Project Title: Kootenay Lake Construction of Navigational Aids

1.0 OBJECTIVE:

The Canadian Coast Guard's objective is to demolish seven timber pile navigational aid dolphins and build nine steel pile navigational aid dolphins in Kootenay Lake and Arrow Lake as identified within this Statement of Work (SOW).

2.0 BACKGROUND INFORMATION:

The Canadian Coast Guard (CCG) is a Special Operating Agency of the Department of Fisheries and Oceans Canada (DFO) that helps to ensure safe and accessible waterways for Canadians. Within its mandate, the CCG has the responsibility to provide aids to navigation, and marine communications and traffic management services that contribute to the safety, accessibility and security of Canadian waters.

Through an ongoing review process, the CCG identifies locations where aids to navigation are required to be constructed or modified to better provide their service and to improve the safety to those who maintain them. The CCG has identified navigational aids in Kootenay Lake and Arrow Lake which require work to improve their structural condition and to improve the safety of those who maintain them.

3.0 SUMMARY OF WORK:

The CCG has identified 7 existing pile dolphin aids to navigation sites which require replacement and 2 proposed pile dolphin sites which require establishment. The full details of the work planned for each site are identified within the construction drawings provided in the reference documents. The general project activities will include removal and disposal of the existing timber structures and constructing new steel structures which includes: driving new steel piles, welding tabs and ladders, and installing work platforms and navigational towers.

The following information is provided to clarify the requirements.

.1 WORK LOCATION – Of the 9 sites requiring work, 8 are located in Kootenay lake, and 1 is in Arrow lake. Their identifications and approximate locations are provided in Table 1 below.

Table 1 - Site Locations

LL #	SITE NAME	GENERAL AREA	LATITUDE	LONGITUDE
1.3	Nelson East	West Arm Kootenay Lake	49° 31' 7"	117° 16' 16"
3.0	Seven Mile Point	West Arm Kootenay Lake	49° 34' 18"	117° 12' 39"
5.0	Kokanee Narrows	West Arm Kootenay Lake	49° 35' 44.5"	117° 7' 12"
5.3	Kokanee Point East	West Arm Kootenay Lake	49° 36' 5.8"	117° 6' 52"
5.6	Strickland Creek East	West Arm Kootenay Lake	49° 36' 26.5"	117° 5' 7"
8.3	Procter Sector (New Site)	West Arm Kootenay Lake	49° 37' 18.69"	116° 56' 50.92"
13.3	Kootenay Landing Outer	South Arm Kootenay Lake	49° 15' 56.9"	116° 41' 23.8"
19.0	Schroeder Point	North Arm Kootenay Lake	50° 2' 5"	116° 54' 5"
39.5	Cape Horn (New Site)	Upper Arrow Lake	50° 21' 7.64"	117° 55' 37.13"

A key map is also provided in Figure 1 below.

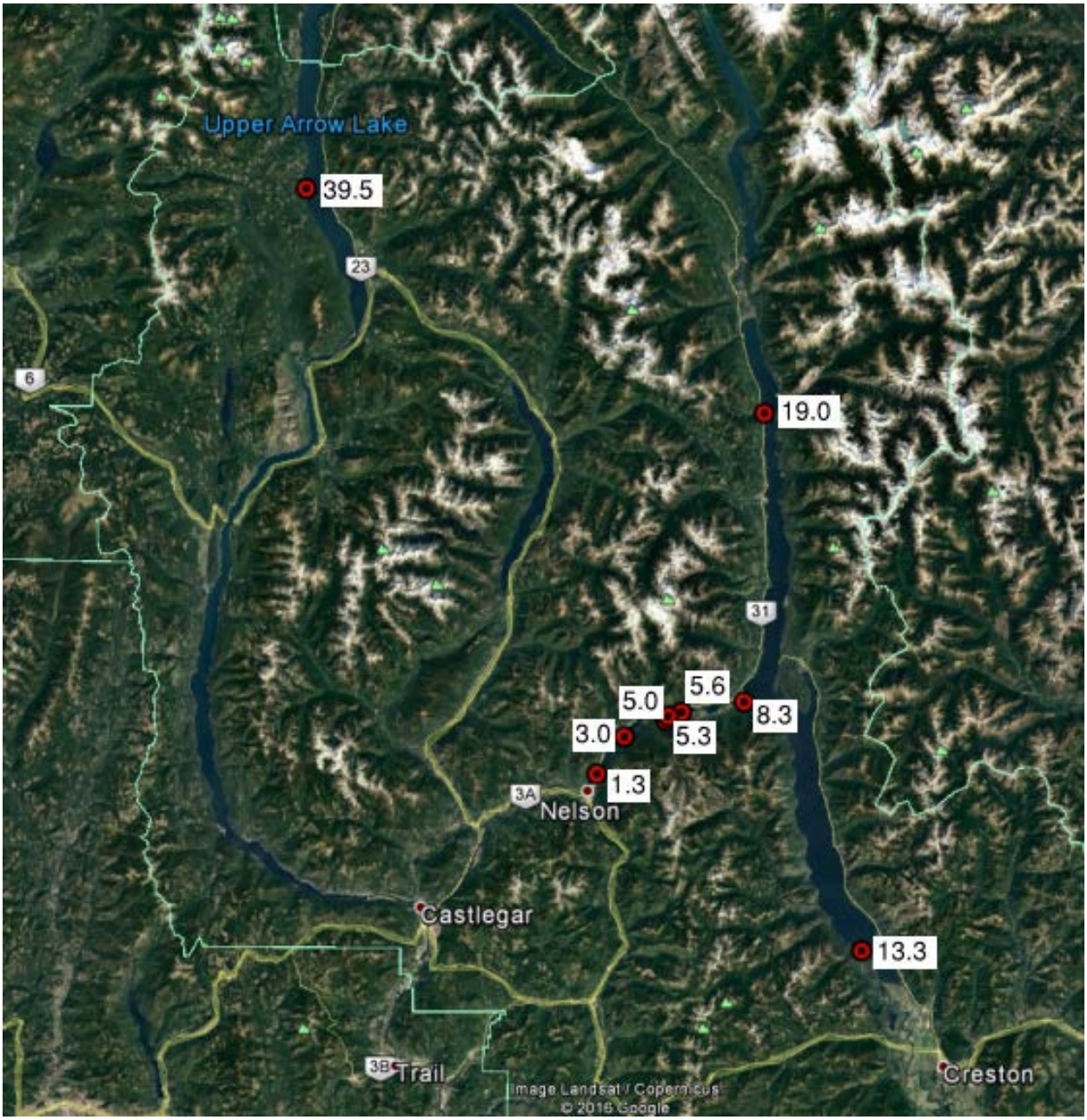

Figure 1 - Site Location Key Map

.2 SCHEDULE – The project construction is to be scheduled by the Contractor within the constraints provided in Section 7.0 below.

.3 REVIEW OF WORK – All Work by the Contractor will be reviewed by CCG for conformance to the Contract Documents and the Environmental Protection Plan. A CCG representative will be on the pile driving barge during all pile driving activities and at completion of Work. The Contractor will be required to transport up to 2 CCG representatives to and from the work barge and shore.

.4 REFERENCE DOCUMENTS – The following documents provide clarification for the required work at each site location.

.1 Appendix A – ISSUE FOR TENDER DRAWINGS
.2 Appendix B – ENVIRONMENTAL PROTECTION PLAN

4.0 REQUIREMENTS:

.1 LAWFULNESS – The Contractor must perform all Work in accordance with all applicable laws, acts, legislations, regulations, and agencies. This may Include, but not be limited to, the following:

.1 Canada Labour Code
.2 WorkSafe BC
.3 Canadian Environmental Protection Act
.4 Canadian Environmental Assessment Act
.5 Fisheries Act
.6 Species at Risk Act
.7 Migratory Birds Convention Act
.8 BC Water Act

.2 PERFORMANCE – Perform all Work identified and to the specifications of this SOW and/or supplemental documents.

.3 PILE DOLPHIN CONSTRUCTION – The Contractor is to provide the pile construction services to completely build the 9 structures identified above in accordance to the drawings provided in Appendix A. The Contractor is to completely demolish the 7 existing timber pile sites identified. This Work will include pile driving, welding, installing platforms, installing navigational aid towers, and extracting piles. If a pile is snapped during extraction and cannot be fully extracted, the Contractor must cut off the remaining pile at the lake floor.

.4 BIRD NESTS – Where existing structures having bird nests present, the Contractor must take precautions to not damage the nests and must transfer the nest to the new site under the direction of the CCG.

.5 NAVIGATION – The Contractor must plan and execute all Work in a manner that will not impede navigation.

.6 MATERIALS – The Contractor must provide all construction materials required for the completion of Work unless noted on the construction drawings as supplied by CCG.

.7 SALVAGE – The Contractor must remove, transport, and store any items noted on the Construction Drawings to be salvaged to a safe and secure location until collected by the CCG.

.8 DISPOSAL – All construction and demolition waste to be disposed of by the Contractor at approved facilities. The Contractor is to provide to CCG waste disposal certificates from an approved facility for the disposal of any hazardous or controlled wastes.

