

Appendix B: Menu of Relevant Information

1. Dead ship and owner/agency details:
 - a. Dead ship owner or agency:
 - i. DSM representative name.
 - ii. DSM representative contact information.
 - b. Dead ship:
 - i. Name.
 - ii. Official number or documentation number.
 - iii. Vessel owner/operator.
 - iv. Vessel class/type/designation.
 - v. Call sign.
 - vi. Flag.
 - vii. Length, breadth, depth.
 - viii. Navigational draft.
 - ix. Air draft.
 - x. Displacement.
 - xi. Location, soundings, and quantities of oil and hazmat.
 - xii. Points of attachment.
 - xiii. Ability of the vessel to anchor, maintain emergency lighting, and establish capstan/windless operations
 - xiv. Condition and operability of firefighting and dewatering equipment.
 - xv. The number of personnel who are to remain on the moved vessel during the evolution and the type and location of primary lifesaving equipment for each person (should the dead ship be manned?).
 - xvi. Depending on the type of movement (i.e., from anchorage to pier for repairs – or – voyage over 100 nm) these conditions might or might not be warranted:
 - The dead ship's tailshaft(s) locked to prevent freewheeling and vibration.
 - The rudder locked.
 - All large, loose gear secured.
 - All cranes/booms secured.
 - All hatch covers secured.
 - All double bottom/voids/cofferdam hatches secured.
 - All watertight subdivision doors and hatches secured.
 - All watertight doors above deck secured.
 - All air ports and side ports secured.
 - All sea valves closed and secured with wire.
 - Forepeak tank secured, with no fuel in tank.
 - Free surface effect minimized.
 - Proper navigation lights and dayshapes rigged for entire voyage.

- c. Towing Vessel(s):
 - i. Number and type (conventional or tractor) of tugs and horsepower/bollard pull to maintain control of the dead ship at all times, including assist tugs.
 - Name.
 - Official number or documentation number.
 - Vessel owner/operator.
 - Vessel class/type/designation.
 - Call sign.
 - Flag.
 - Length, breadth, depth.
 - Navigational draft.
 - Air draft.
 - Displacement.
 - Where assist tugs will provide assistance if not making entire transit.
- d. Towing configuration (stern, push, side)(surge chain, long chain):
 - Ground tackle details:
 - Diameter of tow wire.
 - Length of tow wire.
 - Emergency wires rigged (location, type).
 - Moving condition (single/double drum).
 - Length and position of tows.
 - Points of attachment.
- e. Voyage Information:
 - i. Place of departure and destination.
 - ii. Primary and alternate time and date of expected departure and arrival.
 - iii. Intended trackline.
 - Review navigational clearances along the proposed route to accommodate vessel specifications.
 - Channel width.
 - Navigation draft.
 - Air draft.
 - Lock/canal.
 - Structure gates.
 - Critical infrastructure.
 - Marine construction projects along the proposed route that might reduce clearances.
 - COTP zones passed through.

2. Designated emergency grounding areas.
3. Purpose of dead ship movement.
4. Date of last drydock or underwater inspection.
5. Pilot organization to maneuver the vessel.
6. Maximum weather parameters (i.e., DSM will not commence if any of the parameters are exceeded, or are forecasted to be exceeded during the planned movement):
 - Winds.
 - Currents.
 - Visibility.
 - Tides.
 - Inclement weather plan.
7. Communications plan. Based on the route and complexity of the movement, agree on a communications plan to notify the COTP of departure and arrival. If the movement occurs along multiple COTP zones, the plan should include a communications schedule and hand-off between Sector Command Center/VTS zones.
8. A timeline of events of the overall operation.
9. Identification of aids-to-navigation that might need to be temporarily moved.

Appendix C: Example Standards of Care

C.1. Overview The following are standards of care compiled from various ports. They are not enforceable regulations.

**C.2. DSM
Representative**

Fully review specifics of the vessel to be moved.

Verify the vessel's seaworthiness and watertight integrity. Items to verify, if applicable, include, but are not limited to, the following:

- All compartments entered and inspected.
 - All tanks sounded, their contents identified and measured, and their integrity verified.
 - Sea valves are closed/secured or wired shut if the vessel is blacked out.
 - Bilges are free of oil and water.
 - Secure all moveable equipment in place.
 - Lock rudders using structural steel of acceptable size and quantity (Note: the lock should transfer the rudder load from the yoke to structural members of the vessel's hull).
 - Lock fixed propeller shafts, feather controllable pitch propellers and thrusters.
 - Cover vents to tanks and other closed spaces to prevent water entry, but do not plug so as to prevent the escape of air or gas
 - Secure all hatches, scuttles, doors, and other watertight closures shut.
 - Necessary reinforcement for ocean operation performed.
-

C.3. DSM Plan

If the moving operation is extraordinary in nature, complete a DSM plan to ensure a safe and efficient route that follows applicable traffic separation schemes, accommodates navigational clearances, takes into account tides/currents, marine projects, and other vessel traffic. An effective movement plan includes, but is not limited to the following:

- Vessel name.
- Vessel type.
- Official number (if applicable).
- LOA.
- Draft.

- Air draft.
 - Beam.
 - Freeboard.
 - Location and date/time of vessel's port of departure.
 - Location and date/time of vessel's port of destination.
 - Transit route.
 - Allowable weather, sea, and visibility conditions.
 - Predicted tides/currents along route.
 - Whether personnel remain aboard the vessel during the movement, how access for these personnel is provided, and any hotel services that remain operational.
 - Lead tug name and horsepower, or bollard pull.
 - Lead tug master name.
 - Assist tugs' name(s) and horsepower.
 - Tug working radio frequencies.
 - Diagrams of tow configurations for intended route with size/strength specifications for all elements, including tow wire, chain, bitts, pad-eyes, and shackles.
 - Use of appropriately licensed marine pilots (if applicable)
 - Verification of seaworthiness and watertight integrity.
 - Method and frequency of verifying moved vessel's condition during transit identified.
 - Available emergency means of controlling flooding and dewatering during the movement.
 - Number of personnel available to verify the vessel's condition during the transit and respond to emergency situations.
 - Plan of action should the vessel begin flooding in a manner that cannot be controlled by available emergency resources.
 - Amount, type, and location of oil products and cargo on board moved vessel.
 - Evidence of financial responsibility for oil spill liability as per Federal and state law (if oil or oil residue remains aboard).
 - International voyage plan (if applicable).
 - Moving vessel POC/responsible party name/24hr phone.
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C.4. Pre-Departure Meeting

Before beginning the scheduled movement, the vessel representative holds a pre-departure meeting with all concerned parties to review the movement plan and discuss communications protocols to use during operations.

C.5. Tugs

Tugs assigned should adhere to industry standards for moving capacities and employ a moving arrangement that enables the moving vessels to maintain control of the dead ship at all times.

- Emergency towlines should be rigged for coastwise routes.
- Towlines and bridles should be protected against chafing.

Tugs assigned should report to VTS before conducting DSM operations within the VTS service area per 33 CFR 161.18.

C.6. Licenses

Personnel assigned to conduct the movement hold appropriate licenses per Title 46 CFR, Part 15.

NOTE:

Nothing in this standard of care relieves the vessel owner or DSM representative from any requirement regarding vessel safety and protection of the environment. Depending on particulars of the vessel being moved (age, extended layup status, vessel condition, etc.), the COTP might require additional safety precautions before the movement is authorized. This might include requirements such as obtaining a marine surveyor's report attesting to vessel seaworthiness for the desired movement, or having a COTP representative examine the vessel to verify seaworthiness, pollution potential, and adequacy of the moving arrangement.

Appendix E: Example Tow Plan

U.S.S. MASSACHUSETTS

Tow Plan & Trip-in-Tow Survey



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Vessel Survey Report No. 711

Vessel surveyed at: Battleship Cove, Fall River, MA
Dates of survey: 12-19 October 1998

Vessel surveyed: U.S.S. MASSACHUSETTS (BB-59)

Survey commissioned by: U.S.S. Massachusetts Memorial Committee, Inc.
Battleship Cove Off. 508-678-1100
Fall River, Massachusetts 02721 Fax 508-674-5597

Purpose of survey: Tow Plan & Trip-In-Tow Survey

As outlined in the 'U.S. Coast Guard MSO Boston Towing Plan Specification Sheet' and the U.S. Navy Towing Manual, the following plan is submitted for your consideration regarding the departure and transit of the U.S.S. MASSACHUSETTS (BB-59) from her berth at the mouth of the Taunton River to Drydock #3, S. Boston.



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Vessel Specifics:

BASIS OF HULL MEASUREMENTS

The waterline used as the base, above which, the heights given in this table are figured, is at draft 30' 00" above the lowest point of the keel.

The designer's waterline (D.W.L.) is the waterline which corresponds approximately to the designed normal load and draft. The length between perpendiculars is obtained from the designer's waterline. This waterline is above the molded baseline (M.B.L.) and is parallel to it. The bottom of the keel is the baseline for draft marks.

