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SYMBOLS LIST

	PIPE, SUPPLY
	PIPE CAP
	TRAP
	PIPE PENETRATION, DECK/BHD
	REDUCER, CONCENTRIC
	AIR ADMITTANCE VALVE
	PUMP, CENTRIFUGAL
P	GAUGE, PRESSURE, LOCAL READING
VP	GAUGE, VACUUM/PRESSURE, LOCAL READING
	VALVE, GATE
	VALVE, BALL, 3-WAY
	VALVE, SWING CHECK
HLS	SWITCH, HIGH LEVEL
	FLOW DIRECTION ARROW
	FLANGE
	MATERIAL TRANSITION

MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	TAKEDOWN JOINTS			VALVES		FITTINGS	FLEXIBLE CONNECTIONS	REMARKS
			MATERIAL	GASKETS	BOLTING	BODY	TRIM			
SANITARY DRAINS MAWP: 45 PSI TEMP: AMBIENT	ALL ENGINE ROOM	STEEL, ASTM A53 GR B, ANSI B36.10 GALVANIZED	UNIONS: GROUND JOINT, CARBON STEEL, ASTM A105, 3000 # SOCKET WELD OR THREADED FLANGES: CARBON STEEL, ASTM A105 ANSI B16.5 150# SLIP-ON OR WELD NECK	INORGANIC FIBER WITH NITRILE BINDER, GARLOCK 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	GATE & CHECK: STEEL, ASTM A216 GR WCB, ANSI B16.34 CLASS 150 FLANGED BALL: BRONZE, 150#, FLANGED, ASTM B62	GATE & CHECK: ALUMINUM BRONZE BALL: CHROME PLATED BALL, PTFE SEATS	CARBON STEEL, ASTM A234 GR WPB, ANSI B16.9 & B16.28, SCH 40, BUTWELD OR VIEGA MEGAPRESS WITH FKM SEALS TO ASTM F3326	-	-
	ALL OUTSIDE ENGINE ROOM	CPVC SCH 80, MIN. CELL CLASS 23447, ASTM D1784, ASTM F441, NSF PW	UNIONS: CPVC, CLASS 150, MIN. CELL CLASS 23447, ASTM D1784, ASTM F439	-	-	-	-	CPVC, SOCKET UNION, MIN. CELL CLASS 23447, ASTM F439, SCH 80	-	-

PUMP LIST

QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	REMARKS
1	SEWAGE DISCHARGE PUMP	MACERATOR	OBERDORFER 406MK-7N26	25 GPM	1 HP, 1725 RPM 115V/230V/1P/60HZ	INCLUDES VACUUM SWITCH

GENERAL NOTES CONTINUED

10. CHANGES OF DIRECTION IN HORIZONTAL DRAIN PIPING SHALL BE MADE WITH WYES OR BENDS OF 45° OR LESS. INTERSECTIONS BETWEEN HORIZONTAL BRANCHES OF DRAIN PIPING SHALL BE ACCOMPLISHED WITH THE USE OF LATERALS, WYES, OR SWEEP TEES. IN NO CASE SHALL TWO PIPES INTERSECT AT 90°.

11. HORIZONTAL DRAINAGE LINES WHICH CONNECT DIRECTLY WITH A VERTICAL STACK SHALL ENTER THROUGH 45° WYE, 60° WYE, COMBINATION WYE AND 45° BEND, SANITARY TEE, OR BRANCHES OF EQUIVALENT SWEEP.

12. CLEANOUTS WITH PLUGS SHALL BE FITTED AT THE UPPER TERMINAL OF EACH HORIZONTAL RUN, AT INTERVALS OF NO LESS THAN 1 PER 50 LINEAR FEET OF PIPE IN STRAIGHT RUNS, WHEREVER THE AGGREGATE HORIZONTAL CHANGE IN DIRECTION OF HORIZONTAL PIPING EXCEEDS 135°, AT EACH BULKHEAD AND DECK PENETRATION, AND UPSTREAM OF EACH TOILET. CLEANOUTS SHALL BE INSTALLED TO ALLOW BLOCKAGES TO BE CLEARED WITHOUT REMOVING FIXTURES. CONTRACTOR SHALL INSTALL ENOUGH CLEANOUTS TO SERVE ALL HORIZONTAL RUNS IN THE FINAL AS-BUILT CONDITION.

