



# **TERMS OF REFERENCE**

## **PROJECT: R.019554.001**

December 2010

Provision of  
Design/Build Services  
For the  
Construction of a New Channel, Outer Basin and Fixed Wharf  
At  
Pangnirtung Harbour  
Pangnirtung, NU  
For  
Department of Fisheries and Oceans  
Small Craft Harbours Branch

1. Main Channel
2. Outer Basin
3. Fixed Wharf



**TABLE OF CONTENTS  
FOR TERMS OF REFERENCE**

	<b>Page</b>
1.0 Introduction	4
1.1 General	
1.2 Location	
1.3 Background	
1.4 Existing Studies and Reports	
2.0 Design Objectives	5
3.0 Scope of Work	5
3.1 Main Channel	
3.2 Outer Basin	
3.3 Fixed Wharf	
3.4 Breakwater Road Turn Around at New Fixed Wharf Location	
3.5 Detailed Project Design Brief	
3.6 50% Design Development	
3.7 99% Design Development	
3.8 100% Design Development	
3.9 Overall Design Development Requirements	
4.0 Codes, Guidelines, Regulations, Standards, Permits	9
5.0 Schedule	9
6.0 Cost Control	10
7.0 General	10



## **TABLE OF CONTENTS** **FOR TERMS OF REFERENCE, Cont'd**

### **Appendices:**

1. Appendix A – Site Video of the Harbour and Community
2. Appendix B – Wave Agitation Assessment for Harbour Layout Alternatives; W.F. Baird and Associates Coastal Engineers Ltd, October 2, 2009
3. Appendix C – Geotechnical Investigation Report; Soil-Mat Engineers and Design-Builders Ltd, Nov 27, 2009
4. Appendix D – Wave Climate and Agitation Study W.F. Baird & Associates Coastal Engineers Ltd, July 2005.
5. Appendix E - Materials Sampling, Identification, and Testing for Harbour, Pangnirtung, NU, EBA Engineering Consultants Ltd., May 2007
6. Appendix F - Final Report, Marine Sediment Sampling Program, Proposed Small Craft Harbour, Pangnirtung, NU, Knight Piésold Consulting, April 14, 2009
7. Appendix G – Preliminary Concept Drawing – Entrance Channel and Outer Basin
8. Appendix H – General Procedures and Standards For Professional and Design Services, March 2010



**1.0 INTRODUCTION**

**1.1 General**

These Terms of Reference outline the scope of services required for the Design Builder to complete designs, contract documents and the construction of the Main Channel, Outer Basin and Fixed Wharf

**1.2 Location**

The site is located on the eastern shore of Baffin Island in the community of Pangnirtung, NU.

**1.3 Background**

The Pangnirtung Harbour is located in the village of Pangnirtung, NU on the eastern shore of Baffin Island off Cumberland Sound and inland along Pangnirtung Fjord. Pangnirtung is accessible by scheduled airline service from Iqaluit, the territorial capital.

The community is attempting to grow the Baffin fishing industry to make better economic use of their existing fish plant.

Pangnirtung Harbour currently accommodates about 40 vessels ranging in size from 6m to 20m. These vessels are used for everything from pleasure to tourism to hunting and fishing.

In order to consolidate all vessels within the community, an expansion of the harbour is required. A new wider and deeper channel will allow better and more continuous access to an expanded outer harbour basin. A new larger fixed wharf will accommodate larger fishing and freighting vessels to ease loading/unloading activities.

\*\*DFO-SCH are currently undertaking other heavy civil work in the harbour, consisting of excavation of the inner basin, construction of a west breakwater, launching ramp, sealift beaching/landing area and floating wharves and docks for smaller vessels. This work will be ongoing during the 2011 construction period and the Design Builder will be required to liaise and coordinate their construction activities with the DFO-SCH contractor(s).

\*\*The community of Pangnirtung is supplied via sealift at various times during the shipping season. This activity is vital to Pangnirtung and cannot be interfered with during the Design Builder’s construction activities. All efforts must be expended to allow the unimpeded loading/unloading of the sealift vessels.

**1.4 Existing Studies and Reports**

A list of studies and reports is attached as Appendices “A” to “G” to these Terms of Reference.



The Design Builder shall review and integrate these existing reports as they pertain to his work.

## **2.0 DESIGN OBJECTIVES**

2.1 The objective of this project is to provide design, plans, and Class “A” cost estimates for the following elements:

- (a) Main Channel widening and re-alignment
- (b) Deepening of the Outer Basin to accommodate the new fixed wharf
- (c) New fixed wharf construction

## **3.0 SCOPE OF WORK**

The Design-Builder will provide with the proposal a detailed time schedule for the performance of services. The Design-Builder shall adhere to the approved time schedule. If a change in the approved schedule becomes necessary, the Design-Builder must submit a request to PWGSC and obtain approval for the change.