.9 SCHEDULE – The Contractor must provide to CCG within 28 days following contract award a written schedule for all Work. The site works must be executed in a continual basis and must commence during the week of September 6 – September 12. Work that cannot be completed due to water elevations as discussed in Section 7.1 below must be completed by March 31, 2018.

.10 CERTIFICATIONS – The Contractor must ensure that all welding performed by the Contractor is performed by a welder certified by the Canadian Welding Bureau (CWB) in the material specified and the method selected. Within 28 days following contract award the Contractor must provide CCG verification of the welder's certification and a description of the method to be used.

.11 ENVIRONMENTAL ADHERENCE – The Contractor must adhere to the Environmental Protection Plan (EPP) provided in the reference documents. The supplied EPP addresses additional requirements including mitigation measures and Best Management Practices (BMPs) to be implemented to reduce the risk of negatively impacting the environment due to the Work activities.

.12 EERP – The Contractor must provide to CCG an Environmental Emergency Response Plan (EERP) that address the procedures to be implemented to mitigate any potential negative impact on the environment (i.e. spill) within 28 days following contract award. The Contractor must designate an environmental lead and ensure that workers are adequately trained to carry out the EERP.

.13 HEALTH AND SAFETY – The Contractor is responsible for the health and safety of their workers as it pertains to the Work and to ensure all workers act in accordance with WorkSafe BC regulations.

5.0 TRAVEL:

The Contractor is responsible for all food, lodging, transportation, and all other travel related expenses incurred for the Contractor's workers as it relates to the Work.

6.0 SUPPORT PROVIDED BY CCG:

.1 MATERIALS – CCG will provide all materials and items noted on the Construction Drawings as supplied by CCG and will deliver the materials and items to the Contractor's work yard, or a mutually agreed upon alternate location.

.2 SITE LOCATIONS – The exact locations and orientations of the structures will be identified in the field by CCG and verbally communicated to the Contractor at the time of construction.

.3 CONSTRUCTION WORKERS – CCG will provide the work crews necessary to perform the installation of materials and items noted on the Construction Drawings as to be installed by CCG.

.4 SURVEY – The CCG will survey in the final coordinates of the built structures and will report any changes to the necessary authorities.

.5 NOTIFICATIONS – CCG will provide all notifications required by legislation or otherwise determined by CCG to the appropriate authorities.

.6 PERMITS and FEES – CCG will obtain all necessary permits for the execution of the Work and pay all fees associated with such.

7.0 CONSTRAINTS:

The Contractor should be familiar with the locations of each site and identify project constraints as they relate to the Work. The constraints include, but are not limited to, the following:

.1 WATER ELEVATIONS – The elevations of some of the ladder support brackets and pile braces will be below the expected water elevation in September but should be accessible in March. The Contractor will be required to return to the work sites when the water elevations are low enough to allow the work to be completed.

.2 ENVIRONMENTAL – The EPP addresses project specific activities and procedures to be implemented, to mitigate any potential negative impact on the environment. The Contractor is advised to review the EPP supplied in Appendix B for further requirements.

Project Title: Kootenay Lake Construction of Navigational Aids

1.0 DOCUMENTS:

The following documents are provided in Appendix B:

.1 ENVIRONMENTAL PROECTION PLAN

Kootenay Lake and Upper Arrow Lake Construction of Navigational Aids

Environmental Protection Plan

Prepared for:

Canadian Coast Guard
Maritime and Civil Infrastructure
Western Region
25 Huron Street
Victoria, BC V8V 4V9

Prepared by:

Fisheries and Oceans Canada
Real Property Safety and Security-Pacific Region
Regional Office of Environmental Coordination
9860 West Saanich Road
Victoria, BC, V8L 4B2

May 28th, 2017

Table of Contents

List of Figures

List of Tables

Appendix A

1.0 Introduction

1.1 Project Background

The Canadian Coast Guard (CCG) proposes to rebuild a series of fixed aids to navigation (minor shore lights) within the Kootenay and Arrow Lakes in the Kootenay Region of British Columbia (the 'Project', see Figure 1).

The project is located on Kootenay Lake (South, North and West Arms), and on Upper Arrow Lake. The lakes are located within the Kootenay Region of the interior of British Columbia. Kootenay Lake lies between the Selkirk and Purcell mountain ranges in the southeast corner of British Columbia. The West Arm of Kootenay Lake forms at the outlet of the main portion of Kootenay Lake and flows in a westerly direction becoming the lower Kootenay River, which flows into the Columbia River at Castlegar, BC. The West Arm is separated into the upper and lower West Arm; the upper portion is that area from the outlet located at Balfour, BC downstream for approximately 14 km to Lasca Creek, which is approximately 16 km upstream from Nelson, BC.

This Project aligns with the CCG's goal of providing safe, economical, and efficient services for marine navigation and is critical for CCG's mandate of providing safe and accessible waterways. As part of its mandate, the CCG has the responsibility to provide aids to navigation, and marine communications and traffic management services that contribute to the safety, accessibility and security of Canadian waters. Through an ongoing review process, the CCG identifies locations where aids to navigation are required to be constructed or modified to better provide their service and to improve the safety to those who maintain them.

The CCG intends to complete construction activity on ten fixed navigational aids (minor shore lights) on the Kootenay and Arrow Lakes, British Columbia (BC) and create two new navigational aid sites. Of the ten existing sites, seven in-water piled sites will be replaced, three shore based sites will be decommissioned and removed, and two new in-water nav-aid sites will be created. Most in-water sites are located in proximity to a shoreline, with a few located farther offshore. Shore based sites are close the shoreline.

The in-water fixed aid structures are supported on a timber pile dolphin and shore based sites mounted upon a concrete base, each identified by an assigned number (lighted aid LL, unlighted aid UL);

In-water navigation aids:

LL #	SITE NAME	LOCATION	LATITUDE	LONGITUDE	
1.3	Nelson East	Kootenay -West Arm	49° 31' 7"	117° 16' 20"	Existing Site
3.0	Seven Mile Point	Kootenay -West Arm	49° 34' 18"	117° 12' 43"	Existing Site
5.0	Kokanee Narrows	Kootenay -West Arm	49° 35' 44.2"	117° 7' 16"	Existing Site
5.3	Kokanee Point East	Kootenay -West Arm	49° 36' 5.8"	117° 6' 52"	Existing Site
5.6	Strickland Creek East	Kootenay -West Arm	49° 36' 26.3"	117° 5' 11"	Existing Site
8.3	Procter Sector	Kootenay -West Arm	49° 37' 18.69"	116° 56' 50.92"	New Site
13.3	Kootenay Landing-Outer	Kootenay -South Arm	49° 15' 56.7"	116° 41' 27.6"	Existing Site
19.0	Schroeder Point	Kootenay -North Arm	50° 2' 5"	116° 54' 9"	Existing Site
39.5	Cape Horn	Arrow - Upper	50° 21' 7.64"	117° 55' 37.13"	New Site

Shore based navigation aids:

LL #	SITE NAME		LATITUDE	LONGITUDE	
8.0	Procter Front Range	Kootenay -West Arm	49° 37' 16"	116° 56' 53"	Existing Site
9.0	Procter Rear Range	Kootenay -West Arm	49° 37' 13.4"	116° 56' 56"	Existing Site
39.5	Cape Horn	Arrow Lake- Upper	50° 20' 42.7"	117° 53' 39.7"	Existing Site

The work is proposed to take place over 4-5 weeks between the months of September 6th to November 15th, 2017. The CCG intends to retain a Contractor with a tug/ crane barge to assist with the access to sites, the construction activity, and to provide equipment and storage space.

Scope of work activities will be comprised of;

In-water works: timber pile removal and replacement with a new steel 3-piled dolphin structure with nav-aid platform, ladder and light components then installed on the dolphin. Some minor follow up work (weld metal tabs) may be completed in the late winter 2017/18 when the seasonal water level is lower, allowing clear access to the lower portion of the structure. Established bird nests (i.e. Osprey) that are found on a nav-aid will also be removed intact, set aside and relocated onto the new nav-aid structure after construction is complete.

Shore based works: will include fixed aid decommissioning of daymarker/ light components, masts and demolition of concrete base where required.

The project specific Environmental Protection Plan (EPP) will be implemented during this Project by the CCG, DFO and all contractors and sub-contractors.

1.2 Purpose of Environmental Protection Plan

The EPP is intended to demonstrate the CCG's commitment to protecting valued ecosystem components by avoiding or mitigating potential adverse environmental effects, and reducing the risk of unforeseen environmental incidents resulting from the activities of this Project. This will be achieved through project planning, implementing industry and government best management practices (BMPs), mitigation measures and environmental monitor (EM) when required.

The scope of work is considered a Project under the CEAA 2012 Federal Land Provision (Sec 67) and has been assessed by CCG/DFO internally through a project effects determination process. The mitigation measures and monitoring requirements outlined in this EPP may be re-evaluated during the course of construction if on-site teams identify deficiencies and/or improve construction methods or the environmental protection measures.

