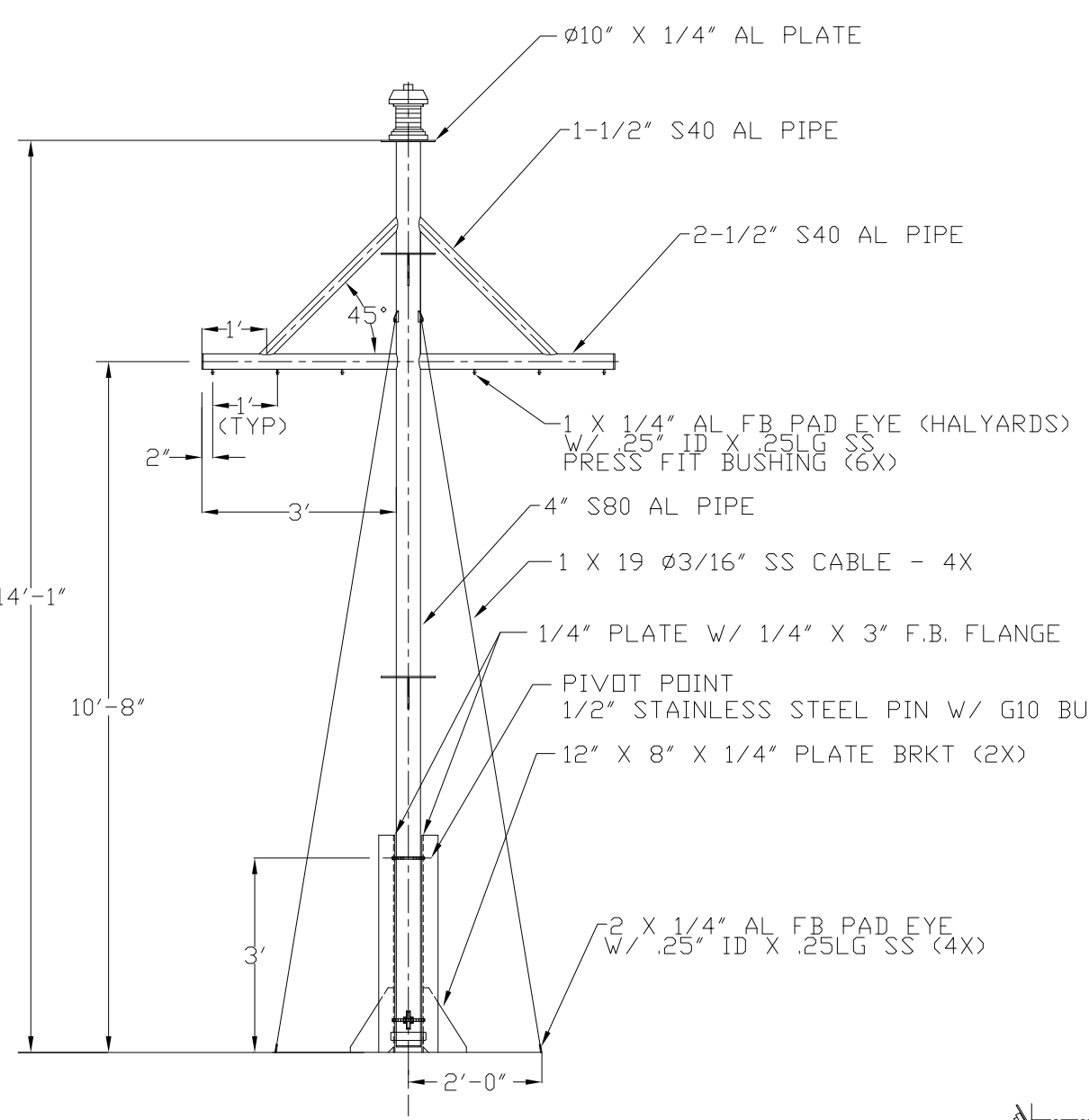
ELEVATION 3-2A  
STARBOARD RADAR MAST  
2'-0" DCL  
SCALE: 3/8"=1'-0"



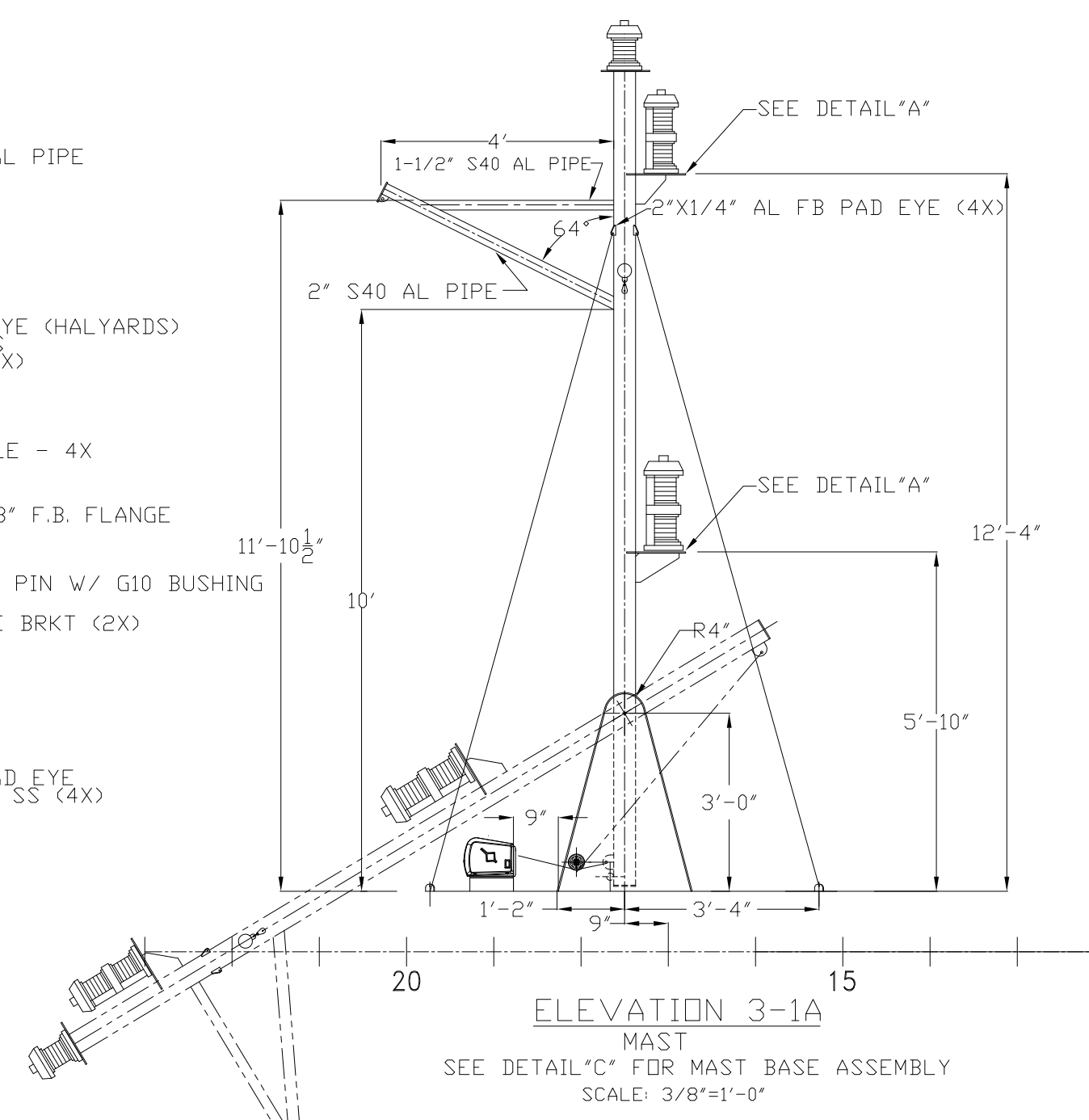
ELEVATION 3-2A  
PORT RADAR MAST  
2'-0" DCL  
SCALE: 3/8"=1'-0"



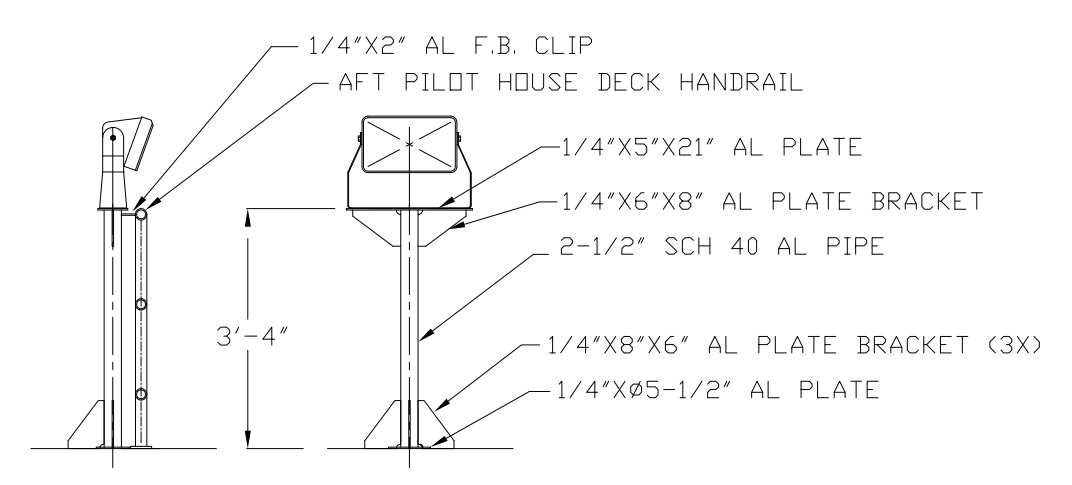
ELEVATION 1-1A  
OUTBOARD PROFILE  
SCALE: 3/16"=1'-0"



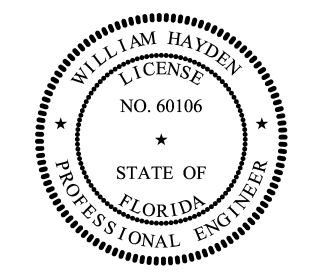
SECTION 3-4A  
MAST  
SCALE: 3/8"=1'-0"



ELEVATION 3-1A  
FLOODLIGHT MAST (2 EA)  
6'-4" DCL (P & S) PILOT HOUSE DECK AFT  
SCALE: 3/8"=1'-0"



ELEVATION 2-1A  
FLOODLIGHT MAST (2 EA)  
6'-4" DCL (P & S) PILOT HOUSE DECK AFT  
SCALE: 3/8"=1'-0"



9	8	7	6	5	4	3	2	1	0	9/8.3.18/a	NCDOT	ALT. NO.
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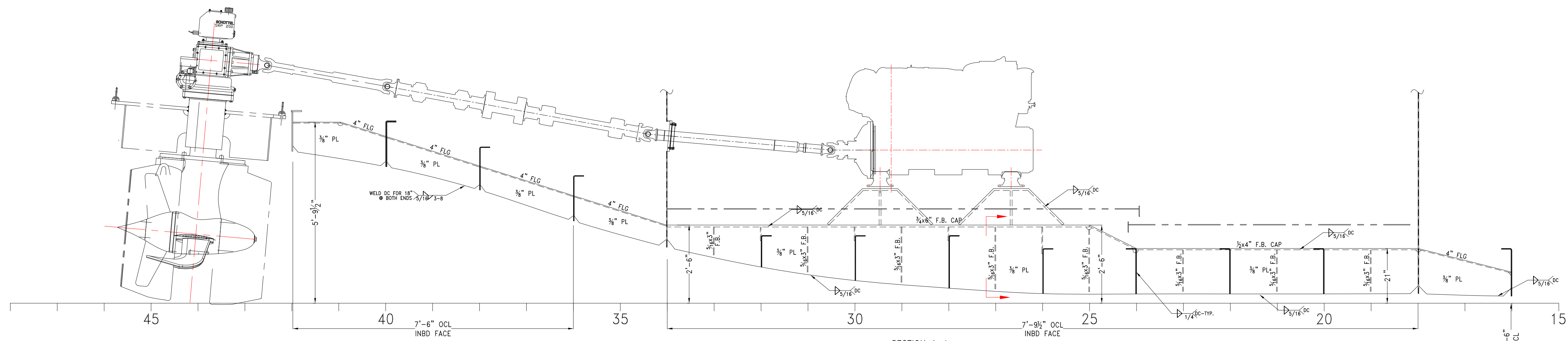
Naval Architects  
Marine Engineers  
Consultants  
Surveyors

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Info@dejongandlebel.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

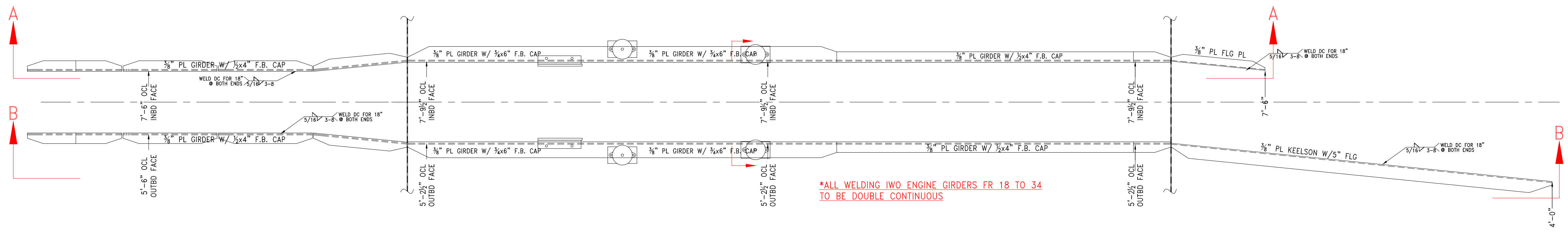
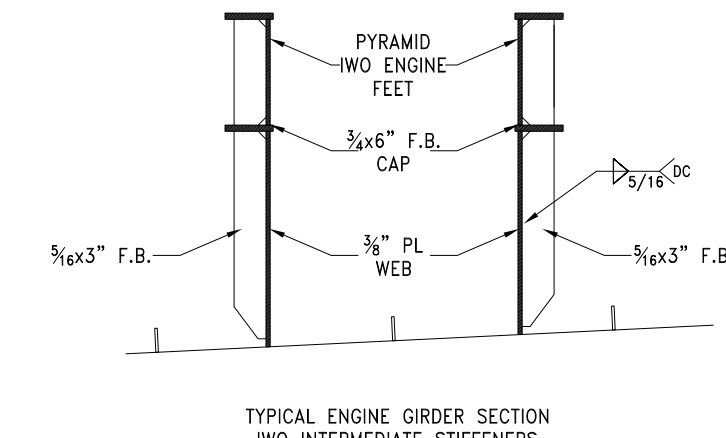
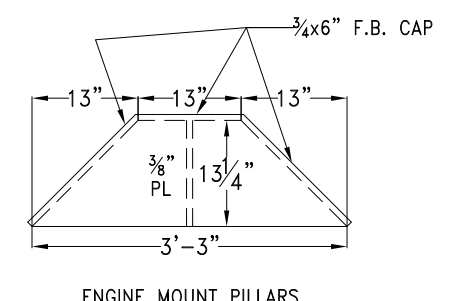
### MAST DETAILS

Dwg. No.	Alt. No.
17-1372-171	1 of 1
Drawn By: JAH	Date: JULY 19, 2018
Checked By:	Date:
App'd By:	Scale: SEE DWG
ABS App'l:	USCG App'l:



SECTION A-A  
OUTBOARD ENGINE GIRDER STRUCTURAL DETAILS  
PORT SIDE SHOWN LKG OUTBD  
STBD SIMILAR; OPP. HAND

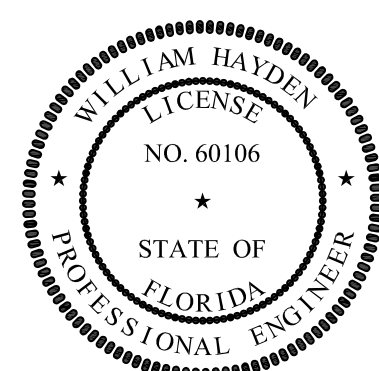
\*ALL WELDING IWO ENGINE GIRDERS FR 18 TO 34  
TO BE DOUBLE CONTINUOUS



SECTION B-B  
INBOARD ENGINE GIRDER STRUCTURAL DETAILS  
PORT SIDE SHOWN LKG OUTBD  
STBD SIMILAR; OPP. HAND

\*ALL WELDING IWO ENGINE GIRDERS FR 18 TO 34  
TO BE DOUBLE CONTINUOUS

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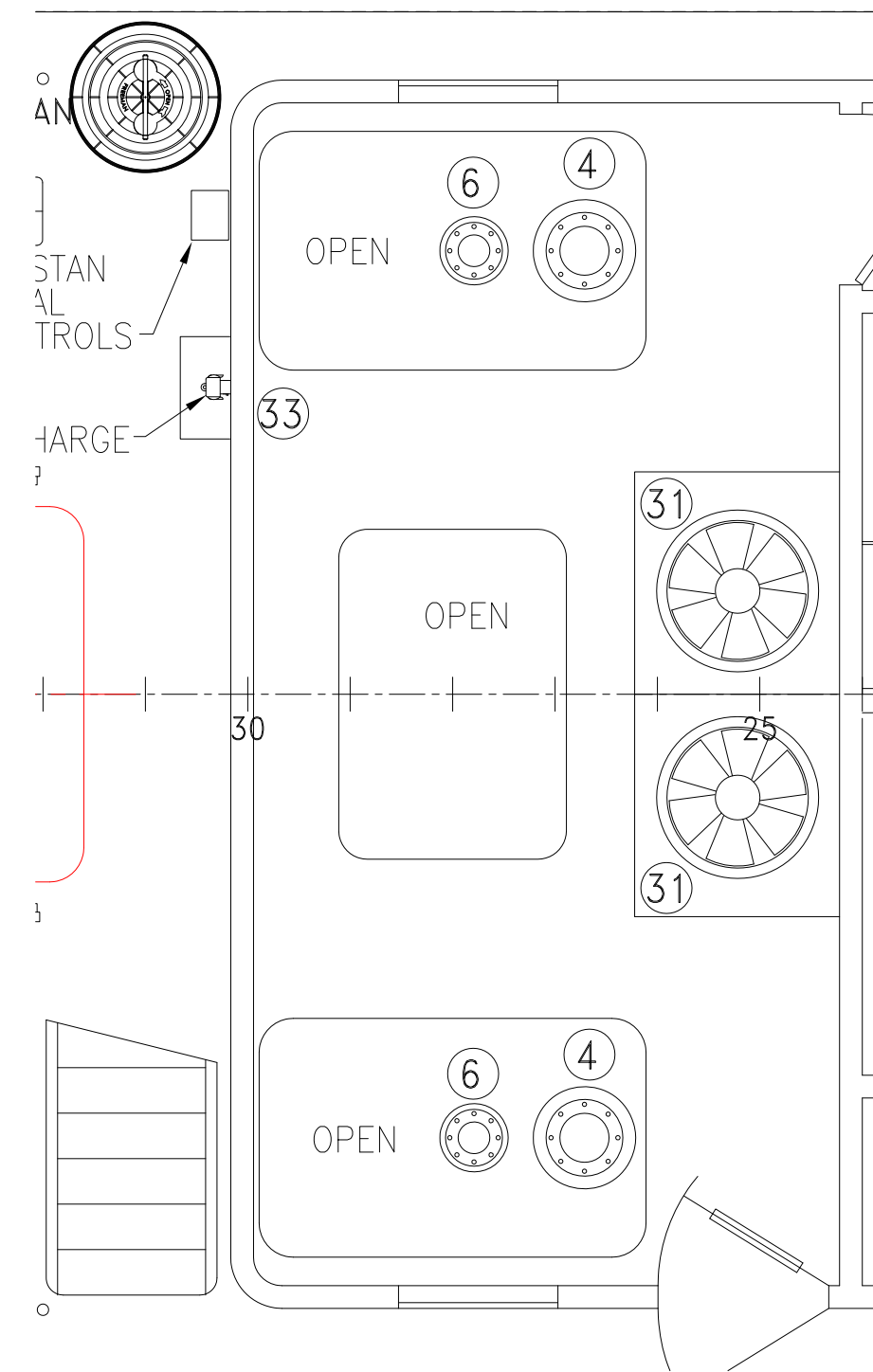


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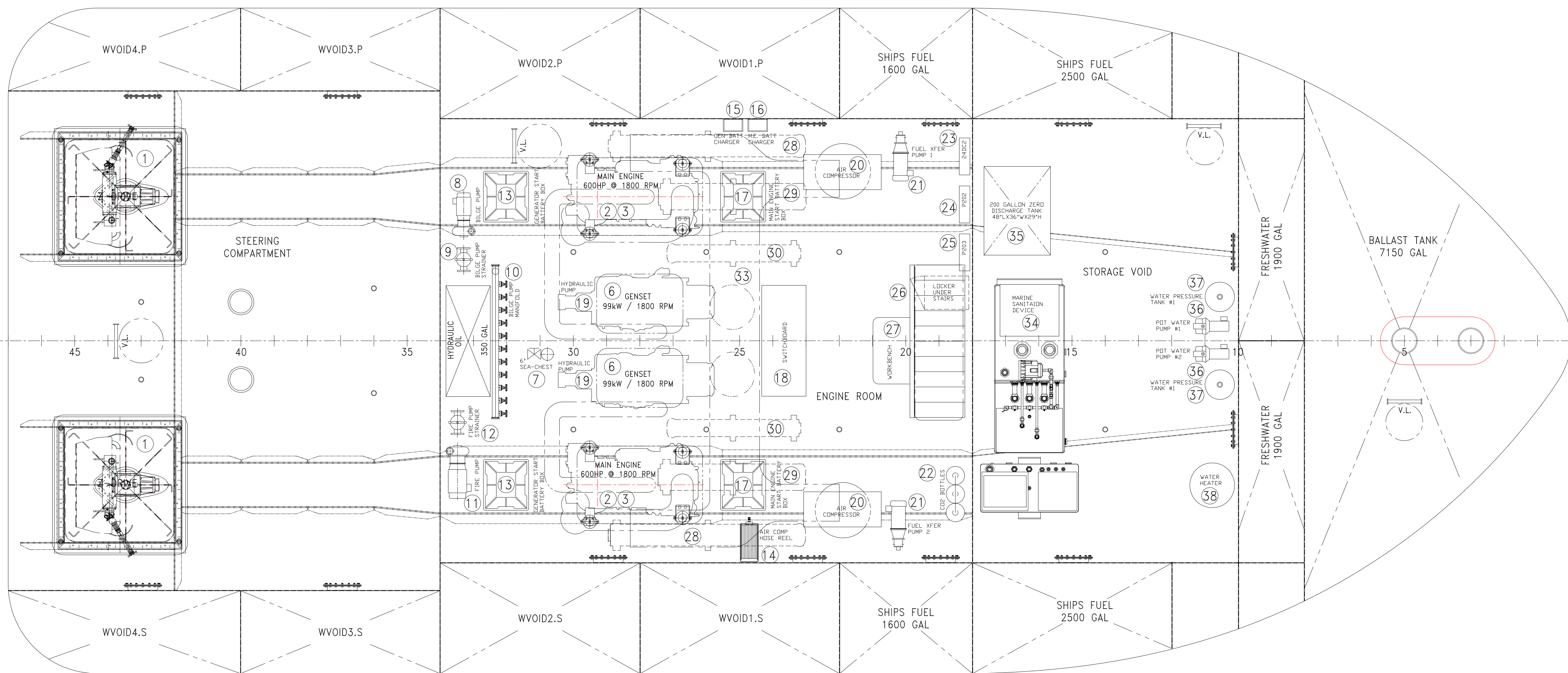
Title: 70.5'x30'x11' NCDOT TOWBOAT  
**LONGITUDINAL GIRDER  
STRUCTURAL DETAILS**

Dwg. No. **17-1372-182** Alt. No. 0  
Sht. 1 of 1  
Date: **JUNE 05, 2018**  
Scale: **1/2" = 1'-0"**  
USCG App'l: \_\_\_\_\_

ANSI-D (24"x36")



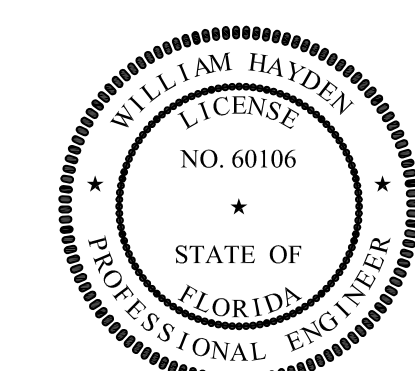
MAIN DECK MACHINERY ARRANGEMENT



HOLD ARRANGEMENTS

EQUIPMENT LIST			
ITEM	QTY	DESCRIPTION	REMARKS
1	2	AZIMUTH DRIVE	
2	2	REDUCTION GEAR	
3	2	MAIN ENGINE	
4	2	MAIN ENGINE EXHAUST SILENCER	
5	2	GENERATOR ENGINE EXHAUST SILENCER	
6	2	120 <sub>208</sub> VAC, 3Ø GENERATOR	
7	1	SEA CHEST	
8	1	BILGE PUMP	
9	1	BILGE PUMP STRAINER	
10	1	BILGE MANIFOLD	
11	1	FIRE PUMP	
12	1	FIRE PUMP STRAINER	
13	2	GENERATOR BATTERY	
14	1	HOSE REEL	
15	1	GENERATOR BATTERY CHARGER	
16	1	MAIN ENGINE BATTERY CHARGER	
17	2	MAIN ENGINE BATTERY	
18	1	SWITCHBOARD	
19	2	HYDRAULIC PUMP	
20	2	AIR COMPRESSOR	
21	2	FUEL TRANSFER PUMP	
22	1	FIRE SUPPRESSION SYSTEM	
23	1	24 VOLT DC PANEL	
24	1	120 <sub>208</sub> ENGINE ROOM PANEL	
25	1	120 <sub>208</sub> ENGINE ROOM PUMP PANEL	
26	1	LOCKER	
27	1	WORKBENCH	
28	2	MAIN ENGINE KEEL COOLER	FAR SIDE
29	2	MAIN ENGINE KEEL COOLER	FAR SIDE
30	2	GENERATOR KEEL COOLER	FAR SIDE
31	2	ENGINE ROOM SUPPLY FAN	MAIN DK MACH SP.
32	1	ENGINE ROOM SUPPLY AIR DUCT	OVERHEAD
33	1	FUEL TRANSFER DISCHARGE	MAIN DK MACH SP.
34	1	MARINE SANITATION DEVICE	
35	1	200 GALLON ZERO DISCHARGE TANK	
36	2	POTABLE WATER PUMP	
37	2	POTABLE WATER PRESSURE TANK	
38	1	WATER HEATER	

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info@dejongandlebet.com

Title: 70.5'x30'x11' NCDOT TOWBOAT  
**MACHINERY ARRANGEMENT**  
Dwg. No. 17-1372-200 Alt. No. 1  
Sht. 1 of 1  
Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 3/8" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

### SYSTEM OPERATION INTENT

EACH ENGINE IS PROVIDED WITH INDEPENDENT COOLING CIRCUITS, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

### SYMBOLS LIST

—	PIPE
	BUTTERFLY VALVE
	BALL VALVE
	BALL VALVE WITH THREADED PLUG
	GLOBE VALVE
	GATE VALVE
	CHECK VALVE
	REDUCER
	FLEXIBLE CONNECTION
	PRESSURE GAUGE (LOCAL READING)
	VACUUM PRESSURE GAUGE (LOCAL READING)
	THERMOMETER
	CENTRIFUGAL PUMP
	FLOW DIRECTION ARROW
	SIMPLEX BASKET STRAINER
	FLOW SWITCH
	LEVEL SWITCH

### GENERAL MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	TAKEDOWN JOINTS			VALVES		FITTINGS	FLEXIBLE CONNECTIONS	COMMENTS
			MATERIAL	GASKETS	BOLTING	BODY	TRIM			
FW COOLING MAWP: 20 PSIG  MAX TEMP: 200°F	2 1/2" & ABOVE	CARBON STEEL ASTM A53 OR A106, GRADE B SEAMLESS ANSI B36.10 SCH 40  SCH 80 SHALL BE USED AT HULL PENETRATIONS	FLANGE CARBON STEEL ASTM A105 ANSI B16.5 150# SLIP-ON OR WELD NECK	GARLOCK STYLE IFG 5500 OR EQUAL	BOLTS: CARBON STEEL ASTM A307 GRADE B ANSI B18.2.1  NUTS: CARBON STEEL ASTM A563 GRADE A ANSI B18.2.2	SEE B.O.M.	SEE B.O.M.	CARBON STEEL ASTM A234, GR WPB ANSI B16.9 SCH 40 BUTT WELD LONG RADIUS	SEE B.O.M.	SEE NOTE 6
	2" & UNDER		UNION CARBON STEEL ASTM A105 ANSI B16.11 SOCKET WELD	-	-	SEE B.O.M.	SEE B.O.M.	CARBON STEEL ASTM A105 ANSI B16.11 3000# SOCKET WELD	SEE B.O.M.	

### EQUIPMENT LIST

ITEM #	QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	NOTES
1	2	MAIN ENGINE SCAC & GEARBOX OIL COOLER KEEL COOLER	KEEL COOLER		6,887 BTU/MIN 84-104 GPM (97 DESIGN) (0 KNOTS)	-	SEE NOTE 10
2	2	MAIN ENGINE J/W KEEL COOLER	KEEL COOLER		16,300 BTU/MIN 52-102 GPM (78 DESIGN) (0 KNOTS)	-	SEE NOTE 10
3	2	SSDG J/W KEEL COOLER	KEEL COOLER		4,631 BTU/MIN 38.2-50 GPM (44.1 DESIGN) (0 KNOTS)	-	SEE NOTE 10

### BILL OF MATERIALS

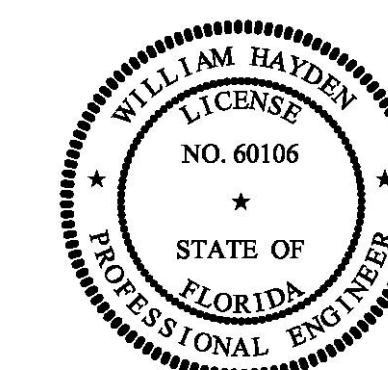
PC MK	QTY	SIZE	DESCRIPTION	MATL SPEC
1	8	2 1/2"	BUTTERFLY VALVE; 200-PSI, LUG TYPE, A395 D.I. BODY, SS DISC, BUNA-N SEATS	ASTM A395
2	1	1-1/2"	GLOBE VALVE; 150#, FLANGED, C. STEEL	ASTM A-216 GR. WCB
3	2	1 1/2"	BUTTERFLY VALVE; PN 10, LUG TYPE, D.I. BODY, SS DISC, BUNA-N SEATS	ASTM A-536 GR 65-45-12
4	A/R	1"	BALL VALVE; 1000 CWP, STD PORT, S. STEEL, NPT, S. STEEL BALL, PTFE SEATS	ASTM A-351 CF8M
5	8	1/2"	THERMOMETER W/ THERMOWELL; BRASS CONNECTION, 30"-240°F RANGE	ASME B40.200/ASTM E2511
6	6	2 1/2"	SHIELDS MARINE EXHAUST/WATER HOSE SERIES 200; HOSES SECURED WITH TWO 1/2" WIDE S. STEEL T-BOLT HOSE CLAMPS	SAE J2006 TYPE R1
7	A/R	2"	SHIELDS MARINE EXHAUST/WATER HOSE SERIES 200; HOSES SECURED WITH TWO 1/2" WIDE S. STEEL T-BOLT HOSE CLAMPS	SAE J2006 TYPE R1
8	8	2"	BUTTERFLY VALVE; 200-PSI, LUG TYPE, D.I. BODY, SS DISC, BUNA-N SEATS	ASTM A-105

#### GENERAL NOTES

NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURER'S CERTIFIED DRAWINGS AS APPROPRIATE.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.
4.	PROVIDE GAUGE PIPING ASSEMBLIES AND MATERIALS FOR GAUGES AND INSTRUMENTS CONFIGURED IN ACCORDANCE WITH ASTM F721. VALVES, TUBING, AND FITTINGS SHALL BE 316 STAINLESS STEEL.
5.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.
6.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER, KEEL COOLERS MAY BE PRESSURE TESTED TO 20 PSI.
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.
8.	KEEL COOLER INLET AND OUTLET VALVES SHALL BE LOCATED CLEAR OF OBSTRUCTIONS, AND WITHIN EASY REACH FOR OPERATION. ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.

#### GENERAL NOTES

NO.	DESCRIPTION
9.	THE CONTRACTOR SHALL VERIFY ENGINE REQUIREMENTS AND KEEL COOLER SELECTION PRIOR TO ORDERING KEEL COOLERS.
10.	TOTAL OF PUMPS FOR REQUIRED FLOW IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEM. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.
11.	CONTRACTOR TO SIZE, LOCATE AND INSTALL EXPANSION TANKS IN ACCORDANCE WITH ENGINE MANUFACTURER'S RECOMMENDATIONS.
12.	PROVIDE A 1" VALVED DRAIN WITH PLUG AT THE LOWEST POINT OF EACH COOLING CIRCUIT.
13.	CONNECT SWITCHES TO SHIP'S ALARM AND MONITORING SYSTEM AND PROVIDE LOW COOLANT LEVEL ALARMS FOR EACH ENGINE.
14.	WHERE PRACTICABLE, ROUTE KEEL COOLER PIPING WITHOUT HIGH SPOTS THAT COULD TRAP AIR. A VENT SHALL BE PROVIDED AT EACH HIGH SPOT CAPABLE OF TRAPPING AIR IN THE SYSTEM.
15.	MOUNT REDUCTION GEAR COOLER AS CLOSE AS POSSIBLE TO REDUCTION GEAR. OIL FLOW MUST BE OPPOSITE OF WATER FLOW IN OIL COOLER.
16.	INTERFACE FLOW SWITCH WITH SHIP'S ALARM AND MONITORING SYSTEM. LOW FLOW ALARM TO OCCUR WHEN FLOW DROPS BELOW 10 GPM.



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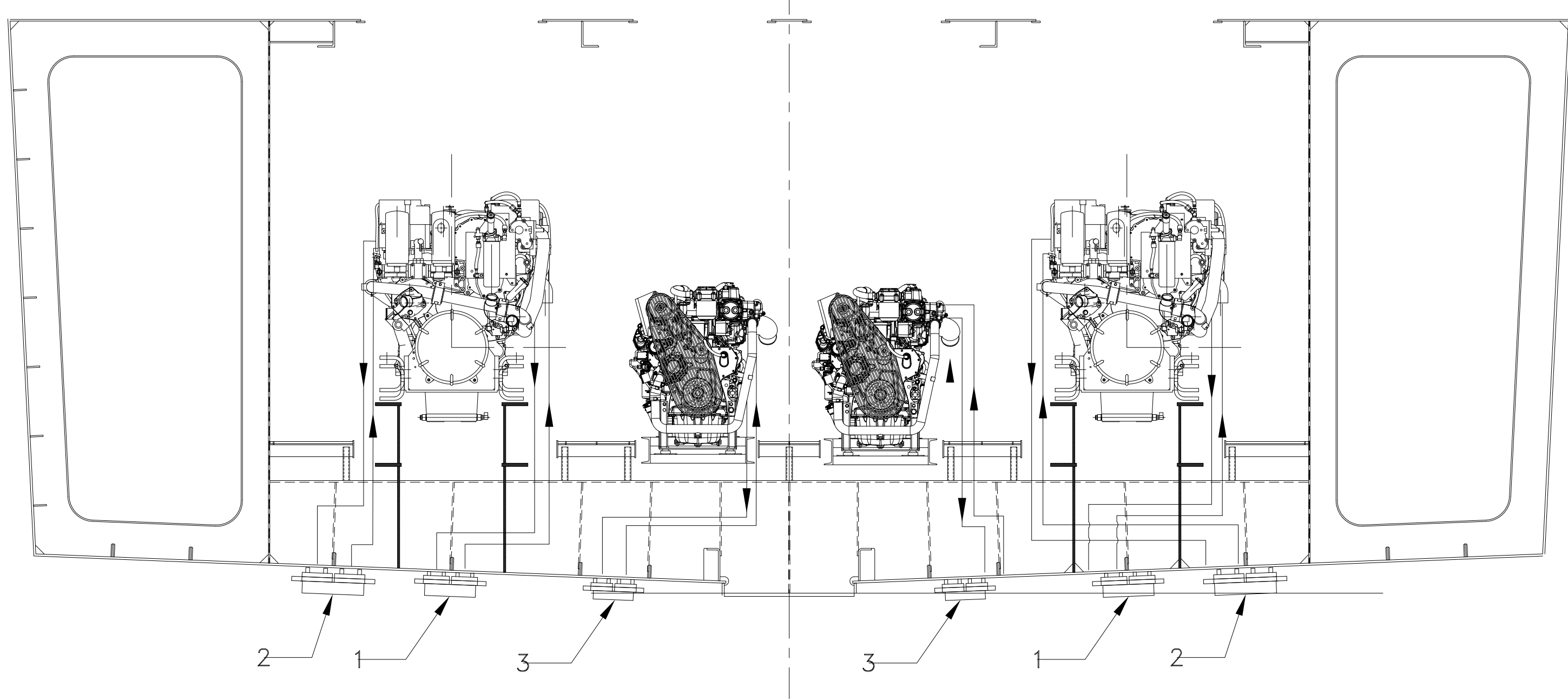
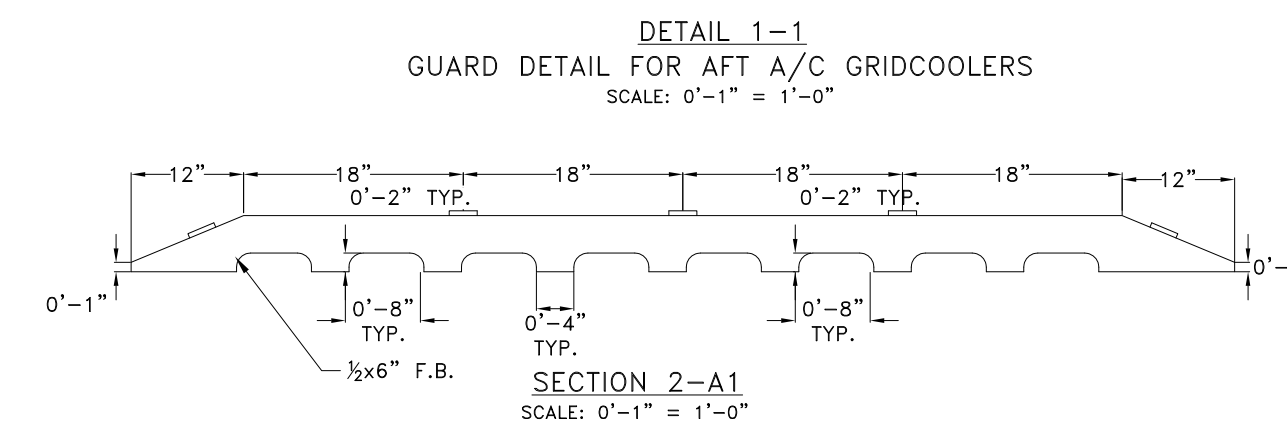
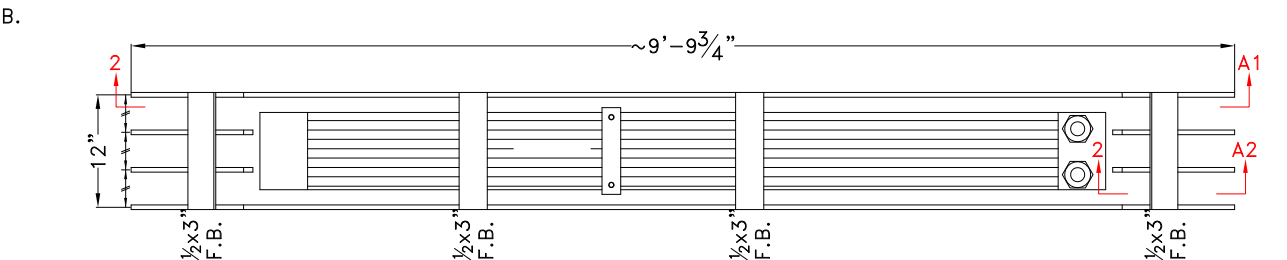
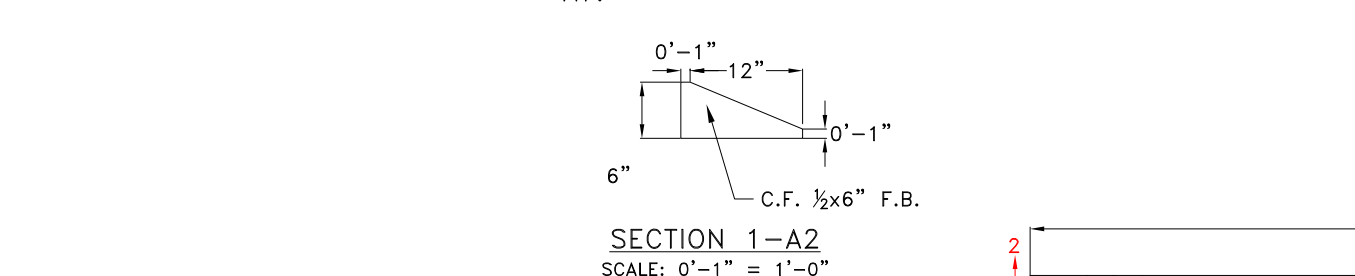
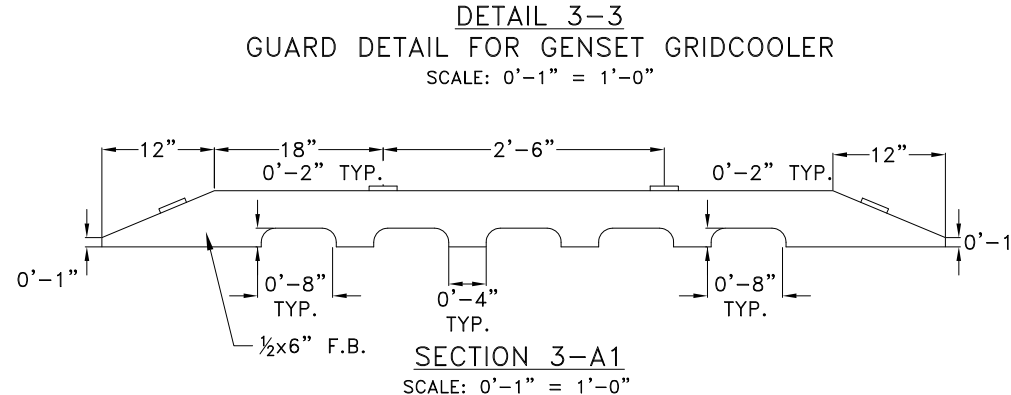
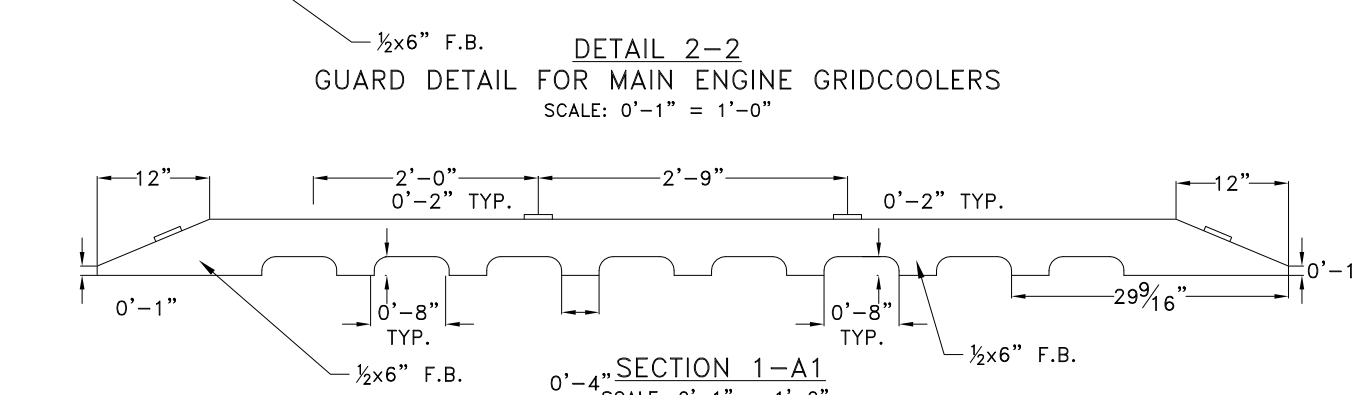
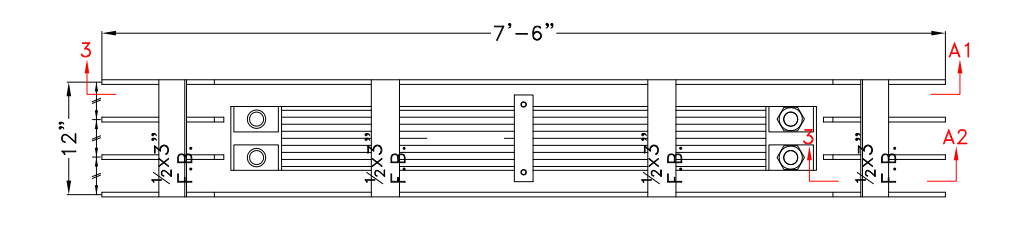
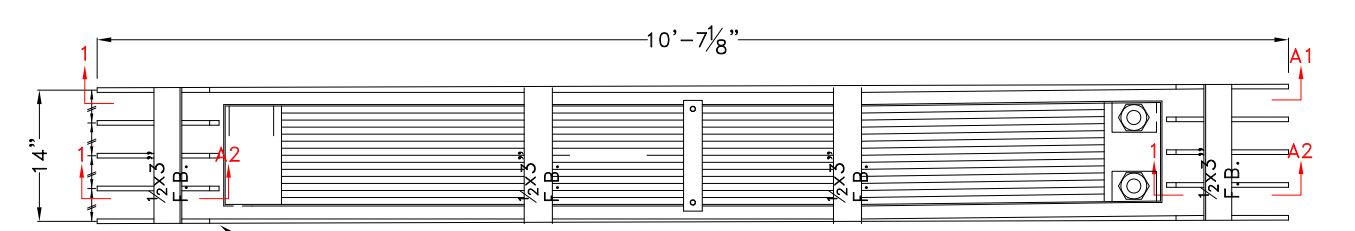
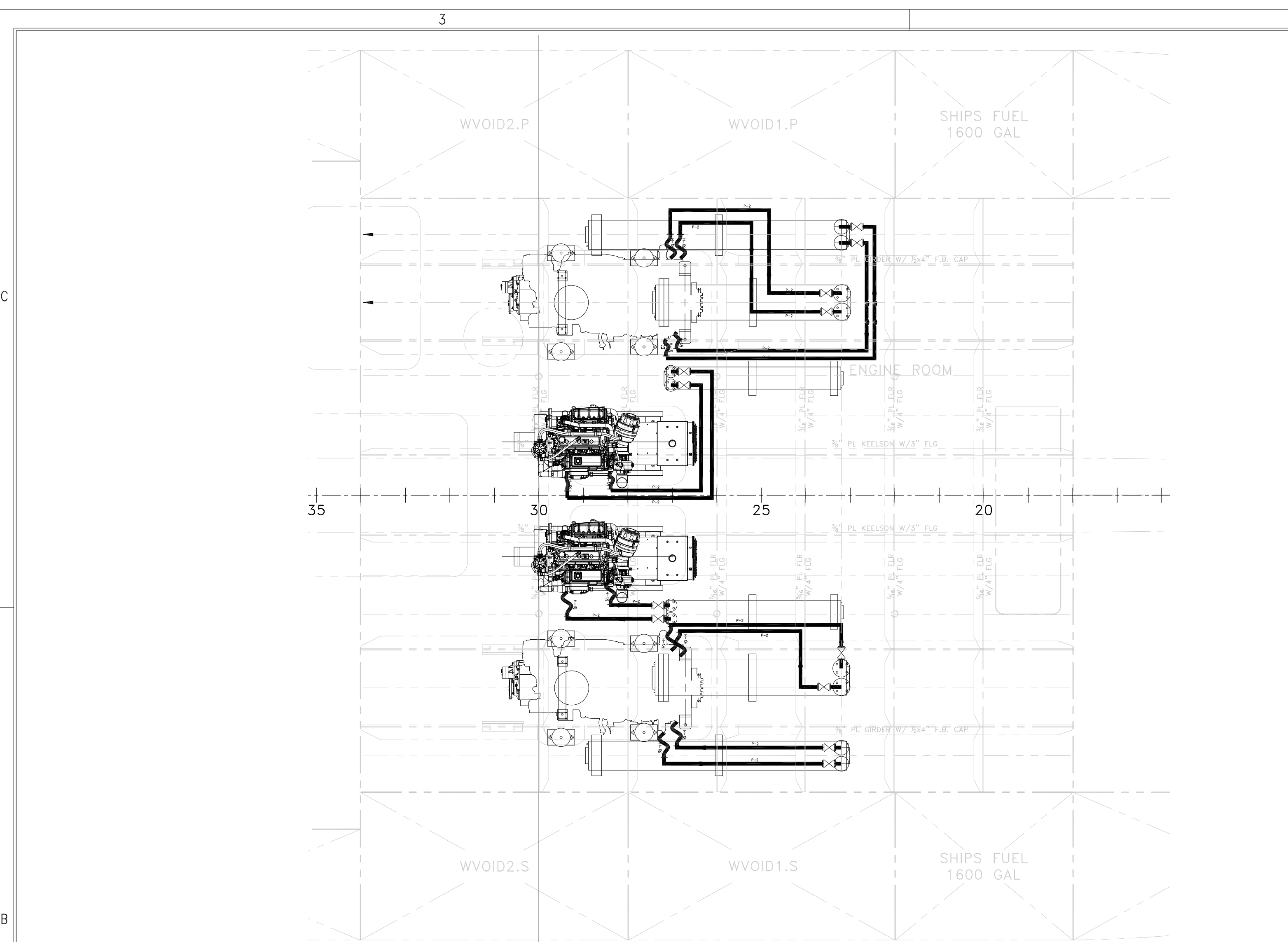
Phone: (904) 399-3473  
 Fax: (904) 399-1522  
 info@dejongandlebet.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

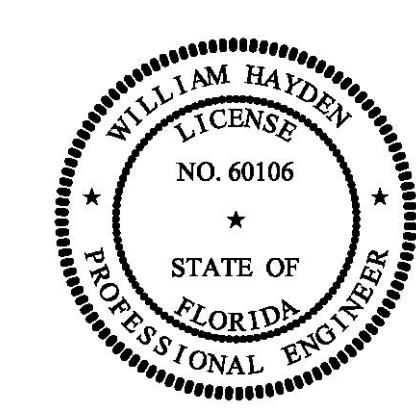
**COOLING SYSTEM**

Dwg. No. 17-1372-256 Alt. No. 1  
 Sh. of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



- GENERAL NOTES -		- GENERAL NOTES -	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.	10.	THE CONTRACTOR SHALL VERIFY ENGINE REQUIREMENTS AND KEEL COOLER SELECTION PRIOR TO ORDERING KEEL COOLERS.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	11.	TYP. OF PUMPS FOR REQUIRED FLOW IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEM. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.	12.	CONTRACTOR TO SIZE, LOCATE AND INSTALL EXPANSION TANKS IN ACCORDANCE WITH ENGINE MANUFACTURER'S RECOMMENDATIONS.
4.	PROVIDE GAUGE PIPING ASSEMBLIES AND MATERIALS FOR GAUGES AND INSTRUMENTS CONFIGURED IN ACCORDANCE WITH ASTM F721. VALVES, TUBING, AND FITTINGS SHALL BE 316 STAINLESS STEEL.	13.	PROVIDE A 1" VALVED DRAIN WITH PLUG AT THE LOWEST POINT OF EACH COOLING CIRCUIT.
5.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	14.	CONNECT SWITCHES TO SHIP'S ALARM AND MONITORING SYSTEM AND PROVIDE LOW COOLANT LEVEL ALARMS FOR EACH ENGINE.
6.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER, KEEL COOLERS MAY BE PRESSURE TESTED TO 20 PSI.	15.	WHERE PRACTICABLE, ROUTE KEEL COOLER PIPING WITHOUT HIGH SPOTS THAT COULD TRAP AIR. A VENT SHALL BE PROVIDED AT EACH HIGH SPOT CAPABLE OF TRAPPING AIR IN THE SYSTEM.
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.	16.	MOUNT REDUCTION GEAR COOLER AS CLOSE AS POSSIBLE TO REDUCTION GEAR. OIL FLOW MUST BE OPPOSITE OF WATER FLOW IN OIL COOLER.
8.	KEEL COOLER INLET AND OUTLET VALVES SHALL BE LOCATED CLEAR OF OBSTRUCTIONS, AND WITHIN EASY REACH FOR OPERATION. ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.	17.	INTERFACE FLOW SWITCH WITH SHIP'S ALARM AND MONITORING SYSTEM. LOW FLOW ALARM TO OCCUR WHEN FLOW DROPS BELOW 10 GPM.



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 Naval Architects  
 Marine Engineers  
 Consultants  
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 www.dejongandlebel.com

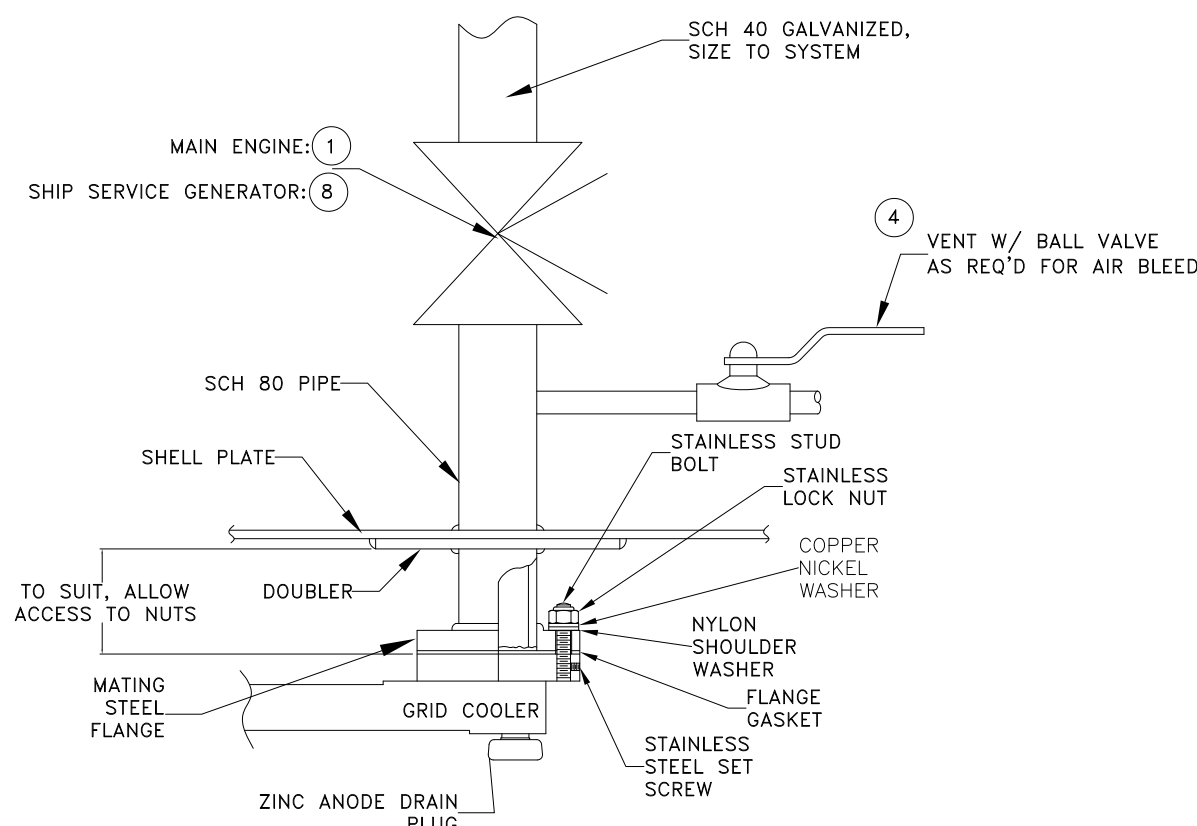
Phone: (904) 399-3673  
 Fax: (904) 399-1522  
 info@dejongandlebel.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

**COOLING SYSTEM**

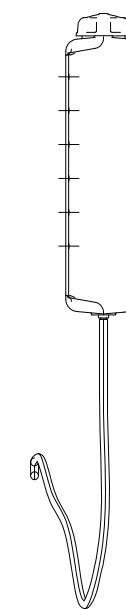
Dwg. No. 17-1372-256 Alt. No. 1  
 Sh. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

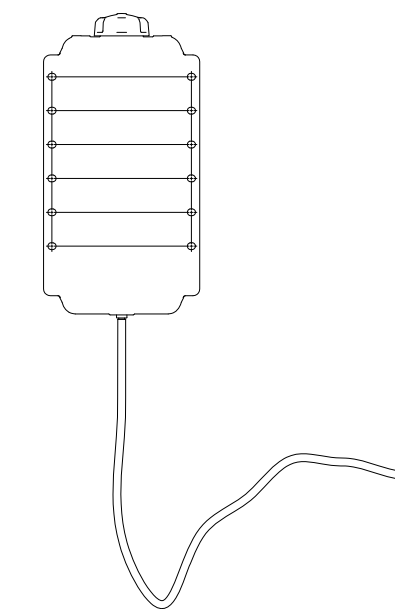


NOTE: COOLERS TO BE INSTALLED IN ACCORDANCE WITH MFG. RECOMMENDATIONS

DETAIL 2-2C  
KEEL COOLER PENETRATION DETAIL  
NO SCALE



DETAIL OF COOLANT RECOVERY TANK  
CAT PART #102-9220 CHG 04

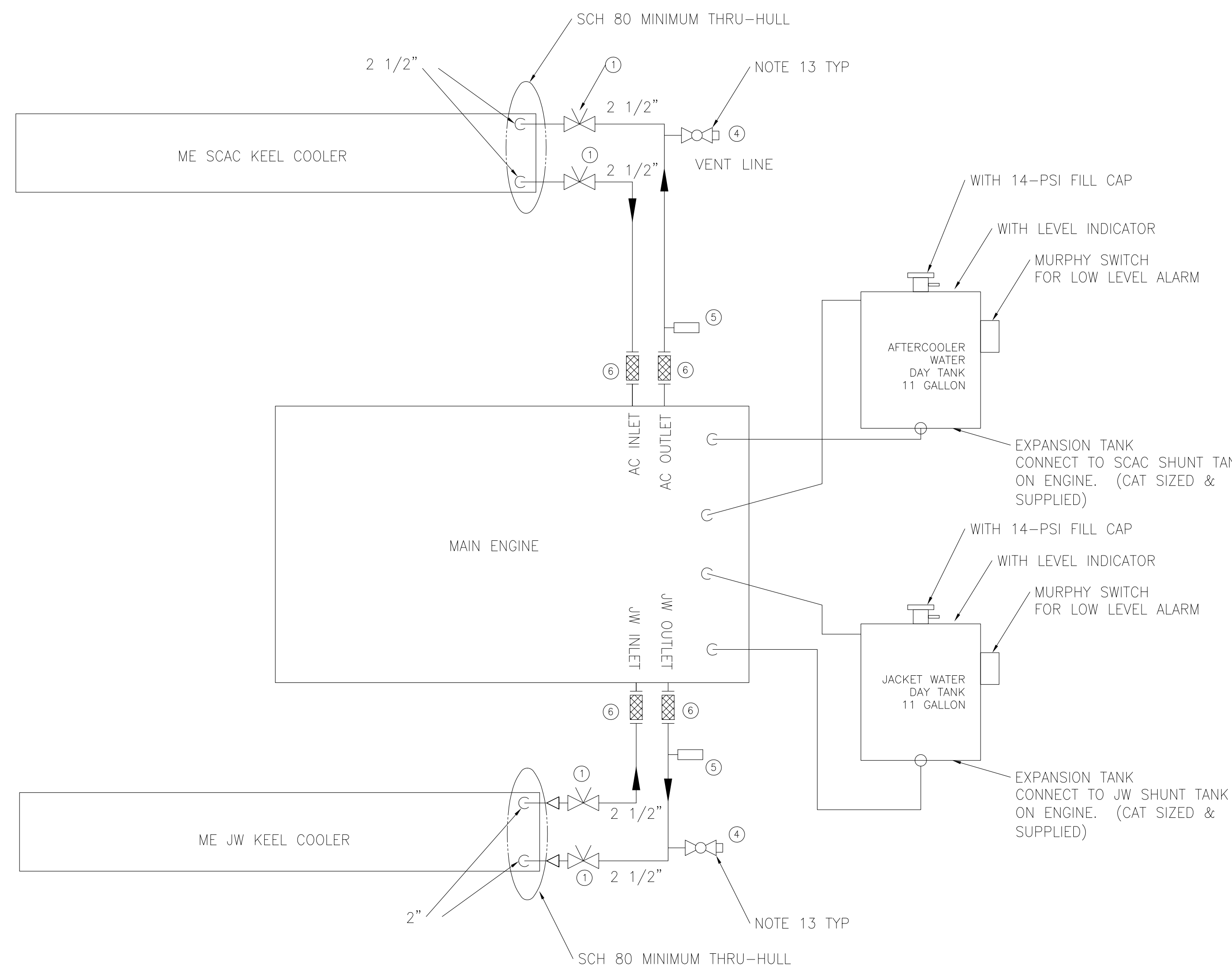


SIZE AND LOCATE VENT LINES PER MANUFACTURER REQUIREMENTS

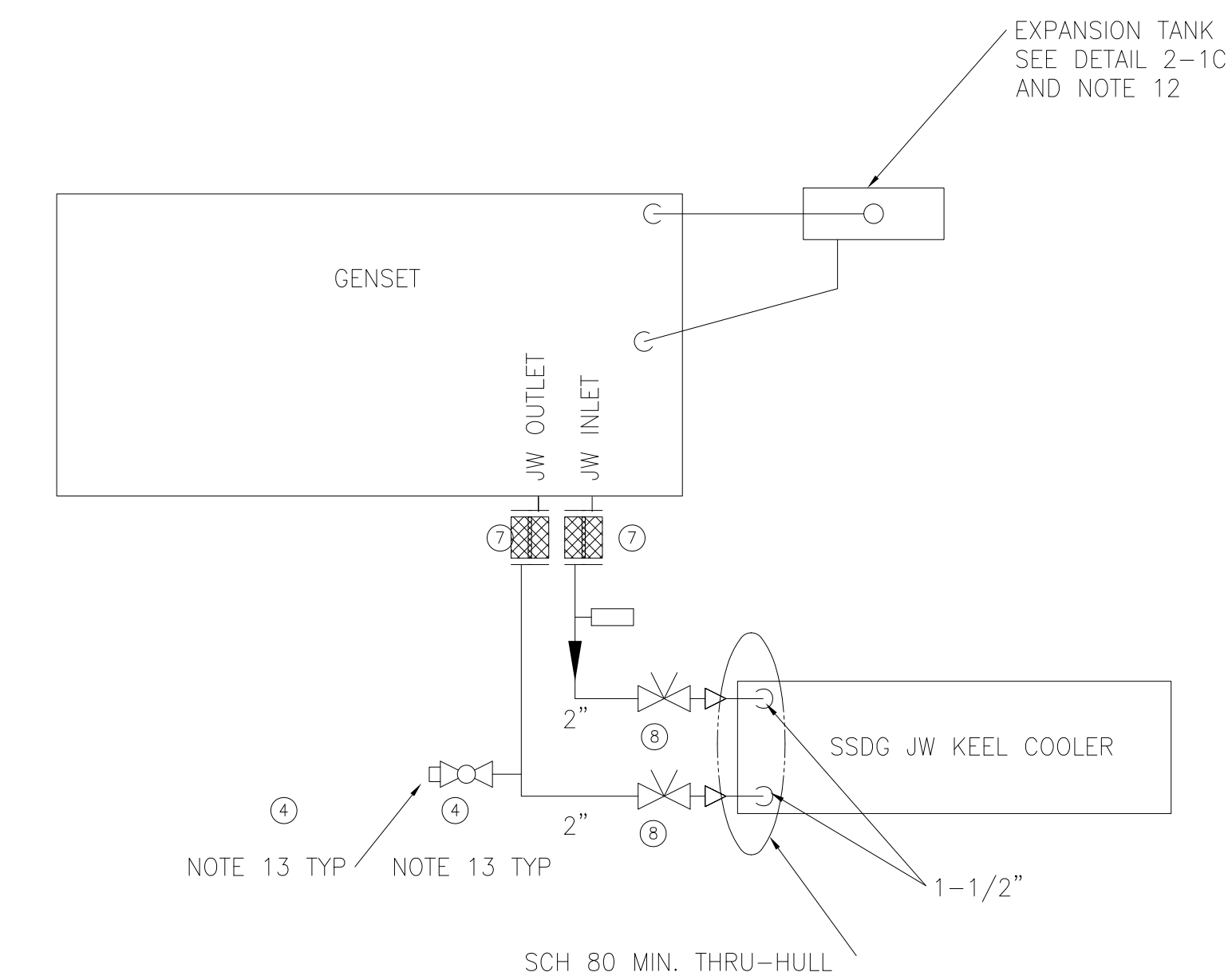
DETAIL OF KEEL COOLED EXPANSION TANK  
CAT PART #432-6671 CHG 00

DETAIL 2-1C  
GENSET EXPANSION & RECOVERY TANKS  
NO SCALE

LOW LEVEL ALARM SWITCH  
SEE NOTE 14



PLAN 2-5A  
SSDG COOLING PIPING DIAGRAM  
NO SCALE



PLAN 2-2A  
SSDG COOLING PIPING DIAGRAM  
NO SCALE

-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.	10.	THE CONTRACTOR SHALL VERIFY ENGINE REQUIREMENTS AND KEEL COOLER SELECTION PRIOR TO ORDERING KEEL COOLERS.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	11.	TYP. OF PUMPS FOR REQUIRED FLOW IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEM. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.
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4.	PROVIDE GAUGE PIPING ASSEMBLIES AND MATERIALS FOR GAUGES AND INSTRUMENTS CONFIGURED IN ACCORDANCE WITH ASTM F721. VALVES, TUBING, AND FITTINGS SHALL BE 316 STAINLESS STEEL.	13.	PROVIDE A 1" VALVED DRAIN WITH PLUG AT THE LOWEST POINT OF EACH COOLING CIRCUIT.
5.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	14.	CONNECT SWITCHES TO SHIP'S ALARM AND MONITORING SYSTEM AND PROVIDE LOW COOLANT LEVEL ALARMS FOR EACH ENGINE.
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7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.	16.	MOUNT REDUCTION GEAR COOLER AS CLOSE AS POSSIBLE TO REDUCTION GEAR. OIL FLOW MUST BE OPPOSITE OF WATER FLOW IN OIL COOLER.
8.	KEEL COOLER INLET AND OUTLET VALVES SHALL BE LOCATED CLEAR OF OBSTRUCTIONS, AND WITHIN EASY REACH FOR OPERATION. ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.	17.	INTERFACE FLOW SWITCH WITH SHIP'S ALARM AND MONITORING SYSTEM. LOW FLOW ALARM TO OCCUR WHEN FLOW DROPS BELOW 10 GPM.

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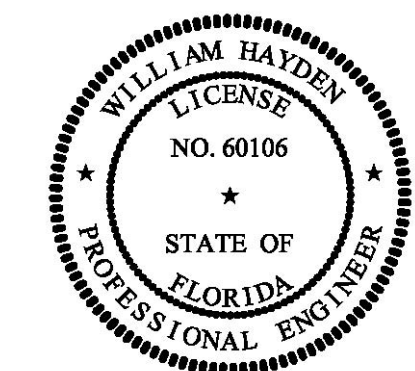
Phone: (904) 399-3673  
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Title: 70.5'x30'x11' NCDOT TOWBOAT

**COOLING SYSTEM**

Dwg. No. 17-1372-256 Alt. No. 1  
Sh. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



MATERIAL SCHEDULE

Table with columns: SERVICE, SIZE, PIPE, COMPONENTS (TAKEDOWN JOINTS, FITTINGS, FLEX CONNECT, GASKETS), VALVES (BODY, TRIM), BOLTING (BOLTS/STUDS, NUTS/WASHERS), REMARKS. Rows include Generator Exhaust Piping (Inlet/Outlet Side of Muffler) and Main Engine Exhaust Piping.

17-1372-4076 Main Engine and Generator Exhaust B.O.M.

Table with columns: ITEM, QTY, SYMBOL, DESCRIPTION, MATERIAL SPEC, REMARKS. Lists items such as Main Engine Dry Exhaust Silencer, Generator Engine Dry Exhaust Silencer, and various expansion bellows.

EQUIPMENT LIST

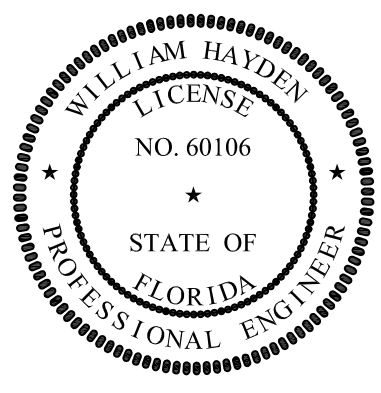
Table with columns: QTY, SERVICE, TYPE, MAKE/MODEL, REMARKS. Lists equipment items like SSG Silencer and Main Engine Silencer.

SPECIFIC NOTES

SYSTEM DETAILS: EX: EXHAUST PIPING ANCHOR, RAINCAP, AND GUIDE DETAILS SHOW PRELIMINARY CONFIGURATION AND LOCATIONS FOR PIPING SUPPORT SYSTEM. PRELIMINARY DESIGN NOTES: EX: EXHAUST PIPING ROUTING SHOWS PRELIMINARY CONFIGURATION AND LOCATIONS FOR PIPING SUPPORT SYSTEM. PARTS EXPOSED TO WEATHER: EX: TAIL PIPE, RAIN HAT, HEAT SHIELD, FASTENERS & HANGERS EXPOSED TO WEATHER AT THE NAV/BRIDGE DECK LEVEL AND ABOVE SHALL BE ASTM A312 TYPE 316L STAINLESS STEEL.

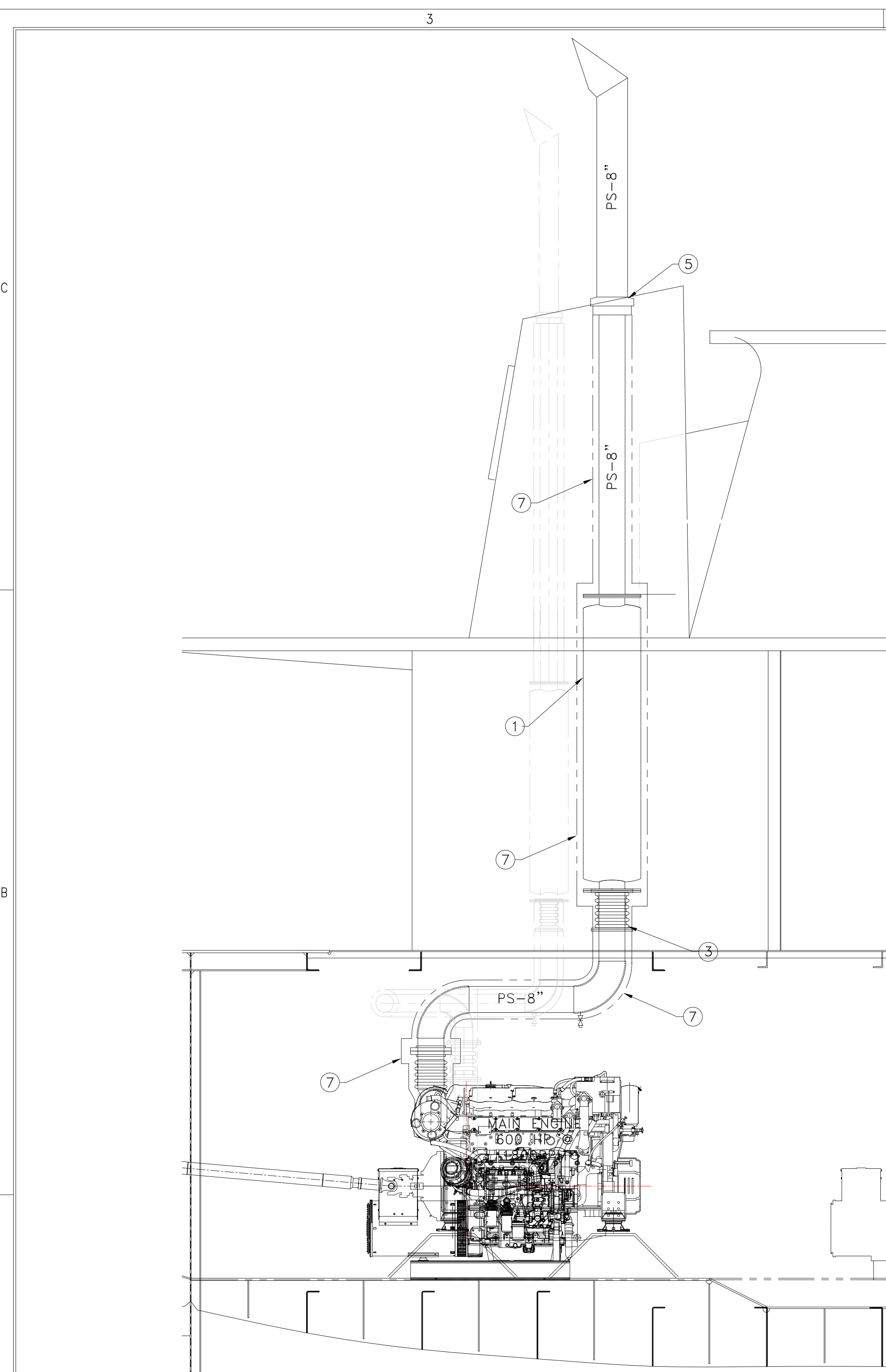
GENERAL NOTES

- 1 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH 46 CFR SUBCHAPTER 2 PIPING SHALL BE RUN AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PROVIDE A SUFFICIENT NUMBER OF TAKEDOWN JOINTS TO ALLOW FOR REMOVAL & INSPECTION. 2 PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED. 3 ALL BOLTED FLANGES ARE TO BE MATED UP FREE OF STRAIN. 4 PIPE HANGERS SHALL MEET THE REQUIREMENTS OF ASTM F708. THE CONTRACTOR SHALL DESIGN AND INSTALL PIPE HANGERS AS NECESSARY TO ADEQUATELY SUPPORT EXHAUST SYSTEMS UNDER STATIC AND DYNAMIC LOADS IMPOSED BY VESSEL MOTIONS, VIBRATION AND THERMAL EXPANSION. THERMAL INSULATION GASKETS SHALL BE INSTALLED BETWEEN THE EXHAUST PIPE AND THE HANGER ATTACHMENT TO THE SHIP. 5 PROVIDE EXPANSION JOINTS WHERE REQUIRED TO ACCOMMODATE THERMAL GROWTH OF EXHAUST PIPES. EXPANSION JOINTS ARE TO BE STAINLESS STEEL MULTI-PLY LAMINATE TYPE MANUFACTURED TO EJMA STANDARDS. EACH EXPANSION JOINT SHALL HAVE ONE END FIXED FLANGE AND THE OTHER END WITH A FLOATING FLANGE. A FLOW DIRECTION ARROW SHALL BE PERMANENTLY MARKED ON EACH EXPANSION JOINT. 6 EXHAUST ELBOW AND EXPANSION JOINT AT ENGINE TURBO OUTLET SHALL BE SUPPLIED BY THE ENGINE MANUFACTURER. ALL OTHERS SHALL BE DME, AMERICAN BDA, OR EQUAL. 7 WEIGHT TRANSMITTED TO EACH ENGINE EXHAUST OUTLET CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN ANY CONDITION. 8 INSULATION FOR ENGINE EXHAUST PIPING AND SILENCERS SHALL BE REMOVABLE INSULATION BLANKETS HAVING A 2" MINIMUM THICKNESS. BLANKETS SHALL BE FASTENED WITH STAINLESS STEEL HOOKS AND INSULATION MATERIALS AND INSTALLATION DETAILS SHALL BE IN ACCORDANCE WITH ASTM F685. 9 1/4" PIPE TAPS SHALL BE INSTALLED ON ENGINE EXHAUST OUTLET PIPING TO FACILITATE BACK PRESSURE MEASUREMENTS. 10 TAIL PIPE, TOP HAT, AND HANGERS EXPOSED TO WEATHER AT THE BRIDGE DECK LEVEL AND ABOVE SHALL BE ASTM A312 TYPE 316L STAINLESS STEEL. 11 VERTICAL EXHAUST PIPING RUNS SHALL BE FITTED WITH VALVED DRAINS LOCATED AT THE LOWEST POINT. EACH DRAIN SHALL CONSIST OF A THREADED STEEL WELDOLET OR HALF COUPLING WELDED TO THE PIPE, FITTED WITH A SCHEDULE 40 PIPE, AND CAPPED WITH A 1" INCH GATE VALVE. 12 PRIOR TO BEING PLACED INTO SERVICE THE EXHAUST PIPING SHALL BE CLEANED AND CHECKED FOR LEAKS. 13 WEIGHT TRANSMITTED TO THE ENGINE CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN HOT AND COLD CONDITIONS. 14 CONTRACTOR SHALL VERIFY ENGINE EXHAUST BACK PRESSURE REQUIREMENTS AND CONNECTION DETAILS PRIOR TO ORDERING MATERIALS.

