PROJECT TITLE St. Clair River, Southeast Bend Cut-off Channel Maintenance Dredging 2019

PROJECT NUMBER R.095968.001

PROJECT DATE 2019-06-12

END OF SECTION

DESIGN ENGINEER

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Part 1 General

1.1 SITE

.1 The site of the dredging work is in the Southeast Bend Cut-off Channel of the St. Clair River, south of Seaway Island in Walpole Island First Nation.

.2 The disposal site for the material from the maintenance dredging is at Point Pelee National Park offshore placement site as shown on the Maintenance Dredging 2019 drawings.

1.2 CONTRACT METHOD

.1 Construct work under combined price contract. All costs for work not specifically identified as a unit price item shall be considered included in the Lump Sum Arrangement.

.2 Items measured for payment are in metric (SI) units.

.3 Submit requests for payment in metric units corresponding with items on the Unit Price Table.

.4 Submit supporting documents in metric units. Perform all necessary conversions required.

.5 Within 48 hours of bid acceptance submit a list of subcontractors and a detailed breakdown of costs associated with the Lump Sum Arrangement.

1.3 EXAMINATION

.1 Before submitting bid, examine existing site conditions and determine conditions affecting work, including potential inclement weather and sea conditions.

.2 Obtain all information which may be necessary for proper execution of Contract.

1.4 EXISTING UTILITIES

.1 Establish location, protect and maintain existing buried, submerged or above ground utility lines.

1.5 CONSTRUCTION AND STORAGE AREA

.1 The limits of the Construction and Storage Area will be designated by the Departmental Representative prior to commencement of work unless otherwise shown on the Drawings.

.2 Confine work including temporary structures, plant, equipment, and materials to established limits.

1.6 MINIMUM STANDARDS

.1 Execute work to meet or exceed:

.1 National Building Code of Canada 2015, National Fire Code of Canada 2015, Ontario Building Code 2012, Canada Shipping Act and any other

code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply as directed by Departmental Representative.

.2 Rules and regulations of authorities having jurisdiction.

.3 Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, R.R.O. 1990, Reg. 834.

.4 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.

1.7 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.8 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits when requested.

1.9 COMMENCEMENT OF WORK

.1 Commence mobilization of plant and equipment to site immediately upon notification of award.

.2 Commence dredging not later than Four (4) weeks after date of award.

1.10 WORKS SCHEDULE

.1 Drawing 1510, Work Schedule, is bound with the specifications.

.2 Submit work schedule of dredging and disposal operations for Departmental Representative's approval within five (5) days after contract award.

.3 When schedule has been approved by Departmental Representative, take necessary measures to complete work within scheduled time.

.4 Do not change schedule without Departmental Representative's written approval.

1.11 CO-OPERATION AND PROTECTION

.1 Execute work with minimum disturbance to occupants, public, other Contractors and normal use of site. Make arrangements with Departmental Representative to facilitate execution of work.

.2 Provide necessary barriers, warning lights and signs. Protect work from damage.

.3 Repair and clean existing structures, roads, beaches or other facilities damaged or fouled by the work or material lost through pipeline leaks. Complete repairs and clean up at no additional expense to Departmental Representative. Repairs made to damaged existing work to equal or better original.

1.12 PROJECT MEETINGS

.1 Departmental Representative will arrange project meetings, set times, record and distribute minutes. Attend these meetings.

1.13 OVERLOADING

.1 No part of work shall be loaded with load which will endanger its safety or will cause permanent deformation.

.2 Repair to original condition any part of work damaged due to overloading at no cost to Departmental Representative.

.3 Obtain from Departmental Representative the allowable loading permitted on the wharf, adjacent to the dredging site

1.14 DATUM

.1 Chart datum for Lake St. Clair is 174.4 metres I.G.L.D. (1985). The dredge area is considered to be in Lake St. Clair.

.2 Chart datum for Lake Erie at Kingsville is 173.5 meters I.G.L.D. (1985). The disposal site for the Maintenance Dredging is on the western shore of Point Pelee, which for the purposes of the contract, is assumed to have the same Chart datum as Kingsville.

.3 Drawing 1501 provides Water Level Charts for Lake St. Clair and Lake Erie and is bound together with these specifications.

.4 Elevations and soundings shown on drawings are expressed in metres relative to chart datum.

.5 Areas to be dredged are to be referenced to vertical bench marks as indicated on the drawings.

1.15 DOCUMENTS REQUIRED

.1 Keep at job site, one copy of each of following:

- .1 Contract drawings.
- .2 Specifications.
- .3 DFO letter of advice
- .4 Amendments and addenda.
- .5 Change orders.
- .6 Other modifications to Contract.

.2 Maintain documents in clean, dry, legible condition.

.3 Make documents available at all times for inspection by Departmental Representative.

1.16 ADDITIONAL DRAWINGS

.1 Additional drawings may be issued by Departmental Representative to clarify work.

.2 Such drawings become part of Contract Documents.

1.17 EQUIPMENT DEMOBILIZATION

.1 Complete demobilization of equipment no later than two weeks after receiving Departmental Representative's written release from the work. Do not leave any equipment on site.

1.18 FLOATING PLANT REQUIREMENTS

.1 Dredges and other floating plants must meet the requirements described in the Floating Plant Appendix of the Bid and Acceptance Form.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA):

.1 CSA-S350-M1980(R2003) Code of Practice for Safety in Demolition of Structures.

.2 National Building Code 2015 (NBC):

.1 NBC 2015, Division B, Part 8 Safety Measures at Construction and Demolition Sites

.3 Province of Ontario:

.1 Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O.Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos - Construction), O. Reg. 845/90 (Silica) as amended by O. Reg. 521/92 and O. Reg. 391/00.

.2 O. Reg. 490/09, Designated Substances.

.3 Workplace Safety and Insurance Act, 1997.

.4 Municipal statutes and authorities.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 11 03.

.2 Submit site-specific Health and Safety Plan:

Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Measures and controls to be implemented to address identified safety hazards and risks.

.4 Provide a Fire Safety Plan, specific to the work location. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.

.5 Contractor's and Sub-contractors' Safety Communication Plan.

.6 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations.

.3 Departmental Representative will review Contractor's site- specific Health and Safety Plan and may provide comments to Contractor within 10 days after receipt

of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 10 days after receipt of comments from Departmental Representative.

.4 Departmental Representative's review of Contractor's final Site Specific Health and Safety Plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction site health and safety.

.5 Submit records of Contractor's Safety Meetings when requested.

.6 Submit a copy of the Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative when requested.

.7 Submit copies of reports or directions issued by safety inspectors of authority having jurisdiction.

.8 Submit copies of incident and accident reports.

.9 Submit Material Safety Data Sheets (MSDS) to Departmental Representative.

.10 Submit names of personnel and alternates responsible for site health and safety.

.11 Submit WSIB – Workplace Safety and Insurance Board, Experience Rating Report for Province of Ontario.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 WORK PERMIT

.1 Obtain permits related to project prior to commencement of Work.

1.5 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.6 MEETINGS

.1 Pre-construction meeting: schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of work.

1.7 REGULATORY REQUIREMENTS

.1 Comply with Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

.3 In event of conflict between any provisions of specified standards and regulations, the most stringent provision governs.

1.8 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with sediment with bulk chemistry as shown Appendix A of this specification and grain size as shown in Appendix B of this specification.

.2 Work on and around water (drowning hazard).

.3 Remote location (no direct access to emergency responders).

1.9 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing. Departmental Representative will respond in writing, where deficiencies are noted and request resubmission with correction of deficiencies either accepting or requesting improvements.

1.10 RESPONSIBILITY

.1 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Ontario Act.

1.11 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Act for the Province of Ontario.

1.12 POSTING OF DOCUMENTS

.1 Provide documents as follow and post on site in conspicuous location:

.1 Contractor's Safety Policy.

.2 Constructor's Name

.3 Notice of Project

.4 Health & Safety Representative Name

.5 Ministry of Labour Orders for Province of Ontario.

.6 Occupational Health and Safety Act and Regulations for Construction for Province of Ontario.

.7 Address and phone number of nearest Ministry of Labour office.

.8 Material Safety Data Sheets.

.9 Site Specific Safety Plans.

.10 Written Emergency Response Plan.

.11 Valid certificate of first aider on duty.

.12 WSIB “In Case of Injury at Work” poster.

.13 Location of toilet and cleanup facilities.

.2 Comply with Provincial general posting requirements.

1.13 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by Departmental Representative and regulatory agency having jurisdiction in the Province.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.15 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt written permission from Departmental Representative.

1.16 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

.2 Assign responsibility and obligation to Health and Safety Coordinator to stop or start Work when, at Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 GENERAL

.1 The material to be dredged is classified as clean to marginally polluted according to the Ministry of the Environment Provincial Sediment Quality Guidelines.

.2 Comply with and complete the Environmental Mitigation Measures form attached at the end of the specifications in Appendix C – Environmental Mitigation Measures.

.3 Follow the recommendations of the DFO letter of advice.

1.2 DISPOSAL OF MATERIALS

.1 Dispose of dredged material in the designated disposal sites as indicated on the drawing sets.

.2 Contractor may be required to temporarily suspend dredging operations if the turbidity plume from dredging activities adversely affects the quality of water. Make no claim for delays resulting from the above.

1.3 DREDGING SCHEDULE RESTRICTIONS

.1 Due to Fisheries' concern in this area, no dredging will be permitted at this location from March 15 to July 15.

1.4 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

.3 All waste materials including containers and waste fluids associated with vehicle maintenance should be disposed of in a legal manner at a site approved by Local Authorities.

1.5 FIRES

.1 Fires and burning of rubbish on site not permitted.

1.6 DRAINAGE

.1 Do not pump water containing suspended materials (or other harmful substances) into waterways, sewer or drainage systems.

.2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.4 Do not allow any debris, fill, deleterious material or other foreign material to enter the waterway.

.5 All hydraulic excavators used on this contract must use a biodegradeable hydraulic fluid that meets Coordinating European Council L-33-T-82.

.6 Prevent spillage of gasoline, diesel fuel and other oil products into the waterways and on land. Clean up spills promptly at own cost in accordance with Provincial regulatory requirements. Report any fuel spills immediately to Departmental Representative and to the Ontario Ministry of Environment and Climate Change Spills Action Centre (1-800-268-6060).

.7 Fuelling of machinery must take place at a safe distance from the waterway as designated by the Departmental Representative.

.8 Do not cause turbidity in excess of specified water quality performance criteria when performing in-water work.

.9 Abide by local noise by-laws.

1.8 CLEANING

.1 Maintain project disposal facility free of accumulated water and rubbish.

1.9 SPECIAL PROTECTION AND PRECAUTIONS

.1 Comply with the requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials and regarding labelling and the provision of material safety data sheets acceptable to Labour Canada.