The forward perpendicular (F.P.) is located at the intersection of the stem with the 33' 7 3/16" waterline and is 2' 00" aft of Frame # 166.

The after perpendicular (A.P.) is located at the intersection of the stern with the 33' 7 3/16" waterline and is 2' 00" aft of Frame #166.

The middle perpendicular (M.P.) is located midway between the forward and after perpendicular and is 1' 00" aft of Frame #83.

The molded base line (B.L.) is located 1 5/16" above the bottom of all keel plates.

Drafts are measured from a line at the bottom of all keel plates extending forward and aft. See enclosed line outboard profile drawing.

Vessel Specifics (cont.)

CURRENT DRAFT MEASUREMENTS

Draft forward:	25' 02"
Draft aft:	32' 04"
Mean draft:	28' 06 1/2"
Air draft:	126' 00"

GENERAL DIMENSIONS

Length overall:	680' 10"
Length Waterline:	666' 00"
Length between perpendiculars:	665' 10"
Extension of vessel beyond F.P.	8' 04"
Extension of vessel beyond A.P.	6' 07"
Breadth molded (max.) at D.W.L.:	107' 11"
Breadth, extreme to outside of armor:	108' 02"
Hull depth amidships (molded):	52' 00"
Frame spacing :	4' centers
Number of frames between perpendiculars:	166 1/2
Displacement standard - as designed:	36,000 tons
Displacement surfaced normal condition:	42,782 tons
Bottom of keel to molded base line (M.B.L.):	1 5/16"
Draft to designer's waterline:	33' 08"

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Vessel Specifics (cont.)

Freeboard at bow (34' 00" draft to top of maindeck):	28' 07"
Freeboard at stern (34' 00" draft to top of maindeck):	20' 07"
Depth of inner bottom, molded (at C.ship):	3' 00"
Depth of 3rd skin above B.L. (at C.ship):	5' 09"
Capacity of fuel and diesel oil tanks 95%:	1,974,070 gallons/6951 tons
Capacity of ballast tanks 100%:	1,581,902.9 gallons/6042.41 tons
Capacity of void tanks 100%:	1,307,434.4 gallons S.W./4,994.02 tons
Capacity of fresh water & potable tanks 100%:	222,414.9 gallons F.W./825.9 tons
Capacity of Lubricating Oil Tanks:	5,940 gallon/20.14 tons @ 291 gal./tons
Capacity of four used oil drain sump tanks (one in each of four enginerooms) 100%:	6,600 gallons/22.68 tons @ 291 gal./ton
Capacity of gasoline tank compartment:	238 tons
Capacity of Peak Ballast Tanks 95%:	3,377.2 gallons/129.0 tons S.W. @ 261.8 gals/tons

CALCULATED DATA

Tons per inch immersion:	121.5 tons
Area of water plane:	51,080 sq. ft.
C.G. of water plane aft of frame:	34.88
Moment to alter trim one inch:	4,200' tons

Vessel Specifics (cont.)

Moment to list one degree:	6,675' tons
Transverse metacentric height (G.M):	8.94'
GZ:	5.03
Draft at Center of Flotation:	35' 01"
Transverse Metacenter Above C.B.:	25.14 ft.
Longitudinal Metacenter above C.B.:	789.0 ft.
Longitudinal Metacentric height:	788.0 ft.
Area of midship section:	3,620 sq. ft.
Total wetted surface:	90,730 sq. ft.
Range of stability P/S (ship not damaged):	67 degrees
Inclination for maximum righting arm (ship not damaged):	34.2 degrees
Center of flotation (aft of amidships):	35.14 ft.

Of all welded and riveted construction, the MASSACHUSETTS's graceful hull is a flush deck design incorporating both longitudinal and transverse framing. Watertight integrity is enhanced by 19 watertight bulkheads (at frames # 5, 10, 17, 24, 31, 36, 53, 65, 73, 83, 93, 103, 113, 129, 136, 142 1/2, 155 1/2, 161, and 164) pierced by watertight hatches only on the 3rd deck level. Below the first platform level, access to all watertight compartments is limited to watertight scuttles and hatches fitted to the decks above.

Further protection is provided by 12 oil tight bulkheads (at frames # 17, 24, 31, 36, 41, 46 1/2, 55, 65, 72, 114, 122, and 129). The extent of the 2nd skin (or double bottom) extends from Frames 10 through 129; the extent of the 3rd skin (or inner bottom) extends from Frames 31 through 142 1/2. The docking keel (Frames 115 through 131 1/2) is teak filled from frames 116 through 122. Bilge keels are fitted on both sides of the hull from frames #64 through 125 and are constructed of 3/8" mild steel plate.

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U.S.S. MASSACHUSETTS (BB-59)

Amount, Type & Location of Oil Aboard

The U.S.S. MASSACHUSETTS (BB-59) has an extensive fuel oil bunker/tankage system. Fuel oil can be stored in a number of inner bottom and wing tanks which extend from frame 17 to frame 129.

Total on hand this report: 86,185 gallons Naval Special Fuel Oil & #2 Fuel Oil
Total on hand this report: 29,839 gallons water
Percent on hand (based on 1,974,070 gallons capacity): 4.37 %

All of the main machinery spaces where FO piping is located have an undetermined amount of residual fuel within their lines; most of the piping has been bled and drained. There is a small amount of spilled oil (not more than 50 gallons maximum for each engineroom) within each engineroom where piping was taken apart for decommissioning purposes. Most of this fuel has hardened and poses no threat to other areas within the vessel.

The five main fuel oil pumping manifolds also contain approximately 100-150 gallons of FO each within their pumping manifolds. The five FO pumprooms are located within compartments A-620-E and the four firerooms.

A list of compartment fuel oil tanks with their current status and amount of fuel and/or water is enclosed with this report.

A list of sea chests and outboard underwater blanks is enclosed with their locations is enclosed with this report.

Certificate of Financial Responsibility

The Certificate shall be obtained and shall be on file with the Office of the U.S. Coast Guard National Pollution Funds Center.

Insurance Liability Coverage

A copy of the insurance liability policy is attached with a statement of valuation.

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Contingency Arrangement for Oil Pollution

The standby pollution containment contractors for the route of the transit of the ship and for the shipyard progression are Northeastern Environmental Services and Clean Harbors.

Date of Departure from Fall River & Arrival Port of Boston with Itinerary

It is anticipated that the U.S.S. MASSACHUSETTS (BB-59) will depart Battleship Cove, Fall River, MA on the morning of 4 November 1998 and arrive at Drydock #3, South Boston Marine Industrial Park, South Boston on or about 7-9 November 1998 for a shipyard/drydocking period. Also, see enclosed itinerary provided by Captain Bruce Fisher of Northeast Pilots.

Weather Restrictions

The departure and arrival of the battleship U.S.S. MASSACHUSETTS shall be affected during daylight hours only. Departure of vessel from Fall River, MA will hinge on securing best five day fair weather forecast window for anticipated three day transit time to Boston.

Intentions for Pilotage

Moran Towing will contract for State & Federal pilots for transit of Narragansett Bay and will also arrange to have State & Federal Pilots aboard for arrival in Boston.

Copy of Loadline Certificate

The Museum has applied to MSO Providence for a waiver from the requirement for a Temporary Loadline Certificate.

Towing Coefficients for Determining Tug Type & Horsepower

The following revised coefficients are for determining the size tug to be used for the tow of the ship around to Boston. Coefficients were pulled from the *U.S. Navy Towing Manual*:

1.) Class Ship:	BB
2.) Tow displacement (per mean draft of 28' 09" on C & R drawing 327528 Displacement & other Curves):	35,400 tons
3. Frontal windage area (At):	8,500 sq. ft.
4.) Wind drag coefficient (CW):	.70
5.) Total projected area of propellers (Ap):	776 sq. ft.
6.) Curve number for hull resistance (RH/^):	5
7.) Curve number for sea state resistance (Rs):	3
8.) Beaufort number (wind):	7 (28-33 knots)
9.) Relative wind speed (Vr):	36 (33 knot wind & 3 knot SOG)
10.) Heading coefficient (K):	1.0
11.) Sea state resistance (Rs):	62,000 lbs.
12.) Tow speed (Vtow):	3 knots
13.) Tow course:	Various
14.) RH/^:	.2

Towing Coefficients for Determining Tug Type & Horsepower (cont.)

15.) Hull resistance (Rh): (1.25 x .2 x 35,400)	8,850 lbs.
16.) Propellor resistance (Rp): (3.737 x 776 x 9)	26,099 lbs.
17.) Wind resistance (Rw2): (0.00506 x .7 x 8500 x 1 x 1,296)	39,019 lbs.
18.) Total steady state tow resistance (Rt): (62,000 + 8,850 + 26,099 + 39019)	135,968 lbs.
19.) Tow hawser resistance:	13,597 lbs.
20.) Total tow hawser tension:	149,896 lbs.