This EPP identifies environmental protection and mitigation measures that should be followed by the Project's personnel during this Project

.

1.3 Description of Work

The proposed work on the fixed aids will include pile extraction/ pile driving, concrete demolition, installation of work platforms, ladders, nav-aid components, and relocation of bird nests if required as per site conditions. For construction details, refer to the project's Construction Information Package.

Table 1-1 Project Sites - Work Activities

LL/ UL	SITE NAME	PHYSICAL ACTIVITY	LOCATION	
1.3	Nelson East	Extract timber piles (9 piles), Install 3 new steel piles, steel platform, aluminum tower, light /solar components,	Kootenay Lake West Arm Existing Site	In water site. Offshore,
3.0	Seven Mile Point	Extract timber piles (9 piles), Install 3 new steel piles, clamp on single pile platform, light /solar components, bird nest platform	Kootenay Lake West Arm Existing Site	In water site. Marks deep water at a sandbar point
5.0	Kokanee Narrows	Extract timber piles (9 piles), Install 3 new steel piles, clamp on single pile platform, light /solar components, bird nest platform	Kootenay Lake West Arm Existing Site	In water site. Marks deep water by shoreline
5.3	Kokanee Point East	Extract timber piles (9 piles), Install 3 new steel piles, clamp on single pile platform, light /solar components, bird nest platform	Kootenay Lake West Arm Existing Site	In water site. Marks deep water by sandbar
5.6	Strickland Creek East	Extract timber piles (9 piles), Install 3 new steel piles, clamp on single pile platform, light /solar components, bird nest platform	Kootenay Lake West Arm Existing Site	In water site. Offshore
13.3	Kootenay Landing Outer	Extract timber piles (18 piles), Install 3 new steel piles, clamp on single pile platform, light /solar components, bird nest platform	Kootenay Lake South Arm Existing Site	In water site. Marks deep water by sandbar
19.0	Schroeder Point	Extract timber piles (9 piles), Install 3 new steel piles, clamp on single pile platform, light /solar components, bird nest platform	Kootenay Lake North Arm Existing Site	In water site. Marks deep water at point of land
8.0	Procter Front Range	Decommission site. Remove range tower Demolish concrete base and remove rubble	Kootenay Lake West Arm Existing Site	Shore based site
9.0	Procter Rear Range	Decommission site. Remove range tower Demolish concrete base and remove rubble	Kootenay Lake West Arm Existing Site	Shore based site
8.3	Procter Sector relocation	Install 3 new steel piles, steel platform, aluminum tower, light /solar components,	Kootenay Lake West Arm New Site	In water site Replaces 8.0, 9.0
39.5	Cape Horn	Decommission site. Remove light components Demolish concrete base and remove rubble	Arrow Lake Upper Existing Site	Shore based Site on a cliff
39.5	Cape Horn relocation	Install 3 new steel piles, clamp on single pile platform, light /solar components,	Arrow Lake Upper New Site	In water site Replaces Existing LL 39.5

The work may be conducted using the following equipment; tug boat, barge, crane, excavator, small work boat, generator and power tools. Pile extraction may require the use of a vibratory hammer. Equipment to install steel pilings may require the use of a vibratory, impact or hydraulic hammer.

2.0 Project Assessment

The Project assessment identifies the Project components that have the potential to cause direct and indirect environmental effects to the surrounding environment at the Project site(s), followed by a description of what these potential impacts may be.

2.1 Project Components with Potential to Cause Adverse Environmental Effects

The Project is located in the Kootenay Region on Kootenay Lake and Upper Arrow Lake, with construction to occur at various sites, accessed by tug/crane barge, small vessels and with shoreline access to land based sites.

Project Timing: The proposed construction window is September 6th to November 15th, 2017 – with a total construction time of 5 weeks.

Timing Windows (Kootenay Region-4): for the Kootenay region are species specific timing windows. The in-water fish timing window is established when there are no spawning fish, eggs or overwintering juvenile present. Working in-water when outside of the timing work window may result in the potential for Project interaction with fish species during sensitive life stages or migrating adults. This construction period will begin within the DFO and BC Ministry of Environment (MoE) Fish Timing windows for listed species but may end outside of some of the timing windows.

Equipment working in Kootenay and Upper Arrow Lakes: During construction there is a potential for equipment accidents and /or malfunctions in the waterway. Accidents or malfunctions could include spills/leaks (e.g., hydrocarbons, wood preservative), debris from collisions, scour form accidental groundings and other types of incidents. These could potentially affect water and sediment quality, or cause direct physical impacts to flora and fauna. Any spills associated with this Project are anticipated to be small as they are limited by volume of the containment reservoirs and equipment and machines. The Project will be working adjacent to a navigable waterway.

Generation of construction waste: The Project will include the generation of construction waste materials. This waste may include but is not limited to; wood waste (treated wood/ saw dust), concrete rubble, hardware, food waste, metal waste (welding) and other miscellaneous wastes. Waste deposition has the potential to indirectly affect water and sediment quality, as well as directly by physically affecting flora and fauna (physical harm, smothering). The deposition of treated timber waste (sawdust) into the aquatic environment has the potential to affect water quality and flora and fauna.

Barging spudding and anchoring: Barge spudding and anchoring can physically disturb sediments and damage habitat. Disturbing sediments can result in particle suspension in the water column, increasing turbidity and lowering the water quality. Spudding and anchoring can also damage spawning habitats (by depositing sediment on top of these habitats, and/or

kill or injure aquatic flora and fauna through crushing, smothering or disturbance to gills.

Pile Removal: Pile removal can physically disturb sediments, affect water quality and damage habitat. Suspended sediments in the water column can negatively affect water quality by elevating turbidity and total suspended solids (TSS). The removal of treated piles has the potential to introduce harmful chemicals, such as polycyclic aromatic hydrocarbons (PAHs) to the aquatic environment. Pile removal has the potential to affect any existing bird nests that may be situated on the piles.

Pile Driving: Pile driving has the potential to suspend sediment and cause acoustic disturbances (noise, shock waves, vibration) to fish and wildlife. Suspended sediments in the water column can negatively affect water quality by elevating turbidity and TSS. Pile driving activities have the potential to produce excess noise both in and out of the water, which depending on the method, pile size and pile material can injure or kill fish. Land or underwater pile rock drilling has the potential to suspend sediment, accumulate rock bed sediments in the drill casing, generate dust and cause acoustic disturbances to fish and wildlife.

Acoustic disturbance is expected to be limited when applying a vibratory hammer or when using an underwater drill. These processes have little impact on the fish habitat as they do not generate shock waves. When driving steel piles of less than 24 inches inch diameter it is an accepted principle that the energy required to drive the pile to final point of installation would not result in shock wave in excess of 30 kPa, and therefore would not require protective measures from the possibility of shock waves. Regardless of the type of hammer being used, best management practices will be implemented to minimize the impact on the fish habitat (BC MPDCA, March 2003).

While birds and wildlife may experience temporary sensory disturbance, the work is taking place within areas already subject to some acoustic disturbance (marine traffic) and have sufficient space around them to allow for species to move away.

This EPP includes measures to mitigate and/ or avoid potential adverse environmental effects associated with the Project.

2.2 Impacts That Cannot Be Avoided

No unavoidable or immitigable adverse environmental effects are anticipated as part of this Project.

3.0 Roles and Responsibilities of Project Team

The roles and responsibilities of the Project Team, which includes CCG, the Contractor and the CCG/DFO Environmental Monitor as described in the following sub-sections. It is the responsibility of all Project personnel to protect environmental, heritage and socio-economic values during the course of the Project.

3.1 All Project Personnel

All Project personnel must work in accordance with applicable regulations and engineering

specifications. In addition, personnel must comply with the mitigation measures identified in this EPP and /or provide suitable alternative approaches, which have been pre-approved by the CCG and/or the Project EM. All CCG personnel, Contractor crews and staff will be introduced to this EPP and required to implement it properly as part of the Project standard operating procedures.

3.2 Canadian Coast Guard

CCG is responsible for the overall Project management and environmental management of this Project. In addition, CCG will be responsible for the following:

- Supplying the Contractor with details regarding the Project, such as background information, any regulatory permits and this EPP
- Delegating authority and communicating requirements, as required, for all aspects of communication with interested parties about construction activities and potential disturbances with respect to this Project
- Promoting compliance with the terms of the regulatory permits or notifications as mandated under the applicable legislation
- Coordinating environmental and construction inspections to check compliance with permits and this EPP
- Notifying regulatory agencies or authorizing notification on their behalf to regulatory agencies of environmental non-compliance or environmental incidences
- Reviewing environmental monitoring reports prepared by the EM for completeness, accuracy and assessment of mitigation measures
- Authorizing stop work authority for non-compliance with this EPP and contravention of regulatory permits
- Granting stop-work authority to Project personnel and allow them to have the ability to suspend Project activities that are at risk of potentially causing serious harm to fish and to valued ecosystem components
- Submit of a Notice of Works to Transport Canada, under the Navigation Protection Act (NPA), as required
- Submit a DFO Request for Project Review, under the Fisheries Act, as required

3.3 Contractor

The Contractor will be responsible for constructing the Project in accordance with the design specifications. In addition the Contractor will be responsible for;

- Understanding details of the Project by reviewing relevant documentation supplied by CCG and DFO, such as background information, permits and this EPP
- Facilitating effective environmental communication among crews and any subcontractors so that environmental responsibilities and requirements are understood by crews and subcontractors prior to the start of work, and are implemented through tailgate or other meetings
- Following the EPP and having on-site environmental protection measures to mitigate potential environmental impacts
- Inspecting the work regularly to evaluate adherence to this EPP and regulatory requirements

- Facilitating personnel training and verifying that personnel are competent in the use of environmental protection and mitigation measures, such as sediment, waste, spill and noise control measures

3.4 Environmental Monitor

It is anticipated that this Project will have an on-site EM perform environmental inspections during the work. The EM will be appropriately qualified to conduct this work, based on Project experience, appropriate training and professional responsibility.

