

APPENDIX A

CCGS CORPORAL MCLAREN MMV
DRYDOCKING AND REFIT 2016



SPECIFICATION - ADDITION
OF LIMBER HOLES IN MAIN
ENGINE ROOM

CCGS G PEDDLE

CANADIAN COAST GUARD



BY: CR

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1111 Bedford Highway
Halifax, NS
Canada, B4A 1B9
Tel: +1-902-444-7447
Fax: +1-902-444-7449

www.allswater.com

Suite 201, 123 Clyde Ave
Mt. Pearl, NL
Canada, A1N 4R9
Tel: +1-709-747-9100
Fax: +1-709-747-2778

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Revision Table

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1 SPECIFICATION

1.1 SCOPE OF WORK

1.1.1 *MAIN ENGINE ROOM*

The Contractor is to perform all strip-out, fabrication and installation work required to meet the modifications to the Main Engine Room in accordance with the references listed in Section 2.0 and the Technical Description as detailed in Section 3.

1.2 BACKGROUND

A survey of the workboat engine rooms has shown an issue with respect to bilge drainage.

1.2.1 *MAIN ENGINE ROOM*

In the Main Engine Room, the bilge water was observed to collect in the longitudinal direction along the outboard side of the main engine girders (port and starboard) from approximately frame 11 to 17. On closer examination these outboard girders do not have any limber holes (rat holes) in the athwartship direction. This means that any water collecting outboard of these girders will not be able to drain to the bilge suctions underneath each main engine. There is a requirement to make a number of limber holes along the outboard side of the main engine girder webs between frames 13 to 15. It should be noted that access to the space where the limber holes are to be installed is very restricted and narrow.

2 REFERENCE DOCUMENTS

2.1 DRAWINGS AND DOCUMENTS

- A. Irving Shipyard Inc. Drawing No. AF6099-52000-01 Rev AF – CCGS Corporal McLaren M.M.V. – Bilge Drainage and Dewatering System.
- B. Irving Shipyard Inc. Drawing No. AF6099-20000-01 Rev AF – CCGS Corporal McLaren M.M.V. – Engine Room Arrangement.
- C. Allswater Structural Drawing No. 15069-800-S-001 – Main Engine Room Limber Hole Additions.
(See Appendix A)

3 TECHNICAL DESCRIPTION

3.1 FUNCTIONAL AND DESIGN REQUIREMENTS

The Contractor will fabricate and/or supply the installation components in accordance with the drawings and guidance notes referenced in Section 2.0.

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3.2 ACCEPTANCE CRITERIA

The Contractor shall ensure that all steel work and removals are within accepted tolerances. The Contractor shall ensure that, after the verification of the installation, all stripped out piping, supporting structure, walkways and walkway frames will be returned to the as found condition.

3.3 EQUIPMENT COMPONENTS AND MATERIALS

3.3.1 *GENERAL*

In addition to the acceptance criteria of section 3.2, the Contractor shall ensure that all bilges and spaces within the Main Engine room are to be dry, clean and certificates provided for gas freed spaces prior to any hot work and appropriate fire watches are placed. The pipe sections to be removed are to be isolated, drained and tagged within the appropriate system before removal.

As noted in section 3.2, the Contractor shall ensure that, after verification of the modification, any disturbed steelwork, piping, wire conduit, electrical wiring and/or wire fastenings, paint coatings will be returned to the as found condition. All new steelwork, piping, and wire conduit are to be primed and painted with marine paint (two coats).

All items removed and identified as items to be re-installed are to be tagged and safely stored for re-installation. The Contractor is to ensure that all new pipes are to be appropriately identified, recorded and "tagged".

Equipment components and material to be removed and installed are listed in the following sections.

3.3.2 *REMOVAL*

3.3.2.1 MAIN ENGINE ROOM STRIP-OUT – STARBOARD

The Contractor shall remove, as a minimum, the following material [Photo 1, 2 & 3] from the outboard side of the starboard engine support girder:

- Steel floor plate and floor support structure b/w frame 13 to 16. To be retained for reinstallation.
- All piping (2" Nom. Dia.) and supports associated with the Sea Water Cooling Line pipe b/w frame 13 to 14. Flanged pipe shall be retained for reinstallation. (Appendix B – Photo #1 - Line #3)

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- All piping (1" Nom. Dia.) and supports associated with the Main Engine Pre-Heat Line pipe b/w frame 13 to 14. Flanged pipe shall be retained for reinstallation. (Appendix B – Photo #1 – Line #4)
- All piping (3" Nom. Dia.) and supports associated with the Seawater Cooling Line pipe b/w frame 13 to 14. Flanged pipe shall be retained for reinstallation. (Appendix B – Photo #1 – Line #5)
- All piping (3/4" Nom. Dia.) and supports associated with the Main Engine Pre-Lube Line pipe b/w frame 13 to 14. Flanged pipe shall be retained for reinstallation. (Appendix B – Photo #1 – Line #1)
- All piping (1 1/4" Nom. Dia.) and supports associated with the Main Engine Pre-Lube Line pipe b/w frame 13 to 14. Flanged pipe shall be retained for reinstallation. (Appendix B – Photo #1 – Line #2)
- All piping (3" Nom. Dia.) and supports associated with the Seawater Cooling Line pipe b/w frame 13 to 14. This pipe will need to be cut out. (Appendix B – Photo #1 & 2 – Line #6)
- All piping (3" Nom. Dia.) and supports associated with the Seawater Cooling Line pipe b/w frame 14.5 to 15.5. Flanged pipe shall be retained for reinstallation. (Appendix B – Photo #3 – Line #6 continued)

If new material is required the Contractor shall supply.

3.3.2.2 MAIN ENGINE ROOM STRIP-OUT – PORT

The Contractor shall remove, as a minimum, the following material [Photo 4 & 5] from the outboard side of the port outboard engine support girder:

- Steel floor plate and floor support structure b/w frame 13 to 15. To be retained for reinstallation.
- Two (2) Battery packs, battery pack securing frame, steel floor plate and floor support structure b/w frame 13 to 15. To be retained for reinstallation.

3.3.3 INSTALLATION

3.3.3.1 MAIN ENGINE ROOM – STARBOARD

The Contractor shall install three (3) limber holes through the web of the outboard main engine girder. The limber holes are to be drilled through the girder web with the use of a Magnetic Drill. Each limber hole shall be located as specified in Drawing 15058-800-S-001. (See Appendix A) Care shall be taken to protect the shell plating IWO each new limber hole.

The Contractor shall re-install, all items saved for re-installation. These are:

- Steel floor plate and floor support structure b/w frame 13 to 16.
- All piping (2" Nom. Dia.) and supports associated with the Sea Water Cooling Line pipe b/w frame 13 to 14. (Appendix B – Photo #1 – Line #3)

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- All piping (1" Nom. Dia.) and supports associated with the Main Engine Pre-Heat Line pipe b/w frame 13 to 14. (Appendix B – Photo #1 - Line #4)
- All piping (3" Nom. Dia.) and supports associated with the Seawater Cooling Line pipe b/w frame 13 to 14. (Appendix B – Photo #1 - Line #5)
- All piping (3/4" Nom. Dia.) and supports associated with the Main Engine Pre-Lube Line pipe b/w frame 13 to 14. (Appendix B – Photo #1 - Line #1)
- All piping (1 1/4" Nom. Dia.) and supports associated with the Main Engine Pre-Lube Line pipe b/w frame 13 to 14. (Appendix B – Photo #1 - Line #2)
- All piping (3" Nom. Dia.) and supports associated with the Seawater Cooling Line pipe b/w frame 13 to 14. (Appendix B – Photo #1 & 2 - Line #2) New piping will need to be installed. Connections will be flanged.
- All piping (3" Nom. Dia.) and supports associated with the Seawater Cooling Line pipe b/w frame 14.5 to 15.5. (Appendix B – Photo #3 - Line #6 continued)

If new material is required, the Contractor shall supply. There will be a requirement to flange pipes which have been cut to gain access to the foundation. The contractor shall identify the piping systems requiring such treatment.

3.3.3.2 MAIN ENGINE ROOM – PORT

The Contractor shall install three (3) limber holes through the web of the outboard main engine girder. The limber holes are to be drilled through the girder web with the use of a Magnetic Drill. Each limber hole shall be located as specified in Drawing 15058-800-S-001. (See Appendix A)

The Contractor shall re-install, all items saved for re-installation. These are:

- Steel floor plate and floor support structure b/w frame 13 to 15.
- Two (2) Battery packs, battery pack securing frame, steel floor plate and floor support structure b/w frame 13 to 15.

If new material is required the Contractor shall supply.

4 INSPECTIONS, TESTS & TRIALS

4.1 GENERAL

The testing of the new systems will be conducted by the Contractor. The trialing of the systems will be determined by Owner. The inspection and approval of the new limber holes will be by the technical authorities. All piping systems which were removed to provide access to the engine foundation and then reinstalled shall be trialed.