Based on the total tow hawser figure in #20 and Figure 6-1 (which corresponds closely to an ATS-1 Class tug of 6,000 SHP), I recommend a primary towing tug of 6,000 SHP. We are also sailing with a 3,000 SHP twin screw trailing tug which may augment the primary tug in an emergency.

Speed of Tow, Towboat Data

It is anticipated that the speed of advance of the tow will be 3-6 knots.

The vessel data for the towing unit is as follows:

NAME: ESTER MORAN
TYPE: Twin Screw Diesel Steel Tug
Clutch Drive w/ Fixed Upper Pilothouse
OWNER: Moran Towing Corp.
OFFICIAL NO.: 292910
HULL NO.: 417
PORT OF REGISTRY: New York, NY
ABS CLASS: +A-1 Towing Service
AMS
BUILDER: Jakobson Shipyard
Oyster bay, NY
YEAR: 1953
GROSS TONS: 426
NET TONS: 106
DIMENSIONS: LOA: 120' 00"
Breadth: 31' 06"
Molded depth: 14' 06"
Loaded draft: 17' 06"
Light draft: 11' 06"
ENGINES: (2) EMD 16-645E7 diesels
BHP: 5,750 (continuous) 6,300 (intermittent)
SHP: 5,500 (continuous) 6,160 (intermittent)
FUEL CAPACITY: 52,000 gallons
FUEL CONSUMPTION: 3,850 gal/day @ 75% on coast
LUBE CAPACITY: 964 gallons
ACCOMMODATIONS: 16
CALL LETTERS: WTC-6454
AIR DRAFT: Main P/H 24' 06" @ 13' 06" Fwd/16' Aft
Upper P/H 33' 09" @ 13' 06" Fwd/16' Aft
TOW WINCH: Almon A. Johnson w/ 2 1/4" x 3000' 6 x
19 steel tow line

Towboat Data

The following tow gear will be utilized by the ESTER MORAN for the tow of the U.S.S. MASSACHUSETTS:

- (2) 90' X 2.50" ABS Grade 3 Certified tow chain for bridle
- (1) #2 fish plate (242.5 ton)
- (1) 45' X 2.50" ABS Grade 3 Certified tow chain for tow pennant
- (2) 2 1/4" x 45' wire pennants with closed tow sockets on each end (ABS certified)
- (7) 2 1/4" (71 ton) Certified & tested tow shackles.

Emergency tow gear includes:

- (2) 90' x 2 1/4" Certified Tow Pennant w/ closed socket on each end.
- (3) 2 1/4" 71 ton Certified towing shackle
- (1) 600' x 6" poly float line to retrieve emergency gear
- (1) Float buoy to be connected to end of float line with emergency line rigged on the bow of the ship and led aft.
- (1) Towing diamond
- (1) Set of running lights to conform to COLREGS
- (2) 40' pilot ladders.

A set of drawings detailing the proposed towing jewelry was prepared by Capt. Igor Loch, Jr. of Moran Towing Corporation and is enclosed within this report.



Tug 'ESTER MORAN'

Member SAMS, ABYC, HNSA & SNAME

Towboat Data

The assist towing vessel that will accompany the ESTER MORAN will either be the JUDY MORAN or CAPE CHARLES, both sister vessels; their nomenclature (powerplants, towing equipment, crews, etc.) are identical and are as follows:

NAME:	JUDY MORAN
TYPE:	Twin Screw Diesel Steel Tug Clutch Drive
OWNER:	Moran Towing Corp.
OFFICIAL NO.:	545094
HULL NO.:	177
PORT OF REGISTRY:	Wilmington, DE
ABS CLASS:	+A-1 Towing Service AMS
BUILDER:	McDermott Shipyard Morgan City, LA
YEAR:	1972
GROSS TONS:	275.97 Domestic 350 International
NET TONS:	187 Domestic 105 International
DIMENSIONS:	LOA: 107' 02" Breadth: 31' 00" Molded depth: 12' 04" Loaded draft: 14' 03"
ENGINES:	(2) EMD 12-645E2 diesels
BHP:	3,000 (continuous) 3,300 (intermittent)
SHP:	2,900 (continuous)
FUEL CAPACITY:	53,800 gallons
FUEL CONSUMPTION:	2,380 gal/day or 99 gal./hr. harbor 2,900 gal/day or 162 gal/hr. on coast
ACCOMODATIONS:	12
CALL LETTERS:	WYN-6274
AIR DRAFT:	Mast up 52' 06", Down 34' 00" @ 12' 00" Fwd/5' Aft
TOW WINCH:	Markey w/ 2" x 2,300' 6 x 19 steel tow line

Towboat Data



Tug 'CAPE CHARLES'.

Tugs to be used in assisting towing vessel in Fall River include:

- 1.) 'RELIANCE' 3,00 SHP, 90,000 lbs. bollard pull. Twin Screw Steel Tug.
Official No.: 556877, Gross tons: 231 Net Tons: 157
Built: 1974 Jakobson Shipyard, Oyster Bay, NY
LOA: 92.5' Beam: 28.0' Draft: 11.7'
- 2.) 'RESOLUTE' 3,000 SHP 90,000 lbs. bollard pull. Twin Screw Steel Tug
Official No.: 561972, Gross tons: 231 Net Tons: 157
Built: 1975 Jakobson Shipyard, Oyster Bay, NY
LOA: 92.5' Beam: 28.0' Draft: 11.7'
- 3.) 'ROGER WILLIAMS' 2,400 SHP, 72,000 lbs. bollard pull. Single Screw Steel Tug.
Official No.: 280540, Gross tons: 196 Net Tons: 133
Built: 1960 Blount Marine, Warren, RI
LOA: 95.1' Beam: 26.0' Draft: 12.4'
- 4.) 'GASPEE', 1,800 SHP, 54,000 lbs. bollard pull. Single Screw Steel Tug.
Official No.: 239432, Gross tons: 201 Net Tons: 136
Built: 1940 Providence, RI
LOA: 94.0' Beam: 24.1' Draft: 14.3'

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Towboat Data

- 5.) 'LEOPARD' 1,200 SHP, 36,000 lbs. bollard pull, Single Screw Steel Tug.
Official No.: 243953, Gross tons: 146 Net Tons: 99
Built: 1943 George Lawley Shipyard, Neponset, MA.
LOA: 81.1' Beam: 24.0' Draft: 9.8'

All tugs were inspected and found in operational condition with good working ship assist lines, orderly engine rooms and qualified wheelhouse/deck/engineering personnel. The above named vessels belong to Providence Steamboat Co., 1 India Street, Providence, RI 02903 401-331-1931.

- 6.) 'PUMA' 1,530 HP, 45,900 lbs. bollard pull, Twin Screw Steel Tug.
Official No.: 288578, Gross tons: 224 Net Tons: 152
Built: 1962 Diamond Manuf. Corp., Savannah, Georgia
LOA: 92.4' Beam: 27.0' Draft: 12.0'

- 7.) "TOWMASTER" 2,260 HP, 67,800 lbs. bollard pull, Single Screw Steel Tug.
Official No.: 263099, Gross tons: 181 Net Tons: 123
Built: 1952
LOA: 94.1' Beam: 25.1' Draft: 10.0'

All tugs were inspected and found in operational condition with good working ship assist lines, orderly engine rooms and qualified wheelhouse/deck/engineering personnel. The above named vessels belong to Massachusetts Towing Co. Inc., 1 Shaw Street, P.O. Box 306, Fall River, MA 02724 508-679-2581

Tugs to be used in assisting vessel in Boston include:

- 1.) 'HAROLD REINAUER', 3,000 HP, 86,000 lbs. bollard pull, Twin Screw Steel Tug.
Official No.: 537964, Gross tons: 181 Net Tons: 123
Built: 1972 Southern Shipbuilding, Slidell, LA
LOA: 89.5' Beam: 28.0' Draft: 14.4'
- 2.) 'VINCENT TIBBETTS II' 3000 SHP 86,000 lbs. bollard pull. Twin Screw Steel Tug
Official No.: 539033, Gross tons: 181 Net Tons: 123
Built: 1972 Southern Shipbuilding, Slidell, LA
LOA: 89.5' Beam: 28.0' Draft: 14.4'

Towboat Data

- 3.) 'H.J. REINAUER' 2000 SHP 62,000 lbs. bollard pull. Single Screw Kort Nozzle Steel Tug
Official No.: 611109, Gross tons: 198 Net Tons: 134
Built: 1979 Jakobson Shipyard, Oyster Bay, NY
LOA: 94.4' Beam: 29.0' Draft: 13.5'

- 4.) 'ETHEL TIBBETTS' 1600 SHP 40,000 lbs. bollard pull. Single Screw Steel Tug.
Official No.: 274347, Gross tons: 259 Net Tons: 176
Built: 1957 Jakobson Shipyard, Oyster Bay, NY
LOA: 100.0' Beam: 27.1' Draft: 12.8'

All tugs were inspected and found in operational condition with good working ship assist lines, orderly engine rooms and qualified wheelhouse/deck/engineering personnel. The above named vessels belong to Boston Towing & Transportation, 36 New Street, East Boston, MA 02128 617-567-9100

MSO Inspection Prior to Arrival in Boston

It is anticipated that the towing vessel will contact MSO Boston 24 hours prior to arrival and make arrangements for inspection of the vessel prior to entering Boston Harbor.

