

Appendix B:

Regulatory Approvals

**FISHERIES AND OCEANS
CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA) 2012
PROJECT EFFECTS DETERMINATION REPORT**

GENERAL INFORMATION

1. Project Title: Wharf Reconstruction, Lawn, NL	
2. Proponent: Fisheries and Oceans Canada, Small Craft Harbours (DFO SCH)	
3. Other Contacts (Other Proponent, Consultant or Contractor): Public Works and Government Services Canada	4. Role: OGD Consultant
5. Source of Project Information: Mike Collins, Senior Project Engineer, DFO SCH Branch	
6. Project Review Start Date: April 13, 2016	
7. DFO File No.: 16-HNFL-00225	8. PWGSC File No.:
9. TC File No.: NPP # 8200-09-1095 / NEATS: 42517	

BACKGROUND

<p>10. Background about Proposed Development (including a description of the proposed development):</p> <p>DFO SCH proposes to reconstruct a marginal wharf located at the Small Craft Harbour Facility in Lawn, NL. The new wharf will be composed of nine (9) treated timber cribs and will measure 6.1 m wide and approximately 58 m long about the leeward edge.</p>

PROJECT REVIEW

<p>11. DFO's rationale for the project review:</p> <p>Project is on federal land <input checked="" type="checkbox"/> <u>and</u>;</p> <p><input checked="" type="checkbox"/> DFO is the proponent</p> <p><input type="checkbox"/> DFO to issue <i>Fisheries Act</i> Authorization or <i>Species at Risk Act</i> Permit</p> <p><input type="checkbox"/> DFO to provide financial assistance to another party to enable the project to proceed</p> <p><input type="checkbox"/> DFO to lease or sell federal land to enable the project to proceed</p> <p><input type="checkbox"/> Other</p>	
12. Fisheries Act Sections (if applicable): n/a	
<p>13. Other Authorities</p> <p>Transport Canada, Navigation Protection Program and Environmental Affairs and Aboriginal Consultation Unit</p>	<p>14. Other Authorities rationale for involvement:</p> <p><i>Navigation Protection Act</i></p>

15. Other Jurisdiction: Department of Environment and Conservation, Service NL Division and Water Resources	
16. Other Expert Departments Providing Advice: Fisheries and Oceans Canada, Fisheries Protection Program	17. Areas of Interest of Expert Departments: <i>Fisheries Act</i>
18. Other Contacts and Responses:	

19. Scope of Project (details of the project subject to review):

Project Description

Construction/Installation:

The proposed project involves the complete demolition and removal of an existing marginal cribwork wharf and construction of a new, treated timber cribwork wharf. The existing wharf consists of fully ballasted cribwork measuring approximately 6.1 m wide with a total length of 56 m along its leeward edge. A rock and gravel fill approach provides access to the wharf. The existing wharf consists of reinforced concrete decking and creosote timber. The jib crane is to be removed and temporarily stored on site until it is re-instated on the new jib crane foundation. There is an existing sheet pile wharf adjacent to the southern end of the wharf that is being removed. There is a steel sheet pile wall and some fender piles that must be extracted along this margin to accommodate the placement of the new cribwork. Temporary sheet piling (~8 m) is to be installed between the inside edge of the northern end of the wharf and an existing shed. This will be installed in order to excavate for the new cribwork and insure that the existed dilapidated support of the private shed is not further compromised. All the existing structure components including those that have collapsed outside the footprint of the existing wharf or settled below the harbour bottom are to be removed and disposed of by the contractor.

The new wharf structure will consist of a reworked gravel approach and v-shaped marginal cribwork wharf angled 55°. The new wharf will be constructed of treated timber cribwork and will measure 6.1 m wide and approximately 58 m long about the leeward edge. The new wharf will be composed of 9 new crib sections, new jib crane base, 8 new ladders, 2 new electrical pedestals, 9 new type "A" cleats and blocks and 1 new light pole. Seven of the new crib sections will measure approximately 6.1m by 6.1 m, while two irregular shaped cribs will make up the 550 apex. The new wharf will have a new reinforced concrete deck that sits approximately 3.5 m above LNT and new 100 X 150 mm vertical fenders on the seaside wall. The outer face of the wharf will be constructed of treated timber cribbing seated on a rock mattress. Excavation/dredging of benthic sediments directly beneath the proposed rock mattress will be required to ensure the rock and overlying cribwork are properly supported on bedrock. Hard bottom is estimated to be located approximately 4 m below existing bottom along the outside face. The rock mattress will be about 1.5 m thick at the outside edge with a base layer consisting of 45 – 400 Kg stone size and a bearing layer consisting of 2-7 Kg stone size. The outside edge of the mattress will be protected by 0.5-1.0 tonne scour. This structure will measure approximately 6.1 m wide by 55 m long (335 m2 footprint). However, the benthic footprint of the final structure will be larger than the footprint of the wharf structure as a result of the installation of a rock mattress.

Operation

The Environmental Management System (EMS) with an integrated Environmental Management Plan (EMP) for the Harbour Authority of Lawn will cover operational aspects of environmental management at the harbour (fuelling, waste disposal, activities on the property and water).

Decommissioning

This facility is not presently planned to be decommissioned. At the time of decommissioning, Small Craft Harbours will develop a site-specific re-use or reclamation plan that is appropriate for the applicable environmental legislation and Fisheries and Oceans Canada policies.

Scheduling

Subject to regulatory approval and DFO SCH operational priorities and funding, this project may commence during the Summer of 2016.

20. Location of Project:

The project site is located at coordinates 46° 56' 33" N; 55° 32' 25" W and can be accessed along Route 220. The community of Lawn is located approximately 356kms southwest of the City of St. John's on the Burin Peninsula.

21. Environment Description:

Physical Environment

The project site is located within a commercially active harbour in the small rural town of Lawn, NL. It is established on a small peninsula. The reconstruction site is located on the eastern side of the peninsula adjacent to an existing sheet pile wharf, private fishing wharves and gravel roadway. Two streams feed into the bay where the project site resides. Vegetation in the area is predominately grassland with coniferous tree stands moving towards the mouth of the bay. The area behind the site is predominately residential zones.

Lawn is located in the South Avalon-Burin Oceanic Barrens ecoregion that occurs along the southern tips of the Avalon and Burin peninsulas in Newfoundland. The ecoregion is marked by cool summers and short, relatively mild winters. It is also strongly affected by the Atlantic Ocean, and its summers are noted for higher frequencies and persistence of fog than in the surrounding barrens. The mean annual temperature is approximately 5.5°C. The mean summer temperature is 11.5°C and the mean winter temperature is -1°C. The mean annual precipitation ranges 1200-1500 mm.

Biological Environment

This ecoregion is classified as having an oceanic low boreal ecoclimate. It supports dense carpets of moss and fruticose lichen, along with closed, low-growing ericaceous shrubs. The moss-heath of this region is unique to North America. Similar communities are found in northern Scotland and Iceland. Dwarf krummholz of balsam fir occurs on some upland sites. The ecoregion is composed predominantly of a mixture of late Precambrian sedimentary and volcanic strata, and its elevations rise abruptly from sea level to about 200 m asl. Stream erosion has cut deeply, and the uplands are dissected, rugged, and rocky along the coastline, but elsewhere inland they present a rolling terrain of low relief. The surface of the uplands is dominated by peat-covered, rolling to hummocky, sandy morainal deposits with slopes that range 5-30%. Fibrisols are found on blanket and sloping bogs. These wetlands cover more than 25% of the ecoregion. Well- to imperfectly drained Ferro-Humic Podzols developed on sandy loam glacial till are the dominant soils in this ecoregion. Wildlife includes caribou, willow ptarmigan, and seabirds. One of the world's largest gannet colonies is situated at Cape St. Mary's. Fishing and water-oriented recreation are the main land uses. The main community is Trepassey. The population of the ecoregion is approximately 9200.

Species at Risk (Aquatic and Terrestrial)

Lawn is within the distributional range of the Blue Whale (Atlantic population), North Atlantic Right Whale, Red Crossbill (*percna* subspecies), Harlequin Duck, and the Monarch Butterfly all placed on Schedule 1 of the *Species at Risk Act* by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). However, the proposed project site is not likely to provide critical or limiting habitat for these species and does not contain any environmental components that are considered to be important, sensitive, threatened or endangered that are likely to be affected by the project.