The EM will be responsible for;

- Evaluating and reporting on the effectiveness of the environmental mitigation measures and on the Contractor's work procedures and practices
- Confirming with construction crews that they are aware of the environmental requirements of the work
- Inspecting regularly the effectiveness of sediment control measures, where appropriate
- Conducting visual monitoring of water quality during in-water construction activities
- Communicating with CCG and DFO on the effectiveness of the mitigation measures being implemented, any difficulties encountered and how they are being managed
- Reporting environmental non-compliance and environmental incidents to CCG
- Writing an Environmental Monitoring report upon completion of the Project (Sec 5.0)

4.0 Environmental Protection Measures

4.1 Development of Protection Measures

This EPP has been developed based on the current understanding, levels of detail related to construction methods and the Project assessment (Sec 2.0). The EPP has been prepared using the Project specifications developed by CCG and existing BMPs adhered to by CCG, DFO and the pile driving industry. These and other documents are used in the development of the mitigation measures within this EPP include but are not limited to:

- BC Conservation Data Center, SARA and Provincial species review
- Best Management Practices for Pile Driving and Related Operations (BC MPDCA, 2003)
- CCG Protocol for On-Site Visits to Navigation Aids in Sensitive Bird Nesting Sites
- DFO Standard Mitigation Measures Organized by Project Activity
- DFO Projects Near Water, Online Assessment
- DFO Aquatic Species at Risk Map
- Standards and Best Practices for Instream Works (MWLAP 2004)
- BC MoE Approved Water Quality Guidelines-Turbidity (MoE 2001)
- Species At Risk Act, Management Plan Series for Westslope Cutthroat Trout and White Sturgeon

The development of this EPP also takes into account the following Acts and Regulations;

- Canadian Environmental Assessment Act 2012

- Fisheries Act
- Species At Risk Act
- Navigation Protection Act
- Migratory Birds Convention Act
- BC Environmental Management Act, Waste Regulations
- BC Wildlife Act
- Water Sustainability Act

The mitigation measures in Sec 4.0 and monitoring requirements in Sec 5.0 outlined in this EPP may be re-evaluated during the course of the construction, to identify and improve upon deficiencies, and improve on the environmental management and protection where needed.

Project construction is anticipated to occur between the months of September 6th to November 15th, 2017. The Project site(s) habitat area is a series of long narrow fresh water lakes with a mixed coastline of rock and cliff shores, beaches, sandbars and estuaries fed from several creeks and rivers. The region is comprised of moderate elevation mountains and valleys. The project area intersects with some shore side parklands and designated habitat areas that will require notifications and permitting. Lands established for the fixed nav-aids are all Provincial Crown land. Provincial guidelines and best management practices are recognized in the EPP's mitigation measures, as applicable. The Project has been reviewed using the following resources;

DFO Projects Near Water Online Assessment Tool: The online assessment was conducted using Fisheries Protection's determination tool based on the scope of work for a project working near or in water and identified that the project will occur partially outside of some species specific fish timing window of least risk, generally timed when fish are not spawning; no eggs are present; or no over-wintering juveniles. The Kootenay Region timing windows are administered by the BC Ministry of Environment Habitat Management Branch.

The project's activities are identified under the criteria for Harbour/ Marine Commercial Activities and will apply the DFO Measures to avoid causing harm to fish and fish habitat including aquatic species at risk with regard to project planning, erosion/sediment control, shoreline stabilization, fish protection and operation of machinery.

Fish Timing Windows: the freshwater timing windows of least risk (Region 4-Kootenay) are maintained by the BC Provincial Government and are species specific. It identifies these fish at sea level in the Kootenay Lake West Arm and Arrow Lakes with least risk windows;

1. Cutthroat Trout, July 15th – October 31st (applies to Westslope Cutthroat Trout)
2. Rainbow Trout, July 15th – October 31st
3. Kokanee, June 16th – August 31st
4. Kokanee West Arm, June 16th – August 15th

The remainders of the species on the timing window table do not have conditions that would interact with this project work.

BC Water Sustainability Act (Sec 11): the restrictions on in-water works within the lake body are somewhat more liberal than activity in upstream elevations; however it is recommended that the project submit a notification for work activity that may occur outside the fish timing window for the following: Rainbow Trout, Cutthroat Trout, Kokanee and Shore Spawning Kokanee West Arm. This notification would identify the low risk changes caused by the project and its mitigation measures.

WSA Sec 11: It is recommended that a Notification of Instream Works be submitted MoE Habitat Management (Kootenay Region) under the Water Sustainability Act Section 11 for changes in or about a stream.

DFO Aquatic Species At Risk:

A review of the aquatic species at risk map areas (BC Southeast-14, 25, 29, and 30 of 33) identified one or more species at risk that may occur at all the project work sites;

1. Westslope Cutthroat Trout *Oncorhynchus clarkii lewisi* SARA Special Concern
2. White Sturgeon *Acipenser transmontanus* SARA Endangered and Critical Habitat areas
3. Columbia Sculpin, *Cottus hubbsi,* SARA Special Concern (Map 29) was identified only for the sites within the Kootenay Lake West Arm.

DFO Review: due to the in-water construction activity (i.e. new piles) to occur within a critical habitat area of a SARA listed endangered aquatic species, and potentially in-water works occurring outside of fish timing windows for other aquatic species (i.e. Shore Spawning Kokanee), a DFO Request for Project Review is recommended.

SARA permit: a SARA permit will be required for the project site LL 13.3Kootenay Outer Landing as it resides inside a Sturgeon Critical Habitat area.

BC Conservation Data Center Species Map:

The BC Conservation Data Center's Internet Mapping tool identified one aquatic species occurrence for the White Sturgeon, SARA listed as endangered, for both the Columbia River and Kootenay populations and is present at all of the in-water fixed aid sites. The Westslope Cutthroat Trout (Nelson River population) is SARA listed (threatened) but the mapping tool did not show any occurrences for the Kootenay Lakes.

Westslope Cutthroat Trout: the Nelson River population of Westslope Cutthroat Trout is protected under SARA and within National Parks under the Canada National Parks Act.

Shore Spawning Kokanee: The sites known for shore spawning Kokanee within the West Arm are provincially managed and monitored at the main index spawning sites; Six Mile south of Duhamel Creek, McDonald's Landing north of Duhamel Creek, Nine Mile near Sitkum Creek and Harrop south of Harrop Creek. Ground water seepage and areas containing suitable habitat of small gravels and sand appear to be the specific sites selected by the spawners. LL3.0 is 784m and 1700m away from the #13 and #14 Six Mile shore spawning sites on opposite site of water body.

Several fish species in the Kootenay Lakes have experienced aa recent decline (Rainbow Trout (*Oncorhynchus mykiss*) and Bull trout (*Salvelinus confluentus*)) or collapse (Kokanee (*Oncorhynchus nerka*)). In particular, the Kokanee are considered a keystone species in Kootenay Lake. As the most abundant species in the pelagic habitat, they provide the primary food source for large piscivores predators. Studies indicate that the main impacts to these species are fishing, water levels and predators. Restoration efforts are underway to revive these fish populations and others. Several studies of these species on the Kootenay Lakes exist, including reports within the SARA Management Plan Series.

Migratory Birds Convention Act:

Several species of birds in Canada are protected under the Migratory Birds Convention Act, 1994 (MBCA). Bird species that are not listed in the Act may or may not be protected under

provincial or territorial legislation (i.e. BC Wildlife Act) or the federal Species at Risk Act. Under the Act, ***it is illegal to harass or kill migratory birds, or to destroy or disturb their nests or eggs. It is also an offence to deposit any substance that is harmful to migratory birds, or permit such a substance to be deposited in waters or areas frequented by birds*.** Families of migratory birds that may be present in the area:

Migratory Game Birds: Waterfowl (i.e. ducks, geese, oystercatchers) and shorebirds (i.e. plovers, cranes, doves)
Migratory Insectivorous Birds: (i.e. swallows)
Other Migratory Nongame Birds: (i.e. herons, gulls. loons)

The nest of the following other birds are protected under the BC Wildlife Act, even when the nest is unoccupied; eagle, osprey, heron, Peregrine falcon, Gyrfalcon and Borrowing owl.

