STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

December 9, 2020

Addendum No. 2

Contract No.: DA00492

WBS Element: 16.33001

M/V Sea Level Credit Drydock (CDD)

To Whom It May Concern:

Reference is made to the proposal and plans previously furnished for this project.

The following revision has been made to the proposal and plans:

Pg. 38 – Changed: Contractor shall store fuel at the contractor facility. Price shall be included in the dry dock bid price. Approximate remaining fuel will be between 2,700 and 3,300 gallons.
TO
Contractor will remove and dispose of up to 3,300 gallons of fuel. The contractor will be responsible for replacing with new fuel 3,500 gallons on the vessel. Price for all fuel items shall be included in the dry dock bid price including fuel boom and any associated fueling and defueling costs, no further compensation shall be made.

Pg. 47 – Changed: Open, ventilate if required and certify gas free and safe for entry, pump dry and clean all accessible voids, holds, pump rooms and machinery spaces under the Main Deck on the vessel.
TO
Open, ventilate and certify gas free and safe for entry, all spaces, and voids for USCG inspection.

Pg. 48 – Changed: The Contractor shall perform gas free testing for tanks, accessible voids, holds, and enclosed areas in way of the hull when directed by the NCDOT Representative at any time such testing is indicated for the protection of the vessel and the safety of personnel.
TO
The Contractor shall perform gas free testing for the entire duration of the dry dock in all spaces, and voids when testing is indicated for the protection of the vessel and the safety of personnel.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION ONE
113 AIRPORT DRIVE, SUITE 100
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113 AIRPORT DRIVE, SUITE 100
EDENTON, NC 27932

Pg. 49 – Changed: Once doors are removed, the contractor shall inspect, provide a condition found report and preform any routine maintenance or repair of the doors, then contractor shall reinstall doors in original locations.
TO
Once doors are removed, the contractor shall inspect, provide a condition found report and preform any routine maintenance or repair of the doors including but not limited to replacing the gasket, cleaning retaining area, prime and paint, replace zincs, bushings and pins. Then contractor shall reinstall doors in original locations.

Pg. 64 – Changed: The Contractor shall spot blast the hull below the DLWL by abrasive blast to a SSPC-SP-10, Commercial Blast in the locations were the paint system is failing in the block area locations.
TO
The Contractor shall spot blast the hull below the DLWL by abrasive blast to a SSPC-SP-10, Commercial Blast in the locations were the paint system is failing in the block area locations approximately 100 SQFT total.

Pg. 65 – Changed: The Contractor shall mechanically or by hand, prep and prepare to paint the hull above the DLWL.
TO
The Contractor shall power tool clean to bare metal, feather, prep and prepare to paint the hull above the DLWL including the waterline in locations were existing paint structure has failed approximately 500 SQFT.

Pg. 65 – Removed: blasted
TO
Changed to: prepared

Pg. 67 – Changed: In all of the above items, the structure attached to the stated item is to be included with the item. Superstructure painting does not include decks, stack, masts, curbs, passenger stairs, or the
Rescue Boat davit, Decks, windows, the underside of the Pilothouse visor, the stack, masts, curbs, the Rescue Boat davit, and other appropriate areas, equipment, and components shall be protected from overspray.
TO
In all of the above items, the structure attached to the stated item is to be included with the item. Superstructure painting does not include decks, stack, masts, curbs, passenger stairs, or the Rescue Boat davit.
Decks, windows, the underside of the Pilothouse visor, the stack, masts, curbs, the Rescue Boat davit, and other appropriate areas, equipment, and components shall be protected from overspray.

Pg. 67 – Changed: The Contractor shall mechanically or by hand, prepare and paint the entire superstructure and miscellaneous details including, but not limited to, the following:
TO
The Contractor shall mechanically or by power tool cleaning to bare metal, prepare and paint the entire superstructure and miscellaneous details including, but not limited to, the following:

Pg. 70 &71 – **Removed Section 18.0 Tail Shaft Bearing Replacement**

Pg. 73 – **Removed paragraph 3in section 20.4 and removed NOTE**

Pg. 74 – Changed: Prussian Blue ink into tiller hubs. Rudder stocks and tiller hub shall be polished as required to ensure a good, 80% contact blue fit.
TO
Prussian Blue ink into tiller hubs. Rudder stocks and tiller hub shall be polished as required to ensure a good, 80% contact blue fit, up to 6 times (Others will be addressed by SA)

Pg. 75 – Changed: o) Hang the rudders and make them up to the rudder stocks in the reverse order of disassembly. Renew all rudder palm bolts with SAE Grade 8 fitted fasteners.
TO
o) Hang the rudders and make them up to the rudder stocks in the reverse order of disassembly. Install rudder nut and weld on locking strap.

Pg. – 77 – Changed: a) Refill each MTU cooling system with a 50/50 mixture of fresh potable water and NALCOOL 2000.
TO
a) Refill each MTU engine cooling system with (2) Drums of MTU POWER COOLANT, 50/50 premixed coolant (Part# 23533532) (4 total).

Pg. – 81 – Changed: 1st paragraph 90-degree
TO
45-degree

Pg. – 82 – **Changed drawing numbers to match**

PG – 82 – **Added NCDOT supplied hatch to 24.3**

PG – 83 – Changed: This section describes the requirement to replace repair the welds in the Cap Rail located at the bow of the vessel. This section also includes 10 bulwark repairs be identified by NCDOT.
TO
This section describes the requirement to replace repair the welds in the Cap Rail located at the bow of the vessel. This section also includes 10 bulwark repairs be identified by NCDOT. Total amount of welds to be repaired for all items equals 500 LF.

PG – 84 – **26.2 Removed reference to MV SEA LEVEL Rudder Stock Housing Replacement_pdf**

PG -100 – 103 **“Bid Form” has been revised to remove Line Item #5 “Generic Miscellaneous Item – Tail Shaft Bearing Replacement”.**

Please replace the Original Pages with the attached Revised Pages and include Additional Drawings where necessary.

The amended EBS File (DA00492.002x) has been uploaded. We apologize for any inconvenience.

Sincerely,

DocuSigned by:
CDAEAC77A6394FB...

C. E. Slachta
Division Proposals Engineer

Cc: S. D. Baker, PE
C. W. Bridgers Jr., PE
G. A. Byrum, PE
R. W. Midgett, PE
E. S. Sedlacek

While under the Contractor's control, the Contractor shall maintain valve tag-out procedures. All valves, regardless of system or function, which are operated by the Contractor or his sub-contractors, from their original position at time of delivery to the Contractor shall be red tagged. The Contractor shall maintain a log to be located in the Engine Room that will note the original valve position, location and purpose of the red-tagged valve and date and time it is either opened or closed each time it is operated. The valve tags and log shall be maintained for the entire duration of the contract. Upon returning the vessel to the owner's control, all valves shall be returned to their original position at the time the Contractor took possession of the vessel.

The Contractor shall provide a heated/air conditioned private office, with two (2) desks and four (4) chairs, a secure 5mb/sec or faster internet connection, small refrigerator and building power (minimum one (1) convenience outlet per wall or equivalent power strip) for the NCDOT Representative for the duration of the project. The office space shall be located as near the vessel dry dock as possible or in the office complex normally provided for the shipyard customer's port engineers. Provide two (2) marked reserved parking spaces, inside the shipyard, for the duration of the project.

If the vessel is not immediately taken into the dry dock when it arrives at the Contractor's facility, the Contractor shall provide all labor, material, and equipment, including tugboats as necessary, to secure the vessel to the Contractor's moorings and to move the vessel to the dry dock when appropriate. Except where specifically indicated otherwise by these Specifications, the vessel will be delivered to the Contractor with minimal fuel and all temporary items removed such as hand radios, binoculars, personal items, food, and trash. The Contractor shall be responsible for any lightering, ballast operation, or liquid load transfer necessary to accommodate the dry dock capacity or complete any work called out in the Contract Documents. The ship will be received with the same amount of fuel onboard as it was delivered to the Contractor. Contractor will remove and dispose of up to 3,300 gallons of fuel. The contractor will be responsible for replacing with new fuel 3,500 gallons on the vessel. Price for all fuel items shall be included in the dry dock bid price including fuel boom and any associated fueling and defueling costs, no further compensation shall be made.

The Contractor shall, plan, budget, and provide a number of days in dry dock as required to complete the work in these Special Provisions. The dry docking schedule shall be provided to the NCDOT Representative prior to the dry-docking of the vessel. Except for emergency situations (prior docking commitments on the part of the Contractor do not constitute emergency situations), once the vessel is docked, any deviation in the dry-docking schedule or dry-docking evolutions (undockings and re-dockings of the vessel) must be requested and submitted in writing to the NCDOT Representative, at least ten (10) days in advance of the proposed change.

The Contractor shall provide adequate docking facilities, soft fenders and mooring lines for the vessel which shall accommodate the vessel's draft and will allow the vessel to safely rise and fall with the tide so no damage occurs to the vessel while it is moored to the Contractor's facilities.

Mooring lines shall be sized and configured to accommodate the vessel and all reasonably anticipated weather occurrences for the Contractor's facility.

5.0 OPEN, CLEAN, AND CERTIFY GAS FREE: BILGES, HOLDS AND ENCLOSED AREAS:

5.1 Description:

This section describes the requirements to clean and gas free the vessel to accommodate ordered work and inspections.

5.2 References:

None

5.3 Owner Furnished Equipment:

None

5.4 Requirements:

The Contractor shall open, clean, dewater if necessary, dry, and gas free the bilges, accessible voids, holds and enclosed areas in way of the hull, as indicated in this section, to facilitate complete inspection of the vessel's structure. The Contractor shall remove all docking plugs (if any) for skegs, rudders, and other inaccessible voids as applicable, and report conditions found. NOTE: Skegs, cap rail and rudders **ARE** "float coated," so all inaccessible voids shall be gas freed and certified only if hot work is anticipated or indicated by the Contract Documents. If the float coat is removed, then it shall be replaced by contractor at no cost to NCDOT.

The Contractor shall utilize a National Fire Protection Association-certified marine chemist to certify the compartments "Safe for Personnel" to accommodate the USCG and NCDOT inspections. Where hot work is anticipated, or indicated by the Contract Documents and Special Provisions, the Contractor shall require the marine chemist to certify the compartments "Safe for Personnel and Safe for Hot work." The Contractor shall maintain gas free certification, for the full term of the performance period or until the NCDOT Representative authorizes closure. Gas free certifications shall be maintained by daily Competent Person inspections, per Title 29 of the Code of Federal Regulations (29 CFR 1915) and in accordance with all conditions and restrictions directed by the marine chemist at the time of initial certification. Copies of all gas free certificates and the daily Competent Person inspection log shall be posted conspicuously on the vessel and a copy shall be provided to the NCDOT Representative.

Open, ventilate and certify gas free and safe for entry, all spaces and voids for USCG inspection. The Contractor shall completely clean the above-specified areas to remove all water, fuel, oil, and grease fouling, then wipe and ventilate the bilges dry. The Contractor shall remove and dispose of bilge slop in all bilges and shaft alleys throughout the vessel. The Contractor shall dispose of all removed materials and waste in accordance with all local, state, and federal regulations. The Contractor shall inspect the vessel before bidding to satisfy himself/herself as to the approximate bilge slop quantity and constituent mixture. After bilge slop removal, the Contractor shall hot-water-and-detergent clean the bilges and shaft alleys, remove debris, pump dry, and properly dispose of the contaminated cleaning solution and debris. At the completion of all work indicated in the Contract Documents, re-deliver the vessel with the bilges in this clean and dry condition.

The Contractor shall perform gas free testing for the entire duration of the dry dock in all spaces, and voids when testing is indicated for the protection of the vessel and the safety of personnel. If gas free certification is lost, the affected compartment(s) shall be re-certified by the NFPA-certified marine chemist. The NCDOT Representative will not accept re-certification by the competent person. If gas free certification is lost due to an act or omission of the Contractor, then additional cleaning, ventilating, and certification shall be accomplished at no cost to the NCDOT.

Compartments that are gas freed and certified per the Contract Documents shall remain in a gas free and certified condition until the Coast Guard and the NCDOT Representative approve closure of the compartment and until all Contractor work in the compartment is complete. Any gas free activity and certification required by the Contractor to conduct shipyard operations will be at the Contractor's expense and incidental to the various bid items involved.

Any gas free testing work directed by the NCDOT Representative in excess of two times per hold, tank or enclosed area, and that is not required by the Contractor to conduct his/her operations, will be considered and settled by the NCDOT Representative as Additional Work.

5.5 CHECKPOINT:

Upon completion of work, the Contractor shall test all bilge high-level alarms. Any repairs required will be addressed as "Additional Work." Protect all bilge suction pockets and boxes from clogging. At the conclusion of all work, clean suction strainers and valves. Exercise all valves and verify that they are easily operable.

Contractor shall take care to protect all equipment from overspray. Any equipment damaged by over spraying shall be restored to its original condition at no additional expense to NCDOT.

All paint work shall be accomplished as detailed in the Special Provision item "Painting – General."

5.6 Tests, Trials and Documentation:

Contractor shall check, update daily, and post at all entry points to the various voids, copies of all certifications and Safe for Entry permits.

5.7 Payment:

The lump sum contract bid price for *Generic Ferry Item (Open, Clean, and Certify Gas Free: Bilges, Holds, and Enclosed Areas)* shall include all costs for cleaning, painting, ventilation, marine chemist inspections and certifications, competent person inspections and certifications, and certification of all tanks, accessible and inaccessible voids, holds and enclosed areas in way of the hull and including disposal of all waste. No further compensation will be made.

6.0 MAIN DECK HATCH MAINTENANCE AND REPAIR & 3 MAIN DECK WATERTIGHT DOOR REMOVAL:

6.1 Description:

This section describes the requirements to inspect, repair, and test the main deck hatches. Contractor shall take into consideration work associated with "Open, Clean and Certify Gas Free: Bilges, Holds, and Enclosed Areas" of this section and closely coordinate this work. This section also covers the removal of the 3 watertight doors maintenance and repair on the main deck.

6.2 References:

6.2.1 DWG 09-060 101-01 – Outboard Profile

6.2.2 DWG 09-060 101-02 – General Arrangement

6.2.3 DWG 09-060 167-01 – Schedule of Openings Below Main Deck

6.3 Owner Furnished Equipment:

None

6.4 Hatch Requirements / <u>CHECKPOINT</u>:

The Contractor shall complete the following work on deck hatches:

a) Contractor shall open and inspect condition of hatch insert rings, hatch gaskets, and hatch operating mechanisms. NCDOT Representative is to provide a list of specific hatches requiring maintenance.
b) Complete inspections and submit a condition found report no later than five (5) working days after taking control of vessel.
c) Based on NCDOT's inspection of vessel, Contractor shall budget to replace [8] ø18" QAWTMH gaskets and [1] 36"x36" QAWTH gasket [DWG 09-060 167-010], as directed by the NCDOT Representative. Gaskets beyond this budgeted amount shall be paid by Supplemental Agreement.
d) Additional equipment may be recommended to be replaced by Contractor, subject to agreement by NCDOT. These repairs or renewals shall be paid by Supplemental Agreement.

6.5 Watertight Door Removal and Replacement Requirement:

The contractor shall remove the 3 watertight doors on the main deck leading to the CO_2 Containment Area, Tank Room and Engine Room. Once doors are removed, the contractor shall inspect, provide a condition found report and preform any routine maintenance or repair of the doors including but not limited to replacing the gasket, cleaning retaining area, prime and paint, replace zincs, bushings and pins. Then contractor shall reinstall doors in original locations.

6.6 Tests, Trials and Documentation:

Following refurbishment and re-installation of all hatches and doors, Contractor shall prove all deck hatches watertight when subjected to low pressure or hose wash. Water test all main deck WTD with USCG present. The 3 main deck watertight doors shall be chalk tested for the USCG.

13.6 Payment:

The lump sum contract bid price for *Generic Ferry Item (High-Pressure Water Wash – Superstructure)* shall include all costs associated with the solvent and high-pressure water wash detailed in this Special Provision. No further compensation will be made.

14.0 SPOT BLASTING AND PAINTING - HULL BELOW DLWL:

14.1 Description:

This section describes the requirements for painting the ferry hull (underwater body), from the keel to 12" above the design load waterline.

After high-pressure water washing of the hull, as outlined in the "High-Pressure Water Wash – Hull Below DLWL" section, the Contractor shall spot blast the hull below the DLWL. Contractor shall only blast the block areas where the paint is failing from the previous dry dock. The entire hull does not need blasting.

Representative, spot repair the anti-corrosive (Primer) coating and shall apply anti-fouling (AF) coatings over the entire underwater body.

14.2 References:

14.2.1 "General Painting Instructions" as part of these Special Provisions:

14.3 Owner Furnished Equipment:

None

14.4 Requirements:

The Contractor shall spot blast the hull below the DLWL by abrasive blast to a SSPC-SP-10, Commercial Blast in the locations were the paint system is failing in the block area locations locations approximately 100 SQFT total.

After surface preparation, dry the area with clean dry compressed air. The Contractor shall assure that the areas to be painted are free of dust, dirt, salt, loose paint, moisture, and other contaminants before painting.
Anti-corrosive paint at the perimeter of the blasted areas shall be feathered or otherwise made tight to eliminate paint failure points and present a clean mechanically etched surface for a secure bond with new Primer applied to the blasted surfaces. Coat all bare metal areas the same day they are exposed by blasting. Apply anti-corrosive paint by conventional industrial airless spray or compressed air spray equipment.

The Contractor shall determine the Manufacturer's minimum and maximum "dry to self-re-coat" criteria and apply the second anti-corrosive coat inside this window.

The anti-corrosive coating system in these selected areas shall be:

- Primer Coat: Amercoat 370 red oxide applied @ 4.0-6.0 Mils DFT

  (NOTE: Paint manufacture requires 2 coats of primer)

- Stripe Coat: Amercoat 370 grey applied @ 4.0-6.0 Mils DFT

- Third Coat: ABC #3 red applied @ 4.0-6.0 Mils DFT

14.5 Tests, Trials and Documentation:

None

14.6 Payment:

The lump sum contract bid price for *Generic Ferry Item (Spot Blast Failed Block Areas & Paint - Hull Below DLWL)* shall include all costs for paint and spot blasting to the hull below DLWL, except for the high-pressure water wash this item will be based upon the Contractor's unit bid price for *(High- Pressure Water Wash – Hull Below DLWL).* Lump Sum prices shall be the total compensation for all labor, equipment, tools, and materials to accomplish the work detailed in these Special Provisions. No further compensation will be made.

15.0 PAINTING - HULL ABOVE DLWL:

15.1 Description:

After high-pressure water washing of the hull, as outlined in the "High-Pressure Water Wash – Hull Above DLWL" section, the Contractor shall prep and prepare to paint the hull above the DLWL.

15.2 References:

15.2.1 "General Painting Instructions" as part of these Special Provisions:

15.3 Owner Furnished Equipment:

None

15.4 Requirements:

The Contractor shall power tool clean to bare metal, feather, prep and prepare to paint the hull above the DLWL including the waterline in locations were existing paint structure has failed approximately 500 SQFT.

After surface preparation, dry the area with clean dry compressed air. The Contractor shall assure that the areas to be painted are free of dust, dirt, salt, loose paint, moisture, and other contaminants before painting.

Anti-corrosive paint at the perimeter of the prepared areas shall be feathered or otherwise made tight to eliminate paint failure points and present a clean mechanically etched surface for a secure bond with new Primer applied to the blasted surfaces. Coat all bare metal areas the same day they are exposed by blasting. Apply anti-corrosive paint by conventional industrial airless spray or compressed air spray equipment.

The Contractor shall determine the Manufacturer's minimum and maximum "dry to self-re-coat" criteria and apply the second anti-corrosive coat inside this window.

The anti-corrosive coating system in these selected areas shall be:

- Primer Coat: Amercoat 370 red oxide applied @ 4.0-6.0 Mils DFT

  (NOTE: Paint manufacture requires 2 coats of primer)

- Stripe Coat: Amercoat 370 grey applied @ 4.0-6.0 Mils DFT

16.4 Requirements

The Contractor shall mechanically or by power tool cleaning to bare metal, prepare and paint the entire superstructure and miscellaneous details including, but not limited to, the following:

- Curtain plates and bulwarks
- Inboard and outboard faces.
- Car deck overhead. (Except were Mascoat is present)

In all of the above items, the structure attached to the stated item is to be included with the item. Superstructure painting does not include decks, stack, masts, curbs, passenger stairs, or the Rescue Boat davit.

Decks, windows, the underside of the Pilothouse visor, the stack, masts, curbs, the Rescue Boat davit, and other appropriate areas, equipment, and components shall be protected from overspray. The painting is to include spot repairs of the paint system in the listed areas. The Contractor shall inspect all areas of the vessel to be painted to assess coating condition and surface areas prior to finalizing the bid price.

The Contractor shall clean the surfaces described above as detailed in the Special Provision item "High-Pressure Water Wash - Superstructure." The Contractor shall blast the entire superstructure (excluding areas where MASCOT coating was applied) by abrasive blast, to a SSPC-SP10. AC paint at the perimeter of the blasted areas shall be feathered or otherwise made tight to eliminate paint failure points and present a clean mechanically etched surface for a secure bond with the new Primer applied to the blasted surfaces. After surface preparation, dry the area with clean dry compressed air. Before coating application, the areas shall be free of all dust, debris, salt, moisture, and other contaminants which may have been introduced following the high-pressure water wash. The surface preparation and cleaning shall be inspected and approved by the Paint Manufacturer's Representative before the final coats are applied. Paint shall be applied by conventional industrial airless spray or compressed air spray equipment in accordance with the paint manufacturer's recommendations. The paint coats for the selected areas shallbe:

For bulkheads, inboard and outboard faces and the car deck overhead:

- Primer Coat: Amercoat 370 red oxide applied @ 4.0-6.0 Mils DFT
- Stripe Coat: Amercoat 370 grey applied @ 4.0-6.0 Mils DFT
- Third Coat: Amercoat 370 white applied @ 4.0-6.0 Mils DFT
- Finish Coat: PSX-One white applied @ 2.0-3.0 Mils DFT

After washing, blasting and cleaning; Contractor shall apply a fresh finish coat over the entire super structure. New top coat shall match exactly the existing paint schematic on the vessel. Contractor shall remove all existing signage, outdoor seating, and protect all windows, equipment and other sensitive areas from overspray prior to applying the top coat. Once top coat is fully applied and dried, Contractor shall restore all signage to its original condition.

17.5 Tests, Trials and Documentation:

None

17.6 Payment:

The lump sum contract bid price for *Generic Ferry Item (Blast & Paint – All Decks)* shall include all costs for paint and blasting all the decks. Lump Sum prices shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions. No further compensation will be made.

~~18.0 TAIL SHAFT BEARING REPLACEMENT:~~

~~18.1 Description:~~

~~This section describes the requirements to renew a tail shaft bearing. Any number of tail shaft bearings may be renewed by this work item. If more than one tail shaft bearing is renewed, the provisions of this work item shall apply to each of them.~~

~~Work on this section shall not begin until given specific authorization by the NCDOT Representative. NCDOT Representative shall not authorize work under this item to proceed until they are given a tail shaft bearing inspection report. This item may be canceled pending result of the tail shaft bearing inspection report, in which case no payment will be made to the Contractor for this bid item.~~

~~18.2 References:~~

~~18.2.1 DWG 09-060 243-01 Shaft Arrangement~~

~~18.3 Owner Furnished Equipment:~~

~~None~~

~~18.4 Requirements:~~

~~Contractor shall remove damaged or worn tail shaft bearing. Contractor shall be responsible for the disposal of removed equipment.~~

~~Bearing shall be replaced with a bearing of the same make and model as the bearing removed. Bearing flanges shall be supplied blank, and shall be templated and drilled to match the bolt pattern of the removed bearing.~~

~~Contractor shall inspect and measure ID of existing Chockfast around removed bearing. The Contractor shall provide a written report of Chockfast condition and IDs to the NCDOT Representative. For purposes of bidding this item, Contractor shall assume Chockfast is in good condition and not in need of replacement. If Chockfast does need to be replaced, replacement shall be handled as "Additional Work."~~

~~Machine new bearing casing to fit Chockfast ID or stern tube bearing boss, as applicable. Tolerances shall be within bearing manufacturer and Chockfast recommended allowances. New bearing housing shall be greased with releasing agent and inserted into the existing Chockfast.~~

~~Template and drill new bolt holes on bearing flange to match existing bolt pattern on the stern tube. Contractor shall renew tail shaft bearing bolts with bolts of equivalent size, material and grade. Re-attach with new materials all locking straps, wire straps, or other keepers as may be affixed to prevent movement of the bearing flange fasteners.~~

~~18.5 Tests, Trials and Documentation:~~

~~Contractor shall provide NCDOT Representative with an AutoCAD drawing showing as installed, machined OD and ID measurements for each installed tail shaft bearing. Measurements are to be shown at four quadrants, in three separate locations along the length of the bearings (both ends and the middle).~~

~~18.6 Payment:~~

~~Include all costs associated with repairs and modifications to the various items outlined in this Special Provision in the unit contract price for *Generic Miscellaneous Item (Tail Shaft Bearing Replacement)*. Unit price per each shall include all labor and expenses to renew one single tail shaft bearing. This unit price shall apply to the renewal of each tail shaft bearing up to (4) tail shaft bearings on the vessel. No further compensation will be made. No further compensation~~

19.0 LINE SHAFT BEARING REPLACEMENT:

19.1 Description:

This section describes the requirements to renew the line shaft bearings. Work on this section shall not begin until the contractor is given specific authorization to proceed by the NCDOT Representative. NCDOT Representative shall not authorize work under this item to proceed until they are given the line shaft bearing inspection report. This item may be canceled pending result of the line shaft bearing inspection report, in which case no payment will be made to the Contractor for this bid item.

19.2 References:

19.2.1 DWG 09-060 243-01 Shaft Arrangement

19.3 Owner Furnished Equipment:

None

19.4 Requirements:

Prior to any disassembly of line shaft bearings, Contractor is to precisely index the position of the bearings on the line shafts, for future reference if needed.

Vessel is equipped with "2," Cooper pillow block [two, Split Cylindrical Roller Bearings, Craft Bearing Company, Model: S1 BCH 500] line shaft bearings. All maintenance under this work item shall be accomplished in accordance with manufacturer guidelines and by manufacturer certified technicians.

Unbolt and remove line shaft bearing from vessel. Bearings shall be transported to a machine shop for inspections and maintenance work. Following loosening and removal of bearing caps, Contractor is to carefully lift and support line shafting at the bearings.

20.3 Owner Furnished Equipment:

NCDOT furnished rudder stocks, rudder stock nuts, quadrants, and quadrant fasteners are available and will be owner furnished, if required.

20.4 Requirements:

While in dry dock, the Contractor shall first exactly determine and mark positioning of the tiller arms when the rudder is at zero angle position. A durable mark parallel to rudder centerline shall be stamped on the tiller arm or upper end of the rudder stock and adjoining structure.

Alternatively, a fixed rigid removable alignment indicator with a mark at zero rudder angle shall be installed from adjoining structure. The zero-alignment indicator and the reference mark on the tiller or upper end of the rudder stock shall allow accurate lineup and viewing for determination as to when the rudder is in its zero-angle position. The alignment indicator shall be bolted in place and removable to facilitate rudder or tiller removal. Removal and reinstallation of the alignment indicator shall not cause loss of the zero-angle reference. The alignment indicator shall be rigid enough not to be bent or loss of zero angle reference from knocks from normal maintenance of the rudder and steering gear. Where new steel is installed or existing paint was damaged by the work performed under this requirement, the areas shall be prepared for and painted to the satisfaction of the NCDOT Representative.

~~The Contractor shall perform the following work, inspections and measurements, and report the findings in writing to the NCDOT Representative within two (2) work days of dry-docking the vessel. Failure to perform these inspections in a timely manner may delay the undocking of the vessel. A delay in vessel undocking due to late reports shall not be considered legitimate grounds the accrual of "Lay Days," or for additional undocking and re-docking charges.~~

a) Remove rudder drain plugs, drain, catch, and properly dispose of any water or excess preservative remaining in the rudder.

~~NOTE: Contractor is advised that NCDOT skegs and rudders are "float coated" to preserve the internal steel, so all appropriate cautions and inspections are to be taken prior to initiation of any hot work to these areas.] "Float Coat" to be renewed by contractor if removed, at no cost to NCDOT.~~

20.4.1 CHECK POINT:

Static pressure test rudders for leaks in the presence of NCDOT Representative. Test pressure shall be 1.5 PSI. Accepted test is no leaks for one hour. Contractor shall provide written report of test results to NCDOT Representative.

b) Unbolt rudders ~~from the rudder stock palms~~.

c) Lower and block up both rudders on the dry dock floor ~~with the palms accessible for inspection~~. Clean each rudder, exterior rudder stock, flange.

d) Unbolt and disconnect all steering gear, angle indicator transmitters, and linkages from the tillers and retain for reuse. Remove the rudder stock o-ring seals.

e) Set aside the parts and protect them for re-installation. Mark the matched rudders, tillers and rudder stocks, indexed to their corresponding ends of the ferry.

f) Suspend, or otherwise support both rudders then, remove the lock plates, thrust washers, bearing keepers, and separate the tillers from the rudder stocks.

g) Lower the rudder stocks from the ship and transport to an inside machine shop for inspection and measurement.

h) Using feeler gauges, inspect bearings in rudder trunk. Measurements are to be taken at four quadrants, in three separate locations along the length of the bearings (both ends and the middle). Provide a written report on the condition of the vessels' rudder stock bearings to the NCDOT Representative.

i) Inspect and measure the wear down on rudder stock bearing surface wear down at both ends of the vessel. All wear down readings are to be taken at three locations along the length of each journal or bearing, and at four circumferential quadrants of each journal or bearing.

j) Thoroughly clean both rudder stocks, mount in a lathe and check by dial indicator or laser methods, for straightness (TIR).

k) Protect the carrier bearings with temporary cover.

NOTE: If the ship's structure is to be used to handle the rudder stocks, the Contractor shall demonstrate to the NCDOT Representative that the structure will support the load. The Contractor may temporarily stiffen the structure to handle the rudders stocks, at the Contractor's discretion and risk, but shall restore the structure and coatings to the as found condition, or better, upon completion of this work item

20.4.2 CHECK POINT:

NCDOT Representative shall review rudder inspection report. NCDOT Representative shall either approve the existing rudder and rudder stock for reinstallation on the vessel, or order that a new rudder or rudder stock be installed. If a new rudder stock is required, it shall be supplied by NCDOT. Contractor shall not reinstall existing rudder without express, written direction to do so by the NCDOT Representative.

l) Prior to reinstallation of rudder stocks, rudders shall be blue quality fit with Prussian Blue ink into tiller hubs. Rudder stocks and tiller hub shall be polished as required to ensure a good, 80% contact blue fit, up to 6 times (Others will be addressed by SA)

20.4.3 CHECK POINT:

NCDOT Representative is to witness and approve 80% contact prior to Contractor installing equipment back into the hull. Contractor is to allow adequate time for additional fitting if necessary.

m) Reassemble the rudder stocks and tillers to the steering gear in the reverse order of disassembly. Renew the lock plate bolts with SAE Grade 8.

n) Lubricate rudder carrier bearings and the carrier, by hand packing, before stock installation. Remove the existing grease fittings and replace them all with new stainless steel fittings. Renew the upper rudder stock 0-rings seals with the same type and size as removed. Secure all loose gland studs and double-nut the studs or use Nylock nuts after installation and adjusting of new o-rings seals. Check and lubricate the bearings again, through installed fittings and cavities prior to trials. Cycle the rudders from side to side and lubricate until grease extrudes from the bearing vents.

o) Hang the rudders and make them up to the rudder stocks in the reverse order of disassembly. Install rudder nut and weld on locking strap.

p) Repack the rudder stock seal with new packing.

q) Re-install any rope guards removed with new Contractor furnished rope guards.

