

New Commuter Class Ferry

18-007

Request for Proposals
and Proposal Notices

Vessel Technical Specifications

30 July 2018

Revision A

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Revision Notes

Revision A Change Notes (Includes, but may not be limited to, the following changes):

SWBS Section	Changes
Varies	Remove decimal point SWBS sections.
126	Revised Potable and Sewage tank capacities
200	Specific engine options named.
432	Clarified Scope and linked to Appendix B4
433	Clarified Scope and linked to Appendix B4
436	Changed system specification to integrate with PA system
439	Clarified Scope and linked to Appendix B4
582	Changed mooring line specifications and clarified bitts and cleat locations
583	Clarified life jacket storage requirements
631	Revised non-skid specifications
645	Revised seating specifications and tied to appendix B3
830.2	Removed test phases list, edited text. Added required test table and edited it.
831	Struck factory testing of portholes from list.
832	Deleted detailed description of required QA/testing. Changed title to System Testing, edited text.
835	Edited text and clarified requirements.
836 & 837	Switched order of sections and edited text.
901	Edited text.
902	Edited text.
903	Deleted delivery to CONTR section (doesn't apply).
953	Deleted section.
Varies	Changed plural "Vessels" to singular "vessel".
921	Edited to simplify and clarify requirements.
922-924	922-924 deleted.
Appendix B3	Revised Standard Finishes and descriptions
Appendix B4	Added Standard PA/GA and CCTV Specifications

000 General Requirements

020 PURPOSE

The OWNER seeks a qualified shipyard ("CONTR") to design, construct and deliver one (1) passenger-only ferry vessel ("Vessel") for operation in the San Francisco Bay Area.

030 OWNER'S REQUIREMENTS VS. OWNER'S PREFERENCES

The purpose of the OWNER's Requirements and Preferences is to convey to the CONTR what features and attributes the OWNER seeks in the new Vessel. The CONTR should incorporate these preferences, to the greatest extent possible, into its proposal and associated design submittal.

Certain performance requirements and technical aspects of the design are considered critical and absolute. These shall be referred to as the **OWNER'S REQUIREMENTS**. These requirements are of the highest priority to the OWNER and shall be met to the fullest extent possible, without compromise.

Maintaining commonality across the vessels in the OWNER's fleet is very desirable as it minimizes training requirements and standardizes maintenance and spare parts inventories while minimizing downtime. These common features, equipment and configurations are referred to as the **OWNER'S PREFERENCES**. While not absolute requirements, the desired features described in this document are being provided to assist the CONTR with proposing a Vessel that will integrate with the existing fleet.

For the purpose of this document, OWNER's Requirements are generally preceded by the word "shall" or presented in tabular form. Wherever an equipment manufacturer and/or model number is provided it will be deemed an OWNER Preference.

040 OVERVIEW

The OWNER requires a turn-key Vessel fully complete in every regard, built in compliance with applicable regulatory requirements, inspected and documented by the U.S. Coast Guard and ready for passenger service.

One (1) passenger only 46 CFR Subchapter "K" aluminum catamaran designed and constructed for efficient and reliable ferry service multiple existing and future routes on the San Francisco bay. The vessel is not intended as the primary vessel on any specific route, rather as an alternate vessel that is able to be employed as needed to service any of the designated routes.

In general, the OWNER is seeking a Vessel based on a proven design or parent craft. The overall emphasis should be on functional utility, high quality construction detailing, passenger comfort, ease of maintenance, ease of repair and longevity. High technology systems and equipment containing levels of control and automation that exceed regulatory requirements are neither required nor desired. The Vessel shall contain simple, well-proven, robust equipment and control systems. Vessel start-up procedures are to be based on a single operator performing all daily system checks and tasks within fifteen (15) minutes. Port and starboard hulls should have equipment and system layouts as similar as possible.

The CONTR shall be responsible for developing the design solutions and details consistent with the Technical Specifications and other requirements of the contract, including but not limited to, the identification, provision and installation of all necessary materials and obtaining all regulatory approvals and certifications. The CONTR shall utilize proven marine technology.

The new vessel shall be constructed and finished to the same high standard of recent WETA newbuilds such as the HYDRUS and PYXIS class vessels and recent refits such as the GEMINI class vessels.

Where no particular preference is stated, the CONTR should offer its best standard equipment and installation when considering regulatory requirements, good marine practice, past experience and quality.

050 MISSION

The Vessel shall be operated as a commuter ferry that will serve a varied clientele including local residents and tourists. The primary mission of the vessel is to provide safe, efficient, reliable and comfortable transportation.

060 OPERATIONAL REQUIREMENTS

The vessel will operate in the inner harbor of San Francisco Bay between various combinations of the OWNER's existing and future ferry terminals shown in Section 061. The variation in the routes which range from long-range, high-speed trips to short duration trips with multiple stops. High passenger counts and ever-increasing bicycle ridership present significant operational challenges, which are further described in Sections 061 through 064.

061 ROUTE(S)

The vessel will primarily provide commuter service on a scheduled basis between several inner harbor terminals. The location of these terminals is shown for reference in Figure 061-2. Inner harbor operations present significant operational and reliability challenges due to multiple maneuvering and docking evolutions, short duration high speed segments and intermittent low speed segments. Figures 061-3 through 061-7 show the typical operating profiles for common routes. The required operational profiles can be very demanding on the propulsion machinery and structure.

The CONTR shall take special care during the design of the Vessel and selection of all propulsion machinery to account for any detrimental effects associated with the operating profiles.

	Terminal	Location
1	San Francisco Ferry Terminal	Pier 1, San Francisco
2	Clay Street Terminal	Jack London Square, Oakland
3	Alameda Main Street Terminal	Alameda
4	Harbor Bay Terminal	Bay Farm Island, Alameda
5	South San Francisco Terminal	Oyster Point
6	Richmond Terminal	Richmond
7	Vallejo Terminal	Vallejo

Figure 061-1 WETA Ferry Terminals



Figure 061-2 WETA Ferry Terminals

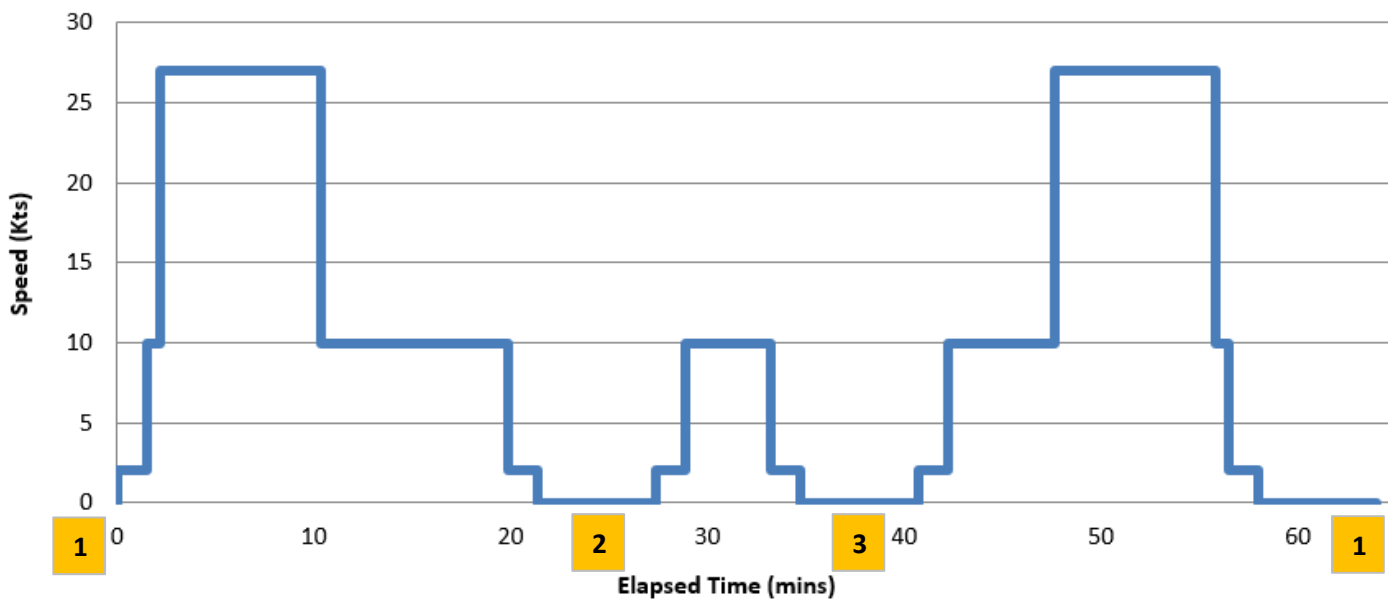


Figure 061-3 Central Bay (SF-Oakland-Alameda Roundtrip)
Yellow boxes indicate terminal, Fig. 061-1

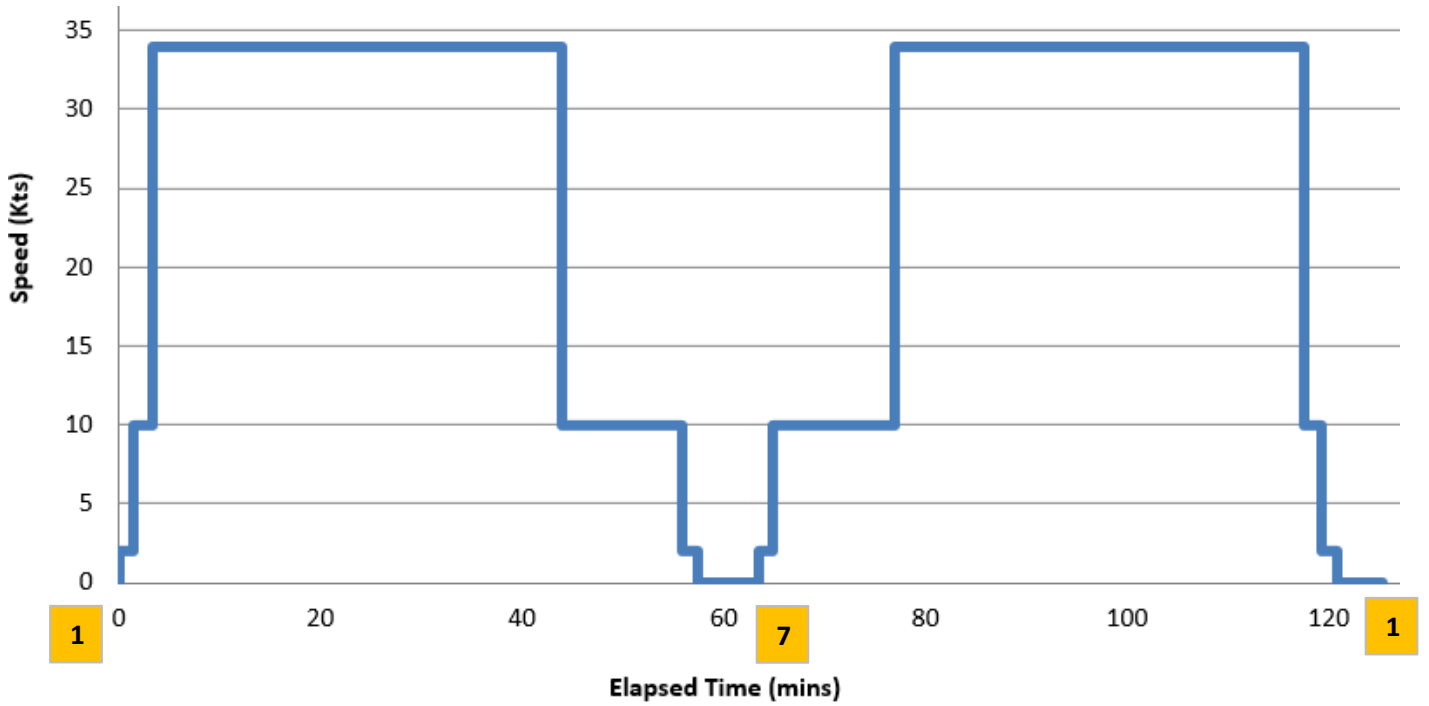


Figure 061-4 – Vallejo (SF-Vallejo Roundtrip)

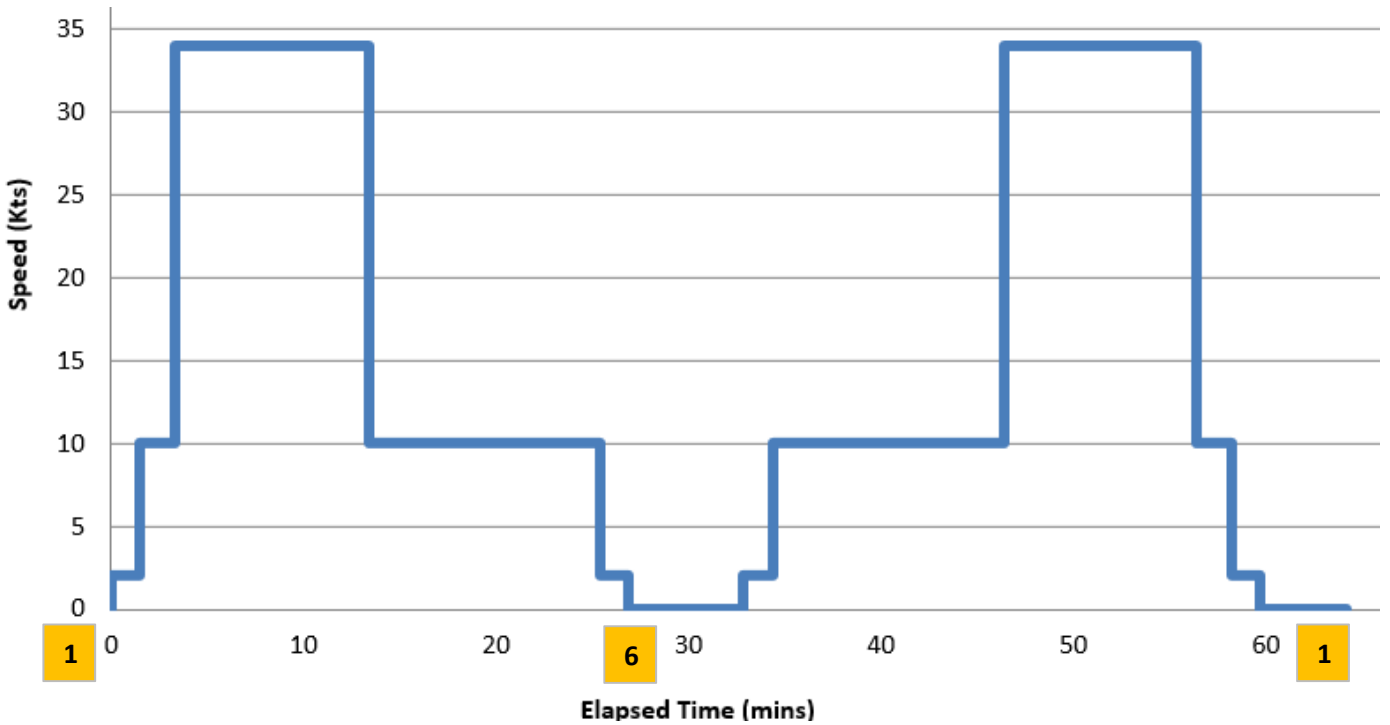


Figure 061-5 – Richmond (SF-Richmond Roundtrip)

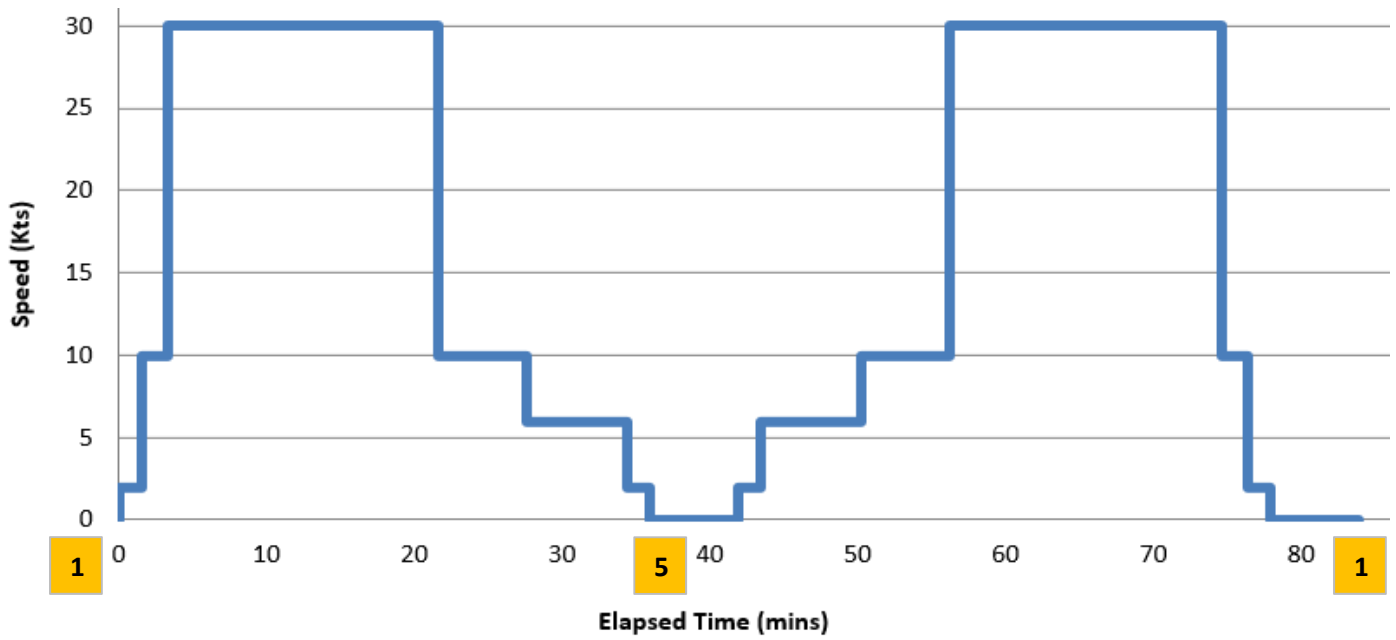


Figure 061-6 – South San Francisco (SF-South SF Roundtrip)

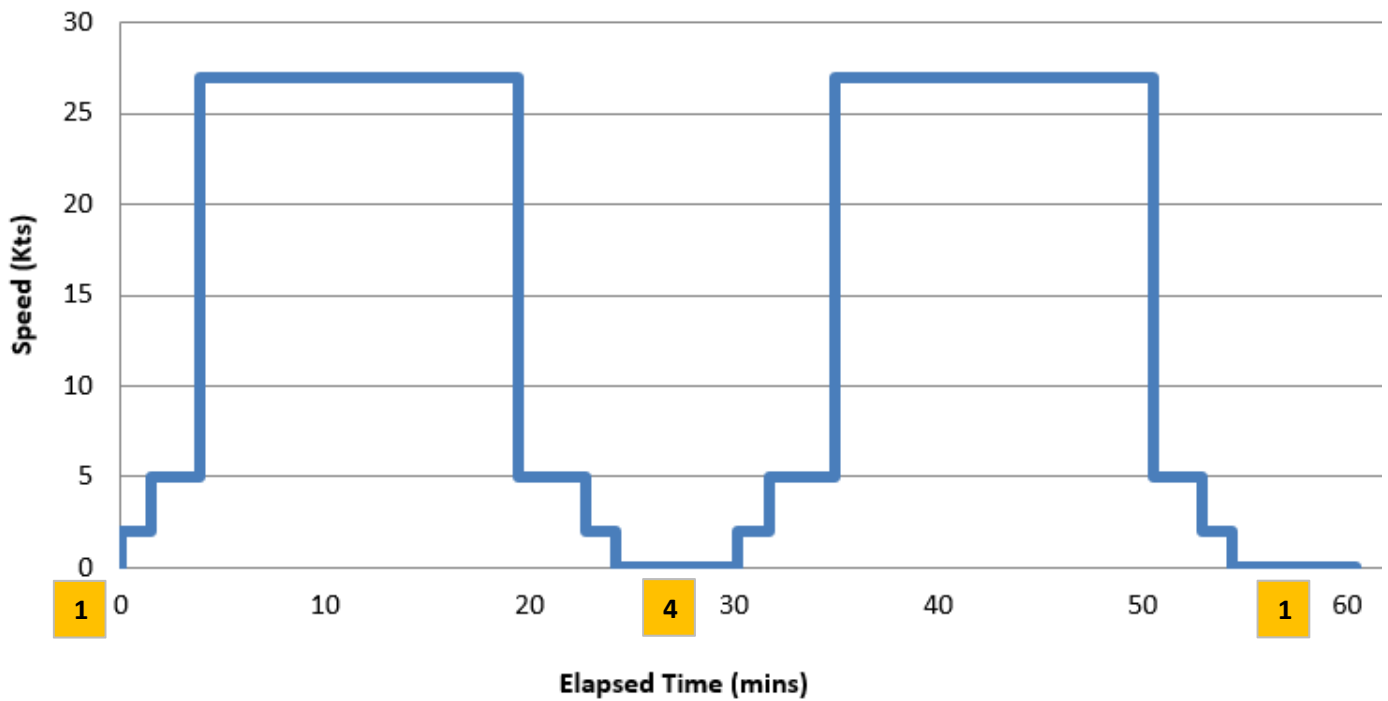


Figure 061-7 – Harbor Bay (SF-Harbor Bay Roundtrip)

062 LOAD PROFILES

The typical engine load profile and operational frequency for the routes outlined in Section 061 is provided for informational purposes in Table 062-1.

Figure 062-1 – Load Profiles					
Route	Central Bay	Vallejo	Richmond	South SF	Harbor Bay
Engine Load Profile					
Idle	34%	17%	25%	37%	44%
Maneuvering	13%	4%	8%	6%	9%
Transit (10 Knots restricted)	29%	20%	38%	17%	0%
Transit (Service Speed)	23%	58%	28%	39%	47%
Trip Frequency					
Round Trips/Day	6	4	4	4	3

The required design service life of the Vessel is thirty (30) years or approximately 90,000 operating hours.

063 LOADING/OFFLOADING

The vessel shall be designed in such a way as to facilitate the safe and efficient transfer of passengers and their belongings within the maximum times per disembarkation/embarkation evolution shown in Table 063-1. The assumption is that ninety-five percent (95%) of passengers are regular commuters, disembarkation and embarkation are not simultaneous, and there are no landside constraints.

Table 063-1. Typical Loading/Offloading Cycle				
	Passengers	Passengers with Bicycles	Total	Maximum Time
Evolution A				
DISEMBARK	250	50	300	6 minutes
EMBARK	25	3	28	
Evolution B				
DISEMBARK	25	3	28	6 minutes
EMBARK	250	50	300	

064 LOADING FACILITIES FOR PASSENGERS

ADA requirements shall be met by the CONTR's design in accordance with the ADA Guidelines of Section 092.

Safety treads or non-skid material shall be installed on the traffic areas of all boarding areas, see Section 634.

The CONTR shall provide stanchions, with chains or barriers, and hooks to cordon off the boarding areas from the main passenger cabin. These items shall be 316 stainless steel.

The CONTR shall ensure that the Vessel being offered is compatible with existing terminal facilities. The Vessel shall be equipped with forward and aft embarkation stations that are compatible with the dimensions shown in Appendix B5. The CONTR shall briefly document their plan for fulfilling these obligations by submitting a Boarding Plan.

The Boarding Plan must be approved by the OWNER before the start of construction.

065 WAKE WASH AND SPEED RESTRICTIONS

Certain segments of the operating route in the Oakland Estuary are speed restricted due to wake wash and port traffic. Vessel speed is typically limited to 10.0 knots in these areas. The Vessel shall exhibit low wake wash characteristics at a restricted cruising speed of 10.0 knots or greater. Although not required, a Vessel that exhibits low wake wash characteristics at speeds above 10.0 knots is desirable, and the CONTR is encouraged to offer such a Vessel.

The CONTR's Vessel design shall minimize adverse effect of wake and propulsor wash on marinas, small craft, beaches, wetlands and other ecosystems. These elements shall be characterized by the wave height and wave energy of the proposed design's wave and propulsor wash signatures while in the full load end-of-service-life condition, inclusive of all exercised options and service life margins defined in Section 810.

The wave and propulsor wash signatures shall be based on a water surface elevation versus time record of a longitudinal wave cut measured on a track 984' (300 m) to one side of the Vessel's straight-line course in water with a minimum depth of 100'.

Wave Energy (E): The unit wave energy is calculated with the following equation:

$$E = 40.97H^2T^2 \quad [\text{lb}\cdot\text{ft}/\text{ft}]$$

Wave Height (H): The greatest vertical distance measured between an adjacent trough and crest in the longitudinal wave cut of the Vessel's wake/propulsor wash, in feet.

Wave Period (T): The time between the zero-crossing of the start of the highest wave and the zero crossing of the start of the next wave in the series, measured from the longitudinal wave cut of the Vessel's wake/propulsor wash, in seconds.

The proposed design's wake and propulsor wash shall have a wave height and a wave energy less than the maximum values shown in Table 065-1 at the restricted cruising speed of 10 knots.

Table 065.1 Wake/Propulsor Wash Criteria Values			
Maximum Values		Target Values	
Wave Height	Wave Energy	Wave Height	Wave Energy
ft	lb-ft/ft	ft	lb-ft/ft
0.75	630	0.62	430

The CONTR shall provide documentation in the form of CFD analysis and/or actual data from parent craft that demonstrates the Vessel's anticipated wake wash characteristics.

066 START UP AND SHUTDOWN

All systems shall be set up with efficiency in mind so that a single trained operator can start up or secure the Vessel in no more than fifteen (15) minutes including safety walkthrough, system alignment, level checks for generators, main engines, controls and navigation, and auxiliary systems. A system start-up checklist shall be developed and provided by the CONTR.

070 ENVIRONMENTAL CONDITIONS

The CONTR shall provide a Vessel suitable for operation in the weather and sea conditions regularly found in the San Francisco Bay region of California.

The Vessel shall be able to meet all contract obligations for route turnaround time, seakeeping, and maneuverability under the following environmental conditions:

- Significant wave height: 4.5'.
- Wind velocity: 35 knots with gusts to 45 knots.
- Minimum ambient air temperature: 30°F.
- Maximum ambient air temperature: 100°F.
- Minimum ambient sea water temperature: 45°F.
- Maximum ambient sea water temperature: 70°F.

080 VESSEL REQUIREMENTS

Certain routes have unique physical limitations and performance requirements that must be met to adequately service that route such as speed, passenger capacity, length and beam restrictions. Other performance attributes such as low wake wash and increased maneuverability are desirable rather than absolute requirements and can be managed operationally.

The OWNER recognizes that a vessel that satisfies all the requirements, both absolute and desired, is unlikely to exist as a parent craft and has therefore created trade space for each of the key parameters in the form of **Threshold** and **Objective** Requirements described in the Table in Section 081 below.