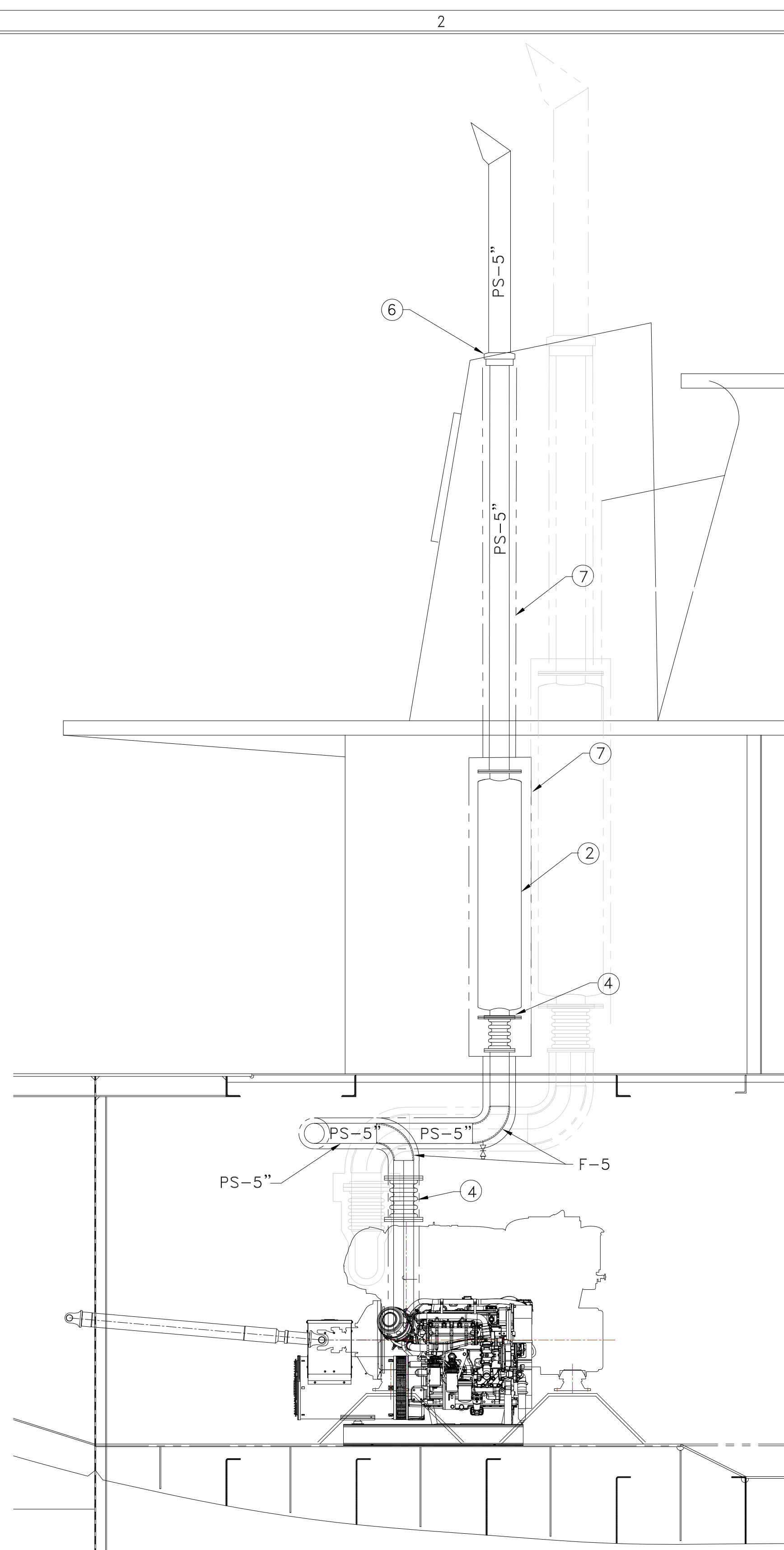


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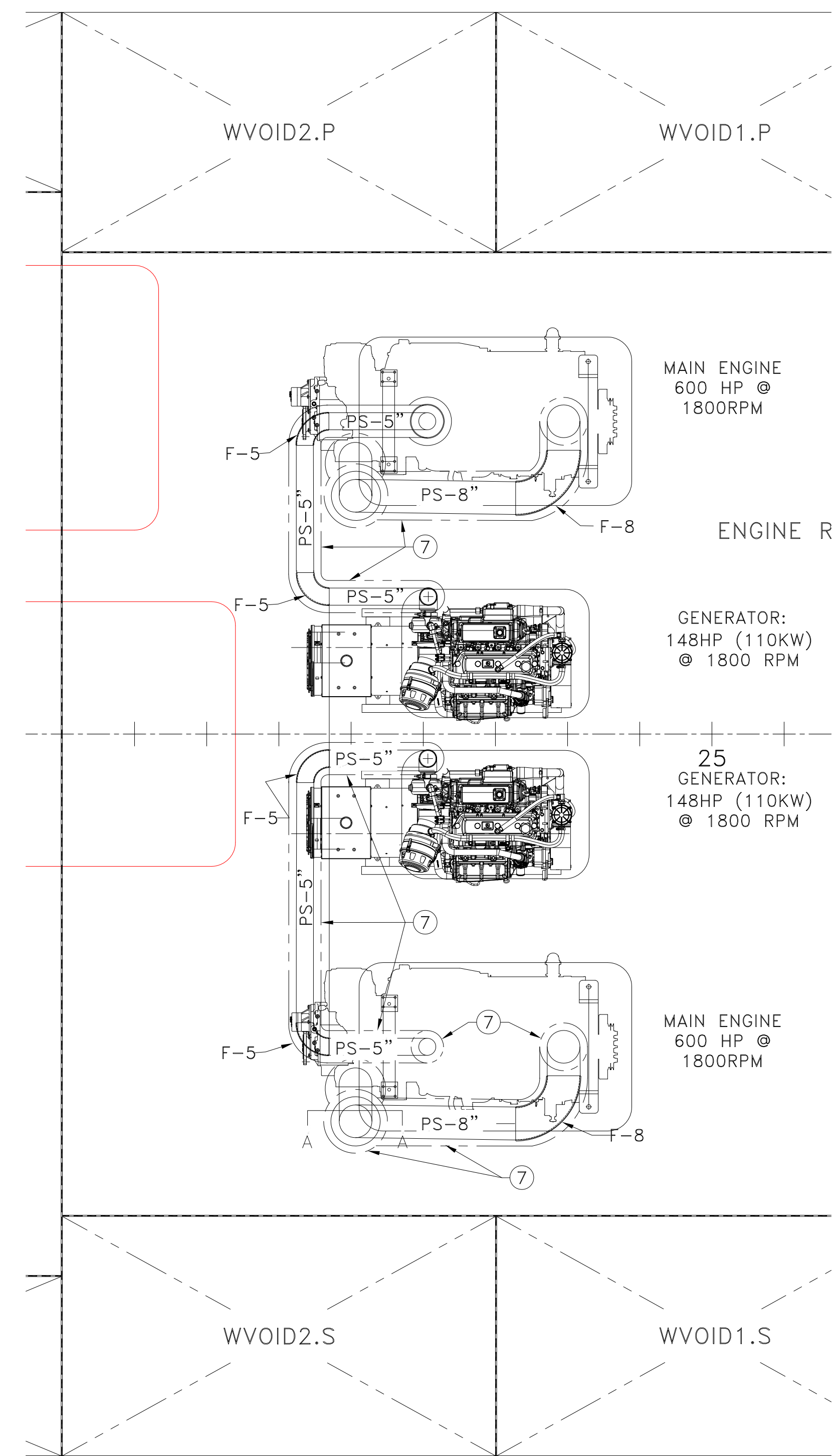




30 MAIN ENGINE  
600 HP @  
1800RPM 25



35 30 GENERATOR:  
148HP (110KW)  
@ 1800 RPM 25



NO.	DESCRIPTION
1	ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH 46 CFR SUBCHAPTER
2	PIPING SHALL BE RUN AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PROVIDE A SUFFICIENT NUMBER OF TAKEDOWN JOINTS TO ALLOW FOR REMOVAL & INSPECTION
3	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.
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6	PROVIDE EXPANSION JOINTS WHERE REQUIRED TO ACCOMMODATE THERMAL GROWTH OF EXHAUST PIPES. EXPANSION JOINTS ARE TO BE STAINLESS STEEL MULTI-PLY LAMINATE TYPE MANUFACTURED TO EJMA STANDARDS. EACH EXPANSION JOINT SHALL HAVE ONE END FIXED FLANGE AND THE OTHER END WITH A FLOATING FLANGE. A FLOW DIRECTION ARROW SHALL BE PERMANENTLY MARKED ON EACH EXPANSION JOINT.
7	EXHAUST ELBOW AND EXPANSION JOINT AT ENGINE TURBO OUTLET SHALL BE SUPPLIED BY THE ENGINE MANUFACTURER. ALL OTHERS SHALL BE DME, AMERICAN BDA, OR EQUAL.
8	WEIGHT TRANSMITTED TO EACH ENGINE EXHAUST OUTLET CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN ANY CONDITION.
9	INSULATION FOR ENGINE EXHAUST PIPING AND SILENCERS SHALL BE REMOVABLE INSULATION BLANKETS HAVING A 2" MINIMUM THICKNESS. BLANKETS SHALL BE FASTENED WITH STAINLESS STEEL HOOKS AND INSULATION MATERIALS AND INSTALLATION DETAILS SHALL BE IN ACCORDANCE WITH ASTM F685.
10	1/4" PIPE TAPS SHALL BE INSTALLED ON ENGINE EXHAUST OUTLET PIPING TO FACILITATE BACK PRESSURE MEASUREMENTS.
11	TAIL PIPE, TOP HAT, AND HANGERS EXPOSED TO WEATHER AT THE BRIDGE DECK LEVEL AND ABOVE SHALL BE ASTM A312 TYPE 316L STAINLESS STEEL.
12	VERTICAL EXHAUST PIPING RUNS SHALL BE FITTED WITH VALVED DRAINS LOCATED AT THE LOWEST POINT. EACH DRAIN SHALL CONSIST OF A THREADED STEEL WELDOLET OR HALF COUPLING WELDED TO THE PIPE, FITTED WITH A SCHEDULE 40 PIPE, AND CAPPED WITH A 1" INCH GATE VALVE.
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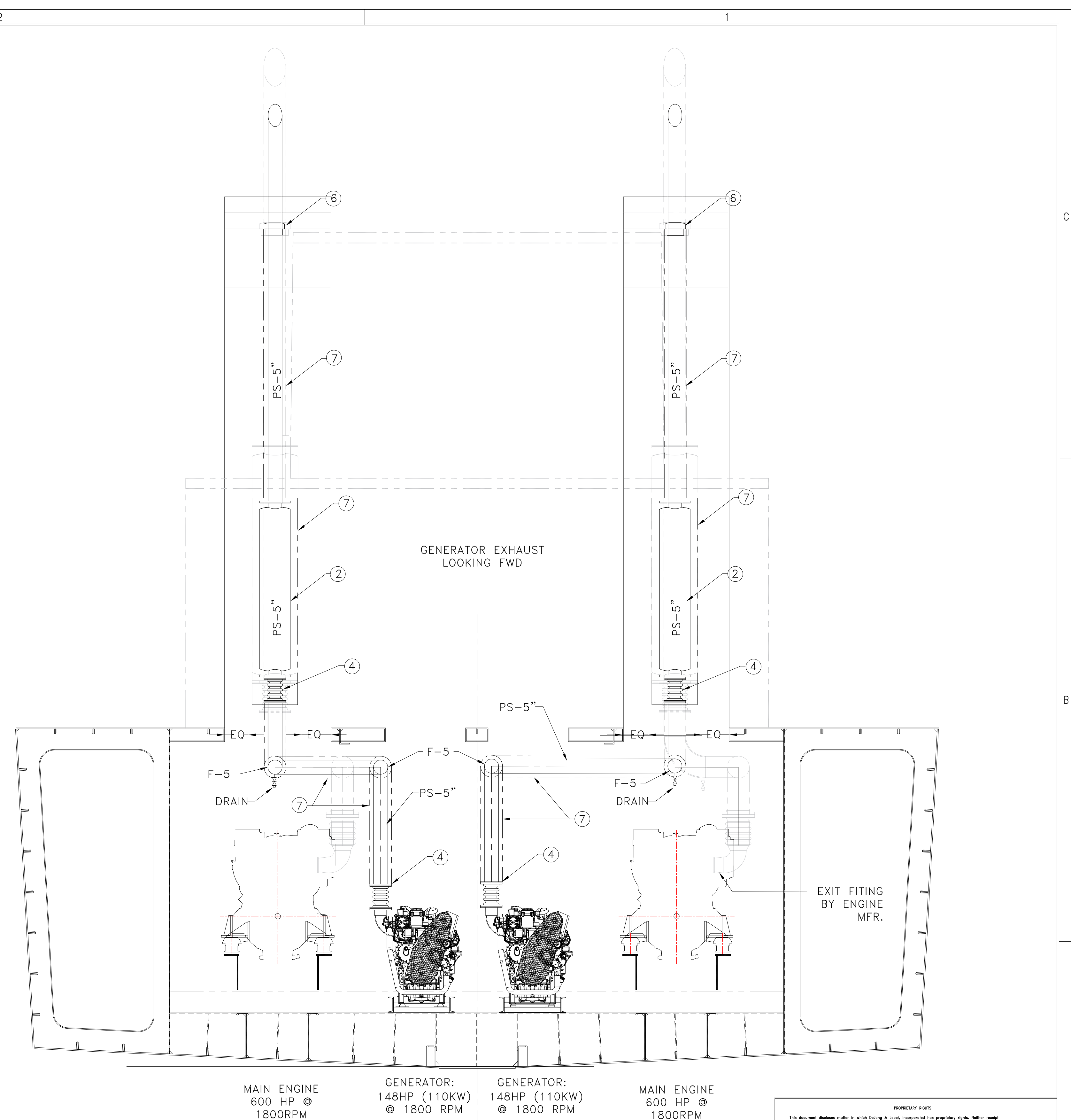
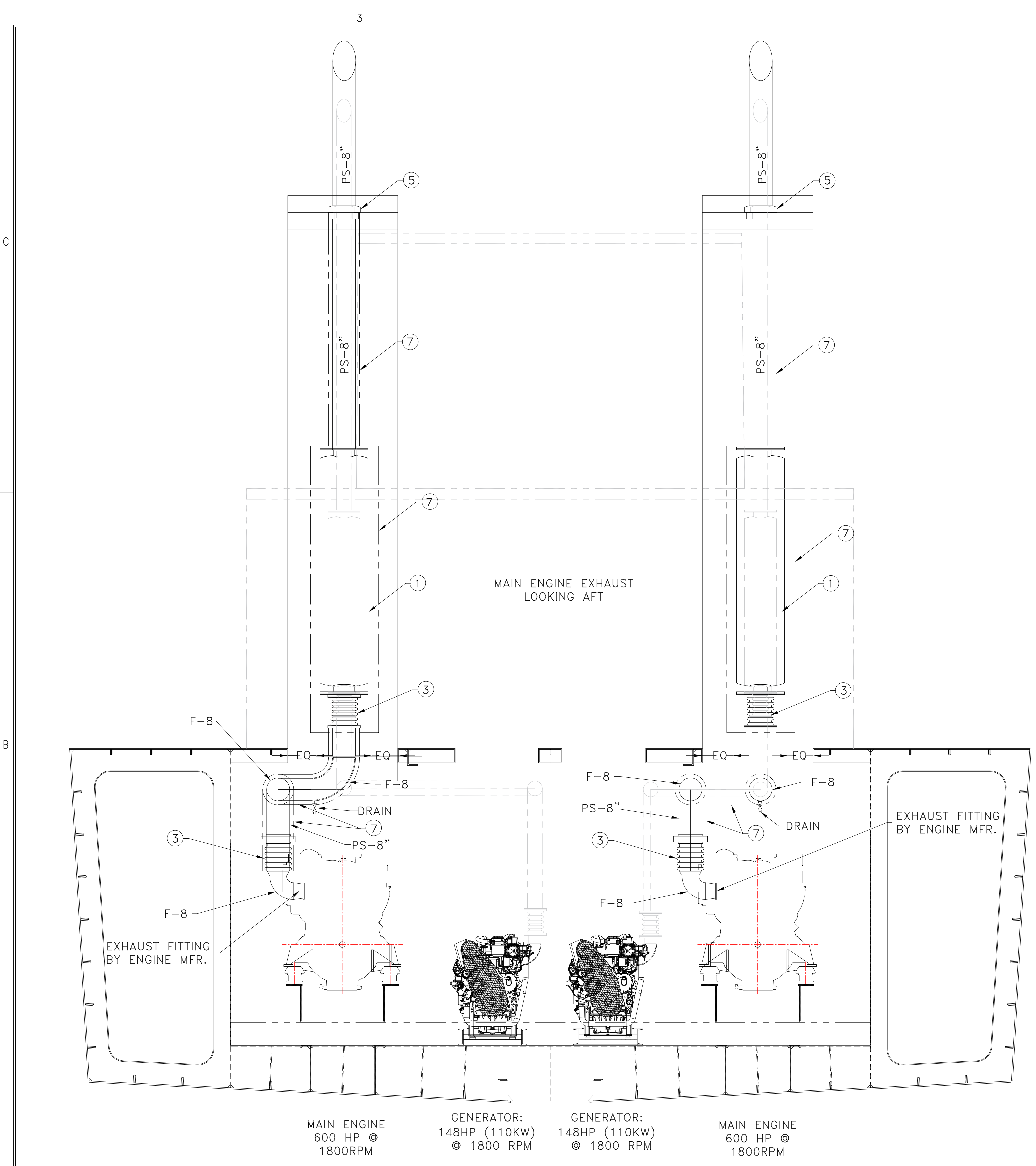
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**ENGINE AND GENERATOR  
EXHAUST & DETAILS**

Dwg. No. 17-1372-259 Alt. No. 0  
Sht. 2 of 3

Drawn By: CHRISTOPHER DUNCAN Date: JULY 16, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



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Title: 70.5'x30'x11' NCDOT TOWBOAT

**ENGINE AND GENERATOR  
EXHAUST DETAILS**

Dwg. No. 17-1372-259 Alt. No. 0  
Sht. 3 of 3

Drawn By: CHRISTOPHER DUNCAN Date: JULY 16, 2018

Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"

ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

SYMBOLS LIST	
	NPS PIPE SIZE AND FLOW DIRECTION ARROW
	REDUCER
	BULKHEAD PENETRATION (SEE DETAIL 2-5A)
	HOSE
	PIPE CAP/CAMLOCK FITTING
	DUPLEX FILTER
	TRIPLEX FILTER
	DRIP PAN (SEE NOTE 11)
	BALL VALVE
	CHECK VALVE
	GATE VALVE WITH HYDRAULIC ACTUATOR
	TANK SUCTION BELLMOUTH (SEE NOTE 10)
	HIGH LEVEL SWITCH
	LOW LEVEL SWITCH
	FUEL FLOW METER WITH RESETTABLE COUNTER
	LIQUID LEVEL SIGHT GAUGE WITH MAGNETIC MARKER

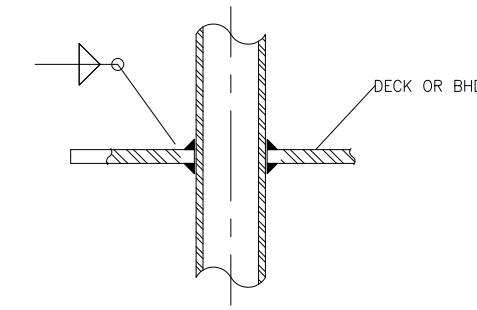
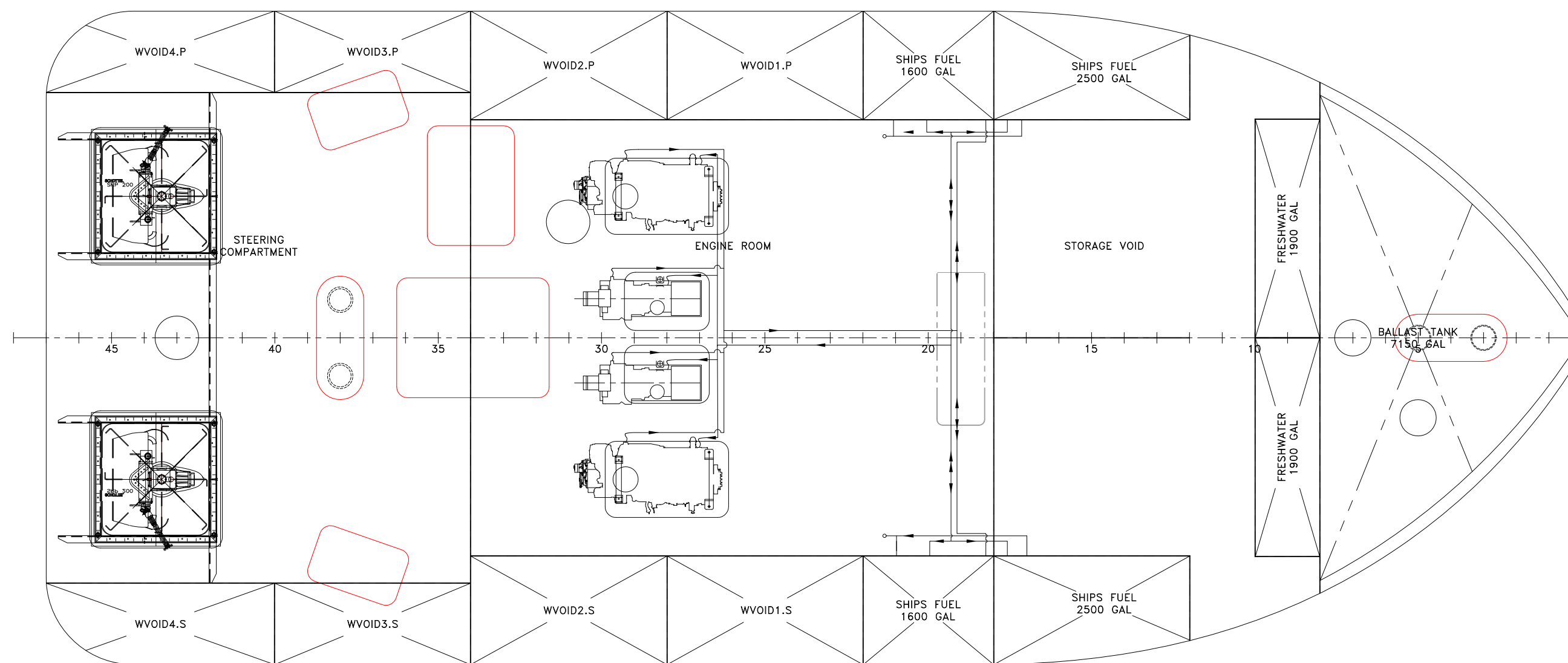


DIAGRAM 2-4A  
TANK BULKHEAD PENETRATION

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
FUEL OIL SERVICE PIPING MAWP: 15 PSIG MAWT: 126°F	ALL	CARBON STEEL, SCH 80, SEAMLESS, ASTM A53 OR ASTM A106 GRADE B, ANSI B36.10	FLANGE SOCKET WELD, WELD NECK OR SLIP ON, CARBON STEEL, ASTM A105, ANSI B16.5  UNION GROUND JOINT, SOCKET WELD CARBON STEEL, ASTM A105, MSS-SP-83	SOCKET WELD CARBON STEEL, ASTM A105 OR ASTM A234 GR WPB, ANSI B16.11  BUTTWELD CARBON STEEL, ASTM A234, GR WPB, ANSI B16.9 OR B16.28	FLEX HOSE MEETING SAE J1942 AND J1475 FOR DIESEL SERVICE SEE NOTE 9	GARLOCK STYLE 3000	GATE FLANGED CARBON STEEL, ASTM A216 GR WCB OR ASTM A105 ANSI B16.34  BALL THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB  CHECK THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB	GATE CRES STEM, DISC AND SEAT  BALL CHROME PLATED BALL, RPTFE OR VITON SEATS  CHECK CRES DISC	CARBON STEEL ASTM A307 GR ANSI B18.2.1	HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2	

BILL OF MATERIALS					
#	QTY.	SERVICE	TYPE	MAKE/MODEL	COMMENTS
①	2	FO TANK LEVEL ALARM	SWITCH MODULE ON GEM SURESITE SIGHTGLASS		MOUNTS TO SURESITE TUBE OPPOSITE LEVEL INDICATOR FLAGS
②	2	ME FUEL FILTER	TRIPLEX COALESCING		SEE NOTE 11
③	2	SSDG FUEL FILTER	DUPLEX COALESCING		SEE NOTE 11
④	2	REMOATE SHUTDOWN FO TANK VALVES	2" 150# ANSI FLG. GLOBE VALVE, HYD. ACTUATED	ABS APPROVED. LK VALVE	
⑤	2	FUEL TRANSFER PUMP	BRONZE GEAR PUMP WITH RELIEF VALVE, 100GMP, 50PSI, 1725RPM 5HP 208VAC, 60HZ 3PH,		
⑥	4	CAM LOCK			
⑦	2	VENT GUARD	WINTEB		
P-1 1/4"	AS REQ'D		1 1/4" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
P-1"	AS REQ'D		1" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
P-3/4"	AS REQ'D		3/4" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
P-1/2"	AS REQ'D		1/2" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
H-1	4		3/4" FUEL OIL HOSE, USCG APPROVED		SAE J-1942, SAE J-1475 (FITTINGS)
H-2	4		1/2" FUEL OIL HOSE, USCG APPROVED		SAE J-1942, SAE J-1475 (FITTINGS)
V-1	4		3/4" FULL PORT BALL VALVE, STEEL, SCREWED, 150# WOG		ASTM A105/A234
V-2	4		1/2" FULL PORT BALL VALVE, STEEL, SCREWED, 150# WOG		ASTM A105/A234
V-3	2		1" FULL PORT BALL VALVE, STEEL, SCREWED 150# WOG		ASTM A105/A234
V-4	14		2" FULL PORT BALL VALVE, STEEL, SCREWED 150# WOG		ASTM A105/A234
CV-1	2		3/4" LIFT CHECK VALVE, STEEL, SCREWED, 150# WOG		ASTM A105/A234
CV-2	2		1/2" LIFT CHECK VALVE, STEEL, SCREWED, 150# WOG		ASTM A105/A234
CV-3	1		1" LIFT CHECK VALVE, STEEL, SCREWED, 150# WOG		ASTM A105/A234



-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	FUEL OIL SUPPLY SUCTION BELLSOUTH AREA SHALL BE AT LEAST 1 1/2 TIMES THE SUCTION PIPE INTERNAL AREA.
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.	11.	FUEL FILTERS SHALL BE USCG APPROVED WITH METAL BOWLS FILTERS SHALL BE FITTED WITH BALL VALVES FOR FILTER ISOLATION WHILE THE ENGINE IS RUNNING, WATER PROBES, AND DIFFERENTIAL PRESSURE GAUGES.
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.	12.	DRIP PANS WITH UP-TURNED EDGES SHALL BE PROVIDED BENEATH ALL FILTERS. EACH DRIP PAN SHALL BE FITTED WITH A LOW POINT DRAIN PORT.
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.	13.	REMOVE FUEL OIL SUPPLY SHUT OFF REACH RODS SHALL TERMINATE AT A FLUSH DECK BOX. LOCATE DECK BOXES ON THE MAIN DECK NEAR THE DECKHOUSE AND OUT OF VEHICLE LANES LOCATE A T-WRENCH ON THE DECKHOUSE BULKHEAD ADJACENT TO EACH DECK BOX. PERMANENTLY LABEL EACH DECK BOX IN ACCORDANCE WITH REF. 1
5.	DO NOT ROUTE PIPING CONTAINING FUEL OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL FUEL OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT	14.	FUEL SYSTEM PIPING SHALL BE CLEANED, FLUSHED AND HYDROSTATICALLY TESTED PRIOR TO BEING PLACED INTO SERVICE.
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION STRUCTURE.	15.	PIPE THREAD SEALING TAPE, GALVANIZED PIPE, AND GALVANIZED FITTINGS SHALL NOT BE USED.
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.		
8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 2-5A		
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR FUEL OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 24" IN LENGTH.		

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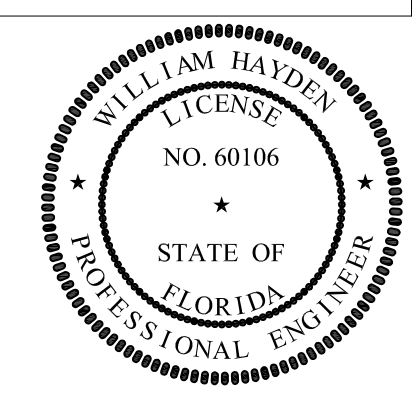
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Title: 70.5'x30'x11' NCDOT TOWBOAT

**FUEL OIL PIPING**

Dwg. No. 17-1372-261 Alt. No. 1  
Sh. 1 of 3

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: NONE  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



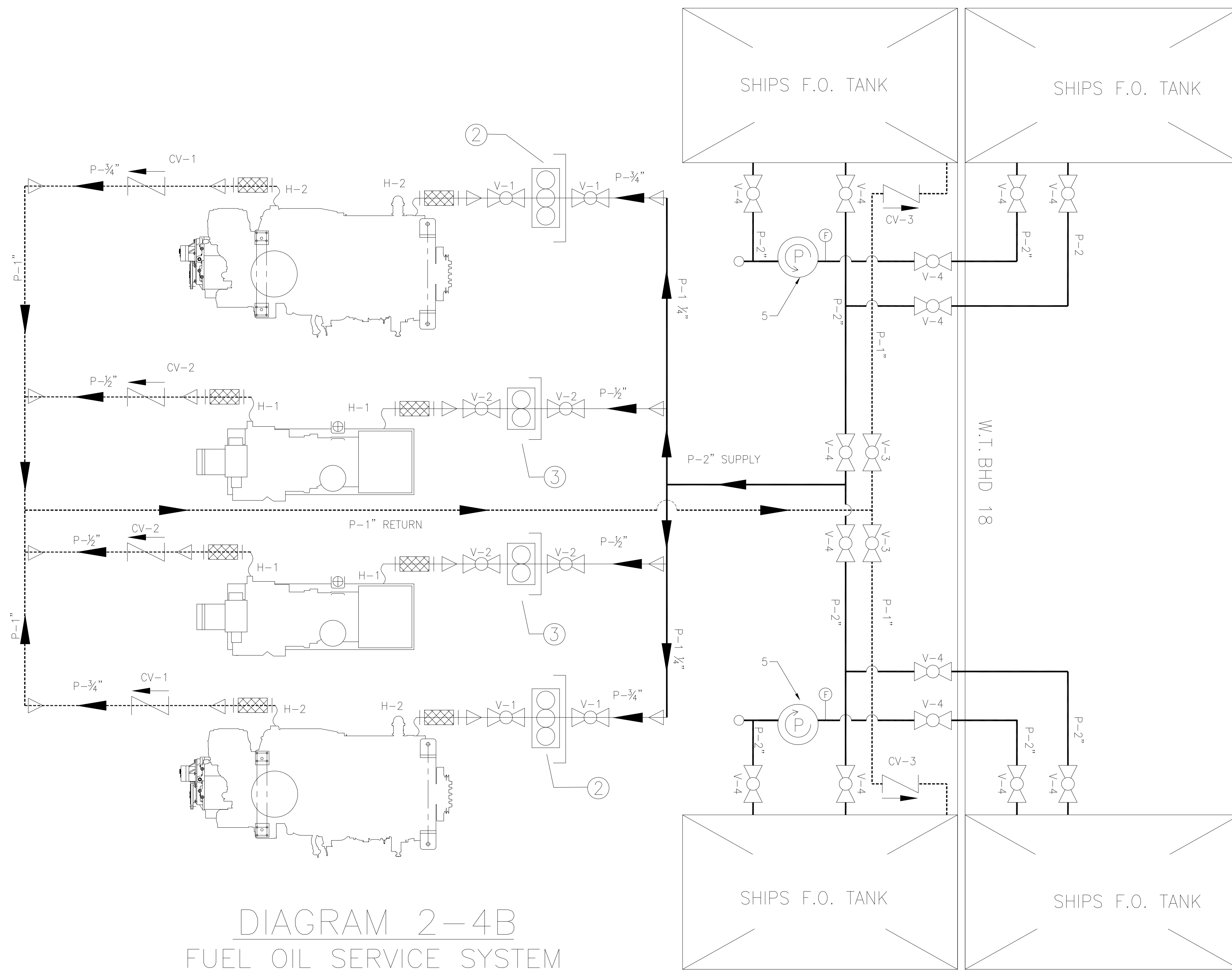


DIAGRAM 2-4B  
FUEL OIL SERVICE SYSTEM

- GENERAL NOTES -		- GENERAL NOTES -	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	FUEL OIL SUPPLY SUCTION BELLSOUTH AREA SHALL BE AT LEAST 1 1/2 TIMES THE SUCTION PIPE INTERNAL AREA.
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.	11.	FUEL FILTERS SHALL BE USCG APPROVED WITH METAL BOWLS FILTERS SHALL BE FITTED WITH BALL VALVES FOR FILTER ISOLATION WHILE THE ENGINE IS RUNNING, WATER PROBES, AND DIFFERENTIAL PRESSURE GAUGES.
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.	12.	DRIP PANS WITH UP-TURNED EDGES SHALL BE PROVIDED BENEATH ALL FILTERS. EACH DRIP PAN SHALL BE FITTED WITH A LOW POINT DRAIN PORT.
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.	13.	REMOTE FUEL OIL SUPPLY SHUT OFF REACH RODS SHALL TERMINATE AT A FLUSH DECK BOX. LOCATE DECK BOXES ON THE MAIN DECK NEAR THE DECKHOUSE AND OUT OF VEHICLE LANES LOCATE A T-WRENCH ON THE DECKHOUSE BULKHEAD ADJACENT TO EACH DECK BOX. PERMANENTLY LABEL EACH DECK BOX IN ACCORDANCE WITH REF. 1
5.	DO NOT ROUTE PIPING CONTAINING FUEL OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL FUEL OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT	14.	FUEL SYSTEM PIPING SHALL BE CLEANED, FLUSHED AND HYDROSTATICALLY TESTED PRIOR TO BEING PLACED INTO SERVICE.
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.	15.	PIPE THREAD SEALING TAPE, GALVANIZED PIPE, AND GALVANIZED FITTINGS SHALL NOT BE USED.
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.		
8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 2-5A		
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR FUEL OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 24" IN LENGTH.		

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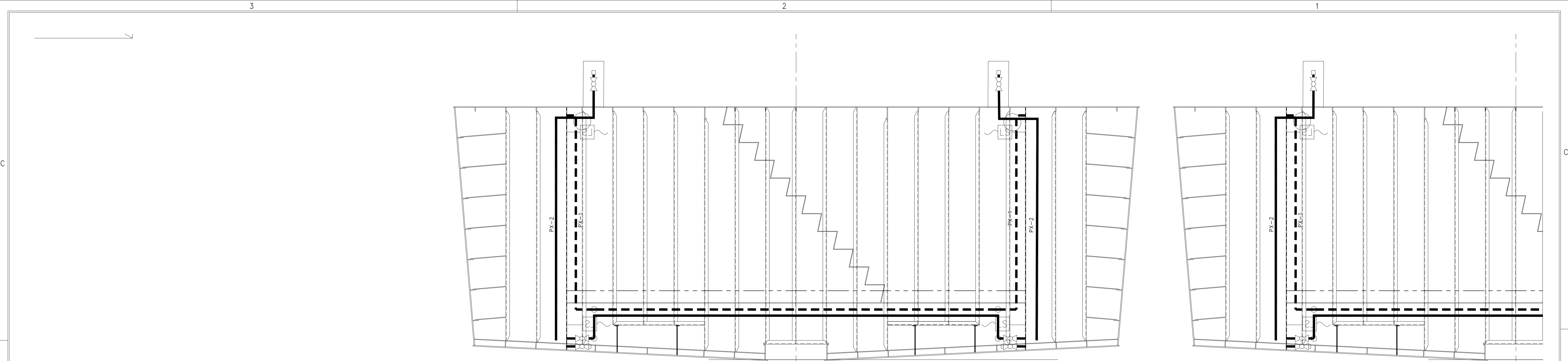
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Title: 70.5'x30'x11' NCDOT TOWBOAT

**FUEL OIL PIPING**

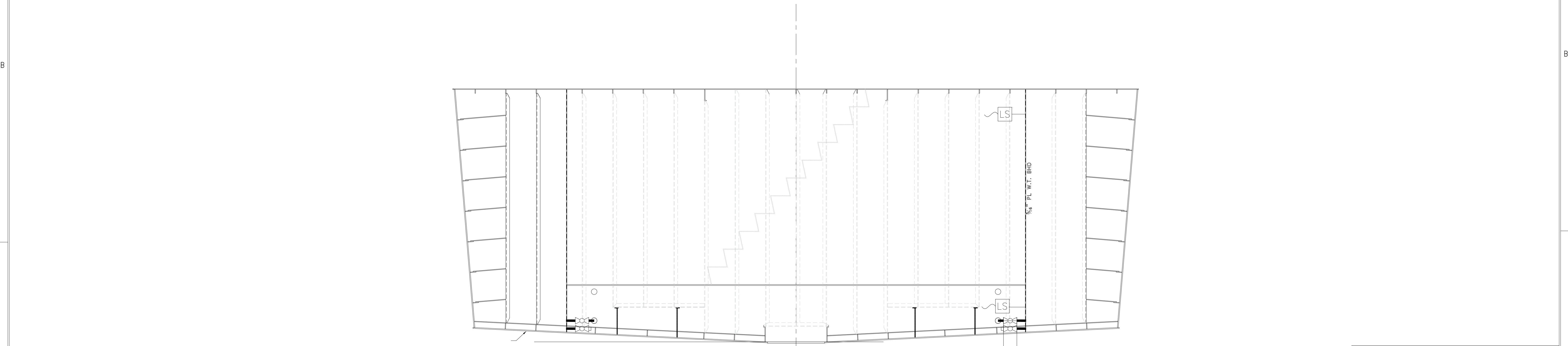
Dwg. No. 17-1372-261 Alt. No. 1  
 Sht. 2 of 3

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: NONE  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



5/16" PL W.T. BHD @ FR 18  
W/ 3x2x5/16" L STIFFS ON AFT FACE  
SHOWN LKG FWD

5/16"  
W/ 3x2



5/16" PL W.T. BHD @ FR 18  
W/ 3x2x5/16" L STIFFS ON AFT FACE  
SHOWN LKG AFT

-- GENERAL NOTES --

NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.
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4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.
5.	DO NOT ROUTE PIPING CONTAINING FUEL OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL FUEL OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT.
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.
8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 2-5A.
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR FUEL OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 24" IN LENGTH.

-- GENERAL NOTES --

NO.	DESCRIPTION
10.	FUEL OIL SUPPLY SUCTION BELLSOUTH AREA SHALL BE AT LEAST 1 1/2 TIMES THE SUCTION PIPE INTERNAL AREA.
11.	FUEL FILTERS SHALL BE USCG APPROVED WITH METAL BOWLS FILTERS SHALL BE FITTED WITH BALL VALVES FOR FILTER ISOLATION WHILE THE ENGINE IS RUNNING, WATER PROBES, AND DIFFERENTIAL PRESSURE GAUGES.
12.	DRIP PANS WITH UP-TURNED EDGES SHALL BE PROVIDED BENEATH ALL FILTERS. EACH DRIP PAN SHALL BE FITTED WITH A LOW POINT DRAIN PORT.
13.	REMOTE FUEL OIL SUPPLY SHUT OFF REACH RODS SHALL TERMINATE AT A FLUSH DECK BOX. LOCATE DECK BOXES ON THE MAIN DECK NEAR THE DECKHOUSE AND OUT OF VEHICLE LANES LOCATE A T-WRENCH ON THE DECKHOUSE BULKHEAD ADJACENT TO EACH DECK BOX. PERMANENTLY LABEL EACH DECK BOX IN ACCORDANCE WITH REF. 1.
14.	FUEL SYSTEM PIPING SHALL BE CLEANED, FLUSHED AND HYDROSTATICALLY TESTED PRIOR TO BEING PLACED INTO SERVICE.
15.	PIPE THREAD SEALING TAPE, GALVANIZED PIPE, AND GALVANIZED FITTINGS SHALL NOT BE USED.

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**FUEL OIL PIPING**

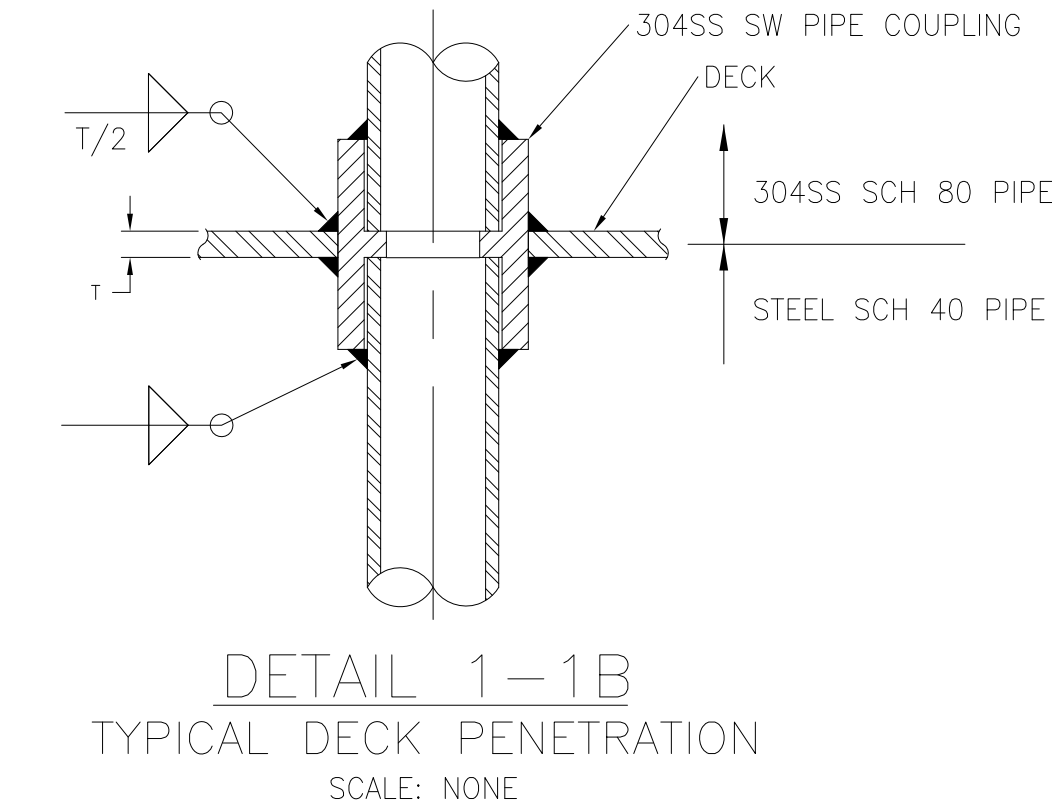
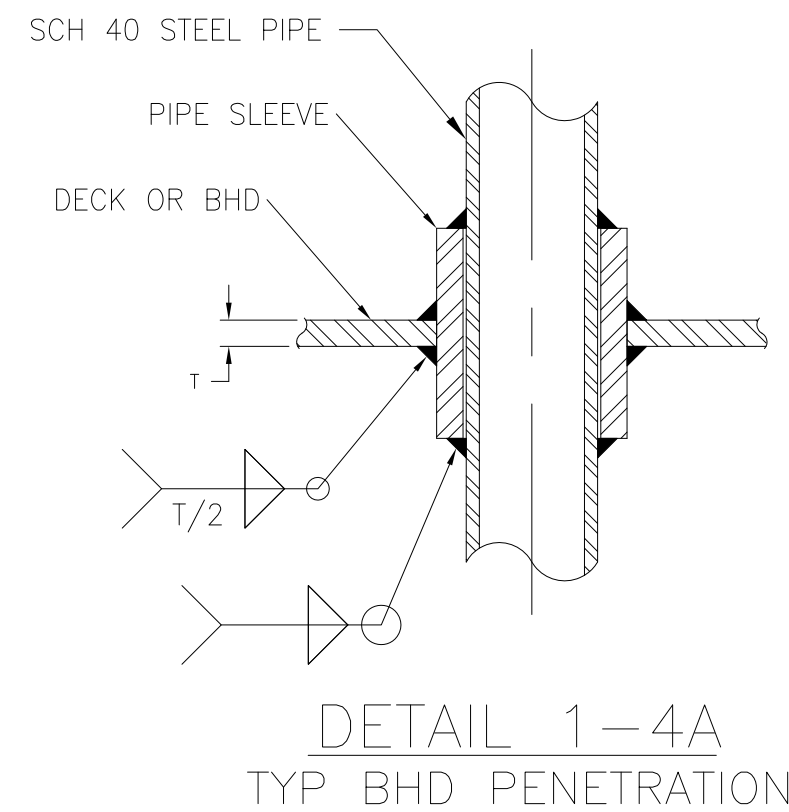
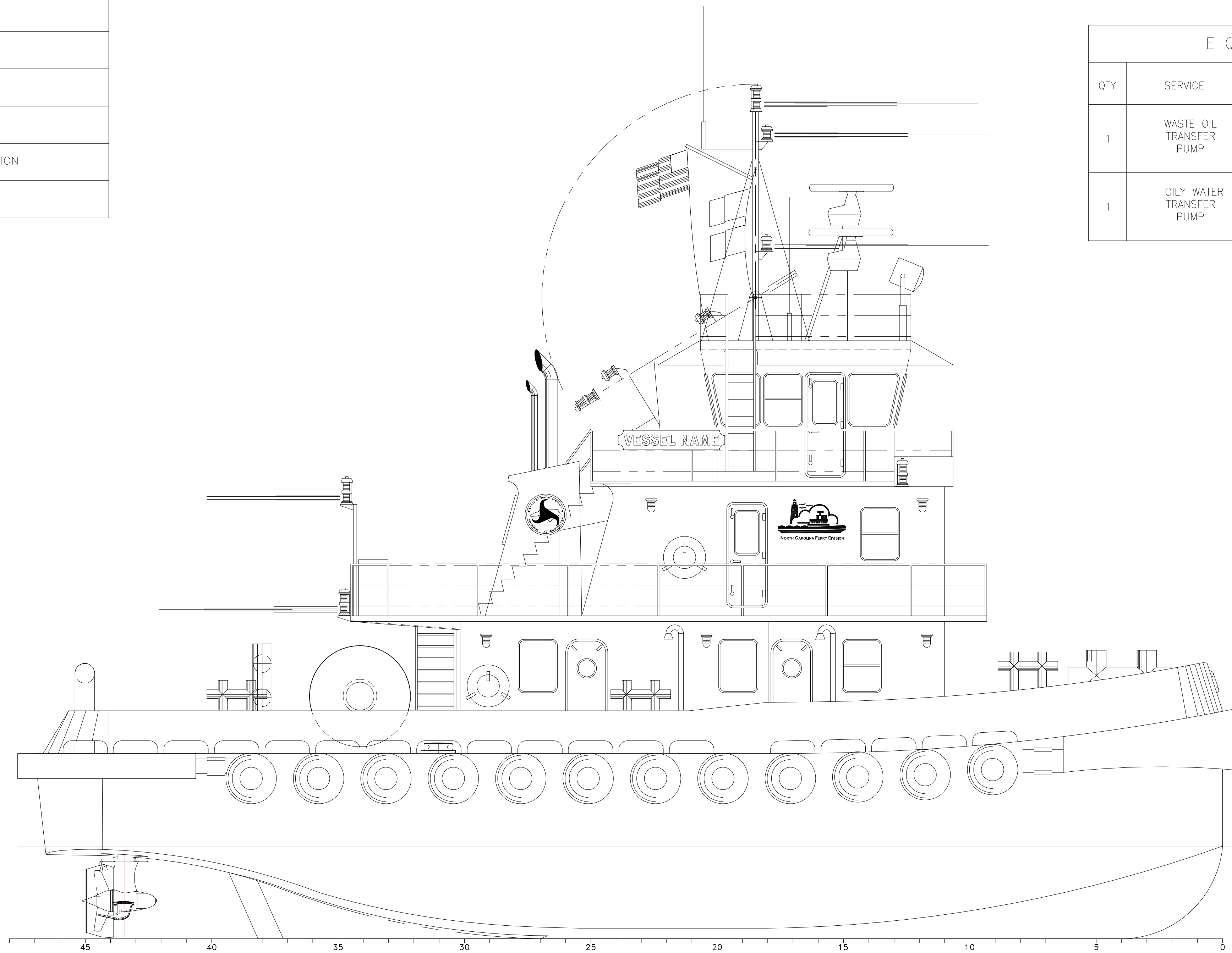
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Sh. 3 of 3

Drawn By: **JACOB CONNALLY** Date: **JUNE 05, 2018**  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: **NONE**  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

SYMBOLS LIST	
	PIPE
	REDUCER
	CHECK VALVE
	BALL VALVE
	BALL VALVE, LOCKING
	DIAPHRAGM PUMP
	CAMLOCK
	DRIP PAN
	HOSE REEL
	SUCTION STRAINER BOX
	BULKHEAD PIPE PENETRATION
	PRESSURE GAUGE

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
WASTE OIL / OILY WATER DRAINS MAMP: 70 PSIG MAWT: 120°F	ALL	BELOW DECK CARBON STEEL, SCH 40, SEAMLESS, ASTM A53 TYPE S, OR ASTM A106, GRADE B, ANSI B36.10  ABOVE DECK 304SS, SCH 80, ASTM A312 GR304/304L	FLANGE #150, SOCKET WELD CARBON STEEL, ASTM A105, ANSI B16.5  VIEGA MEGAPRESS	BELOW DECK STEEL, VIEGA MEGAPRESS  ABOVE DECK SOCKET WELD, S. STEEL, ASTM A351 GR 304/304L, ANSI B16.11	HOSE: SEE NOTE 11	GARLOCK STYLE 3000  BALL - ABV DK SW OR THREADED, 3-PIECE S. STEEL, ASTM A351 GR CF8M	BALL - BLW DK SW OR THREADED, 3-PIECE CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB  CHECK - BLW DK THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB	BALL CHROME PLATED BALL, RPTFE OR VITON SEATS  CHECK CRES DISC	CARBON STEEL ASTM A307 GR B ANSI B18.2.1	HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2	

EQUIPMENT & PUMP LIST					
QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE
1	WASTE OIL TRANSFER PUMP	DOUBLE DIAPHRAGM		35 GPM @ 35 PSI	2HP TEFC MOTOR 208V/3P/60Hz SEE NOTE 10
1	OILY WATER TRANSFER PUMP	DOUBLE DIAPHRAGM		30 GPM @ 35 PSI	2HP TEFC MOTOR 208V/3P/60Hz SEE NOTE 10



KEY ELEVATION  
NO SCALE

- GENERAL NOTES -

- GENERAL NOTES -

NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.	12.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720, AND BE SUITABLE FOR WASTE OIL AND OILY WATER SERVICE. SUCTION HOSES SHALL BE NON-COLLAPSING.
2.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PROVIDE TAKEDOWN JOINTS FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF EQUIPMENT. PIPING SHALL BE RUN TO MINIMIZE CUTTING OF THE SHIP'S STRUCTURE.	13.	LOCATE BILGE STRIPPING SUCTIONS AT THE LOWEST POINTS IN THE ENGINE ROOM, EACH END.
3.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS, HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 1-4A.		
4.	PIPING SHALL BE SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708.		
5.	GAUGE ASSEMBLIES TO BE IN ACCORDANCE WITH ASTM F721. BALL VALVES, TUBING AND FITTINGS SHALL BE 316 STAINLESS STEEL.		
6.	DRIP PANS SHALL BE PROVIDED BENEATH ALL PUMPS, STRAINERS, & FILTERS THAT WILL LEAK DURING ROUTINE MAINTENANCE AND BE EQUIPPED WITH A LOW POINT DRAIN VALVE.		
7.	LUBE OIL PIPING SHALL NOT BE ROUTED NEAR ELECTRICAL DEVICES OR EQUIPMENT. LUBE OIL PIPING SHALL BE AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER.		
8.	GALVANIZED PIPE, FITTINGS, COMPONENTS, ETC. SHALL NOT BE USED.		
9.	FIT DRIP PANS UNDER HOSE REELS AND PUMPS.		
10.	FIT EACH MAIN ENGINE, GENERATOR, AND REDUCTION GEAR SUMP WITH A LOCKING DRAIN VALVE, 1" FEMALE CAMLOCK, AND DUST PLUG TO DRAIN LINE WITH A STAINLESS STEEL CHAIN OR CABLE.		
11.	EACH DIAPHRAGM PUMP SHALL BE SUPPLIED WITH ALUMINUM BODY, INTEGRATED COMPRESSOR, NPT PORTS, AND TPE SEATS, BALLS AND DIAPHRAGMS. EACH PUMP SHALL VFD CONTROLLED WITH PUSH BUTTON SPEED ADJUSTMENT.		

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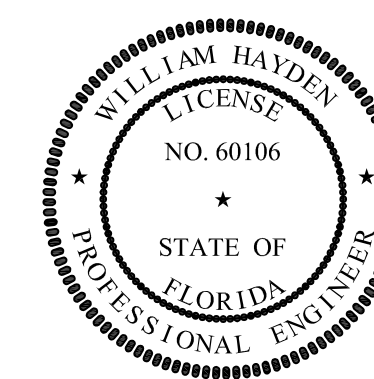
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TITLE: 70.5'x30'x11' NCDOT TOWBOAT

**DIRTY OIL SYSTEM**

Dwg. No. 17-1372-264 Alt. No. 0  
Sh. 1 of 2

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



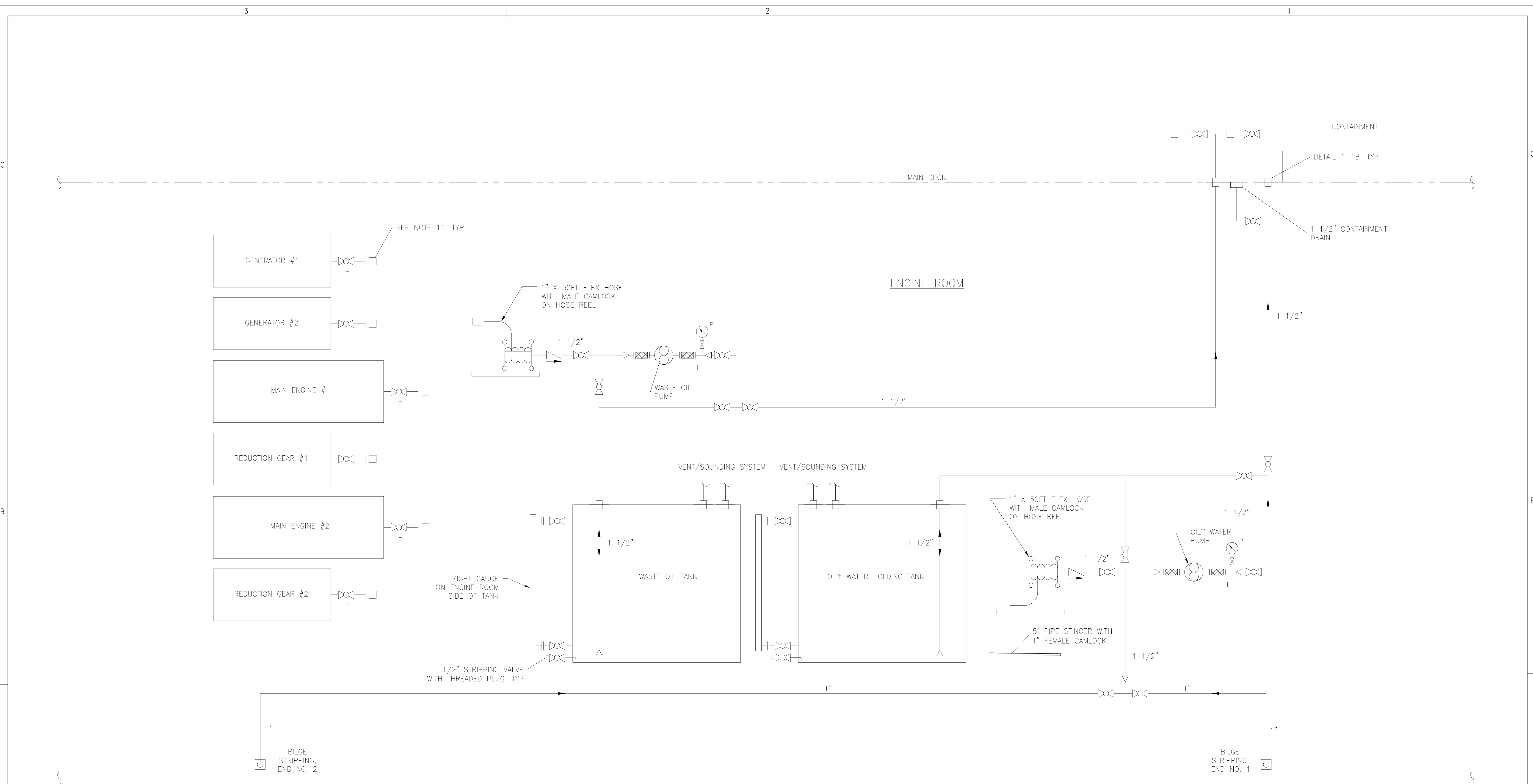


DIAGRAM 2-4A  
OILY WATER COLLECTION/WASTE OIL SYSTEM

- GENERAL NOTES -		- GENERAL NOTES -	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.	12.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720, AND BE SUITABLE FOR WASTE OIL AND OILY WATER SERVICE. SUCTION HOSES SHALL BE NON-COLLAPSING.
2.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PROVIDE TAKEDOWN JOINTS FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF EQUIPMENT. PIPING SHALL BE RUN TO MINIMIZE CUTTING OF THE SHIP'S STRUCTURE.	13.	LOCATE BILGE STRIPPING SUCTIONS AT THE LOWEST POINTS IN THE ENGINE ROOM, EACH END.
3.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS, HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 1-4A.		
4.	PIPING SHALL BE SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708.		
5.	GAUGE ASSEMBLIES TO BE IN ACCORDANCE WITH ASTM F721. BALL VALVES, TUBING AND FITTINGS SHALL BE 316 STAINLESS STEEL.		
6.	DRIP PANS SHALL BE PROVIDED BENEATH ALL PUMPS, STRAINERS, & FILTERS THAT WILL LEAK DURING ROUTINE MAINTENANCE AND BE EQUIPPED WITH A LOW POINT DRAIN VALVE.		
7.	LUBE OIL PIPING SHALL NOT BE ROUTED NEAR ELECTRICAL DEVICES OR EQUIPMENT. LUBE OIL PIPING SHALL BE AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER.		
8.	GALVANIZED PIPE, FITTINGS, COMPONENTS, ETC. SHALL NOT BE USED.		
9.	FIT DRIP PANS UNDER HOSE REELS AND PUMPS.		
10.	FIT EACH MAIN ENGINE, GENERATOR, AND REDUCTION GEAR SUMP WITH A LOCKING DRAIN VALVE, 1" FEMALE CAMLOCK, AND DUST PLUG TO DRAIN LINE WITH A STAINLESS STEEL CHAIN OR CABLE.		
11.	EACH DIAPHRAGM PUMP SHALL BE SUPPLIED WITH ALUMINUM BODY, INTEGRATED COMPRESSOR, NPT PORTS, AND TPE SEATS, BALLS AND DIAPHRAGMS. EACH PUMP SHALL VFD CONTROLLED WITH PUSH BUTTON SPEED ADJUSTMENT.		

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Title: 70.5'x30'x11' NCDOT TOWBOAT

**DIRTY OIL PIPING**

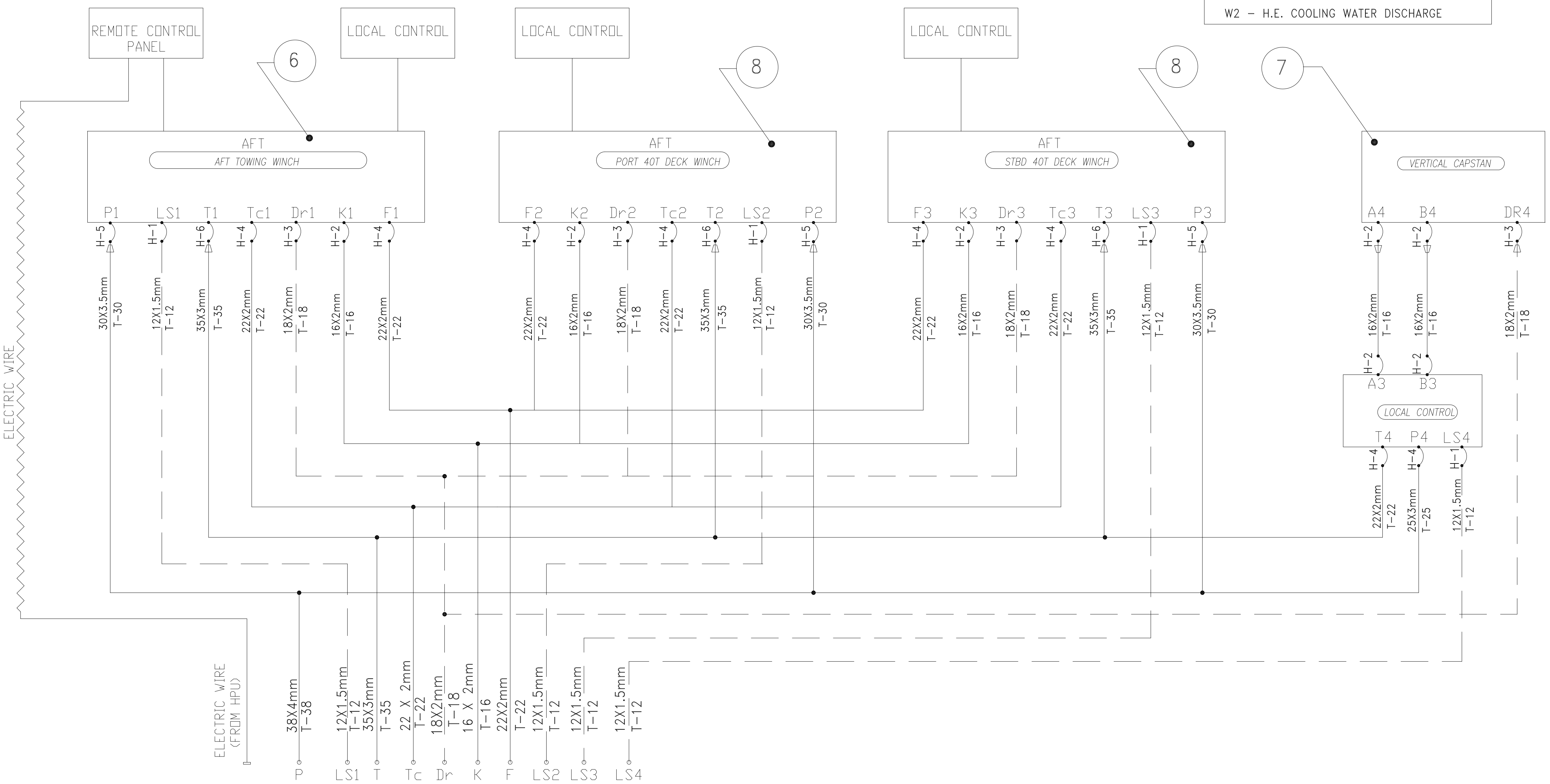
Dwg. No: 17-1372-264 Alt. No: 0  
Sh: 2 of 2

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: Date:  
App'd By: Scale: 1/2" = 1'-0"  
ABS App'l: USCG App'l:

MATERIAL SCHEDULE										
SERVICE	SIZE	PIPE	TAKE DOWN JOINTS	COMPONENTS	FLEX CONNECT	GASKETS	VALVES	TRIM	BOLTING	REMARKS
HYDRAULIC OIL SERVICE PIPING	ALL	STAINLESS STEEL TUBING TYPE 316L, ASTM A213 WALL THICKNESS VARIES	FLANGE SOCKET WELD, WELD NECK OR SLIP ON, 316L, STAINLESS STEEL, ASTM SA182, ANSI B16.11	SOCKET WELD STAINLESS STEEL, TYPE 316L, ASTM A182, ANSI B16.11	FLEX HOSE MEETING SAE J1942 AND J1475 FOR HYDRAULIC SERVICE SEE NOTE 9	GARLOCK STYLE 3000	GATE CARBON STEEL FLANGED CARBON STEEL, ASTM A216 GR WCB DR. ASTM A105 ANSI B16.34	GATE CRES STEM AND DISC SEAT	CARBON STEEL ASTM A307 GR B OR ASTM A563 GR A ANSI B18.2.2	HE-HEAD CARBON STEEL
M.A.W.P. 3000 PSIG		STAINLESS STEEL PIPE, TYPE 316L, ASTM A312	UNION GROUND JOINT, SOCKET WELD CARBON STEEL, ASTM A105, MSS-SP-83	BUTTWELD TYPE 316 STAINLESS STEEL, ASTM A276, ASTM A479, ASTM A182	COMPRESSION TYPE 316 STAINLESS STEEL, ASTM A276, ASTM A479, ASTM A182		BALL THREADED, CARBON STEEL, ASTM A181, DR. ASTM A216 GR WCB	BALL CHROME PLATED BALL, RPTFE OR VITON SEATS		
M.A.W.T. 150°F							CHECK THREADED, CARBON STEEL, ASTM A105, DR. ASTM A216 GR WCB	CHECK CRES DISC		

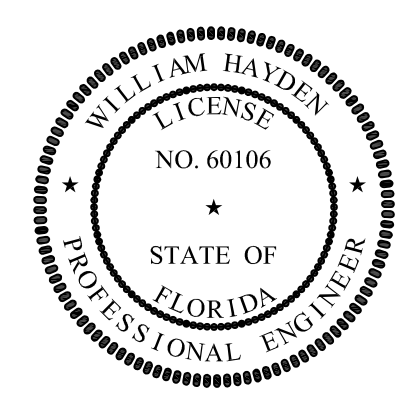
PIPING IDENTIFICATION	
P - PRESSURE	
LS - LOAD SENSING	
T - TANK RETURN	
Tc - BRAKE TANK RETURN LINE	
Dr - DRAIN	
K - BRAKE PRESSURE	
F - HYDRAULIC MOTOR FLUSHING	
LS - LOAD SENSING	
W1 - H.E. COOLING WATER SUPPLY	
W2 - H.E. COOLING WATER DISCHARGE	

BILL OF MATERIALS					
#	QTY.	SERVICE	TYPE	MAKE/MODEL	COMMENTS
1	2	HYDRAULIC PUMP PTO	PTO 400 FOR JOHN DEERE 4045 ENGINE	LOGAN 900-8020	
2	2	HYDRAULIC PUMP PTO	FLUID ACTIVATED CLUTCH, 400 FT-LB, SAE C 14T SPLINE	LOGAN SPF400, OPTION SPF-4300-01	MAX ENGAGEMENT 1800 RPM
3	2	HYDRAULIC PUMP PTO	RIGID COUPLING	LOGAN 088-0018	
4	2	HYDRAULIC PUMP PTO	PNEUMATIC CONTROLS W/ 24VDC SOLENOID	LOGAN 610-0052	
5	2	HYDRAULIC PUMP	PUMP, VARIABLE DISPLACEMENT, 26.4 GPM, 3000 PSI, SAE "C" FLANGE, 2 BOLT	REYROTH A10V50/21DFLR/31R-VSA42N00	
6	1	HYDRAULIC TOWING WINCH	WINCH, TOWING	OIL STATES SKAGIT SMATCO, LLC OSI-HTW-SD-20800	
7	1	HYDRAULIC VERTICAL CAPSTAN	CAPSTAN, VERTICAL	OIL STATES SKAGIT SMATCO, LLC OSI-HVC-ST	
8	2	DECK WINCH	40 TON DECK WINCH	OIL STATES SKAGIT SMATCO, LLC	
9	2	HYDRAULIC PILOT PUMP	PUMP, HYDRAULIC, PILOT PRESSURE, 870 PSI, 7 GPM, 7.5 KW ELEC MOTR, 208 VAC 3Ø	REYROTH PV041	FIXED DISPLACEMENT VANE PUMP
10	1	HYDRAULIC RESERVOIR ASSY	RESERVOIR, HYDRAULIC, 1300 LITERS, 60" W X 56" H X 24" D W/ HYDRAULIC COMPONENTS & DISTRIBUTION BLOCK	HYDRADYNE	
11	1	HYDRAULIC OIL COOLING	HEAT EXCHANGER, OIL COOLING, 40 GPM SEAWATER FLOW	SEN-DURE 16867-1-7	
12	1	H.E. SEA WATER COOLING PUMP	PUMP, CENTRIFUGAL, 23 GPM, 44PSI, STAINLESS STEEL, 208VAC, 3Ø TEFC MOTOR	PRICE PUMP MODEL HP755S, 5" IMPELLER	
13	AR	BULKHEAD PENETRATION	TYPE 316 W/ 2114 ASSEMBLY CARBON STEEL SLEEVE, DI COUPLING NUT, VITON GASKET	CBC MACHINE COMPANY TYPE 250/210 W/ 2114 ASSY	
14	1	STRAINER	1-1/2" BRONZE SIMPLEX STRAINER W/ .06 PERFORATED STAINLESS STEEL BASKET	EATON MODEL 72	24 GPM, .8 PSI PRESSURE DROP, CV = 31.5
PG-1"	AS REQ'D		1" SCHEDULE 40 PIPE, GALVANIZED		ASTM A-53
PG-1-1/4"	AS REQ'D		1-1/4" SCHEDULE 40 PIPE, GALVANIZED		ASTM A-53
P-2"	AS REQ'D		2" SCHEDULE 40 PIPE, 316L SS		ASTM A-312
T-12	AS REQ'D		12mm X 1.5mm 316L SS TUBING		ASTM A-312
T-16	AS REQ'D		16mm X 2mm 316L SS TUBING		ASTM A-312
T-18	AS REQ'D		18mm X 2mm 316L SS TUBING		ASTM A-312
T-22	AS REQ'D		22mm X 2mm 316L SS TUBING		ASTM A-312
T-25	AS REQ'D		25mm X 3mm WALL 316L SS TUBING		ASTM A-312
T-30	AS REQ'D		30mm X 3.5mm 316L SS TUBING		ASTM A-312
T-35	AS REQ'D		38mm X 4mm 316L SS TUBING		ASTM A-312
H-1	2		-8 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-2	2		-10 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-3	1		-12 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-4	6		-16 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-5			-20 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-6	7		-24 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-7	2		-32 HYDRAULIC OIL HOSE, USCG APPROVED	500 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-8	2		-32 HYDRAULIC OIL HOSE, USCG APPROVED	500 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
V-1	2		1-1/4" GATE VALVE, 125#		ASTM A105/A234
V-2	2		2" BALL VALVE, FULL PORT		ASTM A105/A234
CV-1	2		1-1/4" LIFT CHECK VALVE, STEEL, SCREWED, 150#		ASTM A105/A234
U-1-1/4"	1		1-1/2" UNION, ORIFICE, 12MM, GALVANIZED		ASTM A105/A234



DECK EQUIPMENT HYDRAULICS PIPING DIAGRAM FROM HPU/DISTRIBUTION BLOCK

GENERAL NOTES		ALTERATIONS		RESERVATIONS		REFERENCES	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	SUPPORT HYDRAULIC TUBING WITH VIBRATION DAMPENING CLAMPS SUPPORTED WITH THE MAXIMUM SPAN INDICATED BELOW	1.	UPDATE PIPING DIAGRAM	1.	1372-551 COMPRESSED AIR PIPING
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.					2.	1372-5000 ELECTRICAL ONE LINE
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.						
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.						
5.	DO NOT ROUTE PIPING CONTAINING HYDRAULIC OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL HYDRAULIC OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT						
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.	11.	HEAT EXCHANGER SIZE BASED ON 55 GPM OIL FLOW, INLET TEMPERATURE 65°C, OUTLET TEMPERATURE 60°C, SEA WATER FLOW 24 GPM, INLET TEMPERATURE 35°C WITH A HEAT REJECTION OF 30KW				
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY CLAMPS OR HANGERS IN ACCORDANCE WITH APPLICATION. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.	12.	HYDRAULIC OIL PIPING MUST BE SUITABLY INSULATED TO PREVENT INJURIES AND ALLOW ACCESS FOR PIPING INSPECTION				
8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED.						
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR HYDRAULIC OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 24" IN LENGTH.						