20.5 Tests, Trials and Documentation:

Thoroughly clean all surfaces in the tillers, pins, rudder trunks, rudder stock bearings, rudder palms, and rudder stocks, particularly in way of the bearings. Visually inspect as appropriate all non-moving/non-wearing parts and assemblies. Inspect and measure all moving and wearing parts, and report findings in writing.

Upon re-install, measure and report lower rudder stock clearances. Provide a written report of all the measurements to the NCDOT Representative

Provide NCDOT Representative with target bolt torque for rudder palm bolts, prior to tightening. Measure and report the torque applied to the rudder palm bolts to the NCDOT Representative.

Contractor shall perform all tests and inspections as outlined in the "Requirements" section of this work item and shall provide all necessary reports to the NCDOT Representative and USCG Inspector.

20.6 Payment:

The lump sum contract bid price for *Generic Ferry Item (Rudder Removals and Inspections)* shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions for both rudders, including testing and trials and all time necessary in dry dock to complete the work involved. No further compensation will be made.

21.0 ENGINE WATER COOLING SYSTEM INSPECTION AND MAINTENANCE:

21.1 Description:

This section describes the requirements to open, clean, inspect, repair, modify, seal, renew, test and reassemble as indicated, the vessel's sea water cooling system, including but not limited to:

- Removable pipe spool pieces
- Keel Coolers

Contractor shall take into consideration work associated with "Sea Valves" of this section and closely coordinate this work.

Attention is made to the Contractor to note the valve tag-out procedures described in "Take Control and Dry Dock the [M/V Sea Level]."

21.2 References:

21.2.1 DWG 09-060 256-01 – Engine Cooling Piping Schematic

21.2.2 DWG 09-060 256-02 – Engine Cooling System Arrangement & Details

21.8 CHECK POINT:

Prior to purchase and installation of new gaskets, Contractor is to provide NCDOT Representative with cut sheets of proposed gaskets for approval.

a) Refill each MTU engine cooling system with (2) Drums of MTU POWER COOLANT, 50/50 premixed coolant (Part# 23533532) (4 total).

b) Refill each Transmission, Generator and Bow Thruster Engine cooling system with Caterpillar ECL (Extend Life Coolant).

21.9 CHECK POINT:

After fit up of keel coolers but prior to vessel launch, Contractor shall pressure test all keel coolers and FW piping up to the machinery connections. NCDOT Representative shall be present for these tests. Any leaks discovered during this test shall be repaired by the Contractor at no additional expense to the NCDOT.

21.10 Tests, Trials and Documentation:

Upon completion of renewals, repairs, and pressure teats, Contractor is to electrically test the isolation (should be "0") between keel coolers and hull, to ensure that they are electrically bonded.

21.11 CHECK POINT:

NCDOT Representative is to witness the bonding test for all keel coolers. Testing shall be to the satisfaction of the NCDOT Representative.

21.12 Payment:

Include all costs associated with repairs and modifications to the various items outlined in this Special Provision in the lump sum contract price for *Generic Ferry Item (Engine Water Cooling System Inspection and Maintenance)*. No further compensation will be made.

Include all costs associated with high-pressure water washing the sea chests in the lump sum bid item *(High-Pressure Water Wash – Hull Below DLWL).* Include all costs associated with painting the sea chests in the lump sum bid item *(Painting – Hull Below DLWL).*

22.0 BOW THRUSTER REMOVAL AND REPLACEMENT:

22.1 Description:

This section describes the requirement to install a BERP (Bolted Equipment Removal Path) opening in main deck of the M/V Sea Level for removal and replacement of the Omni Bow Thruster. This section also covers the removal and replacement of the bow thruster and walkway. Finally, this section covers the fabrication and replacement of new port and starboard bow thruster tubes. NCDOT will provide Omni Bow Thruster and butterfly valves, Existing Thruster and butterfly valves will be returned to NCDOT.

Contractor to install Main Exhaust, Main Generator Exhaust, and Bow Thruster Exhaust with schedule 120 seamless piping and install 45-degree elbows on exterior ends of pipe for exhaust turn downs, NCDOT representative to determine angle. Transition pipe to be fabricated by contractor. **CHECKPOINT**

Install and weld a ¾" doubler plate to shell. Replace pipe, flange, and doubler plate with ASTM-A-36 material and bolts. Flange gaskets to be replaced with new in kind.

Painting of all interior disturbed areas to be in accordance with section 10 – General Painting of these Special Provisions. **CHECKPOINT**

Painting exterior will be in accordance with section 15 Generic Ferry Item Painting – Hull Above DLWL of these Special Provisions.

23.5 Tests, Trials and Documentation:

All Fit-ups, arc outs, and welding to be inspected by contractor per USCG guidance and with a NCDOT Representative present. Contractor shall ensure that all blast material is removed from the vessel when complete.

Following installation of Main Engine Exhaust Piping, Contractor shall prove integrity of fit-up for exhaust leaks. **CHECKPOINT**

Following installation of Main Engine Exhaust Piping and prior to painting, contractor shall prove watertight integrity of hull inserts when subjected to low pressure water wash with USCG present. **CHECKPOINT**

Contractor to provide Mill Certificates for all material used for repair. **CHECKPOINT**

23.6 Payment:

Include all costs associated with the lump sum contract price for *Generic Ferry Item (Replace and Paint Port & Stbd. Main Engine Exhausts From 1st INBD Flange Through Hull), Generic Ferry Item (Replace and Paint Port & Stbd. Main Generator Exhausts From 1st INBD Flange Through Hull) and Generic Ferry Item (Replace and Paint Stbd. Bow Thruster Exhausts From 1st INBD Flange Through Hull)* Lump Sum prices shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions. No further compensation will be made.

Include all costs associated blasting with the lump sum contract price for *Generic Ferry Item (Blast & Paint – Above DLWL)*. Lump Sum prices shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions. No further compensation will be made.

Include all costs associated painting with the lump sum contract price for *Generic Ferry Item (Blast & Paint – Above DLWL)*. Lump Sum prices shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions. No further compensation will be made.

24.0 RELOCATION OF 18" FREEMAN HATCH:

24.1 Description:

This section describes the requirement to relocate STDB M/V Sea Level main deck 18" Freeman Hatch between FR 27 – FR 28 to FR 26 – FR 27.

24.2 References:

24.2.1 Scantling Plans, Bow – FR 35	110-01 Rev. 4
24.2.2 Handrails & Ladder, Below Deck	612-01 Rev. 1

24.3 Owner Furnished Equipment:

NCDOT supplied Hatch

24.4 Requirements:

The contractor shall relocate 18" Freeman Hatch as per drawing 110-01 Rev. 4. All wiring, piping and equipment IWO of hole cut shall be protected. Remove all material not needed for new fit up and properly dispose of all cutout material. Prep and grind work area. Existing 18" Freeman Hatch to be given to NCDOT Representative. **CHECKPOINT**

Existing Hole cut opening shall be replaced utilizing the following material: 3/8" plate; 5"X3/8" flat bar. All material to meet ASTM-A-36 steel specification. Painting underside of main deck and all disturbed areas to be in accordance with section 10 Painting – General of these Special Provisions. **CHECKPOINT**

New Freeman Hatch hole cut to be in accordance with reference drawing 110-01 Rev. 4. New hole cut opening construction will utilize the following material: 6"X1/2" flat bar. All material to meet ASTM-A-36 steel specification. Freeman Hatch to be flush with main deck and SS Ring to be welded using 308 or 309 welding rods, careful not to warp. **CHECKPOINT**

Contractor to fabricate and install ladder from new Freeman Hatch location to catwalk below, all pad eye and ladder runs welded 100%. Two hand holds to be installed above main deck for access from Freeman Hatch. **CHECKPOINT**

24.5 Tests, Trials and Documentation:

Contractor should be aware that there is 2" slope forward to aft on main deck at new location of Freeman Hatch. Some type of template should be used to assure proper fit-up of Freeman Hatch. NCDOT Representative to be present for cutout and fit-up of Freeman Hatch, any discrepancies found shall be corrected at no additional expense to NCDOT. **CHECKPOINT**

Following installation of main deck Freeman Hatch, Contractor shall prove watertight integrity when subjected to low pressure water wash. Contractor shall ensure that all blast material is removed from the vessel when complete.

24.6 Payment:

The lump sum contract bid price for *Generic Ferry Item (Relocate & Paint Main Deck Forward Vestibule 18" Freeman Hatch & Below Deck Ladder)* shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions, including testing and trials. No further compensation will be made.

25.0 REPAIR PORT AND STARBORD CAP RAIL & 10 LOCATIONS IN BULWARKS:

25.1 Description:

This section describes the requirement to replace repair the welds in the Cap Rail located at the bow of the vessel. This section also includes 10 bulwark repairs be identified by NCDOT. Total amount of welds to be repaired for all items equals 500 LF.

25.2 References:

25.2.1 Bulwarks & Curtain Plates 152-032 Rev. 2

25.3 Owner Furnished Equipment:

None

25.4 Requirements:

The Contractor shall repair the failing welds in the existing cap rail. Note: Cap rail is "float coated," so all inaccessible voids shall be gas freed and certified per section 5. Once the welds are repaired the contractor shall reinstall the float coat. Contractor shall blast, surface prep, and paint to correct color, refer to Section 10 “Painting-General Special Provisions”.

25.5

The Contractor shall repair the 10 locations identified by NCDOT, remove and replace the locations in kind with new steel. Once this work is complete the contractor shall blast surface prep, and paint to correct color, refer to Section 10 “Painting-General Special Provisions”.

25.6 Test, Trials and Documentation:

Contractor shall verify all welds in the company of the NCDOT Representative.

25.7 Payment:

The lump sum contract bid price for *Generic Ferry Item (Repair Port and Starboard Cap Rail & 10 Bulwark Locations)* shall be the total compensation for all labor, equipment, float coat, tools and materials to accomplish the work detailed in these Special Provisions, including testing and trials. No further compensation will be made.

Include all costs associated gas freeing should be included with the lump sum contract price for *Generic Ferry Item (Open, Clean and Certify Gas Free: Bilges, Holds, and Enclosed Areas)*. Lump Sum prices shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions. No further compensation will be made.

Include all costs associated painting with the lump sum contract price for *Generic Ferry Item (Blast & Paint – Superstructure)*. Lump Sum prices shall be the total compensation for all labor, equipment, tools and materials to accomplish the work detailed in these Special Provisions. No further compensation will be made.

26.0 SPOT PREP AND PAINT AFT VOID, TANK ROOM, GALLEY KEEL, AND ENGINE ROOM BILGES:

26.1 Description:

This section describes the requirement to prepare and paint location in the various bilge areas.

26.2 References:

~~MV SEA LEVEL - Rudder Stock Housing Replacement_PDF~~

26.3 Owner Furnished Equipment:

None

26.4 Requirements:

The NCDOT Representative and Contractor will identity locations in the bilge areas to be addressed. Locations include:

- Bow Thruster Room: 500 SQ FT
- Foreword Void: 120 SQ FT
- Galley Keel: 120 SQ FT
- Tank Room: 120 SQ FT
- Engine Room: 120 SQ FT
- Aft Void: 3,500 SQ FT
- Steering Compartment 500 SQ FT

Contractor shall mechanically or by hand surface prep, and paint to correct color, refer to Section 10 “Painting-General Special Provisions”.

26.5 Test, Trials and Documentation:

None

26.6 Payment:

The contract unit bid price per each for *Generic Miscellaneous Item (Spot Prep and Paint Bow Thruster, Galley Keel, Tank, Engine, and Exhaust Void’s)* shall be the total compensation for removal and replacement of all deck plates, all labor, equipment, tools and new materials to accomplish the work detailed in these Special Provisions, including testing and trials. No further compensation will be made.

27.0 REMOVE AND REPLACE BOTH HUBS AND LOWER BEARINGS ON EACH RUDDER POST:

27.1 Description:

This section describes the requirement to remove and replace both hubs on each rudder post and the lower bearings on each rudder post.

County : Dare

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	0000820000-N	SP	GENERIC MISCELLANEOUS ITEM BERTHING DAYS	5 DAY		
0002	0000820000-N	SP	GENERIC MISCELLANEOUS ITEM LAY DAYS	5 DAY		
0003	0000950000-E	SP	GENERIC MISCELLANEOUS ITEM SPOT PREP & PAINT BOW THRUSTER , GALLEY KEEL, TANK, ENGINE & EXHAUST V OIDS	5,000 SF		
0004	0001020000-N	SP	GENERIC MISCELLANEOUS ITEM LINE SHAFT BEARING REPLACEMENT	1 EA		
0005	0001020000-N	SP	GENERIC MISCELLANEOUS ITEM ZINC ANODE REPLACEMENTS, KEEL COOLER GUARDS / 12 LB.	60 EA		
0006	0001020000-N	SP	GENERIC MISCELLANEOUS ITEM ZINC ANODE REPLACEMENTS, KEEL COOLERS / BOLT ON PER KEEL COOLER SPECIF ICATIONS	20 EA		
0007	0001020000-N	SP	GENERIC MISCELLANEOUS ITEM ZINC ANODE REPLACEMENTS, RUDDE RS / 6 LB	12 EA		
0008	0001020000-N	SP	GENERIC MISCELLANEOUS ITEM ZINC ANODE REPLACEMENTS, SEA C HEST & BOW THRUSTER - 5.3 LB.	4 EA		
0009	0001020000-N	SP	GENERIC MISCELLANEOUS ITEM ZINC ANODE REPLACEMENTS, VESSE L HULL / 23-24 LB.	109 EA		
0010	0005000000-N	SP	GENERIC FERRY ITEM BLAST & PAINT - ALL DECKS	Lump Sum	L.S.	
0011	0005000000-N	SP	GENERIC FERRY ITEM BLAST & PAINT - SUPERSTRUCTUR E	Lump Sum	L.S.	
0012	0005000000-N	SP	GENERIC FERRY ITEM CUT, PRE-FABRICATE, INSTALL & PAINT MAIN DECK SOFT PATCH FOR BOW THRUST ER	Lump Sum	L.S.	

County : Dare

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0013	0005000000-N	SP	GENERIC FERRY ITEM ENGINE WATER COOLING SYSTEM IN SPECTION AND MAINTENANCE	Lump Sum	L.S.	
0014	0005000000-N	SP	GENERIC FERRY ITEM FABRICATE NEW PORT/STBD INBOAR D BOW THRU STER TUBES, INCLUDING TRANSITI ON & FLANG	Lump Sum	L.S.	
0015	0005000000-N	SP	GENERIC FERRY ITEM GLOBAL DAVIT - REMOVAL & REINS TALLATION	Lump Sum	L.S.	
0016	0005000000-N	SP	GENERIC FERRY ITEM HIGH-PRESSURE WATER WASH, SUPERSTRUCTURE	Lump Sum	L.S.	
0017	0005000000-N	SP	GENERIC FERRY ITEM HIGH-PRESSURE WATER WASH, HULL ABOVE DLWL	Lump Sum	L.S.	
0018	0005000000-N	SP	GENERIC FERRY ITEM HIGH-PRESSURE WATER WASH, HULL BELOW DLWL	Lump Sum	L.S.	
0019	0005000000-N	SP	GENERIC FERRY ITEM MAIN DECK HATCH MAINTENANCE AN D REPAIR	Lump Sum	L.S.	
0020	0005000000-N	SP	GENERIC FERRY ITEM OPEN, CLEAN AND CERTIFY GAS FR EE: BILGES, HOLDS AND ENCLOSED ARE AS	Lump Sum	L.S.	
0021	0005000000-N	SP	GENERIC FERRY ITEM PAINT - HULL ABOVE DLWL	Lump Sum	L.S.	
0022	0005000000-N	SP	GENERIC FERRY ITEM RELOCATE & PAINT MAIN DECK FOR WARD VESTI BULE 18" FREEMAN HATCH & BELOW DECK LADD	Lump Sum	L.S.	
0023	0005000000-N	SP	GENERIC FERRY ITEM REMOVE & INSTALL BOW THRUSTER AND WALK WAY	Lump Sum	L.S.	

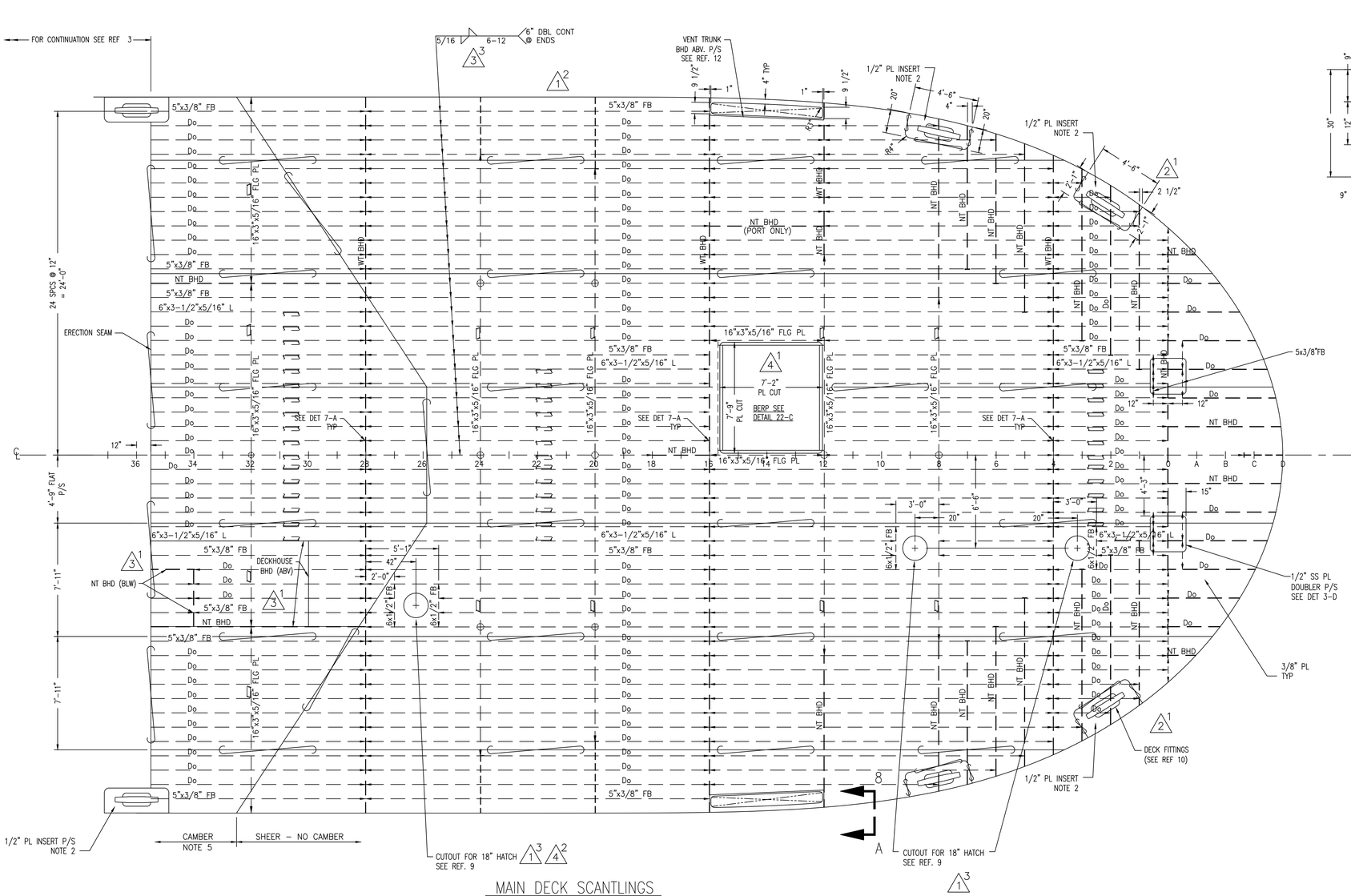
County : Dare

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0024	0005000000-N	SP	GENERIC FERRY ITEM REMOVE 3 MAIN DECK WTD, MAINT ENANCE, REPAIR AND REINSTALL	Lump Sum	L.S.	
0025	0005000000-N	SP	GENERIC FERRY ITEM REMOVE ALL MSD TANK HATCHES - CLEAN, PR EP, PAINT&REPLACE GASKETS&INST ALL 4" FLA	Lump Sum	L.S.	
0026	0005000000-N	SP	GENERIC FERRY ITEM REMOVE AND REPLACE HUBS AND LO WER BEARIN GS ON EACH RUDDER POST	Lump Sum	L.S.	
0027	0005000000-N	SP	GENERIC FERRY ITEM REPAIR PORT & STARBOARD CAP RA IL & 10 BULWARK LOCATIONS	Lump Sum	L.S.	
0028	0005000000-N	SP	GENERIC FERRY ITEM REPLACE & PAINT PORT & STBD MA IN ENGINE EXHAUSTS FROM 1ST INBD FLANGE THROUGH HU	Lump Sum	L.S.	
0029	0005000000-N	SP	GENERIC FERRY ITEM REPLACE & PAINT PORT & STBD MA IN GENERAT OR EXHAUST FROM 1ST INB FLANGE THROUGH H	Lump Sum	L.S.	
0030	0005000000-N	SP	GENERIC FERRY ITEM REPLACE & PAINT STBD BOW THRUS TER EXHAUS T FROM 1ST INBD FLANGE THROUGH HULL	Lump Sum	L.S.	
0031	0005000000-N	SP	GENERIC FERRY ITEM RUDDER REMOVALS & INSPECTIONS	Lump Sum	L.S.	
0032	0005000000-N	SP	GENERIC FERRY ITEM SEA VALVES	Lump Sum	L.S.	
0033	0005000000-N	SP	GENERIC FERRY ITEM SEWAGE SYSTEM - CLEAN, INSPECT & PERFORM MAINTENANCE	Lump Sum	L.S.	
0034	0005000000-N	SP	GENERIC FERRY ITEM SPOT BLAST FAILED BLOCKING ARE AS & PAINT - HULL BELOW DLWL	Lump Sum	L.S.	

County : Dare

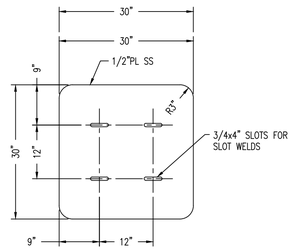
Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0035	0005000000-N	SP	GENERIC FERRY ITEM STARTUP, DOCK AND SEA TRIALS	Lump Sum	L.S.	
0036	0005000000-N	SP	GENERIC FERRY ITEM TAKE CONTROL AND DRY DOCK THE M/V SEA LEVEL	Lump Sum	L.S.	

0752/Dec09/Q5243.0/D143710000/E36 **Total Amount Of Bid For Entire Project :**



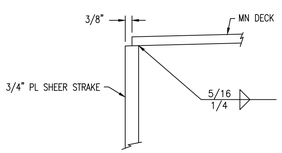
MAIN DECK SCANTLINGS

BOW TO FRAME 36
SCALE: 1/4" = 1'-0"



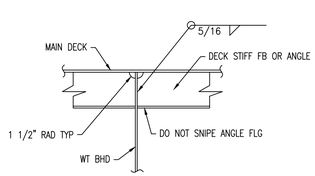
DETAIL 3-D

RAMP GATE DOUBLER
SCALE: 3/4"=1'-0"



SECTION 8-A

TYP CONNECTION AT DECK SIDE
3"=1'-0"



DETAIL 7-A

TYP SECT AT DECK STIFF IN WAY OF WT BHD
1"=1'-0"

GENERAL NOTES

1. THIS DRAWING SHOULD NOT BE USED TO DIRECTLY SCALE NC PARTS OR PREPARE 3D MODELING.
2. MAIN DECK INSERT PLATES SHALL BE INSTALLED WITH THE TOP FLUSH WITH THE DECK PLATING.
3. SEE REFERENCE NO. 1 FOR LONG'L SECTIONS & REFERENCE NO. 2 FOR TRANSVERSE SECTIONS.
4. ALL MATERIAL SHALL BE ABS GR. A OR EQUIVALENT EXCEPT AS NOTED.
5. THE MAIN DECK HAS A MAXIMUM OF 6" STRAIGHT LINE CAMBER AFT OF FRAME 33 AND OUTBOARD OF THE 57' DECK KNUCKLE. WHERE THE BEAM IS LESS THOM MAXIMUN, THE CAMBER MAINTAINS THE SAME ANGLE. FORWARD OF FRAME 26, THE DECK HAS NO CAMBER.
6. WHERE LONG'L BEAMS PASS THROUGH SLOTTED FRAMES, BHDS, OR GIRDERS, THERE IS TO BE A PAIR OF MATCHED INTERMITTENT WELDS ON EACH SIDE OF EACH SUCH INTERSECTION.

RESERVATIONS

1. RESERVE BOW THRUSTER ENGINE FOUNDATION PENDING BOW THRUSTER ENGINE VENDOR INFORMATION.

12/9/2020

THIS DRAWING CONTAINS INFORMATION BASED ON EBDG CONTRACT DESIGN DRAWING
07069-001-110-1
07069-001-120-1
07069-001-130-1

REVISIONS

REV	ZONE	DESCRIPTION	DATE	BY/APPVD
1	13-C 13-D 6-D 5,7-B	1. REVISED LOCATION OF BOW THRUSTER TUBE SHELL PENETRATION PER BOW THRUSTER DEVELOPMENT. 2. REMOVED DECK INSERT PORT SIDE IN WAY OF ANCHOR. 3. REVISED SIZE OF DECK HATCHES.	01/18/10	CF KK
2	4-B 4-D	1. RELOCATED FWD KEVEL AND REVISED DECK INSERT PER BOW GATE DEVELOPMENT.	02/02/10	CF KK
3	8-C 15-A 7-D	1. ADDED BELOW DK NT BHDS. REVISED LOCATION OF ABOVE DK BHDS 2. ADDED ABV DK NT BHDS 3. REVISED WELD TO STAGGERED WELD FOR DK LONGLS.	08/30/10	MB KK
4	5-C 7-B	1. ADDED BOW THRUSTER B.E.R.P. & SHEET 3 FOR DETAILS 2. RELOCATED MANHOLE	04/17/19	BTJ

NO.	REFERENCES	DWG NO.
12	MACHINERY SPACE VENTILATION	513-01
11	BOW THRUSTER INSTALLATION	568-01
10	DECK FITTINGS	582-01
9	SCHEDULE OF OPENINGS, BELOW DECK	167-01
8	LINES PLAN	839-01
7	MOLD LINE CONVENTION	101-03
6	GENERAL ARRANGEMENTS	101-02
5	OUTBOARD & INBOARD PROFILE	101-01
4	CONSTRUCTION PROFILE & LONG'L BHDS, FR. 36-FR. 72	116-02
3	SCANTLING PLANS, FR. 36-FR. 72	110-02
2	FRAMES, BOW-FR. 35	117-01
1	CONSTRUCTION PROFILE & LONG'L BHDS, BOW-FR. 35	116-01

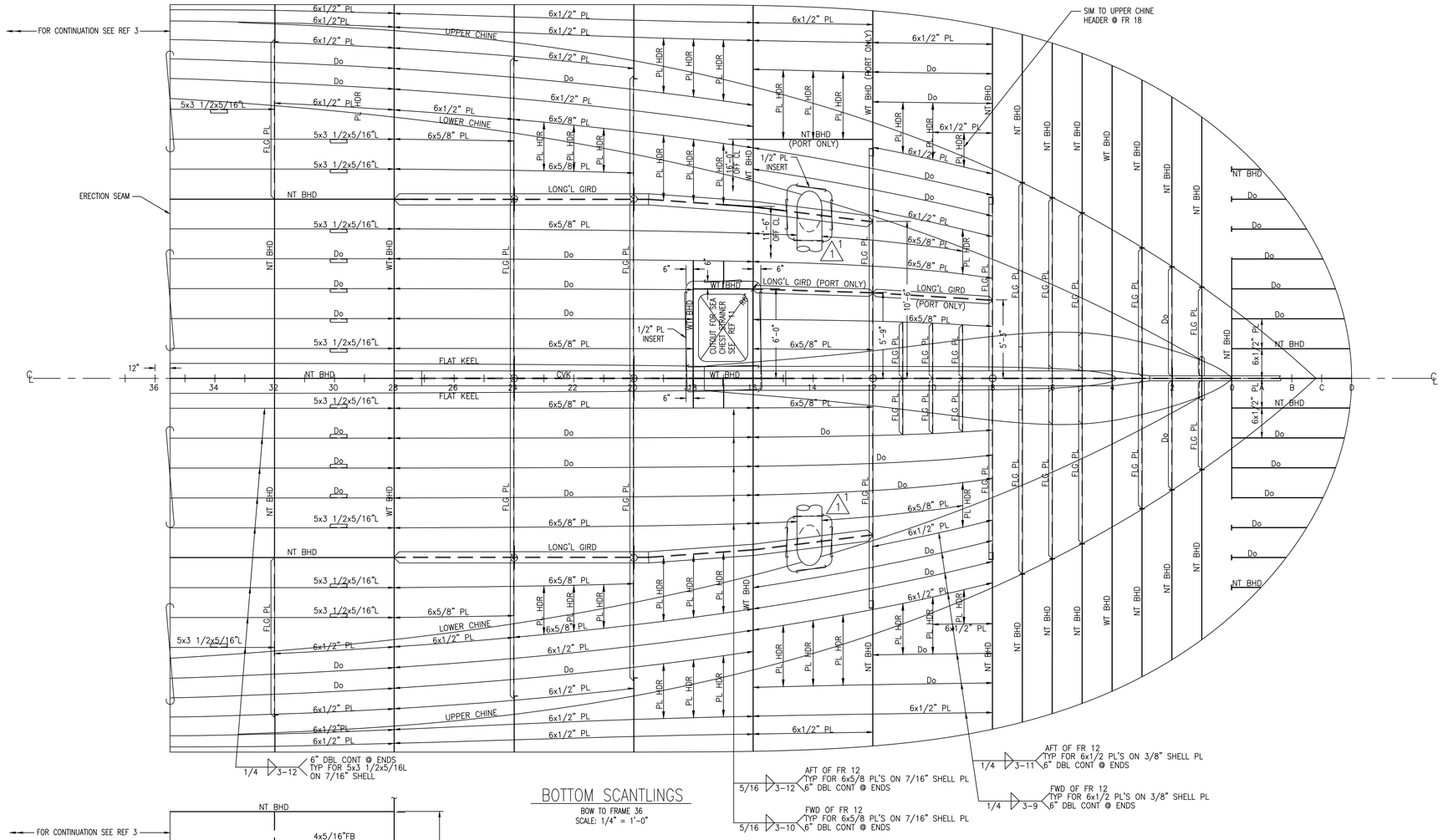
ORANGE Shipbuilding Co., Inc.
A CONRAD INDUSTRIES CO.
710 MARKET STREET-ORANGE, TEXAS 77630
PHONE 409-883-6666 FAX 409-882-0609

GUARINO & COX, LLC
19399 HELENBIRG RD. SUITE 203
COVINGTON LA. 70433

ORANGE SHIPBUILDING CO. INC.
NORTH CAROLINA DOT FERRY DIVISION
NEW SOUND CLASS FERRY

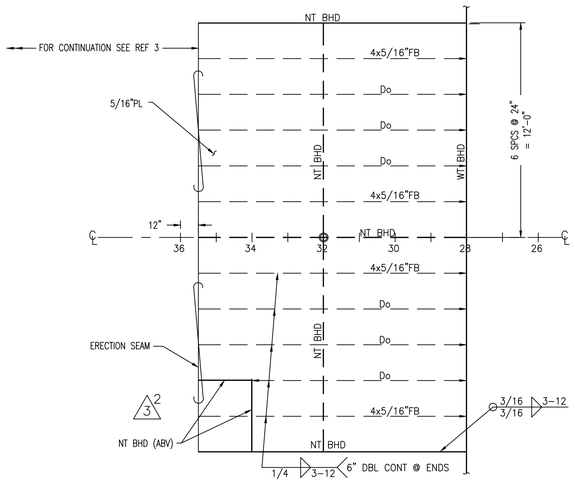
SCANTLING PLANS, BOW - FR. 35

DRAWN BY: C FIELDS	DATE: 12-10-09	DWG NO.	110-01
CK'D BY: KHK	HULL No. 413 & 425	SHT 1 OF 3	
SCALE: 1/4"=1'=0"	G&C Job No. 09-060	REV. 4	



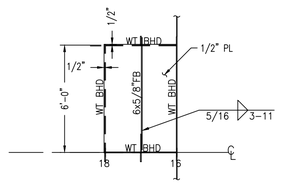
BOTTOM SCANTLINGS

BOW TO FRAME 36
SCALE: 1/4" = 1'-0"



NT FLAT 4'-0' ABV BL

BOW TO FRAME 36
SCALE: 1/4" = 1'-0"



BOW THRUSTER SEA CHEST TOP

6'-0" ABV BL PORT ONLY
SCALE: 1/4" = 1'-0"

12/9/2020

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19399 HELENBIRG RD. SUITE 203
COVINGTON LA. 70433

ORANGE SHIPBUILDING CO. INC.