1.10 WATER QUALITY PERFORMANCE CRITERIA

.1 Resuspension of particulate matter will be measured for compliance 100 m from the in-water work at mid-height of the water column. The total suspended solids (TSS) will be measured during the first three days of production. A site specific correlation between turbidity and TSS will be established specifically for the dredge area. The Departmental Representative may enforce either the TSS criteria or turbidity based on the site specific relationship.

.2 The maximum increase in TSS over background is 25 mg per litre.

.3 The maximum increase in turbidity over background before a site specific relationship is developed is 10 NTU.

.4 If a trailing suction hopper dredge is used the Departmental representative will monitor continuously during the daytime shift. If the increase in turbidity over background is the equivalent by correlatation to 22 mg per litre for 3 consecutive minutes then dredging must stop and the hopper must be disposed at the Point Pelee Disposal site before dredging can resume. Dredging at night may not be

monitored in real time. Dredging and filling of the hopper during night shift shall be no longer in duration than the minimum filling time of the previous day shift.

.5 Departmental Representative will approve the monitoring methods.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ACCESS

.1 Provide and maintain adequate access to and exit from project site.

.2 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and repair any damage resulting from Contractor’s use of roads at no additional cost to Departmental Representative.

.3 Make good damage to any existing land, roads, vegetation or structures resulting from Contractor's equipment and operations. Restore to original condition at no additional cost to Departmental Representative.

1.2 ENGINEER'S OFFICE

.1 Supply one suitable weatherproof office for use by Departmental Representative. Furnish office with table, chairs, and adequate lighting, ventilate with screened window openings and adequate air conditioning equipment. Maintain at minimum temperature of 20°C and to a maximum of 28°C during hours of work. Departmental Representative to approve location and suitability of office. Office to be located on dredge.

.2 Office on dredge to be a separate room dedicated to Departmental Representative's use. Machinery and crew lunch rooms are unacceptable.

1.3 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

.3 Provide sufficient supply of fresh drinking water daily for work force, including PWGSC personnel.

1.4 MEASUREMENT PROCEDURES

.1 Departmental Representative's office: Include all costs associated with the Departmental Representative's office in the lump sum arrangement.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 The following defines the terminology used in this specification.

.2 Dredging: excavating, transporting and disposing of underwater materials.

.3 Class A material: solid rock requiring drilling and blasting to loosen, and boulders or rock fragments of individual volumes of 1.5 cubic metres or more.

.4 Class B material: loose or shale rock, silt, sand, quick sand, mud, shingle, gravel, clay and sand, gumbo, boulders, till, debris or and material not specified under Class A.

.5 Obstructions: class of material greater than 1.5 cubic metres that is not included in this specification.

.6 Debris: pieces of wood, wood fibre, logs, wire rope, tires, scrap steel, pieces of concrete and other waste materials.

.7 Grade: plane above which all material is to be dredged.

.8 Side slope: inclined surface from grade depth at side limit of dredging area to intersect original ground line outside of dredging area and to be expressed as a ratio of horizontal to vertical.

.9 Estimated quantity:

.1 Volume of material calculated to be above grade and inside specified grade side slopes unless otherwise specified.

.2 Area in square metres of material calculated horizontally to exist above grade and within dredge limits, unless otherwise specified.

.10 Definitions:

.1 CMPM: cubic metres place measurement of material above grade at dredging site.

.2 CM: cubic metres place measurement at dredging site of all material dredged.

.3 SQM: area in square metres projected on horizontal plane.

.11 Box cut: dredging channel area with vertical side slopes and allowing side slope of excavation collapse to a natural equilibrium slope.

.12 Cleared areas: areas of dredging accepted as complying with plans and specifications.

.13 Mechanical sweep: clearing all the dredged areas to the grade depth using a mechanical device suspended from a barge.

.14 Chart datum: permanently established plane from which soundings or tide heights are referenced.

.15 Coordinates:

.1 U.T.M.: universal transverse Mercator projection.

.2 M.T.M.: modified transverse Mercator projection.

.3 U.T.M. or M.T.M. Coordinates: plane rectangular coordinates used in grid system in which grid network is applied to U.T.M. or M.T.M. projection. Horizontal control information as indicated.

.16 Matrix block: each dredge area is presented as a number of 5.0 x 5.0 m long blocks. Each block may contain a variable number of soundings depending upon survey coverage.

.17 Average of instantaneous plan: hydrographic survey plan in which average sounding in an appropriate group of matrix blocks is plotted.

.18 Mechanical dredging plant: equipment that is comprised of the following - clamshell, dragline, dipper or backhoe dredge with dump scows.

.19 Hydraulic dredging plant: equipment that uses the movement of water to excavate and transport underwater materials such as: cutter suction dredger, suction dredger or trailing suction hopper dredger.

1.2 LOCATION

.1 Work comprises dredging and disposal of following areas as indicated and as specified herein.

Shoal Area	Disposal Location	Dredging Area (m^2)	Dredging Volume (m^3)
LSCR - W3	Open Water Disposal at Point Pelee	27,950	8,960
LSCR - W1	Open Water Disposal at Point Pelee	10,531	2,795
LSCR - W2	Open Water Disposal at Point Pelee	11,765	3,849
LSCR – E2	Open Water Disposal at Point Pelee	16,298	6,457
LSCR – E3	Open Water Disposal at Point Pelee	2,882	4,682

.2 Area measurements exclude side slopes.

1.3 INTERFERENCE TO NAVIGATION

.1 Do not impede navigation during progress of work in accordance with the Collision Regulation with Canadian Modifications 1983.

.2 Ascertain schedule of vessel movements and fishery activities in area affected by dredging operations. The site is subject to heavy navigational traffic both commercial and recreational. There are ferry crossings on the route between the dredge area and the disposal area.

.3 Make no claim for delays resulting from the above.

.4 Departmental Representative will not be responsible for loss of time, equipment, material or any other cost related to interference with moored vessels in harbour or due to other Contractor's operations.

.5 Keep Operations Centre, Watchkeeper at 1-800-265-0237, Canadian Coast Guard (CCG) Transport Canada, Prescott, Ontario informed of dredging operations in order that necessary Notices to Shipping and Notices to Mariners will be issued. Make arrangements with CCG to relocate and replace buoys for execution of work. Advise nearest Coast Guard Base of any requirements to relocate channel markers/buoys within dredging area.

.1 Contact Information: Marine Communications and Traffic Services Notices to Shipping Series "C" Central and Arctic Region Canadian Coast Guard 401 King Street West, Prescott, ON K0E 1T0 Email NotshipC&A@DFO-MPO.GC.CA Toll Free: 800-265-0237 Tel: 613-925-0666 Fax: 613-925-4519

1.4 REQUIREMENTS OF REGULATORY AGENCIES

.1 Mark floating equipment with lights in accordance with the Collision Regulations with Canadian Modifications, 1983, and maintain a VHF marine radio watch on board.

1.5 SITE INFORMATION

.1 Material to be dredged consists of Class 'B' material.

.2 Sediment Sample Locations are indicated on drawings. Sediment chemistry is presented in Appendix A. Sediment Sample Grain Size Analysis is presented in Appendix B.

.3 This area has been previously dredged to grade depth of 8.5 m below chart datum by Public Works and Government Services Canada.

.4 Results of most recent soundings are shown on drawings. This data is made available for bidding purposes. This data may differ from present site conditions. Take this into consideration when submitting bid.

1.6 DREDGING SEQUENCE

.1 Sequence of dredging will be in the following order:

.1 Dredge only in the direction from upstream to downstream commencing at cut nearest to centreline of channel and completion nearest to the channel limit including side slope material.

.2 Supply Departmental Representative with plan of dredging sequence and\or stages.

.3 Departmental Representative may direct Contractor to alter sequence of dredging areas.

1.7 MEASUREMENT PROCEDURES

.1 Include all costs associated with mobilization and demobilization of dredging equipment in the lump sum arrangement. Include in this item the costs of

providing a duty boat for Departmental Representative's/Inspector's transportation.

.2 Dredging: Class "B" to be measured in cubic metres, in-place measurement (CMPM), for classes indicated on Unit Price Table, determined from soundings taken by Departmental Representative before and after dredging. Only material excavated above grade plane and within specified side slopes will be measured.

.3 Include in the dredging payment item, all costs for disposal of dredged material at the location specified; maintenance of disposal site; site clean-up and mechanical sweeping of dredged areas.

.4 Obstructions:

.1 Removal of obstructions, authorized by Departmental Representative, will be measured in hours actually used in removal.

.2 Dredging equipment used for removal of obstructions will be paid for at rate computed from average hourly earnings of equipment for preceding two weeks and negotiated in advance and authorized in writing by Departmental Representative.

.5 All operations in connection with field positioning of dredging equipment, Contractor's survey vessel, equipment and crew or diving services will not be measured separately for payment but shall be considered included in the dredging item.

.6 There will be no additional payment for delays caused by vessel traffic.

1.8 DREDGING PLANT

.1 Dredging plant used in the work to be mechanical or hydraulic type of sufficient capacity and in good operating condition to satisfactorily complete the work, within the time schedule and in accordance with the specifications.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 LAYOUT OF WORK

.1 Immediately upon entering site for purpose of beginning work on this project, locate all reference points and take proper action necessary to prevent their disturbance.

.2 Departmental Representative will meet with the Contractor and his survey staff to identify the established horizontal control consisting of a baseline, coordinate system with reference control monuments and vertical control consisting of water level gauges, and benchmark to define the work and disposal areas.

.3 Maintain the established horizontal and vertical control and lay out the work from these established references. Be responsible for the accuracy of work relative to established references. Provide and maintain electronic position fixing and distance measuring equipment as required for accurate dredging control. Provide, at own expense, survey vessel, equipment and crew to set up and maintain control for location of dredge limits.

.4 Contractor's electronic positioning system must be made accessible to the Departmental Representative or his representative upon request. It must provide a continuous automatic update of position in all weather conditions. Minimum accuracy of positioning to be ±1 metre. An on-line graphics display of position and hard copy capability is required. Positioning system is subject to Departmental Representative's approval.

3.2 DREDGING DETAILS

.1 Dredge areas LSCR-W3, LSCR-W1, LSCR-W2, LSCR-E2 and LSCR-E3 to a grade depth of 8.6 metres below chart datum. The size of the dredge areas will be adjusted after the pre-dredge survey is undertaken. The size will be set such that the area will produce the tender quantity of dredged material when dredged to the specified grade depth.

.2 Dredge side slopes to 4 horizontal to 1 vertical.

.3 Remove all materials above specified grade depths, within limits indicated. Material removed from below grade depth or outside specified area or grade side slope is not part of work. Do not over excavate.

.4 Manage dredging operations to ensure compliance with the water quality criteria in Section 01 35 44.

.5 Remove spillage or shoaling which occurs as a result of work. This quantity will not be measured for payment.

