

MATERIAL SCHEDULE GENERAL NOTES

PIPING SYSTEM	PIPE		TAKEDOWN JOINTS		VALVES		FLEX CONN'S	FITTINGS TYPE & MATERIAL	MAXIMUM WORKING CONDITIONS			REMARKS	
	SIZE	MATERIAL	MATERIAL	GASKETS	BOLTING	BODY			TRIM	SYSTEM	PRESSURE		TEMP
MSD & SEWAGE TRANSFER (CLASS 2 PIPING)	2" & BELOW	CNA 90:10, C70600 ASME SB466 CLASS 200, SEAMLESS	UNION BRONZE, ASME SB61, BRAZED, MIL-F-1183	NEOPRENE CLOTH INSERTED FULL FACE ANSI B16.21	STEEL ASTM A307 ANSI B18.2.1 GRADE B	BRONZE, CLASS 150 ASME SB61 OR SB62, BRAZED MSS-SP-80	MONEL OR 316 STAINLESS STEEL	SEE GENERAL NOTE 11	BRONZE, ASME SB61, BRAZED MIL-F-1183	SEWAGE	50 PSIG	80°F	1. PIPING SYSTEM DESIGN, MATERIAL, INSTALLATION, TESTING AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH USCG REGULATIONS, ABS RULES, MARPOL, INTERNATIONAL CONVENTION FOR SAFETY OF LIFE AT SEA, AND THE WORLD HEALTH ORGANIZATION. 2. THIS DRAWING PROVIDES DIAGRAMMATIC ILLUSTRATIONS OF PIPING SYSTEMS. PIPING ARRANGEMENTS WITHIN THE VESSEL SHALL BE DEVELOPED BY THE SHIPYARD. 3. EQUIPMENT AND MACHINERY PERFORMANCE CHARACTERISTICS AND PIPE SIZING INFORMATION SHALL BE CONFIRMED BY THE SHIPYARD BASED ON THE SYSTEM'S PIPING ARRANGEMENT AND DETAILS AND CERTIFIED MANUFACTURER'S DATA. 4. PIPING INSTALLATIONS SHALL PERMIT FREE PASSAGE ALONG WALKWAYS AND LADDERWAYS; FREE ACCESS FOR OPERATION AND ROUTINE MAINTENANCE; FREE ACCESS TO ALL DOORS, HATCHES AND OPENINGS; AND, AS MUCH AS IS PRACTICABLE, BE FREE OF INTERFERENCE TO THE READY REMOVAL OF EQUIPMENT AND SYSTEM COMPONENTS. 5. SUITABLE TAKEDOWN JOINTS SHALL BE PROVIDED IN PIPING SYSTEMS FOR READY REMOVAL OF MACHINERY AND EQUIPMENT.
	2-1/2" & ABOVE		FLANGE, BRONZE, ASME SB61 OR SB62, BRAZED, ANSI B16.24, CLASS 150		STEEL, ASTM A563 ANSI B18.2.2 GRADE A	FLANGED BRONZE, CLASS 150 ASME SB61 OR SB62, MSS-SP-80, MSS-SP-67, WAFER OR LUG, DUCTILE IRON, ASTM A395	MONEL OR 316 STAINLESS STEEL RENEWABLE		CNA 90:10, ASME SB466 BUSHIPS DWG, 810-135880 CLASS 200, BUTTWELDED				
VENTS & OVERBOARD (CLASS 2 PIPING)	2" & BELOW	CARBON STEEL ASTM A53 OR A106, GR B. VENTS-SCH 40, OVBDS-SCH 80, ANSI B36.10, SEAMLESS	STEEL, UNION, ASTM A105 MSS-SP-83, CLASS 3000, NPT	NITRILE FULL FACE ANSI B16.21	STEEL ASTM A307 ANSI B18.2.1 GRADE B	STEEL, ASTM A105 OR A216 GR WCB, ANSI B16.34, NPT, CLASS 150	MONEL OR 316 STAINLESS STEEL	SEE GENERAL NOTE 11	STEEL, ASTM A105 OR A234, GR WPB, ANSI B16.11, CLASS 3000, NPT	VENTS OVERBOARDS	ATMOSPHERIC 50 PSI	80°F 80°F	6. GAGE PIPING ASSEMBLIES AND MATERIALS SHALL BE IN ACCORDANCE WITH ASTM F721, EXCEPT PIPING ROOT VALVES SHALL BE AT LEAST 1/2 INCH. 7. PIPE WELDING SHALL COMPLY WITH THE REGULATORY BODY REQUIREMENTS AND WITH THE DETAILS GIVEN IN ASTM F722. 8. BULKHEAD AND DECK PIPING PENETRATIONS SHALL MAINTAIN THE WATERTIGHT AND FIRE RATING OF THE BOUNDARY AND BE IN ACCORDANCE WITH THE REGULATORY BODY REQUIREMENTS AND ASTM F682. REINFORCING PENETRATION SLEEVES SHALL BE FITTED. 9. ALL PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. PIPE SUPPORTS FOR SYSTEMS FOR WITH RESILIENT MOUNTS (AS DESCRIBED IN REF. 1) SHALL BE MOUNTED TO STIFFENED AREAS OF THE SHIP STRUCTURE WITH AN ISOLATED PIPE CLAMP THAT INCLUDES A MINIMUM 1/2" THICK INSERT MADE OF RUBBER WITH 40 TO 45 SHORE A DUROMETER. NO PIPE CLAMPS SHALL BE MOUNTED TO THE CENTER OF BULKHEAD OR DECK PLATING. 10. ALL PIPING EXPOSED TO EXTERIOR OR UNHEATED INTERIOR SPACES SHALL BE WRAPPED WITH HEAT TRACE PER REFERENCE 1.
	2-1/2" & ABOVE		STEEL, FLANGE, ASTM A105 OR A216, GR WCB, ANSI B16.5, CLASS 150, SLIP-ON OR WELDED NECK		STEEL, ASTM A563 ANSI B18.2.2 GRADE A	STEEL, ASTM A105 OR A216, GR WCB, ANSI B16.34, FLANGED, CLASS 150, MSS-SP-67, WAFER OR LUG	MONEL OR 316 STAINLESS STEEL RENEWABLE		STEEL, ASTM A234, GR WPB, ANSI B16.9 & B16.28, SCH 80 BUTTWELD				