22. Scope of Effects Considered (sections 5(1) and 5(2)):

Table 1: Potential Project / Environment Interactions Matrix

Project Phase / Physical Work/Activity	As per Section 5(1)			Section 5(1c)				Section 5(2)			Due Diligence			
	Fish (Fisheries Act)	Aquatic Species (SARA)	Birds (MBCA)	Health and Socio economic	Physical and cultural heritage	Land use	*HAPA Significance	Health and Socio economic	Physical and cultural heritage	*HAPA Significance	Water (ground, surface, drainage, etc)	Terrestrial / Aquatic Species	Soil	Air Quality
Construction/Installation														
Dredging/Excavation	P	-	-	-	-	-	-	P	-	-	P	P	P	P
Old Wharf Demolition	P	-	-	-	-	-	-	P	-	-	P	P	-	P
Wharf construction	P	-	-	-	-	-	-	P	-	-	P	P	-	P
Operation / Maintenance	P	-	-	-	-	-	-	-	-	-	P	-	-	-
Decommissioning / Abandonment	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**structure, site or thing that is of historical, archaeological, paleontological or architectural significance.
Legend: P = Potential Effect of Project on Environment; '-' = No Interaction*

Navigation Consideration

Environmental effects of the project on navigation are taken into consideration as part of the environmental assessment only when the effects are indirect, *i.e.* resulting from a change in the environment affecting navigation. Direct effects on navigation are not considered in the environmental assessment, but any measures necessary to mitigate direct effects will be included as conditions of the *Navigation Protection Act* approval.

- Only direct effects are identified; therefore the effects of the project on navigation are not addressed in this environmental assessment.
- Indirect effects were identified and have been addressed in this environmental assessment.

23. Environmental Effects of Project:

Potential Project/Environment Interactions and their effects are outlined below:

Fish:

- Sedimentation as a result of wharf demolition, and reconstruction may negatively impact fish and quality of potential fish habitat at the immediate project site.
- Accidental discharge of heavy machinery fuel/fluids or hazardous substances could negatively impact fish and potential fish habitat.
- Dredging at the site will destroy potential fish habitat within project footprint.

Health and Socio economic:

- Potential for safety hazards to workers during demolition and construction activities.

Water:

- Sedimentation as a result of wharf preparation, construction and upland development may negatively impact marine water quality at the immediate project site.
- Construction related refuse may be deposited in water-body, decreasing marine water quality.
- Accidental discharge of heavy machinery fuel/fluids or hazardous substances (e.g. concrete washwater) may result in a decrease of marine water quality.
- Dredging activities resulting in a sedimentation event within the water column.
- Construction activities taking place near the shoreline may result in run off / erosion.

Aquatic species:

- Sedimentation as a result of preparation and construction may negatively impact aquatic species present at the immediate project site.
- Accidental discharge of heavy machinery fuel/fluids or hazardous substances (e.g. concrete washwater) could negatively affect aquatic species present at the immediate project site.
- Dredging at the site will destroy flora and any sessile fauna within project footprint.

Soil:

- Improper disposal of dredge spoils and demolition timber may result in contamination of soils.
- Project activities could potentially result in soil contamination due to improper disposal of dredge material or to some type of mechanical malfunction resulting in a hydrocarbon spill.
- Construction activities at site or natural events (e.g. rainfalls) could result in erosion / sedimentation events.

Air quality:

- Construction activities may result in nuisance impacts due to noise and dust.
- Improper storage/disposal of dredge spoils may result in unpleasant odours and provide annoyance to facility users and nearby residents.

24. Mitigation Measures for Project (including Habitat Compensation):

Work should be scheduled to avoid periods of heavy precipitation. Erosion control structures (temporary matting, geotextile filter fabric) are to be used, as appropriate, to prevent erosion and release of sediment and/or sediment laden water during the construction phase.

Minimize duration of in-water work wherever possible.

Conduct in-water work during periods of low tide, to further reduce the risk to fish and their habitat.

Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan will, where applicable, include:

- Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body;
- Site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., dredging, underwater cable installation);
- Measures for containing and stabilizing waste material (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry;
- Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction;
- Repairs to erosion and sediment control measures and structures if damage occurs;
- Removal of non-biodegradable erosion and sediment control materials once site is stabilized.

Work should be properly timed to avoid potential interference with commercial and/or recreational fisheries.

Appropriate sedimentation control measures (e.g. silt curtains, booms, etc), should be deployed where required.

All wastes should be recycled where possible or otherwise disposed of appropriately.

All crib backfill material should be clean and obtained from an approved quarry.

Materials should never be removed directly from any watercourse, or shoreline area for use as ballast.

All drainage and wash water from concrete production should be properly contained and should not drain into the marine environment.

There should be no sedimentation events as a result of proposed activities. If required, mitigation measures must be implemented such as installation of a turbidity barrier, construction of sediment ponds, etc.

Machinery should be well muffled and local municipality construction by-laws must be adhered to.

Machinery must be checked for leakage of lubricants or fuel and must be in good working order.

Refueling must be done at least 100m from any water body. Basic petroleum spill clean-up equipment should be on-site. All spills or leaks should be promptly contained, cleaned up and reported to the 24-hour environmental emergencies report system (1-800-563-9089). The proponent should consider developing a contingency plan specific to the proposed undertaking to enable a quick and effective response to a spill event.

The proponent must ensure that all waste material will be disposed of in an environmentally acceptable manner in accordance with applicable Provincial Regulations.

Any hazardous materials produced as a result of this project are to be transported off-site for disposal/treatment at an approved waste handling facility, pursuant to applicable provincial substances from entering the water.

Shoreline disturbance should be restricted to the immediate work area. Disturbed shorelines should be stabilized.

Conduct work in a manner that prevents the release of debris (i.e., cribbing, ballasts, etc.) or sediments into the water.

Site access must be restricted to authorized workers only.

Workers in contact with hazardous materials (e.g. explosives) must be provided with and use appropriate personal protective equipment.

Proper safety procedures must be followed during the duration of the project as per applicable municipal, provincial, and federal regulations.

Employees will be trained in health and safety protocols (e.g. safe work practices, emergency response).

To the extent possible, the proposed work should be carried out during low tide and low wind-wave conditions to minimize turbidity and to minimize the area that might be affected by turbidity. Weather conditions should be assessed on a daily basis to determine the potential risk on project activities.

Several environmental approvals / permits have been obtained on behalf of SCH. These include:

1. NPP may provide an approval for the proposed alteration of the lawful work under the *Navigation Protection Act*. Any conditions outlined will have to be met.
2. Fisheries and Oceans provided mitigation measures for the protection of fish and fish habitat.
3. Service NL has reviewed the sediment results and provided approval for landfill disposal.

These approvals are attached and all conditions/mitigation measures must be reviewed and implemented by the contractor.

The proponent should ensure that copies of all regulatory approvals are available on-site during project activities.

25. Significance of Adverse Environmental Effects of project:

Significant adverse environmental effects are unlikely, taking into account mitigation measures.

26. Other Considerations (Public Consultation, Aboriginal Consultation, Follow-up)

Public Consultation

The proposed project will provide safer and more secure access for vessels utilizing this facility. No negative public concern is expected as a result of this project. As such, public consultation was not deemed necessary as part of this determination.

Aboriginal Consultation

Aboriginal fishers are not known to utilize the Lawn SCH facility, nor are there any known aboriginal groups in the surrounding area. As such, aboriginal consultation was not deemed necessary as part of this determination.

Government Consultation

Federal and provincial authorities likely to have an interest in the project were consulted by Public Works & Government Services Canada, Environmental Services, during the course of this assessment. A project description was distributed to the following authorities:

- Fisheries and Oceans Canada – Fisheries Protection Program (DFO FPP)
- Transport Canada – Navigation Protection Program (TC NPP)
- Service NL – Approval for Landfill Disposal of Dredged Material (if required).

Mitigations prescribed by DFO FPP have been incorporated into this report and may also be found in Appendix C. It is the proponents' responsibility to ensure that appropriate mitigation measures are adhered to.

A *Navigation Protection Act* approval may be issued for this project. The proponent is required to adhere to any conditions stipulated within the permit.