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Title: 70.5'x30'x11' NCDOT TOWBOAT

**DECK MACHINERY HYDRAULICS**

Dwg. No. 17-1372-265  
 Sht. 1 of 4

Drawn By: JAH Date: SEPTEMBER 7, 2018  
 Checked By: Date: NONE  
 App'd By: Scale: NONE  
 ABS App'l: USC App'l:

ALT. NO. NCDOT

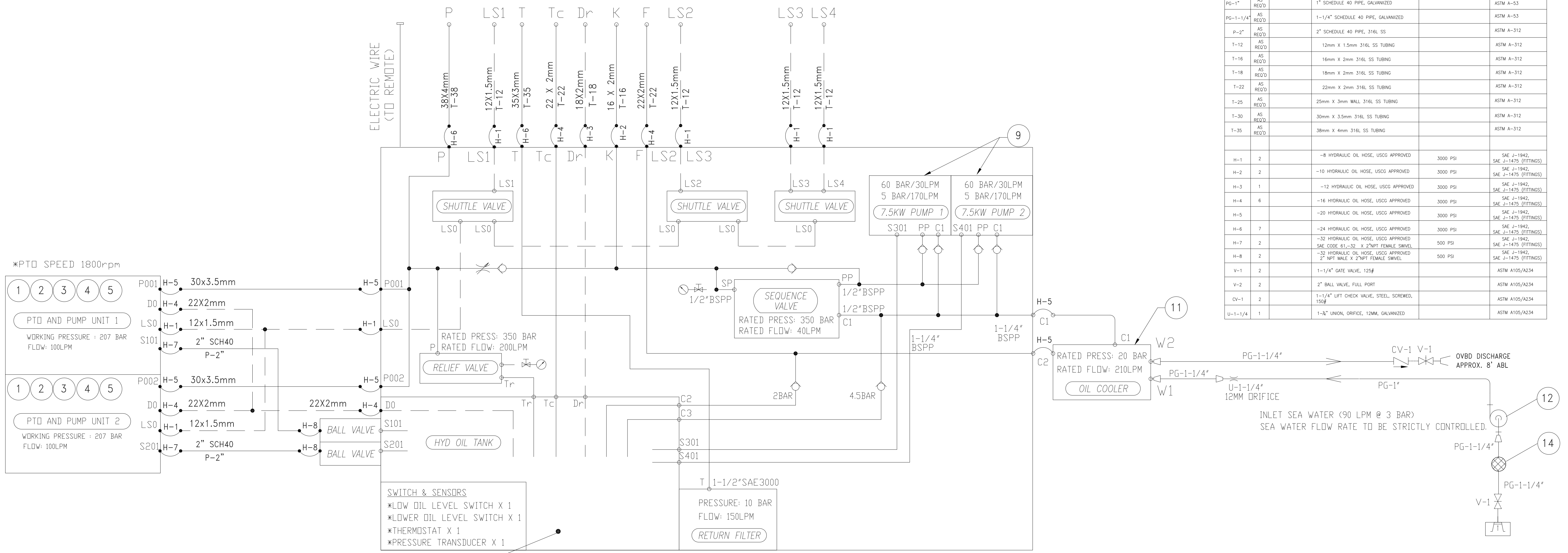
— DRAWING SUBMITTALS —



# MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	COMPONENTS			GASKETS	VALVES			BOLTING	REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT		BODY	TRIM	BOLTS/STUDSNUTS/WASHERS		
HYDRAULIC OIL SERVICE PIPING MAWP: 3000 PSIG MAWT: 150°F	ALL	STAINLESS STEEL TUBING TYPE 316L, ASTM A213, WALL THICKNESS VARIES STAINLESS STEEL PIPE, TYPE 316L, ASTM A312	FLANGE SOCKET WELD, WELD NECK OR SLIP ON, 316L, ASTM A182, ANSI B16.11 BUTT WELD STAINLESS STEEL, ASTM A403, ANSI B16.9, MSS SP-43 UNION GROUND JOINT, SOCKET WELD CARBON STEEL, ASTM A105, MSS-SP-83	SOCKET WELD STAINLESS STEEL, TYPE 316L, ASTM A182, ANSI B16.11 COMPRESSION TYPE 316 STAINLESS STEEL, ASTM A276, ASTM A479, ASTM A182	FLEX HOSE MEETING SAE J1942 AND J1475 FOR HYDRAULIC SERVICE SEE NOTE 9	GARLOCK STYLE 3000	GATE FLANGED CARBON STEEL, ASTM A216 GR WCB OR ASTM A105 ANSI B16.34 BALL THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB CHECK THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB	GATE CRES STEEL, ASTM A307 GR B OR ASTM A563 GR A DISC AND ANSI B18.2 SEAT BALL CHROME PLATED BALL, RPTFE DR VITON SEATS CHECK CRES DISC	HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2		

BILL OF MATERIALS					
#	QTY	SERVICE	TYPE	MAKE/MODEL	COMMENTS
1	2	HYDRAULIC PUMP PTO	PTD 400 FOR JOHN DEERE 4045 ENGINE	LOGAN 900-8020	
2	2	HYDRAULIC PUMP PTO	FLUID ACTIVATED CLUTCH, 400 FT-LB, SAE C 141 SPLINE	LOGAN SPF400, OPTION SPF-4300-01	MAX ENGAGEMENT 1800 RPM
3	2	HYDRAULIC PUMP PTO	RIGID COUPLING	LOGAN 088-0018	
4	2	HYDRAULIC PUMP PTO	PNEUMATIC CONTROLS W/ 24VDC SOLENOID	LOGAN 610-0052	
5	2	HYDRAULIC PUMP	PUMP, VARIABLE DISPLACEMENT, 26.4 GPM, 3000 PSI, SAE "C" FLANGE, 2 BOLT	REKROTH A10V50T1DFLR/31R-VS42N00	
6	1	HYDRAULIC WINCH	WINCH, TOWING	OIL STATES SKAGIT SMATCO, LLC OSI-HTW-50-20860	
7	1	HYDRAULIC VERTICAL CAPSTAN	CAPSTAN, VERTICAL	OIL STATES SKAGIT SMATCO, LLC OSI-HVC-5T	
8	2	DECK WINCH	40 TON DECK WINCH	OIL STATES SKAGIT SMATCO, LLC	
9	2	HYDRAULIC PILOT PUMP	PUMP, HYDRAULIC, PILOT PRESSURE, 870 PSI, 7 GPM, 7.5 KW ELEC MOTOR, 208 VAC 3Ø	REKROTH PV41	FIXED DISPLACEMENT VANE PUMP
10	1	HYDRAULIC RESERVOIR ASSY	RESERVOIR, HYDRAULIC, 1300 LITERS, 60" X 56" X 24" W/ HYDRAULIC COMPONENTS & DISTRIBUTION BLOCK	HYDRADINE	
11	1	HYDRAULIC OIL COOLING	HEAT EXCHANGER, OIL COOLING, 40 GPM SEN-DURE 16867-1-7		
12	1	HE. SEA WATER COOLING PUMP	PUMP, CENTRIFUGAL, 23 GPM, 44PSI, STAINLESS STEEL, SUBMERSIBLE MOTOR	PRICE PUMP MODEL HP235, 07 WHEELER	
13	AR	BULKHEAD PENETRATION	TYPE 316L W/ 2"14 ASSEMBLY, CARBON STEEL SLEVE, DI COUPLING NUT, VITON GASKET	CBC MACHINE COMPANY TYPE 250/210 W/ 2114 ASSY	
14	1	STRAINER	1-1/2" BRONZE SIMPLEX STRAINER W/ .06 PERFORATED STAINLESS STEEL BASKET	EATON MODEL 72	24 GPM, 8 PSI PRESSURE DROP, CV = 31.5
PG-1"	AS REQ'D		1" SCHEDULE 40 PIPE, GALVANIZED		ASTM A-53
PG-1-1/4"	AS REQ'D		1-1/4" SCHEDULE 40 PIPE, GALVANIZED		ASTM A-53
P-2"	AS REQ'D		2" SCHEDULE 40 PIPE, 316L SS		ASTM A-312
T-12	AS REQ'D		12mm X 1.5mm 316L SS TUBING		ASTM A-312
T-16	AS REQ'D		16mm X 2mm 316L SS TUBING		ASTM A-312
T-18	AS REQ'D		18mm X 2mm 316L SS TUBING		ASTM A-312
T-22	AS REQ'D		22mm X 2mm 316L SS TUBING		ASTM A-312
T-25	AS REQ'D		25mm X 3mm WALL 316L SS TUBING		ASTM A-312
T-30	AS REQ'D		30mm X 3.5mm 316L SS TUBING		ASTM A-312
T-35	AS REQ'D		38mm X 4mm 316L SS TUBING		ASTM A-312
H-1	2		-8 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-2	2		-10 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-3	1		-12 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-4	6		-16 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-5	2		-20 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-6	7		-24 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-7	2		-32 HYDRAULIC OIL HOSE, USCG APPROVED	500 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-8	2		-32 HYDRAULIC OIL HOSE, USCG APPROVED	500 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
V-1	2		1-1/4" GATE VALVE, 125#		ASTM A105/A234
V-2	2		2" BALL VALVE, FULL PORT		ASTM A105/A234
CV-1	2		1-1/4" LIFT CHECK VALVE, STEEL, SCREWED, 150#		ASTM A105/A234
U-1-1/4"	1		1-1/4" UNION, ORIFICE, 12MM, GALVANIZED		ASTM A105/A234



PILOT PUMP 2X7.5KW  
HYDRAULIC OIL TANK (1300 LITERS)  
HYDRAULIC POWER PIPING DIAGRAM

GENERAL NOTES		GENERAL NOTES		ALTERATIONS		RESERVATIONS		REFERENCES	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	SUPPORT HYDRAULIC TUBING WITH VIBRATION DAMPENING CLAMPS SUPPORTED WITH THE MAXIMUM SPAN INDICATED BELOW	1	UPDATE PIPING DIAGRAM	1.	1372-551 COMPRESSED AIR PIPING	9	
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.		BETWEEN TUBING SIZE TUBING CLAMPS CLAMP & UNION CLAMP & 90 BEND			2.	1372-5000 ELECTRICAL ONE LINE	8	
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.		1/4" THRU 3/8" 36" 2" 4"					7	
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.		1/2" THRU 1" 60" 4" 8"					6	
5.	DO NOT ROUTE PIPING CONTAINING HYDRAULIC OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL HYDRAULIC OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT	11.	HEAT EXCHANGER SIZE BASED ON 55 GPM OIL FLOW, INLET TEMPERATURE 65°C, OUTLET TEMPERATURE 60°C, SEA WATER FLOW 24 GPM, INLET TEMPERATURE 35°C WITH A HEAT REJECTION OF 30KW					5	
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.	12.	HYDRAULIC OIL PIPING MUST BE SUITABLY INSULATED TO PREVENT INJURIES AND ALLOW ACCESS FOR PIPING INSPECTION					4	
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY CLAMPS OR HANGERS IN ACCORDANCE WITH APPLICATION. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.							3	
8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED.							2	
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR HYDRAULIC OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 24" IN LENGTH.							1	

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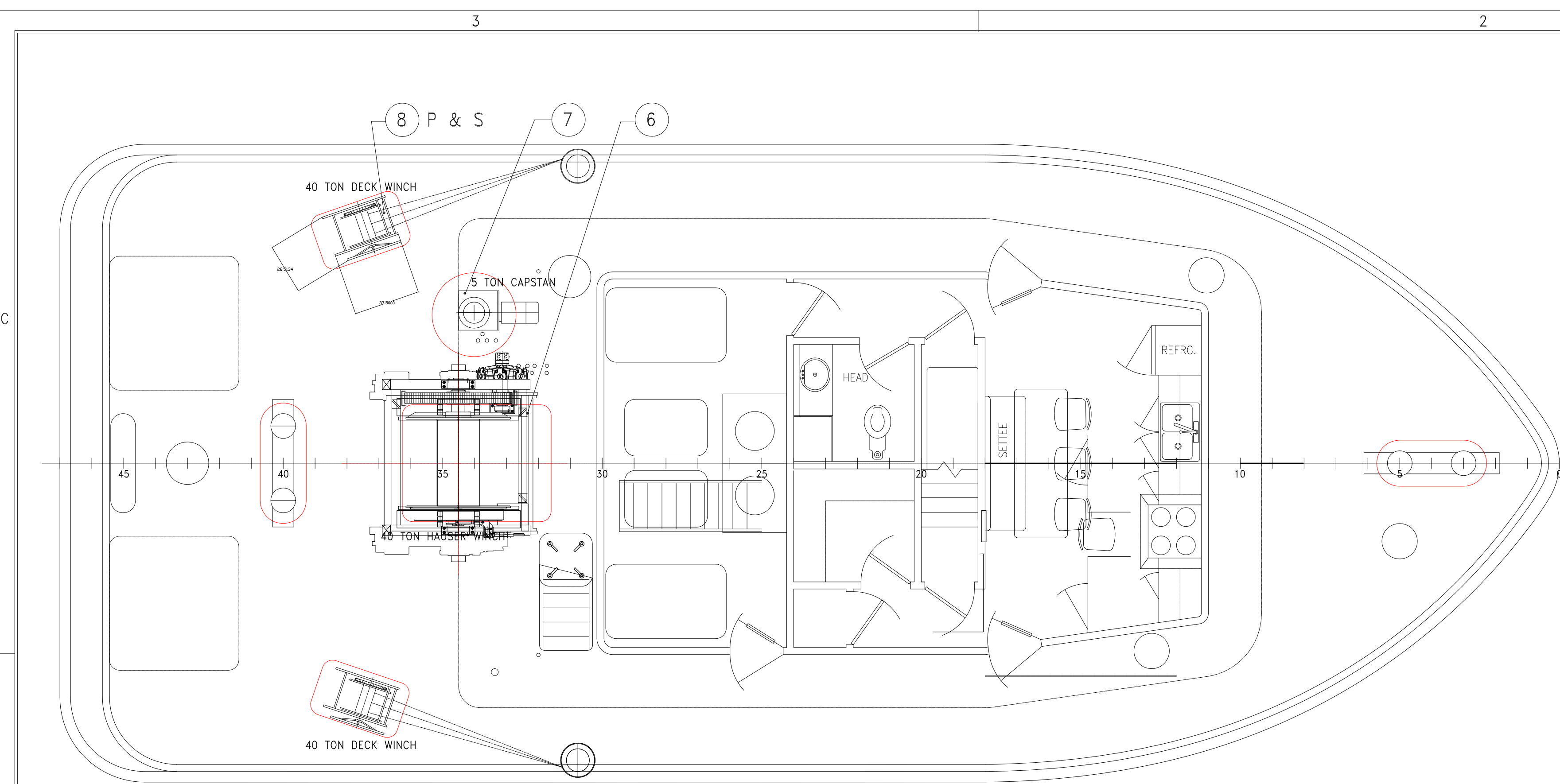
Title: 70.5'x30'x11' NCDOT TOWBOAT  
**DECK MACHINERY HYDRAULICS**

Dwg. No. 17-1372-265  
Alt. No. 1  
Sht. 2 of 3

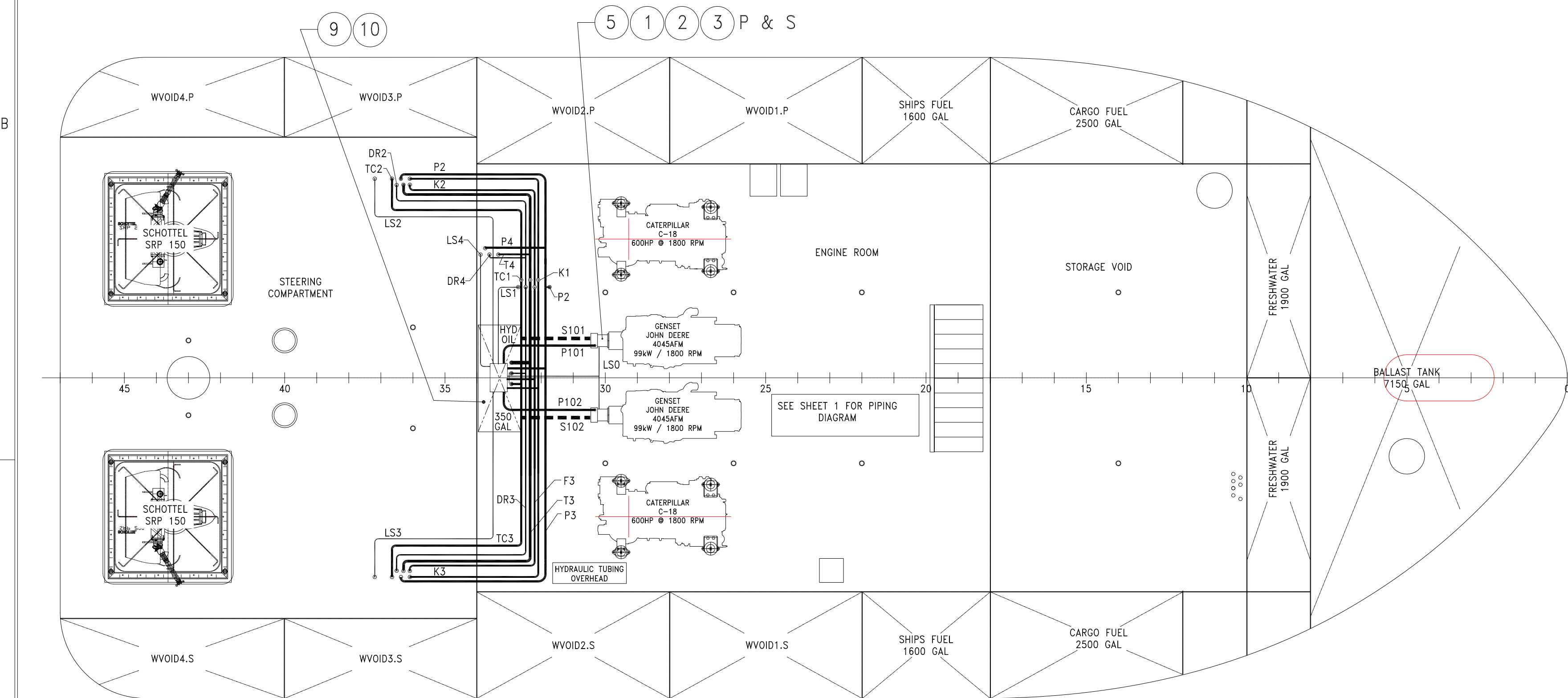
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Checked By: Date: NONE  
App'd By: Scale: NONE  
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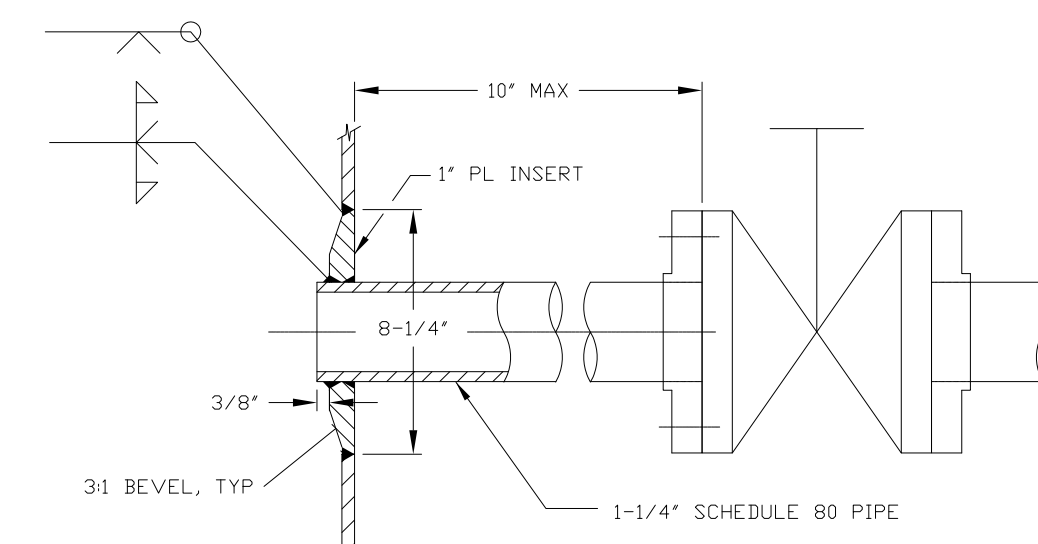
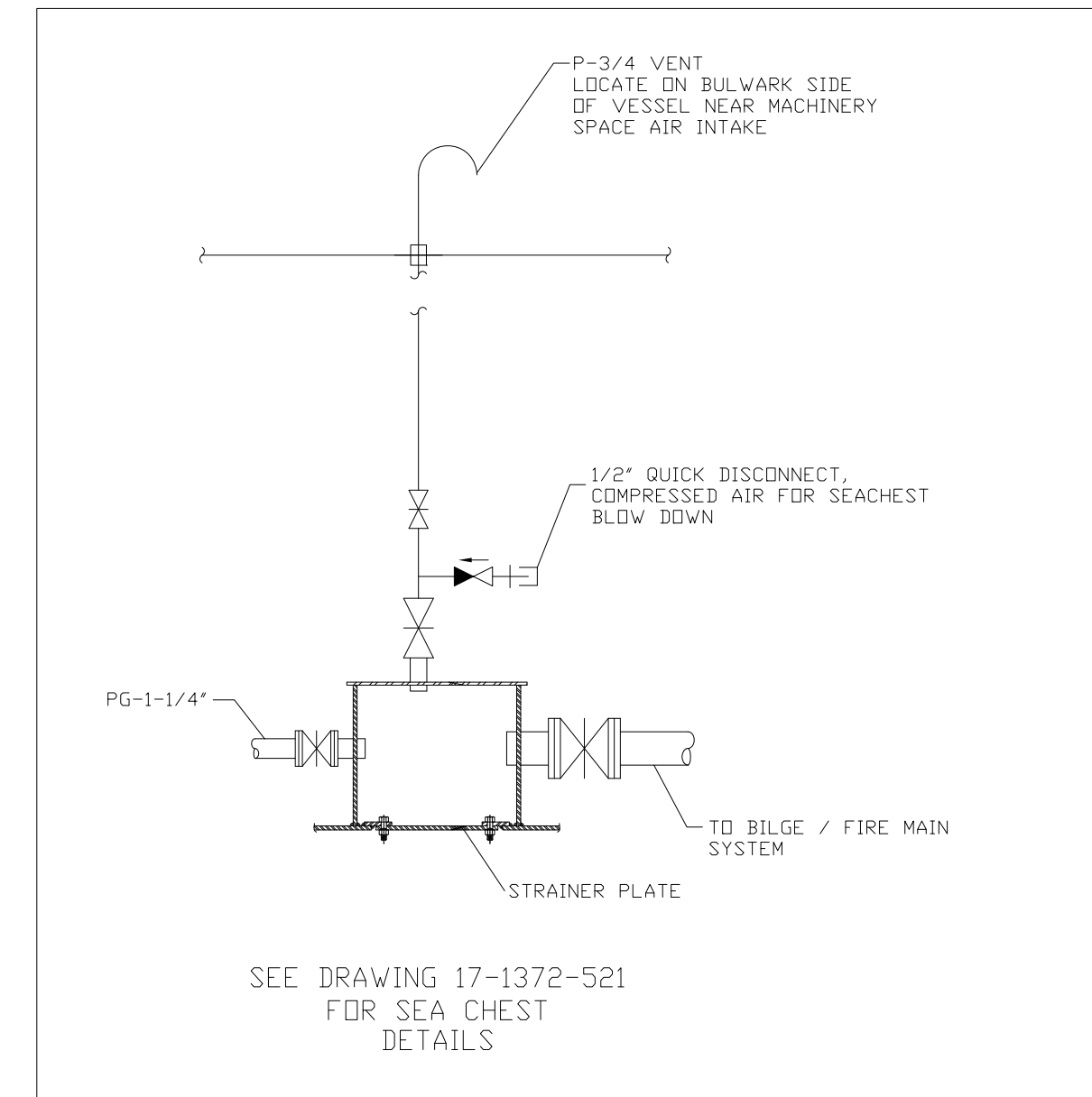
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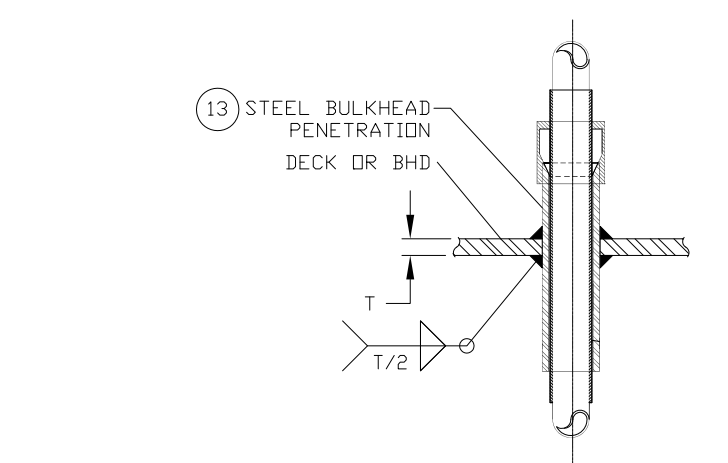
MAIN DECK ARRANGEMENTS



HOLD ARRANGEMENTS



DETAIL 3-4D OVERBOARD DISCHARGE NO SCALE



DETAIL 3-1C TYP. DECK OR BULKHEAD PENETRATION NO SCALE

BILL OF MATERIALS

#	QTY.	SERVICE	TYPE	MAKE/MODEL	COMMENTS
1	2	HYDRAULIC PUMP PTO	PTO 400 FOR JOHN DEERE 4045 ENGINE	LOGAN 900-8020	
2	2	HYDRAULIC PUMP PTO	FLUID ACTVATED CLUTCH, 400 FT-LB, SAE C 141 SPLINE	LOGAN SPF400, OPTION SPF-4300-01	MAX ENGAGEMENT 1800 RPM
3	2	HYDRAULIC PUMP PTO	RIGID COUPLING	LOGAN 088-0018	
4	2	HYDRAULIC PUMP PTO	PNEUMATIC CONTROLS W/ 24VDC SOLENOID	LOGAN 610-0052	
5	2	HYDRAULIC PUMP	PUMP, VARIABLE DISPLACEMENT, 26.4 GPM, 3000 PSI, SAE "C" FLANGE, 2 BOLT	REXROTH A10VSO71DFLR/31R-VSA42N00	
6	1	HYDRAULIC TOWING WINCH	WINCH, TOWING	OIL STATES SKAGIT SMATCO, LLC OSI-HTW-SD-20B60	
7	1	HYDRAULIC VERTICAL CAPSTAN	CAPSTAN, VERTICAL	OIL STATES SKAGIT SMATCO, LLC OSI-HVC-S1	
8	2	DECK WINCH	40 TON DECK WINCH	OIL STATES SKAGIT SMATCO, LLC	
9	2	HYDRAULIC PILOT PUMP	PUMP, HYDRAULIC, PILOT PRESSURE, 870 PSI, 7 GPM, 7.5 KW ELEC MOTR, 208 VAC 3ø	REXROTH PV041	FIXED DISPLACEMENT VANE PUMP
10	1	HYDRAULIC RESERVOIR ASSY	RESERVOIR, HYDRAULIC, 1300 LITERS, 60" X 56" X 24" W/ HYDRAULIC COMPONENTS & DISTRIBUTION BLOCK	HYDRADYNE	
11	1	HYDRAULIC OIL COOLING	HEAT EXCHANGER, OIL COOLING, 40 GPM SEAWATER FLOW	SEN-DURE 16867-1-7	
12	1	H.E. SEA WATER COOLING PUMP	PUMP, CENTRIFUGAL, 23 GPM, 44PSI, STAINLESS STEEL, 208VAC, 3ø, TEFC MOTOR	PRICE PUMP MODEL HP75SS, 5" IMPELLER	
13	AR	BULKHEAD PENETRATION	TYPE 9910 W/ 2114 ASSEMBLY, CARBON STEEL, 3/8 LEVE, DI COUPLING NUT, VITON GASKET	CBC MACHINE COMPANY TYPE 250/210 W/ 2114 ASSY	
14	1	STRAINER	1-1/2" BRONZE SIMPLEX STRAINER W/ .06 PERFORATED STAINLESS STEEL BASKET	EATON MODEL 72	24 GPM, 8 PSI PRESSURE DROP, CV = 31.5
PG-1"	AS REQ'D		1" SCHEDULE 40 PIPE, GALVANIZED		ASTM A-53
PG-1-1/4"	AS REQ'D		1-1/4" SCHEDULE 40 PIPE, GALVANIZED		ASTM A-53
P-2"	AS REQ'D		2" SCHEDULE 40 PIPE, 316L SS		ASTM A-312
T-12	AS REQ'D		12mm X 1.5mm 316L SS TUBING		ASTM A-312
T-16	AS REQ'D		16mm X 2mm 316L SS TUBING		ASTM A-312
T-18	AS REQ'D		18mm X 2mm 316L SS TUBING		ASTM A-312
T-22	AS REQ'D		22mm X 2mm 316L SS TUBING		ASTM A-312
T-25	AS REQ'D		25mm X 3mm WALL 316L SS TUBING		ASTM A-312
T-30	AS REQ'D		30mm X 3.5mm 316L SS TUBING		ASTM A-312
T-35	AS REQ'D		38mm X 4mm 316L SS TUBING		ASTM A-312
H-1	2		-8 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-2	2		-10 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-3	1		-12 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-4	6		-16 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-5			-20 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-6	7		-24 HYDRAULIC OIL HOSE, USCG APPROVED	3000 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-7	2		-32 HYDRAULIC OIL HOSE, USCG APPROVED	500 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
H-8	2		-32 HYDRAULIC OIL HOSE, USCG APPROVED	500 PSI	SAE J-1942, SAE J-1475 (FITTINGS)
V-1	2		1-1/4" GATE VALVE, 125#		ASTM A105/A234
V-2	2		2" BALL VALVE, FULL PORT		ASTM A105/A234
CV-1	2		1-1/4" LIFT CHECK VALVE, STEEL, SCREWED, 150#		ASTM A105/A234
U-1-1/4"	1		1-3/4" UNION, ORIFICE, 12MM, GALVANIZED		ASTM A105/A234

-- GENERAL NOTES --		-- ALTERATIONS --		-- RESERVATIONS --		-- REFERENCES --	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	SUPPORT HYDRAULIC TUBING WITH VIBRATION DAMPENING CLAMPS SUPPORTED WITH THE MAXIMUM SPAN INDICATED BELOW	1	UPDATE PIPING DIAGRAM	1.	1372-551 COMPRESSED AIR PIPING
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.					2.	1372-5000 ELECTRICAL ONE LINE
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.						
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		11.	HEAT EXCHANGER SIZE BASED ON 55 GPM OIL FLOW, INLET TEMPERATURE 65°C, OUTLET TEMPERATURE 60°C, SEA WATER FLOW 24 GPM, INLET TEMPERATURE 35°C WITH A HEAT REJECTION OF 30KW				
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Title: 70.5'x30'x11' NCDOT TOWBOAT

**DECK MACHINERY HYDRAULICS**

Dwg. No. 17-1372-265  
Alt. No. 1  
Sht. 3 of 4

Drawn By: JAH Date: SEPT 07, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 1/4" = 1'-0"  
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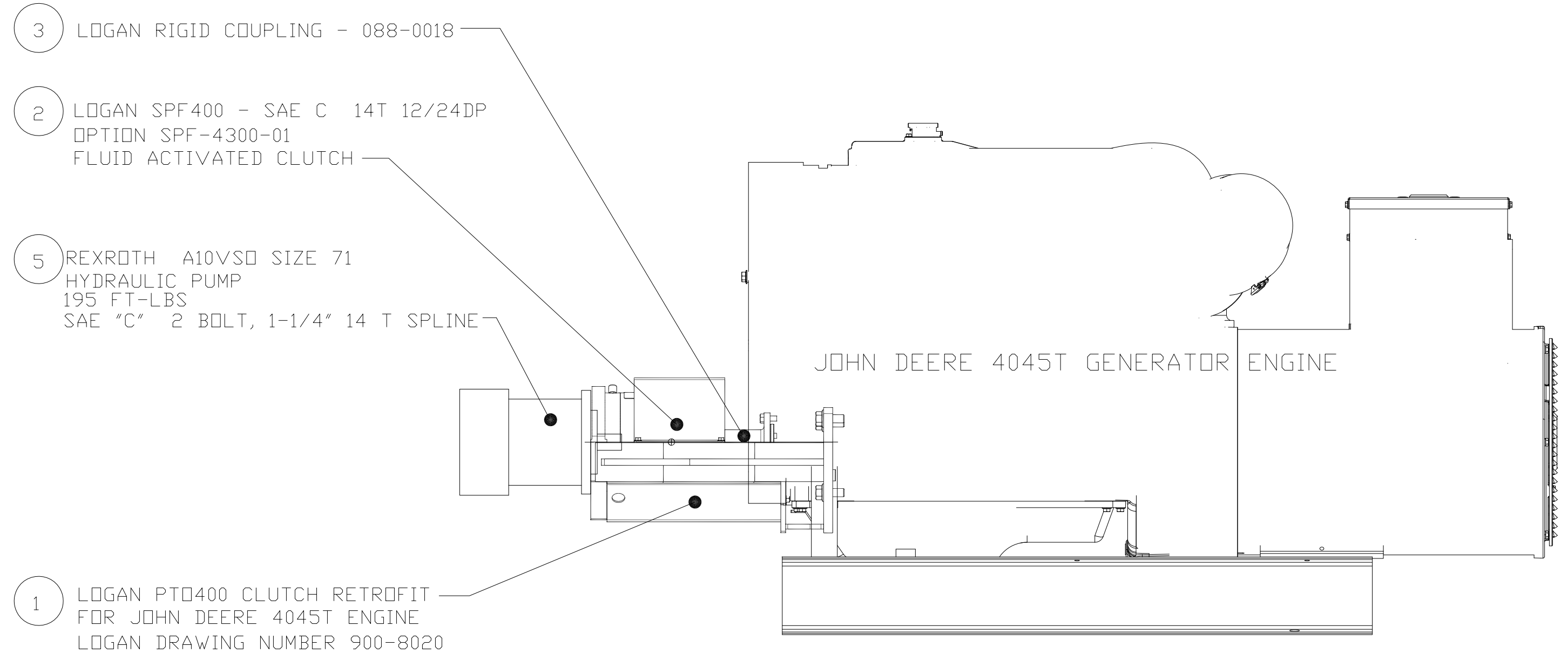
NC DOT ALT. NO.

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③	2	HYDRAULIC PUMP PTO	1 1/2" DP RIGID COUPLING	LOGAN 088-0018	
④	2	HYDRAULIC PUMP PTO	PNEUMATIC CONTROLS W/ 24VDC SOLENOID	LOGAN 610-0052	
⑤	2	HYDRAULIC PUMP	PUMP, VARIABLE DISPLACEMENT, 26.4 GPM, 3000 PSI, SAE "C" FLANGE, 2 BOLT	REXROTH A10VSO71DFLR/31R-VSA42N00	

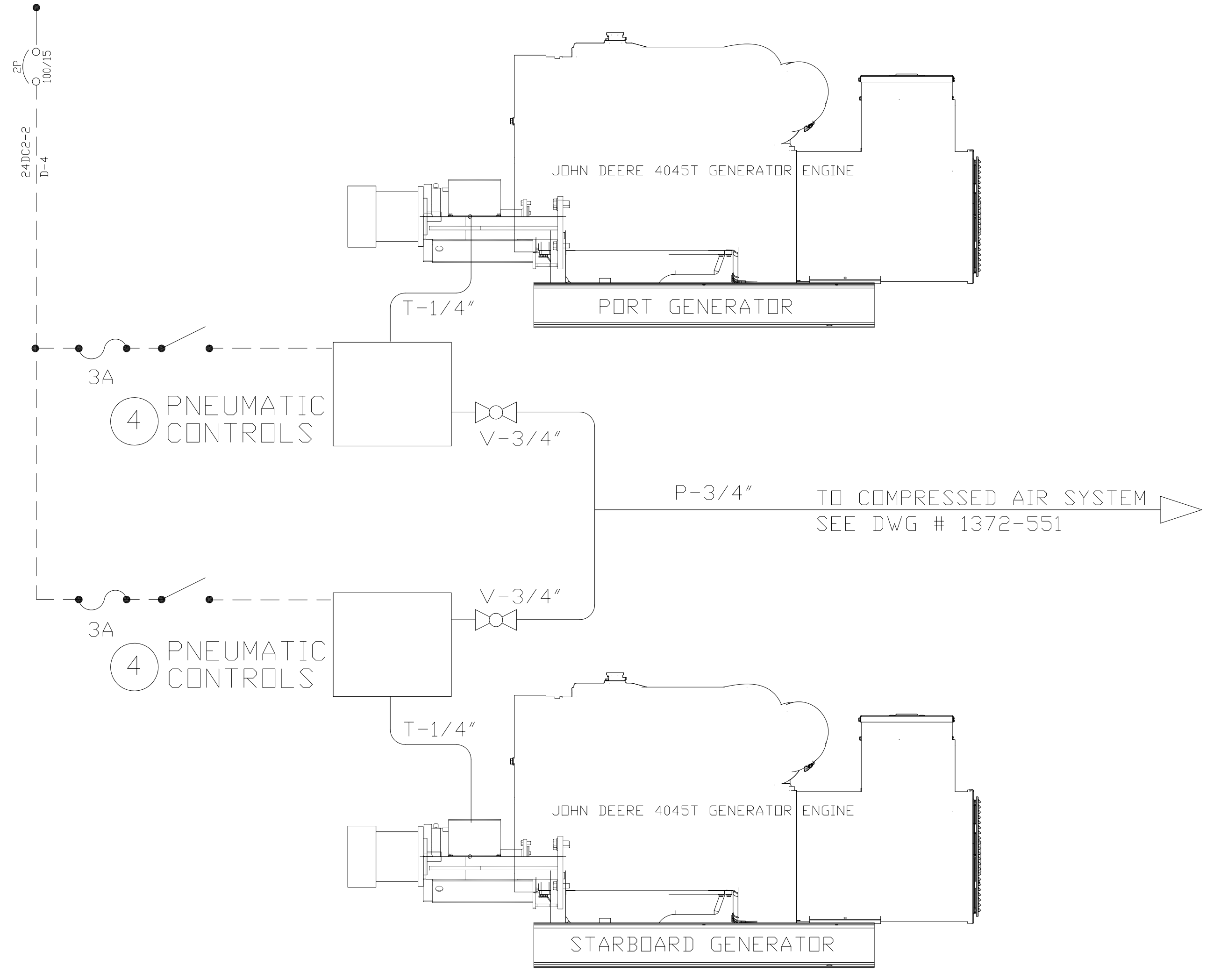
## POWER TAKE-OFF DETAILS

SYMBOLS LIST	
	NPS PIPE SIZE
	TUBING SIZE
	ELECTRICAL CABLE
	HOSE
	BALL VALVE
	FUSE
	SWITCH
	CIRCUIT BREAKER



### GENERATOR PTO CLUTCH ASSEMBLY

### ENGINE ROOM 24DC2 PANEL



### 24VDC/PNEUMATIC CLUTCH CONTROL

PROSPECTIVE ROOPS  
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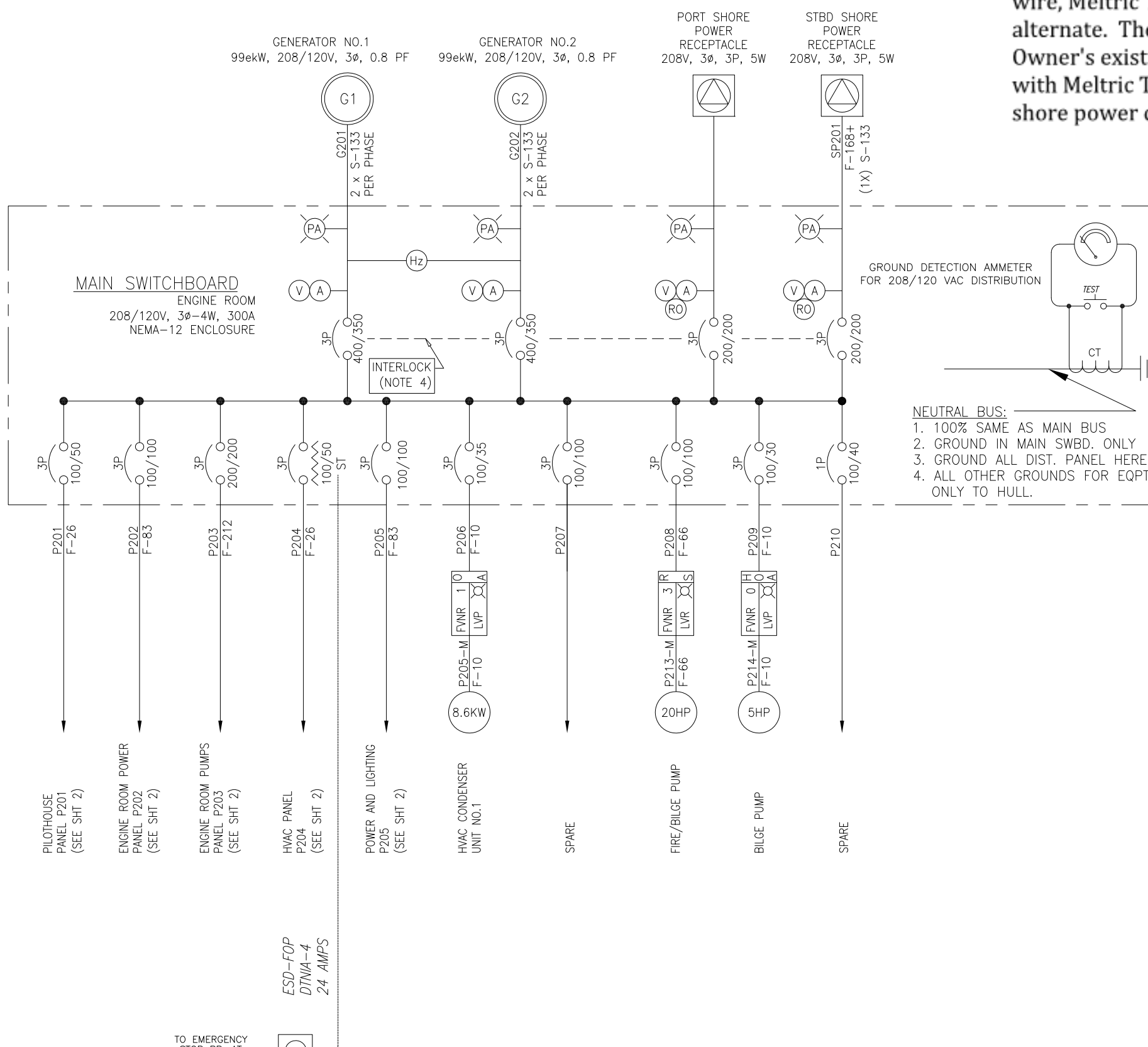
**DECK MACHINERY HYDRAULICS**

Dwg. No. 17-1372-265 Alt. No. 1  
Sht. 4 of 4

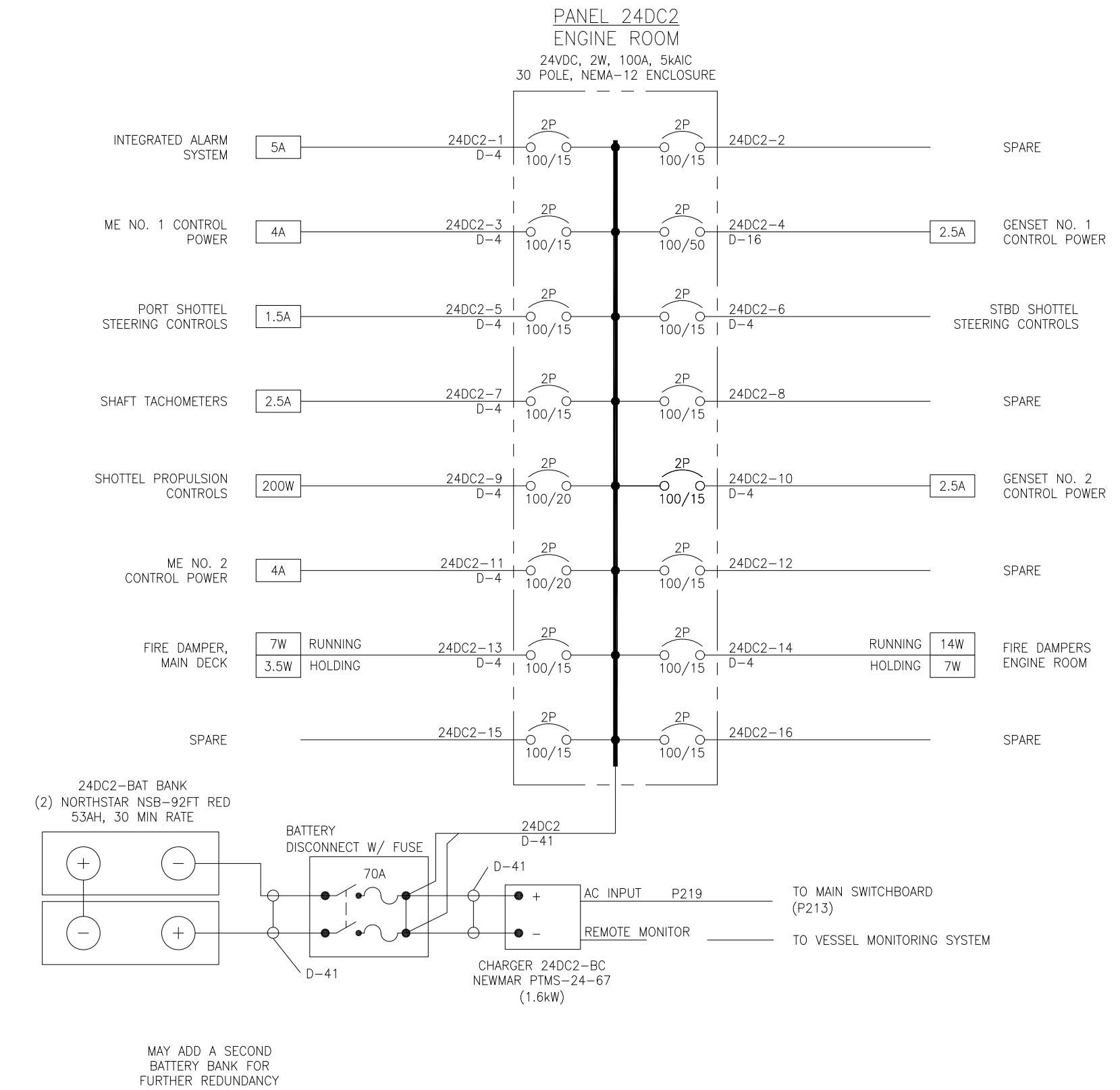
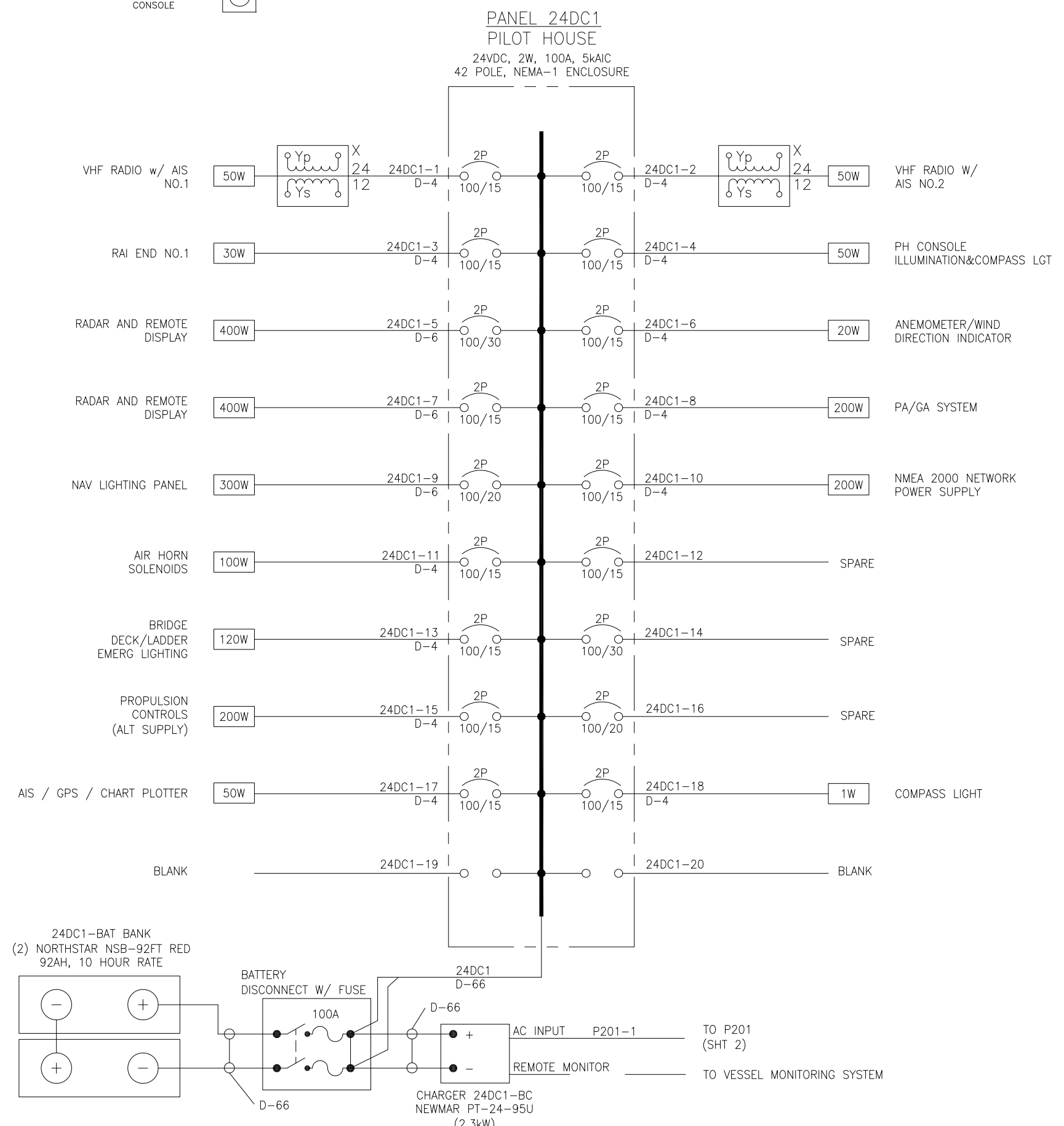
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Checked By: Date:  
App'd By: Scale: NONE  
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-- GENERAL NOTES --				-- ALTERATIONS --				-- RESERVATIONS --				-- REFERENCES --			
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SYMBOLS LIST	
	CIRCUIT BREAKER X = POLES Y = FRAME SIZE Z = TRIP RATING
	TRANSFORMER X = SIZE KVA Yp = PRIMARY VOLTAGE Vs = SECONDARY VOLTAGE Yp - PRIMARY CONNECTION Vs - SECONDARY CONNECTION
	EQUIPMENT
	RECEPTACLE
	LIGHTING
	MOTOR
	GENERATOR
	SHORE POWER RECEPTACLE
	INSTRUMENTATION V - VOLT, A - AMPERES, KW - KILOWATTS, Hz - FREQUENCY PA - POWER AVAILABLE RO - PHASE ROTATION
	MOTOR CONTROLLER W - R, S, RUN STOP, H O.A. HAND OFF AUTO X - SSMR, SOFT START NON REVERSING, FVNR, FULL VOLTAGE NON REVERSING Y - NEMA SIZE Z - LVP OR LVR
	CONTROL DEVICES/FUNCTIONS PB - PUSH-BUTTON PB/IL - PUSH-BUTTON, ILLUMINATED PS - PRESSURE SWITCH LS - LEVEL SWITCH FR - FIRE SHUTDOWN FS - FLOW SWITCH DS - DISCONNECT SWITCH TH - THERMOSTAT
	FUSE
	VENDOR PROVIDED MOTOR CONTROLLER
	50A 125/60V RANGE RECEPTACLE

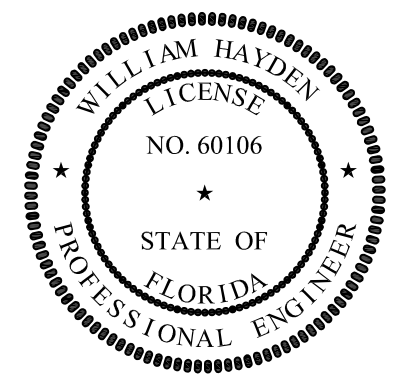


The Contractor shall provide and install a watertight 60 amp, 208-volt, 3 phase, 3 pole/4 wire, Meltric Type DB/DSM, Model 89-60143-080, shore power inlet, or Owner directed alternate. The inlet shall be situated on the deck house generally as situated on the Owner's existing vessels. The Contractor shall make up and provide a shore power cable with Meltric Type DB/DSM Male Plugs, Model 89-61143, sized and fashioned after the shore power cables on the Owner's existing vessels.



- GENERAL NOTES -	
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS AND AMERICAN BUREAU OF SHIPPING RULES FOR BUILDING AND CLASSING STEEL VESSELS FOR SERVICE ON RIVERS AND INTRACOASTAL WATERWAYS WITH NOTATION 7A1, PASSENGER VESSEL, RIVER SERVICE.
2.	SHIP SERVICE SWITCHBOARD IS A 3 PHASE 4 WIRE SYSTEM, 208/120V, 60 Hz, WITH GROUNDED NEUTRAL. SEE REFERENCE 1 FOR SWITCHBOARD LOCATION.
3.	ALL PERMANENTLY INSTALLED ELECTRICAL EQUIPMENT SHALL HAVE METAL ENCLOSURES PROPERLY GROUNDED PER ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE, UNLESS NOTED OTHERWISE.
4.	THE SHIP SERVICE AND SHORE POWER SUPPLIES SHALL BE INTERLOCKED SO THAT ONLY ONE CAN SUPPLY THE SHIP SERVICE SWITCHBOARD AT ANY TIME.
5.	CIRCUIT BREAKERS FOR STEERING GEAR HYDRAULIC PUMPS REQUIRE INSTANTANEOUS TRIP ONLY AND SHALL BE SIZED PER 46 CFR 58.25-58.63(c). CONTRACTOR SHALL VERIFY TRIP RATING AGAINST ACTUAL MOTOR NAMEPLATE DATA.
6.	ALL POWER CABLE SHALL COMPLY WITH THE REQUIREMENTS OF IEEE 1580. ALL CABLE SHALL BE LOW SMOKE, ZERO HALOGEN TYPE, TRICAB OR EQUAL.
7.	NYLON OR BRASS STUFFING TUBES SHALL BE USED WHEN PENETRATING ELECTRICAL ENCLOSURES OR JUNCTION BOXES.
8.	FAULT CURRENT AT THE SHIP SERVICE SWITCHBOARD IS CONSERVATIVELY ESTIMATED AT 3,668A.
9.	ALL CABLES SHALL BE RATED AT 90°C CONDUCTOR TEMPERATURE IN ACCORDANCE WITH IEEE STANDARD NO. 45 2002 TABLE 25.
10.	EACH CABLE SHALL BE TAGGED WITH ITS UNIQUE CIRCUIT DESIGNATION USING EMBOSSED ALUMINUM TAGS ON EACH SIDE OF PENETRATIONS AND INTO CONNECTION BOXES AND/OR EQUIPMENT.

- GENERAL NOTES -	
11.	METAL USED FOR TERMINAL STUDS, LUGS, NUTS, AND WASHERS SHALL BE CORROSION RESISTANT AND GALVANICALLY COMPATIBLE WITH THE WIRE AND TERMINAL LUGS.
12.	WIRES TERMINATING IN EQUIPMENT SHALL BE ARRANGED TO PROVIDE A SURPLUS LENGTH OF WIRE SUFFICIENT TO ALLOW FOR DISCONNECTION, AND TO PERMIT MULTIPLE WIRES TO BE FORMED AT TERMINAL STUDS.
13.	CABLE PENETRATIONS OF STRUCTURAL FIRE PROTECTION SHALL UTILIZE FIRE STOPS WHICH MAINTAIN THE FIRE PROTECTION LEVEL (GRADE A, B, ETC.) ASSOCIATED WITH THE FIRE ZONE PENETRATED.
14.	CABLE PENETRATIONS THROUGH BULKHEADS AND DECKS, BOTH WATERTIGHT AND NON-WATERTIGHT, SHALL COMPLY WITH REGULATORY BODY REQUIREMENTS. MULTI-CABLE TRANSIT TYPE PENETRATIONS MAY BE SUBSTITUTED FOR STUFFING TUBES FOR ALL PENETRATIONS EXCEPT THROUGH OPEN DECKS. EXTRA HEAVY, LOW ALLOY KICK PIPES WITH STUFFING TUBES, OR EQUIVALENT, SHALL BE WELDED INTO ALL OPEN DECKS AND SHALL BE NINE INCHES HIGH TO TOP OF THE STUFFING TUBE. BUILT-IN WATERTIGHT BOXES MAY BE USED IN LIEU OF KICK PIPES. POURED SEALERS SHALL NOT BE ALLOWED.



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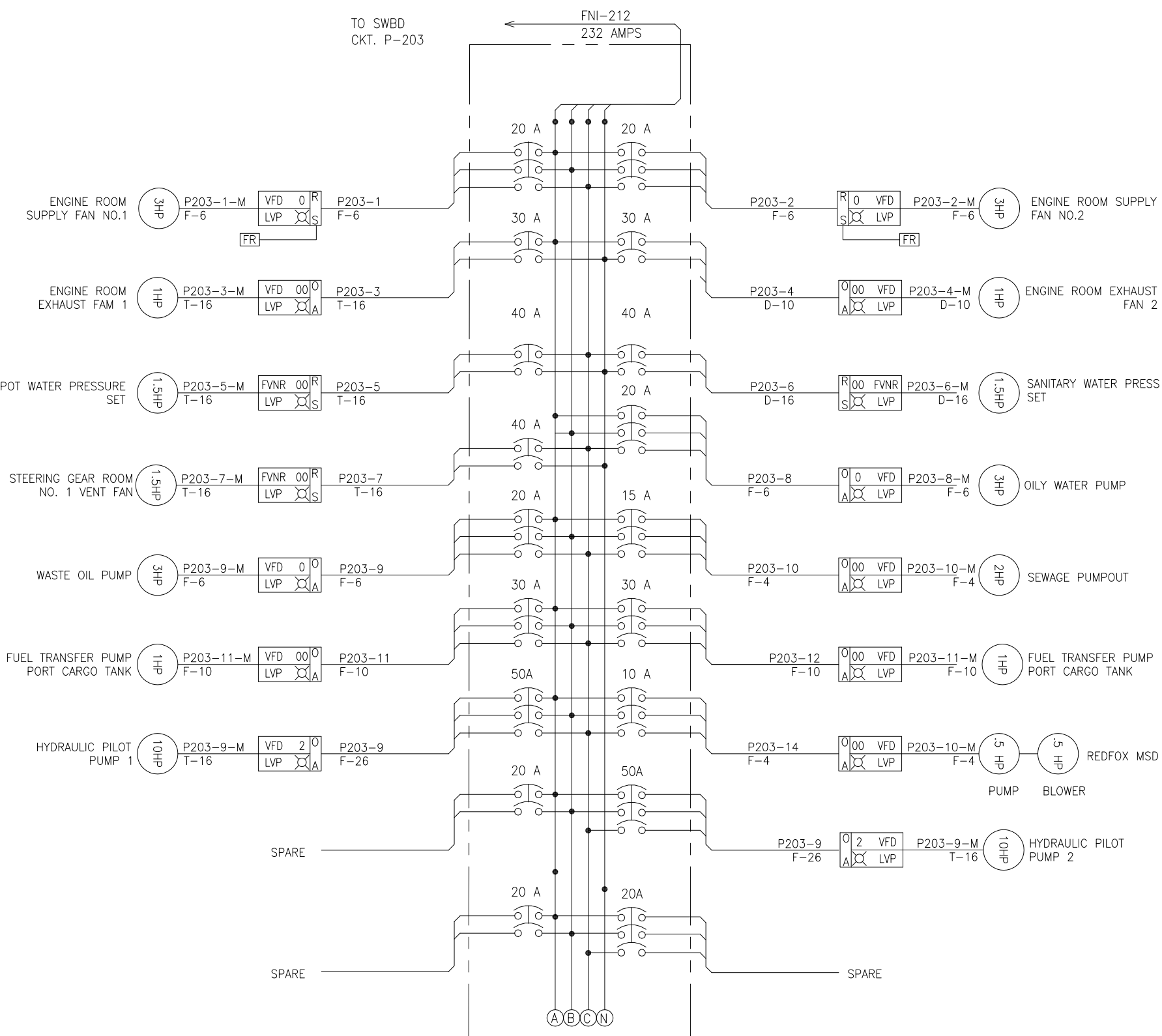
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Title: 70.5'x30'x11' NCDOT TOWBOAT

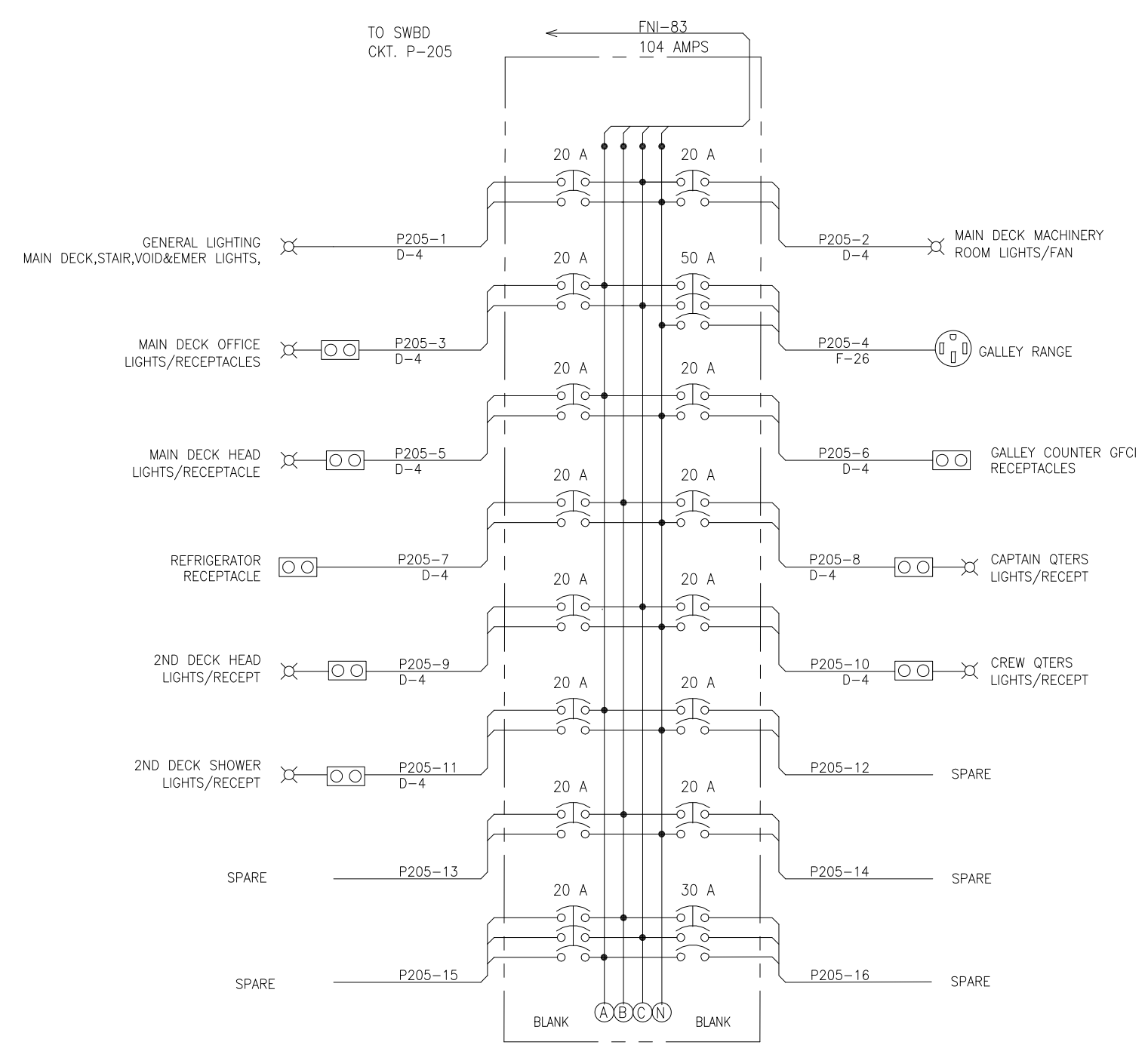
**ELECTRICAL ONE-LINE DIAGRAM**

Dwg. No. 17-1372-320  
Alt. No. 1  
Sht. 1 of 2

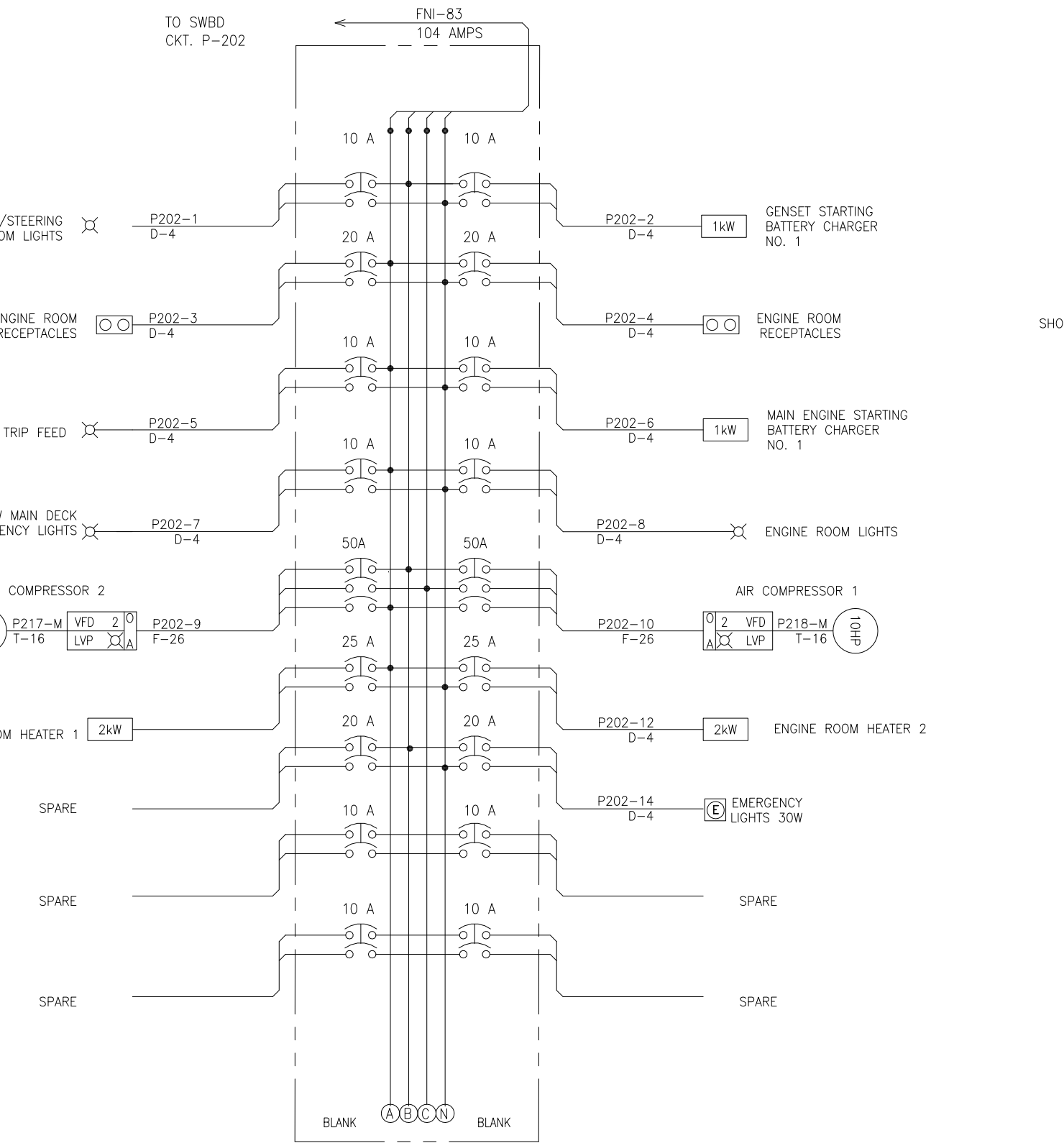
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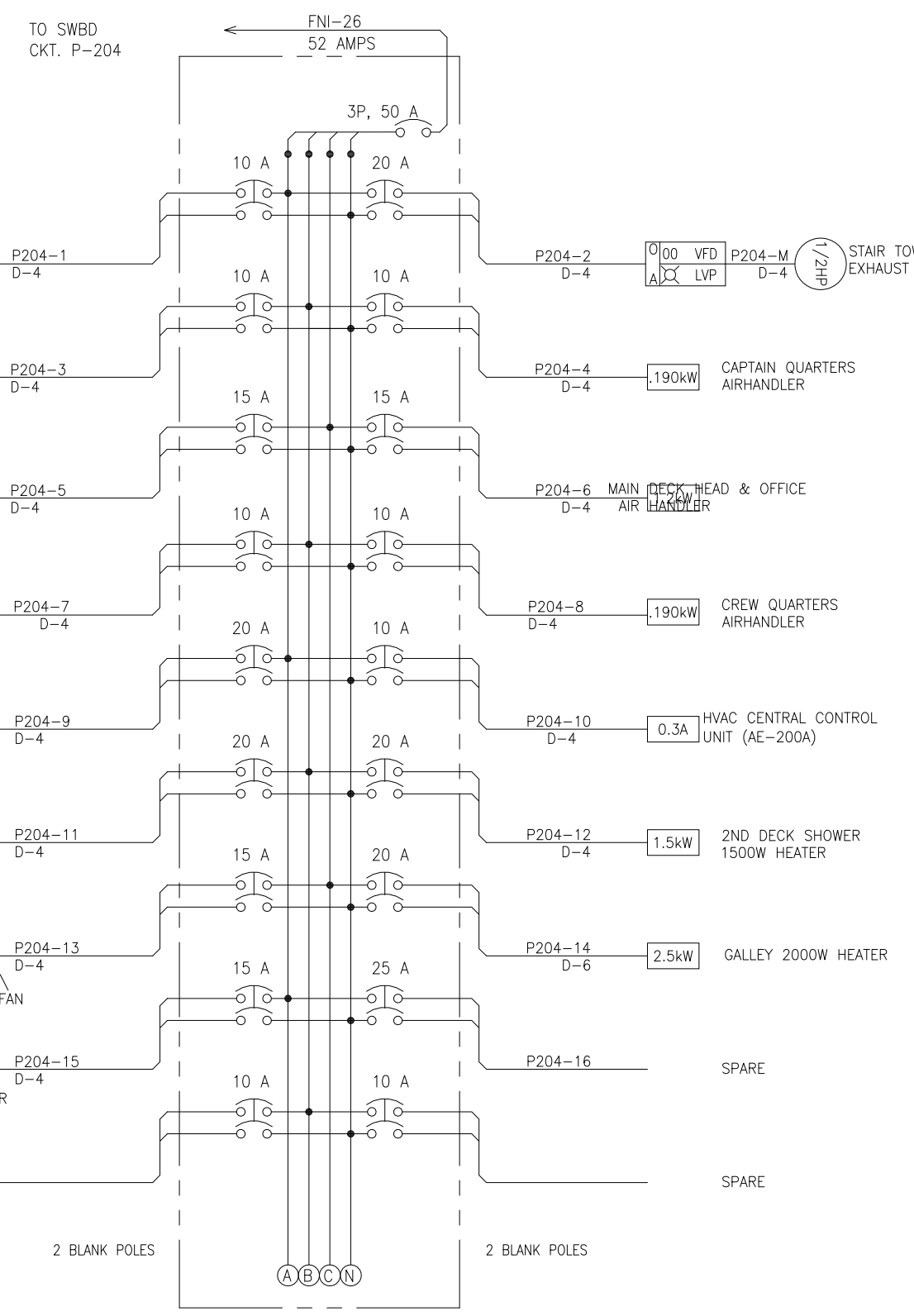
PANEL P203 - ENGINE ROOM PUMP PANEL  
208/120V, 3ø-4W, 225A, 10kAIC, MLO  
42 POLE, NEMA-12 ENCLOSURE



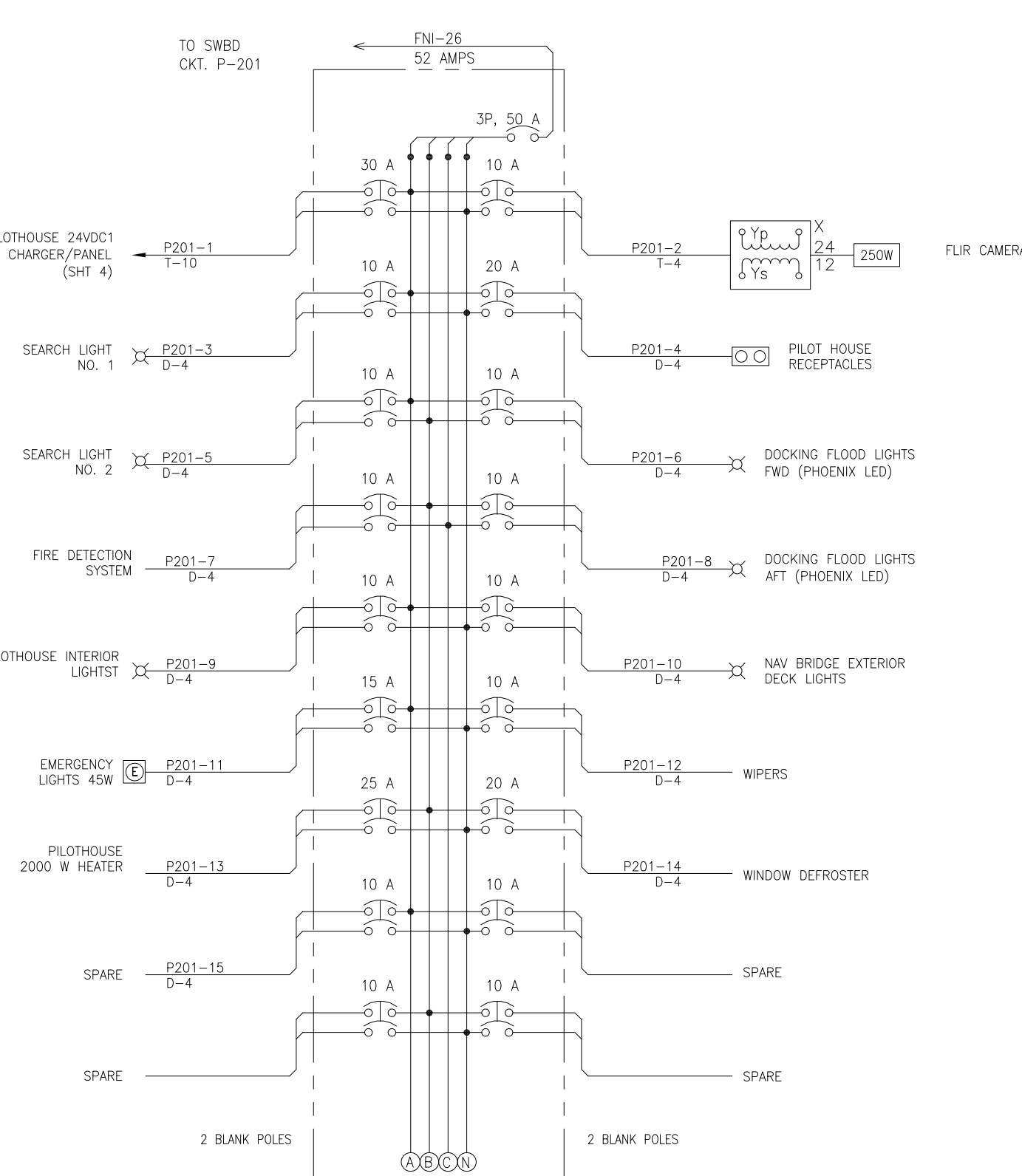
PANEL P205 - POWER AND LIGHTING PANEL  
208/120V, 3ø-4W, 100A, 10kAIC, MLO  
36 POLE, NEMA-12 ENCLOSURE



PANEL P202 - ENGINE ROOM PANEL  
208/120V, 3ø-4W, 225A, 10kAIC, MLO  
36 POLE, NEMA-12 ENCLOSURE



PANEL P204 - HVAC PANEL  
208/120V, 3ø-4W, 100A, 10kAIC, MB  
42 POLE, NEMA-12 ENCLOSURE



PANEL P201 - PILOTHOUSE PANEL  
208/120V, 3ø-4W, 100A, 10kAIC, MB  
42 POLE, NEMA-12 ENCLOSURE

-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS AND AMERICAN BUREAU OF SHIPPING RULES FOR BUILDING AND CLASSING STEEL VESSELS FOR SERVICE ON RIVERS AND INTRACOASTAL WATERWAYS WITH NOTATION "A1, PASSENGER VESSEL, RIVER SERVICE."	11.	METAL USED FOR TERMINAL STUDS, LUGS, NUTS, AND WASHERS SHALL BE CORROSION RESISTANT AND GALVANICALLY COMPATIBLE WITH THE WIRE AND TERMINAL LUGS.
2.	SHIP SERVICE SWITCHBOARD IS A 3 PHASE 4 WIRE SYSTEM, 208/120V, 60 Hz, WITH GROUNDED NEUTRAL. SEE REFERENCE 1 FOR SWITCHBOARD LOCATION.	12.	WIRES TERMINATING IN EQUIPMENT SHALL BE ARRANGED TO PROVIDE A SURPLUS LENGTH OF WIRE SUFFICIENT TO ALLOW FOR DISCONNECTION, AND TO PERMIT MULTIPLE WIRES TO BE FORMED AT TERMINAL STUDS.
3.	ALL PERMANENTLY INSTALLED ELECTRICAL EQUIPMENT SHALL HAVE METAL ENCLOSURES PROPERLY GROUNDED PER ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE, UNLESS NOTED OTHERWISE.	13.	CABLE PENETRATIONS OF STRUCTURAL FIRE PROTECTION SHALL UTILIZE FIRE STOPS WHICH MAINTAIN THE FIRE PROTECTION LEVEL (GRADE A, B, ETC.) ASSOCIATED WITH THE FIRE ZONE PENETRATED.
4.	THE SHIP SERVICE AND SHORE POWER SUPPLIES SHALL BE INTERLOCKED SO THAT ONLY ONE CAN SUPPLY THE SHIP SERVICE SWITCHBOARD AT ANY TIME.	14.	CABLE PENETRATIONS THROUGH BULKHEADS AND DECKS, BOTH WATERTIGHT AND NON-WATERTIGHT, SHALL COMPLY WITH REGULATORY BODY REQUIREMENTS. MULTI-CABLE TRANSIT TYPE PENETRATIONS MAY BE SUBSTITUTED FOR STUFFING TUBES FOR ALL PENETRATIONS EXCEPT THROUGH OPEN DECKS. EXTRA HEAVY, LOW ALLOY KICK PIPES WITH STUFFING TUBES, OR EQUIVALENT, SHALL BE WELDED INTO ALL OPEN DECKS AND SHALL BE NINE INCHES HIGH TO TOP OF THE STUFFING TUBE. BUILT-IN WATERTIGHT BOXES MAY BE USED IN LIEU OF KICK PIPES. POURED SEALERS SHALL NOT BE ALLOWED.
5.	CIRCUIT BREAKERS FOR STEERING GEAR HYDRAULIC PUMPS REQUIRE INSTANTANEOUS TRIP ONLY AND SHALL BE SIZED PER 46 CFR 58.25-58.63(c). CONTRACTOR SHALL VERIFY TRIP RATING AGAINST ACTUAL MOTOR NAMEPLATE DATA.		
6.	ALL POWER CABLE SHALL COMPLY WITH THE REQUIREMENTS OF IEEE 1580. ALL CABLE SHALL BE LOW SMOKE, ZERO HALOGEN TYPE, TRICAB OR EQUAL.		
7.	NYLON OR BRASS STUFFING TUBES SHALL BE USED WHEN PENETRATING ELECTRICAL ENCLOSURES OR JUNCTION BOXES.		
8.	FAULT CURRENT AT THE SHIP SERVICE SWITCHBOARD IS CONSERVATIVELY ESTIMATED AT 3,668A.		
9.	ALL CABLES SHALL BE RATED AT 90°C CONDUCTOR TEMPERATURE IN ACCORDANCE WITH IEEE STANDARD NO. 45 2002 TABLE 25.		
10.	EACH CABLE SHALL BE TAGGED WITH ITS UNIQUE CIRCUIT DESIGNATION USING EMBOSSED ALUMINUM TAGS ON EACH SIDE OF PENETRATIONS AND INTO CONNECTION BOXES AND/OR EQUIPMENT.		

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Title: 70.5'x30'x11' NCDOT TOWBOAT

**ELECTRICAL ONE-LINE  
DIAGRAM**

Dwg. No. 17-1372-320      Alt. No. 1  
Sh: 2 of 2

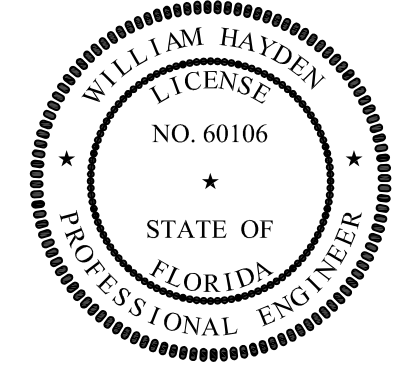
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Checked By: \_\_\_\_\_      Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_      Scale: NONE  
ABS App'l: \_\_\_\_\_      USCG App'l: \_\_\_\_\_

SYMBOL LIST	
	PANEL FEEDERS
	CIRCUIT FEEDERS
	CUBE LIGHT 13W
	METALLIC LED VP 17W
	RED/WHITE LED 13W
	ARIES FLOOD 16W
	DECK LIGHT LED 5W
	BUNK AND MIRROR LIGHT 12W
	RECEPTACLE GFCI 108VAC 20A
	RECEPTACLE 108VAC 20A
	CENTRIFUGAL PUMP
	GEAR PUMP
	RECEPTACLE 208VAC 20A
	LIGHT SWITCH
	MOTOR CONTROLLER HOA
	MOTOR CONTROLLER R/S
	DISCONNECT
	SHOREPOWER INLET
	SEARCHLIGHT
	FLIR CAMERA
	RECEPTACLE, RANGE 50A
	BULKHEAD MOUNT EMERGENCY LIGHTS

**SYSTEM OPERATION INTENT**  
 TO PROVIDE 120/208 3 PHASE AC POWER FROM EITHER OF THE TWO 99KW ONBOARD GENERATORS OR THROUGH A DEDICATED SHORE-POWER CONNECTION THROUGH THE SWITCHBOARD TO THE INDIVIDUAL SUB PANELS IN ORDER TO PROVIDE BASIC VESSEL FUNCTIONALITY WHILE PERFORMING ITS MISSION AS A TOWING VESSEL.