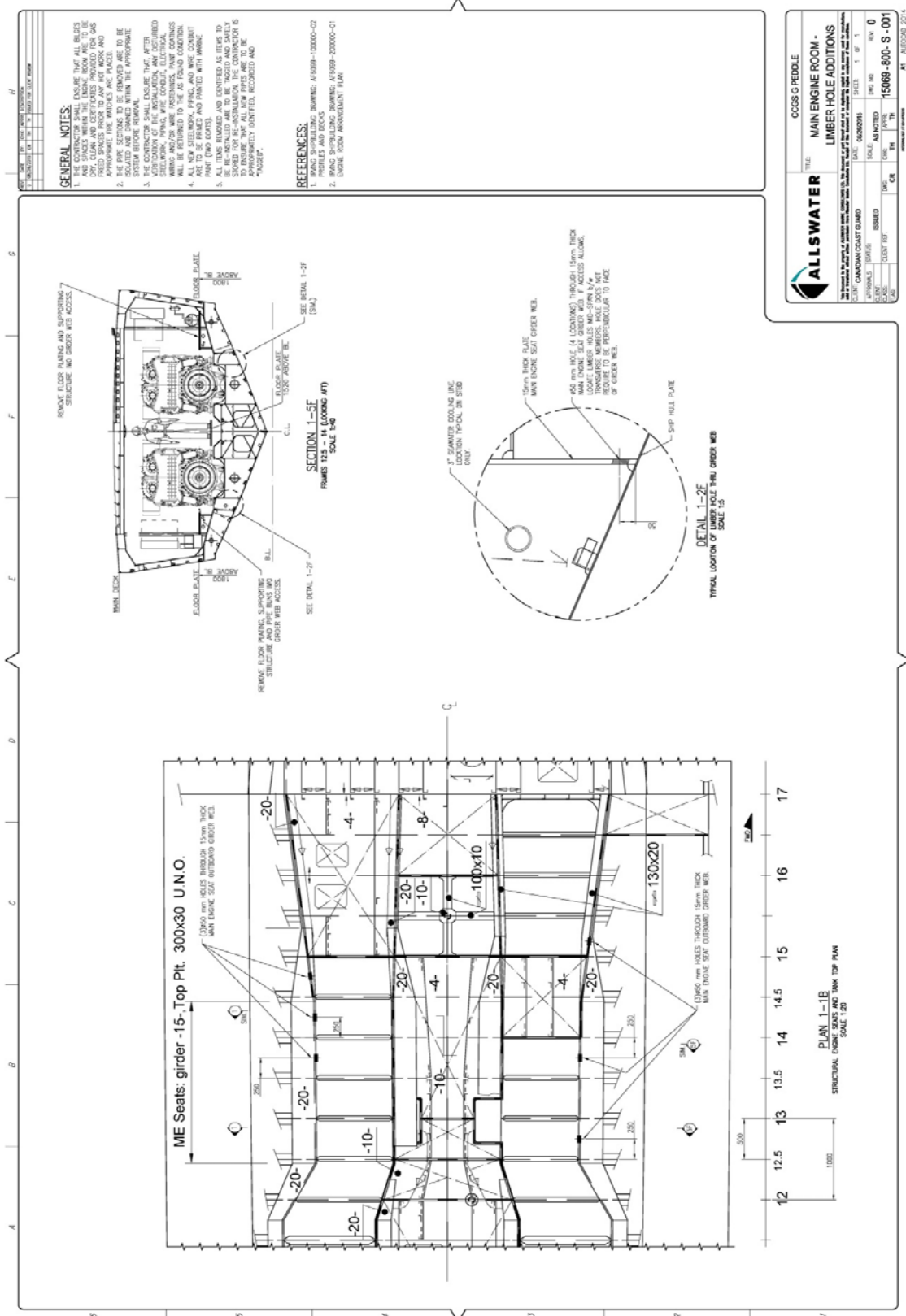
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Appendix A REFERENCES

1. Allswater Structural Drawing No. 15069-800-S-001 – Main Engine Room Limber Hole Additions.



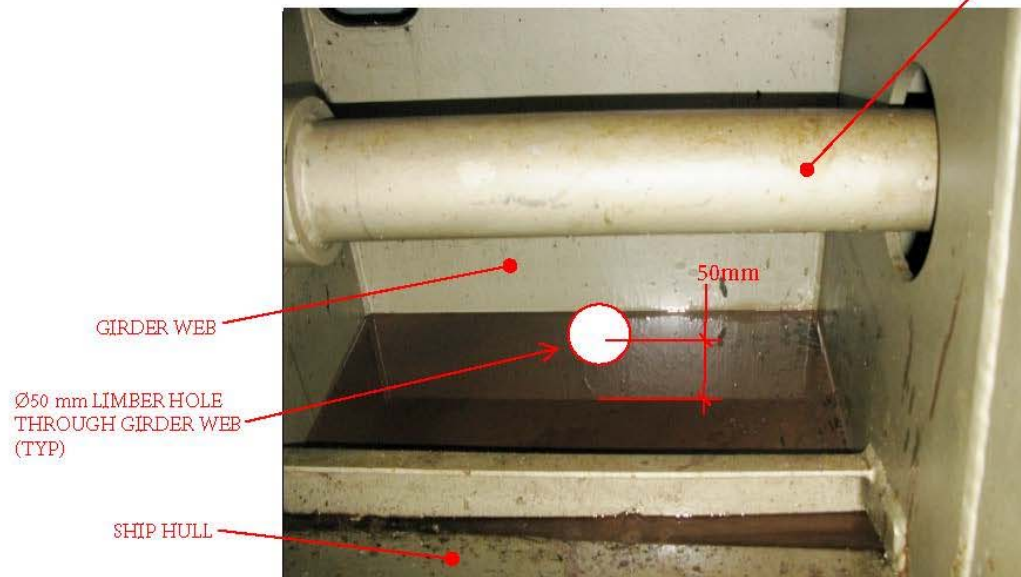
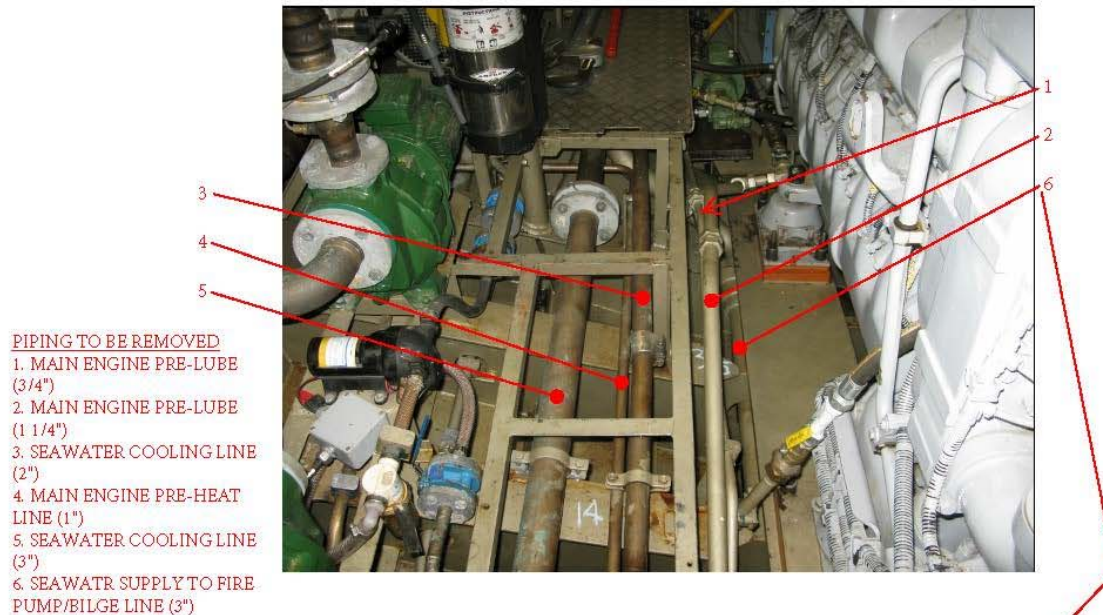
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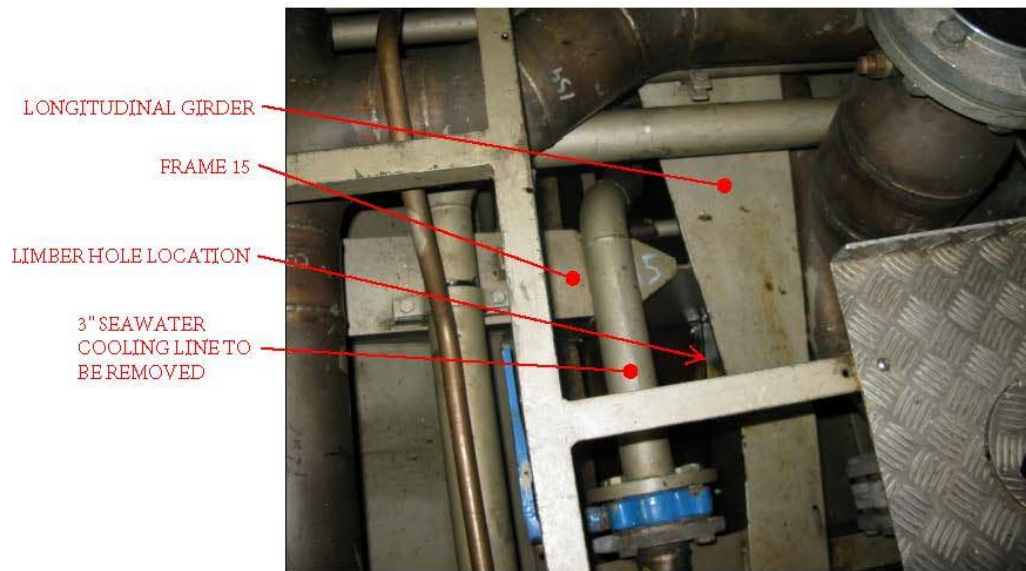
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Appendix B PHOTOS