Service NL were provided with the sediment sampling results.

All expert advice/specialist information provided by the above noted departments has been incorporated into this document.

Accuracy and Compliance Monitoring

A follow-up program (as defined in S. 2(1) and as applicable to non-designated projects on federal lands) is a program for determining the effectiveness of any mitigation measures. Site monitoring (accuracy and compliance monitoring) may be conducted to verify whether required mitigation measures were implemented. The proponent must provide site access to Responsible Authority officials and/or its agents upon request.

27. Other Monitoring and Compliance Requirements (e.g. *Fisheries Act* or *Species at Risk Act* requirements)

n/a

CONCLUSION

28. Conclusion on Significance of Adverse Environmental Effects:

The Federal Authorities have evaluated the project in accordance with Section 67 of *Canadian Environmental Assessment Act (CEAA), 2012*. On the basis of this evaluation, the departments have determined that the project is not likely to cause significant adverse environmental effects with mitigation and therefore can proceed using the mitigative measures as outlined.

29. Prepared by:



30. Date: July 26, 2016

31. Name:

Cathy Martin

32. Title:

Environmental Specialist, PWGSC-ES

DECISION

33. Decision Taken

- DFO may exercise its power, duty or function, i.e. may issue the authorization - where the project is not likely to cause significant adverse environmental effects. Confirm below the specific power, duty or function that may be exercised.
- DFO to issue *Fisheries Act* Authorization or *Species at Risk Act* Permit
 - DFO to proceed with project (as proponent)
 - DFO to provide financial assistance for project to proceed
 - DFO to provide federal land for project to proceed
- DFO has decided not to exercise its power, duty or function because the project is likely to cause significant adverse environmental effects.
- DFO to ask the Governor in Council to determine if the significant adverse environmental effects are justified in the circumstances

34. Approved by:



35. Date:

Aug 22/16

36. Name:

Paul Curran

37. Title:

Regional Engineer, DFO-SCH, NL

38. References:

n/a

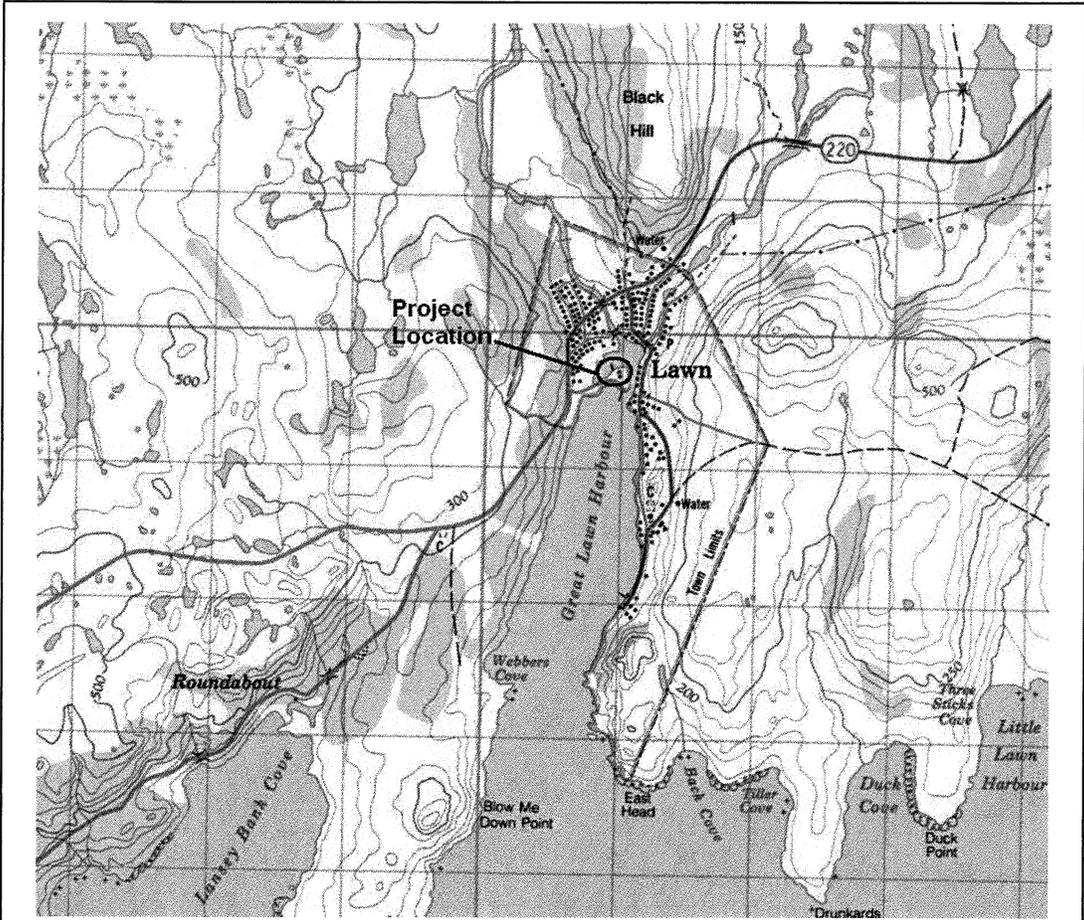
TRANSPORT CANADA RECOMMENDATION

Project Title:	Wharf Reconstruction, Lawn, NL	
TC File No.:	NEATS: 42517	
NPP File No.:	8200-09-1095	
Environmental Review Decision:	Taking into account the implementation of any mitigation measures that Transport Canada considers appropriate, the project is not likely to cause significant adverse environmental effects and, as such, Transport Canada may exercise any power or perform any duty or function that would permit the project to be carried out in whole or in part.	
Prepared by:	Melissa Ginn Environmental Officer Environmental Affairs and Aboriginal Consultation Unit	
Signature:		Date: August 17, 2016
Mailing Address:	10 Barter's Hill, St. John's, NL	
Tel:	709-351-3200 / 709-772-3088	
Fax:	709-772-3072	
Email:	melissa.ginn@tc.gc.ca	
Recommended by:	J. Jason Flanagan Senior Environmental Assessment Officer Environmental Affairs and Aboriginal Consultation Unit	
Signature:		Date:
Approved by:	Kevin LeBlanc Regional Manager Environmental Affairs and Aboriginal Consultation Unit	
Signature:		Date:

APPENDICES

- Appendix A - Topographic Map and Aerial Photographs
 - Appendix B: Site Plan
- Appendix C: Regulatory approvals/responses
 - Appendix D: Sediment analysis results

Appendix A
Topographic Map and Aerial Photo



Description

Appendix A-1
 Topographic Map of Proposed Site
 Location: Lawn, NL

Scale 1:50,000

NTS Mapsheet 01-L-13 – Lamaline





Appendix A-2: Aerial Photo indicating site of marginal wharf reconstruction (photo courtesy of DFO, 2010)



Appendix A-3: Photo indicating proposed marginal wharf reconstruction (photo courtesy of DFO, 2010)

Appendix B
Site Plan of proposed project

Appendix C
Regulatory approvals/responses



P.O. Box 5667
St. John's, NL A1C 5X1

August 4, 2016

Your file Votre référence

Our file Notre référence
16-HNFL-00225

Mr. Paul Curran
Fisheries and Oceans Canada
Small Craft Harbours Branch
10 Barter's Hill, St. John's NL A1C 5T2

Dear Mr. Curran:

Subject: Implementation of mitigation measures to avoid and mitigate serious harm to fish – Wharf Demolition, Replacement, and Dredging, Lawn.

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada received your proposal on June 28, 2016. Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act*.

The proposal has also been reviewed to determine whether it will adversely impact listed aquatic species at risk and contravene sections 32, 33 and 58 of the *Species at Risk Act*.

Our review consisted of:

- DFO Request for Review Application;
- Project description, site photographs and project drawings; and
- Information from local fishery officer

We understand that you propose to complete the following works/undertaking/activities to improve existing facilities at Lawn Harbour:

- Demolish / remove the existing timber crib marginal wharf (56.2 m (L) x 6.1 m (W));
- Dredge within the footprint of the existing/new wharf and extending ~2.4 m outside;
- Install a rock mattress within the dredged area to support the new wharf structures.
- Construct a new timber crib marginal wharf (57.4 m (L) x 6.1 m (W)) within the footprint / location of the demolished marginal wharf structures.