13. CLEANOUTS CONCEALED IN JOINER BULKHEADS OR SUSPENDED CEILINGS SHALL BE ACCESSIBLE VIA REMOVABLE PANEL. PROVIDE 18" OF CLEAR SPACE IN FRONT OF THE CLEANOUT. ACCESS PANELS SHALL BE CLEARLY LABELED.

14. BLACK AND GRAY WATER WASTE DRAIN PIPING SHALL BE SLOPED DOWNWARD AT NO LESS THAN 1/4" PER FOOT IN TRANSVERSE DIRECTION & 1/4" PER FOOT LONGITUDINALLY.

15. AIR ADMITTANCE VALVES CONCEALED IN JOINER BULKHEADS OR SUSPENDED CEILINGS SHALL BE ACCESSIBLE VIA REMOVABLE PANEL OR CEILING TILE. INSTALL AIR ADMITTANCE VALVES A MINIMUM OF 6" ABOVE FLOOD RIM OF FIXTURE SERVED.

16. THE SEWAGE TANK SHALL BE FITTED WITH A LEVEL SENSOR TO INTERFACE WITH THE ALARM AND MONITORING SYSTEM. THE SENSOR SHALL HAVE A HIGH LEVEL ALARM AT 90% FULL.

17. DISCHARGE PIPING SHOWN ON REFERENCE 2.

18. PROVIDE A STAINLESS STEEL DRIP TRAY BELOW THE DISCHARGE PUMP.

19. CPVC PIPE AND FITTINGS SHALL HAVE A USCG CERTIFICATE OF APPROVAL THAT STATES CPVC PIPE AND FITTINGS MEET LOW FLAME SPREAD, AND TOXICITY REQUIREMENTS OF THE FTP CODE ANNEX 1, PARTS 2 AND 5. INSTALL PIPING IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION GUIDELINES. CPVC SHALL BE SEACOR OR SPEARS CPVC WITH USCG TYPE APPROVAL.

20. WHERE STEEL PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS, HEAVY WEIGHT SPOOL PIECES OR AN ALTERNATE APPROVED PENETRATION FITTING SHALL BE USED. SEE DETAIL 1-3A.

21. WHERE PRACTICABLE, DO NOT ROUTE PIPES OVER OR THROUGH SPACES IN WHICH FOOD IS STORED OR PREPARED OR UTENSILS ARE CLEANED. WHERE BLACK OR GRAY WATER DRAINS MUST PASS OVERHEAD OR DIRECTLY THROUGH FOOD PREPARATION OR STORAGE AREAS, CHEMICALLY FUSED CPVC DRAINAGE PIPING SHALL BE USED. PUSH FIT JOINTS SHALL NOT BE USED IN THESE AREAS.

22. DECK AND SHOWER DRAINS INSTALLED IN DECKS SHALL UTILIZE STEEL, ALUMINUM, OR STAINLESS STEEL WELD IN FITTINGS. CONTRACTOR SHALL SELECT DRAIN MATERIAL TO MINIMIZE GALVANIC CORROSION WITH SURROUNDING VESSEL STRUCTURE. BI-METALLIC MATERIALS AND BI-METALLIC JOINT SELECTION SHALL BE APPROVED BY THE OWNER PRIOR TO FABRICATION. TRANSITIONS TO CPVC PIPING SHALL MAINTAIN THE FIRE INTEGRITY OF THE BOUNDARY.