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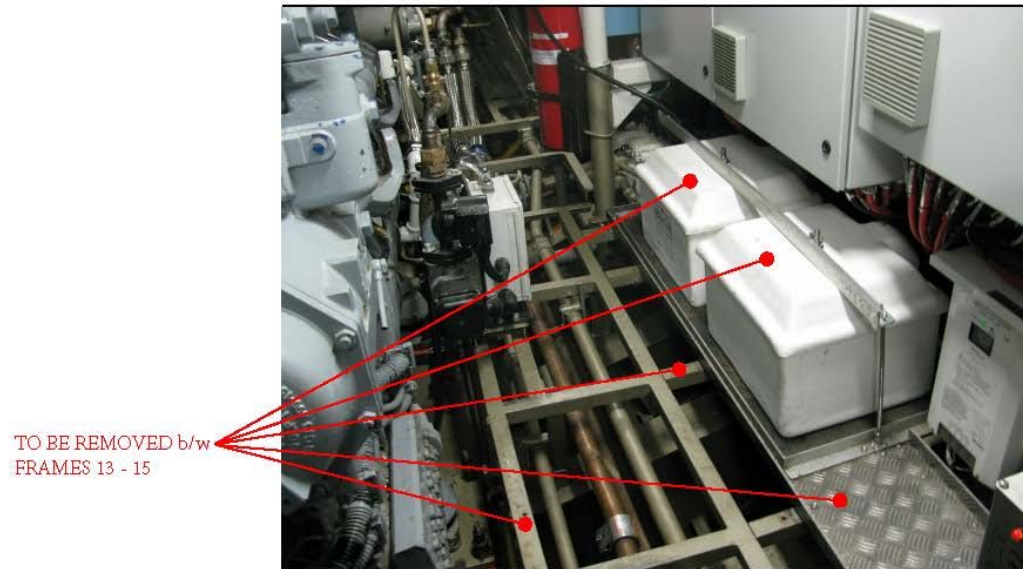


3. Main Engine Room - View of outboard engine support girder (Stbd) & frame 15 (looking aft). 3" Seawater Cooling pipe in foreground to be removed to gain working access to girder web.



4. Main Engine Room - View of outboard (Port) engine support girder (looking aft).

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5. Main Engine Room - View of outboard (Port) engine support girder. Battery packs, steel floor plate and floor support structure to be removed.

APPENDIX B

PANEL E-2 DISTRIBUTION PANEL 120 VOLT

MEGGER AT 50 V

CIRCUIT NUMBER	EQUIPMENT
E2-1	SECURITY DEVICE(SCIP)
E2-2	NAV LIGHTS/MONITORING
E2-3	POWER SUPPLY FOR WIPER CONTROL SYSTEM
E2-4	NAV LIGHTS CONTROL/MONITORING
E2-5	ECHO SOUNDER PROCESSOR DISPLAY AND PRINTER
E2-6	SONAR ASSEMBLY
E2-7	SPEED LOG
E2-8	OPEN DECK AREA BRIDGE DECK LIGHTING
E2-9	FAX MACHINE CHART TABLE LIGHTING
E2-10	SOCKET FOR CHARGERS, PORTABLE RADIO TELEPHONE
E2-11	SPARE
E2-12	CHARGER FOR AUTOMATIC VOLUNTARY OBERVATION SHIPS (AVOS)
E2-13	SOCKET 115 VOLT 15 AMP TOP DECK RADAR ANTENNAE
E2-14	STAIR FR. 14 TOP DECK SOCKETS FOR PORTABLE FLOODLIGHTS
E2-15	CHART LAMP, RED LIGHT BRIDGE AND COMMAND CENTRE
E2-16	EMERGENCY LIGHT BRIDGE / COMMAND CENTRE
E2-17	SPARE
E2-18	SCANNER CONTROL UNIT ANTENNAE S-BAND

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E2-19	SPARE
E2-20	ELECTRIC WHISTLE
E2-21	STBD, CENTRE, AND PORT HEATED FRONT WINDOWS
E2-22	SOCKET FOR DAY SIGNALLING LAMP
E2-23	PORT WING CONSOLE HEATER
E2-24	STBD WING CONSOLE HEATER
E2-25	AIR GROUND VHF TRANSCEIVER
E2-26	CCTV CONTROL STATION / MONITOR BRIDGE
E2-27	SPARE
E2-28	POWER SUPPLY UNIT MF / HF RADIO TELEPHONE
E2-29	FRONT CENTRE WINDOW WIPER CONTROLS (3 PHASE)
E2-30	LOUD HAILER
E2-32	SPARE
E2-33	PORT AND STBD WINDOW WIPER CONTROLS (3 PHASE)
E2-34	PORT, CENTRE, AND STBD HEATED FRONT WINDOWS
E2-35	SOCKET-BRIDGE WING CONSOLES
E2-36	SOCKET-MCR CONSOLE

PANEL E-1 EMERGENCY DISTRIBUTION 120 VOLT

MEGGER AT 100V

CIRCUIT NUMBER	EQUIPMENT
E1-01	SOCKET FOR ECHO SOUNDER TRANSCIEVER ARR. IN EER, FRS. 25-26 STBD
E1-02	JUNC. BOX FOR CCTV POWER OVER ETHERNET ADAPTERS ARR. IN EER FRS. 25-26 STBD
E1-03	SOCKET FOR E-MAIL AT SEA EQUIPMENT ARR. IN EER FRS. 23-24 STBD
E1-04	SPARE
E1-05	RADAR "X" BAND ISOLATION SWITCH ARR. ON TOP OF BRIDGE DECK FR. 15 PORT
E1-06	RADAR "S" BAND TRANSCIEVER AND UPS FOR RADAR STATION UNIT #3 COMMAND CENTRE FR. 18
E1-07	MAIN DECK HEAT TRACE
E1-08	SOCKET FOR CCTV CONTROLLER ARR. IN EER FR. 24 STBD
E1-09	WIRELESS PAGER TRANSMITTER
E1-10	FIRE DETECTION CONTROL UNIT ARR. IN BRIDGE FRS. 18-19 PORT
E1-11	GYRO COMPASS INTERFACE AND POWER SUPPLY UNIT ARR. IN BRIDGE FRS. 25-26 STBD.
E1-12	SOCKET FOR MCR PRINTER
E1-13	SEARCHLIGHT FRS. 21 PORT TOP OF BRIDGE
E1-14	SAT. CONNECTIVITY ADAPTER 4 PORT ARR. IN COMMAND CENTRE, FRS. 16-17 PORT, SAT. CONNECTIVITY ADAPTER 8 PORT ARR. IN BRIDGE FRS. 19-20 PORT
E1-15	INDIVIDUAL STARTER FOR EMERGENCY GENERATOR COMPT FAN

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E1-16	RECTIFIER FOR BATTERY BACK-UP SYSTEM
E1-17	SPARE
E1-18	RED LIGHTS (STAIRS, MESS ROOM)
E1-19	ELECTRONIC CHART SYSTEM (JB) ARR. IN COMMAND CENTRE, FR. 16 STBD
E1-20	ELECTRONIC CHART SYSTEM DISPLAY ARR. IN BRIDGE WING CONSOLE, FR. 22 PORT
E1-21	ELECTRONIC CHART SYSTEM DISPLAY ARR. IN BRIDGE WING CONSOLE, FR. 22 STBD
E1-22	SPARE
E1-23	UPS FOR LAN ARR. IN EER FR. 23-24 STBD
E1-24	DOUBLE SOCKET FOR CELLULAR PHONE TRANSCIEVER AND AMPLIFIER ARR. IN COMMAND CENTRE FR. 17 PORT
E1-25	SEATEL DOME HEATER
E1-26	SOCKET FOR RADIO COMMUNICATION RACK ARR. IN EER, FR. 24 STBD
E1-27	SOCKET FOR RADIO COMMUNICATION RACK ARR. IN EER, FR. 17-18 STBD
E1-28	REMOTE RADAR STATION UNIT #2 ARR. IN COMMAND CENTRE FR. 16 STBD
E1-29	SPARE
E1-30	HEATER FOR SOUND POWERED TELEPHONE (JB) ARR. IN MESSROOM FR. 21
E1-31	RED FLASHING BEACON FOR GENERAL ALARM SYSTEM ARR. IN BOW THRUSTER ROOM, FR. 34
E1-32	FLASHING BEACON FOR AUTOMATIC TELEPHONE (JB) ARR. IN EMERGENCY GENERATOR COMPARTMENT, FR. 15 STBD
E1-33	SHORE CONNECTION BOX FOR AUTOMATIC TELEPHONE ARR. IN HVAC ROOM FR. 32 PORT