.6 Do not cast-over material unless authorized in writing by Departmental Representative. Remove material cast-over on to surrounding area and dispose of it as dredged material.

.7 Remove infilling in dredge areas which occurs prior to acceptance by Departmental Representative.

.8 Make provision for removal of debris in bid. Make no claims for delays attributed to debris.

.9 Immediately notify Departmental Representative upon encountering an obstruction. By-pass the obstruction after clearly marking its location, move to another area and continue work. No related claim will be entertained if the foregoing procedure is not followed.

3.3 SOUNDING SURVEYS

.1 Contract drawings are based on soundings taken by the Departmental Representative in 2018. Contract quantities shown on the Unit Price Table are based on this survey.

.2 A pre-dredging and post dredging sounding survey will be taken by the Departmental Representative.

.3 No area will be dredged prior to Departmental Representative's and Contractor's mutual acceptance of pre-dredge survey for that area.

.4 The Departmental Representative will conduct one post dredging survey of the dredging site at no cost to the Contractor. Any subsequent surveys as a result of finding high spots or incomplete dredging will be done at the Contractor's cost.

.5 Results of the pre and post dredging surveys will be distributed to the Contractor, by the Departmental Representative, prior to and upon completion of the work.

.6 Contractor will be notified of the post dredging survey results within four working days of survey completion and given subsequent release if they have successfully fulfilled the requirements of the work.

.7 The final pay quantity will be calculated on the basis of the pre and post dredging surveys carried out by the Departmental Representative.

3.4 PLACEMENT OF DREDGED MATERIAL AT POINT PELEE

.1 Dispose of dredged material by depositing in the designated open lake disposal site as indicated on drawings and in manner approved by Departmental Representative.

.2 Maintain a minimum depth of water of 5 m below chart datum at disposal site. Departmental Representative will survey disposal site to confirm minimum depth requirement has been achieved.

.3 Deposit dredge material according to layout or as per the Site Representative’s direction.

.4 Ensure dump scows are sealed and do not leak dredged material during transportation between dredging site and open lake disposal site. If spillage or leakage of dredged material occurs, stop work until remedial measures are taken.

3.5 DISPOSAL OF DEBRIS

.1 Do not dispose of debris in open lake.

.2 Dispose of debris in at approved land disposal site.

3.6 RE-DREDGING

.1 Re-dredge unsatisfactory work and verify depths with additional sounding or mechanical sweeping to approval of Departmental Representative.

3.7 CO-OPERATION AND ASSISTANCE TO DEPARTMENTAL REPRESENTATIVE

.1 Cooperate with Engineer and Departmental Representative on inspection of work and provide assistance requested.

.2 Furnish use of such boats, equipment, labour and materials forming ordinary and usual part of dredging plant as may be reasonably necessary to inspect and supervise work.

.3 Provide approved duty boat to transport Departmental Representative and PWGSC Inspectors to and from Port Lambton to the Dredge Site and to and from the dredge site to the disposal area (Point Pelee National Park) under the following conditions:

.1 At the beginning and end of each inspection shift which occurs between sunset and sunrise.

.2 Whenever the PWGSC vessel is deemed to be inoperable for whatever reason.

.3 During poor weather and any emergency situations affecting health and safety of personnel.

3.8 MONITORING OF WORK

.1 Contractor is responsible to monitor effectiveness and productivity of his own work on an ongoing basis.

END OF SECTION

APPENDIX A
Sediment Bulk Chemistry

APPENDIX A-1
2018 St. Clair River Sediment Sampling Results

St. Clair River, Southeast Bend Cutoff Channel
Maintenance Dredging 2019
Appendix A-1 Sediment Bulk Chemistry

O.REG 153 METALS & INORGANICS PKG (SOIL)

Sample ID / Sampling Date	Guideline; O.Reg 153 Table 1-Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-01 25-April-2018	18-02 25-April-2018	18-03 25-April-2018	18-03-Dup 25-April-2018	18-04 25-April-2018	18-05 25-April-2018	18-06 25-April-2018	18-07 25-April-2018	18-08 25-April-2018	18-09 25-April-2018
Calculated Parameters														
Sodium Adsorption Ratio	NV	NV	N/A		0.29	0.41	0.33	0.33	0.40	0.41	0.42	0.26	0.27	0.36
Inorganics														
Conductivity	NV	NV	mS/cm	0.002	0.15	0.066	0.11	0.11	0.074	0.064	0.070	0.19	0.17	0.096
Moisture	NV	NV	%	1.0	28	23	22	24	24	22	24	29	32	27
Available (CaCl2) pH	NV	NV	pH		7.13	7.65	7.36	7.48	7.66	7.59	7.62	7.15	7.18	7.58
WAD Cyanide (Free)	0.1		ug/g	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.01	<0.01
Chromium (VI)	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Metals														
Hot Water Ext. Boron (B)	NV	NV	ug/g	0.050	0.23	0.081	0.11	0.11	0.081	0.066	0.080	0.24	0.19	0.12
Antimony (Sb)	NV	NV	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Arsenic (As)	6	6	ug/g	1.0	2.7	1.7	1.4	1.8	1.6	1.6	1.7	2.4	2.6	1.6
Barium (Ba)	NV	NV	ug/g	0.50	11	5.5	6.6	8.1	4.5	3.7	4.0	8.4	11	5.4
Beryllium (Be)	NV	NV	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	NV	NV	ug/g	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	0.6	0.6	ug/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	0.16	<0.10
Chromium (Cr)	26	26	ug/g	1.0	6.6	4.9	4.9	6.0	4.0	4.2	3.4	5.5	6.6	4.6
Cobalt (Co)	50	NV	ug/g	0.10	2.5	1.6	1.9	2.2	1.6	1.5	1.4	2.4	2.8	1.8
Copper (Cu)	16	16	ug/g	0.50	4.9	3.6	2.6	3.0	2.2	1.4	1.5	5.4	5.9	3.3
Iron (Fe)	NV	2%	ug/g	50	6500	4100	4900	6300	3900	4000	3400	6100	6900	4900
Lead (Pb)	31	31	ug/g	1.0	4.1	2.3	2.8	3.4	2.6	2.1	2.2	3.9	5.5	3.4
Manganese (Mn)	NV	460	ug/g	1.0	160	83	99	120	97	77	84	150	170	110
Molybdenum (Mo)	NV	NV	ug/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.55	0.59	<0.50
Nickel (Ni)	16	16	ug/g	0.50	6.3	3.7	4.3	4.9	3.3	3.4	3.2	5.9	6.5	4.0
Phosphorus (P)	NV	600	ug/g	50	180	160	150	160	130	130	120	190	180	140
Selenium (Se)	NV	NV	ug/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Silver (Ag)	0.5	NV	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	NV	NV	ug/g	0.050	0.056	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.067	<0.050
Uranium (U)	NV	NV	ug/g	0.050	0.33	0.19	0.26	0.28	0.21	0.17	0.20	0.39	0.48	0.30
Vanadium (V)	NV	NV	ug/g	5.0	11	8.3	9.5	13	6.8	8.3	6.0	9.4	12	8.7
Zinc (Zn)	120	120	ug/g	5.0	20	9.5	13	17	11	11	9.1	26	24	18
Mercury (Hg)	0.2	0.2	ug/g	0.050	<0.050	<0.050	0.081	0.097	0.061	<0.050	<0.050	0.082	0.20	0.14

Sample ID / Sampling Date	Guideline; O.Reg 153 Table 1-Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-10 25-April-2018	18-11 25-April-2018	18-12 25-April-2018	18-13 25-April-2018	18-14 26-April-2018	18-15 26-April-2018	18-15-Dup 26-April-2018	18-16 26-April-2018	18-17 26-April-2018
Calculated Parameters													
Sodium Adsorption Ratio	NV	NV	N/A		0.26	0.26	0.30	0.34	0.30	0.24	0.24	0.21	0.23
Inorganics													
Conductivity	NV	NV	mS/cm	0.002	0.18	0.18	0.12	0.098	0.10	0.20	0.19	0.26	0.21
Moisture	NV	NV	%	1.0	40	33	26	25		29		35	34
Available (CaCl2) pH	NV	NV	pH		7.21	7.38	7.21	7.41	7.38	7.14	7.15	7.10	7.16
WAD Cyanide (Free)	0.1		ug/g	0.01	0.02	0.01	0.01	<0.01	0.01	0.02	0.01	0.02	0.02
Chromium (VI)	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Metals													
Hot Water Ext. Boron (B)	NV	NV	ug/g	0.050	0.29	0.27	0.15	0.16	0.13	0.31	0.29	0.38	0.32
Antimony (Sb)	NV	NV	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Arsenic (As)	6	6	ug/g	1.0	3.2	2.5	2.0	1.8	2.1	3.0	2.9	3.7	3.0
Barium (Ba)	NV	NV	ug/g	0.50	12	12	7.2	6.0	7.9	13	11	16	11
Beryllium (Be)	NV	NV	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	NV	NV	ug/g	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	0.6	0.6	ug/g	0.10	0.11	0.13	<0.10	<0.10	<0.10	0.17	0.13	0.16	0.15
Chromium (Cr)	26	26	ug/g	1.0	7.8	7.9	6.5	5.7	5.7	6.8	6.1	8.3	6.1
Cobalt (Co)	50	NV	ug/g	0.10	3.0	3.0	2.0	1.8	1.9	2.8	2.6	3.1	2.5
Copper (Cu)	16	16	ug/g	0.50	11	5.9	3.9	2.4	4.0	6.2	5.5	8.1	5.1
Iron (Fe)	NV	2%	ug/g	50	8700	8000	6600	6100	5800	7000	6600	8300	6400
Lead (Pb)	31	31	ug/g	1.0	5.4	5.1	3.7	3.3	3.7	4.9	4.4	5.6	4.3
Manganese (Mn)	NV	460	ug/g	1.0	190	170	120	110	120	190	180	220	160
Molybdenum (Mo)	NV	NV	ug/g	0.50	0.57	0.68	<0.50	<0.50	<0.50	0.74	0.72	0.89	0.64
Nickel (Ni)	16	16	ug/g	0.50	7.8	7.2	4.8	4.1	4.8	7.1	7.1	8.8	6.4
Phosphorus (P)	NV	600	ug/g	50	230	210	200	170	160	210	210	250	200
Selenium (Se)	NV	NV	ug/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Silver (Ag)	0.5	NV	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	NV	NV	ug/g	0.050	0.073	0.067	<0.050	<0.050	<0.050	0.068	0.060	0.077	0.054
Uranium (U)	NV	NV	ug/g	0.050	0.42	0.42	0.28	0.28	0.28	0.43	0.41	0.50	0.39
Vanadium (V)	NV	NV	ug/g	5.0	15	14	14	12	10	12	10	13	10
Zinc (Zn)	120	120	ug/g	5.0	23	21	19	17	16	25	25	36	26
Mercury (Hg)	0.2	0.2	ug/g	0.050	0.13	0.15	0.072	0.089	0.089	0.073	0.081	0.087	0.088