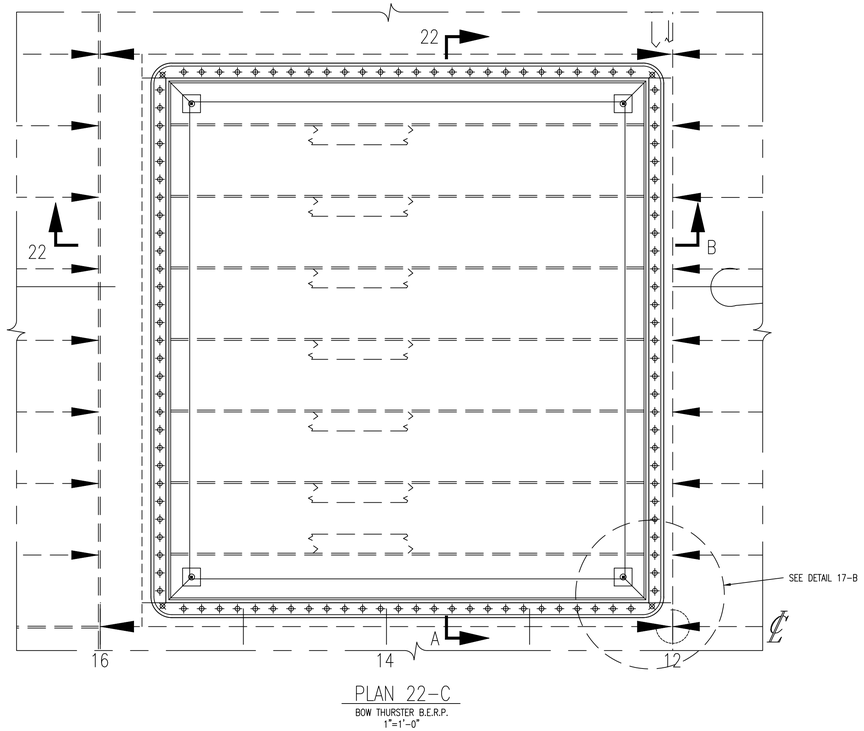
NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

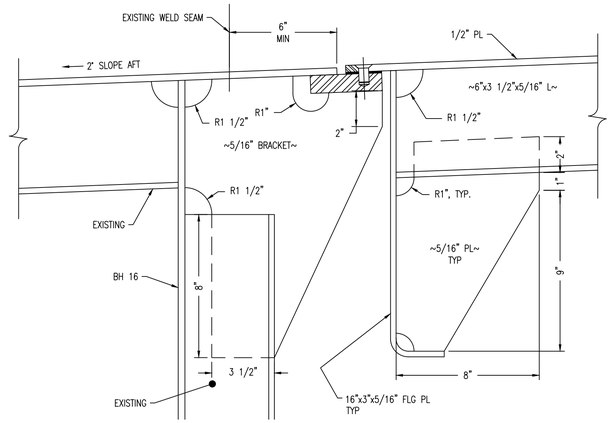
SCANTLING PLAN, BOW – FR. 35

DRAWN BY: C FIELDS	DATE: 12-10-09	DWG NO. 110-01 SHT 2 OF 3
CK'D BY: KHK	HULL No. 413 & 425	
SCALE: 1/4"=1'-0"	G&C Job No. 09-060	REV. 4

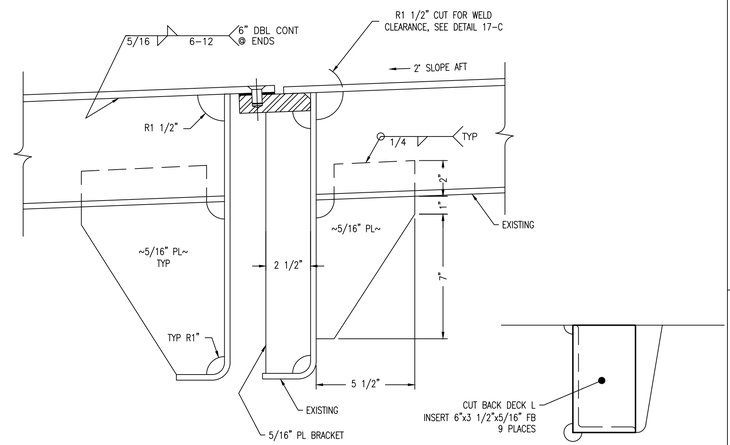
12/9/2020



PLAN 22-C
BOW THURSTER B.E.R.P.
1"=1'-0"

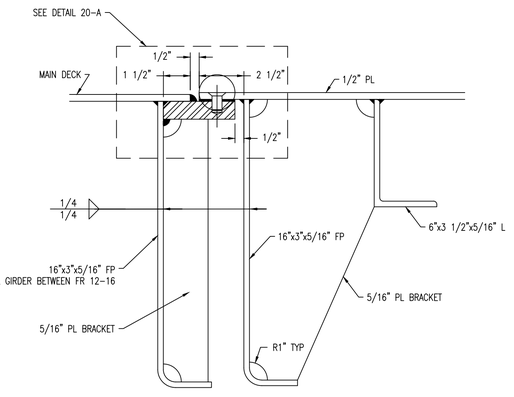


DETAIL 20-C
3"=1'-0"

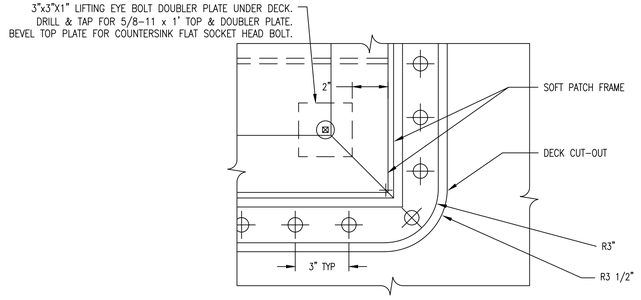


DETAIL 18-C
3"=1'-0"

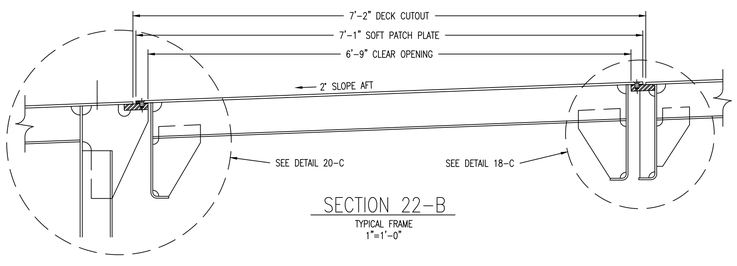
DETAIL 17-C
FRAME 12
IWO B.E.R.P. ONLY
3"=1'-0"



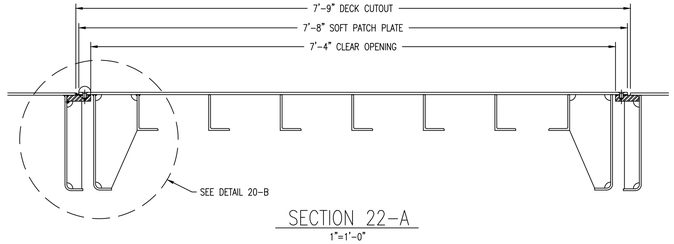
DETAIL 20-B
TYP. SECTION FRS 13-15
PORT SHOWN, STBD SIMILAR
3"=1'-0"



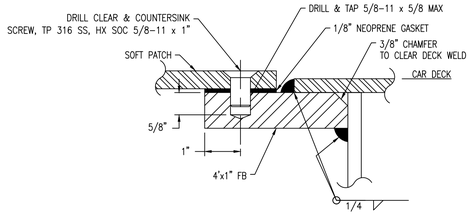
DETAIL 17-B
TYPICAL HATCH CORNER
3"=1'-0"



SECTION 22-B
TYPICAL FRAME
1"=1'-0"



SECTION 22-A
1"=1'-0"

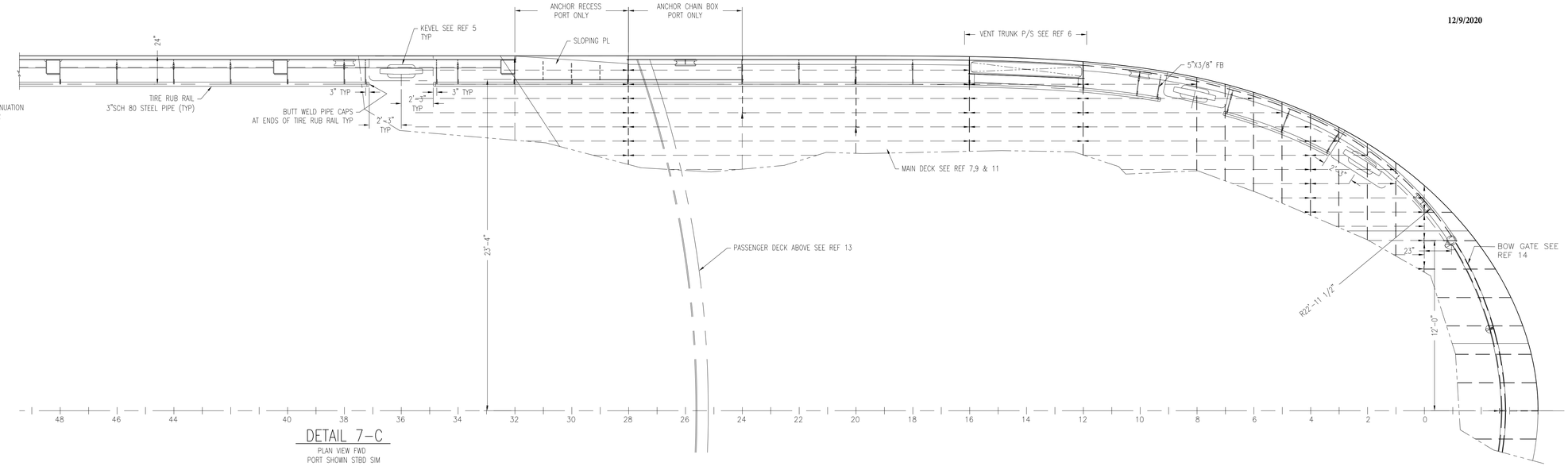


DETAIL 20-A
6"=1'-0"

DRAWN BY: BTJ		DATE: 04-17-19	DWG NO. 110-01 SHT 3 OF 3
CK'D BY: JDW		HULL No. 413 & 425	
SCALE: 1/4"=1'-0"		G&C Job No. 09-060	REV. 4

REVISIONS				
REV	ZONE	DESCRIPTION	DATE	BY/APPVD
1	VARIES VARIES 16-B 16-A 3-A	1. REVISED DEPTH OF PAX DECK TRANS DK GIRDS @ FR 29 & 32 & REVISED LOCATION OF HEADER ON CURTAIN PLATES TO SUIT. 2. ADDED DRAIN HOLES IN HORIZ FLG PL'S ON CURTAIN PL. ADDED SECTION 4-A. 3. REVISED BULWARK PIPE STANCHION SIZE @ FR 104. 4. ADDED SLIDE BOLT DETAILS INFO FOR BULWARK GATE. 5. ADDED DRAIN PLUG @ DET 3-A. ABOVE CHANGES PER DEVELOPMENT OF DWG 152-02 & OWNERS COMMENTS.	7/30/10	MB/BJ /KK
2	VARIES 11-D 19-A	1. REVISED SCANTLING SIZES IN VARIOUS PLACES TO SUIT LATEST SCANTLING CALCULATIONS. 2. ADDED HINGED GATE PORT SIDE PER CHANGE ORDER 011 3. ADDED DETAIL OF RETRACTABLE BOARDING LADDER.	9/7/10	BJ/KK

12/9/2020



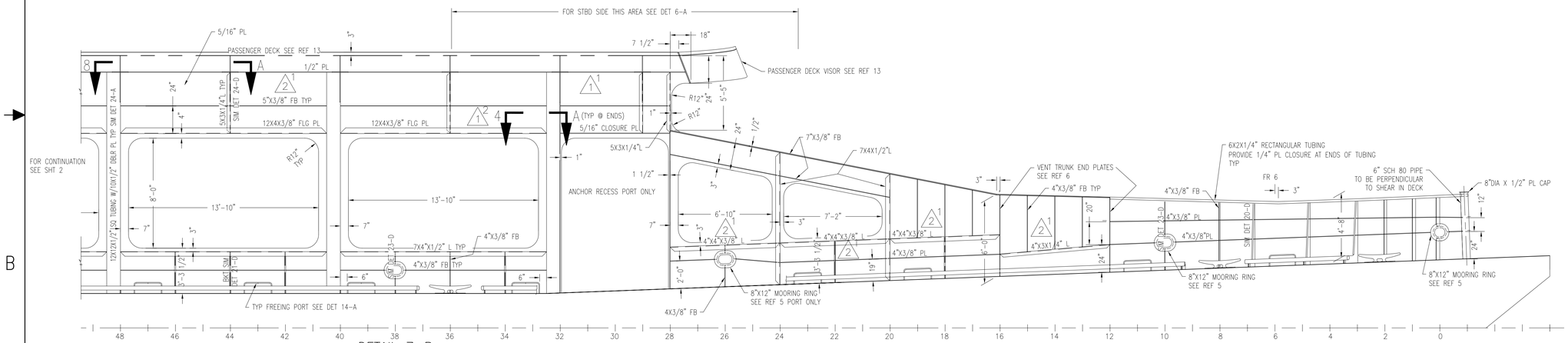
DETAIL 7-C

PLAN VIEW FWD
PORT SHOWN STBD SIM

THIS DRAWING CONTAINS INFORMATION BASED ON EBDG CONTRACT DESIGN DRAWING 07069-001-150-1

GENERAL NOTES

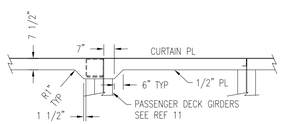
1. THIS DRAWING SHOULD NOT BE USED TO DIRECTLY SCALE NC PARTS OR PREPARE 3D MODELING.
2. ALL WELDING TO BE 3/16" DBL CONT UNLESS NOTED OTHERWISE.
3. ALL STEEL TO BE ABS GR "A" OR EQUIVALENT EXCEPT AS NOTED.
4. BULWARK CAP SHALL BE INTERNALLY COATED WITH A PRESERVATIVE AND SEAL WELDED TO BE WATERTIGHT



DETAIL 7-B

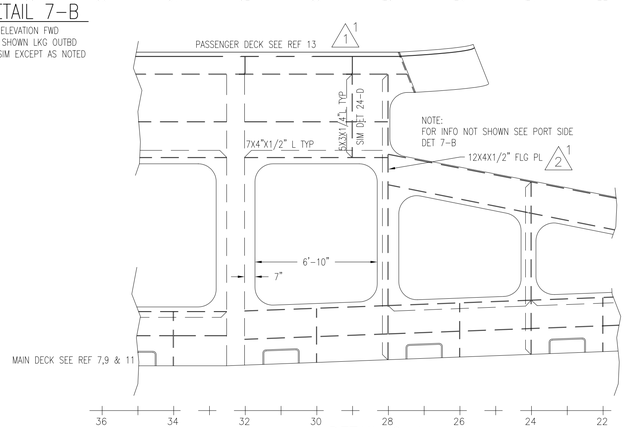
ELEVATION FWD
PORT SHOWN LKG OUTBD
STBD SIM EXCEPT AS NOTED

NO.	REFERENCES	DWG NO.
15	ANCHOR HANDLING	581-01
14	GATE DETAILS	169-01
13	PASSENGER DECK SCANTLINGS	152-02
12	FRAMES, FR. 73-STERN	117-03
11	SCANTLING PLANS, FR 73-STERN	110-03
10	FRAMES, FR. 36-72	117-02
9	SCANTLING PLANS, FR 36-72	110-02
8	FRAMES, BOW-FR. 35	117-01
7	SCANTLING PLANS, BOW-FR. 35	110-01
6	MACHINERY SPACE VENTILATION	513-01
5	DECK FITTINGS	582-01
4	LINES PLAN	839-01
3	MOLD LINE CONVENTION	101-03
2	OUTBOARD & INBOARD PROFILE	101-01
1	GENERAL ARRANGEMENTS	101-02



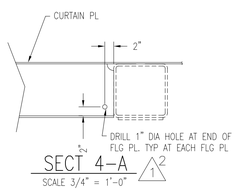
SECTION 8-A

HORIZONTAL PL AT TOP OF COLUMNS
PORT SHOWN STBD SIM



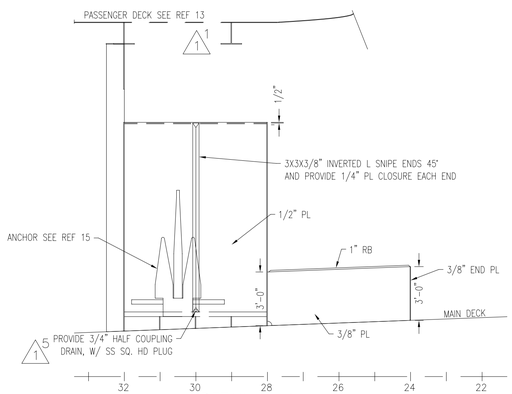
DETAIL 6-A

PARTIAL STBD CURTAIN PL
LKG INBD



SECT 4-A

SCALE 3/4" = 1'-0"



DETAIL 3-A

ANCHOR RECESS 23'-4" OFF CL PORT ONLY
LKG OUTBD

ORANGE Shipbuilding Co., Inc.
A CONRAD INDUSTRIES CO.
710 MARKET STREET-ORANGE, TEXAS 77630
PHONE 409-883-6666 FAX 409-882-0609

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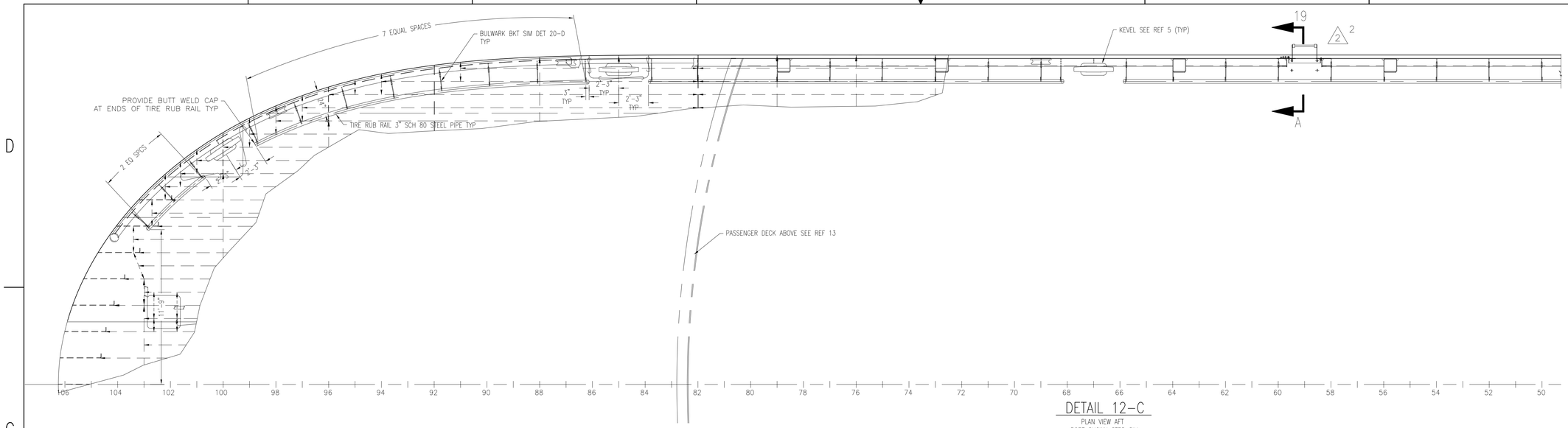
ORANGE SHIPBUILDING CO. INC.

NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

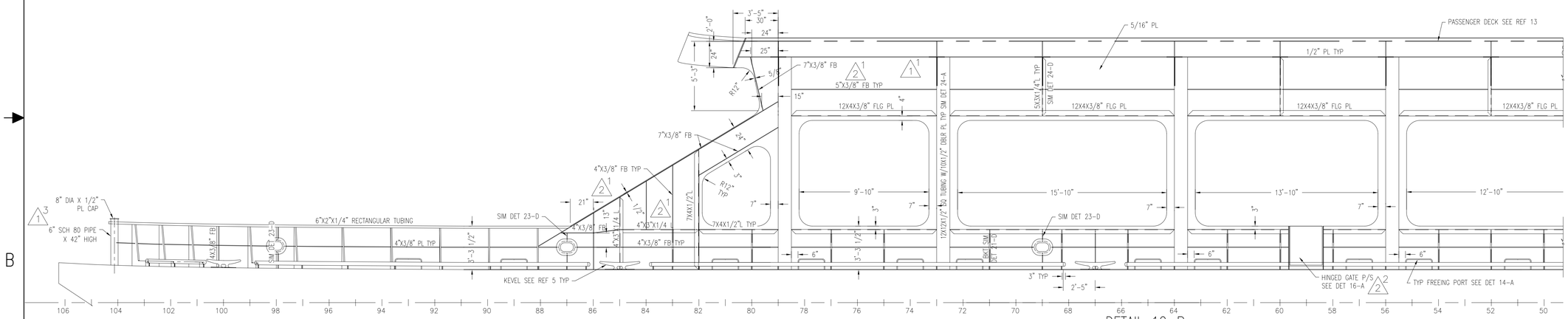
BULWARKS AND CURTAIN PLATES

DRAWN BY: B. JAMES	DATE: 2/19/10	DWG NO.	152-03
CK'D BY: KHK	HULL No. 413	SHT 1 OF 3	
SCALE: 1/4"=1'-0"	G&C Job No. 09-060	REV. 2	



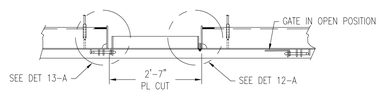
DETAIL 12-C

PLAN VIEW AFT
PORT SHOWN STBD SIM



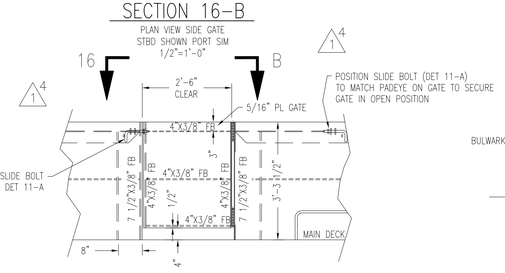
DETAIL 12-B

ELEVATION AFT
PORT SHOWN LKG OUTBD
STBD SIM



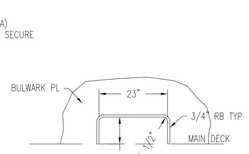
SECTION 16-B

PLAN VIEW SIDE GATE
STBD SHOWN PORT SIM
1/2"=1'-0"



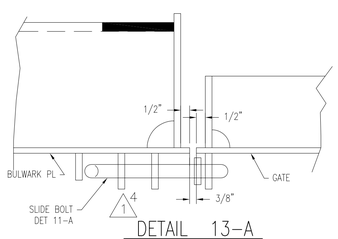
DETAIL 16-A

ELEVATION SIDE GATE
STBD SHOWN LKG INBD
PORT SIM
1/2"=1'-0"



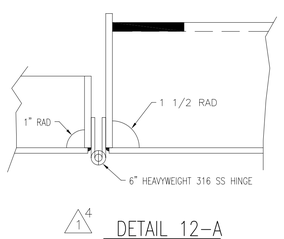
DETAIL 14-A

TYP FREEING PORT
1/2"=1'-0"



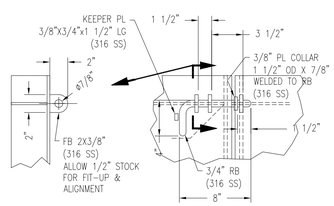
DETAIL 13-A

3"=1'-0"



DETAIL 12-A

3"=1'-0"



DETAIL 11-A

SLIDE BOLT DETAIL
1-1/2"=1'-0"

12/9/2020

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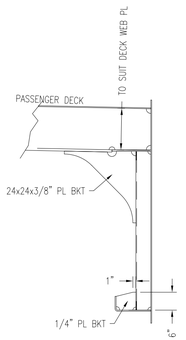
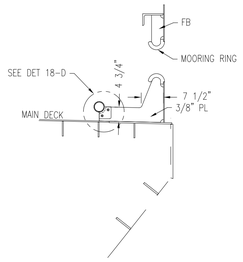
BULWARKS AND CURTAIN PLATES

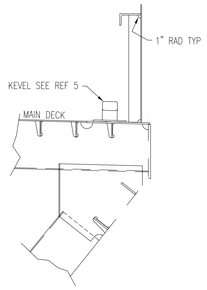
DRAWN BY: B. JAMES	DATE: 2/19/10	DWG NO.	152-03
CK'D BY: KHK	HULL No. 413	SHT 2 OF 3	
SCALE: 1/4"=1'-0"	G&C Job No. 09-060	REV. 2	



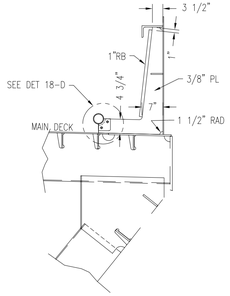
DETAIL 24-D
TYP SECTION BETWEEN COLUMNS
1/2"=1'-0"



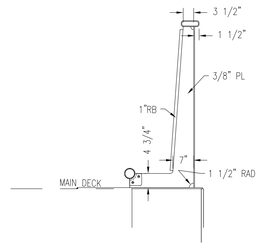
DETAIL 23-D
TYP BULWARK BKT IN WAY OF MOORING RING
1/2"=1'-0"



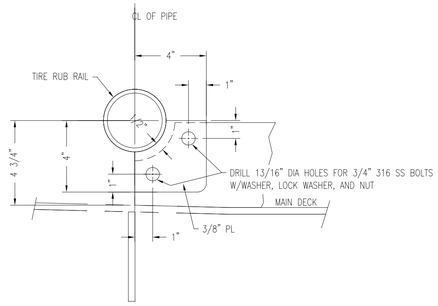
DETAIL 22-D
TYP SECTION IN WAY OF KEVELS
1/2"=1'-0"



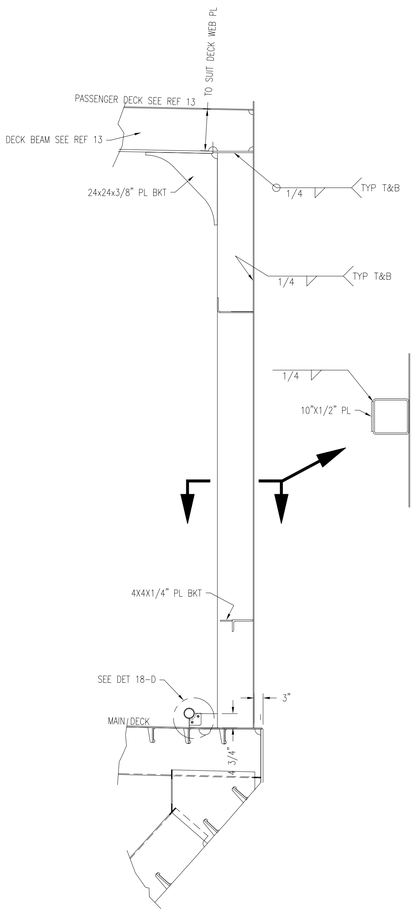
DETAIL 21-D
TYP BKT IN WAY OF CURTAIN PL
1/2"=1'-0"



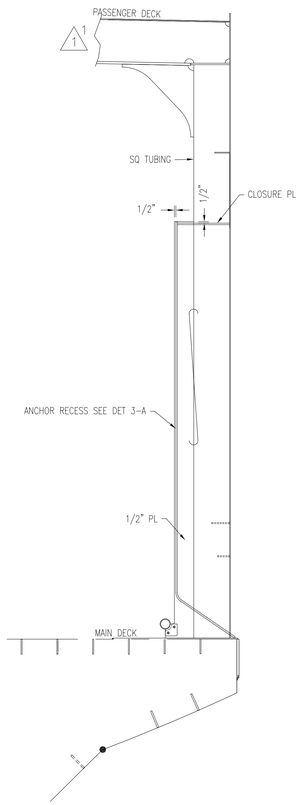
DETAIL 20-D
TYP BULWARK BKT IN WAY OF RECTANGULAR TUBING
1/2"=1'-0"



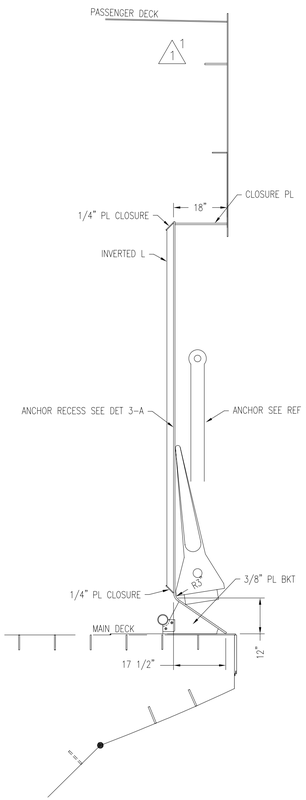
DETAIL 18-D
TYP TIRE RUB RAIL ATTACHMENT
3"=1'-0"



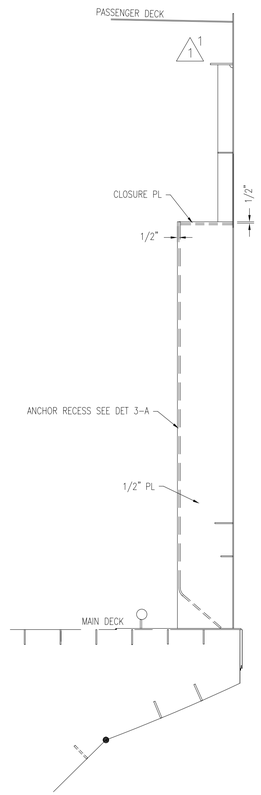
DETAIL 24-A
TYP DETAIL IN WAY OF COLUMNS
PORT SHOWN LKG AFT STBD SIM
1/2"=1'-0"



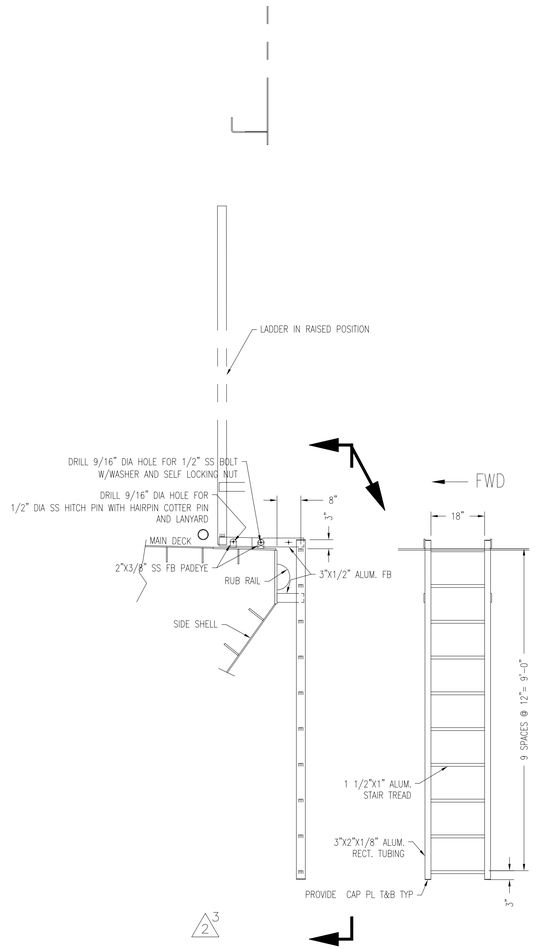
DETAIL 23-A
DETAIL AT FR 32
PORT SHOWN LKG AFT
1/2"=1'-0"