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E1-34	BATTERY LOCKER HEATER ARR. ON BRIDGE DECK FR.24 CL
E1-35	SPARE
E1-36	CONVERTER FOR ANALOG TO INTERNET PROTOCOL
E1-37	SPEED LOG PRE-AMP
E1-38	SPARE
E1-40	IMIC3 UPS

EMERGENCY GENERATOR DISTRIBUTION 240 VOLT

MEGGER AT 500V range

CIRCUIT NUMBER	EQUIPMENT
2Q24	ME STBD PRE-LUBRICATING PUMP
2Q25	ME PORT PRE-LUBRICATING PUMP
2Q26	IICS MAIN CABINET (ATS)
2Q27	EMER DG ROOM ACTUATORS
2Q28	COLD ROOM COMPRESSOR # 1
2Q29	COLD ROOM COMPRESSOR # 2
2Q30	S.W. COOLING PUMP
2Q31	SPARE
2Q32	SPARE

EMERGENCY GENERATOR DISTRIBUTION 120 VOLT

MEGGER AT 500V

CIRCUIT NUMBER

EQUIPMENT

3Q01	EMERGENCY DISTRIBUTION PANEL E2
3Q02	EMERGENCY DISTRIBUTION PANEL E1
3Q03	RECTIFIER FOR AUTOMATION UPS B SYSTEM
3Q04	CHARGER EMER. GEN STARTING BATTERY
3Q05	INTERFACE BOX EX-PROFF HORN
3Q06	CCTV CAMERA IR ILLUMINATORS
3Q07	SPARE
3Q08	H2S ALARM SYSTEM
3Q09	SPARE
3Q10	NAVIGATION LIGHTS PANEL - BRIDGE CONSOLE STATION
3Q11	RESCUE BOAT DAVIT HEATERS
3Q12	RECTIFIER FOR AUTOMATION UPS A SYSTEM
3Q13	EMERGENCY LIGHTS – AFT
3Q14	EMERGENCY LIGHTS – INTERIOR FWD
3Q15	EMERGENCY LIGHTS – ACCOM STBD
3Q16	SPARE
3Q17	EMERGENCY LIGHTS – ER SPACES
3Q18	SOCKETS FOR PORTABLE (3X) FLD LIGHTS STAIR AFT MN DECK

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3Q19	SOCKETS FOR PORT AND STBD RHIB (RECTIFIER 2X)
3Q20	HEATERS EMERGENCY GENERATOR
3Q21	HEATERS PORT AND STBD GENERATORS
3Q22	MMR FIXED FIRE FIGHTING BOX
3Q23	SPARE
3Q24	RVHF/FMWIDEBAND ENCRYPTON TRANSCEIVER
3Q25	GMDSS CONSOLE
3Q26	GALLEY FIXED FF BOX
3Q27	SPARE
3Q28	SPARE
3Q29	VHF/FM WIDEBAND ENCRYPT CONTROL SOCKETS
3Q30	SPARE

EMERGENCY GENERATOR DISTRIBUTION 600 VOLT

CIRCUIT NUMBER	EQUIPMENT
2Q01	SPARE
2Q02	ME STBD PREHEATING PUMP
2Q03	S.W.SERVICE COOLING P/P #2
2Q04	ME PORT PREHEATING PUMP
2Q05	TRAILING LO PUMP GEARBOX STBD
2Q06	SPARE
2Q07	RESCUE BOAT DAVIT ELECTRIC WINCH PUMP HPU
2Q08	MMR FIRE & BILGE P/P
2Q09	STEERING GEAR STBD PUMP # 2
2Q10	STEERING GEAR PORT PUMP # 2
2Q11	TRAILING LO PUMP GEARBOX PORT
2Q12	EMERGENCY FIRE PUMP
2Q13	P3 CPP STBD
2Q14	TRANSFORMER "ET2" 10KVA :600/240 V, 3PH, E-SWBD 240V DIST. (SWBD – Switchboard)
2Q15	P3 CPP PORT
2Q16	AIR STARTING COMPRESSOR #2
2Q17	TRANSFORMER "ET1" 3X10KVA :600/120 V, 3PH, E-SWBD 120V DIST.
2Q18	SPARE

MOTORS

MEGGER AT 500V

CIRCUIT NUMBER

EQUIPMENT

Macerator Pump (Sewage Treatment)

B/W Transfer Pump (Sewage Treatment)

Sludge Pump (Sewage Treatment)

HPU

EXHAUST FAN MOTOR MMR

EXHAUST FAN MOTOR AMR

STBD. TRAILING PUMP GEAR BOX

PORT TRAILING PUMP GEAR BOX

5510-1-118-001 AIRSTART COMP (Compressor 1)

5510-1-117-001 AIRSTART COMP (Compressor 2)

2000-1-014-003 CPP PUMP 2.1

2000-1-014-004 CPP PUMP 2.,2

2000-1-014-005 CPP PUMP 1.1

2000-1-014-006 CPP PUMP 1.2

GRAY WATER TRANSFER STATION

JET VAC COLLECTING UNIT

COALESCING PUMP

CDU1 COMPRESSOR

CDU2 COMPRESSOR

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STEERING FLAT

STEERING HYDRAULIC UNIT STBD. AUX.

STEERING HYDRAULIC STBD. MAIN

STEERING HYDRAULIC UNIT PORT AUX.

STEERING HYDRAULIC PORT MAIN

EXHAUST FAN AMR

VFD1-SB09FA INLET FAN AMR

VFD1-SB08FA INLET FAN MMR

VFD1-SB09EA INLET FAN MMR

VFD1-SB08GA INLET FAN AMR

5510-1-117 AIR START COMPRESSOR

5510-1-118 AIR START COMPRESSOR

FORE PEAK

MEGGER AT 500V

CIRCUIT NUMBER

EQUIPMENT

P-415

WATER HEATER ELEMENTS

P-119

INSTANT WATER HEATER ELEMENTS

P-118

A/C UNIT 2 MOTORS

P-101

HOT WATER CIR. PUMP

BSD-40

BOWTHRUSTER ROOM FAN

E2 12

EM FIRE PUMP

#1 REVERSE OSMOSIS FILTER MOTORS HP # 1

#2 REVERSE OSMOSIS FILTER MOTORS HP #2

PANEL P-5 CONVECTION HEATER PANEL 240 VOLT

MEGGER AT 500V

Location: HVAC room

CIRCUIT NUMBER

EQUIPMENT

P5-1

**WASHROOMS FR 29 & STEWARDS LOCKER BELOW M.
DECK CONVECTION HEATERS**

P5-2

**CENTRAL STORE ROOM, MCR & MEDICAL SAR LOCKER
BELOW MAIN DECK CONVECTION HEATERS**

P5-3

WET GEAR STORE ROOM M. DECK CONVECTION HEATERS

P5-4

H.V.A.C. ROOM M. DECK CONVECTION HEATERS

P5-5

**WASHROOMS FR. 26 STBD, GALLEY, STAIRCASE AND
WASHROOM FR. 16 STBD M. DECK CONVECTION HEATERS**

P5-6

SPARE

P5-7

SPARE

P5-8

SPARE

PANEL P-2 BLAST HEATER PANEL 600 VOLT

MEGGER AT 1000V

Location: Steering Gear Rm

CIRCUIT NUMBER

EQUIPMENT

P2-1	BLAST HEATERS AMR
P2-2	LINEN / LAUNDRY LOCKER BLAST HEATER
P2-3	BLAST HEATER STEERING GEAR ROOM PORT
P2-4	BLAST HEATER STEERING GEAR ROOM STBD
P2-5	SPARE
P2-6	SPARE

PANEL P-1 BLAST HEATER PANEL 600 VOLT

MEGGER AT 1000V

Location: by work bench

CIRCUIT NUMBER

EQUIPMENT

P1-1	BLAST HEATERS MMR
P1-2	BLAST HEATERS MMR & EMERGENCY GENERATOR ROOM
P1-3	BLAST HEATERS BOW THRUSTER ROOM
P1-4	SPARE
P1-5	SPARE
P1-6	SPARE

PANEL L-5 (A.C. DISTRIBUTION 120 VOLT)

MEGGER AT 500 V

CIRCUIT NUMBER	EQUIPMENT
L5-1	LIGHTING IN FREEZER,GALLEY DRY FOOD,REFRIGERATOR,WET GEAR,TRASH COMPACTOR,
L5-2	LIGHTING IN ELECTRO. EQUIP. RM. FR.26 STBD, CAPT. CAB,CH. ENG. CABIN, HVAC ROOM, DECK EQUIP LOCKER, FUEL OIL SPILL LOCKER
L5-3	MIRROR AND WALL LAMPS IN ACCOMMODATIONS
L5-4	SOCKET-OPEN M.DK. FR.28 PORT
L5-5	SOCKET-OPEN M.DK. FRS.21 & 12 STBD
L5-6	OPEN MAIN DECK PORT AND STBD LIGHTING
L5-7	SOCKET-OPEN M.DK. FRS.28 STBD
L5-8	SOCKETS-MESS ROOM PORT
L5-9	SOCKET-OPEN M.DK. FR.33 PORT AND STBD
L5-10	LINEN/LAUNDRY LOCKER, MCR, 2ND ENG CABIN AND 2P CABINS BELOW M.DK.
L5-11	FR.29 STBD LOCKER, STEWARD LOCKER, FR.29 PORT AND BOW THRUSTER BELOW MAIN DECK
L5-12	SOCKETS-MESS ROOM FWD BULKHEAD STBD
L5-13	BED LAMPS BELOW M.DK. AND MAIN DECK
L5-14	SOCKET-LAUNDRY AND PASSAGEWAY BELOW MAIN DECK
L5-15	SOCKETS-MCR BELOW MAIN DECK
L5-16	SOCKETS-2ND ENG AND 2P CABINS BELOW MAIN DECK
L5-17	SOCKETS 1P & 2P CABINS BELOW MAIN DECK