The Design-Builder shall allow for meetings at Halifax at the following stages:

- Stage 1 – Project design brief/concept
- Stage 2 – Design at 50% development
- Stage 3 – Design at 99% development
- Stage 4 – Design at 100% development

The Design-Builder will submit the design for review at the following stages:

- Stage 1 – Project design brief/concept
- Stage 2 – Design at 50% development
- Stage 3 – Design at 99% development
- Stage 4 – Design at 100% development

### **3.1 Main Channel**

The main channel is to be re-aligned approximately 10 degrees east from the existing entrance to the outer basin to better protect the basin from wind and waves coming across the fjord. The channel is to be widened to 26 metres bottom width at dredge grade and -2.4 metres depth below Chart Datum with adjacent slopes of sufficient angle to minimize sloughing. The length of the channel is approximately 310 metres. The side slopes are to be no less than 4:1.



### 3.2 **Outer Basin**

The Outer Basin is to be dredged to -4.4 metres below Chart Datum to the approximate outline of the attached drawing. The side slopes are to be integrated into the existing harbour including the Inner Basin and tidal flats and designed to minimize sloughing of the side slopes. The side slopes are to be cut suitable for the insitu material. The Outer Basin is to include the excavation of the area up to the new fixed wharf construction.

### 3.3 **Fixed Wharf**

A new fixed wharf of the Design Builder's design is to be built adjacent the Outer Basin. The design vessel shall be 35 meters long by 8 meters wide with an approximate gross tonnage of 700 tonnes. The fixed wharf should be capable of rafting side by side 2 design vessels at the fixed wharf. All applicable standards for the safe operation of the vessel including mooring and maneuvering shall be met. The fixed wharf is to be the Design Builder's preference and to utilize the experiences of the Design Builder. Some fixed wharf suggestions are sheet steel pile (either wall of cell) or concrete caisson.

The Design Builder will be required to incorporate any fish habitat compensation requirements into the design and construction of the fixed wharf or adjacent area. This adjacent area would only be required as the result of the Design Builder's design of the fixed wharf and its impact on the fish habitat.

#### **3.3.1 Fixed Wharf Component Requirements**

- .1 **Design Life:** 40 Years including corrosion protection/allowances as required to obtain the design life.
- .2 **Loads:**
  - .1 **Deck/Fixed Wharf Loadings**
    - a) Environmental loads - snow, ice, wind, wave
    - b) Uniformly distributed loads - 20 kPa (fixed wharf deck and upland areas/approach)
    - c) Vehicular loadings - CS-600 truck as per CAN/CSA-S6
- .3 **Mooring & Berthing Forces:**  
Mooring and berthing forces to be determined on the basis of the anticipated vessels to be determined, wind loads, approach angle and velocity. Ice loading must also be accommodated
- .4 **Fixed Wharf Characteristics:**  
The fixed wharf structure is to be constructed as a closed marine solid structure consisting of either steel or concrete.
- .5 **Deck Elevations/Characteristics:**  
Deck elevation to be at Elevation +10.0 meters above Chart Datum. Fixed wharf deck to be gravel surface finished to grade.



- .6 Fixed Wharf Location & Alignment:  
Fixed wharf structure to be located in the area identified on the harbour concept plan. The Fixed Wharf is to be located so as to allow for a future expansion of approximately 10 metres. Alignment to be developed based on environmental conditions and ease of navigation.
- .7 Fendering System:  
Due to ice conditions, this fixed wharf will not be equipped with a fendering system.
- .8 Cleats/Bollards:  
Cleat/bollard spacing and line pull capacity to be sufficient to accommodate anticipated vessel traffic.
- .9 Wheelguard:  
concrete or timber treated to marine grade suitable to the fixed wharf design.
- .10 Ladders:  
Safety ladders to be installed as per code requirements. All ladders to be flush mounted to face of the fixed wharf.
- .11 Fixed Wharf Length & Draft:  
The proposed fixed wharf structure is to be a minimum of thirty (30) metres in length along the main docking face and have water depth or draft at 4.4 meters below Chart Datum.
- .12 Retaining Structures/Approach:  
Retaining structure as required to stabilize transition between fixed wharf and approach structure.
- .13 Scour Protection  
Suitable scour protection requirements to be evaluated/implemented for the base of the new fixed wharf.
- .14 Fire Prevention Regulations:  
FC No. 373 - Standards for Piers and Wharves (Fire Commissioner of Canada) will apply.
- .15 Navigational Light  
Meet the requirements of Transport Canada and the Canadian Coast Guard for the requisite navigational light. Design and install a concrete base to mount the pipe mast for the navigational beacon light. See attached drawing S-1 Fabrication Details – Pipe Mast for Mounting Lights. The final location at the end of the east breakwater will be confirmed by the DFO SCH.
- .16 Electrical:  
There is a requirement to supply and install a dedicated 120 v single phase circuit to power a light beacon to be installed on the end of the east breakwater. The electrical design is to include a NEMA 4X lockable enclosure sufficient to contain the beacon transformer, controls, disconnect switch and necessary grounding. There are existing wharf lighting poles which may be used upon agreement with the Pangnirtung Municipality/Harbour Authority.
- .17 Mechanical:  
No requirement for fire hydrants, water supply, or storm drainage at this time.