DETAIL 21-A
DETAIL AT FR 30
PORT SHOWN LKG AFT
1/2"=1'-0"



DETAIL 20-A
DETAIL AT FR 28
PORT SHOWN LKG AFT
1/2"=1'-0"



SECTION 19-A
TYP SECTION IN WAY OF RETRACTABLE LADDER
PORT SHOWN LKG INBD STBD SIM
1/2"=1'-0"

12/9/2020

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NEW SOUND CLASS FERRY

BULWARKS AND CURTAIN PLATES

DRAWN BY:	B. JAMES	DATE: 2/19/10	DWG NO. 152-03 SHT 3 OF 3
CK'D BY:	KHK	HULL No. 413	
SCALE:	AS NOTED	G&C Job No. 09-060	REV. 2

BILL OF MATERIAL

ITEM NO.	QTY	SIZE	DESCRIPTION	MATERIAL	SPEC NO.	PART NO.	REMARKS
1	2	6"	TAIL SHAFT 6" DIA x 24'-3" LG	STN. STL.	AQUAMET 22		SEE DET 14-D
2	2	5"	LINE SHAFT 5" DIA x 12'-5 11/16 LG	STL	ABS GR 2 OR EQUIV.		SEE DET 10-D
3	2	SEE DET 24-C	COMPANION COUPLING	STL		DWG. 3084-680-247	SUPPLIED W/ Z.F. GEAR INCLUDES COUPLING BOLTS
4	6	1 1/4" W x7/8"DP x10 3/8" LG	COUPLING KEY	STL	AISI 1018 COLD-DRAWN		SEE DET 22-C
5	6	6 1/2" DIA x 1" THK	THRUST PLATE	STL	ABS GR. A OR EQUIV.		SEE DET 23-C
6	18	1"-8UNC x 4" LG	HEX HEAD BOLTS - HIGH STRENGTH SAE GRADE 8	STL	ASTM A449		HEADS DRILLED FOR 18 GA 18-20 304 STN STL LK WIRE
7	2	FOR 5" SHAFT	BULKHEAD STUFFING BOX	VAR		MODEL 1790M	JOHNSON DURAMAX GREASE SERVICE TYPE 10
8	2	6" SCH 80 PIPE 6" LG	MOUNTING TUBE FOR BULKHEAD STUFFING BOX	STL	ASTM A-53		
9	2	10 1/8" x 1" TK	MOUNTING FLANGE FOR BULKHEAD STUFFING BOX	STL	ABS GR 2 OR EQUIV.		SEE DET 18-C
10	16	5/8"-11UNC 2 3/4" LG	BOLT HEX HEAD W/NUTS FOR BULKHEAD STUFFING BOX	STN STL	TYPE 316		
11	2	SEE DET 20-D	LINE SHAFT AFT COUPLING	STL	ABS GR A OR EQUIV.		
12	2	SEE DET 24-D	TAIL SHAFT FWD COUPLING	STL	ABS GR 2 OR EQUIV.		
13	24	1"-8UNC 6 3/4" LG	BOLT HEX HEAD W/ NUT - HIGH STRENGTH GR 8 FITTED	STL	ASTM A449		SEE DET 17-C
14	2	FOR 6" SHAFT	STERN TUBE SEAL	VAR			DEEP SEA SEALS LTD (WARTSILA) DWG. NO. H76214 -W/ MOUNTING BOLTS & GASKET
15	2	16 1/2" OD x 2" THICK	ADAPTER PLATE FOR STERN TUBE SEAL	STL	ABS GR A OR EQUIV.		SEE DET 9-C
16	2	16 1/2" OD x 2" THK	STERN TUBE FLG	STL	ABS GR A OR EQUIV.		SEE GEN NOTE 6, SEE DET 12-C
17	12	5/8"-11UNC 3 1/4" LG	HEX HEAD BOLTS	STN STL	TYPE 316		
18	4	5/8" DIA x 1" LG.	DOWEL PIN	STN STL	TYPE 316		
19	2	7"OD x 5.995"ID x 26 1/2" LG	SHAFT LINER FOR STERN TUBE BEARING	BRONZE	ASTM B505		SAE 660, UNS C93200 OR EQUAL SEE GEN NOTE 2 & 3, SEE DET 13-A
20	2	FOR 7" SHAFT	STERN TUBE BEARING	VAR		861782100 "GAVEL"	JOHNSON DURAMAX, SEE DET 13-A1
21	2	12"OD x 8 1 /2"ID x 62.375" LG	MECH TUBING (HOUSING FOR STERN TUBE BEARING)	STL	ASTM A519		GRADE 1026 HR OR EQUAL SEE GEN NOTE 4 & 6, SEE DET 13-B
22	2	10" SCH 80 PIPE 11'-5 5/8" LG	STERN TUBE PIPE	STL	ASTM A-53		ANSI B36.10 GR B SEE GEN NOTE 4 & 6
23	2	7"OD x 5.995"ID x 28" LG	SHAFT LINER FOR STRUT BEARING	BRONZE	ASTM B 505		SAE 660, USN C93200 OR EQUAL SEE GEN NOTE 2 & 3, SEE DET 15-A
24	2	FOR 7" SHAFT	STRUT BEARING	VAR		861782100 "GAVEL"	JOHNSON DURAMAX, SEE DET 15-A1
25	2	12"OD x 8 1 /2"ID x 28" LG	MECH TUBING (HOUSING FOR STRUT BEARING)	STL	ASTM A519		GRADE 1026 HR OR EQUAL SEE GEN NOTE 4 & 6, SEE DET 15-B
26	16	5/8"-11UNC x 2" LG	HEX HEAD BOLTS	STN STL	TYPE 316		
27	2	1 3/8"W x 1"DP x 14 1/8"LG	PROPELLER KEY	STL	AISI 1018 COLD-DRAWN		SEE DET 20-C
28	2	SEE DET 17-D	PROPELLER PLAIN NUT	BRONZE			
29	2	SEE DET 18-D	PROPELLER JAM NUT	BRONZE			
30	2	20" DIA x 1/2" INSERT PL	STERN TUBE BHD INSERT	STL	ABS GR. A OR EQUIV.		
31	2	FOR 5" SHAFT	PILLOW BLOCK BEARING, CYLINDRICAL, SPLIT-TYPE	VAR			CRAFT MODEL S1 BCH 500-FL
32	8	7/8"-9UNC x 4" LG	HEX HEAD BOLTS - HIGH STRENGTH SAE GRADE 5	STL	ASTM A449		
33	2	12" SCH 40 PIPE x 6" LG	ROPE GUARD	STL	ASTM A-53		SEE DET 19-B
34	2	2" x 3/8" FB	NUT RETAINING STRAP	STN STL	TYPE 316		SEE DET 18-B

12/9/2020

REVISIONS				
REV	ZONE	DESCRIPTION	DATE	BY/APPVD
1	9-C	1. ADDED 3/4" HOLE THRU STERN TUBE SEAL ADAPTER FOR STERN TUBE COOLING WATER SUPPLY PER DEVELOPMENT OF REF 8.	6/30/10	JCM/KHK
2	5-B 4-A 23-A	1. REVISED (ITEM 31) PILLOW BLOCK MAKE AND MODEL. 2. REVISED (ITEM 32) PILLOW BLOCK MOUNTING BOLT SIZE & REV FOUNDATION PER CHANGE IN PILLOW BLOCK.	8/11/10	CF/KHK
3	13-B 14-C 6-A 9,14-C 6-A	1. REVISED LENGTH OF STERN TUBE BEARING HOUSING (ITEM 21) & STERN TUBE PIPE (ITEM 22) & REVISE SHAFT ELEVATION TO SUIT - PER SHIPYARD COMMENTS. 2. ADDED COUNTER-BORE TO STERN TUBE SEAL ADAPTER PLATE, ITEM 15, PER MACHINE SHOP AS-BUILT.	3/3/11	CF/KHK
4	6-A 8-A,B 19-B	1. ADDED INDICATION OF TRSV FLG PLATES AT FR 89 & 90 PER H-413-RFI-S-079. 2. ADDED INDICATION OF ROPE GUARD. DET 19-B ADDED TO SUIT. PER AS BUILT CONDITION.	5/6/11 7/23/11	MH/KK
5	18-B	1. ADDED DETAIL FOR SHAFT NUT RETAINING STRAP	12/4/20	BTJ

SHAFT CALCULATION - TAIL SHAFT

$D = 100K \sqrt[3]{(H/R)[c_1/(U + c_2)]}$

$D = 100 \times 1.29 \sqrt[3]{\frac{1133}{557.1}\ [3.695\ /(60{,}000 + 23{,}180)]}$

D req'd = 5.79"

K = 1.29
c_1 = 3.695
c_2 = 23180
H = 1180 BHP x 0.96 MECH. EFF'Y
H = 1133 SHP
R = 1800 ENGINE RPM / 3.231 GEAR RATIO
R = 557.1 SHAFT RPM
U = 60,000 PSI

SHAFT CALCULATION - LINE SHAFT

$D = 100K \sqrt[3]{(H/R)[c_1/(U + c_2)]}$

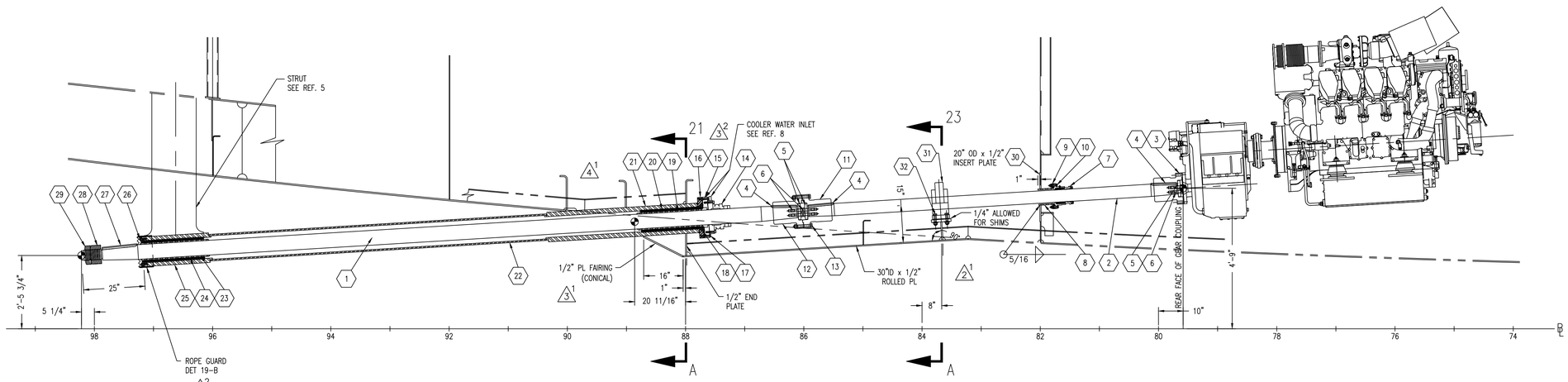
$D = 100 \times 1.1 \sqrt[3]{\frac{1133}{557.1}\ [3.695\ /(60{,}000 + 23{,}180)]}$

D req'd = 4.936"

K = 1.1
c_1 = 3.695
c_2 = 23180
H = 1180 BHP x 0.96 MECH. EFF'Y
H = 1133 SHP
R = 1800 ENGINE RPM / 3.231 GEAR RATIO
R = 557.1 SHAFT RPM
U = 60,000 PSI

GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH ABS RULES FOR BUILDING AND CLASSING STEEL VESSELS UNDER 90 METERS IN LENGTH AND USCG REGULATIONS FOR VESSELS INSPECTED UNDER SUBCHAPTER H.
2. LINER OUTSIDE DIAMETERS SHALL BE MACHINED AFTER THE LINERS ARE INSTALLED ON THE SHAFTS.
3. OUTSIDE DIAMETERS OF SHAFTS SHALL BE VERIFIED PRIOR TO MACHINING INSIDE DIAMETERS OF LINERS FOR INTERFERENCE FIT. (CLASS FN 2)
4. SHOTBLAST INTERIORS OF STERN TUBES TO SSPC-SP-10. APPLY TWO COATS OF COAL TAR EPOXY AT 8 MILS DFT EACH. APPLY TWO COATS OF ANTIFOULING COATING AT 2 MILS DFT EACH. THE FIRST COAT OF ANTI-FOULING SHALL BE APPLIED WHILE THE SECOND COAT OF COAL TAR EPOXY IS STILL TACKY.
5. ALL WORK TO BE TEMPLATED FROM VESSEL.
6. FORWARD END OF STERN TUBE FLANGE TO BE MACHINED AFTER STERN TUBE IS INSTALLED. STERN TUBE AND STRUT BARREL SHALL BE LINE-BORED TO MATCH THE DIAMETER AND ANGLE OF THE BEARINGS.
7. THIS DRAWING SHOULD NOT BE USED TO DIRECTLY SCALE NC PARTS OR PREPARE 3D MODELING.
8. SHAFT TAPER AND PROPELLER SHAFT HUB SHALL COMPLY WITH SAE J755 STANDARDS.
9. LINE SHAFT BEARINGS, STERN TUBE AND STRUT BEARINGS, AND SHAFT SEALS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
10. PROPELLER AND SHAFT COUPLINGS SHALL BE "BLUE FIT" IN ACCORDANCE WITH ABS REQUIREMENTS.



SHAFT ELEVATION
10'-0" OFF CL VESSEL
SCALE 1/2" = 1'-0"

NO.	REFERENCES	DWG NO.
8	COOLER PIPING SYSTEM SCHEMATIC	256-01
7	MACHINERY ARRANGEMENT	200-01
6	MAIN ENGINE FOUNDATION	182-01
5	STRUT DETAILS	114-02
4	LINES PLAN	839-01
3	SCANTLING PLANS, FR. 73-STERN	110-03
2	FRAMES, FR. 73-STERN	117-03
1	CONSTRUCTION PROFILE & LONG'L BHDS, FR. 73-STERN	116-03

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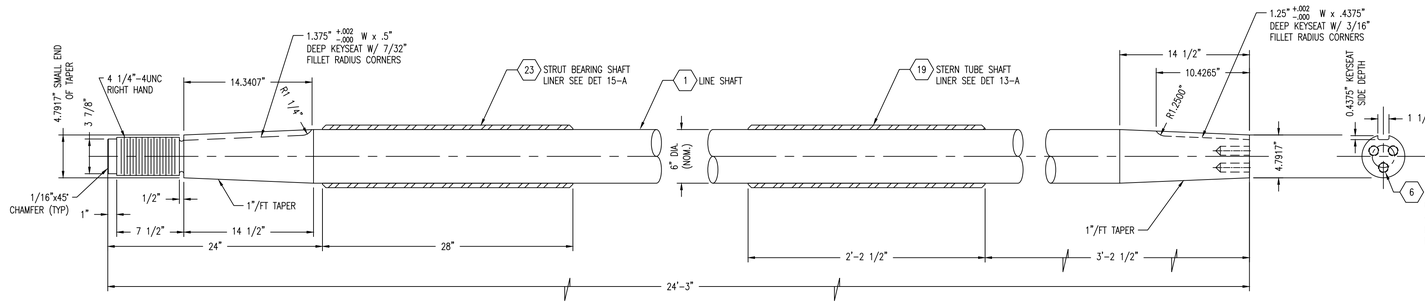
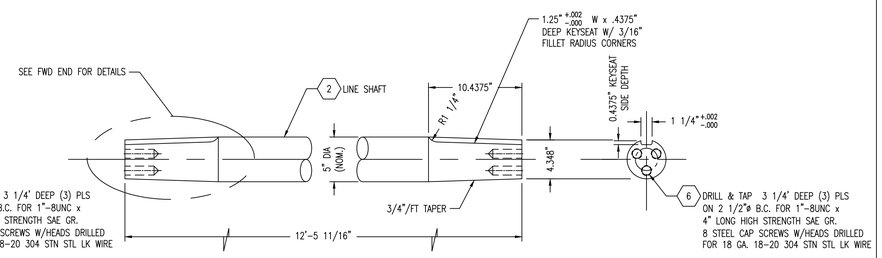
NORTH CAROLINA DOT FERRY DIVISION
NEW SOUND CLASS FERRY

SHAFT ARRANGEMENT

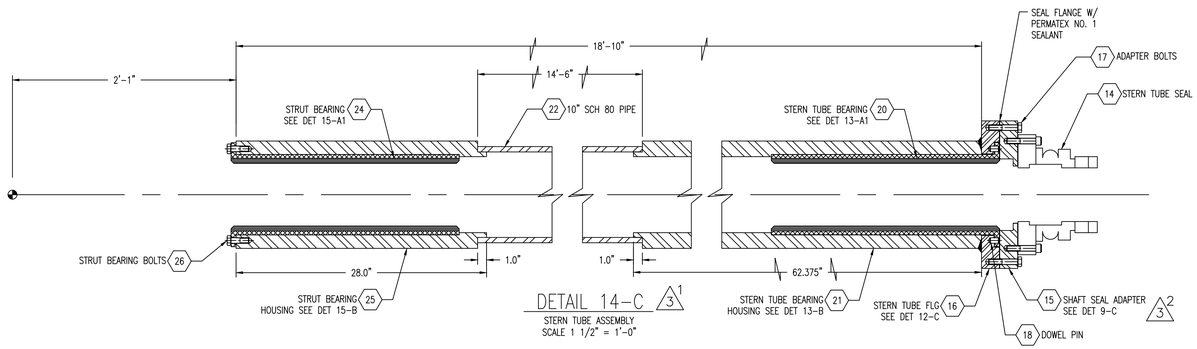
DRAWN BY: C FIELDS	DATE: 5-4-10	DWG NO.	243-01
CK'D BY: KHK	HULL No. 413	SHT 1 OF 3	
SCALE: NOTED	G&C Job No. 09-060	REV. 5	



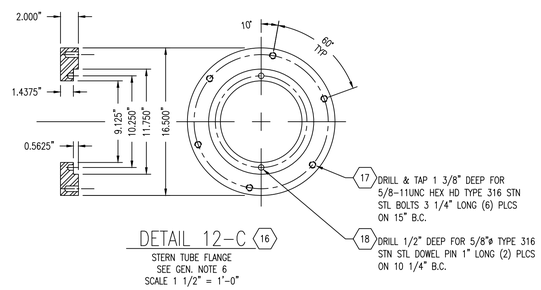
DETAIL 14-D
TAIL SHAFT
SCALE 1 1/2" = 1'-0"



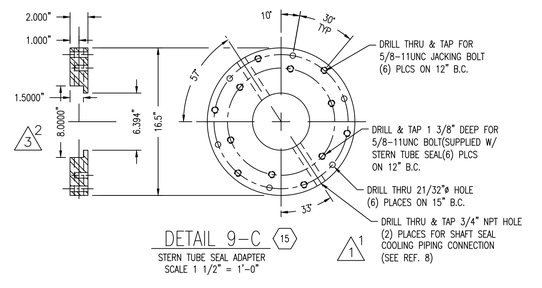
DETAIL 10-D
LINE SHAFT
SCALE 1 1/2" = 1'-0"



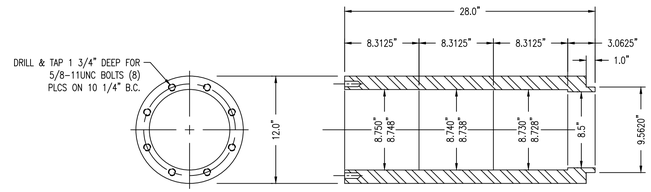
DETAIL 14-C 3/1
STERN TUBE ASSEMBLY
SCALE 1 1/2" = 1'-0"



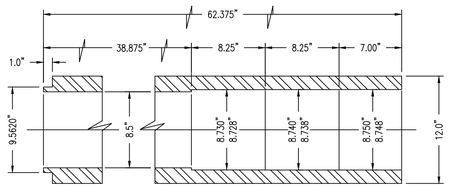
DETAIL 12-C 16
STERN TUBE FLANGE
SEE GEN. NOTE 6
SCALE 1 1/2" = 1'-0"



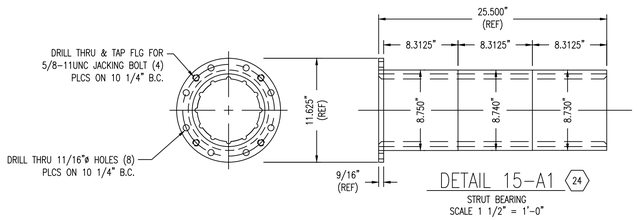
DETAIL 9-C 15
STERN TUBE SEAL ADAPTER
SCALE 1 1/2" = 1'-0"



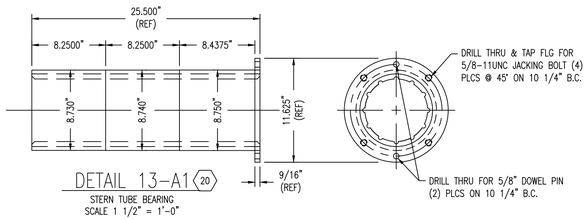
DETAIL 15-B 25
STRUT BEARING HOUSING
SCALE 1 1/2" = 1'-0"



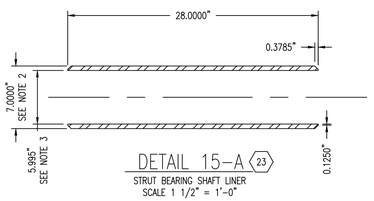
DETAIL 13-B 21 3/1
STERN TUBE BEARING HOUSING
SCALE 1 1/2" = 1'-0"



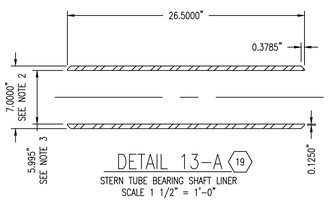
DETAIL 15-A1 24
STRUT BEARING
SCALE 1 1/2" = 1'-0"



DETAIL 13-A1 20
STERN TUBE BEARING
SCALE 1 1/2" = 1'-0"



DETAIL 15-A 23
STRUT BEARING SHAFT LINER
SCALE 1 1/2" = 1'-0"



DETAIL 13-A 19
STERN TUBE BEARING SHAFT LINER
SCALE 1 1/2" = 1'-0"

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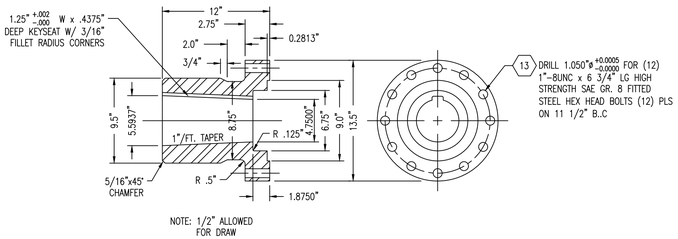
NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

SHAFT ARRANGEMENT

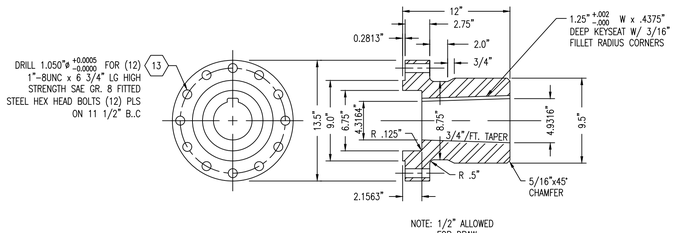
DRAWN BY:	C FIELDS	DATE: 5-4-10	DWG NO.	243-01
CK'D BY:	KHK	HULL No. 413	SHT 2 OF 3	
SCALE:	NOTED	G&C Job No. 09-060	REV. 4	



NOTE: 1/2" ALLOWED FOR DRAW

DETAIL 24-D (12)

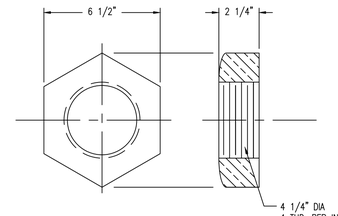
TAIL SHAFT FWD COUPLING
SHIPYARD FABRICATED
SCALE 1 1/2" = 1'-0"



NOTE: 1/2" ALLOWED FOR DRAW

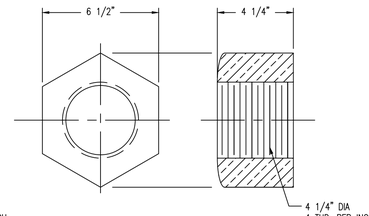
DETAIL 20-D (11)

LINE SHAFT AFT COUPLING
SHIPYARD FABRICATED
SCALE 1 1/2" = 1'-0"



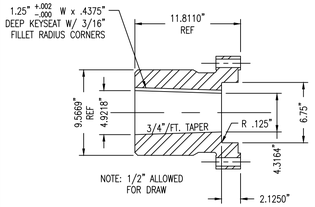
DETAIL 18-D (29)

PROPELLER JAM NUT
SCALE 3" = 1'-0"



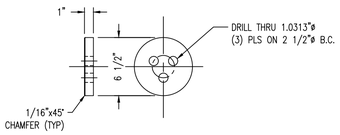
DETAIL 17-D (28)

PROPELLER PLAIN NUT
SCALE 3" = 1'-0"



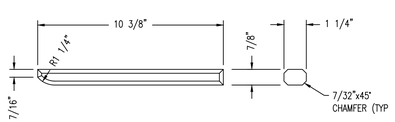
DETAIL 24-C (3)

COMPANION COUPLING DETAIL
SUPPLIED BY ZF
SCALE 1 1/2" = 1'-0"



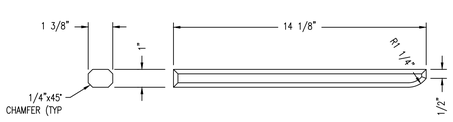
DETAIL 23-C (5)

THRUST PLATE
SCALE 1 1/2" = 1'-0"



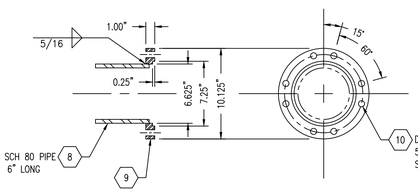
DETAIL 22-C (4)

COUPLING KEY DETAIL
SCALE 3" = 1'-0"



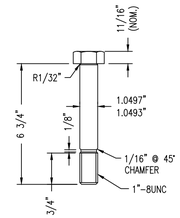
DETAIL 20-C (27)

PROPELLER KEY DETAIL
SCALE 3" = 1'-0"



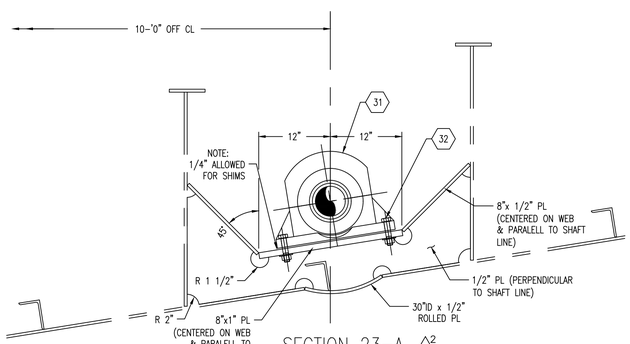
DETAIL 18-C

BULKHEAD STUFFING BOX MOUNTING FLANGE
SCALE 1 1/2" = 1'-0"



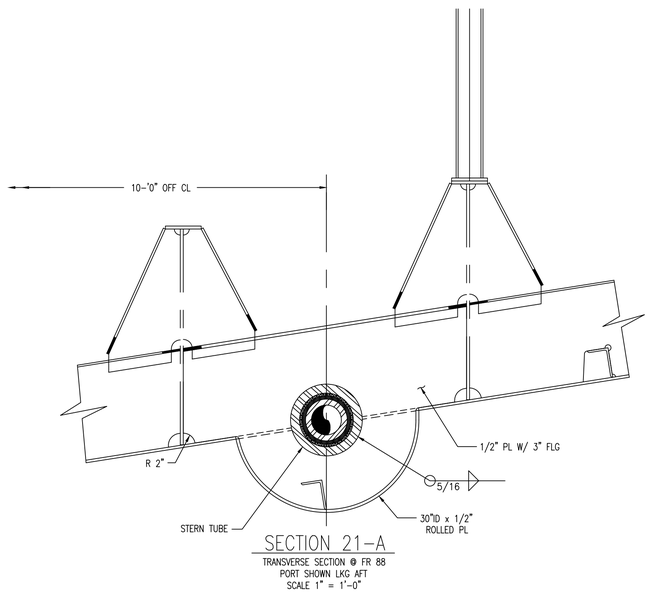
DETAIL 17-C (13)

FITTED BOLT DETAIL
(FOR SHIPYARD FABRICATED COUPLING)
SCALE 3" = 1'-0"



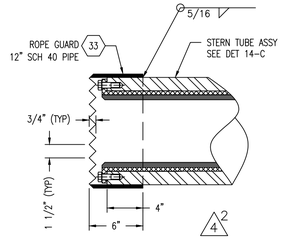
SECTION 23-A (2)

TRANSVERSE SECTION @ 8" FWD FR 84
PORT SHOWN LKG AFT
SCALE 1" = 1'-0"



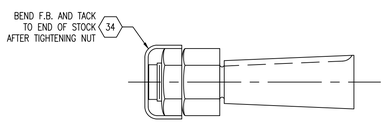
SECTION 21-A

TRANSVERSE SECTION @ FR 88
PORT SHOWN LKG AFT
SCALE 1" = 1'-0"



DETAIL 19-B (33)

ROPE GUARD
SCALE 1 1/2" = 1'-0"



DETAIL 18-B

RETAINING STRAP
SCALE 1 1/2" = 1'-0"

12/9/2020

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NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

SHAFT ARRANGEMENT

DRAWN BY: C FIELDS	DATE: 5-4-10	DWG NO. 243-01 SHT 3 OF 3
CK'D BY: KHK	HULL No. 413	
SCALE: NOTED	G&C Job No. 09-060	REV. 4