MATERIAL SCHEDULE									
SYSTEM	SIZE	WIRE	PANEL ENCLOSURES	JUNCTION BOXES	CIRCUIT DISCONNECTS	MOTOR CONTROLLERS	CIRCUIT BREAKERS	FUSES	CABLE HANGERS
PANEL FEEDER WIRING	ALL	ALL ELECTRIC WIRE SHALL BE UL LISTED SHIPBOARD CABLE, SIZED AT 80 PERCENT MANUFACTURERS LISTED AMPACITY AT 75 DEG C	ALL PANELS SHALL HAVE SOLID COPPER BUS BARS				EACH CIRCUIT BREAKER MUST MEET UL 489 "MOLDED CASE CIRCUIT BREAKERS AND CIRCUIT BREAKER ENCLOSURES" OR OTHER STANDARD SPECIFIED BY THE COMMANDANT AND BE OF THE MANUALLY RESET TYPE DESIGNED FOR: (1) INVERSE TIME DELAY (2) INSTANTANEOUS SHORT CIRCUIT PROTECTION AND (3) SWITCHING DUTY IF THE BREAKER IS USED AS A SWITCH.  EACH CIRCUIT BREAKER MUST INDICATE WHETHER IT IS IN THE OPEN OR CLOSED POSITION.	FUSES SHALL BE OF THE UL CARTRIDGE TYPE ONLY	CABLE HANGERS FOR OVERHEAD AND VERTICAL RUNS MUST BE INSTALLED WITH METAL SUPPORTS AND RETENTION DEVICES AT LEAST EVERY 48 INCHES.
CIRCUIT FEEDER WIRING	ALL								

17-1372-5005.1 Electrical and Lighting B.O.M.					
ITEM	QTY	SYMBOL	DESCRIPTION	MATERIAL SPEC	REMARKS
1	26		PHOENIX REDI LIGHT 42" LED 19W		
2	6		PHOENIX CUBE LIGHT WHITE 13W		
3	11		PHOENIX METALLIC LED VP 17W	UL1598A, UL 844	
4	5		RED/WHITE BI COLOR, SWITCHABLE, DIMMABLE, L.E.D. DOME LIGHT 13W		
5	5		PHEONIX ARIES FLOOD LIGHT 16W		
6	6		PHEONIX BERTH AND MIRROR LIGHT 12W		
7	3		PHEONIX ECMOD 2 280 W LED FLOOD LIGHT		
8	10		DECK LIGHT LED DIMMABLE 5W		
9	8		RECEPTACLE GFCI 108VAC 20A		
10	23		RECEPTACLE 108VAC 3 PRONG 20A		
11	1		RECEPTACLE 208VAC 20A		
12	19		LIGHT SWITCH		
13	8		MOTOR CONTROLLER H.O.A.		
14	6		DISCONNECT		
15	1		SHORE POWER INLET 4 WIRE 200A MALE		
16	1		FLIR CAMERA M500 ULTRA HIGH PERFORMANCE MULTI SENSOR CAMERA SYSTEM		
17	1		HVAC MINI SPLIT REVERSE CYCLE UNIT AIR COOLED PURY-72TLMU-A		
18	1		HVAC MINI SPLIT REVERSE CYCLE AIR HANDLER PKFY-P06NBMU-E2R1 (PILOT HOUSE)		
19	1		HVAC MINI SPLIT REVERSE CYCLE AIR HANDLER PKFY-P12NHMU-E2 (PASSEGEWAY)		
20	2		HVAC MINI SPLIT REVERSE CYCLE AIR HANDLER PKFY-P06NBMU-E2R1 (CAPTAIN & CREW QTRS)		
21	3		HVAC MINI SPLIT REVERSE CYCLE AIR HANDLER PEFY-P12NMAU-E3 (SHOWER & HEADS)		
22	1		HVAC MINI SPLIT REVERSE CYCLE AIR HANDLER PKFY-P18NHMU-E2 (GALLEY)		
23	1		POTABLE WATER PRESSURE PUMP 1.5HP, 115 OR 208 VAC, 60 HZ, 1PH, 50 DEGREE CELCIUS		
24	1		SANITARY WATER PRESSURE PUMP 1.5HP, 115 OR 208 VAC, 60HZ, 1PH, 50 DEGREE CELCIUS		
25	1		BILGE PUMP 5HP 208 VAC 60 HZ 3 PH 50 DEGREE CELCIUS		
26	1		FIRE PUMP 20HP, 208 VAC, 60 HZ, 3PH, 50 DEGREE CELCIUS		
27	1		SEWAGE PUMP 2HP, 208 VAC, 60HZ, 3PH, 50 DEGREE CELCIUS		
28	1		FUEL TRANSFER PUMP 1HP 115 OR 208 VAC, 60 HZ, 1 PH, 50 DEGREE CELCIUS		
30	2		SEARCH LIGHT CARLISLE AND FITCH 15" DIA, 3 MILLION CANDLE POWER, 1000W		
31	5		LAMP, BULKHEAD, LED, RECHARGEABLE LANTERN NSN 6230-01-580-6268	MIL-DTL-16377/53 JAY MOULDING #101.2L(W)	EMERGENCY LIGHTS
32					



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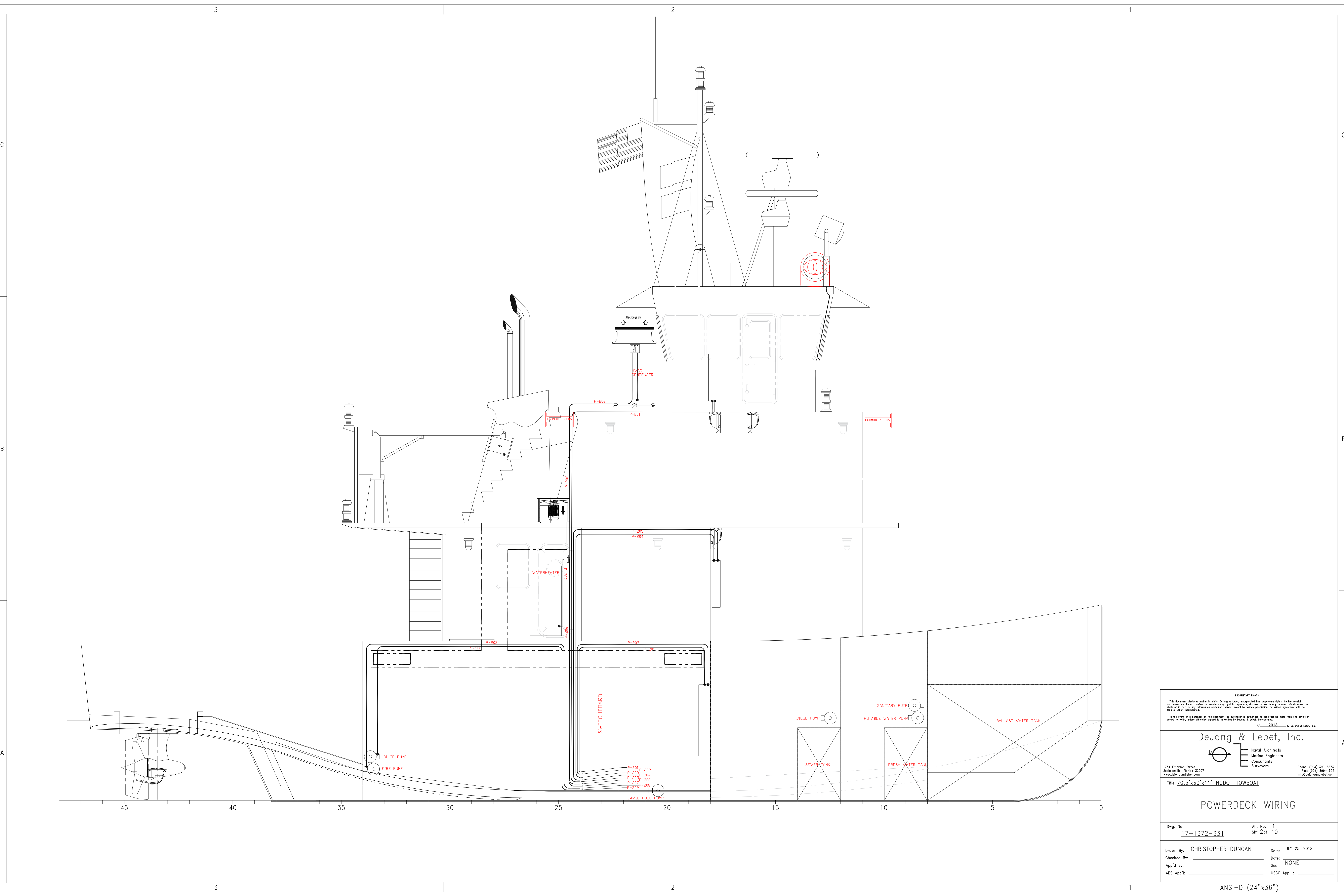
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Title: 70.5'x30'x11' NCDOT TOWBOAT

**POWERDECK WIRING**

Dwg. No. 17-1372-331 Alt. No. 1  
 Sht. 1 of 10

Drawn By: CHRISTOPHER DUNCAN Date: JULY 25, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: NONE  
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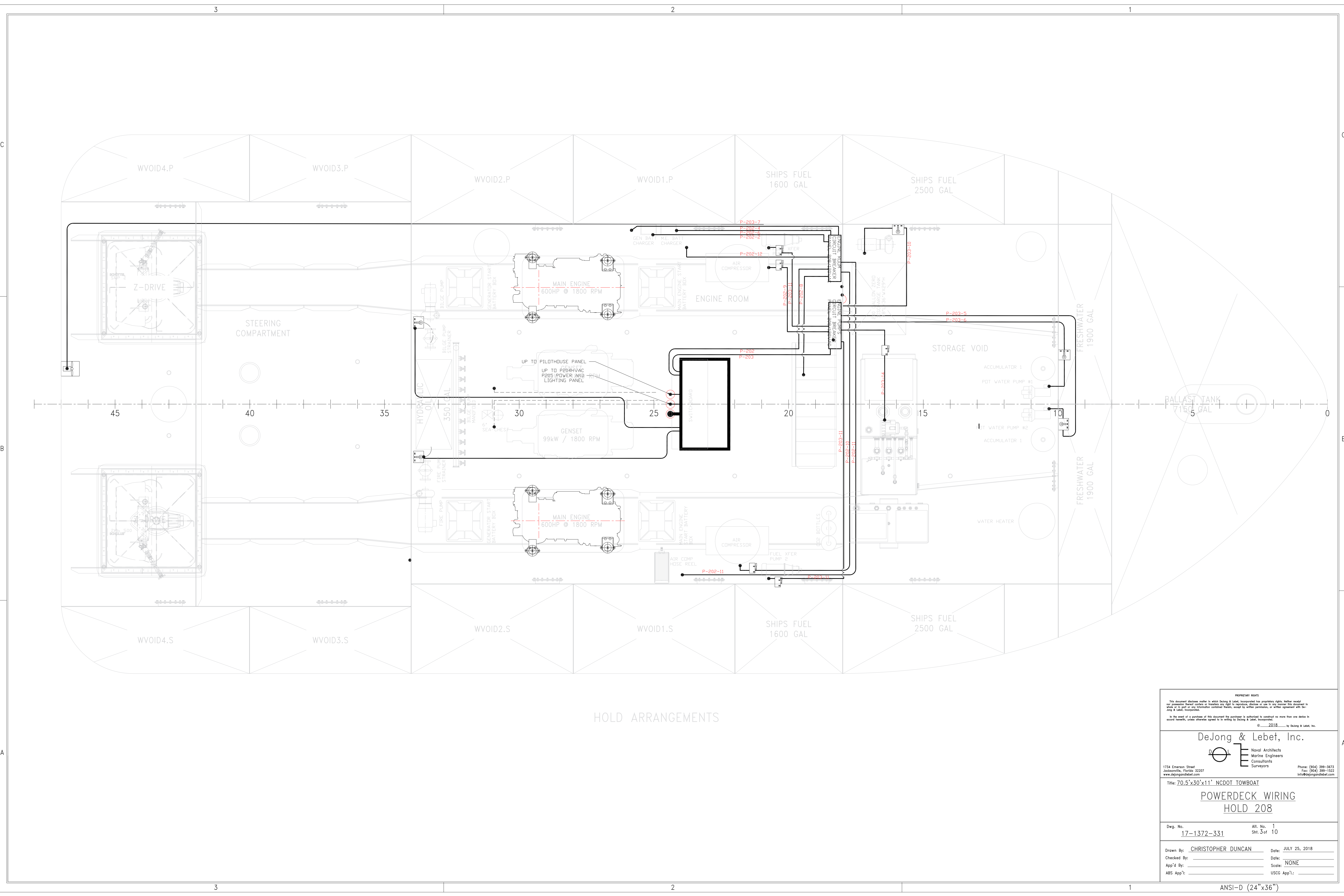
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### POWERDECK WIRING

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Drawn By: <b>CHRISTOPHER DUNCAN</b>	Date: <b>JULY 25, 2018</b>
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Sh. 2 of 10



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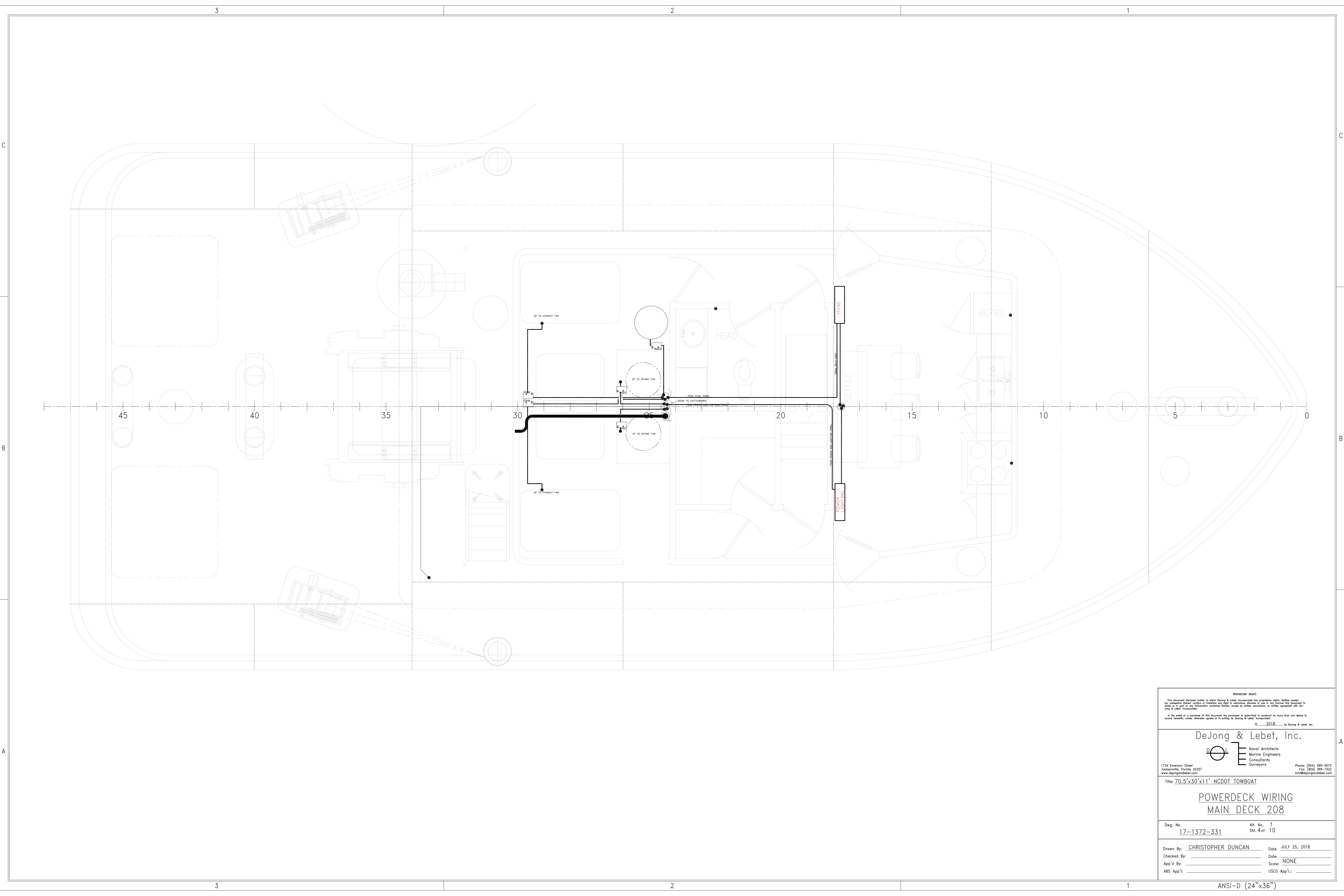
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**POWERDECK WIRING**  
**HOLD 208**

Dwg. No. 17-1372-331 Alt. No. 1  
 Sh. 3 of 10

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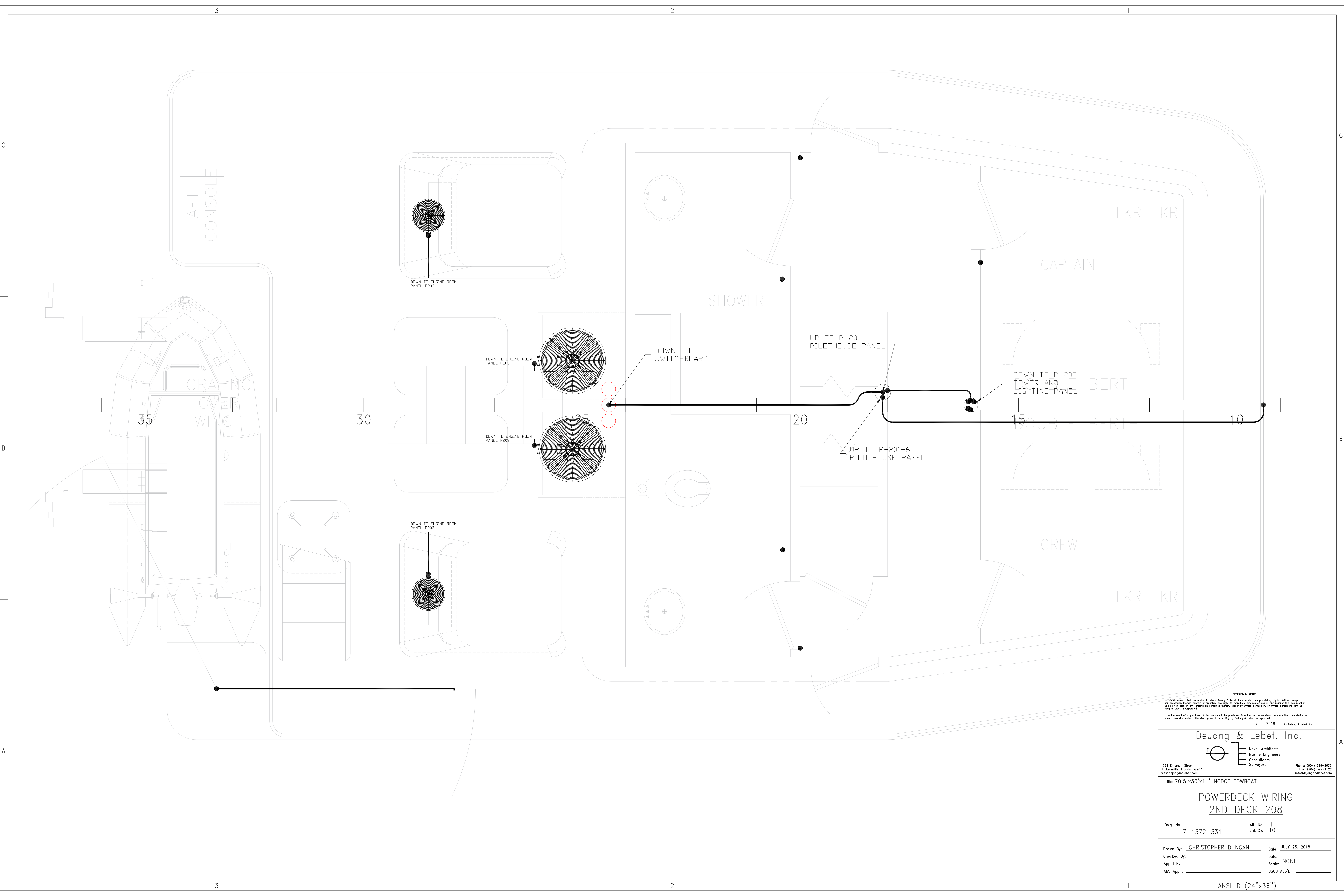
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Title: 70.5'x30'x11' NCDOT TOWBOAT

**POWERDECK WIRING  
 MAIN DECK 208**

Dwg. No. 17-1372-331 Alt. No. 1  
 Sh. 4 of 10

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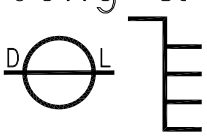


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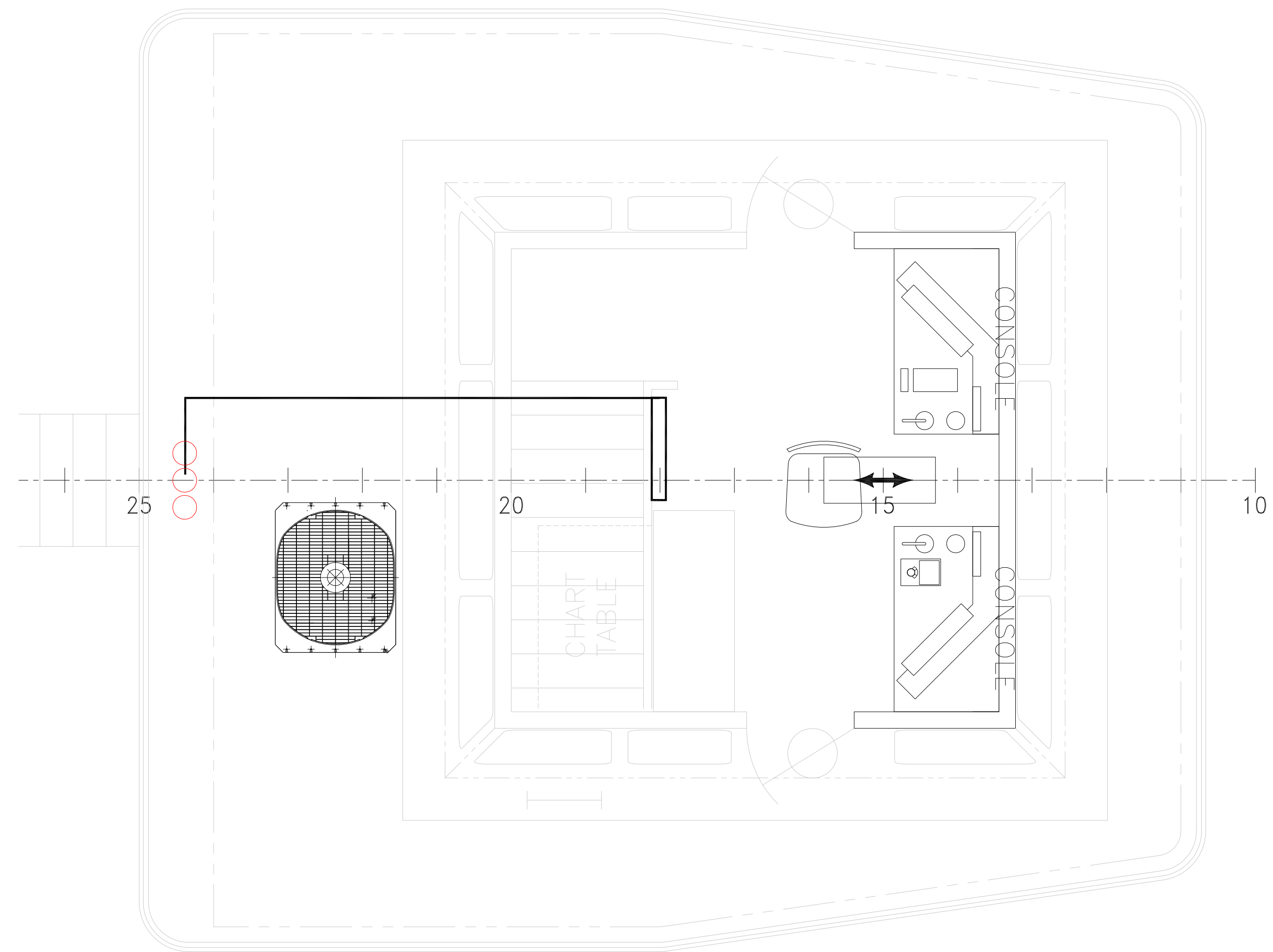
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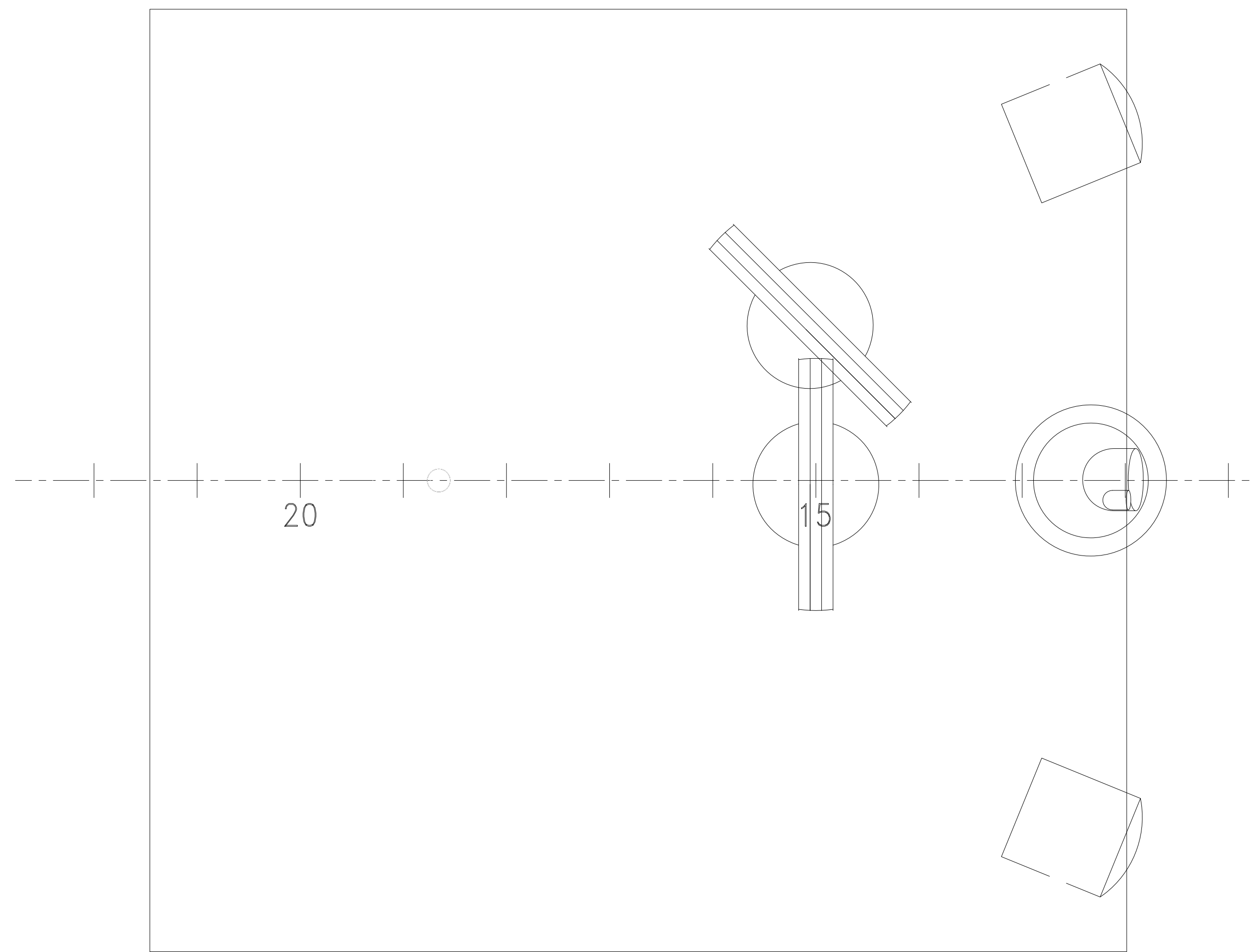
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**POWERDECK WIRING**  
**2ND DECK 208**

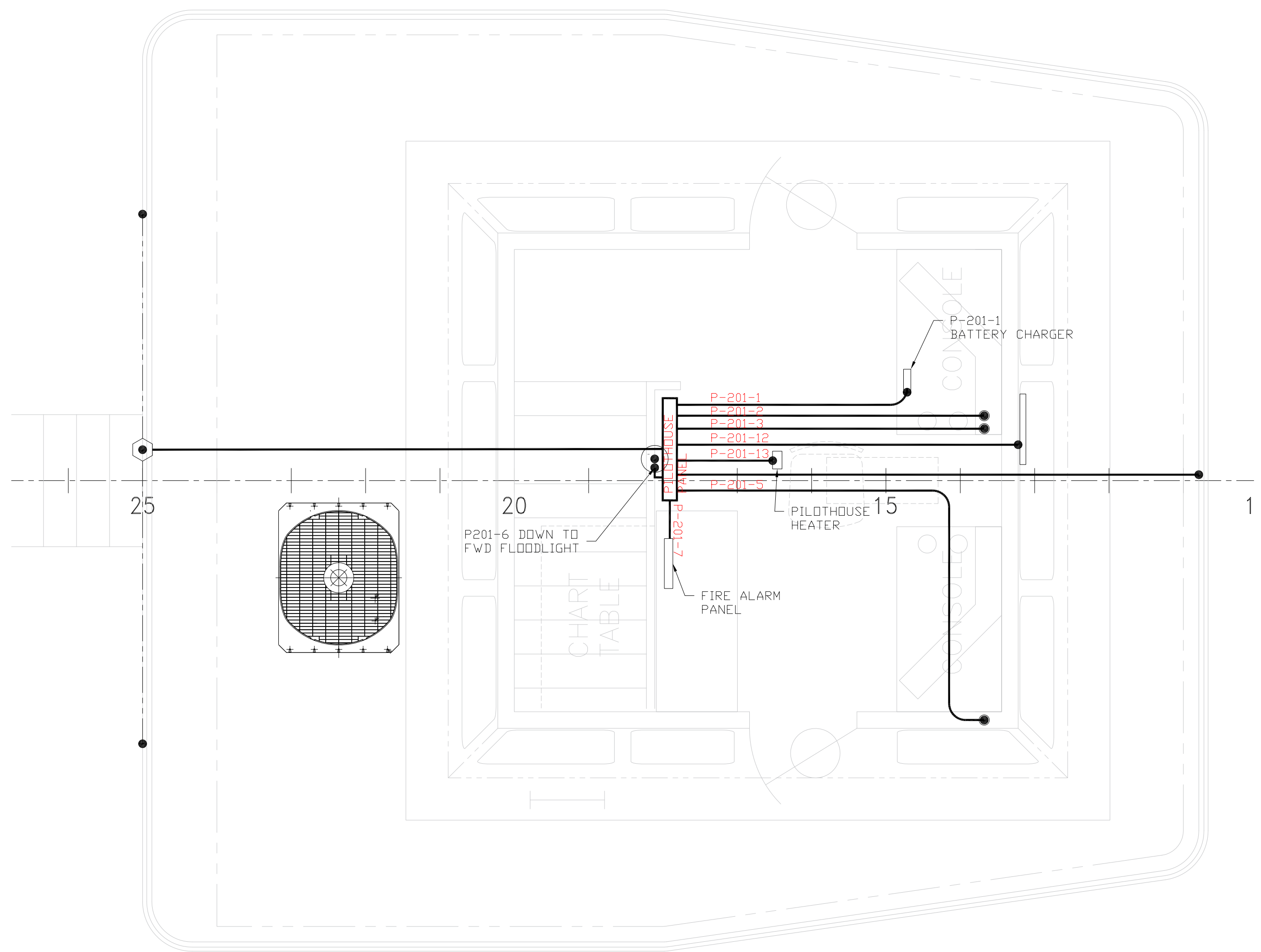
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PILOTHOUSE CONSOLE



PILOTHOUSE ROOF ARRAY



PILOTHOUSE POWERDECK WIRING

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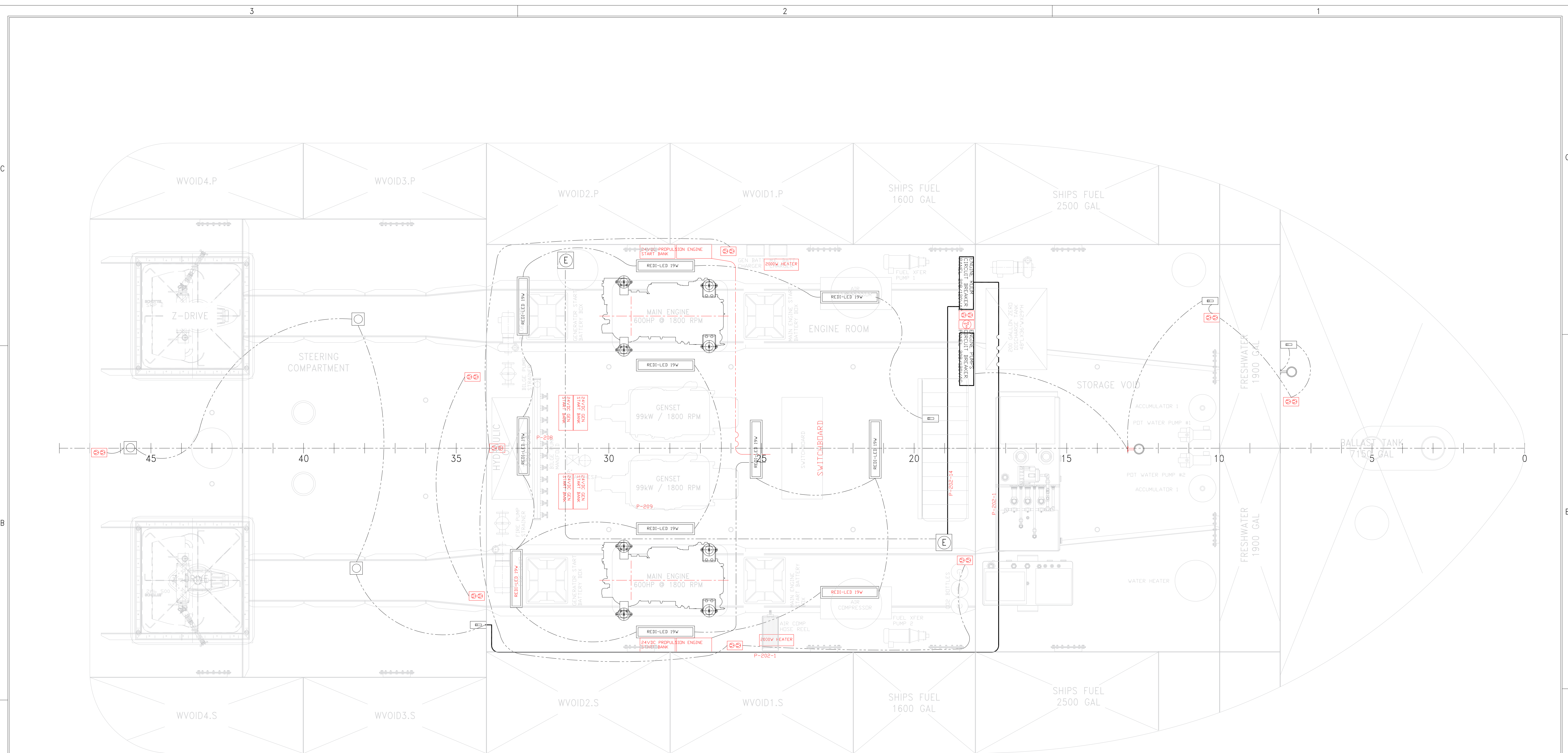
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**POWERDECK WIRING  
 PILOTHOUSE 208**

Dwg. No. 17-1372-331 Alt. No. 1  
 Shk. 5 of 10

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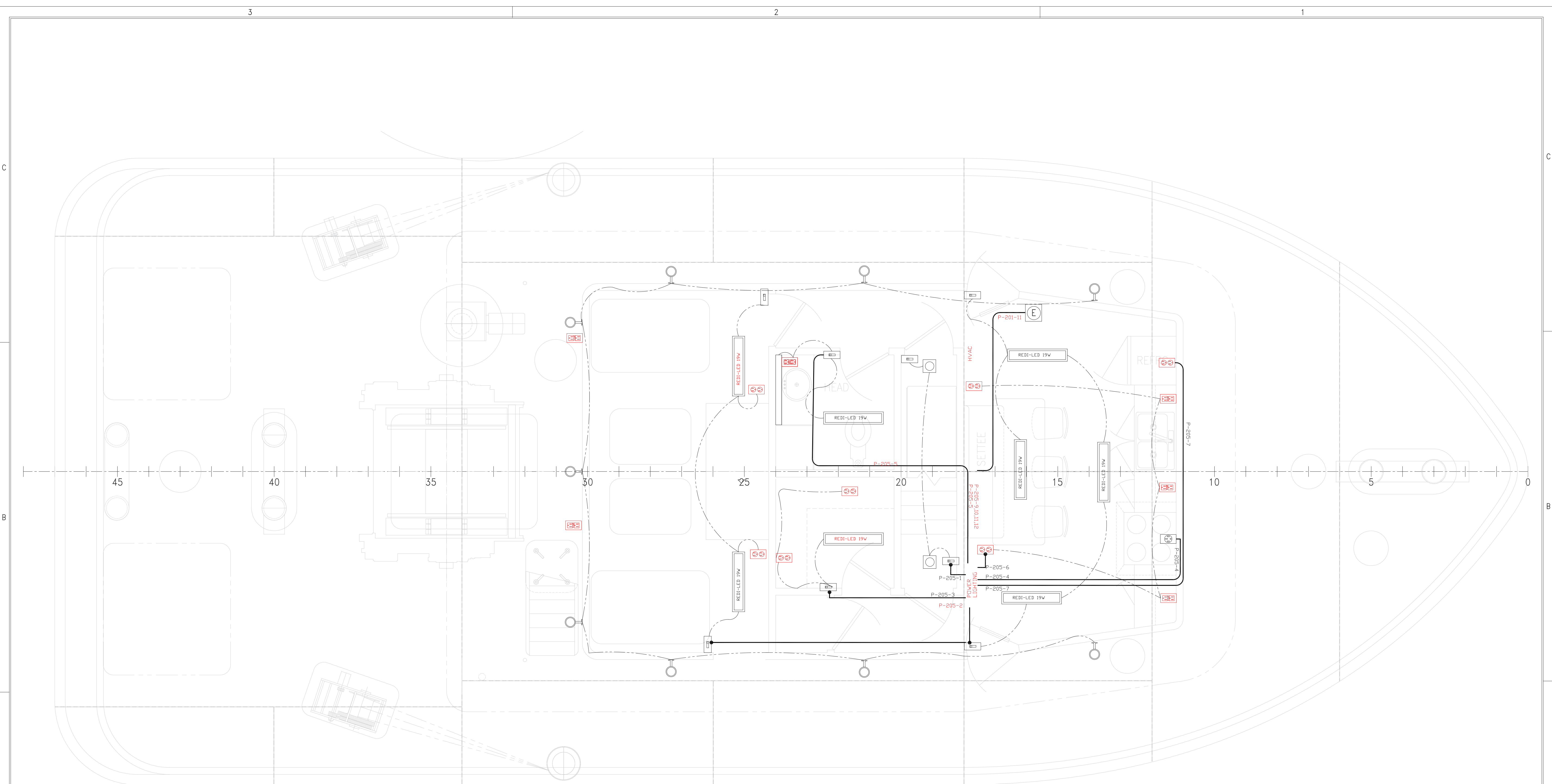
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**POWERDECK WIRING  
 HULL LIGHTING**

Dwg. No. 17-1372-331 Alt. No. 1  
 Sh. 7 of 10

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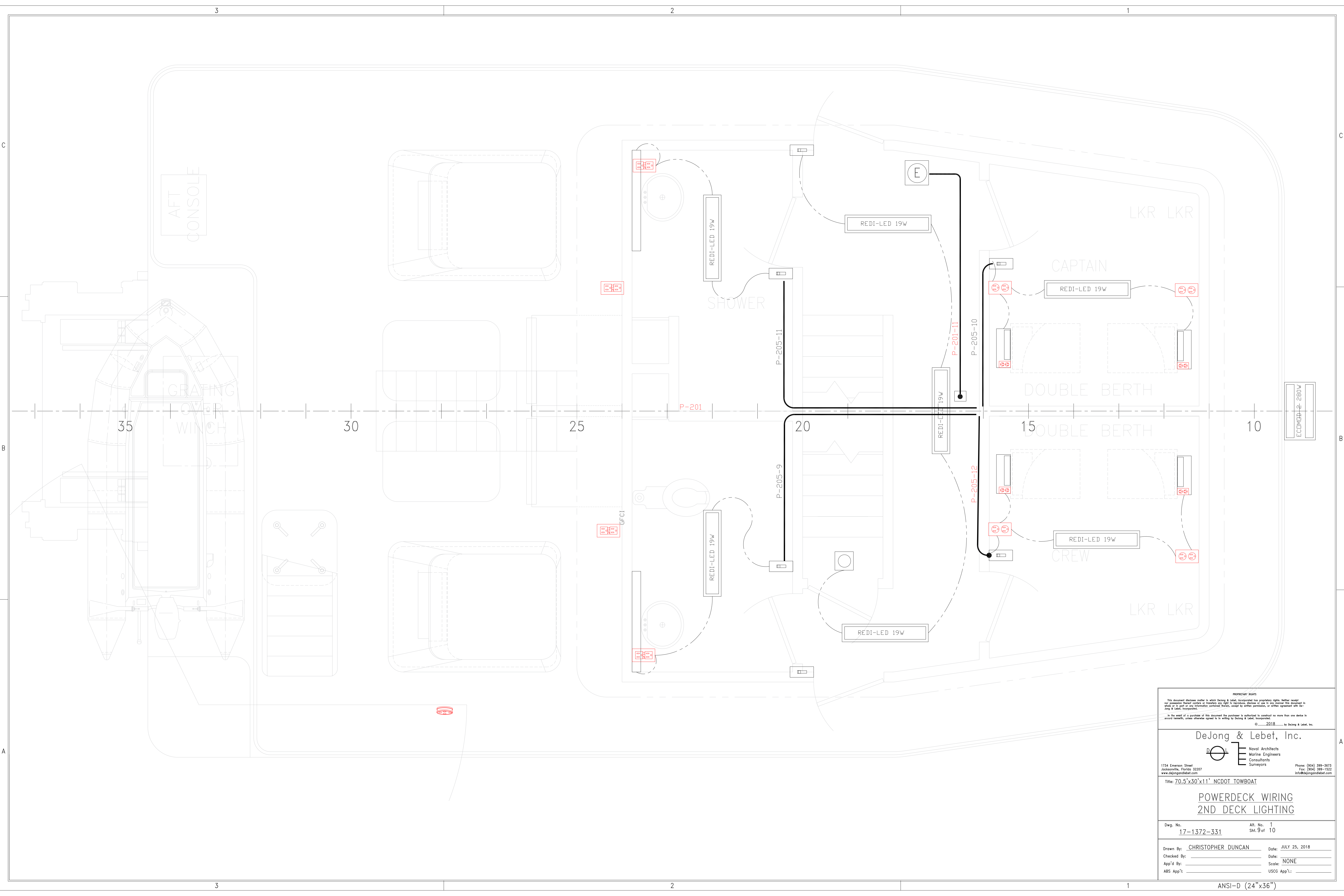
Phone: (904) 399-3633  
 Fax: (904) 399-1522  
 info@dejongandlebet.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

**POWERDECK WIRING  
 MAIN DECK LIGHTING**

Dwg. No. 17-1372-331 Alt. No. 1  
 Sht. 8 of 10

Drawn By: CHRISTOPHER DUNCAN Date: JULY 25, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: NONE  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

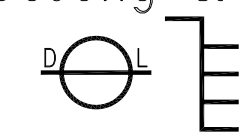


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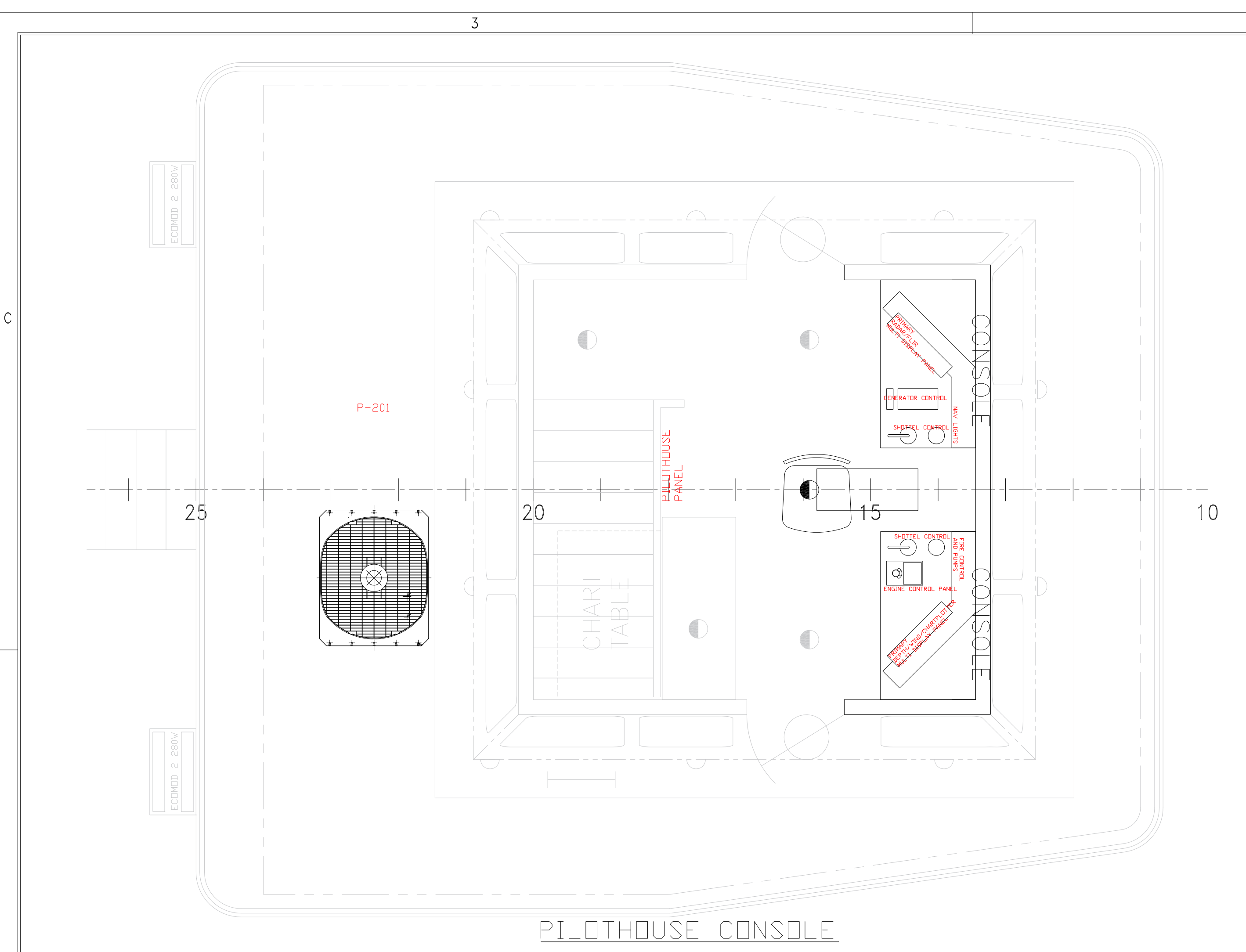
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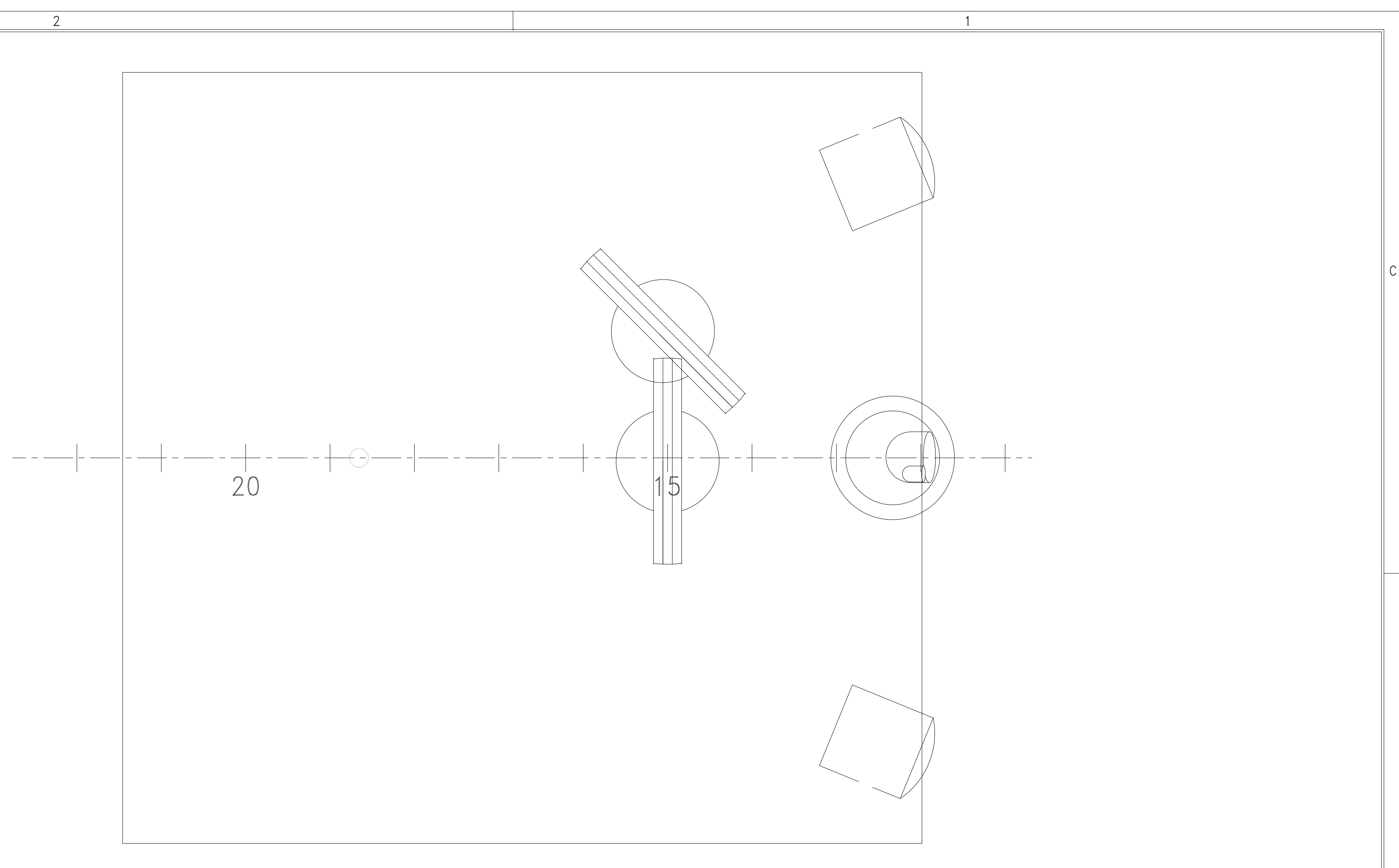
**POWERDECK WIRING  
 2ND DECK LIGHTING**

Dwg. No. 17-1372-331	Alt. No. 1
	Sht. 9 of 10

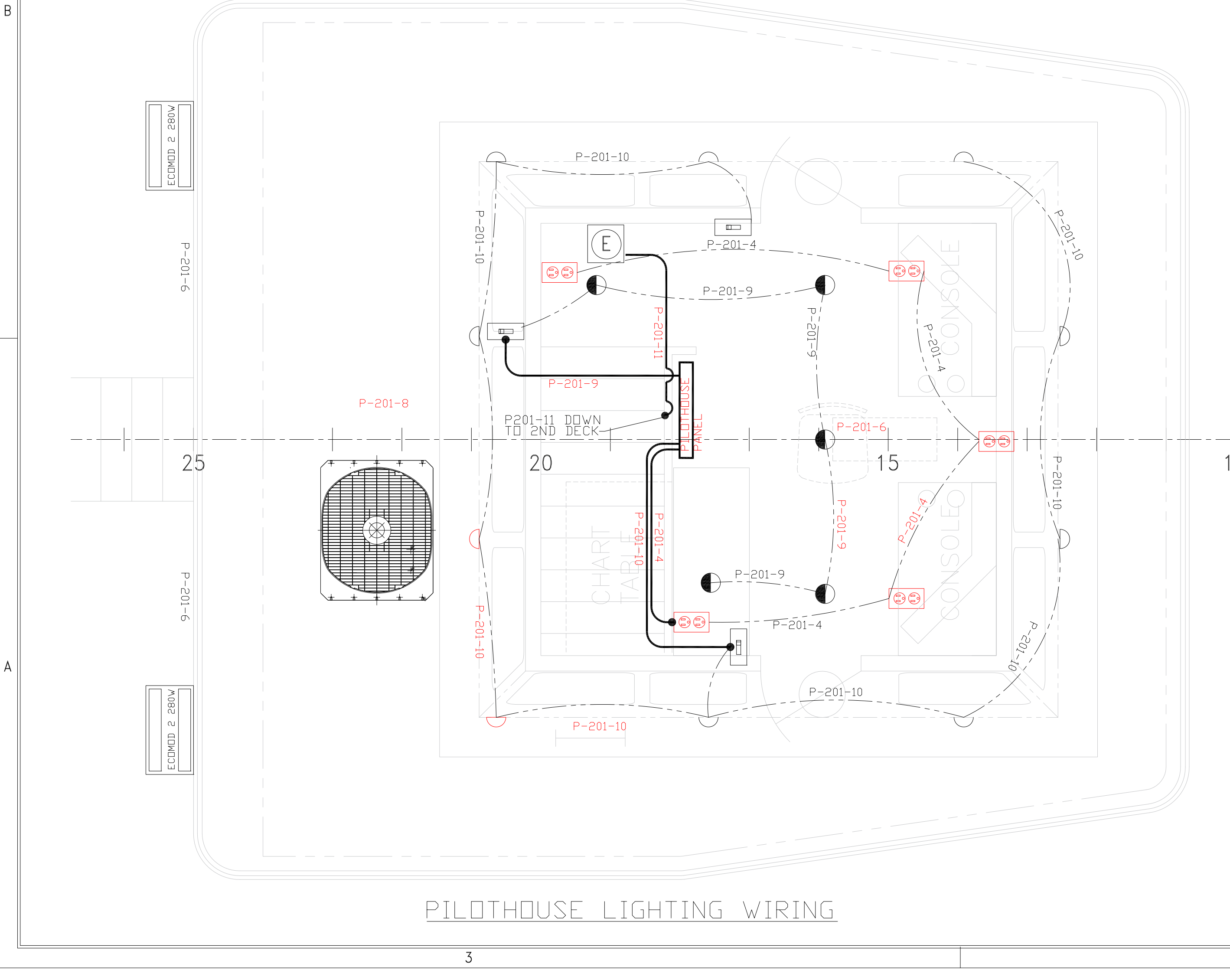
Drawn By: CHRISTOPHER DUNCAN	Date: JULY 25, 2018
Checked By: _____	Date: _____
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ABS App'l: _____	USCG App'l: _____



PILOTHOUSE CONSOLE



PILOTHOUSE ROOF ARRAY



PILOTHOUSE LIGHTING WIRING

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**PILOTHOUSE LIGHTING**

Dwg. No. 17-1372-331 Alt. No. 1  
 Sh: 10 of 10

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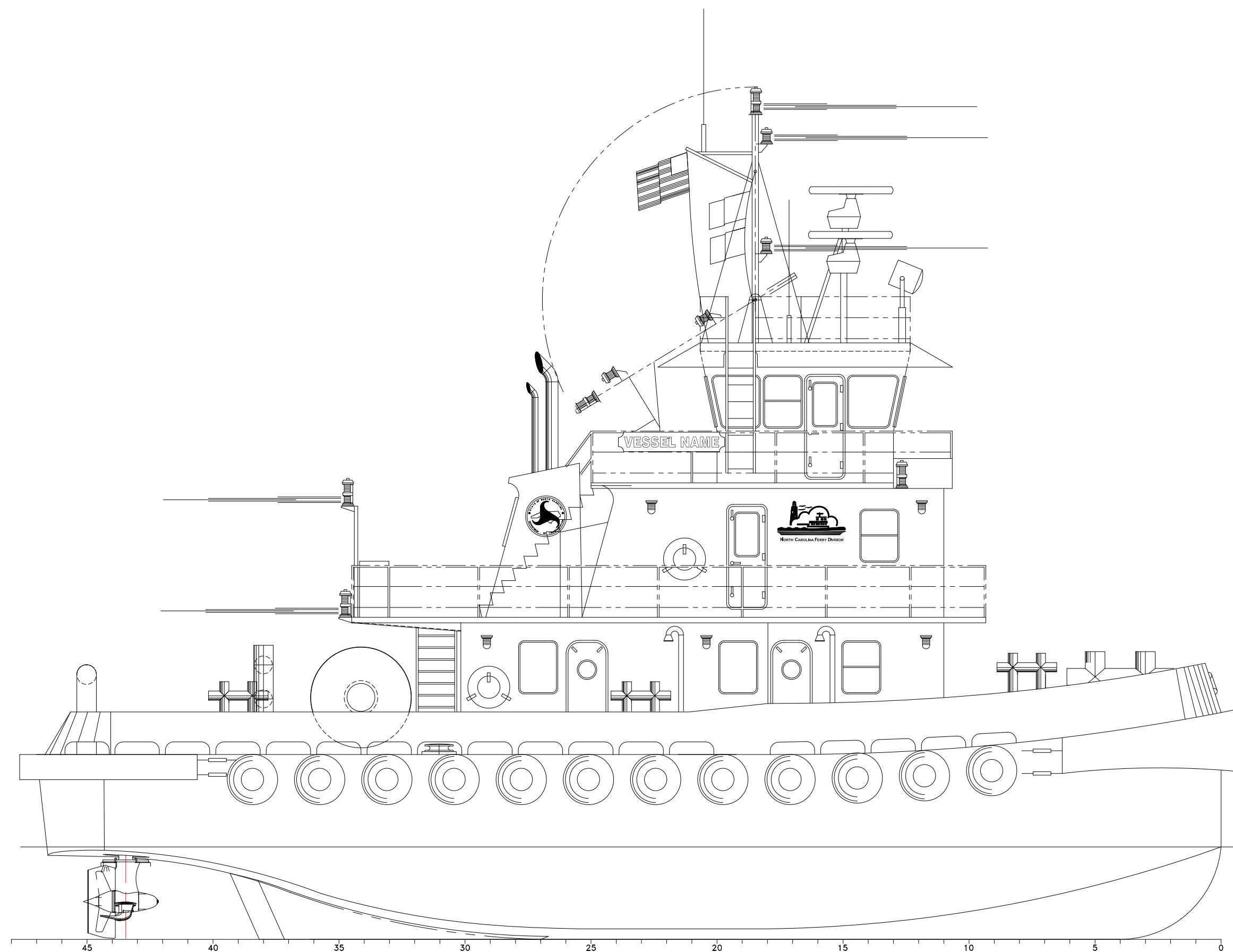


SYMBOLS LIST

	PIPE - FILL/DISCHARGE
	PIPE - VENT
	PIPE UP
	PIPE DOWN
	HOSE CAMLOCK
	SOUNDING TUBE TERMINAL
	VENT TERMINAL
	BULKHEAD PENETRATION

MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
VENTS FILLS, AND SOUNDING TUBES MAWP: 100 PSIG MAWT: 120°F	ALL	CARBON STEEL, SCH 80, SEAMLESS, ASTM A53 OR ASTM A106, GRADE B, ANSI B36.10 (BELOW DECK)  S. STEEL, SCH 80, SEAMLESS, ASTM A312 GR 304/304L (ABV DECK)	FLANGE SLIP ON, CARBON STEEL, ASTM A105, ANSI B16.5, 150# (BELOW DECK)  SLIP ON, S. STEEL, ASTM A182 GR 304/304L, ANSI B16.5, 150# (ABOVE DECK)	SOCKET WELD CARBON STEEL, ASTM A105 OR ASTM A234 GR WPB, ANSI B16.11 (BELOW DECK)  SOCKET WELD S. STEEL, ASTM A351 GR 304/304L, ANSI B16.11 (ABOVE DECK)	-	GARLOCK IFG 5500	BALL THREADED, SW, OR FLANGED STAINLESS STEEL, ASTM A351 CF8M	BALL S. STEEL BALL, RPTFE OR VITON SEATS	CARBON STEEL ASTM A307 GR B ANSI B18.2.1	HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2	

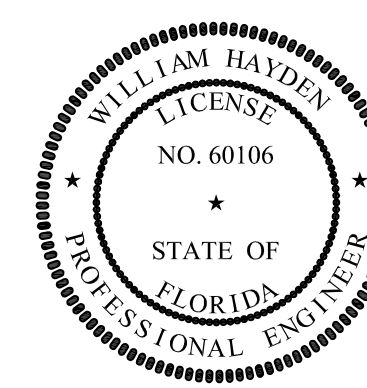


GENERAL NOTES

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8.	SOUNDING TUBE TERMINALS SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS, GENERALLY AS SHOWN IN PLAN 2-3A & 2-3C.
9.	FUEL TANKS SHALL BE FITTED WITH HIGH LEVEL AND LOW LEVEL ALARMS AND CONTINUOUS LEVEL TRANSDUCERS PER REFS 1 AND 4. SENSORS SHALL BE INTERFACED WITH THE SHIP'S ALARM AND MONITORING SYSTEM.

NO.	DESCRIPTION
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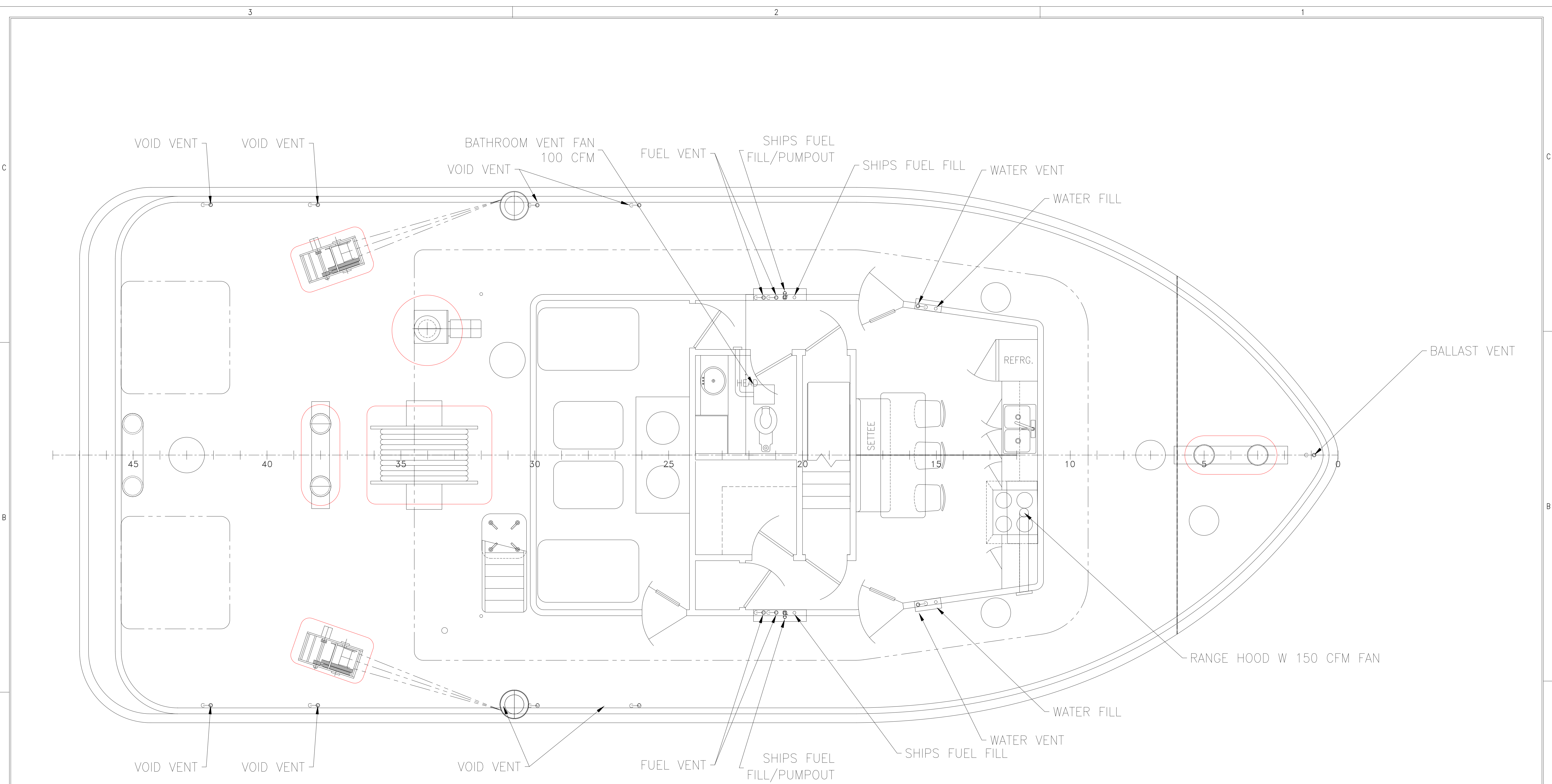
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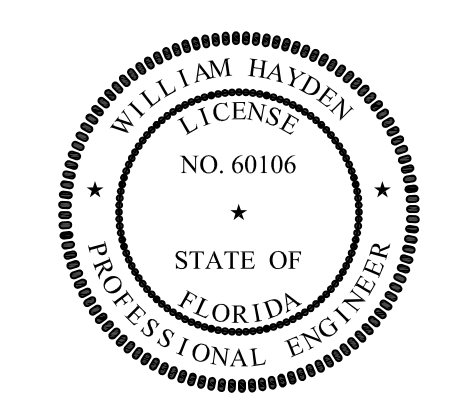
**VENTS & FILLS**

Dwg. No. 17-1372-506 Alt. No. 1  
 Sh. 1 of 5

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
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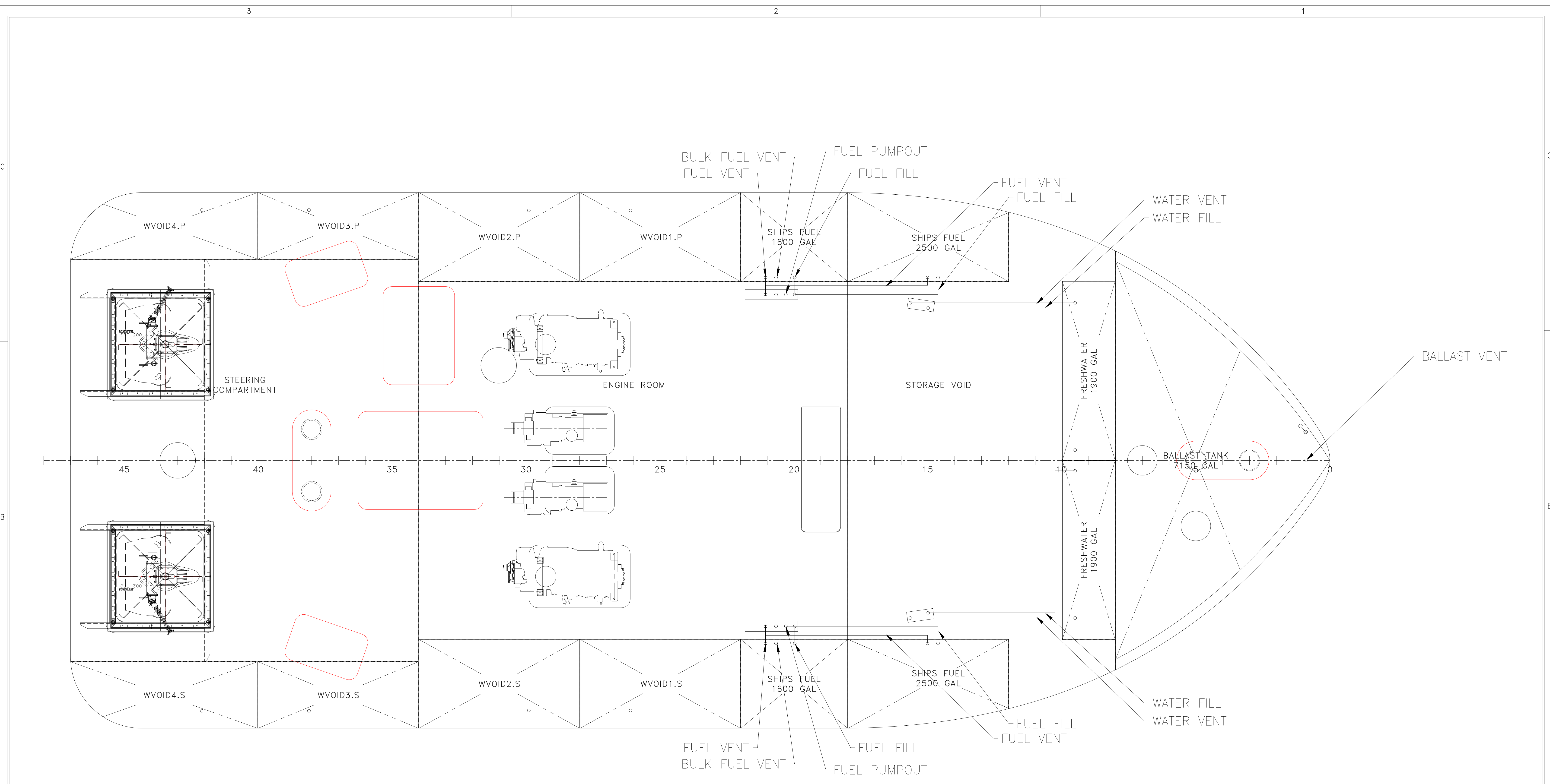
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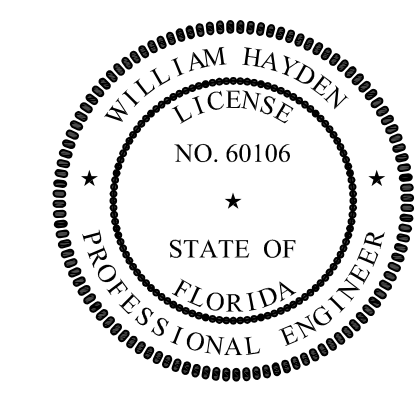
**VENT & FILLS**

Dwg. No. 17-1372-506 Alt. No. 1  
 Sht. 2 of 5

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
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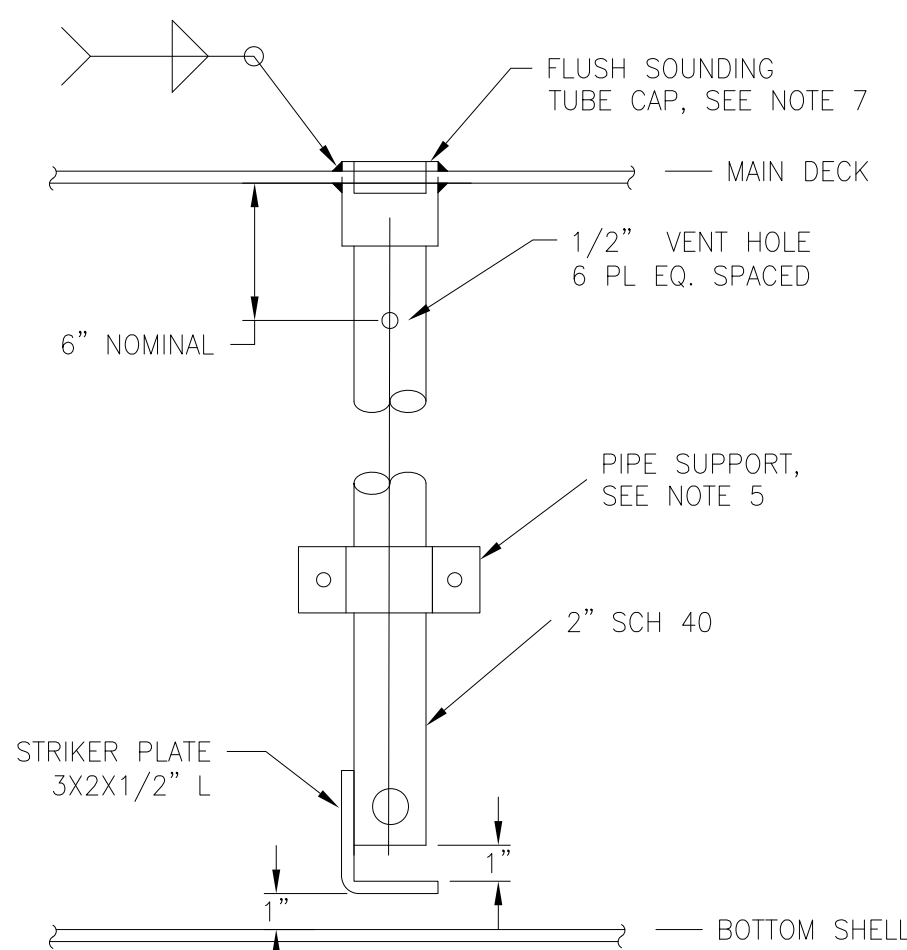
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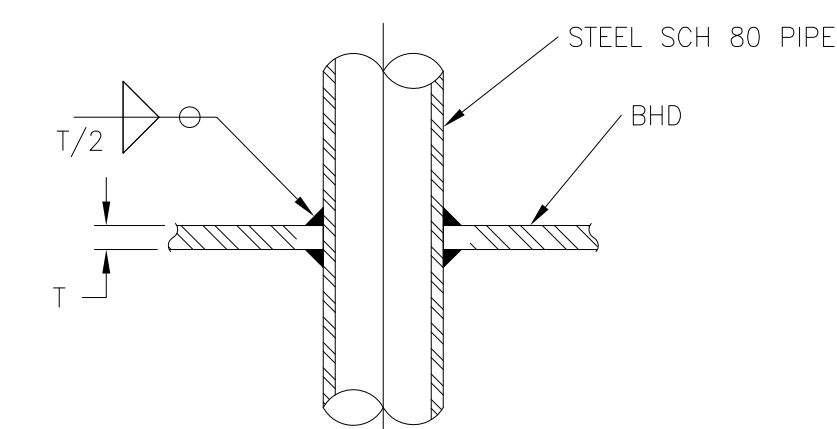
**VENT & FILLS**

Dwg. No. **17-1372-506** Alt. No. **1**  
 Sht. 3 of 5

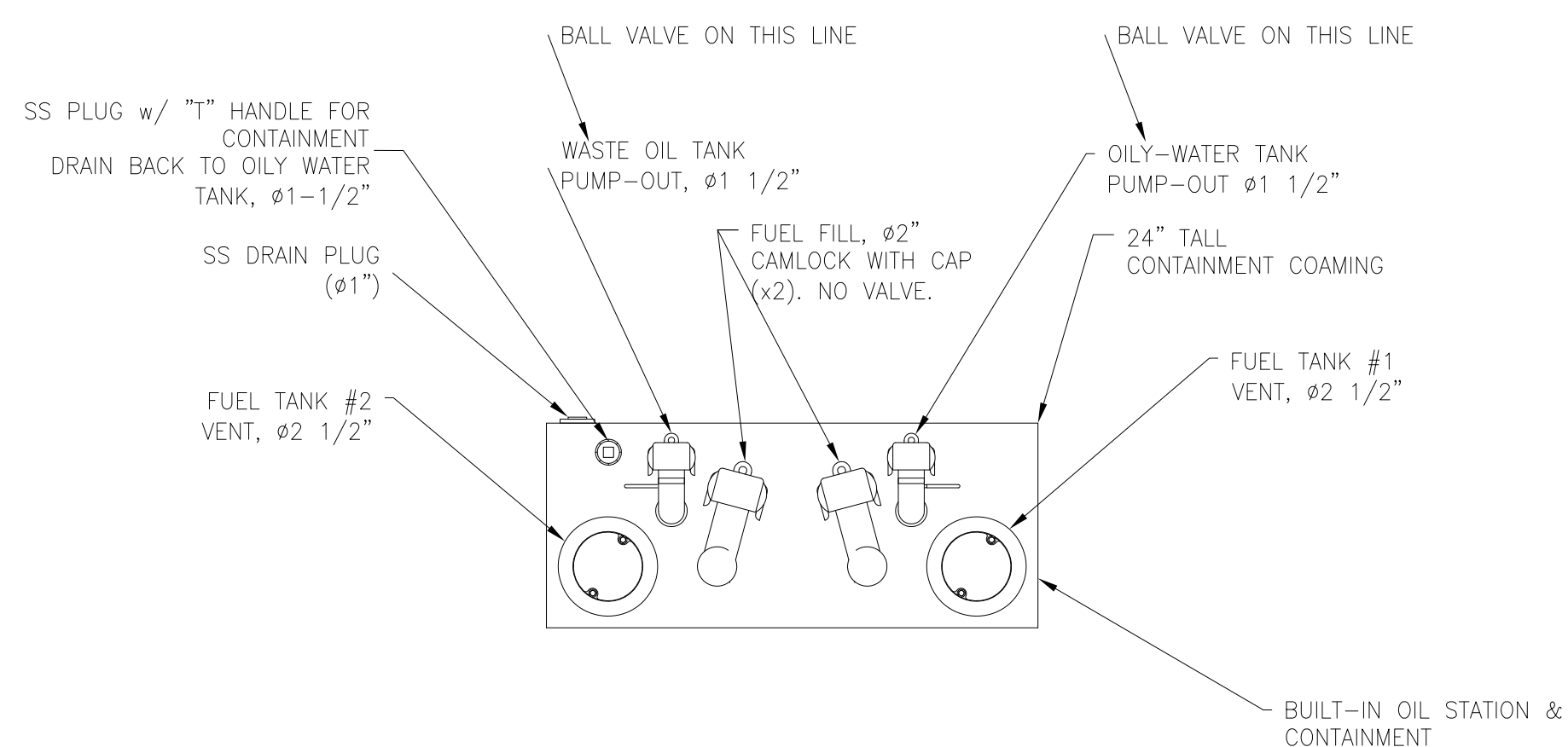
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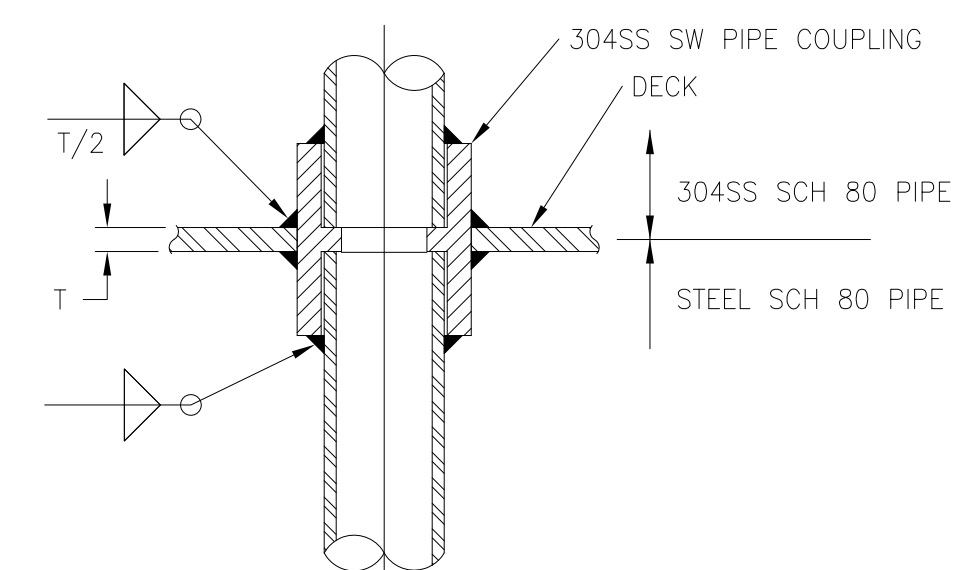
**DETAIL 2-1B**  
TYPICAL SOUNDING TUBE  
SCALE: NONE



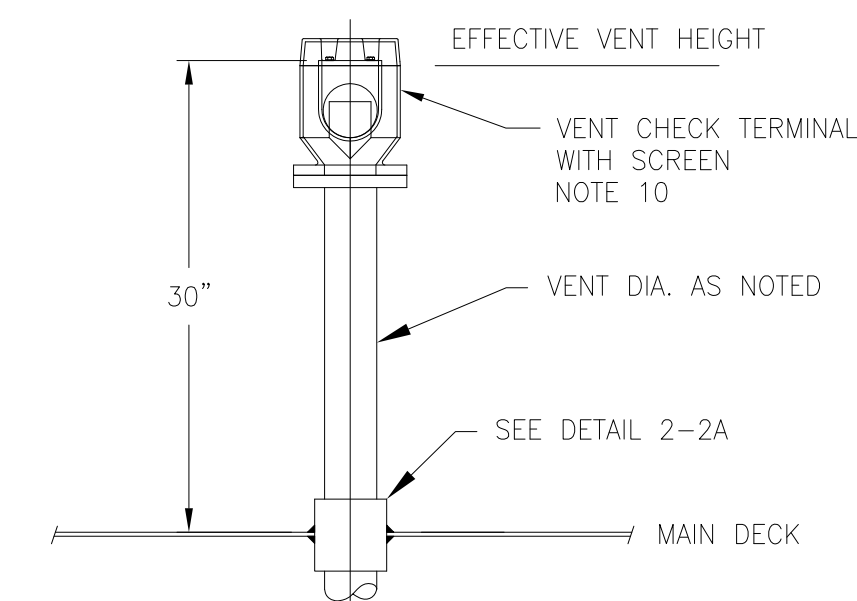
**DETAIL 2-1A**  
TYPICAL BULKHEAD PENETRATION  
SCALE: NONE



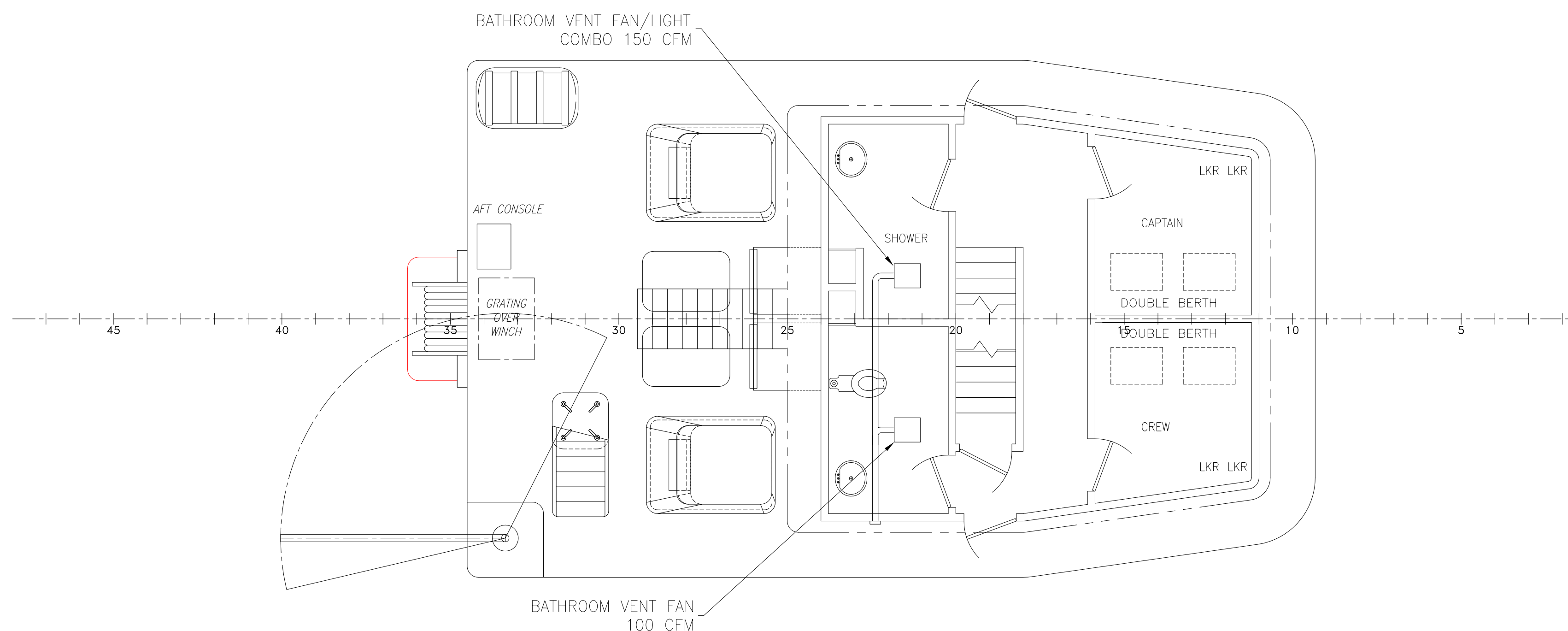
**PLAN 2-1D**  
OIL TRANSFER STATION  
SCALE: NONE



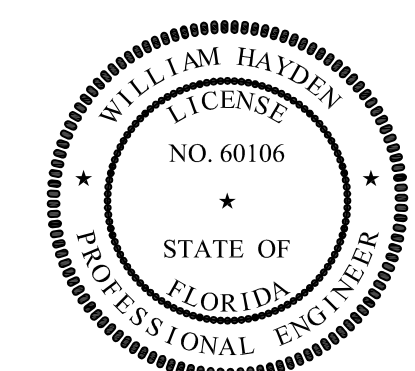
**DETAIL 2-2A**  
TYPICAL DECK PENETRATION  
SCALE: NONE



**DETAIL 2-1C**  
TYPICAL VENT HEAD  
SCALE: NONE



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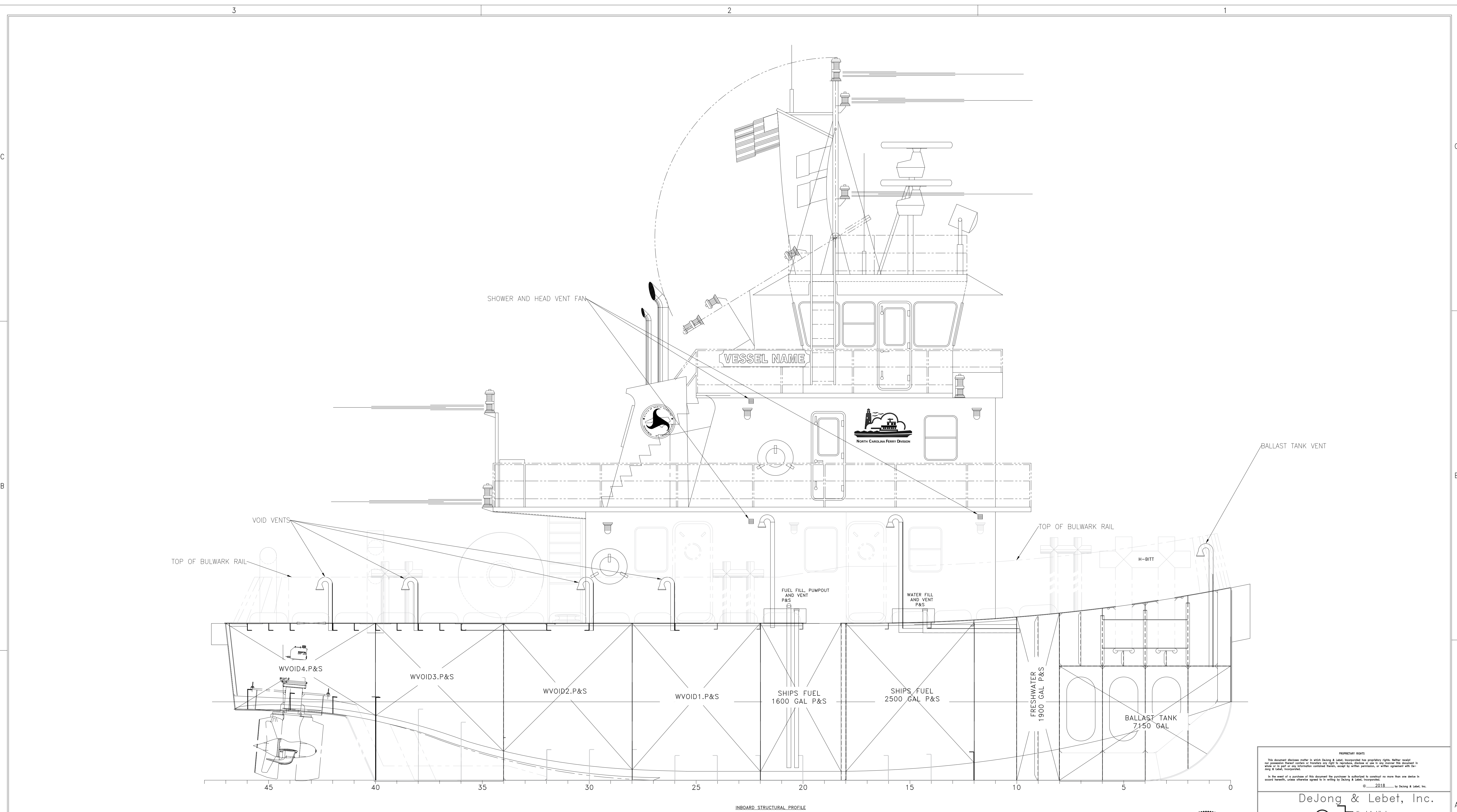
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Title: 70.5'x30'x11' NCDOT TOWBOAT

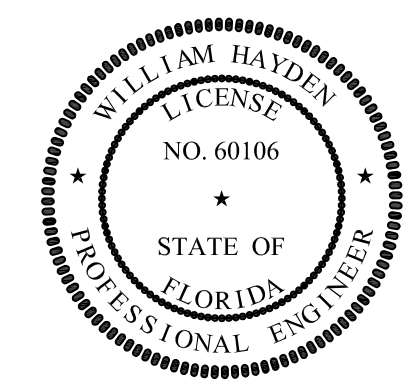
**VENT & FILLS**

Dwg. No. 17-1372-506 Alt. No. 1  
Sh. 4 of 5

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.	10.	TANK AND VOID VENT TERMINALS SHALL BE WINTER WIN2000 HIAS OR EQUAL. THE FUEL OIL, WASTE OIL, & OILY WATER TANKS SHALL BE FURNISHED WITH SS FLAME SCREENS.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	11.	EACH VENT PIPE SHALL BE SLOPED CONTINUOUSLY TO PROVIDE EFFECTIVE DRAINAGE BACK TO THE TANK.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL AND INSPECTION.	12.	WHERE PIPING PENETRATES TANK BOUNDARIES, BULKHEADS OR DECKS, SEE DETAIL 2-1A OR 2-2A.
4.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	13.	PROVIDE 24" HIGH SPILL CONTAINMENTS SURROUNDING THE WASTE OIL AND OILY WATER VENTS. EACH CONTAINMENT SHALL BE FITTED WITH A 1" SS DRAIN PLUG NEAR THE BOTTOM.
5.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.		
6.	SOUNDING TUBES SHALL BE AS VERTICAL AS PRACTICAL AND SHALL TERMINATE AS CLOSE AS POSSIBLE TO THE DEEPEST POINT OF THE TANK OR VOID.		
7.	SOUNDING TUBES SHALL HAVE FLUSH SOUNDING TUBE CAPS, STAINLESS STEEL COMMERCIAL WELD-IN TYPE (NOT A PIPE COUPLING) WITH A BRONZE PLUG. TANK IDENTIFICATION SHALL BE ENGRAVED IN THE TUBE SOCKETS AND CAPS.		
8.	SOUNDING TUBE TERMINALS SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS, GENERALLY AS SHOWN IN PLAN 2-3A & 2-3C.		
9.	FUEL TANKS SHALL BE FITTED WITH HIGH LEVEL AND LOW LEVEL ALARMS AND CONTINUOUS LEVEL TRANSDUCERS PER REFS 1 AND 4. SENSORS SHALL BE INTERFACED WITH THE SHIP'S ALARM AND MONITORING SYSTEM.		