23. WHERE PLASTIC PIPING PENETRATES BULKHEADS OR DECKS, STEEL PENETRATION SLEEVES WITH USCG APPROVED SEALANT AND CRUSHING SLEEVES SHALL BE USED. PENETRATION DETAILS SHALL BE CERTIFIED TO MAINTAIN THE FIRE RATING AND WATERTIGHT INTEGRITY OF THE BOUNDARY AS APPLICABLE. INSTALL PIPING TRANSITS IN ACCORDANCE WITH MANUFACTURER'S APPROVED INSTALLATION DETAILS.

24. SINK OVERBOARD SHALL BE MOUNTED AS FAR ABOVE WATERLINE AS PRACTICAL WHILE MAINTAINING THE REQUIRED SLOPE (NOTE 14) OF THE PIPING. INSTALL A FULL PORT BALL VALVE IN AN ACCESSIBLE LOCATION NEAR THE SHELL PENETRATION.

REVISION HISTORY

REV	ZONE	DESCRIPTION	DWN	DATE	APVD

GENERAL NOTES

GENERAL
1. THIS DRAWING PROVIDES CONTRACT GUIDANCE FOR THE CONSTRUCTION OF A NEW 91'-7" x 27'-6" x 12'-2" PATROL VESSEL FOR THE ALASKA WILDLIFE TROOPERS ALONG WITH THE CONTRACT SPECIFICATION (REF 1). THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION OF ADDITIONAL VESSELS.

REGULATORY STANDARD
2. WHILE THE VESSEL IS UNINSPECTED BY USCG, ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH 46 CFR SUBCHAPTER T. STEEL STRUCTURE SHALL BE CONSTRUCTED TO ABS RULES FOR THE CONSTRUCTION AND CLASSIFICATION UNDER 61 METERS (200 FEET) IN LENGTH. ALUMINUM STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH CHAPTER 5 OF ABS RULES FOR MATERIALS AND WELDING (PART 2).

DETAILS
3. 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 SHOP DRAWING 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.

4. PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS, PIPE SPOOLS SHALL BE SIZED AND ARRANGED TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT WITHOUT CUTTING STRUCTURE OR PIPING.

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 BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE WELDED DIRECTLY TO PIPES.

7.THE PIPING SYSTEM SHALL BE CLEANED AND TESTED IN ACCORDANCE WITH REFERENCE 1.

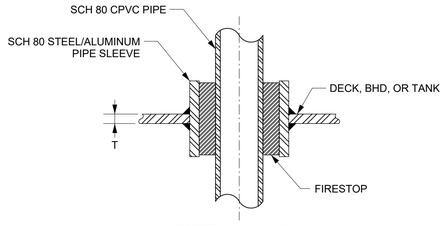
8.TOTAL DYNAMIC HEAD OF PUMPS FOR REQUIRED FLOW ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEM. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.

9.SANITARY DRAIN PIPING IN THE ACCOMMODATIONS AREAS SHALL BE CONCEALED BEHIND JOINER BULKHEADS OR SUSPENDED CEILINGS.

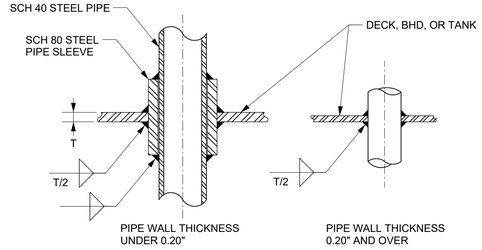
REFERENCES

1. 24065-200-832-0 SPECIFICATION

2. 24065-200-506-0 FILLS, VENTS AND SOUNDS



DETAIL 1-5A
TYP DECK/BHD PENETRATION
CPVC PIPING
SCALE: NONE



DETAIL 1-3A
TYP DECK/BHD PENETRATION
STEEL PIPING
SCALE: NONE

STATE OF ALASKA
49TH
SARAH E. NICHOLS
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REGISTERED PROFESSIONAL ENGINEER
10/2/2026