LIST OF MATERIALS

PIECE No.	QUANTITY	DESCRIPTION	MATERIAL OR MANUFACTURER	SPEC, GRADE	REMARKS
1	40 FT	PIPE, 12", SCH 40, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
2	12 FT	PIPE, 8", SCH 40, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
3	100 FT	PIPE, 6", SCH 40, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
4	1 FT	PIPE, 5", SCH 40, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
5	10 FT	PIPE, 12", SCH 80, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
6	4 FT	PIPE, 8", SCH 80, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
7	10 FT	PIPE, 6", SCH 80, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
8	2 FT	PIPE, 3/4", SCH 40, SEAMLESS	CARB STL	ASTM A-53, GR B	ANSI B36.10
9	2 INCHES	PIPE, 6", SCH 40, SEAMLESS	STN STL	ASTM A-182, GR B	ANSI B36.19
10	4 INCHES	PIPE, 5", SCH 40, SEAMLESS	STN STL	ASTM A-182, GR B	ANSI B36.19
11	5 FT	PIPE, 3", SCH 40, SEAMLESS	STN STL	ASTM A-182, GR B	ANSI B36.19
12	2 FT	PIPE, 3", SCH 40, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
13	2	ELBOW 45°, 12", BUTT WELD, SCH 40	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
14	3	ELBOW 45°, 8", BUTT WELD, SCH 40	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
15	12	ELBOW 45°, 6", BUTT WELD, SCH 40	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
16	–	NOT USED	–	–	–
17	1	ELBOW 90°, 8", BUTT WELD, SCH 40, LR	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
18	2	ELBOW 90°, 6", BUTT WELD, SCH 40, LR	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
19	1	ELBOW 90°, 5", BUTT WELD, SCH 40, LR	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
20	2	ELBOW 90°, 3", BUTT WELD, SCH 40, LR	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
21	12	HALF COUPLING, 3/4", CARB STL, THREADED	FORGED STL	ASTM A-105	ANSI B16.11
22	8	HALF COUPLING, 1/4", CARB STL, THREADED	FORGED STL	ASTM A-105	ANSI B16.11
23	1	REDUCER, CONC., 8"x 5", BUTT WELD, SCH 40	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
24	2	REDUCER, CONC., 4"x 3", BUTT WELD, SCH 40	CARB STL	ASTM A-234 GR WPB	ANSI B16.9
25	20	GASKET, 12", 1/8" THICK, FULL FACE w/HOLES, GRAPHITE/SS, ASA FLG	GRAPHITE		GARLOCK STYLE 3125 SS HT OR EQUAL
26	7	GASKET, 8", 1/8" THICK, FULL FACE w/HOLES, GRAPHITE/SS, ASA FLG	GRAPHITE		GARLOCK STYLE 3125 SS HT OR EQUAL
27	23	GASKET, 6", 1/8" THICK, FULL FACE w/HOLES, GRAPHITE/SS, ASA FLG	GRAPHITE		GARLOCK STYLE 3125 SS HT OR EQUAL
28	–	NOT USED	–	–	–
29	2	GASKET, 4", 1/8" THICK, FULL FACE w/HOLES, GRAPHITE/SS, ASA FLG	GRAPHITE		GARLOCK STYLE 3125 SS HT OR EQUAL
30	2	GASKET, 3", 1/8" THICK, FULL FACE w/HOLES, GRAPHITE/SS, ASA FLG	GRAPHITE		GARLOCK STYLE 3125 SS HT OR EQUAL
31	20	FLANGE, 12", 150#, SLIP-ON, FLAT FACE	FORGED STL	ASTM A-105	ANSI B16.5
32	8	FLANGE, 8", 150#, SLIP-ON, FLAT FACE	FORGED STL	ASTM A-105	ANSI B16.5
33	22	FLANGE, 6", 150#, SLIP-ON, FLAT FACE	FORGED STL	ASTM A-105	ANSI B16.5
34	–	NOT USED	–	–	–
35	2	FLANGE, 4", 150#, SLIP-ON, FLAT FACE	FORGED STL	ASTM A-105	ANSI B16.5
36	2	FLANGE, 3", 150#, SLIP-ON, FLAT FACE	FORGED STL	ASTM A-105	ANSI B16.5
37	6	PIPE CAP, 3/4", 3000# CARB STL, THREADED	FORGED STL	ASTM A-105	ANSI B19.11
38	8	PIPE PLUG, 1/4", 3000#, CARB STL, THREADED	FORGED STL	ASTM A-105	ANSI B16.11
39	4	THERMOMETER 200/1000°F, 2.5" LONG, WITH S-STL THERMOWELL	–	–	–
40	2	THERMOMETER 200/1000°F, 9" LONG, WITH S-STL THERMOWELL	–	–	–
41	A/R	PLATE, 3/4" THK, STEEL	STEEL	ASTM A-36	
42	A/R	PLATE, 3/8" THK, STEEL	STEEL	ASTM A-36	
43	A/R	PLATE, 3/8" THK, STEEL	STNLS. STL.	ASTM A-316	
44	1	RAIN CAP, 3", HINGED, COUNTERBALANCED	STNLS. STL.	COM'L.	HARCO MDL. #HD3-SS
45	6	MULTI-PLY BELLOWS, FLANGED, 12" x 11" LONG, 321 S-STL	BOA	3025E TYPE FLP	ONE END FIXED, ONE END FLOATING, FULL LENGTH LINER
46	2	MULTI-PLY BELLOWS, FLANGED, 8" x 10.75" LONG, 321 S-STL	BOA	3025E TYPE FLP	ONE END FIXED, ONE END FLOATING, FULL LENGTH LINER
47	8	MULTI-PLY BELLOWS, FLANGED, 6" x 10.5" LONG, 321 S-STL	BOA	3025E TYPE FLP	ONE END FIXED, ONE END FLOATING, FULL LENGTH LINER
48	1	MULTI-PLY BELLOWS, FLANGED, 4" x 10.5" LONG, 321 S-STL	BOA	3025E TYPE FLP	ONE END FIXED, ONE END FLOATING, FULL LENGTH LINER
49	1	SILENCER, EXHAUST, 12", WITH 125# ASA FLANGES EACH END, LEFT HAND	STEEL	COWL TS120PLS000	MAIN ENGINE, STBD
50	1	SILENCER, EXHAUST, 8", WITH 125# ASA FLANGES EACH END, LEFT HAND	STEEL	COWL TS80PRS000	BOW THRUSTER
51	1	SILENCER, EXHAUST, 6", WITH 125# ASA FLANGES EACH END, LEFT HAND	STEEL	COWL TS60PLS000	GENERATOR, STBD
52	1	SILENCER, EXHAUST, 3", WITH 125# ASA FLANGES EACH END, LEFT HAND	STEEL	COWL TS30PLS000	EMERGENCY GENERATOR
53	1	SILENCER, EXHAUST, 12", WITH 125# ASA FLANGES EACH END, RIGHT HAND	STEEL	COWL TS120PRS000	MAIN ENGINE, PORT
54	1	SILENCER, EXHAUST, 6", WITH 125# ASA FLANGES EACH END, RIGHT HAND	STEEL	COWL TS60PRS000	GENERATOR, PORT
55	6	GATE VALVE, 3/4", CARB STL, THREADED, CRES TRIM	CARB STL	ASTM A-216	ANSI B16.34
56	6 FT	PIPE, 10", SCH 80, SEAMLESS	CARB STL	ASTM A-106, GR B	ANSI B36.10
57	1	PLATE, 1/2" THK. x 15" O.D., STEEL	STEEL	ASTM A-36	
58	6	MEDIUM PIPE CLAMP FOR 12" PIPE	BLACK STEEL	ASTM A-36	GRINNELL FIG. 212 OR EQ.
59	3	MEDIUM PIPE CLAMP FOR 8" PIPE	BLACK STEEL	ASTM A-36	GRINNELL FIG. 212 OR EQ.
60	15	MEDIUM PIPE CLAMP FOR 6" PIPE	BLACK STEEL	ASTM A-36	GRINNELL FIG. 212 OR EQ.
61	1	MEDIUM PIPE CLAMP FOR 3" PIPE	BLACK STEEL	ASTM A-36	GRINNELL FIG. 212 OR EQ.
62	54	TYPE "E" ANCHOR, CAPTIVE RUBBER HANGER-SIZE 2 W/ TURNBUCKLE & LEFT HANDED EYEBOLT			CHRISTIE & GREY PART NO. CRM2.55.H
63	18	TYPE "G" ANCHOR, CAPTIVE RUBBER MOUNT-SIZE 2			CHRISTIE & GREY PART NO. CRM2.55
64	36	TYPE "G" ANCHOR, MONOLUX PAD, 100x100x19mm, DRILLED 13mm CENTER HOLE			CHRISTIE & GREY PART NO. ML.101019.13
65	36	TYPE "G" ANCHOR, MS PLATE, 100x100x3mm, DRILLED 13mm CENTER HOLE			CHRISTIE & GREY PART NO. SP.100.100.03.13
66	240	5/16"-18 UNC HEX HEAD BOLT, 1 1/2" LONG, W/ LOCKNUT & WASHER	HIGH TENSILE STEEL	GRADE 8	FOR MOUNTING CAPTIVE RUBBER MOUNTS

REFERENCES

1.	259-01	EXHAUST SYSTEM SCHEMATIC
2.	200-01	MACHINERY ARRANGEMENT
3.	110-01	SCANTLING PLANS BOW-FR 35
4.	117-01	FRAMES BOW-FR 35
5.	116-01	CONSTRUCTION PROFILE & LONG'L BHDS BOW-FR 35
6.	110-03	SCANTLING PLANS FR 73-STERN
7.	117-03	FRAMES, FR. 73 – STERN
8.	116-03	CONSTRUCTION PROFILE & LONG'L BHDS FR 35-STERN
9.	154-01	PILOTHOUSE CONSTRUCTION

REVISIONS

REV	ZONE	DESCRIPTION	DATE	BY/APP'D
1	VAR	1. REVISED MAIN ENGINE EXHAUST, GENERATOR EXHAUST AND BOW THRUSTER EXHAUST PER NCDOT REQUEST.	11/24/10	JCM/KHK
	7-D	2. REVISED LIST OF MATERIAL TO SUIT.	1/24/11	
	7-D	3. REVISED LIST OF MATERIAL TO SHOW SCH. 40 IN LIEU OF SCH. 10 FOR PIPE & FITTINGS PER SHIPYARD REQUEST		
2	VAR	1. ADDED EXHAUST FLEXIBLE MOUNTS PER VENDOR (CHRISTIE & GREY) INFO. ADDED DETAILS 26-B & 28-D AND REVISED B/M TO SUIT. REMOVED RESERVATION #1.	2/16/11	JAB/KHK

GENERAL NOTES

1. MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "H" VESSELS AND AMERICAN BUREAU OF SHIPPING RULES FOR VESSELS UNDER 90 METERS.
2. EXHAUST PIPING AND SILENCERS SHALL BE RESILIENTLY SUPPORTED TO REDUCE NOISE TRANSMISSION. WEIGHT TRANSMITTED TO THE ENGINE CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN HOT AND COLD CONDITIONS.
3. PIPE HANGERS SHALL MEET THE REQUIREMENTS OF ASTM VOLUME 01.07 "SHIPBUILDING" STANDARD F708. THE CONTRACTOR SHALL ADJUST THE DESIGN, SPACING AND INSTALLATION OF PIPE HANGERS AS NECESSARY TO PROVIDE AN INSTALLATION SUITABLE FOR CARRYING THE WEIGHT OF THE PIPE INCLUDING DYNAMIC LOADING IMPOSED BY THE OPERATING CONDITIONS OF THE VESSEL AND TO PREVENT DAMAGE FROM VIBRATION AND THERMAL EXPANSION. THERMAL INSULATION GASKETS SHALL BE INSTALLED BETWEEN THE EXHAUST PIPE AND THE HANGER ATTACHMENT TO THE SHIP.
4. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO THE PIPES.
5. THE EXHAUST SILENCERS SHALL BE MOUNTED SO THAT MOVEMENT IS POSSIBLE TO COMPENSATE THE THERMAL GROWTH OF THE EXHAUST PIPELINE.
6. ALL FASTENERS (BOLTS ETC) SHALL BE 304 STAINLESS STEEL.
7. CONTRACTOR SHALL VERIFY THAT LOAD LIMITS ON TURBOCHARGER OUTLET FLANGES ARE NOT EXCEEDED PER VENDOR SPECIFICATIONS DUE TO THERMAL EXPANSION OF EXHAUST PIPING OR EXHAUST PIPING WEIGHT.
8. A 3/4" THK x 6" WIDE RING DOUBLER PLATE SHALL BE INSTALLED ON THE HULL AROUND THE EXHAUST PIPING SHELL PENETRATION.
9. INSTALL A STAINLESS STEEL EXPANDED METAL SAFETY GUARD AROUND THE PORTION OF THE EMERGENCY GENERATOR EXHAUST PIPING WHICH IS LOCATED ABOVE DECKHOUSE TOP.

12/9/2020

THIS DRAWING CONTAINS INFORMATION BASED ON EBDG CONTRACT DESIGN DRAWING 07069-001-259-2

ORANGE Shipbuilding Co., Inc.
A CONRAD INDUSTRIES CO.
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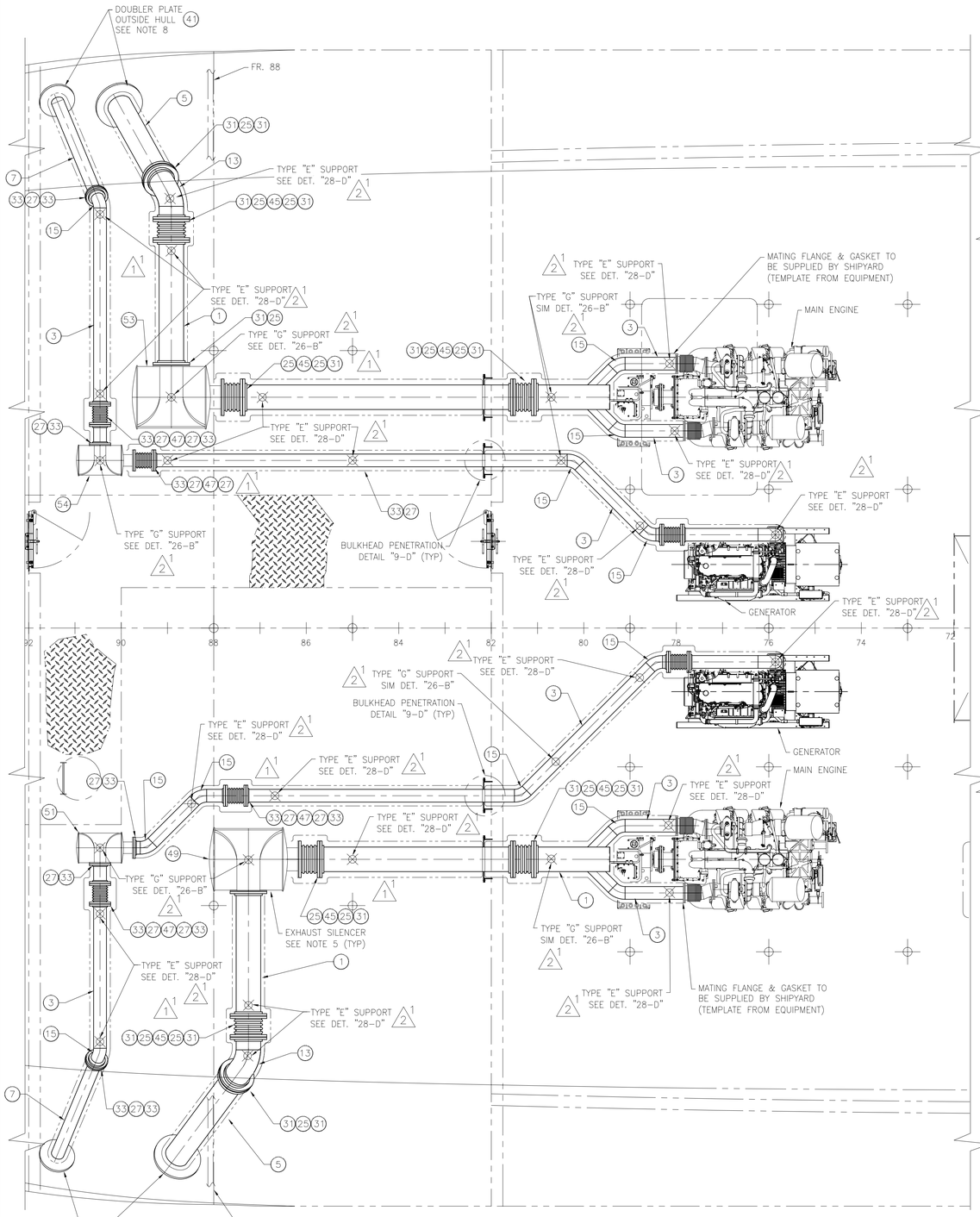
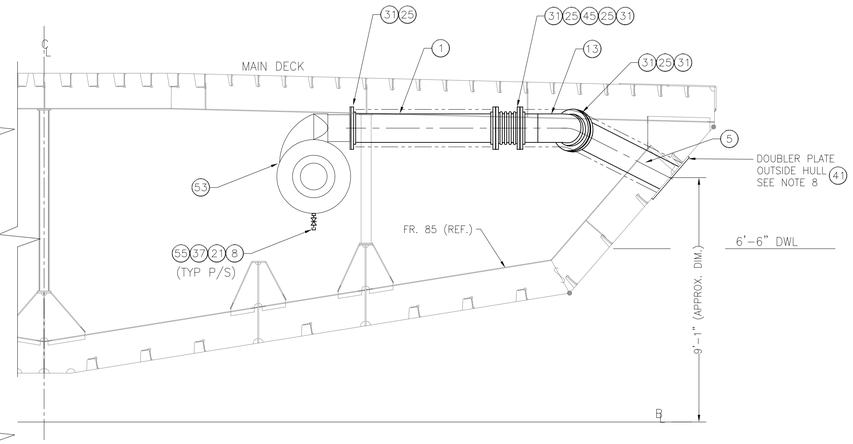
ORANGE SHIPBUILDING CO. INC.
NORTH CAROLINA DOT FERRY DIVISION
NEW SOUND CLASS FERRY

EXHAUST SYSTEM ARRANGEMENT & DETAILS

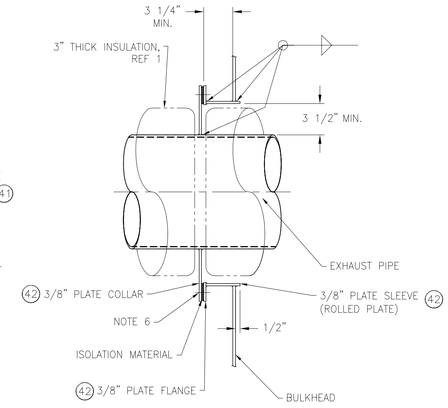
DRAWN BY:	J. MELAN	DATE: 9/24/10	DWG NO.	259-02
CK'D BY:	KHK	HULL No. 413	SHT 1 OF 4	
SCALE:	NONE	G&C Job No. 09-060	REV. 2	



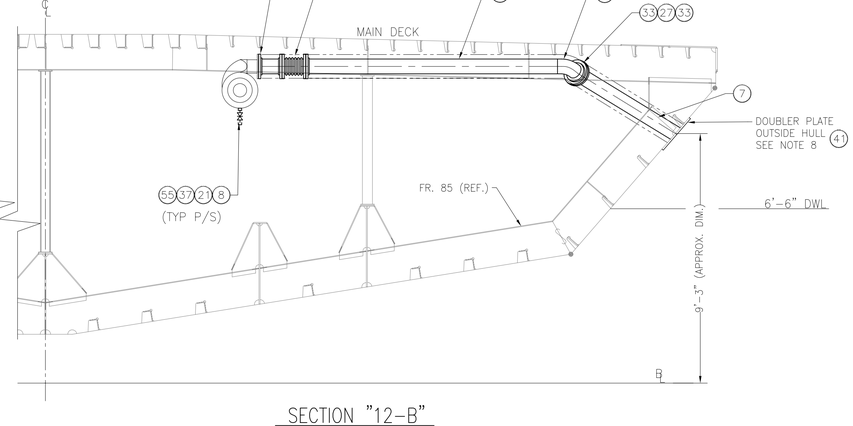
PLAN "15-A"
MAIN ENGINE & GENERATOR EXHAUST
SCALE: 3/8"=1'-0"



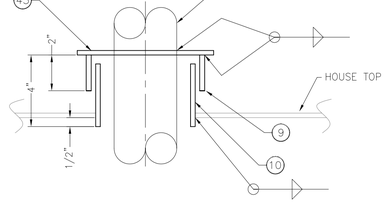
SECTION "12-D"
MAIN ENGINE EXHAUST @ FR 83 LOOKING AFT
PORT SHOWN, STBD SIMILAR
SCALE: 3/8"=1'-0"



DETAIL "9-D"
TYPICAL BULKHEAD PENETRATION
SCALE: NONE



SECTION "12-B"
GENERATOR EXHAUST @ FR 85 LOOKING AFT
PORT SHOWN, STBD SIMILAR
SCALE: 3/8"=1'-0"



DETAIL "9-B"
EMERGENCY GENERATOR RAIN CAP
SCALE: NONE

12/9/2020

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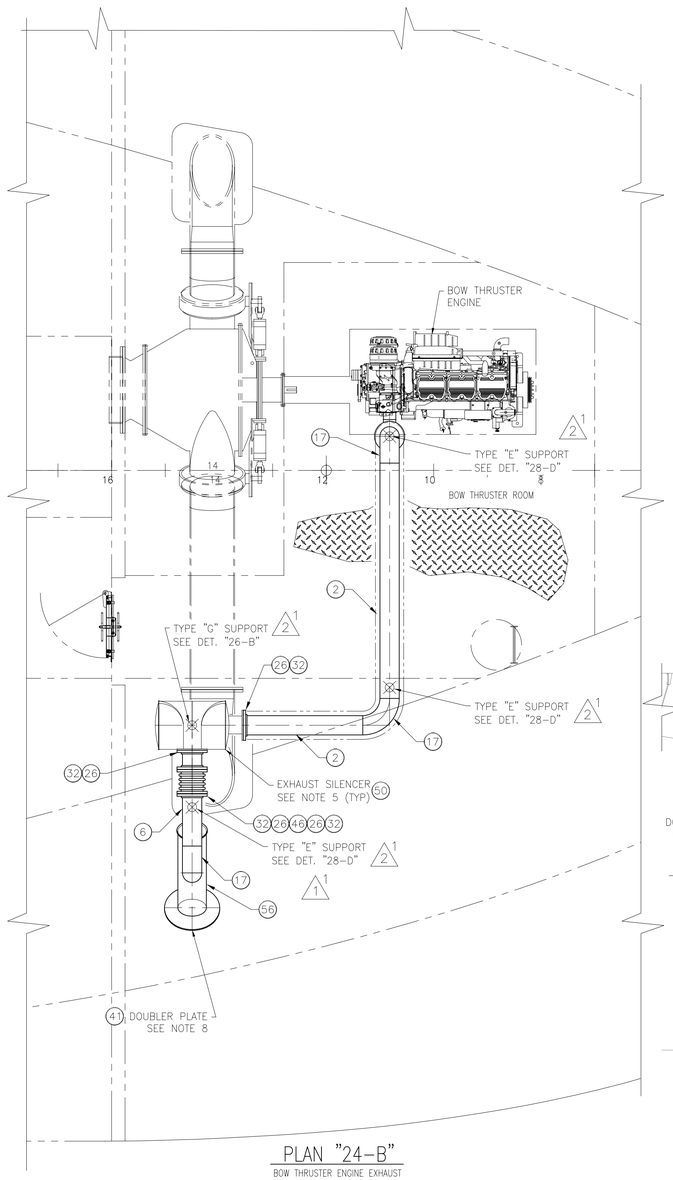
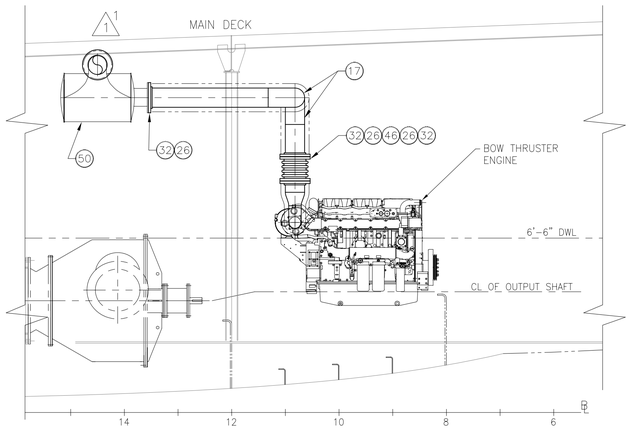
NORTH CAROLINA DOT FERRY DIVISION
NEW SOUND CLASS FERRY

EXHAUST SYSTEM
ARRANGEMENT & DETAILS

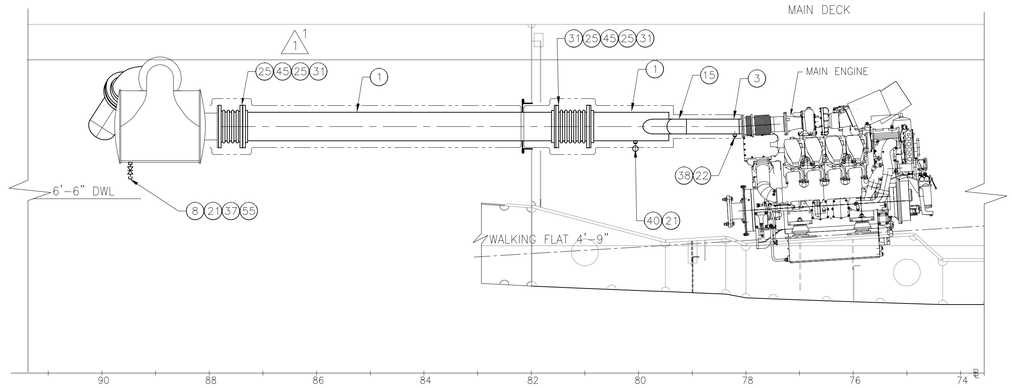
DRAWN BY: J. MELAN	DATE: 9/24/10	DWG NO. 259-02 SHT 2 OF 4
CK'D BY: KHK	HULL No. 413	
SCALE: NOTED	G&C Job No. 09-060	REV. 2



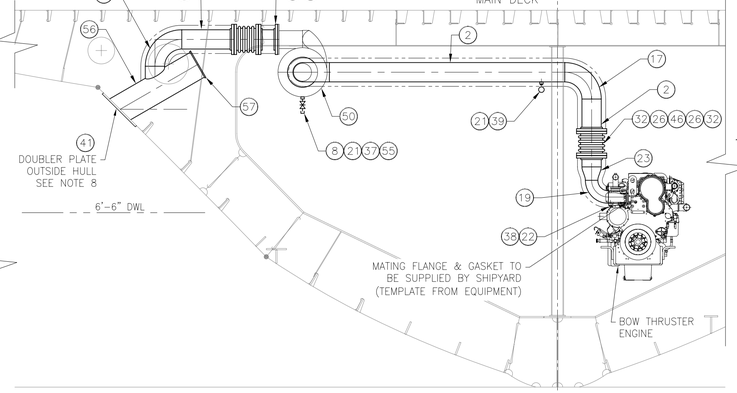
PLAN "24-B"
BOW THRUSTER ENGINE EXHAUST
SCALE: 3/8"=1'-0"



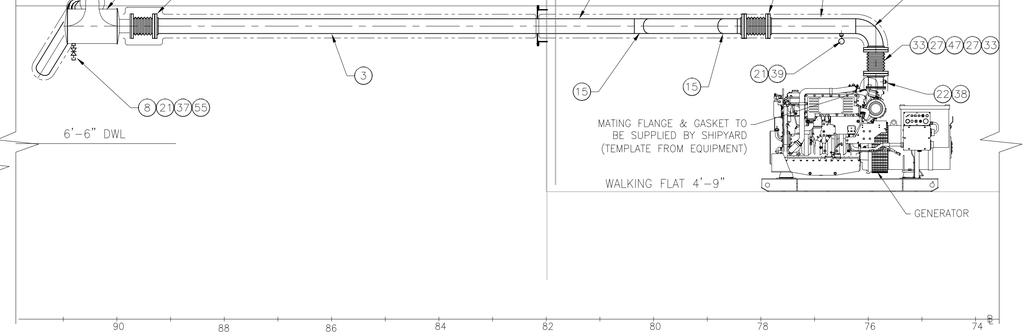
ELEVATION "21-D"
BOW THRUSTER EXHAUST 14'-0" OFF CL STBD
LOOKING TO PORT
SCALE: 3/8"=1'-0"



ELEVATION "17-D"
MAIN ENGINE EXHAUST @ 6'-0" OFF CL LOOKING TO PORT
STBD. SIMILAR
SCALE: 3/8"=1'-0"



SECTION "20-B"
BOW THRUSTER ENGINE EXHAUST @ FR 12 LOOKING AFT
SCALE: 3/8"=1'-0"



ELEVATION "17-B"
GENERATOR EXHAUST @ CL LOOKING TO PORT
STBD. SIMILAR
SCALE: 3/8"=1'-0"

12/9/2020

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ORANGE SHIPBUILDING CO. INC.