While the Vessel must meet the threshold requirement for each of the principal characteristics, proposed vessel designs will be evaluated on the degree to which they are able to achieve the objective requirements.

The key performance requirements and characteristics for the Vessel are described in Sections 081 through 089.

081 PRINCIPAL CHARACTERISTICS

Principal characteristics for the Vessel shall fall within the ranges outlined below:

Table 081-1 Principal Characteristics			
Characteristic	Threshold	Objective	SWBS Ref.
Hullform	Catamaran		-
Hull Material	Aluminum		101
Regulatory Tonnage	Less than 100 GRT		091
Classification	Designed & built to class rules, but not classed		091
Regulatory	United States Coast Guard - Subchapter K		091
Length Over All	125' max		-
Beam (molded)	33'	≤ 30'	-
Draft Max (incl. appendages)*	4'-6"	4'-0"	-
Freeboard	See Appendix B5		064
Enclosed Decks	2	1	601
Main Engines	Diesel Internal Combustion		233
Fuel Type	Ultra Low Sulfur	R-99	200
Propulsors	Waterjets		247
Service Speed	30 knots	37 knots	082
Passengers	250	300	084
Interior Seats	225	250	084
Exterior Seats	25	50	084
Crew	4 max		085
Bicycle Capacity	20	35	672
Fuel Capacity	150% daily required	200% daily required	126

***DRAFT MAX IS VESSEL DRAFT AT FULL LOAD.**

082 SPEED

The Vessel shall have a minimum service speed in accordance with Table 081-1. This service speed shall be attained with the goal of no greater than 85% MCR in the Trial Condition described in Section 840. The threshold speed provided is a minimum required to service all routes and the CONTR is strongly encouraged to propose a vessel that exceeds this speed.

The Vessel shall have a minimum slow cruise speed of not less than 10 knots while exhibiting the low wake wash requirement described in Section 065.

083 APPEARANCE

The Vessel shall be simple yet aesthetically pleasing. An exterior, superstructure scheme shall include, but not be limited to, lightweight decals comprising OWNER's branding in primary color stripes and SF Bay Ferries logos, a sample of which is supplied in Appendix B7.

084 PAYLOAD/CAPACITIES

The Vessel shall have both interior and exterior seating capacities in accordance with Table 081-1. In addition to the standard passenger seating, the vessel shall have the following provisions:

- Three (3) or more designated interior wheelchair spaces.
- Two (2) or more uncovered exterior wheelchair spaces near companion seating.
- Two (2) or more designated interior crew station seats with tables.

085 CREW

The vessel shall be certified to operate with no more than four (4) crew:

- One (1) licensed Master.
- One (1) high-speed qualified deckhand.
- Two (2) deckhands.

A USCG approved vessel arrangement that allows for a reduction in required crew is desirable.

086 SEAKEEPING & MANEUVERING

The Vessel shall exhibit excellent motions to maximize passenger comfort while operating within the prescribed route. The CONTR shall submit data to the OWNER showing either calculations or measured data on the proposed hull form of vessel motions to meet the following criteria in the Trials Condition described in Section 840.

- Vertical Accelerations - 0.20 g RMS (measured in the Pilothouse)
- Pitch - 2° RMS
- Roll - 3° RMS

The Vessel maneuverability characteristics shall allow for rapid, safe and controlled docking in all weather and current conditions. The Vessel must be able to walk in calm weather without the bow falling off and pivot turn against strong winds.

087 MAINTAINABILITY

The CONTR shall develop a comprehensive Preventative Maintenance program to include all Vessel equipment and systems which will enable the OWNER's staff to handle the routine maintenance of the Vessel. The Preventative Maintenance program shall be provided in a searchable, electronic format and address not only the OEM equipment, but most importantly the operational considerations of the custom system installations that are unique to this Vessel.

The CONTR shall ensure all daily service and inspection items such as dipsticks, valves, sight gauges, etc. are provided with clear and unobstructed access.

All equipment and machinery shall be mounted so that it is accessible for all necessary maintenance and inspection and so that components are removable for replacement with a minimum amount of interference. This includes keeping the overhead in way of main engines free of pipe or cable runs and installation of lifting padeyes and rails for machinery removal. All soft patch hatches for machinery removal shall be designated and maintained as "Interference Free Zones." The transit path for machinery to and from these hatches shall also remain interference free. Special attention shall be paid to providing the most economical and efficient means possible to remove equipment.

The CONTR shall provide OWNER a proposed main propulsion unit, generator, reduction gear and SCR removal route depiction on the drawings. The Vessel shall be configured to allow the complete removal and replacement of a propulsion engine, gear or generator within a forty-eight (48) hour period. All equipment removal plans shall provide for equipment removal while Vessel is waterborne. A watertight, fume-tight, soft patch shall be installed over the main engines for this purpose. Hatch shall be sized for engine transit. Soft patches shall be equivalent in construction, layout, materials, and functionality to the main engine removal hatches installed on OWNER vessels.

All access shall be through bolted access plates, hatches or similar opening. CONTR shall ensure minimum clearances factored in for maintenance and repair of all equipment as per OEM recommendations with minimal intrusion into passenger spaces.

088 NOISE AND VIBRATION

Noise and vibration criteria apply to calm water operation of the Vessel in Trial Condition from light load through full load with the propulsion prime movers operating through all power levels (minimum to maximum), with concurrent operation of one generator and normally operating support systems (such as heating and ventilation).

Prior to start of construction, the CONTR shall submit to the OWNER a noise and vibration analysis, or as-built noise and vibration report from the parent vessel. The analysis or parent design shall clearly state the noise mitigating treatments that will be used and the predicted noise and vibration levels for each compartment listed in the tables below. The noise data shall provide the A-weighted noise level, where the microphone was located, and ship/equipment operating conditions.

A third party firm or firms specializing in marine acoustics, vibration analysis and sound measurements aboard marine vessels shall be employed during builder's trials to take measurements in all areas defined by the criteria below. The selected firm shall utilize measurement and reporting requirements from ISO 2923-1996 Acoustics - Measurement of noise onboard vessels. They shall furnish a final report with all measured raw data, averaging calculations, final reportable results and recommendations for each area measured. This final report shall be made available in duplicate to the OWNER.

The CONTR shall be responsible to locate and correct unsatisfactory vibration or noise conditions arising during tests and/or trials, or subsequently during the warranty period.

Noise Criteria

Acoustic insulation shall be installed as required to meet the noise criteria. CONTR shall not exceed the following sound pressure level standards:

NOISE LEVEL ¹		dB (A) ⁴	
DECK	ZONE	REQUIREMENT	PREFERENCE ³
PILOTHOUSE	PILOTHOUSE	65	55
2ND DECK	FORWARD INTERIOR	72	60
	AFT INTERIOR	72	60
	AFT EXTERIOR ²	80	70
MAIN DECK	FORWARD INTERIOR	70	60
	AFT INTERIOR	75	65
	AFT EXTERIOR ²	85	75

Notes:

- 1 – Underway conditions – at all throttle settings, from idle to max RPM, one SSDG online, full HVAC at normal settings, engine room supply/exhaust fans on dockside conditions – main engines at idle, one SSDG online, full HVAC at normal settings, engine room supply/exhaust fans on
- 2 – Aft Exterior dB (A) readings – taken in areas where apparent wind is less than 10 kts.
- 3 – Optimal levels as defined by the ABS COMF+ standard.
- 4 – These values shall be an average of multiple meter readings in each of the spaces (with the microphone no closer than 1 m to a hard surface).

Sound-damping coatings to jet spaces and resiliently mounting machinery and piping have proven effective at reducing sound. The major improvement comes from soft mounting the deckhouse above the hulls.

Vibration Criteria

Engine alignments shall be performed in accordance with propulsion equipment manufacturer's tolerances at initial installation and afloat prior to Builder's Trials. CONTR shall perform alignment, with written acceptance from propulsion equipment manufacturer's representative.

Flexible couplings shall be capable of accommodating misalignment and isolating vibration in all directions (radial, axial and angular). Couplings shall be dynamically balanced to avoid any additional vibration due to rotational imbalance.

CONTR shall not exceed the following overall frequency weighted RMS value standards:

Vibration Limits in mm/sec peak for single frequency components (1 Hz bandwidth) between 5 and 100 Hz		
	U/W @ 10 kts	U/W @ Service Speed
Interior Passenger Spaces	1.5	2.5
Exterior Decks	1.5	3.0

Vibration Limits in mm/sec ² peak for single frequency components (1 Hz bandwidth) between 2 and 5 Hz		
	U/W @ 10 kts	U/W @ Service Speed
Interior Passenger Spaces	75	100
Exterior Decks	75	100

Under all service conditions, the entire propulsion system shall be free of harmful vibrations throughout the entire operating range. Harmful vibration is defined as vibration capable of damaging primary or connected ancillary equipment and as specified by the equipment manufacturers. In addition, the CONTR shall enlist a third party firm to measure and report vibration utilizing ISO 4867 Code for the measurement and reporting of shipboard vibration data.

Harmful vibrations in any part of the system shall be corrected by the CONTR at no cost to the OWNER. A complete and thorough torsional vibration analysis of the main propulsion drive line (to include main engines, main engine mounts, shafting, couplings, gear box, propulsor unit, etc.) and auxiliaries shall be provided by the CONTR, for review by the OWNER.

089 EMISSIONS

The main propulsion engine exhaust emissions shall meet the US EPA Tier 4 standards and be certified as such.

090 VESSEL REGULATORY REQUIREMENTS

The vessel shall be designed and constructed in accordance with the regulatory requirements summarized in Sections 091 through 092 and invoked throughout this specification. This specification also contains additional requirements that augment and/or exceed those of the regulatory agencies. In no case shall the requirements of this Technical Specification supersede or compromise the regulatory requirements.

091 REGULATORY

The Vessel shall be designed and built to class rules, but not classed. The vessel shall be inspected and certificated by the United States Coast Guard (USCG) according to 46 CFR, subchapter K, small passenger vessels (less than 100 gross regulatory tons). The vessel shall meet all regulatory requirements to attain a lakes, bays, and sounds route upon the waters of San Francisco Bay.

The CONTR shall obtain and furnish all certificates, licenses, documents and letters of compliance as may be required and/or issued by the USCG, and other regulatory bodies as required for this class of vessel, route and service.

All certificates and letters of compliance required and/or issued by the regulatory bodies that are required to be displayed shall be mounted on the Vessel behind framed clear Plexiglas at locations consistent with such requirements or, if no such requirements are stated, at locations specified by the OWNER.

For any and all cases in which applicable regulatory language states or implies that the OWNER shall provide or perform a task, it shall be understood that, as part of this contract, such items and tasks shall be provided/performed by the CONTR on behalf of OWNER.

The USCG requirements invoked have precedence over other regulatory requirements, and these Technical Specification, where conflict exists. Where rule interpretations vary between USCG districts, the CONTR shall ensure that the Vessel certificates shall be valid in San Francisco Bay.

Other regulatory requirements invoked in this specification are as follows:

- Rules of the applicable Classification Agency (ABS, Lloyd's or DNV).
- Federal Communications Commission (FCC) Rules for Radio Transmitters.
- Institute of Electrical and Electronic Engineers (IEEE) Publication No. 45.
- Occupational Safety and Health Administration (OSHA).
- U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB).
- U.S. Public Health Service (USPHS).
- County health regulations applicable to San Francisco and Alameda Counties.
- Americans with Disabilities Act (ADA) Passenger Vessel Accessibility Guidelines and Supplementary Information. Americans with Disabilities Act (ADA) PL101-336 as further described in Section 092.

092 ACCOMMODATIONS FOR PASSENGERS WITH DISABILITIES

The CONTR shall, in general, follow the guidelines of the Passenger Vessel Access Advisory Committee's report of November 13, 2000 as submitted to the Federal Architectural and Transportation Barriers Compliance Board.

The CONTR shall comply with all of the applicable sections of The Americans with Disabilities Act, ADA PL101-336 and Proposed Accessibility Guidelines for the construction and alteration of passenger vessels covered by the Americans with Disabilities Act (ADA) published in the Federal Register on Tuesday, June 25, 2013. While this law has not been thoroughly interpreted for applicability to passenger ferries at this time, certain aspects of the law are clearly established. Among these are, the provision of at least one universally accessible restroom, entrance and egress for wheelchairs that does not exceed the allowable slope (1:12), tactile markings for the sight impaired, special areas where wheelchairs can be secured with approved fasteners which can be operated by the passenger and will prevent the chair from movement due to vessel motion, and accessibility to equal refreshment areas by wheelchairs. Deck and stair covering materials shall be ADA compliant. Aisles and passageways shall be wide enough for wheelchair access. Cashier stands, counter, snack bars, etc. shall all be accessible. Door openers for accessible toilets shall be operable at pressures that comply with ADA recommendations. Doors shall not swing into an aisle or passageway. All accessible services including toilets, refreshments, and outside and inside wheelchair restraints shall at a minimum be provided on the boarding deck.

Visual warning systems must be fitted to flash emergency messages to those with hearing disabilities that accompany audible announcements.

Two special areas of documentation are required:

- As part of the Technical and Price Proposal, CONTRs shall submit preliminary plans to the OWNER, showing all special provisions for passengers with disabilities and records all interpretations by regulatory bodies regarding the approval of these measures. Before agreement signing, the successful CONTR shall submit final ADA drawings and plans to the OWNER for approval.
- Prior to and during construction, the CONTR shall clearly document all efforts to meet PL101-336. This includes correspondence and records of telephone calls relating to ADA matters. This documentation shall be provided to the OWNER at the time of Delivery.

100 Structure

The CONTR shall supply all necessary labor, material, skills, and equipment required to complete and test the construction of the vessel.

Anything inadvertently omitted from the plans and specifications deemed necessary and usual to a complete vessel, shall be supplied as a part of this Contract. Materials used and the workmanship thereon shall be of the best description and quality throughout and of adequate sizes to accomplish the purpose intended. The work, in every respect, shall be made under the supervision and to the complete satisfaction of the OWNER and its Representatives in accordance with good marine practice. Defects appearing at any stage of the work shall be cause for rejection even though the piece in question may have previously been passed as satisfactory.

101 STRUCTURAL MATERIALS

Section 825 of this specification contains the principal requirements for materials used in construction of the vessel. Aluminum alloys used in the Vessel shall be as per Table 101.1 unless otherwise noted.

Table 101.1 Structural Aluminum Material Schedule	
Component(s)	Material(s)
Plate $\geq \frac{1}{8}$ "	ASTM B928 5083, 5086, 5456-H116 or H321
Plate $< \frac{1}{8}$ "	ASTM B928 5083, 5086, 5456-H116 or H321, or 5052 of SAE AMS-QQ-A-250/8
Extrusions	ASTM B221 6061-T6, 6082-T6, 5086, 5083, 5456-H111 or H112

Non-structural items of trim and outfit such as window and doorframes, castings, and hardware items may be alloy 6063 or alloy 6061 of ASTM B221 or alloy 356.1, 356.2 or A356.2 of ASTM B179. Alloy 6061-T6 of ASTM B241 may be used for pipes as structural components. If so used, allowable stresses shall be based on the zero-temper condition.

Brasses and bronzes shall be mixtures of virgin material of proper proportion for the purpose intended and shall be clean, smooth castings, uniform in texture and finish. Galvanizing shall be done by the "hot dip" process. Electro-galvanizing will not be accepted. Unwelded fasteners, pipe, tube, sheet metal, or plates and shapes of stainless steel will be grade 316. Where stainless steel is welded, grade 316L will be used unless otherwise specified. In areas of extreme corrosion concern the use of duplex stainless steel grade SAF 2205 or SAF 2507 shall be used. If the CONTR proposes the use of any specialty materials (Inconel, Duplex stainless steel, Titanium, etc.) they shall obtain approval in writing from the OWNER for the application and welding procedures.

102 WELDING AND FITTING

All welding shall conform to the requirements of the USCG, the selected classification society, and the special requirements of this specification. In addition, all welding shall be performed by USCG and classification society certified aluminum welders with current certification. Welder qualification certificates shall be provided to the OWNER prior to a welder performing welding on the Vessel.

Special attention shall be provided to joint design and welding procedures in high stress areas in recognition of the high life cycle service which this Vessel will experience.

All lap welds and fillet welds shall be continuous with ends wrapped around snipes, edges, limber holes, etc. All crater cracks shall be repaired in process.

Intermittent welding is permitted where, and only where, allowed by USCG and classification society rules. Special attention shall be paid to the length of both the weld and the interval, and the uniformity of the weld.

The CONTR shall submit a plan for the non-destructive testing of structural welds. The plan shall designate the inspection plan, the acceptance criteria, and the resolution plan in the event that defective welds are discovered. The CONTR shall provide the plan to the OWNER for review at least thirty (30) days prior to start of welding.

The CONTR shall provide a written welding procedure for the isolation and protection of sensitive equipment when welding occurs onboard.

111 HULL STRUCTURE

All hull structure shall meet USCG requirements and conform to the classification society rules of the CONTR's choice as listed below. The Vessel will not be classed.

American Bureau of Shipping (ABS) or Lloyds's Register (LR) or Det Norske Veritas (DNV) rules may be used for structural design and construction. Combinations of regulatory rules from separate classification societies is not acceptable; the vessel shall be designed to one set of rules in their entirety, and the design shall be approved by the USCG.

All overboard discharges and local structural reinforcement shall be constructed using insert plates in accordance with WETA's standard detailing provided in Appendix B2. Doubler plates will not be allowed unless specifically approved by the OWNER.

All shell plating in way of the propulsors shall be suitably thick to effectively dampen structure-borne vibrations. Alternate mass damping solutions may be applied, or thinner materials used subject to sufficient engineering analysis and OWNER approval.

A high level of structural detailing shall be used throughout the Vessel. Structural connections shall be integrated into the framing design wherever possible to avoid brackets. Lap jointed brackets and stiffeners shall not be used unless required by class or approved by the OWNER. Stiffener end terminations shall be softened and/or well integrated.

The rub rail shall be robust and designed for the high number of daily landings associated with the intended route. The CONTR shall familiarize themselves with the materials, condition and layout of the fendering at the OWNER's piers when analyzing the rub rail. Attention shall be given to the rub rail design to minimize structural integration and facilitate the future replacement of damaged sections.

126 TANKS

The CONTR shall provide tankage in accordance with Table 126-1.

Table 126-1		
Quantity	Service	Capacity
2	Fuel Oil Storage	Total capacity per Table 081-1
2	Urea Tanks	Sufficient to supply between refueling
1	Potable and Fresh Water Storage	500 gallons
1	Sewage Holding	500 gallons
1	Electric Hot Water Heating Tank	25 gallons total capacity
2	Engine Room Lubricating Oil Storage Tank	One 30-gallon tank in each engine room

All tanks shall meet USCG and the selected classification society's structural requirements. Potable water, fresh water, and sewage tanks and associated systems shall comply with United States Public Health Service (USPHS) requirements. All tanks under pressure shall comply with the ASME Boiler Code.

All tanks shall be independent of the hull shell and shall have sufficient space between the tank and shell structure for inspection and maintenance of the shell and the tanks. All tanks shall be supported on foundations to support the tanks under all load conditions. All tanks shall have bolted access openings so personnel may enter the tanks for cleaning, maintenance and repair.

All water and sewage tanks shall be non-metallic.

Tanks shall have Fills, Vents and Sounding provisions in accordance with Section 506.

151 SUPERSTRUCTURE

The enclosed passenger deck areas shall be constructed from aluminum alloy and well insulated from exterior weather, noise, and odors of the machinery plant.

167 HULL DOORS, HATCHES AND MANHOLES

Watertight doors shall be aluminum quick acting. Exterior joiner doors shall be gasketed, of hollow aluminum construction, thermal insulated, meeting USCG requirements for structural fire protection. Exterior doors into the passenger cabin shall be of sturdy construction, as manufactured by PACIFIC COAST MARINE INC., FREEMAN MARINE, or approved equal, and preferably of the hinged type. Following Sea Trials and prior to Delivery, all doors shall be tested for proper closure and tightness and deficiencies shall be corrected.

Engine room doors shall be powder-coated stainless steel with stainless fasteners and locksets. Doors and hatches in passenger areas shall meet the ADA requirements of Section 092 and incorporate fairings or be installed flush to eliminate all tripping hazards. All doors shall have closers and hold open latches, using marine grade materials.

Provide secondary means of escape from all machinery and other compartments as required by USCG. The hatches shall be hinged and manufactured by FREEMAN MARINE EQUIPMENT, or approved equal.

Manholes into void spaces and emergency escapes shall be raised above the finished deck in accordance with WETA's standard details shown in Appendix B2 to prevent water from puddling. They shall be a minimum of 18" diameter, watertight, aluminum, standard positive locking type as manufactured by FREEMAN MARINE EQUIPMENT, or approved equal.

Doors and hatches that are required to be closed at sea shall be so marked.

Hatches shall meet structural fire protection regulatory requirements.

171 MASTS

A main mast shall be installed as required for proper positioning of antennas and navigation lights. Platforms for antennas and lights shall be installed as required. Ladder rungs shall be fitted as required for access to fittings on the mast.

A flag staff with fittings and halyards with a 3' x 5' US flag shall be fitted on the Upper Deck centerline aft.

200 Machinery - Propulsion and Ship Service

Main propulsion power for the Vessel shall be provided by waterjet propulsion units, each driven by a diesel engine, burning No. 2 ultra-low sulfur diesel oil or R-99 as approved by the OEM, through a marine reduction gear. The main propulsion diesels and waterjet propulsion units shall be of sufficient power and thrust to achieve the specified Service Speed, see Section 081 of the Technical Specifications.

The OWNER acknowledges the available options for propulsion diesel engines are limited while the marine industry completes the transition from Tier 3 to Tier 4 emissions standards. The CONTR shall therefore provide separate pricing for the following Propulsion OPTIONS:

- Twin MTU 12V4000M65R 2000bhp@1600RPM
 - With this option, WETA intends to upgrade the engines to the M65L 2575bhp@1800RPM rating at a future date. The vessel, including all structure, systems, components, driveline, waterjet, reduction gear ratio and associated components shall be designed to support the higher M65L horse power rating.
- Quad MAN D 2862 LE 438 1200bhp@2100RPM

All propulsion machinery, equipment, components, and support systems shall be new and unused. Machinery and equipment shall be manufactured by recognized manufacturers of marine propulsion equipment and systems, having the capabilities to provide service and supply parts in the San Francisco Bay Area.

All machinery shall be mounted so that it is accessible for maintenance and that components are removable for replacement with a minimum amount of interference. This includes keeping the overhead in way of main engines free of pipe or cable runs and installation of lifting padeyes and rails for machinery removal. All soft patch hatches for machinery removal shall be designated and maintained as interference-free zones. The transit path for machinery to and from these hatches shall also remain interference free, to the greatest extent possible. A flush, watertight, fume tight, soft patch shall be installed over the main engines, reduction gears, and generators. The soft patches will be designed for transit of the machinery in the same orientation as the machinery operates.

Both Engine Rooms shall be configured for unmanned operation with remote control of all propulsion functions located in the Pilothouse. Local operating panels shall be provided in each Engine Room.

Under all service conditions, the entire propulsion system shall be free of harmful vibrations throughout the entire operating range. Harmful vibration is defined as vibration capable of damaging primary or connected ancillary equipment and as specified by the equipment manufacturers. Harmful vibrations in any part of the system shall be corrected by the CONTR. A complete and thorough torsional vibration analysis of the main propulsion drive line (to include main engines, main engine mounts, shafting, couplings, gears, waterjet unit, etc.) shall be provided by the CONTR for review by the OWNER, thirty (30) days prior to installation of main engines and shafting.

The main engine, reduction gear, waterjet, and generator set vendors shall submit a comprehensive preventive maintenance program outline which will enable the OWNER to conduct routine maintenance of the machinery and equipment provided.

205 PROPULSION SYSTEM INTEGRATION

The CONTR is encouraged to employ the services of a Designated Propulsion Systems Integrator (DPSI) to provide a complete propulsion system for the Vessel including all design, engineering, calculation, analyses, machinery, equipment, hardware, inspections, tests, and trials. The DPSI shall have specific experience with marine waterjet propulsion units installed in high speed ferries. A qualified and experienced DPSI is desired in order to maintain, to

the maximum extent possible, a source of responsibility for design, supply, warranty, and support for the majority of propulsion system machinery and components.

The CONTR and DPSI shall take responsibility for the supply of the propulsion system machinery, including the diesel engine, reduction gear, high speed and low speed couplings and shafting, including torsional and flexible types, spool spacers, resilient mounts, and flexible connections such as exhaust bellows and seawater bellows. The CONTR and the DPSI shall also take responsibility for the integration of all control, alarm, and monitoring systems (CAMS) as they relate to the Vessel and its main propulsion and auxiliary systems. See Section 438 of the Technical Specifications.

It is preferred that a single supplier be used for the torsional/misalignment coupling, and all shafting.

The CONTR is responsible to ensure that the correct size, rating, model, and type of propulsion machinery is selected and installed. The CONTR and the DPSI are responsible to ensure all propulsion machinery is fully integrated into a complete propulsion system package and performs to the requirements of the RFP.

The CONTR, the DPSI, and the Original Equipment Manufacturers (OEM)s for waterjets and reduction gears shall carefully determine and verify to the OWNER that the main engine, the reduction gear, and the waterjet all rotate in the correct direction to provide main propulsion as designed.

233 DIESEL ENGINES

Included with the CONTR's RFP response, CONTR shall provide the OWNER with a complete scope of supply for main propulsion engines, ready for installation and operation.

The CONTR shall provide, install, test, commission, and warranty the marine propulsion engines. These engines shall be heavy duty marine diesel engines in regular production. The engines are to be certified to meet EPA Tier 4 emissions criteria as described in Section 089 and shall be rated for continuous unrestricted operation at 100% maximum continuous rating (MCR).

The engines shall utilize selective catalytic reduction (SCR) for compliance with EPA Tier 4. The SCRs, complete with urea dosing systems and controls, shall be provided by the engine manufacturer. The propulsion engines shall support the control, alarm, and monitoring requirements of Section 438 of the Technical Specifications.

The engine mounting system design is to include optimized engine resilient mounts to reduce structure-born noise. The resilient mounts shall be provided by the engine manufacturer, of standard production release, supported by the engine manufacturer spare parts program and covered by the engine manufacturer's standard warranties. A solid body dynamic analysis of the engine on the proposed engine mounts and the resultant predicted displacements, shall be provided.

The engine and its exhaust components shall meet all regulatory surface temperature requirements; and shall be insulated and lagged where necessary to prevent injury to personnel.

The engines shall be heat exchanger cooled, each with a plate type heat exchanger integral to the engine. Main engine aftercoolers, if provided, shall be separate circuit fresh water cooled. Engine scope of supply will include USCG- approved, flanged, raw water flex joints. The main engine coolant header tanks shall have sight gauges and alarms installed to verify coolant level without opening the header tanks, and to warn of low coolant levels. Header tank shall be integral to or attached to the engine.