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**VENT & FILLS**

Dwg. No. 17-1372-506 Alt. No. 1  
 Sht. 5 of 5

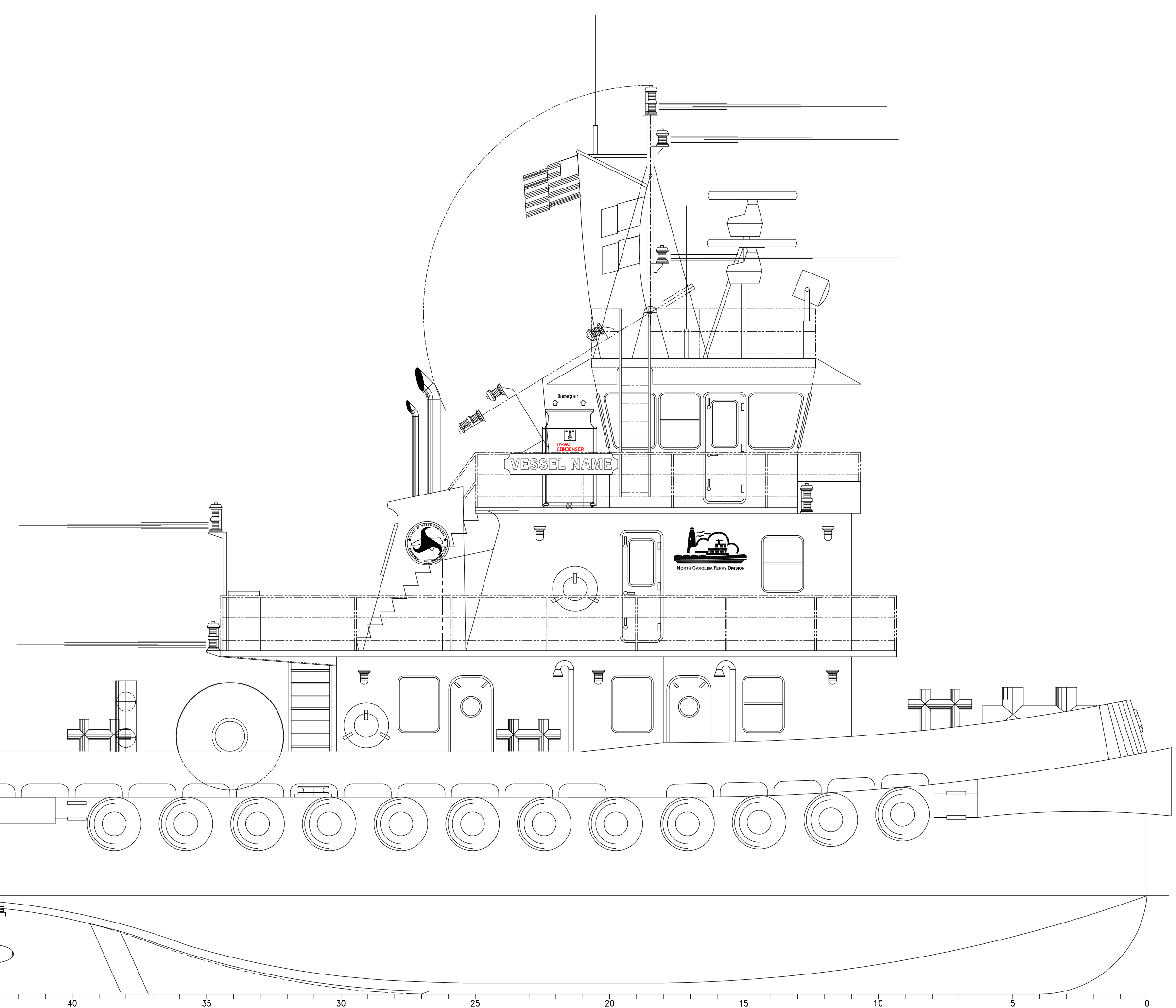
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### MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS	
COOLING WATER PIPING MAWP: 30 PSIG MAWT: 120°F	2" & BELOW	COPPER TUBE, SEAMLESS, TYPE K OR L, ASTM B88	UNIONS: BRAZED, BRONZE, ASME SB88, TYPE K OR L, ANSI B16.24 FLANGES: SILBRAZE, BRONZE, ASME SB862, ANSI B16.24	SILBRAZE: COPPER, ASME SB88, TYPE K OR L, ANSI B16.22		GASKET: GARLOCK STYLE BG3000 OR EQUAL	BALL: BRONZE, FLANGED OR THREADED, ASTM B61 OR B62, MSS-SP-72 CHECK VALVE: THREADED OR BRAZED, BRONZE, ASME SB61 OR SB62, MSS-SP-80 GATE: DUCTILE IRON ASTM A395 FLANGED, 150#	BALL: BRONZE OR CHROME PLATED BALL PTFE SEATS SEAT INTEGRAL: MATERIAL SAME AS VALVE BODY STAINLESS STEEL TRIM	CARBON STEEL ASTM A307 GR B ANSI B18.21	CARBON STEEL ASTM A563 GR A ANSI B18.22	

### EQUIPMENT LIST

QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	REMARKS
1	CONDENSER UNIT	SPLIT HEAT PUMP CONDENSER		72,000 BTU/h COOLING (NOMINAL)	208V/3Ø/60HZ 4.57 KW	MULTI-ZONE VARIABLE REFRIGERANT FLOW HEAT PUMP
3	WALL MOUNTED INDOOR UNIT	SPLIT HEAT PUMP INDOOR UNIT		6,000 BTU/h COOLING (NOMINAL)	208V/3Ø/60HZ 0.03 KW	SERVED BY CONDENSER UNIT
1	WALL MOUNTED INDOOR UNIT	SPLIT HEAT PUMP INDOOR UNIT		12,000 BTU/h COOLING (NOMINAL)	208V/3Ø/60HZ 0.03 KW	SERVED BY CONDENSER UNIT
2	CEILING CONCEALED INDOOR UNIT	SPLIT HEAT PUMP INDOOR UNIT		12,000 BTU/h COOLING (NOMINAL)	208V/3Ø/60HZ 0.09 KW	SERVED BY CONDENSER UNIT
1	WALL MOUNTED INDOOR UNIT	SPLIT HEAT PUMP INDOOR UNIT		18,000 BTU/h COOLING (NOMINAL)	208V/3Ø/60HZ 0.03 KW	SERVED BY CONDENSER UNIT
1	BC CONTROLLER SINGLE				208V/3Ø/60HZ 0.112 KW	
7	SIMPLE MA CONTROLLER				-	
1	SYSTEM REMOTE CONTROLLER				-	



### MATERIAL LIST

ITEM	QUANTITY	SYMBOL	DESCRIPTION	MATERIAL SPEC.	REMARKS
PG-¾"		———	¾" GALVANIZED STEEL PIPE	SCH 40 ASTM A106 GR B ANSI B36.10	
PG-⅝"		---	⅝" GALVANIZED STEEL PIPE	SCH 40 ASTM A106 GR B ANSI B36.10	
PG-½"		———	½" GALVANIZED STEEL PIPE	SCH 40 ASTM A106 GR B ANSI B36.10	
PG-¼"		---	¼" GALVANIZED STEEL PIPE	SCH 40 ASTM A106 GR B ANSI B36.10	

#### GENERAL NOTES

- MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.
- THIS DRAWING IS A CONTRACT GUIDANCE DRAWING IN DIAGRAMMATIC FORM. SYSTEMS SHALL BE DEVELOPED BY THE CONTRACTOR AS NECESSARY TO EFFECT A COMPLETE AND FUNCTIONAL INSTALLATION WITH REGULATORY AND OWNER APPROVAL.
- DUCTS SHALL BE CONSTRUCTED OF HOT-DIPPED GALVANIZED STEEL SHEET METAL THICKNESS AND REINFORCEMENT SHALL BE IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS OR APPLICABLE CFR AND ABS REGULATIONS, WHICHEVER IS GREATER. BURNED OFF OR DAMAGED GALVANIZING SHALL BE REPLACED WITH A SPRAY-ON TYPE GALVANIZING COATING.
- PRELIMINARY DUCT DIMENSIONS SHOWN ARE FOR ROUND DUCTS EXCEPT AS NOTED. RECTANGULAR DUCT OF EQUAL FRICTION LOSS MAY BE SUBSTITUTED AS REQUIRED FOR INSTALLATION.
- FAN SELECTIONS AND MOTOR RATINGS ARE BASED ON ESTIMATED DUCT ROUTING, FITTING SELECTION, AND CONSTRUCTION. DUCT ROUTING MAY NOT ACCOUNT FOR ALL INTERFERENCES. THE CONTRACTOR SHALL FINALIZE DUCT ROUTING AND SIZING BASED ON HIS OWN CALCULATIONS AND SELECT FANS TO SUIT THE INSTALLED DUCTING SYSTEM.
- DUCTS AND PIPING SHALL BE RUN AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.
- WEATHER TERMINALS SHALL BE FITTED WITH REMOVABLE INSECT SCREENS AND WEATHER TIGHT CLOSURES.
- PROVIDE A CONDENSATE DRAIN FOR EACH INDOOR UNIT. CONTINUOUSLY SLOPE AC SYSTEM CONDENSATE DRAIN PIPING WITH NO HIGH OR LOW POINTS TO A DECK DRAIN OR OTHER SAFE EXTERIOR LOCATION. CONDENSATE DRAINS SHALL NOT DISCHARGE ONTO PASSENGER DECKS.
- PROVIDE AND INSTALL REFRIGERANT PIPING IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

#### GENERAL NOTES

- PROVIDE A COMPLETE CONTROL SYSTEM FOR THE HVAC EQUIPMENT. EACH SPACE SHALL BE A SEPARATE ZONE, WITH INDEPENDENT THERMOSTATIC CONTROL, PROVIDE CENTRALIZED HVAC CONTROL AND SHUTDOWN IN THE PILOT HOUSE.
- INSTALL AND COMMISSION HVAC EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS.
- PUMP INTERLOCKS AND FLOW SWITCHES SHALL BE PROVIDED TO PREVENT HEAT PUMP CONDENSERS FROM OPERATING WITH INSUFFICIENT COOLING WATER FLOW.
- THE CONTRACTOR SHALL VERIFY KEEL COOLER SIZING BASED ON FINAL HVAC EQUIPMENT SELECTION PRIOR TO ORDERING.
- INSTALL A KEEL COOLER GUARD TO PROTECT THE KEEL COOLER FROM FLOATING DEBRIS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION.
- MATERIAL TRANSITIONS SHALL BE ACCOMPLISHED WITH FLANGED JOINTS. FIT JOINTS WITH GALVANIC ISOLATION KITS TO PREVENT DIRECT METAL TO METAL CONTACT.

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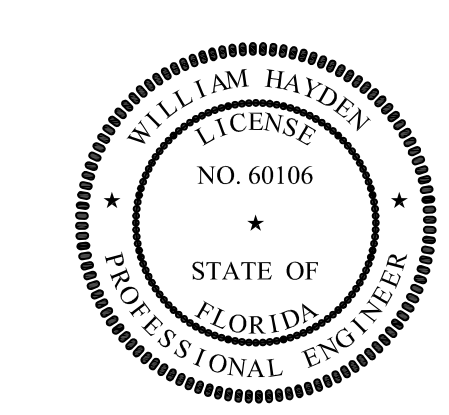
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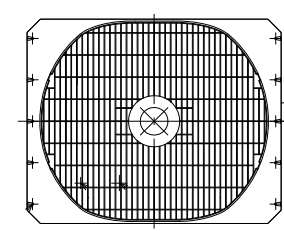
**HVAC SYSTEM**

Dwg. No. 17-1372-514 Alt. No. 0  
 Sh. 1 of 3

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
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69,191 BTU/h COOLING  
79,135 BTU/h HEATING



CONTROL BOX

PG-3/4  
PG-3/8

PG-1/2  
PG-1/4 5,766 BTU/h (3345 BTU/h) COOLING  
6,578 BTU/h  
1/1 PILOT HOUSE / FCU-1

EST. COOLING DISCHARGE AIR TEMP 59.9  
EST. HEATING DISCHARGE AIR TEMP 99.9

PG-1/2  
PG-1/4 11,532 BTU/h (6,869 BTU/h) COOLING  
13,255 BTU/h  
2/2 PASSAGEWAY / FCU-2

EST. COOLING DISCHARGE AIR TEMP 59.9  
EST. HEATING DISCHARGE AIR TEMP 99.9

PG-1/2  
PG-1/4 5,766 BTU/h (3345 BTU/h) COOLING  
6,578 BTU/h  
3/3 CAPTAINS QUARTERS / FCU-4

EST. COOLING DISCHARGE AIR TEMP 59.9  
EST. HEATING DISCHARGE AIR TEMP 99.9

PG-1/2  
PG-1/4 5,766 BTU/h (3345 BTU/h) COOLING  
6,578 BTU/h  
4/4 CERW QUARTERS / FCU-4

EST. COOLING DISCHARGE AIR TEMP 59.9  
EST. HEATING DISCHARGE AIR TEMP 99.9

PG-1/2  
PG-1/4 11,532 BTU/h (6,869 BTU/h) COOLING  
13,255 BTU/h  
5/5 SHOWERS / FCU-5

EST. COOLING DISCHARGE AIR TEMP 58.4  
EST. HEATING DISCHARGE AIR TEMP 103.1

PG-1/2  
PG-1/4 17,298 BTU/h (6,599 BTU/h) COOLING  
19,637 BTU/h  
6/6 GALLEY / FCU-6

EST. COOLING DISCHARGE AIR TEMP 53.9  
EST. HEATING DISCHARGE AIR TEMP 112.9

PG-1/2  
PG-1/4 11,532 BTU/h (6,869 BTU/h) COOLING  
13,255 BTU/h  
7/7 HEADS / FCU-7

EST. COOLING DISCHARGE AIR TEMP 58.4  
EST. HEATING DISCHARGE AIR TEMP 103.1

GENERAL NOTES

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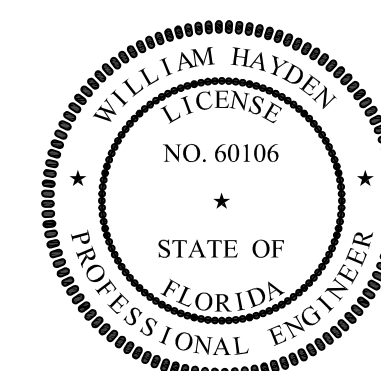
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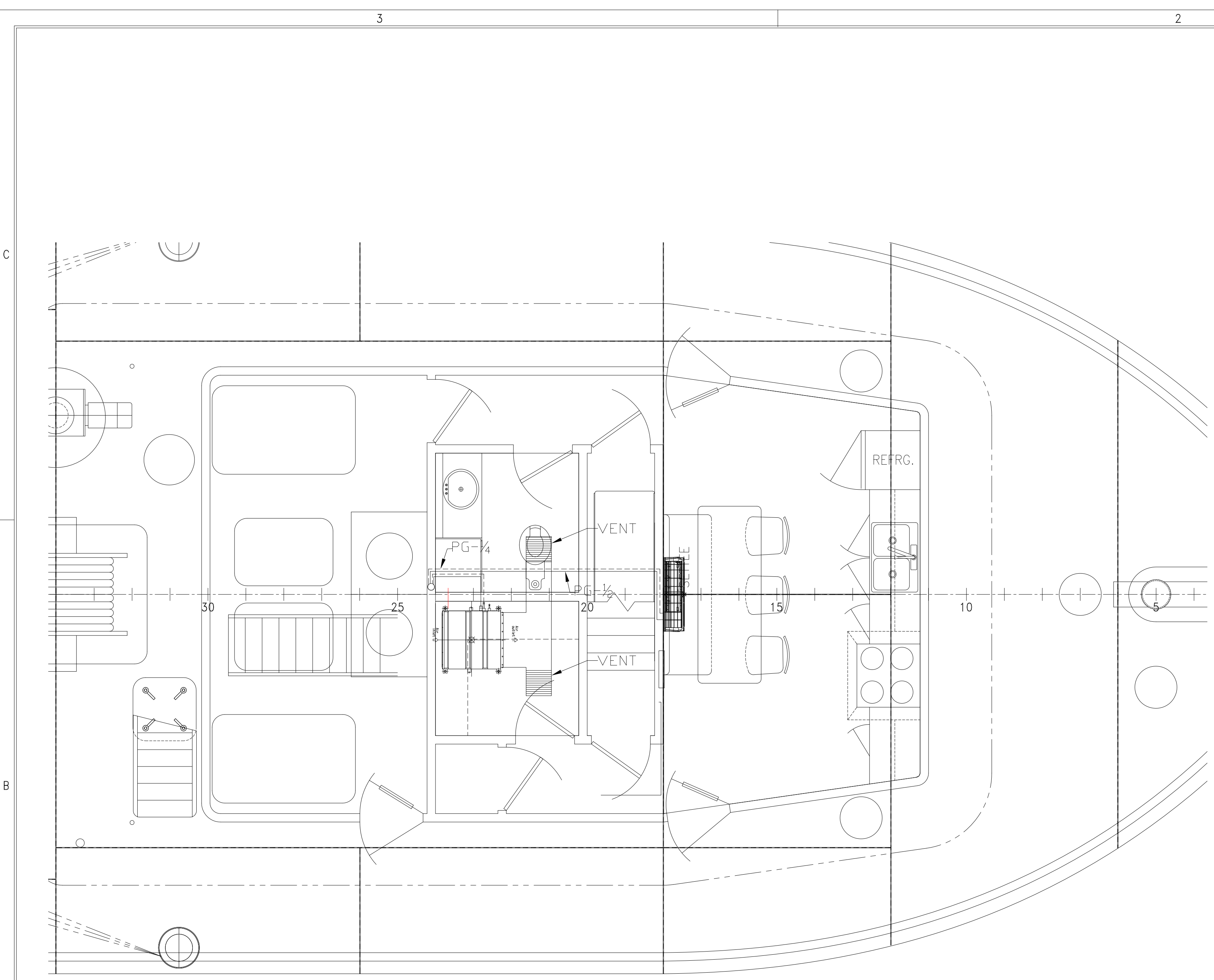
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**HVAC SYSTEM**

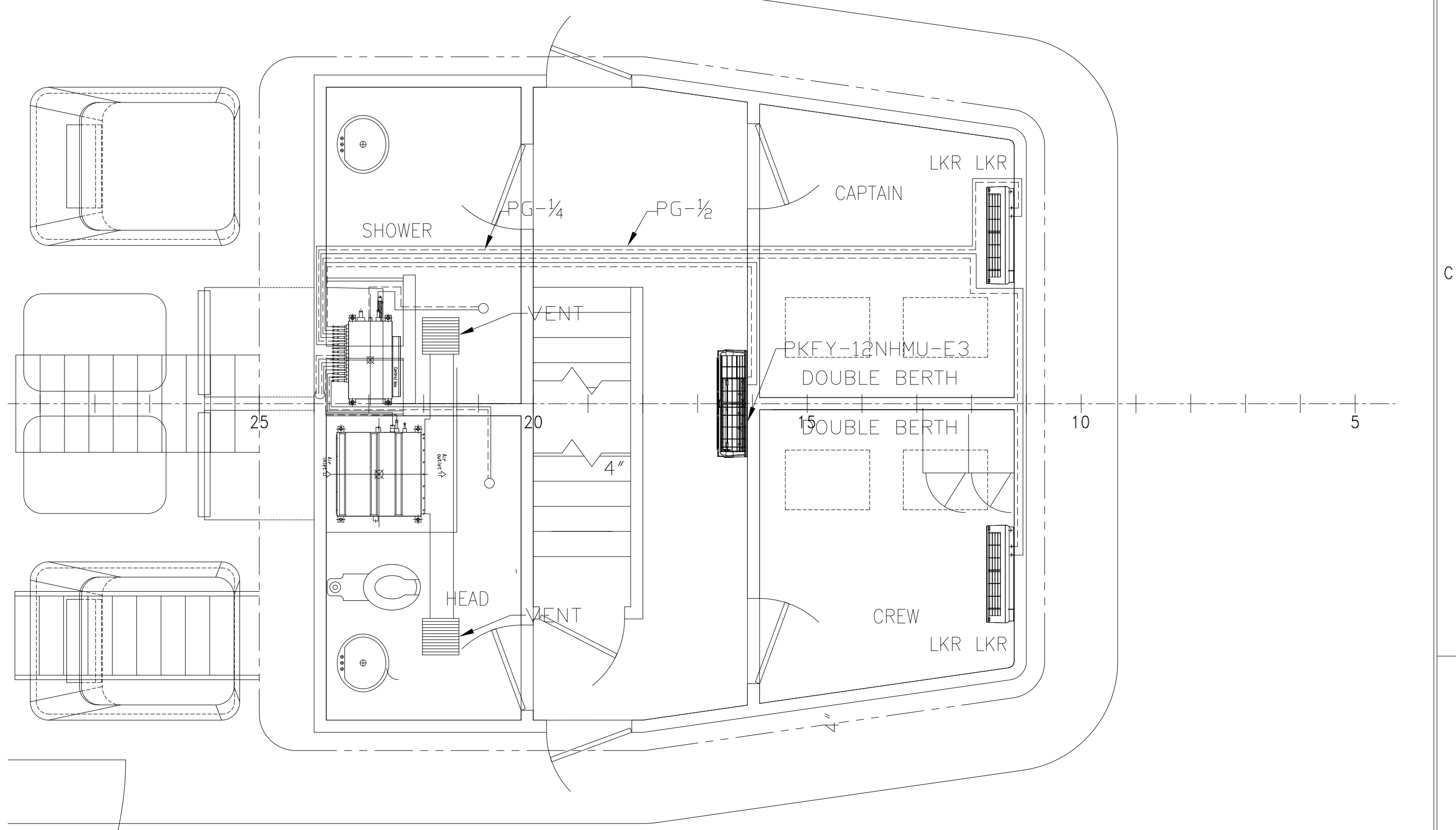
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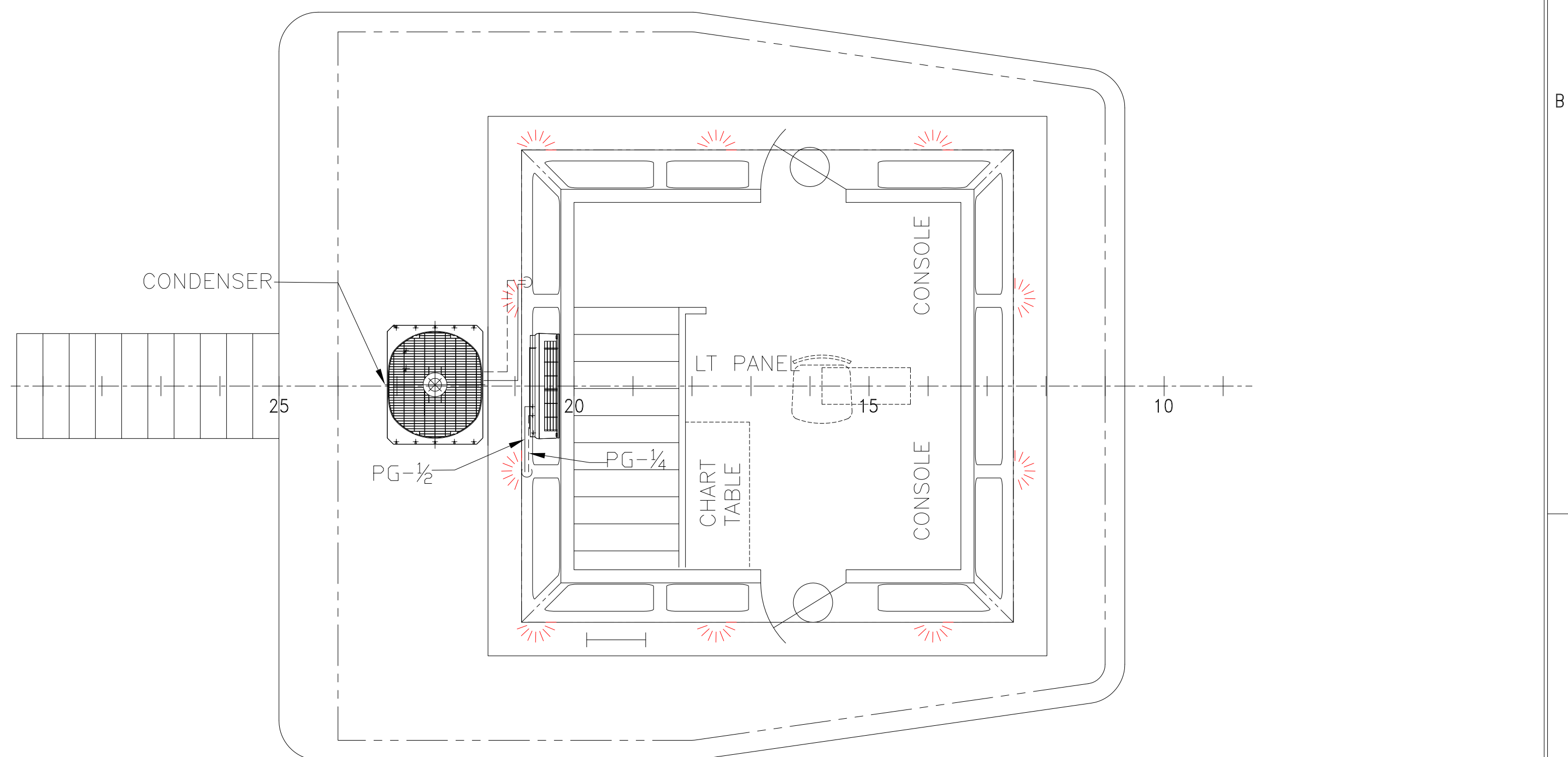




MAIN DECK

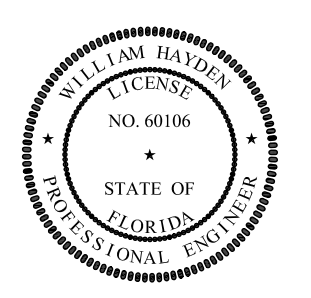


2ND DECK



PILOTHOUSE

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ANSI-D (24"x36")



SYMBOLS LIST

Table with 2 columns: Symbol and Description. Includes FIREMAIN PIPING, BILGE SYSTEM PIPING, MATERIAL TRANSITION, REDUCER, BHD PENETRATION, GATE VALVE, SWING CHECK VALVE, BUTTERFLY VALVE, BALL VALVE, HYDRANT VALVE, PRESSURE GAUGE, VACUUM/PRESSURE GAUGE, FIRE STATION, CENTRIFUGAL PUMP, OVERBOARD DISCHARGE, SEA CHEST, SIMPLEX STRAINER, BILGE SUCTION STRAINER BOX.

MATERIAL SCHEDULE

Table with 10 columns: SYSTEM, SIZE, PIPE, TAKEDOWN JOINTS, VALVE BODY, VALVE TRIM, FITTINGS, BOLTS/BOLT STUDS, NUTS, GASKETS. Includes rows for BILGE and FIRE systems with material specifications like GALVANIZED STEEL and STAINLESS STEEL.

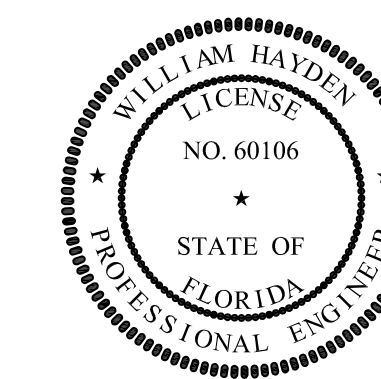
EQUIPMENT LIST

Table with 7 columns: QTY., SERVICE, TYPE, MAKE/MODEL, CAPACITY, DRIVE, REMARKS. Lists equipment such as FIRE/BILGE PUMP, BILGE PUMP, FIRE PUMP STRAINER, BILGE PUMP STRAINER, FIRE STATION, and FIRE MONITOR.

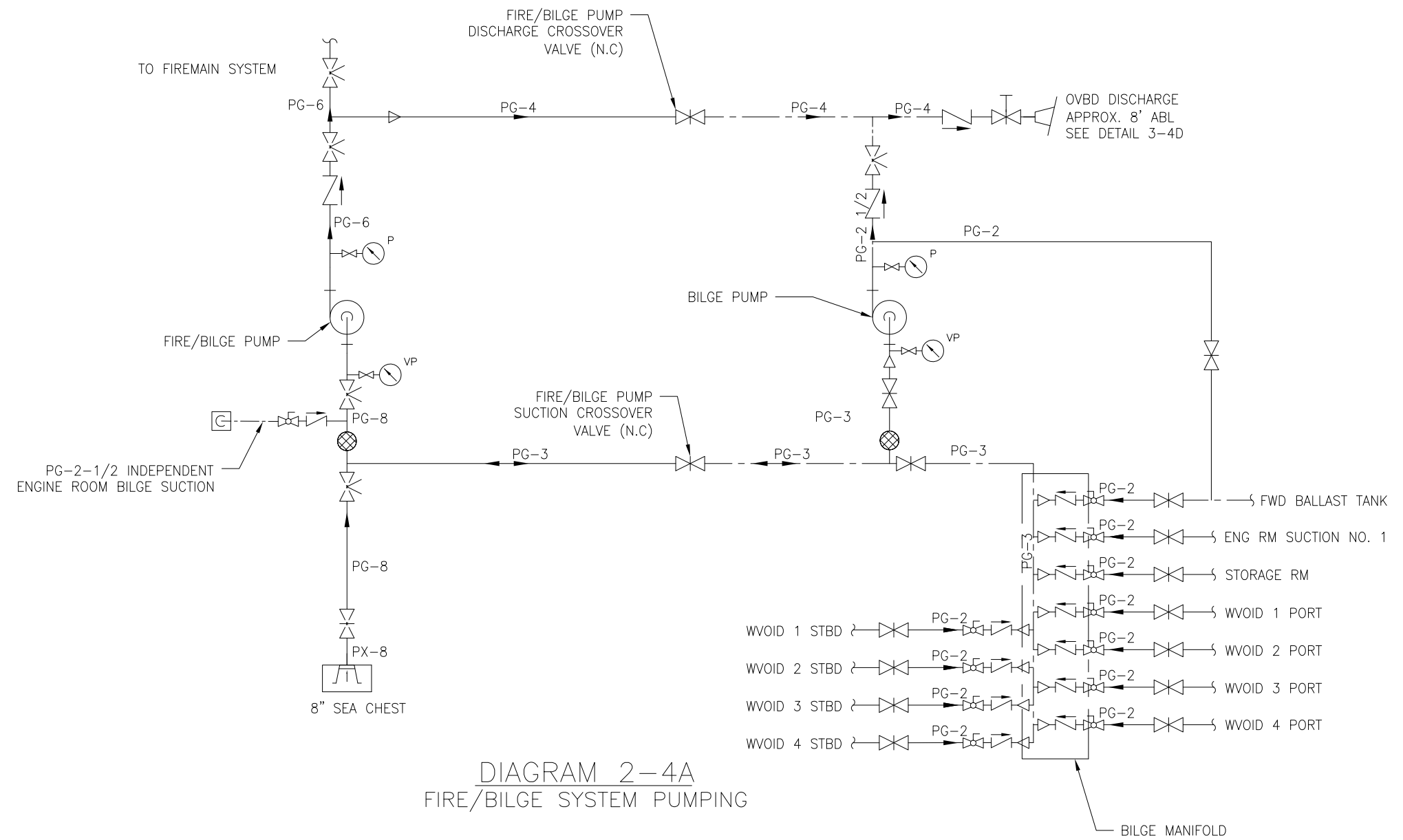
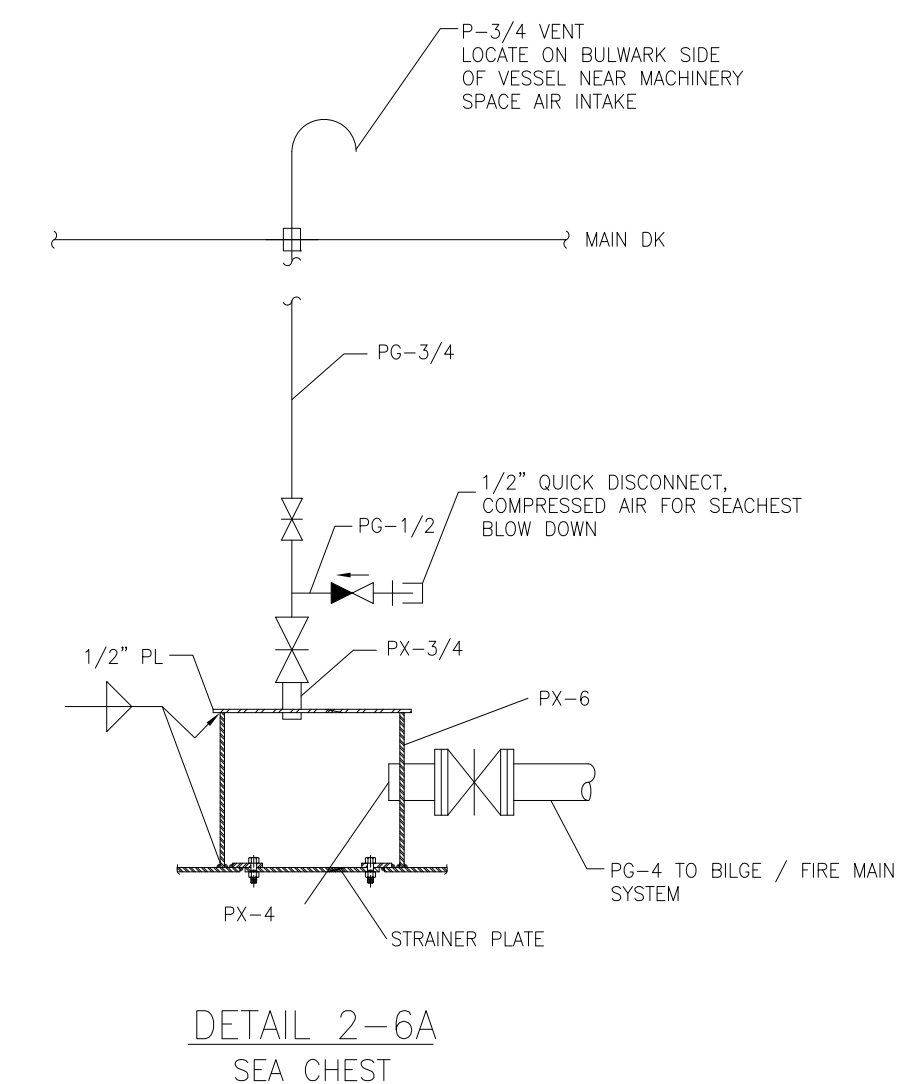
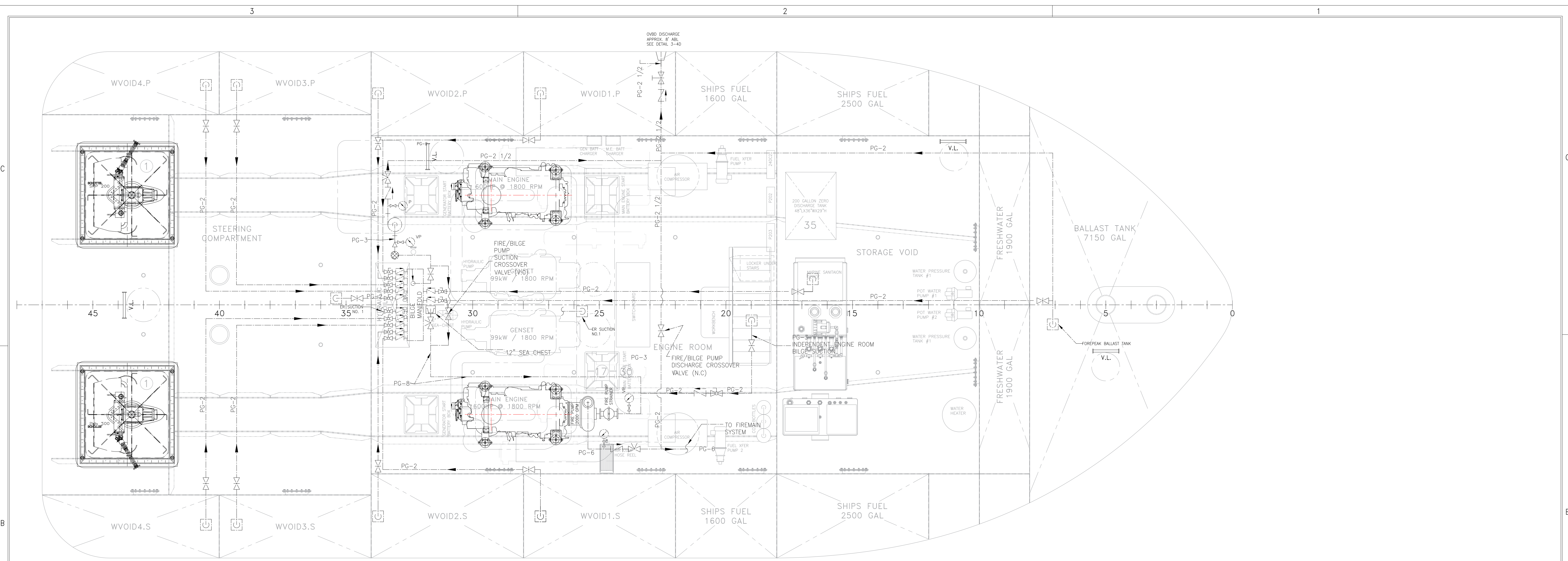
GENERAL NOTES

GENERAL NOTES

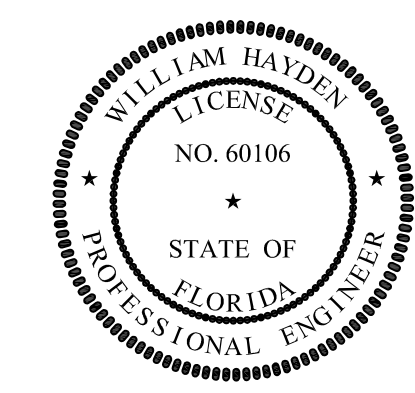
Table with 2 columns: NO. and DESCRIPTION. Contains 15 numbered notes regarding piping standards, fire station requirements, and installation details.



Project information block including DeJong & Lebet, Inc. logo, address (1734 Emerson Street, Jacksonville, Florida), phone/fax numbers, and drawing title: BILGE & FIREMAIN SYSTEM.



-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.	9.	EACH FIRE STATION SHALL HAVE A STAINLESS STEEL ENCLOSURE CONTAINING A 1 1/2" HYDRANT VALVE, 50 FEET OF 1 1/2" LINED COMMERCIAL FIRE HOSE CONFORMING TO UL19, A HOSE WRENCH, AND A USCG APPROVED COMBINATION FIRE NOZZLE. THE HOSE SHALL BE CONNECTED AND STORED IN AN APPROVED HOSE RACK.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL FROM THE SHIP AND NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	10.	THE FIRE/BILGE PUMP IS SIZED TO EXCEED THE MINIMUM REQUIREMENTS OF ABS. THE PUMP CAPACITY SHALL MEET THE FLOW DEMANDS OF THE FOLLOWING SCENARIOS: 1) WATER FLOW SHALL BE AT LEAST 80 GPM FROM THE HIGHEST TWO FIRE STATIONS OPERATING SIMULTANEOUSLY, 2) THREE FIRE STATIONS OPERATING SIMULTANEOUSLY, EACH PROVIDING WATER SPRAY TO A DIFFERENT LOCATION ON DECK.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING AND REPLACEMENT OF EQUIPMENT.	11.	VALVE HANDWHEELS AND CONTROLS TO BE FITTED WITH LABEL PLATES INDICATING FUNCTION.
4.	PROVIDE GAUGE ASSEMBLIES TO BE IN ACCORDANCE WITH ASTM F721. VALVES, TUBING, AND FITTINGS SHALL BE 316 STAINLESS STEEL.	12.	BILGE SUCTION STRAINER BOXES SHALL BE IN ACCORDANCE WITH ASTM F886, TYPE I, HOT DIP GALVANIZED AFTER FABRICATION. STRAINER OPEN AREA SHALL BE GREATER THAN THREE TIMES THE AREA OF THE BILGE PIPE.
5.	AVOID POCKETS IN THE PIPE LINES, BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	13.	A REMOTE PRESSURE GAUGE FOR THE FIREMAIN SHALL BE LOCATED IN THE PILOT HOUSE.
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING CU-NI TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.	14.	FIREMAIN PIPING SHALL BE TIG WELDED.
7.	WHERE PIPING PENETRATES BULKHEADS OR DECKS, THE PENETRATION SHALL MAINTAIN THE WATERTIGHT INTEGRITY OF THE SPACE. PIPE PENETRATIONS SHALL BE IN ACCORDANCE WITH DETAIL 3-1C.	15.	PIPING SHALL BE THOROUGHLY CLEANED BEFORE TESTING.
8.	BOTH PUMPS SHALL BE CAPABLE OF REMOTE STARTING FROM THE BRIDGE.		



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**DeJong & Lebet, Inc.**  
 Naval Architects  
 Marine Engineers  
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 Surveyors

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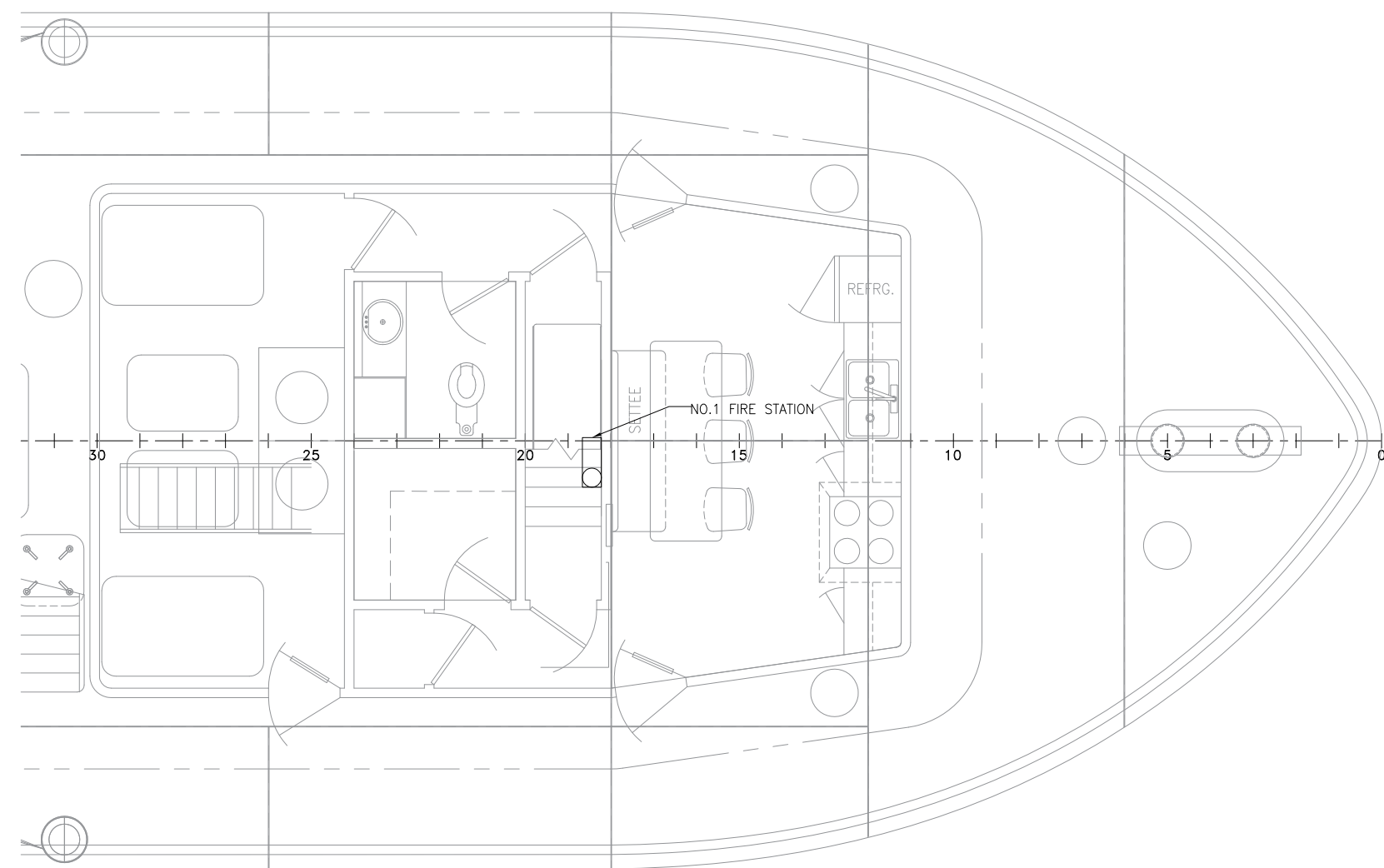
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 Fax: (904) 399-1522  
 info@dejongandlebet.com

Title: 70.5'x30'x11' NCDOT TOWBOAT

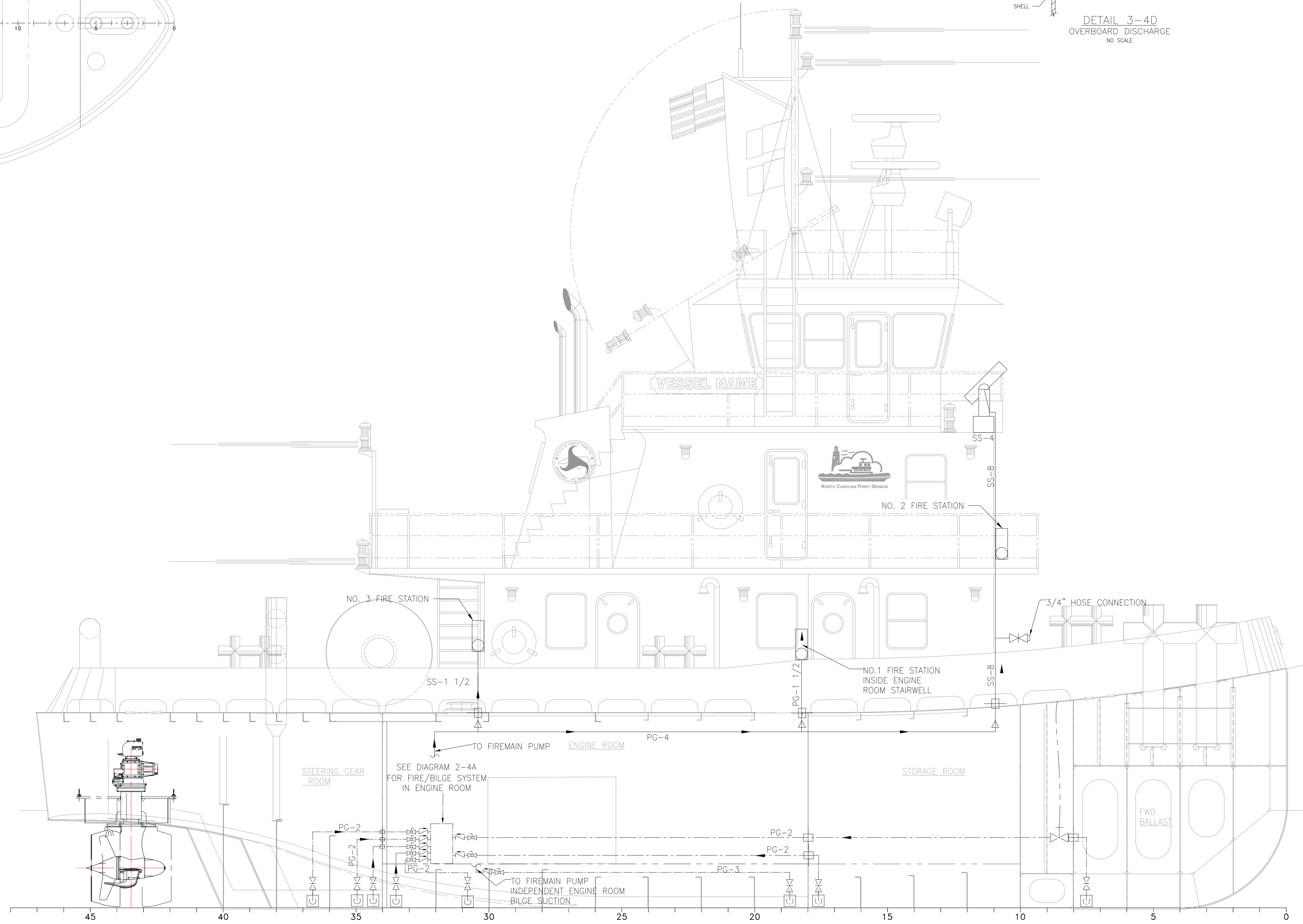
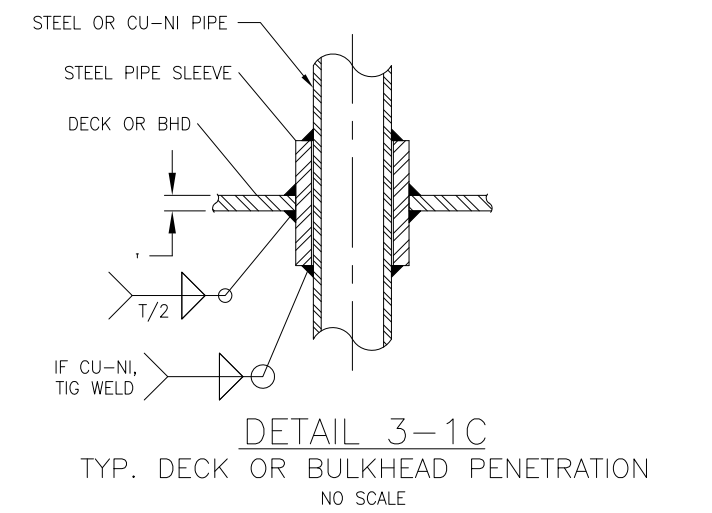
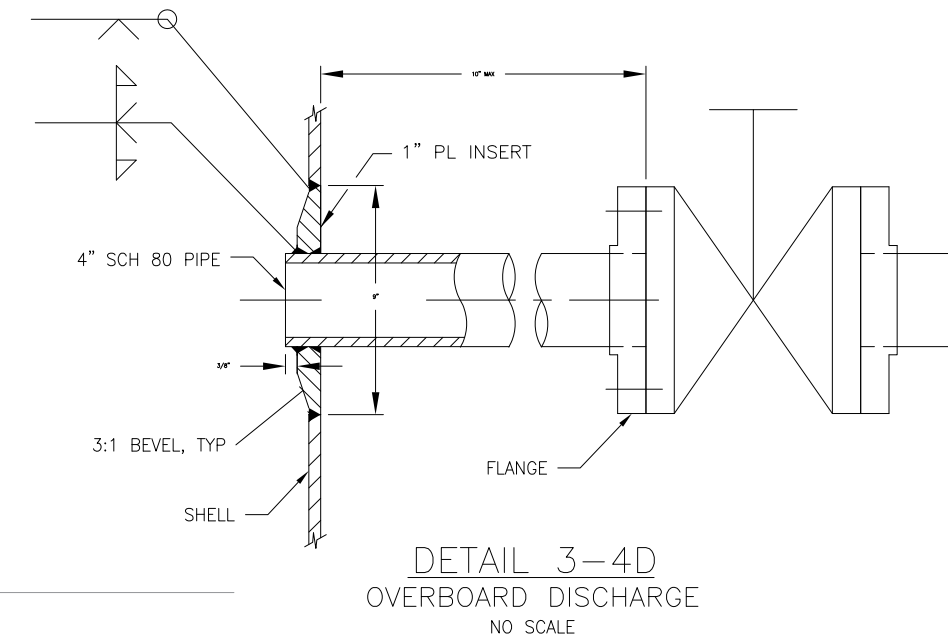
**BILGE & FIREMAIN SYSTEM**

Dwg. No. 17-1372-521 Alt. No. 1  
 Sh. 2 of 3

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



MAIN DECK

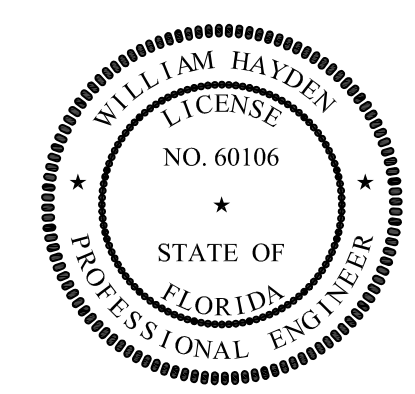


GENERAL NOTES

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3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING AND REPLACEMENT OF EQUIPMENT.
4.	PROVIDE GAUGE ASSEMBLIES TO BE IN ACCORDANCE WITH ASTM F721. VALVES, TUBING, AND FITTINGS SHALL BE 316 STAINLESS STEEL.
5.	AVOID POCKETS IN THE PIPE LINES, BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING CU-NI TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.
7.	WHERE PIPING PENETRATES BULKHEADS OR DECKS, THE PENETRATION SHALL MAINTAIN THE WATERTIGHT INTEGRITY OF THE SPACE. PIPE PENETRATIONS SHALL BE IN ACCORDANCE WITH DETAIL 3-1C.
8.	BOTH PUMPS SHALL BE CAPABLE OF REMOTE STARTING FROM THE BRIDGE.
	316 STAINLESS STEEL.

GENERAL NOTES

NO.	DESCRIPTION
9.	EACH FIRE STATION SHALL HAVE A STAINLESS STEEL ENCLOSURE CONTAINING A 1 1/2" HYDRANT VALVE, 50 FEET OF 1 1/2" LINED COMMERCIAL FIRE HOSE CONFORMING TO UL19, A HOSE WRENCH, AND A USCG APPROVED COMBINATION FIRE NOZZLE. THE HOSE SHALL BE CONNECTED AND STOWED IN AN APPROVED HOSE RACK.
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11.	VALVE HANDWHEELS AND CONTROLS TO BE FITTED WITH LABEL PLATES INDICATING FUNCTION.
12.	BILGE SUCTION STRAINER BOXES SHALL BE IN ACCORDANCE WITH ASTM F986, TYPE I, HOT DIP GALVANIZED AFTER FABRICATION. STRAINER OPEN AREA SHALL BE GREATER THAN THREE TIMES THE AREA OF THE BILGE PIPE.
13.	A REMOTE PRESSURE GAUGE FOR THE FIREMAIN SHALL BE LOCATED IN THE PILOT HOUSE.
14.	FIREMAIN PIPING SHALL BE TIG WELDED.
15.	PIPING SHALL BE THOROUGHLY CLEANED BEFORE TESTING.



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Title: 70.5'x30'x11' NCDOT TOWBOAT

**BILGE & FIREMAIN SYSTEM**

Dwg. No: 17-1372-521 Alt. No: 1  
 Sh: 3 of 3

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_ Scale: 1/2" = 1'-0"  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

MATERIAL SCHEDULE											
SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
CENTRIFUGAL SEWAGE WATER PUMP 2HP@30 PSI	ALL	BELOW DECK CARBON STEEL GALVANIZED, SCH 40, SEAMLESS, ASTM A53 TYPE S, OR ASTM A106, GRADE B, ANSI B36.10  FIXTURE FEED COPPER TYPE-K TUBING STANDARD WALL	FLANGE #150, SOCKET WELD CARBON STEEL, ASTM A105, ANSI B16.5	BELOW DECK STEEL GALVANIZED THREADED,	HOSE: SEE NOTE 11	GARLOCK STYLE 3000  GATE - ABV DK SW OR THREADED, 3-PIECE S. STEEL, ASTM A351 GR CF8M		BALL CHROME PLATED BALL, RPTFE OR VITON SEATS  CHECK CRES DISC	CARBON STEEL ASTM A307 GR B ANSI B18.2.1	HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2	

EQUIPMENT & PUMPLIST					
QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE
1	SEWAGE OVERBOARD PUMP	CENTRIFUGAL	SOLIDS HANDLING NON CLOGGING SELF PRIMING IMPELLER 3'NPT IN/3" NPT OUT	100GPM@60FT HEAD 1750 RPM	5HP TEFC MOTOR 120/208/3P/60Hz

SYMBOLS LIST	
	PIPE
	REDUCER
	CHECK VALVE
	BALL VALVE
	BALL VALVE, LOCKING
	CENTRIFUGAL PUMP
	CAMLOCK
	DRIP PAN
	HOSE REEL
	SUCTION STRAINER BOX
	BULKHEAD PIPE PENETRATION
	PRESSURE GAUGE

17-1372-528 SEWAGE AND GREYWATER PIPING B.O.M..				
ITEM	QTY	DESCRIPTION	MATERIAL SPEC	REMARKS
1	AS REQ'D	HOSE CLAMP S.S. 2" ROLLED EDGES		DOUBLE CLAMP ALL HOSE CONNECTIONS
2	1	TYPE II MSD		REMOTE MOUNTED CONTROL PANEL REQ'D OR EQUAL,
3	4	TOILET WITH SLOAN FLUSH HEAD		OPEN FRONT WHITE SEAT, NO TOP
4	2	DECK PUMPOUT FITTING, GALV, CAM LOCK QUICK COUPLING,		OR EQUAL, VERIFY WITH OWNER
5	AS REQ'D	NO-FIRE, RISE TYPE BHD PENETRATIONS AT A CLASS DECK PENETRATIONS		ROXTEC A CLASS DECK PENETRATIONS MAY BE SUBSTITUTED
6	1	200 GALLON ZERO DISCHARGE HOLDING TANK		
DWV-#	AS REQ'D	MISC, DWV FITTINGS FOR DRAIN LINES		OR EQUAL
CPVC-#	AS REQ'D	PIPE CPVC, SCH 80	ASTM A-53	FOR APPLIANCE TAIL PIECE CONNECTIONS TO SEWAGE DRAINS
PX-#	AS REQ'D	PIPE BLACK IRON, SCH 80	ASTM A-53	
PXX-#	AS REQ'D	PIPE BLACK IRON, SCH 120	ASTM A-53	
F-	AS REQ'D	MISC STEEL BUTT WELD FITTINGS	ASTM A-234	
H-1	AS REQ'D	SHIELDS CORRUGATED SEWAGE HOSE 1-7/8" ID SMOOTH INSIDE DOUBLE CLAMPED	ASTM J1475	MISC CONNECTIONS TO FIXED PIPING AT MSD TANK OR PUMP
V-1	2	GATE VALVE, BRONZE, 1-1/4"	ASTM B-62	OR EQUAL
V-2	8	GATE VALVE, 3", BRONZE	ASTM B-62	
CV-1	AS REQ'D	BRONZE, 1-1/4"CHECK VALVE, SCH 40, VERTICAL	ASTM B-62	OR EQUAL, ON PUMPOUT LINES FROM GALLEY GREY TANK AND LIBERTY LIFT STATION
CV-2	AS REQ'D	BRONZE, 3"CHECK VALVE, SCH 40, VERTICAL	ASTM B-62	OR EQUAL, ON PUMPOUT LINES FROM GALLEY GREY TANK AND LIBERTY LIFT STATION

- GENERAL NOTES -	
NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.
2.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PROVIDE TAKEDOWN JOINTS FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF EQUIPMENT. PIPING SHALL BE RUN TO MINIMIZE CUTTING OF THE SHIP'S STRUCTURE.
3.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS, HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 1-4A.
4.	PIPING SHALL BE SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708.
5.	DRIP PANS SHALL BE PROVIDED BENEATH ALL PUMPS, STRAINERS, & FILTERS THAT WILL LEAK DURING ROUTINE MAINTENANCE AND BE EQUIPPED WITH A LOW POINT DRAIN VALVE.

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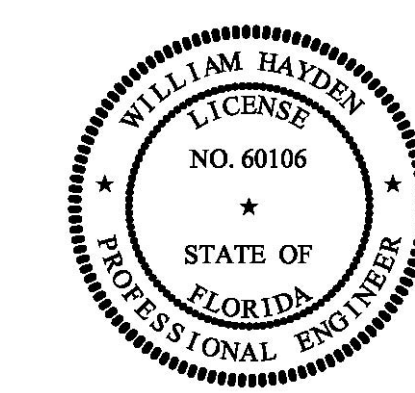
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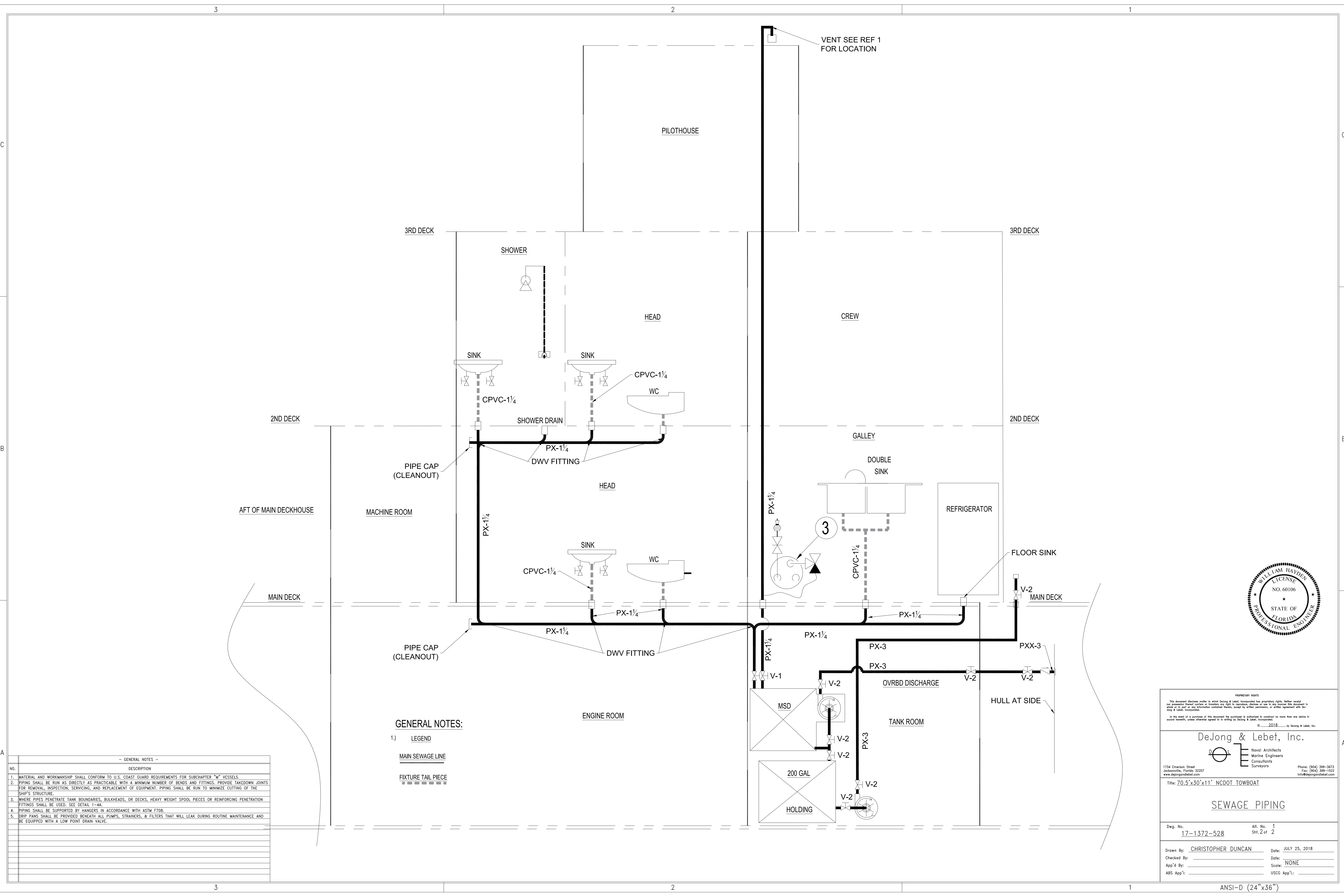
**SEWAGE AND GREYWATER PIPING**

Dwg. No. 17-1372-528 Alt. No. 2  
Sht. 1 of 2

Drawn By: CHRISTOPHER DUNCAN Date: JULY 25, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: NONE  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



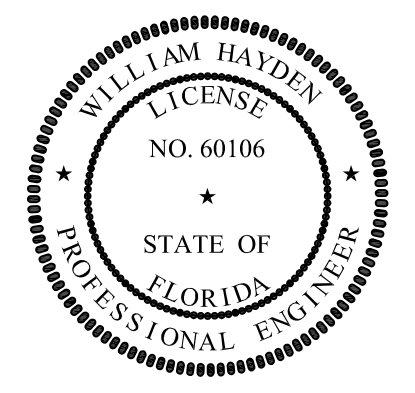




**GENERAL NOTES:**

- 1.) LEGEND
- MAIN SEWAGE LINE
- FIXTURE TAIL PIECE

- GENERAL NOTES -	
NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.
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3.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS, HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 1-4A.
4.	PIPING SHALL BE SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708.
5.	DRIP PANS SHALL BE PROVIDED BENEATH ALL PUMPS, STRAINERS, & FILTERS THAT WILL LEAK DURING ROUTINE MAINTENANCE AND BE EQUIPPED WITH A LOW POINT DRAIN VALVE.



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Title: 70.5'x30'x11' NCDOT TOWBOAT

**SEWAGE PIPING**

Dwg. No. 17-1372-528 Alt. No. 1  
Sh. 2 of 2

Drawn By: CHRISTOPHER DUNCAN Date: JULY 25, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: NONE  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
POTABLE WATER PUMP 45GMP@40 PSI	ALL	BELOW DECK CARBON STEEL GALVANIZED, SCH 40, SEAMLESS, ASTM A53 TYPE S, OR ASTM A106, GRADE B, ANSI B36.10  FIXTURE FEED COPPER TYPE-K TUBING STANDARD WALL	FLANGE #150, SOCKET WELD CARBON STEEL, ASTM A105, ANSI B16.5	BELOW DECK STEEL GALVANIZED THREADED,	HOSE: SEE NOTE 11	GARLOCK STYLE 3000  BALL - ABV DK SW OR THREADED, 3-PIECE S. STEEL, ASTM A351 GR CF8M		BALL CHROME PLATED BALL, RPTFE OR VITON SEATS  CHECK CRES DISC	CARBON STEEL ASTM A307 GR B ANSI B18.2.1	HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2	

EQUIPMENT & PUMP LIST

QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE
1	FRESH WATER PRESSURE PUMP	CENTRIFUGAL		35 GPM @ 35 PSI	2HP TEFC MOTOR 208V/3P/60Hz SEE NOTE 10

SYMBOLS LIST

	PIPE
	REDUCER
	CHECK VALVE
	BALL VALVE
	BALL VALVE, LOCKING
	DIAPHRAGM PUMP
	CAMLOCK
	DRIP PAN
	HOSE REEL
	SUCTION STRAINER BOX
	BULKHEAD PIPE PENETRATION
	PRESSURE GAUGE

17-1372-4008 GENERATOR COOLING PIPING B.O.M..

ITEM	QTY	DESCRIPTION	MATERIAL SPEC	REMARKS
1	2	PUMP 1-1/2 HP SHALLOW WELL PUMP, 120/208VAC 3PH, 45GPM @ 40 PSI WITH PRESSURE SWITCH 35-55 PSI SETTING		1-1/2" NPT IN 1-1/2"NPT OUT OR EQUAL
2	2	BLADDER TANK, 20 GALLON, #3GVT6, VERTICAL PRE CHARGED, 16" DIA		1" (F) IN - 1" (F) OUT OR EQUAL
3	1	WATERHEATER, 50 GAL, WITH USCG APPROVED PRESSURE-TEMP RELIEF VALVE	UL 174, UL 1453	VERIFY WITH OWNER PRIOR TO PURCHASE
5	4	TOILET FLUSHING VALVE, SLOAN OR EQUAL		
PG-#	AS REQ'D	PIPE GALVANIZED, SCH 40	ASTM A-53	
F-	AS REQ'D	MISC FITTINGS, MALL IRON,150#,	ASTM A-197	OR EQUAL
FG-2	AS REQ'D	MISC FITTINGS, GALV, MALEABLE IRON, 150#	ASTM A-197	
CV-2	1	CHECK VALVE, BRONZE, 125 lb., SCREWED 2"	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351
V-1	4	1- 1/2" BRONZE BALL VALVE	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351
V-2	6	3/4" HOSE BIB, BRONZE, 125LB, SCREWED	ASTM B-62	FULL PORT
V-3	0	1- 1/4" BRONZE BALL VALVE	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351
V-4	3	2" BRONZE BALL VALVE	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351
V-5	7	3/8" BRONZE BALL VALVE	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351
V-6	28	1/2" SHUTOFF VALVE, BRONZE	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351
V-7	2	3/4" BRONZEC BALL VALVE	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351
V-8	4	1" BRONZE BALL VALVE	ASTM B-62	OPTION: DUCTILE IRON A-395, CARBON STEEL A-216, 316 STAINLESS STEEL A-351

\*\*

\*\*

MAY BE PROVIDED WITH FIXTURES

GENERAL NOTES

NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.
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3.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS, HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 1-4A.
4.	PIPING SHALL BE SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708.
5.	DRIP PANS SHALL BE PROVIDED BENEATH ALL PUMPS, STRAINERS, & FILTERS THAT WILL LEAK DURING ROUTINE MAINTENANCE AND BE EQUIPPED WITH A LOW POINT DRAIN VALVE.
6.	FIT DRIP PANS UNDER HOSE REELS AND PUMPS.
7.	FLEXIBLE POTABLE WATER HOSE SHALL BE USDA APPROVED DRINKING WATER HOSE.
8.	
9.	
10.	
11.	

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Title: 70.5'x30'x11' NCDOT TOWBOAT

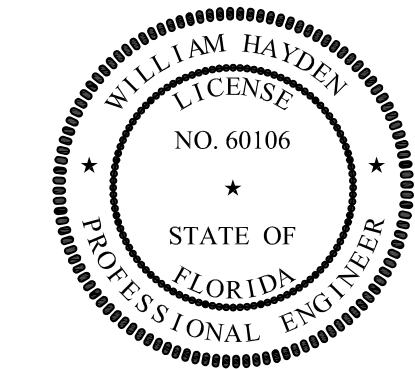
POTABLE WATER PIPING

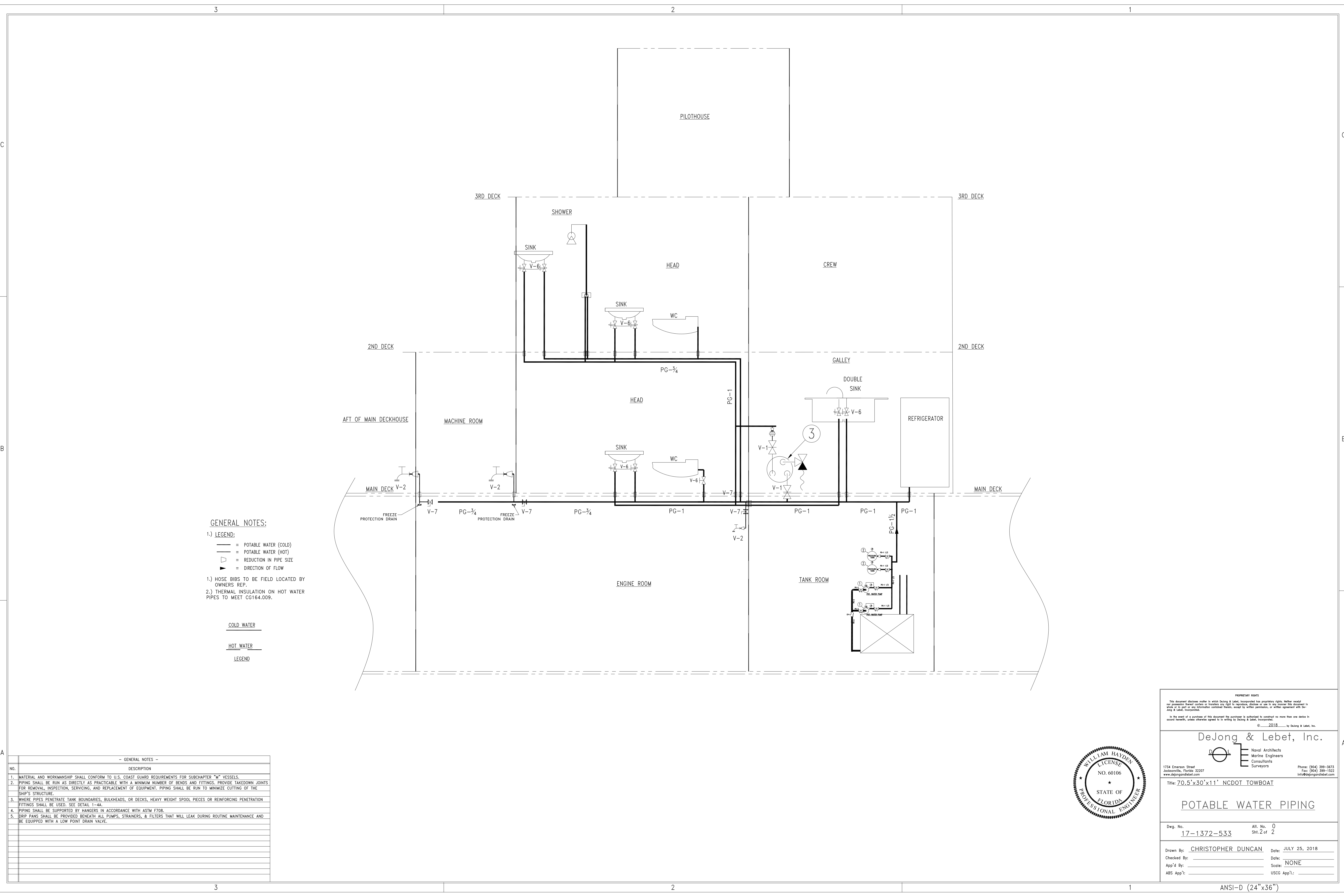
Dwg. No: 17-1372-533 Alt. No: 0 Sh: 1 of 2

Drawn By: CHRISTOPHER DUNCAN Date: JUNE 05, 2018

Checked By: Date: Scale: 1/2" = 1'-0"

App'd By: USCG App'l:





**GENERAL NOTES:**

1.) LEGEND:

- = POTABLE WATER (COLD)
- = POTABLE WATER (HOT)
- ▽ = REDUCTION IN PIPE SIZE
- ▶ = DIRECTION OF FLOW

- 1.) HOSE BIBS TO BE FIELD LOCATED BY OWNERS REP.
- 2.) THERMAL INSULATION ON HOT WATER PIPES TO MEET CG164.009.