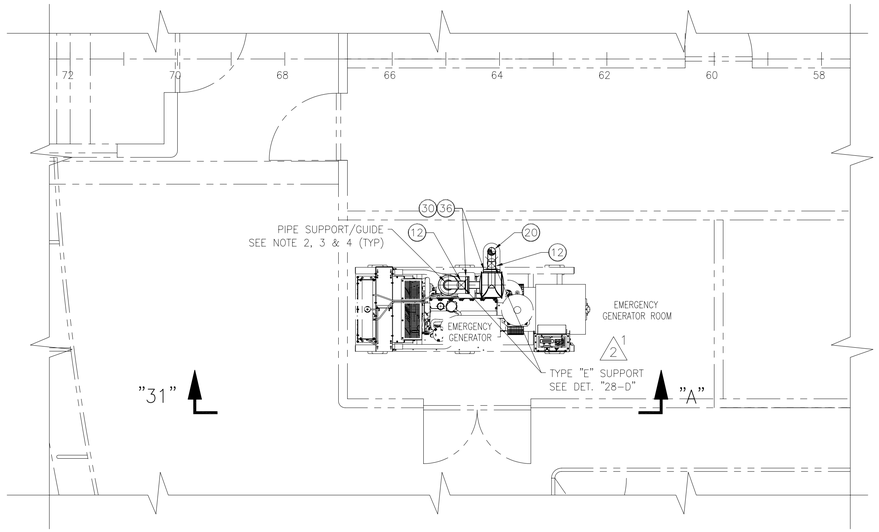
NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

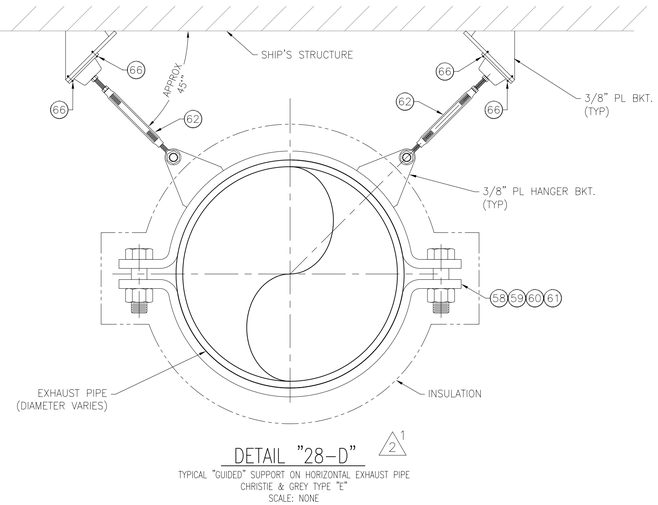
EXHAUST SYSTEM ARRANGEMENT & DETAILS

DRAWN BY: J. MELAN	DATE: 9/24/10	DWG NO. 259-02 SHT 3 OF 4
CK'D BY: KHK	HULL No. 413	
SCALE: NOTED	G&C Job No. 09-060	REV. 2

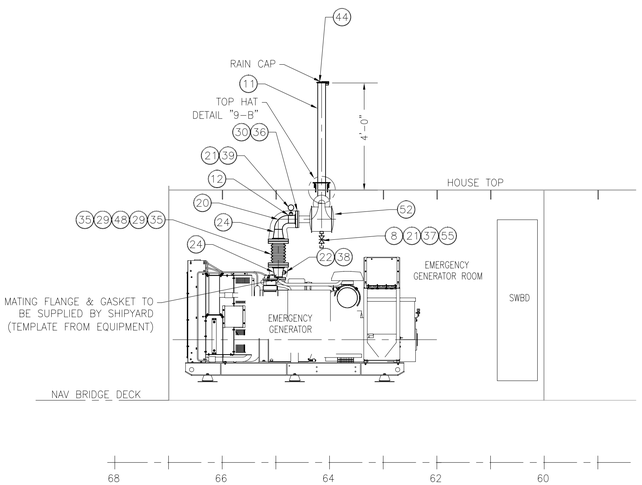
12/9/2020



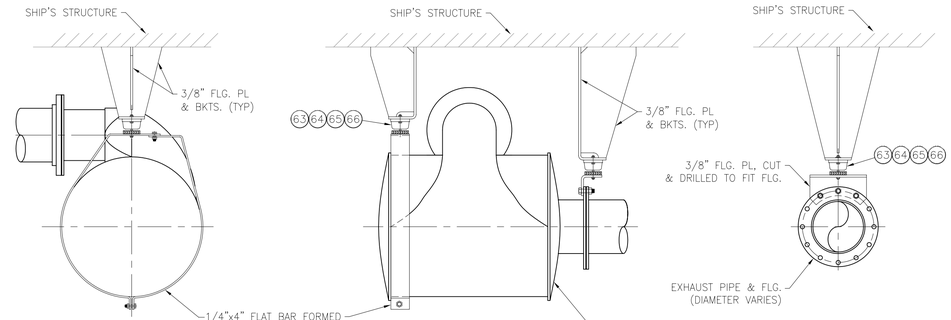
PLAN "31-C"
EMERGENCY GENERATOR EXHAUST PIPING
SCALE: 3/8"=1'-0"



DETAIL "28-D"
TYPICAL "GUIDED" SUPPORT ON HORIZONTAL EXHAUST PIPE
CHRISTIE & GREY TYPE "E"
SCALE: NONE



ELEVATION "31-A"
EMERGENCY GENERATOR EXHAUST PIPING
SCALE: 3/8"=1'-0"



DETAIL "26-B"
TYPICAL "FIXED" SUPPORT ON EXHAUST PIPE & MUFFLER
CHRISTIE & GREY TYPE "G"
SCALE: NONE

THIS DRAWING CONTAINS INFORMATION BASED ON
EBDG CONTRACT DESIGN DRAWING
07069-001-259-2

ORANGE
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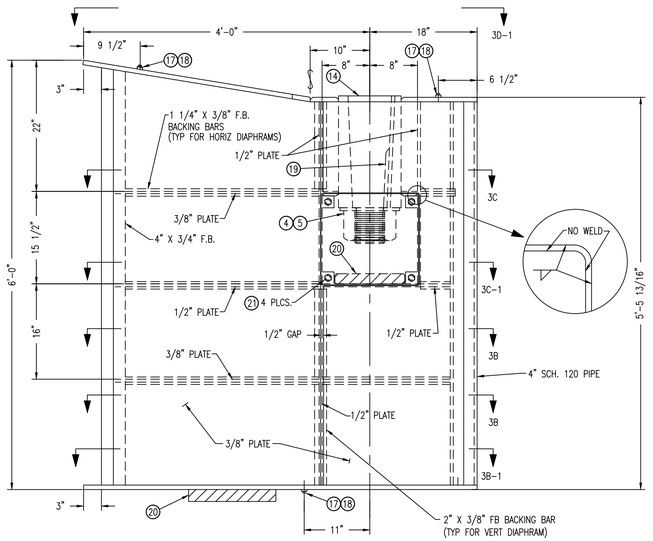
NORTH CAROLINA DOT FERRY DIVISION
NEW SOUND CLASS FERRY

EXHAUST SYSTEM ARRANGEMENT & DETAILS

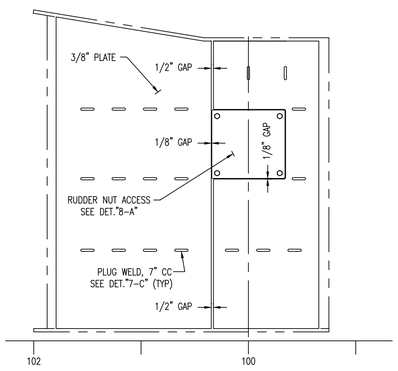
DRAWN BY: J. MELAN	DATE: 9/24/10	DWG NO. 259-02 SHT 4 OF 4
CK'D BY: KHK	HULL No. 413	
SCALE: NOTED	G&C Job No. 09-060	REV. 2

LIST OF MATERIALS (QTY. FOR 2 RUDDERS)

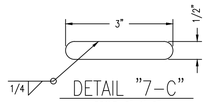
PIECE No.	QUANTITY	DESCRIPTION	MATERIAL OR MANUFACTURER	SPEC, GRADE OR MODEL	REMARKS
1	2	RUDDER STOCK	STAINLESS STEEL	AQUAMET 22	7.25" DIA. X 6'-11 1/4" LONG
2	2	RUDDER TUBE	STEEL	ASTM A-519	13" O.D. x 9 1/2" I.D. x 3'-7 3/4" LONG MECHANICAL TUBING
3	2	SHRINK-ON LINER	BRONZE	ASTM B505	8" O.D. x 7.224" I.D. x 17" LG., SAE B660, UNS C93200 OR EQ. SEE GENERAL NOTES #2 & 3.
4	2	RUDDER NUT, 5" DIA. x 4 T.P.I.	BRONZE		PURCHASED ITEM
5	2	RUDDER NUT WASHER	STEEL	ASTM A-36	1/2" PL x 10" O.D. x 5 1/8" I.D.
6	2	RUDDER CARRIER NUT	STEEL	ASTM A-194	3" DIA. x 4 T.P.I.
7	2	CARRIER NUT WASHER	STEEL	ASTM A-36	6" O.D. X 3 1/4" I.D. X 1/2" THICK
8	6	RUDDER NECK BEARING SET SCREWS, CUP POINT	STAINLESS STEEL	316 S.S.	1/2"-13 UNC x 1 1/2" LONG
9	1	RUDDER NECK BEARING, DURAMAX "490", PART NO. 812100203	HARD RUBBER	-	CODE DX800, CUT IN HALF TO MAKE (2) BEARINGS
10	2	RUDDER NECK BEARING RETAINER PLATE	STAINLESS STEEL	316 S.S.	13" O.D. x 8 3/8" I.D." x 1/4" THICK
11	16	RUDDER NECK BEARING RETAINER PLATE BOLTS	STAINLESS STEEL	316 S.S.	3/8"-16 UNC x 1" LONG
12	2	CARRIER BEARING SUPPORT PLATE	STEEL	ASTM A-36	15" O.D. x 10 5/16" I.D." x 1 1/4" THICK
13	2	RUDDER NUT KEEPER PL	STAINLESS STEEL	316 S.S.	2" WIDE x 3/8" THICK F.B.
14	2	RUDDER STOCK TAPER HOUSING	STEEL	ASTM A-519	10 1/2" O.D. x 5 1/2" I.D. x 1'-6" LONG MECHANICAL TUBING
15	2	FLANGED CARRIER BEARING FOR 4 1/2" DIA. SHAFT	-	-	DODGE TYPE "E" FLANGED BEARING, PART #023146
16	12	CARRIER BEARING BOLTS	STAINLESS STEEL	316 S.S.	3/4"-10 UNC x 2" LONG
17	6	1" PIPE PLUG, SQUARE HEAD	BRONZE	ASTM B505	-
18	6	1" HALF COUPLING	STAINLESS STEEL	316 S.S.	-
19	2	LOWER RUDDER STOCK KEY	STEEL	AISI 1040	1 1/2" WIDE x 1 1/8" DEEP x 10" LONG
20	4	ZINC ANODE	ZINC	-	5 LB.
21	8	RUDDER NUT ACCESS COVER BOLTS & NUTS	STAINLESS STEEL	316 S.S.	3/4"-10 UNC x 2" LONG
22	2	RUDDER STOP SPACER	BRONZE	ASTM B505	10 1/2" O.D. X 7 9/16" I.D. X 3/4" THICK
23	2	CARRIER BEARING SPACER	STEEL	ASTM A-36	5 1/2" O.D. x 4 7/16" I.D." x 1/2" THICK



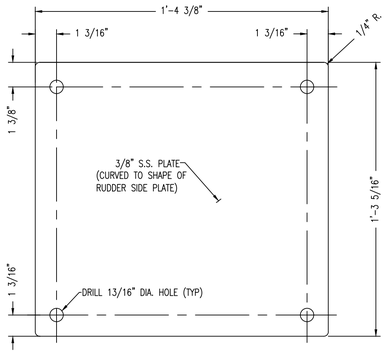
DETAIL "5-D"
RUDDER STRUCTURAL PROFILE
SCALE: 1" = 1'-0"



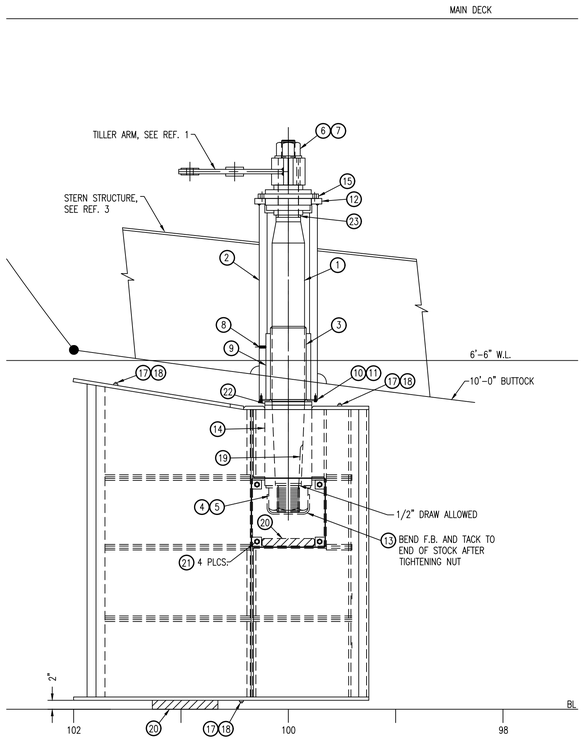
CLOSING PLATE LAYOUT
SCALE: 3/4"=1'-0"



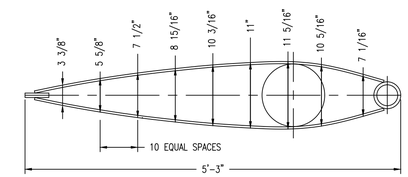
DETAIL "7-C"
SCALE: 6"=1'-0"



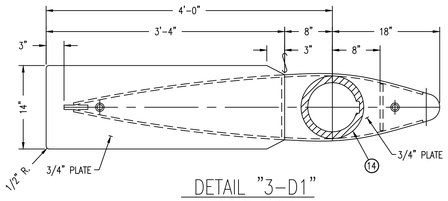
DETAIL "8-A"
RUDDER NUT ACCESS PLATE
SCALE: 3" = 1'-0"



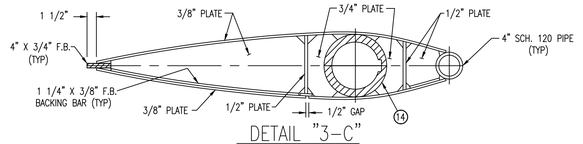
RUDDER ARRANGEMENT
PORT RUDDER SHOWN, STBD. SIMILAR
SCALE: 3/4" = 1'-0"



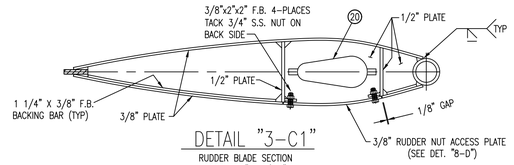
DETAIL "3-D"
RUDDER BLADE LINES PLAN
SCALE: 1" = 1'-0"



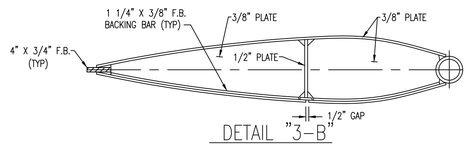
DETAIL "3-D1"
RUDDER BLADE TOP PLATE
SCALE: 1" = 1'-0"



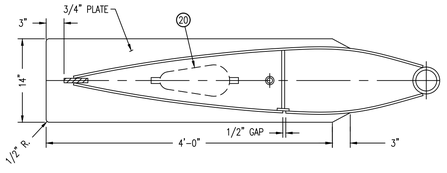
DETAIL "3-C"
RUDDER BLADE SECTION
SCALE: 1" = 1'-0"



DETAIL "3-C1"
RUDDER BLADE SECTION
SCALE: 1" = 1'-0"



DETAIL "3-B"
RUDDER BLADE SECTION
SCALE: 1" = 1'-0"



DETAIL "3-B1"
RUDDER BLADE BOTTOM PLATE
SCALE: 1" = 1'-0"

REVISIONS				
REV	ZONE	DESCRIPTION	DATE	BY/APPVD
1	5-A	1. MODIFIED DETAIL FOR ITEM 13	12/4/20	BTJ

12/9/2020

GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH ABS RULES FOR BUILDING AND CLASSING STEEL VESSELS UNDER 90 METERS IN LENGTH AND USCG REGULATIONS FOR VESSELS INSPECTED UNDER SUBCHAPTER H.
2. LINER OUTSIDE DIAMETERS SHALL BE MACHINED AFTER THE LINERS ARE INSTALLED ON THE STOCKS.
3. OUTSIDE DIAMETERS OF STOCKS SHALL BE VERIFIED PRIOR TO MACHINING INSIDE DIAMETERS OF LINERS FOR INTERFERENCE FIT. (CLASS FN 2)
4. THIS DRAWING SHOULD NOT BE USED TO DIRECTLY SCALE NC PARTS OR PREPARE 3D MODELING.
5. RUDDER NECK BEARINGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
6. RUDDER AND RUDDER STOCK SHALL BE "BLUE FIT" IN ACCORDANCE WITH ABS REQUIREMENTS.

THIS DRAWING CONTAINS INFORMATION BASED ON EBDG CONTRACT DESIGN DRAWING 07069-001-562-1

REFERENCES

1.	561-01	STEERING ARRANGEMENT
2.	110-03	SCANTLING PLANS 73-STERN
3.	116-03	CONSTRUCTION PROFILE & LONG'L. BHDS. 73-STERN
4.	117-03	FRAMES 73-STERN
5.	561-02	HYDRAULIC STEERING SYSTEM SCHEMATIC

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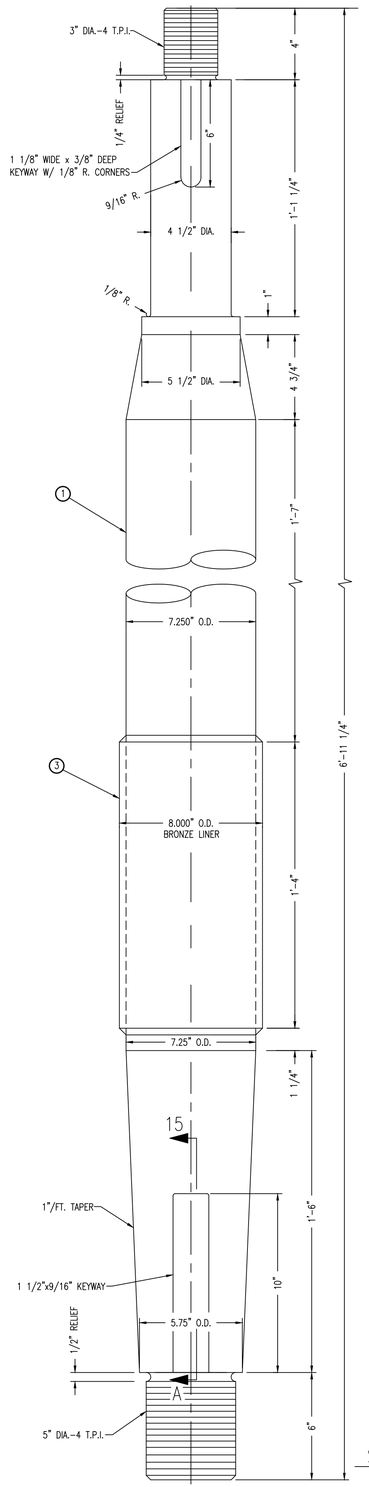
ORANGE SHIPBUILDING CO. INC.

NORTH CAROLINA DOT FERRY DIVISION

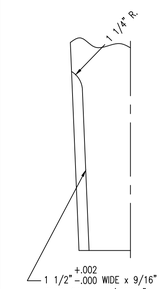
NEW SOUND CLASS FERRY

RUDDER ARRANGEMENT

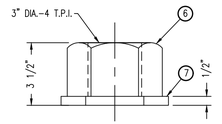
DRAWN BY:	J. BEACH	DATE: 5/12/10	DWG NO. 562-01 SHT 1 OF 2
CK'D BY:	K.H.K.	HULL No. 413	
SCALE:	AS NOTED	G&C Job No. 09-060	REV. 1



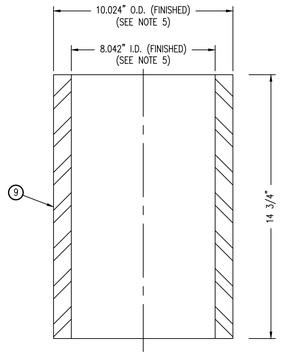
DETAIL "16-A"
RUDDER STOCK DETAIL
SCALE: 3"=1'-0"



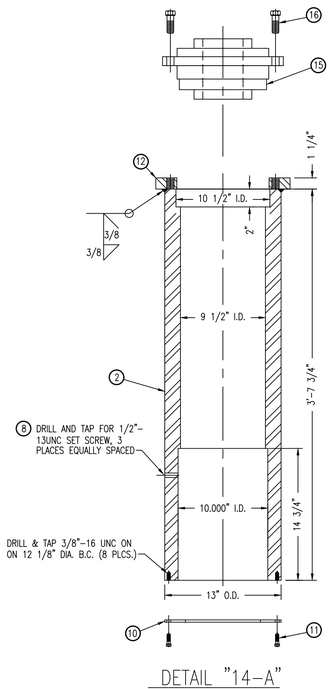
SECTION "15-A"
KEYWAY DETAIL
SCALE: 3"=1'-0"



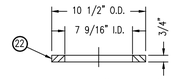
DETAIL "14-D"
RUDDER CARRIER NUT & WASHER
SCALE: 3"=1'-0"



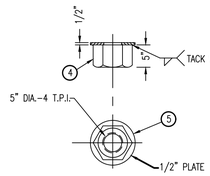
DETAIL "14-C"
RUDDER NECK BEARING
SCALE: 3" = 1'-0"



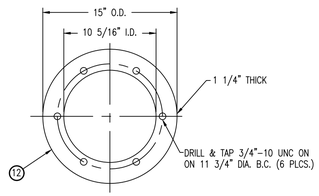
DETAIL "14-A"
RUDDER TUBE DETAIL
SCALE: 1 1/2"=1'-0"



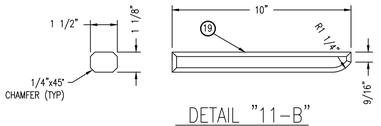
DETAIL "12-D"
RUDDER STOP SPACER
SCALE: 1 1/2" = 1'-0"



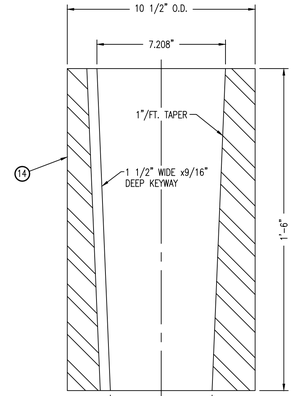
DETAIL "12-C"
RUDDER NUT & KEEPER PLATE
SCALE: 3/4"=1'-0"



DETAIL "13-B"
CARRIER BEARING SUPPORT PLATE
SCALE: 1 1/2"=1'-0"

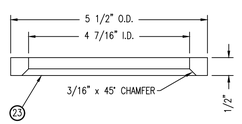


DETAIL "11-B"
LOWER RUDDER STOCK KEY
SCALE: 3"=1'-0"

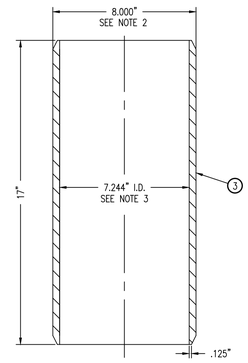


DETAIL "11-C"
RUDDER STOCK TAPER HOUSING
SCALE: 3" = 1'-0"

NOTE:
1/2" DRAW ALLOWED



DETAIL "11-A"
BEARING SPACER
SCALE: 6"=1'-0"



DETAIL "9-D"
RUDDER STOCK LINER
SCALE: 3" = 1'-0"

12/9/2020

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NORTH CAROLINA DOT FERRY DIVISION

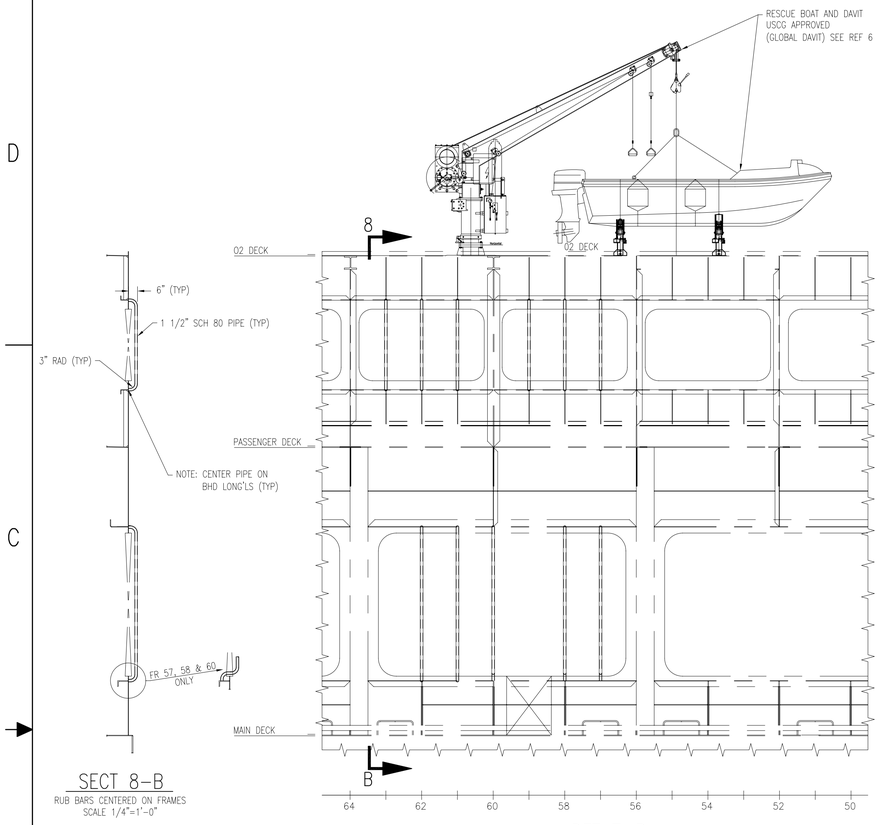
NEW SOUND CLASS FERRY

RUDDER ARRANGEMENT

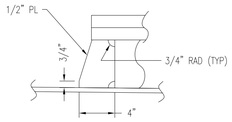
DRAWN BY:	J. BEACH	DATE: 5/12/10	DWG NO. 562-01
CK'D BY:	K.H.K.	HULL No. 413	SHT 2 OF 2
SCALE:	AS NOTED	G&C Job No. 09-060	REV. 1

REVISIONS				
REV	ZONE	DESCRIPTION	DATE	BY/APPVD

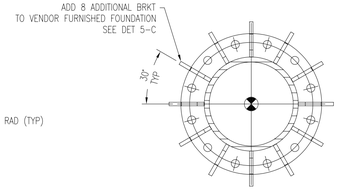
12/9/2020



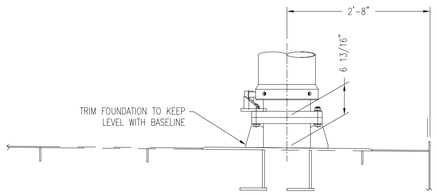
SECT 8-B
RUB BARS CENTERED ON FRAMES
SCALE 1/4"=1'-0"



DET 5-C
DAVIT BASE BRACKET
SCALE 1 1/2"=1'-0"

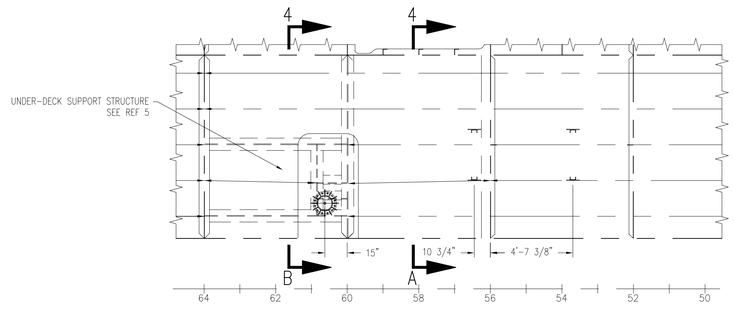


DET 4-C
DAVIT BASE
SHOWN LKG DOWN
SCALE 1 1/2"=1'-0"



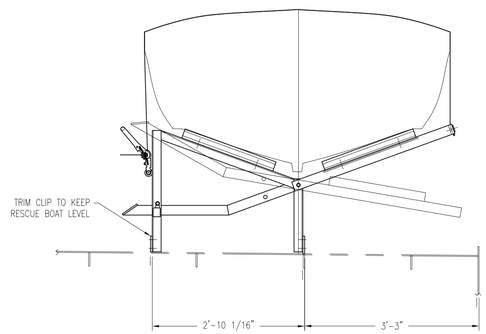
NOTE: FOUNDATION PROVIDED
BY VENDOR

SECT 4-B
SECTION THRU RESCUE BOAT DAVIT
SCALE 3/4"=1'-0"



DET 7-A
PLAN VIEW RESCUE BOAT FOUNDATION & DAVIT
SHOWN LKG DOWN
SCALE 1/4"=1'-0"

NOTE: CRANE AND RESCUE BOAT NOT
SHOWN FOR CLARITY



SECT 4-A
SECTION THRU RESCUE BOAT CRADLE
SCALE 3/4"=1'-0"

NOTE: CRADLE AND CLIPS
PROVIDED BY VENDOR

DET 7-B
ELEVATION @ SIDE SHELL - STBD ONLY
SHOWN LKG PORT
SCALE 1/4"=1'-0"

GENERAL NOTES

1. THIS DRAWING SHOULD NOT BE USED TO DIRECTLY SCALE NC PARTS OR PREPARE 3D MODELING.
2. ALL MATERIAL SHALL BE ABS GR. A OR EQUIVALENT EXCEPT AS NOTED.

NO.	REFERENCES	DWG NO.
6	RESCUE BOAT CRANE RHS.13/3,5 (VENDOR DWG) GLOBAL DAVIT GmbH	1-3531
5	02 DECK AND BHDS BELOW	153-01
4	BULWARKS AND CURTIAN PLATES	152-02
3	MOLD LINE CONVENTION	101-03
2	GENERAL ARRANGEMENTS	101-02
1	OUTBOARD & INBOARD PROFILE	101-01

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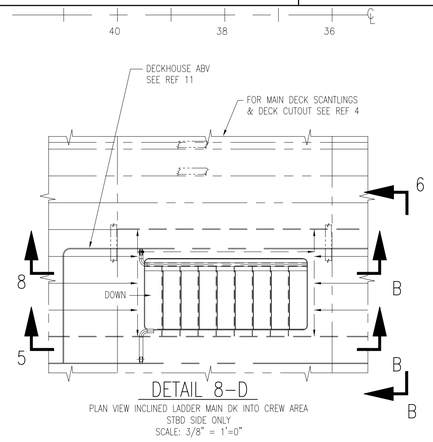
NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

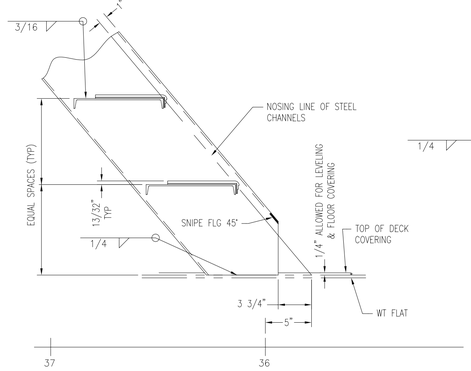
RESCUE BOAT AND DAVIT FOUNDATION

DRAWN BY: BMB	DATE: 12-3-10	DWG NO.	583-01
CK'D BY: KHK	HULL No. 413	SHT 1 OF 1	
SCALE: AS NOTED	G&C Job No. 09-060	REV. 0	



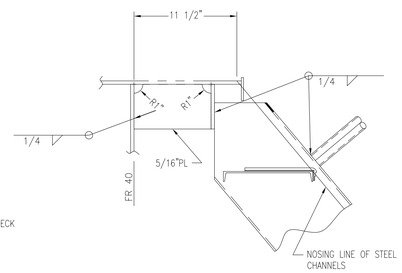
DETAIL 8-D

PLAN VIEW INCLINED LADDER MAIN DK INTO CREW AREA
STBD SIDE ONLY
SCALE: 3/8" = 1'-0"



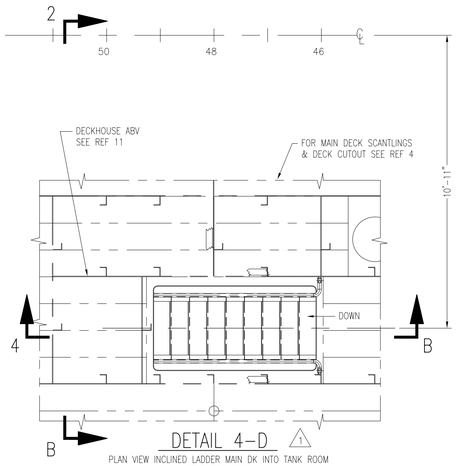
1 DETAIL 6-D

FOR INFO NOT SHOWN SEE DET 8-A
SCALE: 1 1/2" = 1'=0"



1 DETAIL 5-D

FOR INFO NOT SHOWN SEE DET 6-A
SCALE: 1 1/2" = 1'=0"

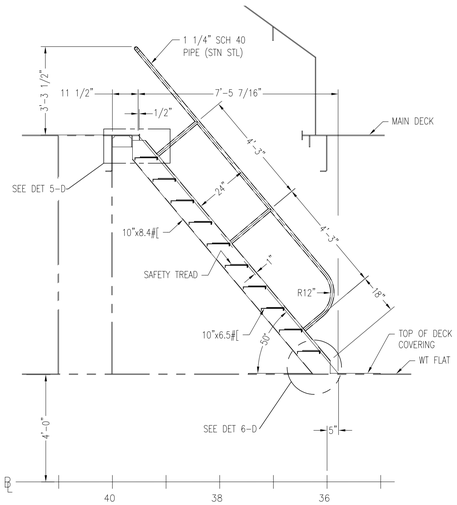


DETAIL 4-D 1

PLAN VIEW INCLINED LADDER MAIN DK INTO TANK ROOM
STBD SIDE ONLY
SCALE: 3/8" = 1'=0"

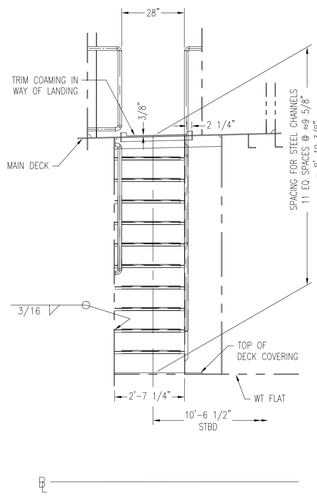
12/9/2020

REVISIONS				
REV	ZONE	DESCRIPTION	DATE	BY/APPVD
1	7-B	1. RELOCATED INCLINED LADDER IN CREW QTRS AND REVISED TO WELDED IN LIEU OF BOLTED ATTACHMENT.	7/8/10	MEH/BJ
	3-A	2. REVISED KEY PLAN TO UPDATE LOCATIONS PER REVISED GENERAL ARRGT. AND ELEVATOR INSTALLATION DEVELOPMENT.		
	20-A	3. ADDED SECT 19-A, 21-A AND DETAIL 21-B FOR LADDER INSIDE OF ELEVATOR TRUNK.		
	20-C	4. RELOCATED LADDER FROM AFT OF FR 82 TO FWD FR 92 PER REVISED GA.		
	3-B	5. RENAMED DET 5-D TO 4-D, SECT 5-B TO 4-B AND SECT 3-B TO 2-B		



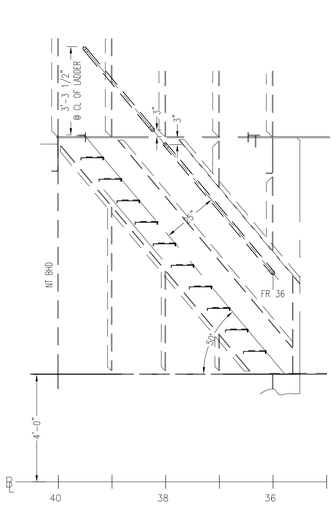
1 SECTION 8-B

STBD ONLY LKG INBD
SCALE 3/8" = 1'-0"



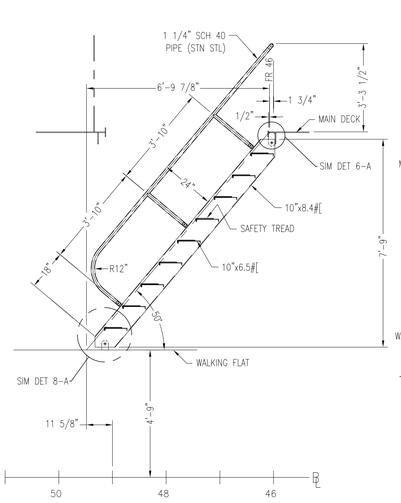
1 SECTION 6-B

STBD ONLY LKG AFT
SCALE 3/8" = 1'-0"



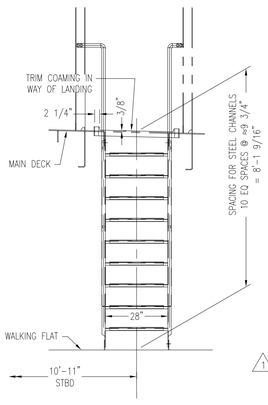
1 SECTION 5-B

STBD ONLY LKG INBD
FOR INFO NOT SHOWN SEE SECT 8-B
SCALE 3/8" = 1'-0"



1 SECTION 4-B

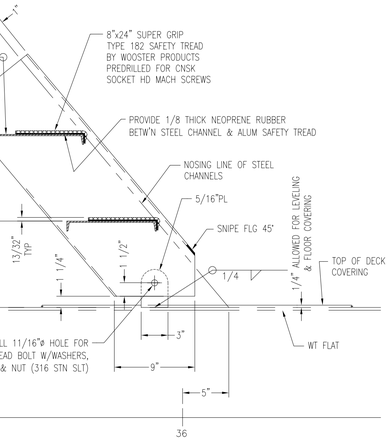
STBD ONLY LKG INBD
SCALE 3/8" = 1'-0"



1 SECTION 2-B

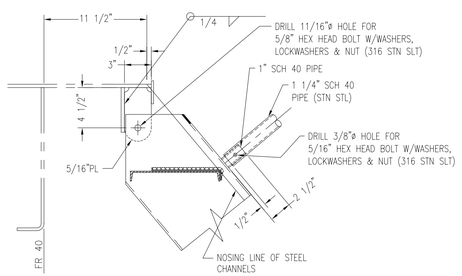
STBD ONLY LKG FWD
SCALE 3/8" = 1'-0"

1			
	16	ELEVATOR INSTALLATION	589-01
	15	SCHEDULE OF OPENINGS, BELOW DECK	167-01
	14	LINES PLAN	839-01
	13	MOLD LINE CONVENTION	101-03
	12	GENERAL ARRANGEMENTS	101-02
	11	MID-DECK STRUCTURE	152-01
	10	OUTBOARD & INBOARD PROFILE	101-01
	9	FRAMES, FR. FR. 73-STERN	117-03
	8	CONSTRUCTION PROFILE & LONG'L BHDS, FR. 73-STERN	116-03
	7	SCANTLING PLANS, FR. 73-STERN	110-03
	6	FRAMES, FR. 36-FR. 72	117-02
	5	CONSTRUCTION PROFILE & LONG'L BHDS, FR. 36-FR. 72	116-02
	4	SCANTLING PLANS, FR. 36-FR. 72	110-02
	3	FRAMES, BOW-FR. 35	117-01
	2	CONSTRUCTION PROFILE & LONG'L BHDS, BOW-FR. 35	116-01
	1	SCANTLING PLANS, BOW-FR. 35	110-01
NO.		REFERENCES	DWG NO.