Intentions for Survey of Towing Preparations

This surveyor will be on hand for the inspection of the towing preparations at the request of the Underwriter and the USS Massachusetts Memorial Committee at the vessel's berth at Fall River.

Watertight Integrity, Steering Gear & Main Shaft Locking Arrangements

The vessel has had all hatches and watertight doors closed throughout the vessel. All topside hatches, piping, and portholes have been secured for sea. All loose topside gear have been secured (crane, fueling rigs, etc.) to prevent movement while underway.

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Watertight Integrity, Steering Gear & Main Shaft Locking Arrangements (cont.)

The two steering gear rooms have each had their pair of hydraulic rams positively locked by the installations of two (2) 6" x 6" wooden shoring well secured with wedges to welded guards. This method of securing ensures best transmittal of working loads to normal steering gear equipment best able to handle working stresses of rudder(s).

There are no signs of seepage at rudder packing glands.

Watertight Integrity, Steering Gear & Main Shaft Locking Arrangements (cont.)

The four main shafts have been secured from movement by welding 1/2" plate to both the shafts and surrounding structural members. Heavy, robust shaft locking flanges have been installed on all stern tubes and are properly bolted to prevent any movement of the shafts. The flax packing rings have been tightened to the stops. There has been no signs of recent seepage.

Vessel Manning

The vessel will be manned by a 14 man special riding crew during transit to Boston. Details of individuals on this detail are contained within Appendix H within this report.

Emergency Communications

The ESTER MORAN carries the following communications equipment:

- 1.) Cellular phone.
- 2.) Two hand-held VHF radios.
- 3.) Four main VHF radios.
- 4.) One 150W SSB radio
- 5.) One 1KW SSB radio

Provision for Anchoring Vessel

The U.S.S. MASSACHUSETTS currently has her starboard anchor windlass and warping capstan operable with 8 1/2 shots of 3" stud-link chain bent onboard.

Coast Guard Assistance

Arrangements for a 'Moving Safety Zone' will be discussed and applied for from COTP Providence and COTP Boston for departure and arrival.

Intended Trackline of Transit

The intended track of transit consists of the following:

The vessel will depart the Battleship Cove, Fall River, MA on or about 4 November 1998, proceed outbound Narragansett Bay with the tow proceeding directly across to clear the Nantucket Shoals, Cape Cod and arrive in the vicinity of the 'B' buoy off Boston, MA to embark MSO Boston inspection party, docking and harbor pilots, and Boston Towing & Transportation assist tugs prior to arrival at the Drydock #3, South Boston.

Notification to Local COTP upon entry/departure

The COTP will be notified as far as possible in advance of any entry or departure of his zone with at least a 24 hour notice of intentions.

Contacts

COTP PROVIDENCE 401-435-2300
COTP BOSTON 617-223-3025

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Aboard U.S.S. MASSACHUSETTS (508)-678-1100, Fax (508)-678-5597

Captain Ernst M. Cummins, USCG (Ret.)
Executive Director
USS Massachusetts Memorial Committee
Battleship Cove Off. 508-678-1100
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Captain Bruce B. Fisher
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Captain Dave Galman
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Boston Towing & Transportation
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Moran Towing Co. Office (203)-625-7853 Capt. 'Buddy' Cantrelle

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**APPENDIX H
TOW PLAN**

**CHECK-OFF LIST FOR PREPARING
AND
RIGGING A TOW**

Adapted from the U. S. Navy Towing Manual

The following list is used by this surveyor to aid in preparing a tow for sea and acceptance by the towing unit. It lists general requirements, most of which must be completed before the surveyor or underwriter will allow vessel to sail. In special situations, the standards reflected in this list can be relaxed and a calculated risk tow accepted. The towing vessel, owner, underwriter and the surveyor must be in agreement to all calculated risk tows, as they do not relieve them of responsibility or safe practice. Calculated risk tows are not routine.

Vessel being Towed

- 1.) Departure from what activity and port: Battleship Cove
Fall River, Massachusetts
- 2.) Does craft have a fixed rudder or a skeg?: Vessel has twin rudders and twin skegs for a pair of propellers
- 3.) Is Booklet of General Plans available: Yes
- 4.) Are instructions posted in after steering for lining up hydraulic steering systems to hand pump?: Both rudders are centered and locked amidships, but can be manually moved should the need arise.
- 5.) Are plans and date of last drydocking available: Date of last drydocking was in 1952.
- 6.) Were hull thickness recordings taken during last drydocking?: Unknown
By whom and where on file?:
- 7.) Is damage control book, curves of forms or other stability data available: Yes
- 8.) Are ladders available for boarding on both port and starboard sides on the after one third of the tow?: Two pilot ladders are available.

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Vessel being Towed

9.) For unmanned ships with freeboard over 10 feet, are rungs welded to the sides?: N/A

Riding Crew

10.) Is a riding crew necessary?: Yes

11.) Which authority has authorized that a riding crew be onboard?: The underwriter.

12.) How many men?: 14

13.) Is there a sufficient number of life rafts onboard with emergency rations and water to accommodate the riding crew in the event they are required to abandon ship?: A 25 man inflatable liferaft will be carried.

14.) Where are they located?: Amidships on 01 Level.

15.) Date life rafts were last tested/inspected: Liferaft has current inflation and inspection certificate.

16.) Are life jackets and life rings aboard?: Yes

17.) How many and what type?: 15 type I life jackets (PFDs) and two 30" type IV liferings with lines.

18.) Date last tested/inspected: Currently inspected

19.) Are at least two P-250s and/or other dewatering and all other necessary firefighting equipment onboard and is there sufficient quantity of fuel supplied for pumps?: Yes.

20.) Is storage of fuel adequate?: Yes.

21.) What means of communications with the towing ship will be provided?:
a.) Station VHF radio
b.) Hand-held VHF radios

Towing Plan (cont.)

Riding Crew (cont.)

22.) Provide list of riding crew:

Captain Ernst Cummings, Executive Director
John Nancizo, Licensed Electrician
John St. Laurant, Volunteer
Joseph Lombardi, Marine Surveyor
Kenneth Preble, Ship's First Lt.
Chris Nardi, Volunteer
Peter O'Farell, Volunteer
Armand Vigeant, Volunteer
Paul Gosselin, USN Damage Control Expert
Richard Ross, Volunteer
Kevin LaFrance, Cook
Maurice Crotteau, Licensed Electrician
Harold Nye, Volunteer
Marvin Mortans, Volunteer

23.) Is the riding crew thoroughly trained in emergency/damage control and support procedures for the vessel being towed?: Yes.

Seaworthiness

24.) Is the craft in proper trim?: Yes.

(Note: For a ship/craft to be in proper trim for towing, it should draw approximately one foot more water aft than it does forward for each 100 feet of length. Deep draft tows use somewhat less than one foot. Before trimming excessively, ensure that drafts obtained will allow sufficient clearing of bottom at point of departure, transit, and at point of delivery, and that the stability of tow is not impaired.)

25.) Will craft require ballast?: No.

26.) If so, what type of ballast?: N/A

27.) Describe where ballast will be placed and how much: N/A

Towing Plan (cont.)

Seaworthiness

- 28.) Draft after craft is in proper trim:
Fwd: 25' 02"
Aft: 32' 04"
Max. navigational draft: 35' 00" Controlling depth Boston Harbor.
- 29.) GM after craft is in proper trim: 8.94 Complete ship's calculated data is in preceding pages.
- 30.) Are all sea valves closed and wired shut?: Yes
- 31.) Is there a two valve protection from the sea for all sea openings?: Yes
- 32.) Is a list of sea valves attached?: Yes
- (Note: Two valve protection consists of either two valves wired shut or one valve and a blank flange.)
- 33.) Closely inspect below decks all drain piping which originates above the waterline and terminates within 20 feet of the waterline. Are there any loose connections or badly deteriorated spots in the piping?: No.
- 34.) Are all sounding tubes capped?: Yes
- 35.) Is a list of sounding tubes attached?: Yes
- 36.) Are all between tank sluice valves closed?: Yes
- 37.) Are all normally dry compartments dry?: Yes
- 38.) Are all bilges free of oil and water?: Yes
- 39.) Are there any broken, cracked or weak frames, longitudinals, plates, welds or rivets?: No.
- 40.) Have repairs been made: Yes.
- 41.) What type(s) of inspection was/were conducted and where?: A complete inspection of all interior spaces and voids was conducted by ship's company and the surveyor.