NV - No value derived
Shaded cells denote concentrations ≥ to guideline values

St. Clair River, Southeast Bend Cutoff Channel
Maintenance Dredging 2019
Appendix A-1 Sediment Bulk Chemistry

TKN and TOC

Sample ID Sampling Date	Guideline; O.Reg 153 Table 1-Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-01 25-April-2018	18-02 25-April-2018	18-03 25-April-2018	18-03-Dup 25-April-2018	18-04 25-April-2018	18-05 25-April-2018	18-06 25-April-2018	18-07 25-April-2018	18-08 25-April-2018	18-09 25-April-2018
Inorganics														
Calculated Total Kjeldahl Nitrogen	NV	550	ug/g	100	484	<100	155	<100	<100	<100	<100	514	553	244
Total Ammonia-N	NV	NV	ug/g	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Organic Carbon	NV	1%	mg/kg	500	7900	1500	5100	4600	5500	3800	7700	12000	9300	6700
F2-F4 Hydrocarbons														
Total Oil and Grease			ug/g	100	190	<100	<100	<100	<100	<100	<100	<100	<100	<100

Sample ID Sampling Date	Guideline; O.Reg 153 Table 1-Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-10 25-April-2018	18-11 25-April-2018	18-12 25-April-2018	18-13 25-April-2018	18-14 26-April-2018	18-15 26-April-2018	18-15-Dup 26-April-2018	18-16 26-April-2018	18-17 26-April-2018
Inorganics													
Calculated Total Kjeldahl Nitrogen	NV	550	ug/g	100	883	555	217	104	262	540	531	828	665
Total Ammonia-N	NV	NV	ug/g	20	28	<20	<20	<20	<20	<20	<20	<20	<20
Total Organic Carbon	NV	1%	mg/kg	500	8900	9900	3800	5000	5900	10000	9400	11000	9600
F2-F4 Hydrocarbons													
Total Oil and Grease			ug/g	100	<170	190	170	<100	<100	<100	<100	<100	<100

NV - No value derived
Shaded cells denote concentrations ≥ to guideline values

O.REG 153 OC PESTICIDES (SOIL)

Sample ID / Sampling Date	Guideline; O.Reg 153 Table 1- Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-01 25-April-2018	18-02 25-April-2018	18-03 25-April-2018	18-03-Dup 25-April-2018	18-04 25-April-2018	18-05 25-April-2018	18-06 25-April-2018	18-07 25-April-2018	18-08 25-April-2018	18-09 25-April-2018
Calculated Parameters														
Chlordane (Total)	0.007	0.007	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
o,p-DDD + p,p-DDD	0.008	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
o,p-DDE + p,p-DDE	0.005	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
o,p-DDT + p,p-DDT	0.007	0.008	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Total Endosulfan	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Total PCB	0.07	0.07	ug/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.023	<0.015
Pesticides & Herbicides														
Aldrin	0.002	0.002	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
a-Chlordane	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
g-Chlordane	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
o,p-DDD	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
p,p-DDD	NV	0.008	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
o,p-DDE	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
p,p-DDE	NV	0.005	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
o,p-DDT	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
p,p-DDT	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Dieldrin	0.002	0.002	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Lindane	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Endosulfan I (alpha)	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Endosulfan II (beta)	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Endrin	0.003	0.003	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Heptachlor	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Heptachlor epoxide	0.005	0.005	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Hexachlorobenzene	0.02	0.02	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Hexachlorobutadiene	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Hexachloroethane	NV	NV	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Methoxychlor	NV	NV	ug/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0075	<0.0050
Aroclor 1016	NV	0.007	ug/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.023	<0.015
Aroclor 1242	NV	NV	ug/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.023	<0.015
Aroclor 1248	NV	0.03	ug/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.023	<0.015
Aroclor 1254	NV	0.06	ug/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.023	<0.015
Aroclor 1260	NV	0.005	ug/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.023	<0.015
alpha-BHC	NV	0.006	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
beta-BHC	NV	0.005	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
delta-BHC	NV	0.003	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Mirex	NV	0.007	ug/g	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020
Surrogate Recovery (%)														
2,4,5,6-Tetrachloro-m-xylene			%		77	76	83	83	78	87	78	72	78	79
Decachlorobiphenyl			%		99	97	111	114	107	122	105	94	104	108

Sample ID / Sampling Date	Guideline; O.Reg 153 Table 1- Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-10 25-April-2018	18-11 25-April-2018	18-12 25-April-2018	18-13 25-April-2018	18-14 26-April-2018	18-15 26-April-2018	18-15-Dup 26-April-2018	18-16 26-April-2018	18-17 26-April-2018
Calculated Parameters													
Chlordane (Total)	0.007	0.007	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
o,p-DDD + p,p-DDD	0.008	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
o,p-DDE + p,p-DDE	0.005	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
o,p-DDT + p,p-DDT	0.007	0.008	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Total Endosulfan	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Total PCB	0.07	0.07	ug/g	0.015	<0.030	<0.023	<0.015	<0.015	<0.015	<0.015	<0.023	<0.023	<0.023
Pesticides & Herbicides													
Aldrin	0.002	0.002	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
a-Chlordane	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
g-Chlordane	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
o,p-DDD	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
p,p-DDD	NV	0.008	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
o,p-DDE	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
p,p-DDE	NV	0.005	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
o,p-DDT	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
p,p-DDT	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Dieldrin	0.002	0.002	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Lindane	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Endosulfan I (alpha)	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Endosulfan II (beta)	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Endrin	0.003	0.003	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Heptachlor	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Heptachlor epoxide	0.005	0.005	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Hexachlorobenzene	0.02	0.02	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Hexachlorobutadiene	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	0.0030	0.0029	<0.0030	<0.0030	<0.0030
Hexachloroethane	NV	NV	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Methoxychlor	NV	NV	ug/g	0.0050	<0.010	<0.0075	<0.0050	<0.0050	<0.0050	<0.0050	<0.0075	<0.0075	<0.0075
Aroclor 1016	NV	0.007	ug/g	0.015	<0.030	<0.023	<0.015	<0.015	<0.015	<0.015	<0.023	<0.023	<0.023
Aroclor 1242	NV	NV	ug/g	0.015	<0.030	<0.023	<0.015	<0.015	<0.015	<0.015	<0.023	<0.023	<0.023
Aroclor 1248	NV	0.03	ug/g	0.015	<0.030	<0.023	<0.015	<0.015	<0.015	<0.015	<0.023	<0.023	<0.023
Aroclor 1254	NV	0.06	ug/g	0.015	<0.030	<0.023	<0.015	<0.015	<0.015	<0.015	<0.023	<0.023	<0.023
Aroclor 1260	NV	0.005	ug/g	0.015	<0.030	<0.023	<0.015	<0.015	<0.015	<0.015	<0.023	<0.023	<0.023
alpha-BHC	NV	0.006	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
beta-BHC	NV	0.005	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
delta-BHC	NV	0.003	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Mirex	NV	0.007	ug/g	0.0020	<0.0040	<0.0030	<0.0020	<0.0020	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030
Surrogate Recovery (%)													
2,4,5,6-Tetrachloro-m-xylene			%		75	75	74	82	75	67	72	66	71
Decachlorobiphenyl			%		94	101	95	106	101	78	92	85	87

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Sample ID Sampling Date	Guideline; O.Reg 153 Table 1-Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-01 25-April-2018	18-02 25-April-2018	18-03 25-April-2018	18-03-Dup 25-April-2018	18-04 25-April-2018	18-05 25-April-2018	18-06 25-April-2018	18-07 25-April-2018	18-08 25-April-2018	18-09 25-April-2018	18-10 25-April-2018	18-11 25-April-2018	18-12 25-April-2018	18-13 25-April-2018	18-14 26-April-2018	18-15 26-April-2018	18-15-Dup 26-April-2018	18-16 26-April-2018	18-17 26-April-2018
Calculated Parameters																							
1,3-Dichloropropene (cis+trans)	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organics																							
Acetone (2-Propanone)	NV	NV	ug/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	0.65	<0.50	0.81	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	NV	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Bromodichloromethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane (FREON 12)	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene	NV	NV	ug/g	0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	NV	NV	ug/g	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	NV	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylene Dibromide	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Hexane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylene Chloride(Dichloromethane)	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone (2-Butanone)	NV	NV	ug/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	NV	NV	ug/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl t-butyl ether (MTBE)	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	NV	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.033	<0.020	<0.020	<0.020	<0.020	0.022	0.021	<0.020	<0.020
1,1,1-Trichloroethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichlorofluoromethane (FREON 11)	NV	NV	ug/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Vinyl Chloride	NV	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
p+m-Xylene	NV	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	NV	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	NV	NV	ug/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10)	NV	NV	ug/g	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F1 (C6-C10) - BTEX	NV	NV	ug/g	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2-F4 Hydrocarbons																							
F2 (C10-C16 Hydrocarbons)	NV	NV	ug/g	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16-C34 Hydrocarbons)	NV	NV	ug/g	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<100	<50	<50	<50	<50	54	54	69	64
F4 (C34-C50 Hydrocarbons)	NV	NV	ug/g	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<100	<50	<50	<50	<50	<50	<50	<50	<50
Reached Baseline at C50	NV	NV	ug/g		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surrogate Recovery (%)																							
o-Terphenyl			%		89	89	92	89	89	90	86	90	88	88	88	90	88	89	92	93	92	94	94
4-Bromofluorobenzene			%		88	88	91	90	89	90	90	90	90	89	89	87	88	87	89	87	87	87	88
D10-o-Xylene			%		79	92	76	84	77	79	84	87	78	81	83	92	70	82	95	77	96	81	83
D4-1,2-Dichloroethane			%		116	116	119	117	118	120	120	121	119	120	121	121	123	123	108	108	110	108	107
D8-Toluene			%		94	93	91	92	94	93	94	92	93	92	92	93	92	92	93	94	93	92	94

NV - No value derived

O.REG 153 SEMIVOLATILES PACKAGE (SOIL)