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L5-18	SOCKETS-EER AND CAPT. CABIN MAIN DECK
L5-19	SOCKETS-INCIDENT COMM. AND CHIEF ENG. CABINS MAIN DECK
L5-20	SOCKETS – PASSAGEWAY, HVAC RM & DECK EQUIP RM – MAIN DECK
L5-21	SOCKET FOR WORKBENCH , EM'CY DG ROOM MAIN DECK
L5-22	SOCKETS 2P CABIN PORT AND 2P CABIN STBD BELOW MAIN DECK
L5-23	SPARE
L5-24	SOCKET-OPEN M.DK. FRS. 10-11 STBD
L5-25	SOCKET-OPEN M.DK FRS. 21 & 12 PORT
L5-26	SPARE

PANEL L-4 (MESSROOM PANEL 120 VOLT A.C.)

MEGGER AT 250 V

CIRCUIT NUMBER	EQUIPMENT
L4-1	SOCKET FOR REFRIGERATOR-GALLEY
L4-2	SOCKET FOR FOOD PROCESSOR-GALLEY
L4-3	SOCKET FOR DEEP FRYER-GALLEY
L4-4	SOCKET FOR REFRIGERATOR-MESSROOM
L4-5	SOCKET FOR MICROWAVE OVEN-MESSROOM
L4-6	SOCKET FOR TOASTER-MESSROOM
L4-7	SPARE
L4-8	SPARE
L4-9	SOCKET FOR REFRIGERATORS (CAPT. AND CH. ENG.)
L4-10	SOCKET FOR COFFEE MAKER-MESSROOM
L4-11	SOCKET FOR SOUP WARMER-MESSROOM
L4-12	SOCKET FOR MIXER-GALLEY

PANEL L-3 (120 VOLT)

MEGGER AT 50 V

CIRCUIT NUMBER	EQUIPMENT
L3-01	SOCKET TOP DECK FWD-PORT
L3-02	SOCKET TOP DECK FWD-STBD
L3-03	SOCKET TOP DECK AFT-PORT
L3-04	SOCKET TOP DECK AFT-STBD
L3-05	NORMAL LIGHTING-COMMAND CENTRE
L3-06	SOCKETS FROM BRIDGE(CHART TABLE,GMDSS AND CELL PHONE CHARGER)
L3-07	SOCKETS FROM COMMAND CENTRE (INCIDENT COMMANDER AND STBD TABLE)
L3-08	SOCKETS FROM BRIDGE AND COMMAND CENTRE
L3-09	SPARE
L3-10	SEARCH LIGHT-STBD
L3-11	FLOODLIGHT BRIDGE DECK PORT (AFT AREA)
L3-12	FLOODLIGHT BRIDGE DECK STBD (AFT AREA)
L3-13	SOCKET RADAR ANTENNA TOP DECK PORT
L3-14	NORMAL LIGHTING-BRIDGE
L3-15	FIRE DETECTION CONTROL UNIT
L3-16	SOCKET FOR FR. 21 PORT AND STBD BRIDGE
L3-17	POWER SUPPLY-SATELLITE ANTENNA CONTROL UNIT
L3-18	SPARE
L3-19	SOCKET FOR FLOODLIGHT FR. 31 BRIDGE DECK

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L3-20	SOCKET FOR FLOODLIGHT FR. 09 MAIN DECK PORT AND STBD
L3-21	SPARE
L3-22	SPARE

L2 PP TOGGLE SWITCH

Circuit Number	Equipment
L2-12-01	WET GEAR FAN
L2-12-02	SPARE
L2-12-11-09-03	WASHROOM MAIN DECK FORWARD FAN
L2-12-04	WASHROOM BELOW MAIN DECK FR. 26 PORT AND STBD. FANS
L2-12-05	WASHROOM MAIN DECK FR. 16 STBD FAN
L2-12-06	LAUNDRY FAN
L2-12-07	HVAC ROOM FAN
L2-12-08	FUEL OIL SPILL LOCKER FAN
L2-12-10	STAIR CASE FAN MAIN DECK FR. 18
L2-12-12	MEDICAL EQ AND SAR LOCKER FAN
L2-12-13	GALLEY HOOD FAN

PANEL L-2 (HEATING AND GALLEY 240 VOLT A.C.)

MEGGER AT 500 V

CIRCUIT NUMBER	EQUIPMENT
L2-1	Galley Mini Split
L2-2	SPARE
L2-3	SPARE
L2-4	SPARE
L2-5	STAIR CASE DUCT HEATER
L2-6	MESS ROOM AND GALLEY DUCT HEATER
L2-7	BRIDGE DUCT HEATER
L2-8	COMMAND CENTRE DUCT HEATER
L2-9	SUPPLY BOX / HEATERS (4 COMPARTMENTS)
L2-10	SUPPLY BOX / HEATERS (7 COMPARTMENTS)
L2-11	SPARE
L2-12	FANS DISTRIBUTION

PANEL L-1 (120 VOLT A.C.)

MEGGER AT 250V

CIRCUIT NUMBER	EQUIPMENT
Q-20	BATTERY CHARGER (BATTERY BACK UP SYSTEM)
Q-21	BATTERY CHARGER (AUTOMATION UPS A)
Q-22	SOCKET AFT WORKING AREA (MAIN DECK FRAME 0)
Q-23	LIGHT STAIR BELOW MAIN DECK AND MAIN DECK
Q-24	SOCKETS STEERING GEAR , AMR, MMR, FORE
Q-25	LIGHTS STEERING GEAR, 1/2 AMR, 1/2 MMR
Q-26	LIGHTS STEERING GEAR, 1/2 AMR, 1/2 MMR
Q-27	NAVIGATION LIGHTS PANEL (BRIDGE CONSOLE)
Q-28	BATTERY CHARGER (AUTOMATION UPS-B)
Q-29	L-3 DISTRIBUTION PANEL 120 VOLT
Q-30	L-4 DISTRIBUTION PANEL 120 VOLT(GALLEY AND MESS EQUIPMENT)
Q-31	BRIDGE AFT HEATED WINDOWS
Q-32	TRASH COMPACTOR
Q-33	L-5 DISTRIBUTION PANEL 120 VOLT
Q-34	SPARE
Q-35	ACTUATOR FOR CYCLONE FILTER (PURGING VALVE CONTROL PANEL)
Q-36	SPARE
Q-37	BRIDGE AFT HEATED WINDOWS

PANEL L-1 (240 VOLT BUSS A)

CIRCUIT NUMBER	EQUIPMENT
Q02	L2 DISTRIBUTION PANEL
Q03	SOCKET AFT WORKING AREA-PORT FR. 8-9
Q04	SOCKET AFT WORKING AREA-STBD FR. 8-9
Q05	SOCKET FORE WORKING AREA STBD FR. 10 MAIN DECK
Q06	SOCKET AFT MMR
Q07	SOCKET FORE MMR
Q08	BOW THRUSTER ROOM FAN
Q09	UV STERILIZER
Q10	IICS MAIN CABINET
Q11	SEWAGE TREATMENT PLANT
Q12	SOCKET GALLEY
Q13	STEERING GEAR EXH FAN
Q14	EXHAUST FAN AMR
Q15	EXHAUST FAN MMR
Q16	GRAY WATER TRANSFER PUMP
Q17	SCIENTIC FREEZER
Q18	DISHWASHER

DISTRIBUTION BOARD BUSS "B"

Q40	DISTRIBUTION BOARD BUSS "C" (FROM 240V TRANS T3)
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Q51	PORT CONVECTION HEATER DISTRIBUTION PANEL
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DISTRIBUTION BOARD BUSS "C"

Q41	COOKING RANGE
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Q42	SPARE
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Q43	SPARE
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Q44	GALLEY HOT PLATES
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Q45	SPARE
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Q46	FOOD WASTE DISPOSER
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Q47	SPARE
------------	--------------

Q48	SPARE
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Q49	FW HYDROPHORE PUMP #1
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Q50	FW HYDROPHORE PUMP #2
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Q52	SPARE
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Q53	SPARE
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TRANSFORMERS

MEGGER AT 500 V

CIRCUIT NUMBER

EQUIPMENT

600/240V PRIMARY

PORT
STBD.

600/240V SECONDARY

PORT
STBD.

600/120V PRIMARY

PORT
STBD.

600/120V SECONDARY

PORT
STBD.