**PUMP DATA (SEE NOTE 3)**

ITEM NO.	SERVICE	QTY	TYPE	CAPACITY (GPM)	TDH (FT)	MOTOR HP	RPM	REMARKS
1	SEWAGE TRANSFER PUMP	1	CENTRIFUGAL	125	115	5	1750	GOULDS SEWAGE PUMP 3888D3 OR EQUAL

**EQUIPMENT LIST (SEE NOTE 3)**

ITEM NO.	SERVICE	QTY	MANUFACTURER	MODEL	REMARKS
2	MARINE SANITATION DEVICE	1	PENUMBRA MARINE LOGISTICS	PIRANHA, OR EQUAL	4000 GALLONS PER DAY

**SHEET INDEX**

SHEET NO.	DESCRIPTION
1	GENERAL NOTES, REFERENCES, REVISIONS, MATERIAL SCHEDULE, PUMP DATA, EQUIPMENT LIST, & SYMBOL LIST
2	DETAIL 13-B, AUXILIARY MACHINERY ROOM MSD ARRANGEMENT
3	PARTIAL PLAN 21-C, 2ND PLATFORM (FRS. 17-65)
4	SECTION 26-C, OVERBOARD DISCHARGE (TYPICAL) PARTIAL PLAN 30-A, 1ST PLATFORM (FRS. 55-83) PARTIAL PLAN 30-C, MAIN DECK (FRS. 55-84)