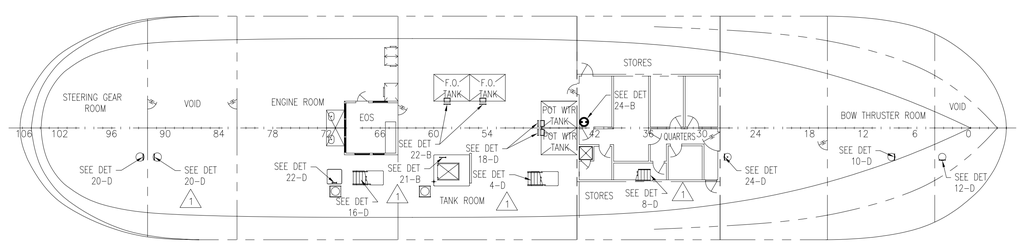
DETAIL 8-A

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



DETAIL 6-A

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



1 KEY PLAN

SCALE: 1/16" = 1'=0"

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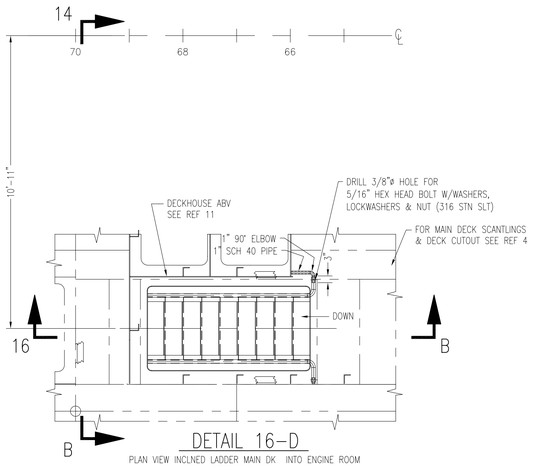
NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

HANDRAILS & LADDERS, BELOW DECK

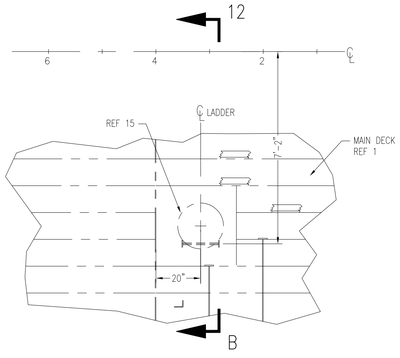
DRAWN BY: C FIELDS	DATE: 03-31-10	DWG NO.	612-01
CK'D BY: BJ	HULL No. 413	SHT 1 OF 3	
SCALE: 3/8" & AS NOTED	G&C Job No. 09-060	REV. 1	

12/9/2020



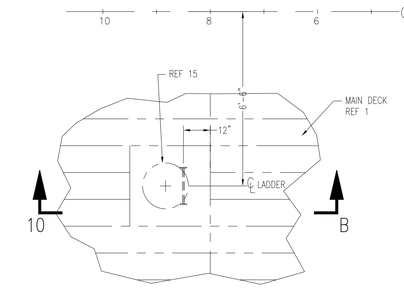
DETAIL 16-D

PLAN VIEW INCLNED LADDER MAIN DK INTO ENGINE ROOM
STBD SIDE ONLY
SCALE: 3/8" = 1'=0"



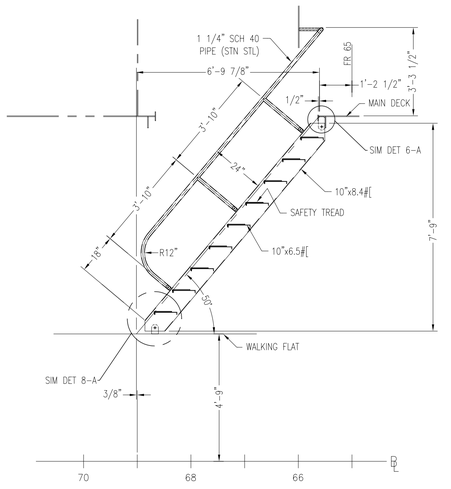
DETAIL 12-D

VERTICAL LADDER MAIN DK INTO FOREPEAK
STBD ONLY



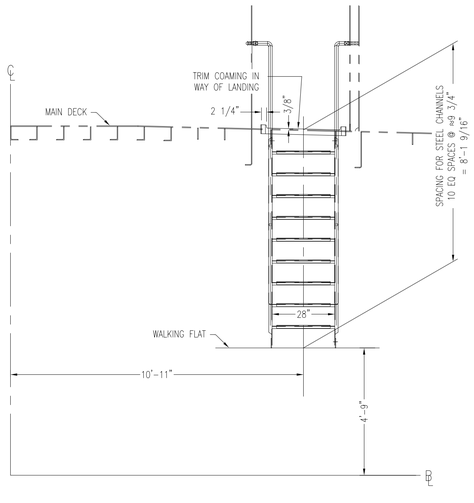
DETAIL 10-D

VERTICAL LADDER MAIN DK INTO BOW THRUSTER COMPT.
STBD ONLY



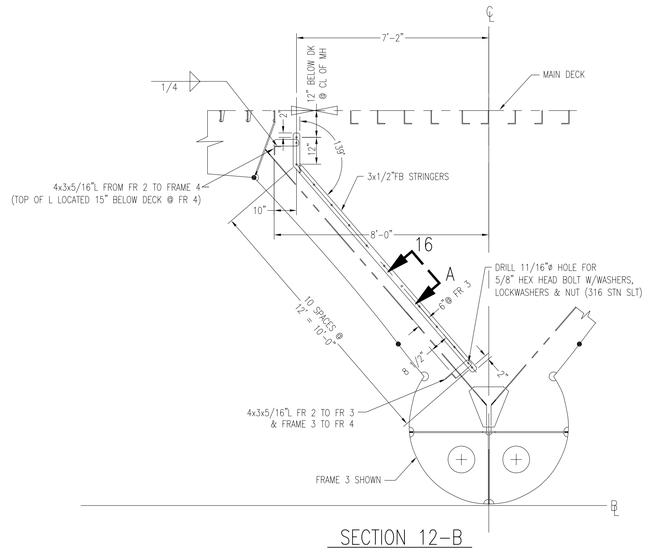
SECTION 16-B

STBD ONLY LKG INBD
SCALE 3/8" = 1'-0"



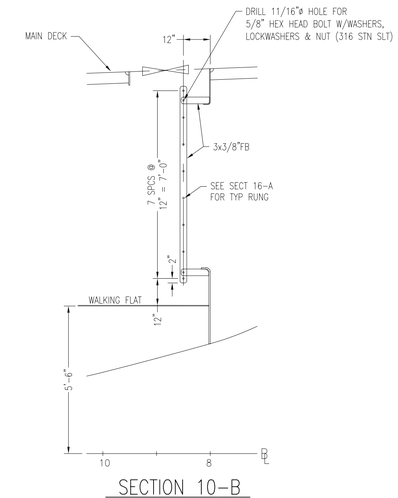
SECTION 14-B

STBD ONLY LKG FWD
SCALE 3/8" = 1'-0"



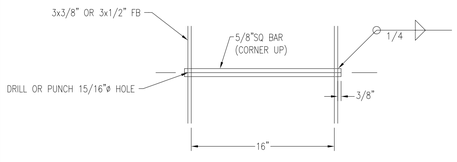
SECTION 12-B

MAIN DK INTO FOREPEAK
STBD ONLY LKG AFT



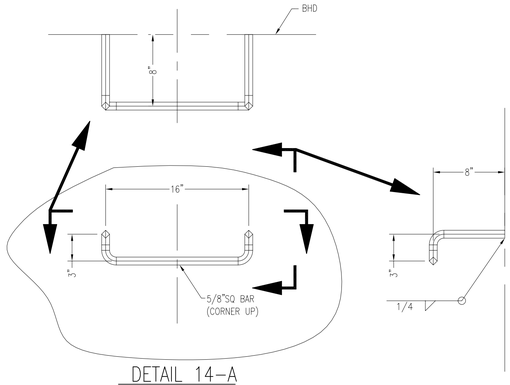
SECTION 10-B

MAIN DK INTO BOW THRUSTER COMPT.
STBD ONLY LKG INBD



SECTION 16-A

TYP VERTICAL LADDER
SCALE: 1 1/2" = 1'=0"



DETAIL 14-A

TYP LADDER DROP RUNG
SCALE: 1 1/2" = 1'=0"

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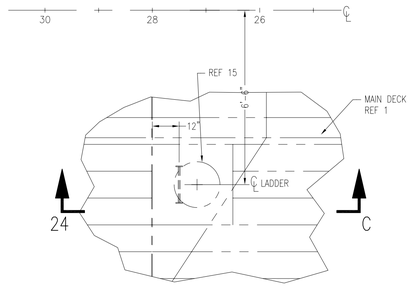
ORANGE SHIPBUILDING CO. INC.

NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

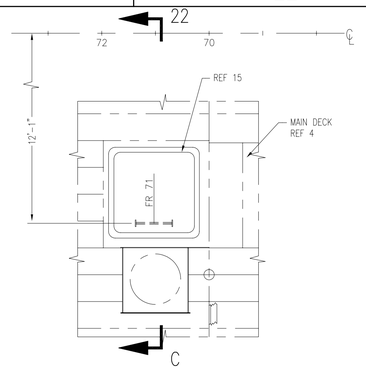
HANDRAILS & LADDERS, BELOW DECK

DRAWN BY: C FIELDS	DATE: 03-31-10	DWG NO. 612-01 SHT 2 OF 3
CK'D BY: BJ	HULL No. 413	
SCALE: 3/8" & AS NOTED	G&C Job No. 09-060	REV. 1



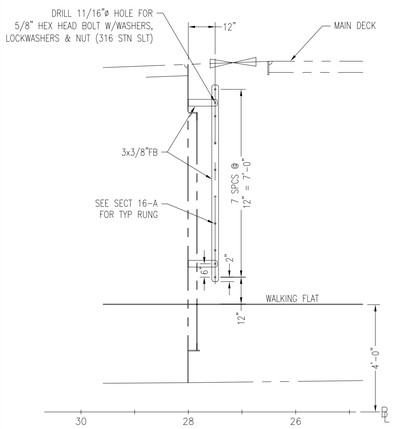
DETAIL 24-D

VERTICAL LADDER MAIN DECK INTO FWD VOID
STBD ONLY



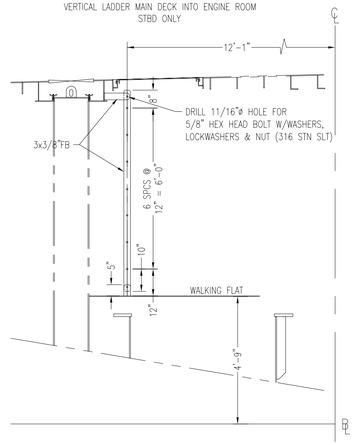
DETAIL 22-D

VERTICAL LADDER MAIN DECK INTO ENGINE ROOM
STBD ONLY



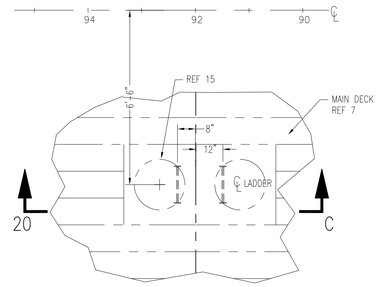
SECTION 24-C

MAIN DK INTO FWD VOID
STBD ONLY LKG INBD



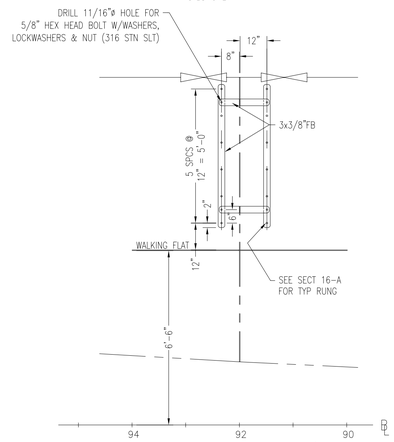
SECTION 22-C

MAIN DK INTO ENGINE ROOM
STBD ONLY LKG INBD



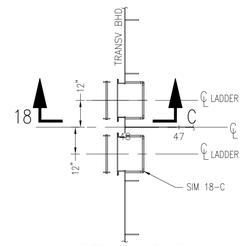
DETAIL 20-D

VERTICAL LADDER MAIN DK INTO STEERING COMPT.
AND MAIN DECK INTO VOID
STBD ONLY



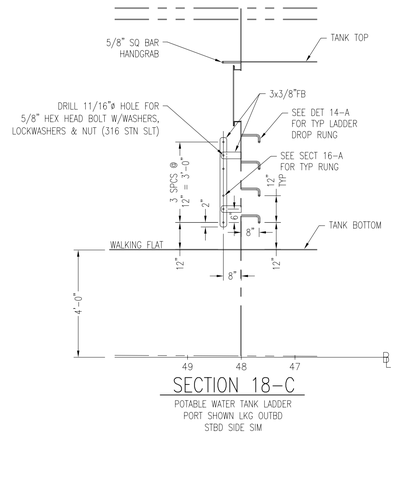
SECTION 20-C

MAIN DK INTO STEERING COMPT.
STBD ONLY LKG INBD



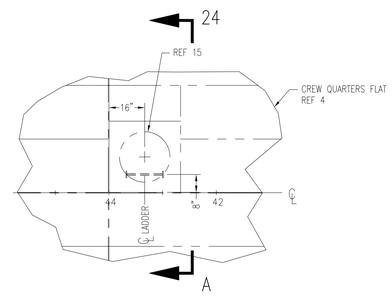
DETAIL 18-D

PLAN VIEW OF VERTICAL LADDER INTO POTABLE WATER TANKS



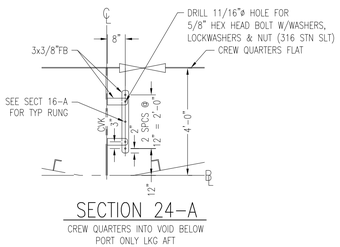
SECTION 18-C

POTABLE WATER TANK LADDER
PORT SHOWN LKG OUTBD
STBD SIDE SIM



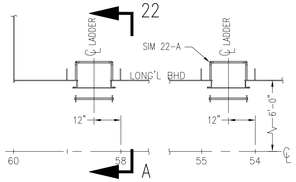
DETAIL 24-B

VERTICAL LADDER CREW QUARTERS INTO VOID BELOW
PORT ONLY



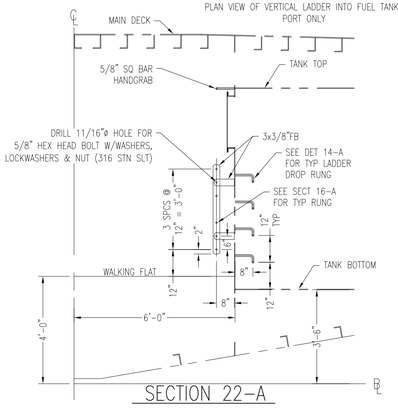
SECTION 24-A

CREW QUARTERS INTO VOID BELOW
PORT ONLY LKG AFT



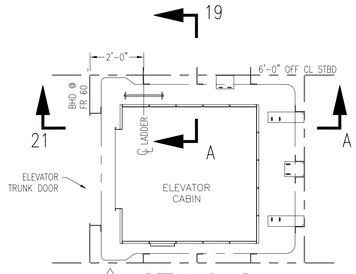
DETAIL 22-B

PLAN VIEW OF VERTICAL LADDER INTO FUEL TANKS
PORT ONLY



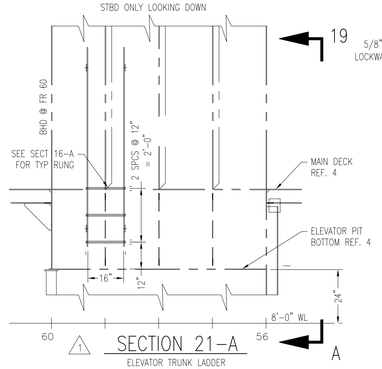
SECTION 22-A

FUEL OIL TANK LADDER
PORT ONLY LKG AFT



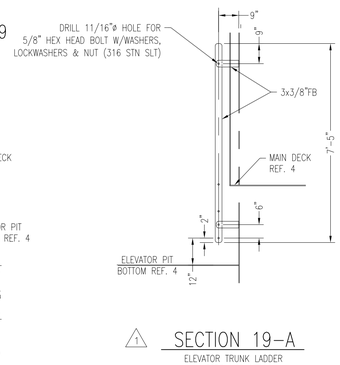
1 DETAIL 21-B

VERTICAL LADDER IN ELEVATOR TRUNK
STBD ONLY LOOKING DOWN



1 SECTION 21-A

ELEVATOR TRUNK LADDER
STBD LKG INBD



1 SECTION 19-A

ELEVATOR TRUNK LADDER
STBD LKG AFT

12/9/2020

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ORANGE SHIPBUILDING CO. INC.

NORTH CAROLINA DOT FERRY DIVISION

NEW SOUND CLASS FERRY

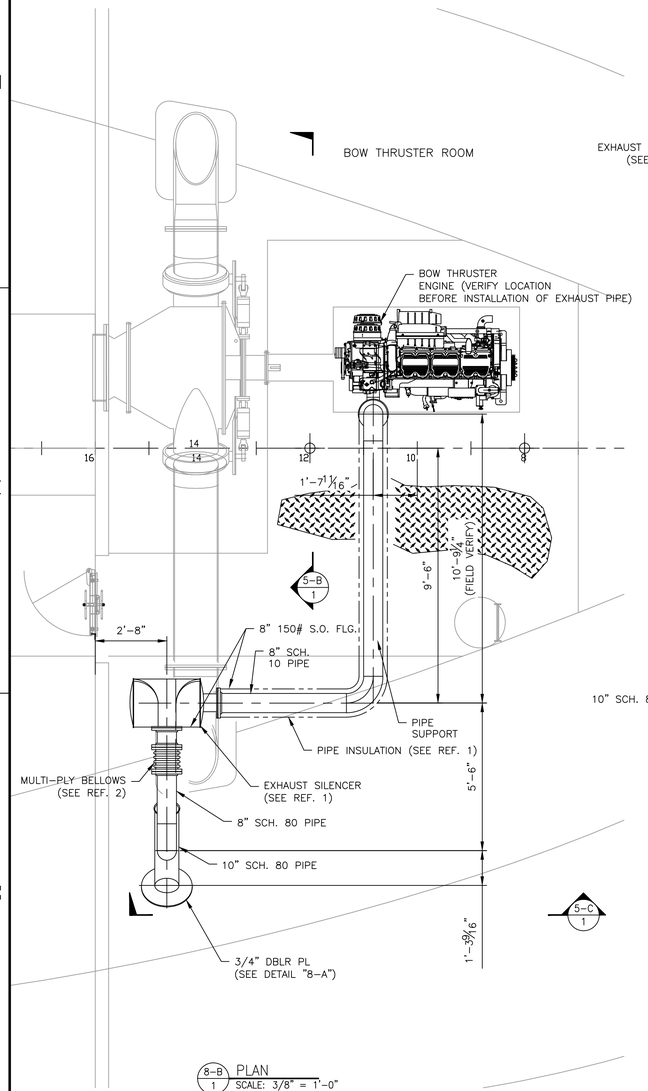
HANDRAILS & LADDERS, BELOW DECK

DRAWN BY: C FIELDS	DATE: 03-31-10	DWG NO.	612-01
CK'D BY: BJ	HULL No. 413	SHT 3 OF 3	
SCALE: 3/8" & AS NOTED	G&C Job No. 09-060	REV. 1	

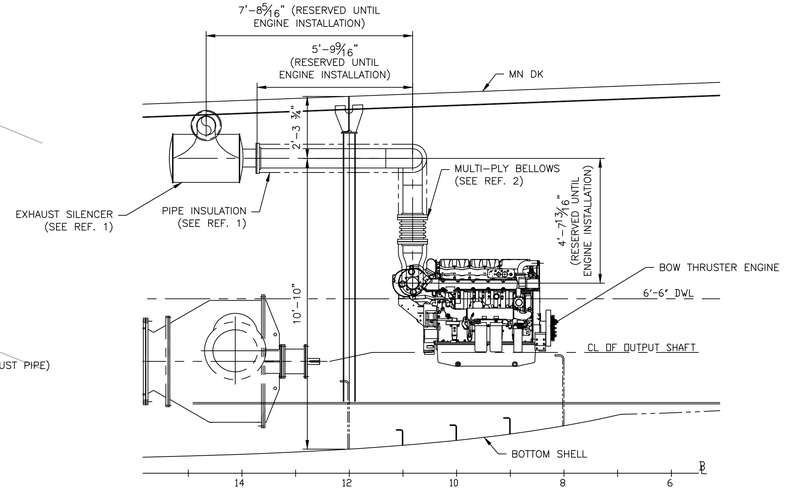
12/9/2020

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	0	ISSUE FOR CONSTRUCTION	2/1/11	EJB
3	1	CHANGE MN ENG 6" EXHAUST PIPE TO 8"	6/3/11	EJB

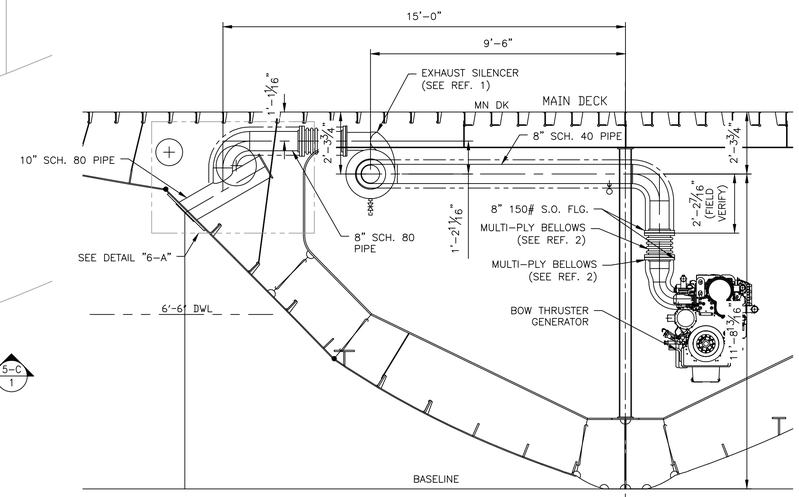
REFERENCES			
NO.	DWG. NO.	REV.	DESCRIPTION
1	259-01	0	EXHAUST SYSTEM SCHEMATIC
2	259-02	1	EXHAUST SYSTEM ARRG'T. & DETAILS



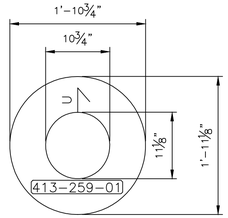
8-B / 1 PLAN
SCALE: 3/8" = 1'-0"
BOW THRUSTER ENGINE EXHAUST



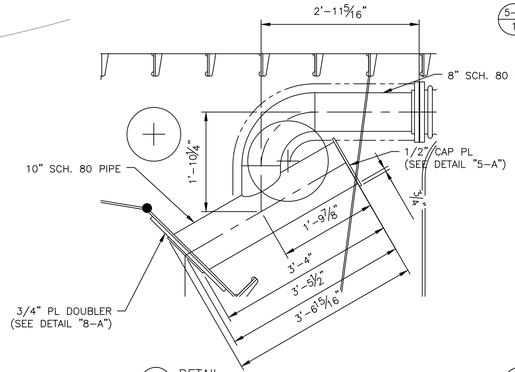
5-C / 1 ELEVATION
SCALE: 3/8" = 1'-0"
BOW THRUSTER ENGINE EXHAUST 14FT OFF CL TO STBD LKG PORT
NOTE: VERIFY LOCATION OF ENGINE LOCATION BEFORE FABRICATION OF EXHAUST PIPE.



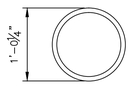
5-B / 1 SECTION
SCALE: 3/8" = 1'-0"
BOW THRUSTER ENGINE EXHAUST @ FR 12 LKG AFT
NOTE: MODIFY FIREMAIN PIPE PER EXHAUST SYSTEM.



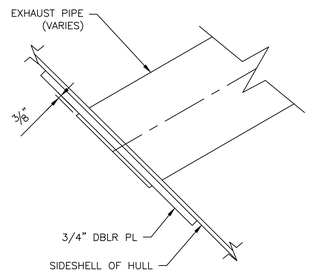
8-A / 1 DETAIL – 3/4" DBLR PL OUTSIDE HULL
SCALE: 1" = 1'-0"
BOW THRUSTER ENGINE EXHAUST
ONE (1) UNIT REQ'D.



6-A / 1 DETAIL
SCALE: 3/4" = 1'-0"
FRAME 12 LKG AFT



5-A / 1 DETAIL – 1/2" CAP PLATE
SCALE: 1" = 1'-0"
BOW THRUSTER ENGINE EXHAUST
ONE (1) UNIT REQ'D.



4-A / 1 DETAIL
SCALE: NONE
TYPICAL EXHAUST PENETRATION THROUGH HULL
ONE (1) UNIT REQ'D.