The engine manufacturer shall provide a fuel treatment and filtration system for each main engine. Each engine shall have its own system that shall provide treated fuel under pressure to each engine, in accordance with Section 261 of the Technical Specifications. All machinery using oil for lubrication or fuel shall be fitted with drip to prevent contamination of the bilges.

Each engine shall be supplied with a pre-lube system designed and integrated into the manufacturer's starting circuit. The pre-lube circuit pump shall be AC powered.

All enhancement systems shall be standard factory installed, supported, and warranted systems. All automation, control electronics and monitoring for such systems shall be supplied by the propulsion system manufacturer and integrated into their systems.

Provide a shelf with coaming in each Engine Room to hold a five (5) gallon bucket of makeup engine coolant.

233 REDUCTION GEARS

The CONTR shall provide and install a reversing, single speed, marine reduction gear for each propulsion engine. The reduction gear ratio shall be selected through careful and thorough examination of the thrust curves by the CONTR's engineering team and the waterjet manufacturer.

The reduction gear boxes shall be rated at the engine's maximum continuous rating. The reduction gear shall be alarmed and monitored in accordance with gear manufacturer's requirements and guidance, and as per Section 438 of the Technical Specifications. The reduction gear boxes shall use the same lubrication oil as the main engines, with written approval from the gear manufacturer.

The gearbox shall be resiliently mounted to its foundation and located and positioned such that there is good access on all sides of the unit for maintenance, inspections, and repair. Replacement of clutch packs and control valves, input/output couplings, input/output shaft seals, oil coolers, and lubrication oil pumps shall not require removal of the unit or removal of soft patches. The CONTR is to make sure all major maintenance and inspections, short of total rebuild, shall be able to be accomplished in place with sufficient access.

The reduction gears shall not require the use of a shaft brake for maneuvering operations.

Reduction gear oil seawater cooling circuits shall utilize orifice controls to provide optimum operating temperatures for the gear. Details of the temperature control system shall be subject to OWNER review and approval.

241 PROPULSION COUPLINGS

The CONTR shall provide all propulsion shaft line and machinery couplings as required.

The torsional couplings shall be CENTA, or equal. Alternate manufacturers must be approved by OWNER prior to purchase.

The CONTR is responsible to ensure the following:

- The torsional couplings shall be operated within application limits of each coupling, under single cylinder misfire conditions.
- The torsional couplings shall be designed such that the elements may be replaced without disturbing the mounting position of the engine or reduction gear.
- The torsional couplings shall be designed for the maximum ambient Engine Room temperature.
- The overall design parameters shall include optimized engine resilient mounts and torsional coupling elements to provide for reduced structure born noise.
- The resilient mounts and torsional couplings shall be a designed system specified by the DPSI, of standard production release, supported by a spare parts system and covered by standard warranties.

Flexible couplings shall be capable of accommodating misalignment and isolating vibration in all directions (radial, axial, and angular) for the full range of shaft speed and motion. Couplings shall be dynamically balanced.

243 SHAFTING

The CONTR shall provide design, supply, installation, testing, commissioning, and warranty support for the propulsion shafting system. The shafting scope of supply is to include, but not be limited to, high speed and low speed composite shafting, machinery housings, hubs, adaptor plates, and spool spacers (as required), and all fasteners.

Shafting Design & Engineering

The shafting system, complete with all components, shall be a designed system provided by the CONTR. It shall incorporate equipment of standard production release, supported by the shafting manufacturer spare parts system, and covered by standard warranties. The entire propulsion shafting system, all components and equipment included, shall be designed to meet ABS HSC standards, however ABS classification is not required.

The CONTR shall coordinate and order a torsional vibration analysis (TVA) to be conducted by the main engine manufacturer of the entire propulsion system, based on the proposed design. The complete shafting system including all components shall not be ordered until the TVA result is produced and accepted by all respective manufacturers. Letters from all the respective firms shall be submitted indicating their review of the TVA and acceptance of the vibratory forces predicted in their respective equipment.

The propulsion shafting system design, torsional characteristics, and calculations shall be approved, in writing, by the CONTR. Calculations shall be provided to the OWNER for review. The calculations shall reference the respective ABS class requirements and show how the calculations meet those requirements. The requirement of the OWNER is to have the CONTR responsible for the final shafting system vibratory and torsional characteristics. The design of the shafting system shall incorporate all misalignment and torsion couplings required for a system free of harmful vibration. All couplings and seals shall provide for the range of motion allowed by the resiliently mounted engines and reduction gears. The installed rotating shafting system shall be free from damaging vibrations in all modes of operation.

An engineering summary, including data from the solid body dynamic analysis (see Section 233) and other assumptions, calculations and OEM limits shall be developed. This summary shall indicate that the overhung weights and dynamic reaction forces exhibited on the engine output flange, reduction gear input shaft, reduction gear output shaft and water jet input shaft, are within the OEM published limits. This engineering summary shall be submitted to the OWNER for review.

A whirling study shall also be conducted and provided to the OWNER for review.

The design shall include two dimensional (2D) AutoCAD® drawings, installation instructions, torque values for all fasteners and alignment tolerances and limits.

The shafting system installation drawing shall be approved by USCG and the OWNER.

All metal parts of the shafting system shall be painted to match the engine to prevent corrosion. Provide a removable drive line spool shaft in the Jet Room aft of the reduction gear for removal and servicing the shaft seal assembly.

Shafting Alignment

Preliminary propulsion train alignments shall occur prior to Vessel launch. Final alignment shall be conducted after vessel launch once the vessel's structure has reached floating equilibrium. Care shall be taken to properly account for the daily heating and cooling of Vessel structure. An alignment report will be provided by the CONTR, indicating actual alignment measurements of the complete propulsion system and indicate compliance with all OEM requirements. The CONTR shall be responsible for the performance and documentation of all shafting alignments. The CONTR shall verify, in writing, to the OWNER that all final alignments of the shafting system and machinery is

within all requirements for installation and warranty. The final shaft and engine alignments shall be witnessed by the OWNER. A copy of this inspection procedure shall be agreed to and signed by the OEMs for the main engine, shafting and coupling manufacturer, the reduction gear, and the waterjet.

All propulsion shafting shall be easily removable, to allow for maintenance and repair of the reduction gear boxes, seals, couplings, and waterjets.

The CONTR is responsible to design and install removable guards over exposed shafting, shaft couplings, and all rotating machinery to prevent personnel injury and facilitate maintenance and inspections.

244 SEALS

Bulkhead Seals

The CONTR shall provide a bulkhead seal assembly in the Engine Room/Jet Room watertight bulkhead to allow the propulsion shaft to penetrate the boundary. The design and specification of this seal shall be undertaken jointly by the CONTR and the DPSI. The seal shall allow for full range of motion of the shaft. The bulkhead seal shall be designed for robustness and durability, and for ease of maintenance and repair. The bulkhead seal shall allow for simple and straightforward removal of the high speed shaft or the reduction gear. The bulkhead seal shall maintain the watertight integrity of the bulkhead.

The design of the bulkhead seal shall allow for servicing and removal of the reduction gear input flange and input shaft seal assembly. The design shall not require that the reduction gear come out of frame to perform the aforementioned maintenance actions.

Stern Tube Shaft Seal

Depending on the waterjet chosen, provide a stern tube shaft seal for the penetration of the low speed shaft into the waterjet tunnel or assembly. The stern tube shaft seal shall preferably be integral with the manufacturer's machinery assembly.

247 WATERJETS

The CONTR shall provide a complete waterjet installation from HAMILTON Waterjet or approved equal. Alternate waterjet manufacturers will be considered if the CONTR believes they provide a significant, industry proven advantage in performance or lifecycle cost to the OWNER.

Waterjets shall come with complete control, monitoring, and alarm packages. All systems required for support and operation of the waterjets are to be provided and installed by CONTR. Waterjets shall be continuous duty rated at the engines maximum continuous rating and engine speed. The selected waterjet manufacturer shall have the ability to provide adequate parts support in the United States to the satisfaction of the OWNER. The waterjets shall be alarmed and monitored in accordance with manufacturer's requirements and guidance, and per Section 438 of the Technical Specifications.

Waterjet controls for throttle, steering, thrust, clutch, back flush, and alarm panels shall be provided at all three (3) Vessel control locations: at the centerline captain's chair and integrated into the Pilothouse console, and at each bridge wing station housed in a weatherproof enclosure. Clutch panels shall include indicator lights to confirm position of clutch. Installations shall be similar to the WETA vessels SOLANO or INTINTOLI and subject to OWNER review and approval.

The waterjet OEM shall take part in all required propulsion train analyses and calculations, and shall sign off on all required calculations, analyses, tests, and inspections. The waterjet OEM shall take part in the selection of the ratio for the reduction gear in order to optimize the overall propulsion efficiency of the Vessel.

Installation Arrangements

The waterjets are to be installed in the designated Jet Rooms inside each hull pontoon, in accordance with manufacturer's installation guidelines. The waterjets are to be located such that there is good access on all sides of the unit sufficient for maintenance and repair. Replacement of seals, belts, and other normal maintenance items shall not require removal of the unit or removal of soft patches. Spare hydraulic drive belts shall be provided and pre-installed on the drive shaft for ready use on a HAMILTON installation. The CONTR shall be responsible to ensure that all waterjet maintenance, short of total rebuild, shall be able to be accomplished in place, and with sufficient access.

If applicable, the intake side of the waterjet tunnel shall include provision for an intake grille, of water jet manufacturer's design, to prevent debris from entering the pump. The grille shall be readily removable and easily installed.

251 COMBUSTION AIR SYSTEM

A combustion air system shall be provided that is capable of supplying 115% of the total engine requirements at 100% power at 85 degrees F. Each engine room shall be equipped with fans to supply ventilation and combustion air to the engine room while maintaining positive engine room pressure under all conditions. The fans shall be fitted with variable frequency drives (VFDs) or two-speed motors for speed modulation depending on engine rpm, full or idle. All fans shall be fitted with a manual and automatic position switch mounted near the entrance to the space. They shall be manually controlled by hand and automatically controlled by engine rpm via simple coolant pressure switch. Manual controls shall allow for high speed, low speed, or fan "OFF." Location and layout of all combustion air and machinery space ventilation system controls are subject to OWNER review and approval. Fans shall be integrated into the Integrated Monitoring and Control System.

The fire dampers and activation system, or components thereof shall be simple and made so that they can be reset by one person. They shall be made of corrosion-resistant material.

The plenums shall be fitted with Wide Manufacturing, Delta T Systems, or equal, water demisters properly fitted with drains and mounted outboard. The air inlet plenums shall be fitted with internal insulation for noise control.

Fans discharging into machinery spaces shall be arranged so that they do not blow directly on or over any electrical boxes, panels, or equipment.

252 PROPULSION CONTROL SYSTEM

The Vessel's propulsion system controls (controlling engine throttles, reduction gears, and waterjet steering and reverse bucket) shall be provided by the waterjet manufacturer with the exception of the tiller. Install a Jastram tiller, or approved equal. The CONTR is responsible to ensure installation of a fully integrated propulsion controls system.

The Vessel controls shall consist of identical dual control lever systems at three stations, arranged for independent control configuration (Pilothouse main centerline station, port and starboard bridge wings). Open weather bridge wing units shall be provided inside a weathertight enclosure. The deck of the enclosure shall be slanted aft and downward by ten degrees (10°) to provide positive drainage of any accumulated moisture. All electrical components at bridge wing stations shall be mounted in NEMA 4 enclosures with internal heaters. Bridge wing stations shall be

arranged to optimize visibility to the passenger boarding areas, and line handling locations at the Vessel stern and bow.

All main engine local control and indication panels shall be located off the engine and shall be resiliently mounted to adjacent structure. Location of local operating panels shall provide for ease of operation and monitoring by operating and maintenance personnel, and locations are subject to OWNER approval.

The speed control and direction control actuators are subject to OWNER approval in all respects.

The speed control system shall have integral adjustment to provide a comfortable rate of power application, determined and adjusted during Sea Trials, regardless of the rate of speed control, lever advance, or retardation.

The direction control levers shall have three detent or stop positions; full forward, neutral (zero thrust), and full reverse, controlling the hydraulic jet unit reverse gate with infinite control throughout the direction control lever quadrant. Time of reverse gate movement under full power from ahead to reverse shall not be more than four (4) seconds.

Reverse gate position control, relative to the pre-selected maneuvering speed, shall be capable of maintaining the Vessel speed at not more than three (3) knots ahead, as well as full speed ahead or astern under full power application.

The reverse gate actuators shall have integral stops, preventing the reverse gate from bottoming in either extreme position, thereby avoiding harmful stresses to the reverse gate.

Reverse gate actuators and fittings which are externally mounted shall be of aluminum or stainless steel construction.

Remote control of all vital systems (including electronic switching of ship service generators) shall be provided in the Pilothouse. Remote controls in the Pilothouse shall permit main engines to be started and stopped from the Pilothouse and at bridge wing stations.

All equipment that can be remotely started, from the Pilothouse or elsewhere, shall be fitted with a master cut-off switch at the equipment operating station in order to prevent personnel hazard.

All propulsion controls, normal and back-up, shall include displays. Displays shall be powered from the same source as the control and be dimmable.

The main propulsion engine controls shall incorporate control station transfer and lock-out, and engine synchronization.

Instruments in the Pilothouse shall give a complete display of engine, reduction gear, and waterjet performance, with audible and visual alarms of propulsion system faults. See Sections 247 and 438 of the Technical Specifications for descriptions and requirements for propulsion system alarm, monitoring, and control systems.

256 SEAWATER COOLING

The Vessel shall be fitted with a seawater cooling system to service the main propulsion engines, gears and generator sets. In general, there shall be independent seachests, strainers, and piping systems for each main engine and generator. Certain items may be grouped into a common seachest subject to approval by the OWNER

All valves and materials in the seawater systems shall be in accordance with Appendix B2. All skin valves shall be easily accessible with visual feedback of the valve orientation. All piping shall be in accordance with the general piping requirements of Section 505.

If a valve is installed with a gear operator and a reach rod the CONTR shall ensure that visual indication of the valves orientation is quick and easy to identify.

All devices requiring seawater shall be self-priming in all modes of operation. During the engineering phase the CONTR shall prove to the OWNER that every effort has been made to ensure that all seawater systems are self-priming.

All strainers shall be simplex basket type strainers. All strainer details shall be approved by the OWNER in the engineering phase to ensure the highest quality units are employed.

All seawater pipes shall be analyzed to ensure that the maximum flow velocity is within industry-accepted norms for the piping material. All flanged connections to aluminum structure shall be heavily reinforced to ensure the long-term viability of the through hull. This shall include heavy insert plates and at least four (4) gussets in areas that are not designed for penetrations (seachests). All aluminum pipes in through-hull connections shall be coated in accordance with Section 633.

All piping shall be in accordance with the general piping requirements of Section 505.

The CONTR shall design and provide complete seawater cooling systems to support installed machinery and equipment, as applicable and required.

The CONTR shall design and install a seawater cooling system to convey seawater from and between seachests, main propulsion and generator diesel engine cooling circuits, shaft seals if required, reduction gear cooling circuits, main engine exhaust transom cooling rings, generator exhaust spray rings, HVAC machinery, and overboard discharges.

259 ENGINE EXHAUST

Main propulsion engine exhaust piping shall exit the vessel through the transom. Generator set exhaust piping shall be routed inboard and discharge into the tunnel between hulls. The Main Engine exhaust shall be a dry exhaust exiting through a cooling ring at the transom. All exhaust pipes will terminate well above the waterline, with significant slope provided to avoid water ingestion into the exhaust pipe under any operating conditions or maneuvers.

The CONTR shall carefully consider the flow of exhaust gases during normal operations and at a reasonable range of speed, heading and wind direction and ensure avoidance of:

- Re-introduction of exhaust gases into any ventilation or combustion air intakes.
- Exhaust gases sweeping onto decks normally occupied by passenger or crew.

Arrangement and details of engine exhaust pipe design, routing, and arrangements are of keen interest to the OWNER and shall be subject to review and approval by the OWNER prior to start of construction. The CONTR shall submit calculations, based on installed piping and components, demonstrating the installed systems do not exceed OEM back pressure, displacements, loads, or moments at all expansion joints and exhaust system connections to engines, equipment, and hull penetrations. Provide expansion joints (wrinkle bellies) ahead of all structural penetrations. Pay particular attention to avoiding stress to piping, flanges, bellows, and structural exhaust penetrations.

All outboard engine exhaust tail pipes are to be 316L stainless steel. Schedule 10 exhaust piping with plate flanges are to be installed. Provide duplex stainless steel with six percent (6%) molybdenum content for the wet part of the exhaust pipe.

All exhaust flange/ gasket bolts shall be retightened following successful Sea Trials. All exhaust flange gaskets shall be double jacketed stainless steel.

Install captive vibration isolators to prevent metal to metal contact and provide effective vibration isolation between any part of the exhaust system and the ship structure.

For main engine exhausts ensure that piping in the way of engine or gear removal is flanged with expansion joints for ease of removal. Flanged sections of exhaust pipe shall be no longer than 6' in length.

Expansion Joints

Exhaust expansion joints shall be provided as needed. They shall be multi-ply, stainless steel or Inconel, provided with liners, and shall be designed, constructed, and installed to EJMA standards. Provide DME, INC. expansion joints. All expansion joints are to be provided with one free-turning flange to facilitate installation. Expansion joints shall be installed with factory-provided shipping stays in place. Shipping stays are to be removed following installation ensuring proper fit. The CONTR shall ensure proper support of the exhaust system, demonstrating adequate pipe line support and flexibility. Care shall be taken to ensure proper alignment of exhaust system with equipment and machinery. Exhaust hangers shall be designed to minimize noise transmission to the structure.

Exhaust Insulation

Insulate all exhaust piping, flanges, expansion joints, silencers, and SCR in both the Engine Rooms and Jet Rooms, in accordance with the following:

- Engine exhausts shall be lagged with a multi-part system made up of silicon/fiberglass outer cloth (ALPHA MARITEX Style #3259-2-SS) sewn to high temperature eighteen (18) ounce inner cloth (ALPHA SIL Style 600).
- Attached to that shall be a knitted stainless steel wire tubular fabric (ALPHA MARITEX #91160) which is in direct contact with the pipe wall.
- Install a 2" temperature mat between the silicon outer cloth and the inner cloth.
- Insulation mufflers are to overlap adjacent sections of insulated pipe by a minimum of 3", and lace together with stainless steel hooks and wire. Insulation is to be installed in easily removable sections.
- Insulation blankets shall be pre-sewn and removable at all flanges.

Selective Catalytic Reduction (SCR)

An SCR system will be required to meet the exhaust emission requirements of EPA Tier IV. The SCR shall meet the following requirements:

- Provided by the same supplier, and integral to, the main propulsion engine.
- The SCR shall be provided with factory installed sound suppression and thermal insulation packages.
- Installed so that access is provided for inspection and easy maintenance of components.
- The catalyst units complete for each engine shall be able to be removed and replaced with a spare unit by two (2) persons in four (4) hours dockside.
- The SCR shall be fitted with a thermal blanket that will limit the surface temperature to a maximum of 65°C or less to ensure that heat transmission to the space that the SCR is located in does not require additional ventilation. The ventilation exhaust shall be located close to the SCR to minimize temperature in the rest of the compartment.
- SCR housings are to be resiliently mounted and isolated from supporting structure.
- The SCR shall be removable through the Engine Room soft patch while the engine remains in place. If possible, design Engine Room air exhaust plenum for removal or servicing of the SCR unit.

261 FUEL OIL SYSTEM

Each engine will be provided with independent supply and return circuits. The sizing of piping and fittings will be in accordance with equipment manufacturer's requirements. Fuel oil return lines from main engines and generator sets shall be independent of each other all the way back to the tank.

All fuel filters and associated gauges and valves shall be located above the engine room deck plates with drip pans under the fuel filter assemblies. Special care shall be exercised in meeting USCG spray protection requirements for the fuel oil system.

The fuel system shall incorporate duplex fuel filters or a fuel filter/coalescer (treatment) system provided by the propulsion system supplier. The use of the manufacturer's fuel treatment system is required and shall be warranted by the propulsion system manufacturer.

All pressure pumps shall be powered with all controls and monitoring for the system provided by the propulsion system manufacturer. All fuel lines shall be routed low in the Vessel to promote flooded suctions to all engines with careful attention paid to venting of entrapped air.

All piping shall be in accordance with the general piping requirements of Section 505. Fuel oil tank high level alarms and level sensing shall be provided in accordance with Appendix B2.

262 LUBE OIL SYSTEM

Clean and dirty lube oil systems shall be installed for the shoreside refilling and removal of lube oil. Clean oil will be pumped onto the Vessel via the OWNER's shoreside pump. Dirty lube oil will be pumped shoreside using the Vessel's lube oil pump.

A simple system is desired with minimal installed piping. A single hose equipped with quick disconnects on each end shall form the backbone of the system and offer maximum flexibility for the maintenance personnel.

Each main propulsion engine, gear and generator shall be outfitted with a remote lube oil connection. The remote lube oil connection shall consist of a standpipe directly connected to the oil sump via an isolation valve. The standpipe shall extend above the engine room deck plates, or as required for convenient service access, and be capped with a quick disconnect fitting and incorporate oil containment.

Each engine room shall be equipped with a lube oil station. The lube oil station shall consist of:

- One (1) portable lube oil hose with quick disconnects on each end. The hose will have sufficient length to reach the filling ports and remote lube oil connectors on the main engine(s), reduction gear(s) and the generator(s).
- One (1) portable, metered shutoff nozzle that controls oil pump flow at the discharge end and a quick disconnect for coupling to the lube oil hose.
- Valved connection to the lube oil tank.
- Hose rack for storage.
- Lube oil discharge pump.
- Drip pan.

The clean lube oil tank shall meet the requirements of Section 126 and be located as high in the engine room as possible to facilitate the gravity-fed supply of clean oil to equipment.

Clean oil fill and dirty oil discharge fittings shall be provided adjacent to each engine room fiddley for connection of the appropriate shoreside oil system in accordance with Section 506.

Clean Oil Fill

Clean oil will be supplied under pressure from the shoreside pump to the Vessel's clean oil fill deck fitting. The Vessel's piping system shall be arranged to distribute the clean lube oil from the fill fitting to:

- The fill station enabling direct connection and metering of oil to the remote lube oil connections on the main engine(s), reduction gear(s) and the generator(s) via the portable lube oil hose.
- Clean lube oil tank(s).
- Oil replenishment tank(s) if so equipped.

Lube oil top-off between oil changes shall be accomplished by connecting the portable lube oil hose to the clean lube oil tank fitting and the desired remote lube oil connection for gravity-fed, metered filling.

Dirty Lube Oil Removal

The Vessel's dirty lube oil discharge pump shall be used to transfer dirty lube oil to a dockside tank. The discharge side of the lube oil pump shall be hard-piped to the dirty lube oil discharge deck fitting. The suction side of the pump shall be fitted with an accessible quick disconnect fitting.

The portable lube oil hose will be configured as necessary to take suction from the desired remote lube oil connection.

298 OPERATING FLUIDS

Upon completion of all work defined in this contract, all operational fluids in all equipment will be topped up with manufacturer approved fluids. The Vessel shall be trialed and delivered with all equipment ready to operate according to manufacturers' recommendations.

300 Electrical Systems

301 ELECTRICAL LOAD ANALYSIS

An electrical load analysis shall be prepared and maintained throughout the vessel's construction program. This analysis shall be updated whenever actual purchased equipment data becomes available or when major service load changes occur. Each revision shall be updated and submitted to the OWNER.

302 ELECTRICAL MOTORS

Motors shall meet appropriate regulatory, IEEE 45, and USCG criteria. Motors shall be low maintenance, high durability motors. AC motors three-fourths (3/4) horsepower and larger shall be 3 phase, 208 VAC if available for the application. One-half (1/2) horsepower and smaller AC motors may be 120 VAC single phase. With the exception of motors for special electronic equipment, and manufactured component equipment motors, and motors one-half (1/2) horsepower or less; all motors shall be built by one manufacturer. All motors shall be suitable for full voltage starting, and shall, at a minimum, meet NEMA standards for the design involved. Motors shall be of the ball-bearing type and shall be designed such that the requirement for periodic lubrication is kept to a minimum. If a motor is to be controlled by a variable frequency drive (VFD), then the motor shall be compatible with the VFD operation in all respects, including having isolated bearings or other shaft-current mitigation technologies. All motors shall be fitted with a corrosion-resistant nameplate which shall include:

- The manufacturer's type and frame design,
- Rated horsepower,
- Type of rating,
- Intended ambient temperature,
- Temperature rise at rated load,
- RPM at rated load,
- Operating voltage,
- Current drain at rated load,
- Number of phases, frequency, and code for locked rotor kva on motors one-half (1/2) horsepower and greater, all in accordance with the national electric code.

303 ELECTRICAL MOTOR CONTROLLERS

All motor controllers shall be equipped with thermal protection devices appropriately sized to support the full running load of the equipment served.

Motor controllers shall be of an industrial type that conforms to the requirements of 46 CFR as well as the UNDERWRITERS LABORATORIES (UL) Standard 508, and they shall bear the appropriate label. Controllers shall also, at a minimum, conform to ABS regulations, IEEE 45 recommendations, and shall meet the requirements of the USCG. Controllers shall be provided from the same manufacturer, SQUARE D or equal. Controllers shall have overload sensors in each ungrounded phase. Controllers having remote start/stop stations shall have control transformers with ungrounded secondary circuits to prevent accidental starting or stopping caused by a single short to ground. All controllers shall have under voltage protection when operating from a remote, automatic two-wire device.

All motor controllers shall indicate: Motor Running; Speed (if applicable); and Direction (if applicable). They shall be fitted with "LOCAL/OFF/AUTO" controls as appropriate with a lock-out mechanism for the "OFF" position. Controls

shall be near the controlled motor, as far as practicable. They shall include a corrosion resistant nameplate with the following information:

- Manufacturer
- Type and Serial Number
- Voltages and Phases
- Current or Horsepower
- Operating Instructions

A plastic laminated wiring diagram of each controller shall be permanently mounted inside the controller cover.

305 NAMEPLATES AND LABELS – ELECTRICAL EQUIPMENT

Nameplates shall be fitted on all circuit breakers, distribution panels, shore receptacles, and connection boxes. Nameplates shall show "fed from" and location on all breaker panels. Amperages of breakers shall also be marked.

Plastic laminated circuit directory cards 8-1/2" by 11" (maximum) and one-line diagrams shall be provided inside panel boxes and switchboards to identify the equipment and service supplied from each circuit including breaker amperage.

All nameplates shall be adhered to the equipment with a permanent marine adhesive, 3M 5200 or approved equal.