**REVISIONS**

ZONE	REV	DESCRIPTION	DATE	APPROVED
21-C	A	1. REMOVED TANK LABELS FOR CLARITY.	8/12/09	SAC
13-B		2. CREATED NEW DIAGRAM 13-B TO BE COMPATIBLE WITH THE NEW MSD SYSTEM		
5-C		3. CHANGED MSD MANUFACTURE AND MODEL		
4-A		4. ADDED MOTOR OPERATED 3-WAY VALVE TO SYMBOL LIST		
19-B		5. UPDATED DIAGRAM IN MSD ROOM		
22-C		6. CHANGED VENT PIPE SIZE TO 8"		
3-A		7. ADDED REFERENCES 7-9		
1-A		8. ADDED TO GENERAL NOTE 16		
3-A		9. UPDATED REFERENCES TO LIST THE MOST CURRENT REVISION OF EACH DRAWING AND THE CONTRACT SPECIFICATIONS.		
22-D		10. UPDATED BACKGROUND TO REFLECT CHANGES TO TANK ARRANGEMENTS IN REF 2. MOVED OVERBOARD LINES TO PENETRATE THE HULL THROUGH VOID 4-49-2.		

REV - OF THIS DRAWING APPROVED BY ABS, LETTER REFERENCE 350990, DATED 6/13/2008. ALL ABS TECHNICAL COMMENTS HAVE BEEN INCORPORATED IN THIS REVISION.

NOTE: THE SYSTEM HAS EQUIPMENT THAT IS NOISE CRITICAL SYSTEM AS DESCRIBED IN REF. 1. THE SYSTEM HAS BEEN DESIGNED TO MINIMIZE THE TRANSMISSION OF UNDERWATER RADIATED NOISE BY ISOLATION OF MECHANICAL EQUIPMENT SEE GENERAL NOTES 9, 11 AND 15.

**REFERENCES**

- ALASKA REGION RESEARCH VESSEL CONTRACT SPECIFICATIONS, REV D
- GLOSTEN DWG. NO. 07096-070-01, REV B, GENERAL ARRANGEMENT
- GLOSTEN DWG. NO. 07096-200-01, REV A, MACHINERY ARRANGEMENT
- GLOSTEN DWG. NO. 07096-259-01, REV A, EXHAUST SYSTEM ARRANGEMENT
- GLOSTEN DWG. NO. 07096-523-01, REV A, SEAWATER SYSTEM DIAGRAM
- GLOSTEN DWG. NO. 07096-526-01, REV A, PLUMBING, INTERIOR & DECK DRAIN SYSTEM DIAGRAM
- GLOSTEN DWG. NO. 07096-528-01, REV A, SANITARY FLUSHING AND AUXILIARY SW SYSTEM
- GLOSTEN DWG. NO. 07096-551-01, REV A, COMPRESSED AIR SYSTEM
- GLOSTEN DWG. NO. 07096-533-01, REV B, POTABLE WATER SYSTEM

**SYMBOL LIST**

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PIPING		FLEX CONNECTION		REDUCER/ENLARGER		OVERBOARD		3-WAY MOTOR OPERATED BALL VALVE
	FLOW ARROW		VIBRATION ISOLATORS		SUCTION BELLMOUTH		GATE VALVE		PLUG VALVE (FULL PORT)
	PIPE DOWN		CENTRIFUGAL PUMP		TANK LEVEL INDICATOR		SWING CHECK VALVE		3-WAY PLUG VALVE (FULL PORT)
	PIPE UP		SHORE FILL / TANK CONNECTION		HIGH LEVEL ALARM		BALL VALVE		PLUG VALVE, LOCKED OPEN
	PIPE UP/DOWN		HOSE CONNECTION		JUNCTION BOX		3-WAY BALL VALVE		BALL VALVE, LOCKED OPEN