Sample ID / Sampling Date	Guideline; O.Reg 153 Table 1-Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-01 25-April-2018	18-02 25-April-2018	18-03 25-April-2018	18-03-Dup 25-April-2018	18-04 25-April-2018	18-05 26-April-2018	18-06 26-April-2018	18-07 26-April-2018	18-08 25-April-2018	18-09 25-April-2018
Semivolatile Organics														
1,2,4-Trichlorobenzene	NV	NV	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-Methylnaphthalene	NV	NV	ug/g	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
2,4,5-Trichlorophenol	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2,4,6-Trichlorophenol	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2,4-Dichlorophenol	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2,4-Dimethylphenol	NV	NV	ug/g	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
2,4-Dinitrophenol	NV	NV	ug/g	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4-Dinitrotoluene	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2,6-Dinitrotoluene	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2-Chlorophenol	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2-Methylnaphthalene	NV	NV	ug/g	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
3,3'-Dichlorobenzidine	NV	NV	ug/g	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthene	NV	NV	ug/g	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Acenaphthylene	NV	NV	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.22	0.22	ug/g	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Benzo(a)anthracene	0.32	0.32	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.37	0.37	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b/j)fluoranthene	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(g,h,i)perylene	0.17	0.17	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(k)fluoranthene	0.24	0.24	ug/g	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Biphenyl	NV	NV	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether	NV	NV	ug/g	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bis(2-chloroisopropyl)ether	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bis(2-ethylhexyl)phthalate	NV	NV	ug/g	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chrysene	0.34	0.34	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.06	0.06	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Diethyl phthalate	NV	NV	ug/g	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Dimethyl phthalate	NV	NV	ug/g	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Fluoranthene	0.75	0.75	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.19	0.19	ug/g	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Indeno(1,2,3-cd)pyrene	0.2	0.2	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	NV	NV	ug/g	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
p-Chloroaniline	NV	NV	ug/g	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Pentachlorophenol	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Phenanthrene	0.56	0.56	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenol	NV	NV	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Pyrene	0.49	0.49	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Calculated Parameters														
2,4- & 2,6-Dinitrotoluene	NV	NV	ug/g	0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
Methylnaphthalene, 2-(1-)	NV	NV	ug/g	0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085
Surrogate Recovery (%)														
2,4,6-Tribromophenol			%		81	67	76	63	58	62	56	66	74	60
2-Fluorobiphenyl			%		87	84	85	83	84	81	81	87	83	80
D14-Terphenyl (FS)			%		88	88	89	89	88	88	87	89	90	88
D5-Nitrobenzene			%		68	68	71	72	70	71	68	72	74	70

Sample ID / Sampling Date	Guideline; O.Reg 153 Table 1-Background Sediment - All Types (2011)	Provincial Sediment Quality Guidelines - Lowest Effect Level (2008)	Units	Reporting Limit	18-10 25-April-2018	18-11 25-April-2018	18-12 25-April-2018	18-13 25-April-2018	18-14 26-April-2018	18-15 26-April-2018	18-15-Dup 26-April-2018	18-16 26-April-2018	18-17 26-April-2018
Semivolatile Organics													
1,2,4-Trichlorobenzene	NV	NV	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
1-Methylnaphthalene	NV	NV	ug/g	0.06	<0.1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.1
2,4,5-Trichlorophenol	NV	NV	ug/g	0.2	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3
2,4,6-Trichlorophenol	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
2,4-Dichlorophenol	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
2,4-Dimethylphenol	NV	NV	ug/g	0.4	<0.8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.8
2,4-Dinitrophenol	NV	NV	ug/g	1	<2	<1	<1	<1	<1	<1	<1	<1	<2
2,4-Dinitrotoluene	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
2,6-Dinitrotoluene	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
2-Chlorophenol	NV	NV	ug/g	0.2	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3
2-Methylnaphthalene	NV	NV	ug/g	0.06	<0.1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.1
3,3'-Dichlorobenzidine	NV	NV	ug/g	1	<2	<1	<1	<1	<1	<1	<1	<1	<2
Acenaphthene	NV	NV	ug/g	0.06	<0.1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.1
Acenaphthylene	NV	NV	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Anthracene	0.22	0.22	ug/g	0.06	<0.1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.1
Benzo(a)anthracene	0.32	0.32	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Benzo(a)pyrene	0.37	0.37	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Benzo(b/j)fluoranthene	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
Benzo(g,h,i)perylene	0.17	0.17	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
Benzo(k)fluoranthene	0.24	0.24	ug/g	0.06	<0.1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.1
Biphenyl	NV	NV	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Bis(2-chloroethyl)ether	NV	NV	ug/g	0.4	<0.8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.8
Bis(2-chloroisopropyl)ether	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
Bis(2-ethylhexyl)phthalate	NV	NV	ug/g	2	<4	<2	<2	<2	<2	<2	<2	<2	<4
Chrysene	0.34	0.34	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Dibenz(a,h)anthracene	0.06	0.06	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Diethyl phthalate	NV	NV	ug/g	0.4	<0.8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.8
Dimethyl phthalate	NV	NV	ug/g	0.4	<0.8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.8
Fluoranthene	0.75	0.75	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Fluorene	0.19	0.19	ug/g	0.06	<0.1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.1
Indeno(1,2,3-cd)pyrene	0.2	0.2	ug/g	0.2	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3
Naphthalene	NV	NV	ug/g	0.06	<0.1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.1
p-Chloroaniline	NV	NV	ug/g	0.4	<0.8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.8
Pentachlorophenol	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
Phenanthrene	0.56	0.56	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Phenol	NV	NV	ug/g	0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4
Pyrene	0.49	0.49	ug/g	0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Calculated Parameters													
2,4- & 2,6-Dinitrotoluene	NV	NV	ug/g	0.28	<0.57	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.57
Methylnaphthalene, 2-(1-)	NV	NV	ug/g	0.085	<0.17	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.085	<0.17
Surrogate Recovery (%)													
2,4,6-Tribromophenol			%		74	71	68	54	60	64	50	61	67
2-Fluorobiphenyl			%		82	83	84	84	80	70	73	68	61
D14-Terphenyl (FS)			%		89	92	90	89	97	93	90	93	90
D5-Nitrobenzene			%		74	73	73	77	71	73	75	74	70

NV - No value derived

APPENDIX A-2
2017 St. Clair River Sediment Sampling Results

General Notes:

1. 'All concentrations in ug/g (ppm) unless otherwise specified.
2. '-' means no value available
3. 'PSQG = Provincial Sediment Quality Guidelines, defined in Guidelines for Identifying, Assessing and Managing Contaminated Sediments in Ontario: An Integrated Approach, May 2008.
4. LEL=Lowest Effect Level
5. Table 1 Full Depth Background Site Conditions

Table 1: Metals

Parameter	Unit	MOECC Table 1	PSQG-LEL	Sample ID	
				17-47	17-48
Antimony	µg/g	1		<0.8	<0.8
Arsenic	µg/g	11	6	2	2
Barium	µg/g	210		3	4
Beryllium	µg/g	2.5		<0.5	<0.5
Boron	µg/g	36		<5	<5
Boron (Hot Water Soluble)	µg/g	NA		<0.10	<0.10
Cadmium	µg/g	1	0.6	<0.5	<0.5
Chromium	µg/g	67	26	3	3
Cobalt	µg/g	19		1.2	1.4
Copper	µg/g	62	16	1	1
Lead	µg/g	45	31	2	3
Molybdenum	µg/g	2		<0.5	<0.5
Nickel	µg/g	37	16	2	2
Selenium	µg/g	1.2		<0.4	<0.4
Silver	µg/g	0.5		<0.2	<0.2
Thallium	µg/g	1		<0.4	<0.4
Uranium	µg/g	1.9		<0.5	<0.5
Vanadium	µg/g	86		5	4
Zinc	µg/g	290	120	7	8
Chromium VI	µg/g	0.66		<0.2	<0.2
Cyanide	µg/g	0.051		<0.040	<0.040
Mercury	µg/g	0.16	0.2	<0.10	<0.10
Electrical Conductivity	mS/cm	0.47		0.039	0.036
Sodium Adsorption Ratio	NA	1		0.073	0.059

Table 2: BNA and PAHs

Parameter	Unit	MOECC Table 1	PSQG-LEL	Sample ID	
				17-47	17-48
Naphthalene	µg/g	0.05		<0.05	<0.05
Acenaphthylene	µg/g	0.093		<0.05	<0.05
Acenaphthene	µg/g	0.05		<0.05	<0.05
Fluorene	µg/g	0.05	0.19	<0.05	<0.05
Phenanthrene	µg/g	0.19	0.56	<0.05	<0.05
Anthracene	µg/g	0.05	0.22	<0.05	<0.05
Fluoranthene	µg/g	0.24	0.75	<0.05	<0.05
Pyrene	µg/g	0.19	0.49	<0.05	<0.05
Benz(a)anthracene	µg/g	0.095	0.32	<0.05	<0.05
Chrysene	µg/g	0.18	0.34	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.3		<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.05	0.24	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.37	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.11	0.2	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.06	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.2	0.17	<0.05	<0.05
Phenol	µg/g	0.5		<0.5	<0.5
Bis(2-chloroethyl)ether	µg/g	0.5		<0.1	<0.1
2-Chlorophenol	µg/g	0.1		<0.1	<0.1
o-Cresol	µg/g			<0.1	<0.1
Bis(2-chloroisopropyl)ether	µg/g	0.5		<0.1	<0.1
m & p - Cresol	µg/g			<0.1	<0.1
2,4-Dimethylphenol	µg/g	0.2		<0.2	<0.2
2,4-Dichlorophenol	µg/g	0.1		<0.1	<0.1
1,2,4-Trichlorobenzene	µg/g	0.05		<0.05	<0.05
p-Chloroaniline	µg/g	0.5		<0.5	<0.5
2-and 1-methyl Naphthalene	µg/g	0.05		<0.05	<0.05
2,4,6-Trichlorophenol	µg/g	0.1		<0.1	<0.1
2,4,5-Trichlorophenol	µg/g	0.1		<0.1	<0.1
1,1-Biphenyl	µg/g	0.05		<0.05	<0.05
Dimethyl Phthalate	µg/g	0.5		<0.1	<0.1
2,4 and 2,6-Dinitrotoluene	µg/g	0.5		<0.5	<0.5
Diethyl Phthalate	µg/g	0.5		<0.1	<0.1
Pentachlorophenol	µg/g	0.1		<0.1	<0.1
3,3'-Dichlorobenzidine	µg/g	1		<0.5	<0.5
Bis(2-Ethylhexyl)phthalate	µg/g	5		<0.2	<0.2
2,4-Dinitrophenol	µg/g	2		<2.0	<2.0

Table 3: OC Pesticides and PCBs

Parameter	Unit	MOECC Table 1	PSQG-LEL	Sample ID	
				17-47	17-48
Gamma-Hexachlorocyclohexane	µg/g	0.01		<0.005	<0.005
Heptachlor	µg/g	0.05		<0.005	<0.005
Aldrin	µg/g	0.05	0.002	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	0.005	<0.005	<0.005
Endosulfan	µg/g	0.04		<0.005	<0.005
Chlordane	µg/g	0.05	0.007	<0.007	<0.007
DDD	µg/g	0.05	0.008	<0.007	<0.007
DDE	µg/g	0.05	0.005	<0.007	<0.007
DDT	µg/g	0.078	0.007	<0.007	<0.007
Dieldrin	µg/g	0.05	0.002	<0.005	<0.005
Endrin	µg/g	0.04	0.003	<0.005	<0.005
Methoxychlor	µg/g	0.05		<0.005	<0.005
Hexachlorobenzene	µg/g	0.01	0.02	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.01		<0.01	<0.01
Hexachloroethane	µg/g	0.01		<0.01	<0.01
Aroclor 1242	µg/g			<0.10	<0.10
Aroclor 1248	µg/g			<0.10	<0.10
Aroclor 1254	µg/g			<0.10	<0.10
Aroclor 1260	µg/g			<0.10	<0.10
Polychlorinated Biphenyls	µg/g	0.3		<0.10	<0.10