COLD WATER

HOT WATER

LEGEND

- GENERAL NOTES -	
NO.	DESCRIPTION
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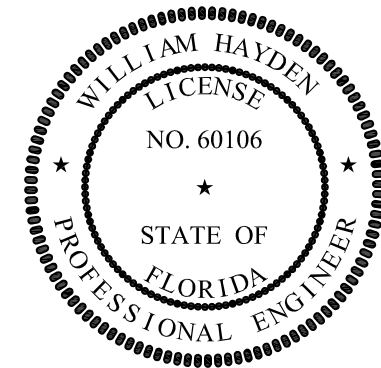
Phone: (904) 399-3673  
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TITLE: 70.5'x30'x11' NCDOT TOWBOAT

### POTABLE WATER PIPING

Dwg. No: **17-1372-533** Alt. No: **0**  
Sht. 2 of 2

Drawn By: **CHRISTOPHER DUNCAN** Date: **JULY 25, 2018**  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: **NONE**  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_





# MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	
COMPRESSED AIR SERVICE PIPING MAWP: 200 PSIG	ALL	CARBON STEEL, SCH 80, SEAMLESS, ASTM A53 OR ASTM A106 GRADE B, ANSI B36.10	UNION GROUND JOINT, SOCKET WELD CARBON STEEL, ASTM A105, 3000#, MSS-SP-83	SOCKET WELD CARBON STEEL, ASTM A105, 3000#, ANSI B16.11	FLEX HOSE MEETING SAE J1942 AND J1475 FOR DIESEL SERVICE SEE NOTE 9	-	GATE CARBON STEEL, ASTM A105 SOCKET WELD OR THREADED, ANSI B16.34  BALL THREADED, CARBON STEEL, ASTM A105, SOCKET WELD OR THREADED  CHECK CARBON STEEL, ASTM A105, SOCKET WELD OR THREADED, ANSI B16.34	GATE STAINLESS STEEL STEM, DISC AND SEAT  BALL STAINLESS STEEL BALL, PTFE SEATS & SEALS  CHECK STAINLESS STEEL DISC	

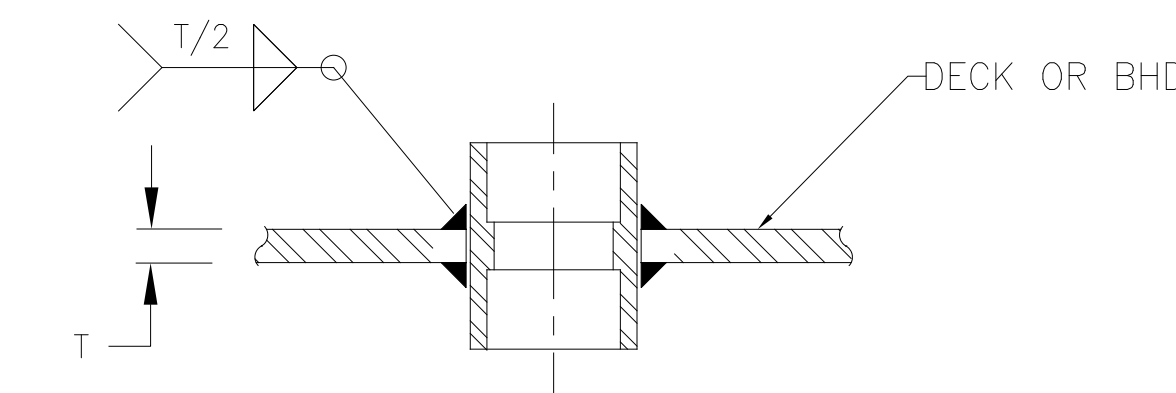
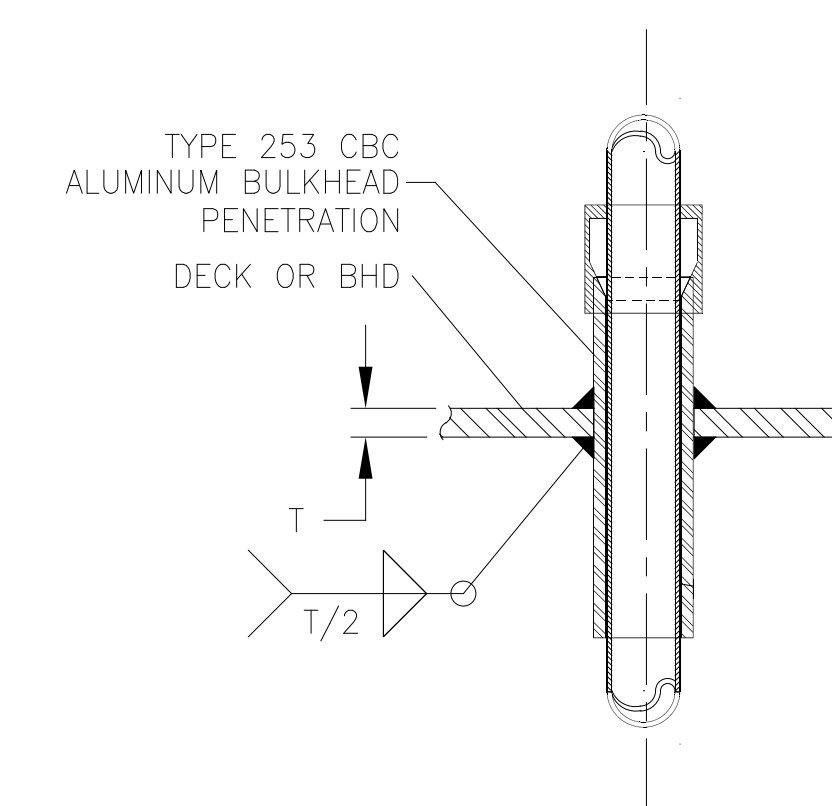


DIAGRAM 1-1A  
STEEL DECK AND BULKHEAD PENETRATION

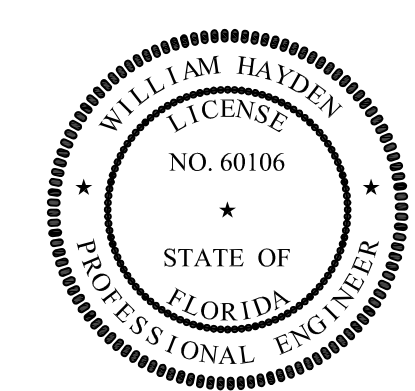
EQUIPMENT LIST				
ITEM	QTY	DESCRIPTION	MATERIAL SPEC.	REMARKS
1	2	AIR COMPRESSOR, 2 STAGE, 175 PSI @ 35 CFM, 208V, 3Ø ELEC MOTOR DRIVEN		SEE NOTE 7
2	2	RECEIVER, VERTICAL, 120 GALLONS, 200 PSI MAWP		SEE NOTES 6 & 7
3	1	AIR FILTER, COALESCING, 45 CFM		
4	1	AIR DRYER, 30 CFM		
5	1	HORN COMBINATION MANUAL/SOLENOID VALVE		
6	1	HORN, 29 CFM @100 PSI, 250 PSI MAX, 3/8" NPT		
7	1	1/2", 50 FT. SPRING RETURN HOSE REEL, 300 PSI		
8	AS REQ'D	3/4" QUICK DISCONNECT, MALE/FEMALE		
9	AS REQ'D	1/2" QUICK DISCONNECT, MALE/FEMALE		
10	1	AIR REGULATOR W/ GAGE, 1-1/2"		
11	1	AIR REGULATOR W/ GAGE, 3/4"		
P-1/4"	AS REQ'D	1/4" SCHDED 80 PIPE	ASTM A53 OR A106 SMLS	
P-3/8"	AS REQ'D	3/8" SCHDED 80 PIPE	ASTM A53 OR A106 SMLS	
P-1/2"	AS REQ'D	1/2" SCHDED 80 PIPE	ASTM A53 OR A106 SMLS	
P-3/4"	AS REQ'D	3/4" SCHDED 80 PIPE	ASTM A53 OR A106 SMLS	
P-1-1/4"	AS REQ'D	1-1/4" SCHDED 80 PIPE	ASTM A53 OR A106 SMLS	
V-1	1	1/4" BALL VALVE	ASTM A105	
V-2	1	3/8" BALL VALVE	ASTM A105	
V-3	4	1/2" BALL VALVE	ASTM A105	
V-4	1	3/4" BALL VALVE	ASTM A105	
V-5	1	1-1/4" BALL VALVE	ASTM A105	

SYMBOLS LIST	
	PIPE
	REDUCER
	CHECK VALVE
	BALL VALVE
	PRESSURE TRANSDUCER
	PRESSURE GAUGE
	HOSE REEL
	BULKHEAD PIPE PENETRATION
	AIR COMPRESSOR
	SAFETY RELIEF VALVE
	COMBINATION MANUAL/SOLENOID VALVE
	PRESSURE REGULATING VALVE
	QUICK DISCONNECT
	PRESSURE REGULATING VALVE
	FILTER
	AIR DRYER



DETAIL 1-2A  
ALUMINUM DECK OR BULKHEAD PENETRATION  
NO SCALE

GENERAL NOTES	
NO.	DESCRIPTION
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3.	WHERE PIPES PENETRATE BULKHEADS, OR DECKS, USE SOCKET WELD COUPLINGS FOR STEEL DECKS & BULKHEADS AND CSO STUFFING BOXES FOR ALUMINUM DECKS & BULKHEADS. SEE DETAIL 1-1A & 1-2A.
4.	PIPING SHALL BE SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708.
5.	BURSTING PRESSURE OF FLEX CONNECTIONS SHALL BE AT LEAST 5 TIMES THE WORKING PRESSURE OR 4 TIMES THE RELIEF VALVE SETTING.
6.	AIR RECEIVERS SHALL BE ASME AND USCG APPROVED & STAMPED
7.	COMPRESSORS SHALL BE SUPPLIED MOUNTED ON THE VERTICAL AIR RECEIVER



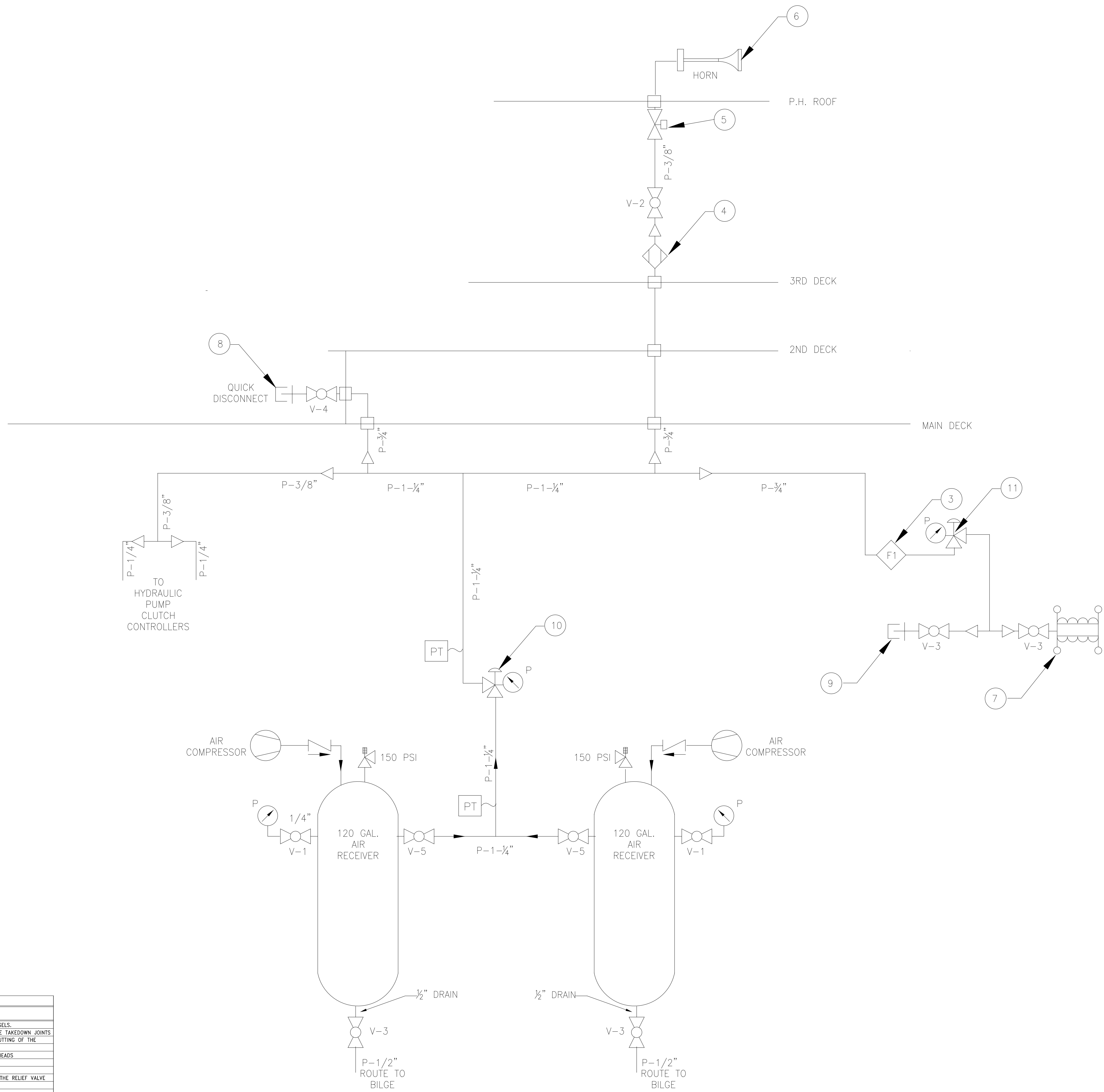
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
**COMPRESSED AIR PIPING**

Dwg. No. 17-1372-551 Alt. No. 1  
Sh. 1 of 3

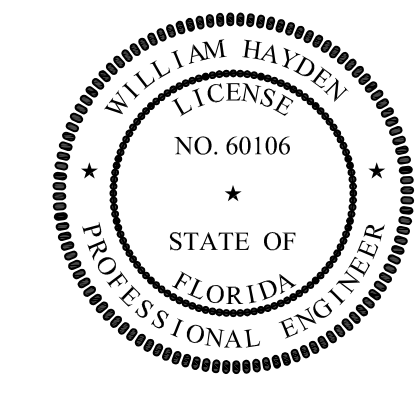
Drawn By: CHRISTOPHER DUNCAN Date: JULY 25, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: NONE  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



COMPRESSED AIR SCHEMATIC

- GENERAL NOTES -

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Title: 70.5'x30'x11' NCDOT TOWBOAT

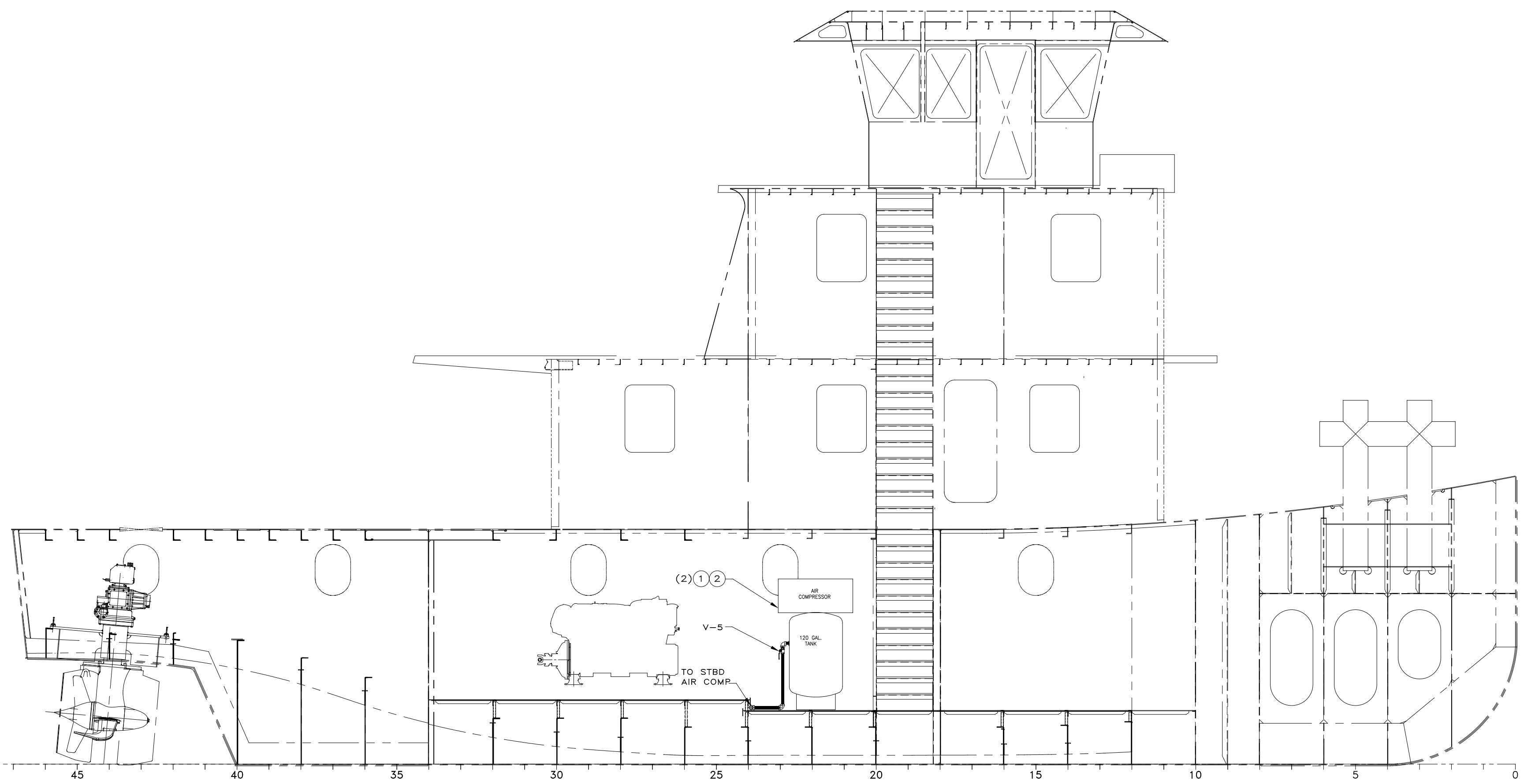
**COMPRESSED AIR  
PIPING**

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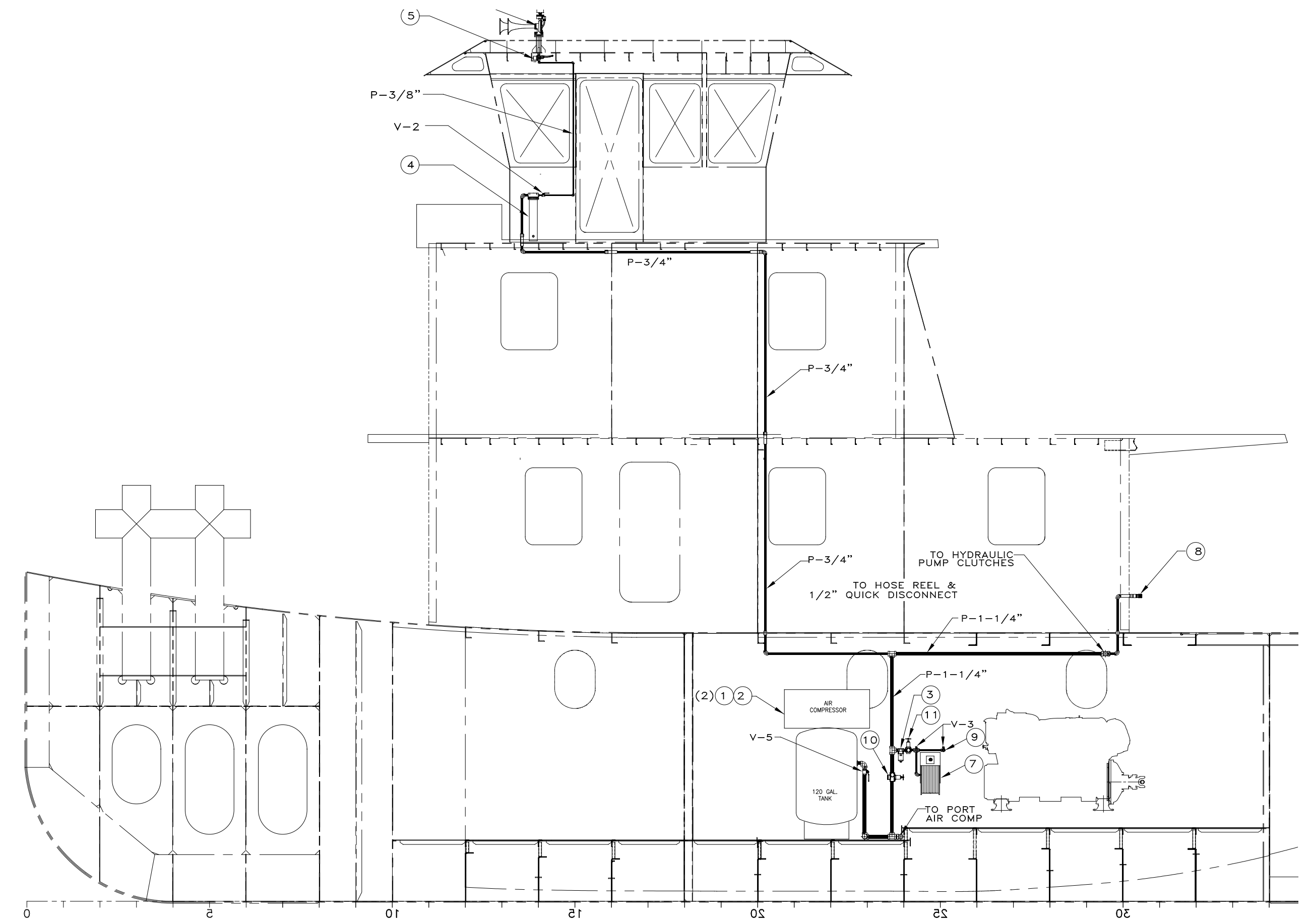
Dwg. No. 17-1372-551      Alt. No. 1  
Sht. 2 of 3

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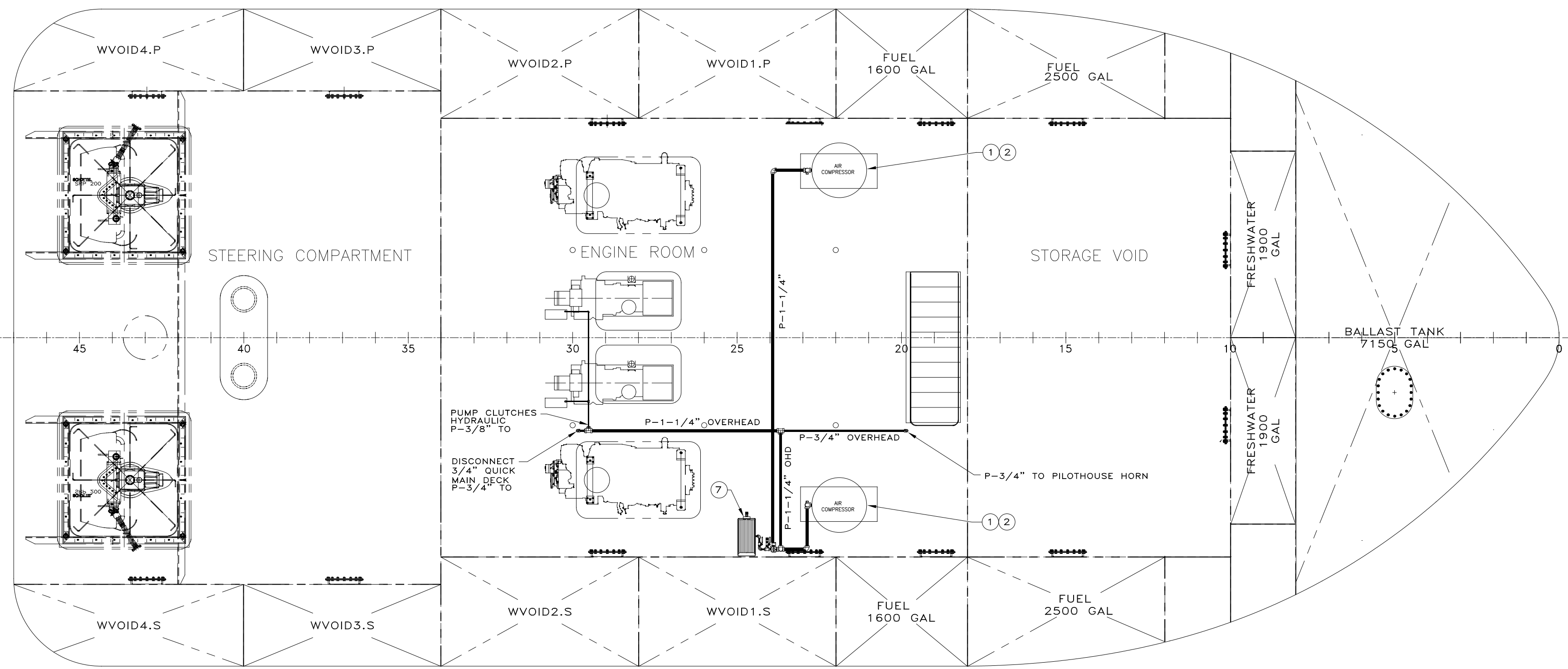
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Checked By: \_\_\_\_\_      Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_      Scale: NONE  
ABS App'l: \_\_\_\_\_      USCG App'l: \_\_\_\_\_



INBOARD PROFILE LOOKING PORT



INBOARD PROFILE LOOKING STARBOARD



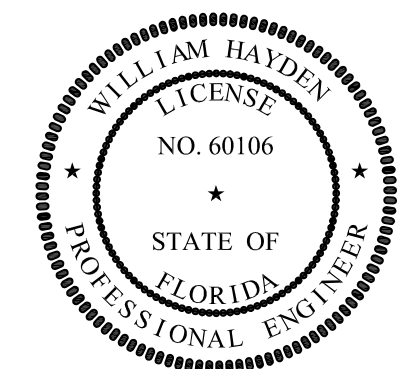
PLAN VIEW HOLD

# COMPRESSED AIR PIPING ARRANGEMENT

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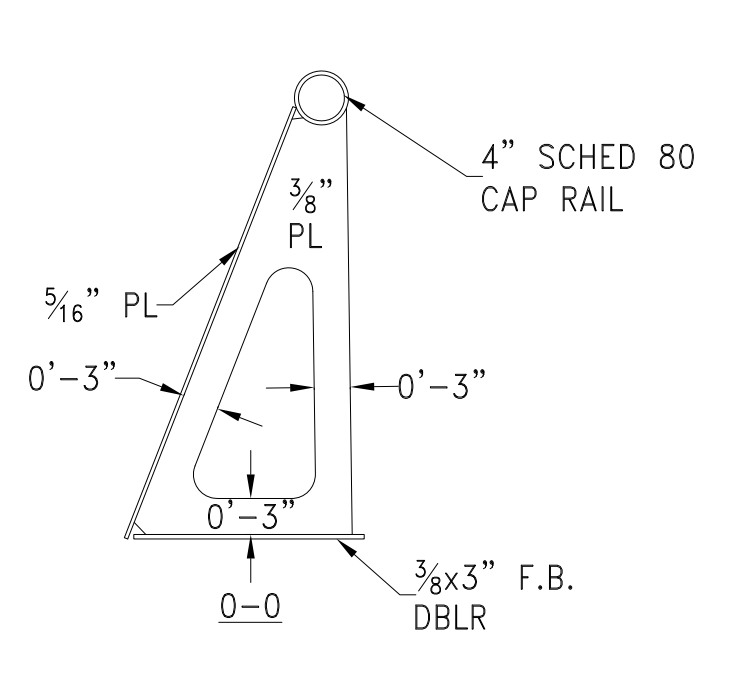
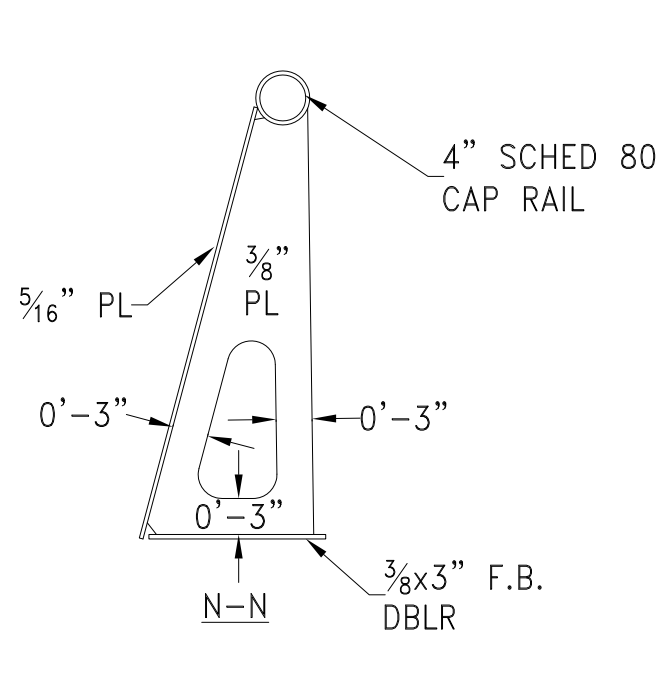
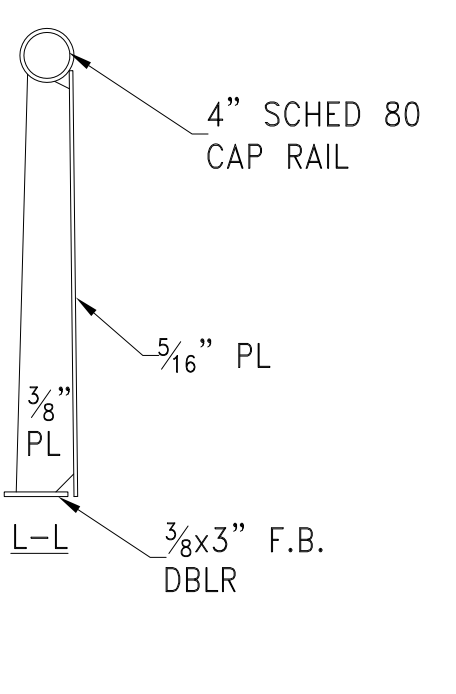
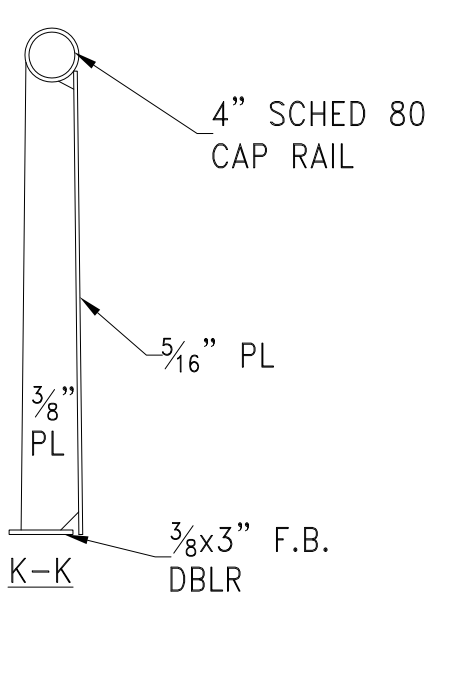
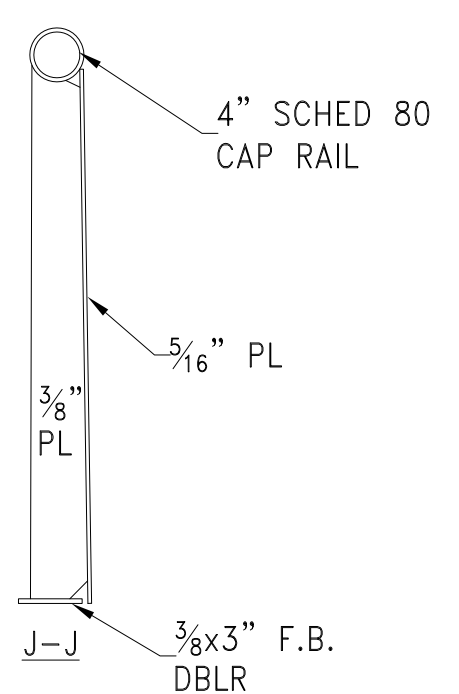
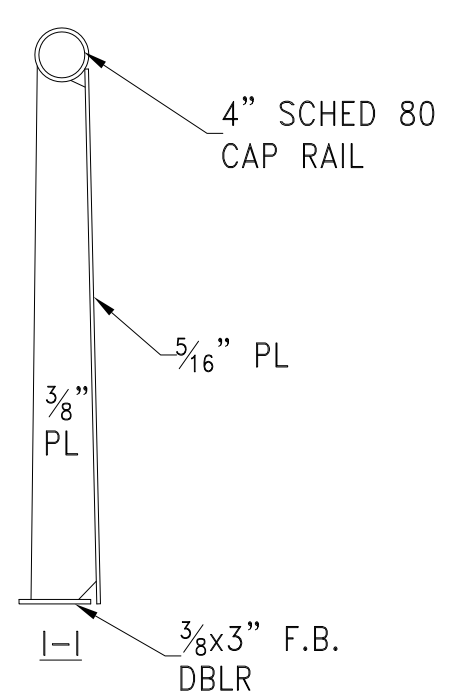
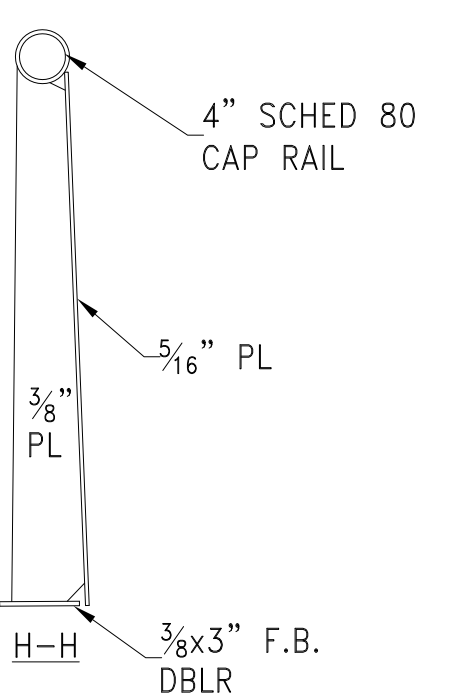
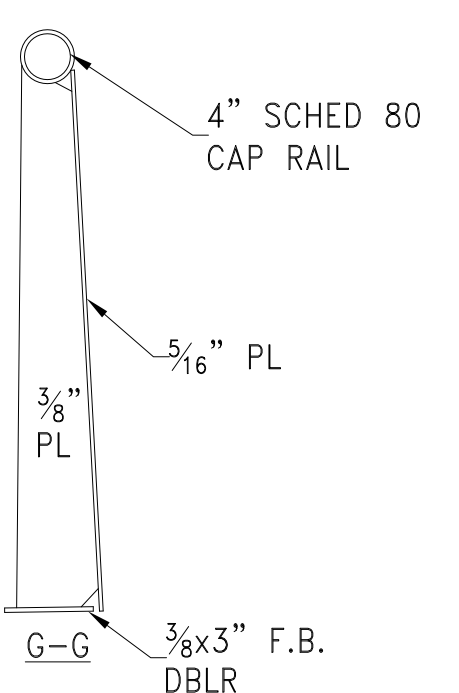
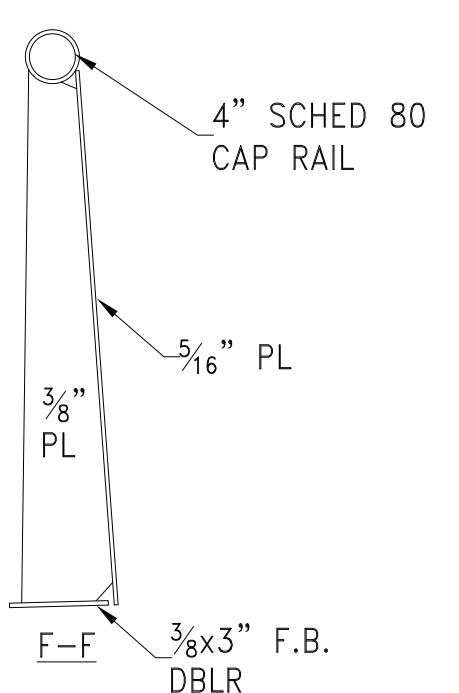
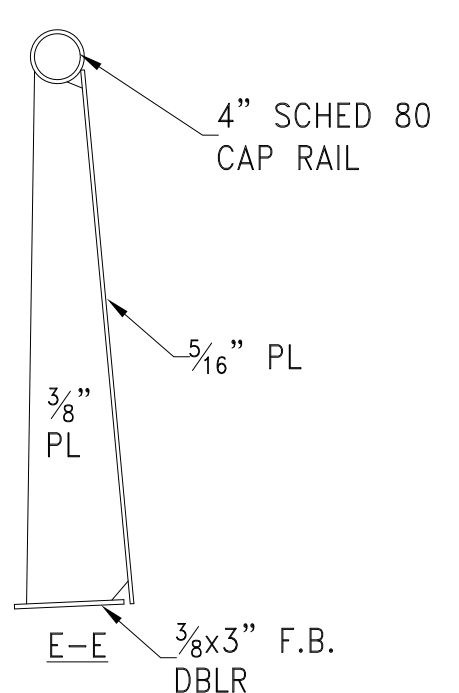
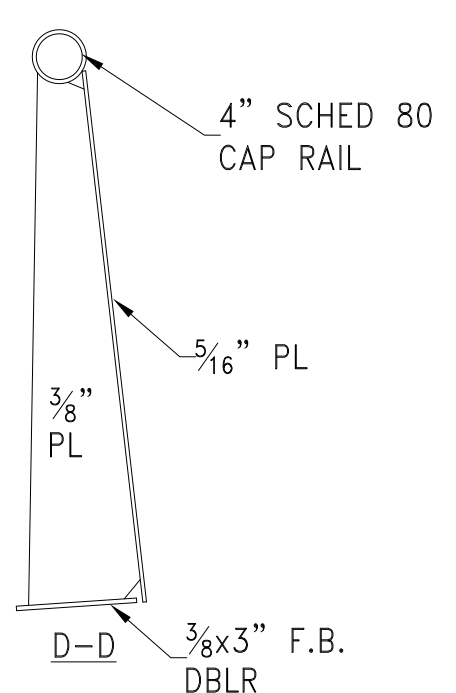
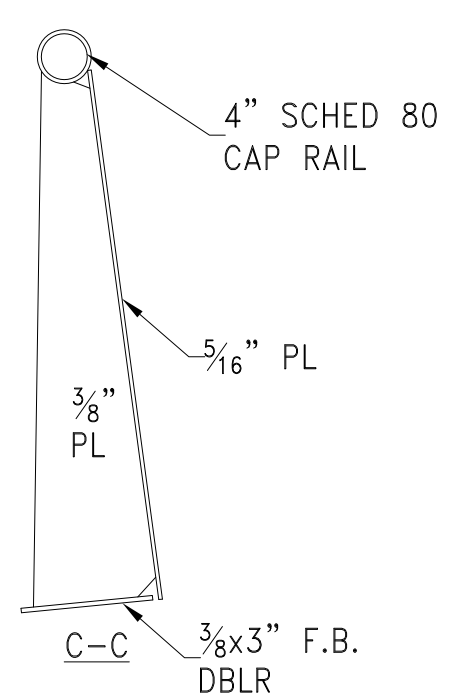
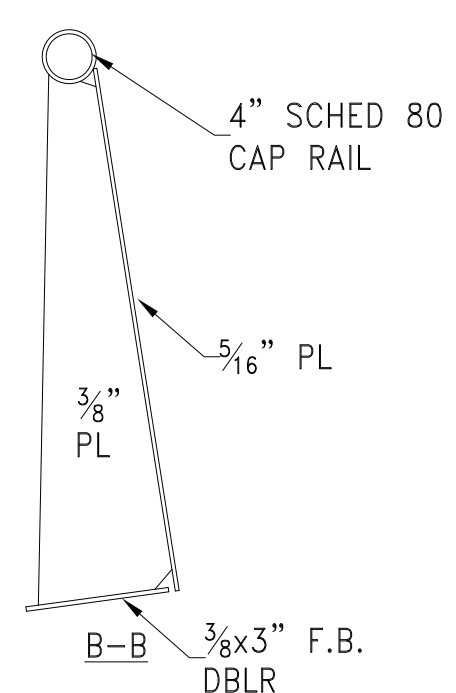
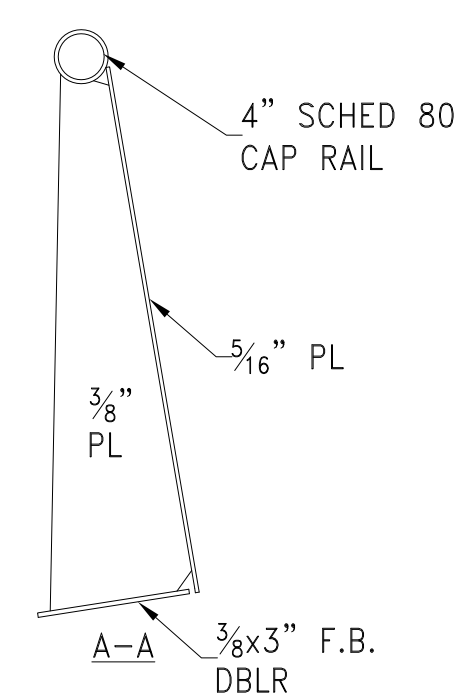
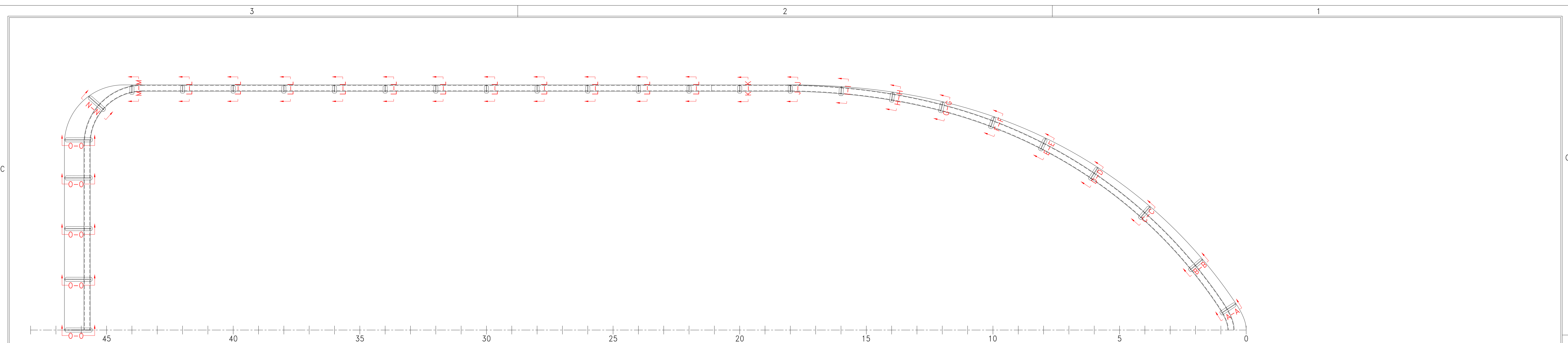
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 info@dejongandlebet.com

Title: 70.5'x30'x11" NCDOT TOWBOAT

**COMPRESSED AIR PIPING**

Dwg. No. 17-1372-551 Alt. No. 1  
 Sht. 3 of 3

Drawn By: JAH Date: OCT 9, 2018  
 Checked By: \_\_\_\_\_ Date: NONE  
 App'd By: \_\_\_\_\_ Scale: NONE  
 ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_




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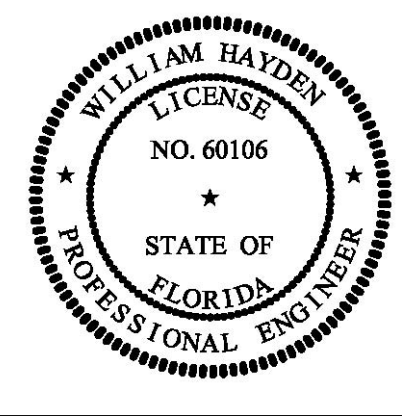
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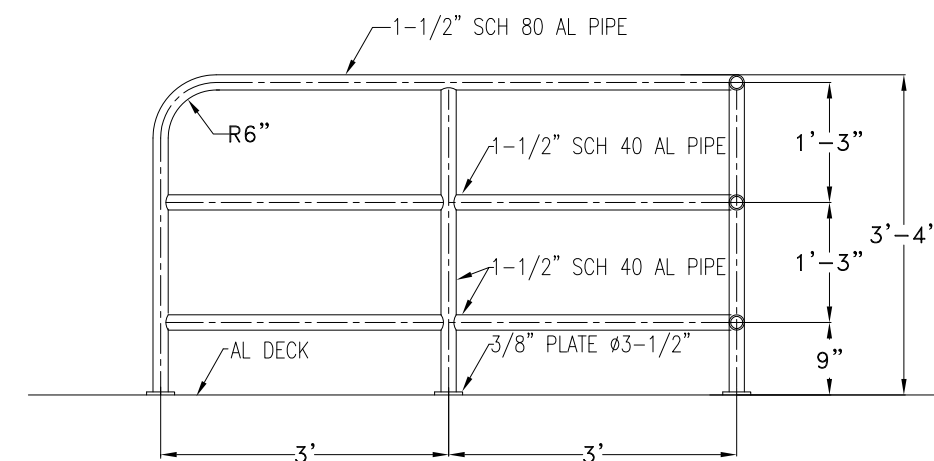
Title: 70.5'x30'x11' NCDOT TOWBOAT

**BULWARKS STRUCTURAL DETAILS**

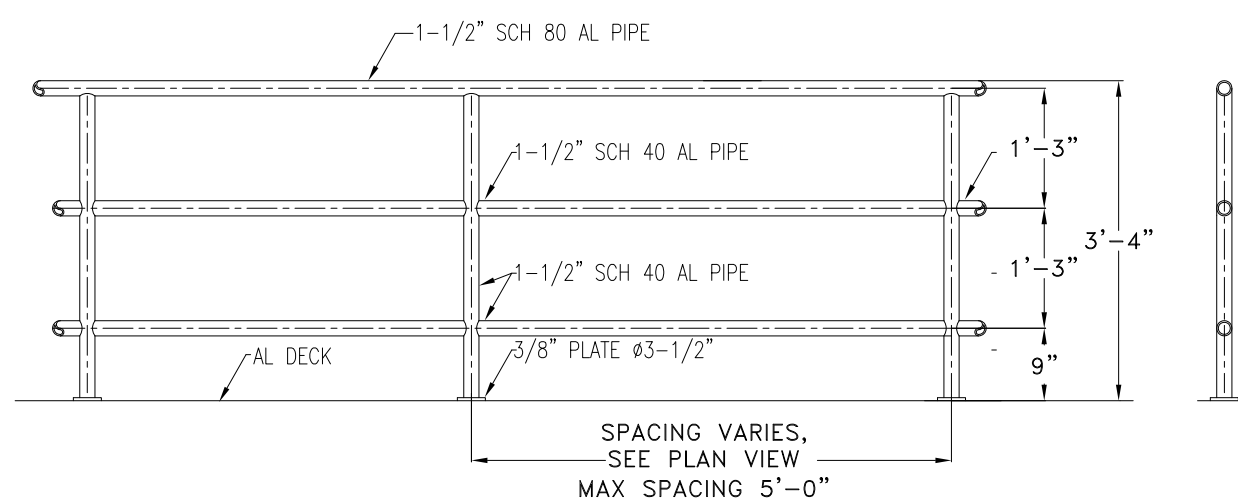
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 Sht. 1 of 1

Drawn By: **JACOB CONNALLY**      Date: **JUNE 05, 2018**  
 Checked By: \_\_\_\_\_      Date: \_\_\_\_\_  
 App'd By: \_\_\_\_\_      Scale: **1/2" = 1'-0"**  
 ABS App'l: \_\_\_\_\_      USCG App'l: \_\_\_\_\_

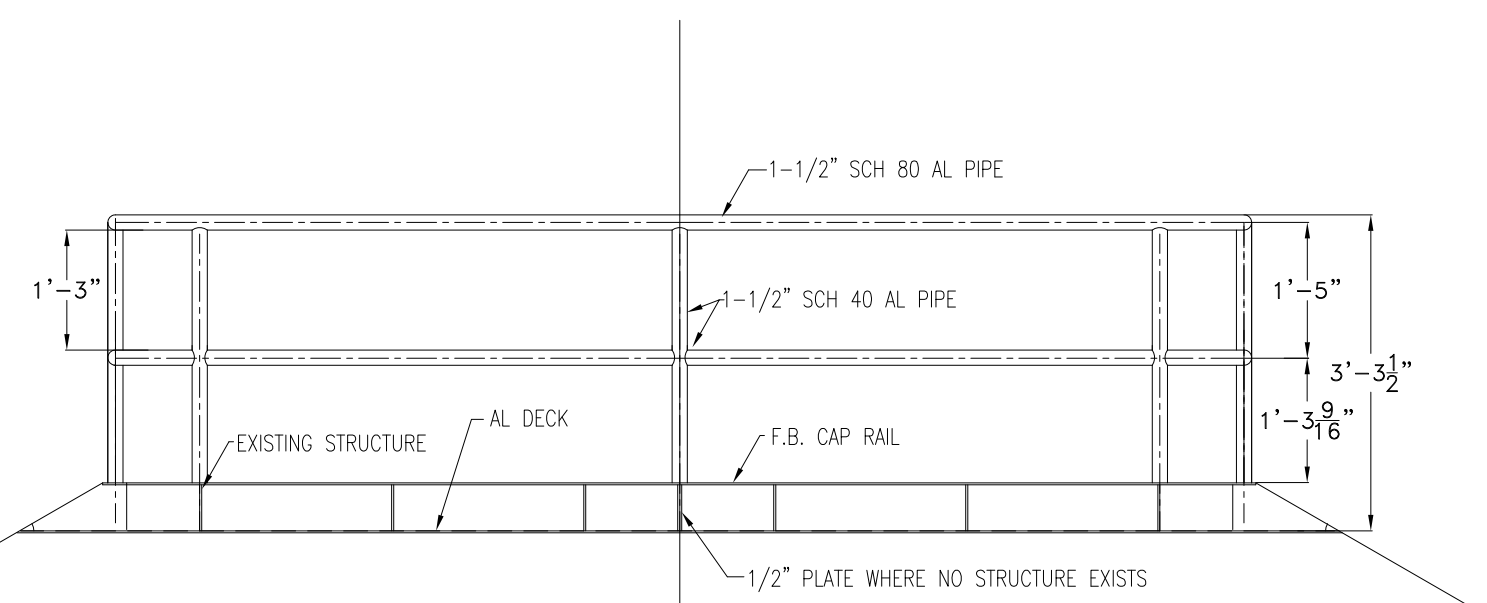




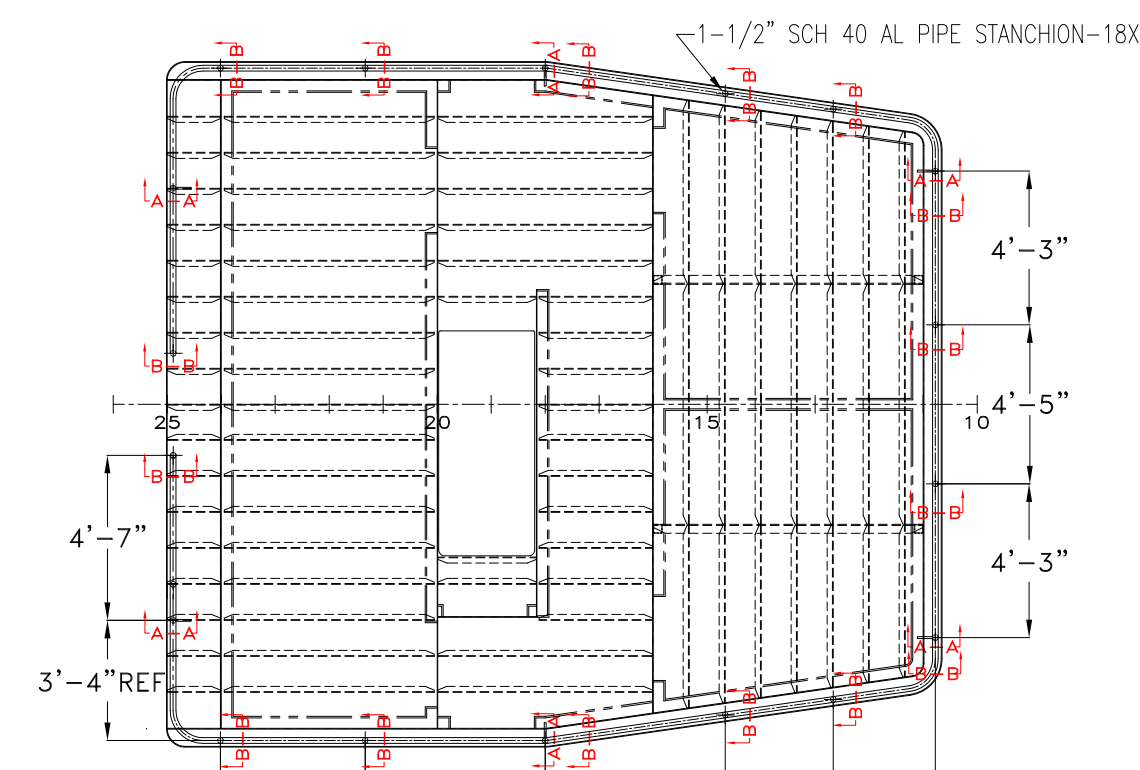
1 2ND DECK STAIR LANDING RAIL  
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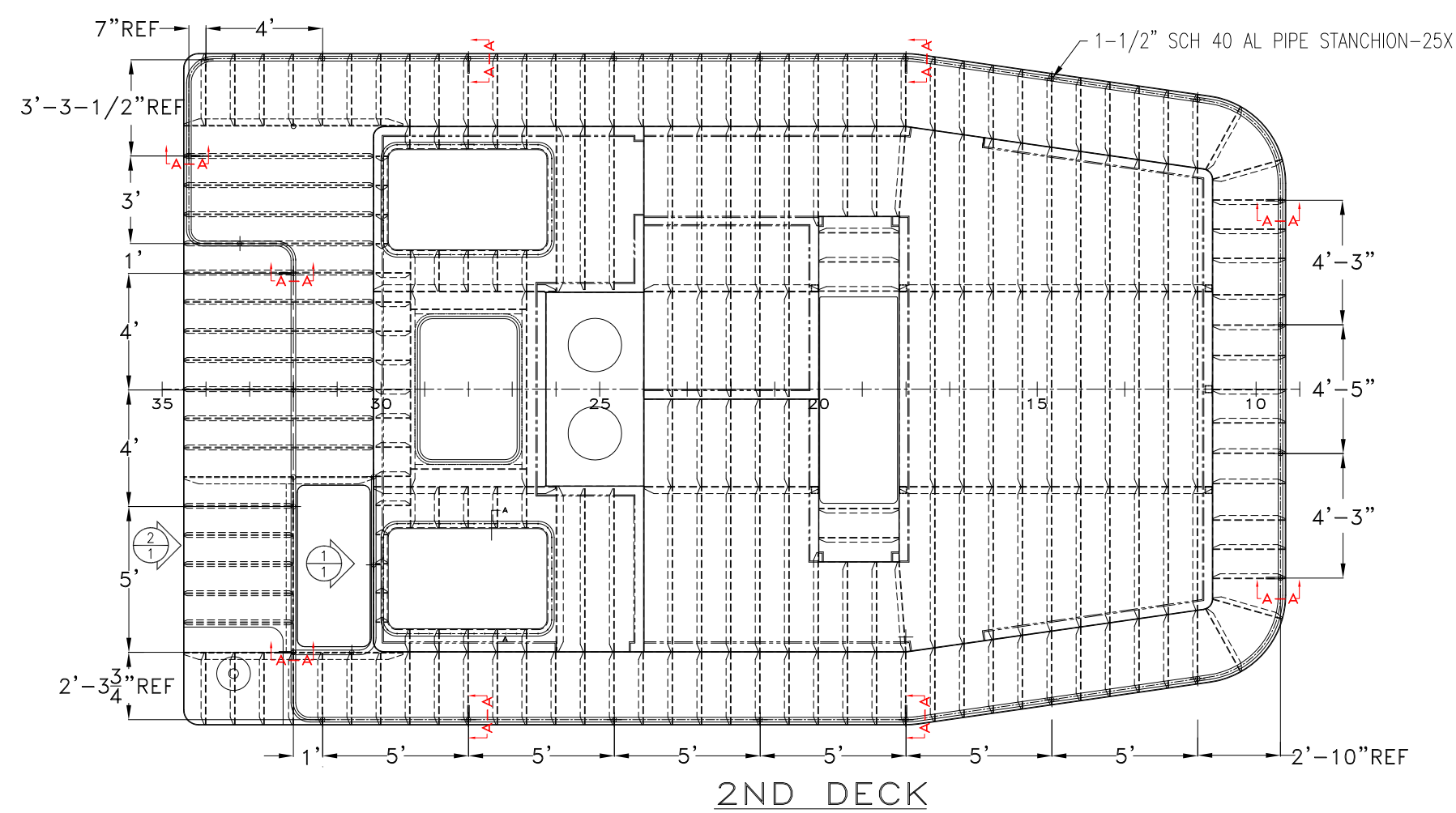
2 TYPICAL RAILING DETAIL MAIN AND 2ND DECK  
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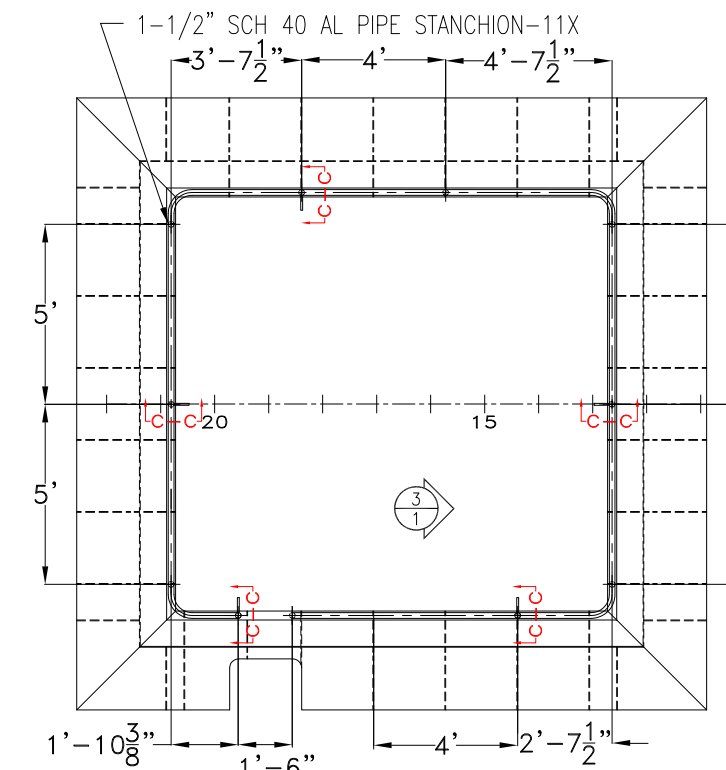
3 PILOT HOUSE ROOF RAILING DETAIL  
SCALE: 1/2"=1'-0"



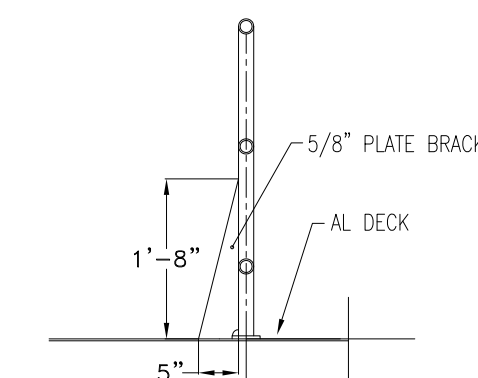
3RD DECK



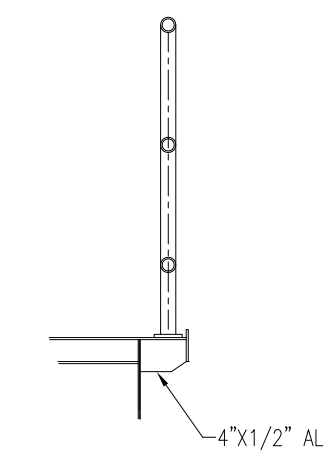
2ND DECK



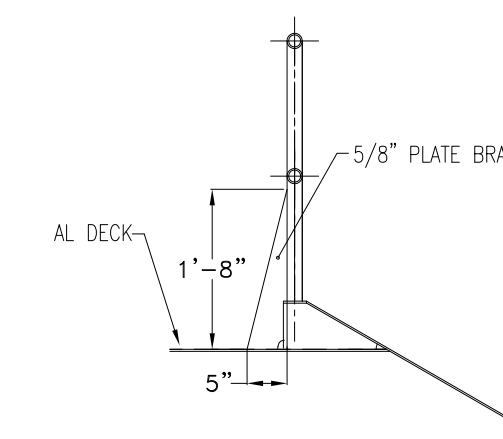
PILOT HOUSE CANOPY



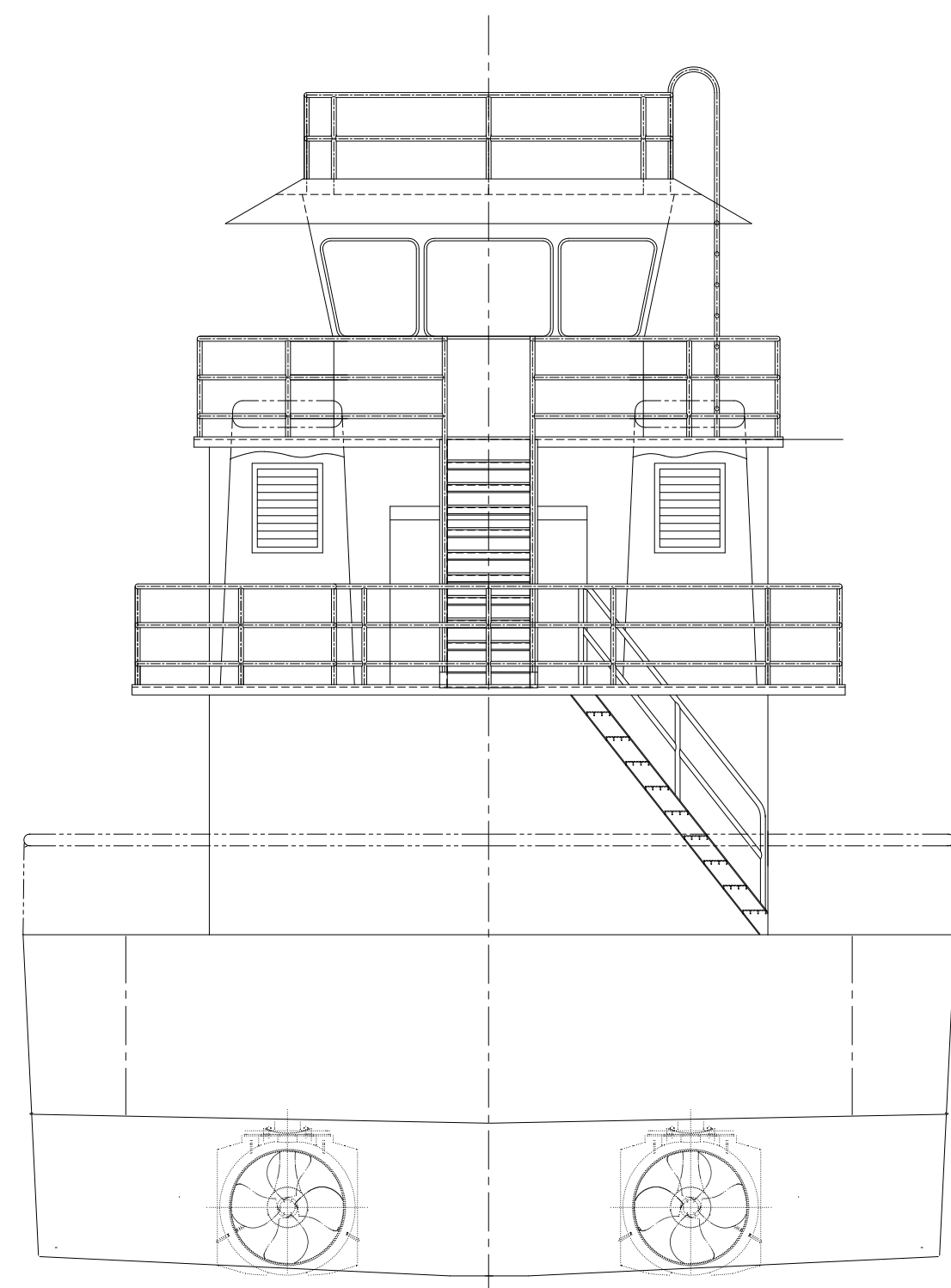
A STANCHION W/ BRACKET  
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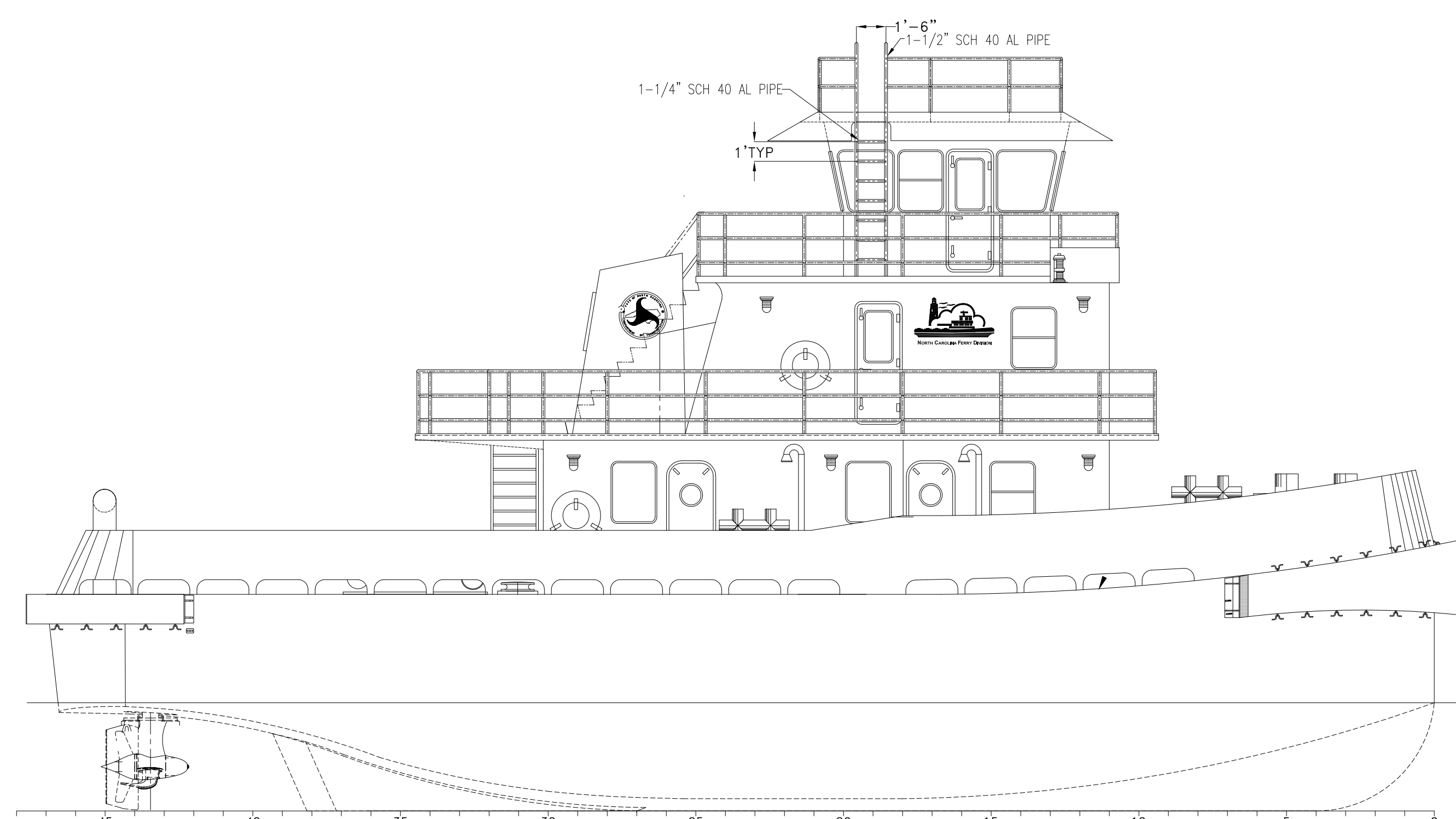
B STANCHION W/ STRUCTURE ADDED UNDER DECK  
SCALE: 1/2"=1'-0"



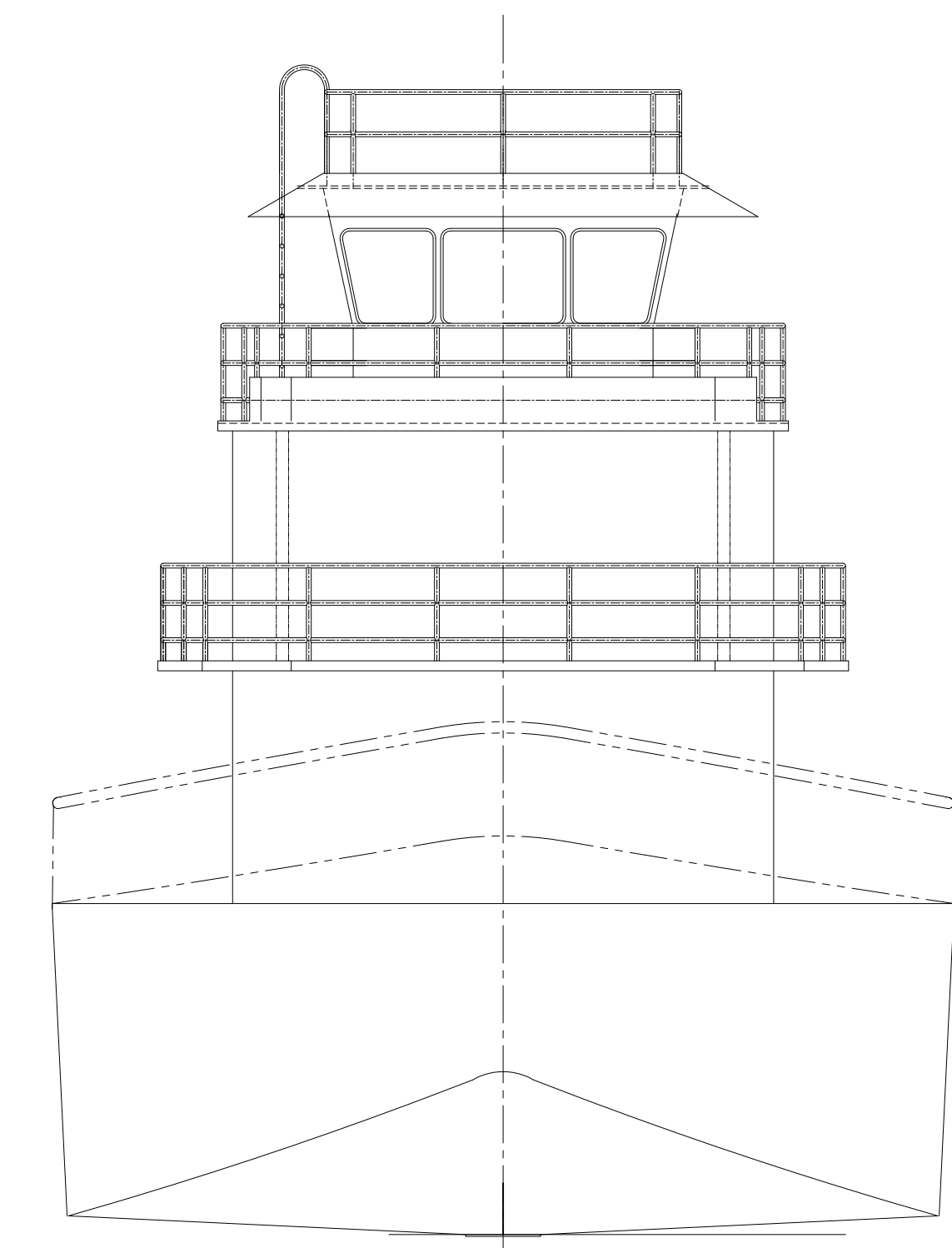
C PILOT HOUSE ROOF STANCHION W/ BRACKET  
SCALE: 1/2"=1'-0"



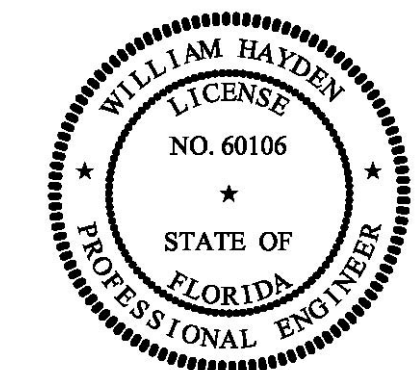
STERN LOOKING FWD



PROFILE



BOW LOOKING AFT



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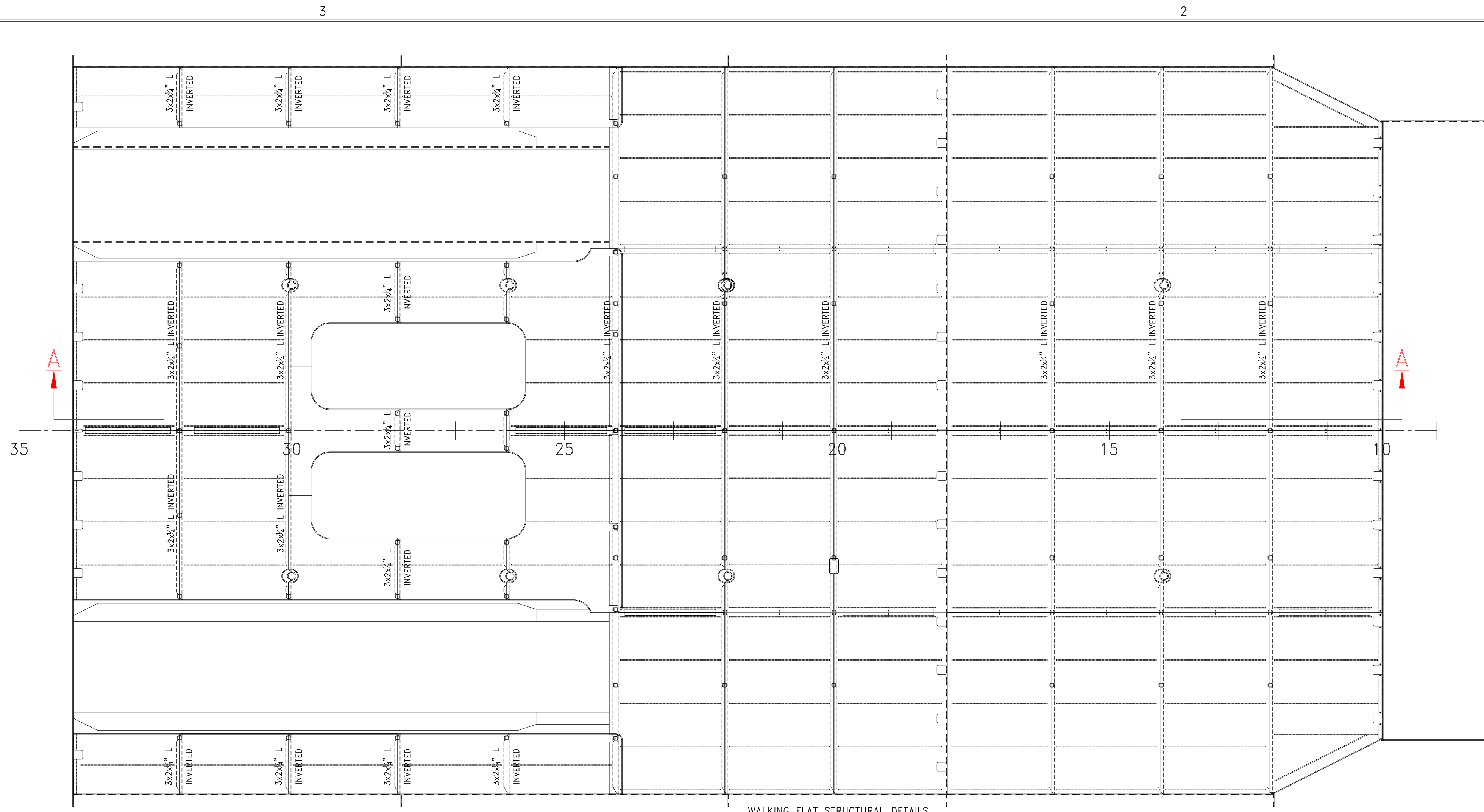
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Title: 70.5 x 30' x 11' NCDOT TOWBOAT