Towing Plan (cont.)

Seaworthiness

- 42.) Has steel wire or cable been used to secure all equipment to prevent movement in heavy weather?: Yes.
- 43.) Is/are the rudder(s) locked?: Yes.
(Note: The rudder(s) should be locked by using a structural steel of acceptable size and quantity. The lock should transfer the rudder load from the yoke to structural members of the tow's hull.
- 44.) What type of locking device is used?: Heavy wood shoring is well wedged with steel supports to lock the pair of rudders in a fore and aft position. Also, a heavy steel bar has been welded across the hydraulic cylinders for both rudders precluding movement.
- 45.) Is/are the propellers removed?: No. Propellers are onboard.
- 46.) Are shafts equipped with extra rings of packing in the gland to allow emergency repair during transit, and is the gland tightened to its tightest position?: Yes.
- 47.) Ensure that there is no leakoff at the stern tube. Can the stern tube packing gland be tightened at least two more inches before it is two-blocked?:
Packing glands are two blocked at this time.
- 48.) Are locking nuts tight on packing glands to prevent their backing off?: Yes.
- 49.) Are all portholes sealed and covered with metal to prevent breakage?: Yes.
- 50.) Are all vents subject to heavy weather flooding (e.g. air, fresh water, fuel tanks, etc.) sealed?: Yes.
(Note: Wood covers are not considered adequate.)
- 51.) Are all hatches, scuttles, doors and other watertight closures provided with pliable gaskets?: Yes.
- 52.) Have weather decks and main transverse bulkhead watertight closures been chalk tested?: Yes.
- 53.) Are all dogs on watertight closures operable and functioning as designed:
Yes.

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Towing Plan (cont.)

Seaworthiness

- 54.) Are all main spaces accessible for adequate dewatering capability?: Yes.
- 55.) Location of pumps/generators/eductors:
- 56.) Amount/location/size of hose:
- 57.) Is adequate fuel available for pumps/generators?: Yes.
- 58.) Is forward one-fifth of craft designed to withstand constant pounding during transit?: Yes.
- 59.) If the craft to be towed is a barge, and inspection reveals signs of serious deterioration, or the barge is suspected of being weakened, it may require shoring; is shoring required?: N/A
- 60.) Is steel 'K' shoring installed on all longitudinals in forward and aft compartments?: N/A
- 61.) Are 1' x 3' international orange stripes painted on the sides of the hull forward, amidships and aft at the water's edge to allow visual inspection for proper trim during transit?: Yes.
- 62.) Are liquid load diagrams and damage control flooding plates available onboard?: Yes.
- 63.) Are damage control inspection routes marked by paint/diagrams?: Yes

Flooding

- 1.) Are amber (lower and red (upper) alarm lights installed?: Yes.
- 2.) Are flooding lights visible from at least 90 degrees and centered forward on the tow (Note: 360 degrees of visibility is preferable for a high-value, escorted tow)?: Yes.
- 3.) Are both the 1 foot and 3 foot flooding alarms lights rigged with two bulbs each?: Yes

Towing Plan (cont.)

Flooding

- 4.) Are flooding alarm lights rigged with a separate battery source?: Yes.
- 5.) Total battery amperage: Unknown.
- 6.) Are flooding alarm lights rigged with flasher-type units?: Yes.
- 7.) Is all wiring connected to sensor indicator lights run below decks insofar as possible?: Yes.
- 8.) Is all wiring secured and protected from chafing and weather damage?: Yes.
- 9.) Are flooding alarms rigged in all major compartments closest to the keel?:
Yes.
- 10.) In large craft or in barges where compartments run athwartships, are flooding alarms rigged on both port and starboard sides?: No, not deemed necessary.
- 11.) Are flooding alarm sensors well secured?: Yes.
- 12.) Is the lower indicator light wire rigged to the 1 foot flooding alarm sensors?:
Yes.
- 13.) Is the upper indicator light wire rigged to the 3 foot flooding alarm sensors?:
Yes.
- 14.) Are the batteries secured for heavy weather?: Yes

Navigation

- 1.) Are proper navigation lights installed for towing and towed unit? Yes.
- 2.) Is each light rigged with two bulbs per CFR?: Yes.
- 3.) Is the tow equipped with a solar switch or time switch?: Manually operated switch.

Towing Plan (cont.)

Navigation

- 4.) Is the battery ventilation sufficient?: Total amperage:
(Note: Sufficient battery amperage must be calculated and available to cover the following:
- a.) Wattage of the bulbs serviced.
 - b.) Distance of bulbs from battery resistance.
 - c.) Duration of tow (taking into account solar/time switch and length of the period of darkness.)

Cargo

- 1.) Will craft have cargo aboard?: No.
- 2.) If liquid cargo, give location and type: N/A
- 3.) Is solid cargo stowed below the main deck secured in position?: N/A
- 4.) Is solid cargo stowed topside secured properly?: N/A
- 5.) Will cargo stowed onboard adversely affect stability of the craft?: N/A
(Note: If so, revise stability calculations in 'Seaworthiness' section of this list.)
- 6.) Has a manifest of all cargo been prepared for the towing ship?: N/A
- 7.) What type of fuel and amount/s are aboard?:
- Total on hand this report: 86,185 gallons Naval Special Fuel Oil & #2 Fuel Oil
Total on hand this report: 29,839 gallons water
Percent on hand (based on 1,974,070 gallons capacity): 4.37 %
- 8.) Where is fuel aboard?: See enclosed list of compartments with oil and water inventory.
- 9.) If vessel is over 300 gross tons, has a Certificate of Financial Responsibility been obtained?: Yes.

Towing Plan (cont.)

Towing Gear

- 1.) Have towing attachments points and fairleads (including chocks/bullnose) been non-destructively tested?: Yes.
- 2.) Date of last test: 19 September 1998
- 3.) Test procedures used: An K-B ultrasonic flaw detector was utilized to check towing eyes, bits and chocks.
- 4.) Has all chain in the towing bridle been measured in accordance with NSTM 581 and/or the US Navy Towing Manual?: Yes.
(Note: The towing bridle is normally chain on all ocean tows. On some service craft, especially barges, wire is successfully used. Wire should be used with extreme caution, due to problems with chafing.)
- 5.) Is the towing bridle of sufficient size and length?: Yes. See enclosed tow equipment coefficients.

(Note: The following restrictions apply:

- a.) For service craft up to 500 tons, no less than 1 1/4" chain.
 - b.) For service craft above 500 tons, no less than 1 5/8" chain.
 - c.) For ships, the bridle must be equal in size to the ship's anchor chain, but not less than 1 1/4".
 - d.) Non-magnetic chain and attachment hardware will not be permitted for towing bridles.
 - e.) The length of each leg of the bridle from the towing attachment point to the flounder plate after rigging is completed must be equal to or greater than the horizontal distance between the attachment points.
 - f.) A bridle apex angle should be between 30-60 degrees, with 60 degrees the optimal angle.
- 6.) Are the bridle legs of the same size chain/wire and equal in length when rigging is completed?: Yes. Link count: 107 links per shot (90°).

(Note: To ensure accuracy, counting links prior to rigging and painting bench marks is the only positive method. Total links per bridle leg should be equal at the attachment point on the tow.

- 7.) If a wire bridle is used, is there a chafe point on the tow?: N/A

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Towing Plan (cont.)

Towing Gear

- 8.) If towing pads do not exist and cleats and bitts must be used, are they substantial enough to handle the strain of towing?: Yes.
- 9.) Are fairlead chocks and/or bullnose substantial enough to handle strain of towing?: Yes.
- 10.) Is the deck area surrounding bitts or cleats in good condition?: Yes. All tow pads, deck and supporting beams, bitts and fairleads have been flaw detected with no outstanding problems noted at time of survey.
- 11.) Is the two bridle fairlead angle sufficiently straight to preclude excessive side loading to fairlead points?: Yes.
- 12.) If mooring bitts are used, state the condition of bitts and surrounding deck area: Bitts and adjacent roller chock are in excellent condition.
- 13.) All towing bridles, when rigged correctly, must have a backup securing system. This is normally accomplished using wire rope of appropriate size (able to lace through chain links) and taking sufficient bights of wire from a second securing point and lacing the wire rope through the after ends of links in the chain bridle (no less than four bights). Size and number of bights of wire should equal the strength of the chain used for the bridle. If a towing pad is used to connect the bridle to the tow, the backup wires must be laced forward of the towing pads. If a set of mooring bitts is used as a securing point for the bridle on the tow, the wire should be laced through the chain links that remain astern of the bitts after the three or more "figure eights" are secured on the bitts.