*

To avoid the potential of serious harm to fish and their habitat we are recommending, in addition to the measures described within your submitted application, that the following mitigation measures be included into your plans:

- To avoid impacts on salmon that migrate through Lawn Harbour, the project should not be carried out during the period of June 1 – Aug 31.
- The project should be carried out in such a manner that sediment, and/or other project related material do not enter the waters of Lawn Harbour or any other adjacent water body.
- Project related activity – e.g. wharf demolition, timber crib placement, and dredging - should be carried out during low tide and low wind/wave conditions to minimize turbidity, and to minimize the area that might be affected by turbidity to that area immediately adjacent to the project area.
- Project related activity should be suspended, and/or additional mitigation measures (i.e. deployment of a floating sediment boom/curtain) if wind or tide conditions cause sediment / turbid water to be visible outside the immediate project area.
- Rock material should be clean rock free of fine erodible material and sized to resist displacement during storm and/or flood events.
- Rock material should not be end dumped; rather it should be dumped on land and placed on station using an excavator or similar equipment.
- Shoreline disturbance should be restricted to the immediate project related work area; any shoreline areas disturbed by project related activity should be stabilized as soon as possible to prevent erosion.
- All dredged or excavated material should be disposed of at an approved site above the high water mark. If necessary adequate sedimentation control measures should be deployed around stored dredge material to minimize potential erosion and sedimentation from the material.

Provided that these mitigation measures are incorporated into your plans, the Program is of the view that your proposal will not result in serious harm to fish. The Program is also of the view that your proposal will not contravene sections 32, 33 or 58 of the *Species at Risk Act*. No formal approval is required from the Program under the *Fisheries Act* or the *Species at Risk Act* in order to proceed with your proposal.

If your plans have changed or if the description of your proposal is incomplete, or changes in the future, you should consult our website (<http://www.dfo-mpo.gc.ca/pnw-pppe/index-eng.html>) or consult with a qualified environmental consultant to determine if further review is required by the Program.

A copy of this letter should be kept on site while the work is in progress. Please contact Darrin Sooley (phone (709) 772-3521, fax 709 772-5562 or email darrin.sooley@dfompo.gc.ca) if you have any questions in this respect. Please refer to the file number referenced above when corresponding with the Program.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tilman Bieger', with a stylized flourish at the end.

Tilman Bieger
Manager, Fisheries Protection - Regulatory Reviews
Ecosystems Management Branch
NL Region

Cc: Cathy Martin – PWGSC, St. John's

Mark McNeil

From: Adams, Barry <BarryAdams@gov.nl.ca>
Sent: August-02-16 2:34 PM
To: Mark McNeil
Subject: RE: Service NL Application - Sediment Disposal, Lawn, NL

From: Adams, Barry
Sent: Tuesday, August 02, 2016 10:52 AM
To: 'Cathy Martin'
Subject: RE: Service NL Application - Sediment Disposal, Lawn, NL

Hi Cathy:

Based on your report & the attached lab analyses, it is acceptable to dispose of the material at an Approved Waste Disposal site with the permission of the owner/operator. As usual, if there are odor or fly issues associated with the material, it should be cover with a layer of clean non-dredged material or hydrated lime.

Hope you're enjoying a pleasant summer!

Barry

From: Cathy Martin [<mailto:Cathy.Martin@pwgsc-tpsgc.gc.ca>]
Sent: Friday, July 22, 2016 11:30 AM
To: Groves, Robert; Adams, Barry
Subject: Service NL Application - Sediment Disposal, Lawn, NL

Good Afternoon,

Please see the attached application for permission to dispose of sediment material at an approved landfill site. The material is part of a Wharf Reconstruction project in Lawn, NL.

If you have any questions please let me know.

Regards,
Cathy M

Cathy Martin

Environmental Services

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

P.O. Box 4600, St. John's, NL, A1C 5T2 / C.P. Box 4600, Saint Jean, T.N, A1C 5T2

Tel: 709-772-5852 Cell:709-691-1567 Fax/Télc:709- 772-0916

cathy.martin@pwgsc-tpsgc.gc.ca

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Appendix D
Sediment Sampling Results



Your P.O. #: CALL UP #94
 Your Project #: 718889 WHARF RECONSTRUCTION
 Site Location: LAWN, NL (401)
 Your C.O.C. #: D05945

Attention: Cathy Martin

Public Works & Government Services Canada
 PO Box 4600
 10 Barter's Hill
 St. John's, NL
 A1C 5T2

Report Date: 2016/03/02
 Report #: R3914371
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B635472

Received: 2016/02/22, 12:00

Sample Matrix: SEDIMENT
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Free (WAD) Cyanide (1)	6	2016/02/29	2016/03/01	CAM SOP-00457	OMOE E3015 m
TEH in Soil (PIRI) (2, 4)	6	2016/02/23	2016/02/24	ATL SOP 00197	Atl. RBCA v3 m
Metals Solids Acid Extr. ICPMS (3)	6	2016/02/25	2016/02/26	ATL SOP 00058	EPA 6020A R1 m
Moisture	6	N/A	2016/02/24	ATL SOP-00196	OMOE Handbook 1983 m
PAH in sediment by GC/MS (Low Level) (3, 4)	2	2016/02/26	2016/02/29	ATL SOP 00102	EPA 8270D 2007 m
PAH in sediment by GC/MS (Low Level) (3, 4)	4	2016/02/26	2016/03/01	ATL SOP 00102	EPA 8270D 2007 m
Low Level PCB in Soil by GC-ECD (3)	6	2016/02/29	2016/03/01	ATL SOP 00106	EPA 8082A m
PCB Aroclor sum (low level soil) (3)	6	N/A	2016/03/01		Auto Calc.
pH (5:1 DI Water Extract) (3)	6	2016/02/25	2016/02/26	ATL SOP 00003	SM 22 4500-H+ B m
VPH in Soil (PIRI) (1)	6	2016/02/23	2016/02/24	ATL SOP 00199	Atl. RBCA v3 m
ModTPH (T1) Calc. for Soil	6	N/A	2016/02/24	N/A	Atl. RBCA v3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Maxxam Analytics Mississauga
- (2) Reported on a dry weight basis.
- (3) This test was performed by Maxxam Bedford
- (4) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Heather Macumber, Project Manager

Email: HMacumber@maxxam.ca

Phone# (902)420-0203 Ext:226

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This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RBCA HYDROCARBONS IN SOIL (SEDIMENT)

Maxxam ID		BWX321	BWX333	BWX335	BWX350	BWX389		
Sampling Date		2016/02/20 10:30	2016/02/20 10:30	2016/02/20 09:30	2016/02/20 09:30	2016/02/20 08:30		
COC Number		D05945	D05945	D05945	D05945	D05945		
	UNITS	BH1-SURFACE	BH1-1M	BH2-SURFACE	BH2-1M	BH3-SURFACE	RDL	QC Batch
Inorganics								
Moisture	%	19	20	20	20	36	1.0	4390840
Petroleum Hydrocarbons								
Benzene	mg/kg	ND	ND	ND	ND	ND	0.025	4391621
Toluene	mg/kg	ND	ND	ND	ND	ND	0.025	4391621
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	0.025	4391621
Total Xylenes	mg/kg	ND	ND	ND	ND	ND	0.050	4391621
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	ND	2.5	4391621
>C10-C16 Hydrocarbons	mg/kg	ND	ND	ND	ND	ND	10	4391391
>C16-C21 Hydrocarbons	mg/kg	ND	ND	ND	15	ND	10	4391391
>C21-<C32 Hydrocarbons	mg/kg	ND	25	29	49	62	15	4391391
Modified TPH (Tier1)	mg/kg	ND	25	29	64	62	15	4389675
Reached Baseline at C32	mg/kg	Yes	No	No	No	No	N/A	4391391
Hydrocarbon Resemblance	mg/kg		COMMENT (1)	COMMENT (1)	COMMENT (2)	COMMENT (1)	N/A	4391391
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	94	97	95	97	98		4391391
n-Dotriacontane - Extractable	%	95	100	100	102	102		4391391
Isobutylbenzene - Volatile	%	69	66	67	71	83		4391621
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable (1) No resemblance to petroleum products in lube oil range. (2) No resemblance to petroleum products in fuel oil /lube oil range.								