Table 4: PHCs

Parameter	Unit	MOECC Table 1	PSQG-LEL	Sample ID	
				17-47	17-48
F1 (C6 to C10)	µg/g			<5	<5
F1 (C6 to C10) minus BTEX	µg/g	17		<5	<5
F2 (C10 to C16)	µg/g	10		<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g			<10	<10
F3 (C16 to C34)	µg/g	240		<50	<50
F3 (C16 to C34) minus PAHs	µg/g			<50	<50
F4 (C34 to C50)	µg/g	120		<50	<50
Gravimetric Heavy Hydrocarbons	µg/g			NA	NA

Table 5: VOCs

Parameter	Unit	MOECC Table 1	PSQG-LEL	Sample ID	
				17-47	17-48
Dichlorodifluoromethane	µg/g	0.05		<0.05	<0.05
Vinyl Chloride	ug/g	0.02		<0.02	<0.02
Bromomethane	ug/g	0.05		<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05		<0.05	<0.05
Acetone	ug/g	0.5		<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05		<0.05	<0.05
Methylene Chloride	ug/g	0.05		<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05		<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05		<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05		<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5		<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05		<0.02	<0.02
Chloroform	ug/g	0.05		<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05		<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05		<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05		<0.05	<0.05
Benzene	ug/g	0.02		<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05		<0.03	<0.03
Trichloroethylene	ug/g	0.05		<0.03	<0.03
Bromodichloromethane	ug/g	0.05		<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5		<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05		<0.04	<0.04
Toluene	ug/g	0.2		<0.02	<0.02
Dibromochloromethane	ug/g	0.05		<0.05	<0.05
Ethylene Dibromide	ug/g	0.05		<0.04	<0.04
Tetrachloroethylene	ug/g	0.05		<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05		<0.04	<0.04
Chlorobenzene	ug/g	0.05		<0.05	<0.05
Ethylbenzene	ug/g	0.05		<0.05	<0.05
m & p-Xylene	ug/g			<0.05	<0.05
Bromoform	ug/g	0.05		<0.05	<0.05
Styrene	ug/g	0.05		<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05		<0.05	<0.05
o-Xylene	ug/g			<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05		<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05		<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05		<0.05	<0.05
Xylene Mixture	ug/g	0.05		<0.05	<0.05
1,3-Dichloropropene	µg/g	0.05		<0.04	<0.04
n-Hexane	µg/g	0.05		<0.05	<0.05

APPENDIX A-3
2018 Point Pelee Sediment Sampling Results

Fisheries and Oceans Canada | Pêches et Océans Canada

Canadian Coast Guard | Garde côtière canadienne

Safety First, Service Always

Point Pelee Offshore Sediment Sampling and Analysis Report

12 June 2018

Canada

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Approvals

Table of Contents

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a) the creation and promulgation of the document; and

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3. Inquiries and/or Revision Requests

All inquiries regarding this document, including suggestions for revision and requests for interpretation shall be addressed to:

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All requests should be clear, concise; and reference the specific Section, Figure or Table.

Introduction

The Canadian Coast Guard maintains Canadian sections of the St Lawrence Seaway-Great Lakes Connecting Channels in the St. Clair River. Periodic dredging is required to maintain these international shipping channels. The sediment in the channels and at potential placement locations requires frequent characterization in order to plan appropriate management methods for the dredged material. The following report details sampling and analysis activities and provides a summary of the results for samples retrieved from a potential placement site off the western shore of Point Pelee National Park.

Section 1 SITE DESCRIPTION

The sediment samples were retrieved from offshore locations on the west side of Point Pelee National Park, between 500 m and 100 m from the shore. The samples spanned from the northern boundary of the park to the south for approximately 4.5 km. The locations are shown in Figure 1 and the GPS locations are given in Table 1.

Table 1 Sample Locations

Sample	Latitude (N)	Longitude (W)
18PP1	42°56'55.23"	82°31'41.17"
18PP2	41°57'18.00"	82°31'52.47"
18PP3	41°57'40.12"	82°32'5.41"
18PP5	41°58'23.17"	82°32'34.70"
18PP6	41°58'43.86"	82°32'51.30"
18PP7	41°59'4.32"	82°33'8.50"
18PP9	41°57'41.84"	82°31'57.01"
18PP10	41°56'56.39"	82°31'36.98"
18PP11	41°57'39.25"	82°32'9.57"
18PP16	41°58'42.54"	82°32'59.72"

Section 2 SAMPLE COLLECTION

Sample collection was performed from a 15 foot vessel using a petit Ponar sampling apparatus and GPS locator. Sample retrieval volumes were relatively low. A full chemical analysis was completed on samples 18PP1, 18PP2, and 18PP3. Particle size distribution analysis was completed on all samples to determine the silt content profile of the nearshore sediment.

Sampling, sample handling, and analytical procedures were conducted according to the recommendations of Environment Canada [1] [2]and CH2MHill [3]. Samples were placed in standard 250 ml soil sample jars and in ALS prepared methyl alcohol preservative sample vials. The samples were submitted to the laboratory for analysis within 24 hours of collection.

Section 3 SEDIMENT ANALYTICAL RESULTS

3.1 ANALYSIS

Samples 18PP1 to 18PP3 were analyzed for organic and inorganic elements according to the parameters of O.Reg 153 for sediment – all property types (Table 1) and the provincial sediment quality guidelines for lowest effect levels [4] [5]. All samples were analyzed for particle size distribution and soil fractions.

3.2 RESULTS

The results were compared to the guidelines for parameters listed in O.Reg 153 and provincial sediment quality guidelines. A summary of the main analytical results are attached in Appendix B of this report.

3.2.1 Sediment Guidelines

The samples demonstrated exceedance in Copper content and in nutrients for TKN and TP above the acceptable levels for sediment. The samples contained detectible levels of other Metals and Polycyclic Aromatic Hydrocarbons, but these levels were not considered elevated.

3.2.2 Silt/Clay Fraction

The silt/clay fraction of the samples ranged from 8% to 92%. Silt content generally increased with greater distance from shore.

3.3 CONCLUSIONS

The existing properties of the sediment offshore of the western shoreline of Point Pelee show some elevated levels of nutrients and a wide range of silt content within 500 m of the shoreline.

Section 4 REFERENCES

[1] Environment Canada, "Guideance document on collection and preparation of sediment for physiochemical characterization and biological testing," Environment Canada, Ottawa, 1994.

[2] Environment Canada, "Sediment Sampling Guide for Dredging and Marine Engineering Projects in the St. Lawrence River," Environment Canada, Quebec, 2002.

[3] CH2M HILL, "Technical Sampling Advice Memorandum for the South East Bend Dredging Project," CH2M HILL, 2012.

[4] Government of Ontario, "Environmental Protection Act, R.S.O. 1990, C. E. 19," Province of Ontario, 2018.

[5] Ontario Ministry of Environment and Energy, "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario," Queen's Printer for Ontario, 1993.

Appendix A FIGURES

Figure 1 Sample Locations along the Western Shore of Point Pelee

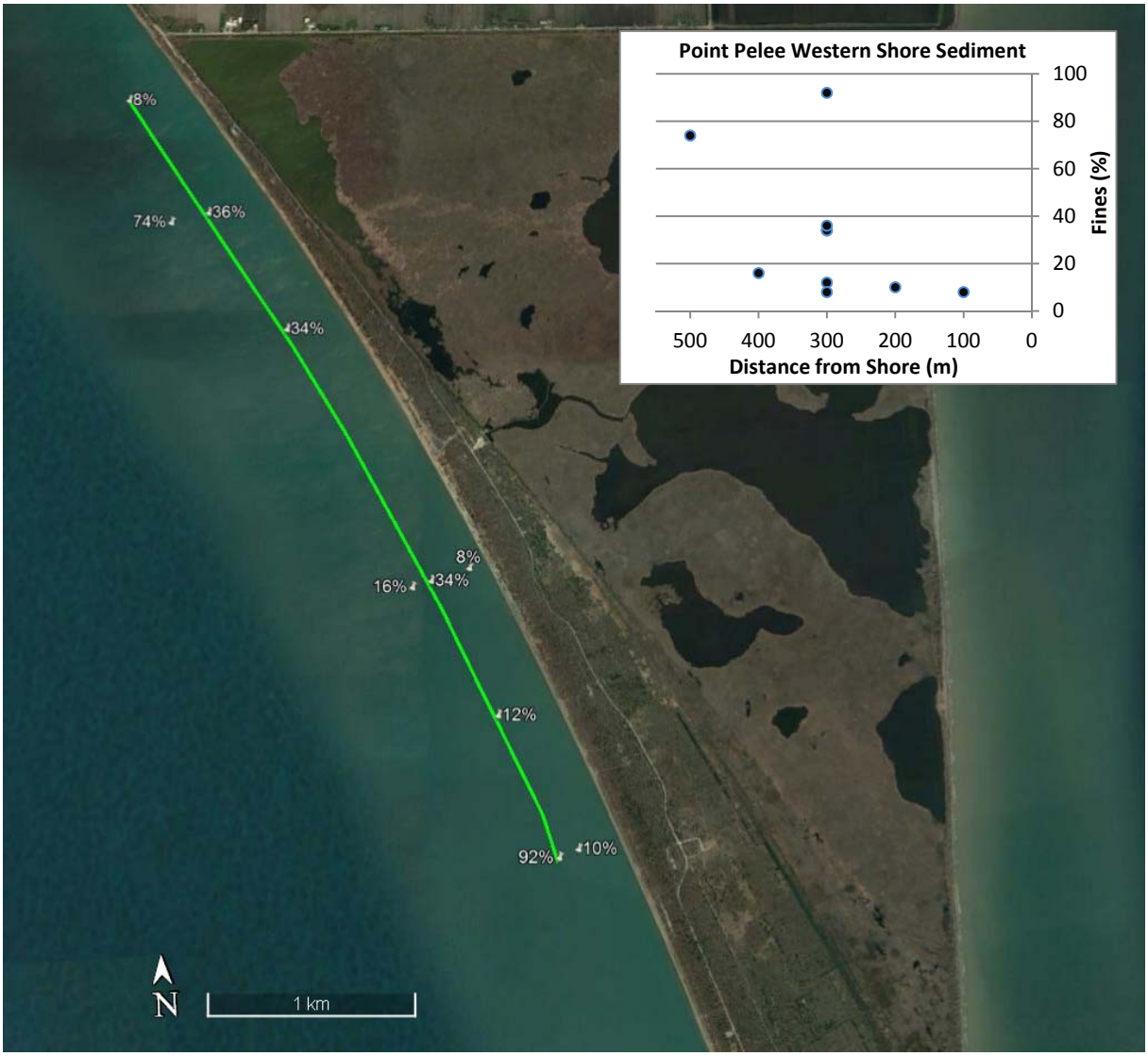


Figure 2 Percent Fines along the Western Shore of Point Pelee VS Distance from Shore