There must be at least 3X diameter plus one wire clip on each bitter end of the backup wire, aligned in the same direction with "U" on bitter end side placed 6 rope diameters apart. Is the towing bridle rigged as stated above?:
No.

- 14.) Type of backup cleats, bitts, padeyes: N/A
- 15.) Distance from towing pad or bitts to backup point: N/A

Towing Plan (cont.)

Towing Gear

- 16.) If mooring bitts are used, with sufficient strength to withstand the entire towing load, does the towing bridle have a round turn followed by three or more complete "figure eights" around bitts before the end of the chain is laced with backup wires?: N/A
- 17.) Has all slack been taken out of the "figure eights"?: N/A
- 18.) In most cases, the bridle legs are run through closed chocks before being connected to the towing pads or bitts. The lead angle from the connecting point to the chocks must be fairly straight to prevent bending and failure of the chain where it passes through the chock. Does the towing rig conform to the above?: Yes.
- 19.) Is there sufficient and adequate metal thickness at all potential chafing points to prevent the bridle from cutting into chocks, gunwale or hull?: Yes.
- 20.) If mooring bitts are used as bridle attachments points, heavy channel iron must be welded across the bitts to prevent the chain from jumping out. Has this been accomplished?: N/A
- 21.) Is the size of the bridle retrieving pendant adequate (i.e., providing a 4:1 safety factor in lifting bridle weight, but no less than 5/8" wire rope)?:
Yes.
- 22.) Is there an adequate number of wire clips securing the retrieving pendant (3 x diameter of wire plus 1)?: Yes.
- 23.) When attached from the bow of the tow to the flounder plate, is there sufficient slack to allow the retrieving pendant to droop slightly with no strain when the unit is being towed?: Yes.
- 24.) Are flounder plates and plate shackles of approved design and rigged in accordance to the U.S. Navy Towing Manual?: Yes.
- 25.) If there is a clearance in excess of 1/16" in securing pins in plate shackles, flounder plates and other towing jewelry, the rig is unacceptable. Is the towing jewelry within acceptable limits?: Yes.

Towing Plan (cont.)

Towing Gear

- 26.) All plate and safety shackle pin nuts must be locked with a minimum 5/16" machine bolt through a drilled hole in the plate shackle nut and pin. Secure the machine bolt in place with jam nuts. Has this been accomplished?: Yes.
- 27.) Lateral movement must be removed from the plate shackle connections by using washers or welding bosses on the plates. Has this been accomplished?: Yes.
- 28.) If multiple tows are planned, and you are the preparing activity, is there sufficient equipment available to rig and stream the appropriate towing method? Is there sufficient quantity of proper gear aboard?: N/A
- 29.) Does towing and towed vessel have the equipment onboard to anchor in 60 feet of water with at least a ratio of 3:1, scope to depth?: Yes.
- 30.) Is anchor and rode of sufficient size?: Yes.
- 31.) Has the anchor windlass brake been tested?: Yes.
- 32.) If plans have been made to anchor the tow at port of delivery, is power available to raise the anchor?: Yes.
- 33.) Major ocean tows are normally rigged with a secondary emergency towing system to recover tow in case of failure of the primary system. Is such a system rigged?: Yes.
- 34.) Are the secondary towing system's attachment and fairlead points adequate to tow the vessel?: Yes.
- 35.) Is adequate chafing protection provided for the vessel's primary and secondary towing system?: Yes.
- 36.) Is the secondary towing pendant at least 1 5/8" wire rope?: Yes.
- 37.) Are the stops sufficient to hold in heavy weather, but accessible to allow cutting and light enough to be broken without damaging the towing pendant or tow?: Yes.
- 38.) Will the secondary pendant fall free without turns that will cause kinking as they pull out?: Yes.

Towing Plan (cont.)

Towing Gear

- 39.) Is the secondary towing pendant fitted with a synthetic line messenger to facilitate passing it to the tug?: Yes.
- 40.) If the tow is unmanned, is a polypropylene floating retrieval line attached to the end of the messenger with a small buoy secured at its end?: Yes.

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TOW GEAR COEFFICIENTS

The following tow gear (which is provided by Moran Towing Corp.) has been analyzed for strength, safe working loads and safety factors utilizing the U.S. Navy Towing Manual (USNTM) and Tugs, Towboats and Towing (TTT) by Edward M. Brady, Cornell Maritime Press, 1979. A safety factor of 3 has been utilized for the purposes of this tow.

MAXIMUM TOWED VESSEL WORKING LOAD: 149,896 lbs.
(Reference: Appendix G, Calculations for Tow Resistance, USNTM)

PRIMARY TOW GEAR

1.) Tow Hawser:

Type: 2 1/4" 6 x 37 Extra Improved Plow Steel
Safety factor for long scope Automatic Tension control winch: 3
Nominal Breaking Strength: 444,600 lbs.
Reference: Table 6-3 Chapter 6 (USNTM)

2.) Chain (bridle):

Type: 2 1/2" ABS Class III Grade B Commercial Stud Link Anchor Chain
Recommended Safe Working Load: 121,400 lbs.
Proof Load: 484,000 lbs.
Breaking Load: 692,000 lbs. (minimum)
Weight per shot: 5,270 lbs.
Links per shot: 107
Reference: Table D-3, Appendix #9 (USNTM)

3.) Shackles (bridle):

Type 2 1/2" Grade B
Recommended safe working load: 142,000 lbs.
Proof load: 303,500 lbs.
Breaking loads: 607,000 lbs. (minimum)
Reference: Table D-9, Appendix D (USNTM)

PRIMARY TOW GEAR (cont.)

4.) Wire Pendants (bridle) (2 x 2 1/4" x 45'):

Type: 2 1/4" 6 x 37 Extra Improved Plow Steel
Safety factor for long scope Automatic Tension control winch: 3
Nominal Breaking Strength: 444,600 lbs.
Reference: Table 6-3 Chapter 6 (USNTM)

EMERGENCY TOW GEAR

1.) Wire Pendants (1 x 2 1/4" x 45'):

Type: 2 1/4" 6 x 37 Extra Improved Plow Steel
Safety factor for long scope Automatic Tension control winch: 3
Nominal Breaking Strength: 444,600 lbs.
Reference: Table 6-3 Chapter 6 (USNTM)

2.) Shackles:

Type 2 1/2" Grade B
Recommended safe working load: 142,000 lbs.
Proof load: 303,500 lbs.
Breaking loads: 607,000 lbs. (minimum)
Reference: Table D-9, Appendix D (USNTM)

3.) Bits:

Type: 18" Double USN
Recommended safe working loads: 375,000 lbs.

CONDITIONS/RECOMMENDATIONS FOR TUG, TOW, TOWAGE & STOWAGE ARRANGEMENTS

The following conditions/recommendations are made in order for this tow to be accomplished and were agreed to by all parties prior to the departure of the tow:

- 1.) That tow operate in weather conditions as follows:
 - a.) That towing vessel and towed vessel seek best five (5) day weather window for anticipated length of transit around Nantucket and Cape Cod.
 - b.) That the towing master take all precautions regarding the towed vessel's safety during the transit. That the towing master shall seek the best course and speed to alleviate any undue stress on towed vessel and tow gear.
 - c.) That towing master shall fulfill the orders of the embarked Coast Pilot.
- 2.) That all wheelhouse personnel shall be properly licensed.
- 3.) That tugmaster shall maintain towing bridle and hawser arrangement as currently made up at time of departure.
- 4.) That a minimum of 15 personnel are manning towed vessel throughout voyage with all required safety gear.
- 5.) That tug and tow shall proceed from: See enclosed Coast Pilot's Itinerary.
- 6.) All lower deck 5" 38 guns must be fixed in a fore and aft position.
- 7.) All items below in the aforementioned structural hull survey must be complied with and completed before departure of tow.

SAND LOCKER, BOSUN STORES AND PEAK BALLAST TANK, FRAMES # 0 through 5.

All spaces in excellent structural condition with dry bilges. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets.

CREW'S BERTHING, PARAVANE STORES, S.D. STORES, PAINT & OIL MIXING ROOM, S.D. OIL INFLAM LIQUIDS STOWAGE ROOMS, FRAMES # 5-10

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Some fallen asbestos lagging. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets.

CREW'S BERTHING, CREW'S HEADS, S.D. STORES, FRAMES 10-17

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Much fallen asbestos lagging. Secure all loose gear for sea. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets.

CREW'S BERTHING, CREW'S HEADS, S.D. STORES, FRAMES 17-24

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Much fallen asbestos lagging. Secure all loose gear for sea. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets.

CREW'S BERTHING, ANCHOR WINDLASS MACHINERY, WINDLASS ROOM, S.D. STORES, PUMP ROOM A-609-E, FRAMES 24-31

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports.

Anchor windlass room has standing hydraulic oil on deck. Port anchor windlass electric controls missing. Pump room has blanked off pump intake and discharge valve with much disconnected piping. Small amounts of standing NSF oil on deck and valves.