RBCA HYDROCARBONS IN SOIL (SEDIMENT)

Maxxam ID		BWX428		
Sampling Date		2016/02/20 08:30		
COC Number		D05945		
	UNITS	BH3-1M	RDL	QC Batch
Inorganics				
Moisture	%	18	1.0	4390840
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.025	4391621
Toluene	mg/kg	ND	0.025	4391621
Ethylbenzene	mg/kg	ND	0.025	4391621
Total Xylenes	mg/kg	ND	0.050	4391621
C6 - C10 (less BTEX)	mg/kg	ND	2.5	4391621
>C10-C16 Hydrocarbons	mg/kg	ND	10	4391391
>C16-C21 Hydrocarbons	mg/kg	16	10	4391391
>C21-<C32 Hydrocarbons	mg/kg	51	15	4391391
Modified TPH (Tier1)	mg/kg	67	15	4389675
Reached Baseline at C32	mg/kg	No	N/A	4391391
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	4391391
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	96		4391391
n-Dotriacontane - Extractable	%	101		4391391
Isobutylbenzene - Volatile	%	71		4391621
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable (1) No resemblance to petroleum products in fuel oil /lube oil range.				

RESULTS OF ANALYSES OF SEDIMENT

Maxxam ID		BWX321		BWX321	BWX333	BWX335	BWX350	BWX389		
Sampling Date		2016/02/20 10:30		2016/02/20 10:30	2016/02/20 10:30	2016/02/20 09:30	2016/02/20 09:30	2016/02/20 08:30		
COC Number		D05945		D05945	D05945	D05945	D05945	D05945		
	UNITS	BH1-SURFACE	RDL	BH1-SURFACE Lab-Dup	BH1-1M	BH2-SURFACE	BH2-1M	BH3-SURFACE	RDL	QC Batch
Inorganics										
Free Cyanide	ug/g	ND	0.01		ND	ND	ND	0.03	0.01	4398068
Soluble (5:1) pH	pH	8.07	N/A	8.17	8.16	8.67	8.55	8.15	N/A	4396145
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected N/A = Not Applicable										

Maxxam ID		BWX428		
Sampling Date		2016/02/20 08:30		
COC Number		D05945		
	UNITS	BH3-1M	RDL	QC Batch
Inorganics				
Free Cyanide	ug/g	ND	0.01	4398068
Soluble (5:1) pH	pH	8.26	N/A	4396145
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable				

PCB'S AND DDT BY GC-ECD (SEDIMENT)

Maxxam ID		BWX321	BWX333	BWX333	BWX335	BWX350	BWX389		
Sampling Date		2016/02/20 10:30	2016/02/20 10:30	2016/02/20 10:30	2016/02/20 09:30	2016/02/20 09:30	2016/02/20 08:30		
COC Number		D05945	D05945	D05945	D05945	D05945	D05945		
	UNITS	BH1-SURFACE	BH1-1M	BH1-1M Lab-Dup	BH2-SURFACE	BH2-1M	BH3-SURFACE	RDL	QC Batch
PCBs									
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	0.010	4398062
Aroclor 1221	mg/kg	ND	ND	ND	ND	ND	ND	0.010	4398062
Aroclor 1232	mg/kg	ND	ND	ND	ND	ND	ND	0.010	4398062
Aroclor 1248	mg/kg	ND	ND	ND	ND	ND	ND	0.010	4398062
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	0.010	4398062
Aroclor 1254	mg/kg	ND	ND	ND	ND	ND	ND	0.010	4398062
Aroclor 1260	mg/kg	ND	ND	ND	ND	ND	ND	0.010	4398062
Calculated Total PCB	mg/kg	ND	ND		ND	ND	ND	0.010	4389855
Surrogate Recovery (%)									
Decachlorobiphenyl	%	94 (1)	89 (1)	84 (1)	93 (1)	86	79 (1)		4398062
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected (1) PCB:Unidentified (possibly halogenated) compounds detected.									

Maxxam ID		BWX428		
Sampling Date		2016/02/20 08:30		
COC Number		D05945		
	UNITS	BH3-1M	RDL	QC Batch
PCBs				
Aroclor 1016	mg/kg	ND	0.010	4398062
Aroclor 1221	mg/kg	ND	0.010	4398062
Aroclor 1232	mg/kg	ND	0.010	4398062
Aroclor 1248	mg/kg	ND	0.010	4398062
Aroclor 1242	mg/kg	ND	0.010	4398062
Aroclor 1254	mg/kg	ND	0.010	4398062
Aroclor 1260	mg/kg	ND	0.010	4398062
Calculated Total PCB	mg/kg	ND	0.010	4389855
Surrogate Recovery (%)				
Decachlorobiphenyl	%	81		4398062
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected				

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		BWX321	BWX333	BWX335	BWX350	BWX389	BWX428		
Sampling Date		2016/02/20 10:30	2016/02/20 10:30	2016/02/20 09:30	2016/02/20 09:30	2016/02/20 08:30	2016/02/20 08:30		
COC Number		D05945	D05945	D05945	D05945	D05945	D05945		
	UNITS	BH1-SURFACE	BH1-1M	BH2-SURFACE	BH2-1M	BH3-SURFACE	BH3-1M	RDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	7900	7600	7900	7400	7700	7800	10	4394448
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	4394448
Acid Extractable Arsenic (As)	mg/kg	5.1	5.1	4.6	4.5	5.2	4.7	2.0	4394448
Acid Extractable Barium (Ba)	mg/kg	24	13	16	14	22	12	5.0	4394448
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	4394448
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	ND	ND	50	4394448
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	ND	ND	0.37	0.30	4394448
Acid Extractable Chromium (Cr)	mg/kg	12	22	14	19	13	11	2.0	4394448
Acid Extractable Cobalt (Co)	mg/kg	5.9	5.8	5.6	6.0	6.1	6.3	1.0	4394448
Acid Extractable Copper (Cu)	mg/kg	8.7	12	14	20	14	13	2.0	4394448
Acid Extractable Iron (Fe)	mg/kg	18000	21000	18000	27000	21000	18000	50	4394448
Acid Extractable Lead (Pb)	mg/kg	8.9	8.1	16	15	13	19	0.50	4394448
Acid Extractable Manganese (Mn)	mg/kg	440	440	410	470	440	420	2.0	4394448
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	ND	ND	ND	ND	0.10	4394448
Acid Extractable Molybdenum (Mo)	mg/kg	ND	3.1	2.2	3.8	2.6	2.4	2.0	4394448
Acid Extractable Nickel (Ni)	mg/kg	11	12	12	16	12	10	2.0	4394448
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	1.0	4394448
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	0.50	4394448
Acid Extractable Strontium (Sr)	mg/kg	37	26	83	29	61	25	5.0	4394448
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	0.10	4394448
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	4394448
Acid Extractable Uranium (U)	mg/kg	0.55	0.65	0.91	0.80	0.92	0.96	0.10	4394448
Acid Extractable Vanadium (V)	mg/kg	23	21	23	21	24	22	2.0	4394448
Acid Extractable Zinc (Zn)	mg/kg	61	64	80	81	73	130	5.0	4394448
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
ND = Not detected									

SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

Maxxam ID		BWX321	BWX333	BWX333	BWX335		BWX350		
Sampling Date		2016/02/20 10:30	2016/02/20 10:30	2016/02/20 10:30	2016/02/20 09:30		2016/02/20 09:30		
COC Number		D05945	D05945	D05945	D05945		D05945		
	UNITS	BH1-SURFACE	BH1-1M	BH1-1M Lab-Dup	BH2-SURFACE	RDL	BH2-1M	RDL	QC Batch

Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	ND	0.066	0.011	ND	0.0050	0.0068	0.0050	4395836
2-Methylnaphthalene	mg/kg	0.0065	0.12	0.0064	ND	0.0050	0.0098	0.0050	4395836
Acenaphthene	mg/kg	0.059	0.52	0.10 (1)	ND	0.0050	0.45	0.0050	4395836
Acenaphthylene	mg/kg	ND	0.0087	0.012	ND	0.0050	0.039	0.0050	4395836
Anthracene	mg/kg	0.043	0.087	0.12	0.037	0.0050	1.8	0.0050	4395836
Benzo(a)anthracene	mg/kg	0.17	0.31	0.37	0.15	0.0050	5.2	0.0050	4395836
Benzo(a)pyrene	mg/kg	0.12	0.19	0.24	0.13	0.0050	2.2	0.0050	4395836
Benzo(b)fluoranthene	mg/kg	0.15	0.22	0.24	0.14	0.0050	2.5	0.0050	4395836
Benzo(g,h,i)perylene	mg/kg	0.054	0.072	0.094	0.067	0.0050	0.45	0.0050	4395836
Benzo(j)fluoranthene	mg/kg	0.072	0.11	0.13	0.069	0.0050	1.3	0.0050	4395836
Benzo(k)fluoranthene	mg/kg	0.068	0.092	0.12	0.070	0.0050	1.3	0.0050	4395836
Chrysene	mg/kg	0.17	0.19	0.35 (1)	0.14	0.0050	3.0	0.0050	4395836
Dibenz(a,h)anthracene	mg/kg	0.014	0.020	0.032	0.017	0.0050	0.16	0.0050	4395836
Fluoranthene	mg/kg	0.54	1.6	0.90 (1)	0.39	0.0050	22 (2)	0.050	4395836
Fluorene	mg/kg	0.031	0.38	0.082 (1)	0.010	0.0050	0.53	0.0050	4395836
Indeno(1,2,3-cd)pyrene	mg/kg	0.051	0.066	0.094	0.058	0.0050	0.50	0.0050	4395836
Naphthalene	mg/kg	ND	0.050	0.018	ND	0.0050	0.025	0.0050	4395836
Perylene	mg/kg	0.040	0.060	0.064	0.038	0.0050	0.57	0.0050	4395836
Phenanthrene	mg/kg	0.25	1.4	0.50 (1)	0.11	0.0050	15 (2)	0.050	4395836
Pyrene	mg/kg	0.40	1.2	0.67 (1)	0.45	0.0050	15 (2)	0.050	4395836
Surrogate Recovery (%)									
D10-Anthracene	%	84	83	87	82		83		4395836
D14-Terphenyl	%	92	88	91	88		83		4395836
D8-Acenaphthylene	%	85	83	87	85		83		4395836

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Lab-Dup = Laboratory Initiated Duplicate
 ND = Not detected
 (1) Duplicate: results are outside acceptance limit. Analysis was repeated with similar results.
 (2) Elevated PAH RDL(s) due to sample dilution.

SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

Maxxam ID		BWX389	BWX428		
Sampling Date		2016/02/20 08:30	2016/02/20 08:30		
COC Number		D05945	D05945		
	UNITS	BH3-SURFACE	BH3-1M	RDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	mg/kg	0.022	0.0071	0.0050	4395836
2-Methylnaphthalene	mg/kg	0.016	0.012	0.0050	4395836
Acenaphthene	mg/kg	0.11	0.021	0.0050	4395836
Acenaphthylene	mg/kg	0.020	0.010	0.0050	4395836
Anthracene	mg/kg	0.19	0.14	0.0050	4395836
Benzo(a)anthracene	mg/kg	1.6	0.49	0.0050	4395836
Benzo(a)pyrene	mg/kg	0.66	0.25	0.0050	4395836
Benzo(b)fluoranthene	mg/kg	0.70	0.28	0.0050	4395836
Benzo(g,h,i)perylene	mg/kg	0.20	0.10	0.0050	4395836
Benzo(j)fluoranthene	mg/kg	0.37	0.15	0.0050	4395836
Benzo(k)fluoranthene	mg/kg	0.38	0.14	0.0050	4395836
Chrysene	mg/kg	1.1	0.35	0.0050	4395836
Dibenz(a,h)anthracene	mg/kg	0.064	0.028	0.0050	4395836
Fluoranthene	mg/kg	2.0	3.1	0.0050	4395836
Fluorene	mg/kg	0.15	0.042	0.0050	4395836
Indeno(1,2,3-cd)pyrene	mg/kg	0.19	0.094	0.0050	4395836
Naphthalene	mg/kg	0.022	0.029	0.0050	4395836
Perylene	mg/kg	0.19	0.098	0.0050	4395836
Phenanthrene	mg/kg	0.73	0.25	0.0050	4395836
Pyrene	mg/kg	1.5	2.1	0.0050	4395836
Surrogate Recovery (%)					
D10-Anthracene	%	85	90		4395836
D14-Terphenyl	%	90	97		4395836
D8-Acenaphthylene	%	82	86		4395836
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

Maxxam Job #: B635472
Report Date: 2016/03/02

Public Works & Government Services Canada
Client Project #: 718889 WHARF RECONSTRUCTION
Site Location: LAWN, NL (401)
Your P.O. #: CALL UP #94
Sampler Initials: FF

GENERAL COMMENTS

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC			Parameter	Date	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type		Analyzed				
4390840	ACL	RPD	Moisture	2016/02/24	19		%	25
4391391	SPI	Matrix Spike	Isobutylbenzene - Extractable	2016/02/24		92	%	30 - 130
			n-Dotriacontane - Extractable	2016/02/24		104	%	30 - 130
			>C10-C16 Hydrocarbons	2016/02/24		91	%	30 - 130
			>C16-C21 Hydrocarbons	2016/02/24		116	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/02/24		105	%	30 - 130
4391391	SPI	Spiked Blank	Isobutylbenzene - Extractable	2016/02/24		93	%	30 - 130
			n-Dotriacontane - Extractable	2016/02/24		98	%	30 - 130
			>C10-C16 Hydrocarbons	2016/02/24		98	%	30 - 130
			>C16-C21 Hydrocarbons	2016/02/24		128	%	30 - 130
			>C21-<C32 Hydrocarbons	2016/02/24		103	%	30 - 130
4391391	SPI	Method Blank	Isobutylbenzene - Extractable	2016/02/24		97	%	30 - 130
			n-Dotriacontane - Extractable	2016/02/24		97	%	30 - 130
			>C10-C16 Hydrocarbons	2016/02/24	ND, RDL=10		mg/kg	
			>C16-C21 Hydrocarbons	2016/02/24	ND, RDL=10		mg/kg	
			>C21-<C32 Hydrocarbons	2016/02/24	ND, RDL=15		mg/kg	
4391391	SPI	RPD	>C10-C16 Hydrocarbons	2016/02/24	NC		%	50
			>C16-C21 Hydrocarbons	2016/02/24	NC		%	50
			>C21-<C32 Hydrocarbons	2016/02/24	NC		%	50
4391621	MCT	Spiked Blank	Isobutylbenzene - Volatile	2016/02/24		87	%	60 - 130
			Benzene	2016/02/24		117	%	60 - 140
			Toluene	2016/02/24		120	%	60 - 140
			Ethylbenzene	2016/02/24		121	%	60 - 140
			Total Xylenes	2016/02/24		122	%	60 - 140
4391621	MCT	Method Blank	Isobutylbenzene - Volatile	2016/02/24		89	%	60 - 130
			Benzene	2016/02/24	ND, RDL=0.025		mg/kg	
			Toluene	2016/02/24	ND, RDL=0.025		mg/kg	
			Ethylbenzene	2016/02/24	ND, RDL=0.025		mg/kg	
			Total Xylenes	2016/02/24	ND, RDL=0.050		mg/kg	
			C6 - C10 (less BTEX)	2016/02/24	ND, RDL=2.5		mg/kg	
4391621	MCT	RPD	Benzene	2016/02/24	NC		%	50
			Toluene	2016/02/24	NC		%	50
			Ethylbenzene	2016/02/24	NC		%	50
			Total Xylenes	2016/02/24	NC		%	50
			C6 - C10 (less BTEX)	2016/02/24	NC		%	50
4394448	MLB	Matrix Spike	Acid Extractable Antimony (Sb)	2016/02/26		99	%	75 - 125
			Acid Extractable Arsenic (As)	2016/02/26		130 (1)	%	75 - 125
			Acid Extractable Barium (Ba)	2016/02/26		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2016/02/26		94	%	75 - 125
			Acid Extractable Boron (B)	2016/02/26		87	%	75 - 125
			Acid Extractable Cadmium (Cd)	2016/02/26		94	%	75 - 125
			Acid Extractable Chromium (Cr)	2016/02/26		95	%	75 - 125