311 ELECTRICAL SYSTEMS - GENERATING

The Vessel shall be equipped with two identical, self-regulating, 208 VAC, three (3) phase, four (4) wire, sixty (60) Hz diesel generator sets. They shall be EPA Tier III certified engines with Permanent Magnet style generators from Northern Lights or equal.

Each generator shall be capable of supplying the Vessel's full AC electrical load at eighty-five percent (85%) of its continuous rated capacity and shall be capable of starting the largest motor without requiring load shedding.

Voltage regulation shall be \pm three percent (3%). The generators are not intended to be operated in parallel.

The generator sets (gensets) shall be provided and installed, complete with an active master local control panel, instrumentation, governors, regulators, alarm sensors, automatic and manual shutdowns, cooling systems with an engine mounted CuNi heat exchanger, FW cooling, wet exhaust, drip pan, 24V electric starting system, alternator and battery with appropriate bulkhead mounted charging system. The coolant header tank and remote reservoir shall have sight gauges installed to physically verify coolant level without opening the header tanks. The gensets shall be provided with an aluminum subframe and coated white in accordance with Section 633.

The gensets shall be test run at the factory under 100% load for four hours prior to Delivery. The purpose of this requirement is to "break in" the engines.

A fully manual means of starting and stopping generators shall be provided locally at the genset and be independent of the Vessel's automation system. A fully manual means of opening and closing generator and shore power breakers, including power available indicators, shall be provided locally at the switchboard and be independent of the Vessel's automation system. Automation systems shall be installed to improve operational functionality but must have the ability to be overridden for direct local control in the event of loss of power or an automation systems failure.

Load transfer shall be protected and alarmed in order to preclude load transfer with reverse current and/or improper phase rotation.

The OEM instrument panel shall include DC voltage, water temperature, oil pressure, Start/Stop and elapsed run time meters. The panel shall be located off the generator set and shall be resiliently mounted to an adjacent structure, and

arranged for ease of operation and monitoring. Displays shall not require scrolling to view normal operating parameters.

The gensets shall be provided with an OEM-supplied, integrated diagnostic panel providing comprehensive indication of the cause of generator set shutdown and faults. The generator sets and diagnostic panel shall be configured to output to the Integrated Control, Alarm and Monitoring system located in the Pilothouse and specified in Section 438.

313 BATTERY SYSTEMS

All batteries provided onboard the Vessel shall be maintenance-free AGM marine type.

Batteries and battery banks shall be fully accessible for maintenance and located well clear of the bilge. All batteries shall be contained in USCG approved battery boxes with covers. All batteries shall be installed with USCG approved disconnect switches. All batteries shall be provided with appropriately sized chargers consistent with the requirements of the battery manufacturer.

Each propulsion engine shall be fitted with its own starting battery and charging system. Each ship service generator shall be fitted with its own starting battery and a fully independent battery charger.

The radio emergency power supply shall be a battery and charger that are sized and located to comply with both FCC regulations and the manufacturer of the radios.

Batteries providing emergency power support of the propulsion control systems shall be sized to provide a "get home" capability.

AC-powered battery chargers shall be provided by a single manufacturer, Charles Industries or approved equal.

Three (3) 120-watt solar panels shall be fitted. Two shall be series connected to provide 24 VDC via a solar controller and connected to charge the Pilothouse's 24 VDC batteries. The other shall be connected via a solar controller to charge the 12 VDC navigation batteries.

314 POWER CONVERSION EQUIPMENT

The CONTR shall provide voltage inverters to service any AC-powered navigation and communications equipment. All battery banks and chargers shall be fully integrated into the Vessel's Integrated Control System for monitoring and alarm. AC systems requiring backup power shall use properly sized and integrated marine batteries and inverters. UPS-type inverters shall not be used.

321 CABLES & CABLE INSTALLATION

VFD drives shall have their wiring isolated or shielded from other cables to prevent electrical noise problems. Control, sensing and data cables shall be mounted separately from line power cables.

Cables shall be U.S. Navy MIL-C-24643 or IEEE 45 low smoke types. Cable containing asbestos or polyvinyl chloride shall not be used. If armored cable is used, the armor shall be aluminum. Wiring and cabling shall meet the requirements of USCG and be of sufficient size to sustain enough fault current to trip the circuit breaker's instantaneous trip devices. Power distribution cabling shall be sized for a maximum voltage drop of five percent (5%).

CONTR shall install two spare multi-conductor (14/7 conductor) cables dead headed between each engine room and the Pilothouse, and engine room to engine room, and engine room and each lazarette.

CONTR shall install two spare power conductor (12/3) cables dead headed between each engine room and the Pilothouse.

322 SHORE POWER CONNECTION

One (1) 208 volt, 3 phase, 100 Amp shore power supply receptacle shall provide electrical supply to the Vessel when moored alongside. The receptacle shall be located near centerline on the bow. The connection shall be per OWNER standard.

A marine isolation transformer shall be provided.

A safety device shall be installed to prevent inadvertent connection of shore power and generators so that only one source can be put on line at any time.

324 ELECTRICAL SYSTEMS - SWITCHBOARDS

For each of the two generator sets, provide dead front switchboards, or main distribution panels herein referred to as switchboards. Switchboards shall have electrically operated breakers with manual override capability. Each switchboard shall be arranged with feeds from each generator and the shore power transformer. Power for operation of the generator or shore power breakers shall come from the source side of the breaker. Power available and voltage indicators shall also be provided from the source side of the breaker.

The generator controls shall not have paralleling capability.

The capability shall be provided for operator selection of local control from the engine room or automatic control from the Pilothouse.

Switchboards shall be provided with local instrumentation for monitoring voltage, current, and frequency of ship service and shore power.

The switchboards shall have sufficient reserve electrical capacity and physical space to support 10% future growth.

A ground fault detection system shall be provided.

Switchboards shall be Ockerman Automation or approved equal.

331 ELECTRICAL SYSTEMS - DISTRIBUTION

The primary generating voltage is 208 VAC, 3 phase, 4 wire. Circuit breakers shall be provided from the same manufacturer.

Power distribution shall be a 3 phase, Y-connected, 120/208 VAC system with the neutral grounded to a single point on the common 208V bus.

Electrical loads on each AC panel board shall be balanced among the three phases within five percent (5%) of the average, except that non-simultaneous loads such as heating and cooling need not be considered together.

AC Distribution panels shall be provided as required. Anticipated panel locations are in each engine room fiddley and in the Pilothouse. Snack Bar equipment shall be supplied from a dedicated distribution panel located in an OWNER approved location in the vicinity of the Snack Bar.

DC power systems including alarm and monitoring system, communication, and navigation systems shall be supplied from storage batteries with AC-powered charging systems as described in Section 313. Emergency lighting shall be supplied per Section 332.

DC-powered control, monitoring, and alarm systems, when fed from two sources of power, shall utilize diode diverters, which will feed the higher voltage of either power source without relays.

Circuit protection for DC circuits, other than for engine starters, shall be provided by distribution panels. DC distribution panels shall be installed in the Pilothouse and as required elsewhere,

All distribution panels shall be inaccessible to passengers in crew-only spaces.

332 ELECTRICAL SYSTEMS - LIGHTING

The OWNER prefers LED lighting over other types wherever feasible, provided LED lighting is designed and/or intended for use in a marine environment.

Lighting fixtures shall comply with USCG Regulations. Fixtures shall bear the UL Marine classification label suitable for the location where they are utilized. General lighting in the passenger areas shall be flush mounted, LED down lights fitted with reflectors. Where possible, lighting fixtures shall be manufactured by one manufacturer, and shall have interchangeable components to the extent possible. Equipment and fixtures exposed to weather or dampness shall be water tight, with metallic parts made of stainless steel or non-metallic.

The lighting systems shall be designed and arranged to allow only the crew to control lighting in the passenger seating areas via group lighting controls in the Pilothouse. Docking and boarding lights shall be operable from the Pilothouse center helm station with fully backlit and dimmable dual position switches.

All stairways shall be adequately lit to provide safe passenger movement and support CCTV surveillance.

Availability of spare parts shall be considered when selecting lighting equipment. Equipment with interchangeable parts shall be selected when practicable.

Interior Lighting

Interior lighting in passenger areas and engine rooms shall be arranged in groups in such a way that if one circuit is out the others will give some lighting coverage. One of the groups shall be a "night light" system to provide minimal but adequate lighting at night for the security cameras when the boat is non-operational and secured. This lighting shall also provide adequate lighting for the safe movement of crew and maintenance staff. The engine room lighting shall be controlled from the fiddleys. The Pilothouse overhead lights shall have a switch mounted at the entry door.

All other cabin lights shall be controlled from a Pilothouse AC power panel.

Exterior Lighting

The Vessel shall be outfitted with exterior lighting of adequate capacity and locations to ensure passenger safety, but no fewer than twenty-four (24). All exterior light fixtures and junction boxes shall be heavy-duty marine grade items.

Exterior floodlights shall be controlled from a single on/off switch in the pilothouse. Lights shall be LED type, 120VAC, located as follows:

- One each to illuminate the four side boarding stations from above.
- Two docking lights.
- Two side bow lights.
- One foredeck light.

One remotely-controlled marine searchlight (Imtra CL25-11 Searchlight, or OWNER approved equivalent) shall be provided on the top of the pilothouse mounted on a pedestal. Remote controls shall include adjustable focus (spot or flood), elevation (tilt) up, down, left and right.

LED Navigation lights shall be controlled by an OEM lighting panel in the Pilothouse.

Emergency Lighting

Emergency DC lighting shall be provided in all spaces as required by USCG, including the engine rooms, which shall have emergency lights at the bottom of the ladder and over the switchboards. Emergency lights shall be powered from a dedicated twenty-four (24) VDC distribution system.

333 ELECTRICAL SYSTEMS - RECEPTACLES

The CONTR shall provide at a minimum the receptacles listed in Table 333.1. Location of all receptacles is subject to OWNER approval. Watertight receptacles with ground fault interruption shall be provided for wet areas and as required by USCG. Exterior and engine room receptacles shall be fitted with weather-tight covers.

Table 333-1 Receptacles		
Quantity	Volts - Amps	Location
As required	120-20	Snack Bar, to serve commissary equipment
As required	208-20	Snack Bar, to serve commissary equipment
40	120-15	Passenger use
10	120-15	General use, such that any location can be serviced by a twenty (20) foot extension cord
6	120-20	Engine Rooms (3 x each)
4	120-20	Pilothouse
4	120-20	Crew Stations (2 x each)
As required	120-20	Exterior Decks (2 x each deck)
4	120-15	Sanitary spaces (1 x each)

400 Command and Monitoring

401 PILOTHOUSE & CONSOLE ARRANGEMENT

The Pilothouse shall be configured with the following four control stations:

- Primary control and monitoring station located on the centerline forward.
- Observer's monitoring station located to the port of centerline forward.
- Port wing control station.
- Starboard wing control station.

The OWNER prefers (P/S) bridge wing control stations that are common to the bridge space, with a direct line of sight to the primary control and monitoring station. Exterior bridge wing control stations will also be considered. The bridge wing control stations shall be arranged to provide an unobstructed, direct line of sight to both forward and aft passenger boarding areas and line handling locations. To achieve this line of sight, each bridge wing shall have provisions that allow the vessel operator to extend their upper body beyond the side of the vessel. The CONTR shall however, make every effort to maximize the line of sight to both forward and aft passenger boarding areas and line handling with the window(s) of a common bridge space in the closed position.

The Pilothouse arrangement shall provide the best possible all-round visibility free from window reflections and refractions. Pilothouse windows shall meet the specifications of Section 625.

Pilothouse

The Pilothouse is a secure space with no public access and shall be provided with locking doors. The Pilothouse shall at a minimum be outfitted with the following equipment and features:

- A locking file cabinet.
- Power receptacles per Section 333.
- HVAC per Section 514.
- Sun glare covers.
- Windows and shades in accordance with Section 625.
- Horizontal chart surface, with full size chart under non-reflective Plexiglas.
- Storage for charts, publications, flares and first aid kit.
- Storage for miscellaneous equipment.

Console

The console arrangement shall be of an ergonomically correct configuration, incorporating at a minimum, the specific equipment identified in Table 401-1 at each control station. The new console shall generally be arranged, built, and configured similar to OWNER vessels. The console shall be fitted with the following features:

- The console shall have a flat deck and an angled back panel.
- The deck, back panel, and all other such surfaces in the Pilothouse shall be provided with a matte black finish to prevent glare.
- A foot and knee recess at the helm station.
- The console shall incorporate a 4" by 4" toe kick at the bottom of the console where it meets the deck.
- Two (2) means of accessing the inside of the console.

- 3-way switched lighting with minimum three (3) fixtures under the console.
- Power receptacles per Section 333.
- HVAC to maintain temperature under console per Section 514.
- Two (2) binocular boxes convenient to each chair, location subject to OWNER approval.
- Two (2) keyboard trays convenient to each chair, location subject to OWNER approval.

The CONTR shall create a full mockup of the new console for OWNER approval prior to construction. The mockup shall show the arrangement of all equipment in the Pilothouse as well as the layout and orientation of Pilothouse console and demonstrate the layout of Pilothouse windows, especially as they relate to crew sight lines.

Table 401-1					
Feature / Equipment	Spec Ref.	Port Bridge Wing Station	Observer Station	Center Helm Station	Stbd Bridge Wing Station
Full follow up tiller - console mounted, waterproof	252	x		x	x
Rudder angle indicators (included in waterjet controls)	252	x		x	x
Analog tachometer	252	x		x	x
Dual function control heads (throttle and shifting) for port and starboard engines	252	x		x	x
Control transfer and accept button	252	x		x	x
Waterjet backup controls (steering and throttle)	252			x	
Helm chairs	401		x	x	
Trackball & keyboard for operation of AIS/ECS (wired)				x	
Mouse & keyboard for operation of AIS/ECS (RF wireless)				x	
Radar displays			x	x	
Electronic chart display				x	
VHF Radios (3)				x	
VHF RAM microphones		x			x
All navigation equipment displays				x	

Table 401-1					
Feature / Equipment	Spec Ref.	Port Bridge Wing Station	Observer Station	Center Helm Station	Stbd Bridge Wing Station
All communications equipment controls				x	
Navigation lighting controls				x	
Searchlight controls		x		x	x
Video surveillance monitors	439			x	
Whistle push button				x	
AIS				x	
Man overboard button – linked to GPS & Nav displays	451			x	
PA system microphones		x		x	x

All instrument lighting (LCD, displays and status/alarm indicator lights, etc.) shall be equipped with physical dimmer controls for night operation and to minimize reflections. Dimmer range shall be infinitely variable from lights off through to full illumination. The console shall be equipped with glare shields for all displays to prevent direct sunlight and glare from shining on the display faces. The number of separate dimmer switches shall be kept to a minimum.

Captain's Chair and Stools

The CONTR shall provide and install two (2) metal, vinyl upholstered, captain's chairs in the Pilothouse. The chairs shall be of rugged construction using quality materials. The design of the chairs shall be ergonomically compatible with the duties of the operator. Chairs shall be manufactured by E. Vejvad Hansen of Denmark Skipper 502-lift Series or equal with full-follow-up jog (steering control) on the armrest. Chairs shall be approved by the OWNER.

The chairs shall be fully adjustable in the longitudinal position, seat height, backrest angle, and lumbar support. The chair locations shall be fully integrated with Pilothouse equipment including Vessel controls, radars, and VHF radiotelephones.

421 NAVIGATION & SIGNALING EQUIPMENT

The Vessel shall be delivered complete with all supplementary navigation and signaling equipment required by the USCG to include but not be limited to:

- One (1) bell meeting regulatory requirements shall be mounted as directed by the OWNER.

- One (1) magnetic compass installed in the Pilothouse console at the steering station, positioned low and on centerline for ease of visibility by the helmsman. The compass card shall be selected for maximum visibility. Magnetic compass lighting shall be red for night operation and fully dimmable. The compass shall be swung and a deviation card provided.
- Chart 18649.
- Required publications including COLREGS, Coast Pilot and Light lists.
- Day shapes.
- Flares in waterproof container.

Table 421-1 provides specifications for equipment currently used in the OWNER fleet. The proposed equipment must have equal or better specifications.

Table 421-1		
Binoculars	West Marine	2 Raiatea Waterproof 7x50 Center-Focus Binoculars, with installed holders
Clock and Barometer	Chelsea	Newport 4 1/2"
Magnetic Compass	Ritchie	Helmsman liquid beaded 4 1/2"

422 NAVIGATION LIGHTS

Navigation lights shall be provided in accordance with the USCG Navigation Rules, COMDTINST M16672.2D (COLREGS) applicable to the Vessel's size and intended service.

Navigation lights shall be LED. A navigation light mimic panel shall be provided on the Bridge to indicate light location, type and on/off status, and failure alarms.

423 NAVIGATION ELECTRONICS

Navigation and communications equipment shall conform to USCG requirements, and be augmented by the following requirements:

- All touch screens shall be capacitive only, not resistive, with buttons adequately sized.
- Navigation electronics shall be interfaced to the maximum extent possible with communication with other navigation equipment.
- MOB button on dash that is integrated to radars, ECS and GPS.
- AC voltage ship navigation, communications and safety systems shall have backup DC power using marine inverters, batteries and chargers per Section 313.
- Primary Radar display mounted directly in front of the Primary Control Station.
- Secondary Radar display mounted directly in front of the Observers Monitoring Station.

The installations shall be free of electromagnetic or other interference and provide for superior performance.

All systems shall be in accordance with all USCG and FCC requirements.

The CONTR shall plan, design, engineer, procure, and install all new navigation, electronics, and communications system. Appendix B4 provides specifications for equipment currently used in the OWNER fleet. The proposed equipment shall have equal or better specifications.

432 TELEPHONE SYSTEM

An AIPHONE or equal telephone system shall be installed between OWNER-approved locations at the Pilothouse, each engine room, crew stations and Snack Bar. The system shall provide single pushbutton dialing. Power for this telephone system shall be provided from the emergency battery backup system. All phones shall be properly mounted and secured. A list of standard equipment used throughout the WETA fleet is provided in Appendix B4 and is typically provided, installed and serviced by Electronic System Support Inc. (ESS) Tel. (636) 677 0244 ext.110

433 PUBLIC ADDRESS & MESSAGING SYSTEM

The CONTR shall install a rack mounted PA system on the bridge in accordance to USCG regulations. Adequate space and slide rails shall be provided for access for connections and maintenance. Commercial/residential grade connectors and receptacles shall be replaced with hard-wired connections wherever possible. Where non marine specific equipment is used, extra care shall be taken to secure electrical connectors, components and receptacles to prevent disconnection from vibration, vessel dynamic loads and maintenance access. All cables to the racks shall be arranged in an open mesh loom, properly secured to the rack and the vessels structure.

Jacks and microphones shall be provided at the Pilothouse console, wing stations and crew stations.

All speakers shall be high quality marine units. All exterior loudspeakers, junction boxes, and fittings shall be stainless steel or non-metallic, watertight, heavy-duty marine grade equipment with terminations sealed for protection against the effects of wind and water.

There shall be a sufficient number of loudspeakers located throughout the Vessel to meet the minimum requirements for sound pressure levels per USCG. Speakers shall be arranged in zones with individual zone volume control. The anticipated zones are:

- Foredeck
- Main Deck cabin forward
- Main Deck cabin aft
- Stern Deck
- Upper Deck cabin
- Upper Deck aft
- Pilothouse

The system shall be integrated with the video digital messaging system described in Section 448. This Standard Announcement & Messaging system shall be used for transmission of typical announcements/information throughout the Vessel. The system shall be arranged to receive, user configurable, synchronized audio and visual announcements via a USB, SD or equal interface. The Standard Announcement & Messaging Panel shall have individual buttons to select one of eight (8) Standard announcements. Six (6) buttons shall have guards to prevent accidental initiation. The Standard Announcement & Messaging Panel shall be located in the Pilothouse within reach of the Helm Station, backlit and fully dimmable.

The audio PA system shall be designed to provide uninterrupted operation in the event of damage to a portion of the Vessel/system.

A list of standard equipment used throughout the WETA fleet is provided in Appendix B4 and is typically provided, installed and serviced by Electronic System Support Inc. (ESS) Tel. (636) 677 0244 ext.110.

436 GENERAL & FIRE ALARM SYSTEM

The CONTR shall install a General and Fire alarm system in accordance with USCG requirements. This shall be integrated with the PA system. Rotating lights shall supplement audible alarms in engine rooms and appropriate lights shall supplement audible general alarms in passenger spaces.

438 INTEGRATED CONTROL & MONITORING SYSTEM

The CONTR shall plan, design, engineer and install the new Integrated Control, Alarm and Monitoring System (ICMS). Vessels in the OWNER fleet use one of two ICMS from the following OEMs:

- Blue Vision System (Callosum) from MTU (preferred).
- Custom ICMS from Axis Engineering, tel. (619) 757 3600.

The OWNER wishes to maintain commonality in the fleet to increase serviceability. The CONTR is responsible for all liaisons with the OEM in order to provide a complete system, including all hardware. The CONTR shall verify all CONTR furnished components of the system are compatible with the ICMS.

The system shall be arranged to alarm and enunciate in the Pilothouse and locally for engine alarms, ship service generator alarms, and ship system alarms. The alarms shall be self-monitoring, and independent of the functions monitored. Alarm sensors for main engines and ship service generators shall cause annunciation of the fault prior to reaching shutdown conditions. Alarms for ship's systems shall be audible (with an acknowledge button silencer) and visual.

Control, Monitoring and Alarm functionality for all Vessel systems shall be integrated to the extent permitted by the regulatory agencies. The intent is to limit the number of system control panels installed on the Vessel. The CONTR shall include any other alarms that may be recommended by equipment manufacturers. The CONTR shall budget for an Integrated Control, Alarm and Monitoring measuring point list that contains a minimum of 450 channels.

All audible Pilothouse alarms shall be distinguishable as to system by different tones or tone patterns. All visual Pilothouse alarms shall be distinguishable as to system by differing light colors or light patterns. All alarms shall be on separate circuits in order to avoid cascading failures.

The system shall be fitted with a 19" touch screen display. The display shall include a physical dimmer and an alarm test feature. All touch screens shall be capacitive only, not resistive, with buttons adequately sized. Draft menus and pages shall be designed and provided to the OWNER for final layouts and approval.

All equipment that can be remotely started, from the Pilothouse or elsewhere, shall be fitted with a master cut-off switch at the equipment operating station in order to prevent personnel hazard.

Instruments in the Pilothouse shall give a complete readout of engine performance with audible and visual alarms of propulsion faults. Comprehensive main engine control, monitoring, diagnostic, and alarm electronic systems shall fulfill all of the following requirements in Table 438-1

The system shall support an automatic generator start and transfer system. The system when selected shall automatically start and put on line a stand by offline generator only when an online generator fails. An alarm shall signal this operation when it occurs. Essential navigation systems and equipment shall remain on during auto transfers.

Table 438-1 PILOTHOUSE CONTROL, ALARM & MONITORING			
	Monitor	Alarm	Control
MAIN ENGINES			
Lubricating oil pressure (two stage alarm)	x	x	
Low lubricating oil level		x	
Overspeed alarm		x	
Exhaust bank temperature	x	x	
Low expansion tank water level		x	
Raw water pressure	x	x	
Jacket water temperature	x	x	
Engine rpm	x		
Engine oil temperature monitor and alarm	x	x	
Individual cylinder temperature	x	x	
Engine hour meters	x		
Gear oil level		x	
Gear oil pressure	x	x	
Gear oil temperature	x	x	
SHIP SERVICE GENERATORS			
Generator start/stop			x
Breaker open/close gens and shore power	x		x
Shorepower volts amps kw frequency, breaker condition	x		
Low lubricating oil pressure		x	
Low lubricating oil level		x	
Overspeed alarm		x	
Bus current monitor	x		
High coolant temperature		x	
Low expansion tank water level		x	
Voltage monitor and over/under voltage	x	x	
Over/under frequency		x	

Table 438-1 PILOTHOUSE CONTROL, ALARM & MONITORING			
	Monitor	Alarm	Control
Starting battery low voltage		x	
Auto-start and load transfer alarms + positive fault indication		x	
Engine hour meters	x		
SHIP SYSTEMS			
Bilge level in all voids and machinery spaces		x	
Fire and smoke detection alarms in all spaces except voids		x	
Fire suppression release		x	
Steering system low pressure		x	
Fuel tank monitor and high (85% and 90%) and low level	x	x	
Potable water tank low level monitor	x	x	
Sewage tank monitor and 90% High level	x	x	
Lube oil tank monitor and 90% High level	x	x	
DC control and alarm system low voltage	x	x	
Engine Room ventilation fans	x	x	x
All ships batteries	x	x	
Fire & bilge pumps	x		x
HVAC systems	x	x	x

The propulsion system suppliers alarm and monitoring system shall also provide access to all engine manuals and technical information.

439 CCTV SURVEILLANCE SYSTEM

A complete closed circuit color television (CCTV) system shall be installed with fourteen (14) video cameras topside, throughout the passenger spaces, and in the engine rooms, and with centralized monitor mounted in the Pilothouse. The system shall allow complete monitoring of the engine rooms, passenger spaces, stairwells and boarding areas from the Pilothouse and shall also enhance the master's view alongside and astern during docking and maneuvering. Final locations shall be approved by the OWNER.

The system shall be complete in all respects including cameras, camera mounts and enclosures, power supplies, switches, digital video recorder unit and hard drive, dedicated computer (vibration isolated mounted) with RF wireless

keyboard and mouse, 19" LCD color fully hardware dimmable marine monitor, foundations, cabling, fittings, cable penetrations, junction boxes, etc.

The CCTV system shall provide for continuous recording, with 14-day capacity before overwrite. These cameras shall be vandal resistant, weatherproof and shall have internal heaters. Cameras in engine room shall be provided with motion sensing feature.

The dedicated computer and digital recorder unit shall incorporate an inverter with a DC power source.

Mounting and location of all CCTV components shall be subject to OWNER review and approval.

A list of standard equipment used throughout the WETA fleet is provided in Appendix B4 and is typically provided, installed and serviced by Electronic System Support Inc. (ESS) Tel. (636) 677 0244 ext.110.

441 RADIOS

The CONTR shall install three (3) new VHF radios, microphones, mounts, cabling, cable penetrations, antenna, antenna mounts, fittings, power supplies, connections, etc. as required in order to form complete marine VHF radio systems.

Provide and install two (2) VHF command ram microphones, one (1) at each bridge wing station. These microphones shall be wired off one of the overhead VHF radios. Install two (2) VHF radios in the overhead and one (1) in the console as designated by the OWNER. All radios are to be interfaced with GPS. All radio systems shall be in accordance with all USCG and FCC requirements. The installations shall be free of other radio interference.

443 DECK LOUDHAILER

Provide a complete FURUNO LH 3000 loudhailer with foghorn, with all required speakers, microphones, amplifiers, and other components. The deck loudhailer will be installed in the Pilothouse and shall feature hail, listen, talkback and fog signal. Four (4) exterior waterproof marine intercom speakers, at bow, stern and aft boarding area locations shall be installed.