The in- water fixed aids have the ability to function as nesting habitat to the Osprey (*Pandion haliaetus*) between March 31st to September 5th, on an annual basis. The Osprey is not federally listed under the Migratory Bird Convention Act but is recognized under the BC Wildlife Act as a raptor Species of Concern within the Kootenay Region. If a nest is occupied during a breeding season it will then be considered as an **active nest** for the next 5 years under provincial regulation.

No permits or approvals are required for the Osprey nest management during construction due to the work schedule occurring after the 2017 nesting season is complete. Mitigation measures will be included in the project EPP for nest management if one is found on a nav-aid location and must be relocated.

Parks and Ecological Reserves: Of the twelve work sites, only the following are located within protected land/ park areas;
LL 13.3 - Creston Valley WMA ,
LL 5.3 - Kokanee Creek Provincial Park,
LL 5.0 - West Arm Provincial Park

Parks Use Permit: a notification of CCG project construction to the BC Parks Dept will be required. A Parks Use Permit (PUP) is normally issued to users for proposed activities within protected areas.

4.2 General Mitigation Measures

Many of the environmental mitigation measures can be applied to all phases of the Project's construction activities. Without the implementation of mitigation measures, construction activities associated with the Project may have the potential to directly and indirectly impact wildlife and its habitat, and cause adverse environmental effects (Sec 2.0). Through the use of mitigation measures, the potential for impacts associated with the Project can be limited. Table 4-1 will provide the general measures whereas ones applicable to more specific project activities (i.e pile driving, concrete works) will be provided in Table 4-2 through to Table 4-7.

Table 4-1 General Mitigation Measures

Category/ Activity	Mitigation Measures
Project Timing	• The freshwater timing windows of least risk to fish and fish habitat is administered by the BC MoE, and relates to specific species in the Kootenay Region. • Where possible, higher risk construction activities are recommended to occur within this timing window. • Ensure mitigation measures are in place prior to starting construction and a copy of any required approvals, permits or conditions is available at the work site.
Permits/ Authorizations	• A copy of any permits or authorizations will be onsite and readily available. Public notices should be given to transportation authorities to warn of potential disruptions to navigation during works.
EPP	• A copy of the Project's Environmental Protection Plan will be onsite and readily available. The EPP should be accessible to Contractors to ensure familiarity with the Project's requirements.
Training	• The Contractor will verify personnel involved in construction activities are adequately trained and use personal protective equipment necessary for work.
Site Access	• Site access practices must be undertaken with regard to resident flora and fauna, especially during times of the year when they are most sensitive.
Pre-Construction Survey	• A pre-construction survey is recommended to identify if any wildlife habitat or species at risk located at the construction site, and if encountered, determine the level of protection if necessary. If a nest is encountered, it is recommended that construction does not proceed until the EM has determined if a permit is required or that work can proceed.
Aid Maintenance	• Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. • Power washing activities must follow mitigation provided under "Power Washing" • An approach of "contain and recover" should be adopted. Drop sheets or other means should be used to prevent paint chips and other debris from entering the surrounding environment. Refuse should be disposed of properly. • Painting activities should be completed in such a way as to minimize the amount of fumes that may enter the environment. The amount of paint used should be minimized and unused containers must be covered.

Stop Work	• The Contractor will stop work and contact the EM for assistance prior to commencing and continuing with any Project activities that may pose an environmental risk not addressed in this EPP. The EM will have the authority to issue a Stop Work order where activities are or will adversely affect the environment (flora/fauna, water quality). The EM will also make in-field recommendations for avoiding or mitigating impacts.
Site Cleanliness	• The Project site(s) should be kept tidy during work activities and left in good condition at the Project's closure. Materials and wastes should be contained and secured when not in use, including at the end of a work day.
Power Washing	• Activities should be completed in such a way as to minimize the amount of fines and organic debris that may enter nearby aquatic environments.
Laydown Area/	• Operate machines and equipment from the barge platform to limit the level of disturbance to the aquatic environmental and to reduce the chance of a spill or incident. Stockpiles of any materials or wastes should be safely placed/ contained within the barge platform. Avoid placement of materials or waste on shore.
Equipment Operation	• All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. • Vehicles should not be operated below the line of Highest High Water in the intertidal zone. If no other method is available to access/ complete the work, the vehicle should proceed with due care and minimize its foot print wherever possible. • Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the project. • Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local.
Air Quality and Noise	• Operate machinery efficiently to limit noise and air quality issues and comply with local Noise Control Bylaws, where applicable. Limit night time construction activity to low noise activities, where appropriate.

Water Quality	• Oil, Fuels, Grease: The Contractor will have measures in place (e.g. routine equipment maintenance) to prevent the release of oil, fuel and grease (detectable by sight and smell) to the environment. • Turbidity: Visually monitor turbidity prior to the construction to observe the general instream conditions. Plan in-water activities in a manner that will reduce the amount of turbidity and sea floor disturbances, where possible. During construction activities, visually monitor turbidity within the work site area to confirm that any changes to water quality. • The terms clear water and turbid flow are used to describe when suspended sediment concentrations in the aquatic environment are low (< 8 NGTU) and relatively elevated (≥ 8 NTU). (MoE Water Quality Guideline, 2001)
Sediment Control	• Work will be conducted with limited sediment disturbance. Work activities will require pile extraction and replacement. Visually monitor turbidity levels during this activity. • Where high water flow is not a factor, the Contractor should be prepared to install a silt curtain if increased turbidity is a concern for aquatic habitat or permits require such mitigation measures (e.g. working outside of the DFO Fish Timing Window).Turbidity levels will be monitored for compliance with the BC Water Quality Guideline (e.g. if as required by DFO Review).
Prop Wash	• Prop wash and scouring will be avoided in shallow water, to the extent possible.
Deleterious Substances	• Deleterious substances (e.g. hydrocarbons and wood preservatives) will not be deposited into the environment (aquatic, terrestrial).
Spudding and Anchoring	• Barges and other Project support vessels will avoid disturbing the sea floor, unless where disturbance will be reasonably required (e.g. from use of barge spuds) • If a spud barge is used for the Project, position the barge strategically to limit repeated lifting and lowering of the spuds where practicable. • The Contractor will position their water borne equipment in a manner that will limit damage to habitat and where possible, employ alternative methods.

Flora and Fauna	• Operations should only be conducted where it is necessary to reduce the effects on nearby vegetation, soil substrates and resident species. Respect should be given to the natural environment to limit the footprint of the Project's activities. • If stressed animals are observed in or near the construction area, stop work and contact the EM for an assessment on the interaction. • Marine mammals are classified as "fish" under the Fisheries Act and additional regulations specific to these taxa are detailed in the Marine Mammal Regulations. Under Section 7 of the Marine Mammal Regulations, "disturbance" of marine mammals is prohibited except when fishing for them under the authority of the Regulations. The Regulations also prohibit moving a marine mammal from the immediate vicinity in which it is found Flora and Fauna

4.3 Pile Removal and Installation

Pile removal and installation have the potential to adversely affect water and sediment quality, fish and wildlife and important habitats. Table 4-2 outlines mitigation measures aimed to limit effects of pile removal and installation on valued ecosystem components, such as flora and fauna, water quality and important habitats.

Table 4-2 Pile Removal and Pile Installation - Mitigation Measures

Category/ Activity	Mitigation Measures
General	*Best Management Practices for Pile Driving and Related Operations* (BC MPDCA, 2003) will be applied. For work sites with sensitive species present, additional mitigation measures to reduce acoustic noise, vibration and shock waves should be implemented (i.e. bubble curtain, exclusion net). These measures may be present in any terms and conditions the project receives through aquatic species approvals and permitting.
Pre-Construction Survey	• A pre-construction survey will be completed and identify any existing bird nesting sites on the navigation aids and take the appropriate steps taken to reduce effects.
Equipment	• Equipment (e.g. cables, vibratory hammer, buckets) should be kept out of the water to avoid a release of deleterious substances. • Where possible, avoid pinching the treated timber (i.e. pile) below the waterline.
Containment Booms	• Sorbent booms should be on hand and readily available. • At the discretion of the EM, deploy sorbent booms around the perimeter of the work area and maintain them during the removal of treated timber. These booms should remain in place and operational until such time as visible evidence of wood treatment chemicals on the water surface is no longer apparent. • At the discretion of the EM, a floating surface boom shall be installed to capture floating surface debris where practicable.
Cutting	• Cutting of treated wood should take place on the barge or an area approved by the EM. All waste materials must be kept out of the aquatic environment, be contained, and be properly disposed of offsite. • Work that is to be done *in situ* is to be fully contained so that no waste materials are deposited into the aquatic environment. Any debris on the water surface should be recovered as soon as possible.