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A CONRAD INDUSTRIES CO.
710 WATER STREET, ORANGE, TEXAS 77630
PHONE 409-883-4466 FAX 409-882-0609

NC DOT FERRY EXHAUST PIPING ARRG'T. & DETAILS

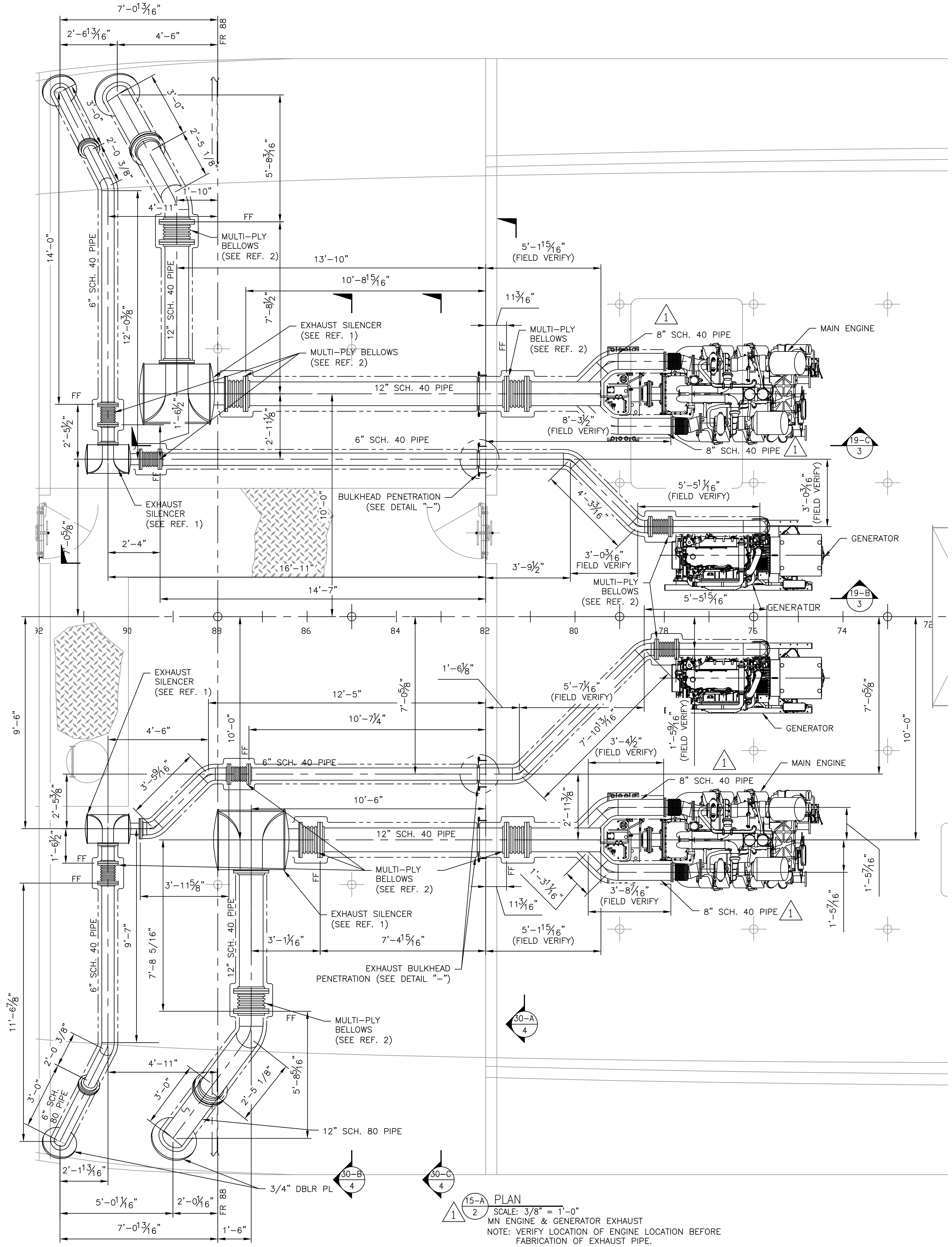
DRAWN	CBC
DATE	1/30/11
CHECKED BY	EJB
YARD APPV'D	
A.B.S. APPV'D	
CUST. APPV'D	

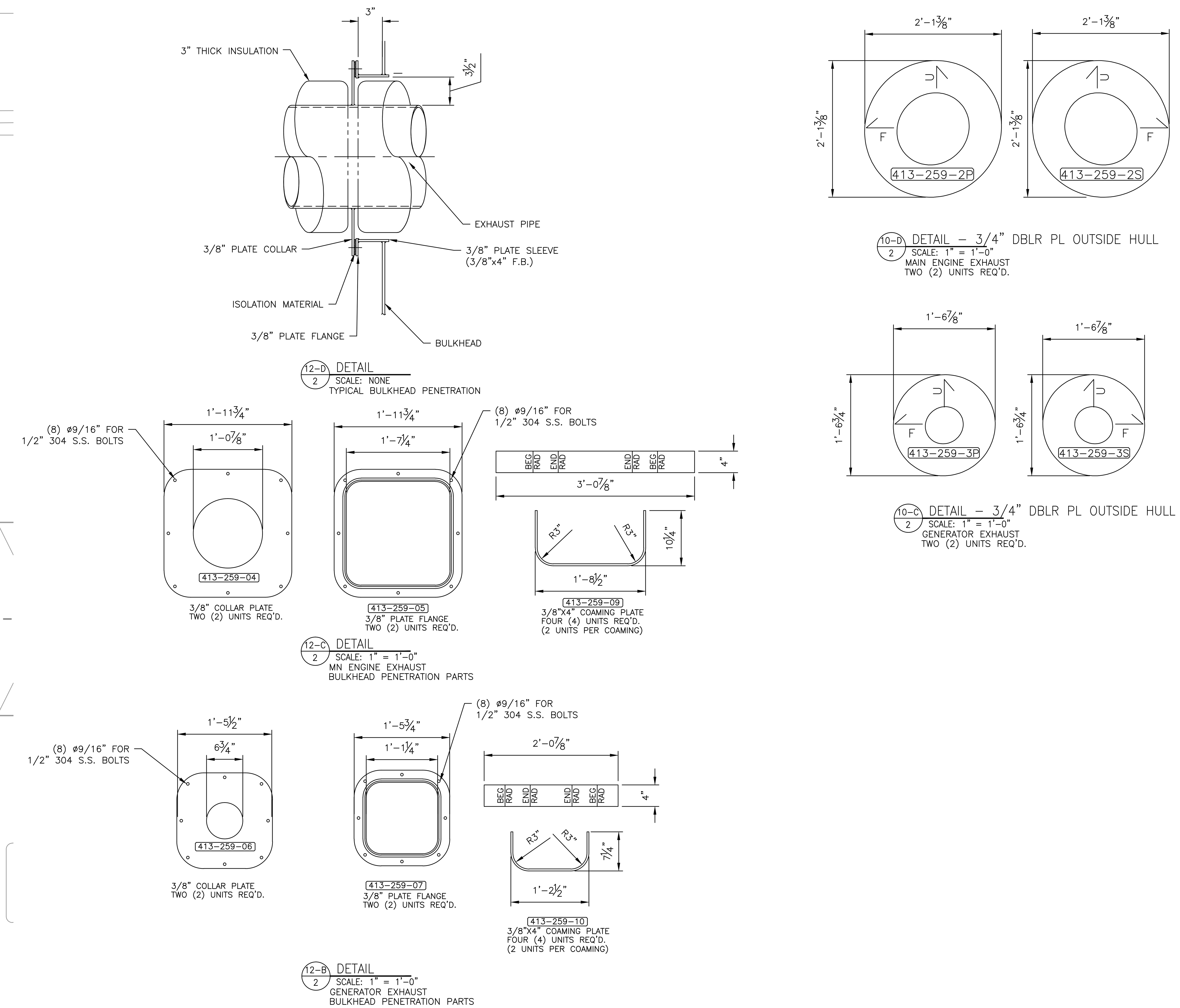
SIZE	PROJECT NO.	DWG. NO.	REV.
D	H-413	259-001	1

SCALE AS SHOWN | FILE H-413-259-001 | SHEET 1 OF 4

12/9/2020

ZONE	REV	DESCRIPTION	DATE	APPROVED
		REVISIONS		
	0	ISSUE FOR CONSTRUCTION	2/1/11	EJB
3	1	CHANGE MN ENG 6" EXHAUST PIPE TO 8"	6/3/11	EJB





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NC DOT FERRY
EXHAUST PIPING
ARRG'T. & DETAILS

DRAWN	CBC
DATE	1/30/11
CHECKED BY	EJB
YARD APPV'D	
A.B.S. APPV'D	
CUST. APPV'D	

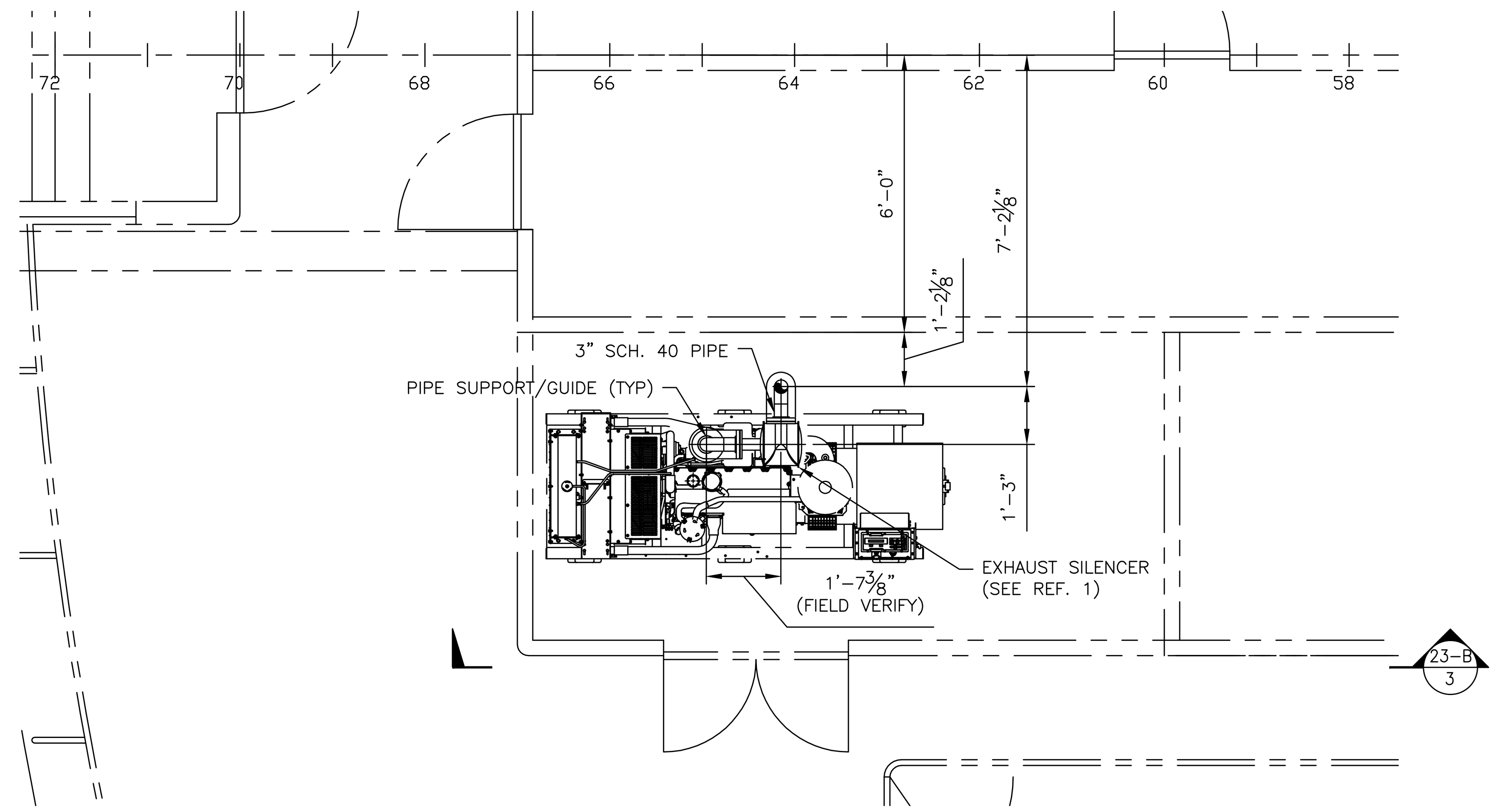
SIZE	PROJECT NO.	DWG. NO.	REV
D	H-413	259-001	1

SCALE AS SHOWN | FILE H-413-259-001 | SHEET 2 OF 4

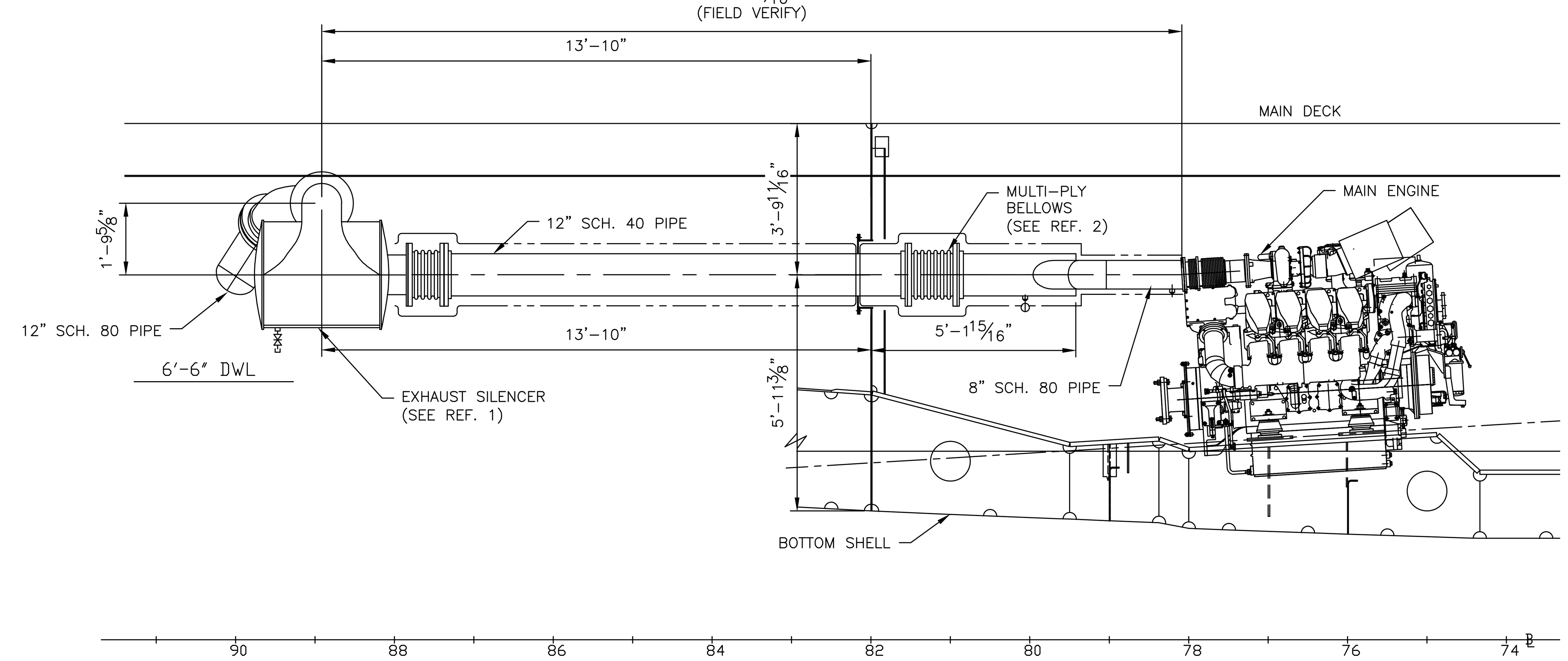
ZONE	REV	DESCRIPTION	DATE	APPROVED
	0	ISSUE FOR CONSTRUCTION	2/1/11	EJB
3	1	CHANGE MN ENG 6" EXHAUST PIPE TO 8"	6/3/11	EJB

REVISIONS

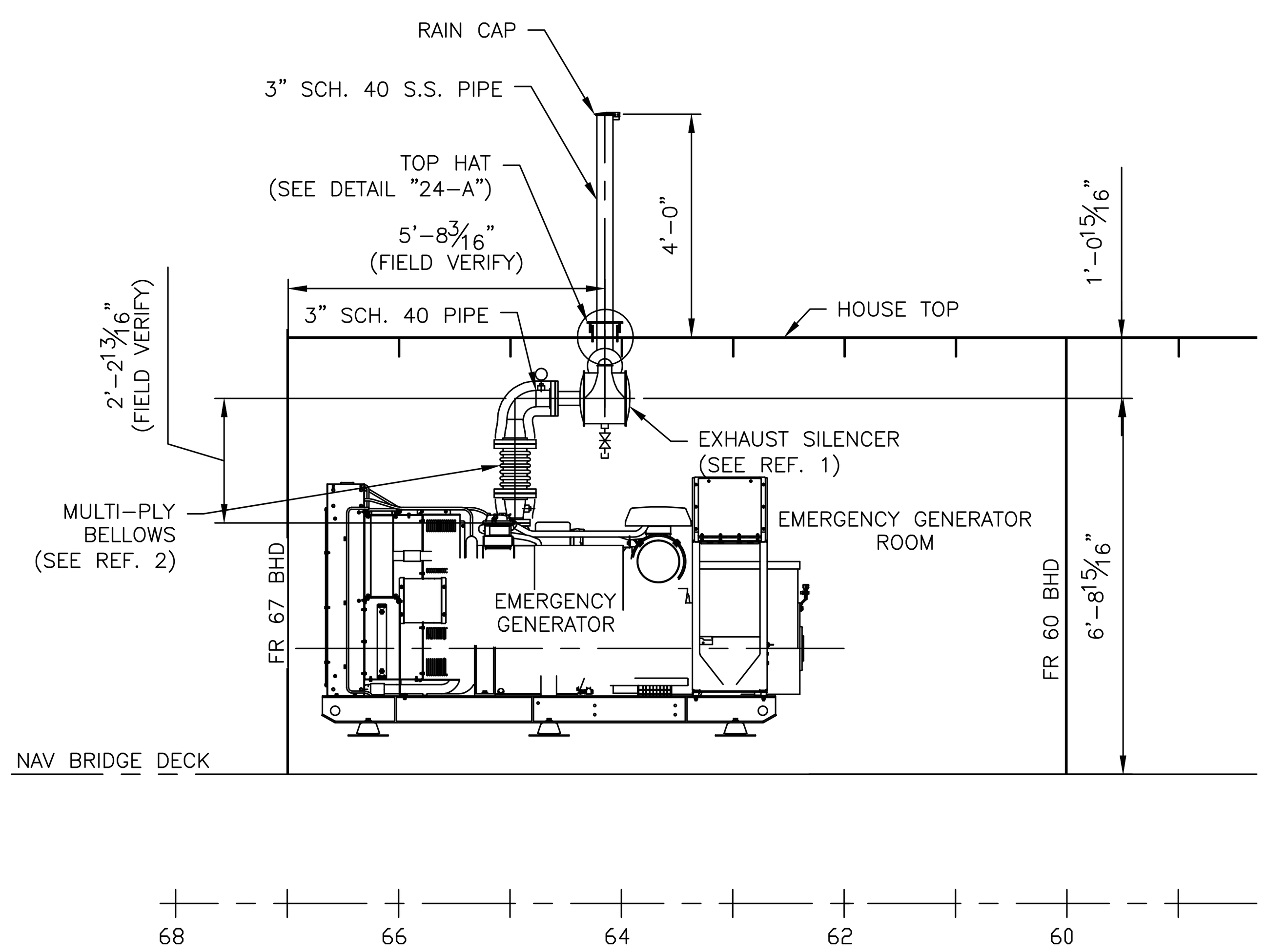
12/9/2020



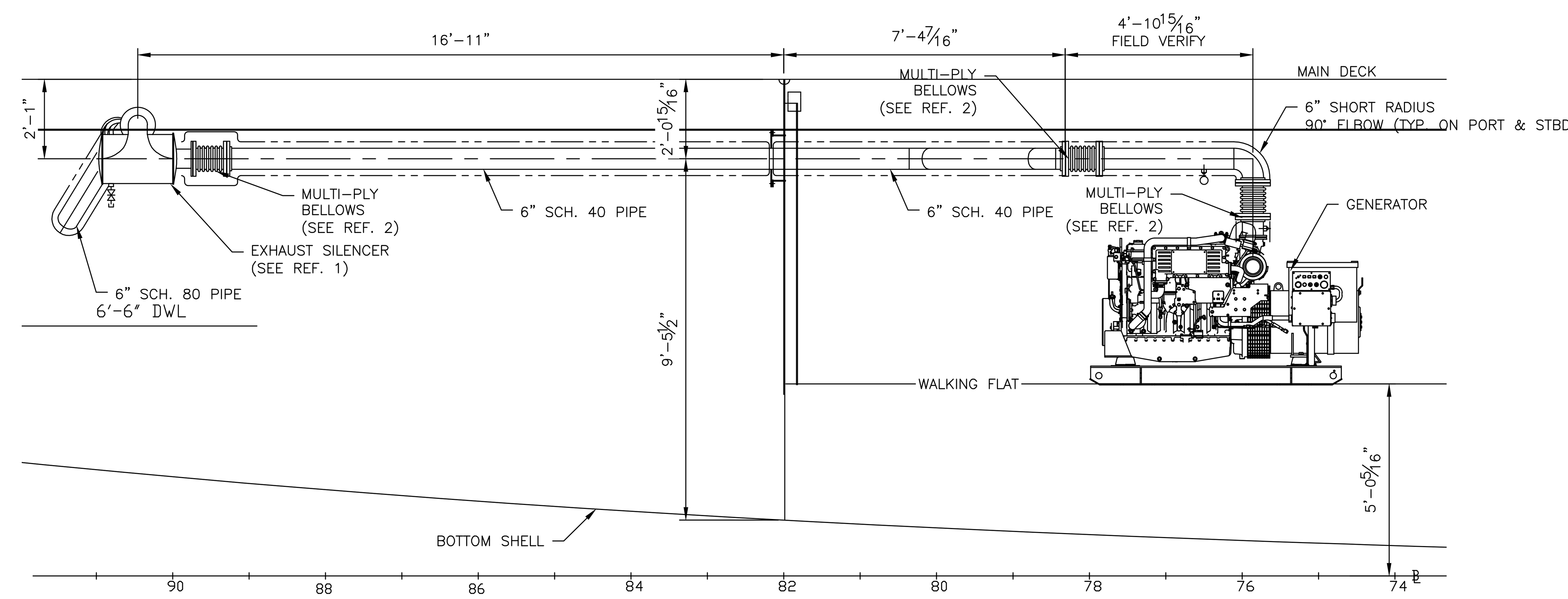
23-C DETAIL
3 SCALE: 3/8" = 1'-0"
EMERGENCY GENERATOR EXHAUST PIPING



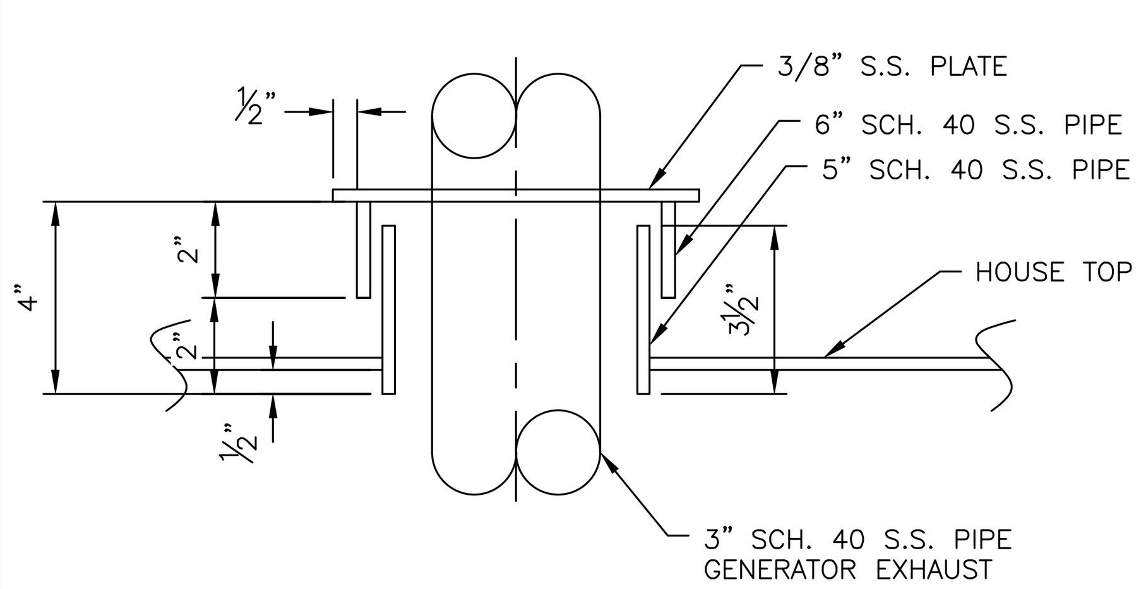
19-C ELEVATION
2 SCALE: 3/8" = 1'-0"
MN ENG EXHAUST 6FT OFF CL TO PORT LKG PORT
NOTE: VERIFY LOCATION OF ENGINE LOCATION BEFORE FABRICATION OF EXHAUST PIPE.



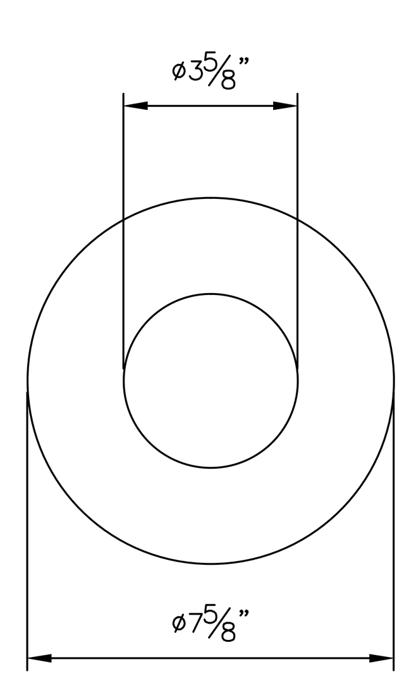
23-B ELEVATION
3 SCALE: 3/8" = 1'-0"
EMERGENCY GENERATOR EXHAUST PIPING
NOTE: VERIFY LOCATION OF ENGINE LOCATION BEFORE FABRICATION OF EXHAUST PIPE.



19-B ELEVATION
2 SCALE: 3/8" = 1'-0"
GENERATOR EXHAUST @ CL LKG PORT
NOTE: VERIFY LOCATION OF ENGINE LOCATION BEFORE FABRICATION OF EXHAUST PIPE.



24-B DETAIL
3 SCALE: NONE
EMERGENCY GENERATOR TOP HAT



413-259-08
23-A 3/8" TOP HAT PLATE DETAIL
3 SCALE: NONE
ONE (1) UNIT REQ'D.

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NC DOT FERRY EXHAUST PIPING ARRG'T. & DETAILS

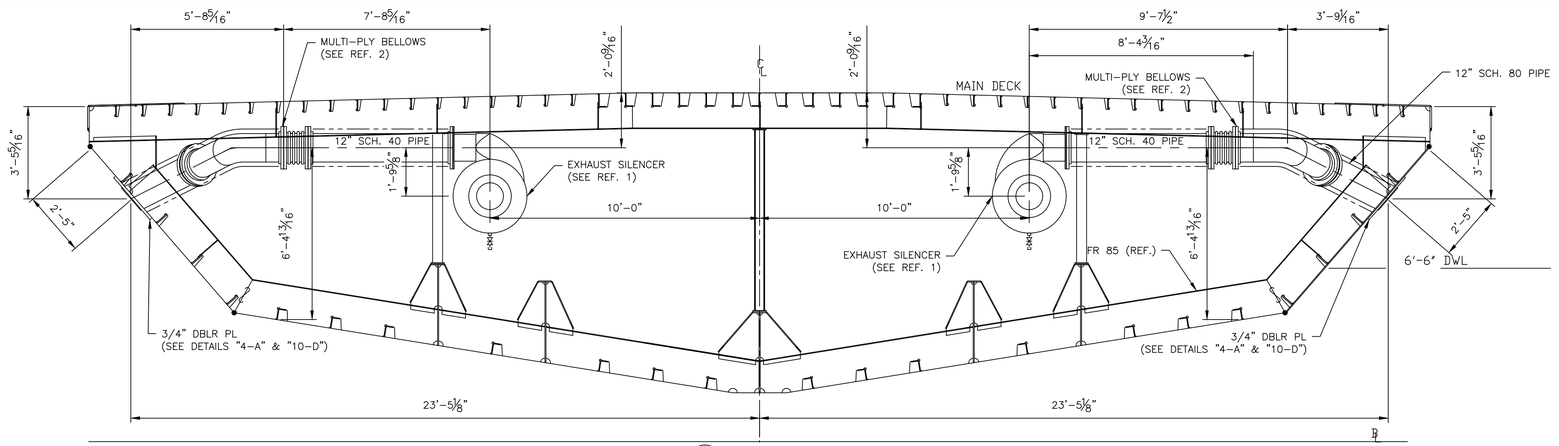
DRAWN	CBC
DATE	1/30/11
CHECKED BY	EJB
YARD APPV'D	
A.B.S. APPV'D	
CUST. APPV'D	

SIZE	PROJECT NO.	DWG. NO.	REV
D	H-413	259-001	1

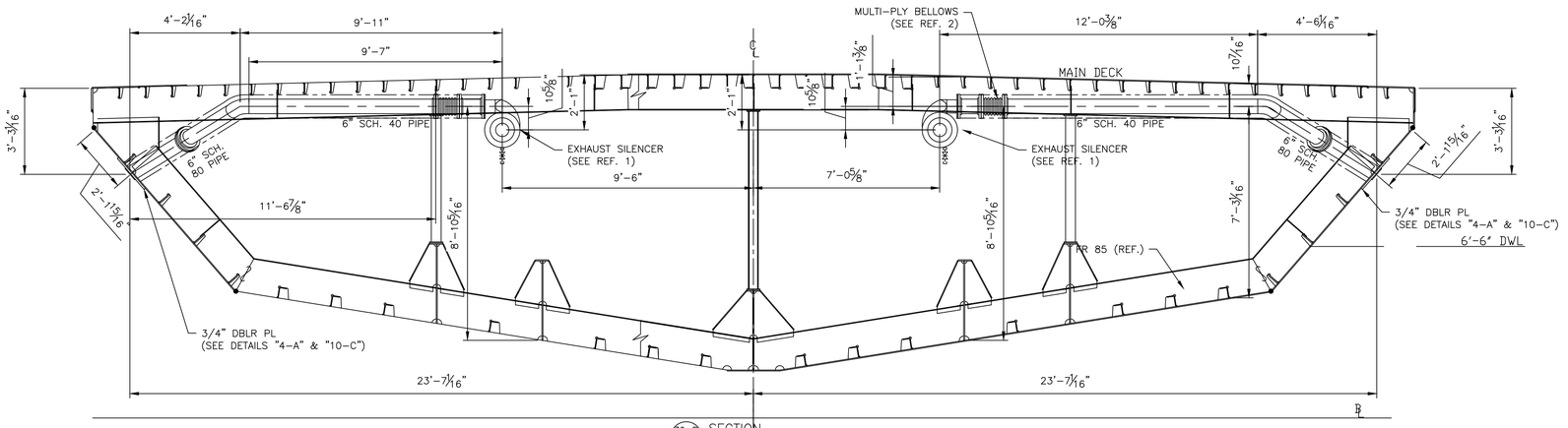
SCALE AS SHOWN | FILE H-413-259-001 | SHEET 3 OF 4

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	0	ISSUE FOR CONSTRUCTION	2/1/11	EJB
3	1	CHANGE MN ENG 6" EXHAUST PIPE TO 8"	6/3/11	EJB

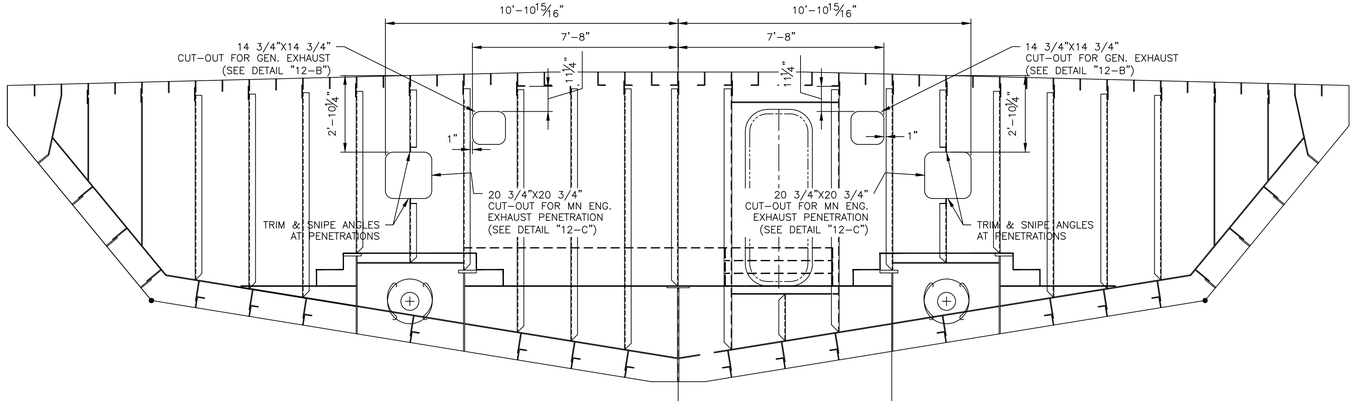
12/9/2020



30-C 2 SECTION
SCALE: 3/8" = 1'-0"
MN ENGINE EXHAUST @ FR 85 LKG AFT
NOTE: VERIFY LOCATION OF ENGINE LOCATION BEFORE FABRICATION OF EXHAUST PIPE.



30-B 2 SECTION
SCALE: 3/8" = 1'-0"
GENERATOR EXHAUST @ FR 85 LKG AFT
NOTE: VERIFY LOCATION OF ENGINE LOCATION BEFORE FABRICATION OF EXHAUST PIPE.



30-A 2 SECTION
SCALE: 3/8" = 1'-0"
EXHAUST PENETRATIONS ARRG'T. & STIFF. @ FR 82 LKG AFT

ORANGE Shipbuilding Co., Inc.
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710 MAPLE STREET, ORANGE, TEXAS 77630
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NC DOT FERRY EXHAUST PIPING ARRGT. & DETAILS

DRAWN	CBC
DATE	1/30/11
CHECKED BY	EJB
YARD APPV'D	
A.B.S. APPV'D	
CUST. APPV'D	

SIZE	PROJECT NO.	DWG. NO.	REV
D	H-413	259-001	1

SCALE AS SHOWN | FILE H-413-259-001 | SHEET 4 OF 4