

Specification for
Vessel Repowering
MV PACIFIC SCOUT

Prepared for:

Pacific Pilotage Authority
Vancouver, BC

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**NOTE: THIS SPECIFICATION IS BASED ON A STANDARD NUMERIC
FORMAT. NOT ALL NUMBERS ARE NECESSARILY ALLO-
CATED IN THIS SPECIFICATION, ONLY THOSE LISTED IN
THE TABLE OF CONTENTS.**

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Specification for Vessel Repowering *MV PACIFIC Scout*

**For: Pacific Pilotage Authority
Vancouver, BC**

PART 100 - GENERAL

This specification covers the work to be performed on the aluminium-hulled *Pacific Scout* pilot vessel operated by Pacific Pilotage Authority (PPA) from Victoria, BC.

The general scope of the refit is as follows:

- 1) Remove existing main engines (three total) and install new engines.
- 2) Remove existing gear boxes (three total) and install new gear boxes.
- 3) Remove existing main engine controllers in engine room and wheelhouse, and install new controllers in each location
- 4) Coordinate with jet supplier to replace jet impellers
- 5) Update fuel system piping to connect new engines to existing system
- 6) Update cooling system piping to connect new engines to existing system
- 7) Update exhaust system to connect new engines to existing system

This work is to be completed while the vessel is tied up at the Bidders facility, or at other mutually agreed location, if appropriate.

- 1) This Specification and accompanying Drawings will form part of a Contract between PPA and Contractor.
- 2) The Specification is to be interpreted as an instruction to Contractor regarding matters of design and construction of vessel, and as such is written in the positive imperative tense.
- 3) The Contractor is responsible for proper execution and functioning of contracted work as per the Specification and is responsible for corrective action in the event of improper or inadequate function related to Contractor work as specified in the Specification.
- 4) Notify PPA's Representative of any proposed departures from specification, whether in principle or detail, and obtain written approval before such changes are committed.
- 5) PPA reserves the right to make alterations in detail as work progresses with an extra charge where extra cost of labour or material may be involved. Such extra charges must have written authorization of PPA's Representative before work is committed. An alteration alone is not justification for extra charges.

- 6) Changes in detail to conform with Contractor practice, or changes considered and agreed upon as improvements, may be put forward by Contractor but must have written approval of PPA's Representative before any related work is committed.

101. PARTICULARS

101.1 Vessel Description

- 1) The *Pacific Scout* is a 19 metre pilot vessel currently operating out of Victoria, BC. The vessel is a high speed aluminium vessel, built in 2006, which has spent 15 years working the coast of British Columbia.
- 2) PPA wishes to replace the three existing main engines with new engines to extend the vessel life.

102. REGULATION AND CLASSIFICATION

- 1) All materials provided and work performed must comply with all applicable Transport Canada – Marine Safety (TC-MS) requirements.
- 2) Contractor is responsible for cooperating with PPA in coordinating inspections with Transport Canada as necessary.

103. REFERENCE DOCUMENTS

The following reference drawings of the *Pacific Scout* are available upon request:

Drawing Number	Rev.	Drawing Title
Pi19/PPA/02b-10	2	19m Pilot Boat for Pacific Pilotage Authority – Machinery Arrangement
Pi19/PPA/02b-12	3	19m Pilot Boat for Pacific Pilotage Authority – Shafting Arrangement
PPA/02b/362&3-17	1	19m Pilot Boat Pacific Navigator (Hull 363) – Fuel System
Pi19/PPA/02b-18	2	19m Pilot Boat for Pacific Pilotage Authority – Cooling System Schematic
Pi19/PPA/02b-13	2	19m Pilot Boat for Pacific Pilotage Authority – Exhaust System

Contractor is responsible for preparation of any further engineering analysis, calculations, detailed design, and drawings to comply with the intent of this Specification and to facilitate production.

104. WEIGHT AND STABILITY

- 1) Contractor to maintain a detailed log of the weight and location of all items removed, added or moved on the vessel during the course of the described work. The detailed log is to be provided to the Owner's Naval Architect for the purposes of updating the vessel Stability Book.

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PART 200 - SCOPE OF WORK

The following scope of work is indicative of the work to be completed during the engine replacement. While it is as complete as possible, it is not an exhaustive list of all work required to be completed.