Pile Removal and Containment	• When removing timber piles, the Contractor will remove the piling by mechanical means, and make every effort to remove the pile intact (one piece). Where complete removal is not possible, piles will be cut off within 100mm of the sea floor. • Avoid intentionally breaking the pile by twisting and bending as this can cause the wood treatment to release into the water column. • Use methods to reduce turbidity and recover of blocks of sediment adhered to the pile (e.g "wake up" the pile by vibrating it to break its bond with the seabed sediment). • Sediment blocks found attached to a pile will not be returned to the aquatic environment. Instead they will be collected, contained and disposed of appropriately offsite. • A containment area (e.g. sediment control; hay bales, geotextile fabric, silt fence, plastic sheeting) for removed treatment timber piles and any adhering sediment shall be included into the work platform/ surface (i.e. the barge deck).
Pile Installation	• To limit impacts to fish and wildlife and reduce shock waves, a vibratory hammer is recommended to install piles. • Given the material (steel) and size of the piles (12.75 inch diameter) yes, the energy required to drive the pile to the final point of installation would not result in shock waves in excess of 30Kpa acoustics, therefore protective measures to reduce shock waves are not expected to be required (BC MPDCA, 2003). • During pile installation, visually monitor the effects on fish. If activities are causing observable signs of fish stress or fish kill, work must stop without delay. If this situation occurs, the Contractor will be responsible for introducing effective means of reducing the level of shock waves, or measures to protect fish from entering the potentially harmful shock wave area such as a confined bubble curtain, before any construction activity can proceed. **A fish kill is designated as serious harm to fish, and is a violation of the *Fisheries Act*.** • Any instances of fish kill must be reported to the EM without undue delay. If serious harm to fish (or fish mortality) occurs, or if there is imminent danger of such an occurrence, DFO (or delegate) will report to the DFO's Observance and Record/ Report phone line. • Once pilings are installed, if the piling ends are open, ensure that a cap is included to prevent wildlife from entering the pile.

4.4 Concrete Works and Rock Drilling

Concrete works and pile/ rock drilling have the potential to adversely affect water and sediment quality, fish and wildlife and important habitats. Table 4-3 outlines mitigation measures aimed to limit effects of these construction activities on valued ecosystem components, such as flora and fauna, water quality and important habitats.

Table 4-3 Concrete Works and Rock Drilling - Mitigation Measures

Category/ Activity	Mitigation Measures
Concrete Base Removal	• Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). • All debris deposited throughout the life of the aid should be removed from the site.
Rock Drilling and Excavation	• Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock remain small and localized. • Reduce the entry of dust and fines into the water, where feasible. Archeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit. • Loose material at excavation sites should be managed to avoid excessive migration of silt and debris to nearby waters, especially during heavy rainfall events. • All excavation below Highest High Water should be completed by hand, as no vehicles should be operated in the intertidal zone. • Any blasting will follow the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.
Dust Management	• There is the potential for dust emissions to be generated from concrete works (demolishing, cutting) and by rock drilling. • If the work activity is consistently generating dust, employ methods to minimize or contain the dust emissions (i.e. water spray/ fog to capture airborne dust; dampen work site (i.e. concrete base); install tarps/hoarding; control equipment use to duration of dust emissions)
Sediment Management	• There is the potential for loose sediments to be generated or accumulated from rock drilling and certain concrete work activities. • Where possible, employ methods to minimize the amount of sediment created from the work activity • Sediment levels that create a significant change in the water's turbidity may also impact the aquatic and terrestrial environments. Contain and control the sediments at the work site by the use of silt curtains

4.5 Wildlife - Bird Nest Management

Fixed nav-aids over water have the potential to function as nesting sites for birds, specifically Osprey. Disruption of the nest during breeding season (March-September) can adversely affect this wildlife and their important habitat. Outside of the breeding season, an intact nest that was used that year is considered active for the next five years and should not be destroyed. If movement of the nest is required, options should be considered for relocation. Table 4-4 outlines mitigation measures aimed to limit effects of construction activities on Osprey nests, with regard to relocation.

Table 4-4 Bird Nest - Mitigation Measures

Category/ Activity	Mitigation Measures
Nest Removal	• Use a removal method that will keep the nest integrated (in one piece) when lifting it from the nest platform on the nav-aid. The nest platform may be secured with the nest during its removal • Place removed nest in a location where it will not be damaged. • Bird nests may contain organic materials, fish carcasses and guano. Use PPE when handling the nest. • If eggs are found in the nest prior to removal, and work is occurring outside of the breeding season (Sept 5th to march xx) the eggs will not be viable. Leave eggs in nest. • If an Osprey is observed approaching the nest, notify the EM directly and stop work to remove the nest. • If the nest incurs damage during or after it is removed, notify the EM
Nest Installation	• Use a removal method that will keep the nest integrated (in one piece) when lifting it from the nest platform on the nav-aid. The nest platform may be secured with the nest during its removal • Place removed nest in a location where it will not be damaged. • Bird nests may contain organic materials, fish carcasses and guano. Use PPE when handling the nest. • If the nest incurs damage during installation, notify the EM

4.6 Waste Control

This Project will generate construction related waste. Improper handling, storage, transportation and disposal of construction waste all have the potential to cause adverse environmental effects. Follow waste disposal requirements as per the BC Environmental Management Act Waste Regulations. Table 4-4 presents mitigation measures to be implemented to control wastes.

Table 4-5 Waste Control Mitigation Measures

Category/ Activity	Mitigation Measures
Waste	• Waste or any miscellaneous unused materials will be recovered for either disposal or a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown into the aquatic or terrestrial environment. • Onsite personnel will make reasonable efforts to prevent debris from re-entering the environment. • Any treated cut wood, chips, sawdust that enters the aquatic environment is to be promptly collected, contained and disposed. Disposal of spoils (e.g. removed broken piles, metal, screw/nail findings and similar materials) is prohibited in the aquatic environment. • Any wastes from metal hot work should be kept out of the aquatic environment including welding rods and tips, and scrap metal. Collect and contain wastes and dispose of appropriately. • Litter in the form of coffee cups, lunch wrappers, cigarette butts and other such items will be placed in covered trash containers. • Debris/ waste will be kept on the barge or an approved laydown area and disposed of appropriately. • Sewage from portable toilets will be disposed of in an approved sewage disposal facility on an as-needed basis.
Portable Toilets	• Place materials defined as hazardous or toxic waste in designated containers. Seal and store emptied containers separately from non-hazardous waste.
Hazardous Waste	• Store preservative treated wood waste (e.g. pile material, sawdust) in a separate sealed water-proof container if there is a risk of leaching. • Hazardous waste, such as sorbent pads, will be collected and disposed of appropriately offsite. • Do not dispose of preservative treated wood through incineration, or with other materials destined for recycling or reuse, or into the aquatic environment, onto the ground, or in other locations where they could pose a health or environmental hazard. • Dispose of treated wood, end pieces, wood scraps and sawdust at a approved offsite facility.

4.7 Spill Prevention, Control and Response

Measures will be implemented to prevent and control the introduction of hazardous material to the environment. Hazardous materials likely to be onsite during the Project may include but not limited to:

- Fuels (gasoline, diesel)
- Lubricants (hydraulic oil, engine oil, grease)
- Transmission fluid

Measures to prevent and control the release of spills are provided in Table 4-5. In the event that a spill occurs during the Project, Table 4-6 provides the spill response measures and reporting requirements.

Table 4-6 Spill Prevention, Control and Response

Category/ Activity	Mitigation Measures
Spill Coordinator	The Contractor will appoint a Spill Coordinator who has knowledge of spill mitigation, containment and reporting procedures. They will also know the inventory of hazardous materials on site.
Training	The Contractor will confirm that onsite personnel understand the nature of the hazardous materials located at the Project site, and know the location of spill kits, containment berms, and other spill control measures and that they are readily accessible.
Fuel	Storage of fuels and petroleum products will comply with safe operating procedures, including containment measures. Portable fuel tanks (jerry cans) will be stored with leak proof secondary containment. Fuel storage, including secondary containment, shall be kept free and clear of collected rainwater, snowfall and other equipment/ materials. While refueling, the operator must stay with the fuel nozzle. Use biodegradable lubricants and hydraulic fluids where possible. Vehicles and equipment must be shut off while refueling.

Equipment	Machinery (excluding barges and vessels) should not be operated in the water unless approved by the EM. Equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products (includes hydraulic fluid, diesel, gasoline and other petroleum products). Maintain equipment in good working condition and free of excess oil and grease to prevent leaking or spillage of deleterious substances into the aquatic environment. Containers, nozzles, hoses will all be free of leaks. At the discretion of the EM, drip trays capable of containing 150% of the fuel will be placed beneath the machinery, equipment and fuel storage facilities that are within 30m of the high water line or in vessels. Small machinery (e.g. generators) should be placed in secondary containment, such as drip trays. Couplings, connectors, hydraulics and hoses should be in good condition and inspected throughout each day whenever possible. The Contractor should conduct spot-checks during equipment operation to verify that couplings, connectors, hydraulics and hoses are not leaking. Containers not in use will be sealed with a proper fitting cap or lid.
Equipment Maintenance and Servicing	Impervious materials, such as tarps, drip pans or spill trays must be placed underneath equipment and machinery during servicing when there is the potential for accidental drips or spills. Servicing and maintenance of equipment shall be conducted on the barge or at the Contractor's shop facilities. Servicing and maintenance of equipment is not permitted in aquatic or terrestrial environments unless are exceptional circumstances and approved by the EM.
Spills	In the event of a leak, all fuelling/ filling operations will be stopped until the cause of the leak has been identified and it has been repaired. All spills must be reported to the EM without undue delay, regardless of volume.