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type		Analyzed				
			Acid Extractable Cobalt (Co)	2016/02/26		94	%	75 - 125
			Acid Extractable Copper (Cu)	2016/02/26		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2016/02/26		NC	%	75 - 125
			Acid Extractable Manganese (Mn)	2016/02/26		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2016/02/26		89	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2016/02/26		94	%	75 - 125
			Acid Extractable Nickel (Ni)	2016/02/26		92	%	75 - 125
			Acid Extractable Selenium (Se)	2016/02/26		94	%	75 - 125
			Acid Extractable Silver (Ag)	2016/02/26		96	%	75 - 125
			Acid Extractable Strontium (Sr)	2016/02/26		96	%	75 - 125
			Acid Extractable Thallium (Tl)	2016/02/26		96	%	75 - 125
			Acid Extractable Tin (Sn)	2016/02/26		NC	%	75 - 125
			Acid Extractable Uranium (U)	2016/02/26		96	%	75 - 125
			Acid Extractable Vanadium (V)	2016/02/26		NC	%	75 - 125
			Acid Extractable Zinc (Zn)	2016/02/26		NC	%	75 - 125
4394448	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2016/02/26		93	%	75 - 125
			Acid Extractable Arsenic (As)	2016/02/26		96	%	75 - 125
			Acid Extractable Barium (Ba)	2016/02/26		97	%	75 - 125
			Acid Extractable Beryllium (Be)	2016/02/26		95	%	75 - 125
			Acid Extractable Boron (B)	2016/02/26		94	%	75 - 125
			Acid Extractable Cadmium (Cd)	2016/02/26		95	%	75 - 125
			Acid Extractable Chromium (Cr)	2016/02/26		96	%	75 - 125
			Acid Extractable Cobalt (Co)	2016/02/26		96	%	75 - 125
			Acid Extractable Copper (Cu)	2016/02/26		97	%	75 - 125
			Acid Extractable Lead (Pb)	2016/02/26		94	%	75 - 125
			Acid Extractable Manganese (Mn)	2016/02/26		96	%	75 - 125
			Acid Extractable Mercury (Hg)	2016/02/26		97	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2016/02/26		99	%	75 - 125
			Acid Extractable Nickel (Ni)	2016/02/26		96	%	75 - 125
			Acid Extractable Selenium (Se)	2016/02/26		96	%	75 - 125
			Acid Extractable Silver (Ag)	2016/02/26		96	%	75 - 125
			Acid Extractable Strontium (Sr)	2016/02/26		97	%	75 - 125
			Acid Extractable Thallium (Tl)	2016/02/26		97	%	75 - 125
			Acid Extractable Tin (Sn)	2016/02/26		98	%	75 - 125
			Acid Extractable Uranium (U)	2016/02/26		98	%	75 - 125
			Acid Extractable Vanadium (V)	2016/02/26		94	%	75 - 125
			Acid Extractable Zinc (Zn)	2016/02/26		96	%	75 - 125
4394448	MLB	Method Blank	Acid Extractable Aluminum (Al)	2016/02/26		ND, RDL=10		mg/kg
			Acid Extractable Antimony (Sb)	2016/02/26		ND, RDL=2.0		mg/kg
			Acid Extractable Arsenic (As)	2016/02/26		ND, RDL=2.0		mg/kg
			Acid Extractable Barium (Ba)	2016/02/26		ND, RDL=5.0		mg/kg
			Acid Extractable Beryllium (Be)	2016/02/26		ND, RDL=2.0		mg/kg
			Acid Extractable Boron (B)	2016/02/26		ND, RDL=50		mg/kg

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Cadmium (Cd)	2016/02/26	ND, RDL=0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2016/02/26	ND, RDL=2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2016/02/26	ND, RDL=1.0		mg/kg	
			Acid Extractable Copper (Cu)	2016/02/26	ND, RDL=2.0		mg/kg	
			Acid Extractable Iron (Fe)	2016/02/26	ND, RDL=50		mg/kg	
			Acid Extractable Lead (Pb)	2016/02/26	ND, RDL=0.50		mg/kg	
			Acid Extractable Manganese (Mn)	2016/02/26	ND, RDL=2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2016/02/26	ND, RDL=0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2016/02/26	ND, RDL=2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2016/02/26	ND, RDL=2.0		mg/kg	
			Acid Extractable Selenium (Se)	2016/02/26	ND, RDL=1.0		mg/kg	
			Acid Extractable Silver (Ag)	2016/02/26	ND, RDL=0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2016/02/26	ND, RDL=5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2016/02/26	ND, RDL=0.10		mg/kg	
			Acid Extractable Tin (Sn)	2016/02/26	ND, RDL=2.0		mg/kg	
			Acid Extractable Uranium (U)	2016/02/26	ND, RDL=0.10		mg/kg	
			Acid Extractable Vanadium (V)	2016/02/26	ND, RDL=2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2016/02/26	ND, RDL=5.0		mg/kg	
4394448	MLB	RPD	Acid Extractable Aluminum (Al)	2016/02/26	0.44		%	35
			Acid Extractable Antimony (Sb)	2016/02/26	NC		%	35
			Acid Extractable Arsenic (As)	2016/02/26	0.50		%	35
			Acid Extractable Barium (Ba)	2016/02/26	15		%	35
			Acid Extractable Beryllium (Be)	2016/02/26	NC		%	35
			Acid Extractable Boron (B)	2016/02/26	NC		%	35
			Acid Extractable Cadmium (Cd)	2016/02/26	NC		%	35
			Acid Extractable Chromium (Cr)	2016/02/26	2.3		%	35
			Acid Extractable Cobalt (Co)	2016/02/26	1.3		%	35
			Acid Extractable Copper (Cu)	2016/02/26	5.6		%	35
			Acid Extractable Iron (Fe)	2016/02/26	5.0		%	35
			Acid Extractable Lead (Pb)	2016/02/26	6.2		%	35
			Acid Extractable Manganese (Mn)	2016/02/26	10		%	35