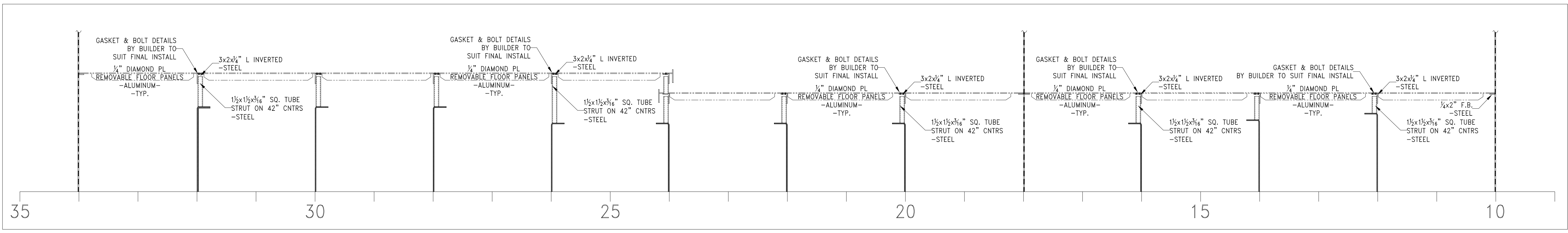
**RAILS & STANCHIONS**

Dwg. No. 17-1372-612 Alt. No. 0  
Sht. 1 of 1

Drawn By: JAH Date: AUG 10, 2018  
Checked By: Date:  
App'd By: AS NOTED Scale:  
ABS App'l: USCG App'l:



WALKING FLAT STRUCTURAL DETAILS  
 1/4" PL AL. DIAMOND TREAD  
 W/ 1/4x3" F.B. AL. STIFFS ON 16" CNTRS  
 REMOVABLE PANELS GASKETED & BOLTED  
 TO 3x2 1/2" INVERTED L STEEL BEAMS



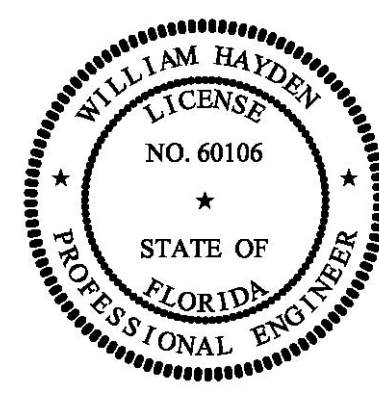
SECTION A-A  
 SCALE: 3/4" = 1'-0"

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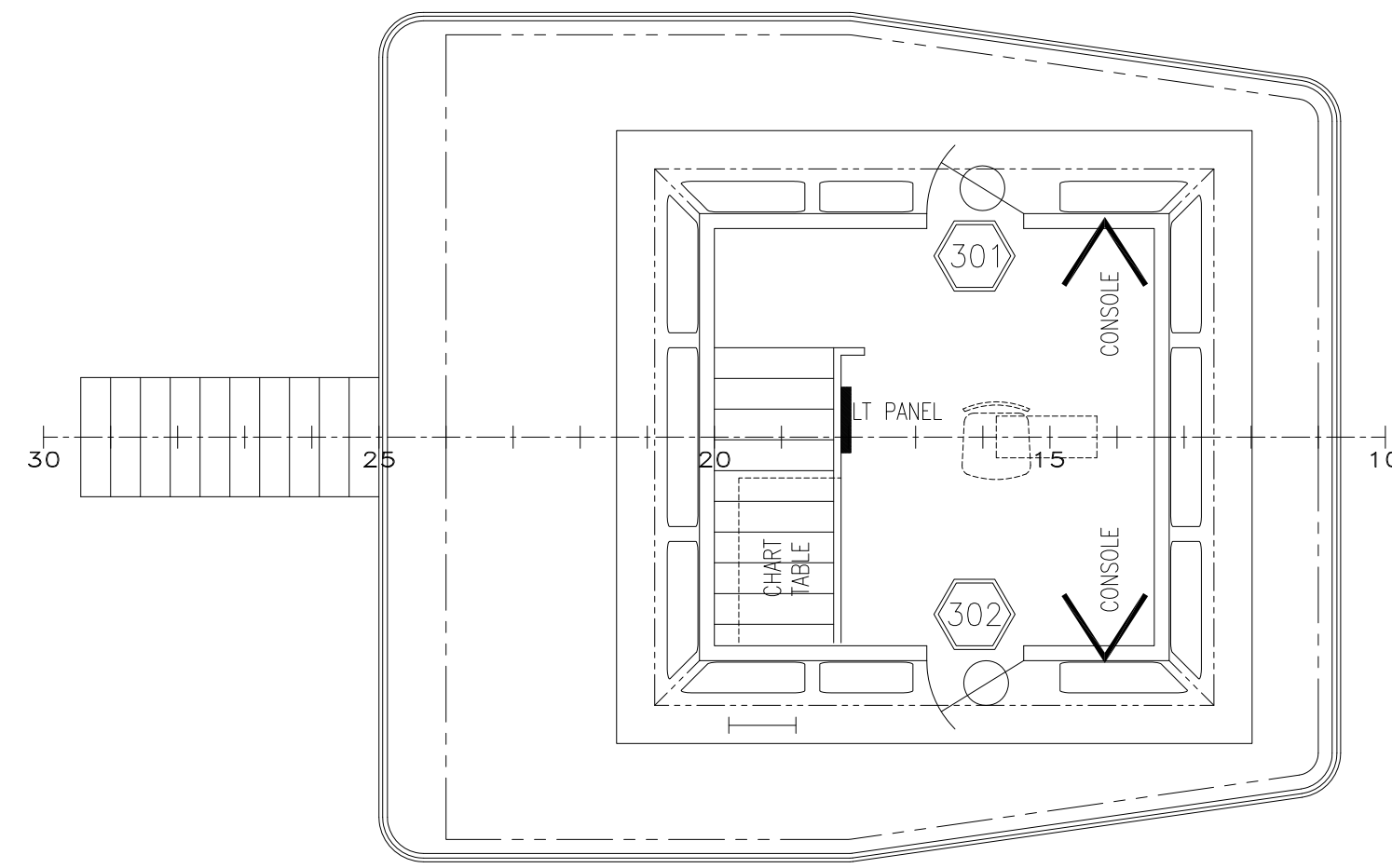
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Title: 70.5'x30'x11' NCDOT TOWBOAT  
 BELOW DECKS  
 WALKING FLAT DETAILS

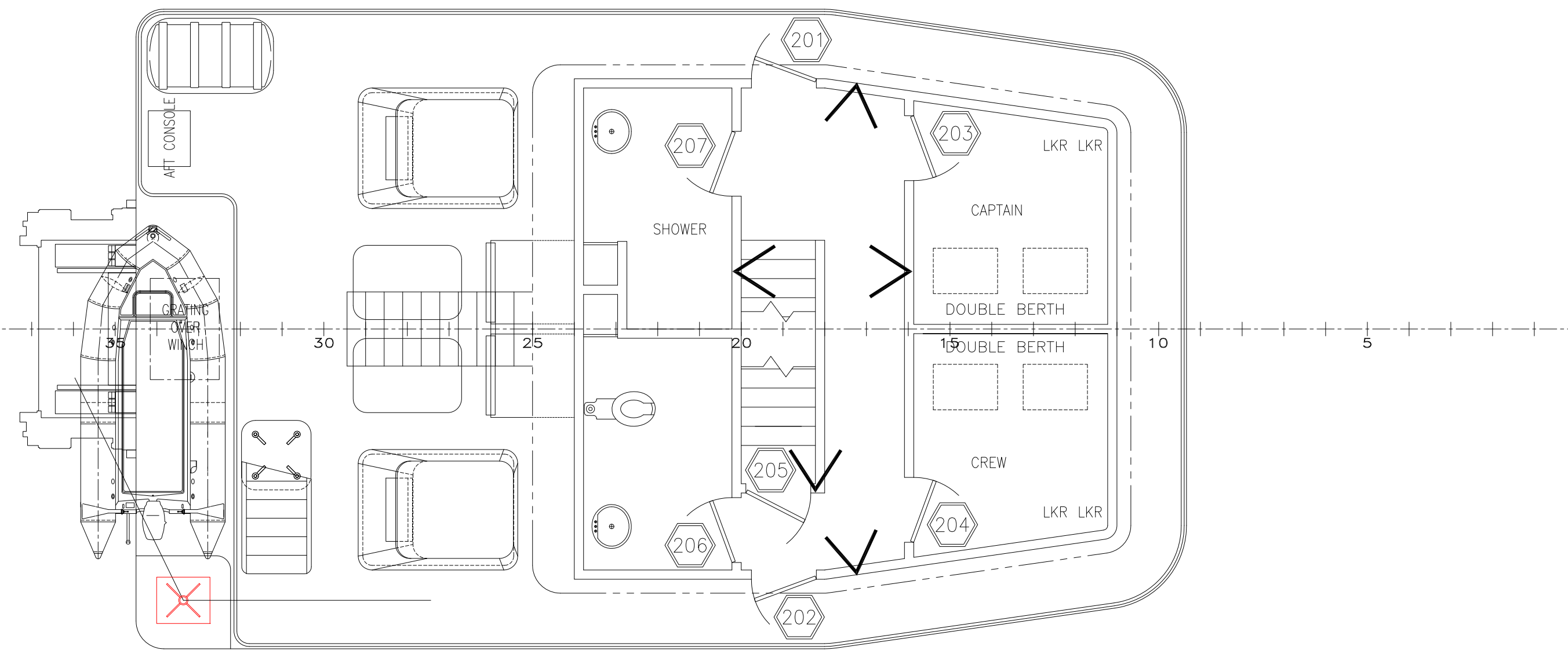
Dwg. No. 17-1372-622  
 Sht. 1 of 1  
 Date: JUNE 05, 2018  
 Scale: 1/2" = 1'-0"  
 USCG App'l: \_\_\_\_\_



ANSI-D (24"x36")

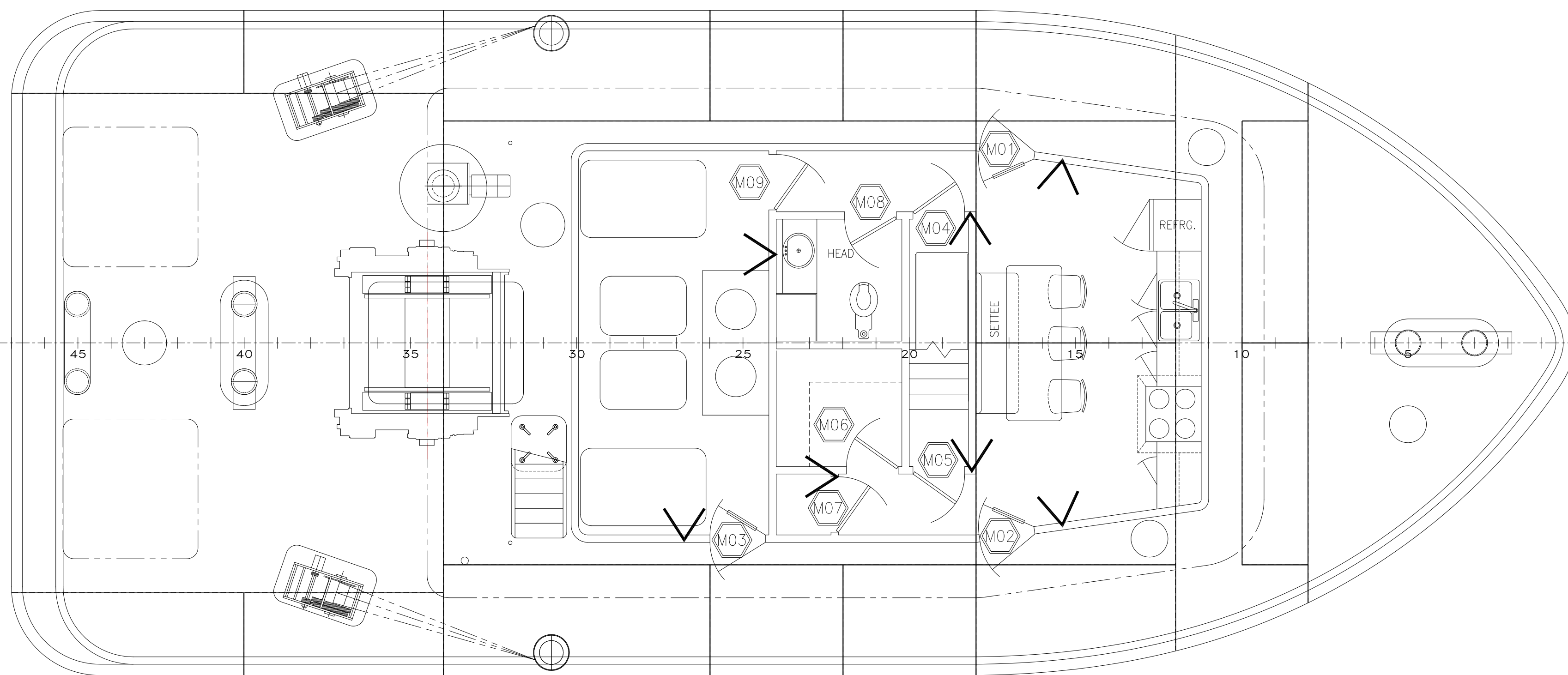


3RD DECK PLAN



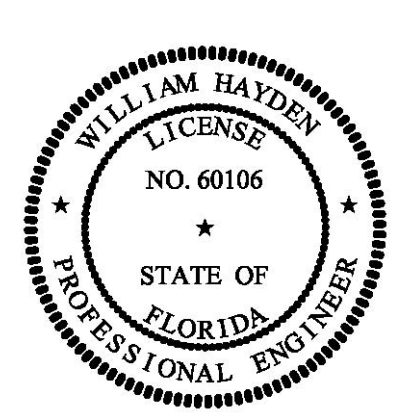
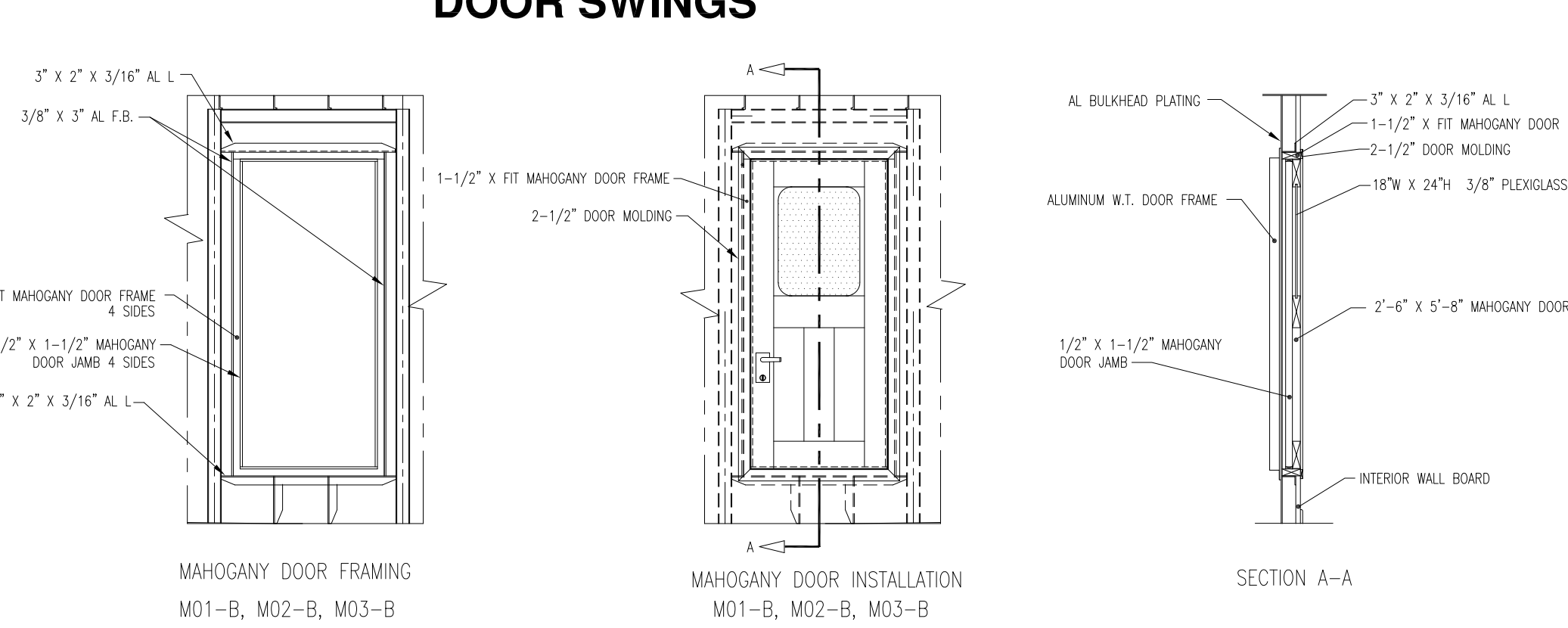
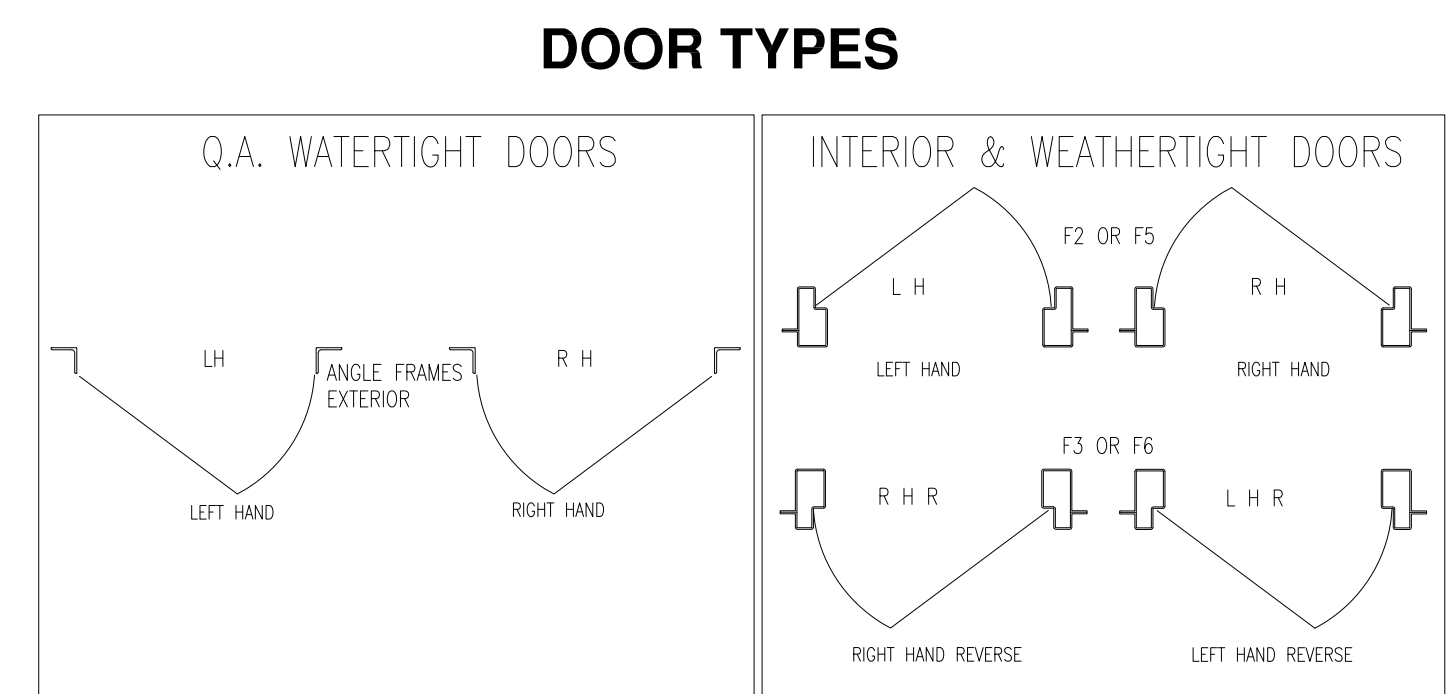
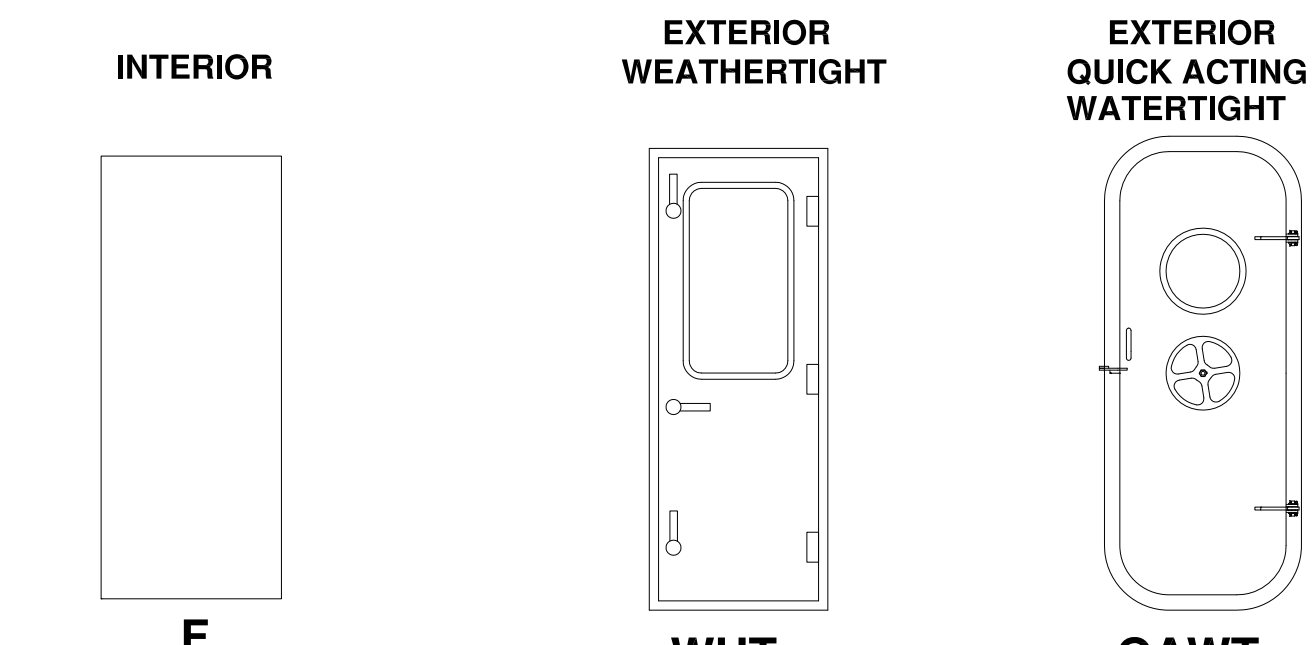
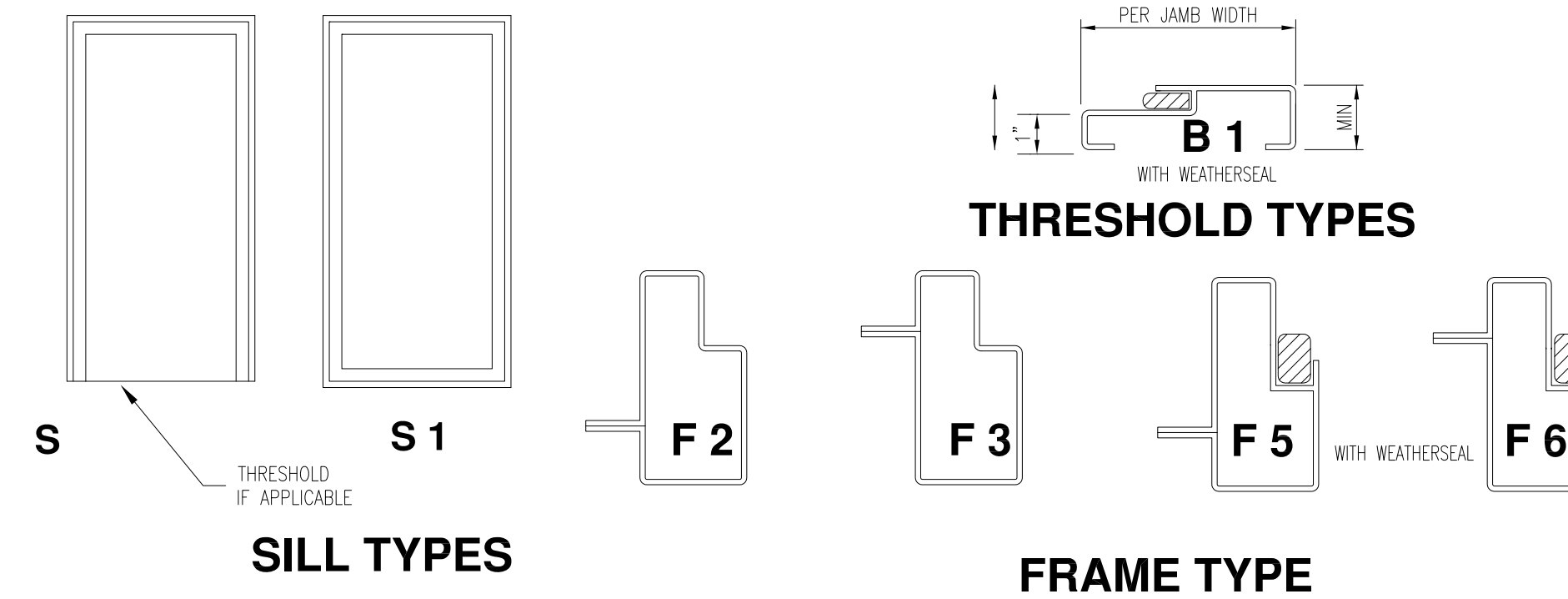
2ND DECK PLAN

INDICATES STIFFENER SIDE OF BULKHEAD



MAIN DECK PLAN

FRAMES										DOORS			HARDWARE			REMARKS				
LOCATION	# OF BHD. PANELS/THYS	ELEV.	HAND	FRM. TYPE	SILL TYPE	THRES. HOLD	MINIMUM CLEAR OPENING WIDTH	MINIMUM CLEAR OPENING HEIGHT	DOOR TYPE	CA. THICK.	LOUVER FRMS HEIGHT	FRAME OUTSIDE DIMENSING - NOT INCLUDING FRAME WIDTH	FRAME HEIGHT	LOCK	HINGE SEE NOTES		CLOSER	HOLD BACKS & STOPPERS	U.S.C.G. RATING	THERMAL INSULATION
<b>MAIN DECK</b>																				
A M01	FWD. PORT EXTERIOR	1		LH	--		2'-6"	5'-8"	QAWT											QAWT DOOR 72"x30" CLEAR OPENING, DWG #104, ALUMINUM
B M01	FWD. PORT INSIDE MAHOGANY	1		RHR	--		2'-6"	5'-8"						YES	YES	YES				PLEXIGLASS 18" X 24" WINDOW, SEE GENERAL NOTES
A M02	FWD. STBD. EXTERIOR	1		RH	--		2'-6"	5'-8"	QAWT											QAWT DOOR 72"x30" CLEAR OPENING, DWG #104, ALUMINUM
B M02	FWD. STBD. INSIDE MAHOGANY	1		LHR	--		2'-6"	5'-8"						YES	YES	YES				PLEXIGLASS 18" X 24" WINDOW, SEE GENERAL NOTES
A M03	AFT. STBD. EXTERIOR	1		RH	--		2'-6"	5'-8"	QAWT											QAWT DOOR 72"x30" CLEAR OPENING, DWG #104, ALUMINUM
B M03	AFT. STBD. INSIDE MAHOGANY	1		LHR	--		2'-6"	5'-8"						YES	YES	YES				PLEXIGLASS 18" X 24" WINDOW, SEE GENERAL NOTES
M04	ENGINE ROOM STAIRS	1		RHR	F6	S B1	2'-4"	6'-8"	F					YES	YES	YES	YES			SEE GENERAL NOTES, VAPOR PROOF SEAL, MINERAL WOOL INSUL
M05	2ND DECK STAIRS	1		LHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
M06	PANTRY	1		LHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
M07	LOCKER	1		LHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
M08	HEAD	1		RHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
M09	E.R. EXHAUST AND VENTILATION	1		LHR	F6	S B1	2'-4"	6'-8"	F					YES	YES	YES	YES			SEE GENERAL NOTES, VAPOR PROOF SEAL, MINERAL WOOL INSUL.
<b>2ND DECK</b>																				
201	FWD. PORT EXTERIOR	1		LHR	F6	S1	2'-4"	6'-0"	WHT					YES	YES	YES	YES			SEE GENERAL NOTES, FIBERGLASS INSULATION, W/ LITE & DOGS
202	FWD. STBD. EXTERIOR	1		RHR	F6	S1	2'-4"	6'-0"	WHT					YES	YES	YES	YES			SEE GENERAL NOTES, FIBERGLASS INSULATION, W/ LITE & DOGS
203	CAPTAIN STATEROOM	1		RHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
204	CREW STATEROOM	1		LHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
205	PILOT HOUSE STAIRS	1		LHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
206	HEAD	1		RHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
207	SHOWER	1		LHR	F3	S	2'-4"	6'-8"	F					YES	YES	YES				SEE GENERAL NOTES
<b>3RD DECK</b>																				
301	FWD. PORT EXTERIOR	1		LH	F6	S1	2'-4"	6'-0"	WHT					YES	YES	YES	YES			SEE GENERAL NOTES, FIBERGLASS INSULATION, W/ LITE & DOGS
302	FWD. STBD. EXTERIOR	1		RH	F6	S1	2'-4"	6'-0"	WHT					YES	YES	YES	YES			SEE GENERAL NOTES, FIBERGLASS INSULATION, W/ LITE & DOGS



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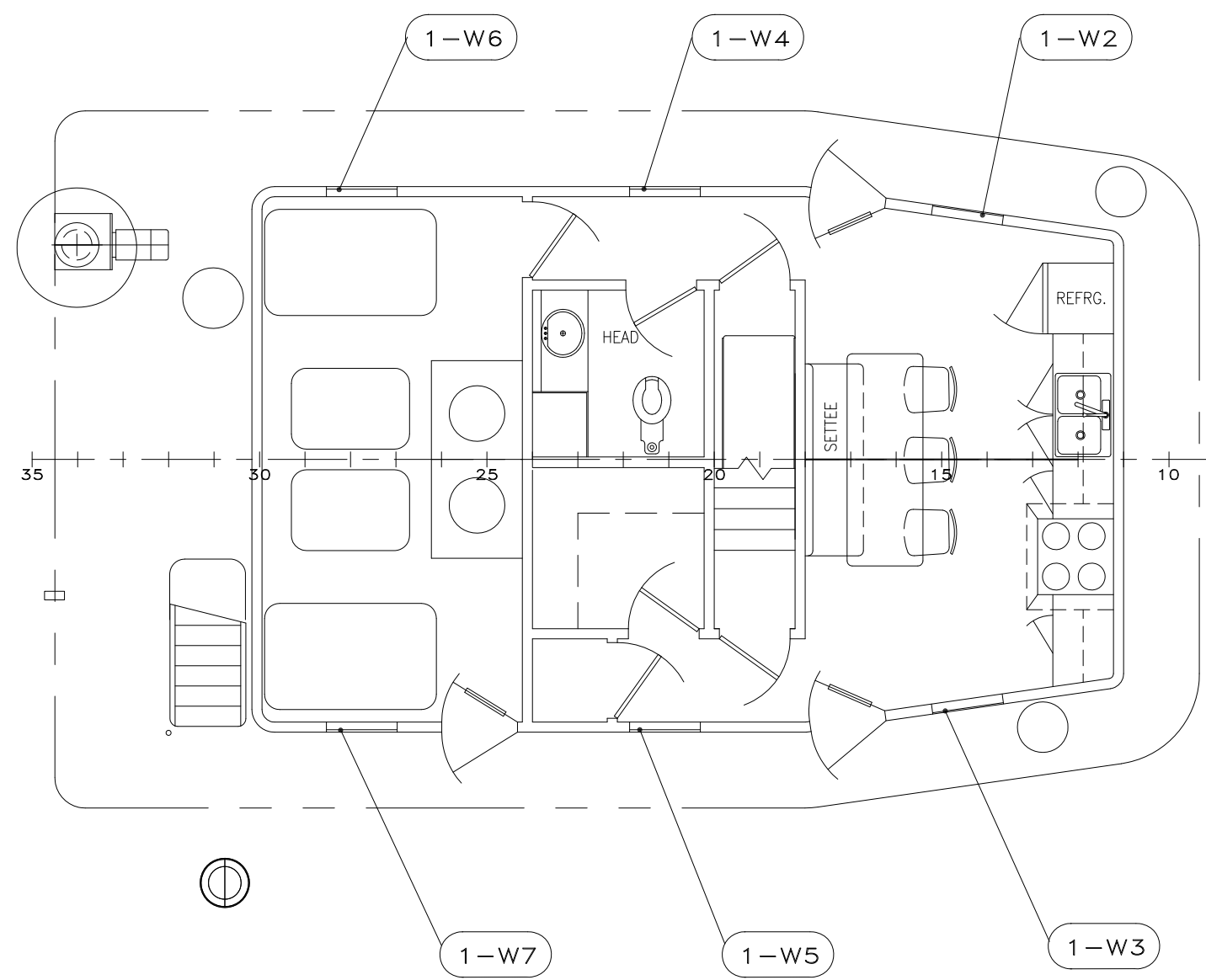
Phone: (904) 599-3673  
 Fax: (904) 599-1522  
 Info@dejongandlebet.com

Title: 70.5 x 30 x 11" NCDOT TOWBOAT

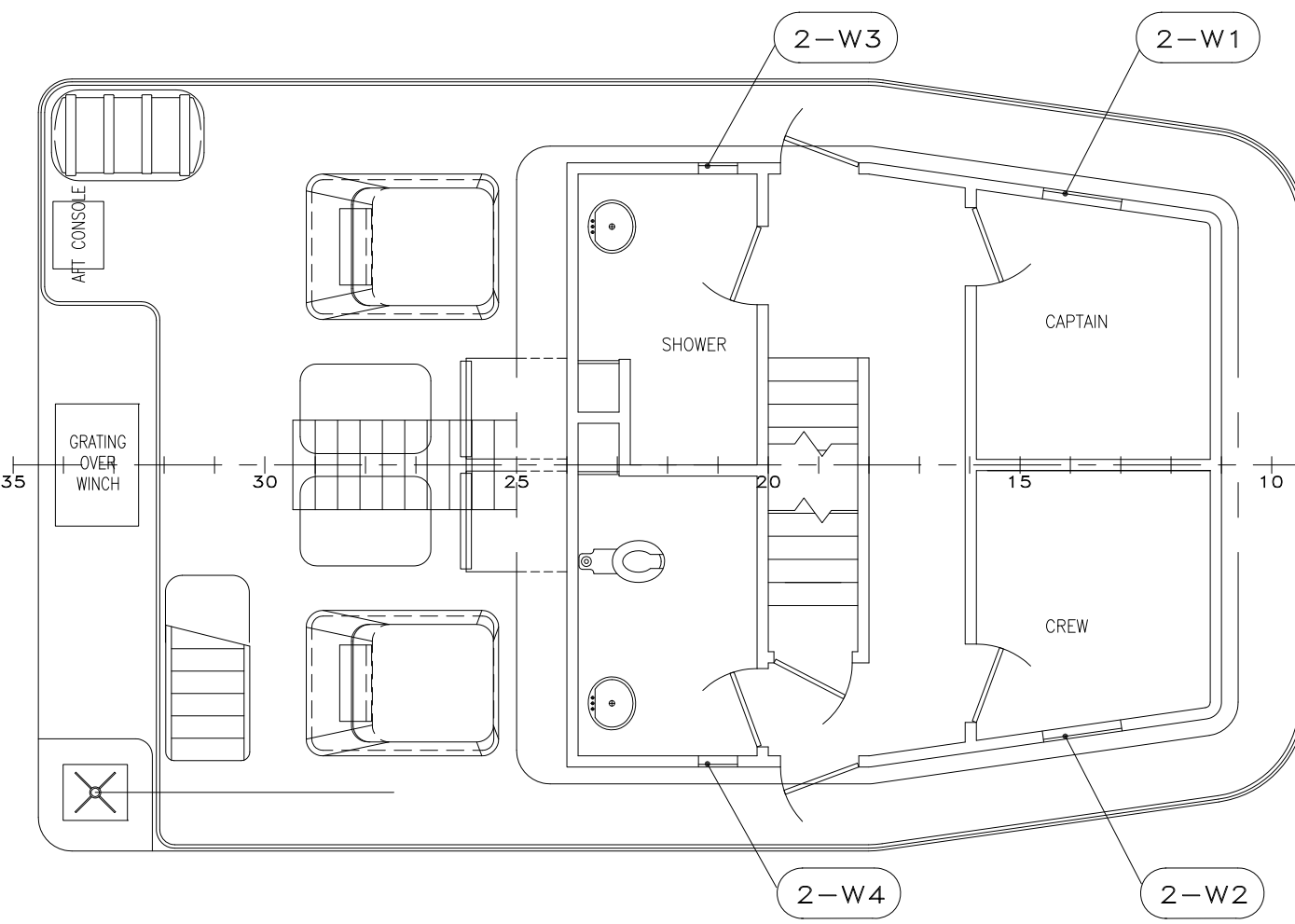
**DOOR SCHEDULE**

Dwg. No. 17-1372-624  
 Alt. No. 0  
 Sht. 1 of 1

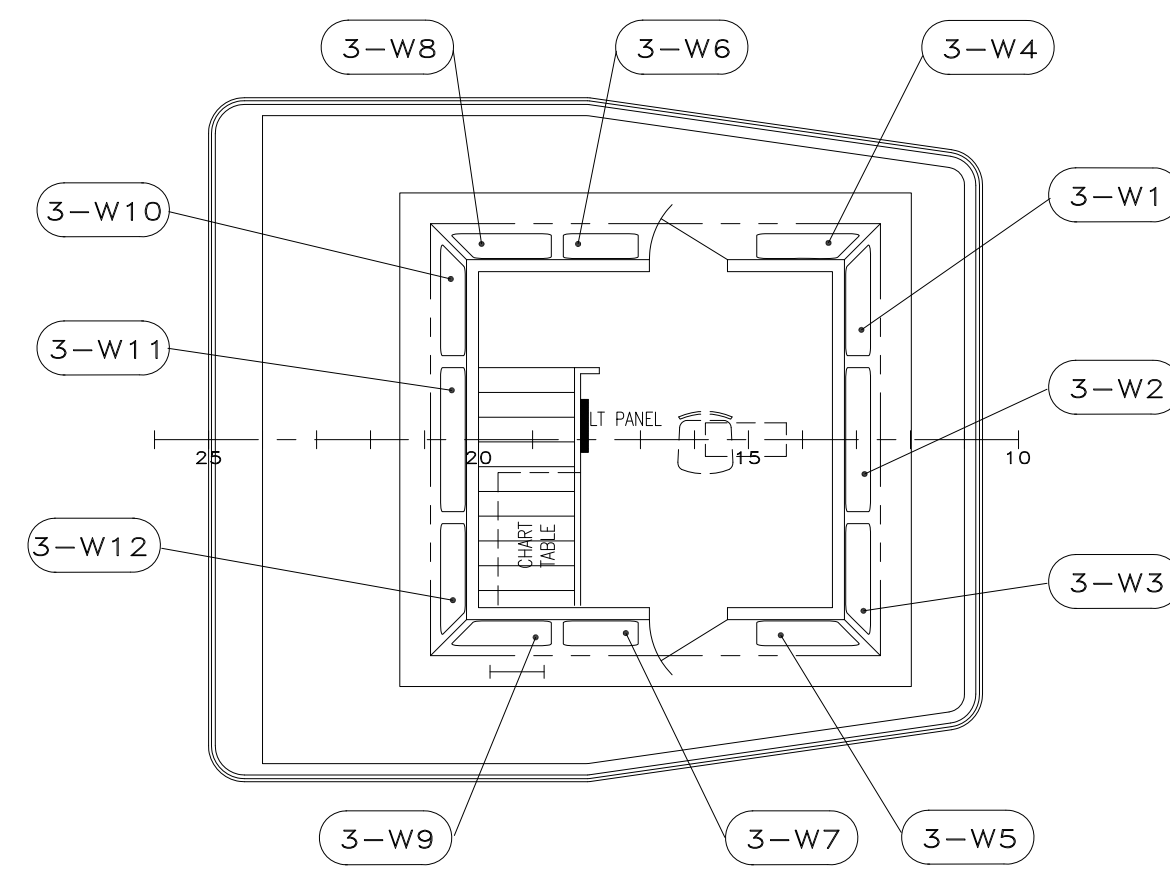
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 App'd By: Scale: NOT TO SCALE  
 ABS App'l: USCG App'l:



MAIN DECK PLAN



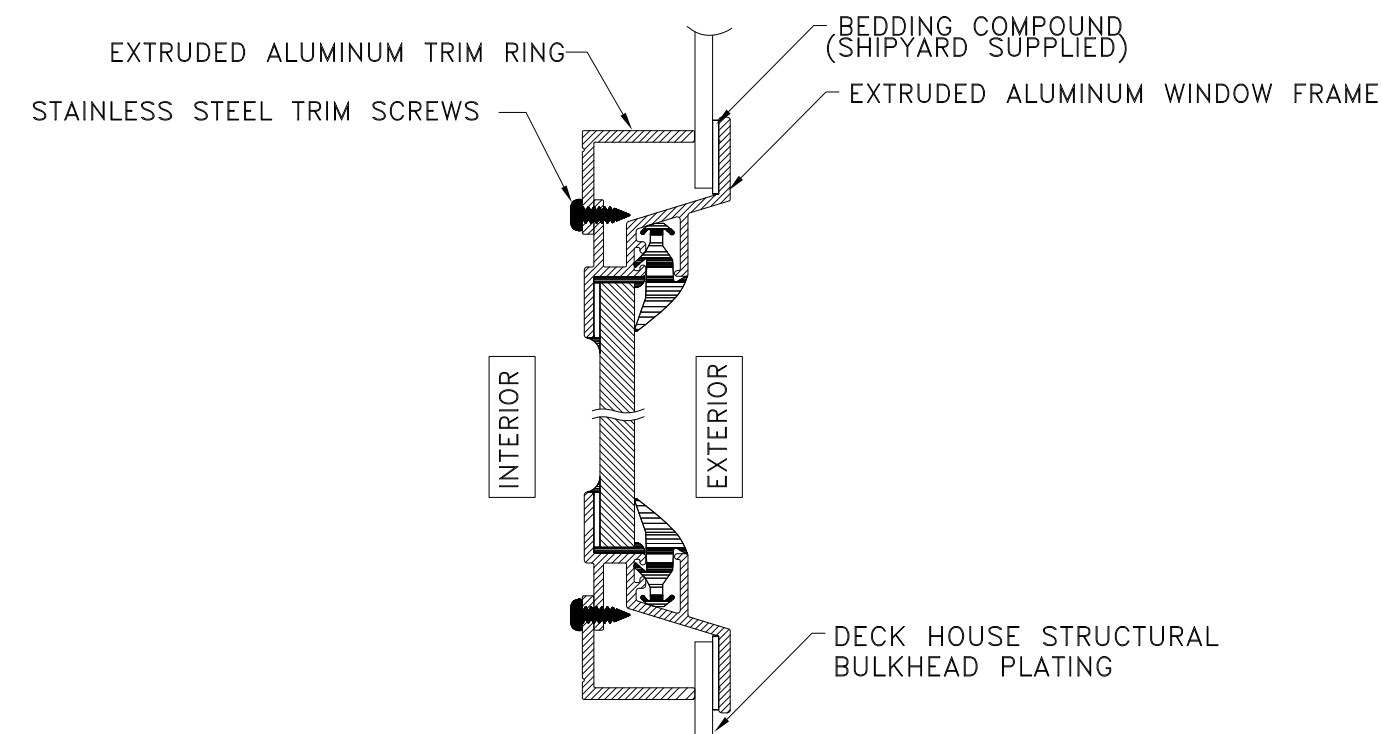
2ND DECK PLAN



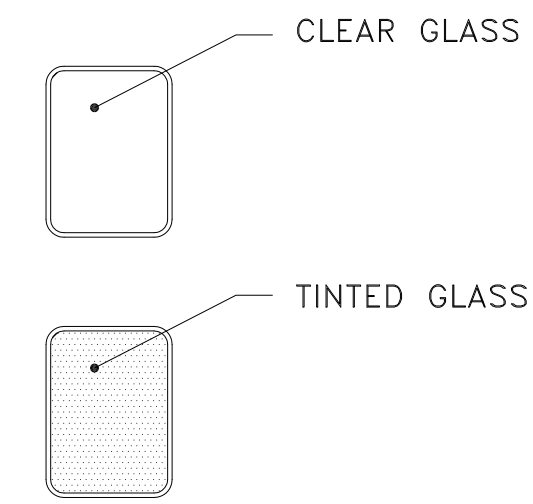
3RD DECK PLAN

WINDOW SCHEDULE

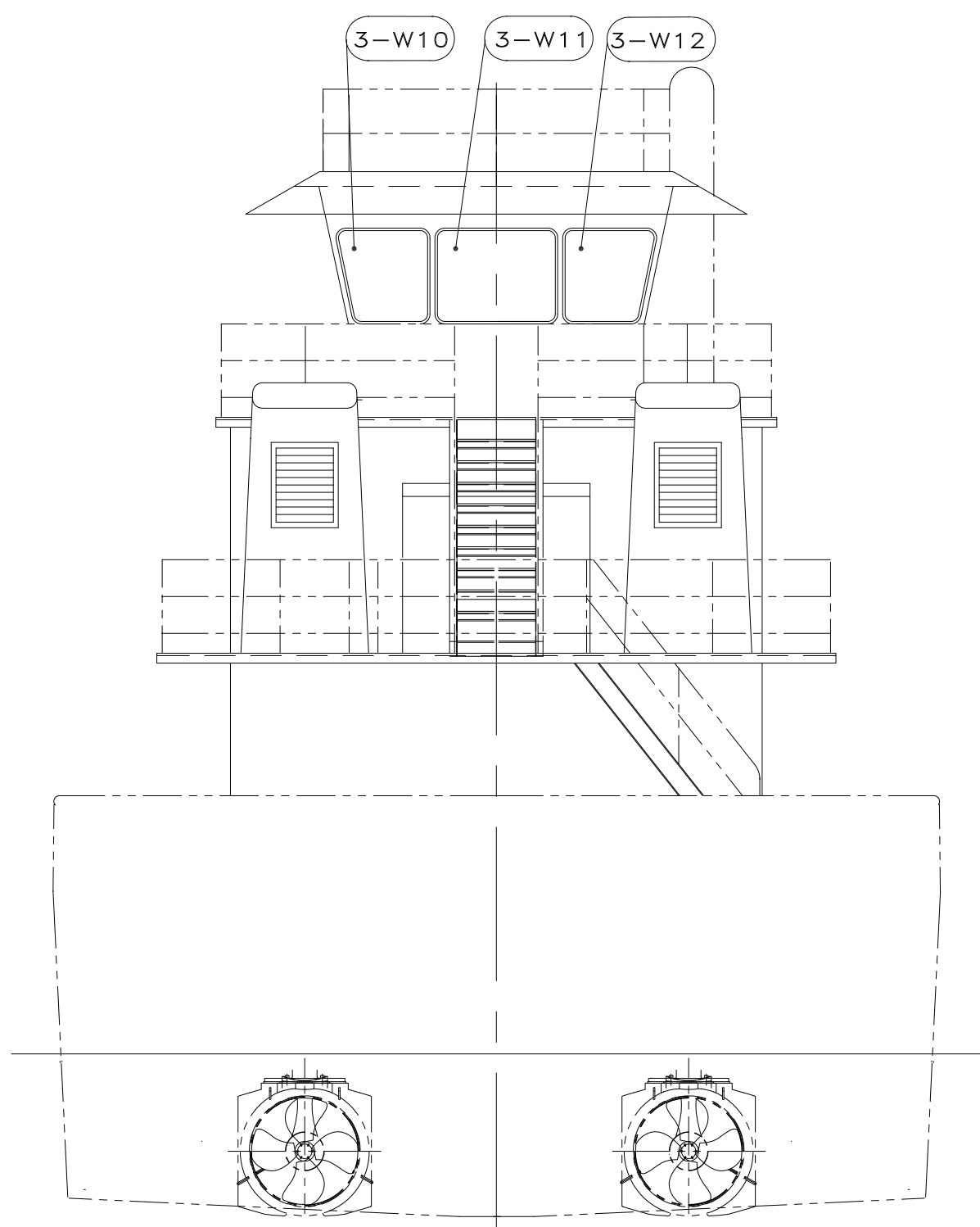
MAIN DECK								
ITEM	NOMINAL SIZE (WXH)	DESCRIPTION	DECK	LOCATION	THICKNESS	CORNER RAD.	FRAME MATERIAL	REMARKS
1-W1								REMOVED
1-W2	28"x38"	WINDOW, VERTICAL SLIDING, CLAMP-IN	MAIN	GALLEY, PORT SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
1-W3	28"x38"	WINDOW, VERTICAL SLIDING, CLAMP-IN	MAIN	GALLEY, STBD SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
1-W4	28"x38"	WINDOW, FIXED, CLAMP-IN	MAIN	PASSAGEWAY, PORT SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
1-W5	28"x38"	WINDOW, FIXED, CLAMP-IN	MAIN	PASSAGEWAY, STBD SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
1-W6	28"x38"	WINDOW, FIXED, CLAMP-IN	MAIN	MACHINERY SPACE, PORT SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
1-W7	28"x38"	WINDOW, FIXED, CLAMP-IN	MAIN	MACHINERY SPACE, STBD SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
2ND DECK								
2-W1	28"x38"	WINDOW, VERTICAL SLIDING, CLAMP-IN	2ND	STATEROOM, PORT SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
2-W2	28"x38"	WINDOW, VERTICAL SLIDING, CLAMP-IN	2ND	STATEROOM, STBD SIDE	1/4"	4"	POWDER COATED ALUMINUM	TINTED GLASS
2-W3	#12"	PORTLIGHT, WELD-IN W/ DEADLIGHT	2ND	SHOWER, PORT SIDE	3/4"	-	ALUMINUM	TINTED GLASS
2-W4	#12"	PORTLIGHT, WELD-IN W/ DEADLIGHT	2ND	HEAD, STBD SIDE	3/4"	-	ALUMINUM	TINTED GLASS
3RD DECK								
3-W1	37.5" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	FWD PILOT HOUSE, PORT	5/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W2	37.5" X 48"	WINDOW, FIXED, CLAMP-IN	3RD	FWD PILOT HOUSE, CENTER	5/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W3	37.5" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	FWD PILOT HOUSE, STBD	5/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W4	35" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	PORT SIDE PH FWD	3/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W5	35" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	STBD SIDE PH FWD	3/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W6	35" X 40.75"	WINDOW, VERTICAL SLIDING, CLAMP-IN	3RD	PORT SIDE PH CENTER	1/4"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W7	35" X 40.75"	WINDOW, VERTICAL SLIDING, CLAMP-IN	3RD	STBD SIDE PH CENTER	1/4"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W8	35" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	PORT SIDE PH AFT	3/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W9	35" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	STBD SIDE PH AFT	3/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W10	37.5" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	AFT PILOT HOUSE, PORT	3/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W11	37.5" X 48"	WINDOW, FIXED, CLAMP-IN	3RD	AFT PILOT HOUSE, CENTER	3/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS
3-W12	37.5" X 40.75"	WINDOW, FIXED, CLAMP-IN	3RD	AFT PILOT HOUSE, STBD	3/8"	4"	POWDER COATED ALUMINUM	CLEAR GLASS



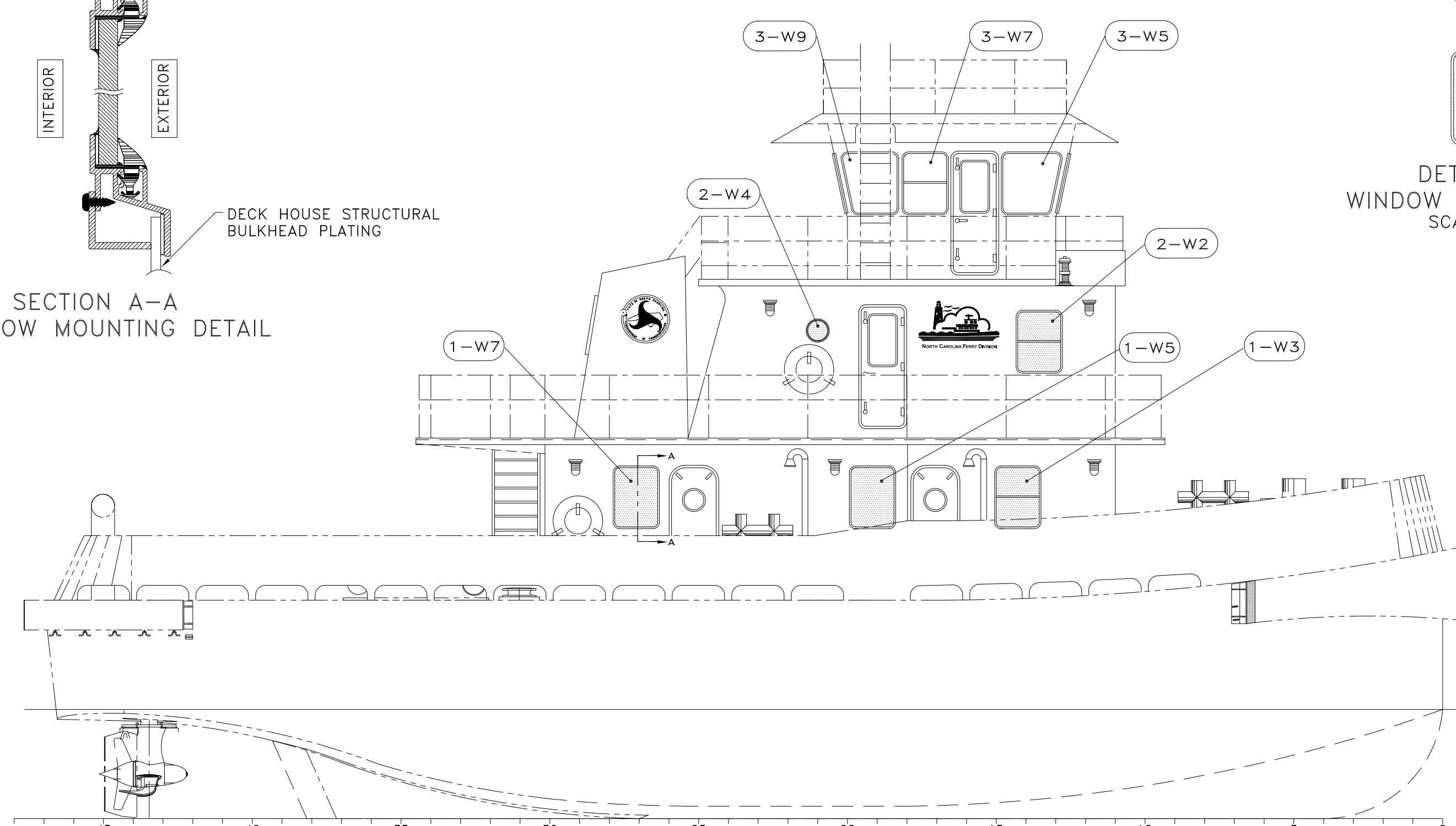
SECTION A-A WINDOW MOUNTING DETAIL



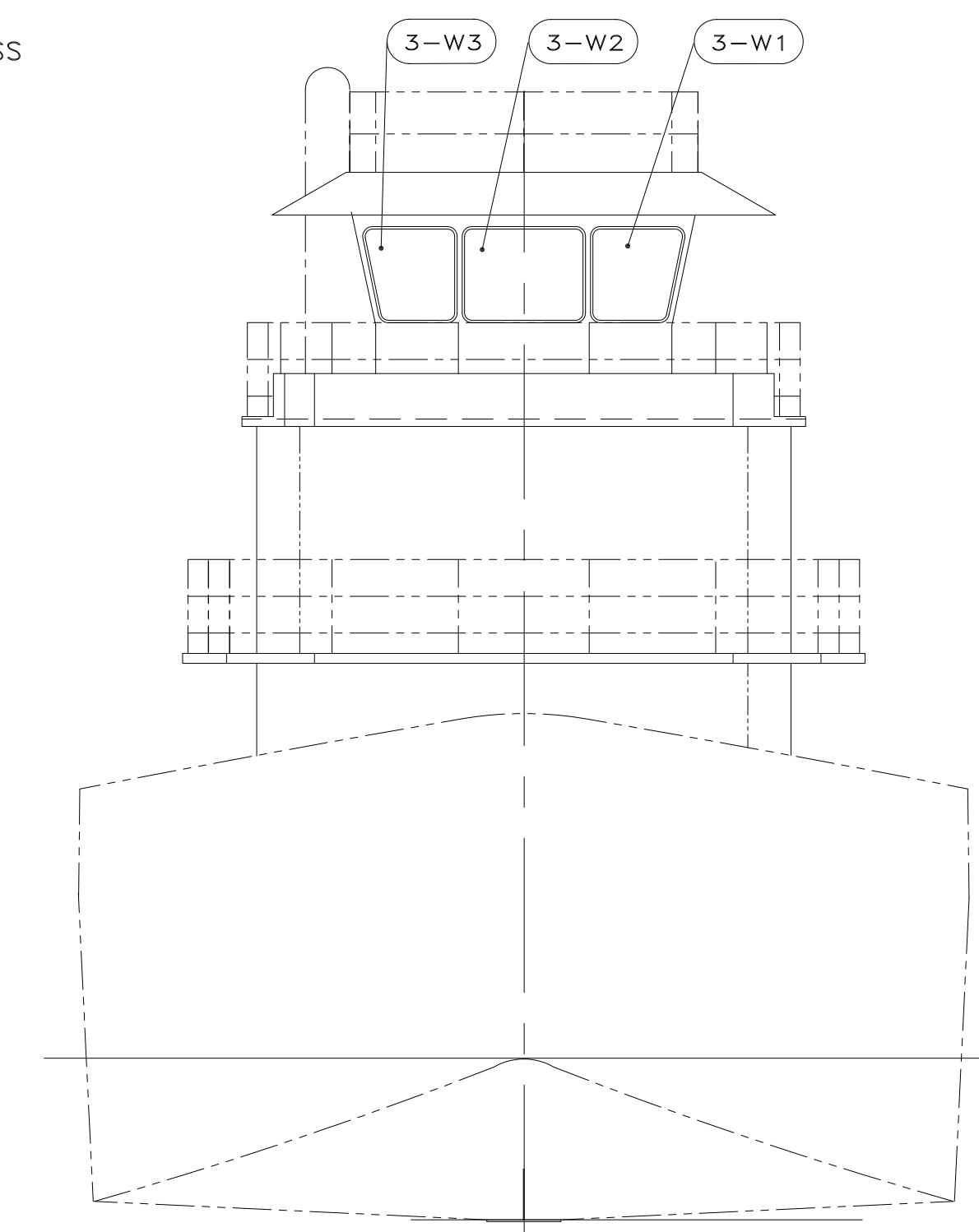
DETAIL 1-1 WINDOW TINT LEGEND SCALE: NONE



STERN LOOKING FWD



PROFILE



BOW LOOKING AFT

GENERAL NOTES

NO.	DESCRIPTION
1.0	VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 46 CFR SUBCHAPTER M
2.0	ALL GLASS SHALL BE TEMPERED SAFETY GLASS
3.0	WINDOW SIZES TO BE VERIFIED WITH LOFTED PLATE CUT OUTS
4.0	SEE DETAIL 1-1 FOR WINDOW TINTING LEGEND

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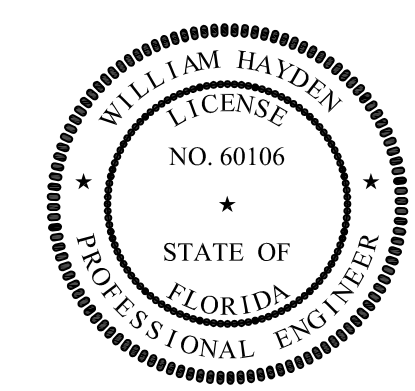
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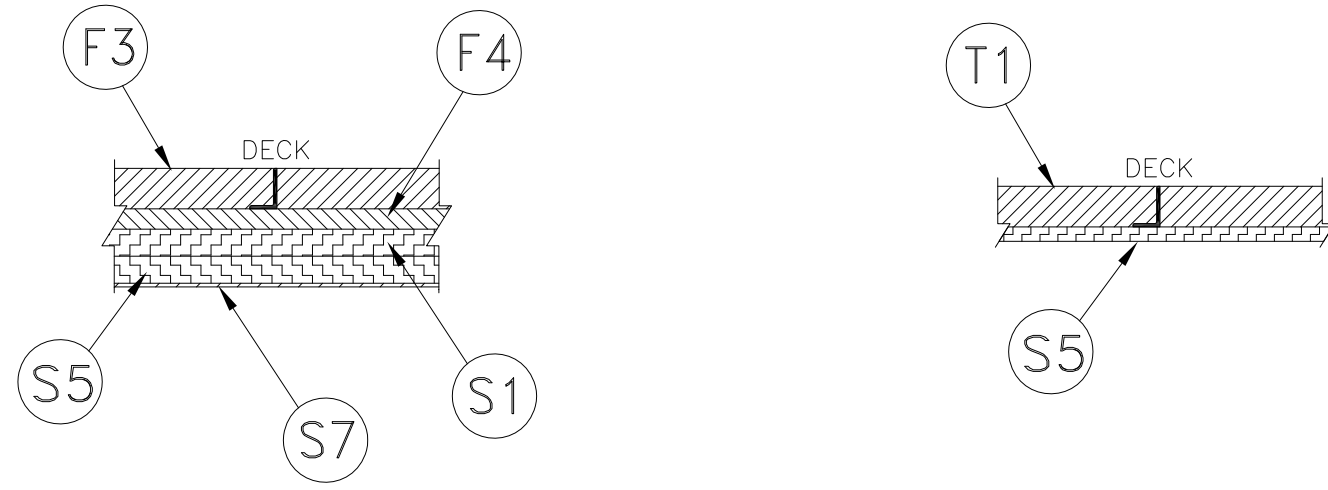
**WINDOW SCHEDULE**

Dwg. No. 17-1372-625 Alt. No. 1  
 Sht. 1 of 1

Drawn By: JAH Date: JUNE 05, 2018  
 Checked By: Date:  
 App'd By: Scale: 2/16" = 1'-0"  
 ABS App'l: USCG App'l:





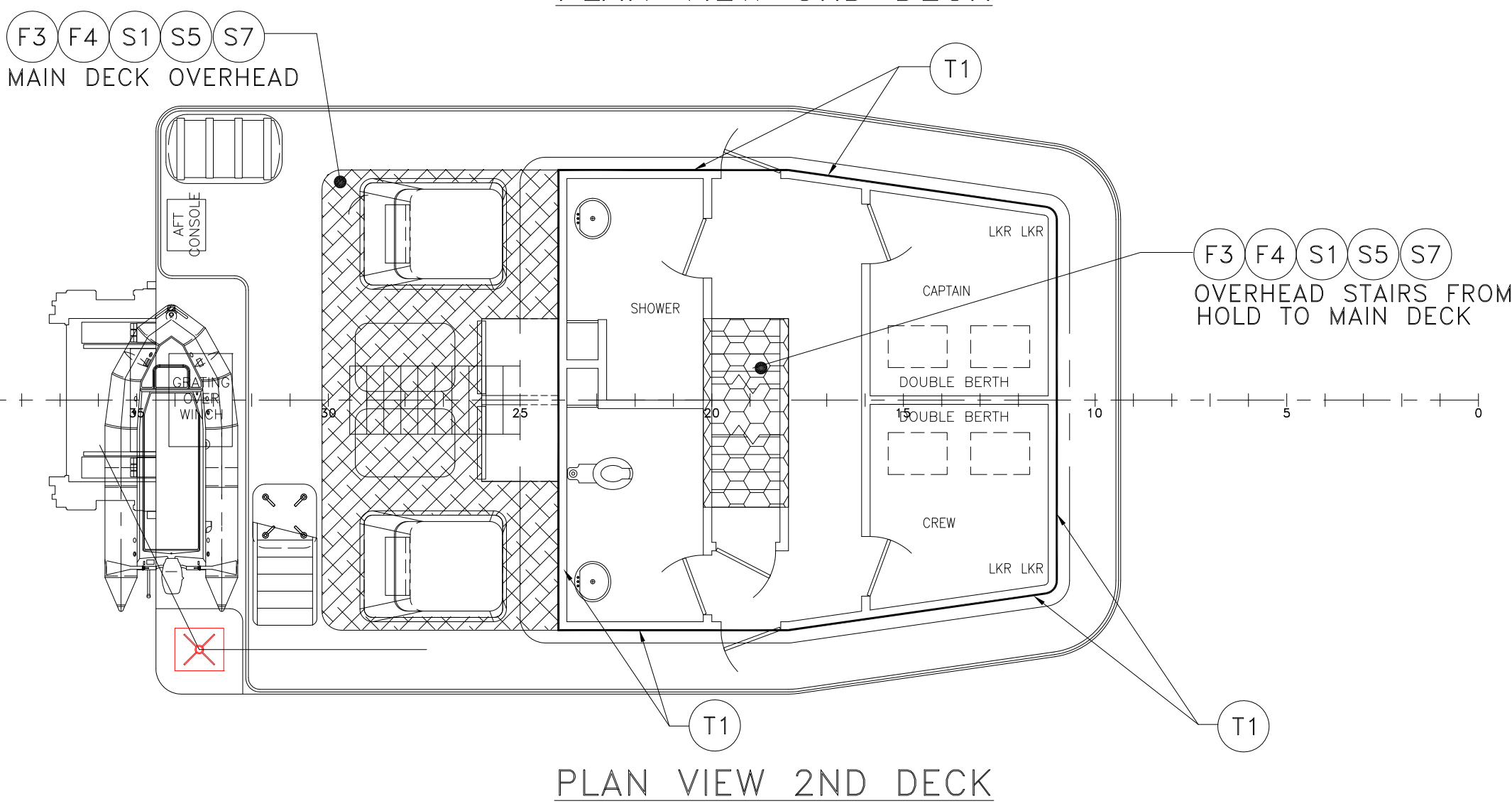
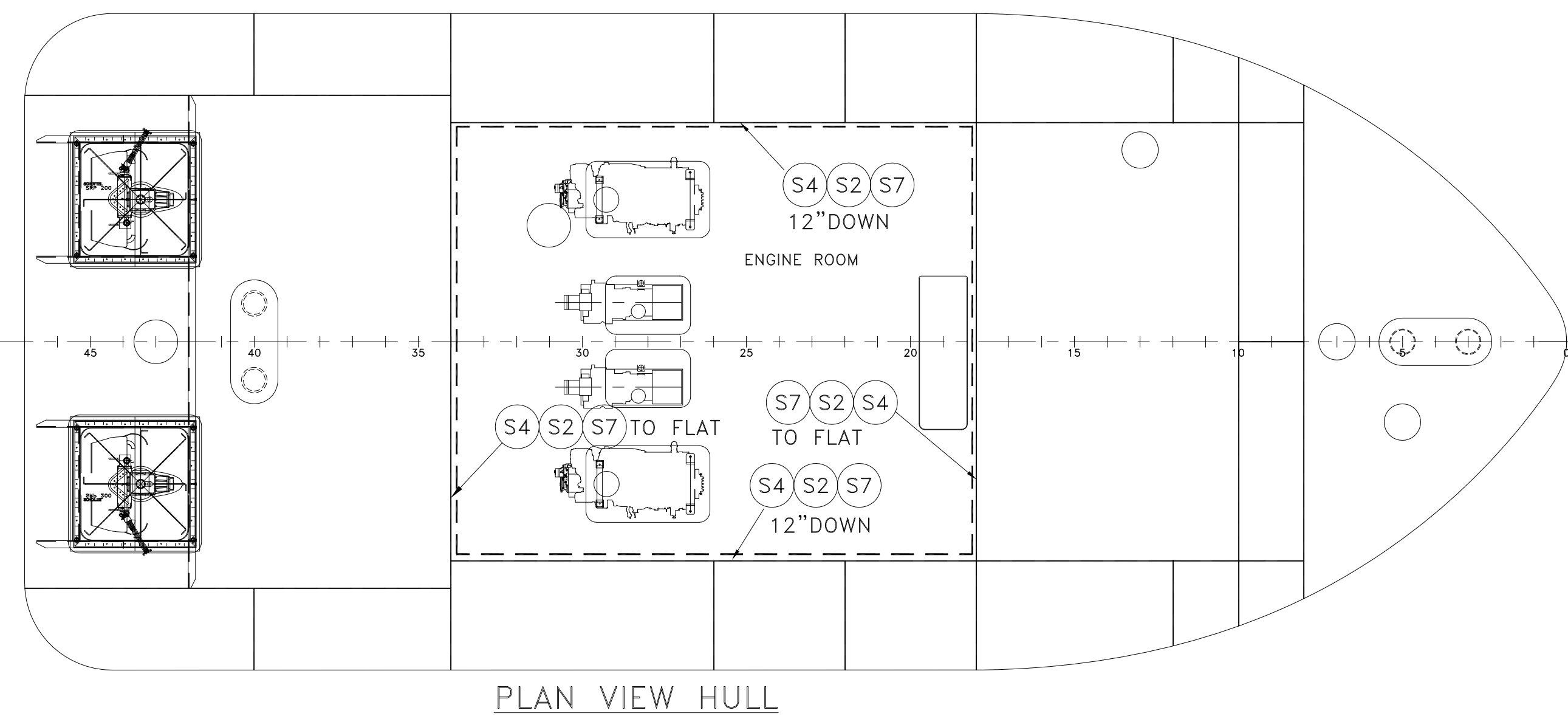
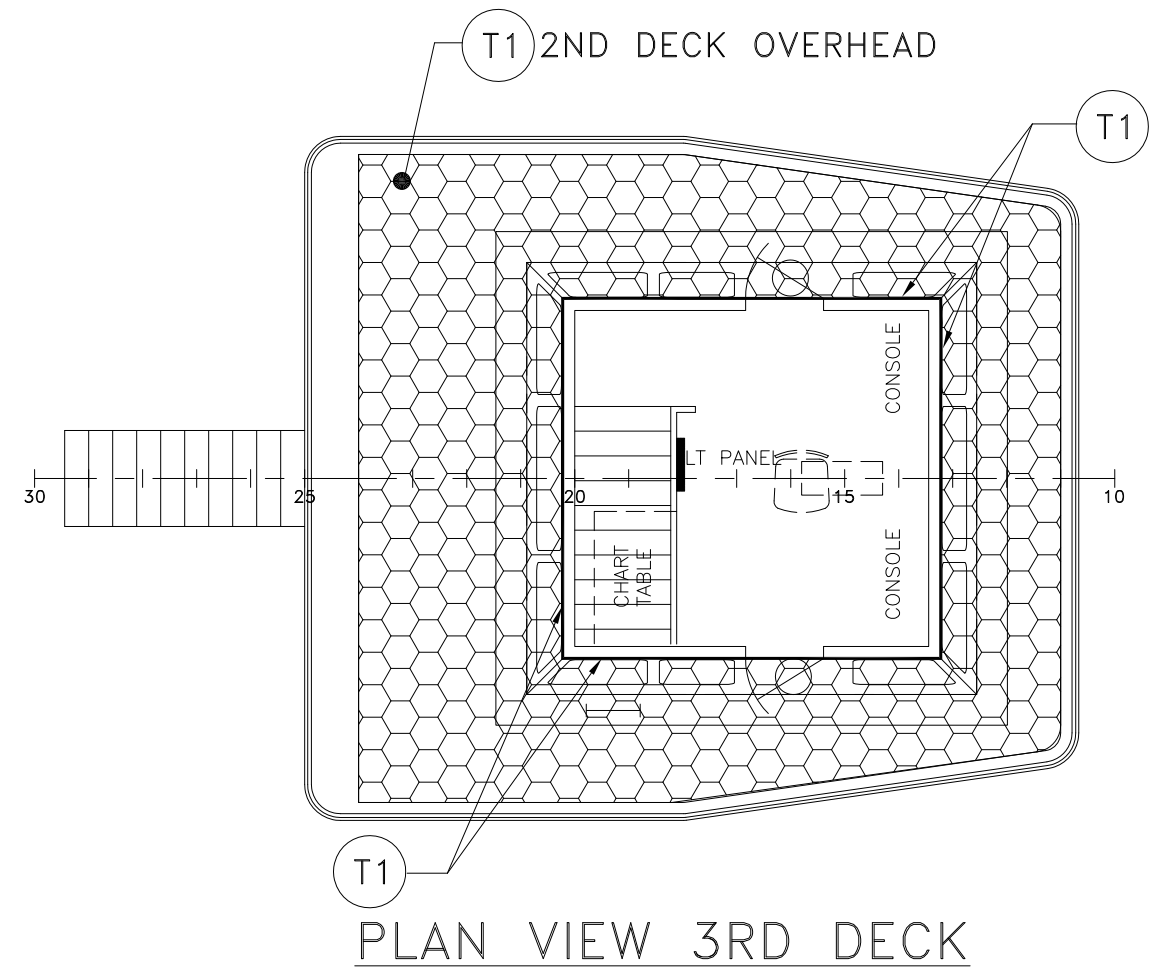
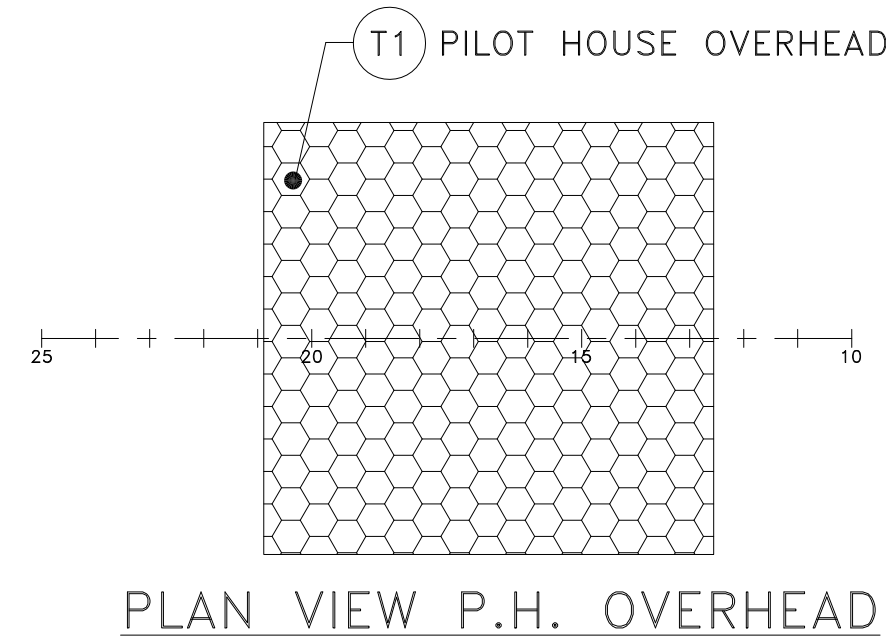
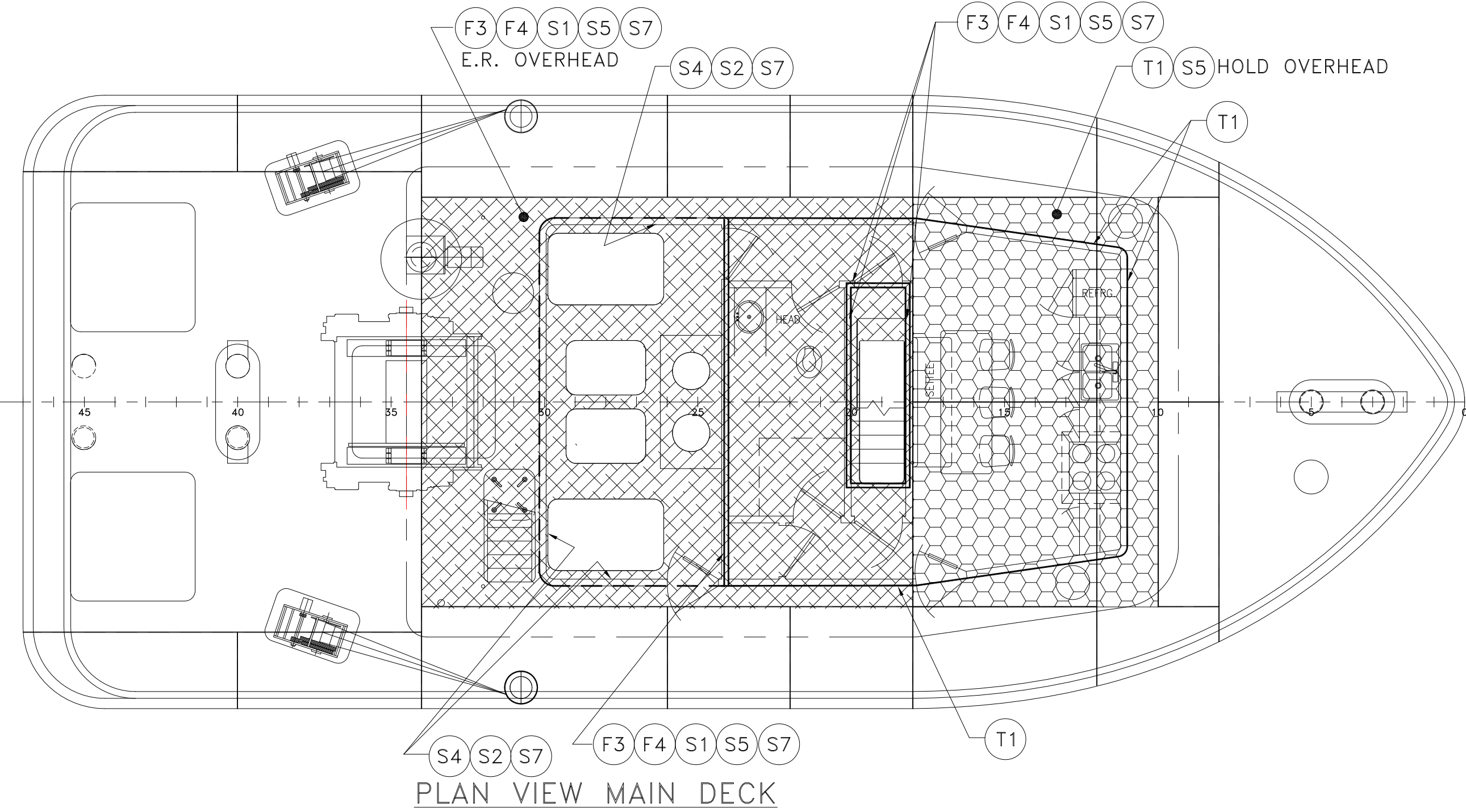


OVERHEAD INSULATION FOR ENGINE SPACE (A-60)

OVERHEAD INSULATION FOR FWD VOID OVERHEAD

### LEGEND

	FIRE INSULATION (BULKHEADS)	F
	SOUND INSULATION (BULKHEADS)	S
	FIRE & SOUND INSULATION (BULKHEADS)	
	THERMAL INSULATION (BULKHEADS)	T