Table 4-7 Spill Response Mitigation Measures and Reporting

Category/ Activity	Mitigation Measures
Spill Response Materials	Spill response materials are required to be readily available when working at the Project site. These materials include but not limited to; • Spill kits • Personal protective equipment (e.g. nitrile gloves, safety glasses) • Fire extinguishers • Shovels
Spill Kits	The Contractor will provide an appropriate number of spill kits on site. The suggested contents of the spill kits are; • 100 sorbent pads, including universal pads suitable for water based fluids (coolant) • 25kg of dry oil sorbent • 2 x 10m sorbent floating booms • 1 roll of 25 x 4m polyethylene sheeting (for underlay) • 10 heavy-duty plastic garbage bags In addition to the spill kits on site, each piece of mobile equipment is suggested to have spill kit with contents as; • Round nose shovel or equivalent • Absorbent sock/roll • 10 sorbent pads • Heavy-duty plastic garbage bags • Personal protective equipment Spill kits will be inspected on a regular basis and will be refilled without undue delay.
Response	In the event of a spill, the Spill Coordinator will direct on site personnel to the location and use of the spill kits. • The initial response to the spill may include; • Stop work • Confirm your own safety and safety of others • On site personnel wear personal protective equipment • Identify the spilled materials and refer to the MSDS to determine if human health or ignition hazards exist • If possible, and safe to do so, contain the spill by any safe means possible (e.g. plug leak, close/ isolate leaking valve) • Obtain assistance from others • Begin containment of spill and stop it from spreading • Clean up the spilled substance using available supplies from onsite spill kits • If the spill kit is on the barge, dyke around the affected areas to prevent spill from entering the aquatic environment

Reporting	The CCG or DFO on site representative is responsible for notifying regulatory agencies or authorizing notification on their behalf to regulatory agencies of hazardous spills and to verify the spill meets provincial and federal requirements. The Spill Reporting Regulation under the BC Environmental Management Act identifies externally reportable quantities for certain substances. All spills to water will be reported by the CCG (or delegate) to the Provincial Emergency Program (Table 6-1) The EM will prepare an Environment Incident/ Non-Compliance Report in the event of a spill. The following information should be collected as it may be required when reporting a spill to regulatory agencies and may be included in the Environment Incident/ Non-Compliance Report; • Reporting person's name and telephone number • Name of the owner of the product spilled and phone number • Date and time of the spill or leak • Location of the spill or leak • Providing a description of the environment • Type of material spilled and quantity • Source of leak or spill • If the spill or leaked product is contained. If not, what is flow direction • Description of the spill response and when it occurred • Percent of material recovered • Details of further action required • Recommendations for preventative/ mitigation measures • Names of other persons or agencies advised concerning the spill

5.1 Environmental Monitoring

5.1 General Monitoring and Reporting

A qualified EM is recommended to be available during the Project work at the initiation of each activity to verify compliance with the EPP. Monitoring may continue until the EM is confident that the Contractor has met the mitigation measures and is conducting work according to the EPP recommendations. The EM will communicate with CCG/ DFO and the Contractor and may conduct spot checks if needed.

When the EM is not on site, a CCG representative will act as the EM. The Contractor will communicate with the CCG to discuss any potential environmental risks related to the Construction activity. The EM will be responsible for verifying that the measures outlined in this EPP are adhered to, maintain detailed notes, photographs and report non-compliances or environmental incidents, If this EPP is followed, the potential for environmental impacts and adverse environmental effects are low and an on-site EM should not be required

constantly for the duration of the Project. It is recommended that an EM be on-site at key activities for in-water work conducted outside of the Fish Timing Windows for this area. An environmental monitoring Field Sheet is available in Appendix A and is recommended for use at each site.

An environmental monitoring report will be prepared by the EM and submitted to the CCG and any other applicable regulatory agencies. The environmental monitoring report will include:

- Names of on-site personnel (consultants, contractors, sub-contractors)
- Dates and brief description of the construction activities the EM was present for
- Description of environmental concerns and corresponding mitigation measures implemented
- Description of environmental incidents and actions taken to mitigate impacts
- Photographs documenting activities, environmental issues, mitigation measures, spill kits
- Water quality data if required

5.2 Stop Work

The EM will have authority to alter work methodology and/or issue stop work orders, in order to prevent environmental impacts and/or adverse environmental effects, whether probable, imminent, or occurring. The EM may also stop work if circumstances are likely to result in a non- compliance with a regulation, Project approvals, or this EPP.

Once corrective actions have been implemented and deemed appropriate by the EM, suspended Project activities will be allowed to resume under the guidance of the EM.

5.3 Environmental Incidents and Non-Compliance

Examples of environmental incidents are ones that cause environmental damage or adverse environmental effects to fish, fish habitat, wildlife and other environmental resources.

Environmental incidents can be caused by hazardous material spills, discharges of deleterious substances into the aquatic environment, and serious harm to fish and fish habitat without prior written approval or authorization. Non-compliances can occur with this EPP or with applicable legislation. Incidents can include workplace incidents such as spills, hazards, injuries, etc.

Environmental non-compliances and incidents must be reported to the CCG representative within 24 hours of occurrence. This representative will then report to the appropriate regulatory agencies, if it is required. Reporting requirements will include:

- Reporting a person's name and telephone number
- Name and phone number of the person who caused the incident or non-compliance
- Date and time of the incident or non-compliance
- Names of other persons or agencies advised concerning the spill (see Table 4-7)

6.0 Emergency Contacts

An emergency contact list will be posted in visible areas on-site by CCG. See Table 6-1.

Table 6-1 Emergency Contacts

Contact	Phone Number
CCG Project Manager: Andrew Wight	Phone: 250-413-2835 Mobile: 250-686-5902
DFO On Site Representative: Andrew Wight Alanna Morbin	 Phone: 250-413-2835 Mobile: 250-686-5902 Phone: 250-363-8725 Mobile: 250-415-0086
Environmental Monitor: Alanna Morbin	Phone: 250-363-8725 Mobile: 250-415-0086
Provincial Emergency Program, 24-hr spill reporting (BC Emergency Management Branch)	Phone: 1-800-663-3456
DFO Observe, Record and Report Line	Phone: 1-800-465-4336 or 604-607-4186
Medical Emergency	Use 911 or VHF Radio Ch 16
Work Safe BC	Phone: 1-866-621-7233

7.0 Closure

It is determined that the Project is not likely to cause significant adverse environmental effects and the Project can be carried out in accordance with the current environmental standards, guidelines and objectives. Project specific environmental protection measures as outlined in the document will be applied during the course of the construction. The outcome of the DFO Request for Review process (for construction in a species critical habitat area) may result in additional required mitigation measures. If this occurs, the requirements will be communicated to the CCG and the Contractor directly, and the environmental protection plan will be updated.

8.0 References

Assessment of Lake Levels and their Variation on the Recruitment of Shore Spawning Kokanee Fry within the West Arm of Kootenay Lake, Poisson Consulting Ltd, May 2012

BC Ministry of Environment, Approved Water Quality Guidelines-Turbidity (MoE 2001)

Best Management Practices for Pile Driving and Related Operations (BC MPDCA, 2003)

CCG Kootenay Lakes Project Information Package, March 2017 CCG Protocol for On-Site Visits to Navigation Aids in Sensitive Bird Nesting Sites, May 2014

DFO Management Plan Series, Species At Risk Act, Section 6, Updated August 2014

DFO Best Management Practices for All Projects, 2016

DFO Measures to Avoid Causing Harm to Fish, Fish Habitat and Aquatic Species at Risk, http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html

DFO Standard Mitigation Organized by Project Activities Table, 2016
DFO Projects Near Water Online Assessment Tool http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

DFO Aquatic Species at Risk Map http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/bc-s-eng.html
Standards and Best Practices for Instream Works (MWLAP 2004)

Observations and Analysis of Shore Spawning Kokanee in WA KL, Redfish Consulting-Andrusak, August 2011
DFO Recovery strategy for White Sturgeon (Acipenser transmontanus) in Canada, 2014
http://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/species-ecosystems-at-risk/brochures/white_sturgeon.pdf

BC Ministry of Environment, Lands and Parks, Management Plan for the Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) in British Columbia*, 2013*
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Prepared by: Alanna Morbin, Bsc