ELLIOTT BAY DESIGN GROUP

CLIENT	ALASKA WILDLIFE TROOPERS ANCHORAGE, AK	DWN	SEN
		CHK	PTE
		APVD	SEN
PROJECT	Large Class Enforcement Vessel	DATE	10/02/26
TITLE	BLACK AND GRAY WATER SYSTEM SCHEMATIC		
SIZE	D	DWG NO.	24065-200-528-0
REV	-	SHEET	1 OF 2
		SCALE	AS NOTED

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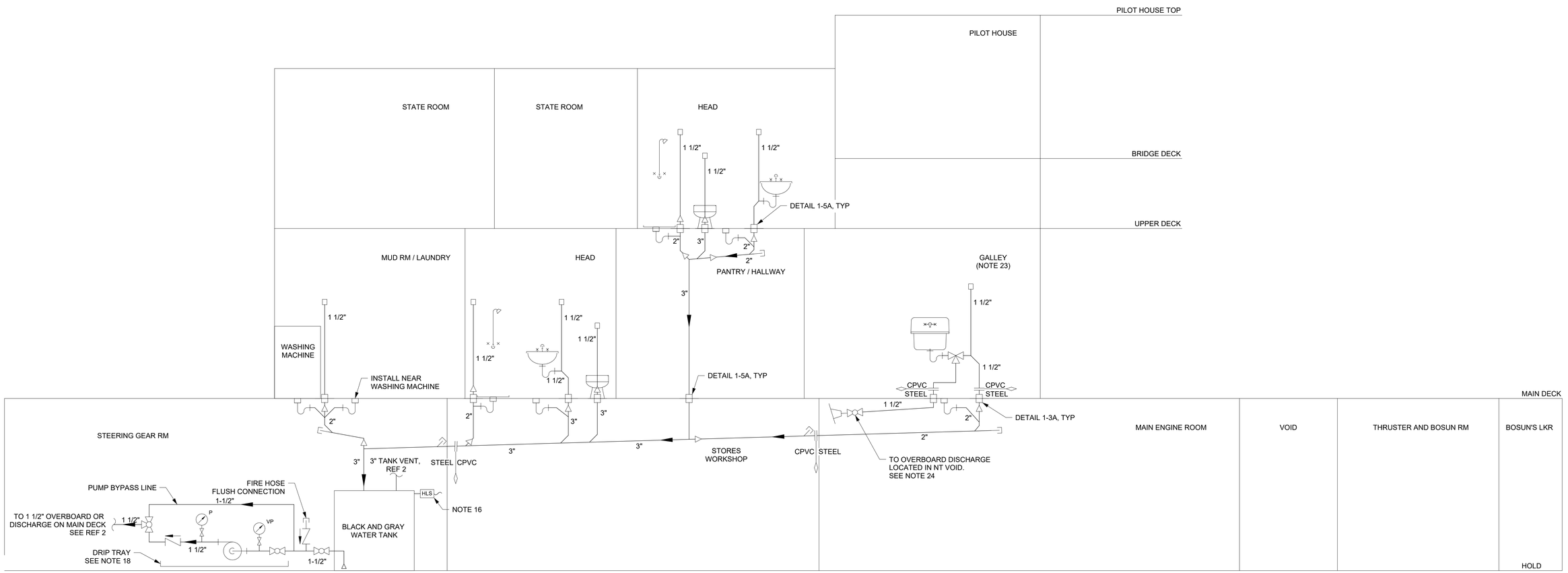

DETAIL 2-4B

BLACK AND GRAY WATER SYSTEM

SCALE: NONE

STATE OF ALASKA
49TH
Sarah Nichols
SARAH E. NICHOLS
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REGISTERED PROFESSIONAL ENGINEER

10/2/2026

SIZE	DWG NO.	REV	SHEET 2 OF 2
D	24065-200-528-0	-	SCALE AS NOTED

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