FAN ROOMS, CREW'S BERTHING, MESS ATTENDANTS BERTHING, MAIN ISSUE ROOM, S.D. STORES, CHAIN LOCKERS, FRAMES 31-36

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports.

Chain lockers (two bins) empty of chain with pelican hooks attached to deadeyes on longitudinal centerline bulkhead.

TURRET #1, POWDER HANDLING ROOMS, 16-INCH PROJECTILE HANDLING ROOMS, FRAMES 36-46 1/2

All spaces in excellent structural condition with minimal standing water at base of turret; water is from area around rifles where bucklers are holed or not secured properly. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Minor amounts of hydraulic oil on decks. Dummy rounds well secured on turret walls.

MARINE BERTHING, STATEROOMS, CREW'S BERTHING, AIR CONDITIONING MACHINERY SPACE, 20 MM MAGAZINE, SICKBAY, 16-INCH POWDER MAGAZINES, WIRING TRUNKS, FRAMES 36-53

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports.

TURRET #2, POWDER HANDLING ROOMS, 16-INCH PROJECTILE HANDLING ROOMS, FRAMES 53-65

All spaces in excellent structural condition with minimal standing water at base of turret; water is from area around rifles where bucklers are holed or not secured properly. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Minor amounts of hydraulic oil on decks. Dummy rounds well secured on turret walls.

CREW'S BERTHING, DENTAL OFFICES, AC COMPRESSOR ROOM, DISPENSARY, CLERICAL OFFICE, SICKBAY, 16-INCH POWDER MAGAZINES, WIRING TRUNKS, FRAMES 53-65

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

CREW'S BERTHING, ELECTRICAL STORES, FAN ROOMS, STATEROOMS, CIC, CODING ROOM, RADIO CENTRAL, DAMAGE CONTROL STATION, CENTRAL CONTROL, REPAIR LOCKERS, FORWARD BATTERY PLOTTING ROOM, I.C. ROOM, FORWARD MAIN POWER DISTRIBUTION ROOM, EVAPORATING & DISTILLING ROOM, FORWARD EMERGENCY DIESEL GENERATING ROOM, FRAMES 65-73

All spaces in excellent structural condition with dry bilges. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

CREW'S BERTHING, OFFICER'S GALLEY, CAPTAIN'S OFFICE, UPTAKE ROOMS, 5" POWDER MAGAZINES, 40 MM MAGAZINES, 5" PROJECTILE HANDLING ROOMS, FRAMES 73-83

All spaces in excellent structural condition. Much standing dirt and paint scale in uptake spaces. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

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CREW'S BERTHING, ENGINEER STORES, BLACKSMITH & COPPERSMITH SHOPS, SUPPLY OFFICE, UPTAKE ROOMS, 5" PROJECTILE HANDLING ROOMS, 5" POWDER MAGAZINES, FRAMES 83-93

All spaces in excellent structural condition. Much standing dirt and paint scale in uptake spaces. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

ENGINEER'S OFFICE, BAKERY STORES, CARPENTER SHOP, GUNNERY OFFICE, UPTAKE ROOMS, CREW'S BERTHING, 5" PROJECTILE HANDLING ROOMS, 5" POWDER MAGAZINES, FRAMES 93-103

All spaces in excellent structural condition. Much standing dirt and paint scale in uptake spaces. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

BAKERY, MACHINE SHOP, BUTCHER & LARDER SHOPS, TRASH INCINERATOR, 5" POWDER MAGAZINES, 40 MM MAGAZINES, 5" PROJECTILE HANDLING ROOMS, FRAMES 103-113

All spaces in excellent structural condition. Much standing dirt and paint scale in uptake spaces. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

The engineering spaces are fitted in the midsection of the ship and are staggered to enhance powerplant survivability. Boilers are fitted alternatively to port in B-1 and B-3 to port and in B-2 and B-4 to starboard respectively. B-1 and B-2 service the outboard shafts; B-3 and B-4 service the inboard shafts. B-1 is open to the public with appropriate additional handrails and fencing fitted. All of the engineering spaces are reached via ladders from just above the armored deck. Ample lighting is provided.

MACHINERY ROOM B-1

The upper platform in this fireroom is in excellent cosmetic and structural repair, the lower flat is not open to the public and has the usual cosmetic problems to a lesser degree. There is some standing water and oil in the bilges. Rust and scale are prevalent, destructive removal of equipment has left exposed asbestos, oil and other hazardous material loose about both spaces. There are lead paint issues in this space and correct remediation is the key. Some of the voids have weeping welds on the bottom plating where intake trunks are provided; seal all bottom bolted hatches where fitted adjacent to these voids. Properly weld and seal all bulkhead cut-outs.

MACHINERY ROOM B-2

The upper and lower platforms in this fireroom are in poor cosmetic repair. There is some standing water and oil in the bilges. Rust and scale are prevalent, destructive removal of equipment has left exposed asbestos, oil and other hazardous material loose about both spaces. There are lead paint issues in this space and correct remediation is the key. Oil sumps are full and need remediation. Seal all bottom void hatches. Properly weld and seal all bulkhead cut-outs.

MACHINERY ROOM B-3

The upper and lower platforms in this fireroom are in poor cosmetic repair. There is some standing water and oil in the bilges. Rust and scale are prevalent, destructive removal of equipment has left exposed asbestos, oil and other hazardous material loose about both spaces. There are lead paint issues in this space and correct remediation is the key. Oil sumps are full and need remediation. Seal all bottom void hatches. Properly weld and seal all bulkhead cut-outs.

MACHINERY ROOM B-4

The upper and lower platforms in this fireroom are in poor cosmetic repair. There is some standing water and oil in the bilges. Rust and scale are prevalent, destructive removal of equipment has left exposed asbestos, oil and other hazardous material loose about both spaces. There are lead paint issues in this space and correct remediation is the key. Seal all bottom void hatches. Properly weld and seal all bulkhead cut-outs.

U.S.S. MASSACHUSETTS (BB-59)

CREW'S MESS, BAND ROOM, PROVISION ISSUE RM, VEGETABLE LOCKER, MOVIE LOCKER, CREW'S GALLEY, CREW'S BERTHING, S.D. STORES, 16" POWDER MAGAZINES, 40 MM AMMUNITION MAGAZINES, RADIO TRANSMITTER & MOTOR RM, 20 MM MAGAZINES, AFTER POWER DISTRIBUTION ROOM, AFTER EMERGENCY DIESEL GENERATING RM, FRAMES 113-129

All spaces in excellent structural condition with dry bilges. Minor standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

TURRET #3, POWDER HANDLING ROOMS, 16-INCH PROJECTILE HANDLING ROOMS, FRAMES 119 1/2-124

All spaces in excellent structural condition with minimal standing water at base of turret; water is from area around rifles where bucklers are holed or not secured properly. Much standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Cut-out blanks in bulkheads for DH piping needs to be rewelded. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Minor amounts of hydraulic oil on decks. Dummy rounds well secured on turret walls. Secure spare 40 mm gun barrels.

SHAFT ALLEYS, FRAMES 113-136

These are in excellent structural condition dry bilges. Shafts are properly locked with no signs of leakage at the bronze flax packing glands; shafts also shored against fore and aft movement. There are lead paint issues in these spaces and correct remediation is the key. This is a possible PCB contaminated space and access trunk. The vertical ladder needs new hardware.

CREW'S MESS, CREW'S BERTHING & WASHROOMS, FRUIT & VEGETABLES REEFERS, DRY PROVISION STORAGE, FRAMES 129-136

All spaces in excellent structural condition with dry bilges. Minor standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

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CREW'S MESS, FAN RM, PRINT SHOP, CREW'S BERTHING, TAILOR SHOP, CLOTHING & SMALL STORES, S.D. STORES, ICE MACHINE ROOM, REEFER ROOMS, PROVISION STORAGE ROOMS, CPO LOCKER, CREW'S BERTHING, CPO MESS, CPO LOUNGE, LAUNDRY, COBBLER SHOP, S.D. STORES, C & R STORES, FRAMES 136-161

All spaces in excellent structural condition with minor seepage of water through wasted rivets into bilges on centerline; approximately 200 gallons water total. Minor standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

CPO LOCKERS, AVIATION WORKSHOP, AIRPLANE CRANE MACHINERY ROOM, RADAR ROOMS, MACHINE GUN STORES, AVIATION STOREROOM, AVIATION GASOLINE STORAGE TANK (COMPARTMENT C-437), FRAMES 155 1/2-AFT PERPENDICULAR

All spaces in excellent structural condition with minor seepage of water through plating and machinery on deck, much condensation causing standing water in aft spaces, this must be properly resolved. There is much waste oil (and other goodies) stored in the aviation gas tank; proper remediation is called for. Minor standing dirt and paint scale. Some fallen asbestos lagging. Secure all loose gear for sea. Close all voids, scuttles and hatches before tow. Renew old hatch gaskets. Close all through hull vents, drains and dewatering ports. Secure all exhibits for sea.