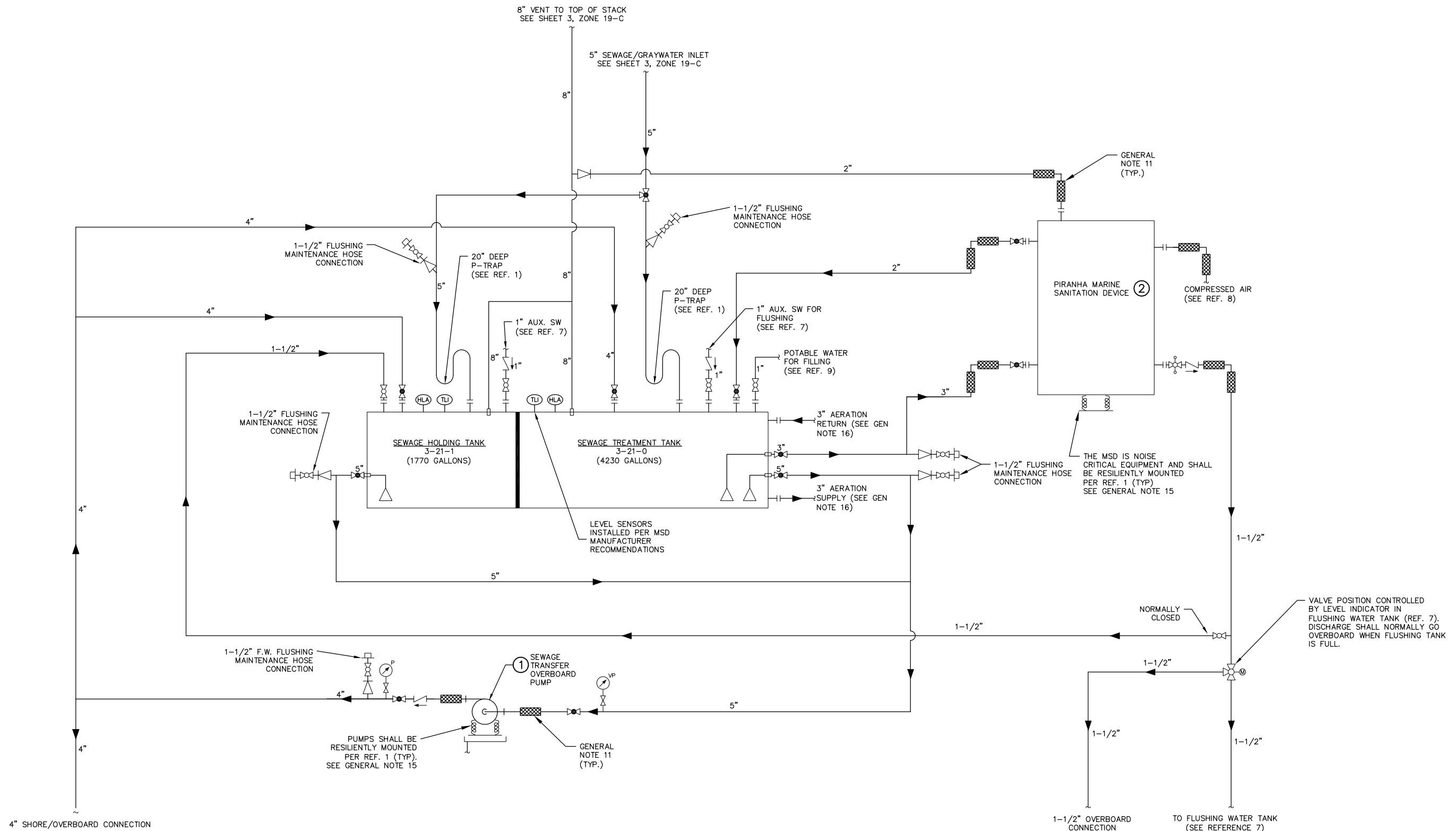
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ALASKA REGION RESEARCH VESSEL  
MSD & SEWAGE TRANSFER SYSTEM DIAGRAM


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DETAIL 13-B  
MSD AND SEWAGE TRANSFER SYSTEM DIAGRAM A<sub>2</sub>