201 Procurement of New Equipment

Contractor is responsible for procurement of all equipment necessary to complete the work.

This scope of work includes the following;

- 1) Procure three (3) new Cummins X15¹ main engines with the following specifications:
 - 600 hp @ 1800 rpm
 - Continuous rating
- 2) Procure three (3) new ZF 665 gear boxes with 1.4 gear ratio.
- 3) Procure three (3) new Hamilton Jet T-195 impellers.
- 4) Provide purchase orders for above items to PPA for review and approval prior to purchasing.

202 Engineering Support

Contractor is responsible for contracting with Camarc Design to perform the engineering tasks required to support the work.

This scope of work includes the following;

- 1) Contract with Camarc Design to develop new shafting arrangement drawing to address new engines and gear boxes.
- 2) Contract with Camarc Design to update engine seating for new engines.
- 3) Coordinate with Camarc, Cummins, ZF, and Hamilton Jet to develop the information necessary to fully design and engineer the installation.

203 Removal of Existing Equipment

The existing three main engines and gear boxes are to be removed from the vessel.

This scope of work includes the following;

¹ The Authority is proposing Cummins X15 engines but is not opposed to the proponent providing an alternative to the existing engines or these proposed engines (including gearbox and impellers). However, the power rating should be within the Transport Canada guidelines for “replacement engines” so no additional SCR system should be installed. Furthermore, the vessel’s operational speed should not be adversely affected, and the newly proposed engines are rated continuously or equivalent.

- 1) Remove engine room hatch from vessel, taking care to preserve integrity of insulation, windows, and lights.
- 2) Remove each of the three main engines and gear boxes, taking care to preserve the integrity of all piping system and wiring connections.
- 3) Where necessary, remove ancillary equipment located next engines (eg starting batteries and fuel filters), and preserve for re-installation
- 4) Engines and gear boxes are to be individually packaged for transport.
- 5) Remove engine control panels from engine room. Package for transport.
- 6) Steam clean bilges in way of removed engines and gear boxes.
- 7) Remove and relocate engine control panel (over centre main engine)

Optional Item 1:

- 1) Prepare and paint bilges in way of removed equipment with Intershield 300HS or equivalent.

204 Installation of New Equipment

The three new main engines, gear boxes, drive impellers, and supporting equipment is to be installed on the vessel.

This scope of work includes the following;

- 1) Modify engine mounts in accordance with Camarc Design work.
- 2) Install three new engines and gear boxes
- 3) Install new engine control modules in engine room (one above each engine),
- 4) Install new engine control modules in wheelhouse in location agreed upon with Owner's Representative.
- 5) Install new jet drive impellers in drives
- 6) Connect all services to engines and gear boxes (eg electrical, fuel, exhaust, cooling water).
- 7) Where necessary, re-locate and install supporting components (starting batteries, fuel filters, cooling water piping). Final locations to be determined with Owner's Representative.
- 8) Connect drive line components in accordance with Camarc Design work.
- 9) Change starting batteries to lithium and upgrade chargers

Optional Item 2:

- 1) Replace all existing cooling water piping for three main engines with TC approved composite piping (the Authority uses Wavistrong GRE cooling water piping as approved by Lloyd's Register on another pilot launch).

205 Commissioning of New Equipment

The three new main engines, gear boxes, drive impellers, and supporting equipment is to be fully commissioned.

This scope of work includes the following;

- 1) Perform laser shaftline alignment as required by suppliers, Camarc Design, Transport Canada, and Owner's Representative. Alignment to be confirmed after vessel launching.
- 2) Perform integration of engines and gearboxes with ships control and monitoring systems
- 3) Perform integration of engines and jet-drive control modules, including wheelhouse helm controls.
- 4) Where necessary, coordinate with engine and drive vendors for supplier technical support on site.

206 Testing of New Equipment

The three new main engines, gear boxes, drive impellers, and supporting equipment is to be fully tested to demonstrate successful installation.

This scope of work includes the following;

- 1) Prepare Dock Trials and Sea Trials plans in coordination with vendors and Camarc Design
- 2) Provide Owner's Representative with TC approved Dock Trials and Sea Trials plans
- 3) Perform dock trials to prove all systems are operating correctly in accordance with approved plan.
- 4) Perform sea trials to prove all systems are operating correctly in accordance with approved plan.

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