OUTBOARD SHAFT SKEGS, FRAME 149

In excellent structural condition, dry bilges. Secure bolted hatch covers.

AFTER STEERING ROOMS, FRAMES 142 1/2-155

No sign of leakage at both bronze flax packing glands. Both rudders have wood shoring to prevent movement. Some standing hydraulic oil and cosmoline surfaces.

TOPSIDE MASTS

Topside masts are constructed of heavy gauge steel and are well anchored to the superstructure; both masts and associated appendages are in good repair; although some of the ladders need additional stiffening hardware.

Remove fore and aft stays. Remove at bolted flanges the foremast and mainmast and all associated appendage to allow vessel to pass safely under the Braga Bridge

Positive means to prevent the public from climbing these appendages has been taken.

01 LEVEL, FRAMES 50-115

Close all topside dogging sideports and hatches, cover all fan room vents with steel dogging ports, renew all wasted or dry rot gaskets on dogging doors. Secure all loose gear for sea.

02 LEVEL, FRAMES 66 1/2-115

Close all topside dogging sideports and hatches, cover all fan room vents with steel dogging ports, renew all wasted or dry rot gaskets on dogging doors. Secure all loose gear for sea. Secure motorboat starboardside aft adjacent to crane. Secure crane boom to superstructure. Secure paint storage rooms (Compartment B-0206M).

03 LEVEL AND ABOVE

Close all topside dogging sideports and hatches, cover all fan room vents with steel dogging ports, renew all wasted or dry rot gaskets on dogging doors. Secure all loose gear for sea.

16-INCH TURRETS (3)

Properly lock turrets on centerline to prevent movement, secure all topside hatches, vents and ports.

5-INCH TURRETS (10)

Properly lock turrets on centerline to prevent movement, secure all topside hatches, vents and ports.

40 MM MOUNTS (13)

Properly lock mounts on centerline to prevent movement.

MAINDECK

The maindeck is flush deck from stem to stern, much work will be necessary to prepare this area for sea. Deck hardware (in way of towing bridle) will need to be thoroughly inspected (magnafluxed) and gauged prior to movement and securing of vessel. Interior structural members are in fine shape with no signs of degradation found.

The maindeck (generally 40 & 60# STS steel) is generally in good repair. However, standing water has been allowed to congregate in under original teak decking; much use of concrete has been done. It is believed that this will be addressed at the shipyard.

Paint coatings on weatherdecks are generally in good condition; however, non-skid areas have been allowed to go untended resulting in rust/scale and creation of potential trip/fall hazards. Also, waterways are frequently blocked with rust/scale, debris and paint chips. Steel stanchions, bronze handrails, and ladders are in need of maintenance on the exterior of the superstructure. Replacement of the pins and secure new chains is required where appropriate.

The following items need addressing on maindeck:

MAINDECK (Forecastle)

Replace gaskets on all foredeck dogging hatches.

Free up roller chocks on forecastle head.

Repair swallow chock to starboard where chain has damaged unit (shipyard).

U.S.S. MASSACHUSETTS (BB-59)

Remove 25,000 # stockless bower anchor or properly secure for sea with additional welded tabbing.

Commission starboard anchor capstan/windlass and port line capstan.

Secure both paravanes stowed in chocks.

Remove port accommodation ladder platform.

Replace gaskets and free-up dogging devices on watertight doors to forward Deck Office. Caulk vertical bulkhead separation where compartment wall meets armored citadel.

Remove handrails, install new gaskets and secure hatch to 2nd deck within Deck Office structure.

Install covers to firemain and fresh water outlets on maindeck.

Secure all 16" turret bucklers/bloomers. Secure/lock all 16" mounts in fore and aft train.

Secure all foredeck vents.

Repair all vent and fan room lips and secure hatches.

PORT & STARBOARD SIDES (maindeck)

Close all dogging ports.

Install new gaskets, install dogging devices and secure all maindeck watertight doors.

Remove fanroom plywood covers and install steel lips and dogging steel covers.

FANTAIL

Close all dogging ports and vents.

Install new gaskets, install dogging devices and secure all maindeck watertight doors.

Remove fanroom plywood covers and install steel lips and dogging steel covers.

Secure accommodation ladder base at port railing. Replace wood bases.

Install new gaskets and secure hatches to 2nd deck. Reinstall watertight hatches where removed.

Install covers to firemain and fresh water outlets on maindeck.

Secure all 16" turret bucklers/bloomers. Secure/lock all 16" mounts in fore and aft train.

Secure all fantail vents.

Lock all 40 mm mounts.

Remove all artifacts for storage.

Properly secure shore power box and cover. Properly blank through-hull openings for telephone, sewerage and fresh water hoses.

Remove A-frame for stern crane and lay boom on deck, properly cradle/secure.

Commission warping capstan and deck winches.

Secure all boat booms and wire strops currently stored under Turret #3.

MAINDECK (interior)

Secure all museum cases and artifacts.

Close all watertight doors and hatches.

Secure galley and wardroom for sea.

HULL (exterior)

Secure all fuel tank covers.

- 8.) That riding crew have the following safety gear: 25 man inflatable liferaft, survival suits, fixed VHF radio station, First Aid Kit, 406 MHz Category I EPIRB, lifelines & Type I PFDs when proceeding on maindeck.

COMMENTS AND SIGNATURE OF ATTENDING SURVEYOR

The battleship Massachusetts has been transformed into a watertight citadel with most of the preparations nearing completion. The towing bridle will be rigged upon arrival of Moran Towing Co.'s tugs on or about the 2nd of November. The undersigned surveyor will be on hand during the rigging of the tow bridle and emergency tow hawser. Ship's power for the trip north will be provided by a 600 Kw 440 V 3 Phase AC diesel generator that will be hooked into the vessel's existing power grid; this unit will arrive next week and be well secured on the fantail.

The Museum staff and contractors have performed miracles in preparing this ship for sea. The surveyor has enjoyed full cooperation from the Museum's staff in completing the rather long list of initial recommendations from the original hull structural survey. A very talented riding crew will attend the battleship on her voyage to Boston with all safety gear aboard.

All recommendations have been complied with and completed.

Additional stability tests, marine engineering and naval architectural analysis are beyond the scope of this survey.



Joseph Lombardi - Marine Surveyor

NOTE: This yacht or workboat survey is issued by the undersigned who has exercised reasonable care in conducting a visual inspection of the accessible areas in connection with a marine survey of the subject vessel. All details and particulars in this report are believed to be true, but are not guaranteed accurate. All judgments, conclusions, and recommendations are expressions of opinion of the undersigned based upon his skill, training, and experience after a routine examination of the vessel and after discussions with owners or others familiar with the vessel. No part of this report is issued as an expressed or implied warranty of the condition of the vessel, of the value of the vessel or of the cost of any repairs. Unless specifically stated otherwise in this report, the undersigned has not removed fasteners, has not removed fixed structures or equipment, and has not disassembled hull or machinery for inspection or testing; therefore this report does not cover latent defects not readily discovered without such removal or disassembly. Unless specifically stated otherwise in this report, the undersigned has not operated the engines, machinery, equipment, or appurtenances. The undersigned has conducted his survey and issued this report for the sole use of the specified requesting party for an agreed fee based upon the intended use of the report and the legal liability of the undersigned; accordingly, others are not to use this report and not to rely upon the contents of this report without payment to the undersigned of an additional agreed fee based upon reevaluation of the same factors; further, the undersigned shall have no liability for consequential damages, no liability for personal injury damages, no liability for property loss damages, and no liability for punitive damages, all of which shall be deemed to have been knowingly and voluntarily waived upon use of this report; further, in no event shall the legal liability of the undersigned for this report ever exceed the fee paid by the requesting party for issuance of this report, regardless of the number of claims or suits and regardless of whether under theory of tort, contract, warranty, products, outrage, or otherwise.

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Ship is turned around in the Taunton River with towing bridle and retrieval lines depicted. Notice towing diamond day shape in rigging.

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Departing Fall River with primary tug 'ESTER MORAN' at short stay.

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Both legs of towing bridle inboard can be seen on foredeck with wire shackled to towing eyes and chain bridle.

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In the sea lanes around Nantucket showing the emergency tow wire strapped to the port side of MASSACHUSETTS.

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U.S.S. MASSACHUSETTS (BB-59)



Tug 'ESTER MORAN' towing battleship MASSACHUSETTS.

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**Excellent view of tow chain bridle and retrieval lines as tug
'ESTER MORAN' commences shortening wire entering Boston Harbor.**

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U.S.S. MASSACHUSETTS (BB-59)



**U.S.S. MASSACHUSETTS snug harbor in Drydock #3
(Commonwealth Drydock), South Boston Naval Annex.**

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