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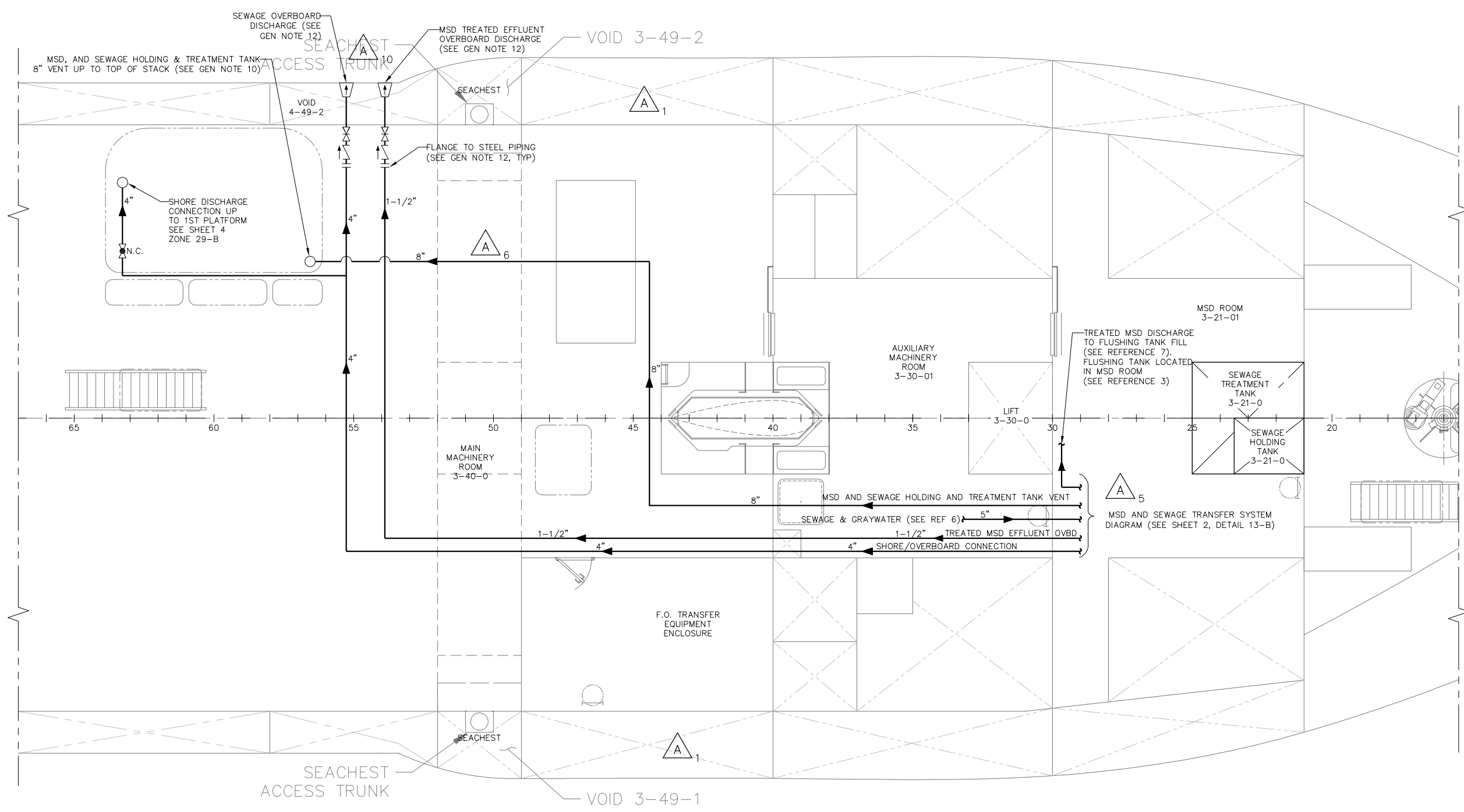
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**PARTIAL PLAN 21-C**  
 2ND PLATFORM (FRS. 16-67)



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 MSD & SEWAGE TRANSFER SYSTEM DIAGRAM

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