SHORE POWER TRANSFORMERS

PRIMARY
SECONDARY

GENERATORS

MEGGER AT 500 V

EQUIPMENT

PORT GENERATOR # 2

CABLE TO SWBD

STBD GENERATOR # 1

CABLE TO SWBD

EM GENERATOR

600V BUSS

#1 Generator S/N: WA-576975-0111

#2 Generator S/N: WA-576977-0111

Emergency Generator S/N: MX-154850-0111

LOCKOUT/TAGOUT PROCEDURE FOR GENERATORS:

1. Lockout Generator Circuit Breaker at Switchboard.
2. Inhibit Generator start at Local Control Panel.
3. Isolate Air Start and bleed off line to Air Starter for Main Generators/ Disconnect Battery for Emergency Generator.
4. Isolate Meg Alert System for respective Generators -
 - a. Emergency Generator open fuse FU03SB11CA in Section 1 Emergency Swbd.
 - b. Port (2) Main Generator open fuse FU09SB05AB Section 3 Main Swbd.
 - c. Stbd (1) Main Generator open fuse FU04SB05AB Section 3 Main Swbd.

600 VOLT DISTRIBUTION PANEL STBD.

CIRCUIT NUMBER	EQUIPMENT
1Q01	HOT WATER CIRCULATION PUMP #1 (B.T. ROOM)
1Q02	SPARE
1Q04	CPP STBD PRESS. MAINTAINING PUMP
1Q11	CPP STBD MAIN PUMP
1Q13	UPPER REVERSE OSMOSIS SYSTEM (B.T. ROOM)
1Q14	P-1 BLAST HEATER DISTRIBUTION PANEL
1Q15	SPARE
1Q17	SPARE
1Q18	CONDENSION UNIT HVAC CONTROL PANEL
1Q19	INLINE HEATER (ON DEMAND HOT WATER HEATER)
1Q20	SPARE
1Q21	HUMIDIFIER
1Q24	SPARE
1Q25	SPARE
1Q26	SPARE
1Q06	SPARE
1Q10	STEERING GEAR STBD PUMP # 1

600V 3 PHASE PORT DISTRIBUTION PANEL

MEGGER AT 500 V

CIRCUIT NUMBER	EQUIPMENT
4Q02	CPP PORT MAIN PUMP
4Q03	SPARE
4Q06	VACUUM SYSTEM UNIT (240 VOLT)
4Q07	COALESCER FILTER CONTROL PANEL
4Q10	SPARE
4Q12	LOWER REVERSE OSMOSIS SYSTEM (B.T. ROOM)
4Q13	SPARE
4Q14	AIR COMPRESSOR # 1 AMR
4Q15	HOT WATER HEATER (B.T. ROOM)
4Q17	P2 BLAST HEATER DISTRIBUTION PANEL
4Q18	SPARE
4Q19	TRANSFORMER "T3" 30 KVA, 600/240V, 3PH, L1 DIST. SWBD BUSS-B
4Q20	DECK MACH. SYST. (INT HYDR, SYST.)
4Q21	AHU CONTROL PANEL DUCT. PANEL HEATER HVAC
4Q22	CPP PORT PRESSURE MAINTAINING PUMP
4Q26	SPARE
4Q08	STEERING PUMP PORT # 1
4Q09	SPARE

MCC-STBD

MEGGER AT 500V

CIRCUIT NUMBER	EQUIPMENT
1-A	SW SERVICE COOLING PUMP #1
1-B	F/O TRANSFER PUMP
1-C	DIRTY OIL TRANSFER PUMP
1-D	FRESH WATER TANK #11 IMMERSION HEATER
1-E	FIRE/BILGE PUMP AMR SELF PRIMING
1-F	INLET FAN MMR
1-G	INLET FAN AMR
1-H	SW PUMP CONDENSING UNIT
1-J	SPARE

MCC-PORT

MEGGER AT 500V

CIRCUIT NUMBER	EQUIPMENT
2-A	FO CONTINOUS TRANSFER PUMP
2-B	SW SERVICE COOLING PUMP #2
2-C	L.O. TRANSFER PUMP
2-D	BILGE/FIRE PUMP MMR SELF PRIMING
2-E	INLET FAN MMR
2-F	INLET FAN AMR
2-G	FRESH WATER TANK #12 IMMERSION HEATER
2-H	SPARE
2-J	SPARE

SECTION 3 SWBD

MEGGER AT 500 V

CIRCUIT NUMBER	EQUIPMENT
3Q02	TRANSFORMER TI 3 X10KVA 600/240 3PH L1 DISTRIBUTION SWBD BUSS A
3Q03	CB-E TIE TO EM SWBD
3Q04	TRANSFORMER T2 3X15KVA 600/120V 3 PH L1 DISTRIBUTION SWBD
	CB-TIE TIES PORT AND STRB SWBD

SECTION 2 SWBD

2Q04	TRANSFORMER T1 3X10 KVA 600/240V 3 PH L1 DISTRIBUTION SWBD BUSS A
2Q05	CB-E TIE TO EM SWBD
2Q06	TRANSFORMER T2 3X15KVA 600/120V 3 PH L1 DISTRIBUTION SWBD
CB-SP-A	SHORE POWER A 600V AC 60 HZ 3 PH 200AMP
CB-SP-B	SHORE POWER B 600V AC 60 HZ 3 PH 200 AMP

NOTE: When taking Swbd Reading Ground Detection cables must be unplugged in Section 1 and 4 of Swbd and Ground Lead for Earth Detection Relay (IM01-SB05AB) must be disconnected in Section 3.

APPENDIX C

APPENDIX D

Specification for NEW Hero Class exhaust outlet

EXHAUST REMOVALS

REFERENCE

Further guidance can be seen on the following drawings:

1. J15073-S01_R0, Sht. 1 - M.E. Exhaust Outlets Strip-Out and Removals, and
2. J15073-M01_R4, Sht. 1 & 2 - New M.E. Exhaust Outlets

EXISTING TRANSOM PENETRATION AND EXHAUST PIPING

The existing exhaust pipe that remains in the ship unaffected by this removal must be adequately supported to prevent bending prior to any removals.

The existing hull penetration and flanged connecting piece are to be removed in their entirety. The portion of piping between the connecting flange and the first set of pipe flanges on the horizontal exhaust run (which contains the flanged connection for the sea water injection) is to be removed as well.

The existing sea water injection line with flanged connection to the exhaust pipe is to be removed and re-used in the new exhaust pipe section which will be installed at this location.

TRANSOM PLATING AND PENETRATION SUPPORT BRACKETS

The corroded weld area surrounding the existing hull penetration piece and any corroded transom plating outside of this weld area is to be cut-out. Care is to be taken to ensure no additional plating that remains in good condition, is cut away in the process. If the corroded area of transom plating exceeds the area of new penetration plating, then insert plates of the original thickness and grade are to be installed, in accordance with Lloyd's Register (this will vary by ship and by P&S side of each ship).

The existing interior welded support brackets for the hull penetration piece are to be cut back and removed.

Canada shall provide Lloyd's certified steel, if necessary, for the transom repair. The Contractor must specify the quantity and thickness required before the repair begins.

NEW TRANSOM PENETRATION AND EXHAUST PIPING TRANSOM EXHAUST PENETRATION, MATERIAL AND WELDING

DESCRIPTION

New transom penetrations (2 off) will be constructed entirely using 316L stainless steel and will be welded directly into the transom plating. No Carbon Steel will be used in the penetration piece.

Reference

Details of the new exhaust penetration arrangement and construction detail guidance can be seen in the following drawings:

1. J16050-I01_R0, Sht. 1 & 2 - M.E. Exhaust & Transom Insert
2. J16050-P01_R0, Sht. 1 - M.E. Exhaust Parts
3. J16050-P02_R0, Sht. 1 - M.E. Exhaust Parts
4. J16050-P03_R0, Sht. 1 – Transom Insert Parts
5. J16050-P0_R0, Sht. 1 – Exhaust Flap Parts

All welding and weld inspection shall be in accordance with the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A. The term Delegated Representative in the Canadian Coast Guard Welding Specification shall mean the CGTA.

TECHNICAL REQUIREMENTS

- For any item requiring the application of fusion welding for steel structures, the Contractor and all Sub-Contractors shall be certified by the Canadian Welding Bureau to CSA\ACNOR W47.1 – latest edition, Division 1 or 2.
- For any item requiring the application of fusion welding for stainless steel structures, the Contractor and all Sub-Contractors shall be certified by the Canadian Welding Bureau to CSA\ACNOR W47.1 – latest edition, Division 1 or 2. Welders, welding operators and welding procedures shall meet the requirements of CSA Standard W47.1, and of AWS D1.6 as permitted by CSA Standard W47.1.
- For any item requiring the application of fusion welding to aluminum structures, the Contractor and all Sub-Contractors shall be certified by the Canadian Welding Bureau to CSA\ACNOR W47.2 – latest edition, Division 1 or 2.

Prior to commencing any welding work, the Contractor shall provide documentation to the TA clearly identifying compliance with the welding certification requirements specified herein and the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A. Typical documents include but are not necessarily limited to: Letter of Validation, Welding Procedures, Welder Performance Qualification Cards, Inspection Personnel Qualification Cards, Inspection Reports, etc.

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The governing standards for welding shall be in accordance with the requirements of the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.