External speakers shall be heavy-duty marine grade, stainless steel or non-metallic components and junction boxes. Mounting and location of all loudhailer components is subject to OWNER review and approval.

444 WHISTLE

One (1) electric whistle shall be installed and shall comply with all USCG requirements. The whistle shall have an integrated fog signal feature.

448 VIDEO SYSTEM

A video system shall be supplied for the Vessel comprised of six (6) 42" flat screen video monitors, distributed inside the passenger cabins. The system shall be capable of displaying video from a video digital messaging system.

The video digital messaging system shall be capable of feeding custom video messages as provided by the owner as well as digital video files to help the Vessel meet 49 CFR Part 39 American with Disabilities Act requirements for passenger vessels. Provisions shall be also made to allow for displaying paid advertisements.

The video digital messaging system shall be controlled from the Pilothouse and used to provide safety messaging and arrival and departure messaging in conjunction with the Public Address system described in Section 433.

A list of standard equipment used throughout the WETA fleet is provided in Appendix B4 and is typically provided, installed and serviced by Electronic System Support Inc. (ESS) Tel. (636) 677 0244 ext.110.

451 GLOBAL POSITIONING SYSTEM (GPS) AND ELECTRONIC CHARTING SYSTEM (ECS)

The CONTR shall provide a GPS system with a Man Overboard (MOB) button mounted on the dash, with the type and location to be approved by OWNER. The GPS shall be interfaced other navigation displays, at a minimum with the radars, VHF radios and Electronic Charting System.

The Contractor shall provide a complete personal computer (PC)-based hardware with MS Windows and Rose Point software installation to support independent electronic charting. Provide signal inputs from the GPS, AIS and all navigation inputs. Provide electronic charts for complete coverage of the routes to be served. Provide electronic charts for full coverage of the delivery voyage if the Vessel is to be sailed to San Francisco for delivery. The PC shall be a marinized, fanless unit with a solid state hard drive operating on DC power. The PC and its CPU, graphics and memory shall exceed the minimum hardware requirements of the Rose Point software, providing capacity for future software upgrades.

Only physical, hardwired com ports should be used. Serial to USB or similar adapters should not be used. Primary user interface will be a trackball and keyboard. A Secondary user interface shall be provided comprised of a RF wireless keyboard and mouse.

Mounting and location of all electronic charting components shall be subject to OWNER review and approval.

455 AUTOMATIC IDENTIFICATION SYSTEM (AIS)

Provide complete installation for the AIS system. The AIS shall be integrated into the Electronic Charting System personal computer. Mounting and location of all AIS components shall be subject to OWNER review and approval.

465 DEPTH SOUNDER

Depth Sounder shall use a transducer model designed for 40 knots and displayed on a FURUNO RD33 display or approved equal. The transducer shall be faired on the outside of the hull to prevent false signals. A coffer dam shall be installed in way of the transducer hull penetration with details approved by the OWNER.

500 Auxiliary Systems

505 GENERAL PIPING REQUIREMENTS

All piping shall conform to USCG requirements for strength, materials and testing. Piping and system components shall be in accordance with:

- the requirements of this section
- the specific system details contained in this specification
- The WETA standard piping materials matrix in Appendix B2

Piping runs shall be straight, neat, and out of the way of walkways and passageways. Pipe hangers welded to ship structure shall be suitably located to support pipe against stress and vibration. Wherever piping must be removed for maintenance or replacement of other components, flanges or take-down joints shall be fitted. Piping to rotating machinery shall have flexible connections of components suitable for the pressure and service.

All piping system fasteners shall be 316 stainless steel.

To the greatest extent possible, pumps for a given service shall be provided by the same manufacturer and shall be of the same size and material.

Shore interface fittings shall conform to OWNER standard in Appendix B1. All valving, fittings, and fasteners shall be high quality marine grade materials. Pot metal or nickel-plated components shall not be used.

All pipe hangers and clamps shall be stainless steel with non-conductive bushings around the pipe, ZSI Alpha, Beta or Omega series clamps.

All valves shall be high quality, quarter-turn butterfly or ball style unless required otherwise by regulatory agencies. Valves in seawater systems shall have highly corrosion resistant discs and stems i.e. Monel, Inconel, Hastelloy or equal. All seawater valves and piping shall be isolated from the hull for galvanic protection. The CONTR shall ensure all valves handles rotate in the same direction (e.g. clockwise to close or vice versa).

All valves located below deck plates shall be equipped with reach rods so as to be accessible from the deck plates without removing deck plates. Removable or hinged deck access hatches shall not be used to access valves unless approved by the OWNER.

All check valves shall be entirely constructed from stainless steel, Monel, Inconel, Hastelloy as appropriate for the service.

506 VENTS, FILLS, AND SOUNDING SYSTEMS

All spaces and tanks shall be vented as required by USCG regulations. All vent openings to weather decks shall be fitted with stainless steel insect screens. Screens shall be accessible for cleaning and replacement. Vent and fill caps shall be color coded to show service following OWNER standard piping system colors in Appendix B6. All tank fills shall have caps capable of locking with a standard padlock. All vents for systems containing oil shall terminate above an oil containment.

Tank vents and load/off-load connections shall be configured and located such that they are not subject to mechanical damage during docking.

Calibrated sounding tapes shall be provided for fuel tanks and voids, as well as the tank level indicators. Tank level indication shall be provided through the Integrated Control and Monitoring System as described in Section 438.

Shoreside Connections and fittings shall be provided in accordance with Appendix B1.

Fuel Oil

The fuel oil system shall be arranged so that both fuel tanks can be filled from the bow. Fuel oil fill piping to the storage tanks shall be consolidated into a central single fueling containment complete with a cofferdam and drain. Fuel tank vent system piping shall also be located within this containment area. Flameproof vents shall be fitted on each fuel tank and mounted vertically with the opening facing down. Fuel oil fill piping and vents shall be sized for fueling at sixty gallons per minute (60 GPM) from the deck fill connections to the tanks.

A two-stage high level alarm system completely independent of the primary sounding and measuring system shall be installed to prevent overflow during refueling operations. The alarm shall provide the following indications of the tank level status during refueling:

- Two (2) lights (AMBER, RED), nominally set for eighty-five percent (85%) and ninety-five percent (95%) tank capacity and located at the foredeck fueling containment. Lights shall be waterproof and be made from SS or high quality marine grade plastic with test function.
- Audible alarms at the foredeck fueling containment and, in the Pilothouse, with the ability to silence locally or through the ICMS.

The refueling alarm shall utilize a dedicated tank level sensor in the tanks or demonstrate equivalent redundancy and have adjustable alarm points for initial setup. The refueling alarm system shall have a master switch located at the refueling station.

Fuel tanks shall be outfitted with standalone fuel sight gauges such as GEMS Suresight or equal. The sight gauges shall be remotely installed on the engine room bulkhead for maximum utility and visibility.

Potable & Freshwater

Water tank fill and vent shall be located on the bow, separate from the fuel fill station.

Lube Oil

Separate clean oil fill and dirty oil discharge connections will be installed adjacent to the Port and Starboard engine room entry doors in a dedicated containment. Tank vents shall terminate in this containment.

Sewage

Sewage tank suction shall be located on the bow and provided with a dedicated containment. The discharge connection shall be valved and capped and be directly compatible with the shoreside hose fittings. Sewage tank vent shall be located in such a manner as to keep odors away from passenger and boarding areas.

507 PIPING DESIGNATION & MARKINGS

All piping systems shall be color coded and stenciled in large letters at least twice in each compartment to indicate their service as set forth in Appendix B2. Arrows of contrasting color to the pipe shall be applied to the pipes to indicate the direction of fluid flow under normal conditions.

All valve wheels and handles shall have engraved stainless steel name tags attached that indicate the system, purpose of the valve, and the normal position if appropriate. For example:

<p>POTABLE WATER FILL</p> <p>NORMALLY CLOSED & LOCKED</p>

All nameplates shall adhere to the equipment with a permanent marine adhesive, 3M 5200 or approved equal.

514 HEATING, VENTILATION, & AIR CONDITIONING (HVAC)

Complete heating and ventilation systems shall be provided for the Vessel to maintain passenger comfort while underway. Designs shall conform to applicable regulatory requirements, SNAME Technical Bulletins and ASHRAE Handbooks.

Final equipment sizing, air quantities, locations and sizes for ductwork, fans, room diffusers, fire and balance dampers, return and exhaust grilles shall be determined by the CONTR to meet the requirements of this Section.

The CONTR shall also provide OPTION pricing for Passenger space air conditioning as defined in Part A of the specification.

Table 514-1 HVAC DESIGN CRITERIA		
Criteria	Cooling Season	Heating Season
Weather	84 ^o FDB - 64 ^o FWB	32 ^o FDB
Sea Water	70 ^o F	50 ^o F
Passenger Cabins / Pilothouse	74 ^o FDB - 62 ^o FWB	72 ^o F

Heating System

The enclosed passenger cabin and Pilothouse shall have space heating installed that is capable of maintaining the Passenger Cabin Temperature per Table 514-1.

Passenger Cabin Ventilation System

The passenger cabin shall be provided with ventilation openings sufficiently sized and located to maximize passenger comfort during summer months. The vents shall be arranged to maintain the flow of fresh, cool air throughout the passenger cabin. Vents shall be arranged to draw from the coolest, odor free, clean air supply available and care shall be taken to avoid the ingestion of exhaust fumes, hot air and noise from machinery or wind.

Ventilation fans shall be provided to maintain air movement throughout the cabin when stationary or at slow speeds. Ventilation fans shall have controls with automatic functionality based on user defined temperature setting. The thermostat shall be located in the Pilothouse.

Pilothouse Air Conditioning

Air conditioning shall be provided in the Pilothouse space only. Air conditioning shall be accomplished self-contained, roof mounted units or equal arrangement sufficiently sized to maintain the Pilothouse Temperatures per Table 514-1.

Pilothouse Defogging

HVAC system design for defogging of Pilothouse windows shall be properly sized to keep all Pilothouse windows clear of fog under all conditions of weather. The fans associated with the Pilothouse defogging system shall be quiet type multi-speed fans to allow operator selection of at least three (3) levels of defogging. The CONTR shall ensure that Pilothouse HVAC and defogging systems meet the noise criteria as established in Section 089 when the fans are being operated at their highest speed setting.

Fire Dampers

All fire and balance dampers shall be installed with full and easy access, allowing for complete operation, maintenance, and inspection of the dampers. Fire damper installation shall allow one (1) member of the crew to reset all fire dampers in three (3) minutes or less. All fire dampers, actuators, fasteners, bushings and components shall be constructed from stainless steel or non-corrosive materials.

Machinery Space Ventilation

The Engine Room ventilation system includes the combustion air and is specified separately in Section 251.

All spaces below decks that contain machinery shall be mechanically ventilated in order to maintain space temperatures and air quality suitable for human occupancy and provide ample ventilation for installed equipment cooling.

524 AUXILIARY SEA WATER COOLING SYSTEMS

The CONTR shall provide complete piping systems to support the seawater cooling requirements of auxiliary machinery and other installed equipment as required. Individual system sea chests or thru hulls may be consolidated in a single sea chest as approved by the OWNER. Quick-opening sea strainers shall be installed ahead of all pumps and machinery with appropriate sea valves, isolation valves, gauges, vents, etc. Special care and attention shall be given to the arrangement and operability of the valves and access to the strainers.

Seachest coating shall be provided IAW section 633.

526 DRAINS

Exterior decks shall be cambered for drainage of water. Drained water shall be collected and led overboard through downspouts.

Trapped deck drains shall be provided in all restrooms, storerooms, and the Snack Bar. These drains shall be directed to the sewage tank.

528 SEWAGE SYSTEM

A sewage system shall be installed, collecting sewage from all installed toilets. The system shall be designed and installed to meet all USPHS regulations. The sewage-holding tank shall be sized per Table 126.1. The sewage tank shall be fitted with a high-level alarm set to 90% and tank level indication in the Pilothouse per Section 438.

The CONTR shall take particular care to properly slope the drains to the sewage tank and to provide convenient clean out ports for snaking lines.

The toilet flushing system shall be a Headhunter system or approved equal utilizing low volume toilets. The toilets shall use fresh water and the supply shall be fitted with a proper USPHS inspected and approved back flow preventer. Toilets shall be fitted with a remote pushbutton mounted in the bulkhead as directed by the OWNER.

All gray water drains shall be connected to the sewage tank and shall include accessible traps.

The sewage discharge pump shall be installed to draw from the tank and discharge to the offload shoreside connection located on the bow as described in Section 506. The sewage discharge pump shall be sized to off-load 500 gallons in five (5) minutes. The pump shall be installed in accordance with the WETA standard detailing in Appendix B2 with provisions for removal from the tank.

Weatherproof, lockable sewage pump controls shall be located adjacent to the shore connection fittings with a hold to pump pushbutton to prevent running the pump dry for extended periods.

A flushing fitting shall be provided adjacent to the discharge connection for flushing the shoreside discharge hose with fresh water after sewage pumping and prior to decoupling the shoreside hose. The flushing fitting should be sized to receive a 1-1/2" fire hose connection and located to prevent back flushing water into the vessel's tank.

Sewage pump suction and discharge piping shall be installed using long radius fittings or equivalent pipe bends.

529 BILGE AND FIRE SYSTEM

Bilge piping and pumping systems shall be provided and installed so that bilges can be pumped either overboard for purposes of emergency dewatering, or to the fire main in case of emergency.

A fire main system shall be installed, serviced by a fire pump with fire stations located and equipped to suit USCG regulations. Fire pumps may not double as bilge pumps. Fire and bilge pumps shall be stand alone and self-priming.

The fire and bilge pumps, and related systems, shall be operable from the Pilothouse as well as locally at the pumps.

The fire main hose stations shall have recessed fiberglass enclosures. Multi-hull vessels shall be fitted with bilge and fire systems in each hull, with appropriate cross connections. The CONTR shall provide complete systems to include pumps, piping, valves, gauges, hull fittings, etc.

Junction boxes shall be stainless steel or non-metallic watertight construction.

Bilge Pumps shall be standalone with individual pumps mounted in each void as required by USCG and installed in accordance with the WETA standard drawing provided in Appendix B2.

533 POTABLE AND FRESH WATER SYSTEMS

Potable and fresh water systems shall be combined systems with appropriate safeguards to ensure adequate separation of the subsystems in terms of health requirements. The design and installation of the potable water and fresh water systems shall satisfy all health regulations of the USPHS.

All potable and fresh water shall be filtered ahead of the pump with a cartridge type mechanical paper filter. The potable water subsystem shall be filtered again after the pump with a cartridge type charcoal filter. Arrange filters next to each other with bypass lines and isolation valves to facilitate filter changes.

The potable water system shall include the potable water storage tank, a filter system, and minimum 25-gallon hot water tank, and potable water distribution to restroom fixtures, drinking fountains, commissary equipment and fixtures, and cleaning stations. Hot potable water shall be provided to all sinks. All potable water fixtures shall have an isolation valve installed in the potable water supply piping to the end faucet. The isolation valve shall be located as close to the fixture as practicable and shall be readily accessible for operation.

To facilitate Vessel cleaning, provide cold-water hose bibbs in the disabled-accessible restroom and in each engine room. Additionally, hose bibbs shall be provided on exterior bow and stern deck for crew use. Bow water supply to have sufficient pressure to spray the Pilothouse windows.

A dedicated bicycle washing station with coiled hose shall be provided adjacent to the bike rack.

Potable water systems shall be flushed and disinfected in accordance with accepted standards for such procedures. The CONTR shall be wholly responsible for obtaining certification that the potable water system is fit for human consumption.

The CONTR shall provide a fresh water subsystem to also supply fresh water to:

- The Pilothouse window washers.
- The toilet flushing system.

The sewage off-load flushing lines and toilet flushing systems shall include back-flow prevention devices to prevent contamination of the fresh water storage tank and other parts of the fresh water system. Back flow preventers shall meet USCG and USPHS requirements for such devices.

555 FIRE SUPPRESSION SYSTEMS

Fire detection, alarm and suppression systems shall be installed to protect machinery spaces in accordance with USCG requirements.

The CONTR shall use FM200 for fire suppression unless a suitable alternative is proposed. The final details and arrangements of the system shall be determined during the detailed engineering and review process.

The new fire suppression and alarm system shall be integrated with the Vessel's alarm and monitoring system per Section 438 to the extent allowed by USCG to provide the captain with all fire suppression and alarm system information needed for safe Vessel operation.

581 GROUND TACKLE

The CONTR shall provide ground tackle in accordance with the following requirements. In the development of the design and location of ground tackle, the CONTR shall ensure that it cannot be fouled with terminal and dock facilities by locating the anchor in a recessed storage pocket to one side of the Vessel centerline.

A lightweight DANFORTH type anchor of appropriate holding power shall be provided. The anchor shall be attached to high strength galvanized stud link chain and 300' of nylon line with an orange marker buoy attached. The chain, line, and buoy shall be fitted and stowed forward, with provisions for quick release without requiring the crewmember to lift outside the railing.

The bitter end of the anchor line shall be securely attached to hull structure. The line shall be complete with closed eye socket, and shall have all necessary detachable links, swivel and fittings required for a complete anchoring assembly.

Any sliding surface for anchor movement shall be faced with UHMW plastic.

582 MOORING

A complete set of four (4) 1-5/8" SSR-1200-8 mooring lines;, each 50' long, eye splice shall be provided on one end.

Provide a minimum of fifteen (15) bitts and cleats to accommodate existing terminal facilities during all conditions of weather and tide. The CONTR shall develop a Mooring Plan, for OWNER approval. The Mooring Plan shall detail the type, number, location, and arrangement of mooring fittings. Mooring cleats shall be provided and "through rail" welded, not surface mounted. At least 6" of clearance shall be provided around cleats of bitts for safe handling.

The bitts and cleats shall be vertically positioned at main deck level. Keyhole any bulwarks in the way of line handling fittings.

The lines utilized for Vessel docking are of fixed length; this requires that the orientation of mooring fittings to the passenger boarding doors be dimensionally exact. The CONTR shall shipcheck the existing OWNER vessels and passenger dock and provide mooring fittings that are completely compatible in all respects.

The vessel shall be fitted with full-length rub rails that extend least 12" out from the side plating. The top of the rub rail shall be vertically positioned at the same height as the main deck. The top surface of the rub rail shall be painted with non-skid, see Table 631-1. The vertical face of the rub rail shall be left unpainted.

In developing the Mooring Plan, the CONTR shall take into account the following:

- Standardized sizes and locations for cleats and bitts.
- Cleats fore and aft of each boarding area, with a minimum of 6" of clearance from superstructure and boarding gates for safe make up of line.
- Cleats and bitts provided with line cuts in bulwarks where needed.
- Adequate open deck space around deck fittings to ensure safe footing.

583 LIFESAVING EQUIPMENT

Life-saving and safety equipment at a minimum shall meet USCG requirements except the following.

- Inflatable Buoyant Apparatus (IBAs) for 100 percent (100%) of the Vessel shall be provided, fully outfitted and installed in locations approved by the USCG and the OWNER; with means for one (1) person launching.
- Life Jackets shall be provided in accordance with USCG requirements. Life Jackets shall be stored in dedicated bins or cabinetry which is integrated into the vessel's interior outfit. Life Jacket storage shall be consolidated to the extent allowable by USCG so as to eliminate the number of storage locations.
- Additional stowage shall be provided for a total of one hundred (100) child size life jackets; this exceeds the ten percent (10%) USCG requirement. Life preservers shall be stowed on both passenger decks in ratios proportionate to the seating.
- The CONTR's design shall completely outfit the forward boarding areas on each side of the Vessel for overboard recovery using a JASON'S CRADLE recovery system. The boarding areas shall have sufficient space for two personnel to rig, install, operate and recover personnel from the water. Each Vessel shall be equipped with a total of two (2) Jason's Cradles. The CONTR shall provide all hardware, including but not limited to, a padeye, a suitable lightweight ratchet block with cam-cleat and yacht braid line and flush mounted color-coded self-draining Jason's Cradles attachment points.

The CONTR shall incorporate provisions in the vessel structure for future installation of a fully automated, electric motor driven Jason's Cradle storage reel. The CONTR shall construct a recessed cavity in the overhead, directly above each forward boarding area. The cavity shall provide sufficient volume to house a reel while supporting the recovery geometry shown in the WETA standard detail. Space allocation shall be provided inside the vessel adjacent to the reel enclosure for future installation of the automation equipment including the electric motor, brakes, controllers etc.

- Four (4) Crew PFD Work Vests, one with 50' of 3/8" floating line attached by safety carabineer.
- Two (2) boat hooks, aluminum pipe with bent sheep's crook; provide stowage clips or brackets at each end of the Vessel at an OWNER -approved location.

The successful CONTR shall prepare a list of all proposed lifesaving equipment for OWNER's approval prior to agreement signing.

600 Outfitting

601 GENERAL ARRANGEMENT

The OWNER desires a modern, easily maintainable interior with a light, open aesthetic and good exterior visibility through large windows. Every effort shall be made to maximize passenger privacy while adding interest to the passenger seating arrangement through various combinations of aircraft-style seats and booths with tables and bench seating.

The CONTR shall determine a Vessel arrangement that includes, but is not limited to, the following general features on each deck:

Pilothouse

- A raised Pilothouse with 360-degree visibility is desired. Pilothouse requirements are further specified in Section 401.

Interior Decks

- A mixture of interior seating, per Section 645.
- Snack Bar per Section 651.
- Ticket Station per Section 651.
- Utility Storage Space per Section 654.
- Unisex and ADA passenger heads per Section 644.
- Wheelchair provisions per Section 084.

Exterior Decks

- Bicycle stowage per Section 672.
- A mixture of covered and uncovered exterior seating per Section 645.
- All boarding facilities.
- Crew locker space per Section 654.

602 HULL DESIGNATING & MARKING

The CONTR shall furnish all nameplates, notices, notice frames, markings and labels, required to complete the Vessel to the satisfaction of the USCG and all other regulatory agencies. This includes the ship name on each side of the bow, and the ship name and hailing port across the stern, deck plans, a CONTR's nameplate, and all licenses and certificates required for posting.

The CONTR shall provide Vessel name lettering and hailing port lettering made from 1/8" thick aluminum plate. The lettering shall be permanently welded to the Vessel at locations approved by the OWNER. Size and style of the lettering shall also be subject to OWNER approval thirty (30) days prior to beginning this work. The lettering shall be preserved and painted following installation.

All nameplates, labels and identification tags shall be permanently adhered to the equipment or adjacent surface with a marine adhesive, 3M 5200 or approved equal.

The CONTR shall provide interior signage in accordance with the WETA standard drawing provided in Appendix B6 and additional signage as required to encompass:

- No Smoking signs.
- Fire door markings.
- Video surveillance.
- Seats reserved for disabled and elderly.
- No Admittance, Crew Only.
- Lighted exit signs.
- Lifesaving equipment locations.
- Life preserver markings.
- Life buoy markings.
- Boarding direction signs.
- Instructions for use of lifesaving equipment.
- Any and all markings and notices required by USCG.
- Signs denoting mobility impaired (wheelchair) facilities.

All vents, fills, and shore side connections shall be clearly marked to show their purpose and restrictions on their use.

Pipe marking details are provided in Section 507.

Fire hydrants and firefighting equipment shall each be marked to indicate the station number and hand held fire extinguishers shall be marked with the location of their station, all per USCG requirements.

Service and other spaces not otherwise required to have markings shall have identification plates of 1/8" thick engraved aluminum material. Markings shall be compatible with the interior design scheme.

If the Vessel is provided with certified spaces (certified for deduction from gross tonnage as determined by the Tonnage Admeasurer), those spaces shall be permanently marked by center punching as required by admeasurement regulations.

Emergency lights shall be marked with a 1" high letter "E", with white lettering on a red background.

To facilitate future blasting and painting of the hulls, provide permanent skip weld marks to indicate the boot stripe location along each hull, at full load static displacement plus 6".

603 DRAFT MARKS

The CONTR shall provide vessel draft markers made from 1/8" thick aluminum plate. The draft markers shall be permanently welded to the Vessel at locations approved by the OWNER. Size and style of the lettering and draft markers shall also be subject to OWNER approval thirty (30) days prior to beginning this work. The lettering and draft markers shall be preserved and painted following installation.

604 LOCKS, KEYS, & TAGS

Weather tight doors and all joiner doors except, where otherwise specified, shall be fitted with cylindrical type locksets, with latch bolt operated by knob from sides, cylinder outside, and no means of locking on the inside. Pilothouse doors shall have cylindrical locksets with latch bolt operated by knob on the inside, cylinder on the outside and thumb turn on the inside. Interior fire doors in main vertical zone bulkheads interior stairway enclosure doors and interior passage way doors shall have cylindrical type latch sets with knobs free on both sides. Doors held open by magnetic holdbacks shall have flush-ring type handles.

All door locks on the Vessel shall be set up for single OWNER grand master key operation. The OWNER shall provide the CONTR with a Master Key.

The overall number of keys on the vessel shall be minimized and consolidated to the maximum extent possible; all keys shall be tagged and indexed.

The CONTR shall provide locks and keys for the four (4) crew lockers.

The CONTR shall provide and install a complete indexed key locker in the Pilothouse, with 4 sets of clearly marked keys of all locks.

External hatches leading to engine rooms, void spaces and other machinery spaces shall be furnished with hasps and padlocks or equal locking provisions for securing with a padlock. Manhole keys and/or wrenches shall be provided and stowed as directed by the OWNER

612 RAILS, STANCHIONS, & LIFELINES

Handrails, grabs, and/or bulwarks shall be fitted on all decks where necessary for the safety of passengers, and for crew access. Full length hand rails shall be fit along the exterior sides of both the main and second deck for crew access, cleaning, and line handling. Intermittently placed handholds will not be acceptable. Handrail stanchions shall be of non-corrosive material. Where breaks are required for line handling, portable handrail sections and suitable grabs shall be provided for the safety of line handlers.

Provide personnel safety equipment, harnesses, tracks, rigging, fittings, railings etc. to enable crews to externally deploy lifesaving gear, service cabin top equipment, wash and maintain all windows.

The CONTR shall ensure ready access to the bow of the Vessel for the crew by providing cutouts or gates, which permit safe transit to the bow area for line-handling or other purposes.

Exterior observation decks shall be fitted with handrails and bulwarks up to a height of 42" to protect against small parcels or children falling overboard.

Handrails shall be installed as required around machinery and elsewhere for safety of operation. Handrails shall be removable where they may interfere with repair or maintenance of equipment.

621 NON-STRUCTURAL BULKHEADS

The CONTR shall provide and install panel joiner bulkheads with finishes in accordance with the final approved interior arrangement drawings and the manufacturer's recommendations. All joinery systems shall conform to the fire load, structural fire protection and other interior design standards as dictated by the USCG for a Vessel of this type and passenger capacity. Where possible, all lightweight materials shall be used to lower the overall weight of the Vessel.