Environment Officer, Regional Office of Environmental Coordination

Reviewed by: Andrew Wight, P.Eng

Project Engineer, Maritime & Civil Infrastructure

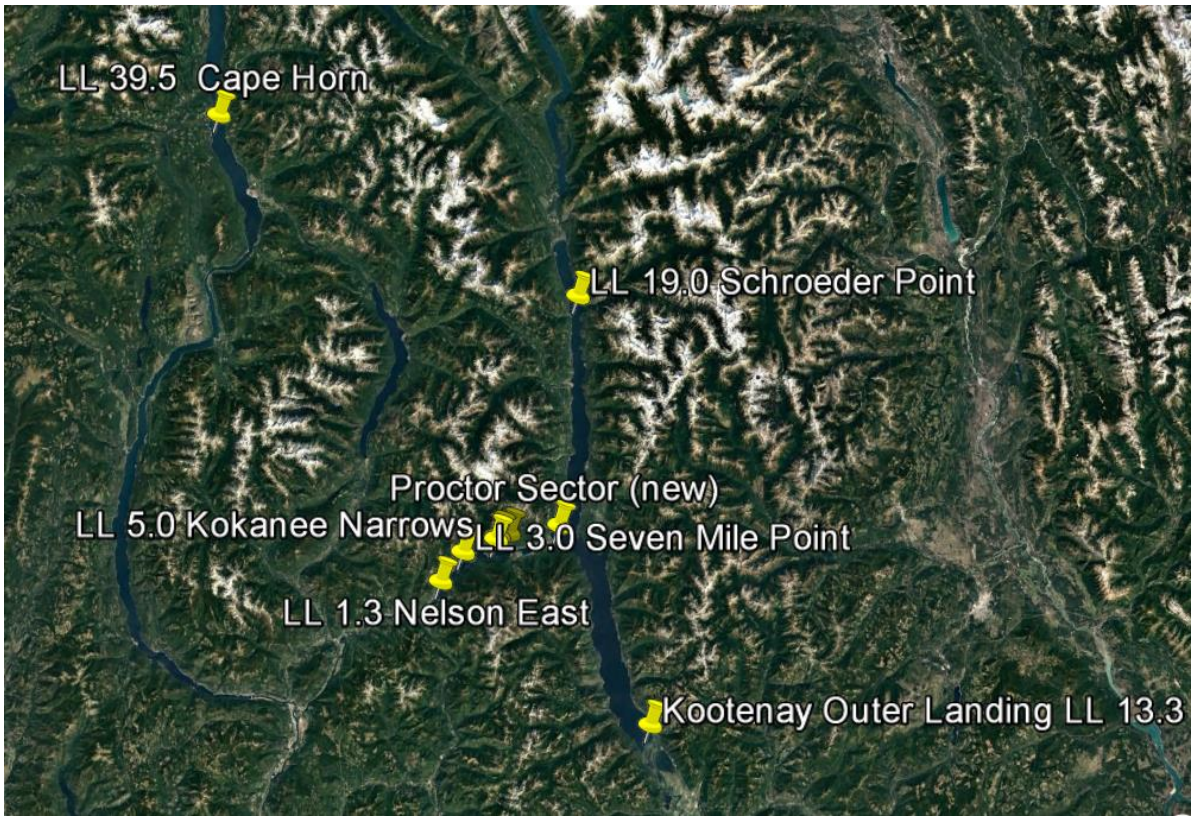

Figure 1 Overview Kootenay and Arrow Lakes

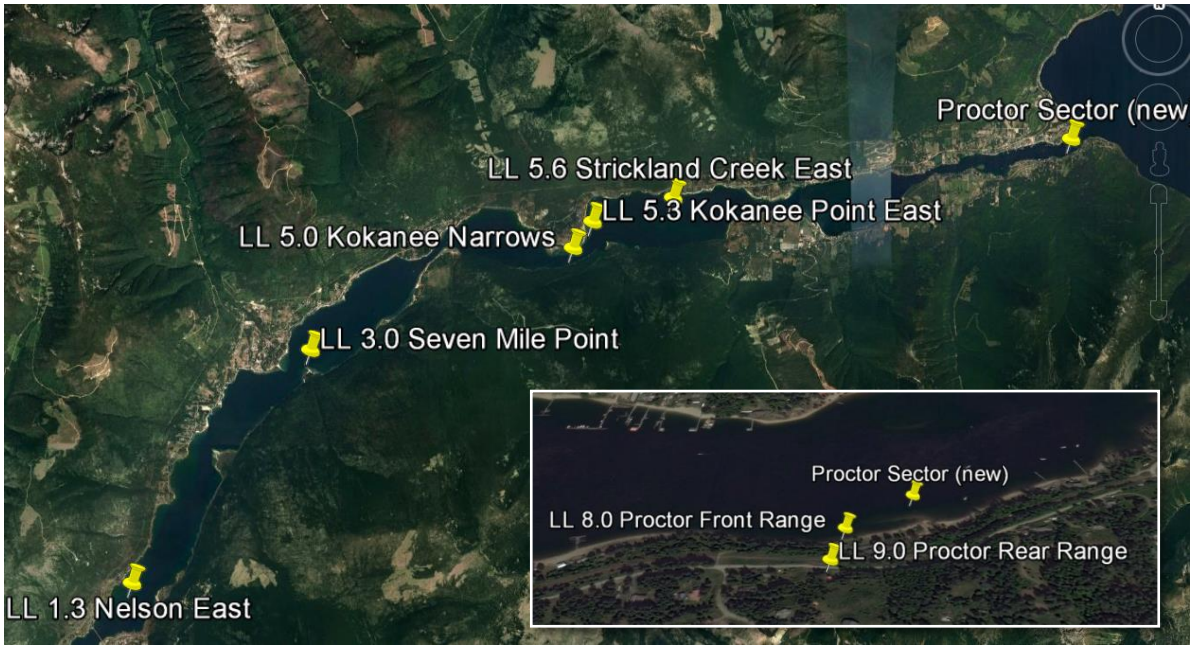

Figure 2 Kootenay Lake West Arm (6 sites)

Figure 3 Kootenay Lake South Arm (1 site)

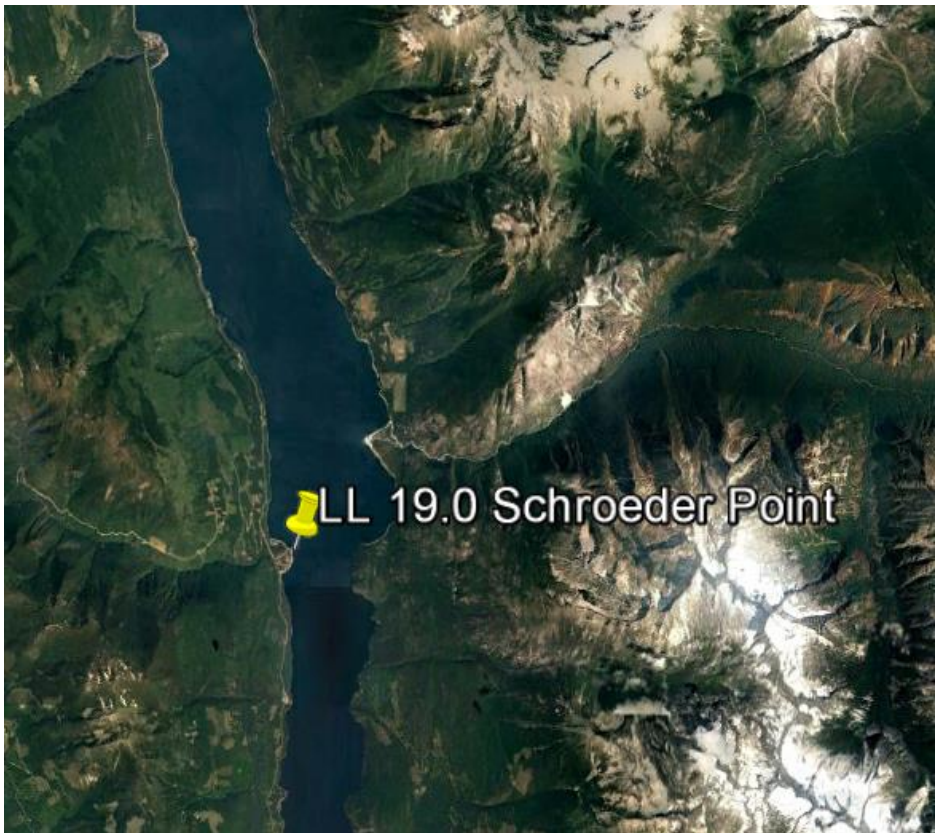

Figure 4 Kootenay Lake North Arm (1 site)

Figure 5 Upper Arrow Lake (1 site)

Daily Environmental Monitoring Field Sheet

Client: Canadian Coast Guard **__of __**
Site Location: **Foreman:**

Date: **EM:**
Time:
Weather:

Mitigation / Management Measure	Status	Revisions/Actions
Permits/EPPs/Contingency Plans		
Site Access		
Hydrocarbons/Spill Control		
Sediment & Erosion Control		
Wildlife & Vegetation		
Barge Camp		
Waste Control		
Concrete		
Archaeology		
General Other		

Compliance Status Definitions

✓	In compliance with EMP. No action required.
!	In compliance with EMP. Requires revised measures.
x	Out of compliance with EMP. Action required.

Daily Environmental Monitoring Field Sheet

Construction Activities __of __
Record of Communications
Additional Notes
Site Drawings