- For structural steels > 3 mm in thickness, welding shall meet the requirements of CSA Standards W47.1 and W59, except as modified by the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.
- For structural aluminum > 3 mm in thickness, welding shall meet the requirements of CSA Standards W47.2 and W59.2, except as modified by the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.

- For structural stainless steels and stainless steel pipes > 3mm in thickness, welding shall meet the requirements of CSA Standard W47.1 and AWS D1.6, and of the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.

For Carbon Steel (CS) to 316L SS dissimilar weld connections, the following procedures are to be followed:

- a. Higher alloy, extra low carbon weld filler metal is required. (e.g. 309MoL).
- b. Low heat input weld process/procedure should be used (e.g. GMAW-P process with 99.99% Ar shielding gas), with a maximum heat input not to exceed 1.5 KJ/mm and a maximum interpass temperature not to exceed 150 C.
- c. No preheat required above 10 C min. ambient temperature and no post weld heat treatment is required.
- d. Dissimilar metal weld joint to be designed to provide a gradual, smooth transition from the thicker 316L Stainless Steel to the thinner Plain Carbon Steel transom plating, e.g. chamfer one side with a 1:4 minimum slope and with the opposite side flush. Side 2 is to be back ground to sound metal on completion of welding Side 1 and prior to welding Side 2.
- e. Appropriate weld sequencing to minimize distortion, (e.g. welding alternately or simultaneously at diametrically opposite segments/quadrants).
- f. Weld procedures previously qualified to ASME Section IX may be accepted in lieu of the CSA/AWS test standards specified herein.

New support brackets for the penetration piece, similar to those in place now, are to be installed and welded following the proper welding procedures as discussed herein. In addition, the cap of the insert/transom plate weld is to be ground flush before welding of the support brackets.

All areas where welding of dissimilar metals has occurred are to be ground smooth and coated with suitable heat resistant epoxy before painting to prevent exposure of the dissimilar weld area to the sea water environment. This coating system is to be inspected and maintained on a regular basis.

EXHAUST PIPING AND SEA WATER INJECTION

REFERENCE

See drawing J15073-M01 for further guidance on the installation.

TECHNICAL REQUIREMENTS

A new exhaust pipe section will be installed to connect the new transom penetration piece with the existing exhaust piping forward of the removal section. The new exhaust pipe will incorporate a flanged sea water connection identical to the one presently fitted and will connect with the existing sea water piping at that location.

The existing sea water injection pipe section presently flange connected to the exhaust pipe is to be removed from the old exhaust pipe section and reinstalled with the new exhaust piping in the same manner. If the existing sea water injection nozzle does not locate to the centre of the exhaust pipe when re-installed, it is to be modified to suit.

Material separation is to be maintained between dissimilar metals.

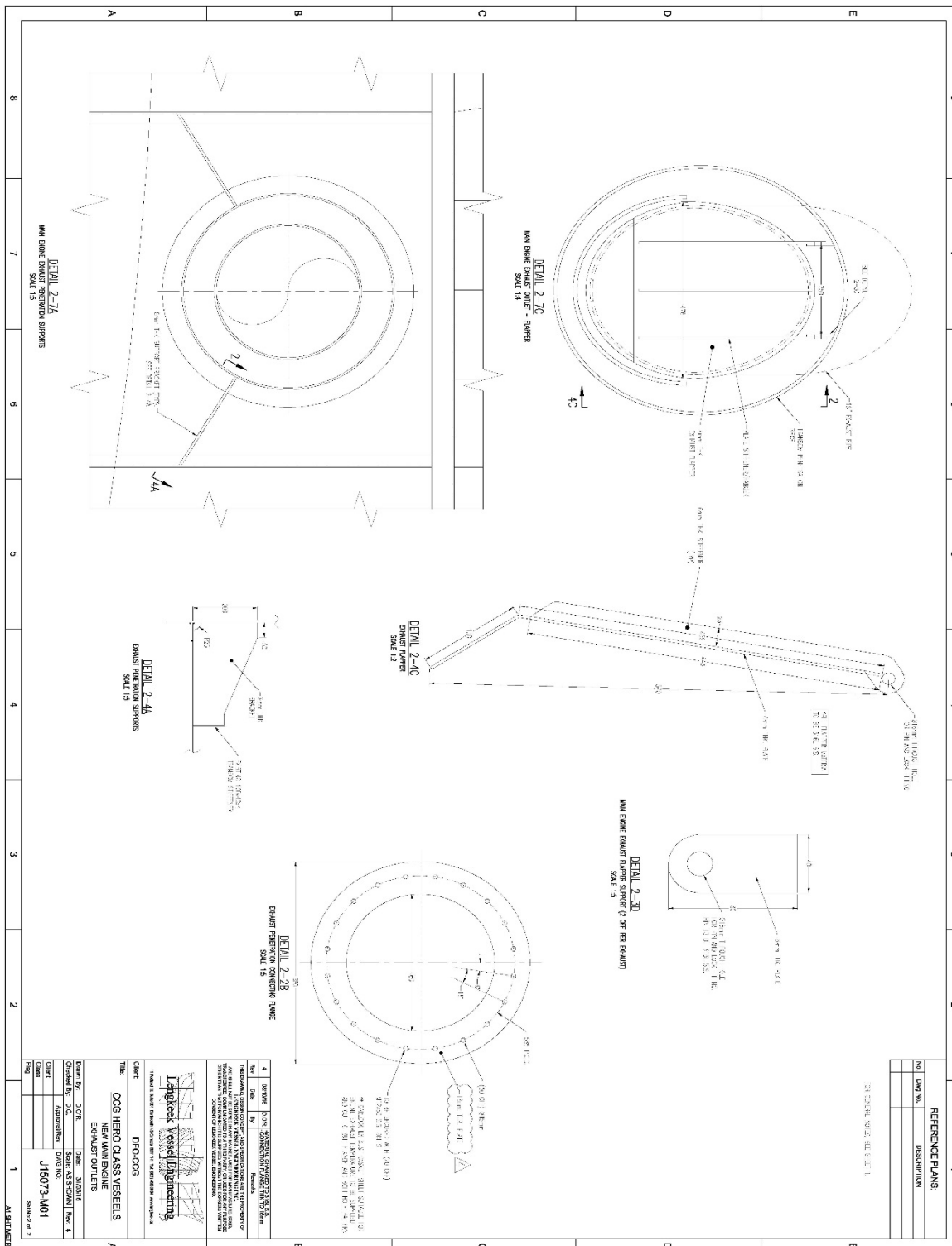
PROOF OF PERFORMANCE

All welds completed under this contract shall be subjected to 100% Visual inspection and then 100% Liquid Dye Penetrant examination in accordance with the requirements of this specification and the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014, EKME#3049715v3A.

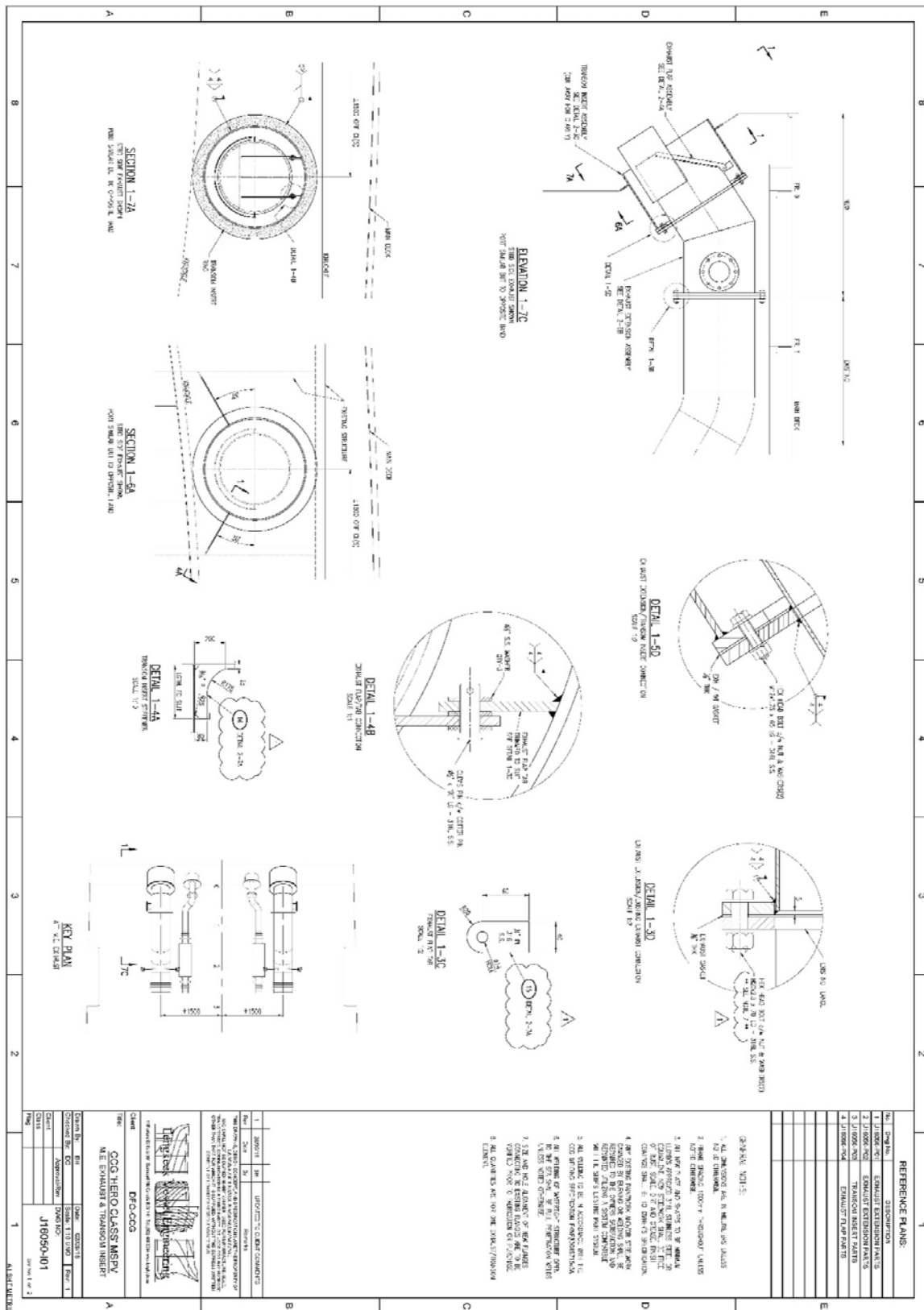
All inspections and examinations required herein shall be performed by the Contractor's qualified third party inspection organization.