The CONTR shall provide and install new tile-style ceiling panels as specified in Appendix B3.

622 FLOOR PLATES & GRATINGS

In machinery spaces, suitable gratings and flats shall be installed to allow safe access to all machinery. Deck plates and gratings shall be of aluminum anti-slip plate, flanged, and fastened to framing with standard slot type 316 stainless steel countersunk Phillips head deck screws of proper length. Ladders to machinery spaces shall be inclined versus vertical wherever practicable.

Lifting padeyes shall be installed above all engine room ladders to allow for easy lifting of parts, motors, and other heavy equipment.

Lifting padeyes shall also be welded to overhead framing to facilitate equipment change out where the weight of said equipment exceeds sixty-five (65) pounds. All padeyes shall be weight tested and marked accordingly, and rated at 1000 pounds minimum.

Shaft couplings, belt drives, and other rotating and exposed machinery shall be fitted with removable guards to prevent personnel injury.

623 LADDERS

Interior stairs between passenger spaces, arranged and dimensioned to support the passenger offloading requirements of Section 063, shall be designed for loads of at least 200 pounds per square foot. Stairs shall be fitted with handrails and non-slip deck treads. Treads shall be Wooster or equal. Wherever installed, non-slip treads shall not present a tripping hazard. Handrails supported by bulkheads shall have a clear hand space per ADA guidelines.

Vertical ladders in general, as well as inclined ladders to machinery spaces, shall be of aluminum construction, fitted with hand rails and overhead grabs as required for safe use. All surfaces of ladders shall be free of sharp corners.

624 NON-STRUCTURAL CLOSURES

Hardware including doors, door hardware, trim, fasteners and attachments shall be corrosion resistant satin finished stainless steel unless otherwise approved. All hardware shall be of the best marine quality, TrioVing or equal.

Doors shall be Pacific Coast Marine or equal quality. Provide a security peephole in the Pilothouse door(s).

Provide rubber button stops and catch hooks for all doors. Doubler plates shall secure stops and hooks to the respective bulkhead or structure.

All exterior weather tight doors shall be fitted with closers and single lever dogs.

In general, interior doors shall be fitted with closers and not swing into an aisle or passageway. Door thresholds and sills shall meet the ADA requirements of Section 092 and incorporate fairings to eliminate all tripping hazards. All interior doors shall be fitted with closers requiring less than five (5) pounds of pressure for operation.

625 AIRPORTS, FIXED PORT LIGHTS, & WINDOWS

Windows in the passenger spaces shall be of the bonded, frameless type and installed using an approved marine grade adhesive system such as Sika, 3M or equal. The glass shall be high quality laminated safety glass. Glass panes shall be of a thickness required by the USCG and classification society rules but in no case less than 3/8" thick on the forward house windows and 1/4" thick elsewhere. All passenger space windows shall be fixed.

The CONTR shall integrate the sizing, layout, and design of Pilothouse windows with the Pilothouse and console arrangement described in Section 401. Visibility for the crew during Vessel operations shall be enhanced to the greatest extent possible by minimizing the size of the mullions and quantity of forward facing Pilothouse windows. The center Pilothouse window shall be as large as possible. Windows in the Pilothouse shall be fixed except that one window on each wing station shall be a horizontal sliding window.

Forward Pilothouse windows shall be fitted with adjustable, robust, marine grade Mylar shades in guided tracks.

Provide windows or CCTV on the aft Pilothouse bulkhead for visibility aft either to the stern, or into the upper passenger cabin spaces, as applicable. The aft Pilothouse windows shall be provided with window treatments (blinds) wherever passengers could potentially see into the Pilothouse. Window treatments shall be fully integrated with the Vessel's interior decor.

Windows shall be tinted to the satisfaction of the OWNER. Pilothouse windows shall not be tinted. Windows shall be shaped to suit the superstructure. Space between clear openings shall not exceed 4-1/2".

Pilothouse windows shall be installed at an angle to minimize glare and reflections.

Window designs and installations shall allow for a two (2) hour window replacement time.

The CONTR shall minimize the number of different, individual window sizes installed on the Vessel.

626 WINDOW WIPERS

The Pilothouse window wipers shall be installed for all forward facing windows. The wipers shall cover the entire rain swept area of visibility clearing at least eighty percent (80%) of the window area. The wipers shall be Wynn Type D, Mk-V or approved equal, linear style, with variable solid-state speed control. The wipers shall have an auto-parking feature that does not obscure the window in the parked position. Quiet wiper operation is essential, the CONTR shall be responsible for ensuring that noise from operating wipers is minimized. See Section 088 for noise limits. A fresh water window washer system shall be provided with water supplied from the Vessel's fresh water system.

631 PAINT & COATINGS

The CONTR shall propose a recognized marine paint manufacturer to the OWNER for approval. The paint formulation, specification, surface preparation, environmental constraints and application, shall be in accordance with that manufacturer's recommendation and warranties. The CONTR shall provide a complete painting schedule to the OWNER for approval prior to agreement signing. Upon receipt of the OWNER's approval, painting system applications may begin. All coating systems shall be legal in the State of California.

The CONTR's Painting Schedule shall be reviewed and approved by the paint vendor(s) before it is submitted to the OWNER for approval. The Paint Schedule shall include information pertaining to paint formulation, surface preparation and cleaning, environmental constraints, and application techniques and tolerances.

Paint performance, including but not limited to anti-fouling performance, shall be fully warranted by the CONTR.

Interior Coatings

The Pilothouse interior shall be painted flat black using Zolotone finish with a sealer coat. The console shall be meticulously covered to prevent paint damage prior to delivery.

The Interior joinery of the vessel shall be constructed of honeycomb aluminum panels with HPL laminate, decorative metal finishes or microperforated aluminum sheet as required by the location of installation. The honeycomb joinery system shall be Ayres Ayrlyte panels Made in the USA or approved equal. The system shall be constructed using the approved Ayers aluminum extrusions, panels, assembly accessories and techniques best suited for each application. Where multiple options exist on how to connect, support, retain or finish panels the most robust method and materials shall be chosen to complete the detail. Standard details for construction shall be developed by the CONTR for review and approved by the OWNER prior to construction. All panel finishes (both sides) shall be approved by the OWNER prior to ordering any interior materials. All finishes shall be reviewed and approved for compliance with the standard WETA interior finishes and the area of application. All laminates shall be high quality and readily available. All adhesives used in honeycomb panel fabrication shall be approved by Ayres and the OWNER. The interior design shall strike a balance between light weight and a durable system suitable for years of heavy passenger service. The OWNER shall approve all panel scantlings to ensure that a suitable balance has been met. The OWNER reserves the right to consult with the manufacturer, require calculations and/or a full size mockup if required to prove the suitability of scantlings, assembly techniques and accessories used.

Exterior Coatings

A representative exterior painting color scheme with logos and branding is provided for reference in Appendix B7. The CONTR shall provide a final color scheme tailored to their Vessel configuration to the OWNER for approval within ninety (90) days of agreement award.

Exterior areas of the vessel not exposed to view shall be left unpainted such as the tunnel between hulls, the inside of bulwarks, undersides of roof structures, and handrails. The CONTR shall determine all such areas with OWNER's approval prior to painting.

Colors on multiple coats of epoxy primer shall be of a differing shade.

The CONTR shall exercise care in the painting of the bow and bulwarks to avoid glare and reflection into the Pilothouse. Gloss finishes on these surfaces shall be avoided.

The CONTR shall coat the inner surface of all hull penetrations with a proven marine epoxy coating system such as Blueseal or equal. Hull penetrations to be coated include, but may not be limited to, thru-hull piping connections, stern tubes and seachests. The epoxy coating system shall be applied to the entire interior surface of each hull penetration, wrapping onto both the outer surface of the hull for no less than 6" and the entire face of the flange to completely encapsulate the aluminum as shown in Appendix B2. The Blue Seal or Amercoat 140 shall be applied over everything while the Intersleek shall only be applied to the interior of the pipe and not over the face of the flange.

Paint thickness and type shall be in general accordance with Table 631-1. In all cases, the application method, thicknesses, and recoating schedule must follow the coating manufacturer's requirements.

Table 631-1			
Location	Coating System	DFT (mils)	Color
Hull - waterline to keel, 6" boot stripe	Sandblast to achieve manufacturers required profile	-	-
	Epoxy primer	5-6 mils	Black
	Epoxy primer	5-6 mils	Light Gray
	Antifouling (Intersleek)	5 mils	Red
	Antifouling (Intersleek)	5 mils	Black
Hull - waterline to sheer and guard rails, House, and Bulwarks	Sandblast to achieve manufacturers required profile	-	-
	Epoxy primer	4-5 mils	Buff
	Polysiloxane Topcoat	3-4 mils	White
Weather Decks (including hull deck on resiliently mounted configurations)	Sandblast to achieve manufacturers required profile	-	-
	Epoxy primer	3-4 mils	Buff
	Pacific Polymers Elastodeck 5001	6-8 mils	Medium Gray
	Broadcast non-skid additive	-	-
	Polysiloxane Topcoat	3-4 mils	Medium Gray
Exterior house overheads, inner bulwarks, non-exposed areas	Refer to Section 631	-	-
Machinery, main engines, gears and gensets	OEM epoxy coatings, white	-	-
Hull Penetrations	Mechanically achieve manufacturers required	2-3 mils	-
	Blue Seal - Filler coats (as required)	10 mils	Blue or Grey
	Blue Seal - Top coat	10 mils	Blue or Grey
	Antifouling (Intersleek)	5 mils	Red
	Antifouling (Intersleek)	5 mils	Black

The CONTR may also provide ORCA vinyl in lieu of the Hull an exterior superstructure coating system specified in Table 631-1. ORCA vinyl shall only be applied by a certified applicator.

633 CATHODIC PROTECTION

The vessel shall be fitted with passive aluminum Milspec MIL-A-24779 anode-type protection system with meters installed on the Bridge to allow for assessment of each of the hulls' potential by the operators. Bolt-on passive anodes shall be provided on the hull bottoms, and at each main engine seachest in sufficient numbers, locations and weight to protect the hull for 2 ½ years. The CONTR shall provide the services of an ABYC certified specialist qualified to design the system and then to measure and provide a report of adequacy when the Vessel is afloat.

Unless otherwise noted, all hardware and fasteners used in the construction of the Vessel shall be 316 stainless steel.

Isolation of Dissimilar Metals

The assembly of dissimilar metals throughout the Vessel shall be in accordance with good shipbuilding practices and all regulatory requirements. Corrosion and Coatings Prevention in the ABS Rules for Building and Classing Aluminum Vessels shall be followed without exception.

Copper tubing is not permitted in sea water systems, and copper nickel piping shall be isolated from hull fittings. Water systems shall be constructed using the same material for piping and fittings throughout the system. Steel and other non-aluminum metal fittings shall be isolated from the aluminum structure at their mounting surfaces by means of 10 mill PVC tape or other approved methods. Isolate stainless steel from aluminum using isolation kits, and products such as TEF-GEL in areas where direct contact cannot be avoided.

Pumps in sea water systems shall be free of ferrous components.

634 DECK COVERING

Deck coverings shall not be applied until production work, especially welding, has been substantially completed. The decks shall be smooth and fair when deck coverings are applied. All decks shall be bare and unpainted except as noted in Table 634-1.

Table 634-1	
Location	Type
Weather Decks	See Table 633-1 for non-skid.
Pilothouse	Carpet per Appendix B3.
Passenger Spaces	Carpeted throughout in accordance with Appendix B3 with a carpet cove base that meets ADA requirements of Section 10.1. Install slip resistant FORBO vinyl flooring or equal mats just inside all passenger boarding areas per OWNER layout and direction.
Internal Stairways	Full tread WOOSTER PRODUCTS Super-Grit nosings, safety yellow at top and bottom stair.
Restrooms & Commissary Spaces, Bow Door	Epoxy poured flooring system in accordance with Appendix B3, minimum 3" coving onto all bulkheads.

Full width and depth safety treads shall be fitted on all stairs, safety yellow at top and bottom stair. Stair treads shall not present tripping hazards wherever installed.

Exterior stair treads shall be fitted on exterior stairways and shall be aluminum.

Rubber matting shall be provided for the Pilothouse and installed in way of ship service switchboards and other electrical equipment. Matting installed in way of electrical equipment shall conform to MIL SPEC #M-15562F Type III for dielectric properties.

The selection of deck covering materials and colors shall take into account the durability, cleanability, and maintainability of such materials. The materials and colors proposed by the CONTR shall account for the fact that many areas of the Vessel will be subject to heavy foot traffic. Materials shall be selected based on their ability to hide such heavy use, yet the materials must present a pleasing appearance and contribute to the overall decor. Another factor that shall be considered in the selection and installation methods of these materials is the ease of future replacement as the deck coverings wear out over time.

After installation of finished decks, they shall be immediately and completely covered with plywood runners and cardboard protection through completion of the delivery voyage in order to protect the finishes.

635 INSULATION

Insulation shall be provided in all exterior bulkheads, joiner doors, and overheads with a suitable vapor barrier on the occupied side of the insulation. Care shall be taken to ensure the integrity of this barrier.

Acoustic insulation shall be installed in the engine rooms and shall be effective so as to limit sound to levels indicated in Section 088. The manufacturer's recommended methods shall be used for installation of the insulation. Sound leaks at doors and other openings shall be sealed to provide an acoustic sound barrier.

Machinery space insulation shall be lined with sheet metal (no perforations). The finished surface shall be designed and installed for protection of the underlying insulation and ease of cleaning.

Mild steel or galvanized pins shall not be used for installation of insulation. Use stick on or welded bi-metallic stainless steel pins and stainless steel clips.

Structural fire protection must be fitted throughout the Vessel in accordance with USCG requirements as specified in 46 CFR.

Engine exhausts shall be lagged with a multi-part system made up of silicon/fiberglass outer cloth (ALPHA MARITEK Style #3259-2-SS) sewn to high temperature eighteen-ounce (18 oz.) inner cloth (ALPHA SIL Style 600). Attached to that shall be a knitted stainless steel wire tubular fabric (ALPHA MARITEX #91160) which is in direct contact with the pipe wall. Install a 2" temperature mat between the silicon outer cloth and the inner cloth.

644 SANITARY SPACES & FIXTURES

There shall be a minimum of two (2) unisex restrooms installed on the vessel. Both restrooms shall be outfitted to meet all requirements for the accommodation of the mobility impaired (ADA). All restrooms shall be accessible only from the Vessel interior. Restrooms shall be outfitted as follows with the WETA standard items designated in Appendix B3:

- Fresh water flush head, with remote mounted flushing.
- One single stainless steel sink and faucet.
- Mirror.
- Liquid soap dispenser.
- Paper towel dispenser.
- Hand dryer.
- Floor drain.
- Overhead light.
- PA speaker.
- Power ventilation.
- AC power receptacle.
- Waste receptacle with lid.
- Coat hook.
- Baby change station (in ADA head).

645 INTERIOR OUTFITTING

Color Boards

The CONTR shall provide the services of an experienced marine interior designer to coordinate the interior color scheme and finishes. The interior designer shall utilize WETA standard interior outfitting details, Appendix B-3, in order to prepare for the OWNER's approval, three (3) unique color board themes. These themes shall show the arrangement of furniture and colors with actual samples of the materials to be used for the seating, tables, commissary space, deck covering, bulkheads, paint, glass, doors, window treatments, etc.

Furniture and Furnishings

The selection of furniture, furnishings, and upholstery materials and colors shall take into account the durability, cleanability, and maintainability of such materials. The materials and colors proposed by the CONTR/CONTR shall account for the fact that many areas of the Vessel will be subject to heavy use. Materials shall be selected based on their ability to hide such heavy use, yet the materials must present a pleasing appearance, maximize passenger comfort, and contribute to the overall decor. Another factor that shall be considered in the selection and installation methods of furniture, furnishings, and upholstery materials is the ease of future replacement as these items wear out over time.

A mixture of seating styles and arrangements similar to existing WETA vessels is preferred.

Seats

Provide at least the threshold number of interior and exterior seating as shown in Table 081-1. Interior cabin seating not located with fixed tables shall have drink holders, except for those seats adjacent to aisleways.

Interior seats shall be of a high quality high back design. Interior seat cushions shall be easily replaceable and constructed of materials that are suitable for a minimum of ten (10) years of service without fading or wearing. All seating shall comply with the WETA standards for interior outfitting details in Appendix B-3.

Removable interior seat covers are not desired and the seat should not require covers in order to meet the ten (10) year service life.

Exterior seats shall be of aluminum construction with a corrosion resistant anodized or powder coated finish.

Seats shall be installed using welded seat tracks.

Tables

Tables shall be track mounted with aluminum frames similar to those of the seats. Tops shall be aluminum honeycomb panel construction with plastic laminate finish and sea rails with cutouts for cleaning. Dimensions, numbers, and locations similar to our existing vessels.

Metal Case Furniture

Case goods (desks, cabinets, etc.) shall be of aluminum. The gauges of aluminum shall be heavy enough to provide the necessary degree of strength and stability for marine use.

Drawers and drawer guides shall be constructed so as to operate freely and without noise. All drawers and doors shall have catches with rated strength such that they will remain closed when tilted thirty degrees from horizontal, but drawers shall be removable at will. Drawers shall have side glides and positive stops to prevent accidental opening.

Doors and drawer heads in metal furniture shall be of vermin proof sealed box construction, braced with proper reinforcements to prevent undue racking or twisting. Doors shall be equipped with rubber bumpers to prevent rattling.

General Wall Decor

Bulkheads in all enclosed passenger areas shall be finished in compliance with WETA standard details of Appendix B3.

Flooring shall be extended upwards a minimum of 4" from decking on all bulkheads.

Hardware

Coat hooks (MCMMASTER-CARR #12845A21, stainless steel) shall be fitted with tamper proof screws, and located at least 72" above the deck, as follows:

- Four (4) in the Pilothouse.
- Forty (40) on the enclosed passenger deck(s).
- Two (2) installed in each passenger restroom.

651 COMMISSARY SPACES

Construction of all commissary units shall be closely coordinated in order to facilitate installation of special equipment.

The customer top shall be designed and sized to provide access for the mobility impaired. Specifically, there shall be a section of the bar with an ADA compliant counter height to accommodate wheelchair patrons. See the requirements as set forth in Section 092.

All commissary equipment shall be securely mounted and fastened to bulkheads, decks, or countertops. Mountings shall be designed and installed to withstand acceleration forces equal to four (4) times the acceleration due to gravity.

The CONTR shall provide sufficient electrical circuits and outlets in the commissary space to serve all appliances and equipment at their intended design locations. The CONTR shall also provide at least two (2) spare outlets in the Snack Bar. The CONTR shall provide plumbing service to support the installation of all equipment.

As part of their Technical Proposals, CONTRs shall submit a complete list of all commissary equipment to the OWNER for review.

Snack Bar

The CONTR shall provide a complete combined beverage and snack bar service on the lower passenger deck approximately midway between the two (2) sets of side-loading doors. The layout and arrangement of the Snack Bar shall follow the general guidance provided in WETA standard details, Appendix B2.

The service shall be adequate in every respect for the convenient and proper service to passengers and crew. The equipment shall be suitable for marine use (i.e., pot metal, nickel-plated steel, and similar low quality items of outfit shall not be used), and shall be of the latest design for the type of service to be rendered. The Snack Bar shall contain, at a minimum, the equipment contained in Table 651.1 and be configured in general accordance with the following requirements:

The Snack Bar shall be located adjacent to the Utility Storage Space described in Section 654 with direct access provided via a lockable door.

The customer accessible exterior surfaces and countertops of the Snack Bar shall have laminate surfaces. All exposed interior surfaces, underside of the bar top, sinks, and double-walled ice basin shall be stainless steel.

Table 651-1 Snack Bar Equipment	
Display case	Refrigerated two (2) shelf.
Beverage system	Provide a sealed locker with plumbed drain, filtered water supply with shut off valve, rack for five (5) syrup boxes, CO2 bottle rack and

Table 651-1 Snack Bar Equipment	
	carbonator shelf with power outlet, 4" PVC chase to the Snack Bar ice bin. OWNER to provide soda mix system.
Double brewing station	FETCO, or equal, with two (2) satellite self-serve warmers. Provide a hot water tap for hot tea and cocoa hot drinks at each satellite station.
Refrigerator	Fifteen (15)-cubic foot with a remote compressor (all remote compressors shall be accessible for service and repair); lockable.
Sink – Primary	Three (3) compartment stainless steel sink with integral drain boards complete with faucets.
Sink – Hand Washing	One (1) compartment stainless steel sink complete with faucet, soap and towel dispenser, meeting hand wash station requirements.
Ice Bin	Covered with integral cold plate for connection to soda system, one (1) 40" speed rail.
Microwave Oven	High quality stainless steel with carousel.
Cashier Stand	Located at the bar with a power receptacle. This area shall be equipped with the OWNER furnished cash register, and have storage for schedules and other paper items.
Cabinets	Stainless steel lockable cabinets with sufficient storage for intended use.

All Snack Bar equipment shall be UL listed and National Sanitation Federation (NSF) approved.

Ticketing Station

The CONTR shall provide a dedicated Ticketing Station on the main interior passenger deck in accordance with the standard details in Appendix B2. The Ticket Station will be attended by a crewmember during and immediately after boarding for direct ticket sales. The Ticketing Station presents a significant traffic flow and passenger congestion challenge during boarding and shall be arranged to accommodate approximately thirty (30) passengers queuing for tickets without impacting the boarding process.

The Ticketing Stations shall consist of an integrated desk, with 110-volt outlet, PA mic jack, Aiphone, coat hooks and dedicated seating for one (1) crewmember. Ticket processing equipment will be furnished by the OWNER and integrated by the CONTR.

654 UTILITY SPACES

The following utility spaces with shelves, bins, and racks, arranged to suit and provide secure underway stowage of material and equipment to be stowed, and with scantlings adequate to support the loads imposed, shall be provided within the Vessel:

- Storeroom, totaling at least 400 ft³, adjacent to the Snack Bar for secure stowage of snack bar items. Storeroom shall be sheet metal lined and fitted out METRO shelving. The CONTR shall provide METRO shelving as required to complete the commissary spaces and storerooms to the satisfaction of the OWNER. All shelving shall be securely mounted to bulkheads, overheads or decks as appropriate. The Utility Storage Space will be used for storage of all normally carried foodstuffs, supplies, portable equipment and utensils etc.
- A crew dayroom adjacent to the Pilothouse, with approximately 30 ft² of open floor space, outfitted with lockers per Section 671, crew head per Section 644, shelves and coat hooks. Microwave oven and under the counter small refrigerator.

656 TRASH DISPOSAL SPACES

The CONTR shall provide stainless steel or aluminum trash receptacles. Trash receptacles shall be provided in pairs with separate receptacles for:

- General waste.
- Recycling newspapers, aluminum cans, plastics.

A minimum of six (6) pairs, fifteen (15)-gallon capacity or greater each shall be provided in all interior and exterior passenger and crew areas.

671 LOCKERS & SPECIAL STOWAGE

The Vessel arrangement shall include provisions for stowing at least four (4) strollers and six (6) pieces of large luggage concurrently. Stroller parking shall have adjacent passenger seating and be either integrated with or in close proximity to the main seating area.

A twenty-four (24) key locker shall be provided in the Pilothouse.

The CONTR shall provide the following storage lockers:

Crew Lockers

- Four (4) each double tiered lockers for the crew shall be provided in the adjacent to the Pilothouse. The lockers shall be 18" wide by 24" deep with a hanging bar and one (1) shelf.

Cleaning Gear Locker (Main Deck)

- Mop, broom and vacuum storage.
- Shelving.
- Complete with recommended cleaning equipment.

Emergency Gear Locker (Main Deck)

- Emergency and rescue equipment.
- Additional lifesaving equipment.

Deck (Bosun's) Locker

- Storage for deck items.
- Spare mooring lines, bunting, and other deck equipment.

672 BICYCLE ACCESS AND STOWAGE

The CONTR shall provide permanent bicycle access and stowage racks on the boarding deck to accept the quantity of bicycles called out in Table 081-1.

Bicycle storage shall be protected from the elements, particularly salt spray. The loading and offloading of bicycles shall be accomplished without having to transit the main passenger cabin and seating area. Bicycle storage facilities shall be arranged to promote efficient traffic flow and minimize congestion during loading and offloading. Racks shall be designed to accommodate commuter, road and mountain style bicycles.

Bicycle storage shall generally be horizontal racks that secure the bicycle's wheel(s) requiring a minimal vertical lifting effort by the passenger. Alternate arrangements such as hanging storage may be considered.

800 Management and Engineering

810 DESIGN & ENGINEERING

The CONTR shall provide an initial Concept Design, demonstrating compliance with the OWNER's requirements, that includes at least the following information:

- Speed vs. Power Curves.
- Predicted Fuel Consumption Curve.
- The chosen hull form, explaining windage and maneuverability characteristics.
- Wake wash prediction.
- Exhaust emissions prediction.
- Trim & Stability Booklet.
- General Arrangement drawing.
 - Deck layout.
 - Cabin layout.
 - Seating Plan (include make and model number of all seats and tables).
 - Boarding facilities.
 - ADA facilities showing aisle widths, wheelchair tie down locations, wheelchair accessible heads.
- Inboard Profile.
- Midship section.
- Machinery Arrangement including engines, gears, propulsion shaftline, and jets.
- Bridge layout with lines of sight.

Following acceptance of the Concept Design proposal, the CONTR shall provide all Contract Design, Detail Design and Production level engineering services necessary for the work in accordance with the Specification. Services shall include technical calculations, surveys, material selection, preparation of diagrams, sketches, schedules, data, and preparation of all production drawings and as-built drawings.

All drawings shall conform to a mutually agreeable Ship Work Breakdown Structure (SWBS) numbering system. All drawings shall be submitted in electronic format as AutoCAD® .dwg and Adobe® Acrobat .pdf version of the AutoCAD files. Scanned drawings with hand mark ups submitted, as .pdf files will not be acceptable. The .pdf file format is only to be used for viewing of CAD drawings. Booklets of details and calculations may be on sheets sized 11" x 17" or 8 ½" x 11".

All drawings shall incorporate the Standard WETA details contained in Appendix B2 of this specification.

All data created from this project shall be provided to and reviewed by the OWNER, including all information provided to USCG. During the design phases, drawings shall be reviewed on a weekly basis at a weekly web meeting organized by the CONTR. The CONTR shall include all personnel deemed necessary for the meeting, and any others requested by the OWNER. The CONTR shall be responsible for taking meeting minutes and emailing a brief synopsis of each meeting to include all decisions made and any action items.