Appendix B SUMMARY OF ANALYSIS RESULTS

Table 2 Particle Size Fractions

Client ID		18PP #1	18PP #2	18PP #3	18PP #5	18PP #6	18PP #7	18PP #9	18PP #10	18PP #11	18PP #16
Date/Time Sampled	29-May-18	11:06	12:15	12:43	13:38	14:00	14:12	12:28	12:00	13:00	14:35
ALS ID		L2102588-1	L2102588-2	L2102588-3	L2102557-1	L2102557-2	L2102557-3	L2102557-4	L2102557-5	L2102557-6	L2102557-7
Sand	%	8	88	66	66	64	92	92	90	84	26
Silt	%	76.38	5.53	27.53	29.13	32.74	3.13	1.06	3.06	12.27	68.67
Clay	%	15.62	6.47	6.47	4.87	3.26	4.87	6.94	6.94	3.73	5.33
Total Fines	%	92	12	34	34	36	8	8	10	16	74

Table 3 Organics

Client Sample ID					18PP #1	18PP #2	18PP #3
Date Sampled					29-May-2018	29-May-2018	29-May-2018
Time Sampled					11:06	12:15	12:43
ALS Sample ID					L2102588-1	L2102588-2	L2102588-3
Parameter	LDL	Units	LEL	Reg 153	Soil	Soil	Soil
Physical Tests (Soil)							
% Moisture	0.10	%			36.7	19.3	19.5
Leachable Anions & Nutrients (Soil)							
Total Kjeldahl Nitrogen	0.020	%	0.055	-	**0.060**	<0.020	<0.020
Organic / Inorganic Carbon (Soil)							
Fraction Organic Carbon	0.0010	-			0.0093	0.0014	0.0026
Fraction Organic Carbon	0.0010	-			0.0084	0.0013	0.0031
Fraction Organic Carbon	0.0010	-			0.0084	0.0014	0.0032
Average Fraction Organic Carbon	0.0010	-			0.0087	0.0014	0.003
Total Organic Carbon	0.10	%	1		0.93	0.14	0.26
Total Organic Carbon	0.10	%	1		0.84	0.13	0.31
Total Organic Carbon	0.10	%	1		0.84	0.14	0.32
Metals (Soil)							
Phosphorus (P)	50	ug/g	600	-	**754**	**723**	**837**

Table 4 Metals

Client Sample ID					18PP #1	18PP #2	18PP #3
Date Sampled					29-May-2018	29-May-2018	29-May-2018
Time Sampled					11:06	12:15	12:43
ALS Sample ID					L2102588-1	L2102588-2	L2102588-3
Parameter	LDL	Units	LEL	Reg 153	Soil	Soil	Soil
Metals (Soil)							
Aluminum (Al)	50	ug/g	-	-	6880	1760	2160
Antimony (Sb)	0.10	ug/g	-	-	0.22	<0.10	<0.10
Arsenic (As)	0.10	ug/g	6	6	3.94	2.14	2.51
Barium (Ba)	0.50	ug/g	-	-	30.6	6.53	8.83
Beryllium (Be)	0.10	ug/g	-	-	0.36	<0.10	0.24
Bismuth (Bi)	0.20	ug/g	-	-	<0.20	<0.20	<0.20
Boron (B)	5.0	ug/g	-	-	9.7	<5.0	<5.0
Cadmium (Cd)	0.020	ug/g	0.6	0.6	0.499	0.109	0.167
Calcium (Ca)	50	ug/g	-	-	72200	65900	64800
Chromium (Cr)	0.50	ug/g	26	26	16.3	6.03	7.60
Cobalt (Co)	0.10	ug/g	-	50	5.39	1.98	2.43
Copper (Cu)	0.50	ug/g	16	16	**16.6**	2.68	4.36
Iron (Fe)	50	ug/g	20000	-	15000	6830	8420
Lead (Pb)	0.50	ug/g	31	31	11.9	2.62	3.54
Lithium (Li)	2.0	ug/g	-	-	11.7	2.6	3.5
Magnesium (Mg)	20	ug/g	-	-	23400	14200	15100
Manganese (Mn)	1.0	ug/g	460	-	418	221	259
Mercury (Hg)	0.0050	ug/g	0.2	0.2	0.147	0.0076	0.0201
Molybdenum (Mo)	0.10	ug/g	-	-	1.49	0.32	0.66
Nickel (Ni)	0.50	ug/g	16	16	15.7	4.28	5.41
Potassium (K)	100	ug/g	-	-	1400	270	370
Selenium (Se)	0.20	ug/g	-	-	0.28	<0.20	<0.20
Silver (Ag)	0.10	ug/g	-	0.5	<0.10	<0.10	<0.10
Sodium (Na)	50	ug/g	-	-	165	113	115
Strontium (Sr)	0.50	ug/g	-	-	71.5	66.1	67.2
Sulfur (S)	1000	ug/g	-	-	<1000	<1000	<1000
Thallium (Tl)	0.050	ug/g	-	-	0.182	<0.050	0.051
Tin (Sn)	2.0	ug/g	-	-	<2.0	<2.0	<2.0
Titanium (Ti)	1.0	ug/g	-	-	239	279	297
Tungsten (W)	0.50	ug/g	-	-	<0.50	<0.50	<0.50
Uranium (U)	0.050	ug/g	-	-	1.02	0.445	0.545
Vanadium (V)	0.20	ug/g	-	-	23.1	13.5	15.9
Zinc (Zn)	2.0	ug/g	120	120	62.0	24.3	31.8
Zirconium (Zr)	1.0	ug/g	-	-	1.9	1.6	1.8

APPENDIX B
Sediment Grain Size Analysis

St. Clair River, Southeast Bend Cutoff Channel
Maintenance Dredging 2019
Appendix B - Sediment Grain Size Analysis

Grain Size Anaysis

Sample ID Sampling Date	Units	Reporting Limit	18-01 25-April-2018	18-02 25-April-2018	18-03 25-April-2018	18-03-Dup 25-April-2018	18-04 25-April-2018	18-05 25-April-2018	18-06 25-April-2018	18-07 25-April-2018	18-08 25-April-2018	18-09 25-April-2018
Physical Properties												
Sieve - #4 (>4.75mm) - fine gravel	%	0.20	<0.20	<0.20	<0.20	3.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Sieve - #10 (>2.00mm) - coarse sand	%	0.20	<0.20	0.23	<0.20	0.86	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Sieve - #40 (>0.425mm) - medium sand	%	0.20	0.95	4.0	0.43	0.59	<0.20	0.40	0.47	<0.20	1.6	<0.20
Sieve - #200 (>0.075mm) - fine sand	%	0.20	84	92	91	62	94	92	93	69	79	87
Sieve - Pan - Silt and Clay	%	0.20	15	4.2	8.5	33	5.5	7.3	6.3	31	20	13
% sand by hydrometer	%	2.0	85	97	91	93	96	96	97	83	88	94
% silt by hydrometer	%	2.0	11	<2.0	6.9	4.3	<2.0	2.7	<2.0	12	8.2	3.9
Clay Content	%	2.0	3.1	<2.0	<2.0	2.5	<2.0	<2.0	2.5	4.2	4.2	2.5
Grain Size	N/A	N/A	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE
Texture	N/A	N/A	LOAMY SAND	SAND	SAND	SAND	SAND	SAND	SAND	LOAMY SAND	SAND	SAND

Sample ID Sampling Date	Units	Reporting Limit	18-10 25-April-2018	18-11 25-April-2018	18-12 25-April-2018	18-13 25-April-2018	18-14 26-April-2018	18-15 26-April-2018	18-15-Dup 26-April-2018	18-16 26-April-2018	18-17 26-April-2018
Physical Properties											
Sieve - #4 (>4.75mm) - fine gravel	%	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	2.2	<0.20
Sieve - #10 (>2.00mm) - coarse sand	%	0.20	<0.20	0.37	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Sieve - #40 (>0.425mm) - medium sand	%	0.20	0.20	0.62	1.0	<0.20	0.24	<0.20	<0.20	0.27	0.32
Sieve - #200 (>0.075mm) - fine sand	%	0.20	68	73	88	94	79	80	81	72	88
Sieve - Pan - Silt and Clay	%	0.20	32	26	11	5.9	21	19	19	26	12
% sand by hydrometer	%	2.0	75	82	91	95	92	85	87	78	85
% silt by hydrometer	%	2.0	18	12	4.3	2.4	5.7	11	8.4	18	11
Clay Content	%	2.0	6.8	5.9	4.2	2.5	2.5	4.0	4.2	4.8	4.2
Grain Size	N/A	N/A	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE	COARSE
Texture	N/A	N/A	SANDY LOAM	LOAMY SAND	SAND	SAND	SAND	LOAMY SAND	SAND	LOAMY SAND	LOAMY SAND

APPENDIX C
Environmental Mitigation Measures

APPENDIX C

ENVIRONMENTAL MITIGATION MEASURES

Responsible Authority: Department of Fisheries and Oceans Canada (DFO) Canadian Coast Guard (CCG)

St. Clair River, Ontario, Southeast Bend Cut-Off Channel Maintenance Dredging 2019

PWGSC Project No. R.095968.001

The purpose of this record is to monitor the implementation of mitigation measures. It is the responsibility of the PWGSC Project Manager to ensure that this record is completed over the duration of the project. This Environmental Mitigation Measures report form must be completed in full. Specify in the table below whether the mitigation measures have been applied. If a mitigation measure has not been applied, specify the reason(s) why this was not done.