On behalf of the CGTA, the contractor shall be audited by the Canadian Welding Bureau: prior to, during and on completion of the welding work.

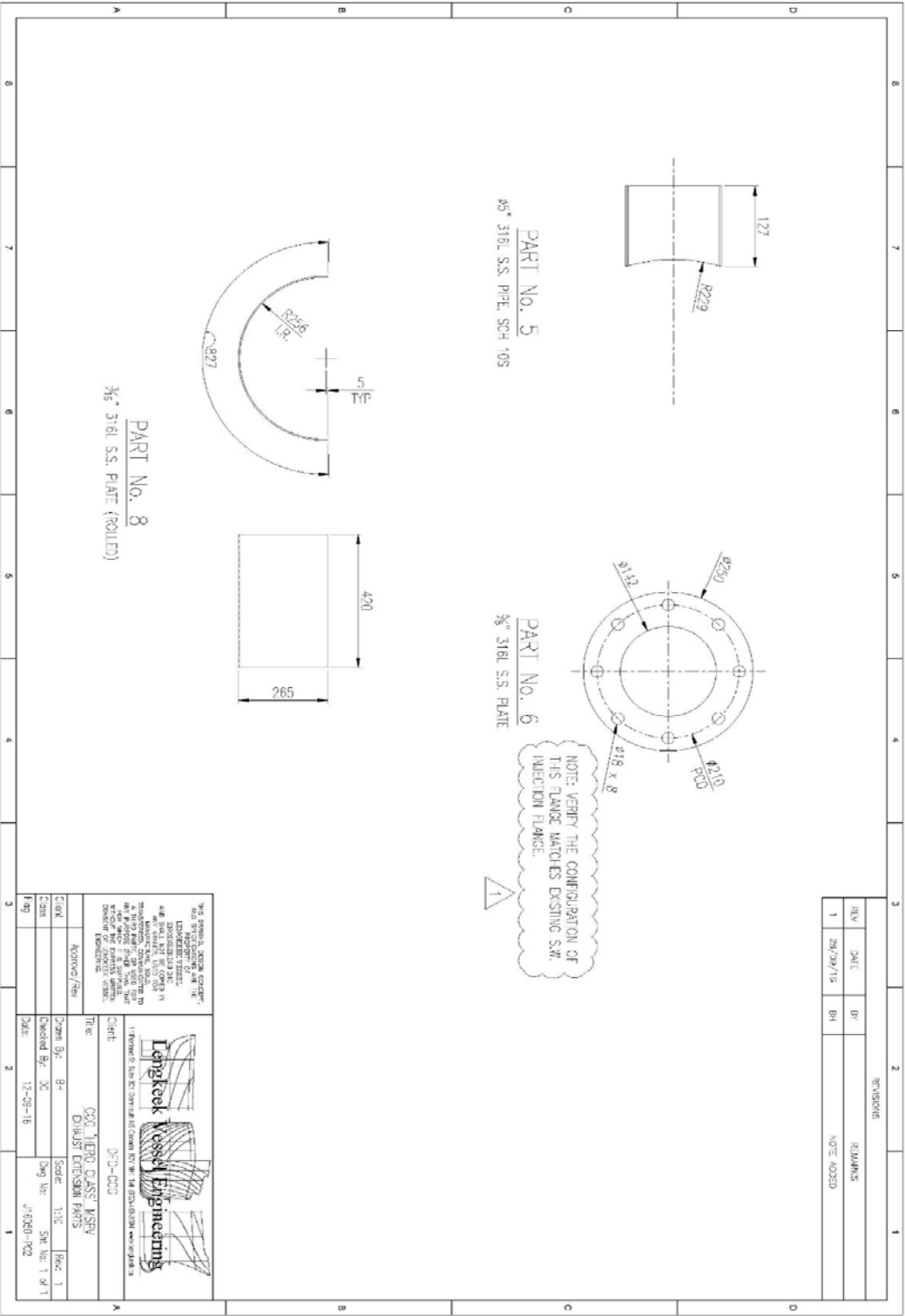
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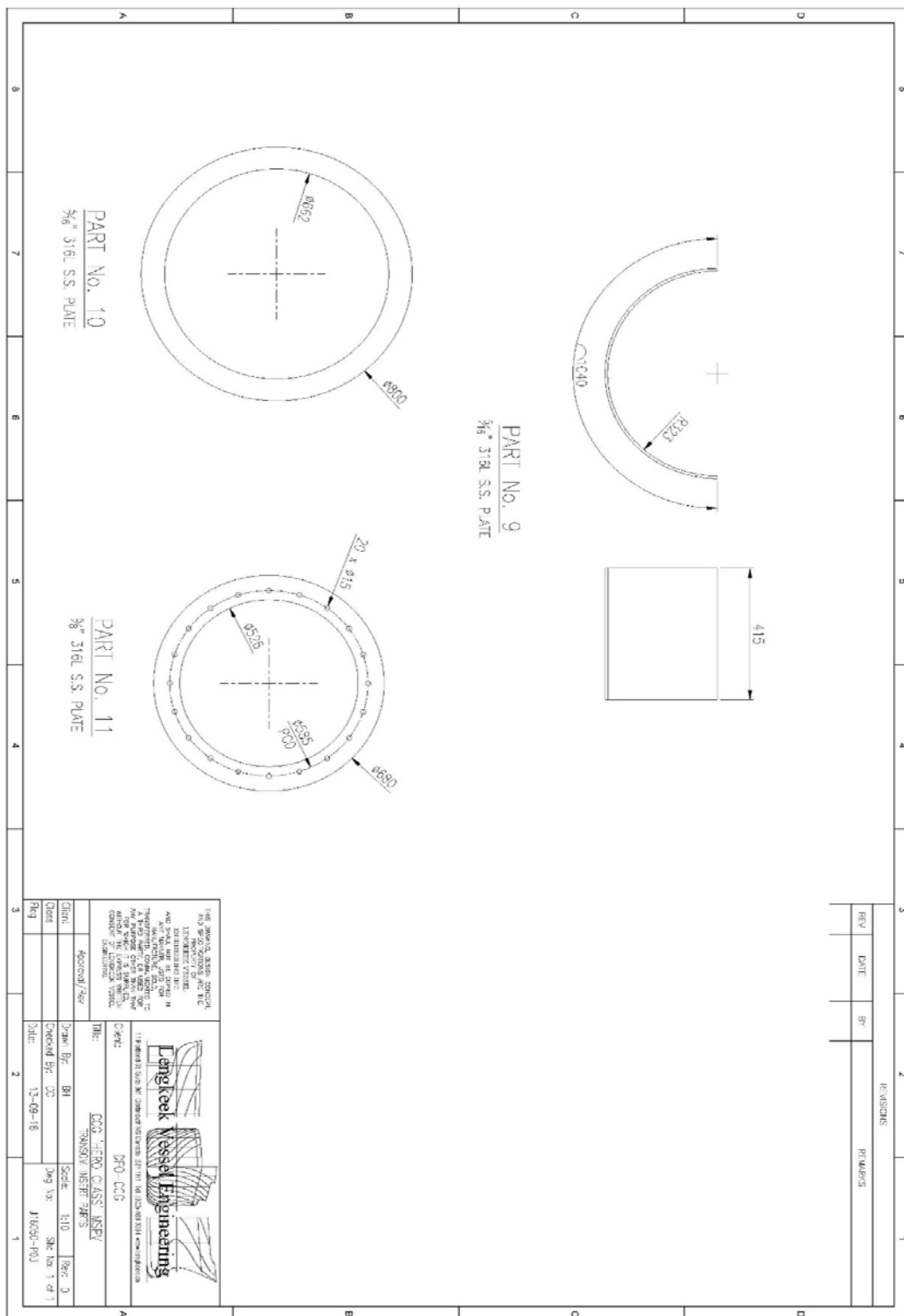


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APPENDIX E

**CCGS CORPORAL MCLAREN MMV
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