Drawings shall include a Bill of Materials (BOM) of all major components defined in the drawing. Raw materials such as plate, extrusions, pipe, pipe fittings, hoses and hose end fittings shall be called out in the drawing or in an attached material schedule. All drawings shall show enough detail, including material schedules, such that the system can be recreated from the drawings. Symbols on drawings shall conform to recognized marine commercial standards.

Materials shown on drawings shall have item numbers and be identified in a material list by material specifications, ASTM, ANSI, NEMA, etc., as appropriate.

The OWNER will review the CONTRs detailed production level drawings to determine compliance with the Specification and Contract. The OWNER's review will not relieve the CONTR of responsibility for deviations from the Specification unless specific written approvals of deviations are received by the CONTR with the final approval of the drawing by the OWNER. Approval of a drawing does not constitute approval of a deviation, mistake, or omission. OWNER approval of a deviation from the Specification will not relieve the CONTR of the responsibility for satisfactory operation of the system or equipment. Work performed by the CONTR prior to the OWNER's review and approval of the CONTR's drawings will be at the CONTR's own risk.

All drawings shall be initialed in the title block by the drafter and the engineer responsible for the production level drawings prior to submittal to the OWNER. They shall be signed by the engineer and supervising engineer checking the drawing. Each drawing shall be checked and finished before submitting to the OWNER for final review. Concept or progress reviews of drawings are encouraged, but the status of the drawing must be made clear to the OWNER prior to review. Drawings without appropriate signatures and drawings which are not complete will not be reviewed by the OWNER for anything other than concept approval and will be returned to the CONTR for completion. Returned drawing submittals do not count towards fulfilling the CONTR's obligations with regard to scheduling; i.e., all returned drawings must be resubmitted complete within the scheduled time.

The CONTR shall furnish a copy of all written or email correspondence sent to or received from regulatory agencies to the OWNER. When submitting system production level drawings, such as piping diagrams and isometric wiring diagrams, CONTR shall include the calculations by which the system components were sized. The OWNER will not review these drawings without supporting calculations.

As-Built Drawings

All working drawings are to conform to an "as-built" condition and stamped "AS-BUILT FINAL" in the title block. The final drawings shall reflect systems and arrangements of the Vessel as finally completed and approved. The drawings shall not be stamped "AS-BUILT FINAL" until after the CONTR has verified that the physical configuration of the Vessel matches the drawing being submitted as an as-built. Close attention shall be paid to electrical and piping termination details. The CONTR shall verify that equipment data matches the drawing BOMs.

Display Drawings

The CONTR shall develop and provide 24"x36" D sheet size, non-fading positive prints of drawings to be mounted in the locations as required by the USCG on board the Vessel. Any plans required by the USCG for issuance of the COI shall also be provided by the CONTR. These drawings shall be mounted in anodized aluminum, or stainless steel, frames with clear plastic covers ("Plexiglass") prior to delivery of the Vessel.

Weight Control Program

Minimizing weight growth during the contract work is important. Scantling sizes shall be kept to a reasonable size. All systems shall be designed to balance the weight of the Vessel versus the long-term durability of the Vessel.

The CONTR shall prepare and maintain a Builder's Weight Estimate (BWE). Each revision of the BWE shall be submitted to the OWNER. The weight estimate shall conform to the agreed SWBS system. Throughout the construction period, the CONTR shall monitor the actual weight of equipment and materials against the BWE. The BWE shall be updated and resubmitted monthly. Weight growth or migration shall be brought to the attention of the OWNER.

Service Life Margin

The CONTR shall incorporate a Service Life Margin into the Vessel design. The Service Life Margin is an allowance for future growth of the Vessel during its operational life. This margin shall be intact when the Vessel is delivered to the OWNER. As a minimum the CONTR shall include a service life margin of 4,480 pounds (2 long tons) and a contract modification margin of 2,240 pounds (1 long ton). The centers of these weights shall be assumed to be at the vessel's Longitudinal Center of Gravity and 4' above the main deck.

820 TECHNICAL DOCUMENTS

As part of the complete Vessel, the CONTR shall provide to the OWNER, upon delivery:

- A complete set of the USCG approved drawings for the Vessel.
- A complete set of all As-Built drawings for the Vessel. Three (3) full-sized black and white reproducible copies and an identical AutoCAD (Latest Release) copy on CD-ROM.
- Smaller drawings, such as 8 ½" x 11", and 11" x 17", shall be on bond paper.
- Manufacturer's drawings and schematics – minimum three (3) copies of each document.
- Vendor and subcontractor drawings – minimum three (3) copies of each document.
- Machinery, equipment, and parts: manuals and technical documentation – minimum three (3) copies of each document and one copy on CD-ROM.
- Vessel operations manual, specifically procedures to operate shipyard custom built and interfaced systems including machinery, controls, auxiliary, electrical, plumbing and safety – minimum three (3) copies.
- One copy of all purchase orders. The purchase orders shall be grouped by SWBS section. The intention is that the OWNER shall have all of the information required to contact vendors, order spares, operate and repair the Vessel.

825 MATERIALS

Control of Materials

The materials used on the work shall meet all requirements of these technical specifications.

Materials to be supplied shall be identified in the CONTR-developed documents such as: specifications, purchase technical specifications, drawing BOMs, drawing equipment lists, or detail drawings. Materials shall be described to the extent required for ordering or reordering from suppliers. Descriptions shall include brand name, model, type, size and other information as applicable to the item.

Where necessary to provide flexibility and competition in the purchasing process, alternative manufacturers may be suggested by CONTR and are subject to approval by the OWNER.

No materials shall be ordered until after Notice to Proceed has been authorized by the OWNER. Any materials ordered prior to such notice to proceed are at the CONTR's sole risk.

All materials incorporated in the Work covered by this Contract are to be new, of current production, of the specified or most suitable grade of their respective kinds for the purpose and, except where otherwise specifically provided for in the Contract for particular items, currently supported by spare parts in the United States of America and as required by the Contract. All material items used shall be suitable for use in a marine environment and for their intended use.

All materials shall be free from imperfections of manufacture and from defects that adversely affect appearance or serviceability.

Materials banned by the State of California shall not be used under this Contract.

Structural plates, shapes, bars, castings, forgings and all other material used throughout the Vessel which are subject to Regulatory Body approval shall meet the requirements of the Regulatory Bodies.

Samples

Samples of materials shall be submitted for approval when so directed by the OWNER or indicated in the Contract Documents. The OWNER may order such sampling at their sole discretion. Any work in which untested materials are used after such direction from the OWNER, and which the OWNER has not approved in writing, is subject to removal at the OWNER's direction and at the CONTR's expense.

Material samples may, at the option of the OWNER or Regulatory Bodies, be subjected to laboratory testing beyond that normally performed by the manufacturer, to verify compliance with quality requirements. The results of the tests may be the basis for acceptance of quality of manufactured lots. Except where such testing is expressly required by the Contract, the costs of laboratory testing that is requested by the OWNER and beyond that normally performed by the manufacturer shall be paid for by the OWNER as Extra Work at the laboratory facility's invoiced price and without CONTR mark-up.

Tests and Inspections at Place of Manufacture, Production or Shipment

In addition to material tests and inspections that occur at the CONTR's facilities, certain items of equipment and other materials shall be inspected and/or tested at the source (place of manufacture, production or shipment) as required by the Regulatory Bodies and the Contract. During the monthly Progress Meetings CONTR shall apprise the OWNER of anticipated tests that may occur in the following month that the OWNER may desire to witness including similar propulsion component testing.

Where inspections and tests at the place of manufacture, production or shipment are made, the following conditions shall be met. The conditions in subparagraphs 'A' and 'B' below shall be requirements of any Contract or agreement between the CONTR and the producer, manufacturer, fabricator or supplier:

- A. The OWNER and Regulatory Body representatives shall have the cooperation of the CONTR and the producer, manufacturer, fabricator or supplier with whom the CONTR has contracted for the materials.
- B. The OWNER and Regulatory Body representatives shall have full entry at all times to such parts of the plant as may concern the production, manufacture, assembly, cleaning, painting and packaging of similar materials being furnished.
- C. In the case of plant facilities located within the continental United States, the OWNER shall be advised of the production and/or fabrication schedule a minimum of 4 calendar days prior to beginning work on any similar item requiring test or inspection. In the case of plant facilities located outside the continental United States, the OWNER shall be advised of the production and/or fabrication schedule a minimum of 10 calendar days prior to beginning work on any similar item requiring test or inspection. Such notifications shall include the recommended dates that the OWNER be on site to witness or perform tests and inspections.
- D. Planning and coordinating the conducting and witnessing of tests and inspections at sources of supply by Regulatory Body representatives shall be the responsibility of the CONTR.

All materials that are fabricated or installed without having received the required inspections and tests witness thereof by Regulatory Body representatives, shall be considered unacceptable and may, at the OWNER's discretion, be subject to removal and correction at the CONTR's expense.

The OWNER reserves the right to retest materials that have been tested at the source of supply, after they have been delivered and prior to incorporation into the work where, damage warrants such retest. The OWNER reserves the right to reject all materials which, when retested, do not meet the requirements of the Contract.

Material Certification

Where materials are required by these specifications to conform to certain standards and requirements, such as those of the USCG, ASTM, AISI, ANSI, FCC, USPHS, or UL, the following provisions shall apply:

- A. All items requiring U.S. Coast Guard approval shall be listed in COMDTINST M16714.3 (old CG-190), "Equipment Lists," or a USCG approval letter or certificate shall be furnished to the OWNER upon request.
- B. Copies of materials certifications, test reports, metal analyses, welding inspections, non-destructive test data, welding procedures and test schedules shall be provided to the OWNER as requested.
- C. The OWNER may permit the use, prior to or without sampling and testing, of certain materials or assemblies when accompanied by the manufacturer's certificate of compliance stating that such materials or assemblies fully comply with the requirements of these specifications. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified.
- D. Provision of invoices, certificates of compliance or other documentation contending that furnished materials comply with standards and other requirements applicable to the materials shall not relieve the CONTR of his responsibility to perform inspections, tests, research or other validation work necessary to ensure that the materials do in fact comply with the requirements.
- E. All items requiring Classification Society approval shall have an approval affidavit furnished to the OWNER prior to installation of the item.

Protection and Storage of Material

The CONTR shall be responsible for the protection from the elements, weather, and abuse, of all material intended for use and installed on board the Vessel until Delivery Acceptance of the Vessel by the OWNER.

Due consideration shall be given to the nature of the item during handling and storage. Materials shall be stored out of the weather in a manner that assures the preservation of material quality and fitness for the work.

All finished surfaces shall be protected by appropriate means. Surfaces damaged or marred shall be replaced or repaired by the CONTR to the satisfaction of the OWNER at the CONTR's expense.

The OWNER may reject any material improperly stored or handled.

The OWNER may require that stored materials, even though inspected before storage, be inspected again prior to their use. Stored materials shall be located so as to facilitate their prompt inspection.

OWNER Furnished Equipment and Material

The CONTR shall furnish all parts, materials, equipment, tools, or any other items as necessary to complete the full installation of the items listed above. There is no intent to utilize any OWNER Furnished Equipment as part of the Project. Should it become necessary for OWNER Furnished Equipment to be utilized, the provisions for such be negotiated.

"Or Equal" Material

Where a specific brand name and/or model is required by the Contract Design Package, followed by the term "or equal," the indicated brand name shall be provided unless OWNER approval of an "or equal" product is obtained. To

request OWNER approval of an “or equal” product, the CONTR must submit a written request to the OWNER and shall be obligated to include the following in the request:

- A. All relevant data establishing equality or superiority of the proposed product as it relates to:
 - a. Performance, reliability, maintainability, durability, size, and weight characteristics
 - b. Requisite Regulatory Body approvals
 - c. Availability of parts and service
 - d. Service history/records of the proposed item
- B. Identification of any material variations of the proposed “or equal” product from the Contract Design Package otherwise addressed by item ‘A’ above.
- C. The warranty of the proposed item.
- D. Drawings and sketches of the proposed item, if available.
- E. Names, addresses and telephone numbers of firms that have the item in similar service.
- F. An analysis of the effect on Vessel’s weight, center-of-gravity and stability.
- G. A statement that no increase in the Contract Price or time to complete the Work shall result from use of the “or equal” item. Written quotes from the “specified” and proposed “or equal” vendors shall be provided.
- H. Other salient technical data necessary for a comparative analysis.

The CONTR shall make arrangements for the OWNER to view the proposed “or equal” item in use at the CONTR’s site or deliver a sample to the OWNER if requested.

The OWNER shall provide a written determination regarding the request for use of the “or equal” item. The OWNER’s determination shall be considered final. For use of an “or equal” item to be considered approved, it must have the unambiguous written approval of the OWNER. The OWNER’s approval of an “or equal” item allows the CONTR the option of procuring that item. In each case where the request is disapproved by the OWNER, the CONTR shall provide the specified material at no extra cost to the OWNER.

Use of “or equal” items and material substitution shall not be considered without a written request for same, nor shall it be allowed without OWNER written approval.

It shall be the CONTR’s responsibility to design, integrate, test and incorporate the “or equal” item in the work. All costs to the CONTR as a result of the use of the “or equal” item, over and above the cost of the originally specified brand name item, shall be at the CONTR’s expense. The CONTR shall be entitled to no extension of time associated with the use of an “or equal” product. The OWNER shall not be responsible for any delay resulting from a substitution request.

In cases where material items are explicitly called out by brand name in the OWNER’s Requirements without the use of the “or equal” phrase; the items so specified must be provided.

830 REQUIRED TESTS & TRIALS

The CONTR shall develop, in cooperation with the OWNER, a comprehensive testing and trials plan. The following table outlines the minimum required tests and trials:

Required Test or Trial	Location	Purpose	Reference Section
Shipyards Internal QA and Testing Plan	CONTR Facility	Routine and ongoing QA and inspection using the shipyard’s standard processes and documentation.	

Factory Acceptance Tests	CONTR or OEM Facility	Test and verification of certain components and equipment with prior approval from the OWNER.	831
System Tests	CONTR Facility	Verification of system operation.	832
Dock Trials	CONTR's Facility	Verification equipment / systems perform satisfactory / establish readiness for Sea Trials,	833
Sea Trials	CONTR's Facility	Confirm the vessel meets all requirements and functions properly prior to delivery.	834
Delivery	WETA Facility	CONTR shall deliver vessel to the specified WETA facility in San Francisco Bay	835
Drydocking	San Francisco Bay	CONTR shall dry dock vessel in San Francisco Bay for inspection of underwater portions of the hull.	836
Delivery Acceptance	San Francisco Bay	OWNER to inspect vessel following delivery and drydocking.	837
Operational Acceptance	San Francisco Bay	Vessel to be tested for interface with existing mooring arrangements, passenger load/offload function, and other preparations to go into service.	838
Final Acceptance	San Francisco Bay	Starts the Warranty Period.	839

The CONTR shall provide a Master Test Plan for OWNER's approval. The CONTR shall provide test procedures to the OWNER for approval at least thirty (30) days prior to beginning any test. The plan shall include a testing schedule, define testing procedures, and track deficiencies, corrections and acceptance.

Tests shall be conducted to the requirements and satisfaction of the OWNER, the USCG OCMI, and specific equipment manufacturers as required. Following testing and trials, any item of CONTR-furnished equipment that does not meet specification requirements will be corrected and retested until specifications have been met. The tightness of all electrical connections, switches, circuit breakers, and buss bars shall be verified to the OWNER's satisfaction.

The CONTR shall provide all instruments for operational tests. The type and quantity shall be such that they shall provide sufficient data to analyze the performance of systems, machinery, and equipment. Electric motor test instruments shall include a voltmeter, ammeter, and watt-meter, either as separate meters or combined in a single analyzer.

Ship's gauges and instruments may be used for tests of the systems they serve provided they have been calibrated. Calibrated shipyard test instruments and means of connection shall be provided as necessary for additional readings required to test machinery and systems. Calibration data for instrumentation shall be made available to the OWNER upon request.

The CONTR is responsible for all costs associated with all testing and trials.

831 FACTORY ACCEPTANCE TESTING

Contractor may conduct factory testing of specified equipment. CONTR must identify all factory-tested equipment for prior approval by OWNER and shall submit documentation of test results to the OWNER for OWNER's approval. Examples of some equipment subject to Factory Acceptance Testing include:

- Pressure test of non-integral tanks or pressure vessels.
- Operational and load tests for generator engines on test beds in compliance with the regulatory requirements.
- Functional tests for other machinery, electrical and electronic equipment at vendor's facilities.
- Other components as requested by the CONTR and specifically approved by the OWNER.

832 SYSTEM TESTING

The purpose of system testing is to ensure that all workmanship is satisfactory, all equipment has been properly installed, all systems are functioning properly, all subcontract work is satisfactory and that all required regulatory inspections have been completed. This program will cover all aspects of construction, including metal work, machinery systems, piping systems, electrical systems, interior and joinery, outfitting and paint.

The CONTR will assemble a list of tests to be completed and will coordinate with the OWNER and regulatory inspectors to demonstrate completion of various tests and inspections. Testing shall not be limited to the regulatory requirements but shall prove all systems to the satisfaction of the OWNER. The OWNER shall be given at least forty-eight (48) hours' notice on all system testing and will witness the tests unless the option to witness is specifically waived.

The OWNER and an authorized manufacturer's representative shall be present for inspections and shall confirm acceptance of all work completed. All work completed shall be inspected by the CONTR in the presence of the OWNER and regulatory inspectors as required. The OWNER shall have the right to appoint additional consultants and representatives to witness tests and trials at their discretion.

Only upon satisfactory completion of the system testing, and after correction of all defects by the CONTR to the satisfaction of the OWNER, the vessel may begin the next stage of testing and trials.

833 DOCK TRIALS

Dock Trials shall be conducted to demonstrate proper functioning of propulsion systems and controls, auxiliary systems, electronics and safety equipment prior to Sea Trials. At least two weeks prior to dock trials, the CONTR will present an agenda to the OWNER for review and comment.

Initial start-up and application of load to the main engines will be performed by the CONTR in conjunction with the engine/reduction gear manufacturer's representatives. The engine and gear manufacturer's will review and approve the installation of the main engines and gears, including alignments prior to engine start-up.

Following initial start-up and testing, the main engines will be run at the dock for a minimum of four (4) hours to demonstrate readiness for Sea Trials. Controls and clutches will be verified from each Control station.

Generator start-up and testing will be completed in conjunction with the generator manufacturer's representative. Proper function of the switchgear and power management systems will be verified by the switchboard manufacturer. Following initial start-up and testing the generators will be run for a minimum of four (4) hours to demonstrate readiness for Sea Trials.

All auxiliary systems will be run at the dock to verify proper operation. Bilge and fire systems will be demonstrated to be fully operable in case of an emergency during Sea Trials. The proper operation of the steering system will be verified from each Control station, including the emergency steering station.

All navigation and communication electronics will be verified to be functioning properly in conjunction with the electronics vendor.

The proper deployment of the anchor and ground tackle will be demonstrated by lowering and retrieving the anchor in a controlled manner.

The proper operation of the IBA cradle and release will be demonstrated by simulating launching and retrieving while dockside.

The CONTR shall ensure that vendors and subcontractors have all necessary spare parts for their systems on hand so that failures of filters, fuses, gaskets, relays, valves, etc. do not delay dock or sea trails.

The dock trials will consist of the following (not necessarily all-inclusive) list:

- Weather/water tightness of hatches, windows, port lights, doors, shell doors etc.
- Safety equipment – life rafts to be put aboard just before Sea Trials with maximum future service time possible. Fire extinguishers to be put aboard also with inspection dates as far as possible in the future.
- Lifting appliances, cranes, boarding/ accommodation ladders, etc.
- Steering gear.
- Ventilation and heating system.
- Air conditioning.
- Electrical systems and generators, load tests.
- Generator to Generator switching. Shore power to generator switching and vice versa.
- Anchor and mooring equipment.
- Deck equipment, bollards, etc.
- Bilge and fire-fighting systems.
- Sanitary systems.
- Bridge and navigation equipment.
- Hydraulic equipment.
- Alarm tests for safety systems.
- Test of lifesaving equipment.
- Fire shutdown systems for ventilation, valves and required pumps etc.
- Working tests of all machinery.
- Tests of domestic hot and cold water service.
- Black-out test.
- Complete electrical lighting systems.

- Communication equipment.
- Public Announcement and CCTV camera / monitoring equipment, etc.
- Navigation equipment that can be pre-tested in port.
- USCG stability test.
- Harbor condition noise and vibration level measurements.

The shore fuel, sewage and water connections will be separately verified and tested.

834 SEA TRIALS

Following completion of dock trials, Sea Trials will be conducted to demonstrate the performance of the Vessel and proper function of systems underway. Every effort shall be made to replicate a “working” scenario at sea.

The CONTR shall conduct at least two (2) sets of Sea Trials. The first set shall be Builder’s Trials for yard personnel and regulatory inspectors to confirm proper functioning of all systems. During Builder’s Trials the engine and gear manufacturers will verify performance and proper installation of the main engines and gears including developed power, cooling temperatures, etc. Builder’s Trials shall be a minimum of eight (8) hours in length unless specified otherwise.

The second set of Sea Trials shall be Performance Trials to demonstrate contractual performance and proper functioning of all systems to the OWNER. The Performance Trials will be conducted at the full Trial Condition specified in Section 840. This trial shall be a minimum of eight (8) hours in length unless specified otherwise.

Sea Trials will be conducted in a location mutually agreed to by the OWNER and the CONTR.

The procedures shall follow SNAME T&R Bulletin C-2, 1973 “Code for Sea Trials.” Sea Trials shall include measurement of speed, fuel consumption, noise, vibration, and wake wash in accordance with the agreement. Care shall be taken to specify, in the test documents, the acceptable level for all figures to be recorded during Trials.

At least two (2) weeks prior to the start of Sea Trials, the CONTR will present a Sea Trials agenda to the OWNER for approval and to the equipment manufacturers for review and comment. Following completion of Sea Trials, the CONTR shall prepare the final Sea Trials report in a timely fashion and present the results to the OWNER for OWNER’s approval.

At a minimum, Sea Trials shall consist of the following:

- Propulsion Performance Trials (Builder’s Trial only).
- Speed Trials (at full range of RPM).
- Endurance test (minimum 4 hrs. continuous uninterrupted period of 4 hours at full speed ahead).
- Night Trials.
- Emergency Crash Stop (from full speed ahead).
- Split Throttle turning.
- Ahead Steering (at full speed ahead).
- Astern Operation and Steering (up to maximum safe speed, not to exceed 12 knots).
- Turning Circle (at full speed ahead).
- Zigzag Maneuver (at full speed ahead).
- Auxiliary Systems Testing (underway testing of systems, as required).
- Blackout Test.

- Noise and Vibration Survey (underway portion; see Section 057).
- Thermographic Survey of electrical installations.
- Compass Adjustment (Builder's Trial only).
- Navigation and Communications Systems Testing (underway testing, as required; i.e. GPS, depth sounder, RADAR, integration, etc.).
- Unmanned Engine Room Testing (command, control and monitoring systems).
- Check of tank capacities and draughts for speed runs.
- Controls and helm operation.
- Test from ahead to astern and astern to ahead.
- 'Slow ahead' trial with two engines.
- 'Slow ahead' trial with one engine.
- 'Full ahead' trial on one/two engines at a time, port and starboard.
- Dead ship inspection and start-up.
- Emergency steering and maneuvering.
- Full load test of emergency fire pump, if required.

All domestic items that would normally be in use during sea conditions to be run and tested while on the trials, including heads and miscellaneous equipment throughout the Vessel to be sure that they function normally under sea conditions.

Speed trials will be conducted at a minimum of 100-rpm intervals from idle to 75% load. Above 75% load, speed trials will be conducted at a minimum of 50-rpm intervals. For each setting, two (2) runs will be made in opposite directions over a reciprocal course to account for any wind, waves or current. Speed will be determined by measuring the time to cover a set distance as determined by the vessel's GPS.

A minimum of one hour of trials shall be conducted at night, commencing no earlier than 1 hour after sunset, at maximum possible operating speed, to determine if visibility, reflections, night backlighting, or fogging issues are present on the bridge and to correct them.

Additional trials may be required if the conditions are not favorable due to excessive wind or waves.

Lubricating oils from all diesels and gearboxes shall be sampled for analysis after trials.

The CONTR shall be responsible for all costs associated with Sea Trials including provision of crew, fuel oil, lube oil, water provisions and any instrumentation or other test equipment required.

Any defects found during the Sea Trials shall be corrected by the CONTR at their own expense and demonstrated to the OWNER prior to OWNER's authorization for delivery. At its sole discretion, OWNER may authorize delivery prior to correction of defects found during the Sea Trials. CONTR must correct any such defects as a condition of Operational Acceptance.

835 DELIVERY

Contractor may not commence delivery of the Vessel from its location until WETA has approved all dock trials and sea trials required to take place at Contractor's location. Contractor may not commence delivery until WETA has issued an Authorization for Delivery to the Contractor. Delivery will be considered complete after WETA conducts a post-delivery inspection and will be acknowledged by WETA's issuance of a Post-Delivery Receipt. Delivery does not constitute Acceptance, nor does delivery include a transfer of any risk of loss or transfer of title.

Insurance during Delivery. The Contractor retains full responsibility, including risk of loss or damage to the Vessel, until Operational Acceptance. Contractor is responsible for providing all necessary insurance, security, safety maintenance and operation of the Vessel at all time, including during delivery. The Contractor must procure and maintain and provide proof of insurance against any loss of or damage to the vessel or personal injury or death or damage to or loss of property caused during the delivery voyage including without limitation full form hull and machinery insurance in an amount equal to the Total Contract Price, and full form protection and indemnity insurance. Such insurance and proof must be at the Contractor's sole expense, including all deductibles. WETA must be named as an additional insured under any such insurance.

Protection of Vessel during Delivery. The Contractor is fully responsible for adequately preparing the Vessel for open ocean and local transport. Whenever the Contractor sails the Vessel under its own power, the Vessel must be under the command of an experienced Captain, holding a valid USCG license with a rating acceptable for the delivery voyage from the Contractor's facility. During the voyage, in addition to the licensed Captain, there must be no less than one senior deckhand and three other deckhands onboard the Vessel at all times. All deckhands, including the senior deckhand, shall meet the minimum requirements of the USCG, Navigation and Vessels Inspection Circular (NVIC) No. 1-91. Additionally, the Contractor must provide WETA with a letter from the Local Officer In Charge of Marine Inspection (OCMI) that the Captain holds a license with the necessary endorsement to sail the vessel on the intended voyage. The Contractor shall submit all required vessel movement reports to the cognizant USCG officials

Damage to Vessel During Delivery. Contractor must report to WETA any allision, collision, grounding, or other incident that may have caused damage to the Vessel during the delivery voyage. WETA may require that its representative be onboard at all times while the Vessel is underway. WETA's representative will not be in command of the Vessel.