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/Firm Responsible	Compliance (Task Complete – Yes or No Date) if No, provide reason
Reduce or eliminate idling time of equipment and vehicles, including while loading trucks.			
Vehicles, equipment and boats must be maintained in good condition, equipped with emission controls as applicable, and operate within regulatory requirement, including meeting local authorities emission requirements.			
Fires and burning of debris are not permitted.			
Properly shape stockpile to avoid steep faces or sides.			
Cover or wet down materials to prevent blowing dust.			
If necessary, provide windbreaks to reduce dust (wind screen; fences)			
Apply other mitigation measures, as applicable, as per *"Best Practices for the Reduction of Air Emissions from Construction and Demolitions Activities"*. Prepared by Cheminfo Service Inc. and Construction and Demolition Multi-stakeholder Working Group for Environment Canada Transboundary Issues Branch (2005).			
Repair any damage and restore surfaces, including stabilizing and revegetating any disturbed soils, as soon as possible.			
Contractor to employ an experienced dredge operator capable of minimizing sediment disturbance and resuspension.			
No in-water disposal of dredged material except at designated location.			
Dredged material must be deposited in disposal site.			
Do not permit any dredged material to spill or flow into waterways during disposal of the material.			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/Firm Responsible	Compliance (Task Complete – Yes or No Date) if No, provide reason
Install sedimentation/erosion control measures prior to commencement of any disturbance of the site, including earthworks. Maintain sedimentation/erosion control measures on a regular basis, particularly prior to and after runoff events, with accumulated materials being cleaned out regularly and prior to removal of sediment and erosion control measures.			
Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.			
All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, silt, etc.) from entering the water.			
Fueling of machinery must take place at a safe distance from the waterway as designated by the Departmental Representative.			
Prevent spillage of gasoline, diesel fuel and other oil products into the waterways.			
Machines and equipment used shall be free of visible grease and oils.			
Do not allow any debris, fill, deleterious material or other foreign material to enter waterway.			
All workers should be fully aware of the spill prevention and response procedures, including notification of the MOE Spills Action Centre at 1-800-268-6060.			
The Contractor should have emergency spill response equipment available onsite to ensure prompt response to any oil or fuel leaks or spills.			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/Firm Responsible	Compliance (Task Complete – Yes or No Date) if No, provide reason
An emergency spill kit is to be kept onsite in case fluid leaks or spills from machinery.			
Ensure workers have proper training in spill control and containment, and are required to implement spill control measures.			
Ensure emergency spill control equipment readily available on-site at all times.			
All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, etc.) from entering the water.			
Machinery should be operated in a manner that minimizes disturbance to the banks or bed of the water body.			
Machinery to arrive on site in a clean condition and to be maintained free of fluid leaks.			
Machinery to be washed, refueled, and serviced and fuel and other materials for the machinery is to be stored away from the water to prevent deleterious substances from entering the water.			
Implement mitigation measures as per Surface Water/Drainage, Fish/Fish Habitat and Noise.			
Complete work as quickly as possible.			
Ensure all works are in compliance with the *Migratory Birds Convention Act.*			
Work cannot proceed during the OMNR “No in-water work” window March 15 to July 15.			
Contractor to take measures to suppress releases of dust.			
Monitor public complaints. Inform CCG.			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/Firm Responsible	Compliance (Task Complete – Yes or No Date) if No, provide reason
Submit site-specific Health and Safety Plan within 7 days after date of Notice to Proceed and prior to work commencement, including • Results of site specific safety hazard assessment; • Results of safety and health risk or hazard analysis of site tasks and operation from work plan; • Measures/controls to be implemented to address identified safety hazards/risks; • A Fire Safety Plan, specific to the work location; • Contractor's/Sub-Contractor's Safety Communication Plan; and • Contingency and Emergency Plan.			
Comply with Acts and regulations of the Province of Ontario, as applicable including Acts and regulations governing safety and environmental aspects.			
Comply with specific standards and regulations to ensure safe operations at site.			
In event of conflict between provisions of specified standards and regulations, the most stringent provision governs.			
Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Project Manager verbally and writing.			
Follow procedures in place for Employees Right to Refuse Work as specified in the Act for the Province of Ontario.			
Implement mitigation for Navigation.			
Abide by the local noise by-laws.			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/Firm Responsible	Compliance (Task Complete – Yes or No Date) if No, provide reason
Maintain equipment, including noise reduction components, in a good state of repair.			
Efforts will be undertaken by the contractor to avoid sensitive timings with respect to noise (i.e. during early morning or evening when duck hunting activities occur).			
Do not dispose of debris in open lake or waterways.			
Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.			
Ensure proper storage of materials and operation of equipment to prevent deleterious substances from entering water.			
Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials and regarding labelling and the provision of material safety data acceptable to Labour Canada.			
Conduct ongoing inspection and monitoring of the proposed mitigation measures to ensure that they are properly functioning and, if deemed necessary, implement the necessary contingency action if the monitoring finds that the mitigation measures are not functioning as intended. This can include suspending work until repairs can be made.			
Do not impede navigation during progress of work in accordance with the Collision Regulations with Canadian Modifications 1983.			
Ascertain schedule of vessel movements in area affected by dredging operations, recognizing the site is			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/Firm Responsible	Compliance (Task Complete – Yes or No Date) if No, provide reason
subject to heavy commercial and recreational navigational traffic.			
All vessels must comply with the *Canada Shipping Act*, including any requirements under the collision regulations			
All vessels and floating equipment should be marked with lights in accordance with the Collision Regulation with Canadian Modifications 1983.			
Any floating material and debris must be contained during the dredging activity and removed upon completion of the operation.			
The Contractor will maintain a VHF marine radio watch on board.			
The Contractor must notify the Regional Operations Centre at Watchkeeper (1-800-265-0237), Canadian Coast Guard, Prescott, Ontario and keep them informed of dredging operations in order that necessary Notices to Shipping and Notices to Mariners will be issued. Notify Watchkeeper at least 24 hours in advance of commencement and upon completion of the dredging.			
Monitor daily, short term and long term weather forecasts for potential extreme weather conditions affecting the Project.			

Notes:

Completed by:

Name:	Title:
Firm:	Telephone No:
Signature:	Date:

Drawing 1501
Water Level Charts for Lake St. Clair & Lake Erie

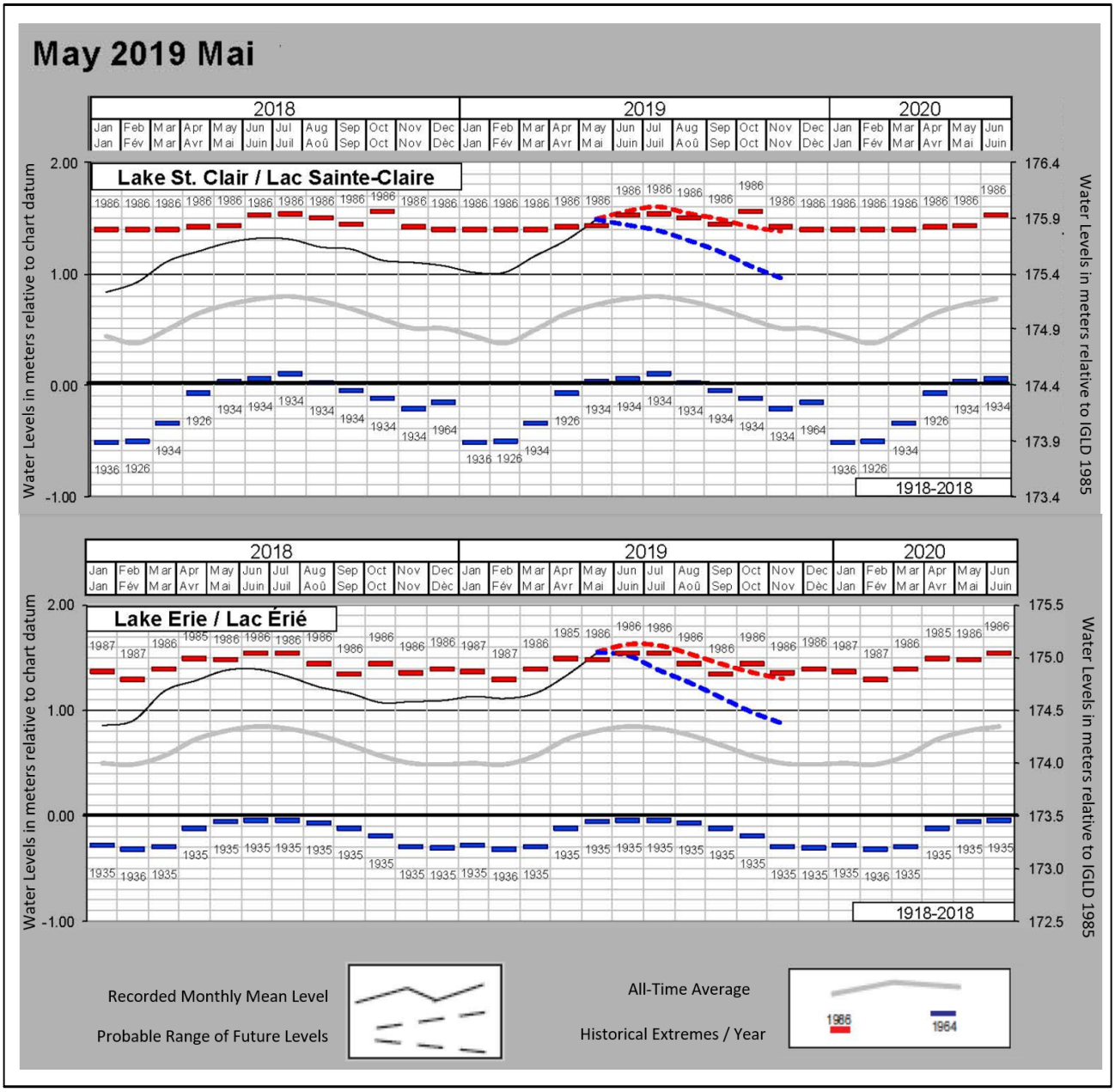
Public Works and
Government Services Canada
Architectural and Engineering Services
Ontario Region

Travaux publics et
Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

WATER LEVEL CHART

DRAWING No. 1501

PROJ. No. R.095968.001



INFORMATION ONTAINED FROM
MONTHLY WATER LEVEL BULLETIN
GREAT LAKES AND MONTREAL HARBOUR
CANADIAN HYDROGRAPHIC SERVICE

INFORMATION ALSO AVAILABLE AT THE
FOLLOWING WEB SITE:
https://tides.gc.ca/C&A/bulletin-eng.html

Drawing 1510
Work Schedule

Public Works and
Government Services Canada
Architectural and Engineering Services
Ontario Region

Travaux publics et
Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

WORK SCHEDULE

DRAWING No. 1510

PROJ. No. R.095968.001

ST. CLAIR RIVER, SOUTHEAST BEND CUTOFF CHANNEL
MAINTENANCE DREDGING 2019
PROJECT No. R.095968.001

DATE OF CONTRACT AWARD

NAME OF CONTRACTOR

	OPERATION	TIME IN WEEKS									
		1	2	3	4	5	6	7	8	9	10
1	MOBILIZATION OF DREDGE EQUIPMENT										
2	CLASS "B" DREDGING										
3	DEMOBILIZATION OF DREDGE EQUIPMENT										

CONTRACTOR TO SCHEDULE WORK IN SEQUENCE SPECIFIED AND WITHIN DEPARTMENTAL SCHEDULE. SUBMIT A COPY OF COMPLETED SCHEDULE WITH YOUR BID.