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date		Recovery	UNITS	QC Limits
Batch	Init	QC Type		Analyzed	Value			
			Acid Extractable Mercury (Hg)	2016/02/26	NC		%	35
			Acid Extractable Molybdenum (Mo)	2016/02/26	NC		%	35
			Acid Extractable Nickel (Ni)	2016/02/26	3.8		%	35
			Acid Extractable Selenium (Se)	2016/02/26	NC		%	35
			Acid Extractable Silver (Ag)	2016/02/26	NC		%	35
			Acid Extractable Strontium (Sr)	2016/02/26	NC		%	35
			Acid Extractable Thallium (Tl)	2016/02/26	NC		%	35
			Acid Extractable Tin (Sn)	2016/02/26	NC		%	35
			Acid Extractable Uranium (U)	2016/02/26	1.2		%	35
			Acid Extractable Vanadium (V)	2016/02/26	2.7		%	35
			Acid Extractable Zinc (Zn)	2016/02/26	6.0		%	35
4395836	GTH	Matrix Spike [BW333-01]	D10-Anthracene	2016/03/01		83	%	30 - 130
			D14-Terphenyl	2016/03/01		87	%	30 - 130
			D8-Acenaphthylene	2016/03/01		85	%	30 - 130
			1-Methylnaphthalene	2016/03/01		NC	%	30 - 130
			2-Methylnaphthalene	2016/03/01		NC	%	30 - 130
			Acenaphthene	2016/03/01		NC	%	30 - 130
			Acenaphthylene	2016/03/01		99	%	30 - 130
			Anthracene	2016/03/01		NC	%	30 - 130
			Benzo(a)anthracene	2016/03/01		NC	%	30 - 130
			Benzo(a)pyrene	2016/03/01		NC	%	30 - 130
			Benzo(b)fluoranthene	2016/03/01		NC	%	30 - 130
			Benzo(g,h,i)perylene	2016/03/01		NC	%	30 - 130
			Benzo(j)fluoranthene	2016/03/01		NC	%	30 - 130
			Benzo(k)fluoranthene	2016/03/01		NC	%	30 - 130
			Chrysene	2016/03/01		NC	%	30 - 130
			Dibenz(a,h)anthracene	2016/03/01		98	%	30 - 130
			Fluoranthene	2016/03/01		NC	%	30 - 130
			Fluorene	2016/03/01		NC	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2016/03/01		NC	%	30 - 130
			Naphthalene	2016/03/01		67	%	30 - 130
			Perylene	2016/03/01		93	%	30 - 130
			Phenanthrene	2016/03/01		NC	%	30 - 130
			Pyrene	2016/03/01		NC	%	30 - 130
4395836	GTH	Spiked Blank	D10-Anthracene	2016/03/01		81	%	30 - 130
			D14-Terphenyl	2016/03/01		84	%	30 - 130
			D8-Acenaphthylene	2016/03/01		86	%	30 - 130
			1-Methylnaphthalene	2016/03/01		97	%	30 - 130
			2-Methylnaphthalene	2016/03/01		93	%	30 - 130
			Acenaphthene	2016/03/01		107	%	30 - 130
			Acenaphthylene	2016/03/01		107	%	30 - 130
			Anthracene	2016/03/01		108	%	30 - 130
			Benzo(a)anthracene	2016/03/01		102	%	30 - 130
			Benzo(a)pyrene	2016/03/01		94	%	30 - 130
			Benzo(b)fluoranthene	2016/03/01		96	%	30 - 130
			Benzo(g,h,i)perylene	2016/03/01		90	%	30 - 130
			Benzo(j)fluoranthene	2016/03/01		89	%	30 - 130
			Benzo(k)fluoranthene	2016/03/01		94	%	30 - 130
			Chrysene	2016/03/01		103	%	30 - 130
			Dibenz(a,h)anthracene	2016/03/01		81	%	30 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date	Value	Recovery	UNITS	QC Limits	
Batch	Init	QC Type		Analyzed					
4395836	GTH	Method Blank	Fluoranthene	2016/03/01		105	%	30 - 130	
			Fluorene	2016/03/01		109	%	30 - 130	
			Indeno(1,2,3-cd)pyrene	2016/03/01		80	%	30 - 130	
			Naphthalene	2016/03/01		94	%	30 - 130	
			Perylene	2016/03/01		95	%	30 - 130	
			Phenanthrene	2016/03/01		109	%	30 - 130	
			Pyrene	2016/03/01		106	%	30 - 130	
			D10-Anthracene	2016/02/29		85	%	30 - 130	
			D14-Terphenyl	2016/02/29		100	%	30 - 130	
			D8-Acenaphthylene	2016/02/29		89	%	30 - 130	
			1-Methylnaphthalene	2016/02/29		ND, RDL=0.0050			mg/kg
			2-Methylnaphthalene	2016/02/29		ND, RDL=0.0050			mg/kg
			Acenaphthene	2016/02/29		ND, RDL=0.0050			mg/kg
			Acenaphthylene	2016/02/29		ND, RDL=0.0050			mg/kg
			Anthracene	2016/02/29		ND, RDL=0.0050			mg/kg
			Benzo(a)anthracene	2016/02/29		ND, RDL=0.0050			mg/kg
			Benzo(a)pyrene	2016/02/29		ND, RDL=0.0050			mg/kg
			Benzo(b)fluoranthene	2016/02/29		ND, RDL=0.0050			mg/kg
			Benzo(g,h,i)perylene	2016/02/29		ND, RDL=0.0050			mg/kg
			Benzo(j)fluoranthene	2016/02/29		ND, RDL=0.0050			mg/kg
			Benzo(k)fluoranthene	2016/02/29		ND, RDL=0.0050			mg/kg
			Chrysene	2016/02/29		ND, RDL=0.0050			mg/kg
			Dibenz(a,h)anthracene	2016/02/29		ND, RDL=0.0050			mg/kg
			Fluoranthene	2016/02/29		ND, RDL=0.0050			mg/kg
			Fluorene	2016/02/29		ND, RDL=0.0050			mg/kg
			Indeno(1,2,3-cd)pyrene	2016/02/29		ND, RDL=0.0050			mg/kg
			Naphthalene	2016/02/29		ND, RDL=0.0050			mg/kg
			Perylene	2016/02/29		ND, RDL=0.0050			mg/kg
			Phenanthrene	2016/02/29		ND, RDL=0.0050			mg/kg

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Pyrene	2016/02/29	ND, RDL=0.0050		mg/kg	
4395836	GTH	RPD	[BW333-01]	1-Methylnaphthalene	2016/03/01	NC		%	50
				2-Methylnaphthalene	2016/03/01	NC		%	50
				Acenaphthene	2016/03/01	133 (2)		%	50
				Acenaphthylene	2016/03/01	NC		%	50
				Anthracene	2016/03/01	34		%	50
				Benzo(a)anthracene	2016/03/01	18		%	50
				Benzo(a)pyrene	2016/03/01	25		%	50
				Benzo(b)fluoranthene	2016/03/01	7.6		%	50
				Benzo(g,h,i)perylene	2016/03/01	26		%	50
				Benzo(j)fluoranthene	2016/03/01	19		%	50
				Benzo(k)fluoranthene	2016/03/01	28		%	50
				Chrysene	2016/03/01	58 (2)		%	50
				Dibenz(a,h)anthracene	2016/03/01	NC		%	50
				Fluoranthene	2016/03/01	57 (2)		%	50
				Fluorene	2016/03/01	130 (2)		%	50
				Indeno(1,2,3-cd)pyrene	2016/03/01	35		%	50
				Naphthalene	2016/03/01	NC		%	50
				Perylene	2016/03/01	5.2		%	50
				Phenanthrene	2016/03/01	94 (2)		%	50
				Pyrene	2016/03/01	57 (2)		%	50
4396145	TPE	RPD	[BW3321-01]	Soluble (5:1) pH	2016/02/26	1.2		%	N/A
4398062	LGE	Matrix Spike	[BW3333-01]	Decachlorobiphenyl	2016/03/01		86	%	70 - 130
4398062	LGE	Spiked Blank		Aroclor 1254	2016/03/01		100	%	30 - 130
				Decachlorobiphenyl	2016/03/01		92	%	70 - 130
				Aroclor 1254	2016/03/01		101	%	30 - 130
4398062	LGE	Method Blank		Decachlorobiphenyl	2016/03/01		92	%	70 - 130
				Aroclor 1016	2016/03/01	ND, RDL=0.010		mg/kg	
				Aroclor 1221	2016/03/01	ND, RDL=0.010		mg/kg	
				Aroclor 1232	2016/03/01	ND, RDL=0.010		mg/kg	
				Aroclor 1248	2016/03/01	ND, RDL=0.010		mg/kg	
				Aroclor 1242	2016/03/01	ND, RDL=0.010		mg/kg	
				Aroclor 1254	2016/03/01	ND, RDL=0.010		mg/kg	
				Aroclor 1260	2016/03/01	ND, RDL=0.010		mg/kg	
4398062	LGE	RPD	[BW3333-01]	Aroclor 1016	2016/03/01	NC		%	50
				Aroclor 1221	2016/03/01	NC		%	50
				Aroclor 1232	2016/03/01	NC		%	50
				Aroclor 1248	2016/03/01	NC		%	50
				Aroclor 1242	2016/03/01	NC		%	50
				Aroclor 1254	2016/03/01	NC		%	50
				Aroclor 1260	2016/03/01	NC		%	50

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
4398068	XQI	Matrix Spike	Free Cyanide	2016/03/01		101	%	75 - 125
4398068	XQI	Spiked Blank	Free Cyanide	2016/03/01		98	%	80 - 120
4398068	XQI	Method Blank	Free Cyanide	2016/03/01	ND, RDL=0.01		ug/g	
4398068	XQI	RPD	Free Cyanide	2016/03/01	NC		%	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

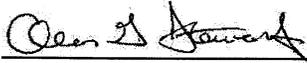
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery is within QC acceptance limits. < 10 % of compounds in multi-component analysis in violation.

(2) Duplicate: results are outside acceptance limit. Analysis was repeated with similar results.

VALIDATION SIGNATURE PAGE

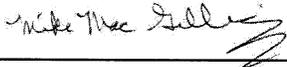
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Alan Stewart, Scientific Specialist (Organics)



Brad Newman, Scientific Specialist



Mike MacGillivray, Scientific Specialist (Inorganics)



Paula Chaplin, Project Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.