**3.4 BREAKWATER ROAD TURN AROUND AT NEW FIXED WHARF LOCATION**

A new turnaround is to be built at the end of the breakwater adjacent the new fixed wharf. The turning radius shall be sufficient to allow a tandem truck to fully maneuver.

**3.5 DETAILED PROJECT DESIGN BRIEF**

**Project Schedule**

The Design-Builder will prepare a realistic project schedule in the form of a bar chart that will show:

- Design development at stages
- Reviews by PWGSC Project Manager and Department of Fisheries and Oceans – Small Craft Harbours (DFO-SCH); allow 1 week for this review.

**Project Costs**

- Develop cost estimates for each major item of work
- Develop a unit price table for each major item of work.

**3.6 50% DESIGN DEVELOPMENT**

The Design-Builder shall, after the project design brief is approved, develop the design to the 50% stage. At the end of this stage, the Design-Builder shall prepare a Class “B” estimate that will allow the client to be aware of any changes from estimates presented in the project design brief.

**3.7 99% DESIGN DEVELOPMENT**

The Design-Builder shall after the 50% design development is approved, develop the design to the 99% stage.

At this stage, the Design-Builder shall finalize the quantities.

At the end of this stage, the Design-Builder shall prepare a Class “A” estimate that will allow the client to be aware of any changes from estimates presented in the 50% design development.

**3.8 100% DESIGN DEVELOPMENT**

Final design to include construction drawings and updated Class “A” estimate.

Once the Final Design is completed, the Design-Builder will forward all documents to PWGSC.



### **3.9 OVERALL DESIGN DEVELOPMENT REQUIREMENTS**

The Design-Builder will make any desired changes to drawings and documents at each stage as per comments made by PWGSC.

The Design-Builder shall submit monthly reports, which describe progress and indicate the milestones completed.

The Design-Builder shall affix his/her stamp or seal to all submitted plans and documents.

Documents will be in metric units.

Submit 5 copies of the Final Design and cost estimates to PWGSC. Provide four copies of design documents for review at Project Design Brief/Concept, 50%, and 99% design stages. Provide digital copies of documents with each submittal.

### **4.0 CODES, GUIDELINES, REGULATIONS, STANDARDS, PERMITS**

- 4.1 Latest and strictest shall apply including Transport Canada Standards for Vessels.
- 4.2 Planning Guideline for Commercial Fishing Harbours-Atlantic Canada
- 4.3 Harbour Accommodation Guidelines
- 4.4 UFC Design Criteria – Design: Small Craft Berthing Facilities
- 4.5 Please note that no physical work on site may start prior to the issuance of the necessary permits. Mobilization is allowed.
- 4.6 Application has been made for the Disposal at Sea Permit. Receipt of the DAS Permit is estimated to be in February.
- 4.7 The NIRB has issued a permit for this work
- 4.8 Application has been made for the Navigable Waters Permit (NWPA). This permit requires a final design drawing to be submitted for approval. Receipt of the Permit is estimated to be 2 months after the Design Builder has completed this design drawing.

### **5.0 SCHEDULE**

- 5.1 The Design-Builder's proposal must incorporate the following information:
  - Submittal dates of Project Design Brief, 50%, 99% and 100% completion including cost estimates. Estimates shall be provided for each of Channel, Outer Basin and Fixed Wharf in such detail as to provide a FY cash flow including a unit price table to allow payment based upon completion for each month of work.
  - The In-Service date of the new harbour developments is to be July 2013.



**6.0 COST CONTROL**

The Design Builder will maintain the necessary records to confirm the work performed.

If at any time during the progress of the work, the Design-Builder considers that the cost outlined in the contract will be exceeded, he shall immediately provide PWGSC with complete details in writing.

**AT NO TIME SHALL THE APPROVED CONTRACT VALUE BE EXCEEDED WITHOUT PRIOR WRITTEN AUTHORIZATION OF PWGSC.**

**7.0 GENERAL**

All data collected, reports and drawings made in connection with the project become the property of the DFO-SCH and must be turned over with full copyright to DFO-SCH upon completion of the contract. This includes, but is not limited to, As-Built Drawings, Shop Drawings, and any Operations and Maintenance Manuals.

The Design Builder shall provide quality control for the work. The Quality Control Plan will be required and approved prior to work commencing on site. All records will be provided to PWGSC as per the above paragraph. A final survey of the work will be undertaken by the Design Builder and submitted for approval of completion of the work by PWGSC..

PWGSC may provide inspection services for confirmation of quantities and areas undertaken as part of the work. This information may be used for Progress Payment calculations and quality assurance that the Design Builder is meeting the requirements of the contract.