### BILL OF MATERIALS

SYMBOL	DESCRIPTION
	FIRE INSULATION / A-60 ( ALL TO MEET U.S.C.G. 164.007 REQUIREMENTS EXCEPT (F2) WHICH IS TO MEET U.S.C.G. 164.008 REQUIREMENT )
(F2)	THERMAX / 3/4" THICK FIRE SHEATHING. (OR EQUAL) B-15 PANEL.
(F3)	3" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD.
(F4)	1-1/2" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD WITH LEAD FACING.
(F5)	1-1/2" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD WITH FIBERGLASS CLOTH FACING.
(F6)	3" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD WITH FIBERGLASS CLOTH FACING.
(F7)	1-1/2" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD.
(F8)	1-1/2" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD WITH MYLAR FACING.
(F10)	3" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD WITH MYLAR FACING.
(F11)	2" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD.
(F12)	1" THICK 8.0 P.C.F. DELTA MARINE MINERAL WOOL MARINE BOARD.
	SOUND INSULATION ( TO MEET U.S.C.G. 164.009 REQUIREMENTS )
(S1)	2" THICK 2.9 P.C.F. "JOHNS MANVILLE" HULLBOARD.
(S2)	2" THICK 2.9 P.C.F. "JOHNS MANVILLE" HULLBOARD WITH MYLAR FACING.
(S3)	2" THICK 2.9 P.C.F. "JOHNS MANVILLE" HULLBOARD WITH GROOVED SURFACE & PERFORATED FIBERGLASS FACING.
(S4)	2" THICK 2.9 P.C.F. "JOHNS MANVILLE" HULLBOARD WITH LEAD FACING.
(S5)	1" THICK 2.9 P.C.F. "JOHNS MANVILLE" HULLBOARD WITH MYLAR FACING.
(S6)	1" THICK 2.9 P.C.F. "JOHNS MANVILLE" HULLBOARD.
(S7)	18 GAGE PERFORATED ALUMINUM SHEET
	THERMAL INSULATION ( TO MEET U.S.C.G. 164.009 REQUIREMENTS )
(T1)	3" THICK UNFACED MINERAL WOOL INSULATION 2.5 P.C.F., "JOHNS MANVILLE" OR EQUAL

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70.5'x30'x11' NCDOT TOWBOAT  
INSULATION SCHEDULE:  
THERMAL, ACCOUSTIC &  
FIRE MAIN & HOLD DECKS

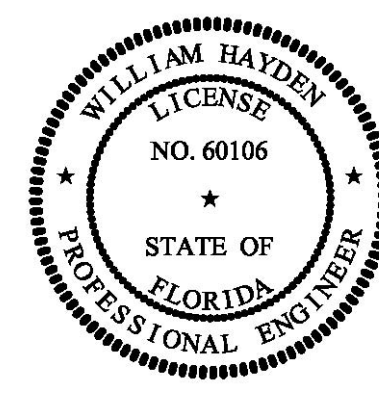
Dwg. No. 17-1372-635 Alt. No. 0 Sh. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018

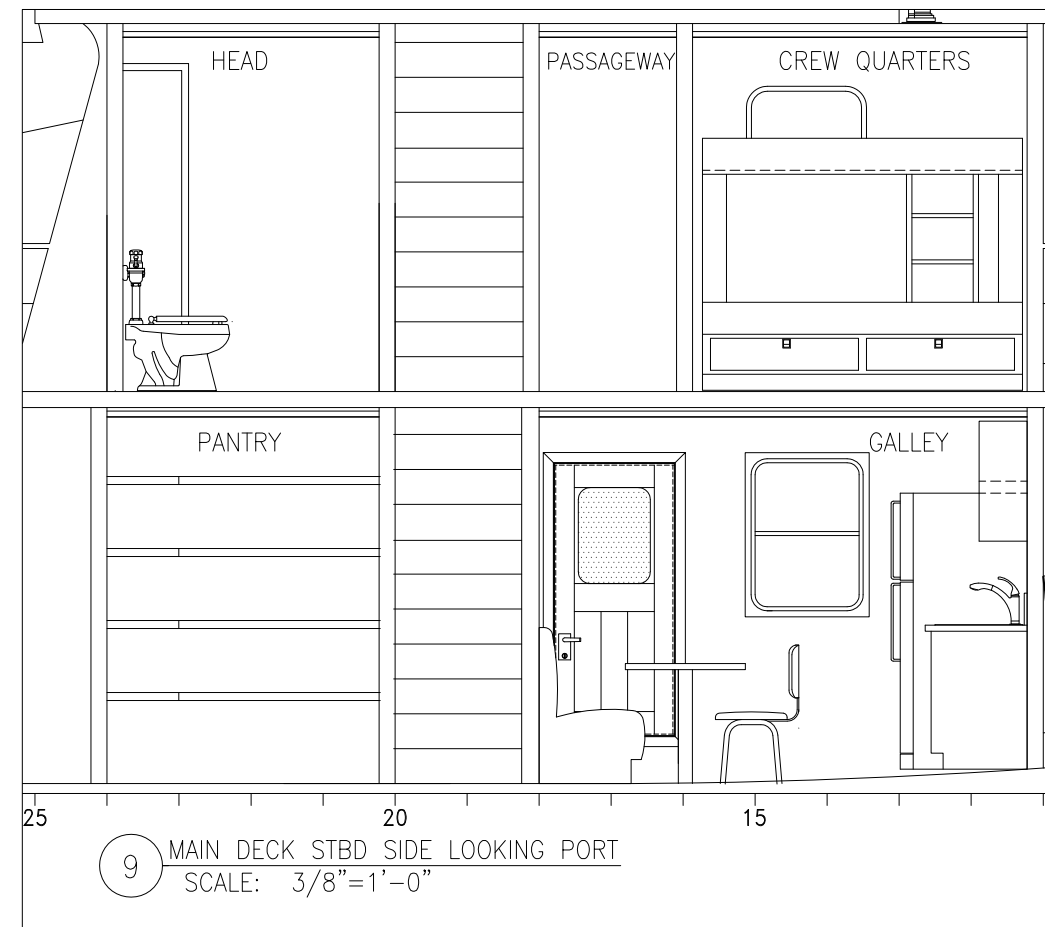
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App'd By: \_\_\_\_\_ Scale: 1/4" = 1'-0"

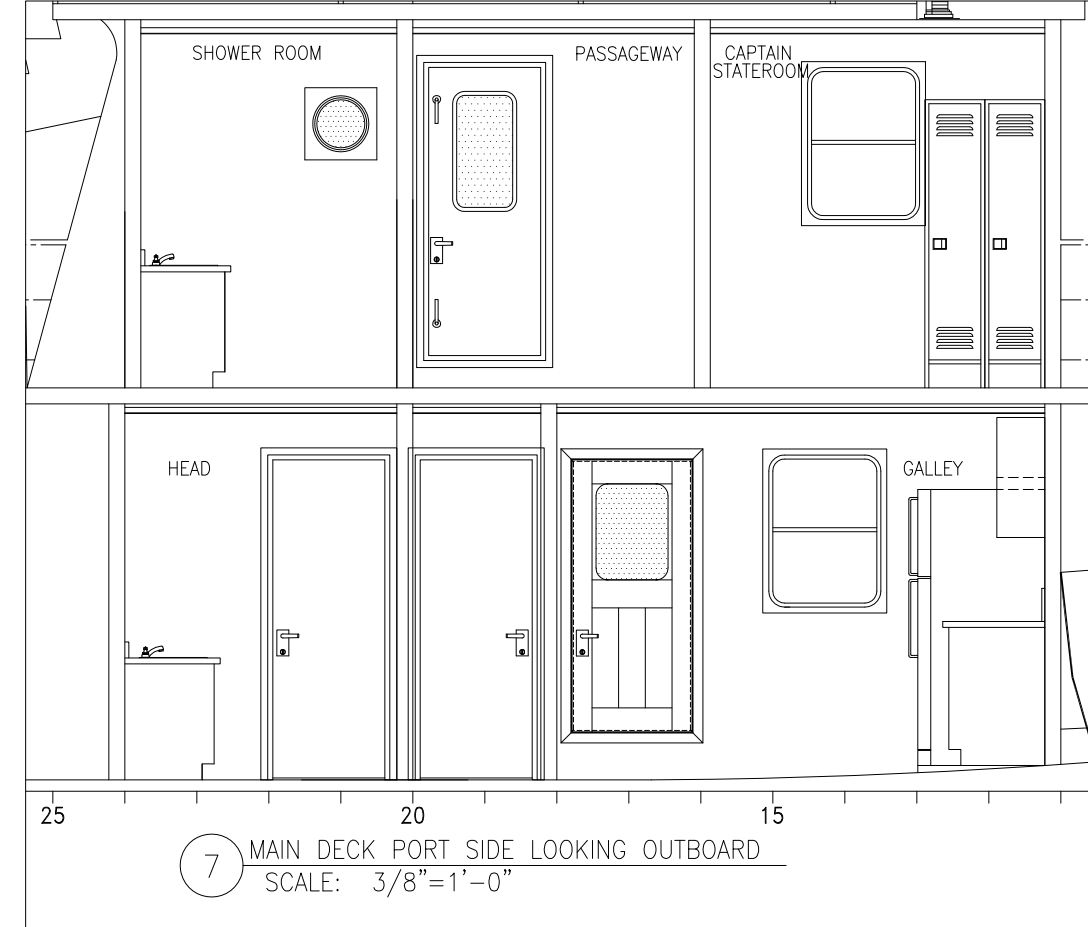
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_



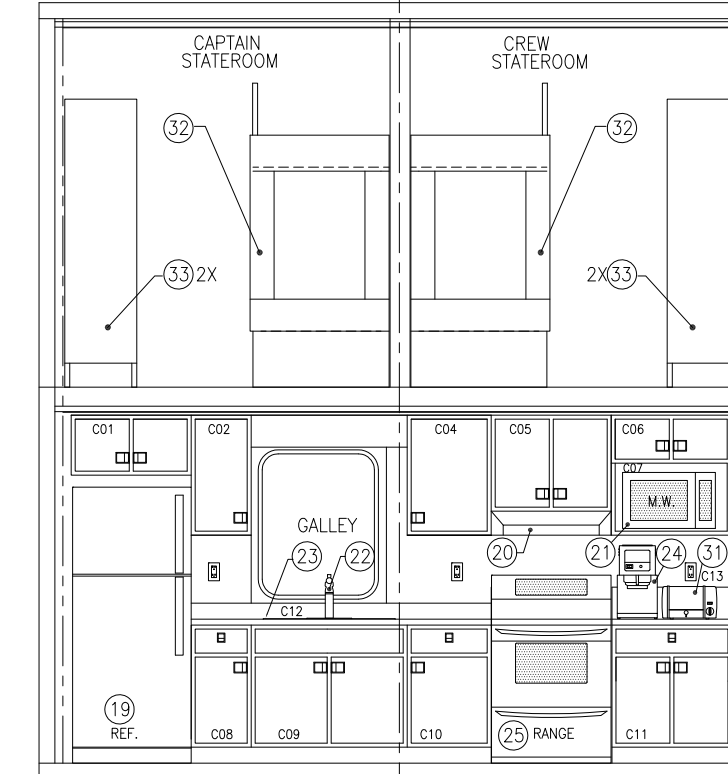
8 2ND DECK STBD SIDE LOOKING PORT  
SCALE: 1/4"=1'-0"



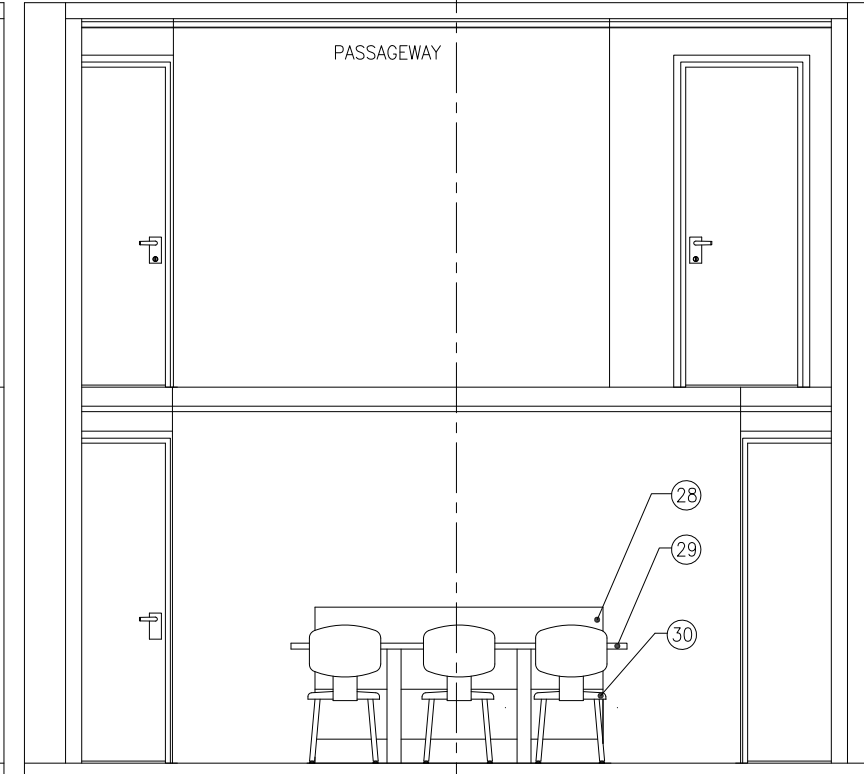
10 2ND DECK PORT SIDE LOOKING OUTBOARD  
SCALE: 1/4"=1'-0"



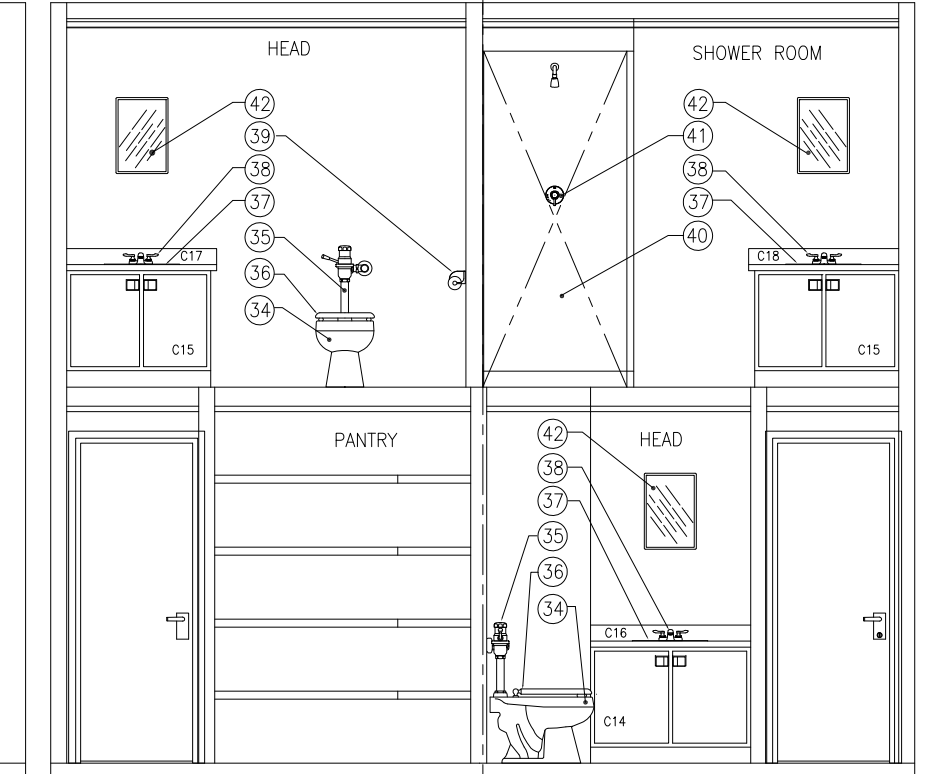
2 2ND DECK STATEROOMS FWD ELEVATION  
SCALE: 3/8"=1'-0"



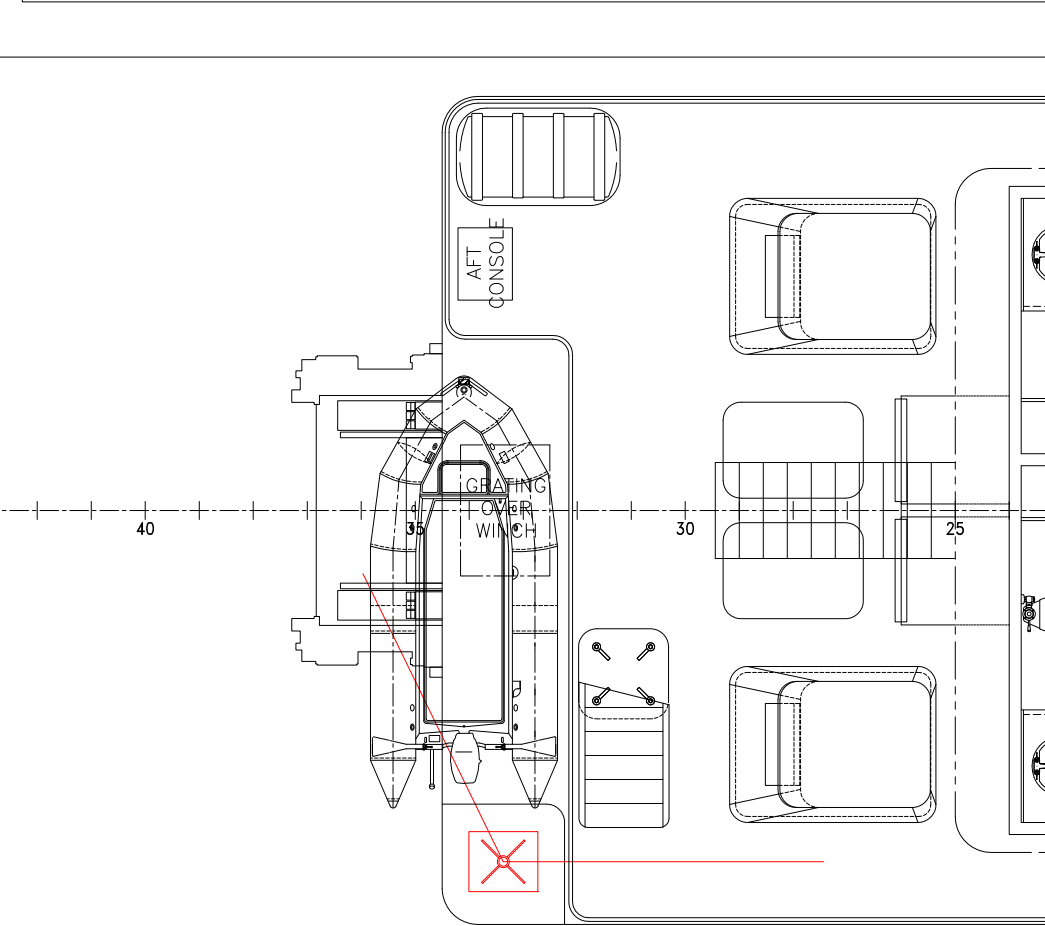
4 2ND DECK FRAME 17 LOOKING AFT  
SCALE: 3/8"=1'-0"



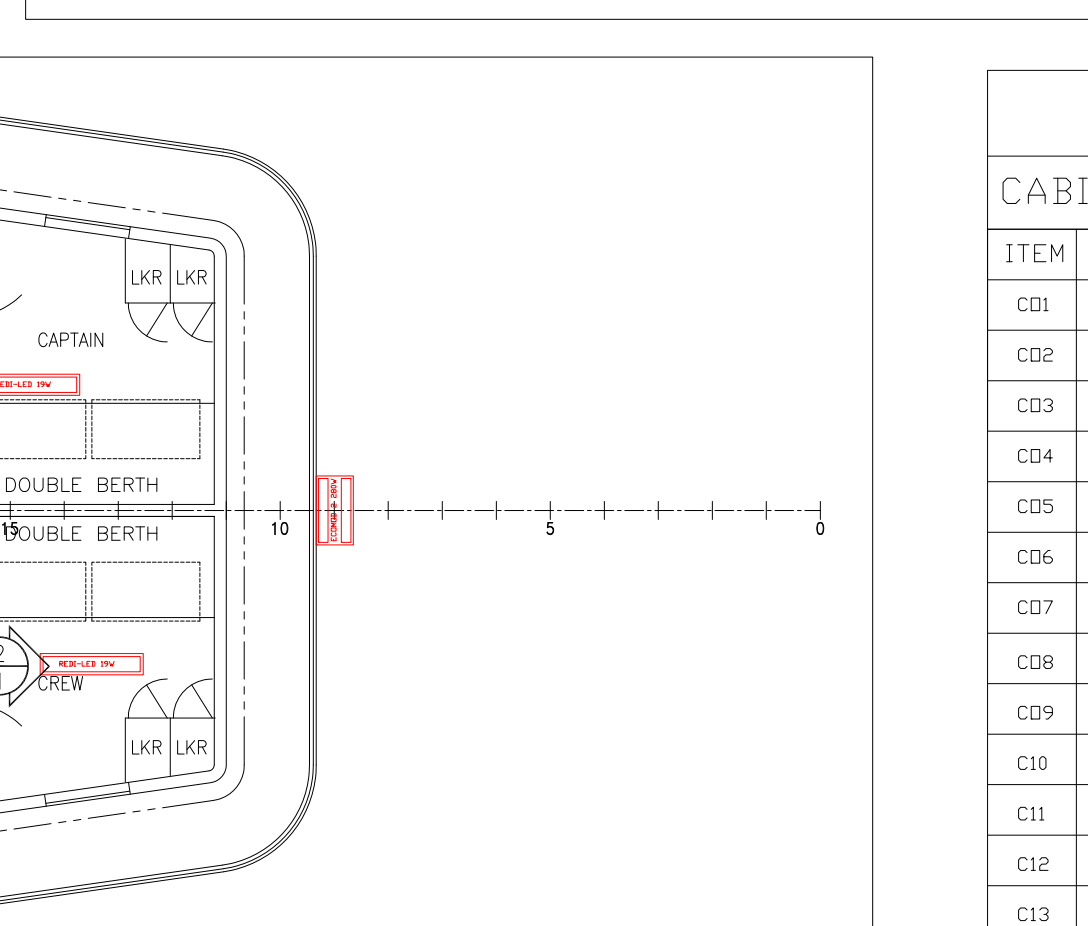
6 2ND DECK FRAME 21 LOOKING AFT  
SCALE: 3/8"=1'-0"



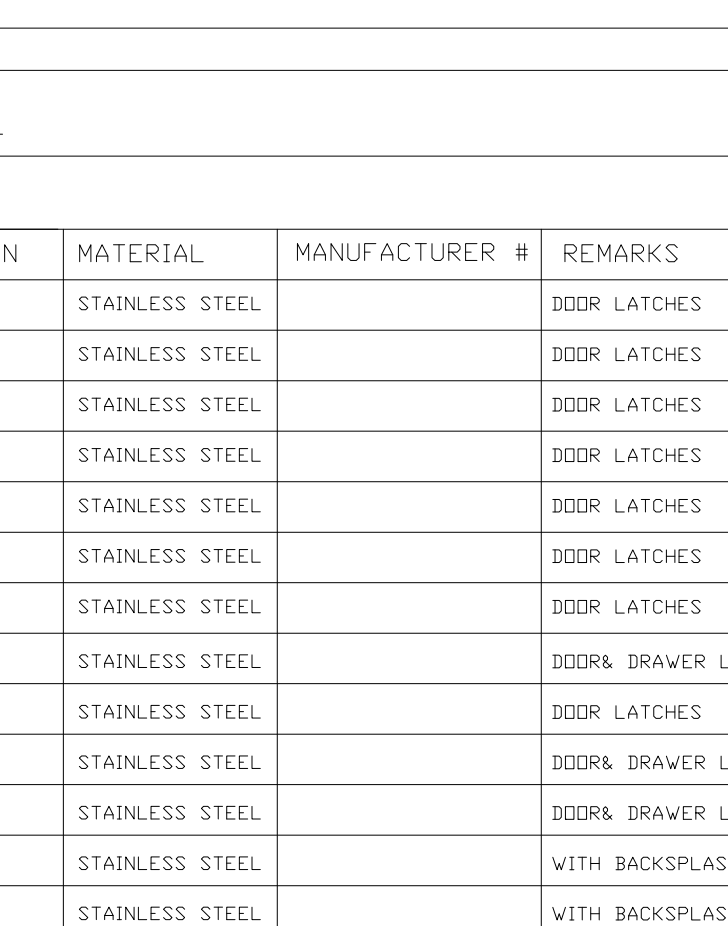
9 MAIN DECK STBD SIDE LOOKING PORT  
SCALE: 3/8"=1'-0"



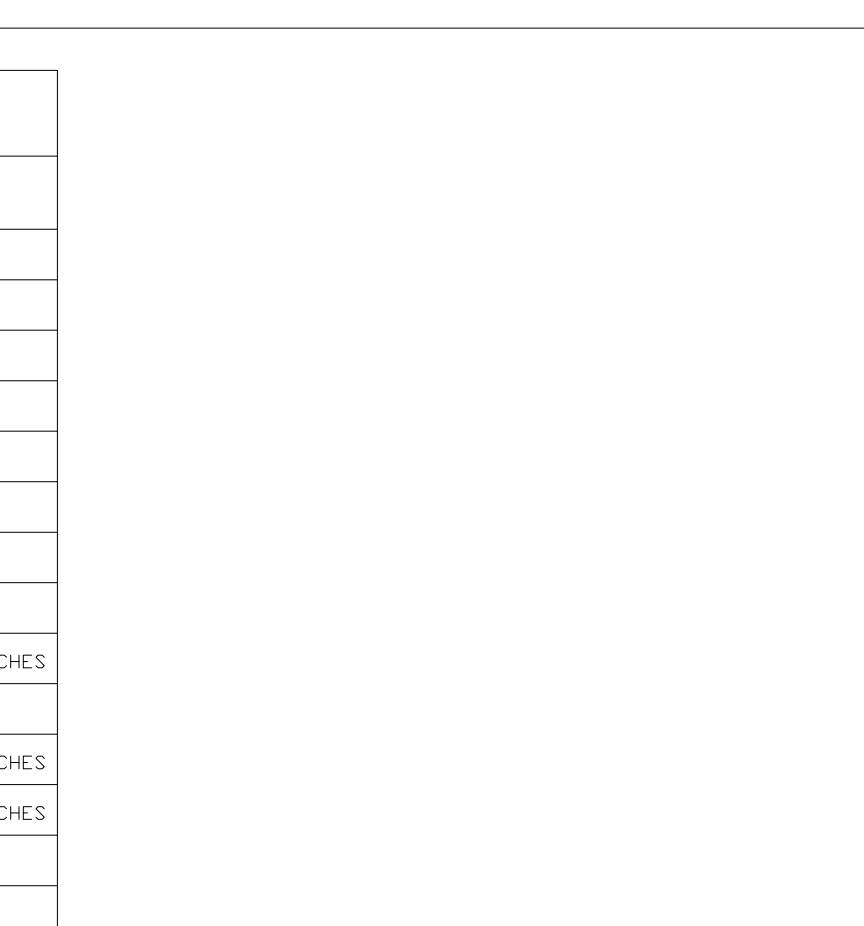
7 MAIN DECK PORT SIDE LOOKING OUTBOARD  
SCALE: 3/8"=1'-0"



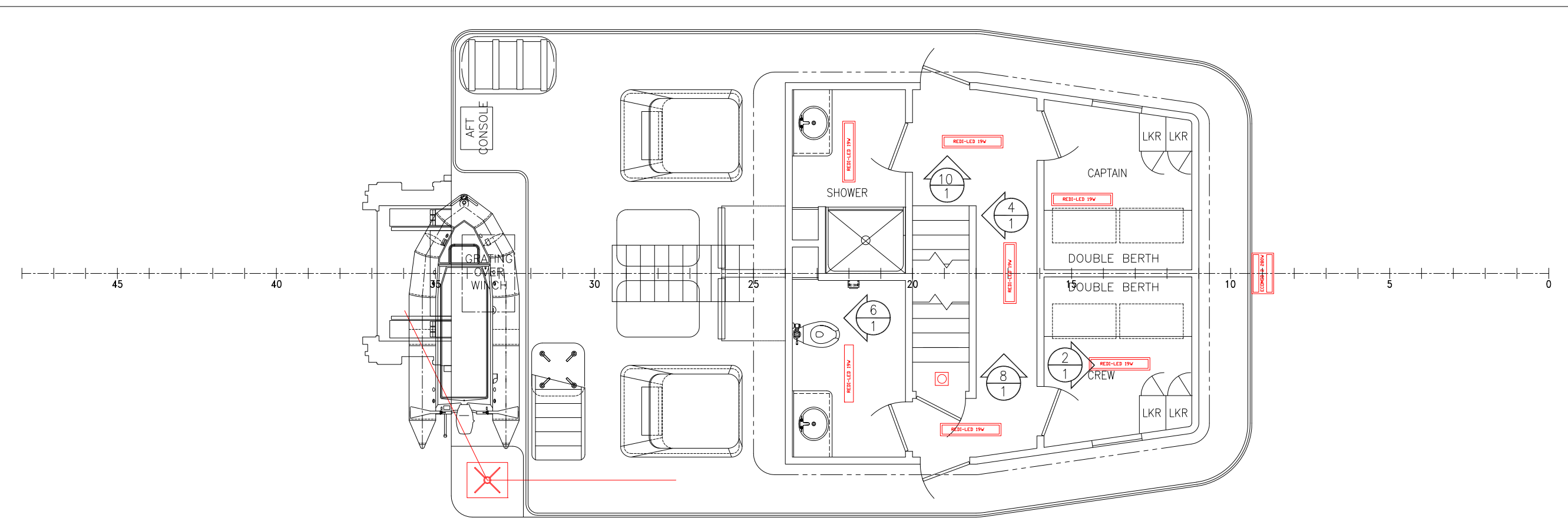
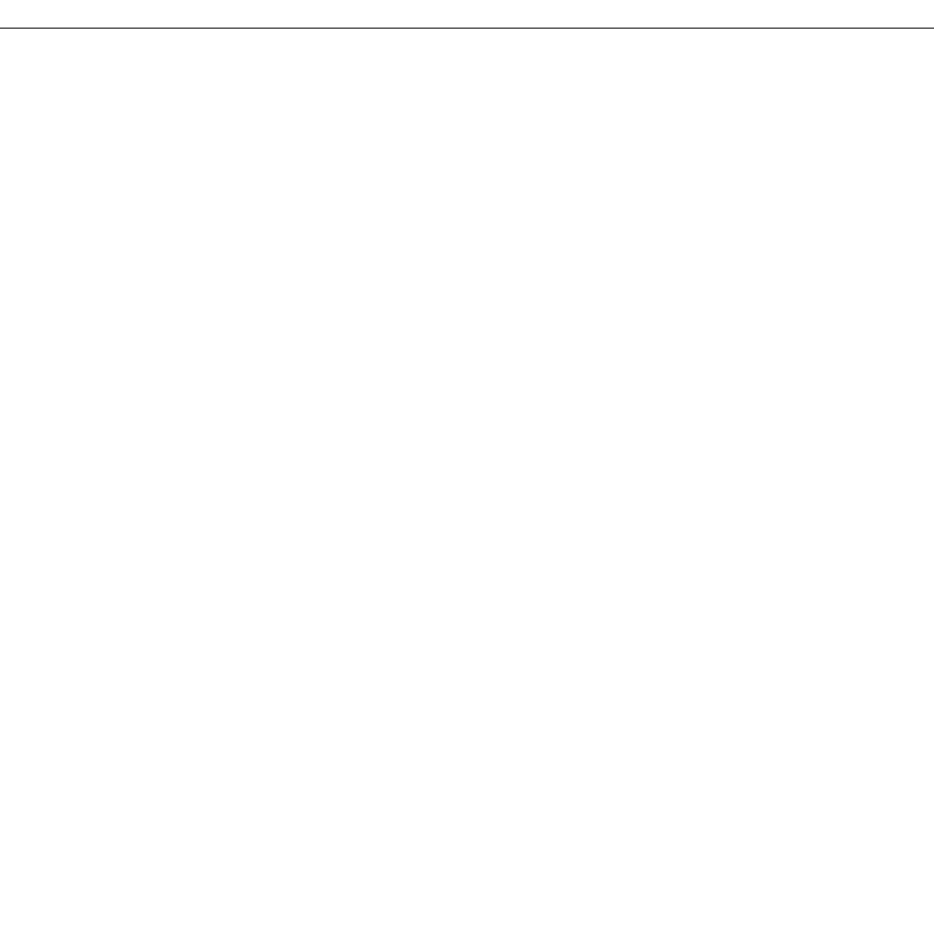
1 MAIN DECK GALLEY LOOKING FWD  
SCALE: 3/8"=1'-0"



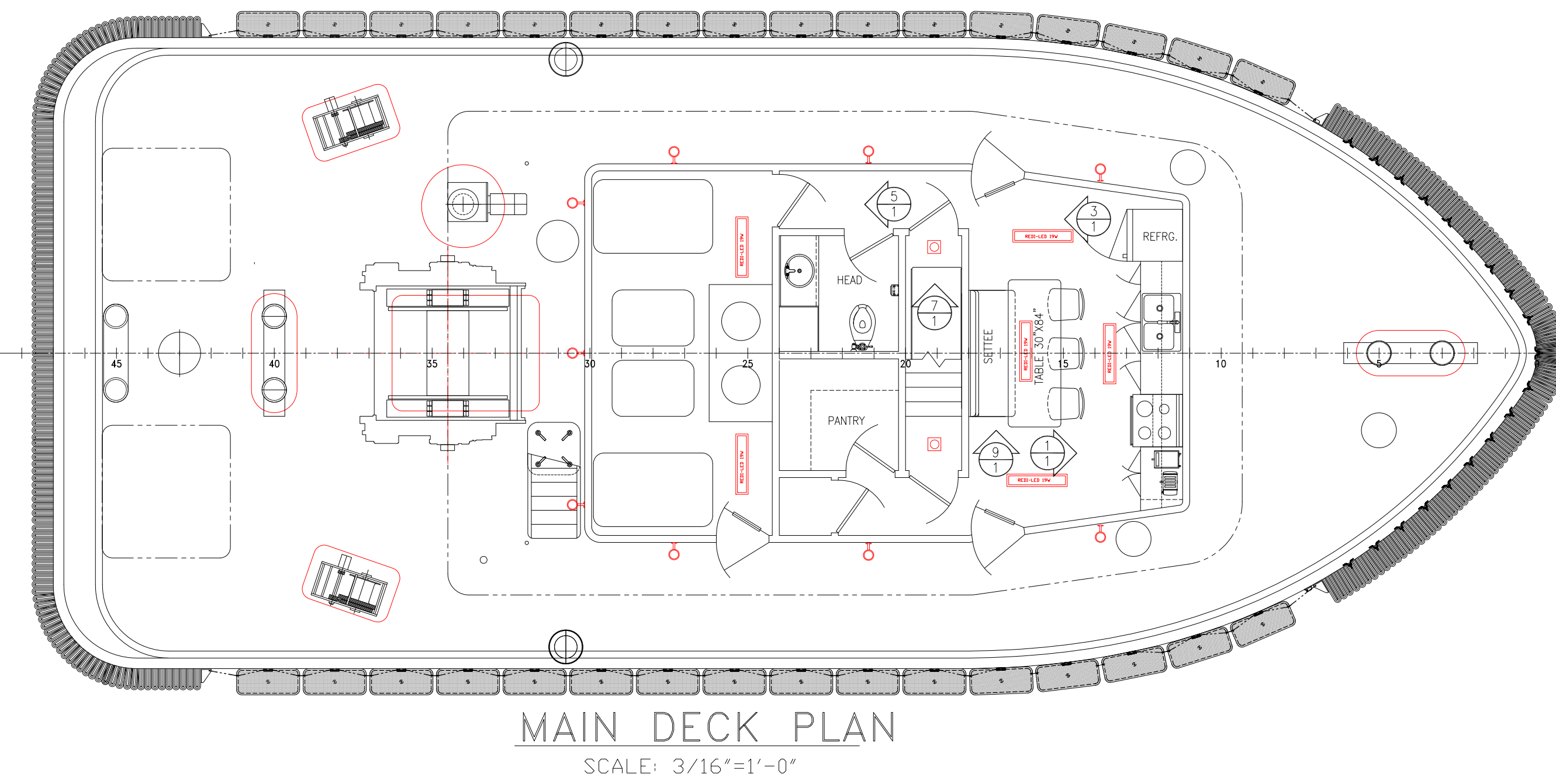
3 MAIN DECK GALLEY LOOKING AFT  
SCALE: 3/8"=1'-0"



5 MAIN DECK FRAME 21 LOOKING AFT  
SCALE: 3/8"=1'-0"



2ND DECK PLAN  
SCALE: 3/16"=1'-0"



MAIN DECK PLAN  
SCALE: 3/16"=1'-0"

BILL OF MATERIALS

CABINET SCHEDULE

ITEM	QTY	DESCRIPTION	WIDTH	DEPTH	HEIGHT	LOCATION	MATERIAL	MANUFACTURER #	REMARKS
CD1	1	WALL CABINET, REFRIGRATOR	30"	12"	15"	GALLEY	STAINLESS STEEL		DOOR LATCHES
CD2	1	WALL CABINET	15"	12"	30"	GALLEY	STAINLESS STEEL		DOOR LATCHES
CD3	1	PANEL, OVER SINK	39"	1"	24"	GALLEY	STAINLESS STEEL		DOOR LATCHES
CD4	1	WALL CABINET	21"	12"	8"	GALLEY	STAINLESS STEEL		DOOR LATCHES
CD5	1	WALL CABINET, OVER RANGE	30"	12"	24"	GALLEY	STAINLESS STEEL		DOOR LATCHES
CD6	1	WALL CABINET	30"	12"	12"	GALLEY	STAINLESS STEEL		DOOR LATCHES
CD7	1	SHELF, MICROWAVE	30"	12"	18"	GALLEY	STAINLESS STEEL		DOOR LATCHES
CD8	1	BASE CABINET	15"	24"	34.5"	GALLEY	STAINLESS STEEL		DOOR& DRAWER LATCHES
CD9	1	BASE CABINET, SINK	39"	24"	34.5"	GALLEY	STAINLESS STEEL		DOOR LATCHES
C10	1	BASE CABINET	21"	24"	34.5"	GALLEY	STAINLESS STEEL		DOOR& DRAWER LATCHES
C11	1	BASE CABINET	30"	24"	34.5"	GALLEY	STAINLESS STEEL		DOOR& DRAWER LATCHES
C12	1	COUNTER TOP	75"	25.5"	1.5"	GALLEY	STAINLESS STEEL		WITH BACKSPLASH
C13	1	COUNTER TOP	FIT	25.5"	1.5"	GALLEY	STAINLESS STEEL		WITH BACKSPLASH
C14	1	BASE CABINET	FIT	21"	29"	HEAD, M.D.	STAINLESS STEEL		DOOR LATCHES
C15	2	BASE CABINET	36"	21"	29"	2ND DECK HEAD & SHOWER	STAINLESS STEEL		DOOR LATCHES
C16	1	COUNTERTOP	FIT	22.5"	1.5"	HEAD, M.D.	STAINLESS STEEL		WITH BACK SPLASH
C17	1	COUNTERTOP	37.5"	22.5"	1.5"	HEAD, 2ND DECK	STAINLESS STEEL		WITH BACK SPLASH
C18	1	COUNTERTOP	37.5"	22.5"	1.5"	SHOWER	STAINLESS STEEL		WITH BACK SPLASH

FIXTURE & EQUIPMENT SCHEDULE

ITEM	QTY	DESCRIPTION	LOCATION	FINISH	MANUFACTURER #	REMARKS
19	1	REFRIGERATOR, 208 CUBIC FT	GALLEY	STAINLESS STEEL		W/ ICE MAKER
20	1	HOOD	GALLEY	STAINLESS STEEL		
21	1	MICROWAVE, 1.6 CU FT, 1150W	GALLEY	STAINLESS STEEL		
22	1	FAUCET, KITCHEN, SINGLE HANDLE	GALLEY	STAINLESS STEEL		
23	1	KITCHEN SINK, 33"X22"X8"	GALLEY	STAINLESS STEEL		
24	1	COFFEE MAKER	GALLEY			STAINLESS STEEL DECANTER
25	1	RANGE	GALLEY	STAINLESS STEEL		
26	1	BASE CABINET	GALLEY	STAINLESS STEEL		DOOR& DRAWER LATCHES
27	1	BASE CABINET, SINK	GALLEY	STAINLESS STEEL		DOOR LATCHES
28	1	SETTEE, 72" LONG X 36" HIGH	GALLEY	BLACK VINYL		
29	1	TABLE, 84" X 30"	GALLEY	STAINLESS STEEL		TABLE BASES.COM
30	3	CHAIR	GALLEY	BLACK PAINTED STEEL & FABRIC		
31	1	TOASTER, 4 SPLICE	GALLEY	STAINLESS STEEL		
32	2	BUNK, DOUBLE, 32"W X 80"L	STATEROOMS	STAINLESS STEEL OR ENAMELED STEEL		W/ CURTAINS
33	4	LOCKER, 15"W X 18"D X 72"H	STATEROOMS	ENAMELED STEEL, GRAY		
34	2	TOILET, ELONGATED,	HEADS	CERAMIC		
35	2	VALVE, FLUSH	HEADS	CHROME PLATED BRASS		
36	2	SEAT, TOILET, COMMERCIAL	HEADS	POLYSTYRENE SS HINGE		
37	3	LAVATORY	HEADS & SHOWER	STAINLESS STEEL		
38	3	FAUCET, LAVATORY	HEADS & SHOWER	CHROME PLATED BRASS		
39	2	HOLDER, TOILET PAPER ROLL	HEADS	STAINLESS STEEL		COMMERCIAL GRADE
40	1	SHOWER STALL	SHOWER	STAINLESS STEEL OR FIBERGLASS		
41	1	VALVE, SHOWER	SHOWER	CHROME PLATED BRASS		
42	1	MIRROR, 12" X 18"	HEADS & SHOWER	STAINLESS STEEL FRAME		

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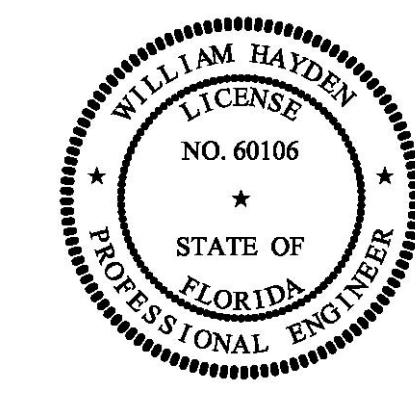
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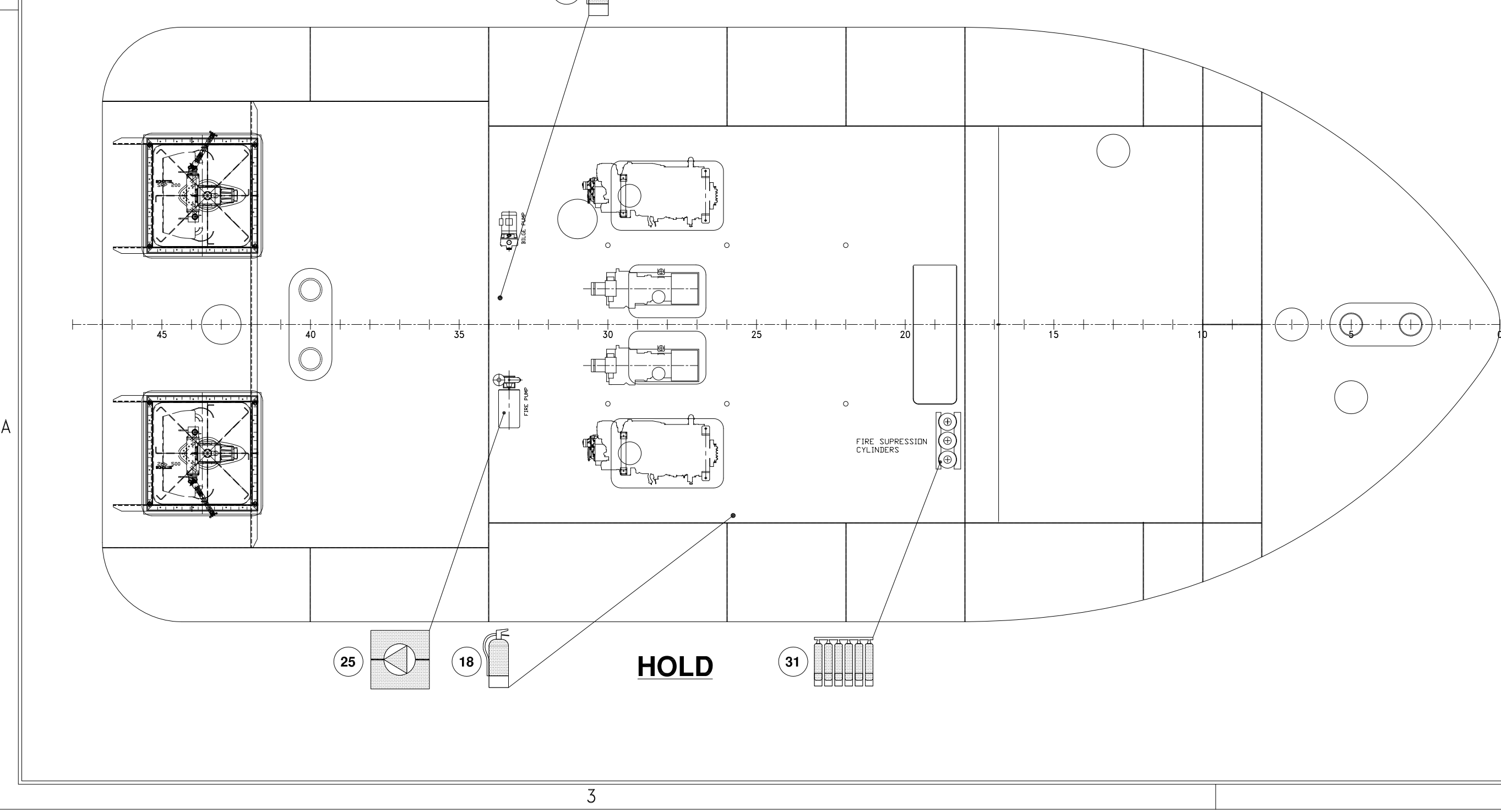
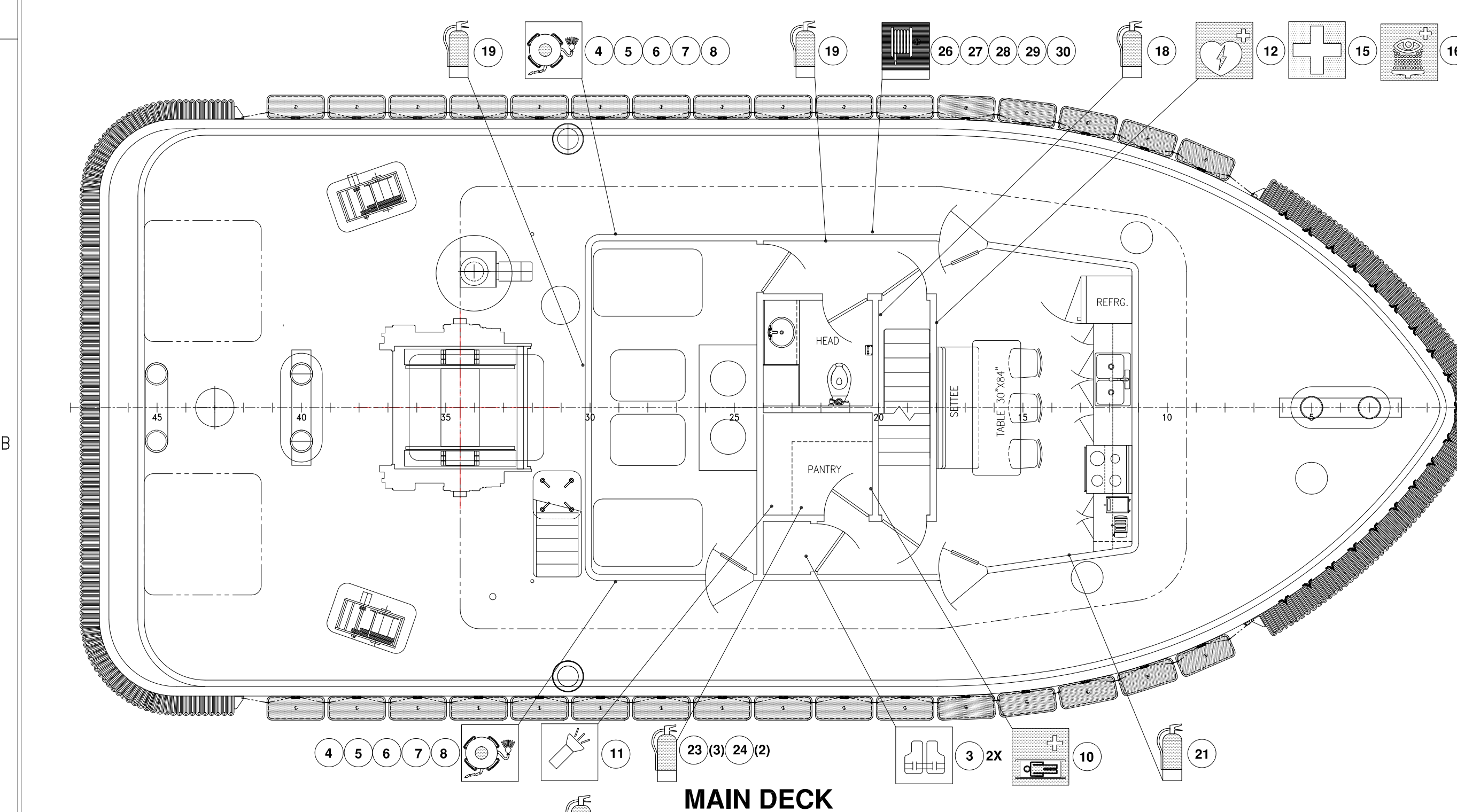
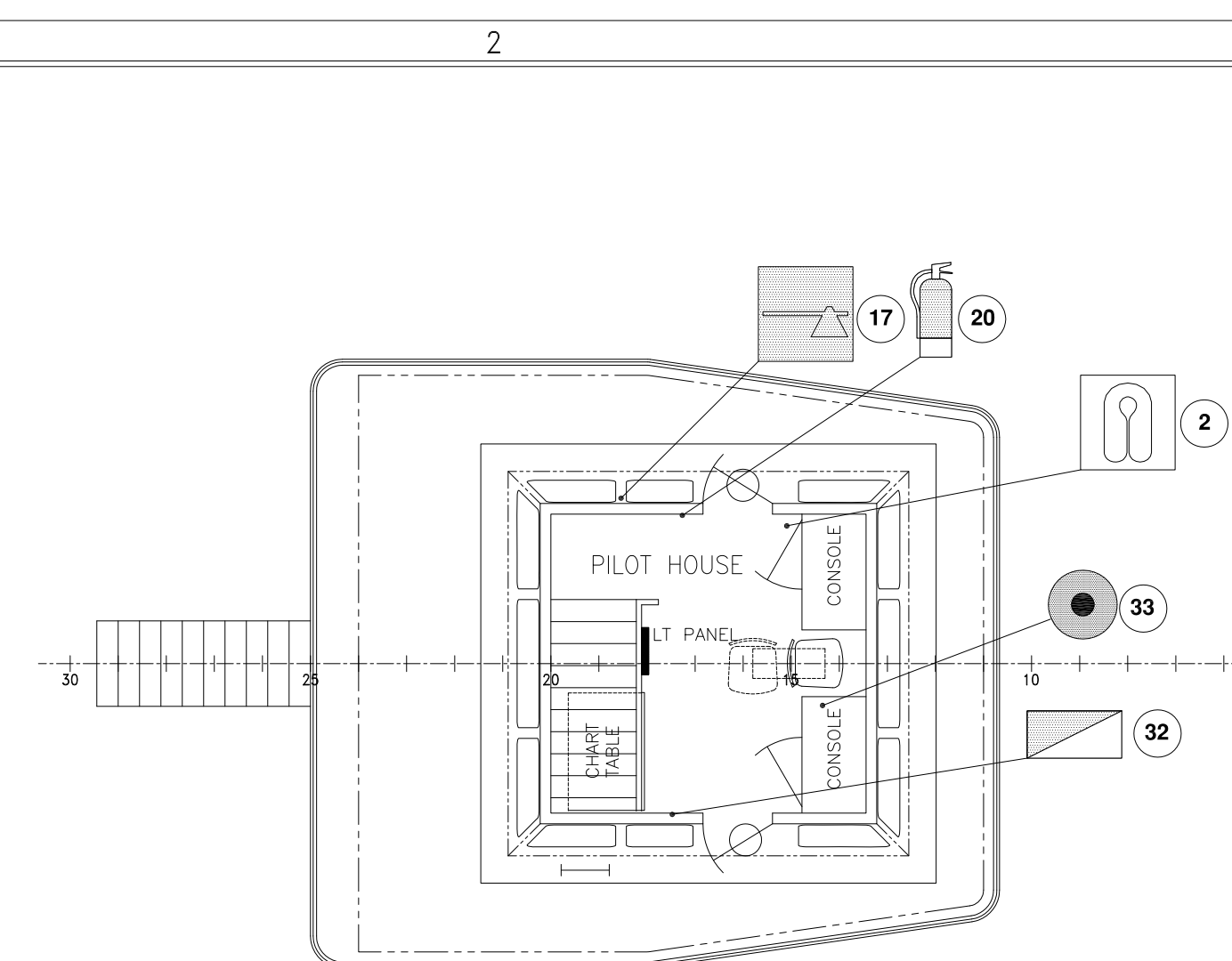
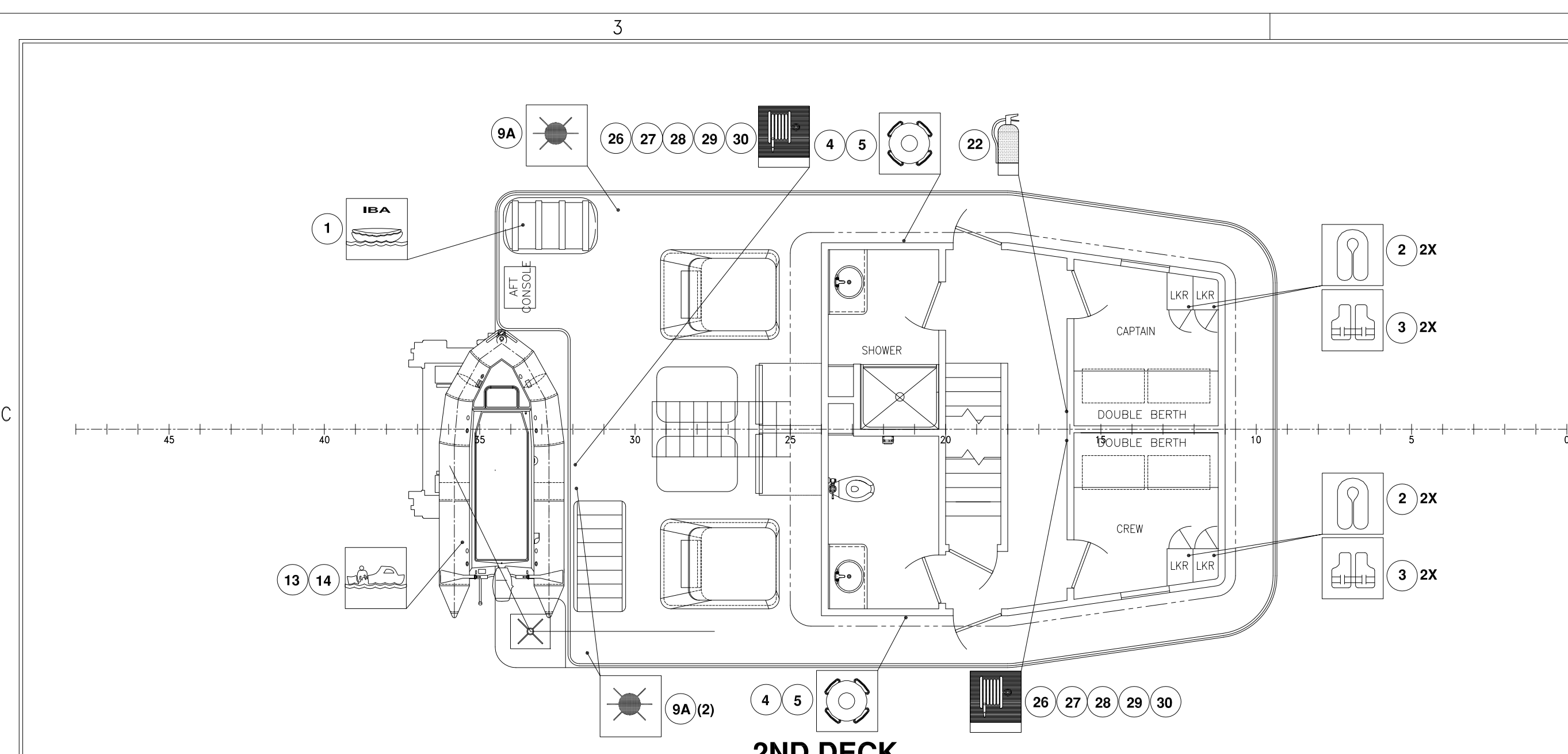
Phone: (904) 399-3673  
Fax: (904) 399-1522  
info@dejongandlebet.com

Title: 70.5'x30'x11' NCDOT TOWBOAT  
**CREW GALLEY, STATEROOMS & RESTROOMS**

Dwg. No: 17-1372-655 Alt. No: 0  
Sh: 1 of 1

Drawn By: JAH Date: JUNE 05, 2018  
Checked By: Date: SEE DWG  
App'd By: Scale: SEE DWG  
ABS App'l: USCG App'l:



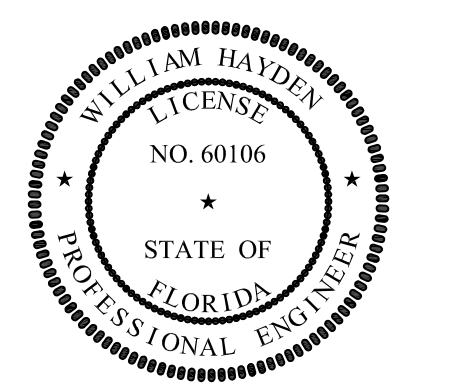


### SYMBOL LEGEND

SYMBOL	DESCRIPTION
	INFLATABLE BOUYANT APPARATUS
	LIFE PRESERVERS, ADULT
	ADULT WORK VEST
	30" LIFE RING
	30" LIFE RING W/ ROPE & WATERLIGHT
	PLYWOOD BACK BOARD FOR RESCUE
	DEFIBRILLATOR
	RESCUE BOAT
	FIRE AXE
	FIRE EXTINGUISHER
	FIRE PUMP
	FIRE HOSE STATION W/ RACK, VALVE, HOSE AND NOZZLE
	FIXED FIRE EXTINGUISHING SYSTEM
	FIRE DETECTION SYSTEM CTRL PANEL
	FIRST AID KIT
	EYE WASH STATION
	GENERAL ALARM CONTACT MAKER
	GENERAL ALARM CONTACT MAKER
	LIFE RAFT AND RESCUE BOAT FLOOD LIGHT W/ LOCAL SWITCH

### EQUIPMENT LIST

LIFE SAVING EQUIPMENT						
ITEM	QTY.	DESCRIPTION	LOCATION	PART NUMBER	MANUFACTURER	REMARKS
1	1	INFLATABLE BOUYANT APPARATUS	2ND DECK AFT			
2	6	LIFE PRESERVERS, ADULT	SEE DWG			
3	6	ADULT WORK VEST	SEE DWG			
4	4	LIFE RING, 30"	SEE DWG			
5	4	BRACKET, LIFE RING	SEE DWG			
6	100 FT	ROPE, ORANGE, POLYETHYLENE, 5/16"	MAIN DECK			50' PER LIFE RING
7	2	LIGHT, MAN OVBORD	MAIN DECK			
8	2	BRACKET, MAN OVBORD LT	MAIN DECK			
9	12 FT	ROPE, ORANGE, POLYETHYLENE, 5/16"	SEE DWG			6 FT PER LIGHT
9A	3	12 VOLT IBA & RESCUE BOAT FLOODLIGHT W/ LOCAL SWITCH	SEE DWG			
RESCUE EQUIPMENT						
ITEM	QTY.	DESCRIPTION	LOCATION	PART NUMBER	MANUFACTURER	REMARKS
10	1	PLYWOOD BACKBOARD	PANTRY			RESCUE STRETCHER
11	2	3 CELL FLASHLIGHT	PANTRY/GALLEY			MOUNTING BRACKET W/ GALLEY FLASHLIGHT
12	1	DEFIBRILLATOR, PORTABLE	GALLEY			
13	1	BOAT, RESCUE, 14"-RIGID INFLATABLE	2ND DECK AFT			
14	1	OUTBOARD, 15 HP, FOUR STROKE	2ND DECK AFT			
15	1	FIRST AID KIT	GALLEY			
16	1	EYE WASH STATION	GALLEY			
FIRE SAFETY EQUIPMENT						
ITEM	QTY.	DESCRIPTION	LOCATION	PART NUMBER	MANUFACTURER	REMARKS
17	2	AXE, FIRE	SEE DWG			W/ MOUNTING BRACKETS
18	3	FIRE EXTINGUISHER, 15# ABC TYP. II	ENGINE ROOM E.R. ACCESS TRUNK			W/ MOUNTING BRACKETS
19	2	FIRE EXTINGUISHER, 15# ABC TYP. II	MAIN DECK			W/ MOUNTING BRACKETS
20	1	FIRE EXTINGUISHER, 10# ABC TYP. II	PILOTHOUSE			W/ MOUNTING BRACKETS
21	1	FIRE EXTINGUISHER, 10# ABC TYP. II	GALLEY			W/ MOUNTING BRACKETS
22	1	FIRE EXTINGUISHER, 10# ABC TYP. II	2ND DECK PASSAGEWAY			W/ MOUNTING BRACKETS
23	3	FIRE EXTINGUISHER, 15# ABC TYP. II	FORWARD VOID SPARES			W/ MOUNTING BRACKETS
24	2	FIRE EXTINGUISHER, 10# ABC TYP. II	FORWARD VOID SPARES			W/ MOUNTING BRACKETS
25	1	FIRE PUMP, 50 PSI @ 80 GPM	ENGINE ROOM			
26	3	FIRE HOSE ENCLOSURE	SEE DWG			STAINLESS STEEL
27	3	FIRE HOSE, UL, 19, 50', 1.5"	SEE DWG			
28	3	ANGLE HOSE VALVE, BRASS, 1.5"	SEE DWG			
29	3	COMBINATION NOZZLE, 1.5"	SEE DWG			
30	3	SPANNER WRENCH, UNIVERSAL	SEE DWG			
31	1	FIXED FIRE EXTINGUISHING SYSTEM	ENGINE ROOM			
32	1	FIRE DETECTION SYSTEM	PILOT HOUSE			USCG TYPE APPROVED
33	1	GENERAL ALARM CONTACT MAKER	PILOT HOUSE			



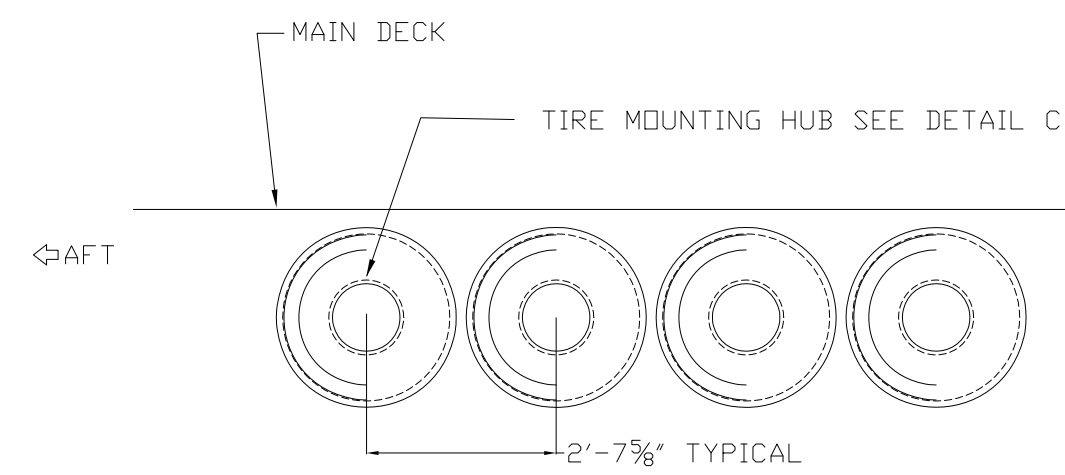
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Title: 70.5"x30"x11" NCDOT TOWBOAT  
**LIFE, EMERGENCY & FIRE FIGHTING EQUIPMENT**

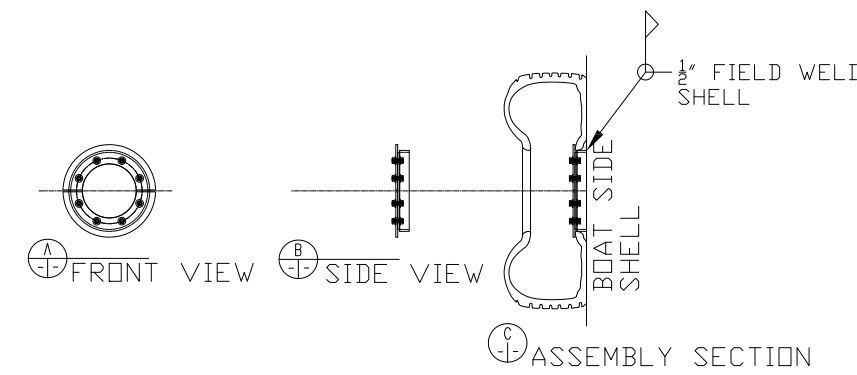
Dwg. No. **17-1372-680** Art. No. 1  
Sht. 1 of 1

Drawn By: **JACOB CONNALLY** Date: **JUNE 05, 2018**  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: **3/16" = 1'-0"**  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

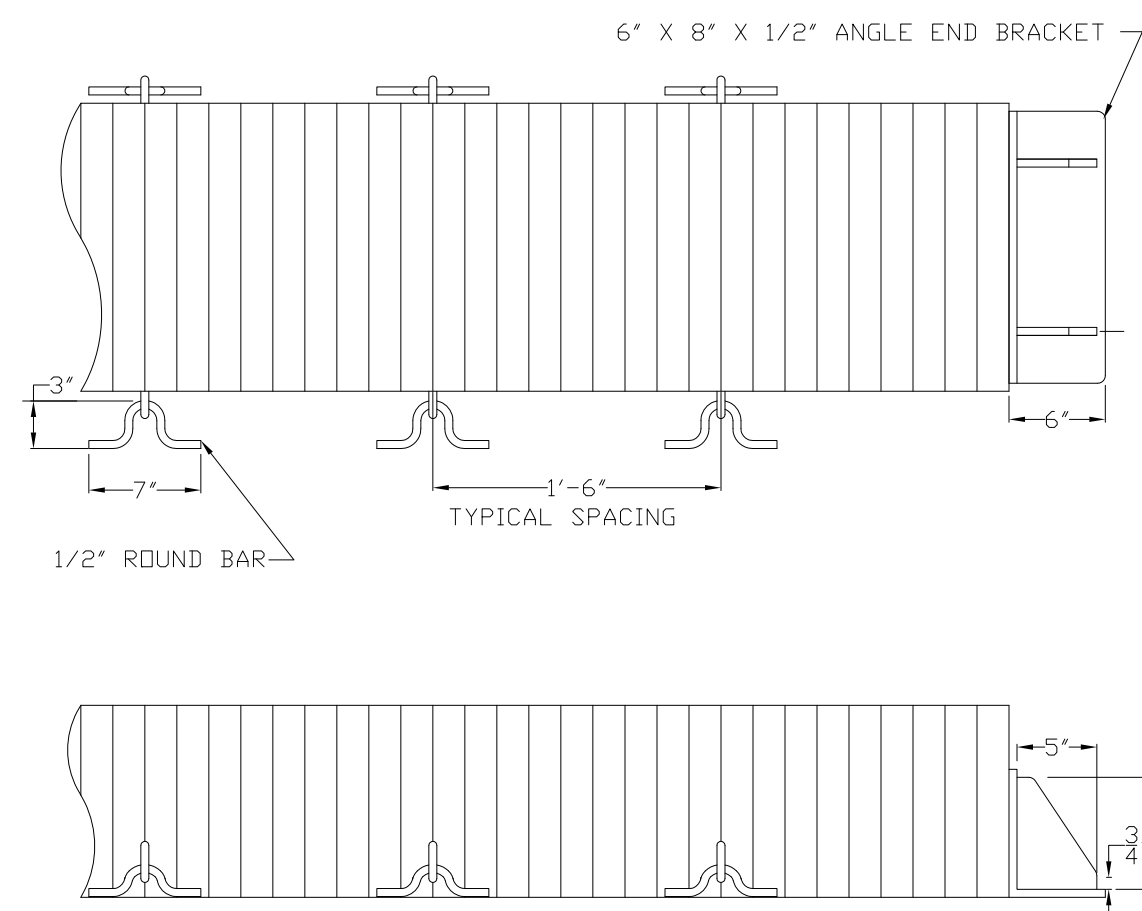


SIDE SHELL TIRES DETAIL "A"

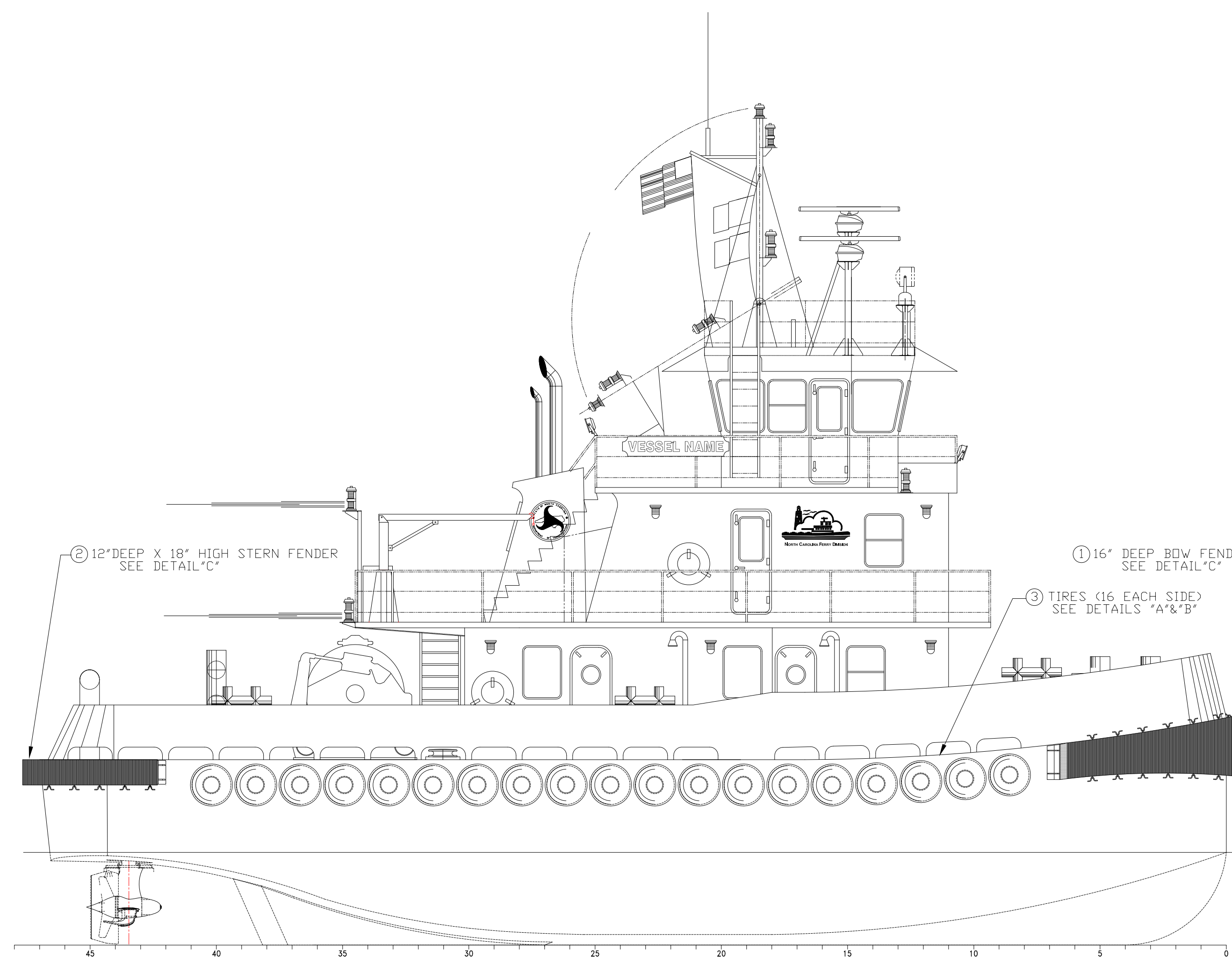
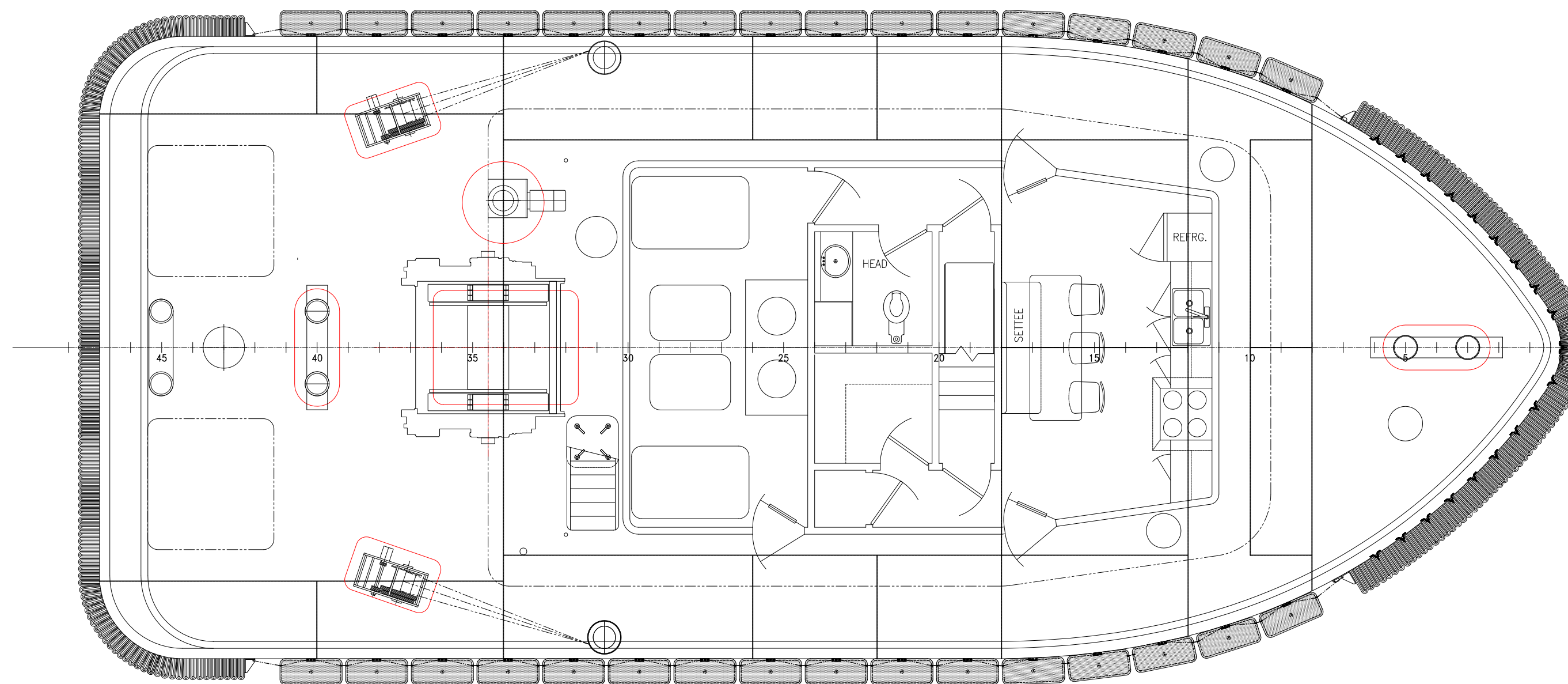
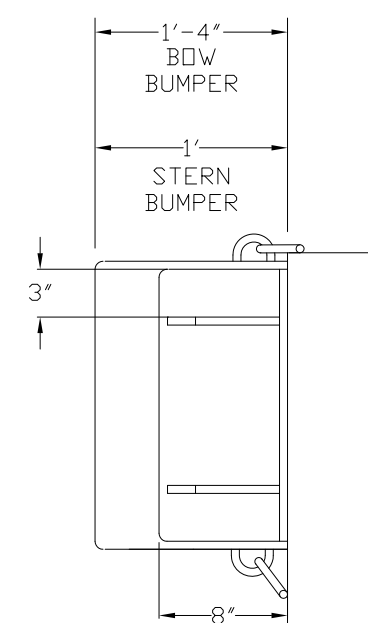
32 EACH (16 PER SIDE)  
30"H X 15"W X 13.5" RIM  
SCALE: 3/8" = 1'-0"



DETAIL B  
TIRE MOUNTING DETAIL BUMPER  
TIRE HUB FOR 13.5" RIM  
SCHUYLER MARITIME TYPE OR  
EQUAL



BOW AND STERN FENDER DETAIL "C"  
STERN FENDER SHOWN  
SCALE: 1" = 1'-0"



ELEVATION 1-1A  
OUTBOARD PROFILE  
SCALE: 3/16" = 1'-0"

BILL OF MATERIALS

BUMPERS & TIRE SCHEDULE

ITEM	QTY.	DESCRIPTION	MANUFACTURER #	REMARKS
1	AR	FENDER, BOW, 16" DEEP, CHAIN LINK HANGER		DR EQUAL
2	AR	FENDER, STERN, 12" DEEP X 18" HIGH, CHAIN LINK HANGER		DR EQUAL
3	3B	TIRE, AIRCRAFT, 30x11.5-14, 30"HX11.5"WX10.0"RIM		
4	3B	MOUNTING HUB FOR TIRE, AIRCRAFT, 30x11.5-14, 10.0"RIM		DR EQUAL

GENERAL NOTES

NO.	DESCRIPTION
1.	STRUCTURAL STEEL TO MEET ABS GRADE A STANDARDS
2.	UNBRACKETED STIFFENERS OF SHELL, WATERTIGHT AND DILIGHT BHDS AND HOUSE FRONTS ARE TO HAVE DOUBLE CONT. WELDS FOR 1/10 OF THEIR LENGTH AT EACH END.
3.	UNBRACKETED STIFFENERS OF NONTIGHT STRUCTURAL BHDS, DECKHOUSE SIDES AND AFTER ENDS ARE TO HAVE A PAIR OF MATCHING INTERMITTENT WELDS AT EACH END.
4.	THE WELDING OF LONGITUDINALS MAY BE AS REQ. UNDER FRAMES OR DECK ABOVE. IN ADDITION, THEY ARE TO HAVE DOUBLE CONTINUOUS WELDS AT THE END AND IN WAY OF TRANSVERSES EQUAL IN LENGTH TO THE DEPTH OF THE LONGITUDINAL. FOR DECK LONGITUDINALS ONLY A MATCHED PAIR OF WELDS IS REQ. AT THE TRANSVERSES. FOR SLAB LONGITUDINALS THE ATTACHMENT IS TO BE MADE DOUBLE CONTINUOUS
5.	FILLET WELDS OF A SIZE WHICH IS 0.3 TIMES THE THICKNESS OF THE THINNER PLATE BUT NEED NOT BE GREATER THAN 5/16 IN.
6.	SHIPYARD TO PROVIDE RATHOLES, SNIPES & CUTOUTS TO ALLOW FOR ADEQUATE DRAINAGE TO THE BILGE AT CENTERLINE.

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Title: 70.5'x30'x11' NCDOT TOWBOAT

RUBBER FENDER & TIRE LAYOUT

Dwg. No. 17-1372-684 Alt. No. 1  
Sh. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018  
Checked By: \_\_\_\_\_ Date: \_\_\_\_\_  
App'd By: \_\_\_\_\_ Scale: SEE DWG  
ABS App'l: \_\_\_\_\_ USCG App'l: \_\_\_\_\_