836 DRYDOCKING

Following delivery to the WETA facilities in San Francisco Bay, the CONTR must arrange at its expense for the vessel to be drydocked in the San Francisco Bay area. The drydocking operation shall include having the underwater appendages examined, bottom cleaned, and any damages from delivery repaired. Bottom paint anti-fouling shall be touched up and anodes inspected. Seachests shall be opened for examination and cleaning. The OWNER shall be notified of the time and place of this drydocking and shall inspect the vessel prior to undocking.

The drydocking shall be witnessed by the USCG for the purposes of fulfilling periodic under water inspection requirements.

Docking plans shall be provided with the Vessel. The docking plan shall identify three (3) unique block set arrangements.

All costs associated with this drydocking shall be borne by the CONTR.

837 DELIVERY ACCEPTANCE

Following successful completion of Drydocking, the CONTR shall conduct Delivery Acceptance Trials from the San Francisco Ferry Terminal. Delivery Acceptance Trials shall demonstrate that the vessel has been delivered to the WETA facilities in new condition and fully operational. Damage following the Owner's Sea Trials and Delivery shall be repaired. Other operational issues discovered during the delivery of the vessel will be corrected by the CONTR. Example criteria for Delivery Acceptance:

- Service speed requirement as described in Section 081.
- Fuel consumption specified in the CONTR's proposal and the tank capacity in Table 081-1.

- All physical work shall be completed, with all requisite regulatory approvals, certifications and letters of compliance obtained, and with the vessel ready for service in full compliance with the Contract to the satisfaction of the OWNER.
- The vessel shall be thoroughly cleaned in accordance with Section 951 of these provisions to the satisfaction of the OWNER.
- All shop and installation tests and inspections shall be completed, with results demonstrating compliance with the Contract to the satisfaction of the OWNER.
- Any prerequisite tests to Operational Acceptance shall have been completed, with results demonstrating compliance with the Contract, and approved by the OWNER.
- Correction of all known deficiencies including deficiencies that develop or are identified after Delivery.

838 OPERATIONAL ACCEPTANCE

Following Delivery Acceptance at the OWNER's facility, the CONTR shall conduct Operational Acceptance Trials. This Operational Acceptance shall be contingent upon the following:

- Completion of shipboard CONTR-responsible training.
- USCG Sector approval.
- Round-trip transit times achieved as described in Section 061.
- Compatibility with passenger-loading facilities and demonstration of passenger loading/unloading rates as described in Section 063.
- The Operational Acceptance Survey described herein shall have been completed, with the results supporting a conclusion by the OWNER that the Vessel is complete, clean, free of deficiencies, and in compliance with the Contract to the satisfaction of the OWNER.
- satisfactory provision of documentation evidencing transfer of title to the vessel to WETA

If the Operational Acceptance testing and survey reveals only minor defects or deficiencies that WETA determines do not prohibit it from placing the Vessel in revenue service, then WETA may at its sole discretion Operationally Accept the Vessel. WETA will certify Operational Acceptance by issuing Contractor a Certificate of Operational Acceptance.

Upon completion of the Operational Acceptance for the Vessel, a letter relating WETA's determination regarding Operational Acceptance of the Vessel shall be issued by the OWNER. The letter shall provide notice as to the extent of unsatisfactory or incomplete Work which must be corrected or completed prior to Final Acceptance of the Vessel. Correction of discrepancies, if any, may be deferred until after Operational Acceptance Trials, but before Final Acceptance of the Vessel. In connection with this notice, it must be recognized that under the terms of the Contract, the CONTR is required to deliver a complete Vessel that is free of all deficiencies, and that deferral of corrective Work is not a waiver by the OWNER of its entitlement to a complete Vessel that is free of deficiencies.

The CONTR shall immediately take appropriate action to correct and complete any work that is determined to be unsatisfactory or incomplete and shall be responsible for any delay in the Project associated with correcting deficiencies. The cost of such delay shall be at the CONTR's expense.

Any work or operation of the Vessel called for by the OWNER in the course of inspection of previously unsatisfactory or incomplete Work shall be performed at the CONTR's expense in advance of Operational Acceptance.

Following Operational Acceptance, the completed Vessel shall be turned over to WETA's Operator in San Francisco, California. The CONTR shall fill all fuel tanks, top up all fluids, and present a vessel ready and fit for service to WETA. WETA may gain beneficial use of the Vessel upon Operational Acceptance and prior to Final Acceptance.

839 FINAL ACCEPTANCE

Only after Operational Acceptance, Final Acceptance will occur when (1) all defects or deficiencies discovered through any test have been corrected and all open issues have been resolved to WETA's satisfaction such that WETA, in its sole discretion, deems the Vessel capable of operating reliably and safely, and (2) Contractor has delivered to WETA all manuals, drawing, reports, and other deliverables required by the Contract. WETA will issue a Notice of Final Acceptance of the Vessel to the Contractor within seven calendar days of WETA's determination that the Contractor has satisfied the requirements of this Section. WETA will not provide Final Acceptance of the Vessel if it does not meet all Contract requirements and specifications, even if the Contractor assures WETA that any deficiencies will be handled under the warranty process. Any Warranty commences upon Final Acceptance.

840 TRIALS CONDITION

- Fully loaded with passengers (simulated weight).
- 90% tankage of fuel, potable water and sewage.

A full passenger load may be simulated with the use of temporary weights (water or other) positioned throughout the Vessel so as to mimic a standard distribution of passengers. CONTR shall submit a simulation plan to the OWNER for approval at least 30 days prior to trials.

841 INCLINING & STABILITY

The CONTR shall propose to the OWNER a plan for determining the stability of the vessel, building on the Preliminary Trim & Stability Booklet submitted as part of the Step Two submittal.

This plan shall detail the process that the CONTR will follow in obtaining USCG approval of the final Trim & Stability Booklet and issuance of a USCG Stability Letter.

The CONTR shall submit a Final Trim & Stability Booklet for OWNER review ten (10) days after vessel launch.

Stability Letters shall be framed and posted in the pilothouse as required by USCG.

842 TRAINING

The CONTR shall provide technical instruction and training for the proper operation, preventative maintenance, and basic troubleshooting of the major machinery and control systems, to be conducted by the manufacturer's Technical Representative for up to eight (8) OWNER's personnel, for maintenance and operation of the following equipment:

- Main propulsion engines/emissions system – total six (6) hours.
- Ship's service diesel generators – total two (2) hours.
- Main switchboard and electrical distribution – total four (4) hours.
- Plumbing – total two (2) hours.
- Safety systems – total two (2) hours.
- Pilothouse controls – total eight (8) hours.

Training shall be scheduled and coordinated with the OWNER. OWNER shall make every possible effort to minimize duplication of training but due to operating schedules it may not be possible to schedule all personnel simultaneously for training. Multiple sessions may be required in some or all areas listed above.

OWNER will pay all wages and expenses of OWNER's personnel during training sessions.

850 REGULATORY BODY REVIEW, APPROVAL AND CERTIFICATION OF WORK

The CONTR shall plan, coordinate and obtain in a timely manner all Regulatory Body inspections of the Work, and reviews and approvals of the related drawings, specifications and other documentation, as required to obtain the required regulatory classifications and certifications of the Vessel. A schedule of inspections, tests and trials requiring Regulatory Body observance shall be maintained in accordance with the provisions of the Technical Specifications.

The Contract Design Package shall be submitted to the USCG for compliance review with respect to USCG and applicable regulations, specifically addressing requirements for 46 CFR Subchapter K passenger vessels.

All deliverables shall be revised to address comments provided by the Regulatory Bodies in conjunction with their reviews. This work shall be accomplished to the satisfaction of the OWNER.

All fees associated with inspections, witness of material and equipment tests and certifications, reviews and approval of Work, and classification and certification of the Vessel by Regulatory Bodies shall be included within the Contract Price. Costs of travel and per diem for visits to CONTR's and manufacturers' facilities by Regulatory Body agents shall be considered included in the Contract Price.

A copy of all written communications, which includes electronic transmissions of information or letters, between the CONTR or its agents and the Regulatory Bodies, and any attached drawings or other technical documentation included with each written communication, shall be provided to the OWNER if requested. A copy of each item of written communication, plus any attached technical documentation, from the CONTR or its agents to a Regulatory Body shall be forwarded to the OWNER if requested, on the day the communication is mailed or otherwise transmitted to the Regulatory Body. A copy of each item of written communication, plus any attached technical documentation, from a Regulatory Body to the CONTR or its agents shall be provided to the OWNER within two days of receipt by the CONTR or its agents.

900 Shipyard Contract Services

901 SCOPE AND INTENT OF CONTRACT

The CONTR is required to notify the OWNER of any deviations in the Contract Design Package from the OWNER's Requirements. The scope of the Work associated with the term "design," as used throughout the Contract documents, shall be broadly interpreted to be inclusive of the associated engineering, calculations, studies, and other related work necessary to affect a thorough design. The term "material" shall be broadly interpreted to include vessel "equipment," except where a clear distinction is being made otherwise.

902 PROSECUTION AND PROGRESS

Following Contract Award and prior to Notice to Proceed the CONTR shall submit the following to the OWNER:

- A. Project Schedule (see Sections 921 - 924).
- B. The following lists derived from the Project Schedule:
 - a. A list showing anticipated dates for procurement of materials and equipment, or the ordering of articles of special manufacture.
 - b. A list showing proposed begin and end of fabrication.
 - c. Installation dates for vessel systems, tests and trials, maintenance items, and other items of scheduled work.
 - d. A list of proposed shipment dates for material other than stocked items.
- C. Deliverable Schedule (see Section 925).
- D. A letter designating the Equal Employment Opportunity Officer and that person's responsibilities and authority.

The CONTR shall provide adequate materials, labor and equipment to ensure the completion of the Project in accordance with all Contract requirements. The Work shall be performed as vigorously and as continuously as conditions may permit. The CONTR shall take into consideration and make due allowances for foreseeable delays and interruptions to the Work such as weather, equipment breakdowns, shipping, Regulatory agency inspections and approvals. Receipt and acceptance of a schedule submitted by the CONTR shall not be construed to assign responsibility for performance or contingencies to the OWNER or relieve the CONTR of their responsibility to adjust work forces, equipment, and work schedules as necessary to insure completion of the work within the prescribed time (See Sections 941 through 946).

The CONTR shall take delivery of the vessel at the WETA Pier 9, Alameda, or Mare Island facilities. The OWNER will indicate the designated delivery location prior to delivery. All costs associated with the delivery of the vessel to the WETA Pier 9, Alameda, or Mare Island facilities from outside of the San Francisco Bay Area are the sole responsibility of the CONTR.

The OWNER may require up to three OWNER's Designated Representatives onboard for all legs of deliveries at OWNER's expense.

910 MANAGEMENT REVIEW & PROGRESS MEETINGS

The CONTR shall present Management Reviews to the OWNER. The reviews shall be scheduled monthly at a location in or near the construction shipyard and shall be coordinated so that they are held concurrently with the progress meetings. The first review is to be held within thirty (30) calendar days following Notice to Proceed. These reviews shall, at a minimum, address the following topics:

- A. Status of the design and outstanding design issues. Actions taken to resolve issues and schedules for same shall be included. OWNER-responsible actions that affect the CONTR shall also be included.
- B. Material status, certification, delivery schedule and other outstanding issues. Actions taken to resolve issues and schedules for same shall be included. OWNER-responsible actions that affect the CONTR shall also be included.
- C. Construction schedule, issues and status. Actions taken to resolve any issues shall be addressed. OWNER-responsible actions that affect the CONTR shall be included.
- D. Status of the Work to date, current and potential problem areas that could affect the Project Schedule and cost, and activities including inspections scheduled for the following two weeks.
- E. Regulatory Body approval and certification; status and outstanding issues; actions underway to resolve any outstanding issue(s).
- F. Quality Assurance.
- G. Schedule of Values and payment.
- H. Change Order status and any contractual issues.

The CONTR shall identify any OWNER actions that are requested or required to resolve issues and/or support the CONTR's efforts.

The CONTR shall prepare an agenda and submit to the OWNER for review prior to the meeting. The OWNER may request additional topics for the Management Review and the CONTR shall address those topics during the meeting. A copy of the final agenda and any supporting documentation shall be provided to the OWNER not less than twenty-four (24) hours prior to each scheduled meeting date.

The CONTR shall provide a written record of the minutes of the progress meetings and maintain a file of minutes. The OWNER shall acknowledge receipt of the minutes and may provide comments or additional information to the CONTR to be appended to the minutes. The acknowledgement of the minutes by the OWNER shall not constitute acceptance of any item of equipment or component parts.

921 PROJECT SCHEDULE

A properly maintained Project Schedule is required by the OWNER. The Project Schedule requirements are as follows:

- A Project Schedule Draft shall be submitted to the Owner for review seven (7) days after Contract Award and prior to Notice to Proceed.
- A Project Schedule Baseline shall be developed and published seven (7) days after OWNER's review of the Draft.
- The Project Schedule Baseline shall serve as the Contract Schedule.
- The Project Schedule shall be revised over time to reflect:
 - Resource loading including reference to other work occurring in the shipyard.
 - Material availability.
 - Change Orders.
- Revisions to the Project Schedule shall be submitted to the Owner for review three (3) days prior to the monthly meeting in both both electronic (on Microsoft Project compatible software) and PDF format.
- The Project Schedule shall be discussed at every monthly meeting.
- Milestone payments are dependent upon OWNER's acceptance of the current Project Schedule.

The CONTR warrants that the Project Schedule is the CONTR's committed plan to complete all Work within the allotted Contract Time and assumes responsibility for prosecution of the work as shown. The CONTR shall utilize the Project

Schedule in planning, scheduling, coordinating, and performing the work. The schedule shall include major activities of subcontractors, equipment vendors, and suppliers.

The Project Schedule shall be developed to the CONTR's typical level of detail, however the OWNER may request additional detail as needed to clarify or substantiate the scheduled milestones.

925 DELIVERABLE SCHEDULE

Within fifteen (15) days after Contract Award and prior to Notice to Proceed, the CONTR shall submit a schedule of dates for deliverables. This Deliverable Schedule is the CONTR's committed plan to complete the engineering and design within the Contract Time. The Deliverable Schedule shall list all drawings, analyses, reports, Technical Specifications, purchase technical specifications, and other deliverables that must be developed pursuant to the OWNER's Requirements and other Contract Documents.

The Deliverable Schedule shall provide for various interim submittals, revisions, and a final submittal of each deliverable, and shall include columns giving the intended dates of all submittals. The quantity and timing of submittals for each deliverable shall be proposed by the CONTR in the Deliverable Schedule, and should appropriately consider the need for OWNER endorsement of intended arrangements and other salient characteristics of the design.

The Deliverable Schedule shall include columns for the following entries for each listed deliverable: scheduled dates of submittals, actual dates of submittals, latest revision (by letter), drawing size, outstanding reservations, and expected release date. The Deliverable Schedule shall also identify deliverables that are required to be submitted to each Regulatory Body for approval, review and/or information, and the expected and actual dates of such approvals.

CONTR shall provide electronic copies of all drawings and data to OWNER for at least a seven (7) calendar day review and comment period. All drawings prepared for submittal to the U.S. Coast Guard shall be reviewed by OWNER prior to submittal to U.S. Coast Guard. OWNER shall receive all drawings approved by the U.S. Coast Guard.

The Deliverable Schedule shall be revised to show all changes, progress and delays, and shall be submitted monthly to the OWNER at least three (3) days prior to the monthly Management Review meeting.

931 OWNER APPROVAL OF WORK

Where the words "approved" or "for approval" are used without reference to the approving authority, they shall mean "approved by the OWNER" and "for the OWNER's approval." "Approved" status cannot be conferred by anyone but an authorized employee or other representative of the OWNER. OWNER approval does not relieve the CONTR of securing Regulatory Body approvals as required herein.

In no event shall approval by the OWNER of any aspect of the CONTR's Work be a warranty that the Work is complete, accurate or of sound design, or that the Work complies with Regulatory Body requirements. Such characteristics of the Work are the CONTR's responsibility, and any subsequent discovery of omissions or deficiencies with regard to the completeness, accuracy or soundness of the Work, and/or conformance with the Contract, and/or compliance with Regulatory Body requirements, shall be remedied by the CONTR to the OWNER's satisfaction through correction of the omissions or deficiencies at the CONTR's expense, irrespective of prior approval of the Work by the OWNER.

Any submittal that is found to be substantially deficient upon review shall be rejected and returned to the CONTR for resolution of deficiencies and resubmitted. A "rejected" determination shall void any credit which may otherwise be due the CONTR with regard to meeting a deadline for submission of the material in question.

932 CONFORMITY WITH CONTRACT

All Work performed and all materials furnished shall be in conformity with the Contract. In certain respects, the requirements of the approved design for the Vessel may exceed the requirements of pertinent Regulatory Bodies. Such approved design requirements shall not be changed except on written approval of the OWNER.

933 COOPERATION BY CONTRACTOR

The CONTR shall maintain a minimum of two full size sets of approved plans and Contract Documents, one set of which the CONTR shall keep available on the Work site at all times.

The CONTR shall give the Work the constant attention necessary to facilitate the progress thereof in accordance with the Project Schedule, and shall cooperate with the OWNER, their Inspectors and other CONTRs in every way possible.

The CONTR shall have on the Work site at all times, as their agent, a competent Superintendent or Project Manager, thoroughly experienced in the type of Work being performed and capable of reading and thoroughly understanding the plans and specifications, who shall receive instructions from the OWNER or their authorized representatives to the extent provided elsewhere in the Contract Documents. The Superintendent or Project Manager shall have full authority to supply such materials, equipment, tools, labor and incidentals as may be required. Such Superintendent or Project Manager shall be furnished irrespective of the amount of Work subcontracted.

The CONTR shall bear the sole risk and the obligation to rebuild, repair, restore, replace and to otherwise make good all damage, loss or injury to all or any portion of the Vessel, and to any Work or material for the Contract, including Change Order Work, on or incorporated into the Vessel until the entire Work for both Vessel has been finally accepted by the OWNER.

934 DUTIES OF THE OWNER'S INSPECTORS

Inspectors employed by the OWNER are authorized to inspect all Work done and materials furnished. The Inspector is not authorized to issue instructions contrary to the terms of the Contract documents, or to act as foreman for the CONTR; however, the Inspector shall have the authority to reject Work and materials, which rejection the CONTR may request to be decided by the OWNER. The OWNER's personnel are not to be considered part of CONTR's Quality Assurance personnel.

935 QUALITY ASSURANCE AND INSPECTION OF WORK AT CONTRACTOR'S SITE

Nothing contained in this subsection shall in any way restrict or impair the OWNER's rights under any warranty or guarantee.

The CONTR shall utilize a Quality Assurance (QA) program that assures that all aspects of design, construction, and completion of the Work comply with the requirements of the Contract. The program shall ensure that the latest applicable drawings, requirements, specifications and instructions defined in the Contract, as well as authorized changes, are communicated to workers and used in the Work. The program shall also include sequential and well-documented inspections and tests of completed elements of Work by the CONTR. The intent of these inspections and tests shall be to identify and resolve all deficiencies prior to presentation of the Work to the OWNER for acceptance. The QA program and its implementation plan (described below) shall be coordinated with the inspection and test requirements of the Contract; as well as the weight control program, noise and vibration control program, and other programs required by the Contract or otherwise developed by the CONTR to control the Work.

The personnel assigned to the development and administration of the QA program shall have independent authority and organizational freedom to identify and evaluate quality problems and initiate and recommend timely and positive solutions.

The implementation of QA procedures by a Subcontractor or Vendor does not relieve the CONTR of their responsibility to assure that the supplied items fully comply with the requirements of the Contract.

At a minimum, the Quality Assurance program shall make provision for the following or similar:

- A. A status report shall be provided monthly, on a mutually pre-established date, by the CONTR, listing any and all discrepancies in a Discrepancy Report (hereinafter "DR") and their disposition(s). Outstanding issues shall be highlighted.
- B. A process utilizing a CONTR-developed standard DR form, through which the OWNER can communicate potential issues and problems to the CONTR. The form shall include, at a minimum:
 - a. Independent tracking number suitable to the OWNER;
 - b. Date of issue initiated or identified by the OWNER;
 - c. Reference drawings/materials and revisions;
 - d. Subject;
 - e. Requirement references;
 - f. Issue or problem description;
 - g. Signature column by OWNER and date, if corrected;
 - h. Response area for CONTR, sign off and date.

The CONTR shall be responsible for tracking and providing a disposition for all issues raised by the OWNER.

The CONTR shall maintain and comply with its internal QA program as reviewed by the OWNER.

936 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK

All Work that does not conform to the Contract shall be considered as unacceptable Work, unless determined acceptable under the provisions of Section 932.

Unacceptable Work, whether the result of poor workmanship, use of defective, unsuitable, or unauthorized materials or equipment, or damage through carelessness or any other cause, found to exist prior to the final acceptance of the Work, shall be remedied or removed immediately and replaced in an acceptable manner at the CONTR's expense.

No Work shall be done on the Vessel except as required by the Contract or directed by WETA. Work done contrary to directives, except as herein provided, or any Work done without authority, shall be considered as unauthorized and shall not be paid for under the provisions of the Contract. Work so done may be ordered removed or replaced at the CONTR's expense.

Upon failure on the part of the CONTR to comply forthwith with any order of the OWNER made under the provisions of this section, the OWNER shall have authority to cause unacceptable Work to be remedied, or removed and replaced, unless determined acceptable under Section 932. No change in the Contract Price will be allowed in respect to any costs incurred by CONTR for such remedial work.

941 CONTRACT TIME DEFINITION

Contract Time shall be the period of time, measured in calendar days, that is allocated to the CONTR to complete the design and construction Work required by the Contract and to deliver the Vessel to the OWNER in full compliance with the Contract requirements and operational acceptance by the OWNER. Contract Time equals the number of days of time stipulated in the Contract at the time of Contract Award as proposed by the CONTR and agreed to by the OWNER, plus any additional days of time allocated during the course of the Contract by approved extensions of time, minus any days of time reclaimed by the OWNER based upon reductions in the scope or character of the Work during the course of the Contract.

The count of Contract Time expended shall begin on the date of the Notice to Proceed. The count of Contract Time, in conjunction with approved modifications or suspensions of the count of Contract Time, shall be the basis for establishing the approved scheduled date of Final Acceptance. Failure to complete the Work, submit all deliverables, and deliver the Vessel to the OWNER within the Contract Time may also be an event of default authorizing the OWNER to take any steps permitted by the Contract Agreement.

946 TIME IMPACT ANALYSIS

When Contract modifications are initiated by either the CONTR or the OWNER these changes shall be dealt with using standard Change Order document.

951 FINAL CLEAN-UP

Before the Operational Acceptance Survey, all rubbish, excess materials, temporary structures, and CONTR's equipment shall be removed from the Vessel and, as applicable to the item, disposed of. All interior and exterior surfaces of the Vessel shall be washed, dusted, polished, vacuumed, and/or disinfected, as applicable to the surface, so as to be thoroughly clean, new, undamaged, and fit for service.

Immediately prior to the Final Acceptance of the Vessel, all surfaces that require re-cleaning as a result of use during the Operational Acceptance Trials or other cause shall be washed, dusted, polished, vacuumed, and/or disinfected, as applicable to the surface, so as to be thoroughly clean, new, undamaged, and fit for customer service, throughout the Vessel.

952 CONTRACT COMPLETION

Following completion of the Guarantee/Warranty Period and satisfactory completion of all outstanding warranty claims, the OWNER shall issue a letter releasing the CONTR from further performance under the Contract subject to rights and remedies reserved in the Contract Agreement.

970 SPARE PARTS

The OWNER typically maintains a comprehensive inventory of spare parts for its other fleet assets. Commonality with the machinery components of the OWNER's existing fleet assets is desirable to minimize the quantity of spare parts required on hand.

In addition, the main engine dealer spare parts supply shall be guaranteed to be on hand by the engine distributor 50 miles from San Francisco. Supplies shall be available for the foreseeable items which might require immediate replacement, for example, injectors, filters, cooler parts, ECM's, etc. CONTR is to provide a current list of available spares for the engines provided for these new Vessels.

981 PROTECTION AND RESTORATION OF PROPERTY

The CONTR shall be responsible for all damage or injury to property of any character, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the Work, or at any time due to defective Work or materials, during the prosecution of the Work, and said responsibility shall not be released until the Project shall have been completed and accepted.

The CONTR shall safeguard the Vessel's machinery and electrical equipment, the use of which shall be made only upon the express written approval of the OWNER, and under supervision of competent, trained personnel.

The CONTR shall at all times, insofar as conditions of the Work permit, keep the openings of the Vessel closed against the weather. Deck openings, permanent and/or temporary shall be protected by a watertight coaming with a securely fastened cover.

During the course of the Work, the CONTR shall maintain adequate heating and ventilation throughout the Vessel to preclude the formation of molds and/or other deleterious substances.

982 CHARACTER OF WORKERS, METHODS AND EQUIPMENT

The CONTR shall at all time employ sufficient labor and equipment for prosecuting the several classes of Work to full completion in the manner and time required by this Contract.

All workers and management personnel shall have sufficient skill and experience to perform properly the Work assigned to them. Workers engaged in special Work or skilled Work shall have sufficient experience in such Work and in the operation of the equipment required to perform all Work properly and satisfactorily.

Any person, whether worker or superintendent, employed by the CONTR or by any Subcontractor whom the OWNER deems incompetent, careless, insubordinate, or otherwise objectionable, or whose continued employment on the Work is deemed to be contrary to the public interest shall, at the written request of the OWNER, be removed forthwith by the CONTR or Subcontractor employing such person, and shall not be employed again in any portion of the Work without the approval of the OWNER. The OWNER shall notify the CONTR in writing at least five days before submitting a written request to remove any worker and shall cite the reason for the impending removal in the notice.

Should the CONTR fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the OWNER may suspend the Work by written notice until such orders are complied with.

No convict labor shall be employed and no materials manufactured or produced by convict labor shall be used in connection with the Work. This provision shall not be construed as applying to convicts on parole or probation.

The CONTR shall not discriminate against any person because of sex, race, creed, color, sexual orientation, or national origin.

All equipment which is proposed to be used shall be of appropriate size and in such mechanical condition as to meet the requirements of the Work and to produce a satisfactory quality of Work.

When the methods and equipment to be used by the CONTR in accomplishing the construction are not prescribed in the Contract, the CONTR is free to use any methods or equipment that he demonstrates to the satisfaction of the OWNER shall accomplish the Work in conformance with the requirements of the Contract, except as provided above.

When the Contract or manufacturer's instruction specifies that the construction be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized.

APPENDIX B1 SHORESIDE INTERFACES

APPENDIX B2 WETA STD DETAILS

APPENDIX B3 INTERIOR OUTFITTING

APPENDIX B4 MASTER EQUIPMENT LIST

APPENDIX B5 MOORING INTERFACE

APPENDIX B6 SIGNAGE

APPENDIX B7 EXTERIOR GRAPHICS